TITLE: COMPUTERWORLD

REEL NO: 1 of 4

VOLUME: 18 ISSUES: 1-16

DATE: January 2 - April 16, 1984

PUBLICATION NO: 6206

NOTES: Includes:
BUYER'S GUIDE (Issue 8A)
SPECIAL ISSUES

THIS PERIODICAL MAY BE COPYRIGHTED, IN WHICH CASE THE CONTENTS REMAIN THE PROPERTY OF THE COPYRIGHT OWNER. THE MICROFORM EDITION IS REPRODUCED BY AGREEMENT WITH THE PUBLISHER. DUPLICATION OR RESALE WITHOUT PERMISSION IS PROHIBITED.

UNIVERSITY MICROFILMS INTERNATIONAL, ANN ARBOR, MICHIGAN

VOL 18
ISSUE 1
JA 2 1984
UMI

CW MAR84
MI48116UIVVNWDSHJ 2D20C 752213
JI FROSCH
8814 MARGO DR
BRIGHTON MI 48116

COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Weekly Newspaper

Second-class postage paid at Framingham, Mass. and additional mailing offices • 1984 by CW Communications/Inc.

944/year

December 26, 1983/January 2, 1984

Vol. XVII, No. 52/Vol. XVIII, No. 1

NEWSPAPER

COMPUTERWORLD
THE INDEPENDENT VOICE OF THE COMPUTER COMMUNITY

Reg. U.S. Pat. Off.

Publisher John C. Wilkinson
Vice President/Editorial Director Ellis Booker
Executive Editor Cheryl H. Gee
Vice President/Publisher Timothy J. Sennott
Managing Editor Marjorie Sharpe
Senior Editors Paul Gillin
Copy Chief Phil Hirsch
Jim Davidson
Features Tom Henkel
Office Administrator Jim Davidson
Industry Bill Laberis
Personnel George Harvey
International Editor Bruce Blakeney
Staff Writers Katherine Bulkeley
Patricia Keefe
Peter Bernish
Lynn Baker
John Gallant
James Connolly

Correspondents
New York David Myers
Washington, D.C. John Eberhart
West Coast Robert Bath
Ashley Bader
Production Coordinator Barbara Van Bergen
Chief Copy Editor Dennyse White
Assistant Chief Copy Editor
Editor Robin Gee
Copy Editors Becky Bakula
Dave Bradford
Bruce Grant
Elizabeth Hayes
Deborah Sundaes-Ham
Thomas Schmidt
Charlotte Stone

Assistant to the Editor Jane Pring
Editorial Assistants Joyce Park
Mary DeCristoforo

Consultants
Education J. Daniel Couger
Human Communication Josh Hoos
Looks on Science Charles P. Lecht

SPECIAL PUBLICATIONS
Computerworld Extra!
Editor Bruce Bond
Copy Editor Paul Bevigan
Computerworld On Communications
Editor Bruce Bond
Copy Editor Paul Bevigan
Computerworld OA
Editor Ann Bailey
Staff Writer Glenn Rifkin
Copy Editor Nancy Fleming
Computerworld Buyer's Guides
Editor Marsha Bloomenthal
Copy Editor Rich LePage

Please address all correspondence to the appropriate department at One IDG Plaza, 375 Cochituate Road, Framingham, Mass. 01701. Phone: (617) 879-0700. Telex 95-1130.

OTHER EDITORIAL OFFICES & SALES OFFICES

New York Suite 703, 401 East 80th St., New York, N.Y. 10021. Phone: (212) 879-2338.

West Coast 1060 Marsh Rd., Menlo Park, Calif. 94025. Phone: (415) 328-8664.

Washington, D.C. 425 National Press Building, 529 14th St. N.W., Washington, D.C. 20045. Phone: (202) 347-8748.

Regional Terry Cavanaugh, CW Publications, 6th Floor Data Point Bldg., London EC1 4AD. Phone: 01-251-8202. Telex: 23210 (Computer Business Group only).

Peter Sawa, CW Publications, Peter Sawa Assoc., 305 Chestnut Rd., Islington, London SW19 5HH. Phone: 01-879 8454/5 (open for all CWCI publications except Computer Management and Computer Business Europe).

Philippe Amat Lefebvre, Le Monde Informatique, 105 Avenue Charles De Gaulle, 92202 Neuilly Sur Seine, Paris. Phone: 755.14.14. Telex: 612808 F.

Japan Hirohiko Hayashi, Computerworld Japan, 7-8 Shiromi 1-Chome, Chuo-ku, Osaka 540, Japan. Phone: (06) 941-8841. Telex: 529-6517 (Computerworld Japan att).

Hidetoshi Abe, Tokyo Representative Group, Toranomon Mori, 2-2-2 Kasumigaseki, Chiyoda-ku, Tokyo 100. Phone: (03) 504-0131. Telex: J26550 (cops for all CWCI publications except Computerworld Japan).

Australia Alan Tweed, Computerworld Pty. Ltd., 67-68 Alexander Street, Crows Nest, NSW 2065. Phone: (02) 439-3355. Telex: AA72585 COMPUB.

Brazil Rio Bigelow, Tom Moss, Computerworld do Brasil, Servicos e Publicacoes Ltda., Rua Alcindo Guanabara, 25/15th Floor (Edificio Marquez de Herval), Rio de Janeiro, RJ Brazil. Phone: (021) 240-0345. Telex: 2122000 (WORLD BR).

Sheldon Richard Gordi, Computerworld do Brasil, Caixa Postal 21.5, Cerqueira Cesar, Sao Paulo City 7 S.P. Phone: (011) 214-0233, (011) 214-0346. Telex: 1171255 ACBASIL, 1171255 ACBABR.

Spain José Kelley, Computerworld Espana, Diputacion, 15, Madrid 7. Phone: 231-22-00, 231-23-00, 234-23-00. Telex: 47463(CPSP) EI.

Sweden Peter Sundell, Computerworld Sverige, Box 1908, Sankt Eriksgatan 63, 11384 Stockholm 2. Phone: 08-15-05-10. Telex: 17089 cwsto.

Denmark Tony Hemmink, Computerworld Danmark, Rum Nordre Alle, Vedbaek DK-2950, Denmark. Phone: (02) 89-20-22. Telex: 37409 SVDATA DK.

The Netherlands Johanna A. Wijnen, Mgr. Bkv., CW Communications B.V., c/o IDG Benelux, Prins Bernhardplein 22, 1005 Am Amsterdam. Phone: 020-751-596. Telex: (052) 10743.

Italy Daniela Cavallini, Gruppo Editoriale Jackson, s.r.l., Via Rosellini 12, 20124 Milano.

Southeast Asia Hiroshi Ogawa, Sun Mgr., Computerworld Asia, Inc., Singapore Office, 1 Scotts Road, #21-05 Shaw Centre, Singapore 0922. Phone: 64-6922-1033.

Circulation: Computerworld is published weekly except for January (5 issues), February (4 issues), March (5 issues), April (4 issues), May (5 issues), June (4 issues), July (4 issues), August (5 issues), September (4 issues), October (5 issues), November (4 issues), December (4 issues) and a single combined issue for the last week in December and the first week in January by CW Communications/Inc., One IDG Plaza, 375 Cochituate Road, Framingham, Mass. 01701.

Copyright 1984 by CW Communications/Inc. All rights reserved.

Computerworld can be purchased on 35 mm microfilm through University Microfilms Inc., Periodical Entry Dept., 300 North Zeb., Ann Arbor, Mich. 48106. Phone (313) 761-4700. Computerworld is indexed weekly in the Computer Publications Index, Information Handling Services, Englewood, Colo.

REPRINT RIGHTS: permission to photocopy for internal or personal use or the internal or personal use of specific clients is granted by CW Communications for libraries and other users registered with the Copyright Clearance Center (CCC), provided that the base fee of $0.50 per copy of the article, plus $.25 per page, is paid directly to Copyright Clearance Center, 21 Congress Street, Salem, MA 01970.

Permission of photocopy fees not covered by or otherwise indicated by this symbol.

Special reprints should be addressed to Nancy H. Shannon, CW Communications, One IDG Plaza, 375 Cochituate Rd., Framingham, MA 01701. (617) 620-7700.

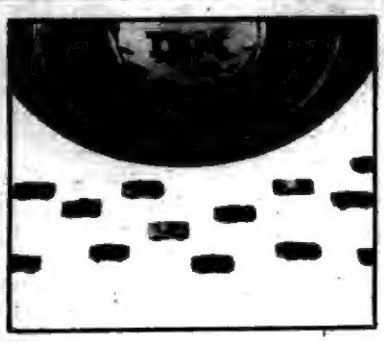
$1.50 a copy; U.S. — $46 a year; Canada, Central & So. America — $130 a year; Europe — $180 a year; Africa, Middle East — $200 a year (airmail service). Four weeks notice is required for change of address. Please allow six weeks for new subscription service to begin.

ABP IVC

Postmaster: Send Form 3579 (Change of Address) to Computerworld, Circulation Dept., Box 880, 375 Cochituate Road, Framingham, Mass. 01701.

Computerworld is a member of the CW Communications/Inc. group, the world's largest publisher of computer-related information. The group publishes 42 computer publications in 16 major countries. More than a million people read one or more of the group's publications each month. Members of the group include Argentina's Computerworld Argentina; Australia's Australian Computerworld and Micro Computer Magazine; Brazil's Dataforum and Microbrasil; China's China Computerworld; Denmark's Computerworld Danmark and MicroData; France's Le Monde Informatique; Germany's Computerwoche, Microcomputerwelt and PC Welt; Italy's Computerworld Italia; Japan's Computerworld Japan; Mexico's Computerworld Mexico; Norway's Computerworld Norge and MikroData; South Africa's Computerworld; Spain's Computerworld Espana and MicroDatos; Sweden's Computervarlden, MikroDatorn and Mikro Nytt; the UK's Computer Management and Computer Business Europe; the U.S. Computerworld, Datapro Computing, Mini Cate, InfoCate, InfoWorld, MICRO MARKETWORLD, Microcomputing, PC World and 80 Micro.

FORECAST '84 CONTENTS



4 Annual DP Budget Survey
A survey of DP managers finds that 1984 budgets are on the rise — but more conservatively than in past years.

8 Management by Consensus
As automation spreads throughout the offices of large corporations, MIS directors are finding that carte blanche decision making is a thing of the past.

12 MIS Managers
Knowing how to program a computer and run a DP operation is no longer the whole formula for success in a business-oriented high-tech world, five MIS executives say.

16 What's Hot! What's Not!
In a field where trends change as quickly as the weather, the technologies that were on top yesterday are not necessarily there today.

19 Micros and the End User
The honeymoon is over. Now that big business and small computers are wedded, can the marriage survive?

23 Micro-Mainframe Links
More than a few vendors have announced micro-to-mainframe connections, but it may be wise to look carefully before leaping to any vendor offering early solutions.

30 IBM
Through marketing savvy and organizational quick-footedness, Big Blue has made big strides in sweeping all its competition by the roadside.

36 An IBM Look at the History of Computers.
A recent exhibit shows how IBM scientists and engineers have not only pushed the firm to the top, but helped shape the destiny of computing.

40 DEC
The past year has been one of ups and — for the first time — dramatic downs for Digital Equipment Corp. But the roller coaster ride may be over as DEC prepares to go back to the basics in 1984.

44 The AT&T Divestiture
The Bell system will be officially broken up on Jan. 1, but telecommunications users still do not have the answers to some important questions about what it will cost them.

49 White-Collar Crime
While DP criminals working from the outside have been the center of much attention in the past year, a greater problem may be those culprits working from the inside.

57 Computer Crime
The U.S. may have more computers, but it doesn't have a monopoly on computer crime, according to a survey of seven countries.

61 Fifth-Generation Computing
The worldwide race to develop a new generation of computers is now an all-out battle. The stakes may be political as well as industrial supremacy.

68 Relational Data Base Management Systems
Relational DBMS are becoming more sophisticated and offer more information control, but at a price.

71 Information Centers
Two years ago the information center was just a concept with a promise. Today it is an integral part of a number of large corporations.

77 Unix and the New Contenders
It won the hearts of academia, but it's had a tough time convincing business users it has a future. Could Unix yet become an operating system standard?

85 Privacy Issues in 1984
Although computers were not a part of George Orwell's *1984*, they are the center of concern for those who fear for the privacy of individuals.

88 Computer Matching
Government agencies are swapping data, and computer matching is in full swing. But limiting its use and its impact on privacy are issues that are far from resolved.

96 Industrial Policies in an Election Year
The Democrats will claim that the current administration has been disastrous. The Republicans will claim that the economy and workers are getting back on their feet. Who is to be believed in Election Year 1984?

99 Computers in Elections
The days of one-on-one electoral campaigns are over. Today, a candidate's chances of success are based on his data processing as well as his political strengths.

101 Third-Generation PBXs
Although PBXs that can juggle both voice and data communications are only three years old, they already have a steady following.

Editorial 106
Software & Services 109
Communications 115
Systems & Peripherals 121
Office Automation 117
Computer Industry 119

Forecast '84 Graphics Designer
Henry P. Pling

TURBO

Why are SYBACK & SyncSort CMS the fastest things on no wheels?

(More technology in the tank!)

Call (201) 568-9700.

Arrange a test drive.

You say you've always had very simple tastes? All you ever wanted was the best?

Well, step into our showroom and kick a few tires! We'll show you two programs that are the Ferrari and Lamborghini of VM programs.

- **SYBACK – the world's fastest and most maneuverable backup, restore and copying program;**
- **Syncsort CMS – the world's fastest and most maneuverable VM/CMS sort program.**

What makes 'em so special? Well . . .

(1) TURBO PERFORMANCE: Have you ever stepped down on the gas in a dangerous driving situation and discovered . . . nothing? Well, that'll never happen to you with these two vehicles.

Both are equipped with our special brand of "software turbocharging." We call it FBT, which stands for Fluid Buffering Technique. Our competitors call it something else.

We discovered FBT one dark and rainy night when we were trying to find a way to speed up the movement of data in sort programs. After crying "Eureka," we applied it to our OS and DOS sort programs. The results were . . . wow!

Now we've carried that bright idea over into VM dump-restores and sort programs. And the results are still wow! Compared to any other backup or sort program clogging the nation's VM thruways today, SYBACK and SyncSort CMS will save you up to:

- **50% in Elapsed Time;**
- **45% in VTime;**
- **55% in TTime;**
- **75% in SIOs.**

So who needs all that speed? You do. If you want to optimize your VM operations, stay out of needless DP traffic jams, and make the boss happy with your throughput.

Here's what happened to one large government agency. Their backup operations used to require a full 24 hours to complete. Then they installed SYBACK. Now their backup takes — are you ready? — one-half hour!

(2) EASY HANDLING: SYBACK and SyncSort CMS are among the most flexible, user-friendly programs ever produced by anybody anywhere. That's one reason programmers love 'em. And where does it say that backup and sort operations have to be hard to be good?

(3) "MISTER SOFTWRENCH" SERVICE: We've got the best pit crew in the business. More than 85% of all customer requests are resolved within 24 hours.

If you'd like to put a little high technology in your VM tank, give us a call. We might even take your used VM dump-restore or sort program as a trade-in!

SYNCSORT CMS • SYBACK • SYNCSORT CMS • SYBACK • SYNCSORT CMS • SYBACK • SYNCSORT CMS • SYBACK • SYNCSORT CMS • SYBACK • SYNCSORT CMS • SYBACK •

VM

syncsort INC.

Syncsort Incorporated 560 Sylvan Ave., Englewood Cliffs, N.J. 07632

Annual DP Budget Survey

PHOTO © 1983, GEORGE BILLIS

Picking Up the Check

By Peter Bartolik

It may be the fear of future inflation, or perhaps the tail end of the recession. But whatever the reason, DP budgets are increasing at a slower rate than over the past two years, even as DP centers take on increasing responsibilities, *Computerworld's* annual survey of DP managers has found.

While several of the 49 DP managers polled this year said they are appropriating money in anticipation of AT&T divestiture-related increases, for microcomputer purchases and for end-user training, budgets as a whole are not growing as fast as they did last year and the previous year.

The majority of respondents to the survey — 67% — said their budgets for 1984 will be up over the 1983 level, while 15 will experience level funding and one will work with a smaller budget. The increases will average 12.4%, compared to the 17% reported last year and the 20.3% reported the year prior to that.

The one manager who reported a reduction — a whopping 33% cut — said it is the result of a corporate reorganization.

The economic recovery being touted in Washington, D.C., has yet to show up in the spending plans of an overwhelming majority (83.6%) of the managers. A few even said they are still feeling the affects of the recession.

The fastest changing areas of the data processing world, microcomputers and communications, are creating wide divisions in the manner of dealing with procurement and administration, according to this year's survey. Twenty of the respondents reported that microcomputers are purchased out of DP budgets, while 20 others reported micros are purchased by end-user budgets (the remainder had no set

---

Staff Writer Peter Bartolik coordinated the efforts of the Computerworld writers who conducted the survey upon which this story is based. Members of the survey team included staff writers John Gallant, Lynn Haber and Patricia Keefe and West Coast correspondent Robert Batt.

DP BUDGET SURVEY

policy); last year, 19 managers said end users paid for micros and only six said DP departments paid.

Perhaps reflecting the experimental aura surrounding micro implementation, Henry Goldbeck, DP manager of Follet Corp. in Chicago, said his company established a "micro study budget" and will purchase about 100 units this year from that budget.

End-user training, particularly with regard to micros, is a responsibility for 55% of the managers, but only half have a readily identifiable budget line item to fund that responsibility. "It's part of each programmer's job," Goldbeck noted, "but it is not budgeted."

Communications

Communications appears to be another area where both DP management and upper management are feeling their way. Almost half, 45%, reported they have some responsibility for corporate voice communications policy, ranging from giving advice to selecting the entire telecommunications system. An identical percentage also said they have set funds aside in anticipation of increases resulting from the divestiture of AT&T, but only four managers without some say over voice communication have made such a provision.

At Helene Curtis Industries, Inc. in Chicago, according to DP Director Edward Valliere, "We're very concerned [about the AT&T divestiture]. We're just waiting to see; we put aside $20,000." But James Durkee, vice-president of management information systems for Carson Pirie Scott & Co., also in Chicago, represents the other end of the scale: "We've been upgrading our own switches with purchased equipment. We're positioned to buy anyone's service."

According to the survey, communications will eat up an average of 10.8% of DP budgets in 1984, about the same as last year.

As in previous years, salaries continue to eat up the lion's share of the budget, but that share has dropped slightly from 46% to 43%.

The actual salary increase are lower than in previous years, averaging 5.7% across the board and only 5.8% in those departments which actually are increasing spending for salaries in 1984.

Last year, departments that increased personnel salaries experienced an average 17% increase over the previous year.

In a seemingly inconsistent reversal of last year's survey, 57% of the managers surveyed plan to hire additional personnel this year; last year, 58% planned not to hire. Positions being created are generally for programmers, analysts and support personnel, although one department expects to hire a data base management system administrator.

Members of this year's survey group said they have less trouble finding qualified DP personnel than last year's group; only 55% of the 1984 group said they have problems filling positions, compared to 62% last year.

Personnel turnover rates in 1983 were greater than last year's at 20% of the departments, smaller at 36.5% and the same at half of the departments covered in the survey; the 1982 survey had found sharply decreased turnover, which may indicate that DP personnel this year are more secure in their ability to find new employment in an eco-

(Continued on Page 7)

FREE 82-PAGE BOOK EXPLAINS TRANSACTION PROCESSING.

A new 82-page book, "SYNAPSE TRANSACTION PROCESSING. SYSTEM OVERVIEW.", clearly illustrates how a systems designer can accelerate development of a high-performance, fault-tolerant, on line transaction-processing system.

It discusses automation of integrity and recovery. Tells how to get performance from a Relational DBMS. Describes transparent expansion of a system on line. And it has a complete index.

The book presents a comprehensive, management-level introduction for the nontechnical manager. Yet it provides an adequate overview for the technical manager and staff.

To obtain a free copy, call (408) 946-3191. Or write: Synapse Computer Corporation, Corporate Communications Department CW, 801 Buckeye Court, Milpitas, CA 95035.

© 1983 Synapse Computer Corporation.

2 Trillion

Last night we backed up two trillion (yes, that's 12 zeroes) characters of data, and checked our work.

VMBACKUP

We bring files back alive, the way they should be—readable, usable—which some "cut-rate" backup systems *don't* do. We verify the data before moving it to tape. That's why 75% of the Fortune 100 companies trust their vital data to VMBACKUP.

How do we do this?

- Start with a solid design.
- Take the best systems people in the VM community.
- Have them build it right.
- Add competent, helpful support people.
- Stay close to our customers.

And we create a winning situation for our users.

VM Software Inc.

(703) 821-6886

London • Frankfurt • Paris • Stockholm • Milan • Tel Aviv • Rio De Janeiro • Sydney • Tokyo

VMBACKUP Sounds Great!
- ☐ Call me.
- ☐ Send more information.

I'd also like information on your other products checked:

- ☐ **VMACCOUNT:** Complete online collection, costing, & reporting.
- ☐ **VMARCHIVE:** End-user initiated archive/restore to intermediate disk or tape.
- ☐ **VMSECURE:** Complete security & directory management.
- ☐ **VMTAPECMS:** Tape management featuring drive management, SL tape support, security, and audit file.
- ☐ **VMLIB:** A source library control system offering compression, **COPY/INCLUDE** cross reference, and management of the development process.
- ☐ **VMSCHEDULE:** A complete scheduling and monitoring system for end-users.

Name _____ Title _____

Company _____

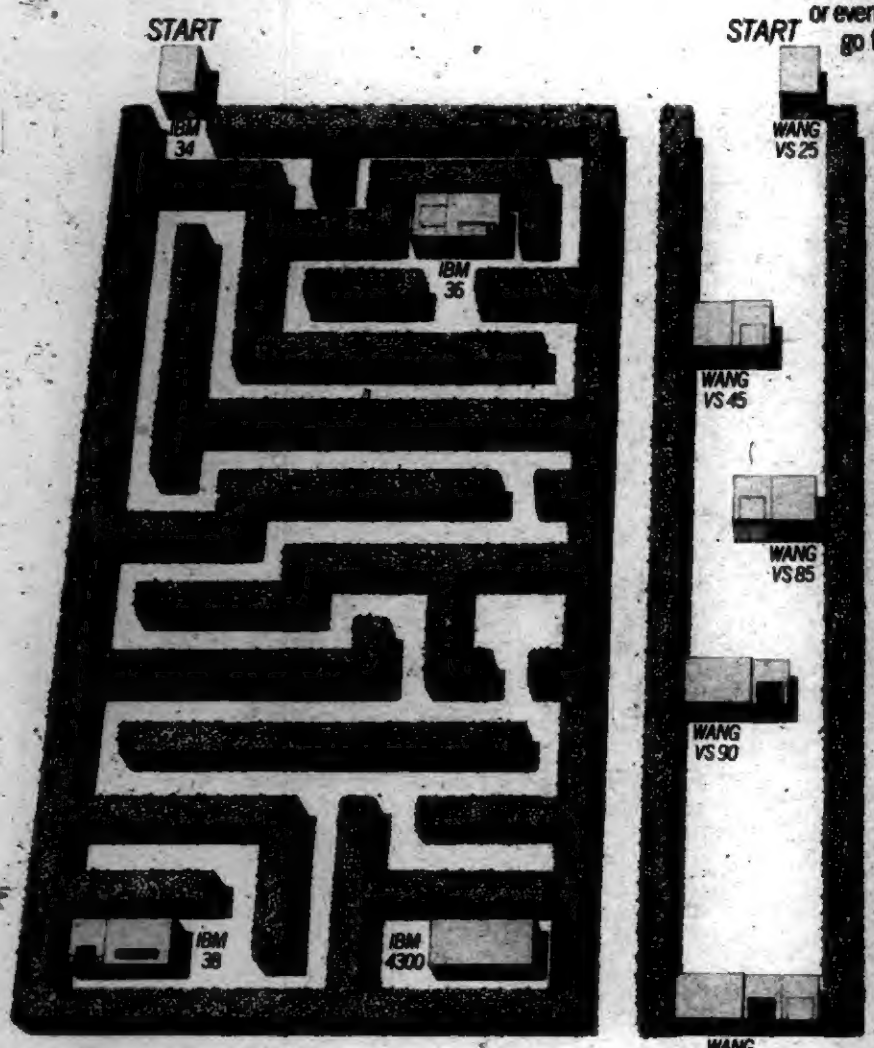
Address _____

City, State _____ Zip _____

CPU _____ Phone _____

2070 Chain Bridge Road • Suite 355 • Vienna, Virginia 22180 • 703-821-6886

Compared to IBM, Wang has the growth path of least resistance.



If you're currently considering an IBM 34 or even a 36, consider this: where do you go from there?

To an IBM 38? Sure, if you want to spend up to 18 months converting to a different operating system, different source codes, and different software.

To an IBM 4300? The same problem again. Only magnified. Because if the IBM 34 and 36 have little in common with the IBM 38, the IBM 38 has nothing in common with the IBM 4300 (logo excepted).

Now consider the Wang VS line.

One operating system that supports the same software, utilities, and documentation. A line that's compatible from top to bottom and bottom to top. A line that's compatible with other Wang equipment as well as most mainframes, including IBM. And a line that can tie you into total office automation faster and easier than any other systems available anywhere.

But even if you only need a single computer, a Wang VS is a better choice. Because every VS offers data processing, voice, graphics, electronic mail and extensive networking. And only a Wang VS offers Word Processing Plus, feature for feature the most comprehensive word processing software in the world.

So whether you plan to buy just one business computer or a whole lot, the Wang VS line is simply the best way to go. And the only way to grow.

Compare it to IBM; it's easy to see why Wang offers the growth path of least resistance.

For a demonstration of Wang VS computers, call 1-800-225-9264. Or write to: Wang Laboratories, Inc., Business Executive Center, One Industrial Avenue, Lowell, MA 01851.

WANG

The Office Automation Computer People.

© 1983 Wang Laboratories, Inc.
CW48

DP BUDGET SURVEY

(Continued from Page 5)

nomic upturn.

Most managers, about 60%, won't hire personnel without formal DP training. But the majority of those who do hire novices find them to be effective personnel. "Given a little bit of time to learn, they become very effective," said David Sheppard, senior vice-president of DP services with the Boston Co., a financial services company in Massachusetts.

More than 65% of the managers have appropriated funds for training, and such funds average 2.53% of the total budget among the 26 managers who were able to pinpoint the figures.

In a slight dip from last year's 50:50 ratio, the managers reported their programmers spend an average of 45.3% on maintenance work and the rest on new development.

Programmers spend more than 50% of their time on maintenance at 20 of the 49 shops that were surveyed. Three managers reported they employ separate teams of programmers for maintenance and development; one of those said the programmers rotate between maintenance and development.

Vendors will be pleased with one aspect of the survey: 80% of the managers plan to purchase new software, and slightly more than 70% expect to buy additional hardware and peripherals.

Ten managers reported they will be purchasing various types of financial applications packages such as accounts receivable, general ledger and the like; seven will purchase data base management systems; five will be purchasing packages to run under IBM's MVS operating system; three will purchase fourth-generation software; and three will purchase applications generators. Only two managers expect to purchase micro-to-mainframe linkage packages.

IBM will be the big winner in the hardware area, with 10 IBM 3081s (nine at one shop alone), three 3083s, two 4300 series machines, three System/36s and one Series/1 on the managers' shopping lists. One shop plans to buy seven of Tandem Computers, Inc.'s Non-Stop II or TXP units; and several plan purchases of minicomputers and micros.

Purchase and lease of hardware, along with service and maintenance, will cost DP shops an average 19.7% of their budgets this year, down from last year's 22%. Mainframe costs will eat up the largest chunk, with 15 shops reporting the purchase and license fees at between 30% and 40% of their total budgets.

Software Costs Rising

Software costs, however, will chew up a far greater chunk of the 1984 budget than they did in 1983. Reflecting perhaps the large number of managers purchasing new packages this year, software costs will average about 19.6% of the total budget, compared with only 10% in 1983.

Overall, half of the managers said their greatest cost increase this year will be in the area of salaries; 28.5% said hardware and 22.5% indicated software will go up the most (some managers picked more than one area, accounting for the figures adding up to more than 100%).

'Seven managers said their greatest concern [in 1984] will be to reduce backlog, and another five said their concern is to improve efforts to make information available to the end user.'

Three managers said their greatest increase will be in the purchase of outside consulting services. Asked to list their concerns as department heads for this year, the managers listed a wide variety.

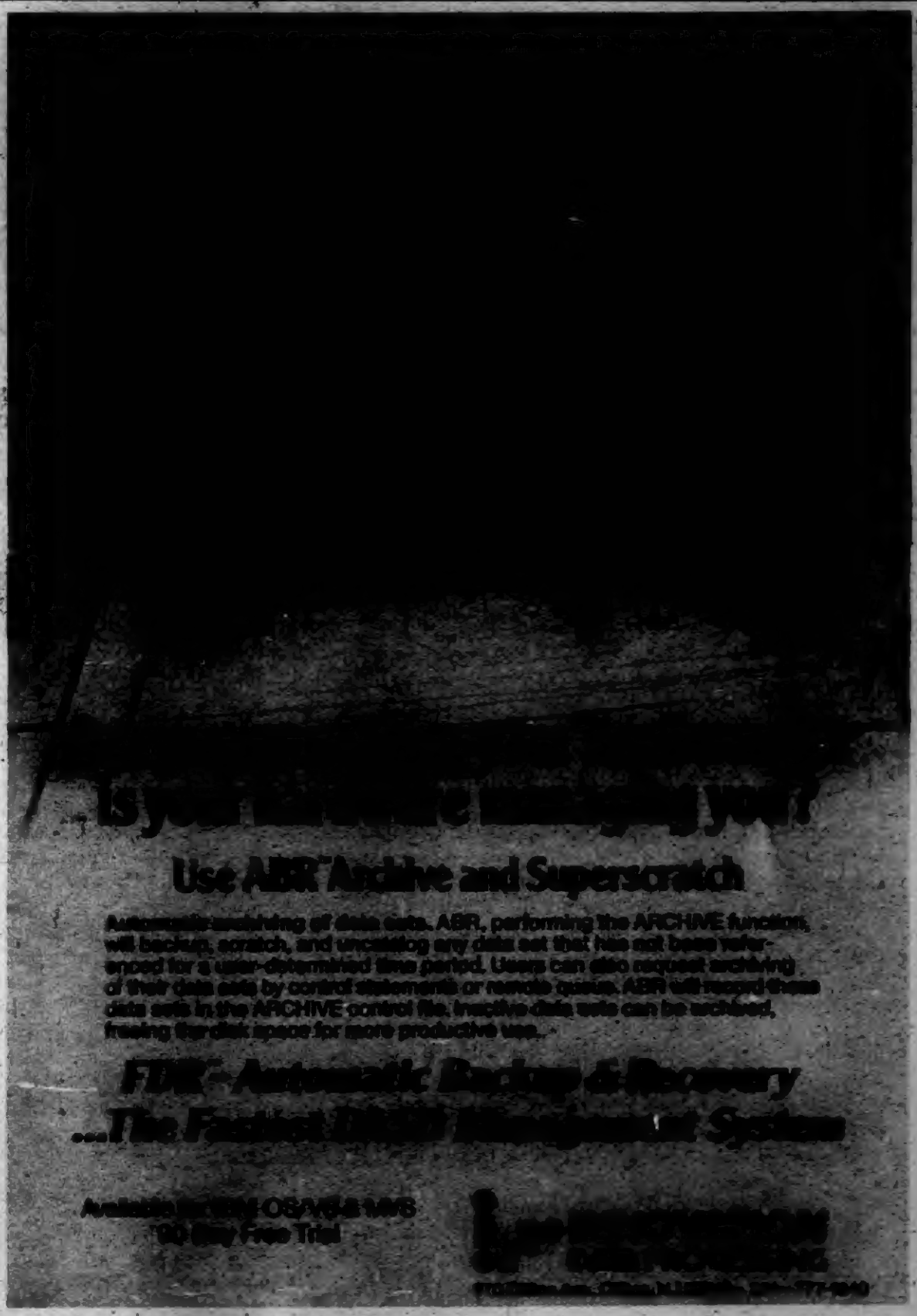
Seven managers said their greatest concern will be to reduce backlog, and another five said their concern is to improve efforts to make information available to the end user.

Six managers said they are most concerned with supporting corporate goals, and five said increasing productivity tops their list. Five managers mentioned personnel; four are concerned with micro proliferation and micro-to-mainframe communications.

Personal Queries And Reports On IBM/38?

FUSION 4/38, the first full information retrieval and presentation system for the non-technical user.

FUSION
PRODUCTS INTERNATIONAL
(415) 651-4760
PO Box Fusion
Mill Valley, CA 94942
Telex 176880 FUSION



Management By Consensus

The MIS Chief 's Balancing Act

By David Myers

The spread of microcomputers and word processors through the offices of Fortune 1,000 corporations has forced the management information systems (MIS) chief to walk a tightrope.

Beneath lies annihilation — the loss of power within the corporation, even the loss of a job. On the other side lie enhanced stature and leverage, a more important role within the corporation. Whether he makes it across is almost entirely up to him.

Office automation has sparked a trend within America's largest corporations toward computer decision making by consensus or committee. There is nothing radical in that. Corporations live and breathe by committee.

But in the past, it was always the MIS chief who decided how the corporation was going to automate its information processing functions. Suddenly the MIS director finds he can no longer act alone.

"When it comes to general planning, equipment selection, vendor selection and implementation strategies, it is no longer clear that the MIS director has carte blanche," according to Tom Willmott of International Data Corp., a Framingham, Mass.-based market research firm.

"MIS decisions were once restricted entirely to the data processing department. Administration department heads would choose things like PBX [private branch exchanges].

"Now the MIS director may be involved in office automation, but the president of the company has his finger in the pie, too. No longer is it 'MIS director, write a check,' " Willmott maintained.

Why has office automation sparked this trend? Probably because it got its start outside the data processing department, in the administrative offices of the corporation.

As Susan Roper, manager of office automation for Hughes Aircraft, put it, "More and more individuals are saying they want that tool." They aren't walking down the hall to the DP department for help, that is; they are demanding the resources for solving their own problems themselves.

What has resulted is a proliferation of microcomputers throughout many corporations. Rather than waiting for the MIS chief to get around to them, department heads are going out and buying machines for their personnel.

(Continued on Page 10)

David Myers is Computerworld's correspondent in New York.

Their way.

Our way.

IDMS/R Automatic System Facility.

One database management system provides an Automatic System Facility for system development: IDMS/R.

Fourth generation languages, though excellent productivity tools, only address part of the system development task – namely, steps three and four as shown above. IDMS/R with Automatic System Facility, however, automates all of the steps necessary to develop systems. All you do is specify the data.

The Automatic System Facility dynamically builds the system.

It defines the database; creates screen formats; develops the applications; links the definition, screen and application together, then documents the system.

One DBMS using a powerful system development facility does it all. And does it all automatically. IDMS/R.

For more information on this facility, to attend a seminar or for a demonstration call (617) 329-7700.

Cullinet

© 1983 Cullinet Software Inc., 400 Blue Hill Drive, Westwood, MA 02090.

MANAGEMENT BY CONSENSUS

(Continued from Page 5)

Joseph E. Izzo of the JIA Management Group pointed out that in 1979 only 5% of the computers installed in U.S. companies were outside the control of the data processing department. This year the number is gauged at between 30% and 35%.

"When the [Apple Computer, Inc.] Apples came out, everybody wanted one. They became a sort of de facto standard. Now the same thing is happening with the IBM [Personal Computer]. We have to race just to keep up," said Jim Stockwell, manager of data processing at Teledyne, Inc.

> *"'The MIS group is not a police force. I don't see it as our role to go out and see if [other departments] need the productivity gains they say they'll be able to achieve" with office automation.'* — Raymond Priore, vice-president of systems and information processing at Consolidated Edison of New York.

Of course, as soon as one brand of computer is installed in one department and another brand in another department, the problem of incompatibility rears its ugly head.

In order to stave off incompatibility woes before they arise, many firms are beginning to appoint committees to draw up plans for corporationwide office automation.

The committees are not a welcome sight; no one in American business wants to serve on yet another committee; but they became necessary when it grew clear that DP departments did not have the power to enforce compatibility requirements.

"We have no centralized control. These people [in other departments] don't necessarily have to come to us" before springing for microcomputers, Roper said.

Indeed, a good many American firms are "highly decentralized," split up into "individual business units with their own business requirements," as Anthony Pizzelanti, vice-president for information systems at the Macmillan Publishing Co., pointed out.

Central Committee

In these firms, a central committee — often disguised under the genteel sobriquet "Office Automation Task Force" — is the only way to keep track of and have a semblance of control over what is happening in the various corporate departments.

The committee may include top-level executives. "I expect senior management to get more attuned to the process. It's inevitable anyway," Pizzelanti said.

The involvement of top-level execs is inevitable because office automation is something that interests them, whereas data processing seems alien, according to Teledyne's Stockwell.

What is more, top-level executive involvement is welcome to many MIS directors because it relieves them of the responsibility of judging other department heads' equipment requests.

'Not Police Force'

"The MIS group is not a police force. I don't see it as our role to go out and see if [other departments] need the productivity gains they say they'll be able to achieve" with office automation, noted Raymond Priore, vice-president of systems and information processing at Consolidated Edison of New York.

An Office Automation Task Force also prevents other departments from feeling as if strange machines, foreign procedures and unobtainable productivity goals have been foisted upon them.

"It's a way of ensuring that the right constituency gets involved in decision making," according to Raymond L. Boggs of the Venture Development Corp.

You Probably Thought We Were Selling Computer-Controlled Computer Power.

Powercenter Plus™
Power Distribution System

Actually...We're Selling Peace of Mind.

Some jobs are difficult. Others are just plain impossible – like estimating all the costs of computer errors due to line voltage sags and surges, to say nothing of brownouts. But now for a small percentage of your facility investment, you can have complete protection against troublesome voltage variations. And you can have immunity from noise and the effects of load changes, frequency changes and power-factor changes, too. Not to mention flexible distribution of power throughout the computer room, monitoring of all key power parameters, and two-level facility protection. Powercenter Plus™ power distribution system – it's the only power center that does it all. Complete with microcomputer-controlled power conditioning, of course.

That's peace of mind.
That's our business.

TOPAZ®
SOLUTIONS TO POWER PROBLEMS™
9192 TOPAZ WAY, SAN DIEGO, CALIFORNIA 92123-1165 (619) 279-0831

MANAGEMENT BY CONSENSUS

Thus the task force is a sort of users group. And some firms, in fact, have set up a variety of small, in-house users groups rather than a single central committee and have decided to permit a controlled proliferation of small systems, as long as there is no overlap between departments with incompatible machinery.

In any case, the task force or users group method of decision making puts the burden of proof squarely upon the user for justifying his need for automated office equipment.

"It's the user's requirement, so he should be the one to have to justify it to the corporation. Not that I couldn't participate in the justification process. But I don't see that as my role," Priore contended.

Added Benefit

Placing the onus for justification upon the user has the additional benefit — from the MIS director's perspective — of awakening department managers to the cost and implementation difficulties that are involved in a new system.

As Roper pointed out, involving users in the acquisition process scales down their expectations and makes them more sensitive to everything that goes into choosing and starting up a system.

"If they are not involved in the acquisition process, they could end up wasting more time with a personal computer than they save," Roper said.

MIS Chief's Role

But what of the MIS chief's role in all these changes? Will the increased involvement of top-level execs in computers decrease his power within the corporation? Or will the involvement of users in computer acquisition increase their dependence on him and so enhance his standing in the firm?

"It all depends on the character of the MIS manager," Boggs said. "If he is really concerned with how the equipment is going to be used on a day-to-day basis, which means he must understand how business is conducted so the equipment won't have a disruptive effect, then he has a future.

"But if he is technologically driven — if he is insensitive to people's needs — he is vulnerable to being co-opted by the committee," Boggs added.

To survive the challenge of office automation, the MIS chief must become "far more of a businessman than he is now," JIA's Izzo agreed.

Izzo suggested that the MIS director should subscribe to *The Wall Street Journal* and *Business Week* and concern himself with the most pressing of business issues.

'Not Just Manager'

The encroachment of top-level management upon his traditional territory means the MIS chief must become "a leader, not just a manager," Izzo added.

While some MIS directors bemoan a weakening of their position as a result of growing "computer literacy" in the executive suites, others are viewing it as an opportunity to be seized.

As Roper pointed out, the MIS managers are the ones to provide training and guidance. As Teledyne's Stockwell explained, as long as there is a need for technical advice, there will always be a need for MIS directors. Those who fear a reduction of their power as executives learn more about computers have already had their power reduced, Izzo said.

"The more executives know, the more powerful he [the MIS chief] should be. That's where his greatest power will come about. As executives become [computer] literate, he has the chance to become a leader," Izzo said.

Perhaps the greatest challenge, however, will be not to the MIS director himself but to the data processing department as it is known today.

As more and more users become adept with office automation, they may begin to infiltrate the inner computer sanctums. And there may evolve a new organization within the American corporation — the Office of Computer Technology.

> ***Will the increased involvement of top-level execs in computers decrease his power within the corporation? Or will the involvement of users in computer acquisition increase their dependence on him and so enhance his standing in the firm? "It all depends on the character of the MIS manager. If he is really concerned with how the equipment is going to be used on a day-to-day basis, then he has a future. But if he is technologically driven, he is vulnerable to being co-opted."***
>
> — Raymond L. Boggs, Venture Development Corp.

Computerworld has news for you.

Microcomputer News.

Beginning with your January 9th issue of *Computerworld*, you'll get a new special section in every issue. A section completely devoted to microcomputers in the corporate environment. And if that's your environment — to work in; to consult to; to supply — then you're going to look forward to this section every week.

You'll get the products . . .

You'll get useful information on all single- and multi-user microcomputer systems with commercial applications — and micro peripherals, boards and add-ons — from the angle of the corporate user. And you'll get news on those business micro software packages designed for corporate micro users in large organizations. And that's just the product coverage.

. . . and the pundits.

You also can look forward to hearing regularly from guest columnists and industry experts on the trends, the technology, and the strategies you need to keep up with the microcomputer marketplace.

MIS Managers

Traditionally one of the most underbudgeted items in data processing, DP training needs have grown beyond the traditional technical courses offered to help departmental staff keep up with the latest hardware and software innovations. Today, because of the growing corporate reliance on the management information systems (MIS) function and the onslaught of end-user computing, a new dimension to training has been created — one that imbues everyone in the DP department, from the vice-president of information systems to the programmer, with a business orientation.

An understanding of business in general — and the specific company's business in particular — bodes well for DP professionals who can expect to broaden or lengthen their career paths by taking steps to become business-literate while working to help their end users become computer-literate.

In an attempt to determine the role of MIS in relation to the needs of the corporate world, Computerworld *recently interviewed five high-level MIS executives employed in industries that represent some of the largest users of information processing. The professionals interviewed included:*

- *From the retailing industry, Anthony M. Grybowski, manager, Systems & Data Processing, Federated Department Stores, Ohio. Grybowski holds a B.S. in accounting and an executive degree in business data processing.*
- *From the manufacturing and services sector, Donald J. Marino, director of Management Information Systems at Bendix Corp. in New York. Marino, who earned a B.S. in business administration, worked 10 to 12 years in product scheduling before spending the last 20 years in systems analysis and systems management.*
- *From the transportation industry, Robert Forstrom, vice-president of Information Systems for The Bekins Co. in California. He has a B.A. and a master's degree in chemical engineering. Forstrom began his DP career as a systems programming manager 20 years ago.*
- *From the diversified financial area, Edward Huntington, assistant vice-president/Equipment, Finance Data Center, Citicorp Industrial Credit in New York. Huntington, who concentrated in computer science in college, has been in DP for 22 years.*
- *From the commercial banking sector, H. Alfred Colby, senior vice-president of Information Services, John Hancock Mutual Life Insurance Co., Boston. He has a B.S. in economics and worked on systems analysis and managed projects in the user community before being promoted to his current position.*

Broadening the Perspective

By Patricia Keefe

Is it important for management information systems managers to broaden their perspectives and skills beyond the narrow technical realm of DP? If so, why?

Grybowski: Absolutely. The MIS director has to respond to the business that the organization is in and the DP business. In order to do so, he must be involved in all aspects of the company, such as marketing and manufacturing, to get a feel for the business and to implement priorities with upper level management.

MIS executives need to be more aware of corporate goals so they can contribute a bit better to the bottom line. In other words, MIS directors should not operate in a vacuum.

Marino: There's no question that much of the black eye given MIS in the press — some of it well deserved — is created by the fact that [MIS has] taken technicians and made them managers instead of taking managers and teaching them technical abilities. All of my managers are business-oriented. At Bendix [Corp.], now Allied [Corp.], we have a kind of top-down, bottom-up structure where our strategies and

Patricia Keefe is a staff writer at Computerworld.

Anthony M. Grybowski

H. Alfred Colby

Donald J. Marino

objectives are business-oriented and need MIS support to make those objectives come true.

Forstrom: Yes, it is advantageous from the point of view of the [chief executive officer] and officers of the subsidiary. In their view, the MIS top executive should be a manager, and this would require him to have broader skills. As a participant in the strategic planning of the company . . . I am expected [not only] to contribute technical solutions to corporate problems, but [also to contribute] ideas from a business standpoint. Subsidiary presidents say I should know their businesses as well as they do in order to contribute technical solutions to the business problems that they have.

I have found that users do not understand how to apply technology to business, so they expect DP to understand their problems, such as in operations, marketing and business.

Huntington: Yes, the reason being that unless a DP or MIS manager has an idea of what's going on in the world around him, especially in application or user areas, he cannot really perform his job properly. He must be able to understand the needs of the user community.

Colby: It is important to have business skills in addition to having good managerial skills for my professional and technical people, especially at senior levels, where [they are] beginning to get much more involved in the business the company is in.

Does the need for an ability to look at the overall business picture apply to your technical staff as well as to you?

Grybowski: I believe it is essential that they get some background in accounting, marketing and psychology. When they get involved in applications, people can do a better job if they have an understanding of the users' requirements.

Marino: My own background is 20 years in DP and an additional 12 years in an operational production environment. Many of my supervisors, and especially my systems analysts, were brought in from user groups to be trained as MIS people.

We cross-pollinate. We have a program now that takes user analysts, teaches them DP and then sends them back to their respective departments to help us.

Forstrom: Partly yes and partly no. Some people need both, such as systems analysts and programmers. I have found that business programmers don't necessarily have to understand the implementation of what they do.

Huntington: I like my systems programmer management and operations management to know what is happening in the world outside hardware. If they approach applications with tunnel vision, they will not be as receptive to user needs and problems.

Colby: There is room for both technically [oriented] and business-oriented data processing staff. We need more than ever good technical people — next year we [in MIS] expect to experience growth of 15% to 20%. In some cases, there is no need for good technical people to be involved or to know about business plans. On the other hand, as we are called upon more and more to help end users, it becomes important to understand their business.

How are you handling business-oriented training for your technical staff members?

Grybowski: Our main way is to offer a tuition refund program and to encourage staff to attend evening classes. If they have a computer science degree, we recommend that they attend business classes, such as marketing or accounting. If they have a broad background in college, we try to expand them further, rotating them on different systems, such as marketing, manufacturing and accounting.

We use a combination of training methods. We do have manuals, which we supplement with on-the-job training. The quickest way to learn is probably to use manuals and team the person up with a more experienced staff member to get him accustomed to the particular job, then turn the job over to him and see how he does.

Marino: Since 1975 we have had an account with a company called Advanced Systems, Inc., in Chicago. We are a big user of its audiovisual devices. We started actually structuring the training program for systems analysis courses several years ago using its media. We put a lot of our systems analysts, programmers and technical people

(Continued on Page 14)

Computerworld will look new to you.

Effectively new.

Starting with your January 9th issue, you will see an updated look in *Computerworld*. It will be cleaner-looking, more organized, and easier to read.

You'll get the best of the old . . .

The organization of the paper will remain the same — organized into news, editorial, technical and In Depth sections. But, you'll see more graphics, a more readable typeface and — you'll get more indexes to the news contained within the weekly issue.

. . . and a lot that's new.

Expanded technical sections will feature columns by DP/MIS experts, by *Computerworld's* own editors and by DP/MIS executives who have implemented unique solutions in their own firms.

The redesign, *Computerworld's* first in seven years, is being carried out under the direction of Robert Lockwood, the nationally known newspaper designer whose credits include *The Christian Science Monitor, Chicago Sun Times, Allentown Morning Call, Philadelphia Bulletin, Dallas Morning News* and *Baltimore Sun*. He was the founder and first president of the Society of Newspaper Designers.

MIS MANAGERS

(Continued from Page 13)
through those courses.

We have staff meetings weekly, where all the higher level technicians sit in and describe their weekly activities, and I describe what's going on in the business world.

At my level, in this division, I report directly to the vice-president and general manager on the staff level with the other directors of the various functions. In addition to conventional systems programming and computer operations, I have a software and education group with a supervisor of education whose basic responsibility is to control the education of the 70-some people who work for me.

We also support highly professional organizations, such as the Data Processing Management Association and [the American Federation of Information Processing Societies, Inc.]. This program allows [technical employees] to go back to college to finish degrees or further their education — and it does not have to be computer science — and the company pays for it.

Furstrom: We provide some on-the-job training and education. We get people to spend time with the business people as much as possible. We encourage people to take university-level business classes, such as MBA or advanced-degree courses. We also provide in-house, video-assisted training.

Huntington: We have almost daily meetings with the user community to discuss how we can change things. It's an open dialogue where they can discuss problems they have, or perceive to have, with the DP center and address them and bring them out in the open.

We are primarily an IBM shop, and we send staff to IBM schools. Also, two members of the staff attend school at night in the computer science field. We also send operations managers to various IBM seminars for an exchange of ideas, to see what's new in equipment.

Many user departments hold seminars, which we attend when time permits. Unfortunately, that's not too frequently.

Colby: We talk about it some, of course. There are a number of professional [insurance] organizations that provide courses, such as the Life Office Management Association [Loma] and Charter Life Underwriters. The company pays for the Loma courses, subsidizes the books and provides a bonus upon passing each of the nine exams in the series.

We also have some insurance-related courses run by the personnel department. And we have a regular education center with its own entry-level courses and a couple dozen higher level courses.

In a more important way, we rotate assignments. We have a couple dozen people out at the moment, rotated out in user areas. This includes systems and management people who typically work an assignment for one to two years. They are dedicated to systems analysis and specification development of the user department, for example. In return, we'll take users into our area. Some users are in management jobs, such as systems management and directors.

Is the growth of end-user computing a major force behind the move toward general business education for technical staff members?

Grybowski: In some companies, end-user computing may force it, but in our particular company, we've always been user-oriented, and we've always gone the extra mile for the user to keep him happy. Most of our end users are in the engineering and technical [research and development] areas. There is some demand to hint there will be more growth in [end-user computing].

Marino: We've got a whole program going whose sole purpose is to introduce computing to the world outside of MIS. And to do that, it's kind of an information management concept, however, it's not that formal. We have a huge network of 300 CRTs that we are making available to users, including a variety of software products and applications and about eight personal computers in a few strategic areas. We are trying to develop a strategy for personal computing. I really don't see a lot of impact here, because a lot of my MIS people are going for additional education anyway.

Furstrom: We have a need to work with and assist a broad range of users on everything from the information center idea to personal computer ideas. The staff is assigned to do that. To a degree, although I don't know if it has a significant impact, it has caused a few people to have to understand business. Generally, staff systems analysts understand it anyway.

Huntington: We are just embarking on an office automation project where we are placing micros on 75% of the desks in the division — that is just starting up. Only the first 25 computers have arrived, and they are being installed on a top-on-down basis. I suspect this will underline the need for a business orientation, although as of yet we are not feeling any impact.

Colby: End-user computing is growing in leaps and bounds here. We have an information center with a couple hundred users, and it's growing at 100% a year. We find we are being called upon more and more to support this, to provide training and advice. Strangely, it has not adversely impacted the traditional central operations.

This announcement is neither an offer to sell nor a solicitation of an offer to buy these securities.
The offer is made only by the Prospectus.

December 15, 1983

BUSINESS LAND™

5,000,000 Shares

Common Stock

Price $10 Per Share

Copies of the Prospectus may be obtained from the undersigned only in States where the undersigned may legally offer these securities in compliance with the securities laws thereof.

L. F. ROTHSCHILD, UNTERBERG, TOWBIN — LEHMAN BROTHERS KUHN LOEB Incorporated

BLYTH EASTMAN PAINE WEBBER Incorporated — THE FIRST BOSTON CORPORATION — ALEX. BROWN & SONS

DILLON, READ & CO. INC. — DONALDSON, LUFKIN & JENRETTE Securities Corporation — DREXEL BURNHAM LAMBERT Incorporated

GOLDMAN, SACHS & CO. — HAMBRECHT & QUIST Incorporated — E. F. HUTTON & COMPANY INC.

KIDDER, PEABODY & CO. Incorporated — LAZARD FRERES & CO. — MERRILL LYNCH CAPITAL MARKETS

PRUDENTIAL-BACHE Securities — ROBERTSON, COLMAN & STEPHENS — SHEARSON/AMERICAN EXPRESS INC.

SMITH BARNEY, HARRIS UPHAM & CO. Incorporated — DEAN WITTER REYNOLDS INC.

ALLEN & COMPANY Incorporated — F. EBERSTADT & CO., INC. — A. G. EDWARDS & SONS, INC.

MONTGOMERY SECURITIES — MOSELEY, HALLGARTEN, ESTABROOK & WEEDEN INC.

OPPENHEIMER & CO., INC. — PIPER, JAFFRAY & HOPWOOD Incorporated — ROTHSCHILD INC.

THOMSON McKINNON SECURITIES INC. — TUCKER, ANTHONY & R. L. DAY, INC.

What's Hot! What's Not!

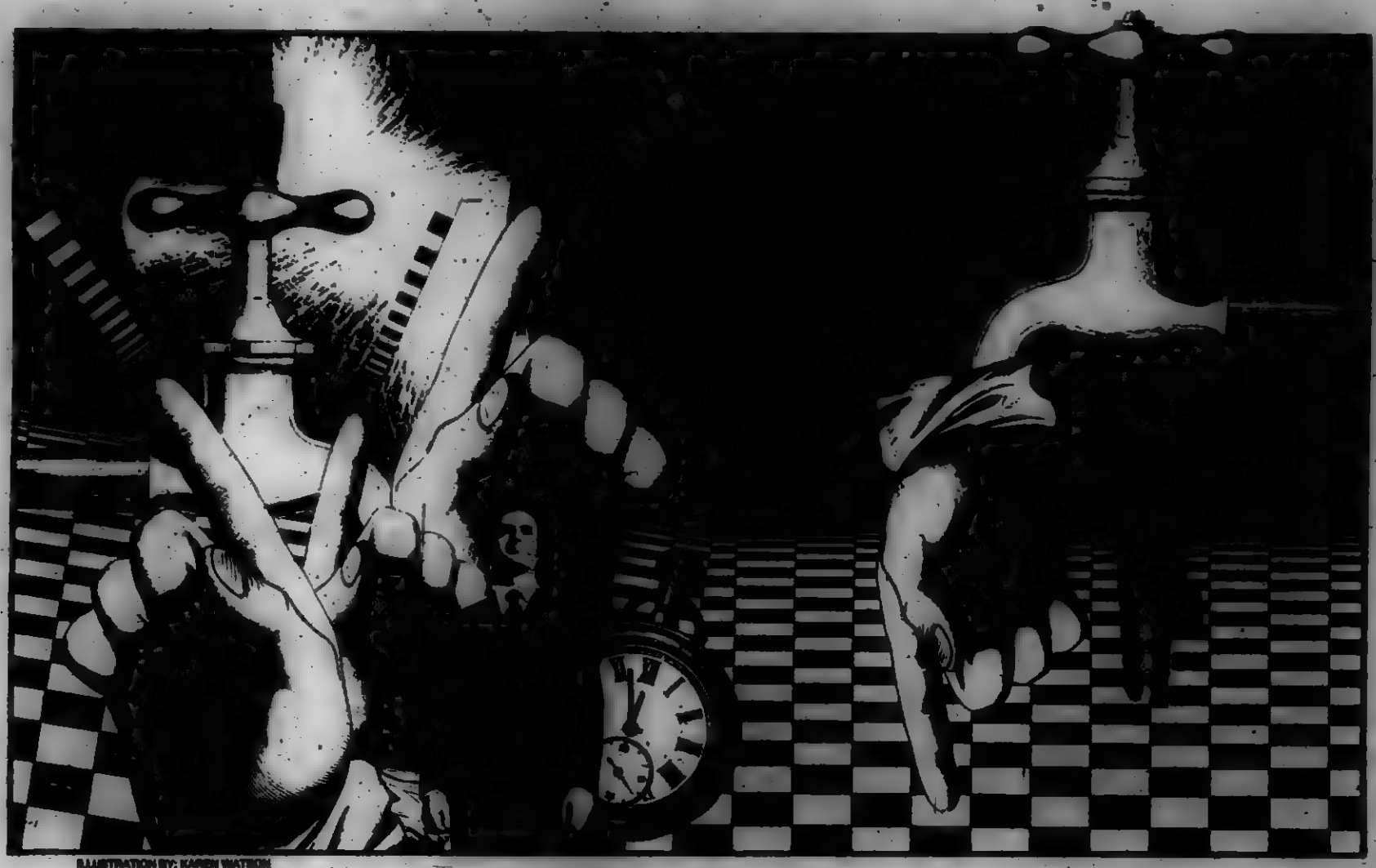


ILLUSTRATION BY: KAREN WATSON

By Jim Bartimo

Keeping track of the new products, technologies and buzzwords of the computer industry is as difficult as keeping track of the Top 40 hits in popular music — as soon as you get used to one, another one comes along to replace it.

In the ongoing effort to keep our readers up to date on new trends, *Computerworld* has compiled this list of upcoming and outgoing technologies as a guide for the confused. Readers are advised to use this list as but one source of information on an ever-changing industry.

What's Hot in Chip Technology

Digital Equipment Corp. last summer invested $26 million in Trilogy Ltd., a company promising to bring wafer technology to the computer industry [CW, Aug. 8]. Promising high reliability, wafer technology places all circuitry on a single 2½ sq-in. wafer instead of wiring hundreds of individual chips to boards. "We always talk about high tech, but this is an order of magnitude higher than high tech," according to David Dell, director of research services at the Diebold Group in New York.

Perhaps another few orders of magnitude higher than wafer technology is the **biochip** — the computer industry's attempt to turn living organisms into microchips. Some predictions call for a reduction in size by 500 times from current silicon chips, but others say the chips could be 30 years in the making.

Biochips are made from existing biosystems, such as large protein molecules, to produce electronic circuits and switches or by synthesizing an electron-trained molecule from scratch. Suspiciously close to reproducing the human brain, biochips would prove a boon because "the processing capacity of your brain is more dense than any chip," according to Kenneth Bosomworth, president of International Resource Development, Inc. (IRD), a Norwalk, Conn.-based market research firm.

What's Not Hot

If IBM, Bell Laboratories and Sperry Corp. say **Josephson junction circuits** are dead — they're dead. Research attempts to supercool circuits to reduce resistance and increase speed were dropped by all three organizations last year, short-circuiting British physicist

(Continued on Page 16)

Jim Bartimo is a senior editor/communications for Computerworld.

WHAT'S HOT AND WHAT'S NOT

(Continued from Page 15)

Brian Josephson's idea [CW, Nov. 14]. Silicon and gallium arsenide technologies are still best bets for the immediate future of processors.

What's Hot in Systems

There are 675 micro hardware products on the market today and 154 manufacturers, according to IRD. The microcomputer has hit the industry with a force strong enough to support some 100 microcomputer publications and employ countless third-party software developers. The question still weighing heavy on everyone's mind is: When will the micro market turn cold?

What's Not Hot

DEC stock last autumn took a one-day plunge of 21 points, following in a more drastic manner the lead of other minicomputer makers such as Data General Corp., Prime Computer, Inc. and Datapoint Corp. While the minicomputer will be with us for some time, it will most likely be best utilized in specialized niches such as office automation and engineering — leaving distributed data processing in the hands of its smaller brother, the micro.

What's Hot in Displays

Whether it turns out to be electroluminescent, liquid crystal or plasma, flat-panel displays will account for 50% of the computer displays within three years, according to Boscomworth. Since the general shape of things in the computer industry is tending toward miniaturization, the compaction of the CRT's footprint would be a natural development.

The IBM Personal Computer is hot.

The 5-in. display was hot in the days when Adam Osborne and his staff first showed it off. It's not hot anymore.

What's Not Hot

Adam Osborne will tell you — 5-in. display screens can be hazardous to your health. While his computer's peephole display screen wasn't the only reason his company filed for protection under the Chapter 11 bankruptcy statute [CW, Sept. 19], it didn't help.

What's Hot in Storage Technology

Boasting 4G bytes of storage and sometimes even more, one optical disk storage system can store the entire *Encyclopedia Britannica* if necessary. Optical disks grew out of the entertainment industry's marketing of movies to the home and, as a result, can store images as well as digital information.

While there are numerous applications for document storage already in place today, 1984 could well see a boom in erasable optical disks that are interchangeable with magnetic disk drives. "If there's a breakthrough in cost for erasable disks, they'll naturally take off," according to Hank Koehn, director of futures research for the Los Angeles-based Security Pacific Bank.

Vertical recording technology strives to stand magnetic bits of information on end instead of side by side on a disk as they are today. According to Diebold's Dell, this would have a compacting effect, leading to 4 billion bytes on one disk by 1985 and 15 billion bytes on a disk by 1990. "They wouldn't

COMMUNICATE WITH CECOM

For micro to mainframe communications, talk to Cecom, the nationwide specialists in software and hardware links between mainframes and personal computers. Cecom puts uploading and downloading of data as well as file sharing at the fingertips of your personnel while maintaining the data integrity and system security you require. That means improved communications through the complete interaction and integration of the micros in your organization.

If it's an entire system you need, talk to Cecom. With offices from coast to coast, Cecom also does total system and network configuration, re-engineering, and refurbishing to put together the communications package you need.

For more information about Cecom or their many services, call or write:

3795 Williston Road
Minnetonka,
Minnesota 55343

cecom
cecom, incorporated
We Communicate!

Call Collect:
(612) 938-7178
(201) 244-1560

"If you want to do OEM computer business in the U.S., you'd better go to the Invitational Computer Conferences in Boston, Dallas, Minneapolis, Orange County, Washington, D.C., Los Angeles, Ft. Lauderdale, ...We do!"

Experienced marketing management knows that the best way to reach the technical decision maker/buyer is to meet him where he lives and works, demonstrate operating equipment and provide him with the technical information he needs. Over the past 12 years successful marketers have found the Invitational Computer Conferences to be the most cost-efficient, effective method of covering their U.S. computer industry customer base.

The exclusive, one-day OEM conferences will be held in ten major market areas throughout the United States and are attended by a select, invited audience of OEM's, systems houses and quantity end users. Guests can attend a variety of technical seminars and view operating displays of the newest computer and peripheral equipment. The informal setting makes it easy to meet with potential customers one-on-one and the simple tabletop displays keep exhibit costs at a minimum.

Sept. 15, '83	Newton, MA
Sept. 29, '83	Minneapolis, MN
Oct. 18, '83	Valley Forge/ Philadelphia, PA
Oct. 20, '83	Washington, D.C./ Vienna, VA
Nov. 8, '83	Houston, TX
Nov. 10, '83	Dallas, TX
Jan. 9, '84	Irvine, CA
Feb. 7, '84	Ft. Lauderdale, FL
Feb. 28, '84	Los Angeles, CA
Mar. 1, '84	Palo Alto, CA

For more information:
B.J. Johnson & Associates, Inc.
3151 Airway Ave. #C-2
Costa Mesa, CA 92626
(714) 957-0171

WHAT'S HOT AND WHAT'S NOT

look a hell of a lot different, but there would be 100 times the density [of information]," Dell said.

What's Not Hot

Last year at this time, microcomputer users were barraged with multiple sizes in disk drive offerings, and many wondered which one would end up being the standard. Now, it looks like the use of 8-in. disk drives and 3½-in. disk drives will not reach widespread use in the microcomputer market. With even advanced micros such as the Apple Computer, Inc. Lisa settling on 5-in. drives, the micro market has at least one standard by which to live.

What's Hot in Memory

"Nonvolatile" will be the name of the memory game next year, and the winner in the portable terminal and computer market will remain Cmos. Currently featured in notebook computers from Radio Shack, Epson America, Inc. and NEC Information Systems, Inc., Cmos allows internal memory to remain intact with a power source as small as four AA batteries. "The price is coming down and will continue to drop by 40% per year," Dell predicted of Cmos.

What's Not Hot

A clear parallel to Cmos is magnetic bubble memory, which utilizes no power source at all to maintain memory, but instead relies on magnetic bits to line up in rows after the power source is shut down. What's the problem with magnetic bubble? Its high price tag has not captured the support of many vendors, and a lack of vendor support has lead to a continued high price tag.

What's Hot in Software

"People in the home and in business don't have the time to fool around with software," Koehn said, so windowing capability and integrated software packages are among the hottest items in software.

Introduced by Xerox Corp. in its office automation workstation, the Star, windows allow the user to treat the computer screen like a desktop where various files can remain open simultaneously. Third-party software houses such as Visicorp have developed windowing for the IBM Personal Computer, and the Apple Macintosh (when introduced in January) is predicted to feature similar windowing to the company's Lisa.

Keeping the users' needs in mind, integrated software — such as that found in Lotus Development Corp.'s 1-2-3, Sperry Corp.'s Sperrylink office system and DEC's All-in-One software — allows users to transfer data, text and graphics easily from one file to another. If Comdex/Fall '83's 20 introductions of integrated packages is any indication, this type of software will remain popular throughout the next year [CW, Dec. 5].

What's Not Hot

With integrated software and powerful data processing available for under $10,000 with a microcomputer, hooking up a dumb terminal to a remote host in a time-sharing configuration has become less and less necessary. "The next five years will see an almost total disappearance of the raw computer utility concept," Ed Metz, senior vice-president at Input, Inc., told *Computerworld* last September.

What's Hot in Communications

Last year was the year of the nonblocking private branch exchange (PBX) telephone system, which promised the ability to switch data and voice with equal efficiency. Dubbed "the next-generation PBX," nonblocking architectures, such as those from Intecom, Inc., Ztel, inc. and finally Rolm Corp., suggested that local-area networks could be best

(Continued on Page 18)

Optical disk storage is hot.

American Red Cross

We'll Help. Will You?

ELECTRONIC MAIL UNDER CICS

Streamline Communications
Reduce WATS, Fax, Telex
and Express Mail Charges

Some of the major features of SYSM® include:
- Easy to use
- 327X/328X support
- Dial-up TTY support
- Simple commands
- Menu driven
- In/out baskets
- Broadcast to groups
- Forward with comments
- Full security
- DOS, VS1, MVS, CICS

Here's two good reasons why you should call today:
- 30-day free trial
- Site license
  $12,000 DOS
  $14,000 OS

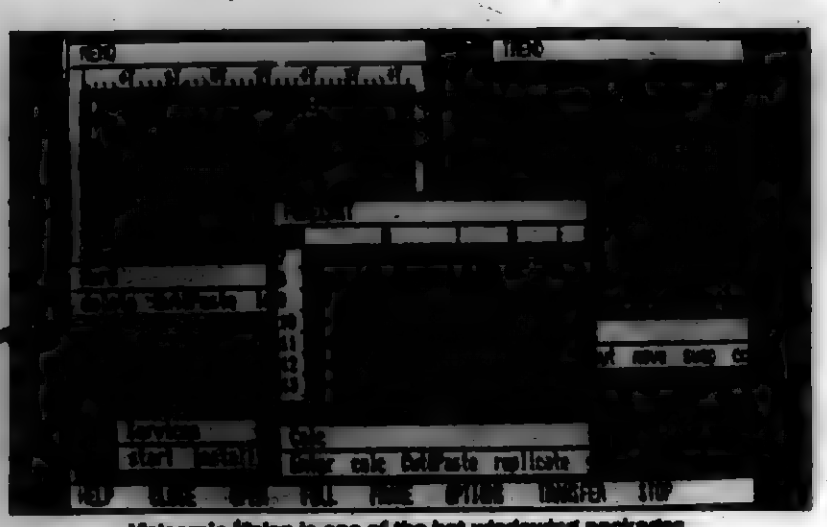
CALL:
(208) 377-0336

H&W™
COMPUTER SYSTEMS, INC.

H&W Computer Systems, Inc. P.O. Box 4785, Boise, Idaho 83711-4785

CICS Solutions

WHAT'S HOT AND WHAT'S NOT



Visicorp's Vision is one of the hot windowing packages.

(Continued from Page 17)

achieved through existing telephone wiring.

Nonblocking "allows one port access to every other port," according to Edward Horrell, president of the Memphis, Tenn., consulting group, Mitchell & Horrell, Inc. "Now that data is on the line as well as voice, nonblocking is important because data can't tolerate the delays that voice can."

Industry pundit Dixon Doll, president of the DMW Group, Inc., predicted that "every vendor planning to offer voice and data switching will commit to nonblocking."

What's Not Hot

There is no shortage of reasons why video teleconferencing is not taking off as was once expected. While teleconferencing was predicted to cut travel expenditures by allowing video meetings to take place over data lines, the unfamiliarity of the technology seems to be too much of a hindrance.

"We have a lot to learn about how people interact," Koehn said. "People become controlled, and there's less friendly banter with videoconferencing. There's also a lot of nonverbal signaling going on [that isn't picked up through teleconferencing]."

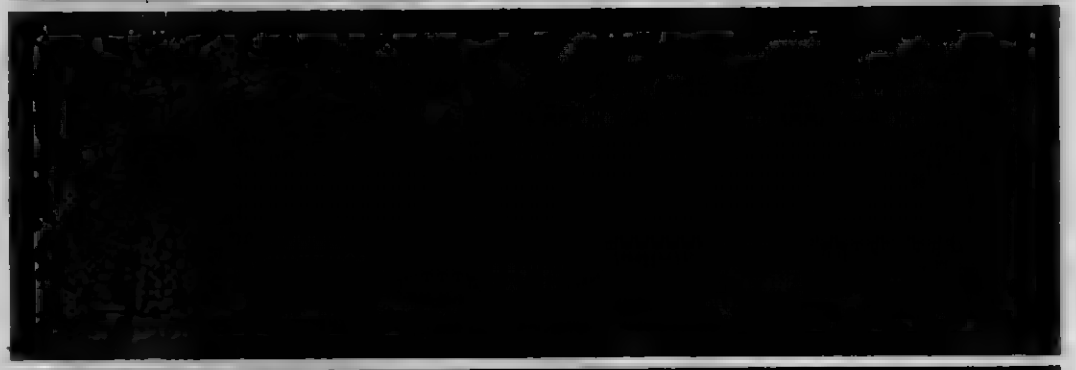
What's Hot in Computer Crime

The movie *War Games* did more for the reputation of computer hackers than any teenage whiz kid could have in his best system-cracking days. The media jumped on almost every prosecution — including the 414s and the Wizard of Arpanet — with an unusual fervor [CW, Sept. 12]. Why the sudden interest in hackers? If these kids can crack these systems, perhaps computers are not so threatening to the public after all.

What's Not Hot

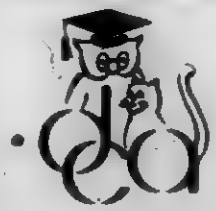
For the sixth year in a row, the U.S. Congress has failed to act on a federal computer crime bill that would make the misuse and abuse of computers a federal crime. While Rep. Bill Nelson (D-Fla.) vowed at the start of the congressional session to push through the controversial H.R. 1092, the bill never got any further than subcommittee hearings [CW, Nov. 28].

Ten Management Seminars on Vital Problems in Data Processing



FOR A FREE CATALOG, PLEASE SEND IN THE FORM BELOW

DIGITAL CONSULTING ASSOCIATES, INC.



339 Salem Street
Wakefield, MA 01880
(617) 246-4880

Name _____
Title _____
Company _____
Division/Branch _____
Street _____
City _____ State _____ Zip _____
Phone Number _____

What business does a handsome dog like me have with a top cat like you?

My name's McGruff, and it's my business to help prevent crime. I think it should be your business, too—to teach your employees how to protect themselves. Just send for my business kit—it'll help you develop a program that teaches your employees how to make their homes burglar-proof, make their neighborhoods safer, even how not to get mugged.

So take the time, and...

TAKE A BITE OUT OF CRIME

Write to McGruff, Crime Prevention Coalition, 20 Banta Place, Hackensack, NJ 07601 for lots of information on Crime Prevention.

A message from the Crime Prevention Coalition, this publication and The Ad Council.

Ad Council ©1980 The Advertising Council, Inc.

Micros And the End User

A Passing Fancy?

By Jeffry Beeler

The sometimes sweet, sometimes stormy romance between big business and small computers is entering a new phase in its evolution—a development that confronts management information systems (MIS) directors with significant management and technological issues as they look ahead to 1984.

Only a few years ago, the question that dominated conversations among prospective buyers of commercial personal computers went as follows: Are microcomputers just a passing fancy, mesmerizing but hopelessly impractical playthings, or will they take their place alongside other business machines in large corporations and prove their mettle in serious, demanding applications?

Jeffry Beeler is a Computerworld West Coast correspondent.

Since then, the question has been answered with resounding finality. What began between big business and personal computers as a harmless flirtation and progressed into casual courtship has blossomed into a passionate love affair and is now hurtling inexorably toward engagement and a rendezvous at the altar. At the least, the pair is already openly cohabiting, as evidenced by the growing list of Fortune 1,000 companies where personal computers are invading work places by the hundreds and thousands.

But today, the focus of concern in the big business-personal computer relationship is beginning to shift to a second, perhaps even more urgent, question: Will the union work? More importantly, will the once-promising marriage ultimately prove a mismatch, leaving both sides permanently scarred and plunging them into discord?

The answers to the above questions may take years to fully reveal themselves, although some tantalizing clues have already begun to emerge and no doubt will continue to do so as 1984 progresses.

In the meantime, opinion on the subject remains sharply divided. Some industry observers — including Dr. Lew Glendenning, director of information systems research at San Jose, Calif.-based Strategic, Inc. — view the future of business microcomputing fairly optimistically. Citing the results of his own company's recent market research, Glendenning credits personal computers with already having cut large companies' costs, boosted worker efficiency and productivity and won "strong [user] support." He also cites fresh research findings to support the frequent vendor claim that

(Continued on Page 20)

MICROS AND THE END USER

(Continued from Page 19)
micros can make major inroads into the big business world's huge application backlogs — a serious problem that has defied solution for years.

Echoing Glendenning's optimism on the application backlog question is Connecticut Mutual Life Insurance Co. Vice-President Ted Stein, who bases his opinion on his own firm's recent experiences with 1,000 networked IBM Personal Computers. "Many of the programs that [corporate computing departments] have never gotten around to developing are small and personal and are the sort of thing that end users could frequently do themselves," he said.

"So if they have the right hardware and software tools at their disposal, users will be able to ease the application backlog because they know the subject matter in question much better than any programmer or systems analyst."

Not everyone, however, views the future relationship between large corporations and personal computers quite so rosily. One such skeptic is independent DP consultant Gopal Kapur, who foresees an impending information systems crisis unless big businesses speedily supplement their microcomputer acquisitions with significantly improved management techniques.

For years, Kapur said, most large user organizations have woefully neglected to impose strict standards and sound management procedures on their in-house software development operations. The unfortunate result has been programming projects that all too often exceed their budgets, miss their implementation deadlines and produce systems that either reek with errors or fail to work as expected.

Although the absence of standards and effective management has caused untold grief, the situation offers at least one minor consolation: Because most programs until recently were written exclusively on mainframes, with all their inherent inefficiencies, systems-related catastrophes could usually be counted on to develop at a reasonably sedate pace. But with the recent proliferation of micros, the speed with which applications or data can go seriously awry has been dangerously accelerated.

"It's a little like having a berserk person running around inside your organization," Kapur said. "If you give the person a baseball bat, he could hurt a lot of people. But think how much more harm would be done if you gave the same individual a machine gun." Thus, in the absence of careful control over software-development activities, personal computers threaten to aggravate greatly the very problems they were expressly designed to solve.

The mass importation of microcomputers into the big business arena may also stimulate another potentially harmful trend — an increased willingness by nontechnical end users to "decouple" themselves from their corporate MIS organizations, Kapur said. After years of abuse and neglect at the hands of their DPers, many users are increasingly looking to micros as their deliverance.

Another personal computer problem that will grow in importance during the coming year is the issue of end-user training, which many corporations thus far have sorely neglected, according to Microcomputer Managers Association founder James Haner. Snowed by a recent spate of television advertising campaigns, many computing novices have been misled into believing that they can learn to use their micros in a matter of minutes.

If the training issue is not addressed, commercial personal computers may receive "only about one hour of use per month rather than 10 hours every week," according to Aaron Goldberg, research manager for International Data Corp. of Framingham, Mass.

Fill in your IBM micro/mainframe communications picture.

AST Research, the leader in IBM PC enhancement products, brightens your micro/mainframe communications picture with a full palette of economical, integrated hardware/software masterpieces. With AST Products, you can emulate IBM terminals or create PC-based Local Area Networks.

AST improves your office operating cost picture.

AST communications products give your IBM PC the flexibility to act as a terminal for your host system or as a stand-alone computer for smaller tasks. Your PC won't bog down the mainframe with unnecessary small jobs and local computing on the PC eliminates phone line charges too. Get the power of a mainframe when you need it and personal computer convenience right at your fingertips.

Applications solutions that are shrines of genius.

AST keeps pace with your ever-changing applications requirements with reliable, high quality, cost effective communications products. AST products provide support for Bisync and SNA/SDLC communications protocols as well as networking multiple PCs for sharing resources.

Choose AST products — by the numbers.

These AST communications packages are currently available:

1. AST-SNA™ emulates a 3274/3276 controller and 3278 or 3279 display terminal using SDLC protocol.
2. AST-BSC™ emulates 2770 batch RJE and remote 3270 display terminals using 3270 Bisync protocol.
3. AST-PC3X™ allows your PC to connect to an IBM 3274/3276 cluster controller via coax cable and emulates a 3278 or 3279 display terminal.
4. AST-3780™ emulates 2770, 2780, 3741, and 3780 RJE workstations using Bisync protocol.
5. AST-5251™ emulates a 5251 Model 12 remote workstation connected to an IBM System 34, 36 or 38.
6. PCnet™ is the first Local Area Network designed specifically for the IBM PC or XT and the PC-DOS 1.1 or 2.0 operating system.
7. DC-232™ is a user-programmable dual-port card-cassette™ communicating in Async, Bisync, SDLC or HDLC protocols.

Discover how well AST can fill in your micro/mainframe communications picture. For descriptive data sheets, write or call: AST Research Inc., 2121 Alton Ave., Irvine, CA 92714. (714) 863-1333. TWX: 2953708ASTRES

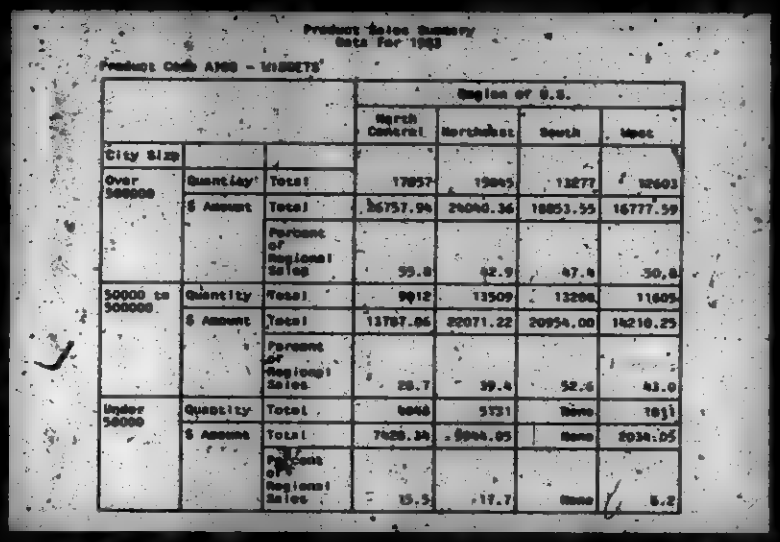
AST RESEARCH INC.

Number One Add-Ons For IBM PC.

Attention:

Data base administrato
IMS-DL/I programmers
SAS users

SAS/IMS-DL/I saves you time



Product Sales Summary
Data For 1983

Product Code A900 - WIDGETS

			Region of U.S.			
			North Central	Northeast	South	West
City Size						
Over 500000	Quantity	Total	17857	13965	13277	12603
	$ Amount	Total	36757.94	26040.36	18853.55	16777.59
		Percent of Regional Sales	55.8	42.9	47.4	30.8
50000 to 500000	Quantity	Total	9012	13509	13208	11605
	$ Amount	Total	13787.86	22071.22	20954.00	14210.25
		Percent of Regional Sales	20.7	39.4	52.6	43.0
Under 50000	Quantity	Total	6048	5131	None	7811
	$ Amount	Total	7428.34	9968.05	None	2034.05
		Percent of Regional Sales	13.5	17.7	None	6.2

MICROS AND THE END USER

Will Apple Steal IBM's Micro Mart Thunder?

By Tam Hamlet
CW Staff

IBM dominated the microcomputer market during 1983. And it will probably do the same in 1984.

In addition to major IBM announcements, such as the 3270 Personal Computer and the Personal Computer XT/370, the Personal Computer and Personal Computer XT were doing so well that IBM could not keep pace with the demand.

The situation spawned a host of vendors willing to manufacture anything that could be plugged into an IBM micro, including IBM-compatible disk drives, memory expansion boards, printers, plotters, tape drives and keyboards.

By all predictions, 1984 will bring much of the same. But Apple Computer, Inc. may try to steal IBM's thunder.

For Apple, 1984 may be a make-or-break year. While IBM has been wallowing in the success of its Personal Computer, sales of Apple's latest entry, the Lisa, have been less than impressive. Prospective buyers have shunned the Lisa, contending the machine is too expensive, is incompatible with current Apple systems and does not offer easy access to IBM mainframes.

According to Michael Killen, president of Strategic, Inc., a Santa Clara, Calif., market research firm, IBM's success — and Apple's lack of it — is a classic case of good product marketing over bad.

According to Killen, Apple made an incredible blunder when it announced the Lisa, a processor that originally cost about $10,000 (it now costs about $8,000). Current Apple users could not upgrade to the Lisa, and new users were hesitant to make a heavy investment in a machine that did not offer IBM compatibility, he explained.

"The Lisa is going to dangle out there," Killen said, comparing the processor to the earlier, somewhat ill-fated Xerox Corp. Star, an intelligent workstation that offers capabilities similar to the Lisa, including multiple windows and business graphics. The Star was announced in 1981 with a $16,000 price tag. So far, industry watchers agree, the Star has not been a successful product for many of the same reasons the Lisa has not been a hot seller.

Noting that many corporate micro users also use IBM mainframes, Killen said, "I can't see any IBM shop getting involved with another family of machines, like Lisa, when it can buy a carload of machines for the [Personal Computer]."

Apple is expected to ring in 1984 with a flurry of product announcements, including the much-touted Macintosh. Some industry watchers believe the early 1984 announcements are Apple's attempt to lash back at IBM.

The Macintosh, according to Ralph Wagner, president of Microsource Financial, Inc., a Watertown, Mass., computer dealer, will do everything the Lisa can do for around $3,000. Other industry watchers, such as Tod Corenson, a vice-president at Eaton & Associates, a Cupertino, Calif., market research firm, feel the Macintosh will be the entry-level Lisa now missing from the Apple lineup.

In either case, the Macintosh appears to offer Apple stronger ammunition for landing corporate accounts. The question is whether the Macintosh will meet analysts' and users' expectations and whether Apple can successfully market the device to raise corporate eyebrows.

Lisa Enhancements

Apple is reportedly planning enhancements to the Lisa. Corenson said planned enhancements include: a rewrite of the Lisadraw graphics package that is said to be four times faster than the currently available version; a revision of Apple's Pascal compiler; and the availability of Xerox's Smalltalk operating environment on the Lisa. The addition of IBM compatibility, such as a linkup to IBM's Systems Network Architecture, would also improve Lisa's image among corporate accounts, Corenson noted.

Apple's Achilles' heel appears to be a lack of presence in Fortune 500 firms.

"We've had the best year ever in terms of volume with Apple," Wagner said. But he quickly noted many of those sales were to public schools and not corporations.

However, IBM has its problems, too. While IBM appears to have gained control over the largest corporate microcomputer accounts, "there is an absolute finite supply of products from IBM," Wagner said. Pointing to the almost weekly announcements of IBM-compatible microcomputers, Wagner said IBM's delivery problems tend to give competitors about a year to develop competing products.

WHEN YOU'RE READY
OUR PC PLUS KIT
WILL BE WAITING

10mb Internal Upgrade

When you're ready to boost your storage capacity from 640K to 10mb without boosting power and without eating up desk-top space, our internal PC PLUS will be just a phone call away.

Waiting to give you all the capacity of the *XT at a price that saves you hundreds of dollars compared to the cost of trading up.

The DSS PC PLUS kit uses a half-height 10mb Winchester disk drive that gives you all the benefits of Winchester technology — increased data integrity, faster access — without taxing the power supply. It also includes a Winchester disk controller that is *IBM formatted.

The DSS PC PLUS kit presents the storage solution you need now. What are your data storage needs? At DSS, we do much more than sell components. We create solutions.

The DSS PC PLUS kit includes:
— 10mb half-height disk drive
— DSS Controller
— Full height front bezel
— Mounting hardware
— Cables

Features and Benefits
— *Increased capacity*
— *Increased access time*
— *Upgradeability*
— *No additional power requirements*
— *Enhanced cooling*
— *One board controller solution*
— *Operates with 1.25 MS-DOS through 2.0 MS-DOS*
— *Internal upgrade*
— *1 10mb half-height Winchester = 31 floppy's*
— *Increased data integrity*

Retail price: $2250
from the dealer nearest you

DSS
2907 N. 55th St., No. 5 Boulder, Colorado 80301 303/449-7587 Toll Free: 800-951-PLUS
Data Storage Solutions, Inc.

*XT is a registered IBM trademark

Micro-Mainframe Links

PHOTO © 1984, GEORGE DILLON

Making the Connection

By Paul Gillin

The wait is almost over.

The micro-mainframe link — the great software buzzword of 1983 — is set to become a widespread reality in 1984. Rarely has a single software technology so captured the attention of the computer industry. And probably never before has a largely unavailable technology been the subject of so much anticipation and speculation.

The micro-mainframe link was the subject of dozens of product announcements in 1983 by companies that included four of the top five independent packaged software vendors and both of the leading makers of microcomputer spreadsheet packages. However, with most of the products not scheduled to be available until early 1984, the opportunity to evaluate the various approaches has not yet been realized.

The clamor for such products is not surprising. The 1982 installed base of 1.6 million microcomputers in corporate environments is expected to grow to more than 19 million by 1985, according to International Data Corp. (IDC), the Framingham, Mass.-based market research firm.

The user demand for access to business data has sent DP managers scurrying to find any way to tie micros into their corporate mainframes. International Resource Development, Inc. (IRD), located in Norwalk, Conn., predicts that users will spend more than $500 million on micro-mainframe communications in 1984 [CW, Dec. 5]. An IRD study found that nine out of 10 Fortune 500 companies surveyed were either implementing or seriously studying programs in this area.

So far, the demand for link products has outstripped the ability of most vendors to respond with technically sophisticated offerings. The links announced this year have taken nearly as many forms as the vendors offering them. And while many claims have been made, relatively few products have actually been delivered. Those that have been unveiled are only a first step in what observers believe will be a flood of very sophisticated links that will become available over the next few years.

The end result may be a shakeout

(Continued on Page 25)

Paul Gillin is senior editor/software for Computerworld.

SWIG©

SOFTWARE WRITERS INTERNATIONAL GUILD

THE LARGEST PAID MEMBERSHIP PROGRAMMERS GUILD - OVER 5,000 MEMBERS WORLDWIDE!!

SCHEDULED SWIG ACTIVITIES & MEMBERSHIP BENEFITS

(1) $10,000 PROGRAMMING CONTEST (Members only)

(2) NATIONAL COMPUTER WEEK (May 11-May 20, 1984)

(3) ANNUAL CONFERENCE AND SOFTWARE AWARDS CEREMONY (During National Computer Week)

(4) CONSULTANT REGISTRY (With computer store referral system for customized software)

(5) JOB PLACEMENT SERVICE (Free to individual members, fixed maximum fee to companies)

(6) FREE SEMINARS & MEETINGS LOCALLY

(7) SOFTWARE LIBRARY LENDING & EXCHANGE SERVICE (Professional quality assemblers, utilities, games, etc.)

(8) SOFTWARE LOCATION SERVICE (For companies & individuals-if it exists, SWIG will find it. If not, see #9)

(9) SOFTWARE DEVELOPMENT SERVICE (From novice to scientist, SWIG members can work on any project-from applications to games to R&D)

(10) LEGAL SERVICE

(11) AGENT (SWIG can represent you in sales to software publishers)

(12) 24 HOUR - 7 DAY BULLETIN BOARD SYSTEM (BBS) ACCESSIBLE BY COMPUTER FREE

(13) AND MORE!!!!

MEMBERSHIP APPLICATION FOR SOFTWARE WRITERS INTERNATIONAL GUILD

NAME _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

PHONE # ( ) _____

- CLASSIFICATION:

  ☐ NOVICE ☐ BEGINNER TO ADVANCED

  ☐ ADVANCED WITH ON THE JOB EXPERIENCE ☐ RESEARCH/SCIENTIST

- WHAT EQUIPMENT DO YOU HAVE EXPERIENCE WITH &/OR ACCESS TO &/OR PLAN TO BUY?

  ☐ MAINFRAME ☐ MINI ☐ MICRO ☐ DESIGN/R&D

  BRAND NAME(S): ☐ IBM ☐ XEROX ☐ APPLE ☐ TI

  ☐ COMMODORE ☐ RADIO SHACK ☐ ATARI ☐ OSBORNE

  ☐ TIMEX/SINCLAIR ☐ NORTH STAR ☐ HEWLETT PACKARD

  ☐ OTHER _____

- AREAS OF INTEREST:

  ☐ DATA PROCESSING ☐ BUSINESS APPLICATIONS ☐ GRAPHICS

  ☐ LEGAL ☐ VOICE ☐ MEDICAL ☐ APPLIANCE (HOME) CONTROL

  ☐ ROBOTICS ☐ GAMES ☐ MUSIC ☐ R&D ☐ OTHER _____

- MEMBERSHIP ACTIVITIES AND SERVICES OF INTEREST:

  READ THE LIST ON THE LEFT AND CIRCLE THE NUMBERS BELOW THAT APPLY.

  1 2 3 4 5 6 7 8 9 10 11 12

☐ I HAVE ENCLOSED $20 ANNUAL MEMBERSHIP FEE ☐ CK ☐ MO
(MAKE CHECK PAYABLE TO: SWIG)

RETURN TO: SWIG
P.O. BOX 87
STONY POINT, NEW YORK 10980
(914) 354-5585

SWIG© SOFTWARE WRITERS INTERNATIONAL GUILD

MICRO-MAINFRAME LINKS

(Continued from Page 23)
in the market for micro-mainframe links that could severely affect those vendors whose technology does not offer significant added value over and above the early "vanilla" links, which were essentially terminal emulators.

But despite the problems that lurk down the road, those vendors who delivered links this year have found them enormously successful.

Management Science America, Inc. (MSA), which was the first mainframe software vendor to enter the market when it introduced its Peachlink in December 1982, attributes more than $5 million in combined mainframe and micro software sales directly to the link's introduction. McCormack & Dodge Corp., which began delivering its PC Link package in July, has chalked up more than $2 million in sales of its link alone.

"Many users are buying our product without even looking at it," commented Robert Weiler, McCormack & Dodge's vice-president of marketing. "They buy it because they like our company, and I'm sure the same applies to MSA."

Stamp of Approval

As in the personal computer market, it was IBM that legitimized the micro-mainframe link concept this year with its October announcement of the 3270-PC and the Personal Computer XT/370.

The 3270-PC, which is the more end-user-oriented of the two products, offers the ability to run concurrent applications from multiple mainframes in a terminal emulation mode using windowing techniques.

David Ferris, chairman of Ferrin Corp., a San Francisco-based personal computing support firm, called the IBM 3270-PC "numerically the much more important announcement. Large companies have been holding off on [IBM] 3270 purchases and getting terminal emulators instead. But a lot of them would prefer to wait and buy that emulation directly from IBM."

The two announcements "have echoes that will be with us for a long time," added Thomas O'Flaherty, a principal consultant with Input, Inc. in Saddle Brook, N.J.

In addition to establishing itself as a vendor of a full line of communicating hardware, IBM has set a bar over which all other competitors must leap, O'Flaherty said. "This will have vendors worried because they'll always be a couple of steps behind IBM," he stated.

For the moment, however, competitors are welcoming IBM's endorsement of the linkage concept. "IBM is telling us people will want to access mainframe data, so it can't help but improve the market," McCormack & Dodge's Weiler observed.

He believes the link market is beginning to resemble the packaged application software field of the late 1960s, when IBM's endorsement opened the door for independent vendors who provided improved functionality over the Big Blue offerings.

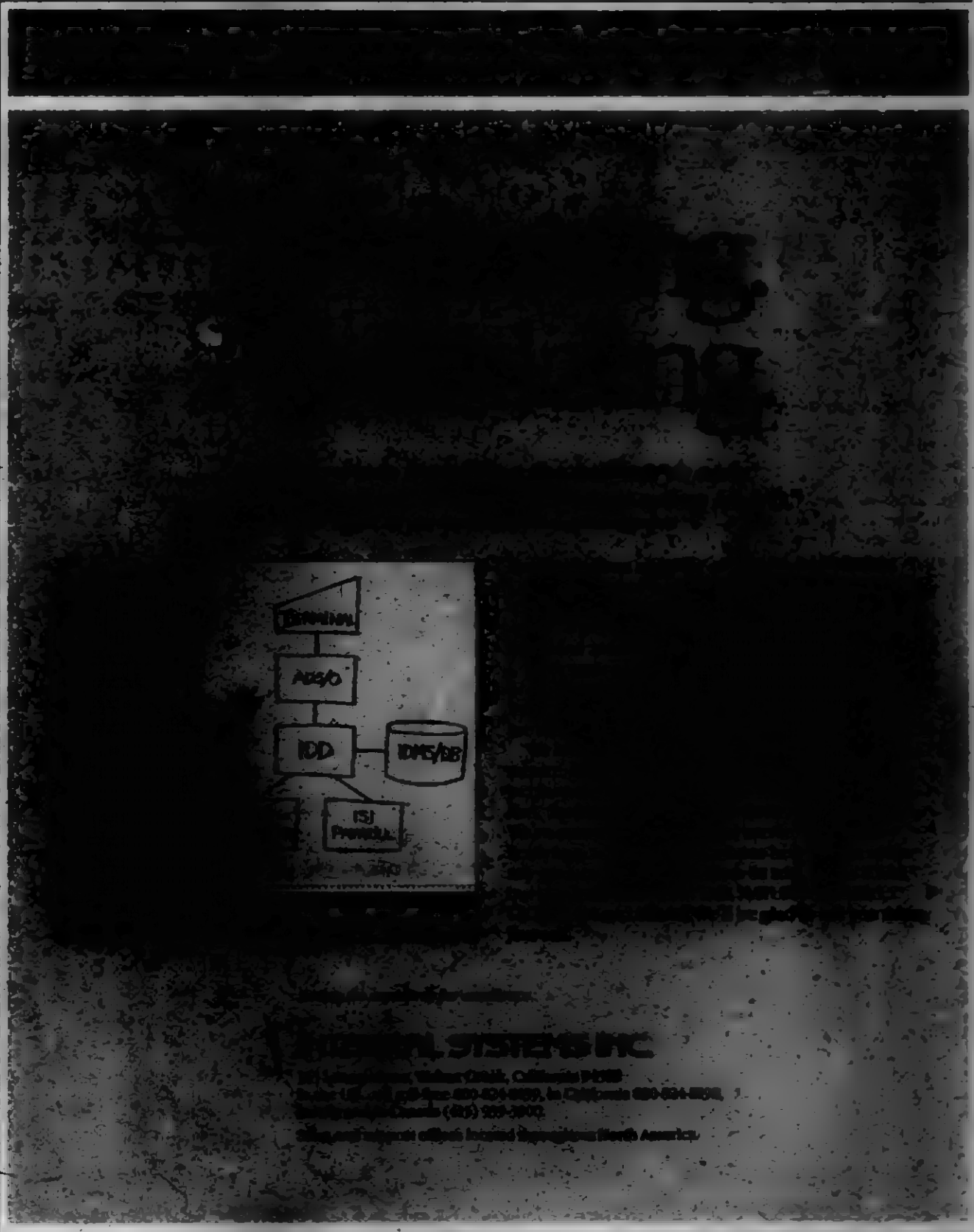
"The key for us," Weiler said, "is to stay ahead of IBM technically and to offer attention to the individual customer. That's what made the independents flourish in the first place."

Four Categories

Micro-mainframe connections currently fall into four general categories, according to "Communications Software: Forging the Micro-to-Mainframe Link" from IDC. These include:

- Dumb terminal or terminal emulation, allowing transfer and receipt of data in the host format.
- Data download, in which the data from the host becomes a file stored locally on the microcomputer.
- Information download, in which files are structured and formatted for a specific purpose.
- Active information extraction, in which software

(Continued on Page 36)



MICRO-MAINFRAME LINKS

(Continued from Page 25)

on both host and microcomputer allow the user to select the desired data.

A host of terminal emulation and download products are now available for nearly every large system and most micros. But the major announcements of this year have fallen into the latter two categories, with each vendor offering its own unique capabilities.

MSA's Executive Peachpak II, for example, allows real-time downloading of multiple "mini data bases" on MSA mainframe applications directly into a format that can be run on several popular microcomputer packages.

Data Extraction

Visionswer-Answer/DB, a jointly announced product from Informatics General Corp. and Visicorp, allows the IBM Personal Computer to extract data from a variety of different data bases. Applied Data Research, Inc. (ADR) and Visicorp's Vision-based software integrates Visicorp applications with 10 ADR mainframe products including data base management, decision support, program development and office automation.

Computer Corp. of America's PC-204 offers a transparent user interface and automatic reformatting of mainframe files on the company's Model 204 DBMS to run on Lotus Development Corp.'s Lotus 1-2-3. McCormack & Dodge's Interactive PCLink allows real-time uploading of Personal Computer files to update the mainframe data base.

Cullinet Software, Inc.'s Personal Computer System features proprietary IBM Personal Computer software tied to an extracted data base on the mainframe, offering virtual mainframe storage, communication between microcomputers via the extracted data base and an indirect interface to other data base management systems.

These products give users a broad and diverse range of options from which to choose. Yet some significant shortcomings are already becoming apparent, observers say.

"The most glaring shortcoming is that they're not really out there," observed James B. Rothnie Jr., executive vice-president of Computer Corp. of America. "The shape of the market will be a lot different in 1984, after the users get some experience."

Satisfied With Less

O'Flaherty noted that despite vendor claims of technically elegant features, most users for the moment will be satisfied with far less. "Many people in DP are frightened of having users roam around in their on-line files, anyway," he said. "Right now the most important features are simple file transfers. We have to walk before we can run."

Mac Lewis, president of Systems Center, Inc. in Irving, Texas, pointed to the reliance of most links on terminal emulation as a fundamental weakness. "Most of the products are using the [Technical Analysis Corp.] Irma board, which allows the [personal computer] to plug via a coaxial cable into an [IBM] 3274 cluster controller," he said. "That limits the mainframe to having to deal with [IBM] 3270 data streams. All they can really transfer effectively is text-type information."

Lewis believes the next major innovation to come down the micro-mainframe pike will be a tie into IBM's Systems Network Architecture to allow loading of entire control blocks including binary data. Such a capability could overcome the problem posed by terminal emulation that requires data to be re-keyed or reformatted in order to fit

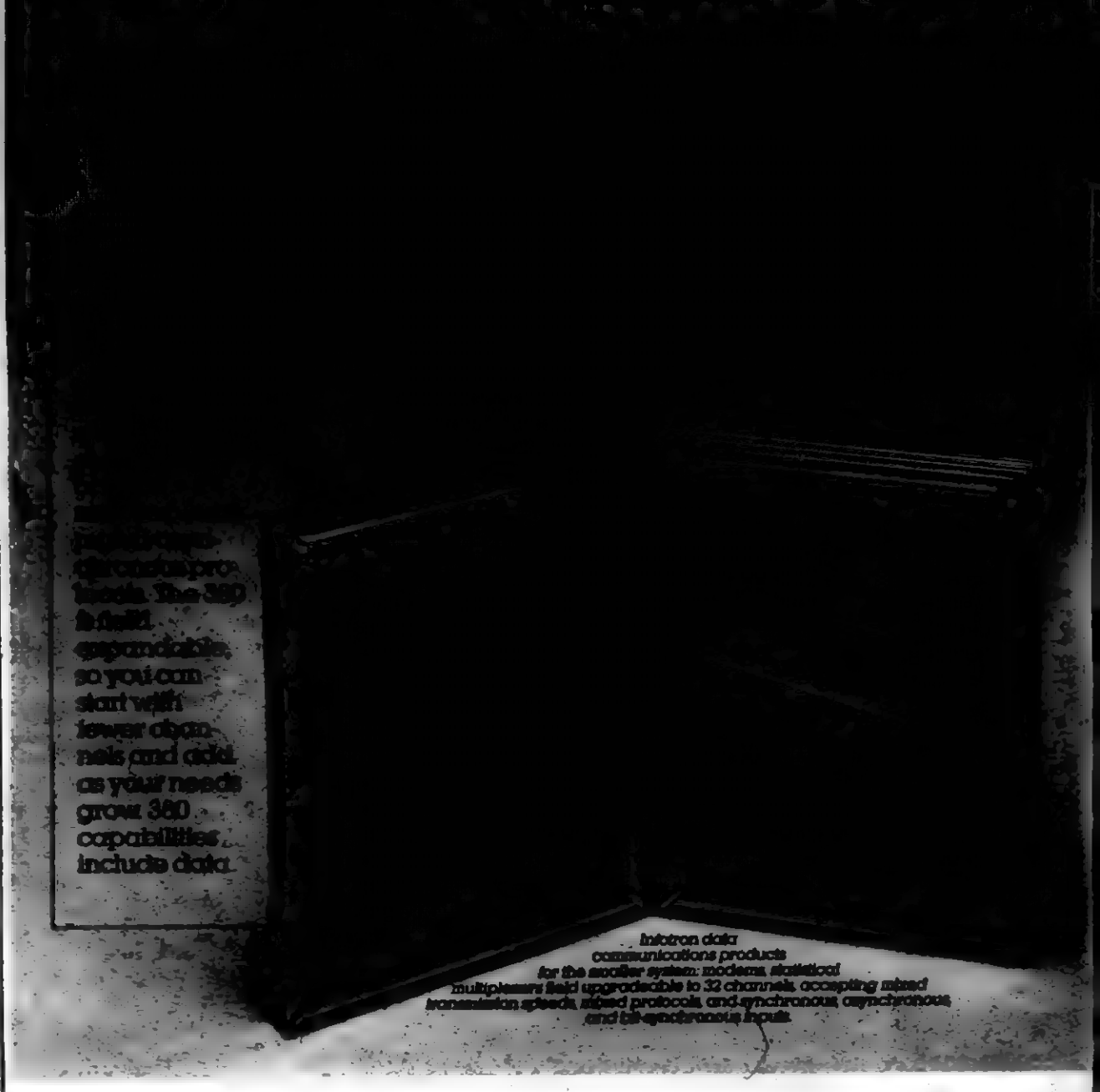
(Continued on Page 27)

Management Science America, Inc.	100	Applications	Accounting, Human Resources, Manufacturing
Cullinet Software, Inc.	68	Data Base	DBMS, Program Design, Report Generation, Query, Banking Info Applications
University Computing Co.	62	Applications/ Data Management	Performance Measurement/System Management, Program Support, Data Management, Accounting, Bank, Manufacturing
Visicorp	36	Analysis Tools	Analysis
On-Line SW International	14	Program Design	Program Support, Program Design

IDC Chart

Independent Packaged Software Vendors Offering Micro-to-Mainframe Links

How to put yourself into data communications And still keep tomorrow



Intotron data communications products for the smaller system: modems, statistical multiplexers field upgradeable to 32 channels, accepting mixed transmission speeds, mixed protocols, and synchronous, asynchronous and bi-synchronous inputs.

MICRO-MAINFRAME LINKS

(Continued from Page 26)

into the micro application. It could also allow applications to be exchanged between the micro and mainframe or other micros in object code without the need to recompile at either end, he said.

The IDC report points to the lack of a "universal" link as a potential future stumbling block. "There is no doubt that current announcements are attempts by vendors to preserve/extend/protect their current base of users," the report stated. "How long they will be able to hold out against the development of a truly universal link is open to speculation."

So far, the Informatics/Visicorp product is the only "intelligent" link that attempts to meet that criterion. However, it is limited by the requirement that it run under IBM's IMS/DC teleprocessing monitor. The IBM 3270-PC is also a first step toward providing a link to disparate kinds of data. "The world badly needs a way of addressing various kinds of mainframe organizations," Ferris said.

'Untapped Field'

The micro-mainframe market of the future may evolve into one dominated by IBM or several independents offering a horizontal link to various data bases. "There is an untapped field for generalized links," Rothnie said.

It will be complemented by many independents selling links that include intelligent features built around individual packages. "The vendors of applications software, in particular, will have a niche because they can make it very easy for the data base administrator or the user to get at their data," Ferris commented.

Right now, the most important factor is time. With most of the major new link products due to be available within the next three months, users are just preparing to get their feet wet. A look back next year may reveal a new crop of untapped needs and yet another swing in the software market.

Link Products Spur Predictions

As the software industry prepares for the first round of reactions from users of microcomputer-to-mainframe link products, observers are speculating about some of the new issues that may emerge.

"In areas in which a lot of sensitive information is involved, the physical security of diskettes in the office will be an issue," predicted James B. Rothnie Jr., executive vice-president of Computer Corp. of America. "On a terminal, users see information in a very ephemeral way. They're not used to worrying about these things."

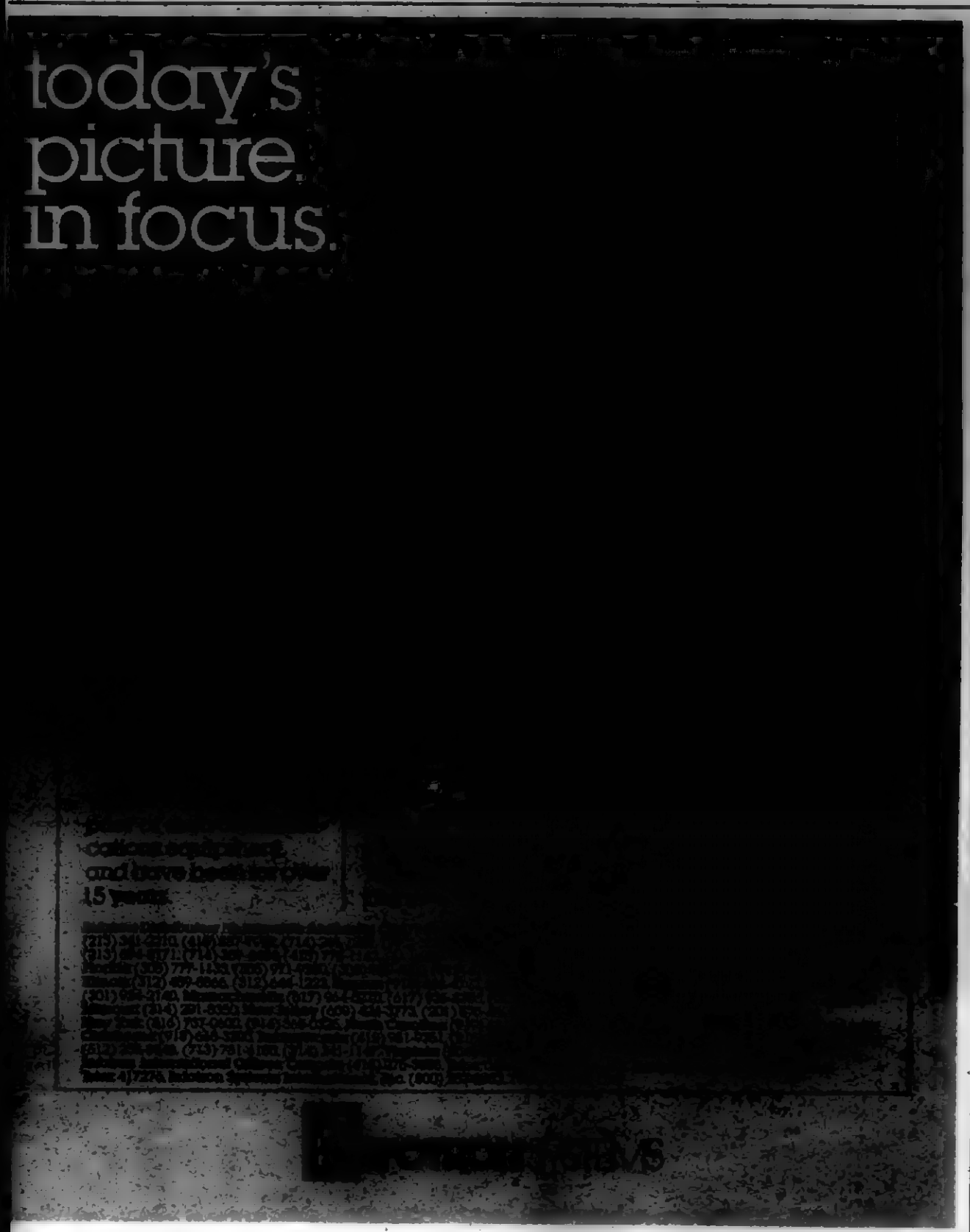
Education and training will become critically important as users start exploring the uncharted territory of the corporate data base, according to Thomas O'Flaherty, a principal consultant at Input, Inc. in Saddle Brook, N.J. "Users now look at MIS [management information systems] through a keyhole, knowing very little about what goes on inside," he said. "It's a heavy burden on MIS people to open that up."

O'Flaherty also believes mainframe software will begin to be modified to take advantage of the distributed processing power available on micros. "New technologies will make on-line capabilities on the mainframe less important," he said. "We'll see the industry evolve from batch to on-line back to batch again."

More friendly applications will proliferate on microcomputers, with windowing becoming a hot item, predicted Betty Feezor, product manager of the Personal Computer Products Division at Management Science America, Inc. Also, "from a corporate perspective, people will be looking for really superior service from vendors."

Security will become an issue, particularly as dial-up access becomes more popular among users, Feezor said. Another concern is that users will want to download tóo much data at first, highlighting the need for good training from DP.

Local-area networks could be rejuvenated by the micro-mainframe link, noted Robert Weiler, vice-president of marketing at McCormack & Dodge Corp. "One of the hotter areas will be networking personal computers to each other without going through the mainframe," he forecast.



American
Red Cross

We'll Help. Will You?

GET EVERYBODY ON BOARD.

Now there's a way to let everyone in your company chip in.

AT&T Information Systems, the company whose unparalleled communications heritage has been bringing people together for 100 years, now brings your office together. With state-of-the-art office automation that's designed to get your company moving ahead.

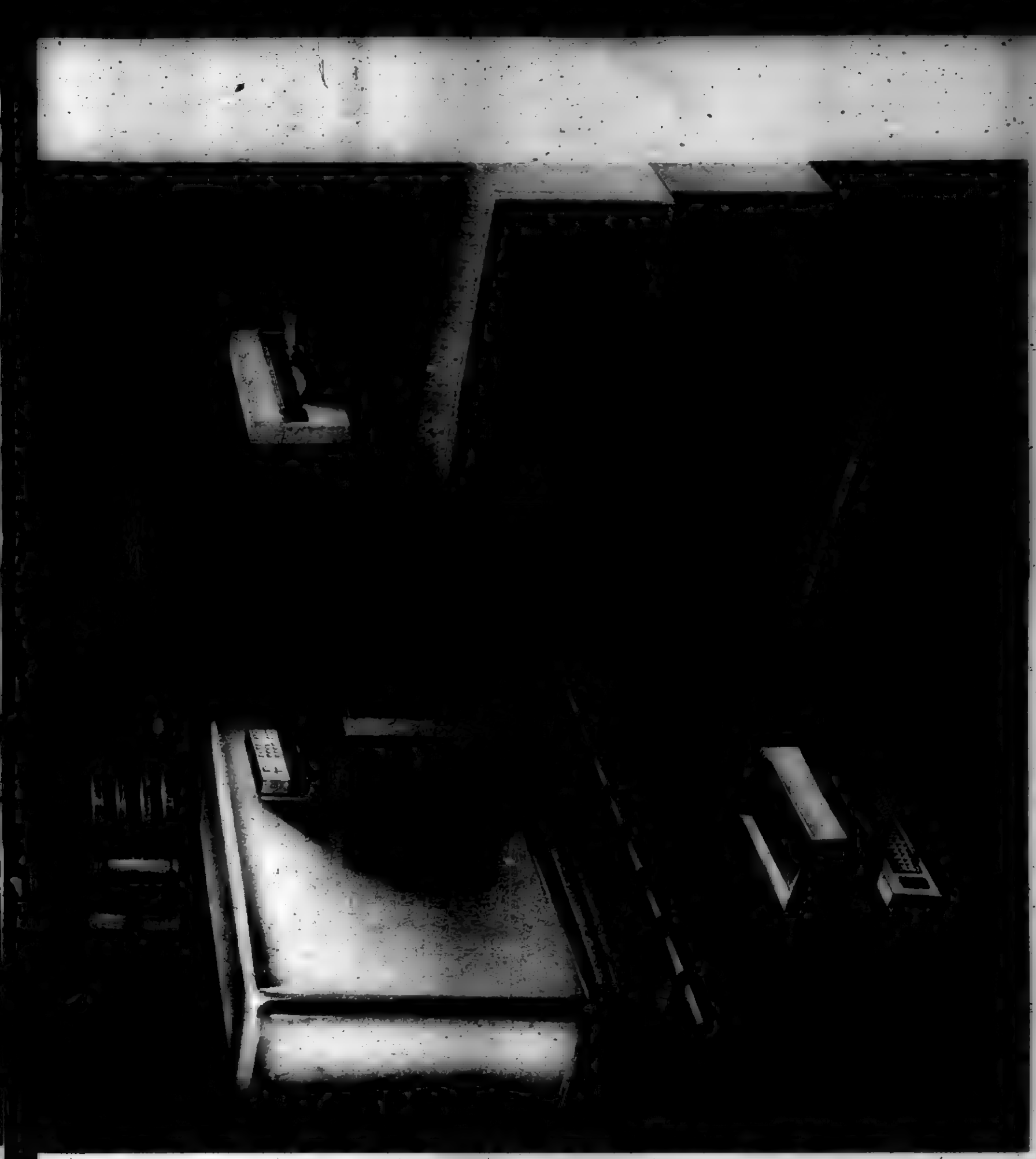
Electronic Document Communications, now available on System 85 and DIMENSION® PBX, is an easy-to-learn software application that's hard to beat. Because it integrates your office by letting everyone prepare, send and store documents and messages with the speed and efficiency of a computer. So you can have better access to the right information in the right form at the right time.

Electronic Document Communications can streamline your office in three ways:

Preparing Information—Reduces the time, effort, cost and wasted paper between drafts by electronically creating, editing and formatting documents and messages. "The Composer," a special software feature, checks spelling, grammar, punctuation and usage. EDC even measures whether documents are readable by technical and nontechnical readers.

Moving Information—Speeds documents to many people in different locations simultaneously so they can act decisively. EDC allows you to determine the timing and cost of delivery, and even check to find out when documents were received. Using a password ensures the privacy of your messages.

Managing and Storing Information—Locates documents, and retrieves and evalu-



ates contents quickly and easily with electronic files—while reducing the possibility of losing documents. An electronic "Mailbox" allows you to quickly determine which documents to read first. EDC reduces storing and filing costs with an electronic "Archives" that allows for either short- or long-term storage, and the "Wastebasket" which enables you to permanently delete items after a determined period of time. There's even an electronic "Calendar" that checks personal schedules and arranges mutually convenient meetings.

Not only will all these features help you further integrate your office, Electronic Document Communications is itself just one part of AT&T's line of completely integrated business systems. For state-of-the-art office automation, you can implement EDC in conjunction with other applications software like Message Center/Directory, a call coverage and message system. These office management applications are now available on System 85 and DIMENSION™ 600 and 2000 systems with the Applications Processor.

The result is you'll be able to improve staff productivity at every level and get everybody on board. And as new features are developed in the future, they'll be compatible with your existing equipment.

EDC was developed by Bell Labs systems designers who now work for AT&T Information Systems Laboratories. AT&T Western Electric produces EDC, and AT&T Information Systems will maintain it with comprehensive, conscientious service from the largest service organization in the industry. To find out more, call toll-free 1-800-247-1212, Ext. 879M.

AT&T's Electronic Document Communications: It's part of the integrated office of tomorrow that you can board today.

AT&T Information Systems

IBM

King of the Road

By Bill Laberis

Why, man, he doth bestride the narrow world like a colossus.

— Cassius in Shakespeare's *Julius Caesar*

A personal computer was absent from both the product agenda and the minds of most key strategists at IBM in 1980. But the following year brought a personal computer announcement; a few machines were shipped by year's end. In 1982, 100,000 personal computers bearing the ubiquitous blue initials left IBM's shipping dock; in 1983, 600,000 machines.

Bill Laberis is senior editor/industry at Computerworld.

In 1984, IBM will own a majority share of an exploding market where 36 months ago it had no product. To do so, IBM unflinchingly shattered a time-honored tradition in allowing outsiders to provide major components and software for its personal computer.

The action sent deep tremors rippling throughout the personal computer market, burying some of IBM's competitors and driving most of the rest to the relative safety of various market niches. But it soon became apparent that, in the personal computer market as throughout every sector of the computer industry, there is no safety.

IBM is leaving no stone unturned in its inexorable quest to control every area where it competes and, thus, control its destiny. Its quick work of the personal computer business yielded positive proof of both its intent and its ability to do so.

What is truly mind-boggling is the magnitude of IBM's mastery over the most vibrant and strategically pivotal sector of the world economy. To put the company's No. 1 position in proper perspective, consider that IBM will earn more profit in 1983 — about $5 billion — than its closest U.S. competitor will realize in *total sales*.

IBM's maintenance revenues alone will be more than double the total sales of Digital Equipment Corp., which bills itself as the No. 2 computer company. In fact, IBM's revenues from a product it introduced just two years ago, the Personal Computer, are likely to exceed the total sales of its nearest competitor in 1984.

IBM Dominance

In short, no industrial company in history has approached the sheer dominance IBM has established over the markets in which it competes. No other company has wielded the power of IBM to legitimate such a broad range of products, methodologies and business practices. And few, if any, large companies have demonstrated IBM's uncanny ability to move so nimbly and quickly, completely revamping its organizational structure, manufacturing strategy and product mix, all since 1981.

"IBM will continue to play the wind in every arena of the market," said Michael Geran, IBM analyst with E.F. Hutton Corp. in New York. "They call the tune, and everyone else dances."

If it can be said that a mean and lean IBM put on the gloves in 1982, it follows that the company bloodied many noses in 1983 and will likely score major knockouts in the coming year. Companies that carefully chose markets where IBM maintained a low profile will find themselves fighting off Big Blue in their own backyards.

For example, with its 4300 series Glendale machines announced in September [CW, Sept. 19, 1983], IBM is targeting the scientific and engineering applications that heretofore had consumed so many high-end DEC and Data General Corp. superminis. According to Carl Amdahl, vice-chairman of Trilogy Ltd., "IBM is now able to provide a very cost-effective, high-performance machine that competes with off-the-shelf technology solutions found in today's superminis."

To complement this drive into the noncommercial market, IBM showed surprising versatility in announcing a significant OEM pact with Computervision Corp., the only company with greater computer-aided design and manufacturing revenues than IBM [CW, Aug. 15, 1983].

Equity Interest

Realizing it can't do it all alone, IBM is using others to spearhead thrusts into promising markets. It will use its equity interest (17%) in Rolm Corp. to ensure that it has an IBM-friendly private branch exchange to bring to the automated office. Its equity interest in Intel Corp., which has virtually paid for itself in terms of Intel's stock appreciation, ensures IBM a steady supply of Intel's coveted microprocessors. And an IBMer on the boards of both Rolm and Intel will ensure that at least a portion of the companies' development efforts will have a distinctive IBM flavor.

After several years as the defendant in a fruitless antitrust suit brought by the U.S. Justice Department, IBM has taken the offensive in the legal arena. Japan, Inc. will reel for some time to come following the punishment meted out to Hitachi Ltd. for its part in stealing IBM trade secrets.

Mitsubishi Electric Ltd. pleaded no contest in U.S. District Court to settle an industrial espionage case involving IBM software secrets. After being fined a paltry $10,000, Mitsubishi revealed the real damage suffered: It announced it would delay its re-entry into the Japanese IBM plug-compatible market for a "few" years.

And IBM has warned its biggest competitor in Japan, Fujitsu Ltd., about possible copyright infringement, reportedly buying and analyzing a Fujitsu mainframe to carefully scrutinize the machine for copyright violations.

"It's getting to be a mean, ugly world out there, and it doesn't look like it's going to be quite so much fun anymore," according to William F. Zachmann, vice-president of International Data Corp. in Framingham, Mass. "The junkyard dog is on the loose."

UNIX &C

HANDS-ON TRAINING

A complete Curriculum for:

End Users Management Applications Staff Technical Support

COURSES	NEW YORK	BOSTON	WASHINGTON, D.C.	SAN FRANCISCO	CHICAGO	DALLAS	LOS ANGELES	TUITION	RESIDENCE TUITION*
UNIX Overview	Jan 10	Nov 1 Mar 6	Nov 8 Jan 10 Mar 6	Oct 11 Nov 15 Mar 13	Oct 18 Dec 6	Jan 3 Feb 21 Apr 3	Jan 3	$ 225	$660
UNIX Fundamentals for Non-Programmers*	Jan 11-13	Nov 2-4 Mar 7-9	Nov 9-11 Jan 11-13 Mar 7-9	Oct 12-14 Nov 16-18 Mar 14-16	Oct 19-21 Dec 7-9	Jan 4-6 Feb 22-24 Apr 4-6	Jan 4-6	$ 735	
UNIX Fundamentals for Programmers*	Jan 16-18	Oct 3-5 Nov 7-9 Mar 12-14	Oct 3-5 Nov 14-16 Jan 16-18 Mar 12-14	Oct 17-19 Nov 28-30 Mar 19-21	Oct 24-26 Dec 12-14	Jan 9-11 Feb 27-29 Apr 30- May 2	Jan 9-11	$ 735	$1125
Shell as a Command Language*	Jan 19-20	Oct 6-7 Nov 10-11 Mar 15-16	Oct 6-7 Nov 17-18 Jan 19-20 Mar 15-16	Oct 20-21 Dec 1-2 Mar 22-23	Oct 27-28 Dec 15-16	Jan 12-13 Mar 1-2 May 3-4	Jan 13-13	$ 490	
"C" Language Programming*	Jan 23-27	Oct 10-14 Nov 14-18 Mar 19-23	Oct 10-14 Nov 28- Dec 2 Jan 23-27 Mar 19-23	Oct 24-28 Dec 5-9 Mar 26-30	Oct 31- Nov 4	Jan 16-20 Mar 5-9	Jan 16-20	$1225	
Shell Programming*	Jan 30-31	Oct 17-18 Nov 28-29 Mar 26-27	Oct 24-25 Dec 5-6 Jan 30-31 Mar 26-27	Oct 31- Nov 1 Dec 12-13 Apr 2-3	Nov 7-8	Jan 23-24 Mar 12-13	Jan 23-24	$ 490	$1125
Using Advanced UNIX Commands*	Feb 1-3	Oct 19-21 Nov 30- Dec 2 Mar 28-30	Oct 26-28 Dec 7-9 Feb 1-3 Mar 28-30	Nov 2-4 Dec 14-16 Apr 4-6	Nov 9-11	Jan 25-27 Mar 14-16	Jan 25-27	$ 735	
UNIX Internals	Feb 6-10	Oct 24-28 Dec 5-9 Apr 2-6	Oct 31- Nov 4 Dec 12-16 Feb 6-10 Apr 2-6	Nov 7-11 Apr 30- May 4	Oct 3-7 Nov 14-18	Jan 30- Feb 3 Feb 21-25 Mar 19-23	Jan 30- Feb 3	$1375	
UNIX Administration*	Feb 14-16	Apr 10-12	Feb 14-16 Apr 10-12	May 8-10		Feb 7-9 Mar 27-29	Feb 7-9	$ 735	
Advanced "C" Programming Techniques*	Feb 27-29	Apr 30- May 2	Feb 27-29 Apr 30- May 2	May 14-16		Feb 13-15 Apr 2-4	Feb 13-15	$ 735	$1125
Advanced "C" Programming Under UNIX*	Mar 1-2	May 3-4	Mar 1-2 May 3-4	May 17-18		Feb 16-17 Apr 5-6	Feb 16-17	$ 490	
Building UNIX Facilities and "csh" Shell*				April 9-13			Feb 27- Mar 2	$1225	

*Including hands-on training workshops **UNIX is a trademark of Bell Laboratories †Starting fee for consecutive seminar dates

CALL FOR DETAILS ON: • VIDEO-BASED COURSES • IN-HOUSE SEMINARS

To reserve your seminar space now or for additional information, call:
(800) 621-3155 or in Illinois (312) 987-4000 8:30-5:00 central time.

Computer Technology Group UNIX seminars are presented by experts experienced in teaching UNIX as well as in designing and implementing UNIX-based systems.

COMPUTER TECHNOLOGY GROUP
Our business is UNIX training.

COMPUTER TECHNOLOGY GROUP
Telemedia, Inc.
300 S. Michigan Ave., Chicago, IL 60604

IBM

IBM Plug-Compatible Mainframers Fading

They were the "Great White Hope" of the computer industry just a few years ago, carrying to users a promise of liberation from the company that held the keys to the 370 instruction set.

Buoyed by favorable user opinion and led by a cadre of former IBMers, IBM plug-compatible mainframe (PCM) and peripherals makers successfully chewed into IBM's market share on several fronts. Often they did so by offering superior technology at attractive prices.

Tracking the fortunes of the PCMs today is a fairly easy task, mainly because there are so few that are viable, at least without support from various Japanese partners.

Magnuson Computer Systems, Inc. is mired in Chapter 11 proceedings, having been all but buried by IBM's 4300 series. Cambex Corp. ended fiscal 1983 losing nearly $2 million on ever-shrinking sales. Storage Technology Corp. (STC) has laid off scores of workers to counter weighty quarterly losses and is a full 18 months behind IBM in getting its 3380-type disk drive to market. Memorex Corp. has turned to making Burroughs Corp.-compatible disk drives to cover for sagging IBM-compatible sales. National Advanced Systems, Inc. has gotten out of domestic manufacture of IBM-compatible mainframes altogether. Upstart IPL, Inc. has suffered three consecutive quarterly losses, with no particularly bright prospects in sight.

"IBM will no longer concede anything to the PCMs," said Charles Greco, market analyst with International Data Corp. in Framingham, Mass. "I'm not saying it's IBM's intent to bury every PCM. On the other hand, it won't bother them much if they do."

Only Amdahl Corp., which weathered a very poor year in 1982, has enjoyed any measure of success selling into the IBM world. But there are questions about Amdahl's ability to deliver Extended Architecture capabilities as planned — and about the long-term future of a company that is largely single-product in nature.

Even the Japanese PCMs are feeling IBM's ire, and in very costly ways, as IBM has aggressively and successfully pursued legal paths to prevent the Japanese from freely duplicating its operating software and modifying it for Far Eastern applications, as the Japanese had done for years.

No Concessions

"IBM will no longer concede anything to the PCMs," said Charles Greco, market analyst with International Data Corp. (IDC) in Framingham, Mass. "I'm not saying it's IBM's intent to bury every PCM. On the other hand, it won't bother them much if they do."

IBM is "behaving like they want 100% of every market they compete in," agreed Jack Hart, IBM analyst at IDC. "And instead of worrying about who's going to sue them, they're out suing the competition, like National Advanced Systems, over secrets theft. Things have changed."

In brief, IBM has gained a tremendous competitive advantage in recent years with a massive capital investment program that has made the company the quintessential low-cost, high-volume producer. Its participation in virtually every segment of the computer industry has enabled IBM to spread ever-increasing research and development costs across several product lines, lowering per-unit costs.

The PCMs — mainly single-product-line companies — cannot afford the initial capital expense needed to compete with IBM's production capabilities and don't have a range of products across which to distribute research and development costs.

In addition, IBM, with its early product support approach, has managed to withhold product specifications from its PCM competitors until it is nearly in the volume-shipment mode. This, coupled with changes IBM routinely makes during a product's life cycle, has

ATTENTION
MICRO SOFTWARE SUPPLIERS/DEVELOPERS

Do you currently offer engineering or scientific software application packages for the IBM PC or XT?

If so, Auerbach is providing you with the opportunity to have your packages considered for inclusion in a new publication . . . FREE.

If your engineering or scientific software packages are on the market today and run on the IBM PC or XT, you may qualify . . . contact us immediately!

Submit your company name, contact, and telephone number, along with the name(s) of your software package(s) to:

Software Editor
Auerbach Publishers Inc.
6560 N. Park Drive
Pennsauken, NJ 08109

Or call:
(800) 257-6162, Ext. 230
(in N.J. (609) 662-2070, Ext. 230)

AUERBACH Auerbach has been a leading publisher of computer information for over 25 years.

RACCU CORPORATION
announces the leading seminar in
COMPUTER PROCUREMENT MANAGEMENT

Contracting for computer technology should be managed to keep your lawyer unemployed. RACCU announces a seminar on managing computer technology procurement which includes topics on organizing the procurement function, supplier selection by proposal, negotiation methods by category and supplier, dealing with superior bargaining power, and developing alternative remedies to litigation; at the following locations and dates:

Baltimore	Chicago	Denver
17, 18 January	24, 25 April	14, 15 August

For information, call RACCU at 814-455-9328, or write:
RACCU Corporation, Publication and Seminar Division
Box 1825, Erie, PA 16507;
PLEASE SEND INFORMATION on the Computer Procurement Management Seminar to:
Name: _____
Address: _____
City State Zip

Cut your computer installation time.

We carry Belden®...the most comprehensive line of computer cable available.

If you want to move data a few feet or a few miles, we can help you get clean, clear signals regardless of how difficult the operating environment. We have cable for local area networks plus plant and office interconnect applications. We also stock Belden's Bit-Driver™ line drivers and multiplexers for replacing short-haul phone lines with long-term savings. Plus, RG-62 coax, twin-ax from 78 to 200 ohms, Datalene,™ and individually shielded pair cables. Ask for them in Belden's time-saving, convenient, pull-dispensing UNREEL® packages. Many are also in stock for direct air plenum installations. Plus, we carry fiber optic cable for total interference immunity. You won't find a more complete line anywhere to cover your needs.

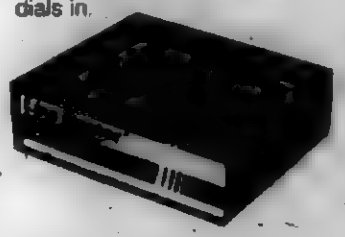
ANIXTER
SERVICE IS OUR TECHNOLOGY.
Call an Anixter specialist today. Consult the yellow pages for the distribution center in your area.

The Solution.

Dial-Up 3270

LineMaster An intelligent device for dial-in access to your mainframe 3270 Bisync line. **LineMaster** is a communications watchdog which keeps a line in service until a user dials in.

- For any remote 3271/4/6 line—up to 19.2K baud.
- Compatible with any 3270 BiSync emulator including microcomputers.
- Connects between modem and mainframe.
- Installs in minutes.



$639.

MF
MicroFrame, Inc.
205 Livingston Avenue
New Brunswick, NJ 08901
(201) 828-4499

IBM

As 'Great White Hope' of the DP Industry

put the PCMs on the losing end of a vicious cycle where:

- IBM announces and ships a product.
- The company gets a one-year-plus shipment jump on the PCMs.
- The PCMs announce their plug-compatible versions and initiate shipments, struggling to meet stated performance benchmarks within compressed development times.
- Responding to PCM me-too announcements, IBM slashes the price of its product, at this point having recovered most or all of its initial capital investment.
- The PCMs must follow suit, biting deeply into their profit margins.
- IBM announces the successor to its product, and the cycle starts anew.

"Clearly it is the IBM strategy to get out there in volume prior to the plug compatibles' ability to respond," said Carl Amdahl, vice-chairman of Trilogy Ltd., which hopes to leapfrog IBM technologically and ship a competitive high-end mainframe by 1985. "IBM has clearly come a long way regarding the way it will now compete with the PCMs."

Amdahl, who was Magnuson's technical chief during its brief heyday, said IBM is much more price-aggressive than it was a few years ago, giving customers significant price breaks when they purchase systems bundling IBM components exclusively.

IBM, Amdahl said, has also insulated itself from antitrust pressure by promoting itself as "the creator and defender of American high technology and the only company capable of defeating the Japanese in the high-tech wars." Finally, he said, IBM has now caught up with and surpassed the technical expertise of its PCM competitors and has greatly padded its technological hand by acquiring stakes in other leading-edge suppliers like Intel Corp. and Rolm Corp. Amdahl predicted more of the same in 1984.

Jesse Aweida, chairman of troubled STC, said IBM's newfound aggressiveness has impacted companies in areas where it is competing in earnest for the first time. "The PCMs are used to fighting IBM," Aweida said. "We're dealing largely with very sophisticated users at the high end, and they look for value. That's what keeps us alive."

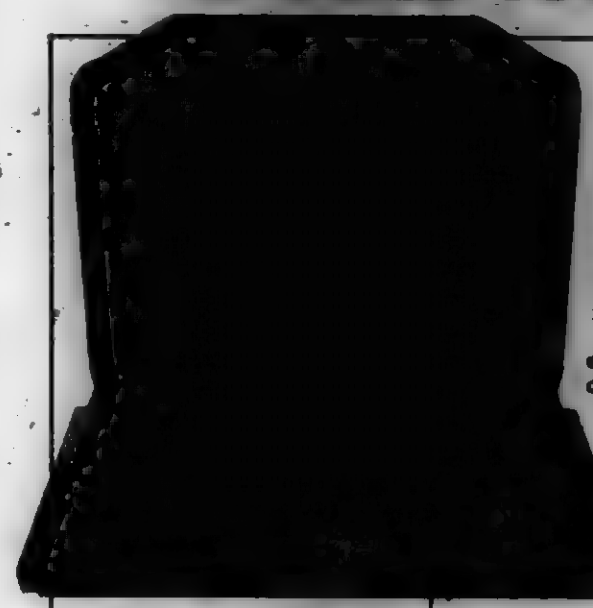
Aweida, whose company also is hoping to leapfrog IBM technologically with an optical disk storage system, said it is not feasible for PCMs to compete against IBM across a wide range of products in both marketing and manufacturing. However, STC is making an effort to crack the mid-range systems market, where, Aweida said, IBM has no competition.

"It has gotten tougher to compete [with IBM], mostly because they've become so price aggressive," Aweida said. "This trend will continue into next year and beyond, because they have great ambitions.

"But remember, users don't want to be confined to one supplier, especially when the PCMs can offer cost-effective alternatives," he added. "I wish people would stop writing about the PCMs like we're dead."

IDC's Greco sees the situation differently. "In the long run, only the Japanese will be able to compete effectively with IBM, and they might have to abandon the 370 architecture altogether to do it," he said. "The PCMs in 1984 will be more against the wall than ever. IBM's just too big and too good, that's all."

WITH RAMIS II ENGLISH, THE COMPUTER HAS FINALLY LEARNED YOUR LANGUAGE.



Now, you can talk to your computer the way you talk to a colleague: in plain English.

Even if you've never been on speaking terms with a computer, RAMIS II's advanced knowledge-based technology lets you ask questions, obtain answers, even create reports in only a few minutes. As a result, you can work more effectively and productively—without having to learn a specialized computer language. You just use English.

RAMIS II: ARTIFICIAL INTELLIGENCE THAT DELIVERS REAL PRODUCTIVITY.

RAMIS II English combines years of research by Mathematica in linguistics and artificial intelligence with proven expertise in developing practical, easy-to-use software products. The result is maximum fluency with minimum demands on support staff. In fact, while other systems require days or weeks of dictionary setup for each application, the *extensive built-in knowledge base* of RAMIS II English provides immediate access to most data.

RAMIS II English enables you to access data directly, without costly and time-consuming downloading or reformatting, so the latest information is always available.

Wherever your data is stored—in RAMIS II databases; in ADABAS, IMS, TOTAL, or IDMS databases; or in VSAM or sequential files—there's only one language you need to know: English. And, because English comprehension is an integral part of RAMIS II, you have full access to all of its fourth-generation capabilities, from powerful reporting and analysis to full color business graphics.

THE BENEFITS OF RAMIS II ENGLISH SPEAK FOR THEMSELVES.

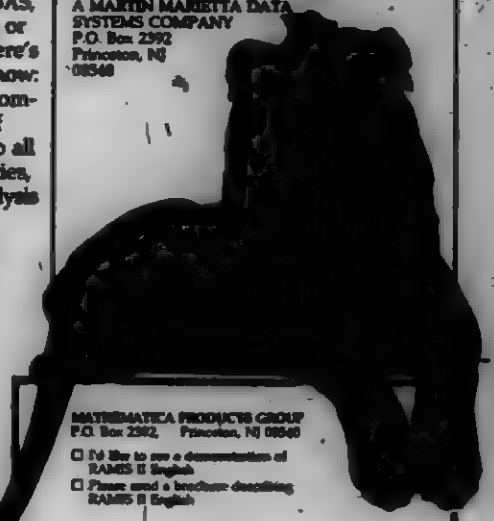
Teaching the computer to speak your language is the best way to put the vast power of today's computer systems directly into the hands of *every* user from *every* department. RAMIS II English is one more powerful demonstration by Mathematica of the increased productivity available through RAMIS II—*the real* leader in complete software for business.

RAMIS II English makes it easy to understand why we're the real leader in complete software for business.

Let RAMIS II English speak for itself. See it in action at one of our regional Product Demonstration Centers. For more information, contact your local Mathematica office, call toll free (800) 257-5171, or return the coupon below.

MATHEMATICA PRODUCTS GROUP

A MARTIN MARIETTA DATA SYSTEMS COMPANY
P.O. Box 2392
Princeton, NJ
08540



MATHEMATICA PRODUCTS GROUP
P.O. Box 2392 Princeton, NJ 08540

☐ I'd like to see a demonstration of RAMIS II English.
☐ Please send a brochure describing RAMIS II English.

Name
Title
Company
Address
Telephone
Computer Operating System
CW 1/2

RAMIS II...THE LEADER BY DESIGN

Boston (617) 357-9424 Chicago (312) 670-9710 Dallas (214) 788-1916 Houston (713) 850-0697
Los Angeles (213) 670-0962 New York (212) 980-9097 Princeton (609) 799-2600 San Francisco (415) 461-4315
Washington, DC (202) 484-5752 Basel (061) 439923 Bergen (5) 321300 Heidelberg (06221) 16053
Hong Kong 5-435714 Kingston (809) 929-7223 London (01) 580 3031 Milan (2) 546 8080 Manchester (2) 906788
Ottawa (613) 236-9616 Paris (1) 776 61 71 Santiago (2) 31014 Singapore 273 9255 Stockholm (8) 530720
Sydney (02) 923 1677 Tel Aviv (052) 70364 Toronto (416) 226-4433

IBM

What's Next in IBM's Product Strategy? Only

Second-guessing IBM's product and market strategies has become a tricky art in recent years.

Simply put, Big Blue has come to dominate so many sectors of the computer industry that its moves are dictated less by somewhat predictable external market forces and more by internal considerations of what is right for IBM. As one IBM watcher put it, "The worst thing for IBM's competitors is that IBM is no longer pressured into announcing anything. Almost without exception, the company does what it wants, when it wants, all in line with internal production schedules, capital requirements and the like.

"Guessing what they'll do is just that — guessing."

Nowhere was this independence more apparent in the past year than with IBM's November introduction of the PCjr, its low-end micro, which front-line analysts had picked for introduction at various times in March, mid-June, Sept. 15 and, finally, Nov. 1. IBM then defied virtually all predictions by announcing it would not actually sell the machine until well after the Christmas shopping rush.

Some Predictions

Notwithstanding a mind entirely its own, IBM is likely to make certain product and strategic announcements in concert with its stated intention to become a $100 billion company by 1990. What follows is a compendium of what IBM might have in store for 1984, based on interviews with several IBM watchers, including Jack Hart, long-time IBM employee and now an IBM analyst with International Data Corp. (IDC) in Framingham, Mass.; Charles Greco, who tracks IBM, and the lease market in particular, at IDC; Robert Fertig, president of Enterprise Information Systems in Greenwich, Conn.; and Robert Djurdjevic, editor of the Annex Computer Report.

Here are their predictions:

● *A 3080 Series Successor.* With the lofty code name "Sierra," IBM's 3080 replacement will be announced sometime in 1984, with analysts divided between a second- and fourth-quarter announcement. Initial shipments would begin six months after the announcement, volume shipments three to six months later.

The machine will offer sizable price/performance increases over the present high-end offerings, perhaps in the range of $200,000 per million instructions per second (Mips). Whether a clear migration path from the 3080 will be offered is questionable, with one source predicting an entirely new architecture followed by a "true" VM/XA announcement. A single processor in the 15- to 20-Mips range is expected, with 30-plus Mips in the dyadic mode.

IBM will likely delay the announcement as long as 3080 order backlogs remain healthy, which at present they are. The usual pre-announcement signals — price cuts in the 15% to 20% range for machines like the 3081 Model Group K and 3084 — will come two or three months before the Sierra announcement, perhaps on two separate occasions. Clearly, any gains in market share that IBM realizes with increased 3080 sales in anticipation of Sierra will come at the expense of Amdahl Corp.'s 5860 and the high-end machines of National Advanced Systems, Inc.

But if 3080 sales continue at present levels well into 1984, a Sierra announcement may not appear at all next year. As one analyst put it, "What's Sierra going to compete against? It will compete against IBM's 3080 series, that's what. They've got all the time in the world now."

● *More Storage Devices.* IBM's outrageously successful 3380 disk drive (more than 48,000 spindles shipped in 1983 with no viable competition) will be enhanced by a dual-density version offering about 1¼ times the storage at less than 1¼ times the price of the 3380. All signs point toward field upgradability of the 3380 to the dual-density model, while IBM will leave the door open to introducing a quad-density version, perhaps in 1985.

Analysts concede that IBM owns the mass storage market and that plug-compatible manufacturers such as Storage Technology Corp. (STC) and the Memorex Division of Burroughs Corp. are in for a rough ride in the disk drive arena in the coming years (see story on Page 34).

Analysts state with somewhat less conviction that IBM will also announce a successor to its 3420 tape drive, a replacement that has been rumored for a couple of years. IBM dropped the 3420's price 20% in August.

matchmaker,

IBM Displaywriter & HEWLETT PACKARD Series 40 computer system & DATAPOINT 1550 data
processor & HONEYWELL Series 60 computer system & WANG System 35 word processor &
Series 3003 word processor & NCR Comten 3670 computer system & PHILIPS Series 3004 wo
reader & COMPUCORP 700 data terminal & HONEYWELL Series 62 computer system & RAYT
& HONEYWELL microSystem 6/10™ microcomputer & EXTEL 8315 data terminal & AM JACK
DATAPOINT 6600 data terminal & ANDERSON JACOBSON AJ833 data terminal & HONEYWELL DPS
HEWLETT PACKARD HP 3000 mainline & PHILIPS INFORMATION SYSTEMS Model 2001E word process
system & WANG System 30 word processor & PHILIPS 2002 Twin word processor & IBM PC
JACOBSON AJ650 data terminal & TRS 80® personal computer & LANIER No Problem™ word pr
computer system & WANG 2200 computer system & APPLE IIe personal computer & AM JAC
PHILIPS Model 2005 word processor & COMPUSCAN AlphaWord III™ optical character reader
Series 44 computer system & NBI OASys 4000S word processor & EXXON 210 intelligent ty
computer system & EXXON 120 intelligent typewriter & APPLE II personal computer &
system & IBM Displaywriter & HEWLETT PACKARD Series 40 computer system & DATAPOI
VT 1300 word processor & HONEYWELL Series 60 computer system & WANG System 35 word pro
PHILIPS Series 3003 word processor & NCR Comten 3670 computer system & PHILIPS Series
character reader & COMPUCORP 700 data terminal & HONEYWELL Series 62 computer syste
& HONEYWELL microSystem 6/10™ microcomputer & EXTEL 8315 data terminal & AM JAC
DATAPOINT 6600 data terminal & ANDERSON JACOBSON AJ833 data terminal & HONEYWELL DPS

© 1983 ITT World Communications Inc

IBM

IBM Knows for Sure

Hunt Grace Perlis Djordjevic

But there are some compelling reasons for IBM's not announcing a new tape drive, despite the fact that it would allow the company to recoup some of the tape market share it has lost to STC. One reason is that STC will not announce a new tape drive until after IBM does, because the STC version must be IBM-compatible to sell at all. By not announcing a 3420 successor, IBM essentially will deprive STC of revenues it would realize from quick sales of a competitive product, which STC is rumored to have waiting in the wings.

Nonetheless, the consensus is that a 3420 successor will arrive in the second half of 1984, and it will be an 18-track, data streaming version.

● *On the Low End.* Louder rumblings of a 32-bit, multiuser system announcement have been heard, with some analysts speculating that IBM will make a concession to market pressure and announce full Unix support with the machine, called "Popcorn" at times. IBM is not now a dominant force in the low-end (20 terminals or less) multiuser market, accounting for only about one system in 10 shipped, compared with two of three mainframes. With few unplowed fields remaining, IBM may well announce significant products here in 1984.

● *Communications.* Seeking to attack its heretofore biggest customer, AT&T, before the communications giant can get its bearings in the competitive world, IBM will heighten its communications interests in 1984.

A local-area network is inevitable, not unlike the proposed baseband token ring net IBM unveiled in Geneva in October [CW, Oct. 31]. AT&T has local-area network plans, too, but is keeping them more tightly wrapped.

IBM's local-area network will run initially on twisted pair media at speeds starting at 4M bit/sec, while combining the serial local-area network principle of a ring net with elements of a star configuration.

In concert with the aforementioned upgraded mass storage devices, IBM may enhance its 3880 controller to handle the new load requirements, perhaps including tape controlling capabilities if a 3420 successor is announced.

● *Leasing.* The byword for 1984 is, "Look out, third-party dealers, here comes the IBM Credit Corp., full steam ahead." Analysts believe that with a third financing partner —General Mills Corp. — in tow, IBM will offer such attractive lease rates that it will capture any deal it wants, leaving the third-party dealers fighting harder than ever to write attractive leasing deals.

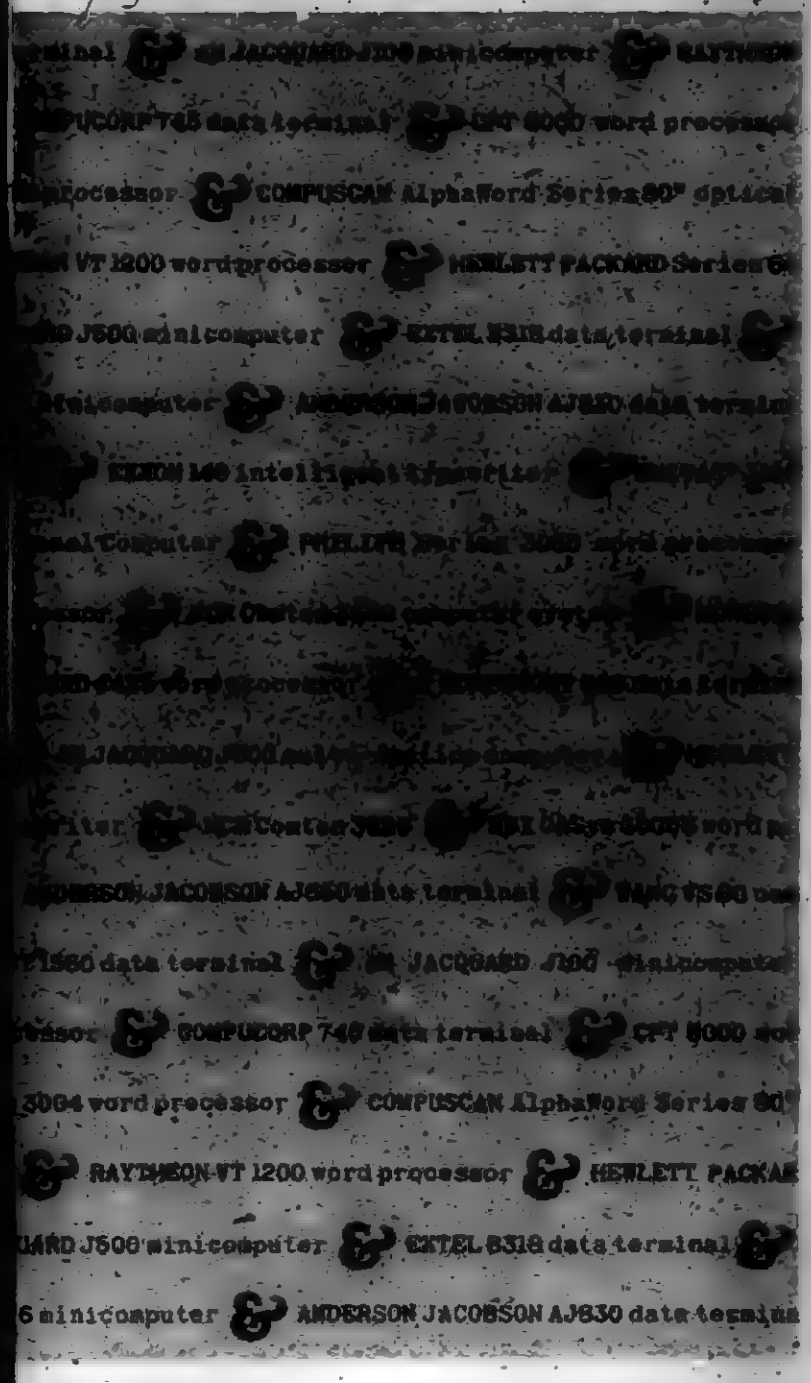
Next year, IBM Credit Corp. will "handsomely compensate" IBM's sales representatives who steer lease customers to IBM Credit Corp. and not to third-party dealers, one source said. IBM Credit Corp.'s lease volume will reach $1 billion next year, making it the largest lessor by far. The implications for users in 1984 are generally more favorable lease rates across the board, with third-party lessors at times taking greater risks than usual.

● *Business Strategy.* Growing from $40 billion in sales to $100 billion in seven years will be a Herculean task, even for a company 10 times larger than its nearest competitor. One growth path IBM will continue to follow will lead it to stake more minority equity positions in established companies, as it has done with Rolm Corp. (19% ownership) and Intel Corp. (17%).

Analysts polled settled on two broad areas in which IBM may be active in 1984 in minority stakes, robotics and software. However, none would speculate on particular partnership candidates.

Organizationally, IBM went from having seven to 18 independent business units in 1983, a trend likely to continue next year as the company continues to reap the rewards of carefully planned decentralization as it deepens its penetration across a broad range of market segments.

matchmaker.



A word processor and a computer aren't a match made in heaven.

Of course, neither are a telex machine and CRT. Or any of the machines listed here.

Rather, they're all matches made by us: ITT World Communications.

You see, until we came along, it wasn't very easy for businesses to send information from a word processor to a computer. Or from a telex to a CRT. Or vice versa.

Now all that (and more) is possible—by sending information through us.

Our network simply eliminates all the usual problems of unlike equipment.

So a company never has to be in the costly position of owning unneeded terminals, just to "talk" to other terminals.

Which means, you'll not only get the communications your company needs, but you could save money as well.

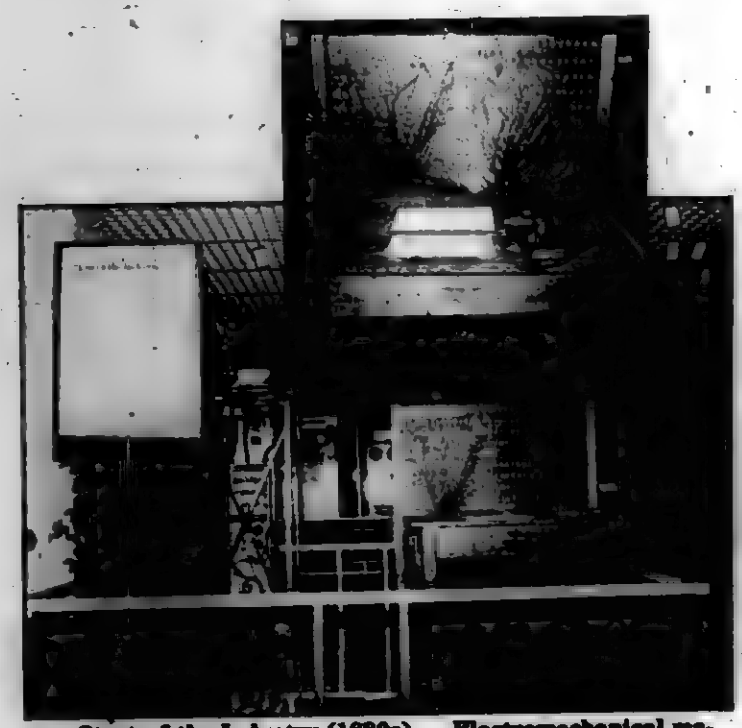
Advanced communications *and*-economy?

It sounds like a perfect match to us.

For more information contact your local ITT sales representative or write Marketing Dept. A/PR, ITT World Communications, 100 Plaza Drive, Secaucus, NJ 07096.

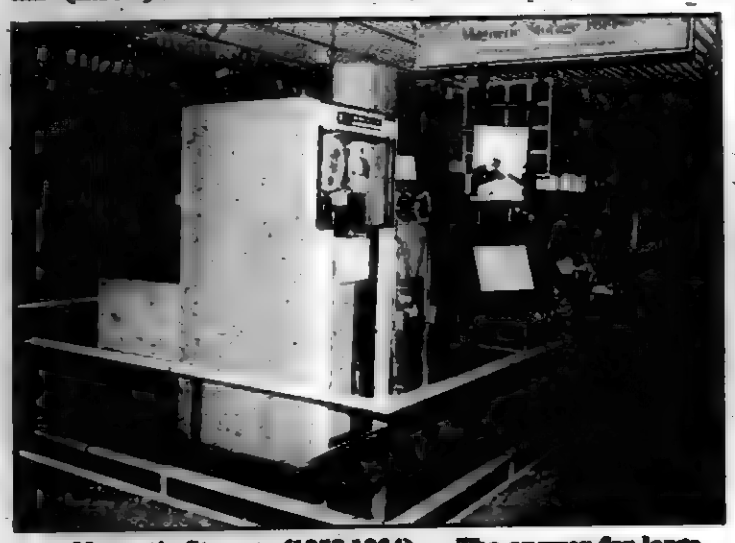
ITT

An IBM Look at the



1 Start of the Industry (1880s) — Electromechanical machines were the heart of info processing through 1940s. (Insert) Punch card machine by Herman Hollerith.

2 Wires, Wheels and Levers (1890-1946) — The beginning of modern data processing. (Inset) IBM 077, an early collator.



4 Magnetic Storage (1953-1964) — The answer for large-volume storage was the magnetic disk, enabling users to retrieve information directly, in less than a second.

5 Transistors (1957-1964) — Smaller, Faster, More Reliable. As a vacuum tube replacement, the transistor cut the time needed for electrical pulse circuits.

7 IBM 370 (1970s) — Faster Solutions to More Needs. The first computer with an entire main memory of monolithic technology.

8 IBM 3084 — Very High Densities (1980s) — More Speed, Function, Capacity, Reliability.

History of Computing

Photos by Lynn Haber
Text by David Myers

3 Vacuum Tubes (1946-1958) — The basis for the electronic computer, permitting calculations several thousand times faster than electromechanical relays.

6 IBM 360 (1964) — The First Big "Family" of Computers. This system incorporated new solid logic technology.

9 Today — Higher Productivity, Lower Cost.

The history of computing is in many ways the history of IBM. From the punched-card reader invented by Herman Hollerith for the census of 1890 to the newly unveiled PCjr home computer, IBM scientists and engineers have developed enough gadgetry for 10,000 patents.

A simple selection of these would make an impressive exhibit of computer technology — and that is what IBM created in a recent exhibit at its new Gallery of Science and Art on the ground floor of its world headquarters building in New York. (The IBM gallery, located at 590 Madison Ave., changes its exhibits regularly. The museum is open free to the public Tuesday through Friday from 11 a.m. to 6 p.m. and on Saturday from 10 a.m. to 5 p.m.)

Known to American business enthusiasts as the company of the Watsons, IBM might just as fairly be known as the company driven by hundreds upon hundreds of largely anonymous computer engineers. From modest beginnings as a maker of punched-card readers and time clocks, IBM became a computer vendor when the five-ton Harvard Mark I, a so-called Automatic Sequence Controlled Calculator, was installed at Harvard University in 1944.

Two years later, the first 100 production models of the company's 604, the first electronic calculator built around vacuum tubes instead of electromechanical relays, rolled off the lines in Endicott, N.Y.

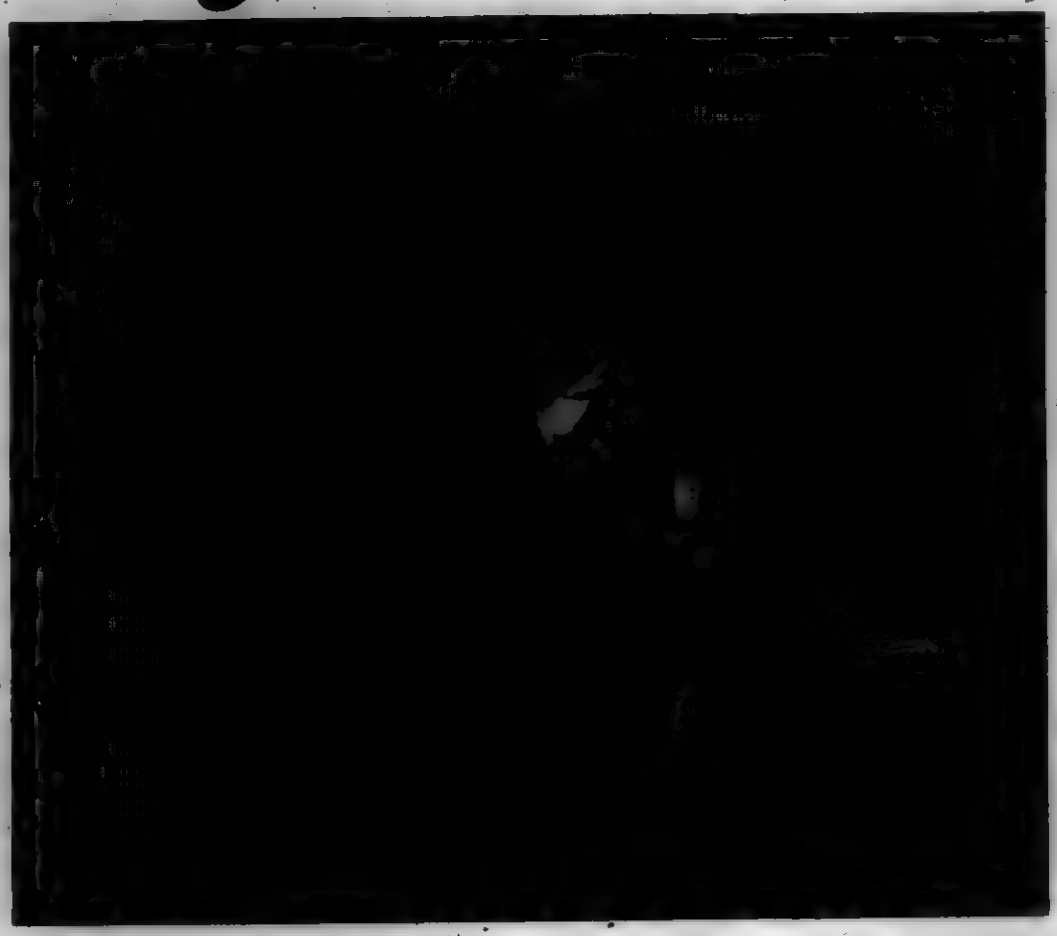
In 1948, when the firm installed the huge Selective Sequence Electronic Calculator in its headquarters on Madison Ave., IBM determined for years to come how the world would picture computers: room-size monstrosities of blinking lights — with 12,500 tubes and 21,400 relays — that dwarfed their operators.

Since then, computer technology has progressed from vacuum tubes to magnetic-core arrays, invented by An Wang and F.W. Viehe and first introduced into widespread use in the early 1960s. Soon after came the transistor, invented at Bell Laboratories in 1947 and used by IBM in 1961 in its Stretch, a computer 75 times faster than previous vacuum-tube models, built out of 150,000 transistors.

In 1964, only four years after IBM had launched captive production of transistors, came solid-logic technology, capable of switching a current from on to off in 30 billionths of a second. Integrated-circuit technology made its debut in 1971 in the 370 line of mainframes, the first all-integrated-circuit machines delivered by IBM. Not coincidentally, the 370 also capped an effort begun with the company's 360 series to make all its equipment compatible — yet another concept that IBM pioneered.

Lynn Haber is a Computerworld staff writer and David Myers is Computerworld's New York correspondent.

"IBM terminals n
says PCI.



Full capabilities, both worlds.

When your 3278 is in the ASCII mode, it can be a DEC VT-100 or TTY-compatible terminal. When your 3278 switches back to IBM, it regains its IBM screen capabilities, its 3278 identity. It's a split personality terminal, with the PCI 74D.

If you'd like to hear more about how to make your IBM world non-IBM compatible, get a dialog going with PCI today. To start your conversation, here's how to speak the language.

Your IBM CRT can communicate with ASCII hosts, like DEC, as if it was a DEC terminal. With a stroke of the key from your IBM CRT on your desk, you become instantly DEC-compatible. Your IBM terminal is now a DEC VT-100 CRT, thanks to the PCI 74D *de*converter from Protocol Computers, Inc.

You don't have to buy new terminals; you already own them.

Your IBM 3278 is a multi-function performer. Talk to DEC hosts, including those running the Unix and VAX/VMS operating systems. Talk to Dow Jones™ News/Retrieval Service for the latest stock information. Dial-up The Source. Connect to your Local Area Networks. The PCI 74D makes previously inaccessible time-sharing and private ASCII networks instantly available.

With the stroke of the key, you're back talking to IBM.

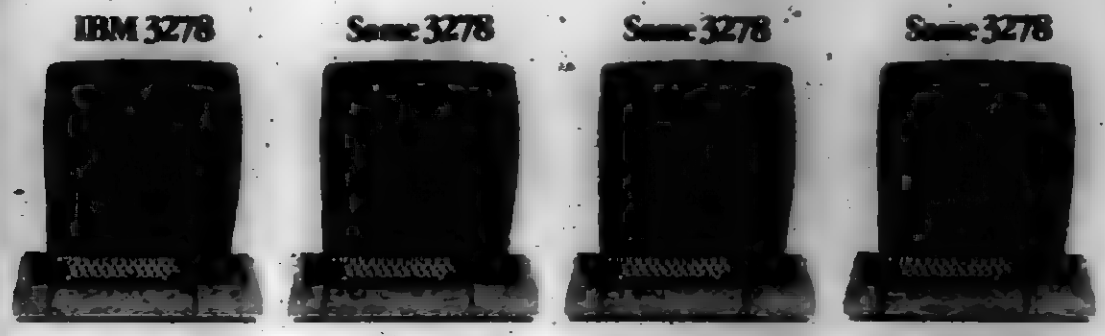
The PCI 74D switches your IBM 3278 terminal into the ASCII mode when it receives a specific keyboard command sequence. Suddenly the asynch ASCII world is at your fingertips. And just as easily, with another stroke of the key, you're back to IBM.

The PCI 74D resides between the IBM controllers (3274s and 3276s) and the hosts (IBM and ASCII). Connections to the controller or host can be either direct or through a modem. The PCI 74D is transparent to the IBM host.

Glossary:

ASCII (American Standard Code for Information Interchange). The language spoken by DEC, not by IBM (without PCI).
ASYNCHRONOUS Start-stop communications technique used by low-cost low speed ASCII terminals and Personal Computers.
CoaxFACE™ Exclusive PCI device provides RS232C interface to coax cables for attachment of ASCII terminals to PCI converters.
DEC Digital Equipment Corpora-

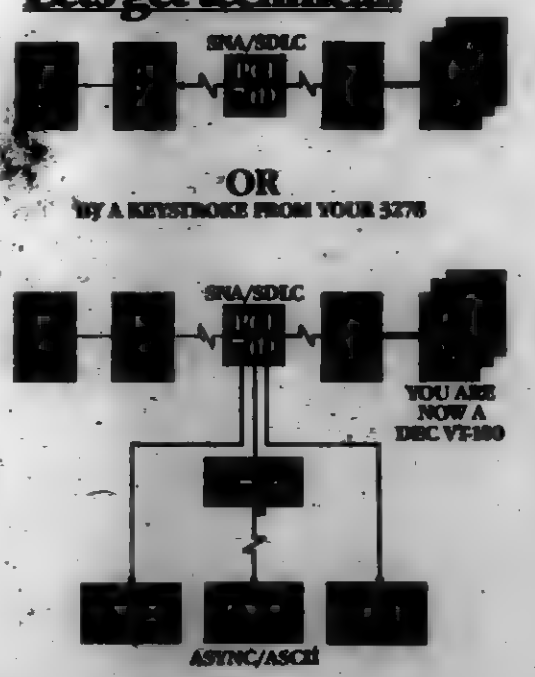
ow speak to DEC,"



tion. Used here as synonym for an ASCII host.
DECONVERTER (74D) Makes the IBM 3270 world ASCII-compatible.
FULL SCREEN The ability to modify an entire CRT screen of data without host interruption.
MODEMS Interface to allow digital devices to communicate over phone lines.
PaperCRT™ ASCII hard copy keyboard terminals have all the versatility of 3278 CRTs with this PCI option.
PCI (Protocol Computers, Inc.) We make the non-IBM world IBM compatible. Now we make the IBM world non-IBM compatible, too.
SDLC (Synchronous Data Link Control). Line protocol for data communications between IBM systems and terminals.
SNA (System Network Architecture). IBM's approach to data communications networking.
SNA/SDLC IBM communications; non-compatible with DEC (ASCII) communications (without PCI).
SYNCHRONOUS High speed, high cost data communications technique.
PCI 74D Deconverter makes the IBM 3270 world ASCII compatible.

3274/76 IBM controllers which support 3278s, 3287s in an SNA/SDLC network.
3278/79 IBM's CRT and color CRT.*
3178 IBM low cost CRT.*
3287 IBM's printer.*
*All non-compatible with DEC (ASCII) without PCI.

Let's get technical.



For more information call today, (800) 423-5904, (213) 716-5500 in California. Or write PCI, 6150 Canoga Avenue, Woodland Hills, California 91367-3773

The Micro Mainframe Link is available from PCI:

PCI 1076: ASCII to SNA/SDLC 3270 emulation.
PCI 1051: ASCII to Sys 34/36/38 5251 emulation.
PCI 74D: Deconverter that makes IBM CRTs ASCII-compatible.
PCI 1067: SNA/SDLC to ASCII 3767 emulation. The NTO alternative.
PCI 71B/SNA: BSC 3271 to SNA/SDLC 3274 emulation.
PCI 75B/SNA: BSC 3275 to SNA/SDLC 3276 emulation.
PCI 1071: ASCII to BSC 3270 emulation.
PCI 3780/SNA: SNA/SDLC to BSC 3780 emulation.
Videotex 67: SNA/SDLC to Videotex protocol conversion.
PCI's X.25 Series: PCI 73SX and PCI R73SX, SNA/SDLC to X.25 protocol converters for host and terminal connections respectively; PCI 1076X, ASCII to 3270 SNA/SDLC through X.25 networks, PAD included.
PCI's Networkers: Keystroke for keystroke 5251/11 and 3278 keyboard compatible ASCII CRTs.
PCI's IBM-PC software packages: For 3270 and System 34/36/38 emulation.

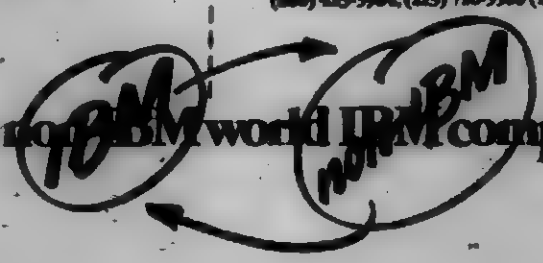
TWX 910-495-1941 PCI WHQ

"Hello DEC, this is IBM calling."

Name/Title
Company Name
Address
City State Zip
Phone CW 1/2

PROTOCOL COMPUTERS, INC.
6150 Canoga Avenue Woodland Hills, CA 91367-3773
(800) 423-5904, (213) 716-5500 (In California)

PCI Making the non-IBM world IBM compatible.



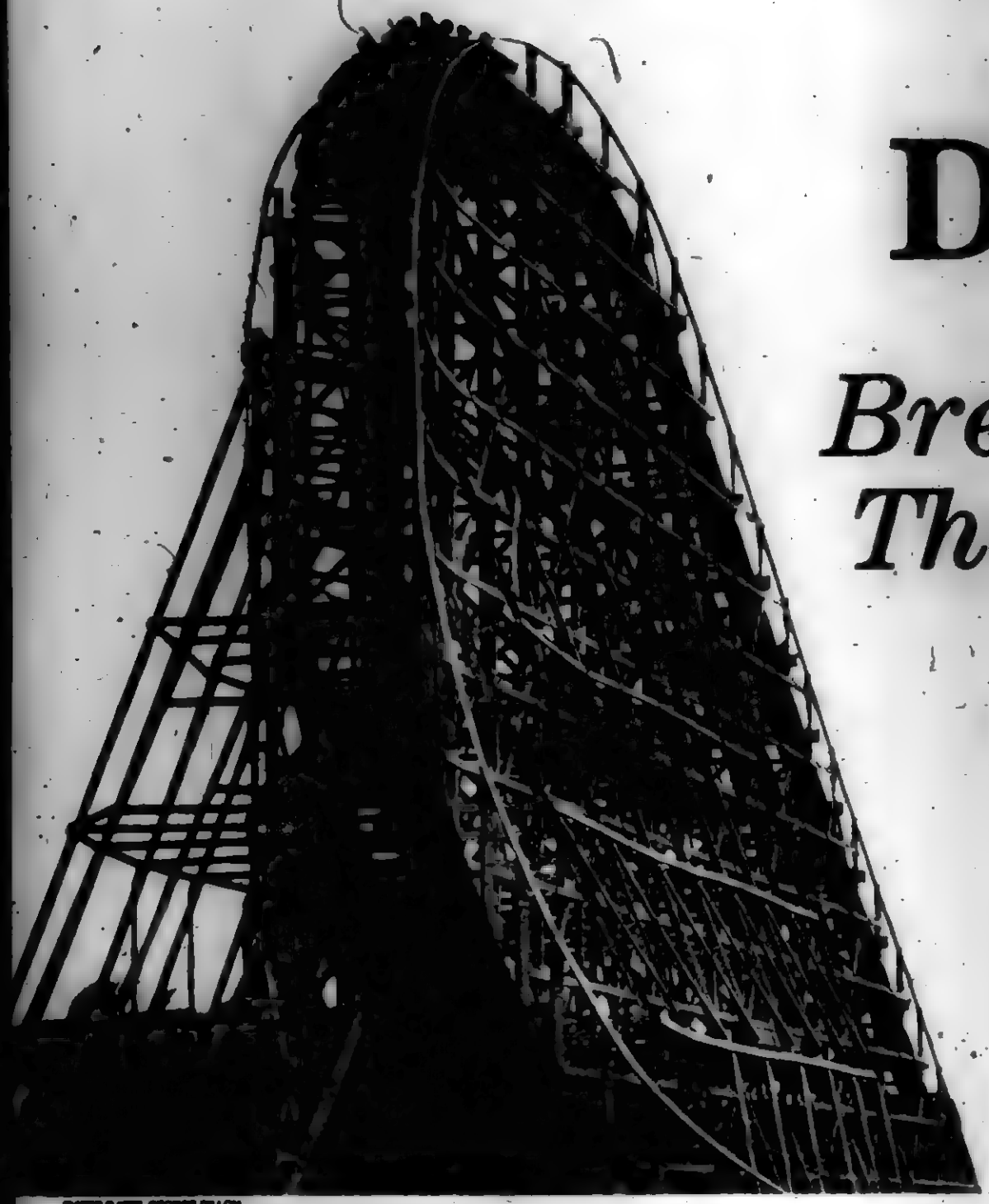


PHOTO © 1983, GEORGE GILLON

DEC

Breaking The Fall

By Peter Bartolik

The arrows flew from all sides in 1983 while Digital Equipment Corp. circled the wagons and hunkered down in decidedly bad humor. During a year in which the company was expected by some to renew its vigor, key executives left, earnings dropped and upstart competitors brought out faster machines.

The company struck a defensive posture, maintaining that nothing was wrong. But despite its protestations, it's beginning to look like DEC may go back to the basics in 1984.

Many people believed that 1983 would be the watershed year during which DEC would hone neglected marketing skills and mount a full-fledged campaign on the potentially lucrative business and office automation markets. The year was a watershed one, but not for the anticipated reasons. DEC announced in late October that first-quarter earnings would be off sharply — following a 32% slide in fiscal 1983 — because of "administrative problems" in shipping microcomputers and delays in shipping computer disk drives for large machines. Following the bad news, the stock market chopped more than $30 off the per-share price of DEC stock before it began to edge slowly back up past the $70 level.

Financial analysts, many of whom had begun to back away from the stock, sounded betrayed, in light of DEC's previous forecasts, and quickly revised downward their estimates for the company's health in 1984. Stephen K. Smith, an analyst with Paine Webber Mitchell Hutchins and still a DEC booster, lowered his fiscal year 1984 earnings projection to between $3 and $4 per share, which would be the lowest level in many a year.

The finger pointing was fast and furious; some said the company was befuddled by the aggressive moves of IBM, others said that the company lacked solid marketing skills. Some even insinuated that the company's management was past its prime.

No Charlie Chaplin

Talking to DEC President Kenneth H. Olsen, who has no intention of appointing a successor, one would think that 1983's problems were merely a bump in the road, an inconvenience that was overplayed by the nervous Nellies on Wall Street and the bloodthirsty hounds of the press. "You see, people who make these comments don't understand what marketing is," Olsen said in a recent interview with *Computerworld*. "They expect marketing to be Charlie Chaplin on television. [But] marketing is identifying your product and identifying your customer and bringing the

Peter Bartolik is a staff writer at Computerworld.

DEC

two together, and with our kind of product, we're after commercial, industrial, scientific and educational markets.

"This [marketing] often is not completely noticeable by the ordinary people who aren't our customers. . . . We really haven't been too bad through the years, and people that consider us not a marketing company ought to look at the results; we're not doing too badly. I think that's the measure. The measure isn't whether your mother-in-law in Idaho recognizes the name of the company.

"So, yes, we plan to be aggressive, and yes, we should be more aggressive, but no, our goal isn't to be noticed by the financial people or the press."

But the people who make the decisions on buying business computers and word processing equipment may very well be the people whose eyes are riveted on the latest TV antics of IBM's Charlie Chaplin look-alike. And the question has been asked whether a company that touts its highly technical spec sheets can sell in the burgeoning office automation market.

Frederick G. Withington, an industry analyst with Arthur D. Little, Inc., believes that in 1984 we will see "a considerable amount of refocusing" from DEC. "They'll be going back to their basic market." He quickly added, however, "that [it] doesn't mean they're giving up on office automation or the personal computer, it just means they realize there is more potential in their traditional scientific and engineering market."

Olsen claims that in the recent past the company has not lost an office automation contract in bids against the industry leader, Wang Laboratories, Inc., and that DEC probably has more word processing workstations installed than anybody else. But much of that installed base is in the markets of science and engineering where DEC has traditionally dominated.

"When it comes to the white-collar office, we didn't concentrate on that 'til the last couple of years, but we haven't lost an order to the leader in that business, [not] a single new order for a couple of years," Olsen said. "People already using somebody else's equipment have a tendency to continue to do so, but for new orders we don't lose."

Aaron Goldberg, an industry analyst with International Data Corp., doesn't feel DEC is ready to give up on the white-collar market. However, he concluded, "The move into the commercial markets is taking DEC a lot longer than it anticipated."

Won't Overrun IBM

In the area of microcomputers, DEC is going to bide its time and wait for the market to rise to the company's level, according to Olsen. With the announcement late last year of the Microvax I, a VAX-11 superminicomputer on two micro boards, and the expected announcement later this year of the "VAX-on-a-chip," the company is developing sophisticated equipment for the sophisticated user who grows dissatisfied with the limits of lower end microcomputers.

"We're not going to overrun IBM [in the micro area]; we're not going to compete head-on with IBM," Olsen declared. "Our equipment didn't set out to get that broad market base, and so we're not going to go after that broad market they are. We're going after that segment which maybe learned about computers with the less expensive, more computer-oriented machines [and now wants more power]."

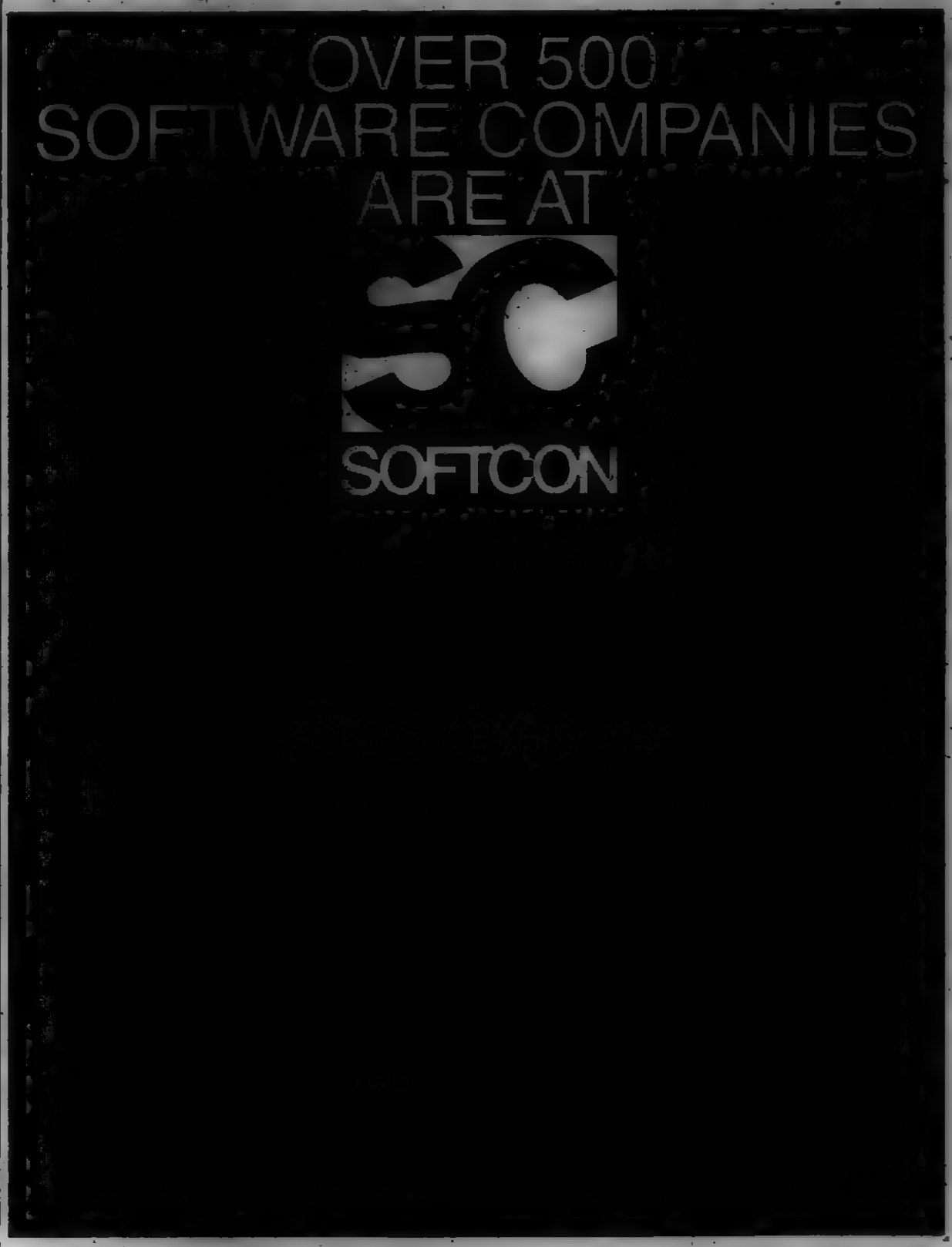
But if DEC won't compete with IBM in the micro arena, that's not going to stop Big Blue from trying to claim a piece of the traditional DEC market. Olsen said he welcomes the challenge and is "flattered" by IBM's interest, but believes DEC offers unique services.

However, IBM's move into DEC territory has "already happened," according to Withington, who said that DEC is not fully prepared to wage war with IBM. "DEC needs better technology. [Its] electronics are not as modern as IBM's."

On the other hand, DEC is not entirely defenseless, Withington acknowledged. "In the eyes of a considerable number of users, DEC has superior software, better cost packages and ease of use, and perhaps the company is more responsive. And its greatest asset is the number of people who have written software for the VAX."

IDC's Goldberg also believes DEC is well-equipped to maintain its market, but he expressed concern about the "exodus" of top and mid-

(Continued on Page 48)



(Continued from Page 41)

die management personnel, particularly from "projects" under way at the company. Most notable of the departures was the mid-summer resignation of C. Gordon Bell, formerly vice-president of engineering [CW, July 25].

Olsen practically bristles when he thinks of the published comments of unidentified former employees. "When the senior people left the company, I don't think any of them ever said bad things to the press. But some of the people who lost out at the more junior level don't know enough to keep their mouths shut, and the press often doesn't know enough. . . . you [shouldn't] talk to people who either left angry or who didn't make it here, who failed here or were let go or . . . the press should be more sensitive."

If the company has more leaders than it can use, he added, that is a positive sign that shows DEC is doing well; some personnel, he added, were with the company for a long time and simply wanted a different type of position or change of pace.

The 'Late' VAX

Another topic that ruffles Olsen's feathers is the suggestion that the high-end replacement for the six-year-old VAX-11/780 is late in coming. "The VAX computer is a very sophisticated computer. Because of all the features and details, it is very difficult to make it very fast, so from the start there have always been people who make simpler, faster machines. . . . We don't compete on speed, we compete on throughput and convenience [and] ease of use and those features."

Olsen claims that the products "we've got coming" make his job the most exciting that it has ever been. But the industry experts aren't so sure.

An Almost Mythical Giant

MAYNARD, Mass. — Within the organization, Digital Equipment Corp. President Kenneth H. Olsen looms larger than life, an awe-inspiring mythical giant standing with one foot forward, gazing over the horizon. It's an image with which Olsen is apparently not uncomfortable.

During a recent interview with *Computerworld*, Olsen made it clear that DEC is his company, and in no way is he ready to turn the helm over to someone younger.

Asked if he had a team ready to take over when the time comes to go out fishing, Olsen replied: "Oh no, you never have a team ready, and I'm still too young to say we'll set a team up. . . . We have a number of bright people, [but] I'll probably never admit that they're ready to take over without me."

Olsen at a Recent Meeting

On his actual role, Olsen said: "If anything, I fail at not being the forceful decision maker. . . . Where we've been successful, we've broken down the pieces where people have responsibility, set the goals and measured them. . . . Basically, strategy is encouraged by me or teased by me, but it's the responsibility of individuals."

"And so far as making the decisions, I take an active part in teasing, showing, educating, but . . . the decisions come automatically . . . it's making sure decisions get made, that's the job."

Departed Personnel

On departed personnel: "The people who have left us left for all kinds of reasons, and we would never make any comments about why. We would never say how many left because we encouraged them or how many left because . . . and most of them know enough to keep their mouths shut, too."

"Maybe the way to say it is, as friends and as colleagues for a long period of time, we miss them; but as part of the organization, it gives the opportunity for the bright, young people to move in and take these jobs."

On IBM's aggressive product strategy: "We have a head start there. We have the software, we have the machines, we have the products coming, so we feel flattered to have them show this interest."

(Asked if it isn't a problem to deal with the mystique behind the IBM name, Olsen replied, "Oh yeah, but it's a big market. We do those areas we feel we can offer something unique in.")

On the challenges of younger superminicomputer manufacturers: "When people say there's three or four machines out there faster, our answer is there always have been, so [speed] is not what made [the VAX-11] the standard of the industry. It's fast, but there is always something that goes a little faster. So we won't admit that we've lost any of that market; we've always had competition there and probably will for a long time. We don't offer the fastest, simplest machine."

Trauma With Micros

On the trauma in the micro market: "The trauma which we went through bears no relationship to the trauma that others went through. We made some administrative mistakes, we call them administrative, and that really had little to do with our personal computer plans."

"Our first year, we probably shipped more than IBM did its first year. We shipped approximately what we had planned. There were different types of plans, different types of numbers, so that statement is not always consistent; you see. And we accomplished very much what our original plans were, although at times we had more ambitious plans.

"But the problem of most personal computers, I would assume, is that most of them are in the same market; they do the same thing. We, from the start, have been after a different market and a different level of quality. . . . So we feel our approach just takes a little longer to catch on."

MicroAge

"THEIR ENTHUSIASM ABOUT OUR GROWTH IN ALASKA WAS CONTAGIOUS...IN LESS THAN TWO YEARS WE'VE EXPANDED INTO FOUR COMPUTER STORES!"

"MicroAge's enthusiasm was catching! The same can do energy that started MicroAge during the pioneering days of microcomputing is now a matter of company policy."

"Plus, MicroAge helped us get key product lines for Alaska!"

"We're believers in MicroAge. Their industry knowledge and insight into recent product developments has given us the flexibility to think and react before our competition does. We started with 4 people in a single store in 1981...now we have 4 stores and 26 people."

"At MicroAge, they speak our language...success!"

Jay Waldoff
MicroAge Franchisee

Tom Hunter
MicroAge Franchisee

To build your own professional computer sales organization with MicroAge, write to:

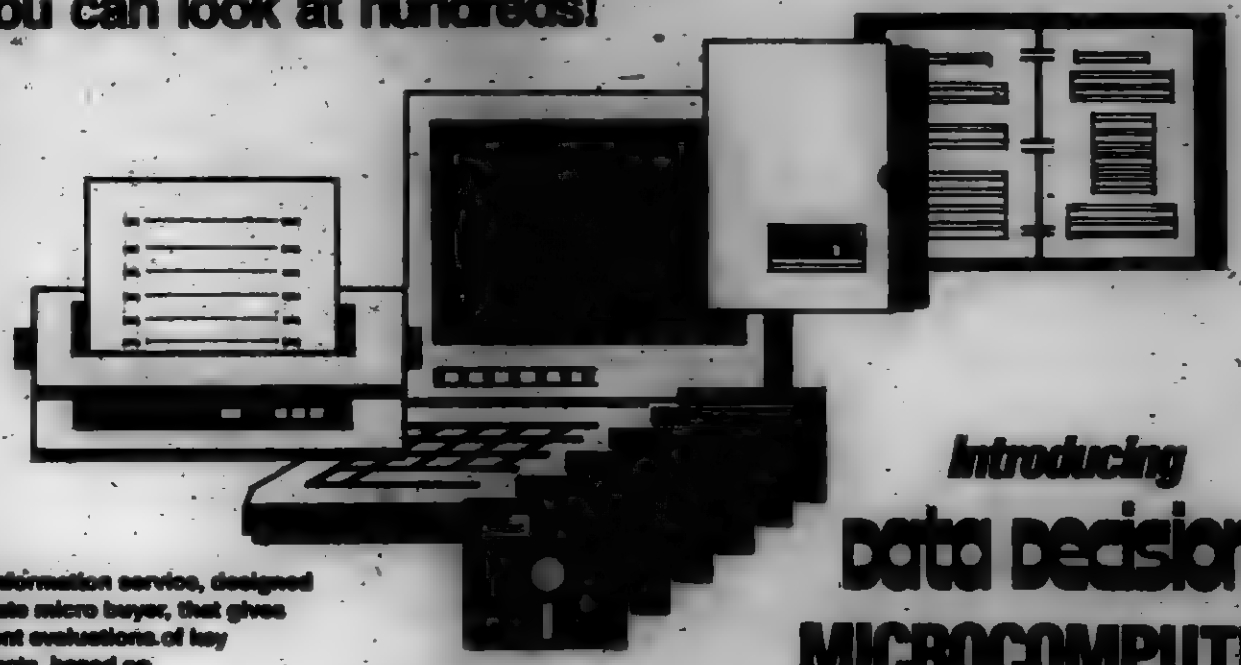
MicroAge®
COMPUTER STORES
"The Solution Store" ®

1437 West Alameda • Tempe, Arizona 85282

(602) 968-3168

How many micro software products do you have the time and money to test before you buy?

Now you can look at hundreds!



Introducing

Data Decisions™ MICROCOMPUTERS

An ALL-NEW information service, designed for the corporate micro buyer, that gives you independent evaluations of key software products based on

Hands-On Testing By Microcomputer Experts In Data Decisions' Own Labs

That's right. You'll find hard-hitting analyses based on the actual experience of seasoned experts who used the products under controlled conditions designed to simulate the situations you'll find when you bring these products in-house. Equally important—these experts base their evaluations on *fine-tuned, consistent criteria* so you'll know that similar products are all judged by the same standards.

In addition to this EXCLUSIVE FEATURE—available ONLY in Data Decisions MICROCOMPUTERS—you'll also find out:

Everything you need to know about MICROCOMPUTERS:

Desktops . . . high-level intelligent terminals marketed as independently programmable standalones . . . multi-user UNIX-type-based systems . . . executive workstation "professional" computers . . . integrated office automation workstations . . . supermicros . . . lineatops . . . portables/transportables . . . MORE

Everything you need to know about SOFTWARE:

Spreadsheets . . . graphics . . . financial packages . . . independent operating systems . . . DBMSs . . . office automation . . . communications . . . MORE

Everything you need to know about EXPARSION/ EXTENSION CARDS:

Controllers . . . clocks . . . A to D converters . . . extra quad boards . . . interface boards . . . language cards . . . solid state disks . . . memory boards . . . processor enhancements . . . auxiliary processors . . . MORE

Everything you need to know about COMMUNICATIONS:

Micro LAN networks . . . micro modems . . . micro terminals . . . terminal emulators . . . micro-to-mainframe downloaders . . . database access packages . . . electronic mail . . . MORE

Everything you need to know about PERIPHERALS, ACCESSORIES, SUPPORT EQUIPMENT:

Printers . . . plotters . . . monitors . . . floppies . . . hard disks . . . keyboards . . . tape drives . . . OCR, bar codes, sensors . . . power supplies . . . power surge protectors . . . cooling fans . . . MORE

In short, Data Decisions MICROCOMPUTERS gives you everything you need to:

- Eliminate time-consuming evaluations of inappropriate products.
- Reduce the number of sessions you have with vendors and distributors.
- Avoid costly product-selection mistakes.

And all this for no more than you would have to pay a consultant to do *one* of our hands-on software evaluations!

How is the Information in MICROCOMPUTERS Provided?

As a MICROCOMPUTERS subscriber you get:

Two loose-leaf volumes filled with the most complete, concise, accurate, easy-to-use and current information ever compiled on the micro marketplace. . . . And all this information is consistently formatted to make product comparisons easy and quickly guide you to the facts you need.

Incisive Product Analyses that *highlight* the specific strengths and limitations of mainstream hardware and software products and discuss their suitability for a corporate environment.

Action-Oriented Technology Reports, Market Studies, and Tutorials on topics like hard disk cassette drives, modems on a chip, color printers and networking pcb.

Reliable User Ratings that let you see how products measure up in the opinion of your peers.

Lively Monthly Newsletters that highlight late-breaking industry happenings, discuss new product announcements, and provide a calendar of events. The MICROCOMPUTERS Newsletter also contains 2 special features —"Magazine Roundup," which tells you the best articles published in the microcomputer trade press during the previous month, and "*This Month's Test Results*," a capsule version of the key findings of each hands-on analysis.

Unlimited Free Telephone Consulting by micro experts whose only job is to provide quick answers to your questions.

Thick Monthly Updates . . .
Comprehensive Surveys . . . User Names for major software products . . .
Complete Vendor Directory . . . MORE

About Data Decisions™

Data Decisions is a research organization that publishes information services on computer and communications hardware and software and provides custom consulting services on the computer and communications industries.

When Data Decisions was founded in 1960, it quickly attracted a unique group of information specialists and professionals who, individually and as a group, have played a major role in the development of the EDP information services industry as we know it today.

The staff of professionals at Data Decisions includes the largest, most experienced group of senior analyst-editors ever assembled to work on EDP information services. Data Decisions has *three times more people assigned to the evolution and maintenance of our flagship products than does our largest competitor.* At present we employ over 100 people, and our development efforts are carefully designed to assure our continuing pre-eminence in the coming years.

Can I Examine MICROCOMPUTERS for Myself?

YES! If you *act now*, you can receive a *no purchase obligation TRIAL REVIEW* of Data Decisions MICROCOMPUTERS and an *opportunity to subscribe* to MICROCOMPUTERS at a *special charter subscription bargain price* of only $625—that's $75 off the regular subscription fee of $700.

Even if you've already agreed to look at another micro information service, be sure to take advantage of this Data Decisions offer as well. YOU WON'T FIND HANDS-ON TESTING RESULTS ANYWHERE ELSE, and you have nothing to lose.

To request your trial review and become eligible for our $75 *limited-time charter subscriber discount*, simply fill in and return the coupon. Data Decisions will send you MICROCOMPUTERS to examine at your convenience, with absolutely no purchase obligation.

SPECIAL CHARTER SUBSCRIPTION OFFER!

☐ **YES.** Please have someone phone me to arrange a *no purchase obligation* TRIAL REVIEW of MICROCOMPUTERS. Should I decide to become a subscriber, I understand that, by acting now, I will be eligible for a special charter subscription price of $625—a $75 savings off the regular subscription fee of $700.

☐ Although your offer is completely risk-free, I'm still not sure. Please provide more information.

Signature

Name (Please type, print or affix business card)

Title

Company

Address

City State Zip

Phone

Data Decisions™
20 Bruce Road
Cherry Hill, NJ 08034
(609-429-7100

The AT&T Divestiture

Hoping for the Right Numbers

By Phil Hirsch

Photo © 1981 Stock, Boston/Inc.

Even though the Bell system will be broken up on Jan. 1, telecommunications users still do not have the answers to some important questions. Among other things, they don't know what message toll service, Wats and other heavily used communications services will cost after April 3.

That's the date on which the Federal Communications Commission's (FCC) new access charge plan may or may not go into operation, along with new rate tariffs filed by AT&T and the Bell operating companies last October. Congress strongly opposes the FCC access charge plan, and most corporate communications users strongly oppose the tariffs.

The access charge plan restructures the way local telephone companies will be reimbursed for the costs they incur in providing access to the long-distance telephone network. Historically, this reimbursement has been made through "settlements" paid by long-distance telephone carriers. Other common carriers have basically paid a similar Exchange Network Facilities for Interstate Access charge. Altogether, this "interstate contribution" amounts to about $6.5 billion annually.

Although tendered by carriers, the money actually comes out of their customers' pockets. That means it has been paid totally by long-distance communications users.

Since long-distance charges comprise a major part of most corporations' communications bills, business users are particularly eager to reduce their part of the interstate contribution. One reason that's difficult is because the contribution includes a hefty subsidy that enables local telephone companies to keep down the costs of their local services.

The political consequences of this point became clear when the FCC unveiled its access charge plan a year ago and was immediately assailed by Congress, consumer groups and state regulators. The plan imposes a monthly surcharge on all users of the local telephone network, including those who make no telephone calls at all. The surcharge is $2 per month for each residential subscriber's access line and up to $6 per month for each business access line.

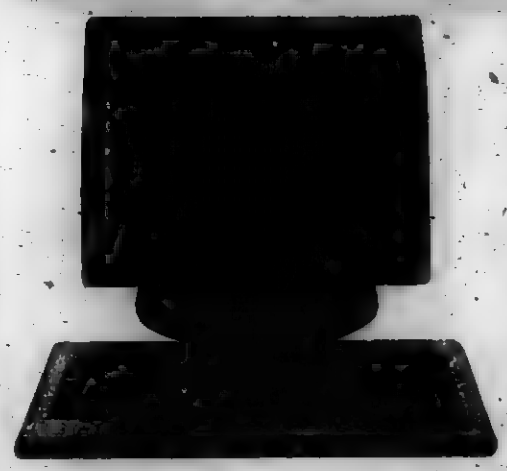
According to an analysis made by the House of Representatives' telecommunications subcommittee, the residential surcharge would amount to $1.9 billion the first year the plan was in effect and $3.6 billion in the plan's sixth year. In other words, about 30% of the annual interstate contribution would be shifted the first year from long-distance users to local residential users, while in the sixth year, about

(Continued on Page 46)

Phil Hirsch is senior editor/communications at Computerworld.

ADDS Viewpoint/Color from your point of view.

EVEN BOSSES NEED A LITTLE COLOR.



Right out of the box, the new ADDS Viewpoint/Color brings extra clarity and comprehension to any business application. Bosses like that.

They also will like the ergonomically designed detachable keyboard with its separate key cluster for numeric entry and cursor control. And the display screen which tilts from a minus 5° to a plus 15° and swivels a full 360° for comfortable viewing.

But should only a boss deserve color?

The full-featured ADDS Viewpoint/Color costs less than many monochrome terminals so there's no reason not to let color improve your communications company-wide: That makes nine good reasons to buy ADDS Viewpoint/Color terminals. Red, blue, green, yellow, cyan, magenta, white, black and price.

IT ALL ADDS UP.

ADDS
Applied Digital Data Systems Inc.
A Subsidiary of NCR Corporation
100 Marcus Blvd., Hauppauge, New York 11788

(Continued from Page 44)
55% of the total contribution would be shifted.

However, legislation now pending in both houses of Congress would bar the FCC from imposing surcharges on residential and single-line business users. If either bill is enacted, larger companies would supply a much bigger percentage of the interstate contribution than they would under the FCC plan.

The House bill (H.R. 4295) permanently bans residential and single-line business surcharges, while the Senate legislation (S. 1660) defers them for two years. The full House passed H.R. 4295 early last month; S. 1660 is scheduled for a final vote in the Senate late in January.

'Excellent Chance'

According to Herb Jasper, who probably spends more time tracking telecommunications developments on Capitol Hill than anyone else in Washington, D.C., there is an "excellent chance" the Senate will pass its bill. Jasper, executive vice-president of the American Council for Competitive Communications, an other common carriers' trade association, pointed out that the Senate bill is sponsored by a Republican — Bob Packwood (R-Ore.) — which gives it an edge in the present Republican-dominated Senate. Moreover, S. 1660 is less objectionable than the House bill to AT&T and bigger companies.

For the companies, the big advantage of the Senate bill is that it defers residential and single-line business surcharges for only two years, rather than permanently banning them. AT&T, meanwhile, prefers the way the Senate proposes to deal with the "other common carriers' differential."

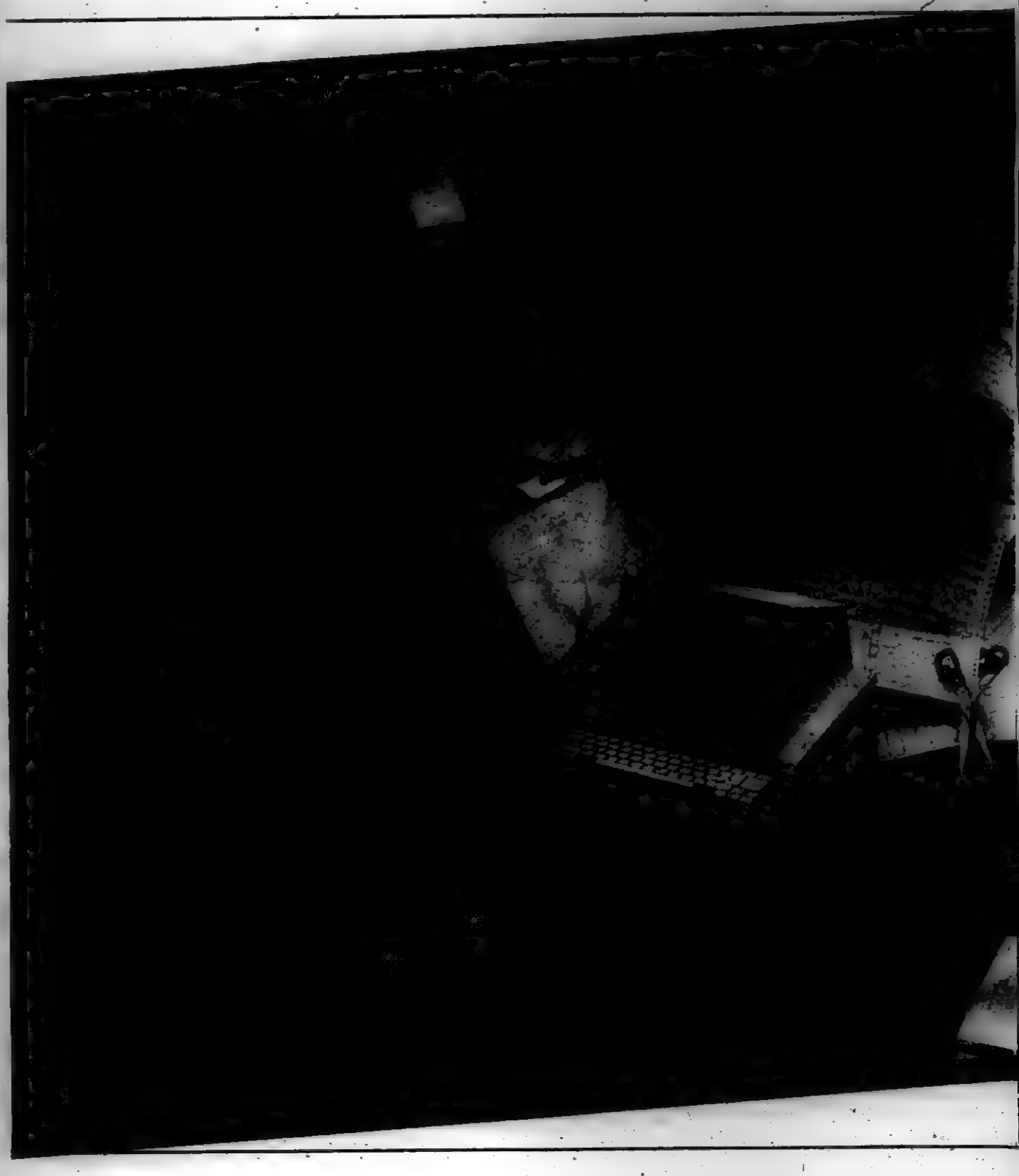
Presently, other common carriers pay considerably less than AT&T for access to local telephone networks because the other common carriers get poorer quality interconnection. (One result: other common carriers' customers must dial more digits to set up long-distance calls.) During the next two years, however, as electronic switches come into wider use, this qualitative difference in interconnection facilities is supposed to disappear gradually. Under the House bill, the differential in access charges does not start to decline until the other common carriers begin receiving improved interconnection service. Under the Senate bill, however, the differential would drop precipitously the first year the FCC's access charge plan is in effect, thereby raising the other common carriers' costs and forcing them to raise their rates relative to AT&T.

Brian Moir, Washington counsel for the International Communications Association (ICA), agrees with Jasper that there's a good chance S. 1660 will be passed by the Senate. He noted, however, that the Reagan administration and the FCC have joined the bulk of the telephone industry in criticizing the House bill directly and the Senate legislation by implication, so he thinks changes are likely before the measure reaches the president's desk.

Moratorium Option

What sort of changes? Moir — who served six years as legal counsel to the House Commerce Committee and its telecommunications subcommittee before going into private practice — believes the House bill's total ban on residential and single-line business surcharges might be replaced by a moratorium. To make this change more palatable to consumer advocates, the moratorium could be made longer than the two years specified in S. 1660 and could be phased in over more than the six years mandated by the FCC in its access charge plan.

In exchange, Moir said, the telephone carriers may have to accept the House-approved provision freez-



ing the AT&T/other common carriers' access charge differential until the specialized carriers obtain better quality interconnection.

Rate Fight Certain

Even if the access charge battle is resolved on Capitol Hill, another fight over rates is virtually certain at the FCC.

Last October, AT&T filed new interstate tariffs embodying the FCC access charge plan, and the Bell operating companies — along with independent telephone companies serving non-Bell areas — filed tariffs specifying their terms for supplying access facilities. Initial comments on the Bell operating companies' tariffs were filed late in November by about 60 organizations.

Because the carriers allegedly have failed to supply adequate information, "there simply is no basis on which the commission can conclude that . . . the estimated interstate access service revenue requirements are reasonable and reliable," said the Ad Hoc Telecommunications Users Committee, which includes such companies as Allis-Chalmers, Control Data Corp., General Motors Corp. and Sears Roebuck & Co. "There is potential in the tariffs [for] enhanced service providers, sharers and end users [to] be subjected to unreasonable, discriminatorily high local service charges."

In its comment, the ICA noted that the user must order and pay for his access circuit long before he actually uses it. The access tariffs do not require local telephone companies to maintain an inventory of access circuits, the association explained, so the only way a user can be sure of having facilities when he needs them is to file planned facilities orders.

Since planned facilities orders have to be placed at least 24 months before they are activated, "an [interstate customer] must know fully two years in advance where its new facilities will be located, exactly what facilities it will need and, if applicable, where its customers will be located," ICA said. "Plainly this type of arrangement taxes even the most sophisticated forecasting systems."

The tariffs also require the interstate customer to prepay "one full year's monthly charges in three installments over no longer than the first 14 months following the order date," the ICA observed. "Payments are due on the last day of the specified months, and any payment not received by the exchange carrier by the end of the first working day of the next month would . . . cancel the [Planned Facilities Orders]."

Most of the organizations commenting on the Bell operating companies' /tariffs said the FCC should extend its investigation beyond April 3, the date the tariffs are presently scheduled to become effective. Given this consensus, it is believed that that is what the commission will do. Although the proposed rates would go into effect on April 3, they would be subject to change at the end of the investigation, and users might even get refunds. But because both the critics and the issues are numerous, the investigation is likely to take quite a while and ultimately end up in court.

Buying Methods to Change

Besides changing the way users buy transmission services, AT&T's divestiture will drastically change the way they obtain terminal equipment. Local telephone companies, as well as AT&T Information Systems, AT&T's deregulated subsidiary, will be selling, as well as leasing, new terminal equipment after Jan. 1. Users will have the option of buying or continuing to lease their already installed terminals.

In November, the FCC adopted a plan permitting this embedded base to be sold to its present users after divestiture. However, it is not yet clear what the

(Continued on Page 48)

CLEAR YOUR DESKS FOR THE PERSONAL TERMINAL BOOM.

Introducing a desktop revolution. The Personal Terminal from TeleVideo®—a compact new terminal for people who've forgotten what the finish on their desktops looks like. It isn't intimidating. It doesn't require programming knowledge. And it costs much less than a full-sized terminal. Clearly, the Personal Terminal will simplify the way your company works.

Want communications capabilities? Two RS-232 communication ports are standard equipment. An attached telephone option is available. And two optional, internal modems (300 or 300/1200 baud) put managers on-line with data services in seconds.

Want to expedite data retrieval? The Personal Terminal has 7 function keys (shiftable to 14) that reduce often-used commands to one key stroke. With a modem installed, those same keys can autodial up to 10 phone numbers. The built-in directory feature lets you autodial up to 18 more.

Send and receive electronic mail. Check inventory. Review sales and traffic figures instantly with the Personal Terminal. The 9-inch screen is easy to read. The professional keyboard is easy to use.

The Personal Terminal from TeleVideo. The desktop connection to a more intelligent, productive and cost-effective office environment. Isn't it time you got in on the information management boom?

Call us at 800-538-8725 for more information (in California call 408-745-7760) or contact your nearest TeleVideo office:

California/Santa Ana	(714) 557-6095
California/Sunnyvale	(408) 745-7760
Georgia/Atlanta	(404) 399-6464
Illinois/Chicago Area	(312) 351-9350
Massachusetts/Boston	(617) 668-6891
New York/New Jersey	(201) 267-8805
Texas/Dallas	(214) 980-9978
France/Paris	33-1-687-3340
United Kingdom/ Woking, Surrey	44-9905-6464

GET IN ON THE BOOM.™

TeleVideo® Terminals

© TeleVideo Systems, Inc.

(Continued from Page 47)

sales price will be in every case. That's because the new owner of the equipment, AT&T Information Systems, does not plan to announce prices of several types of equipment until after Jan. 1, 1985. The list of equipment is broken down into some 20 equipment categories; it includes electronic private branch exchanges (PBX) (Series 700 and 800), data sets (Series 400, 600, 800) and various models of the Datespeed 40 terminal.

How long users will have to wait for prices after Jan. 1 has not been specified. The FCC decision allows the company to wait until Jan. 1, 1986. AT&T said that "overall, it is estimated that roughly 75% of the multiline customer premises equipment (CPE) base will be made available for sale during 1984."

For the long term, the most significant feature of the CPE decision is that it promises to give users more control over what they buy, when and from whom — thus achieving a goal the FCC has been seeking since the 1960s; the Justice Department's antitrust suit against AT&T had a similar objective. It isn't clear, however, that users will gain similar control over transmission services.

Although it will be quite a while in some cases before sales prices for some already installed terminals are announced, users will be protected by the fact that several competing manufacturers offer similar equipment. The FCC order limits what AT&T can charge to rent embedded terminals between Jan. 1, 1984 and the date they are offered for sale. The order also limits what AT&T can charge to lease or rent terminals for a two-year period after sale prices are announced, thus giving users plenty of time to decide whether to retain or replace the equipment.

In the case of transmission services, the situation is much murkier. Not only are Congress and the FCC arguing about the commission's access charge plan, but telephone companies and their customers are arguing about the tariffs that implement that plan.

But there is another problem that may be even more significant.

Although AT&T currently carries over 90% of this country's interstate communications traffic, and most observers do not expect that percentage to decline markedly for a long time, former U.S. Assistant Attorney General William F. Baxter told Congress he believes the intercity market is on the verge of becoming competitive. His view is significant because the Justice Department has primary responsibility for monitoring the post-divestiture behavior of AT&T and the divested Bell operating companies.

In Congress, meanwhile, and at the FCC, great sympathy is being explicitly and implicitly expressed for the Bell operating companies. One indication: both S. 1660 and H.R. 4296, the pending telecommunications bills, tax users who bypass their local telephone company networks. However, all of the operating companies significantly threatened by bypass services have the resources to upgrade their networks so that business customers will be discouraged from migrating to bypass technology, and many of them are building upgrade facilities right now.

In other words, it is questionable whether any help is needed from Capitol Hill.

Last month, the FCC decided that the Bell operating companies, after divestiture, must abide by a "modified" interpretation of the Second Computer Inquiry decision. That decision says, essentially, that if AT&T or any of its operating company subsidiaries markets "enhanced" services or terminal equipment, it must be done through separate subsidiaries on a deregulated, nontariffed basis.

Possibly the most significant aspect of last month's FCC action was that three of the four commissioners who voted for it — Mark Fowler, Henry Rivera and Mimi Weyforth Dawson — did so reluctantly. They had expressed strong doubts about whether the divested Bell operating companies really need to be saddled with separate subsidiaries.

It is at least conceivable, though, that dimming the bright line separating regulated from unregulated services will enable the Bell operating companies to retain their present monopoly control of local exchange services. AT&T's long-distance monopoly may also be strengthened.

Ever since 1981, when Computer Decision II was issued, AT&T has been trying to do away with it. November's FCC decision could give this campaign a tremendous boost, particularly if, as seems certain, some Bell operating companies are allowed to establish unseparated divisions in place of separate subsidiaries.

As a result, it is quite likely the most important question facing the FCC and telecommunications users in 1984 will be whether Computer Decision II's bright line remains in place and preserves the limited competition achieved so far.

Shared DASD users, don't leave your data integrity to chance.

Protect it with Super-MSI™, the integrity protection package designed exclusively for multiple-CPU environments.

Easy to install. Easy to maintain. Super-MSI requires no modifications to your operating system and can be implemented in an active system in as little as ten minutes—assuring complete data integrity from the moment it is installed.

Super-MSI guarantees data integrity.

No complicated job scheduling. No elaborate control schemes. No software changes. Super-MSI spans inter-system activity to give "unified system" integrity to your entire multi-system complex.

Super-MSI preserves integrity under MVS, MVS-SE, MVS-SP, SVS, MVT, VS1 and MFT systems.

Super-MSI prevents data destruction.

Inadvertant modification, simultaneous access ... Super-MSI stops the damaging data abuses that multiply in a multi-systems environment. Prevents the errors that can so easily occur—and too often go undetected—when users operate in a multi-systems complex.

Super-MSI eliminates hardware RESERVEs.

Super-MSI completely protects your data integrity and frees your systems of RESERVEs and RESERVE lock-outs. Super-MSI converts selective RESERVEs to logical controls that securely protect your data without inhibiting system throughput.

Super-MSI does more.

As part of the CGA family of single-image software for multiple-CPU sites, Super-MSI works together with MSM®, our Multiple Systems Manager which manages tape and disk storage devices and GCD®, our Global Console Director which consolidates consoles, cutting costs and streamlining operations. The result is a unified single system image that is transparent, flexible and powerful. Use them together or in any combination. CGA's multiple systems software is a must for large users.

More than 1,000 CGA single-image software packages are in use around the world, preserving data integrity and helping multiple-CPU sites hum like they're supposed to. Call today. Set up a free trial of Super-MSI, GCD or MSM.

Speak software. Talk to CGA.
800-237-2057

cga

CGA Software Products Group
P.O. Box CGA-1
Holmdel, NJ 07733

PHOTO © 1983, GEORGE GILLEN

White-Collar Crime

The Enemy Within

By Robert Batt

While the movie *War Games* and the recent spate of well-publicized computer break-ins have focused attention on the threat from outside hackers, the management information systems professional faces a potentially more damaging intrusion of corporate data from his own employees.

According to a recent report from the New York-based Research Institute of America (RIA), an estimated $70 billion is lost each year to white-collar, computer-related crime, fraud and embezzlement, of which up to 75% can be attributed to insiders.

"DP-related crimes originating from within the company itself are by far the biggest part of the problem. For example, it is much harder for outside hackers to identify the vulnerabilities of a software system than the insider who has access to the system for a much longer period of time and who knows the operating procedures of the company," commented Bob Abott, president of EDP Audit Controls, Inc., an Oakland, Calif.-based security consultant.

Since huge quantities of information are concentrated in one place, sensitive data can be easily copied or stolen, the RIA report, titled "Safeguarding Your Business Against Theft and Vandalism," pointed out.

In a world of large-scale data banks, information can be directly entered into a computer without any written record or proper authorization, and it can be changed without leaving any trace.

A dishonest programmer can bypass controls and surreptitiously enter information into the system, authorizing his own transactions, RIA said. "Many records can be altered in a brief period. An embezzler can alter just so many written checks or records in a given time. Given access to a computer, however, he may get away with millions in minutes," the RIA report said.

Banks, for example, have been the victims of a swindle called "breakage." The dishonest employee, assigned to distribute interest to customers' accounts, programs the computer to deposit in his own account the odd fractions of a penny or dollar left over on many accounts. It's a difficult threat to detect, said Barry Bergman of the San Mateo, Calif.-based Barrick Security Group, because an audit reveals only that the correct total interest was paid.

"The audit trail is invisible. This makes checking and cross-checking of data more difficult for people

(Continued on Page 52)

Robert Batt is a Computerworld West Coast correspondent.

TX

The most powerful on-line

Today, the world of business computing is being introduced to a system featuring over two-and-a-half times the performance and twice the price/performance of its nearest competitor.

A versatile system. Able to compile the information of the largest corporations into a single relational data base. Instantaneously updated and fully available across the entire system.

An expandable and compatible system. Allowing the simple addition of future programs and equipment, without sacrificing past investments.

And most importantly, a system that won't let you down. Because its fault-tolerant design won't let itself down. Even if a major component fails.

This system isn't from IBM.

It's from Tandem.

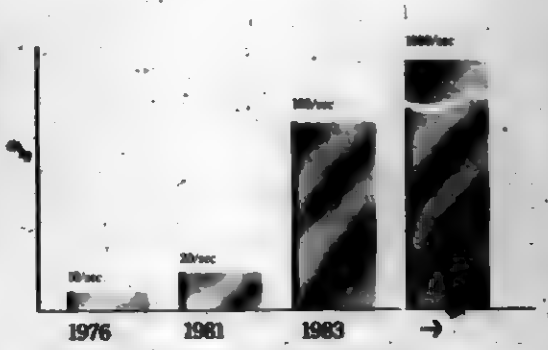
Introducing the NonStop TXP™ system.

TXP: 32-bit transaction processing.

The TXP system processes high-volume loads faster and more economically than any other system. Executing over 100 transactions per second now and thousands of transactions in the near future.

It's built around multiple parallel 32-bit processors. Each addressing 16 MB of physical memory and over a gigabyte of virtual memory.

To help memory keep pace with that kind of processing, TXP pulls 64 bits on each memory access.



Our success can be summed up in a second. *Transactions per second. Numbers unsurpassed in the industry. On-line systems that fit your needs today. And tomorrow. With more processing power on the way.*

The TXP system also features parallel data paths. Manipulating 32 bits of information in a single cycle, two 16-bit operations in the same cycle.

And TXP incorporates extensive pipelining, to process multiple instructions simultaneously. Each processor overlaps instructions in three levels: Fetching one, while preprocessing a second, while executing a third.

While helping TXP deliver full 32-bit power, for less.

Cache memory pays off in faster response times.

Cache memory is a high-speed data storage area between the processor and main memory. It lets the processor store more frequently used information closer. So it can get to it faster.

And our tests have shown that the TXP cache memory has a 98% "hit rate." Which means the requested data is virtually always nearby for fast access.

The result? Larger volumes of work can be processed in shorter amounts of time. Helping TXP to be even more productive.

Making cache memory pay big dividends.

A system you'll expand, not disband.

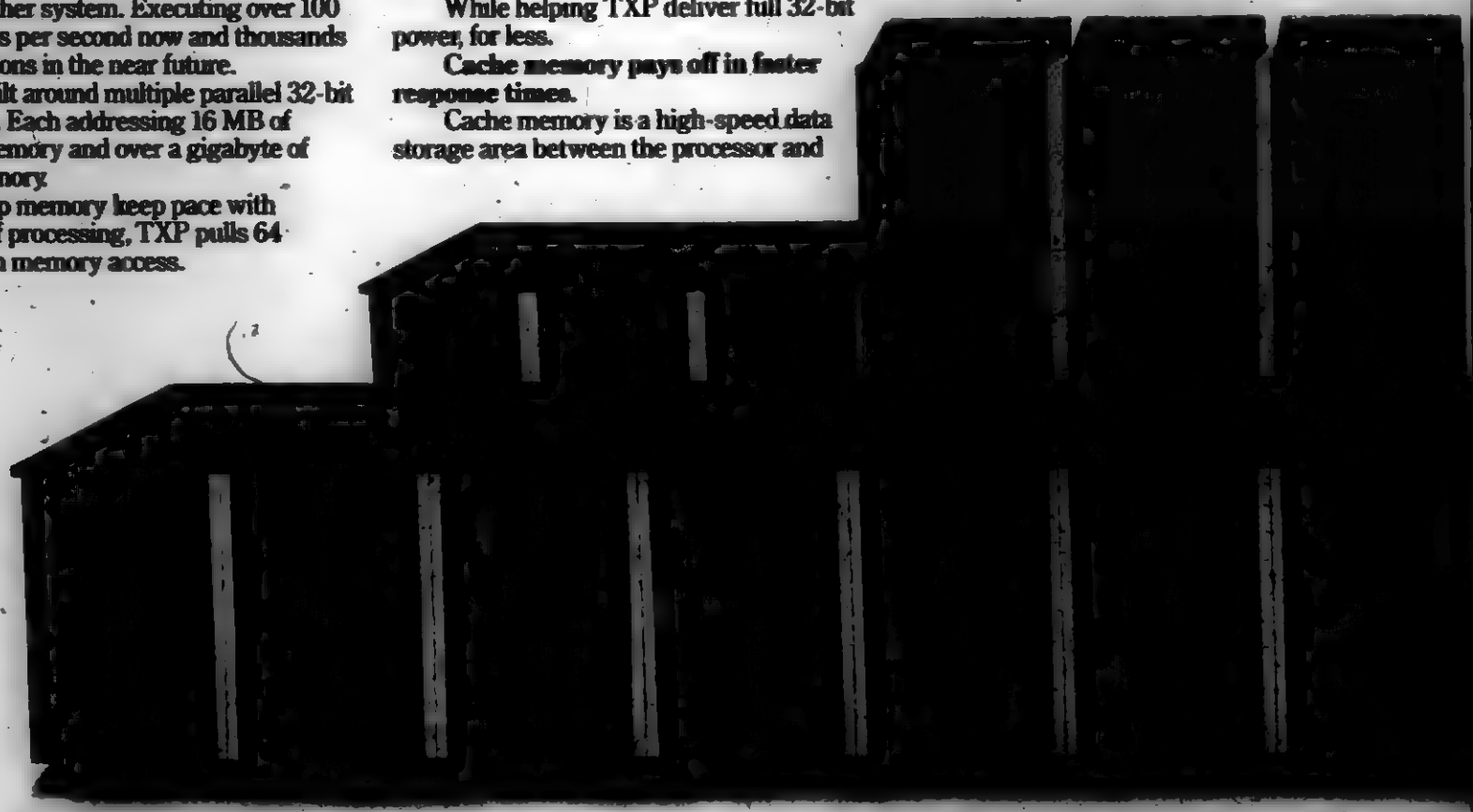
Most computer systems have very limited expandability. So if a company outgrows its computer's capacity, it usually means starting again from scratch.

Selecting and buying a larger and more expensive system.

Then reprogramming.

Then re-training.

Plus all the chaotic disruption and



XP

computer in business today.

massive loss of revenue that's unavoidable during the switch-over.

Not so with the TXP system.

It can expand from two to 16 processors. Increasing its power by a factor of eight.

That's more power than any of the largest mainframes.

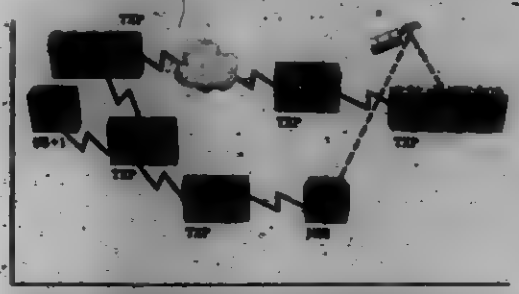
And the additional processors can be installed while TXP is running at full speed. No downtime. No reprogramming.

Still not enough power? Up to 14 TXP systems can be joined together by high-speed fiber optics. Linking the systems together as one computer with 224 processors.

But that still isn't the full potential of the TXP.

TXP systems at up to 255 sites can be joined in a worldwide network. Generating the power of over 4,000 processors.

And that gives TXP the most powerful on-line computer capacity in business.



The most powerful computer network in business today. *Users access a single unified global data base from any of thousands of terminals anywhere in the system.*

Expandability our competition wishes they could disband.

NonStop™ system compatibility from the people who started it all.

TXP can process more information and support more programs, users and devices than any other computer designed for on-line transaction processing.

Devices you most likely already have.

Even devices made by IBM.

But what if your company isn't quite ready for the TXP system's awesome power?

We suggest the Tandem NonStop II™ system. The second most powerful on-line computer in business today. The cost effective solution for medium to large corporations.

What if your company is somewhere between a Nonstop II and a TXP?

No problem. They can be combined. They can share the same data and programs. In fact, NonStop II and TXP processors can coexist in the same cabinets.

And what if your company needs even a smaller computer? We make a smaller computer. The Tandem NonStop 1+ system. Perfect for those low-volume sites where less processing power is needed.

Tandem literally wrote the book on NonStop™ transaction processing. That's because we introduced the first NonStop system.

Over eight years ago.

And for over eight straight years, despite attempts by others, we've continued to lead the industry.

Learn all about TXP, ASAP.

For complete literature, contact your local Tandem Sales Office.

Or write Tandem Computers Incorporated, 19333 Vallco Parkway, Cupertino, California 95014.

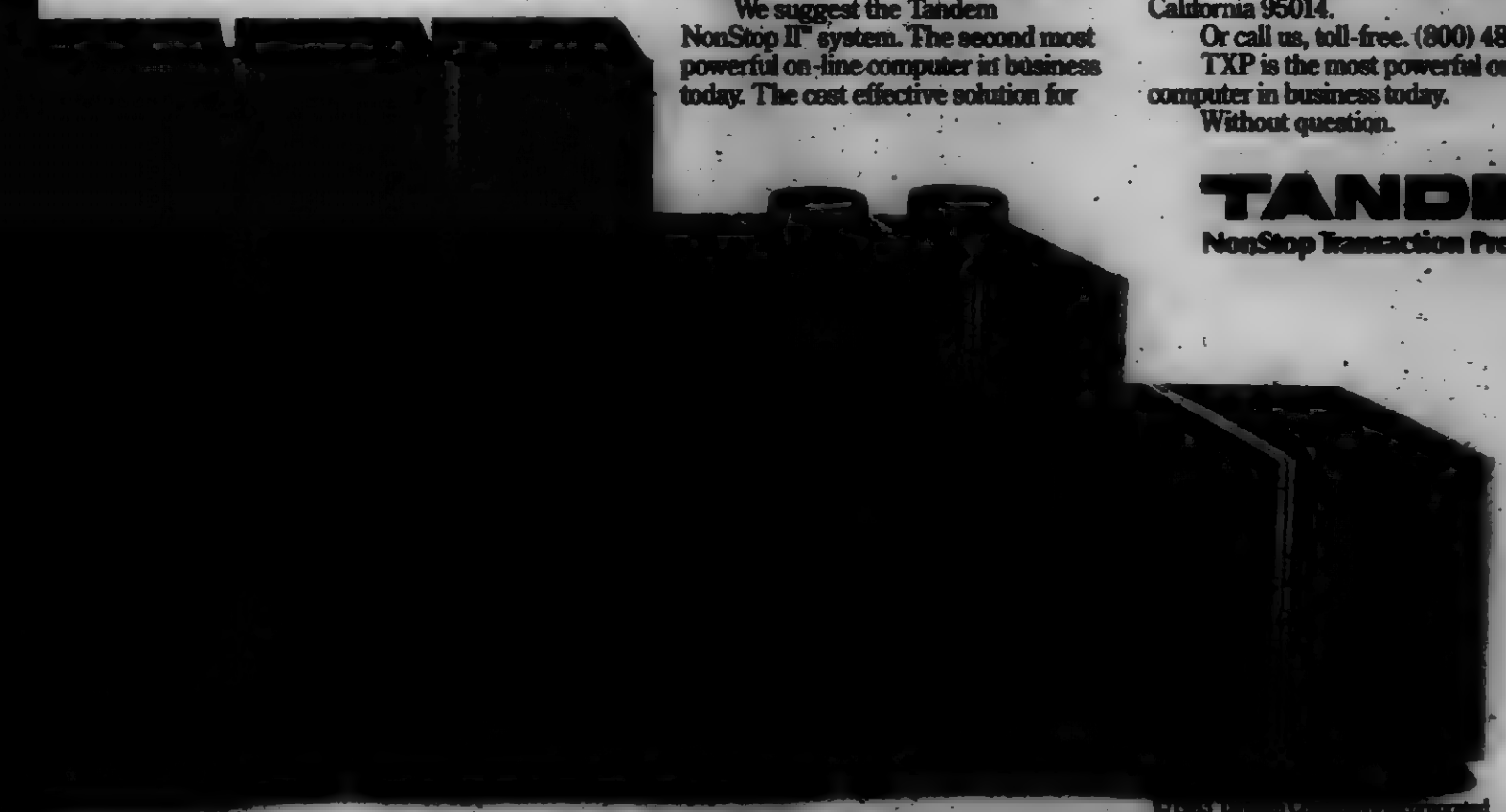
Or call us, toll-free. (800) 482-6336.

TXP is the most powerful on-line computer in business today.

Without question.

TANDEM

NonStop Transaction Processing



©1985 Tandem Computers Incorporated

WHITE-COLLAR CRIME

(Continued from Page 49)

used to dealing with ledgers and accounts," RIA pointed out.

According to Doug De Vries, computer security manager at Hewlett-Packard Co., as computer systems continue to expand and more people are connected to them, the risks of fraud and embezzlement increase, particularly through the use of computer networks linking personal computers with corporate mainframe data.

Enormous Potential

"Within three years, with the use of micros widespread throughout the office environment, the potential for misuse of information will be enormous," he warned. Both Digital Research, Inc.'s CP/M system software and Microsoft, Inc.'s MS-DOS operating system contain no passwords, and a would-be thief can copy what he wants, De Vries added.

In a recent speech to DP managers in Lake Tahoe, Calif., the HP executive declared, "Computer security is a growing problem because of the greater business dependence on DP. Vital corporate assets are involved, and distributed systems are becoming more complex. There is good reason to be worried about threats to the continuity of the integrity of corporate information."

Added Peter Neumann, assistant director of the computer science laboratory at SRI International, Inc. in Menlo Park, Calif.: "When you now think of the number of on-line data bases that are accessible by phone lines and the potential for altering critical data which could even threaten human life, you begin to shudder at the risks we are taking with inadequate computer security."

The RIA report noted: "Sensitive information can be stolen without anyone being present. A person at a remote terminal who knows how to bypass the codes and passwords can illegally retrieve information without leaving any clues to his identity."

Home Computing

The advent of home computing is going to add mightily to the problem, remarked Charlie Charlebois, director of international operations at the Tampa, Fla.-based security consulting firm of Stanley/Wacker, Inc.

Charlebois, a former Central Intelligence Agency staffer, said the introduction of home banking systems, for example, will confront data security managers with problems they have never had to face before.

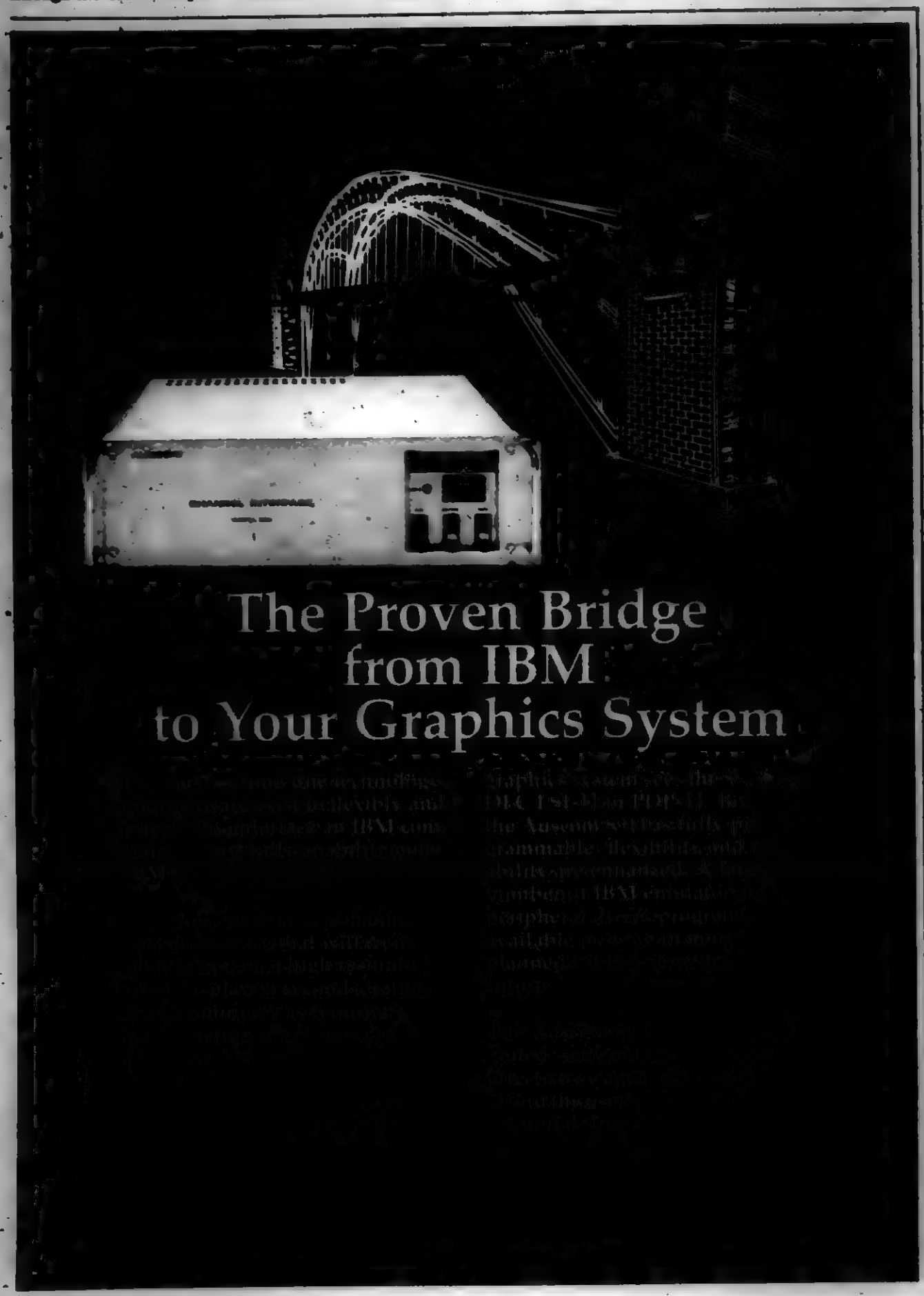
"There is definitely a danger in home computing because you have very little control, unlike security in your own building. Employees, particularly scientists and engineers, are now able to take classified information home, and the chances of abuse are markedly increased," Charlebois commented.

The explosion in microcomputers, while creating increased headaches for the computer security manager, offers the opportunity to increase corporate awareness of the need to protect corporate information and data rigorously, according to John O'Mara, executive director of the Boston-based Computer Security Institute.

"The theme for 1984 is the need to convey a sense of urgency. Awareness is the key to this problem. Security needs to have the [consent] of senior management, which will come out of the recognition that you can have protection without spending hundreds of thousands of dollars," he remarked.

For now, the battle appears to be an uphill one. According to De Vries, technology is the driving force in the computer field, with security desperately trying to catch up.

"It's going to be a tough business to be in, because as a security manager you are never going to catch up fully," the HP security manager concluded.



WHITE-COLLAR CRIME

DP Crime: Where There's a Will, There's a Way

The first thing an industry expert will tell you about computer security is that no system is absolutely secure. When it comes to abusing corporate data, the old maxim of "Where there's a will there's a way," seems to apply to white-collar data processing criminals.

According to Peter Neumann, assistant director of the computer science laboratory at SRI International, Inc., "escalation" is the key word for those most concerned with denying employees unauthorized access to company data bases.

"Computer security is not a 100% thing. As systems improve, the types of security penetration will become more sophisticated and require more technology.

"While the likelihood of such a penetration is small, the risks are high, because in these days of corporate networks storing masses of vital information, it is the kind of crime that can destroy an entire company or even industry," Neumann attested.

The problem of trying to protect data from the unscrupulous insider is made even more difficult by the fact that many companies refuse to believe they have serious security problems. The "common reaction to business crime reports, consultants claimed, is, 'But our employees wouldn't steal.'"

Neumann's colleague, Donn Parker, senior management systems consultant at SRI, said that covering up a computer malpractice is also common because companies fear the effect of adverse publicity upon their businesses and future security efforts.

Parker has collected data on more than 1,100 reported cases of computer abuses.

"We believe that most cases of computer crime go unreported. Every computer security review we have done has revealed a significant number of computer-related losses that have not been reported," he commented.

Specific Steps

However, many experts agree that a number of specific steps can be taken by corporations to protect their data from employee misuse.

According to Doug De Vries, computer security manager at Hewlett-Packard Co., several factors should be evaluated in determining what security procedures a company should implement. These include:

- The role of computer systems in a company.
- The asset value of DP resources.
- The impact of downtime on the people depending on the DP resource.
- Rating the scale of probability of information vulnerability.
- Providing protection to the appropriate degree.

"Users must consciously choose protection based on the level of risk rather than close their eyes and hope that disaster will not strike. Ensuring the integrity of data is not free and, as a rule of thumb, 1% of a company's annual budget should be spent on data security," he urged.

De Vries outlined a number of specific actions a company can take to improve its security. These would include:

- Assigning a manager to deal with computer security who reports directly to the management information services director.
- Issuing written policies about security.
- Instituting regular, but unannounced, DP audits.

(Continued on Page 54)

WHITE-COLLAR CRIME

(Continued from Page 53)

- Analyzing and implementing data security controls for the company as a whole, for specific data centers and programming groups.
- Developing computer security teams that involve the whole organization, not just the DP department.

In a recent report titled "Safeguarding Your Business Against Theft and Vandalism," the New York-based Research Institute of America recommended a number of procedures that can be implemented to help improve security. For example:

- All computer tapes and disks should be kept in a library where they can be logged out only with an authorized signature.
- Files should be classified in terms of their degree of sensitivity to the company, with sensitive material being kept under lock and key in its own locations, accessible only to those authorized to work with the data.
- DP managers should insist on controlling the number of personal computer users and a log-in procedure for terminal users.
- Passwords should be carefully designed and controlled.

While creating a climate of awareness about the importance of security is an essential first step, technology must also play a role in deterring the would-be insider criminal.

According to SRI's Neumann, success in this area to date has been limited. "A great deal of research still needs to be done. Currently, there are small solutions for small problems, but there is no global solution to secure emerging technologies such as sophisticated computer networks.

Nevertheless, some progress is being made, industry experts claimed. Among the software security packages on the market are IBM's Resource Access Control Facility; ACF 2, developed by SKK, Inc. of Rosemont, Ill. for MVS, VS1 and VM users and marketed by Cambridge Systems Group; CGA Software Products Group, Inc.'s Top Secret; and Security Access Control from Electronic Data Systems Group appear to be the most popular, according to the observers.

On the hardware side, dial-up/call-back security devices are available from Digital Pathways, Inc. of Palo Alto, Calif., and San Francisco-based Leemah, while Futurex Security Systems of Fair Oaks, Calif., specializes in microcomputer encryption devices.

Encryption, however, has yet to achieve market favor. Most companies, De Vries said, only want to encrypt 5% of their most sensitive information and view the techniques as expensive. Neumann of SRI agreed. "There is this naive view that all you have to do is encrypt everything," he said scornfully.

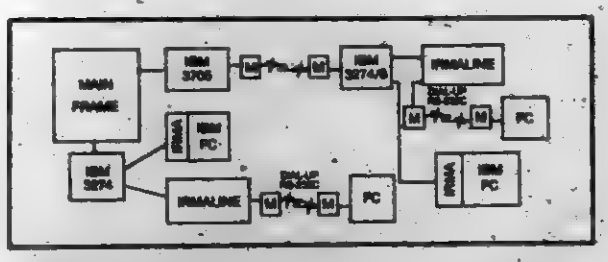
Voice-activated systems are now beginning to appear on the market. According to Research Institute of America in its report, one of the most interesting of these devices is a product called Computer Entry from Philadelphia-based manufacturer IMM Corp.

The product screens all calls from remote locations and allows valid callers to access particular files in the computer. When the computer phone number is dialed, a digital voice asks for identification.

If an incorrect code or no code is given, the voice may either ask the caller to try again, allowing for the possibility that an authorized user made a dialing mistake, or the modem may be immediately deactivated, not to be used until it is manually turned on. A third possibility is to have the device divert the call to a special phone in the data center for verification.

"While it's not clear to me that there are long-term solutions other than to continue to refine the computer operating software and architecture, manufacturers are slowly realizing there is a market for computer security devices," Neumann said.

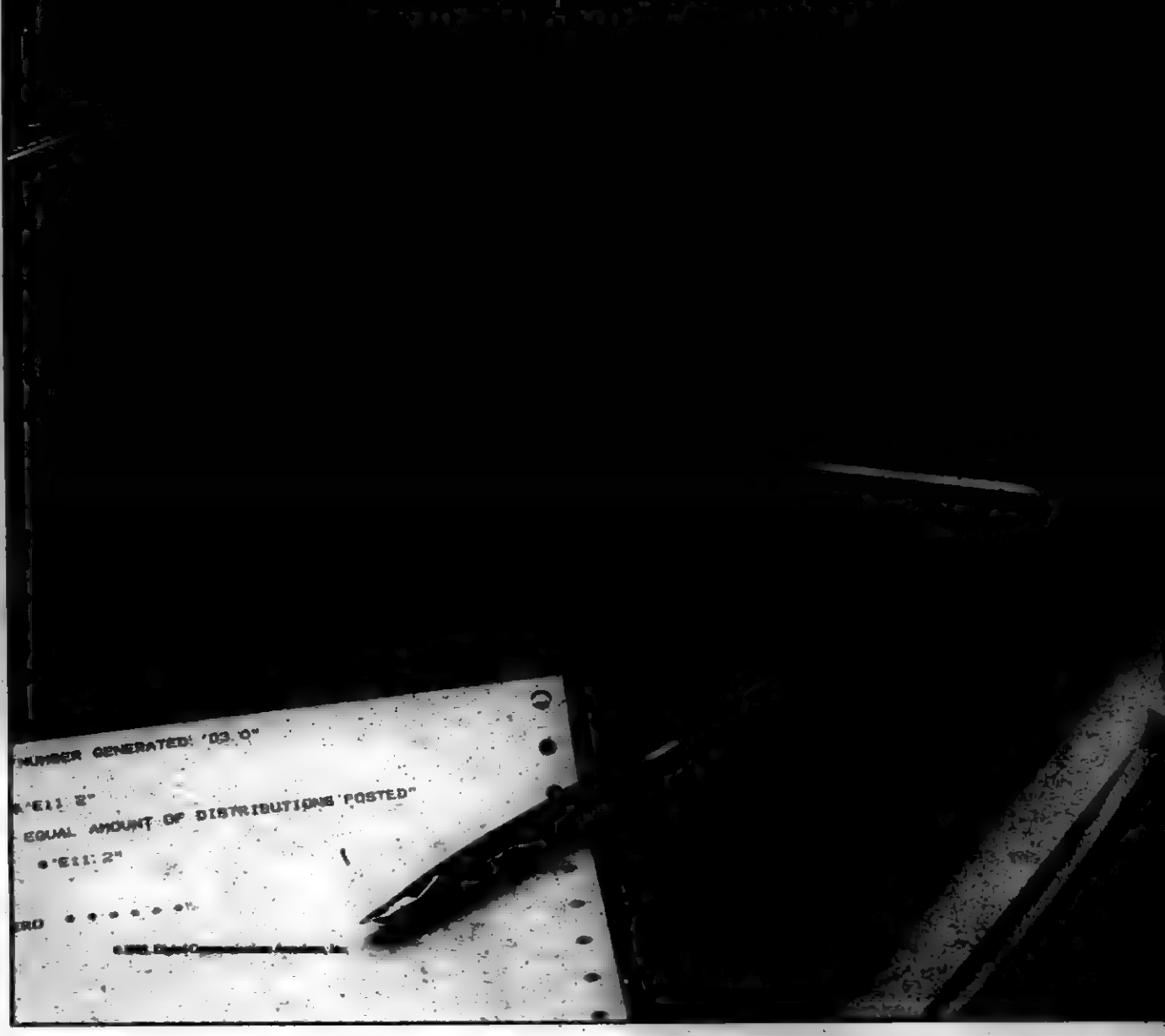
Here are two beautiful ways to get small computers on line with the mainframe quickly, easily and economically—yours from DCA, home of the industry's first coaxial cable links between small computers and IBM 3270 networks.



IRMA is the Decision Support Interface that gets IBM Personal Computers and IBM PC XTs into the 3270 mainstream via direct attachment to 3274 or 3276 controllers.

IRMA, IRMALINE, and Decision Support Interface are trademarks of Digital Communications Associates, Inc.

IRMA and IRMALINE
The DCA family connections that help small computers think big.



WHITE-COLLAR CRIME

Security Message Often Falls on Deaf Ears

"If anyone assumes that they have a completely secure computer system, they really have their head in the sand."

That comment from Peter Neumann, assistant director of the computer science laboratory at SRI International, Inc., sums up the seriousness of the situation facing security managers as they attempt to strengthen protection of their data processing systems from internal misuse.

Yet getting senior management and department heads to admit that a problem exists in the first place is a major exercise in communication, industry experts agree. When it comes to instilling a passion for securing one of the company's most vital assets — information — the message often falls on deaf ears.

"In the corporate culture, most people do not recognize that data may be of importance to someone else, and so while they are aware of the convention about security, in practice they do not do much about it," remarked security specialist Barry Bergman of Barrick Security Group.

According to Bill Stark, president of Stanley/Wacker, Inc., a Tempe, Fla.-based consulting firm, one of the most crucial areas where security considerations are ignored is in hiring new personnel. "There is such a frenzy for people to be hired, particularly in a small high-technology company that is expanding rapidly, that managers do not take the time to do the checking on new employees and singling out potential risks," he said.

Once a company has been burned, Stark continued, they are reluctant to admit to a breach of security, especially in the financial community where such an admission can lead to a rapid loss of credibility and funds. "They don't want to prosecute in order to avoid the adverse publicity, and they even fail to inform other prospective employers if asked to provide a reference for the felon," he asserted.

In many ways, therefore, misuse of corporate computer resources is a hidden problem. "It is going to take a couple of really mammoth computer heists to galvanize opinion in the data processing community and prompt effective action," Neumann added.

The employees who turn out to be computer criminals are hard to detect in advance. According to Donn Parker, senior management systems consultant at SRI International, who has interviewed over 40 perpetrators of computer crime, they are white-collar workers who see themselves as problem solvers and consider themselves basically honest. They view the use of computers against a corporation as an intellectual challenge rather than a crime to be punished.

The New York-based Research Institute of America (RIA) has recommended a number of hiring procedures designed to identify would-be troublemakers. It recommends companies:

- Design an application form that provides enough detailed information to enable a manager to verify the applicant's statements and dig more deeply into areas not mentioned.
- Verify all information given, including academic and job background.
- Query references in person or by telephone rather than by a form letter.
- Bring in an investigator for preemployment screening of applicants for sensitive company positions.

A clear indication that

(Continued on Page 56)

IRMALINE does the same for remote IBM PCs, IBM PC XTs, Apple Lisas and DEC Rainbows, among others, with just a local phone call to a nearby 3270 controller.

Both can go to work literally minutes out of the box. Both provide mainframe data access, selection and storage, and data communication back to the mainframe.

Put first things first. Find out more about the DCA first family of 3270 micro/mainframe connections. For information, write DCA, 303 Technology Park, Norcross, Georgia 30092. Phone (404) 448-1400, TLX 261333 DCA ATL. Or call us toll-free (800) 241-IRMA.

The new home of IRMA, IRMALINE and the rest of the TAC family.

dca Digital Communications Associates, Inc.

IBM PC and IBM PC XT are trademarks of International Business Machines Corporation. Apple and Lisa are trademarks of Apple Computer, Inc. DEC/Rainbow is a trademark of Digital Equipment Corporation.

WHITE-COLLAR CRIME

Consultant Calls System Software Weak Link

While many experts agree that banking, financial services and brokerage houses are the most vulnerable sectors for internal data processing crime, it is in a company's system software that the true security weaknesses lie, according to Bob Abott, president of EDP Audit Controls, Inc.

The Oakland, Calif.-based security consultant stressed that the key to secure data systems lies in increasing protection for the company's operating system and application software.

The former research worker at Lawrence Livermore Laboratory said that many software programs have properties that reveal themselves to users over time, properties that were not intended by the authors. As a result, a would-be criminal is able to begin construction of a knowledge base that can be used to abuse corporate data.

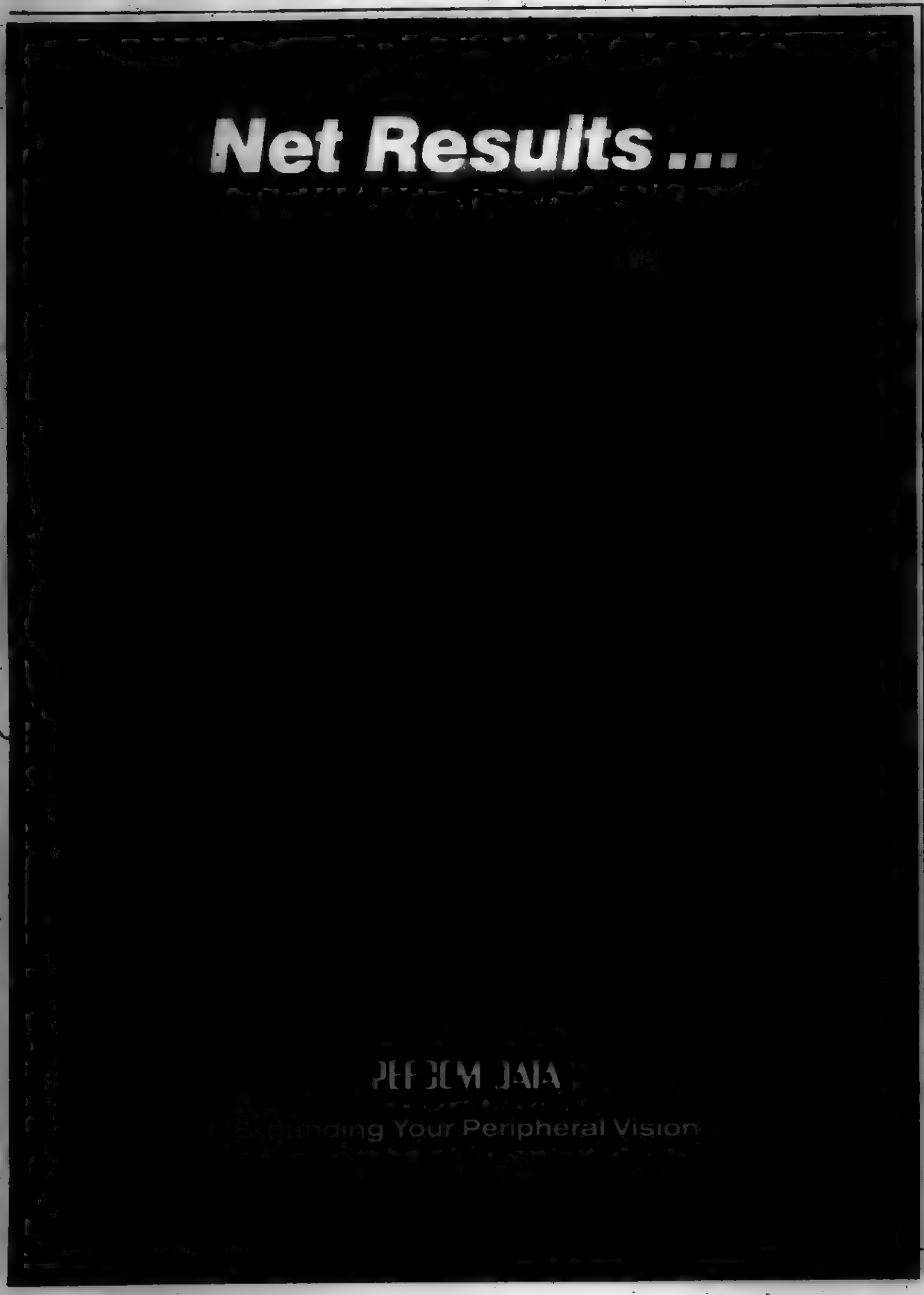
In a book titled *Security Analysis and Enhancement of Computer Operating Systems*, Abott has outlined the glitches in system software that allow security intrusions to occur. These include:

- Incomplete and inconsistent parameter validation.
- Implicit sharing of privileged or confidential data.
- Asynchronous validation or inadequate serialization, that is, timing errors brought about by the software itself.
- Inadequate identification, authentication and authorization of control access to software.
- Violation of prohibition or limit to software capabilities.
- Exploitable logic errors.

While radical improvements have been made in securing mainframe software over the past decade, he added, this knowledge base has not been applied to microcomputers. "Many personal computers have been designed with many of the flaws that pervaded mainframe software in the 1970s, because the people designing the new systems have not been schooled in computer security problems.

"The question is: Does the design of that new system software take into account the lessons of the past decade in computer security? How is it to be tested?" Abbot said.

Abott suggested, as one possible solution, the inclusion of a mandatory independent third-party statement attesting to the fact that a vendor's software meets industry-accepted standards.



Awareness Of Security

(Continued from Page 55)

the security problem is increasing comes from the Boston-based Computer Security Institute, which has seen its membership grow to more than 3,000 organizations in the last year. Its role is to emphasize practical, cost-effective long-term solutions to the problem of security through conferences and newsletters.

In order to generate more support for increased computer security, most industry analysts agree that senior management must get more involved. They must understand that no adequately secure commercial computer system exists today, based on the value of the data stored and the machine's processing capability.

Until more far-reaching progress is made, the potential for a major computer crime, bordering on a disaster, will persist.

Computer Crime

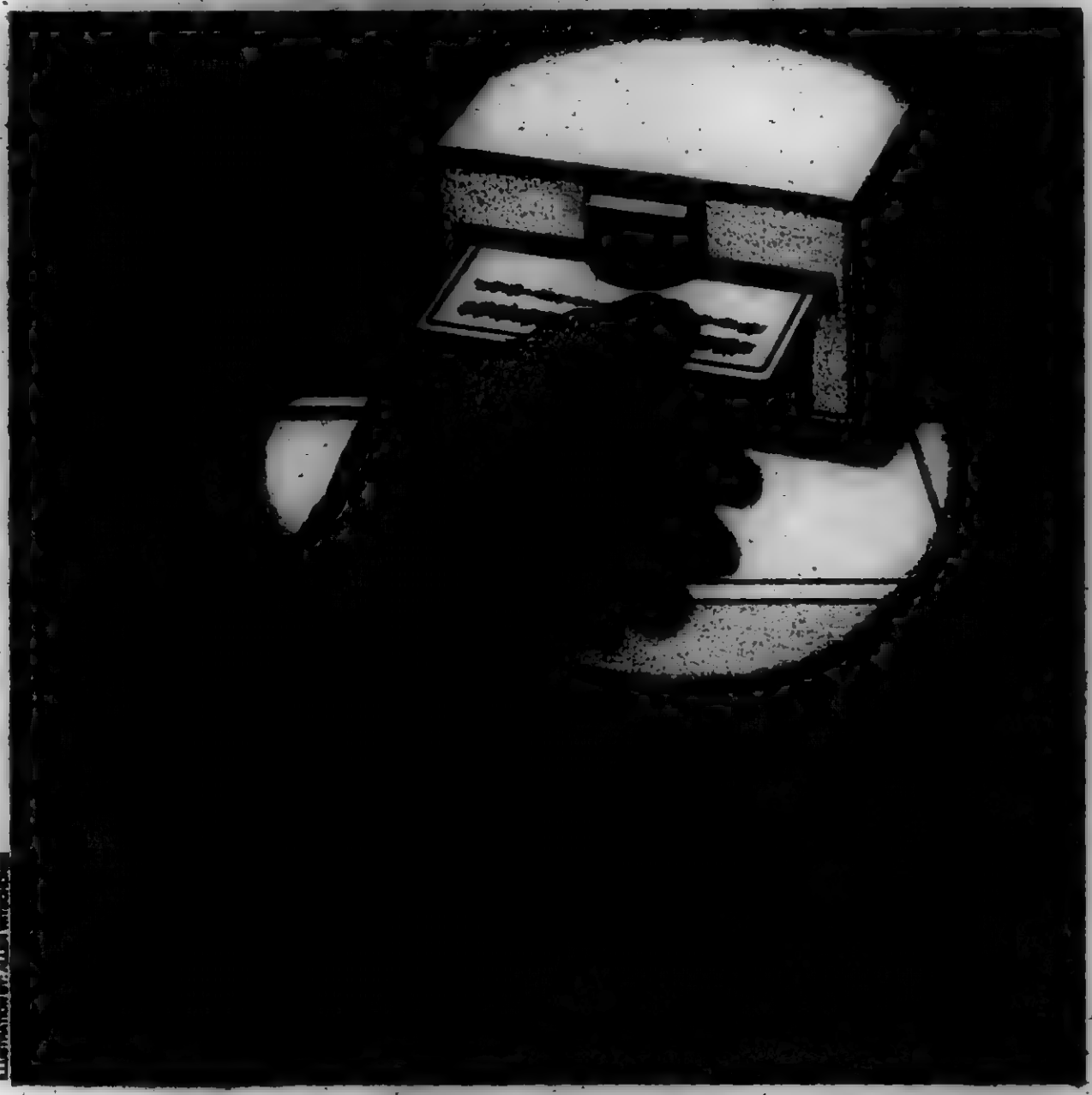


ILLUSTRATION BY: ALLEN WITCOMB

A Worldwide Concern

By Susan Blakeney

So you think the U.S. has the market cornered on computer crime?

Think again. According to an international survey recently conducted by *Computerworld*, computer criminals are popping up just about everywhere there's a computer. While the U.S., because of the sheer number of computers within its boundaries, may still take dubious credit for the lion's share of computer-related transgressions (annual U.S. losses are estimated at $100 million), some analysts say it's only a matter of time before the rest of the white-collar universe follows America's lead and catches the computer crime fever sweeping the U.S.

Computer industry watchers from seven countries contributed to the *Computerworld* survey: Australia, Brazil, France, Italy, Japan, Sweden and West Germany. Six of the seven respondents agreed that computer crime was considered a major problem in their country.

In Brazil, the banking industry is especially vociferous on the subject of computer crime. While they offered no estimates on the dollars lost to computer invasions, Brazilian bankers are said to be scrambling to wage a counterattack.

In Japan, losses to date are estimated at $30 million. In Sweden, authorities maintained that the computer crime problem costs $10 million a year — most of which they attribute to the illegal copying of software for resale on the black market. In West Germany, the average computer crime is valued at between $200,000 and $500,000, with an official annual figure unavailable at this time.

Then there's Italy, where "stealing is the way we do business," according to one industry expert there who requested anonymity. Here computer crime is considered a critical problem, but not as much as during the reign of the Red Brigade (the terrorist gang probably best re-

(Continued on Page 58)

Susan Blakeney, Computerworld international editor, is coordinator of the CW International News Network.

COMPUTER CRIME

(Continued from Page 57)

membered for holding U.S. Army Brig. Gen. James L. Dozier hostage for over a month at the end of '81). Apparently, the frequency of computer sabotage during that period prompted many companies to hastily implement physical security measures, "so the average security level can be considered good today," the survey revealed.

Even in Australia — the one country in Computerworld's survey claiming computer crime did not pose a big threat — there have been 124 computer crimes reported, with damages estimated at $5 million. Furthermore, Australian computer security consultant Kevin J. Fitzgerald stressed, "What this represents as a percentage of the actual total, we don't know."

Fitzgerald did say, however, that computer crime is an extremely slippery subject for several reasons. First, many computer crimes are only discovered by accident, so nobody really knows how much damage is being done. At the same time, most companies don't want to admit publicly they have fallen victim to computer crime — especially banks. An expert in France summed up that nation's corporate attitude toward computer crime by saying, "They ignore it . . . if they can."

On the other hand, the Japanese police department, which conducted its own survey on this subject, discovered that "most companies don't ignore the problem of computer crime . . . but only 32% of them take measures to cope with it."

Computer Sin List

When asked what type of computer crime happens most frequently, the international experts overwhelmingly placed "copying and stealing software" at the top of the computer sin list. Other violations, in descending order of frequency, include:

- Input of unlawful data.
- Altering or destroying magnetically recorded data.
- Sabotage.
- Stealing information.
- Illegal use of computers.
- Illegal electronic funds transfers.
- Illegal use of automated teller machines.
- Unauthorized access to restricted or classified information.

In Sweden, rumors are rampant that several Soviet espionage incidents involving computers have occurred. The transcripts from these cases, however, are said to be classified because they involve military secrets.

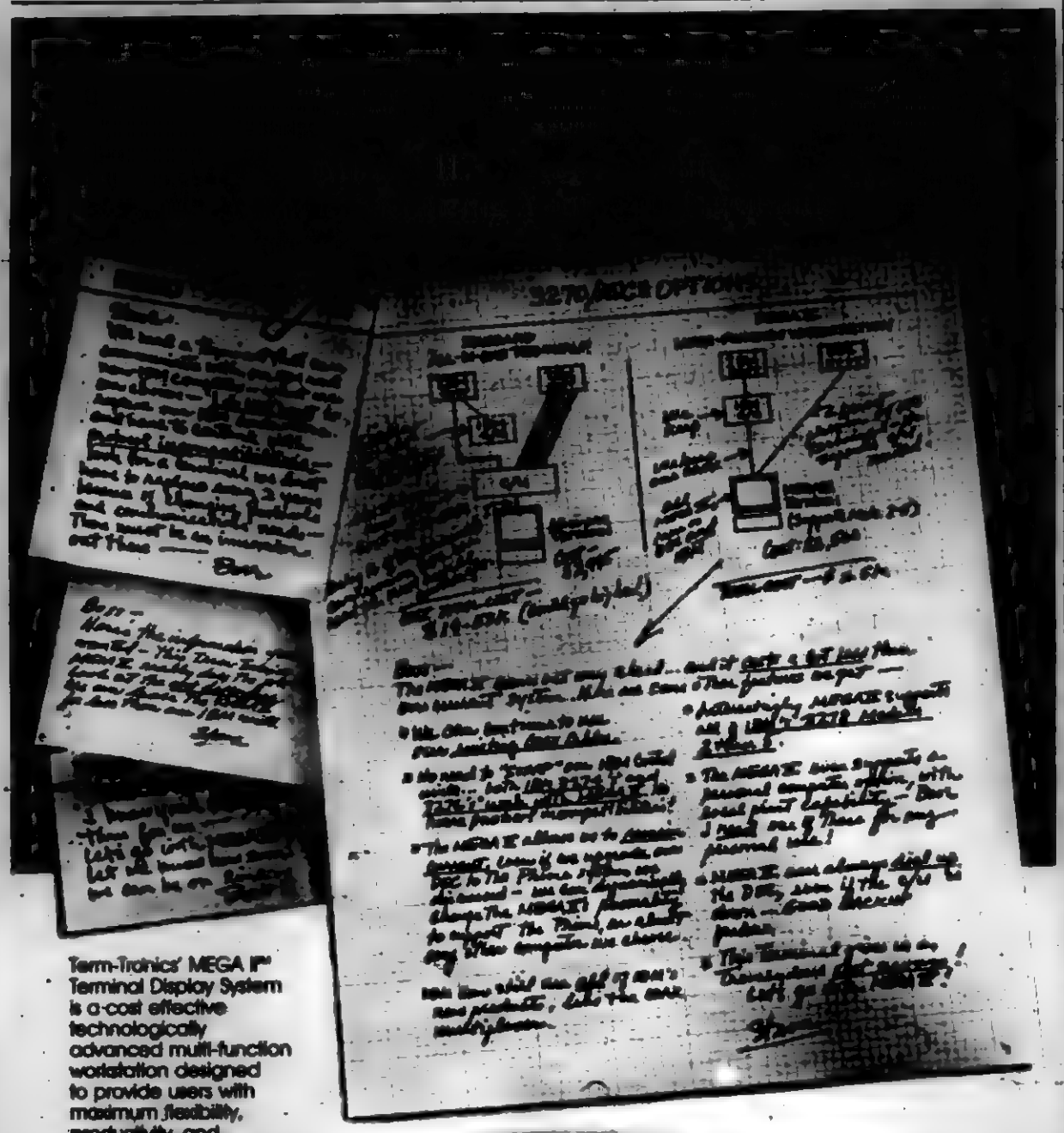
Deterrents to computer crime vary from country to country, but to a great extent they are still quite negligible. Only West Germany, for example, has a body of law that specifically addresses computer crime. Some 80 cases have gone before a court there, and depending on the nature of the crime, sentences have carried both fines and prison terms. In Japan, new laws are expected to be established within the next year to deal with this particular subject area.

In Australia, computer criminals are charged under white-collar crime legislation, and their penalties have been jail terms or fines. In other countries, general laws are applied to computer crime cases. In Sweden, for example, "ordinary crimes are committed by criminals using computers as tools," so people are tried under existing criminal laws. However, there are laws in Sweden that prohibit people from establishing personal files and forbid people to match personal data files. "This law was passed to prevent government agencies and corporations from collecting too much information about citizens," according to the survey results from Sweden.

What techniques and precautions are companies using to safeguard against computer crime? Most large companies around the world — with the exceptions of Japan and Australia, where employers appear to be more trusting — utilize tight access control with respect to their computer systems and their computer rooms. These companies also claim to have intrusion alarm systems for the computer rooms. Only a few very large companies employ guards for the computer room.

Everyone that responded to the security survey claimed that nearly all companies restrict worker access to the computer room and utilize identification codes or magnetic cards. In many countries, computer room access keys are used, although few companies strictly monitor the signing in and out of these keys. According to the recent official Japanese "Police Department White Paper," only 6.3% of the offices require use of a key and an identification code for access to their computers; and although many offices restrict handling of computer access keys, few companies keep track of these keys [CW, Nov. 7].

To protect sensitive data and preserve trade secrets, only Australians and Brazilians practice data encryption, the survey revealed. Also in Australia, compa-



nies use something called "avoidance security," a policy whereby no sensitive data can be committed to the computer's memory.

In Japan, it is generally felt that restricting access to the computer room with identification cards, restricting access to the system itself with user codes and restricting access to certain data files are sufficient precautions.

DP Criminals

Just what kind of people are involved in these wrongdoings? The "hacker" (America's subtriquet for the amateur computer prankster) is not considered a major problem in other countries.

In West Germany, the survey indicated that "90% [of computer crimes] are done by employees — the end users." This also rang true in the rest of the countries polled. Other potential criminals, in descending order of number of times mentioned, included: programmers, operators, bank employees and disgruntled employees. Japanese sources also mentioned "the titleholders in companies" as notable for being among the greatest offenders on the list of computer felons.

When asked if employers investigated people's backgrounds before hiring them, five out of seven respondents said yes, with Australia and Japan again dissenting. None of the countries polled, however, use polygraph testing during hiring; in fact, administering polygraphs is illegal in Australia and Sweden.

So what else is being done to combat computer crime? In Australia, extensive training courses are held for external auditors; special courses are conducted for fraud police; and the government has reportedly earmarked money for additional security training, the survey revealed.

In Japan, the police regularly hold conferences that address the issue of computer crime. Furthermore, 17% of all Japanese police offices are said to have implemented specific computer crime prevention

(Continued on Page 60)

Love, Money Drive International DP Crime

Love and money, not necessarily in that order, are the driving forces behind the international world of computer crime, according to a recent worldwide *Computerworld* survey on the subject.

In Sweden, for instance, three computer executives were separately seduced within the last 18 months by Soviet women and summarily coerced into giving up defense secrets and classified information. (All three eventually committed suicide.) According to Ragnar Eriksson of the National Police Headquarters in Stockholm, businessmen are extremely naive about computer espionage.

He urged employers to make greater use of psychological tests in order to predict a potential employee's psychological weaknesses.

In Japan, a 32-year-old bank clerk, at her lover's request, opened five different savings accounts under assumed names in five branch offices. She then began channeling funds into these accounts by entering "receipt of money" statements into the bank's computer system. After she accumulated over $600,000, she withdrew the money and ran away with her boyfriend. Six months later, international investigators discovered and arrested her in the Philippines.

In Australia, the sting again mixed romance with finance. An operator at the New South Wales state-run horse betting agency was changing the time clock in the computer system by three minutes. After a horse race, he would quickly telephone his girlfriend, an input clerk, with the winning horses and the amounts to put down. Authorities still don't know how much money he embezzled with this technique, but he was betrayed by his lady friend when he ditched her for another woman.

In West Germany

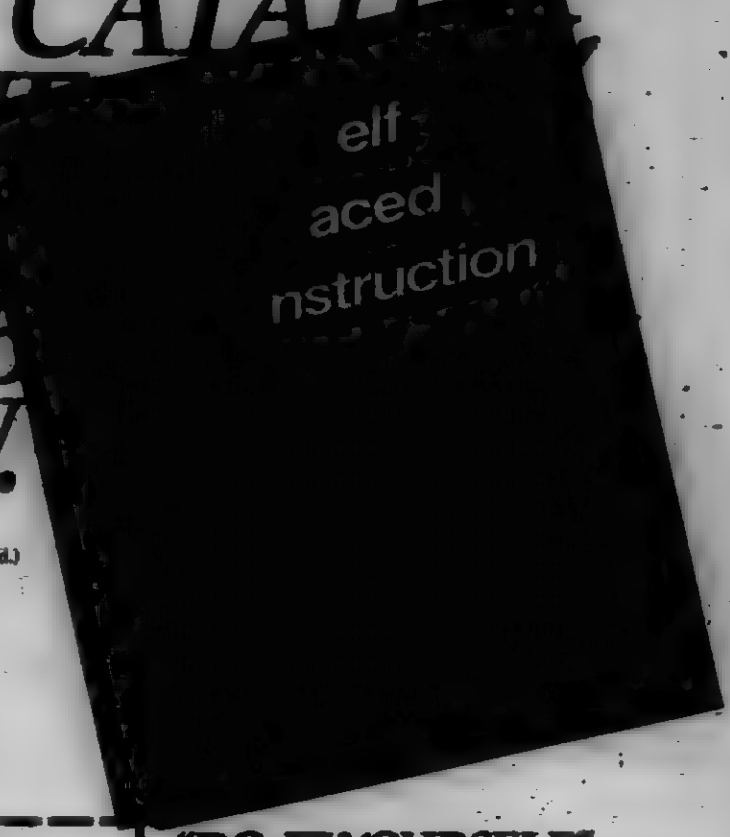
And in West Germany, the culprit was a programmer at a large German stock company. With the help of a program developed in-house, he fed salary information on fictitious people into his own salary account in the company's payroll system memory.

To circumvent the checkpoints in a normal payroll system, the felon developed his program to change the payments in such a way that they would never appear on any master list, nor would they generate wage slips.

This fraud was discovered by chance, and the offender was sentenced to jail for two years for illegally extorting $75,000 from his employer, sources said.

IF YOU DON'T HAVE THIS NEW CATALOG PHON... 1-800... 332-56... NOW.

(between 8:30 am and 6 pm, Monday thru Friday, or send request card.)



☐ YES. SEND ME the new Digital Mail Order catalog on Self-Paced Instruction courses.

My Name _____

Company _____

Department _____ Title _____

Mailing Address _____

_____ Zip _____

☐ SEND ONE TO OUR TRAINING DIRECTOR, TOO.

Name _____

Company _____

Mailing Address _____

_____ Zip _____

USE THIS FORM TO REQUEST SPI CATALOG BY MAIL.

Digital Equipment Corporation
Educational Services Department
12 Crosby Drive BUO/E55-20
Bedford, MA 01730

"DO-IT-YOURSELF" TRAINING THAT PAYS... FROM DIGITAL

If you want to be 'up and running' fast, on any Digital system, then... SPI training is your answer. It is the lowest-cost way to train anyone, and it produces learning that sticks, skills that expand.

This comprehensive new catalog tells you which SPI courses you should consider, exactly what is available and how to order.

If you are a Systems Analyst, Programmer, Operator, involved in maintenance, or simply a User, you should look into this catalog... and so should your Training Director.

Ask for your copy today.

Digital Equipment Corporation
Educational Services Department
12 Crosby Drive BUO/E55-20
Bedford, MA 01730

digital

COMPUTER CRIME

(Continued from Page 59)

programs.

West Germany also has specially trained police officers to investigate computer fraud cases, and additional training is presently being planned, according to the survey results.

In Sweden, the Society for Data Processing established a task force to study matters of computer security, and one task force recommendation resulted in the establishment of an international body for dealing with computer security within the cadre of the International Federation of Information Processing Societies.

In contrast, "nothing in particular" is being done to formally fight computer crime in Italy, according to the respondent, and this is also true in Brazil and France.

A number of interesting responses were elicited when *Computerworld* asked the international participants what else can and should be done to ward off future computer crime. The number one answer to this survey question, from six out of seven countries: Vendors should build more security features into their software.

Another suggested procedure, mentioned by more than half of the respondents, was tightening security in the work place. Participants in West Germany, Japan and Italy opted for harsher laws and better training programs for computer crime investigators.

The survey results from Italy stressed the importance of preventive organizational measures, such as splitting up tasks in the application development phase, tight production management in the computer room and the introduction of a security manager at every company.

In Australia, "More control is needed over people — it's really a people problem," according to Fitzgerald. His recommendations included changing people's attitudes toward computer crime.

Save Your MIS Manager

50% off
PC WORLD Magazine
For Group Corporate Discount Subscriptions

For details
Call Christopher Van Dyke
800-872-7800, California: 800-872-7808

With new advancements every day
You need PC World
every month.

Fifth-Generation Computing

PHOTO © 1984, GEORGE GILLON

Who's on First?

By Tom Henkel

Driven by the quest for both economic and political strength, world powers are currently staging a quiet war.

In this war, the biggest and strongest will not necessarily have an advantage over the small and weak. A single person's idea may prove the deciding factor.

In this war — the war over which nation will be first to develop the next generation of computer systems — the battlefield is the laboratory.

Computers have become so vital that today it is almost impossible to live without them. Corporations throughout the world would come to a grinding halt if they could no longer use computer systems. But perhaps the most important dependency on computer systems is for national defense.

Most world powers currently use sophisticated computer systems to design and control weapons. Without bigger and faster computer systems to build bigger and more effective weapons, some theorists contend, a world power could be rendered helpless in a few years.

It is for these reasons that thousands of researchers are working to unlock the mysteries of physics and electronics which will permit the development of new computer systems. The 1980s may be remembered as the time when computing ceased to be identified as an industry and became a political force.

The current challenge involves what has been dubbed the fifth generation of computer systems.

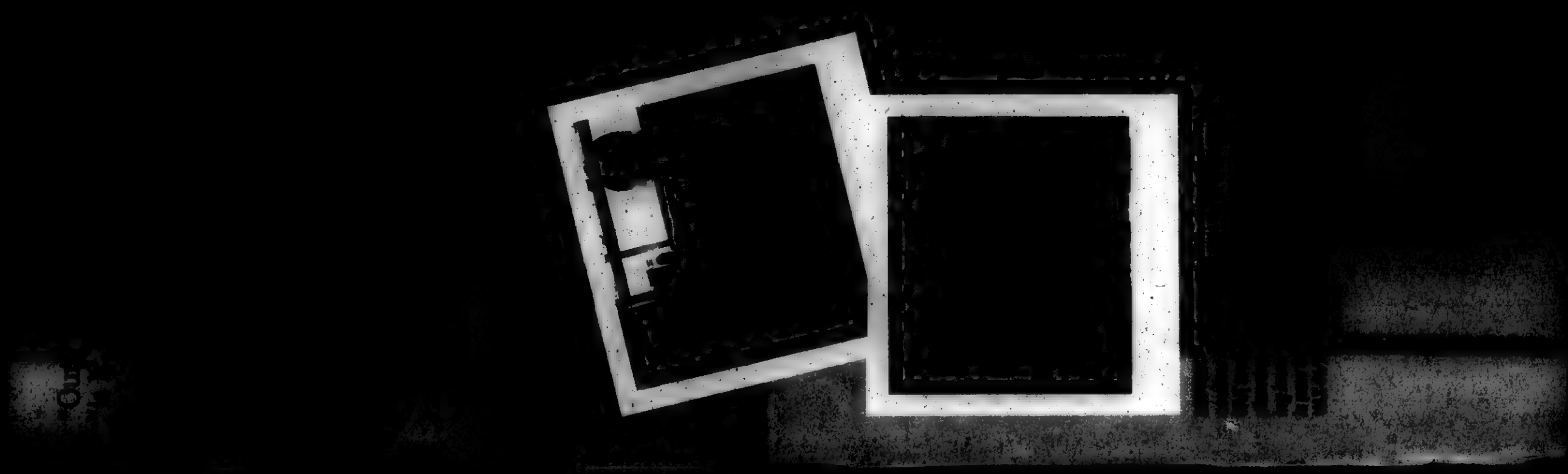
The U.S. and Japan are the two major players vying to be the first to develop this new class of machines. France and the United Kingdom also have ongoing government-sponsored research projects. In addition, countless researchers in other countries are working on individual projects that eventually could lead to significant developments in computing.

(Continued on Page 56)

Tom Henkel is the senior editor/systems at Computerworld.

"EVEN BEFORE RAW MATERIALS ARRIVE, VAX HAS OUR ENTIRE MANUFACTURING LINE ON SCHEDULE."

Dr. Michael J. Rangall, Vice President, Business Services, Hemagen Roxy Pharmaceuticals, Inc.



How 3 famous names got together to

SOLVE YOUR PROBLEMS OF INTELLIGENT MICRO TO MAINFRAME CONNECTION.

Get the answers you're looking for—with the VisiAnswer™ Software System from Informatics®, the leader in mainframe to micro integration.

Informatics has teamed the best minds in the business to solve the problems of intelligent mainframe data access for microcomputer users. The VisiAnswer™ Software System is the breakthrough result of a unique team involving Informatics Corporate Micro Systems and VisiCorp™ products working with IBM® Personal Computers.

VisiAnswer™ solves the timely problems plaguing data processing professionals like you.

Available for use right now, the VisiAnswer Software System is the micro to mainframe system specifically designed to help you:

- Manage *and* control the integration of microcomputers with your current mainframe—right in *your* data processing department.
- Provide your company's micro end-users with access to specific mainframe data—without wading through unrelated information for hours.
- Maintain *security*/control of restricted portions of your corporation's data.
- Supply end-users access to *current "live" information*, instead of information that's historical and obsolete.
- Intelligently access *all* mainframe data, whether it's unique application data or part of a data base management system.

VisiAnswer™ makes your job easier and more efficient than ever.

With more and more managers and analysts in your company using desk-top computers these days, there's a tendency to improvise the way they obtain the data they need. That leaves the door wide open for mistakes and inaccurate information.

You can avoid these problems and maintain a high level of processing efficiency for everyone who needs access to that [illegible] the VisiAnswer Software System. It delivers intelligent [illegible] that makes current mainframe data available to your [illegible] in an orderly fashion. That makes their jobs *and* [illegible] accurate—something upper management [illegible]

[illegible] by the best minds in the [illegible]

[illegible] data access technology and mainframe [illegible] VisiCorp's expertise in user-friendly micro software. We chose the IBM Personal Computer for its leadership in delivering business solutions, and IBM chose us as a value-added remarketer.

This system works with *all* data bases on IBM mainframe systems. And your end-users will get data that is immediately usable with all Visi Series™ Products and other products utilizing the VisiCalc® file format.

Find out more about Informatics VisiAnswer system. Mail this coupon or call toll free today. See how VisiAnswer products can fit into your Personal Information Center as an integral part of your unique business strategy.

Get the facts on VisiAnswer™—
the intelligent micro to mainframe connection.

Mail this coupon today or call toll free:

1 800 227-3800 Ext. 130

(In Canada, call collect, 0 416 488-7192)

Informatics general corporation

THE SOFTWARE ENGINEERS

[illegible] U.S. Registered Trademark of VisiCorp.
[illegible] Registered Trademarks of Apple, Inc., Software Arts and Tandy.

VisiAnswer Information Coupon

Mail to: Informatics, Free VisiAnswer Information,
P.O. Box 1452, Canoga Park, California 91304

I want to know how the VisiAnswer Software System can provide intelligent solutions to my micro to mainframe problems.

☐ I'd like to see the VisiAnswer System in action. Please schedule me for a free, no-obligation VisiAnswer demonstration.

☐ I'd like more information on your VisiAnswer Product. Please send me the full details, without cost or obligation.

Your Name

Company Name

Address

City

FIFTH-GENERATION COMPUTING

U.S., Japan View Fifth Generation Differently

The U.S. and Japan are by far the front-runners in the race to the fifth generation. In many ways, the two countries are performing the same research; the difference between them is their philosophical approaches.

Traditionally, the U.S. has operated with the philosophy that business and government should maintain a polite distance. Business' job is to turn a profit; government's job is to enforce laws and collect taxes.

As a result, U.S. corporations have historically tended to focus attention on short-term projects. In many companies, a plan aimed at boosting next quarter's profits often gets more attention than a long-range plan which may not turn a profit for 10 years.

But when it comes to research, it is difficult to put a deadline on results. Consequently, a project with potential for a significant long-term pay-back may be pushed aside in favor of other projects.

Also stifling U.S. development of a new generation of systems is the market for such systems. The biggest profits appear to come from highly popular computer systems — units which will sell in the thousands, as opposed to a handful.

Many U.S. computer companies make use of large semiconductor houses, such as Motorola, Inc. and Fairchild Industries, Inc., to supply logic chips, memories and other components such as gate arrays for their processors. For the semiconductor houses, profits come from selling current items such as microprocessors rather than from developing new technologies.

To combat this trend, the U.S. Department of Defense's Defense Advanced Research Projects Agency (Darpa) has announced plans to pump money into various universities and companies to fund artificial intelligence research projects. However, the focus of the research project must be aimed at defense rather than at commercial applications.

A Darpa spokesman estimated it would spend about $50 million by the end of 1983 on assorted artificial intelligence projects at the business and university levels. The spokesman also pointed out that while Darpa is funding defense-oriented projects, a technology developed for a defense application can often be easily adapted for use in a commercial project. Darpa intends to make the technology developed under its funding available to industry.

Some Solutions

Control Data Corp. has found a way around the problem of funding projects with long-term rather than short-term payoffs. The firm recently allowed two of its top supercomputer architects, Neil Lincoln and Lloyd Thorndyke, to form their own company, ETA Systems, Inc. (CW, Aug 22.)

According to CDC Chairman William Norris, the two started their own company with CDC's blessing because CDC could no longer budget enough money to support adequately a supercomputer research project.

Of the U.S. computer makers, only IBM, which reportedly spent $3 billion in 1983 on research and development, appears able and willing to fund the major research projects necessary to produce a new generation of processor, noted Dr. Al Brenner, head of computing at the Department of Defense's Fermi Laboratory.

The quest for a U.S.-developed fifth-generation processor has an entrepreneurial flavor. Perhaps the most publicized effort has been that of the Microelectronics Computer Corp. (MCC), a research consortium of nine high-tech companies led by the former head of the National Security Agency, (Ret. Adm.) Bobby Inman. MCC was formed through the efforts of CDC's Norris to develop a high-tech research consortium.

In addition to CDC, other members of the consortium include: Honeywell, Inc.; Micro Devices, Inc.; Mostek, Inc.; NCR Corp.; National Semiconductor Corp.; Sperry Corp.; Allied Corp.; and Rockwell International Corp. MCC recently chose Austin, Texas, for its headquarters (CW, Dec. 19).

Thinking Machines, Inc., a Waltham, Mass., group of MIT researchers, is pooling the expertise of several leading experts, including one of MIT's leading artificial intelligence researchers, Marvin Minski, to work on new technologies. Both MCC and the Thinking Machines organizations are still in the formative stages and neither, at this point, has produced concrete plans for research.

In an effort to produce a faster supercomputer, three research organizations — Los Alamos National Laboratory, Lawrence Livermore Laboratory and SRI International, Inc. — have formed the Supercomputer Project Research Experiment for Research and Development (Spread), which hopes to develop a supercomputer 1,000 times faster than currently available processors. While American scientists contend that supercomputers should not be included in mention of the fifth generation, their presence is essential for at least the design and testing of new systems. Others also contend that supercomputers will eventually become an integral part of new technology processors, performing the number-crunching segments of complex problems.

In addition, leading universities such as MIT, Stanford University and Carnegie-Mellon University are working on individual projects that may contribute significantly toward development of a fifth-generation processor.

Although U.S. research efforts are operating independently, Dr. Paul Schneck, a researcher with the Office of Naval Research in Washington, D.C., noted the fragmentation may offer the U.S. a benefit over other countries because many different avenues are being explored.

"I don't think any of us has the right answers at this point," Schneck said. He pointed out that while there is redundancy in the U.S. efforts, there is less chance the U.S. will wind up throwing all its support behind a project which in the end proves impractical.

Limited Time Only
Rent an Eagle Personal Computer
for as low as $195/mo.
Call for special purchase price.

- ☐ Tell me more about the IBM compatible Eagle PC-2, expandable to 64 m-bytes, with software included.
- ☐ Tell me more about Data Access Systems and its multi-million dollar inventory of quality PC's, CRT's, printers and modems, and its 22 service locations with on site service.
- ☐ Tell me about the NEW Spirit Portable.

Name_____
Company_____
Address_____
City_____ St.____ Zip_____
Telephone_____

District Offices:
Atlanta (404) 998-2250 Minneapolis (612) 854-4488
Boston (617) 769-6430 New Jersey (201) 227-6868
Chicago (312) 957-0440 New York City (212) 564-6301
Cleveland (216) 473-2131 Philadelphia (609) 228-6868
Dallas (214) 387-4100 Phoenix (602) 254-1927
Detroit (313) 979-7300 San Francisco (415) 979-1811
Houston (713) 682-5885 Seattle (206) 575-1448
Los Angeles (213) 532-2236 Washington, DC (301) 468-2277

DATA ACCESS SYSTEMS, INC.
Cohen & Gordon Avenues
P.O. Box 1200 Blackwood, NJ 08012

Call Toll Free
800-257-7748
In NJ 609-227-4010

Clip this coupon and mail today.

MAKE YOUR VAX® DANCE

The QUICKSTAR™ family of VAX utility programs increases speed, efficiency and user enjoyment. QUICKSTAR includes:

- QUICKSTAT™ for interactive system status monitoring
- QUICKTALK™ for speedy inter-terminal communication
- QUICKCHANGE™ for username switching with no manual logout/login

Name_____
Title_____
Company_____
Address_____
City_____ State_____ Zip_____
Phone ( )_____

SEND COUPON NOW FOR COMPLETE DETAILS!

STI Signal Technology, Inc.
5951 Encina Road, Goleta, CA 93117 (805) 683-3771 Outside California call toll-free (800) 235-6787
TWX 910-334-3471

VAX is a trademark of Digital Equipment Corporation.

(Continued from Page 61)

What exactly is a fifth-generation processor? Ironically, the term may not be concretely defined until someone actually makes one — perhaps 10 or 20 years from now. Currently, however, the term is being used to represent a genre of processors which exhibits significantly enhanced capabilities over currently available systems.

Dr. Al Brenner, head of computing at the U.S. Department of Defense Fermi Laboratory in Batavia, Ill., contends a fifth-generation processor is one capable of sophisticated artificial intelligence. Such a machine would execute logical, as opposed to mathematical, calculations.

However, John P. Riganati, a researcher with the U.S. National Bureau of Standards, notes the Japanese have defined the fifth generation to be a series of processors which, when available in the 1990s, may give Japan a stronger position in the electronics industry. Under that definition, a fifth-generation processor could include artificial intelligence processors or the high-speed, number-crunching processors known as supercomputers.

In contrast, American scientists seem to agree that new versions of supercomputers should not be included in the definition of fifth-generation processors. Newer versions of the supercomputers that exist today, such as those produced by Cray Research, Inc. and Control Data Corp., while they may employ vastly different technology, will function in basically the same manner and, thus, do not qualify as a new generation, the scientists say.

But researchers like Brenner admit the distinction between supercomputers and artificial intelli-

Japan's Approach to Fifth Generation

Unlike the U.S., which is taking a fragmented approach toward developing a fifth-generation processor, Japan is performing research in a highly controlled fashion.

With its Ministry of Trade and Industry (Miti) as a coordinator, Japan has focused the efforts of several government-sponsored projects, such as the Institute for New Generation Computer Technology and the Japan Information Processing Development Center, to work toward some commonly held goals. Each of the projects has a nine- to 10-year life span aimed at producing results sometime around the end of the century.

Japan's strong government control allows for focusing the research on several tracks. John P. Riganati, a researcher with the U.S. National Bureau of Standards, noted that the Japanese fifth-generation project, for example, is designed around 27 projects centering on seven major themes.

The benefit of this targeted approach is that Japan appears to have made the next generation of computer systems a national goal, uniting various forms of research and even some fierce competitors. The disadvantage, according to Paul Schneck, a researcher with the U.S. Office of Naval Research, is that tight governmental control may leave Japan with too narrow a focus.

Still relatively new, none of the Japanese research has yet produced a significant technological breakthrough. However, some Japanese members under the Miti umbrella, such as Hitachi Ltd. and NEC Information Systems, Inc., have announced supercomputers that appear to rival those produced in the U.S.

Some experts, including Schneck, contend that Japan is riding a no-lose wave. Even if it cannot meet its proposed 1990s goal for developing a new generation of processors, Japan will undoubtedly develop useful technologies as a result of the Miti-controlled research. Other observers added that Miti has already succeeded in breaking a long-standing stereotype about the Japanese — that they are masters at observing and copying the technologies of other countries, but lack the expertise to produce new technologies domestically.

Another advantage of the Miti approach is that it has made more readily available to scientists and researchers at the university level tools such as supercomputers, which are vital to developing and testing new technologies and circuit designs.

Schneck noted that relatively few U.S. researchers have ready access to supercomputers or the expertise to use them.

But the U.S. government has made an attempt to make more heretofore classified supercomputers and other resources available to researchers, he added.

This announcement is neither an offer to sell nor a solicitation of an offer to buy these securities.
The offer is made only by the Prospectus.

December 12, 1983

COMPAQ

COMPAQ COMPUTER CORPORATION

6,000,000 Shares

Common Stock

Price $11 Per Share

Copies of the Prospectus may be obtained from the undersigned only in States where the undersigned may legally offer these securities in compliance with the securities laws thereof.

L. F. ROTHSCHILD, UNTERBERG, TOWBIN — E. F. HUTTON & COMPANY INC.

BEAR, STEARNS & CO. — THE FIRST BOSTON CORPORATION — A. G. BECKER PARIBAS Incorporated

BLYTH EASTMAN PAINE WEBBER Incorporated — ALEX. BROWN & SONS — DILLON, READ & CO. INC.

DONALDSON, LUFKIN & JENRETTE Securities Corporation — DREXEL BURNHAM LAMBERT Incorporated — GOLDMAN, SACHS & CO.

HAMBRECHT & QUIST Incorporated — KIDDER, PEABODY & CO. Incorporated — LAZARD FRERES & CO.

LEHMAN BROTHERS KUHN LOEB Incorporated — MERRILL LYNCH CAPITAL MARKETS — PRUDENTIAL-BACHE Securities

ROBERTSON, COLMAN & STEPHENS — SALOMON BROTHERS INC

SMITH BARNEY, HARRIS UPHAM & CO. Incorporated — WERTHEIM & CO., INC. — DEAN WITTER REYNOLDS INC.

ALLEN & COMPANY Incorporated — F. EBERSTADT & CO., INC. — A. G. EDWARDS & SONS, INC.

MONTGOMERY SECURITIES — MOSELEY, HALLGARTEN, ESTABROOK & WEEDEN INC.

OPPENHEIMER & CO., INC. — PIPER, JAFFRAY & HOPWOOD Incorporated — ROTHSCHILD INC.

THOMSON McKINNON SECURITIES INC. — TUCKER, ANTHONY & R. L. DAY, INC.

UNDERWOOD, NEUHAUS & CO. Incorporated

gence processors can be somewhat muddied by research that makes use of both logical and mathematical processing capabilities.

Many researchers are currently working to develop huge multiprocessors which incorporate many subsystems. Some, such as John Pinkston of the National Security Agency, have gone so far as to predict that computer systems may someday occupy the space of a small city, with thousands of processors linked together. Such a processor would manage its own work load, distributing tasks to the most capable components of the system.

Three Fronts to the Battle

Although an exact definition of fifth-generation processor is lacking, research is currently being conducted on three fronts: processors capable of performing artificial intelligence functions (such as expert systems, natural languages, visual and voice recognition and computer-aided instruction); supercomputers; and multiprocessors.

Technical problems appear to plague all three technologies. Dr. Paul Schneck, who is with the Office of Naval Research in Washington, D.C., recently pointed out that designers of computer systems have exhausted the obvious methods of increasing computer processing power. "Since we began building computers 30 years ago, there has been an order of magnitude [in speed increases] every half-dozen years or so." Now, researchers are facing the possibility that computer speed cannot be increased by technological advancements alone.

Scientists will have to resort to better packaging techniques and more efficient processor designs to boost performance, Schneck said.

All this research takes time and costs a phenomenal amount of money. IBM and Bell Laboratories have each spent millions over the past 10 years researching Josephson junctions, circuits which when cooled to near absolute zero lose virtually all resistance and allow dramatically increased switching speeds. In recent months, both organizations decided the Josephson approach is not practical for commercial systems and significantly cut back research [Nov. 14, 1983].

High risk and astronomical cost have driven many other computer makers away from serious research to develop the next generation of processors. The high cost has also curtailed some university research. To solve this problem, the governments of various countries have actively begun funding research projects. Perhaps the most popular of these is Japan's Ministry of Trade and Industry, the U.S. Department of Defense's Defense Advanced Research Projects Agency and the European Strategic Program of Research in Information Technology.

Europe Still at Starting Gate

If the quest for the fifth generation of computer systems was a horse race, some observers at the track would contend that European entries are still at the starting gate.

The European Strategic Program of Research in Information Technology (Esprit) is the only major cooperative effort among European high-technology firms to share research and development efforts. Still in the formative stages, the organization appears to have identified four major areas — microelectronics, artificial intelligence, office automation and computer-assisted manufacturing — as its focus.

Like Japan's Ministry of Trade and Industry (Miti), Esprit has given itself 10 years and a budget of upward of $800 million to set new technologies in motion.

Government-Funded Projects

In addition, individual countries, principally France and the UK, have ongoing government-funded research projects which may yield technological developments that could influence fifth-generation architectures.

France's Ministry de la Defense, for example, currently has two ongoing projects. The project dubbed Marianne is a supercomputer project aimed at developing a larger vector processor; Isis is a project aimed at linking multiple minicomputers into a multiprocessing system, according to Dr. Paul Schneck, a researcher with the Office of Naval Research.

Project Marianis is a proposed project that will combine the results of the Marianne and Isis projects, possibly to form a vector multiprocessor.

UK officials are at the present time studying a recently produced government report that looks into the viability of a fifth-generation project.

Dr. Jim Howe, leader of artificial intelligence research at Scotland's University of Edinburgh, noted that his institution has several ongoing projects, which yield advances in use of the Lisp and Prolog artificial intelligence languages.

PROBLEM SOLVING SOFTWARE FOR VM

If you have—or are getting—VM, you need these products. They solve the hard problems, making your job easier and your users more productive!

MORE RELIABILITY

● ***V/SAFE*** and ***V/SNAP*** catch CP ABENDs, take a dump and then let the system go on running. You might run for a year without a real "crash!" One customer said this software "... paid for itself the first month we had it up!"

HIGHER PRODUCTIVITY, EASE OF USE

● ***V/QUICK*** cuts "trivial" response time by up to 50%. Faster editing means happier and more productive users!

● ***V/TEMP*** lets users get temporary mini-disk space FAST, with a single command and almost no I/O. Improves system performance, eases training.

NEW FUNCTION

● ***V/SPELL*** gives you an interactive spelling check function as part of XEDIT. A "must" if you do text processing with CMS. "Our users love it," said one customer.

● ***V/FIND*** lets you locate a hexadecimal or EBCDIC character string in virtual or real memory. Debuggers delight!

ACT NOW

Call or write VM Systems Group! Our products will help you make IBM's best interactive system even better. And if you aren't already getting our newsletter, *V/UPDATE*, let us know,—we'll be happy to send it to you!

ARE YOU A "VM BIGOT?"

We are. We produce ***V/UPDATE***, a monthly newsletter of hints and information about VM — and a "TRIVIA" quiz item to test your wits, as well. *V/UPDATE* is written by VMSG staff experienced with VM systems programming and installation management, and it is available FREE to those running or planning for VM.

VM Systems Group is dedicated to solving the hard problems of VM installations with technically sound, supported, software products. Our products are designed for ease of installation and use and they are available NOW, shipped the day after we get your order.

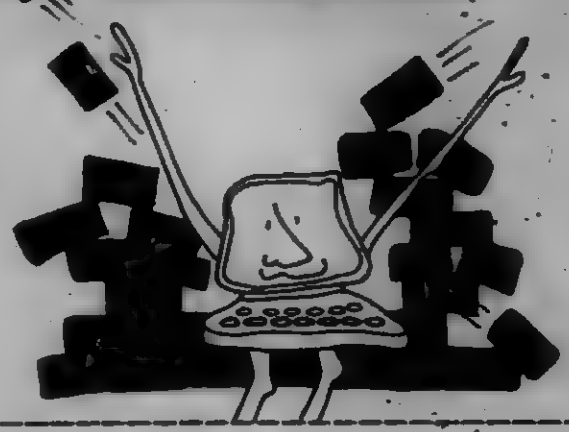
VM Systems Group

Solving the Hard VM Problems

3123 N. Military Road • Arlington, VA 22207

703/243-5514

BREAKTHROUGH IN VAX/VMS* SESSION/IMAGE ACCOUNTING



Only TRACS™ allows examination and tracking of VMS session/image resource data by user, time interval, terminal port and other key fields. TRACS offers:

- General query and interactive capabilities
- Flexible report writer and graphics
- Full screen forms editor

Name _____

Title _____

Company _____

Address _____

City _____ State _____ Zip _____

Phone ( ) _____

SEND COUPON NOW FOR COMPLETE DETAILS!

STI Signal Technology, Inc.

5951 Encina Road, Goleta, CA 93117 (805) 683-3771 Outside California call toll-free (800) 235-8787

TWX 910-334-3471

*VAX/VMS is a trademark of Digital Equipment Corporation

Relational Data Base Management Systems

Pushing for Acceptance

By Paul Gillin

At Napco Industries, Inc. in Hopkins, Minn., the Information Services Department converted this year from IBM's DL/1 hierarchical data base management system (DBMS) to Applied Data Research, Inc.'s (ADR) Datacom/DB, a relational model.

Nate Gould, Napco's director of information services, was convinced that relational was the way to go because "We need to get at data in many different ways. With DL/1, we needed too many keys and indexes to get at data."

By the end of 1984, Napco's data base will fill seven IBM 3370 disk drives with an average of 15,000 to 20,000 transactions daily. And performance under Datacom/DB is at least as good as it was under DL/1, Gould said.

But the DP department at Inland Steel Co. in East Chicago, Ind., gave relational DBMS only a cursory look when it went shopping for a data base last year. "We're planning to do big things with our data base, like automated data capture from the factory floor. You can have very lengthy runtimes with relational," Jay Schwarz, Inland's data base administrator, said.

The company eventually settled on the inverted list architecture Adabas DBMS from Software AG of North America, Inc. to run on its IBM 3081 and Amdahl Corp. 470V/8 processors. "The main thing we were looking for was productivity gains," Schwarz said. "Adabas has a lot of nice features built around it, like the [Software AG] Natural language and security features. It was more functionally complete."

These contrasting examples highlight a debate that is heating up in the software industry as vendors and users show increasing interest in the improving technology of relational DBMS. While the relational architecture has been long admired for its ease-of-use features, vendors have begun to claim that the model is suitable for high-volume production applications, a claim that critics vigorously dispute.

Relational DBMS came into its own this year largely because of the endorsement of one vendor. In announcing Database 2 (DB2) and a version of its SQL for its MVS operating system last June, IBM told its largest users they could test the re-

---

Paul Gillin is senior editor/software for Computerworld.

lational waters without giving up the sanctity of their existing IBM IMS data bases. However, the computer giant was careful not to position DB2 as a replacement for IMS, but rather to position it as an adjunct containing extracted tables for use by nonprogrammers.

The year also saw the second largest data base vendor, Cullinet Software, Inc., announce IDMS/R, a relational version of its popular IDMS. Cincom Systems, Inc. followed by announcing Ultra, a relational system for Digital Equipment Corp. VAX-11 superminicomputers. These vendors joined such other systems software heavyweights as ADR and Computer Associates International, Inc. as recent converts to the relational view.

'It Really Has Arrived'

DB2 and IDMS/R were the most significant announcements to address the subject, according to observers. "There is no question" that the whole direction of data base is in relational, according to Ronald G. Ross, editor of the "Data Base Newsletter." "When you've got both IBM and its major competitor at the large end saying that relational has arrived, then it really has arrived."

But viable relational DBMS in a transaction-heavy environment is still at least five years in the future, Ross asserted. However, the pressure for more technically elegant DBMS models will come from the users rather than from DP, which marks a new trend.

"Relational DBMS was in the wraps of academia and was not well understood for years," said Bernard Plagman, president of The Plagman Group, Inc., a management consulting firm. "IBM has lifted that shroud in announcing DB2." Plagman predicted that "the primary use of relational DBMS for the early years will be as an information center product. Transaction-driven DBMS will remain traditional for years to come."

But some vendors are banking on the opposite trend. "We have been convinced that relational techniques will be much more viable in the '80s than others," said Mark Wasilko, marketing manager for CA-Universe at Computer Associates. First installed in April, Universe was Computer Associates' entry into the DBMS market. Of the more than 50 installations anticipated by the end of 1983, most are using Universe as their primary DBMS, Wasilko said.

The debate over response times "is only a small part of the issue in my book," compared with the challenge to DP control presented by microcomputers, Wasilko said. "With personal computers, users now have a new alternative to DP," Wasilko said, adding, "We're giving DP an alternative to loss of control in that they can now take advantage of their investment in the data center."

But that control may come at a price. "It's not a software problem; it's a hardware problem," said William Inmon, director of Coopers & Lybrand in Denver. "We're seeing some corporations using up mainframe after mainframe for relational processing."

Inmon said vendors are all wrong in touting relational DBMS as suitable for high-volume transactions. For example, relational

(Continued on Page 70)

What 'Relational DBMS' Means

While relational data base management systems (DBMS) became the talk of the data base industry in 1983, the definition of what the technology entails became cloudier.

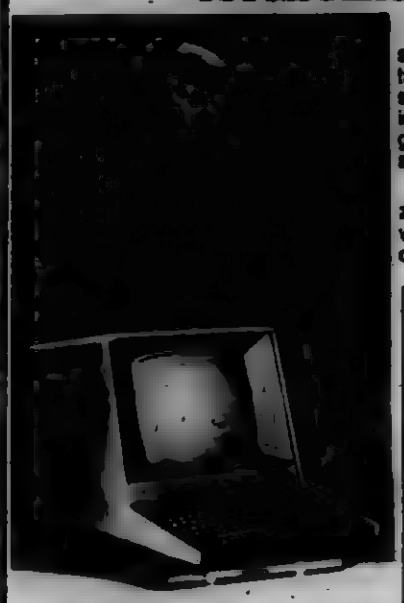
Essentially, the relational DBMS provides a logical view of data using tables with rows and columns. Data structures are defined in logical rather than in physical terms. Relations are normalized — that is, there are no dependencies within a relation. Indexes and pointers are not needed to navigate the data base.

Only three functions are theoretically required to access specific data. The Select function retrieves rows based on a stated criterion. The Project function extracts columns, or attributes, from a relation. The Join function combines relations based on specific criteria.

Relational DBMS uses a very high-level language that should insulate the user from the need to know the underlying data structures.

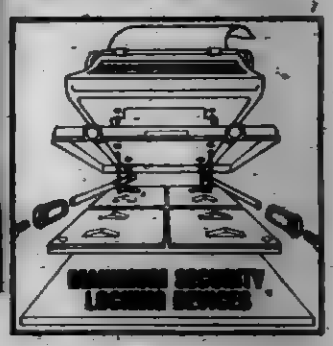
As summed up by Ronald G. Ross, editor of the "Data Base Newsletter," "In relational, the user is absolutely unaware that any physical construct may be necessary to support his query, which is in a purely logical structure."

Protect Your Business Machines From Unwanted Visitors With Anchor Pad.



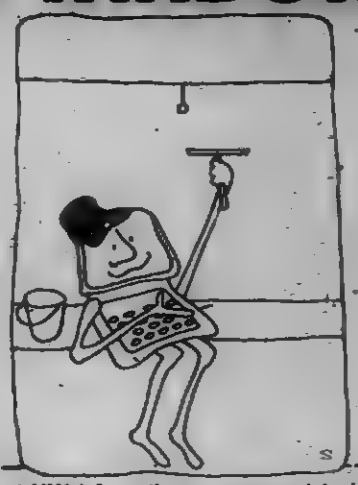
ANCHOR PAD provides maximum security without damaging either furniture or equipment. It combines the stopping power of four separate locking and bonding devices to produce a gripping force of over 6,000 lbs. that stops thieves cold.

Find out why major business organizations have put ANCHOR PAD to work for them. Write for our free brochure, or call (800) 235-7972



ANCHOR PAD ANCHOR PAD INTERNATIONAL, INC.
3224 Thatcher Avenue, Marina Del Rey, California 90291

MAKE YOUR VAX DO WINDOWS



SMARTSTAR™ is the first VAX information management tool that creates multiple window applications—and can scroll your screen to 400 lines. The SMARTSTAR family includes:

- SMARTDESIGN™ for designing applications without programming
- SMARTQUERY™ for powerful, easy-to-use application processing
- SMARTCALL™ when VAX host programming is required
- REQUEST for integrated report and query

Name _____
Title _____
Company _____
Address _____
City _____ State _____ Zip _____
Phone ( ) _____

SEND COUPON NOW FOR DETAILS AND JOIN THE 4TH GENERATION

STI Signal Technology, Inc.
5951 Encina Road, Goleta, CA 93117 (805) 683-3771 Outside California call Toll-free (800) 235-0787
TWX 910-334-3471
VAX is a trademark of Digital Equipment Corporation

RELATIONAL DATA BASE MANAGEMENT SYSTEMS

(Continued from Page 69)

systems routinely scan entire data bases in response to a SELECT command, a procedure that is acceptable in batch processing, but can destroy response times when performed on-line. "As long as the relational environment has capabilities for entire data base scans, you are not going to be able to achieve the throughput for high-volume transactions."

Furthermore, Inmon questioned the desirability of letting end users access the corporate data base. "It's taken 15 years to get operational systems up to the point [where] they are today," he said. "I sure hope we don't get something that will let users run amok in the data base."

Companies experiencing these kinds of problems usually take one of two unpleasant approaches, he said. They continue to throw hardware at performance problems or clamp down on data base usage. Either approach annoys the users.

A more palatable alternative that was tried successfully by a Coopers & Lybrand client was to offer users relational functions on micros with restricted access to the corporate data base, Inmon said. Although the initial user reaction was negative, the project later proved to ease demands on processing power while offering users the access they coveted.

Most observers agree that debate over the viability of "truly relational" production data bases is becoming secondary to the emerging need for relational-like features. Unfortunately, Ross said, this has led to a war of words in which the user is the ultimate loser.

"I would rebel against any vendor who told me he had a functional relational front end if I found out the data base was unable to support relational operations fully," Ross said. "But if he could demonstrate that his DBMS engine fully supported those functions, I would readily accept him into the fold of relational vendors."

ADR's Datacom was redesigned two years ago from an inverted list architecture into a structure the company calls "relational indexed." Like relational, data is stored in tables, but the DBMS also incorporates an index that is invisible to the user.

Datacom also makes extensive use of ADR's Datadictionary facility to define data bases, control users' authorization and functions and manage high-level application development. According to Stephen Gerrard, director of marketing for data base products at ADR, the aim is to "move these products more and more into the relational camp, but only if they can be used in a high-production environment.

"Academics may not agree with our implementation as a pure relational DBMS, but our goal is to have a relational data base for production, not for academic definition," he said. Gerrard claimed that over 95% of Datacom's more than 400 users employ the DBMS in high-transaction production environments. "We have not had users complain that it's not adequate."

A notable and successful holdout from the relational tide has been Computer Corp. of America (CCA). Sales of the company's modified inverted file Model 204 DBMS are growing 100% annually, and the company has no immediate plans to enter the relational arena, according to James B. Rothnie Jr., executive vice-president.

Rothnie criticized the "cultish sort of following" that has developed around the relational concept. "I think tabular data structures are shortsighted and will not be the wave of the future," he said. "On the research side, we've seen a shift away from relational into the areas of semantic data models and functional data models, both of which are basically network architectures."

In fact, Rothnie said, basic tabular structures have ease-of-use problems that are not recognized by vendors. "If you need information that accesses more than one relation, you have to perform a join which, I think, is virtually impossible for a user to understand," he said. "Languages like SQL and [Relational Technology, Inc.'s] Quel are good for programming, but not for users, and the reason is [exemplified in] joins."

The value of relational has been its use of high-level languages that limit user control under a relational structure, but that can provide big benefits when appended onto richer architectures, he said.

What is needed to bring relational into the production environment? Many observers agree that advances in I/O technology, which balance the need of the DBMS to scan large amounts of data, could make a difference. Associative memory, in which retrieval from the storage device is done on the basis of content rather than address, is a promising technology, Plagman said. Data base machines also present an attractive — albeit expensive — alternative by relieving the mainframe of some of the access burden.

The Data Center is under your command.

But is it under your control?

Value Computing's systems management software automates the critical tasks of production forecasting and scheduling, capacity planning, and resource allocation and accounting, and brings those tasks under centralized control. Your control.

The effects on data center operations are immediate: a more stable production environment ... faster turnaround ... fewer manual procedures ... shorter night processing times ... fewer mistakes, mis- re-runs ... less management dependency on operations personnel.

In short, a smoother running, better performing data center; a center where managers get the most intensive use of all resources. Without making a major capital investment in additional CPUs or peripherals.

We don't believe there's a more cost-effective way to improve the performance of your data center or the value of its position in your company. Call us and find out why more than 1500 users agree.

Value Computing Software Systems:
OCMS—The most powerful and ...hensive production scheduling ...rol system available.
...-Charge—The industry standard in job accounting and computer billing.
VALU-LIB—An entirely new tape management system designed for today's VS environments.
SMF Express—A unique package for the management of important SMF data.

VALUE COMPUTING
THE OPTIMUM SOFTWARE FOR DATA CENTER MANAGEMENT
Value Computing, Inc., 466 N. Kings Highway, Cherry Hill, NJ 08034 (800) 257-8242. In New Jersey (609) 482-2500

Information Centers

PHOTO © 1983, GEORGE DILLON

The Users' Report

By George Harrar

The premise and promise of the information center is simply stated: Users can solve many of their own problems when provided with proper tools and techniques.

Two years ago, the information center was an appealing concept without a track record. Today, there is a record — the experiences of the companies which installed information centers early on. Is DP's applications backlog really reduced? Can fourth-generation software bring ease of use and productivity to the end user? Is the spread of personal computers throughout the company under control?

The information center promised much. Now the promises can be matched to reality by looking at the center not as an IBM concept, but rather as an up-and-running part of several large American companies.

Chemical Bank

Some came from an engineering background, others from credit and human relations. Not one member of Chemical's 12-member Office Technology Center staff had worked in a traditional DP position. "We tried before to have DP work with users," Assistant Vice-President Cecil Toulon Jr. said, "and it just didn't work. DP has to talk the language it does every day, and users talk their own language."

According to Toulon, "You don't have to justify buying a personal computer" at the giant New York bank. "If you get a senior vice-president to sign the purchase order, you can have one. That's the main reason for developing the center — to keep personal computing under control."

Since February of last year, the Office Technology Center has operated as much more than a personal tool for users. It is no less than a front-line means to corporate automation. "If we get the people at the top involved in the technology, the next step is the people under them," Toulon said. "So far we have worked with five or six executive vice-presidents and a similar number of senior vice-presidents. Once we get personal computers into of-

(Continued on Page 73)

George Harrar, senior editor/features, is responsible for Computerworld's *weekly In Depth section.*

(Continued from Page 71)

fices, then we can connect them to office systems to create a workstation."

The Office Technology Center Toulon directs labors to create a friendly image, making sure, for instance, that the logo on the center's seminar brochures won't "make users afraid." The "Office of Technology Center News," bearing the logo, will go out to 6,000 officers and professionals in 1984. "You must sell the information center," Toulon said. "Users still aren't sure DP is their friend, that it is something they can use. For 90% of our users, this is their first real introduction to DP. So you must use [public relations] and marketing tools to sell it."

Chemical Bank diverged from IBM's Information Center concept in designing the Office Technology Center to incorporate personal computing, office systems and time-sharing.

Corning Glass Works Corp.

An employee interest survey showed that 71% of the Corning professional staff wanted personal computing or time-sharing capability. In response, the Corning information center evolved from a mainframe service to one now complemented by personal computers. The justification: Eliminate outside time-sharing and reduce system backlog. The prime purpose: allow users to access data.

In 1981, there were 200 users corporatewide, with 1,000 hour/mo connect time and 30,000 CPU second/mo on an IBM 3033. By mid-1983, the number of users had jumped to 1,200, the connect hours per month to 5,000 and the CPU seconds per month to 70,000. "The key to the information center taking off was [IBM's] ADRS," said Doug Leupen, manager of Information Services at Corning's Health and Science division in Medfield, Mass. "That spreadsheet broke down barriers because you can become productive very quickly with it."

The ADRS departmental reporting software package provided the function aspect of a successful information center. Also key has been the support and education provided by a small central staff, which currently handles 600 to 700 phone inquiries a week.

In 1981, the information center was instructed to break even within one year, and it did so. But in 1982 came the ultimate test. "The corporation was going through a period of lower earnings," Leupen said, "and break-even companywide was cut by 6%. Yet the information center actually doubled in use that year, with full chargeback. Key managers were using the information center to help them lower their costs."

Corning, a multinational manufacturer specializing in materials and basic technology, is standardized on IBM-compatible hardware. Any terminal can log on through IBM's Systems Network Architecture to the corporate IBM 3033 mainframe in Corning, N.Y. "The big effort now," Leupen said, "is to integrate the personal computer into the information center concept. We're moving toward the work center concept of one terminal on one desk to serve many uses, such as word processing and spreadsheet."

The information center has not lessened the application backlog waiting at the door of data processing. "What really happens is you don't hit the backlog," Leupen said. "If a user senses his requirement won't be addressed for a year or so, he won't make it. The information center addresses the hidden backlog that can't be measured because you never know if it is there."

The recently implemented Focus data base management system from Information Builders, Inc. is considered to have the potential to become the most productive of the fourth-generation software tools. "Via Focus," Leupen said, "users can look at information in the mainframe through a CRT or pull it down to a personal computer for analysis or for making a graph." Other software packages commonly used are Foresight, a financial planning package from United Information Services, Inc.; SAS from SAS Institute, Inc.; PGF and Peca, both from IBM; and Minitab, an on-line statistical system from Penn State University.

Denny's, Inc.

"In name, we're two years old," said Evan Wride of Denny's information center. "But we used the name improperly. In June, we restructured [the information center] properly as IBM defined it. We're treating the information center as a Big Eight accounting firm, a group of consultants."

Wride, as director of Communication and Administrative Systems, took over responsibility in June for an information center that "wasn't doing a good job in addressing new technology." In addition, he oversees Communication and Network Planning, reporting on a level with the directors of Systems Development, Computing Services and the Planning and Ac-

"dBASE II.gave us something that money can't buy."

Richard Sommers
Lead Programmer/Analyst
at a major health
maintenance organization.

"dBASE II gave us time.

"And in the research battle against breast cancer, time is an invaluable weapon.

"Our research people are not computer people. They're doctors and nurses. So I had to write a customized 'layman's' application for them *very* fast."

"My program development speed even impressed me."

"Using dBASE II, the relational database management system (DBMS) from Ashton-Tate, I was able to quickly develop a very large and sophisticated program for research data storage and analysis. The real beauty of the new program is its speed and ease of use. A simple two-word command starts the program, so data can be entered much faster. And when our researchers need to query the database, they ask their questions in English using medical terminology familiar to them, without having to deal with computerese.

"In the past few months, I've recommended dBASE II to at least four of my programming colleagues in other hospitals."

Put time on your side with dBASE II.

When you're customizing an applications program and fighting the clock at the same time, you won't find a faster, more flexible solution than dBASE II* from Ashton-Tate. We'll be glad to rush you all the details. Ashton-Tate, 10150 West Jefferson Boulevard, Culver City, CA 90230. (800) 437-4329, Ext. 217. In Colorado, (303) 799-4900. In the U.K., call (0908) 568866.

ASHTON·TATE

*Suggested retail price, $700.
dBASE II is a registered trademark of Ashton-Tate.
©Ashton-Tate 1983

counting Staff.

"Communications has been identified as the key, the glue that will tie the division together," Wride said. Fifteen regional offices comprise the restaurant division of this billion-dollar company. Currently these offices run by telephone, telex and typewriter. The information center, which was started as a development group using Focus instead of Cobol, is taking on a project management function. Top priority is making recommendations toward automating the offices with word processing, financial planning software and on-line access to the host computer.

"We're currently looking to hire a project leader, someone with the same skills as if he were on the systems development staff," Wride said. This person will join information center experts specializing in personal computers and Focus to make a formal project management team ready to automate the regional offices. "We will probably take two months for the requirements definition, then do a pilot," Wride said. "When it's working well, we'll do it for the whole corporation."

Using the information center as a project team means that the same staff which studied the end-user environment and surveyed end-user needs remains after the project is implemented to answer end users' questions and solve their problems. In contrast to many information centers, like Denny's version gets involved in projects typically taking up to three months to complete.

Dennison Manufacturing Co.

"I haven't had to justify the information center budget, amazingly enough," John Lucas said. "I'm prepared to do it. The return is so obvious that they haven't felt it necessary." Lucas manages the center at Dennison, a paper remanufacturer (maker of stickers and labels) now getting into high-tech products such as point-of-sale terminals and labeling equipment. "We explicitly don't have charge-back. If a user is accessing the

(Continued on Page 74)

IBM's Information Center: Where It All Began

In 1973, IBM Canada in Toronto dedicated several systems analysts to go into the user community to help users write reports rather than having them march through the regular systems function. By 1974, this operation was named an "information center," an idea ready to spread across Canada and south of the border.

"Our stated goal at the beginning," said Gwen Warlow, the information center manager, "was to provide education, consultation, minimal environment support and problem resolution. We were trying to assist our users to become self-sufficient, that's always been our goal. That user self-sufficiency goal has not changed, but some of the subsets under it have. We've grown and deepened our involvement with user planning, resource management and office systems. We work with users much more, help them with any of their personal computing needs."

Two thousand regular end users are served by the information staff of 25. The user community is expected to grow to 2,700 in 1984, with the user-to-staff ratio staying about 100:1.

"We're looking at a broader user population now," Warlow said. "Initially, we had people who had learned tools and coded for themselves. Later on, there were users who were prepared to work with tools and could make extracts and reports for themselves. Now many people are using menus and program function keys only. They want things programmed for them."

Warlow's background is in marketing and administration in information systems. Her staff includes some from marketing, some from information systems and others from customer service.

"I think the information center works best under information systems," she said. "I think of information systems as neutral, not in finance, administration, marketing or customer service."

Warlow believes the information center has improved the overall quality of projects submitted to systems development because end users are more sophisticated. "Now that they know how to use the tools, they are more realistic about the system they want," she said.

"Before, they would put a request in and prepare to go through the enhancement cycle. Now they build what they want right into the original request. They count on using end-user tools. The information center has achieved that," Warlow maintained.

No other 3270 protocol converter can match all these features.

Since 1977, hundreds of companies all over the world including Bell Labs, Citicorp, ITT, Litton, Westinghouse—have used Local Data products to make IBM communications easy and inexpensive.

We believe the DataLynx™/3274 is the best price/performance 3270 protocol converter on the market.

So, before you buy any other protocol converter at any price, compare the DataLynx/3274 features first. Then decide.

- SNA/SDLC or BSC protocols supported. SNA is PU type 2.
- BSC for EBCDIC and ASCII.
- 16 bit, 8 MHZ Intel 8086-2 CPU.
- Auxiliary printer support allows each async port to have a separately addressable 3287 type printer. This feature enables dial users to combine CRT and print data over one dial-up line.
- 80 types of ASCII async display terminals can emulate IBM 3278 display stations, and ASCII async printers to emulate IBM 328X printers.
- Micro to main-frame support with our FileLynx™/3278 program for the IBM PC and PC compatibles supports terminal emulation and file transfer (upload/download).
- Hard copy KSR support with our "Paper/3278".
- Unique "paging" feature supports emulation of *all* models of the 3278 display station.
- Pseudo-transparency feature allows host application to transmit character and control codes to async terminal devices (e.g. graphics terminals, graph plotters, mini-computers, high-speed printers with down-loadable forms control units).
- "Compu" support for micro, mini and instrumentation computers as terminal devices.
- Dual host support.
- PROM cartridge for easy user upgrade of firmware.
- Powerful, friendly configurator mode, using menus to allow parameter definition for sync ports, logical units, async ports and terminal characteristics, including help utility.
- Configuration values saved in non-volatile EEPROM.
- Monitor mode displays current status of all ports and logical units.
- May be connected to a host directly (in modem eliminator mode), or via modems on a dedicated multipoint or point-to-point line (dial-up or dedicated), via RS-232C sync ports.
- Data rates to 19,200 bps (sync & async).
- Async ports may be configured for any of 15 fixed bit rates or "autobaud", with or without parity checking, and with a specified character format.
- Simple DTE/DCE change on all ports.
- Flow control on async ports may be configured for physical and/or logical signalling.
- Virtual device support enables reconnect of dial users independent of physical port.
- Security through dual level password protection.
- Emulation of standard 3278 keyboard functions is tailored for each supported terminal type.
- 25th status line emulation.
- SAS graphics support.
- Base color support.
- 3278-5 (27 x 132 character screen) support on 9 channels with memory expansion option.
- LU configurator options provide support for various screen formats and printer page widths.
- Front panel includes 33 function status indicators.
- Self-test of channels, memory and firmware integrity is performed continually in background mode assisted by a "watchdog" timer.
- UL and FCC approved.

For more information about the remarkable DataLynx/3274 protocol converter, call or write today. And ask about our 30-day free trial program.

Local Data DATALYNX/3274

Local Data
"Your Lynx to IBM."

LOCAL DATA · 2701 Toledo Street · Suite 705 · Torrance · CA · 90503 · Telephone (213) 320-7126 TLX 182518

INFORMATION CENTERS

(Continued from Page 73)

mainframe, he just pays for computer time. If he's on a micro, he just pays for consumable supplies."

Lucas came from Honeywell, Inc., bringing 12 years of experience in financial analysis, Basic programming and time-sharing. One information center specialist and one temporary staff person report to him; he reports to the manager of User Systems within Management Information Systems (MIS). The main walk-in center, which serves about 250 microcomputer users and 35 to 40 users who work with mainframe products, is located within the MIS building at company headquarters in Framingham, Mass.

The new year launches a new effort to reach Dennison end users through satellite centers. "We started this idea ourselves," Lucas said. "We were looking at ways to put micros in the end-user community in the most effective way. There was no good alternative for the person who wanted to use a micro four or five hours a day, short of coming over to us. The satellite centers are more for people who understand what they're doing, working on ongoing applications." The satellite locations enable the end user who has "graduated" from the main information center to work on his own, closer to his office.

In the information center, Lucas maintains one ground rule — no programming. "It's strictly off-the-shelf software," he said. "We think we can support most people that way. If we had to program, we couldn't support as many people. [The center] would become dedicated to a special group of people."

In the micro area, 1-2-3 by Lotus Development Corp. is "preeminent," according to Lucas. For mainframe applications, the only fourth-generation language used is Infodata Systems, Inc.'s Inquire, the data base ad hoc query package allowing remote, multiuser accessing.

The Charleston, W. Va., information center, begun in September 1980, is one of two DP centers serving this multinational chemical, metal and carbon maker.

"It originated to support CMS installation when [IBM's] CMS was brand new," Robert Hutton, senior staff analyst, said. "Now people are getting comfortable with CMS, and throughout the company people are getting fairly heavily into personal computer use. So now the information center is becoming a resource for people using personal computers, mostly the larger ones from IBM and Apple [Computer, Inc.]."

Part of the center's purpose was to lessen applications backlog. "It has helped in CMS-supported systems," Hutton said. Software provided by the information center is designed, as Hutton said, "to be used directly by the user if he is willing to invest a little time." The software includes Inquire, SAS' Sasgraph and [Isaco Graphics, Inc.'s] Telegraph.

Originally, the information center was aligned under the MIS position of applications manager. A year ago it shifted to the DP area, under supervision of the data center manager.

NOW -- A ONE TIME AD
WITH A ONE TIME OFFER

Specialty Computer Services, Inc. as a COEM for DEC and Referenced Reseller for MCBA will, during Jan. 1984 only, sell a new PDP-11 or VAX 730 minicomputer syst. for 20%* of "et price AND include 1 MCBA COBOL accounting package FREE.

SCS call for complete details
515-752-6550 ask for
Jim Lewis.

112 South Second Avenue, P.O. Box 617
Marshalltown, Iowa 50158

* 10% on some printers, selected options.

"...AND THE 2314X BEGAT THE 3330X, AND THE 3330X BEGAT THE 3350X, AND THE 3350X BEGAT THE 33800..."

PCM COMMITMENT YOU CAN COUNT ON FOR GENERATIONS

For five PCM generations, Control Data has been building cost-effective, plug-compatible storage systems. This long-term commitment has paid off with increasingly effective storage systems. We were the first to introduce double-density versions of earlier models, like the 3350 disk drive. And now our commitment has paid off again.

Introducing the 33800 and 33750—two new and even more effective IBM-compatible storage systems from Control Data. Who else?

Better products, backed by outstanding service. Together they tell the story of Control Data's commitment to PCM. Today. Tomorrow. Always. For more information, call 612/553-4311.

CONTROL DATA

[redacted] DOS VS-L

IPCP opens and closes CICS files from batch partitions with a single execute statement.
- enable/disable transactions
- and many other CEMT functions
- eliminate PAUSE statements
- keep CICS up 24 hours
- free 30 day evaluation period
- $950 one time or $48/month

J. W. LAMPI, INC.
8160 Benjamin St. NE
Minneapolis, MN 55432
(612) 571-3934

VAX track to hardware freedom.

You know about the many portable programming benefits of UNIX™. You're also keenly aware of your company's extensive investment in VMS software. Now you can take advantage of both and be hardware independent, too. Because now there's EUNICE.

▲ Clearly, the way to go.

EUNICE provides a machine transparent medium that allows your programmers the freedom to operate in any one of three environments: VMS, UNIX, or integrated VMS/UNIX. They can switch modes at any time, depending on application. And through EUNICE, they can also take advantage of a wealth of available UNIX-based software.

EUNICE comes with the full Berkeley 4.1 BSD UNIX environment which includes the high level languages of C, FORTRAN 77, LISP, Pascal, and Franz LISP. You also get standard UNIX networking software. Plus, Source Code Control System — a powerful facility that provides a completely controlled program development and documentation environment.

▲ We keep you on track.

Wollongong is a full-service organization dedicated to the advancement of UNIX. As such, we're quickly becoming recognized as *The UNIX Authority*. We sell more UNIX-based software to the 32-bit minicomputer market than anyone else. And back it with the widest range of support services available.

Services like personalized client consultation; system-level design; fast, efficient installation; on-site training and full documentation. We also provide a wide variety of options to enhance the efficiency of your VMS/UNIX system. Options like RM/COBOL, a high-level implementation of the ANSI 74 COBOL standard for efficient execution of COBOL business applications. Or IP/TCP, the new Department of Defense protocol that allows two or more host computers to communicate within a predefined environment.

▲ Over 300 VAX sites already free!

They know the fastest track to independence lies with EUNICE. Because they've joined the growing list of satisfied Wollongong customers. To find out how you can enjoy hardware freedom, mail the coupon today, or call our toll-free number: 800-USA-UNIX. In California, call: 800-962-UNIX.

CW 1/86

The Wollongong Group, Inc.
1129 San Antonio Road
Palo Alto, CA 94303
Tel 415-962-9224

OK, I'm ready to declare my hardware independence. Please send me all the details.

Name _____

Title _____

Company _____

Address _____

City _____

State _____ Zip _____

Phone (___) _____

™UNIX is a trademark of Bell Laboratories.

WOLLONGONG
The UNIX Authority

Unix And the New Contenders

PHOTO © 1983, GEORGE DELLON

By Jeffry Beeler

Among research and academic institutions, it long ago established itself as a standard and has seldom lacked for outspoken admirers willing at a moment's notice to recite its many virtues.

But in the commercial world, a host of well-documented shortcomings has kept it from realizing its full potential and has seriously slowed its acceptance by nontechnical end users.

Today, however, the picture is beginning to change. Nearly 15 years after its conception at Bell Laboratories, Inc., this long-time bit player in the international business systems drama is finally starting to emerge from obscurity and grab some of the limelight its fans consider long overdue.

Already it shows signs of becoming the preferred operating system for 16-bit personal computers and has even made modest inroads into central computing departments, where it can occasionally be found running on IBM 370s and comparable CPUs. Whether its limited successes on the business mainframe stage will continue and ultimately propel it into technological stardom and end-user acclaim is still open to debate.

As the 1983 calendar turns its last leaf and AT&T enters its first year of true deregulation, the evolution of this potentially influential software product will bear closer watching than ever before. What finally happens with it will present corporate management information systems (MIS) managers with new challenges and opportunities that will inevitably affect their ability to:

- Hire qualified programmers.
- Acquire the latest and most advanced programming languages and development tools.
- Sidestep the pitfalls of sudden hardware obsolescence while safeguarding their investment in existing software.
- Span the vast gulf separating personal computers and central mainframes.
- Keep pace with user demand for new, improved applications.

The object of all the attention and

(Continued on Page 78)

Jeffry Beeler is a Computerworld West Coast correspondent.

(Continued from Page 77)

industry speculation is, of course, AT&T's Unix, an operating system whose overall performance thus far has drawn decidedly mixed reviews, with raves in some quarters and boos in others.

Initially for Bell Only

First written in 1969 by Bell Labs scientists Ken Thompson and Dennis Ritchie, Unix was intended as a program development tool strictly for AT&T's own internal use. Then, in the early 1970s, the user audience substantially widened when Bell began making the product available to the outside world, particularly to universities and research facilities. Because its developer was then constrained from competing in the computer industry, the program was distributed to outsiders exclusively through licensing arrangements rather than being sold directly.

Since then, Unix has found its way into the hands of more than 2,200 licensees, among them some 700 institutions of higher learning, including MIT and the University of California, according to AT&T fact sheets. At the same time, the system has also continued to flourish within Bell itself, where it is currently installed on approximately 750 CPUs in 300 sites, per-

(Continued on Page 80)

IBM to Develop Its Own Unix Version

IBM will develop and support its own version of AT&T's Unix and make the operating system available across a broad range of processor models, from personal computers to host mainframes, according to industry analyst Robert Fertig.

As modified by IBM, the control program will be a "superset" of its AT&T counterpart and will "play" on the 4300 and 308X series as well as on CPUs that have yet to be announced, he predicted.

"IBM needs to support Unix because it doesn't want independent software firms to control its destiny," and because it has to interconnect otherwise incompatible hardware, the president of Greenwich, Conn.-based Enterprise Information Systems, Inc. said in a recent interview.

Fertig's remarks about the industry giant's operating systems plans put him in accord with market researcher Eileen Shrabutenas, who described Unix as one of AT&T's most important weapons in the impending computer industry showdown with IBM.

Because of its portability, Unix provides AT&T with a ready means of integrating a large corporation's existing systems organization with the hodgepodge of competing personal computers now proliferating among its end users. Such a capability for integrating dissimilar systems is currently unavailable from IBM, according to Shrabutenas, a senior analyst at Los Altos, Calif.-based Yates Ventures, Inc.

Shrabutenas also predicted that Unix will form the technological foundation for AT&T's first commercially available line of computing hardware, the initial models of which are expected to make their debut next year. Included in the anticipated equipment family will be an existing intelligent terminal that AT&T will upgrade with a Motorola, Inc. 68000 microprocessor to form the company's first Unix-based personal computer.

A second member of the predicted Unix-driven processor line will be a high-level CPU comparable in computing power to the Digital Equipment Corp. VAX-11 superminicomputer series, Shrabutenas said.

Like Unix itself, both the personal computer and the supermini were originally developed for internal AT&T use and are now being adapted for release to the outside world as the company finally enters the era of deregulation.

The advent of the first AT&T-supplied computing hardware line will significantly expand the business world's hardware options and propel AT&T into the front ranks of the computer industry. "In the past," Shrabutenas recalled, "the leading hardware vendors included IBM, DEC and [Hewlett-Packard Co.]. In the future, that select group will be joined by AT&T, which is the only company with enough clout to challenge IBM in the Fortune 1,000 environment."

The sudden entry of such a dominant new player into the equipment vendor ball game could spell big trouble for the "bunch" companies — Burroughs Corp., Sperry Corp., NCR Corp., Control Data Corp. and Honeywell, Inc. — some of which can ill afford increased competition in their traditional market niches, Shrabutenas warned.

NOW ACCESS YOUR BURROUGHS™ MAINFRAME WITH AN IBM PC™ AND GET TOTAL WORKSTATION CAPABILITIES...

Your IBM PC™ can now function as a full capacity Burroughs TD830/MT983 type terminal and even the ET2000 thanks to the INTERCOM™ series from ICC. Synchronous, asynchronous, and direct connect communications over the Burroughs poll/select network as well as advanced functions not found on any terminal are all standard with INTERCOM. Best of all, your PC still functions as a PC. You can access your word processing or spreadsheet programs in the foreground while maintaining background communications with the host.

PLUS FILE TRANSFER...

INTERCOM series allows you to share corporate data with our micro-to-mainframe file transfer connection. INTERCOM's sophisticated file transfer program automatically uploads or downloads files between the IBM PC and Burroughs mainframe. Reformat routine can even convert transferred data to LOTUS™ 1-2-3 or VISICALC™ format.

WITH INTERCOM™

ICC's commitment to innovative software and hardware products and total customer support solves tomorrows communication problems today.

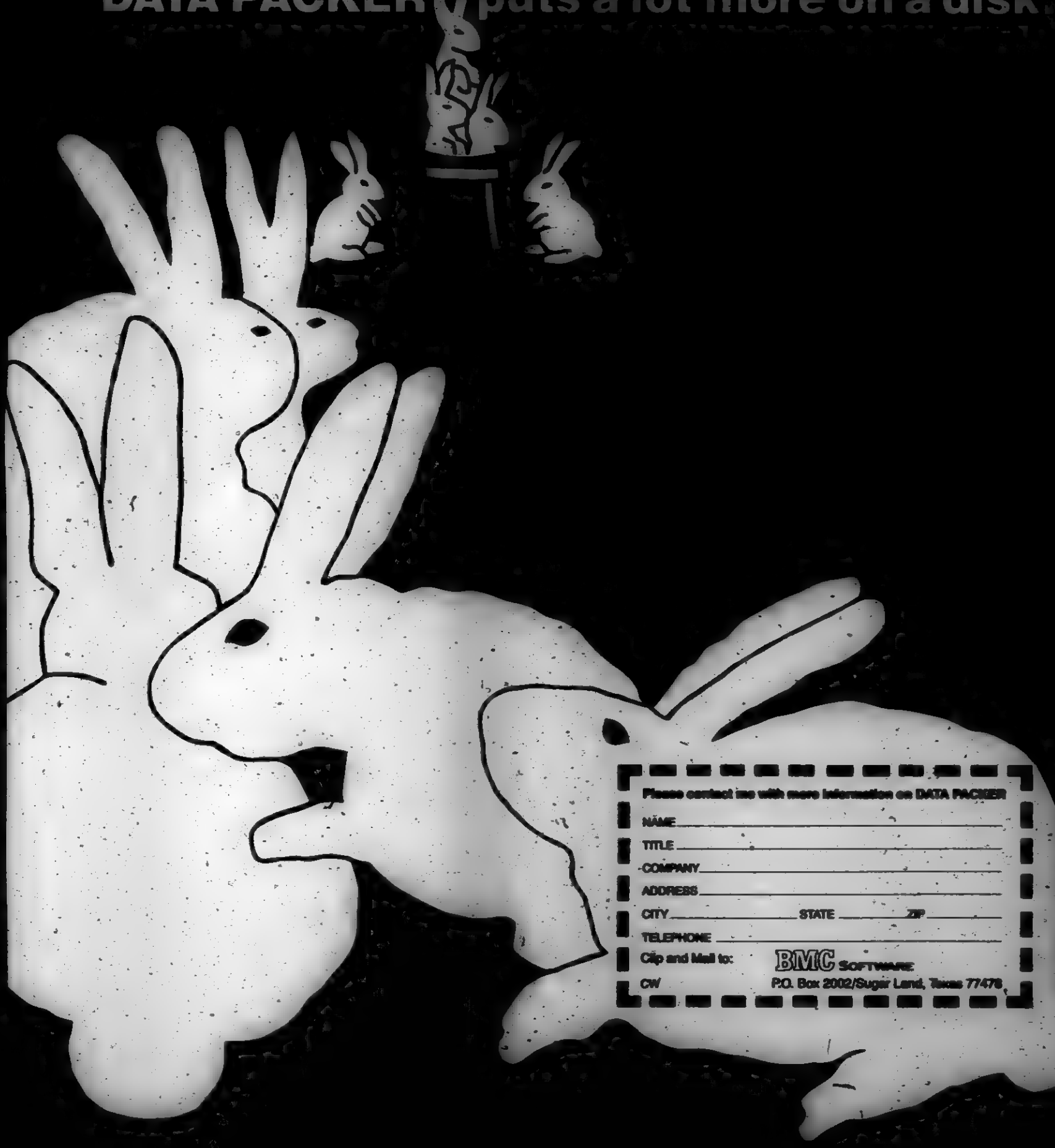
ICC Intercomputer Communications Corporation

3195 Linwood Ave. • Cincinnati, OH 45208 • 513/321-3199

IMS MAGIC

SOFTWARE

DATA PACKER puts a lot more on a disk.



Please contact me with more information on DATA PACKER

NAME _____

TITLE _____

COMPANY _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

TELEPHONE _____

Clip and Mail to: BMC SOFTWARE

CW P.O. Box 2002/Sugar Land, Texas 77478

UNIX AND THE NEW CONTENDERS

(Continued from Page 78)

forming hundreds of applications ranging from programming to office automation.

In the commercial world, however, efforts to spread the gospel of Unix have often met with stiff user resistance. The reason for the opposition has to do primarily with the operating system's obscure and complicated command structure — a feature well adapted to software development, but intimidating and difficult for computing novices.

To a large extent, therefore, Unix's long-term success in the commercial marketplace depends on AT&T's ability to simplify the program's user interface. Efforts to increase the software product's user-friendliness will probably rank among the firm's top Unix-related priorities during the coming year, according to John Ulett, marketing manager for Microsoft, Inc.'s Xenix operating system.

Corporate Standard?

On the question of whether large companies will ever adopt Unix as a standard, opinions diverge widely. One of the skeptics in the debate over Unix standardization is Fenwicke Holmes, president of the Santa Barbara, Calif.-based Information Academy, who retired earlier this year as information systems director for Del Monte Corp.

Holmes sees little chance for the vaunted AT&T operating system to displace the well-entrenched IBM software that has dominated corporate computing centers for years. "The world of large mainframes is an institution like the Catholic Church, and it would take an awful lot of drive to get it to change," he contended. In theory, he added, MIS departments "should be their companies' main agents for internal change." In practice, however, "they are often less adaptable to change than they should be because of their vast investment in Cobol, procedural languages and operating systems."

Other sources see Unix standardization in the mainframe realm as a distinct possibility. The benefits of converting big corporate hosts to Unix would be myriad, contends Jack Scanlon, vice-president of Western Electric's Processor and Software Systems Division.

According to Scanlon, because Unix is written almost entirely in C, it can be easily adapted to operate with many vendors' hardware. Thus, a Unix application originally written to run on Company A's processor can be quickly transported to Company B's.

For information systems directors, such portability greatly simplifies the problem of hardware selection by minimizing the potential ill effects of choosing incorrectly. With most other operating systems, "a data processing executive has to be as good a technologist as he is a manager," Scanlon said. "But if his company migrated to Unix, he

(Continued on Page 84)

CP/M, MS-DOS To Help Shape Future of Unix

Microsoft, Inc.'s MS-DOS and Digital Research, Inc.'s Concurrent CP/M are only two of the widely used microcomputer operating systems with which the Unix world will increasingly have to contend. Other software offerings that are also likely to play a role in shaping the AT&T operating system's future will include the Unix derivatives and look-alikes.

The distinction between the two classes of Unix-like operating systems lies in their source code, Eileen Skrabutenas, a senior analyst at Yates Ventures, Inc., explained. Unlike the derivatives, which use the same source code as their AT&T model, the look-alikes are based on their own proprietary programming.

Among the derivatives, which include examples such as Microsoft's Xenix operating system, one of the key trends for 1984 will be the addition of windowing capabilities, according to John Ulett, Microsoft product marketing manager.

Among the look-alikes, meanwhile, Skrabutenas foresees the development of a standard port between Unix's latest version, System V, and the microprocessors of four major chip manufacturers — Intel Corp., Motorola, Inc., National Semiconductor Corp. and Zilog, Inc. When it released System V last January, AT&T's Western Electric announced the signing of an agreement to develop versions of the modified operating system for the four semiconductor makers' processors.

The emergence of a standard System V interface will allow application software to be transported easily among the four microprocessor options and will simplify the integration of personal computers into existing mainframe environments, Skrabutenas predicted.

As players in the larger Unix world, the look-alikes are likely to be confined primarily to narrowly defined market niches, she added.

DEC PRIME
DATA GENERAL
IBM WANG
HP TANDEM
PERKIN-ELMER

RELIABLE REMOTE PRINTING WITHOUT THE COSTS

At up to 1800 LPM

BREAK YOUR REMOTE PRINTING BOTTLENECK
The Remote Line Printer System (RLPS, patent pending) *Obsoletes* all current solutions for high speed, cost effective minicomputer based remote printing! Quite simply, the RLPS "looks" like a locally attached printer to your system.

DOUBLE OR TRIPLE YOUR THROUGHPUT
The RLPS plugs into the parallel printer port and accepts data in the more *efficient* parallel mode. Combined with its advanced data compression techniques, the RLPS provides speeds up to 1800 LPM as compared to the typical 500 LPM limitation with serially attached line printers.

DATA INTEGRITY AT LOW COST
The RLPS uses modern X.25 level 2 protocol to assure data integrity and eliminate the need for costly communications hardware to detect errors.

SAVE UP TO 50% IN TRANSMISSION COSTS
The RLPS' improved throughput results in cost savings of up to 50% or more in a dial-up environment *OR* increased availability of a private wire for better system utilization.

ABSOLUTELY NO SOFTWARE COSTS
The RLPS doesn't require a communications operating system and special software handlers. Further, the RLPS eliminates the need for reprogramming; *both* local and remote users have the same version of applications software.

PLUG COMPATIBILITY AND FLEXIBILITY
For maximum versatility, the RLPS can be configured for applications in the same building as your system, cross town, cross country and even over satellite circuits! Plug compatibility with a wide range of systems including those manufactured by DEC, DATA GENERAL, HEWLETT-PACKARD, TANDEM, PRIME, WANG, HONEYWELL, and IBM is *GUARANTEED*.

DIGITAL ASSOCIATES, THE PRINTER SOURCE, is America's leading independent supplier of plug compatible line printer systems. We offer the largest selection available, savings of up to 50% off your system vendor's prices, quick delivery, nationwide service, a full line of printer controllers and communications interfaces and complete product support with a full line of ribbons and supplies.

For further information on the RLPS or plug compatible line printer systems, call our hotline, (203) 327-9210 today.

The Printer Source...

Digital Associates Corporation

better printers at better prices

1039 East Main Street
Stamford, Connecticut 06902
(203) 327-9210

1983 was a very good year.

NCR introduced more major data processing products than any other high tech company.

NCR closes out its first century with one of its most impressive technological achievements, the NCR 9300. It's the first full 32-bit VLSI mainframe designed for business applications. The 9300 delivers the power of a mainframe at the price of a mini.

New computers for 1983 included the UNIX™-based Tower, a microprocessor with the power of traditional minicomputers. NCR also added new multiprocessors to our top-of-the-line 8600 mainframe series.

We introduced the NCR Personal Computer specifically designed for the business/professional market. It provides dual processor capabilities to enhance performance, and is the first personal computer designed with networking in mind. It can function as an offline computer, an online terminal to your mainframe, or networked with other NCR Personal Computers and other popular PCs.

We strengthened our position as the world's leading supplier of retail point-of-sale terminals by introducing a wide range of new products. Included is a terminal that looks up the prices of over 14,800 items stored in its own internal bubble memory.

Our number one position in automated bank teller machines produced the technology for self-service airline, ski lift and service station terminals. We are the leader in electronic banking networks and electronic funds transfer.

Why did NCR introduce all these high technology products in 1983? We wanted to get a good start on our second hundred years. For more information, call 1-800-CALL-NCR. In Ohio, 1-800-543-4470.

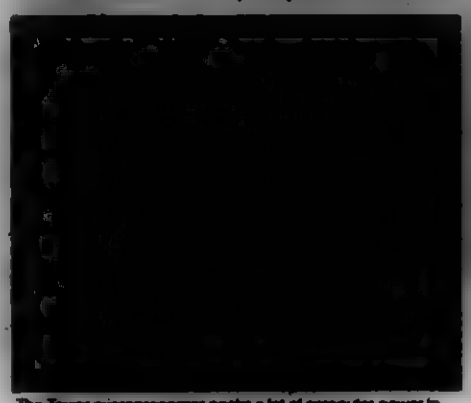
And 1984 will be even better.

NCR

1884-1984
Celebrating the future

UNIX is a trademark of Bell Laboratories.

People Express, one of America's fastest-growing airlines, chose an NCR 8600 series computer system to handle online reservations. NCR is a leader in online transaction processing equipment, communications and system software.



The Tower microprocessor packs a lot of computer power in a 29" x 27" x 7" package. Up to 16 operators, local or remote, can access the Tower at one time.

Debit cards and Electronic Funds Transfer became a reality in 1983. NCR is the leader in EFT technology today!

Bubble memory technology provides resident mass memory in the terminal for automatic price look-up for supermarkets and other retail stores.

The new NCR Personal Computer offers unsurpassed monochrome or color graphics. Industry standards are used throughout so the applications programs you need are available now.

New drive-through ATMs help the world bank on the go. NCR helped pioneer the regional electronic banking network and has installed more Automated Teller Machines worldwide than any other supplier.

The NCR 9300, a roomful of computer power in a 50-pound box, was a big breakthrough in 1983. Add this 32-bit VLSI mainframe for a complete system price of less than $48,000!

A network of Honeywell computers to improve customer service.

When Metropolitan says they stand by you—believe them.

One way to upgrade customer service is to do more to help the sales representatives responsible for that service.

So the Metropolitan Insurance Companies are installing over 1000 Honeywell DPS 6/40 small computers in their personal insurance offices throughout the U.S. and Canada.

By decentralizing computerized sales support functions, Metropolitan is giving its sales representatives instant access to data that once took days to get.

For instance, they can now obtain sales illustrations and price quotes and process service transactions just by going to a terminal.

The system also helps reps by maintaining their policyholder files and generating quality sales letters and timely reminders for client calls. What's more, Metropolitan's managers benefit by being able to measure sales against objectives more easily. The system is a strong decision support tool. Indeed, its word processing, electronic mail, and other office automation capabilities will go a long way toward speeding operations and decreasing paperwork overall.

The Metropolitan Insurance Companies chose the DPS 6/40 for its reliability, expansion capability, ease of use, and the quality of support available from Honeywell. They also liked its combination of price/performance, local processing power, and communications.

Metropolitan has always been dedicated to the best possible customer service.

We think it's a wise policy.

For more information on how Honeywell computers can help solve your problems, call 800-328-5111, Ext. 2705. (In Minnesota, call collect, 612-870-2142, Ext. 2705) or write Honeywell Inquiry Center, MS 440, 200 Smith Street, Waltham, MA 02154.

Together, we can find the answers.

Honeywell

(Continued on Page 80)

could be wrong occasionally in his hardware selection."

Portability also provides MIS heads with at least one other major payback: Because software houses will increasingly gravitate to Unix, the operating system will make available to its users a wide selection of the latest and most productive applications, Scanlon said.

Pick to End Self-Exile With Future Release

One of the computing field's least known software products may soon end its long self-exile in the industry backwaters and make a place for itself in the mainstream of commercial applications.

For years, Pick & Associates, Inc., the originators of the Pick operating system, have intentionally soft-pedaled their most cherished creation, whose many perceived shortcomings reportedly left the authors deeply dissatisfied and reluctant to seek widespread distribution. That combination of resolute perfectionism and distaste for aggressive promotion has made Pick "one of the industry's best-kept secrets," according to Janice Antonellis, a senior market analyst for International Data Corp.

Soon, however, the fog of secrecy surrounding the operating system may lift forever. An ongoing effort to rewrite Pick and, thus, rid it of its reputed drawbacks has finally begun to bear fruit in the form of a new Pick release, probably slated for introduction sometime next year, Antonellis said.

If reports of the imminent release prove true, the developers' long-delayed bid to push their products in earnest may finally be at hand, she added.

Pluses and Minuses

Whether the expected promotion succeeds and thrusts Pick into a position of unaccustomed prominence may ultimately depend on the scope and judiciousness of the rumored software rewrite. By all accounts, the control program's strengths are manifold.

Like its nearest equivalent, Unix, Pick operates with a wide array of processor models and size classes, ranging from personal computers to mainframes.

The system also boasts a large library of application software, according to Eileen Skrabutenas, a senior analyst at Yates Ventures, Inc.

Unlike Unix, however, Pick still lacks support for a high-level programming language, Skrabutenas said. In fact, the only language available with the operating system is Pick Basic.

Among small businesses, where Skrabutenas expects Pick's influence to be felt most heavily, failure to support a high-level programming language might work to a commercial operating system's advantage. But in the Fortune 1,000 world, such a handicap usually means instant rejection.

So as a future enhancement, high-level language support ranks among the leading candidates for inclusion in Pick's next release, Skrabutenas said.

Whether Pick ever finds a significant place for itself in the big-business sun also depends heavily on future directions with Unix. "If Unix finally acquires an effective user interface, Pick won't gain much momentum," a source who asked not to be identified said.

"But if Unix fails to become significantly more user friendly than it has been in the past, Pick may have a promising future," the source contended.

Normally, you might not trust a product with a new name. But while all of our products have a new name, they also have a proven history of quality and reliability.

That's because Genicom was formerly the Data Communication Products Department of General Electric. Now an independently owned company, Genicom will continue the same product line we established with GE...only the name has changed.

Our Genicom 3000 family, for instance, still offers the same performance features already preferred by users and the design flexibility so important to OEM's, distributors, retailers and dealers. Speeds from 40 to 400 cps. Single or dual mode printing. Type quality from EDP to NLQ. Multi-color printing. Graphics. Selectable type fonts. American craftsmanship and more.

Of course, we'll also offer Genicom 2000 teleprinters and the soon to be introduced 4030 shuttle matrix printers. You'll find we have the same complete product line that we had with GE. We have the same corps of experienced employees, the same facilities, and the same nationwide service network.

But above all, we have a new commitment to excellence. Which means, while we continue to serve existing customers with established products like our 3000 family, we plan to introduce more products to meet growing needs.

At Genicom, we've changed our name and we're planning to change the future with more innovations, and more of the quality you've come to expect from us under any name.

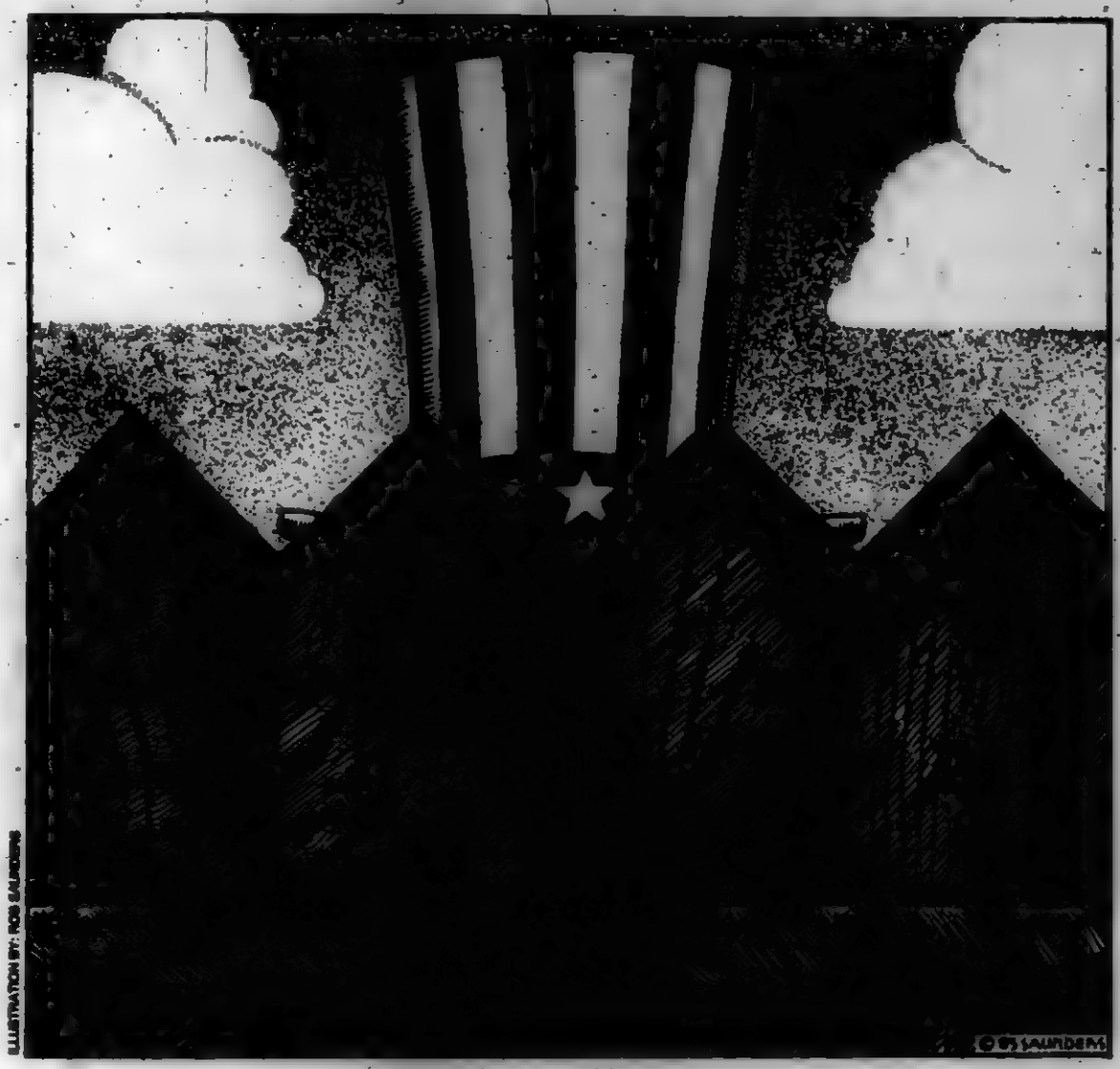
Genicom Corporation, One General Electric Drive, Dept. M321, Waynesboro, VA 22980. In Virginia, call 1-703-949-1170.

GENICOM

For the solution to your printing needs call

TOLL FREE 1-800-437-7468

Privacy Issues In 1984



By Jake Kirchner

There was of course no way of knowing whether you were being watched at any given moment . . . You had to live — did live, from habit that became instinct — in the assumption that every sound you made was overheard, and, except in darkness, every movement scrutinized.

***— George Orwell's* 1984**

As the calendar turns to 1984, George Orwell's chilling negative utopia is much in the public consciousness. The terms "1984" and "Big Brother" are heard from every quarter, and many would have us believe that Orwell's society of complete government control and absolute lack of personal privacy is close at hand.

Actually, our society today is not at all similar to that depicted in the novel. But then Orwell's story was not a prediction, but a warning — a warning that we and our institutions are evolving in such a way that our powers of self-determination are slowly being eroded. Unfortunately, what most people think of when they hear "1984" is illustrated in the quote above; they form a mental image of Big Brother as an oppressive physical presence in the form of jackbooted, truncheon-wielding fascists relying on Peeping Tom electronics.

The Big Brother we really face is a much different beast.

In the novel, the most obvious instrument of government repression was television; every room was monitored, every action observed and every sound heard. Television is many things in our lives, not all of them beneficial. But except for scrutiny from observation cameras in some stores, public buildings and the like, most of us do not have to fear physical surveillance — at least not yet.

Computers, of course, were not well known in the late 1940s, when the novel was written. Today, many people think computers will be the primary instruments of repression. A recent Louis Harris opinion poll found that 77% of the general public and 79% of congressmen and their top aides are somewhat concerned to very concerned about threats to their privacy in the computer age. Another poll, conducted in Canada, revealed that more than half those surveyed fully expect their privacy will be invaded by computers or by government agencies and private sector organizations that use computers.

Certainly, computers make privacy invasion easy. Law enforcement agencies at every level are rapidly

(Continued on Page 86)

Jake Kirchner is a Computerworld *correspondent based in Washington, D.C.*

PRIVACY ISSUES IN 1984

(Continued from Page 85)

automating, in some cases for the purposes of surveillance. Bureaucratic and corporate organizations, not satisfied with the teeming data banks resident in their large mainframe systems, are deploying microcomputers by the tens of thousands with little or no thought to how all the personal data they process will be protected. And even the most minor financial transaction, it seems, requires one to fill out lengthy, detailed applications often demanding very personal and apparently irrelevant information — further grist for the computer mill.

But even with this trend to large-scale data gathering and lax security, the actual mechanisms of computerized privacy invasion is not well understood. Most people seem to believe it will result from too many organizations having too much information on us. While that is no doubt a legitimate concern, little thought is given to how that information will come to be in the "wrong" hands.

We fear that government and corporate America will come to take our privacy away. In fact, our privacy is already gone to a great degree and, in fact, it was not taken; to a large extent, we gave it away, all too witting accomplices of Big Brother.

We traded our privacy for government benefits, ranging from food stamps and unemployment checks to public education and income tax deductions. We bartered it for medical insurance, house mortgages, car loans, credit cards and check-cashing privileges. In many cases, we did not like giving up all the personal information, but we did not seem to have much choice.

Reflecting on this recently, one privacy advocate said: "It's always a trade-off; it's always a balance . . . The question is: Do you want to fill out this incredibly obnoxious application or do you want a credit card? Do you want to fill out this disgusting application or do you want a job . . . If you don't have a job, getting one is the most important thing."

Our concern now is that all that data might be used against us; that it will be shared by the wrong people in ways we are not aware of and would not approve of if we did know. We do not like it, but we do not know what to do about it.

Citizen Concern

Citizens are concerned about privacy, but do not know how to safeguard it. Computerized bureaucracies and corporations pay lip service to the need to protect personal privacy, but in practice are more concerned about efficiency than privacy. Legislators, whom we might expect to be concerned about our rights to privacy, are just like the rest of us — deficits, crime, nuclear proliferation and unemployment seem to be much more immediate threats.

Computerworld recently asked a number of people interested in the privacy issue to comment on "the 1984 issue" and to speculate on the causes of and possible cures for the trend toward gradual privacy erosion.

If their remarks have any common thread, it is that the American public is very much concerned about privacy, but does not know how to protect it, and that is not likely to change unless citizens and legislators make a concerted effort to win back and preserve privacy rights.

A staff member of the U.S. House of Representatives' Subcommittee on Government Information, Justice and Agriculture, which has unsuccessfully pushed privacy legislation for years, said support for privacy measures is "a mile wide and an inch deep. People are willing to trade their privacy for every other benefit."

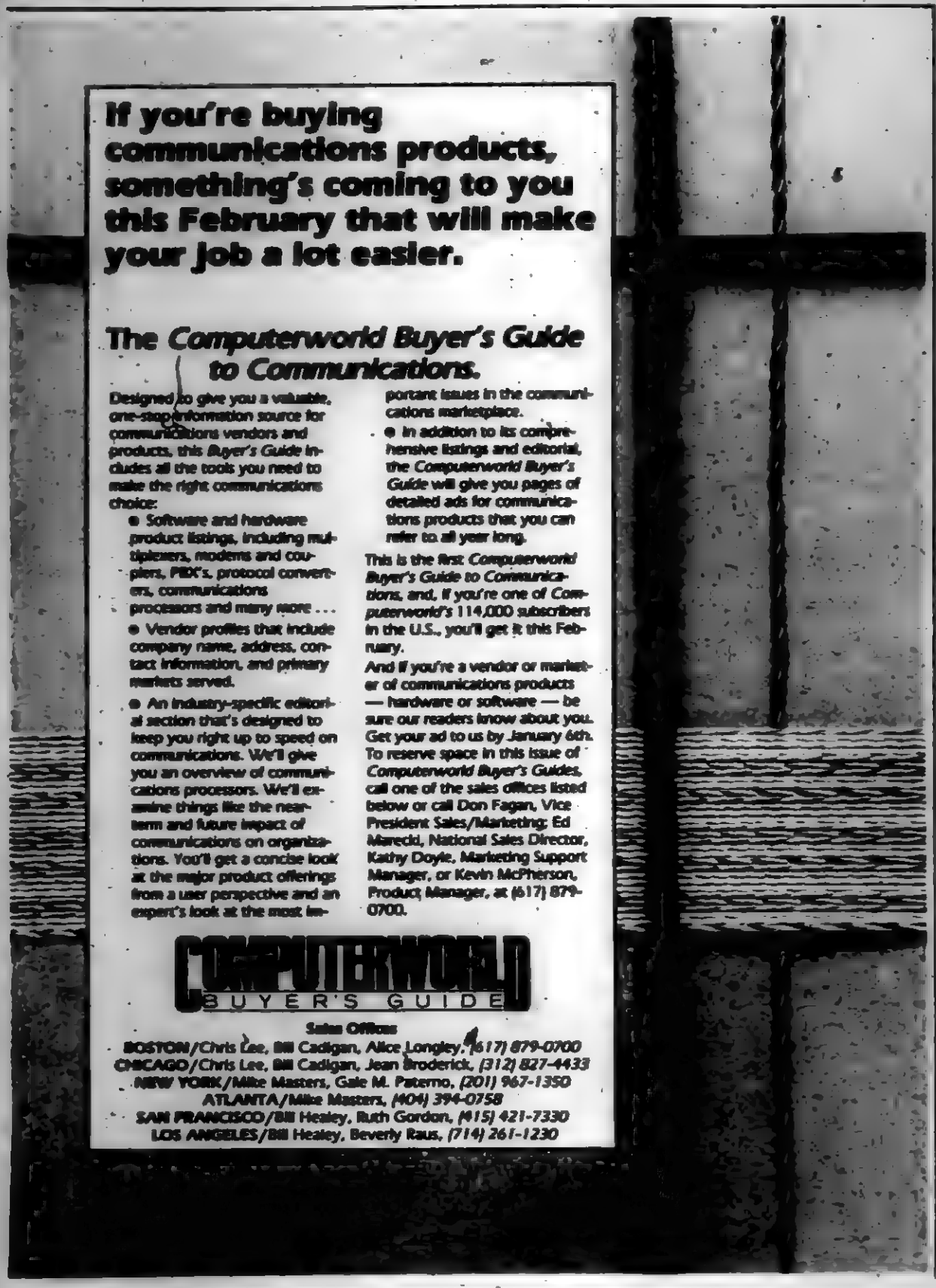
Why that is so is not immediately clear. Terril J. Steichen, director of former President Carter's Privacy Project and currently a private consultant and writer specializing in information technology topics, put it this way: "The public hates Big Brother. They like privacy but, unfortunately, they have very distorted perceptions of both."

Privacy loss, according to Steichen, results from the incremental gathering of data by many organizations plus a concomitant loss of individual control over use of that data.

Data gathering and sharing, he said, produce "data images" of citizens. Organizations make decisions about people based solely on those images, even though the data may be old, incomplete, inaccurate and biased. The person behind the data is no longer a factor.

To August Bequai, attorney and author of six books on white-collar crime and related subjects, privacy invasion is considered a sign of the times.

"Technology in and of itself doesn't mean anything," he declared. He pointed, rather, to what he sees as "a lack of sensitivity on the part of people as regards privacy . . . We've become less sensitive to the other person's rights — that's what privacy is, another person's rights."



PRIVACY ISSUES IN 1984

Federal Record Poor for Privacy Protection

With so much concern today over privacy issues, the logical question to ask is why the government is not looking out for our privacy.

Why must we fear intrusion by government agencies? After all, 1984 also marks the 10-year point for the Privacy Act, passed to ensure individual privacy protection in government operations. But today, there is more government data gathering, more data sharing and less individual control over what agencies do with our data than ever.

According to a recent congressional report, the current administration has the worst record for privacy invasion of any since the Nixon years. The report accuses the Office of Management and Budget (OMB) — responsible for overseeing agencies' privacy practices — of almost complete failure to perform its duties under the Privacy Act.

Here again, lack of understanding plays a role. Government agencies, with some exceptions, do not seem to understand why they should be zealous about protecting personal privacy. They also often confuse privacy with security and think that keeping data secure is the same thing as protecting the privacy of the data subjects.

Reluctant Citizens

OMB Deputy Director Joseph R. Wright told a congressional subcommittee a few months ago that a public perception that government data banks can be tapped from outside might make citizens reluctant to supply data to the government, "thereby eroding the integrity of our data bases and ultimately affecting the quality of our programs."

What Wright did not say is that the same thing holds true for privacy protection. If citizens feel the government is not respecting the confidentiality of personal information, if the data is freely shared by other government and private entities, agencies may encounter resistance to their data-gathering efforts. But to the government, the threat is always from the outside, never from within the organization.

Commenting on that, Terril J. Steichen, director of former President Carter's privacy project and currently a private consultant and writer specializing in information technology topics, remarked, "The fox is not going to view himself as a mad slayer of chickens. He sees himself as playing a vital role in the world. No one, including the government bureaucrat, likes to have his integrity questioned. . . . [To him] all the bad people are outside."

Beyond that, as the House Government Operations Committee report put it, "Privacy interests frequently conflict with other important governmental interests, such as economy and efficiency." According to Steichen, "Government often presents privacy as a luxury that costs government money; [privacy is] sort of silly because it requires duplication of data gathering."

It seems clear that any push to rededicate the government to privacy protection will have to come from outside the bureaucracy itself and will have to be mandated by Congress. But the chances for congressional action on privacy matters are quite slim.

The only privacy legislation now before Congress is a bill by Rep. Glenn English (D-Okla.), chairman of the House Government Information, Justice and Agriculture Subcommittee, which calls for a separate government entity to oversee privacy protection. The bill, however, is controversial even within the subcommittee, primarily because it would establish a new agency in a time when the trend is toward less bureaucracy, and according to Capitol Hill sources, the bill will be moved slowly, if at all.

The legislation "needs a tremendous amount of additional support," a subcommittee aide said. And given the Republican-controlled Senate, particularly the Judiciary Committee headed by Strom Thurmond (R-S.C.), there is almost no possibility of getting Senate approval of any but the most minor privacy legislation during 1984.

In the Senate, the most that can be hoped for is tighter privacy regulations for agencies and a mandate for greater OMB vigilance in implementing the Privacy Act. The Senate Governmental Affairs Subcommittee on Oversight of Government Management will soon continue its investigation into agency use of computer matching, particularly as it relates to Internal Revenue Service data, but a subcommittee attorney said it is not clear what if any legislation might result from this initiative.

In addition, congressional privacy advocates on both sides of Capitol Hill are fully aware that the law enforcement community, especially the Federal Bureau of Investigation, has been able to gut or kill any privacy legislation for the last five years.

Any privacy protection mechanism makes law enforcement agencies fear they will lose access to data they feel they need to do their jobs, and to a certain extent they are correct. Congress to this point has not been able or willing to make it clear that, at least in terms of privacy, police in a free society must operate under some restraints.

The blame for this state of affairs, however, should not rest solely with any one ideology; liberal legislators, too, have been negligent about privacy protection. Not only have they not faced down law enforcement, they have also been quick to advocate increased data gathering and computer matching in social welfare programs.

Evidently, in a time of tight federal budgets, programs to help the needy must be run in a climate of fear, and recipients, who in many cases are the most defenseless, must give up their privacy rights and be treated as second-class citizens in order to qualify for benefits. This holds true at least for those who, because they are at the bottom of the economic scale, must wait at the end of the government giveaway line.

Few of the more fortunate among us recognize that we receive far more in government benefits — from mortgage interest deductions, corporate tax credits and the like — than does any fatherless family on food stamps. If we do not protect the privacy rights of the least among us, who will protect ours?

The question is not academic, according to August Bequai, attorney and author of six books on white-collar crime and related subjects, who has done considerable thinking about the future of privacy and data security in the U.S. He argues that automation combined with a growing lack of ethics in this country threatens more than our privacy.

"If you have the right formula, and by that I mean the instrumentalities to gain all sorts of information and the instrumentalities to control information and a lack of ethics, and . . . if the socio-politico-economic fabric of America suffers a traumatic event or events — recession, invasion, terrorist attack — the unethical, armed with this awesome technology, can deprive us of our privacy and our political freedoms.

"We've been spared this in our country, thank God," Bequai added. But, he said, "I find it hard to believe the naivete of people who are supposedly intelligent. . . . They say, 'So what?' "

Not Without Hope

Despite the gloomy assessment of many privacy advocates, 1984 is not a year without hope. Indeed, all those contacted by *Computerworld* were uniformly optimistic that the privacy situation can change. Bequai, seemingly the most pessimistic of all, contended that education at all levels can make us more sensitive to the need to protect our privacy and that of all citizens.

The year 1984 has spawned considerable interest in privacy. George Orwell's book and the current state of society will be the topics of seminars, hearings and meetings all across the country during the coming year. Those concerned about privacy are hoping these will lead to much more grass-roots support for privacy regulations and codes of conduct in government and the private sector.

John Shattuck, head of the Washington, D.C., office of the American Civil Liberties Union, which is working with a number of public interest and professional groups to elevate the privacy issue in the public and in state and federal legislatures, said the combination of increased public access to computer technology and the Orwellian year are creating a better climate for action on privacy matters.

Shattuck said any privacy legislative agenda probably will have to wait for a change in the control of the Senate and for a new president. But he also said he does not see any presidential candidate making privacy a campaign issue. This he attributed to "overarching issues," such as the economy and foreign policy, that are crowding out privacy matters.

But, he said, "If it weren't for the fact that the world is otherwise falling apart, [privacy] might be the top item of priority." In any event, Shattuck said, privacy is an issue whose time has come.

ADDERS/Data Entry
BEATS ALL OTHER
DATA ENTRY SYSTEMS
ON SIMPLICITY, FUNCTIONALITY, AND COST

Simplicity : ADDERS/Data Entry runs on existing terminals under SHADOW II or CICS in pseudo-conversational mode. Non-D.P. staff can set up their own input screens to mirror source documents. No additional hardware needed!

Functionality : ADDERS/Data Entry offers all the function of the best key-to-disk systems plus on-line power and direct data entry.

Cost : ADDERS/Data Entry protects your resources by removing the need for specialized hardware and making optimum use of your mainframe power.

ADDERS/Data Entry is one of a group of integrated products that make common use of the ADDERS nucleus.

Call 1 (800) 556-7845 now for a free trial.
Your payback can start in just three months.

Rendeck
5 Faneuil Hall Marketplace
Boston, MA 02109 ■ (617) 367-9180

Computer Matching

PHOTO © 1988, BROOKE DILLON

An Ethical Exchange?

By John Gallant

I think there are some very distinct signs that Big Brother is around and watching. I don't mean that strictly in an Orwellian sense, but in the insidious ways computer matching has made possible. This widening exchange of information is the basis for a general surveillance system.

— John Shattuck, director of the Washington, D.C., office of the American Civil Liberties Union

Norma Rollins believes that important events — milestones, if you will — crystallize support for privacy issues.

Rollins, director of the New York Civil Liberties Union (NYCLU) Privacy Project, hopes that 1984 — in an Orwellian sense — will be the milestone that coalesces opposition to the widening use of computer matching.

"The last driving force behind a privacy issue was Watergate. The 1974 federal Privacy Act came about as a result of that," Rollins said. "Maybe 1984 will be the same for computer matching. That's a magic year. [George] Orwell's book may be just the thing to stimulate our thinking and to build a constituency once again."

Empowered by the U.S. Congress to regulate the use of computer matching on the federal level, the Office of Management and Budget (OMB) defines "computer matching" as a procedure "in which a computer is used to compare two or more automated systems of records or a system of records with a set of nonfederal records to find individuals who are common to more than one system or set." The definition is simple enough. But the benefits of computer matching, the future of efforts to limit its use and its impact on personal privacy in the heralded year of Big Brother are issues that are far from clear.

One thing, at least, is certain. The technique of computer matching will be used more often, and for a wider range of purposes, on both the state and federal levels. President Reagan has placed high priority on the eradication of fraud and inefficiency in federal benefit programs, instructing administrators to be "as mean as junkyard dogs" in their efforts to combat theft and waste. Under the Reagan administration's auspices, the technology

(Continued on Page 90)

John Gallant is a Computerworld staff writer.

AVOID DOWNTIME!
WATER *ALERT*
. . . FOR COMPUTER AREAS

Warns you of water leakage in sub-floor wiring areas.

- Produces a loud, intermittent alarm when activated by presence of water.
- Completely self-contained . . . no wiring, no connections.
- Early water detection (1/64" water film activates alarm) provides maximum time for corrective action.
- 24 hour per day monitoring.
- Options include remote indicator, remote flashing light, and automatic telephone dialer.

3 Models from $59 - $110
Call or write for complete information.

Dorlen Products

COMPUTER MATCHING

(Continued from Page 88)

behind computer matching is constantly being refined.

"The most common problems in government programs are overpayment of benefits and erroneous payments to recipients whose assets exceed the income standards. Computer matching is simply the most efficient method to pinpoint data on assets and income and ensures that only the deserving get government benefits," said Thomas McBride, former inspector general of the U.S. Departments of Labor and Agriculture.

McBride, currently associate dean of the Stanford University Law School, also supervised the Computer Matching Project of the President's Council on Integrity and Efficiency. His former colleague on the project, U.S. Department of Health and Human Services (HHS) Inspector General Richard Kusserow, is even more adamant in his support of computer matching. Charged with protecting the department's $300 billion annual budget, Kusserow estimated that he and his staff initiate three-quarters of the matching programs undertaken by the 18 federal inspector generals.

"I hate the term 'computer matching,'" Kusserow said. "It's like a fingernail on a blackboard to my ears. This is nothing more than an automated auditing technique. It's a labor-saving technique, and if I wasn't using it, I should be fired. We're protecting the disadvantaged, the aged and the retarded. I want to be certain that only they get the benefits they're entitled to. I can't imagine anyone objecting to that. In this case, we're on the side of the angels."

Heavenly support notwithstanding, opponents of computer matching see in its widening use an increasing, dangerous impact on personal privacy. According to Ronald Plesser, former general counsel to the federal Privacy Protection Study Committee, the use of computer matching is leading to a "dangerous disintegration" of Fourth Amendment privacy rights.

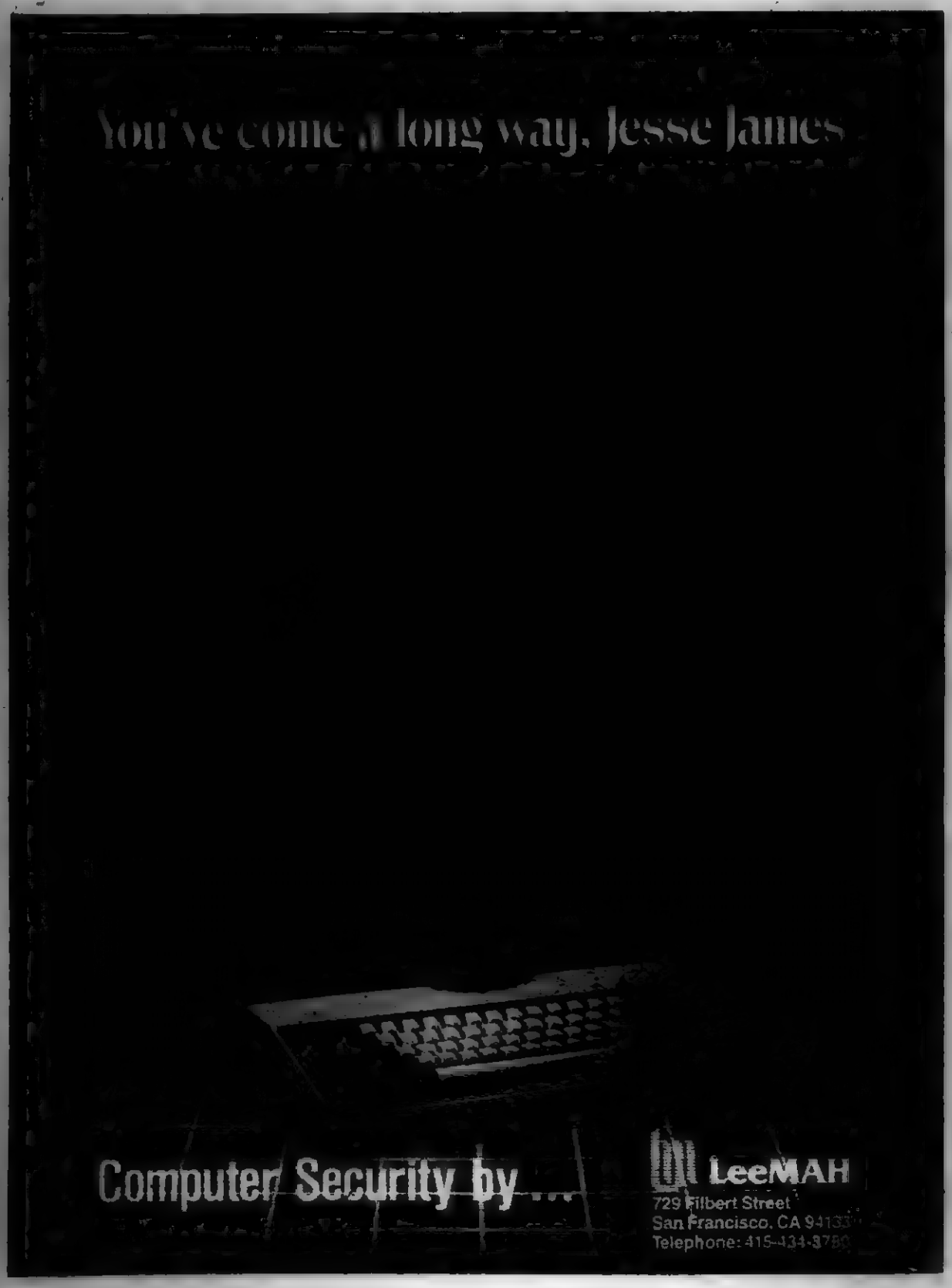
"The government is pretty well committed to the use of computer matching," Plesser explained. "There have been attempts to get as much information as possible from [Internal Revenue Service] files, and they're even thinking of using census data. I would be shocked if they did that. We can expect a greater use of private information by the government also. That's troubling."

Robert Ellis Smith, publisher of the Washington, D.C.-based "Privacy Journal" newsletter, said the future promises a greater mass use of personal information, but no proportional rewards in terms of efficiency. "These programs won't do all the things they're supposed to do. Don't expect any great benefits from these techniques," he said.

Smith likened the use of computer matching to "a mass invasion of privacy," a problem that in the future will be aggravated by government's increasing reliance on private records. "The government is discovering that it doesn't even have to collect the data anymore. There are no laws limiting it from using private information," Smith said. "That means we'll have to rely on private organizations to protect our privacy rights, and if the price is right, they'll give up any information."

John Shattuck, director of the Washington, D.C., office of the American Civil Liberties Union, called computer matching "the fastest growing privacy invasion industry in government." He also criticized what he labeled the OMB's failure to regulate properly its use and a lack of congressional

(Continued on Page 92)



Everyone In The UNIX* World Will Gather At

UniForum™

The International Conference of UNIX Users

JAN. 17-20, 1984 WASHINGTON HILTON WASHINGTON, D.C.

If you are already a part of the UNIX world . . . or want to know more about UNIX . . . UniForum is the one place you should be January 17-20, 1984.

Twenty-six conference sessions . . . all of the major UNIX vendors . . . and anyone-who-is-anyone in the UNIX community will be at the Washington Hilton for UniForum.

Begin with an all-day tutorial on Tuesday . . . hear a distinguished keynote speaker on Wednesday . . . and follow these features with informative sessions presented by /usr/group and USENIX on Wednesday, Thursday and Friday.

Exhibits will be open Tuesday, Wednesday and Thursday.

Use the registration form on this page to sign up today!

TUTORIALS

TUESDAY, JAN. 17

ALL-DAY SESSIONS – 8:30 a.m. to 5 p.m.

1. **Software Contracts & Licenses**
   Speaker: Susan H. Nycum, of Gaston, Snow, Ely Bartlett; Palo Alto, CA
2. **C Style and Portability**
   Speaker: Eric Allman, of Britton-Lee; Los Gatos, CA
3. **UNIX Systems Administration**
   Speakers: Ed Gould and Bob Kridle, of Mt. Xinu; Berkeley, CA
4. **Advanced Shell Programming**
   Speaker: Steve Bourne, of Silicon Graphics Inc.; Mountain View, CA
5. **Vi Editor**
6. **UNIX Systems on Local Area Networks**

REGISTRATION

Registration for conferences and tutorials will open in the Washington Hilton on Monday, Jan. 16 at 2 p.m.

REGISTRATION FEES (Including Exhibits):

Tutorials	$150
Students	$100
Conferences:	
Member /usr/group or USENIX	$150
Non-member	$175
Students	$100

To attend exhibits only: $10

**UNIX is a trademark of Bell Laboratories.*

/usr/ group SESSIONS

USENIX SESSIONS

WEDNESDAY, JAN. 18

7. **Keynote Address** – 9 a.m. - 10 a.m.
   Speaker: Jack M. Scanlon, Western Electric Company
8. **Joint Session** – 10:30 a.m. - Noon
9. **UNIX in Government** – 1:30 - 3 p.m.
10. **Networks** – 1:30 - 3 p.m.
11. **Market Research and UNIX** – 3:30 - 5 p.m.
12. **Distributed UNIX** – 3:30 - 5 p.m.

THURSDAY, JAN. 19

13. **Microcomputer to Mainframe Communications** – 8:30 - 10 a.m.
14. **Compilers and Languages** – 8:30 - 10 a.m.
15. **Graphics Applications on Work Stations** – 10:30 - Noon
16. **UNIX Directions** – 10:30 - Noon
17. **UNIX to Microports** – 1:30 - 3 p.m.
18. **Applications** – 1:30 - 3 p.m.
19. **/New Developments in Office Automation** – 3:30 - 5 p.m.
20. **Implementations** – 3:30 - 5 p.m.

FRIDAY, JAN. 20

21. **Case Studies in Office Automation** – 8:30 - 10 a.m.
22. **Datalinking** – 8:30 - 10 a.m.
23. **UNIX Standards** – 10:30 - Noon
24. **Open Session** – 10:30 - Noon
25. **Graphics - Computer Graphics Systems & Applications** – 1:30 - 3 p.m.
26. **Joint Session** – 3:30 - 5 p.m.

The Washington Hilton is located at 1919 Connecticut Avenue, N.W.
Regular shuttle bus service is available from both Dulles Airport and Washington National Airport to the Washington Hilton.

HOTEL: To make your hotel reservations, call toll-free 1-800-323-8186 (in Illinois and Canada, call 312-299-3131).

SHOW HOURS – Tues., Jan. 17: Noon to 7 p.m.; Wed., Jan. 18: 10 a.m. to 6 p.m.; Thurs., Jan. 19: 10 a.m. to 6 p.m.

THESE COMPANIES WILL EXHIBIT:

Able Computer
Absolut Software
Access Technology
Altos Computer
Amdahl Corp.
Areta Systems Corp.
Auxco
Avalon Computer Systems
Aviv Corp.
AGS Computers, Inc.
Benjamin/Cummings Publishing Co.
Bibliographic Retrieval Services
Britton-Lee
C & P International Consultants
Cadmus Computer Systems
Callan Data Systems
Cambridge Digital Systems
Canta Forda Computer Laboratory
Charles River Data Systems
Codata Systems Corp.
Compugraphic
Computer Consoles, Inc.
Computer Corp. of America
Computer Methods, Ltd.
Computer Technology Group
Computerized Office Services
ComputerAutomation, Inc.
Contel Computer Corp.
Corvus Systems
Counselor Systems, Inc.
Cucumber Bookshop, Inc.
CMI Corporation
Data General
Data Language
Digital Equipment Corp
Dual Systems
Exact Systems and Programming Corp.
Excelan
Falcon Systems
Fortune Systems
Forward Technology
Gould Computer Systems
Government Computer News
Handle Corp.
Hayden Book Company
Hewlett Packard
Honeywell Information Systems
Human Computing Resources
HHB Softron
Image Network
Imagen Corp.
Infosystems Technology
Institute for Advanced Professional Studies
Integrated Computer Systems
Intel Corporation
Interactive Systems Corp.
Interactive Training Systems
Interlan, Inc.
IBC/Integrated Business Computers
Logical Software, Inc.
Masscomp
Megadata Corp.
Metheus Corp.
Micro Focus, Inc.
Microsoft Corp.
Momentum Comuter Systems International
Motorola/Four Phase
National Semiconductor
Network Research Corp.
Nuvotec, Inc.
NBI, Inc.
NCR Corp.
Octagon Computer Systems
Officesmiths, Inc.
Onyx Systems, Inc.
Oracle Corp.
Oregon Software
Pacific Basic Graphics
Pacific Micro Computers
Peradyne Corp.
Perkin-Elmer
Phact Associates, Ltd.
Pixel Computer, Inc.
Plexus Computers, Inc.
Portable Software
Productivity Products
Proper Software
Pyramid Technology Corp.
Quadstron Systems, Inc.
R. Systems, Inc.
Relational Database Systems
Relational Technology, Inc.
Rhodnius, Inc.
Ridge Computers
Ryan-McFarland Corp.
Sage Computer Technology
Santa Cruz Operation, Inc.
Sky Computers
The Software Express
Software Ireland
SofTest, Inc.
Spectrix Microsystems
Sphinx Ltd.
Sritek, Inc.
Structured Methods, Inc.
Sun Microsystems
Symmetric
STSC, Inc.
Tektronix, Inc.
TQM Software
TYX Corporation
Unify Corporation
Uniq Computer Corp.
Unisource Software Corp.
UNIX Review
UNIX/World
UniComp Corp.
UniPress Software, Inc.
UniSoft Systems
UniVentures
Urban Software Corp.
User Training Corp.
Van Data
VenturCom, Inc.
Voelker-Lehman Systems
Western Electric
Whitesmiths, Ltd.
Mark Williams Co.
The Wollongong Group
Yotis Ventures
ZBog, Inc.

Sponsored by /usr/group

Co-Sponsored by USENIX Association

The right application software package — does the choice get blurred?

Help is on the way from *Computerworld* this January

The ever-increasing requests for office software; the demand for tools by programmers and users alike; the bewildering array of products to choose from — make the job of selecting applications software challenging and difficult. Here's what you'll get from this January's Special Report on Applications Software to make your job easier:

- The packaged decision: Should you buy, or develop in-house?
- Methods of selecting the best application for your needs.
- Modifying and maintaining packaged applications.
- Integrating applications from multiple vendors.
- Conversion stories.
- Integrating micro with mainframe applications.
- Applications for manufacturing.

You'll get information on who should select packaged applications. You'll read about the impact of application generation tools on selecting packaged solutions. And you'll get pages of fact-filled ads for products to keep you up-to-date on just what's new. If you buy, choose or recommend applications software products — you won't want to miss this special report in *Computerworld's* January 30th issue.

And if you've got packaged software products our readers want to know about — then you need to get your ad to us by January 13 to be included in the Special Report. To reserve space in this issue, call Don Fagan, Vice President Sales/Marketing; Ed Marecki, National Sales Director, or Kathy Doyle, Marketing Support Manager at (617) 879-0700. Or, call one of the sales offices listed below:

COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

SALES OFFICES

BOSTON/Chris Lee, Jayne Donovan, Michael Kelleher, Ron Mastro, Jim McClure, Alice Longley, *(617) 879-0700*
CHICAGO/Art Kossack, Chris Lee, Jean Broderick, *(312) 827-4433*
NEW YORK/Mike Masters, Doug Cheney, Ray Corbin, Joan Daly, Fred LoSapio, Gale M. Paterno, *(201) 967-1350*
ATLANTA/Jeffrey Melnick, Mike Masters, *(404) 394-0758*
SAN FRANCISCO/Bill Healey, Ernie Chamberlain, Theodora Franson, A.G. Germano, Barry Millione, Nicole Boothman (recruitment), *(415) 421-7330*
LOS ANGELES/Barnie Hockswender, Bob Hubbard, Bill Healey, *(714) 261-1230*

COMPUTER MATCHING

(Continued from Page 90)

interest and oversight — concerns shared even by some advocates of computer matching.

"It's almost a runaway train," Shattuck said. "There are virtually no restrictions on its use. The OMB has not disapproved a single use of computer matching. It's my feeling that they haven't even reviewed most of them because there is so little organized opposition to it. Until the OMB begins to exercise regulatory authority over this, there is a tacit invitation for agencies to define as legitimate all uses of computer matching."

Because the technology behind computer matching has "mushroomed," according to NYCLU's Rollins, utilization of the techniques has outstripped government policies and individual protections. Without the creation of some sort of national computer matching oversight agency, individual privacy may face extinction, Rollins said.

"A few years ago, people were up in arms about a proposed central federal data bank. But we don't need it anymore. The central data bank may not exist physically, but the way computers can now share information, it's already in place. It's time we step back and make some rational decisions. If computer matching continues on this course, it may be too late in a couple of years," Rollins said.

Those privacy concerns have even prompted some advocates to admit that legislative action is overdue. According to former Inspector General McBride, the issue of computer matching will become a major legislative topic in the next few years. "I think government officials and taxpayers have strong concerns in making efficient use of benefit programs. But there is a need to balance that with privacy concerns. I'm confident that the large majority of congressmen represent a constituency that is concerned with both."

Whether that privacy constituency will arise is far from certain. "I don't see any evidence of legislative concern," Smith said. "It's very hard for people in political life to oppose computer matching, because it's touted as cutting fraud and waste."

Plesser added, "I wish it was true. But it won't happen. I'm not convinced that anyone — with very few exceptions — is interested in computer matching in either the Senate or the House."

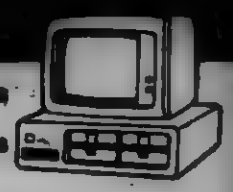
According to HHS' Kusserow, the future does hold promise for legislative action, but in a far different sense. "There has been a lot of improvement in the way we use computer matching. We're trying to move these techniques to the front end, to pick up exceptions before they go into the data bank. We've made the process far less intrusive, or Congress would already have taken action against it. What you will see, though, is a legislative mandate to do more computer matching, to undertake some of these state-initiated programs on the federal level."

In Kusserow's view, the future of computer matching rests on efficiency rather than privacy. During his term there, the Computer Matching Project targeted its newsletter toward program administrators, offering tips on the use of computer-matching techniques, case histories and cost/benefit analyses of the programs. Kusserow emphasized that each computer-matching project must be "tested and refined in order to reduce the number of people who are intruded upon.

"No one questions my authority to audit the records of my agency," Kusserow added. "I'm mandated by Congress to do that. Because com-

(Continued on Page 94)

ON SITE MAINTENANCE SERVICE



- Maintenance contract prices up to 50% less than manufacturer's rates
- Fast response time — over 100 field technicians
- Most brands of equipment serviced
- On-site user training programs available

CALL FOR BROCHURE & PRICE LIST

LEWIS BUSINESS MACHINE SERVICE COMPANY
251 Park Avenue South, New York, N.Y. 10010
New York (212) 477-1666 • New Jersey, Connecticut, Massachusetts (800) 421-6782

Who's sold more printers to American business?

Epson.

Actually, we've not only sold more printers to American business, we've sold more printers to America.

Which brings up some very important reasons why Epson is the printer for *your* business.

Standard equipment.
Virtually every microcomputer made is Epson-compatible. Which means manufacturers make their computers to work with our printers, because Epson printers are not only the world leaders, they're the world standard.

The reason why.
We sell more printers, because we make better printers. Our features are consistently one step ahead of the competition. Our quality and value have never been equalled. And our reliability rates are second to none.

Another reason.
Epson printers are stocked by more computer stores in more places than any other brand. Which means if you *ever* have a problem — and you probably won't — we'll be there.

Your next printer.
It can be very confusing buying a printer nowadays. But it needn't be. If you want the features, the reliability, the quality, the value, just remember one thing.

Epson.

Number one.
And built like it.

EPSON
EPSON AMERICA, INC.
3415 Kashiwa Street
Torrance, California 90505

The Epson FX-100™ can print spreadsheets in correspondence-quality type at 160 characters per second. To see it and the entire line of Epson high-performance printers, call (800) 421-5426 for the dealer in your area. In California, call (213) 539-9140.

Epson is a registered trademark and FX-100 is a trademark of Epson America, Inc.

COMPUTER MATCHING: AN ETHICAL EXCHANGE?

Privacy Advocates Assail 'Rogues' Gallery'

It would be difficult to find a federal department or agency that does not employ computer matching in some form. But it is individual states, most notably New York, which in many respects pioneered computer matching, initiating programs that have been or will be imitated on the national level.

During hearings on computer matching held last year by the Senate Government Management Oversight Subcommittee, the panel's chairman, Sen. William Cohen (R-Maine), estimated that federal agencies had implemented more than 85 matching programs and state agencies some 170. As far as privacy advocates are concerned, the following is a rogues' gallery of some of those computer matches:

● The Internal Revenue Service (IRS) is moving forward with its plan to begin matching its computerized files against commercially available lists of names, addresses and incomes of U.S. citizens in an attempt to identify people who fail to file tax returns. Planning to test the program early in 1984 in six of its 60 district offices, the agency is currently seeking bids for lists from private firms that estimate income from such sources as U.S. Bureau of the Census data, vehicle registration files and property assessment records. The IRS hopes the test will show the match can produce enough names of tax nonfilers to justify the costs [CW, Sept. 5, 1983].

● The Selective Service System began in 1982 to match its records against computerized Social Security Administration files for the names and addresses of American men who had failed to register for the draft. According to a spokeswoman, the agency hoped to track down the approximately 500,000 young men that Selective Service estimates did not register [CW, May 17, 1982].

Once the U.S. Departments of Defense and Transportation had reviewed the results of the match to winnow out those already serving in the U.S. Coast Guard and the military, the narrowed lists were forwarded to the IRS for another match to find current addresses for the nonregistrants. In a recent interview with Computer-

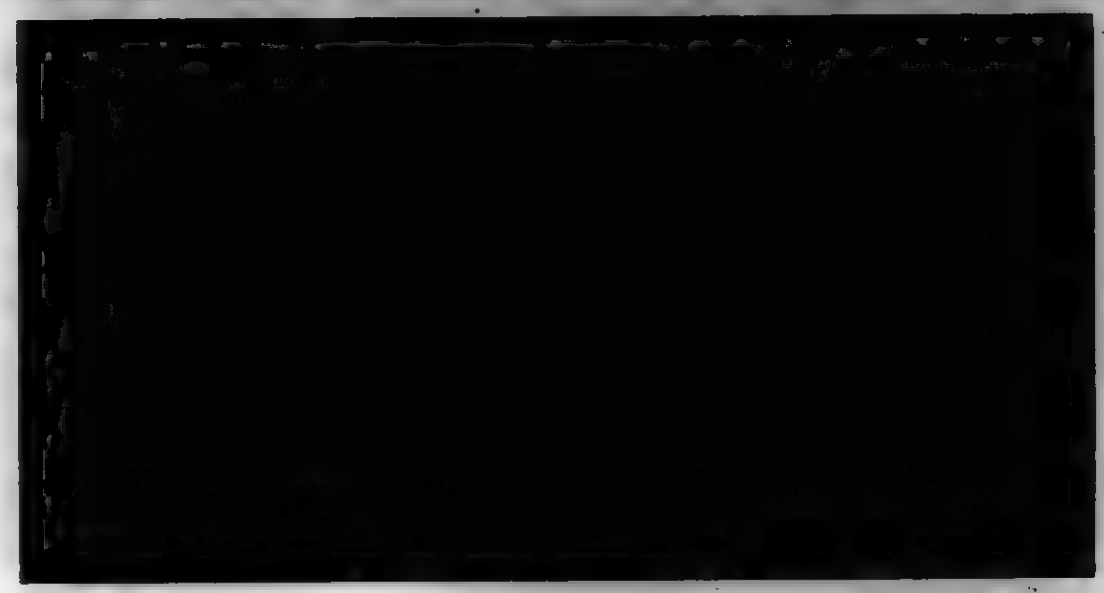
'1984' Seen Milestone

(Continued from Page 99)

puter matching only picks out exceptions, it is far more limiting than a general audit. I don't have to review 35 million records. I only need to look at the exceptions. In addition, I don't need any authorization to perform a standard audit, but I need approval for a computer match. That's added protection."

It remains to be seen whether 1984 provides the symbolic focus that crystallizes opposition to the indiscriminate use of computer matching. But Shattuck will be watching. "We are confronted with legal protections that haven't come up to date with the technology. I'm guardedly optimistic that Congress, the courts and the states will understand that they must take a hard look at this technology and its use. I'm hopeful; I can say that at least."

PRESENTING LEAR SIEGLER'S AMERICAN DREAM MACHINES: THREE NEW HIGH TOUCH™ TERMINALS.



Have you noticed that the more high technology we put into the workplace, the more human touches the workers put in? There's a real need to soften the interface between people and high technology.

That's why we designed our new High Touch™ terminals to work together with biology, not just with technology.

Our new generation of High Touch terminals brings an elegant new touch to our American Dream Machine (ADM™) tradition. The family features three new ergonomic terminals designed to meet the needs of OEMs and end users alike: The ADM 11, ADM 12 and ADM 24E.

6' coiled cable lets you put the keyboard anywhere.

There is more to ergonomics than simply tacking on a few faddish features as an afterthought. That's why we put our thinking in up front. And came up with a whole new way for terminals to relate to humans.

No aspect of terminal design escaped our deepest consideration. Or reconsideration. Dozens of little touches add up to the convenience and comfort of High Touch. For example, we put the power "on/off" switch and contrast control knob in front where they're easy to reach.

The monitor not only tilts and swivels, it stops positively in almost any position.

The clean, crisp display features a large character matrix on an easy-to-read green or amber non-glare screen—made even easier to read by the hooded bezel. Screens are available in 12" or 14" sizes.

Our uncluttered keyboard, with its logical separations between key groupings, improves your efficiency. The low-profile, DIN-standard keyboard is not only tapered, its angle of tilt is easily adjusted for maximum operator comfort.

Low profile DIN-standard keyboard with adjustable tilt.

The Selectric® layout with its sculptured keys makes data entry easy and efficient. And we placed the *control* and *escape* keys close to the alphanumeric keys, where people just naturally expect to find them.

The ADM 11 is a High Touch conversational terminal that accepts data continuously at 19.2 kilobauds. It features separate cursor control keys logically arranged in a cross for ease of use. Four modes are provided for the printer interface: page print,

Distributor Sales & Service: Boston (617) 458-0626 • Chicago (312) 279-7710 • Houston (713) 780-0440 • Los Angeles (714) 774-1000, Ext. 219 • Philadelphia (215) 265-6000 • San Francisco (415) 828-6041 • England (04867) 80666 • From the states of CT, DE, MA, MD, NJ, NY, RI, VA and WV (800) 523-5253. OEM Sales: Chicago (312) 279-6260 • Houston (713) 780-2585 • Los Angeles (714) 774-1000, Ext. 382 • New York (516) 549-6941 • San Francisco (415) 828-6041 • England (04867) 80666. Selectric® is a trademark of IBM. ADM,™ High Touch™ and Express Depot™ are trademarks of Lear Siegler, Inc.

COMPUTER MATCHING: AN ETHICAL EXCHANGE?

Of Agencies Employing Computer Matching

world, a spokeswoman for Selective Service said the agency has discontinued the use of Social Security data and now relies mainly on driver's license records obtained through individual contracts with state motor vehicle divisions.

● One of the most controversial of the computer matching projects to date is Massachusett's Bank Match Project. The commonwealth's Department of Public Welfare submits computer tapes bearing the Social Security numbers of all welfare recipients to more than 100 banks in an effort to snare recipients who have more money in their bank accounts than allowed by law. As of September, almost 1,200 of the 1,239 recipients whose benefits were initially terminated remained off the welfare rolls. The agency estimates that Bank Match has saved Massachusetts $6 million to date.

● Selective Service said it is only waiting input from the U.S. Department of Health and Human Services before it implements a program to compare periodically its computerized draft registration records against lists of absent fathers with child-support obligations. [CW, Oct. 24, 1983]. The Selective Service maintains information on some 11 million men between the ages of 18 and 23 who have filed with the agency since draft registration was reinstated in 1980.

● New York's Wage Reporting System is a quarterly computer match of public assistance and unemployment records against information on the reported earnings of the state's 8 million workers. State Department of Taxation and Finance wage data is compared with lists of public assistance recipients and unemployment insurance claimants submitted by the Social Services and Labor Departments. Matches are returned to those departments to be investigated.

In the Wage Reporting System's February 1982 annual report, the Commissioners of Social Services, Labor and Taxation claimed that the program had saved $23.7 million in public assistance payments and $14.5 million in unemployment insurance. Those figures were disputed by the New York Civil Liberties Union, which claimed that many of the costs of the program had not been taken into account.

● Implemented last year, the IRS' Offset Program is aimed at withholding tax returns to individuals delinquent in child-support payments. Using a consolidated list of those persons provided by the Department of Health and Human Services, the IRS runs a computer match against its master files and offsets individual tax returns by the amount of child support owed. In 1982, the IRS withheld $174 million as a result of 279,000 such offsets.

● In December 1982, the federal government announced it would begin garnishing the wages and pensions of almost 47,000 government and military employees and retirees unless they agreed to repay close to $68 million in delinquent student loans. The wage garnishment program was the result of a computer match of nearly 10 million government employee records against a list of student loan defaulters.

Programmable Function Keys	4 (shiftable to 8)	16 (shiftable to 32)	16 (shiftable to 32)
Non-Volatile Function Keys	Optional	Standard	Standard
Function Key Legends at Bottom Line	Plain Text	Plain Text	Standard Non-Volatile
No. of Pages of Display Memory	1	2	2 or 4
Display Memory Configurations (Plus 25th message/status line)	24 lines by 80 characters	(2) 24x80 or (1) 48x80 or (1) 24x158	User-Definable up to 96x80
Scrolling	Standard Scrolling	Smooth, Jump or Horizontal Scrolling Split Screen	Smooth or Jump Scroll Split Screen
Transmission Mode	Conversation Mode	Conversation or Block Mode	Conversation or Block Mode
Editing	Limited	Full Editing & Protected Fields	Full Editing & Protected Fields
Visual Attributes: Reduced Intensity, Blink, Blank and Reverse Video. Underline also on ADM 12 and ADM 24E	3 Embedded 1 Non-Embedded	5 Embedded or Non-Embedded, plus Full Screen Reverse Video	6 Embedded or Non-Embedded, plus Full Screen Reverse Video and Highlight
OEM Flexibility	Modifiable Set-Up Characteristics	Modifiable Set-Up Characteristics & Personality	Modifiable Set-Up Characteristics. Add to Program in ROM or Down-Line Load in RAM (56K ROM or RAM. Plus up to 22K Display Available) Room for add'l Logic Boards.

line print, transparent print, and display and print. There are four programmable function keys (shiftable to eight). And two levels of setup mode to reduce errors while still giving the operator maximum flexibility.

For a High Touch terminal with editing and more, choose the ADM 12. It features five non-embedded attributes. Embedded mode can also be selected for existing applications. And 16 programmable non-volatile function keys (shiftable to 32). The display memory can be configured as two 24 x 80 character pages, or one 48 x 80 page, or one 24 x 158 page. The terminal runs in either conversational or block mode.

Or choose our top-of-the-line ADM 24E which features a moveable 24-line window you can use to look at 48 (or 96) lines of memory. The ADM 24E also offers plenty of additional space for OEMs, with up to 56K ROM or RAM available for add-on programs. Plus up to 22k display RAM.

When it comes to terminal technology, we're the historic leader with the largest installed base. Our terminals are used in more computer-based systems than any other.

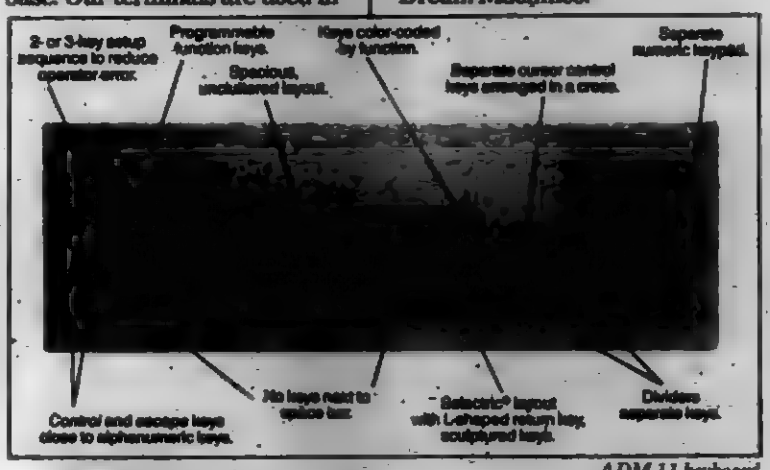
When you buy Lear Siegler, you're buying proven quality and reliability, backed by the broadest network of full service centers anywhere. That means you can get walk-in Express Depot™

Monitor tilts and swivels to almost any position. Available with 12 or 14 inch screen.

service, on-site service and extended warranty service in 3,000 cities nationwide.

Lear Siegler High Touch terminals are made in America—designed, engineered, manufactured and shipped from Anaheim, California to provide you with the best local support.

And that's just one more reason they're called the American Dream Machines.



ADM 11 keyboard.

LEAR SIEGLER, INC.
DATA PRODUCTS DIVISION
901 East Ball Road, Anaheim, CA 92805 · 714-774-1010

EVERYBODY MAKES TERMINALS. ONLY WE MAKE LEAR SIEGLERS.

Call Lear Siegler at 800/532-7373 for an authorized distributor near you: Advanced Technology • Commercial Resources • The Datastore • Data Systems Marketing • David Jamaison Carlyle, Inc. • Digital Source, Inc. • Dytec/South • Gentry Associates • Hall-Mark Electronics • Inland Associates • Kierulff Electronics • MAC-COM Alamtron, Inc. • Marva Data Services • M.T.I. • National Computer Communications • Pioneer (Standard, Harvey, Gaithersburg) • 3M Corp • Wyle Electronics

ELECTION '84

Butting Heads Over Industrial Policy

By Jake Kirchner

Election year 1984 opens with campaigns for the White House and for congressional seats already in full swing. In every national election, the economy in general — and jobs in particular — is a major point of contention between the Democrats and Republicans.

This year will be no different, even with the recovery advancing on almost every front. This is primarily a legacy of the painful recession that has accompanied much of the Reagan presidency.

In 1984's campaigns, the Democrats will claim that Reagan policies have been disastrous for the working man and point to the persistent high levels of unemployment over the last several years, levels that not even the recovery has brought down any significant degree. The Republicans, on the other hand, will point with much pride and self-congratulation to the economic turnaround that began in mid-1983. They will advance the argument that all is well again with the economy, that the recession was an unfortunate, but perhaps necessary, dose of medicine to get the country on a long-term healthy track and that as the economy continues to improve, more industries will rebound and hire more people.

While the candidates mount the stump to point the economic finger of blame at their opposition, they will be mindful that the electorate may well be moved to ask what can be done to ensure that the economy will continue to grow and unemployment continue to decline. The parties' strategies for future economic vitality will be articulated under the heading "industrial policy."

Industrial policy — the general term given to various approaches to what the government should or should not do to promote new industries and protect the old, thus ensuring sufficient employment levels for future generations — will provide the nails that fix the economic plank to the parties' platforms when they are constructed at the national conventions later this year.

With that in mind, the two parties are already developing their respective industrial policies. While industrial policy has been one of the hottest topics in recent national

Jake Kirchner is a Computerworld correspondent based in Washington, D.C.

INDUSTRIAL POLICY

debate among economists, most of the practical application of various and opposing theories has centered in Congress, where the Republican and Democratic variations have already begun to emerge.

General Policy Outline

Although not all politicians have lined up behind one industrial policy approach or another, the general outline of the two parties' thinking can be summarized as follows:

Democrats believe the future economic health of the nation requires a collaboration of government, industry, labor and academia to determine the best method of future development.

Republicans believe the government should reconsider all laws, regulations and policies that have any bearing on the economy and redefine them to create an economic environment that allows industries to grow as much as possible in a generally unfettered free-market economy.

The Democrats describe their approach as a sensible, democratic means of joining all sectors of the economy to chart the most widely beneficial course for the economy. Republicans disdain that idea, scornfully referring to it as a doomed attempt to "pick winners and losers" from among today's industries through government interference, which they claim will be fraught with bureaucratic bungling and pork-barrel politics.

In the words of Treasury Secretary and Republican spokesman Donald T. Regan, the Democrats' approach is "a cure in search of a disease, a nostrum being pushed without evidence as to its efficacy for various misdiagnosed or imagined illnesses." Less diplomatic was Republican Congressman Thomas E. Petrie of Wisconsin, who said the Democrats' ideas are "perilously close to the corporate state of [Benito] Mussolini, the original model of fascism."

This is not to say there are not substantial areas of agreement between the two parties about certain "necessary" components of eco-

Both say high-technology industries — particularly computers, semiconductors, telecommunications and robotics — will be central to the U.S. economy.

Both parties say government policies, tax codes, capital investment regulations and antitrust laws must be structured to promote research and development and investment in plants and equipment. Both seek ways to increase productivity. Both would promote better math and science education and better, more wide-ranging employee job training programs to provide the workers that will be needed in future, high-tech America.

Republicans and Democrats say older industries must be encouraged and helped to modernize, that international trade must be advanced and U.S. industries must be protected from unfair foreign competition.

How, Not What

It is the question of how, not what, that divides the two parties and sets the stage for the election-year economic debate.

An outline of Democratic thinking was developed in November by the House Economic Stabilization Subcommittee of the Committee on Banking, Finance and Urban Affairs. Under the direction of subcommittee Chairman Rep. John J. LaFalce (D-N.Y.), the panel held 30 days of hearings, receiving testimony from more than 125 witnesses. The subcommittee's Democrats then produced a report, "Forging an Industrial Competitiveness Strategy" that will be the basis for industrial policy legislation in the House.

Defining what he called "key structural problems with the economy," LaFalce introduced an industrial policy legislation package, which prominently featured a provision for a Council on Industrial Competitiveness to "coordinate our existing set of industrial policies into a more effective competitive strategy." The council would be set up in the executive branch of the government and consist of high-level government officials and representatives of industry, labor, academia and public-interest groups. It would identify economic trends and problems and recommend economic strategies to the president and Congress.

The legislation also would mandate an Advanced Technology Foundation to promote applied research in the private sector. The most controversial provision in the package is a plan for a Bank for Industrial Competitiveness to channel needed capital into key U.S. industries. This would include monies for the so-called "sunrise industries" — the high-technology sector — and for older industries that must be revitalized to fend off competition from foreign firms with more modern plants and cheaper labor.

An ad hoc task force of Senate Democrats headed by Sen. Edward Kennedy (D-Mass.) shortly thereafter issued its own "Democratic Agenda" for providing future jobs, which embraced many of the same concepts, although the plan said the development bank at this point is only something that should be considered. The Senate Democrats also emphasized programs for promoting trade, worker training, education and R&D.

(Continued on Page 98)

We've made it so easy to build expert systems, all you need is a pair of scissors.

It's true. With TIMM™ (The Intelligent Machine Model), just about anyone can now build a powerful expert system. Quickly. Easily. Without knowing a thing about computers. Just send us the coupon or call, and we'll tell you all about this exciting breakthrough in artificial intelligence. Here are just some of TIMM's features:

- Knowledge engineering embedded in software
- Lets you quickly build prototype systems
- Is "domain-independent"
- Checks for consistency and completeness
- Learns by example, generalizes knowledge

SEND ME THE STORY OF TIMM™

Name _____
Company _____
Title _____
Address _____
City _____
State _____ Zip _____
Telephone _____

Mail to: TIMM, P.O. Box 6770, Santa Barbara, CA 93160-6770
Or call, toll-free, 1-800-235-6788. In California, call (805) 964-7724

The Software Workshop®
Artificial Intelligence Laboratory • General Research Corporation

The Norwegian computer market wants to hear from you.

The Norwegian computer market is expected to grow at an annual rate of 30%. The Scandinavian countries (Norway, Sweden and Denmark) constitute the fourth largest regional market in Western Europe, and according to International Data Corporation, it is a highly developed market.

Reach your potential buyers in this important marketplace with *Computerworld/Norway*. A tabloid newspaper published twice a month, *Computerworld/Norway* reports on the most timely news concerning new products, new software applications, market trends and opportunities. Editorial coverage includes trade shows, foreign markets, education, government, major industries and the implications of computers. *Computerworld/Norway* is circulated to 7,000 DP professionals in end-user related environments.

CW International Marketing Services gives you one-stop advertising service in countries around the computer world. For more information on *Computerworld/Norway* or any of our other foreign publications, just fill out and return the coupon below.

Diane Lo Piccolo, Manager
International Marketing Services
CW COMMUNICATIONS/INC.
375 Cochituate Road, Box 880
Framingham, MA 01701
(617) 879-0700

CW COMMUNICATIONS/INC.
Publishers of Computerworld and other leading computer publications around the world.

Please send me more information on:
☐ Computerworld/Norway ☐ Your other foreign publications

Name _____ Title _____
Company _____
Address _____
City _____ State _____ Zip _____

(Continued from Page 97)

The Republicans are not so well advanced in their industrial policy planning, but much work has been done. For example, a White House Commission on Industrial Competitiveness, headed by Hewlett-Packard Co. President John A. Young, has been looking into R&D, productivity, education, training and foreign threats to U.S. industries.

More recently, House Republicans have formed a 234-member Task Force on High-Technology Initiatives, chaired by Rep. Ed Zschau, a former computer company president and first-term representative from California's Silicon Valley area. The group has already articulated a Republican approach to industrial policy, which the task force says will be backed by legislative agenda for actions "compatible with a consistent and predictable policy of the role of government in relationship to the private sector."

This agenda "will focus on creating an environment in which high tech, new ideas and industrial growth are likely to flourish," the task force said, adding that this "climate for innovation" would include:

- A commitment to basic research.
- Incentives for risk taking by investors and entrepreneurs and an abundant supply of risk capital and a favorable regulatory climate.
- A strong educational capability, particulary in the sciences, providing a well-educated and technically trained work force.
- Expanding foreign and domestic market opportunities.

Battle Lines Drawn

So the lines of battle are drawn.

The Republicans will emphasize the economic turnaround and tout their plans to cement an economic climate that will enhance industrial competitiveness and ensure long-term economic health. A healthy economy, they will argue, will guarantee jobs and prosperity for all Americans.

The Democrats will constantly remind working Americans of the economic ills of the early 1980s. They will portray whatever final strategy they adopt as a concerted effort to ensure a more flexible and equitable economic order that will fend off any future job-killing recessions. They will promise to protect and modernize mainstream manufacturing sectors while providing the climate for explosive, industrywide high-technology growth.

The current unknown in the coming debate on the two parties' plans is, ironically, the economy.

If the recovery of 1983 turns into the boom of 1984 with drastically lowered unemployment, the industrial policy debate may well fall to the Republicans, who will claim the country should not change a successful program.

If the recovery stagnates and unemployment remains high, the Democrats will have a potent argument for their industrial policy agenda, an agenda they will portray as a major change of direction from failed Reaganomics.

Republicans' Policy

As outlined by the Republican Task Force on High Technology Initiatives, a possible Republican industrial policy might include the following:

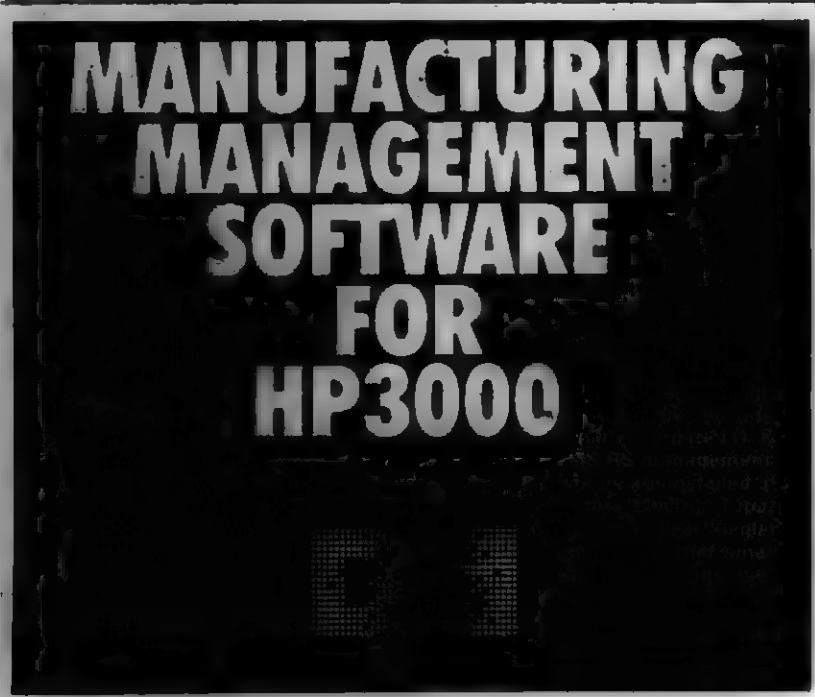
- Increased federal funding of research carried out in universities and laboratories.
- A federal research and development project for advanced computer design.
- Federal promotion of research and development collaboration by U.S. companies, particularly through amended antitrust laws.
- Permanent tax credits for R&D.
- Tax incentives for risk capital investment.
- Tax credits and deductions for corporate contributions of cash and equipment to schools.
- An aggressive federal trade policy aimed at achieving fair and free trade.
- A government fiscal policy aimed at reducing the deficit, strengthening general economic health and encouraging personal savings and investment.

Democrats' Platform

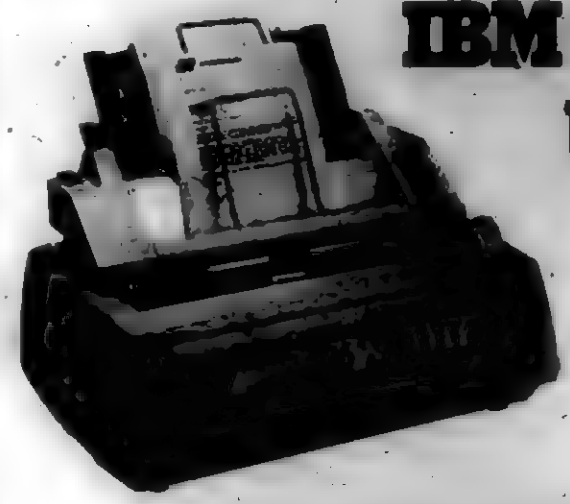
According to Senate and House Democrats, federal actions under their industrial policy plans would include:

- An executive branch council of government, labor, business and public interest group representatives to develop a coordinated industrial policy program and encourage business, labor and government cooperation.
- Federal- and state-level centers to promote university and private-sector research and development.
- Clarified antitrust laws to encourage joint research and development in the private sector.
- Permanent tax credits for R&D.
- Improved investment in plants and equipment through federal support of state development finance agencies and consideration of a national development bank for direct federal financial support for industry.
- Education programs to include upgraded science, math and foreign language studies at all levels and vocational education programs targeted on emerging technologies and directed at disadvantaged youth, displaced homemakers and dislocated workers.
- Promotion of free international trade and government relief for industries that have been hurt by imports.
- Adjustment programs for workers and communities facing changing markets and technologies, including restructured unemployment insurance, improved training systems to help small firms and dislocated workers, community service employment for dislocated workers and adjustment assistance for companies and communities.

MANUFACTURING MANAGEMENT SOFTWARE FOR HP3000



IBM 3270 Users:



Better than IBM 5210, the ISI-736 Printer is available now!

Solid Character, Letter Quality

Plug compatible with the 3287 for on-line printing from your IBM system. Optional Twinfeeder automatically feeds letterheads and second sheets selectively from trays under program control. Ideal for IBM CPU-based word processing software. Multiple fonts and separate pitches. Support most languages. Features include: programmable tray selection, underscoring, boldface type, subscripting and super-scripting. And no need to run SNA to use these features!

Call, write or TWX today!

Interface Systems, Inc.
5855 Interface Drive, Ann Arbor, MI 48103
Telephone (313) 769-5900. TWX 810-223-6058

Election '84

The Automated Platform

By Katherine Hafner

When Tom Hayden was running for the California State Assembly in 1982, he attended countless cocktail parties where his aides made certain to collect the names and addresses of all those in attendance. Shortly after the get-together, people who had been there received a personalized letter from Hayden, "just to stay in touch" and remind them of his stand on various issues.

Hayden won the election by a 10-point margin. His Republican opponent in the race to represent the district of West Los Angeles (population 300,000) has since dropped out of sight, and Hayden's incumbency greatly increases his chances for reelection in 1984.

Hayden's office likes to attribute his sound victory to a combination of traditional grass roots campaigning, replete with sore feet and no end of hand-shaking, and a thorough exploitation of the advantage that can be gained with the use of a computer.

The Hayden campaign included personalized, albeit computer-generated, letters from Henry Fonda and Robert F. Kennedy Jr. Many of the letters were part of mass mailings, while others mentioned information gleaned from cocktail parties and opinion polls pertaining specifically to each reader.

"We generated 1.7 million pieces of direct mail," said Stephen Rivers, Hayden's administrative assistant. "Some were brochures, some were

(Continued on Page 100)

Katherine Hafner is a Computerworld staff writer.

ILLUSTRATION BY: MICHAEL MYER

(Continued from Page 99)

personalized letters. You determine whom you want to write to and the message you want to convey, and they are individually typed.

"Tom walked precincts every day, he met hundreds of voters and put information about their concerns into the computer for follow-up letters and phone calls," Rivera said. "Everyone he met would get input to our in-house computer and would get a personal letter."

Hayden's mode of operation is being duplicated by political candidates across the country, who are gearing up for the 1984 elections with the use of computer systems large and small, in-house or via outside direct-mail services.

Computers are being used for unprecedented precision in the identification and typecasting of voters. Census and other demographic data is used to figure out geographic areas for a candidate to concentrate on, and computers are used to gather and retain voluminous data about individual voters. Like Hayden's campaign in California, a candidate will start with a list of voters in a district, add as much information as possible about each person and then reach that person by using that information.

Heated Battle

Perhaps most heated of all is the battle between the Republican and Democratic National Committees, whose respective data processing systems generate thousands of direct-mail letters each week.

The Republican National Committee, which invested in its computer system as early as 1975, is far ahead of the Democrats with respect to the amount of computerized resources available to it. It holds a 7:1 advantage over the Democrats in the amount of direct mail it is able to generate and the number of donors and potential donors residing on the committee's data base.

The Republican National Committee also uses its system for sophisticated intracampaigning communications via internal electronic mail, automatic telephoning and ready-made press releases and proposed speeches for nonincumbents around the country.

When the Republicans first listed their donors on a Digital Equipment Corp. Decsystem 2060 with 5M bytes of memory in 1975, they started with about 25,000 names. By the 1982 election, that number had risen to 1.5 million, compared with the Democrats' base of 300,000 names residing on an IBM System/38 mainframe the committee purchased last March.

"We started a lot later than our opposiion, and we're funded at a much lower level," conceded Ed Mills, management information systems director for the Democratic National Committee. "But I think we're closing the 7:1 ratio. We won't achieve parity by 1984, but we will close the gap. It's a long process."

The use of computers in elections has increased dramatically over the past few years, affecting every aspect of the political arena. In 1984, compared with two years ago, the number of state and local candidates using microcomputers to bolster their campaign strategies is likely to triple. For less than $10,000, a candidate can maintain some 200,000 names. And the 1984 presidential election is certain to pivot around the almighty megabyte more than ever before.

While it used to be a question of how many votes a candidate could buy for his dollar, the question now is how much computing power can be purchased. For instance, for the $12 million a political action committee pumps into a direct-mail drive, only $2 million is generally made to give to candidates.

Long-Term Implications

While there is little doubt that the introduction of computers into the electoral process is changing the face of elections in America, at issue are the long-term social implications for computers in politics.

"I'm certainly aware that the strategists want to balance the scales," commented Marc Rotenberg of the Public Interest Computer Association in Washington, D.C. "But if you're taking a step back and examining computers in the political process, you have to go back to some fundamental questions.

"There have always been situations where one party has power over the other," Rotenberg said. "The question you have to ask is what the new technology brings to the circumstances. We have increasingly refined data about people's life-styles, incomes and membership associations. The level of information is carried much further than would have been possible in the past. We have begun in a sophisticated way to turn a political body into a commercial market."

A candidate's principal concern, Rotenberg said, is often with swing districts, where different types of people are examined together with pertinent factors such as their income and employment levels. If unemployment, for instance, is very high in a district, a candidate will stress new jobs.

"These things aren't new," Rotenberg said. "The question is what the computers do to that situation. The computer is a very powerful tool. For people who feel it wasn't the intention of our political system, it might be cause for concern. With technology, there's a point where a quantitative difference makes a qualitative difference.

"The extent to which computers are helping or hindering is difficult to judge," Rotenberg said. "Many politicians are more concerned with evening the game than the long-term perspective."

Behind every elaborate computer system, of course, is a lot of money — $1.5 million in the case of the Republicans and their mainframe. A hefty war chest invested in sophisticated technology can often, if not always, be a pivotal factor.

In the 1982 New York gubernatorial race between Mario Cuomo and Lew Lehrman, for instance, Lehrman spent some $6 million on his campaign. Lagging behind Cuomo in the polls, he sent letters to completely different constituents, custom-tailored to each group's different concerns. Lehrman lost the election, but his last-ditch effort helped him narrow the gap considerably.

There are other, more subtle effects that the technological age can have on the electoral process.

Apropos the connotations that *1984* has carried ever since George Orwell wrote his ominous book by that title four decades ago, computers in the next election have introduced an element of paranoia into the voting procedure itself.

"If you felt that in general your political ideas were somehow being observed and correlated, you might change your patterns and possibly even your political opinions in order not to come under the heading of subversive," warned Michael Goldhaber, director of technology projects at the Institute for Policy Studies in Washington, D.C. "So you might feel that what you did in the voting booth was an extension of that."

Along with others, Goldhaber is concerned that the relative newness of such a rapidly changing technology makes it difficult for people to understand and work with computers, thus making the possibilities for new forms of manipulation a real danger.

Big Brother

"Obviously, before computers were around, there were other means of intimidation," Goldhaber said. "But it's not so much what computers can do, but that they are sensed as Big Brother. In the voting booth, you're never quite sure how secret the ballot is at this point. Uses of all sorts of procedures and polling can alter and manipulate the public mood."

According to Christopher Arterton, an associate professor of political science at Yale University, there are positive aspects to the presence of computers in the political process. "Instruments of communications have been so blunt in the past that candidates haven't been able to talk very specifically about issues they stand for," Arterton said. "Now candidates will be much more specific about programs they stand for and will speak to issues they know audiences will be interested in. That is, they will speak in detail about x and y without necessarily having x and y be contradictory."

Said political analyst Goldhaber: "I see the great challenge is to find ways to use new technologies to promote some sort of common human feeling, to maintain the sense that we're all part of the same community at bottom. In my view, that's the heart of any effort to have a democracy."

INTRODUCING
A LOOK INTO
THE FUTURE

ESP/JSS — the new Execution Scheduling Processor. Now from Sterling Software Marketing.
Here is the most versatile time-dependent job scheduling system yet . . . NOW you can have reliable predictions of system downtime effect on job scheduling. NOW you can specify schedules using different time zones. NOW you can specify simple and complex scheduling criteria with intervals ranging from 0.01 minute to years, decades — even a century. NOW you can change initiator classes at different times during the week and activate special over-night or weekend classes automatically . . . NOW you can have all of this and more with ESP/JSS.

For a free on-site evaluation, without obligation, call TOLL FREE 800-824-8512. California, Alaska, Hawaii, or Canada call collect 916-441-7234. Ask for ext. 41.

STERLING SOFTWARE MARKETING
Formerly Software Module Marketing

Crocker Bank Building/Penthouse
1007 Seventh Street
Sacramento, CA 95814

Third-Generation PBXs

ILLUSTRATION BY: PEDRO ROMAN

Making the Right Choice

By Katherine Hafner

As private branch exchange technology floods the marketplace, the lines between successive generations are less distinct than ever before.

Before 1975, all PBXs were considered first generation — voice-only, with manual switching via a console operator. When Rolm Corp. and Northern Telecom, Inc. introduced their digital PBX systems, the second generation came and brought about a revolution.

Although second-generation PBXs were designed to carry voice only, they have since been modified to allow for data. But enhancing a voice-only PBX to carry data proved expensive and inadequate.

Thus, in 1980, the third-generation PBX was born, along with the concept of introducing the computer into the switching system itself. Designed to carry both voice and data, third-generation PBXs feature T-1 interface capabilities, remote switching units and nonblocking architecture.

Nonblocking capabilities can be of paramount importance when installing a voice-data PBX. Because voice conversations are generally short, in a voice-only system it is usually unnecessary to include enough talking paths to accommodate each pair of ports. Third-generation PBXs are "nonblocked," meaning they can handle the traffic load when all ports are busy.

As opposed to a blocking mode, where data transmitted carries a one-in-500 chance of blocking, nonblocking architecture carries a one-in-a-million chance of blockage. In addition, nonblocking architecture handles high-speed and low-speed data, voice and video, all in a nonblocking mode at relatively low cost.

Perhaps the most distinctive characteristic of the third-generation PBX is the fact that data-switching capabilities are not retrofitted on the system.

(Continued on Page 104)

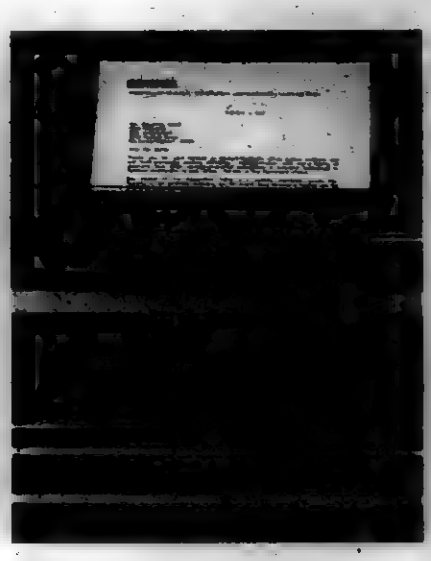
Katherine Hafner is a Computerworld staff writer.

The Intera
Now it takes even less

A simple menu offers a range of options. With a few keystrokes, the user can pick an application and get straight to work.

New desk management software makes it easy for busy executives to handle electronic mail, calendar functions, filing and memos.

New three-in-one workstation combines word processing, graphics and data entry capabilities in a single terminal. It also has character sets for eleven national languages.



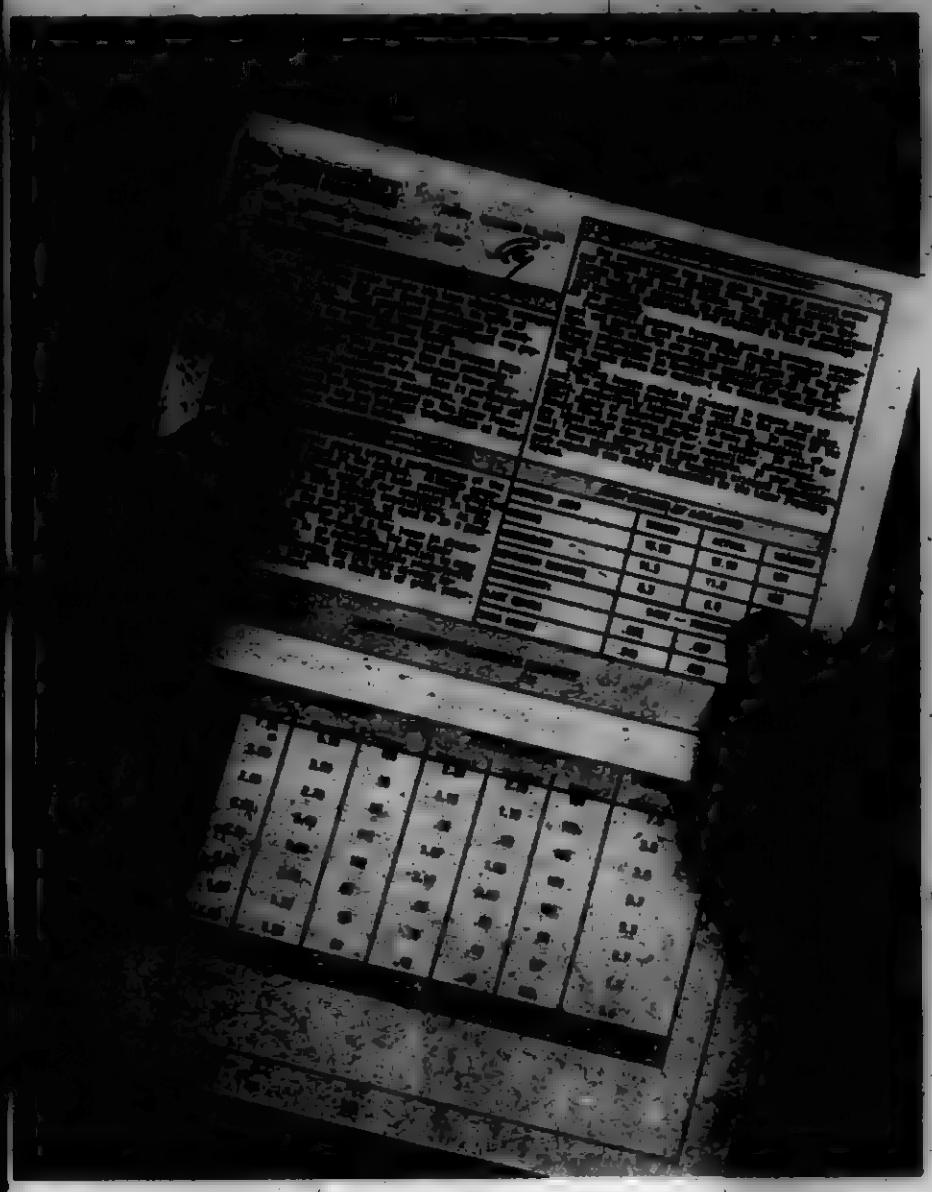
High-quality printing for business correspondence or reports is the function of this letter-quality printer.

Graphics created on this color terminal can be filed or plotted on paper or transparencies.

Innovative new touch screen control makes this manager's workstation simple to learn and to use.

An Office Systems Support Team is available for each customer, dedicated to on-site consulting, training and implementation assistance.

ctive Office.
work to do more work.



New laser printers provide fast text and grapic reproduction in quiet, low-cost, desk-top models. Up to 32 character fonts can be selected, forms stored and page sizes reduced.

Reports and summaries can be ready in a matter of minutes, using personal or company data bases. Without any programming.

Powerful, easy-to-use workstations that communicate. That's the key to increasing productivity in The Interactive Office.

Now executives can stay on top of their crowded agendas with calendar functions that help to sort priorities and avoid scheduling conflicts. With electronic mail to send memos and reports instantly around the office or the world.

We're giving managers the personal computing power they need, with connections to the company system for accessing and sharing data. And our word processors and graphics capabilities let support staffs put together impressive presentations and documents easily, even merging text and graphics.

Since The Interactive Office is built around the powerful HP 3000, data processing jobs, order entry and accounting become an integral part of the overall plan.

If you'd like to see your company do more work more easily, call your local Hewlett-Packard sales office. Or write for our brochure, "The Interactive Office," to John Metcalfe at Hewlett-Packard, Dept. 03188, 19447 Pruneridge Avenue, Cupertino, CA 95014. In Europe, contact Henk van Lammeren, Hewlett-Packard Nederland B.V., Dept. 03188, P.O. Box 529, 1180 AM Amstelveen, The Netherlands.

We'll show you why the most productive office is an Interactive Office.

HEWLETT PACKARD

VAX USERS!
NOW GET SPREADSHEET
AND GRAPHICS IN ONE PACKAGE.
• Full business graphics • Advanced features • Affordable price
GRAPHIC OUTLOOK™
from STONE MOUNTAIN COMPUTING
1086 Cambridge Dr.
Santa Barbara, CA 93111 (805) 964-9101
VAX is a trademark of Digital Equipment Corporation

THIRD-GENERATION PBXs

(Continued from Page 101)

"That's an important consideration," commented George Colony, president of Forrester Research, Inc., a Cambridge, Mass., consulting firm. "If you're going to have 10% to 20% of your handsets attached to terminals requiring large blocks of information moving through a PBX, you'll need a fast internal matrix and a high bandwidth matrix."

Starting with Intecom, Inc. and the introduction of its IBX in 1980 [CW, July 19, 1982], third-generation PBXs have inundated the market in the past two years: AT&T with its System/85; Mitel Corp. with the SX-2000 (to be installed in the third quarter of 1984); and Siemens Communications Systems, Inc. with the Saturn II and Saturn III, to name a few.

And just as users have familiarized themselves with the various third-generation PBXs available on the market in 1983, yet another advance in technology is sneaking up on them: so-called fourth-generation PBXs.

Depending on which side of the debate you choose to tune into, a fourth-generation PBX can assume two different guises: it can be a souped-up version of a third-generation PBX and labeled fourth generation for the sake of advertising hype; or a fourth-generation PBX can be viewed as a legitimate term for a brand new product, which is local-area-network-based, with simultaneous voice and data capabilities.

Specifically, Ztel, Inc., with its Private Network Exchange (PNX) [CW, April 25, 1983] and CXC Corp. with its Rose, have announced systems that are said to combine the voice capabilities of a PBX with the short, bursty data traffic characteristic of a local-area network.

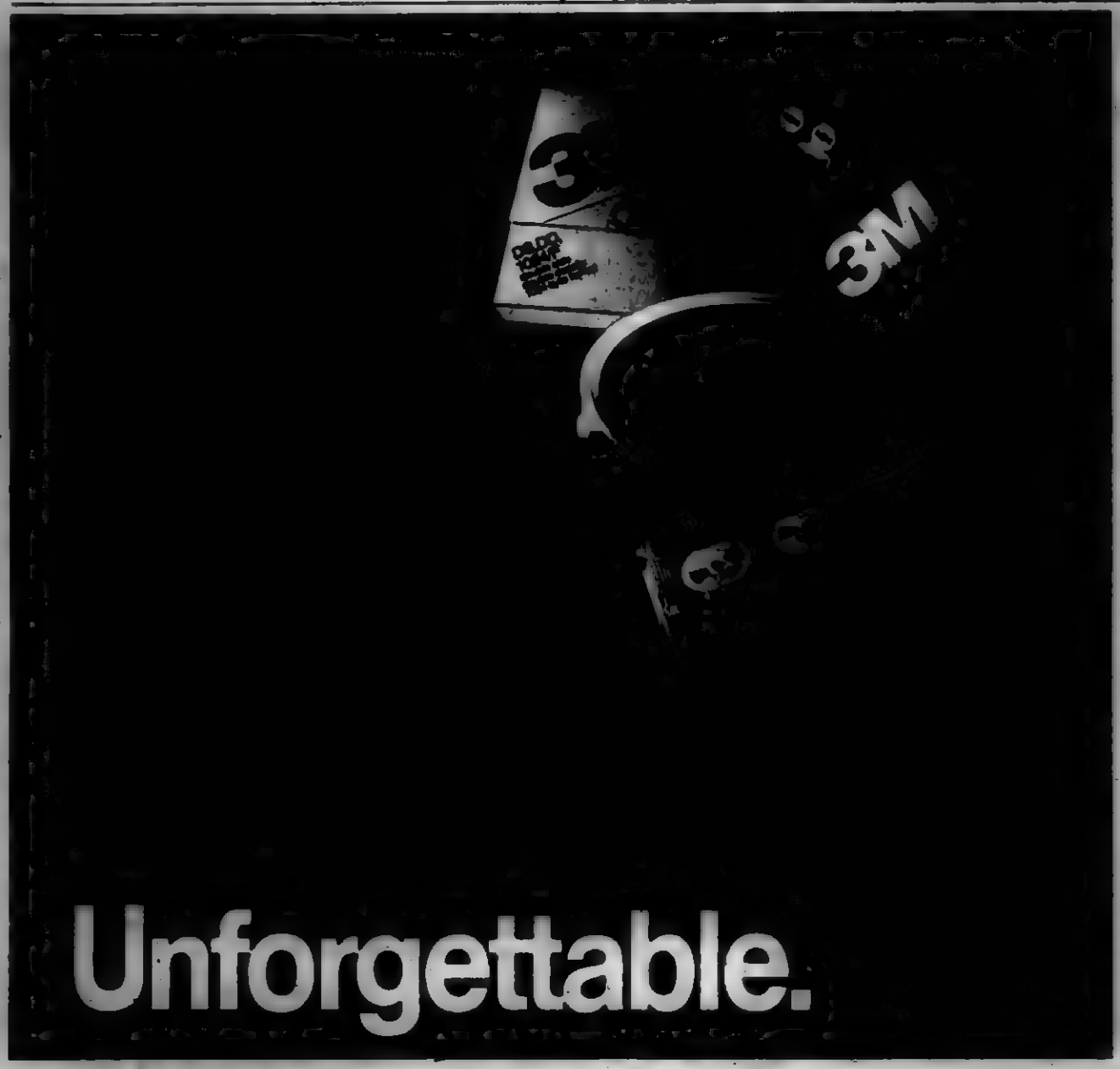
Whatever you choose to call the newest breed of PBX, it has sparked a brand new debate among communications soothsayers: Will the PBX eventually take hold as the most cost-effective and efficient method for short-haul communications, thus obviating the need for local-area networks?

Two Will Cohabit

The overriding opinion of many industry analysts is that the two technologies will cohabit.

"It appears that the industry is recognizing that the natural hub of any office will probably be a PBX," commented Alan Frost of the Eastern Management Group. "That's not saying local-area networks won't find a place. They will still be important for high data requirements and host-to-host exchange. But for routine office automation, the PBX will definitely step in."

"My feeling is the PBX will coexist with the local-area network, with the [local-area network] working as a connection for professional computers and handling the high-capacity functions, moving large documents or handling batch transfers to a nonimpact printer," Colony offered. "I suspect the IBM [local-area network] will coexist very nicely with the Rolm CBX. That will be the first elegantly planned interface between the [local-area network] and the PBX



If it's worth remembering, it's worth 3M data recording products.

3M computer media products remember everything, every time. Their reputation for reliability is backed up by something very rare in the magnetic media industry: over thirty years of manufacturing experience. That experience, plus the fact that 3M controls the entire manufacturing process, assures that the same high quality is built into every computer media product we make. So you can have complete confidence in every 3M data cartridge, diskette, and roll of computer tape you buy.

Insist on the best for all your DP needs. Insist on information processing products from 3M. Inventor of the data cartridge and the world's largest manufacturer of flexible magnetic media for the home, office and computer room.

Look in the Yellow Pages under computer supplies and parts for the 3M distributor nearest you. In Canada, write 3M Canada, Inc., London, Ontario. If it's worth remembering, it's worth 3M data recording products.

3M hears you...

3M

itself. They might even be sold together as a package."

As users remain wary of local-area networks, "mostly because of the tremendous wiring commitment," Colony said, "the user still understands that that kind of function is mandated within the company. Since the building is already wired for telephones, the first type of [local-area network] will be a PBX."

According to Colony, as the cost of communications lines diminishes between 10% and 15%, "it will be difficult for PBX vendors to make money just selling the PBX support," and future profits will lie in PBX applications.

Colony pointed to the significance of IBM's recent acquisition of 15% of Rolm in setting the pace for the future PBX market. "IBM is going to be a major new market dynamic in 1984," Colony said. "You're going to see Rolm distributing IBM products like the local-area network and personal computers. And you're going to see IBM distributing Rolm's CBX II. In fact, the Rolm CBX will perhaps become the prime market factor in 1984 because of its connection to IBM."

Strong Focus on Data

According to Colony, the major problem with next-generation PBXs is their strong focus on data. If a PBX is dedicated to data, the system's ability to handle voice can be greatly reduced, Colony cautioned.

"That's something the CXCs and Ztels have to watch out for," Colony said. "Because if you look at even 1987, in Fortune 1,000 companies with a third- or fourth-generation PBX, 75% of the capacity of the switch will still be going to plain old interactive voice. The mood is, 'Sure, give me the special features, but you've got to promise me we'll never lose a conversation.'"

For the data and telecommunications manager who has been given the responsibility for deciding which of these advanced switching systems to buy, the choices can be extremely confusing, especially when augmented with a healthy dose of marketing hyperbole and a plethora of vendors to choose from. (In 1978 there were six digital PBX manufacturers; today there are 20.)

'Shrewd Marketers'

"Systems are being sold by vendors who have solutions looking for problems," commented Edward Horrell, president of Mitchell & Horrell, Inc., a consulting firm in Memphis, Tenn.

"These guys are shrewd marketers. They all claim to have what you want: low cost, the technology, experience and delivery dates. That's all well and good, but you have to identify your specific needs. It is very important to document a three- to five-year communications plan. You must identify what you want to do and where you want to be and how you're going to get there. It sounds obvious and mundane, but it's incredibly important."

Whatever you choose to call the newest breed of PBX, it has sparked a brand new debate among communications soothsayers: Will the PBX eventually take hold as the most cost-effective and efficient method for short-haul communications, thus obviating the need for local-area networks? Many believe the two . . . will cohabit.

According to Horrell, communications managers have traditionally been perceived as "hard dollar specialists," whose purchasing decisions have been based on a comparison of fixed charges with the Bell system.

"Those days are gone now," Horrell said. "Now the [communications] manager goes in and says, 'These are our problems, these are the solutions and this is the cost. Because of that, the telecommunications industry is going to have to wake up soon in order to get up to snuff with the DP people."

"I recently had a parade of vendors come though for two-hour presentations with my client and it's always the last vendor out the door who looks the best. They all look good. The salesman makes them all look good," said James Morgan, principal at J. H. Morgan Consultants in Morristown, N.J.

Morgan suggests that companies in the market for a PBX designate a team of people for evaluating the products.

"In the past, when it was plain old telephone service, the telecommunications manager made the decision.

"The strong trend today is for a variety of people to make the decision. The team should consist of the telecommunications manager, the DP manager, the OA manager and the purchasing manager."

COMMUNICATION NETWORKS '84 offers you 100 solutions to your post-divestiture telecommunication problems.

As telecommunications and data processing managers, your success depends on keeping up to date with changing technologies. At COMMUNICATION NETWORKS you can choose from 100 information-packed sessions designed to help you succeed.

You'll learn how to survive the transition into the competitive telecommunications environment resulting from the AT&T divestiture. You'll discover new applications in Local Networks, Satellite, Bypass/DTS, Public and Private Data Networks, Interconnection, Micro Networking and new management technologies.

COMMUNICATION NETWORKS gives you twelve sessions focusing on "Network Technologies." Thursday, February 2, is "Microcomputer Networking Day," a full day devoted to teaching you how to get more from your PC than just stand-alone applications.

You may even choose to develop specific skills in one of the nine full-day "In-Depth" seminars. "In-Depth" seminars will be held on January 30, one day prior to the official opening of COMMUNICATION NETWORKS.

In just five years, COMMUNICATION NETWORKS has become the leading professional communications conference and exhibit in the nation. And COMMUNICATION NETWORKS '84 promises to be even better than ever—more sessions, more speakers, more exhibitors including American Satellite Co., AT&T Information Systems, COMSAT, Digital Equipment Corp., General DataComm Ind., General Electric Co., Integrated Communication Systems, General Electric Co., Microwave Link Operation, GTE Business Communications Systems, GTE Sprint Communications Corp., Harris Corp., DTS Div., Hewlett-Packard, M/A-COM, Mohawk Data Sciences, Northern Telecom, Inc., Scientific-Atlanta, Inc., Siecor Corp., 3M Business Communication Products, Ungermann-Bass, Inc., Usinet, United Technologies Communications Co. and many more offering the latest in products and services.

The DEC Rainbow 100+ The Rainbow 100+ system will feature 8088A and 8088 microprocessors, a 10 MB Winchester hard disk, a dual floppy diskette with 800 KB capacity and synchronous communications, built-in terminal emulator, printer port and 128 KB of system memory.

As an added plus for CN '84 attendees . . . you'll have a chance to win a DEC Rainbow 100+ Computer System.

COMMUNICATION NETWORKS '84, will take place at the Washington Convention Center in Washington, D.C., the telecomm capitol. It will be held on January 31 - February 2, 1984.

Call toll-free 800-225-4698 (in MA, 617-879-0700) for more information. Or fill out and return the coupon below.

COMMUNICATION NETWORKS Conference & Exposition

Washington, D.C. · January 31—February 2, 1984

The Sixth Annual Communication Networks Conference & Exposition for the Telecommunications Business Professional

Washington Convention Center, Washington, D.C.

Register today!

Call 1-800-225-4698 or fill out this coupon and return it. We'll be glad to bill you or your company.

Name _____

Title _____

Company _____

Address _____

City _____ State _____ Zip _____

CW

EDITORIAL

Great Expectations

The American spirit took a beating in 1983. American lives were lost in the Middle East. Conflict and controversy raged in Central America. Tensions between the U.S. and the Soviet Union escalated dangerously. Even American relations with some of our closest European allies became strained.

Yet throughout the swings of the past several years from crisis to confidence, the march of technology has not only continued, but quickened dramatically. For most of us, its spread has been received joyfully, promising unimagined new capabilities in information management, dramatic productivity improvements and the promise of a more fulfilling life-style.

But high tech has also brought with it an unprecedented concern about the potential for its abuse. Americans are coming increasingly to question our country's reliance on computers for its national defense. Revelations of the adventures of teenage "hackers" this year have made us realize how vulnerable our information resources really are. And, ironically, new evidence is emerging that Korean Air Lines Flight 007 took its ill-fated course as the result of a computer data entry error.

Also, many Americans now worry about the vulnerability of their privacy to computerized invasion. A recent Louis Harris poll found that 77% of Americans are concerned about this issue, up from 64% just five years ago [CW, Dec. 12].

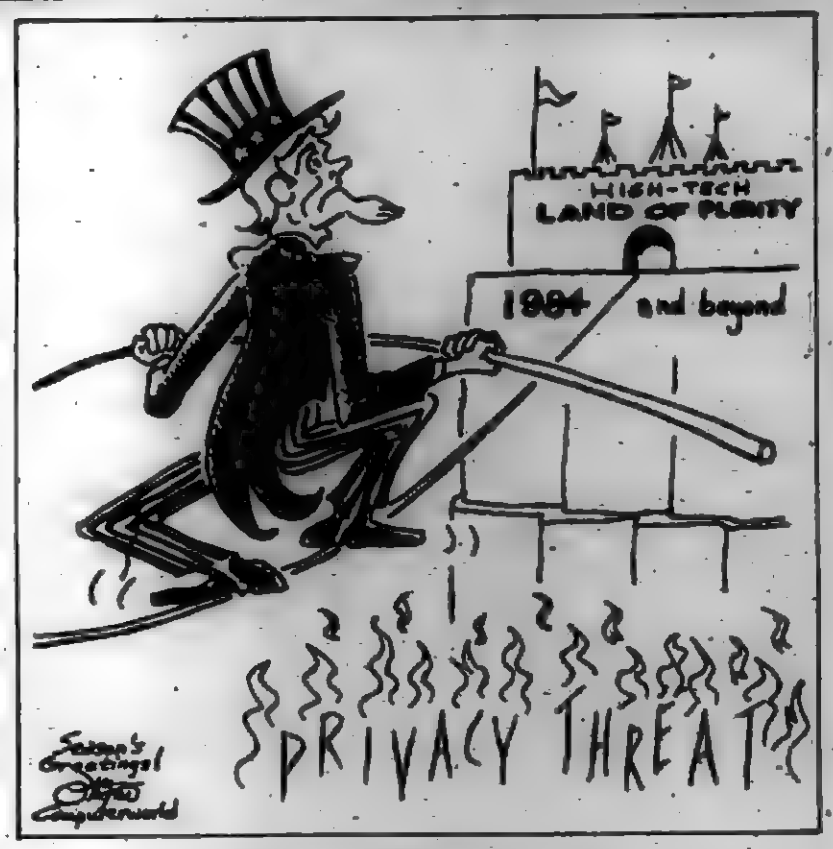
On the other hand, an overwhelming percentage of the survey respondents think science and technology has been generally beneficial. Over 90% see a big rise in productivity through the use of high tech in the work place.

The practical benefits of computers are becoming apparent in myriad new ways. New applications in expert systems have moved computers out of the hospital billing department and into the doctor's office, where they help physicians make more informed diagnoses. Computer-assisted design applications are helping engineers to work out potentially dangerous design problems before products reach the public. And Americans are discovering with delight that a computer in the home can be a welcome boost to their children's educations.

America's love/hate affair with the computer will intensify as the pace of technology quickens. The question remains which emotion will ultimately triumph. Clearly, public concern about the possible invasion of privacy from computers deserves notice. Legislation in this area is critical if computerphobia is to be overcome.

However, high technology also deserves an occasional pat on the back. Recent world events, at times, may have caused us to question the ability of humans to survive their own frailties. But computer technology has also set an example that we can all emulate. Even as suspicion about the motives and practices of some of our largest institutions has become ingrained in our consciousness, high-technology companies, with their high standards of competitive ethics, continue to top lists of the most respected companies.

As 1984 approaches, we cannot help but to be haunted by the specter of technological oppression raised by George Orwell's futuristic novel *1984*. However, we can also be buoyed by the possibilities that computer technology holds in store a truly better way of life. It is now more critical than ever that business and government unite to reassure the public that computer technology can and will be controlled. And it is up to all of us to applaud and encourage the true benefits we have gained from computer technology in recent years. Progress is stimulated by an atmosphere of acceptance, but stagnates in an atmosphere of fear.



LETTERS

Alternative Route

I agree with Harold Lundy's argument in the In Depth article "Justifying Subsecond Response Time" [CW, Nov. 21] that programmer productivity will improve significantly in the subsecond response time range. The question is: Will reprioritizing really help large TSO shops (and Roscoe or Wylbur shops for that matter) ever come close to subsecond response time, especially when production consistently requires high priorities?

The study does set the reader on the right path, but neglects to point out a fork in the road — and a path less traveled by.

Rather than shifting priorities and going through the gyrations that inevitably lead to an expensive CPU upgrade (and the same cycle of response time problems, reprioritizing and more upgrades and programmers working at all sorts of odd hours), a company should explore the alternative route, which is not only cheaper, but far better for the management information systems operation as a whole.

Many firms have taken the off-line, yet interactive, development route and reaped tremendous benefits as a result.

My firm needed a system that not only offered consistent subsecond response times, but powerful development tools, too — one that would allow us to continue programming in Cobol, communicate to multiple mainframes (from IBM and Sperry Corp.) and was, above all, affordable.

We found a product called Maestro, by Softlab Systems of San Francisco. It eats TSO's lunch (and Roscoe's and Wylbur's), but not mainframe resources. Our programmers are not only twice as productive, but they're home in time for dinner, too.

Robert Gregory
West Orange, N.J.

'Not the Usual Piffle'

I'd like to thank *Computerworld* for publishing Barry L. Abramson's article "Reducing Security Risks Associated With VM Access" [CW, Dec. 5]. This delightful piece of humor brightened an otherwise gray day here.

Abramson's situation is a perfect backdrop for comedy — sharing one VM virtual machine among six divisions. Where I sometimes pretend to work, a typical programmer will have six virtual machines for his own use.

Another masterstroke was to add the interminable series of prompts before allowing someone to edit a file. I invoke the EDIT command at least 100 times a day. I'm surprised Abramson didn't let his comic sense run free and have a team of system programmer commandos tunneling under the raised computer room floor to bomb the CPU into tiny pieces of silicon.

But the concept that makes Abramson's piece a work of genius, and not the usual piffle that we have to wade through in our daily lives, is the policy he describes of requiring all users to submit a written request for any given file to be erased.

What an idea! What opportunities for bureaucracy. The reams of paper. I can see it now: "Why do you want to erase that file? We'll just give you another zillion cylinders of storage — that way you can save *everything*."

I certainly hope Abramson has found a way to forbid people from using file modes A0 and A3, from giving out passwords and from insisting on working long hours from remote locations using dial-up lines. In fact, I hope Abramson finds a way to make sure that no power is provided to the CPU: That's a sure way to keep it secure.

Jonathan Seder
Menlo Park, Calif.

LECHT ON SCIENCE/Charles P. Lecht

George Orwell's Roasting: Medium-Well, Please

As we enter 1984, a crowd of folks who should be in the know will be asked their opinions of this year's state of affairs as compared with those depicted in George Orwell's monumental work with that date for its title. Virtually all these experts will observe that if he meant his novel's somber social portrait to serve as an actual forecast for 1984, he was way off base. Often enough, they will go on to say that any real threat of Orwell's dour vision being realized could be indefinitely postponed by increasing our defense spending, developing better surveillance techniques, providing more "pointed" education on who our "enemies" are and exercising yet more intelligent control over our free press.

Indeed, I surmise that if Orwell were around in 1984, he would surely be the subject of one of the grandest "roastings" of all time, although, curiously enough, there is ample reason to believe that it would be unwarranted. Notwithstanding the many discrepancies between the actual state of the world as we near 1984 and the vision Orwell would seem to have had of that same time, it is highly likely that his book was intended more as a parable or as an overarching cautionary tale than as straight prognostication. Indeed, it was some time before Orwell was persuaded to accept the title by which his work came to be known; evidently, his preference had been for *The Last Man in Europe*.

To an extent, the subject and substance of *1984* were drawn from the (barely disguised) fears provoked in Orwell by sociopolitical tendencies emerging in the late 1940s, not only in the West, but in the East and elsewhere. He almost certainly was not offering a literal forecast for 1984, although it must have occurred to him that many people might think so.

> *'Most every government, it seems safe to say, will take the position that the world in which it happens to be living is vastly different from Orwell's imagined one and, by its lights, vastly better. To the extent that any one of them would be prepared to acknowledge some Orwellian characteristics in itself, it would probably dismiss these as relatively minor (albeit warranted for some reason or other) when compared with the massive contamination afflicting the body politic in "enemy" countries.'*

Had he done no more than create a great and enduring sci-fi novel (which he did), he would, in *1984*, have earned himself a degree of respect that rarely attaches to authors in that genre; for his ideas on totalitarianism were so thoroughly and convincingly worked through that he succeeded in giving to the language, in his own name and that of Big Brother, two shorthand terms by which the whole world now recognizes the sort of monstrous dictatorship that leaves us no moment or place of refuge from total terror. Whatever Orwell's actual intentions, we can be grateful to him for providing us with a special reason to reflect upon world government as we enter 1984 and to seek out new insights into it and ourselves. And this, we know, is always useful.

Orwellian Characteristics

Most every government, it seems safe to say, will take the position that the world in which it happens to be living is vastly different from Orwell's imagined one and, by its lights, vastly better. To the extent that any one of them would be prepared to acknowledge some Orwellian characteristics in itself, it would probably dismiss these as relatively minor (albeit warranted for some reason or other) when compared with the massive contamination afflicting the body politic in "enemy" countries.

Governmental variations upon this theme are as wide as the planet itself: from the Italians, who can be forgiven if they view any government they elect as fully Orwellian, after having lived through Mussolini, to the Soviets, who admit no trace of Orwellianism, apparently, viewing their enforced reeducation camps in Siberian subzero temperatures as a rewarding experience for their citizens who do not share the Communist party's opinions.

Just how much Orwellianism exists in any country is hard to determine, but I think there is strong (circumstantial) evidence to support the thesis that the world described in *1984* has more or less globally arrived in 1984. Certainly, most of the world takes the view that most of (the rest of) the world is comprised of more-or-less Orwellian, totalitarian states. The roughly equally populated East and West blocs appear to hold that opinion of each other, and both of them behave as though they regarded the Third World in that way.

Instrument of Propaganda

Did or did not Orwell's work foresee that an inevitable fixture of 1984 would be "the enemy," an instrument of propaganda utilized by one's own government to keep one alternately enflamed or terrorized into submission to the strictures of one's local polity? One need not look too closely at the "news" programming emanating from the respective Ministries of Truth of East and West to confirm this sad actuality. Big Brother and his enemy seem almost to share the intimacy of the same object reflected in different mirrors, down to the last detail of olive branch and bomb.

Also, it is inarguable that Orwell's

(Continued on Page 108)

HUMAN CONNECTION/Jack Stone

User Emancipation From Big DP Brother: 1984

The reality of life in 1984, at least within the microcosm of the computer society, is far different from the dire predictions of George Orwell in *1984*, wherein Big Brother and his followers placed the citizenry into a state of virtual slavery.

In the coming year, users are taking the strongest position ever to establish their independence from what many perceive to be the strangling bureaucracy of data processing departments. They are using the political leverage that derives from knowledge, experience and the headiness from installing successful systems themselves, albeit systems on the micros and small minis and, hence, of miniscule dimensions when compared with those running on the mainframes.

Not an insignificant number of users are even elevating themselves into lofty levels of arrogance, making the now oft-heard claim: "With only a personal computer and some quick code written for a $400 generalized data base manager, I've come on-stream with a superpowerful information system." Indulging in such an attitude, and using their gift of gab, users are surely venting their past frustrations with their computer center dealings to the top-level decision makers and attempting to use their personal computer expertise as leverage to get control over the data processing establishment.

> *'Without question, users are making life for DPers more miserable than ever; their ignorance in years past was difficult enough to deal with, but the high-and-mighty distain for computer professionals that some of them display in real time after a few hours of fooling around with a personal computer is really tough to swallow.'*

Without question, users are making life for DPers more miserable than ever; their ignorance in years past was difficult enough to deal with, but the high-and-mighty disdain for computer professionals that some of them display in real time after a few hours of fooling around with a personal computer is really tough to swallow.

User Pseudoknowledge

However, to deal with the alarmingly rapid growth of user pseudoknowledge of computer systems, the answer is not — and cannot be — to avoid it, but to address it head on and in calm, measured, intelligent and rational ways. Here are some thoughts that may be useful to you if you are struggling with your users:

- If you have been around the business for more than just a few years, you surely know that for every generation of new equipment technologies, there arises a new wave of proliferation of machinery in the user areas that is typically acquired not with reasonable justification, but on a helter-skelter, seat-of-the-pants basis.

The current explosion in personal computers is no different, except that it is not untoward to learn of users who select their personals in more bizarre ways than ever, such as how their first graders work with Logo. Surely, central coordination — if not control — of personal computer acquisition is mandatory if the corporate coffers are not going to bleed to death from the constant demand from users for support of computing machines, software, documentation, training and supplies from every nook and cranny of the business.

- Your center must organize, if it has not already, a team of systems specialists whose sole job is to work with the users and help them to separate fact from fiction and whimsy from reality when it comes to the age-old issues of what computers can and cannot do and which ones are the right choices for the solution of user problems.

Users have to be straightened out on many matters that we take as given, but that come as shocks of enlightenment to many of them, such as that disk space is not infinite and some software will not handle files spread across volumes; some systems installed on "fast machines" run agonizingly slowly because the software is poorly written; formal training sessions are not the end of user learning, but rather they are the beginning of a life-long, self-developing experience; and they should search for answers to their trivial technical questions in the documentation, though not by pestering the data processing department.

Orwell's Roasting: Medium-Well, Please

(Continued from Page 107)
description of individual freedom in 1984 fulfills many of our views of its actuality in 1984. His thesis envisaged the subjugation and enslavement of the people by an increasingly automated, mind-controlling state. Certainly, our Communist neighbors, in our judgment, have lent more than sufficient credence to this vision of 1984. Alas, by theirs, so have we.

Startling, isn't it? Almost everyone in the world believes that the preponderance of the rest is in thrall to a Big Brotherly dictator. Each nation speaks of the slavery in which the governments of most others hold their respective populations; the enslavement process is said to be advanced by a group of soulless (that is, robot-like) order followers, whose threats are validated in the eyes of a quivering, cowering citizenry by the appearance on their screens of a fleshless, Big Brother video image. Americans affirm that individual freedom in 1984 is Orwellian for at least 75% of our brethren here on Earth, by my reckoning. Not bad, as an example of accuracy in a futurist.

And what is there to say for Orwell's view of history and books in 1984? Subjected to brainwashing and physical torture, citizens are compelled to relearn history — or fail to do so at their peril. They are adjured to understand that to control the history books (and their analogs) is to control and, thus, to invent history.

Revised Histories

Since the turn of this century alone, many countries have seen fit to revise their official histories in response to political upheaval, economic dislocation, population migrations and other such traumatic manifestations.

Not long ago, some Germans believed that they could revise history by burning books and that it might even be more thorough if they incinerated a few flesh-and-blood authors and readers into the bargain.

It does not take too much imagination to intuit that the history of Persia endorsed by the Ayatollah Khomeini may vary from that promulgated by the supporters of the late Shah Rizah Pahlavi. Could we argue against the importance of knowing how to relearn history if, having been born into yesterday's version of it, we now wished to live happily in today's Iran, Cuba, Vietnam, USSR, People's Republic of China, Yugoslavia, Poland, Czechoslovakia, Hungary, Rumania, Tibet and so on? The official alternatives to reeducability have often been unpleasant, when they have not been terminal.

Examples of Orwell's accuracy as a forecaster (never mind whether he aspired to forecasting) abound. In Beirut, an international peacekeeping contingent could attest that war is peace. It is hard to think of a single communist country in which we, as Americans, would not see their freedom as slavery; as to their strength, we would just as surely view it as the product of the most lamentable, state-enforced ignorance.

All right, all right! Nineteen eighty-four may not resemble 1984 all that closely, but it is still too close for comfort. Consider this excerpt from the diary of the novel's protagonist, Winston: "April 4th, 1984. Last night to the flicks. All war films. One very good one of a ship full of refugees being bombed somewhere in the Mediterranean."

Lecht is chairman of Lecht Sciences, Inc., a New York-based think tank specializing in computer and communications technologies.

Before you change computers, Call 800-558-5148*

- COBOL to COBOL
- FORTRAN to FORTRAN
- DOS ALC to OS ALC
- RPG/RPG II to COBOL
- CCP to CICS
- HEAVY/3 to COBOL
- Plus FREE "Conversion With No Surprises" brochure

DASD PEOPLE/PRODUCTS/RESULTS
DASD Corporation • Corporate Services Center
9045 North Deerwood Drive • Milwaukee, WI 53223 • 414-355-3405
Member of the Cap Gemini Sogeti group *In Wisconsin, call 414-355-3405, collect.

This advertisement is not an offer to sell nor a solicitation of an offer to buy these securities. The offering is made only by the Prospectus.

NEW ISSUE

875,000 Shares

Hogan SYSTEMS

COMMON STOCK

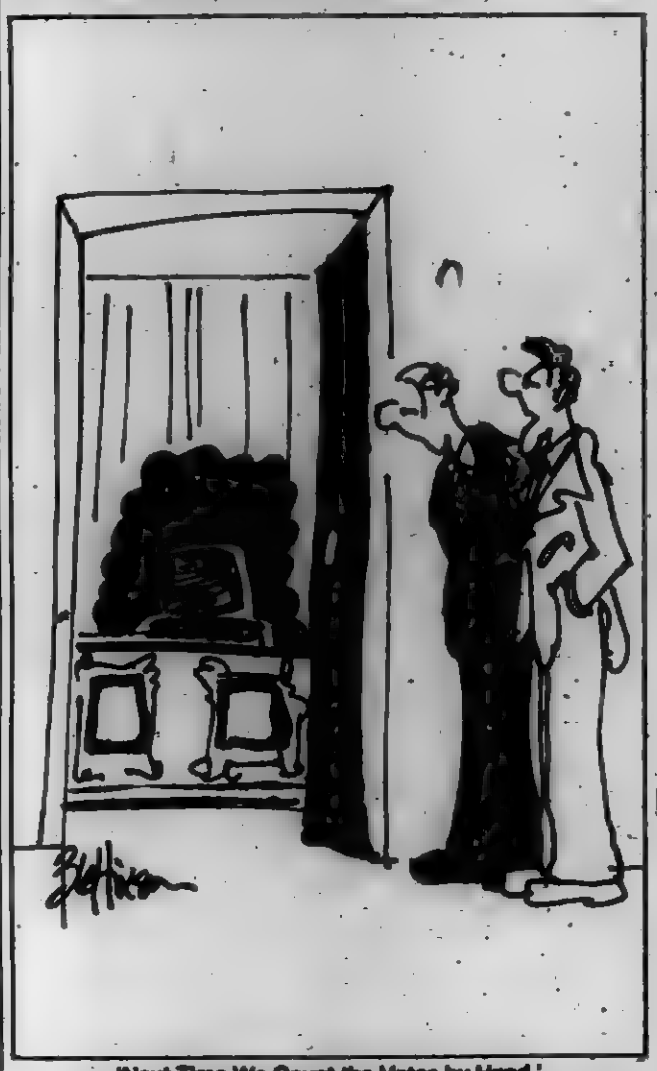
Price $18½ Per Share

Copies of the Prospectus may be obtained from any of the several Underwriters only in such states in which such Underwriters are qualified to act as dealers in securities and in which the Prospectus may be legally distributed.

Hambrecht & Quist Incorporated — Alex. Brown & Sons

Bear, Stearns & Co. — The First Boston Corporation — A. G. Becker Paribas Incorporated
Blyth Eastman Paine Webber Incorporated — Dillon, Read & Co. Inc.
Donaldson, Lufkin & Jenrette Securities Corporation — Drexel Burnham Lambert Incorporated
Goldman, Sachs & Co. — E. F. Hutton & Company Inc.
Kidder, Peabody & Co. Incorporated — Lazard Frères & Co. — Lehman Brothers Kuhn Loeb Incorporated
Merrill Lynch Capital Markets — Prudential-Bache Securities
Robertson, Colman & Stephens — L. F. Rothschild, Unterberg, Towbin
Salomon Brothers Inc — Shearson/American Express Inc.
Smith Barney, Harris Upham & Co. Incorporated — Wertheim & Co., Inc. — Cable, Howse & Ragen

December 14, 1983



'Next Time We Count the Votes by Hand.'

MSA Launches System Aimed At Two Types Of Manufacturers

ATLANTA — Management Science America, Inc. (MSA) has introduced packaged software tailored specifically for manufacturers with schedule-driven operations.

As a cost-free enhancement to the MSA Manufacturing System (MRP II), the features can be used by both repetitive manufacturers and job-shop manufacturers who have some repetitive processes in their operations, the vendor said.

According to the vendor, most manufacturers consider themselves either job shop or repetitive, although the majority are both.

The system operates on IBM mainframe hardware under Cullinet Software, Inc.'s IDMS, Datacom/DB, IBM's IMS and DL/1 or Cincom Systems, Inc.'s Total data base management systems.

The schedule-driven capabilities combine MRP II, Japanese methodology and zero-based inventory concepts. Using those features, manufacturers can establish a production schedule, set a production rate, check on production progress and report on production vs. schedule automatically in an on-line, real-time environment.

According to the vendor, the system provides maximum support of "just-in-time" inventory policies. It gives manufacturers stringent control over their materials and labor, since it automatically reduces inventory and accounts for labor used at various checkpoints in the production process, the vendor said.

The system is priced from $150,000 to $350,000, depending on the number of modules, hardware and operating environment.

MSA is located at 3445 Peachtree Road N.E., Atlanta, Ga. 30326.

With TI, IBM; Service Also Introduced

UIS Inks OEM Agreements

KANSAS CITY, Mo. — United Information Services, Inc. (UIS) has announced its entry into the microservices market with the signing of multimillion dollar OEM agreements with Texas Instruments, Inc. and IBM and the introduction of its Vista Service.

According to the company, Vista integrates microcomputer hardware and software into the UIS worldwide communications network and large-scale host and application software services. The OEM agreements authorized the sale of TI's Professional Computer and IBM's Personal Computer with the information services of UIS. Vista currently works with TI's Professional Computer, and UIS said it plans to announce the IBM Personal Computer link in January 1984.

In addition to providing stand-alone processing capabilities, the microcomputers reportedly will act as a window to UIS's teleprocessing services. The interface software — dubbed Vistacom — included at no extra charge with the microcomputer, is said to control all asynchronous communications with UIS host services.

A spokesman for UIS said that when host computer services and communications are needed, Vista users will have the ability to link into UIS's teleprocessing network. Micro software packaged with Vista will enable users to perform word processing, spreadsheet, business graphics and records management functions. All third-party software written under Microsoft, Inc.'s MS-DOS operating system will run on the micros without modification, the spokesman said.

Prices for Vista range from $5,545 for the base unit, which includes the system unit, CRT terminal, 256K bytes of random-access memory, internal modem, MS-DOS and one-year on-site maintenance, to $8,910 for the base unit plus a Winchester disk drive and a 150 char./sec printer.

More information is available from UIS, which can be reached through P.O. Box 8551, Kansas City, Mo. 64114.

Sorting Techniques Enhance Release 6.0 of IBM's DF/Sort

WHITE PLAINS, N.Y. — New sorting techniques that are said to enable large systems to handle more applications are included in Release 6.0 of IBM's Data Facility Sort (DF/Sort) for IBM MVS and MVS/XA operating systems.

The new version reduces sort time by 14% to 40% over IBM's OS/VS Sort Merge Release 5, the vendor said. Enhancements to Release 6.0 include improved fixed-length record sort performance; improved variable blocked, spanned record sort performance; sort performance optimized to larger region sizes; and improved merge performance for variable-length records.

The product is also said to feature improved message handling; new statistics messages; improved installation/execution options; extended parameter list support and MVS/XA support. It also includes several functions from IBM's DOS/VS-VM/SP Sort/Merge Version 2.

DF/Sort operates with all processors supported by IBM's VS1, MVS or MVS/XA. A basic license is $231, with a distributed systems licensing option charge of $173 available through IBM, 1133 Westchester Ave., White Plains, N.Y. 10604.

Investigating Financial Modeling Alternatives

By Len Bergstrom
Special to CW‡

In the first part of this two-part series, Len Bergstrom defined some of the criteria you should establish before investigating the alternatives of financial modeling software. Bergstrom now provides some guidelines for investigating the alternatives.

Once the company's criteria have been established, you are ready to investigate the alternatives. Both general and specific criteria should be evaluated.

General criteria relate to the vendor, while specific criteria are associated with the financial modeling systems themselves. Positive and negative dominant factors should be identified for either category and applied to the full range of potential candidates.

The remaining criteria are then established by major categories (such as modeling and reporting) and weighted by elements (such as financial functions and graphics) within each category. Critical requirements should be emphasized more heavily. Remember that 100% satisfaction is rarely accomplished. Your goal should be to select a product that best fulfills the majority of the company's requirements.

An overview of remote computing services vendors can quickly and easily determine whether a vendor has the general characteristics required. A vendor's history and outlook can provide a comfort factor for subsequent dealings. Also, the type of hardware and operating software may or may not be compatible with needs. Of more direct significance is the availability of the network relative to corporate locations.

Application availability is of prime importance. What major financial systems are available and how do they relate to one another? What about data management? Are your areas of importance able to be accommodated with major systems or companion products? What external data bases and access mechanisms are offered? What are the vendor's future plans? Other areas to consider include pricing structures, service options, system reliability and support, documentation, training and consulting.

If you are evaluating a system for use in house, you should be concerned with product capabilities and the viability of the vendor. The majority of software vendors are relatively young and small, so the kind of general criteria used for remote computing services vendors may not apply. The user must also be concerned with contract negotiations, including performance guarantees and rights to source code under certain conditions. Installations of the product by multiple companies help insure against potential disaster.

Once you determine that a vendor meets your general criteria, analyze whether specific criteria are met by the financial modeling system. Financial systems components are very different according to individual planning systems, both in regard to specific integral components and in style of implementation. Although most claim to be "English language," the low range is actually close to a true programming language. Special attention should be directed to report generation, functions for financial and statistical operations and ease of use of documentation.

Some vendors say everything needed by the user should be embedded in a single system. Others adopt the philosophy of concentrating on specific activ-

(Continued on Page 114)

Startech Announces Release 2.0 of 'Viewcom'

WOODSIDE, N.Y. — Startech Software Systems, Inc. has announced Release 2.0 of Viewcom, an IBM CICS printer terminal spooling and automatic batch report distribution system.

Viewcom's IBM Personal Computer option supports printing from an IBM mainframe running under CICS to be directed to up to three printers connected to an IBM Personal Computer, transparent to the applications running on the Personal Computer, a spokesman said.

This feature can print multiple reports concurrently from the mainframe's CICS Viewcom print queues. A maximum of three printers per Personal Computer can be active simultaneously.

The Viewcom interface runs as a background task in the Personal Computer, independent of the Personal Computer application.

Viewcom Release 2.0 provides automatic transfer facility from the batch spool queue as well as automatic security checking with user exits. Additional functions include automatic unattended printing of reports, a virtual multiregion option and intersystems communications capability of routing any report in the Viewcom queue to another CICS address space in the same CPU or in a remote CPU to any remote job-entry station or the central-site printer. These Viewcom features will also function in a multiregion option or intersystems communications environment, Startech said.

In addition to these routing capabilities, Viewcom allows instant report auditing by allowing users to access sections of the report before printing.

DOS/VSE support in Viewcom Release 2.0 has been enhanced to provide both automatic and interactive on-demand batch report transfers to the on-line CICS Viewcom print queue.

Viewcom Release 2.0 costs $4,995 for DOS and $7,995 for OS packages from Startech at 25-39 Borough Place, Woodside, N.Y. 11733.

Intel Imax 432 Release For Its IAPX System Out

SANTA CLARA, Calif. — Intel Corp. has announced a release of the Imax 432 virtual memory operating system for its IAPX 432 micro-mainframe system line.

According to Intel, the Imax makes available blocks of main memory that contain data that is no longer being accessed and puts them through a process known as "garbage collection," which involves the deallocation of these unused memory blocks. After deallocation, the system performs a compaction process whereby it combines various-size blocks into large contiguous blocks to provide ample memory capacity.

Written in Ada, Imax 432 is said to make use of Ada's generic package concept. For example, the vendor said, a generic I/O sink module can be used to send data from a port to a disk system, a CRT display, a line printer or a laser printer. The programmer takes the generic package or module and fills in the specific information determined by the type of output device. The programmer does not have to write the entire output driver module and can instead work with the appropriate Imax generic module.

The cost of Imax is determined by quantity. The first copy is priced at $8,000 from Intel at 3065 Bowers Ave., Santa Clara, Calif. 95051.

Receipt Aid From CSU Runs On NCR 2950

CHICO, Calif. — California State University (CSU) at Chico has announced a cash receipting software package for use with the NCR Corp. Model 2950 terminal.

According to a CSU spokesman, the package prints receipts, locates and displays information about the transaction on the terminal, prompts for needed data and, at the end of each cashier cycle, transfers the data collected to a Control Data Corp. Cyber series mainframe. The package also is said to print reports with varying levels of detail, and it updates several subsidiary systems. It was designed to interface with the systemwide Financial Accounting System.

The vendor said that the program is easy to modify because of its modular structure.

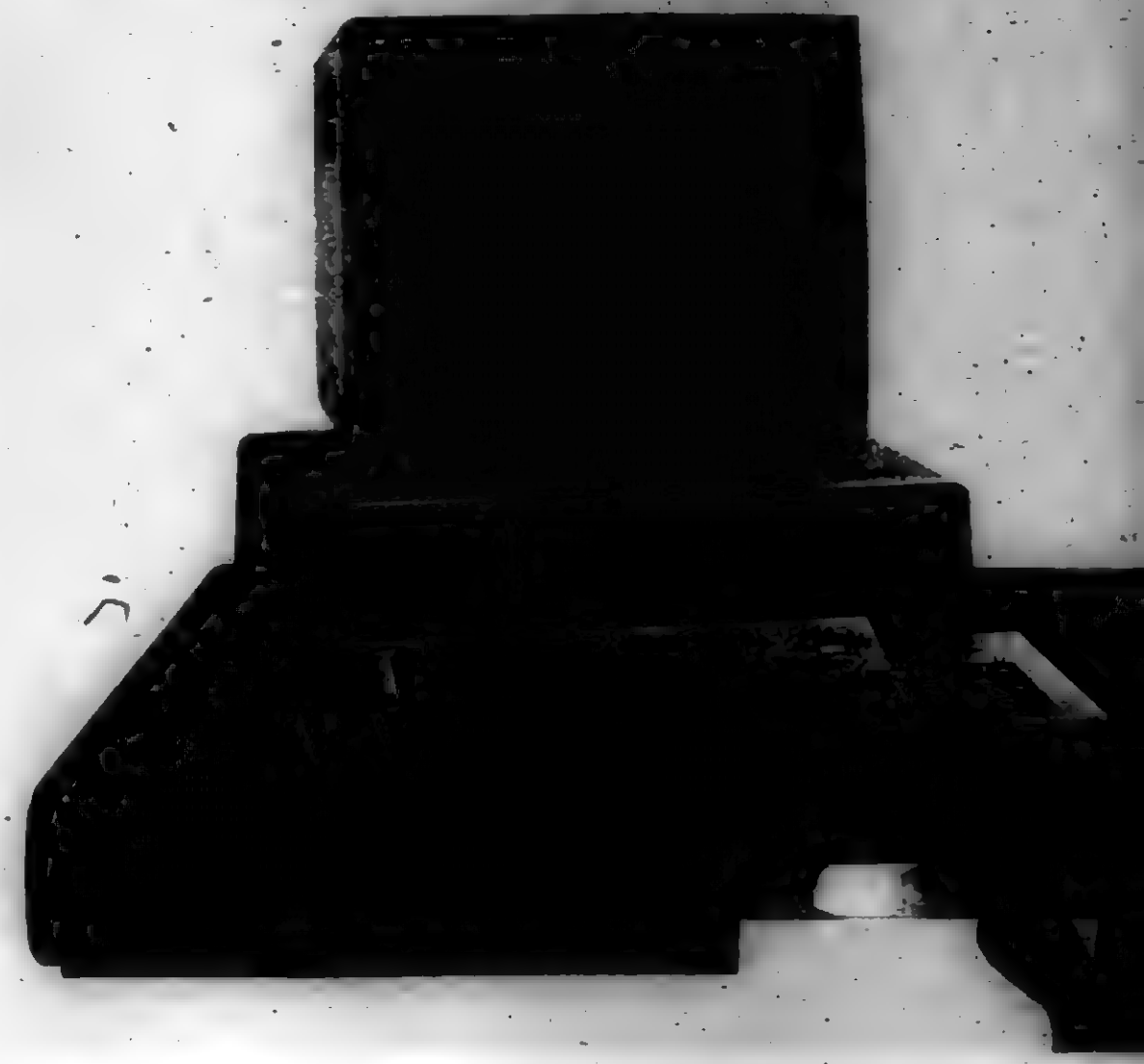
For each transaction, a cashier selects the screen for that transaction type, then follows as it prompts for information. When the transaction is complete, a receipt is printed, a journal tape is printed, and checks are endorsed by slip number and receipt number.

The cash receipting package is said to be a collection of programs written in NCR Basic and Cobol. The NCR Basic programs operate on the NCR Model 2950 terminals, and the Cobol programs operate on the Cyber processor.

The package is priced at $5,000 from CSU, Chico, Business Affairs Office, Chico, Calif. 95929.

Announcing the State of the Smart.

IBM 3270 Personal Computer



Utility Offered for MVS/XA

HOLMDEL, N.J. — CGA Software Products Group, Inc. has introduced a data center management utility designed for IBM's MVS/XA operating system.

According to the vendor, Single Image Software Version 7.1 is able to simplify error-handling diagnosis and reduce the number of load modulest and library size requirements for the operating system. It reportedly supports recent IBM program temporary fixes in the MVS operating system.

The software is now available for lease at $625/mo per site with the vendor's Multiple Systems Integrity Facility, $7,500 per year with the Global Console Director, $7,512 per year with the Multiple Systems Manager and $1,525 per month or $18,300 per year for all three, according to a spokesman for the vendor.

Additional information about the utility is available from CGA Software Products Group, which is located at 960 Holmdel Road, Holmdel, N.J. 07733.

System Utilizes HP's Image DBMS

PHOENIX — EDP Construction Systems has introduced the CAS/3000, a menu-driven, interactive, real-time construction accounting system which utilizes Hewlett-Packard Co.'s Image data base management system on the HP Series 3000 processors.

According to the vendor, all subsystems are totally integrated, allowing single-entry processing and multicompany, divisional and departmental processing within a single data base.

Subsystems include accounts payable, general ledger, job cost and accounts receivable, the vendor said.

The price is $30,000 and includes one year of system maintenance and initial training. EDP Construction Systems is located at 2910 E. Camelback Road, Phoenix, Ariz. 85016.

Lexis, Nexis Now Available Via IBM Personal Computer

DAYTON, Ohio — Mead Data Central, a division of Mead Corp., has announced that its Lexis and Nexis data base services are now available via the IBM Personal Computer and other terminals.

Nexis and Lexis, previously available only via terminals leased from Mead Data Central, reportedly can be accessed through the IBM Personal Computer, the IBM Displaywriter, the IBM 3101 terminal and the Televideo 950 terminal.

The company also has reported that it is negotiating with other computer manufacturers regarding the use of those computers to access the data base services.

Prime-time connect rates for Lexis and Nexis reportedly are $90 per hour for up to five hours monthly, $75 per hour for six to 10 hours, $60 per hour for 11 to 100 hours and $30 per hour for more than 100 hours. Off-peak rates are $45 per hour for less than 100 hours and $30 per hour for more than 100 hours. In addition, there is a surcharge of 45 cents for each word search unit.

More information is available from Mead Data Central, 9393 Springboro Pike, P.O. Box 933, Dayton, Ohio 45401.

If you're looking for a personal computer that will satisfy your company's professionals and managers, IBM now has exactly what you need. The new IBM 3270 Personal Computer.

The fact is, many personal computers can be *too* personal for many business environments. Not the 3270 Personal Computer. Its strength is the ease with which it communicates with IBM hosts and office systems—in the next room or around the globe.

The 3270 Personal Computer is designed to accommodate the way people actually work. It can display in color up to seven windows of information at one time. Four with data from host computer applications (on the same or different hosts), two electronic notepads and one personal computer session. And despite its impressive capabilities, the 3270 Personal Computer is small enough to sit on a desk without taking it over.

The information windows can be moved, just as a person moves papers on a desk. They can be made bigger or smaller, put on top for immediate attention or temporarily hidden when not in use. Information on the screen can be processed, printed or exchanged between windows. And the 3270 Personal Computer can be programmed by the data processing professional to meet the needs of each end user or department.

The IBM 3270 Personal Computer offers outstanding price/performance. And volume discounts are available. It could turn desks throughout your company into very Smart Desks.

To arrange to have an IBM marketing representative contact you, call toll free 1 800 IBM-2468, Extension 99. Or send in the coupon.

IBM

IBM, Dept. 3B99
400 Parson's Pond Drive
Franklin Lakes, NJ 07417

☐ Please have an IBM representative call me.
☐ Please send me more information on the 3270 Personal Computer.

Name Title
Company
Address
City State Zip
Phone 3-2

The Smart Desk from IBM.

Source Members To Receive E-Com Service

MCLEAN, Va. — Source Telecomputing Corp. has announced that members of the Source, its on-line information and communication service, will now be able to utilize the U.S. Postal Service's Electronic Computer-Originated Mail (E-Com) from their microcomputers.

According to Source Telecomputing, the E-Com service provided on the Source is contracted through an E-Com-certified telecommunications carrier in New York, where messages are received from members of the Source, batched, processed, sent on to serving post offices and delivered as first-class mail. Reportedly, the arrangement allows individual members to use E-Com as often as necessary without having to send a minimum of 200 messages per day, which is required of E-Com's corporate clients.

E-Com is one of several messaging services provided through the Source. Messages can be composed on-line using the editing capabilities of the Source or off-line where they can be uploaded for electronic delivery. The three primary messaging services are E-Com, which costs $1.35 for the first page and 25 cents for subsequent pages; Western Union Mailgram messages, which range in cost from $3 to $5.15; and Sourcemail, which delivers messages to any other member of the Source beginning at 13 cents per minute.

The Source is said to be compatible with any microcomputer or terminal and can be accessed via a local telephone line in 500 U.S. cities. Costs include a one-time $100 membership fee, with basic hourly connect charges ranging from $7.75 to $20.75 from Source Telecomputing, 1616 Anderson Road, McLean, Va. 22102.

Genesys Launches 'Search-All' for IBM DOS, OS

LAWRENCE, Mass. — Genesys Software Systems, Inc. has announced what it describes as a one-button human resource information and decision system for mainframes using IBM's DOS and OS.

Search-All reportedly is designed to work with Genesys' IBM Payroll Accounting, Personnel Administration and Deferred/Cafeteria Benefits Management Systems. It is said to integrate into one application capabilities such as query, information generation, on-line report writing, modeling and forecasting.

Search-All is said to let users decide what to look for and what to do with it in determining alternatives and to refine qualifications continually. The system is said to be menu driven, eliminating the need for users to know complicated syntax.

According to Genesys, Search-All will be available Feb. 1 as a free added feature for its All-Screen package, or at $40,000 for DOS systems and $45,000 for OS systems. All-Screen reportedly costs $35,000. Genesys may be reached at 20 Ballard Way, Lawrence, Mass. 01843.

Price Hike Announced for 'DOS Jars'

McLEAN, Va. — Johnson Systems, Inc. has announced an immediate increase in the price of its DOS Jars Job Accounting Report System for use in IBM's DOS and OS operating system environments. The new permanent license fee is $7,500, including the DOS/Power/VS option, a spokesman said.

DOS Jars is an accounting, billing and performance measurement system that enables users to account accurately and bill equitably for all resources used in the DOS and OS environment. The package consolidates information about computer resources on IBM's System 370, 30 series, 4300 series and compatibles.

Johnson Systems' Marketing Services Department is located at 6300 Greensboro Drive, McLean, Va. 22102.

IBM 5080 Gets Graphics Tool

BOULDER, Colo. — Precision Visuals, Inc. has announced DI-3000, graphic tools support for the IBM 5080 Graphics System.

The system can be utilized by system integrators and application developers in engineering, scientific and computer-aided design installations.

Written in Ansi Fortran, DI-3000 is an integrated system of 200 user-callable subroutines developed in accordance with both Core and evolving Ansi standards, the vendor said.

The package supports a range of graphics terminals and hard copy devices and simplifies access to more advanced hardware features by presenting the application developer with a "virtual device" interface.

Prices for a 25-year license including the new driver will depend on the IBM host machine's class but will start at $12,000 for the 4300 series, $15,000 for the 3030 series and $19,000 for the 3080 series. The driver alone, which will be released concurrently with the IBM 5080 system, will range in price from $2,000 to $4,000 depending on mainframe.

Further information is available from Precision Visuals, 6260 Lookout Road, Boulder, Colo. 80301.

Tape System For HP 3000 Unwrapped

SAN JOSE, Calif. — Mednick Enterprises has announced the Tapes/3000 tape management system for the Hewlett-Packard Co. HP 3000 computer.

According to the vendor, Tapes/3000 reduces the risk of losing or overwriting data by requesting and cataloging magnetic tapes as they are used. The package reportedly also performs most tape librarian functions. It will accept data from on-line users and operators, from job streams and the HP 3000, and it uses the data to keep track of each tape in the system.

There are four programs in Mednick's tape processing system. The Tapes Maintenance program is used to maintain information about data set characteristics and tapes in the system. The File Request program is used to request input and output tapes to be used by the job or session. A Scratch program is used to automatically scratch all tapes that have expired according to the date or generation/version count. The Operator Utility program is for special cases such as handling missing scratch tapes, resetting in-use flags, inputting non-HP 3000 tapes into tapes and getting the current Scratch tape count.

Tapes/3000 is priced at $2,500 from Mednick Enterprises, located at 1680 Arbor Drive, San Jose, Calif. 95125.

INTELLECT.™
NO SOONER SAID
THAN DONE.

To use INTELLECT, the natural language query system, all you have to do is ask—in everyday conversational English—and you'll retrieve. Immediately, in either text or full-color graphics.

INTELLECT, the world's only successful true natural-language query system, is an ideal tool for your information center. INTELLECT's powerful information retrieval capabilities are so advanced that it understands questions and responds with answers as if you were talking to a knowledgeable colleague. Executives access data themselves,—more easily than ever before—without learning any technical jargon or "computerese." It's so easy to use, it doesn't even have a training manual!

Whether you use INTELLECT as a retrieval system or as an effective data analysis tool, it transforms raw data in the data base into information and presents it in finished color graphics in a matter of seconds. It's a live dynamic interface that fully integrates your existing database and graphic systems.

Already hard at work in hundreds of organizations, INTELLECT is ideal for marketing, finance, personnel, manufacturing, and banking applications.

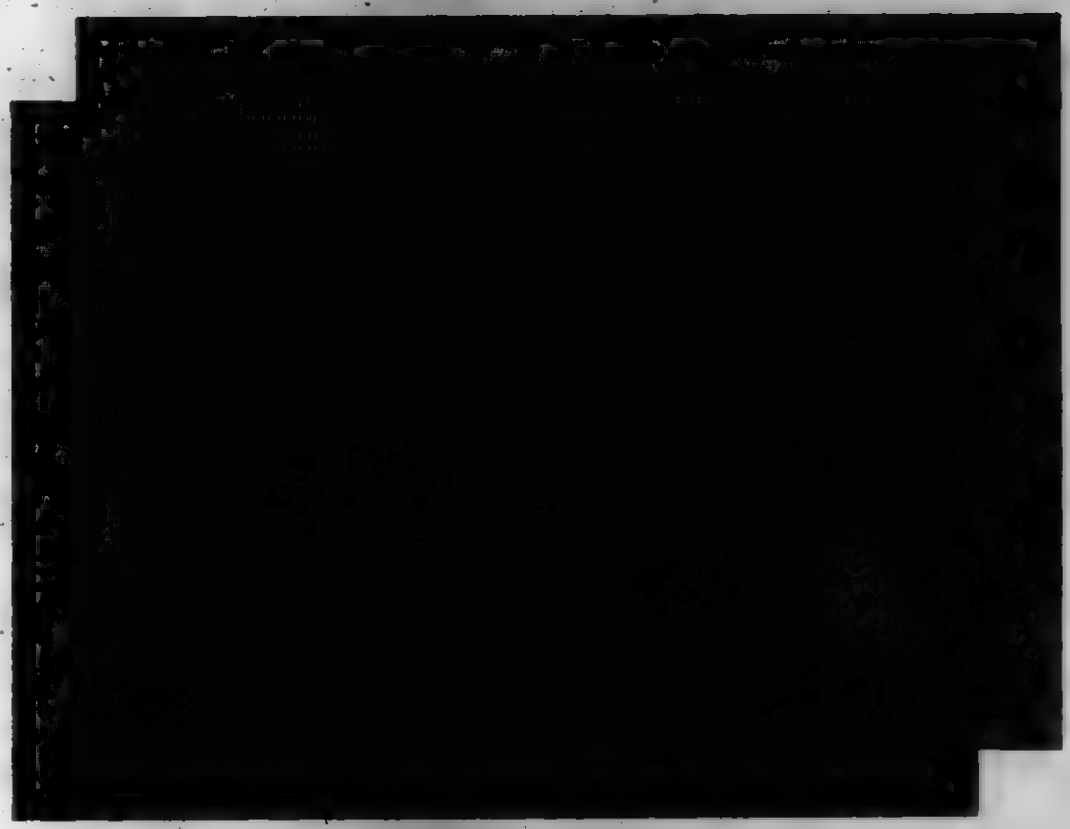
INTELLECT is an important technological breakthrough. You can learn more about it by attending one of our nationwide seminars. Or put its amazing power at your fingertips in minutes with one of our demonstration tapes.

Call or send coupon for more details. Look into INTELLECT, and be an eyewitness to the future of computing.

Tell me more about INTELLECT.
Name _____ Title _____
Company _____
Address _____
City _____ State _____ Zip _____
Telephone _____
Hardware Type _____ Info Center? _____
_____ Demo Tape _____ Seminar _____ Sales Presentation
ARTIFICIAL INTELLIGENCE CORPORATION
100 Fifth Avenue, Waltham, MA 02254 C-IR

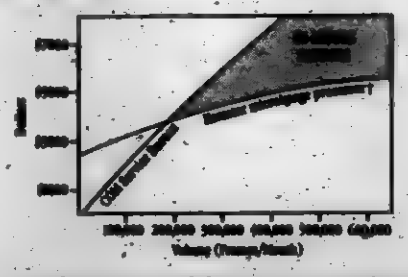
ARTIFICIAL INTELLIGENCE CORPORATION
100 Fifth Avenue, Waltham, MA 02254 617-890-8400

Don't pay this bill.



Run your own in-house COM for less with a Kodak Komstar microimage processor.

The decision is long overdue. Especially if your monthly computer output is close to a quarter-million pages.



That's when a Kodak Komstar microimage processor not only pays great dividends in faster, easier turnaround but can pay for itself in two years or less.

The chart here shows the break-even point based on the above service bureau bill.

But what it doesn't show are all the applications you're probably putting on paper: Internal SYSOUT. Security reports. Or time-sensitive data.

So instead of spending lots of money on a COM Service Bureau, spend it on your own Kodak Komstar 100, 200, or 300 microimage processor.

Send in the coupon today. Or call toll-free 1-800-44KODAK (1-800-445-6325), Ext. 300. And take the smart way out of next month's bills.

Please have one of your representatives contact me with more information on a Kodak Komstar microimage processor.

NAME _____

COMPANY _____

ADDRESS _____

CITY _____

STATE _____ ZIP _____

TELEPHONE ( ) _____

Eastman Kodak Company
Business Systems Markets Division
Dept. DP3647, Rochester, NY 14650

Set of Design, Development Tools

National Semi Unveils 'Plan'

SANTA CLARA, Calif. — National Semiconductor Corp. has announced the Plan software package, a set of interactive design and development tools to simplify the implementation of systems with Monolithic Memories, Inc. Programmable Array Logic (PAL) devices.

The Plan system, according to the vendor, automatically selects the correct PAL configurations, reducing the amount of time spent in search and evaluation. The package consists of three programs, Plus, Serv and Prog, which were developed to guide designers from initial Boolean logic expressions through device selection and documentation to the actual programming of the devices.

The Plan package is said to interface with most programming systems and uses notations similar to those of Monolithic Memories' Palasm design tools. Its comprehensive messaging operation includes error alerts, device-selection guidance and prompts.

Serv allows assignment of the previously defined logic to a different device and reassigns pin-outs, provides pin-out diagrams, fuse maps or equations to the CRT terminal or printer for documentation. Prog provides the logic and device data to a device programmer for programming or verification, automatically selects the proper PAL and pin assignments and creates a permanent disk file representing the defined logic equations and the device fuse map in the chosen format.

The package is priced at $195 from National Semiconductor, 2900 Semiconductor Drive, M/S D3696, Santa Clara, Calif. 95051.

Fortran Engine Accelerator Off-Loads IBM, DEC Units

SEATTLE — Flexcomm Corp. has announced the Fortran Engine accelerator, which the company said can be used to off-load IBM mainframes and Digital Equipment Corp. VAX-11 minicomputers.

The accelerator is reportedly a turnkey system that uses a Gould, Inc. Concept 32 superminicomputer and Flexcomm's proprietary communications software executing in both the Gould processor and the host, which are connected by a high-bandwidth data link.

The Fortran Engine is said to allow an installation to recover large amounts of CPU resources that are currently consumed by computation-intensive Fortran applications.

The package offers conversion services to transport the existing Fortran applications to the Gould supermini, according to the vendor.

It will be priced at approximately $500,000, depending on configuration, from Flexcomm, which is located at 15245 Pacific Highway S., Seattle, Wash. 98188.

Madic Adds General Ledger Module To Corporate Information System

SANTA CLARA, Calif. — Madic Corp. has announced a general ledger module as an addition to its Corporate Information System, an integrated closed-loop management information system for manufacturers and distributors.

The general ledger contains features that enable users to produce detailed financial statements from multiple levels of general ledger files and runs on Pick Associates, Inc. and compatible computers.

According to the vendor, the module's major features include comprehensive audit trails, customized financial statements and an extensive budgeting system.

The Corporate Information System is available for $105,000 (individual modules not available) from Madic, 3960 Freedom Circle, Santa Clara, Calif. 95054.

Selecting Financial Modeling Systems

(Continued from Page 109)

ities with interfaces to various functions. Again, user criteria determine what style is most appropriate.

An in-depth benchmark problem review should be performed to learn how different systems accomplish identical tasks. While this is not a complete answer, it can provide some solid comparisons from which commonly used activities can be viewed. How easy are models to build and change? How does one ask "what if" questions, perform sensitivity analysis or do backward iteration or goal seeking?

Selected benchmark usage should be observed in light of the established criteria. If you need features such as automatic reordering of logic statements and the solution of simultaneous equations, the field of choice narrows dramatically. Benchmarks allow you to obtain an additional level of comfort. They are often "decision clinchers" in many feasibility studies.

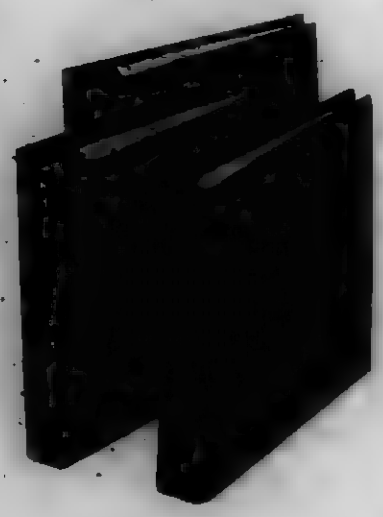
Comparative cost factors need to be understood. However, it is not a simple matter of looking at the different costs of CPU time. Connect charges and storage costs can far outweigh the cost of computations. Personnel time may turn out to be the overriding factor. The availability of discounts, minimums and initiation of service charges must be considered. Also, differing rates for remote job entry and remote and local batch processing can be influential, especially if you are willing to wait a few hours for results.

If you are selecting a product for in-house use, costs are a very different concern. Many authors offer their products on a free-trial basis before a license agreement is enacted. Maintenance, documentation, training and consulting are usually offered on a variety of terms. The effect of the product on system efficiency is difficult to ascertain unless the product is put up on your in-house environment.

The final step is to contact user references, especially those in your industry segment with similar applications and environments.

Now some disconcerting news: Once a system is carefully selected, your job is not complete. It is essential that users evaluate and periodically reevaluate their criteria and the changing means of satisfying those criteria.

Bergstrom is a principal and vice-president of consulting services at Real Decisions Corp. in Stamford, Conn.



DASD MANAGEMENT AWARD WINNER

The world's leading DASD management system, installed in more than 750 Fortune 1000 sites. Tailored to IBM VS1 and MVS, operating environments, yet doesn't rely on any IBM utility. DMS/OS — with disaster recovery — gives you more space and more usable DASD reports. Here is a direct-access storage device management system that dramatically reduces DASD conversion time, frees up operator time, and provides enforced control standards.

Is it any wonder that over 75% of world's leading industries turn to Sterling Software Marketing and DMS/OS for DASD management?

For a free on-site evaluation without obligation, call TOLL FREE 800-824-8512. California, Alaska, Hawaii, and Canada call collect 916-441-7234. Ask for Ext. 41.

STERLING SOFTWARE MARKETING

Formerly Software Electric Marketing

Crocker Bank Bldg./Penthouse
1807 Seventh Street
Sacramento, CA 95814

IBM is a registered trademark of International Business Machines, Inc.

Innovator 300 LPM Printer System

Now! Compatible with nearly any micro, mini, and mainframe.

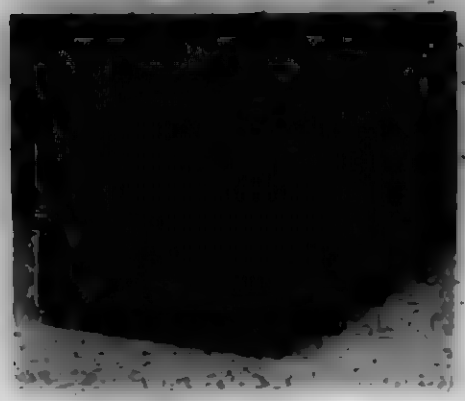
The Innovator printer system can interface with your IBM, Burroughs, DEC, RS-232 Serial and many additional communication protocols. Also, the highly reliable, field proven Teletype™ mechanism provides years of virtually maintenance free performance, significantly lowering your cost of ownership. Starting at..... $4,995

FEATURES:
- Impact printer with fully formed characters
- Ultra quiet acoustically damped cabinet
- BSC/SNA compatibility
- Micro-processor controller/interface board
- 132, 80 column, heavy-duty print mechanism
- Low cost nationwide service

innovative™ network data communications

(305) 634-1644
1-800-327-3035

INNOVATIVE ELECTRONICS, INC., 4714 N.W. 165th Street, Miami, FL 33014



The Barrier Security Unit

Security Unit Said To Limit Access To Minis, Micros

ORANGE, Calif. — International Anasazi, Inc. has announced a data security device designed to limit access to minicomputers and microcomputers that receive data over 300 to 1,200 bit/sec dial-up asynchronous lines.

The Barrier reportedly allows calling terminals to connect with the dialed host only after accepting the appropriate user-programmable password. It is said that the user can program up to 63 characters for the access greeting message and another 63 characters for the access granting message.

According to the company, the Barrier is designed to hang up after three invalid password attempts. The unit is said to function with all 300 to 1,200 bit/sec modems and is installed between the modem and the secured computer.

The Barrier is available now in limited quantities and is scheduled to be available in large quantities by February 1984. It costs $369, according to the vendor. International Anasazi is located at Suite 202, 2914 E. Katella Ave., Orange, Calif. 92667.

Home Banking Seen Poised To Displace Check Writing

By Jim Bartimo
CW Staff

There are 100 million checks written each day in the United States totaling 40 billion annually, and each check is handled by an average of 10.2 people.

But within 10 years, writing checks could be displaced by computer-aided home banking just as many bank teller windows have been displaced by the automated teller machine (ATM).

Home banking usually refers to access by the customer to his account via a personal computer and modem. In addition to offering up-to-date account information, home banking may offer access to financial services, such as Individual Retirement Accounts, and the ability to send checks electronically.

At the Bank of America in San Francisco, one of the first complete home banking programs was introduced at the end of November, and 25,000 home banking programs are expected to be on-line by the end of 1984. The $8/month service is available 18 hours a day, seven days a week and eliminates much of the need for writing checks.

Customers can transfer funds directly from their accounts to many department stores, home mortgage companies and utilities. Users have constant access to their account status simply by dialing the bank's computer. Unlike most home banking programs restricted to IBM or other major micros, Bank of America accepts any communicating personal computer.

"We think home banking will play a significant role in banking," according to Maury Healy, vice-president/director of marketing/public relations. "Years ago, the trend was to have a lot of branches — then it was ATMs. The need for brick and mortar branches is lessening now as banks harness these new technologies."

Indeed, the development of ATMs is comparable to the development of home banking. While 50% of the computer-literate Silicon Valley customers of Bank of America use ATMs, it has taken at least 10 years for the cash-dispensing machines to

(Continued on Page 116).

Davoxnet Allows Transmission Of Voice, Data

MERRIMACK, N.H. — A series of products to form a network allowing simultaneous transmission of voice and data, in both IBM 3270 and asynchronous protocols, over standard twisted-pair telephone wire was introduced recently by Davox Communication Corp.

Known collectively as Davoxnet, the products include two workstations that can be connected to the Davox controller by either telephone wire or coaxial cable; an interface for converting the standard controller from telephone wire to coaxial cable and for adding an expansion controller connected by telephone wire; and a software package for file transfer between IBM Personal Computers and IBM mainframes and the Davoxnet components.

The 1911 Intelligent Terminal reportedly provides for IBM 3270, Digital Equipment Corp. VT100 and other asynchronous emulation along with hookup capability for $2,175. The Professional PC Deskset workstation provides an additional feature on an integrated feature phone for $2,375.

The eight-port Davoxnet Interface is priced at $750, and the PC/Host file transfer is priced at $800. The Smart Button Administrator enables workstation soft keys to be changed remotely by an administrator or automatically by a host program and costs $750.

More information is available from Davox, 6 Continental Blvd., P.O. Box [illegible], Merrimack, N.H. 03054.

Zstem Debuts for Zenith's Z100

VANCOUVER, B.C. — KEA Systems Ltd. has developed Zstem, a smart-terminal emulator for the Zenith Data Systems Corp. Z100 running under the firm's Z-DOS operating system.

Zstem emulates a Data General Corp. Dasher D200 terminal and is said to provide parallel and serial printer support and bidirectional file transfer capability. Zstem users may configure several features, including data rates from 45.5 bit/sec to 38.4K bit/sec, the number of data, parity and stop bits, flow-control protocols and half- or full-duplex communications.

Zstem-D200 costs $124.95 from KEA Systems, Department ZCW-2, 11-811 Beach Ave., Vancouver, B.C., Canada V6Z 2B5.

Instant Cure for Computer Indigestion

John Beall & Company, Inc.

HP Net Analyzer Designed To Expand Test Capability

PALO ALTO, Calif. — Hewlett-Packard Co. has announced a network analyzer designed to expand testing capabilities for device characterization in the research and development laboratory and for production testing.

The HP 3577A network analyzer reportedly provides an integrated three-input receiver, graphics display and synthesized source. Also, the companion HP 35677A and HP 35677B S-parameter test sets are said to work with the network analyzer. The test sets reportedly also allow simultaneous display of transmission and reflection parameters.

The HP 3577A is said to be programmable over the HP Interface Bus. The company said simple programming codes minimize development time for automatic measurement software.

The product reportedly is useful for audio, video, baseband, intermediate-frequency and radio-frequency measurement problems and in areas such as sonar and digital communications.

The HP 3577A is said to cost $23,500, and the HP 35677A and HP 35677B cost $3,500 each, with delivery six weeks after receipt of orders. The company is located at 1820 Embarcadero Road, Palo Alto, Calif., 94303.

Terminal Ties Commands Of VT100, Tektronix 4027A

IRVINE, Calif. — CIE Terminals, Inc. announced recently a dual-personality, color graphics terminal that reportedly allows simultaneous use of Digital Equipment Corp.'s VT100 alphanumeric software commands and Tektronix, Inc.'s 4027A color graphics command structure and 4010/4014 emulation mode.

The CIT-467 employs Ansi X3.64 control sequences and provides rectangle, polygon, circle, arc and pie command functions, a company spokesman said. Compatible with 4027A graphics primitives, it also reportedly features full dot addressability, user-programmable scale factor and relocatable origin.

Video features include a 7- by 9-char. matrix, 132- by 80-char. column display, eight colors with 64 programmable combinations and a variable-speed smooth scroll up to 2,400 bit/sec, the spokesman said.

The unit costs $2,995 from 2505 McCabe Way, Irvine, Calif. 92714.

Fiberlink Units Announced For RS-232 Ports

WESTBURY, N.Y. — The Fiberlink Products Group of Math Associates, Inc. has announced a direct plug-in RS-232 Fiberlink, fiber-optic transmission system.

The XR-1150 reportedly connects two RS-232 serial ports between computer peripherals or microprocessors in the same manner as a standard interface cable. Contained within the shielded package is a full-duplex, 100K bit/sec optical transceiver said to allow operation at distances exceeding a mile between units.

Power for the XR-1150 can reportedly be supplied through spare pins on the integral DP-25P connector or by means of a plug-in ac adapter.

The units are priced at $349 per pair from Math Associates, 2200 Shames Drive, Westbury, N.Y. 11590.

Home Banking May Displace Check Writing

(Continued from Page 115)

become as widely accepted elsewhere.

Home banking "is certainly still in the initial phases," according to Sheldon Golub of the American Banker's Association in New York.

But most banks are enthusiastic about the new technology for a number of reasons. One is that banks will save money when paper checks are handled electronically instead of by 10.2 people.

Another reason is that banks are looking for ways to keep their customers. "With home banking, you're talking about a far greater capability for investing," Golub said.

The increased investment opportunities come about when the time lag involved in withdrawal and deposit is eliminated. So, someone with $100,000 to invest for only two weeks would normally keep the cash in a savings account, but could instead quickly put it into a higher yield investment electronically, Golub pointed out.

But not all banks are as enthusiastic as Bank of America. Shawmut Bank of Boston recently completed a pilot project offering basic home banking services to 100 existing customers.

While waiting for the results of the project to be studied, the bank remains tight-lipped. "We really don't have much to say," said Barbara Roux, project manager of electronic banking services.

Nearly Nine Million Computer-Involved People Around the World Rely on Our Publications For the News They Need.

We're CW Communications/Inc.; the world's largest publisher of computer-related newspapers and magazines. And wherever you go in the computer world, you'll find computer-involved professionals reading—and relying on—our publications. With highly trained and experienced editorial staffs all over the world, our publications give readers the best and most up-to-date information available in this rapidly changing industry.

Around the world:

We publish, co-publish or provide editorial services to the leading computer publications in the world, including publications in all of the following countries:
Scandinavia—Denmark, Sweden, Finland and Norway.
Western Europe—Germany, United Kingdom, France, Italy, Spain, Greece, the Netherlands.
The Mid-East—Kuwait, Saudi Arabia.
Asia/Africa—People's Republic of China, Korea, Japan, Singapore, Southeast Asia, South Africa.
The Southern Pacific—Australia.
Central and South America—Mexico, Brazil, Argentina, Chile.

In the United States:

In the world's largest computer market, we publish a whole series of publications that cover different aspects of the industry. Our largest publication, with more than half-a-million readers every week, is *Computerworld*, a weekly newspaper aimed primarily at larger computer users. Its companion publications include *Computerworld Office Automation*, *Computerworld On Communications* (each published semi-monthly) and a series of *Buyer's Guides* covering all major segments of the industry.

In addition, we publish *MICRO MARKET WORLD* for dealers, distributors, retailers and others involved in the microcomputer marketplace. For microcomputer users, we publish *InfoWorld*, *Microcomputing*, *PC WORLD*, *80 Micro*, *inCider*, *Run*, and *Hot CoCo*.

No one in the world publishes more computer information for more people in more countries than we do. And we'd be happy to give you more information on any of our publications. Just send a telex to our U.S. offices, attention CW International Marketing Services, (telex #95-1153) or write us at the address below.

CW COMMUNICATIONS/INC.

Ven-Tel Micro Modems Bow

SANTA CLARA, Calif. — Ven-Tel, Inc. has introduced four modems designed for use with various personal computers, including the IBM Personal Computer and Personal Computer XT and the Hewlett-Packard Co. HP 150.

All four are autodial, autoanswer, 1,200 and 300 bit/sec and are designed to run with varied software packages, including Microstuf, Inc.'s Crosstalk-XVI.

The modems are the PC Modem Half-Card, PC Modem 1200, HP Internal Modem and 1200 Plus.

The PC Modem Half-Card reportedly was designed to fit in the small expansion slot on the Personal Computer XT, leaving a standard slot for additional memory or other peripherals, and to fit in any slot of the Personal Computer. The system reportedly features automatic dialing and logon, terminal emulation and automatic data capture. It is priced at $549.

The HP Internal Modem is designed to fit into one of the HP 150 expansion slots and is reportedly compatible with HP software, including DSN/Link and PPC. It is priced at $425.

The PC Modem 1200 is said to be a full-size version of the PC Modem Half-Card, fitting in the Personal Computer, Personal Computer XT, Compaq Computer Corp. computers and Eagle Computer, Inc. computers. It reportedly will cost $499.

The 1200 Plus stand-alone smart modem reportedly features LED lights on the front to allow easy monitoring of the phone call and both a self- and a remote-diagnostic test. It is priced at $499.

The four modems will be available in January. Ven-Tel is located at 2342 Walsh Ave., Santa Clara, Calif. 95051.

Ven-Tel, Inc. 1200 Plus

Transmission Units Debut, Said to Cut Errors, Misuse

CHERRY HILL, N.J. — Datatel, Inc. recently announced two data security units said to protect against unauthorized data transmission over telephone lines and to eliminate transmission errors for users of asynchronous terminals.

The DCP4010 Originating Unit is installed at the remote site, between terminal and modem, and the DCP4015 Answer Unit is installed at the central site, between computer and modem, a company spokesman said.

Each unit is programmed with a four-digit code that must be matched by the two units at either end of the transmission link: the DCP4010 is programmed with four thumb-wheel switches, and the answering unit is programmed with four dual in-line package switches. Other features include a cyclic redundancy check for error detection and data retransmission and a 16K-byte buffer for storage and protection against buffer overflow, a vendor spokesman said.

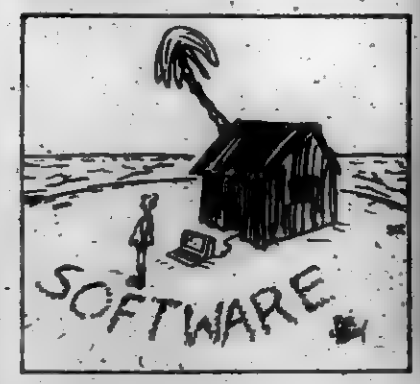
Pricing starts from $750 per unit from Datatel at Cherry Hill Industrial Center, Cherry Hill, N.J. 08003.

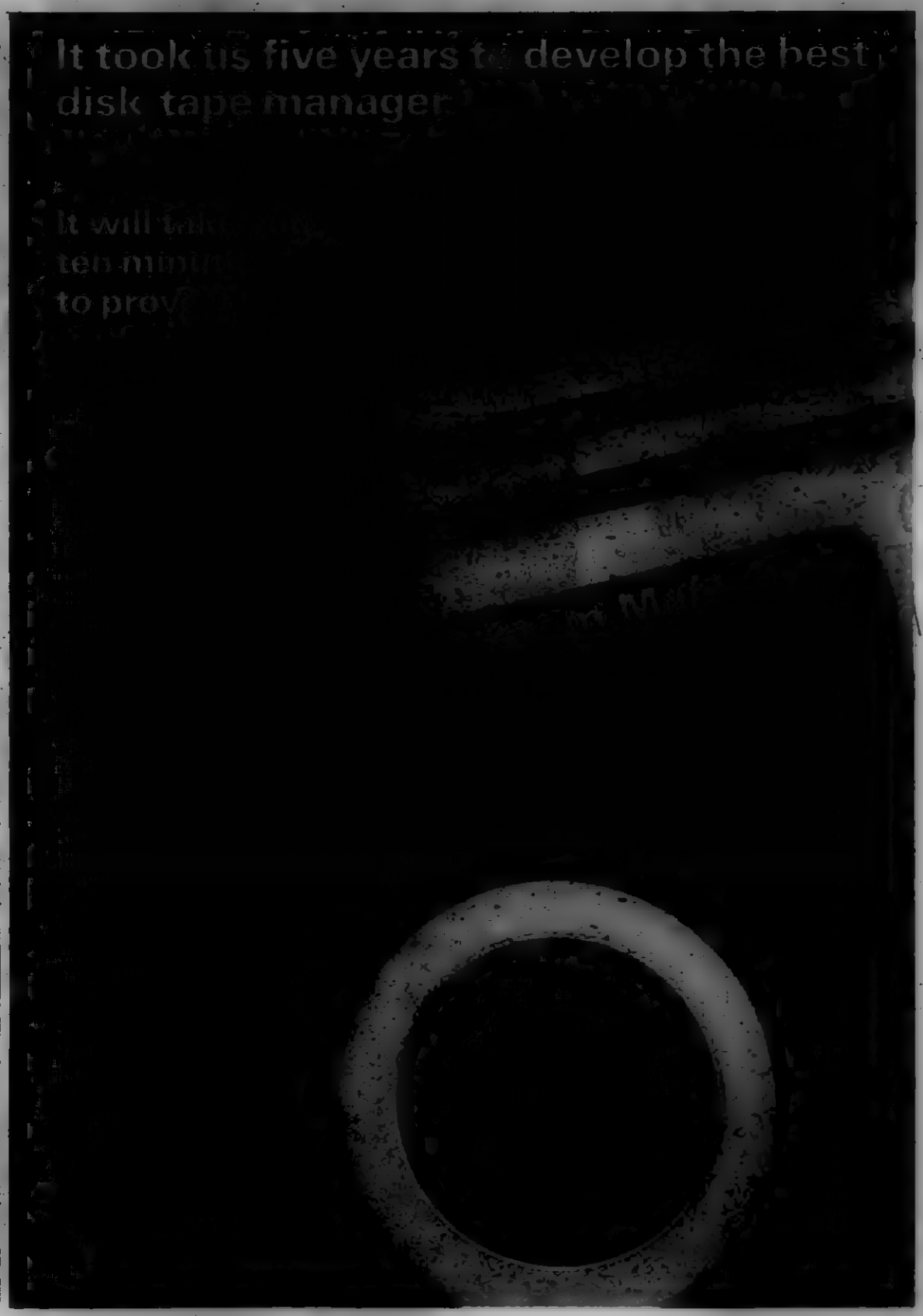
Cable Tester For Technicians Out For RS-232

SEATTLE — Datacom Northwest, Inc. has announced an RS-232 cable tester with a remote indicator for use on the bench or in the field by data communications technicians.

The Datacom RS-232 Cable Tester reportedly tests by two methods — the manual step mode or the continuous scan mode. Fifty LEDs are said to indicate connections on each end of the cable, while three more LEDs indicate open, short or continuity for each connection of the cable under test.

The device reportedly operates with the Datacom line of breakout boxes and pocket cablers. According to the company, the device will be available in January for $399. Additional information is available from Datacom Northwest, which is located at 11300 25th Ave. N.E., Seattle, Wash. 98125.





Modem Offers European Protocols

YOUNGSTOWN, Ohio — Western Datacom Co. has introduced an autoanswer, autodial modem that is said to enable any computer to telecommunicate with other modems located anywhere in the world.

Worldcom 200 is a standalone unit that uses the protocol of the country called, while maintaining compatibility with Federal Communications Commission (FCC) and Bell system standards for connections to the U.S. switched telephone network. The same RS-232C connection used for data also accepts dialing commands compatible with most half-duplex modems.

According to Western Datacom, the Worldcom 200 features FCC Part 68 registration with European protocols and tone or pulse dial on 1,200 bit/sec half-duplex lines or 300 bit/sec full-duplex lines. Operating modes include Bell 103/113, Bell 202, CCITT V.21, CCITT V.23 and videotex.

The price of the unit is $595 from Western Datacom, 5083 Market St., Youngstown, Ohio 44512.

Converters Eliminate Need for Leased Lines

HYANNIS, Mass. — Fibronics International, Inc. has introduced a pair of converters that use fiber optics between T1 modems or multiplexers, eliminating the need for leased telephone lines.

An FM-T1 converter translates into optical signals the 1.544M bit/sec bipolar T1 output and transmits the signals to the second FM-T1, which reconverts the information back to bipolar signals.

Prices for a pair of Fibronics FM-T1 fiber-optic converters start at $2,000. Delivery takes two to four weeks. More information is available from Fibronics International at 218 Main St., Hyannis, Mass. 02601.

Tektronix Offers Capability To 4115 Units

BEAVERTON, Ore. — Tektronix, Inc. has announced that its Autoconvergence capability is now a standard feature on all of the company's 4115 computer display terminals.

Autoconvergence is said to allow users to resolve the problem of color beams failing to intersect precisely at any point on a terminal.

Tektronix notes that beam convergence naturally drifts due to factors such as heat, position and equipment age, causing visual fatigue and loss of color information and images.

The 4115 terminal is priced at $19,950, according to the vendor.

More information is available from Tektronix, which can be contacted through P.O. Box 500, Beaverton, Ore. 97077.

Broadcast Scheduled For Feb. 9

WASHINGTON, D.C. — Tele-Update '84, a regulatory update for major telecommunications users, will be broadcast from here Feb. 9 to various teleconference locations around the country.

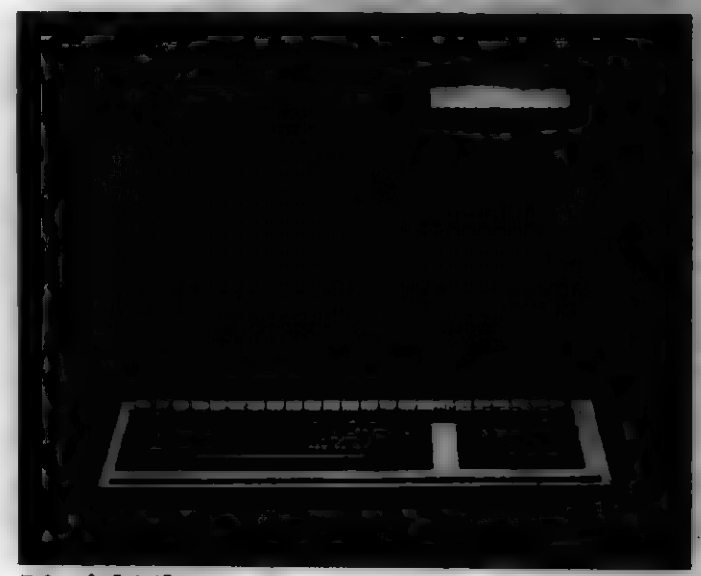
Sponsoring the conference is Jon Taylor and Co.'s Satellite Seminars.

The four-hour program tentatively is planned to include three panel discussions. The discussions will focus on topics such as: access charges, bypass systems and universal service, featuring participants from government agencies and Bell operating companies; deregulation of equipment and services, with representatives of the Federal Communications Commission, AT&T, other common carriers and the interconnect industry; and state regulation.

The program will feature two-way audio communications, according to the sponsors, and advance registration is priced at $75.

More information is available from Satellite Seminars through P.O. Box 356, Salt Lake City, Utah 84110.

CAN YOU FIND THE IBM* 3278 HIDDEN IN THIS PICTURE?



It's right there.

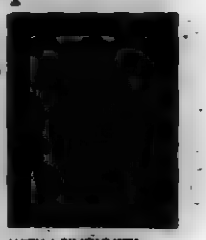
Inside the Advanced Personal Computer from NEC Information Systems.

In fact, the Advanced Personal Computer is the best personal computer for direct connect 3278 emulation, with 3274 and 3276 controllers.

Get the advantages of personal computing plus direct connect 3278 emulation.

With the APC, your people will be more productive than ever before.

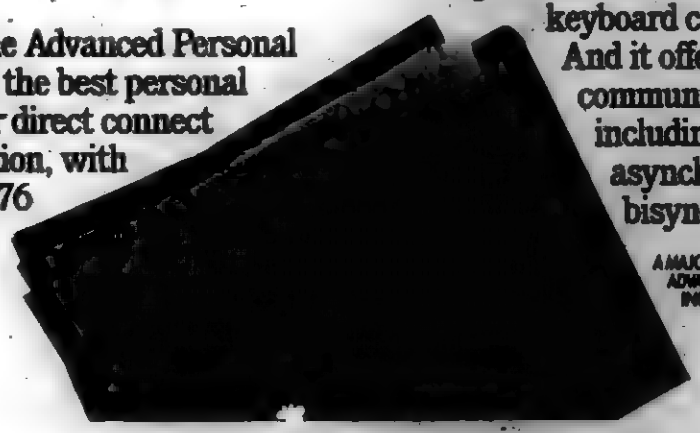
They can easily perform all their existing 3278 applications. Then, with a single keystroke, switch to a full function personal computer, quickly and easily.



WITH A SINGLE KEY-STROKE, YOU CAN SWITCH FROM 3278 EMULATION TO A FULL FUNCTION PERSONAL COMPUTER.

And the APC is fully compatible with all 15 different 3278 keyboard configurations.

And it offers a full range of communications protocols, including SNA/SDLC, asynchronous and bisynchronous.



A MAJOR INSURANCE COMPANY IS USING THE ADVANCED PERSONAL COMPUTER TO GREATLY INCREASE WORKER PRODUCTIVITY.

Prentice Announces Modem for Public Nets

SUNNYVALE, Calif. — Prentice Corp. has announced the 9600 A/B which, the company said, is a 9,600 bit/sec modem that functions over public-switched telephone networks.

The unit reportedly also operates over less expensive 3002-type unconditioned lines, and in leased-line operation, the 9600 A/B is compatible with CCITT Recommendation V.29. In both leased-line and public-switched network modes of operation, the unit conforms to CCITT Recommendations V.24 and EIA Standard RS-232C, according to the vendor.

The modem reportedly is designed for high-volume data communications between pairs of multiplexers in computer-to-computer data transfer applications or in medium-size to large networks. Said to be a compact desk modem unit, the 9600 A/B incorporates advanced large-scale integration for reduced power consumption.

The 9600 A/B is priced at $2,995 from Prentice, 266 Caspian Drive, P.O. Box 3544, Sunnyvale, Calif. 94088.

Seminars to Cover Micro Networks

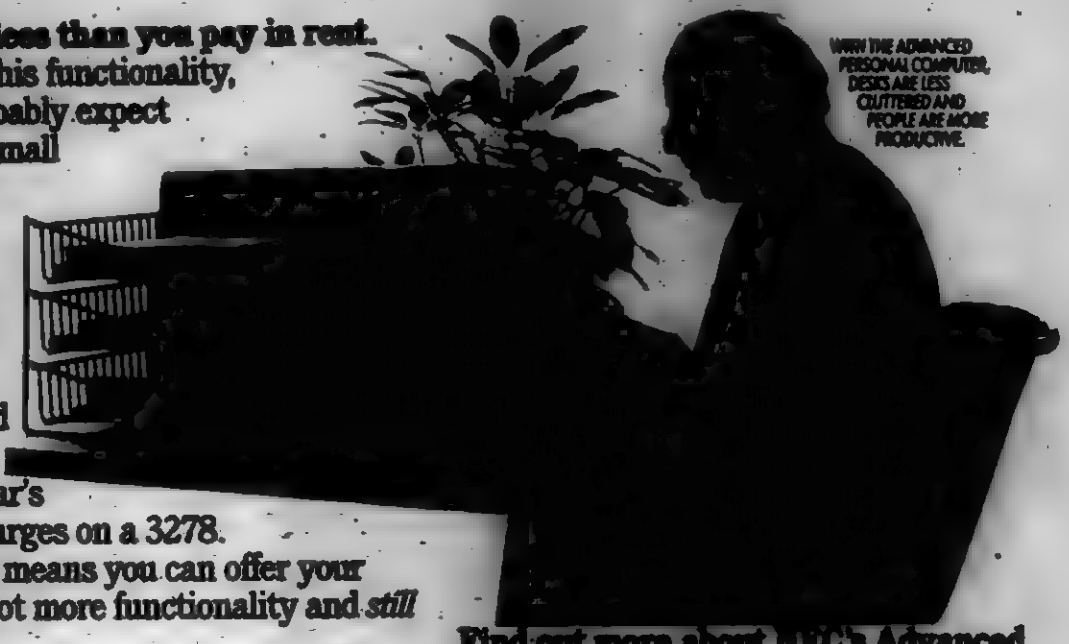
MINNEAPOLIS — Architecture Technology Corp. recently announced "Personal Computer Local Networks," a series of seminars to be held at five locations in March and April.

The seminars are set for: Phoenix, March 8-9; Atlanta, March 15-16; Minneapolis, March 22-23; Washington, D.C., March 29-30; and San Francisco, April 12-13.

The registration fee is $645. Architecture Technology can be reached through P.O. Box 24344, Minneapolis, Minn. 55424.

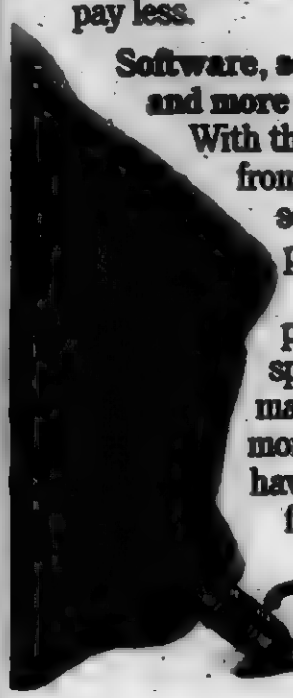
Own for less than you pay in rent.
With all this functionality, you'd probably expect to pay a small fortune for the APC. Surprise! The APC can be purchased for less than 1 year's rental charges on a 3278.

Which means you can offer your people a lot more functionality and *still* pay less.



Software, software, and more software.
With the APC, you can choose from hundreds of different software applications programs.

You can get word processing, forecasting, spreadsheets, database management and much more. In fact, we probably have a software program for any need you might have.



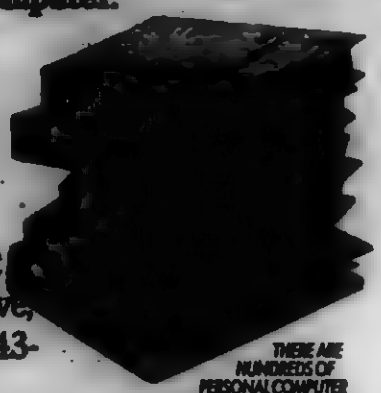
YOU CAN OWN AN NEC ADVANCED PERSONAL COMPUTER FOR LESS THAN THE COST OF LEASING A 3278 FOR 1 YEAR.

The APC also offers you the best color graphics in the industry, and a wide range of graphics software. The most storage capacity of any computer in its class. And the kind of reliability that NEC is famous for.

All for less than you're paying now.

*[illegible] is a registered trademark of International Business Machines Corp.

Find out more about NEC's Advanced Personal Computer.
For more information about the APC, or for the location of your nearest NEC representative, call 1-800-343-4419.


THERE ARE HUNDREDS OF PERSONAL COMPUTER SOFTWARE PACKAGES THAT RUN ON NEC'S ADVANCED PERSONAL COMPUTER.

And find out why so many 3278 users are saying "NEC and me".

NEC AND ME

NEC Information Systems, Inc.
1414 Massachusetts Avenue,
Boxborough, MA 01719

Terminal Enhanced By Addition Of Graphics

ANN ARBOR, Mich. — Ann Arbor Terminals, Inc. has combined a graphics controller with its Ambassador terminal to offer an integrated alphanumerics/graphics terminal with high-resolution output.

The graphics controller processes industry-standard Tektronix, Inc.'s 4010-4014 codes with a resolution of 768 pixels by 600 pixels, the vendor said.

According to the company, the user has control of the mapping from program drawing area to viewport, the size and angle of the alphagraphic characters and numerous graphics modes, including polygon draw and fill.

Over 50 graphics control parameters may be specified through either a set up menu or commands.

Hard-copy graphics output to a dot matrix printer is standard, according to the vendor.

The alphanumeric features of the terminal reportedly include a 60-line display with vertical scroll and zoom, Ansi-standard coding, editing and formatting controls and RS-232C printer output.

Thirty-eight keys are programmable on 60 levels with any Ascii string.

Common graphics commands may be downloaded to the function keys to facilitate execution, the company noted.

Data line monitoring functions provide diagnostics for checkout of both alphanumeric and graphics output, according to the vendor.

Displays may be set up to contain alphanumerics only, graphics only, or a combination of both, the vendor said.

The Ann Arbor Ambassador graphics terminal package reportedly is available for $3,090.

Ann Arbor Terminals is located at 6175 Jackson Road, Ann Arbor, Mich. 48103.

Provides Centralized Data Base

Netman Ready for VM/CMS Sites

SANTA MONICA, Calif. — California Software, Inc. has announced that its Netman data center and data communications management system is now available for IBM VM/CMS environments.

Netman is said to provide a centralized and integrated data base and to allow a user to perform inventory control, configuration management, order tracking, problem reporting, vendor analysis, failure notification, financial management, invoice verification, budget preparation and change management.

Netman VM/CMS includes more than 30 on-line screen, extensive batch and on-line reports and interfaces with popular report writer systems. It is said to utilize a single server machine to manage data base access for an unlimited number of users.

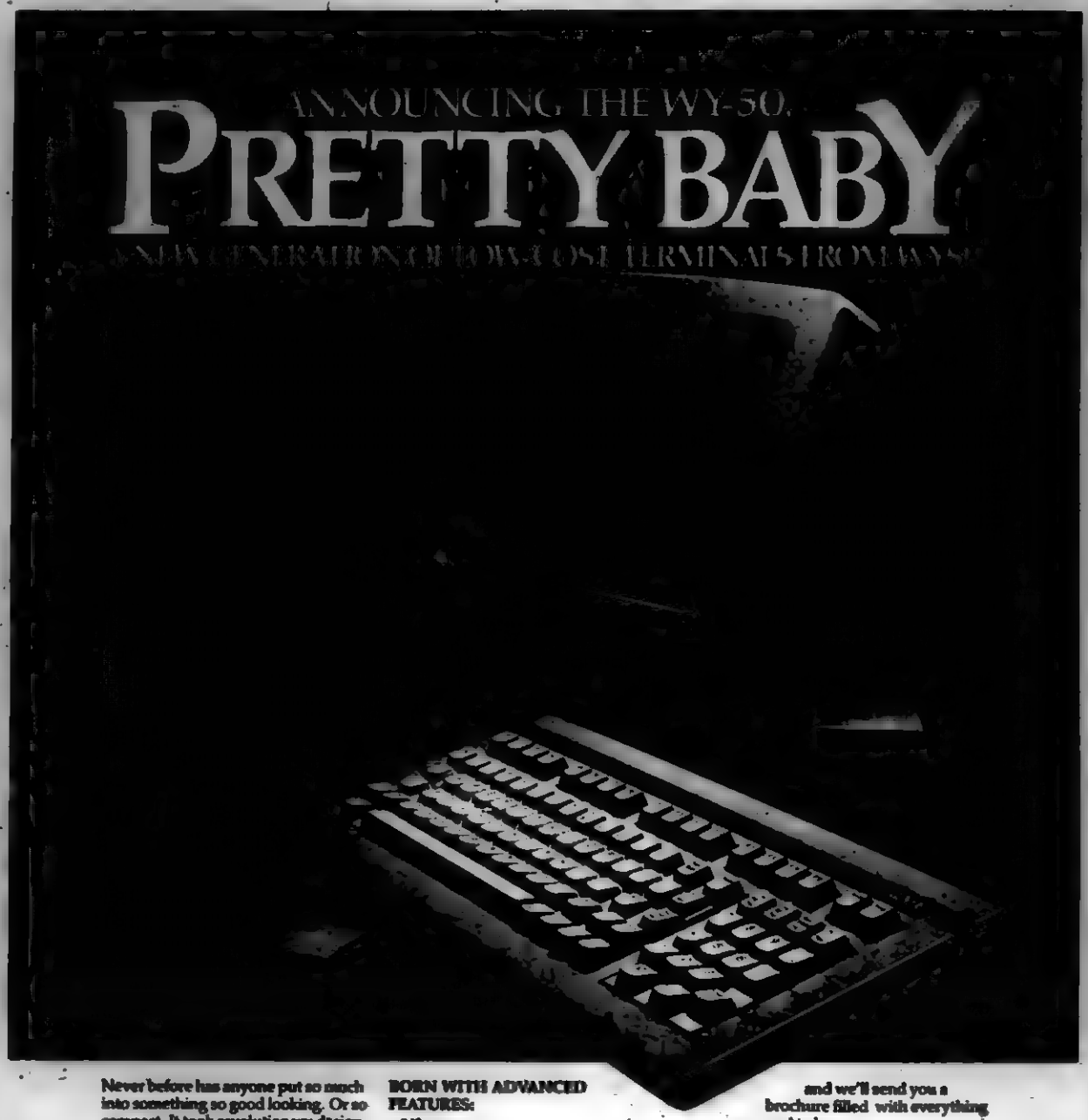
Netman VM/CMS is available now at an introductory license fee of $32,500 from California Software, 1460 Fourth St., Santa Monica, Calif. 90401.

IBM's PCjr Gets In-Board System

NORWOOD, Mass. — Microcom, Inc. has introduced an in-board communication system for IBM's PCjr.

Called Era 2, the system includes a 1,200 bit/sec modem and communications software. It incorporates the Microcom Networking Protocol for transfer of text or data files between personal computers and any other personal computer, minicomputer or mainframe. Era 2 also accesses remote data bases and utilities.

A free subscription to Dow Jones and an MCI Communications Corp. mail promotion are bundled with each Era 2 package. Priced at $429 per unit, the Era 2 carries a four-year warranty from Microcom, 1400A Providence Highway, Norwood, Mass. 02062.



Never before has anyone put so much into something so good looking. Or so compact. It took revolutionary design to do it. Design a lot of people couldn't accomplish for the price. But we did.

In fact, the birth of the WY-50 introduces a new standard for low cost terminals. It was conceived to give you 30% more viewing area. Developed to meet the most advanced European ergonomic standards. And best of all, delivered for a surprisingly low price.

The WY-50 sells for only $695.00.

BORN WITH ADVANCED FEATURES:
- 14" screen.
- 80/132 column format.
- Soft-set up mode.
- High resolution character.
- Low-profile keyboard.
- Industry compatible.
- Only $695.00.

For more information on the revolutionary design, outstanding features and unique good looks of our Pretty Baby, contact WYSE TECHNOLOGY and we'll send you a brochure filled with everything you need to know.

The WY-50. It's a real beauty.

WYSE
Make the Wyse Decision.

WYSE TECHNOLOGY 3040 N. First St., San Jose, CA 95134, 408/946-3075, TLX 910-338-2251, Outside CA call toll-free, 800/421-1058, in So. CA 213/340-2013.

Racal-Milgo Adds Omnimode 96 To Modem Line

MIAMI — Racal-Milgo, Inc. has introduced an addition to its Omnimode series of modems.

The Omnimode 96 reportedly operates at data rates of 4,800-, 7,200- and 9,600 bit/sec. The modem can reportedly be configured to operate with CCITT V.29 standards and for backward compatibility with the Racal-Milgo MPS 9601 or CMS 9601 modems. Test features for local and remote modems reportedly include standard tests, as well as CCITT V.54 loops.

Options on the modem include a Remote Modem Control and a multiport option for four-port operation, allowing data rates to be assigned in any combination of 2,400-, 4,800- and 7,200 bit/sec, according to a vendor spokesman.

The unit price for the Omnimode 96 ranges from $3,650 to $5,350, depending on the configuration. More information is available from Racal-Milgo at 8600 N.W. 41st St., Miami, Fla. 33166.

Ku-Band Tech Focus of Meet For February

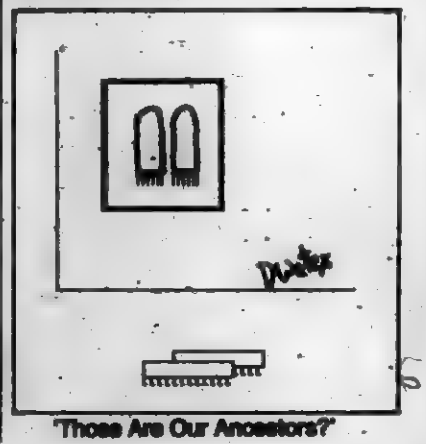
BETHESDA, Md. — Phillips Publishing, Inc. has announced a seminar to be held Feb. 16-17 in Washington, D.C., titled "Ku-Band Satellite Communications in the '80s."

The leader of the 1½-day seminar is Richard E. Wiley, former chairman of the Federal Communications Commission (FCC), one of the founding members of the law firm of Wiley, Johnson & Rein.

The topic of the seminar is the far-reaching impact which Ku-Band satellite technology will have on business and personal communications during the remainder of this decade.

According to the vendor, only one domestic Ku-Band satellite system is in operation, but the FCC has authorized an additional seven systems to be built and launched. The satellites are expected to have particular impact on business communications, because smaller earth station antennas for this band can be located on rooftops, making them accessible in high-density areas.

The price of the seminar is $595 per person. Phillips is located at Suite 1200N, 7315 Wisconsin Ave., Bethesda, Md. 20814.



"Those Are Our Ancestors?"

Compatible With IBM Personal Computer

Strategic Technologies Unveils Micro

ATLANTA — Strategic Technologies, Inc. has announced a briefcase microcomputer, the PC Traveler, which is software compatible with the IBM Personal Computer.

The unit weighs 28 lb and uses an Intel Corp. 80186 microprocessor. The PC Traveler uses Release 2.0 of Microsoft, Inc.'s MS-DOS operating system and features a 9½-in. diagonal ac gas plasma display with an 80-col. by 25-line format. The vendor claims to be the first to offer a micro incorporating a gas plasma display.

Other features of the unit include an integrated printer that can accept both letterhead and fanfold stationery. The printer can operate at 80 char./sec and print 80 or 132 char./line. Multiple print fonts, character sets and dot-addressable graphics are also supported.

The PC Traveler includes a 6.2M-byte cartridge disk drive. Conventional half-height diskette drives are also available, the vendor said.

The PC Traveler comes with 128K bytes of standard random-access memory, which is expandable to 256K bytes. In addition, the unit can be equipped with an internal modem.

Strategic's PC Traveler

The PC Traveler costs $4,495, Strategic Technologies said from 7001 Peachtree Industrial Blvd., Building 3, Norcross, Ga. 30071.

Microfilm Aid Ties Indexing, Addressing

KINGSTON, N.J. — Advanced Data Management and Intec Equipment, Inc. have announced Computer-Aided Retrieval (CAR) capability for the storage and access of microfilmed documents for their data base management software product, DRS.

This capability combines the indexing and rapid addressing features found in computer data bases with storage capabilities of microfilming. CAR was designed to be compatible with Digital Equipment Corp.'s PDP-11 minicomputers and VAX series superminicomputers and IBM's System 370, 4300 series and 30 series mainframes.

The price for CAR ranges from $15,000 to $52,000. Additional information is available from Advanced Data Management through 15-17 Main St., P.O. Box 601, Kingston, N.J.

Charles River Introduces Two Processors

FRAMINGHAM, Mass. — Charles River Data Systems, Inc. has added two 32-bit processors to its Universe line of superminicomputers.

Called the Universe 68/35 and the Universe 68/67, the units are based on the Motorola, Inc. 68000 microprocessor and incorporate a 32-bit Motorola Versabus I/O bus. The units also offer a 4K-byte cache memory, the vendor said.

The Universe 68/35 features a 5¼-in. Winchester disk drive with a formatted capacity of 35M bytes. The unit offers up to 3M bytes of main memory and can support up to 64 users. The 68/35 uses an integral 8-in., double-sided, double-density floppy disk drive for program loading and backup storage, the vendor said.

The Universe 68/67 uses a higher capacity 8-in. Winchester disk drive with a formatted capacity of 64M bytes. A built-in 45M-byte streaming tape drive is used for system backup. The Universe 68/67 comes with 512K bytes of main memory, which is expandable to 5M bytes, the vendor said.

Like other products in the Universe line, the 68/35 and 68/67 support the Unix operating system as well as Charles River's Unos operating system, the vendor said.

The Universe 68/35 including 512K bytes of main memory with byte parity checking, 35M bytes of Winchester disk storage and 1.25M bytes of floppy disk storage costs $14,900. Delivery time is 30 days, the vendor said.

The Universe 68/67 with 512K bytes of main memory, 64M bytes of Winchester disk storage and a 45M-byte streaming tape drive costs $24,900. The unit will be available in the first quarter of 1984, the vendor said.

Charles River Data is located at 983 Concord St., Framingham, Mass. 01701.

CDC's Subsystems Boast 18M-, 30M-Byte Storage

MINNEAPOLIS, Minn. — Control Data Corp. has introduced two 5¼-in. Winchester disk subsystems that offer 18M and 30M bytes of storage, respectively. The units can be used with microcomputers employing an IBM architecture.

Called the Storagemaster 518 and 530 subsystems, the devices will be available in the first quarter of 1984 at Sears Business Systems Centers and participating Computerland outlets, the vendor said.

Based on CDC's Wren disk drives, which previously were only available to OEMs, each subsystem includes a disk drive, power supply and fan. A single-board controller is supplied for installation, without adjustment, in the IBM Personal Computer processor unit, the vendor said.

The Model 518 costs $2,595 and the 530 costs $3,390, the vendor said.

In addition, CDC announced the Storagemaster Premium series of 5¼- and 8-in. flexible diskettes. The diskettes are offered with 48 or 96/100 track/in. densities with single- or double-sided recording. Storage capacities range up to 1M byte per diskette with various format options available. The diskettes are available in packages of 10 and cost approximately $45 to $65 per package, Control Data said from 2200 Berkshire Lane, Minneapolis, Minn. 55441.

Polo Workstation Debuts

MOUNTAIN VIEW, Calif. — Polo Microsystems, Inc. has introduced an integrated personal computer workstation that includes monitor, dual disk drives and modem.

The Polo system is supplied with a 128K-byte CPU, expandable to 768K bytes, a 12-in. color monitor and two double-sided, double-density, 5¼-in., 360K-byte disk drives. Memory can be expanded an additional 10M bytes with the hard disk option. Microsoft, Inc.'s MS-DOS and Digital Research, Inc.'s CP/M emulator operating systems are standard.

Priced at approximately $3,400, the system is available from Polo Microsystems at 2570 El Camino Real W., Mountain View, Calif. 94040.

Ricoh Releases Printers, Floppy, Plotter

FAIRFIELD, N.J. — Ricoh of America, Inc. recently introduced a number of peripheral products, including several types of printers, an IBM-compatible floppy disk drive and a four-color plotter.

Among the printers is the LP 4120, a tabletop laser printer that operates at 12 page/min. It weighs 112 lb and provides four interchangeable type fonts. The printer also features overlay and portrait/landscape conversion capabilities and can be interfaced to a variety of data processing and networking systems, the company said.

Ricoh's line of three serial impact printers features a double-daisy printing wheel and bidirectional printing. All of the printers accept optional forms tractor feeder, letter guide and cut-sheet feeder. The units range in speed from the 20 char./sec 1200N to the 40 char./sec 1500Q to the 50 char./sec 1600Q.

The Ricoh TP-X is a thermal printer capable of printing up to 100 char./sec. The 24-element printing head delivers an output resolution of 180 dot/in.

The RF8160, a half-size, 8-in. double-sided floppy disk drive, features double-density design that accommodates up to 1.6M bytes of storage. It is said to be compatible with a range of IBM units, including the 3740 and 32 drives, the 3600 and 4964 double-sided drives and System/34 drives.

Finally, Ricoh has introduced the GP-1, a four-color ballpoint pen plotter/printer for business and personal computers. At a printing speed of up to 120mm/sec, the GP-1 can print in black, blue, red and green ballpoint and felt-tip pen type. It features 26 plotter commands and an oil pen that is said to last 1,000 meters.

The LP 4120, which has a suggested retail price of $14,000, will be available from Ricoh in the first quarter of 1984. The serial impact printers will be available at the same time from retailer Hamilton/Avnet. Suggested retail prices are $900 for the 1200N, $1,800 for the 1500Q and $2,700 for the 1600Q. Prices for the TP-X, RF8160 and GP-1, which will be released in the second quarter of 1984, are not yet available. More information is available from Ricoh, 20 Gloria Lane, Fairfield, N.J. 07006.

Multimodel Desktop Operates As Stand-Alone Using CP/M

MINNEAPOLIS — Computer Designed Systems, Inc. has introduced its Adviser Micro Plus, a multimodel desktop computer.

The unit can communicate with the company's Adviser series of interactive microcomputers or operate as a stand-alone system using Digital Research, Inc.'s CP/M operating system. Accounting and word processing software is available, in addition to programs for graphics and electronic spreadsheets, the vendor said.

The basic system comes with an 80-col. printer and a 12-in. CRT terminal that displays 80 columns by 24 lines. Also included is one 5¼-in. disk drive. Storage capacity of the diskette drive versions ranges from 500K bytes to 2M bytes; optional hard disk storage is available, the vendor said.

A standard feature is a detachable 96-key typewriter keyboard with a 10-key calculator pad. Micro Plus is available in either monochrome or color versions, the vendor said.

The base price of Micro Plus is $2,000. More information is available from Computer Designed Systems, 10911 Olson Memorial Highway, Minneapolis, Minn. 55441.

Controller Joins DEC Processors, Industry Drives

GARDEN GROVE, Calif. — An emulating 5¼-in. floppy disk controller, said to feature Zilog, Inc. Z80-based design, is available from Distributed Logic Corp. (Dilog) for interfacing Digital Equipment Corp. LSI-11-11/23 Plus and Micro/PDP-11 processors to one or two 96 track/in., double-sided, double-density 5¼-in. floppy drives with industry-standard SA450 interface.

The Model DQ619 controller reportedly is contained on one dual-height printed-circuit board that includes all control and interface electronics for DEC RX02 disk drive emulation supported by DEC RT-11, RSX-11 and RSTS operating systems — without software patches or modifications.

The controller introduces dc motor control and includes 22-bit addressing for 4M-byte access, the vendor said. Other features include a full sector data buffer, on-board self-test and compatibility with DEC XII data reliability diagnostics.

The Model DQ619 costs $595 in quantities of 50. More information is available from Dilog at 12800 Garden Grove Blvd., Garden Grove, Calif. 92643.

Firm Announces RAM Board For IEEE-696 Bus

DALLAS — SDSystems, Inc. has announced the Expandoram IV, a random-access memory (RAM) expansion board for systems based on the IEEE-696 S-100 bus.

The product comes with 256K bytes of parity-checked memory. The board supports both 8- and 16-bit data transfers and may reside anywhere in the 24-bit address space of the IEEE-696 bus, the vendor said.

The Expandoram IV utilizes 150-nsec, 64K-byte dynamic RAM chips. The board is also designed to use 256K-byte RAM chips as they become available. The 256K-byte chip configurations yield a memory capacity of 1M byte, according to the vendor.

The Expandoram IV costs $1,145, the vendor said. SDSystems can be reached through P.O. Box 28810, Dallas, Texas 75228.

Disk Drive Series Targeted At OEM, Mini Markets

SANTA CLARA, Calif. — Memorex, Inc. has introduced a series of 8-in. Winchester disk drives with 166M bytes of storage aimed at the OEM small business computer and minicomputer markets.

The Memorex 230 series contains three models to match the storage requirements of small systems: Model 233 (83M bytes), Model 234 (1.1G bytes) and Model 236 (1.6G bytes). Each of the models has the industry standard storage module drive interface with a 1.2M byte/sec transfer rate, the vendor said.

The 230 series features 30-msec average access time with a switchable option that permits cartridge module drive interface users to integrate the drives without changing the interface.

The series permits 6.4G bytes of storage to be configured in the same space as a single 14-in. drive or 3.3G bytes in half the space, the company said.

Evaluation units will be available in January 1984, with production quantities available in March.

The Model 233 will be priced at $2,420, the Model 234 at $2,640 and the Model 236 at $3,080.

More information is available from the vendor, which is located at San Tomas at Central Expwy., Santa Clara, Calif. 95052.

FOR THREE DAYS IN TEXAS WILL TURN

No single computer, personal or otherwise, has so profoundly affected all of business and industry as the IBM Personal Computer.

And now, for three days only, you can see, touch, use and compare the hardware, software, peripherals and compatibles that run on, like or with this revolutionary machine. It's the PC *World Exposition* in Houston, and you are invited to join us.

You'll see hundreds of exhibits from all the product leaders. Both makers and marketers of hardware, software, printers, peripherals, add-ons and services in a giant exhibition and retail selling event. Here's a list of some of the product leaders you'll see:

Alpha Software Corp.
Anadex Inc.
Arbor Technology
Ashton-Tate
AST Research Inc.
Benchmark
BOS National Inc.
BPI Systems Inc.
Robert J. Brady Company
Braid Communications
Brown Disc Manufacturing
Business Computing
CDI
Celestial Software Inc.
Cermetek Microelectronics
Compaq Computer
Computercraft
Computer Intelligence
ComputerKnowledge Corp.
Computer Roomers
Computerworld
Computex Corporation
Contemporary ComputerWear
Corona Data Systems
Corvus
CPU Corporation
Creative Computer Products
Data Business Vision
Datamac
Data Storage Solutions
Data Translation Inc.
Decision Data Computer Corporation
Digital Communications Associates
Discortex Corp.
Distributed Logic Corp.
Dynax Distributors
Emulex Corporation
ENVAX Systems Inc.
ESC Technologies, Inc.
Everex Systems Inc.
Ferox Microsystems
Hayden Book Co. Inc.
Hewlett-Packard Company
Human Edge Software Corp.
I.B. Magazette
Independent Computer Consultants Associates
Information Builders
Informer
InfoWorld
Interface Inc.
International Computerized Linguistics
Interphase Corporation
Lexisoft Inc.
LPKF Pacific
Marc Software
MICRO MARKETWORLD
Micro-Design Inc.
Micro Line Inc.
Microtek Lab
National Instruments
NEC
Novation
Omega Software Inc.
Omni Graphics Inc.
On Trak Data Systems
OSM Computer Corp.
Palantir Software
Panamax Line Conditioning
P.C. Telemart
PC World
Pencept Inc.
Personal CAD Systems
Petroware
Phase Information Machines
Prentice Hall Business & Professional Division
Printronix Inc.
Que Corporation
Racal-Vadic
Roland DG
RTCS/Real Time Computer Science Corp.
Santa Clara Systems
Seequa
Sensor-Based Systems
Software Automation Inc.
Software Centre International
Software Solutions Inc.
Sorbus Service Division MAI
Sperry Corp.
Stapmagraphics Corporation
SWI International Systems
Syspriat Inc.
Systems Management Associates
Tall-Grass Technology
TCS Software
Televideo Systems Inc.
3M Data Recording Products
Thunderhawk Corporation
Toshiba America Inc.
United Networking Systems Inc.
Vectrix Corp.
Verbatim Corporation
Vertex Systems
ZEDUCOMP

(Exhibitors as of Dec. 15, 1983)

Shugart Offers Winchester Series, Microfloppy

SUNNYVALE, Calif. — Shugart Corp. has introduced a series of intelligent 5¼-in. Winchester disk drives that reportedly provide device independence from CPUs and a double-sided 3½-in., 1M-byte disk drive for desktop and portable computers.

The Shugart 700S series of Winchester disk drives, the 706S and 712S, are said to utilize intelligent small computer system interface controllers and half-height disk drives in an integrated, system-level product. The devices reportedly require only the connection of the drive to the host with the small computer system interface cable for integration.

The 706S is designed for a 5M-byte formatted capacity, and the 712S offers a 10M-byte formatted capacity. Both units reportedly have the intelligence to relieve the processor and controller of housekeeping functions such as formatting, data error detection and correction, defect mapping, data buffering, automatic retries and self-arbitration.

Shugart's latest microfloppy disk drive is the Shugart 350, which the company says occupies only one-fourth the volume of a standard 5¼-in. minifloppy drive.

The 350 reportedly operates with the Ansi working standard 3½-in. hard-shell cartridge media format, while providing 1M byte of unformatted capacity, 6-msec track-to-track access time and 80 tracks per side.

According to the company, the 350 may be incorporated into current systems with minimal impact on controllers and software investments and is quieter than minifloppies because it has only nine moving parts.

The 700S series and the 350 will be available for evaluation during the first quarter of 1984, with volume slated for the second quarter. The 350 costs about $200 in OEM quantities. The 706S costs $661, and the 712S costs $716 in OEM quantities.

Shugart is located at 475 Oakmead Pkwy., Sunnyvale, Calif. 94086.

Personal Computer Unveiled By Royal Business Machines

WINDSOR, Conn. — Royal Business Machines, Inc. has introduced a personal computer that features 64K bytes of random-access memory and the ability to handle programs written under Digital Research, Inc.'s CP/M operating system.

Called the Royal Alphatronic Personal Computer, the system is based on a Zilog, Inc. Z80A microprocessor and includes 32K bytes of read-only memory (ROM), consisting partly of Microsoft, Inc.'s Basic Interpreter. According to the vendor, the computer addresses a variety of professional business and tutorial applications.

Built-in interfaces connect a cassette recorder, two disk drives and a Centronics Data Computer Corp.-type printer. An RS-232C communications interface has also been included for connection of printers, modems and other peripherals.

Any color or black-and-white television or professional-quality red-green-blue monitor can be used with the Alphatronic system. Depending on the monitor, the computer can display either 80 or 40 columns by 24 rows, allowing the flexibility of a wide range of programs. The system's high character resolution is provided by an 8- by 12-dot matrix, and eight foreground and eight background colors can be selected.

Keyboard features include a built-in 79-char. keyboard with 6 double programmable function keys (Ascii layout), separate numeric key pad, separate cursor control keys, two oversize return keys, positive touch keyboard and card holder for key function references.

Options include a line of ROM cartridges, which plug into the top left side of the computer for optional game and tutorial software, and two disk drives — a 5¼-in., slim-line double-density drive with controller (320K bytes) and a 5¼-in., slim-line double-density drive without controller (320K bytes).

The price for the computer is $695 from Royal Business Machines at 500 Day Hill Road, Windsor, Conn. 06095.

Interface Cable Out From IQ

BELLEVUE, Wash. — IQ Technologies, Inc. has announced the SC8J7 Smart Cable, an RS-232 interface cable.

The product interconnects computer systems, terminals, modems, printers and other devices with an RS-232 interface. The cable connects handshake lines used in specific applications and functions at transmission rates of up to 19.2K bit/sec, the vendor said.

The price is $119.95, according to IQ Technologies, which is located at Suite 308, 11811 N.E. First St., Bellevue, Wash. 98005.

FEBRUARY, ALL EYES IN TO THE IBM PC.

Plus, we'll present personal computer experts from around the nation in an up-to-the-minute conference program. You'll learn how to choose and how to use the technology and equipment surrounding the PC family of microcomputers. Here's a partial listing of the conference sessions:

Wednesday, February 1, 1984
User Sessions:
The Benefits of the IBM PC for Small Businesses
Financing Options and Tax Advantages
Available Add-Ons and Peripherals
Software: What's Available and How to Find It
What Do the Compatibles Have To Offer?
How I Became Compatible With My IBM PC
Medical/Dental Applications for the PC
The PC in the Law Office
PC's and Real Estate
Manufacturing Resource Planning with the PC
Investment Software for the PC
CPA Software: The Bottom Line
Software for Insurance Applications
Distributed Control Software for the PC

Thursday, February 2, 1984
User Sessions:
The Anatomy of the IBM PC
Defining Levels of Compatibility Between Systems
Overview of Compatibles: Desktops and Portables
Word Processing Software
Database Management Software
Business Graphics Software
Analyzing Your Software Requirements
Overview of Major Business Applications Software
Integrated Software Solutions

Friday, February 3, 1984
User Sessions: The PC in the Corporate Environment
Review of Policy and Planning Issues
Implementation Strategies
Use of PC to Mainframe Communications (Includes Security Issues)
Local Networking for the PC

Quite simply, the PC *World Exposition* is the biggest event in Texas for the most important computer in history.
Don't miss it.

FREE ADMISSION to one Conference Session of your choice. Just present this coupon at the Registration Desk any day of the Show, pay the regular $10 exhibits only admission and choose any one Conference Session free of charge. One coupon per person.

The PC World Exposition
Houston
February 1-3, 1984, Astro Hall

SAVE $5.00 on Full Exhibit & Conference Admission. Present this coupon at the Registration Desk and pay just $25.00 for a Conference Pass entitling you to attend all Conference Sessions and three days of exhibits. One person per coupon.

IT'S WHAT THE WORLD IS COMING TO.

The PC *World Exposition* is produced by Mitch Hall Associates
in cooperation with CW Communications, Inc., publishers of PC World, MICRO MARKETWORLD, InfoWorld, and Computerworld.

Three-day admission to all exhibits and conference sessions is $30.00. Admission to the exhibits only for three days is $10.00. Show hours run from 10:00 AM to 5:00 PM Wednesday and Thursday, February 1 and 2, and from 10:00 AM to 3:30 PM on Friday, February 3. Conference sessions run from 8:30 – 10:30 AM and 1:30 – 5:30 PM on all three days.
For speaker and conference information, call CW Communications at 1-800-336-4880.
For information on exhibiting, call Mitch Hall Associates at 1-617-369-7401.

* signifies manufacturer's registered trademark.
™ signifies manufacturer's trademark.

MCBA introduces shrink-to-fit software.

With nine years in minicomputer software, 15,000 installations worldwide and an established reputation in the mini world, MCBA is proudly shrinking its software line.

Down to micro size.

We've taken the impressive power of minicomputer software and made it available for micros. Right now.

Alter the fit? Absolutely.

Alter the functionality, modularity and capability? Not one bit…so to speak.

This new line of serious microcomputer software is by far the most comprehensive, well-tested and sophisticated in the industry today. By whose standards? Thousands of MCBA users who rank it the best in the business.

MCBA's library of 16 integrated manufacturing, distribution and accounting packages can be installed in whatever combination

nd sequence a user eeds for his or her usiness.

It grows with businesses. No matter what size they are now. Or want to be later.

And MCBA software now runs in RM/COS,® UNIX™ and UNIX look-alike environments.

In other words, we've tailor-made our newest software to fit micros—as comfortably as it fits user needs.

So whether you're a dealer or a user, find out about it. Call us now at (818) 957-2900.

Shrink-to-fit software. For growing businesses.

MCBA®

Minicomputer Software for Micros.

RM/COS is a Registered Trademark of Ryan-McFarland Corp. Unix is a Trademark of AT&T. MCBA is a registered trademark of MCBA, Inc.

Bits & Pieces

Two Nonstop Power Units Designed for Applications

DALLAS — Bits Power Systems, Inc. has announced two uninterruptible power supplies (UPS) for computer applications requiring dedicated, continuous and isolated electrical power.

According to the vendor, the units are always on-line. Utility line power is used only to maintain a full charge on the internal gel-type batteries.

Model UPS-200 and UPS-400 have visual, audible and remote alarm functions. Standard full load backup time from internal batteries is 10 minutes. External 12V batteries may be plugged into a connector for extended backup time and automatic charging, the vendor said. Four standard grounded output receptacles are provided.

UPS-200 (200W) measures 5-in. high by 13-in. wide by 16-in. long and weighs 35 lb. Model 400 (400W) measures 6-in. high by 16-in. wide by 18-in. long and weighs 55 lb.

The price for the UPS-200 is $795 and $995 for the UPS-400.

Further information is available from Bits Power Systems, Suite B114, 11020 Audelia Road, Dallas, Texas 75243.

Plug-In Security Module, Software Back IBM Micros

ANNANDALE, Va. — Advanced Computer Security Concepts, Inc. has announced a plug-in module and associated software that will prevent unauthorized disclosure or modification of confidential or proprietary data on the IBM Personal Computer or Personal Computer XT.

The module contains a Zilog, Inc. Z80 microprocessor, 4K bytes of random-access memory, a minimum of 2K bytes of erasable programmable read-only memory, buffers and flags, a software implementation of the Data Encryption Standard, interface software and data protection software that enciphers all data residing on a diskette or hard disk. The data is deciphered only after being loaded into the memory and is again enciphered before being written back to the disk file, the vendor said.

The system operates under IBM PC-DOS Release 2.0 and costs $795. Further information is available from Advanced Computer Security Concepts, 4609 Logsdon Drive, Annandale, Va. 22003.

Desktop Chubb-8900 Offers Security Manager System

TORONTO — Chubb Engineered Systems has announced the desktop Chubb-8900, a computer-based security management system.

The unit can be handled by one operator and performs a variety of control/command functions, such as recording and controlling access via card readers, monitoring doors and intruder detection devices and signals heating, ventilation and air conditioning abnormalities. It can also unlock doors, turn lights on and off and sound required signals at prescheduled times or in response to specific conditions, the vendor said.

The system can handle 32 card readers, 5,000 pass cards and provide monitoring and command functions for 1,000 individual zones.

Prices begin at $35,000 and vary according to the size and complexity of the application, the vendor said.

Further information can be obtained from Chubb Engineered Systems at 80 Horner Ave., Toronto, Ont., Canada M8Z 4X9.

Storage Control Device Simplifies Winnie Use

SAN JOSE, Calif. — Priam Corp. has introduced an intelligent storage control device designed to simplify integration of Priam Winchester disk drives into multiuser computer environments.

The Delegate DS201 reportedly manages combinations of up to four 5¼-in., 8-in. and 14-in. Winchester disk drives with data rates of up to 1.8M byte/second has ports for ¼-in. tapes and floppy disks.

It contains an autonomous microprocessor with its own memory and I/O controllers, allowing it to delegate operations with minimal host involvement.

The DS201 is the second Delegate-series control device. It offers the ANSC Intelligent Peripheral Interface rather than the Smart-T interface of the earlier DS101.

The unit will be available during the first quarter of 1984 at a price of $975 in OEM quantities.

Priam Corp. is located at 20 W. Montague Expwy., San Jose, Calif. 95134.

Digital Optical Disk Drive Fits OEMs, Integrators

PARIS — Thomson-CSF Communications has announced the Gigadisc GD 1001, a read/write digital optical disk drive for OEMs and systems integrators.

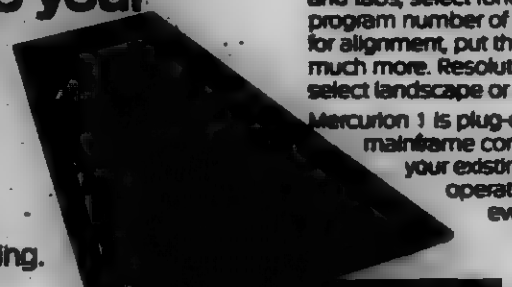
The product is capable of storing 1G byte of formatted data on a single-sided, 12-in. optical disk. The unit is available in both a 19-in. rack-mountable version and a stand-alone tabletop unit, the vendor said.

The unit costs between $6,000 and $9,000 and is currently available in OEM quantities, the vendor said.

Thomson-CSF can be reached at 23 Rue de Courcelles, Bureau 8.02, BP 96-08, 75362 Paris Cedex 08, France.

Mercurion 1

The page-per-second non-impact printer matched to your computer



...and priced to change all your thinking.

Now Mercurion 1 makes non-impact printing as cost-effective as it is performance-effective. Revolutionary ion deposition imaging—far simpler and more reliable than laser xerography—gives you letter quality printing, and on standard 8½ x 11 paper now demanded by government and most businesses. All of this, plus 5,280 lines-per-minute.

At an initial cost less than 50% that of conventional non-impact printer systems, Mercurion 1 also substantially reduces maintenance costs, downtime, and per-page operating costs. And does it quietly (55dBA).

A simple, user-friendly control panel lets you set margins and tabs, select fonts (up to 8 styles and sizes), program number of copies (1 to 255), feed a single sheet for alignment, put the system through self-test, and much more. Resolution is 240 x 240 pixels, and you can select landscape or portrait orientation.

Mercurion 1 is plug-compatible with all popular mini- and mainframe computers. It's designed to replace your existing impact line printer directly—no operating system software changes. We even supply the cable.

And you can count on SSI quality and service support. Thousands of our printer systems are in use worldwide.

Call us or mail the coupon below for a fully-detailed brochure on this great new printer system.

SSI Southern Systems, Inc.

2841 Cypress Creek Road
Ft. Lauderdale, FL 33309.
(305) 979-1000 (800) 327-5802
Telex 522135

Southern Systems Canada:
(416) 229-2589

Soup up your Volkswriter.

Everybody knows Volkswriter, the word processing software package that's become synonymous with high performance. Now, there's a way to get even higher mileage out of your Volkswriter. Hook it up to a Dataproducts P Series dot matrix color printer.

The versatile P Series translates the executive class, word processing capabilities of the Volkswriter into brilliant full color charts, graphs and text. It delivers a full page of text quality print in nothing flat while its sheet feeder automatically prevents loading hassles. And the P Series uses pin feed or plain paper and has the brains to fill every appropriate line with crisp, sharp copy, even if it has to justify to do it. And the P Series color printer has dual speed capability for correspondence quality output for the Volkswriter's many word processing applications and high speed output for draft and spreadsheets.

The Dataproducts P Series color printer. Think of us as a supercharger for your Volkswriter.

For more information go to your nearest computer store and ask about the Dataproducts P Series color printer, or call Dataproducts, 1-800-258-1386.

Dataproducts computer printers

Nobody puts ideas on paper so many ways.

Volkswriter is a registered trademark of LIFETREE SOFTWARE, INC.

As Info Equipment Proliferates

Flexibility Called for in Integrating OA

By Lynn Haber
CW Staff

FRAMINGHAM, Mass. — The critical role of communications for major business productivity gains has come to the forefront as the shift in office automation moves away from a fragmented approach toward a more integrated approach, according to a recent report published here.

"In present and future office environments, the nodal points for the communication of information will include workstations, computers, file servers, printers and other peripherals, personal computers and other types of equipment, as well as telephones and memos on paper. The ability to link all of these requires more flexible and more fully connective communications methods than those used in the past," according to "Office Networks," prepared by International Data Corp. (IDC).

The report praised the broad range of information processing equipment available to meet the changing office automation needs, but cautioned against this great flux which has resulted in a lack of standards in an environment of rapidly changing technology.

"With the availability of newer networking solutions for office communications comes the promise of higher level, cost-effective applications to support the automated office of the future. However, with this promise, some confusion exists," according to the report.

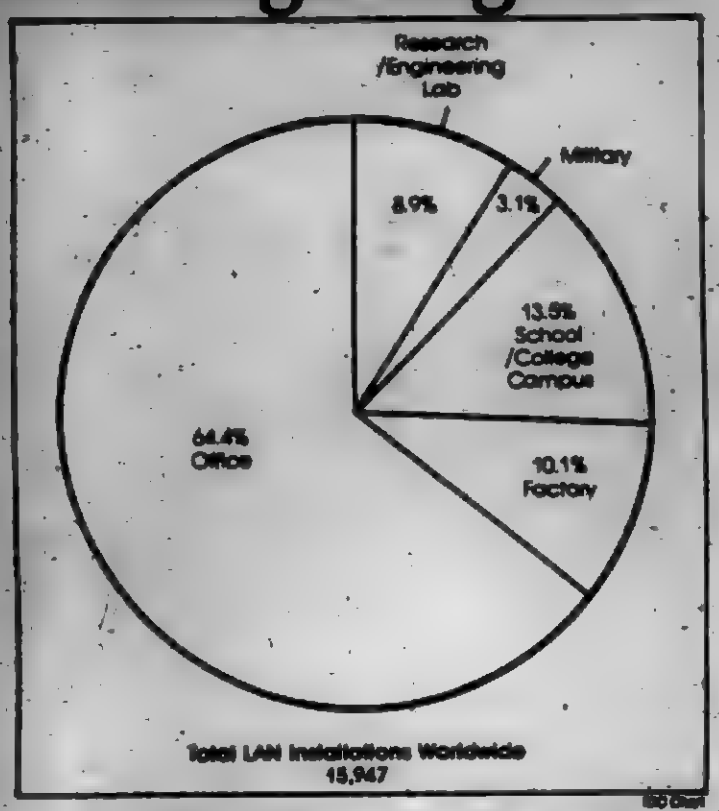
In the course of the study, IDC examined user needs and considerations for planning to implement an office communications network. Two important networking options explored were local-area networks and the voice/data private branch exchange (PBX).

According to the researchers, there are currently some 15,960 local-area networks of all types installed worldwide, with 64.4% of these in the office (see chart). The number of local-area networks installed worldwide is expected to reach 103,210 by the end of the year 1988.

The study also predicted an emergence of the PBX as a means of office networking. A number of third- and fourth-generation voice data PBXs have already become available, and these are expected to compete against local-area networks.

One constant theme throughout the report is the need for careful planning of an office network before any discussion of technology takes place. "The network in place should support the desired applications, not dictate what applications are possible. The best office network is the one that satisfies present, as well as future, business requirements," the report said.

The report is available for $3,500 from IDC, which may be reached at Five Speen St., Framingham, Mass. 01701.



Type of Premises With Local-Area Net Installation

HP Package Provides Networking For Its 9000

PALO ALTO, Calif. — Hewlett-Packard Co. recently announced a network package to provide local-area networking among its HP 9000 32-bit computers running under HP-UX, the company's version of the Unix operating system.

The HP LAN 9000 reportedly connects Series 500 computers via an Ethernet-compatible 10M bit/sec link and is said to allow users with little or no data communications knowledge to gain access to files, transfer files within a network, start or stop processes on other systems in the network and automatically communicate between processes running simultaneously.

The system is comprised of a microprocessor-based local-area network unit linked to a host HP 9000 computer through a dedicated HP-IB interface, a company spokesman said.

The network unit is connected to a 10M bit/sec coaxial cable, and software from the host is downloaded to the network unit to handle the transfer of information from the computer to other computers on the network via a transceiver and a cable, according to the vendor spokesman.

The package is priced at $5,035, and delivery is estimated at eight weeks after receipt of order. More information is available from Hewlett-Packard, 1820 Embarcadero Road, Palo Alto, Calif. 94303.

Inconix Local-Area Net Connects to IBM Micro

NATICK, Mass. — Inconix Corp. has introduced a local-area network that can be used for direct connection to the IBM Personal Computer via an RS-232 link.

The Cinchnet network provides for access by up to 124 Cinch Pac primary automation control units over a distance of 4,000 ft at a speed of 28.8K bit/sec without the need for polling, the company said. Each Cinch Pac offers local control intelligence for stand-alone operation without control instructions from or intervention by a host computer, a spokesman for the firm pointed out.

The combination of Cinch Pac with the Personal Computer via the network reportedly provides distributed digital control capability at a cost of about $1,000 per loop.

More information on the local-area network is available from Inconix, which is located at 10 Tech Circle, Natick, Mass. 01760.

DG Offers Amber Screen

WESTBORO, Mass. — Data General Corp. has announced that its Dasher Model D210, D211, D410 and D460 workstations are now available with an amber video screen.

Said to be compatible with earlier green-phosphor Dasher models, the workstations can reportedly be used with existing applications, including Data General's Comprehensive Electronic Office (CEO) system.

The CEO package consists of word processing, information management and decision support products. The price for the amber monitors ranges from $820 to $1,610. DG can be reached at 4400 Computer Drive, Westboro, Mass. 01581.

Corvus Out With E-Mail, Software

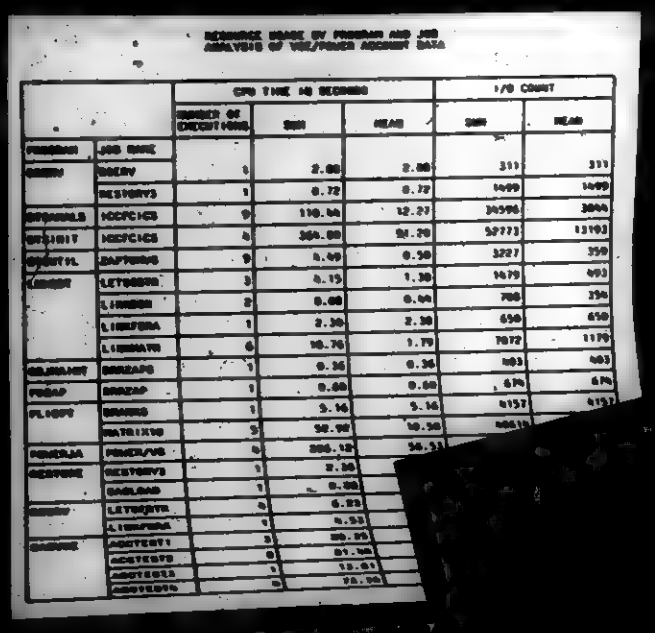
SAN JOSE, Calif. — Corvus Systems, Inc. has announced an eight-program integrated software package for its Corvus personal workstation and an electronic mail package for various personal computers.

The Corvus Isys software package reportedly integrates a word processing package, a 225-row by 127-col. spreadsheet, business graphics, list management, data communications, sorting, rapid information retrieval and desk tools.

Corvus Isys allows the user to transfer data between programs and among computers using the Corvus Omninet local-area network. Computers on the network reportedly can share numerical data, standard text paragraphs or lists from common mass storage systems.

Corvus Omnimail is available for various personal computers, including those from Corvus; Apple Computer, Inc.; IBM; Digital Equipment Corp.; and Texas Instruments, Inc. It reportedly manages network mail traffic and allows users to track correspondence, edit, file and distribute messages and data parcels to several locations.

Corvus Isys, available now, and Omnimail, set for delivery in the first quarter of 1984, are priced at $495 each from Corvus Systems, 2029 O'Toole Ave., San Jose, Calif. 95131.


RESOURCE USAGE BY PROGRAM AND JOB
ANALYSIS OF VAX/VMS ACCOUNT DATA

		CPU TIME IN SECONDS			I/O COUNT	
		NUMBER OF EXECUTIONS	SUM	MEAN	SUM	MEAN
PROGRAM	JOB NAME					
QUERY	QUERY	1	2.88	2.88	311	311
	HISTORY3	1	0.72	0.72	1499	1499
SPINNER	HOSPICHS	9	110.56	12.27	34596	3844
SPINIT	HOSPCHCS	4	304.80	26.20	52773	13193
SPOOTYL	ZAPTHRU	9	4.69	0.50	3297	359
LOADER	LETHRU	3	4.15	1.38	1479	493
	LIHRU	2	0.88	0.44	788	394
	LIBRFUN	1	2.38	2.38	650	650
	LIBMAIN	6	10.76	1.79	7872	1179
GALAXY	BRAZAP	1	0.36	0.36	683	683
PRAP	BRAZAP	1	0.68	0.68	1 674	674
FLIGHT	BRAVO	1	5.16	5.16	8157	8157
	MATRIX10	5	50.90	10.58	40619	
PENDULA	PENDULUS	6	206.12	34.33		
HISTORY	HISTORY3	1	2.38			
	BADLAND	1	0.28			
	LETHRUTH	4	0.88			
	LIBMPUBA	2	0.53			
SPHERE	ADOTEST1	1	20.35			
	ADOTEST2	1	31.38			
	ADOTEST3	1	13.01			
	ADOTEST4	1	72.10			

SAS
SAS saves time.

To Increase 270% in '83, Report Says

Floppy Drive Shipments Skyrocketing

MOUNTAIN VIEW, Calif. — Worldwide shipments of floppy disk drives in 1983 will total an estimated 5.5 million units, up a whopping 270% over 1982's shipments, while growth to 23.6 million units shipped is expected by 1986, according to a recently released report from Disk/Trend, Inc.

The report showed further that a surge in 1983 shipments has made two-sided, 5¼-in. minifloppies the dominant flexible disk drive configuration. The trend to half-high versions of 5¼-in. drives is well established, the report found, especially with two-sided models from the Japanese manufacturers.

Considering worldwide unit shipments of all minifloppy drives, more than 90% of two-sided drives and more than 60% of one-sided drives will be half-high models by 1986, the study reported.

In addition, Disk/Trend's annual survey found that IBM is expected to start internal production of two-sided, 5¼-in. floppies next year with a program that will increase to production of an estimated 1 million drives in 1986.

However, the company's consumption of minifloppies by that time will be so great that IBM will likely buy as many minifloppies as it manufactures, the report said.

IBM's Plans for Drives

The report also noted that IBM will start using 1.6M-byte, 5¼-in. drives on new models in its Personal Computer line, which will supersede older word processing and small business systems. This will stimulate IBM's competitors to use compatible floppy drives, creating an active market in the U.S. for the 1.6M-byte format, originated in Japan.

This format will capture more than one-quarter of the 1986 shipment level of two-sided, 5¼-in. drives, the study said.

Other findings of the survey included:

- Despite continued confusion over competing microfloppy standards and stern competition from half-high 5¼-in. drives, microfloppies are starting to reach significant production quantities, with next year's worldwide shipments up to 810,000 units and shipments of more than three million expected by 1986.
- Worldwide shipments of 8-in. floppies are flat at present, with a slight growth for two-sided drives offset by declines in shipments of one-sided drives. After 1984, shipment declines of more than 10% (20% in 1985) are expected for drives in this category.
- For the first time in 1982, a different company held leadership in worldwide OEM shipments in each of the product groups analyzed. Tandon Corp. led in two-sided, 5¼-in. market share with 38%, and Shugart Corp. led in the one-sided, 8-in. market with 63%.

The study, prepared by James N. Porter, includes information on individual revenue and unit shipment projections for flexible disk drives in five separate product groups and provides statistics and analysis on installed drive populations, average OEM selling prices, competitive market shares of manufacturers and a basic review of competing data storage technologies.

The report also contains basic specifications of 285 flexible disk drives and profiles on 57 manufacturers of flexible disk drives worldwide.

The report is priced at $675 from Disk/Trend, located at 1224 Arbor Court, Mountain View, Calif. 94040.

Unit shipments in thousands	1982 Shipments	Forecast 1985	1984	1985	1986
8 inch drives					
One side	887.7	329.3	209.8	118.6	63.8
Two sides	1,032.5	1,301.8	1,429.4	1,340.7	1,088.0
8 INCH TOTAL	1,630.2	1,631.1	1,639.2	1,459.2	1,151.8
5.25 inch drives					
One side	2,120.1	3,636.2	4,446.7	4,835.2	4,862.8
Two sides	1,477.8	5,492.8	8,583.4	11,060.1	14,555.2
5.25 INCH TOTAL	3,597.9	9,129.0	13,030.1	15,495.3	19,418.0
Microfloppy drives	25.5	282.4	810.0	1,693.0	3,018.0
TOTAL, ALL DRIVES	5,253.6	11,052.5	15,479.3	19,647.5	23,592.8

Source: 1983 Disk/Trend Report

Worldwide Flexible Disk Drive Shipments

Distribution Of Software Electronically Fast Growing

By Lisa Raleigh
Special to CW‡

Electronic distribution of software is more than a probability favored by futurists. It's happening now, but is viable only for game software and other small programs at this time.

The potential for electronic distribution of business software will not be realized for many months and possibly years, according to industry analysts. Because business programs are so much larger than games, and because they require a great deal more support, many issues remain to be resolved.

It is already possible to download software from a central source via a modem to a retail store or even to an end-user location. However, the transmission of large programs requires a sizable chunk of time, sometimes more than an hour. Dealers wonder if their customers will sit still longer than 10 minutes waiting for a program to download.

Even if speed were not an issue, documentation and support remain untransmittable. An exception is on-line documentation, but that only makes large programs larger still. Also, even if big programs

(Continued on Page 132)

Xerox Merges Versatec, Office Products Division

LOS ANGELES — Xerox Corp. has announced the consolidation of two corporate organizations into a new division of the company and the appointment of a divisional president, according to Robert Adams, group vice-president and president of Xerox Systems Group.

The new Information Products Division will combine the resources of Versatec, Inc., a Xerox company in Santa Clara, Calif., and the Xerox Office Products Division in Dallas, where the new division will be located.

Named to head the Information Products Division is Renn Zaphiropoulos, president and co-founder of Versatec Co., who will retain his Versatec responsibilities and assume direction of three business units and staff functions in the former Office Products Division.

The three business units are electronic typing, information processing/personal computing and telecopiers, the company said.

In addition to Versatec's electrostatic printer and plotter line of equipment, the new division's products will include Xerox's Memorywriter typewriters, 860 information processing system, 820-II and 16/8 personal computers and 295, 455, and 495 Telecopier facsimile transceivers.

William C. Jackson Jr., former president of the Office Products Division, will join the Dallas-based Genra Group, which recently acquired Xerox's computer retail stores, as president.

Tandy's Model 2000 Seen Impacting IBM's Plans

By Jeffry Beeler
CW West Coast Bureau

With the recent announcement of its Model 2000 microcomputer, Tandy Corp. has gained a "temporary advantage" over IBM in the crowded IBM-compatible personal computer field and will force the industry giant to strengthen its next move in the personal computer arena.

That assessment of the Tandy machine's market impact comes from industry analyst Robert Fertig, president of Greenwich, Conn.-based Enterprise Information Systems, Inc.

In response to Tandy's first IBM-compatible micro, Big Blue will probably add extra technological muscle to its long-rumored Popcorn Personal Computer, which Fertig envisions as a multiuser workstation incorporating a 32-bit Intel Corp. 8286 microprocessor.

The announcement of Tandy's Model 2000 has, in Fertig's view, also "pulled the rug out from under" Sperry Corp. and "completely neutralized" the latter company's own IBM-compatible micro only days after its formal debut at the Comdex/Fall '83 show [CW, Dec. 5]. The Sperry 16-bit machine incorporates a 7.16MHz Intel 8088-2 and boasts a 50% greater

(Continued on Page 134)

Outpaced.

This DP department doesn't have the skills to stay ahead of new hardware/software developments. DELTAK CAN HELP.

As the pace of technology keeps changing, even seasoned staffers find their skills are falling behind. Meanwhile, applications backlogs are skyrocketing. And in most companies, there's no sign of a departmental staff-up in sight.

That's the problem. So what's the solution?

It all starts with training. You see, a properly planned DP training program can help personnel gain the practical knowledge they need to stay up-to-date. It can also ease applications backlogs by boosting productivity.

And proper training starts with DELTAK. We offer over 800 multimedia and computer-based courses for all levels of MIS professionals, from COBOL programming to database management. And since we're the world's leading DP educator, we can show you the latest ways to keep your people informed and productive.

For all the facts, call or write DELTAK today. And watch the pace pick up right away.

DELTAK

East/West Technological Center
1751 West Diehl Rd., Naperville, IL 60566
(312) 369-3000 (800) 532-7686

© Copyright 1989, DELTAK, Inc.

Local Nets Can't Aid Corporate User

Software Publisher Bemoans Lack of Micro Tools

By Robert Batt
CW West Coast Bureau

SAN DIEGO — The computer industry has created hundreds of thousands of "first-time losers" because of inadequate microcomputer software, an industry expert claimed recently.

Hal Tilbury, president of Bluebird Systems, Inc., a Carlsbad, Calif.-based software publisher, charged that the lack of powerful software means local-area networks are unsuited to the needs of today's corporate user.

"A first-time loser is one who soon discovers that what he bought won't do what he wanted, and disillusionment quickly sets in," Tilbury said here during a work session at the Multi-User Systems and Local Networks Forum, sponsored by Future Computing, Inc.

In large part, it is the computer industry that is to blame, he continued. "We blitz the buyer with Madison Avenue advertising campaigns that make micro-based software sound as if it is just as sophisticated as that found on a mainframe. We sell software designed for personal use to a business without taking the time to determine if it can do a job that it was never really designed to do."

Tilbury said local-area networks are not suited to provide the kind of transaction processing environment required by business data processing users.

What a business needs, he asserted, is the ability to do transaction processing from a centralized common data base, constantly and instantly available to the people in the organization who have a need to know. The user of the system must be allowed to initiate any job from any workstation at any time, and the software available has to be powerful and flexible enough to do the job, he added.

"No wonder the user became a loser. We didn't have the software he needed," Tilbury proclaimed. "The available micro-based software is all oriented to personal computing or support of a single-user work session and just does not match up to the user's needs."

'A first-time loser is one who soon discovers that what he bought won't do what he wanted, and disillusionment quickly sets in.' — Hal Tilbury, president of Bluebird Systems, Inc.

Local-area networks were not designed to accommodate transaction processing, Tilbury said. Rather, they were created out of the desire to allow several micros to share expensive disk and printer resources and to communicate with each other. While excellent for individual work session tasks such as word processing, graphics and spreadsheet analysis, local-area networks still do not fit the corporate bill.

Tilbury described local-area networks as too slow and expensive for the business environment. They cannot efficiently accommodate a common shared data base and cannot really handle true record-locking or file-sharing functions, he complained.

Furthermore, he said, the software used by local networks is Digital Research, Inc. CPM- or Microsoft, Inc. MS/DOS-based and consequently has been written for a single-user approach.

"Generally speaking, the most successful microcomputer software was written to accomplish a narrowly defined specific purpose. This has not been done with most micro-based operating systems, which have tried to be all things to all people."

Wang Offers Vision Support

SAN JOSE, Calif. — Wang Laboratories, Inc. has joined a growing list of computer makers offering support for Visicorp's Vision, the company's integrated operating environment product.

Wang and Visicorp have inked an agreement giving Wang exclusive marketing rights to Vision applications manager and related Vision software applications for Wang's personal computer. The agreement specifies that Wang will be responsible for the distribution, licensing and promotional activities associated with the marketing of Vision on Wang's micros.

In November, Visicorp reached a similar agreement with IBM for distribution of Vision on the IBM Personal Computer XT. Other computers that will support Vision include Compaq Computer Corp.'s Plus; Texas Instruments, Inc.'s Professional Computer; Honeywell, Inc.'s 7900 system; and Eagle Computer Corp.'s Spirit and PC Plus.

Our giant commitment to OEMs

BOARDS TO SYSTEMS.

YOU NAME IT.

CIE Systems is committed to being your source for the very latest in micros and all that goes with them.

The micros are the CIES 680™ Business Computers with the advanced 32/16-bit 68000 microprocessor and Intel's Multibus™ architecture. So from boards to systems, you can easily configure your product line for virtually any business.

There are four 680 models. The 680/30 (shown above), 680/20 (on the right), 680/35 and the 680/40.

The 680/30 and 680/35 will accommodate up to eight interactive users. The 680/20 expands to four users. And the 680/40 expands to as many as 20 users.

Disk capacities range from 10 to 300 Mbytes, memory from 256K to one Mbyte.

Operating systems include REGULUS™ (UNIX™ compatible) and RM/COS.™

Language processors include BASIC, FORTRAN, COBOL and PASCAL.

Applications offered are general accounting, financial worksheet and word processing, as well as a wide range of vertical applications.

And you can include PRO-IV,™ the applications processor that allows you to develop applications in one-tenth the time or modify applications in one-hundredth the time it normally takes.

Boards up to complete CIES 680 systems. Our name or your name on them. That's an ongoing commitment to OEMs from CIE Systems, the company backed by the third largest trading company in the world with well over $50 billion in sales.

Just call or write CIE Systems, Inc., 2515 McCabe Way, Irvine, CA 92713-6579 (714) 660-1800. Call toll free 1-800-437-2341. In California, call 1-800-458-6279.

CIE SYSTEMS
A C.ITOH ELECTRONICS COMPANY

The CIES 680 is a Trademark of CIE Systems, Inc.
Multibus is a Trademark of Intel Corporation.
REGULUS is a Trademark of Alcyon Corporation.
UNIX is a Trademark of Bell Laboratories.
RM/COS is a Trademark of Ryan-McFarland Corporation.
PRO-IV is a Trademark of Data Technical Analysis, Inc.

© CIE SYSTEMS, INC., 1983

Electronic Distribution of Business Software

(Continued from Page 129)

could be sent quickly, error-free transmissions cannot be guaranteed.

Piracy is another serious concern of software publishers who fear losing control when others take responsibility for making copies of their products. They worry that a legitimate copy may be difficult to tell from an illegal one when factory packaging is not part of the sale.

Nevertheless, interest in the concept is building. Eric Bedell, manager of retail marketing for Lotus Development Corp., reported that the subject is "the topic of the month," judging from the number of phone calls he receives each week from market researchers studying electronic distribution. Taylor Coleman, founder of Softwareland, an Ariz.-based chain of software stores, pointed to similar growing interest.

"I think it has a place down the road, but in the short run it's not viable," Coleman said. "The trend is toward bigger and bigger programs. The successful programs are monsters. It won't work until you can speed up the transmission time dramatically."

At 1,200 bit/sec, a 192K-byte program such as the Lotus 1-2-3 would take at least 20 minutes to transmit; at 300 bit/sec, it would take more than an hour and a half. These are minimum elapsed times, however. Many experts say additional time must be allowed to account for errors in transmission.

"There is a question of integrity. Even one bit dropped means that the program won't run" and would need to be sent again, according to Enzo Torresi, co-founder of San Jose, Calif.-based Businessland.

Consequently, an additional "20% to 30% error-correcting factor" is customarily tacked on to the average downloading time, said Dave Wagman, chairman of Softsel Computer Products, a physical software distributor which plans to undertake some form of electronic distribution in the future.

Wagman said one of his major concerns is proper documentation. "To send something electronically now, the program must be very small and must require no documentation. Getting the documentation to the customer will be a problem. You could put it on-line, but then you'd have even bigger programs to transmit," he said.

The significance of personal assistance is a factor many dealers and software developers emphasize when discussing the prospects for electronically distributed software.

"It's still important, on the average, that there be a human interaction in the sale of software," Wagman said. He cautioned, though, that this might not always be the case. "If it gets to the point where people don't need point-of-sale, then electronic distribution will displace retail," he said.

Supplemental Channel

Executives at both Softyme and PC Telemart claimed that electronic distribution will function as a supplemental channel, handling perhaps 10% of the software distributed.

Most retailers appear unconcerned that downloading services direct to users will take away their businesses. "A significant part of the cost of software is in the form of added value," said Rick Inatome, president of Inacomp Computer Centers, headquartered in Troy, Mich. "And I can speculate from the current state of software that the existing distribution channels will be necessary for a while. I'm very confident that I can continue to add value."

Packaging, too, is an area where electronic distribution is expected to run into some snags. The consumer-oriented marketing lessons they have learned over the last couple of years might not be applicable.

"The big issue is that it's a move toward products becoming intangible," Bedell said. "Packaging and merchandising have become very important as ways for software companies to distinguish themselves."

Beyond marketing considerations, the prospect of unpackaged products also raises many questions about security. An authorized program diskette can look exactly like one that has been illegally copied. "With electronic distribution, the software vendors will lose one important thing that they have today — the fact that every copy looks like it came from the manufacturer," Wagman noted.

Not surprisingly, no major software publishers have yet made a commitment to any type of electronic distribution scheme. Many of them cite the potential for piracy as their chief worry. Others, like Dennis Carelli, director of sales for Software Publishing, voiced concern about maintaining their existing channels. "It will be part of our distribution, but I can't say when," Carelli said. "The lifeblood of our firm is the retail dealer, so we're not going to do anything that takes away from the retailer."

Publishers may be slow to sign up, added Ester Dyson, president of Rosen Research, "because a lot of things have to be worked out. There's no rush, so they're waiting for the other guy to do it first. The idea will catch on, but it will take some time."

Raleigh is an associate editor at Micro Market World, *a sister publication of* Computerworld.

Words Alone Don't Describe The Lasergrafix™ 1200 Printer.

The QMS Lasergrafix 1200 is a breakthrough in electronic page printing. But words alone just don't describe it. Because QMS designed the Lasergrafix 1200 to do so much more than words. With a built in intelligent controller that takes simple print commands through your normal data stream. Built-in applications firmware eliminates the need for additional software—and frees your computer's resources for other work.

The difference is graphic—for all your business, scientific and individual printing needs. Create forms that have multiple typefaces and letters up to ten inches high—all on the same line. CAD/CAM. Bit mapped and vector graphics. Pie charts. Bar charts. Even barcodes. At a crisp resolution of 90,000 dots per square inch. With a printing speed of 12 pages per minute.

And, of course, letter quality word processing.

The Lasergrafix 1200 interfaces with just about any computer system. With versatility that lets you take business graphics to the limits of your imagination. Ask for a demonstration. You'll discover that the whisper-quiet performance of the Lasergrafix 1200 speaks softer than words.

And says a whole lot more.

QMS®

QUALITY MICRO SYSTEMS, INC.
P.O. Box 81250 Mobile, AL 36689
Telephone (205)633-4300 Telex RCA 26 6013

WHERE IMAGINATION LEADS

☐ Send me the Lasergrafix 1200 Information Packet, samples of mixed fonts, graphics and everything else it does.
☐ Please contact me to arrange a demonstration.

Name: _____ Title: _____

Company: _____

Address: _____

_____

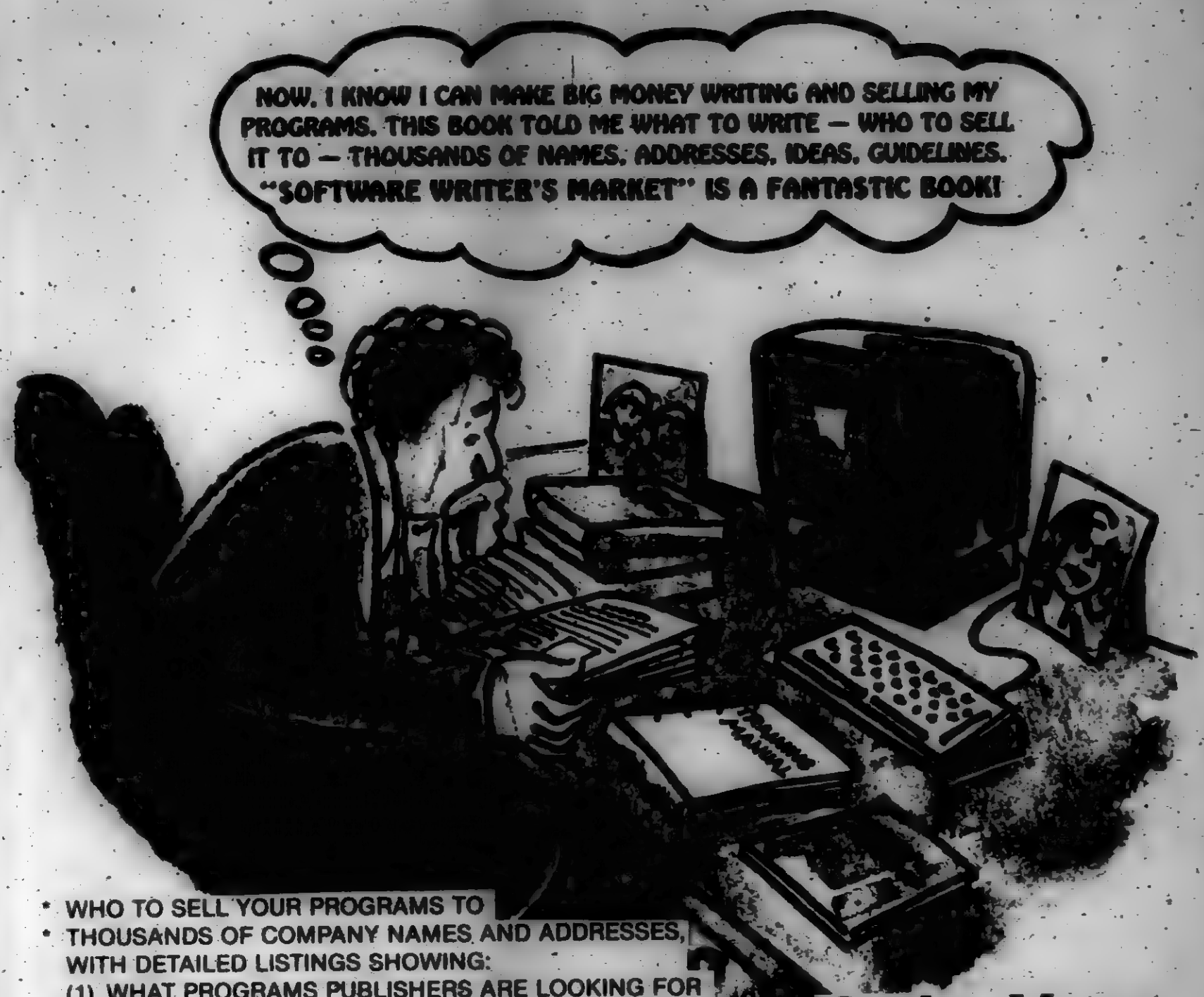
Type of system you are now using: _____

Number of print workstations you are considering: _____

Prime applications for printer: _____

QUALITY MICRO SYSTEMS, INC.
P.O. Box 81250 · Mobile, AL 36689 CW

programmer's READ THIS...



- WHO TO SELL YOUR PROGRAMS TO
- THOUSANDS OF COMPANY NAMES AND ADDRESSES, WITH DETAILED LISTINGS SHOWING:
  (1) WHAT PROGRAMS PUBLISHERS ARE LOOKING FOR
  (2) HOW THEY WANT YOU TO SUBMIT YOUR PROGRAM
  (3) HOW MUCH THEY PAY — AND WHEN!
- 100 CATEGORIES — FROM "ACCOUNTS RECEIVABLE" TO "GAMES" TO "VIDEO CONTROL" PROGRAMS
- HOW TO WRITE CLEAR DOCUMENTATION
- DEBUGGING TECHNIQUES

Order Your Copy Today!

Enclose check or money order for $19.95 (No C.O.D.'s) to:

IPF Publications
146 Country Club Lane
Pomona, NY 10970
(914) 354-5585

Name .....

Address .....

City ..... State ..... Zip .....

Supershorts

Intel Corp. and Inmos International, Inc. of Colorado Springs, Colo., have entered into an agreement to develop methods for Chmos dynamic random-access memory (RAM) products. The two companies intend to work separately on dynamic RAM designs and Chmos technologies, but will keep key specifications consistent.

• • •

The University of Michigan's College of Engineering has received a grant of over 200 professional workstations from Apollo Computer, Inc. The workstations will be incorporated into the college's new computer-aided engineering network for engineering students and faculty for instructional and research programs.

• • •

Harris Corp. has given a Harris 800 superminicomputer to Clemson (S.C.) University. The gift will be used for research programs by faculty and students in the electrical and computer engineering department.

• • •

Wang Laboratories, Inc. and Visicorp have signed an agreement giving Wang exclusive marketing rights to the Vision application manager and related Vision software applications for the Wang Professional Computer. Under terms of the agreement, Wang will be responsible for the physical distribution, licensing and promotional activities associated with the marketing of the software.

• • •

Automatic Data Processing, Inc.'s ADP Autonet and Digital Communications Associates, Inc. (DCA) have announced a joint development project that enables both DCA communications products and Digital Equipment Corp.'s Unibus-compatible devices, including the PDP-11 and VAX-11 series computers, to link directly with the ADP Autonet public data network without the need for protocol conversion.

(Continued on Page 137)

Tandy Seen One Up on IBM, for Now

(Continued from Page 129)

execution speed than its IBM counterpart, the company said.

The new Tandy micro, announced only three days later, is built around an 8MHz Intel 8186 and reportedly offers twice the clock speed of the industry giant's micros. A reportedly superior microprocessor and doubled clock speed enables the Model 2000 to operate from 2.5 to four times faster than IBM's XT, according to Tandy executive vice-president Ron Stegall.

But if the Tandy machine constitutes something of a coup from a purely technological perspective, Fertig claimed that from a marketing standpoint the company's announcement may have been ill conceived.

"Tandy shot itself in the foot by introducing the 2000 at Comdex," Fertig said. "The company's sales force was caught off guard by the announcement and hadn't been trained to demonstrate or sell the product."

Fertig also faulted Tandy for neglecting to provide users of its existing systems with a clearly delineated migration path to the Model 2000. Because of its ability to run the same software as the IBM Personal Computer, the firm's latest offering lacks compatibility with its older sister systems, which support Tandy's own proprietary operating system.

The Model 2000 thus marks a sharp departure from its developer's traditional product direction and will "make the company's [existing] users wonder whether they're going to be left out in the cold," he said.

The abrupt change in product course will also create additional uncertainties among the firm's users about what systems moves their supplier is likely to make in the future, he added.

Fertig further criticized Tandy for reportedly failing to accompany its Model 2000 announcement with price cuts for the company's existing systems, thus creating a "lopsided" pricing structure that works to the old products' disadvantage. "Why would anyone want to buy one of Tandy's existing [personal computers] now that the 2000 has arrived on the scene?" he asked.

Taken together, Fertig concluded, the mistakes in Tandy's latest microcomputer introduction make the firm's entry into the world of IBM compatibility look "haphazard" and create the impression that the vendor acted "without considering all the possible ramifications."

Tandy's Stegall rejected Fertig's claim that Tandy failed to prepare adequately its sales force for the Model 2000's announcement. "Every one of our 6,500 sales people received four hours of training on the machine" prior to its debut, he said.

Stegall also minimized the significance of the 2000's incompatibility with its sister systems and defended his firm as having compiled an impressive track record for "sharp" retail pricing. "The lack of compatibility with our other systems isn't really all that important because the Model 2000 was never intended as a replacement for any of our existing products," he said.

In any event, Stegall added, Tandy's history of supporting its customers with distinct migration paths has been "outstanding."

In general, he characterized the company's recent Model 2000 announcement as well planned and executed.

Talking to the French computer world is now easier than you think...

... with our sister publication Le Monde Informatique.

France's rapidly growing market for computers and data processing systems is one of the largest in the world. Currently, the installed value of general purpose computer systems is more than $11.1 billion, and a tremendous continuing demand for data processing equipment will cause outside spending on computer-related equipment to increase at an annual rate of 16%, between 1981 and 1985.

When choosing new equipment and keeping up-to-date with this ever-changing industry, top systems executives will read *Le Monde Informatique*. *Le Monde Informatique* is a weekly tabloid newspaper with a uniquely targeted circulation of 22,000 copies. The circulation profile was developed by International Data Corporation, the world's leading EDP market research firm, to reach the decision-makers and buying influences at the most important DP facilities in France.

CW International Marketing Services Department can give you one-stop advertising service in countries around the world. For more information about *Le Monde Informatique* or any of our other foreign publications, just fill out the coupon below.

Diana La Muraglia,
Manager, International Marketing Services
CW COMMUNICATIONS/INC.
375 Cochituate Road, Box 880, Framingham, MA 01701 (617) 879-0700

Please send me more information on
____ Le Monde Informatique
____ Your Other Foreign Publications
Name_____
Title_____
Company_____
Address_____
City_____ State_____ Zip_____

Publishers of Computerworld and other leading computer publications around the world.

WE WROTE THE BOOK ON DOCUMENTATION. AND THEN WE THREW IT AWAY.

Communication Sciences Introduces Explain. *The system that puts your software documentation where you need it most—online and in your data base.*

With Explain, you can create online user help, training procedures, program documentation and more. Because Explain uses the power of your DBMS, you can maintain the documentation as easily as you do the rest of your business data.

Access to the online documentation is at the user's fingertips. With simple commands, users can retrieve the help they need—directly from any application you link to Explain.

Chosen by Comserv Corporation as the online help system for AMAPS/3000, Explain is a powerful tool for both writers and readers of software documentation. And it's available to users of HP/3000/Image and IBM series 30xx and 43xx systems.

With Explain, you can afford to throw the books away. And keep the documentation.

For more information: call us at (612) 332-7559, or write to Communication Sciences, Inc., 100 North Seventh Street, Minneapolis, MN 55403.

Communication Sciences Inc.

Introducing the only computer tape certified error-free at 6250 CPI

The Magnetic Tape Division
Graham
CARLISLE

Supershorts

(Continued from Page 134)

Chrysler Corp. and Control Data Corp. have signed a memorandum of intent to develop jointly a new generation of computer-aided design (CAD) software. The companies said the cooperative venture will significantly advance state-of-the-art software technology in mechanical CAD engineering and analysis. Chrysler plans to use the jointly developed software in its vehicle design and development programs. CDC will market the CAD programs through its computer products and services organizations.

• • •

A corporate grant of $417,955 from Digital Equipment Corp. has allowed Boston's Wentworth Institute of Technology to acquire DEC's VAX-11/780, 12 SLI-11 and 30 VT180 computers.

• • •

Datapoint Corp. has announced plans to participate in the Boston Computer and Communications Center, Boscom. The Datapoint Learning Center will feature the company's office-oriented products operating in a Tandem Computers, Inc. ARC local-area network environment and will emphasize a hands-on approach.

• • •

The American Electronics Association (AEA) has announced a 17% increase in new members in 1983. A total of 2,350 electronics and information technology companies are participating in the organization, according to the AEA year-end report. The number of AEA associates — financial, professional and business organizations that maintain close relationships on a continuing basis — increased from 397 in 1982 to 473 in 1983.

• • •

Joseph J. Kroger, president, Computer Systems operations at Sperry Corp., has announced a consolidation of the office information systems and the communications terminals operations. The combined organization will be headed by Stuart J. Miller, vice-president, office information systems.

Nickels & Dimes

Compaq Computer Corp. has begun an initial over-the-counter offering of six million shares of common stock. The offering price per share was $11.

$$$

Analog Devices, Inc. has reported a 23% increase in sales and an 87% increase in net income for the fiscal year ended Oct. 29, 1983. Sales reached $214 million, and net income was $18.4 million.

$$$

Wyle Laboratories has reported sales for the quarter ended Oct. 31 of $79.7 million, up 33% over the same period last year. Net income was $2.5 million, or 33 cents per share, compared to a net loss of $1.5 million last year.

$$$

Televideo Systems, Inc. has reported sales of $168.7 million and net income of $22.4 million for the fiscal year ended Oct. 31, increases of 71% and 76%, respectively.

$$$

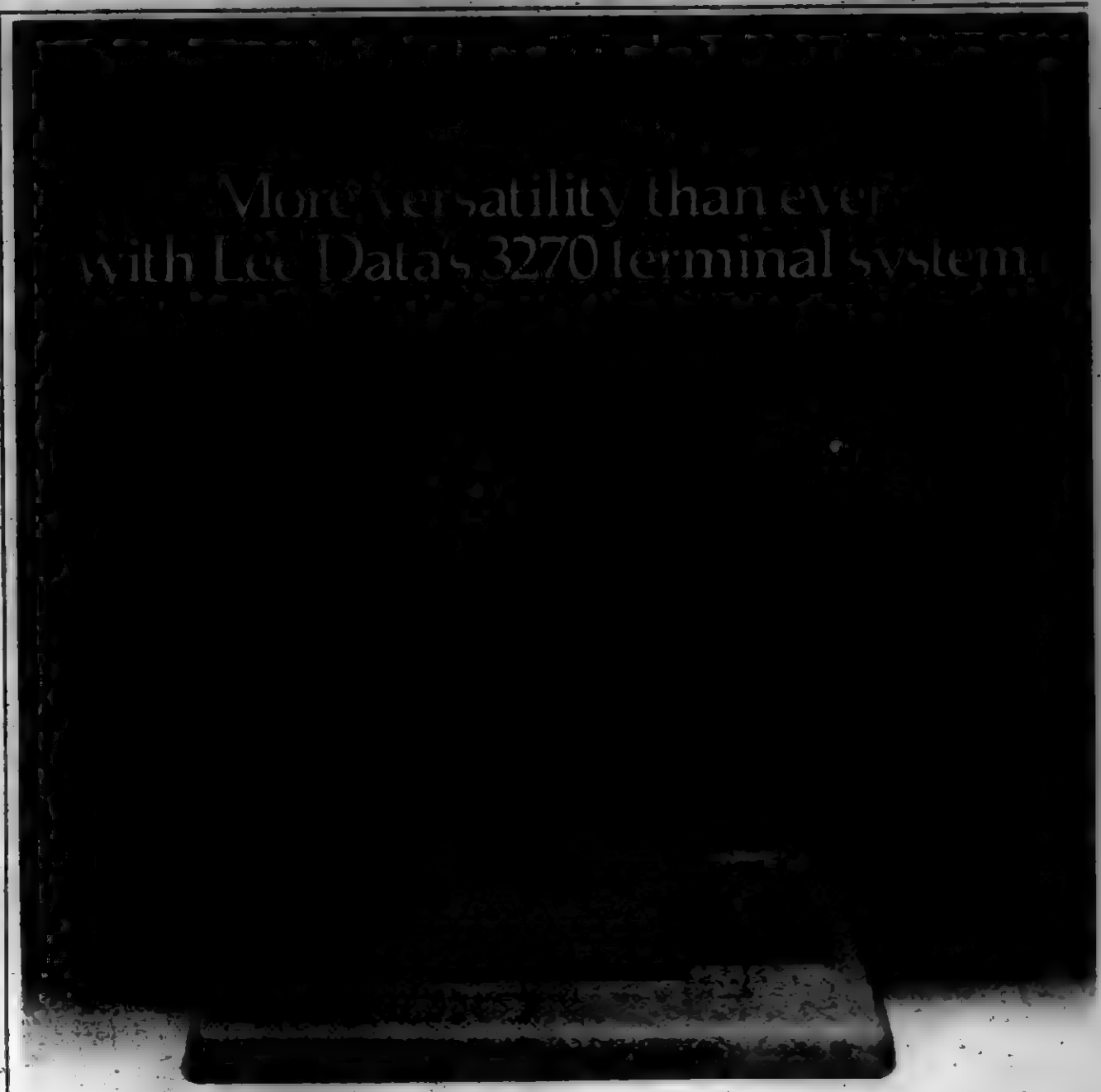
Western Digital Corp. has completed a public offering of 2.8 million common shares. Proceeds totaled $24.4 million, of which $17.5 million will be used to repurchase 2.2 million shares of the company's stock presently held by First Interstate Bank of California. Remaining proceeds will be used to reduce short-term debt.

$$$

AM International, Inc. has reported a $7.1 million increase in net income on a 4.4% increase in revenues for the first quarter of fiscal 1984, ended Oct. 29. Net income was $2.5 million, or 24 cents per share, compared with a net loss of $4.6 million, or 45 cents per share, for the first quarter of 1983.

$$$

Cambex Corp. has reported a loss of $1.9 million, or $1.09 per share, for the fiscal year ended Aug. 31, compared with income of $76,000, or 4 cents per share, for fiscal 1982.



Lee Data's new Personal Workstation now lets you enjoy all the advantages of professional business computing plus have both 3270 and asynchronous access to CPU-based applications—all from the same Lee Data workstation!

That's right! Completely-integrated, IBM-compatible personal computing —offering the latest functional capabilities and these value-added features:

Support for a wide variety of popular applications, including all compatible IBM Personal Computer software.

Personal Workstation-to-host file transfer capabilities that allow transfer of data from CPU-based files through existing system communications networks, meaning no new communications networks are ever required.

A single board design that incorporates both display station and printer support, as well as 128K of random access memory standard—with up to 256K of expanded memory on the same board. Plus a dual diskette drive feature that offers two 5¼-inch floppy diskettes, each with 320K of storage capacity!

And four standard system expansion slots for add-on requirements as your needs change.

3270 and asynchronous application access and new personal computing, too—all part of an advanced system design by Lee Data.

Let us show you how easily personal computing can become a part of your company's terminal system.

Call our system specialists toll free:

800/328-3996

Designers of innovative systems for the information worker

LEE DATA CORPORATION

7075 Flying Cloud Drive
Minneapolis, MN 55344

POSITION ANNOUNCEMENTS

Join a Winner

MASSCOMP offers you that rare career opportunity...the opportunity to put yourself at the center of action as we shape the computer future with our new MASSCOMP/500 Series computer and workstation:

This is the computer awarded "1982 Product of the Year" by **Electronic Products Magazine** *and winner of the "IR 100" competition for* **Industrial Research and Development** *magazine. This is the same computer that combines the performance of a large UNIX™-based 32-bit computer with the flexibility and user-ease of a mid-range minicomputer. Already it's had a significant impact on the scientific, engineering and industrial markets it was designed to serve. And it's become the standard by which all other computer systems will be judged.*

Our expansion has created key openings for the kind of professional who wants to join forces now and share in the excitement of a bold young company, fast-becoming an industry leader. As we see it, we're building much more than computers, we're building a future that will take us as far as your vision can reach. MASSCOMP offers a high-energy, rapid growth environment, where your contributions can have a major impact on a company with unlimited potential. Now is the time to start sharing in the personal and professional rewards of a key contributor's position.

For confidential consideration, direct your resume, including salary history, to:

Personnel Manager
MASSCOMP
One Technology Park
Westford, MA 01886
(617) 692-6200

An Equal Opportunity Employer

Marketing Software Systems Engineer

The individual we are seeking will provide pre-and post-sales support for third party application software vendors. Responsibilities will include: converting systems dependent code, converting, running and optimizing benchmarks, and consulting with vendor personnel on UNIX™ and MASSCOMP specific facilities. Some travel to customer sites will be required.

Qualifications for the position include: a minimum of 2 years FORTRAN programming experience, and 1 year experience as a UNIX™ user although 2 years experience as a systems programmer on any multi-user operating system may be substituted for the UNIX™ experience. Additional experience that would prove helpful would include experience in user support or as pre- or post-sales analyst for computer vendors in technical markets. Experience converting technical third-party software is also desirable.

OEM Marketing

The individual we are seeking will develop large OEM markets. Responsibilities will also include planning and executing strategies for future target OEM markets; as well as designing special promotional programs.

The qualified individual will have worked within the OEM environment for at least 4 years in a sales or marketing capacity dealing with technical applications. A BSEE or BSCS would be helpful.

MASSCOMP

MASSCOMP is the trademark of the Massachusetts Computer Corporation.

MVS SYSTEMS PROGRAMMERS

THE RECENT ACQUISITION of an MVS based IBM system has created the need for experienced IBM software specialists at Roadway's corporate headquarters in Akron, Ohio. Preferred candidates will have achieved good academic records while earning either (1) Associate's or Bachelor's Degree in Computer Science, Computer Programming, MIS or Data Processing, or (2) Bachelor's Degree, math or business-related major.

SUCCESSFUL CANDIDATES will have at least two years experience in:

- MVS System Generation and Maintenance
- JES 2
- TSO/SPF
- Performance Measurement and Tuning
- Capacity Planning
- Software Evaluation

Your experience in the above areas will allow you to participate in establishing standards and directions for future growth.

CASH COMPENSATION includes excellent starting salary and incentive pay. Fringes include stock plans, pension and insurance.

IF YOU WANT TO BE CONSIDERED for one of these positions with an established industry leader, please send your resume with college transcripts and salary requirements to the address below. Candidates whose resumes are received by January 15 will be given first consideration.

ROADWAY EXPRESS

Supervisor - Personnel
ROADWAY EXPRESS, INC.
P.O. Box 471
Akron, Ohio 44309-0471

An Affirmative Action/Equal Opportunity Employer

Manager SEAS Computing Facility

The George Washington University School of Engineering and Applied Science seeks a Manager for its Computing Facility. The facility serves 600 student users, student and faculty research projects, and administration, and other administrative users. Hardware includes 45 Apples and HP 3000, a 4 mega byte VAX 11/780 with 1200 mega bytes of disk storage, a Ethernet network system, and an on-campus computer center. Laboratory facilities include a Prime 9650, an Apollo work station, and a Vector Graphic 3000. A considerable amount of new hardware is on order. The manager will supervise approximately 20 employees, mostly part time students, and is responsible for expanding the hardware and maintenance of computer equipment. Applicants must have BS in Engineering, Computer Science, or related area, and 5 years data processing management experience. Send resume with salary requirements by January 15, 1984 to:

Steven Mirsky
The George Washington University
2125 G Street N.W.
Washington, D.C. 20052
EOAA Employer

Database and Data Communications

Interested in a challenging career in a high growth company where the rewards are substantial? If the answer is yes, ETA International, Inc. would like to hear from you.

ETA specializes in database and data communications software systems. The people in our company are nationally known for their expertise in IDMS DB/DC and ADS/OnLine. We have opportunities with several development and conversion projects as well as consulting, design, support, and education activities. Expertise in Database or Data Communications is required. Experience with ADS/OnLine or IDMS/CICS would be a plus.

Positions are available for qualified applicants throughout the country. To arrange for an interview in your area, call our headquarters directly or send resume with salary history to the address below. No agencies please.

COUNSELOR/ PLACEMENT MGR

High base salary & incentives & also fringe ptg.

Our EDP placement dept is heavily supported with local & nat'l advertising. If you have a proven track record in data processing, are sales oriented, need challenge and want to participate in building a department in Southern California, contact Paul Gilbert, Robert Half Personnel (213) 385-6555

ROBERT HALF OF LA Personnel Services
3600 Wilshire, Suite 2000
Los Angeles, CA 90010

MIS AUDITOR

Owens-Corning Fiberglas, a world leading building materials manufacturer, is currently in need of an MIS Auditor to join its Corporate Audit Department. Responsibilities will include planning and executing audits of Corporate and Division MIS activities, verifying compliance and recommending improvements. Operating environment is large IBM mainframe and distributed TI minicomputers. Qualified applicants will be degreed with 2 years or more of MIS or Auditing experience and will possess a strong working knowledge of current data processing technologies and concepts. For confidential consideration, forward resume and salary history to: Cathy Provost, Owens-Corning Fiberglas, Fiberglas Tower, Toledo, OH 43659. Dept. T-6.

An Affirmative Action/Equal Opportunity Employer m/f

COBOL/VS PROGRAMMING WORKSHOP

(OS/MVS AND VSE LEVEL)

Hands-On Advanced Training

For Further Information:

Cambridge Institute for Computer Programming
Advanced Training Programs
400 Boylston Street
Boston, Massachusetts 02116
Telephone: 617/426-2050

COMPUTER SCIENCE FACULTY RHODE ISLAND COLLEGE

We invite applications for a computer scientist whose responsibilities would be primarily to teach advanced level computer science courses, to engage in scholarly research, and to assist in computer science curriculum development. Candidates should have track position beginning fall semester, 1984. Master's degree in Computer Science plus one year's graduate work in computer science above the master's degree required. Doctorate in Computer Science preferred (required for tenure and and/or rank). Beginning rank and salary dependent upon qualifications and experience. Salary range $20,000 - $40,000 (academic year). Associate Wage Unit fringe package. Available summer employment. Application deadline March 15, 1984. Submit letter of application, resume and three letters of reference to Office of Personnel Services, Rhode Island College, 600 Mount Pleasant Avenue, Providence, RI 02908, Attn: Chair, Mathematics/Computer Science Department. Rhode Island College has a pleasant, medium, ethnically balanced campus. The College is an institutional member of the ACM and MAA and is committed to high quality programs in undergraduate computer science. Our computer resources include an IBM 4341, VAX DEC 8CP 11/70 (4MB/8) and a DEC VAX 11/750 on order; several micro labs supplied with IBM PCs and Apples.

An Affirmative Action/Equal Opportunity Employer

position announcements | position announcements | position announcements | position announcements | position announcements

ANALYST/ PROGRAMMER IV

Juneau, 177-43x.

The Department of Administration is seeking senior level Analyst/Programmers to work on the statewide general accounting system development project. Expertise in the use of COBOL and CICS, and knowledge of HASP, RJE, 1.3 and command level CICS is required.

MINIMUM QUALIFICATIONS:
5 years of experience as an Analyst/Programmer III with the State of Alaska or the equivalent elsewhere.

NOTE: Analyst/Programmers III characteristically perform a variety of tasks such as detailed program design, coding, testing, debugging, documentation and implementation of fairly complex systems applications and changes. This is the full proficiency level for positions with programming emphasis. Systems analysts work in under general supervision and serve as team member on large projects or as assigned small straight forward projects.

INQUIRE: Personnel Coordinator, Pouch C,MS91, Juneau, AK 99811

An equal opportunity/ affirmative action employer. Women and minorities are encouraged to apply

STATE of ALASKA

SYSTEMS ANALYSTS AND PROGRAMMERS FOR SUNBELT LOCATIONS

Job dissatisfaction, compromise, and frustration are the biggest obstacles to overcome to achieve one's career goals. Every day new career opportunities pass us by because we are unaware of their existence. Let us keep you abreast of what your true value is in the market place. Absolutely no obligations, please call or write Randy Perkins, CPer, Data Processing Specialist.

Dunhill

Of CHARLOTTE, INC.
6401 Carnegie Road, Suite 107
Charlotte, North Carolina 28211
800-438-2912
(NC Call)
(704) 542-0112

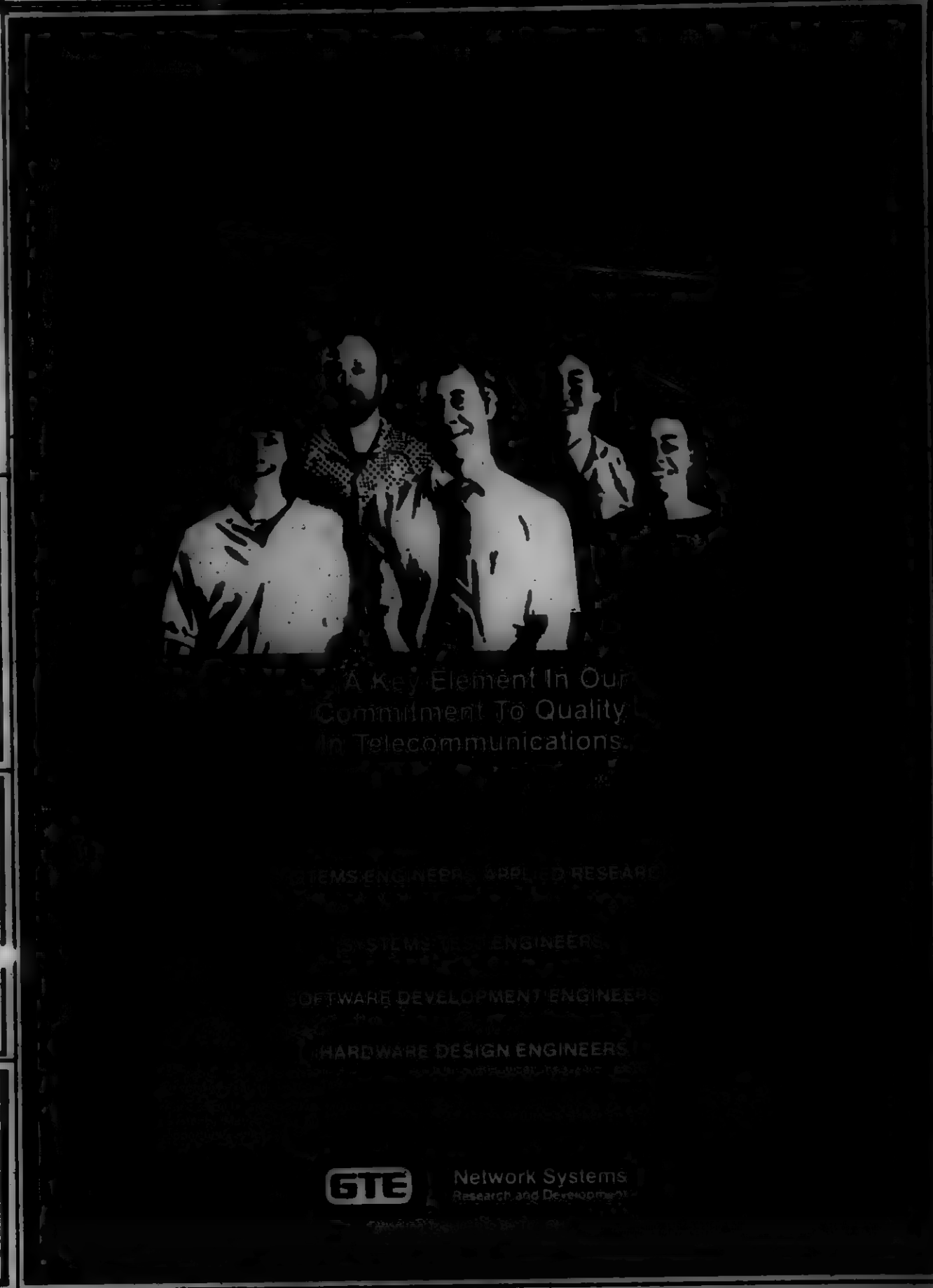
Vice President Operations

Direction, supervision and coordination of the Corporation's data processing operations including systems development, data base administration, computer operations and support. This position is located in Albany, New York. Candidate must possess a Bachelor's degree and at least 7 years of progressively responsible experience in computer and data processing. At least 5 years of this experience must have been in a management capacity. Salary: negotiable plus New York State benefits. Send resume to: Bureau of Human Resources Management, Higher Education Services Corporation, 99 Washington Avenue, Albany, New York 12255. EEO/AA Employer. Deadline for application: January 25, 1984.

D.P. MANAGER

Tech. aerospace engineering & mfg. org. needs an exp. network & opns. mgr. Will plan, direct & supv. IBM 3033 opns. & teleprocessing networks covering 5 nat'l locations w/70 on-line terminals. Pos. requires solid exp. in opns., prog., & communications incl. some supvry. Advanced degree a plus. $40,000. (fee paid)

ROBERT HALF OF BUFFALO, INC.
1310 Liberty Bldg.
Buffalo, NY 14202
(716) 842-0801
(AGENCY)



Senior Computer Scientist II

You'll guarantee 24/hr./day computer support through the development, installation and maintenance of IBM 3031 operating system and telecommunications systems. To qualify, you must have demonstrated ability in the following areas: installation, generation, tuning and maintenance of IBM's OS/VS2 MVS-SP, JES2, ACF/VTAM; writing user exits for IBM system software.

Besides the satisfaction of helping to solve America's energy problems, you'll earn a competitive salary and excellent benefits. Send your resume with salary history to: SERI, 1617 Cole Boulevard, Golden, Colorado 80401; Attention: K. Porter, Ref. No. E309-684. We are an equal opportunity employer.

SERI
Solar Energy Research Institute

300 DP Operations

#1 employment agency, #1 DP employment consultant for 1982 in IPA (150 agencies, 500 consultants), now #1 agency in NPC (100 agencies, 400 consultants). Fee paid.

Mark Young, CPC (704) 333-1620

Corporate Personnel Consultants, Inc.
3705 Latrobe Drive, Suite 310
Charlotte, N.C. 28211

HOW TO MAKE OVER $80,000.00 A YEAR ON CICS COMMAND LEVEL PROGRAMMING

Acquire one of the most demanded & rewarding programming skills in months instead of 2 years. A complete self-study book based on CICS latest version 1.5, written in COBOL and with special emphasis on VSAM. It covers virtually every CICS technique you will ever need. Fifteen sample programs address all CICS major applications. Over 150 ready-to-use examples. Sample programs include: Menu, Add, Update, Delete, Browse, Print 24x80, Print 66x132, Print Any Size Report, Message Routing, Screen Refreshing, VSAM Alternate Index Setup and Manipulation, Constant Table Setup and Use and more.

It is hard to believe the learning can be so easy until you try it. In hours, you can start to create your own BMS maps; in days, you can start to write your own pseudo conversational CICS programs. Some CICS techniques are especially hard. When you are stuck for the technical problems, you'll be thankful you have this book.

Moonlighting on CICS projects is very rewarding. A typical 10-screen system can mean $15,000 cold cash. This book also tells you how to market your services, locate the contracts, write a proposal, make a presentation, quote the right price & draw a contract agreement without a lawyer.

But act now. Send $34.95 (plus $2.00 for shp. & hndl.) for $32. ea. for 2, $30 ea. for 3, $28. ea. for 4 and over. (shp. & hand. incl.) in Check or money order to: CCD ONLINE SYSTEMS, INC., P.O. BOX 795759, DALLAS, TX 75379. Allow 1 to 2 weeks for delivery. Full refund within 10 days if not satisfied.

What are the cold, hard facts on computer salaries?

Find out in our new, free Salary Survey.

No doubt during 1983, you knew that many organizations took a hard line on awarding liberal salary increases.

The effects of the salary freeze were felt by many computer professionals. Firms enacted across-the-board cuts, lowered compensation ranges for "new hires," restricted bonuses and benefits or set forth other policies to lower their personnel costs in countless situations.

Yet, on the other hand, did you know that salaries for *some* computer professionals *soared* right on through the uncertain business outlook?

A favorable climate for skilled professionals.

Our 1984 Computer Salary Survey and Career Planning Guide will give you new insight on trends that impact compensation, provide current salary figures and review ways the computer profession will be affected in the future. It will also explain why many computer professionals are able to advance their careers more successfully than others.

In the new Survey, you'll learn how salary differences between computer professionals are becoming more pronounced than ever:

- How some professionals—performing the same work and having a similar amount of experience—are earning significantly more than their peers.
- Why some professionals now earn as much as 25% more than they did last year.
- What emerging skills are most in demand and which positions command high salaries now and in the future.
- How size of firm and computer installation greatly affects compensation levels.

Cold, hard data with helpful tips.

The new Survey is based on contacts with more than 44,000 computer professionals and 35,000 organizations. Not only are salary averages for fifty-eight positions reviewed (including ten new ones which we never before covered), but high and low compensation ranges are also covered.

Included are positions in programming, software, systems design, data base/data communications, Edp auditing, operations, computer sales, marketing, marketing support and management. The new 32-page Survey is available without charge.

Since 1968, this annual report has helped approximately a quarter of a million computer professionals understand current trends in technology and compensation, realize how and where they fit in and what they need to do to reach their fullest potential.

Source Edp is the world's largest recruiting firm devoted exclusively to the computer profession. Because each of our professional staff has had extensive computer experience prior to joining our firm, we are able to provide remarkable insight on computer careers.

You owe it to yourself—especially if most of your career lies ahead—to call or write for your free copy today.

Personnel Services
source edp
The world's largest recruiting firm devoted exclusively to the computer profession.

Call Source today for your free copy.

Is your salary still frozen?

Call the Source Edp office nearest you for a free copy of our new 32-page report. We'll mail a copy to you in strict confidence, without obligation.

If unable to call, write:

Source Edp
Department CS1
P.O. Box 7100
Mountain View, CA 94039

When writing, please include your title.

United States:

Alabama
Birmingham 205/822-6745

Arizona
Phoenix 602/279-1010
Tucson 602/792-0375

California
Northern
Mountain View 415/969-4010
Sacramento 916/446-3470
San Francisco 415/434-2410
Walnut Creek 415/945-1910
Southern
Irvine 714/833-1730
Fullerton 714/738-1312
Los Angeles/Downtown 213/688-0041
Los Angeles/South Bay 213/540-7500
Los Angeles/West 213/203-8111
San Diego 619/231-1900
San Fernando Valley 818/781-4660

Colorado
Denver 303/773-3700

Connecticut
Danbury 203/797-0880
Hartford 203/522-6560
New Haven 203/787-4585
Stratford 203/375-7240

District of Columbia
Washington D.C. 202/659-6655

Florida
Fort Lauderdale 305/491-0145
Jacksonville 904/356-1820
Miami 305/624-3536

Georgia
Atlanta
Downtown 404/588-9350
North 404/953-0200

Illinois
Chicago/E. Loop 312/861-0770
Chicago/W. Loop 312/346-1280
Oak Brook 312/986-0422
Rolling Meadows 312/392-0544

Indiana
Fort Wayne 219/432-7333
Indianapolis 317/631-2500

Iowa
Des Moines 515/243-0191

Kansas
Overland Park 913/888-8885
Wichita 316/688-1621

Kentucky
Louisville 502/581-9800

Louisiana
Baton Rouge 504/924-7183
New Orleans 504/581-8000

Maryland
Baltimore 301/727-4050
Greenbelt 301/441-8700
Towson 301/321-7044

Massachusetts
Boston 617/482-7813
Burlington 617/273-5160
Wellesley 617/237-3120

Michigan
Detroit 313/259-7877
Grand Rapids 616/459-5539
Lansing 517/484-4561
Southfield 313/352-5520
Troy 313/362-0070

Minnesota
Minneapolis
West 612/544-3800
Downtown 612/332-8480
St. Paul 612/227-6100

Missouri
Kansas City 816/474-3388
St. Louis 314/862-3800

Nebraska
Omaha 402/346-0788

New Hampshire
Nashua 603/880-4047

New Jersey
Cherry Hill 609/482-2800
Edison 201/494-2800
Morristown 201/267-3222
Paramus 201/845-3900
Princeton 609/452-7277

New Mexico
Albuquerque 505/247-4278

New York
Albany 518/482-3258
Buffalo 716/835-6430
New York City
Grand Central 212/557-6611
Penn Station 212/736-7445
Wall Street 212/962-8000
Rochester 716/263-2670
Syosset, L.I. 516/364-0900
Syracuse 315/422-2411
White Plains 914/683-8380

North Carolina
Charlotte 704/552-6577
Greensboro 919/378-1155
Raleigh 919/847-7005
Winston-Salem 919/724-0880

Ohio
Akron 216/535-1180
Cincinnati 513/769-5080
Cleveland 216/771-2070
Columbus 614/224-0880
Dayton 513-461-4680
Toledo 419/242-8801

Oklahoma
Oklahoma City 405/722-7410
Tulsa 918/599-7700

Oregon
Portland 503/223-6180

Pennsylvania
King of Prussia 215/265-7250
Philadelphia 215/665-1717
Pittsburgh 412/281-6540

Rhode Island
Providence 401/751-6065

South Carolina
Columbia 803/256-7446
Greenville 803/271-7044

Tennessee
Nashville 615/259-0885

Texas
Austin 512/479-0720
Dallas
Central 214/954-1166
North 214/387-1600
Fort Worth 817/338-9309
Houston
Downtown 713/751-0100
Galleria/Post Oak 713/439-0550
San Antonio 512/342-9558

Utah
Salt Lake City 801/566-5900

Virginia
McLean 703/790-5610

Washington
Seattle 206/454-8400
Spokane 509/838-7877

Wisconsin
Green Bay 414/432-1184
Madison 608/251-0104
Milwaukee 414/277-0945

Canada:

Ontario
Toronto
Don Mills 416/425-6720
Downtown 416/865-1125
Mississauga 416/848-3344

Programmer/Analyst

Get Out Of The Office And Into The Mainstream.

Wilton, Connecticut
Chicago · San Francisco Bay Area · Dallas

D&B Computing Services, a leader in database management software and remote computing is seeking data processing professionals to join its national Professional Services group in the above locations.

As a Consulting Programmer Analyst, you'll accomplish more than simply cranking out code or maintaining someone else's systems. Instead, you will support and extend our marketing efforts by meeting with our Fortune 500 clients, identifying their needs, and developing and implementing a variety of interactive applications.

With the training and resources our organization can provide, you will grow professionally, learning and applying 'leading edge' technology and skills: Nomad 2 relational DBMS, sophisticated application development tools and project estimating/monitoring techniques. Concentrating on custom software development to address our clients' business needs, you will take a system from the specifications stage right through implementation and user training.

You may be an ideal candidate if you have 2-5 years of solid applications design and programming experience with one or more high level languages - preferably COBOL. DBMS experience using FOCUS, RAMIS, or NOMAD is essential. Additionally, excellent written, verbal and interpersonal and problem solving skills are necessary to perform well in this exciting, client-oriented position.

In return, we'll back you up with the business and software resources of a multi-national computer services company servicing more than 70% of the Fortune 500. In short, you'll experience a variety of challenging assignments and a high degree of visibility conducive to career growth.

Finally, you will enjoy the security and benefits of being associated with the Dun & Bradstreet family of companies, including generous medical and dental coverage, profit sharing and tuition assistance.

For immediate consideration and more information, send us a copy of your resume, in confidence, to: P. Bean, MS#11, D&B Computing Services, 187 Danbury Road, Wilton, CT 06897.

D&B Computing Services

a company of The Dun & Bradstreet Corporation

An equal opportunity employer M/F/H/V

THE RIGHT DOOR?

CONSULTANT SYSTEMS, INC.

1984

For many the career path is a dark hallway with many doors. Some say ENTER, but should really say EXIT. Some say NOWHERE, though you can't see it at the time. Some say ALMOST EVERYTHING YOU EVER WANTED, but they are locked.

At CONSULTANT SYSTEMS we have an open door policy. We've taken the excellent compensation, good fringe benefits, job security, and added:

VARIETY	(in assignments, systems and applications)
ENHANCEMENT	(Building upon existing skills)
ADVANCEMENT	(Based strictly on performance)
RECOGNITION	(Visibility on projects of prime importance)
ELIMINATION	(Of corporate red tape)
ENVIRONMENT	(professionalism and personal growth)

As specialists in commercial data processing services, CONSULTANT SYSTEMS advises and assists major corporations in the areas of systems planning, technical support, customized application development, hardware/software evaluation and educational/training support.

If you're good at what you do, we'll create a place for you. Skills with CICS (Command or Macro levels) or IMS DB/DC or Honeywell DBMTP or HP IMAGE/QUERY or IDMS are a plus. Call COLLECT or drop us a line. We have a lot to talk about.

A Happy New Year is just through an open door...

CONSULTANT SYSTEMS, INC.
Eastern Division

P.O. Box 14188, Pittsburgh, PA 15239
Robert S. Fiorito, Corporate Project Staffing
Call Collect (412) 795-8580

Equal Opportunity Employer M/F — Subcontractors are welcome to reply

Good people making technology work.

Laser Isotope Separation Program

Located 40 miles east of San Francisco in the diversified East Bay Area, the Lawrence Livermore National Laboratory is an applied science research and development facility operated by the University of California for the U.S. Department of Energy.

We currently have a position available for a Senior Group Leader in the area of Control Systems. In this position, you will report to the LIS Program Leader and be responsible for the development and implementation of a common approach in I&C hardware, software, systems protocols and man-machine interfaces for the next generation of laser and laser isotope separation separator systems located at the Laboratory and at production plant sites. Additionally, your responsibilities will include a major program activity involved in the development of process instrumentation and control subsystems.

We are seeking an individual with an MS/PhD or equivalent in Electrical Engineering or Computer Science plus demonstrated experience in planning and construction of large computer-based control and/or data acquisition systems. Proven experience in dealing with off-site organizations and demonstrated ability to work in large multi-discipline groups and communicate effectively with systems users also required.

To apply for this position, send your detailed resume with full employment history and objectives to: Art Wang, Employment Division, Lawrence Livermore National Laboratory, P.O. Box 5508, Dept. ECSI-910, Livermore, California 94550.

U.S. citizenship is required.
An Equal Opportunity Employer M/F/H/V.

University of California
Lawrence Livermore National Laboratory

COMPUTERWORLD

Can Point

You In The

Right

Direction

Find the job you want in Computerworld's classifieds. No other publication carries as many ads for computer professionals as Computerworld, so no other publication can give you as wide a choice of jobs, salary and location as Computerworld.

Be sure to look over our recruitment ads every week, so you don't miss the opportunity that's just right for you.

FRESNO COUNTY
Computer Services Department

The Computer Services Dept. of Fresno County has several excellent career opportunities for experienced Data Processing professionals interested in working in a local government setting. The department has two IBM 4341-M02 mainframes, running the VM, MVS and CMS operating systems and a Dec VAX 11/780 running the VMS system. Program languages include COBOL and UFO. We offer complete benefit package including paid medical/dental/optical/life insurance, retirement plan, deferred comp., and a generous vacation and sick leave plan.

Systems Supervisor-supervisory responsibilities requires strong technical and project management skills, and experience with on-line systems. Local govt. exp. would be highly desirable. Requires: BA and one yr. of full-time systems or programming experience at the lead supervisory level. Add'l exp. can substitute for BA $2597 - 3156.

Systems Programmer III-special knowledge and experience in teleprocessing network mgmt. Desirable qualifications include experience with VTAM, BTAM and NCP with IBM 3705-BSC, SNA SDLC communications protocols. Minimum qualifications: two years of systems programming exp. $2652 - 3221.

Sr. Programmer Analyst-position requires strong technical skills including a strong math background or experience in one or more of the following: DBMS, geographic systems, on-line systems, or micro computers. Requires BA and three years full-time paid experience as a programmer analyst. Add'l exp. can substitute for BA. $2415 - 2940.

TO APPLY CONTACT:
Fresno County Personnel
2220 Tulare Street
3rd Fl. Del Webb Bldg.
Fresno, CA 93721
(209) 488-3364

Wafer Fab Industrial Engineer

Provide industrial Engineering support for a Semiconductor Wafer Fabrication operation to include plant and equipment layouts, work station layouts, labor and equipment performance measurement and standards, capacity analysis as well as productivity and quality improvement projects. Responsibilities include coordinating equipment installations, defining manufacturing methods and procedures, and designing ergonomic jigs and fixtures. Experience in work measurement and production methods. Experience or background in computer programming, Basic and Fortran a must. Knowledge of Finance and Engineering Economy. BS Ind. Engr., Exper 0 yrs. $2150/mo. Job location: Rio Rancho, New Mexico. Send resume to ESD Ed O'Brien, 6200 Hanover NE, Albuquerque, NM 87110. Please refer to #983878.

DON'T DELAY
CALL COLLECT TODAY:

For outstanding DP jobs in the BEST SOUTHEASTERN COMPANIES: Programmer/Analysts; Systems Analysts; DBA's; Technical Support.

All fees, relocations, and interview expenses paid by our clients.

Personnel Placement, Inc.
937-D Huffman Mill Rd.
Burlington, NC 27215
(919) 584-6991

position announcements | position announcements | position announcements | position announcements | position announcements

New Mexico State University Computer Center is seeking applicants for the position of Lead Systems Analyst (Position Announcement Number 84) for Mainframe Services in the Academic Computer Services area. A Bachelor's degree in Computer Science or related area is required, a Masters degree in Computer Administration, Computer Science, or related area is preferred, and at least 3 years of relevant work experience and 1 year of supervisory experience in conducting of an operational environment are necessary. This position also requires 2 years experience as a Systems Analyst and extensive experience with CICS and JCL. Experience with mainframe operations is desirable. Salary Range: $26,700 - $34,000. Starting date: February 1, 1984, or ASAP. This position provides a unique opportunity to join and lead a team whose charter is to provide efficient and appropriate mainframe services to the academic community. Located twenty minutes from the edge of beautiful Aspen Mountain, NMSU has excellent computer science degree programs. NMSU Computer Center has two major computers, an IBM 4341 VM and an Amdahl 470 V/8 both with an MVS/XBA batch environment and VM/CMS for interactive services, furnished apartments, send your resume to: Harvey A. Partridge, Director of Academic Computer Services, NMSU Computer Center, Box 3AT, Las Cruces, NM, 88003. Deadline for applications January 6, 1984.

MINORITY & FEMALE APPLICANTS ARE ENCOURAGED TO APPLY AN EQUAL EMPLOYMENT AFFIRMATIVE ACTION EMPLOYER

Average Temp - 75°
SUNSHINE STATE

Florida's EP community is Booming!!
Our clients need your expertise.

MAINFRAME PROGRAMMERS

PIA COBOL, Model 204 DB ..... To $35K
PIA BAL, CICS MACRO ..... To $35K
PIA COBOL, DMS, Health Care ..... To $35K
PIA DSC PDP, BASIC, MACRO ..... To $35K
PIA COBOL, IMS DB/DC ..... To $35K
PIA NATURAL, Pascal, COBOL ..... To $35K
Bank Analysts & Progs IBM MVS ... To $35K

SYSTEMS PROGRAMMERS

Sr. Sys Prog - MVS ..... To $35K
Sr. Sys Prog - IMS DB/DC ..... To $35K
Sys Prog - ADF/VTAM, SNA NCP ... To $35K
Data Base Analysts - IMS, IDMS, ADABAS, MODEL 204 ..... To $35K

AVAILABILITY, INC
813 832 2828

SR. PROG./ ANALYST

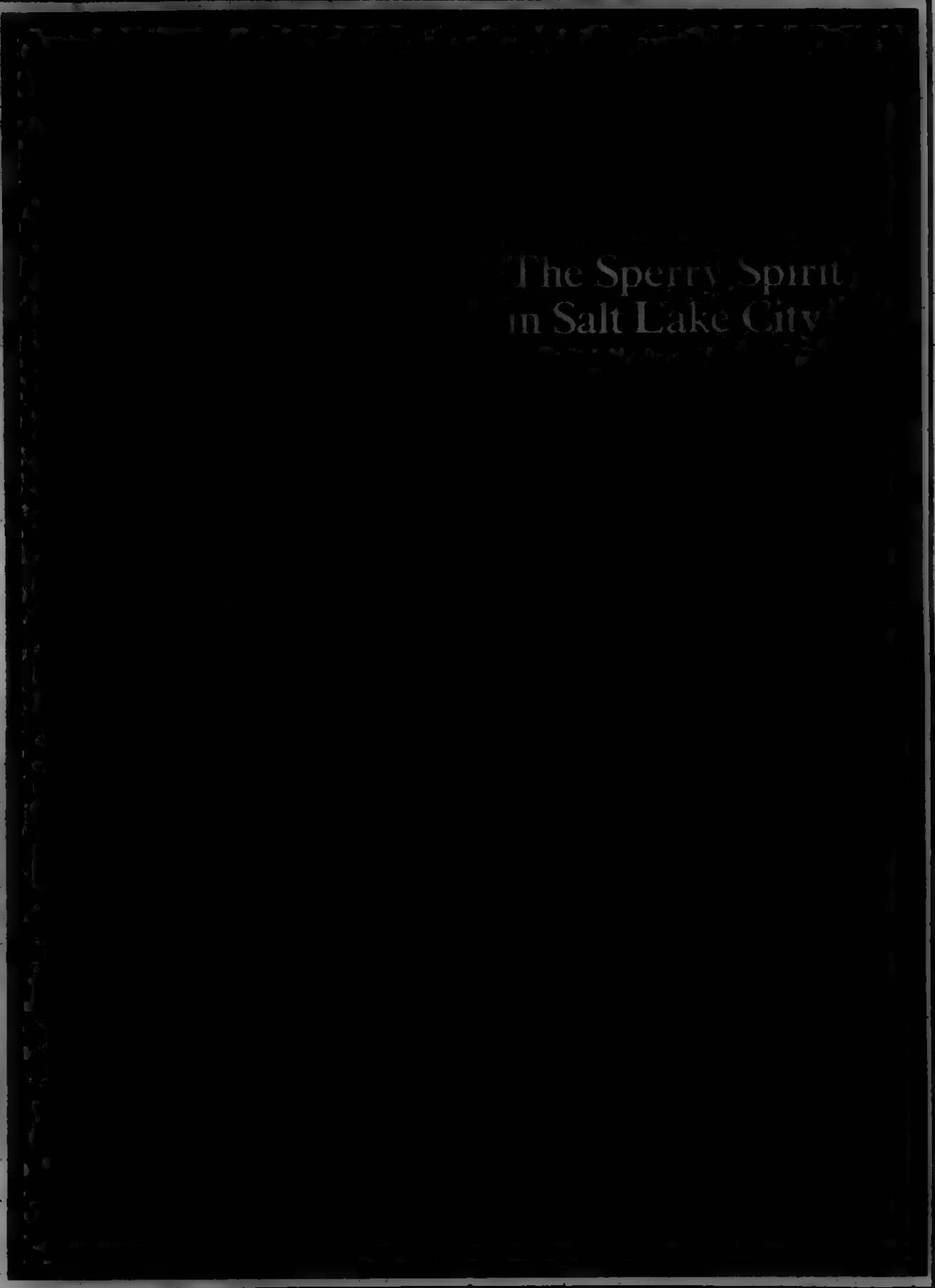
Fortune 1000 corp. actively seeks solid, people oriented sr. prog./syst. analyst. Desire a "fast start up" person w/COBOL, CICS, DL-1, VSAM & ISAM exp. for 4341 data ctr. A professional oppty. for hard working syst. expert who enjoys a somewhat laid back environ. $33,000.

Robert Half of Buffalo, Inc.
1310 Liberty Bldg.
Buffalo, NY 14202
(716) 843-0801
Personnel Consultants

MOVE OUT W
SOUTH NOW!

Our computer can help you get here or stay here. Four WAYS lines; 13 years' experience; 270 affiliated offices; 365+ current job orders; 3000+ company clients from Virginia to Texas to Florida! Send resume to:

DATA RESOURCES, USA
Division of Landrum Personnel Resources
P.O. Box 1373C
Pensacola, Florida 32596-1373
CALL TOLL FREE (800) 874-9407
In FLORIDA (904) 434-2321 COLLECT



Data Processing

PROGRAMMER/ ANALYST

Programmer/Analyst to develop, implement and maintain on-line systems in a manufacturing environment. Proficiency in RPG-III and a working knowledge of COBOL required. IBM S-38 experience preferred. Degree or equivalent with a minimum of 4 years related work experience.

Excellent opportunity with growing Virginia HBA/pharmaceutical firm. Comprehensive salary and benefits package. Send resume including salary history to:

C.B. FLEET COMPANY, INC.
Attn: Peggy Davis
P.O. Box 11349
Lynchburg, VA 24506

fleet

Equal Opportunity Employer M/F

EDP INCORPORATED

Our Clients need good

Analysts Programmers Tech Specialists

Let us help you connect with outstanding career opportunities in the *SOUTHEAST*

Our clients have many challenging positions available.

Send your resume today, before your position is filled. All fees paid by our client companies.

EDP INCORPORATED
Suite 300, Fairview Plaza One
Charlotte, NC 28210
704/554-1101

SOFTWARE DESIGN ENGINEER

A Fortune 200 company and respected leader in the manufacturing and aftermarket servicing of oil field drilling instrumentation offers an excellent opportunity for a software development professional in the Austin area.

Reporting to the Computer Product Design Manager, this position will be responsible for the design of language interpreters, operating systems, local area networks and modules for structured system use as well as project/team management and support services for your software products.

Qualifications include a BS/Computer Science (or equivalent) with 3-5 years demonstrated knowledge in assembly language programming (8080/Z-80, 6809, 8051, 8748, 8086/88, 68000) and experience with the CP/M and ISIS operating systems.

In addition to a competitive salary, benefits package and liberal relocation assistance program, we offer a challenging environment and personalized career growth as a part of a professional team developing state-of-the-art data acquisition equipment on the leading edge of drilling technology.

For confidential consideration, please respond to:

CW-B4331, Computerworld, Box 880, Framingham, MA 01701
Equal Employment Opportunity/m/f

position announcements | position announcements | position announcements | position announcements | position announcements

Imagine total project control... internal mobility... and an unmatched state-of-the-art environment.

That's Data Processing at First Chicago.

The First National Bank of Chicago presents a career path in Data Processing as advanced, dynamic and vital as the computer industry itself. A career that will allow you to work in small project groups for better control and visibility. Seeking bottom-line results.

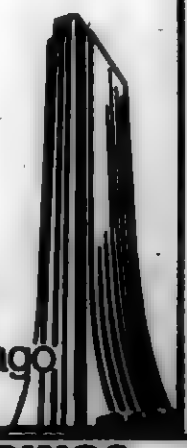
A career with the advanced technological support of one of Chicago's leading financial institutions ... An IBM 3033, AMDAHL V-8, TANDEM, DEC environment.

We have immediate openings for:

PROGRAMMER/ANALYST
- PL/1 Structured Programming Methodology
- New Development and Enhancements

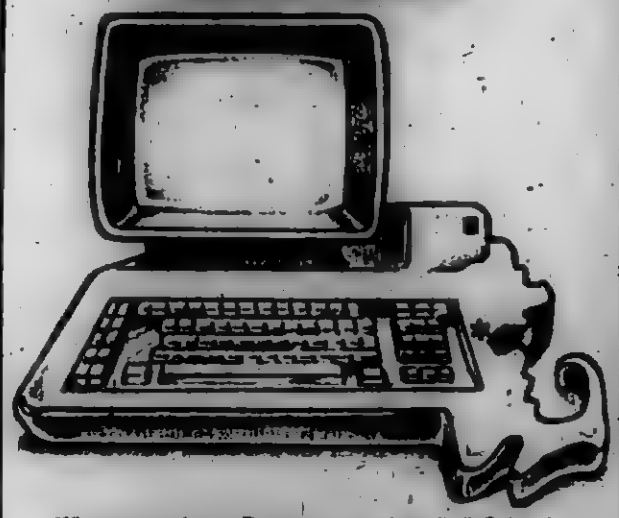
BUSINESS SYSTEMS ANALYST
- Decision Support, Personal Banking, Credit Policy Applications
- Life Cycle Methodology and System Implementation
- Liaison Between Technical and User Staff

Data Processing at First Chicago. The rewards include visibility; hands-on participation; corporate support and excellent salary/benefits package. Send us your resume in strict confidence. Kathryn C. Kniola, THE FIRST NATIONAL BANK OF CHICAGO, One First National Plaza, Professional Employment Unit 1-22, Chicago, Illinois 60670. Equal opportunity employer m/f/h.



1st FIRST CHICAGO
The First National Bank of Chicago

RPG II/III PROGRAMMERS: COME WORK IN THE STATE OF THE ART.



When you work near Boston, you can have it all. Cultural resources. Educational opportunities. And the boundless recreation that our ocean and mountains provide.

At Marcam Data Systems, we're looking for people who want all that, and more. We seek creative, ambitious programmer/analysts with 1-3 years experience on an IBM System/34 or System/36. Professionals who would also like brand new offices...a superior salary and benefits package...and the chance to work with the industry's best technical people on our in-house System/34, System/36 and System/38.

If you find us inviting, please send your resume to: Tom Ebling, Vice President for Product Development, Marcam Data Systems, 123 Highland Avenue, Needham, MA 02194.

MARCAM
the MAPICS enhancers

Data Processing Professionals

The Stroh Brewery Co., a nationwide brewery, has immediate openings for experienced professionals seeking to advance their careers in Data Processing. The current environment consists of an IBM 3033 operating in a MVS/TSO environment. We support all of Stroh's data processing requirements, including remote plants. We currently have opportunities in the following areas:

Senior Communication Analyst Programmer
Responsibilities include design, maintenance and implementation of all communications software and hardware in a MVS environment. Qualified candidates should have a minimum of 5 years' experience in data-communication with working knowledge of ACF/VTAM and ACF/NCP. IMS/DC experience would be considered a definite plus.

Software Support Programmer
Responsibilities include maintenance and control of all DASD and related software. The current environment includes 30 spindles of IBM 3350S using VSAM and IMS. Qualified candidates should have a minimum of 3-5 years' experience with DASD management.

If you are interested in working in a fast paced environment where progressive management enables your efforts to directly impact the future success of the business, we can offer you an outstanding career opportunity along with an attractive compensation package. Please send your resume, with salary history, to:

THE STROH BREWERY COMPANY
STROH EMPLOYMENT CENTER - CW-DP
ONE STROH DRIVE
DETROIT, MI 48226

NO AGENCIES PLEASE
EQUAL OPPORTUNITY EMPLOYER M/F/H

STROH

HIRING?

More computer people read Computerworld than any other newspaper in the United States - more than half a million computer people every week.

And, among our 529,650 readers at user organizations, about half claim to look at recruitment ads at least every other week (only a small percentage say they never look at recruitment ads).

No wonder Computerworld carries more recruitment ads for computer people than any other publication.

To place your ad or to get a rate card with complete details on Computerworld Classifieds, call or write:

Classified Advertising
COMPUTERWORLD
Box 880
Framingham, MA 01701
1-800-343-6474
617-879-0700

SENIOR PROGRAMMER/ANALYST

ON-LINE, INC., A RAPIDLY GROWING NORTHWEST SERVICE BUREAU SPECIALIZING IN BURROUGHS MEDIUM SYSTEMS THRIFT, IS SEEKING A SENIOR PROGRAMMER ANALYST WITH 4 TO 5 YEARS COBOL EXPERIENCE. BURROUGHS THRIFT APPLICATION BACKGROUND IS HIGHLY DESIRED.

WE SERVICE 7 BILLION DOLLARS IN ASSETS WITH 4 BURROUGHS MEDIUM SYSTEM COMPUTERS IN SUPPORT OF OVER 1,500 ONLINE TERMINALS.

WE OFFER AN EXCELLENT SALARY AND BENEFIT PACKAGE. SEND YOUR RESUME IN COMPLETE CONFIDENCE TO:

ON-LINE, INC.
ATTN: AL BUCKINGHAM
1100 OLIVE WAY
SEATTLE, WA 98101

AN EQUAL OPPORTUNITY EMPLOYER

SYSTEM PROGRAMMER/TECHNICIAN
Entry level salary $17,000 and excellent fringe benefits. Qualifications: college course work in Data Processing. Recent related experience in computer operations, with emphasis on experience in COBOL programming. Working knowledge of interactive terminal-oriented computer systems, preferably PRIME, including capabilities and structure. Experience with computer communications equipment. Apply by 1/12/84 to Personnel Office, Arizona Western College, P.O. Box 929, Yuma, AZ 85364, (602) 726-1000 Ext. 222. EOE.

Technical Specialist Systems Programmer
BS in computer science or equivalent experience required. Involves installation and maintenance of IBM, VM, DOS/VSE, Computer Associates and Pansophics software. Consultant to operations and development staff. Excellent opportunity to work independently in the beautiful Pacific Northwest. Salary commensurate with skills and experience. Qualified applicants send resume by January 31, 1984 to:

Personnel
Weyerhaeuser Company
P.O. Box 188
Longview, Washington 98632
Weyerhaeuser - an Equal Opportunity Employer

position announcements | position announcements | position announcements | position announcements | position announcements

1984 EXPANSION

Prestigious Consulting
Overtime Pay & Bonuses

CICS
IMS

skills immediately needed!

800-241-6002

G.A. WEDLER (M-18)

DATA RESOURCE CORP.

3991 Roswell Road S'188
Atlanta, GA 30342
(404) 455-7300

EOE M/F

MANAGER SYSTEMS PROG NEW JERSEY

Global agency to join expert ranks of Fortune 500 telecommunications product co. Candidates should have 5+ yrs DP exp & recent involvement in comparable position. Manage systems software programmers in operating & on-line systems disciplines. Manage system performance measurement & reporting efforts & perform evaluation of future technologies with recommendations to data center mgmt. Current configuration: IBM 3033/4341 CICS/VS, MVS/SP 1, 2, 3, DPDS 1.5, IMS 1, 2, VTAM, NCP, CICS & SHARE 1.5. Superior benefits & salary. $55,000 FEE PAID

RESIDENT SERVICE

551 Fifth Avenue
New York, N.Y. 10036
212-221-6400 (Agency)

COMPUTER EDUCATION SPECIALIST

Arkansas State University has two positions of computer education specialists. Minimum qualifications include earned doctorate or equivalent work experience in information systems or computer science. Duties include advisement regarding computer education and instruction of courses in information systems and computer science. Salary competitive and commensurate with qualifications and experience. Send curriculum vitae with letters of reference and transcripts of graduate work to Director of Personnel, Box 2160, State University, AR 72467. ASU is an AA/EOE.

The College of Saint Benedict invites applicants for a tenure track position opening in Computer Science to teach upper and lower division Computer Science courses. Fall 1984. In a Joint Department with Saint John's University. Ph.D. preferred. (M.A. or M.S. acceptable with teaching experience.) Rank and salary negotiable. Excellent fringe benefits. Send resume, transcripts and three letters of recommendation to

Computer Science Chair,
c/o Kelley Flynn,
Wage and Benefit Coordinator,
College of Saint Benedict,
Saint Joseph, MN 56374,
by March 15, 1984. EOE. M/F/H

HP 3000 PROGRAMMERS

Expanding, mid-size health care consulting and DP firm, located in suburban Washington, D.C., and specializing in medical information systems, is in search of several Programmer Analysts. At least 1 year of solid experience with HP 3000, IMAGE and DSG/3. Desirable knowledge of FORTRAN a definite plus. Responsibilities include developing, customizing, installing and supporting on-line systems. We offer excellent salaries, progressively increasing responsibilities and a good benefit package. Please send resume or call:

Jeppesen and Blair Inc.
51 Monroe Street
10th Floor
Rockville, MD 20850
Attn: DP Department
(301) 251-0600
(Wendy Burke)
An Equal Opportunity Employer

You Decide.

If you want opportunity and challenge, the choice is Tandem's Software Development Team.

We pioneered the field of fault-tolerant computing. And, with our new TXP* system, we've taken on-line transaction processing further than anyone had imagined.

As career go, however, what makes Tandem different—and, we believe, better—is that we support the notion that the essence of success in our business is founded in opportunity and challenge for each of us:

Database Management

Relational Database Management

Requires 3+ years' experience in relational database management systems development to contribute to a new project, and an understanding of query processing, various data access methods, data description and data manipulation concepts. Implementation experience with architectural design and distributed DBMS.

Application Development Tools

Design/implement high-level application development tools in the areas of application specification and generation, non-procedural language design, human engineering and ergonomics.

Diagnostic Technical Leader

Design/specify the maintenance and diagnostic architecture, design methodology and diagnostic tests for support of distributed fault-tolerant systems. MSCS/MSEE and previous project management experience desirable.

Quality Assurance

Software Product Quality

Experience in the design/implementation of quality computer systems. Use your analytical and creative abilities to influence product design, implement test tools and develop regression test libraries in database management, operating systems, data communications and compilers.

QA Tech Leader

Lead a group building quality into new system software. Write test programs, design a regression test system and develop a release control library system. Sound knowledge of database management software, software reliability and operating systems.

Operating Systems

Positions involve detail design, implementation and debugging skills, substantial operating systems development experience, and excellent writing and verbal skills:

Disc Access Method and Transaction Management.

High-level design skills. Experience with file systems, access methods, device independent I/O, locking, failure recovery, transaction management.

Disc I/O Design and Implementation

Background in low-level disc I/O, disc space management, resource management, and performance optimization.

Datacommunications

Develop and enhance software from link level protocols to access methods. Projects involve ADCCP, SNA, SDLC, HDLC, X.25 and networking.

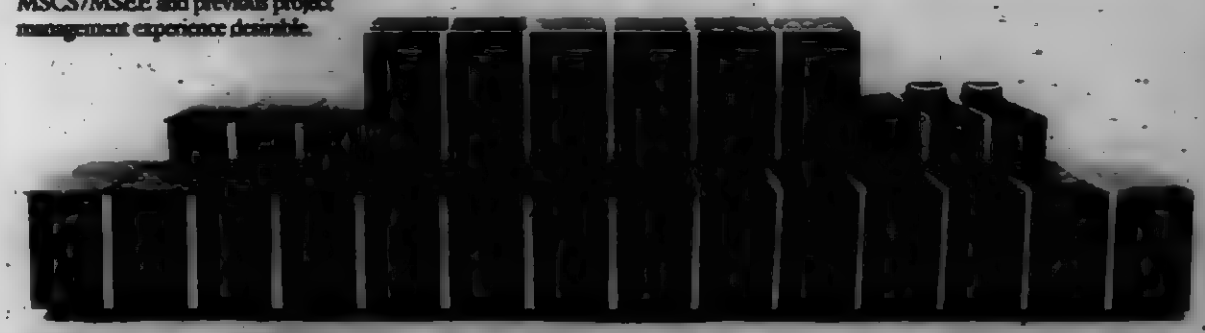
Processor Microcode

Design and develop processor instruction set and I/O channel microcode, participate in microarchitecture definition. Requires 5-7 years' experience developing instruction set firmware or related hardware design.

Call Joy Mar COLLECT at (408) 725-9097 for more details about these positions. Or send your résumé to her attention, Tandem Computers, Inc., Dept. 12/3, 19333 Vallco Parkway, Cupertino, CA 95014. We are an equal opportunity employer.

Principals only, please.

TANDEM



Makers of TXP,* the most powerful on-line computer in business today.

*TXP is a trademark of Tandem Computers, Inc.

DIRECTOR OF FINANCIAL SYSTEMS MANAGEMENT

For a Southwest based corporation. Responsibilities include documentation of current financial reporting and accounting systems, the determination of present and future management information needs, the development of alternate methods for providing the information required by management, as well as conversion and implementation. Candidates must possess an undergraduate degree in accounting, a strong background in systems design and superior analytic capabilities with effective interpersonal skills.

Send resume and compensation history in confidence to: CW-B4332, Computerworld, Box 880, Framingham, MA 01701

An equal opportunity employer m/f/h.

DATA BASE ANALYST

Old Dominion University is searching for a dynamic individual for the position of Data Base Analyst. Assist with the installation of database handling/ consulting systems utilizing an Australian technology on an IBM 4341-2 computer system to support an enrollment of 15,000 students.

Responsibilities include external data base functions: data base generation, problem diagnosis and resolution, performance analysis, security, and staff training.

Systems analysis experience, COBOL and CICS experience and DB/DC knowledge, preferably TOTAL, required. Experience in higher education and a related college degree preferred.

Excellent benefit program: paid tuition and retirement; state supported health plan; and tuition-free training. Enjoy the moderate climate, the beach, the bay and the cultural attractions of Virginia's fastest growing area.

Position expected. Salary range $20,871 to $32,400, commensurate with qualifications. Closing date January 13, 1984. Send resume and request for application to:

Employment Office
Old Dominion University
Norfolk, VA 23508
AA/EEO Employer

EMPLOYMENT SERVICE FOR PROGRAMMERS AND ANALYSTS

National Openings With Client Companies
and Through Affiliated Agencies

Scientific and commercial applications • Software development and systems programming • Telecommunications • Control systems • Computer engineering • Computer marketing and support

Call or send resume or rough notes of objectives, salary, location restrictions, education and experience (including computers, models, operating systems and languages) to either one of our locations. Our client companies pay all of our fees. We guide, you decide.

RSVP SERVICES, Dept. C
Suite 700, One Cherry Hill Mall
Cherry Hill, New Jersey 08002
(609) 667-4488

RSVP SERVICES, Dept. C
Suite 211, Dublin Hall
1777 Walton Rd., Blue Bell, PA 19422
(215) 629-0565

From outside New Jersey, call toll-free 800-257-0191

RSVP SERVICES

Employment Agents for Computer Professionals

position announcements | position announcements | position announcements | position announcements | position announcements

Software engineers. This is the place.

At Kodak, computers play a vital and ever-increasing role in every step of production. And we need skilled professionals who want to share in the challenges and rewards of technological leadership.

We're looking for talented software and computer engineers with a BS or MS and technical experience in minicomputer and microprocessor systems used in the development of software for real-time equipment control. Assignments may involve design of software systems for products or manufacturing control; programming mini- and/or microcomputers; integrating computer software and hardware into complex electromechanical systems; and quality assurance of computer programs.

Kodak also has opportunities for electrical engineers in the areas of design and development, video, test, systems and optical engineering.

We offer competitive salaries, liberal benefits, and opportunities for individual contribution and growth. Positions are available now. If you have the necessary skills and drive to meet the challenge of working for a corporation in the forefront of technology, send your resume today.

Personnel Resources
Eastman Kodak Company
Dept. DCPW
Rochester, NY 14650

Kodak. The right place. The right time.
An equal opportunity employer

Internal Auditing Opportunity

WE'RE RELIANCE ELECTRIC — an Exxon affiliate with 24,000 employees generating an annual sales volume of $1.6 billion. Our products include a wide range of electrical/electronic/mechanical equipment and control systems and related components, with specific applications for the world's diverse industrial marketplace. Our internal auditing activities are broadening and offer the following opportunity:

SENIOR EDP AUDITOR

Your accounting and/or computer science major and minimum 5 years' career experience, with emphasis on business information systems auditing, will qualify you for consideration for the present opportunity. Your high technical skill level will be a key factor. You should be proficient in one or more programming languages (COBOL, RPG, BASIC), as well as have experience with report writer/generator software. You should also have the ability to work with various financial and manufacturing systems.

Primary responsibilities will be to: evaluate and test security and control of computer operations, programs and systems; review new systems for proper internal controls and development methodology; apply computer-assisted audit techniques using audit software; provide technical assistance and training to the general Audit Staff; and assist in the development of EDP audit plans and schedules.

This position presents a challenging opportunity with excellent internal growth potential, either within Internal Audit or in other controllership assignments. You'll also appreciate our competitive salary/benefits plan and attractive suburban location. For immediate, confidential consideration, send your resume outlining your career experience to:

Manager, Corporate Employee Relations

RELIANCE ELECTRIC COMPANY

29325 Chagrin Boulevard • Cleveland, Ohio 44122

An Equal Opportunity Employer
Principals Only

Computer Application Analysts

Mobil Exploration and Producing Services, Inc., provides advanced geophysical and geological data support to Mobil Oil Corporation's exploration activities worldwide. We currently have several excellent opportunities for experienced and entry level Computer Applications Analysts. As a member of our Seismic Support Group, you will be involved in challenging assignments working with some of the most sophisticated technology available.

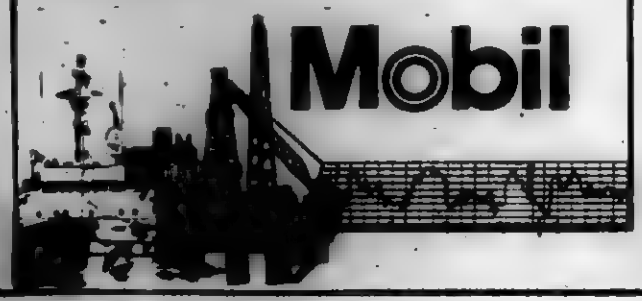
To qualify you must possess the following:

- Minimum 1-3 years technical programming experience or equivalent credentials. Experience with CDC, Cray computers or familiarity with seismic techniques/processing desired but not required.
- B.S. degree in Mathematics, Physics, or Geophysics.
- Solid knowledge of FORTRAN and good familiarity of hardware and OS software concepts.

Responsibilities include:

- Develop and implement software incorporating new seismic technology.
- Function as part of a team on a large scale software development or conversion project.
- Interact with units in MEPSI and other divisions within Mobil to provide user support/training.
- Write user/programmer support documentation for seismic software.

Mobil offers the salary and comprehensive benefits package that you expect from an industry leader. Qualified candidates should send their resume to: Glenda Lear, Employee Relations, Mobil Exploration & Producing Services, Inc., Dept. CW 12, P.O. Box 900, Dallas, Texas 75221. An equal opportunity employer, m/f.



LOOKING?

Find the job you want in Computerworld's classifieds.

No other publication carries as many ads for computer professionals as Computerworld, so no other publication can give you as wide a choice of jobs, salary and location as Computerworld.

You can even try a "Position Wanted" ad to look for exactly what you want, where you want.

Be sure you look over our recruitment ads every week, so you don't miss the opportunity that's just right for you.

MINI/MICRO PROGRAMMER ANALYST

Excellent career opportunity for motivated self-starter to design, specify, and build software systems & interfaces for IBM PC & other mini/micros as required. Heavy user/engineering interface; training & guidance to entry-level programmers in implementation phase.

The qualified candidate will have a BS in Computer Science or related discipline - graduate work an asset. 4 - 5 years broad programming & analysis experience with mini or micro systems. Experience in both high-level and Assembler languages required.

We have an excellent benefit package with 100% tuition reimbursement.

Send resume and salary requirement to Personnel Director.

ENGLER INSTRUMENTS

SANGAMO WESTON
Schlumberger

250 Culver Avenue
Jersey City, N.J. 07305

An Equal Opportunity Employer

HAPPY NEW YEAR

Now is the time and this is the place. A better opportunity awaits you in Florida. New budgets and new beginnings make this the most active hiring season of the year. Don't miss this chance to explore what the future can hold for you.

If you appreciate a knowledgeable approach to your career planning, then contact our staff of former DP managers who speak your language and understand your needs.

COMPUTERPEOPLE
5720 N. Nebraska Blvd.
Suite 204
Tampa, Florida 33604
(813) 886-6130

We Serve Computer Professionals Exclusively -
And That's Important To You!

Systems Programmer Position
(Anticipated)

The System Network Computer Center at Louisiana State University has an immediate opening for a System Programmer Position. A college degree in computer science or a related field with at least 3 years experience in data processing and systems programming is required. Preference will be given to applicants with experience in JES2, UNIVAC, VM/CMS and telecommunications. Support computers are IBM 3081 and IBM 3033. Send confidential resumes by January 15, 1984 to:

Dr. John M. Tyler, Director
System Network Computer Center
Baton Rouge, Louisiana 70803

LSU is an Equal Opportunity Employer

position announcements | position announcements | position announcements | position announcements | position announcements

Software Designers Programmer-Analysts Programmers

ADR Services, Inc., a subsidiary of Applied Data Research, Inc., is in a continuing expansion mode. We have immediate career opportunities for computer professionals with two or more years industry experience.

We are seeking individuals experienced in:

- ADR/DATACOM/DB/DC
- IDMS/DC
- ROSCOE
- COBOL
- ADABAS
- AD6/On-Line
- T90/SPF
- CICS

Positions are available in the Dallas, Texas; Boston, Massachusetts; and Washington, D.C. areas.

ANALYST/DESIGNERS with experience in developing on-line DBMS based applications, user interview requirements definition, and detailed systems specifications will participate in the development and implementation of a variety of new projects involving state of the art, on-line real-time applications.

PROGRAMMERS with IBM COBOL structured programming experience in a data base environment will participate in the development and implementation of new applications utilizing the latest application development tools and data base technology.

Additionally, we have immediate openings at our Vienna, Virginia office for HONEYWELL SYSTEMS PROGRAMMERS who will participate in the re-design of established software products using PASCAL.

- Honeywell DPS-6/ GCOS Mod 400
- L6 Assembler and/or PASCAL, DBMS Internals
- Relational DBMS (DATACOM, ADABAS, etc.)

ADR Services, Inc. offers a competitive benefits and compensation program, including relocation assistance. Local interviews will be arranged. Please forward your resume in confidence to: Mr. John Chester, 800 Follin Lane, Suite 270, Department C, Vienna, Virginia 22180.

ADR SERVICES

Equal Opportunity Employer

SYSTEMS ANALYST

GOULD

Gould Inc. Computer Systems Division is an international leader in the real-time scientific super-minicomputer market. We are currently seeking a Systems Analyst to provide pre-sales support to our New Orleans/Slidell Office.

The ideal candidate will have 2 to 5 years FORTRAN programming, strong communication skills and a solid understanding of scientific and engineering related applications.

In addition to an interesting and challenging work environment, we offer an excellent salary, bonus program, car allowance and complete benefits package. Local interviews will be held. For immediate and confidential consideration, please call Cathy D'Amico (213) 323-8560 or send your resume, including salary history and requirements, to:

GOULD, INC., Computer Systems Division, Slidell Tower Building, 520 Old Spanish Trail, Suite 311, Slidell, LA 70458.

An Equal Opportunity Employer M/F/H

Sohio

Geophysical Software Professionals

Discover Sohio in Dallas, Texas

Opportunities exist in our Geophysical Systems Development staff for individuals with experience in seismic systems development to develop state of the art seismic processing systems in a DEC VAX 11/780 - CRAY IS/X-MP environment.

The successful candidates will work within a structured analysis and design project team environment to provide seismic systems development support for the Geophysical Research and Development staff at Sohio's Geophysical Data Center in Dallas.

Geophysical Systems Analyst

Requires expertise in using structured analysis and design techniques to analyze, design, specify and test state of the art seismic systems for Sohio's aggressive exploration programs.

Minimum 3 years' experience in seismic software development including time series analysis or geophysical signal processing is required.

Individuals should have above average skills in interpersonal relations, written and oral communication. Project management skills are also desirable.

Geophysical Programmer Analyst

Seismic software experience, including development in seismic analysis and interpretation techniques (wavelet and/or velocity analysis, event tracking, filtering), signal processing and color graphics.

These positions require a BS or MS in geophysics or physics with strong skills in software development, or a BS or MS degree in computer science or math with strong skills in seismic software development.

Geophysical Data Base Analyst

Requires expertise in using structured analysis and design techniques to analyze, design, specify and test geophysical data base management systems for use with state of the art seismic interpretation systems.

BS or MS degree in computer science, math or related field is required. Minimum 3 years' training and experience in the analysis, design, specification and testing of software systems under a structured environment is required.

Individuals should have above average skills in interpersonal relations, written and oral communications. Project management skills are desirable.

All positions require familiarity with FORTRAN '77. Experience with DEC (VAX-11/750 & VAX 11/780) and CRAY IS/X-MP systems is desirable. DEC assembler, DEC systems internals, data base management systems, graphics software and hardware experience is preferred.

It's time to consider joining the Sohio adventure where the compensation package, including benefits, is outstanding. The opportunity for visability is unequaled, and to top it off, Sohio has one of the best relocation programs in the industry: To find out more, send your resume, complete with salary history, to Dan Allman, SOHIO PETROLEUM COMPANY, Dept. D047, 5420 LBJ Freeway, Suite 800, Two Lincoln Centre, Dallas, Texas 75240.

Equal Opportunity Employer M/F/H/V. Principals Only Please!

Your search leads to Sohio

SOHIO

MANAGER COMPUTER OPERATIONS

Fortune 500 Blue Chip Company opportunity growth position for professional with total plus yrs exp in management of computer operations. In charge total multi-processor environment. Will supervise a staff of 35. Previous experience in networking preferred. Comprehensive compensation package. Salary 40-50K plus incentive plan. Pay paid. Contact Jay Brown at 513-227-2121.

Accountemps/ DIV. ROBERT HALF, INC. P.O. Box 756 MidCity Station Dayton, OH 45402

Give us your resume

We'll give YOU San Francisco!

Some people come to sail on the Bay, some to ski in the Sierras, and some to snorkle in Santa Cruz. But the professional climate is the real reason, and every bit as exciting.

There's nobody better qualified than CRG to introduce you to San Francisco. We've been here longer—over 10 years—know everyone in EDP worth knowing, and our list of client companies reads like the Who's Who of the business world.

Send your resume today, or call. All fees, interview and relocation expenses are paid by our clients.

Computer Resources Group, Inc.
343 Sansome St., San Francisco, CA 94104
(415) 398-3535 or 3333 Bowers Ave., Santa Clara, CA 95051, (408) 727-1660

CRG AFFILIATES IN 27 MAJOR U.S. CITIES

National Computer Associates

An employer-retained professional placement service

position announcements | position announcements | position announcements | position announcements | position announcements

Computer Programming

Guide The Development Of A New System

You'll create it.

High Visibility With Top Management

There are very few opportunities to create a new system. This is one of them.

Guide our Applications Development Team.

Experience the real, honest-to-goodness coming alive of a new system. It will be the core of operations of our growing $135 million corporation.

Company: Solid. In business 43 years. Leader in its field. Doubled in size last year—about to do it again. Marketing in 44 states plus D.C.

Location: New 102,000 sq. ft. office—Indianapolis, Indiana

You: Prior applications development experience using IBM hardware and a data base approach is highly desirable. Prefer Computer Science or Business major with computer programming minor. Must be a logical thinker, a good communicator, and self-starter.

Send resume in strict confidence or call **Bob Talley 317-297-4123.**

Golden Rule

Golden Rule Insurance Company

Golden Rule Buildings
The Waterfront
Indianapolis, Indiana 46224-4199

Our employees know of this ad.
Equal Opportunity Employer—M/F

PROJECT ATHENA OPENINGS

The Massachusetts Institute of Technology recently launched Project Athena, a $70 million educational effort based on the integration of modern computer and communications capabilities into all phases of the educational process. Project Athena involves the use of 3,000 new DEC and IBM computers. Individuals will work closely with MIT faculty and students as well as the DEC/IBM/MIT staff members assigned to the project.

The following positions are now open and require a minimum of a Bachelor's degree or equivalent combination of education and experience.

Applications Consultant (A340)

Individual will assist in the development of education software which achieves the dual purpose of curriculum enrichment and technical coherence. Qualifications include: three to five years' in applications development with particular emphasis on graphics. Must have at least two of the following languages: C, LISP, Fortran and Pascal.

Education/Support Specialist (A338)

Individual will: 1) evaluate educational needs of user community and provide educational courses and materials to meet needs; 2) plan and supervise on-site consulting to users in terminal rooms as well as a staff "hotline" for unresolved questions; and 3) organize and publish a library of Athena-developed courseware/software. Qualifications include: excellent administrative, organizational, verbal and written communication skills. Experience in preparation of educational materials and documentation formatters (i.e., nroff, Scribe or TEX). Familiarity with design of user interfaces, software verification or graphics systems desirable.

Operations Coordinator (A339)

Individual will assist in planning and performing the administrative and technical activities involved in hardware and software installation and operation of all Project Athena computers. Develop and implement procedures and establish control. Communicate with users and interface with hardware/software vendors. Assure system and user file backup and recovery. Qualifications include: experience with UNIX operating system, supervision of computer systems operations and maintenance, and logistics/support in academic environment. Excellent interpersonal and communication skills required.

Please send 2 copies of resume, referring to appropriate job number (ex: Ms. Sally Hansen, MIT Personnel Office, W9-220, 77 Massachusetts Avenue, Cambridge, MA 02139.

MIT is an equal opportunity/affirmative action employer.

DATA PROCESSING OPPORTUNITIES
Oklahoma City Location

If you are interested in designing and implementing a state-of-the-art computer system, the Hertz Corporation has outstanding career opportunities for you.

At our worldwide Reservation Center in Oklahoma City, you will receive the ground floor opportunity to develop large scale software systems in support of our highly distributive field location. We currently have professional career opportunities available for:

PROGRAMMERS
PROGRAMMER ANALYSTS

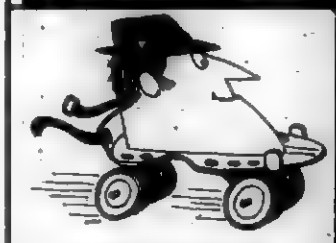
Preferred qualifications:
- 3-5 years in data processing
- Mini-computer implementation and/or design background
- Communication experience
- Familiarity with structure methodology
- COBOL
- Background in designing large software systems

These positions offer competitive salaries and excellent benefits: relocation program, company paid life/medical/dental insurance, savings plan, retirement, tuition refund and more. Please submit both your resume and salary history to:

Hertz

THE HERTZ CORPORATION
Attn.: Data Services
10301 North Pennsylvania
Oklahoma City, OK 73120

Equal Opportunity Employer m/f/h



MOVE AHEAD WITH COMPUTERWORLD

More computer people read Computerworld than any other newspaper in the United States—more than half a million computer people every week. And, among our 529,650 readers at user organizations, about half claim to look at recruitment ads at least every other week (only a small percentage say they never look at recruitment ads). No wonder Computerworld carries more recruitment ads for computer people than any other publication. To place your ad or to get a rate card with complete details on Computerworld's Classified section, call or write:

Classified Advertising
Computerworld
375 Cochituate Road,
Box 880
Framingham, MA 01701
1-800-343-6474
617-879-0700

Manager Software Development

We seek an ambitious and talented software development professional to take full responsibility for the management and technical direction of NCR's system development languages, including NCRL, C and ADA. As Section Manager, you'll also be responsible for assisting in the recruitment of personnel, preparing and managing budgets and forecasts, and contributing to the accomplishment of overall department objectives.

To qualify for this highly visible position, you should have prior experience at the group manager level, or equivalent, including managerial training. Also vital are experience in high level languages, compiler design and the software development process, plus budgeting and forecasting.

NCR is a $3.5 billion company, growing faster than ever in our 100 year history. Our computers and interactive systems are an essential part of all types of business, science, governmental, and educational endeavors.

If you are qualified for this position and want to learn more, send your resume, in confidence, to: **Personnel Resources, NCR Corporation, Systems Engineering - Torrey Pines, Dept. P55, 11510 Torreyana Road, San Diego, CA 92121.**

NCR
Complete Computer Systems
An Equal Opportunity Employer

Data Processing Manager

Salary $34,900 - $47,100
Closing Date 1/9/84

Applicants should obtain a full job description and application form from Pierce County Personnel Department, 734 County City Building, Tacoma, Wash. 98402.

Pierce County is an Equal Opportunity Employer.

SYSTEMS SPECIALIST
Sacramento, CA

The Golden 1 Credit Union is a progressive full-service financial institution with 8 offices, 160,000 members and $350,000,000 in assets. We are seeking experienced Systems Specialists. The individual must have a minimum of 2 years experience in IBM COBAVSE, NDP, CICS, BAL, and COBOL. Responsibilities will include identifying and maintaining present IBM systems and applications. Position requires the understanding of hardware and software as well as applications. Salary commensurate with experience. Send resume to Peggy Pullen, Personnel Officer, 7770 College Town Drive, Suite E, Sacramento, CA 95826.

position announcements | position announcements | position announcements | position announcements | position announcements

Sohio

Discover Sohio in Dallas, Texas

Opportunities exist in our Geophysical Systems Development staff for individuals with experience in seismic systems development to develop state of the art seismic processing systems in a DEC VAX 11/780 - CRAY IS/X-MP environment.

The successful candidates will work within a structured analysis and design project team environment to provide seismic systems development support for the Geophysical Research and Development staff at Sohio's Geophysical Data Center in Dallas.

CRAY Software Optimizing Analysts

BS (MS preferred) in computer science, math, physics or geophysics with at least 2 years' code optimization experience on CRAY IS/X-MP systems is required. Experience with DEC systems (VAX-11/750, VAX-11/780) and FORTRAN '77 is preferred. Previous experience with seismic software development and geophysical signal processing is desirable.

Individuals should have interpersonal skills to effectively interact with Sohio's Geophysical R&D staff. Project management skills helpful.

It's time to consider joining the Sohio adventure where the compensation package, including benefits, is outstanding. The opportunity for visability is unequaled and — to top it off — Sohio has one of the best relocation programs in the industry. To find out more, send your resume, complete with salary history to: Dan Allman, SOHIO PETROLEUM COMPANY, Dept. D048, 5420 LBJ Freeway, Suite 800, Two Lincoln Centre, Dallas, Texas 75240.

Equal Opportunity Employer M/F/H/V.
Principals Only Please!

Your search leads to Sohio

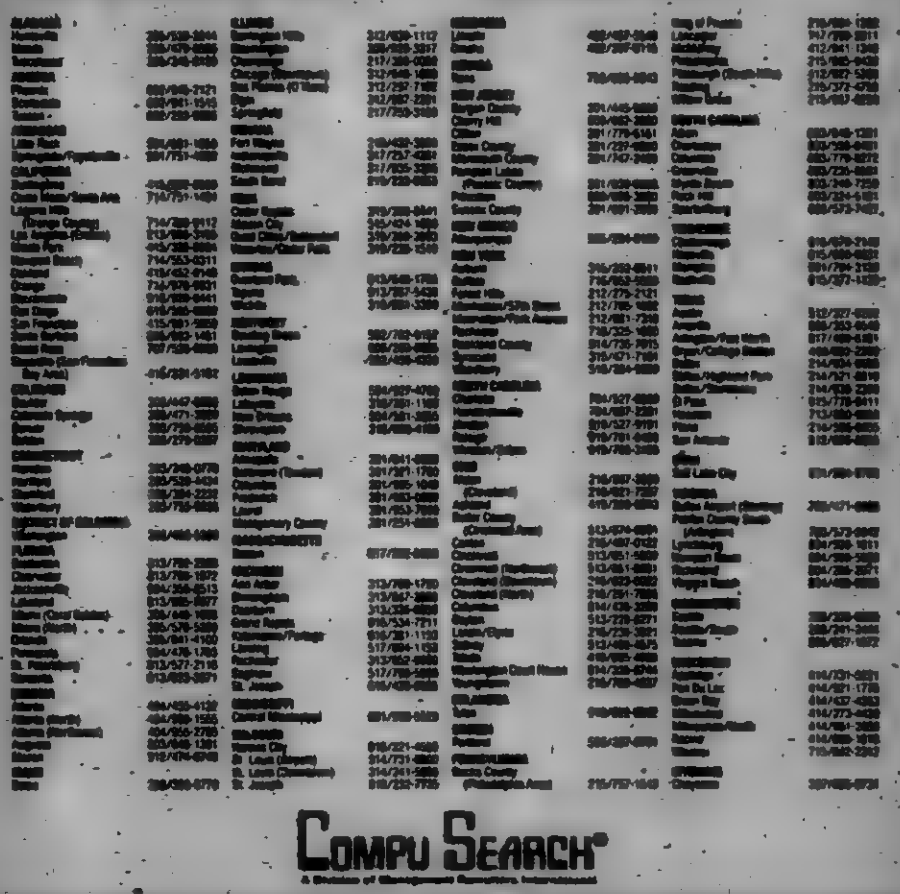
SOHIO

SYSTEM DESIGN BEGINS AND ENDS WITH PEOPLE.

YOU CAN CALL US NOW OR YOU CAN CALL US LATER.

CompuSearch, a division of Management Recruiters, specializes in finding data processing people with the training and experience to step right into your DP staff positions and start producing — right now.

Don't be frustrated by staff vacancies or expansion needs. Call CompuSearch today! We'll find, screen and deliver the qualified people you need.



COMPU SEARCH®

PROGRAMMER/ANALYST

Looking for a challenge and an exciting opportunity to grow in the data processing field? Join our data processing group and help to provide the systems support needed in a major facility.

If you are ready to accept this challenge, you have a Bachelor's degree plus several years of programming experience in a business/manufacturing environment. You want an active user-oriented atmosphere that expects results; you enjoy interfacing with people on all levels; and are looking for a chance to develop your career by working on the IBM S38. Previous experience with IBM 34/36 is beneficial, but not required. There will be opportunities in the areas of networking and communications.

Barry Controls offers excellent salaries and an outstanding benefits package. Please send resume with salary history to: Natalie Ombrello, Employment Manager.

BARRY™ CONTROLS

A DIVISION OF BARRY WRIGHT CORPORATION

700 Pleasant Street
Watertown, MA 02172

An equal opportunity employer, M/F/H/V

KING ABDULAZIZ UNIVERSITY — JEDDAH, SAUDI ARABIA

King Abdulaziz University, Computer Center, is now accepting applications for the following positions:

1. DATA BASE ADMINISTRATOR - 3-5 years experience in IMS DC/1, CICS. Knowledge of DBMS and SDF is desirable.

2. SYSTEM PROGRAMMER - IBM - 3-5 years experience in OS/VS1, VM/SP, APL, IIS. Knowledge of SAS, SLAM II, GPSS, CSMP, STAIRS, packages is desirable.

3. SYSTEM PROGRAMMER - DEC - 3-5 years experience in RSTS/E and VAX/ UMS.

4. SYSTEM ANALYSTS/SYSTEM ENGINEERS - 4-6 years experience in designing and implementing systems in Database environment. Knowledge of CICS, IMS and COBOL is essential.

5. SENIOR PROGRAMMERS - Minimum 5 years experience in coding COBOL, Basic, CICS MACRO and command level, DL/1.

6. INFORMATION CENTER CONSULTANT - Experience in VM/SP and related IBM information center product such as: APL, IIS, STAIRS and high level languages.

7. DOBIS/LIBIS ADMINISTRATOR - Experience in installing, implementing and maintaining the DOBIS/LIBIS library system.

If interested, send a resume, one photograph, certificates, letters of reference to:

KING ABDULAZIZ UNIVERSITY OFFICE
c/o SAUDI ARABIAN EDUCATIONAL MISSION
2425 WEST LOOP SOUTH, SUITE 654
HOUSTON, TEXAS 77027

position announcements | position announcements | position announcements | position announcements | position announcements

SOFTWARE COMMUNICATION SPECIALISTS

The Garland Division of E-Systems, Inc., a Fortune 500 company, located in Northeast Dallas, is offering you the opportunity to enjoy everything that makes Dallas one of the most livable areas in the United States. This Group is working with the FAA on an exciting project that will network weather data nationwide for General Aviation flight assistance.

We are looking for individuals with:

- EE, Math, or Computer Science degree with 5 or more years experience working with various bit, byte and asynchronus protocols.
- Solid experience designing and implementing communications based systems (computer-computer, device to computer).
- Tandem computer systems expertise using GUARDIAN operating systems preferred.
- Experience with TAL language.

At E-Systems, Inc., Garland Division you'll be working with employees that demand an environment of real career growth. You'll have a package of plusses that includes excellent salaries and FlexComp—a super plus that lets you use tax free dollars to design your own benefits package!

For immediate consideration, please forward your resume to: Ann Olson, E-Systems, Inc., Garland Division, P.O. Box 226118, Dept. 41, Dallas, Texas 75266.

U.S. Citizenship Required.
An Equal Opportunity Employer, M/F, H, V.

E-SYSTEMS
The problem solvers.
GARLAND DIVISION

King Fahd Hospital of the University

KING FAISAL UNIVERSITY

Dammam, Saudi Arabia

This 360-bed teaching hospital, located on the Arabian Gulf in Saudi Arabia, invites qualified computer professionals to apply for the following post:

DIRECTOR OF DATA PROCESSING

Applicants should possess a University degree in Computer Science as well as five (5) years experience in the management of a Hospital Computer System. Experience with PCS (Patient Care Systems) is a plus!

Salary is competitive and benefits include:

- 45 days annual leave
- Annual roundtrip airline tickets
- Free furnished accommodations
- Free medical care
- One year, renewable contracts

Interested applicants should forward their resume, salary history and three letters of reference to:

King Fahd Hospital of the University
KING FAISAL UNIVERSITY
2425 West Loop South, Suite 540
Houston, Texas 77027

M & T BANK

DATA PROCESSING POSITIONS

M&T Bank is a two billion dollar financial institution, headquartered in Buffalo, New York, with a network of 49 branches, including a long standing presence in New York City. As a commercial bank dedicated to serving the corporate and personal banking needs of the community, we are endeavoring to increase the range of our products and to further improve the quality of services to our customers.

We, at M&T Bank, are determined to implement new, modern systems to support our ambitious business objectives. In view of this, several excellent opportunities currently exist for dynamic, self-starting individuals to assume key roles in our Amherst Data Center. Solid qualifications for one of the following positions can lead to challenging, long-term career prospects.

SYSTEMS SOFTWARE PROGRAMMERS

The Systems Software Programmers will be responsible for installing, monitoring, and maintaining state - of the art systems as well as performing capacity planning and performance tuning functions.

The candidates we are seeking will possess approximately three to five years experience with IBM oriented OS/VS1 operating systems knowledge.

Proven experience with sys-gen, program product installation, and on-going operating systems maintenance is required. These individuals will be familiar with IBM 3033 and IBM 4341 Central Processors; CICS and SNA experience is desired.

SOFTWARE MANAGER

The Software Manager will be responsible for selecting, installing and maintaining state of the art MVS and VM operating systems. The incumbent will also develop performance measures and capacity planning tools and shall participate in applications tuning, equipment selection, and long-term strategy setting.

We are seeking an individual who possesses a minimum of eight years experience in systems programming including three years in systems software management. The successful candidate will have experience with the IBM 3033 and Air IBM 4341; CICS familiarity is highly desirable.

In addition to the career growth afforded by these positions, we offer a comprehensive benefits and relocation package. All interested candidates should submit their resumes in confidence to:

TOM HOSICK
Human Resources Group
M&T Bank
One M&T Plaza
Buffalo, New York 14240
AN EQUAL OPPORTUNITY EMPLOYER M/F/V/H

SENIOR OBSERVER SYSTEMS MANAGER
INTERNATIONAL PAYROLL/PERSONNEL

Opening for Senior System Engineer with specialization in International Payroll/Personnel (PPP). Must have high school degree and minimum of 5 years of data processing experience with minimum of 3 years experience in PPP programming or design. Must have in-depth knowledge of IBM (OS and DOS) operating systems and ICL (International Computers Limited) mainframe systems. Experience in converting IBM software to ICL necessary along with knowledge of U.K. statutory requirements for payroll and personnel. Salary: $27,000 per annum, 40 hours, M-F. Applicants should apply in person with resume or send resume to Georgia Department of Labor, 2967 Covington Highway, Decatur, Georgia, and refer to Job Opportunity Notice 0166041. An Equal Opportunity Employer.

COMPUTER SYSTEMS ENGINEER – Development of intelligent CMA-A programmed controlled interfaces between DEC, UNIBUS, Q-BUS & non-standard high speed process computers. Design interface circuit & microprogramming & DR also control for peripheral data acquisition system. Requires Master's Degree in Electrical Engineering; 2 yrs job exp. or 2 yrs related exp. in Computer System Engineering. Must know ASSEMBLY & micro-programming languages; knowledge of PDP-11M operating system & INTEL 8085-based microprocessor development systems; experience in Bit-Slice circuit design & application; experience in digital systems design-ing. Pays $32,000/yr to work 40 hrs. 5 days/week from 8 a.m. to 5 p.m. Apply to: T.E.C. Recruiter, Texas or send resume to T.E.C., TEC Building, Austin, Texas 78770 J.O. 8911141. All Paid by an Equal Opportunity Employer.

Manager-Data Processing

The Dana-Farber Cancer Institute is seeking a Data Processing Manager to take the lead role in developing and implementing short and long term plans for management information systems. Will assume management of day-to-day operations and provide technical support to top management on data processing and related matters. To qualify, you'll need a proven record in hospital systems with demonstrated ability to manage patient care data systems. MUMPS programming experience preferred. Excellent salary and benefits.

DANA-FARBER CANCER INSTITUTE

Please send resume to: Director of Personnel, 44 Binney Street, Boston, MA 02115

An Equal Opportunity/Affirmative Action Employer

SYSTEMS PROGRAMMER

($36,456 - $44,496)

IBM Experience Preferred

Obtain job descriptions/applications at Personnel, San Jose Community College District, 4750 San Felipe Road, San Jose, CA 95135, (408) 270-6408.

Position to be filled AS SOON AS POSSIBLE. Send applications and resumes to Personnel Office IMMEDIATELY. EOE

CLASSIFIED ADVERTISING ORDER FORM

Computerworld's Classifieds work.

Issue Date: Ad closing is every Friday, 10 days prior to issue date.

Sections: Please be sure to specify the section you want: Time and Services, Software for Sale, Position Announcements and Buy/Sell/Swap. (Available upon request: Software Wanted, Real Estate.)

Copy: We'll typeset your ad at no extra charge. Please attach CLEAN typewritten copy. Figure about 25 words to a column inch, not including headlines.

Cost: Our rates are $126.10 per column inch. (A column is 2" wide.) Minimum size is two column inches (2" wide by 2" deep) and costs $256.20 per insertion. Extra space is available in half-inch increments and costs $64.05. Box-numbers are $15.00 extra.

Billing: If you're a first-time advertiser, (or if you have not established an account with us.) WE MUST HAVE YOUR PAYMENT IN ADVANCE.

Ad size desired:_____columns wide by_____inches deep.

Issue Date(s):_____

Section:_____

Signature:_____

Name:_____

Company:_____

Address:_____

Telephone:_____

Send this form to:

CLASSIFIED ADVERTISING,
COMPUTERWORLD

375 Cochituate Road, Box 880, Framingham, MA 01701

position announcements | position announcements | position announcements | position announcements | position announcements

SAUDI ARABIA

SYSOREX INTERNATIONAL, a California Corporation and a rapidly growing systems management company now developing innovative multi-technology systems in Saudi Arabia has the following challenging position:

DATA PROCESSING TRAINING SECTION HEAD

The responsibilities for this data processing position are:

- Supervision & coordination of all courses, course development and instruction.
- Quality Assurance of all the educational programs and products developed within the Training Section.
- Day to day supervision of staff.
- Maintain product/service delivery schedules.
- Training course and staff personnel effectiveness evaluation.
- Coordinate manpower and financial resource budgets.

Requirements:

- Minimum masters degree in Management, Education or Computer Science.
- Vocational or Educational instructor experience.
- 5 years Data Processing experience.
- Proficiency in Arabic language highly desirable.

We offer an excellent benefit package including: medical, life, accidental death, disability and profit sharing plans. You will additionally receive 26 working days vacation, 13 holidays, free furnished housing, annual return home travel, paid relocation expenses, plus eligibility for present Federal Income Tax exclusions.

Please send resume with present salary, to Personnel SINFOS-SA, CW-206, SYSOREX INTERNATIONAL, INC., 10260 N. Tantau Avenue, Cupertino, CA 95014. U.S. CITIZENSHIP REQUIRED. INDIVIDUALS ONLY APPLY.

SYSOREX
Sysorex International Inc.

DECISION SUPPORT ANALYST

Business Analysis Group

As the computer company leading in office automation, Wang today stands #264 on the Fortune 500, with continued sales revenue growth of over 30%. And that's still only just the beginning. Continued expansion has created an opportunity for a Decision Support Analyst to join our Business Analysis Group.

As a senior level individual contributor and project leader in the development and implementation of Revenue Cycle Decision Support Systems, you'll provide critical management information for key Wang decision-makers. Working with senior Business Analysis personnel and corporate management, you'll identify business issues to be addressed using Revenue Cycle DSS. Responsibilities will include developing quantitative analyses, reports and recommendations, and providing direction to others in the application of DSS tools to key business issues and problems.

The successful candidate will possess a minimum of 4-6 years related experience demonstrating a general business or business systems background, with specific experience in the use of fourth generation software tools (FOCUS, EPS, etc.) in business analysis applications. A general understanding of the principles and practices of database development and management is essential. Exposure to business analysis, automated systems development, and end-user computing desirable. MBA a plus.

Leading the way in benefits.

Wang offers one of the best benefit programs in the industry including profit sharing, stock bonus, long term stock option and stock purchase plans, company paid dental, medical and life insurance, tuition reimbursement and our employee country club.

Contact us today.

Send resume with salary history to Karen Connolly, Personnel Supervisor, Wang Laboratories, Inc., M/S 5121A, Dept. CW1/84, 12 Elizabeth Drive, Chelmsford, MA 01824.

We are an affirmative action employer.

WANG

The Office Automation Computer People

CORPORATE MIS DIRECTOR

NATIONAL MAIL ORDER RETAIL CHAIN

Fast paced Kentucky based company is on an aggressive national expansion program. We are in a development mode for both software and hardware. As part of the key management group, you must have the following qualifications:

- MIN of 3 years experience with retail POS systems in a multi-location environment.
- MIN of 5 years experience in top DP position with medium or large company.
- NEED familiarity with catalogs/direct mail marketing systems.
- MUST be able to relate well with other top management and must be a motivating factor for DP and user groups.
- MUST possess full decision making capabilities for hardware and software - now and in the future.

NO PHONE CALLS PLEASE

Send Resume Now to:

William Johnson, Senior Vice President
Camping World, Inc.
Beech Bend Road
Bowling Green, Kentucky 42101

1984?

Sales/Software/Engineering Openings
$20,000 .....TO.....$35,000
Areas of Interest: Manufacturing, Insurance, Banking, Computer Service, DOS/OS-MS DS/DC, COBOL, ALC, BURROUGHS, MODEL 204, CICS (all levels), BOMP, LIFE 70, MSA, McCormick & Dodge, SAS, VTAM, MVS Internals, Tuning, PC's, Networking, Federal Marketing, CPU Sales, etc.

Positions: Sales/Management/ Support/Development/Internals

Locations: National, International

[redacted]

SR. DATABASE DESIGN & ADMINISTRATION SPECIALISTS

One of the nation's leading professional services firms has positions immediately available for individuals with extensive data processing experience specifically including design, development and administration of large, complex financial databases.

Experience must include:

- Bachelor's or advanced degree
- 5-10 years data processing experience
- Superior communication skills
- Logical database design
- Field definition and design
- Software design, development and testing techniques
- COBOL
- IBM OS/MVS
- Model 204
- VSAM
- Quality control techniques

These positions offer unique opportunities for professional growth and compensation fully commensurate with experience. Please forward resume in complete confidence to: Fran Barkley, Dept. SMP, P.O. Box 4143, McLean, VA 22103. An equal opportunity employer.

position announcements | position announcements | position announcements | position announcements | position announcements

SOFTWARE ENGINEERS

TRW's Defense Systems Group is a world leader in engineering, advanced electronics, information data systems, and software development. Our continued expansion has created career opportunities for the following Software Engineers:

PROJECT ENGINEER

To provide technical and programmatic support to a Navy customer by monitoring real-time digital data and display processing subsystem development activities performed by Navy contractors; will assess development contractor progress, initiate requirements, participate in design and test reviews, and make recommendations to the customer as a result of the reviews. A general knowledge of electronic hardware and real-time software design and application, and the ability to learn the functional capabilities and interface requirements of a number of digital computer-based electronic devices required. Degree in EE/Computer Science or equivalent with 10-12 years experience. Position is in San Diego, California.

SENIOR SOFTWARE ENGINEER

To provide software developing skills to complete development of our existing PHASE I navy project Office MIS. The selected individual will develop data base administrator support tools and procedures for the system. In addition, the person will prepare requirements for and develop system enhancements. Work will be done on a WANG VS-80 using the TOTAL data management system. Degree in Math/Computer Science/Engineering with 5-10 years experience. Position is in McLean, Virginia.

Top professionals at TRW find excellent salaries and benefits (including flexible work hours, medical/dental/vision plans, and a Christmas week shut-down.)

To explore the opportunities TRW offers, forward your resume along with your salary history and requirements in strictest confidence to:

Personnel Director
TRW
Defense Systems Group
7600 Colshire Drive
McLean, Virginia 22102
An Equal Opportunity Employer.
U.S. Citizenship is required.

TRW

A Company Called TRW

University of Pittsburgh at Johnstown

Computer Programming Institute

April 23 through August 29, 1984

The University of Pittsburgh at Johnstown is accepting applications for its Computer Programming Institute, an 18-week certificate program designed for college graduates or college seniors interested in acquiring additional marketable skills.

The program provides the equivalent of 22 college credits and prepares participants for a career in business applications programming. The program will be limited to 30 students. Applicants for the Institute must have earned a minimum of 90 college credits toward a degree and have taken the following courses: college algebra, introductory statistics and a computer programming course.

For a brochure write or call:

Office of Continuing Education
University of Pittsburgh at Johnstown
(814) 266-9661, Extension 204

Applications are due February 2.

UPJ

Arizona/California/Texas/Colorado/Florida/Boston

SCIENTIFIC OR BUSINESS PROGRAMMERS

All fees and relocation paid. $20-40,000

If you have a BSEE, BSCS, BS in Mathematics or Physics or equivalent, we need you right now.
For Business: OS/DOS/IMS/CICS/MVS/JES Prog/Anal/Systems/Data Base. All large scale installations.
For Scientific: experience in the computer, communications, semiconductor, or aerospace/defense industries.
Your name, resume, and present employer will not be given out without your permission.
For sincere personal service, please send a confidential resume to:
Dan Pullman (602) 274-6900
PULLMAN PERSONNEL
3939 North Central Ave., Suite 505, Phoenix, Arizona 85012

ROCKY MOUNTAIN OR NATIONAL

Telecommunications/SNA ....C, UNIX, LAN, IBM protocols
Data Acquisition .....8 and 16 bit MPU's, mainframes
CAD/CAM and Graphics .....PASCAL, FORTRAN, PL/1

Data Base Development .....IDMS, IMS, DB/DC
Systems Analysis .....Business and Mfg. Appl.
Programming .....Scientific, High-Tech, Biomed

Margo Kolle/Vic Tutle
Career Marketing Associates
7100 E. Belleview #208
Englewood, CO 80111
(303) 770-6900

APS WANTS THE BEST... PROGRAMMER ANALYSTS

As Arizona's resource leader, we are seeking additional energetic professionals to bring their talents and expertise to our organization. We have openings in our power plant Systems Development Department.

PROGRAMMER ANALYST III
This position requires heavy experience in COBOL. Familiarity with JCL, TSO/SPF and OS/MVS helpful. Financial and project scheduling experience using PREMIS and PICOM preferred. 3 to 5 years as a Programmer Analyst is required. This position assists in the enchancement and maintenance support of the Palo Verde cost control system.

PROGRAMMER ANALYST II
This position requires experience with COBOL, IMS and TSO/SPF. Familiarity with Warnier specification techniques are helpful. 2 years as a Programmer Analyst is required.

Applicants for both positions should have a degree in Computer Science, Math, or Engineering. The equivalent experience is acceptable.

Find your place with APS, a company that cares about your future. Send your resume to:

V. L. Lim
ARIZONA PUBLIC SERVICE COMPANY
P.O. Box 21666, Station 1102 CW1226
Phoenix, Arizona 85036

An Equal Opportunity Employer M/F

APS.
Arizona Public Service Company

PROGRAMMER ANALYST

Fast growing company in the dynamic sun belt, Dallas Texas area, with an expanding Data Processing System IBM 38. Qualifications should include System 38 experience and RPG II and III with a proven track record. We have a small shop atmosphere and provide a competitive salary, extensive benefits package, and career growth. Call or write Sally Beauty Company, P.O. Box 490, Denton, TX 76202. Attn: Personnel Department, (817) 566-1111.

V4 Programmer/Analyst and Project Manager

in Sunny Galveston, Texas

Applicants need a minimum of 2 years programming and analysis of property and casualty insurance systems utilizing COBOL in an IBM DOS or OS environment. Experience with rating, statistics, bureau reporting and specifically the V4 insurance system are a plus. Send resume and salary requirements to:

American Indemnity Group
Personnel Department
P.O. Box 1260
Galveston, Texas 77553
EOE M/F Principals Only

PUBLICATIONS

ESPECIALLY FOR PC OWNERS/USERS

A Buyer's Guide to the Literature on COMPUTERS, ERGONOMICS, AND USER FRIENDLY SYSTEM DESIGN

Computers: The Non-Technological (Human) Factors

Compiled by independent literature analysts for the serious user or enthusiast whose time is too valuable to spend on anything less than the BEST literature. This publication is a must for anyone interested in the usability of computer hardware and software. It includes:

- Over three dozen original capsule reviews describing content, purpose, and significance. Also price and accessibility.
- Carefully-selected government and industry publications plus specialized books not available through regular trade channels.

ONLY $17.50 postpaid

complete and mail today

The Report Store
910 Massachusetts St., Suite 503
Lawrence, Kansas 66044

☐ Yes, send me _____ copies of Computers: The Non-Technological (Human) Factors. Check enclosed for $17.50 ea.

☐ Send me more information about The Report Store (or call us at 913-842-7348).

Name _____
Address _____
City _____
State _____ Zip _____

BUY•SELL•SWAP

CMI

CMI

3081
New or Used

3081/3083/3084
Lease Financing Available
For Your System or Ours
2, 3, 4 or 5 Year Terms

Wanted
4341-M2
4341-L01
Call Now

Series 1
New 4955's, 4967 Disk
Used 4955F's, 4955E's
Immediate Delivery
Buy-Sale-Trade
Leases Available

3083
New or Used

3725
Lease Financing Available
For Your System or Ours
2, 3, 4 or 5 Year Terms

Series 1 I/O
New or Used
IBM/CDC/Printronix/
Datum/Data Products/NEC
Printers - ASC11/3193
150 CPS-1139 LPM
Tape Cassettes - Back-up Unit
Datum 2000B-4000
Disks - Fixed/Removable
5.2MB-240MB
Buy-Sale-Trade Leases Available

3350 3360 3830
3340 3370 3330
3375 3380
Buy/Sell/Lease

3033
All Models

SYSTEM 36
Monthly Lease Rates
Lower Than IBM Credit Corp.
2, 3, 4, or 5 year terms
Includes System 34 telecoms

8130's
Sale or Lease
Available Immediately

3800
LASER PRINTERS
Model 1's -
Available for Immediate Delivery
Model 3
Lease Financing Available - Any Term

3033
All Upgrades

3042
Attached Processor
Available Now
Short Term Lease

NEW 5224 PRINTERS
Greater Discounts Than IBM
Leases Available
5224-1 (140 LPM) $165/mo.
5224-2 (240 LPM) $188/mo.
Call For Short Term Rates
Immediate Delivery

3705-3704
Available for
Immediate Delivery
Sale or Lease
We Can Supply Models E through K
Call Us For Purchase/Leaseback
Of Your MLC Machines
And Save 50% Of Your Monthly Cost

DATA GENERAL
Hanson Data Systems

3705

CDLA

FORSYTHE McARTHUR ASSOCIATES, INC.
DEALER / LESSOR OF IBM
Computers and Peripherals
FOUNDED 1971

Home Office
Chicago
919 North Michigan Avenue
Chicago, Illinois 60611
312 943-3770

Branch Offices
Atlanta 404 953-8457
Milwaukee 414 785-0544

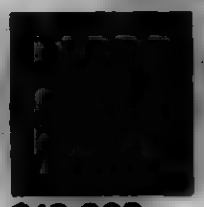
CDLA

buy sell swap | buy sell swap | buy sell swap | buy sell swap | buy sell swap

DISK DRIVES • CONTROLLERS • PERIPHERALS • MEDIA

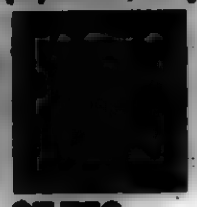
WANG • DEC

National authorized CDC OEM-Distributor offers new equipment, fully warrantied for 90 days:



$12,900

CDC Model 9766 (300 Mb.) WANG Models 2285V-2, and 2285 (300 Mb.) DEC Model RM05 (300.1 Mb.)



$7,750

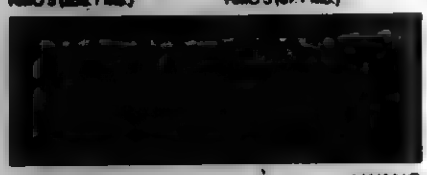
CDC Model 9766 (80 Mb.) WANG Model 2285V-1 (75 Megabytes). DEC Model RM03 (67.1 Mb.)

$8,875

CDC Model 9448 (66 Mb.) WANG Model 2280-3 (80.4 Mb.) WANG Model 2280 V-3, 6560 (66 Mb.) DEC Model RM07 (66.4 Mb.)

$20,825

CDC Model 9775 (675 Mb.) WANG Model 2285 V-3 (640 Megabytes). DEC Model 2-RM05s (512.2 Mb.)



ERST

INTERNATIONAL CORPORATION

225 Lafayette Street, New York, NY 10012

ERST is the largest dealer in pre-owned WANG equipment—2200, VS, WP (CPUs, Terminals, IOPs, Controllers, Printers, Memory Upgrades).

Next time give us a call . . . Toll Free **1-800-FOR-ERST** . . . In NY: **212-431-1100**

FOR SALE
IBM SERIES/1 SYSTEMS

(25) 3101-MOD.22 CRT
(1) 4955-F 512K Proc.
(2) 4955-E 256K Proc.
(1) 4959-I/O Exp. Unit w/2 Channel Switch
(2) 4959-I/O Exp. Unit
(1) 4962-13.8 MB Disk/Diskette
(12) 4963-64 MB Disk
(1) 4964-Diskette
(2) 4974-Matrix Printer
(2) 4978-Display Station
(6) 4997-Rack Enclosure

ALL EQUIPMENT UNDER IBM MAINTENANCE AGREEMENT

INQUIRIES TO:
INSURANCE OFFICE OF AMERICA
P.O. BOX 10038
SANTA ANA, CA 92711
ATTN: JOHN FEAGINS
(714) 894-0800

C.D. SMITH & ASSOCIATES, INC.

DEC computer systems & options
12905 East Freeway, Suite 310
Houston, Texas 77015
(713) 451-3112
TELEX 76-2547

DEC

WE ARE BUYING: VAX 11/780

WE ARE SELLING:

MSV78-DC	..$ 800	DT07-N	..$ 400
MSV78-CA	.. 4,800	RA81-AA	.. 19,800
MSV78-DC	.. 3,800	TE11-CA	.. 10,800
RP07-AA	.. 9,700	RD53-AA/RD73	6,000
DW780-AA	.. 10,800	11/750 CPU	...CALL

If you would like to be on our Mailing List, call Yolanda (713) 451-3112.

MEMORY BOARDS
NEW COMPATIBLE WITH
DEC-DG HARRIS
AND MANY OTHERS

DISK PACKS
ANY MANUFACTURER
FULL DEPOT REPAIRS

WANG WORD PROCESSORS AT THOUSANDS OFF!

Guaranteed, refurbished WPS 20, WPS 30 and Wangwriters available for immediate delivery. You don't pay a cent till Wang installs and places equipment under service agreement. 15-day return privilege. Buy, Lease, Rent.

For Free Info and fast answers call toll-free:

1-800-321-2986

ELECTRONIC OFFICE EXCHANGE, INC.
Dept. 3CRCWD • Box 7037 • Ann Arbor, MI 48107

Your Full Service Computer Dealer

DP's	S/34	Series/1	3270's
MAIN FRAMES	S/36	System Configured To Your Specs	3277 • 3278
PERIPHERALS	AND RELATED PERIPHERALS	Upgrades Available	3274 • 3276
COMMUNICATIONS	— Call —	— Call — JOHN BURLEW TERRY STONE	— Call — TERRY GATE
— Call — DAVID HARRISON	RICHARD LOVING		

TOLL-FREE (800) - [illegible] / IN TEXAS 214 - 350-7243

The nationwide market - a call away!

DEC/DG

SYSTEMS/PARTS/PERIPHERALS
NEW/USED/SURPLUS • DISCOUNT PRICES
Since 1977! Buy, Sell, Trade and Broker.

PHIL	BRYAN	JENNIFER
DG	11-VAX	8-LSI

CALL TODAY - (305) 392-2005 TELEX 568-670

thomas business systems, inc.
4301 Oak Circle - Unit 11 Boca Raton, Florida 33431

System/34 Printer & Displays Sale/Lease

Control Units 3690 - B13 3690 - D13 Avail. 1st QTR 1984 Sale/Lease

Sale/Lease 4341's Models K, L, M - GFP 1 & 2 Lease Term - 1 Yr or Longer

Controllers 3690 3803 3274 3276 Immediate Delivery

Tape Drives 3420 3430 3410 8809 Immediate Delivery

DASD 3380 3375 3370 3350 3344 3310 Immediate Delivery

Display Stations 3278 3279 3178 3277 Immediate Delivery

Printers 3811 Immediate Delivery

CDLR

Computer Marketing Inc.
P.O. Box 5265 Philadelphia, PA 19125

NPA SYSTEMS INC.

SPECIALIZING IN:
PURCHASE
SALE, TRADE,
LEASE, RENT
AND SERVICE OF
Data General EQUIPMENT

10,000 SQ. FT. WAREHOUSE FULLY STOCKED
751 CRATES AVENUE, HOLBROOK, N.Y. 11741
TELEX # 510 222 0882
(516) 467-2500

Hardware, software, problems, people, pricing, ethics litigation, communication, macros, minis and micros.

We like to make an issue of it. EVERY WEEK.

buy sell swap | buy sell swap | buy sell swap | buy sell swap | buy sell swap

COMDISCO

Commitment To Excellence

IBM PROCESSORS

3081

3083

3033

4341

4341/4381

4331-2/4361

Amdahl

IBM PERIPHERALS

3880

3880 AAA

3803-2

3420-4/6

05/3705

725

78/3278

3890

The Leader in Full Service Leasing

buy sell swap | buy sell swap | buy sell swap | buy sell swap | buy sell swap

IPS

TELEPHONE (201) 262-9500 Telex: 642-197

IBM 3178 leasing

Flexible lease terms available...
12, 24, 36 or 48 months

Hartford Computer Group
"The Total Computer Company"

800 323-6355

IBM CRT RECORD EQUIPMENT & DISK DRIVES
DISPLAY PRODUCTS DATA MODULES MAG. TAPE DISKETTES

SALE OR LEASE
machines
026—029—082— 083— 084
085—087—088— 129— 514
519—548—557
disk packs
2316—3336(1)—3336(11)—3348(70)
5 MEG. TO 300 MEG. PACKS—NEW & USED
Highest Prices Paid for Used Packs & Machines

THOMAS COMPUTER CORPORATION
5833 W. Howard St. Chicago, IL 60648
800-621-3808 312-647-0800
Authorized Distributor – Memorex, CDC, 3M, BASF, Verbatim, Dysan

PEARL HAS IBM SYSTEMS 34, 36, 38

and we have a large inventory of IBM 3741's, CPU's, CRT's and printers. We buy, sell, lease, rent and purchase/leaseback IBM Systems.

Call John Speight or Ken Warren
Pearl Computer Division
P.O. Box 24026 • 4717 Centennial Blvd.
Nashville, TN 37202 (615) 383-8703

BUY-SELL-LEASE
SERIES/1
SAVE ON NEW OR USED
OVER 2000 CUSTOMERS
S/38
4331
4341
ALL RELATED PERIPHERALS
S/34
SEE OUR NEW PRICES
S/36
SHORT/LONG TERM LEASES
3033
3081
Call toll-free 800 [illegible]
CGI

DATA GENERAL
New & Used Equipment
BUY. SELL. TRADE.
mcIntyre's
Mini-Computer Sales Group Inc.
(313) 583-4100
TLX: 810-232-1665
Answer Back: MCDATAGEN FARM
32000 Edward Ave.
Madison Heights, MI 48071

SELLING?

Sell your product or service in Computerworld classifieds.

Join the thousands of advertisers who use our classifieds because they get results.

You can find buyers for discs and DEC's, terminals and timesharing, software and System 370's.

More than half a million active computer people read Computerworld each week, and you can reach them efficiently in Computerworld classifieds.

To place your ad, or to get a rate card with complete details on Computerworld Classifieds, call or write:

Classified Advertising
Computerworld
P.O. Box 880
Framingham, MA 01701
1-800-343-6474
617-879-0700

buy sell swap | buy sell swap | buy sell swap | buy sell swap | buy sell swap

STOP
YOU'VE FOUND IT!
IBM S/36
IBM S/34
IBM S/38
4331/4341
NEW
4361/4381
- Trade Ins in Trade
- We Buy, Sell or Lease
- Hardware and Used Peripherals
- Add-ons Welcome

TexCom
SAN ANTONIO
(512) 349-9956
JOIN THE MORE THAN 150 OTHER MAJOR COMPANIES THAT CURRENTLY LEASE IBM EQUIPMENT FROM EXCOM

PCM
Pioneer Computer Marketing
214/343-2904
BUY - SELL
LEASE
- All IBM Systems
- Peripherals
- Tapes
- Disks

SERIES/1
- Systems
- Features
- Peripherals

SYSTEM 34
- CPU
- Peripherals
- Upgrades

PIONEER COMPUTER MARKETING
11448 Pagemill Road
Dallas, Texas 75243
214/343-2904

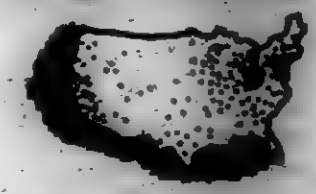
IBM
3270

RANDOLPH'S APPROACH TO COMPUTER LEASING... AND WHY IT WORKS.

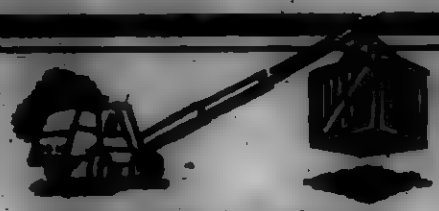
Started in 1964, Randolph has been saving its customers 30% to 70% of their DP hardware dollars . . .

And we know leasing is still the most financially attractive method of acquiring computer equipment at low cost without draining working capital.

But we learned early that the dollar-and-cents approach to computer leasing is only part of a company's concern. Equally important are: prompt installation . . . dependable servicing . . . flexible upgrade capabilities . . . and full support services. Our commitment to this approach is the key to satisfied customers . . . and our success.



RANDOLPH . . . COAST TO COAST
We presently serve customers in over 300 cities and towns from Maine to Hawaii.



EQUIPMENT ON THE MOVE
We have under management IBM computers with an original cost of over one-half billion dollars . . . and we're adding to this investment to meet the changing needs of our customers. Whether it's an IBM 3081 or 4300 system, additional tape drives, disk storage, printers or other peripherals, our equipment inventory is available to meet your company's requirements. Even hard-to-get machines are sought out and acquired for Randolph customers.

BUT . . . SERVICE MAKES THE DIFFERENCE
The real story behind Randolph's success is our approach to customer support services. To keep computer operations running smoothly and efficiently, these support services have proven to be valuable assets to our customers' D.P. operations.

Continuous IBM Maintenance Program
Manufacturer's service is available day or night, seven days a week, to insure optimal use of your system.

On-Going Technical Support
Randolph's technical staff is on call to help you reconfigure your system to meet changing data processing requirements.

Active Remarketing Division
We assure maximum return on your investment in computer equipment which you no longer use.

MEMBER OF THE FIRST NATIONAL BOSTON FAMILY
In 1972, The First National Bank of Boston purchased our S/360 leasing business, and we became a wholly-owned subsidiary.

With the Bank's financial capabilities behind us, Randolph customers benefit even more from the combined efforts of the best computer leasing and financing people in the United States.

HOW ABOUT YOU?
If your company is not presently leasing computer equipment from Randolph, you'll be interested in our new brochure outlining our special customer support services, and important facts on how we can reduce your computer costs. Call Joseph B. Kelly, Jr., Executive Vice President, 800-243-5307.

537 Steamboat Road
Greenwich, Connecticut 06830
(203) 661-4200 (800) 243-5307

Randolph

THE FIRST NATIONAL BANK OF BOSTON
A MEMBER OF COMPUTER DEALERS & LEASING ASSOCIATION RANDOLPH COMPUTER CORPORATION A subsidiary of BANK OF BOSTON

We've Got Your Number

S/34 ALL MODELS QUICK DELIVERIES
SERIES 1 CONFIGURED TO YOUR NEEDS
S/36 ATTRACTIVE LEASE RATES
S/38 NEW & USED MACHINES
5110/5120 NEW LOW PRICES
PERIPHERALS
CRT'S...PRINTERS...DISK...TAPE...MODEMS

CARLYN
COMPUTER SYSTEMS
8100-G Rockfish Road Alexandria, VA 22309
"CALL COLLECT" (703) 642-1950

You can get information on buying or leasing
IBM 34-36-38
as fast as you can dial
1/800/LEAS-PAK.
In Texas call 817/268-0023.
Up to 50% Savings
LPI
LEAS PAK INTERNATIONAL
P.O. Box 759 • Hurst, TX 76053 • 817/268-0023
Send for our free products and services brochure
Name _____
Address _____
City _____ State _____ Zip _____
Phone _____

buy sell swap | buy sell swap | buy sell swap | buy sell swap | buy sell swap

DEC

Call toll free 800-328-7000

MIDWEST SYSTEMS, INC.

Buy - Sell - Lease

S/32
S/34
S/38

IBM 3741 3742

CPU's CRT's PRINTERS ALL MODELS

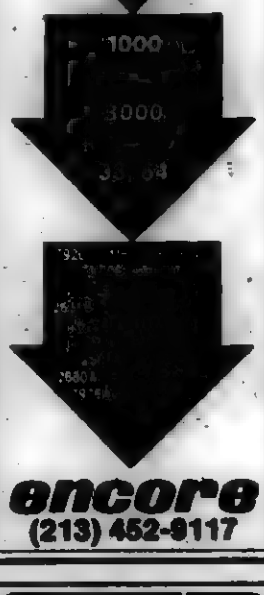
PURCHASE/LEASEBACK SHORT & LONG TERM LEASES

CMA

Computer Marketing of America, Inc.
P.O. Box 71
630 Bryan Street
Old Hickory, Tennessee 37138

1-800-251-2670
In Tennessee: 615-847-2631

HP



encore
(213) 452-9117

* * * * DEC * * * *
BUY—SELL—LEASE—TRADE—CONSIGN
SYSTEMS — PROCESSORS — OPTIONS
PERIPHERAL — MODULES — MEMORY
— SPARES —
NATIONAL COMPUTER EXCHANGE
(714) 990-5988
600 North Lunar Avenue, Brea, CA 92621
TWX: 910-596-1499

FREE
DEC and DATA GENERAL
Discount Guide
NEWMAN
(313) 994-3200

BURROUGHS 6810
BURROUGHS 2900
BURROUGHS 1955
BURROUGHS 4900

ESI
2468 W. Alameda Ave.
Denver, Colorado 80223
(303) 922-8331
Telex: 910-931-0483

STC 8650
SALE LEASE
LOW LOW PRICES
PAM CHRISTIANSEN
800-IBM-4341

Burroughs:
B 20, B 80, B 92, B 93, B 1700
IBM-systems 34-, 38xx, 43xx
Xerox: 2000 + 2200
NCR: 60 x TB 1483, 8130, 8150, 8244, 8250, 8270, 8430, 8555
Nixdorf: 820/15 MKC -
Philips: P 350
We have available about 2500 different computers from all firms.
F. Wilsch GmbH & Co., second-hand Computer Kg.
Karl-Valentin-Str. 17, D-8032 Gauting, TX 089 816 within

DATA GENERAL SPECIALISTS
FOR
Surplus New & Used Equipment & Systems
with full depot repair facilities.
CALL US
WE TAKE THE TIME.
- WE CARE -
JM Associates
691 W. Chapel Avenue
Cherry Hill, NJ 08002
609-663-1115

WANTED TO BUY
DEC Equipment
Vax and PDP-11
Systems-Components-Peripherals
New or Used
Meadowbank Enterprises
Essex St. • Middleton, MA 01949
(617)777-4665

FUJITSU EAGLE
with cabinets, cables, slides and terminator $13,000
NEW FUJITSU SP380
80 characters per second, letter quality printer
INTRODUCTORY SPECIAL $2,500
MANDERS
(303) 693-3035
2771 S. Jasper, Aurora, CO 80013

BUYING?

Whether you're looking for big computers little computers, terminals, printers, software, time sharing or services, you'll find it in *Computerworld* classifieds.

Pages of ads every week, with everything from Discs to DEC's from time sharing to terminals, and software for every size computer system.

You'll find what you need in *Computerworld* classifieds.

Call 800-343-6474 (or 617-879-0700) for more information

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY
375 Cochituate Road, Box 880, Framingham, MA 01701/(617) 879-0700

buy · sell · swap

B[illegible] EASE TRADE

SYSTEM 32's, 34's, 38's

4300's All Peripherals

303X's and Peripherals

360's & 370's All Peripherals and I/O

3270's CRTS, Printers & Controllers

(214) 258-0541

TWX 910-860-5256

METROPLEX COMPUTER COMPANY, INC.

[illegible] Dealer Dr., Suite 100
Irving, Texas 75061

Dedicated to Service With Integrity

INTERSTATE COMPUTER EXCHANGE

[illegible] CALL [illegible] COLLECT

AUCTIONS

BUSINESS OPPORTUNITIES

BIDS & PROPOSALS

NEW & USED EQUIPMENT FOR SALE BY END USER

DATA GENERAL

1) 6049 TRI PRT	$ 400	3) 101/201 1/2 BAY CABS	300
2) 6075 LPS PRINTER	4000	3) 1144A 1 BAY CABINETS	600
1) 6974 LPS PRINTER	4000	1) 1470A 1 BAY SID. CAB.	
1) 6189 LPS PRINTER (NEW)	6000	W/MBR COND. (NEW)	4400
1) 6191 LPS PRINTER (NEW)	6000	1) 1470B 1 BAY SID. CABINET W/MBAT EXCH (NEW)	3600
1) 6168 80 MB DISK (NEW)	4000	1) 4231 ULM 8 BOARDS	700
2) 6188 80 MB DISKS	6000	2) 6064 LPS CONT	600
2) 6270 80 MB S/S	6000	1) 6027 80 MB CONT	700
1) 6270A 80 MB DISK	3000	3) 6026H 4C 8 SLOT BAK	1200
1) 6237D 16 MB DISK (NEW)	4000		
1) 6053 12.5 MB DISK W/FLPY	2100		
1) NOVA 4/C 8 SLOT 128K 10 MB DISK W/FLOPPY & ULM S			12,100
1) NOVA 4/C 8 SLOT 128K 12.5 MB DISK W/FLOPPY & ULM S			12,400
1) ECLIPSE S/250 128K 12.5 MB DISK W/FLOPPY & 2 4227's			16,000

MODEMS & TERMINALS

11) VA1224 VADIC 1200 BAUD	125	11) 6212A MICOM MODEMS	1600
1) VA3451 VADIC 1200 BAUD	400	28) AU ACOUSTIC COUPLERS	
2) VA3455 VADIC 1200 BAUD	400	SELL 100-115 200	50
28) ADDS LSJ TERMINALS	275	4) ADDS LSJ TERMINALS	300

CONTACT: ROBERT FULWILER 214-288-6614

Processor	Peripherals	Operating Systems
S/23	3741	1255
S/32	3742	1419
S/34	029/129	3600
S/38	5211	
5110	5251	
5114	5225	
5120	5256	
DATAMASTER	3262	

We Buy & Sell

DEC

Systems Components

Digital Computer Resale

call:713 445-0662

[illegible] Kenrick Ste C22
Houston, Tx 77060

AUCTION

The undersigned will sell at Public Auction on Tuesday, January 10, 1984 at 10:00 a.m. EST the following goods:

Two (2) Chancellor CS-1000 Graphics Terminals
Two (2) Chancellor CS-5000 Graphics Terminals
One (1) Chancellor CSD-7000 Graphics Terminal
CPT Word Processor system with Cassette printer
One (1) each:
ADT 1 bin Jet Printer
NEC Spinwriter 5500
Diablo Model II LA120-AA terminal
DECWriter II LA36-EA terminal
Data Media CRT
Xerox 2000 copier

The auction will take place on the premises of Comprehensive Incorporated, 2150 Wheeler Road, Columbus, Ohio, 43228.

The terms of the sale are a minimum down payment of 20% in either cash, certified or cashier's check at the time of sale with the balance due within 24 hours. Delivery shall take place upon receipt of the total purchase price. All goods are sold "as is." The undersigned reserves the right to reject any or all bids and to bid on and purchase any or all of these goods.

The goods shall be available for inspection at the auction location between 1:30 and 3:00 p.m. on Monday, January 9, 1984 or at other times by contacting Tony Gasso at 614-457-9555.

Comprehensive Incorporated

WANTED!

Vendors of vertical market software systems for the IBM System/34, 36 and 38 seeking a complement of financial application packages for the "total solution" or "add-on" approach. We have them ... several thousand installs ... easily adaptable ... multi-company/facility user documented and "packaged" for marketing ... priced reasonably. We will offer install/support services and an attractive commission arrangement with you. Let's talk!

HARRIS DATA SERVICE, INC.
11629 W. Dearborn Avenue
Milwaukee, WI 53226
(414) 475-1760

WANTED SOFTWARE SOLUTIONS FOR THE HP3000

Hewlett-Packard is seeking quality software suppliers that address specific vertical markets in the NY/NJ area. If you have a unique application solution and want to take advantage of the financial, marketing, and technical incentives offered by Hewlett-Packard, call:

Lee Solnick
(201) 265-5000 Ext. 5407
or Sales Attendant
(212) 971-0900, (201) 623-6020

FOR SALE

State Of Georgia Surplus Computer: UNIVAC 1100 And 90 Series, 3 Sets UNIVAC 770-03 Printers, 5x91 8000, 5x94, 7000.

This Equipment Will Be Certified By UNIVAC To Be In Working Condition And That A Service Contract Can Be Initiated By Purchaser.

For Further Information And Inspection Of Above Equipment Contact Mr. Mathew Jones, Georgia Tech University, Atlanta, Georgia, Phone 404-894-2000.

Please Note That In Order For Your Bid To Be Acceptable You Must Have A Check In The Amount Of 20% Of Your Total Bid In Order To Be Acceptable.

Sealed Bids For This Computer May Be Obtained From The Attorney Or State Of Georgia, Department Of Administrative Services, Surplus Property Section, 1085 Murphy Avenue, S.W., Atlanta, Georgia 30310.

Opening Date And Time:
January 20, 1984, 2 P.M.

State Of Georgia Reserves The Right To Reject Any Or All Bids.

STATE OF MARYLAND REQUEST FOR PROPOSALS

The State intends to acquire a Turnkey System for the purpose of automating the State's Housing Division. The system will consist of packaged software, the necessary hardware and vendor support. For more information and RFP contact Donald W. Lee, Department of Economic and Community Development, 45 Calvert Street, Annapolis, MD 21401, (301) 269-2995.

The Bulletin Board

BASIC FOUR

DATA GENERAL

HONEYWELL

IBM

SYSTEM/36's

3203-5

3411 TAPES

Models 2 & 3
For 3536 & 4300
Immediate Delivery
(914) 238-6631
Computer Merchants Inc.

DISPLAYWRITER

Model A3
Dual Disk
Printer w/Sheet Feeder
Call Louis Felder
(914) 238-6631

IBM

4361-ML5

Available
Ships 2/17/84
Call Robert Frank
MCI Computer Corp.
(410) 594-2585

PRINT TRAINS

IBM 1416 & 3216
Bought - Sold - Leased
Repaired - Reconditioned
COMPU-ACT COMPANY, INC.
(212) 685-8401

IBM System 34

128K/64MB
3262 Printer Attachment
Contact:
Dale Calliver
(617) 770-5400

4361-ML5

1/84/84 Ship-Confirm
Lease Only
Fortune 1000 Co.'s Only
Data Lease Corp.
Howard Kochin
(508) 282-0170

For Sale
IBM Office Systems 6/440
Includes (1) Document Printer
Fully Warranteed
2 Years Old
Call John Silva
Satchwell Sohmer
(203) 488-5466

Buy • Sell • Lease
IBM
Cougar Computer Corp.
Suite 219
26600 Euclid Office Plaza
Euclid, OH 44132
(216) 261-3660

SYSTEMS 34/36/38
Lease or Sale
S/36 DELIVERIES
WANT TO BUY S/34's
1-800-LEASPAK
In TX (817)268-6665

BUY	SELL	LEASE
	TRADE	
S/34	S/36	S/38

Peripherals
All Guaranteed IBM Models
PROCOM
(212) 279-1717

IBM SALE/LEASE
3271-2 (Qty) Avail NOW
3277-2 (Qty) Avail NOW
Avail NOW
3274 DFU N/A
3274 SPR 4001
Purchase-Lease Back Program
Vendor COMPANY
(516) 234-0555

For Sale
• IBM System/32 •
32K - 13.5M Disk
• 3741 Data Recorder •
Lots of Features
• Also Have Lots of Floppies •
Call Allco at Astrin Bros. Co.
(201) 368-1441

IBM

Buy ... Sell.... Lease
IBM MICR
3890 - 1419
(813) 722-4534

Your ad
can be here
for
$130

PRIME

PRIME

LARGE SELECTION
OF USED PRIME
COMPUTER SYSTEMS
...SAVINGS TO 50%
Peripherals also available
Maintenance/DEC Drives Conversions
Modems/Terminals/Printers
1st SOURCE
...Your Alliance Source
A DATAMATION SERVICES,
INC., COMPANY
3501 EAST CAMPBELL AVE.
PHOENIX, ARIZONA 85018
(602) 957-0300
ASK FOR DON OR MATT

MISC.

Buy • Sell • Lease
DATAPOINT
Cougar Computer Corp.
Suite 219
26600 Euclid Office Plaza
Euclid, OH 44132
(216) 261-3660

3 AYDIN 5005 COLOR
MONITORS W/KEYBOARD
1 5215 DISPLAY
GENERATOR
Excellent Condition
Immediate Availability
Best Offer Over $10,000.00
Contact Joel Pavlovic
(201) 575-4455

BURROUGHS

BUY SELL LEASE
All Systems & Peripherals
AVAILABLE
• B1955 Sys • B1965 Sys
• B80s • B900s
(Configured To Your Specs.)
SPECIAL: Excess Memory
• 256 Terminals model 160 & 110
• TDs80s, MT180s, MT185s
• 200 & 207 Style Disk Drives
• Verilaser Tape Sub-systems
• Memory Upgrades
• Printers 2245 & 2260 Styles
Guaranteed Burroughs Maint.
Depot Maintenance Available
COMPUTER PROVIDORS
(216) 249-7370
(Member ADP)

B20 Model B21-6T

Save Over $12,000
Hardware, Software & 30 Month Field
Up Maintenance Period
$16,500
Call Russ at
(513) 299-4444 ext. 946 days
(513) 885-4945 evenings
Located in Dayton Metro Area

NCR

FOR SALE
One 9851 NCR Computer,
Printer and Two CRT's.
Phone Dave Arnett
Western Commercial
(208) 529-6711 Ext. 146

SPERRY UNIVAC

V-77 600 SYSTEM
• 600K CPU with Paging MOS
• 640MB 300 MB Disk Drives
• 16 MB Disk Drives
• 800 bpi Tape Drives
• 6250/1600 bpi Tape Drives
• 300 LPM Printer
• 600 LPM Printer
• Communications Equipment
Ask for Your Price

HEWLETT PACKARD

HP 3000
BUY & SELL
Complete Systems
Memory • Terminals
Disk Drives • Tape Drives
Maintenance Parts
Century Corporation
(Formerly Finley & Associates)
(714) 540-4921
(213) 420-6545

Buy-Sell-Lease
HP3000 3X, III, 4X
and related peripherals
Call Carol
CSU INDUSTRIES, Inc.
516-239-4316

For Sale
H.P. 9845 C
With 2 mass storage units.
Includes Rom's and programs.
For Details Call:
Annie Colson
(212) 747-5717

MISC. SYSTEMS

For Sale
TANDEM NON STOP (TXS-1)
(2) 75K Processors
(4) 4194 340MB Disk Drives
(4) LP40 Printer, 32 Async Ports
LA36 DEC Writer Consols,
COBOL Micro code
Available for Current Specs
With
(32) 6340 SCROC Terminals
And
(48) Intelligent Terminals
each including:
64K plus 48K Buffer
(640) Hard Disk (by HYTEC)
300 CPS Heavy Duty Matrix Printer
1200 Baud PRESTIGE Modem
And
INFOREX 1000 Processor 5MB
(2) Key Stations
9 Channels Tape Drive
Immediate Delivery for
ALL or PART
Call Tom Schoenhaver at
(408) 730-1000 (213) 776-6000

MODEMS FOR SALE
1 pair 7502
12 channel TDM V.35
Available February 1984
Also Modems available now:
1 pair 0212 Rel 001 000-SJ/A
1 pair 0212 000 0000-000-PK
1 pair 0212 000 0000-DA-SAT
1 pair 0216 000 0000-00
1 pair 0216 000 0000-00
Call 201-994-5110 ext. 000

DEC

DEC NEW & USED

11/70, 512KB MOS	$49,000
11/84, 256KB MOS	$14,500
11/84-AQJ-256KB	$7,495
DH11-AD	$2,000
DH11-AE	$2,000
DZ11-A	$1,495
DZ11-B	$1,495
DZ11-E	$2,000
FP11-A	$1,995
FP11-C	$2,000
KE11-B	$495
RSP11-MS	$995
LA120-GA	$1,795
MX11-CE	$2,000
RL81-AK	$1,000
RL88-AK	$1,995
RL211-AK	$2,200
RH640	$2,200
TA625	$2,200
TWU77-AB	$14,700

LEXINGTON COMPUTER CORP.
(800) 255-2545

DEC BARGAINS

11/84A CPU Bld	$1,595
11/44 KE44-A "CIS"	$2,575
4A-MS750-C System III	$7,900
BDV11-AA	$495
DLV11-J	$395
DR750-AA	$8,400
DZ11 MUX Bd.	$1,195
DZS8-B	$1,575
FP11A	$1,195
KX11-B	$2,575
KW11-P	$695
M811-MB	$1,275
M8750-DC	$4,500
M8750-FD	$2,500
M8V11-PK	$1,195
M8V11-PL	$1,275
PDP 11/84A-DC	$6,200
RLV11	$375
VAX 1MB M8750-DA	$2,500
VAX 1MB M8750-DA	$2,000

Call Ray at QEI, Inc.
(617) 275-6900

Now Available In Stock!
More PDP-11 with 18 MOS
Winchester, 20 RD50 Pkkg
Disks, 256 KB Memory
Duplex Printer
PDP 11-60, RLV-11 Controller,
64KB Memory, LA 180 Printer,
RT-11 Licence.
$9,000
PDP 11-23 with RL02 Store (2),
256 KB Memory, LA 180 Printer,
RT-11 Licence.
$12,000
LA 180 Printers with Controller
$595
Other Configurations Available
Complete Range of DEC Compatible
Systems, Components.
E.E.C. Systems, Inc.
(617) 449-6180

DEC

DEC & PRIME SPECIALS

• MEM8-FD	
-Avail Now	$4,995 ea.
• PDP 11/70,	
1MB MOS Memory	$[illegible]
• RM08-AA	$[illegible]
• DDC 8750	$[illegible]
• DDC 8750	$[illegible]
• RP06-AA	$[illegible]
• VAX 11/780 1MB,	
64K chip Now	$[illegible]
• RM05	$[illegible]
• TU78 A9	$[illegible]
• Prime Computer Systems	
Available Upon Request	

SEVCO SC.
(617) 486-8566

BUY - SELL - TRADE
1184-C ... 8750 ... RM78 ... 8750
1179-... ... Call ... RM05-AA ... 8750
8A11-AE ... 2780 ... RM05-C ... 8750
DH11-AE ... 2780 ... RM05-AA ... 8750
DA11-8A ... 780 ... RP06-C ... 8750
MB13 ... 8 ... RP06-AA ... 8750
NEW YORK COMPUTER EXCHANGE
(516)752-0055 (800)645-9760

WANG

BUY - SELL
MVP/LVP - OIS - VS - PC
SYSTEMS IN INVENTORY
VS80 - MVP - WP200
AND PERIPHERALS
2640C - 2240C - 2200-4
Wang Compliant Maintenance
Also
(800) 321-4554

Paged...
WANG USERS.....
HAVE YOU HEARD ABOUT THE
GROUP OF FORMER WANG EM-
PLOYEES IN ATLANTA WHO BUY &
SELL USED WANG EQUIPMENT AND
PLUG COMPATIBLES?
I.C.A. (404) 977-4288 or
1-800-241-5180

VS 80

8MB Memory, w/ 70MB Disk
Terminals, Tape
Telecommunications, EDP's
Printer, COBOL Compiler
Listings, Wang Maintenance
$50,000 Complete
Tom Wang
(508) 663-7102

TIME MANAGEMENT?

EXECUTIVE SECRETARY & Exploited-
oriented assessment/automated training
consulting at a fraction of the cost of
Alternatives for any VS on all world stations.
Send for VS Product List:
Stakemaster Information Systems, Inc.
[illegible] Blvd., Suite 10 West
St.Pt. Beach (813) 821-[illegible]

ORDER FORM

COMPUTERWORLD BULLETIN BOARD

Issue Date: Ads can be accepted up until the Monday preceding the issue desired. Computerworld comes out every Monday.

Classifications: Most ads will be classified according to the brand of equipment that is being bought or sold. These classifications include Burroughs, Data General, Digital/DEC, Honeywell, IBM, NCR, Sperry Univac, Software, Terminals, Misc. Systems and Miscellaneous.

Copy: Copy sent in via the mail or telecopier (telecopier extensions are 419 and 451) should be clearly typewritten. Ads may be given over the phone to our team of ad takers. The standard size is 1 column by 1 inch deep. These units may be combined to form larger sized ads. Describe the equipment very briefly, give the price and the name of the person to contact. All ads will be set up using a standard format. No borders or logos are allowed.

Costs: The price for each standard unit is $130.00 (One unit minimum and no fractional units allowed.) There are no agency commissions and no quantity discounts.

Billing: Once you've written your ad, send (or call) it in with your name and address for billing purposes and we'll run it. (If your company has never advertised with us before, we request a check with your order.)

Budget# _____
Signature _____
Name _____
Title _____
Company _____
Address _____
Telephone _____

Send data form to:
COMPUTERWORLD BULLETIN BOARD
375 Cochituate Road, Box 880,
Framingham, MA 01701

617-879-0700 800-343-6474

SOFTWARE FOR SALE

Changing Computers?

Retain your SOFTWARE INVESTMENT

Datamare's conversion approach provides the solution to management's conversion problems and facilitates the recovery of the initial capital investment in systems development.

- COBOL to COBOL
- ASTOCOBOL/SPS to COBOL
- EASYCODER/TRAN to COBOL
- BAL/ALC to COBOL
- DOS/ALC to OS/ALC
- PL/1 to COBOL
- RPG/RPG II to COBOL
- RPG/RPG II to PL/1

Faced with Conversion? Call or write today

The Conversion Software People

DATAMARE, INC.

3586 Elmwood Avenue
Buffalo, New York 14217
Phone (716) 876-5758
TELEX: 91510

THE
"1 - 2"
YEAR-END SOFTWARE PRODUCT SALE
FROM
HARRIS DATA SERVICE, INC.
"Our most dramatic "1-2 Punch" sale of software for the
IBM System/34, 36 and 38 computers in 1983!!

HARRIS DATA SERVICE, INC.
11439 W. Dyerbrum Avenue
Milwaukee, WI 53225
(414) 475-1783
Offices Nationally

#1 PAYROLL and FIXED ASSETS
Harris Data Service, Inc. invites you to purchase these traditional year-end emphasis software applications during our special year-end offer period.

From October 1, 1983 through January 15, 1984 purchase one or both of these internationally recognized software products for 1/3 off current selling price!

These products shall be offered with complete source and object code and user documentation as well as the Harris "Lifetime Limited Warranty" Software Product Policy . . . A promise backed by 11 years of successful history.

Now . . . for the 2nd sales punch . . .

#2 ACCOUNTS PAYABLE, GENERAL LEDGER and ACCOUNTS RECEIVABLE,
We invite you to also take advantage of our year-end sale atmosphere by purchasing A/P, G/L and A/R.

During this same year-end sales period - October 1, 1983 through January 15, 1984, Harris Data Service, Inc. will offer any two of these three internationally recognized packages at 1/2 off current selling price, each, with the purchase of one of these three packages at full price.

Buy two . . . Save 50%! Buy three . . . Save 100%!

These products shall be offered with complete source and object code and user documentation as well as the Harris "Lifetime Limited Warranty" Software Product Policy . . . A promise backed by 11 years of successful history.

Contact Harris Data Service, Inc. or an authorized Harris Product Distributor for detailed information and free "demo diskettes" for all applications.
Get your "Hands On" Harris Software Products Today!!

NEED FLEXIBLE SOFTWARE PACKAGES?

The PICK Operating System makes our Sales Order Processing and Inventory Control Software the ideal solution for your company.

Find out why BusinessWeek calls PICK, "The computer industry's best-kept secret."

Call now for information or register for our next PICK seminar.

EDP OF AMERICA, INC.
Pick Operating System Specialists
201-272-0770

Analyze system and program performance on your
IBM SERIES/1
The Performance Analyzer for IBM systems measures and reports on resource utilization for single programs or complete systems.
M & A Computer Systems
38 Hotaling Place #304
San Francisco, CA 94111
(415)434-3647
SERIES/1 SPECIALISTS

ROBOT 38

Elegant Software
for IBM S/34, 36 and 38

General Accounting	Payroll/Personnel
Financial Reporting	Property & Equipment
Accounts Receivable	Report Writer
Accounts Payable	Oil & Gas
Order Processing	All Systems exist
Inventory Management	RPG II/RPG III
Sales Analysis	Data Base
Job Cost	Interactive

J.D. Edwards & Company
4940 South Syracuse Street Suite 2300
Denver, CO 80237
303/779-3732

Dallas — 214/ 458 9636
Houston — 713/ 880 8278
Northern California — 415/ 697 7754
Southern California — 714/761 8368

COMPUTERWORLD

You want your business to keep moving ahead, right?

Then you need quick, time-saving solutions to your personnel and equipment problems. Classified advertising in the #1 trade publication for the computer industry is the obvious way to get them...

...Classified Advertising in COMPUTERWORLD.

Our classifications include Position Announcements, Buy Sell Swap, Software for Sale, Time & Services, Business Opportunities, Real Estate and the Bulletin Board (the ideal, low-cost way to sell pieces of computer equipment).

If you are looking to hire computer professionals or to buy or sell equipment, contact us at 1-800-343-6474 or, in Massachusetts, call 617-879-0700. Our mailing address is COMPUTERWORLD, 375 Cochituate Road, Box 880, Framingham, MA 01701.

It's about the biggest step forward you can take toward solving your business problems.

Move ahead with COMPUTERWORLD.

TIME & SERVICES

VIMAC
Venture Investment Management Company

12 Arlington Street
Boston, MA 02116
(617) 267-2700
Provides
Equity Seed Capital
to
ENTREPRENEURS
in the
Computer Industry
Confidentiality Assured

RSTS/E TIMESHARING ELECTRONIC MAIL

No Kilocore Tick Charges
No CPU Time Charges
No Minimum Monthly Charge
200 Blocks of Disk Free

$4 PER HOUR CONNECT TIME

Computer Timeshare Corp.
P.O. Box M
College Park, MD 20740
(301) 779-CTSC

time & services | time & services | time & services

SYSTEM DEVELOPMENT ON TSO/SPF

at affordable prices
Full capacity of an IBM 3033
for daytime use in western U. S.
ISPF, COBOL, FORTRAN, PL/I, IMS,
ADF, VSAPL and other aids.

PRIMDATA OF SWEDEN
44 Montgomery St., Suite 500
San Francisco, CA 94104 • Tel (415) 955-2612

TRANSITION HELP TO MVS OR A BIGGER SYSTEM- reasonable prices
Full capacity of an IBM 3033
for daytime use in western U. S.
We can give you the computer, the
time and the technical help.

PRIMDATA OF SWEDEN
44 Montgomery St., Suite 500
San Francisco, CA 94104 • Tel (415) 955-2612

MODELING, PROJECTIONS, HEAVY BATCH

with VSAPL, ADRS, ADI, SAS, APE,
GPSS, MPSX or your own programs.
Full capacity of an IBM 3033
for daytime use in western U. S.
at reasonable prices.

PRIMDATA OF SWEDEN
44 Montgomery St., Suite 500
San Francisco, CA 94104 • Tel (415) 955-2612

DATA CENTER SERVICES

BURNS

Computer & Memory Repairs

VAX AND PDP DEVELOPMENT TIME
Omnicomputer™
$7/$14
BUDGET BYTES™
212-944-9220

COMPUTER TIME & TIMESHARING

- We are time brokers.
- IBM timesharing our specialty.
- Also RJE & batch time.

Call John Rudder at
Computer Reserves, Inc.
(201) 666-5700

Get off the routing list and on to the subscriber list.

To subscribe, you can use your American Express, Visa or Mastercharge card and call, toll free, 800-343-6474 (in Massachusetts, call 617-879-0700).

COMPUTERWORLD

ADVERTISERS INDEX

AD Council 17,36,37
American Telephone & Telegraph 30-31
Anchor Pad International 88
Andrew Brothers 98
Applied Digital Data 78
Artificial Intelligence 103
Ashton-Tate 78
A.S.T. Research 98
Auerbach Publisher 92
Avocom 92

John Basil Company 122
BMC Software 79

Cecom 96
CGA Software 98
CIE Systems 122
Communication Sciences Inc. 122
Comset 102
Computer Technology 91
Control Data Corp. 74
Candale 127
Cullinet 9
CW Buyer's Guide 96
CWCI 11,13
CW France 126
CW India 126
CW Norway 98
CW Supplement 96

DASD 102
Data Access 98
Data Decisions, Inc. 98
Data Storage Solution, Inc. 92
Datagraphics 126
DEC 98
Datasystems for Industry 98
DEC/VPN VAX 82-83
Delhi 129
Digital Associates Corp. 98
Digital Communication Associates 84-85
Digital Consulting 98
Durkee Products 98

Eastman Kodak Co. 123
Epson America 98

Four Phase Systems 92
Fusion Products 7

General Electric 94
General Research Corp. 97
Graham Magnetics 126

H & W Computers 77
Hambrecht & Quist 102
Hewlett Packard 100-101
Honeywell Information Systems 88-89

IBM 110-111
Information 44
Informs 36-37
Innovation Data Processing 7
Integral Systems Inc. 98
Intercomputer Communications 76
Interface Systems 98
International Computer Conference 16
IPT Publications 24,128
ITT 34-35

J. W. Lampl 74
Jade Software Corp. 98
Jost Stapler 94-95
Jus Data Corp. 127
JustMail 98
Local Data 77

3M 104
Mathematica 92
MCBA 124
MicroAge 92
MicroFrame 92
MSA 104

NCR Corp. 32
NBC 118-119
Northeast Expositions 48

Paradise Systems 126
PC World 98
PC World Expo 122-123
Perwin 98
Protocol 38-39

Quality Micro Systems 102

RACCU Corp. 92
Randeck Corp. 97
I.F. Rothschild 14,66

SAS Institute 21,128
Signal Technology 65,67,69
Southern Systems 128
Specialty Computer Services 76
Sterling Software 100,114
Stone Mountain Computing 104
Synapse Computer 5
Syscon 3
Systems Automation 114

Tandem Computers 80-81
Televideo 46-47
Term-Tronics 98
Tepas Inc. 10

Uniforum 91

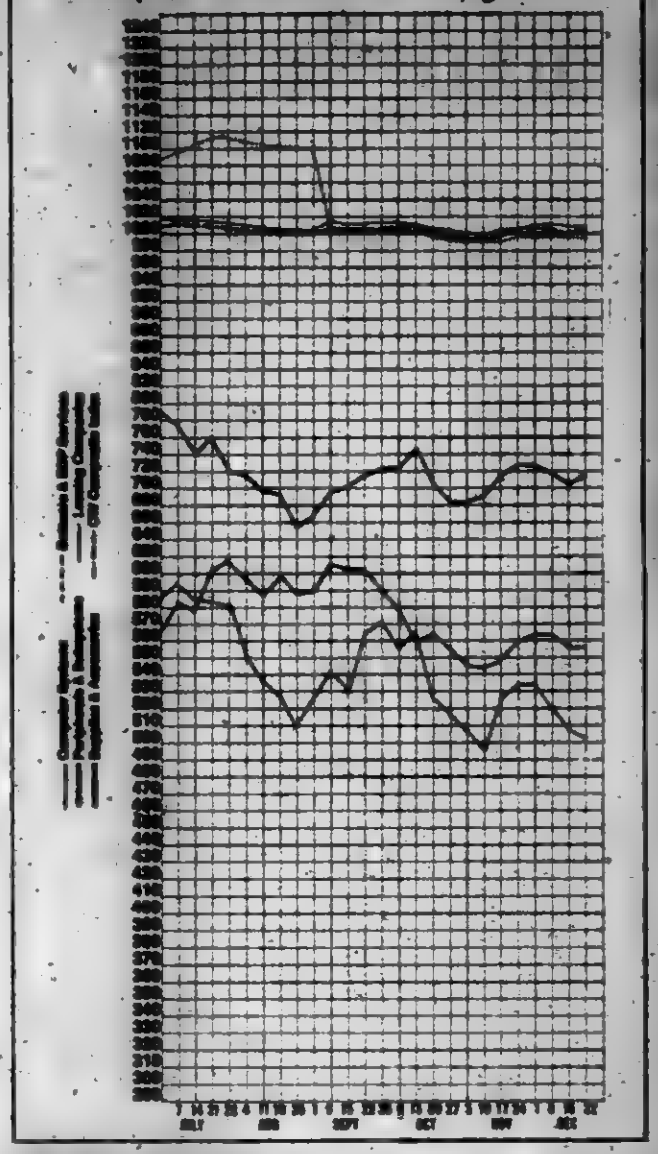
Value Computing 78
VM Software, Inc. 8
VM Systems Group 76

Wang Laboratories 4
Wellesgang Group 75,89
WYSE Technology 128

Zilog Inc. 76

This index is provided as an additional service. The publisher does not assume any liability for errors or omissions.

Computerworld Stock Trading Index



Computerworld Sales Offices

Vice-President/Sales/Donald E. Fagan
Assistant to the Vice-President/Sales/Edward P. Marecki
Marketing Support Manager/Kathy Doyle
COMPUTERWORLD, 375 Cochituate Road, Box 880, Framingham, MA 01701
(617) 879-0700

BOSTON SALES OFFICE (617) 879-0700
Northern Regional Director/Chris Lee
District Managers/Jim McClure, Ronald Madera, Jayne Donovan, Michael F. Kelleher
Sales Assistant/Alice Langley
COMPUTERWORLD, 375 Cochituate Road, Box 880, Framingham, MA 01701

CHICAGO SALES OFFICE (312) 827-4433
District Managers/Arthur Kossack, H. Newton Berndt, III
Sales Assistant/Joan F. Broderick
Northern Regional Director/Chris Lee
COMPUTERWORLD, 2600 South River Road, Suite 304, Des Plaines, IL 60018

NEW YORK SALES OFFICE (201) 967-1365
Eastern Regional Director/Michael J. Masters
Sr. District Manager/Doug Cheney
District Managers/Ray Corbin, Joan Daly
Account Executive/Fred Lo Sapio
Sales Assistant/Dale M. Petrino
COMPUTERWORLD, Perpetua Plaza I, 140 Route 17, North, Paramus, NJ 07652

LOS ANGELES SALES OFFICE (714) 891-1365
District Managers/Bob Hubbard, Bernie Hockenender
Western Regional Director/William J. Healey
COMPUTERWORLD, 18005 Sky Park Circle, Suite 250, Irvine, CA 92714

SAN FRANCISCO SALES OFFICE (415) 421-7366
Western Regional Director/William J. Healey
Account Managers/Barry Milona, A.G. Germano, Theodore Pearson, Ernest Chamberlain
Account Manager, Classified/Nicole Brothman
COMPUTERWORLD, 300 Broadway, Suite 28, San Francisco, CA 94133

ATLANTA SALES OFFICE (404) 394-0799
District Director/Jeffrey Mallock
Eastern Regional Director/Michael J. Masters
COMPUTERWORLD, 1669 Peeler Road, Suite D, Atlanta, GA 30338

CLASSIFIED ADVERTISING (617) 879-0700
Al DeMilla, Bill Cadigan
COMPUTERWORLD, 375 Cochituate Road, Box 880, Framingham, MA 01701

CW INTERNATIONAL MARKETING SERVICES
Manager/Diana La Mongie
COMPUTERWORLD, 375 Cochituate Road, Box 880, Framingham, MA 01701
(617) 879-0700

For foreign sales offices, see Page 2.

CW COMMUNICATIONS/INC.
Board Chairman/Publisher
Patrick J. McGovern
President
W. Walter Boyd
Senior Vice-President
Lee Vollmer

Group VP-Communication Services, Jack Edmonston. Group VP-Circulation, Margaret Phelan. VP-Marketing, Donald E. Fagan. VP-Finance, William P. Murphy. VP-Editorial, John Wilmerding.

Computerworld Headquarters: 375 Cochituate Road, P.O. Box 880, Framingham, MA 01701
Phone: (617) 879-0700, Telex: 95-1130.

SALES: Vice-President, Donald E. Fagan. National Director, Edward P. Marecki. Corporate Advertising Administrator, Frank Collins. Marketing Support Manager, Kathy Doyle. Display Advertising Supervisor, Anne Hadley. Display Advertising, Deborah Bryer, Pam Valentines, Elaine Carlos, Carolyn Medeiros, Cindy Chilton. Classified Advertising Manager, William J. Mills.

COMMUNICATION SERVICES: Group Vice-President, Jack Edmonston. Manager Research, Kathryn Stewart. Sales Promotion Director, Liz Johnson.

PRODUCTION: Production Director, Peter Holm. Production Manager, Marlene Sibul. Supervisor, Trish Gaudette. Systems Manager, Tom Pleu. Typesetting Manager, Carol Polack. Art Director, Tom Monahan.

CIRCULATION: Group Vice-President, Margaret Phelan. Circulation Manager, Jane Dasbery. Fulfillment Manager, Maureen Burke.

Computerworld (ISSN 0010-4841) is published on 52 issue anniversary through University Microfilms Inc., Periodical Entry Dept., 300 North Zeb Rd., Ann Arbor, Mich. 48106. Phone (313) 761-4700. Complimentary subscriptions available. Write to Circulation Dept. for subscription information.

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, DECEMBER 21, 1983

All statistics compiled computed and formatted by TRADE QUOTES, INC Cambridge, Mass. 02139

		52WK-HI	52WK-LO	CLOSE	NET	PCT
				DEC 21	CHNGE	CHNGE
		(1)	(1)	1983		
COMPUTER SYSTEMS						
A	ALPHA MICROSYSTEMS	11- 5/8	3	4 1/2	- 1/8	-2.7
A	AL100 COMPUTER SYST	9- 3/8	3	3	- 1/8	-4.0
A	ARGOSY COMP	9- 3/8	3	3	-1 1/8	-4.0
A	APPLE COMPUTER INC	16- 7/8	3	4 1/4	- 1/8	-2.7
N	AT&T	69- 7/8	53	53 3/8	- 1/2	-0.9
N	BURROUGHS CORP	69- 3/8	43	43 3/4	-1 3/8	-3.0
A	COMPUTER AUTOMATION	9- 1/2	3	3 1/2	- 1/8	-4.0
A	COMPUTER CONSOLES	9- 3/8	3	3 1/4	- 1/8	-3.7
N	CONTROL DATA CORP	44- 1/4	23	44	+ 1/4	+0.6
A	CONVERGENT TECHNOL	23- 1/2	3	23 1/8	+2 3/4	+13.2
N	CRAY RESEARCH INC	39- 1/2	21	39 1/2	+2	+5.3
N	DATA GENERAL CORP	39- 1/2	19	32 7/8	- 1/8	-0.3
N	DATAPOINT CORP	11- 3/8	3	3 7/8	-1 1/8	-4.3
N	DIGITAL EQUIPMENT	82-1/2	49	79 5/8	+1 1/2	+2.1
A	EDCO INC	9- 1/8	3	3 1/8	- 1/8	-3.8
A	ELECTRONIC ASSOC.	9- 1/8	3	3 1/8	- 1/4	-7.4
A	FLOATING POINT SYST	16- 3/4	3	3	0	0.0
N	FOXBORO	22- 1/4	13	20 1/2	+1 3/8	+7.2
N	GENERAL AUTOMATION	9- 3/4	3	3 1/8	- 1/8	-3.8
N	GERBER INC	34- 1/4	21	31 1/8	- 1/2	-1.6
N	HARRIS CORP	39- 3/8	19	40 1/4	+ 3/4	+1.9
N	HEWLETT-PACKARD CO	82- 1/8	40	42 1/2	+2 1/2	+6.2
N	HONEYWELL INC	88-1/2	37	37 3/4	+2 1/8	+6.1
N	IBM	97-1/8	53	53 3/8	+2 3/4	+5.4
A	ICL SYSTEMS INC	9- 1/4	3	3 1/2	+ 1/4	+7.7
N	IU4-CDR INC	19- 3/8	10	10 1/4	- 3/4	-6.8
O	MADRIGON CORP SYSTS	1- 1/8	1	1 1/2	+ 1/8	+9.1
N	MANAGEMENT ASSIST	9- 1/8	3	3 1/8	- 1/8	-3.8
N	MATSUSHITA ELECTADV	47- 1/2	23	23 1/2	+ 1/8	+0.5
A	MEGALAN COMPUTER SYS	9- 1/8	3	3 3/8	0	0.0
N	MOHAWK DATA SCI	10- 1/8	3	3 7/8	- 1/8	-3.2
N	MOTOROLA INC	88-1/8	43	122 1/2	-1 3/8	-1.1
N	NAT'L SEMICONDUCTOR	28- 5/8	15	15 3/4	+1	+6.8
N	NCR	38-1/8	22	22 7/8	-1 3/8	-5.7
N	PERKIN-ELMER	17- 3/4	7	10 7/8	-1 1/4	-4.8
N	PRIME COMPUTER INC	11- 3/8	6	6 7/8	- 1/8	-1.7
N	SPERRY CORP	51- 1/4	27	47	+1 1/4	+2.7
N	TANDEM COMPUTERS INC	14- 1/2	6	8 3/4	+1 1/8	+14.6
N	TIMEX CORP	39- 5/8	19	19	0	0.0
N	TELEVIDEO SYSTEMS	19- 1/4	4	4 3/8	- 7/8	-6.6
O	TELNOM CORP	9- 1/8	3	3	- 1/2	-6.9
N	TEXAS INSTRUMENTS	71-1/8	38	38 1/4	+2 3/8	+6.6
A	ULTIMATE CORP	9- 3/4	3	3 7/8	- 3/8	-8.8
N	WESTOO (GRAPHICS INC	9- 1/4	3	3	0	0.0
A	WANG LABS "B"	19- 1/2	8	8	+ 1/4	+3.2
A	WANG LABS "C"	11- 1/2	4	4	+ 1/4	+6.6
N	XEROX CORP	38- 1/2	22	30 1/4	+ 1/4	+0.8
LEASING COMPANIES						
N	BOOTHE FINANCIAL CP	11- 3/8	3	3	- 1/4	-6.7
A	COMDISCO INC	7- 7/8	3	3 3/8	-1 1/8	-8.7
O	CONTINENTAL INFO SYS	9- 1/8	3	3 3/4	0	0.0
N	CPT INC	9- 1/8	3	3 1/4	- 1/8	-3.8
N	U.S. LEASING	10- 1/2	3	3 3/8	-1 3/8	-8.8
COMPONENTS						
N	ADVANCED MICRO DEV	13- 3/8	3	3 7/8	- 3/8	-1.1
A	ADV'D SEMICONDUCTOR	9- 1/8	3	3 1/8	- 3/4	-3.2
N	ANALOG DEVICES INC	10- 1/8	3	3 3/8	- 1/8	-3.6
A	ANALOGIC CORP	20- 1/2	3	3 3/4	0	0.0
N	APPLIED MAGNETICS CP	10- 1/2	3	3	+1 1/8	+3.2
N	TERADYNE	14- 3/8	3	3	+ 3/8	+1.4

EXCH: A=AMEX N=NEW YORK O=OVERSEAS P=PACIFIC B=BOSTON
I=INTERNAT'L R=REGIONAL O=OVER-THE-COUNTER
B-I-C PRICES ARE BID PRICES AS OF 3 P.M. ON LAST DAY
(1) TO NEAREST DOLLAR

		52WK-HI	52WK-LO	CLOSE	NET	PCT
				DEC 21	CHNGE	CHNGE
		(1)	(1)	1983		
SOFTWARE & SVC SERVICES						
O	ADVANCED COMP TECH	1- 5/8	3	4 1/8	+ 1/8	+3.2
A	ADVANCED SYSTEMS INC	9- 1/8	3	3	+ 1/8	+1.2
A	ADS COMPUTERS INC	7- 1/2	3	3	+ 1/2	+1.8
A	AMERICAN SOFTWARE	17- 3/4	3	3 1/8	+ 3/4	+3.5
A	AMACOMP INC	9- 1/2	3	7 3/8	+ 1/8	+3.1
A	ANALYSTS INTL CORP	9- 1/2	3	3 1/8	+ 3/8	+3.1
A	APPLIED DATA RES.	9- 7/8	3	3 1/8	+ 1/8	+4.0
A	ASK COMPUTER SYSTEMS	9- 1/2	3	3	+ 3/8	+4.0
A	AUTOMATED SIMP INC	9- 1/2	3	3 1/8	+ 1/8	+4.0
N	AUTOMATIC DATA PROC	51- 1/2	28	48 1/2	+ 1/2	+1.0
A	CBA COMPUTER ASSOC	9- 1/2	3	3 1/8	+ 1/8	+4.0
A	COMPUTER ASSOC INT'L	9- 1/2	3	3 1/8	+ 3/8	+12.5
A	COMPUTER ASSOCIATES	9- 1/2	3	3 1/8	+ 1/8	+4.0
A	COMPUTER HORIZONS	9- 1/2	3	3 1/8	+ 1/8	+4.0
A	COMPUTER NETWORKS	9- 1/2	3	3 1/8	0	0.0
A	COMPUTER SCIENCES	11- 1/2	3	3 1/8	+ 1/8	+4.0
A	COMPUTER TASK GROUP	9- 1/2	3	3 1/8	+ 1/8	+4.0
A	COMPUTER VISIONS	9- 1/2	3	3 1/8	- 1/8	-3.8
A	COMPUTERIZED SYSTEMS	9- 1/2	3	3 1/8	- 1/8	-3.8
A	COMSHARE CORP	9- 1/2	3	3 1/8	+ 1/8	+4.0
A	COMSHARE	9- 1/2	3	3 1/8	+ 1/8	+4.0
O	CALLINET SOFTWARE	1- 1/2	1	1	- 1/8	-9.1
O	CYCARE SYSTEMS INC	9- 1/2	3	3 1/8	+ 1/8	+4.0
O	ELECTRONIC DATA SYST	59- 1/2	29	58 1/2	+ 1/2	+0.8
O	HUMAN SYSTEMS INC	9- 1/2	3	3 1/8	+ 1/8	+4.0
O	GENERAL ELECTRIC CO	59- 1/2	29	57 1/2	+ 1/2	+0.8
O	GTE CORP	59- 1/2	29	57 1/2	+ 1/2	+0.8
O	INFORMATICS INC	19- 1/2	3	3 1/8	+ 1/8	+4.0
O	INFOTRON SYSTEMS CORP	9- 1/2	3	3 1/8	+ 1/8	+4.0
O	KEANE ASSOCIATES	9- 1/2	3	3 1/8	+ 1/8	+4.0
O	LOGICON	9- 1/2	3	3 1/8	+ 1/8	+4.0
O	MCI COMMUNICATIONS	12- 1/2	3	3 1/8	+ 1/8	+4.0
O	MODU ART SYSTEMS INC	9- 1/2	3	3 1/8	+ 1/8	+4.0
O	MATHEMATICAL APP GRP	9- 1/2	3	3 1/8	+ 1/8	+4.0
O	MICRO SYSTEMS INC	9- 1/2	3	3 1/8	+ 1/8	+4.0
O	MODCOMP CP	9- 1/2	3	3 1/8	+ 1/8	+4.0
O	NATIONAL DATA CORP	9- 1/2	3	3 1/8	+ 1/8	+4.0
O	ON-LINE SOFTWARE INT	9- 1/2	3	3 1/8	+ 1/8	+4.0
O	PANSOPHIC SYSTEMS	9- 1/2	3	3 1/8	+ 1/8	+4.0
O	PLANNING RESEARCH	9- 1/2	3	3 1/8	+ 1/8	+4.0
O	POLICY MGMT SYSTS CP	9- 1/2	3	3 1/8	+ 1/8	+4.0
O	PROGRAMMER & SYS	9- 1/2	3	3 1/8	+ 1/8	+4.0
O	REYNOLDS & REYNOLDS	9- 1/2	3	3 1/8	+ 1/8	+4.0
O	SCI CORP	9- 1/2	3	3 1/8	+ 1/8	+4.0
O	SHARED MEDICAL SYST	9- 1/2	3	3 1/8	+ 1/8	+4.0
O	SCIENTIFIC COMPUTING	9- 1/2	3	3 1/8	+ 1/8	+4.0
O	SOFTWARE AG	9- 1/2	3	3 1/8	+ 1/8	+4.0
O	TYMSHARE INC	9- 1/2	3	3 1/8	+ 1/8	+4.0
O	UCC CORP	9- 1/2	3	3 1/8	+ 1/8	+4.0
O	UNIV CORP	9- 1/2	3	3 1/8	+ 1/8	+4.0
PERIPHERALS & SUBSYSTEMS						
A	AM INTERNATIONAL	2- 1/2	1	1 3/4	0	0.0
A	ANDERSON JACOBSON	9- 1/2	3	3 1/8	+ 1/8	+4.0
A	AUTO-TROL TECHNOLOGY	9- 1/2	3	3 1/8	+ 1/8	+4.0
A	DATATRAC INC	9- 1/2	3	3 1/8	+ 1/8	+4.0
A	GENRISE INT'L	9- 1/2	3	3 1/8	+ 1/8	+4.0
A	GOLT-BERNARD & ASS	9- 1/2	3	3 1/8	+ 1/8	+4.0
O	CANNON CORP	9- 1/2	3	3 1/8	+ 1/8	+4.0
O	CONTROLDATA DATA CORP	9- 1/2	3	3 1/8	+ 1/8	+4.0
A	CETEC CORP	9- 1/2	3	3 1/8	+ 1/8	+4.0
O	COMMISTRONICS	9- 1/2	3	3 1/8	+ 1/8	+4.0

		52WK-HI	52WK-LO	CLOSE	NET	PCT
				DEC 21	CHNGE	CHNGE
		(1)	(1)	1983		
O	COMPUTER DEVICES INC	1- 3/4	1/2	1/2	- 1/8	-20.0
O	COMPUTER TRANSCEIVER	4- 1/2	4	4	+ 1/8	+3.2
O	COMPUTERVISION CORP	69- 1/2	34	68 1/2	+ 1/8	+0.2
N	CROMEMCO CORP	10- 1/2	3	10 1/2	+ 3/8	+3.7
A	DATAPRODUCTS CORP	10- 1/2	3	3 1/2	0	0.0
O	DATARAM CORP	9- 1/2	3	3 1/8	- 3/8	-3.7
O	DATA SWITCH CORP	13- 1/2	3	3	-3 1/2	-15.2
O	EATON INC	9- 1/2	3	3	- 1/8	-1.2
O	EXCISION DATA COMPUT	9- 1/2	3	3	+ 3/8	+3.8
O	GENERAL-ELECTRIC	11- 3/8	3	3 1/8	+ 1/8	+1.0
O	ELECTRONIC M & R	9- 1/2	3	3 1/2	- 3/8	-4.7
O	ESSATA, INC	11- 1/2	3	3 3/4	0	0.0
O	HYMAN & SUTHERLAND	9- 1/2	3	3	-1 3/4	-4.9
O	HARVARD TECHNOLOGIES	9- 1/2	3	3 3/8	0	0.0
O	HEWL DATA COMM SYS	9- 1/2	3	3 1/8	- 1/4	-7.4
O	INTRAT SOUTHWEST SYS	9- 1/2	3	3 1/8	- 1/8	-3.8
O	KEYSTONE COMP	9- 1/2	3	3 1/8	- 1/4	-9.8
O	KONT CORP	9- 1/2	3	3 1/2	+ 1/8	+3.7
O	INFORMATION INTL INC	19- 1/2	3	3 1/8	- 1/2	-9.7
O	INFORMATION SCIENCE	12- 1/2	3	3 1/2	-1 1/2	-30.0
O	INTEL CORP	11- 5/8	3	3	+1 3/4	+6.2
O	ITL SYSTEMS INC	9- 1/2	3	3 1/2	+ 1/8	+4.7
O	LOGIC ELECTRONICS	9- 1/2	3	3 1/8	- 3/8	-4.9
O	MEGADATA CORP	9- 1/2	3	3 1/8	- 1/8	-1.8
O	MAI DATA CORP	10- 3/8	3	3 1/8	+ 1/8	+4.1
O	MEMOREX CORP	9- 1/2	3	3 1/8	- 1/2	-4.1
O	NETWORK SYSTEMS CORP	9- 1/2	3	3	-1 1/8	-3.8
O	NO AMERICAN PHILIPS	9- 1/2	3	3 1/8	-1 3/8	-4.8
O	NORTHERN TELECOM LTD	11- 1/2	3	3 1/8	-1	-2.4
O	OMEX	9- 1/2	3	3 1/2	0	0.0
O	PERIPHONE CORP	10- 1/2	3	3 1/8	+ 3/8	+4.8
O	PERMIL CORP	9- 1/2	3	3 1/8	+ 1/8	+4.0
O	PHOENIX COMPUTER INC	7- 1/2	3	3 1/8	+ 1/8	+4.0
O	PLESSEY CO (ADR)	11- 1/2	3	3 1/8	0	0.0
O	POINTRONIX INC	9- 1/2	3	3 1/2	+1	+3.7
O	RAYTEK CORP	9- 1/2	3	3 1/8	- 1/8	-3.7
O	RAYTHEON CO	9- 1/2	3	3 1/8	+ 1/8	+4.0
O	RECOGNITION EQUIP	9- 1/2	3	3 1/8	0	0.0
O	REMEX CORP	9- 1/2	3	3 1/8	-1	-3.8
O	SANDERS ASSOCIATES	9- 1/2	3	3 1/8	- 3/8	-3.8
O	SCAN DATA	1- 1/2	1	1 1/8	0	0.0
O	SCAN-TRON CORP	12- 1/2	3	3 1/2	+ 1/8	+3.7
O	SCIENTIFIC ATLANTA	19- 1/2	3	3 1/8	+ 3/8	+4.0
O	STERLING TECHNOLOGY	9- 1/2	3	3 1/8	0	0.0
O	SYKES DATATRONICS	9- 1/2	3	3 1/8	- 1/8	-3.8
O	SYSTEMS & COMP TECH	20- 1/2	3	3 1/8	- 3/8	-3.8
A	T BAR INC	9- 1/2	3	3 1/8	- 3/8	-4.0
A	TAB PRODUCTS CO	9- 1/2	3	3 1/8	+ 1/8	+4.0
O	TANDON CORP	9- 1/2	3	3 1/2	+ 1/8	+3.7
A	TDC INC	9- 1/2	3	3 1/8	- 3/8	-4.8
O	TEKTRONIX INC	39- 1/2	19	38 1/2	+1 3/8	+3.7
O	TELEX	9- 1/2	3	3 1/8	+ 1/8	+4.0
O	TERMINAL DYNAMICS CP	9- 1/2	3	3 1/8	+ 1/8	+4.0
O	TIMEPLEX INC	9- 1/2	3	3 1/8	+ 1/8	+4.0
O	VISUAL TECHNOLOGY	9- 1/2	3	3 1/8	-1	-3.1
SUPPLIES & ACCESSORIES						
O	AMERICAN BUS PRODS	7- 1/2	3	3 1/8	+ 1/8	+4.0
O	BARRY WRIGHT	13- 1/2	3	3 1/8	+ 1/8	+4.0
O	DUPLEX PRODUCTS INC	13- 1/2	3	3 1/2	+ 1/2	+4.0
O	DWYER INST. PFD(W)	9- 1/2	3	3 1/2	+ 1/2	+4.0
O	3M COMPANY	49- 1/2	3	3	0	0.0
O	MOSAIC (DEL) LTD	39- 1/2	3	3 1/8	+ 1/8	+4.0
O	STANDARD REGISTER	11- 1/2	3	3 1/4	+ 1/8	+4.0
O	WALLACE BUS FORMS	11- 1/2	3	3	+ 1/4	+8.3

15 pointed questions to ask MSA or any software supplier

These questions will help you when you sit down with individual software companies.

They're tough questions. Relevant ones. And any supplier who is worth his salt should be able to answer them without backpedaling.

Ask MSA

We'll answer all these questions to your satisfaction—plus any others you may have.

In fact, we're probably the best equipped to answer them. Because MSA is the software company. We offer the most complete line of totally integrated systems in the software industry, including financial, human resource and manufacturing.

So you avoid the headache of trying to tie together individual systems. (And the even bigger headache of adding to them.)

With MSA's integrated systems, there's no unnecessary duplication of data or effort. Reporting is faster. All your company's information is more timely and accurate—and in the right form.

Our technical edge comes from experience

Staying ahead is easier for a company that's steeped in software technology. MSA has spent years developing, refining, testing and enhancing our systems.

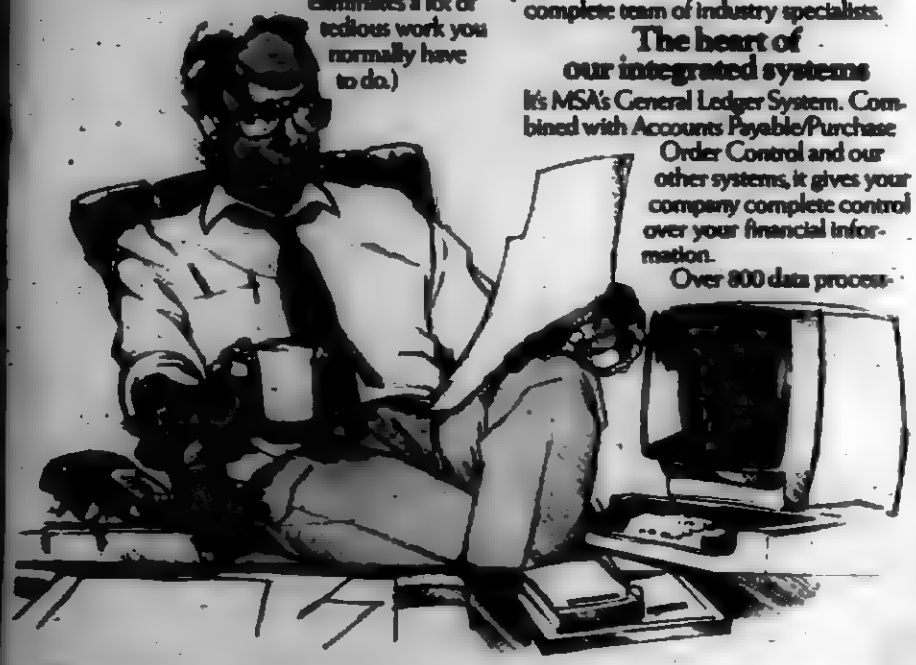
This year alone, we'll invest $25 million to make sure all our systems are technologically razor sharp. That gives us a decided advantage over flash-in-the-pan technology that may not have the bug-free logic of a more experienced system.

It also gives you a decided advantage over "custom" systems you have to update yourself.

MSA relieves you of that time-consuming burden. We update and enhance your software for a full year. Then we continue this service for a surprisingly low annual fee.

Maintenance includes keeping your system up-to-date technologically. Enhancing it with new features that make it work even harder for you.

And making sure it reflects changes in accounting procedures and government regulations, including 401(k), TEFRA, and FAS52. (That eliminates a lot of tedious work you normally have to do.)



Save this box. It can help you make an intelligent software decision.

1. Can you offer us a complete range of software systems designed to work together?
Or will we have to piece together a patchwork of systems?

2. Are your systems just record keepers, or can they really help us make decisions?
Can we pull together information from any of our integrated systems? In exactly the form we want it?

3. Can you provide business software for both mainframes and microcomputers?
Do you develop this software yourself or do you simply market it for another company?

4. Are your systems truly online so all of our information is current?
How many of your systems are online? How secure are they?

5. Will my company have to be the one that discovers the bugs in your brand new system?
Just how long have your systems actually been used, and how have they been tested?

6. Will you update your systems as technology advances and regulations change?
What are some of your most recent updates? Will you keep us current on regulatory changes?

7. Do your systems really do everything you say they will?
Or will we have to change them or add to them to get the features we want?

8. How long have you been in business?
What are your revenues? What is your growth record? Where will your company be five years from now?

9. How many systems has your company installed?
How many of these were installed in the past six months? How many of your earlier customers are still using—and liking—your systems?

10. Do your financial systems handle unlimited foreign currencies?
Do your financial systems use a common set of currency exchange rates?

11. Can you link our executives' computers directly to the mainframe—so they can get their own information?
Is that software available right now?

12. How will you make sure our own people thoroughly understand your systems?
Do you have educational centers near us, or will we have to travel all the way across the country to find one? Will you be there to help during installation and after?

13. How many of your people specialize in software for my industry?
How many accountants work for you? Human resource specialists? Manufacturing experts?

14. Do your systems have built-in features that make them easier to use?
What happens if someone needs help figuring out a feature? Do you have online documentation that's easy to understand?

15. As my business changes will your system be flexible enough to change with it?
Or will we have to pay a lot to revamp it? Or even regenerate it?

© Management Science America, 3445 Peachtree Road, N.E., Atlanta, Georgia 30326

35,000 days of training

At MSA, we make sure your people have a firm grasp of our systems. Last year alone, we conducted more than 35,000 student days of customer training for over 1,800 companies. At education centers all over the world, as well as at our headquarters.

From training sessions to cassettes to complete, easy-to-understand documentation, MSA provides the most extensive Customer Education Programs in the industry.

And MSA systems are just as friendly as our people. Our online HELP feature actually guides users through our systems, and EASY-SCREEN™ lets them design their own screens without creating data processing nightmares.

If there's ever a question or problem with our systems, MSA customers are always close to service.

Our Account Managers are knowledgeable, responsive, and backed by a complete team of industry specialists.

The heart of our integrated systems

It's MSA's General Ledger System. Combined with Accounts Payable/Purchase Order Control and our other systems, it gives your company complete control over your financial information.

Over 800 data processing specialists, accountants, and financial experts work together to make MSA's financial systems the most advanced and most highly integrated in the industry.

MSA has the answers

Whatever your size—whatever your business—MSA has a total software solution.

We'll provide the highest quality integrated online software.

We'll tie your business and manufacturing software systems together, using our exclusive Extended Closed Loop™ manufacturing system.

We'll provide business software for your microcomputers, through our Peachtree Software Company.

We'll even link your microcomputers to your company's mainframe—with MSA's Executive Peachpak™ application software. A revolutionary concept that lets executives get the mainframe information they need through their personal computers.

MSA ready-to-install application software

1. General Ledger
2. Accounts Payable/Purchase Order Control
3. Budgetary Control/Encumbrance
4. Fixed Assets Accounting
5. Capital Expenditure Tracking
6. Forecasting & Modeling
7. Accounts Receivable
8. Order Processing
9. Foreign Exchange
10. Inventory & Purchasing
11. Payroll
12. Personnel Management & Reporting
13. Manufacturing Control System (MRP II)
14. Executive Peachpak™ II
15. Peachtree Software™ business systems for microcomputers
16. Peachtree Software™ office productivity systems for microcomputers

EASY-SCREEN, Executive Peachpak II, Peachtree Software, and Extended Closed Loop are trademarks of Management Science America, Inc.

Talk to us

If we've whetted your appetite with our 15 questions, clip the coupon below.

We'll send you a concise booklet that will help you even more in your deliberations. We'd also like to send you more information on how MSA can help you plan for software. And on individual systems.

Just fill in the information below, or contact Robert Carpenter at (404) 239-2000.

Management Science America, Inc.
3445 Peachtree Road, N.E.
Atlanta, Georgia 30326

☐ Please send me a free detailed brochure.
☐ Please send more information on the following systems. (Write numbers from product list.)

Mainframe Computer Type/Model _____

Name _____

Title _____

Company _____

Address _____

City _____

State _____ Zip _____

Business Phone ( ) _____

CW17a(1/2/84)

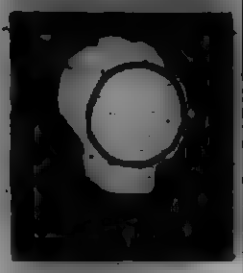
MSA
The Software Company

VOL 18
ISSUE 2
JA 9 1984
UMI

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

COMPUTERWORLD

$1.50 A COPY; $44/YEAR | JANUARY 9, 1984 | VOL. XVIII, NO. 2



Product Spotlight
Stand-alone array processors may be the poor man's supercomputers
11

In Depth
Information systems, the power in your hands
ID/7

Fire!
A luxury hotel shuts down, but its DP department barely misses a step/**18**

SECTIONS

Editorial/**40**
Software & Services/**43**
Communications/**53**
Systems & Peripherals/**59**
Microcomputers/**65**
Computer Industry/**71**

UMI
300 N ZEEB RD
ANN ARBOR MI 48106
UNIVERSITY MICROFILMS
SERIAL PUBLICATIONS
MI48106UIVYMUIVYM FCMB

NEWSPAPER

INSIDE

Computers in 12 cities will be able to communicate at high speeds over the same lines used for telephone calls by the end of the year, AT&T announced. Page 2.

■

Implementation went pearly for the first user of the Peachpak II micro-to-mainframe link. And the first user of an integrated fourth-generation application development system is also pleased. Page 4.

■

IBM has put its stamp of approval on another vendor's decision support system. Page 5.

■

Franklin Computer Corp. gave up the fight last week and settled its legal battle with Apple Computer, Inc. Page 6.

■

A lot of people on and off Capitol Hill are unhappy about a proposal to expand the FBI's electronic surveillance of people who have not been convicted of crimes. Page 8.

■

It was not the first time — it was the 15th — that the alleged mastermind behind a plot to smuggle a U.S.-made computer system into the Soviet Union had reportedly received shipments of "critical technology" equipment. Page 16.

■

How do you get corporate managers to use those "typewriter-televisions" you put on their desks? A consultant gives his suggestions in *Computerworld*'s new Microcomputers section. Page 65.

■

Jan. 3 was the first day of business for the deregulated AT&T, and AT&T Communications' chairman and chief executive officer, R. Marvin Tinsenbaum, showed off the new corporate logo before flag-raising ceremonies at national headquarters in Basking Ridge, N.J.

AT&T discounts CPE for users

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — AT&T last week began selling its entire base of installed terminals to its users at discounts of 10% to 20%. Beginning March 1, a company spokesman said, the discounted prices will be reduced an additional 1% each month for a period of 15 months.

AT&T customers interested in buying terminal equipment presently on lease — known as customer premises equipment — should call their Business Service and Sales Center, the spokesman said. The center, which has the customer's equipment service record, will set a "ball-park price" immediately and call back later with a final price.

This procedure applies to systems containing 10 or fewer stations, the spokesman explained. A customer with 11 or more stations should call his marketing branch office. The telephone numbers of the Business Service and Sales Center and the marketing office are on the customer's monthly bill.

Asked for samples of the discounted prices for customer premises equipment, the AT&T spokesman said that installed two-line, four-station Comkey 416 terminals are being offered for $1,489.50, 10% less than the price of the same equipment new. Two-line, six-station Comkey 416s were reduced 10% (to $2,385 from $2,650); the six-line, 10-station Comkey 718 was reduced 15% and now costs $3,792 instead of $4,461.

The spokesman noted that these prices are approximate. He emphasized that the discounted sales price of a particular terminal will vary widely, depending on such factors as its age and complexity. A formula has been devised for relating the terminal's age to its sales price, but the spokesman declined to

See CPE page 2

FYI

Why *Computerworld* looks different this week

What's different about *Computerworld* this week?

Nothing — and everything.

Everything you've found in *Computerworld* in the past is still in the same place. The latest news is still right up front, and product news is still in the technical sections. The In Depth section remains in its convenient place, the center of *Computerworld*, and continues to provide longer, thought-provoking articles on a wide range of topics. The editorial section of *Computerworld* still follows the news section, giving our readers a forum for their insights and opinions.

But a lot is different, too. We've made the wealth of information in *Computerworld* easier to access. Because our readers' jobs require them to absorb more information than ever before, we've added indexes throughout *Computerworld* to help them find that information. We'll be using informational graphics — charts and illustrations — more than ever before to convey information quickly.

The typeface of *Computerworld* is different this week, too. It's a classic newspaper typeface, designed for readability.

And to help our readers do their jobs even better, we've expanded our technical sections with columns by experts in specific fields and by users who have implemented workable solutions to their companies' problems, as well as with columns by *Computerworld*'s own editors.

Something else is new, too — we've added a technical section on microcomputers. Centralizing the increasing amount of news on microcomputers in corporate environments that *Computerworld* has been providing for the past year, the new section will be devoted to single-user and multiuser microcomputer systems, peripherals and software.

Because of the merging of office automation into the mainstream of data processing, the news contained in the former Office Automation section has been folded into the other technical sections. If you're looking for information on electronic mail software, for example, you'll find it in the Software and Services section; local-area networks are now covered in the Communications section.

The move to a new look for *Computerworld* actually began more than a year ago, when our editors began to meet with groups of readers around the nation. After discussing the current state of the DP executive's profession and the time pressures he faces on the job every day, these readers asked us to continue giving them all the news we have been giving them, but to make it quicker and easier to get at.

Computerworld's updated look is the result of six months of work by Robert Lockwood, regarded as one of the foremost newspaper designers in the U.S. His credits include *The Christian Science Monitor*, *Chicago Sun-Times*, *Allentown Morning Call*, *Philadelphia Bulletin*, *Dallas Morning News* and *Baltimore Sun*, among others. The founder and first president of the Society of Newspaper Designers, Lockwood worked with a redesign committee made up of members of the *Computerworld* editorial and production staffs.

The updating of *Computerworld* represents our commitment to serve our readers' needs as they change. We think you'll agree.

AT&T plans high-speed data on voice lines

By Jim Duffine
CW Staff

MURRAY HILL, N.J. — Computers will be able to communicate at high speeds over the same lines used for telephone calls when AT&T's Circuit Switched Digital Capability (CSDC) is implemented in more than 12 cities by the end of this year, the company announced recently.

Calling it a "giant step" toward the totally integrated networks often referred to as integrated services digital networks (ISDN), the newly deregulated AT&T said CSDC will allow companies to send nearly all business communications over conventional phone lines. This data includes voice, graphics and data.

"We're definitely moving toward an ISDN with this," an AT&T spokeswoman said.

Developed by Bell Laboratories, CSDC will allow users to alternate between analog voice calls and digital data transmissions with the touch of a button. Speeds of 56K bit/sec will be achieved for data, AT&T claimed.

The system is now undergoing a trial at the New Jersey Bell switching center here. Initially, the capabilities of CSDC as a high-speed computer connection and as a bulk-data carrier will be tested.

Local telephone companies will install the CSDC equipment, which can be interconnected by long-distance networks of various interexchange carriers.

In addition to bulk data transfer, CSDC's 56K bit/sec digital transmission speed will also allow for teleconferencing, encrypted voice and high-speed facsimile at speeds of 4 sec/page.

CSDC consists of a software package for the Western Electric 1AESS switching system, additional hardware for the switch, modifications to the local telephone lines and some additional equipment at the customer site.

Switching from voice to data

To use the network, customers dial into the service with a five-digit code, then dial the site where the transmission is being sent. Once a call is established, the connection can be alternated between voice and data transmission, AT&T said.

When a customer sends data from a computer, hardware installed at the customer's office permits two-way digital communication over the wire pair running between the customer's site and the central telephone office.

CSDC allows simultaneous, two-way traffic by alternating the signals going in each direction and sending them at high speeds. To accomplish this, a time compression multiplexer is used to send and receive alternately bursts of data. Multiplexers are installed at both the telephone office and the customer's premises, according to AT&T.

Rather than send signals in both directions at 56K bit/sec, the multiplexers send signals at double that rate, but alternate between sending and receiving more than 700 times per second. According to AT&T, this process make it appear to the user that data is moving in both directions simultaneously.

CPE

from page 1

disclose it.

Asked whether a customer could request AT&T to visit his site and examine his customer premises equipment before pricing it, the spokesman said some site visits will "undoubtedly" be made, but the AT&T representative will decide when they are necessary.

Customers who prefer to continue leasing their present equipment can do so for the next two years at specified rates. Until next March 1, according to the spokesman, 1983 charges will continue. After that date, the monthly fee will be based on a "national lease rate," separately calculated for each product category.

The national lease rate is equal to either 70% of the highest state-tariffed charge in effect at the end of 1983 for that product line or the median of all state-tariffed rates in effect at the end of 1983 for that product line, whichever is higher. If a customer has been paying less than the national lease rate, his monthly charge after March 1 will be increased in stages over the following two years until it reaches the national level.

New rate March 1

Customers who have been paying more than the national lease rate will begin paying the new rate March 1.

The selling and leasing of AT&T's embedded terminal base is administered by AT&T Information Systems, the telephone company's deregulated subsidiary. Under the AT&T divestiture agreement, all installed, leased AT&T terminals, along with the terminal marketing and service centers, were transferred from the erstwhile Bell operating companies to the subsidiary on Jan. 1.

Prior to last week, AT&T had said it would offer only about 75% of its embedded terminal base for sale this year. Under the terms of a plan proposed to the Federal Communications Commission early last year, the company could have waited until Jan. 1, 1986 to announce prices for the remaining 25% — which included popular models of electronic private branch exchanges, key telephone, modems and data terminals.

This scheme would have been hard on users because, without knowing what it would cost to buy their installed equipment, the users could not accurately determine whether to replace or retain that equipment.

Last November, however, the FCC ruled that AT&T, after posting a sales price for a particular type of embedded terminal equipment, would have to lease it for two years at the national lease rate.

Nata raps Mountain Bell's Centrex offer

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — Mountain Bell Telephone Co. was accused last week of flouting the Federal Communications Commission's Second Computer Inquiry decision.

Mountain Bell's accuser is the North American Telecommunications Association (Nata), whose members include independent manufacturers of private branch exchange equipment that competes directly with Centrex.

The dispute goes back to last March, when Nata complained that Mountain Bell, along with other Bell operating companies, had begun offering "enhanced" Centrex equipment directly despite the FCC's Computer Decision II, which says that such services, if offered by telephone operating companies, must be marketed through separate, deregulated subsidiaries.

The association has been trying to persuade the commission to issue a ruling that "Centrex service may not be expanded to provide enhanced service."

Among those involved in the controversy is the International Communications Association (ICA), a major communications users group.

The heart of Nata's petition is that Computer Decision II bars any addition to network-provided Centrex services beyond those offered in 1980, when the decision was adopted, ICA told the commission last month. "Centrex service is a significant revenue source for local telephone companies," ICA said, adding that if the Nata proposal to freeze enhancement of Centrex were granted, it "would destroy the economic and operational viability of Centrex service . . . The severe dislocation of existing Centrex customers cannot be overemphasized. . . . Moreover . . . there is simply no way companies could have effective communication systems if the relief Nata requests is granted."

The latest chapter in this controversy began last week, when Nata and other interested parties submitted "reply comments" to the FCC covering issues raised in earlier filings. According to Nata, Mountain Bell is offering "Centron 300" service on a tariffed basis in Colorado and on an untariffed basis in Utah. Nata contends that Centron is an enhanced Centrex service that includes automatic route selection, multilevel facilities restriction and automatic overflow to dial-up facilities.

The association's filing includes a Sept. 23, 1983, letter from a Mountain Bell official, Paul B. Dorius, to the Utah Public Service Commission, which said, "It is Mountain Bell's position that since Centron is directly competitive with the offerings of nonregulated terminal equipment vendors, there is no legal or public policy basis for requiring that Mountain Bell's Centron offering be tariffed."

According to Nata, this position contradicts the one Mountain Bell has taken in its comments to the FCC — that Centron is a "basic" service as that term is defined in the commission's Computer Decision II.

"At a minimum," Nata told the commission last week, "Mountain Bell's inconsistent representations . . . indicate . . . considerable uncertainty regarding . . . the parameters of the Computer [Decision] II as it pertains to Centrex." The association added that this same uncertainty underlies the enhanced Centrex offerings of other telephone companies.

Bug causes broadcast of nuke alarm

By John Gallant
CW Staff

HARRISBURG, Pa. — A mishap during the installation of a computerized emergency warning system at Pennsylvania Emergency Management Agency (Pema) headquarters here last week set off a nuclear attack warning that was broadcast to police and Civil Defense (CD) authorities in 41 of the state's 67 counties.

At 11:15 a.m on Wednesday, the following message came over teletypewriters in police radio rooms and CD headquarters: *This is an attack warning. Supplemental information will be provided when available. Take appropriate action.*

Authorities in Lehigh County moved quickly, transmitting the message of imminent attack to emergency personnel and sounding fire sirens throughout the district. But Lehigh was the only county to carry that warning all the way to the public, according to Pema Press Secretary John Comey. Within five minutes of the nuclear attack alert, officials in the other counties received notice telling them to ignore the broadcast.

The faulty warning was the result of a botched transfer between floppy disks of "canned" emergency messages during the installation of a new computerized AT&T emergency teletypewriter system, Comey said. "Somehow, the message was transmitted rather than duplicated," Comey said. "For reasons unknown as of now, the nuclear attack warning was broadcast to the counties that were already on-line with the new system."

The system, scheduled to be fully on-line at the end of last week, will be part of the nationwide Emergency Warning System. Comey said that the nuclear alert message was caught before the statewide Emergency Broadcast System could be activated.

In Allegheny County, according to Police Inspector Leonard Jackson, officials had begun to notify emergency personnel when the disregard notice came through.

ADR/IDEAL

puts you in command of the application backlog

IDEAL SOLVES THESE PROBLEMS

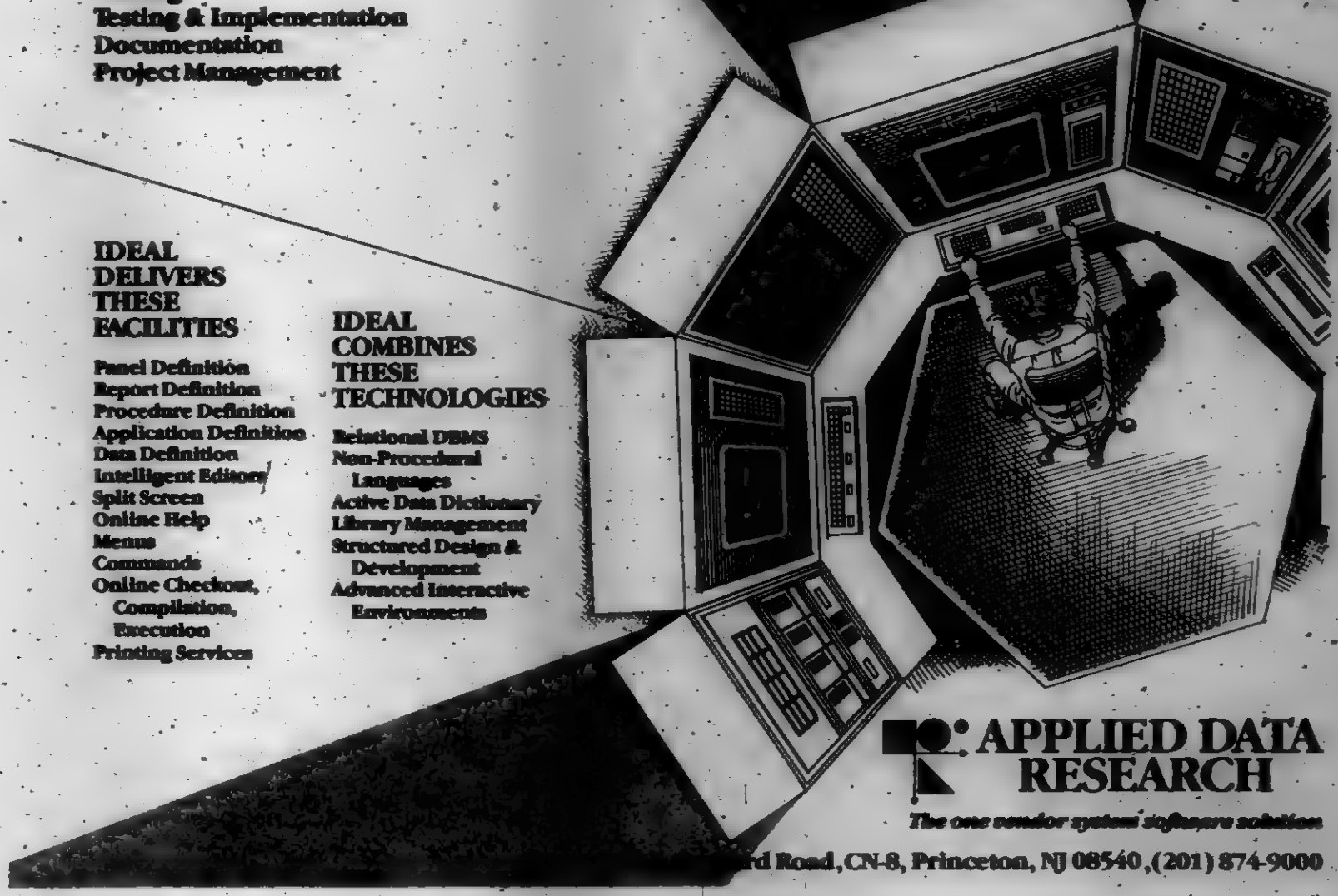
- Large-Scale Applications
- Production Applications
- Departmental Applications
- Application Enhancements
- Online Retrieval
- Online Transaction Processing
- Dialog Management
- Batch Reporting
- Complex Updates
- Design
- Coding
- Testing & Implementation
- Documentation
- Project Management

IDEAL DELIVERS THESE FACILITIES

- Panel Definition
- Report Definition
- Procedure Definition
- Application Definition
- Data Definition
- Intelligent Editors
- Split Screen
- Online Help
- Menus
- Commands
- Online Checkout, Compilation, Execution
- Printing Services

IDEAL COMBINES THESE TECHNOLOGIES

- Relational DBMS
- Non-Procedural Languages
- Active Data Dictionary
- Library Management
- Structured Design & Development
- Advanced Interactive Environments



APPLIED DATA RESEARCH

The one vendor system software solution

rd Road, CN-8, Princeton, NJ 08540, (201) 874-9000

Firm makes 'Ideal' choice after PL/I

1ST USER

By Paul Gillin
CW Staff

WESTWOOD, Mass. — The F. W. Faxon Co., a library serials management firm based here, prides itself on flourishing in a market that has been a graveyard for many companies. While more than 80% of its competitors have failed over the years, Faxon has achieved $200 million in annual sales, with a steady 25% growth rate.

The company attributes much of that success to keeping up with the technological Joneses. Faxon installed its first computer in 1953. Now, with most of its library services on-line, the company runs 280,000 transactions daily on its IBM 3081 Model D mainframe.

Faxon acts as an intermediary between publishers and subscribers, most of which are academic and business libraries. Some of its more than 25,000 clients subscribe to 100,000 publications. Among the services Faxon offers are subscription management, on-line serials check-in, checks on undelivered copies, union list management for libraries that share resources and a routing service.

Company expansion and the dramatic growth of the publishing industry in recent years led Faxon to seek an alternative to PL/I for its programming work. Following an evaluation that included Cullinet Software, Inc.'s IDMS data base management system (DBMS) and related application development facilities, Faxon late last year became the first user of Ideal, an integrated fourth-generation application development system from Applied Data Research, Inc. (ADR) of Princeton, N.J. Faxon also purchased ADR's Datacom/DB DBMS, Dataqeery, Datareporter and Datadictionary.

Although Ideal is oriented toward programmers, its first user at Faxon was an analyst with no programming experience. "I found that once you have detailed specs, the Ideal products lend themselves well to translation to the actual set of code," said Jeff Phillips, a section head in the technical division of Linx, Faxon's flagship serials management service.

Working with user David Brown, an electronic publishing consultant, Phillips coded the entire instruction set for a new "electronic yellow pages" service. Called Infoserv, the on-line, menu-driven service allows librarians to search for new serial sources by various keywords and topics and to request more information on subscriptions.

Infoserv "had an initial estimate of six months of programming time with two to three people," Phillips said. Using Ideal, Phillips and Brown coded the application in a little more than a month.

Screen painting and file definition were particularly simple, Phillips said. "We never had a screen written out or a format document."

CW Photo by P. Gillin

Although he had no programming experience, Jeff Phillips (right) of F. W. Faxon & Co. developed a project in a high-level language with help only from user David Brown (left). Now Faxon is using the language on a much larger programming project under the supervision of Alan Exon (center).

Ideal is now being exercised on a more intensive project. The Horizon project is a "mammoth order processing program for the Amsterdam office," according to Alan Exon, manager of advanced systems design. When completed this spring, Horizon will provide a full range of services for worldwide subscriptions that come from its Netherlands office.

Faxon is devoting nine full-time DP employees to the nine-month project. The goal is to write the program without using a single line of PL/I or assembler code. So far, Exon said, that goal is within reach.

Exon noted that Faxon will achieve major reductions in code using Ideal, Dataquery and Datareporter instead of PL/I programs. Allowing for reports that users can write themselves and programs not needed by the Amsterdam office, he estimated that 100,000 lines of Ideal code will be needed to provide roughly the same functions as two million lines of PL/I.

Because the final project will probably include 200 or more screens, Ideal's ability to prototype has been a lifesaver, Exon said. "The user doesn't have the patience to read 150 pages of specs," he said. "Ideal is wonderful for producing panels very fast. This project would be extremely difficult to create without prototyping."

Exon called Ideal's full screen editor and compilation speeds "very fast" and praised the software's ability to execute several commands on a screen simultaneously. "You can change a country code and then immediately back out to the menu and go to another panel, all in the same transaction," he said.

The product also allows Faxon to do concurrent batch processing and real-time updating of Datacom/DB indexes, he said.

However, Exon admitted that Faxon has undergone some "growing pains" as a first user. "Programming Help panels can be tedious," he commented. "String functions are inadequate, and Ideal's [procedure definition language] in some cases is verbose for the sake of clarity."

Another shortcoming of Ideal, according to Exon, is its lack of an interactive debugger. "Now you have to write your own exhibit statements, and when you debug you have to go back and recompile and relink. The perfect solution would be a language you can run in interpretive mode for interactive debugging, could edit at any point and re-execute at any point."

Fledgling info center goes up with 'Peachpak II'

1ST USER

By John Gallant
CW Staff

BATON ROUGE, La. — The first user of Management Science America, Inc.'s (MSA) Executive Peachpak II micro-to-mainframe link has successfully implemented the software as part of a fledgling information center, though end users are currently allowed to utilize only the downloading capabilities of that package.

Announced at MSA's Interact meeting in September, Peachpak II was designed to accommodate on-line data base sharing between mainframes and the IBM Personal Computer. The package was said to allow for the downloading and uploading of mainframe files in MSA applications for manipulation on any microcomputer application utilizing Software Arts, Inc.'s Data Interchange Format.

The first user, Fidelity National Bank here, has operated Peachpak II in a test environment since mid-October and in full production mode since early December. According to Glen Smarada, assistant vice-president and programming manager, Fidelity is using the package on two IBM Personal Computers in the bank's Accounting Department. The micros are linked to Fidelity's IBM 4341 Model Group 2 mainframe through a coaxial network utilizing Technical Analysis Corp.'s Irma boards.

Smarada said the decision to go with the MSA micro-mainframe link was a natural outgrowth of the DP department's goal of helping end users utilize "their own data." Early in 1983, management implemented policies on microcomputer acquisition and use and created an information center that has since attempted to standardize hardware and software selection throughout the organization. Through the information center, Fidelity purchased 25 micros, most of them IBM Personal Computers, and the first version of Executive Peachpak.

"We run several MSA applications on the mainframe, including human resources, fixed assets, accounts payable and their financial package," Smarada said. "We wanted something to interface with their financial package, and Executive Peachpak, which we installed in April 1983, was an exact match."

While the original version of the software resided only on the micro, Peachpak II required, in addition, the installation of several host programs to accommodate the data base sharing function, an undertaking that, Smarada said, was "quite simple" with MSA's assistance. More important, he said, users have had little trouble learning to use the system.

"Users used to have to take information from a variety of reports and load it into spreadsheets," Smarada said. "Now they can just download that data directly into the micro applications. That has saved these people quite a bit of time. Also, that capability has made them realize the many additional things they can do with the information available. People are producing things that were just 'blue-sky' before."

Fidelity's users are currently employing only two microcomputer applications with Peachpak II — MSA's Peachcalc spreadsheet and Lotus Development Corp.'s Lotus 1-2-3 spreadsheet package. The MSA micro-mainframe link allows data to be downloaded directly into those applications without the need for a reload at the micro level. Also, "all security is handled on the mainframe level," Smarada said. "You have to utilize the same passwords you would on a terminal. We were very concerned about security, but we're finding it to be more than adequate."

That concern for data security is one of the factors behind Fidelity's decision not to allow any uploading of data to the mainframe. "We want users to become familiar with the retrieval aspects of the system first."

Smarada said Fidelity may begin to utilize Peachpak II's uploading capabilities in the near future. The bank also plans to expand the use of micros to its 17 branches and to allow users in the Human Resources Department to take advantage of Peachpak II within the next year.

Second-class postage paid at Framingham, Mass., and additional mailing offices. *Computerworld* (ISSN-0010-4841) is published weekly, except: January (5 issues), February (5 issues), March (5 issues), April (7 issues), May (5 issues), June (5 issues), July (5 issues), August (5 issues), September (5 issues), October (5 issues), November (5 issues), and a single combined issue for the last week in December and the first week in January by CW Communications/ Inc., Box 880, 375 Cochituate Road, Framingham, Mass. 01701.

Copyright 1984 by CW Communications/Inc. All rights reserved.
Computerworld can be purchased on 35 mm microform through University Microfilm Int. Periodical Entry Dept., 300 Zeeb Rd., Ann Arbor, Mich. 48106. Phone (313) 761-4700. *Computerworld* is indexed: write to Circulation Dept. for subscription information.
PHOTOCOPY RIGHTS: permission to photocopy for internal or personal use or the internal or personal use of specific clients is granted by CW Communications for libraries and other users registered with the Copyright Clearance Center (CCC), provided that the base fee of $3.00 per copy of the article, plus $.50 per page is paid directly to Copyright Clearance Center, 21 Congress Street, Salem, MA 01970.
Permission to photocopy does not extend to contributed articles followed by this symbol. ‡
Special requests should be addressed to Nancy M. Shannon, CW Communications/Inc. Box 880, 375 Cochituate Rd., Framingham, MA 01701. ISSN 0010-4841/82 $3.00 + $.50
$1.50 a copy: U.S. — $44 a year; Canada, Central & So. America — $110 a year; Europe — $165 a year; all other countries — $245 a year (airmail service). Four weeks notice is required for change of address. Please allow six weeks for new subscription service to begin.

ABP mcc

POSTMASTER: Send Form 3579 (Change of Address) to Computerworld, Circulation Dept., Box 880, 375 Cochituate Road, Framingham, Mass. 01701.

IBM picks Comshare DSS for Info Center

Seen as endorsement of 'System W'

By Paul Gillin
CW Staff

ANN ARBOR, Mich. — Comshare, Inc. last week announced a two-year "complementary marketing" agreement with IBM, whereby IBM will recommend Comshare's System W and Micro W decision support system (DSS) software for use in IBM Information Centers. It is the first time IBM has concluded such an agreement with a DSS vendor.

While both companies stopped short of calling the deal a joint marketing agreement, sources said the announcement amounts to an endorsement of System W by Big Blue.

Under the terms of the agreement, IBM and Comshare field representatives will conduct joint sales calls on customers who are interested in DSS, a Comshare spokesman said. IBM sales representatives will also refer interested prospects to Comshare for DSS applications rather than referencing three alternative vendors, as has been the company's practice in the past. However, IBM will continue to recommend alternative vendors if the customer requests that information, an IBM spokeswoman said.

The agreement also provides for IBM and Comshare to work together on future enhancements of System W to support new IBM hardware and software. Comshare will have full responsibility for providing, installing and supporting System W and will offer education and custom programming services for the software, Comshare said.

'We are their experts'

"We are their [IBM's] experts in decision support," said Richard L. Crandall, Comshare's president.

"It's the biggest thing we've ever done," he added. "The DSS market has been as confused and factionalized as the personal computer market was before IBM came in. People want leadership, and IBM is providing it."

But an IBM spokeswoman emphasized that the deal should not be construed as a joint marketing agreement or an endorsement.

"For one thing, we are not marketing System W. The reps will go together to sales prospects," she said. "We also do not endorse other vendors' software products."

Major step for Comshare

However, the deal will clearly be a major boost to Comshare, which introduced System W as packaged software just over a year ago. "It's a meteoric rise, a true success story," said Len Bergstrom, vice-president of Real Decisions Corp. in Stamford, Conn., which publishes a DSS report. "We've been watching System W for a long time. It's always been presented and packaged very well. We look at it as being very successful."

Bergstrom added that users will be the "real winners" in the wake of the agreement. "IBM's endorsing DSS will give it some momentum," he said. "We see a lot of clients wanting bundled packages. And the DSS concept is very well tied to the Information Center concept."

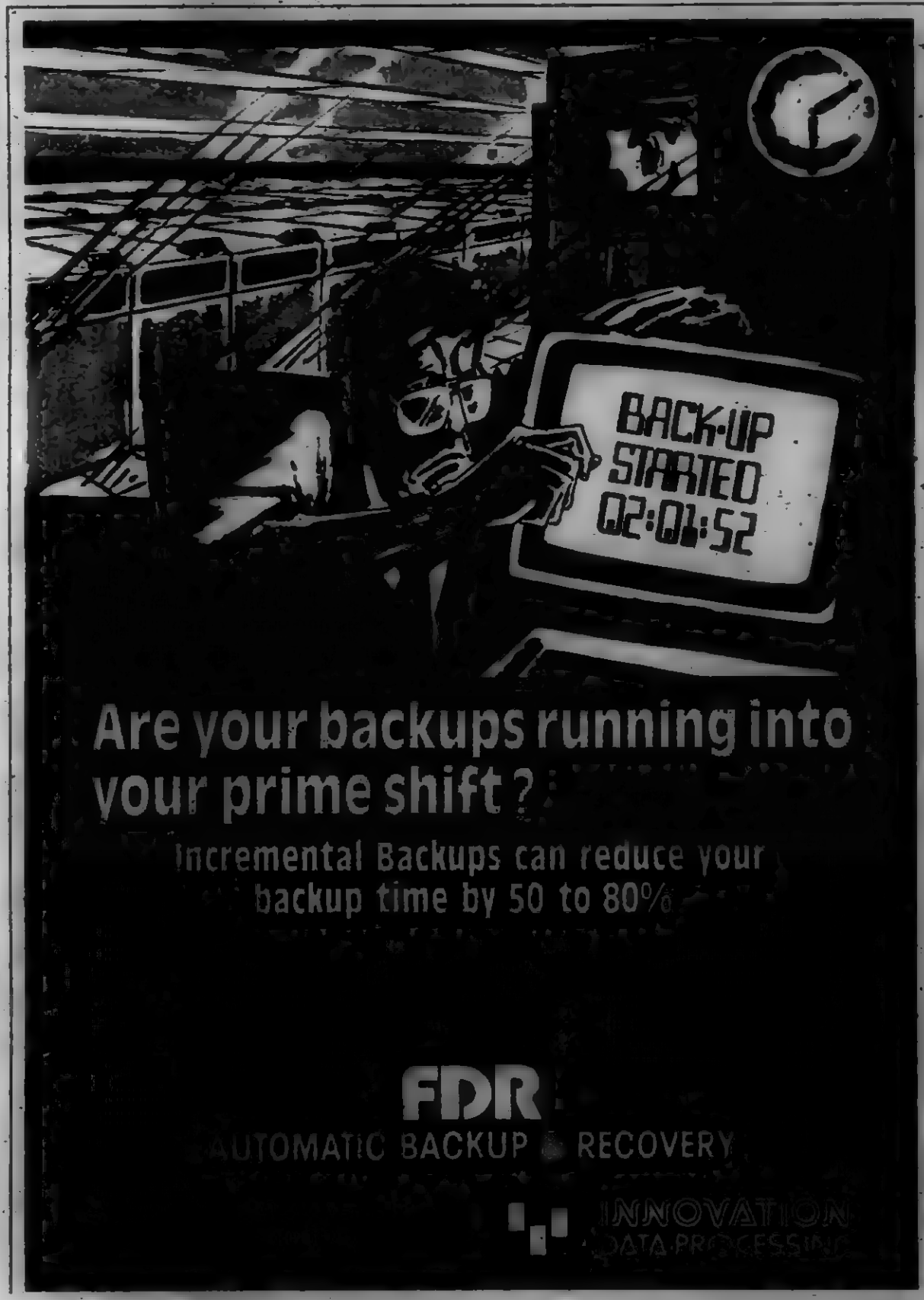
While admitting that he was "enthusiastic" of Comshare's success, a spokesman for Execucom, Inc., which markets the IFPS DSS, downplayed the significance of the deal. "I sum it up as a nonagreement," said Gary Greenfield, Execucom's vice-president of technology. "The [IBM] salesmen are not getting any commission; they're just being told to recommend [System W]. In two months it'll be as if [the deal] never existed."

Greenfield pointed to the fact that IBM will continue to offer IFPS on its Information Network remote computing service as a mitigating factor. "The System W agreement doesn't make System W a product of IBM," he said. "It also doesn't preclude IBM salesman from recommending IFPS."

Bergstrom agreed. "The question is whether IBM is going to hold together on this. I'm not sure if this is an exclusive agreement, and there may be others in the works," he said. "We've seen IBM salesmen recommend IFPS before."

The IBM spokeswoman said that the Comshare agreement was concluded with IBM's National Accounts Division (NAD), which is separate from IBM Information Services, an independent business unit that includes the Information Network. She said the NAD agreement was different from the Information Network's agreement with Execucom.

The price of System W ranges from $75,000 to $110,000. Micro W license for $1,000 for each copy, with quantity discounts available. Comshare is located at 3001 S. State St., Ann Arbor, Mich. 48104.



Franklin settles copyright dispute with Apple

Agrees to pay $2.5 million, use own operating system

By David Myers
CW New York Bureau

NEW YORK — Franklin Computer Corp. last week gave up its highly publicized legal battle with Apple Computer, Inc. over the copyrightability of operating systems and of computer programs embedded in read-only memory (ROM).

At a hastily called news conference here on Wednesday, Franklin President Avram Miller announced that his company, a maker of Apple-compatible microcomputers, had agreed to pay Apple $2.5 million to settle the dispute. In addition, Franklin agreed to accept the validity of Apple's copyright claim on its operating system software and to stop copying the Apple programs.

In accepting the settlement, Miller said Franklin was accepting "as law" the September decision of the Third Circuit Court of Appeals, which ruled that copyright protection extends to operating systems as well as to applications programs (CW, Sept. 12).

The appeals court decision had overturned an earlier lower court ruling that denied an injunction against sales of the Franklin ACE series of microcomputers.

Question remains unresolved

The settlement also means that Franklin has dropped its plans to appeal the case to the U.S. Supreme Court. As a result, the question of the copyrightability of ROM-based programs remains unresolved, according to legal experts contacted last week by *Computerworld*.

"One of the reasons we wanted to settle was that we felt we were in a lose-lose situation," Miller said. "The longer we pressed our case, the more we felt we would hurt not only ourselves, but Apple and the software industry."

In Cupertino, Calif., an Apple spokeswoman hailed the out-of-court settlement as "significant not only for us, but for other computer and software manufacturers who need [copyright] protection to design new technologies and products."

Not 'expressions of idea'

Franklin had originally argued that operating systems could not be copyrighted since they are not the "expressions of an idea" required by copyright law.

The company contended that the silicon chips holding the operating programs are useful devices rather than "expressions" and thus cannot be "understood."

As part of the settlement, Franklin has been given until April 1 to stop manufacturing computers with software copied from Apple. After then, the Cherry Hill, N.J.-based vendor can sell Apple-compatible boxes only with an operating system of its own devising.

Miller said Franklin had decided to give up its case against Apple, even though it had asked the U.S. Supreme Court to hear arguments from both sides, because the company is close to bringing its own operating system to market. "If we felt we couldn't do that, we wouldn't have settled," he said.

Miller was vague, however, when asked when the market could expect the Franklin operating system. And he would disclose neither the cost nor the time spent to develop the new operating system code.

Asked how the Apple and Franklin operating systems would differ, he replied that Franklin's operating system "implements the same functions [as Apple's] in a different code." He declined to elaborate.

In Cupertino, the Apple spokeswoman said her company had not yet studied the Franklin operating software, but noted that the out-of-court settlement provides for arbitration of future copyright disputes between the two firms.

Neither she nor Miller, however, would say anything more about the arbitration process.

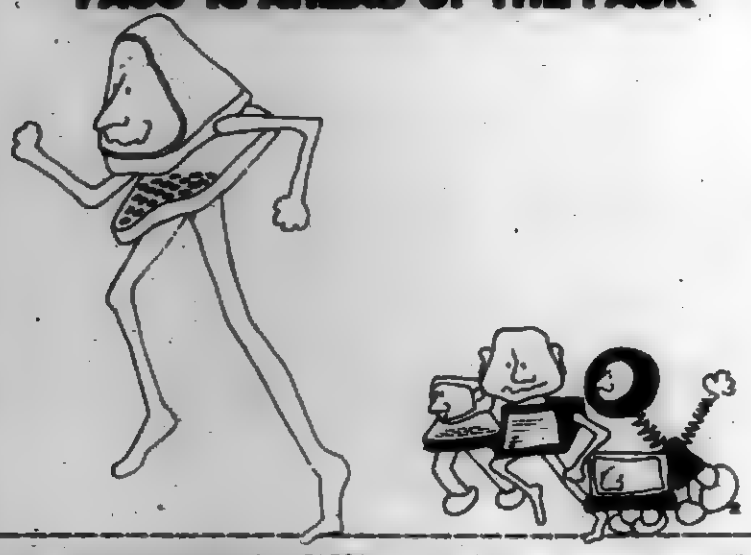
'We'll still be competing'

Asked if he considered the settlement a defeat, Miller replied, "I'll trade a legal victory for a victory in the market. We'll still be competing with Apple — just not in court."

Miller said the $2.5 million his company agreed to pay Apple is "something I'd rather not spend, but it's not a financial drain" on the firm. A source close to the micro vendor said Franklin had set aside as much as $5 million of its recent $11 million private fund-raising issue to cover the cost of any settlement with Apple.

Asked if Franklin had thus gotten off cheaply, Apple's spokeswoman declined to comment.

FOR VAX™ RESOURCE ACCOUNTING, PACS™ IS AHEAD OF THE PACK



The competition isn't even close. PACS is so good, it's the only resource accounting package in DEC's™ EAS library. Here's why:

- Flexible billing algorithms
- User budgeting and port speed accounting
- EZLOG™ for true 3-level reporting by account, project and user

Name _____
Title _____
Company _____
Address _____
City _____ State _____ Zip _____
Phone ( ) _____

SEND COUPON NOW FOR COMPLETE DETAILS ON ALL THE PACS BENEFITS

STI Signal Technology, Inc.
5881 Encina Road, Goleta, CA 93117 (805) 683-3771 Outside California call toll-free (800) 235-3707
TWX 910-334-3471
VAX and DEC are trademarks of Digital Equipment Corporation

Portables on planes under probe

By Lynn Haber
CW Staff

WASHINGTON, D.C. — A federal advisory committee for the airline industry has begun studying whether high-technology devices such as portable computers brought on board an airplane interfere with the aircraft's electronic equipment.

The committee on "Potential Interference to Aircraft Electronics Equipment From Devices Carried Aboard" is a result of the first meeting of the Radio Technical Commission for Aeronautics (RTCA), held this past November. RTCA, a nonprofit organization sponsored by government and industry, had been approached by Eastern Airlines to look into possible interference problems.

"In recognition of the fact that the airplanes themselves are getting more complex and heavily computerized, and these personal computers do represent a significant advance in state-of-the-art technology, we thought it was best to find out if there is a need for caution regarding their use in common operating areas on board the aircraft," explained Jim Ashlock, spokesman for Eastern Airlines. Eastern has banned the use of personal computers on board aircraft.

The RTCA plans first to look into how the passenger-operated devices affect the aircraft antennas. That testing will be undertaken by members of the airframe industry, according to Rod Jago, technical staff officer for RTCA and secretary of the special committee.

"Boeing [Co.] has volunteered, and we're asking McDonnell Douglas [Corp.] and Lockheed [Aircraft Corp.] to do some testing. We've also asked some airlines to do testing. The Federal Aviation Administration [FAA] will be asked to do some testing on their 727," Jago said.

The second phase of testing will examine what type of radio frequency spurious emissions escapes from a variety of devices. (Interference caused by escaping radio frequency energy can be seen on a home television screen in a neighborhood where someone is operating shortwave radio equipment, for example.) Some computer industry representatives who attended the RTCA meeting, including Tandy Corp., Apple Computer, Inc. and Hewlett-Packard Co., volunteered to test computer equipment, according to Jago.

"One of the things that will hopefully come out of this study is a standardized type of procedure among airlines which will help not only the people who want to use these types of devices, but also the airlines themselves," Jago said. "We'll also be able to develop some kind of listing of acceptable and not acceptable devices when used under certain situations."

The committee made no recommendation to ban the use of carry-on personal computers aboard aircraft, although an interim recommendation to ban the use of portable computers during takeoff and landing was suggested.

"The committee felt that a ban would be premature because at the present time we really don't have any documented, first-hand evidence that there is a problem," Jago said.

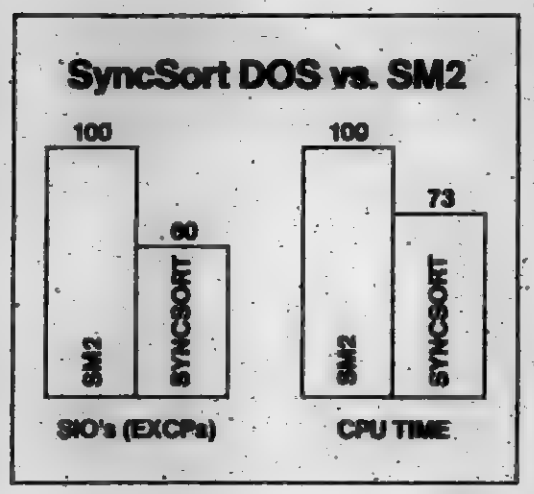
The FAA does ban the use of transistor FM radios on planes, because the band frequency on some FM devices is close to the aircraft's communications band.

IN-LAWS

Smile, IBM. New SyncSort DOS is the perfect mate for your 4300 series!

Call (201) 568-9700.

Meet our new DOS/VS(E) release.



High performance computer without high performance sort program like bride without groom—expectation without fulfillment.

—Old Chinese Proverb.

* * *

You say you just got this brand-new 4300 ? It's got big blue eyes, great price-performance curves and nifty disk drives? Now you're thinking about marrying it to IBM's 5746-SM2 sort program?

Well, don't do it pardner! The groom is definitely too old for the bride. Like IBM's other DOS sorts, SM2 is a hangover from an older generation of sorting technology.

There's only one sort around that's really fit for the hand of a glamorous new 4300 computer. And that's the latest release of SyncSort DOS. It's perfect for DOS/VS(E) and its new Fixed Block Architecture and VSAM type of data. Here's what SyncSort DOS can bring to the marriage:

1. BETTER PERFORMANCE. The first release of SyncSort DOS—back in 1978—incorporated many of the breakthroughs we made in OS sorting. Since then, in numerous releases, we've steadily cut the amount of resources that go into sorting. The new release carries on that old family tradition. Compared to SM2, SyncSort uses up to 50% less CPU Time and up to 70% fewer SIOs.

2. BETTER PROGRAMMER PRODUCTIVITY. SyncSort DOS has a host of features to cut the amount of programming time that goes into applications. You can often reduce the amount of time required for simple reports from five programmer days to one programmer day simply by using these features. They can:

- select relevant records;
- perform summaries on designated numeric fields;
- reformat records on output;
- insert character strings;
- convert numeric data to printable characters (including editing);
- produce reports divided into logical pages with headings, pagination and dating—and much more.

3. BETTER CUSTOMER SERVICE. We have the smartest Tech Service people in the business and the best and fastest service. About 85% of all requests for service are resolved within 24 hours. Try us and find out for yourself.

So if you'd like to match that phenomenal new computer with the perfect mate, give us a call. We'll send over one of our matchmakers to give you a personal demonstration.

Once you've seen SyncSort DOS in action, we don't think it'll be long before you call us with a familiar request: "Play it again, VSAM!"

syncsort INC.

Syncsort Incorporated 560 Sylvan Ave., Englewood Cliffs, N.J. 07632

NEWS

Plan would widen FBI electronic surveillance

By John Gerstner
CW Washington Bureau

WASHINGTON, D.C. — A proposal to expand the Federal Bureau of Investigation's electronic surveillance of noncriminals has fueled congressional efforts to develop legislation regulating the bureau's computerized criminal records system.

The proposal, now under consideration by the National Crime Information Center (NCIC) policy advisory panel, would expand the FBI-operated interstate records exchange network to include separate files on "associates" of certain types of criminals. These include drug traffickers, terrorists, foreign espionage agents and members of organized crime.

The idea came from the policy board's planning and evaluation committee at the board's meeting in Denver last October. According to Board Chairman Fred H. Wynbrandt, the four proposed new files were among several suggested by the subcommittee.

Wynbrandt said the ideas were put forward in "a brainstorming session" on ways to make the NCIC more helpful to law enforcement officers. He said another proposal, to include information on persons known to be associated with wanted persons, was "rejected out of hand" by the board as "beyond where the policy board wanted to go, way beyond."

Wynbrandt, who is assistant director of the Criminal Information and Identification Branch within the California Attorney General's Division of Law Enforcement, said the board is sensitive to fears the NCIC might become too involved in intelligence-gathering on noncriminals. "We're concerned about privacy, security and individual freedoms," he asserted.

Nevertheless, the proposal has alarmed Capitol Hill critics of NCIC operations, who last year unsuccessfully opposed an FBI decision to turn what was originally a record system into a national surveillance system. Last April the Secret Service included on the NCIC system a file to monitor the activities of some 125 persons that the service fears may threaten the president and other protected persons.

FBI authority questioned

At the time, Rep. Don Edwards (D-Calif.), chairman of the House Judiciary Subcommittee on Civil and Constitutional Rights, which has jurisdiction over the NCIC, insisted the new file was outside existing FBI statutory authority and required new legislation. The FBI disagreed and got the support of the full Judiciary Committee, which was convinced by arguments the file was necessary to protect the president.

Since then, Edwards' subcommittee and its Senate counterpart, the Judiciary Subcommittee on Patents, Copyrights and Trademarks, have been exploring the possibility of legislating guidelines for the system's record quality and for access to the system by non-criminal-justice persons.

Congress' Office of Technology Assessment reported last year that a high level of record errors reduces the effectiveness of the NCIC. Access is also a long-standing problem, because in some states anyone can obtain NCIC records, meaning sensitive and possibly inaccurate data can be disseminated beyond the control of law enforcement authorities.

The Edwards' subcommittee plans to hold hearings on the new associate's file proposal in late February or early March. According to a subcommittee staff attorney, the proposal concerns Edwards, who attended the October policy board meeting, because the NCIC is authorized to collect, maintain and exchange only criminal data "that is a matter of public record somewhere."

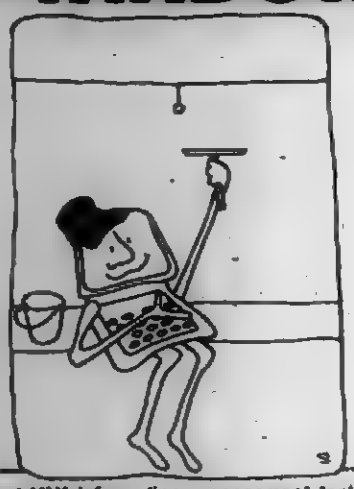
Investigatory and intelligence data, however, while legitimately maintained by individual law enforcement units, should not be available on a police information system, the attorney said. He explained, "It could result in a national surveillance system for exchange of information that is derogatory and that has not been tested in court and will in fact be used against a person."

Steven J. Metalitz, staff director of the Senate subcommittee, said the panel is aware of the proposal for the associate's file and will take a closer look at it if it progresses beyond the discussion phase. He said the subcommittee "would be skeptical about [the proposal] if there is a real danger of turning the system into one that is more intelligence-oriented."

Surveillance uses of the NCIC, such as those proposed in October and the existing Secret Service file, are "inconsistent with other [record exchange] uses of the NCIC," he said.

Besides congressional opposition to the proposed files, there remains considerable work that must be completed before they can be implemented. Regional groups of the policy board, which represents NCIC users, are now considering the new files. If approved on this level, the proposal must still receive final board and FBI endorsement.

MAKE YOUR VAX™ DO WINDOWS



SMARTSTAR™ is the first VAX information management tool that creates multiple window applications—and can scroll your screen to 480 lines. The SMARTSTAR family includes:

- SMARTDESIGN™ for designing applications without programming
- SMARTQUERY™ for powerful, easy-to-use application processing
- SMARTCALL™ when VAX host programming is required
- REQUEST for integrated report and query

Name
Title
Company
Address
City State Zip
Phone ( )

SEND COUPON NOW FOR DETAILS AND JOIN THE 4TH GENERATION

Sigma Technology, Inc.
3301 Exeter Road, Goleta, CA 93117 (805) 683-3771 Outside California call toll-free (800) 235-4780
TWX 910-334-3471
VAX is a trademark of Digital Equipment Corporation

NYC computerized tax program collects $40 million from evaders

NEW YORK — A computerized tax program designed to catch up with individuals and businesses which have evaded city tax payments has resulted in the collection of millions of dollars here.

Operating since July 1981, the Taxpayer Automated Compliance System (Taca), run by New York City's Tax Division, has aided in the collection of more than $40 million from over 55,000 persons and firms.

By using a system that matches various types of files, the city has been able to detect evaders of commercial rent tax, unpaid business income tax and delinquent individual taxpayers. "We take existing city or state files and match them against our tax files," explained Umberto Dindo, director of Taca.

The initial tax project, aimed at evaders of commercial rent tax, brought in approximately $20 million alone from over 100,000 businesses.

The City Tax Division employs 30 people to run the program and mails an average of half a million letters per year, according to Dindo. "The initial match — the big one where we also had to create the files, the online system and so on — was costing about 10 cents on the dollar," he said. "But in the meantime, we've run the program over and over again, and we're down to an average of four to five cents on the dollar, which includes software, computer time, postage and clerical time."

A spin-off of Taca is to detect and follow up delinquent taxpayers, including those who have never filed returns. "Everything from the initial questionnaire all the way down to the warrant is being produced by that program," Dindo said.

The Taca program and all the associated software were developed by the data processing division for the tax department. The tax department uses two IPL Systems, Inc. 4446 computers with 4M bytes of memory.

"We are constantly developing new programs for the match because we have not done every match we would like to do," Dindo said.

CORRECTIONS

"Venture Unveils Service Merging Payroll, Personnel" [CW, Dec. 12] incorrectly stated the name of one of the vendors involved in the agreement. The service is a joint venture between Chemical Bank and Information Science, Inc.

The correct price of "Computer Access Security Report" [CW, Dec. 12] is $1,495. It is available from Federal Engineering, P.O. Box 2498, Gaithersburg, Md. 20879.

"'Valu Lib' Update Released for IBM 4300s, Series/36" [CW, Dec. 19] incorrectly identified the host computers required by Valu Lib. The product runs on IBM 4300 series and 30 series mainframes under IBM's MVS and VSI operating systems.

"Maestro" is the correct spelling of the product from Softlab Systems mentioned in the letter to the editor written by Robert Gregory [CW, Dec. 26/Jan. 2].

DEC pays $3.2 million to settle GSA claims

By Bill Laberis
CW Staff

Digital Equipment Corp. last week said it has paid the U.S. government $3.2 million to settle claims lodged against it by the Government Services Administration (GSA).

The claims, in which the Justice Department alleged DEC had defrauded the government in the sale of $70 million worth of computers in the late 1970s, were settled without DEC's admitting or the government's proving any wrongdoing on the part of the Maynard, Mass., company. However, a government spokesman said the settlement does not diminish the allegations of fraud made by the Justice Department, even though the department will not pursue court action.

"It was the government's assertion that the mispricing of data, which initiated our investigation, was the result of fraud," said Robert Ashbaugh, assistant director in the commercial litigation branch of the Justice Department. "At the same time, it could very well have been simply the kind of dispute that would involve a breach of contract.

"We really gave up our right to prove or to say, with any degree of specificity, that [DEC] was guilty of fraud when we settled the case," Ashbaugh continued.

A DEC spokesman strongly denied the allegation of fraud, saying instead that DEC complied fully with its contractual obligations and requirements in its dealings with the GSA and other government agencies. "Perhaps more than anything, this matter points up the complexity and difficulty in dealing with the government," the spokesman said.

According to the Justice Department's Ashbaugh, the $70 million deal with DEC was part of a so-called multiple award contract, wherein the GSA certifies several vendors as appropriate and the various federal agencies can then choose among the certified vendors to fill equipment needs. Inherent in this procedure is the understanding that the government is entitled to most-favored customer status, guaranteeing it the best (lowest) price, Ashbaugh said. The GSA certifies that the government is getting the best price by scrutinizing purchase orders that the certified vendors have filled for other commercial customers.

It was the government's contention that DEC did not furnish GSA all the paperwork it should have and, thus, submitted a price schedule that was higher than it should have been — several million dollars higher.

The DEC spokesman said that the government was given all the documentation it had requested. But he said further that the nature of government procurement makes it virtually impossible to make the absolute best deal with government agencies.

For example, he said, the government demands that the shipping and transit insurance fees be paid for by the vendor. And government agencies can take up to six months to evaluate a machine before paying any part of the cost.

"Under those conditions, it's hard to see how the government is going to be entitled to the best discount available," the DEC spokesman said.

Both DEC and Ashbaugh called the $3.2 million settlement fair. The government would not say whether the payment included any penalty, characterizing it only as a lump sum payment.

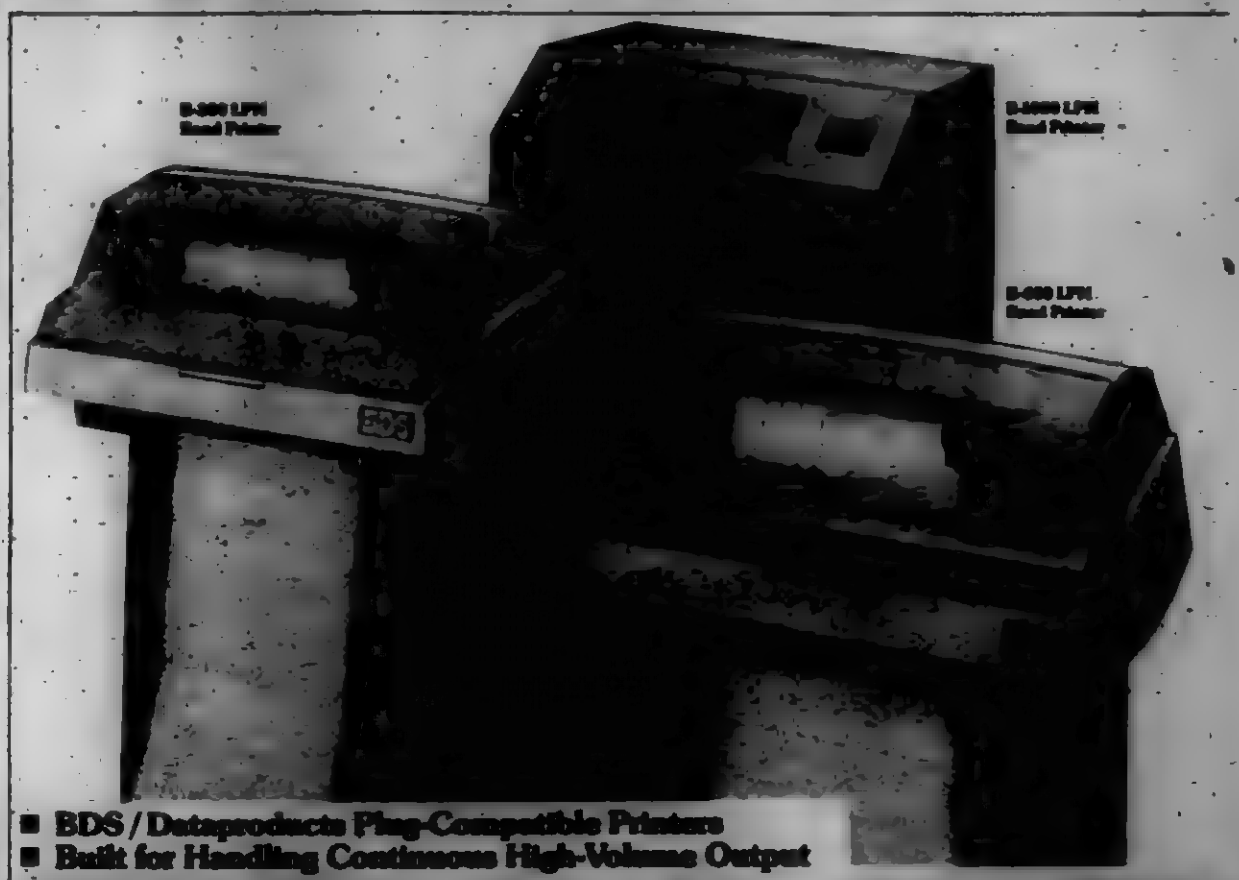
Hitachi execs fined $10,000

SAN FRANCISCO — A federal judge here has slapped a $10,000 fine on two Japanese computer company executives who recently pleaded guilty to charges of conspiring to transport stolen IBM systems technology from the U.S. to Japan.

U.S. District Court Judge Spencer Williams fined Hitachi Ltd. executives Kisaburo Nakazawa and Takehiro Inoue for their role in a widely publicized trade-secrets theft case involving IBM and two of its Japanese competitors. The two, both 45, are employed at Hitachi's Kanagawa Works hardware development facility in Japan and hold the titles of general manager and department manager, respectively.

Nakazawa and Inoue were among nine Hitachi employees indicted during the summer of 1982 for participating in a Japanese scheme to steal numerous IBM trade secrets, including MVS/SP Version 2 source code and hardware designs for the 3081. To obtain the highly confidential IBM property — which was later recovered after the plot was exposed — Hitachi paid more than $600,000 to Federal Bureau of Investigation agents posing as electronics black marketeers.

For months after news of the arrests broke, the Hitachi defendants refused to answer summonses, but Nakazawa and Inoue recently entered their pleas in federal court.



■ BDS / Dataproducts Plug-Compatible Printers
■ Built for Handling Continuous High-Volume Output

IBM · DEC · HP
BURROUGHS BDS

■ Since 1975, the Largest Independent Supplier of Plug-Compatible Printer Systems
■ Over 5,000 Systems Installed
■ Complete Line of High Quality Daisy Wheel, Matrix and Band Printers. 55 CPS to 2000 LPM
■ 30-50% Savings
■ Quick Delivery (30 Days or Less)
■ Reliability Built-In (BDS Controllers and Interfaces)
■ Low Maintenance Cost
■ TRW Nationwide Service
■ Price Includes Installation and 90 Days Parts and Labor Warranty

I would like more information on plug-compatible printers
☐ 55 CPS Daisy Wheel Printer
☐ 55-300 CPS Matrix Printer
☐ 300-2000 LPM Band Printers
Name
Title
Company
Address
City State Zip
Phone ( )

(510) 656-8116
BDS Corporation
600 Thomas Ave.
Mountain View, CA 94043
U.K. (734) 768585 Australia (03) 543-3366

VM/SP Printer Roulette

Round and round it goes, where it prints nobody knows!

The stakes are high: Your corporate information. The game is fixed: You have little control of your print files or small printers.

Stop gambling. Stack the odds in your favor. The ACX-PM™ Printer Manager gives you complete control and management of your 326X, 328X, and ASCII printers.

No risk, 30-day free trial.

For more information, drop us your business card.

ACX

Advanced Computer Extensions, Inc.
5120 Belmont Road, Suite B
Downers Grove, Illinois 60515

or for faster access, (312) 971-1505.

Software aids crackdown on trade in stolen goods

LOUISVILLE, Ky. — Armed with a computer program that they developed themselves, a veteran police detective and a data processing department joined forces in a crackdown on thieves who sell and pawnshops that buy stolen goods.

The program that runs on Jefferson County Police Department's IBM Series/1 minicomputer lets Detective Bob Roby review in minutes data that once took hours, even days. The program has helped him recover $55,000 worth of stolen property, clear 71 burglaries and make 58 arrests between February and December of '83.

On the pawnshop detail for the 600-member police force that covers the area surrounding Louisville, Roby hands out 3- by 5-in. cards asking pawnbrokers, jewelers and gold dealers to record the names, addresses, thumbprints and other data about people who sell them items. But last January, with the cards building up at the rate of several hundred per week, Roby sought help from Sgt. Phil Miller, who handles data processing and telecommunications for the department.

"I figured that if I had a computer, I could serialize things and be able to go back and check out whether an individual was selling a lot of one type of item, say, shotguns. Then we could check him out. I not only needed to know who was selling them, but needed the serial numbers, too.

"A lot of people don't keep serial numbers, so I needed a way to help them identify their stolen property," Roby said.

Days to develop

Miller used a Series/1 utility known as Prompt, produced by Mid/American Control Corp. of Shelbyville, Ky., to write a program for Roby's project. "It wasn't that hard to do," Miller recalled. "It only took a couple of days to develop and a week to test it."

Now Miller and his civilian assistant, Janice Carter, transfer Roby's data from cards onto diskettes each week. The minicomputer produces a printout, now five inches thick, cross-referencing the data by item, seller's name and pawnshop.

Roby hopes to have his own terminal or IBM Personal Computer soon to input directly into and access the Series/1. "It's been more successful than we ever dreamed. We haven't even begun to scratch the surface with the computer. Other detectives are always asking for my information, and I know we'll be able to do still more once we get our own computer and get it loaded," Roby maintained.

Primary job

Meanwhile, Miller reported that the pawnshop program is only one relatively minor task for the Series/1. The computer's primary job is keeping crime, incident and activities statistics for the department and training records. A typical use is the study of selective enforcement, where the computer is used to show what impact increased police presence has in a particular neighborhood.

One program, now being tested, that Miller developed using Prompt will catalog sex crimes, sex offenders and violent criminals so detectives can identify potential suspects by inputting individual characteristics of a crime.

The police department, which utilized general county data processing services until 1981, paid about $65,000 for its computer and software. It now spends $68,000 per year for data processing, compared to $320,000 annually when it was part of the county network.

No other 3270 protocol converter can match all these features.

Since 1977, hundreds of companies all over the world including Bell Labs, Citicorp, ITT, Liston, Westinghouse—have used Local Data products to make IBM communications easy and inexpensive.

We believe the DataLynx™/3274 is the best price/performance 3270 protocol converter on the market.

So, before you buy any other protocol converter at any price, compare the DataLynx/3274 features first. Then decide.

- SNA/SDLC or BSC protocols supported. SNA is PU type 2.
- BSC for EBCDIC and ASCII.
- 16 bit, 8 MHZ Intel 8086-2 CPU.
- Auxiliary printer support allows each async port to have a separately addressable 3287 type printer. This feature enables dial users to combine CRT and print data over one dial-up line.
- 80 types of ASCII async display terminals can emulate IBM 3278 display stations, and ASCII async printers to emulate IBM 328X printers.
- Micro to main-frame support with our FileLynx™/3278 program for the IBM PC and PC compatibles supports terminal emulation and file transfer (upload/download).
- Hard copy KSR support with our "Paper/3278".
- Unique "paging" feature supports emulation of all models of the 3278 display station.
- Pseudo-transparency feature allows host application to transmit character and control codes to async terminal devices (e.g. graphics terminals, graph plotters, mini-computers, high-speed printers with down-loadable forms control units).
- "Compu" support for micro, mini and instrumentation computers as terminal devices.
- Dual host support.
- PROM cartridge for easy user upgrade of firmware.
- Powerful, friendly configurator mode, using menus to allow parameter definition for sync ports, logical units, async ports and terminal characteristics, including help utility.
- Configuration values saved in non-volatile EEPROM.
- Monitor mode displays current status of all ports and logical units.
- May be connected to a host directly (in modem eliminator mode), or via modems on a dedicated multipoint or point-to-point line (dial-up or dedicated), via RS-232C sync ports.
- Data rates to 19,200 bps (sync & async).
- Async ports may be configured for any of 15 fixed bit rates or "autobaud", with or without parity checking, and with a specified character format.
- Simple DTE/DCE change on all ports.
- Flow control on async ports may be configured for physical and/or logical signalling.
- Virtual device support enables reconnect of dial users independent of physical port.
- Security through dual level password protection.
- Emulation of standard 3278 keyboard functions is tailored for each supported terminal type.
- 25th status line emulation.
- SAS graphics support.
- Base color support.
- 3278-5 (27 x 132 character screen) support on 9 channels with memory expansion option.
- LU configurator options provide support for various screen formats and printer page widths.
- Front panel includes 33 function status indicators.
- Self-test of channels, memory and firmware integrity is performed continually in background mode assisted by a "watchdog" timer.
- UL and FCC approved.

For more information about the remarkable DataLynx/3274 protocol converter, call or write today. And ask about our 30-day free trial program.

Local Data
DATALYNX/3274

Local Data
"Your Lynx to IBM."

LOCAL DATA • 2701 Toledo Street • Suite 706 • Torrance • CA • 90503 • Telephone (213) 320-7126 TLX 182518

Array processors gaining appeal

PRODUCT SPOTLIGHT

By Tom Henkel
CW Staff

Serious scientific processing was once a task reserved for big, wealthy users of very large mainframes — oil exploration firms, defense organizations and weather-tracking institutions, for example.

Led by the booming medical imaging field, however, more users of superminicomputers and low-end mainframes have turned to stand-alone array processors to help them process computer-intensive applications like simulation, signal processing and computer-aided design.

The concept of array processing is not new. Scientists have known for some time that certain computer applications, typically those involving large blocks of mathematical data, can be processed much faster than one calculation at a time can be processed. That is basically what an array processor does: breaks up a problem, or series of problems, and puts mathematical operations into groups, or arrays. With data in that format, a processor is capable of performing multiple additions, subtractions or divisions at one time.

Array processors themselves are not new either, at least not by computer industry standards. Most of the major players in the stand-alone array processor market have been around for at least five years.

Array processors are architecturally similar to supercomputers, the multimillion-dollar processors that typically handle mammoth programs like nuclear research and meteorological forecasting. The major differences between supercomputers and array processors are cost and speed. Supercomputers currently can execute upward of 100 million floating-point operations per second (Mflops). Supercomputers recently announced by the Japanese firm Nippon Electric Co. (NEC), for example, boast a throughput of 300 Mflops; Control Data Corp. claims its top-of-the-line Cyber 205 can execute some 200 Mflops.

Array processors, in contrast, are much slower. Currently, the most powerful array processors, such as the top-of-the-line models from Star Technologies, Inc. and Floating Point Systems, Inc., offer a maximum throughput of some 100 Mflops. Most other array processors operate considerably slower, about 5 to 50 Mflops, according to Jeffry Canin, a technical analyst with the San Francisco investment banking firm of Woodman, Kirkpatrick & Gilbreath.

But if array processors are considerably slower than supercomputers, they are also considerably less expensive. Supercomputers typically cost upward of $7 million. Array processors tend to cost less than $200,000, with some units costing as little as $5,000.

With the right application, array processors can improve the calculation of a general-purpose minicomputer by a ratio of 50:1 or 1,000:1, claimed Business Development Group, Inc., a market research firm in Stanford, Calif., in a recently released report on the array processor market.

But array processors are not for everyone. Like supercomputer users, the array processing community is a very sophisticated lot. Applications tend to be very specialized, and not much packaged software is available for array processors, Bob Hausman, vice-president of development at Star Technologies, point-

See ARRAY page 12

STAND-ALONE ARRAY PROCESSORS FOR MEDIUM-LARGE SYSTEMS

Vendor[1]	Model	Maximum Address Spike (Word Size)	Compatible Processors	Price[2]
Analogic, Inc. Audubon Road Wakefield, Mass. 01880	AP500	32 Bit	Digital Equipment Corp. PDP-11	$95,000
Computer Design and Applications, Inc. 377 Elliot St. Newton, Mass. 02164	MAP	24-Bit Floating Point	DEC PDP-11 and LSI-11	$12,500 - $19,900
Computer Signal Processing, Inc. 40 Linnell Circle Billerica, Mass. 01821	Map 200, Map 300	38-Bit Floating Point	DEC PDP-11; Data General Corp. Nova, Eclipse; Gould, Inc. SEL Systems; Raytheon RDS 500, 704; Prime Computer, Inc. 400, 500; Hewlett-Packard Co. HP 2100; Harris Corp. Processors	$22,500 - $36,000
	Mini Map	38-Bit Floating Point	DEC PDP-11	$14,700
Floating Point Systems, Inc. P.O. Box 23489 Portland, Ore. 97223	AP 120B AP 190L FPS-1000 FPS-5000	38-Bit Floating Point 38-Bit Floating Point 38-Bit Floating Point 38-Bit Floating Point	DEC PDP-11; DG Nova, Eclipse; Gould SEL; Raytheon RDS; Prime 400, 500; HP 2100; Harris Minicomputers; IBM Mainframes; Sperry Corp. Mainframes; Control Data Corp. 6600	$18,500 - $28,000
Marinco, Inc. 11760 Sorrento Valley Road San Diego, Calif. 92121	3000	24-Bit Floating Point	Intel Corp. Multibus, DEC Q-Bus	$4,250
Numerix, Inc. 320 Needham St. Newton, Mass. 02161	432	32-Bit Floating Point	Stand-Alone	$75,000
Signal Processing Systems, Inc. 223 Crescent St. Waltham, Mass. 02154	SPS	16-Bit Fixed Point or Floating Point	DEC PDP-11; DG Nova, Eclipse; Modcomp Minicomputers	$60,000 - $80,000
Sky Computers, Inc. Foot of John St. Lowell, Mass. 01852	Skymark	32 Bit	DEC Q-Bus, Intel Multibus	$6,000
Star Technologies, Inc. 1200 Benjamin Franklin Plaza Portland, Ore. 97258	ST-100	32 Bit	IBM Mainframes DEC VAX 11/780	$250,000
Stein Associates, Inc. 280 Bear Hill Road Waltham, Mass. 02154	AP/10	16-Bit Fixed Point or Block Floating Point	DEC PDP-11; DG Nova, Eclipse	$80,000 - $150,000

[1]The Top 10 Array Processor Vendors in Terms of Sales
[2]For a Basic System Configuration

Source: Business Development Group, Inc.

Array processors found prevalent in CAT scanning

STANFORD, Calif. — Who's using array processors? A market research firm here believes it has identified the most likely markets for array processor use.

Perhaps the hottest market today for array processors is in medical imaging, according to Business Development Group, Inc., a market research firm here, which recently released a report titled "Array Processor Market Report."

The report noted that the array processor market has jumped from $10 million in 1977 to about $130 million in 1982. Hospitals, research foundations and laboratories use array processors for computer-aided tomography, more familiarly known as CAT scanning. This application uses the array processor to analyze X-ray data to generate pictures of body tissue.

Graphics artists also use array processors, as do textile designers and photograph printers, who employ array processors to manipulate patterns, photos or text to create a master plate for printing.

Oil exploration and service companies use array processors for seismic exploration, well logging and electromagnetic surveys. Array processors are used to evaluate mechanical or acoustic signals sent into land masses or the sea. The application is similar to a CAT scan, but earth masses instead of tissue are being evaluated, the report noted.

Linear programming

Businessmen and production managers, specifically those involved with mining, timber harvesting and transportation, can make use of array processors for linear programming — manipulating complicated arrays of numbers to optimize yields. The array processor can evaluate variables including time, capacity and market prices, the report noted.

Array processors are used for applied research at various universities, foundations and government agencies. Since much research involves sophisticated image- or signal-processing applications, basic research is a catchall category for array processor use, the report said.

The military is also a big user of array processors for such applications as pattern recognition, cartography, robot-controlled ordnance and navigation systems. Array processors can also be used to evaluate satellite data and radar images.

Many organizations, including the government, banks, operators of private data links, point-of-sale networks and oil companies, would like to use voice processing. Array processors can help to secure data transmission and to encrypt and identify voices by manipulating signals, the report said.

In addition, array processors can be used for complex computer-aided design (CAD) applications, such as circuit design. They can also be used for process-control applications such as monitoring many remote sensors

See BCA page 12

#1
VisiCalc®
For TSO or VM/CMS
DYNACALC™
FASTER THAN THE COMPETITION!
• More mainframe features • External file support
FOR A FREE 30-DAY TRIAL CALL:
(312) 525-6400
Chicago Soft
730 N. LaSalle, Suite 2 Chicago, IL 60610
*VisiCalc is a registered trademark of VisiCorp. VisiCorp is not associated with Dynacalc.
**Dynacalc is owned by Dynasoft Corp.

THOUSANDS OF SOFTWARE PROGRAMS ARE GATHERING IN NEW ORLEANS.
SOFTCON
SOFTCON EXHIBITORS

NEWS

ARRAY from page 11

ed out. Many users prefer to develop their own software for array processors, he added.

Canin, however, said that while the amount of packaged software for array processors is miniscule when compared with, for example, packaged software for the IBM mainframe market or the microcomputer market, there are software packages available for popular array processors which offer a basic set of algorithms. Users can customize those algorithms to suit specific applications. Among these packages are Nastran, a structural analysis package, and Spice, a standard circuit design package. Both are produced by Macneal-Schwendler Corp.

Like the applications for supercomputers, most applications for array processors are developed in Fortran. Because Fortran is somewhat more difficult than the so-called "user-friendly" languages available for file-oriented processors, not everyone is capable of using an array processor.

But according to Star Technologies' Hausman, an entire corporation does not require access to an array processor. In fact, only some applications employ a sufficient level of computations to run efficiently on an array processor. Some applications can actually be executed faster on a standard commercial processor.

Array processor users typically access the unit through a front-end processor, such as a supermini or mainframe. But Hausman noted some array processors can accommodate a microcomputer at the front end.

Some array processors can be configured with their own memory, while others share memory with the front-end processor. Sharing memory with the front-end processor boosts the speed of the array processor if it must frequently access information from the front-end processor, Canin said.

Since not all applications are suited for array processing, there must be some way to determine which programs should be sent to the array processor and which should remain in a file-oriented system. For some applications, the decision is easy, especially for the sophisticated users that typically use array processors. But for those cases in which the user is unsure whether the application will efficiently support array processing, Hausman said, there are precompilers, such as the Vast produced by Pacific Sierra, Inc., which help evaluate applications before submission to an array processor.

What makes a firm decide to buy an array processor? According to Lester Gerhardt, a computer scientist at Rensselaer Polytechnic Institute in Troy, N.Y., time is often the major criterion. Some applications are so complex and so computer-intensive that they take an extremely long time to process on a conventional mainframe or superminicomputer. If a firm has enough of those applications, buying an array processor is a logical choice. An array processor is often less expensive than adding the extra file-oriented processors to speed up processing significantly.

SCANNING from page 11

and making production decisions and for nondestructive testing applications, the report noted.

What does the future hold for the array processor market? According to Business Development Group, decreasing costs for both minicomputers and array processors will make more minicomputer users willing to buy array processors.

In addition, applications such as CAD and computer simulation are becoming more popular. Since both applications require a high degree of computing power, more users of minis and low-end mainframes will find themselves forced into buying a stand-alone array processor to go along with their current systems.

The report costs $1,500 and is available from Business Development Group through P.O. Box 3044, Stanford, Calif. 94305.

It was DP business as usual after Boston hotel fire

By James Connolly
CW Staff

BOSTON — Although a smoky electrical fire injured 65 people, caused $500,000 in damages and cost millions of dollars in lost revenues, the data processing department at the Westin Hotel here barely missed a step.

The Jan. 2 fire disrupted the hotel's main and emergency power supplies and closed the building for several days at an estimated loss of $1 million a day in revenues. But less than 24 hours after the mid-day fire drove 120 guests and hundreds of employees to the street, the data crucial to operating the "fully automated" luxury hotel — safely stored on diskettes — was being processed to meet payroll and end-of-month and end-of-year accounting deadlines.

Amid adversity, it was business as usual in the computer room. "We are very fortunate," said Systems Manager Dennis Nixon. "When the power went off, everything crashed. But I turned a key in a box on the wall for the backup power supply, and we were up again in no time at all.

"We did a complete back-off, and I took all of the software out in a box and brought it home with me for safekeeping for the night."

Nixon noted that his systems assisted in evacuating the hotel; rescuers were armed with printouts, produced every four hours, indicating the names of guests and the occupancy of each of 700 rooms.

"A lot of people are intimidated by computers. I think that after this experience, they won't be anymore, at least not in this hotel," Nixon concluded.

Backup power at work

As electrical crews worked last week to restore power, front desk clerks shivered without heat in a lobby lit by emergency lights and an oil hurricane lamp, helping guests relocate and recover luggage the day after the fire. But five floors above in the administrative offices, Nixon's dedicated backup supply provided power for IBM and NCR Corp. systems and four table lamps. In addition, accounting department personnel moved in to use Nixon's power for calculators to complete their monthly and annual reports.

Nixon said he was not using several systems, partially because he was unsure how much power was available. But, he added, his main reason for idling much of the equipment was that there were no guests and few employees to service.

The basement fire was caused by a short circuit in a switching room, according to fire officials. The blaze burned cables for the regular and emergency power supplies. But the emergency supply for the computer center was independent of both central systems.

The 37-story hotel, which opened last June, uses two IBM System/36s, two IBM Series/1s and two NCR 2160 minicomputers. The systems not only handle administrative tasks such as payroll and accounting, but provide on-line service to the hotel restaurants, housekeeping department, front desk, reservations office and other departments.

There are more than 75 terminals located throughout the hotel, but only those in the computer center were operating during the power outage.

Nixon said that the return to full operations would only mean running daily audits for the various departments for the days they were closed and manually entering payroll information for maintenance workers and other employees who worked during the shutdown. "Actually, things worked out pretty well for us, because we can concentrate on the payroll and accounting without having the rest of the operations to worry about. We're very happy that we can pay the employees. That's a priority for the company," Nixon reported.

"We could have worked on the day of the fire if they had let us back in the building. I brought the diskettes with me, just in case we couldn't get back in for days. Then I could have gone to IBM to work, but that would have taken a full day just to config-

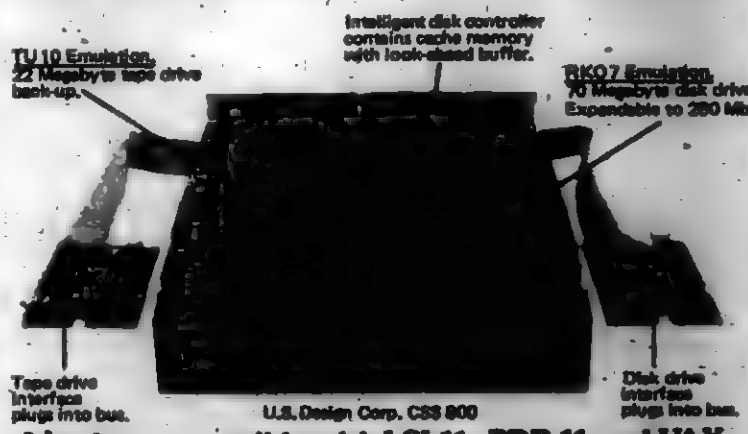
See FIRE page 14

CW Photo by J. Connolly

Workers shared only power source available after Westin fire.

Attention DEC Mini/Micro Users:

Let MTI show you how U.S. Design's compact storage system can cut access time by up to 90% and give you the most megabytes for your buck.



It's plug compatible with LSI-11, PDP-11 and VAX, and supports RSX-11M, RSTS/E, RT-11 and DSM.*

MTI is an authorized distributor for U.S. Design Corp. Our expert field sales engineers provide on-site consultation to show you how this 42-pound desktop (or rackmount) storage system can increase error-free throughput for you.

Whether you buy, rent or lease, you'll find MTI is the one source for all the terminals, peripherals, systems, applications expertise and service you'll ever need. At good prices. Call MTI today and save.

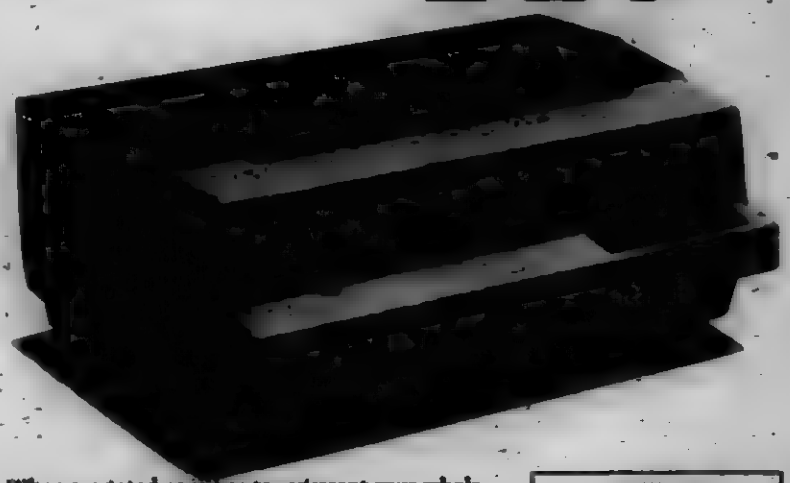
New York: 516/621-6200, 212/767-0677, 518/449-5959
Outside N.Y.S.: 800/645-6530
New Jersey: 201/227-5552
Ohio: 216/464-6688

mti

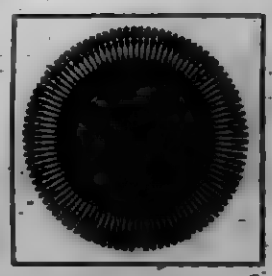
Applications Specialists & Distributors, New York, New Jersey and Ohio.
DEC, Intel, Texas Instruments, Altos, Lear Siegler, Dataproducts, Diablo, Reprit, Intecolor, Racal-Vadic, MICOM, Digital Engineering, U.S. Design, Optrex, Protocol Computers, MicroPro, Microsoft, Polygon and Select.

* Registered trademarks of Digital Equipment Corp.

Make it snappy.



When a printed page has to represent your whole company, it'd better look sharp. Our DP-35 and DP-55 daisywheels rival the finest office typewriters for crisp clean impressions. And they zip along at just about a page a minute. Call your printer distributor. Or contact Dataproducts at (213) 887-8924, 6200 Canoga Avenue, Woodland Hills, CA 91365. In Europe, 136-138 High Street, Egham, Surrey, TW 20 9HL, England.



Dataproducts Daisywheel Printers

FIRE

from page 13

are the system to run our software," he added.

While the hotel was closed, arriving guests, including 400 members of the Northeastern Retail Lumbermen's Association in Boston for an annual convention, were relocated to other hotels.

The New York Westin collected from United Airlines' Apollo reservation system the names of scheduled arrivals and telephoned them to Boston so arrangements could be made for those people.

The hotel rented office space to run a secretarial pool during the power outage.

CW Photo by J. Connolly

Boston's Westin Hotel

Data base built to help Salvadorans gain asylum

By Peter Bartelin
CW Staff

WASHINGTON, D.C. — Residents of war-torn El Salvador who seek political asylum in the U.S. and who need the high level of proof it requires can now turn to a computerized data base for assistance.

The data base, jointly compiled by two private, nonprofit organizations here, helps Salvadorans obtain documented evidence that their forced return to El Salvador would subject them to human rights violations and persecution there.

The data base was recently established by the Center for National Security Studies and the Political Asylum Project of the American Civil Liberties Union (ACLU) Fund of the National Capital Area.

The Documentation Center, ACLU Fund spokeswoman Maria Bosa said, has three goals: to provide data needed by attorneys representing Salvadorans who are seeking political asylum in the U.S.; to assist those engaged in the debate over legislative initiatives to provide Salvadorans with temporary legal protection against deportation; and to make documentation of human rights abuses in El Salvador publicly available.

"The level of proof demanded of asylum applicants by the Immigration and Naturalization Service, the Immigration Courts and the State Department has always been high," Bosa said. "Asylum applicants have been required to present specific evidence corroborating that they have a particularized and individualized fear of persecution if returned to their country."

During the first three months of 1983, according to Bosa, only 31 requests for asylum were granted to Salvadorans, while 1,426 requests were denied.

The ACLU Fund began its Political Asylum Project last April. Paper indexing of the materials did not work out too well, Bosa said, so in July the Project and Center for National Strategic Studies joined up to compile the data base on the center's Televideo Systems, Inc. TS800 microcomputer, using Ashton Tate's Dbase II data base management system.

Two principal files have been compiled. One contains a list of more than 18,000 Salvadorans who have either been killed or imprisoned in El Salvador.

The second file is an index of more than 1,000 documents, such as government reports and cables, reports in periodicals and reports by the ACLU Americas Watch.

The Political Asylum Project is located at 122 Maryland Ave. N.E., Washington, D.C. 20002.

Stories on networks sought

Computerworld is looking for a few good stories on data communications networks. A Feb. 27 Special Report on the subject is now in the making, and contributions are welcome until Jan. 16.

Contributed stories can take two forms: tutorials that are not product-specific and cover a trend or direction in data communications networks; or case studies of specific users who have solved specific business problems with a certain type of data communications network.

These articles should be between four and six double-spaced, typewritten pages in length. Authors are encouraged to include any camera-ready art or black-and-white photographs.

Authors should include with all submissions a very brief biography (name, title, company, city, state) and a telephone number at which they can be reached.

Articles should be sent to Jim Bartimo, Senior Editor/Communications, *Computerworld*, Box 880, 375 Cochituate Road, Framingham, Mass. 01701.

"We're saving $50,000 a year by eliminating SYSOUT printouts and installing JCLWTR."

That's the word from one user of AID's new JCLWTR system.

Instead of printing every production SYSOUT listing, JCLWTR stores them on disk where they're instantly accessible through special SPF screens or hard copy printouts.

The savings in paper, printing, handling, and storage costs add up so quickly that even medium and small shops can recover the system's minimal cost in just months.

JCLWTR installs on medium and large IBM systems operating under MVS and supports on-line interfaces to COM.

Find out how much you can save with AID's JCLWTR system. Send in the coupon, or call Lew Kabza at 312/654-3030.

AID Applied Information Development, Inc.
823 Commerce Drive,
Oak Brook, Illinois 60521

I'd like to know more about the JCLWTR system

Name/Title_____

Company_____

Address_____

City/State/Zip_____

Phone( )_____

TO ALL MSI AND TELXON USERS:

50% OFF ALL AZURDATA SCOREPAK™ TERMINALS.

While MSI and Telxon are discontinuing certain model terminals and offering close-out specials, the Azurdata Scorepak continues to be a top seller. The reputation of excellence and reliability established by the Scorepak makes it a consistent leader among portable data entry terminals.

In celebration of our Scorepak success, Azurdata is offering 50% off on all Scorepak terminals. If you were doing business with our competitors

and now find they will no longer support your needs—or maybe you're ready to trade-up to a winner—we want to hear about it at Azurdata! Call now, this is a limited time offer. But you can be sure it isn't "limited to stock on hand" because Azurdata recognizes a winner and the Scorepak is here to stay.

Azurdata

Azurdata, Incorporated
4102 - 148th Avenue N.E.
Redmond, WA 98052-5182

Seattle 800-426-5002 toll free
St. Louis 800-325-0121 toll free
Atlanta 404-482-0039

Azurdata is also a manufacturer of programmable terminals and a leader in application programs such as Shelf Price Audit, Direct Store Delivery, and Route Accounting.

Offer good on orders of 50 or more terminals. Orders must be received by February 28 and shipped prior to March 31. Offer does not include the Scorepak IV and is valid only in the continental United States.

FCC rules on marketing satellites, network interfaces

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — AT&T must market receive-only satellite earth stations through its deregulated, separate subsidiary, the Federal Communications Commission ruled last month. The commission also decided that the newly divested Bell operating companies must similarly market wideband channel interfaces through separate subsidiaries.

Both actions are related to an escalating battle between the carriers and their competitors, which seems likely to affect the quality and diversity of future "smart network" services. The key issue is who will control and supply the interface between a user's terminal and the growing number of high bit-rate channels being offered by the carriers.

These interfaces are usually referred to as channel service units (CSU) or network channel terminating equipment (NCTE).

The stakes in this battle are high for users as well as vendors, since the channels are the forerunners of the integrated services digital network (ISDN) which, within the next five to 10 years, is expected to carry virtually all of the digitally encoded information generated by U.S. business communications users.

Under the FCC's Second Computer Inquiry decision, AT&T is required to market terminal equipment (customer premises equipment or CPE) through a deregulated separate subsidiary.

But the company can apply for a waiver of this rule, as it did recently in the case of receive-only earth stations.

Application rejected

The FCC rejected that application because AT&T allegedly failed to show that denial of the waiver request would deprive customers of service or cause them to incur unreasonable costs. The commissioners thus reaffirmed their position that waivers will be granted only on narrow grounds.

Last summer, the FCC decided that wideband channel interfaces are CPE and must be offered by AT&T through its deregulated subsidiary, AT&T Information Services.

The commission also decided that the separate subsidiary rule applies to CPE marketed by the divested Bell operating companies, subject to certain modifications. (Notably, already installed NCTE and CSUs can be leased and maintained by the regulated side of each operating company.)

Last month, the FCC rejected several operating companies' arguments which sought to reverse these decisions.

Wide World Photos

A Canadair CL44 turbo-prop cargo plane carrying 24 tons of computer equipment made an emergency landing on New Year's Day at Boston's Logan Airport after its landing gear failed. Some of the computer equipment, en route from Puerto Rico to Worcester, Mass., included CPUs and spare parts belonging to Digital Equipment Corp. The four-man crew escaped uninjured. According to a DEC spokesman, none of the equipment appeared damaged.

Attention DEC Mini/Micro Users:

Take advantage of the MTI/Racal-Vadic/MICOM connection.

We are experts at configuring and installing data communications networks on DEC systems.

MTI is an authorized distributor for Racal-Vadic, MICOM and DEC. And we know our products inside out. We sell, rent and lease acoustic couplers, modems, line drivers, multiplexors, port selectors and all DEC terminals. We supply cables, switches, and all the rest. What about price? You'll find we're very competitive. Call us today.

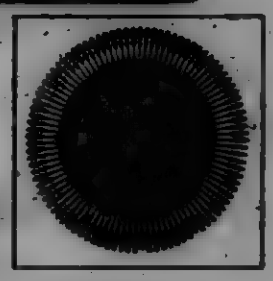
New York: 516/621-6200, 212/767-0677, 518/449-5959
Outside N.Y.S.: 800/645-6530
New Jersey: 201/227-5552
Ohio: 216/464-6688

mti

Applications Specialists & Distributors, New York, New Jersey and Ohio.
DEC, Intel, Texas Instruments, Altos, Lear Siegler, Dataproducts, Diablo, Epson, Intecolor, Racal-Vadic, MICOM, Digital Engineering, U.S. Design, Cipher, Protocol Computers, MicroPro, Microsoft, Polygon and Soltec.

Better letters.

We can't help your spelling or grammar, but we can help your important correspondence look a little brighter than the next guy's. In less than a minute our DP-55 daisywheel dashes out a letter-perfect page. Throw out your white out, call your printer distributor. Or contact Dataproducts at (213) 887-5924, 6200 Canoga Avenue, Woodland Hills, CA 91365. In Europe, 136-138 High Street, Egham, Surrey, TW 20 9HL England.



Dataproducts Daisywheel Printers

Commerce rapped for licensing fugitive dealer

By Patrick Bardelli
CW Staff

WASHINGTON, D.C. — The alleged mastermind behind a foiled plot to smuggle a sophisticated U.S.-made computer system into the Soviet Union had received 14 earlier shipments of "critical technology" equipment, U.S. officials revealed during a recent press conference held jointly by Defense Secretary Caspar W. Weinberger and Treasury Secretary Donald T. Regan.

Anonymous "top Defense Department officials" quoted in *The Washington Post* late last month criticized the U.S. Commerce Department for failing to halt the 15 shipments to a West German national, Richard Mueller, who is still a fugitive from a 1979 federal indictment charging him with export violations [CW, Nov. 21, Nov. 28, 1983].

One part of the consignment containing Digital Equipment Corp.'s VAX-11/782 supermainicomputer and other materials was displayed at a press conference last month following its return from West Germany; the other part of the consignment remains in custody of the Swedish authorities who intercepted it a week after the West German seizure.

Mueller 'under investigation'

Following the Weinberger-Regan press conference, an unidentified Defense Department official reportedly said Mueller "was under investigation by one part of the Commerce Department, while the other part of the Commerce Department was issuing licenses" to allow an unidentified New York-based computer broker and export company to purchase the equipment and ship it to the South African firm controlled by Mueller.

The official was quoted by *The Washington Post*, which said the official and others made comments under protection of anonymity during a "background briefing."

Dan Landa, a spokesman for the Commerce Department, said his department had no response to the allegations. Explaining export licensing procedures, however, he noted that licensees must agree upon issuance that the destination on the license is the end-user destination. An end user desiring to "re-export" equipment — ship it on to another country — must obtain permission from the Commerce Department.

"I mention that because that's what happened in the South African case," Landa said. "They had no right to re-export that [shipment]," Landa said.

The Defense officials quoted by *The Post* also reportedly said the Defense Department will soon place before the National Security Council a plan to stop the export of sensitive goods to communist nations.

During the cabinet-level news conference, Secretary Regan said the U.S. Customs Service, with the assistance of the West German authorities and the cooperation of the Defense Department, "prevented what would have been an espionage coup by the Soviets."

'Legal or illegal means'

The Soviet Union, he charged, "will go to great lengths to obtain high-technology equipment. Whether they have to use legal or illegal means, the [Soviet Union] will do what is necessary because it does not have the wherewithal to develop comparable technology."

Secretary Weinberger said the VAX-11/782 would help the Soviets "produce vastly more accurate ... and more destructive weapons." Defense officials reportedly have said they suspected the Soviets intended to use the equipment to operate a design and manufacturing facility for production of high-speed integrated circuits.

Government officials have said the equipment can be used for a number of military applications, including simulation of missile-target encounters, logic design of military systems and "war gaming," among others.

High-tech smuggler still at large and still very much at work

On Aug. 30, [1981], the U.S. Department of Commerce banned Richard Mueller and his company, Semitronic AG SA of Zug, Switzerland, from trading with U.S. companies until May 31, 2001. Mueller, it seems, had gotten caught exporting sophisticated computerized drafting systems to the Soviet Union.

It was not the first time Mueller had been implicated in illegal high technology shipments to the Soviets. It may not be the last time either...

— Computerworld, Sept. 14, 1981

Those prophetic words by freelance investigative reporter Christopher Simpson, part of a series of reports on high-tech smuggling he wrote for *Computerworld* in 1981, came true during the last two months of 1983. With more than 17 years of his "probation" still to be served, Mueller was implicated as the mastermind behind an attempt to smuggle a top-of-the-line Digital Equipment Corp. VAX-11/782 supersminicomputer into the Soviet Union.

Mueller had previously fled the U.S. following a federal indictment handed down in 1979 that charged him with violating export regulations and exporting a complete assembly line for mass production of microcomputers to the Soviet Union. Two officials of a Sunnyvale, Calif., firm, II Industries, were convicted on charges related to the case.

Despite that indictment, *Computerworld* reported in 1981, "no sanctions were imposed against [Mueller] until the end of August [1981], and he continued to trade with U.S. companies."

Commerce criticized

Last month, it was reported in *The Washington Post* that top Defense Department officials strongly criticized the U.S. Commerce Department for allowing 15 shipments, including the VAX-11/782, to be exported to a South African firm controlled by Mueller.

The firm, according to those anonymous Defense Department officials, "was under investigation by one part of the Commerce Department, while the other part of the Commerce Department was issuing licenses." The Commerce Department declined to respond to the charges.

With the U.S. Congress still mired in controversy in attempting to renew the Export Administration Act [CW, Nov. 21, 1983], the current investigation into Mueller's dealings seems certain to play a key role in the Defense Department's attempt to gain greater discretion over the granting of export licenses. Export regulations remain in effect, despite the impasse in Congress, because of emergency powers invoked by President Reagan when the act expired late last year.

Although Mueller was well known to the Commerce Department as a result of two illegal export cases in the 1970s, the Customs Service revealed last month that he had received a total of 15 shipments of U.S.-manufactured "critical technology equipment" worth a total of $7 million including the VAX.

"None of these shipments remains in South Africa," customs officials said.

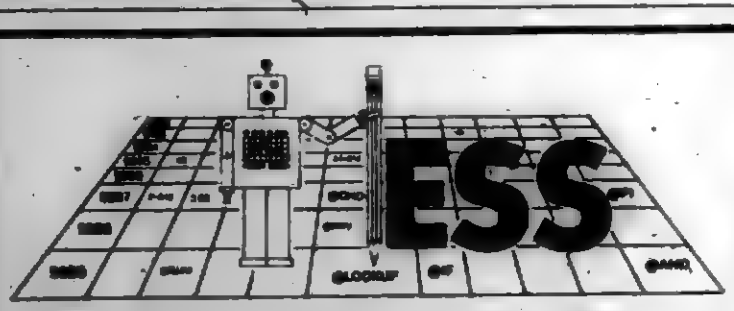
A customs investigation in South Africa revealed, according to customs officials, "that Richard Mueller, after making a sizable investment in commercial and residential real estate in South Africa, arrived there in January of 1983 and took up residence."

Established companies

Through several intermediaries, Mueller has established a number of shell companies in South Africa, beginning in 1979. These were funded through his Swiss holding companies and several Swiss bank accounts.

The customs investigation revealed that the millions of dollars worth of U.S. critical technology purchased by Mueller's firms from U.S. companies and exported to South Africa were funded through Swiss bank accounts.

One of Mueller's "front companies," Microelectronics Research Institute of Cape Town, South Africa, according to customs officials, was the importer of equipment "which was allegedly to be put into civilian electronics research by that firm," but was transferred to another "front company" that transferred it on paper to a Mueller subsidiary in Switzerland.



Electronic Spread Sheet for VM/CMS & MVS/TSO
- Not Just Another CALC -

Powerful - Spreadsheet size is limited only by available virtual storage. ESS easily handles spreadsheets with thousands of rows and/or columns.

Proven - Already in use at over 70 installations.

Compatible - ESS accepts the same commands as VisiCorp's VisiCalc® program for microcomputers. A person familiar with VisiCalc® can be using ESS productively in minutes. In addition, ESS can load and save files in VisiCalc® format.

High Performance - Assembler language code and sophisticated storage management techniques give you fast response, even with very large spreadsheets.

Easy to Install - Just load the ESS program. No additional program products or languages are required.

Cost Effective - ESS gives all your users access to personal computing capabilities for just $220 per month. Compare that to the cost of buying hundreds of microcomputers.

Questions? - For more information about ESS, or to arrange a 30-day free trial, call or write TRAX.

TRAX

TRAX Softworks, Inc.
19961 Nathanal Blvd., Suite 245
Los Angeles, CA 90064
(213) 475-8729

Quality assurance shows top growth in corporate DP

By Patricia Keefe
CW Staff

ORLANDO, Fla. — Quality assurance is the fastest growing function in corporate DP, recording growth of 55% in 1983, according to an international survey by the Quality Assurance Institute (QAI). Additional growth of 33% is projected by June 1984.

The survey indicated that almost one-third of quality assurance groups were formed at the request of senior management, which is recognizing that need is making this function the top growth area in corporate DP, QAI added.

The survey results represent the responses of 135 organizations from a spectrum of fields, approximately one-third more responses than in 1982. The responding companies were either members of QAI or attendees at the third annual DPMA Quality Assurance Symposium.

Other changes

Other changes between 1982 and 1983 noted by the survey on DP quality assurance, which the QAI defined as being responsible for establishing and measuring a process that produces quality computer systems, include:

■ A $25,000 increase in the maximum salary offered quality assurance managers in 1983 compared with the 1982 maximum of $40,000.

■ An average salary in 1983 for quality assurance managers of $42,700, representing approximately a 10% increase over a year ago.

■ An average age for the quality assurance function of two years and seven months, up from less than two years 12 months ago. However, the staffing ratio of full-time quality assurance professionals to systems analysts and programmers is less than 1:100 in 80% of the organizations that responded to the survey. "The less-than-desirable staffing ratio is attributed to the newness of the function," QAI said.

■ The survey also found the same top three responsibilities for quality assurance managers in 1983 as in 1982: certifying systems prior to production status; enforcing DP standards; and reviewing and certifying development and documentation. Increasing in importance were developing system and programming standards, developing control standards and training.

The survey found that reporting hardware/software problems and monitoring adherence to in-place security measures reduced in importance to these managers.

For 53.3% of all the respondents to

See GROWTH page 18

Quality assurance success seen linked directly to exec support

ORLANDO, Fla. — The effectiveness of the quality assurance function in an organization is directly linked to the support — or lack of support — from DP management, according to the "1983 Survey of EDP Quality Assurance" by the Quality Assurance Institute (QAI) here.

"Quality assurance managers believe that they must have strong [DP] management support to be successful," QAI said.

The strengths and problems of quality assurance vary significantly from company to company and industry to industry, but overall, have not changed significantly since 1982, according to the international survey. The greatest strengths associated with DP quality assurance include knowledgeable and motivated staff, quality and respectability of staff, improved productivity and independence.

The problems considered most serious by the organizations responding to the QAI survey include:

■ Lack of management support.
■ Lack of skilled personnel.
■ Lack of acceptance.
■ Lack of standards and procedures.
■ Time limitations.
■ Getting credibility.

About half of all quality assurance groups listed management support of recommendations as the most important practice for enforcing quality, the survey said, underlining the importance of management support. Its respondents' two most popular methods for enforcing quality are controlling the source or object code library and stopping low-quality projects from continuing until corrective steps are taken.

The survey also found that the basis for evaluating quality in 48% of the organizations polled is compliance to standards. Thirty-eight percent use professional judgment, and 12% use mathematical methods.

Also cited as important to the quality assurance function is a knowledgeable and high-quality staff. Although the survey found that most of the quality assurance personnel come from DP, QAI said the function "requires skills other than data processing."

These skills, in order of importance, include verbal communication, written communication, systems analysis, interpersonal relations, knowledge of business and interviewing, time management and business systems design.

Attention DEC Mini/Micro Users:
MTI is one of Digital's Authorized Distributors.

That's why you can always lease or buy the latest DEC terminals and micros from MTI.

MTI is a full-service distributor. Our sales engineers will help you choose the most cost-effective equipment for your needs. Our warehouse staff will check out each piece of equipment thoroughly before it is shipped. Our service department will install your equipment and give you timely maintenance and service.

As one of the few Authorized Digital Terminals Distributors, MTI can give you the best of two worlds; terminals and microcomputers, based on advanced technology from the industry leader, and the expertise and service from applications specialists.

Whether you rent, buy or lease our equipment, you'll find MTI is the one source for all the terminals, peripherals, systems, applications expertise and service you'll ever need. And all of this at prices that are very attractive and hard to beat. Call MTI today and save.

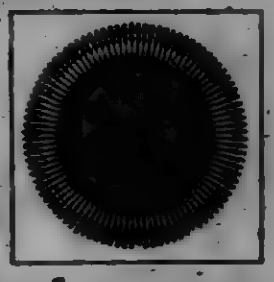
New York: 516/621-6200, 212/767-0677, 518/449-5969
Outside N.Y.S.: 800/645-6530
New Jersey: 201/227-5552
Ohio: 216/464-6688

mti

Applications Specialists & Distributors, New York, New Jersey and Ohio.
DEC, Intel, Texas Instruments, Altos, Lear Siegler, Dataproducts, Diablo, Rapid, Intecolor, Racal-Vadic, MICOM, Digital Engineering, U.S. Design, Cipher, Protocol Computers, MicroPro, Microsoft, Polygon and Select.

Rough writer.

In the business machine torture chamber most of us call the office, one word processing printer shows true grit. We build our DP-Series daisywheels to keep turning out letter-perfect documents month after month. In the face of adversity, and in the hands of a secretary. Call your printer distributor. Or contact Dataproducts at (213) 887-3924, 6200 Canoga Avenue, Woodland Hills, CA 91365. In Europe, 136-138 High Street, Egham, Surrey, TW 20 9HL England.



Dataproducts Daisywheel Printers

Akers to keynote NCC

LAS VEGAS — John F. Akers, president and director of IBM, is scheduled to be the keynote speaker for the 1984 National Computer Conference (NCC).

NCC '84 will be held here July 9-12 at the Las Vegas Convention Center; its theme is "Enhancing Creativity."

Akers, elected IBM president and a director in February 1983, joined IBM in 1960 as a sales trainee. He is a former group executive of the data processing marketing group and the information systems and communications group.

NCC is sponsored by several societies and institutions. They include the American Federation of Information Processing Societies, Inc. (Afips), the Association for Computing Machinery, the Data Processing Management Association, the Institute of Electrical and Electronics Engineers Computer Society and the Society for Computer Simulation.

Conference fees are $100 in advance or $125 on-site, according to Afips, which is located at 1899 Preston White Drive, Reston, Va. 22091.

Videotex meet set for April

CHICAGO — The Videotex '84 International Conference and Exhibition, featuring information on marketing, products and technology from the videotex industry, will be held here April 16-18 at the Hyatt Regency Hotel.

Sponsored by London On-Line, Inc., the conference theme is "Widening the Spectrum."

According to the conference organizer, it will feature three simultaneous conference sessions.

Talk shops

Among the sessions will be newly instituted "talk shops" to enable participants to follow the program elements specifically geared to their business interests.

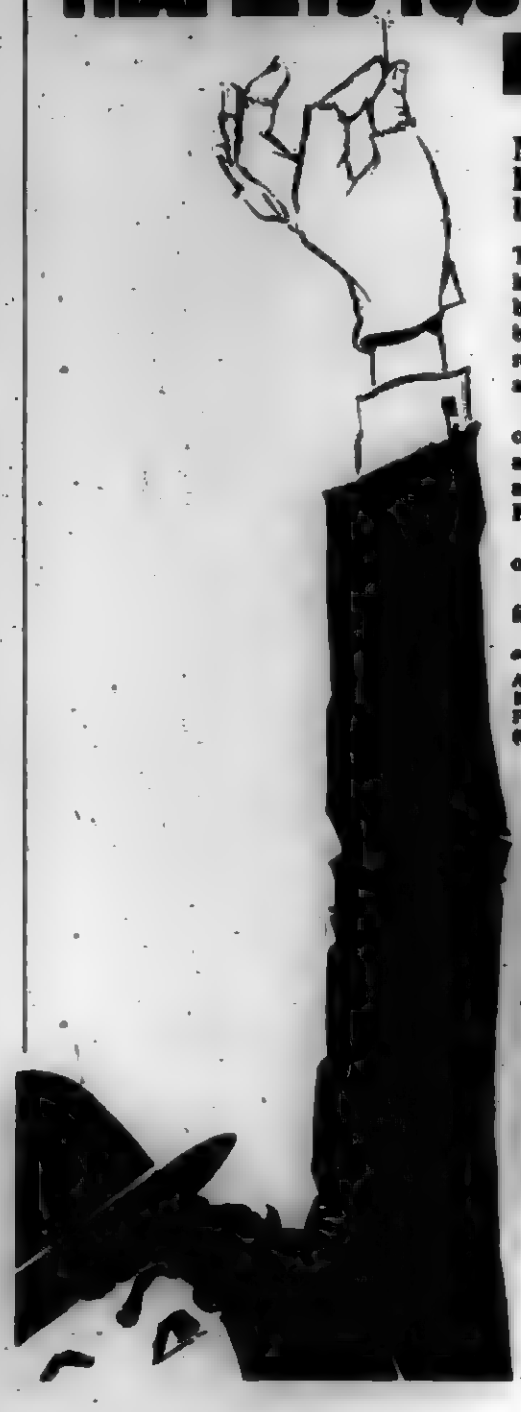
"Videotex — The Full Picture" will cover basic aspects of the videotex industry, according to the conference organizer.

"Industry Issues and Developments" will focus on major strategic and technical issues.

"Talking Shop" includes more informal sessions where delegates will be able to exchange ideas on a variety of topics.

The registration fee is $695. After Feb. 29, the fee is $795, the organizer said. London On-Line is located at Suite 1190, 2 Penn Plaza, New York, N.Y. 10121.

IBM PC/OWNERS:
HARD DISK STORAGE WITH BACKUP THAT LETS YOU FIND A NEEDLE IN A HAY STACK.



Now, in a single package, hard disk storage and file-oriented backup: Alloy's PC-STOR.™

The remarkable new PC-STOR combines the latest Winchester hard disk technology with the industry's finest file-oriented tape backup. With this system you can locate, retrieve and re-position backup data quickly, precisely and easily. The PC-STOR makes recovery from awkward floppy disk or streaming backup systems a memory of the past for users of IBM or IBM-PC compatibles.

The new Alloy Winchester hard disk comes with 35 megabytes of formatted storage, is 4 times faster than the IBM-XT system, and is especially designed for ease of use. It can be purchased as the PC-DISC™, a hard disk system without backup, or as a PC-STOR, a hard disk with file-oriented tape backup.

If you already have a hard disk system, you should add file-oriented tape backup: Alloy's PC-BACKUP™.

For the ultimate in hard disk and hard disk backup systems, find out more about Alloy's advanced product line, today.

For more information, please contact your local computer store, or call or write:

Alloy Computer Products
100 Pennsylvania Avenue
Framingham, Mass. 01701
(617) 875-6100

In Europe, contact:
Alloy Computer Products (Europe) Ltd.
Cirencester, Gloucestershire, England.
Tel: 0285-68709 Tlx:43340

IBM PC is a registered trademark of IBM Corp. PC-STOR, PC-BACKUP and PC-DISC are trademarks of Alloy Computer Products.

ALLOY
Computer Products

GROWTH

from page 17

the survey, the average number of reviews per system development projects was one to three; when that question was asked only of the DP organizations that responded, the percentage rose to 75% for one to three reviews. This review process typically accounted for 2% to 5% of the project cost among the combined organizations (44.1%) and by 50% of responding DP organizations.

After the review, reports are issued by only 69% of the overall respondents (60.7% of the responding DP organizations).

Not cost-justified

In addition, 84% of the survey respondents do not cost-justify their function to management. Of the respondents who represented DP organizations, 67.9% do not cost-justify their function to management.

The majority of the quality assurance groups report to either the senior DP manager or the manager of DP support/planning. Less than 20% report to the manager of systems and programming and those that do "appeared to be the least effective in promoting quality data processing," the survey report said.

Quality assurance was found to flourish in organizations using formal design and maintenance methods. Approximately three-fourths of the organizations having quality assurance groups use formal system development life cycle methods, although close to half of the system development life cycle methods used were developed in-house.

Moreover, about half the quality assurance groups use a formal review process, such as review checklists, to ensure that quality is built in during the developmental process. Most often, survey respondents (52.8%), combined a review team with a quality assurance staff member to conduct these reviews.

During the review, over three-fourths of the quality assurance analysts responding use probing, the survey found.

Approximately one-half use questionnaires, 20% use checklists and 12% reported performing part of their analysis using software.

Copies of the survey are available for $25 if payment is included with the order ($35 invoiced). Copies are distributed to QAI members at no cost from Quality Assurance Institute, which is located at 9222 Bay Point Drive, Orlando, Fla. 32819.

NEWS

INTERNATIONAL REPORT

CW INTERNATIONAL NEWS NETWORK

AUSTRALIA

NORTH SYDNEY — Austnet Electronic Funds Transfer (EFT) Services Pty. Ltd. has established an on-line link with the U.S.' Visa automated cash disbursement system. According to Austnet EFT's technical director, Chris Reilly, the company is the first EFT service outside the U.S. to link into the Visa system, enabling Visa card holders from anywhere in the world to withdraw cash instantly from Visa automated teller machines.

PERTH — A records management system that reportedly allows organizations to catalog and file all of their incoming and outgoing documents has been jointly developed here by Computer Power and the Systems Research Institute of Australia. The software was created for the Western Australian Government and will run on several different manufacturers' computers. It is presently up and running in the War Department of the Premier, and in the Department of Agriculture. It will next be implemented at the Metropolitan Water Authority and the Education Department.

BRAZIL

RIO DE JANEIRO — The Brazilian computer firm Cobra is reportedly facing a major crisis with the resignation of its president, Antonio Carlos De Loyola Reys. Without directly criticizing company shareholders, Loyola Reys attributed his resignation to the fact that resources were never allocated where most needed and that the role of the company, in terms of technological development, has never been clearly defined. According to Loyola Reys, the shareholders should allocate funds to relieve the company of debt and also rearrange the composition of shareholders to give the government absolute majority. It is not yet known who will replace Loyola Reys.

CHINA

BEIJING — China's largest domestically produced mainframe was unveiled here recently by the Research Institute of Computing Technology. The 64-bit Galaxy System 757 is capable of operating at speeds up to 10 million instructions per second, ten times faster than China's former top-of-the-line DJS 260 system. The System 757 has a main memory of 520K bytes and is intended for parallel processing in large-scale scientific and engineering applications.

FRANCE

PARIS — Carte Bleue, the credit card system developed by Intelmatique here with 3.3 million customers, has adopted "smart card" technology. Intelmatique will begin issuing the new cards, with memory, intelligence and security implanted in a microprocessor on the card in February.

JAPAN

TOKYO — Digital Research Japan has announced a Kanji version of its CP/M microcomputer operating system. Kanji CP/M has the ability to convert Kana and Roman letters into a Kanji phrase or sentence; the user simply inputs Kana or Roman characters and presses the Kanji conversion key. According to Digital Research Japan, Mitsubishi Electric Corp., Sanyo Electric Co. Ltd. and Sord Computer Corp. are among nine vendors that plan to adopt the Kanji CP/M operating system as a standard for their machines.

TOKYO — Toshiba Corp. has combined lens technology and convergent circuit technology to create a display of 10,000 characters on a 100-in.-high screen. The display system is said to have six different types of signal processing circuits that handle video and computer signals for large screen displays needed in video con-

See REPORT page 22

HARD FACTS

ABOUT THE REAL LEADER IN COMPLETE SOFTWARE FOR BUSINESS: RAMIS II FROM MPG

FACT: RAMIS II Is The One System For All Your Users

To meet the full spectrum of application development and Information Center needs, RAMIS II starts with the most advanced decision support capabilities: a powerful report writer, a complete relational language, full-color business graphics, and much more.

Then we add a data base manager robust enough for high-performance on-line applications, a multitasked TP monitor that minimizes overhead and state-of-the-art screen formatting.

The result is the only integrated data base/data communications system designed for both highly structured transaction processing applications and unstructured decision support systems. And, the only product designed to fully unlock the power of your IBM mainframe, whether it's a 4321 running SSX, or a 3081 running MVS/XA.

RAMIS II Unlocks Your Existing Data

RAMIS II maximizes the return on your investment in data through ready access to ADABAS, IMS, TOTAL, DL/I, and IDMS data bases, as well as VSAM, ISAM and sequential files.

With the most powerful report writer available, plus graphics, RELATE and even English comprehension, RAMIS II unlocks external data easily and efficiently.

The Full Commitment And Support Of Martin Marietta

Leadership takes vision, plus the commitment and resources to turn that vision into bold new products.

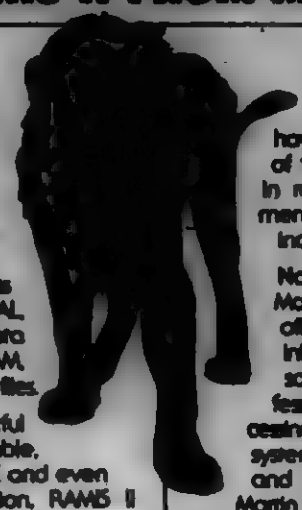
FACT: More copies of RAMIS II have been sold than all other 4 GL's combined.

FACT: RAMIS II English comprehension responds to everyday English commands.

FACT: MPG developed the first practical relational language.

FACT: There's no more powerful system for screen-based applications than RAMIS II.

FACT: RAMIS II was the first product designed for both application building and Information Centers.



To achieve our goal of a complete software solution, we have invested an average of 16% of annual revenues in research and development—more than twice the industry average.

Now, as part of Martin Marietta Data Systems, we offer a complete range of information solutions, from software products to professional services, from processing services to integrated systems. And, the financial and technical strength of Martin Marietta, a diversified company with more than 5½ billion in revenues, is accelerating new product development.

It takes more than a roar to be the leader. When it comes to providing a complete software solution, the facts prove there's only one real leader—RAMIS II from MPG.

To get all the facts, visit one of our regional Product Demonstration Centers, or attend a free RAMIS II seminar. For more information, call your local MPG office or call toll free (800) 257-5171. (In New Jersey call (609) 799-2600, Ext. 2325.)

Mathematica Products Group
A Martin Marietta Data Systems Company
P.O. Box 2392
Princeton, NJ 08540

Copyright ©1983 Mathematica Products Group, Inc.

RAMIS II...The Leader By Design

Boston (617) 357-9434 Chicago (312) 670-9710 Houston (713) 850-8697 Los Angeles (213) 670-6982 New York (212) 980-9077 Princeton (609) 799-2600 San Francisco (415) 461-6315 Washington, DC (202) 484-5732 Basel (61) 429923 Bergen (5) 32 13 00 Heidelberg (6221) 14051 Hong Kong 5-435714 Kingston (809) 929-7223 London (1) 580-3681 Milan (2) 546-8080 Montevideo (2) 906788 Ottawa (613) 238-8616 Paris (1) 776 41 71 Santiago (7) 31016 Singapore 273 9255 Stockholm (8) 330720 Sydney (2) 923 1677 Tel Aviv (32) 70364 Toronto (416) 226-6613

"Rockwell International eliminates order management paperwork and ships products faster with a ***Tandem NonStop Computer System.***"

Robert P. M[illegible]
Avionics Group

Our Tandem NonStop computer helps us dramatically streamline order tracking for our broad line of products here at the Collins avionics facilities in Cedar Rapids. This automated operation has meant we've been able to ship our products faster as well as respond to customer inquiries in a much more timely, accurate fashion.

The Tandem system consolidates all data pertaining to the orders from order entry to scheduling, inventory, to packing lists, and right on down the line to shipping. And, because the system is on-line, other departments have immediate access to this information as well. Accounting, for example, now generates invoices automatically, resulting in much improved cash flow. Manufacturing is saving $175,000 a year in internal freight charges due to the reorganization of ordering and shipping procedures, and the Group as a whole has been able to eliminate more than 300,000 reproduced documents a year.

Other system benefits contributing to our improved customer service include better control of backorders, more accurate pricing information, and the ability to make detailed forecasts of market conditions for planning purposes. The net result is an operation that is helping us achieve some very significant gains in plant productivity.

The NonStop System.

Ideally suited to on-line transaction processing where continuous availability of up-to-the-second information is critical to your business.

Tandem. Fully supported by a worldwide sales, training, service and manufacturing organization.

For information on how a Tandem NonStop system can improve your productivity or your P/L statement, call your local sales office or Tandem Computers Incorporated, 19333 Vallco Parkway, Cupertino, California 95014, U.S.A. Toll Free 800-482-6336 or (408) 725-7500 in California.

TANDEM

NonStop Transaction Processing

Universal interconnection seen next interchange step

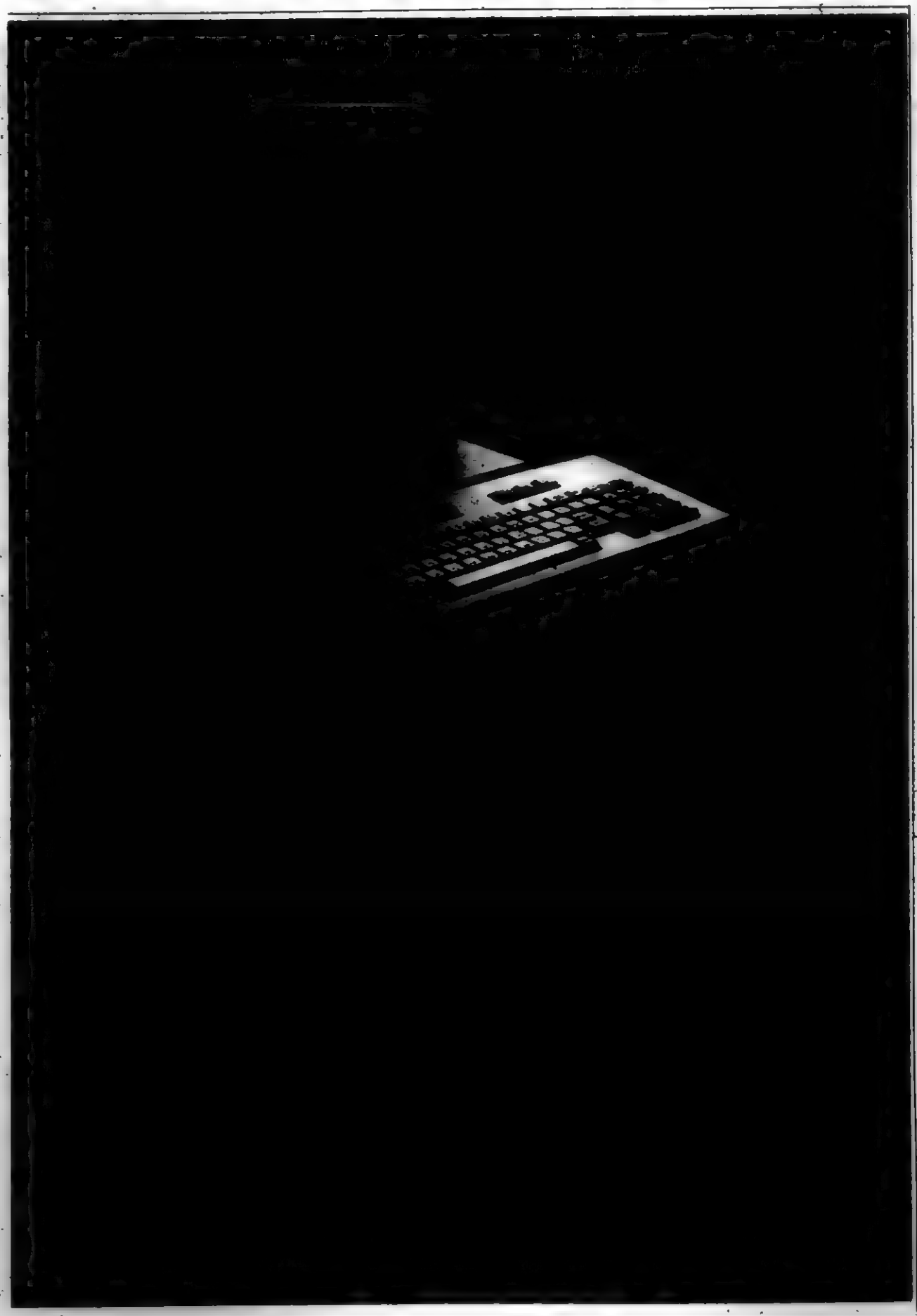
WASHINGTON, D.C. — Universal interconnection is the next major advance in electronic data interchange, according to T.J. O'Rourke, president of Tymshare, Inc.

He was among the speakers here last month at the annual meeting of the Transportation Data Coordination Committee (TDCC), which develops, maintains and promotes business use of electronic data interchange standards. Tymshare is a major supplier of on-line, computer-based communications/information services.

The first electronic data interchange standards, O'Rourke said, were "closed," limited to specified applications and required adherence to proprietary standards. Next came "open" systems, which did not require the use of any particular hardware, software or network service but did make adherence to a specific nonproprietary communications protocol mandatory. The grocery industry's Universal Communications Standard (UCS) is one such open standard, O'Rourke said.

He added that open systems are now beginning to be replaced by "generic standards," which contain the resources needed to resolve differences between user systems; thus, they make standards irrelevant. By promoting communications across company and industry boundaries, he expects generic standards to increase vastly electronic data interchange traffic.

At the TDCC meeting, Tymshare unveiled a service called Edi-Net which, according to O'Rourke, embodies a generic standard.



REPORT from page 19

ferencing, superintendance control, propaganda, education and television broadcasting, a spokesman said. The product, including projector, video control unit, power unit and screen, costs about $2 million.

OSAKA — Sharp Corp. has introduced two multifunction Japanese word processing/personal computers. The WD 2200 and WD 2700 can also be remotely connected to an IBM host computer and emulate IBM 3270 terminals, the vendor said. The WD 2700 also has image scanning capabilities, along with hard disk and ink jet printer options. The WD 2200 with a thermal printer costs $4,247, and the WD 2700 is priced at $7,872 with dot matrix printer and $9,362 with an ink jet printer.

MATSUMOTO — Epson Corp. and Suwa Seikosha Corp. Ltd. have jointly announced Skymirror SM-10, a microcomputer designed to capture weather information from weather satellites and instantly display the data on a personal computer. Floppy disk drives or cassettes can be used to play back the weather data as needed. The system, priced from $9,574, can also be used as a standalone Japanese word processor and personal computer.

NEW LIFE FOR
1401 PROGRAMS

CS-TRAN converts your 1401 *object* programs to COBOL for the mainframe or mini of your choice.

CS-TRAN is the *only* translator that accepts your object programs, patches and all, yet allows you to include actual COBOL paragraph names and record definitions.

If you'd like more details about new life for your 1401 programs just call or write Russ Sandberg.

C·S Computer Systems Inc.
200 South Main Street, P.O. Box 366
Manville, NJ 08835 • 201-526-6000

HERO ARRIVES AS THOUSANDS CHEER!

THE PERSONAL COMPUTER: BOON OR BOMB? IT DEPENDS ON YOUR AIM.

The personal computer is a hit. Everyone wants one. The problem is, in a business organization, it's too personal. Every operator becomes an electronic freelancer, hoarding personal data. Incapable of, or unwilling to, exchange information with other computers.

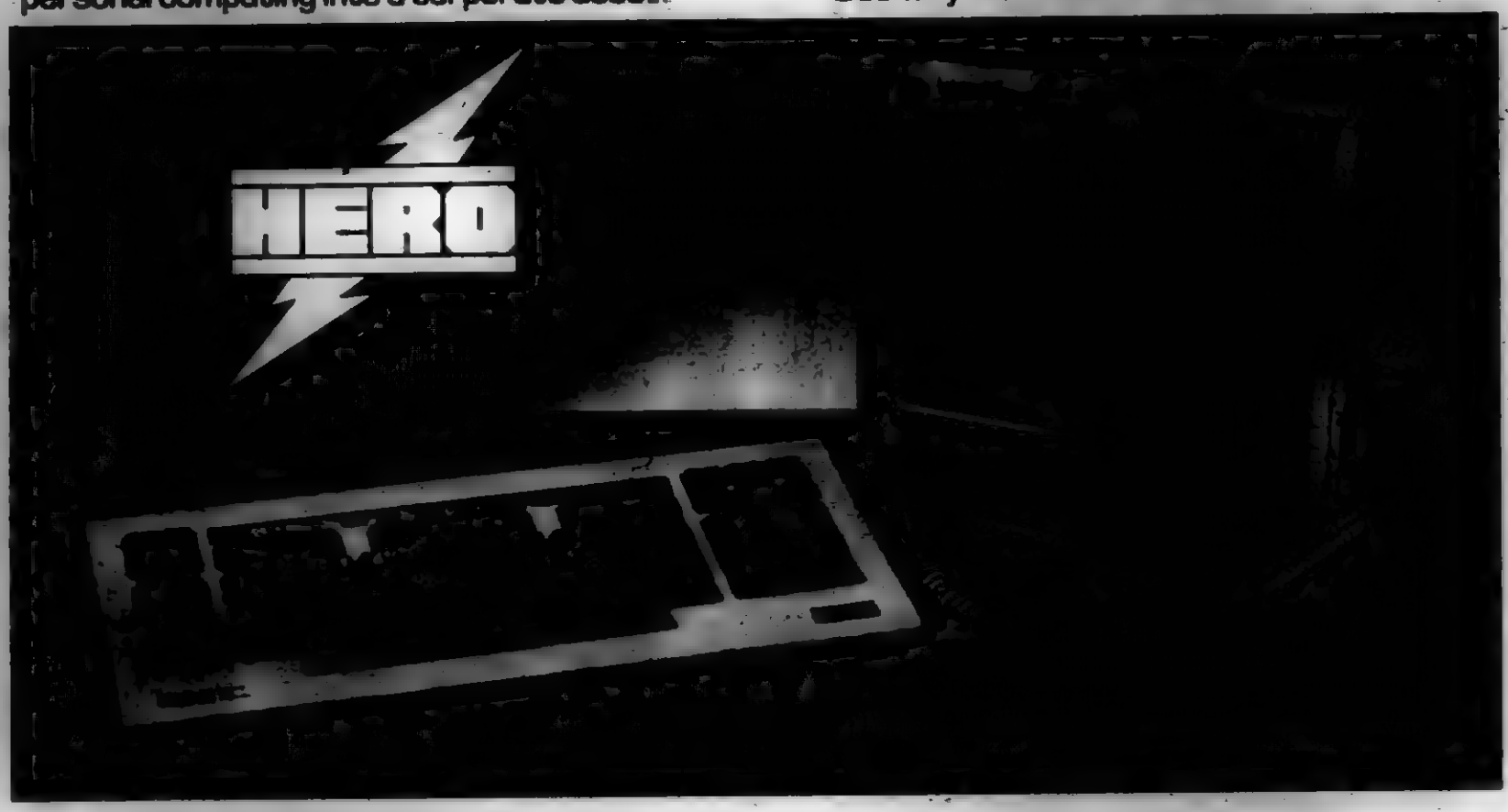
Work is lost or duplicated. Even triplicated. Which drives costs—and information managers—crazy. This is Computer Shock. Fortunately, Mohawk Data Sciences has the treatment.

ENTER THE HERO! NOT A MOMENT TOO SOON.

MDS® introduces HERO!™ the Networked Personal Computer. HERO is an intelligent desktop workstation. The heart of a HERO is a 16-bit microprocessor. Its magic transforms personal computing into a corporate asset.

In HERO, MDS offers a personal computer with the ability to contribute to, and draw from, an entire organizational information network. Integration replaces disintegration.

See why we named it HERO?



INFORMATION FLOW THAT WAS NOT WORKING WILL NOW BE NETWORKING.

No more isolated little fiefdoms. No more anarchy. No more lack of central control. Coordinated with the MDS Communications Processor, HERO ties your information network together. Individual workstations can talk to each other. They can draw from departmental and corporate sources. And vice versa.

You keep your current network and HERO improves it. Your people keep their current jobs. They just do them better. Your investment is not only protected, it works harder.

And it all works for you.

MDS MERGES WITH IBM.

HERO marries compatibly into IBM networks. Using the MDS Communications Processor, HERO can talk with IBM mainframe computers. It's engineered to look like IBM 3270 SNA or 3776 remote job-entry systems. And our MDS Super SNA option lets you have both on one communications link. Most IBM and non-IBM protocols are available, including binary synchronous, asynchronous and X.25.

Only MDS offers you INTELLIGENT 3270.™ It integrates the intelligence of HERO with the intelligence of the host. User-written HERO programs can draw data from the host, process it, update it and return it. Or store it locally.

HERO DOES EVERYTHING A PERSONAL COMPUTER DOES. ONLY MORE HEROICALLY.

Since it's engineered to help you make decisions, HERO naturally provides word processing, financial spreadsheets, scheduling, analysis and planning functions. And it can run software under MS-DOS.

HERO is multilingual. It can understand programs written in FORTRAN, PASCAL and BASIC. As well as existing MDS Series 21® programs written in COBOL and MOBOL (Mohawk Business Oriented Language).

HERO HAS BRAINS TO MATCH ITS LOOKS.

With HERO's 16-bit processor comes memory expandable from 256K to one megabyte, with private disk storage up to 80 megabytes.

HERO is small, light and handsome. It fits snugly on the corner of a desk, and has the quiet, impressive good looks which inevitably find their way into the corner office.

Memory and storage modules are textbook size. They tuck away under a desk. With MDS, out of sight is never out of memory.

MDS SAVES YOU MONEY IN THE PROCESSING.

The MDS SUPER 21™ Communications Processor can cluster as many as 16 HEROS to a shared database. Each workstation shares the same disk drives, tape drives, printers, modems and communications lines.

And you share the savings. SUPER 21 provides two communications ports that operate simultaneously. It can talk to two different mainframes in two different protocols at once.

HERO TODAY, HERO TOMORROW.

HERO is designed to grow with your system. The modular sections are made to snap together. So it's a snap for a user to assemble, install and repair.

Built-in diagnostic "confidence tests" give you a sequential read-out, verifying that your HERO is healthy and ready to go.

If you need help, MDS staffs over 1,500 Field Engineers in hundreds of locations around the world, around the clock. Whatever your needs, we'll work out a maintenance plan that suits you.

THE MDS PHILOSOPHY: UNITE AND CONQUER.

Twenty years ago, MDS set out to devise programs linking business systems together. Not just office automation—word processors and personal computing. Rather, automation for entire organizations: sophisticated networks linking remote locations together.

Over the years, by listening to our users and by responding to their specific networking needs, we've become acknowledged experts in automating the organization. By making this responsiveness our number-one priority, MDS has become a multidivisional, multinational networking organization.

We'd like to help you do the same. If you want to know more, we suggest two informed sources:

(1) Talk to our customers.
(2) Call us at **800-MDS-HERO.**

MDS HERO WILL MAKE A HERO OUT OF YOU.

MDS MOHAWK DATA SCIENCES

7 Century Drive, Parsippany, NJ and over 430 locations worldwide.

MDS and Series 21 are registered trademarks. And HERO, INTELLIGENT 3270 and SUPER 21 are trademarks of Mohawk Data Sciences. MS-DOS is a registered trademark of Microsoft, Inc.

ICA seminar set for Jan. 15-18 in Fort Lauderdale

Theme of meet — integrating the digital office

FORT LAUDERDALE, Fla. — The International Communications Association (ICA) will hold a seminar on digital telecommunications technology trends in management on Jan. 15-18 at the Fort Lauderdale Marriott Hotel and Marina.

The theme of the seminar will be "Integrating the Digital Office," focusing on alternatives for merging installed components of office automation into a unified system. The meeting will include a series of intensive sessions exploring a range of issues relating to digital technology and its implementation.

According to an ICA spokesman, seminar topics will deal with technical and management aspects of digital private branch exchange (PBX), transmission methods to interconnect advanced devices, evolving digital network standards and trade-offs related to bypassing local telephone company facilities.

The impact of deregulation will be examined in several sessions dealing with the divested local phone companies, the spokesman said.

The tuition fee for the seminar is $425 for ICA members and $450 for others. More information about the seminar is available from ICA headquarters at Suite 828, LB-89, 12750 Merit Drive, Dallas, Texas 75251.

The Micro Solution

Finally, there is a total solution for your microfloppy needs . . .

The Dysan 3¼" Flex Diskette.™

It assures a source of high quality duplication services from Dysan's established production facilities.

It includes both alignment and Dysan's exclusive Digital Diagnostic Diskettes (DDD) for trouble-free drive operation and media interchangeability.

It utilizes a high performance, cost-effective and widely available media, selected specifically for minifloppy plug compatibility.

Its flexible jacket bends without damage, and optimizes media lifetime in contaminated environments.

It is from the same company who standardized the minifloppy with Shugart and the 5.25" Winchester drive with Seagate.

Considering supporting services, minifloppy compatibility, product availability and proven performance, it's apparent there is only one complete microfloppy standard.

The Dysan 3¼" Flex Diskette.

3¼" Flex Diskette is a registered trademark of Dysan Corporation.

Dysan CORPORATION

Corporate Headquarters
5201 Patrick Henry Drive
Santa Clara, CA 95050
(800) 551-9000, Department 50
(408) 988-3472

AT&T chief to speak

NEW YORK — Charles L. Brown, chief executive officer and chairman of AT&T, will keynote a seminar here Jan. 26-27 on the business, legal and regulatory strategies of telecommunications companies.

"The New Telecommunications Landscape: The Companies Speak on the World of 1984 and Beyond" will be held at the New York Hilton by the *Legal Times* and Law & Business, Inc./Harcourt Brace Jovanovich, Publishers. Key executives from a variety of telecommunications companies and speakers from government, legal, financial and consulting organizations will participate.

Registration, including lunch and a reception, is $425 per person ($335 for representatives of nonprofit and government organizations).

Additional information is available from Law & Business/Harcourt Brace Jovanovich, 757 Third Ave., New York, N.Y. 10017.

Telexchange to hold meet

SAN FRANCISCO — The Fourth International Telexchange Meeting, scheduled at the Westin St. Francis Hotel here Jan. 16-18, will focus on system security, high-resolution computer graphics and micro-to-mainframe integration using Telefile Computer Products, Inc. and Xerox Corp. Sigma systems.

Sponsored by Telexchange, the Telefile Computer Users Group, the conference will also feature discussions on performance monitoring, state-of-the-art hardware and software development and additions to the users group library.

There will also be general business meetings and special-interest group meetings at the conference.

Registration costs $200. More information is available from Telexchange, 17131 Daimler St., Irvine, Calif. 92714.

Interest bonus proves bogus for bank's customers

By James Connolly
CW Staff

COLUMBUS, Ohio — Some savings account customers at the Ohio State Federal Savings and Loan Association here recently got a surprise bonus in their passbooks. But their good fortune was nullified quickly by the computers that created it.

A misunderstanding between a service bureau and the bank caused computers to credit $100,000 to $200,000 in extra interest to more than 2,000 customers. The bank reclaimed that money within a week from disappointed but "understanding" savers.

"To this point, reaction from customers has been pretty understanding, once they knew what the situation was," said Stanley Spencer, vice-president for communications at Citizens Federal Savings and Loan Association, Ohio State's Dayton-based parent company. "Even most of the negative reaction was just, 'How did this happen?' When we explained it, they understood.

"It was just one of those freak things."

The error had its roots in the merger of the banks last year, when Citizens Federal, which used an NCR Corp. 8500 financial system, took over Ohio State Federal Savings, which utilized a Burroughs Corp. B4890 system through the Savings and Loan Data Center in Cincinnati.

Spencer said that Citizens Federal allowed a year to integrate Ohio State into the NCR system. Oct. 22, a Sunday, was chosen as the conversion date. "What happened was that they were projecting the interest a customer would earn through the end of the interest cycle, rather than cutting it off on Sunday," Spencer explained.

The data center continued crediting accounts through the week of Oct. 22, although the host computer at Citizens Federal was crediting interest as of the 22rd.

At the end of the week, when Citizens Federal received reports from the data center, officials noticed the excess interest paid. The extra interest averaged less than $50 per customer and probably did not exceed $200 for any single customer, Spencer said.

After discovering the error, the bank sent letters to between 2,000 and 3,000 Ohio State customers explaining the situation. Accounts were then reduced by the appropriate sum.

Spencer said the bank lost "little" money through customers closing accounts before the error was found.

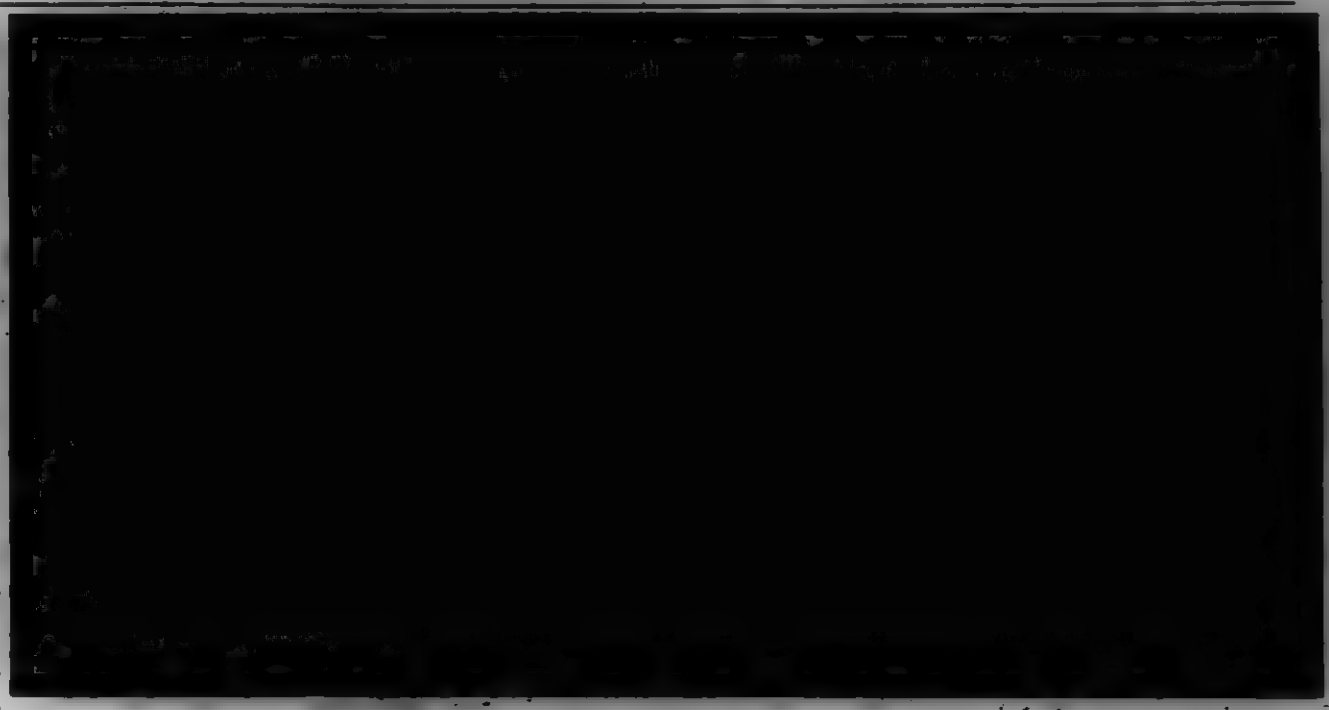
Meet to cover fiber optics

MADISON, Wis. — A three-day program on the "Design of Fiber-Optic Communications Systems" will be held here March 12-14 at the University of Wisconsin Extension.

The program is structured to assist the design engineer and experienced technical personnel in the understanding and design of fiber optics in communications systems.

The program will be presented by industry leaders and will address subjects of fiber parameters, receivers and transmitters, optical measuring techniques, link design, cable installations and broadband applications.

The fee is $475. Further information is available from the Department of Engineering & Applied Science, University of Wisconsin Extension, 432 N. Lake St., Madison, Wis. 53706.



It's time the technology of data collection caught up to the technology of data processing.

The speed of your data processing is limited by the speed of your data collection and input. Unfortunately, for a lot of people, data collection technology stopped with the development of the clipboard.

But MSI has changed all that.

Because MSI portable data collection systems are microprocessor-based answers to multipart forms. They actually extend the power of your central computer by allowing data to be keyed in right in the field. And then transmitted over ordinary phone lines to a host computer or data processing center.

MSI systems eliminate paper shuffling, keypunching, and errors by collecting data at its source. At the same time, we return control to the data processing department, eliminate costly time delays, and match the sophistication of your central system with our equally sophisticated remote system.

Our family of hand-held terminals can be used anywhere there's data to be collected. For salesman order entry, inventory control, financial reporting, manufacturing control, and field data collection tasks of all kinds.

Learn how MSI data collection products can bring your system to the peak of its capabilities. Just return the coupon.

You'll find the technology of data collection is right where you want it.

MSI Data Corporation
340 Fischer Avenue
Costa Mesa, CA 92626
I am interested in:
☐ A sales presentation
☐ Product literature
Name/Title
Company
Address
City State Zip
Telephone
Computer
MSI DATA CORPORATION CW 1/9

The world leader in portable data collection systems.

MANAGERS ON THE MOVE

BURT MALL has been appointed director of data processing at Intermatic, Inc. in Spring Grove, Ill.

Mall moved to Intermatic — manufacturer of automatic timers, outdoor lighting and heaters — from A.G. Becker Paribas, Chicago investment bankers, where he was manager of operations analysis. Prior to that, he was manager of data processing for 10 years at Northern Petrochemical Co., Inc., a division of Internorth Corp. in Des Plains, Ill.

Mall is a graduate of the Southern Illinois University in Carbondale with a B.A. in psychology and a minor in mathematics. He has completed work toward an MBA at Northern Illinois University in De Kalb, Ill.

■

CHARLES E. WOOD has been promoted to vice-president of information systems in the tire division of Copper Tire & Rubber Co. in Findlay, Ohio. Besides continuing to be responsible for computer operations, operations research and analysis, systems and systems planning, computer programming and office equipment, Wood gains additional responsibility as planning coordinator on the division's executive staff.

Wood was director of Cooper's data processing department from 1969 to this year, when the department was reorganized as Information Systems. He has held various managerial and supervisory positions in the systems and data processing areas since joining the company in 1959.

Wood holds a B.S. from Findlay College. He completed an advanced management program at Bowling Green State University in 1976 and has done graduate work there since 1980.

■

LEON B. BILLIS has been elected vice-president of The Equitable Life Assurance Society of the U.S. in New York. He will be responsible for planning for the company's computer centers.

Billis joined Equitable in 1963 as an operator in the data processing department. He was named a senior systems specialist in 1975, manager of the Technical Division in 1977 and manager of the Planning Division in 1978. He was elected assistant vice-president in 1980.

He is a 1974 graduate of Baruch College with a B.A. in business management. He received his MBA in executive management from St. John's University in 1970.

■

ALBERT A. SINISI JR. has been promoted to executive associate to the vice-president and director of technology resource management at Thomas Jefferson University in Philadelphia. In his new role, Sinisi will address issues governing the impact on Jefferson of new and advanced technologies. He will have general responsibility for recommending to the senior officers the policies and processes by which the university will manage the acquisition and assimilation of new technologies.

Sinisi

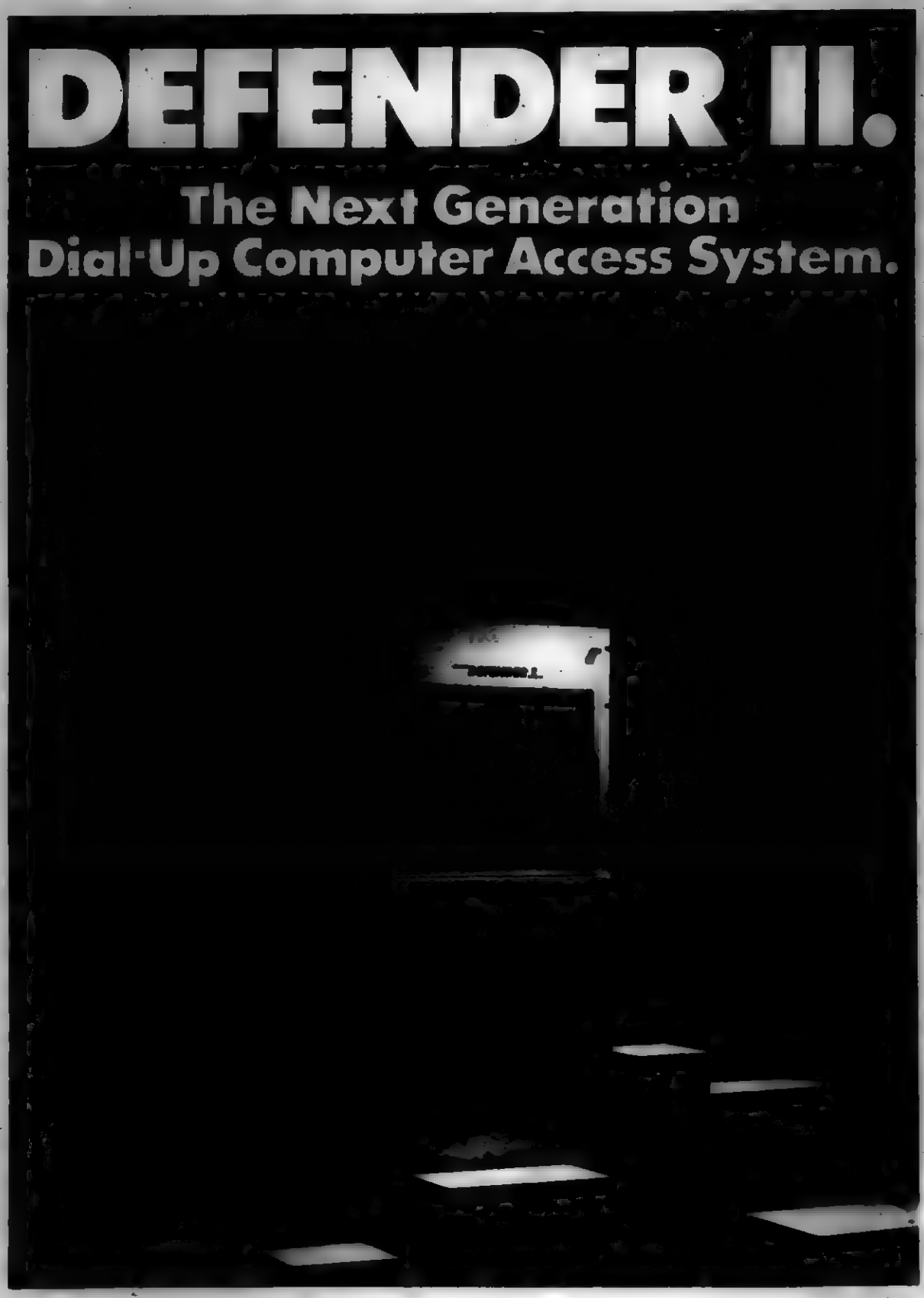
In his new post, Sinisi will be responsible for technology forecasting and planning, generally defining the capital, operating and human resources requirements of technology acquisition and coordinating the integration of complementary technologies, such as telecommunications and data processing. He will retain responsibility for completing Jefferson's new electronic data processing plan and will serve as the chairman of the technological subcommittee of the university's telecommunications committee.

Sinisi began his career at Jefferson in 1970 as a project manager in information systems and was promoted three years later to associate director, a position he held for the next five years before becoming director.

Prior to his work at Jefferson, Sinisi was a systems analyst at the General Electric Co.

In addition to his responsibilities at Jefferson, Sinisi is currently a member of the Mayor of Philadelphia's Advisory Board for Information Management.

He is a graduate of St. Louis University with a B.S. in aeronautics. He obtained his master's degree in business administration at Widener University in Chester, Pa.



Graphics, CAD/CAM covered by directory

CHERRY HILL, N.J. — Data Decisions, Inc. has published a directory of 66 graphics and computer-aided design and manufacturing (CAD/CAM) packages produced by 34 vendors. The packages run on mainframes, minicomputers and microcomputers.

Product descriptions are alphabetically arranged, preceded by a reference chart. It describes intended users, lists operating systems required and highlights functions and options.

The report, "Graphics and CAD/CAM," is available for $29 from the vendor.

Data Decisions is headquartered at 20 Brace Road, Cherry Hill, N.J. 08034.

1-800-421-4807
1-800-421-4808
MARINCO, INC.
A FELLOWES COMPANY

NEWS

Computer chess champions

'Cray Blitz' wins chess trophy

NEW YORK — Belle, a seasoned champion, was unbeaten in 27 consecutive matches. Former champion Nuchess was in fine shape and looking for revenge. Built for speed, Cray Blitz was the top threat among the 20 other contenders.

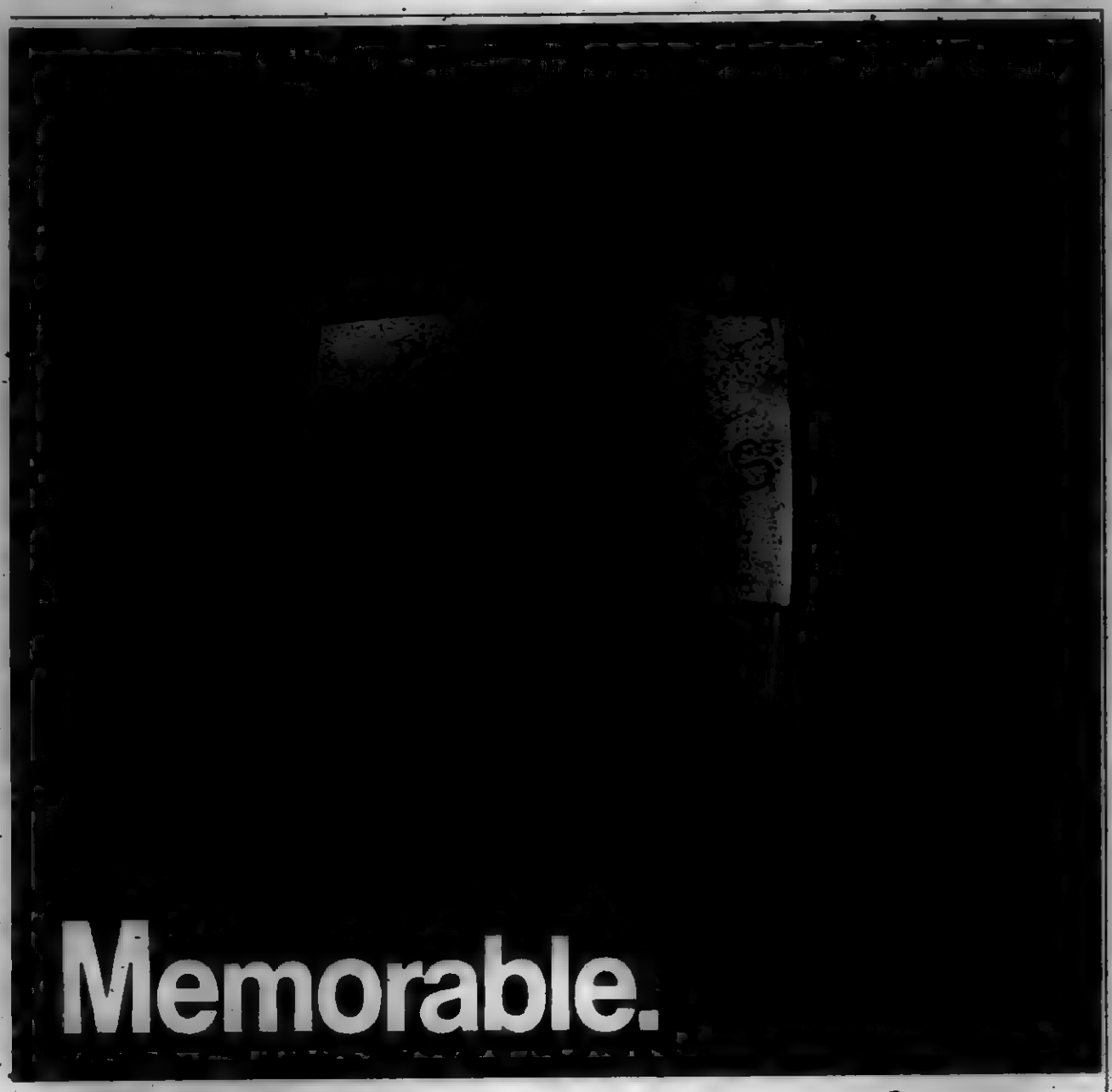
After the dust had cleared at the triennial World Computer Chess Championship, held here in conjunction with the recent Association for Computing Machinery meeting, the developers of the Cray Blitz computer chess program walked off with the top trophy.

About half of the programs competing against each other for the crown of World Computer Chess champ were played on microcomputers. Although some of those micro-based contenders fought hard, they proved in the end no match for their bigger foes, some of which employed more than one processing unit.

Triumph over Belle

Cray Blitz, which runs on a Cray Research, Inc. Cray-1/M series processor, battled to a draw with 1977 champion Nuchess in the tourney's fourth round and triumphed over 1980 champ Belle in the final round en route to the championship. The developers of the Cray Blitz program, Dr. Eugene Moore and Dr. Robert Hyatt of the University of Southern Mississippi, faced challengers from eight nations, including Canada, England, West Germany and Austria.

The loss of the title was particularly bitter for Belle, which operates on a Digital Equipment Corp. PDP-11/23 processor, as the U.S. Chess Federation had only recently recognized the former champion as the first chess program worthy of a national master rating.



With 3M diskettes, your computer never forgets.

3M diskettes remember everything, every time. Because at 3M, reliability is built into every diskette. We've been in the computer media business for over 30 years. And we've never settled in. We're constantly improving and perfecting our product line, from computer tape and data cartridges to floppy disks.

3M diskettes are made at 3M. That way, we have complete control over the entire manufacturing process. And you can have complete confidence in the reliability of every 3M diskette you buy.

Look in the Yellow Pages under Computer Supplies and Parts for the 3M distributor nearest you. In Canada, write 3M Canada, Inc., London, Ontario. If it's worth remembering, it's worth 3M diskettes.

3M hears you...

3M

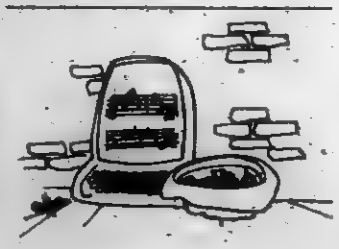
Journal covers Fortran's 25th

RESTON, Va. — The January 1984 issue of the *Annals of the History of Computing*, a quarterly journal published by the American Federation of Information Processing Societies, Inc. (Afips), is a special issue covering Fortran's 25th anniversary.

The issue contains 14 articles by original developers and users of Fortran, a widely used high-level programming language. Articles include "Early Computers and Computing Institutions," "Computing Prior to Fortran," "Early Fortran User Experience" and "The Impact of Fortran Standardization."

Single copies cost $10-$20. A one-year subscription to Annals costs $22 (members of Afips Constituent Societies), $30 to nonmembers and $50 to institutions.

Further information is available from Afips Press, 1899 Preston White Blvd., Reston, Va. 22091.



FIRST CONCEPT TECHNOLOGIES, INC.

Announces

INTERCHANGE/1

The complete Micro to Mainframe Data Link.
Available for installation TODAY.

INTERCHANGE/1 allows personal computer users complete access to mainframe data. PC programs can treat that data as if it were actually stored on the personal computer. ADABAS, IDMS, TOTAL and VSAM files can be accessed with simple GET, INSERT, UPDATE and DELETE commands, from standard PC programming languages.

INTERCHANGE/1 is the complete micro to mainframe link. It requires no special PC "database language", but instead extends PC BASIC and PASCAL by adding database manipulation commands. Several mainframe files may be accessed from a single PC program.

INTERCHANGE/1 supplies records on request, without the need for full file transfer, just as normal PC file processing does. It also allows sophisticated data "queries" through its programmatic "GET MATCH" command. You supply the criteria, INTERCHANGE/1 returns only those records which meet that criteria.

Where full file transfer is necessary **INTERCHANGE/1** provides both an UPLOAD and a DOWNLOAD utility. UPLOAD can be used to enter records interactively from the PC, or to transfer records from a PC file to the mainframe database. DOWNLOAD will allow transfer of mainframe files to the PC and will even prompt for MATCH criteria so that only the desired records are transferred.

INTERCHANGE/1 includes both the micro and mainframe interface. No user written mainframe program is required. Full mainframe security is provided and can be controlled at the central computer. The Data Center determines which fields in a file may be accessed by a particular user and assigns passwords to control the level of access (READ-ONLY, UPDATE, INSERT/DELETE).

INTERCHANGE/1 is a true micro to mainframe interface because it treats the microcomputer as an equal, not as a 3270 terminal.

INTERCHANGE/1 is the first in our CONTINUUM series of products for Distributed Data Processing (DDP). We are committed to supporting a true DDP environment.

INTERCHANGE/1 forms the basis for an integrated distributed resource system.

INTERCHANGE/1 currently supports mainframe ADABAS, IDMS, TOTAL and VSAM files and interfaces with the IBM Personal Computer. Support for additional mainframe database products, additional microcomputers (Apple, Wang) and additional "mainframes" (VAX, BURROUGHS, DATA GENERAL) are under development. Call us for details or special requests. If we don't have it now, we will build it for you.

Within the next several months, at least a dozen micro/mainframe links will be announced by other manufacturers. To help you in evaluating the products which have been, or will be announced, we have prepared a booklet, in easy to understand "laymen's" terms, titled:

"All you need to Know about the
Micro to Mainframe Link --
Questions to ask your vendor."

The booklet describes what is necessary in a true micro to mainframe link, and explains some of the terms used to describe the various versions available. It will help you to determine what level of link you require for your environment.

For your free copy of our booklet call Toll Free
1-800-448-3400
or
1-800-962-5000 (in New York)
or return the coupon provided below

To futher assist your finding a product to meet your needs, WE have provided a list of those vendors we know who have already announced or will be announcing some form of micro to mainframe link. It is not exhaustive, and WE invite any vendor we miss to let us know, so we can include them in our next ad.

"Our Competition"

Cincom Systems, Inc. (Cincinnati, Oh.)
Computer Automation (Richardson, Tx.)
Computer Corporation of America (Cambridge, Ma.)
Cullinet Software (Westwood, Ma.)
Informatics General Corporation (Fairfield, N.J.)
Intel Corporation (Santa Clara, Ca.)
National Data Corporation (Fairfield, N.J.)
On-Line Software International (Fort Lee, N.J.)
PCI (Woodland Hills, Ca.)
Relay Software, Inc. (Columbia, S.C.)
Software AG of North America (Reston, Va.)

To receive your free copy of our booklet:
"All you need to know about the Micro to Mainframe Link -- Questions to ask your vendor."
Call **Toll Free 1-800-448-3400** or
(in New York) **1-800-962-5000** or
return this coupon below:

FIRST CONCEPT TECHNOLOGIES, INC.
P.O. Box 23510
Rochester, New York 14692

Please send me your booklet on the
Micro to Mainframe Link

NAME _____

TITLE _____

COMPANY _____

ADDRESS _____

_____

PHONE _____

Mainframe Database used _____

Micro used _____

We are the best,
and we intend to prove it.

FIRST CONCEPT
TECHNOLOGIES, INC.
P.O. BOX 23510
ROCHESTER, N.Y. 14692

EQUITABLE LIFE
LEASING CORPORATION

OFFERS

OPERATING & TAX PRICED LEASES

FOR:

Data General

IBM

digital

PRIME

HEWLETT PACKARD

WANG

EQUITABLE LIFE
LEASING CORPORATION

For more information call any of the offices listed below

Atlanta
Boston
Chicago
Cincinnati
Cleveland
Dallas
Denver
Detroit
Houston
Kansas City
Los Angeles
Milwaukee
Minneapolis
New York
Orlando
Philadelphia
Phoenix
Pittsburgh
Portland
St. Louis
Salt Lake City
San Francisco
Seattle
Washington D.C.

CORPORATE HEADQUARTERS

TURNAROUND TIME

LARRY E. LONG

Q I was moved from development work into management information systems (MIS) planning about 18 months ago. Since that time I have completed two MIS plans. One was operational, and the other was in response to top management's request for a strategic plan for MIS.

Both plans have been well-received in the MIS department, but top management thinks our MIS strategic plan is still too operational. I've been asked by the director of MIS to revise the last plan to emphasize strategic planning. Do you have any suggestions about how to proceed?

A Many MIS "strategic" plans are no more than management summaries of more detailed operational plans that concentrate on new systems development, major enhancements and hardware upgrades. Top management's response to your strategic plan indicates to me that you may have fallen into this same trap.

You may be better off starting from scratch than trying to revise the MIS strategic plan. At this point, top management is not going to be satisfied with a revised operational plan. They want a plan that articulates those MIS strategies that are consistent with, and complementary to, corporate objectives.

If you haven't already done so, review the corporate strategic plan to see if it identifies any directions for MIS (often it does not). Invite input from corporate planners. Follow any corporate planning guidelines to the extent possible.

Keep in mind that top management wants a strategic plan that focuses on what has to be done to achieve specific results. Through a series of discussions with top management and MIS managers, derive a consensus of what the function of MIS is to be. Then set a series of strategic objectives.

In the plan, accompany each strategic objective with a brief explanation of how that objective is to be met. Each major planning area (systems, hardware, personnel, operations, communications and so on) should be supported by at least one strategic objective.

For example, the strategic objectives for information systems planning might be to integrate existing and proposed information systems in a data base environment and to emphasize user friendliness and distributed data processing in systems design.

Finally, keep it to 20 pages or less.

Q I've conducted several in-house training sessions over the last three years on data base management and structured design. I enjoy teaching and would like to know what the career opportunities are in colleges and universities. Are there opportunities for part-time instructors?

A Academe is experiencing a desperate shortage of data processing and computer science instructors. In all likelihood, you need look no further than local institutions to find openings. Recruitment of both full-time and part-time faculty has become an ongoing task in most departments.

Q I'd like to add some specifics to your response to a person who was doomed to documenting dinosaurs. We follow these guidelines in updating the documentation of old systems and programs that have no documentation or poor documentation:

1. Documenting the data flow is more important than documenting the programs.
2. Set a time for documenting a system.
3. Begin with the identification of all programs (not program internals).
4. Compile data flow diagrams showing all I/O for each program (files, data sets, reports and screens).
5. Now, if time permits, identify the worst programs and list the programming tricks that they use.

A Your guidelines are good, but allow yourself enough flexibility to spend more time on the redocumentation of old systems that are extremely volatile and critical to organizational operation (and sometimes survival). Give these dynamic systems more attention than the relatively stable systems that have cumbersome but acceptable documentation.

Q I would like to work in Europe or perhaps South America for a few years, while I'm still young and unattached. I have five years' experience as a programmer/analyst. Will I be able to find a job?

A The best opportunities for employment are in the Third World countries and countries with oil-based economies. Jobs and work visas are more difficult to obtain in industrialized Europe.

Nationalism is strong in most countries, and employers prefer to hire their own, when possible. To get your foot in the door, you will probably need to demonstrate a specialized expertise and facility with the language. The oil countries are less demanding.

Long is a professor at Lehigh University, a DP consultant and author. If you have a question you'd like him to address, send it to Larry Long, Editorial Department, Computerworld, P.O. Box 880, Framingham, Mass. 01701.

NEW TANDY TRS-80® MODEL 2000

The ultra-high performance MS-DOS system that operates at over twice the speed of the IBM PC.

Introducing a new standard in MS-DOS based computers—the Tandy 2000 Personal Computer.

Tandy 2000 uses today's most popular and sophisticated MS-DOS based programs. And since Tandy 2000 runs at over twice the speed of the IBM PC, you can get the job done quicker.

You can store twice as much data on Tandy 2000's two built-in disk drives as you can on IBM PC, COMPAQ, or TI Professional drives. And you can handle bigger jobs, since our memory expands to 768,000 bytes.

Tandy 2000's video display is truly stunning. Our color graphics have up to twice the resolution of the others, and up to twice as many colors.

And not only does the Tandy 2000 take up less desk space, it also costs less*.

Service? Radio Shack's is second to none—total hardware and software support nationwide.

Best of all, the Tandy 2000 is available today at over 1000 Radio Shack Computer Centers and at participating Radio Shack stores and dealers nationwide.

Tandy 2000 With Two Disk Drives **2750.00** 25-5103

Non-interlaced monitor, Digi®-Mouse and graphics not included

Commercial Lease Available For Only $95 Per Month (Plus Applicable Use/Sales Tax)

Radio Shack COMPUTER CENTER

A DIVISION OF TANDY CORPORATION

Send me the free Tandy 2000 brochure.

Mail To: Radio Shack, Dept. 84-A-826
300 One Tandy Center, Fort Worth, TX 76102

NAME _____
COMPANY _____
ADDRESS _____
CITY _____ STATE _____ ZIP _____
TELEPHONE _____

*Comparable systems based on IBM's retail prices as of 9/1/83. Prices apply at participating Radio Shack stores and dealers. IBM is a registered trademark of International Business Machines Corp. MS is a registered trademark of Microsoft Corp. COMPAQ is a trademark of COMPAQ Computer Corporation. TI is a registered trademark of Texas Instruments, Inc.

©1984 AT&T Information Systems

WHEN YOU'VE GOT TO BE RIGHT

In business, being right is what it's all about. Right in the decisions you make, right in the equipment you select to help you make those decisions.

AT&T Information Systems can help you be right. Now more than ever before.

As of January 1st, all our business communications equipment is for sale or for lease. Whether it is equipment you already have, or additional equipment you might need. We offer everything from basic business phones to the most sophisticated voice and data systems in the industry. And you can buy them at competitive prices that are consistent nationwide. Simply give us a call to discuss all the options available to you.

Also on January 1st, our service and sales forces were integrated, united into the largest organization of its kind anywhere. There are 206 branch offices across the country. Plus 79 Business Service and Sales Centers.

No matter what size your business, we'll help you with planning, installation and maintenance. Before, during, and after the sale.

What else is new? A new spirit of competitiveness throughout the company, from top to bottom. A new dedication to the idea of providing you with better products and better service. On faster timetables.

A few things haven't changed. We're still supported by the genius of AT&T Bell Labs, plus the benefits of more than 100 years of communications experience.

Before you make decisions vital to moving your business ahead, talk with us. **AT&T INFORMATION SYSTEMS. 1-800-247-1212.**

It's worth your while, when you've got to be right.

Speaker cites next decade's concerns, players

By John Gallant
CW Staff

NEWTON, Mass. — Communications capabilities, computing power and memory will become increasingly inexpensive, but programming costs will be the fly in the ointment in the DP marketplace of the next decade, according to an industry expert who spoke here recently.

In addition, Robert G. Gilbertson Sr., president and chief executive officer of Data Switch Corp. of Norwalk, Conn., told the Boston Society for Information Management that IBM will "continue to cast a heavy shadow in the computer industry" with even more aggressive pricing and the introduction of new products.

According to Gilbertson, IBM's increasing dominance does not bode well for "the seven dwarves" — the mainframe vendors that do not make IBM plug-compatible machines.

IBM to dominate

"We will be dominated even more by IBM in the 1980s than we have been in the past. Within its corporate structure, IBM has created organizational groups that are designed to attack any chosen market through whatever means available. We've seen that clearly with the Personal Computer, and I think you'll see it with local-area networks also," said Gilbertson, a former IBM executive and faculty member of the Harvard Business School.

"In the mainframe market," he forecast, "it's clear that one or more of the non-plug-compatible manufacturers will retire by 1986 — and the first will probably be [Honeywell, Inc.]."

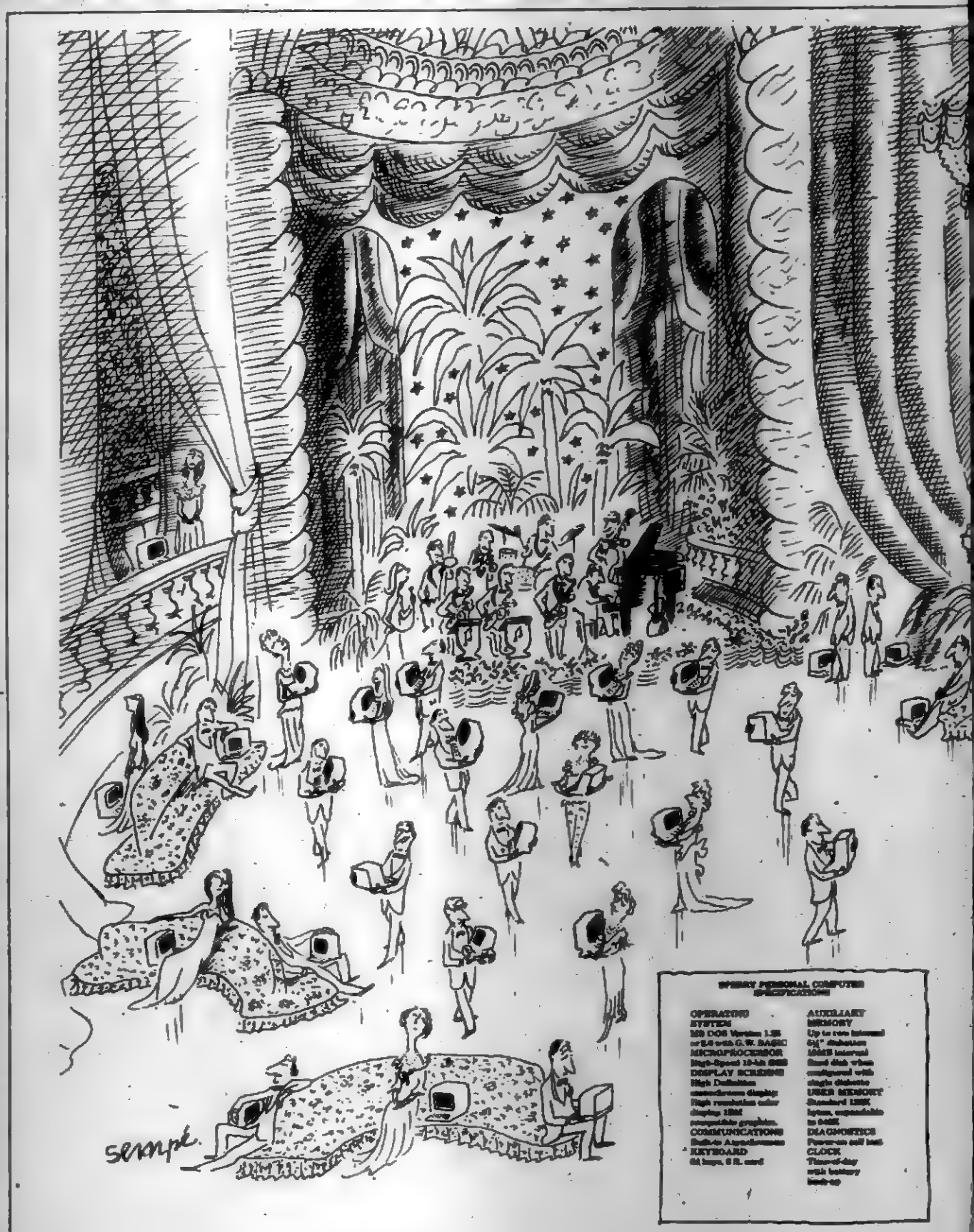
Gilbertson predicted that IBM's upcoming moves will include replacements for the 3080 and 4300 series processors, a new "fiber channel" for high-speed data delivery and a new emphasis on distributed processing, with the expected introduction of the token and star ring local-area networks.

In response, IBM compatibility will become an increasingly popular survival strategy. "We can have all the IEEE [Institute of Electrical and Electronics Engineers] and Ansi meetings we want, but IBM will continue to set the standards in the industry," Gilbertson said. "For example, when the token and star ring local-area networks are introduced, they will quickly obsolete all other offerings. In the micro area, competitors like [Apple Computer, Inc.] will have to become -IBM-compatible to withstand market pressures."

The private and government sectors will spend more than $1 trillion in the next five years for DP services — a vast sum, but one that Gilbertson said will purchase "huge capabilities." Processing power will become cheaper, as will additional memory capacity, although he predicted that cost savings for increased storage will level off as "designers reach the electromechanical limits of these devices."

More important, "telecommunications costs will drop even faster in the unregulated environment of the next decade," Gilbertson predicted. "It will become more and more economical to divide your processing resources, to move away from the idea of one central processing location."

But the "kicker" in all the good news, he said, is that programming costs will rise with the introduction of ever more new products requiring ever more sophisticated code. "It has been estimated that one line of Cobol code costs about $14. That cost won't fall. We're getting better at writing bug-free code, but we aren't getting any more efficient at producing code."



CALENDAR

WEEK OF JAN. 15

JANUARY 16-17, BOSTON — Data Communications for Personal Computers. Contact: Center for Advanced Professional Education, Suite 110, 1620 E. Garry St., Santa Ana, Calif. 92705.

JANUARY 16-17, DALLAS — Micro/Personal Computers: Comparative Analysis and Implementation Guidelines. Contact: Software Institute of America, 339 Salem St., Wakefield, Mass. 01880. Also being held Jan. 19-20 in Los Angeles.

JANUARY 16-17, SAN FRANCISCO — Managing Projects in the Structured Environments. Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

JANUARY 16-17, DALLAS/RICHARDSON, TEXAS — Ithaca II. Contact: Center for Advanced Professional Education, Suite 110, 1620 E. Garry St., Santa Ana, Calif. 92705. Also being held Jan. 18-19 in Houston, Jan. 23-24 in San Francisco and Jan. 25-26 in San Jose, Calif.

JANUARY 16-18, ATLANTA — DP Auditing and Controls. Contact: MIS Training Institute, Inc., 4 Brewster Road, Framingham, Mass. 01701.

JANUARY 16-18, PHOENIX — Data Communications Systems. Contact: Center for Advanced Professional Education, Suite 110, 1620 E. Garry St., Santa Ana, Calif. 92705. Also being held Jan. 25-27 in Arlington, Va.

JANUARY 16-18, ATLANTA — Auditing Advanced Computer Systems. Contact: MIS Training Institute, Inc., 4 Brewster Road, Framingham, Mass. 01701.

JANUARY 16-18, RALEIGH/DURHAM, N.C. — Personal Computers and Networking. Contact: Center for Advanced Professional Education, Suite 110, 1620 E. Garry St., Santa Ana, Calif. 92705.

JANUARY 16-20, TRUMBULL, CONN. — Advanced Unix. Contact: Gregory Geiger, Bunker Ramo Information Systems, Trumbull Industrial Park, 35 Nutmeg Drive, Trumbull, Conn. 06609.

JANUARY 16-20, NEW YORK — Structured Analysis and System Specification Workshop. Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036. Also being held Jan. 16-20 in Chicago and Jan. 23-27 in Boston, Seattle and Columbus, Ohio.

JANUARY 16-20, BOSTON — Structured Analysis and Design Workshop. Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036. Also being held Jan. 16-20 in Minneapolis, New York and Salt Lake City and Jan. 23-27 in Denver and Pittsburgh.

JANUARY 16-20, COLLEGE PARK, MD. — Unix Workshop. Contact: Plum Hall, One Spruce Ave., Cardiff, N.J. 08232.

JANUARY 16-20, HOUSTON — Structured Analysis for Real-Time Systems. Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036. Also being held Jan. 23-27 in San Francisco.

JANUARY 16-20, WASHINGTON, D.C. — Unix and Software Tools. Contact: Mark Weber, Professional Exposition Management Co., Inc., Suite 205, 2400 E. Devon Ave., Des Plaines, Ill. 60018.

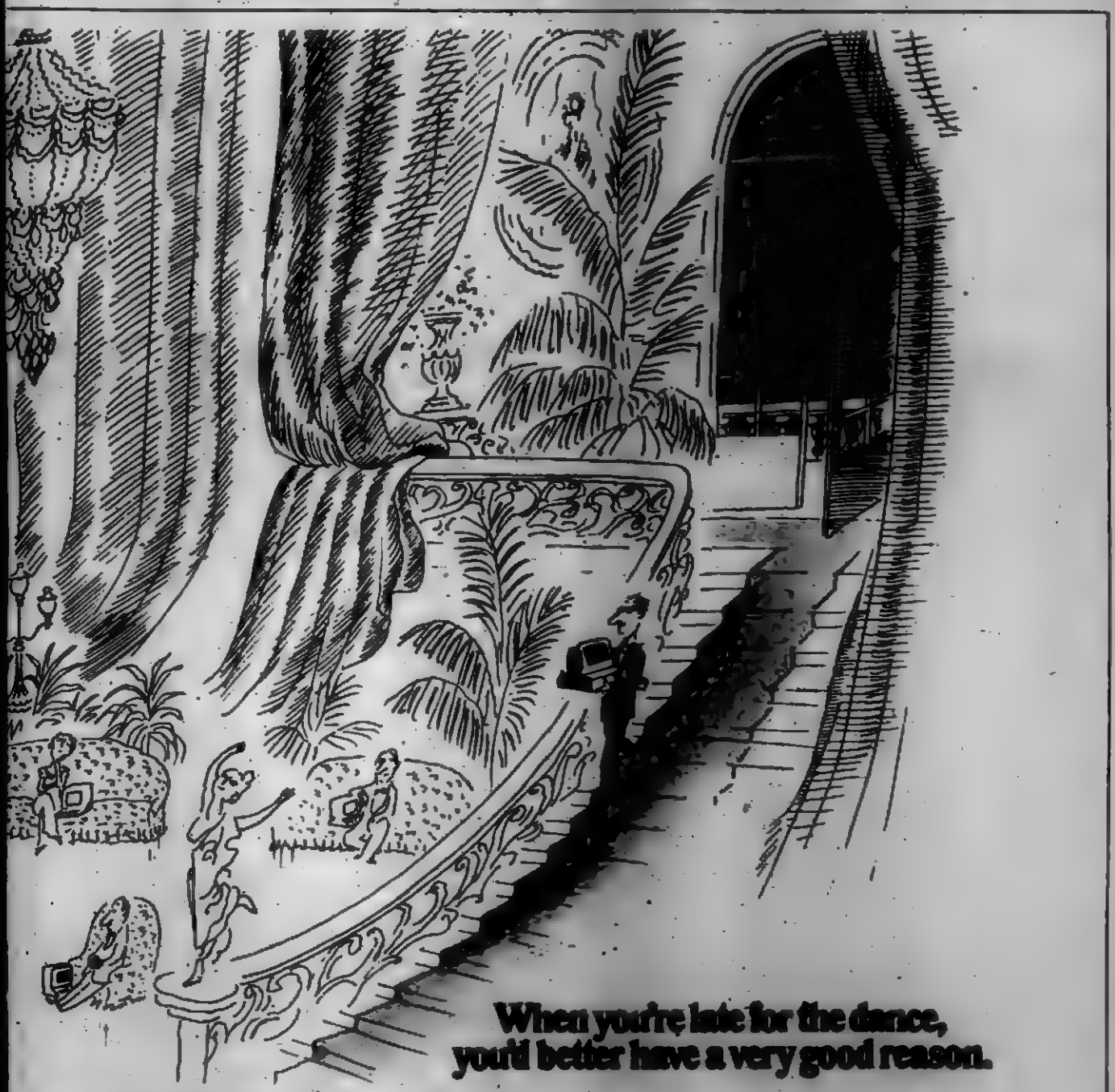
JANUARY 16-20, NEW YORK — Structured Programming Workshop. Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

JANUARY 16-20, TRUMBULL, CONN. — C Programming. Contact: Gregory Geiger, Bunker Ramo Information Systems, Trumbull Industrial Park, 35 Nutmeg Drive, Trumbull, Conn. 06609.

JANUARY 16-20, BOSTON — Structured Design Workshop. Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036. Also being held Jan. 16-20 in Portland, Ore.

JANUARY 16-20, DENVER — Information Modeling Workshop. Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036. Also being held Jan. 16-20 in Denver, Raleigh, N.C., and Washington, D.C.

See DATES page 38



When you're late for the dance, you'd better have a very good reason.

The party started about three years ago for the personal computer.

And there was dancing.

But there wasn't much talking. Because as more and more computer companies arrived, there were some very real compatibility problems.

Until one latecomer arrived. Sperry.

With a remarkably simple solution. The Sperry PC.

It was able to run all IBM compatible software.

It was able to run all this software with stunningly more dramatic graphics and from a substantially more comfortable keyboard than IBM's.

And, with the flick of a special "turbo" switch, the Sperry PC could even run 50% faster than IBM.

Enough for one night? Not for the people from Sperry.

For the Sperry PC had the additional ability to plug into the real brains of an organization—the main computer. Whether that system was IBM or Sperry.

Or both.

The Sperry PC. An admittedly attractive arrival.

But when you get there late, you'd better have something important to bring to the party.

To see how the Sperry PC can work for you and for your free copy of the Micro Software Catalogue, write Sperry Corporation, Computer Systems, Dept. 100, P.O. Box 500, Blue Bell PA 19424. Or call 800-547-8992.

© SPERRY Corporation, 1983

SPERRY

The Sperry PC.
What the personal computer should have been in the first place.

DATES from page 27

JANUARY 17-18, PHOENIX — **Local Networks in the Factory.** Contact: Architecture Technology Corp., P.O. Box 24344, Minneapolis, Minn. 55424.

JANUARY 17-19, KANSAS CITY, MO. — **1984 Midwestern Telecommunications Showcase.** Contact: U.S. Telecommunications Suppliers Association, Suite 1618, 333 N. Michigan Ave., Chicago, Ill. 60601.

JANUARY 17-19, ORLANDO, FLA. — **Southcon/84 High-Technology Electronics.** Contact: Electronic Conventions, Inc., 8110 Airport Blvd., Los Angeles, Calif. 90045.

JANUARY 17-19, ORLANDO, FLA. — **Mini/Micro Southeast '84.** Contact: Electronic Conventions, Inc., 810 Airport Blvd., Los Angeles, Calif. 90045.

JANUARY 17-20, PALO ALTO, CALIF. — **Data Base Management Systems: Mini, Micro and Distributed Applications.** Contact: Integrated Computer Systems, 3304 Pico Blvd., Santa Monica, Calif. 90405.

JANUARY 17-20, LOS ANGELES — **Practical Structured Techniques for Software Design and Coding.** Contact: Integrated Computer Systems, 3304 Pico Blvd., Santa Monica, Calif. 90405.

JANUARY 17-20, WASHINGTON, D.C. — **Hands-On Pascal Workshop.** Contact: Integrated Computer Systems, 3304 Pico Blvd., Santa Monica, Calif. 90405.

JANUARY 17-20, WASHINGTON, D.C. — **Software Project Management: Micro and Minicomputer Software Engineering.** Contact: Integrated Computer Systems, 3304 Pico Blvd., Santa Monica, Calif. 90405.

JANUARY 17-20, WASHINGTON, D.C. — **CAD/CAM Systems.** Contact: Ruth Dordick, Integrated Computer Systems, 6305 Arizona Place, Los Angeles, Calif. 90045.

JANUARY 17-20, BALTIMORE — **Computer Network Design and Protocols.** Contact: Ruth Dordick, Integrated Computer Systems, 6305 Arizona Place, Los Angeles, Calif. 90045. Also being held Jan. 24-27 in Palo Alto, Calif.

JANUARY 17-20, ANAHEIM, CALIF. — **Microprocessor Software, Hardware and Interfacing.** Contact: Ruth Dordick, Integrated Computer Systems, 6305 Arizona Place, Los Angeles, Calif. 90045.

JANUARY 17-20, SAN DIEGO — **Programming in C: A Hands-On Workshop.** Contact: Ruth Dordick, Integrated Computer Systems, 6305 Arizona Place, Los Angeles, Calif. 90045.

JANUARY 17-20, SAN DIEGO — **Data Communications.** Contact: Ruth Dordick, Integrated Computer Systems, 6305 Arizona Place, Los Angeles, Calif. 90045. Also being held Jan. 31-Feb. 3 in Washington, D.C.

JANUARY 18-20, DENVER — **Data Base Management.** Contact: Center for Advanced Professional Education, Suite 110, 1820 E. Garry St., Santa Ana, Calif. 92705. Also being held Jan. 25-27 in Washington, D.C.

JANUARY 18-20, INDIANAPOLIS — **Local-Area Networks.** Contact: Center for Advanced Professional Education, Suite 110, 1820 E. Garry St., Santa Ana, Calif. 92705. Also being held Jan. 25-27 in Boston.

JANUARY 18-20, CHICAGO — **Network Communications Protocols.** Contact: Center for Advanced Professional Education, Suite 110, 1820 E. Garry St., Santa Ana, Calif. 92705. Also being held Jan. 25-27 in Raleigh/Durham, N.C.

JANUARY 18-20, COLUMBUS, OHIO — **Unix.** Contact: Center for Advanced Professional Education, Suite 110, 1820 E. Garry St., Santa Ana, Calif. 92705. Also being held Jan. 25-27 in Minneapolis.

JANUARY 19-20, ATLANTA — **Creative Use of Audit Software.** Contact: MIS Training Institute, Inc., 4 Brewster Road, Framingham, Mass. 01701.

JANUARY 19-20, NEW YORK — **Fourth-Generation Data Management Software.** Contact: Software Institute of America, 339 Salem St., Wakefield, Mass. 01880. Also being held Jan. 30-31 in Seattle.

JANUARY 19-20, NEW BRUNSWICK, N.J. — **Data Communications for Personal Computers.** Contact: Center for Advanced Professional Education, Suite 110, 1820 E. Garry St., Santa Ana, Calif. 92705. Also being held

The Texas Instruments Quite simply, the best on the market today.

Jan. 30-31 in Los Angeles.

JANUARY 19-21, PASADENA, CALIF. — Datawest '84. Contact: Layna J. Browdy Berkhemer and Kline, Inc., Suite 250, 261 S. Figueroa St., Los Angeles, Calif. 90012.

JANUARY 20, LOS ANGELES — CICS/VS Concepts and Facilities. Contact: Teltech, 39 Broadway, New York, N.Y. 10006. Also being held Jan. 23 in New York.

WEEK OF JAN. 22

JANUARY 23, HOUSTON — Successful Strategies for Acquisition and Control of Microcomputers: The Revolution. Contact: Datamation Institute, Suite 415, 950 Boylston St., Chestnut Hill, Mass. 02167.

JANUARY 23-24, NEW YORK — The Impact of the Computer Revolution 1984-2001. Contact: Yourdon, Inc.; 1133 Ave. of the Americas, New York, N.Y. 10036.

JANUARY 23-24, ORLANDO, FLA. — Software Configuration Management. Contact: Education Foundation of the Data Processing Management Association, Department SCM, P.O. Box 3008, 3420 Kashiwa St., Torrance, Calif. 90510. Also being held Jan. 26-27 in Boston and Jan. 30-31 in Washington, D.C.

JANUARY 23-25, NEW YORK — CICS/VS Application Programming. Contact: On-Line Software International, Fort Lee Executive Park, Two Executive Drive, Fort Lee, N.J. 07024.

JANUARY 23-25, MILLBRAE, CALIF. — Surge Protection of Computers and Other Electronic Systems. Contact: Francis P. Drake, Department of Engineering and Applied Science, University of Wisconsin Extension, 432 N. Lake St., Madison, Wis. 53706.

JANUARY 23-25, HUNTSVILLE, ALA. — Personal Computers and Networking. Contact: Center for Advanced Professional Education, Suite 110, 1620 E. Garry St., Santa Ana, Calif. 92705. Also being held Jan. 30-Feb. 1 in Toronto.

JANUARY 23-26, FORT LEE, N.J. — Vtam: From Start to Finish. Contact: On-Line Software International, Fort Lee Executive Park, Two Executive Drive, Fort Lee, N.J. 07024.

JANUARY 23-26, ATLANTA — Vtam: Its Structure and How to Use it. Contact: On-Line Software International, Fort Lee Executive Park, Two Executive Drive, Fort Lee, N.J. 07024.

JANUARY 23-26, FORT LEE, N.J. — IMS/DB (DL/1) Application Programming. Contact: On-Line Software International, Fort Lee Executive Park, Two Executive Drive, Fort Lee, N.J. 07024.

JANUARY 23-27, SALT LAKE CITY — Information Modeling Workshop. Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

JANUARY 23-27, TRUMBULL, CONN. — Practical Data Communications. Contact: Gregory Geiger, Bunker Ramo Information Systems, Trumbull Industrial Park, 35 Nutmeg Drive, Trumbull, Conn. 06609.

JANUARY 23-27, LOS ANGELES — Advanced Structured Analysis. Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

JANUARY 23-27, COLLEGE PARK, MD. — C Programming Workshop. Contact: Plum Hall, One Spruce Ave., Cardiff, N.J. 08232.

JANUARY 23-27, DALLAS — Structured Program Design and Maintenance. Contact: Georganna Carson, Ken Orr and Associates, Inc., 1725 Gage Blvd., Topeka, Kan. 66604.

JANUARY 23-27, NEW YORK — CICS Command-Level Programming. Contact: SYS-ED, One Park Ave., New York, N.Y. 10016.

JANUARY 23-27, ORLANDO, FLA. — CICS Programming. Contact: Harris Education Center, 6220 S. Orange Blossom Trail, Orlando, Fla. 32809.

JANUARY 23-27, WASHINGTON, D.C. — Data Communications for Microcomputers. Contact: George Washington University, Washington, D.C. 20052.

JANUARY 24-26, NEW YORK — CICS/VS Command-Level Debugging. Contact: Teltech, 39 Broadway, New York, N.Y. 10006.

JANUARY 24-26, PHOENIX — Data Communications Concepts. Contact: Suzanne Galliart, Memorex Customer Education, M/S 03-16, 3393 Octavius Drive, Santa Clara, Calif. 95051.

Professional Computer. personal computer And tomorrow.

For your best performance and productivity, rely on the TI Professional Computer.

Critics have called it "the machine IBM should have designed." And "the optimum personal computer." And thousands of demanding business and professional people have had similar praise for the design, software availability and dependability of the Texas Instruments Professional Computer. Here's why.

Best internal design.

With the TI Professional Computer, you avoid the possibility of computer underbuy or overbuy. Unlike IBM, our standard PC can grow to XT capability — so you don't have to choose between a PC or an XT. If you need more computer after you buy the standard TI Professional Computer, add features like internal memory up to 768K RAM. And internal 10 megabyte Winchester disk. Or other expansion capabilities which you can add using our 5 built-in option slots. So you get more computer without buying a new one.

Best graphics.

Our high resolution monitors give you some of the sharpest displays available, 3-plane graphics and the capability for 8 simultaneous colors or monochrome shades (IBM and Apple give you only 4). Plus, unlike IBM, the same software runs on either the color or monochrome monitor.

Best software available today.

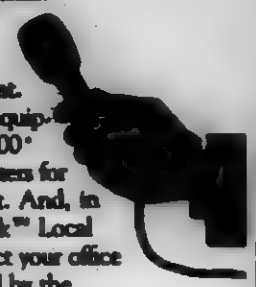
Literally hundreds of third-party software packages are available for the TI Professional Computer. Including the best-sellers like Lotus 1-2-3™. TI and leading third-party software suppliers are committed to developing new programs to help keep your business ahead.

Best keyboard.

Superior design makes this the easiest to use keyboard. You get 12 programmable function keys for faster, easier use. Separate numeric keypad and cursor controls. And isolated edit/delete keys to prevent accidental loss of data.

Best new features for the future.

Come in to a participating dealer today for a demonstration of the TI Professional Computer using our revolutionary speech recognition† capability. Soon you will be able to add the recently announced Speech Command™ option to the TI Professional Computer. This will enable you to operate the computer with simple voice commands. Which lets you work a lot faster and easier.



Best support equipment.

We offer companion equipment like the OMNI 800* Model 850 and 855 printers for reliable hard copy output. And, in early 1984, the EtherLink™ Local Area Network to connect your office workstations. All backed by the TI worldwide network of service and support.

See the TI Professional Computer for yourself. It is, quite simply, the best. Today and tomorrow. Now at participating ComputerLand stores and independent dealers. For the location nearest you, and answers to questions about your computing needs, call 1-800-527-3500.

TEXAS INSTRUMENTS
Creating useful products and services for you.

* CompuLED and Speech Command are trademarks of Texas Instruments Incorporated.
EtherLink is a trademark of 3Com Corporation.
† 1-2-3 is a trademark of Lotus Corporation.
Voice input demonstrated recognizable. Available early 1984.
Copyright © 1983 Texas Instruments 2771-04CPC

EDITORIAL

And now, 1984

How perfect! We enter 1984, trying to shrug off George Orwell's dire warnings of government control and surveillance, only to find there is a proposal to expand drastically the Federal Bureau of Investigation's capability to monitor electronically noncriminals.

The proposal to expand the bureau's National Crime Information Center network to surveil "associates" of certain types of criminals is only in very preliminary discussion and may go no further.

But the trend is very disturbing. Last year the FBI and the Secret Service turned the NCIC, an interstate criminal records exchange system, into a national surveillance system by adding a file to monitor the activities of persons of interest to the Secret Service.

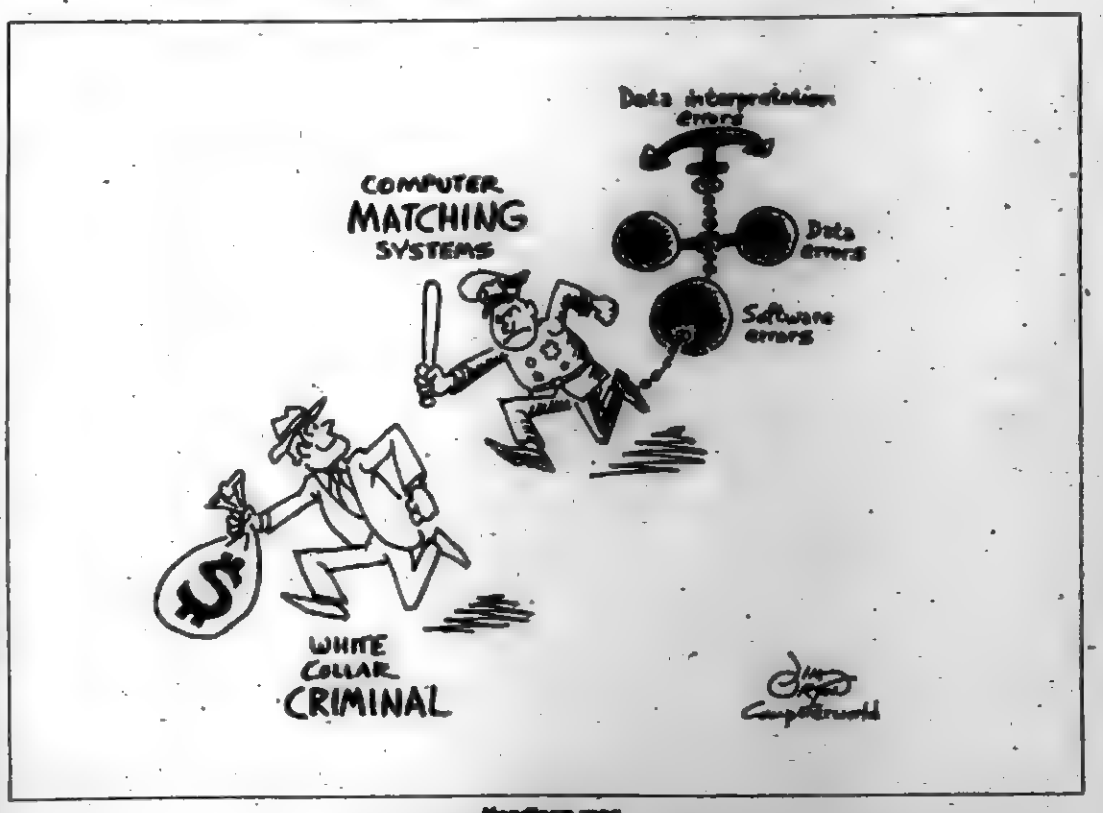
A congressional oversight subcommittee said the file was illegal, but the FBI claimed it was needed to protect the president. Now the FBI can claim it needs further surveillance capabilities to stop terrorists, drug runners and foreign spies.

Some, no doubt, will wonder why the FBI didn't have this capability before and why it should not have it now. Of course law enforcement should have the tools to stop terrorists and spies, but the NCIC should not be one of them. That system was designed to provide data to thousands of police officers and court officials across the country. These people surely are not the first line of defense against terrorists or spies.

More importantly, in some states the network is open to anyone and is used by many firms to see if job applicants have criminal records. What happens when your cousin, unknowingly in an NCIC "known associate" file because she baby-sits for a mobster's sister-in-law, goes looking for a job or is stopped for speeding? She might be denied a job or find a policeman, alerted to the NCIC "hit," pointing a gun at her.

That sounds far-fetched, but without some statutory guidelines, who knows what kind of information will go into this kind of file? And police system "computer errors" have resulted in the jailing and death of innocent people before.

It is frightening to consider what might happen if this sort of activity is allowed without specific legal authority. If the FBI can use records systems to monitor individuals, why can't other government agencies or even private corporations? In Orwell's novel, people were constantly monitored by the government. Now, it seems, in the real 1984 we might have many Big Brothers.



Handicap race

LETTERS TO THE EDITOR

Problems not common to all environments

In Barry L. Abramson's article, "Reducing Security Risks Associated With VM Access" [CW, Dec. 5], Abramson cites several security-related problems he has perceived in his organization's use of IBM's VM operating system and outlines the steps he has taken to address them. The article implies that these problems arise from operating system shortcomings and suggests that they might be corrected in future versions of VM.

Judging by the descriptions given, these problems are due mainly to the manner in which the operating system is used and are not common to all VM application environments. The solution techniques described employ standard tools provided to users by the operating system for that purpose and others and are not, strictly speaking, modifications to the operating system. (However, system source and change management tools are provided with VM to facilitate local operating system modifications, should they be needed to meet special installation requirements.)

It is difficult to see how the base VM system might be modified to alleviate problems such as those described without impairing or precluding many existing legitimate and productive uses of the operating system in differing environments.

Edsen C. Hendricks
Systems Consultant
San Diego, Calif.

Inaccurate picture

Barry L. Abramson's article, "Reducing Security Risks Associated with VM Access" [CW, Dec. 5], presents a profoundly inaccurate picture of VM/SP. Specifically:

- Userids are normally not shared. The problems Abramson claims to solve are caused by users' sharing what should be private resources.
- His scheme for naming files to indicate ownership and to implement control won't work and destroys the benefit of meaningful (user-chosen) file names.
- A number of products (commercial and public domain) are available for manually or automatically backing up data. Abramson seems to have discovered (for himself, the hard way) the benefits of regularly backing up data.
- The CMS command ERASE * * * (printed as ERASE "*") is invalid and is not allowed by CMS.
- The cornerstone of his scheme, CMS EXECs for file protection, is terribly unreliable; an architecture built on EXECs can be defeated by a slightly knowledgeable user.

The article makes two valid points, but offers no solutions. First, sharing files among CMS users is cumbersome (but not for the reasons listed). Abramson fails to mention that many file and library management packages exist that provide controlled and auditable access to files across virtual machine boundaries.

Second, he says that "the responsibility for ensuring system and file security rests with the managers and users of these facilities." But it requires a better understanding of the facilities and weaknesses of the system than he demonstrates.

Gabriel Goldberg
The Mitre Corp.
McLean, Va.

COMPUTERWORLD

Editor
John C. Wildmaich

Executive Editor
Pita Shaw

Assistant Managing Editor
Cheryl M. Gallo

Design Editor
Marjorie Magowan

Senior Editors
Software
Paul Gillin
Communications
Jim Barlow
Phil Hirsch
Systems
Tom Hoskel
Industry
Bill Laberis
Features
George Hayes
International Editor
Susan Delaney
Associate Features Editor
Barbara Von Schryer
Staff Writers
James Batterson
Peter Bochalis

James Connolly
John Gallant
Lynn Haber
Patricia Keefe
Paul Korzeniowski
Correspondents:
New York
David Myers
Suite 7G
401 East 80th St.
New York, N.Y. 10021
212/570-2135
Washington, D.C.
Bureau Chief: Jake Kirchner
980 National Press Building
529 14th St., N.W.
Washington, D.C. 20045
202/347-8718
West Coast
Bureau Chief: Jeffry Beeler
Correspondent: Robert Batt

1060 March Rd.
Menlo Park, Calif. 94025
415/328-8084
Chief Copy Editor
Donovan White
Assistant Chief Copy Editor
Kathie Gow
Copy Editors:
Becky Bolches
Dave Boulland
Bruce Crane
Elizabeth Morse
Deborah Scaduto-Hinn
Thomas Schmidt
Charlotte Ziems
Assistant to the Editor
June Fettig
Editorial Assistants:
Mary DeChristofaro
Joyce Furio

Contributors
Columnists
J. Daniel Couger
Human Communication
Jack Stone
Telecommunications
Larry Long
Telecommunications
Thomas Madron
The Data Center
John P. Murray

Special Publications
Computerworld Extra!
George Hayes, Editor
Computerworld on Communications
Bruce Howard, Editor
Computerworld Q/A
Ann Dooley, Editor
Computerworld Buyer's Guides
Marcia Stonesifer, Editor

Main Editorial Offices: Box 880, 375 Cochituate Road, Framingham, MA 01701 617/879-0700

Computerworld is a member of the CW Communications/inc. group, the world's largest publisher of computer-related information. The group publishes 42 computer publications in 16 major countries. Nine million people read one or more of the group's publications each month. Members of the group include: Argentina's Computerworld/Argentina, Australia's Australian Computerworld and Micro Computer News; Brazil's Computerworld and Mundo Unix; Chile's Chile Computerworld; Denmark's Computerworld Danmark and AlleyData; France's Le Monde Informatique; Germany's Computerwoche, Mikrocomputerwelt and PC Welt; Italy's Computerworld Italia; Japan's Computerworld Japan; Mexico's Computerworld Mexico; Norway's Computerworld Norge and AlleyData; Saudi Arabia's Saudi Computerworld; Spain's Computerworld/Espana and Microbusiness; Sweden's Computerworld Sverige, AlleyData and Att Hantera; the UK's Computer Management and Computer Business Europe; the U.S.' Computerworld, Desktop Computing, Hot CoCo, InCider, InfoWorld, Micro Marketworld, Microcomputing, PC World and Software.

VIEWPOINT

U.S. computer industry: 1984

LECHT ON SCIENCE

CHARLES LECHT

In 1984, fantastic changes, some started in 1983, others earlier, will deepen in their effect on our computer industry and cause its evolution to the information services industry to be accelerated. This will occur if for no other reason than 1984's sudden entrance in our industry of a sea of communications companies to compete for marketplace share. The fact that one, AT&T, has the right stuff to capture a lot of it should give our computer industry added incentive for rapid change.

The computer industry events of 1984 will be as diverse as they are exciting. I offer the following in the realms of supercomputers, large mainframes, mid-range computer systems, minicomputers, microcomputers, terminals, telephones and services as representative.

Astonishingly, America's supercomputer industry will complete its withdrawal from our view. Control Data Corp.'s spin-off of Electronic Technology Associates, Sperry Corp.'s strange repudiation of Univac's name, IBM's decision to drop Josephson technologies and then to aid in the formation of Hypres as well as other signals emanating from Cray Research Corp. and from our newly formed Microelectronics Computer Co. all tell us that the really high-powered stuff is headed for silent and unseen development.

Large mainframe business

The large mainframe business will continue to exhibit youthful vitality as companies that need heavy firepower are given increased incentives, including massive discounts, to acquire more and more of it. Price performance improvements will occur so rapidly that we will be confounded in assessing the residual values of things purchased. And each incremental improvement will be substantial enough to warrant our serious consideration of its adoption.

> *Programming as we know it today will truly start to disappear in 1984. With increased usage of ISDN facilities a certainty, increased investment in their software offerings will occur. These will relieve us from the need to learn artificial lingos like Cobol to get a computer to do our bidding.*

The mid-range computer industry as we know it will begin to vanish. Despite vigorous economic growth, these systems will see their usefulness diminish as stand-alone corporate facilities begin to be replaced by terminals linked to mainframes and/or to our emerging integrated services digital networks (ISDN). The advantages of centralized data processing will be rediscovered, as distributed systems facilities are easily obtainable through ISDN ports.

Our old minicomputer industry will merge with our new microcomputer industry; both will join the smart terminal industry, which will ultimately include the telephone industry. Then all of them — micros, minis, smart terminals and telephones — will slowly begin to metamorphosize into the dumbest terminals possible: idiot-proof boxes requiring as little thinking as we can get away with to perform our most sophisticated chores.

The labeling of terminals as dumb or smart will cease. We will discover that few intelligent people really want to program computers to do things that can be obtained without programming (all other things being equal).

Thus, we can expect our fast-rising sea of programmable devices to be soon engulfed in a swelling ocean of nonprogrammable analogs whose appearance will drastically diminish our need to program anything.

Programming as we know it today will truly start to disappear in 1984. With increased usage of ISDN facilities a certainty, increased investment in their software offerings will occur. These will relieve us from the need to learn artificial lingos like Cobol to get a computer to do our bidding.

Natural-language front ends that place plain old English at our disposal are imminent. No, not the high-class literary stuff (which you're used to reading in my essays, of course), but rather the utterances of businessmen everywhere fumbling and mumbling through their chores and acting in decidedly human and discombobulated ways. Composed of monosyllabic phrase-like grunts whose issuances have a high probability of representing little more than frustration, plain old English is the evolved lingo of jawing businessmen everywhere and even in its inherent inefficiency and ambiguity is preferable to any synthetic language we may devise.

The need to program will also be diminished by yet increased usage of canned applications — especially when we are able to command these to do our bidding with natural-language utterances.

AT&T will increasingly enhance the services it offers while deploying a blizzard of devices to aid users in obtaining them, from telephones to portable personal computers to workstations to on-site corporate computer facilities. At the same time, it will modernize its communications facilities, install cellular mobile systems and announce alternatives to users currently faced with land-based "last-mile" interconnect problems.

IBM will make love, not war, with AT&T. All the *Star Wars* theories will be disproven in 1984. AT&T is IBM's largest customer; in turn, IBM's dependence on AT&T's communications facilities will increase inordinately in the year to come. AT&T, which is buying IBM 3084s as fast as it can, cannot carry off its plans without IBM products. Projected volume and delivery schedules could not be met even if the rest of the computer industry dedicated all its available production to the new AT&T, not to speak of its 22 offspring.

IBM will come out of the closet to become a highly visible telecommunications company offering every conceivable service by year's end. Starting as a reseller of AT&T communications facilities by offering a potpourri of enhancements (the company already uses AT&T lines to deliver its Information Network offerings) and moving on to eventual utilization of Satellite Business Systems facilities, IBM has set its course to become a major force in the telecommunications field.

The American computer and telecommunications industries, through their trade associations, will apply pressure upon our government in order to seek aid in thwarting foreign competition.

Japanese singled out

The Japanese will be singled out, since American electronics companies believe that European competitors are more a threat to themselves than to anyone else. The Communications and Computer Industries Association and its once arch rival, the Computer and Business Equipment Manufacturers Association, will join with the Electronics Industry Association to pool their resources in lobbying the corridors of Capitol Hill to prevent the sale of Japanese electronics in the U.S.

Those biased and self-interested groups will unwittingly mount a campaign that can only result in higher

See INDUSTRY page 42

Some of my best friends are users

HUMAN CONNECTION

JACK STONE

Although it may sometimes appear otherwise, I have no ingrained prejudice against the user community. If the truth be known, some of my best friends are users.

What has happened, though, is that the expectations of many of the new user set — based on a little knowledge of personal computer operations, enough to be dangerous — have transcended into the systems netherlands, a realm of automation make-believe that resides only in the imagination of unknowing users. Even worse, from such fantasies this ilk has derived ridiculous conclusions about the viability of the computer center organization, in certain cases passing such views on to top executives as gospel. I'll wager a pretty penny that if you wander unannounced into a user's personal computer complex, you'll catch some conversational gems along this drift:

■ "Why don't we give each department manager a personal computer to control his unit's operating records and data files? By doing so, we can eliminate a great deal of the hardware in the computer center that, as far as we can see, is doing little more than creating jobs for that department."

■ "Personal computers are more powerful, have great flexibility and are cheaper than the systems provided by the data processing organization. We should dismember the DP dinosaur and transfer the analysts into user groups where they can get a taste of the real world."

■ "Our central programming staff has been automated out of existence by the generalized file managers installed on our personal computers. No longer do we have to wait in line two years to get the programmers to make some system changes. Now we can reformat our files ourselves and in a matter of a few minutes. Programmers are a dying breed."

Hands-on demonstration

My reflection upon these people is simply expressed in the paraphrase of a biblical thought: The data processing community should forgive them, because they know not of what they do. The thrill accompanying a few elementary computer successes — finding the on/off switch of a personal computer, running a sort task and watching personalized letters pour out on a printer — leads the personal computer user to believe he is a genuine DPer. In fact, relative to the technical challenges in the large-scale computer center the personal computer experience is little more than that of a hands-on demonstration.

What can be done to deflate the wild notions that these novices have about central computer services without losing their trust and confidence altogether? One idea is to let the users proceed on their own, allowing them to learn from their own failures that personal computers, in spite of all their remarkable assets, are, nonetheless, tiny machines.

Of course, they have a role to play, but more and more of the new users are finding that to meet the demands for processing truly large files — and I'm talking in terms of the 500M-byte variety, way in excess of the 10M-byte hard disk capacity that many neophytes believe is the storage penultimate — or for high-speed number crunching, this role is one of a low-cost intelligent terminal interconnected to mainframes. And I'll guess that a good many users who make this discovery quietly phase their personal computers into the closet and negotiate for a decent terminal, determined not to disclose their embarrassment and/or stupidity.

VIEWPOINT

Don't talk down to your users

READER'S PLATFORM

DENNIS LA HOOD

How many times have you felt unappreciated for the extensive time and effort you've put into a project? If you hear anything from your user, it usually revolves around some problem. Almost never do you receive a thank you. How come?

As computer people, we become quite proficient in the skills of our technology. We tend to be creative and have high initiative and above-average intelligence. We demand a lot from ourselves, and our standards are usually pretty high. It is this kind of everyday elitism that also gives us a false sense of our importance. Our true mission is not to be the creators of all good, but to be the facilitators of our users' needs. It is the users' specific needs that result in the requirement for systems to be developed and for our existence. Without the need to build a system, there is no need for the architect. We sometimes lose sight of this. Consider the following:

■ Our first challenge is that of becoming good listeners. The next time you attend a meeting with your users, keep track of the following: How many times do we interrupt the user before they've completed a thought? How many times do we stop listening and start mentally developing a solution? How quickly do we start leading the conversation instead of acting as facilitators?

When we develop systems to our own understanding of the problem, we run the risk that the solution does not meet the user's expectations. Not meeting user expectations guarantees dissatisfaction.

■ Talk up to users, not down to them. It tends to be a normal inclination for DPers to think of themselves as smarter than most users. The fact is that the user is our boss, and even when we truly are smarter than our boss, we would never flaunt it. In most cases (if not all), the user knows more about the needs of the organization, and it is these needs that we must understand to attain the successful solution.

The user's knowledge, therefore, is most important to our success. In any learning environment, those that have the knowledge are treated respectfully by those who need to attain that knowledge.

■ Don't promise more than can be delivered.

What's your reaction to an advertisement that suggests a product is a panacea? How do you feel about a salesman's claim that "it'll be totally transparent?" When building user expectations, be careful to limit yourself to deliverables. If each deliverable is an expectation met, then user satisfaction will grow, and mutual respect will be enhanced.

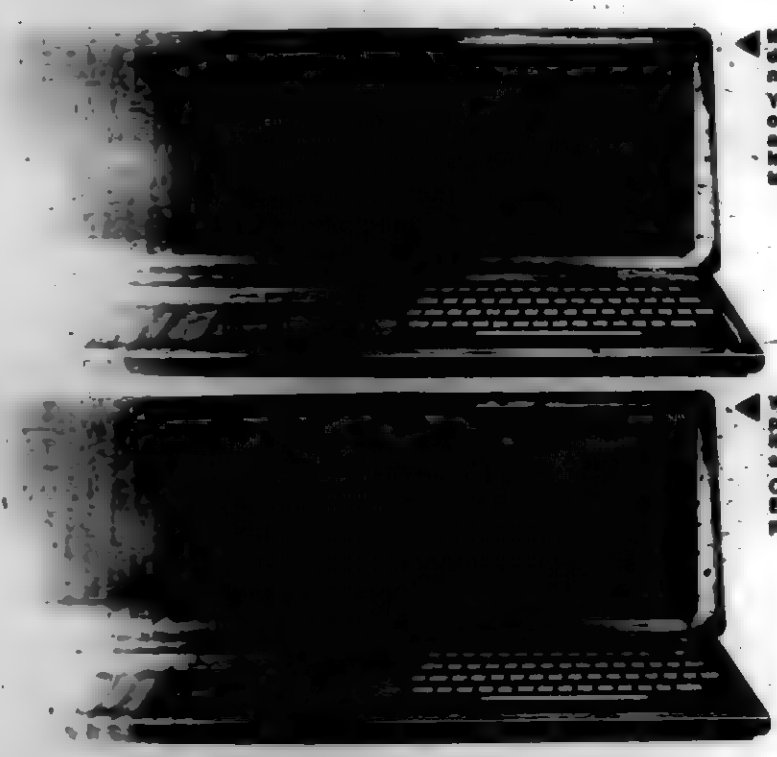
These three basic "to do's," when practiced diligently, will earn the systems development professional the recognition and job satisfaction that the extensive time and effort put into each project deserve. Give them a try.

Measure your recognition before and after. You can always go back to the old ways. But wouldn't it be nice to hear "nice job" just once? ‡

LaHood is director of computer and communications services at Agway, Inc. in Syracuse, N.Y.

THE ENCRYPTOR™

Data Security at An Affordable Price



If your microcomputer data looks like this, it's not secure.

Your confidential reports, client or customer files, and other critical business information can be tampered with or stolen.

With THE ENCRYPTOR™ products, your data looks like this — and it's totally secure.

Only individuals with Encryptor keywords can process your data.

Please send me information about The Encryptor™ products. I'm particularly interested in:

- ☐ Stand-alone micro application
- ☐ Micro-to-micro application
- ☐ Micro-to-mainframe application
- ☐ Total system application

Name_____

Title_____

Organization_____

Address_____

City_____

State_____ Zip_____

Telephone ( ) _____

Futurex Security Systems™
A Division of Jones Futurex™ Inc.
9700 Fair Oaks Boulevard
Fair Oaks,CA 95628

By physically transforming data, THE ENCRYPTOR™ products provide complete protection for stored or transmitted information. They eliminate unauthorized access, manipulation, or theft of such confidential information as:

- Corporate trade secrets
- Customer or client files
- Electronic fund transfers
- Personnel records

THE ENCRYPTOR™ products are reliable, high-speed devices that can be applied to micro-to-mainframe, micro-to-micro, and stand-alone micro configurations. They comply with the national Data Encryption Standard (DES) and allow for implementation of Message Authentication Code (MAC) for electronic fund transfers.

THE ENCRYPTOR™ products offer the easy-to-use, cost effective solution to your data security problems. For more information, return the coupon or call Futurex Security Systems™ at 800-251-5112 (800-251-5111 inside California).

FUTUREX™

Futurex Security Systems™
9700 Fair Oaks Boulevard
Fair Oaks,CA 95628
(916) 966-6838

A Division of Jones Futurex™ Inc.

CW/84

INDUSTRY

from page 41

user costs, slower technological growth and a lot of hard feelings. I say "unwittingly" because most of their membership has more to fear from a handful of domestic competitors than from Japanese imports.

When not fighting the Japanese, these same groups will work over the Association of Data Processing Services Organizations, Inc. (Adapso), whose leading members are ill prepared to cope. Squeezed between the competition of emerging value-added ISDN facilities and newly emergent data processing service organizations offering banking services from within banks, brokerage services from within brokerage firms and the like, Adapso membership will find 1984 tough sledding.

It's hard to imagine that a Martian landing is high on the list of New Year's resolutions of anyone I know, although conditions for a landing are improved by the close proximity of Mars to Earth in May 1984. So I won't predict the surprise announcement of an Earth-Mars landing party. But it wouldn't be so farfetched if it did occur. What about *Sputnik*'s surprise launch in 1957. Whatever, 1984 will be remembered for the high-tech surprises it will bring and, on balance, I forecast that we'll all be better off because of these. Hang on; Happy New Year.

Lecht is chairman of Lecht Sciences, Inc., a New York-based think tank specializing in computer and communications technologies.

SOFTWARE & SERVICES

Micro link options growing

By Betty Prosser
Special to CW

The personal computer's ability to access information on large mainframes has spawned major developments. In just two years, hardware and software companies have spent millions on micro-to-mainframe development. The confusion surrounding this intensive period of development is now giving way to a market that provides a real choice.

When examining today's micro-mainframe products, you need to consider three major factors: function — what the micro-mainframe product is designed to do; integration; and transfer capability — how the mainframe information is transferred.

Most products provide a method of downloading mainframe information to a personal computer, where micro software packages such as spreadsheets, word processors or graphics systems provide management analysis and reporting.

Integration is also a popular concept of this new transfer technology. A fully integrated micro-mainframe software system provides automatic loading of mainframe data directly into the personal computer's application software. The highest level of integration provides an added degree of flexibility by automatically loading mainframe data into multiple personal computer applications.

Few micro-mainframe products have achieved this level of integration. Most only build a separate file on the personal computer's floppy disk. After the mainframe information is transferred to this special "transfer file," an additional step is required to load the data into an application on the personal computer. True integration allows the user to specify which personal computer application will use the mainframe data. Then, when information transfer is initiated, it is automatically loaded into the personal computer application.

See MICRO page 44

UFO/Cobol unveiled for CICS, CMS

HASBROUCK HEIGHTS, N.J. — Oxford Software Corp. has announced UFO/Cobol, an Ansi Cobol-based IBM CICS and CMS application development system.

The product is based on a language consisting of Ansi Cobol statements with natural extensions to run in an on-line environment, a spokesman said.

A pseudoconversational mode of executing on-line programs is provided along with support of all CICS and CMS I/O facilities using standard Ansi Cobol extensions. The product supports calls to standard data base interfaces as well as call subroutines in other languages that conform to CICS or CMS requirements, the spokesman said. An interactive screen painting facility eliminates the need to separately assemble Basic Mapping Support maps. All IBM 3270 screens are treated as ordinary records in a Cobol program. Support of 3270 attributes includes color, highlighting, protection and testing for modified fields.

The Paint facility allows for the free-form design of 3270 screens on-line without code writing. Use of screens is defined, and all CICS or CMS code required to perform on-line transactions is eliminated and replaced with natural Cobol language extensions, the spokesman said. Program execution allows for the pseudoconversational execution of all programs with no preprocessing involved in program compilation.

The CICS/VS version is available immediately. The VM/CMS version will be available in the second quarter of 1984. The price is $24,000 for the IBM DOS version and $33,000 for the OS version. A 25% discount is available through April 1, the vendor said.

Oxford Software, 174 Blvd., Hasbrouck Heights, N.J. 07604.

DBMS for micros called lacking

SOFTALK

PAUL GILLIN

Think about that nice new data base management system (DBMS) you just bought for your microcomputer. Do you really need it? Is it really better than the alternatives? Do you think you will be using it in two or three years?

Jon Nackerud thinks not. The founder and former president of Relational Technology, Inc., which markets Ingres, a relational DBMS, has been keeping a close eye on the micro DBMS market since the products began to proliferate last year.

He is decidedly unimpressed. "Nothing on the market interests me at the time," he said in a recent interview. "It's like a gold rush. Everybody's sold their farm and got their wagon and headed west. They're digging a lot and finding a lot of fool's gold."

Just as spreadsheets were the hot item of the early part of 1983, micro DBMS flourished at the end of the year. Driven in large part by the success of Ashton-Tate's Dbase II (which is now shipping more than 1,000 copies a month) the new entries have sought to capitalize on some of the obvious weaknesses of Dbase, particularly in the areas of ease of use. All but a handful claim a relational structure.

Nackerud called Dbase II "an excellent DBMS," but added that it has spawned a host of imitators and a market direction that is far off course. Micro DBMS vendors are attempting to sell a product without an application, he said. The frenetic quality of the micro software market typically results in a flurry of announcements on the heels of each successful new product, he said. Unfortunately, foresight gets lost in the chaos while market share becomes a vendor's critical considera-

See GILLIN page 44

PRIME

Prime offers simulator for chip design/49

digital

VAX, Decsystems get data link/47

INSIDE

- CICS facility offloads printing, reports to IBM Personal Computer /46
- Pascal validation tools released /51
- Courseware out for Focus users /52

Are you in a MVS or VS1 SHARED DASD ENVIRONMENT?

DUQUESNE SYSTEMS

DUQUESNE SYSTEMS
Shared Device Management products provide a comprehensive solution to the problem caused by sharing data and devices between two or more computer systems. If you have a multiple CPU environment, then you need one or more of our Shared Device Management products. SDM provides global control over DASD, tapes and console devices with many benefits such as data integrity, elimination of operator errors and elimination of redundant hardware.

SDSI

Shared Dataset Integrity, SDSI, solves the inherent data integrity problems caused by the simultaneous access of the same data by more than one system without the use of device 'reserves'. SDSI greatly improves system performance by allowing the user to eliminate device 'reserves' from existing programs without any system or program modifications.

STAM

Shared Tape Allocation Manager, STAM, automatically manages mountable devices, (tape and disk), in multi-CPU installations. Allocation decisions for shared device pools are made automatically, thus eliminating the potential for disastrous operator errors and more effectively using those valuable resources than is possible with manual control.

SCON

Supervisole is designed to provide a single console image for a multi system environment where console messages can be merged together to create a single stream on one or more designated consoles. The result is a more streamline and productive operating environment. Operators will have to monitor only one console instead of many eliminating the need for redundant hardware and personnel.

DUQUESNE SYSTEMS INC
TWO ALLEGHENY CTR.
PITTSBURGH, PA 15212
PHONE 412-322-2000
TELEX 902 083

PLEASE SEND ME INFORMATION

☐ SDSI ☐ STAM ☐ SCON ☐ OTHER DSI PRODUCTS

NAME _____
COMPANY _____
ADDRESS _____
CITY _____ STATE _____ ZIP _____
TEL. _____

Ingres Update Offered

Relational Technology, Inc. has announced Version 1.2 of its Ingres relational data base management system for Digital Equipment Corp. VAX-11 computers under DEC's VMS operating system.

The new version is said to feature improved transaction processing capabilities, better concurrency control, provisions for textual data and enhancements to Ingres/Forms, the company's forms management system.

In complex transactions, "begin/end" commands can be bracketed around any set of updates to preserve the consistency of the data base when records spanning several files are updated as single-user transactions, a spokesman said.

Multiuser concurrency control is improved with page-level locking, and the software will automatically escalate locking to relation level when it is more efficient, the spokesman said. Ingres will also detect deadlocks when they occur and abort one or more transactions in progress.

Ingres/Forms users can create forms with "table fields" that let users view and update several records from a file simultaneously.

Ingres is priced at $40,000 for a VAX 11/750 or 11/780 and $20,000 for a VAX 11/730.

Relational Technology, 2855 Telegraph Ave., Berkeley, Calif. 94705.

UNIVERSITY OF MINNESOTA SCHOOL OF MANAGEMENT PRESENTS SEMINARS FOR THE SYSTEMS ANALYST

April 16-20, 1984
Radisson Inn & Yacht Club
Superior, Wisconsin

Sponsored by:
MIS Research Center and Executive Development Center

"Seminars for the Systems Analyst" is a chance for companies to develop their talent from within and a chance for professional systems analysts to refresh their skills. These comprehensive seminars take a two-phase approach to systems analysis training.

PHASE A (three days) Systems Analysis and Design

PHASE B (two days) Interpersonal Skills for the Systems Analyst

For Further Information contact:
Gayle Wooten
Executive Development Center
324 Management & Economics Bldg.
271 - 19th Ave. So.
Minneapolis, MN 55455
612/373-3837

NOTE:
Training at your site. . . we can bring this seminar to your site at a significantly lower cost. For further information contact
Pam Jensen
at 612/373-3837

Options from page 43

Another element that differentiates the various micro-mainframe offerings is the method of transfer. This determines the amount of mainframe information sent to the personal computer and directly affects how selective the user can be in choosing information to download.

During the early phases of micro-mainframe development, the on-line screen was the standard unit of transfer. The only flexibility in selection was the option to transfer partial contents of an on-line screen, such as columns of budget figures. Despite its limitations, this screen-by-screen transfer has certain advantages. Because the transfer operates independently of the mainframe software, the mainframe system requires no modifications.

However, screen-by-screen transfers are somewhat limited for applications requiring transfer of greater volumes of data. Large-scale financial analysis requires many transfers to assemble a comprehensive report. Nevertheless, screen-by-screen transfer is excellent for bottom-line analysis.

The latest developments in transfer technology offer new solutions to this problem. One approach is file-to-file transfer, which involves selecting part or all of a mainframe file and then transferring the file to the personal computer.

While this is an effective way to download entire files, it also has certain limitations. File-to-file transfer usually requires a special batch job to create the transfer file. As a result, it requires the involvement of DP personnel as well as a time commitment.

If the system is not fully integrated, this method will require an additional selection process and a separate function to load the information manually into the personal computer's application software. File-to-file transfer may also quickly fill up disk space, since large quantities of unwanted data are transferred.

The alternative is a new concept called data base sharing. With data base sharing, each on-line mainframe system is divided and then subdivided into manageable units of information which are actually mini data bases.

DP personnel are not required, and data base sharing is not restricted by file boundaries. Instead, data elements are grouped in logical units that are easily selected and transferred in an on-line environment. Multiple mainframe files may even be accessed and transferred in one request.

Assume, for example, that a manager wants to use the accounts payable system to analyze figures for one regional office. Part of the information resides on a vendor master file, and part of it resides on an invoice file. Both files are so large that a file-to-file transfer to a personal computer is not feasible. Using data base sharing, the manager may select only the vendors and invoices for the particular regional office and then transfer only the selected material directly to the personal computer. If this data base sharing facility is completely integrated, the invoice amounts can be automatically loaded into a spreadsheet micro application at the time of transfer.

The future will bring even more accelerated development in micro-mainframe technology. As major hardware vendors such as IBM provide more sophisticated equipment and mainframe software vendors negotiate agreements with micro vendors, the product offerings are sure to become even more confusing. Future development will center around the data base sharing concept.

Fessor is product manager of Management Science America, Inc.'s Personal Computer Products Division.

DBMS from page 43

tion. "There's not a lot of thought about whether products have a long life," he said.

The root of the problem goes right down to the personal computer user, who is generally ignorant of data processing concepts and couldn't care less about the mechanics of a DBMS, he said.

"A lot of people are buying personal computers out of anxiety. They don't want to be left behind," he said. "I find most of their needs can be filled by using 3- by 5-[in.] cards."

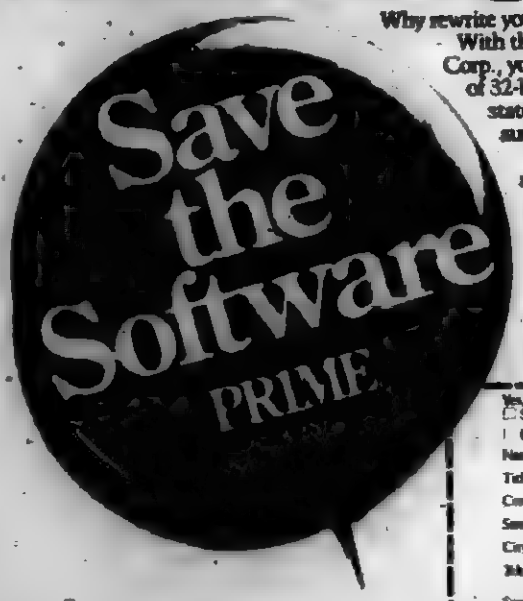
Such users are now bombarded by ads full of DBMS bells and whistles, but offering few ideas of how to use the newly functional data, he said. "Companies are coming out with a $2 million advertising commitment which basically says 'you the consumer are too dumb to know the difference,' " he said. Again, users are buying the DBMS for fear of being left behind.

Nackerud, who left Relational Technology last August, said he is far more impressed by application-specific products that have emerged on the micro. And therein lies the future of micro DBMS. Visicorp's Visicalc and Lotus Development Corp.'s Lotus 1-2-3 are "very good ways to present data," he said.

Nackerud predicts that micro DBMS in their current forms will cease to exist within three years. Instead, the data base will be incorporated into the application with ties to more elegant DBMS on the mainframe.

The market is still open for someone to declare a micro data base standard, one which can be accessed by all applications, he asserted. Distributed data bases will emerge with simple features at the micro level. More sophisticated functions such as backup and recovery, journalization and page locking will be added incrementally at various levels up to the mainframe.

Move up from your System/34 without losing your investment.



Why rewrite your software just because you've outgrown your System/34? With the ESCAPE/34 software package developed by Database Systems Corp., you can migrate all your System/34 applications to the Prime 50 Series of 32-bit computers. ESCAPE/34 makes up to 95% of your RPG II statements compatible with Prime. Any remaining statements are automatically flagged for you.

Then once you're in the Prime family, you'll never have to worry about growth again. All our computers are fully compatible, clear up to a system with 16Mb of memory and 5 billion bytes of storage. And you can keep growing, with the most versatile networking in the industry, fully integrated office automation software, extensive CAD/CAM capability, and over 1,000 third-party applications.

Send the coupon today for more information, or call our toll-free number. And help us save your software investment.

1-800-343-2540 In Mass., 1-800-322-2450

Yes, I want to save my software!
☐ Send me the ESCAPE/34 brochure and a free "Save the Software" button
☐ Have a Marketing Representative call
Name _____
Title _____
Company _____
Street _____
City _____ State _____ Zip _____
Telephone _____

Send to: Prime Computer, Inc.
Prime Park, MS 15-60
Natick, MA 01760

PRIME

CW 1 9 84

Only Lee Data's Universal Terminal System can satisfy all of your information processing needs... 3270, Async and personal computing.

Finally, there's a single, universal way to satisfy the individual information processing needs of all your people. From sales manager to accountant. From research to production. The Lee Data Universal Terminal System can do it all.

And our system is modular by design to provide you any or all of these cost-effective, problem-solving advantages:

3270-compatibility plus more

Combine complete 3270 system-compatibility with an innovative Lee Data design and you have a System that delivers greater convenience and flexibility.

Our System not only offers standard 3274-compatible local and remote control units, but now also provides combination local/remote controllers with a unique dual-host access capability.

In addition, you can choose from a full line of terminal capabilities, beginning with our cost-effective 3178-compatible display on up to our popular All-In-One Display which offers, in a single unit, four selectable screen sizes—including 132-column—a great advantage in program development, spread sheet applications and many others where flexibility is required.

3270-plus-Async: another cost-effective advantage

If your application needs currently find you switching between 3270 and VT100-style terminals to get the job done, Lee Data has a better way.

As part of our System, you can enjoy the further advantage of a 3270/Async capability that allows dynamic selection of 3270 and VT100 operating modes from a single Lee Data display. A simple command entered at the keyboard provides you access to applications running on an IBM CPU, non-IBM systems (such as DEC, H-P or Prime), as well as timesharing services. Another Lee Data solution to simplifying your company's terminal network.

And now integrated personal computing too

That's right! Now our System also includes a sophisticated personal computing package that can easily be integrated into an existing Lee Data 3270 system.

With our approach, you get continued interactive access to host-based files, plus all the advantages of professional business computing from the same Lee Data workstation.

Advanced features include a host file transfer capability, a single-board design, four standard system expansion slots and, of course, complete IBM-compatibility.

All these additional capabilities plus the same user-friendly Lee Data displays.

Plus these added benefits...

To any Lee Data System, add our unique Coax Eliminator products and realize additional savings of up to 85% in cabling costs alone.

Combine this with all the outstanding features already mentioned and you'll find a System offering everything you need for efficient, cost-effective operation.

Discover the advantages of our Universal Terminal System for yourself. For more information, call our system specialists toll free:

800/328-3998

Designers of innovative systems for the information worker

LEE DATA CORPORATION

7075 Flying Cloud Drive
Minneapolis, MN 55344
TWX 910-576-1690

SOFTWARE & SERVICES

SYSTEMS SOFTWARE

ADVANCED SYSTEMS CONCEPTS, INC.
Performance Simulation System

Advanced Systems Concepts, Inc. has announced a performance simulation package for the Digital Equipment Corp. VAX-11 series of superminicomputers.

The Performance Simulation System reportedly allows a user to record one or more terminal sessions for the purpose of replaying them under a variety of scenarios.

A company spokesman said the package provides three main facilities: performance testing, application reliability and security.

The package is said to provide a transparent method of capturing one or more terminal I/O sessions. The spokesman said the input log may be edited as required and then replayed through "pseudo" terminals, allowing large terminal and/or transaction loads to be performed while not consuming significant manpower and terminal resources. During playback, the output of the simulated terminal session is captured, enabling comparison of the original output log against the playback output log, according to the spokesman.

The package is immediately available for license fees of $4,995 for the VAX-11/780, $3,495 for the VAX-11/750 and $1,995 for the VAX-11/730.

Advanced Systems Concepts, 22 Hudson Place, Hoboken, N.J. 07030.

SIGNAL TECHNOLOGY, INC.
Quickstar

Signal Technology, Inc. has introduced a set of utility programs for Digital Equipment Corp.'s VAX-11 computer.

Called Quickstar, the set consists of three interrelated programs. The first component, Quickstat, is used for interactive system status monitoring. It reportedly gives managers information on what system resources are being used, and it provides additional selective privileges, the company noted.

Quicktalk, another component of the program set, enables users to communicate between terminals. A user can send a message to any other user or connected terminal with a single command.

Quickchange was reportedly designed to allow users to change from one user name to another without logout and logon steps while retaining recording of accounting messages, changes of defaults and checking of privileges.

Quickstar is priced at $1,700.

Signal Technology, 5951 Encina Road, Goleta, Calif. 93117.

STARTECH SOFTWARE SYSTEMS, INC.
PC/Viewcom

Startech Software Systems, Inc. has announced the PC/Viewcom system, a micro-to-mainframe link that provides for the off-loading of host printing and automatic report distribution.

According to Startech, the system utilizes IBM's CICS teleprocessing monitor and the IBM Personal Computer to route batch reports or online transaction-generated reports to the Personal Computer printer or IBM 3280 or 3260 series printers. It is said to provide full-function mainframe-type spooling facilities such as forward and back spacing printers in the event of a forms jam, report class type queuing, report purging and user report directory displays.

The system reportedly can drive up to three printers simultaneously per Personal Computer, and each device can print different reports from the host.

PC/Viewcom is priced at $2,000.

Startech Software Systems, 3539 Borough Place, Woodside, N.Y. 11377.

BUSINESS SYSTEMS ASSOCIATES
Laserset

Business Systems Associates (BSA) has announced a product that is said to allow users of Hewlett-Packard Co.'s HP 3000 to utilize Xerox Corp.'s Xerox 2700 laser

We Make the Addition Easy Anywhere in the World. PHAZE

In a time when the highly competitive information marketplace is expanding from a national to a global scale, today's corporations must decide how they will position themselves in this changing market. As a company that provides solutions to the problems that face modern business, PHAZE has taken its position in the world market with a commitment to excellence—not only in our products and people, but to our ideals of quality, service and value as well.

SOFTWARE & SERVICES

printer.

BSA's Lasersoft software utility package, combined with an interface controller and the Xerox 2700, enables HP-3000 users to operate the laser printer to merge forms and data from existing reports, a company spokesman said.

The package features Printform, enabling the operator to copy the contents of any form on the laser printer, including data and display enhancements.

A package including Lasersoft, the interface controller and the Xerox 2700 is available for $22,995.

BSA, 20343 Osborne St., Canoga Park, Calif. 91304.

UNIQUE AUTOMATION PRODUCTS, INC.
UAP-Link

Unique Automation Products, Inc. (UAP) has announced the expansion of its UAP-Link file transfer software line to include modules for the IBM VM/CMS and Unix environments.

UAP-Link was reportedly designed to transfer binary or text files among mixed or matched computers. According to the vendor, the package features a layered protocol that corrects line errors and data compression capabilities that increase throughput, and the system requires no conversion programs to reformat text data.

Additional features include single-user control, automatic transfer from dial to logoff, file protection, command files, smart terminal mode and global commands. The release permits the following equipment to be interfaced to the new modules through standard serial ports: the IBM Personal Computer and Personal Computer XT; the Digital Equipment Corp. Rainbow, VT180, RSX-11M, TSX-Plus and RT-11; and the Victor Technologies, Inc. Victor 9000.

The Unix version of UAP-Link is priced at $900, and the VM/CMS version costs $1,500.

UAP, Suite G, 15401 Redhill Ave., Tustin, Calif. 92680.

VIRTUAL MICROSYSTEMS, INC.
P-Bridge

Virtual Microsystems, Inc. has announced the P-Bridge system, which reportedly allows Digital Equipment Corp. PDP-11 and VAX-11 minicomputers to run software written for Softech Microsystems, Inc.'s P-system.

To accommodate four users, the product includes four Zilog, Inc. Z80 microprocessors, 256K bytes of random-access memory and a bit-slice state machine.

The cost of P-Bridge ranges from $5,000 to $7,500, depending on the host CPU, and includes the board, software that allows it to run and a license for the P-system.

Virtual Microsystems, Suite 720, 2150 Shattuck Ave., Berkeley, Calif. 94704.

DIGITAL EQUIPMENT CORP.
Mixed Packages

Digital Equipment Corp. has announced what the company termed "mixed packages" combining Decsystem-10 and Decsystem-20 computers with VAX-11/780 superminicomputers through DEC's Decnet networking software.

In addition, the company announced average price reductions of 20% on Decsystem-10 and Decsystem-20 mainframe systems.

The spokesman said the mainframe/VAX packages are connected through Decnet to interchange data and files. A typical mainframe/VAX combination, according to DEC, is a 1078 package consisting of a Decsystem-1091 mainframe and a VAX-11/780 superminicomputer with associated hardware and peripherals. This package is priced from $499,500 and will be available in late spring of 1984.

DEC said price reductions of mainframe packages and associated software are effective immediately.

DEC, 146 Main St., Maynard, Mass. 01754.

DATAMETRICS SYSTEMS CORP.
Torch/IO

Datametrics Systems Corp. has announced the Torch/IO system, which it described as a measurement tool for Sperry Corp. 1100 se-

Continued on page 49

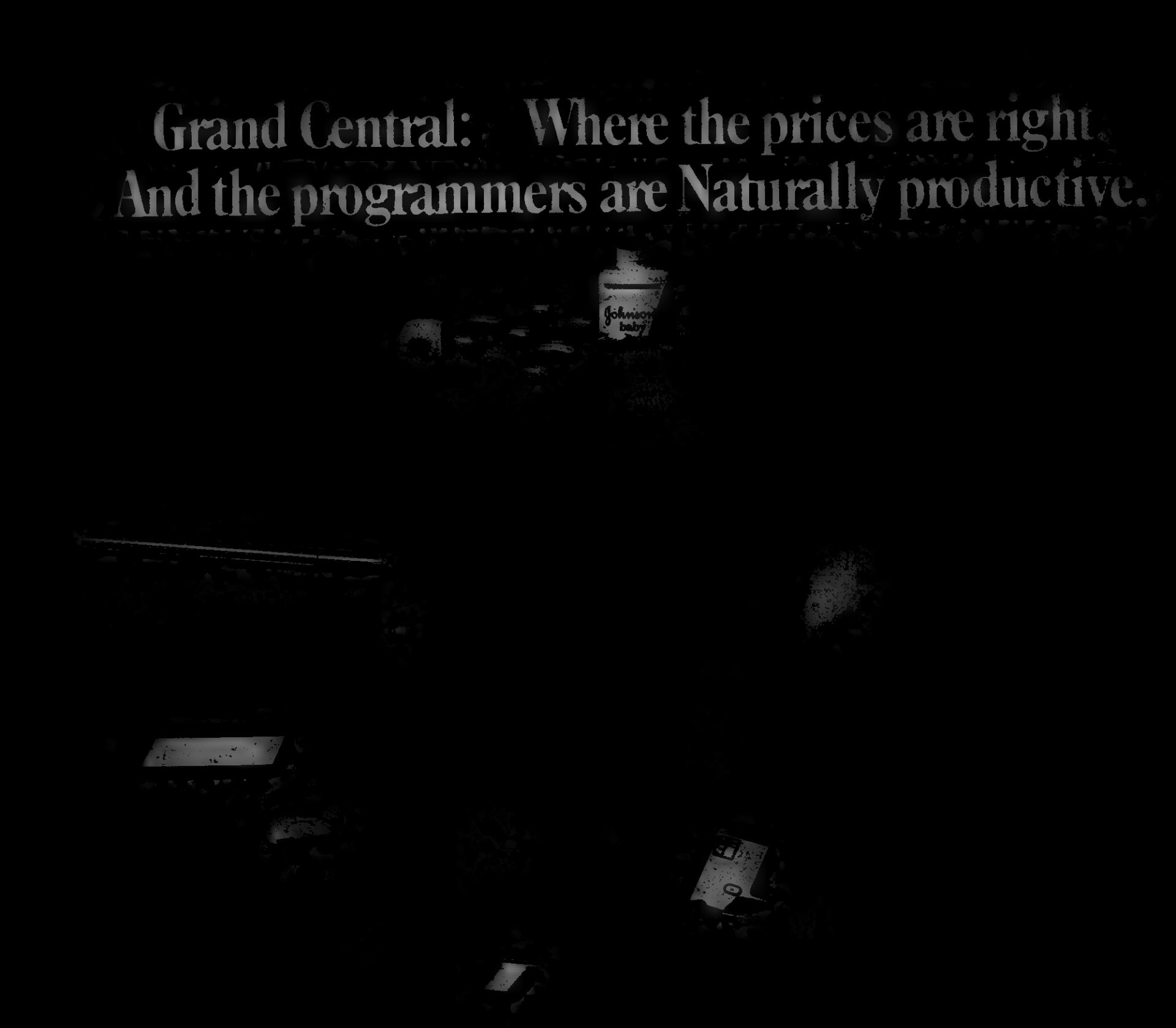
Our PHAZE P3270 and P8000 product families are state of the art, feature-superior, modular workstations that operate in the IBM-compatible environment. These products are designed to be added into existing 3270 environments with an ease and value not found elsewhere. They emphasize our commitment to providing the very best in manufacturing, sales and service worldwide. And in every product we build, our corporate commitment to producing the finest machines available is our starting point. Unlike other companies, we aren't striving for quality, we *start with it.*

It is this same determination to provide quality and excellence that allowed us to bring our first products from drawing board to volume delivery in less than one year. Now, as we continue to expand our product line, we will be satisfying the needs, demands and expectations of 3270 environments anywhere in the world. Because that market is dynamic enough to grow and expand for many years to come.

So is PHAZE.

PHAZE
INFORMATION MACHINES CORPORATION
7650 East Redfield Road Scottsdale, Arizona 85260
1-800-423-2904 • (602) 991-6655

Grand Central: Where the prices are right.
And the programmers are Naturally productive.



SOFTWARE & SERVICES

Continued from page 47

rius processors.

Torch/IO was designed to help operations managers, systems programmers and performance analysts minimize contention for mass storage space. A spokesman said that when many high-use files migrate to a particular device or string of devices, contention for access to that device causes excessive queuing to occur, and I/O service times degrade. Using Torch/IO, the files, file portions and devices experiencing performance degradation can reportedly be identified.

Once identified, files can be reassigned to minimize mass storage contention and reduce I/O service times. Torch/IO can be leased at $4,500 for a single CPU.

Datametrics Systems, Suite 201, 3040 Main St., Fairfax, Va. 22031.

VESOFT, INC.
Security/3000

A security software package for the Hewlett-Packard Co. HP 3000 series CPUs has reportedly been enhanced to limit access to selected subsystems, programs and operating systems commands even after end users have logged on.

With Vesoft, Inc.'s expanded Security/3000 package, access to system modules is reportedly limited through a menu concept in which an account manager creates a file listing all the options that users are authorized to execute. The account manager specifies the file name.

Security/3000 has also been enhanced to allow passwords to be set at any terminal and to monitor and automatically log off display units when they remain idle beyond a preset time limit. The package licenses for $2,400 from the company.

Vesoft, 9213 Warbler Place, Los Angeles, Calif. 90069.

APPLICATION PACKAGES

ARTHUR ANDERSON & Co.
Fin-Pac/38

Arthur Andersen & Co. has announced an accounts receivable system for IBM System/38 computers in companies of varied structures and in varied industries.

Fin-Pac/38 reportedly was developed in RPG-III to utilize interactive and data base facilities of the System/38 for timely and accurate reporting and collection of accounts receivable.

The company said that data entry, validation, posting, file maintenance and inquiry are performed on-line. Other features reportedly allow users to print selectively only those reports needed at a particular time and provide for foreign currency conversions.

The price for the system is $5,000, plus installation, according to the company.

Software Information, Arthur Andersen, 33 W. Monroe St., Chicago, Ill. 60603.

PRIME COMPUTER, INC.
Themis

Prime Computer, Inc. has announced Themis, an interactive logic simulator for digital electronic design.

The product offers mixed mode simulation capabilities, which allow users to model and test at the switch, gate, function or language level, the vendor said.

Themis incorporates features for accurate delay modeling and four-state, three-strength metallic oxide semiconductor circuit simulation, which helps ensure accuracy in large-scale integration or very large-scale integration design, according to the vendor.

The product runs on Prime's 50 series of compatible, 32-bit, virtual memory minicomputers, including the low-end 2250, under the vendor's Primos operating system. It is compatible with the system software available on Primenet and Prime's X.25 standard networking and communications system.

The standard package is priced at $20,000 for the Prime 2250 and $40,000 for all other Series 50 systems.

Prime Computer, Prime Park, Natick, Mass. 01760.

GENERAL ELECTRIC INFORMATION SERVICES CO.
Repmain

General Electric Information Services Co. (Geisco) has announced a software package that is said to provide comprehensive planning and control information for the repair and maintenance of operating facilities.

Dubbed Repmain, the package was designed for use in conjunction with Geisco's Mims system manufacturing package for IBM mainframes in the MVS and VM operating system environments. The vendor said Repmain consists of subsystems that can work separately or together.

The planning and tracking capabilities of Repmain address the primary components of the maintenance process, including spare parts, work orders and purchasing, the vendor said. The system was designed to store and process detailed data for assets and cost centers, and items requiring preventive maintenance on a periodic basis can be entered into the system generating work orders describing the work to be done.

According to the firm, the Repmain system is written in Geisco's

Continued on page 51

Finally a CICS query system that's as easy for the DP department as it is for the end user.

Introducing ExecuTrieve.

From the perspective of the DP professional, ExecuTrieve represents a dramatic breakthrough in query system efficiency.

No disruption. ExecuTrieve operates with your existing files in your CICS environment. It doesn't require costly system changes or any additional programming.

Low overhead. Through the use of our proprietary access method, users can browse or create complex reports with remarkably low I/O and CPU overhead.

Easy to install. ExecuTrieve can be installed and operational in as little as one afternoon.

Of course, efficiency is only half the story. ExecuTrieve makes as much sense for the end user as it does for you. Look at it from the other side.

Introducing ExecuTrieve.

From the perspective of the end user. ExecuTrieve is a remarkably simple, but powerful query system.

Easy to learn. ExecuTrieve is a free-format fully on-line system using simple English syntax and requiring no computer sophistication. An editor even allows you to correct errors anywhere in the text.

Quick response. Our proprietary access method means quicker response to even the most complex queries. In fact, the more complex the query, the quicker the response.

Complete reports. ExecuTrieve has a report generator and graphic capability. So it's a snap for non-pros to develop effective reports.

Efficient for the professional. Easy for the end user. Any way you look at it, ExecuTrieve is a query system worthy of investigation.

Call or write On-Line Software International.

ExecuTrieve for CICS from

ON-LINE SOFTWARE INTERNATIONAL

Fort Lee Executive Park
Two Executive Drive, Fort Lee, NJ 07024
(201) 592-0809, Toll Free (800) 526-0272

"IDMS/R is the perfect DBMS for the IBM 4300 user."

Frank Chisholm*

*Frank L. Chisholm is Cullinet's Executive Vice President. Frank has worked closely with Cullinet users and prospective users for more than six years. As a key member of Cullinet's management team, Frank has contributed heavily to Cullinet's database product development strategy.

Because IDMS/R, with its Automatic System Facility, makes your IBM 4300 as easy to use as a personal computer.

The Automatic System Facility (ASF) is so comprehensive and easy to use that all an IBM 4300 user need do to develop an application is to define a relational record. ASF then dynamically generates all necessary supporting structures including data definitions, screen formats, application processing logic, and documentation. In other words, the developer can witness the application being produced, literally, in seconds. This is what makes ASF a major advance over fourth generation languages. Thus IDMS/R is the perfect system for the IBM 4300 user with limited staff resources.

But suppose when you build a complex, high volume production application with IDMS/R, you desire outstanding performance. Typically, 5% of the data relationships (joins) in any application are accessed 95% of the time. With IDMS/R you can simply change these relationships to predefined joins and benefit from a dramatic boost in performance.

We call it Relational Fastpath. This is what makes IDMS/R a unique relational DBMS, and a perfect system with which to build production applications. In addition, IDMS/R has the most sophisticated back-up and recovery capability of any DBMS, a full integration with personal computers and a complete line of integrated financial and manufacturing applications.

In summary, IDMS/R was designed to satisfy the requirements of the IBM 4300 user who wants to develop both production and end user applications faster and easier.

For further information, attend a Cullinet Seminar. Mail the attached coupon or call the Cullinet Seminar Center at 800-225-9930 (in Massachusetts 617-329-7700).

IDMS/R Seminar Cities and Dates

City & State	Date	City & State	Date	City & State	Date	City & State	Date
Atlanta, GA	Feb. 15	Denver, CO	Feb. 7	New Orleans, LA	Feb. 28	Sacramento, CA	Feb. 21
Arlington Heights, IL	Feb. 23	Des Moines, IA	Feb. 16	New York, NY	Feb. 22	St. Louis, MO	Feb. 8
Austin, TX	Feb. 14	Detroit, MI	Feb. 9	Norfolk, VA	Jan. 18	Salt Lake City, UT	Feb. 21
Baltimore, MD	Feb. 21	Edmonton, AB	Feb. 15	Oklahoma City, OK	Feb. 9	San Diego, CA	Feb. 23
Bloomington, IL	Feb. 21	Greensboro, NC	Jan. 17	Orlando, FL	Feb. 7	San Jose, CA	Feb. 14
Boston/Westwood, MA	Feb. 23	Hartford, CT	Feb. 14	Oshkosh, WI	Feb. 28	Savannah, GA	Feb. 3
Bowling Green, KY	Feb. 1	Indianapolis, IN	Feb. 21	Ottawa, ON	Feb. 1	Seattle, WA	Feb. 7
Buffalo, NY	Jan. 17	Joliet, IL	Feb. 9	Ottawa, ON	Feb. 21	Somerset, NJ	Feb. 6
Burlington, MA	Feb. 9	Kansas City, MO	Feb. 22	Philadelphia, PA	Feb. 8	South Bend, IN	Feb. 7
Calgary, AB	Jan. 18	Lansing, MI	Feb. 1	Pittsburgh, PA	Feb. 29	Syracuse, NY	Feb. 14
Charleston, WV	Feb. 29	Los Angeles, CA	Feb. 9	Portland, ME	Feb. 21	Tampa, FL	Feb. 8
Charlotte, NC	Feb. 23	Louisville, KY	Feb. 16	Quebec City, PQ	Feb. 15	Toledo, OH	Feb. 24
Cincinnati, OH	Feb. 7	Memphis, TN	Feb. 23	Quincy, IL	Feb. 29	Toronto, ON	Feb. 2
Cleveland, OH	Feb. 3	Miami, FL	Feb. 16	Richmond, VA	Feb. 8	Worcester, MA	Feb. 16
Columbia, SC	Jan. 19	Milwaukee, WI	Jan. 17	Roanoke, VA	Jan. 20	York, PA	Feb. 15
Columbus, GA	Feb. 28	Moline, IL	Feb. 3	Rockford, IL	Feb. 14		

I'd like to attend your seminar on _____ Date

in _____ City

My computer is _____

Name/Title _____

Name/Title _____

Company/Department _____

Address _____

City _____

State _____ Zip _____

Phone ( )

Mail to: The Cullinet Seminar Center
400 Blue Hill Drive, Westwood, MA 02090-2198

Database : Cullinet

SOFTWARE & SERVICES

Continued from page 48

fourth-generation, nonprocedural Mims system language and is said to enable labor requirements to be planned and measured against availability and in planning inventory requirements. The vendor said all information pertinent to key maintenance activities can be clearly monitored and tracked. In addition, detailed costs, including spare parts, labor and overhead, can be tracked to work orders.

For clients currently using the Mims system, Repmain is licensed for $25,000.

Geisco, 401 N. Washington St., Rockville, Md. 20850.

INTERACTIVE SYSTEMS, INC.
Mentor

Interactive Systems, Inc. has announced an on-line data analysis and modeling package for Digital Equipment Corp.'s VAX-11 superminicomputers and Decsystem-10 and Decsystem-20 mainframes.

Called Mentor, the system is said to utilize literal names in addition to the conventional method of numerical row and column access. The vendor said that models developed in several different departments or divisions do not have to be laid out identically because Mentor can perform a consolidation on multiple models that use the same identifiers.

Mentor also features an interactive report writer that permits flexible reporting of data in a model without affecting the integrity of the model itself. According to the vendor, once a report format has been created, it can be saved for future use, and various report formats accessing the same model are also available. The system can store instructions for future use so that a user wishing to perform a task only has to input the correct commands.

Mentor is available at an introductory license fee of $5,000.

Interactive Systems, 131 Middlesex Tpke., Burlington, Mass. 01803.

HMS COMPUTER SYSTEMS, INC.
AIM/3000 Fixed Asset System;
AIM/3000 Billing System;
AIM/3000 General-Purpose Report Writer

HMS Computer Systems, Inc. has added three products to its AIM/3000 line of financial accounting software for the Hewlett-Packard Co. HP 3000 computer.

The Fixed Asset System provides property control for assets and calculation of depreciation and produces the information necessary to meet governmental reporting requirements, a spokesman said. Assets may be kept active for taxing purposes after they are fully depreciated for book purposes. The purchase price is $7,000.

The Billing System is integrated with the AIM/3000 Accounts Receivable or can be interfaced with an existing system. It has total billing and invoicing capabilities with the ability to restart from any specific invoice. The system accommodates printing of multiple addresses and recurring billings. It is priced at $2,000.

The General-Purpose Writer allows the nontechnical user to generate customized reports in minutes, the spokesman said. It is interfaced with all AIM/3000 systems and includes a preloaded data dictionary. It costs $2,000.

HMS Computer Systems, P.O. Box 35505, Building 9, 4504 E. 67th St., Tulsa, Okla. 74153.

PARA RESEARCH, INC.
Easy Text versions

Para Research, Inc. announced it has enhanced two versions of its Easy Text word processing package: One version runs on IBM's System/34 and System/36, while the second version was designed to be used with the System/38.

The Easy Text for the System/34 or System/36 has an added 30,000-word spelling checker that works in interactive or batch mode.

Enhancements to the System/38 version of Easy Text include automatic line centering, automatic text conversion for 48- and 64-char. printers and paragraph indenting.

The Easy Text is priced at $750 for the System/34 and System/36 and $1,500 for the System/38.

Para Research, 85 Eastern Ave., Gloucester, Mass. 01930.

LANGUAGES

SOFTWARE CONSULTING SERVICES, INC.; BRITISH STANDARDS INSTITUTE
Pascal Validation Suite Quality Control; Standard Pascal Model Implementation

Software Consulting Services, Inc. and the British Standards Institute have jointly announced the Pascal Validation Suite Quality Control package and the Standard Pascal Model Implementation system.

The Pascal Validation Suite (PVS) system consists of 724 test programs that are said to exercise systematically a Pascal compiler to determine its ability to process programs written in International Standards Organization Standard Pascal.

The Standard Pascal Model Implementation (SPMI) is said to be a complete Pascal implementation.

Both PVS and SPMI are available in machine-readable source code for $450 each.

Software Consulting Services, Ben Franklin Technology Center 125, Murray H. Goodman Campus, Lehigh University, Bethlehem, Pa. 18015.

You want quality products when you buy financial applications software, but it's tough to measure before the buying decision is made.

At Data Design, we measure product quality four ways.

● By product features that make it easy to implement, use and maintain.

● By our track record for reliability, the result of our extensive in-house Quality Assurance program.

● By effectiveness of our documentation, which is the industry's best.

● And by results, which we let you calculate for yourself by talking to *any* customer who has ever installed our financial applications software.

You'll find measurable quality in Data Design's Fixed Assets and Accounts Payable/Purchase Control systems. We engineer them with modular architecture, making them flexible enough to adapt rapidly to changing financial requirements. Data Design's Data Mapping Facility, an exclusive feature of our advanced system architecture, gives users the power to adapt the system to changing conditions.

Our applications systems are written in ANSI COBOL and designed for large and medium-scale computers. Their quality has already been measured by hundreds of U.S. corporations—many of whom use McCormack and Dodge, Software International, or MSA general ledger systems but came to us for Fixed Assets and Accounts Payable.

And you'll find the same measurable quality in Data Design's soon-to-be-announced General Ledger System.

See how we measure up to your needs. Call us at (408) 730-0100 from inside California or toll-free from any other state at (800) 556-5511.

Please send information on the following Data Design software:
☐ Accounts Payable/Purchase Control System
☐ Fixed Assets Accounting System
☐ General Ledger System

Computer Make/Model
Name
Title
Company
Address
City State Zip
Phone

Mail to: Data Design Associates, Inc.
1279 Oakmead Parkway,
Sunnyvale, CA 94086
(800) 556-5511.
(408) 730-0100 (California)

DA DATA DESIGN ASSOCIATES

SOFTWARE & SERVICES

PLUM HALL, INC.
C Programming Workshop; Advanced C Topics; Unix Workshop

Plum Hall, Inc. has announced three five-day introductory courses in the basics of programming in the C language, advanced C topics and programming in Unix.

According to Plum Hall, the seminar materials are available for unlimited internal use through a sublicensing agreement. The C Programming Workshop is an introduction to C for programmers, while the Advanced C Topics seminar covers efficiency, portability and other software engineering topics. The Unix Workshop emphasizes software development.

Internal use of each course is priced at $10,000.

Plum Hall, 1 Spruce Ave., Cardiff, N.J. 08232.

REMOTE COMPUTING SERVICES

CITIBANK
Citiintegrator

Citibank has introduced Citiintegrator, an IBM Personal Computer- and Personal Computer XT-based treasury management system that automates data collection and reporting of bank balance information and serves as a "window" to Citibank's electronic banking and cash management services.

The software is said to provide integration with Lotus Development Corp.'s Lotus 1-2-3 and can link any independent data base using an autodial feature.

Citibank electronic banking services that can be automatically accessed through Citiintegrator include Citicash Manager, Cititreasury Manager and Citibanking.

Citiintegrator's data retrieval and autodialing capability costs $5,000; report consolidation costs $7,500; and target balance consolidation costs $2,500.

Citibank, 399 Park Ave., New York, N.Y. 10043.

ON-LINE DATA BASES

DOW JONES & CO., INC.
Dow Jones Spreadsheet Link

Dow Jones & Co., Inc. has announced a microcomputer-based software product that provides an interface between the Dow Jones News/Retrieval interactive information service and Visicorp's Visicalc, Microsoft, Inc.'s Multiplan and Lotus Development Corp.'s Lotus 1-2-3 spreadsheets running on Apple Computer, Inc. hardware.

The Dow Jones Spreadsheet Link allows users to download data from News/Retrieval into the spreadsheet. A version for the IBM Personal Computer will be available later in the first quarter of 1984.

Dow Jones, P.O. Box 300, Princeton, N.J. 08540.

TRAINING

Data Kinetics Ltd. has announced two training courses focusing on Information Builders, Inc.'s Focus fourth-generation software system.

The courses, Focus Retrieval and Reporting and Focus Programming Workshop, are said to emphasize the user-oriented capabilities of the Focus language. In addition to reporting, the workshop teaches the more complex tools including defining, loading and updating files and data bases, a spokesman said.

It is intended for the experienced programmer interested in building systems. Focus Retrieval and Reporting is said to be a three-day course, and the Focus Programming Workshop is a five-day course.

Reporting course is priced at $4,500, and the Focus Programming Workshop is priced at $6,000.

Data Kinetics, Education Department, 97 Norman St., Ottawa, Ontario, Canada K1S 3E5.

GOAL SYSTEMS INTERNATIONAL, INC.
Design course; Vsam/BC course

Goal Systems International, Inc. has announced two computer-based training (CBT) courses.

The Design course for new CBT authors, project managers or administrators is said to be an introduction to the development and administration of CBT courses.

The six-hour course discusses learning principles and their application to the construction of questions.

Vsam/BC is a four- to seven-hour course that is geared toward system and application programmers in IBM Vsam environments. The course does not cover coding of utilities or requests.

Both Design and Vsam/BC are priced at $3,780 for a permanent license.

Goal Systems International, 5455 N. High St., Columbus, Ohio 43214.

BECOME A CICS CONSULTANT IN JUST TWO WEEKENDS.

We know that it's tough for consultants to fit a weekday course into their hectic schedules. That's why SysEd offers special CICS training courses for consultants that you can complete in only two weekends.

Our intensive weekend courses in Command Level, Macro Level, Internals, Application Design and VSAM are designed to make even non-CICS programmers immediately productive in a CICS environment. Each SysEd course provides a true-to-life learning experience with "hands-on" use of the computer; up-to-date, practical information; a solid foundation in CICS fundamentals and insights into advanced materials; and individual attention from highly qualified instructors.

SysEd's special weekend courses for consultants are held regularly at our classroom/computer facilities in New York City, Chicago, San Francisco and Dallas. Because class size is limited, applications are on a first come, first served basis.

For more information, call David Shapiro (212) 889-3366.

SYS-ED

ONE PARK AVENUE, NEW YORK, NY 10016 • (212) 889-3366

LISTEN UP!

Call 1-800-551-6666 TOLL FREE and hear what everyone's talking about.

Quikjob™

Quikjob is a one-step load and go program for one time report writing, fast file creation and dataset quick fixes for use with IBM Mainframes, UNIVAC 90 Series and System 80. • Uses free-format English-like language • Complete and fast, most programmers start using Quikjob after just ½ hour • Generates reports in hours, not days, and updates files faster than you might think possible • Rental or pathase basis • It's quick, complete, and affordable — as low as $425 per month! Try Quikjob FREE for 30 days and see for yourself. Over 1,000 users worldwide

SYSTEMS SUPPORT SOFTWARE
5230 Springboro Pike
Dayton, Ohio 45439
(513) 435-9814

ADDERS/Data Entry BEATS ALL OTHER DATA ENTRY SYSTEMS

Simplicity : ADDERS/Data Entry runs on existing terminals under SHADOW II or CICS in pseudo-conversational mode. Non-D.P. staff can set up their own input screens to mirror source documents. No additional hardware needed!

Functionality : ADDERS/Data Entry offers all the function of the best key-to-disk systems plus on-line power and direct data entry.

Cost : ADDERS/Data Entry protects your resources by removing the need for specialized hardware and making optimum use of your mainframe power.

ADDERS/Data Entry is one of a group of integrated products that make common use of the ADDERS nucleus.

Call 1 (800) 556-7845 now for a free trial. Your payback can start in just three months.

Rendeck
5 Faneuil Hall Marketplace
Boston, MA 02109 • (617) 367-9180

SAS Users Group International

The Diplomat Resort
Hollywood Beach, Florida

Date Changed!
March 18-21, 1984

Sally Carson, Chair, The Rand Corporation

Featuring papers, tutorials, and posters on the SAS® System for:

- Capacity planning and evaluation, and systems software
- Econometrics, time series, and operations research
- Education and consulting
- Graphics
- Information systems
- Interactive techniques
- Portable SAS
- Statistics

For information, write or call:

sugi
Box 8000
Cary, NC 27511-8000
(919) 467-8000

SAS is the registered trademark of SAS Institute Inc.
Copyright © 1983 by SAS Institute Inc.

COMMUNICATIONS

PBX nullifies net predictions

DATA STREAM

JIM BARTIMO

The problem with predictions is that they are always based only on facts existing in the present. So, the futurists of the 1950s predicted space colonies after the launching of *Sputnik* and robots after the advent of the home appliance.

Because these futurists of yesterday had no information on the microprocessor, they could not have predicted the widespread use of computers, communications or even video games.

Similarly, the futurists (read: consultants) of the last three years have been predicting the widespread use of local-area networks. Based on the information available in 381, predictions that most peripherals and computers would share data over a Xerox Corp. Ethernet or a Wang Laboratories, Inc. Wangnet were justified. Users wanted connections; why not wire devices together?

But things have changed in the last few years. First and foremost, the private branch exchange (PBX) now offers local networks with their new nonblocking architectures. While transmission rates are lower over the twisted pair wiring of the voice world, so is the price.

Not only is the PBX an attractively priced alternative to local-area networks, it is beginning to look as if

See PBX page 54

Deregulation may oust vendors

By Lynne Hefner
CW Staff

SAN JOSE, Calif. — While deregulation will create significant new revenue opportunities for data communications equipment and services suppliers, the associated disruption will eliminate many vendors, according to a report recently released here.

The report, "Data Communications Markets: Impact of Deregulation," published by Strategic, Inc., projects that the shift of major carriers from universal service to a competitive price-based marketing environment will trigger fundamental problems in the data communications market and cause major headaches for the user community.

Among the negative effects will be a reduction in the quality of switched network transmission. This, in turn, will reduce the revenues that would have otherwise accrued to the independent high-speed switched network modem vendors and force the restructuring of the data communications services submarket into specialized transmission and value-added network segments, as users scramble for reliable services.

"Deregulation will create a healthy market environment for the network management product sector of the data communications equipment submarket," the report said. "This sector, which includes hand-held analog and digital test sets, along with technical control and network management systems, will increase from $472 million in 1984 to over $1.1 billion in 1988, showing an average annual growth rate of 25%."

On the other hand, Strategic pointed out, the associated need for leased services will create additional revenue opportunities for those multiplexer vendors that cater to the needs of the network service suppliers. The inevitable reduction of network reliability will also enhance the sales prospects of test and diagnostic equipment vendors.

The report also projects that new high-volume semiconductor technology, rapid progress in fiber optics, excess satellite capacity and the economics of digital transmission will combine to stimulate the introduction of a broad range of alternative methods of data transmission.

Strategic's report discusses the major influences that will drive this market for the rest of the decade and warns of potential problems that may affect corporate strategy. The report costs $1,500.

Strategic, P.O. Box 9747, San Jose, Calif. 95157.

Digital's DR Soft/Net links micros

A software package that can reportedly link microcomputers running its CP/M operating system via any local-area network was announced here by Digital Research, Inc.

Introducing its new DR Soft/Net package, the company claimed the product enables offices to tie together diverse personal computer workstations using local-area networks such as Xerox Corp.'s Ethernet, Datapoint Corp.'s Arcnet and Corvus Systems Inc.'s Omninet.

The package is said to interconnect micros running any version of Digital's CP/M, CP/M 86 and Concurrent CP/M operating systems.

Networking features reportedly include file sharing, password protection and record and file locking. In conjunction with Concurrent CP/M, DR Soft/Net is said to provide a file-server capability at each workstation. According to the vendor, users are able to share files and transfer information while

See LINK page 54

INSIDE

- OS and DOS users can communicate with any device supporting IBM 2780 and 3780 protocols/55
- Computers with IEEE-488 interfaces can communicate with RS-232 through a microprocessor-based interface/55
- PCI debuts Ascii-to-IBM converters/55
- Local network supporting multiple operating systems now available/55
- The fourth-generation PBX and the user/57

TUTORIAL

Communications manager to emerge from automation

By Steven S. Lubow
Special to CW

With the communication of information fast becoming the most essential function of the automated corporate office, the emerging new breed called the communications manager must be a key decision maker in a company's information management process.

The rapidly changing business world demands that voluminous amounts of mostly computer-generated data be delivered quickly and in usable form to many levels of decision makers and specialists throughout an organization.

Communications, however, costs enormous amounts of time and money, which means that — for corporate survival — the escalating costs of processing information must be reduced. Also, the growing library of company-developed software must eventually be networked for optimum efficiency.

Many companies still believe that a well-tuned office automation capability can address these issues because of the manager's familiarity with in-house computer systems and the word and data processing needs of all company functions.

What top management does not realize is that virtually all information management is now a communications matter and can no longer be the exclusive province of the data processing, information system or office automation manager. The communications manager — who is the only one with an overview of every department's communications needs — has to be involved in the decision-making process from the beginning.

Ideally, of course, the office automation manager should incorporate communications into his sphere of expertise, and the communications manager should be knowledgeable about office automation. Even more ideally, their two departments should merge into one. At the very least, however, both should work together for cost-effective results, with each implementing critical assigned functions.

For instance, just as a company's traffic manager (not the senior accountant) decides on the most cost-effective way of shipping a product, the communications manager (not the office automation manager) should be the one to choose the appropriate method of transporting information.

Communications technologies are now at a developmental level comparable to where data processing was 15 years ago and are moving forward rapidly. Data processing tends to accommodate mainly traditional business practices and is not likely to advance beyond that stage unless there is a major shift in the way companies operate.

The advent of affordable data communications systems brought about by inexpensive microprocessors has significantly influenced the rise of communications technology. What is being done today in this area was not possible just two or three years ago, because certain integrated chips were not available.

As an example, the function of a modem the telephone company currently rents for about $75 per month can now be performed by a chip that costs only about $30 to buy.

Choosing the technology for transporting information requires strategic planning, and this logically falls within the scope of the communications manager. In this capacity, he can reduce office automation's work load by selecting office equipment that not only has communications capabilities, but can take over some of the processing load at remote workstations. Any excess loads on the central DP computer can then be shifted to the office automation side of the house or to the communications processor.

In addition to his role in office automation, the communications manager should play a vital part in a company's networking, which is

See MANAGER page 54

PBX

from page 53

it could be the hub of the automated office.

Second, IBM has yet to give local-area networks its blessing by releasing a product in this field. Although hinted at time and again, IBM's entry into this market seems less and less likely.

Big Blue seems content to stick to its Systems Network Architecture (SNA) method of connectivity with last year's introduction of the 3270 Personal Computer. IBM has not ignored the PBX network either, by investing heavily in Rolm Corp.

The final blow to local-area networks may be the high-flying predictions of the futurists. The gap between hype and reality has weakened the confidence of the data manager to invest too heavily in a technology stuck at the starting gate. When no one will invest in a technology, prices stay high, and when prices stay high, no one will invest.

But perhaps another new development, such as telecommuting, will make host-based networks the darling of the communications industry once more. Perhaps users were just waiting for the recession to subside before investing heavily in communications equipment.

There are many reasons to believe the local-area network is not dead — but the same could be said of the space station and the robot.

MANAGER

from page 53

becoming more critical and complex as demand for information continues to increase.

Again, because of his overall view of an organization and its local, regional, national and global operations, the communications manager is in the best position to apply cost-effective concepts and technology to the equipment and services required to solve business communications problems now.

The communications manager is also the one who will be ready with the right solutions 10 years from now. Communications is, after all, a long-term proposition, and today's communications manager must place more emphasis on planning than on the actual operations of communications.

The communications manager cannot afford to indulge in short-term solutions, except as they fit into the context of a more comprehensive strategic plan.

A long-term plan would allow corporations to buy three units now instead of committing to 20, because the next five units scheduled for purchase would provide more advanced technology and, probably, more capability.

Corporations, particularly those that are watching expenditures (and which ones are not?) are beginning to realize that the communications manager is in a position to save them millions of dollars — not just in direct costs, but also through more efficient office operations and equipment planning.

If communications is coming of age, so must the communications manager.

Lohera is chairman and president of Intelligent Communications Networks, Inc., Ventura, Calif.

LINK

from page 53

running an application.

DR Soft/Net does not require dedicating a separate workstation CPU to supervise networking, Digital claimed, and its multitasking capabilities also support transferring data between local and remote processors via a local network, thereby providing full distributed processing.

The product will be sold for $1,000. Digital Research also announced a new compiler design, the first example of which, a compiler for Fortran-77, will be released in January, the company said.

The Fortran-77 compiler, priced at $500, will be the first of five new compilers to use the technology and will run on Concurrent CP/M and CP/M-86 operating systems.

Digital Research, 160 Central Ave., Pacific Grove, Calif. 93950.

Science Dynamics offers ACT-LTBR

Science Dynamics Corp. has announced the ACT line trunk billing recorder (LTBR) a microprocessor-controlled terminal that records accesses to telephone operating company equipment.

The product may be used with both electromechanical and stored-program controlled telephone company switching systems. The unit includes 24 electronic meters for each input to record the number of inbound and outbound accesses and their duration for each rate period — day, evening and night, according to the vendor.

The ACT-LTBR terminal includes a built-in control panel for programming trunk and line parameters to suit each installation.

Each input is individually programmable to accommodate various types of loop, ground start or electrical and mechanical signaling, or units may also be programmed from a central site, according to the vendor.

Other terminal features include security code protection, battery-protected memory, a perpetual calendar and modular construction, the vendor said.

A basic ACT-LTBR to accommodate 16 lines or trunks is priced at $3,150.

Science Dynamics, 1919 Springdale Road, Cherry Hill, N.J. 08003.

RED HOT DEMO.
SEE THE NEW ENVISION 430.
IF ITS NOT MORE THAN
A COLOR PRINTER,
IT'S FREE.

You really can't lose. Because if we can't prove our new Envision 430 Color VectorPrinter™ is more than a color printer, we'll give it to you on the spot. Free.

WHAT YOU DON'T KNOW

What you might not know is that our new 430 has the uncanny ability to print high resolution pen plotter graphics. It can do that because we designed vector-to-raster conversion right into the printer.

And to make our 430 that much better than any other color printer you can buy, we also gave it the ability to print 100 characters per second in letter quality mode or 300 characters per second for drafts. This means our 430 gets your work done a lot faster. It also means you can print high speed drafts, letter quality text, high resolution raster graphics and plot vector graphics—on the same page! So when you buy our new 430, you're really getting four very usable talents in one very versatile printer.

A VERITABLE PARADISE OF COLOR

Even if you're not a Van Gogh, our new 430 gives you the ability to create inspired color graphics. It prints any four colors of red, green, blue, cyan, magenta, yellow or black in a single pass. You can also blend any of these colors to create an entire spectrum.

And because a one-eighth inch solid color band is printed on each pass of the 18-wire printing head, our 430 creates your masterpieces with incredible speed.

UNCOMMON VECTOR/RASTER GRAPHICS

We made our 430 compatible with the Hewlett Packard 7220 pen plotter. That means it's supported by a host of business, engineering, and scientific graphics software packages. And it gives you printed quality that's nothing short of superb. As well it should. Because we designed our 430 with exceptionally accurate horizontal and vertical registration. It also prints raster graphics at 360x144 dots per inch for the highest resolution or 72x72 dots per inch for maximum speed. And to give you added flexibility, we gave our 430 the ability to print on plain paper *and transparencies.*

LETTER QUALITY MAGNA CUM LAUDE

When you begin using our 430 you'll quickly discover you don't have to be a wordsmith to create letter quality documents with punch. Any of the character fonts can be mixed or colored using host computer control.

WORDS, 4444 (characters), lines or pages CAN BE PRINTED in any of EIGHT COLORS. One letter quality font in 10, 12, and 18 PITCH and one high speed font in 10 and 12 PITCH ARE STANDARD. This means you can make MESSAGES STAND OUT You can COLOR specific words or IDEAS

And our 430 comes with optional letter-quality character fonts like **BOLD**, *italic*, SCRIPT and ORATOR. Plus you

COMMUNICATIONS

PROTOCOL CONVERTERS

CONNECTICUT MICROCOMPUTER, INC.
Buster GR

Connecticut Microcomputer, Inc. has announced a microprocessor-based interface designed to allow computers with IEEE-488 interfaces to communicate with devices that have standard RS-232 interfaces.

The Buster GR is said to facilitate connections between processors and printers, modems, terminals, mainframes and other computers.

Programmed through Basic commands from the host IEEE-488 computer, Buster GR reportedly features selectable bit/sec rates from 75 to 19.2K, 110-char. input buffer and parity and word-length selection.

The unit, currently available, costs $495 for a standard version.

Connecticut Microcomputer, 36 Del Mar Drive, Brookfield, Conn. 06804.

PROTOCOL COMPUTERS, INC.
PCI 176

Protocol Computers Inc. (PCI) has announced the immediate availability of its new Series 100 protocol converters which, the vendor claimed, enables Ascii terminals to communicate with IBM hosts.

The Series 100 includes four models:

- PCI 176, which supports up to seven personal computers and/or Ascii terminals and printers, according to the vendor.
- PCI 167, which, the vendor said, allows IBM 3767 users to substitute Ascii terminals, printers, teletype terminals, graphics plotters and micros for IBM Systems Network Architecture (SNA) devices.
- PCI 151, which reportedly allows non-IBM Ascii terminals and printers to be linked to IBM's System/34, 36 and 38 computers.
- PCI 171, which provides Ascii to bisynchronous conversion for non-SNA IBM applications, according to the vendor.

Pricing for the PCI 171 and 176 starts at $1,950 and at $2,850 for the PCI 151 and 167.

Protocol Computers, 6150 Canoga Ave., Woodland Hills, Calif. 91367.

COMMUNICATIONS SOFTWARE

SOFTWARE DEVELOPMENT AND MAINTENANCE, INC.
SDM3780

Software Development and Maintenance, Inc. (SDM) has announced a communications software product that is said to enable IBM users with OS and DOS operating systems to transfer data to any other computer, terminal or remote entry device that supports 2780 and 3780 communications protocols.

Known as SDM3780, the software system emulates a remote job entry workstation for the IBM subsystems JES and Power. Also, SDM3780 can support file-to-file transfer as either the host or the terminal, using any combination of hardware and/or software subsystems it supports, SDM said. SDM3780 runs under any IBM DOS/VSE, OS/VS1 or MVS operating system. Communications are performed via IBM 2780 and 3780 Binary Synchronous Communications protocols using Vtam.

SDM3780 is priced at $4,500 for the DOS version and $5,000 for the OS version.

SDM, P.O. Box 668, 124 Spring Ave., Fuquay-Varina, N.C. 27526.

LOCAL-AREA NETWORKS

KANTEK, INC.
Kannet

Kantek, Inc. has announced Kannet, a local-area network that can support up to 254 computers of dissimilar types with several different operating systems.

According to the company, fully transparent format translations make it appear to each computer that all other computers are the same type it is. The operating systems supported by the Kannet system include Microsoft, Inc.'s MS-DOS, IBM's PC-DOS and Digital Research, Inc.'s CP/M 86 and CP/M 80. All operating systems may reside on the network concurrently, Kantek noted.

The Kannet system is priced at $1,295 for each computer in the network.

Kantek, Suite J, 1370 N.E. 20th, Bellevue, Wash. 98005.

AUXILIARY EQUIPMENT

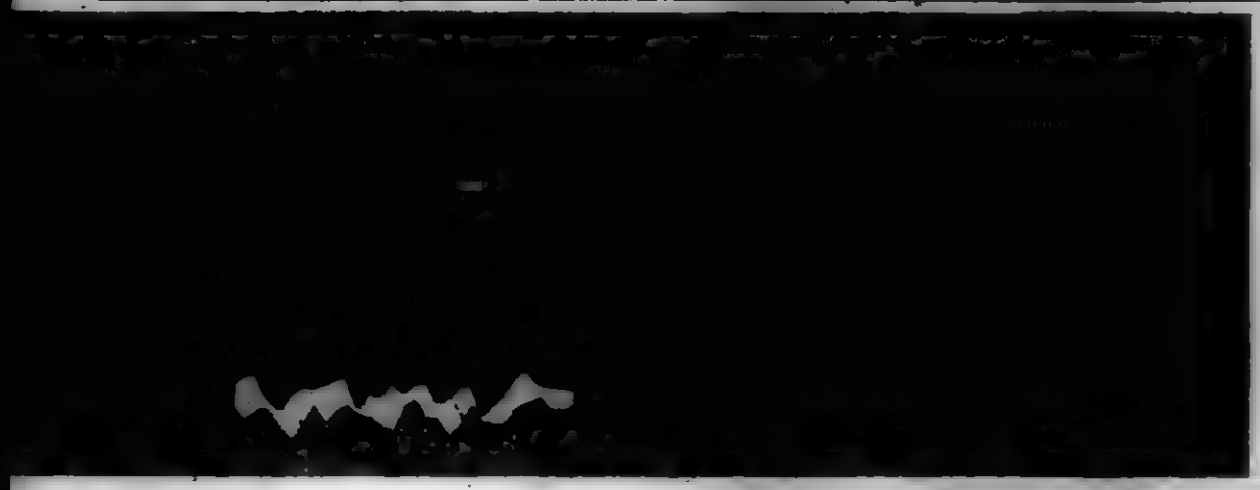
COMMUNICATIONS PUBLISHING GROUP, INC.
"Fiber Optics Coupler & Connector Patents"; "Fiber Optics Fiber & Cable Patents"

Communications Publishing Group, Inc. has published two reports concerning fiber-optic patent activity from 1963 to 1983: "Fiber Optics Coupler & Connector Patents" and "Fiber Optics Fiber & Cable Patents."

The reports contain fiber-optic patent numbers, descriptions of each patent, reproductions of selected patents and names of whomever was assigned a patent.

The reports cost $125 each.

Communications Publishing Group, P.O. Box 383, Dedham, Mass. 02026.



can define up to 196 characters to print both text and graphics. And to add versatility to your text creations we made our 430 compatible with the Diablo 630 ECS. Which means it supports the most popular text and word processing packages.

NO MORE RIBBON WASTE

Another nice little benefit of our 430 you won't find in other color printers is a four-cartridge ribbon system. Our separate color cartridges advance independently as each color is used. By doing things this way you don't end up wasting ribbon or running out of the color you want just when you want it. It also means lower cost per copy for you. Plus you also have a choice of high quality mylar ribbon cartridges and longer life nylon ribbon.

YOU DON'T HAVE TO PASS UP SPEED FOR QUALITY

Our 430 has been designed with an 18-wire printing head. This means that instead of having to pass over a line more than once to achieve high quality, our 430 prints letter quality characters in a single pass. It also does this with a great deal more speed because it never has to retrace the same line.

And while we're talking about speed, you should know we built our 430 with a print control microprocessor which tracks the carriage through a unique closed-loop servo system and adjusts for carriage speed and direction during dot placement. That permits it to print while the carriage accelerates. Which is another reason it gets your job done a lot faster.

THE 430's UNFORGETTABLY EFFICIENT

If you tear down our 430 you'll find two 16-bit microprocessors. One of them controls the printing mechanism; the other takes care of the host interface and command interpretation.

They both share a 128K-byte bit-map memory. So while you're busily telling the 430 what to print next— it's busily printing what you told it to print last.

A RED HOT DEMO

We think you'll be impressed when you see our 430. But that's not enough to get you to pick up your telephone and call. So if we can't prove it's more than a color printer, we'll give you a 430. Free.

Show a little sporting interest and take us up on our offer. You'll get a red hot demo and a chance to buy a printer and a plotter. Send us the coupon or call. Envision, 631 River Oaks Parkway, San Jose, CA 95134, (408) 946-8755 or Telex: 176437.

Text and graphics samples courtesy of: ISSCO, Magatek, Molecular Structure Corporation, and Precision Visuals, Inc.

..., ENVISION... MOVE IT TO ME. PLEASE CONTACT ME REGARDING A DEMO.

NAME

TITLE

COMPANY

ADDRESS

CITY

STATE, ZIP

PHONE

CW 1/9

Envision

Introducing COMPAQ PLUS, the first high-performance portable personal computer.

The makers of the COMPAQ™ Portable Computer, the industry standard, announce another breakthrough—the COMPAQ PLUS™ Portable Personal Computer. No other personal computer can handle so much information in so many places.

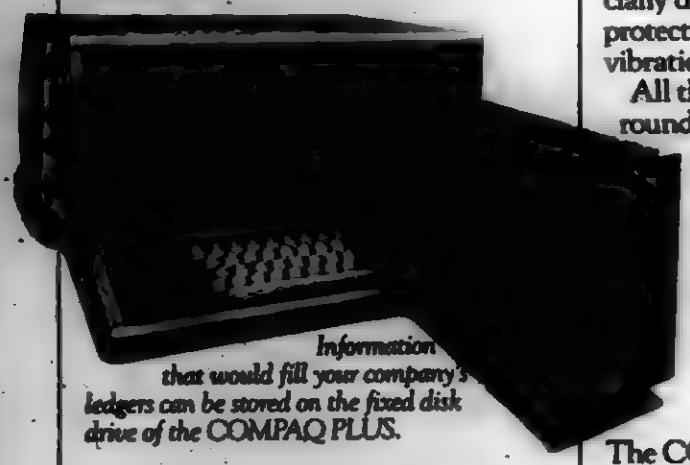
The new COMPAQ PLUS offers an integrated ten-megabyte fixed disk drive in a portable.

Plus a bigger payload

How much is ten megabytes?

Enough to tackle jobs that can't be conveniently handled on most personal computers.

A mailing list of 100,000 names and addresses.



Information that would fill your company's ledgers can be stored on the fixed disk drive of the COMPAQ PLUS.

Inventory records on a quarter million items.

The entire San Francisco phone book, with room left for Peoria.

Your most used programs can be permanently kept on the fixed disk drive of the COMPAQ PLUS, ready to call up and run.

Store a library of accounting programs—payables, receivables, general ledger, and payroll—*with* the company's books. Then take them to a board meeting or a branch office.

Your inventory control program and your inventory records can go with you to the factory. Your building specs and your project management programs can go with you to the construction site.

The high-capacity portable multiplies the productivity of every program it runs.

Plus more programs

The COMPAQ PLUS runs all the popular programs written for the IBM® Personal Computer XT, available in computer stores all over the country. And they run with no modification whatsoever.

You're buying a computer to solve problems. Why not have more problem-solving programs to choose from?

Plus a traveler's toughness

A true portable has got to be tough. The COMPAQ PLUS is.

Its fixed disk drive is designed specifically to travel. Rough roads and hard landings don't bother it because a specially designed shock isolation system protects the disk from jolts and vibration.

All the working components are surrounded by a unique aluminum frame with cross-members that strengthen it side-to-side, front-to-back, and top-to-bottom.

Does a portable personal computer really have to be this tough? Take a look at your briefcase and then decide.

Plus a lot more

The COMPAQ PLUS comes with a 360K byte diskette drive for entering new programs and copying data files.

The COMPAQ PLUS also works with optional printers, plotters, and communications devices designed for

The COMPAQ Portable, the industry standard in portable personal computers. ▼

The problem-solving power of a high-performance desktop personal computer can now go where you need it.

IBM's personal computer family.

It has two IBM-compatible slots for adding optional expansion boards. With companion programs, they'll let you network with other personal computers, communicate with your headquarters computer files or add memory capacity if your needs grow.

When you see all that COMPAQ PLUS has to offer, you'll be pleasantly surprised by the price. The fact is, it costs hundreds less than comparably equipped desktop personal computers.

See the first high-performance portable personal computer. The COMPAQ PLUS—performance, programs, productivity. Plus problem-solving power.

For the name of the Authorized Dealer nearest you, call 1-800-231-0900.

©1983 COMPAQ Computer Corporation
COMPAQ™ and COMPAQ PLUS™ are trademarks of COMPAQ Computer Corporation.
IBM® is a registered trademark of International Business Machines Corporation.

The new COMPAQ PLUS, the first high-performance portable personal computer. ▼

COMPAQ PLUS™

COMMUNICATIONS

Newest PBXs to provide exclusive service

By Neil Weber
Special to CW

When hand-held digital calculators first hit the market, they were marvels of miniaturization and electronic design. They were also very expensive. But for people who needed that level of computational power, they were the only game in town. Then, only months later, similar or even more sophisticated models were flooding the market at vastly lower prices.

Today, users and potential users of digital telephone-switching systems are about to face this dilemma. "Fourth-generation" private branch exchanges (PBX) are now on the drawing boards of several manufacturers, replete with sophisticated enhancements that sound utterly fantastic. In the near future, a number of these new systems will be brought to market.

Like the digital calculators, these new PBXs will at first be relatively expensive, and, for a time, they will have their share of bugs.

Predictably, most companies will follow the classic pattern of waiting to buy only when the product is attractively priced and thoroughly proven. However, those few companies that do "take the plunge" will gain an exclusive period of valuable service from these new switches.

The fourth-generation PBX will incorporate all of the current capabilities and will provide vastly greater data transmission capacity and speed-along, as well as a host of "convenience" features.

But even more important, the new PBXs will integrate voice and data transmission capabilities into a single device. Thus the stage will be set for the PBX to act as a complete protocol and format translator, capable of linking virtually any two computers. In effect, then, the new generation of PBXs will soon open the door to data bases anywhere in the world, regardless of the computers involved.

At the present time, a company that requires a great deal of data transmission through its PBX system must employ a separate data switch, which generally costs between $100,000 and $200,000. With the fourth-generation PBXs, however, no additional data switches or expensive external modems will be required.

Hence, the quandary of companies in search of a state-of-the-art PBX. In making their decision to buy or to wait, these companies will need to consider a number of factors.

Companies employing a moderate number of lines (200-600) and a comparatively low volume of transmitted data should be especially careful in projecting their future requirements before investing in a fourth-generation system. It may be a long time before such a company can utilize all of the features available with today's systems, much less those of fourth-generation systems.

The capability to handle data traffic better is in most cases the prime rationale for acquiring a fourth-generation system. Thus, companies that do not have extensive data transmission requirements will do well to question the need for such an advanced PBX.

Furthermore, these companies will take comfort in the proven reliability of third-generation systems. As the product of several years of design experience, third-generation PBXs are virtually free of problems associated with voice transmission.

Fourth-generation systems, however — designed "from scratch," so to speak — will require a period of time before they offer a comparable level of reliability in the realm of data transmission.

Neil Weber is director of Product Marketing at Harris Corp.'s Digital Telephone Systems Division.

NETWORK HEALTHCARE

DATA COMMUNICATION NETWORKS AREN'T LIKE PEOPLE BUT...

One thing's for certain. Poor advice early in the design stage, the wrong equipment, or inadequate product support could make your network very sick.

We can help prevent that. Meet ComDesign's data comm "doctors". They are a group of dedicated, service oriented data communication specialists. Talented, qualified, and helpful, they dispense the application engineering answers that will keep your network in the pink. For large networks or small. And you don't have to be a ComDesign customer to take advantage of this service. As a matter of fact, you'll never even need an appointment. Just use the toll-free number below. The doctor's always in.

(800) 235-6935
(805) 964-9852 in CA

ComDesign

751 S. Kellogg Ave. Goleta, CA 93117

Manufacturers of Advanced Statistical Multiplexers and Other Networking Products

The right application software package — does the choice get blurred?

Help is on the way from *Computerworld* this January

The ever-increasing requests for office software; the demand for tools by programmers and users alike; the bewildering array of products to choose from — make the job of selecting applications software challenging and difficult. Here's what you'll get from this January's Special Report on Applications Software to make your job easier:

- The packaged decision: Should you buy, or develop in-house?
- Methods of selecting the best application for your needs.
- Modifying and maintaining packaged applications.
- Integrating applications from multiple vendors.
- Conversion stories.
- Integrating micro with mainframe applications.
- Applications for manufacturing.

You'll get information on who should select packaged applications. You'll read about the impact of application generation tools on selecting packaged solutions. And you'll get pages of fact-filled ads for products to keep you up-to-date on just what's new. If you buy, choose or recommend applications software products — you won't want to miss this special report in *Computerworld's* January 30th issue.

And if you've got packaged software products our readers want to know about — then you need to get your ad to us by January 13 to be included in the Special Report. To reserve space in this issue, call Don Fagan, Vice President Sales/Marketing; Ed Marecki, National Sales Director, or Kathy Doyle, Marketing Support Manager at (617) 879-0700. Or, call one of the sales offices listed below:

COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

SALES OFFICES

BOSTON/Chris Lee, Jayne Donovan, Michael Kelleher, Ron Mastro, Jim McClure, Alice Longley, *(617) 879-0700*
CHICAGO/Art Kossack, Chris Lee, Joan Broderick, *(312) 827-4433*
NEW YORK/Mike Masters, Doug Cheney, Ray Corbin, Joan Daly, Fred LoSapio, Gale M. Paterno, *(201) 967-1300*
ATLANTA/Jeffrey Melnick, Mike Masters, *(404) 394-0758*
SAN FRANCISCO/Bill Healey, Ernie Chamberlain, Theodora Franson, A.G. Garmano, Barry Milione, Nicole Boothman (recruitment), *(415) 421-7330*
LOS ANGELES/Bernie Hockswender, Bob Hubbard, Bill Healey, *(714) 251-1230*

SPECIAL INTRODUCTORY OFFER FOR NEW SUBSCRIBERS. SAVE $5.00, PAY ONLY $39.00 FOR A FULL YEAR'S SUBSCRIPTION.*

(Basic Annual Subscription Rate is $44.) *U.S. ONLY

No Other Publication Gives You SO MUCH Timely News, Money-Making Ideas & Management Information— ***PLUS*** *Specials & Bonus Issues!*

As a weekly newspaper, ***COMPUTERWORLD*** gives you thorough and timely coverage of news and ideas of interest to computer users in industry, business, government and education. Unlike monthlies, ***COMPUTERWORLD*** covers *hundreds* of relevant news items *each week*. *But beyond the "news" you get much more as a CW reader:*

- Weekly "In Depth" articles.
- Monthly "Special Reports" on selected subjects.
- ***COMPUTERWORLD BUYER'S GUIDE SERIES*** . . . a comprehensive series of product-specific lists and up-to-date information on each major product area.
- ***COMPUTERWORLD OA*** with incisive coverage of office automation.
- ***COMPUTERWORLD ON COMMUNICATIONS*** covers product and system developments in the rapidly changing communications field.
- **PLUS** Other Special Issues Throughout The Year!

SUBSCRIBE NOW

Complete Form On Reverse, Then Return In Attached Postage-Paid Envelope. Or Use Your Charge Card and Call TOLL-FREE: 1-800-343-5730.

☐ **Please enter my subscription (details on back)**

☐ **I'm already a subscriber, but I'd like you to change my:**

☐ address ☐ title
☐ industry ☐ other

My current mailing label is attached and I've filled in new information on the other side.

Put old label or label information here

COMPUTERWORLD

Please send me COMPUTERWORLD for one year. RATES: United States ~~$44~~;
Canada, Central & South America $110; Europe $165;
All Other Countries $245 (Airmail Service)

Special Introductory Offer — Only $39.00 Save $5.00

☐ Check Enclosed
☐ Am Ex ☐ BA/Visa ☐ MC (MC Only - List four digits above your name)

If charge we must have cardholder's signature _____ Expiration Date: _____

First Initial		Middle Initial		Surname	
Your Title					
Company Name					
Address					
City			State	Zip Code	

Address shown is:
☐ Business
☐ Home

☐ Check here if you do not wish to receive promotional mail from *Computerworld*.

☐ Check here if you're interested in receiving information on *Computerworld's* Index.

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY
CIRCULATION DEPT. 375 Cochituate Road, Rte. 30, Box 897,
Framingham, MA 01701-9985

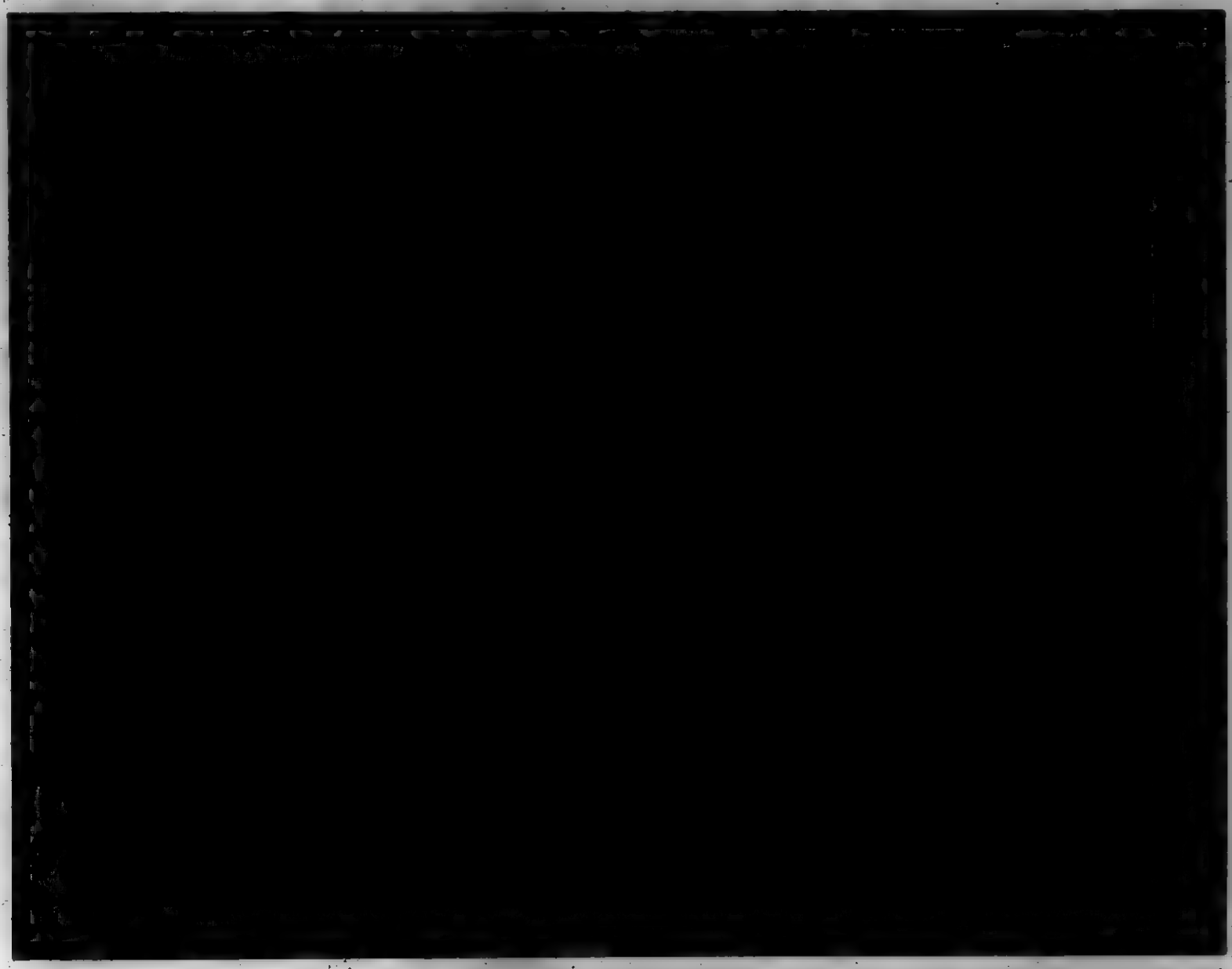
Detach here, moisten and seal envelope securely before mailing.

1. BUSINESS/INDUSTRY (Circle One)
End Users
10 Manufacturer (other than computer)
20 Finance/Insurance/Real Estate
30 Medicine/Law/Education
40 Wholesale/Retail Trade
50 Business Service (except DP)
60 Government—State/Federal/Local
65 Public Utility/Communication Systems/Transportation
70 Mining/Construction/Petroleum/Refining
75 Other User
Vendors
80 Manufacturer of Computers, Computer-related Systems or Peripherals
85 Computer Service Bureau/Software/Planning/Consulting
90 Computer/Peripheral Dealer/Distributor/Retailer
95 Other Vendor

2. OCCUPATION/FUNCTION (Circle One)
11 President/Owner/Partner/General Manager
12 VP/Assistant VP
13 Treasurer/Controller/Financial Officer
21 Director/Manager/Supervisor DP/MIS Services
22 Director/Manager of Operations/Planning/Administrative Services
23 Systems Manager/Systems Analyst
31 Manager/Supervisor Programming
32 Programmer/Methods Analyst
35 OA/WP Director/Manager/Supervisor
38 Data Comm Network/Systems Mgmt
41 Engr/Scientific/R&D/Tech Mgmt
51 Mfg Sales Reps/Sales/Marketing Mgmt
60 Consulting Mgmt
70 Medical/Legal/Accounting Mgmt
80 Educator/Journalist/Librarian/Student
90 Other

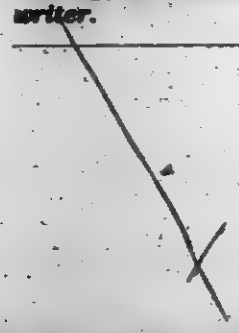
3. COMPUTER INVOLVEMENT (Circle all that apply)
Types of equipment with which you are personally involved either as user, vendor or consultant
A. Mainframes/Superminis
B. Minicomputers/Small Business Computers
C. Microcomputers/Desktops
D. Communications Systems
E. Office Automation Systems

IN DEPTH



The rise of the technical writer

The technical writer is, at least in some systems departments, an equal member of the development team. Projects are now more user-driven, demanding an effective liaison between user and technician — namely, the technical writer.



By Gene Knauer

In the rush to develop systems that meet the immediate or imminent needs of a management information systems environment, documentation often receives low priority. And traditionally, technical writers have lagged behind systems and user staff in both salary and status.

But the picture has changed significantly in recent years and continues to brighten. With greater acceptance of documentation as an important element of systems development, pay and responsibilities for writers are growing.

In a typical development situation, the programmer builds a system along linear patterns of logic. He usually jots down notes about a system in the order that his ideas come. These notes rarely constitute concise system documentation but can form an initial draft.

Enter the technical writer. From amidst the twists and turns, contradictions and omissions of the programmer's notes, the tech writer must synthesize and extract a clean, clear set of user instructions for the new computer system. The writer seeks to uncover the hidden logic in a program and then to convert it into a hierarchical pattern, with a main function at the top and subfunctions below.

"The writer is always seeking," says John Urton, a technical documentation consultant at the Federal Home Loan Bank in San Francisco. "He's always asking, 'What's this? Why isn't this working? Let me see that.' Once the system is designed, people want him to go away."

Technical writers in most MIS environments are usually activated about the time that new systems design and implementation staff are moving on to other projects. Friction often results from the technician's lack of interest in a system that is already history to him. The questions tech writers ask about the system to be documented force the programmer/

analysts to rehash old work.

"Often," says Lois Pryor, co-owner of Echols & Pryor Technical Communications in Berkeley, Calif., "the questions are seen by the systems staff as intrusions on their thought processes, which are now focused on equally complex and challenging new systems." When the tech writer uncovers mistakes or weaknesses in a system that reflect badly on its authors, friction between the two groups may turn into open hostility.

Pryor's partner, Carla Echols, remembers when "tech writers were traditionally the people who did the typing in the offices in Silicon Valley. They had the status of clerks." This situation contributed to the friction.

But changes in the development environment are now promoting greater harmony in the workplace. Among the improvements is a growing overlap in the responsibilities of systems staff and writers.

A variety of schemes for organizing documentation efforts, subspecialties within tech-writing ranks and a burgeoning tech-writer consulting market now exist.

Armed with new knowledge about systems technology and the development process, the user expects more from documentation, based on his experience with manuals from popular micro packages. Dry technical prose isn't acceptable anymore. Graphics, tutorials, flowcharts, on-line help screens and quick reference cards are part of the new generation of documentation tools.

Environmental portraits

At MIS environment A, tech writers are regarded as editors. Given specifications by the systems staff, their charge is merely to edit rather than extensively rewrite.

At environment B, tech writers are equal members of systems development teams. Using a homegrown methodology, the tech writer helps monitor the project and serves as the repository and synthesizer of all information. Documentation is developed before systems, in some cases, are ever designed. Drafts of these early documents, which describe how a system will work or should work, are circulated among programmers as part of the design process. Eventually, revised versions of these initial documents become user documentation.

At environment C, no tech writers are employed. Since the users are technically oriented, they don't need documentation simplified to the normal level of nontechnical user friendliness. The shop's systems analysts, in addition to their other duties, develop all necessary documentation.

Several changes in the MIS environment are creating a trend toward option B, where the systems staff and technical writer are peers working together closely through the development process.

Change number one is the growing decentralization of data processing environments. Projects are now more user-driven. The technical writer, along with the applications/business analyst, is one of the prime liaisons between user and technician. Translating technical details to readable, concise instructions, the tech writer acts as the user vangard, the interpreter of a foreign language to business English.

"The user is getting more sophisticated," says writer Mary Ann Tharaldsen of Wells Fargo Bank in San Francisco. "He can do a little programming and understand the programmer better than before." Users have come to realize that systems are an important adjunct to the business environment, an adjunct they must control and understand and demystify.

Change number two is the emergence of hundreds of thousands of user computerphiles into the world of data processing through the microcomputer revolution. Armed with new knowledge about systems technology and the development process, the user expects more from documentation, based on his experience with manuals from popular micro packages. Dry technical prose isn't acceptable anymore. Graphics, tutorials, flowcharts, on-line help screens and quick reference cards are part of the new generation of documentation tools. They are

System 1032 for VAX

DBMS Bliss

Now there's software that users can use, programmers can program, and managers can manage.

Don't despair. If you've been frustrated waiting for ideal data management software, your worries are over.

The answer is System 1032™ DBMS for your VAX. And you can sample it at no risk or obligation. Here's the story.

Responsive Assistant

System 1032 provides a common-sense relational approach to data management, without the burden of relational calculus or SQL. Users easily grasp both simple and complex data relationships, and assistance is right at their fingertips. Special function keys make it easy to complete commands, quickly learn new ones, and see explanations of options and parameters, even in mid-command. So there's no need to struggle with a manual in the lap or consult an already-hassled wizard.

Best of all, System 1032 is fast and pretty. It answers complex queries almost instantly and produces presentation-quality reports with single commands.

Designer's Delight

Don't think it's a toy, though. Sophisticated applications designers can program in any VAX language, including System 1032's built-in block-structured language, and still access all of System 1032's powerful data management tools. A complete range of data types, format definitions, shared data structures, and other advanced features ensure that System 1032 easily satisfies the most demanding needs.

If you're a manager, you'll especially appreciate System 1032. Your users and programmers all use the same unified command language and data base concepts, so communication between them is easier than ever. And System 1032's careful human engineering drastically cuts your training costs and increases productivity.

Plus we exploit the best of the VAX architecture with shareable native code, asynchronous I/O, and proprietary inverted files—efficiently! So, unlike other software, System 1032 won't force you to buy more memory, disk space, or CPUs.

Risk Free

Software House has an impeccable decade-long reputation for reliable software and responsive technical support. System 1032 is the offspring of System 1022,® the most widely used DBMS for DEC mainframes. Its step-oriented commands and relational design have proved themselves in years of use at hundreds of sites. And System 1032 has undergone extensive field-testing to ensure that it works right the first time for you. Although new, System 1032 is already the most mature DBMS available for your VAX.

Convince yourself. Try System 1032 on your own VAX with your own data. A 60-day trial period costs just $85. Verify our claims, browse through our manual, and test our hot-line support service. Compare and benchmark System 1032 against other software, relational or not, at whatever price. Then sit back in bliss and watch your end users and programmers accomplish more, faster than you thought was possible.

So don't delay. Call us today, or send in the bliss coupon.

©Copyright 1983, Software House
System 1022 and System 1032 are trademarks of Software House. VAX is a trademark of Digital Equipment Corporation

System 1032™

☐ Please call me.
☐ Send me the latest on System 1032.

My VAX environment is:
☐ 11/782 ☐ 11/730
☐ 11/780 ☐ On order
☐ 11/750 ☐ Under consideration
☐ My company is an OEM.

Name _____
Title _____
Company _____
Address _____
City _____
State/Prov _____ Zip/PC _____
Tel _____
CW8

Send to:
Giselle Valdes
Software House
1106 Massachusetts Avenue
Cambridge, Massachusetts 02138

Software House

1106 Massachusetts Avenue
Cambridge, Massachusetts 02138
Tel. (617) 661-9440 TWX: 710-320-1075

Abuser Friendly Report Processor For IBM/38?

Managerial support software that is truly easy to use.

Call or write for more details on FUSION 4/38.

FUSION
PRODUCTS INTERNATIONAL

(415) 381-1340
PO Box Fusion
Mill Valley, CA 94942
Telex 176099 FUSION

Introducing the TI 855 microprinter. No other printer says better so many ways.

Feature for feature, no other microprinter can match the versatility, compatibility, reliability and productivity of the OMNI 800* Model 855 microprinter. Here's why.

Two Printers In One. With the TI 855 you get the speed of dot matrix draft copy. Plus the precise clarity of the most advanced matrix technology for letter-quality print. It's two printers in one — at one low price.

A Great Family Name. Texas Instruments is known for providing the world with the industry standard for printers — the TI 810. TI builds the same reliability into every 800 series microprinter. Both the 855 and the data processing Model 850 are part of the expanding TI line of high-performance, low-cost microprinters.

Hardware Compatible. The TI 855 microprinter is compatible with all major PC hardware. And it provides both serial RS232C subset and "Centronics-type" parallel as standard interfaces.

Software Compatible. The TI 855 uses industry standard escape sequences for compatibility with virtually all third-party software. And for those with proprietary software needs, a model is available with ANSI standard escape sequences.

Tough Font Modules For Quick Character Change. Three font modules can be inserted into the front of the printer at one time, and are accessed individually. Each contains both draft- and letter-quality character sets. They're easier to use, more reliable and more durable than traditional metal or plastic daisy wheels.

More Productivity Than Any Other Microprinter. The 855 offers both friction and tractor paper feed, to handle all types of word and data processing applications. A quick-change snap-in cartridge ribbon. Raster and mosaic graphics. And intelligent printing which maximizes document throughput — regardless of format.

Get the printer that makes for better information systems. For more information visit your nearest TI authorized dealer or write Texas Instruments Incorporated, P.O. Box 402430, Dept. DPF-083OW Dallas, TX 75240. Or call toll-free: 1-800-527-3500.

TEXAS INSTRUMENTS

Creating useful products and services for you.

Copyright © 1983 Texas Instruments * Trademark of Texas Instruments

29380-R1

contributing to clearer, simpler manuals and broadening the scope and importance of the tech writer's job.

On-line documentation

On-line documentation is a growing phenomenon. The costs for production and lack of flexibility of hard copy along with the cost for quick and frequent updating are two of the major reasons.

In one DP environment, user acceptance of on-line documentation was monitored closely. The results showed a strong trend in favor of the new approach. When the on-line screens were first introduced, the ratio of printed lines of documentation to viewed lines was 115 to 1. Within a year, that figure dropped to 45 to 1.

Changes in documentation can be written and released on-line in the same day. Special user interface programs are also becoming a part of the on-line documentation environment. Programs are available that adapt to the user's level of knowledge. The programs prompt the user to give enough information in the query to direct him to the proper section of documentation.

If the user is experienced and knows exactly what section of documentation to search for, a short query, properly worded, is sufficient.

Value of graphics

Whatever one's language skills, visuals are one of the most effective methods of conveying information. Consultant John Urton uses IBM's Script software as an aid in formatting and editing. "It helps me with information mapping, breaking down documentation into concepts and processes and procedures and generally smaller units."

Urton uses graphics enthusiastically and sets up sophisticated referencing through tabs and color coding. "Often all you need is the outline of a procedure, says writer trainer Carla Echols. "The graphic representation can be much more effective than prose." Echols claims writers are starting to do more flowcharting and less writing.

Logisticon, a systems house in the Silicon Valley, went a step beyond simple graphics for its documentation. It hired a cartoonist. Technical writer Dierdre Morgan worked with the artist to develop a manual that is entirely cartoons for a modular microcomputer-based warehousing and distribution package. Capitalizing on the use of flowcharts, diagrams and basic English, Morgan tailored the manual to speak simply and concisely to truck drivers working in warehouses, transporting merchandise from delivery docks to storage.

Artificial intelligence

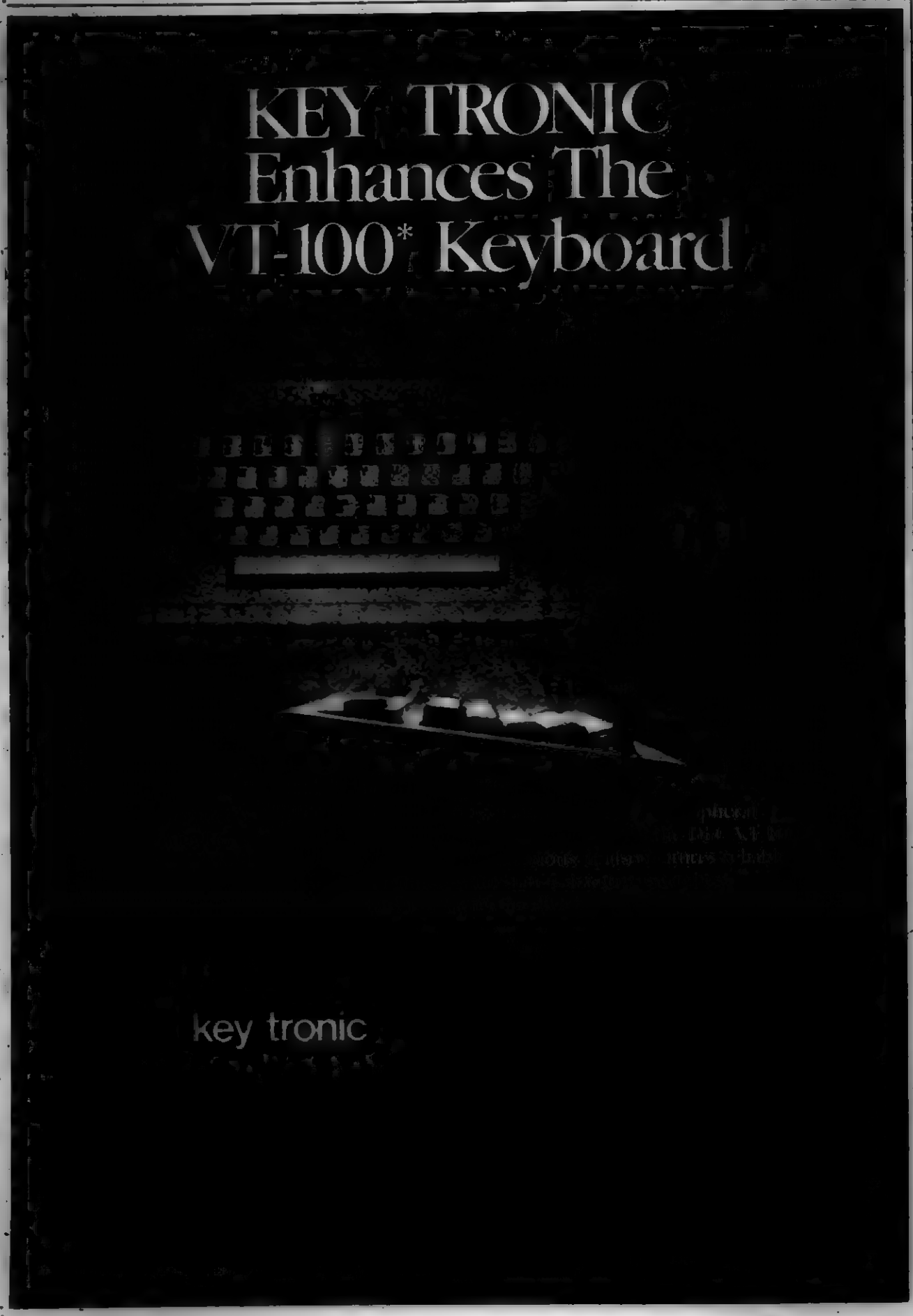
Even experimental "knowledge information processing" expert systems have affected the world of DP documentation. At the National Magnetic Fusion Energy Computer Center in Livermore, Calif., consultants are working on a sophisticated user interface for on-line documentation.

The center serves the country's magnetic fusion community — physicists and engineers at universities and corporations. But the documentation department confronts most of the same problems as its peers in financial MIS environments: interpreting and answering user queries, amending and implementing changes in documentation, extrapolating the hidden logic and functional sequence of a system from a technician's notes.

A team of consultants at the center is working on an experimental program that takes a user's on-line query, looks for terms in the question that might be key words in the documentation in question and then displays those passages of the documentation in which the key words appear. If there are no key words in the query, the program a) prompts the user to paraphrase the question until key words are produced or b) routes the query to a consultant's terminal at the center. In this case, the user would receive an answer or a referral to a specific passage of documentation, unaware that a human being was on the other end of the communications link.

Micro workstations

Other MIS environments are experimenting with using microcomputers as



1983 was a very good year.

NCR introduced more major data processing products than any other high tech company.

NCR closes out its first century with one of its most impressive technological achievements, the NCR 9300. It's the first full 32-bit VLSI mainframe designed for business applications. The 9300 delivers the power of a mainframe at the price of a mini.

New computers for 1983 included the UNIX™-based Tower, a microprocessor with the power of traditional minicomputers. NCR also added new multiprocessors to our top-of-the-line 8600 mainframe series.

We introduced the NCR Personal Computer specifically designed for the business/professional market. It provides dual processor capabilities to enhance performance, and is the first personal computer designed with networking in mind. It can function as an offline computer, an online terminal to your mainframe, or networked with other NCR Personal Computers and other popular PCs.

We strengthened our position as the world's leading supplier of retail point-of-sale terminals by introducing a wide range of new products. Included is a terminal that looks up the prices of over 14,800 items stored in its own internal bubble memory.

Our number one position in automated bank teller machines produced the technology for self-service airline, ski lift and service station terminals. We are the leader in electronic banking networks and electronic funds transfer.

Why did NCR introduce all these high technology products in 1983? We wanted to get a good start on our second hundred years. For more information, call 1-800-CALL-NCR. In Ohio, 1-800-543-4470.

And 1984 will be even better.

NCR

1884-1984
Celebrating the future

UNIX is a trademark of Bell Laboratories.

People Express, one of America's fastest-growing airlines, chose an NCR 8600 series computer system to handle online reservations. NCR is a leader in online transaction processing equipment, communications and system software.

The Tower microprocessor packs a lot of computer power in a 29" x 27" x 7" package. Up to 16 operators, local or remote, can access the Tower at one time.

Debit cards and Electronic Funds Transfer became a reality in 1983. NCR is the leader in EFT technology today!

Bubble memory technology provides resident mass memory in the terminal for automatic price look-up for supermarkets and other retail stores.

The new NCR Personal Computer offers unsurpassed monochrome or color graphics. Industry standards are used throughout so the applications programs you need are available now.

New drive-through ATMs help the world bank on the go. NCR helped pioneer the regional electronic banking network - and has installed more Automated Teller Machines worldwide than any other supplier.

The NCR 9300, a roomful of computer power in a 50-pound box, was a big breakthrough in 1983. Add this 32-bit VLSI mainframe for a complete system price of less than $48,000!

IMPROVE YOUR COMMUNICATIONS

WITH CECOM
MICRO & MAINFRAME
FILE SHARING

Now you can upload, download, and share files while maintaining data integrity and total system security. Supporting recognized 3270 emulation cards and protocol converters, the easy to install Tempus-Link runs under all recognized IBM software disciplines for the PC, the PC-XT, and mainframes while enhancing your communications by giving you complete interaction and integration with the micros in your organization.

For more information about the Tempus-Link, emulation cards, total system or network configurations, or equipment refurbishing, call or write:

cecom
cecom, Incorporated
We Communicate!

Dealer inquiries invited

workstations for tech writers. Lead Documentation Editor T.R. Girill of the Livermore center is managing the development of such a system.

"We're experimenting with a program that automatically splits the editing tasks between the micro and the mainframe. Global changes affecting the entire document are handled on the mainframe. Smaller, single-line or word changes take place on the micro."

According to Girill, the main file the writer is working on resides on the mainframe. Little pieces of the file are shipped, as needed, to the micro, a handy feature when editing among the 16,000 pages of on-line documentation that the center produces.

Another type of expert system the Livermore center is experimenting with involves the concept of a decision tree. According to Girill, the system is another type of query response mechanism that accesses a general subject or portion of documentation and then leads the user down a "tree" with alternatives, until the problem or user query is fully defined. The system ends by routing the user to that part of the documentation that answers the question.

Writing subspecialties

Evidence of the emergence of technical writing as a data processing specialty is in the proliferation of writing subspecialties and in the consulting positions they have spawned.

Documentation has established itself as one of the best liaisons between the technical and user worlds. As more users enter the world of data processing, their introduction to systems will be greatly influenced by the quality of systems documentation.

There are now methods analysts (who specialize in putting together standards and procedures manuals), indexers (they anticipate under what names a user might seek a bit of information in a manual, then set up the indexing and cross references), hardware and marketing and operations writers, to name just a few.

For the writer with several years of experience and an interest in consulting, rates currently range between $20 and $60 per hour. Hardware documentation, usually requiring an engineering or electrical background, may bring hourly consulting rates of $75 or more for qualified professionals. But the duration of consulting assignments for the tech writer is usually much shorter than for systems analysts and programmers.

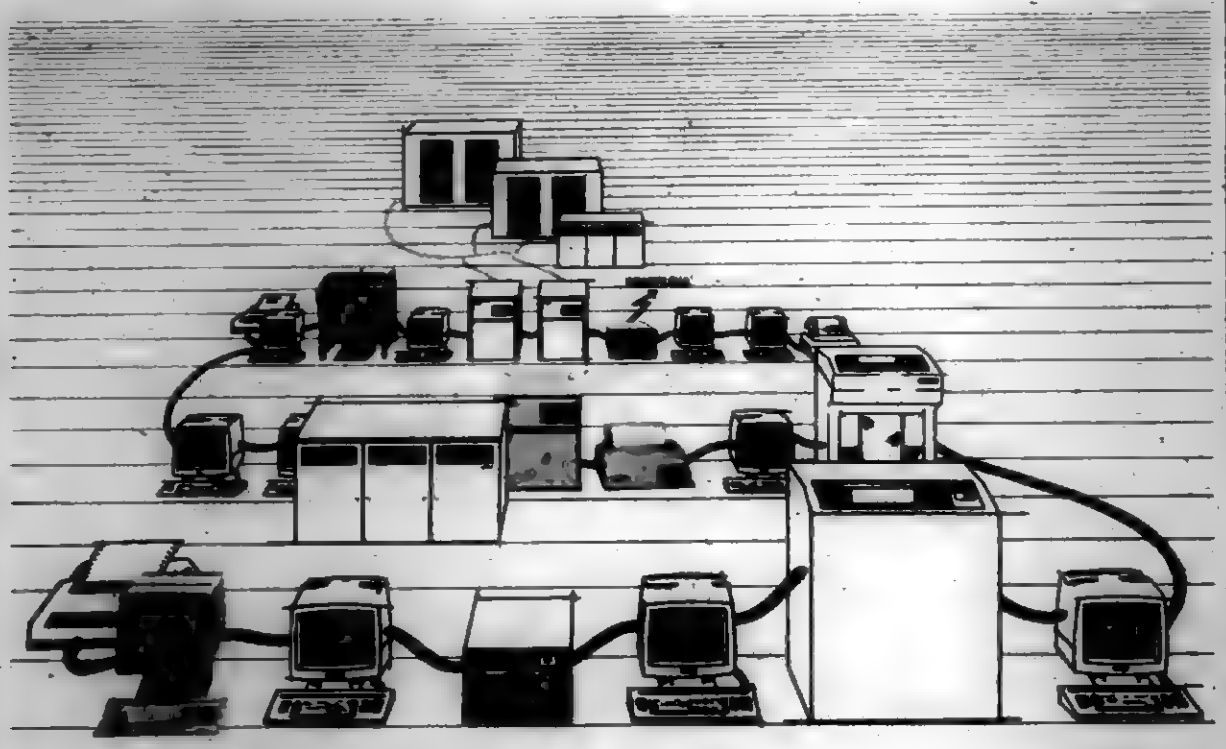
This difference may account for the steady attrition from within documentation ranks. More money and greater responsibility lure tech writers to programming, analysis and management at rates of 50% to 75%, according to one recent survey.

At a salary in the range between $15,000 and $35,000, a technical writer can take his chances as a consultant (usually as an independent or subcontractor) or become an analyst, a technician or a manager.

Clearly, documentation has established itself as one of the best liaisons between the technical and user worlds. As more users enter the world of data processing, their introduction to systems will be greatly influenced by the quality of systems documentation. The clear-thinking, pragmatic, diplomatic and hard-working technical writer of today can look forward to a future with multiple opportunities within MIS.

About the Author

Gene Knauer is marketing representative and seminar director for Knauer Computer Consulting in San Francisco, Los Angeles and Honolulu. He writes freelance articles for a variety of computer publications.



3270 Networking: No More No Man's LAN.

Imagine. 3270 Processing. IBM-Compatible Personal Computing. Local Area Networking. And SNA Compatibility. In One System.

Imagine a system that successfully settles the uncharted territory of 3270 local networking—that "no man's LAN" of unlinked and unrealized potential.

Imagine a system that delivers the power of 3270 processing, and the flexibility to build two local area networks from a single controller. Imagine being able to attach up to 120 devices to that controller. Or attaching four distinct controllers—and multiple coaxial links of up to 10,000 feet each—to any of those LANs.

Imagine the economies of a system that handles that networking with standard 3270 coax. That requires no commitment to special architectures or non-standard LAN technologies. And that, thanks to a multi-drop, station-to-station design, can eliminate thousands of feet of new coax.

Of course, such a system would have SNA compatibility. But it would also have a set of capabilities to dramatically increase throughput, while reducing hardware and support costs in *any* environment. Capabilities like multi-host and multi-personality support, application and address switching, and system printing.

This system would have multi-user personal computing "built into" the network—allowing you to assign true 16-bit computing power, maintain overall MIS control, and share expensive disks and printers.

Such a system would boast an intelligent display station that displays a mastery of ergonomic and aesthetic design. With multi-screen formats, anti-glare screen, low-profile keyboard, and a tilt-and-swivel pedestal with the smallest footprint in the industry. Such a system would also include a full line of printers.

Imagine. 3270 processing. IBM-compatible personal computing. Versatile, economical, powerful local area networking. In one system.

Braegen *has* imagined just such a system. They have designed it. Built it. And called it the ELAN™ System.

If such a system sparks your imagination, give us a call. We know the feeling. The Braegen Corporation, 525 Los Coches Street, Milpitas, CA 95035, (408) 945-8150; TWX: 910-338-7332.

Braegen makes networks better

BRÆGEN

™ELAN is a trademark of The Braegen Corporation.

IN DEPTH

Illustration by Kristin VanValkenburgh

Information systems — the power in your hands

By David G. Robinson

Businesses are coming to view their information systems as strategic weapons. With maturing products, intense overseas rivalry and increasingly fragmented and specialized markets, information systems can be powerful competitive tools when applied aggressively at the right time and in the right place.

Information systems are being used to strengthen communications with customers, analyze market trends and drive down operating costs by streamlining manufacturing and distribution facilities. While these applications sound familiar, the difference in the 1980s is the way in which companies are focusing their information systems efforts on those areas of the business that will yield the greatest competitive benefit.

Logically, this direction should result in new and challenging opportunities for the information systems organization. At last, the information systems function is putting its "beast in the basement" status behind it and becoming a real partner in managing the business.

Unfortunately, accomplishing this task is far from easy. Because of the way strategic systems operate within the business, traditional organizational structures and business/information systems relationships act as an impediment to the pursuit of strategic systems.

Supporting business changes

Business and information systems managers must first understand that information systems do not produce any strategic value at all. The systems themselves are, in fact, intrinsically worthless. The value that accrues from the use of information systems is a function of *business changes* that the systems support, not a function of the systems themselves.

Most strategic business moves involve some sort of change: in business process, in culture, in managerial approaches or in the marketplace. It is the strategic changes developed by management to respond to perceived opportunities or

Information systems cannot be strategic by themselves. They must be linked to corporate strategic thinking and become a vital part of the fundamental business changes which that thinking produces.

known competitive threats are the source of value when information systems are used strategically. Information systems operate to facilitate or make possible these fundamental strategic business changes.

Consider the following example. A large division of a manufacturing company determined that its inventory levels were excessively high, especially in its extensive distribution network. Corporate management had decided that working capital levels supporting the business had to be reduced or the business could not be maintained and would be considered as a candidate for divestiture. One of the major efforts management had initiated to combat this problem was an improved distribution system. Unfortunately, it was not until well into the systems effort that the fundamental *business* problem was identified: The company had adopted a customer service standard that resulted in excessive inventory levels.

For the past decade, information systems organizations have been taught, often painfully, that the key to success is to "serve the user." In reality, what the user wants is frequently inconsistent with the strategic direction of the corporation, especially in times of strategic change.

This basic business assumption had to be reviewed along with the other logistics and product movement processes that had been considered part of the system. The inventory problem became solvable only when the company began to rethink its entire distribution philosophy and adopted comprehensive alterations in its approach to servicing customers. After the problem had been reconsidered, the nature of the new distribution system also changed, and much of the original design work had to be scrapped.

The lesson here is that information systems cannot be strategic in and of themselves; they must be linked to a body of strategic thinking and be vital to the fundamental changes which that thinking produces.

Insiders or outsiders?

Many information systems managers would like to play a leading role in furthering strategic systems thinking in their organizations. For those who are already members of the senior management team, this desire is relatively easy to fulfill. Many other information systems managers are considered members of upper-level management as defined by their organizations, but they are often excluded from the "inside" discussions that surround the formulation of new business strategies.

In addition, most information systems organizations are managed to respond to requests from the operating level of the organization. This structure fundamentally limits the information systems department's ability to deal with strategic issues in the corporation. Communications between strategic managers and operating managers are often imperfect, especially at those times when strategic management is attempting to change the views of the bulk of operating managers in the corporation as part of a new strategic thrust. Yet these same operating managers largely determine what the information systems organization will provide for the corporation.

As a result, the information systems organization is commonly out of touch with strategic thinking in the company. Even when communication between information systems and the business is good, the former is still one step removed from strategic thinking. For the past decade, information systems organizations have been taught, often painfully, that the key to success is to "serve the user." In reality, what the user wants is frequently inconsistent with the strategic direction of the corporation, especially during times of strategic change.

Among our clients, we have seen the dilemma of the information systems manager lead to several undesirable results. First, we frequently encounter large, expensive and risky business efforts which, while responsive to the "bottom-up" requirements of the organization, are inconsistent with the "top-down" strategic view of the business. Second, because these tactical systems requests vastly outnumber strategic opportunities, the strategic systems opportunities are frequently lost in the shuffle.

Third, because operating managers are not usually positioned either to develop ideas for strategic change or to have the authority and responsibility to implement them, they are unable to work with the information systems organization to plan for strategic systems without the substantial involvement and backing of top management. That support is frequently lacking.

Finally, because this set of structures frequently results in the wrong systems being built, substantial amounts of information systems resources are being misapplied.

One company's experience shows what can happen when a strategic system is managed using conventional approaches. Senior management

$995
buys these fully integrated facilities for application development

METAFILE® is bursting with potential.

The METAFILE System gives users of IBM PCs, XTs or compatibles all the software they need to grow their own unique solutions to information management problems.

With the METAFILE System you can easily prepare text and create data bases, forms, menus and reports – and tie them all together, integrated. Either on the spur of the moment, or during the development of structured formal applications for others to use.

Unlike multi-function systems that force together a collection of software pieces, the METAFILE System is – from its very foundation – a single integrated architecture. One high-level language drives all its facilities. No need to learn (or teach others) a variety of inconsistent languages.

If your company has an Information Center, the METAFILE System helps meet your goals of faster application development, personal computer software standardization, and the training of users to design their own solutions.

The most appreciated advantage of your METAFILE System may be ease, or speed, or freedom. But the net result, in all cases, is higher productivity.

- Fourth-generation language, for higher productivity
- Data base management, giving you extensive capabilities
- Text management, with many word processing features
- Ad hoc inquiry, for on-line reporting
- Prompt-assisted commands, for easier use
- On-line documentation, to speed training
- Extensive debugging aids, for faster troubleshooting
- Report generation using single commands
- Display management using direct screen presentation
- Menu building for custom application interaction
- Forms generation for user-defined data entry
- Menu-driven assistant for easier use

Sensor-based Systems, National Service Desk, Dept. CW 014, 1701 East Lake Ave., Glenview, IL 60025

Please send _____ METAFILE® Abridged Version kits at $25.00 each including postage and handling.
Or _____ METAFILE® full system version at $995.

☐ Check or Money Order enclosed
☐ Send C.O.D. ($2.00 additional per order)
☐ Visa/MasterCharge #:
☐☐☐☐-☐☐☐☐-☐☐☐☐-☐☐☐☐
Exp. Date _____ (Please sign below)

Name _____
Firm _____
Address _____
City _____
State _____ Zip _____
Telephone No. (___) _____
Signature _____

NOTE: System Requirements. METAFILE Abridged Version runs in 128K memory, using PC-DOS 1.1 or 2.0, with one 320K floppy drive plus any other disk storage device.

CW-014

$25
lets you experience the beauty of it all

For just $25, a special ABRIDGED VERSION will let you experience – and show others – the almost unlimited potential of the METAFILE System. The Abridged Version is a fully-functional kit including system disk, demonstration disk, and a 72-page "get-acquainted" guide. Use the order form below, or call the toll-free number.

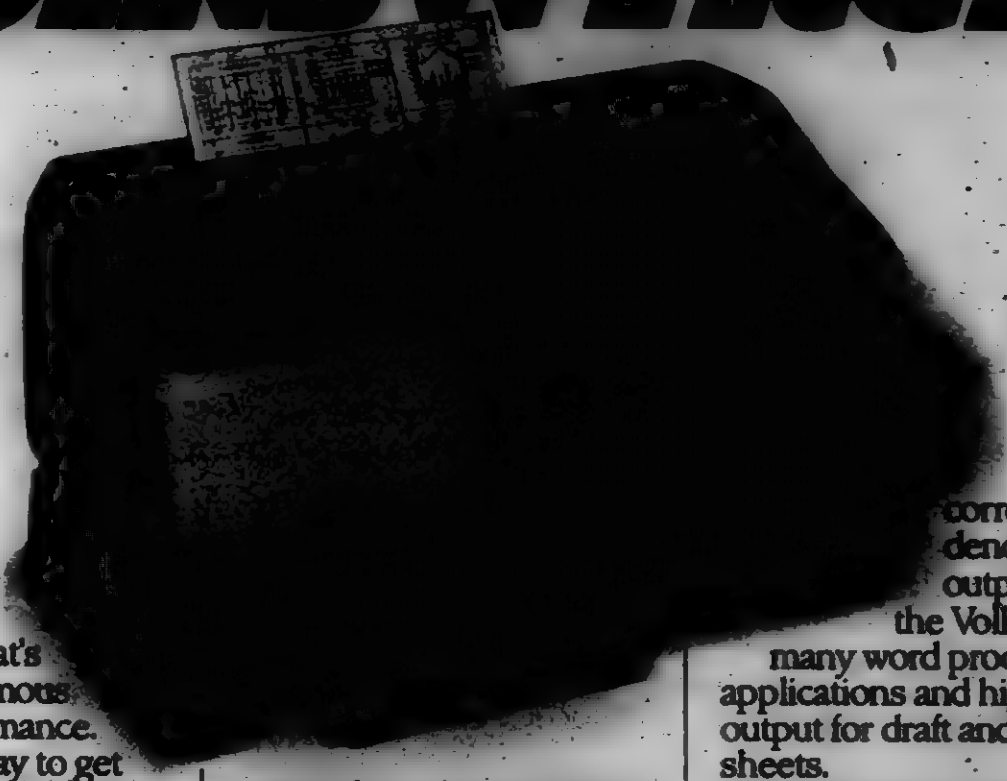
METAFILE Version 7, the full-capacity licensed system, for $995, is available along with training, consultation and periodic upgrades through seven regional offices. Sold only through authorized METAFILE agents.

To order by phone, call toll-free:
1-800-323-3731
or (312) 724-0310.

Sensor-based Systems
1701 East Lake Avenue
Glenview, IL 60025

METAFILE.
Integrated Information Management System

Soup up your Volkswriter.



Everybody knows Volkswriter, the word processing software package that's become synonymous with high performance. Now, there's a way to get even higher mileage out of your Volkswriter. Hook it up to a Dataproducts P Series dot matrix color printer.

The versatile P Series translates the executive class, word processing capabilities of the Volkswriter into brilliant full color charts, graphs and text. It delivers a full page of text quality print in nothing flat while its sheet feeder automatically prevents loading hassles. And the P Series uses pin feed or plain paper and has the brains to fill every appropriate line with crisp, sharp copy, even if it has to justify to do it. And the P Series color printer has dual speed capability for correspondence quality output for the Volkswriter's many word processing applications and high speed output for draft and spreadsheets.

The Dataproducts P Series color printer. Think of us as a supercharger for your Volkswriter.

For more information go to your nearest computer store and ask about the Dataproducts P Series color printer, or call Dataproducts, 1-800-258-1386.

Dataproducts computer printers

Nobody puts ideas on paper so many ways.

Volkswriter is a registered trademark of LIFETREE SOFTWARE, INC.

The quality of strategic communication between business managers and information systems managers can be substantially improved if systems managers attempt to couch every issue in basic business terms.

had identified improved marketing information as a strategic business issue and had chartered an internal task force to address and resolve the problem. Because the effort was regarded as a "data processing" project, it was delegated to a task force of managers two organization levels below the senior executive staff.

As the design effort progressed, the operating manager on the task force began to expand the scope of the effort and add additional demands, including a major overhaul of the order entry system. In time, each task force representative injected his area's system "needs" into the project. As the size and complexity of the system's functional specifications grew, new technologies were introduced into the design to support the increased level of functional sophistication.

The MIS group at the company felt that the user demands were too complex and that the technology to be used posed significant risks. The group was unable to alter the view of the task force, however, and had no clear process of appeal to senior management. Communications between the two groups broke down, and senior management was clearly troubled at the scale of investment involved, particularly when the value the system would add to the business was becoming increasingly unclear. After watching the project flounder for two years, senior management finally intervened and retained the services of an outside consultant.

The delays in the project resulted from the narrow technical debates which had overshadowed the underlying business assumptions used to assess potential benefits. Another problem was the "loading up" of the project with lower level needs not related to the project's original strategic purpose. By refocusing the project on the business benefits the system would support, the company discovered that many elements that yielded the most value to the business were the least complex technically and the least expensive.

When senior management was presented with these results, it rapidly authorized implementation of the high-payoff elements. The technical debate had continued for more than a year; implementing the high-value elements took less than three months. The original system plan would have cost more than $4 million over several years and carried a high risk of failure; the high-payoff elements cost less than $100,000 and provided immediate strategic benefit to the business.

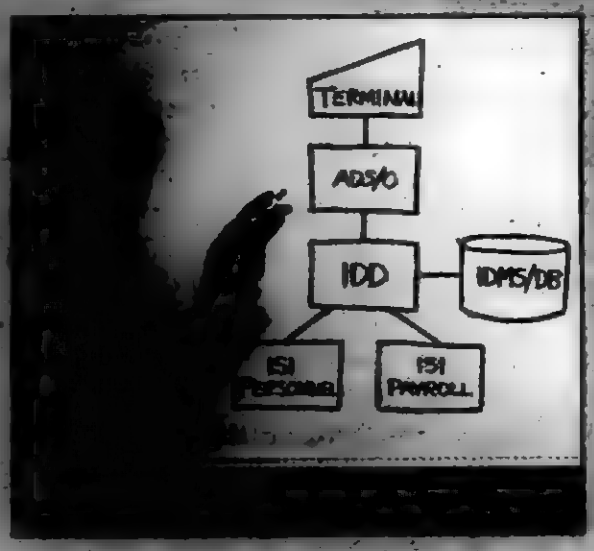
What can be done

Fortunately, there are actions that information systems managers can take to overcome obstacles and provide leadership in the pursuit of strategic systems for their organizations:

1. **Start talking in business terms.** Information systems managers have long had a tendency to favor a technical focus over a business focus in their discussions with management. Two factors contribute to this tendency. First, information systems managers are often excluded from many business discussions, especially those dealing with strategic business issues. As a result, they tend to retreat to their own turf, where their expertise is unchallenged. Second, the past five years have brought an explosion in the number of technical issues that must be mastered,

No waiting.
No kidding.

"Today we are installing the industry's only native IDMS Payroll/Personnel System using ADS/O".
Bob Tatum, ISI Vice President of Product Management



Finally. The one and only completely native IDMS human resource solution. All of the dialogues, screens, schemas and files reside on IDD. The entire on-line system has been developed using ADS/O exclusively. And there are no interface programs.

Now, you can receive it, just like Ford Motor Company, Harvard University, IBM-SEL, Fluor Engineers, Inc. and the City University of New York. And there are many more.

We have the industry's most advanced system architecture. We offer more on-line (real-time) payroll/personnel expertise than any other vendor. We deliver the best system documentation in the business. We're committed to customer service and we're ready and willing to be on-site to help clients with any aspect of their installation. In addition to IDMS, our products run under IMS, NATURAL/ADABAS, CICS/VSAM and others. We'll be glad to tell you more. Just call.

Setting the standards for excellence.

INTEGRAL SYSTEMS INC.

165 Lennon Lane, Walnut Creek, California 94598
In the U.S. call toll-free 800-824-8199, in California 800-824-8196,
locally and in Canada (415) 939-3900.
Sales and support offices located throughout North America.

FIXED PRICE COMPUTING SERVICE

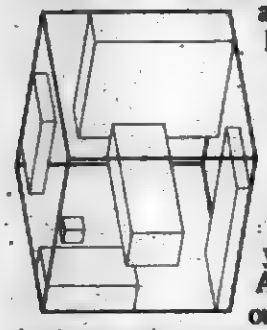
INTRODUCING SUBSCRIPTION SERVICE:

A Cost-Effective Alternative to Traditional Remote Computing Services or In-House Processing.

Now you can ***couple*** the benefits of a professionally managed remote computing service with the predictable cost associated with in-house processing. It's called Subscription Service, and it's available today from Martin Marietta Data Systems.

PREDICTABLE COST

Subscription Service is designed to keep your DP operation within budget. It curbs cost overruns by delivering a block of resources at an affordable ***fixed price*** — almost like the in-house machine.



But, unlike the in-house machine, your service doesn't degrade at peak-use periods, just when you need it most. And, when you're out of gas, you can upgrade easily. No lease payout. No hardware moves.

NO MYSTERY PRICING

Subscription Service unbundles the remote computing service offering to take the guesswork out of prices. Resource capacity and support levels are clearly defined and easy to understand. You buy what you need. Nothing more—nothing less.

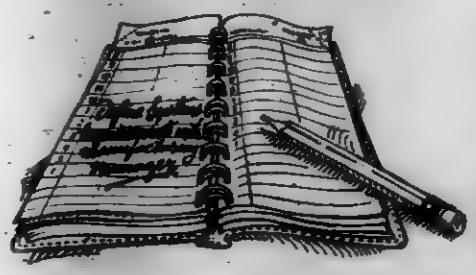
MORE TIME FOR YOUR USERS

It's a fact, a professionally managed computing service offers you ***freedom*** from day-to-day operational problems, giving you more time to focus on solutions to user problems. And, with an inventory of packaged solutions and productivity tools at your fingertips, the time and resource requirements to create a solution are greatly reduced.

COUPLE FREEDOM WITH AFFORDABILITY

Subscription Service is proof that you can get the best for less. All subscribers are linked to Martin Marietta's powerful host computers, providing the most up-to-date computing resources. You can depend on:

- ☐ Solid, stable, thoroughly-tested hardware, software and personnel
- ☐ Response time and throughput associated with IBM's fastest processors
- ☐ Access to hundreds of productivity tools and application systems
- ☐ Responsive technical consultants available around the clock



DISCOVER HOW SUBSCRIPTION SERVICE CAN WORK FOR YOU

If your budget for computer operations exceeds $20,000 per month for either remote computing service or in-house processing, then find out how much Subscription Service can save you. Or how much more service you can get for what you are currently spending. Or both! Simply return the attached coupon or call toll-free (800) 638-7080. In Maryland: (800) 492-7170.

Don't be undersold. Or sold a bundle. Get the precise level of resources you need with Martin Marietta's Subscription Service.

- ☐ Please send me your Remote Computing Services brochure.
- ☐ I'd like to have my subscription requirements sized. Have your representative call me.

Name: _____

Title: _____

Company: _____

City: _____

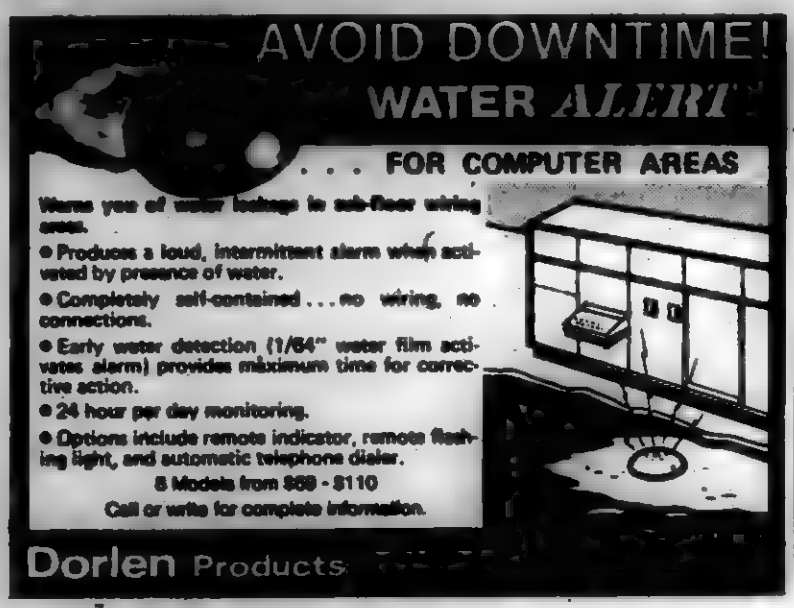
State: _____ Zip: _____

Phone: ( ) _____

Mail To: Martin Marietta Data Systems
Marketing Services Department, CWSS
6303 Ivy Lane
Greenbelt, MD 20770

MARTIN MARIETTA

Martin Marietta Data Systems



raising anxiety levels about technical incompetence.

What is often overlooked is that some technical issues become irrelevant to a business if the basic business issues are clearly understood. The quality of strategic communication between business managers and information systems managers can be substantially improved if information systems managers attempt to couch every issue in basic business terms.

2. Strengthen formal strategic systems planning. Many information systems professionals have come to realize that the benefits of formal information systems planning lie in improving the quality of communications with upper management. But this avenue is only available if the information systems organization makes a concerted effort to develop a strategic plan — one that identifies those areas of the business where information systems can be used to strategic advantage and develops specific action programs to pursue those opportunities. This type of plan is the strongest means available to an information systems organization for forging the link between its activities and the strategic business plans of the organization.

3. Use communications opportunities wisely. Unfortunately, information systems organizations are not always given the freedom to develop a good strategic systems plan. Such a plan requires communication with management, and senior managers are sometimes uninterested in a strategic systems planning exercise. In these cases, there are still opportunities to begin exercising leadership in the right direction.

The annual information systems budget and its defense provide an excellent opportunity to present convincing, high-quality thinking about the relationship between information systems and the business.

Every information systems organization is required to submit an annual budget. This budget and its defense provide an excellent opportunity to present convincing, high-quality thinking about the relationship between information systems and the business.

In addition, some information systems organizations have found the production of an "Information Systems Annual Report" to be an effective starting point in restructuring communications with senior management.

Such a report lays out issues the information systems organization feels are critical for senior management to understand and can be written using internal information systems resources and then forwarded to senior management for review. While seldom solicited, this type of report has proven useful for several organizations in establishing a dialogue with senior management.

No longer can the information systems function operate simply as a passive service organization if strategic opportunities for the use of such systems are to be realized. The systems organization must forge a link with senior management so that its resources can be channeled into the strategic thrust of the business. Linking these two interests is often difficult, but it is vital.

About the Author

David G. Robinson is a vice-president of Index Systems, Inc., a consulting firm in Cambridge, Mass., that specializes in the management of information technology. Robinson is responsible for the firm's strategic systems planning services. As a specialist in the planning and management of information systems in large organizations, he has consulted to manufacturing, transportation, financial and government groups.

Lease a Magnuson PCM from Phoenix Leasing and get guaranteed support.

One of the best buys in plug compatible mainframes just got better. Now, when you lease a Magnuson M80 system from Phoenix Leasing, you get guaranteed support for as long as you have the system. **Get more power for the dollar.** With more processing power for the dollar, the Magnuson M80 is the most cost-effective alternative to IBM's 4300 series. And now, with guaranteed support from Phoenix Leasing, you can count on cost savings for years to come. **Complete systems, immediate delivery.** Phoenix Leasing has Magnuson systems in inventory ready for immediate delivery. And we can provide a complete system, including peripherals, all in one lease package. **Complete support guaranteed.** Now you can lease a Magnuson with confidence, because Phoenix Leasing guarantees support. Service is available nationwide, so you can be sure of receiving prompt service no matter where you are in the country. ☐ Here's how our service guarantee works: If we ever fail to provide you with satisfactory support, you are under no further obligation to keep the system. It's as simple as that. **Flexible terms make it easy.** We'll help you acquire the computer system you need by designing a lease that fits your requirements. We'll work with you to come up with the length of term, payment schedule, and buyout options that work best for you. **Backed by a company that knows what it's doing.** We've been in the business of leasing data processing equipment for more than 11 years, and we have acquired more than $500 million worth of equipment, including more than 100 Magnuson systems. We currently have over 6000 leases helping companies meet their data processing needs. **Call Kirby Fiegel today.** Don't miss out on one of the best computer bargains that will ever come along. Call Kirby Fiegel at (800) 227-2626 today. (In California, call 800-772-4021.) Find out how you can take advantage of this outstanding opportunity.

Compare Magnuson with IBM

		MIPS*
Magnuson	M80/42	.77
IBM	4341-1	.72
IBM	4341-10	.58
Magnuson	M80/32	.56
Magnuson	M80/31	.42
IBM	4331-2	.40
IBM	4341-9	.38
Magnuson	M80/30	.24

*COMPUTERWORLD estimates

Phoenix Leasing, 495 Miller Avenue, Mill Valley, CA 94941

PHOENIX LEASING

© 1983 Phoenix Leasing Incorporated

IN DEPTH

Illustration by Kinsie VanValkenburgh

Where information power can change your company

By Gregory L. Parsons

Significant advances in the related technologies of computers, telecommunications, data access and storage devices, graphics equipment and software have created a spectrum of opportunities for managers. The speed, cost, size and capabilities of the new information technology continue to improve rapidly, and there appear to be unlimited applications that could be "computer enhanced."

However, in spite of this new wealth of technological advances, the ability of most businesses to assimilate and apply information technology lags far behind the available opportunities. Although many authors have noted this shortfall over the years, the effect in the 1980s of this "strategic gap" is much more critical. Senior executives increasingly feel that their businesses should receive more benefit from technology investment, but few are able to articulate the impact information technology has or should have on their businesses.

The Executive's View

In a recent study, three senior executives not directly involved in the technology were asked to assess the impact of information technology on their businesses; their responses were quite different. A divisional president of a large industrial corporation said: "I think information technology contributes at least 3% of our bottom-line profit margins. Operationally, we couldn't get through the week without the system support, and in the marketplace, I don't think we could hold our market share without the technology. But this is mainly a gut feeling; I can't back up these estimates with numbers or specific reasons."

The chief strategist for a major U.S. bank said: "The technology is our top strategic concern, not because it outweighs everything else, but because we are unsure what to do with it. Although we have a strategy for the marketplace, the technology issues seem to be eluding

Information technology can fundamentally change whole industries by altering product life cycles or speeding distribution. It can create new business rivals, new consumer demands, new profits. How are you putting information technology to work in your company?

(Reprinted from "Information Technology: A New Competitive Weapon," by Gregory L. Parsons, Sloan Management Review, Vol. 25, No. 1, pp. 3-14, by permission of the publisher. Copyright © 1983 by the Sloan Management Review Association. All rights reserved.)

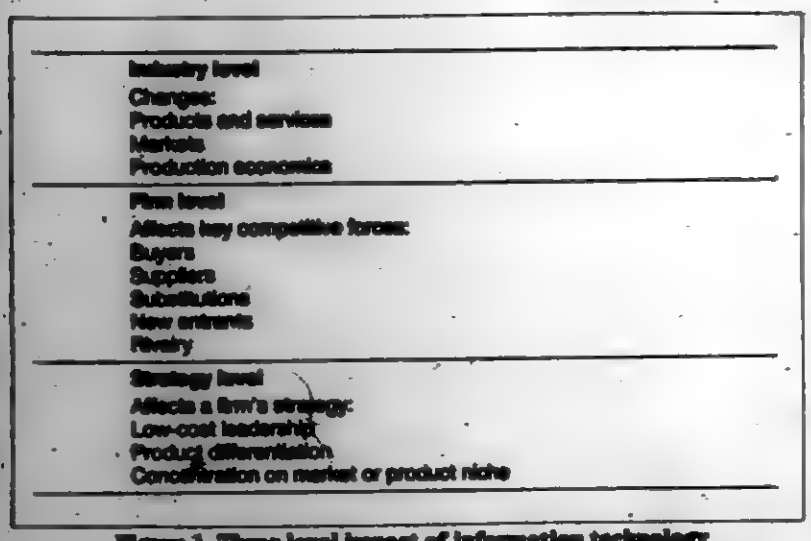


Figure 1. Three-level impact of information technology

us. On the one hand, it's important — everybody agrees on that, but then we end up doing projects based on a series of piecemeal technical decisions. We can't seem to grasp the bigger picture."

The chief financial officer of a large consumer goods manufacturing company explained his view of information technology: "We've really cleaned up our data processing act since the mid-1970s. The systems run well and now we're mainly fine-tuning. I expect we'll be doing primarily maintenance programming in the foreseeable future. I feel that we've gotten most of the benefits from the technology currently available. As the cost comes down, more projects will be financially justified, and then we'll do them."

From these remarks and the comments of many other senior executives questioned about information technology, two issues are clear. First, the importance of the technology varies widely from firm to firm. In some, it is a top-level strategic concern; in others, it is basically perceived as an administrative convenience. Second, there are no commonly accepted guidelines or framework for measuring the importance of information technology to a business. Most planning approaches do not take into account the strategic relevance of the technology. Although executives claim a "feeling" about the technology's importance, few could explain why it was so important. Even fewer could articulate how important information technology should be for the future.

Clearly, information technology is significantly affecting many firms and is now or will become a strategic concern for many over the next five years. It has been estimated that more than $1 trillion will be spent on information technology investments during that period. Figure 1 presents a three-level framework to help senior managers assess the current and potential impact of information technology.

This framework was developed from a two-year study of more than a dozen companies. It is based on a recognition and analysis of the competitive environment and strategies of business and focuses on the opportunities for firms to use information technology to improve their competitive positions. In order for information technology to become a viable competitive weapon, senior management must understand how information technology may impact the competitive environment and strategy of the business.

Impact at industry level

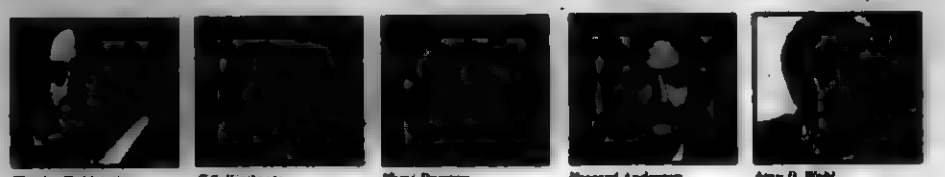
At the global level, information technology changes the fundamental nature of the industry in which the firm competes. When information technology changes an industry, it may affect the nature of the industry's products and services, the industry's markets and/or the industry's economics of production.

Products and services. In some industries, information technology may change the very nature of the industry's products and services: Information technology may substantially alter the product life cycle and significantly increase the speed of distribution.

For example, because of advances in information technology, the products and services of the publishing industry are undergoing significant changes. As the industry moves from a paper product to an electronically based one, the time and space constraints for product development and distribution are shortened. Authors and news sources are preparing electronic manuscripts and text, which are sent to publishers on floppy disks or directly from computer to computer. Electronic manuscripts are edited on word processors, typesetting is computerized and graphics are generated by computers. Promotional materials are distributed by telecommunications, and readers can buy the product from the publisher's electronic data base.

The time lag between an idea for a new product and its mass distribution could be virtually eliminated. Small publishers who can adopt the technology have substantially

COMMUNICATION NETWORKS '84
offers you 100 solutions
to your post-divestiture
telecommunication problems.



Charles Brownstein, Chairman, CBX, Continental Telecom, Inc. Keynote
F.S. Vigilante, AT&T Information Systems, Viewpoint
Mimi Dennis, F.C.C., Policy
Howard Anderson, The Yankee Group, Futures
Amy D. Wohl, Advanced Office Concepts, Micro Networks

As telecommunications and data processing managers, your success depends on keeping up to date with changing technologies. At COMMUNICATION NETWORKS you can choose from 100 information-packed sessions designed to help you succeed.

You'll learn how to survive the transition into the competitive telecommunications environment resulting from the AT&T divestiture. You'll discover new applications in Local Networks, Satellite, Bypass/DTS, Public and Private Data Networks, Interconnection, Micro Networking and new management technologies.

COMMUNICATION NETWORKS gives you twelve sessions focusing on "Network Technologies." Thursday, February 2, is "Microcomputer Networking Day," a full day devoted to teaching you how to get more from your PC than just stand-alone applications.

You may even choose to develop specific skills in one of the nine full-day "In-Depth" seminars. "In-Depth" seminars will be held on January 30, one day prior to the official opening of COMMUNICATION NETWORKS.

In just five years, COMMUNICATION NETWORKS has become the leading professional communications conference and exhibit in the nation. And COMMUNICATION NETWORKS '84 promises to be even better than ever—more sessions, more speakers, more exhibitors including American Satellite Co., AT&T Information Systems, COMSAT, Digital Equipment Corp., General DataComm Ind., General Electric Co., Integrated Communication Systems, General Electric Co., Microwave Link Operation, GTE Business Communications Systems, GTE Sprint Communications Corp., Harris Corp., DTS Div., Hewlett-Packard, M/A-COM, Mohawk Data Sciences, Northern Telecom, Inc., Scientific-Atlanta, Inc., Siecor Corp., 3M Business Communication Products, Ungermann-Bass, Inc., Uninet, United Technologies Communications Co. and many more offering the latest in products and services.

The DEC Rainbow 100+ The Rainbow 100+ system unit features Z80A and 8088 microprocessors, a 10 MB Winchester hard disk, a dual floppy diskette with 800 KB capacity and synchronous communications, built-in terminal emulator, printer port and 128 KB of system memory.

As an added plus for CN '84 attendees . . . you'll have a chance to win a DEC Rainbow 100+ Computer System.

COMMUNICATION NETWORKS '84, will take place at the Washington Convention Center in Washington, D.C., the telecomm capitol. It will be held on January 31 - February 2, 1984.

Call toll-free 800-225-4698 (in MA, 617-879-0700) for more information. Or fill out and return the coupon below.

COMMUNICATION NETWORKS Conference & Exposition
Washington, D.C. · January 31–February 2, 1984

The Sixth Annual Communication Networks Conference & Exposition for the Telecommunications Business Professional
Washington Convention Center, Washington, D.C.

Register today!

Call 1-800-225-4698 or fill out this coupon and return it. We'll be glad to bill you or your company.

Name _____
Title _____
Company _____
Address _____
City _____ State _____ Zip _____

CW

reduced the product development cycle, gaining a significant advantage over large competitors.

Markets. Information technology can significantly change the markets of some industries. For example, financial companies will face a market of computer-literate consumers and businesses that will demand electronically based products and services. Information technology has already created a new product line called cash management systems, which are offered by large banks. As information technology erases traditional geographic market limitations, financial services companies must now compete in a global market. The emerging technology for automatic teller machines (ATMs), home banking and electronic funds transfer is making more sophisticated financial products and services possible and increasing the overall demand.

Production economics. Information technology developments may change the basic economics of production in some industries. In the distribution industry, information technology is dividing businesses into two categories: those that have computerized warehousing and inventory control and those that have manual operations. Businesses with computerized capabilities have the ability to serve a national market and are breaking the industry pattern of regional distribution. Such national distributors also enjoy other advantages, such as economies of scale in marketing, software and hardware. Because of control problems and high costs, businesses with manual operations are limited to local markets by their technological position.

Information technology will also affect the production economics in some industries by changing the industry's historical trade-off between standardization and flexibility. Some equipment manufacturing plants have already used information technology to achieve unit costs that remain essentially constant, whether one unit or one million units are produced. This new potential will effectively remove many of the traditional competitive advantages in these industries.

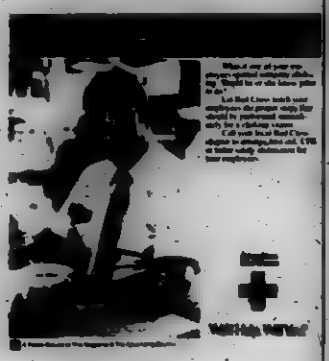
Information technology will reduce historical economies of scale in some areas while extending them in others. Because of the monitoring, controlling and coordinating potential of the technology, larger and more efficient facilities can be built which will capture new economies of scale by utilizing machinery, space, energy and specialized labor more efficiently.

There are critical implications for firms that compete in industries in which information technologies are changing the nature of the business. Traditional rules of competition will change, new economies of scale will evolve and entry barriers will erode in one area and spring up in others. There will be new competitors, new products and services, new distribution channels and different levels of demand and elasticity. Product life cycles will be shortened, and the value-added stream of the industry will be redistributed.

Before management can consider the long-run impact information technology will have within the firm, it must understand how information technology is changing the industry. This effort is entirely consistent with most views of corporate strategy, which begin with an understanding of the external environment of the firm. At the industry level, the impact of information technology ranges from major (in the banking industry, for example) to minor (as in the aluminum industry).

To link information technology effectively to the

Application monitoring	Unlimited number standard
Individual transaction record available	Yes
Network alarms	23 types
Immediate display of network alarms	Yes
Intelligent line data display	Yes
User-programmable automatic alarms trap	Yes
Protocol discrepancy alarms	Yes
Line utilization analysis	12 real time and 30 database components
Network configuration recognition	Automatically generated and verified
Entire database available to host	Yes
Local (non-host) database	Yes
Low maintenance design	Yes
Special A.C. power	None required

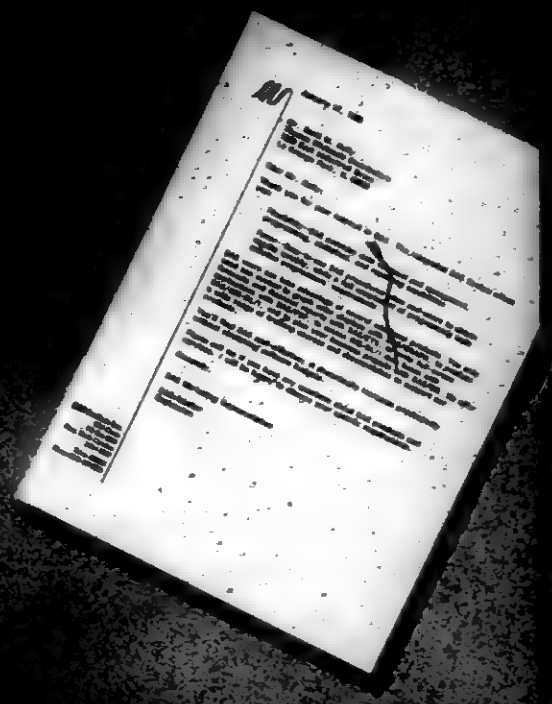


SAS...
Power and Flex
to Meet All You

Available
for
IBM, DG ECLIPSE
and DEC VAX

ibility

r Needs



strategic needs of the firm, management must anticipate the impact of information technology at the industry level before it occurs so that strategies can be developed to position the firm appropriately in the new industry setting. For example, given the current rate of development in telecommunications and office technology, videoconferencing may become a major substitute for some business air travel in less than 10 years. This change would significantly affect the airline industry's business travel market. Today's chief executive officer and strategist must address a crucial question: What impact will information technology have on our industry over the next five to 10 years in terms of products and services, markets and production economics?

Impact at firm level

The impact of information technology is determined by the specific competitive forces facing the firm. M. E. Porter, in *Competitive Strategy*, described five forces that form the industry structure and the competitive "arena" for each firm in the industry. These five forces are the buyers, the suppliers, the substitutes, the new entrants and the rivals within a particular industry. Each firm in every industry faces these five generic forces; the specific manifestations of these forces determine a firm's profitability and range of potentially successful strategies. This framework for competition provides a useful vocabulary for defining the key issues facing a firm today and in the future.

Competitive forces

As information technology affects the products, services or operations of a business, it may change the relationship between an industry and its suppliers. For example, the use of sophisticated quality control systems by the auto industry is forcing steel producers to become much more quality conscious. This matter is even addressed in contracts, and it will change the mix of suppliers. As industries become much more dependent upon information technology, the supplier will become an important force for a firm to consider when planning strategy.

The technology will also change the level of sophistication of some industries' suppliers. Suppliers of funds to financial institutions are increasingly sophisticated (and consequently more powerful) because information technology allows them to monitor and redeploy investments with astonishing ease. Competitively, firms in industries in which information technology is affecting the supplier relationship must be concerned with how this change will affect a supplier's power in dealing with the industry.

Information technology will also affect the buyer relationships of industries as new products, services and distribution channels evolve. Buyers in the banking industry can now choose products and services from a variety of channels. The buyer/industry relationship has been fundamentally changed by ATMs, point-of-sale (POS) terminals and electronic home banking. Information technology has also altered the product mix of industries as firms have packaged information around a basic service. For example, a large distribution company has enhanced its distribution service by offering retail customers computer-generated inventory management reports on a fee-for-service basis.

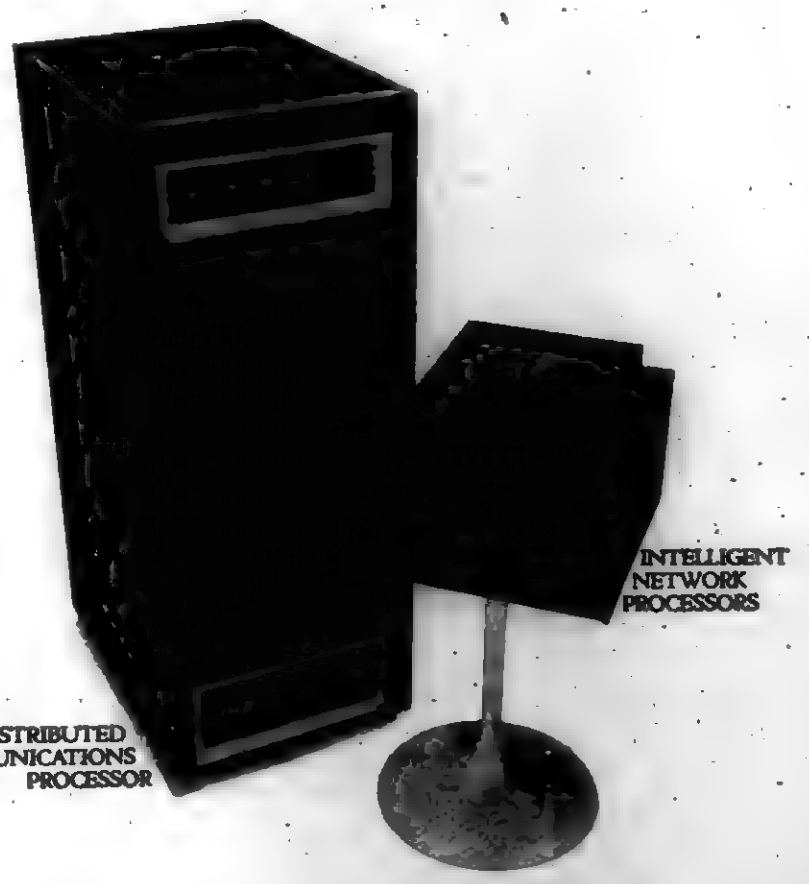
Information technology also affects the rate of substitution in some industries. For example, a large overnight carrier has recognized that electronic mail may substantially substitute for paper-based communications and is developing an electronically based business. Information technology will speed up the life cycle of many products by shortening the development process through computer-aided design (CAD) and computer-aided engineering (CAE). Firms that succeed by duplicating products at low cost will respond to product innovators much more rapidly and accelerate the substitution process.

Information technology affects the rate of new entry into industries by negating existing entry barriers or creating new ones. For example, in the banking industry, information technology-based access to banking services has seriously eroded the traditional entry barriers enjoyed by many branch offices. In the distribution industry, information technology has created new entry barriers by requiring investment in extensive computer and telecommunications networks that are used to control costs in large-scale multilocation distribution facilities. In effect, information technology has created a new scale-economy barrier that the new entrant must overcome in order to price competitively and still be profitable.

Finally, information technology

Each firm in every industry faces five generic forces: buyers, suppliers, substitutes, new entrants and rivals. The specific manifestations of these forces determine a firm's profitability and range of potentially successful strategies.

OH WHAT A YOU WEAVE.



changes industry structure by affecting the rivalry bases among intra-industry competitors. By introducing a new competitive weapon into various settings, information technology sparks outbreaks of firm warfare. Recently, American Airlines and United Airlines have used their reservation systems to competitive advantage by listing their own flights ahead of competitors' flights (termed "systems bias") and by negatively promoting competitors' flights.

Certain securities brokerage firms have exploited information technology to introduce a radical form of cost competition through the telecommunications and computer-based discount brokerage. In the banking industry, leading banks see smaller competitors joining forces through shared ATM networks. Clearly, information technology will contribute significantly to rivalry in many industries in a number of as yet unknown ways.

By introducing a new competitive weapon into various settings, information technology sparks outbreaks of firm warfare. Recently, American Airlines and United Airlines have used their reservation systems to competitive advantage by listing their own flights ahead of competitors' flights (termed "systems bias") and by negatively promoting competitors' flights.

Because the competitive forces of buyers, suppliers, substitution, new entrants and rivalry can significantly affect a firm, managing information technology is a vital element of a firm's strategy and part of its competitive domain. Although information technology represents a challenge or threat to a firm's established ways of doing business, it also represents opportunities for gaining new competitive advantages. Information technology resources can be used as competitive weapons to improve a firm's position in its competitive environment.

Creating competitive advantages

Buying power. The buyer groups of an industry represent a force which, if strong, can reduce the profitability of an industry. For example, strong buyer power exists if customer groups are very concentrated or if they purchase large volumes relative to the industry's total sales. When a handful of buyers represents an industry's entire market, then the importance of each buyer to each selling competitor is so great that concessions are a way of life for the industry and potential profits are reduced. Buyers also have significant power if the cost of changing suppliers or changing to a substitute product is low. The lack of "switching costs" between an industry and its buyers can result in reduced profitability.

There are two ways in which information technology can be a strategic weapon for reducing buyer power. First, it can introduce switching costs, making it more costly for a buyer to change suppliers. Information technology has greatly increased the ability of many firms to raise switching costs for buyers. For example, a large medical supply company has provided on-line order entry terminals and inventory management software for customers. As the customers' systems are integrated with the supplier's, it becomes much more difficult for customers to order from a competitor. If customers change suppliers, they incur testing and implementation costs as well as the cost of retraining personnel and developing new procedures. The more sophisticated the systems, the greater the switching costs and the less power buyers have to indiscriminately switch to a competitor.

Second, information technology represents a strategic weapon for dealing with powerful buyers by providing the capability for firms to develop buyer information systems that determine the profit potential of various buyer groups. All industries have certain customers who are extremely expensive to service relative to the average customer. In addition, some firms are particularly well suited to service some customer groups but not others. However, it is usually very difficult for a manager to determine the overall attractiveness of a current or potential market segment to the business.

For example, because of the insurance industry's historical tradition of providing full service to all business customers, there has been no attempt to match products to customer segments in order to maximize profit. Consequently, although they have a wealth of data, most insurance companies have poor information to answer such crucial questions as: How much does it cost to service a particular market segment? How should our customer portfolio be pared to fit our particular capabilities?

To address these critical issues, a large insurance firm is building an extensive claims data base to go beyond actuarial calculations in an attempt to determine which potential markets will be most profitable. As the overall cost of servicing

TANGLED WEB

When first you practiced to send and receive, it was simple. One data source. One data destination.

But as your networks grew, they grew more complex. More fragmented. More dispersed. More out of control.

Something had to be done, and Codex did it. With 6000 Series Intelligent Network Processors.

These statistical multiplexers help you unify a fragmented data network, consolidate data paths, gain more management control and cut line and equipment costs.

At the same time they give you error-free transmission, greater throughput, increased uptime, maximum flexibility and one point of control easily monitored and managed.

With the Codex 6000 Series, this level of control is possible in any network. With any kind of computer. With any mix of synchronous and asynchronous terminals. Here or overseas. And in more than 40 different protocols from IBM, Honeywell, Burroughs, DEC and more. Including support for X.25.

Codex can even unsnarl the process of choosing equipment and designing a network through the Codex Application Engineering program—the most comprehensive support service in the industry.

It all boils down to this: No matter how big and unmanageable your network has grown, there's a simple way to untangle it.

Codex.

Call 1-800-821-7700 ext. 887 for more information. Or write Codex Corporation, Dept. 707-87, 20 Cabot Blvd., Mansfield, MA 02048.

codex

MOTOROLA Inc.

© 1983 Codex Corporation

insurance customers increases significantly because of deregulation and competition, buyer selection is a key issue, and the strategic application of information technology resources will provide a competitive advantage.

Supplier power. Strong supplier groups may reduce much of an industry's potential profits. The suppliers of an industry include the sources for raw materials, machinery, capital and labor. Suppliers will be powerful if they are very concentrated or if the buyer faces very high costs to obtain information, to shop or to negotiate.

The lack of comprehensive information systems to monitor and evaluate a bank's current and future money position represents a severe strategic disadvantage in dealing with the major supplier — the financial markets. Information technology is a critical tool to help the banking industry respond effectively to fluctuations in these markets.

Information technology represents a strategic opportunity for a firm when the technology can be used to mitigate the factors driving the power of suppliers, thus improving the firm's competitive position. For example, information technology can be used as a viable alternative to high-priced labor. Recent developments in robotics and computer-aided manufacturing not only reduce the cost of labor outright, but they also reduce labor's power to demand industry profits. A manufacturing company recently installed a real-time labor efficiency management system that is tied directly to the wage incentive system specified in the union contract. The owner of the business feels that this system has provided a significant advantage in dealing with his labor force.

Information technology can also be used to avoid high switching costs. One of the major problems facing the banking industry is its inability to manage strategically its largest single cost — the cost of money. The sources of funds for a bank include customer deposits, money markets and certificates of deposit. The interaction of various interest rates for these sources creates a complex problem for bank management, especially during times of extreme interest rate volatility. The lack of comprehensive information systems to monitor and evaluate a bank's current and future money position represents a severe strategic disadvantage in dealing with the major supplier — the financial markets.

Information technology is a critical tool to help the banking industry respond more effectively to fluctuations in these markets. Currently, the lack of strategic information technology severely limits the ability of many banks to gather, process and decide on optimal funds sourcing quickly.

Because of historical and economic conditions, many industries are subject to intense supplier power. Although some of this power is uncontrollable, the strategic application of information technology often represents a potential competitive advantage.

Substitution. The existence of cost-effective substitutes for a product (for example, margarine for butter) may limit potential profitability in an industry. In some instances, a substitute product can virtually eliminate an industry, as happened when the silicon chip-based calculator replaced the electro-mechanical adding machine. An industry must recognize that both existing and potential substitutes will affect the overall demand for products and the profitability that will result from serving the remaining demand.

This reduced profitability results from price competition with substitutes, the cost of advertising against substitutes and product innovation directed at substitutes. However, substitution also represents an opportunity for a firm within an industry to increase its own market by offering its products as substitutes to another industry's buyers.

Information technology becomes a potential strategic factor in dealing with the competitive force of substitution when information technology affects the buyer's decision to substitute or not. This decision is affected by altering the relative price performance comparison with the substitute by lowering cost or improving the perceived performance and by increasing or decreasing the range of functions performed by a product.

One example of substitution based on information technology involves a large brokerage firm that developed a new financial product to support a range of product features through a sophisticated information system. Although the product features existed separately in other products, the combination of features and easy customer use made this product an effective substitute for many existing products in spite of the price premium. This product has been extremely successful and now has a host of imitators.

New entrants. For existing competitors, new entrants present a concern because they will extract some of the industry's profits. For example, increased competition can be touched off by new entrants who use price-cutting tactics to gain market

FOR THREE DAYS IN TEXAS WILL TURN

No single computer, personal or otherwise, has so profoundly affected all of business and industry as the IBM Personal Computer.

And now, for three days only, you can see, touch, use and compare the hardware, software, peripherals and compatibles that run on, like or with this revolutionary machine. It's the PC *World Exposition* in Houston, and you are invited to join us.

You'll see hundreds of exhibits from all the product leaders. Both makers and marketers of hardware, software, printers, peripherals, add-ons and services in a giant exhibition and retail selling event. Here's a list of some of the product leaders you'll see:

Alpha Software Corp.
Anadex Inc.
Arbor Technology
Ashton-Tate
AST Research Inc.
Benchmark
BOS National Inc.
BPI Systems Inc.
Robert J. Brady Company
Braid Communications
Brown Disc Manufacturing
Business Computing
CDI
Celestial Software Inc.
Cermetek Microelectronics
Compaq Computer
Computercraft
Computer Intelligence
ComputerKnowledge Corp.
Computer Roomers
Computerworld
Computex Corporation
Contemporary ComputerWear
Corona Data Systems
Corvus
CPU Corporation
Creative Computer Products
Data Business Vision
Datamac
Data Storage Solutions
Data Translation Inc.
Decision Data Computer Corporation
Digital Communications Associates
Discortex Corp.
Distributed Logic Corp.
Dynax Distributors
Emulex Corporation
ENVAX Systems Inc.
ESC Technologies, Inc.
Everex Systems Inc.
Ferox Microsystems
Hayden Book Co. Inc.
Hewlett-Packard Company
Human Edge Software Corp.
I.B. Maguette
Independent Computer Consultants Associates
Information Builders
Inforunner
InfoWorld
Interface Inc.
International Computerized Linguistics
Interphase Corporation
Lexisoft Inc.
LPKF Pacific
Marc Software
MICRO MARKETWORLD
Micro-Design Inc.
Micro Line Inc.
Microtek Lab
National Instruments
NEC
Novation
Omega Software Inc.
Omni Graphics Inc.
On Trak Data Systems
OSM Computer Corp.
Palantir Software
Panamax Line Conditioning
P.C. Telemart
PC World
Pencept Inc.
Personal CAD Systems
Petroware
Phase Information Machines
Prentice Hall Business & Professional Division
Printronix Inc.
Que Corporation
Racal-Vadic
Roland DG
RTCS/Real Time Computer Science Corp.
Santa Clara Systems
Seequa
Sensor-Based Systems
Software Automation Inc.
Software Centre International
Software Solutions Inc.
Sorbus Service Division MAI
Sperry Corp.
Summagraphics Corporation
SWI International Systems
Sysprint Inc.
Systems Management Associates
Tall Grass Technology
TCS Software
Televideo Systems Inc.
3M Data Recording Products
Thunderhawk Corporation
Toshiba America Inc.
United Networking Systems Inc.
Vectrix Corp.
Verbatim Corporation
Vertex Systems
ZEDUCOMP

(Exhibitors as of Dec. 15, 1983)

penetration, which occurred when the Japanese entered the U.S. automobile industry market. Unless industry demand grows fast enough to accommodate the number of new entrants, average profitability will decline.

Entry barriers are the major structural components of an industry that slow or exclude new entrants. Although entry barriers take many forms, sizes and shapes, they all create a more favorable situation for an existing industry participant than for a potential entrant.

This better situation may be based on costs, reputation, service, technology or some other characteristic important to success in the industry. Entry deterrents are tactics or processes that an industry or a firm can employ to make a potential entrant reconsider his entry. Such actions as deep price cutting during a new entrant's test marketing can act as a deterrent by emphasizing the industry incumbent's relative cost advantage over the potential entrant, and it can also confuse the test market results.

Information technology can be used as a strategic element to deal with new entrants, both offensively and defensively. An insurance company has continually led the industry by building and maintaining a large on-line telecommunications network to its agents. As increasingly sophisticated insurance products are rapidly introduced, this network will continue to grow as an entry barrier.

Entry barriers and deterrents are key aspects of an industry's continued success. Without continual maintenance of the barriers, new entrants will sneak into the industry, usually at the most profitable segments of the market. A firm's strategy must also take into account entry barriers, because a new entrant will often target a vulnerable competitor. Industry leaders are particularly responsible for maintaining entry barriers and creating deterrents.

A firm that contemplates entering a new industry must consider the entry barriers to be overcome and any potential retaliatory action by the violated industry. There are a number of ways to penetrate a new industry, including undertaking joint ventures and acquisitions, focusing on a nonthreatening industry niche or developing new technology that circumvents historical barriers.

Information technology can be used as a strategic element to deal with new entrants, both offensively and defensively. For example, a major insurance company has continually led the industry by building and maintaining a large on-line telecommunications network to its agents. As new, increasingly sophisticated insurance products are rapidly introduced, this network will continue to grow as an entry barrier. Agents must now have much more on-line support, training and promotional backup, and this network provides that support. Without such support, a new entrant will not be an effective competitor.

Another example involves a large financial service company that has built a reputation of quality service and that offers the greatest geographical coverage of any competitor. The company's quality of service and ability to serve a worldwide customer base are built upon information technology capabilities, which represent a capital barrier and which support a reputation barrier.

Information technology will also be used by industrial firms trying to achieve new manufacturing economies of scale relative to competitors, new entrants and substitutes. The potential of these firms to gain scale economies using information technology will depend upon the possibility of going beyond stand-alone applications (which have been the predominant industrial use of information technology).

To develop new scale economies, information technology must be viewed as an organizing concept to use when redesigning the manufacturing process. New economies of scale will only be achieved by identifying the strategic impact of information technology and deploying information technology resources to achieve the desired competitive effect.

Rivalry. Industry rivalry can vary from very intense "guerilla warfare" to a very relaxed "country club" approach. Very intense rivalry depletes the industry of some potential profits, because actions detrimental to the entire industry may occur as competitors struggle to the death for an advantage. The airline industry provides a good example. Because of intense rivalry, airline companies are price cutting far below their real costs. Although one competitor may eventually win, the entire industry is losing.

Dealing with competitors strategically does not always mean destroying them. To operate effectively over time, most industries require a group of good competitors. Having proper competitors allows a firm to earn more profits, develop more new

FEBRUARY, ALL EYES IN TO THE IBM PC.

Plus, we'll present personal computer experts from around the nation in an up-to-the-minute conference program. You'll learn how to choose and how to use the technology and equipment surrounding the PC family of microcomputers. Here's a partial listing of the conference sessions:

Wednesday, February 1, 1984
User Sessions:
The Benefits of the IBM PC for Small Businesses
Financing Options and Tax Advantages
Available Add-Ons and Peripherals
Software: What's Available and How to Find It
What Do the Compatibles Have To Offer?
How I Became Compatible With My IBM PC
Medical/Dental Applications for the PC
The PC in the Law Office
PC's and Real Estate
Manufacturing Resource Planning with the PC
Investment Software for the PC
CPA Software: The Bottom Line
Software for Insurance Applications
Distributed Control Software for the PC

Thursday, February 2, 1984
User Sessions:
The Anatomy of the IBM PC
Defining Levels of Compatibility Between Systems
Overview of Compatibles: Desktops and Portables
Word Processing Software
Database Management Software
Business Graphics Software
Analyzing Your Software Requirements
Overview of Major Business Applications Software
Integrated Software Solutions

Friday, February 3, 1984
User Sessions: The PC in the Corporate Environment
Review of Policy and Planning Issues
Implementation Strategies
Use of PC to Mainframe Communications (Includes Security Issues)
Local Networking for the PC

Quite simply, the PC *World Exposition* is the biggest event in Texas for the most important computer in history.
Don't miss it.

FREE ADMISSION to one Conference Session of your choice. Just present this coupon at the Registration Desk any day of the Show, pay the regular $10 exhibits only admission and choose any one Conference Session free of charge. One coupon per person.

The PC World Exposition
Houston
February 1-3, 1984, Astro Hall

SAVE $5.00 on Full Exhibit & Conference Admission. Present this coupon at the Registration Desk and pay just $25.00 for a Conference Pass entitling you to attend all Conference Sessions and three days of exhibits. One person per coupon.

IT'S WHAT THE WORLD IS COMING TO.

The PC *World Exposition* is produced by Mitch Hall Associates in cooperation with CW Communications, Inc., publishers of PC World, MICRO MARKETWORLD, InfoWorld, and Computerworld.

Three-day admission to all exhibits and conference sessions is $30.00. Admission to the exhibits only for three days is $10.00. Show hours run from 10:00 AM to 2:00 PM Wednesday and Thursday, February 1 and 2, and from 10:00 AM to 2:30 PM on Friday, February 3. Conference sessions run from 8:30 – 10:30 AM and 2:30 – 5:30 PM on all three days.
For attendee and conference information, call CW Communications at 1-800-225-4698.
For information on exhibiting, call Mitch Hall Associates at 1-617-239-7400.

* signifies manufacturer's registered trademark.
** signifies manufacturer's trademark.

markets and create better entry barriers than it could alone. For a firm to cope strategically with the competitive force of rivalry, management must identify when to compete, when to cooperate and how to do so effectively.

Information technology presents major opportunities for companies to affect the degree of rivalry and the methods used to deal with it. Firms can improve both their own competitive position and the entire industry by utilizing information technology-supported data, information technology distribution channels and potential information links within the industry. In the banking industry, information technology represents a tremendous strategic opportunity for individual firms to deal with increasingly intense rivalry.

For example, smaller rival banks may share a common group of ATMs against a market share leader. In the airline industry, shared reservation systems are a way to improve overall service to the consumer. In the railroad industry, standardized data and communications networks between firms offer a way to improve railroad transportation service. Other examples of cooperative information technology use by rivals include computer-to-computer connections, joint information technology ventures and shared software.

Since information technology presents a virtually unlimited opportunity to structure the relationship between a firm and its competitors, information technology should be a vital component of any strategy for dealing with rivals. The key, of course, is to know which information technology relationships should be cooperative and which should be competitive.

The five forces of buyer power, supplier power, substitution, new entrants and rivalry shape the competitive environment for each firm in an industry. These forces vary in the manner and degree to which they will affect each firm in the industry. As part of its strategic analysis, each firm must identify the specific competitive forces and underlying economics that determine the strength and stability of those forces.

The importance of information technology as a competitive resource can then be estimated by isolating where information technology can be used to alter a competitive balance or parry a competitive thrust. Although this may sometimes happen by accident, the analysis presented here provides a method of identifying the most likely opportunities, and it should, therefore, improve a firm's luck.

Impact on strategy

The industry setting not only determines the average profitability for a firm, but it also forms the competitive environment within which a firm's strategy must operate. Successful firms in an industry position themselves relative to industry forces by effectively implementing one or more generic strategies:

- Overall cost leadership on an industrywide basis.
- Differentiation of products and services on an industrywide basis.
- Concentration on a particular market or product niche.

Each of these strategies provides a general framework within which a firm sets functional policies and procedures and also performs activities that implement that strategy. If a firm executes one of these strategies successfully, it will enjoy an advantage relative to industry forces that will yield higher than average returns.

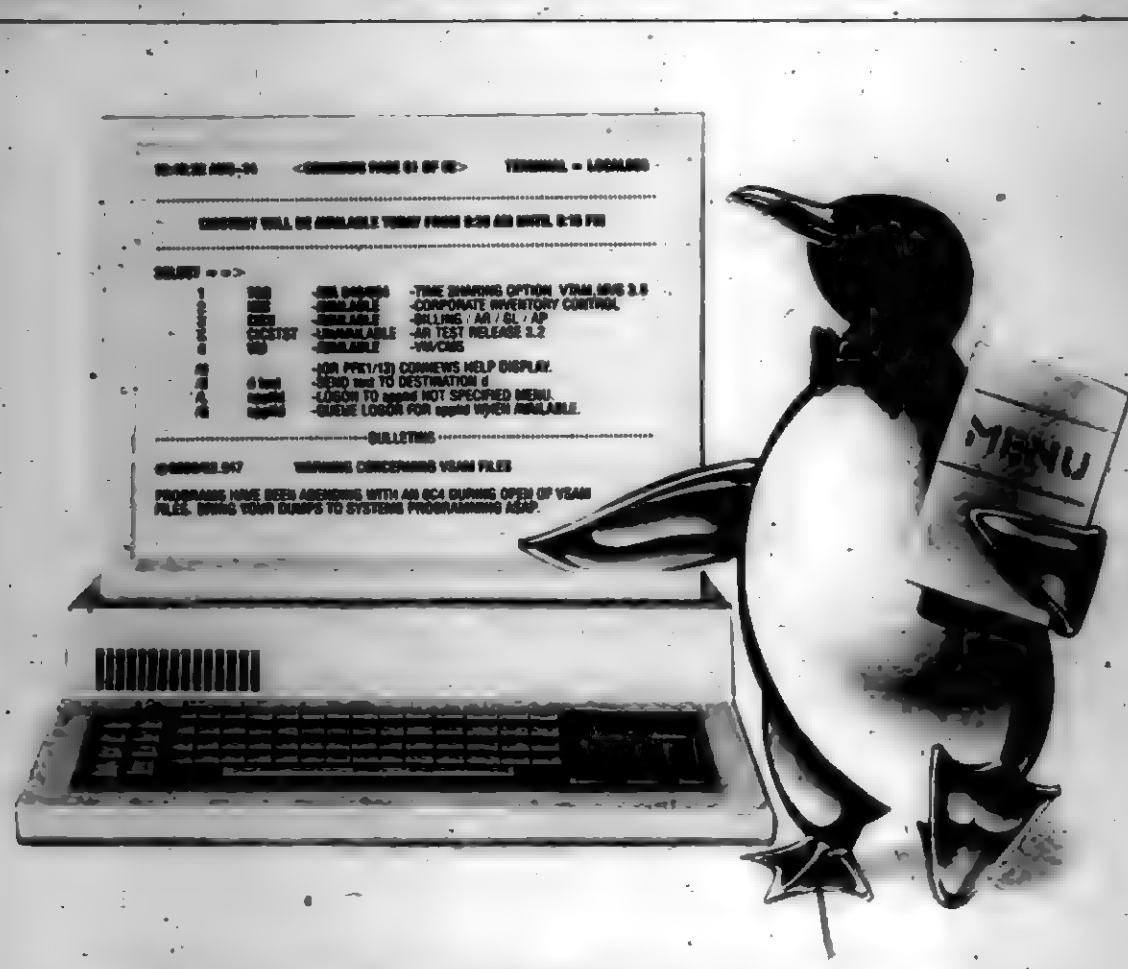
Information technology can affect the ability of firms to execute a particular generic strategy. For example, a large financial service company holds its cost leadership position in the industry because of a sophisticated application of information technology that substantially reduces the cost of transmitting and processing transactions. A manufacturing firm has distinguished its products by achieving levels of quality control and precision that competitors cannot match. The key to its advantage is a quality control information system and the heavy use of computerized machine tools, which provide much greater accuracy while tripling productivity.

Information technology can contribute to a generic strategy in a variety of ways, because the successful execution of such a strategy requires the broad support of all functional areas in a firm.

Information technology is utilized for experimentation support in research laboratories, for computer-aided design and engineering in engineering departments and for production control in factories. The technology is also used for market analysis and distribution support in marketing departments, as a sales tool in the field, for office recordkeeping and for planning in executive offices. In the long term, nearly all functions of all firms can be computer-enhanced to some degree. The strategic issue is: Given scarce resources of time, money and staff, which applications are most important to automate?

Supporting strategies

Clearly, a firm should use information technology to support, reinforce or enlarge its business strategy. In general, firms pursuing an overall cost leadership strategy should use information technology to reduce costs either by improving the productivity of labor or by improving the utilization of other resources, such as machinery and inventory. Firms following a differentiation



CONNEWS.™ THE APPLICATION MENU THAT GIVES YOU THE HOT NEWS AND THE COLD FACTS.

CONNEWS is the user-friendly ACF/VTAM software product that lets 3270 users select from a convenient application menu or view up-to-the-minute information from an electronic bulletin board. No systems modifications are required.

CONNEWS. It's the MENU that really satisfies your taste for applications, and installation NEWS. Some of the more desirable entrees include:

- Customized Company LOGO displays
- Individual MENUs for specific terminal groups
- Terminal ID permanently displayed
- Operator MODIFYable "HOT NEWS" area
- Availability status for menu entries
- 999 page electronic Bulletin Board
- Single or Multi Domain operation

If you want your menu to be easy-to-read, friendly, and highly flexible, CONNEWS is the one for you. Call us today to make a reservation for a FREE TRIAL.

cxi CXI, Inc., 10011 N. Foothill Blvd., Cupertino, CA 95014 (408) 725-1881

Every software ad you read seems to be talking about 'integrated software.' But it was 1-2-3™ from Lotus® that actually gave the phrase real meaning, because we combined spreadsheet, information management and graphic functions in one simple, powerful program.

A program that is faster and easier to use than any other software available today.

In short, the tasks it can perform are really impressive, but why it can perform them is even more important.

Because we feel the real criterion for any management tool is its ability to let the human mind flourish and accomplish more than it ever has before.

That's why with 1-2-3 the thought process is not interrupted, so your mind no longer has to wait for your hands. To the novice, it makes everything plausible. To the expert, it makes anything possible.

The results: Business decisions come faster and easier.

1-2-3 from Lotus is truly compatible with the most important personal computer of all—the human mind.

And isn't that what integration really should mean?

Call 1-800-343-5414 (In Massachusetts call 617-492-7870) and find out more about 1-2-3 from Lotus.

Lotus

The hardest working software in the world.

1-2-3 and Lotus are trademarks of Lotus Development Corporation. All rights reserved.

THE FIRST MOBILE COMPUTER.

THE COMPLETE COMPUTER FOR THE MOBILE PROFESSIONAL.

Professionals on the move in today's productivity-paced business environment have to run a little faster just to keep up.

They can easily spend half their time in airports, taxis, lobbies and hotels unable to do the work they'd like to get done.

But we have a solution.

Give them the powerful 9 pound, 16-bit computer that works when and where they do.

Give them an advanced battery-powered printer that attaches securely on the computer.

Give them an interactive human interface and operating environment that takes only 15-30 minutes to learn.

And unique field-oriented software that comes in rugged plug-in capsules.

In short, give them the Gavilan™ mobile computer.

PORTABLE TURNED PRACTICAL.

Never has there been a complete business computer system as sophisticated, yet as lightweight, as the Gavilan.

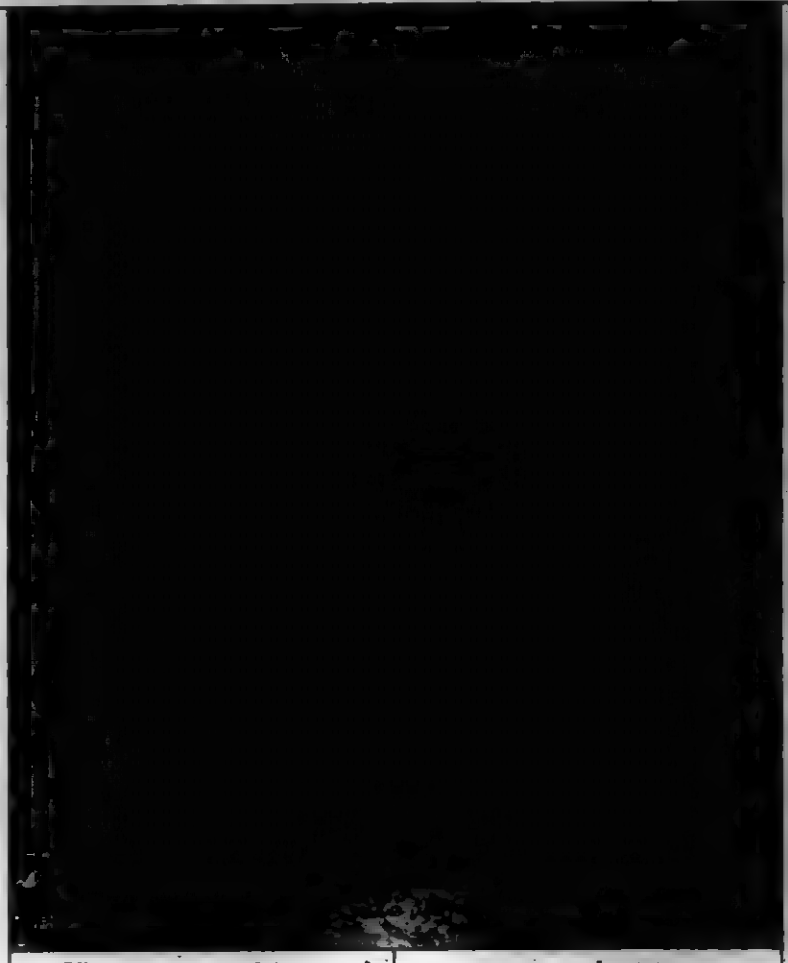
Self-contained, rechargeable 8-hour batteries free the user from external power constraints.

The 8 line X 80 character screen eliminates the need for an external monitor, although you can add one if you wish.

The full-size typewriter keyboard makes data entry as convenient as it is in desktop systems.

A built-in 3½" microfloppy disk drive and modem provide the capabilities of data handling and transmission where they never before existed.

And a 50 character per second printer gives the mobile professional in the field the immediacy of hard copy text, forms, charts, spreadsheets and graphics.



All in a compact 14 pound mobile office.

WE BUILT A MORE MOBILE MOUSE.

The success of any computer depends in part on the "friendliness" and accessibility of the user interface.

Especially in the field.

A standard mouse interface is fine for the expanse of a desktop, but not for work on the move.

So with the Gavilan, we incorporated a built-in touch panel: the first fully integrated computer mouse.

It's a pressure-sensitive pad just above the keyboard. Finger movements across the touch panel control the on-screen movements of a cursor.

But like a mouse, the Gavilan touch panel actually executes virtually all of the user commands, saving the keyboard for typing only.

Through the touch panel, users store and retrieve data. Cut and paste. Move documents. Scroll through pages of information. Zoom out for a complete look at the format of a document. Or even ask the computer what just happened and what to do next. With one finger.

SOFTWARE IN A CAPSULE.

The intuitive ease of talking to the computer through the touch panel is made possible by the unique Gavilan operating environment and software packages.

The applications packages come in durable capsules called CapsuleWare.™ They plug directly into the body of the computer, adding no additional volume. The operating software, (GO System™) then lets each of the applications communicate with each other through a common interface and a sharing of data.

The result is a completely integrated information environment that lets the user combine spreadsheets, graphics and word processing text together.

All in the same uninterrupted user mode.

OUTWARD MOBILITY FOR USERS, UPWARD MOBILITY FOR OEMs.

The Gavilan mobile computer and its CapsuleWare programs are creating vertical market demands—both in MS/DOS and the Gavilan operating environment—for software packages completely unrealized one short year ago.

That means new opportunities in applications development far beyond the typical office-bound programs. From air and sea navigation to banking services. Journalism to field auditing. Anthropology to insurance.

And that means you've got the chance to be first in your chosen field.

A position we strongly advocate.

Gavilan Computer Corp.
P.O. Box 5004
Campbell, CA USA 95008
(408) 379-8000
Telex 4991278 GVLN US

Gavilan

Gavilan, CapsuleWare and GO System are trademarks of Gavilan Computer Corporation. MS/DOS is a trademark of Microsoft Corporation.

strategy should use information technology either directly to add unique features to the product or service or to contribute to quality, service or image through the functional areas.

Although a firm may benefit from an information technology application that is not consistent with its competitive strategy, it will enjoy much greater strategic benefits from an information technology application that is consistent with and supportive of its competitive strategy. Understanding a firm's strategy is critical to the selection of appropriate automation projects, because applications that contribute to a cost leadership strategy are very different from applications that contribute to a differentiation strategy.

When a firm pursues a cost leadership strategy, information technology must create or support opportunities in these same areas. Information technology applications can substantially reduce costs in the functional areas of engineering, design and manufacturing. Information technology can also be used to reduce waste significantly, to improve productivity and to identify marginal customers. The firm that vigorously pursues a cost leadership strategy should identify and execute information technology projects that support and advance such a strategy.

Conversely, a strategy to achieve a differentiated position in an industry has a very different set of requirements. The differentiation strategy requires a perceived uniqueness in design, brand image, technology, product features, customer service, dealer networks or some other category. Usually, firms pursuing a differentiation strategy are most successful when they establish uniqueness in several categories. A distribution company specializing in periodicals differentiated itself in service reliability, responsiveness to customer needs and additional product features primarily through its computer systems. Among nationwide periodical distributors, this firm is perceived as the most sophisticated and highest quality firm in the industry.

Information technology can support a differentiation strategy in a variety of ways. It can contribute to superior customer service by providing historical customer profiles and by increasing the availability of spare parts with a dealer inventory system. Information technology can contribute to high quality through the use of quality control systems and through the use of computer-aided manufacturing systems, which provide flexibility and improved responsiveness to customer needs. Information technology can create better product designs, satisfying both manufacturing and marketplace requirements. In some instances, information technology can also provide access to markets that would otherwise be too remote to service.

Figure 2 shows how information technology applications must be specifically chosen to support the generic strategy of a firm. Applications supporting a low-cost generic strategy are designed to take advantage of

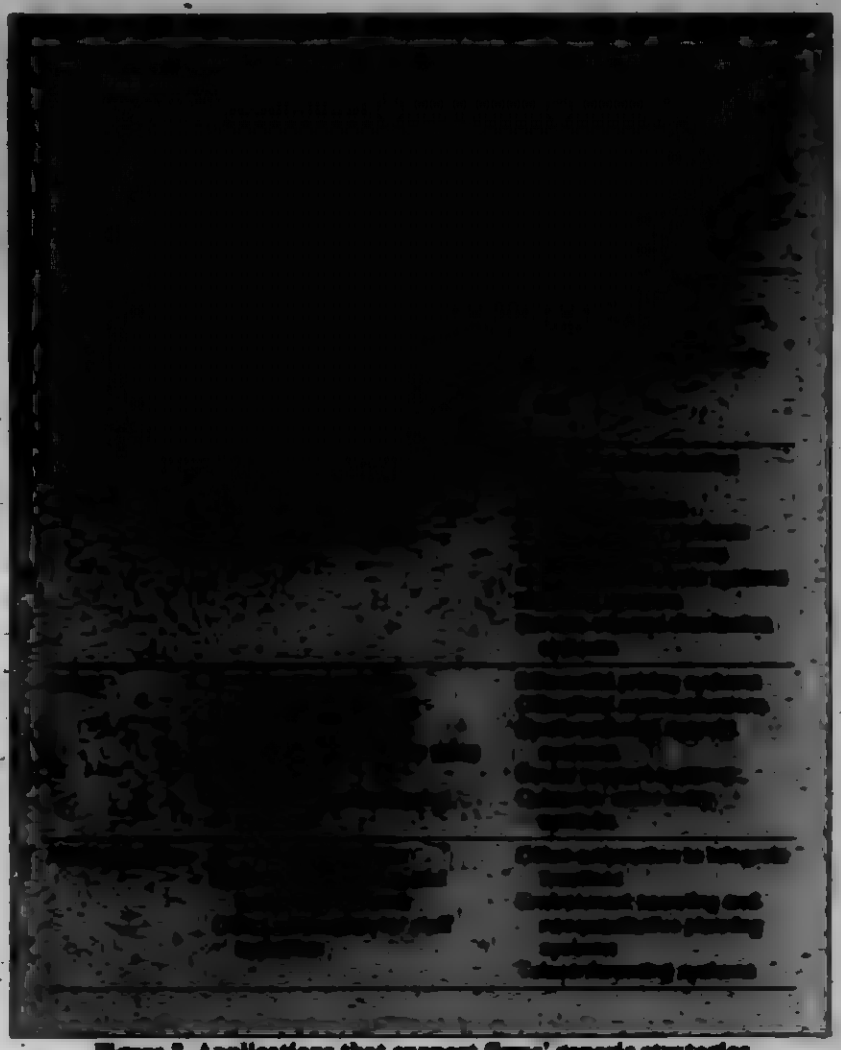
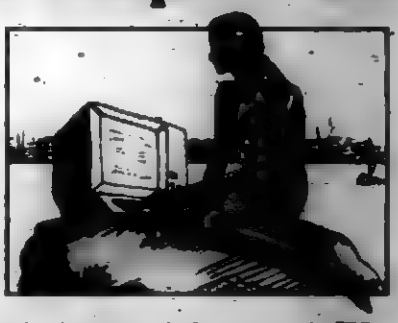


Figure 2. Applications that support firms' generic strategies

Reach the Danish computer market with Computerworld/ Denmark.



The Danish EDP market is growing at an incredible rate of 23% annually. Last year, this market was valued at more than $185 million. And the U.S. is Denmark's major supplier of EDP products accounting for 40% of the country's computer equipment imports.

When Danish computer professionals with purchasing power want the most up-to-date local and international information on the EDP industry, they read *Computerworld/Denmark*, sister publication to *Computerworld*. *Computerworld/Denmark* is a bi-weekly newspaper serving the Danish computer community with the latest developments in hardware, software, terminals and other computer products and services. And, in every issue, the *MicroWorld* section reports on the special needs of the micro end-user and the status of the market.

So, if you'd like to market your products or services internationally, *Computerworld/ Denmark* has a circulation of 20,000 computer professionals who would like to hear from you.

CW International Marketing Services will give you one-stop advertising service in countries around the world. We will translate your ad and bill you in U.S. dollars. For more information on *Computerworld/Denmark* or any of our other foreign publications, just fill out the coupon below.

Diane La Muraglia, Manager
International Marketing Services
CW Communications/Inc.
375 Cochituate Road, Box 880
Framingham, MA 01701
(617) 879-0700

CW COMMUNICATIONS/INC.
Publishers of *Computerworld* and other leading computer publications around the world

Please send me more information on
☐ *Computerworld/Denmark* ☐ Your other foreign publications

Name _____
Title _____
Company _____
Address _____
City _____ State _____ Zip _____

"If you want to do OEM computer business in Europe you should go to the Invitational Computer Conferences in England, France, Germany and Scandinavia ...We do!"

Europe is a true regional market place and experienced marketing management knows that the best way to reach the technical decision maker/ buyer is to meet him where he lives and works, demonstrate operating equipment and provide him with the technical information he needs. During the past three years, successful marketers have found the Invitational Computer Conferences to be the most cost efficient, effective method of covering their multi-national, computer industry customer base.

The exclusive, one-day, OEM conferences will be held in five-market areas in Europe and are attended by a select, invited audience of OEMs, systems houses and quantity end users. Guests can participate in a variety of technical seminars and view operating displays of the newest computer and peripheral equipment. The informal setting makes it easy to meet with potential customers one-on-one and the simple table-top displays keep exhibit costs at a minimum.

Feb. 21, '84	Stockholm, Sweden
Feb. 23, '84	Paris, France
Feb. 28, '84	Munich, West Germany
Mar. 1, '84	Frankfurt, West Germany
Mar. 7, '84	London, England

For more information call or write:

B. J. Johnson & Associates, Inc.
3151 Airway Ave., #C-2
Costa Mesa, CA 92626
Tel: (714) 957-0171
Telex: 678401 TAB IRIN

Text 100 Ltd.
No. 10 Barley Mow Passage
Chiswick, London W4 4PH
ENGLAND
Tel: 01-994-6477
Telex: 8811418 Ref. T100N SPACES G

Although it is clear that information technology applications should be consistent with a firm's strategy, little attempt is made in many firms to understand how the technology will affect the firm's strategic position in the industry or how it might support a business strategy.

existing and emerging information technology to achieve a low-cost position in an industry. Applications supporting a low-cost strategy are substantially different from applications supporting a differentiation strategy.

The strategic success of information technology projects within a firm depends upon how well they support the firm's competitive strategy. In one instance, a firm following low-cost strategy gained little strategic benefit from a computer system that offered many options and much flexibility but that was very expensive to operate.

Over time, the overall cost leadership strategy of the firm continued to narrow the product line and to streamline operations, requiring the functional areas to standardize and limit options. The large, expensive, multioption system, which was still being developed, ran counter to the firm's strategy. As a result, the system was only partially used, and parts of it were never implemented. Now the users in operations correctly feel that using the system makes it difficult for them to meet their functional objectives as dictated by the cost leadership strategy. They want to scrap the system and buy their own package, which will run on a minicomputer.

In other firms, information technology developments were linked to a specific strategy, and users were very enthusiastic about implementing the systems. They felt the systems were valuable because they helped them carry out assignments within the overall strategy. System designers must realize that the strategic benefit will only be realized if there is a commitment to and acceptance of the system by multiple functions and levels in the organization.

Effective strategy requires coordination of many interfacing functions. Management must consider such factors as supporting subsystems, personnel and compensation to ensure an information technology system will contribute significantly to a strategy. For example, highly sophisticated, information technology-enhanced tools for selling insurance will not be effective if salespeople are not hired, trained and motivated to use the systems.

Although it is clear that information technology applications should be consistent with a firm's strategy, little attempt is made in many firms to understand how the technology will affect the firm's strategic position in the industry or how it might support a business strategy. For example, a number of major U.S. banks have recently removed their top information systems executives. Although a variety of explanations were given for these management changes, the underlying reason was that information technology was not being managed in a way consistent with the banks' strategic needs.

The problem, of course, was not that these executives could not develop technology consistent with the bank's strategy. The problem was and continues to be that neither the bank executives nor the information systems executives understand how information technology affects their business. Neither group can articulate how computer hardware and software should support or extend the bank's ability to make money.

For years, technical experts have expressed concern over whether a firm's computer systems met their needs. Unfortunately, these experts did not understand the needs of a business from a competitive viewpoint, as they did not perceive information technology to be in the competitive domain of a business. In spite of this general lack of strategic direction, firms in many industries are using information technology to their competitive advantage.

As technology continues to develop rapidly and becomes a major factor in more industries, firms must begin to manage strategically information technology. The framework presented here describes the first steps management should take to link information technology to a firm's competitive strategy by analyzing its impact at the industry, firm and strategy levels.

By understanding when, where and how information technology will affect a firm, management can develop an explicit strategy that makes the necessary trade-offs and directs resources to take advantage of opportunities while mitigating threats. Without such an understanding, firms will continue to ride a speeding technological roller coaster, spending more money and acquiring new hardware without sound business justification.

About the Author

Gregory Parsons is assistant professor of business administration at the Graduate School of Business Administration, Harvard University. He consults on information systems technology and its impact on competition and business strategy.

UNLEASH THE POWER
of your IBM PC® with Fox 10-BASE™.

NEW, from Fox Research. 10-BASE is the most powerful, easy-to-use Data Base Management System *ever* designed for IBM PCs and compatibles. And, at just $495, it's a powerful value.

10-BASE speaks "IBM"®. We translated IBM's Sequel (SQL) into "PC" to put flexibility and astonishing power at your fingertips.

Power to let you grow into networking as your business grows.

Power to do your job with fewer commands.

Do more.
Do it better and faster.

Access as many files as you need, with as many records per file as you want. Create new "files" from existing files with a single command. Then use the automatic Data Dictionary to overview everything.

The whole idea, after all, is to spend your time evaluating information, not looking for it.

RESEARCH

30-Day Free Trial

☐ YES! Here's P.O. # _____ for $495.00 (plus applicable tax). I want to try 10-BASE on a 30-day trial basis. If I'm not completely satisfied, I'll return my 10-BASE and cancel my P.O.
☐ Send more information.
☐ Send me your dealer package.

Name
Title
Company
Address
City
State, Zip
Phone

Send To: Fox Research, Inc., Attn: Greg Goodall, National Sales Manager, 7005 Corporate Way, Dayton, Ohio 45459. Or call: 800/358-1010. Or 800/762-1060 in Ohio.

(Store locator, attach your business card here)

See us at
SOFTCON

A subsidiary of CompCom Technology, Inc.

IN DEPTH

32 Bit	IBM	Data General Corp.	Nixdorf Computer Corp.	Honeywell, Inc.
Model	System 38/5	MV/8000	8890/30	6/82
Memory (Bytes)	2M	1M	1M	1M
Operating System	CPF	AOS/VS	Nixdos/UDE	Gcos/6
Language	RPG-III	Cobol	Cobol	Cobol
Data Base	S/38 DB	Infos	NDS	TPS-6

16 Bit	Digital Equipment Corp.	Microdata Corp.	Hewlett-Packard Co.
Model	PDP-11/44	Reality 2000	3000/40
Operating System	DSM-11	Reality	MPE-IV
Language	Mumps (DEC Standard Mumps	Basic	Fortran IV
Data Base	DSM-11	Reality	Image 3000

32 Bit	IBM System/38 Model 5 RPG-III	Data General MV/8000 Cobol	Honeywell 6/82 Cobol	Nixdorf 8890/30 Cobol
Data base creation	1 hour, 50 min	6 hours	1 hour, 5 min	1 hour, 6 min
Long query	4 min	4 min, 30 sec	1 min, 25 sec	4 min, 11 sec
Short query	1 sec	1 sec	1 sec	1 sec
Data base occupation (K bytes)	23,400	22,800	14,700	23,631
Lines of code	535	1,150	2,219	3,239

16 Bit	DEC PDP-11/44 Mumps	HP 3000 Fortran	Microdata Reality 2000 Basic
Data base creation	32 min	3 hours, 30 min	46 min
Long query (17,000 records)	8 min, 55 sec	2 min, 30 sec	15 min
Short query (99 records)	<1 sec	>2 sec	18 sec
Data base occupation (K bytes)	6,073	23,093	3,000
Lines of code (source)	183	2,994	391

Seven systems were evaluated in the benchmark tests. The results show how Mumps stacked up.

A case for Mumps

In benchmark tests to determine the systems vendor for a retailing application, Mumps — perhaps surprisingly — proved the superior choice for programming language performance.

By Casimiro Alonso

The system buyer's dilemma is familiar: "Overpurchasing" immediately results in wasted resources, and the waste may continue for years. Yet purchasing only enough computing power for current needs usually means that sooner or later the operations manager must choose among four distasteful alternatives: accept slow response times, limit the number of terminals and applications, redesign and reprogram applications or upgrade the CPU and install larger disks.

This situation is especially troublesome for systems vendors, like our company, who are often required to bid competitively on meeting a potential customer's needs. Overspecifying could mean losing the job to a competitor. Underspecifying means the system will fail to meet long-term customer needs.

We are always careful to examine solutions such as modular hardware that is easily upgradeable, software that is upward-compatible and distributed processing systems linked with local-area networks. Yet, more and more, we find that the simplest solution is the best: to provide the very highest system price/performance right from the outset.

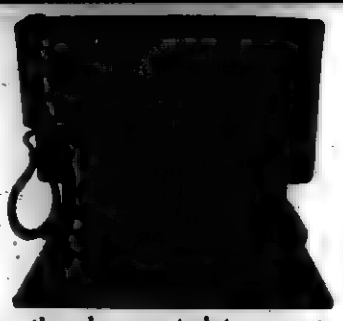
Recently, hardware vendors have made great strides in improving the price/performance of microcomputers, as evidenced by Motorola, Inc. 68000-based systems. However, hardware vendors primarily stress machine performance and are not as aggressive in matching hardware improvements to software progress as some would like them to be. In fact, programming languages and operating systems have followed from mainframes to minis to superminis to micros without changing sufficiently to accommodate many of today's interactive needs. Now, this outdated software is often a bottleneck to a true increase in total system performance.

Put to the test

Just how much difference good system software can make in performance recently came out in a series of benchmark tests we were involved in as part of a bid to provide an administrative computer system to a department store.

Getting this contract required demonstrating superior performance, with the lowest overall cost, over several competitors in actual customer applications. Each

GET EVERYBODY ON BOARD.



Now there's a way to let everyone in your company chip in.

AT&T Information Systems, the company whose unparalleled communications heritage has been bringing people together for 100 years, now brings your office together. With state-of-the-art office automation that's designed to get your company moving ahead.

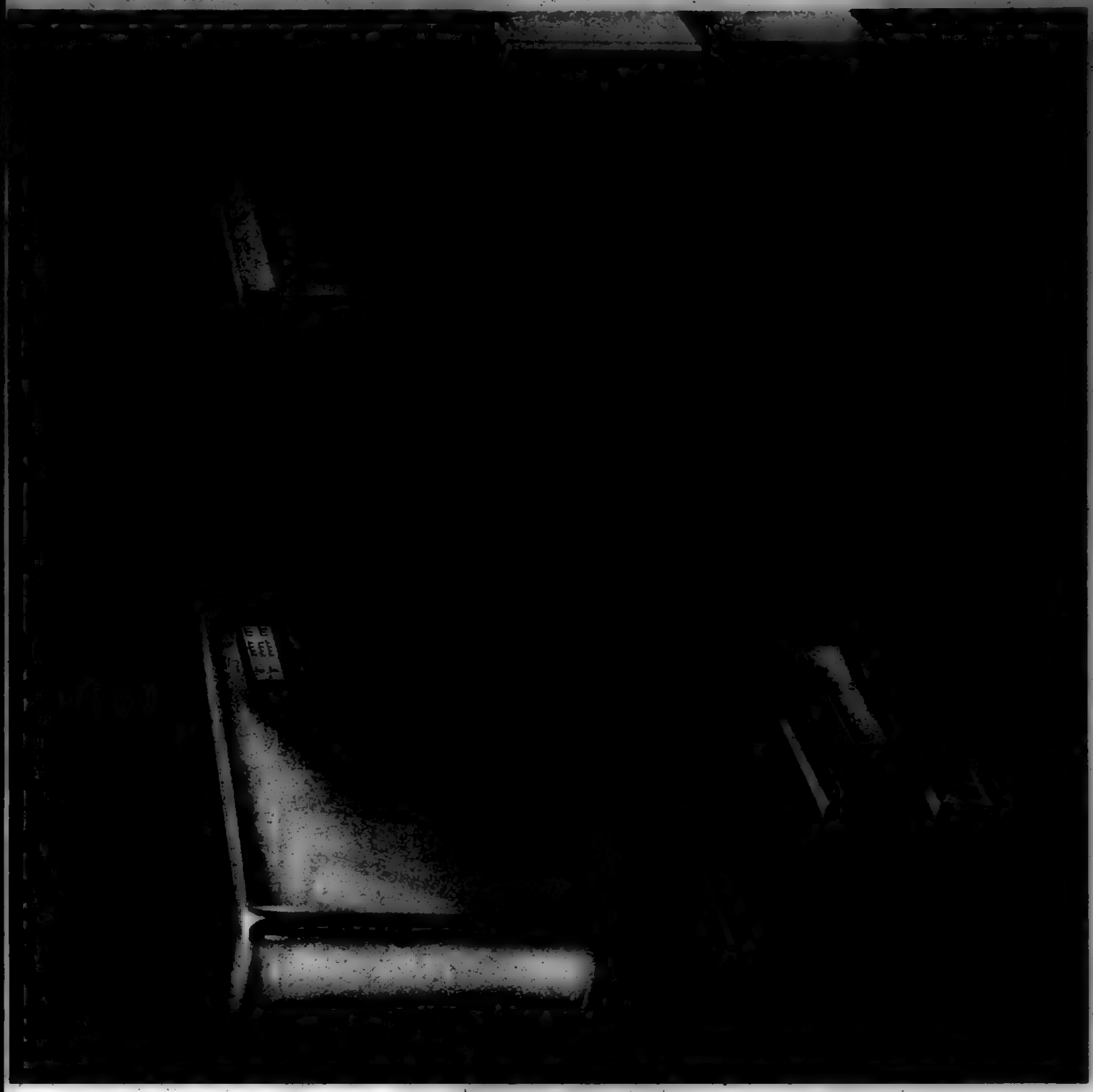
Electronic Document Communications, now available on System 85 and DIMENSION PBX, is an easy-to-learn software application that's hard to beat. Because it integrates your office by letting everyone prepare, send and store documents and messages with the speed and efficiency of a computer. So you can have better access to the right information in the right form at the right time.

Electronic Document Communications can streamline your office in three ways:

Preparing Information—Reduces the time, effort, cost and wasted paper between drafts by electronically creating, editing and formatting documents and messages. "The Composer," a special software feature, checks spelling, grammar, punctuation and usage. EDC even measures whether documents are readable by technical and nontechnical readers.

Moving Information—Speeds documents to many people in different locations simultaneously so they can act decisively. EDC allows you to determine the timing and cost of delivery, and even check to find out when documents were received. Using a password ensures the privacy of your messages.

Managing and Storing Information—Locates documents, and retrieves and evalu-



ates contents quickly and easily with electronic files—while reducing the possibility of losing documents. An electronic "Mailbox" allows you to quickly determine which documents to read first. EDC reduces storing and filing costs with an electronic "Archives" that allows for either short- or long-term storage, and the "Wastebasket" which enables you to permanently delete items after a determined period of time. There's even an electronic "Calendar" that checks personal schedules and arranges mutually convenient meetings.

Not only will all these features help you further integrate your office, Electronic Document Communications is itself just one part of AT&T's line of completely integrated business systems. For state-of-the-art office automation, you can implement EDC in conjunction with other applications software like Message Center/Directory, a call coverage and message system. These office management applications are now available on System 85 and DIMENSION® 600 and 2000 systems with the Applications Processor.

The result is you'll be able to improve staff productivity at every level and get everybody on board. And as new features are developed in the future, they'll be compatible with your existing equipment.

EDC was developed by Bell Labs systems designers who now work for AT&T Information Systems Laboratories. AT&T Western Electric produces EDC, and AT&T Information Systems will maintain it with comprehensive, conscientious service from the largest service organization in the industry. To find out more, call toll-free 1-800-247-1212, Ext. 879M.

AT&T's Electronic Document Communications: It's part of the integrated office of tomorrow that you can board today.

AT&T Information Systems

IN DEPTH/A CASE FOR MUMPS

competitive bid was based on providing both economical application development and an efficient run-time environment. In addition, we wanted to assure that the system we proposed was expandable and economical over the long term, as well.

From previous experience with the Mumps language, we were aware of its ability to improve programmer productivity and, thus, to reduce software costs by speeding up development time. We also liked the fact that Mumps provided easy portability from micros to minis to superminis. We were, therefore, inclined to go with a Mumps-based system. However, what overall effect Mumps would have on system performance and whether it would allow the full functionality required for winning the contract was unclear.

The data for the comparison was submitted by the different hardware vendors, and each vendor was kept informed of the results of each other vendor so as to encourage each to obtain the best possible performance from his system.

The benchmark took the form of comparing Mumps with other languages and data base systems in terms of disk occupation, processing speed and lines of code needed. Specifically, it consisted of:

1. Creating a data base with the following structure:

Files:

Parts file (1,000 records).

Color file (6,000 records) containing six "color" records per "part."

Size file (48,000 records) containing eight "size" records per "part-color."

Store file (288,000 records) containing six "store" records per "part-color-size."

Supplier file (30 records).

Family file (20 records).

Relationships:

Part-color-size-store (343,000 relations).

Store-part-color-size (343,000 relations).

Supplier-part (1,000 relations).

Family-part (1,000 relations).

2. Creating a data base that gives stock and sales charts as well as stock value per family part-color-size-store. The query implied the use of the "family-part" and the "part-color-size-store" relations. Two different queries were performed: a "long" one requiring access to 17,650 records, and a "short" one, accessing just 50 records.

On the data base creation test, Mumps was from half again as fast to 18 times as fast as the other systems. The Mumps data base also occupied only one-half to one-fourth of the disk space required by others. And Mumps programming required one-third fewer lines of code.

The chart on the cover page shows the technical specifications of the different systems evaluated in the benchmark.

Results on seven systems

Mumps performed much better than the other languages on almost every comparison run (again, see cover page). On the data base creation test, for example, Mumps was from half again as fast to 18 times as fast as the other systems. The Mumps data base also occupied only one-half to one-fourth of the disk space required by others. And Mumps programming required one-third fewer lines of code.

In summary, in different comparisons on various machines, Mumps was bested only once.

A more significant fact is that a Digital Equipment Corp. PDP-11/44, running Mumps, actually outperformed all 16-bit and most 32-bit minis on most of the tests.

This data indicates that a user choosing Mumps software for interactive data base applications can expect up to five times more power from a given computer. And this power, in turn, will eliminate many of the performance problems encountered by minicomputers in administrative environments.

In addition, the data laid to rest the criticism that the

IN DEPTH/A CASE FOR MUMPS

The system we were prepared to recommend to our customer was a DEC VAX-11/750 under VMS, running VAX-11 DSM. This recommendation was made to allow the user to take advantage of Mumps as well as gain the 32-bit capability and future growth and versatility of the VAX.

Mumps "interpreter" approach imposes performance penalties on applications. The results show clearly that Mumps is not at all slower than other software. Indeed, it offers an incredible performance increase over competitive systems.

For these reasons, we decided to recommend that our client go with a Mumps applications program.

Implementations on DEC CPUs

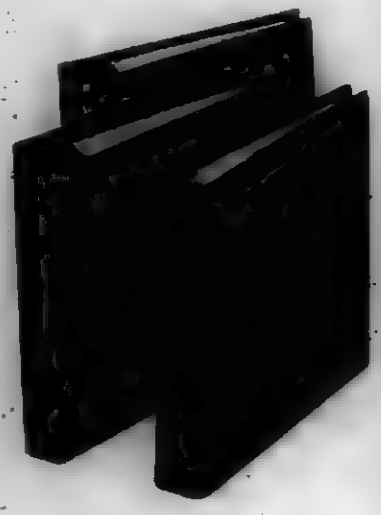
At the time of the benchmark comparisons, the development system in our company was a DEC PDP-11/44 with RK07 disk drive running DEC-standard Mumps, DSM V2.2.

The system we were prepared to recommend to our customer was a DEC VAX-11/750 under VMS, running VAX-11 DSM. This recommendation was made to allow the user to take advantage of Mumps as well as gain the 32-bit capability and future growth and versatility of the VAX. However, it also meant that we would have to use an outside VAX to refine the programs after we developed them on our own in-house 11/44. This procedure presented no problem, because no modification of source code would be needed in order to move the Mumps programs between the 16- and 32-bit CPUs.

The performance obtained in-house with the 11/44 was exceptionally good and placed us far ahead of the others preparing competitive proposals. It also provided a large margin for the additional overhead burden we expected in moving from the PDP-11's dedicated operating system to the general operating system of the VAX. Unfortunately, when moving to the VAX, the overhead turned out to be greater than we anticipated and threatened to wipe out much of our competitive advantage.

Before making the final proposal, we decided to test the latest Mumps implementations on the VAX to see how much, if any, performance improvement was possible. We contacted both DEC and Intersystems Corp., two major Mumps suppliers, for help. DEC responded with an improved, experimental VAX-11 DSM (2.1); Intersystems with its current M/VX.

The basic difference between DEC's experimental and current



DASD MANAGEMENT AWARD WINNER

The world's leading DASD management system, installed in more than 750 Fortune 1000 sites. Tailored to IBM VS1 and MVS, operating environments, yet doesn't rely on any IBM utility. DMS/OS — with disaster recovery — gives you more space and more usable DASD reports. Here is a direct-access storage device management system that dramatically reduces DASD conversion time, frees up operator time, and provides enforced control standards.

Is it any wonder that over 75% of world's leading industries turn to Sterling Software Marketing and DMS/OS for DASD management?

For a free on-site evaluation without obligation, call TOLL FREE 800-824-8512. California, Alaska, Hawaii, and Canada call collect 916-441-7234. Ask for Ext. 41.

STERLING SOFTWARE MARKETING

Formerly Software Modules Marketing

Crocker Bank Bldg. Penthouse
1807 Seventh Street
Sacramento, CA 95814

IBM is a registered trademark of International Business Machines, Inc.

WHY WAIT FOR A PIG IN A POKE ?

PROCMAN THE TSO CLIST COMPILER

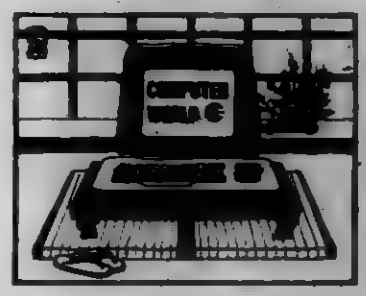
Reduce service units
Reduce CPU overhead
Reduce CLIST run times
SPF panels and tutorial
Adds new CLIST facilities
No system or CLIST modifications
Provides multi level security by CLIST

. . . when you can have PROCMAN NOW !!

TONE Software Corp.

1735 S. Brookhurst
Anaheim, CA 92804
(714) 991-9460 Telex 181592

Computerworld/Japan can bring your message to the world's second largest computer market.



The Japanese computer industry is growing at a rate of 20% per year. There are currenty more than 101,000 installed general purpose computers valued at over $18 billion. This figure does not include minis, micros and personal computers. Small business computers are currently the leading growth sector in the Japanese computer market.

Japan is looking for well-developed technology that will meet their future needs. And with no strong independent software industry of its own, Japan offers great opportunity for U.S. manufacturers in the packaged software market.

Computerworld/Japan is a weekly publication covering the latest developments in the Japanese computer industry with reports on new products, services and trends. Its 30,000 subscribers include top management and DP professionals throughout the country.

CW International Marketing Services gives you one-stop advertising service in countries around the world. For more information on *Computerworld/Japan* or any of our other foreign publications, just fill out the coupon below.

Diane La Rungila, Manager
International Marketing Services
CW COMMUNICATIONS/INC.
375 Cochituate Road, Box 880
Framingham, MA 01701
(617) 879-0700

Please send me more information on:
☐ *Computerworld Japan* ☐ Your other foreign publications

CW Communications/Inc.
Publishers of *Computerworld* and other leading publications around the world.

Name _____ Title _____
Company _____
Address _____
City _____ State _____ Zip _____

Figure 1

Figure 2

VAX-11 DSM is that the new version uses a global handler that minimizes the use of RMS isam files to store data base files ("globals" in the Mumps world). The currently marketed version relies heavily on the use of RMS isam files.

M/VX does its own data base handling within one RMS file. It is more specialized software, designed to minimize dependency on both operating and record management systems. Since it minimizes dependency on operating system facilities, it avoids much of the overhead associated with general operating systems.

The comparative test of these implementations produced a pleasant surprise (see Figure 1). The results show that DEC's experimental VAX-11 DSM X2.1 can provide performance on a VAX 750 comparable to that of an 11/44 running DSM-11. Further, they show that with M/VX, a VAX 750 can clearly outperform an 11/44, and a VAX 780 can become an "unbeatable" machine.

In short, these tests show that it is possible to combine the advantages of the VAX with the advantages of Mumps, without the performance losses resulting from the overhead of a general operating system.

Mumps, Cobol on VAX

Although the benchmark was set up to compare several systems, we also thought it would be informative to demonstrate to the customer the results obtained when running the data on the same VAX 750 using first Cobol, then Mumps. The results were as shown in Figure 2.

Because of this series of benchmark tests, our company was able to make a strong, well-supported recommendation for a powerful, versatile and fast hybrid system: a DEC VAX for 32-bit capability and future flexibility and Intersystems M/VX for high-performance Mumps applications programs.

On this recommendation, we were selected, and our customer ordered three VAX systems as described above. They are now up and running.

Prior to installation, the customer was also able to save considerable development time by assigning three programmers and a systems analyst, none with prior Mumps experience, to develop and test applications on our in-house PDP-11. This development work was possible because no conversion was needed when the applications moved later to the VAX.

The applications development took about one-third the amount of time that had been forecast for the use of other languages. Seven complex applications were developed in a space of about four months.

In addition, the customer got a bonus in disk space savings, which provides growth potential and a future possibility of saving money in disk configuration.

About the Author

Casimiro Alonso is vice-president for technical operations at Calculo de Sabadell, Barcelona, one of Spain's leading computer service companies. He holds an MBA degree from the University of Barcelona, where he was formerly a professor of operating systems design.

ELECTRONIC MAIL UNDER CICS

Streamline Communications
Reduce WATS, Fax, Telex
and Express Mail Charges

Some of the major features of SYSM® include:
- Easy to use
- 327X/328X support
- Dial-up TTY support
- Simple commands
- Menu driven
- In/out baskets
- Broadcast to groups
- Forward with comments
- Full security
- DOS, VS1, MVS, CICS

Here's two good reasons why you should call today:
- 30-day free trial
- Site license
  $12,000 DOS
  $14,000 OS

CALL:
(208) 377-0336

H&W™
COMPUTER SYSTEMS, INC.

H&W Computer Systems, Inc. P.O. Box 4785, Boise, Idaho 83711-4785

CICS Solutions

VAX VMS

- TIMESHARE USER
- FORTRAN PROGRAMMER

Call toll-free for detailed course outlines. The cost is $3700 per week.

Walter Gallant
Mini & Micro Edu. Services
(800) 824-7888 ext. 844573

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 709 FRAMINGHAM, MA 01701

postage will be paid by

CIRCULATION DEPARTMENT

COMPUTERWORLD

375 Cochituate Road, Rte. 30
Box 897
Framingham, MA 01701-9985

SYSTEMS & PERIPHERALS

Export control crumbling

HARD TALK

TOM HENKEL

U.S. control over what hardware is shipped to foreign countries is falling apart. With more computer systems, peripherals and components being shipped today than ever before, it is becoming clear that the government hasn't the slightest idea where much of it is going.

It is impossible to check every box on every airplane, boat or truck that departs U.S. borders. And it's equally difficult to make sure computer systems that leave the U.S. for sanctioned sites actually reach their destinations.

Let's face it, no one really knows what happens to a box when it is shipped from point A to point B. Items pass through many hands and visit many freight yards before winding up, usually, at the address listed on the shipping label.

Sometimes things go wrong. While logic dictates that big things like computer systems just do not vanish, many DPers have spent days waiting for a desperately needed replacement part that was loaded on a truck on Tuesday and has not been seen since. There are hundreds of horror stories about shipped items, even entire freight cars, that have been missing for years.

The U.S. Customs Service recently snatched two Digital Equipment Corp. VAX-11/782 superminicomputers from West German and Swiss docks. They said those systems had been laundered out of the U.S. and were destined for the Soviet Union. They reportedly were to be used for military applications.

But keeping two VAX processors out of the Soviets' hands hardly solves the problem.

High tech has become a worldwide preoccupation. That means the United States no longer holds the plug to every computer system built. The Japanese, for example, make most of the components that go into the VAX, as

See CONTROL page 61

DP disasters hurt entire firm

Planning seen key to survival

By Leif F. Sennagel
Special to CW

Disasters in the computer room affect not only the DP operation, but the rest of the company as well. A corporation's cash flow can be interrupted, its position in the marketplace can be hurt, customer and employee relations can be strained and a firm's purchasing power can be jeopardized.

While there is no way to prevent many disasters, the risks and implications of a significant disruption of DP services cannot be ignored.

Planning is the key to survival in any contingency program. The goal is to get critical applications running as quickly as possible regardless of the reason the system is not working. For example, there can be hardware damage resulting from a fire, explosion or power failure.

But also remember that a system can be rendered helpless by other factors. For example, a data communications failure could make vital data inaccessible.

But contingency planning involves more than just finding innovative ways of getting the hardware back on-line. There are many issues to consider. For example, how much money will a firm lose if a critical application is lost? What happens if that application is down for an extended period of time?

Function at many levels

A contingency plan can function at many levels. It is up to the DP executive to determine which steps a firm should take to protect its data. This decision should include an economic justification of various contingency planning alternatives and integrate top management and user views.

A good contingency plan must also hold provisions to test and refine the plan.

There should be a framework for maintaining the plan. This involves training personnel in how to recover suc-

See PLANNING page 61

Selanar announces upgrades

SACRAMENTO, Calif. — Selanar Corp. has announced a series of graphics upgrades for terminals and printers produced by Digital Equipment Corp., Qume Corp., Televideo Systems, Inc. and Lear Siegler, Inc.

The SG480, SG481 and SG482 reportedly are user-installable, high-resolution graphics upgrades for the DEC VT100, VT101 and VT102, respectively, featuring 800- by 480-pixel resolution and Tektronix, Inc. 4010 and 4014 emulation with enhanced graphics module. They feature variable character sizes, variable line types, point plot, incremental plot, write-through mode and crosshair cursor.

The upgrades are priced at $1,195, the vendor said.

Also announced by Selanar were the SG101-D and SG102-D low-resolution upgrades for the DEC VT101 and VT102, respectively. They reportedly feature 700- by 250- by 2-pixel resolution, Tektronix 4010 and 4014 emulation and user installation in less than 15 minutes. They are priced at $795.

For the Lear Siegler 3A, 3A Plus and 5, Selanar is offering the SG305 low-resolution retrofit board. It reportedly features 640- by 240- by 2-pixel resolution, Tektronix 4010 and 4014 emulation and 30-minute field installation. It is priced at $795.

Selanar also announced the SG970 and SG102Q, which are retrofit graphics boards for the Televideo 970 and Qume QVT102 terminals. Priced at $795, they reportedly feature Tektronix 4010 and 4014 emulation with enhanced graphics modules and are user installable in less than 20 minutes.

The Selanar SG120V provides standalone Tektronix 4014 graphics and is compatible with the DEC LA34, LA50, LA100 and LA120 printers.

According to the vendor, the SG120V offers a resolution of 132 dot/in. horizontally by 72 dot/in. vertically, a 7,000-vector buffer, a 100K-byte spooling buffer, switch-selectable bit/sec rates between host and printer, eight selectable picture sizes and rotation of picture. It is priced at $1,095.

Selanar, 4213 N. Freeway Blvd., Sacramento, Calif.

TARGA
Targa Electronics Systems Inc.

Targa Electronics offers bubble memories/62

INSIDE

■ Optical storage report available/62
■ Hewlett-Packard announces printers/64
■ Streaming tape subsystem for Series 1/63
■ Attorney workstation/63
■ Fujitsu America Winchester drives/62

PSYCHOMETRICS INC.

THE BERGER SERIES OF DP PERSONNEL TESTS

Your DP Manager recognizes the job-relatedness of our tests

Your Personnel Director understands the cost-effectiveness and productivity of our tests

Your Attorney appreciates the adherence of our tests to government regulatory agency guidelines

Your Industrial Psychologist is assured of the criterion-related and content validities of our tests

IBM to ASCII

Fluent Communications From a Polished Performer

Series II Plus

We've added a little polish to our Series II family of protocol converters. The result is the Series II *Plus*, a complete line of SNA/SDLC and Bisync protocol converters. If you've become accustomed to the performance of KMW 3270, 3770, HASP and 2780/3780 protocol converters, you're going to appreciate the *Plus*.

Pluses

+ Diagnostics

The KMW Series II *Plus* provides three levels of extensive on-board diagnostics for trouble-shooting without ever opening the unit. Level one testing includes PROM and RAM tests as well as confidence tests of most system components. Level two testing is a much more comprehensive test of system components including I/O circuits. Level three is controlled via the system console and includes the ability to move data files to each of the supported peripheral devices.

+ Programmability

Host session and asynchronous device parameters are programmable via the setup mode on the system console. Programmable host session parameters include:

- log on information
- device address
- buffer size
- data rate

Programmable asynchronous device parameters include:

- device type
- character framing
- input mode
- data flow control
- output mode
- data rate

Setup data can be permanently held in EEPROM even when the Series II *Plus* is powered off.

+ Speed

Featuring a Z80A processor, the Series II *Plus* is capable of data rates up to 19.2 Kbps or, with optional Z80B processor and DMA, up to 56 Kbps as well as concurrent operation of up to 8 input/output devices at equivalent rates!

+ Code Compliance

The Series II *Plus* converters meet the FCC emissions requirements and are designed to satisfy those requirements when included in subsystems. The Series II *Plus* is also UL and CSA listed.

+ Fluency

The Series II *Plus* provides fluent communications in IBM SNA and Bisync protocols including 3770, 3270, HASP and 2780/3780. All Series II *Plus* converters support a multitude of input and output devices and are available with up to 8 ports (3 in 2780/3780 converters). You can count on the Series II *Plus* for fluent IBM to ASCII communications.

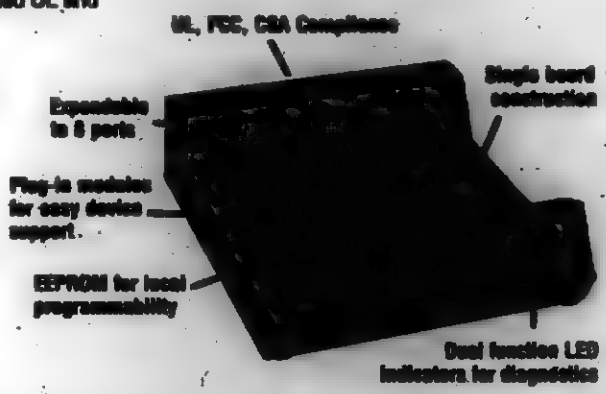
+ Hardware Design

Another Series II *Plus* advantage is the efficient hardware design of the unit. The sleek exterior lines give way to a plug-in modular interior which provides for maximum flexibility, a high degree of reliability and ease of maintenance. KMW's unique hardware design allows for a series of plug-in modules to provide device interfaces. Standard interface modules include Data Products 8 bit Parallel Printer interfaces, Documation Parallel Card Reader and RS-232 Serial General Purpose interfaces.

The reliability of the Series II *Plus* design is exemplified by an impressive mean time between failure of over 13,000 hours. That's a real plus.

With a mean time to repair of only 30 minutes, down time is always at a minimum.

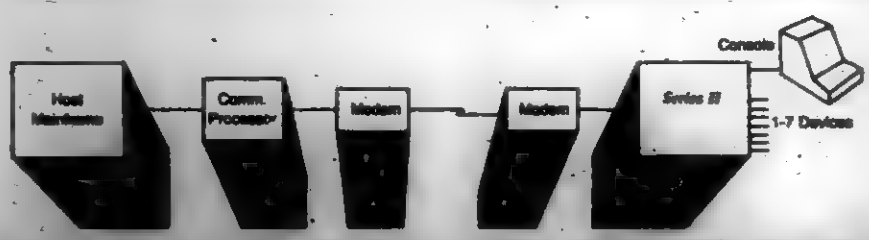
The Series II *Plus* is engineered for performance and the proof is in the package.



A Special *Plus*

The Series II *Plus* is available in synchronous-to-synchronous configurations including 3770 to 2780/3780 or HASP to 2780/3780. If your applications require something special, check with KMW.

Add a little polish to your communication. The Series II *Plus* . . .
Fluent communications from a polished performer.



KMW SYSTEMS CORPORATION

8307 Highway 71 West • Austin, Texas 78735 • 512/288-1453 • TWX: 910-874-2005 CABLE: KMWSYS

Call Toll Free 800/531-5167

SYSTEMS AND PERIPHERALS

CONTROL

from page 59

well as other large-scale processors.

Many countries are importing Japanese components and integrating them into computer systems. Scotland's so-called Silicon Glen is dotted with microcomputer manufacturing plants that buy up Japanese components and use cheap Scottish labor for assembly.

Burgeoning industry

Israel has a burgeoning software industry. Taiwan is making chips. The list goes on, and it will continue to grow. If the Soviets want a VAX-level processor, they are going to get it, if not from an American manufacturer, then from a foreign source.

While the U.S. currently holds the top slot when it comes to technology, there is no guarantee it can keep those technologies under wraps.

Even if the current, outdated, U.S. export laws that forbid U.S. manufacturers from dealing with the Soviets are stiffened, other countries are sure to find the Soviet Union an extremely fertile market in which to sell electronics. After all, without the IBMs and DECs of the U.S. as competitors, selling hardware becomes a much easier task.

PLANNING

from page 59

cessfully from a disaster.

Gaining top-level, corporatewide support for a disaster recovery plan is probably the strongest guarantee for success.

Three basic steps

To do this, there are three basic steps that help define the overall impact of the DP operation on the rest of the company.

■ The first step is to evaluate thoroughly the costs and benefits of a contingency plan. This involves input from the DP department as well as from the users of the system.

■ Next, the DP executive must determine which applications are most critical to the firm's operation. This involves a priority analysis of applications, determining the operating requirements for each of the key applications.

This phase also includes an analysis of the risks and benefits of various recovery alternatives.

■ The last step involves the actual development of a contingency plan. This plan should be developed by the DP personnel so that they are familiar with its structure. The final step also involves testing the contingency plan to make sure it works and training personnel in how to cope with a disaster.

At the conclusion of each of these phases, an interim report of observations, findings and recommendations should be released to management for review and comments before proceeding to the next phase.

In this way, management involvement is maintained, and there is a higher potential for a workable contingency plan.

The main reason a contingency plan fails is because the firm chose a technical solution before adequately understanding the management requirements of the organization.

Somogyi is an information system services specialist with Ernst & Whinney, a Cleveland-based disaster recovery consulting firm.

TURNKEY SYSTEMS

AGENCY MANAGEMENT SYSTEMS, INC.
Turnkey management and marketing system

Agency Management Systems, Inc. (AMS) has announced a turnkey management and marketing system, designed for independent insurance agents and brokers. The system is based on IBM's Personal Computer.

The AMS micro includes an IBM Personal Computer with 256K bytes of main memory, a 35M-byte hard disk drive, 60 char./sec letter-quality printer, streaming cassette tape drive for backup and a mouse. Software includes accounting, billing, client services, diary, word processing, query and marketing.

The software for the micro provides the marketing and management tools that the company offers in its IBM Series/1 minicomputer system.

The AMS micro costs approximately $16,000, the vendor said.

AMS, Suite 300, 150 Interstate N., Atlanta, Ga. 30339.

DATA STORAGE

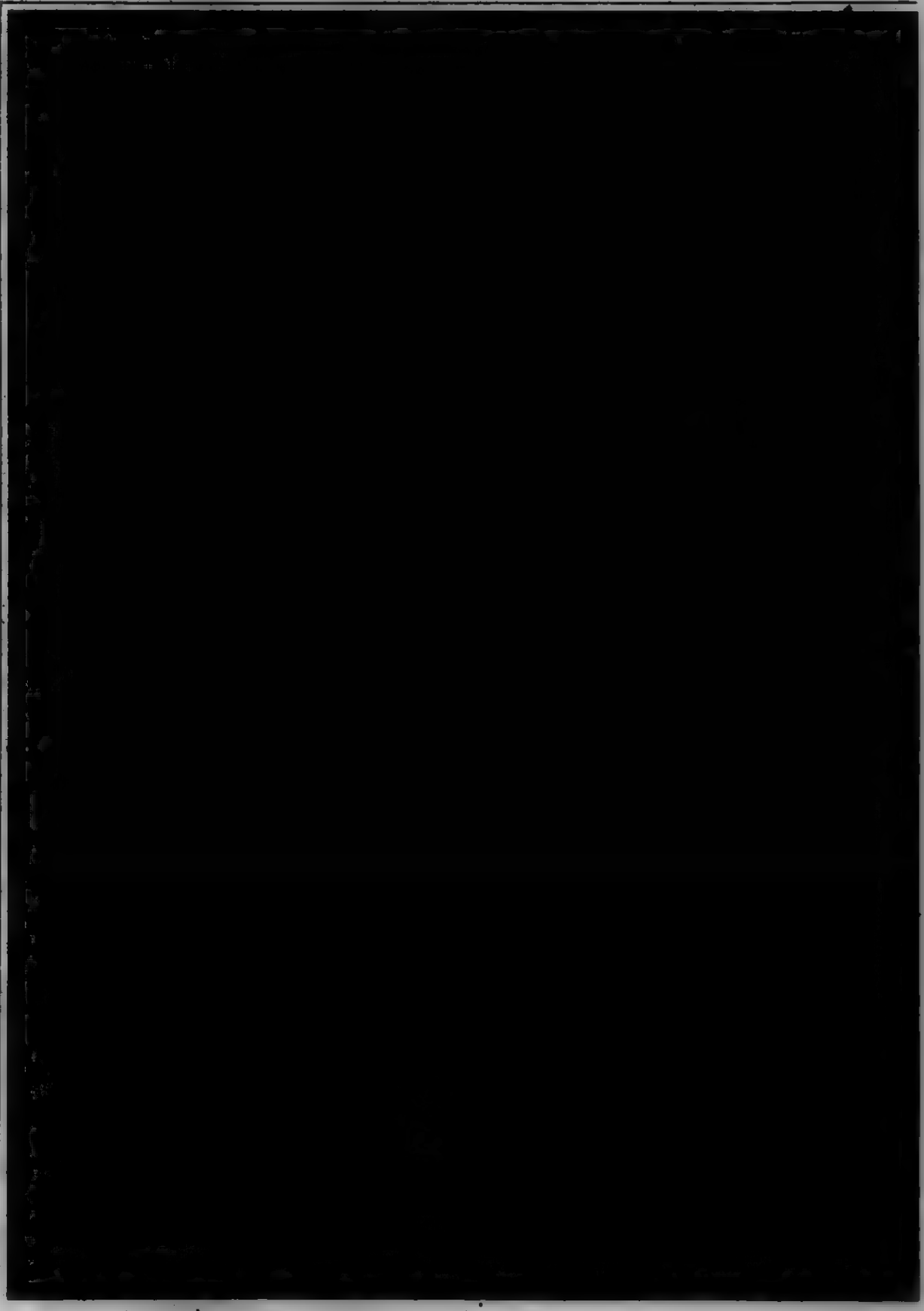
QANTEX DIVISION OF NORTH ATLANTIC INDUSTRIES
Jetstream 16

A streaming cartridge tape system that can read and write as a 9- or 18-track tape drive and offers up to 90M bytes of storage is available from the Qantex Division of North Atlantic Industries.

Called the Jetstream 16, the unit is both QIC 02- and QIC 24-compatible and was designed as backup storage for Winchester disks in the 30M-byte range and higher. The unit is said to provide up to 80M bytes of formatted data on a standard data cartridge, in addition to reading and writing the standard 9-track, 45M-byte format. The system handles burst transfer rates of up to 400K bit/sec, the company said. An average transfer rate of 72K byte/sec is required to maintain streaming.

Other features of the microprocess-

Continued on page 62



SYSTEMS AND PERIPHERALS

Continued from page 81

ser-based Jetstream 16 include automatic reference burst location, automatic cartridge identification, error logging and diagnostic tests.

The Jetstream 16, including controller, costs $1,450 in single quantities, with OEM discounts available, the vendor said.

North Atlantic Industries, Quantex Division, 60 Plant Ave., Hauppauge, N.Y. 11788.

TARGA ELECTRONICS SYSTEMS, INC.
DR1101 data recorder Solidrive, FDE425 CH40 holder/interface

Targa Electronics Systems, Inc. has announced a line of industrial bubble memory data storage systems designed for moderately rugged plant and factory environments.

Available in sealed, removable cartridges of 128K bytes or 256K bytes, the memory systems were designed for industrial and laboratory data acquisition and process control applications, the vendor said.

The DR1101 data recorder is a self-contained, benchtop device with various interface and software protocol options. The unit includes an RS-232C or IEEE 488 communications port with software implemented to emulate a Digital Equipment Corp. TU-58 cartridge tape recorder or a Hewlett-Packard Co. HP 82902 floppy disk drive.

The Solidrive FDE425 is a floppy disk emulator that is electronically compatible with Anfi standard drives and fits a 5¼-in. footprint. The unit can be changed from one standard format to another, the vendor said.

The CH40 OEM holder/interface subassembly series was designed for manufacturers of such equipment as portable computers, control systems and geophysical instruments.

It is available with serial or parallel communications and simple software protocols, the vendor said.

Single-unit prices for 128K-byte versions of the Targa systems are $2,995 for the DR1101 data recorder, $2,495 for the FDE425 floppy disk emulator and $1,795 for the CH40 holder/interface, according to the company.

Targa Electronics Systems, P.O. Box 8485, 3101B Hawthorne Road, Ottawa, Canada K1G 3H9.

ROTHCHILD CONSULTANTS
Optical Memory Report

Rothchild Consultants has announced that it will publish an annual report, with periodic updates, on developments in the field of optical disk drives, optical media and digital read-only disk drives.

The "Optical Memory Report" will provide manufacturers, users and venture capitalists with information about product specifications, vendors, OEM and user prices and market forecasts.

The first edition is scheduled to be published in the spring of 1984 at a cost of $1,995. It can be purchased at a discounted prepublication price of $1,495 if payment is received before April 1, according to the vendor.

Rothchild Consultants, P.O. Box 14817, San Francisco, Calif. 94114.

FUJITSU AMERICA, INC.
M2333; M2330AT; M2333AT

Fujitsu America, Inc. has announced an 8-in. Winchester disk drive and two half-high, 5¼-in. rigid disk drives.

The 8-in. drive, the M2333, reportedly offers 337M bytes of unformatted storage in a package that measures 5 in. by 8½ in. by 15 in.

A pair of the drives reportedly can be installed side by side in a standard 19-in. rack to provide 674M bytes of storage. The drive is said to feature an average positioning time of 20 msec, and a data transfer rate of 2.4M bit/sec with a storage module drive plus interface, according to the vendor.

Evaluation units reportedly will be available in August with production delivery scheduled for November at a price of $5,500 in quantities of 100.

The 5¼-in., half-height drive, the M2330AT, reportedly offers 6.6M bytes of

Third in a series of reports on the role of personal computers in the office.

The most important program we've ever written.

Personal computers, in general, don't require nearly as much service and support as mainframes. Apples, in particular, require even less. Thanks to extensive self-diagnostics, in-the-field quality monitoring, and modular self-service hardware, all our machines are phenomenally reliable.

But in the event your Apples do need our attention, we've got just the program: our National Account Service and Support Program for Apple Personal Computers.

A package of innovative options that lets you pick and choose exactly what level and what kind of service and support you need — designed specifically for your business, corporation or profession.

EVERY APPLE COMES WITH A SET OF WHEELS.

Which means, if you desire, we'll come to you. It's all part of our nationwide Apple On-Site Service Program, provided in conjunction with the RCA Company.

Like all Apple products, Apple On-Site works simply. You call us. One phone number. Toll-free. We do the rest.

"The rest" entails having an RCA Customer Service Representative from one of the over 200 field offices come out to your office and solve your problem. Usually within the next half business day.

This partnership with RCA makes Apple On-Site one of the most experienced service networks in the business.

And just one easy-to-budget-for annual fee covers everything. There are no zone charges, no warranty or travel charges, and no minimum quantities. So you can get on-site service whether you have one Apple or one thousand.

LISA GETS LOTS OF ATTENTION.

The same toll-free number mentioned above puts users of the Lisa® Personal Office Systems in touch with specially trained Lisa experts who can answer application-related questions during the warranty period.

You can also get special application training on the Lisa. Courses follow a hands-on, self-paced format, and are taught by certified Apple trainers.

Both basic and advanced courses are available, either at your office or at selected Apple sites.

SYSTEMS AND PERIPHERALS

storage, and the M2233AT, 13.3M bytes of storage. Both drives are 1.62 in. high, and have Seagate Technology, Inc. ST506/412 compatibility.

In quantities of 100, the M2230AT drives are priced at $750 each, and the M2233AT at $850, according to the vendor. Evaluation units reportedly will be available during the first quarter of 1984.

Fujitsu, 3075 Oakmead Village Drive, Santa Clara, Calif. 95051.

COMPUTER STORAGE TECHNOLOGY, INC.
CS-100; TS-100

Computer Storage Technology, Inc., (CST) has announced a streaming tape subsystem for backup storage and an on-line operational magnetic tape subsystem for the IBM Series/1 minicomputer.

The CS-100 streaming tape subsystem provides up to 56M bytes of backup storage for large capacity Winchester disk drives, according to CST.

It reportedly uses the firm's CC-100 peripheral processor and a ¼-in. cartridge tape streamer based on the QIC-02 cartridge used by Archive Corp. Sidewinder or Cipher Data Products, Inc. Quarterback tape drives.

The tape subsystem can be mounted in a standard 19-in. rack, with no need for a software driver, diagnostic changes or controls, other than a power switch, according to a spokesman for the vendor.

The firm's TS-100 tape subsystem consists of a TC-100 peripheral processor, a universal users' adapter and up to four tape transports, the spokesman said.

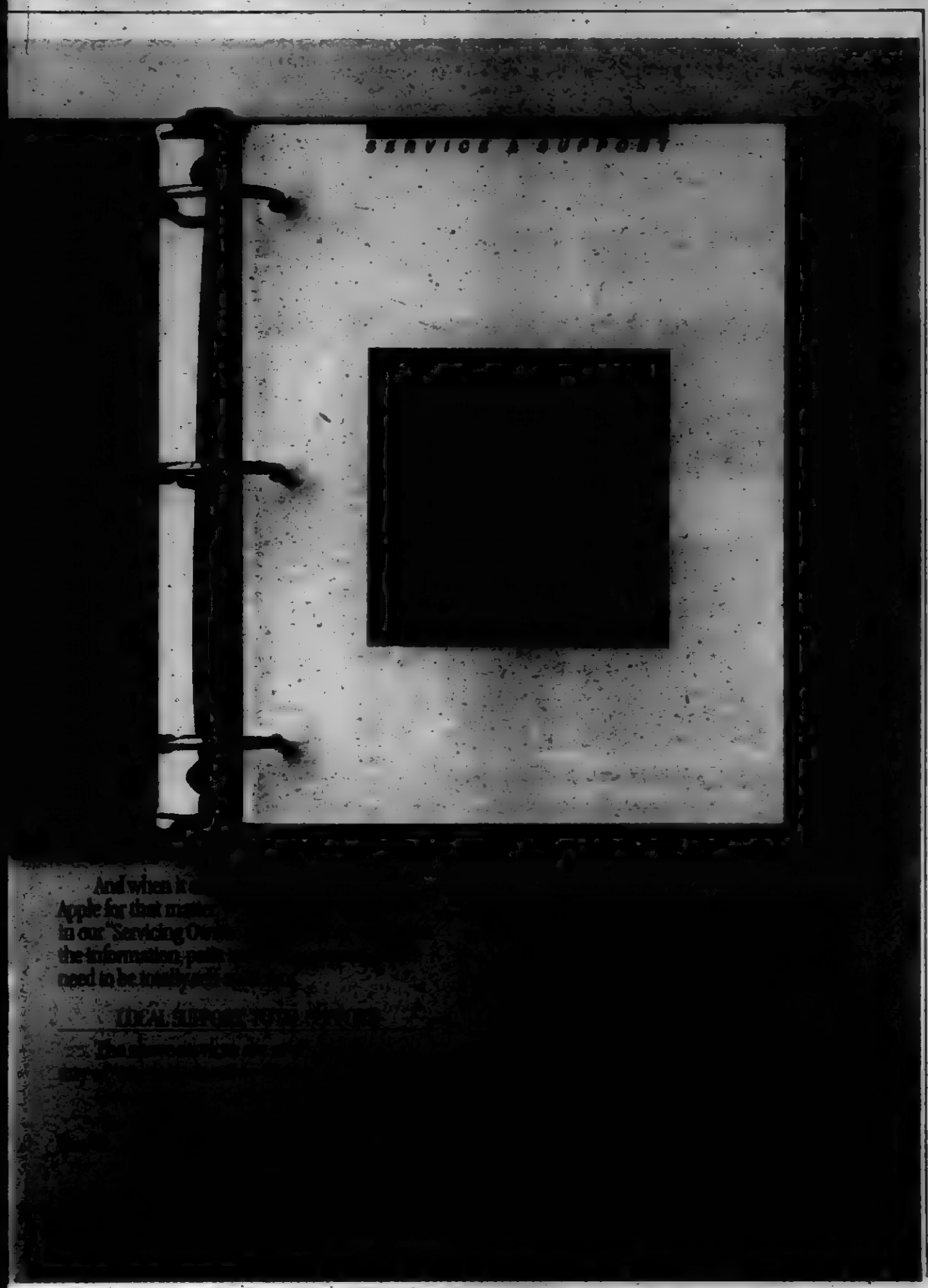
It is said to be compatible with tape speeds from 12.5 in./sec to 125 in./sec.

It reportedly features switch-selectable address and density selection with quartz crystal generated timing in order to eliminate the need for controller adjustments.

Both subsystems are available 30 days after receipt of order, according to the spokesman.

The CS-100 costs $4,970. The price of the TS-100 depends upon the tape drive selected, ranging from $10,100 using the Kennedy Co. 9000 drive to $12,300 using the Kennedy 9300, according to the vendor.

Computer Storage Technology, 1269 S. State College Blvd., Anaheim, Calif. 92806.



And when it
Apple for that matt
in our "Servicing Ow
the information, pe
need to be inst

[illegible]

TERMINALS

BARRISTER INFORMATION SYSTEMS CORP.
Attorney Workstation/Telephone

A combination computer workstation and telephone designed for lawyers and professionals is being offered by Barrister Information Systems Corp. for use with the Barrister Law Office Information System.

Comprised of a Northern Telecom, Inc. Displayphone, the Attorney Workstation/Telephone functions as a terminal on the Barrister system and as a telephone with special executive features, according to a spokesman for the vendor.

With the Displayphone, the attorney can inquire into the Barrister litigation support, information management and financial management data bases, as well as public information sources such as Dow Jones News Retrieval Service, *The New York Times*, Lockheed Dialog and Westlaw, the vendor spokesman said.

The system performs docketing functions and has a reminder service for key meetings that holds up to 58 entries one year in advance, the vendor said.

The Attorney Workstation reportedly features a 7-in. video display terminal, a retractable keyboard and a directory that stores as many as 81 numbers for automatic dialing.

The Displayphone is portable and can communicate to the Barrister system from any location through telephone lines, according to the vendor.

The Attorney Workstation/Telephone is priced at $1,995.

Barrister Information Systems, 45 Oak St., Buffalo, N.Y. 14203.

SYSTEMS AND PERIPHERALS

SYSCON CORP.
Veraterm

Syscon Corp. has announced a hand-held terminal with 64K bytes of programmable memory for data gathering applications.

According to a company spokesman, the Veraterm terminal weighs 1 lb and measures 3¼-in. by 7-in. by 1¼-in. It reportedly features 32 keys, including a shift key, for a total of 63 functions. A 2-line by 32-char. LCD, low-power microprocessor and rechargeable battery are also included.

The terminal can be programmed for a variety of tasks, such as collecting meter readings, gathering inventory of patient information, recording data for laboratory experiments, monitoring industrial processes and monitoring and scheduling maintenance, the spokesman said. Data reportedly can be loaded and unloaded from a variety of host computers through an interface and a battery-charging device that can accommodate eight terminals, the vendor said.

The terminal is available for $3,000, and the interface device is available for $6,000.

Syscon, 3990 Sherman St., San Diego, Calif. 92110.

HEWLETT-PACKARD CO.
HP 78532A

Hewlett-Packard Co. has announced an addition to its bedside patient monitoring family, the HP 78532A monitor/terminal.

Compatible with all HP medical equipment, the bedside terminal was designed to be an integral part of the HP Care-Net critical care local-area network.

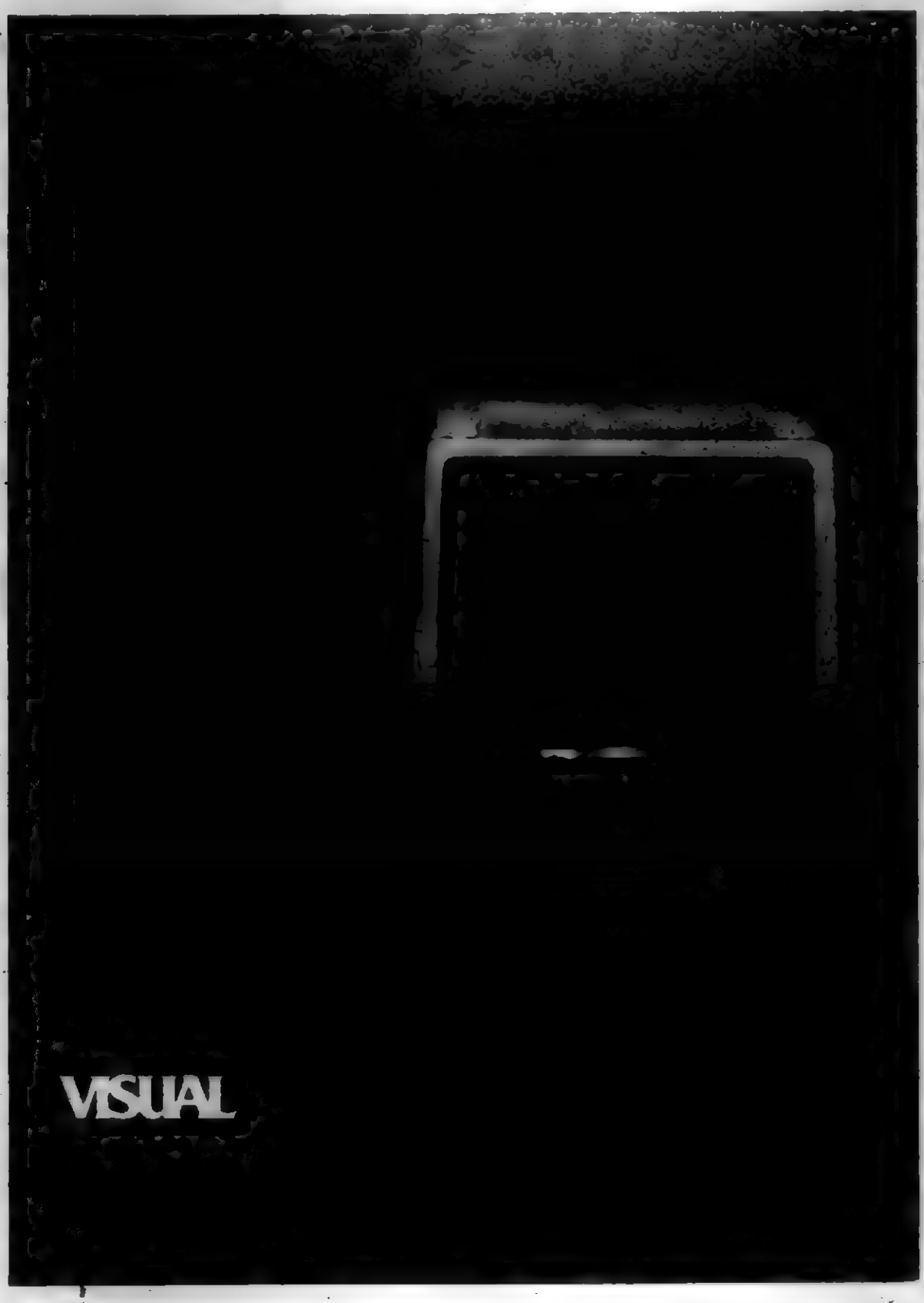
Standard measurements on the terminal/monitor include full-lead electrocardiogram, two pressures and one- and eight-hour trends. The expandable 16-bit microprocessor allows field-upgradable enhancements such as the cardiac output module, which provides cardiac output and blood temperature measurements, the vendor said.

The HP 78532A has an overview feature which allows the user to access the waveforms, vital signs and alarm messages of up to 24 patients. Overview is initiated manually or automatically during an alarm condition from another bed, the vendor said.

Buttons on the instrument panel provide access to critical or frequently performed tasks. A row of user-changeable function keys labeled on the video screen are for less critical functions. In addition, bedside information can be displayed in a variety of formats, the vendor said.

The HP 78532A monitor/terminal is priced at $7,540.

Hewlett-Packard, Medical Products Group, 100 Fifth Ave., Waltham, Mass. 02254.



HEWLETT-PACKARD CO.
Matrix and Line Printers

Hewlett-Packard Co. has announced four printers including three matrix printers and a system line printer that operates at 300 line/min.

The HP 2930 family of three character-sequential printers operates at 200 char./sec. Included in the family are a general-purpose printer and a remote workstation printer that can produce bar code and a letter-quality printer for business, technical, manufacturing or personal printing, the vendor said.

The unit's print head uses 12 wires arranged in two staggered columns. A last-form tear-off feature makes it possible to remove the last printed sheet of continuous paper without wasting a blank sheet, the company noted.

Users may choose 5, 10 or 16.36 char./in. printing and both serif and sans-serif fonts. Line drawing, math symbols and character sets in 10 languages are also standard.

Included in the HP 2930 family is the HP 2932A printer, which was designed for distributed printing applications. For data capture applications, the HP 2933A factory data printer features large-character generation and bar-code printing in several formats. The HP 2934A distributed office printer, designed for business and personal use, offers either a 40 or a 67 char./sec matrix, letter-quality print and 200 char./sec memo-quality printing.

All three printers are supported by the HP 150 and 200 personal computers, the HP 1000 and 9000 technical computers and the HP 250 and 3000 business computers. With RS-232C and Centronics Data Computer Corp. parallel interfaces, the printers are also compatible with many other systems.

The HP Series 300 Model 2563A system line printer provides 300 line/min printing for many types of business uses. Featuring compressed print, multinational and optical character recognition character sets, raster graphics and bar codes, the HP 2563A has noise-reduction features as well as paper-jam detection.

The line printer can link to HP 3000, 250 and 1000 computer systems through the HP Interface Bus and to a number of other systems through Centronics and Dataproducts New England, Inc. interfaces.

The HP 2932A, 2933A and 2934A matrix printers are priced at $2,495, $2,795 and $2,895, respectively. Replacement print heads are $140. The HP Series 300 Model 2563A line printer is $5,780, including power supply. OEM discounts are available.

Hewlett-Packard, 1820 Embarcadero Road, Palo Alto, Calif. 94303.

MICROCOMPUTERS

The education of managers: getting them to use micros

By Anthony J. Faneel
Special to CW

First of a Two-Part Series

"What are those typewriter-televisions anyway?" is the question on the cover of Peter McWilliams' best-seller, *The Personal Computer Book*. What are they indeed. As businessmen all over the country hoped for a happy and prosperous 1983 to greet them last January, they were served a giant literary bromo as *Time* magazine named the personal computer "Machine of the Year."

Then just before the first-quarter numbers were being tallied and management had finally read the last chapter of Thomas J. Peters' and Robert H. Waterman Jr.'s *In Search of Excellence*, managers got another literary barrage. This time it was *Business Week's* turn: "The personal computer explosion is changing the organizational structure of companies as well as the function of managers."

The siege continued with headlines proclaiming "Chip Wars" and "Computer Shock." Amid this ever-increasing public computermania appeared the confident, almost smiling face of IBM Chairman John Opel on the cover of *Time* with the IBM logo in the background and the title "The Colossus That Works." The smile was probably due to IBM's record personal computer sales.

Uneducated on personal computer

It seems that these typewriter-televisions are everywhere. Yet most management personnel are uneducated on the personal computer, which has found its way into offices, small businesses, classrooms and homes.

There is a need for education on the use of personal computers in corporate business operations. "Not here," many managers say. "I conducted a personal computer session with my company's management. We brought them in for a demonstration, and [the managers] asked questions and seemed interested."

If that was education, the elementary school year could be shortened to one day by bringing in the students, working some math problems on the board, reading a short story aloud and discussing the significance of the Fourth of July. Clearly, that kind of brief exposure cannot be deemed sufficient education.

Picture an organization about to receive a powerful new method of processing one of its vital assets. The management would expect an in-depth review of the background of this new process, a review of its proven capabilities, examples of its use in other organizations and a brief conceptual review of how it functions.

There should be no difference in approach to the introduction of the concept of utilizing personal computers in corporate business operations. Information is certainly a vital asset of an organization and, therefore, the personal computer deserves the status of a powerful new method of processing. Typically, the management information systems function within an organization has the responsibility to encourage the proper use of personal computers and control the potential misuse of this new technology.

There are three parts to an educational seminar: format, content and delivery. Often, participants concentrate on the content of a seminar and either ignore until the last minute or spend very little time on the other two-thirds of the requirements of a successful seminar.

The audience for a management seminar on personal computers will require that the developer keep in mind the group's level of computer literacy, current perception of the personal computer and the main focus of the seminar.

A central theme for this kind of educational seminar should be to leave the participants with an understanding of what a personal computer can do, not how a personal computer works. Concept-oriented, nontechnical meetings of this kind have proven successful in introducing the personal computer in hundreds of organizational structures.

Computer literacy

Management education should include some computer literacy on the trends within the information industry and how the combination of the information center and the personal computer is making this step forward possible.

It is hard to dispute the astronomical success of personal computers which, according to an International Data Corp. projection, will surpass mainframes in 1987 in terms of dollar volume.

An explanation of the use of the personal computer as a management productivity tool is an excellent vehicle to stimulate the audience's interest in what functions it performs. New York-based Booz, Allen & Hamilton, Inc.'s study on knowledge workers — defined as management and nonmanagement professionals — is a revealing description of the highly interrelated work functions of this critical group of workers.

Next in the seminar should be a section focusing on the types of organizations that use personal computers as management productivity tools and the functions they perform.

Success stories

The data processing and non-data-processing publications are filled with success stories about time-saving management uses of personal computers. Best-selling books on the subjects of successful management and worldwide economic trends can provide plenty of material for this section.

Senior management of organizations that have made the commitment to use personal computers will likely say that they are preparing for the shift to a more service-oriented economy. The personal computer will assist their organizations in dealing with the need for timely information, which will be a requirement to perform efficiently and to compete effectively.

Computer technology will soon be used as a competitive weapon to fight the competition and to play a strategic role in the success of organizations. The best person to deliver this section is a member of a management team from an organization that successfully uses personal computers.

Faneel is president of Personal Computer Management, Inc. of Wheaton, Ill., a consulting firm that provides seminars on personal computers for managers.

Next week: software, modeling and graphics.

DEC unveils more software

MAYNARD, Mass. — A version of the P/OS operating system is among a series of software products announced recently by Digital Equipment Corp. for its Professional 300 series of microcomputers.

P/OS Version 1.7 includes performance and function enhancements, DEC said. It was designed to take advantage of increased memory and floating-point processing capabilities that are standard on all Professional systems. Its license is included in the system price. Media and documentation are sold separately for $175.

DEC's PRO/V7M is a complete Unix system for the Professional 300 series. It costs $695. ET-11 is DEC's single-user, real-time operating system designed to be operated on DEC's PDP-11 series, including the Professional 300. The single-user price is $700.

Softech Microsystems, Inc.'s UCSD P-system Version IV.1 can now be installed as an application on P/OS to provide a portable application software environment. It can be written in UCSD Pascal and Fortran 77. The price ranges from $250 to $975.

The PRO/Tool Kit was designed for use on the Professional 350. It is said to eliminate the need for a host system in Professional applications development and offers DEC RSX and VMS program development capabilities on the Professional 350. Licenses range from $295 to $495. The Professional Host Tool Kit Version 1.7 is an enhancement that provides improved performance and supports

See P/OS page 66

Apple enhances Apple III system

CUPERTINO, Calif. — Apple Computer, Inc. has announced an enhanced version of its Apple III business computer system and an electronic information service for Apple III owners.

The Apple III Plus system reportedly features an interlace video mode, which is said to double screen resolution of text and graphics, a clock/calendar function, an Apple IIe-style keyboard, revisions in the operating system and a reengineered main logic board.

The interlace video mode is said to scan both normal lines and between normal lines, giving the appearance of solid lines instead of dots. The clock/calendar function reportedly allows date and time stamps on files and tracking of sequences of events.

The keyboard reportedly is identical to the Apple IIe keyboard, featuring repositioned cursor control keys, a delete key and a choice of either Qwerty or Dvorak key layouts.

Revisions of the Sophisticated Operating System (SOS) 1.3 and system utilities are intended to support hardware changes that are said to include redesigned four-

See APPLE page 66

INSIDE

- Another Apple IIe compatible debuts from Multitech Industrial Corp./66
- BASF brings out a 3½- and 5¼-in. Floppy Disk; Three Companies Introduce Winchester Hard Disks/67
- The PC Express Communications Package for the IBM Personal Computer Now Works with IBM's SNA/70
- Apple II users get a CP/M card that includes word processing, spread sheet and list management software bundled in/70
- Doctors, graphic designers and engineers can use a light pen to create graphics on the IBM PC/70

P/OS

from page 85

new language and compilers, the spokesman said. It licenses for $4,000.

The Whitesmiths Ltd. C Compiler for the PRO/Tool Kit and the Professional Host Tool Kit supports the full C language and offers a library of support functions. It costs $550 for the PRO/Tool Kit and $1,100 for the Professional Host Tool Kit.

Application packages that are available include: PRO/Applications Starter Kit, an integrated package of business applications for computer novices, priced at $300; PRO/Datatrieve, an implementation of DEC's Datatrieve-11 interactive data management system for the Professional 350, priced at $495; Professional Inter-System Management, which enables a Professional under P/OS 1.7 to communicate directly with IBM mainframes, priced at $595; and RS/I, a new version of Bolt Baranek and Newmann, Inc.'s RS/1 Research System for stand-alone use on Professional 350s with hard disks and color monitors, priced at $1,900.

Other applications include: Maps/PRO Graphics, a business graphics system for the Professional 350 developed by Ross Systems, Inc., priced at $200; Mechanical Engineering TK! Solverpack, one of a series of applications packages used with Software Arts, Inc.'s TK! Solver that contains 13 general models for mechanical engineering, priced at $200 for TK! Solver, $100 for Mechanical Engineering TK! Solverpack and $100 for TK! Financial Solverpack; and Universal Microprocessor Development system from Boston Systems Office, an integrated development system that is compatible with more than 30 microprocessors. It is priced from $1,000 to $3,000.

Hardware announcements include a Real-Time Interface module option, which includes four I/O ports, allowing the Professional to communicate with and control passive data capture devices. It is priced at $595. Computing Terminal Interconnect licensing is no-charge licensing of the Professional's bus for third-party hardware vendors.

DEC, Maynard, Mass. 01754.

APPLE

from page 85

layer main logic board, peripheral ports on the back panel that use standard DB-25-pin connectors and modified slot housings for easier insertion of peripheral cards.

The Apple III+ system is now available for a suggested retail price of $2,995.

Apple Serve III is an electronic information service for owners of the systems.

Apple Serve III is said to feature an electronic mail connection among Apple III owners; a bulletin board for exchanging hardware and software tips; referrals and meeting information; an electronic newsletter produced by Apple; and information on software updates and directions for obtaining them.

The service is provided through the Compuserve, Inc. network. A modem and a telecommunications software package are required.

The service is available now for free, although, Apple said, there may be a charge at a later date.

Apple Computer, 10260 Bandley Drive, Cupertino, Calif. 95014.

SYSTEMS

WINTERHALTER, INC. Datataliker II

Winterhalter, Inc. has introduced the Datataliker II, an intelligent front-end processor which allows most popular microcomputers to access IBM and IBM-compatible mainframes and other communications networks.

The product is said to plug into a micro's RS-232 serial port. Using several software packages included with the product, the Datataliker II allows a microcomputer to emulate several different remote batch and interactive IBM terminal systems.

The software, currently available for micros running on Digital Research, Inc.'s CP/M, CP/M 86 and Concurrent CP/M 86 and Microsoft Inc.'s MS-DOS operating systems, reportedly allows the connected system to emulate the IBM 3271, 3275 and 3276 interactive terminals and the IBM 3780, 2780, 3741, 2968 and 2770 remote batch terminals.

The unit costs $995.

Winterhalter, 3553 Research Park Drive, Ann Arbor, Mich. 48106.

MULTITECH INDUSTRIAL CORP. Microprofessor MPF-III

Multitech Industrial Corp. has introduced the Microprofessor MPF-III, a microcomputer said to be compatible with the Apple Computer, Inc. Apple IIe.

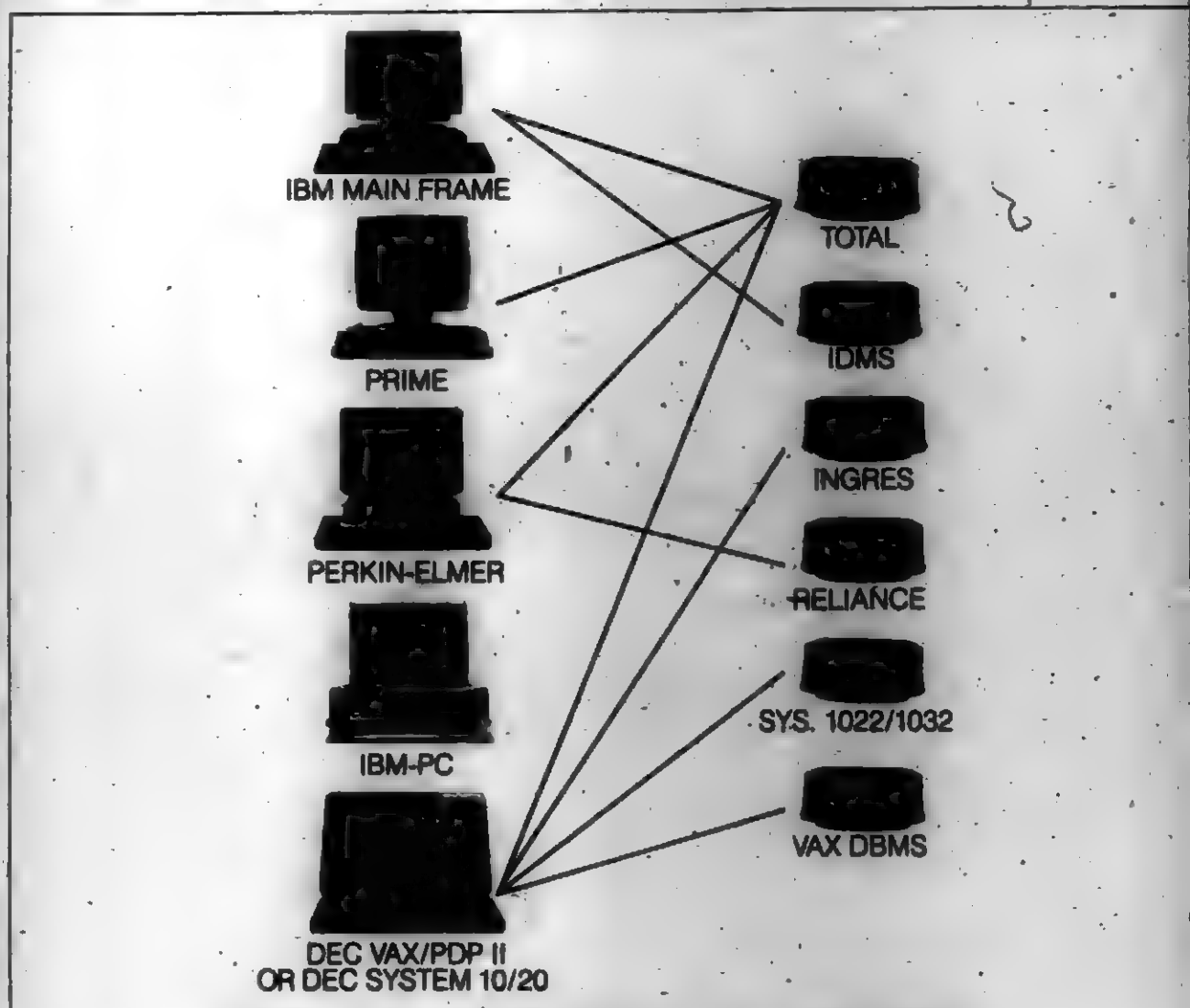
The MPF-III features 64K bytes of random-access memory (RAM) and 24K bytes of read-only memory. The vendor said 2K bytes of RAM function as a text buffer for an 80-col. screen feature.

Several standard expansion capabilities are available on the MPF-III including two monitors, cassette unit, a Centronics Data Computer Corp. printer and joystick interface. Optional expansion features include a floppy disk, RS-232C interface, a Zilog, Inc. Z80 microprocessor, Digital Research, Inc.'s CP/M and a Chinese character generation card.

The MPF-III comes with a 90-key detachable keyboard, the vendor said.

The unit costs $599.

Multitech Industrial, 315 Fu Hsing N. Road, Taipei 104, Taiwan, ROC.



MIX VS.

No DBMS matches SEED for transportability. No DBMS offers you a wider range of hardware options now and for the future. Whether you opt for DEC, IBM, Prime, Perkin-Elmer or GOULD CSD.

And SEED lets you transport applications across machines—micro to mainframe or the reverse. SEED also provides the only compatible path from DEC 10/20 to IBM and VAX.

Because SEED is so transportable, it enables you to standardize development efforts to increase programmer productivity. In short, SEED helps you get the most out of both your hardware and your human resources. And we back SEED with our own resources—a team of experienced professionals that gives you personalized, on-going support and service.

Seed Software, 2300 Walnut Street, Suite 734, Philadelphia, PA 19103.

MICROCOMPUTERS

ONYX SYSTEMS, INC.
Price reductions

Onyx Systems, Inc. has reduced prices by up to 12% on several of its 8-bit microcomputer models. Price reductions range from $240 to $1,210 on the Onyx Sundance, C5001 and C8001 series processors.

With these reductions, the price of a Sundance II incorporating an 80-col. Digital Equipment Corp. VT100-type video display terminal, 192K bytes of random-access memory (RAM), a 7M-byte Winchester disk drive and tape backup is $7,250. The maximum configuration of the Sundance II, with 132-col. display, 192K bytes of RAM, a 21M-byte disk drive and tape backup, is priced at $9,750.

The price of the C5001A now ranges from $5,990 to $7,990. These systems include 192K bytes of RAM, tape cartridge backup and a choice of 7M-, 14M- or 21M-byte disk drives. The C5001/MU, which features 256K bytes of RAM and a 14M- or 21M-byte disk, begins at $7,990.

The C8001/MU begins at $10,990, supports five users and has 256K bytes of RAM and a 30M-byte disk.

Onyx Systems, 25 E. Trimble Road, San Jose, Calif. 95131.

STORAGE

QUALITY COMPUTER SERVICES, INC.
Bev, Big Blue

Quality Computer Services, Inc. has announced a 10M-byte, fixed, 5¼-in. Winchester hard disk subsystem said to offer an average data transfer rate of 5M bit/sec, an average latency time of 8.33 msec and a track-to-track seek time of 3 msec. The subsystem, Bev, is part of the vendor's family of 10M- to 84M-byte, 5¼-in. Winchester hard disk subsystems.

Also offered is Big Blue, a single-slot card said to run Digital Research, Inc. CP/M 80 programs on the IBM Personal Computer and the Compaq Computer Corp. Compaq without CP/M. Included with Big Blue are a Zilog, Inc. Z80B microprocessor; 64K-byte random-access memory; parallel and serial ports; serial cable; real-time clock; and hard disk interface. Bev costs $1,999 and Big Blue costs $595, the vendor said.

Quality Computer Services, 9 Quora Drive, Metuchen, N.J. 08840.

SEAGATE TECHNOLOGY, INC.
ST8100

Seagate Technology, Inc. has announced an 8-in. Winchester disk drive, reportedly designed for multiuser networking, graphics and shared-resource systems based on desktop supermicrocomputers.

The half-height ST8100 is said to feature reduced access time, 102.1M bytes of unformatted storage and a transfer rate of 10M bit/sec. The average access time reportedly is 30 msec, the vendor said.

Evaluation versions of the drive cost approximately $1,500. They are scheduled to be available in the second quarter of 1984, the vendor said.

Seagate, 920 Disc Drive, Scotts Valley, Calif. 95066.

BASF SYSTEMS CORP.
Storage media

BASF Systems Corp. has announced two media products, a 3½-in. micro diskette and a high-density 5¼-in. floppy disk.

The 3½-in. diskette has storage capacity of .5M bytes per side. The 5¼-in. floppy disk has a storage capacity of up to 1.6M bytes, the vendor said.

The price is $7.50 each for the 3½-in. diskettes and $10.00 each for the 5¼-in. floppy disks. These products will be available in the first quarter of 1984, according to the vendor.

BASF Systems, Crosby Drive, Bedford, Mass. 01730.

EICON RESEARCH LTD.
Discache

Eicon Research Ltd. has announced a Winchester disk subsystem for personal computers, reportedly featuring the ability to make frequently used data immediately available from a random-access memory (RAM) cache rather than from a disk.

The Discache subsystem is said to offer 10M- or 20M-byte formatted storage, a 256K-byte RAM cache memory, a microcomputer and an incremental backup system.

The product is available now at a suggested retail price of $3,000.

Eicon Research, 2157 Park Blvd., Box 60458, Palo Alto, Calif. 94306.

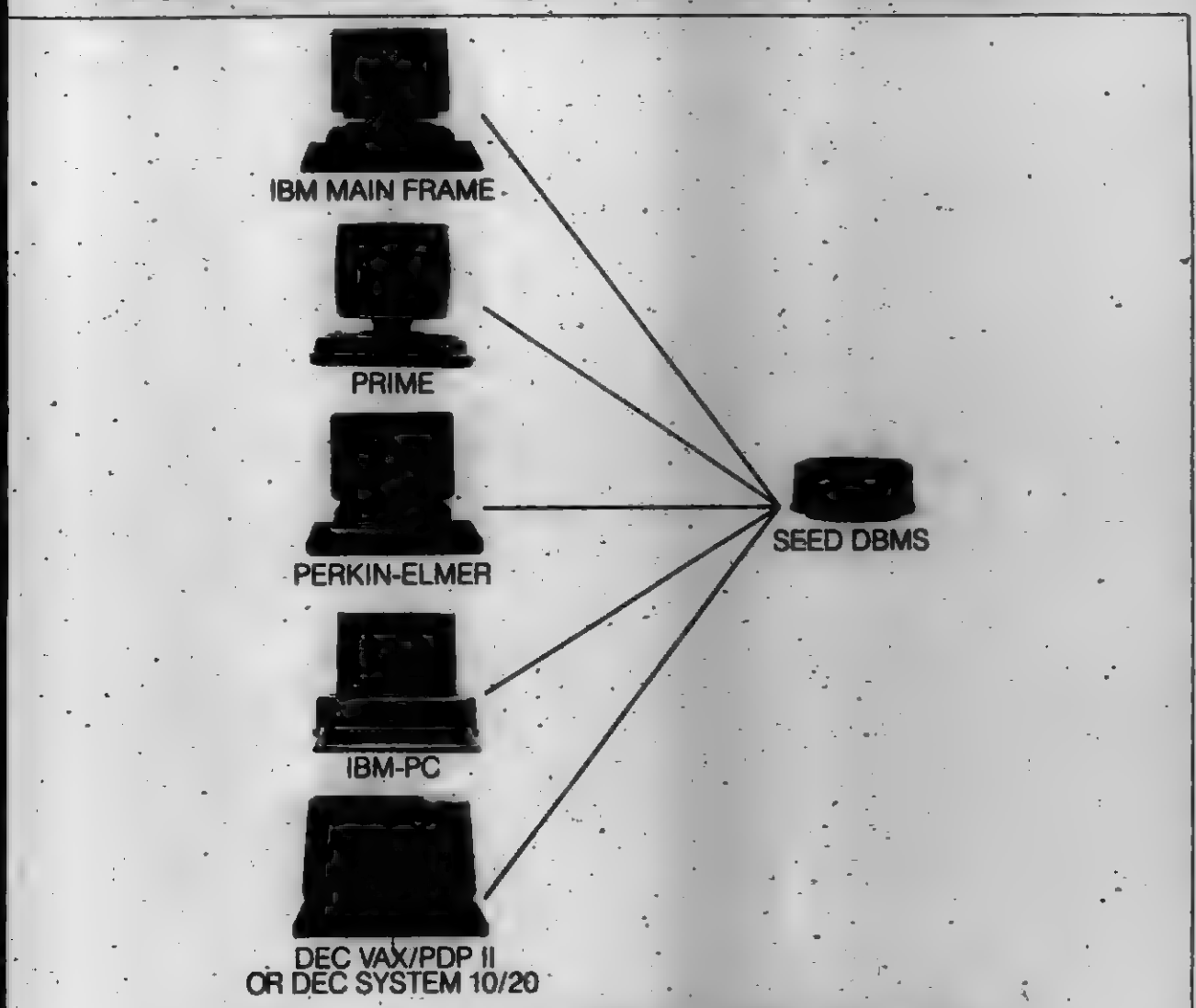
PRINTERS/PLOTTERS PERIPHERALS

COMPUTER STORAGE TECHNOLOGY, INC.
Model CS-400

Computer Storage Technology, Inc. (CST) has announced a microprogrammed magnetic-tape peripheral processor said to meet IEEE-696 standard for S-100 bus compatibility.

The Model CS-400 reportedly can record up to 55M bytes of data on a single ¼-in. cartridge and is capable of transferring data to tape at the speed of a streaming tape drive. The subsystem is comprised of a CST Model CC-400 single printed-circuit board peripheral processor, an Intel Corp. 8237 direct memory access (DMA) controller, a Zilog, Inc.

Continued on page 69



MATCH

Send for your *FREE SEED Information Kit* today.
Get all the details on how SEED DBMS increases productivity for managers, programmers and end-users, and how SEED makes DBMS maintenance and operation more economical. Send for the SEED DBMS Information Kit. It's yours FREE.
Or call us at (215) 568-2424. And be sure to ask for information on our FREE DBMS Seminars. C1984

☐ Send me the FREE SEED Information Kit. ☐ Call me to discuss my specific requirements. ☐ Send me details on DBMS Seminars.

Name____ Title____ Company____

Address____ City____ State____ Zip____ Telephone____

☐ OEM ☐ System Integrator ☐ End User

Computer____ Oper. Sys____

UNITED INFORMATION SERVICES, INC.
SEED SOFTWARE, 2300 Walnut Street, Suite 734, Philadelphia, PA 19103

The right equipment in the right place is not enough.

Get the facts on training in Computerworld Office Automation this February.

This February, *Computerworld Office Automation* will give you a close look at a whole range of training methods to help you choose what's right for your users: traditional training classes, computer-aided instruction, vendor instruction, on- or off-site training—and lots more. We'll also include a survey of different methods users have tried—and the results.

You'll read about one user's experience implementing an electronic mail system and accounts of how four different types of OA managers are coping in a multi-vendor environment. In addition, you'll get the results of a reader survey on the difficulties in hiring qualified office automation staff so you'll know what to expect.

And that's not all. There'll be feature articles on:

- Using superminis in office automation
- The current state of decision support systems
- The four-phase evolution of integrated systems
- PBX technology
- The growing use of on-line databases in office automation

Computerworld Office Automation is designed to give you OA information geared to the DP/MIS environment—in a way that no traditional office publication can. As a *Computerworld* subscriber, you'll be getting six issues of *Computerworld Office Automation* in 1984—as part of your subscription! And if you've got users demanding training, you won't want to miss this first issue on training and implementation strategies.

If you've got office automation products our readers should know about, then you need to get your ad reservation in by January 6th. The materials are due one week later on January 13th. To reserve ad space in this February 15th issue of *Computerworld Office Automation*, call one of the sales offices listed below, or Ed Marecki, National Sales Director at 617-879-0700.

To: Ed Marecki, *National Sales Director*
CW Communications/Inc.
Box 880
Framingham, MA 01701

☐ *Please send me advertising information on Computerworld Office Automation.*

☐ *Please have a sales representative call me.*

Name _____

Title _____

Company _____

Address _____

City _____ State _____ Zip _____

Telephone _____

Computerworld
OFFICE AUTOMATION

Sales Offices

BOSTON/Chris Lee, Jayne Donovan, Michael Kelleher, Ron Mastro, Jim McClure, Alice Longley (617) 879-0700
CHICAGO/Art Kossack, Chris Lee, Jean Broderick (312) 827-4433
NEW YORK/Mike Masters, Doug Cheney, Ray Corbin, Joan Daly, Fred LoSapio, Gale M. Paterno (201) 967-1350
ATLANTA/Jeffrey Melnick, Mike Masters (404) 394-0758
SAN FRANCISCO/Bill Healey, Ernie Chamberlain, Theodora Franson, A. G. Germano, Barry Milione, Nicole Boothman (recruitment) (415) 421-7330
LOS ANGELES/Bernie Hockswender, Bob Hubbard, Bill Healey (714) 261-1230

MICROCOMPUTERS

Continued from page 67

29088 peripheral processor for data transfer and a ¼-in. cartridge tape streamer based on the Qic-02 cartridge interface from Archive, Inc., the vendor said.

The peripheral processor is embedded in one slot of the S-100 host computer, while the streaming cartridge tape drive and power supply are contained in a tabletop chassis.

A basic CS-400 is available as a 45M-byte system (extendable to 55M bytes) with a full 20-bit DMA transfer capability and features 16-level DMA request arbitration along with 8- or 16-bit I/O address decoding, the vendor said.

A menu-driven software program provides use of Digital Research, Inc.'s CP/M and MP/M operating systems, the vendor said.

The price for a single subsystem is $2,995.

CST, 1369 S. State College Blvd., Anaheim, Calif. 92806.

ALPHACOM, INC.
Alphacom 42

Alphacom, Inc. has announced a price cut for its 40-col. home computer printer.

The Alphacom 42 universal printer, which reportedly uses a single-chip microprocessor and thermal technology, is said to operate at 2 line/sec and to feature bit-mapped graphics.

The unit is now priced at $79, plus $20 for an interface for most systems, according to the company.

Alphacom, 2323 S. Bascom Ave., Campbell, Calif. 95008.

BOARD-LEVEL DEVICES

ATRON CORP.
PC Probe

A hardware and software debugging tool for program development on the IBM Personal Computer and compatible systems has been introduced by Atron Corp.

Called the PC Probe, the device consists of a printed-circuit card that fits into any Personal Computer card slot, an umbilical cable and probe that plugs into the Personal Computer's 8088 integrated circuit socket and debugging software on a floppy diskette.

Designed for all standard high-level personal computer languages, including Macro Assembler, Pascal Compiler, Fortran Compiler and C Compiler, the PC Probe reportedly contains support for debugging both hardware and software.

Since it can access all Personal Computer bus signals as well as the 8088 CPU, Atron's tool can monitor and trap on interrupts and direct memory access requests as well as on standard CPU operations, the company noted.

Other features of the PC Probe include symbolic debugging capability, program patching, macro commands and program crash recovery, the vendor said.

The PC Probe sells for $2,195 in single quantities, with multiple quantity discounts available.

An optional eight-channel test clip cable costs $100, the vendor said.

Atron, 21075 Bank Mill Lane, Saratoga, Calif. 95070.

TEKPRINT, INC.
Print-It Model 2

Tekprint, Inc. has announced Print-It Model 2, a parallel printer interface for the Apple Computer, Inc. family of computers.

Featuring 64K bytes of internal read-only memory, 202 graphics modes, 25 text modes and seven format modes, the Model 2 is compatible with Apple II and IIe microcomputers and over 15 models of printers, the vendor said.

Print-It Model 2 is said to handle 40- or 80-col. text, a standard and alternate font, color or black and white, low- and high-resolution graphics, double high-resolution graphics and, on the Apple IIe, automatic selection of the proper print format to match the current display screen.

The Print-It Model 2 card, including handbook and printer cable, is available for an introductory price of $69, according to the vendor. Its retail selling price will be $174.

Tekprint, 8 Blanchard Road, Burlington, Mass. 01803.

ONE OF THE BEST BRAND NAME PRINTERS HAS A BRAND NEW NAME.

GENICOM

The General Electric 3000 family of printers has become an industry leading product. But now, this popular printer series has a new name, Genicom (the Data Communication Products Department of GE-its own independently owned company called Genicom).

At Genicom today we offer the same complete line of printers we offered while a part of General Electric. We have the same facilities, the same nationwide service network, and the same corps of experienced employees... only the name has changed.

Above all, Genicom offers you the same reliable product quality you've come to expect from us over the years. Our Genicom 3000 printers feature outstanding performance for end-users as well as superior flexibility for many OEM's, distributors, retailers and dealers. There are 3000 models with speeds from 45 to over 400 cps. Single or dual mode printing. Type quality from draft to NLQ. Multi-color printing. Graphics. Selectable type fonts. American craftsmanship and more. There are even 3000 family printers for personal computers... ideal for business needs.

We're proud of the exceptional brand reputation we established under General Electric. But now we're going to make a new name for ourselves by bringing you more innovations, and more of the reliable quality you've always found in each of our products.

Genicom Corporation, One General Electric Drive, Dept 18831, Waynesboro, VA 22980. In Virginia, call 1-703-949-1178.

GENICOM

For the address of your printing needs call

TOLL FREE 1-800-437-7468

MICROCOMPUTERS

ADVANCED LOGIC SYSTEMS
The Business Card

Advanced Logic Systems (ALS) has introduced an integrated package of hardware and software for the Apple Computer, Inc. Apple II family of microcomputers.

This package, called The Business Card, includes the vendor's T/Maker III software package and a circuit board offering Digital Research, Inc.'s CP/M Plus operating system.

T/Maker III is an integrated program that includes word processing, spreadsheet, list management and bar charting capabilities.

With this program, there is no need to transfer data between programs.

The Business Card is available for a price of $499.

The price of the standalone Apple CP/M version of T/Maker III is $275.

Current users of either the ALS CP/M Card or Z-Card can purchase T/Maker from ALS for $165.

ALS, 1195 E. Arques Ave., Sunnyvale, Calif. 94086.

INTELLIGENT TECHNOLOGIES INTERNATIONAL CORP.
Clusternet 3270

Intelligent Technologies International Corp. (ITIC) has introduced an enhancement to its PC Express communications package that it claimed will broaden the package's range of applications in IBM's Systems Network Architecture (SNA) environment.

Called Clusternet 3270, the new enhancement is said to be a printed-circuit board with SNA software that permits an IBM Personal Computer to serve as an IBM 3274 cluster controller linking as many as 12 Personal Computers with a mainframe.

The Clusternet 3270 board resides on a central Personal Computer, which is linked to the mainframe via a dial-up or leased telephone line and an external modem operating at 2,400, 4,800 or 9,600 bit/sec.

According to the vendor, the new package will be available for delivery in the first quarter of 1984 and is available as a standard feature of the PC Express with the SNA package, which is priced at $1,295.

ITIC, 151 University Ave., Palo Alto, Calif. 94301.

AUXILIARY EQUIPMENT

DUNCAN-ATWELL COMPUTERIZED TECHNOLOGIES, INC.
Lenipen/XT; Lenipen/Jr.

Duncan-Atwell Computerized Technologies, Inc. has announced color graphics systems for IBM microcomputer users, including artists, architects, computer-aided design and manufacturing engineers, doctors and graphics programmers.

The Lenipen/XT was designed for use with the IBM Personal Computer XT and XT/370 and compatibles.

A scaled-down version of the Lenipen/XT, the Lenipen/Jr., was designed for the IBM PCjr.

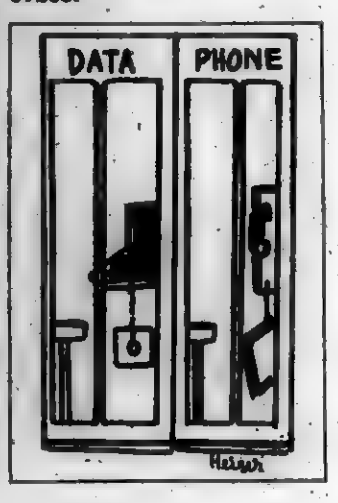
Both products are said to be direct derivatives of the vendor's Lenipen 1.0.

The products reportedly support various I/O devices, with light pens as the primary source of graphics input.

The vendor said the products provide for user logic programming, which allows the user to create a graphics image with a light pen, mouse or keyboard, while the system creates a Lenigram program of the image that can be saved and recalled.

The Lenipen/XT is priced at $695, and the Lenipen/Jr. is $345.

Duncan-Atwell Computerized Technologies, 1900 Salem Ave., Hillside, N.J. 07205.



COMPUTER INDUSTRY

Semi demand sign of times

INDUSTRY INSIGHT

BILL LABERIS

If you are interested in knowing just how vibrantly the computer industry will perform overall in the new year, look no further than the semiconductor sector.

Simply put, the companies that make the elemental pieces of computer systems massive and small generally cannot meet demand for their products now. The worst case (or best, depending on how you look at it) is given by the microprocessor makers, which in some cases will meet no more than 25% of the demand for their processing chips.

The pace of recovery in 1983 clearly caught the chip makers off guard, and thus they were slow in ramping up production, especially since most of them had reacted to the 1982 recession with layoffs. This, compounded by the fact that it takes about four months to produce a typical memory or processor chip, has sent many computer makers scrambling to find reliable second and third sources for key components.

But all too often in recent months computer makers have had to deal with the harsh reality that their components suppliers are just sold out, making promises of no better than six-month-plus lead times in many cases.

However, 1984 will likely witness a scenario wherein semiconductor supply finally catches demand, as production shortages abate and the industry settles into shipping about 3.5 billion chips per month — a full 60% above 1983 levels and nearly 200% above 1982 levels.

For system makers and end users alike, one result of this boom

See [illegible] page 80

Retail chains vary strategies

Few employ marketing plan aimed at big business

By Peter Burrill
CW Staff

Computer store chains are uniformly involved in a rapidly growing business, but the strategies employed by such chains to target their services to particular business markets are apparently quite varied.

Three nationally recognized chains of varying size were recently queried by *Computerworld* about strategies developed to target that segment of business represented by the Fortune 1,000 list. Only one company said it employs a specific strategy for targeting big business.

Contacted were officers of Computerland Corp., the largest computer store chain with more than 540 franchised stores open nationally; Entre Computer Centers, Inc., which has identified itself as the second largest chain with 100 stores already open and franchises granted for an additional 100 stores that are opening at the rate of 15 to 25 a month; and Byte Industries, Inc., an up-and-coming organization with 19 Byte Shop stores already opened and plans to expand its market with revenues from an anticipated public offering slated for this month.

Both Byte Shops and Entre first began franchise operations in 1982, although the original Byte Shop was opened in 1975. Computerland, which more than doubled sales volume to about $1 billion in 1983, was founded in 1976 and opened the first store in 1977. Entre posted $23 million in sales to franchisees in 1983, up from $687,444 during its first year of operations; Byte Industries would not comment on sales volume because of the pending offering.

"We are not a home computer retailer," declared Entre's advertising director Michael H. Savage during a recent interview. "We are concentrating almost entirely on business, including small business, professionals and corporations."

Entre, with an estimated 50% to 60% of its sales going to big business, was the only chain with a specific strategy for gaining a foothold in the corporate marketplace. Entre also recently announced a public offering, with revenues to be used for "general corporate purposes."

Byte Shops, according to President David Pava, have a three-pronged marketing approach aimed at the "high-end home use," personal productivity applications in all types of businesses and specific vertical market applications in which it intends to be

See RETAIL page 80

National Semi reports strong gains

SANTA CLARA, Calif. — Reflecting the continued boom in demand for micro circuits of all types, National Semiconductor Corp. reported strong quarterly gains in sales and profit as well as record-setting order rates.

For its second quarter, the company posted sales of $369 million, a 33% increase compared with the same period a year earlier. Profit in the quarter totaled $13 million, or 15 cents per share, compared with a loss of $3.5 million in the second quarter a year ago.

Commenting on National Semi's performance, Charles E. Sporck, president and chief executive officer, said both the company's components and systems divisions showed continued bottom-line improvement.

In addition, Sporck reported that capital spending in the first six months of fiscal 1984 jumped 38% to $83 million, with total capital spending for the year expected in the $200 million range, compared with $131 million in fiscal 1983. A significant portion of the current capital outlays will be directed at increasing current wafer fabrication capacity, including the construction of a new plant in Arlington, Texas, and a new research and development center here.

"Our goal," Sporck said, "is to expand fabrication and assembly capacities to meet current and projected growth in demand."

Stanford welcomes $21 million research gift/72

Back to basics with HP's Young/73

INSIDE

■ Portable mart splintering as it booms/78
■ $260 million buys AT&T a slice of Europe/80
■ Scrambling Ansacomp defaults/74
■ In short, what's happening/82

A Simon Legree for Computers

John Beall & Company, Inc.

Stanford gets grants to study link between languages

By Robert Batt
CW West Coast Bureau

PALO ALTO, Calif. — Grants totaling $21 million have been awarded to a group of computer scientists, philosophers, logicians and linguists at Stanford University in an attempt to create a breakthrough in man's understanding of the link between natural and computer language.

The grants, made by the System Development Foundation of Palo Alto to the Center for the Study of Language and Information, will extend over four years and will eventually sponsor research by almost 100 professors, postdoctoral students and researchers from Stanford, SRI International, Inc. and Xerox Corp.'s Palo Alto Research Center (Parc).

"The purpose of the project is to take the body of insights into language from linguistics, logic, philosophy and the humanities together with the new challenges posed by computational languages and develop theories adequate to both," according to Jon Barwise, who is director of the Center for the Study of Language and Information.

Through their studies, the researchers have developed a new view of language, Barwise said. This view is that language and computation are two sides of the same coin. Central parts of the study of language and of computer science make up a single subject matter, which they have termed "situated language."

Terry Winograd, a professor of computer science at Stanford, said, "It is not our goal to create new applications, rather it is to establish theories essential to the design of computers and, by bringing people together from different disciplines, to create a body of knowledge that will allow us to lay the foundation for a whole new discipline."

According to the researchers, situated languages include natural languages like English and Chinese as well as computer languages such as Pascal and Lisp. This view of language centers on three complementary insights: that natural language use is fundamentally computational, that computational practice is fundamentally linguistic and that understanding linguistic activities in any real situation requires theories based on solid semantic foundations, theories that connect computation and language with information from the world.

"This theoretical framework will be the basis not only of a deeper understanding of natural language and computation, but the basis for practical developments involving the interaction of computers and humans," the researchers noted in a paper to the foundation.

Truth not absolute

These theories, Winograd claimed, challenge traditional logic by asserting that the truth of any statement is not absolute, but is related to the context, or situation, in which it is made.

Charles Smith, director of programs for the foundation, claimed, "This notion is central to making computers work intelligently."

The research at the Stanford campus has been going on informally for the past two years.

Brian Smith of Xerox's Parc has taken the group's ideas to develop the 2-Lisp and 3-Lisp computer languages, which reportedly enable computers to ask questions of themselves about their own state, a capability known as the power of reflection.

The Stanford research will be supported by more than 100 Xerox 1108 Dandelion workstations, three Digital Equipment Corp. VAX-11/750 superminis and a DEC 2060 mainframe. The systems will be tied together by Xerox's Ethernet local-area network.

HIGH PERFORMANCE

NOW AVAILABLE IN A THREE-SPEED

INTRODUCING THE NEW DS 220 MULTI-MODE MATRIX PRINTER

First there was the Datasouth DS180. The original high-performance printer. The printer that raised the standards of on-the-job performance to new heights. A tough act to follow.

And now, following in the same tradition, is the new Datasouth DS220. State-of-the-art performance, taken to higher levels. In a new 3-speed multimode form. Ready to run data, near letter quality and graphics output—in a single printer.

At data speed, the Datasouth DS220 leaves competitors in the dust. By using high speed tabbing to zip over blank spaces and true logic seeking to print the next available character, the Datasouth DS220 charges through printed copy at speeds rivaling more expensive line printers.

At 40 CPS NLQ speed, the Datasouth DS220 creates near letter quality output with the kind of class that might make you wonder if it was produced by a daisy wheel printer. With its fine tuned 18 x 48 dot matrix, multiple fonts are produced with the precise clarity required for word processing applications.

And for graphics, the Datasouth DS220 adds high performance style to popular microcomputer applications programs through high resolution dot addressable output. Sharp new details emerge from business charts and graphs, and engineering drawings.

And those are just its printing capabilities. Its fully instrumented dashboard allows push button programming of up to fifty features for forms control, communications and print style selection.

Best of all, the Datasouth DS220 costs much less than you might expect for a high performance three speed. Go to your nearest showroom and run a Datasouth DS220 through the gears. See how little it costs to own three high performance printers in one high performance package.

south

AVAILABLE NATIONWIDE
THROUGH OUR NETWORK OF
SALES AND SERVICE DISTRIBUTORS

Datasouth Computer Corporation
Box 240947 · Charlotte, NC 28224
704/523-8500 · Telex 6843018 DASOU UW

COMPUTER INDUSTRY

U.S. high tech must return to basics: panel

To restore reputation as world leader

By Robert Batt
CW West Coast Bureau

PALO ALTO, Calif. — U.S. high-technology industries will have to get back to basics if they are to restore their reputation for world leadership, according to John Young, president and chief executive officer of Hewlett-Packard Co.

Speaking at the second meeting of the recently formed President's Commission on Industrial Competitiveness, Young, who was appointed by President Reagan to chair the commission, said there are no quick fixes to the malaise affecting many of the nation's economic sectors.

At the same time, Young said, the commission's view is that U.S. industry does not suffer from an incurable disease, but is rather in need of vigorous rejuvenation.

"In dealing with the questions of industrial competitiveness, I tend to concentrate on fundamentals such as capital resources and trained manpower," Young said.

"Without the fundamental ingredients, we cannot stay in the competitive race and, so, returning to the basics is the business now facing the nation," Young told a press conference following the commission hearing.

Young said the commission, charged by Reagan with reviewing ways to increase competitiveness, especially in high technology, will make specific proposals during the course of its deliberations before issuing a final report by December 1984.

"Our aim is to look for specific areas that can make a difference in some measure to creating a forward motion that over time can have a considerable impact," he said.

Budget deficit

Also at the commission hearing, John Ong, president of B.F. Goodrich Co. and co-chairman of the commission's subcommittee on international trade with Robert Noyce, vice-chairman of Intel Corp., admitted that the commissioners are unlikely to come up with proposals that sharply increase the administration's controversial budget deficit, currently approaching $200 billion.

"We are trying to avoid being just another advocacy group, with a list of proposals that do not take account of current realities," Young added.

Ong stressed the commission's goal was to identify public policy areas in which it can recommend government action, for example, tax credits or propose congressional legislation to deal with a specific problem.

"The more carefully thought out our proposals, the more effective we will be as a commission," according to Ong.

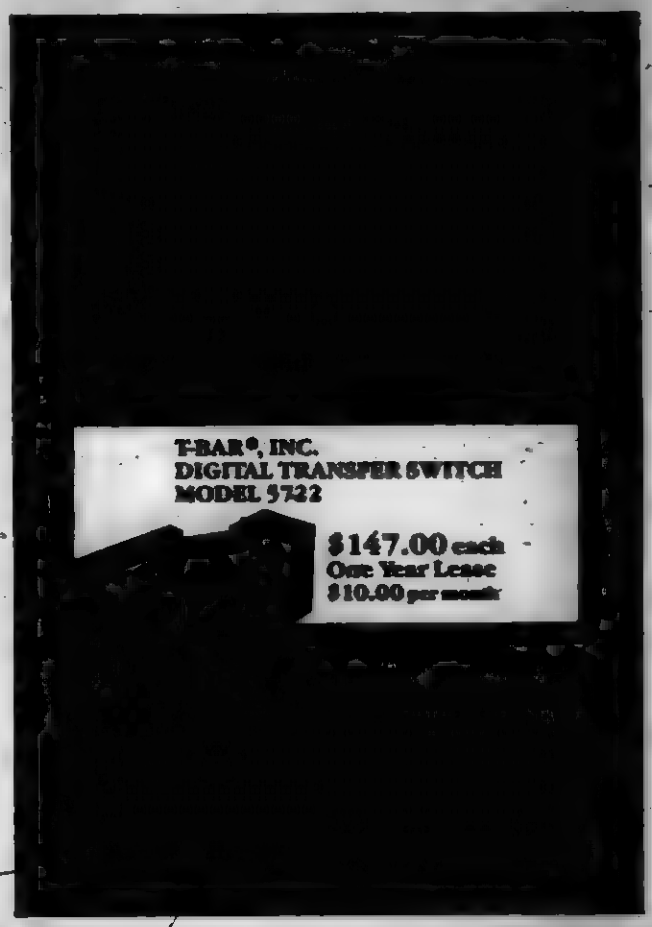
In his presentation to the commission, David Crockett, president of Dataquest, a Silicon Valley, Calif.-based market research firm, said Japan will continue its dominance in many areas of the semiconductor market.

In the area of 256K-byte dynamic random-access memory (RAM), he contended, the major Japanese manufacturers, such as Hitachi Ltd., Fujitsu Ltd., Nippon Electric Co. and Toshiba, will ship around 14 million units this year, compared with 800,000 in 1983.

Crockett estimated Japan's share of the immature dynamic RAM market at 76%. "In the 1980s, the technology thrust will shift from dimension reduction to applications," he told the commission.

Commission members include several high-level industry figures, such as Mark Shepherd, chairman of Texas Instruments, Inc., and Noyce; respected academics, such as Michael Porter, professor of business administration at Harvard University; and government officials, including George Keyworth, science adviser to the president.

Among the areas being investigated by the commission are capital resources, research and development, manufacturing, human resources, international trade and industrial strategy.



EDP AUDITORS FOUNDATION INC.
Announces the
CISA EXAMINATION
(Certified Information Systems Auditor)
On
April 7, 1984

- Developped and Administered by Educational Testing Service (ETS)
- Over 50 U.S. and Foreign Test Centers.(Ability for Special Test Centers)
- Registration and Fee — $185 (U.S.)
- CISA Study Guide – $20 (U.S.)
- Available — Sample Test I — 50 Actual CISA Test Questions and Suggested Answers – $7.50 (U.S.)

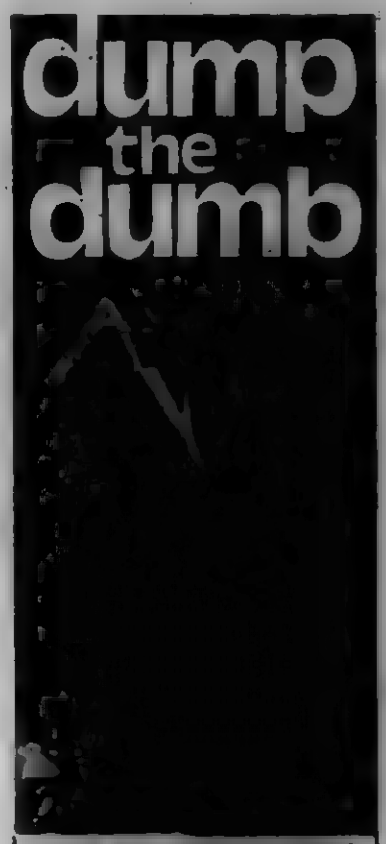
NEW FOR 1984 EXAM:

- Sample Test II — Additional 50 Actual CISA Test Questions and Suggested Answers – $7.50 (U.S.)
- Information Systems Audit Process — A Critical Review of CISA Job Dimensions, by S. Rao Vallabhaneni, CISA – $20 (U.S.)

For a CISA Registration Form and Bulletin of Information Write or Call

EDP AUDITORS FOUNDATION
373 S. Schmale Road
Carol Stream, Illinois 60188
312/653-6950

ALL COMPLETED REGISTRATION FORMS MUST BE RECEIVED NO LATER THAN FEBRUARY 24, 1984



REPLACE YOUR DUMB 5251'S OR 3278'S WITH SMART PC'S, XT'S, & BLUE LYNX™

Turn your PC or XT into a full functioning 5251 or 3278 terminal. With BLUE LYNX there is virtually no difference in operating a PC running under emulation from the terminal you're currently using. In addition to getting both online and offline capabilities BLUE LYNX gives you:

- PC printer and color monitor support
- Bidirectional file transfer capability

Insert the BLUE LYNX synchronous communications board into any slot in your IBM, PC or XT, load the BLUE LYNX program diskette, give your PC a station address and establish connection. No special host configuration is necessary.

BLUE LYNX 5251 Version 2 — $800
ETU/24 — $500* ETU/26 — $500*
ETU/28 — $500* *One time CPU charge
BLUE LYNX 3278 for SDLC or BSC — $800
BLUE LYNX 5251/3278 Combo — $1230
VTERM Asynchronous Communications and DEC VT emulation. — $160
(requires IBM Asynchronous Adapter)

212-684-7788

TECHLAND SYSTEMS
25 Waterside Plaza NY NY 10010 1/84

BLUE LYNX is a trademark of Techland Systems Inc.
BLUE LYNX 5251 is a joint development of Software Systems, Inc. of Jefferson City, Missouri & Techland

IBM, Syracuse enter AI pact

SYRACUSE, N.Y. — Syracuse University and IBM have entered into a multiyear cooperative research program designed to broaden artificial intelligence (AI) development efforts, the university announced recently.

IBM will provide a 4341 mainframe, as well as an assortment of minis, personal computers and terminals, with Syracuse University providing the research staff to develop and implement AI capabilities for IBM's systems.

The research will be conducted in four areas. The first two research projects will concentrate on enhancing existing AI languages; the other two research projects will concentrate on developing an expert system to assist users in accessing a computer system.

NESTU Presents: Two In-Depth Seminar Sessions
SET FOR FEB. 21 AT WELLESLEY COLLEGE
NORTH EAST SYSTEM THIRTY-EIGHT USERS will feature seminars:
☐ System 38 — Past, Present & Future
☐ A System 38 Based Company MIS — The 5 Most Common Mistakes
The speaker will be ROBIN RETALLICK,
Registration for the entire event is $38 for members and $55 for non-members. The price includes dinner.
RETURN THIS FORM WITH YOUR CHECK TO
NESTU
64 Temple Street
Spencer, MA 01562
Name
Company/Organization
Street
City/State
Telephone (area code)
Attending

Sperry comments

Clarification: In response to an industry analyst's claims about Tandy Corp.'s Model 2000 microcomputer [CW, Dec. 26/Jan. 2], a Sperry Corp. spokesman acknowledged the Tandy machine's edge in processing speed, but credited his own firm's micro with providing superior IBM compatibility. The Sperry comments were received after press time.

Anacomp defaults on lending agreement

INDIANAPOLIS — Financially troubled Anacomp, Inc. has defaulted on portions of a $45 million lending agreement with several of its creditors as efforts to reach a refinancing agreement have failed.

According to company officials, Anacomp did not honor all conditions of loans made to it by Chase Manhattan Bank and Manufacturers Hanover Corp. in New York, Bank of America in San Francisco, Fletcher National Bank in Indianapolis and Lloyds Bank International Ltd. of London.

The systems integrator and software house has suffered losses in excess of $16 million in its last two reporting quarters, with substantial losses anticipated in the quarter ended Dec. 30. The company had been mentioned as a possible merger candidate [CW, Nov. 28].

To counter its losses, which were due in large part to delays Anacomp has experienced in marketing a banking software program, the company has reduced its work force by about 10%, or 220 workers, and cut salaries companywide.

The company has also resigned in capital spending and ceased dividend payments.

Meanwhile, Anacomp is seeking to spin off its data services business to raise capital.

Market research firm offers subscription plan

ROCKVILLE, Md. — A computer market research firm has announced the availability of a subscription program for clients wishing to sell information and telecommunications technology and services to the federal government.

Input claimed its Federal Information Systems and Services Program provides information on executive agencies' expenditures for automated data processing and telecommunications through 1990.

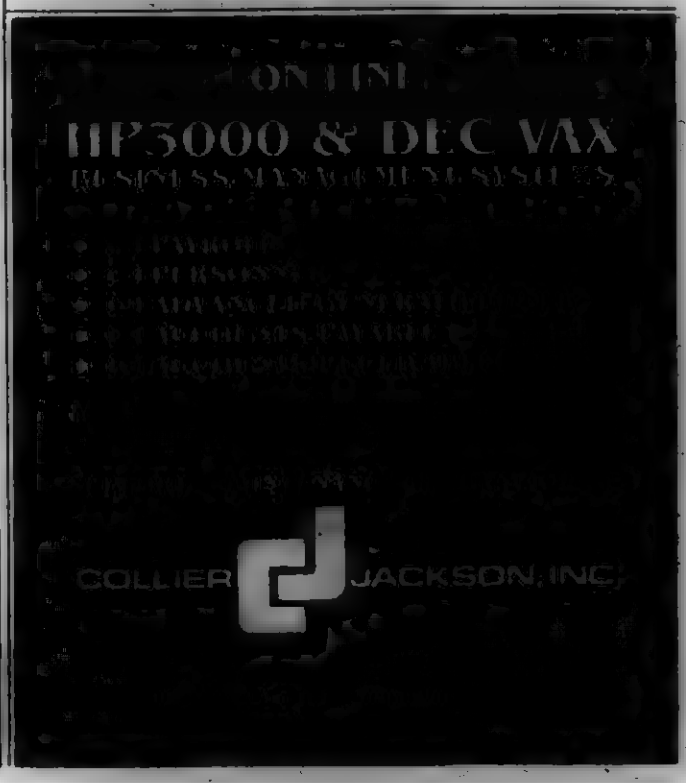
Input said that the program interprets the government's procurement plans for use by companies in their planning processes.

According to Input, the procurement plans of government executive agencies are public information, but often use reporting techniques that obscure the size of acquisition programs.

Thus, Input said, the list of major systems acquisitions published by the U.S. Office of Management and Budget, General Service Administration and National Bureau of Standards is incomplete.

More information on the program is available from Input, located at 11820 Parklawn Drive, Rockville, Md. 20852.

MicroAge
"BECAUSE WE COULDN'T AFFORD MISTAKES!"
"They guided us over the rough parts when we needed it"
"During September of 1982, we started our MicroAge Computer Store in Tulsa, Oklahoma with 3 people. Today we have 11 people working for us and we're still hiring. By following MicroAge's advice and marketing strategy when we started in business, we were able to reach Tulsa's business computer buyers in a much shorter time than we could have on our own."
"Both of us had technical backgrounds in computers but lacked the marketing experience necessary to reach our goals. We used MicroAge's experience and leadership to guide us through the rough spots and boost our sales and marketing potential.
"MicroAge . . . they helped us build a sales organization to reach the Oklahoma businessmen."
John E. Meier
John Meier
President
George B. McLawhon
George McLawhon
Vice President
To build your own professional computer sales organization with MicroAge write to:
MicroAge
COMPUTER STORES
"The Solution Store"®
1457 West Alameda • Tempe, Arizona 85282
(602) 968-3168



THE LIBRARY OF COMPUTER AND INFORMATION SCIENCES

Please accept my application for trial membership in the Library of Computer and Information Sciences and send me the AUERBACH DATA PROCESSING MANAGEMENT LIBRARY (34929) billing me only $2.95. I agree to purchase at least three additional Selections or Alternates over the next 12 months. Savings range up to 30% and occasionally even more. My membership is cancelable any time after I buy these three books. A shipping and handling charge is added to all shipments.

No-Risk Guarantee: If you are not satisfied—for any reason—you may return the AUERBACH DATA PROCESSING MANAGEMENT LIBRARY within 10 days and your membership will be canceled and you will owe nothing.

7-CC2

Name _____

Name of firm _____
(if you want subscription sent to your office)

Address _____

City _____

State _____ Zip _____

(Offer good in Continental U.S. and Canada only. Prices slightly higher in Canada.)

Computerworld 1/9/84

THE LIBRARY OF COMPUTER AND INFORMATION SCIENCES

Please accept my application for trial membership in the Library of Computer and Information Sciences and send me the AUERBACH DATA PROCESSING MANAGEMENT LIBRARY (34929) billing me only $2.95. I agree to purchase at least three additional Selections or Alternates over the next 12 months. Savings range up to 30% and occasionally even more. My membership is cancelable any time after I buy these three books. A shipping and handling charge is added to all shipments.

No-Risk Guarantee: If you are not satisfied—for any reason—you may return the AUERBACH DATA PROCESSING MANAGEMENT LIBRARY within 10 days and your membership will be canceled and you will owe nothing.

7-CC2

Name _____

Name of firm _____
(if you want subscription sent to your office)

Address _____

City _____

State _____ Zip _____

(Offer good in Continental U.S. and Canada only. Prices slightly higher in Canada.)

Computerworld 1/9/84

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY CARD
FIRST CLASS PERMIT NO 230 RIVERSIDE N J

POSTAGE WILL BE PAID BY ADDRESSEE

THE LIBRARY OF COMPUTER
AND INFORMATION SCIENCES
Riverside, New Jersey 08075

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY CARD
FIRST CLASS PERMIT NO 230 RIVERSIDE N J

POSTAGE WILL BE PAID BY ADDRESSEE

THE LIBRARY OF COMPUTER
AND INFORMATION SCIENCES
Riverside, New Jersey 08075

Indispensable at $79.60
Incredible at $2.95

Take this comprehensive 8-volume Auerbach Data Processing Management Library for just $2.95 when you join the Library of Computer and Information Sciences

Specialization.

It's a worrisome burden for computer professionals.

Not only do you need specific technical expertise, but you have to know how to use it in support of business objectives and goals.

For more than 25 years Auerbach has served the information needs of computer professionals, assisting them to increase their effectiveness and enhance their careers.

That's why the Auerbach Data Processing Management Library has become an indispensable tool for every data processing professional.

These eight volumes are published at $9.95 each and cover all the specifics of Data Processing Management:

1. Data Processing Management. Long Range Planning Policies and Procedures. Decentralized Computing. Systems Implementation. Selecting Software Packages. Structured Techniques. **$9.95**

2. Computer Programming Management. Estimating Software Costs. Designing Modular Programs. Decision Tables. Acquiring and Approving Programmers. Testing. Program Maintenance. **$9.95**

3. Data Communications Management. Communications Technology. Formulating Network Requirements. Data Security. Disaster Recovery Planning. System Network Architecture (SNA). Digital Communications. **$9.95**

4. Data Base Management. DBMS Implementation Planning. Data Base Design. Distributed Data Bases on Unlike Computers. Case Studies. **$9.95**

5. Systems Development Management. Organizing for Project Management. User-Oriented Systems Analysis and Design. Using a Systems Consultant. Evaluating Software Packages. Structured Walkthroughs. **$9.95**

6. Data Center Operations Management. Documentation. Career Planning in Operations. Developing a Scheduling System. Evaluating and Negotiating with Vendors. Selecting Data Security Software. **$9.95**

7. EDP Auditing. Defining Objectives. Writing Audit Reports. Cost/Benefit Review. Test Design for Systems under Development. Application Programs. Auditing Microcomputer-Based Systems. Hardware Acquisition. **$9.95**

8. Distributed Processing Management. Establishing Controls. Operational Costs. Information Confidentiality. User Chargeback Procedures. Protocols and Compatibility. **$9.95**

The Library of Computer and Information Sciences is the oldest and largest book club especially designed for the computer professional. In the incredibly fast-moving world of data processing, where up-to-date knowledge is essential, we make it easy for you to keep totally informed on all areas of the information sciences. In addition, books are offered at discounts up to 30% off publishers' prices.

Begin enjoying the club's benefits today!

Complete in 8 comprehensive softbound volumes

The Auerbach Data Processing Management Library...

- **8 comprehensive volumes**
- **Over 1,200 pages of text**
- **More than 100 major topics**
- **104 contributing authors, each an experienced data processing practitioner**

4 Good Reasons to Join

1. The Finest Books. Of the hundreds and hundreds of books submitted to us each year, only the very finest are selected and offered. Moreover, our books are always of equal quality to publishers' editions, never economy editions.

2. Big Savings. In addition to getting the AUERBACH DATA PROCESSING MANAGEMENT LIBRARY for only $2.95 when you join, you keep saving substantially—up to 30% and occasionally even more. (For example, your total savings as a trial member—including this introductory offer—can easily be over 50%. That's like getting every other book free!)

3. Bonus Books. Also, you will immediately become eligible to participate in our Bonus Book Plan, with savings up to 70% off the publishers' prices.

4. Convenient Service. At 3–4 week intervals (6 times per year) you will receive the Book Club News, describing the Main Selection and Alternate Selections, together with a dated reply card. If you want the Main Selection, do nothing and it will be sent to you automatically. If you prefer another selection, or no book at all, simply indicate your choice on the card, and return it by the date specified. You will have at least 10 days to decide. If, because of late mail delivery of the News, you should receive a book you do not want, we guarantee return postage.

If the reply card has been removed, please write to: **The Library of Computer and Information Sciences, Dept. 7-CCI, Riverside, N.J. 08075** to obtain membership information and an application.

Computerworld 1/30

Market for portables still strong but fragmenting

By Bohdan S. Szuprowicz
Special to CW

The so-called portable computer is fast becoming the most talked-about variant of the personal computer revolution. But what is not entirely clear is that some of the portable computer promoters are also getting carried away with a lot of very heavy media hype not unlike that which preceded the home computer shakeout of recent months.

The portable computer market is also splintering rapidly into several segments, including desktop, suitcase (transportable or luggable), briefcase and notebook categories. Some analysts also throw hand-held computers into what is sometimes dubbed the "mobile" computer products group.

All this only further confuses the end users and investors alike who are still trying to recover from the shock of the rapid demise of Osborne Computer Corp. after its spectacular rise to portable computer pioneering preeminence in just two years.

Optimistic Forecasts

Despite that bankruptcy, market forecasts suggest that during 1982 nearly $300 million in portable computers were sold, primarily in the U.S., which so far accounts for 90% of the market. For 1983, this market will likely increase more than 200%.

In the longer run, a tenfold increase in the sales of portable computers is seen within the next few years, and between 20% to 25% of all microcomputers in use by 1987 are expected to be in that category.

Whether or not portables will remain similar to those now capturing the imagination of end users is another matter.

Chances are that technological developments are so rapid and competition so fierce that new, much more portable computer products will be thrown at users at an ever-increasing pace for the conceivable future, making existing models obsolete almost overnight.

Transportable Variety

So far the bulk of portable computers is of the transportable, suitcase-size variety, weighing from 18 to 40 lb and being no more portable than the average home TV set. Studies show that up to 80% of those machines are never moved and that they are used mostly in business applications, as they are cheaper than standard desktop units that would otherwise be used. Due to strong initial sales, Osborne dominates market share, followed by IBM-compatible maker Compaq Computer Corp.

The next supplier with a reasonable market share thus far is Inbytec Corp. of Canada, whose Hyperion has about 5% of the total. The remaining 25% of the market is being split by at least two dozen firms that have since entered the business.

What few outsiders realize, however, is the fact that the market for these relatively heavy portables has already peaked and is being overtaken by lighter, cheaper and almost equally powerful briefcase portable computers.

Some of these are sufficiently compact that you may be tempted to take one with you even when you are almost sure that you will not need to use it. That is the true test of portability in computers.

Notebook Portables

Even more convenient are the notebook portable computers, which are under 6 lb in weight, although their capabilities today are still somewhat limited.

But rapid developments in custom very large-scale integration microchips and solid-state memories as well as low-power, flat panel displays guarantee a veritable flood of new portable designs, and current product life cycle is seldom more than two to three years at best.

Perhaps the best indication of future trends is the fact that current portable computer market leaders Kaypro, Inc. and Compaq are already rumored to be working on briefcase, lightweight portables presumably of the 16-bit IBM Personal Computer-compatible variety. This is significant in that both companies increased their sales dramatically during 1983. Kaypro posted a 1,400% revenues increase to more than $75 million and promptly went public at $10 per share as soon as it became profitable.

Rising Revenues

Compaq's revenues rose spectacularly from $4.8 million the first quarter of 1983 to $18.1 million in the second and $36 million in the third, when the company became profitable.

Compaq has been very well financed with almost $30 million in venture capital and is already rushing to go public, registering six million shares for sale last October.

But at the time Compaq also stated that its backlog for deliveries through the fourth quarter of 1983 was only $40 million. This suggests that while the company may indeed do $100 million of business in 1983, the explosive revenue growth period may be over.

Rapidly growing competition is not the least factor affecting such growth. Anderson-Jacobson, Inc.; Columbia Data Products, Inc.; Computer Devices Corp.; Corona Data Systems, Inc.; Dynalogic Information Technology Corp.; Eagle Computer, Inc.; and Seequa Computer Corp. are all now in the market with 16-bit IBM Personal Computer-compatible transportable computers of the same category.

Szuprowicz is president of 21st Century Research of North Bergen, N.J.

OFF — LEASE — USED
REFURBISHED
COMPUTER EQUIPMENT SALE

WAREHOUSE CLEARANCE SALE

PRINTERS	for PERSONAL COMPUTERS and TERMINALS (55 cps - 180 cps)	from $ 795
PORTABLE COMPUTERS		from $ 675
ASYNC TERMINALS	(300 - 1200 baud)	from $ 395
SHEET FEEDERS		from $ 425
MODEMS & COUPLERS	(300 - 1200 baud Autodial / Autoanswer)	from $ 160
PROFESSIONAL WORD PROCESSING SYSTEMS		$ 1395
DISK DRIVES	(SMD - attach to TI, Basinet)	from $ 595
PRODUCTS	Datasouth, Cuma, TI, Memorex, Rutishauser, Ziyad, Anderson, Jacobson, General Datacom, Slevin	

TERMINALS UNLIMITED

CONTACT — TELEMARKETING HARDWARE
NATIONAL TELEMARKETING 800/336-0423
In VIRGINIA: 800/572-8560

Here are a few good reasons why you should make Local Data your protocol converter company.

Local Data's comprehensive line of local and remote protocol converters have been used around the world to make async-to-IBM communications simple and economical.

DATALYNX™/3274.
DataLynx™/3274 remote async ASCII protocol converter supports SNA/SDLC or BSC protocols. 80 types of ASCII async terminals can emulate IBM 3278 display stations. RS-232C ASCII async printers can emulate IBM 328X printers.

DATALYNX™/3780.
DataLynx™/3780 async ASCII-to-IBM 3780, 2780, 2770 and 3741 protocol converter supports EBCDIC BSC protocol on one channel and async ASCII devices on the other two channels. Features include transparency, mini/micro support and free file transfer program.

INTERLYNX™/3278.
InterLynx™/3278 allows the attachment of low-cost ASCII CRT terminals or p.c.'s to 3274/3276/4701 and 43XX integrated adaptor Type "A" coax ports. InterLynx/3278 enables the user to use async CRT's on IBM systems and switch to async applications under terminal control.

FILELYNX™/3278.
For micro-mainframe file transfers.

INTERLYNX™/3287.
InterLynx™/3287 allows attachment of ASCII printers to IBM Type "A" coax ports or 3274/3276/4701 controller and 4321/4331 CPU's.
SNA LU1 SCS and LU3 capability are standard with the InterLynx/3287. Features include parallel and serial ports and front panel set-up.
For more information call today.

LOCAL DATA · 2701 Toledo Street · Suite 706 · Torrance · CA · 90503
Telephone (213) 320-7126
Telex # 182518

Local Data

Local Data
"Your Lynx to IBM."

Introducing MARK V™ for CICS users: a *unique*, 4th generation non-procedural application development system that saves you time and money at every stage of your application life cycle—and makes it all easy.

Informatics just broke the productivity barrier with MARK V, an extraordinary timesaving application development system. But, MARK V is not for everyone. *It may be for you if:*

- ☑ You need help in reducing your backlog of medium to complex CICS applications.
- ☑ You use CICS with IBM-supported data access such as VSAM or DL/I.
- ☑ Your CICS system demands highly efficient application execution.

Then, MARK V can help you produce efficient compiled applications that rival the execution of well-written COBOL—in less than half the development time!

Easy application development and maintenance is just the beginning!

MARK V improves productivity throughout the application development and maintenance cycle—not just in the coding—by providing:

- Interactive application design and simulation
- Easy to use, menu-driven specification language for development and maintenance
- Transparent and complete data access/communications control
- Automatically produced application documentation

That means with MARK V your programmer need only specify the solution. MARK V generates the complete application. This methodology allows you to solve more complex problems more efficiently using less highly trained personnel—and that saves you money!

Reserve your free demonstration of MARK V—the simple new way to develop and maintain your medium to complex CICS applications.

As a data processing professional, you're also a professional skeptic. But the simplicity, versatility and timesaving capabilities of MARK V are easy to see—and prove. To do so, simply mail the coupon below or call toll free. We'll schedule your *free demonstration* as quickly as we can. Remember, however, that interest in MARK V is unusually high. Scheduling is on a "first come" basis. So mail the coupon or call *today*.

To see MARK V CICS for yourself, mail the coupon or call toll free

1 800 227-3800, ext. 911

(In Canada, call collect, 0 416 488-7192)

Informatics general corporation

THE SOFTWARE ENGINEERS

EXCLUSIVE OFFER FOR CICS USERS WITH IBM-SUPPORTED DATA ACCESS

YES. I want to learn how MARK V can make my medium to complex applications development and maintenance both fast and easy.

☐ Please call me to arrange a free demonstration right away. I understand that there is no cost or obligation.

☐ I'm not yet ready for a free demonstration. But please send me a free fact kit on the MARK V application development system.

Name_____

Title_____

Company Name_____

Phone Number_____
(include area code)

Address_____

City_____ State_____ Zip_____

Mail this coupon to: Informatics, MARK V Free Information, P.O. Box 1462, Canoga Park, CA 91304

CW-AG

DEMAND

from page 71

should be the ability to manufacture and market the next generation of memory chip — the 256K-byte random-access memory — a little more quickly than had been predicted. Right now, Texas Instruments, Inc. is passing out samples of its 256K-byte version; Intel Corp. and National Semiconductor Corp. will do the same in the first or second quarter of this year; Motorola, Inc. will be sampling in the second half of the year; and Advanced Micro Devices, Inc. should join the pack in early 1985.

In addition, greater sales and profits will yield greater research and development and capital investment dollars, making possible the first shipments of a 1M-bit chip by as early as 1986.

These and other key bits of semiconductor data have been made available by semiconductor management, which heretofore had been somewhat closemouthed.

■ Depending on whom you believe, it was either an administrative foul-up, a misunderstanding of commonly accepted protocol or a miserly act of Scroogian proportions.

But whatever the case, a lot of trade press and business press people were a bit upset with AT&T when the communications behemoth declined to pick up the luncheon tab for the press when company chairman Charles Brown spoke to the New York Security Analysts Society just before the holidays.

How upset? Given the then-announced demise of Western Electric Corp. and the impending Jan. 1 divestiture, Brown's appearance would ordinarily have drawn legions of media types. Perhaps a half-dozen actually showed up.

It wasn't the $20 luncheon fee that scared them off. The press simply does not pay to cover a news event. This long-standing practice made particular sense in this case, a luncheon for a $100 billion company featuring its chairman, whose intent was to take the podium and hit home-run balls. And the press wasn't allowed in without paying for lunch.

As a rule, according to the Analysts Society, the guest company picks up the press tab, no questions asked. Prior to its luncheon, AT&T reacted to the press protestations by saying it would have been silly for the company first to be invited to lunch, then to have to pay for a portion of it, albeit a very small portion.

Eventually AT&T saw the error of its ways and held a hastily called press conference the morning of the luncheon. The press conference was free of charge.

However, one attendee mentioned something about a collection plate next to the press table.

RETAIL

from page 71

come the "total solution" stores for specific markets. Big business, per se, has "not been identified as a specific group that we are going after.

At Computerland, according to Vice-President Don McConnell, the specific marketing strategy is to "support the franchisees' marketing efforts for whatever segment they are targeting. To the extent that they seek the Fortune 1,000 companies, we support them with products, training and customer support."

To that end, McConnell added, Computerland offers franchisees its Class program — Computerland Large Account Support Service — to assist in negotiating large account customers and providing ordering and invoicing services.

The benefit of dealing with computer stores for big business rather than a vendor's direct sales force, according to Entree's Savage, is that "a prospect is not locked into a single brand." Entree offers a mix of several popular micro brands and "has a very strong value-added concept." By offering servicing, training, education and support, he added, "we just don't sell them a piece of hardware and kick them out the door."

AT&T to aquire 25% of Olivetti

NEW YORK — In a move designed to power a major thrust into the European computer market, AT&T agreed just before the year-end holidays to pay $260 million to acquire 25% of Italy's Ing. C. Olivetti & Co. AT&T maintained an option to increase that stake to 40% after four years.

The deal involves the purchase for cash by AT&T of 100 million newly issued Olivetti shares sometime during the first quarter of this year.

Under the terms of the agreement, Olivetti will begin distributing AT&T's products, including switching equipment, private branch exchanges, software and microprocessors. AT&T, however, has made no agreement as of yet to distribute Olivetti's office automation products in the U.S., a market in which Olivetti is not a major player. Such an agreement is being negotiated, AT&T said.

In general, analysts felt that Olivetti's European market presence would be a major boon to AT&T in that sphere, while AT&T's financial backing and tech support would yield the greatest benefits to Olivetti. AT&T has a limited communications presence in Europe, due largely to the state-controlled communications systems in many European countries.

THE LEADING EDGE OF MINI

It's been going on for years.

Somebody comes out with a grown-up version of last year's mini. It sets a new standard of performance. So the whole industry follows along.

Not to be outdone, somebody else sets a new standard for price. And everybody rushes to catch up all over again.

There's only one little problem. So far, nobody's ever given you leading edge performance and a hot new price on the same system.

Well, at Wicat, we took a good hard look at this particular kind of progress. And headed 180 degrees the other way.

Instead of parading out one grown-up mini after another, we created the first generation of grown-down mainframes.

There are seven of them in all, from a single-user desktop to a full-blown 48-user system. And from the bottom of our line to the top, we'd like you to compare our price/performance

COMPUTER INDUSTRY

EXECUTIVE CORNER

■ Herbert M. Shaener has been named vice-president and general manager of the new Desktop Division of Data General Corp.

■ Michael Barber has been named vice-president, manufacturing operations, at Micom Systems, Inc.

■ David J. Stewart has been promoted to vice-president, development programs, for the System Sciences Division of Computer Sciences Corp.

■ James F. Farem has been named vice-president of manufacturing at Fortune Systems Corp.

■ Jerald R. Higgins has been promoted to vice-president, worldwide systems sales for Zilog Systems, a division of Zilog, Inc.

■ Arthur D. Lambert has been named vice-president, North American sales for Zenith Data Systems Corp.

■ Dr. John Francis Lubin, professor of management at The Wharton School, University of Pennsylvania, has been elected to the board of directors of Data General Corp.

■ D. T. Wiles, chairman of the investment banking firm of Hambrecht & Quist, has been elected chairman of Magnuson Computer Systems, Inc. Magnuson Computer Systems has been operating under the protection of Chapter 11 of the Federal Bankruptcy Code since March.

■ Martin Marietta Data Systems, Inc.'s Vice-President Shirley F. Pruitch has been named chairwoman of the National Bureau of Standards' Panel for the Institute for Computer Sciences and Technology for a three-year term. She will also serve as an ex officio member of the Board on Assessment of the National Bureau of Standards Programs.

■ Dean O. Morton, executive vice-president of Hewlett-Packard Co., was elected chairman of the board of directors of the American Electronics Association for 1984 at its recent board meeting.

■ Donald L. Steele has been appointed vice-president of University Computing Co. and general manager of its applications software division.

■ Computer Consoles, Inc. has announced the appointment of four vice-presidents. They are David M. Danehak, central engineering; Robert J. LoFaso, corporate marketing services and support services; John M. Murphy, controller; and Jeffrey N. Waxman, office systems sales.

■ Kevin Billingham has been appointed vice-president of business development, and James D'Arezzo has been named vice-president of corporate communications at Compaq Computer Corp.

■ Peter A. Chiaramop has been named vice-president and general manager of the Marketing Division of Computervision Corp.

■ Dennis D. Hilding has been promoted to vice-president, sales, and Ray A. Wilson has been promoted to vice-president of the Computer Services Group at NCA Corp.

■ James S. Campbell, former president of Shugart Corp., a Xerox Corp. subsidiary, has been appointed president, chief executive officer and chairman of Fortune Systems Corp.

■ Larry D. Welkwer has been promoted to vice-president, product development, and Roger M. Lane has been named vice-president, customer service logistics, at Datapoint Corp.

NICKELS & DIMES

Systematics, Inc. has announced second-quarter revenues of $18.6 million and net income of $1.4 million, up 18% and 15%, respectively, over second-quarter last year.

■

Moody's Investors Service has raised the rating on the senior debt of NCR Corp. from A2 to A1. The change affects approximately $248 million of debt. Moody's has also assigned a Prime-1 rating to the commercial paper of NCR Credit Corp., a wholly owned NCR Corp. subsidiary.

■

Software AG Systems, Inc. has reported revenues of $9.9 million and net income of $1.3 million, or 21 cents per share, for second fiscal quarter ended Nov. 30, compared with revenues of $7.2 million and net income of $370,000, or six cents per share, for the same period last year.

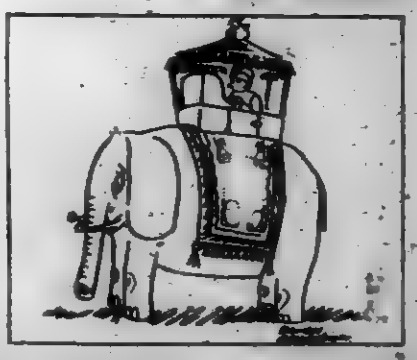
■

Management Assistance, Inc. has announced revenues of $376 million for fiscal year 1983 compared with $358 million for the previous year. Net income was down for the year at $1 million, or 14 cents per share, compared with $7.5 million, or 92 cents per share, for 1982.

■

Moody's Investor Service has lowered its rating on Digital Equip-

Continued on page 82



COMPUTER TECHNOLOGY.

to any grown-up micro or mini you can think of.

Better yet, all Wicat systems give you the same mainframe operating system. So you can move up to a whole new level of performance. Without sacrificing one cent of your original software investment.

What's the operating system? That's your decision. You can have your own MCS, or the industry standard UNIX.* And we give you all the language compilers you could ask for. Nine of them, at last count.

So if you're ready for a direction that makes a lot more sense, call or write us for complete information. Wicat Systems, P.O. Box 539, 1875 South State, Orem, UT 84057. (801) 224-6400.

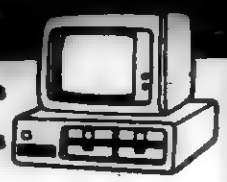
We'll show you how to stay right out there on the leading edge. Without going over it.

WICATsystems™

The grown-down mainframes.

*UNIX is a registered trademark of Bell Laboratories.

ON-SITE MAINTENANCE SERVICE



- Maintenance contract prices up to 50% less than manufacturer's rates
- Fast response time — over 100 field technicians
- Most brands of equipment serviced
- On-site user training programs available

CALL FOR BROCHURE & PRICE LIST

LEWIS BUSINESS MACHINE SERVICE COMPANY
251 Park Avenue South, New York, N.Y. 10010
New York (212) 477-1988 • New Jersey, Connecticut, Massachusetts (800) 421-6782

Continued from page 81

ment Corp.'s $75 million sinking fund debentures from Aa1 to Aa2. The company's commercial paper rating remains unchanged at Prime-1. The action reflects DEC's lower operating profit margins and Moody's belief that those margins and profitability will remain under pressure over the intermediate term.

■

Electronic Data Systems Corp. has reported revenues of $176.4 million and profits of $16.8 million for the first quarter of fiscal 1984, up 23% and 24%, respectively, over the same period last year.

■

IBM has declared a regular quarterly cash dividend of 95 cents per share on common stock payable Dec. 10 to holders of record Nov. 9.

SUPERSHORTS

Wang Laboratories, Inc. has licensed text-to-speech technology from Speech-Plus, Inc. of Mountainview, Calif. The software technology uses 400 letter-to-sound rules and an exceptions dictionary with 3,000 entries to convert serial Ascii English text to immediately intelligible spoken English.

■

Shand, Morahan & Co. has formed an EDP Risks Department as the result of increasing awareness of loss potential in the computer field. The underwriters in the new department will concentrate solely on data processing risks, including unauthorized computer access coverage, electronic data processing professionals' errors and omissions coverage and the development of other computer-related policies.

■

Burroughs Corp. and Telex Computer Products, Inc. have announced their intention to form Plasma Graphics Corp., a jointly owned company that will manufacture and market a line of advanced flat panel information displays for use with computers and electronic instruments. Upon completion of definitive agreements, Plasma Graphics will begin operations in the first quarter of this year at a Plainfield, N.J., facility.

■

R. F. Hutton, which recently announced the Huttonline financial information service, will offer Quasar Corp.'s Quik-Link 300 terminal to Hutton subscribers on a value-added basis with the Huttonline service. Quasar President Jim Lokey said the terminal offered through Hutton's network of 5,000 brokers will be programmed to permit easy access via automatic logon to the Huttonline service. Hutton clients will be able to order a Quasar terminal directly through their account executives and to charge their purchase directly to their R. F. Hutton accounts.

■

Sony Corp. of America has formed the Sony Component Products Division "to serve the expanded ... [OEM] market in the United States," according to Kenji Tamiya, president and chief operating officer.

■

Dartmouth College has signed a contract with Apple Computer, Inc. as part of an overall plan to enable all incoming freshmen to acquire a personal computer at reduced cost by the fall of 1984. According to the agreement, Dartmouth will purchase at least $2 million in Apple equipment over the next three years, including products not yet on the market.

■

Wang Laboratories, Inc. has announced that Cobe Corp. of Madison, Wis., has been selected as an independent sales organization, bringing together Wang's computer technology and Cobe's experience in financial institution informational management. Cobe will market its Cobe-One financial programs on Wang's 2200 series of computers.

How can you afford to have an office full of computer equipment that can't communicate?

XLAN™ lets your mini and micro computers, along with related peripherals, talk to each other. Regardless of type, brand, or nationality.

Because XLAN is compatible with virtually all kinds of computer equipment, its versatility makes networking easy. Your office is connected with an inexpensive shielded-pair cable. It's economical to install and maintain, and it easily permits network additions or reconfigurations.

XLAN was designed for easy use. And cost-efficient operation. Think of it as a computer party line for sharing information and resources. The simple network from Complexx. XLAN.

Complexx Systems, Inc., 4930 Research Drive, Huntsville, AL 35805
205/830-4310.

COMPLEXX™

POSITION ANNOUNCEMENTS

Applications are invited from qualified applicants for the position of Executive Director of the Washington Library Network (WLN). WLN is an automated bibliographic service to libraries in eight western states and provinces, providing a wide range of library processing and information functions. A study by Peat, Marwick, Mitchell & Company to be completed in early 1984, will help determine future marketing and governance directions.

Opportunity for well-qualified manager to direct a high-technology agency toward continuing success.

The Director should:

- —be responsive to the WLN membership in developing an innovative program of automated bibliographic services for libraries.
- —provide effective day-to-day leadership to WLN operations, working with a diverse team of highly motivated data processing and library professionals.
- —exhibit managerial skills with substantial data processing administrative experience. Experience in a library setting is desirable but not required.
- —work with diverse groups in coordinating a productive pursuit of WLN goals and objectives.

The Director currently reports to the WLN Executive Officer, who is the Washington State Librarian.

This position is exempt from the Washington State Civil Service System, contingent upon Washington State Personnel Board approval.

Send detailed resume to:

Frederick G. Reuss
State Librarian
Washington State Library
Olympia, WA 98504
(206) 753-4018
An Equal Opportunity Employer
Closing Date: February 15, 1984

VP DATA PROCESSING
Mortgage Banking Firm

Alexander Grant & Company is assisting a mortgage banking client in recruiting a Vice-President of Data Processing. This is an excellent opportunity to join the management team of a successful, growth-oriented,diversified mortgage banking firm located in the Southwest. The Vice-President of Data Processing will establish an in-house department, direct the conversion of systems from outside processing services, and expand the use of information systems technology in the organization.

Candidates should have:

- Demonstrated management ability
- Knowledge of the mortgage banking industry
- Planning and project management skills
- Experience in dealing with advanced technology (IBM experience preferred)
- High degree of self-motivation and professionalism

Send your resume and compensation history in confidence to

Alexander Grant

Regional Recruiting Director
1800 One Dallas Centre
Dallas, Texas 75201

An equal opportunity employer
No agencies please

BRIGHT FUTURES AT LOCKHEED-AUSTIN.

Engineering and computer specialists interested in advanced military tactical support programs will find Lockheed's division in Austin, Texas, to be extremely interesting.

Lockheed has formed the division to concentrate on some major tactical support programs. They include command and control and target location systems and are active programs for the Army, Navy and Air Force. For those seeking challenge, immediate openings exist for:

★ **ATE DESIGN ENGINEERS**
Several positions exist for engineers at various levels to design avionics test programming sets. A BSEE or equivalent plus 4 years of related experience are required. Some digital design concepts and communication theory with micro-processing-based test equipment background are desirable. Experience with EQUATE/ATLAS is a definite plus.

★ **REAL-TIME SYSTEMS PROGRAMMERS**
Requires a BS and 4 years experience in Assembly language. Prefer applicants with Rolm 1666/Data General NOVA computers and military systems.

★ **SOFTWARE SPECIALISTS - Ada**
Capable of design and development of applications, systems and data communications S/W. Prefer candidates with experience in Ada, graphics display, C³I applications and MIL-STD-SPEC standards.

★ **RF/MICROWAVE ENGINEERS**
Background in R.F. antennas, microwave power supply design, and computer-aided design and analysis will assume responsibility for UHF/VHF data transmission systems on a major program. Automated bus driven R.F. test equipment experience also desirable. Requires BS and 4 years experience in R.F. system design, analysis and testing.

★ **EMC/EMI ENGINEERS**
Background in R.F./microwave systems and digital electronics systems design and analysis. Will assume responsibility for EMC/EMI and TEMPEST activity on major programs. Requires BS and 2 years experience in electronic system/circuit design, analysis and EMC/EMI testing. Experience in TEMPEST requirement satisfaction desirable.

★ **INFRARED (IR)/ELECTRO-OPTICS ENGINEERS**
Positions exist for engineers with a background in IR component/system design, analysis and test. Will assist a major program to develop an IR detection and imaging system. Requires a BS and 4 years related IR/electro-optics system design experience.

★ **SIGNAL PROCESSING SYSTEMS ENGINEERS (C³I)**
To analyze communications and/or radar systems performance; develop conceptual designs and computer simulation tools; and support integration of signal processing algorithms in major C³I systems. Knowledge of wave form signature analysis, statistical pattern recognition, algorithm development, technical threats and mission scenarios is a must. Educational background in advanced modulation detection, estimation theory and aircraft interface design is desirable.

Lockheed offers unmatched opportunity with plenty of room to grow. And in Austin's pleasant setting, affordable living makes excellent salaries go even further.

Lockheed-Austin's exceptional wage and benefits package includes medical, dental and life insurance. A retirement plan is provided, along with much more.

Qualified candidates should send resumes to: Professional Employment, Dept. 653-0184, P.O. Box 17100, Austin, TX 78760. Lockheed is an equal opportunity, Affirmative Action employer. U.S. citizenship is required.

Lockheed-Austin

DATA PROCESSING

PENTAMATION
VAX SYSTEMS ENGINEER

Growing Lehigh Valley based OEM, marketing hardware/software packages to the health care and education industries, nationwide, seeks an SE to serve as in-house Systems/Software Consultant and troubleshooter for entire VAX family. BA/BS and a minimum of 2 years intensive VAX systems software experience required. Send resume to:

PENTAMATION
Enterprises, Inc.
One Bethlehem Plaza, Bethlehem, PA 18018
An Equal Opportunity Employer, M/F

COMPUTER EDUCATION SPECIALIST

Arkansas State University has two positions of computer education specialists. Minimum qualifications include earned doctorate or equivalent work experience in information systems or computer science. Duties include advisement regarding computer education and instruction of courses in information systems and computer science. Salary competitive and commensurate with qualifications and experience. Send curriculum vitae with letters of reference and transcripts of graduate work to Director of Personnel, Box 2169, State University, AR 72467. ASU is an AA/EOE.

DIRECTOR OF MANAGEMENT INFORMATION SERVICES

Dundalk Community College, a public comprehensive college serving Southeastern Baltimore County Maryland, has an opening for a Director of Management Information Services to assume overall responsibility for managing computer resources in a distributive environment.

The college is currently functioning within a shared-computer environment and utilizes a host mainframe (IBM 4341). The college is committed to a path of development which will provide for enhanced and expanded local capabilities while at the same time maintaining potential interface with the host mainframe. Accordingly, the candidate selected will, in addition to normal administrative functions, coordinate and design the development of new systems to meet both administrative and academic computing needs.

Successful candidates will have five or more years of relevant technical experience in computer operations, programming and systems design, preferably in an educational environment including at least two years of experience in a project management capacity. They will possess demonstrated knowledge of a variety of hardware and software, distributive management systems and information systems design, and will also demonstrate the proper blend of ingenuity, commitment and interpersonal skills.

For application and a copy of the job description call (301) 522-4288 or write Personnel Office, Dundalk Community College, 7200 Sollers Point Road, Baltimore, MD 21222.

Applications must be postmarked no later than February 10, 1984. EOE/AA.

SOFTWARE SUPPORT SPECIALISTS

NEW CONCEPTS IN CUSTOMER SUPPORT OPEN EXCITING CAREER PATHS IN THE ROCKIES.

Our accelerated growth in providing state-of-the-art software support has created exceptional opportunities for highly motivated, technically proficient specialists. You'll be in the forefront of computer technology as part of Digital's most advanced Customer Support Center, staffed by teams of specialists. Equipped with virtually unlimited computer resources, the Center provides software support to our customers throughout the U.S. and Canada. Join us for this unique opportunity.

We want to talk to you if you have: the communications skills to consult with our customers on a one-to-one basis, the ability to work as a team member while researching and structuring innovative solutions to complex software problems, and the drive to take full advantage of the technical and managerial growth opportunities our expansion will create.

If you're interested in and qualified for one of the following positions, write to us this week.

TOPS-20/TOPS-10—requires at least 1-5 years of operating system support experience with DECSYSTEM-10's, DECSYSTEM-20's or other large time-sharing systems. Applications experience in several high-level languages preferred.

VMS—requires at least 2 or more years of application and/or system software experience. Experience with VAX/VMS software a plus.

DECnet—requires at least 1-2 years' experience working with DECnet applications of VAX, RSX, and RSTS systems and a solid knowledge of communication protocols.

RSX—requires at least 2 years' applications or 1 year's systems experience with RSX-11M or RSX-11M-PLUS.

CTS-300/RT-11—requires at least 1 year's experience with applications and/or system experience.

PRESALES/TECH SUPPORT DIGITAL SYSTEMS—experience on at least one or more Digital operating systems or configurations.

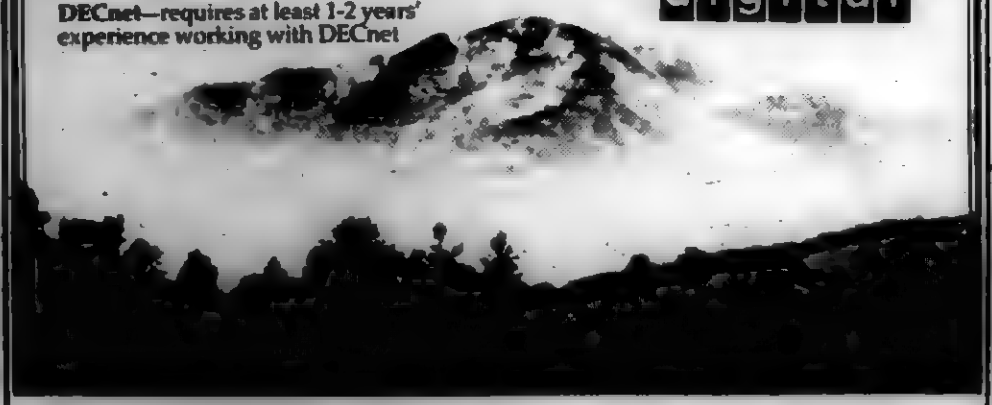
SENIOR FIELD SERVICE ENGINEERS—requires at least 3 or more years in a hardware engineering environment. 16-32-, 36-bit experience desirable.

All these positions offer competitive salary/benefits package plus relocation assistance to Colorado Springs, an area with a moderate year-round climate, a reasonable cost of living, and a wide variety of recreational and cultural attractions.

To apply, please send your resume to: Susan Chamberlain, Digital Equipment Corporation, Customer Support Center, Dept. 0109 3804, 4405 North Chestnut Street, Colorado Springs, Colorado 80907.

We are an affirmative action employer.

digital™



Data Processing

PYA/Monarch

PYA/Monarch, a division of Fortune 100 Consolidated Foods Corporation, is the third largest food service distributor in the U.S. We supply food and non-food products and services to restaurants, cafeterias, caterers, hospitals, schools and colleges, hotels and motels, etc., from coast to coast. Our corporation has grown from sales of $470 million to sales that now exceed $1 billion since 1978.

Greenville, South Carolina

Greenville, S.C. rests peacefully at the foothills of the Blue Ridge Mountains. Snow skiing, beautiful Carolina beaches and abundant lakes offer vibrant recreational opportunities. Combine the natural beauty with our low cost of living and Greenville, S.C. is a most inviting locale.

PYA/Monarch Opportunities

Because of PYA/Monarch's commitment to maintain our dominant position in the food service industry, our present MIS plan will put in place an information processing environment unequaled in the food service industry. We afford capable professionals the opportunity to fulfill their professional, personal goals within a dynamic, innovative, ever-changing IBM 3083, MVS, on-line environment.

Project Manager - Distribution Systems

Strong systems analysis and design skills required to direct systems development projects in purchasing, inventory management and sales analysis. Applicant should be familiar with Data Base Management concepts and have experience managing major development projects.

Programmer/Analyst - Distribution Systems

Applicant should have experience in the development of large mainframe based distribution systems. Specific areas of planned development are order processing, purchasing and inventory management.

Programmer/Analyst - Sales Analysis

Applicant should have experience with Data Base Management systems and the development of sales reporting systems. Position requires good written and oral communication skills.

Quality Assurance Analyst

Monitor applications systems development process to ensure compliance with departmental standards, develop and implement sytems test plans and assist in the development of user documentation and training material. Knowledge of systems development process is required.

Installation Representative

Installation of application software and training of user personnel. Degree or course work in Computer Science is preferred. Travel required.

Please send resume and an outline of salary history to:

Department BK
PYA/Monarch Inc.
P.O. Box 1328, Greenville, S.C. 29602

An Equal Opportunity Employer M/F

DIRECTOR OF INFORMATION SYSTEMS STRATEGY

A highly recognizable organization operating in 50 states is seeking a Director of Information Systems Strategy for its national Chicago-based location. This is a newly created, highly visible position responsible for establishing strategic and tactical consulting to affiliate companies. This position will lead a staff of systems consultants in providing state-of-the-art applications planning and technology assessment, comparative and competitive analyses, needs/problem identification, solution plan development and, implementation assistance.

EXPERIENCE REQUIREMENTS:

Candidate must be knowledgeable in the latest advances in information processing technology with a minimum of 6 to 8 years of experience in the following areas:

- Applications development for higher business systems using large scale IBM computers
- Equipment evaluation (CPU's Input/Output, COM, WP)
- Communications hardware and protocols, front ends
- Software evaluation (system control, language processors, applications systems, data base management)
- Capacity planning configuration management
- Installation and disaster planning
- Distributed processing

Excellent verbal and written skills are required. Travel up to 20-30%. BSEE, BS Computer Science, MBA or equivalent undergraduate degree required. We offer a highly competitive salary and an excellent fringe benefit package. Interested candidates send resume with salary requirements in confidence to:

Dept. J8
P.O. Box 11118
Chicago, IL 60611

IF YOU ARE A CAREER ORIENTED EDP PROFESSIONAL AND . . . .

. . . are interested in working in a state-of-the-art environment for a progressive, medium-size organization.

. . . would like to live in a white-collar, two university town with excellent schools, shopping, recreational and cultural opportunities.

The Country Companies, an all-line insurance group located in Bloomington, Illinois, has multiple openings for qualified individuals.

SENIOR SYSTEMS ANALYSTS
SENIOR PROGRAMMER ANALYSTS
PROGRAMMER ANALYSTS
SYSTEMS ANALYSTS

These positions (determined by applicant's level of experience) require a minimum of two years experience with business applications, COBOL and/or insurance applications experience required. Experience with structured analysis, structured programming, 8100-DPPX and IBM PC desirable.

SYSTEMS ANALYSTS
PROGRAMMER ANALYSTS

These positions (determined by applicant's level of experience) require a minimum of two years experience with business applications, COBOL and/or insurance applications experience required. Experience with structured programming, structured analysis, OSUCL, MVS, TSO/PF, CICS, PANVALET desirable. Knowledge in the following areas is useful: property and casualty insurance processing, insurance accounting, systems development in an IMS environment. We also have an opening in Information Center for individual with experience in FOCUS and classroom training.

SENIOR DATA ADMINISTRATION ANALYST

Responsible for strategic data planning and for development and implementation of individual data bases. Strong experience in data administration necessary. Experience in one or more DBMS's, data dictionary, and/or insurance helpful.

SENIOR SYSTEMS ANALYST

This position requires technical competence in operations research, particularly as applied to design analysis and resource costing. Requires solid background in large IBM MVS/XP environment supporting complex ACF/SNA network. Prefer experience with SMF, TSO, TCAM, CICS, and IMS statistical analysis.

IF YOU . . . . meet the requirements for any of these positions and would like to make a positive career move, indicate position of interest, send resume and salary history to:

JACK FOWLER, Director of Employment
Illinois Farm Bureau
1701 Towanda Avenue, Bloomington, Illinois 61701

UNIX*/C

$25,000 to $50,000
APPLICATIONS & SYSTEMS
Over 300 Openings Nationwide
Client co's pay all fees
Call or send resume
in confidence to:
J. ROGERS ASSOC
(609) 771-8282
2999 Princeton Pike, Dept C-D
Lawrenceville, NJ 08648
UNIX is a trademark of Bell Labs

DP PROFESSIONALS

MEDICAL ENGINEERING, INC., a dynamic medical software firm, seeks qualified professionals for their Corporate Data Center. Hardware environment includes IBM Systems 34, 38, 38, 4341 using RPG II, RPG III, DOS/ VSE/VM, COBOL under CICS in a national communications network. Minimum 1-2 years experience in programming/design. BA or BS preferred. Send resume and salary requirements to: MEDICAL ENGINEERING, INC., 2675 Winkler Ave., Suite 108, Fort Myers, FL 33901 or call (813) 936-5211.

High Technology Consulting

Look to the FUTURE!

SEI's role and reputation continue to grow as one of the nation's leading project-oriented, high technology consulting organizations. SEI consultant teams' skills are in demand to specify and construct sophisticated systems and applications across the country.

SEI looks to the future with a variety of new, challenging, large-scale system development efforts. New SEI projects include industrial automation, advanced microprocessor systems, and support for the emerging cellular telephone industry. These projects, now getting under way, offer you an unparalleled opportunity to be involved in major applications and internals efforts from the ground up.

SEI is seeking first-rate professionals -- leaders and technical experts -- who also look to the future: Eager to learn, ready to work hard, serious about their careers, interested in the variety and challenge of consulting.

Look to YOUR Future!

DEVELOPMENT MANAGERS
$46,000-$75,000

Direct the planning, staffing, construction of major mainframe and microprocessor-based development efforts. We're looking for hands-on, technically-oriented managers, who lead from personal, practical experience in the construction of sophisticated systems.

Qualifications:

- Outstanding technical and leadership skills
- Familiarity with System Development and Project Control methods
- Strong background in microprocessor technology or IBM mainframes
- Minimum 8 years relevant experience

Positions in Chicago, New York, Phoenix, and San Francisco

APPLICATION DEVELOPERS
$31,000-$61,000

Get in on the ground floor of development for a major new support system for the communications industry -- Worldwide, Networked, Online -- One of the genuinely significant development projects of the 1980s. Help define the state of the art!

Qualifications:

- Working knowledge of Structured Analysis and Design
- Familiarity with large scale IBM environments and software: VM/CMS, OS/MVS, CICS, IMS, VSAM
- Minimum 6 years solid, real-world development experience
- Experience with FOCUS a plus

Positions in Chicago, New York, and Phoenix

TECHNICAL WRITERS
$31,000-$56,000

At SEI, Technical Writers are contributing consultants, not just editors of other people's drafts. SEI Technical Writers participate in all aspects of major development projects, studies, proposals, document preparation, quality assurance.

Qualifications:

- Outstanding writing and editing credentials
- Minimum 4 years experience in programming, system analysis, and design
- Exceptional good sense and broad perspective on EDP
- College level teaching experience a plus

Positions in Chicago, New York, and Phoenix

BUSINESS ANALYSTS
$38,000-$61,000

Your job? Determine what systems are actually supposed to DO! Perform requirements analyses, cost-benefit studies, preliminary system designs. Interact directly with top client personnel. Provide ongoing user advocacy and direction to development projects.

Qualifications:

- Broad technical skills, including a minimum 4 years experience in programming, system design, and analysis
- Working knowledge of Structured Analysis and Design
- Ability to communicate effectively with a wide range of business and technical people
- Writing/teaching experience a plus

Positions in Chicago, Los Angeles, New York, Phoenix, and San Francisco

MICROPROCESSOR SOFTWARE EXPERTS
$38,000-$75,000

SEI micro projects are major systems. Participate in the development of leading edge microprocessor-based products. Help establish development environments, port and tailor software, contribute to the development of firmware and hardware.

Qualifications:

- Working knowledge of micro-based operating systems, compilers, communications, I/O drivers, Local Area Networks, and software products
- Demonstrated skills in large-scale software development
- Minimum 6 years experience
- Experience with UNIX and 68000 a plus

Positions in Chicago, Los Angeles, Phoenix, and San Francisco

IBM SYSTEM INTERNALS EXPERTS
$46,000-$75,000

Construct and enhance development and production environments. Participate in custom tailoring, installation, troubleshooting, performance evaluation and tuning, capacity/configuration analysis and planning for systems and communications.

Qualifications:

- In-depth knowledge of IBM mainstream products including: CICS, IMS DB/DC, VM/CMS, OS/MVS, SNA/ACF/NCP/VTAM
- Outstanding assembly language programming skills
- Understanding of the interaction between systems and applications
- Minimum 6 years experience

Positions in Chicago, New York, and Phoenix

SEI offers top salaries, an imaginative personalized benefits package, unlimited opportunity for growth, and the challenge of working alongside other SEI consultants -- the best in the business.

For confidential consideration, send detailed resume:

Chicago:
Lorna L. Schroeder
SEI Information Technology
450 East Ohio Street
Chicago, IL 60611

Los Angeles:
Kathleen Radner
SEI Information Technology
5455 Wilshire Blvd.
Los Angeles, CA 90036

New York:
Gene H. Gleaser
SEI Information Technology
Suite 1700
122 East 42nd Street
New York, NY 10168

Phoenix:
Richard E. Shuman
SEI Information Technology
313 East Thomas Road
Phoenix, AZ 85012

San Francisco:
Steven J. Drach
SEI Information Technology
1750 Montgomery Street
San Francisco, CA 94111

SEI information technology

THE BUSINESS OF TECHNOLOGY

-- An Equal Opportunity Employer M/F --

JOIN A TEAM ON THE LEADING EDGE OF TECHNOLOGY!

Computer Consoles, Inc., designs, manufactures, markets, and services a variety of minicomputer-based fault-tolerant information systems. Located in Rochester, New York, we have all the cultural and educational advantages of a large metropolitan area as well as the ambience and scenic beauty of a small, relaxed town.

CCI currently has opportunities for:

GROUP LEADER/DEVELOPMENT SYSTEMS

You will be responsible for software, systems administration, and operations for 32-bit super minis using UNIX* as software development systems.

We prefer a technical degree with a minimum of 5 years' system and/or managerial experience. Knowledge of "C" and UNIX internals a must.

DATA MANAGEMENT SYSTEMS DESIGNER

You will be a member of a team responsible for designing and developing an interactive transaction data management system. This includes an integrated data dictionary, query editor and advanced files access method. A non-procedural commercial application generator and forms manager provide easy-to-use facilities for end-users. The total system is integrated into PERPOS™. CCI's multi-processor Power 5™ family of systems and office automation products.

We prefer a B.S./M.S. in C.S./E.E. plus 4-5 years' experience in system design and development of data management systems. Experience with UNIX and "C" is highly desirable.

SENIOR SOFTWARE ENGINEER

You will be responsible for the design and development of PERPOS™, a UNIX-compatible fault-tolerant operating system.

We prefer a B.S.C.S. plus 3-5 years' related experience. You must have UNIX, "C", and OS internals experience.

SENIOR SYSTEM SPECIALIST

You will be the lead designer and developer of advanced R&D projects that will extend CCI's Power Series of fault-tolerant systems.

An advanced degree with extensive experience in UNIX operating system development are required. Additional experience with other operating systems and hardware system design is highly desirable.

**UNIX is a trademark of Bell Labs.*

We offer challenging assignments, opportunities for growth, attractive compensation, and a benefits package that includes dental and profit sharing plans. Please send your confidential resume, including salary history and indicating position of interest, to:

CCI
COMPUTER CONSOLES INCORPORATED

Tom W. Foley
Computer Consoles, Inc.
97 Humboldt Street
Rochester, New York 14609

Equal Opportunity Employer M/F/H/V

VM Systems Programmers

At National, we have one of the largest and most sophisticated timesharing environments in the Santa Clara Valley. If that's the kind of environment you're seeking, consider these immediate opportunities.

You'll be part of the NSC Timesharing Services Computer Center, which supports all of National's engineering and general VM timesharing user community. You will be responsible for Sysgens, I/O Gens, operating system maintenance/upgrades, problem resolution, performance monitoring and system tuning.

Your background should include a BS/BA in computer science, math or equivalent, and three to five years' experience in a large IBM or IBM-compatible main frame environment.

To apply for this position, please send your resume to National Semiconductor, Dept. I.R. P.O. Box 62499, Sunnyvale, CA 94088, or call us at (408) 721-3004. We are an equal opportunity affirmative action employer. Principals only, please.

Let's talk about your career.

National Semiconductor

TECHNICAL COMPUTER SUPPORT

The Goodyear Tire & Rubber Company has openings for technical support people in the technical computing facilities at our Corporate Headquarters in Akron, Ohio. This facility is devoted exclusively to serving the corporate research, development and engineering community with a heavy emphasis on interactive and real-time systems. Education should include a B.S. degree in Math, Science or Engineering. Available positions include:

- IBM Systems Programmer: experience in MVS/TSO, VM/CMS, CICS, VTAM or TCAM required.
- DEC Systems/Application Programmers: experience in VAX VMS, communications, database, and real-time programming required.
- User Support: experience in interactive computing, VM/CMS, computer training, SAS, graphics and/or DSS tools required.

Send detailed resume and salary requirements in confidence to:

K.G. Easterling
Salaried Personnel

THE GOODYEAR TIRE & RUBBER COMPANY
1144 E. Market Street • Akron, Ohio 44316

GOODYEAR

MANAGER MIS TECHNICAL SUPPORT

Brockway, Inc (NY), a Fortune 500 Corporation which manufactures glass, plastic and metal containers has a challenging opportunity at its headquarters in northwestern Pennsylvania for a highly motivated MIS professional.

We are looking for a strong Manager with effective interpersonal skills to provide leadership and a responsive level of technical support to a professional staff of systems programmers and teleprocessing analysts. If you are looking for a highly visible position and have IBM 370, 4300 or 308X experience in addition to:

- Systems generation in VM, MVS, CICS environment.
- Proven ability as a results-oriented problem solver.
- Hardware and software evaluation ability.
- Telecommunications troubleshooting in an SNA/SDLC network.
- Extensive knowledge of design, programming, and maintenance of software.

We would like to talk to you.

Experience with one or more of the following is a definite plus: DOS/VSE, CICS/VS, VSAM, DL/1, IDMS, IDD, CULPRIT

We offer a competitive salary, excellent fringe benefits and the opportunity to develop your professional skills. For immediate and confidential consideration, send your resume and salary history to:

Lawrence Kutach • Manager Salaried Employment
BROCKWAY, INC (NY)
McCullough Avenue • Brockway, PA 15824

Brockway

We Are An Equal Opportunity Employer

CALIF. - UNIX*

- Port to parallel processor
- User friendly interface
- System V and BSD 4.2
- M68000 Port also

Agency inquiries invited.

CALL (714) 891-UNIX*

CPU COMPUTER PROFESSIONALS UNLIMITED, agency

7611 Garden Grove Blvd.
Ste. D, Garden Grove, CA 92641

**UNIX is a trademark of Bell Laboratories*

SYSTEM 36 PROGRAMMER/ANALYST

Peppermill, Inc., a multi-location company in Reno, Nevada, with activities in the restaurant, hotel, and gaming areas, is seeking an experienced Programmer/Analyst. The successful candidate will have a minimum of 5 years data processing experience and at least 1 year of RPG III programming. In addition, the candidate should also have good analytical skills so that they may work well in an independent environment. Experience in the restaurant, hotel, and/or gaming industry will be a definite plus. We offer an excellent starting salary and a full range of company benefits, including profit sharing. Qualified candidates should submit their resume, including salary requirements to:

Dick Elsner
Manager, Information Services
Peppermill, Inc.
3700 Grant Drive
Reno, NV 89509

EMPLOYMENT SERVICE FOR PROGRAMMERS AND ANALYSTS

National Openings With Client Companies
and Through Affiliated Agencies

Scientific and commercial applications • Software development and systems programming • Telecommunications • Control systems • Computer engineering • Computer marketing and support

Call or send resume or rough notes of objectives, salary, location restrictions, education and experience (including computers, models, operating systems and languages) to either one of our locations. Our client companies pay all of our fees. We guide, you decide.

RSVP SERVICES, Dept. C
Suite 700, One Cherry Hill Mall
Cherry Hill, New Jersey 08002
(609) 667-4488

RSVP SERVICES, Dept. C
Suite 211, Dublin Hall
1777 Walton Rd., Blue Bell, PA 19422
(215) 629-0585

From outside New Jersey, call toll-free 800-222-0153

RSVP SERVICES
Employment Agents for Computer Professionals

Question:

Why should you work at Tandem?

Answer:

Because not just anybody can.

A lot has been written about Tandem's success. We pioneered fault-tolerant computing. Tandem systems offer unparalleled flexibility and networking capability. And our work environment has been cited as an example of corporate excellence.

But we couldn't have come as far as we have without exceptional people. In fact, our revenues have grown 33% in 1983. So, while we are growing rapidly—and have many opportunities for Sales Representatives, Systems Analysts, and Customer Engineers—we're still very selective about who we hire.

What's so special about Tandem People?

Commitment. From the shipping dock to R&D, everyone at Tandem is committed to the ongoing success of the company. And with good reason—everyone shares in the success of the company. One indicator is the fact that over one-third of Tandem stock is held by our employees.

Tandem people are also extremely professional. Our unique, decentralized structure demands people who accept responsibility willingly, because everyone is given a rare degree of autonomy.

If you're looking for a place where your colleagues are highly motivated, dedicated professionals, then you're somebody we'd like to talk to. Apply now for one of these excellent career opportunities with Tandem:

Systems Analysts

We're looking for talented Systems Analysts to provide pre- and post-sales support, including sizing and configuration planning, design analysis, applications design, benchmarks, and technical presentations. You will also evaluate user education requirements, and generally plan smooth installations with our Sales Representatives. *Additionally, we're looking for experienced educators and design support personnel.* These positions require a minimum of 6 years' applicable experience, with a thorough knowledge of one or more of the following: OS internals, data communications protocols, database design, or project management in an on-line environment.

Sales Representatives

We're looking for Sales Representatives to work with customer upper- and executive-level management in FORTUNE 500-sized organizations to sell Tandem systems and aid in their installation. Your commissions will be limited only by your ambition. These outstanding opportunities call for aggressive, professional salespeople with over 5 years' proven ability to sell large business systems.

Customer Engineers

To keep our systems performing flawlessly, Tandem is looking for Customer Engineers to work with clients. Responsibilities include the installation, maintenance, troubleshooting and repair of Tandem systems, including peripherals and controllers. To qualify, you should have at least 5 years' extensive hardware support experience with large-scale computer systems.

How to apply

Western Division

To apply for positions in Northern California, call Janet Heckman at (415) 777-1230, or send your résumé to her attention: Tandem Computers, Inc., 4 Embarcadero Center, Suite 3000, San Francisco, CA 94111.

For positions in all other states west of the Rockies, call Lisa Deutschman at (408) 970-4386 or send your résumé to her attention: Tandem Computers, Inc., 2820 San Tomas Expressway, Santa Clara, CA 95051.

Central Division

Encompassing the entire Midwest as far south as Texas and as far east as Pittsburgh.

Send your résumé to Steve Sleffuick, Tandem Computers, Inc., Two Woodfield Lake, 1100 Woodfield Road, Suite 450, Schaumburg, IL 60195; or call (312) 884-6684.

Eastern Division

Including the entire Eastern Seaboard and southern states as far west as Mississippi.

Contact Mark Lynch, Tandem Computers, Inc., 12100 Sunrise Valley Drive, Reston, VA 22901.

Tandem is an equal opportunity employer, m/f/h/v.

Principals only, please.

TANDEM

Makers of TXP,* the most powerful on-line computer in business today.

*TXP is a trademark of Tandem Computers, Inc.

Cullinet is one of the country's most respected and financially successful computer software companies, with an annual growth rate of better than 50%. In fiscal 1984, our expanding customer base is driving revenue growth at 62% and creating exceptional opportunities for talented professionals who share our commitment to excellence.

Manufacturing Applications Support

Post-Sales

Successful candidates will assume responsibility for manufacturing software support at customer locations, and provide education in manufacturing applications internally and externally. Qualified candidates must possess a minimum of 5 years' DP experience in manufacturing applications demonstrating a solid understanding of the user environment. Programming or system design experience and well developed interpersonal/communication skills are essential. Additionally, the ideal candidate's background will include combined experience in customer support, vendor application software, and software installation. Project leadership talent required. Openings are available in:
• Los Angeles • Cleveland • Denver • Edison, NJ • Chicago • Detroit

DB/DC Consultants

Field Support

You'll be responsible for software installation and customer education, as well as database and applications systems design reviews, including interface with user management and technical representatives. To qualify, you must possess a minimum of 3-5 years' systems programming experience using Assembler on OS, DOS, MVS, VSI operating systems or several years as a database administrator involved in the design, implementation and testing/tuning of a database such as IMS, IDMS, or TOTAL. Teleprocessing background (CICS, IMS-DC, Shadow) would be helpful. Openings are available on the following cities:
• Washington, DC • Atlanta • Charlotte • Tampa • Chicago • Minneapolis • Cleveland • St. Louis • Detroit

Customer Support Manager

New York City

The successful candidate must possess 7-10 years' DP experience in a large IBM mainframe environment and 3-5 years' background in management to assume a key role managing a team of post-sales technical support specialists responsible for the implementation and installation of systems and applications software. You'll ensure customer satisfaction for an assigned group of major accounts, utilizing a strong marketing/business orientation, solid interpersonal/communication skills and familiarity with recruiting, hiring, training and expense control.

Marketing Support Representatives

Pre-Sales

These key positions throughout the U.S. require extensive systems level experience with IBM-based DB/DC software in an on-line environment. A solid grounding in operating systems is essential. Superior communication and people skills are a must. Vendor experience in supporting technical sales is a definite plus.

Candidates interested in challenging careers involving extensive travel may explore these and other opportunities throughout the U.S. by writing to C.H. Levy, Dept. CW-1984, Cullinet, 400 Blue Hill Drive, Westwood, MA 02090. Candidates for positions in this advertisement should include resume and **must** specify position of interest and geographic preference.

An Equal Opportunity Employer

Cullinet

FIELD ENGINEERS

Dataserv Computer Maintenance is expanding nationwide. We now have immediate openings in major cities and will be adding more in the near future.

These are key positions and provide excellent opportunities that will lead to further promotion in a fast growing company. Excellent compensation plan and good fringe benefits for experienced individuals. Your potential for personal advancement with a $100 million plus company is the greatest right now as we expand.

We now have immediate openings in these cities for these positions:

San Diego, California — FIELD ENGINEER
Immediate opening for experienced Field Engineer for support of IBM 3600 banking equipment.

Des Moines, Iowa — FIELD ENGINEER
Excellent opportunity for experienced Field Engineer to work on 327X, 3420 and 3211 equipment.

Richmond, Virginia — FIELD ENGINEER
We have immediate opening for experienced I/O Field Engineer to maintain IBM disk and tape equipment.

Dataserv will soon have additional opportunities for field engineers and technical specialists in several other major cities throughout the United States. If you are considering a change in employment, contact Dataserv for a review of what we have to offer.

For immediate consideration and more information call Toll Free — 800-328-6729 or send your resume to: Bev Walters, Dataserv Computer Maintenance, Inc., P.O. Box 3003, Hopkins, MN 55343. We are an equal opportunity employer and all inquiries are considered confidential.

dataserv

Sr. Scientific Programmers

Challenging positions available for Sr. level Scientific Programmers to work at our Kenilworth or Lafayette, New Jersey sites. We require a BS/MS in Computer Science, Mathematics or related field. Candidates should have knowledge of INQUIRE, SAS, and TSO. Responsibilities will be diversified and directed to clinical research studies.

Interested candidates should send resume to: Ms. Irene Brenneman, Schering-Plough Corporation, 2000 Galloping Hill Road, Kenilworth, New Jersey 07033.

Schering-Plough
We Are An Equal Opportunity Employer M/F

A DYNAMIC DIFFERENCE IN YOUR CAREER

Dynamic Control is the nation's leader in developing healthcare software systems. We have entered into a complementary marketing agreement with IBM Corporation which has increased our volume and our need for experienced systems professionals.

Programmers
Programmer/Analysts

Make the most of your experience in coding RPG II on System/3 or System/34 or RPG III on System/36 in an interactive on-line environment. A minimum of 3-3 years coding experience may qualify you for projects with national or international travel, competitive salary and benefits, and advancement potential.

Financial Installers

You will work with hospital financial staffs to assist with the installation of automated financial and accounting systems. Other duties will include training of customer personnel and system modifications. We require hospital accounting and hands-on experience with an automated hospital information system.

At Dynamic Control in Orlando, you'll enjoy our ideal year-round climate along with the absence of state income tax. We also have openings in our Bethesda, Maryland office. For immediate consideration, please send your resume to the address below or call Personnel, TOLL FREE, 1-800-327-5352, or from within Florida, call COLLECT, 305-671-4483. Dynamic Control, Personnel Department, 1311 S. Semoran Blvd., Winter Park, FL 32792.

Dynamic Control
A Division of Travenol Laboratories, Inc.
An Equal Opportunity Employer M/F

A small (700 full-time, 700 part-time) middle-sized arts college in North-central Illinois is seeking a Computer Scientist to fill a tenure-track faculty position. Applicants must: 1) Have a Master's Degree in Computer Science or a related field; 2) Have excellent teaching recommendations; 3) Be qualified to teach at least two of the following -- BASIC, FORTRAN, PASCAL, COBOL, ASSEMBLY; 4) Be qualified to teach upper division computer science courses. Preference will be given to candidates with any of the following: 1) Expertise in DBMS, Business info systems, Systems analysis and design; 2) Computer graphics; 3) CAD/CAM; 4) Ability to teach Mathematics-Statistics; 5) A doctorate in Computer Science or related field; 6) Computer-related experience outside of an educational institution.

Duties will consist of teaching approximately 12 hours/week/semester, advising students, and contributing to the development of young (four years old) Computer Science Department. Present computing facilities include an IBM 4341 Model 2 with CP and MUSIC operating systems, two disc drives, one tape drive, two printers, 20 terminals (with color graphics), and the microcomputers.

Rank and salary competitive and based upon qualifications. Attractive benefits program. Send vitae, credentials, and three letters of recommendation to: Dr. Gordon Weaver, Vice President and Dean of the College, Rockford College, Rockford, IL 61108-3393.

COUNSELOR/ PLACEMENT MGR
High base salary & incentives & stat fringe pkg.

Our EDP placement dept is heavily supported with lead & mail advertising. If you have a proven track record in data processing, are sales oriented, need challenge and want to participate in building a department in Southern California, contact Paul Gibson, Robert Half Personnel (213) 386-6805

RESUMIX GROUP OF LA Personnel Services
3660 Wilshire, Suite 2000
Los Angeles, CA 90010

Programming

SAUDI ARABIA

International engineering firm has the following positions open for its PRIME computer facility in Saudi Arabia supporting payroll, accounting, supply and general MIS applications.

PROGRAMMER/ANALYST

Minimum of 3 years' FORTRAN programming experience with emphasis on financial applications. Familiarity with PRIME or equivalent mini-computer system desirable. Degree required.

Benefits package includes:
- Furnished housing
- 6 day R&R to Athens
- Severance pay
- 2 weeks vacation
- Paid health and life insurance
- All transportation provided

Positions involve 1 year single status contract.
U.S. citizenship is required.
Please send resume to Dept. K-006.

PACIFIC ARCHITECTS AND ENGINEERS, INCORPORATED
1111 West 6th St., Los Angeles, CA 90017
Equal Opportunity Employer M/F

ROBERT HALF

EDP OPPORTUNITIES COAST TO COAST

Robert Half, staffed by EDP professionals for EDP professionals with 80 offices throughout the U.S., Canada & Great Britain, is the largest network of personnel consultants in the Data Processing field. And its establishment in 1948 also makes Robert Half the oldest. One call and you can search the local, national and international markets. All fees are paid by client companies, of course. The following is a partial listing of opportunities and locations:

ALBUQUERQUE

SYSTEMS PROGRAMMER

Expanding Albq, IBM large-scale shop. Requires CICS systems programming exp. Growth potential.
Start $28,000

Dick Starnes
ROBERT HALF
of New Mexico
P.O. Box 3220
Albuquerque, NM 87190
(505) 884-4967

TENNESSEE

SYSTEMS PROGRAMMER

Rapidly growing company needs 2–4 years OS, VS 1 or MVS programming experience. Must know Assembler, SMP and IBM Utilities. CICS installation background a plus! Position open due to growth. Co Paid Fee.
$28,000

ROBERT HALF
of Tennessee, Inc.
1101 Kermit Dr., Suite 407
Nashville, TN 37217
(615) 361-4800

ST. LOUIS

RPG II PROGRAMMER/USER

Southern Missouri manufacturer seeks individual with 2 yrs experience who will program in RPGII and manage the DP dept. WE work on development in a System 34 environment.
To $27,000

EDX/EDL SYSTEMS ENGINEER

St. Louis service firm seeks an experienced software engineer. Requires 6 years systems experience, demonstrated success in software design architecture and implementation of major system or subsystem, 16 Bit Mini/Micro Real-Time distributed data processing communications network environment.
$30–50,000

PROJECT MANAGER

Large, dynamic firm in St. Louis seeks individual with Series 1 background with COBOL OS/MVS in financial systems. CICS or BAL is a plus.
To $36,000

COBOL PROGRAMMER/ANALYSTS

Expanding Midwest service firm seeks individuals with structured techniques and 3–4 yrs of COBOL in an OS/MVS environment.
To $31,000

SR SYSTEMS ANALYST

Dynamic firm seeks an experienced systems analyst with a background in project management. Requires 3–5 yrs of COBOL with CICS. Good written and verbal communication skills a plus.
To $38,000

Randy Pace- Warner Coffman
ROBERT HALF
of St. Louis
7733 Forsyth Blvd.
St. Louis, MO 63105
(314) 727-1535

SEATTLE

EDP AUDITOR

Seeking individual with 3+ years experience as EDP auditor in manufacturing environment. Experience in IBM IMS COBOL shop ideal. Opportunity for advancement into general dp management position.
Mid $30's

O & P MANAGER

Area firm seeks O & P manager with experience in distribution industry. Must have experience managing large group of P/A's. IBM mainframe experience ideal. Salary Open

IMS SYSTEMS PROGRAMMER

Seattle headquarters of national firm seeks individual with 3 or more years experience supporting IMS and CICS. Responsibilities will include capacity planning and data base application design reviews. Excellent company which strongly supports its data processing function.
Salary DOE

DATA BASE ANALYST

Seeking analyst with experience using COBOL in IBM OS environment and 2+ years DL/1 to join data base group. This is an excellent opportunity to learn the fine points database design from a master.
$28–30,000

IDAHO

DOS SYSTEMS PROGRAMMER

Idaho firm seeks individual with 3 or more years experience supporting IBM DOS/VSE under VM. Telecommunications and some application programming experience helpful.
$28–32,000

Marjie Petersen
ROBERT HALF
of Seattle, Inc.
600 University St. #2300
Seattle, WA 98101
(206) 284-0000

MILWAUKEE

EDP CONSULTANT

Dynamic! This describes both the company and the individuals they are seeking. Requires 3+ years systems experience. Will be working on consulting staff of large public accounting firm. Must have desire to excel.
$28–32,000

SOFTWARE PROGRAMMER

Corporate data center seeks seasoned technical expert to support its DOS/VSE system. Opportunity to gain integrated knowledge as system migrates under VM to MVS. Requires 3+ years VM, CMS & DL/1.
$28–36,000

Brian Krueger or Dick Steil
ROBERT HALF
of Wisconsin
777 E. Wisconsin Avenue
Milwaukee, WI 53202
(414) 271-HALF (271-4253)

SAN ANTONIO

SYSTEMS PROGRAMMER

Degree preferred not req'd. 3+ yrs actual exp in Series 1 EDX–RPS performance area is a MUST. Audio response – Personal computer exposure a PLUS. Benefits are excellent – 4 day work week, Credit Union, pension, profit sharing, etc. Professional growth potential is superb.
$28–32,000 + Bonus

NETWORK ANALYST

Degree preferred not req'd. Must have good knowledge and working ability with SNA–VTAM (Gens and Dumps), Data set, modems, communications HP/IBM environment. Position is due to expansion – with exceptional opportunity to learn and grow both prof/earnings.
$30–33,000 + Bonus

All positions above and many more are in Texas where "Long Necks," "Armadillos" and the "Cotton-Eyed Joe" call home.

Bob Bobbed
ROBERT HALF
of San Antonio, Inc.
8343 IH 10 West, Suite 600
San Antonio, TX 78201
1-800-531-6402
In TX Dial (512) 736-5467

AUSTIN

SOFTWARE ENGINEERS

Assembly language. Knowledge of computer graphics, device drivers, programmable controllers or control systems.
$42,000

INSURANCE EXPERTS

IBM mainframe experience, COBOL or Assembly language.
$37,000

SYSTEMS PROGRAMMERS

OS/MVS or DOS/VSE experience. Multiple opportunities.
$30–48,000

DATA BASE EXPERTS

IDMS DB/DC or IMS DB/DC preferred.
$42,000

John P. O'Keefe
ROBERT HALF
of Austin, Inc.
400 E. Anderson #334
Austin, TX 78752
(512) 835-0883

NEW ORLEANS

P/A's

Univac 1100 w/ on-line apps, DMS1100/DDL/DML/MRP/ shop floor control.
$40,000

DATA BASE

Data base exp w/ DDL/SDDL/ CLP/DMS prog/logical & physical DB design. Openings in analysis, design & admin.
$40,000

ROBERT HALF
of New Orleans
P.O. Box 57629
New Orleans, LA 70157
(504) 835-4396

SAN FRANCISCO

SR SYSTEMS ANALYST

City firm seeks individual w/ 5–7 yrs DP and supervisory experience on IBM 4300/DOS, COBOL. Hands on experience w/DBMS manufacturing system and MRP modules required.
$35,000

PROGRAMMER ANALYST

Peninsula firm seeks individual w/ 3+ yrs DP exper w/ knowledge of acctg plcgs: MBA, ISA, ABC to work on appl dev team. OS/JCL, VSAM exper w/good debugging skills preferred.
$30,000 midpt

COMPUTER SERVICES MANAGER

City firm seeks individual w/ 3+ yrs supervisory operations exper. IBM preferred. Mainframe required. Telecommunications, data entry and control helpful.
Mid $30's

SR ANALYST

Peninsula firm seeks individual w/ 5–7 yrs exper in financial &/or insurance appl in IDMS (3 yrs min), COBOL/OS envir.
$37,000 midpt

PROGRAMMER ANALYST

City firm seeks individual w/2 yrs min Command CICS, familiar w/ VM envir (CMS). DOS/VSE, JCL, VSAM. Sys prog exper a plus.
$28–30,000

PROG ANALYST II

City firm seeks programmer w/ 3+ yrs HP 3000/COBOL exper to work in development.
$28–32,000

ASST TO ADMIN OFFICE AUTO

City firm seeks individual to assist Administrator in all areas of DP, WP and acctg. Telecommunications and DP user exper on IBM/36 plus Micros helpful.
$20–40,000

Pamela Brown
ROBERT HALF
of Northern California
111 Pine Street, 15th Floor
San Francisco, CA 94111
(415) 434-1900

WASHINGTON

EXPANDING DATA CENTER

Growth opportunity in the nation's capitol! Rapidly expanding DC based firm seeks several experienced programmer/analysts. COBOL required. CICS preferred. Excellent benefits including tuition assistance.
$30,000

ROBERT HALF
of Washington
7316 Wisconsin Ave.
Suite 401
Washington, DC 20814
(301) 652-1350

WESTERN MICHIGAN

SOFTWARE SPECIALISTS

Progressive companies offer 3 tech careers. Senior MVS person for leadership role in conversion.
To $40,000

Promotable tech specialists, MVS preferred, ACF/VTAM accepted.
To $37,000

DOS/VS or VSE staff position, will train person with 1–2 years exposure.
$25–30,000

Joe Grabinski
ROBERT HALF
of Western Michigan, Inc.
Suite 302, 160 Division N.
Grand Rapids, MI 49503
(616) 459-5333

BOSTON

DIR-TECH SVCS

Fast-track $2B firm seeks proven mgr to oversee the DBA & tech support depts. Multi-CPU IBM OS/MVS IMS DB/DC shop. Super oppty to manage tech growth of fast paced org.
$50,000

OS/MVS SYS PROG

Prestigious fin'l svcs co offers challenging oppty for BAL internals pro. You should have solid networking know! in an IBM OS/MVS IMS environ. Upward mobility for the internals specialist.
$35,000

IMS TEAM LDR

Exciting career oppty awaits the tech skilled ldr. You should have strong IBM OS/MVS IMS DB/DC COBOL bkgrd for this Fortune 500 org. Hvy admin/tech involvement with development tech support grps.
$35,000

ROBERT HALF
of Boston, Inc.
100 Summer Street
Boston, MA 02110
(617) 423-1360

PROVIDENCE

SOFTWARE DEVELOPMENT

Multi software devel co seeks Sr P/A w/TOTAL data base and/or Mantis on-line exp. Lge IBM syst exposure. Retail syst know a plus. Trvl involved.
$35,000

ROBERT HALF
of Providence, Inc.
76 Westminster Street
Suite 900
Providence, RI 02903
(401) 274-6700

NEW YORK

PROJECT LEADER IBM/BAL

Prestigious fin'l service org has situation for top-flight candidate to assume responsibility for support of sophisticated acctg & fin'l reporting systems. This successful candidate will supervise small staff, in addition to heavy client contact in training, customizing and enhancing products. In-depth BAL programming exper coupled with JCL and access methods. Outstanding oppty with growth to manager position. Fee Paid.
$38,000

SYSTEMS PROGRAMMER TRAIN MVS

NYSE listed mfg in central NJ. 2+ yrs CICS exper required along with MVT or VS1 background to qualify for MVS training. Some applications programming also essential. This 3083 installation is expanding and moving into telecommunications. Excellent growth & learning oppty. Fee Paid.
$28,000

ROBERT HALF
of New York, Inc.
522 Fifth Avenue
New York, NY 10036
(212) 221-6600

SOUTHERN CALIFORNIA

PROGRAMMER ANALYST

Multiple openings for IBM COBOL P/A's with good CICS in financial and mfg environments.
To $36,000

ROBERT HALF
of L.A.
3600 Wilshire, #2000
Los Angeles, CA 90010
(213) 386-6805

HARTFORD

CAD/CAM

Multiple openings for indivs w/3+ yrs exp in CAD/CAM sys. These positions inc tech dev & sales. Suburban setting, full relos, + many perks.
$40,000+

IMS DB/DC

Outstanding oppty for indiv w/DB/DC. Must have exp in logical/physical Data Base design & strong tech skills. Suburban loc, many extras.
$40,000

LIFE SYSTEMS

Multiple sys oppys for exp'd prog's sys/analyst & proj ldrs for CT clients expanding 1984 req. These are on-line devel using IMS & CICS.
$30,000

DATA BASE (IMS or IDMS)

New position in small group to formulate data base design, modeling & architecture for long-range corp planning. 3 yrs exp in data base qualifies for this hi-vis staff position.
$30,000

SR SYS ANALYSTS

CICS, COBOL & BAL or CICS appl bkgrd req'd for Sr M oppys fin'l svcs co for indiv seeking more devel proj's.
$30,000

MFG SYSTEMS

Sys analysts & proj ldrs req'd for growing mfg co. Bkgrd should incl IBM DOS/VSE or HP3000 & Data Base exp. Oppty to install distrib sys in US & overseas.
$40,000

ROBERT HALF
of Hartford, Inc.
111 Pearl Street
Hartford, CT 01603
(203) 278-7178

BUFFALO

SYS-36 P/A

Join prof staff supporting newly installed IBM Sys-36 in upstate NY. Ideal app has at least 3 yrs in RPG III in either Sys-3 or 34 data ctr. Exposure to RPG III a +. Addt exp in mfg helpful. A small DP ctr in a lge corp.
$28,000

ROBERT HALF
of Buffalo, Inc.
1210 Liberty Bldg.
Buffalo, NY 14202
(716) 842-0801

MINNEAPOLIS ST. PAUL

SYS PROGRAMMERS THROUGH PROJECT LEADERS

An exciting and growing company offers you a challenging, state-of-the-art environment where your ability in interpersonal relationships are as important as your technical abilities. Company offers fast advancement. All new development. Requires 2+ yrs IBM, COBOL, MVS and programming exp. Job #4632.
Salary $28–35,000

Mark David
John Miller
ROBERT HALF
of Minnesota, Inc.
3600 IDS Center
Minneapolis, MN 55402
(612) 339-0091

FREE:
Ask for our latest Salary Survey.

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

KINGDOM OF SAUDI ARABIA
KING SAUD UNIVERSITY
ABHA BRANCH
ABHA SAUDI ARABIA

COMPUTER CENTER

The Department of Computer at King Saud University, Abha Branch has available the two following positions for the Academic Year 1983/84 which starts Febuary 1984

A. COMPUTER SERVICE MANAGER

QUALIFICATIONS REQUIRED

- Full Knowledge of Arabic language (reading and speaking
- Master Degree in Computer Science
- Several years of working experience in computer center
- Ability to recruit and train new staff
- Knowledge of MIS

JOB DESCRIPTION

- Managing the Computer Center
- Teaching some computer courses
- Training personnel for the computer center
- Improving computing facilities
- Developing computer programs for the University Branch Administration and the College

B. PROGRAMMER

QUALIFICATIONS REQUIRED

- Bachelor Degree in Computer Science
- Minimum of two years relevant experience
- Arabic knowledge will be an advantage but not conditional

JOB DESCRIPTION

- To assist in Programming Courses
- To assist in Training new staff
- To contribute the development of administrative system and scientific programs

THE BENEFITS OFFERED BY THE UNIVERSITY FOR THE TWO POSITIONS ARE:

- Free roundtrip airline tickets annually for the employee and his family
- Furnished accommodation or housing and furnishing allowance
- Monthly transportation allowance
- Relocation allowance
- End of service gratuity
- Free Medical and Dental care covering family
- Contribution by the University to cover tuition fees for non-Arabic-speaking children

Intended Applicants are kindly requested to send their application letters indicating the position applied for together with photocopies (non-returnable) of their academic diplomas and specialized experience certificates, and an updated resume to the following address:

KING SAUD UNIVERSITY
ABHA BRANCH
COMPUTER CENTER
P.O. BOX 418
ABHA — SAUDI ARABIA

A second copy of the above mentioned information should also be mailed to

KING SAUD UNIVERSITY OFFICE
2425 WEST LOOP SOUTH #450
HOUSTON, TEXAS 77027
Attention: Ms. Nikky Amin

Qualified candidates should furnish their correct addresses and telephone numbers where they can be reached for notification of place and date of scheduled interview.
Applications will be held in strict confidence.

Information Systems Opportunities

The continued growth of Fleming Companies, one of the nation's largest wholesale food distributors, has created the need to expand our Information Systems team at our new and expanded corporate offices in Oklahoma City.

Programmer Analyst

3-5 years COBOL programming experience. DOS/VSE, VSAM and JCL. IBM 4331 hardware. Willing to travel 25%.

Systems Programmer

4 years experience with 1-2 years systems programming environment. Desired skills include DOS/VSE generation and maintenance; VM/370; CICS; VSAM; PANVALET/OWL; DYNAM/T. Willing to travel 25%.

Benefits Package

Fleming offers one of the best in the industry, including company paid medical, dental and life insurance, profit sharing, pension and stock purchase plans as well as our new "Stock Share" and 401K "Savings Plus" plans.

Call now! Join a company with a dynamic past and promising future. To schedule an interview, call Greg Belsheim, at (405) 840-7308, 8am - 5pm weekdays, Tuesday and Thursday until 8pm. If you are unable to call, send your resume with salary history to: Greg Belsheim, Fleming Companies Inc., P.O. Box 26647, Oklahoma City, OK 73126.

Fleming Companies, Inc.

Equal Opportunity Employer (M/F)

BUSINESS APPLICATION PROGRAMMERS

Raytheon's Equipment Division Information Processing Systems (IPS) has immediate openings for Business Application Programmers with a college degree and 2-5 years experience. Hardware utilized is an IBM 3081 G, operating in an OS/MVS environment. Software/Languages utilized are primarily COBOL, IMS DB/DC, ROSCOE, LIBRARIAN, OS/JCL and utilities.

IPS is involved in the development of Engineering, Manufacturing and Financial Business Systems, plus the evaluation and selection of User-friendly Decision Support Systems. Design/Development Methodologies and automated software generation tools are utilized to support system development.

Please forward resume and salary information to Bob Nelson, Dept. 1-8, Raytheon Equipment Development Laboratories, 528 Boston Post Road, Sudbury, MA 01776.

RAYTHEON COMPANY
EQUIPMENT DIVISION

An Equal Opportunity Employer

EXPERIENCED MIS PROFESSIONALS & EDP AUDITORS

DOMINION BANKSHARES CORPORATION, a $3.2 billion multi-bank holding company with 150 offices throughout Virginia, is seeking experienced MIS Professionals and EDP Auditing Professionals to staff our growing needs in Roanoke, VA.

Our computer center utilizes large scale IBM mainframes and a statewide communications network in support of our bank and bank related offices.

QUALITY ASSURANCE ANALYST

This position requires a BS Degree (preferably Computer Science), 3-5 years data processing experience and a systems analysis background. A technical and analytical aptitude, an IBM hardware/software background and the ability to communicate effectively with MIS personnel and user departments is desired. Experience in quality assurance and banking is a definite plus.

PLANNING ANALYST

Our Information Systems Planning Division is seeking an individual to work on developing an overall office automation scheme and the MIS strategic plans. This position requires a Bachelor's Degree (Masters preferred), an ability to communicate both orally and in writing and superior planning and organizational skills. A background in banking would be a plus.

PROGRAMMER/ANALYSTS

Our Applications Systems Division has openings for experienced Programmer/Analysts. Banking systems experience in CPCS, Deposits, CIF or Loans Systems as well as 2 or more years of COBOL programming is preferred. A Bachelor's Degree in Computer Science is a plus.

EDP AUDITOR

This position requires a BS Degree, 3 years of EDP auditing experience and prior experience in auditing banking systems under development for the adequacy of the system of internal controls. A knowledge of MVS, JCL, CICS, ACF2, COBOL, ROSCOE, Easytrieve and banking systems is highly desirable.

DOMINION BANKSHARES CORPORATION offers a wide variety of benefits including medical, dental and life insurance, a pension plan, a savings plan, a stock purchase plan, relocation assistance and competitive performance based salaries. **For confidential consideration, call John Sanders at (703) 563-7952 (COLLECT) or send your resume, with a cover letter indicating your salary requirements and the position you are interested in, to: John R. Sanders, Jr., Professional & Technical Recruiter, (CW).**

Dominion Bankshares Corporation

DOMINION BANKSHARES CORPORATION
P.O. Box 13327,
Roanoke, VA 24040

An Equal Opportunity Employer M F H

DIRECTOR OF MANAGEMENT INFORMATION SYSTEMS

Join the nation's largest retailer of brand name consumer electronics where top management is strongly committed to MIS and currently has state of the art POS and on-line systems.

Wards Company, Inc. is looking for a bright, enthusiastic, high level individual for this key position. Requires strong systems analyst who has background in programming and possesses good oral and written communications skills.

Experience managing multiple concurrent development teams is a plus.

Wards is a fast growing company and is looking for a person who wants a growth opportunity, with the challenges it provides. Highly competitive salary, fringes and bonus.

Send resumes or request more information from:

Wards Company Inc.

Wards Co. Inc.
2040 Thalbro Street
Richmond, Va. 23230
(804) 257-4360

SENIOR PROGRAMMER DEC/VAX

SPSS, Inc., a world leader in the development of quality statistical software, has an immediate career opportunity for a creative programmer to become part of its highly skilled team in the Northfield, Minnesota Division.

The ideal candidate will have at least two years of experience programming large scale scientific applications on a DEC/VAX under VMS, a working knowledge of VAX Macro and a background in software performance. Experience with software design and at least one higher level language preferred.

We offer a creative, progressive work environment and a competitive salary and benefit package. Northfield is a pleasant college town located less than one hour's drive from Minneapolis. Interested individuals should forward their resumes to:

SPSS, Inc.
Northfield Division
402 Washington Street
Northfield, MN 55057

An equal opportunity employer

PROGRAMMER ANALYST

Hitchiner Manufacturing Company is progressing toward a totally interactive information system environment with newly acquired HP-3000 systems.

We are looking for a Programmer Analyst to join us in the development of major integrated custom manufacturing and general business applications. Two years programming experience is a minimum requirement. HP-3000, RAPID software, and/or manufacturing applications experience desirable.

Join Hitchiner and enjoy a competitive salary, a benefit package that includes medical/dental coverage, tuition reimbursement and profit sharing, and excellent potential for growth. We also provide relocation assistance to New Hampshire's mountain country, where low taxes and a relaxed lifestyle make this one of New England's most desirable locations. Send your resume and salary requirements today to: Hitchiner Manufacturing Company, Inc., Personnel Dept., P.O. Box 2001, Elm Street, Milford, N.H. 03055

An Equal Opportunity Employer

POSITIONS AVAILABLE

Instr. or Asst. Prof in Quant. Methods/Comp. Sci., Fall 1984; 2 of 3 tenure track. Areas: telecommunications or comp. sci. plus 1 or 2 of: stats., DBMS, languages, digital electronics, op. systems, computer/assembly construction, data structures, systems software, MIS, systems design. Qualifications: PhD or Master's with teaching exp. and/or substantial prof. exp.; competence to teach undergraduate level courses (stats., D.P., BASIC, FORTRAN, COBOL, PASCAL); adv. courses (DBMS, systems software), courses in the evening MBA program (stats & quantum) and the evening undergrad CIS/CS degree and certificate programs. St. Thomas is a Catholic Liberal Arts College with an undergrad. day and evening division, an evening MBA program, and a Grad. Educ. program. Send resume by 2/15/84 to Dr. S. Fotz, Chair, CIS/CS Dept., College of St. Thomas, St. Paul, MN 55105.

Programmer/Analysts

We're Looking For The Kind Of People Who Can Juggle Assignments.

Fairfield County, Connecticut

We're TSI International, one of the world's largest proprietary software product vendors. With over 2000 clients worldwide and more than a decade of experience, our industry reputation for quality software products and services has been firmly established. Our people have made the difference.

We've gained our position in this industry by hiring and developing the best professional talent in the business. DP professionals who do not simply want to be locked behind a tube. People who excel in an environment that provides continual variety and challenge. In short, professionals who not only possess the sense of invention necessary for ongoing software product development, but who also enjoy being the technical backup for our field marketing staff and clients as well.

While our revenues and size have grown considerably, our management still recognizes and rewards individual contributors. Today, we remain a small, personal company that has matured - not simply grown large. And our people share the benefits, resources and security of being part of the Dun & Bradstreet family of companies.

We expect 1984 to be a year of continued growth for TSI and our employees. If challenge and variety appeal to you, look into several positions currently available in our Wilton, Connecticut headquarters.

Software Product Specialists

As a Product Specialist at TSI, your role will encompass both software development and support. You will participate in all phases of the software business including the design, coding, testing, debugging and maintenance of proprietary software packages. Additionally, relying upon your strong written and verbal communication skills, you'll provide high level customer and sales support.

As a member of a small, cooperative team, you will represent an advanced software product sold to the IBM (Honeywell or Univac) mainframe environment. Products that include database design tools (Facets); data dictionaries (Data Catalogue 2); storage and retrieval systems for CICS (Docu/Master); and other technologically advanced software tools in the beginning stages of development.

To qualify, you should have 3-5 years of COBOL programming experience in an on-line, IBM environment. Exposure to DBMS (IMS, TOTAL, ADABAS, ETC.) along with some working knowledge of BAL and CICS (command or macro) will be necessary. For one of our positions, experience with large Univac systems is desirable.

In return, we'll offer you a whole new world of varied assignments and opportunities. You will be in the position to make a difference, to become a key contributor to the growth of the team and the company. Additionally, we'll provide you with generous medical, dental, tuition and profit sharing benefits. For immediate consideration, send your resume to C.P. Bean, Mailstop #11, TSI International, 187 Danbury Road, Wilton CT 06897

TSI International

a company of The Dun & Bradstreet Corporation

An Equal Opportunity Employer M/F/H/V

INTERNATIONAL ATOMIC ENERGY AGENCY SYSTEMS PROGRAMMER

The International Atomic Energy Agency seeks a Highly experienced Systems Programmer for its Computer Section - Systems Group.

Requires: University degree or equivalent plus 5 years' relevant practical experience in data processing in a large IBM environment and experience with TSO, JES2, ACF2, SMP and IBM program products. Some working experience in technical project management, current telecommunication technology, computer architecture, programming languages, and various operating systems are also prerequisites.

Presently: The Agency has a dual IBM 3033/3081 MVS/SP configuration with JES2, ACF/VTAM, TSO/SPF, CICS, STAIRS and ADABAS and provides a variety of computer services to the United Nations organizations based in Vienna, as well as world-wide networks for information retrieval.

Initial contract for two years, two-step emoluments depending on experience and qualifications approx. $ 32,000 - 34,000. Additional allowances for dependants. Travel and removal expenses paid. Six weeks annual leave. Send curriculum vitae with an indication of your nationality, under Vacancy Notice No. 109/83, to the Division of Personnel, International Atomic Energy Agency, P.O. Box 100, A-1400 Vienna, Austria.

Analysts

WANT REAL SUCCESS? Try New England.

Enjoy the cozy sophistication of New England, where everything is close by ... including some outstanding career opportunities.

Several well established client firms in coastal and interior areas seek Analysts and Systems Analysts with experience on IBM 4341, 3081 or similar equipment with expert knowledge of OS/MVS, JCL, CICS, IMS, VM/CMS or COBOL. Also HP3000, DEC 11/780, IBM S/34, -36, -38 in great demand.

All fees, interview and relocation costs paid by client company. Send confidential letter or resume to: Sheehy Associates, Inc.; Suite M, 465 Congress St., Portland, Maine 04101

SHEEHY ASSOCIATES, INC.

Representing Equal Opportunity Employers

*Quality of Life/Quality of Work Life.

FOR ACHIEVERS ONLY

INTERMEDIATE to SENIOR LEVELS

- Software Development Mgr
- Technical Support Specialist
- Data Base Administration
- Voice/Data Communications
- Office Automation
- Microprocessor Software
- Systems & Programming Mgr
- EDP Audit/Security
- Systems Planning
- Manufacturing Systems

DEC, HONEYWELL, IBM, NCR, UNIVAC

BRUCE A. MONTVILLE
Managing Partner

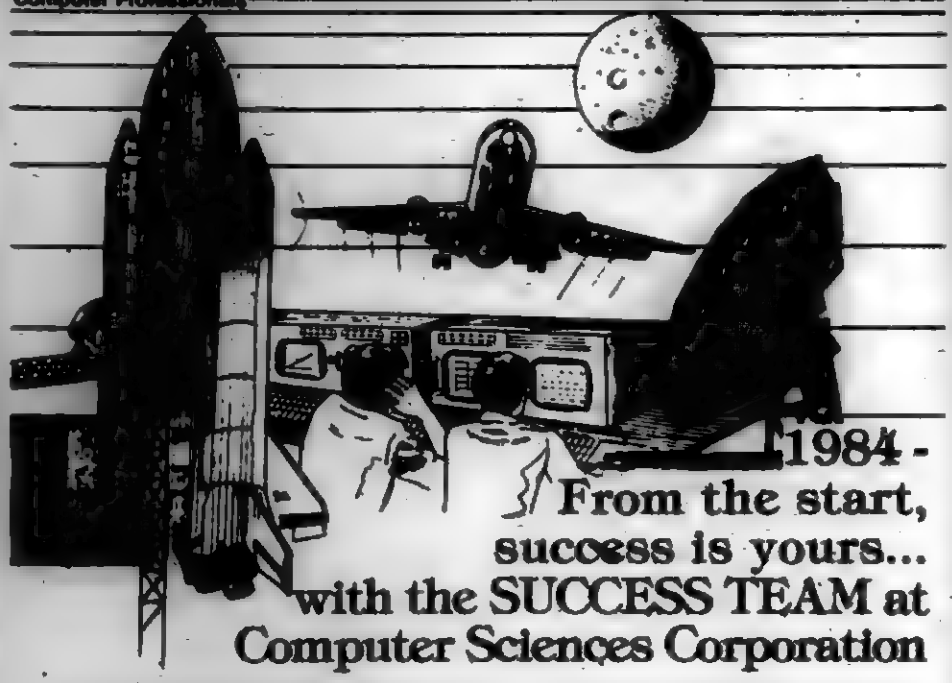
EXETER 2100
National Recruiting Consultants
(603) 778-2712

TOLL FREE 1(800) 258-3028

COMPUTER PARK, P.O. BOX 4678
HAMPTON, NH 03842

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

Computer Professionals



1984 - From the start, success is yours... with the SUCCESS TEAM at Computer Sciences Corporation

Make 1984 your "success year" with CSC, a company that has earned industry distinction for the caliber and commitment of its personnel. At the System Sciences Division, we have become THE SUCCESS TEAM by providing the most technically advanced software systems and by recognizing the abilities and achievements of our employees. Start the New Year by resolving to take advantage of such an environment.

We continue to provide the NASA Goddard Space Flight Center with systems that support such sophisticated programs as Tracking and Data Relay Satellite System Operation, the Network Control Center and the Flight Dynamics and Control Systems Program.

Immediate openings are available for computer professionals with Bachelor's or advanced degrees in Mathematics, Physics, Astronomy, Electrical Engineering or Computer Sciences. If your background includes solid experience in FORTRAN or Assembly Language and you have worked with state-of-the-art Computer Systems utilizing sophisticated Programming Applications and Software Engineering techniques, you are encouraged to make 1984 your most professionally and personally rewarding year yet.

These exceptional opportunities are complemented by excellent salaries and a comprehensive benefits package. For prompt consideration, send your resume to: Staffing Department CW-518 or call TOLL FREE: 800-638-0842 or call locally (301) 589-1545.

CSC

COMPUTER SCIENCES CORPORATION

SYSTEM SCIENCES DIVISION
8728 Colesville Road
Silver Spring, MD 20910
An Equal Opportunity Employer

BGS

The premier company in computer capacity management software seeks an experienced professional to participate in its continuing success. Our integrated family of capacity management software - BEST/1, CAPTURE, INFOBASE, and CRYSTAL - is effectively serving the needs of over 500 large IBM facilities, worldwide. Projected demand for both existing and to-be-released products is extremely high. We have an immediate need for a:

DEVELOPMENT MANAGER FOR MVS PRODUCTS

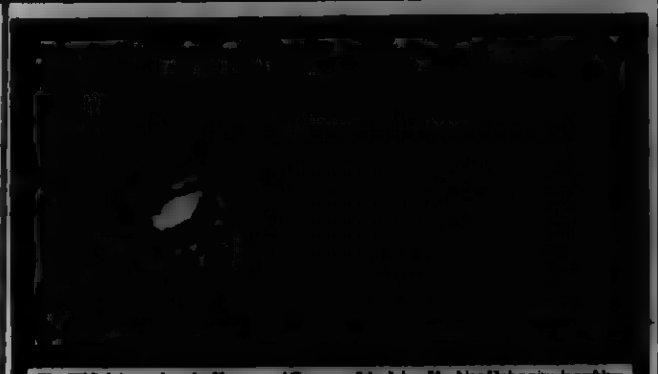
The successful candidate will assume responsibility for leading a team of systems and programming specialists in defining and developing extensions to our performance modeling and computer performance evaluation products for the large-scale MVS user community. A strong technical background in MVS is required, as well as a proven ability to manage systems professionals.

Remuneration for the position is extremely attractive as are BGS professional atmosphere, flexible work schedules, easily accessible location, and a full benefits package, including medical/dental coverage and tuition reimbursement.

Please respond to Business Mgr., Personnel Administration.

BGS SYSTEMS, INC.

One University Office Park
Waltham, MA 02254
(617) 891-0000



The ST ScI, located on the Homewood Campus of the Johns Hopkins University, is seeking dynamic and knowledgeable professionals for its activities within the challenging Space Telescope development and implementation program. The Institute is an academically focused, non-DOD organization under contract with NASA.

QUALITY ASSURANCE MANAGER (SOFTWARE)

Responsible for development and implementation of a quality assurance program for large software development projects, documentation, hardware development, and data operations. Experience with software QA techniques and practices expected, including DOD-STD-1679A, MIL-S-52779A, MIL-Q-9858, IEEE 730. BS in engineering, Computer Science, or Mathematics.

ENGINEERING

Responsible for knowledge of instruments onboard ST, involvement with pre-launch testing, orbital and science verification of instruments, and monitoring technical and scientific performance of instruments. Experience with complex space scientific experiments, areas of observation, on-board computers, real-time programming, high voltage preferred. BS in engineering or Computer Science.

ST ScI offers competitive salary, excellent benefit package and relocation assistance. Submit resume and salary history to: Space Telescope Science Institute, Personnel Dept.—SI02, Homewood Campus, Baltimore, MD 21218.

An Equal Opportunity/Affirmative Action Employer, M/F/H/V

High Tech '84
Opportunities
30,000-$65,000

The coast-to-coast Fox-Morris recruitment network has placed thousands of hi-tech executives in key positions with leading companies during more than two decades. A few examples of choice 1984 opportunities include:

SYS. DVLPMT. CONSULTING. $50K+. Big 8 clients seek fast-track design/dvlpmt pros for hi-level assignments
M. Feiger, New York

MGR., LIBRARY AUTOMATION to $60K. MLS w/tech undergrad to acquire, staff & implement corp. on-line research facility
J. Clark, McLean

BUSINESS SYSTEMS ANALYST to $40K. Key planning role w/int'l. Never ideal opply. for recent MBA/micro enthusiast.
J. Clark, McLean

DP SALES. $40K+. Exp'd. HW. SW sales pros in hvy. demand Mains. minis. micros.
M. Feiger, New York

OPERATIONS MGR., $40K. 3033 MVS shop seeks strong mgr. to take charge.
H. Greene, Phila.

REC SYSTEMS to $40K. Multiple openings w/defense contractor
J. Clark, McLean

CONFIGURATION MGMT., $34-40K. Capacity planning change mgmt & research/acquisition exp. Lg. IBM MVS/IMS
A. Thomas, Cleve.

TRUST SYSTEMS, $35K. Hi-caliber analyst w/strong financial/trust/portfolio systems exp
H. Greene, Phila.

MINI SYSTEMS, $35K. Oppty. for technically strong prog./analysts w/exp. w/PRIME, DG, DEC, Fortran, PL-1
H. Greene, Phila.

INFO. SYSTEMS AUDITOR to $35K. Help pace new sys. dvlpmt. & emerging technologies.
G. Nugent, McLean

To discuss your career goals, in confidence, with one of our experts, call or send resume today.

PHILA., PA 19102—1500 Chestnut St. 215-561-6300 (H. Greene)
ATLANTA, GA 30346—47 Perimeter Ctr. 404-393-6933 (D. Desmond)
BALTIMORE, MD 21204—409 Washington 301-296-4300 (C. Newman)
CHARLOTTE, NC 28201—1350 Johnston Bldg. 704-375-8000 (L. Stone)
CLEVELAND, OH 44131—4401 Rockside 216-524-8585 (A. Thomas)
DALLAS, TX 75240—5501 LBJ Freeway 214-934-2300 (P. McLaughlin)
HOUSTON, TX 77056—3000 Richmond 713-622-5588 (R. Myers)
McLEAN, VA 22102—8200 Greensboro 703-790-1330 (G. Nugent)
NEW YORK, NY 10119—One Penn Plaza 212-947-4400 (M. Feiger)
NEWTON, MA 02159—159 Wells Ave. 617-332-6000 (A. Gelb)
ORANGE, CA 92668—505 City Parkway West 714-634-2600 (J. LaBorde)
PITTSBURGH, PA 15222—4 Gateway Ctr. 412-232-0410 (M. Leely)
RALEIGH, NC 27623—3101 Poplarwood Ct. 919-872-2040 (M. Hunter)
SAN FRAN., CA 94111—601 Montgomery 415-362-4363 (J. Craig)

FOX-MORRIS
personnel consultants

ASSISTANT PROFESSOR COMPUTER SCIENCE

Tenure-track position requires minimum of M.S. Computer Science and commitment to quality teaching. Experience and related mathematical skills preferred. Teaching courses in introductory and advanced computer science in Day and Evening Divisions. Load 3-1-3. Salary negotiable. Deadline: March 1 or until position is filled. Applications: Dr. Rita Murray, Dept. Mathematical Sciences, Russell Sage College, Troy, NY 12180 (518/270-2328).

RUSSELL SAGE COLLEGE

An Affirmative Action/Equal Opportunity Employer

MUMPS

If you have it, we want you!

Healthstat, a subsidiary of Brockton Health Corporation, has an immediate opening for a Programmer/Analyst with experience programming MUMPS language. We offer a competitive salary and benefits package. Resumes only, and salary history to: Lois Salvatore, Personnel Specialist.

Brockton Health Corporation
480 Clinton Street
Brockton, MA 02402.

NEW ENGLAND

From the Sandy Beaches of Cape Cod to the Snowy Slopes of Vermont, WE COVER NEW ENGLAND! Over 15 yrs. exp. will put you in touch with exciting career opportunities with clients that range form Fortune 100 Companies to Major Cities to Small Shops in quiet Country settings. Our openings range from APPLICATION PROGRAMMERS to SYSTEMS PROGRAMMERS, From SOFTWARE ENGINEERS to MIS DIRECTORS. Let the Professionals in our 5 conveniently located offices spring you into New England.

DATA POSITIONS

POSITIONS, INC., 117 Park Avenue, Suite 201, West Springfield, MA 01089
or Call Collect Bill Mallory (413) 781-3412

SOFTWARE ENGINEERS

If you want a positive atmosphere:

Unencumbered by staff management and other distractions, to use and further develop your state-of-the-art conceptual and programming skills, please read on —

Our Corporate objective is the integration of a nationwide private X.25 network with traditional communications protocols, to support short response time inquiry applications and store and forward batch transmission applications.

To achieve our objective, we are looking for several high-technology professionals who; perceive the challenges we face, have implemented solutions in these areas and would value the opportunity to engage in technically challenging work.

If you have in-depth quality programming experience in and an understanding of:

- development and integration of user invented systems software with vendor software
- real time distributed processing
- remote interface processors
- telecommunications network implementation

and you:

- have technical excellence as a career objective
- thoroughly enjoy the freedom to work toward simple solutions to complex problems
- take prideful responsibility for your creations
- have a history of successful project implementation

Let's Talk!

MasterCard, a recognized leader in world-wide funds transfer, is developing network technology to accommodate growing needs in the electronic financial services environment. We offer an attractive benefits package including competitive salary, 3 weeks vacation, health, life and dental insurance, an industry leading savings plan and a favorable cost-of-living location.

Send us, in strict confidence, your latest resume, handwritten update or comments and present cash compensation. If you don't have a resume, feel free to call and leave your phone number(s) -- we will respond.

Mr. Robert A. Reuss
MASTERCARD INTERNATIONAL, INC.
12115 Lackland Road
St. Louis, Missouri 63146
(314) 434-6800 extension 218

We Are An Equal Opportunity Employer

RESEARCH AND DEVELOPMENT PROGRAMMER ANALYST

PPG Industries Chemical Group has an opening for an experienced scientific programmer analyst at its Barberton, Ohio Technical Center. Located adjacent to Akron, Ohio, Barberton combines the advantages of a small town lifestyle with the cultural advantages of a major metropolitan area. PPG is a major producer of both commodity and specialty chemicals and provides a challenging opportunity for growth with competitive salary and benefits packages.

SCIENTIFIC PROGRAMMER ANALYST

Will work with a diverse group developing/supporting computer based project in a major chemical research and development laboratory. Require BS/MS computer science degree with a broad based computer science background. Four plus years experience with IBM OS/MVS/TSO, ASSEMBLER, FORTRAN. Experience/interest in mini/micro-computer based applications.

Please send resumes, including salary history to:

Barbara T. Germeaux
Coordinator, Professional Employment
PPG Industries, Inc.
12 North, One PPG Place
Pittsburgh, PA 15272

Equal Opportunity Employer

DATA PROCESSING

OPEN HOUSE

You are Cordially Invited to Attend an.

OPEN HOUSE

For Data Processing Professionals

ON TUESDAY & WEDNESDAY JANUARY 10th & 11th

from 10am to 8pm
at the

BARCLAY CHICAGO HOTEL

166 East Superior Street
Check Hotel Activity Directory for our location.
Parking across the street on Superior.
Refreshments will be served.

The Chicago based national organization for Blue Cross and Blue Shield companies is engaged in a major expansion of its telecommunications network. The network, which serves all affiliate companies nationally, is being significantly enhanced with real-time interactive capabilities that will allow the connection of more than 100 IBM large scale computers.

We are looking for experienced and motivated professionals with Tandem, IBM, Texas Instruments and Burroughs background.

DIRECTOR OF NETWORK PLANNING

5 or more years varied switching network design and implementation management experience, including hardware, software and communications facilities. Tandem and IBM SNA experience. A B.S. in either Computer Science or Electrical Engineering is preferred. An undergraduate degree is required.

MANAGER OF TECHNICAL AND FIELD SERVICES

5 or more years experience in management of technical services, including Burroughs, Tandem, IBM and TI. A B.S. in either Computer Science or Electrical Engineering is preferred. An undergraduate degree is required.

STAFF CONSULTANT, TECHNICAL SERVICES

3-5 years experience in developing and implementing large systems, including substantial programming language knowledge, especially Tandem TAL. College degree or equivalent work experience. IBM internals a plus. Up to 25% travel.

CONSULTANT, FIELD SERVICES

3-5 years experience with large computer networks with [illegible]ability to define and resolve customer problems. 10% to 30% travel.

STAFF CONSULTANT, TELECOMMUNICATIONS SOFTWARE

3-5 years experience in designing, developing and implementing large telecommunications systems. College degree or equivalent in work experience. COBOL a must, TI assembler language a plus.

SENIOR CONSULTANT, APPLICATIONS SYSTEMS

5-7 years experience in designing, developing and implementing large applications systems. 1-3 years supervisory skills. College degree or equivalent in work experience.

SENIOR SYSTEMS ANALYST, APPLICATIONS SYSTEMS

5 or more years experience in COBOL programming on IBM or Burroughs systems, 2 or more years of systems design. College degree or equivalent in work experience.

SYSTEMS ANALYST II, APPLICATIONS SYSTEMS

2-5 years complex COBOL programming experience. 1-2 years of detailed systems design. College desirable.

We offer highly competitive salaries; a stable, professional work environment; regular merit appraisals; and a comprehensive benefit package including health care, life insurance, tuition reimbursement and retirement benefits.

Please plan on attending next Tuesday or Wednesday. You'll have the chance to discuss our opportunities and your career with our systems management. If you cannot attend, have any questions, or wish to schedule a private appointment, please call Peggi Sturm at 440-6412, Monday-Friday, 8:30am to 4:30pm.

BLUE CROSS & BLUE SHIELD ASSOCIATION

676 North St. Clair St., Chicago, IL 60611

An Equal Opportunity Employer M/F

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

EASTERN
Eastern Airlines has the following programmer openings at its Miami Computer Center:

IBM 30xx SYSTEM SOFTWARE PROGRAMMERS

Requires one year experience with generation, internals, troubleshooting, and/or maintenance of one or more of the following: MVS - JES3 - TCAM - VTAM - NCP - CICS - IMS/DB. These are system programming positions and require assembler language background. (Position JK1)

IBM 30xx INFORMATION CENTER TECHNICAL SUPPORT PROGRAMMERS

Requires experience using one or more of the following software products: MARK IV - TSO - SAS - FORTRAN. These positions assist end users in developing programs and systems. (Position JK2)

UNIVAC 1100 SYSTEM SOFTWARE PROGRAMMERS

Requires one year experience with generation, internals, troubleshooting and/or maintenance of one or more of the following: OS1100 - TIP - DMS1100 - CMS1100 - TELCON. These are system programming positions and require assembler language background. (Position CC1)

IBM CICS APPLICATIONS PROGRAMMERS

Requires an AS or BS degree in Computer Sciences or Management Information Systems plus 2 years experience in Command Level CICS programming using COBOL and SL/1. (Position WL1)

UNIVAC 1100 APPLICATIONS PROGRAMMERS

Requires an AS or BS degree in Computer Sciences or Management Information Systems plus 2 years experience in COBOL programming. (Position WL2)

DATABASE ADMINISTRATION POSITIONS

Requires one year experience supporting databases in CICS-DL/1 or IMS-DB/DC environments. Experience must include use of IMS utilities, database recovery/reorganization and COBOL programming. (Position LR1)

BAL PROGRAMMER

Requires one year of BAL programming experience in an IBM environment. (Position TO1)

PL1 PROGRAMMER

Requires minimum two years PL1 experience in an OS/MVS environment with JCL. (Position TO2)

Working for Eastern Airlines can open up a new world for you. As an employee, you, your spouse, children, and parents can fly anywhere Eastern flies (South America, the Caribbean, the West Coast, etc.) for $8.00 plus tax. With nearly 38,000 employees in our system, we offer tremendous career opportunities. Living in Florida offers a sunfilled casual outdoor year round lifestyle with no state-city income tax.

In applying for any of these positions, please refer to the specific position code letters in parenthesis at the end of each position description. Send detailed resume, including salary history and requirements, to:

EASTERN AIRLINES
Management Recruiting
Department MB
International Airport
Miami, FL 33148
An Equal Opportunity Employer M/F

SENIOR SOFTWARE ENGINEERS
SENIOR SYSTEMS PROGRAMMER

The Space Telescope Science Institute has several openings for senior and intermediate level computer professionals. We offer an environment that encourages technical excellence and initiative and provides the freedom to solve challenging problems in innovative and creative ways.

A thorough knowledge of software system development techniques as applied to interactive scientific problem solving is essential, as are good communications skills, an active mind, and a commitment to excellence. Substantial direct experience in one or more of the following fields and at least a Bachelor's degree in Computer Science or one of the physical sciences are minimum requirements for these positions.

- Interactive Data Processing
- Real-Time Data Acquisition
- UNIX Operating Systems
- Image/Graphics Processing
- Man-Machine Interface Design
- Networked Operating Systems

ST ScI, located on the Johns Hopkins University campus in Baltimore is a major international center for research in astronomy. The Institute will be the site of scientific data acquisition and analysis for the Space Telescope, which is due to be launched by the Space Shuttle in 1986. We offer an atmosphere of intellectual stimulation and reward, coupled with competitive salary, excellent benefit package, and relocation assistance.

Submit resume, salary history and a portfolio of your work to: Space Telescope Science Institute, Personnel Dept. 8453, Homewood Campus, Baltimore, Maryland 21218.

An Equal Opportunity/Affirmative Action Employer, M/F/H/V

COMPUTER PROFESSIONALS

Your Place In The Sun: Extraordinary Lifestyle... Extraordinary Career

Come to North Carolina-the sunbelt living's great! The natural beauty here enhances our quality of life with beautiful lakes, majestic mountains, and uncrowded beaches-all easily reached from our location in Charlotte. Our climate is conducive to a vast array of recreational activities...year-round! And culturally, we are as sophisticated as any major metropolitan area.

As the largest bank holding company in the Southeast, NCNB has a distinguished reputation for creating custom-tailored services to meet the financial needs of our customers, both domestically and internationally. We have the resources and growth to offer you an outstanding career interfacing with top professionals and the very latest advances in data processing technology. Our environment includes: IBM 3081G, 3081K, MVS, JES3, TSO, IMS, VTAM.

To keep pace with the dramatic growth of NCNB, the Corporation has committed to a multi-year program to replace our major systems. This process has begun and opportunities are available for **SYSTEMS ANALYSTS** with 3+ years experience designing and implementing systems in a similar environment. Banking experience in one or more of the following is desired: Deposits, Loans, Cash Management, International, Funds Transfer, Item Processing (CPCS). Experience with HOGAN software is a plus.

NCNB and North Carolina-have the best of all possible worlds! Send resume and salary requirements to: Personnel Manager, NCNB Personnel Division, 107-1, NCNB Corporation, Charlotte, N.C. 28255. We are an equal opportunity employer.

NCNB Corporation

TIRED OF THESE LONG COLD WINTERS?

DATA PROCESSING PROFESSIONALS with skills in Large Systems or Mini's, DATABASE or On-LINE SYSTEMS, consider a move to the beautiful SAN FRANCISCO BAY AREA

Our clients have the most CHALLENGING and GROWTH ORIENTED career opportunities CALIFORNIA offers.

LOGICAL OPTIONS
Bon Market Plaza, Space Tower, Suite 870140
San Francisco, CA 94105 • (415) 777-3900

SOFTWARE DEVELOPMENT PROJECT MANAGER

Sacramento California company seeking a Contract Project Manager. Must have large systems development experience using IDMS database. Qualified candidates will have a Bachelor's degree and 10 years experience in systems analysis and design. Knowledge of group insurance industry would be a plus. Computer environment is IBM 4341 with VM, DOS/VSE, IDMS, and 80 on-line terminals. Compensation negotiable. Principals only. Send resume and salary history to C.E. Bradbury, V.P., IRD, P.O. Box 254068, Sacramento, CA 95865.

Systems Programmers
$26,000-$45,000+

Immediate choice 1984 multiple career opportunities in Upstate NY, NYC & Northeast U.S. Experience with • OS/MVS • IMS • VM/CMS • VAX and other operating systems. Reply in confidence to

Carol Stuart, DP Specialist
HORNBLE PERSONNEL
Box 116 Westview Station
Binghamton, NY 13905
607-722-5377
All fees paid • Nationally affiliated

Data Base Analyst

The Upjohn Company, a leading pharmaceutical company located in Kalamazoo, Michigan, is seeking data processing professionals for data base administration.

Applicants must possess a BS degree plus 2 years experience in COBOL or PL-1 programming and DL/I control blocks and utilities with strong analytical skills. Additional experience with TSO/SPF, IMS/DC, and ADF are highly desirable.

Kalamazoo is a mid-sized southwestern Michigan community offering a mix of cultural/recreational opportunities including lakes, nearby colleges, and a four-season climate. The Upjohn Company offers a competitive salary and benefits and relocation assistance.

For confidential consideration, please call from outside of Michigan toll free 1-800-253-0660 and ask for extension 3-6767; or call from Michigan collect 616-323-6767 to request a specialized employment application be sent to you immediately. Please refer to ad number 15673-E when calling.

Upjohn

A Century of Caring

An Equal Opportunity Employer M/F

PROGRAMMER/ANALYST

The City of Highland Park, Illinois, is accepting applications for a Programmer/Analyst to assist in implementing municipal computer applications. The position is in the Department of Computer Services and reports to the Director. The hardware environment includes VAX-11 and other minicomputers, local area network, and laser printer. The software environment includes VMS, COBOL, and Oracle database management system. B.S. in computer science or related field is required. Individuals possessing a strong academic record in lieu of experience will be considered. Salary range: $16,611 to $22,340. Interested persons should apply to:

Personnel Office
City of Highland Park
1707 St. Johns Avenue
Highland Park, IL 60035
Phone: (312) 432-0800
We are an affirmative action/equal opportunity employer.

Technical Specialist Systems Programmer

BS in computer science or equivalent experience required. Involves installation and maintenance of IBM, VM, DOS/VSE, Computer Associates and Pansophics software. Consultant to operations and development staff. Excellent opportunity to work independently in the beautiful Pacific Northwest. Salary commensurate with skills and experience. Qualified applicants send resume by January 31, 1984 to:

Personnel
Weyerhaeuser Company
P.O. Box 188
Longview, Washington 98632
Weyerhaeuser - an Equal Opportunity Employer

DATA BASE ADMINISTRATOR

Two to four years experience in monitoring data bases for performance, logical and physical design, organization and recovery procedures plus a college degree required. Experience in a CICS, ICCF, DOS/VSE environment preferred. ADABAS and NATURAL experience desired. Electric and water utility experience helpful. Send resume and salary requirements to Personnel Division, Orlando Utilities Commission, P.O. Box 3193, Orlando, FL 32802.

An Equal Opportunity Employer M/F

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

We didn't get to be first... by being third-rate!

National Computer Associates is number one in size and in the quality of its personnel consultants. We are the nation's largest network of independently owned firms specializing in the placement of computer professionals. When you come to us you'll have the assurance of knowing that you've made the best possible choice.

Come in. Call. Or mail your resume to the firm nearest to you. Company clients assume our fees.

ATLANTA: Bill Lamont
235 Peachtree Street Suite 1801-C
Atlanta Georgia 30303 (404) 581-0840
BOSTON: Robert Kleven and Co Inc
North Brook Park Suite One 75A Bedford Street
Lexington Massachusetts 02173 (617) 861-1600
CHICAGO: Thorn Hertz & Associates
190 W Wacker Drive Suite 1700
Chicago Illinois 60606 (312) 977-1600
COLUMBUS: Michael Thomas Inc
651 Wilson Bridge Road Suite 201
Worthington Ohio 43085 (614) 846-9626
DALLAS: DataPro Personnel Consultants
12720 Hillcrest Suite 520
Dallas Texas 75230 (214) 661-8600
DETROIT: Electronic Systems Personnel Inc
3000 Town Center Suite 2580
Southfield Michigan 48075 (313) 352-5640
FLORIDA: Data Sciences Personnel Inc
P O Box 8577
Hollywood Florida 33084 (305) 434-8112
HARTFORD: Compass Inc
900 Asylum Avenue
Hartford Connecticut 06105 (203) 549-4340
HOUSTON: Career Consultants Inc
2000 South Post Oak
Houston Texas 77056 (713) 626-4100
INDIANAPOLIS: Computer Personnel Services Inc
107 S Pennsylvania
Indianapolis Indiana 46204 (317) 634-6712
KANSAS CITY: D P Career Associates
6405 Metcalf Suite 502
Shawnee Mission Kansas 66202 (913) 236-8200
LOS ANGELES: Superior Resources, Inc.
Personnel Service
17141 Ventura Boulevard Suite 200
Encino California 91316 (213) 986-4488
MELBOURNE: EDP Consultants Inc
7352 West State Street Suite 3
Wauwatosa Wisconsin 53213 (414) 475-0977
MINNEAPOLIS: Electronic Systems Personnel
958 Twin City Federal Tower 121 S. 8th St
Minneapolis Minnesota 55402 (612) 338-6714
NEW JERSEY: Systems Search
90 Millburn Avenue
Millburn New Jersey 07041 (201) 761-4488
NEW YORK: Retail Associates Inc
7 Dey Street Suite 410
New York New York 10007 (212) 227-7370
UPSTATE NEW YORK:
CPA Associates Personnel Inc
2530 James Street
Syracuse New York 13206 (315) 463-9225
NORTH CAROLINA: Datalabors
Div of DataForce Inc PO Box 5990
Greensboro North Carolina 27403
(919) 373-1467
PHILADELPHIA: Systems Personnel Inc
115 West State Street
Media Pennsylvania 19063 (215) 565-6660
PHOENIX: Professional Career Consultants
4620 North 12th Street Suite #101
Phoenix Arizona 85016 (602) 274-6666
SAN FRANCISCO: The Computer Resource Group
Inc Agency 303 Sacramento Street
San Francisco California 94111 (415) 398-3535
SEATTLE: Hoover Morton Morris & Associates
1940 116th Avenue N E
Bellevue Washington 98004 (206) 453-3788
WASHINGTON D C: ESP Systems Corporation
914 Lamberton Drive
Silver Spring Maryland 20902 (301) 649-8171

Call the NCA firm nearest to you for Salary Survey and Relocation information.

National Computer Associates

PROJECT LEADER

Beaird-Poulan/Weed Eater Division of Emerson Electronic Company is expanding its MIS Department and offers growth opportunities for a Manufacturing Systems Project Leader.

Our present computer environment includes an IBM 4341 and an IBM 3031 running OS/MVS and DOS/VSE. We use CICS and IMS for data communications and data base.

Our manufacturing systems are being developed in conjunction with the IBM COPICS system.

The ideal candidate for the Manufacturing Project Leader should have 4-6 years in-depth manufacturing systems experience, be degreed and experienced at the detail level with COPICS. OS/MVS experience is a definite plus.

This position offers a competitive salary and benefits package and is located in our Division headquarters in Shreveport, Louisiana. Shreveport is located in Northwest Louisiana, and has a community of 375,000.

Send resumé and salary history to:

BEAIRD-POULAN/WEED EATER
DIVISION EMERSON ELECTRIC CO.
Manager of Employment
P.O. Box 9329 • Shreveport, La. 71139

An equal opportunity employer.

EMERSON

HAVE A HAPPY NEW YEAR AT NORTHROP.

1983 was a year filled with accomplishments at Northrop Data Processing. We completed a major reorganization along divisional lines to enhance our responsiveness to a wide variety of needs. New Data Centers utilizing IBM's latest mainframes and operating systems were established. We introduced our first Information Service Center at the Aircraft Division and provided continued support to Engineering, Manufacturing and Financial functions.

1983 was a big year. As a service organization we can't rest on the success of last year. We must continue evaluating future needs and plan accordingly.

1984 promises to be a year of continued growth for both the divisions we service and ourselves. We will continue applications programming support to a full range of functional organizations and take on new challenges. In 1984, we will create additional Information Service Centers and establish the Applications Development Center as an aid to programmers. Continuing improvements to our network systems will include integration of personal computers into the framework of software services.

1984 looks like another big year for Northrop's data processing professionals. How does it look for you? If you don't see diversified challenge, success and reward coming with the new year, perhaps you should consider our broad range of opportunities.

- **Software Project/Product Management**
- **Computer Systems Planning**
- **Operating Systems Software Support Including Performance Tuning**
- **IMS Systems Software & Data Base Administration**
- **Graphics & Aeroscience Support Programming**
- **Manufacturing & Financial Applications Programming**

If you're experienced in any of these areas, we'll welcome your inquiry. For immediate and confidential consideration, send us your resume and, Happy New Year!

Mr. Cris Cristine
Engineering & Administrative Staffing
Dept. 1222/80 NA-CW 128305
P.O. Box 2116
Hawthorne, CA 90250

NORTHROP

Making advanced technology work.

Equal Opportunity Employer M/F/H
Proof of U.S. Citizenship Required

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

WALKER WALKER WALKER WALKER WALKER

INTERACTIVE PRODUCTS

Walker Interactive Products' high tech solution for financial applications software has placed us at the TOP of our industry. We offer excellent opportunities for rapid advancement in a state-of-the-art technology. We are looking for dedicated professionals with the following backgrounds:

INSTALLATIONS SPECIALISTS

New York/Chicago/Atlanta/San Francisco

- Three or more years' system programming experience in multiple operating systems, teleprocessing, and database environments such as VM/CMS, IMS DB/DC, IDMS DB/DC, ADABAS, COM-PLETE, CICS and DL 1.
- The ideal candidates will also be familiar with IBM mainframe environments.
- We are seeking sharp individuals who also enjoy trouble-shooting and possess excellent interpersonal skills.
- These are positions involving customer contact and requiring 75% travel.

SENIOR QUALITY CONTROL ANALYST

- You will need a degree in CS.
- Previous experience in financial application systems is required.
- You must have exposure to DBMS and TP Monitors IBM 370.
- Experience with structured COBOL is necessary.
- And strong communication skills are a must.

SENIOR PROGRAMMER ANALYST

IBM Mainframe Environment

- You must have 4 or more years experience in COBOL programming.
- A familiarity with accounts receivable, accounts payable and/or general ledger is required, as is an enjoyment of maintenance and/or development.
- Project analysis experience is helpful.
- Assembler not necessary, but helpful.

SENIOR PRODUCT ANALYST

- You will need a BS/BA or equivalent.
- You should have 5 or more years COBOL/Assembler programming experience in an IBM mainframe environment.
- Experience in multiple operating systems, data base and teleprocessing systems is required.
- You should be an innovative fast learner with excellent communications skills.
- This is a position involving 10% travel.

In addition to high growth potential in a progressive environment we offer an excellent salary and benefits package. Please send your resume to the Director of Human Resources, Walker Interactive Products, 100 Mission Street, Suite 300, San Francisco, CA 94105. An Equal Opportunity Employer

MIS EXPANSION DEVELOPMENT PROJECTS

SECURITY. . .VISIBILITY. . .CAREERS

Motorola's Government Electronics Group has immediate career opportunities for candidates seeking a stable working environment. We are searching for highly seasoned, top of the line individuals who can contribute to our team efforts in fourth generation languages and structured design methodologies.

PROJECT MANAGERS

We have immediate needs for Systems Development Project Managers with a proven track record of planning, organizing, and implementing projects. Candidates must have formal experience in project management using a development methodology, good user communications skills and experience in either quality assurance, marketing or MRP. Degree preferred with several years of successful project management experience.

BUSINESS SYSTEMS ANALYSTS

We need Business Systems Analysts with good user communications skills and experience in Quality Assurance, Logistics, Marketing, MRP, and/or expert knowledge of Financial Applications. Must be able to identify business problems, recommend solutions, and have proven skills with formal structured analysis methodologies. Degree preferred with several years experience required.

Qualified applicants please forward your resume and salary history to Jerry Rule at:

MOTOROLA INC.

Government Electronics Group

8201 E. McDowell Rd., Dept. BQ12
Scottsdale, Arizona 85252

"Motorola, a World Leader in Electronics, Quality and Productivity Through Employee Participation in Management"

U.S. Citizenship Required. An Equal Opportunity/Affirmative Action Employer

DEC SYSTEMS PROGRAMMER

Florida

Price Waterhouse, a leading international CPA firm, has an immediate opportunity for a DEC Systems Programmer to join the Technical Support Group in our beautiful Tampa, Florida National Administrative Center.

We are operating 2 DEC 2060's with Nationwide communications systems. The selected individual will be working as a member of the Technical Group supporting and monitoring the TOPS20 operating system. Responsibilities will include providing recommendations for enhancement of the DEC 2060's hardware and software. We prefer a minimum of 3 years experience with TOPS20 operating systems, MACRO programming and familiarity with FORTRAN and/or COBOL. A degree is preferred.

We offer a competitive salary, full range of company benefits, relocation assistance and the outstanding year 'round recreational advantages of the Tampa Bay area. Please reply in complete confidence to:

Personnel Manager

Price Waterhouse

P.O. Box 30964
Tampa, FL 33630

Equal Opportunity Employer M/F

Senior Capacity Planner

San Francisco Location

Bank of America, one of the world's leading financial services organizations, currently has an opening for a Senior Capacity Planner.

In this position, you will be responsible for capacity planning for all large-scale equipment (CPU's, Tape, DASD, Printers) in the teleprocessing environments for two large California Data Centers. You will assess IMS application plans and monitor IMS system activity. In addition, you will develop enhancements to the IMS Capacity Planning Methodology.

You should have a minimum of 10 years' Data Processing experience, preferably systems programming background in a heavy IMS environment with an emphasis on IMS performance/capacity planning. Strong communication and interpersonal skills are required.

Bank of America offers an outstanding salary and benefits package designed to attract and maintain top professionals. Send your resume to: Bank of America, Professional Recruitment, Dept. 3462-8109A, P.O. Box 37000, San Francisco, CA 94137. An equal opportunity employer m/f/h/v.

Bank of America NT&SA

The Professional's Choice.

COMPUTER SCIENCE FACULTY POSITION

Four year, church related, accredited, liberal arts college with 1,600 students, seeks two faculty members to teach in a growing computer science program beginning September 1, 1984. Duties will include teaching, advising and committee assignments. Preference will be given to candidates with Ph.D. in computer science but will consider persons with a Master's degree. Experience or education in management and/or business administration is a plus. These are permanent faculty positions. Aurora College currently has 500 computer science majors. The program is supported by an on-campus VAX 11/780 computer with VMS operating system. Send vitae, transcripts and three references to Dr. AJ Anglin, Vice President for Academic Affairs, Aurora College, Aurora, IL 60506. Application deadline is February 24, 1984. An Equal Opportunity/Affirmative Action Employer.

SYSTEMS MANAGER

A medium sized property and casualty insurance company with home office located in the mid-Atlantic region is seeking an experienced manager to run the data processing department. Must have prior experience in PMS systems with strong analytical and communications skills. Competitive salary and benefits. Send resume and salary history in confidence to:

Box CW-84088
Comprehensive
P.O. Box 999
Framingham, MA 01701

ELECTRICAL ENGINEER. Disk drive read/write engineer responsible for design and development of Winchester technology mass storage disk drive products. Bachelor's degree in Electrical Engineering required. Must demonstrate familiarity with Winchester disk drive technology. $24,600.00 per year; 40 hour week. Contact or send resume to Colorado Job Service Center, 344 Main Street, Longmont, CO 80501. Order No. 2485541.

MAPPER

Major consultancy has created a new division entirely devoted to MAPPER projects.
A great career move for MAPPER enthusiasts.
Immediate long term assignments for MAPPER independents.
Call now to help continue the MAPPER revolution.
Call Agness (212) 867-6818
(strict confidentiality)
An Equal Opportunity Employer M/F

MAPPER

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

SYSTEMS PROGRAMMER, MVS

Broad challenges in new IBM 4381 installation

The corporate offices of the J.A. Jones Construction Company will be acquiring an IBM 4381 system this year, requiring an additional Systems Programmer to help plan, install and maintain systems software.

Prequalify for this opportunity you should have at least 3-5 years systems programming experience including 2 or more in an MVS environment. You must have in-depth knowledge of HASP/ASP, TSO/SPF, JCL and VSAM, as well as effective communication skills. Working knowledge of assembler, CICS and ADR/IDEAL would be a plus.

The advantages of a career in the Carolinas...

There's more reasons to join us than just the technical challenge. You'll also enjoy the living conditions of the Charlotte, North Carolina area – known for its pleasant Southern weather and excellent cultural, social, educational and recreational opportunities.

J.A. Jones is an internationally successful company involved in all aspects of the construction industry. We will provide you with a competitive salary and a full benefits plan, including educational allowance for yourself and dependents. Arrange for an interview. Send your resume including salary history and requirements for immediate and confidential consideration. Employment Representative, Dept. 4814A, J.A. JONES CONSTRUCTION COMPANY, 6565 St. Albans Street, Charlotte, NC 28207. An Equal Opportunity Employer M/F/H. No Agencies Please.

J.A. JONES CONSTRUCTION COMPANY

ASSOCIATE DIRECTOR COMPUTING SERVICES

The University of Nebraska Medical Center is seeking a strong managerial individual to help lead the Computing Services Department in networking IBM mainframe, a DEC super mini and several other mini and micro computers for a total integrated system. Individual will also be involved in planning future growth, providing budget planning and maintaining internal policies and procedures in a growing department providing on-line Hospital Administrative and Academic Computing Support. Candidates should have a minimum of 10 years experience with demonstrated increasing managerial responsibility. 3 years experience should be in managing a computer environment with multi-department information systems. A bachelor's degree in computer science or related area required. MS degree and experience in a health care setting is preferred. Submit resume and salary history to:

Department of Human Resources
UNIVERSITY OF NEBRASKA MEDICAL CENTER
619 S. 42nd Street
Omaha, Neb. 68105

Equal Opportunity Employer M/F/H/V

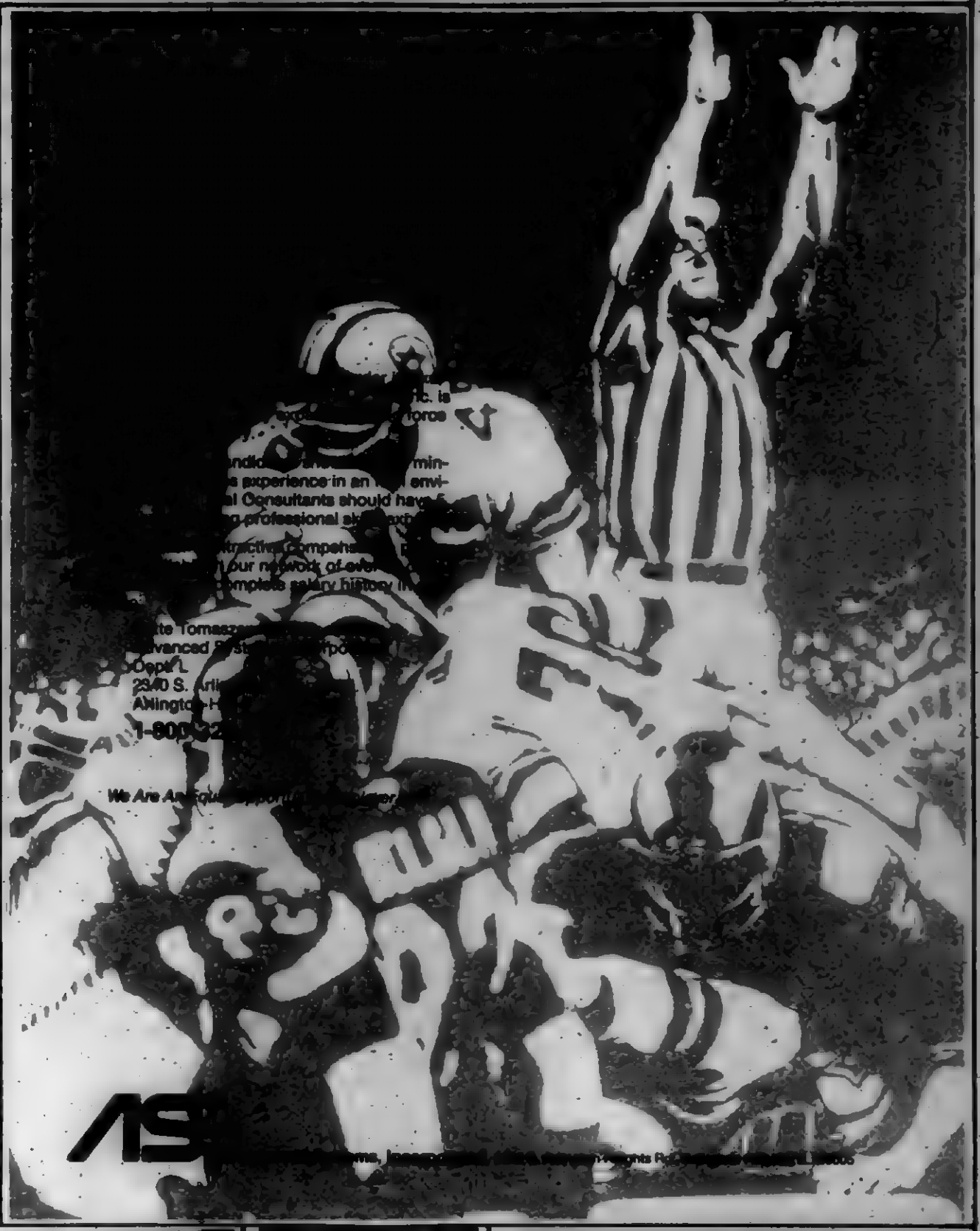
The EDP Specialist

Specializing in career placement of EDP personnel of all disciplines. Our nationwide clients offer opportunities spanning the full spectrum of the Data Processing and Software/Hardware Engineering Field.

THE TRIMBEC GROUP

Send resume, salary history and geographical preferences to: Adele Durham, Data Processing Division, Drawer 40, Liverpool, N.Y. 13088

424-4888



Dunhill Means Data Processing Professionals

The Right Career Choice

At Dunhill of Charlotte our only business is finding the right people for the job. We represent many of the largest and most respected corporations across the country. That's why we can offer the busy data processing professional the opportunity to explore the job market without doing any more than simply sending us a resume.

We are not asking you to make any commitment. There is never a fee with Dunhill of Charlotte, and all matters are held in strict confidence. What more could you ask for? We will also keep you up to date on industry trends and current salary ranges in the DP area.

Keep your career running in high-gear by letting Dunhill of Charlotte find the opportunity you have been searching for as a professional. We want to go to work for you today! We specialize in the placement of Programmers, Analysts and Systems Programmers in the Carolinas and throughout the beautiful Southeast and Southwest. Give us a call now, or send your resume to:

Keith Reichle, CPC
Data Processing Consultant
6401 CARMEL ROAD
SUITE 107
CHARLOTTE, N.C. 28226
1-800-438-2912
In North Carolina, call collect (704) 542-0312

Dunhill of Charlotte, Inc.

An Equal Opportunity Employer M/F

WANTED! A Software Seer for Technological Lair in Maine Wilderness!

You'll join a group of 30 + professionals at a superbly equipped DP center with a 4341 DOS/VSE VM/CMS, and a DEC VAX 11/780, linked to the $2-billion international company's corporate headquarters with a 3033 MVS.

In the extraordinary natural environment, where a curious moose on your doorstep might get only passing mention during coffee, you'll be doing stimulating software development and design work on an 11/780. Must have a degree plus 5-10 years in business systems and expert knowledge of the 11/780.

All fees, interview and relocation costs paid by our client company. Send confidential letter or resume to Sheehy Associates, Inc., Suite M, 455 Congress St., Portland, Maine 04101. Or call (207) 761-1929 collect.

SHEEHY ASSOCIATES, INC.

"Always in search of excellence."
Representing equal opportunity employers.

SENIOR SYSTEMS SOFTWARE PROGRAMMER

A major Wichita, Kansas manufacturing corporation has an immediate opening which will play an important role in the expansion and continued development of their Data Processing division.

The position requires a minimum of 3 years large IBM systems programming experience. Successful applicant will have current working experience in MVS/SP, JES2, VSAM and OS/JCL. This person will be key in an upcoming conversion to MVS.

Starting salary based on pertinent experience to include excellent benefits program and relocation assistance.

Qualified applicants, please send resume to:

Larry Cease
WILLIAM-LAWRENCE & ASSOCIATES
530 S. Market, Suite 210
Wichita, Kansas 67202

Or call, 316/269-0942, from 8:00 AM to 5:00 PM, or 316/721-0931 after 7:00 PM and on weekends.

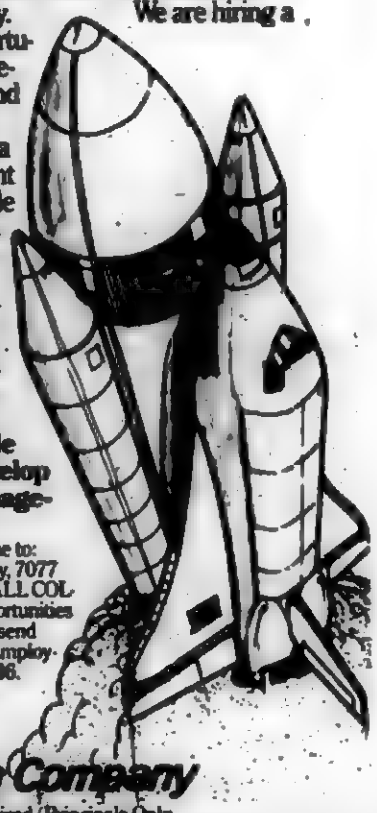
Equal Opportunity Employer

COMPUTER PROFESSIONALS

With Current Experience In Applications Software, OS/SW, Communications Networks, Compilers, DBMS and Development Tools.

We are now assuming our responsibilities as the Shuttle Processing Contractor for NASA at the Kennedy Space Center, Florida and the U.S. Air Force at Vandenburg Air Force Base, California. This six year contract (with options to fifteen years) will provide you with a secure opportunity to join the team of professionals like yourself who are making a significant contribution in the manned space program.

If you are an experienced computer professional whose goal is more challenging and rewarding work in a state-of-the-art environment, look to Lockheed Space Operations Company. We are hiring a number of professionals, like you, to fill opportunities involving the development and enhancement of: Applications Software (Real-time and Interactive), Operating Systems Software, Communications Networks, Compilers, Data Base Management Systems and Development Tools. You will be working on the Space Shuttle Launch Processing Systems (LPS), which is a highly distributed network of over 300 MODCOMP Super Mini Computers and a large number of Honeywell 6000's with over 3.5 billion bytes of mass storage. Some of these opportunities will involve a three month program to become familiar with the entire LPS and the space system unique OS/SW.



We also have opportunities available for MIS Applications professionals to develop a wide variety of on line Data Base Management Systems.

For immediate consideration call or send your resume to: Donald C. Quirk, Lockheed Space Operations Company, 7077 North Atlantic Avenue, Cape Canaveral, Florida, 32920. CALL COLLECT (305) 799-0100. Candidates who wish to pursue opportunities located at Vandenburg Air Force Base, California should send their resume to: Lockheed Space Operations Company, Employment Office, 1100 West Laure Avenue, Lompoc, CA, 93436.

Lockheed
Space Operations Company

An Equal Opportunity Employer/U.S. Citizenship Required/Principals Only.

RAMIS II/FOCUS

FOURTH GENERATION SOFTWARE SERVICES, INC. invites individuals with significant experience developing systems solutions to business problems using RAMIS II and/or FOCUS to apply for positions in what we intend will become the pre-eminent consulting company specializing in fourth generation systems technology. Initial assignments are in the New York to Philadelphia metropolitan area, but special consideration will be given those who are amenable to travel and/or relocation as we grow.

Candidates for consulting positions should have:

- 2 years of RAMIS II/FOCUS experience
- 4 years of sound DP experience
- strong communications skills
- excellent interpersonal skills
- leadership experience or potential
- prior consulting or client/user exposure

For those real pros who meet our high standards, we offer comprehensive benefits, outstanding salaries, liberal expense policies, and bonuses that directly reflect one's contribution to company growth.

If you fit the profile and are looking for real challenge and growth with rewards corresponding to accomplishments, please tell us about yourself by calling or writing:

DAVID H. LOVELL, PRESIDENT
FOURTH GENERATION SOFTWARE SERVICES INC
Clinton Professional Center
66 Old Highway 22, Clinton, New Jersey 08809
(201) 735-8300

Programmer Analysts

Teledyne Continental Motors, a top division of a Fortune "200" corporation and a proven leader in the general aviation industry, has an opportunity available for Data Processing professionals. These positions are located at our sunny Mobile, AL headquarters, near the Gulf of Mexico.

To qualify, you should have a degree in Computer Science or related field and a minimum total of 2 years experience in business applications, preferably in a manufacturing environment. Your background should include heavy COBOL programming and Database experience. Our operating environment includes an IBM 4331 computer using DOS/VSE with on-line Programming Under CICS.

We offer a competitive salary and comprehensive benefit program including dental and vision care. We're conveniently located near beautiful recreational areas and pleasant residential communities. For immediate confidential consideration, write or send resume including salary history to:

Professional Employment Office
TELEDYNE CONTINENTAL MOTORS
Aircraft Products Division
P.O. Box 90/Mobile, AL 36601
An Equal Opportunity Employer M/F

Computer Systems Manager

St. Petersburg, Florida
Corporate Strength.
Advanced Technology.
Two important reasons to join GE.

A key start-up role
General Electric offers a ground-floor opportunity managing the installation, implementation, and administration and maintenance of a Johnson Controls Security System for a plant security operation utilizing PDP 11 computer.

Credentials
A technical degree, in-depth experience with DEC PDP 11, supported by strong managerial capability. Must be U.S. citizen.

The GE Advantages
Attractive Florida location...with lower cost of living advantages ...strong career prospects within the growing GE organization. Salary is commensurate with responsibilities; excellent benefits.

Contact
Send resume with salary history to: Professional Employment, General Electric Company, Neutron Devices Department, P.O. Box 11508, St. Petersburg, Florida 33733

An Equal Opportunity Employer

M.I.S. MANAGER

Immediate opening. Responsible for direction, coordination, planning of M.I.S. activities. Must have a minimum of 3-5 years experience in hospital systems analysis, RPG programming and operation in IBM System 34-38 environment. Currently beginning installation of IBM H.P.M.S. software. Must have excellent interpersonal skills for coordinating an innovative information system. Please submit resume to:

Personnel Office
St. Joseph Hospital
297 Center Street
Bangor, ME 04401

NCR IMOS Programmer

Established software house has openings for Programmers with Accounting or Business applications background. NEAT/3 exposure would be helpful. Salary open based upon experience. Send resume in confidence to

Datamerica Corporation,
P.O. Box 466, Fort Scott,
KS 66701, Telephone
(316) 223-6340

WANTED: ALL STATES

Software reps
or rep companies

We are a designer/manufacturer of games and specialty programs for the Vic 20 and Commodore 64 computers
We offer a very generous commission plan
Contact: Jerry Hammond
NUFEKOP
P.O. Box 186
Shady Cove, Oregon 97539
WATS 1-800-535-3539

COMPUTER ELITE

MOVE UP TO
FOURTH GENERATION LANGUAGE TECHNOLOGY

If you have at least 5 years experience with business computer systems and are clearly superior in talent, then we are interested in you.

We are a small, high technology/advanced software company with national and international reputations as the leader in developing complex, online, integrated business computer systems using state-of-the-art fourth generation language technology. We are currently undergoing explosive, exciting growth and are looking for top-quality personnel to participate in this growth.

We require a demonstrated ability to perform, rapid learning ability, intelligence, creativity, tenacity and industry in order for you to acquire new leading edge computer systems skills. 10% travel desirable, but not mandatory. We have openings for:

SENIOR PROGRAMMER/ANALYSTS

- Minimum 5 years business computer system development experience.
- DBMS, FOCUS, RAMIS, NOMAD or COBOL are plusses.

Please send your resume to:

FOURTH GENERATION TECHNOLOGY, INC.

Nigel S. Read, President
444 Camino Del Rio South, #134
San Diego, California 92108 EOE
Telephone: (619) 294-8888

INFORMATION SYSTEMS

WASHINGTON METROPOLITAN AREA

Our RAPID EXPANSION is creating immediate opportunities for degreed individuals with experience in the following areas:

COMPUTER PROFESSIONALS

- FORTRAN
- COBOL
- PL-1
- ADABAS
- TSO
- JCL/WYLBUR
- TPL
- SAS
- SPSS

Senior Systems Analyst (4+ years exper.)
Senior Programmers (4+ years exper.)
Programmer/Analysts (2+ years exper.)

ENERGY ANALYSTS

Familiarity with petroleum and natural gas industries, electric utilities, coal and synfuels. Two or more years experience required.

OPERATIONS MANAGER

Experience in supervision of large-scale automated survey operations. ENERGY applications helpful.

STATISTICIANS

Background in inferential methods, time series analysis, regression techniques. Proficiency in SAS and SPSS required. Useful to have: FORTRAN, TSO, WYLBUR, IBM systems utilities.

THE ORKAND CORPORATION is a well-established management consulting firm with a proven track record for providing high-quality research, management, and consulting services to our clients. Our current and projected growth will create continued opportunities for career advancement. We would like the chance to review your experience and career goals in light of our staffing requirements. Please forward resume to Personnel Department CW (refer to specific position), 8630 Fenton Street, Suite 938, Silver Spring, Maryland 20910. Your credentials will be reviewed in confidence. Principals Only.

THE ORKAND CORPORATION

An Equal Opportunity Employer

MANAGER OF BUSINESS SUPPORT

Auxton Computer Enterprises, Inc., a leader in providing management and data processing consulting services to the telecommunications industry, is currently seeking additions to its management team to help keep pace with rapid growth and expansion. Individuals hired will be afforded the unusual opportunity to apply their skills to a wide variety of internal and external assignments while learning AUXCO's products, services and operations, in preparation for positions of greater responsibility and contribution in the future.

Desirable qualifications include:

- 5 years experience in data processing and/or management consulting
- Proven ability to manage both projects and people
- Substantial knowledge of IBM mainframe environments and compatible software
- Large systems development experience
- Sound business acumen

These positions will be based at AUXCO's corporate headquarters in beautiful Orlando, Florida. Some travel will be required. For confidential consideration, please submit resume including salary requirements, to: K.N. DANE

AUXCO Auxton Computer Enterprises, Inc.

300 E. Robinson Street, Orlando, Florida 32801

Equal opportunity employer M/F

UNIX* Software/"C" Professionals

The most important meeting at UniForum could be between you and Bunker Ramo

We're a leading source of state-of-the-art information systems for the financial services industry, with a 50-year history of producing landmark on-line transaction processing systems. Today, our engineering team is making landmark achievements in the commercial application of UNIX systems with our new generation of products, which combine a 32 bit system architecture with the UNIX operating system. This real-time multi-user system along with its sophisticated communications provides the financial services industry with a full range of information services and user friendly applications.

Our large scale product development effort means opportunities for Systems & Software Engineering Professionals. If your background fits any of the openings below, see us at the UniForum Winter Conference. There our technical managers and engineers will be showing off our systems and talking about careers. Your visit could begin a bright new future.

Software Product Development
Design and implement "C" language software products for our Motorola M68000/UNIX systems and intelligent clustered workstations. Applications range from distributed transaction processing to office automation.

System Software Development
Specification, design and implementation of UNIX software kernel enhancements and modifications. Operating system performance analysis and evaluation.

Communication Software Development
Design and develop software related to device emulation projects (SNA, SDLC, X.25, Bisync) and local area networking.

Product Assurance
QA engineering for real-time multi-user UNIX software applications written in "C", including network test, SNA,X.25, SDLC, Bisync. Also "C" and UNIX software programmers for productivity and test tool development.

Software Instruction
To develop state-of-the-art courses in microcomputer languages and operating systems. In-house or at customer site, these courses are in high professional demand in this explosive field.

Our engineering staff has access to highly productive development tools (VAX 11/780 UNIX HP64000 Development Systems) and sophisticated laboratory facilities at our modern Trumbull, Connecticut Headquarters—a prime educational and cultural area approximately 60 miles from New York City.

Join us at UniForum
Jan. 17,18,19.(Tues.,Wed.,Thurs.)

See us at Booth 12 (on the Terrace level) or stop by our Hospitality Suite between 4PM & 9PM at the Washington Hilton.

If unable to see us at UniForum and are interested in the opportunities we have available, please forward a resume to Steve Mooney—or call him collect.

Bunker Ramo Information Systems
An ALLIED Company

Trumbull Industrial Park
35 Nutmeg Drive, Trumbull, CT 06609
(203)386-2640
An equal opportunity employer

*Trademark of AT&T Bell Laboratories

Communications/ Networking

A telecommunications analyst position is available in the Office of the Vice Provost for Computing and Information Services. This is a professional level (non-faculty) position which requires an individual with a broad background in telecommunications, networking, and computing. This individual will provide technical support to the Vice Provost, the computing center, and a campus committee on networking. The successful candidate should remain aware of developments in networking and information services and provide technical support in the implementation of campus networking plans. A Master's degree in networking and 3-5 years of experience in the field is required. The successful candidate must have the ability to stay abreast of new developments in networking and communications and be able to interact with all levels of University administration. To apply send a letter of application, resume and the names and addresses of 3 professional references to:

Office of the Vice Provost
Computing and Information Services
Lehigh University
Linderman Library 39
Bethlehem, PA 18015

Lehigh University is an Equal Opportunity Affirmative Action Employer

SWARTHMORE

MANAGER OF ADMINISTRATIVE SYSTEMS

We are seeking an individual to manage the Administrative Systems of our Computing Center. Reporting to the Director of the Computing Center, this individual will have responsibility for administrative programming, development and support; supervising administrative programmers; generating documentation; setting priorities for maintenance, development and recommendations regarding new software or use of consultants. The successful candidate will have a BA or BS, 3-5 years of experience in progressively responsible positions. Familiarity with PRIME Information Systems and the ADAS software package desired or experience in a PICK operating system environment. Prior work in an academic setting highly desirable. Good communications skills a must.

We offer competitive compensation and excellent benefit package. Pleasant, professional work environment in an expanding, growing computing center. Send resume and salary history in confidence to Mr. Lee Robinson, Personnel Department, Swarthmore College, Swarthmore, PA 19081.

EOE M/F/H

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

EDP Professionals

Middle South Services has one of the South's largest data processing centers serving one of the nation's largest power systems. Middle South Utilities, our parent company, is a major electric utility. Our hardware environment includes two IBM 3081s, and IBM 4341 and Tandem mini 16s. If you are a career-minded EDP professional, we have the following opportunities available:

PROJECT LEADER With strong hands-on management background to work on an on-line distribution, construction and operating system. Requires at least 1-plus years experience as a first-line supervisor or lead analyst on a medium to large-scale system utilizing IMS DB/DC and involving maintenance, enhancement and program performance.

(IMS) SYSTEMS PROGRAMMER Will install new releases, apply maintenance, perform problem resolution and assist with tuning. Requires at least 1-2 years systems programming experience in IMS DB/DC and related products.

(MVS) SYSTEMS PROGRAMMER With at least 2-plus years experience in MVS operating systems to install, monitor, help problem-solve, tune and assist in the installation of MVS/XA systems migration.

ANALYST PROGRAMMERS Requires previous experience in scientific applications with a sound knowledge of PL-1 and OS JCL. Though not required, knowledge of IMS/ADF or FORTRAN would be a plus. Computer applications development with exposure to a VM operating system would be helpful.

SENIOR ANALYST PROGRAMMERS The ideal candidates will use their extensive experience in designing and programming business systems on a large mainframe to develop and enhance financial systems. Application experience preferred in cost accounting, inventory control, general ledger and/or accounts receivable. Familiarity with COBOL, PL-1 and TSO helpful but not required. An accounting degree, computer science/business degree or equivalent work experience is required.

Due to our size and scope of operation, we offer access for advancement, career stability and an excellent salary with major benefits. For more information, call our number below or to apply directly, send your confidential resume to Byron Heath or Richard Jackson, MIDDLE SOUTH SERVICES, INC., P.O. BOX 61000, NEW ORLEANS, LA 70161.

1-800-231-4481

In Louisiana, call collect (504) 569-4980.

MIDDLE SOUTH SERVICES INC.

An Equal Opportunity Employer M/F

Computer Professionals

We Have A Job For You As A

SYSTEMS ANALYST

Exciting plans in data processing require us to recruit new talent that is self-motivated, innovative and technically competent for participation in major new project development. Individual would be responsible for work flow analysis, feasibility study, preparation of system specifications and implementation activities. Two new projects that require this recruitment effort are our major new credit scoring/risk monitoring system for the Credit Card and Consumer Loan Divisions as well as a study to improve Branch processes through advanced technologies.

Candidates must have three years strong prior financial systems analysis experience and a minimum of five years programming or related technical data processing knowledge with heavy user contact. Will possess excellent presentation skills, strong writing skills and the ability to work independently and with users at all levels.

Competitive benefits and starting salary. Qualified applicants forward your resume to: D. Gregg Paul, BANK OF VIRGINIA, Operations Center, P.O. Box 25970, Richmond, VA 23260, or telephone (804) 747-2829. An equal opportunity employer m/f/h.

Expanding the horizons of banking Bank of Virginia

SYSTEMS PROGRAMMER

Southeast Location

Our company's outstanding growth in a manufacturing field has created an excellent career advancement opportunity for a Systems Programmer. This position includes responsibilities for installation, modification, and tuning of systems software, including: MVS, VTAM, JES, ROSCOE and TSO.

Qualified candidates should possess 3-5 years experience in systems programming, including exposure to IMS DB/DC systems, communications techniques and job entry subsystems.

We offer an excellent salary and benefits package. If your experience matches our requirements, we'd like to hear from you. For further information, send your resume and salary requirements to:

CW-B4334
Computerworld
Box 880
Framingham, MA 01701

Equal Opportunity Employer M/F

OVERSEAS OPPORTUNITIES FOR COMPUTER PROFESSIONALS

Frank E. Basil, Inc., an international Operations and Management company, has successfully completed contracts worldwide both as prime contractor and subcontractor.

Currently, we anticipate the award of the continuation of the Saudi Naval Expansion Program (SNEP), an effort which will require mobilization in early 1984. To meet the demands of this project, we have immediate positions available for the following skilled computer professionals:

- ADP Department Head
- DP Manager
- Data Base Administrator
- Systems Software Programmer
- Applications Programming Supervisor
- Applications Systems Analyst
- Systems Analyst
- Programmer Analyst
- Applications Programming Supervisor
- ADP Planning/Staff Services Branch Head
- ADP Documentation Specialist

To qualify for one of these positions, your skills should include some of the following utilizing IBM 360/370, 3033, 3081:

TSO/SPF	VTAM
ACF/NTAM	ADF
ACF/NCP	SCL
RACF	OS COBOL
MVS	IMS DB/DC
JCL	"C" Lisp

Most of these positions, which will be based in Saudi Arabia, are single status. All require U.S. citizenship.

If you're a computer professional looking for a challenging position overseas, here's your opportunity to display your talents. Send your resume in complete confidence to: Dept. 109, Frank E. Basil, Inc., 1054 31st Street, N.W., Washington, D.C. 20007. An equal opportunity employer.

BASIL

SOFTWARE ENGINEERS

Our client's sales have almost doubled in the last five years. Due to this tremendous growth we have been asked to locate for them software engineering professionals for Raleigh, North Carolina.

If you have a BS/MS CS, BS/MS EE or equivalent technical degree with three plus years experience in design and implementation of software modules for Motorola 68000 or Intel 8086/8088 based products. Or if you have experience in the design and implementation of digital circuit boards for Motorola 68000 or Intel 8086/8088 based products we would like to talk to you.

For immediate consideration call or write to

Fortune Personnel Consultants of Raleigh, Inc.
139 Mine Lake Court
Raleigh, North Carolina 27615
(919) 846-6639

Company Paid Fee

Systems Analyst, 40 hrs/wk, $25K. Consults w/clients' user departments to define on-line & batch requirements for IBM, Burroughs & ICL computer systems using COBOL, MICROCOBOL & RPG II languages and OS & DOS/JCL, VM/CMS & BOS operating systems. Supervise design, development & implementation of these systems. Advise on data processing/word processing interfacing and provide emergency production support when necessary. Min Reqs: Bachelors deg Science Field, 4 yrs programming exp, 3 yrs combined exp in ICL, Burroughs & IBM computer systems designing & programming financial/administrative applications using structured techniques in COBOL & MICROCOBOL w/knowledge of OS & DOS/JCL & VM/CMS & BOS operating systems, 1 yr combined exp in IBM & Burroughs interactive systems including on-line inquiries & data entry facilities, in supervision, & data/word/data communication systems using Burroughs & IBM software, and working background in RPG II w/emp in data processing/word processing interfacing. Apply at the Texas Employment Commission, Dallas, Texas, or send resume to the Texas Employment Commission, TEC Building, Austin, Texas, 78778, J. O. # 2511133. An Equal Employment Opportunity Employer.

WASHINGTON D.C. SYSTEM SPECIALIST MSA

The National Academy of Sciences, a prestigious Washington D.C. based institution has a career opportunity within a progressive environment which includes a modern DBMS and state-of-the-art application development tools.

This key position will be responsible for the planning, design, development, maintenance and user interface for the MSA payroll/personnel systems. The ideal candidate will possess a thorough grounding in programming and analysis with at least one year of experience with the MSA payroll/personnel systems. Excellent opportunity for advancement.

We offer an excellent starting salary based upon qualifications plus a liberal benefits package (includes paid relocation) and a desirable working environment. We are conveniently located in scenic Downtown Washington near the White House and public transportation. Interested applicants should send resume and/or letter in confidence to Personnel Office, or call Richard Lawrence at: (202) 334-3468.

NATIONAL ACADEMY OF SCIENCES
2101 Constitution Ave., N.W.
Washington, D.C. 20418
An Equal Opportunity Employer

(PROGRAMMER)

SENIOR PROGRAMMER/ ANALYST

The Fox Chase Cancer Center, a major biomedical research center located in NE Philadelphia, seeks a talented self-motivated individual for our research computer center. Responsibilities include consulting and project work in a variety of areas including: data base management, graphics, data acquisition, communications, and image processing on DEC VAX and PDP-11 equipment. Excellent benefits and facilities. Send resume and salary requirements to:

JOE CURRY
PERSONNEL DEPT.
FOX CHASE CANCER CENTER
7701 Burholme Ave.
Phila., PA 19111

Equal Opportunity Employer

DRAW SUCCESS FROM SUCCESS . . .

intel

WHERE INTEL HARDWARE AND SOFTWARE MEET.

Intel Corporation's leadership in superior circuitry is common knowledge, and our expanding efforts in software are drawing uncommon recognition as well. That's why your successes in building a Systems Integration and Test career should lead you to Intel in Portland, where an uncommon meeting of career potential and lifestyle satisfaction can be yours.

SYSTEM INTEGRATION AND TEST ENGINEERS

As a key contributor to our Product Integration and Evaluation Group, you'll need expertise ranging from the elaboration of basic system test concepts to the overall test planning and test system design. Our highly significant innovative systems incorporates many new elements. The advanced nature of our project requires your ability to lead a team in integration planning and detailed test systems design and implementation. You and a 4-8 member team will cover everything from general concepts to complex details in applying your system software design and testing experience. 3-5 years' minimum experience is required, emphasizing integration on mainframes and/or large mini-computer systems, and backed by a Master's in CT, EE, CS or equivalent.

When you total up the dynamic leadership Intel has proven, the basic challenges presented by our current project, our excellent salary/benefit offerings, and the attractions of our beautiful location, you'll probably draw the conclusion that this is an uncommon opportunity. For immediate consideration, please send your resume to: Harry Speltz, Intel Corporation, JFL-1-148, 5200 NE Elam Young Parkway, Dept. 08729, Hillsboro, OR 97123 or call (503) 681-4608. An Equal Opportunity Employer M/F/H.

intel winners by design

Programming

MIS Upgrade at Lockheed

Lockheed-Ontario has challenging career opportunities in the development and support of business and financial applications.

System Programming Analyst

Responsibilities will include creating system specifications, monitoring the system development process, and providing assistance to users of the system. Your background should include 5+ years' structured COBOL programming and a working knowledge of structured analysis/design and data base concepts. Proficiency in OS/VS JCL, TSO/SPF, PANVALET, VSAM and IBM utilities is required. IMS DB/DC a plus.

Join a leader and put the challenge back into your career. Please send your resume to Lockheed-Ontario, Dept. 1-542-5, P.O. Box 33, Ontario, California 91761. Lockheed is an equal opportunity, affirmative action employer.

Lockheed-Ontario
We are Technology and Systems.

DEVELOP YOUR FUTURE AT . . . CANDLE CORPORATION

CANDLE CORPORATION, a multinational computer software company (developer of OMEGAMON®), is looking for extremely qualified people to join our Technical Services staff. Our highly innovative products have attracted an impressive range of Fortune 1000 clients. Continued growth and diversification have created the following openings:

Software Development

To assist in the development of user friendly product externals and participate in overall product design. This position will involve coordination and review among internal technical personnel and the user community to insure design specifications and externals requirements are met.

Requirements include four or more years of software development experience with large scale systems and knowledge of Systems Performance Evaluation Software. Excellent verbal and written skills are necessary.

Technical Support Specialists

You will be the technical interface between Candle and our customers. It is through this group that the image of Candle is reflected to the world.

SR. DOS SPECIALIST

Requires extensive knowledge of CICS/VS internals in a DOS/VS(E) environment. Must have excellent communication and presentation skills. Knowledge of performance and tuning concepts is also desired. Position involves extensive customer interface. Openings in our Los Angeles, New York, and San Jose facilities.

SR. SYSTEMS SPECIALIST

Requires knowledge of MVS and either IMS or CICS internals. Must have excellent communication skills. Knowledge of performance and tuning concepts is also desired. Position involves extensive customer interface. Openings in our New York, Los Angeles, and San Jose facilities.

Quality Assurance Manager

Will manage effort to build test cases and stress test all Candle software products prior to shipment. Also responsible for ensuring user friendliness of Candle products, good documentation and ease of installation. Systems programming background as well as quality assurance experience in large scale environments desired.

Data Security Specialist

Must have a minimum of 3 years' MVS operating system experience and previous experience with design/implementation of data security systems. Position open at our Los Angeles facility.

Product Planning Specialist

You will assist with design review, design coordination and product planning. Other responsibilities include current/future product research and consulting to the Marketing Department.

Requires broad experience in evaluation and planning activities in large scale environments. An in-depth knowledge of MVS, VM, IMS, CICS or IBM TP is also required. Position open at our Los Angeles facility.

MVS Programmer

Duties will include internals/external design. Heavy assembler language coding, 3-6 years, and a good working knowledge of MVS/370 control and flow, as well as performance considerations. Knowledge of supervisor helpful.

These openings provide an opportunity to work with some of the top people in the industry.

For immediate consideration, please send resume (handwritten OK) to:

Joel Prescott
10865 Wilshire Blvd. #2484 • Los Angeles, CA 90024
Equal Opportunity Employer M/F/H

!Candle

COMBINE THE JOY OF TEACHING OTHERS WITH THE EXCITEMENT OF WORKING IN THE COMPUTER FIELD

Join the ranks of Saint Mary's College's growing, dynamic Computer Science Department. Teach state-of-the-art courses to excited students in beautiful Winona, MN. Requirements: Master's degree (computer science preferred); proven teaching ability; experience in computer software. Opportunities include advancement in rank and tenure, and possible consulting work and summer employment. Salary dependent upon degree and experience. This position opens in the Fall of 1984. Initial preference given to applications received by February 1, 1984. Send resume to Paul Schoenecker, Box 897, Saint Mary's College, Winona, MN 55987.

Equal Opportunity/ Affirmative Action Employer

PROGRAMMERS PROGRAMMER/ANALYSTS SR. SYSTEM PROGRAMMER

KWASHA LIPTON, Port Lee, New Jersey, a leader in Employee Benefits Consulting is currently seeking qualified MIS personnel. Your immediate task, to take responsibility in developing and implementing customized client information systems.

The candidates we seek must be:

- Degreed, Math/Computer Science/Accounting
- GPA minimum 3.0
- 3-4 yrs. BAL (Sys. Prog.)
- 1-3 yrs. COBOL, OS/MVS, TSO/SPF
- "Hands-On" Structured Methodology, Project Life Cycle
- System testing through implementation

Our compensation package is attractive. Please send confidential response, including salary history and requirements to our Management Consultants:

The FLAGMAN Group
1450 Broadway, 6th. Floor
New York, New York 10018
Contact: M.B. Green, Dir. Human Resources
(212) 921-8945

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

JOIN A LEADER

[redacted]

For fifteen years Boole & Babbage has been a world leader in software products, education and consulting services designed to plan for and optimize the performance of large IBM MVS computer systems. Our products and services are used by most Fortune 1000 companies. Boole & Babbage's worldwide growth has been impressive, and we are now searching for experienced professionals committed to excellence in this field to join our Marketing organization.

[redacted]

San Francisco Bay Area

Positions are now available in Product Management and Marketing Support. We are looking for those rare individuals who combine a solid understanding of IBM's MVS environment (familiarity with IMS is a definite plus) with outstanding communications and leadership skills.

These positions are career, growth oriented opportunities, and Boole & Babbage offers an outstanding benefits package. If you are qualified, enthusiastic, and committed to being with a leader, we would like to hear from you now.

Send your resumes to H. Bording, c/o Boole & Babbage, Inc., 510 Oakmead Parkway, Sunnyvale, CA 94086.

Boole & Babbage

Development Project Manager

OPPORTUNITIES LIKE THIS LAUNCH METEORIC CAREERS

All the pieces are in place except one... and maybe that's you. The company is a nationally recognized leader in the real estate community, so you know you'll be backed with the finest resources. The project is high priority so you know it will be highly visible.

PRC Realty Systems, Inc., a leader in providing automated systems to the real estate community, needs a leader for a new project in its software development organization.

You must have a minimum of 11 years of data processing experience, with a minimum of 3 years of management experience preferably in a development environment. Experience in development work on a 32-bit minicomputer, using modern techniques and tools, and experience with UNIX® on a 32-bit minicomputer is required.

For immediate consideration, please send your resume and salary history to: Planning Research Corporation, 1500 Planning Research Drive, Department KO-38, McLean, VA 22102. An Equal Opportunity Employer M/F/H/V

prc

Planning Research Corporation

---

inc.

SPSS

An Environment For Creative Excellence

SPSS, Inc., a world leader in the development of quality data analysis software, is expanding its software development staff. We are looking for professionals seeking a challenging and rewarding opportunity to be involved in the design and development of state-of-the-art software. Our commitment to innovative and quality software, modern software development tools and computer facilities, and our highly skilled professional staff make this a unique career opportunity. We have several opportunities for professionals in the following areas:

GRAPHICS PROGRAMMERS

You will be responsible for development and support of graphics software including writing software to drive graphics devices. To qualify, your background should include at least two years experience in FORTRAN and Assembler and knowledge of graphics software and hardware. Experience with IBM VM/CMS desired.

SOFTWARE DESIGNERS

You will participate in the design and development of innovative interactive software for high end microcomputer applications. To qualify, you need at least two years experience in interactive software development with a strong background in FORTRAN, C or Assembler and knowledge of UNIX or IBM PC/DOS operating systems. Experience with database design, human factors, data communications graphics, or statistics desired.

SUPPORT PROGRAMMERS

You will be responsible for support and enhancements to current products and contribute to the development of new products. Your background must include at least two years experience in FORTRAN and Assembler and experience with large scale FORTRAN programs.

We offer a competitive salary and benefits program and relocation assistance. Send resume indicating position of interest to:

J.M. Meyers
Technical Recruitment Manager

SPSS, Inc.
444 N. Michigan Ave.
Chicago, IL 60611

Equal Opportunity Employer M/F

ROMAC

[redacted] Romac & Associates/Personnel Consultants (Agency) specializes in the placement of Data Processing, Accounting, Banking and Financial Personnel. All Fees are paid by our client corporations. Below are representative opportunities. Qualified candidates are invited to call or write for appointment. NO RESUME NEEDED. Replies held in confidence.

SYSTEMS PROGRAMMER OS/MVS
$39,000
1221 MAGNUS ISLAND PLAZA
ROCHESTER, NEW YORK 14604
716-232-4610

FACULTY POSITIONS IN BUSINESS COMPUTER INFORMATION SYSTEMS

The Computer Information Systems Department welcomes applications for faculty positions available September 4, 1984. One position may start February 20, 1984. Masters in Business preferred (will consider Bachelors degree with extensive business and teaching experience). Several years of recent experience in business systems analysis and programming is required. College teaching experience desirable. Requires strong interest in undergraduate instruction and ability to teach courses in several of the following areas: Systems Analysis, Programming Languages, Telecommunications, and Data Base management. Rank and salary will depend upon qualifications and experience. Send complete resume to Dr. Robert J. Thome, Head, Department of Computer Information Systems, Peoria State College, Big Rivers, Ill 61607.

AFFIRMATIVE ACTION
EQUAL OPPORTUNITY EMPLOYER

PERSONNEL ADS—INFORMATION SERVICES DEPARTMENT

The Christian Broadcasting Network, Inc. has immediate openings in their Information Services Department for the following positions:

PRODUCTION CONTROL ANALYST

To support our Help Desk function. 3-4 years extensive MVS, operating experience and a strong working knowledge of IBM OS JCL and Utilities is a must. Must be able to interface well with users. Experience in TSO/SPF and Telecommunications is a plus.

SR. COMPUTER OPERATOR

Requires a minimum of three years hands on experience on a large scale IBM Mainframe console using MVS JES2 or 3. Must be able to work well with people. A good working knowledge of IBM OS JCL is a plus.

SR. PRODUCTION SUPPORT ANALYST

Requires a superior knowledge of IBM OS JCL, TSO/SPF, C-Data, and macros. Should have a good working knowledge of one or more of the following: COBOL, PL/1, Pro-Grammer, or SAS (two years experience or better preferred). Responsibilities will include maintenance of production JCL, Production liaison, development of C-Data, macros and other productivity aids, development and installation of software packages.

If you feel bid and wish to serve, send resume in confidence to:

Employment Manager
Christian Broadcasting Network, Inc.
CBN Center
Virginia Beach, VA 23463

CBN is an Equal Opportunity Employer

Sr. Director, Info. Syst. Div.

Must be familiar w/hospital systems & systems engg. & extensive knowledge in IBM health care systems to direct & provide well defined & quality computer service for health care industry. Analyse data & plan layout, conduct workshops & provide tech. consultation to corp. executives. BSCS w/4 yrs exper. in job offered; or BS Engg. w/2 yrs in job offered + 5 yrs in systems engg. + 6 mos. extensive CS training. $45,000/yr. Job in LA. Send this ad & your resume to Job #1431, PO Box 995, Sacramento, CA 95804, not later than 1/24/84.

MVS PROGRAMMER/ANALYST

Numerous positions are now available for large mainframe IBM P/A's. Majority of needs are in new development. These are Blue Chip Twin Cities companies offering excellent starting salaries, excellent growth potential, state-of-the-art environment plus relocation package. Requires 2+ yrs exp in COBOL, OS/MVS, on-line a plus. Salary Range from $25-35,000.

JOHN MILLER
OR MARK DAVIS
ROBERT HALF
3936 IDS Center
Minneapolis, MN 55402
(612) 339-6951

DATA PROCESSING

Instructor/Assistant Professor. Tenure Track position.

Teach at a university located on Grand Lake St. Marys in rural Ohio. Excellent recreational facilities offering advantages of small town living.

Develop and teach courses in Data Processing and related fields. Masters' degree with business and/or teaching experience required. Competitive salary with excellent fringes.

Submit letter and resume to: Assistant Dean, Western Ohio Branch Campus, Wright State University, 7600 State Route 703, Celina, OH 45822. Equal Opportunity, Affirmative Action Employer.

Applications should be received by January 31, 1984.

UNIVERSITY OF IOWA
SENIOR SYSTEMS PROGRAMMER

to perform software installation, maintenance, and performance tuning in an MVS/JES2 environment. Previous systems experience with large IBM systems is required. Experience with SMF, performance analysis, capacity planning and MVS/JES2 is desirable. The University of Iowa offers the advantages of a major university in a small mid-western city. Screening of candidates will begin 30 January 1984. Send resume with salary inquiry to:

Harland W. Gordon
System Support Manager
Wang Computing Center
University of Iowa
Lindquist Center
Iowa City, IA 52242

The University of Iowa is an Equal Opportunity/Affirmative Action Employer

---

GIVE YOUR CAREER A SHOVE BY LOOKING IN THE CLASSIFIED PAGES OF COMPUTERWORLD.

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

SPR is Looking for

Programmer Analysts

who are

Problem Solvers

Make this an equal equation

Six certainly does not equal one. But by adding one line to one side or the other, you should be able to make this an equal equation.

SPR has immediate openings for Programmer Analysts with at least 3 years experience with any one or combination of the following skills:

PL-1 ADF
IMS ACP PARS

SPR offers the opportunity to join a major national consulting firm with a 10 year record of growth and professionalism.

We offer an excellent compensation and benefits package. We have challenging opportunities throughout the Central and Southwest Regions. See below for answer.

To investigate these positions please send your resume including geographic preference or CALL COLLECT:

Earle Poppe
Manager of Technical Services
918/587-8626

SPR
The Strategic Resource for the Computer Community

1 Boston Plaza
20 E. 5th Street/Suite 901
Tulsa, OK 74103
Chicago, Dallas, Denver, St. Louis, Tulsa, Milwaukee, Los Angeles
Equal Opportunity Employer M/F

Answer if I = 1 Remember, call Earle Poppe (918) 587-8626 Collect.

CIBER

The Data Processor's Choice

The Best And The Brightest Data Processing Professionals . . .

. . . have always found solid rewards and diverse challenges at CIBER. We're a respected Data Processing Consulting Firm that delivers a variety of applications development and software conversion services to our customers across the nation.

Currently we have positions for those who can work in a vertical capacity meaning analysis, programming, implementation and documentation with emphasis toward IDMS, IMS, CICS and many other state-of-the-art packages.

At CIBER, we respect your talents and efforts and encourage you to advance in your career. Our promotion from within policy, excellent compensation and attractive benefits package provide the stimulation to achieve your career objectives.

Our branch offices are located throughout the United States: Atlanta, Chicago, Dallas, Denver, Detroit, Houston, Phoenix, Sacramento, St. Louis, and Tulsa.

Call us collect or send your resume to:

CIBER
Personnel Resources
67 E. Weldon, Suite 121
Phoenix, Arizona 85012
(602) 264-6411

We are an Equal Opportunity Employer

COMPUTER SCIENCE FACULTY

Two full-time tenure-track positions at the Assist/Assoc level: (1) Ph.D. in Computer Science or Ph.D. in a related area and strong Computer Science credentials; (2) Ph.D. in Mathematics, Statistics or Computer Science and able to teach courses in Computer Science and Statistics. A commitment to quality teaching is essential. Rank and salary are competitive and commensurate with experience and qualifications. The Department offers majors in math and computer science (ACM-based). The College has 7000 students at the Bachelors and Masters level; it is located in a developing area (with mild winters) fifty miles inland from Savannah and the coast. Send detailed resume and list of references to DAVID R. STOKE, DEPT OF MATH AND COMP SCI, L.B. Sass, GEORGIA SOUTHERN COLLEGE, STATESBORO, GA 30460. Applications received by February 27 will be considered in the initial screening, but applications will be accepted until the positions are filled. An equal opportunity/affirmative action employer.

SYSTEM PROGRAMMER I

University of Wisconsin-Parkside

We seek a system programmer to help maintain an IBM 4341 and DEC 11/70 each under its own operating VM/SP, DOS/VSE and RSTS/E. Responsibilities include assisting in the generation and maintenance of operating systems, system utilities, and languages.

Desired qualifications include a Bachelor's degree with 2 to 3 years programming experience in PL/1 or COBOL. Experience as a system programmer in a CICS environment is preferred.

Starting salary ranges from $26,600 to $28,000 depending upon experience and education. Advanced educational opportunities available.

Uni-Parkside is a medium-size university in a pleasant suburban environment located in southeastern Wisconsin.

Send resume to:
William Silverstone, Director
Computer Center
University of Wisconsin-Parkside
Kenosha, WI 53141
AN EQUAL OPPORTUNITY EMPLOYER

UNIX™ and SUNSHINE™

Many opportunities in Austin and Dallas for UNIX and C experienced people. Call collect or send resume.

214/484-UNIX
UNIXSEARCH
2915 LBJ Freeway #161
Dallas, TX 75234

UNIX is a trademark of Bell Laboratories
SUNSHINE is a trademark of Texas

GENERAL EMPLOYMENT ENTERPRISES, INC.

Data Processing Divisions

A network of Professionals To Service your local or Relocation Career Desires.

VICE PRESIDENT
SOFTWARE SPECIALIST
$50-60,000
Build an operations college staff for software applications in Fortune 1000 Corp. A real challenge to the innovator.

SOFTWARE QUALITY
Corporate Team
$30-35,000
A corporate Headquarters Plant! A Fortune 500 firm that will welcome your IMS Internals, BAL and CICS practical experience.

Technical Specialists
$30-40,000
A sleeping editor in bigger things. Owners and supervise System Programmers in a telecommunications environment. MVS Internals are key.

Software Engineering
$30-40,000
Creative innovative opportunities using "C" language and Unix systems on the conversions. All activity leads to Project management.

CAREER MINDED
PROGRAMMER ANALYST
$25-30,000
An "open-end" banking experience that will pave the way into executive management. Your training in COBOL/BASIC will qualify for your career desires.

CAREER PATH
Software Systems Designers
$30-40,000
Creative! Innovative! Challenging! New corporate research center in Telecommunications! PL/I, Pascal or Assembly coupled with software design will be well received!

ASSISTANT TO
Systems Programmer Mgr.
$30-40,000
"Hands On" exposure to database is the "plus" for moving in as the understudy.

CENTRAL LEADER
Service Engineer
$24-28,000
A field operations opportunity that requires a self-starter! Be involved in the important area of preventative maintenance on S.P. installations.

FIELD PROFESSIONAL
$27-40,000
A start-up position with a well established company! Create new team in Mainframe environment. Your IBM 360/370 expertise ideal!

Systems Manager
MANUFACTURING
$35-40,000
Put some momentum into your group! Capitalize on your IBM/DOS to move into development activity. A key position for management progression.

SOFTWARE PROGRAMMER
$24-28,000
Excellent visibility for advancement! Your exposure and experience with the 3000 series and OS/MVS first! There is Project Leader potential here.

DATA SYSTEMS
PROGRAMMER ANALYST
$25-30,000
Start in the inner circle of top management. Be involved with IBM series 1 EDX/EDL. Retail background will dovetail with this opportunity.

Systems Analyst Today!
Project Leader Tomorrow!
$30-35,000
Create your future! Your COBOL, DOS Training will pave the career path. Have a hand in development, research and problem solving! High visibility.

TERMINAL SUPPORT
MANAGEMENT
$30-40,000
A banking combination! MVS internal plus supervision in the Support Areas! Planning and developing are the challenges for the experienced Software Programmer.

FAR WEST

Phoenix, AZ 85012
3443 N. Central Ave.
602/265-7600

Huntington Beach, CA 92648
2130 Main Street
714/960-3451

Los Angeles, CA 90010
3699 Wilshire Blvd.
213/386-4030

Palo Alto, CA 94303
2471 E. Bayshore Rd.
415/494-3441

San Francisco, CA 94111
444 Market Street
415/981-6440

San Francisco, CA 94105
One Market Plaza
415/495-6511

San Jose, CA 95128
1550 The Alameda
408/289-8760

Woodland Hills, CA 91367
5800 Vanet
213/703-6000

CENTRAL AND MIDDLE WEST

Columbus, OH 43215
88 E. Broad St.
614/228-5182

Indianapolis, IN 46204
5 E. Market St.
317/636-2281

Chicago, IL 60603
150 S. Wacker Dr., Ste. 660
312/346-7601

St. Louis, MO 63101
720 Olive Street
314/231-7600

Naperville, IL 60540
360 W. Shuman Blvd.
312/357-5995

Chicago, IL 60606
150 S. Wacker Dr., Ste. 912
312/782-1624

Louisville, KY 40207
Executive Park #615
502/897-5347

Detroit, MI 48226
1200 Sixth St.
313/963-8479

Chicago, IL 60606
150 S. Wacker Dr., Ste. 775
312/782-6382

Independence, OH 44131
6100 Rockside Woods Blvd.
216/524-4444

Arlington Heights, IL 60005
65 W. Algonquin Rd.
312/364-8450

NORTHEAST

Boston, MA 02116
545 Boylston St.
617/267-6116

Philadelphia, PA 19103
8 Penn Ctr. Plaza
215/564-3161

Philadelphia, PA 19102
3 Penn Ctr. Plaza
215/568-3220

SOUTHWEST

Dallas, TX 75235
8350 Douglas
214/363-7370

Dallas, TX 75206
3550 N. Central Exp.
214/987-6762

Dallas, TX 75201
Plaza of Americas
214/742-1117

Houston, TX 77056
1235 N. Loop West
713/861-6868

Houston, TX 77074
6300 Bayou
713/777-6200

CANADA

Hamilton, ONT. L8P-1A2
100 King - Stelco Towers
416/527-6881

Oakville, ONT. M6C-4Z5
One Eva Road
416/822-6116

General Employment Enterprises, Inc.
Corporate Offices 150 S. Wacker Dr. Chicago, IL 60606
Member of American Stock Exchange

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

MANAGER/ SYSTEMS PROGRAMMING

Who has a DP environment large enough to be state-of-the-art and small enough for high visibility? The folks who do it right!

And, the folks who do it right, Kentucky Fried Chicken, want you to find out about the varied projects, room for creativity and the chance to learn and grow within a growing Department. Currently, our Information Resource Management (IRM) Department is expanding and has created the following career spot.

Responsibilities include participation in the development/implementation of computer hardware and software planning and resource management. You will coordinate the implementation/maintenance of all operating systems and software products. VM/MVS and/or OS/VSI and CICS background required.

At least 8-10 years' experience with computer mainframes, associated peripherals and data communications equipment is required. You should be thoroughly familiar with IBM operating systems and software. DOS/VSE to MVS conversion experience is essential. Management and interpersonal skills, as well as a degree (or close to completion) in Business, Computer Science or related field are required.

We offer an excellent salary, comprehensive benefits program and a professional environment. For further information, please send your resume, stating background, salary history and requirements, to: Ms. Kathleen Brittain, Employment Specialist, Kentucky Fried Chicken, P.O. Box 32070, Department 294C, Louisville, KY 40232. We are an equal opportunity employer M/F.

Kentucky Fried Chicken.

Alascom, Inc., Alaska's long lines common carrier, has an immediate opening in the Marketing Department for an

ACCOUNT REPRESENTATIVE

Successful candidate must have a thorough knowledge of protocols, multiplexing, speed conversions and packet switched data networks, and be well versed in current telecommunications systems concepts with professional sales or communications marketing background in computers and data communications. A Bachelor's Degree in Marketing or related field plus three years successful sales or related experience in a common carrier operating telephone service company or technologically sophisticated environment required.

Alascom offers competitive salaries and benefits, in addition to excellent working conditions. Qualified individuals should send a resume to Alascom, Inc. Employment Office, H-130, Pouch 6607, Anchorage, AK 99502. An equal opportunity employer.

ALASCOM

DALLAS

Full interview, info and fee paid for large scale Real Systems PAPL and local growing stable company in suburban Dallas. If you are considering a move to Dallas, this is the possible situation. Salary open. D.S.E. Contact us to find out more.

8750 Stemmons Frwy. 13007
Dallas, TX 75247 (214) 637-4848

DATA PROCESSING CAREERS

FACULTY POSITION COMPUTER SCIENCE DEPARTMENT

Two or more full-time faculty positions starting September, 1984, or January, 1985. Teaching responsibilities and opportunity exists in Operations Research and Quantity Analysis, Data Structures, and/or Data Base Management Systems. Terminal degree in Computer Science or related area required. Masters in a related area, with experience, are encouraged to apply. Rank and salary dependent on qualifications. Summer teaching and enrollment stipend. Send inquiries, with graduate transcripts received by April 1, 1984, to

Dr. Duane Bender,
Computer Science Department,
Minnesota State University,
P. O. Box 16, Mankato, MN 56001.

Application Software Manager

Are You Interested in a Rewarding Challenge That's Unique to Tektronix?

Our engineering professionals enjoy the fact that they are working with technology found nowhere else in the world. We're where you ought to be, with the world's leading manufacturer of oscilloscopes and many other general purpose instruments.

Your specific challenge will be to lead a software group in the support of customer applications in current and future Laboratory Instrument Systems products. Responsibilities will include the implementation of utility, training and application software products, and development of an expert level of technical knowledge in Laboratory Instrument measurement applications.

An EE or CS degree along with recent experience in writing code in high-level computer language such as BASIC, FORTRAN, and PASCAL are required. In addition, we require project management experience, and a willingness to travel 10-25% of the time.

Our rewards are what you might expect from a billion dollar, Fortune 500 company. For immediate consideration, please send your resume to Vivian Stock, MS 39-313, Tektronix, Inc., P.O. Box 500, AKL1, Beaverton, OR 97077.

We are an equal opportunity employer m/f/h.

Tektronix
COMMITTED TO EXCELLENCE

MAINE

We have specialized in data processing professional placement in Maine for almost a fifth of a century. If you qualify for positions in the $25-40,000 range, please contact us in total confidence. Our clients pay our fees and provide relocation assistance.

ROMAC.
477 Congress St.
Portland, Maine 04101
(207) 772-4748

EMPORIA STATE UNIVERSITY

DATA PROCESSING/ INFORMATION SYSTEMS POSITION

Relevant doctorate or ABD preferred. MBA or MS required. Business or teaching experience desirable. Teaching computer languages, applications, and systems courses. Salary competitive. Assistant to Associate Professor. ESU has over 1500 business majors including 200 data processing/information systems majors. Beginning with Spring February 15, 1984. Apply to Chair, Division of Accounting and Data Processing/Information Systems, Emporia State University, Emporia, KS 66801. (316) 343-1200.

An Equal Opportunity Employer M/F/H.

DON'T DELAY CALL COLLECT TODAY:

For outstanding DP jobs in the BEST SOUTHEASTERN COMPANIES: Programmer/Analysts; Systems Analysts; DBA's; Technical Support.

All fees, relocations, and interview expenses paid by our clients.

Personnel Placement, Inc.
837-D Huffman Mill Rd.
Burlington, NC 27215
(919) 584-5991

IBM 36
Southern Oregon

Programmer/Analyst for design, implementation and maintenance of programs and systems for a progressive county government. Requires background, knowledge and experience with IBM systems using RPG language. Degree desired with at least 2 yrs. compatible experience. Salary range $20,596 - $33,988 plus liberal fringes. Send resume to County Administrative Office, Jackson County Courthouse, Medford, OR 97501. EOE

Palette

Palette Systems, Inc., one of America's fastest growing CAD/CAM software companies, seeks a Support Programmer for its rapidly increasing number of customer sites. Computers involved are VAX, PDP-11 with RSX, and Professional 350. Experience on these machines will be an advantage. Duties will include software development, remote installation and programming support, and periodic customer travel. Please send resumes, including $/$ details of present employment and salary to:

Palette Systems, Inc.
Two Burlington Woods
Burlington, MA 01803
Attn: M. E. Hawley

UNIVAC

Programmers, Systems Analysts, Data Base Analysts, Systems Programmers—let us update you on the rapidly changing UNIVAC market coast-to-coast. To confidentially explore exciting new career opportunities, rush a resume or call Gary Rapetto, CPC.

RENOLL OF
ALBUQUERQUE INC.
1717 Louisiana NE, Bldg. C
Albuquerque, NM 87110
(505) 883-1971
An Equal Opportunity Employer

SYSTEMS ANALYST

Position available in expanding insurance firm located between Baltimore and Washington. Requires experience in COBOL, IBM mainframe, and PMS system. Exposure to current software/data base systems a plus. Excellent working conditions with competitive salary and benefits. Send resume or call:

Rick Bauer
Montgomery Mutual Insurance Company
17810 Meeting House Road
Sandy Spring, MD 20860
(301) 924-4700

SYSTEMS ANALYST

- Dvlpmnt, conversion, reprogramming of Securities System. Functional anal., redesign & conversion to GEMCOS transaction processor. Write WFL routines, program unit test, systems test, debug & document. 3 yrs exp. or 3 yrs consultancy/programming. Mech. Elect. Eng. Must have knowl. GEMCOS, DMS-II, COBOL & CANDE. $32,000 pa. 40 hrs/5 days/wk.

Datavalue, Inc.,
675 3rd Ave., NY NY 10017.

PHILADELPHIA

SR SYSTEMS ANALYST TO $35,000

Prestige client seeks degreed pro w/ SYSTEM DESIGN/DEVEL exp on UCS/CALE IBM hdwre. Prior COBOL progrmng reqd. Relational Database & gen'l biz apps phd. All relo expenses pd. Excel benefit pkg. MAKED IN/TV.

ROBERT HALF
OF PHILADELPHIA, 19043.
3000 Market St., Suite 755
Philadelphia, PA 19104
(215) 386-4300

ASSISTANT DATA PROCESSING MANAGER

Immediate opening for systems professional to assist in planning, organization and control of data processing activities in a growing electronic firm in southeast Iowa. The qualified applicant will have 5 years experience, degree preferred, working in an IBM 4331-K2 DOS/VSE, CICS, VTAME environment. Salary range $35,000+ and benefit package. Resumes to:

Personnel Director
WINEGARD COMPANY
3000 Kirkwood, Burlington, IA 52601

Computer Science

Faculty positions at Instructor, Assistant Professor, Associate Professor and Professor levels are anticipated starting August, 1984. Ph.D. in Computer Science preferred, doctorate in related field will be considered. Rank and salary commensurate with experience. Teaching or research areas of interest include theory of computing, systems programming, data base systems, computer graphics, programming languages and artificial intelligence. The department offers B.S., M.S., and Ph.D. degrees. Send inquiries and resumes by May 15, 1984 to:

Dr. Richard T. Chien
Eminent Professor and Chairman
Department of Computer Science
Old Dominion University
Norfolk, VA 23508
An Affirmative Action/ Equal Opportunity Employer

Job Order No. 419927

Responsible for providing customers with: (1) quick response to problems with computer systems and related equipment; (2) programming assistance with both "off-the-shelf" software programs and custom programs written in BASIC and PASCAL programming languages; (3) assistance in efficient use of customer systems and software programs; and (4) provide technical assistance to customers with special hardware or equipment requirements. Strong background in electronics with emphasis on digital computers. Experience programming in BASIC and PASCAL languages. Must be fluent in English and Spanish. B.S. in Electrical Engineering or Computer Science, 40 hrs./wk. 10 am to 8 pm schedule, $1,750.00/mo. CONTACT: LA. DEPT. OF EMPLOYMENT SECURITY, 1991 Woodale Blvd., Baton Rouge, LA 70806.

Systems Analyst, Electronic Data Processing: Analyses business and scientific procedures and problems to refine data and convert it to programmable form for electronic data processing, utilizing the UNIX operating system. Forty hours per week, 8:00 a.m. to 5:30 p.m. $24,000 per year. Bachelor of science or master of science in computer science required. Three months experience required. Submit resume to: Job Service of Florida, 105 East Broward Boulevard, Fort Lauderdale, Florida 33302. Refer to Job Order #3736870.

Maine Yankee Atomic Power Company is currently seeking experienced Systems Analysts for the following positions:

Senior Systems Analyst

This position will be responsible for design, review and test plan analysis of software systems and data base applications. Qualifications should include: MS degree in Computer Science, 5 or more years of computer experience.

Systems Analyst

This position will be responsible for the design and implementation of process control software including the development of new process applications in color graphics in a real time sensor based environment. Qualifications should include: BS degree in Computer Science, Math or Engineering, 3 or more years experience as a Software Engineer.

Systems Analyst

This position will be responsible for the development, updating and maintenance of a nuclear power plant operations simulator. Qualifications should include: BS degree in Computer Science, Math or Engineering, 2 or more years of systems experience, preferably in computer modeling.

Maine Yankee offers career growth in a challenging work environment with competitive salaries and benefits. Send resume outlining work history and salary requirements to: Lawrence J. Davis, Personnel Coordinator, Maine Yankee Atomic Power Company, Edison Drive, Augusta, Maine 04336, (207) 622-3521

Equal Opportunity Employer M/F
Women and minorities are encouraged to apply.

Arthur Young is only interested in EDP Professionals who see their positions a bit differently.

As a continuing challenge, instead of a calculated survival.

As an opportunity to use your technical expertise, creativity, and business acumen to excel—and to receive rewards directly tied to your performance.

As one of three or four uncommon people in your area who will grow as a consultant with Arthur Young's Information Systems Consulting Practice.

You must be a highly qualified and experienced EDP Professional, in areas such as Systems Planning, Project Management, or Systems Design and Implementation. Or a Technical Specialist in areas such as Telecommunications, Database and Operations Center Management.

You must be comfortable in a position where you will work with top management in both the private and public sector.

You must demonstrate a talent for leadership, and be the type of person who pursues goals aggressively.

That's the kind of difference we're looking for.

Perhaps five percent of you can realistically see your future position in this way.

If you're among that select few, we'd like to invite you to an open house in your area. Contact the Arthur Young Representative nearest you as soon as possible for the time and place.

And remember, there's only room enough for those who will make a difference.

Chicago: Wayne Wipert, Management Consultant, Recruiting, (312) 645-3160. Tuesday, January 24.

Dallas: Phil Scott, Partner, Information Systems Consulting, (214) 969-8609. Saturday, January 14.

Los Angeles: Roger Ferrar, Office Director, Management Consulting, (213) 977-3481. Monday and Tuesday, January 16 and 17.

New York: Dave Nugent, Management Consultant, Recruiting, (212) 407-1828. Tuesday and Thursday, January 24 and 26.

Washington, D.C.: John Madden, Office Director, Management Consulting, (202) 828-7092. Saturday, January 21.

ARTHUR YOUNG

The fastest growing research-oriented pharmaceutical company in the U.S. is recruiting for the following positions at its Corporate Headquarters in Research Triangle Park, N.C. (near Raleigh/Durham).

DATA BASE ADMINISTRATOR

This position requires 2 years of data base administration experience with Hewlett-Packard equipment and programming and COBOL.

PROGRAMMER/ ANALYSTS

These positions require 2 years COBOL programming experience on Hewlett-Packard equipment with manufacturing/accounting/personnel applications background.

Raleigh/Durham is located in the rolling Piedmont area of North Carolina and offers access to 3 nationally recognized universities, numerous cultural opportunities and nearby recreational opportunities.

The Company offers a competitive salary, benefits and relocation package. Send your resume, indicating the position that you are interested in, to: **Personnel Manager, GLAXO INC., P.O. Box 13398, Research Triangle Park, N.C. 27709.**

(No Private Agency Referrals Please)

Glaxo

An Equal Opportunity Employer M/F/H/V

+ 000 SUNBELT OPENINGS

D.P. - ROBERT MONTGOMERY

Prog. Anal.	to $35,000
(3 yrs H/P & COBOL)	NC location
Prog. Anal.	to $35,000
(3 yrs Mfg. CICS & COBOL)	NC location
Prog. Anal.	to 28,000
(3 yrs banking IMS & COBOL)	VA location
Sys. Progs.	to $40,000
(3 yrs MVS or IMS)	DC location
Sys. Progs.	to $40,000
(3 yrs NCP & VTAM)	FL location
Sys. Anal.	to $35,000
(3 yrs fin. appl. & COBOL)	TN location

ENGINEERING - MIKE HUNTER

Systems Engineer(CS)	to $70,000
Software Mgr's (Communications)	to $50,000
Software Engr. (Telephony)	to $50,000
Sr. Software Engr's (Unix-C/C or UTEL)	to $50,000
Software Engr's (Management)	to $35,000

Fee-Paid is the nations largest corporate owned Co. with over 100 offices located throughout the nation. For a free confidential log of our clients needs call 919/876-8040 or send resume to:

FEE-PAID ASSOCIATES
3101 Poplarwood Court
Raleigh, NC 27625

VAX/VMS
(PROGRAMMER/SYSTEMS ANALYST)

We have acquired a state-of-the-art relational data base management system implemented in hardware as a back-end processor interfaced to a VAX/VMS operating system to provide technical software support services to Programmers, Systems Analysts, and Operations personnel. The requirements for this position also includes a Bachelor's Degree in Business Administration, Mathematics, Accounting, Computer Sciences, or related fields.

EQUAL OPPORTUNITY EMPLOYER - M/F

Liberal Fringe Benefits
Must be a U.S. citizen
Replies held confidential

Send resumes to:

Trudie L. Rainey
Employment Section Chief
Reynolds Electrical & Engineering Co., Inc.
Post Office Box 14400
Las Vegas, NV 89114-4400

BUY - SELL - SWAP

CMI

3033
All models

3081
New or Used

Series 1
Immediate Delivery
Buy-Sale-Trade
Leases Available

3083
New or Used

Lease Financing
Available
For Your System or Ours
2, 3, 4 or 5 Year Terms

Series 1 I/O
Buy-Sale-Trade Leases Available

Wanted
4381
Delivery Positions

Wanted
4341-M2
4341-L01
Call Now

3380 3350
3340 3370 3330
3375 3360
Buy/Sell/Lease

SYSTEM 36
Monthly Lease Rates
Lower Than IBM Credit Corp.
2, 3, 4, or 5 year terms
Includes System 34 takeouts

3725
Lease Financing Available
For Your System or Ours
2, 3, 4 or 5 Year Terms

3800
LASER PRINTERS

8130's
Sale or Lease
Available Immediately

3705-3704
Available for
Immediate Delivery
Sale or Lease

CMI CORPORATION

SERIES I SPECIAL

Control Data
126MB Removable Drives . . $12,900
Diskette Drives . . . . . $ 1,495
Printers & Displays

New or Used
Immediate Delivery

IBM
4956 Processors
4967 200MB Disk Drives
All Peripheral & Features

ALL UPGRADES
TERMINALS
DISK
PRINTERS
LEASING
SHORT OR LONG TERM
NEW OR USED
4300
3033 308X
SYSTEM 38
SERIES I
SYSTEM 34/36
BUY SELL LEASE

DEC

RENT • BUY • UPGRADE • SELL

PDP, 11/03, 11/04, 11/23, 11/24, 11/34,
11/44, 11/70, VAX/730, VAX/750, VAX/780

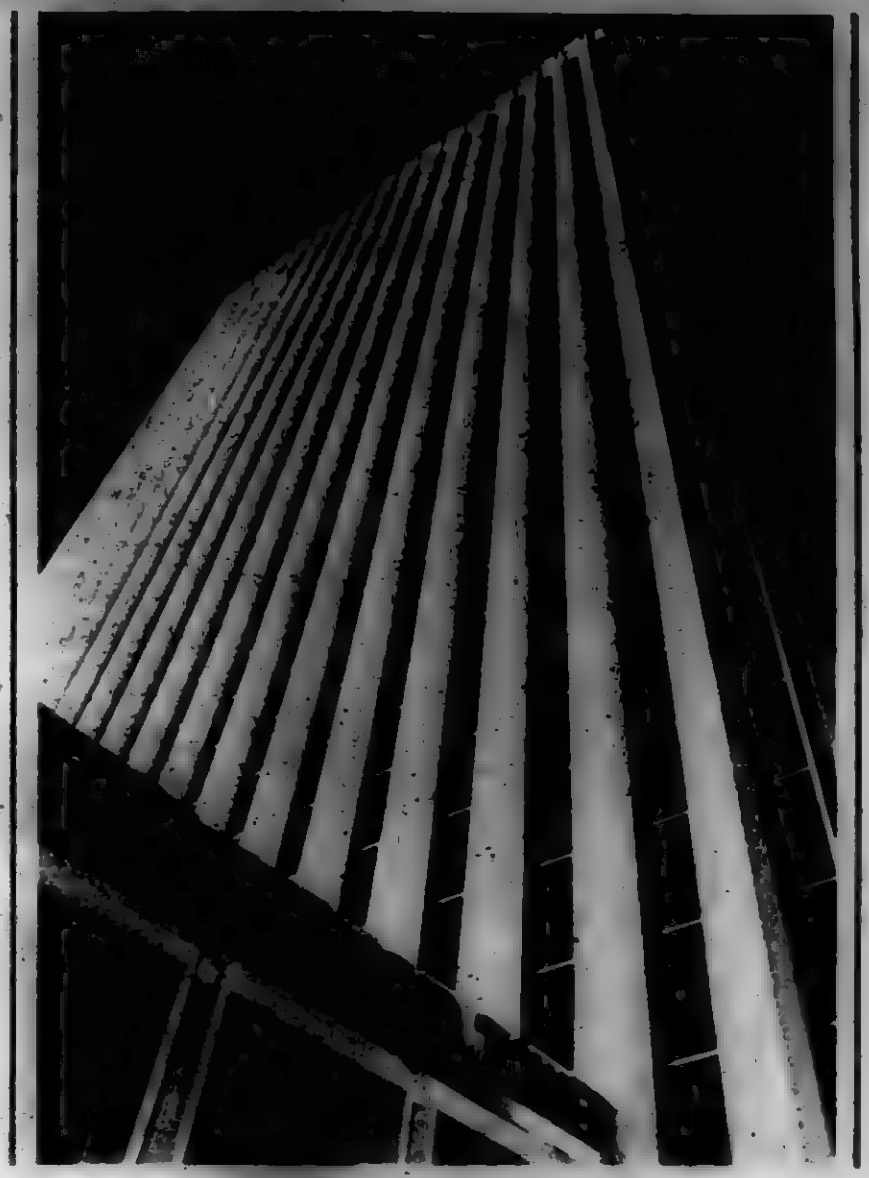
SYSTEMS • OPTIONS • SUPPLIES

11/24	1MB, Dual RLO2, DZ11-A, Dual H9642 (new)	$24,995
11/23+	256KB, Dual RLO2, DZV11-C, VT100, Remote (new)	$16,395
11/70	512KB MOS, LA36 (used)	CALL
VAX/780	1MB, RUA82, RLO2, VMS Backup (new)	CALL

Customized Configurations–Call With Your Request.

In Stock		Specials		In Stock	
11/24-BC (new)	$11,250	M811-PB (new)	$4,195		
DB11-A (unused)	$ 495	MS750-CA (new)	$4,195		
DMF32-AB (new)	$ 3,495	MS780-DC (new)	$6,850		
DUP11-DA (used)	$ 995	RH750 (used)	$2,995		
DZ11-F (used)	$ 3,195	RK611-EA (used)	$2,695		
H9642 (new)	$ 1,350	RL211-AK (new)	$5,495		
KT24 (new)	$ 795	RUA81-AA (new)	Call		
LP11-WA (unused)	$ 2,695	VT52-AA (used)	$ 495		

BROOKVALE ASSOCIATES
800-645-1167 NY:(516) 567-7777



When you lease equipment, make sure it comes with a good name behind it.

With the rapidly changing and improving technology of your industry, it's not always easy to keep your company's system up to date. And it's important to make sure you get the best advice, the best service, and the best financing available.

At Greyhound Computer Corporation, we've been leasing, servicing, refurbishing, maintaining and providing financing for computer and other equipment for over 20 years. And we have the resources and the knowledge to help you customize your equipment-leasing requirements. We can also assist you with the financing.

Whether you want to lease or purchase your equipment, look for the name with the kind of strength you need behind it: Greyhound.

Regional Offices

Mike Coate
Eastern Regional Headquarters **(617) 272-8110**

Dave Eyland
Western Regional Headquarters **(415) 283-8980**

John O'Shea
Central Regional Headquarters **(312) 789-9100**

Ron Gell
Southern Regional Headquarters **(512) 451-0121**

Sales Offices in:

Atlanta, Austin, Boston, Chicago, Dallas, Houston, Los Angeles, New York, Philadelphia, Phoenix, Pittsburgh, San Francisco

GREYHOUND COMPUTER CORPORATION
A subsidiary of The Greyhound Corporation

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

SHORT TERM LEASES AVAILABLE

CSI

COLA

---

ceres announces hardware made easy

- *Easy to buy— most IBM products available immediately*
- *Easy to lease— FAS 13 Operating Leases IBM S/34, S/38, S/36, 4300, 308X*
- *Easy to rent— IBM 5224, 5225, 5291, 5251, 3278, 3178, 3279, 3287*
- *Easy to sell, or trade in— best deals in town.*

Come to Ceres for all your computer needs. Call (212) 279-4467 in New York; (713) 627-7117 in Houston.

Do it today.

ceres capital corporation

MEMBER AMERICAN SOCIETY OF COMPUTER DEALERS

IBM UNIT RECORD EQUIPMENT & DISK DRIVES

SALE OR LEASE

machines
026—029—082— 083— 084
085—087—088— 129— 514
519—548—557

disk packs
2316—3336(1)—3336(11)—3348(70)
5 MEG. TO 300 MEG. PACKS—NEW & USED
Highest Prices Paid for Used Packs & Machines

THOMAS COMPUTER CORPORATION
5833 W. Howard St. Chicago, IL 60648
800-621-3666 312-647-6666
Authorized Distributor – Memorex, CDC, 3M, BASF, Verbatim, Dysan

---

DATA GENERAL

Hanson Data Systems

Your Full Service Computer Dealer

COMPUTER CORPORATION

BPI	S/34	Series/1	3278's
MAIN FRAMES	S/36	*System Configured To Your Specs	3277 • 3178
PERIPHERALS	S/38	*All Features and Peripherals Available	3274 • 3276
COMMUNICATIONS	AND RELATED PERIPHERALS	*Sales, Repair, Service	3271 • 3272
— Call — FRED HANNERT	— Call — RICHARD LOGAN	— Call — JOHN BUTLER RANDY STONE	— Call — TERRY SMITH

TOLL FREE 800-527-6481 / IN TEXAS 214-350-7243
4272 Dallas Tower • Dallas, Texas 75201

WANT TO BUY

SYSTEM/34 PERIPHERALS
5251's, 5291's, 5224's, 5225's, and 5256's

Call 214/258-0541

METROPLEX COMPUTER COMPANY, INC.
320 Decker Drive • Suite 180 • Irving, TX 75062
TWX 910-860-9285

System/34 128K/64MB Printer 300LPM $1600. P/Mo. Sale/Lease

Sale/Lease 4341's Models K, L, M - GFP 1 & 2 Lease Term - 1 Yr or Longer

Control Units 3680 - B13 3680 - D13 Avail: March 1984 Sale/Lease

Controllers 3880 3803 3274 3276 Immediate Delivery

DASD 3380 3375 3370 3350 3344 3310 Immediate Delivery

Tape Drives 3420 3430 3410 8809 Immediate Delivery

Display Stations 3278 3279 3178 3277 Immediate Delivery

Printers 4245 3262 3289 3211 1403 3262 3268 3287 5256

COLA

Computer Marketing Inc.
P.O. Box 5257 Philadelphia, PA 19126

NPA SYSTEMS INC.

SPECIALIZING IN:
PURCHASE SALE, TRADE LEASE, RENT
AND SERVICE OF
Data General EQUIPMENT

201 COATES AVENUE HOLBROOK, N.Y. 11741
TELEX # 510 222 0882
(516) 467-2500

STC 8650
SALE LEASE
LOW LOW PRICES

PAM CHRISTIANSEN
MARKETING COMMUNICATIONS

800-IBM-4341

Inflation Fighters

Quality & Savings

Slightly used, Money Back Guarantee. Full Reels. All External Labels Removed. Guaranteed for use at 800 BPI through 6250 BPI.

2400' Reel $4.95 ea.
1200' Reel $4.25 ea.
600' Reel $3.50 ea.

All Tapes with Hanging Seals

We pay freight on orders over 200 tapes. All orders shipped within 48 hours.

Call or Write

Computer Tape Mart
44A Seabro Avenue
N. Amityville, New York 11701
[516] 842-8512

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

COMDISCO

A Commitment To Excellence

IBM PROCESSORS

- 3081
- 3083
- 3033
- 4341
- 4341/4381
- 4331-2/4361
- Amdahl

IBM PERIPHERAL

- 3850
- 3880
- 3880 AA4
- 3370/33
- 3803
- 3420-4
- 3705/3706
- 3725
- 3178/3278
- 3890

Available February

The Leader in Full-Service Leasing

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

SYSTEM/34
SYSTEM/36
SYSTEM/38
SERIES/1

FIND IT FAST IN OUR FAMOUS
COMPUTER MARKET ADVISOR
SEND US YOUR BUSINESS CARD
AND WE WILL SEND YOU A FREE COPY.

ECONOCOM

- BUYS
- SELLS
- LEASES

- QUICK DELIVERY
- COMPETITIVE PRICING
- FLEXIBLE FINANCING
- TRADE-INS ACCEPTED
- PROFESSIONAL SERVICE
- SHORT-TERM LEASING
- LONG-TERM LEASING
- PERIPHERAL LEASING
- TAKE-OUTS DONE

901-767-9130

ECONOMIC COMPUTER SALES, INC. • 845 CROSSOVER LANE • P.O. BOX 240287 • MEMPHIS, TENNESSEE 38124

STOP
YOU'VE FOUND IT!

IBM 5/36
IBM 5/34
IBM 5/38
4331/4341
NEW
4361/4381

- Over 150 of These Years Leased.
- We Buy, Sell or Lease.
- New and Used Peripherals.
- Trade-ins Welcome.

TexCom

SAN ANTONIO
DALLAS • HOUSTON
(512) 349-9955

JOIN THE MORE THAN 150 OTHER MAJOR COMPANIES THAT CURRENTLY LEASE IBM EQUIPMENT FROM TEXCOM.

The nationwide market - a call away!

DEC/DG

SYSTEMS/PARTS/PERIPHERALS
NEW/USED/SURPLUS • DISCOUNT PRICES
Since 1977! Buy, Sell, Trade and Broker.

PHIL	BRYAN	JENNIFER
DG	11-VAX	8-LSI

CALL TODAY - (305) 392-2005
TELEX 568-670

thomas business systems, inc.
4301 Oak Circle - Unit 11 Boca Raton, Florida 33431

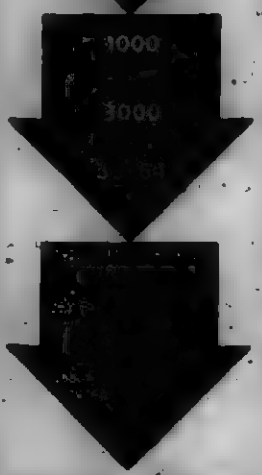
FOR SALE
IBM SYSTEM/3 MODEL 15D

1 - 256K CPU
1 - 1403 PRINTER 600LPM
2 - 3340 STORAGE UNITS
2 - 3344 DIRECT STORAGE
1 - 3411 TAPE DRIVE
1 - 5424 CARD UNIT
10 - 3277 DISPLAY STATIONS - DATA ENTRY KEYBOARD
2 - 3277 DISPLAY STATIONS - TYPEWRITER KEYBOARD
1 - 3277 CONSOLE
1 - 3286 PRINTER
1 - 5410 DECISION DATA KEY-PUNCH

ALL MACHINES UNDER MAINTENANCE
AVAILABLE APPROXIMATELY 4/1/84
4 DATA MODULES ALSO AVAILABLE

CITY OF PITTSFIELD
DATA PROCESSING DEPARTMENT
GEORGE HOWES, MANAGER
1-413-499-1100 EXT. 86
70 ALLEN STREET, ROOM 40
PITTSFIELD MA 01201

HP



encore
(213) 452-9117

AVAILABLE FOR LEASE ONLY

Availability Date: April 1, 1984

3033-A16	Processor
3830	Extended Channels
4860 (2)	Data Streaming
3PQ870	NPO Conversion
3036-1	Console
3037-1	Power & Coolant Distribution Unit
3830	Multiprocessing
3042-1	Attached Processor
3036-1	Console
3037-1	Power & Coolant Distribution Unit
3830	Multiprocessing
3096-1	Multiprocessor

Contact Jack Northrop
215/964-2800

LFC
Three Radnor Corporate Center
Radnor, Pennsylvania 19087
(215) 964-2000

Member Computer Dealers & Lessors Association

Buy - Sell - Lease

S/32
S/34
S/38

IBM

CPU's CRT's PRINTERS
ALL MODELS
PURCHASE/LEASEBACK
SHORT & LONG TERM LEASES

CMA
Computer Marketing of America, Inc.
P.O. Box 71
610 Bryan Street
Old Hickory, Tennessee 37138

1-800-251-2670
In Tennessee: 615-847-4031

We Buy & Sell
DEC
Systems
Components

call:713
445-0082
Houston, Tx 77099

FORSYTHE McARTHUR ASSOCIATES, INC.

DEALER / LESSOR OF IBM
Computers and Peripherals

FOUNDED 1971

Home Office
Chicago
919 North Michigan Avenue
Chicago, Illinois 60611
312 943-3770

Branch Offices
Atlanta 404 953-8457
Milwaukee 414 785-0544

CMA

NEW & USED EQUIPMENT FOR SALE BY END USER

DATA GENERAL

1) 6040 TTY PRT	$ 400	2) 10132H 1/2 BAY CABS	350
2) 6073 LP2 PRINTERS	900	2) 11444A 1 BAY CABINETS	600
1) 6074 LP2 PRINTER	1000	1) 1078A 1 BAY IND. CAB. W/AIR COND. (NEW)	4400
1) 6130 LP2 PRINTER (NEW)	1950		
1) 6181 LP2 PRINTER (NEW)	2250	1) 10788 1 BAY IND. CABINET W/HEAT (EACH (NEW)	3900
1) 6120 20 MB DISK (NEW)	5000	2) 4041 ULM 5 BOARDS	700
3) 6120 20 MB DISK	4800	2) 3564 LP2 CONT	900
6) 6070 20 MB E/S	3800	1) 6027 20 MB CONT	700
2) 6070A 20 MB DISKS	3500	2) 6060H 4C 8 SLOT 64K	1300
1) 6027C 10 MB DISK (NEW)	4400		
1) 6058 12.5 MB DISK (W/FLOPPY	2100		
1) NOVA 4X 5 SLOT 128K 15 MB DISK W/FLOPPY & ULM 5			12,100
1) NOVA 4X 5 SLOT 128K 12.5 MB DISK W/FLOPPY & ALM 5			12,800
1) ECLIPSE S/20 128K 12.5 MB DISK W/FLOPPY & 2 4927'S			10,000

MODEMS & TERMINALS

11) VA1201 VADIC 1200 BAUD	125	11) 8012/24 MICOM MODEMS	1200
1) VA3451 VADIC 1200 BAUD	400	696 AJ ACOUSTIC COUPLERS	
8) VA3456 VADIC 1200 BAUD	400	BELL 103-113 300	85
36) ADM3A L.S.I. TERMINALS	275	4) ADM3 L.S.I. TERMINALS	350

CONTACT: ROBERT FULWILER 214-699-6614

ACM
Pioneer Computer Marketing
214/343-2904

BUY - SELL
LEASE
- All IBM Systems
- Peripherals
- Tapes
- Disks

SERIES/1
- Systems
- Features
- Peripherals

SYSTEM 34
- CPU
- Peripherals
- Upgrades

PIONEER COMPUTER MARKETING
11446 Pagemill Road
Dallas, Texas 75243
214/343-2904

BUY-SELL-LEASE
SERIES/1
SAVE ON NEW OR USED
OVER 2000 CUSTOMERS
S/38
4331
4341
ALL RELATED PERIPHERALS
S/34
SEE OUR NEW PRICES
S/36
SHORT/LONG TERM LEASES
3033
3081
Call toll-free 800-[illegible]
CCI

WANG WORD PROCESSORS
AT THOUSANDS OFF!
Guaranteed, remanufactured WPS 20, WPS 30 and Wangwriters available for immediate delivery. You don't pay a cent till Wang installs and places equipment under service contract. 10-day return privilege. Buy, Lease, Rent
For Rave Info and fast answers call toll-free:
1-800-321-2966

HOW TO SAVE
$30,000
PER MONTH
ON A 3083 LEASE.

Lease the same 3083 that IBM leases for over $92,000 per month from Randolph—for less than $62,000 per month. That adds up to savings of $1,440,000 over a four-year lease period. If you're renting an older machine, Randolph may save you even more—and you'll get about four times the throughput in the bargain.

WHEN IS THE BEST TIME TO TALK TO RANDOLPH ABOUT LEASING A 3083?
Now—because Randolph has 3083's available for 4th quarter delivery. But it's never too late, even if you already have a machine installed. Whatever your situation, we can tailor a lease that will fit your exact needs and let you start saving money right away.

TALK TO RANDOLPH NOW.
We can solve problems like these, and more . . .
Stuck with a lease on your old machine?
We'll sublease it, and provide a new lease on a 3083.
Own a 3083 but need cash?
Sell your machine to Randolph, and we'll lease it back to you.
Machine installed on a rental basis?
We'll show you how to end the lease and install a new 3083. Any termination charges can be folded into your new Randolph 3083 lease.

LEASING COMPUTERS IS OUR ONLY BUSINESS.
At Randolph, our people have an average of 18 years in the DP industry . . . from 360's to 3081's. They know all about alternative financing to be sure, but they also know their way around a DP department and the hardware in it.

WE LEASE MORE THAN 3083's.
Whatever your needs, now is the time to talk to Randolph. We provide leases for IBM 303X, 4300 and 3081 systems and peripherals—disks, tapes—as well as 3083's.

UNIQUE FINANCIAL STABILITY.
We're an important part of one of the nation's oldest and leading financial institutions . . . The First National Bank of Boston. 19 years in computer leasing gives added assurance that Randolph will continue as the leader in the computer leasing industry . . . continue to live up to the terms and conditions of our agreements . . . provide upgrades . . . fulfill all of our commitments.

LET RANDOLPH HELP YOU SAVE $30,000 PER MONTH.
We can solve a lot of problems for you, and save you money, too. Talk to Randolph now . . . call Joseph B. Kelly, Jr., Executive Vice President, 800-243-5307.

537 Steamboat Road
Greenwich, Connecticut 06830
203 661-4200 • 800 243-5307

Randolph

A MEMBER OF COMPUTER DEALERS & LESSORS ASSOCIATION RANDOLPH COMPUTER CORPORATION A subsidiary of THE FIRST NATIONAL BANK OF BOSTON BANK OF BOSTON

We've Got
Your Number
S/34
ALL MODELS
QUICK DELIVERIES
SERIES 1
CONFIGURED TO
YOUR NEEDS
S/36
ATTRACTIVE LEASE RATES
S/38
NEW & USED MACHINES
5110/5120
NEW LOW PRICES
PERIPHERALS
CRT'S, PRINTERS, DISK, TAPE, MODEMS
CARLYN
COMPUTER SYSTEMS
[illegible]
"CALL COLLECT" (703) 642-1959

You can get information
on buying or leasing
IBM 34-36-38
as fast as you can dial
1/800/LEAS-PAK.
In Texas call 817/268-0023.
Up to 50% Savings
LPI
LEASE PAK INTERNATIONAL
P.O. Box 799 • Hurst, TX 76053 • 817/268-0023
Send for our free products and services brochure
Name _____
Address _____
City _____ State _____ Zip _____
Phone _____

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

DISK DRIVES · CONTROLLERS · PERIPHERALS · MEDIA

WANG · DEC

National authorized CDC OEM-Distributor offers new equipment, fully warranted for 90 days:

$12,900

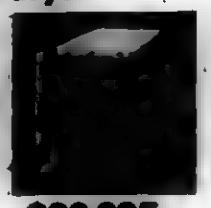
CDC Model 9766 (808 Mb.) WANG Models 2285V-2, and 2285 (808 Mb.) DEC Model RM03 (688.1 Mb.)

$7,750

CDC Model 9762 (80 Mb.) WANG Model 2285V-1 (75 Megabyte). DEC Model RM03 (671 Mb.)

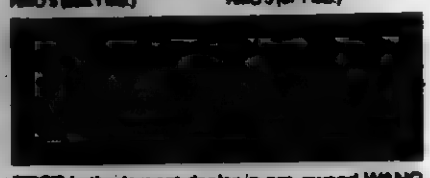
$8,875

CDC Model 9448 (86 Mb.) WANG Model 2280-3 (80.4 Mb.) WANG Models 2280 V-3, 2580 (80 Mb.) DEC Model RM07 (80.4 Mb.)



$20,825

CDC Model 9775 (676 Mb.) WANG Model 2285 V-3 (640 Megabyte). DEC Model 2-RM03s (512.2 Mb.)



ERST

INTERNATIONAL CORPORATION

295 Lafayette Street, New York, NY 10012

ERST is the largest dealer in pre-owned WANG equipment — 2200, VS, WP (CPUs, Terminals, IOPs, Controllers, Printers, Memory Upgrades).

Next time give us a call . . . Toll Free 1-800-FOR-ERST . . . In NY: 212-431-1100

IBM SYSTEM/34

S/3 • S/32 • S/38

5291 • 5251

3741 • 3742

BUY • SELL • LEASE

REFURBISHED • RECONFIGURATED

SHORT-TERM LEASES

PURCHASE/LEASEBACK

Tennecom MARKETING INCORPORATED

210 SPACE PARK NORTH

P.O. BOX 240

GOODLETTSVILLE (NASHVILLE)

TENNESSEE 37072

800-422-1004

IN TENNESSEE CALL: (615) 859-3572

C.D. SMITH & ASSOCIATES, INC.

DEC computer systems & options

12660 East Freeway, Suite 316

Houston, Texas 77015

(713) 451-3112

TELEX 76-2547

DEC

WE ARE BUYING: VAX 11/780

WE ARE SELLING:

MS780-DC	5,500	DR64-W	1,495
MS780-CA	4,500	RA81-AA	16,500
MS780-DC	5,500	TE10-CA	10,500
RF780-AA	5,750	RF80-AA/RF30	5,500
DW780-AA	10,500	11/780 CPU	CALL

If you want on our Mailing List, call Yolanda (713) 451-3112.

BURROUGHS 6810

BURROUGHS 2930

BURROUGHS 1955

BURROUGHS 4900

2480 W Alameda Ave.
Denver, Colorado 80223
(303) 922-5331
Telex: 910-931-0483

BURROUGHS CHECKS PROCESSING EQUIPMENTS AND OTHERS

FOR IMMEDIATE SHIPMENT: 2 X B-9157 M.I.C.R. SORTER READER, EQUIPED WITH 16 POCKETS, 4 JET-INK ENDORSER AND MICROFILMER SELL WITH 4 X 4A CONTROLE, 1 X B9847-14 LINE PRINTER, 1 X B9111-1 CARD READER, 1 X B9486-16 TAPE ELECTRONIC-LIST, AND 2 X B9486-2 P.E. DRIVE. ALL THESE EQUIPMENTS IN PERFECT CONDITION.

PRICE $135K U.S.

FOR INFORMATION CALL OR WRITE:
RENE LIEBLER, EP MANAGER
FEDERATION DES CAISSES POPULAIRES DESJARDINS
1, COMPLEXE DESJARDINS
MONTREAL, QUEBEC
CANADA, H5B 1E7
Tlx (514) 281-2055

DEC

our unbeatable combination

large inventory at low, low prices.

Call toll free 800-328-7000

In Minnesota (612) 894-4029

MIDWEST SYSTEMS, INC.

12447 Riverwood Drive, Burnsville, Minnesota 55337

IMMEDIATE AVAILABILITY:

SYSTEM/38

MODEL 7 GB

IBM LIST

ECONOCOM

IN STOCK!

Fujitsu Eagle

with cabinet, cables, slides & termination

$13,000

New Fujitsu SP 360

80 character per second, letter quality printer.

Introductory Special - $2,000

MANDREL INDUSTRIES, INC.

303-693-3035

2771 S. Jasper • Aurora, CO 80013

PEARL HAS IBM SYSTEMS 34, 36, 38

and we have a large inventory of IBM 3741's, CPU's, CRT's and printers. We buy, sell, lease, rent and purchase/leaseback IBM Systems.

Call John Speight or Ken Warren

Pearl Computer Division

P.O. Box 24026 • 4717 Centennial Blvd.

Nashville, TN 37202 (615) 383-8703

BUY · SELL · LEASE

SERIES-1

S/34 • S/36 • S/38

4300

S/23 S/32 5110-20

Tape-Disk-Printers-Tubes

AMCOM CORPORATION

5200 W 73RD ST · MINNEAPOLIS, MN 55435

(612) 835-4737

CALL TOLL FREE

800-328-7723

WANTED TO BUY

DEC Equipment

Vax and PDP-11

Systems-Components-Peripherals

New or Used

Meadowbank Enterprises

Essex St. • Middleton, MA 01949

(617) 777-4092

dda

3033 U12-SN 20362

With 3850 Extended Channels and 3 Data Streaming Channels. Available June 1984 On a 2 Year Lease

Call (201) 777-8092

---

* * * * DEC * * * *

BUY—SELL—LEASE—TRADE—CONSIGN

SYSTEMS — PROCESSORS — OPTIONS

PERIPHERAL — MODULES — MEMORY

— SPARES —

NATIONAL COMPUTER EXCHANGE

(714) 990-5988

600 North Lunar Avenue, Brea, CA 92621

TWX: 910-596-1499

IBM

3270

Processor	Peripherals	Terminals/Displays
S/23	3741	1255
S/32	3742	1419
S/34	029/129	3600
S/38	5211	
5110	5251	
5114	5225	
5120	5256	
DATAMASTER	3262	

ID

BUY SELL LEASE 5120

4300's/3

S/38, S/1

S/36

S/34

Call Collect: 404-252-7480

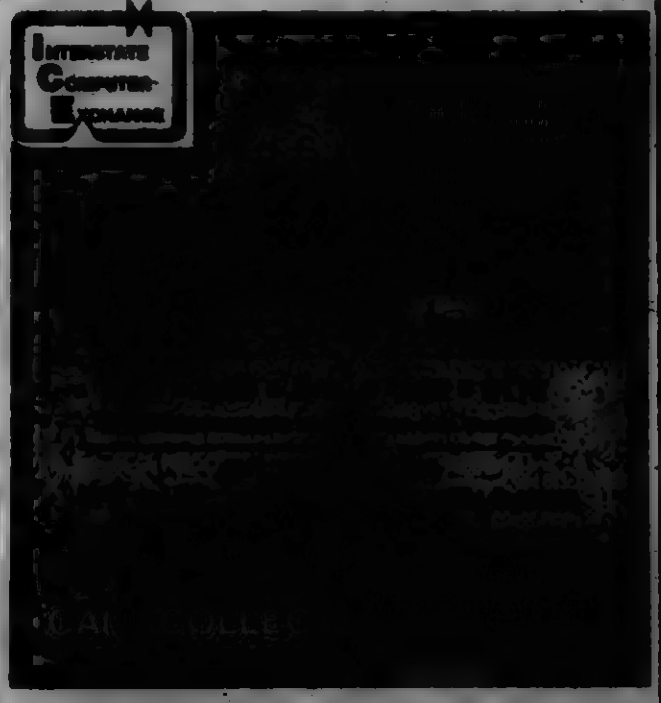
DATAMARC

6065 Roswell Rd.

Atlanta, GA 30328

BUY SELL SWAP

BUY SELL SWAP



BUSINESS OPPORTUNITY

WANTED SOFTWARE SOLUTIONS FOR THE HP9000

Hewlett-Packard is seeking quality software suppliers that address specific vertical markets in the NY/NJ area. If you have a unique application solution and want to take advantage of the financial, marketing, and technical incentive offered by Hewlett-Packard, call:

Lee Edwards
(201) 265-5000
Ext. 5407
or Sales Attorney
(212) 521-4800
(718) 521-4800

HEWLETT PACKARD

BIDS & PROPOSALS

AURORA, COLORADO

The City of Aurora is requesting proposals for a computerized mapping and information system. Proposals will include both hardware and software to meet the requirements of the Engineering, Utilities, Planning and Data Processing Departments.

PRE-PROPOSAL CONFERENCES will be held January 24, 1984 at 10:00 A.M. Mountain Standard Time. This conference is optional and vendors must notify Aurora Contract Administration if they plan to attend.

Proposals will be accepted until 2:00 P.M., February 13, 1984. Specifications may be obtained from the City of Aurora, Contract Administration Office, 1470 S. Havana Street, Aurora, CO 80012, phone (303) 695-7340, on or after January 16, 1984.

AUCTIONS

AUCTION

The undersigned will sell at Public Auction on Tuesday, January 10, 1984 at 10:00 a.m. EST the following goods:

Two (2) Datamedia DS-1000 Graphics Terminals
Two (2) Datamedia DS-2000 Graphics Terminals
One (1) Datamedia DSG-7000 Graphics Terminal
CPT Word Processor system with Qume printer
One (1) each:
ADT 10A Jet Printer
REC Typewriter 5000
DECWriter II LA 120-AA terminal
DECWriter II LA34-EA terminal
Data Media CRT
Hazeltine 2000 printer

The auction will take place on the premises of Computerve Incorporated, 3100 Wilson Road, Columbus, Ohio, 43228.

The terms of the sale are a minimum down payment of 25% in either cash, certified or cashier's check, on the date of sale with the balance due within 24 hours. Delivery shall take place upon receipt of the last payment plus. All goods are sold "as is." The undersigned reserves the right to reject any or all bids and to bid on and purchase any or all of these goods.

The goods shall be available for inspection at the auction location between 1:00 and 3:00 p.m. on Monday, January 9, 1984 or at other times by contacting Tony Gaines at 614-457-9558.

Computerve Incorporated

The Bulletin Board

Buy : Sell : Lease Buy : Sell : Lease Buy : Sell : Lease Buy : Sell : Lease

WANG

Parasol...
WANG USERS.....
HAVE YOU HEARD ABOUT THE GROUP OF FORMER WANG EMPLOYEES IN ATLANTA WHO BUY & SELL USED WANG EQUIPMENT AND PLUS COMPATIBLES?
EC.A. (404) 977-4366 or 1-800-241-3180

PRINTERS

DIABLO 1620-S
Letter Quality Printer
Refurbished
30 Day Warranty
Tractor/or Sheet Feed
RS232/RS-232 Interface
Quantity Discount Available
$695.
Wanted: LA-36's (Qty)
Call Tim Mason
(619) 280-0805

FOR SALE
Decision Data S/36 Printer
Model 9600-34 - 330 lpm drum printer with features F1101 Static eliminator and F1350-02 Sound Attachment, can be used on either local or remote printer.
Price $6,000 negotiable.
616-947-0471

MISC.

Buy • Sell • Lease
DATAPOINT
Cougar Computer Corp.
Suite 219
26250 Euclid Office Plaza
Euclid, OH 44132
(216) 261-3500

MRX 3853's $300/Month
MRX 3850's $250/Month
Term 12 Months
Available Immediately
Any Quantity
Call Brian O'Hear
(703) 893-2460

PRIME

PRIME
LARGE SELECTION OF USED PRIME COMPUTER SYSTEMS ...SAVINGS TO 50%
Peripherals also available:
Memories-Disk Drives-Controllers
Modems-Terminals-Printers
1st SILVERS
...Your Alternate Source
A DATAMATION SERVICES, INC., COMPANY
3001 EAST CAMPBELL AVE.
PHOENIX, ARIZONA 85016
(602) 957-0800
ASK FOR DON OR MATT

DEC

DEC BARGAINS

11/34A CPU Set	$1,595
11/44 KE44-A 'CIS'	$2,975
4A-MS780-C System Kit	$7,800
SDV11-AA	$495
DLV11-J	$395
BR780-AA	$9,400
DZ11 MUX Bd.	$1,125
DZ32-S	$1,870
FP11A	$1,185
KK11-S	$2,875
KW11-P	$330
MS11-MB	$1,375
MS780-DC	$4,850
MS780-FD	$2,995
MSV11-PK	$1,135
MSV11-PL	$1,275
PDP 11/34A-DC	$3,350
RLV11	$975
VAX 1MB MS730-CA	$2,995
VAX 1MB MS750-CA	$2,995

Call Ray at CEI, Inc.
(617) 275-6800

HELLO FRIENDS!!
Season's Greetings
Best Wishes
For The New Year
NEW YORK COMPUTER EXCHANGE
(516) 752-0055 (800)645-6199

New Available In Stock!
More PDP-11 with 10 MB Winchester, (2) RK05 Primary Disks, 256 KB Memory
Inquire Price
PDP 11-03, RLV-11 Controller, 64KB Memory, LA 180 Printer, RT-11 Licenses
$5,495
PDP 11-03 with RL02 Disks (2), 256 KB Memory, LA 180 Printer, RT-11 Licenses
$12,895
LA 180 Printers with Controller
$595
Other Configurations Available
Complete Range of DEC Computer Systems, Components.
E.L.C. Systems, Inc.
(617) 443-5168

DEC NETWORK SYSTEMS HYPER-CHANNEL A-400
Don Bailey
Floating Point Systems
(503) 641-3101

DEC NEW & USED
BUY — SELL — EXCHANGE
Systems • Processors • Memory
Options • Peripherals • Modules
LAKEWOOD COMPUTER CORP.
2500-9 Bates St., Saint Paul, MN 55102
(406)266-2545

IBM

IBM 4331-L2
FEATURE #'s: 1401, 2001, 2201, 3401, (3)-3701's, 3840, (3)-4005's, 5348, 5831, 1421.
1st Day Order Of Upgrade From 4331-L2 To 4361-M5 Is Also Available With Purchase.
AVAILABLE 3/19/84
$75,000.00
Dayton Newspapers, Inc.
45 S. Ludlow St.
Dayton, Ohio 45402
Jack Galeski
(513) 225-2312

IBM/PC
160 KB Disk,
64K, KBD $1799
IBM/XT $4495
CHI, (804) 359-7280
Room 423, P.O. Box 27401,
Richmond, VA 23279

SYSTEM/34 UPGRADES
5 mg. to 27 mg. ——— Available
27 mg. to 64 mg. ——— Available
5 or 7 ——— Now
Terms Exchange
Feature Work
Want to Buy 5340's
The Pilot Support Group Inc.
(203) 853-4881

PRINT TRAINS
IBM 1416 & 3216
Bought - Sold - Lease
Repaired - Reconditioned
COMPU-ACT COMPANY, INC.
(513) 898-9401

4361-M5
1/28/84 Ship-Confirm
Lease Only
Fortune 1000 Co.'s Only
Data Lease Corp.
Howard Kozlen
(203) 222-0170

Buy • Sell • Lease
IBM
Cougar Computer Corp.
Suite 219
26250 Euclid Office Plaza
Euclid, OH 44132
(216) 261-3500

SYSTEMS 34/36/38
Lease or Sale
S/36 DELIVERIES
WANT TO BUY S/34's
1-800-LEASPAK
In TX (817)268-6823

Buy ... Sell....Lease
IBM MICR
3890 - 1419
(813) 722-4534

WANT TO BUY
SYSTEM/34's
5211-2 PRINTERS
5256-3 PRINTERS
MIDLAND FINANCIAL
(612) 888-7171
1-800-328-6888

BUY	SELL TRADE	LEASE
S/34	S/36	S/38

Peripherals
All Guaranteed IBM Maint.
PROCOM
(212) 279-1717

SYSTEM/36's
All Models Available
2 Yr. Or 3 Yr. Leases
We Take S/34 Trade-Ins
STAR DATA SYSTEMS
1 (800) 531-5942
(512) 822-5822-Texas

IBM SERVICE/1
Payroll Package
• 5321 Version 2.1
• Runs in 14K
• Source plus user's guide
$250
Purchase & Software
$2500 Maintenance
Purchase Price $5,000
(214) 931-2300

AVAILABLE
IBM 4331-2 5471P7F 2MB
IBM 4331-2 5471P2D 2MB
IBM 4331-2 5471P1A 2MB
IBM 4331-1 5471P1F 2MB
LSX Corporation, Inc.
800-241-3294
In GA 404-955-5566
No Dealers Please

WANT TO BUY
4341-L1 WS5278-A2
3203-5 1416-1 WS5812
3375-A1 WS5180 3375-B1
3420-4 SD 3420-4 SD
3800-1
Call Harry Reynolds
(214) 438-4345

SYSTEM/36 A22
FOR RENT OR LEASE
NOW
CALL (214) 991-2936

IBM SYSTEM 23
Less Than 200 Hrs. Use
Contact Dr. William Burch
1427 Vine Street
Philadelphia, PA 19102
(215) 568-1838

SALE/LEASE
4331-L2
Features To Suit
Immediate Delivery
Call Bill Hagen
(914) 238-8531

IBM SALE/LEASE

3271-2 (Qty)	Avail 1/15
3277-2 (Qty)	Avail 1/15
3705 J1	Avail 2/1
3357-1 (Qty)	Avail 2/1
3274 B1	
5/34 5/38 4300	

Purchase/Lease Buck Programs
WANGO CORPORATION
(212) 594-6969

FOR SALE
5360-B2 Perch
370/1-1 Comm. Unit
w/7207 & 5520
5790-A2 Comm. Unit
w/7541, 1642, 3666, 4680, 4701, 4711 & 4714
Call Matt Stavolis
(914) 238-8531

FOR SALE
SYSTEM/38 MODEL 041
(3) 6021
(3) 6031
(1) 6020 (128 LPS)
Immediate Availability
Continental Computer Trade Inc.
(214) 934-0388

SALE/LEASE
S/36
1 MB CPU
258 MB Disks
Immediate Delivery
Call Ron Gibb
(914) 238-8531

S/34's AVAILABLE
FOR SHORT TERM LEASE
Available 2/1/84 - Model 7357, W/1110, 5815, 4001, 2560, 3500, 3701, 3702
Available 2/1/84 - Model 7357, W/1110, 5811, 2560, 3701
Configurations Can Be Changed To Accommodate Needs.
Also For Sale - Available 4/15/84 - S/34 Model C24, W/1110, 5811, 2560, 3701
CONTACT: Bond Computer Hynet Division, The Bondar Corporation 716-373-0360

More Bulletin Board on the next page.

The Bulletin Board

HONEYWELL

LEVEL 6 & DPS 6 EQUIPMENT
NEW & REFURBISHED
Systems • Peripherals • Memory
CRT's • Applications Software
SUBSTANTIAL DISCOUNTS!!!
Southeastern Computer Services Ltd.
100 Stanford Rd.
Northboro, MA 01532
(617)898-9888
Telex 710-347-7574

VIP 7205 3685.

Kraus Systems Inc.
9950 W. Lawrence Ave.
Suite 101
Schiller Park, IL 60176
(312) 671-4630

BURROUGHS

BUY • SELL • LEASE
B1700 • B1800 • B1900
(Domestic Config. Install. Avail.)
B80 Single B7900
B9347/B9348 Disk
B9348/B7148 Printers
Mag Tape Subsystems
Tapes • MT850 • SMT • Diskettes
TU80/CDC/TT Terminals
Installation & DEPOT MAI Available
MP Corp. (312) 359-1100

BUY SELL LEASE
All Systems & Peripherals
AVAILABLE
• B1855 Sys • B1825 Sys
• B80s • B900s
(Configured To Your Specs.)
SPECIAL SYSTEM MEMORY
• 880 Terminals model 100 & 110
• TD830s, MT980s, MT982s
• 205 & 207 Style Disk Drives
• Various Tape Sub-systems
• Memory Upgrades
• Printers 0/80 & 0/90 Styles
Guaranteed Burroughs Mod.
Depot Maintenance Available
COMPUTER PROVISIONS
(216) 248-7575
(Member EDA)

SPERRY UNIVAC

V-77 800 SYSTEM
(2) 200K CPU w/2 Pages WCS
(2) 8425/80 200 MB Disk Drives
16 MB Disk Drives
800 bpi Tape Drives
6250/1600 bpi Tape Drives
300 LPM Printer
600 LPM Printer
Ask for TOM BASS

FOR SALE
BC-7 800
Available March 15
No Brokers
Call (203) 265-2086
Ask for Mr. Linder

HEWLETT PACKARD

HP 3000
BUY & SELL
Complete Systems
Memory • Terminals
Disk Drives • Tape Drives
Miscellaneous Parts
Condec Corporation
(Formerly Finley & Associates)
(203) 630-4264
(212) 486-5840

HEWLETT PACKARD
1000 • 2000 • 3000
SYSTEMS & PERIPHERALS
BUY & SELL WORLDWIDE
EURODATA, INC.
(813)725-0486
Tlx: 052-3085

HP 1000 HP 3000
Buy/Sell/Lease
Available From Stock
Systems • Terminals • Disc Drives •
Tape Drives • Memory • Printers • Parts
30 Day Warranty
Supported HP Maintenance
Computer Solutions, Inc.
(201) 672-0660

For Sale
HP250 & Peripherals
Available Now
$15,000
Call John Eisemann
Riviera Motors, Inc.
(602) 945-9511

FOR SALE OR LEASE
HP3000
MODEL 64
Configured to Your Specs
Windermere Systems
1-800-638-8788
1-301-948-3884

Buy-Sell-Lease
HP3000 3X, III, 4X
and related peripherals
Call Carol
CSU INDUSTRIES, Inc.
516-239-4310

DATA GENERAL

D.G. CRT's
Brand New
D-210 $795
D-211 $845
Disk Tape $Call
We Will Not Be Undersold on
Any New or Used D.G. Equipment
Kenco Data Systems
(212) 867-4284

6168	D210 VDT Now	$800.
6168	D211 VDT Now	$850.
6168	D410 VDT Now	$1,300.
6167	D400 VDT Now	$1,400.
6214	600MB Winchester Sub	$20,000
6061	160MB S/S	$18,000
6070	300MB S/S	$23,000
6053	12.5MB S/S	$9,000
6064-II	Nova 4X 256 KB	$4,500
6098-II	C/350 512KB MOS	$5,000

Data Investors (201) 666-7881

SRV 8000/8600
2 Mb Memory Boards
Available Now
Liberal Trade In
On Your Old Boards
M-8600 ½ Mb System $10,000
C-300 ½ Mb System $10,000
MV-8000 2 Mb System Call
MV-8000 2 Mb System Call
8600-H Nova 4S 64 Kb $5,000
w/8448 & Lundoy Cab
8086-H Nova 4X 256 Kb $10,000
w/8448 256 Mb & Cab
8081-H Nova 3D 256 Kb $7,500
ULM II, 8448 & Cab
6070 30 Mb Disk Subsystem $4,500
6030 80 Mb Disk Subsystem $12,000
6021 160 Mb Disk Subsystem $14,000
6000 Systems Industrial Cab $500
6768 CDC 80 Mb Drive $4,000
6026 Eclipse 256 Kb Memory $5,000
6027 S140 256 Kb Memory $2,500
6057 Nova 4X 256 Kb Memory $2,500
6605 CRT Terminal $975
6130 D400 Terminal $1,300
6088 600/1600 Tape S/S $10,000
6089 12.5 Mb Disk S/S $5,000
6708 2 Mb MV 8000 Memory Call
6708 512 Kb MV 8000 Memory Call
4215 600 LPM Printer $6,500
Instl. Computing Systems Co.
(612) 941-5501

(1) Data General Eclipse C/150
(1) DZA 80MB Disk Drive
(1) 9 Track 800 BPI Tape Drive
(2) Data General Dashers 6012
Above Equipment was
Dismantled and Carries
a 60 Day Maintenance
Certification by
Data General Corp.
(10) Data General CRT's 6012
Selling All Equipment as
One Package
Minimum $10,000
FOB Largo, Florida
Bids and Further Info to:
Purchasing Director
James W. Crosby
(813) 584-6071 ext.316

MISC. SYSTEMS

MICRODATA Series 8000

512K 800 Memory
128 MB Winchester Sub
P300 Line Printer
45 IPS/1600 BPI Tape
(24) Ports
(2) Prism Terminals
2nd Line Printer Controller
Available Immediately
(216) 461-6600

GENERAL AUTOMATION 16/80
600 LPM Printer
600 Centronics Card Printer
(2) 5 MB Disk Drives
Paragon Console
(2) 9600 BPS, 16 Code Controller
(4) Disk Packs
(6) Mags, Card Cabinets
Quotation Some Lessons at
N.E. Edition
(617) 894-6001

DATAPOINT

System 1800 (New) $9,000.
(2) 1891 Processors $2,400 ea.
(2) 3011 Printers $2,100 ea.
All Used Equipment
In Mint Maintenance
Phone Rob Hilton
(601) 627-1410 Ext. 270

SOFTWARE FOR SALE

Need general accounting software for IBM System/38?

We've simply solved your problem.

LAWSON ASSOCIATES has solved it with the first general accounting software specifically designed for IBM System/38. Not merely compatible, but state-of-the-art to fully utilize your computer's capabilities. Compare. You won't find a total software solution like it anywhere else.

DESIGN FEATURES: They include: on line systems using data base management; menu driven, user friendly programs written in RPGIII, the System/38 language; and integrated modules. Their benefits: ease of installation and use, plus maximum employee productivity.

INTEGRATED MODULES: Those available include: General Ledger and Report Writer/Accounts Payable/Accounts Receivable/Fixed Assets/Payroll/Personnel/Purchase Order/Order Entry/Inventory Control

SERVICE FEATURES: Fully documented and supported. Onsite training and implementation. One year warranty. Available now for immediate installation.

For more information, please call or write:
Lawson Associates, 2021 East Hennepin Ave., Minneapolis, MN 55413
(612) 379-2633

LAWSON ASSOCIATES
WE SIMPLY SOLVE PROBLEMS

Specializing in IBM System/38
FRIEDMAN & ASSOCIATES, INC
100 Walnut Road
Doylestown, PA 18901
(215) 348-7660
Totally on-line order entry, complete manufacturing systems MRP with on-line net change
• Fixed price software
• Training, consulting, implementation, conversion
• Full system integration
We make it work!

Try the best automated System 34/36 documentation money can buy for 30 days. Free.

REMDOC	Automatic multi-library system documentation including flowcharts.
NEW IN RELEASE 3	• Pre-defined run books • Command data dictionary • Word processing functions
COMPILE/PLUS	Screen & printer layouts plus indented summary with each compile.
LMU	Full screen multi-member library maintenance utility.

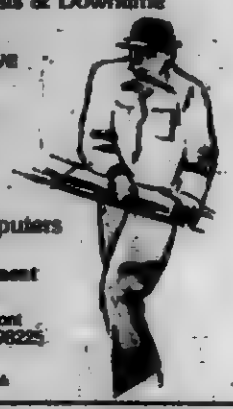
REN Associates (415) 641-0997
207 Virginia Avenue
San Francisco, CA 94110

ABC MM ON-LINE
MAINTENANCE MANAGEMENT SYSTEM

Maintenance Management

Manufacturing • Processing • Utilities
Schools • Hospitals • Public Works
Mines • Paper • Cement • Chemicals
Oil & Gas • Transportation
Construction • Service

- Cuts Maintenance Costs & Downtime
- Increases Productivity
- Corrective & Preventive Maintenance
- Automatic Scheduling
- Equipment History
- Spare Parts Inventory
- IBM, DEC, HP, COBOL, Other Computers



ABC Management Systems, Inc.
Suite 3, 805 Dupont
Bellingham, WA 98225
(206) 671-5170
TM Registered Trademark

SOFTWARE FOR SALE
On Line, Interactive
Parking Civil Violation
Enforcement System
(PCVES)
For further
information contact:
Municipality of Anchorage
Attn: Henry J. Hickey
Purchasing Officer
Pouch 6-650
Anchorage, AK 99502
907/264-4888

SYSTEM 32/34/36
SOFTWARE
LIQUIDATION SALE
• School Dist. System
• County Govt. System
• Law Firm (WP) Mgt.
• Medical Clinic Pkg.
• CPA Client Acct.
• Dist. Water Billing/Acct.
• General Accounting
• Accounts Payable
• Accounts Receivable
• Many Others
Sale Price -- $15,000.00
Respond To:
Software Sale
1241 E. Isard Ct.
Lakewood, CO. 80215

SOFTWARE FOR SALE | SOFTWARE FOR SALE | SOFTWARE FOR SALE | SOFTWARE FOR SALE | SOFTWARE FOR SALE

- ON-LINE, REAL-TIME APPLICATIONS SOFTWARE
- ANSI COBOL - CICS COMMAND LEVEL

CUSTOMER ORDER MANAGEMENT - IMSS/COM"
- ORDER ENTRY, SHIPMENT PROCESSING and BILLING
- INVENTORY CONTROL and ACCOUNTING
- ORDER and SALES ANALYSIS
- COST OF SALES, A/R & G/L INTERFACE
- SPECIAL PRICING and PROMOTIONS
- SHIPMENT POOLING and ROUTING

ACCOUNTS RECEIVABLE - IMSS/AR"
- CASH APPLICATION (ON-LINE and/or AUTOMATIC)
- ON-LINE INQUIRY and AGEING (ITEMS and PAYMENTS)
- STATEMENTS
- PAYMENT HISTORY and ANALYSIS
- G/L INTERFACE

ACCOUNTS PAYABLE - IMSS/AP"
- ON-LINE VOUCHERING
- CASH REQUIREMENTS and INVOICING
- VENDOR HISTORY and ANALYSIS
- G/L INTERFACE

- YOUR SYSTEMS INCLUDE:

VSAM or IDMS DATA BASE ACCESS
SOURCE CODE, CONTROL TABLES & JCL
USER, SYSTEM, & OPERATIONS MANUALS
TRAINING, EDUCATION, SYSTEMS & PROGRAMMING SUPPORT
LOCAL and REMOTE PROCESSING
MULTI-COMPANY/MULTI-WAREHOUSE CAPABILITY
CUSTOMIZATION SUPPORT WITH WARRANTY

Changing Computers?

Retain your SOFTWARE INVESTMENT

Datamare's conversion approach provides the solution to management's conversion problem and facilitates the recovery of the initial capital investment in systems development.

- COBOL to COBOL
- AUTOCODER/SPS to COBOL
- EASYCODER/TRAN to COBOL
- BAL/ALC to COBOL
- DOS/ALC to OS/ALC
- PL/1 to COBOL
- RPG/RPG II to COBOL
- RPG/RPG II to PL/1

Faced with Conversion?
Call or write today

The Conversion Software People
Datamare, Inc.
2065 Elmwood Avenue
Buffalo, New York 14217
Phone (716) 876-8732
TELEX: 91510

Software Tools for VAX/VMS

Make more of your VAX with packages from Evans Griffiths & Hart, Inc.

- **ROSS/V,** a RSTS/E subsystem for VAX/VMS written in VAX-11 MACRO. RSTS/E monitor calls are performed in VAX native mode; the rest of your PDP-11 code (run-time systems, TKB, applications, etc.) is performed directly in the PDP-11 microcode that's present in every VAX. ROSS/V provides the quickest way to migrate from RSTS/E to the VAX and a convenient way to do RSTS/E development on your VAX. While some VAX users are working in native mode, others are simultaneously working under ROSS/V's RSTS/E subsystem. Supports an extensive subset of RSTS/E monitor calls. Provides most of the standard RSTS/E features, like CCLs, send/receive, and RSTS/E-style file update mode. (ROSS/V is also distributed by Online Data Processing, Inc.)
- **KDSS,** a complete multi-terminal key-to-disk data entry subsystem. Eliminates the need for keypunching and stand-alone key-to-disk systems. (Also available for RSTS/E and RSX-11M.)
- **TAM,** an efficient multi-terminal screen-handling facility that provides complete support for the development of transaction-processing applications on a wide variety of terminals. (Also available for RSTS/E and RSX-11M.)
- **VSORT,** a powerful sort that is very much faster than SORT32. Sorts sequential and relative span and nospan files.
- **VSELECT,** an extremely fast package for scanning RMS files to extract and reformat records that meet user-specified selection criteria. Use VSELECT and VSORT to reduce the number of secondary keys you need in indexed files: you can select records from an indexed file and sort them in less time than it takes to run CONVERT on the file.
- **BSC/DV,** a VMS device driver for the DEC DV11 synchronous multiplexer. Suitable for handling a wide variety of bisynchronous protocols. (Also available for RSTS/E.)

Call or write for complete descriptions of features and benefits.

Evans Griffiths & Hart, Inc.
Dept. CI
95 Waltham Street, Lexington, MA 02173 (617) 861-8570
TWX 710-326-0193

DEC, PDP, RSTS, RSX, VAX, and VMS are trademarks of Digital Equipment Corporation.

EGH

Choose your building blocks from these applications, which operate individually or in combination:

DISTRIBUTION
- Order Processing
- Billing
- Sales Analysis
- Inventory Control and Purchasing

MANUFACTURING
- Product Structure
- Product Standard Costing
- Inventory Control and Purchasing
- Master Production Scheduling
- Material Requirements Planning (MRP)
- Shop Floor Control and Costing
- Capacity Requirements Planning

FINANCIAL
- Accounts Receivable
- Accounts Payable
- General Ledger

IBM/38 ALL
THE SOFTWARE
YOU'LL EVER NEED

NEED FLEXIBLE SOFTWARE PACKAGES?

The PICK Operating System makes our Sales Order Processing and Inventory Control Software the ideal solution for your company.

Find out why BusinessWeek calls PICK, "The computer industry's best-kept secret."

Call now for information or register for our next PICK seminar.

EDP OF AMERICA, INC.
Pick Operating System Specialists
201-272-0770

R/1 TERMINAL RESPONSE TIME MONITOR for your EDX

IBM SERIES/1

Track & Report Response Time by Terminal, Program, Time-of-Day.
Easy to Install & use.
Printed & Graphics Reports
Call or write:
M & A Computer Systems
30 Hotaling Place #204
San Francisco, CA 94111
(415)434-3617

SERIES/1 SPECIALISTS

Elegant Software
for IBM S/34, 36 and 38

General Accounting	Payroll/Personnel
Financial Reporting	Property & Equipment
Accounts Receivable	Report Writer
Accounts Payable	Oil & Gas
Order Processing	All Systems are:
Inventory Management	RPG II/RPG III
Sales Analysis	Data Base
Job Cost	Interactive

J.D. Edwards & Company
4949 South Syracuse Street/Suite 2200
Denver, CO 80237
303/773-3722

Dallas — 214/ 458 0838
Houston — 713/ 680 8276
Northern California — 415/ 967 7784
Southern California — 714/751 5902

More IBM System/38 Users Are Choosing RTC Systems.

For technically superior software in a wide range of Financial, Manufacturing, Distribution and Management Business Systems.

The International Software Developers.

RTC Systems, Inc.
49 Plain Street
North Attleboro, MA 02760
(617) 695-5008

SOFTWARE WANTED

INTERNATIONAL TOUR OPERATOR SEEKS SOFTWARE PACKAGE REQUIRED FUNCTIONS

RESERVATIONS
TOUR ACCOUNTING
TOUR OPERATIONS
MANAGEMENT REPORTING

System must support high volume multi location operator. Please write to: CW-84333, Computerworld, Box 880, Framingham, MA 01701.

TIME & SERVICES

VAX/VMS TIMESHARE

5¢

.02 PER HOUR CONNECT TIME
ONE MB DISK STORAGE INCLUDED
AVAILABLE NATIONWIDE VIA TELENET
LEASE-A-RORI™ WITH 10 MB DISK & NO CPU OR CONNECT CHARGES FOR $800 PER MONTH

RIDGE CORPORATION
(714) 69WATT
(213) 516-0550
(714) 969-6070

COMPUTER TIME RENTAL

IBM 4331
DOS/VSE - IDCS
All Shifts Available
3370 Disk, 3420 Tape
Dual/Density
1403-N1,
2540 Reader/Punch
Reasonable Rates
Contact: Al Palma
Rentamatic Data Services
(212) 997-1411

VAX AND PDP DEVELOPMENT TIME

NO KILOCOM TIO CHARGES NO CPU CHARGES

Omnicomputer.™

$7/$14

RSTS/E | VMS

PER HOUR CONNECT TIME

BUDGET BYTES™ 212-944-9230

Omnicomputer, Inc.
1430 Broadway, New York, N.Y. 10018

TIME & SERVICES | TIME & SERVICES | TIME & SERVICES | TIME & SERVICES | TIME & SERVICES

SYSTEM DEVELOPMENT ON TSO/SPF

at affordable prices
Full capacity of an IBM 3033
for daytime use in western U. S.
ISPF, COBOL, FORTRAN, PL/I, IMS,
ADF, VSAPL and other aids.

PRIMDATA OF SWEDEN
44 Montgomery St., Suite 500
San Francisco, CA 94104 • Tel (415) 955-2612

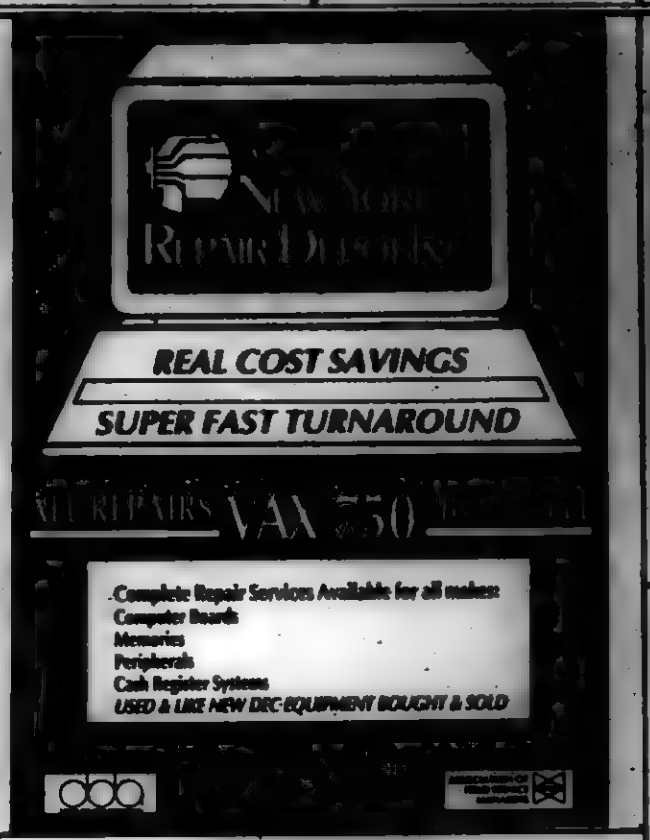
TRANSITION HELP TO MVS OR A BIGGER SYSTEM-reasonable prices
Full capacity of an IBM 3033
for daytime use in western U. S.
We can give you the computer, the time and the technical help.

PRIMDATA OF SWEDEN
44 Montgomery St., Suite 500
San Francisco, CA 94104 • Tel (415) 955-2612

MODELING, PROJECTIONS, HEAVY BATCH

with VSAPL, ADRS, ADI, SAS, APE,
GPSS, MPSX or your own programs.
Full capacity of an IBM 3033
for daytime use in western U. S.
at reasonable prices.

PRIMDATA OF SWEDEN
44 Montgomery St., Suite 500
San Francisco, CA 94104 • Tel (415) 955-2612



WANTED:
TIME ON BURROUGHS MAINFRAME

Fast growing corporation headquartered in Memphis, Tennessee wants to contract time on a large scale Burroughs system. Requirements call for major use of the mainframe system, shared or dedicated, for an on-line application during the hours 7 a.m.-9 p.m. Monday through Friday. The system must be up by March, 1984. This arrangement will require very little time and no investment by you. We will pay top dollar. Reply to:

TOMMY POWELL, VP OPERATIONS, DATA COMMUNICATIONS CORPORATION
3000 DIRECTORS ROW, MEMPHIS, TN 38131

901-345-3544

DATA CENTER SERVICES
BURNS

COMPUTER REPAIRS
DEC-DG
ALL BOARDS
1-2 WEEK TURNAROUND
MEMORIES
POWER SUPPLIES
DISKS PACKS AND TERMINALS
ANY MANUFACTURER

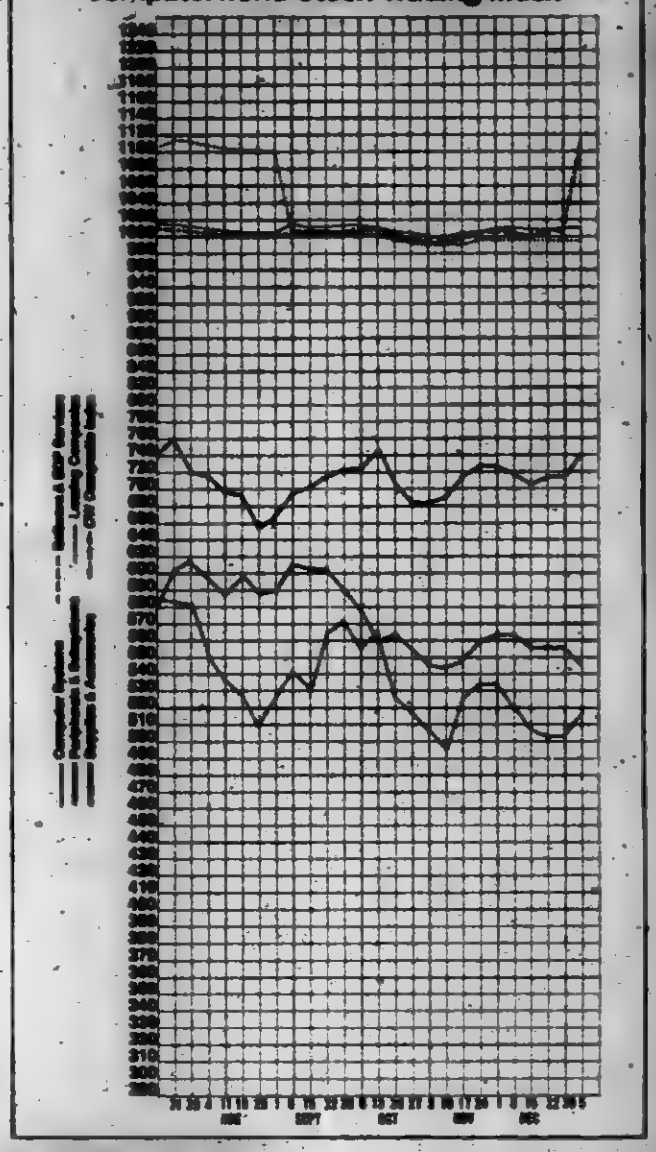
ICOTECH
Innovative Computer Techniques
COMPUTER SERVICES
IBM 3081 DEC-10
COMPUTER OUTPUT MICROFILM

ADVERTISERS INDEX

ACK 19
Ad Council ID/15
Alloy Computer 19
American Telephone & Telegraph 24-25,ID/30-ID/30
Apple Computer 68-69
Applied Data Research 3
Applied Information Development 14
Associates, Inc. 14
BBN 9
John Buell Company 71
Bytegen Corp. ID/6
C. Itoh 70
Cecom, Inc. ID/8
Codex Corp. ID/18-ID/19
Collier Jackson 74
Cambridge 67
Comnet '84 ..... ID/14
Compaq 26
Com/Peripherals, Inc. 73
Computer Systems 66
CS Computer 23
Cullinet 60
CW International ID/26,ID/31
CW Office Automation 66
CW Supplement 65
CXI ID/20
Data Design Associates 61
Datapredanta 12,15,17,ID/9
Datawatch Computer 73
Digital Pathways 28
Dorian Products ID/12
Dragoma Systems Inc. 62
Dynamic 13
Dysan 28
ERP Auditors 70
Exacta Corp. ID/16
Envision 64-65
Equitable Life Leasing 22
First Concept Technologies, Inc. 21
Fox Research ID/26
Fusion Products ID/2
Gavalin ID/24
GENICOM 60
H & W Computer Systems ID/28
Hatachi 61
Information 70
Innovation Data Processing 5
Integral Systems Inc. ID/10
Invitational Computing ID/25
Jones Futurex 63
Keytronic ID/4
KMW Systems 60
LIMI Software Corporation 58
Lee Data Corp. 45
Local Data 16,76
Lotus Development Corp. ID/28
MH 56
MacMillan Book Club 76-77
Mathes Computer Products 28
Martin Marietta ID/11
Mathematica 18
McCormack & Dodge 113
MicroAge 74
Mini & Micro Educational Services ID/32
Mohawk Data Systems 32-33
MSI Data Corp. 27
NTI 13,15,17
NCR Corp. ID/5
NISTU, Inc. 74
Northeast Expositions 12
On-Line Software 69
PC World Expo ID/29-ID/31
Plasma Information Machines Corp. 46-47
Phoenix Leasing ID/12
Prime Computer 44
Psychometrics 59
Radio Shack 56
Randeck Corp. 61
RAS Institute ID/14-ID/17SS
Sensor Based Systems ID/3
Signal Technology Inc. 8,9
Software A G 48
Software Banco ID/1
Sperry Corp. 30-37
Sterling Software ID/21
Synal 62
Syscoert 7
Systems Support Software 58
Tandem Computers 29-31
Techland 75
Teletype Corp. 39
Terminals Unlimited 76
Texas Instruments 38-39,ID/3
Tesa Software ID/31
Tesi Software, Inc. 10
United Information Services 66-67
University of Minnesota 64
Verbatim ID/30
Visual Technology 64
Wang 69-61

This index is provided as an additional service. The publisher does not assume any liability for errors or omissions.

Computerworld Stock Trading Index



Computerworld Sales Offices

Vice-President/Sales/Donald E. Fagan
Director/National Sales/Edward P. Marecki
Marketing Support Manager/Kathy Doyle
COMPUTERWORLD, 375 Cochituate Road, Box 880,
Framingham, MA 01701
(617) 879-0700

BOSTON SALES OFFICE (617) 879-0700
Northern Regional Director/Chris Lee
District Managers/Jim McClure, Ronald Mesten,
Joyce Donovan, Michael F. Kelleher
Sales Assistant/Alice Longley
COMPUTERWORLD, 375 Cochituate Road, Box 880,
Framingham, MA 01701

CHICAGO SALES OFFICE (312) 827-4433
District Managers/Arthur Kossack,
Sales Assistant/Joan F. Broderick
Northern Regional Director/Chris Lee
COMPUTERWORLD, 2600 South River Road, Suite 304,
Des Plaines, IL 60018

NEW YORK SALES OFFICE (201) 967-1360
Eastern Regional Director/Michael J. Masters
Sr. District Manager/Doug Chaney
District Managers/Ray Corbin, Joan Daly
Account Executive/Fred Lo Bapio
Sales Assistant/Gale M. Palermo
COMPUTERWORLD, Paramus Plaza I,
140 Route 17, North, Paramus, NJ 07652

LOS ANGELES SALES OFFICE (714) 261-1230
District Managers/Bob Hubbard, Bambi Hostenmiller
Western Regional Director/William J. Healey
COMPUTERWORLD, 18005 Sky Park Circle, Suite 260,
Irvine, CA 92714

SAN FRANCISCO SALES OFFICE (415) 421-7230
Western Regional Director/William J. Healey
Account Managers/Barry Milione, Theodore Frances,
Ernest Chamberlain
Account Manager, Classified/Nicole Beechman
COMPUTERWORLD, 300 Broadway, Suite 20,
San Francisco, CA 94133

ATLANTA SALES OFFICE (404) 394-0799
District Director/Jeffrey Melnick
Eastern Regional Director/Michael J. Masters
COMPUTERWORLD, 1353 Pealer Road, Suite D,
Atlanta, GA 30338

CLASSIFIED ADVERTISING (617) 879-0700
Al DeMilo
COMPUTERWORLD, 375 Cochituate Road, Box 880,
Framingham, MA 01701

CW INTERNATIONAL MARKETING SERVICES
Manager/Diane La Murgia
COMPUTERWORLD, 375 Cochituate Road, Box 880,
Framingham, MA 01701
(617) 879-0700

CW COMMUNICATIONS/INC.
Board Chairman/Publisher
Patrick J. McGovern
President
W. Walter Boyd
Senior Vice-President
Lee Vollmer

Group VP-Communication Services, Jack Edmonston. Group VP-Circulation, Margaret Phelan. VP-Marketing, Donald E. Fagan. VP-Finance, William P. Murphy. VP-Editorial, John Wildermuth.

Computerworld Headquarters: 375 Cochituate Road, P.O. Box 880, Framingham, MA 01701
Phone: (617) 879-0700. Telex: 95-1153.

SALES Vice-President, Donald E. Fagan. National Director, Edward P. Marecki. Corporate Advertising Administrator, Frank Collins. Marketing Support Manager, Kathy Doyle. Display Advertising Supervisor, Anne Hadley. Display Advertising, Deborah Bryer, Pam Valentinas, Elaine Caiza, Carolyn Medeiros, Cindy Chaisen. Classified Advertising Manager, William J. Mills.

COMMUNICATION SERVICES Group Vice-President, Jack Edmonston. Director Research, Kathryn Dinneen. Sales Promotion Director, Liz Johnson.

PRODUCTION Production Director, Peter Hahn. Production Manager, Marlene Gifford. Supervisor, Trish Gaudette. Systems Manager, Tom Pilla. Typesetting Manager, Carol Polack. Art Director, Tom Monahan.

CIRCULATION Group Vice-President, Margaret Phelan. Circulation Manager, Jane Desberg. Fulfillment Manager, Maureen Burke.

Computerworld can be purchased on 35 mm microfilm through University Microfilms Int., Periodical Entry Dept., 300 North Zeb Rd., Ann Arbor, Mich. 48106. Phone (313) 761-4700. Computerworld subscription sales to Circulation Dept. for subscription information.

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, January 4, 1984

All statistics compiled computed and formatted by TRADE QUOTES INC.® Cambridge, Mass. 02139

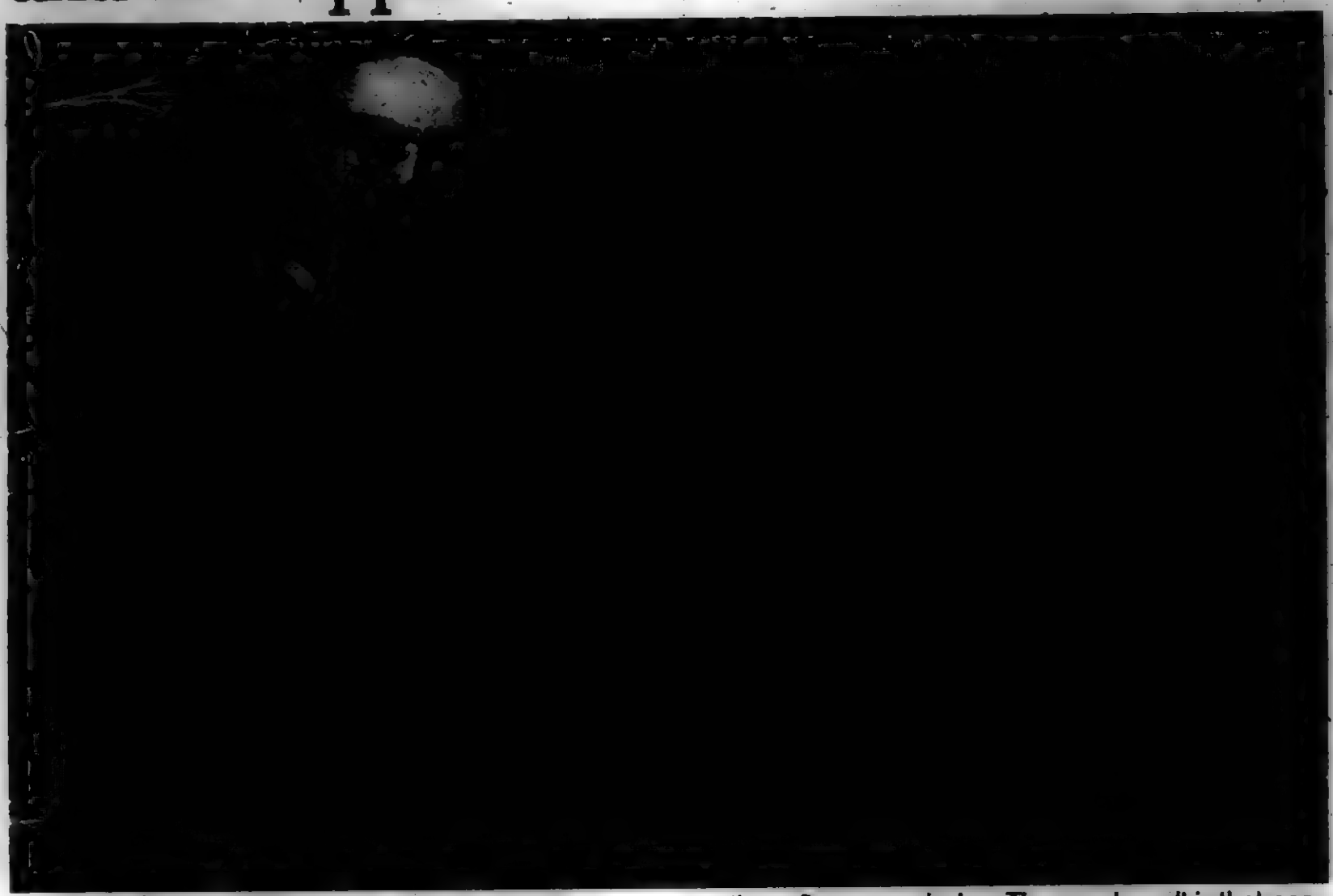
	1983-84 RANGE	CLOSE JAN 4	NET CHGE	PCT CHGE
COMPUTER SYSTEMS				
ALPHA MICROSYSTEMS	14- 24	18 3/4	+ 1/8	+0.6
ALTOS COMPUTER SYST	9- 22	11 1/2	+1 1/2	+20.0
ANSWER CORP	9- 20	10 5/8	+ 3/8	+3.4
APPLE COMPUTER INC	21- 65	22 7/8	+2 3/8	+14.9
AT&T	59- 74	64 3/8	+1	+1.2
BURROUGHS CORP	49- 64	57 1/8	+ 3/8	+0.7
COMPUTER AUTOMATION	4- 17	7 3/4	+1 1/4	+19.2
COMPUTER CONSOLES	9- 20	12	+ 1/8	+1.2
CONTROL DATA CORP	21- 62	46	-2	-4.2
CONVERGENT TECHNOL	19- 41	33 3/8	- 1/8	-0.3
CRAY RESEARCH INC	29- 57	53 1/8	+2 1/8	+4.1
DATA GENERAL CORP	19- 37	30 3/8	+2 1/2	+10.7
DATAPOINT CORP	11- 34	28 7/8	+1 5/8	+6.0
DIGITAL EQUIPMENT	82-132	73 1/2	-2 7/8	-3.8
ECCO INC	9- 15	13 7/8	+ 1/4	+1.8
ELECTRONIC ASSOC.	9- 15	7 5/8	-1	-11.6
FLOATING POINT SYST	19- 44	38 3/8	+ 7/8	+2.4
FOXBORO	32- 47	38 3/4	+ 5/8	+1.7
GENERAL AUTOMATION	3- 18	11 7/8	+ 1/8	+1.1
GERBER INC	28- 44	32 1/4	+1 1/8	+3.6
HARRIS CORP	29- 51	46 3/8	+ 3/8	+0.8
HEWLETT-PACKARD CO	22- 46	43 1/2	-1	-2.3
HONEYWELL INC	69-132	132 1/2	+1 1/4	+3.9
IBM	97-134	133 7/8	+ 1/8	+0.2
ISC SYSTEMS INC	3- 10	9	+ 1/8	+0.6
M/A-COM INC	10- 24	19 7/8	+ 5/8	+3.2
MASSBUS CORP SYSTS	1- 5	3/8	- 1/8	-20.0
MANAGEMENT ASSIST	7- 15	12 3/4	- 1/2	-2.7
MATSUSHITA ELEC(ADR)	47- 88	86 1/8	+2 3/4	+3.3
MODULAR COMPUTER SYS	3- 12	9 1/8	+ 1/2	+5.8
MOHAWK DATA SCI	10- 18	18 1/8	+ 3/8	+2.1
MOTOROLA INC	80-139	139 3/8	+ 1/8	+0.1
NAT'L SEMICONDUCTOR	19- 89	88 1/4	- 1/2	-0.6
NCR	39-138	137 3/4	-2 7/8	-2.0
PERKIN-ELMER	17- 37	36 7/8	+	+0.4
PRIME COMPUTER INC	11- 30	17 7/8	+	+0.8
SPERRY CORP	33- 48	47 5/8	+ 5/8	+1.3
TANDEM COMPUTERS INC	12- 66	58 3/8	+1 1/4	+2.2
TIMEX CORP	34- 54	50 1/4	-2 3/4	-5.2
TELEVIDEO SYSTEMS	14- 41	19 7/8	- 7/8	-4.2
TOLEDO CORP	9- 18	16 3/4	- 1/4	-1.2
TEXAS INSTRUMENTS	71-170	161 3/4	+2 1/2	+1.7
ULTIMATE CORP	9- 20	18 1/2	+2 3/4	+18.2
VECTOR GRAPHICS INC	3- 14	13 7/8	+ 1/8	-0.2
WANG LABS "B"	13- 42	38 1/4	+3 1/2	+10.0
WANG LABS "C"	11- 42	38 3/8	+3 3/8	+10.1
XEROX CORP	38- 62	59 3/8	+ 3/8	+0.7
LEASING COMPANIES				
BOOTHE FINANCIAL CP	11- 28	23 3/4	- 1/4	-0.7
COMDISCO INC	7- 42	39 1/8	+1 3/4	+0.9
CONTINENTAL INFO SYS	3- 15	8 1/2	-1 1/4	-12.8
DPF INC	9- 13	13 3/4	- 3/8	-0.8
U.S. LEASING	19- 47	38	- 3/8	-1.1%
COMPONENTS				
ADVANCED MICRO DEV	15- 38	36 1/8	+3 1/8	+10.1
ADV'D SEMICONDUCTOR	19- 27	26 1/2	+4 1/4	+13.1
ANALOG DEVICES INC	19- 42	39 1/8	-1	-2.9
BARLOGIC CORP	29- 57	54 1/4	+3 1/2	+10.0
APPLIED MATERIALS CP	19- 37	33 1/2	-1 1/2	-4.3
INTERGRAPH	14- 38	37	-1	-2.7

INDEX: H-NEW YORK; A-AMERICAN; P-PACIFIC; B-BOSTON
L-NATIONAL; M-MIDWEST; O-OVER-THE-COUNTER
A-Y-C PRICES ARE BID PRICES AS OF 5 P.M. ON LAST DAY
(1) TO NEAREST DOLLAR

	1983-84 RANGE	CLOSE JAN 4	NET CHGE	PCT CHGE
SOFTWARE & SVC SERVICES				
ADVANCED COMP TECH	1- 8	3 1/4	-1	-23.0
ADVANCED SYSTEMS INC	1- 8	3 3/4	- 3/4	-16.7
ADR COMPUTERS INC	17- 38	35	-4	-7.4
AMERICAN SOFTWARE	17- 31	28	- 3/4	-2.1
ANACOMP INC	9- 13	8 3/4	-4 1/4	-12.5
ANALYSTS INTL CORP	9- 20	11 3/4	+ 1/8	+1.0
APPLIED DATA RESH	9- 22	20 3/8	+ 3/8	+1.9
AUTO COMPUTER SYSTEMS	21- 41	37 1/2	+ 1/2	+1.3
AUTOMATRIX CORP INC	1- 4	1 5/8	+ 1/8	+8.3
AUTOMATIC DATA PROC	21- 44	38	+ 1/2	+1.4
CDA COMPUTER ASSOC	9- 17	12 3/8	+ 1/2	+4.2
COMPUTER ASSOC INT'L	19- 38	33	+ 1/4	+0.8
COMPUTER HORIZONS	9- 28	13 3/4	+ 1/2	+3.7
COMPUTER METHODS	3- 10	6 5/8	+ 1/8	+1.9
COMPUTER SCIENCES	11- 23	16 1/8	+ 1/2	+3.2
COMPUTER TASK GROUP	7- 17	13	+ 1/8	+1.0
COMPUTER VISION	7- 20	8 1/4		+3.1
COMPUTING SYSTEMS	1- 3	1 1/4	+1/4	+25.0
COMPUTRON CORP	1- 3	2 1/8	+ 1/8	+3.1
COMSHARE	7- 14	13 5/8	+ 1/2	+3.8
CULLINET SOFTWARE	15- 30	28	-1	-3.3
CYCARE SYSTEMS INC	9- 17	15 1/4	+1 1/2	+10.9
ELECTRONIC DATA SYST	19- 42	38 1/4	+1 1/8	+3.0
HAMAN SYSTEM INC	15- 31	28 1/8	+1 3/4	+6.6
GENERAL ELECTRIC CO	69- 88	88	+ 3/4	+0.8
GTE CORP	49- 63	63	- 1/8	-0.2
INFORMATICS INC	19- 34	19 3/4	-	0.0
INFOTRON SYSTEMS COR	29- 43	38 3/4	-	0.0
KEANE ASSOCIATES	4- 12	7 3/4	+1 1/2	+24.0
LOGICON	9- 34	32 7/8	+ 3/8	+1.2
MCI COMMUNICATIONS	13- 24	23 3/8		+0.0
MGMT SCI AMER INC	9- 28	27 3/4	+1 1/2	+5.7
MATHEMATICAL APP GRP	16- 22	16 1/2	-	-0.7
MICRO SYSTEMS INC	25- 53	48 3/4	-1	-2.2
MONCHIK-MERGE CO	1- 5	4	+ 1/4	+5.2
NATIONAL DATA CORP	17- 32	18 3/8	+ 1/2	+2.1
ON-LINE SOFTWARE INT	13- 27	17 1/8	+1 1/4	+10.7
PANSOPHIC SYSTEMS	9- 20	20 3/4	+1	+5.0
PLANNING RESEARCH	9- 21	18 7/8	- 1/8	-2.0
POLICY MGMT SYSTS CP	19- 38	38 1/8	+ 3/8	+1.1
PROGRAMMING & SYS	1- 8	5 1/8	+ 1/8	+10.8
REYNOLDS & REYNOLDS	17- 33	32 3/4	+ 1/4	+10.1
SCI CORP	11- 34	33 1/8	+1 3/8	+4.3
SHARED MEDICAL SYST	19- 43	39 3/8	+1 3/8	+4.2
SCIENTIFIC COMPUTING	9- 20	11	- 1/2	-4.3
SOFTWARE AG	13- 31	11 3/4	- 1/2	-2.0
TYMSHARE INC	15- 38	21	+1 1/8	+5.6
UCC CORP	9- 18	13 3/4	+ 1/4	+1.8
UNIV CORP	7- 17	10 3/8	- 3/8	-3.4
PERIPHERALS & INNOVATION				
AM INTERNATIONAL	3- 7	4 3/8	+ 3/8	+10.3
ANDERSON ANDERSON	9-120	11	+ 1/8	+0.8
AUTO-TROL TECHNOLOGY	9- 38	32 7/8	- 1/8	-0.3
BARCTEC INC	7- 23	17	+ 1/4	+1.5
BRENTWOOD INT'L	9- 13	7 3/4	+ 3/8	+7.1
BOLT,BERANEK & NEW	9- 30	24 1/8	+ 1/8	+0.5
CANNON CORP	1- 4	1 3/8	+ 1/8	+8.3
CONTRONICS DATA CORP	9- 30	14 3/8	+ 1/2	+3.6
CETEC CORP	9- 12	10 3/8	+1 1/8	+12.0
COMMITTERMICS	9- 20	10 1/8	- 3/8	-3.6

	1983-84 RANGE	CLOSE JAN 4	NET CHGE	PCT CHGE
COMPUTER SERVICES INC	1- 21	3/8	- 1/8	-25.0
COMPUTER TRANSCEIVER	1- 3	3 3/8	- 1/8	-3.2
COMPUTERVISION CORP	19- 41	34 3/8	- 1/8	-0.7
COMRAC CORP	19- 38	36 1/8	- 1/8	-1.3
DATAPRODUCTS CORP	19- 41	38 1/8	- 1/8	-0.3
DATAMEDIA CORP	9- 17	9 3/8	- 1/8	-1.3
DATA SWITCH CORP	13- 41	38	-1	-2.5
DATUM INC	7- 17	16 3/8	- 3/8	-2.2
DECISION DATA COMPUT	9- 17	11 1/2	- 1/8	-1.0
DIGITAL-GILBERTI	11- 28	11 1/8	- 1/8	-1.1
ELECTRONIC G & R	9- 11	9 1/8	- 1/8	-2.0
EVANS & SUTHERLAND	9- 22	20 3/4	+ 3/4	+3.8
GANDALF TECHNOLOGIES	9- 20	9 1/8	- 1/8	-1.3
GEN'L DATA COMM IND	9- 21	16 3/8	- 1/8	-0.7
GREAT SOUTHWEST IND	1- 6	3 1/4		0.0
HEWLETTNE CORP	19- 32	26 1/2	+ 1/4	+0.9
ICOT CORP	1- 6	3 7/8	+ 3/8	+10.7
INFORMATION INTL INC	19- 32	13	+ 1/4	+1.9
INFORMATION SCIENCE	13- 17	14	- 1/2	-3.7
INTEL CORP	9- 48	46 1/8	- 1/8	-0.3
IPL SYSTEMS INC	9- 19	9	- 1/8	-1.3
LANDY ELECTRONICS	7- 18	11 3/4	+ 1/8	+1.1
MEDIDATA CORP	3- 13	12	- 3/4	-5.8
MEI DATA CORP	19- 32	30	+ 1/8	+0.4
MORROW CORP	9- 28	26 3/8	+ 1/8	+0.5
NETWORK SYSTEMS CORP	9- 34	32 3/8	+ 1/8	+0.1
NV AMERICAN PHILIPS	9- 28	27 1/2	+ 1/8	+0.5
NORTHERN TELECOM LTD	23- 48	48	+1 1/4	+2.6
OMEX	7- 14	8 1/8	+1 1/4	+18.7
PARADYNE CORP	7- 20	17 3/4	+1 1/8	+6.8
PERIPH. CORP	7- 17	12 3/4	+ 3/8	+3.1
PHENIX AMERICAN INC	7- 17	12	-	0.0
PLESSEY CO (ADR)	29- 41	38 1/2	-1 1/4	-3.2
PRINTRONIX INC	19- 34	33 1/2	-	-1.5
QANTEX CORP	9- 20	11	- 1/8	-1.1
RAYTHEON CO	43- 68	66	- 3/8	-0.5
RECOGNITION EQUIP	9- 17	13 3/8	+ 3/8	+2.8
RELA CORP	49- 88	80 1/8	- 7/8	-1.7
SANDERS ASSOCIATES	49-120	48 1/8	- 1/8	-0.2
SCAN DATA	7- 3	3 1/4	- 1/8	-3.7
SCAN-TRON CORP	11- 27	16	-1 1/2	-5.8
SCIENTIFIC ATLANTA	19- 34	31 3/4	-1	-3.1
SYSTRONIX TECHNOLOGY	19- 38	16 3/8	- 1/8	-0.7
SYKES DATATRONICS	9- 27	9 1/2	+ 3/8	+4.1
SYSTEMS & COMP TECH	19- 37	37 5/8	+ 1/8	+0.3
T BAR INC	7- 17	16	- 1/8	-12.0
TAB PRODUCTS CO	19- 38	35 3/8	+ 1/8	+0.1
TANDON CORP	19- 38	38	- 1/2	-2.6
TEC INC	9- 15	14 3/4	+2 3/8	+20.2
TEKTRONIX INC	34- 67	66 1/8	+1 1/4	+1.8
TELEX	9- 38	38 3/8	+2 1/8	+5.2
TERMINAL DATA CORP	9- 17	9 1/8	- 1/8	-1.3
TIMEPLEX INC	7- 17	16 1/8	-3 7/8	-18.1
VISUAL TECHNOLOGY	9- 20	18 1/8	+	+0.6
SUPPLIERS & DISTRIBUTORS				
AMERICAN BUS PHONE	7- 29	21	-1 1/8	-5.1
BARRY WRIGHT	13- 30	28	- 1/2	-1.8
DATAFLEX PRODUCTS INC	13- 27	26 3/8	+3 1/8	+13.5
DAVIS BUS. PHONE	9- 20	12 1/8	-1 1/4	-9.3
IN COMPANY	19- 30	28 1/8	- 7/8	-3.0
PHONE CORP LTD	23- 34	34	- 1/8	-0.4
STANDARD REGISTER	11- 30	28 1/8	-1	-3.4
WALLACE BUS PHONE	11- 20	18 1/2	- 1/8	-1.0

The man who taught financial software to A.B. Dick, Alberto Culver, Hershey Foods, Hartz Mountain, Howard Johnsons, Newsweek, National Steel, Philip Morris, Parker Pen, Pabst, Pillsbury, Pepsi-Cola and Dr Pepper.



He's Alan Rick, a McCormack & Dodge training instructor. A member of a teaching team which has won the reputation, hands-down, for the best hands-on training in the financial software industry.

Clients find our training schools as valuable as our software packages. Enrollment has grown from less than 300 in 1977 to over 3,000 in 1981. People have come from more than 150 Fortune 500 companies. From departments with such demanding workloads that any system but the fastest and most powerful is simply out of the question. Whether it's for accounts payable, capital projects analysis, fixed assets, general ledger, payroll/personnel or purchase order management.

At McCormack & Dodge, we work hard to make our schools—and our entire company—as user-oriented as the software we design. The usual result is that people who sit down and talk to us do more than just talk. They become customers. We'd like to show you why.

Tomorrow's software today.

☐ General Ledger ☐ Payroll/Personnel
☐ Accounts Payable ☐ Purchase Order Management
☐ Fixed Asset Accounting ☐ Capital Project Analysis

1-800-343-0325*

*Telex 174002

McCormack & Dodge

a company of The Dun & Bradstreet Corporation

McCormack & Dodge Corporation, 1225 Worcester Road, Natick, MA 01760. Sales and support offices throughout North and South America, Europe, Asia, Australia and Africa.

VOL 18
ISSUE 3
JA 16 1984
UMI

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

COMPUTERWORLD

$2.00 A COPY; $44/YEAR | JANUARY 16, 1984 | VOL. XVIII, NO. 3

An interview with the lead designer of the controversial Ada language/14

Business is good
for Europe's first commercial user of the DG/Rolm Ada Development Environment/15

In Depth
Keeping business secrets secret
19/7

SECTIONS

Editorial/20
Software & Services/37
Communications/53
Systems & Peripherals/61
Microcomputers/69
Computer Industry/79

CB MARS
MI48116UIVVN#09HJ 3D29C 502213
JI WROSCH
6814 MARGO DR
BRIGHTON MI 48116

NEWSPAPER

INSIDE

IBM added to and subtracted from its line of System/36 processors last week. Page 4.

■

Are your end users buying too many different kinds of microcomputer software? Computer Associates International, Inc. claimed a solution: software for the IBM Personal Computer that integrates applications, a mainframe link, multitasking and a window manager. Page 5.

■

The suit in which IBM charged National Semiconductor Corp. and its National Advanced Systems, Inc. subsidiary with stealing IBM trade secrets was settled out of court last week. Page 6.

■

Reduced costs and increased flexibility are the two major reasons that computer-based training is gaining in popularity. Page 8.

■

Computerization isn't for everyone. A recommissioned battleship that saw action off the Lebanese coast last month is sticking with its World War II-era analog warfare system. Page 16.

■

Have a pain in your backleg? You may find a technique called normalization soothing. Page 37.

■

Digital Equipment Corp.'s executive suites seem to come equipped with revolving doors. Page 79.

■

AT&T: Keep access fees, we'll cut rates

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — AT&T may increase its private-line rates only 7.9% overall — rather than the 15.5% originally planned — if the Federal Communications Commission implements its plan to charge users for access to the long-distance network. The company said it might also decrease Message Toll Service and Wats charges more than the 10.5% promised earlier.

Both offers were included in comments AT&T submitted to the commission Jan. 6. They appear to be part of an intense lobbying campaign aimed at Congress; AT&T has also sent nearly two million brochures and letters to community leaders, shareholders and employees.

A bill passed by the U.S. House of Representatives, H.R. 4102, forbids the FCC from putting the access charge plan into effect. Similar legislation (S. 1660) is awaiting a final vote in the Senate.

The White House opposes these measures, as do many corporate communications users and telecommunications vendors. The latter two groups have formed an Alliance for Telephone Progress to seek changes in the legislation (story on page 2).

The original private-line increases and MTS/Wats decreases proposed by AT&T last Oct. 3 could be changed, AT&T said, because the company overestimated the access charges it would have to pay under the FCC's

See RATES page 2

Data base unit announced for IBM sites

By Paul Gillin
CW Staff

LOS ANGELES — Teradata Corp. today announced an integrated hardware and software data base computer for IBM mainframe environments that reportedly manages databases of up to one trillion bytes.The fault-tolerant data base computer, dubbed DBC/1012, uses more than 1,000 Intel Corp. 8086 microprocessors running in parallel.

The DBC/1012 is believed to be only the second data base machine available for IBM mainframes. Software AG of North America, Inc. markets the Data Base Machine, a back-that includes the company's Adabas data base management system. However, Software AG has downplayed the processor in recent product literature.

Teradata's basic model includes six microprocessors equaling 12M bytes of main memory, 1.9G bytes of disk storage, relational software, host interface software and data base utilities. It performs 2.5 million instructions per second.

Parallel microcomputer modules and disk storage can be field upgraded to achieve a maximum of 400 Mips with a capacity of up to 2G bytes of main memory, a spokesman said. All modules communicate via Teradata's Ynet, a multiprocessor interconnection that distributes data and processing functions over multiple subsystems. Ynet broadcasts request messages to the microprocessors and merges their results in sequence, the

See DBC page 7

FYI

A fearless Fortran forecast: Redskins by six

By Bruce Heard
Special to CW

LOS ANGELES — There have been times in the past when fearless Fortran forecaster Bud Goode has equivocated when asked to pick the next Super Bowl champion.

"I don't believe the computer," he complained.

"It's a dismal science," he decried.

No more. The computer says Redskins by six over the Raiders in Super Bowl XVIII, and that's good enough for Goode. The forthright forecaster was even willing to hazard a guess at the Jan. 22 event's final score: Washington Redskins: 21, L.A. Raiders: 17. Or 14. Something like that.

Goode's computer is a Sperry Corp. 1106 mainframe, and he uses it to compile a weekly 80-page readout that was sold to nine National Football League coaches and CBS commentator Dick Vermeil this past season. The software that drives the 1106 is based on a regression analysis that includes 120 variables covering virtually every phase of football.

Although not a betting man himself, Goode handicaps NFL games each week during the 16-week regular season for *The New York Post* and *The Philadelphia Enquirer*, among others. After experiencing stunning success against the line last year, he sank to two games below .500 against it this season. "I expected to fall out of bed this year because of statistical variations," he noted matter-of-factly.

During the course of the season, several teams jockeyed for statistical supremacy in Goode's Super Bowl race. In the American Football Conference, the L.A. Raiders did not emerge as the favorite until the 12th week. Before that, San Diego — Goode's preseason pick — Miami and Pittsburgh all enjoyed front-runner status. In the National Football Conference, Washington, the defending Super Bowl champion, supplanted Dallas as the favorite early in the season and stayed there.

In the Redskins-Raiders match, the Redskins are very strong statistically in ball control. According to Goode, the Super Bowl champions will typically run the ball 10 times per game more than their opponents during the regular season. The Redskins almost doubled that number, upping it to 17.

"It's a big edge because of the clock-eating ability," he pointed out.

Washington led the NFL in scoring with a 33.8 point average, a 40-percentile advantage over the Los Angeles defense, which relinquished a not-too-stingy 21.1 points per game.

See SUPER page 10

Redskins' John Riggins

Alliance to monitor legislation

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — "To ensure passage of legislation responsive to the reasonable concerns of business and protective of America's technological future," several corporate communications users groups and trade associations last week announced they have formed the Alliance for Telephone Progress (ATP). The group's initial goal is to amend telecommunications legislation now before the U.S. Senate.

Meanwhile, in related actions:

■ The Reagan administration has announced it will oppose the pending Senate legislation (S. 1660) which would bar the Federal Communications Commission from putting its proposed access charge plan into effect. The Senate is likely to vote on S. 1660 next week.

The latest views of the Reagan administration on the pending legislation came in a statement made by a White House spokesman earlier this month claiming, "We support a deregulatory move as being in the best interest of the industry as well as individual consumers.

"We're concerned about initial consumer costs but believe that in the long term, these will iron themselves out."

■ AT&T offered to reduce its Message Toll Service/Wats rates beyond the levels promised last October and also offered to scale back increases in private-line rates proposed at that time (see story on page 1). The October announcement concerned a new interstate (between local access and transport areas) tariff, based on the FCC's access surcharges.

■ An AT&T spokesman said the company mailed nearly two million announcements of the new offer to its shareholders and employees, local opinion molders and the general public.

■ A knowledgeable Washington, D.C., source said the FCC is "caught between a rock and a hard place: While Congress objects to the access surcharge, the carriers and business communications users insist on it." He believes Congress and the commission will decide to defer the access charge for several months despite objections from users, telephone carriers and possibly Federal District Court Judge Harold Greene, who presided over the AT&T divestiture.

This Thursday the commission may act on petitions for further reconsideration of its access charge decision.

A press release issued by the newly formed ATP last week estimated that if S. 1660 or a similar measure in the House of Representatives (H.R. 4102) is enacted, their members' communications bills will increase between 40% and 200%.

Members of ATP include the International Communications Association, Association of Data Processing Service Organizations, Committee of Corporate Telecommunications Users, National Retail Merchants Association, Electronic Funds Transfer Association and Aeronautical Radio, Inc.

RATES from page 1

new plan.

However, "if the access charge plan were to be modified, either by commission action or congressional mandate, to reduce or to eliminate the fixed monthly end-user fee or to increase the amount of the discount for other common carriers, AT&T's ability to offer any rate reductions would be jeopardized.

"In fact, such changes could eliminate the MTS and Wats rate reductions already proposed in the Oct. 3 filing."

Key part of plan

A key part of the FCC's access charge plan is a fixed monthly surcharge of $2 per month per line on the local telephone company's residential users and up to $6 per month per line on business users.

The plan also calls for reducing the differential between what AT&T and the other common carriers now pay for access to local telephone networks. Other common carriers are now charged far less for lower quality interconnection, AT&T said.

AT&T said that, because of uncertainty concerning the FCC plan and the related access charges that local telephone companies will levy on AT&T and other long-distance carriers, it could not estimate how much more MTS/Wats rates might come down. But the company promised to pass on to customers all of the savings.

Criticisms rejected

AT&T rejected criticisms from users that the rate reductions proposed last October represented only about half of what it would save in reduced costs stemming from the FCC decision.

Column 1	Column 2 (Percent)	Column 3 (Percent)
Private-line services (overall)	15.3	7.5
Voice-grade services (overall)	15.9	8.5
Dataphone Digital Service (DDS)	-3.8	-31.2
2,400 bit/sec DDS	74.3	38.1
4,800 bit/sec DDS	19.8	-1.0
9,600 bit/sec DDS	0.5	-30.5
56K bit/sec DDS	-38.0	-44.6
Telegraph-grade services (overall)	65.9	30.7

The table above shows how present rates for specified services (Column 1) would be affected by AT&T's Oct. 3 tariff (Column 2) and by the possible revisions offered by the company last week (Column 3). All figures were supplied by AT&T, which emphasized that they are tentative.

In the original tariff, AT&T increased individual private-line rates by widely varying amounts. Generally, the decreases were greatest for the most competitive offerings.

While charges for telegraph-grade service went up 65%, for example, those for 56K bit/sec Dataphone Digital Service (DDS) circuits dropped 38%. An AT&T spokesman said last week that, tentatively, the company now estimates that rates for telegraph-grade services will increase only 30.7%, while those for 56K bit/sec DDS will drop 44.6% (see table).

FCC asks AT&T to justify rates further

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — AT&T last week received a 20-page letter from the Federal Communications Commission that asked for further justification of the post-divestiture rates the company proposed last October.

The pending tariff, scheduled to go into effect April 3, will "have a dramatic effect upon charges paid by subscribers," wrote Jack D. Smith, chief of the FCC's Common Carrier Bureau.

By next Monday, Jan. 23, Smith wants AT&T to answer a number of questions that the bureau's staff raised after perusing last October's filing and questions that customers raised in comments submitted to the FCC.

For example, the American Library Association, together with two regional library network operators, complained that charges for communicating over regional bibliographic networks would go up 37% to 84%.

AT&T was asked to respond to these and all of the other customer complaints individually. In each case, the FCC wants a breakdown of present and proposed charges and a comparison of the Total Service and Transport Circuits Service options offered in the tariff.

Under the former option, AT&T would provide an end-to-end service, obtaining the customer's local access facilities from the appropriate local telephone company. Under the latter option, the customer would acquire his own local access facilities, obtain the interexchange circuit from AT&T and retain responsibility for end-to-end testing and maintenance.

As part of its response to each customer complaint, AT&T was asked to "fully explain and justify price differences between . . . alternatives by rate element."

Other customer complaints included several from news services employing multipoint private lines comprised of voice-grade and telegraph circuits now provided under AT&T's Tariff 260.

"The contentions of unreasonable increased rates go both to recurring and nonrecurring charges proposed for these services," the commission's letter said.

The letter also reported that one multipoint network customer — Bunker Ramo Corp. — contends that "AT&T's recurring charges for terminating channels are substantially higher than would be incurred by customers acquiring them directly from [a local] exchange carrier."

Bunker Ramo reportedly also contended that, overall, the Total Service charge exceeds the cost of acquiring the service elements separately, under the Transport Circuits option, by 46% to 50%.

Port Authority bypasses Nynex for PBX

By David Myers
CW New York Bureau

NEW YORK — The Port Authority of New York and New Jersey has bypassed Nynex, the regional telephone holding company carved out of the old New York and New England telephone companies, to set up its own private branch exchange (PBX) at the Port Authority Bus Terminal here.

Closely following two other major bypass decisions in New York, the Port Authority decision raised questions about Nynex's ability to hold onto its lucrative Manhattan base.

AT&T Chairman Charles L. Brown told securities analysts here last month that Nynex was more vulnerable to bypass operations than were the other six operating companies because of the heavy concentration of business and government offices in Manhattan.

Purchased SL-1

The Port Authority purchased a $650,000 Northern Telecom, Inc. SL-1 digital PBX from Standard Telephone, a South Hackensack, N.J.-based dealer for Northern Telecom, and installed the system to handle its automatic call distributing. Jack Gavigan, supervisor of telecommunications services for the Port Authority, said the agency had gone to a Northern Telecom PBX out of unhappiness "with the service the telephone company provided. We were getting complaints from the general public attempting to get bus information."

Asked if officials at the Port Authority were concerned about weakening Nynex, Gavigan replied that "our real concern was whether they [Nynex] could be relied upon. It is increasingly the case that people in my position are becoming dissatisfied with the response time and other services" of what was formerly known as New York Telephone Co.

The Port Authority has now become the second public agency in the state to bypass the phone company, joining the New York State government in sealing a deal with an unregulated carrier [CW, Sept. 26].

VOTERS

Thanks for giving SyncSort 75% of the vote in IDC's 1983 Sort Survey.

Call (201) 568-9700.

If you're still in the "sorting minority."

Ladies and gentlemen...sort users...fellow Americans: As we stand before you today on this windswept Inaugural Platform, clutching our notes, we are both very proud and somewhat puzzled.

We're proud that SyncSort has again been re-elected to office as "America's No. 1 Sort Program." It's now used by a whopping 75% of America's major data processors, according to the latest IDC sort survey. Here's the final vote tally:

SORT PROGRAMS IN USE IN THE U.S.*

But proud as we are of this achievement, we're puzzled, too. How come 25% of you are still procrastinating about SyncSort? You use the best hardware, and sooner or later you're going to want the best sort program to make that hardware work even better.

If you'll call, we'll prove to you that all three versions of SyncSort—OS, DOS and CMS—are clearly superior to their IBM counterparts in the three critical areas of sorting:

1. PERFORMANCE. Sorts have a built-in "Tammany Hall factor." If they run inefficiently, they can embezzle a great deal of your computer resources and corrupt your entire system's throughput.

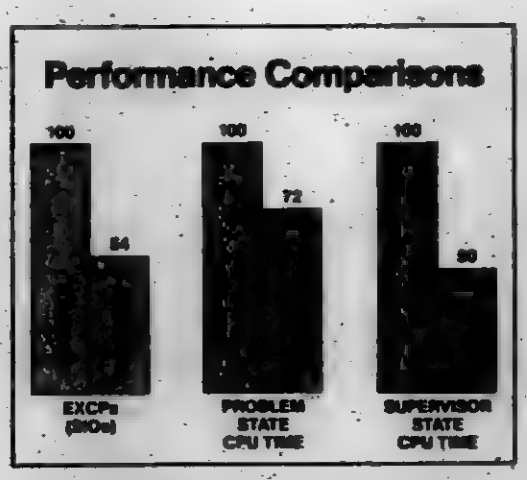
SyncSort prevents this by keeping sorts honest. Because of the technological breakthroughs we pioneered—many of which are now patented—all three versions of SyncSort use far less computer resources than any of their IBM opposite numbers. Just how great the sort-performance gap has become can be seen by the charts at lower left.

2. PRODUCTIVITY. There's more to sorting than sorting. SyncSort is loaded with sophisticated features that make it easy to perform other important data-processing functions. Using these features, the time required for simple applications can often be reduced from five programmer days to one. Another reason why SyncSort has always carried the programmer vote!

3. SERVICE. We never forget who elected us to office. When you need sorting help, our Technical Service people will provide fast, accurate, courteous sorting advice. More than 85% of all customer inquiries are resolved within 24 hours.

To the 75% who cast their ballots for SyncSort, our warm thanks. And to the 25% who didn't, better call us today. Why postpone the inevitable?

*According to IDC's Seventh Annual Survey of Sort Programs Used in OS and OS/VS.



syncsort INC.

Syncsort Incorporated 560 Sylvan Ave., Englewood Cliffs, N.J. 07632

IBM adds one System/38, scraps three, cuts prices

By Tom Henkel
CW Staff

RYE BROOK, N.Y. — IBM last week scrapped three older members of its System/38 processor lineup, announced a mid-range System/38 processor and slashed prices on the remaining two processors in the line.

Highlights of the announcement include:

■ The introduction of the System/38 Model 6, a mid-range processor that reportedly offers 2M to 4M bytes of main memory and the ability to connect up to 128 local workstations. The Model 6 replaces the older Model 5 and Model 7 processors, which IBM will no longer market. IBM said the Model 6 offers about 25% more internal performance than the Model 5, with a purchase price of about 8.9% less.

■ The elimination from the System/38 family of the entry-level Model 3, a processor that many industry watchers maintained did not offer enough main memory to fulfill users' needs. Most agreed the Model 3 was never a strong contender in the System/38 lineup.

■ Decreases in the purchase prices of the remaining two processors in the System/38 line by as much as $32,500 on the Model 8 and $17,500 on the Model 4. IBM also made some minor enhancements to those processors.

■ The announcement of an electronic spreadsheet program, Worksheet/38, as part of IBM's Office/38 program product.

Faster storage cycle time

The System/38 Model 6 features a control storage cycle time of 133 nsec, compared with 200 nsec on the older Model 5. Main memory cycle time on the processor is 400 nsec, compared with 600 nsec on the Model 5, IBM said.

The Model 6 is available in 2M-, 3M- and 4M-byte memory configurations. The Model 5 offered 1M, 1.5M and 2M bytes of main memory.

In addition, the Model 6 can accommodate 12 more local workstations than the Model 5, IBM noted.

The Model 6 processor with 2M bytes of main memory, 794M bytes of disk storage, 20 workstations and a system printer costs $180,423. The unit costs $3,561/mo on a five-year lease plan. A similarly configured Model 5 processor formerly cost $189,453.

The Model 6 will be available in March, IBM said.

Models 4, 8 enhanced

Besides getting price cuts, the Model 4 and Model 8 processors also were enhanced. Presumably to fill the void left by the Model 7 processor, the Model 8 is available with 2M- or 3M-byte memory configurations; its previous minimum main memory capacity was 4M bytes.

The Model 4 can accommodate 12 additional local workstations, raising the maximum number of terminals from 20 to 32. The additional terminals can be attached without an expansion feature, IBM said.

The newly announced spreadsheet program, Worksheet/38, enables users to develop relational models for planning and budgeting applications. The package, which can access information stored in a System/38 data base, is available for a one-time charge of $2,700, an IBM spokesman said.

Last week's System/38 announcements were made through IBM's Information Systems Group, located at 900 King St., Rye Brook, N.Y. 10573.

Characteristics \ System	System/38 Model 4	System/38 Model 6	System/38 Model 8
Relative Performance[1]	13	20	32
Mips[2]	.2	.3	.52
Memory Size in Bytes (Minimum-Maximum)	1M-2M	2M-4M	2M-8M
Purchase Price[3] (Memory Size)	$48,140 (1M)	$67,903 (2M)	$137,806 (4M)
Lease Price (Lease Term)	$2,903 (3 Year)	$1,754 (5 Year)	$8,400 (3 Year)
Machine Cycle Time (Nsec)	1,100 (Per 4 Bytes)	400 (Per 4 Bytes)	400 (Per 4 Bytes)
Channels[4] (Minimum-Maximum)	1	1	1
Cache (Buffer) Size	None	None	None
Bus Architecture?	No	No	No
Price per 1M Byte Of Main Memory	$7,900	$7,900	$7,900

1. CW estimates based on vendor-supplied information. Relative performance ratings are based on an IBM 370/158-3 equating 45. These numbers are designed to put the processor into perspective with other systems; they do not constitute a buyer's guide. All systems are not alike; they use different operating systems, instruction sets and architectures and therefore cannot be directly compared. In addition, actual relative performance may vary with the application, peripherals and software.
2. CW estimates.
3. For the processor only.
4. The System/38 has one channel through which many devices can be used.

NCR unveils terminal system to fit IBM's 3270, SNA/SDLC

DAYTON, Ohio — Citing its intention to offer communications compatibility with IBM, NCR Corp. last week announced a general-purpose cluster terminal system that is compatible with IBM's 3270 line of terminals and IBM's Systems Network Architecture/Synchronous Data Link Control (SNA/SDLC).

The NCR 7950 terminal system is comprised of either 15-in. monochrome display terminals (green or amber) or 14-in. color display terminals, a 200 char./sec printer and a controller that can support up to 32 CRT terminals or printers. The controller is based on a Motorola, Inc. 68000 microprocessor.

NCR plans to market the unit to large corporations that have a need for clustered CRT terminals that can communicate with a host processor in a 3270 SNA/SDLC environment. A spokesman said NCR is targeting both NCR users and users of other vendors' systems.

According to NCR, the 7950 can be used in lieu of a microcomputer, but the company did not elaborate.

The introduction of the NCR 7950 marks the first time NCR has announced a 3270-compatible product, the spokesman added.

Features of the 7950 include a data field storage facility for commonly used word sets. The feature can be recalled on the screen as needed.

In addition, a printer buffer is available to store screen contents when the printer is busy.

Add-on features

The 7950 was designed to enable customers to buy entry-level configurations similar to the IBM 3178 CRT terminal introduced last year [CW, March 14]. The 7950 accommodates add-on features, many of which are user installable and do not require users to replace CRT terminals, the vendor said.

Other features include a tilt-and-swivel display, 24 function keys and a 10-key numeric pad.

The 7950's basic monochrome display terminal costs $1,395. A seven-color display terminal costs $3,350, and a printer for the unit costs $5,000. The 68000-based controller costs $6,000.

NCR's world headquarters is located at 1700 S. Patterson Blvd., Dayton, Ohio 45479.

IBM doubles memory on System/36 to 1M byte

X.25 support also announced

RYE BROOK, N.Y. — Besides adding to and subtracting from its line of System/38 processors last week, IBM also doubled from 512K to 1M byte the maximum main memory available on the smaller System/36.

In addition, the firm announced support for the X.25 communications protocol on the System/36 and introduced a remote cluster controller.

All System/36 configurations are available with a main memory maximum of 1M byte. The main memory enhancement is available in 256K-byte increments, which cost $2,500 each.

Disk storage expanded

The maximum amount of disk storage for the System/36 has also been expanded, from 400M to 800M bytes. The disk storage expansions are available in 200M-byte increments, costing $17,500.

Both memory enhancements will be available in May. A System/36 processor with doubled main memory and disk storage is priced at $107,600.

Further System/36 enhancements announced last week include the ability to add six extra local workstations, bringing the maximum number of local workstations to 36. That means up to 100 local and remote workstations can be added to the System/36; the previous maximum was 94.

The System/36 can be used in an X.25 network operating at 2,400, 4,800 or 9,600 bit/sec.

The remote cluster controller features an external modem adapter operating at 2,400 to 19.2K bit/sec; distributed data services operating between 2,400 and 56K bit/sec; and support for the X.21 and X.25 communications protocols. The unit costs $2,950 and will be available in May, according to the vendor.

More information is available from IBM's Information Systems Group, located at 900 King St., Rye Brook, N.Y. 10573.

Second-class postage paid at Framingham, Mass., and additional mailing offices. *Computerworld (ISSN-0010-4841) is published weekly, except: January (5 issues), February (5 issues), March (5 issues), April (7 issues), May (5 issues), June (5 issues), July (5 issues), August (5 issues), September (5 issues), October (5 issues), November (5 issues), and a single combined issue for the last week in December and the first week in January by CW Communications/ Inc., Box 880, 375 Cochituate Road, Framingham, Mass. 01701.*

Copyright 1984 by CW Communications/Inc. All rights reserved.

Computerworld can be purchased on 35 mm microform through University Microfilm Int. Periodical Entry Dept., 300 Zeeb Rd., Ann Arbor, Mich. 48106. Phone (313) 761-4700. *Computerworld* is indexed; write to Circulation Dept. for subscription information.

PHOTOCOPY RIGHTS: permission to photocopy for internal or personal use or the internal or personal use of specific clients is granted by CW Communications for libraries and other users registered with the Copyright Clearance Center (CCC), provided that the base fee of $3.00 per copy of the article, plus $.50 per page is paid directly to Copyright Clearance Center, 21 Congress Street, Salem, MA 01970.

Permission to photocopy does not extend to contributed articles followed by this symbol. ‡

Special requests should be addressed to Nancy M. Shannon, CW Communications/Inc. Box 880, 375 Cochituate Rd., Framingham, MA 01701. ISSN 0010-4841/82 $3.00 + $.50

$2.00 a copy: U.S. — $44 a year; Canada, Central & So. America — $110 a year; Europe — $165 a year; all other countries — $245 a year (airmail service). Four weeks notice is required for change of address. Please allow six weeks for new subscription service to begin.

ABP mcc

POSTMASTER: Send Form 3579 (Change of Address) to Computerworld, Circulation Dept., Box 880, 375 Cochituate Road, Framingham, Mass. 01701.

'CA-Executive' integrates software for IBM micro

Offers applications, mainframe link, multitasking, windowing

By Paul [illegible]
CW Staff

JERICHO, N.Y. — Computer Associates International, Inc. last week announced a software product for the IBM Personal Computer that integrates a range of popular applications software, an intelligent link to IBM mainframes, multitasking capability and a window manager.

Called CA-Executive, the product will be geared toward Fortune 1,000 companies in which microcomputer users are buying too many different kinds of micro software, according to Charles Wang, Computer Associates president. In a departure from its traditional sales strategy, the company will sell CA-Executive to executive end users as well as to data processing personnel.

Computer Associates is providing discounts of nearly 50% for orders of more than 50 copies of the product, whose single-unit price is $1,295.

Slated for availability in April, CA-Executive includes a data base management system (DBMS) called CA-DBMS that incorporates a command structure virtually identical to that of CA-Universe, the company's mainframe relational DBMS.

Other programs in CA-Executive include a spreadsheet (CA-Calc), word processing (CA-Writer), editing (CA-Edit), graphics (CA-Graph), forms generation (CA-Form), mainframe linkage software (CA-Link) and on-line tutorial (CA-Tutor).

Windowing allows multiple programs to be displayed simultaneously; data can be transferred back and forth between windows.

The link to the mainframe offers on-line uploading and downloading, communications with other Personal Computers on a network and terminal emulation for performing functions on mainframe applications. The software includes an intelligent file transfer capability, IBM 3270 terminal emulation, access to any subset of a CA-Universe data base and dumb terminal emulation for access to external data bases.

Security is administered by the data processing department, and invalid data cannot be transmitted via CA-Link, a spokesman said.

CA-DBMS is a relational DBMS that includes a report writer and security to the field level. CA-Writer is a version of Easywriter II from Information Unlimited Software, Inc., a Computer Associates subsidiary, that includes text and word processing, a spelling checker and electronic mail capability.

CA-Calc is an electronic spreadsheet that is integrated with CA-DBMS to allow data to be transferred between the components without reformatting. CA-Edit is a programmer-oriented tool that provides facilities for processing data, creating and editing files, writing and executing programs and generating reports.

CA-Form is a menu-driven screen painter designed primarily for creating screens, forms and reports. CA-Graph produces most standard graphs in full color. Graphs can be transferred into other windows for composite reports. CA-Tutor is an on-line tutorial that complements written documentation. PC-DOS lets any IBM PC-DOS program execute within a CA-Executive window.

When used with CA-Universe on the mainframe, CA-Executive allows users to manipulate, update and access data within CA-Universe and download a subset of the data or a new table to the micro. The window manager reportedly can be manipulated by function keys or a mouse. Utility windows include a directory, print spool, clock, notepad and Help functions.

CA-Executive is written in C on a Unix operating system with a PC-DOS translator that makes multiprocessing possible, according to Wang.

Computer Associates is at 125 Jericho Tpk., Jericho, N.Y. 11753.

IBM micro gets Unix look-alike

RYE BROOK, N.Y. — IBM announced last week that it will offer an optimized version of Bell Laboratories, Inc.'s Unix operating system for its Personal Computer and Personal Computer XT microcomputers.

The operating system, called the Personal Computer Interactive Executive (PC/IX), was adapted for use on the IBM micros by Interactive Systems Corp., according to an IBM spokeswoman. She added that PC/IX can run virtually all Unix programs commercially available for microcomputers.

The operating system is available for a one-time license fee of $900 and will be marketed though IBM's National Accounts and National Marketing Divisions.

2 Trillion

Last night we backed up two trillion (yes, that's 12 zeroes) characters of data, and checked our work.

VMBACKUP

We bring files back alive, the way they should be—readable, usable—which some "cut-rate" backup systems *don't* do. We verify the data before moving it to tape. That's why 75% of the Fortune 100 companies trust their vital data to VMBACKUP.

How do we do this?

- Start with a solid design.
- Take the best systems people in the VM community.
- Have them build it right.
- Add competent, helpful support people.
- Stay close to our customers.

And we create a winning situation for our users.

VM Software Inc.

(703) 821-6886

London • Frankfurt • Paris • Stockholm • Milan • Tel Aviv • Rio De Janeiro • Sydney • Tokyo

VMBACKUP Sounds Great!

- ☐ Call me.
- ☐ Send more information.

I'd also like information on your other products checked.

- ☐ **VMACCOUNT:** Complete online collection, costing, & reporting.
- ☐ **VMARCHIVE:** End-user initiated archive/restore to intermediate disk or tape.
- ☐ **VMSECURE:** Complete security & directory management.
- ☐ **VMTAPE/CMS:** Tape management featuring drive management, 3L-tape support, security, and audit file.
- ☐ **VMLIB:** A source library control system offering compression, **COPY/INCLUDE** cross reference, and management of the development process.
- ☐ **VMSCHEDULE:** A complete scheduling and monitoring system for end-users.

Name _____ Title _____

Company _____

Address _____

City, State _____ Zip _____

CPU _____ Phone _____

CW1-16-84

2070 Chain Bridge Road • Suite 355 • Vienna, Virginia 22180 • 703/821-6886

IBM, NAS settle case

Suit over trade secrets theft

By Jeffry Beeler
CW West Coast Bureau

SAN JOSE, Calif. — A civil suit in which National Semiconductor Corp. and its National Advanced Systems, Inc. (NAS) subsidiary were accused of stealing IBM trade secrets was settled out of court last week.

In return for IBM's promise to drop all claims against the two defendants, National Semi agreed to pay all the industry giant's legal fees stemming from the 16-month-old suit. The fees total $3 million — a pittance compared with the $750 million to $2.5 billion in damages that IBM threatened last Nov. 15 to demand from NAS and its parent company.

Last week's agreement also gave IBM the temporary right to scrutinize each of NAS' future products prior to first-customer shipment, according to an affidavit filed in U.S. District Court. The purpose of the inspection provision, which expires on Oct. 1, 1988, is to satisfy IBM that none of the company's allegedly stolen trade secrets finds its way into NAS' new processors and other systems modules.

In addition to providing an advance look at the products themselves, the defendants will be required to give IBM access to all NAS' accompanying systems specifications, users manuals, principles of operation and related materials, the affidavit said.

If the two sides disagree over whether a future NAS product incorporates proprietary IBM technology, the dispute will be referred to a three-member arbitration panel whose rulings will be binding.

The panel will consist of one representative from both IBM and NAS, as well as a chairman to be chosen jointly.

In other provisions of last week's settlement, National Semi and NAS have agreed to refrain from using IBM's trade secrets in their new product development and to return any proprietary technology they may receive in the future.

NAS: 'We're quite pleased'

Asked for his reaction to the Jan. 9 settlement, NAS President David Martin voiced relief that his company's long legal ordeal had finally ended. "We're quite pleased with the settlement," he said during a Jan. 10 interview. "The agreement bodes well for the firm's future and eliminates much of the fear, uncertainty and doubt" that IBM's suit had created in the minds of both market analysts and NAS' own customers, he said.

Although National Semi and NAS have steadfastly maintained their innocence in the trade-secrets theft case, they settled the suit anyway, because "nobody, not even the government, has the resources to compete with IBM's legal technology," Martin said.

Since its inception in September 1982, National Semi's legal wrangle with IBM had seriously tarnished NAS' image in the eyes of certain stock analysts and potential investors, Martin said. The civil suit had also prompted at least a few otherwise promising sales prospects to question the Mountain View, Calif.-based firm's viability as a systems vendor.

Roots of the case

In many respects, last week's settlement was closely patterned after a related out-of-court agreement that IBM reached on Oct. 6 with National Semi's Tokyo-based processor supplier, Hitachi Ltd., another defendant in Big Blue's civil suit. The complaint against Hitachi, NAS and National Semi stemmed from a widely publicized industrial espionage case in which two major Japanese electronics vendors were accused of conspiring to steal proprietary IBM systems technology.

To obtain the trade secrets, the conspirators reportedly paid a total of nearly $650,000 to Federal Bureau of Investigation undercover agents posing as electronics black marketers.

Hitachi later pleaded guilty to one count of conspiring to transport stolen property and received the maximum penalty under U.S. law.

In their Jan. 9 court filing, NAS and its parent company repeated their long-standing contention that neither organization had used the pilfered IBM technology, which included MVS/SP Version 2 source code and hardware designs for the 3080 system.

All the IBM product information in the defendants' possession has already been returned to its owner, the papers added.

MSA stock plunges 25% in reaction to flat earnings

By John Gallant
CW Staff

ATLANTA — Despite anticipated record revenues of $145 million in 1983, Management Science America, Inc.'s (MSA) stock plunged more than 25% last Monday, fueled largely by its announcement of flat per-share earnings and a marked decrease in the rate of profit growth in 1983.

While MSA's release of preliminary year-end figures showed that 1983 revenues would hit $145 million, up 44% over 1982, pretax profits are expected to increase only 38% and earnings to rise only 17%. That figure represents a sharp drop from the 63% earnings growth reported the previous year.

The most significant announcement, however, was that MSA anticipates 1983 earnings per share to remain at 1982's 62-cent level. It was that news that sent MSA's stock into a tailspin, dropping from $30 per share to $22.25 at the close of business Monday. At midweek, MSA shares traded at $23.

Commenting on MSA's year-end results, Chairman and Chief Executive Officer John P. Imlay Jr. said the software firm "on balance [was] pleased with the progress made in strengthening our leadership position within the industry." However, Imlay said that foreign revenues, which fell below targeted levels, and a substantial tax rate increase stemming from the "decision to treat [research and development] tax credits in a conservative manner" were problems for the firm.

In addition, MSA announced that while revenues from sales of its manufacturing software quadrupled in 1983, they were still lower than expected. According to President William Graves, manufacturing software sales, such as those for the firm's material requirements planning system, accounted for between only $4 million and $5 million, a figure "below what we wanted."

'Skittish market'

Harry Edelson, vice-president of First Boston Corp., said MSA's stock dip was indicative of a "skittish market in technology issues.

"Wall Street was looking for growth," Edelson said. "A growth company is supposed to grow, and if it doesn't, that's a big problem. When flat earnings come as a surprise, that's a warning that things could get worse. We're seeing a bear market in technology stocks right now as it is. Many are selling from one-half to one-third less than their price a year ago."

Edelson also said MSA's flat earnings might have spurred profit taking among investors.

Robert O'Connor, financial analyst for Tucker, Anthony & R. L. Day, Inc., agreed with Edelson's assessment. In addition, O'Connor cited an estimated tax increase of close to 9% during 1983 and an increase of 19% in the number of MSA's outstanding shares as factors behind the stagnant per-share earnings.

Graves said the company's failure to attain target revenue levels in foreign markets was the most significant difficulty MSA encountered last year. He cited a goal of nearly $35 million in foreign revenues, a level that MSA missed by some $7 million.

Imlay said MSA is "re-evaluating how [it] operates in certain foreign markets in order to improve profits." In addition, the firm will stress the marketing of its manufacturing and order processing products, moves which Imlay predicted would boost 1984 revenues by 35% and earnings per share to more than $1.

NAS to service Magnuson M80s

By Jeffry Beeler
CW West Coast Bureau

MOUNTAIN VIEW, Calif. — Customers who lease Magnuson Computer Systems, Inc.'s M80 series processors from Phoenix Leasing, Inc. will soon gain the option of having their hardware and software maintained by National Advanced Systems, Inc. (NAS).

In principle, NAS agreed early this month to serve as the third-party service representative for Phoenix Leasing's base of Magnuson mainframes, which are plug-compatible with IBM's medium-scale CPUs. Announced Jan. 6, the arrangement marks NAS' debut as a provider of third-party systems maintenance and support services, said NAS Director of Marketing Services Pat Case.

Under the proposed agreement, Phoenix Leasing's M80 users can request NAS' optional Total Support Package, which covers user education and software maintenance, as well as service for any model of IBM or IBM-compatible processor or peripheral. Customers also may opt instead to limit NAS' Magnuson-related support activities to hardware maintenance alone.

The service agreement also calls for Phoenix Leasing, based in Mill Valley, Calif., to give NAS access to its large inventory of M80 spare parts, Case noted.

Many of the parts found their way into Phoenix Leasing's hands from Magnuson's UK subsidiary, which recently declared bankruptcy, said Frank Juliano, the leasing company's director of technical operations.

The agreement in principle is expected to take effect formally soon, probably by the end of the month, according to Alan Cade, NAS' vice-president of strategic business services.

Juliano expects the association between Phoenix Leasing and NAS to be "phased in gradually." As contracts with the leasing company's existing Magnuson users gradually expire, the customers will be allowed to take one of two courses of action: either renew their current service agreements or transfer their maintenance and support business to NAS.

Future users of Phoenix Leasing's Magnuson systems, meanwhile, will receive their maintenance and support almost exclusively from NAS.

VAX™ USERS!
NOW GET SPREADSHEET
AND GRAPHICS IN ONE PACKAGE.
• Full business graphics • Advanced features • Affordable price
GRAPHIC OUTLOOK™
from STONE MOUNTAIN COMPUTING
1096 Cambridge Dr.
Santa Barbara, CA 93111 (805) 964-9101
VAX is a trademark of Digital Equipment Corporation

ANALYSIS

One market that's not bustling

With its introduction last week of a data base machine for large IBM mainframe environments, Teradata Corp. set its sights on a potentially plentiful market that may also harbor serious dangers.

While many of the largest software firms have explored the feasibility of data base machines in recent years, the market is notable for its lack of activity.

From a cost-efficient standpoint, the technology just has not seemed that attractive, according to Ron Ross, editor of the "Data Base Newsletter."

"The question is whether you can improve productivity enough to make up for the cost of the technology, and so far the answer has been No," Ross said in an interview last week. "Nobody wanted to get out there with a machine that would produce improvements for a year or two only to come up against improved price/performance ratios from the mainframe. IBM has kept that ratio improving so they don't come up against that kind of competition."

Invested $27 million

Teradata has invested $27 million and four years of development in the belief that data base machines are now viable, according to David Clements, Teradata's manager of product marketing.

Clements claimed the market has been weak because current data base machines "are targeted toward an area in which there's not a data base problem yet" because the data bases are relatively small.

Diminishing hardware costs and spiraling personnel expenses in recent years have underscored the importance of improving mainframe response times, Clements said. "With [IBM] IMS programmers making as much as $55,000 a year, hardware has become the cheapest concern."

'Linear improvement'

Teradata believes its data base machine will survive competition from improving mainframe technology by offering power that is based on low-cost microprocessors, which can be added as processing requirements expand. "Adding microprocessors results in a linear improvement of performance," Clements explained.

Ross said the use of a relational data base management system may make machines such as Teradata's DBC/1012 viable. "With relational systems, you're specifying a request for a whole table of data," he said. "This means the amount of communications between the data base machine and the mainframe is minimized."

A large machine of this kind could be useful to companies that are planning on distributing their data base processing, according to Ross.

DBC from page 1

spokesman said.

The computer employs a relational-model DBMS using the Teradata query language, Teqsl, an IBM SQL-like language for data manipulation, query and control.

The Interactive Query Language (Iteq) is provided for nontechnical users employing a terminal connected to the mainframe.

Relieved processing load

DBC/1012 attaches to the host on a block multiplexer channel and communicates source code with the mainframe.

In benchmark tests, according to the spokesman, the data base machine relieved the host of about 40% of the processing load in intensive data base applications.

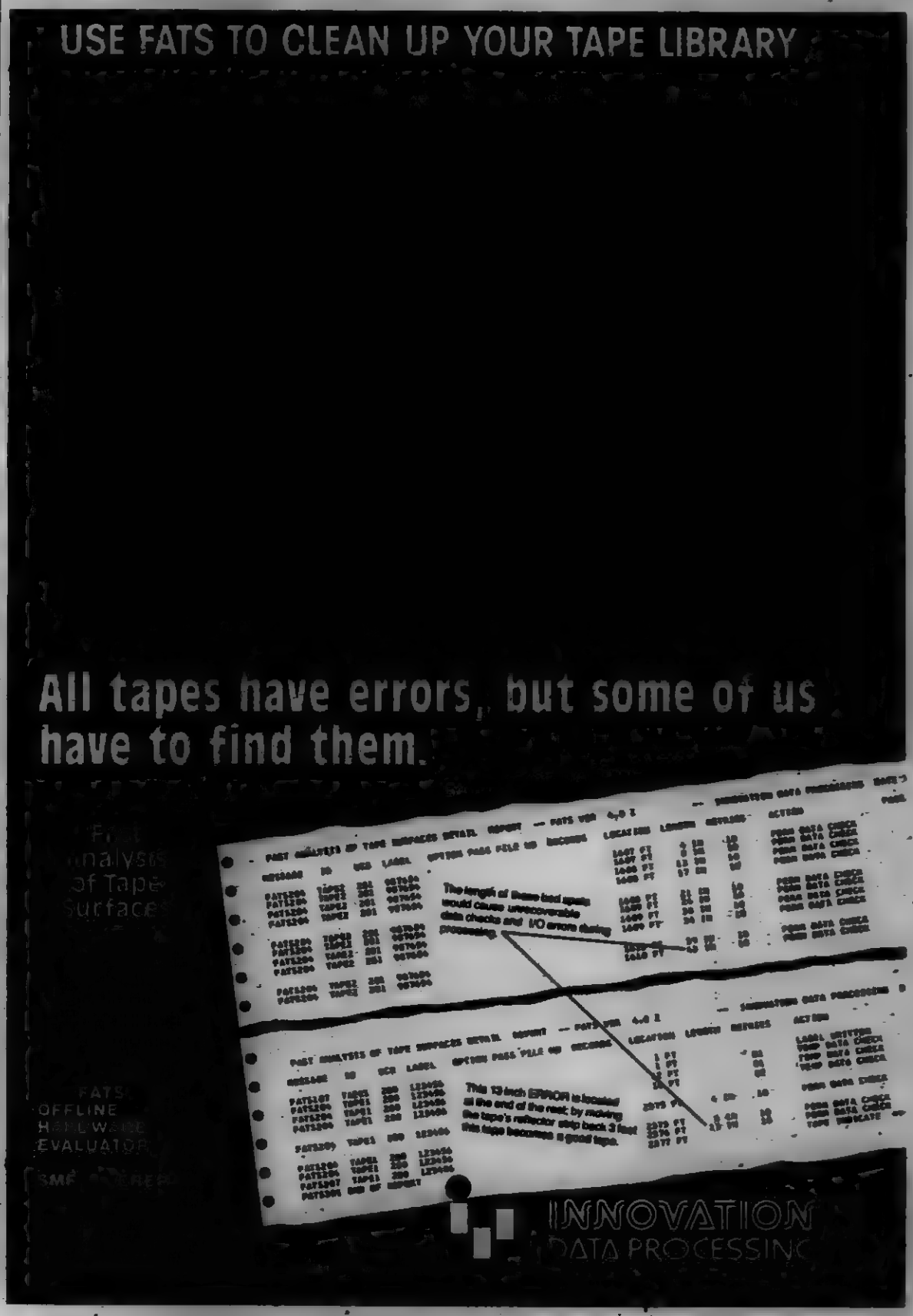
DBC/1012 will be marketed to IBM MVS sites in very large companies with data bases that approach 1T byte, according to David Clements, Teradata's manager of product marketing.

"When you get to that kind of layer, the magnitude of data base problems is tremendous," he said.

Available immediately, the basic DBC/1012 system is priced at $480,000. Add-on components are priced at approximately $60,000 per Mip and $37 per 1M byte of add-on disks, according to a spokesman for the vendor.

Additional information on the DBC/1012 can be obtained from Teradata, which is headquartered at 12945 Jefferson Blvd., Los Angeles, Calif. 90066.

Teradata DBC/1012



Lower cost, flexibility cited as CBT advantages

By Patricia Keefe
CW Staff

NEW YORK — Reduced costs and increased flexibility are the most frequently cited advantages of computer-based training (CBT), according to a survey conducted recently by RSA Information Designs, Inc., a communications and training consulting firm here.

Moreover, IBM's equipment is the hardware of choice for many current and prospective CBT users, according to "The Market for Computer-Based Training in Business and Industry — 1983," the report on the survey's results.

The report is based upon the responses of 74 people in 68 Fortune 500 firms and government agencies regarding their current and planned use of CBT. Fifty-three percent of the 74 work in DP and/or technical training, and 47% work in human resources training — predominantly in financial services, insurance and manufacturing.

Although 60% of the 68 firms polled do not offer CBT, 46% of that group plan to introduce CBT within one year and 17% within two to five years.

Of those organizations currently offering CBT, most use it primarily to provide training in DP and technical skills and in software application usage. However, they are considering using CBT to teach a wider range of topics, the study said.

For example, while product knowledge and management development topics make up about 4% of current courseware, they represent 29% of potential future offerings. Also, basic, clerical and selling skills courseware represents 8% of current offerings and 22% of possible future offerings.

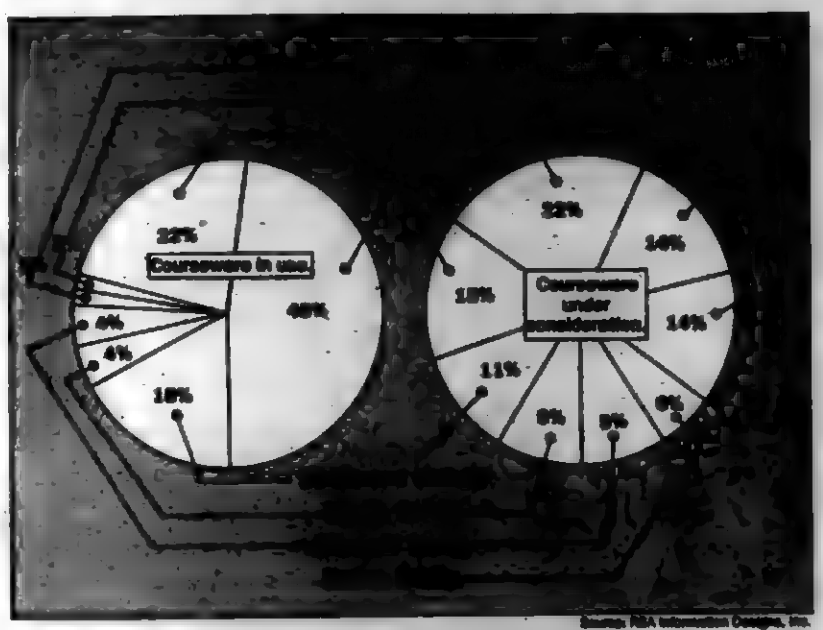
Advantages and difficulties

Among the benefits anticipated from CBT are reduced costs as a result of reduced travel to take training courses, study respondents reported. Other participants pointed to the benefits of student self-pacing and open scheduling, which they said provide flexible, accessible training.

Moreover, the study found that respondents credit CBT with fostering improved or faster learning and course-completion rates.

The greatest difficulty associated with CBT usage was focused on authoring or developing courseware (32%), the management of resources and facilities (22%) and cost (12%), according to the study.

The study found that beyond the typical courses in DP or data entry, courses in use or in the planning stages range from equipment skills training to insurance or financial product knowledge to interviewing and marketing skills. Current courseware, however, appears to include few options, the study said. Color graphics is most frequently cited (35%), followed by touch-panel input (25%). Future courses may be more interactive video; videotape (25%) followed by both videodisk and color graphics (18% each) were most frequently cited as future options.



Source: RSA Information Designs, Inc.

Of the available courseware, off-the-shelf programs were found to exceed in-house or custom-made products, representing 59% of the current choices and 57% of the planned choices. "Nonusers are overwhelmingly interested in purchasing their courseware," the study said, adding that 74% of the 23 nonuser respondents expressed an interest in purchasing primarily off-the-shelf courseware, but would consider custom-made programs as well.

Conversely, current users are looking either to author their own courses or to contract for custom-made programs.

Once purchased, these programs are most often run on microcomputers in general and IBM hardware in particular — both mainframes and micros. The study found that terminals connected to a mainframe are currently the primary CBT delivery system (51%), followed by micros (38%) and minis (11%). Micros, however, represent 36% of delivery systems under consideration for future use compared to 18% each for mainframes and minis.

Of the mainframe equipment in use today among study respondents for CBT delivery, the choice of the users polled was overwhelmingly IBM (90%). Current micro usage was found to be divided almost equally between IBM and Apple Computer, Inc. (45% each). As for possible future brand choices, IBM is the sole mainframe under consideration and the micro choice of more than half the organizations citing specific hardware (58%).

"IBM, in fact, was cited by a few firms as their possible future choice without specifically stating whether mainframe or micro," the study said, adding that only 17% of the respondents were considering Apple micros.

Not only are CBT users favoring IBM hardware, but there appears to be a trend toward using IBM-compatible authoring systems to develop or implement courseware, the report continued. The most popular mainframe authoring system in use among survey respondents (96%) was IBM's Interactive Instructional System. It and Goal Systems International, Inc.'s Phoenix were the top choices under consideration for future use.

For microcomputers, the most popular authoring system in use is Bell & Howell Co.'s Pass for the Apple (45%), but IBM Personal Computer authoring systems such as McGraw-Hill, Inc.'s Interactive Authoring System (43%) or Computer Systems Research, Inc.-developed Trainer 3000 (29%) are among those under consideration for future use. Pass was not cited at all.

The report costs $185. RSA Information Designs is located at 201 E. 17th St., New York, N.Y. 10003.

For $1750 plug into the IBM 3270 with low-cost printers.

InterLynx™/3287 protocol converter features:

- Fully compatible with IBM 3274/3276 controllers.
- Use low-cost ASCII dot matrix and letter quality printers on 3270 controllers.
- 3270 Type A coax-to-async ASCII conversions.
- LU 3 (BSC) and LU1 (SCS SNA/SDLC) modes.
- Full operator panel (including reprint).
- Front panel menu setup.
- RS-232C and Centronics interface standard.
- Pseudo-transparent data feature.

Find out why over 2,000 companies worldwide use Local Data protocol converters to expand their IBM mainframe communication capabilities.
Call today for more information. And ask about our 30-day free trial program.

Local Data
INTERLYNX™/3287

LOCAL DATA • 2701 Toledo Street • Torrance • California • 90503
Telephone 213-320-7126/TLX 182518

"Your Lynx to IBM."

Comtec meet set for Feb. 20-23

SAN JOSE, Calif. — Comtec, a nonprofit organization that supports the advancement of computer output micrographics (COM) technology, will hold its 14th annual conference Feb. 20-23 at the Westin Miyako Hotel in San Francisco.

A dozen speakers will address subjects related to COM. Arnold Keller of Hitchcock Publishing, the keynote speaker at the conference, will discuss "COM and Information Resource Management."

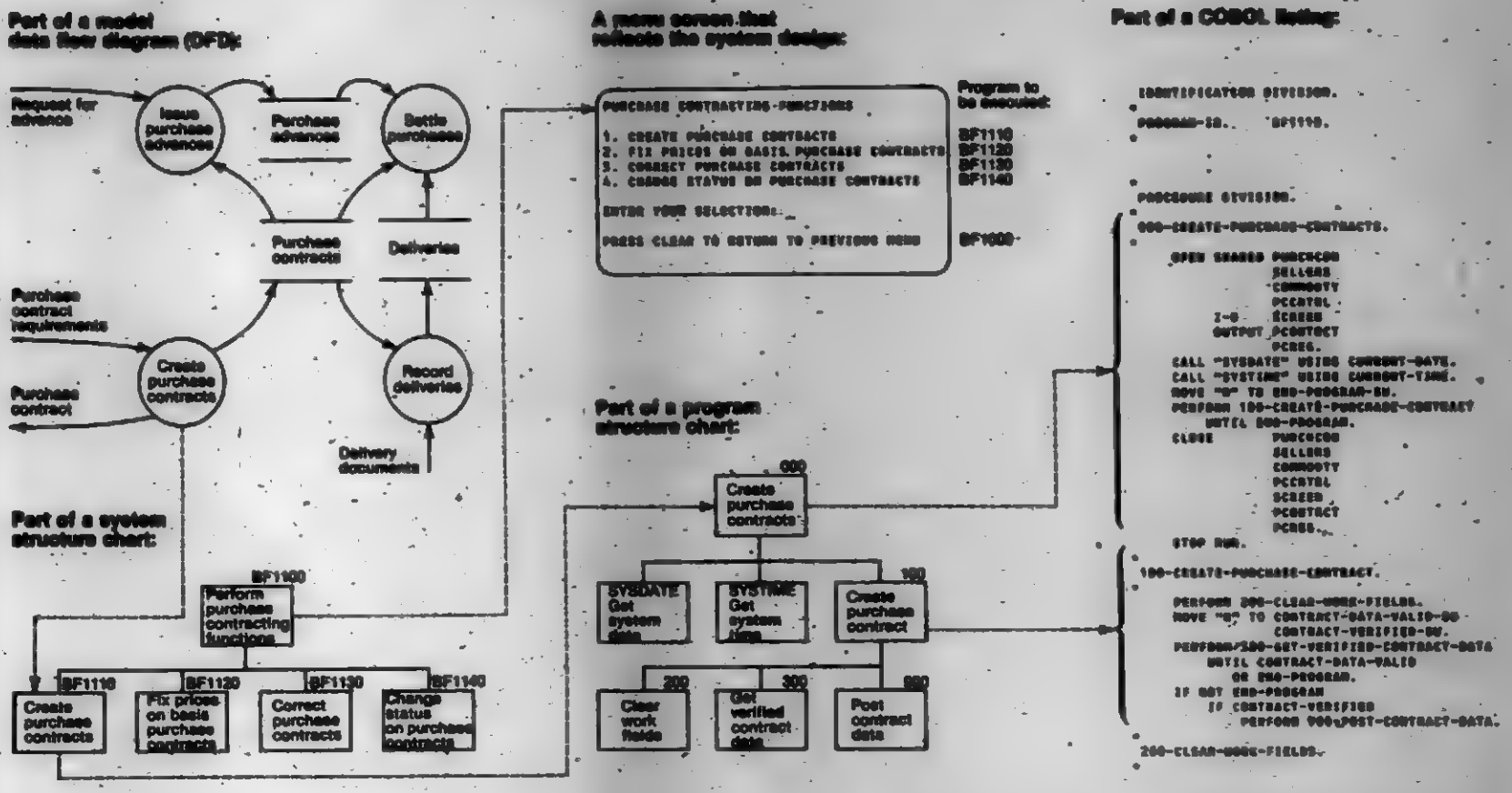
Other speakers include Kevin Fitzgerald of Bell & Howell Co., Karen Voigt of Minolta Corp., Dr. Terry Sonnonstine of 3M Co. and Michael Hughes of Rio Grande Micrographics.

Sessions at which vendors present their products and services will also be featured at the conference, and the seventh Ed Rosse Award will be presented for the most significant contribution to the COM field.

Cost for the three-day conference, including a Japanese Yomise St. Gala dinner on Feb. 22, is $295 before Jan. 20 and $320 after Jan. 20. One-day registration is $140.

Comtec can be reached at Suite 200, 100 N. Winchester Blvd., San Jose, Calif. 95128.

Does your system documentation tie together like this?



In most of the system-development methods I've seen, the system documentation doesn't tie together at all. Instead, it simply points up the shortcomings of the development methods used.

The analysis documents don't lead you into design, and the design documents don't lead you into implementation. They don't help you make the decisions that affect the success of the system the most. They focus on details instead of on critical factors. They're hard to maintain, so they aren't kept up-to-date. They don't tell maintenance programmers whether one program change will affect other parts of the system, too.

At last, a system-development method that offers some solutions

But now, I'm delighted to tell you about a development method that tackles these problems head-on. Find out how to put it to work for you in a NEW book called *How to Design and Develop Business Systems*.

You'll learn how to:

- use an 8-phase development method that takes you easily from analysis to design to implementation
- cut down on paperwork that no one else ever looks at
- create data flow diagrams (DFDs) to analyze an existing system and to model the new system (a DFD shows what data goes into and out of a system and what happens to the data in between)
- use your model DFD to figure out what data elements you need in the new system
- use your model DFD to create a system structure chart that breaks the system down into its logical functions
- use the system structure chart to create menus for interactive systems, to plan programs, and to decide which parts of the system you should do first
- make the right decisions about organizing the database or files so you save hours (or days or months) of re-programming
- get the user to find analysis and design errors early, before the corrections get expensive
- create a program overview that tells what a program must do, but lets the programmer decide how to do it
- design, code, test, and document programs so they're easy to read and maintain...even though they'll need less maintenance
- make your final documentation work as painless as possible

128,000-line interactive COBOL system analyzed, designed, coded, and installed in 12 months

I believe in this method because I've seen it work. And you will, too. The author of the book, Steve Eckols, shows you exactly how he used it to develop a complex system for a grain brokerage.

The system's entirely interactive, nearly self-instructional, and consists of about 128,000 lines of COBOL code. You can see a small part of its documentation above (these are pieces from the book illustrations).

At any rate, Steve did the system by himself, from start to finish, in a year. That averages out to more than 450 lines of tested COBOL code *per day*.

Now I know not everyone will reach Steve's level of productivity. There are just too many factors you can't control.

Still, I'm convinced you should give this method a try. After all, if it's true the average COBOL programmer produces less than 5,000 lines of tested code per *year*, what have you got to lose?

You decide which ideas will work best for you

I guess you can tell I'm sold on this method! Even so, I know it won't be the last word on system development. I also know many people can't...or won't want to...adopt it in its entirety.

So I suggest you treat this book as an idea book. Take the ideas you like (I guarantee you'll like some of them) and plug them into your existing development method. I'm convinced they'll improve the quality of your systems and cut your development time.

FREE trial and 100% guarantee

So you don't have to risk a penny, this book comes with my 100% guarantee. It must give you some development ideas you can put to work in your shop, or send it back for a full refund...*no time limit*. But first, take up to 30 days to review it FREE of charge.

So get a copy TODAY. Find out how to create reliable, maintainable systems in less time than ever before!

To order,

Call toll-free 1-800-221-5528
(Weekdays, 9 to 4 Pacific Std. Time)
In California, call 1-800-221-5527

OR Mail the coupon below

Mike Murach & Assoc., Inc., 4222 W. Alamos, Suite 101 Fresno, CA 93711 SD2/1

Yes, Mike, I want to improve system development in my shop. Please send me _____ copies of **How to Design and Develop Business Systems** at $20 each. I must be completely satisfied, or I'll send them back at any time for a full refund.

☐ Bill me for the books plus shipping and handling (and sales tax in California).
☐ Charge my _____ Visa _____ MasterCard:
Card number _____ Valid thru (mo/yr) _____
Cardowner's signature _____
(not valid without signature)
☐ I want to SAVE shipping and handling charges. Here's my check or money order for full payment. Calif. residents, please add 6% sales tax to your total. (Offer valid in U.S.)

Name & Title _____
Company _____
Address _____
City, State, Zip _____

Mike Murach & Associates, Inc.
4222 West Alamos, Suite 101 • Fresno, California • 93711 • (209) 275-3335

Congressman: U.S. shouldn't plan tech development

But should foster high-tech innovations

By Peter Bartelt
CW Staff

PALM SPRINGS, Calif. — The U.S. government should not get involved in planning technological development, but it should make things easier for private enterprise to develop new innovations, according to U.S. Rep. Ed Zschau (R-Calif.).

Speaking here at Infocorp's 1984 Strategic Issues Conference last week before a large group representing a wide segment of the information processing industry, the first-term congressman said heightened government interest in the development of high technology "is a mixed blessing."

While many good ideas have been suggested in Congress, "a lot of bum ideas get suggested, and some of them will pass."

Formerly a professor at the Stanford Graduate School of Business before starting his own company, System Industries, in 1968, Zschau said there is a role for government to play in fostering innovations. But proposals to establish a national planning council to target tax dollars toward identified opportunities are "naive," he said.

Equally misguided, in Zschau's view, are suggestions "to put all the dollars into sunrise industries and forget about all those smokestack industries." While high tech will create millions of jobs, the number "is still relatively small" in comparison to the number of people employed in more traditional industries, he explained.

Don't ignore older industries

Older industries should not be ignored, and efforts should be made to apply the new technologies to make the others more efficient, Zschau suggested. Government should become involved in those new industries, he said, but not by targeting which new technologies should be fostered.

"What we should be doing, in my opinion, is targeting the process by which those innovations are created," he said.

Government's role should be to make sure a climate for innovation exists by implementing four prerequisites that would allow companies to develop new innovations, Zschau said. These prerequisites include:

■ A commitment to broad research, not just in the area of military applications. One method, he said, is to amend antitrust laws to permit corporations to pool "scarce" resources for R&D. "I think by the end of the year we will have changes that permit consortia . . . to enable us to compete in foreign countries with consortia that have long been encouraged."

■ Incentives for industry to take risks on new ideas. Zschau noted that reductions in the federal capital gains tax have dramatically increased the availability of venture capital. He recommended expanding R&D tax credits to cover software and to implement "intellectual property protection" so companies do not fear their investment in new ideas will result in others reaping the profits.

■ The encouragement of an adequate supply of trained technical personnel. "Japan, a country half our size [in population], turns out more engineers a year than we do. Now, we've got the Japanese beat when it comes to lawyers and accountants." Educational institutions need financial assistance to obtain enough faculty and equipment; "the private sector can help . . . but government can give a nudge here, too."

■ The development of market opportunities. The government, Zschau said, must knock down foreign trade barriers and also ensure that U.S. export controls "are designed in a way so we can control, but we can also export."

There must also be a robust domestic market, Zschau said, adding that he thinks the increasing federal deficits must be brought under control to ensure the current recovery does not run out of steam. He said the issues of raising taxes and cutting spending must be depoliticized.

Zschau concluded that it is not the government's responsibility to maintain technological leadership in world markets. "It is your responsibility," he told the audience of industry representatives.

BOWL from page 1

However, Washington gives up too many yards per pass attempt, a critical weakness in the forecaster's estimation.

"The Raiders are strong against both the running and passing games," he pointed out. Los Angeles gives up 5.4 yards per pass attempt as opposed to 6.3 for the Redskins. In Goodean statistics, that one-yard differential translates into a three-point edge for Los Angeles.

It all sounds very concise, but as Goode is quick to observe, "There's no way you can beat the line."

Howard, a betting man, is editor of Computerworld on Communications.

MAKE YOUR VAX DANCE

The QUICKSTAR™ family of VAX utility programs increases speed, efficiency and user enjoyment. QUICKSTAR includes:

- QUICKSTAT™ for interactive system status monitoring
- QUICKTALK™ for speedy inter-terminal communication
- QUICKCHANGE™ for username switching with no manual logout/login

Name _____
Title _____
Company _____
Address _____
City _____ State _____ Zip _____
Phone ( ) _____

SEND COUPON NOW FOR COMPLETE DETAILS!

STI Signal Technology, Inc.
5951 Encina Road, Goleta, CA 93117 (805) 683-3771 Outside California call toll-free (800) 235-8787
TWX 910-334-3471

VAX is a trademark of Digital Equipment Corporation

4th Generation Language for the Personal Computer

NPL® The NonProgrammers NonProcedural Language

The NPL Information Management System lets an end user build applications without becoming a programmer.

In less than one day, you will:
- create database files of your own
- specify edit and validation tests
- 'paint' data entry screens
- select, sort and merge data records, and
- print simple and formatted reports

NPL is available on the following microcomputers: IBM-PC® & IBM-XT®, Apple® II & III, DEC Professional® 350 & Rainbow® and the Sage II ...soon on Victor® 9000, Burroughs B20, Hewlett Packard 9816.

If you like RAMIS II®, FOCUS® or NOMAD2® on big mainframe computers, you'll love NPL on a microcomputer... the strong language similarity means zero training time.
The NPL System is an essential tool for your company's INFORMATION CENTER.

All for only $950!

For more information, contact our Customer Services at 609/924-7111 or write:

Desktop Software Corporation
228 Alexander Street, Princeton, NJ 08540

IBM PC & IBM XT are registered trademarks of International Business Machines, Inc., Apple II & Apple III are registered trademarks of Apple Computer Inc., DEC Professional & Rainbow are registered trademarks of Digital Equipment Corporation. Sage is a registered trademark of Sage Computer Technology. Victor is a registered trademark of Victor Technologies, Inc. RAMIS II is a registered trademark of Mathematica, Inc., FOCUS is a registered trademark of Information Builders, Inc. NOMAD2 is a registered trademark of D & B Computing Services, Inc.

IBM multiuser micro forecast — without Unix

By Peter Bartells
CW Staff

PALM SPRINGS, Calif. — IBM will probably bring out a multiuser microcomputer system sometime early this year, but it won't use the Unix operating system.

That was the prediction delivered here last week to a large group of industry representatives attending Infocorp's 1984 Strategic Issues Conference.

Infocorp President Richard J. Matlack predicted IBM will announce a multiuser system sometime during the beginning or middle of the year. "IBM is going to bring out an [Intel Corp.] 8086 multiuser system," he forecast. "It will be a proprietary operating system, a superset of [Microsoft, Inc.'s] MS-DOS."

Unix is a great operating system for some uses, but not for commercial data processing, Matlack said. But it is notable that Unix was developed by AT&T, which could be IBM's biggest competitor if it comes out with an expansive line of computer products, as many expect.

IBM may announce the anticipated multiuser micro earlier than the company would like in order to meet those competitive pressures, according to Ralph A. Gilman, senior vice-president of Infocorp and head of the company's Microsystem Analysis Group. "If I were IBM, I'd probably want to wait another year; but competitively, their hand might be forced," Gilman said.

Companies that have entered the multiuser battle scene experienced a disappointing year in 1983, according to Infocorp. "Clearly there is no leader in this market," Gilman said. "It's ripe for a leader to step in — IBM, AT&T."

According to Infocorp, a lot of potential multiuser system buyers settled for microcomputers that could be linked together.

There is a lack of software standards and a lot of confusion among buyers, according to Gilman. "The market really hasn't given us an indication where they are going to turn. Maybe IBM will."

Functionality needed

The criteria for spurring the market, in Gilman's view, is "a data base/file server functionality." Users "want to attach dumb terminals to the system, but also to attach personal computers in a network."

The problem has been that "nobody really wants to take the lead in developing software to make this happen. Nobody wants to spend the money," Gilman said. "It might be an opportunity for some of the mini vendors who have the software to step in."

A number of strategic problems face micro vendors, Gilman said.

One is the entry fee for bringing a new product into the market. The cost of doing that will again escalate this year, he said, costing from $50 million to $100 million. Driving those costs are running hot lines to answer users' questions, waging "warranty wars" to bolster confidence in products, operating product centers, providing training and service and purchasing national advertising that can run $20 million and up.

Another factor is the lack of shelf space. Computer stores presently have about 8,000 shelf slots to exhibit micros, but only 2,000 of those spaces are available to new products.

"A lot of people are taking a second look at direct sales, particularly for multiuser systems," Gilman said.

There is a similar lack of access to big business decision makers, he added. "The big market, the Fortune 1,000 corporate manager, more and more is going to the internal information center and trying things out. It's a nonthreatening type of environment — they're not looking over his shoulder."

Hotel fire prompts regulations

BOSTON — Four days after an electrical fire shut down both the regular and emergency power systems at the Westin Hotel here, a state panel passed regulations requiring isolated, fire-resistant emergency electrical and communications systems in new high-rise buildings.

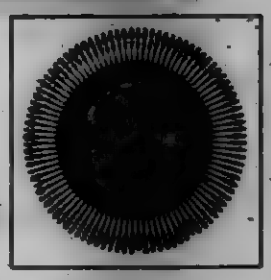
The Mass. Board of Fire Prevention passed the emergency regulation, which could become permanent after a Feb. 3 public hearing. A Boston electrical inspector suggested the rule after the Jan. 2 fire disrupted the 37-story Westin's emergency power and communications network. That outage left most of the hotel unlit and without a public address system as 120 guests and several hundred employees fled through smoke; 66 people were injured.

Although the Westin fire knocked out most power, the data processing department, equipped with a dedicated emergency power supply, lost electricity for just minutes [CW, Jan. 9].

The new regulation requires new buildings over 70 feet tall to isolate emergency cables from the primary cables by placing the emergency system in a separate shaft. That shaft and the cable coverings must be able to withstand fire for four hours.

Heavy duty.

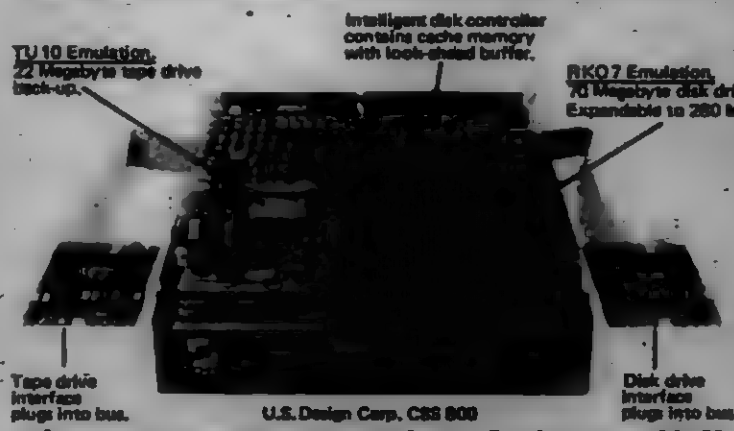
If you can't afford printer downtime, pick the ones designed to take all the punishment you can dish out and still keep printing. Our 35 and 55 character-per-second daisywheels print sheaves of crisp, sharp letters at doubletime, with never a moan or groan. Call your distributor. Or contact Dataproducts at (213) 887-3924. 6200 Canoga Avenue, Woodland Hills, CA 91365. In Europe, 136-138 High Street, Egham, Surrey, TW20 9HL, England.



Dataproducts Daisywheel Printers

Attention DEC Mini/Micro Users:

Let MTI show you how U.S. Design's compact storage system can cut access time by up to 90% and give you the most megabytes for your buck.



It's plug compatible with LSI-11, PDP-11 and VAX, and supports RSX-11M, RSTS/E, RT-11 and DSM.*

MTI is an authorized distributor for U.S. Design Corp. Our expert field sales engineers provide on-site consultation to show you how this 42-pound desktop (or rackmount) storage system can increase error-free throughput for you.

Whether you buy, rent or lease, you'll find MTI is the one source for all the terminals, peripherals, systems, applications expertise and service you'll ever need. At good prices. Call MTI today and save.

New York: 516/681-6200, 212/767-0677, 518/449-5959
Outside N.Y.S.: 800/645-6530
New Jersey: 201/227-5552
Ohio: 216/464-6688

mti

Applications Specialists & Distributors, New York, New Jersey and Ohio. DEC, Intel, Texas Instruments, Altos, Lear Siegler, Dataproducts, Diablo, Epson, Intecolor, Racal-Vadic, MICOM, Digital Engineering, U.S. Design, Cipher, Protocol Computers, MicroPro, Microsoft, Polygon and Selsat.

* Registered trademarks of Digital Equipment Corp.

Atari founder heralds the unorthodox for innovation

By Peter Bartelik
CW Staff

PALM SPRINGS, Calif. — "If you really want your people to innovate, buy a science fiction book, take the cover off and tell them it's history," Atari, Inc. founder Nolan K. Bushnell declared here last week during a conference for information industry representatives.

Delivering the keynote address at Infocorp's 1984 Strategic Issues Conference, Bushnell praised the unorthodox and sparked much laughter from an audience of more than 200 people representing vendors, various entities in the product distribution chain, representatives of large end-user organizations and others.

Claiming, partly tongue in cheek, that innovation is another word for concealing sources, Bushnell said, "The future is not totally dependent on innovation. Most of the ideas are out there. Just read science fiction; most of the things they write about are going to come true."

Now chairman of Catalyst Technologies, a venture group that has "figured out a way to mass-produce small companies," Bushnell praised the potential for innovation among individuals and urged the participants to foster individual experimentation.

"To throw wagonloads [of people] at projects is the most oft-repeated mistake of American big business," he charged. Also, he said, "It's not axiomatic that a person who can see the future is necessarily articulate enough to explain his vision to you."

Bushnell developed the Chuck E. Cheese's Pizza Time Theatre concept, which features robotized animal characters and which, he said, may develop into robotic delivery of pizzas by the end of the year. He expressed his feelings on robotics to illuminate his views on innovations.

Robots will 'do windows'

Many believe robots will eventually be a standard feature in homes, "yet, the amount of cynicism and skepticism is overwhelming." He continued, "Then the questions is, what will [robots] do? They do windows."

Bushnell noted that Americans in 1982 spent $8.2 billion on pet food alone and that there is potential for robotics to capture at least some of those dollars. "Fido . . . [is] basically an entertainment device. . . . It's easy to have them detect smoke and fire and take appropriate action."

The point, he said, is that technological innovators "must be willing to enter a novelty. There's nothing immoral, fattening or bad for you [in that]; not everything has to have utility."

In the microcomputer area presently, he declared, there is little that is innovative and much that is merely further development, such as the Personal Computer-compatibles of the "commodity" that is the IBM Personal Computer. "Real innovation comes when you take marketplaces that have not previously existed and do something. Having a product that didn't exist means people aren't used to it, which means you might not have [an identifiable] use for it."

The information revolution has created the need for development of high-tech innovations in the leisure industry, as machines take over the roles of people, he said. He suggested that innovators should look to those areas: "Being willing to go after fun can be a really nice way of finding places to enter."

In addition to encouraging businesses to allow very small groups — one to three people — to work on projects, Bushnell also said he believes in setting time constraints and setting goals. "My theory is that 25% of the technological [gross national product] of the U.S. is created 24 hours before a trade show," he said. "The U.S. has more innovations than the Soviet bloc because of trade shows."

In a more serious vein, he declared that "the business of innovation is one of a philosophy of belief in the individual."

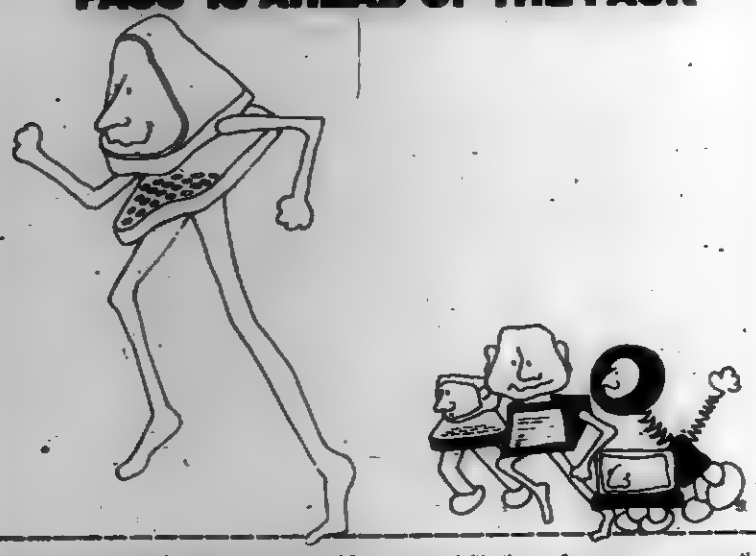
Report details mini purchases

CHERRY HILL, N.J. — Management Information Corp. (MIC) has published "How Small Businesses Use Computers," a report that describes minicomputer purchasing processes completed by 26 companies in various businesses, such as a nursing home, a furniture manufacturer and a trucking company.

MIC interviewed company officials responsible for recent minicomputer purchases. The report includes systems selected, purchasing criteria, financial considerations and system implementation, the publisher said.

The 87-page report is priced at $11. More information is available from MIC, 140 Barclay Center, Cherry Hill, N.J. 08034.

FOR VAX™ RESOURCE ACCOUNTING, PACS™ IS AHEAD OF THE PACK



The competition isn't even close. PACS is so good, it's the only resource accounting package in DEC's™ EAS library. Here's why:

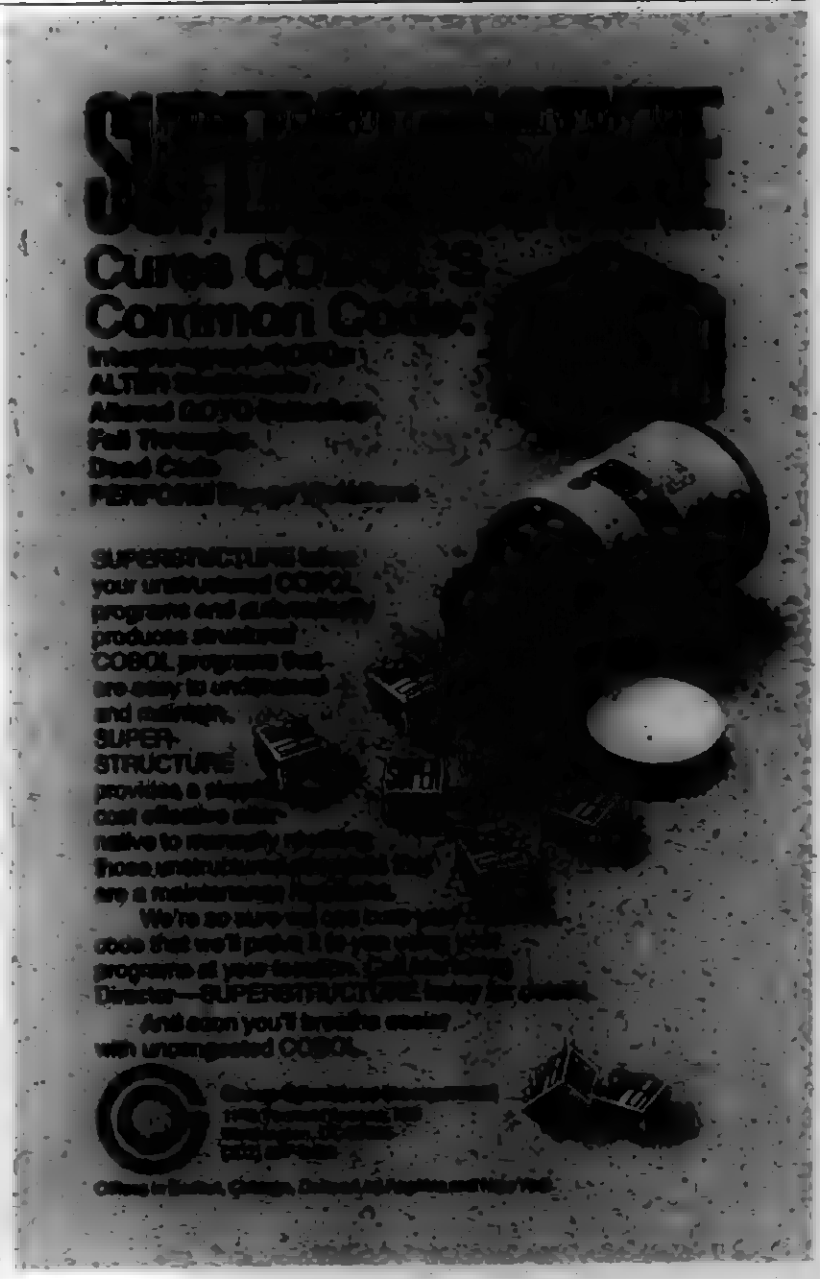
- Flexible billing algorithms
- User budgeting and port speed accounting
- EZLOG™ for true 3-level reporting by account, project and user

Name _____
Title _____
Company _____
Address _____
City _____ State _____ Zip _____
Phone ( ) _____

SEND COUPON NOW FOR COMPLETE DETAILS ON ALL THE PACS BENEFITS.

STI Signal Technology, Inc.
5951 Encina Road, Goleta, CA 93117 (805) 683-3771 Outside California call toll-free (800) 235-5787
TWX 910-334-3471

VAX and DEC are trademarks of Digital Equipment Corporation



There's life after IBM: market researcher

By Peter Bartelik
CW Staff

PALM SPRINGS, Calif. — Not only is there life under IBM for other computer vendors, there may even be life after IBM, according to a market research firm that hosted a conference here last week for industry representatives.

Richard J. Matlack, president of Infocorp and host of the company's 1984 Strategic Issues Conference, looked far beyond the five-year analyses promised to representatives of many industry segments. He warned participants that rapid innovations in the information processing industry would eliminate their present functions and inspire vast structural dislocations before the end of the century.

"I think companies like IBM that have been around for a long time will either voluntarily or involuntarily break themselves up into new relationships," Matlack predicted.

As the industry progresses from information processing to knowledge information processing, "the old rules" of doing business will no longer apply: "If machines can design hardware better than hardware designers, why do we need hardware designers? If machines can program better than programmers, why do we need programmers?"

While admittedly "crystal-balling," Matlack repeatedly said he believes the next stage of computer technology has already arrived. The industry has already started the shift from Mips — millions of instructions per second — to Lips — logical inferences per second, he said.

Companies like Digital Equipment Corp. and General Electric Co. have designed expert systems that "do better jobs than the individuals training them to do those jobs," he added.

Matlack warned industry players to look ahead and look beyond the obvious. "We're kind of like dinosaurs tiptoeing around the tarpits. I'm afraid we're going to fall in." The reason for that fear is that the present state of technology has made available "too much information, but not much knowledge."

The delivery of knowledge to end users will be what drives the industry through the next 25 years, Matlack claimed. But the cost of bringing new products into the market has in the past year or two already become much more expensive, he said during a review of Infocorp's current five-year projections.

"Today, to get into the micro business, it takes $30 million to $50 million," Matlack said.

Microcomputers are where the action is now and in the next few years, according to Infocorp's projections. "By 1988, this new industry, which is only seven years old, will actually generate the majority [dollar-value share] of systems shipped," according to Matlack.

While IBM presently dominates, other big players such as ITT and AT&T will carve up the market so that no one company can overwhelmingly dominate, Matlack said.

Opportunities presently exist for companies that can bring practical uses to the consumer computer market, he added.

According to Infocorp Vice-President Ralp A. Gilman, "By 1988, over two-thirds of [microcomputer] units sold will be priced under $1,000." In dollar terms, he added, by 1988, micros in the $1,000 to $6,000 price range will represent half of all micro shipments.

Large computer systems, priced over $350,000, won't disappear, according to Matlack, and in fact should experience rapid technological development. "Eventually, large systems are going to link all your micro systems," he said.

"They are not going to go away, they just won't be as dominant as they once were," he added.

Small systems, priced from $25,000 to $350,000, have seen the market slow considerably, but there are still opportunities for innovative companies such as those presently selling fault-tolerance, computer-aided design and manufacturing and transaction processing, Matlack said.

Common conference set for April

CINCINNATI — Common, the organization of users of IBM equipment ranging from the Personal Computer to the 4300 series processors, plans to hold its spring '84 conference at the Convention and Exposition Center here April 1-5.

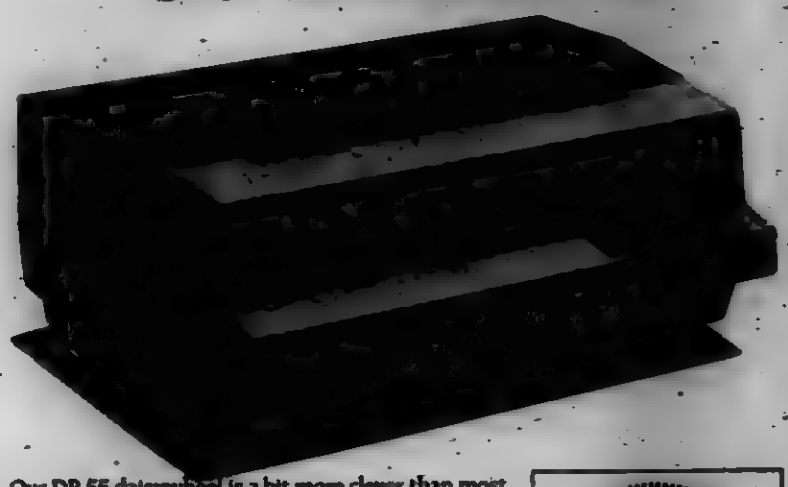
The conference will feature 200 seminars covering such topics as management, hardware and applications.

Among the scheduled seminars are "Performance Appraisal," "Dealing with Problem Employees," "Office Politics," "Job Stress and Burnout" and "How to Introduce New Technology Into Your Firm."

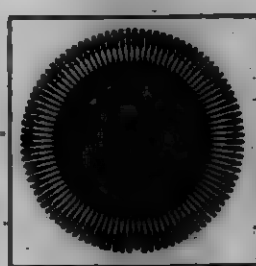
The conference costs $100 for members who prepay, $130 for members who register the first day of the conference, $160 to nonmembers who pay before the conference and $180 for nonmembers registering on the first day.

Information can be obtained through Administrative Director, Common, Suite 1717, 435 N. Michigan Ave., Chicago, Ill. 60611.

Brighter writer.



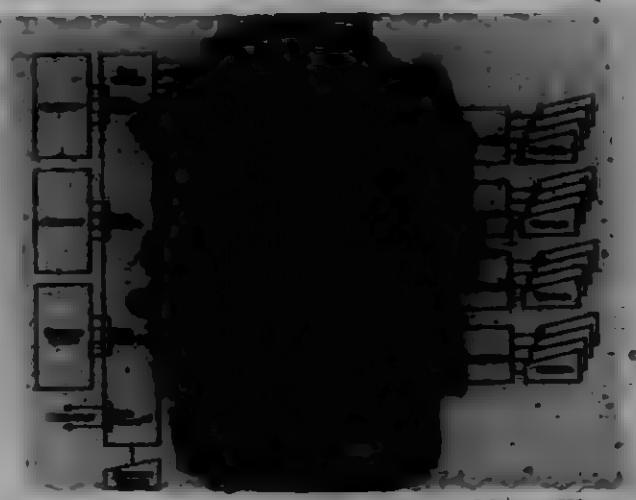
Our DP-55 daisywheel is a bit more clever than most. A digital status display tells you what it's doing as it prints, and how you can help when it doesn't. It can save you time and money, and that's just plain smart. Call your printer distributor. Or contact Dataproducts at (213) 887-3924, 6200 Canoga Avenue, Woodland Hills, CA 91365. In Europe, 136-138 High Street, Egham, Surrey, TW 20 9HL England.



Dataproducts Daisywheel Printers

Attention DEC Mini/Micro Users:

Take advantage of the MTI/Racal-Vadic/MICOM connection.



We are experts at configuring and installing data communications networks on DEC systems.

MTI is an authorized distributor for Racal-Vadic, MICOM and DEC. And we know our products inside out. We sell, rent and lease acoustic couplers, modems, line drivers, multiplexors, port selectors and all DEC terminals. We supply cables, switches, and all the rest. What about price? You'll find we're very competitive. Call us today.

New York: 516/621-6200, 212/767-0677, 518/449-8989
Outside N.Y.S.: 800/645-6530
New Jersey: 201/227-5552
Ohio: 216/464-6688

mti

Applications Specialists & Distributors, New York, New Jersey and Ohio. DEC, Intel, Texas Instruments, Altos, Lear Siegler, Dataproducts, Diablo, Reprit, Intecolor, Racal-Vadic, MICOM, Digital Engineering, U.S. Design, Cipher, Protocol Computers, MicroPro, Microsoft, Polygon and Select.

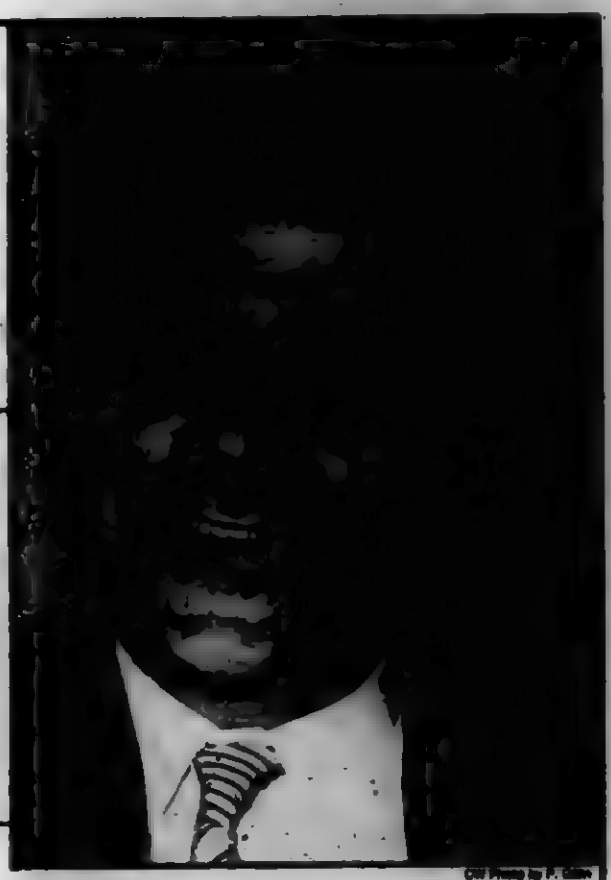
Ada's year of reckoning

Insights offered by its chief designer

Nineteen eighty-four should be the year of reckoning for the Ada programming language. The U.S. Department of Defense (DOD), which commissioned Ada in 1974 in an effort to standardize its development work, has directed that all major DOD projects begun after January 1, 1984, must be programmed in Ada.

The language has been the subject of much scrutiny and debate in the data processing community, which may eventually have to deal with the issue of scrapping millions of programs to conform to a government-imposed language standard. Ada detractors say the language is complex, difficult to learn and largely untested. Supporters say Ada's portability and technical elegance will more than make up for the inconvenience of converting existing software.

Jean Ichbiah, president of Alsys, S.A. of France and chairman of the board of Alsys, Inc. in the U.S., was the chief designer of Ada while at CII-Honeywell Bull in France. His new company markets Ada compilers in Europe and is preparing to enter the U.S. market with microprocessor-based Ada compilers later this year. Ichbiah was recently interviewed at Alsys's offices in Waltham, Mass., by Computerworld Senior Editor/Software Paul Gillin.



Ichbiah

CII Photo by P. Glinn

According to the Department of Defense (DOD), all mission-critical applications should now be developed in Ada. Is that actually the case?

We have no reason to believe the contrary. The important thing is that DOD is actually starting to design in Ada. They don't need a compiler to start with, but they need to be sure that they will rendezvous at the correct time with an operating compiler.

They have at least one year available to them before they need an Ada compiler actually operating on these machines, a year and a half before they need a good compiler and probably two years until they need an excellent compiler.

How there been the level of interest in Ada from the business community that you had expected to see?

I strongly believe that when we come up with the compilers, the language is so much better than anything else that the use of it will spread very fast. So it's no surprise to me at this stage that [the business community is] not crying out for compilers. Once they have them, they will use them.

The approach DOD is taking to promoting the language is beyond my wildest dreams. If you want a point of reference, in 1971 on PL/I, you had about three books available and that was for a language defined in 1964, with the first compiler available in 1968. On Ada you already have 50 to 60 books. It's a milieu of culture that's developing, in which a consensus creates a consensus and so on.

How do you respond to the argument that instead of Ada, we should standardize something we already know, like Cobol?

Languages like Cobol and Fortran are not bad languages, but they were good languages designed for a time when the cost of hardware was exceedingly high. We've come to a different time in which we know that we can ascribe many more tasks to the computer. For example, an Ada compiler is going to do a lot more checking than a Fortran compiler or a Cobol compiler.

We've also come to a culture where we're asking a lot more from computers. We are giving them tasks for which reliability is essential, and, therefore, we give much more value to program reliability. This is not something that we could achieve with previous language technology.

What impact do you think the Ada initiative will have on other DOD language development plans? Is it intended to be a complete language for DOD projects in the foreseeable future, or do you think it will be an evolutionary language?

I think within DOD they will use Ada and try to do other things with packages merged into Ada, rather than through new languages. Ada has a very powerful concept we call a "package."

In the past, if you wanted to do work on matrices, there was no other way than having a special feature called "matrix" in your language. With Ada, if you want to define matrices, you don't have to change the language. You just define a package that you call "matrices," in which you define what is a matrix and what are the operations you want to do.

The beauty of these mechanisms is that they don't require any changes to the compiler.

How important to Ada's success is the issue of portability?

One important thing DOD has done that has given a lot of credibility to the Ada effort is ensure that Ada means the same things to all people using it. In the past, a language was defined, compilers were developed and several years later they started standardizing it, and then years later they thought about a validation facility. That was like shooting first, aiming after and thinking finally.

With Ada they've done the things in the right order. There was the language definition, then they developed the standard for the language, then they developed a validation facility and then finally compilers. It's the first time compilers have appeared that could be validated against a standard.

Another important thing is that they have to revalidate every year to be called Ada. You can't sell an Ada compiler unless it's validated.

How do you avoid a "Tower of Babel" effect created by many vendors implementing their own versions of the language?

Several companies, including our own, are using an approach that will simplify the portability of Ada compilers. We're restructuring our compiler in such a way that we can distinguish two main logical parts.

The part that we call the root is machine independent and represents about 80% of the work that needs to be done. Now, this part translates into an intermediate language. This is taken over by a code generator, and the code generator translates it to object code. It really means that when we are attaching another machine, we only need to do the 20% part that is machine-specific again. We don't need to do the root.

The primary criticisms that are leveled at Ada are that it's too complex and that it contains too many elegant features which are useful only in a limited sense. How do you respond to that criticism?

First of all, you can teach Ada by stages. For instance, if you don't need the real-time feature, you don't have to learn it. The second response is that this kind of complexity is very subjective. The experience we've had is that once people learn Ada, they find it extremely easy to use.

Suppose someone provides you a very small language, which is simple and solves a part of a problem, but leaves you needing other tools to solve the rest of the problem. Have they made your problem simpler? No.

Ada has taken a realistic attitude that our aim is to solve problems, not only one facet of the problem, and if we judge complexity, we should judge the complexity of the complete resolution of the problem.

A third line of response is that much of this complexity accusation has come from a certain part of the academic community. Their claim was based on the document that defined the language. Now let me use an analogy. If you had a theater and you saw the design documents for the theater, they show all the wiring, all the concrete and such. If these documents are not complex, the theater is not going to do its job.

I think the comparison applies well to Ada. We can teach it to professionals in a matter of days. Thereafter, if they use their intuition, they find the correct answers, very much as you don't need to remember the plans of the theater in order to find your seat.

What will it take in the end to convince the skeptics that Ada is here for the long term?

When our compilers are available on the [Intel Corp.] 8086 and the [Motorola, Inc.] 68000 [microprocessors], then people will be pressed to make a choice. If they have to do the applications, I don't see why they would do it in Pascal or C rather than in Ada.

The reason we're not expending any effort trying to convince skeptics is that they have the right to be skeptics until they get a compiler in hand. When they have a compiler that runs, the situation will be quite different.

NEWS

French user gives ADE credit for new business

1ST USER

By Susan Blakeney
CW Staff

ORLY, France — The first commercial European user of the Data General Corp./Bolsa Corp. Ada Development Environment (ADE) says it has won a string of new accounts since it implemented the system last fall.

ADE is comprised of Bolsa's Ada software and DG's family of Eclipse superminis. The multiuser Ada Work Center systems are intended for developing, testing and debugging Ada applications (CW, May 9).

ADE's first European user is Informatique Internationale, which specializes in applications development for aerospace projects, nuclear energy and oil exploration. Informatique Internationale is a subsidiary of the major French software and systems house Groupe Cisi.

Informatique Internationale's president, Guy Canevet, said ADE has been critical to getting new business in the space and research industries, including contracts with the French Space Agency, the European Space Research and Technology Center, Aerospace and Electronic Serge Dassault and the French Institute of Statistics. "These accounts would not have been possible without the new product," Canevet maintained. "For example, the computer center at the National Scientific Research Center at the University of Montpellier [in Montpellier, France] can connect terminals directly to our computer to run Ada development programs. We have contracts from other customers who simply want experience with Ada."

The DG/Bolsa Ada compiler was the first commercial compiler to be validated by the U.S. Department of Defense's (DOD) Ada Joint Project Office in June 1983. Ada, the standard programming language trademarked by DOD, is expected to become the single most common computer language for all branches of the American military by 1986.

The general response to ADE at Informatique Internationale has been very positive, according to Canevet. "We have been able to make tools for developing other software with it . . . We have created a version of a testing language [Atlas] that allows hardware testing. We're quite pleased and hope our success will continue."

Similar in structure to Pascal, Ada is considered particularly well suited for real-time applications requiring concurrent processing. As demonstrated by Informatique Internationale, the characteristics of Ada are also beneficial in commercial, industrial and scientific applications.

Canevet first heard of the ADE product at a seminar early in 1983 and contacted Bolsa shortly thereafter. Until then, Informatique Internationale had used a system it had developed itself. "It was a top-down methodology using a series of graphs. But then for a more detailed analysis, we had to use something else . . . We had developed an extended version of Fortran with real-time capabilities," Canevet recalled. "The whole process took too much time . . . We needed more sophisticated software engineering tools."

The decision to go with ADE was made in June. Even though comparative shopping was not possible, Canevet said the combination of Ada with a high-quality development environment was very attractive.

"We would have liked to make an industrial comparison of products, but there were no other ones available," he lamented. "And as far as I know, it's still the only one out there."

Informatique Internationale sent two staff members to Bolsa's Santa Clara, Calif., training center for a week. Upon their return, they trained the rest of the company's applications development team. The software was installed in September at company headquarters here on an eight-user DG Eclipse MV/4000 system configured with DG Dasher terminals.

When asked if the new application development environment has visibly hiked productivity, Canevet said it is too early to tell. "We are now developing one part of a new ground station for a satellite using ADE. We're still experimenting with it."

As proof of its satisfaction, Canevet said, the company is upgrading its DG MV/4000 minicomputer to the DG MV/10000 supermindcomputer in March. "We need more power because of all the new business that's developing," he explained.

Report eyes computer tax breaks

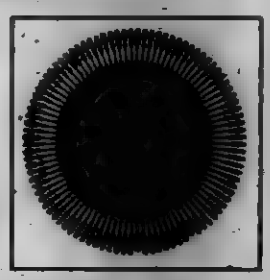
PRAIRIE VILLAGE, Kan. — A report explaining how computer purchasers can take advantage of tax breaks has been compiled by a certified public accountant here.

"Tax Breaks for Computer Buyers," by Vernon Jacobs, is said to outline the benefits of deducting computer purchases on tax returns and of investment tax credits that are available.

The 26-page report is available for $9, according to the publisher. It can be obtained from Research Press through Box 8137-P, Prairie Village, Kan. 66208.

Mighty write.

This is the word processing printer built to survive the rigors of the office. Our heavy duty DP-Series daisywheels whisk out crisp, letter-perfect documents – hour after hour, month after month – without a whimper. Call your printer distributor. Or contact Dataproducts at (213) 887-8924, 6200 Canoga Avenue, Woodland Hills, CA 91365. In Europe, 136-138 High Street, Egham, Surrey, TW 20 9HL England.



Dataproducts Daisywheel Printers

Attention DEC Mini/Micro Users:
MTI is one of Digital's Authorized Distributors.

That's why you can always lease or buy the latest DEC terminals and micros from MTI.

MTI is a full-service distributor. Our sales engineers will help you choose the most cost-effective equipment for your needs. Our warehouse staff will check out each piece of equipment thoroughly before it is shipped. Our service department will install your equipment and give you timely maintenance and service.

As one of the few Authorized Digital Terminals Distributors, MTI can give you the best of two worlds; terminals and microcomputers, based on advanced technology from the industry leader, and the expertise and service from applications specialists.

Whether you rent, buy or lease our equipment, you'll find MTI is the one source for all the terminals, peripherals, systems, applications expertise and service you'll ever need. And all of this at prices that are very attractive and hard to beat. Call MTI today and save.

New York: 516/621-6200, 212/767-0677, 518/449-5959
Outside N.Y.S.: 800/645-6530
New Jersey: 201/227-5552
Ohio: 216/464-6688

mti

Applications Specialists & Distributors, New York, New Jersey and Ohio.
DEC, Intel, Texas Instruments, Altos, Lear Siegler, Dataproducts, Diablo, Rapidi, Intecolor, Racal-Vadic, MICOM, Digital Engineering, U.S. Design, Cipher, Protocol Computers, MicroPro, Microsoft, Polygon and Select.

The *USS New Jersey* joined American ships last month in the shelling of Syrian positions east of Beirut.

Battleship happy to stay analog

Gunfire system predates digital computers

By Peter Bartelik
CW Staff

This may be the era of *Star Wars* computerized warfare, but when the recommissioned battleship *USS New Jersey* fired its massive 16-in. guns during naval bombardment operations off the coast of Lebanon last month, the devastating shells were directed by electromechanical systems that predate the first stored-memory computers.

According to a spokesman for the U.S. Navy, the gunfire support system aboard the *New Jersey* — the only active battleship and the largest active warship in service throughout the world — is a World War II-era analog system.

Although the *New Jersey* was twice taken out of mothballs for service "on the line" during the Korean and Vietnamese conflicts, and again recommissioned just over one year ago, the gunfire support system remains the same as installed for the original commissioning in May 1943, according to Lt. Dennis Sawyer of the Navy's information office.

The battleship was recommissioned by President Reagan on Dec. 28, 1982. During the legislative battle to fund the $326 million renovation project, supporters termed the vessel invincible because of armor protection up to 16 inches thick and its massive firepower. Critics termed it a dinosaur and said its 1,500 enlisted men and 60 officers would be sitting ducks in today's high-technology warfare.

Shells create craters

The shells fired in December against positions reportedly held by Druse Muslim fighters each carried 1,900 pounds of explosives that reportedly can create craters 50 yards across and 20 feet deep.

The *New Jersey* is one of four "Iowa-class" battleships built for World War II service. The *USS Iowa* is itself currently undergoing refurbishing and is scheduled for recommissioning on April 30, after which it will relieve the *New Jersey* in the Mediterranean.

According to John Reilly, a civilian historian with the Naval Historical Center in Washington, D.C., the components of the *New Jersey*'s gunfire control system are still state of the art, even though they were developed prior to World War II. "No new system has been developed for heavy weapons," he said. "There has been no occasion to develop a new system. What they have on board works."

With the Iowa-class ships out of service as much as in service over the past four decades, he surmised, there has been no pressing need to spend millions to develop a modern computer system.

At the heart of the system controlling the nine 16-in. guns is a Mark 8 range keeper, an electromechanical device that receives input from various sensors on target range and direction, along with the *New Jersey*'s own motion, direction, speed and even wind speed.

Keeps guns on target

The range keeper keeps the guns pointed on target during movement by both the ship and target. The system was adapted from the Mark 34 system in use during the 1930s, Reilly said.

Another range-finder system, the Mark 1, directs the *New Jersey*'s battery of 12 five-in. guns, which were also fired last month. The Mark 1, also developed during World War II, was the first system termed a computer by the Navy, according to Reilly.

There has been some modernization, Lt. Sawyer noted. In the latest recommissioning, 20 eight-in. guns were removed to make way for cruise missiles. The long-range Tomahawk is designed for antishipping attacks of 200-plus miles and land attacks in excess of 1,350 miles and is controlled by General Dynamics Corp.'s Tomahawk Control System and onboard Terrain Contour Matching microprocessors.

The short-range harpoon is designed for ship-to-ship operations up to 60 miles and is controlled by the AN/SWG-1 control system built by McDonnell-Douglas Corp. and Sperry Corp.

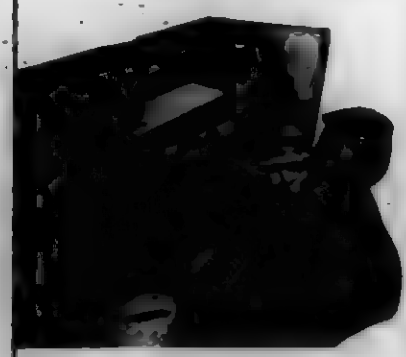
UNIX & C
HANDS-ON TRAINING
AND NOW INTERACTIVE VIDEO

Select your training medium according to the type of training you prefer and the number of people to be trained.

VIDEO-BASED TRAINING. The Computer Technology Group's Video-Based Training integrates professionally developed and produced video and text material, as well as hands-on exercises, into complete training programs.

Our courses are produced with the highest standards of video quality, applying the latest techniques of instructional design including the use of computer graphics and animation techniques to compress learning time. The students' time is not wasted with the "camera at the back of the classroom" or "chalk talk" approach which is so inefficient, and often ineffective, in transferring skills.

Our Video-Based Training courses are completely self-contained, including the hardware-independent hands-on exercises. All you need is a video cassette player.



COURSE	Number of Modules: Video-Based	Interactive
Computers at Work	15	
UNIX—An Executive Perspective	1	
UNIX Overview	6	6
UNIX Fundamentals	15	15
'C' Language Programming	16	16

INTERACTIVE VIDEODISC TRAINING. Our new UNIX Videodisc Training Curriculum combines the benefits of our Video-Based Training with the flexibility of microcomputer access. Designed as a one-on-one tutor, our interactive system assesses the training needs of each student and dynamically tailors the training to his/her specific needs, thus eliminating redundant training. Through engaging exercises and interactive video, we are able to increase student comprehension while reducing training time.

Developed by the Computer Technology Group and Interactive Training Systems, the curriculum uses the latest laser videodisc technology—including IBM PC, color monitor and Interactive Training System Controller.

PUBLIC AND IN-HOUSE SEMINARS. Both public and in-house seminars are offered on a wide variety of UNIX and 'C' Language subjects, including:

UNIX Overview • UNIX Fundamentals for Non-Programmers • UNIX Fundamentals for Programmers • Shell as a Command Language • 'C' Language Programming • Shell Programming • Using Advanced UNIX Commands • UNIX Internals • UNIX Administration • Advanced 'C' Programming Workshop • Advanced 'C' Programming Under UNIX • Berkeley UNIX Fundamentals and "csh" Shell.

TM UNIX is a Trademark of Bell Laboratories

Call toll-free: (800) 621-3155
or in IL (312) 987-4082
310 S. Michigan Ave., Chicago, IL 60604

COMPUTER TECHNOLOGY GROUP
Telemedia, Inc.

Custom software sales tax meets its match

Specter of personal ruin fuels one-man crusade

By Bill Laberis
CW Staff

MIAMI — When state revenue agents in 1976 told Bob Sherin that he owed $45,000 in unpaid sales taxes, about the only thing he was certain of was that he could not afford to pay.

What he did not know was that the revenuers' visit would nearly ruin his computer service business, strain his marriage to the breaking point and launch him on a crusade that today has made him a driving force behind abolishing state sales taxes on custom software.

Sherin

Sherin's cause has taken him to courtrooms, administrative chambers and statehouse rostrums across the country. There his single-minded dedication, fueled by a trauma that he said almost blotted out his professional and personal life, has been a key factor in several successful attempts to exempt custom software from state sales tax provisions.

"It's almost a religion with him; he'll go anywhere and do just about anything to press his fight," said one software industry executive familiar with Sherin's antitax campaign of the past seven years. "A lot of people disagree with the position he has taken over the years, myself included, but you'd have to say on the other hand that a lot of people are indebted to him, too."

Sherin has been retained as a special witness and nonjudicial adviser in sales tax cases by professional organizations such as the Data Processing Managers Association and the Association of Data Processing Service Organizations, Inc. He has at times bucked the legal establishment in advocating that sales tax rules be fought not in court but at administrative hearings, where the tax code itself is contested, not simply its application in individual cases.

If taking on the government hasn't been enough, Sherin has also butted heads with Data General Corp. In 1973, DG demanded that Sherin cease using the term Nova in his company name, then Nova Computing Services, Inc., because DG had labeled its minicomputer line with the same name. But Sherin fought back, claiming his use of the word predated DG's, and threatened to take DG to court to prove his point. DG backed off, paying Sherin for exclusive rights to the Nova trademark.

> *"Sherin's cause has taken him to courtrooms, administrative chambers and statehouse rostrums . . . his single-minded dedication . . . has been a key factor in several successful attempts to exempt custom software from state sales tax provisions."*

But it is his obsession with obliterating software sales taxes that has dominated Sherin's life since 1976. "My struggle has given me a sense of personal fulfillment, which is what I needed to compensate myself for what I had needlessly suffered," Sherin said in a recent interview. "It's the most important thing in my life."

Sherin's odyssey began in early 1976 shortly after Florida revenue officials examined the books of Nova Computing and presented him with a bill for $45,000 in back taxes, interest and penalties. The state's actions seemed entirely proper, given a segment of the state tax code that extended the sales tax to punched data processing cards and coded magnetic tapes, labeling them "tangible . . . and, therefore, taxable property."

Word of Sherin's assessment spread. A local bank demanded back half a $50,000 loan made to Sherin for hardware he'd purchased. To make good on the demand note, Sherin chewed into his business' operating capital and even refinanced his home. The strains on his business and credit rating began to creep into his marriage. Eventually his wife left him.

Determined to fight the law, Sherin found little hope in the legal community, where lawyers informed him that the law was clear. So he turned what remained of his business over to associates and immersed himself in law books for the next year, spending each day in a local law library poring over case studies relating to taxation. At one point he studied at night by candlelight when, because he was unable to pay his bills, his electricity was shut off.

He persuaded both the *Miami Herald* and the Florida Light and Power Co. to pay for some legal research into the matter and raised further funding with appeals to his customers for aid. But Sherin was to argue the case himself, and his day in court arrived in November 1976.

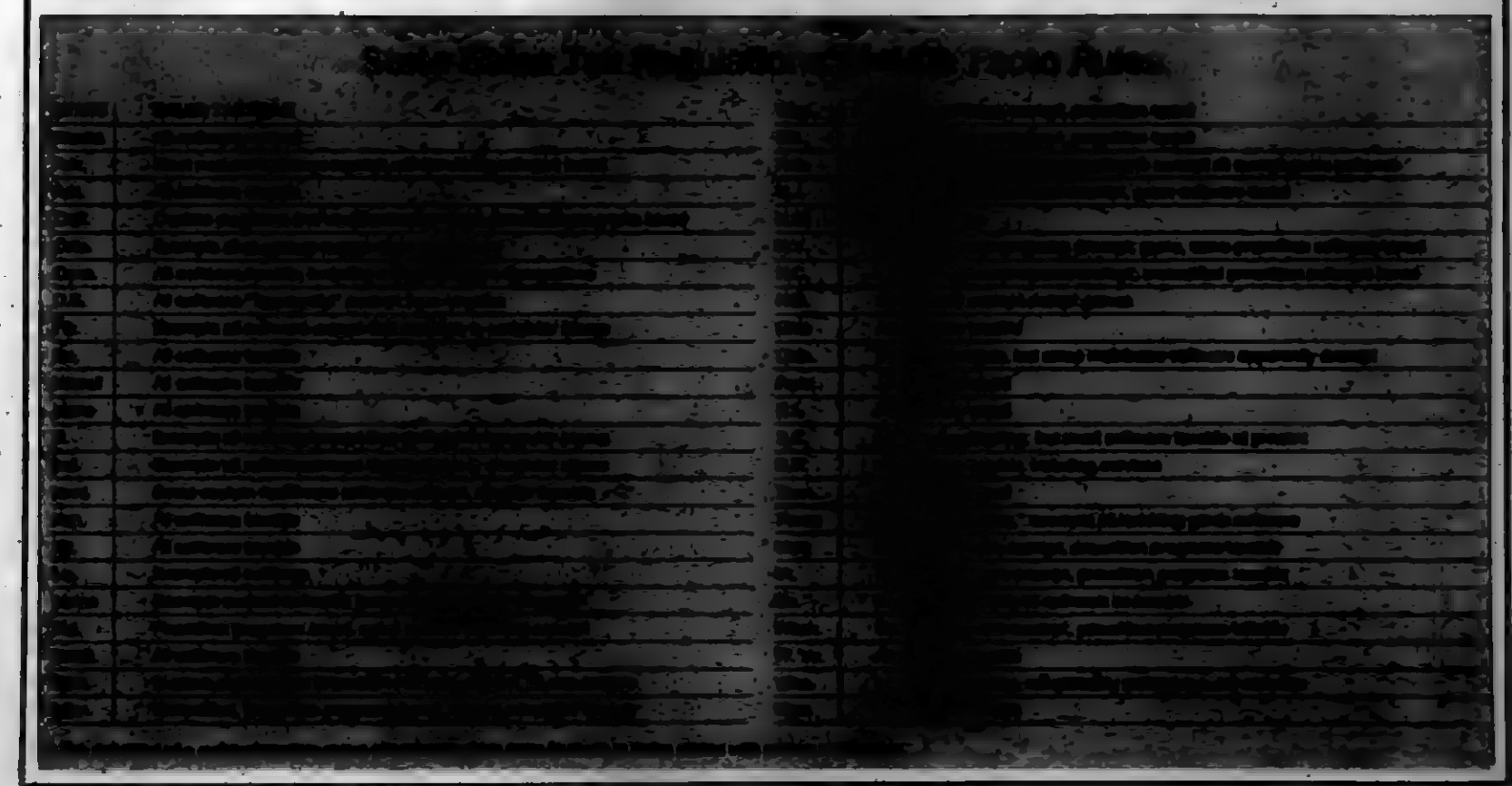
Sherin's attack went to the heart of the tax code, questioning the propriety of labeling a programmer's work as tangible while calling that of an accountant or lawyer intangible. The climax of the case came when he subpoenaed the state's director of systems and programming and, over the objections of state attorneys, got the director to state his opinion that software is a personal, and therefore intangible, service.

Sherin prevailed; the administrative examiner who heard the case issued a directive that the tax rule applying to software was invalid. The state did not appeal.

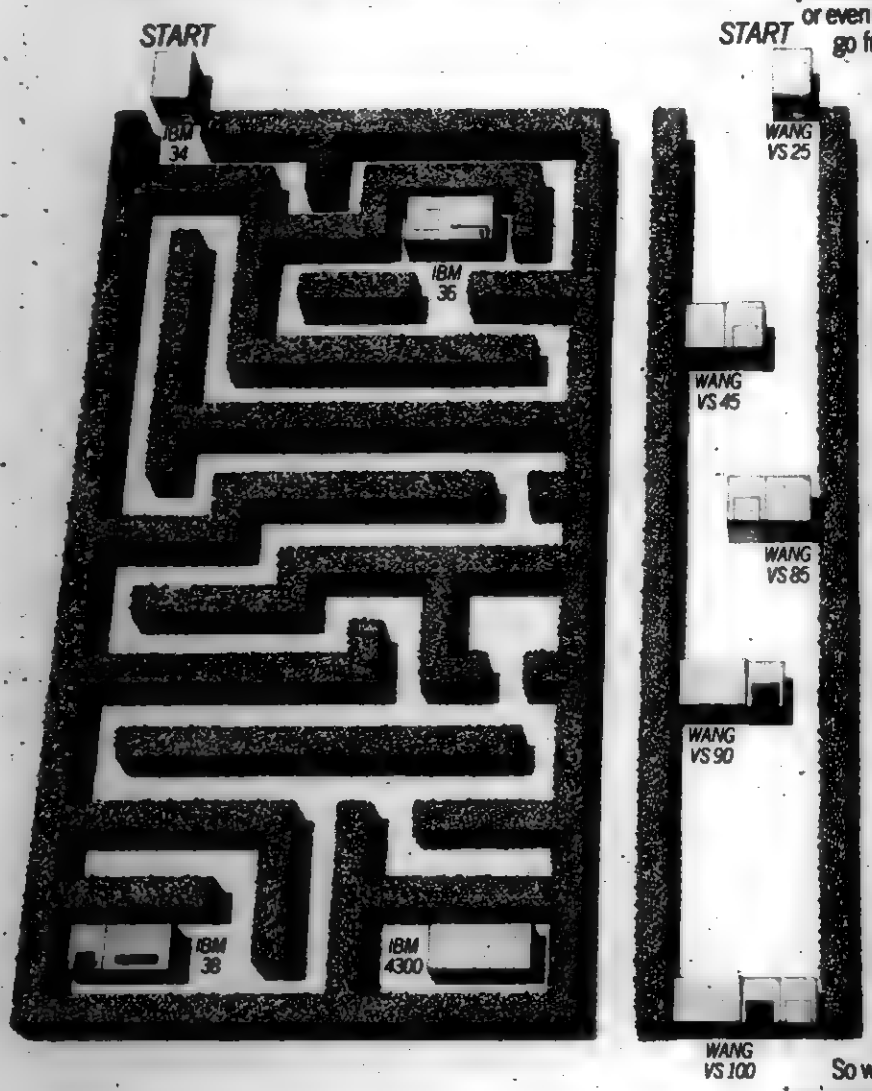
His victory drew the attention and praise of industry groups, who began drawing upon his expertise to join the sales tax fight in several states, including Rhode Island, Ohio, Massachusetts, Michigan and Wisconsin. He also began writing voluminously on the subject for industry association journals and trade publications.

Today, Sherin said he is continuing his antitax crusade, having an admittedly easier time building upon his past accomplishments than going it alone. He was involved in the recently concluded action in Michigan, where the high court upheld a ruling against the state tax department, differentiating between custom and canned software in the application of sales taxes [CW, Sept. 26].

"It's fun for me now. . . . I found you really can become quite an expert on a narrow issue," Sherin said. "I feel I've been fighting for basic rights, improper taxation and the like. It's an honor to have been involved."



Compared to IBM, Wang has the growth path of least resistance.



If you're currently considering an IBM 34 or even a 36, consider this: where do you go from there?

To an IBM 38? Sure, if you want to spend up to 18 months converting to a different operating system, different source codes, and different software.

To an IBM 4300? The same problem again. Only magnified. Because if the IBM 34 and 36 have little in common with the IBM 38, the IBM 38 has nothing in common with the IBM 4300 (logo excepted).

Now consider the Wang VS line.

One operating system that supports the same software, utilities, and documentation. A line that's compatible from top to bottom and bottom to top. A line that's compatible with other Wang equipment as well as most mainframes, including IBM. And a line that can tie you into total office automation faster and easier than any other systems available anywhere.

But even if you only need a single computer, a Wang VS is a better choice. Because every VS offers data processing, voice, graphics, electronic mail and extensive networking. And only a Wang VS offers Word Processing Plus, feature for feature the most comprehensive word processing software in the world.

So whether you plan to buy just one business computer or a whole lot, the Wang VS line is simply the best way to go. And the only way to grow.

Compare it to IBM; it's easy to see why Wang offers the growth path of least resistance.

For a demonstration of Wang VS computers, call 1-800-225-9264. Or write to: Wang Laboratories, Inc., Business Executive Center, One Industrial Avenue, Lowell, MA 01851.

WANG

The Office Automation Computer People.

© 1983 Wang Laboratories, Inc.
CW17

Experts say Apple-Franklin issue undecided

Operating system copyrightability still 'on the table'

By David Myers
CW New York Bureau

NEW YORK — Franklin Computer Corp. abandoned its fight with micro rival Apple Computer, Inc. two weeks ago, but the out-of-court settlement left unanswered the question of whether an operating system embedded in read-only memory (ROM) can be protected by copyright, legal experts said last week.

Franklin agreed to pay Apple $2.5 million and to accept the validity of Apple's copyright claims. The Cherry Hill, N.J.-based maker of Apple-compatible micros was given until April 1 to quit copying Apple's operating code [CW, Jan. 9].

"Settlements don't affect the larger legal issues except for those between the parties involved," Daniel T. Brooks, staff attorney for the Computer Law Association, said from Springfield, Va. "The larger legal issues are still lying on the table."

Issues not addressed

The settlement "undercuts the ability of the Supreme Court to address the issues," Brooks lamented. "Somebody else now has to take it to that level."

A Philadelphia Appeals Court had ruled in favor of Apple's copyright claims last fall [CW, Sept. 12, 1983]. In announcing the settlement earlier this month, Franklin President Avram Miller said his company was accepting the appeals court ruling "as law."

But Washington copyright attorney Jon A. Baumgarten, who was retained by Franklin after the appeals court ruling, noted that "all the court said is that an operating system is not per se uncopyrightable." No high-level U.S. court has had the opportunity "to examine any particular operating system," Baumgarten pointed out.

"The current state [of law] is that there are still large issues remaining to be resolved. All that has really been settled is the categorical question: Computer programs are a 'category' [protected by copyright] like books or pieces of music," Baumgarten said.

Apple lawyers disagree

Apple's attorneys disagreed. "The case resolved quite a number of issues," maintained Jeffrey Blatt, a Beverly Hills, Calif., lawyer who represented Apple in the case. "I don't really think there's a question that object code is protected if it sits in ROM."

Blatt said that "it's always nice if the Supreme Court takes the case" to settle the issue for good, but even so "the law is much clearer now than when we started. [Franklin v. Apple] did its job. It has been cited, has already been used as a precedent [in other cases]."

According to the lawyers who spoke to *Computerworld*, the legal issues still to be settled include what Baumgarten called "second-generation questions," such as whether gate arrays or even printed-circuit boards can be shielded by copyright legislation.

Blatt pointed out that circuit boards are covered by copyright laws in Great Britain.

"My feeling is that what an electrical engineer does to design a circuit is not copyrightable. But what a software programmer does is. He's preparing a 'work of authorship,'" Brooks said.

Another question left unanswered by the settlement is whether the computers of two manufacturers can ever be "bit-to-bit compatible" without identical operating codes, according to Brooks.

"The larger the number of bit variations, the greater the potential that somebody sometime will discover a program which won't run on both," Brooks said.

Meanwhile, Franklin is preparing an operating system that it says will be able to run any Apple application program. Franklin computers running on the new operating system will hit the market before April 1, Miller promised.

Third-party arbitrator

If Apple believes the new operating system still infringes on its copyright, a third-party arbitrator will settle the dispute. Blatt said the two micro vendors were in the process of choosing the arbitrator.

As for the $2.5 million settlement, which had been called low by some, Brooks said, "That's not bad for a royalty [payment]."

Franklin expects to have sold about 100,000 boxes with the Apple-identical operating system. That works out to about $25 per box in "royalties."

While Blatt would not say if Apple viewed the $2.5 million settlement as a royalty payment for past infringements by Franklin, he nevertheless said it is "typical" for the loser in a copyright case to pay royalties to the winner.

NCR

From the cutting edge
of NCR software engineering comes
NCR/SNA Systems Network Architecture

If you are a computer manufacturer, or an OEM, there are two ways that you can implement SNA or X.25 on your systems:

- Do it yourself.
- Call NCR.

NCR systems engineers have developed portable communication products which can be easily implemented on a variety of processors and operating systems. These products allow for SNA communications, SNA network management and communication using X.25. Many of the products are immediately available, and could be ported onto most processors with minimum effort. And that's not all. NCR/SNA is backed by the resources and experience of an international company with a long background in data processing, and with the engineering technology that will keep it among the leaders.

In 1984, NCR will become 100 years young. If you are going to make a major investment in a strategic product, you'll want the innovative technology and service for which NCR has long been famous.

If you would like more information contact:

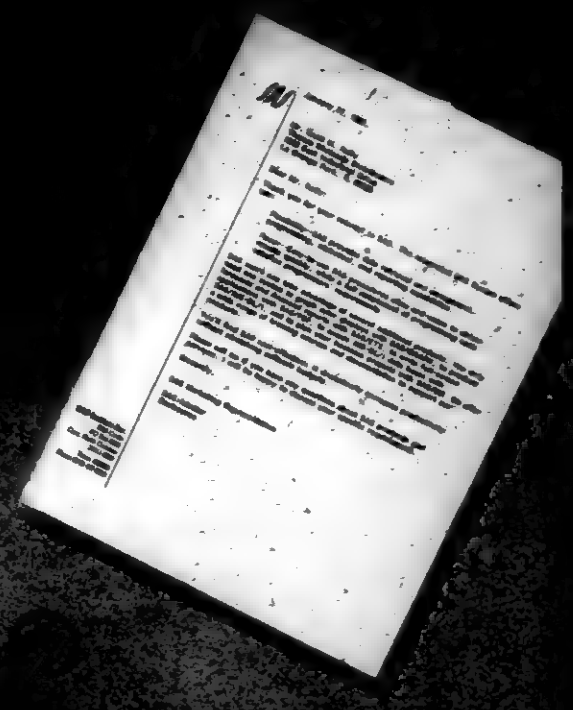
NCR Corporation
11010 Torreyana Road
San Diego, California 92121
Phone (619) 452-1020

If you are an NCR computer user, and would like to learn more about SNA implementation on NCR's Systems, contact your local Account Manager.

SAS...
Power and Flex
to Meet All You

Available
for
IBM, DG ECLIPSE
and DEC VAX

ibility
r Needs



THE IDEA THAT SPARKED THE REVOLUTION IS THE MOST THOROUGHLY PROVEN LOCAL AREA NETWORK IN EXISTENCE TODAY.

DATAPOINT

We sparked the revolution

AI-like package sends helicopter designer soaring

1ST USER

By Paul Gillin
CW Staff

CULVER CITY, Calif. — Can seven Army pilots with no programming knowledge teach a computer to think like a military commander in less than two days?

Analysts at Hughes Helicopters, Inc., a designer of helicopters for commercial and Department of Defense (DOD) use, think they can. As a result, the company became the first commercial user of an artificial intelligence-like software package that reportedly can be used for any application requiring an expert system.

Hughes uses The Intelligent Machine Model (Timm) from General Research Corp. of Santa Barbara, Calif., to simulate the decisions an enemy commander might make when faced with an air attack. The data is used to make design decisions for the helicopters Hughes builds for the DOD.

While Timm is rudimentary in many respects, the analysts have found that the decisions it makes closely parallel those of military experts, according to Bill George, an operations research analyst.

Unusual application

Hughes installed Timm on its Prime Computer, Inc. 400 processor three months ago after it found that no expert systems on the market were suitable for their unusual application. Hughes built its own expert data base by drawing on a group of seven army pilots from Fort Lewis, near Tacoma, Wash.

"We're not experts, so we wanted experts to input the criteria so we can make decisions based on expert knowledge," George said. The pilots spent two days presenting the scenario, the decision structure for the problem, the possible decisions and which factors were important to each decision.

The knowledge base can be built several ways, George explained. The software can randomly generate a scenario and present it to an expert who inputs the best decision under the circumstances. Factors can also be input manually and assigned a weight, or the software can generate a random case and a decision that is approved or corrected by an expert.

To build the war games model, the analysts generated a few random scenarios and then let the pilots take over. "Usually, in a short period of time you have the people sitting down and writing it all by themselves," George said.

Timm prompts the experts to define the problem domain and the set of possible solutions. Each decision adds to the knowledge base, which is capable of storing about 500 rules.

"The more rules you put in, the more intelligent it becomes," George said. "You could crank out several hundred rules in a few hours."

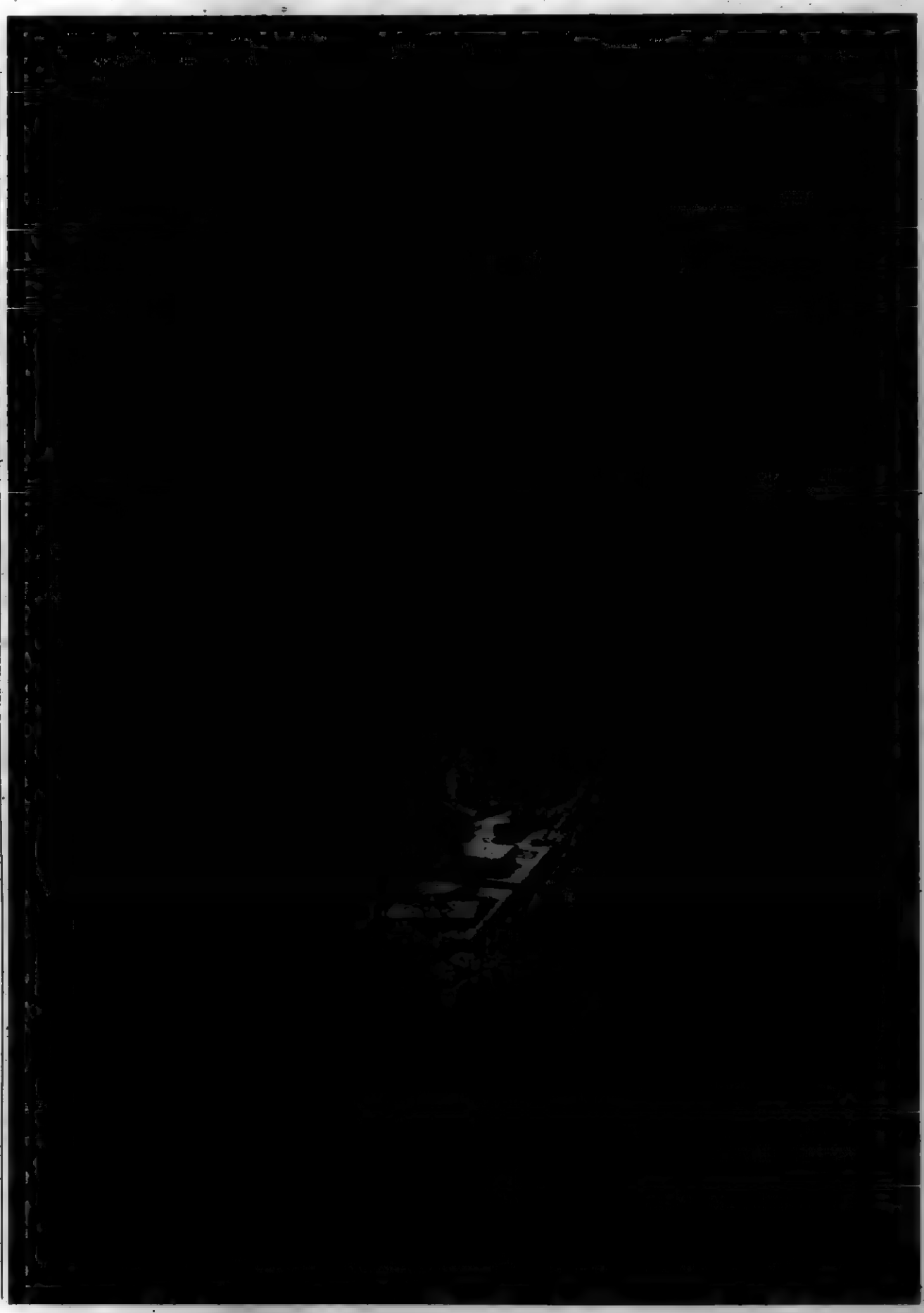
The software is capable of making as many as 25 distinct decisions based upon up to 50 factors and 25 different values for each factor, he said.

Whenever there is a split body of opinion on a decision, the software points out the inconsistency and makes the decision that is statistically the most valid.

All decisions can be rated on a 100-point scale by consistency, and a reliability estimate can also be provided. Timm is also capable of producing a list of the criteria it used to make a decision, George said.

However, Timm does carry a price, George noted. Because the software is application-independent, it is crude as far as specialized expert systems go, he said. It also demands about 20M bytes of virtual memory.

"It's hard to say if this is a true artificial intelligence model, but I don't know of anybody else who has one like it," he said.



Computer helps clients insure against Mother Nature

By James Connolly
CW Staff

JERICHO, N.Y. — A company bets against Mother Nature here, setting computerized odds on whether it will rain in Miami next week or snow in St. Paul, Minn., next month.

Good Weather International, Inc. arranges insurance for businesses whose economic lives depend on the weather, and it does this by drawing on a data base of more than 200M bytes and a hard-copy library of weather reports going back 40 years from 7,000 weather stations.

For 25 years, Good Weather has arranged insurance for concert and air show promoters, film producers and swimsuit makers who need one-time or seasonal guarantees of sunshine so they can plan their business. Others, such as ski equipment firms and mens' outdoor-ware makers, want wintry weather early and often.

But the company has recently taken on new clients, firms like the Toro Co., which guarantees snow for its snowblower customers, and Republic Airlines, which promises fun in the sun for vacationers.

It's Good Weather International that figures the odds of bad weather and pays up — with financial backing from the American International Group — if the rain hits and the snow doesn't.

"We arrange every conceivable type of insurance that has to do with the weather. We're not dealing with individuals, but with big companies that have seasonally sensitive products. Extremes in the weather play havoc with their cash flows. One bad season, they can generally stand it. But two bad seasons in a row, and they may be out of business. That's where we come in," said Good Weather President Henry Fox.

Good Weather simply determines whether precipitation is likely for a given time period by counting the number of times the National Weather Service has measured even one one-hundredth of an inch of precipitation for a site and date in the past 30 or 40 years.

Until the past few months, those calculations and checks of years' worth of records were done by hand, with Good Weather's staff leafing through weather service reports.

Moving up to a mainframe

Now, with companies like Toro and Republic marketing weather guarantees, Good Weather is experimenting with an IBM System/23 Datamaster office system and hopes to move up to an IBM mainframe, either a Series/34 or a Series/36 next year.

"We have 200M bytes of information just on rain alone, so we are going to need a larger system," Fox said.

"What the computer will let us do is get deeper into what we call weather trending," he continued. "What we have been doing is looking at a 30- to 40-year history and coming up with odds. What is more important is the trend."

Fox, who hired programmers to work in-house on the projection programs, won't reveal his company's accuracy rate. But he maintained, "We do have an excellent success rate because we are dealing strictly with the law of averages. We will pay some large losses. Some people will beat us, as the case may be. But with the law of averages, we usually come out ahead."

On the average, Good Weather — which writes policies on behalf of many of the 200 insurance companies that are subsidiaries of American International Group — sets premiums of 5% to 10% to insure single events, such as concerts, against rainouts or to offer swimsuit manufacturers guarantees against poor vacation seasons. Good Weather is managing general agent for the insurance group.

Toro spokeswoman Jane Cella declined to reveal what premiums Toro is paying for its promotion, in which the company offers full rebates to snow-thrower purchasers if the snowfall is less than 20% of the local norm and 50% rebates if the snowfall is 20% to 50% less than the norm.

Republic ticket holders traveling to Southern California, Florida and Arizona are guaranteed their money back if it rains between 10 a.m. and 4 p.m. on more than half of their vacation days.

In Republic's case, the premium costs the airline from 1% of the ticket price to 5%, depending upon the destination.

It is a promotion where Republic reportedly has little risk. A customer buys their original ticket, and if it rains on their vacation, the insurer pays for another round-trip ticket, also from Republic.

The promotions by both companies are being backed by insurance policies arranged through Good Weather International.

Those policies generally are very simply worded, saying that the client can collect if the weather service reports a specific amount of precipitation, or less than that amount in the case of snow, for the dates in question.

Once the policy is written, Fox noted, the question of whether someone collects is determined by the weather service's regular reports, not by Good Weather.

MicroAge

"BECAUSE WE COULDN'T AFFORD MISTAKES!"

"They guided us over the rough parts when we needed it"

"During September of 1982, we started our MicroAge Computer Store in Tulsa, Oklahoma with 3 people. Today we have 11 people working for us and we're still hiring. By following MicroAge's advice and marketing strategy when we started in business, we were able to reach Tulsa's business computer buyers in a much shorter time than we could have on our own."

"Both of us had technical backgrounds in computers but lacked the marketing experience necessary to reach our goals. We used MicroAge's experience and leadership to guide us through the rough spots and boost our sales and marketing potential.

"MicroAge . . . they helped us build a sales organization to reach the Oklahoma businessman."

John E. Mosier
John Mosier
President

George McLawhon
George McLawhon
Vice President

To build your own professional computer sales organization with MicroAge write to:

MicroAge®
COMPUTER STORES
"The Solution Store"®
1457 West Alameda • Tempe, Arizona 85282
(602) 968-3168

IEEE forum set for D.C.

WASHINGTON, D.C. — Keeping U.S. technology competitive in the world marketplace into the 21st century will be the focus of the Institute of Electrical and Electronics Engineers, Inc. (IEEE) 1984 Conference of U.S. Technology Policy, scheduled to take place here Feb. 22-23.

The conference will feature 11 speakers, including a yet-to-be-named White House official who will be introduced the evening of Feb. 22 by IEEE President Richard J. Gowen.

The theme of the two-day conference is "Electrotechnology and Innovation: Challenge 21." Dr. Simon Ramo of TRW, Inc.; Dr. George Keyworth, director of the White House Office of Science and Technology Policy; and Dr. Richard DeLauer, under secretary of defense for research and engineering, will open the conference.

Other congressional, industrial and academic figures will also make presentations.

The registration fee is $150 before Jan. 20 and $175 after that date. Registration forms are available from Lisa I. Ladaw at the IEEE Washington Office, Suite 608, 1111-19th St. N.W., Washington, D.C. 20036.

Gould users to meet

ANAHEIM, Calif. — The Gould Users Group will hold a general meeting Jan. 25-27 at the Sheraton-Anaheim Hotel here.

The agenda will include user presentations, workshops, presentations by Gould, Inc. and a panel discussion with Gould management, according to Steve Larkin, chairman of the Gould Users Group.

The advance registration fee is $35 per person; a $10 surcharge will be added to anyone registering the first day of the meeting. The registration fee includes all seminar materials as well as lunch on each day. More information is available from Eileen Lerner, Users Group Administrator, Gould, 6901 W. Sunrise Blvd., Fort Lauderdale, Fla. 33310.

IT is...

the leader in integrated decision support and data processing software.

Ten programs, each separately available, make the IT series the most comprehensive and flexible software system on the market for MS-DOS based personal computers.

Non-computer professionals will find IT easy to use. All programs are menu-driven and make extensive use of help screens. And for the DP professional, ITSoftware programs meet the kinds of operational data processing requirements that are now justified by the low cost of today's microcomputer hardware and software.

Whatever your requirements, you'll discover that ITSoftware meets more of your needs.

KeepIT™ keeps IT together.

At the heart of the ITSoftware series is KeepIT, a menu-driven, relational data base manager that acts as the core module through which all other software is integrated. Only a full data base management program like KeepIT can provide the flexibility of data entry, file transfer, records maintenance, report generation and file management capabilities needed to fully utilize the data calculation and presentation strengths of spreadsheet, graphics and word processing programs.

KeepIT's comprehensive design greatly extends the ability to transfer information from one program to another. Not just for a few numbers, but for entire data files. KeepIT also allows you to specify calculations on the data base and have the results transferred to a spreadsheet or graphics program.

Best of all, you don't have to replace your current software to take advantage of ITSoftware's advanced capabilities. Use them both. KeepIT also comes equipped with interfaces to most other popular micro-based software.

Other members of the ITSoftware series include:

CalcIT™: 3-D spreadsheet program.
LinkIT™: asynchronous communications package.
PassIT™: 3270 file transfer facility.
EditIT™: program editor with mouse management.
SortIT™: sort/merge utility.
StatIT™: MathStat™ program.
WritIT™: our release of MultiMate™ for word processing.
ShowIT™: graphics and drawing program.
SendIT™: for remote presentation of ShowIT slides.

Buy IT.

ITSoftware . . . ask for IT by name. For more information, call toll-free (800) 222-0592. In New Jersey: (609) 799-2600. Or write to ITSoftware, P.O. Box 2392, Princeton, New Jersey 08540. We'll send you a free brochure.

Name _____

Company _____

Title _____

Address _____

City _____ State _____ Zip _____

Phone _____

ITSoftware

RAMIS II is a registered trademark of Mathematica Products Group. MathStat is a trademark of Mathematica Policy Research. MultiMate is a trademark of Softword Systems. The IT series product names are trademarks of ITSoftware.

MARTIN MARIETTA

Martin Marietta Data Systems

The company that gives you RAMIS® II.

NEWS

INTERNATIONAL REPORT

CW INTERNATIONAL NEWS NETWORK

BRAZIL

RIO DE JANEIRO — Brazil's Special Department of Informatics has established new criteria for manufacturers of microcomputers here. Projects that relate to the production of microcomputers will only be approved by the government if the machine's operating system has been developed locally.

RIO DE JANEIRO — Brazil's Association of Information Services Organization last month announced the signing of agreements with IBM and Control Data Corp. for the joint development of products here. Sources said the IBM agreement calls for the translation of IBM documentation manuals; the CDC agreement covers software development, sources said.

RIO DE JANEIRO — According to a recent report from the Special Department of Informatics, Brazil's financial sector is responsible for half the information processing equipment sold in this country. The banks here, which have started to install 24-hour automatic teller machines, are reportedly appealing to the domestic computer industry for more diversification of products.

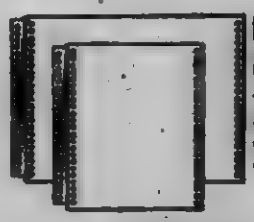
Computer paper & labels

COMPARE PRICES & SAVE

Order direct from the nation's leader, Mail Advertising Supply!

Manufacturing and distributing labels and paper products nationwide over 10 years.

- *Order toll free 800-558-2126.*
- *Money-back guarantee. You must be completely satisfied.*
- *Products shipped same day.*
- *Shipments via UPS, freight or airfreight FOB Waukesha, WI. We will quote firm shipping cost.*
- *Orders from personal and home computer users accepted by Master Card, VISA or personal check.*



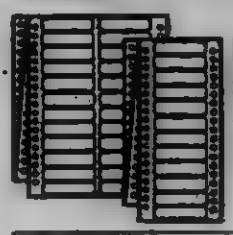
BLANK PAPER

18# Register Bond, Fan-Folded with or without vertical perfs

- Available in single part, multi-part carbon interleaved and new clean-perfed.
- Many other sizes in stock and available for immediate shipment.
- For larger quantities or custom orders call for quote.

Stock No.	Sheet Size (inches)	Description	Sheets Per Carton	Prices Per M Sheets		
				2,500-12,500	25M-100M	125M-150M
B-149	14-7/8 x 11	1 part	2,500	$9.50/M	$9.55/M	$9.25/M
B-149-2 part	14-7/8 x 11	2 part	1,200 sets	$20.95/M	$20.25/M	$20.25/M
B-95	9-1/2 x 11	1 part	2,500	$9.95/M	$9.25/M	$9.95/M
B-95-2 part	9-1/2 x 11	2 part	1,200 sets	$19.75/M	$18.50/M	$17.25/M
B-95-CP	9-1/2 x 11	Clean Perf	2,500	$7.75/M	$8.65/M	$8.50/M

For larger quantities, call for quote



PRESSURE SENSITIVE (Peel and Stick) **LABELS**

- Over 100 label types and sizes in stock, available for immediate shipment.
- 1/16" horizontal and 1/10" vertical spacing, 12" fold. Piggyback Cheshire spacing also available.
- Manufactured with only the highest quality face sheet, adhesive and backing for trouble-free performance.

Stock No.	Label Size (inches)	Labels Across	Overall Carrier Width (inches)	Labels Per Box	Prices Per M Labels	
					5-50M	100M-250M
MA7605	3-1/2 x 15/16	Quint	14	20M	$2.65/M	$2.30/M
MA7109	3.3 x 15/16	Quad	14-7/8	20M	$2.54/M	$2.19/M
MA7613	3-1/2 x 15/16	Single	4-1/4	5M	$2.72/M	$2.33/M
MA7035	3-1/2 x 15/16	Double	8	10M	$2.68/M	$2.29/M
MA7631	3-1/2 x 15/16	Triple	11-1/2	15M	$2.65/M	$2.46/M
MA7035	3-1/2 x 15/16	Quad	15	20M	$2.78/M	$2.39/M

For larger quantities, call for quote.

To place orders, for product information or to request a catalog, CALL:

Toll Free (800)558-2126 Wis. Toll Free (800)242-1739

Mail Advertising Supply Co., Inc.

1450 S. West Avenue, Waukesha, Wisconsin 53186 (414) 549-1730

Dealer Inquiries Invited

FRANCE

PARIS — The French Citibank has become the first user here of Wang Laboratories, Inc.'s Wangnet broadband local-area network. Citibank installed the local-area network in one of its new buildings to interconnect hundreds of word processing systems, terminals and Wang CPUs. The bank is now studying the feasibility of connecting IBM machines to Wangnet.

PARIS — What is IBM's answer to the threat posed by Trilogy Systems Corp.? Some are predicting price wars between the two companies in 1985. Others believe the battle will involve IBM's thermal conduction module technology and Trilogy's wafer-scale integration packaging technology.

Speaking on this subject here recently, IBM's director of component research and development, Stephen Paris, said that circuit integration could eventually be improved by two or three times, which would enable IBM to create monoprocessors operating at 15 million to 16 million instructions per second (Mips). At present, monoprocessors execute approximately 7 Mips with thermal conduction module technology.

PARIS — One hundred all-purpose Minitel videotex terminals have been distributed to selected members of the French National Assembly, and an additional 370 terminals will be added to the system by March. In addition to nightly updates on proposed laws, deputies can use the terminals to keep abreast of the daily agenda and for immediate research on legal matters, economic and domestic affairs.

The terminal also serves as an electronic mailbox. The Minitel videotex system interfaces with three separate data bases. The system includes a micro videotex server which stores up to 10 million characters.

JAPAN

MATSUMOTO — Epson Corp., a subsidiary of Seiko Group which manufactures microcomputers and printers, plans to establish a manufacturing plant in California that would begin production by 1986. Last October, the company founded a French subsidiary called Epson France to provide its product line to the European marketplace.

NETHERLANDS

AMSTERDAM — Shares of the Dutch software company Minihouse went "over-the-counter" on the London Stock Exchange recently, a move that sparked general confusion and calamity in the Dutch financial world.

When financiers questioned why the company did not use the Amsterdam Stock Exchange, a company spokesman said London was used for the stock offering because Dutch financial organizations are still reluctant investors when it comes to systems houses and software companies. Minihouse added that its stocks will eventually be made available in Amsterdam.

AMSTERDAM — During the first quarter of this year, European postal, telephone and telegraph (PTT) administrations are expected to connect their X.25 packet-switched public data networks. This month the Dutch PTT will connect its Datanet-1 to England's network, followed by the networks of Belgium, France, Spain and Switzerland. The X.25 networks of the U. S. and Canada and other European countries are planned for a later date, a spokesman said.

The newly formed European network will replace Euronet, but the management company of Euronet will reportedly be maintained.

AMSTERDAM — The European Common Users Group for users of the IBM System/34, 36, 38, Series/1 and 8100 information system is expanding its membership abroad and forming Common groups here and in Scandinavian countries. In Holland, the management of Common will be handled by the Amsterdam-based software house Information Share, a nonprofit subsidiary of Management Share.

HILVERSUM — Sopho-Net is the name of a switching network recently released by Philips Telecommunications BV that works by interchanging packets at high speeds. The product can reportedly handle all types of communications in a unified system of electronic lines.

According to Philips, Sopho-Net was designed to become the keystone of the integrated information network in the "office of tomorrow" and is compatible with all kinds of equipment including systems from Digital Equipment Corp. and IBM.

Further details are available from Philips at P.O. Box 32, 1200 JD Hilversum, Netherlands.

NEWS

On-line litigation library built for Baldwin-United case

DAYTON, Ohio — An on-line litigation information library was recently initiated to serve interested parties in what may be one of the most complicated bankruptcy cases in U.S. history.

Mead Data Central, a division of the Mead Corp., initiated the library in early January on both its Lexis and Nexis information retrieval services.

The library will document the Chapter 11 reorganization of the Baldwin-United Corp. of Cincinnati. U.S. Bankruptcy Court Judge Randall Newsome is overseeing the reorganization.

Baldwin-United and two of its subsidiaries, D.H. Baldwin Co. and Baldwin-United Leasing Co., filed for reorganization under Chapter 11 of the U.S. Bankruptcy Code on Sept. 26, 1983.

Several thousand creditors

There are several thousand creditors involved in the case, ranging from large banks to individuals who purchased annuities from Baldwin's insurance subsidiaries. The reorganization could take up to four years of court proceedings to accomplish, according to a spokesman for Mead Data Central.

Mead Data Central President Jack W. Simpson, in announcing the service, stated, "The Baldwin-United Litigation Library is being created to give debtors' and creditors' counsel [and] news media and other interested parties quick, easy access to the huge volume of material that will be generated by the impending litigation."

Mead Data Central has helped clients create their own private libraries since 1975, but the Baldwin-United library is the first such data base of litigation material on a single case to be open to the public.

The company said a member of one of the creditors' committees involved in the litigation will help prepare documents for inclusion in the data base. New documents will reportedly be available on-line within 10 days of filing with the court.

The library will reportedly contain transcripts of the trial and all public comments filed with the court since the original filing, including affidavits, motions and supporting memoranda, briefs and orders of the court. An on-line index of all documents filed with the court will be available to users of the two retrieval systems.

Nexis is available for a minimum monthly fee of $60, with no charge for the Nexis terminal; Lexis is available for a monthly library access fee of $100 and terminal rental fee of $55 from Mead Data Central, P.O. Box 933, 9333 Springboro Pike, Dayton, Ohio 45401.

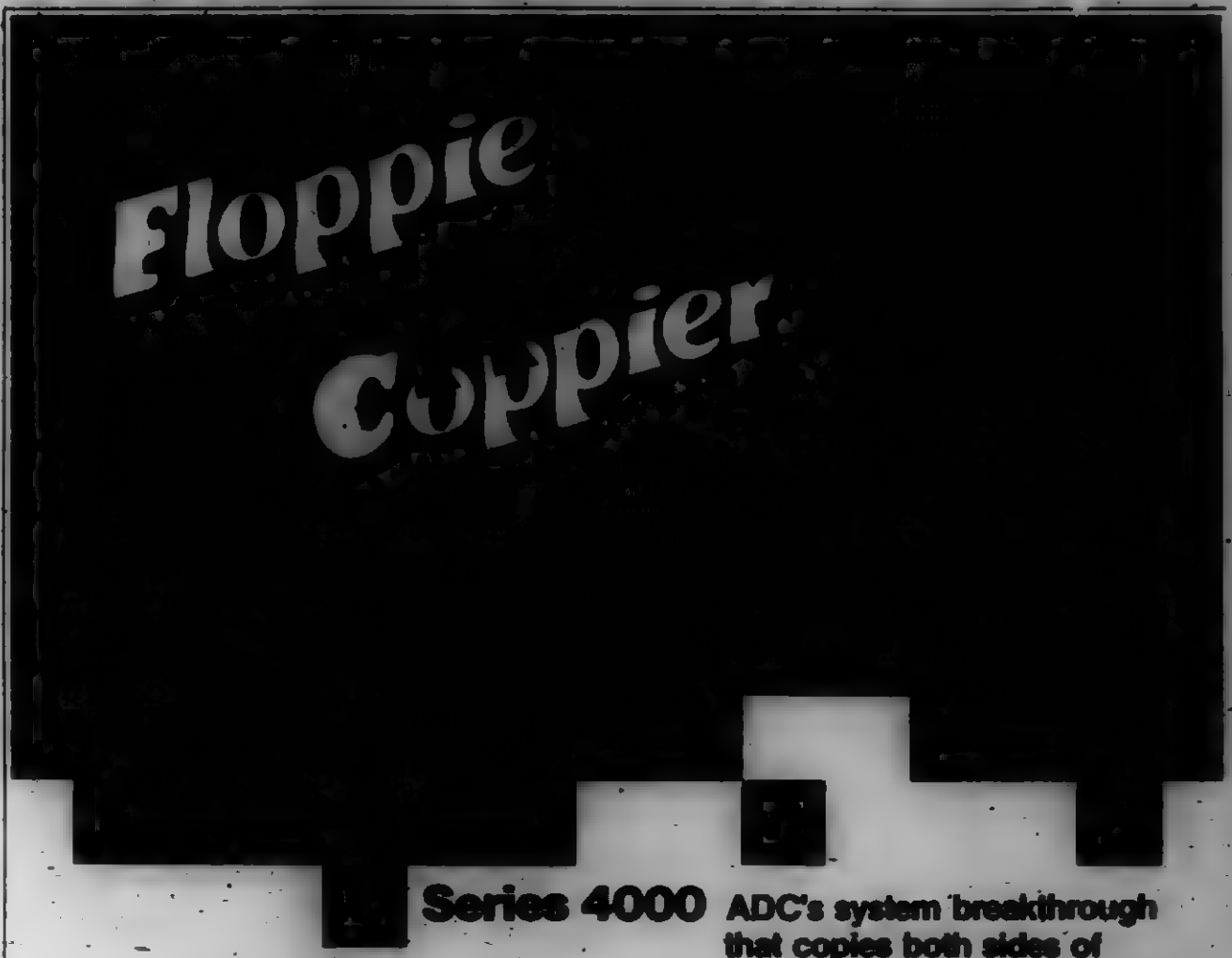
Press office, cabinet tied

WASHINGTON, D.C. — A computer link was recently established between the White House press office and the public information offices of the cabinet departments to help the flow of information on current issues.

Hooked into IT&T's Dialcom communications system, the press office utilizes an electronic mail system to communicate with the agencies and a news monitoring system to keep up with the wire services.

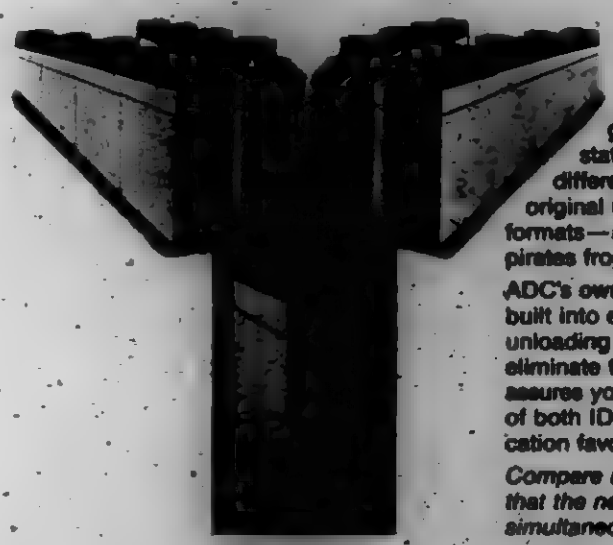
"The purpose of the on-line system is to help advise the agencies about what we're saying on issues of interest to them and for them to advise us on background or to give us talking points on current issues which might come up in one of our daily briefings," said Anson Franklin, assistant press secretary for the White House.

With IBM Displaywriters at work in the press office, the communications link has been successful so far, according to Franklin.



Series 4000 ADC's system breakthrough that copies both sides of double-sided diskettes at once!

Just as efficiently and smoothly as your office copier, ADC's new Series 4000 Floppie Coppier™ automatically initializes and copies thousands of duplicate diskettes per hour—and doubles your throughput for double-sided diskettes!



Unlike other blackbox-type duplicators, Series 4000 gives you total single-master control of up to 16 slave stations—each simultaneously working on an entirely different diskette size and format. Since inventing the original Floppie Coppier, ADC's developed over 300 different formats—and dozens of different protection schemes to prevent pirates from copying your Floppie Coppier "coppies."

ADC's own industry-standard-setting Robotic Disk Handler is built into each Series 4000 slave unit, automatically loading and unloading up to 100 diskettes with patented gentle fingers that eliminate the disk destruction of other systems. Floppie Coppier assures you of perfect "coppies" every time with true CRC control of both ID and data fields, instead of the indiscriminate duplication favored by some of our copy-cat imitators.

Compare and you'll come back to the original—especially now that the new Floppie Coppier is even further ahead with simultaneous double-sided duplication—another ADC first!

APPLIED DATA COMMUNICATIONS
14272 Chambers Road, Tustin, CA 92680
(714) 731-6000

First and still foremost in media duplication and test technology

NEWS

CALENDAR

WEEK OF JAN. 22

JANUARY 23-27, TRUMBULL, CONN. — **Introduction to Unix.** Contact: Gregory Geiger, Bunker Ramo Information Systems, Trumbull Industrial Park, 35 Nutmeg Drive, Trumbull, Conn. 06609.

JANUARY 23-27, DALLAS — **CICS/VS Internals.** Contact: On-Line Software International, Fort Lee Executive Park, Two Executive Drive, Fort Lee, N.J. 07024.

JANUARY 24, NEW YORK — **CICS/VS Logic and Debugging.** Contact: On-Line Software International, Fort Lee Executive Park, Two Executive Drive, Fort Lee, N.J. 07024. Also being held Jan. 26 and Jan. 31 in New York.

JANUARY 24-26, SAN JOSE, CALIF. — **Advanced Semiconductor Equipment Exposition and Technical Conference.** Contact: Cartlidge and Associates, Inc., Suite 305, 4030 Moorpark Ave., San Jose, Calif. 95117.

JANUARY 24-26, IRVING, TEXAS — **SAS Basics Course.** Contact: SAS Institute, Inc., P.O. Box 8000, Cary, N.C. 27511. Also being held Jan. 24-26 in Cary, N.C.

JANUARY 24-26, ARLINGTON, VA. — **SAS Basics (Portable) Course.** Contact: SAS Institute, Inc., P.O. Box 8000, Cary, N.C. 27511.

JANUARY 24-27, BOSTON — **Computer Graphics.** Contact: Integrated Computer Systems, 3304 Pico Blvd., P.O. Box 5339, Santa Monica, Calif. 90405.

JANUARY 25, TRUMBULL, CONN. — **Unix Marketing.** Contact: Gregory Geiger, Bunker Ramo Information Systems, Trumbull Industrial Park, 35 Nutmeg Drive, Trumbull, Conn. 06609.

JANUARY 25-26, CARY, N.C. — **SAS Color Graphics Course.** Contact: SAS Institute, Inc., P.O. Box 8000, Cary, N.C. 27511.

JANUARY 25-27, EAST RUTHERFORD, N.J. — **The Business Telecommunications Exposition.** Contact: The Exposition Group, 9128 Columbia Ave., North Bergen, N.J. 07047.

JANUARY 25-27, NASHUA, N.H. — **Preventive Maintenance and the Personal Computer.** Contact: New Hampshire College Resource Center, New Hampshire College, 2500 N. River Road, Manchester, N.H. 03104.

JANUARY 25-27, LOS ANGELES — **Computers in Manufacturing.** Contact: National Institute for Management Research, P.O. Box 3727, Santa Monica, Calif. 90403.

JANUARY 26-27, LAS VEGAS — **Computers in Construction.** Contact: CIP Information Services, Inc., 1105-F Spring St., Silver Spring, Md. 20910.

JANUARY 26-28, ORLANDO, FLA. — **The Southeastern Regional Office Machine Dealers Association Meet (Bermuda '84).** Contact: Sergenda, Inc., Suite 205, 5115 Maryland Way, Brentwood, Tenn. 37027.

JANUARY 27-29, HOUSTON — **Resource '84.** Contact: Joyce Fadem, Professional Resources, Inc., P.O. Box 740433, Houston, Texas 77274.

WEEK OF JAN. 29

FEBRUARY 1, NEW YORK — **Advanced Disease.** Contact: Center for Advanced Data Processing, Inc., Suite 402, 450 7th Ave., New York, N.Y. 10123.

FEBRUARY 1-2, DALLAS — **Recovery/Restart.** Contact: On-Line Software International, Fort Lee Executive Park, Two Executive Drive, Fort Lee, N.J. 07024.

FEBRUARY 1-2, SUNNYVALE/SAN JOSE, CALIF. — **Data Communication for Personal Computers.** Contact: Center for Advanced Data Processing, Inc., Suite 110, 1820 E. Garry St., Santa Ana, Calif. 92705.

FEBRUARY 1-3, LOS ANGELES — **SAS Macro Language Course.** Contact: SAS Institute, Inc., P.O. Box 8000, Cary, N.C. 27511.

FEBRUARY 1-3, NEW BRUNSWICK, N.J. — **Data Base Management.** Contact: Center for Advanced Professional Education, Suite 110, 1820 E. Garry St., Santa Ana, Calif. 92705. Also being held Feb. 6-8 in San Jose, Calif.

FEBRUARY 1-3, KANSAS CITY, MO. — **Office Automation and Integration.** Contact: Data-Tech Institute, 386 Franklin Ave., P.O. Box 569, Nutley, N.J. 07110. Also being held Feb. 8-10 in Boston.

FEBRUARY 1-3, HOUSTON — **Unix.** Contact: Center for Advanced Professional Education, Suite 110, 1820 E. Garry St., Santa Ana, Calif. 92705. Also being held Feb. 6-8 in Boston.

FEBRUARY 1-3, HOUSTON — **The PC World Exposition.** Contact: Karen Bartnicki, CW Communications, Inc., 375 Cochituate Road, Box 880, Framingham, Mass. 01701.

FEBRUARY 1-3, ANAHEIM, CALIF. — **Networking Personal Computers.** Contact: Data-Tech Institute, 386 Franklin Ave., P.O. Box 569, Nutley, N.J. 07110. Also being held Feb. 8-10 in Washington, D.C.

FEBRUARY 1-3, ST. LOUIS — **Data Communications Systems.** Contact: Center for Advanced Professional Education, Suite 110, 1820 E. Garry St., Santa Ana, Calif. 92705. Also being held Feb. 6-8 in Pittsburgh.

FEBRUARY 1-3, DALLAS — **Relational Data Bases.** Contact: Software Institute of America, 339 Salem St., Wakefield, Mass. 01880. Also being held Feb. 6-8 in Boston.

FEBRUARY 1-3, SAN DIEGO — **Network Communications Protocols.** Contact: Center for Advanced Professional Education, Suite 110, 1820 E. Garry St., Santa Ana, Calif. 92705. Also being held Feb. 6-8 in Atlanta and Feb. 15-17 in New York.

FEBRUARY 1-3, DETROIT — **Personal Computers and Networking.** Contact: Center for Advanced Professional Education, Suite 110, 1820 E. Garry St., Santa Ana, Calif. 92705. Also being held Feb. 6-8 in Houston and Feb. 13-15 in Montreal.

FEBRUARY 2, NEW YORK — **Word Processing With Wordstar.** Contact: Center for Advanced Data Processing, Inc., Suite 402, 450 7th Ave., New York, N.Y. 10123.

FEBRUARY 2-3, BOSTON — **Automating Rehabilitation Facilities With Microcomputers.** Contact: Management Information Systems, National Easter Seal Society, 2023 W. Ogden Ave., Chicago, Ill. 60612

FEBRUARY 2-3, ORLANDO, FLA. — **Local Networks: Strategies for Success.** Contact: Architecture Technology Corp., P.O. Box 24344, Minneapolis, Minn. 55424. Also being held Feb. 9-10 in Phoenix, Feb. 16-17 in Washington, D.C., and Feb. 29-March 1 in San Francisco.

FEBRUARY 2-3, WASHINGTON, D.C. — **Micro/Personal Computer Operating Systems.** Contact: Software Institute of America, 330 Salem St., Wakefield, Mass. 01880.

FEBRUARY 2-3, DENVER — **Networking Personal Computers.** Contact: The American Institute for Professional Education, Carnegie Building, 100 Kings Road, Madison, N.J. 07940. Also being held Feb. 6-7 in St. Louis.

FEBRUARY 2-5, HOUSTON — **IBM PC World Exposition.** Contact: Mitch Hall Associates, P.O. Box 360, Westwood, Mass. 02090.

FEBRUARY 3-5, RENO, NEV. — **Sage Faire '84.** Contact: Sage Faire '84, 4905 Energy Way, Reno, Nev. 89502.

WEEK OF FEB. 5

FEBRUARY 6, NEW YORK — **Introduction to IBM Personal Computer.** Contact: Center for Advanced Data Processing, Inc., Suite 402, 450 7th Ave., New York, N.Y. 10123.

FEBRUARY 6-7, DALLAS — **Managing Information Centers Effectively.** Contact: Association for Systems Management, 24587 Bagley Road, Cleveland, Ohio 44138. Also being held Feb. 13-14 in Cincinnati.

FEBRUARY 6-8, NEW YORK — **X.25 and Packet-Switching Networks.** Contact: Systems Technology Forum, Inc., 9000 Fern Park Drive, Burke, Va. 22015.

FEBRUARY 6-8, BOSTON — **Relational Data Bases.** Contact: Software Institute of America, 330 Salem St., Wakefield, Mass. 01880.

FEBRUARY 6-8, BOSTON — **Networking Personal Computers.** Contact: Personal Computer Management Association, 11928 N. Earlham, Orange, Calif. 92660. Also being held Feb. 13-15 in Denver and Feb. 27-29 in Orlando, Fla.

FEBRUARY 6-8, WASHINGTON, D.C.— **Data Communications: Network, Design and Optimization.** Contact: Institute for Advanced Technology, 6003 Executive Blvd., Rockville, Md. 20852.

FEBRUARY 6-8, WASHINGTON, D.C.— **Introduction to Data Communications.** Contact: Systems Technology Forum, Inc., 9000 Fern Park Drive, Burke, Va. 22015. Also being held Feb. 22-24 in New York and Feb. 27-29 in Denver and San Francisco.

FEBRUARY 6-8, ORLANDO, FLA. — **DP Disaster Recovery.** Contact: EDP Security, Inc., 181 West St., Waltham, Mass. 02154.

FEBRUARY 6-8, MINNEAPOLIS — **Micro and Personal Computers: Technology and Applications.** Contact: Institute for Advanced Technology, 6003 Executive Blvd., Rockville, Md. 20852.

FEBRUARY 6-9, NEW YORK — **IMS/DB (DL/1) Application Programming.** Contact: On-Line Software International, Fort Lee Executive Park, Two Executive Drive, Fort Lee, N.J. 07024.

We've made it so easy to build expert systems, all you need is a pair of scissors.

It's true. With TIMM™ (The Intelligent Machine Model), just about anyone can now build a powerful expert system. Quickly. Easily. Without knowing a thing about computers. Just send us the coupon or call, and we'll tell you all about this exciting breakthrough in artificial intelligence. Here are just some of TIMM's features:

- Knowledge engineering embedded in software
- Lets you quickly build prototype systems
- Is "domain-independent"
- Checks for consistency and completeness
- Learns by example, generalizes knowledge

SEND ME THE STORY OF TIMM™

Name_____

Company_____

Title_____

Address_____

City_____ State_____ Zip_____

Telephone_____

☐ Please call me. ☐ Send information only.

Mail to: TIMM, P.O. Box 6770, Santa Barbara, CA 93160-6770
Or call, toll-free, 1-800-235-6788. In California, call (805) 964-7724

The Software Workshop®

Artificial Intelligence Laboratory • General Research Corporation

More and more, personal computers in large organizations are dramatically improving productivity. But there's also a problem involved with this improvement. People are using many different, often incompatible microcomputers, yet they still need to share information, programs, and peripherals.

It's as if everyone had an automobile, but no highways leading to their destination. No traffic signs to follow. No rules of the road. The result? Mass confusion.

Until now, that is. Until Liaison from SofTech Microsystems.

Based on the p-System,™ the Universal Operating System,™ Liaison is a family of network software products that lets you establish a workable, efficient personal computer network. It allows personal computers and users to co-operate and work together so that your organization is altogether more effective. Liaison includes systems software products, such as an operating system, print servers and disk servers as well as development tools. And, a collection of network applications, including a database management package, electronic mail, and more.

Liaison lets you unite many different personal computers in an effective network. 8 and 16-bit machines from virtually all personal computer manufacturers (including IBM,® TI,® Corvus,® and Apple®) can all share programs, all work together, all co-operate.

So if you're tired of your different personal computers driving you to the brink of insanity, give us a call at SofTech Microsystems.

We'll show you how Liaison can get you back on the road to recovery.

SOFTECH MICROSYSTEMS

SofTech Microsystems, Inc.
16885 West Bernardo Drive · San Diego, CA 92127 · (619) 451-1230

Liaison, p-System, and Universal Operating System are trademarks of SofTech Microsystems, Inc. IBM is a registered trademark of International Business Machines. TI is a registered trademark of Texas Instruments, Inc. Corvus is a registered trademark of Corvus Systems, Inc. Apple is a registered trademark of Apple Computer, Inc.

Introducing Liaison.™ Software that allows personal computers to co-operate.

EDITORIAL

Interesting deal

Until recently, IBM's information center has been a lot of bark without much bite. While the goals of the information center are well considered — to provide a means for end users to do their own computing — IBM had been reluctant to throw its weight behind any of the myriad software vendors now providing information center tools.

All that is changing now. The announcement this month of a "complementary marketing agreement" between IBM and Comshare, Inc., which makes the System W decision support system, marks another in a series of Big Blue moves to provide some direction to the proliferating information center market.

The IBM-Comshare deal [CW, Jan. 9] followed three important IBM announcements last year. One was an agreement to sell Intellect, the natural language query and reporting product from Artifical Intelligence Corp. of Waltham, Mass. The second was IBM's announcement of an in-house version of its Application System data management and information retrieval package. The third was IBM's announcement of DB2, a relational data base management system targeted primarily for information center use.

The most interesting aspect of the Comshare announcement was its language. While the deal clearly amounts to an endorsement of System W, IBM was emphatic in refusing to term it a joint marketing agreement. IBM sales representatives reportedly will not sell System W, but will be instructed to recommend it as the primary DSS for IBM environments. Comshare will still be charged with selling, supporting and providing end-user training for the software.

In addition, IBM has left itself a convenient "out" in case it takes a shine to a new piece of DSS software. While IBM sales reps are directed to pass along sales leads to Comshare, they are not embargoed from recommending alternative vendors if they so choose.

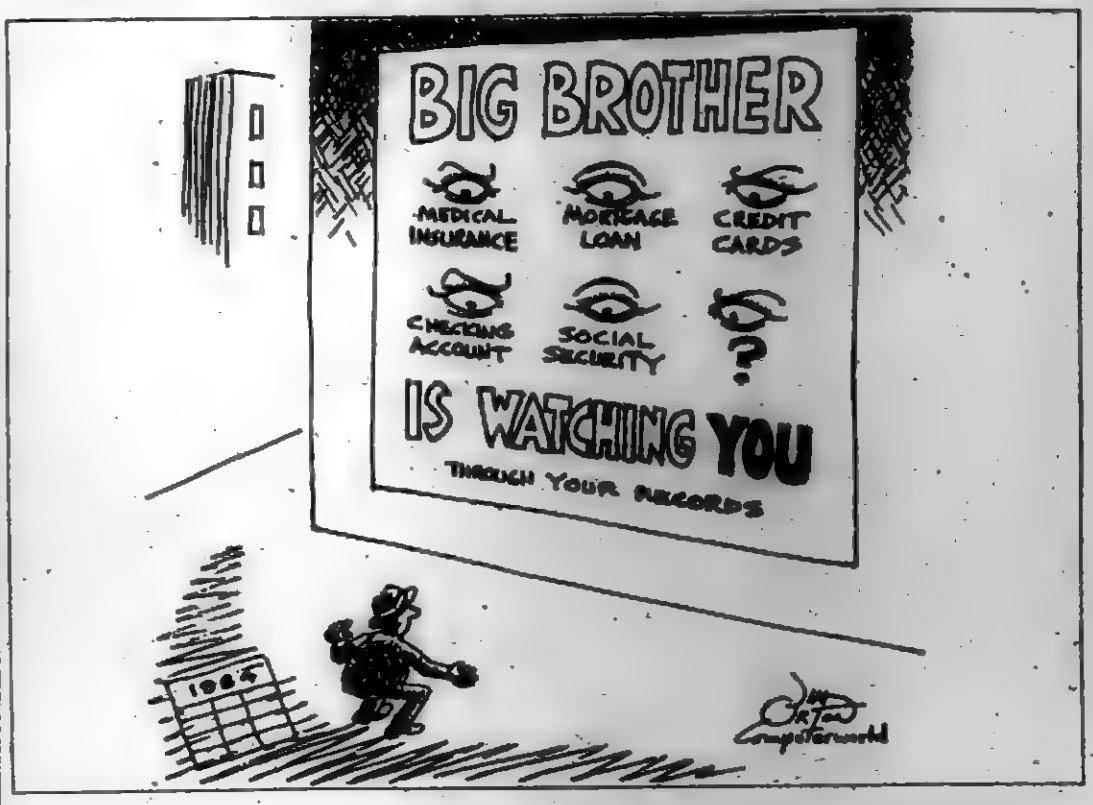
Therein lies the consolation for the DSS vendors that were passed up by Big Blue. Considering that System W has been available in package form for barely a year, it was a bold decision for IBM to choose it over such veteran players as Execucom Systems Corp.'s IFPS, Management Decision Systems, Inc.'s Express and EPS, Inc.'s FCS. However, the agreement is hardly a repudiation of those vendors.

In fact, an IBM spokeswoman said the Comshare deal will be the first of "many announcements" of a similar nature. IBM also said it would continue to offer IFPS on its Information Network, an escape hatch allowing the company to stop short of an all-out endorsement of System W.

At the risk of sounding trite, it is safe to say that users will be the big winners in this latest IBM marketing foray. By bringing Comshare under its wing, IBM has assured customers that the System W software will always be in step with its hardware and operating system environment. In promising future agreements of the same kind, IBM has also hinted that users considering an information center will soon have a range of stable software products from which to choose, all of them blessed and insured by IBM.

With the possible exception of Comshare's competition, software vendors should also take heart from the announcement. In effect, IBM has said that it is willing to endorse a quality product, even if it competes in some areas with IBM software.

Moreover, IBM's success in opening the Personal Computer market to third-party software vendors has apparently led the computer giant to reconsider its attitude toward independent vendors in the mainframe arena. Independents should be encouraged by the message that IBM will look favorably upon software that will help it sell hardware, even if the code originates outside the company.



LETTERS TO THE EDITOR

Electrical matters

Two items in Leo Sharkey's article, "Reorganization Spurred by Manager's Experience" [CW, Dec. 12], require some comment.

The article states: "But Edison could not produce less electricity even though industries were using less." This implies erroneously that a utility generates more electricity than is being demanded by its customers at a given moment. This is a physical impossibility. Detroit Edison and every other electric utility produces exactly the amount of power its customers demand.

Next, the article says: "To halt a power plant's motion, even momentarily, would result in a fatal flat spot on the turbine." I am somewhat at a loss to address the "fatal flat spot on the turbine." Perhaps an oblique reference is being made to the steam turbine rotor distortion that can occur when a spinning rotor is brought to complete rest while the turbine is still hot. Unequal thermal stresses along the vertical diameter of the rotor will cause this massive hunk of metal to distort and bend. Realizing that the parts inside huge steam turbines are fitted to watchmaker tolerances, rotor blades will make contact with stationary components. The result is one bound up mess from which it is extremely difficult to recover.

Peter Kasklewski
Manager, Process Computer Engineering
Northeast Utilities Service Co.
Hartford, Conn.

Computerworld welcomes letters from its readers. Preference will be given to typed, double-spaced letters of 150 words or less; they may be edited for the purposes of clarity and brevity. Letters should be addressed to Editor, Computerworld, Box 880, 375 Cochituate Road, Framingham, Mass. 01701.

COMPUTERWORLD

Editor
John C. Wilkinson

Executive Editor
Rita Shaw

Assistant Managing Editor
Cheryl M. Gallo

Design Editor
Marjorie Magowan

Senior Editors:
Software
Paul Gillin
Communications
Jim Barbino
Phil Hirsch
Systems
Tom Henkel
Industry
Bill Laberis
Features
George Hayer
International Editor
Susan Blakeney
Associate Features Editor
Barbara Van Scoyoc
Staff Writers:
James Garbagnia
Peter Bartolik
James Connolly

John Gallant
Lynn Haber
Patricia Keefe
Paul Korzeniowski

Correspondents:
New York:
David Myers
Suite 7G
401 East 80th St.
New York, N.Y. 10021
212/570-2135
Washington, D.C.
Bureau Chief: Jane Kirchner
445 National Press Building
529 14th St., N.W.
Washington, D.C. 20045
202/347-6718
West Coast
Bureau Chief: Jeffry Beeler
Correspondent: Robert Ball
1020 Marsh Rd.
Menlo Park, Calif. 94025
415/328-8084

Chief Copy Editor
Donovan Wills

Assistant Chief Copy Editor
Kathie Gow

Copy Editors:
Becky Bairos
Dave Bradford
Bruce Crane
Elizabeth Morra
Deborah Scadutto-Ham
Thomas Schmidt
Charlotte Ziems

Assistant to the Editor
Jane Fettig

Editorial Assistants:
Mary DiChristina
Joyce Fiala

Contributing Editors
J. Daniel Couger
Malcolm Crawford
Jack Dolce
Tomorrow Time
Larry Long
Microcomputers
Thomas Madron
The Data Center
John P. Murray
Leaders on Science
Charles P. Lecht
Special Publications
Computerworld Extra!
George Hayer, Editor
Computerworld on Communications
Bruce Hoard, Editor
Computerworld OA
Ann Dooley, Editor
Computerworld Buyer's Guides
Marcia Blumenthal, Editor

Main Editorial Office: Box 880, 375 Cochituate Road, Framingham, MA 01701 617/879-0700

Computerworld is a member of the CW Communications/inc. group, the world's largest publisher of computer-related information. The group publishes 44 computer publications in 16 major countries. Nine million people read one or more of the group's publications each month. Members of the group include: Argentina's Computerworld Argentina; Australia's Australasian Computerworld and Micro Computer Magazine; Brazil's DataNews and MicroMundo; China's China Computerworld; Denmark's Computerworld Denmark and MikroData; France's Le Monde Informatique; Germany's Computerwoche, Microcomputerwelt and PC Welt; Italy's Computerworld Italia; Japan's Computerworld Japan and PC Japan; Mexico's ComputerworldMexico; Norway's Computerworld Norge and MikroData; Saudi Arabia's Saudi Computerworld; Spain's ComputerworldEspana and MicroSistemas; Sweden's ComputerSweden, MikroData and Att Hantdator; the UK's Computer Management and Computer Business Europe; the U.S.' Computerworld, Desktop Computing, Hot CoCo, inCider, InfoWorld, Micro Marketworld, Microcomputing, PC World, Run and 80 Micro.

VIEWPOINT

Just what is quality, anyway?

QUALITY

WAYNE SMITH

Over the next several months, this column will be focusing on software quality and how senior management, together with information services management, can establish and operate a quality data processing function. This will not be a technical dissertation on techniques, methodologies and standards, but rather a look at the issue from an organizational and management viewpoint. Fundamental underlying principles regarding quality programs, their critical success factors and how, specifically, a quality information services organization can actually contribute to improving an organization's bottom line will be discussed. Furthermore, the topics discussed are all well within our current capabilities.

The principal question surrounding any attempt to establish a quality function effectively is: What is quality, anyway? That quality is felt to be a somewhat desirable but, nevertheless, unrealistic and unattainable goal for an information services function is the biggest hurdle senior management must overcome.

No real quality breakthrough will occur until senior management changes its long-held beliefs and opinions that quality is expensive, unattainable and subjective.

These cultural changes are always slow to take place. Moreover, it appears that two major roadblocks stand in the way of a real quality breakthrough:

■ Senior management does not yet recognise that quality in information services is not a subjective measure of relative goodness, but rather is simply "Doing exactly what we say we are going to do, when we say we are going to do it."

■ Information service's inability (along with the quality assurance function's inability) to quantify the cost of quality effectively in the organization. That is, what is the actual cost of shipping defects into production (it is probably several times greater than you think it is), how expensive are missed schedules, what business opportunities are lost (or delayed) due to poor requirements analysis and so on.

First roadblock

The first roadblock, because it has to do with the perception of quality in the organization, represents the essence of the problem. Recognising that quality is nothing more than meeting requirements and that quality information services is the best road to improved productivity requires more than an intellectual understanding by management; it must become part of its mind-set and must positively affect day-to-day decision making. For too long, quality issues were relegated to the technical staff for solution. And, of course, their solutions were primarily technical in nature. Accordingly, there was heavy emphasis on tools, techniques and methodologies that addressed the program development and coding components of the project. As a result, the quality orientation was a technical orientation, focusing on only 10% to 30% of the project effort without exploiting the real quality leverage, namely, the management and organizational strategies.

But what does this new definition of "quality" mean? Embedded in the notion that a quality system is a system that meets requirements are the following issues:

■ The organization must invest in the development of a well-defined, complete and verifiable set of requirements before design and programming begins. This includes not only the traditional business requirements, but also the technical, production and maintenance requirements. In other words, if it is an important enough issue to the organization, then it is worth attempting to define it in the requirements document.

■ These requirements must all meet the following constraint: Can I set up a process whereby an independent agent can verify that the delivered product meets

See QUALITY page 32

Users, DPers should change micro views

HUMAN CONNECTION

JACK STONE

Although sometimes it doesn't seem so, there truly is a farsighted segment of the data processing community that recognizes that the personal computer in stand-alone mode offers cost-effective solutions to a vast number of "smaller" information handling problems that are far too costly to implement on terminal-oriented minis and mainframes. These DPers also appreciate that the added processing overhead on the larger machines is only one factor that is eliminated when the micros off-load some of the work. Just as important, if not more so, is the relief accruing to the analysis and programming teams that can reduce the level of ongoing systems support to the smaller users and devote more of their energies to the solution of the "larger" business problems.

There is no question that end users and DPers alike benefit from the growth of personal computers. Processing power is decentralized in parcels appropriate to operational needs; general-purpose applications packages make the micros a lot easier to work with and faster to adapt to particular requirements; and organizational structures make adjustments in internal procedures to streamline the manual data-handling functions.

Broader scheme of things

But in the broader scheme of things, perhaps the most significant payoff of all is that many users become more knowledgeable about computerized systems, some even achieving high levels of operational independence and the concomitant rewards of reduced frustration and increased productivity. As a result of the experience, enlightened DPers learn that it is in their best interests to support the acquisition of personal computers and, thereby, to relieve the burden of ongoing support.

Unfortunately, such knowledge falls short for a great many people in our industry who evolve distorted, if not widely exaggerated, claims about the role that personal computers should play in modern enterprise.

For example, on the business side, there are those who avow that their flock of personal computers will eventually replace the mainframes because of their attractive operability, maintainability and economic factors. Yet equally bizarre notions are found on the DP side, generally involving the pooh-poohing of personal computers' capabilities and their downgrading to the level of toys, plus the alleged waste of money and manpower in user departments stemming from poor systems designs.

Role of the personal computer

Of course, the role of the personal computer is found in its generic name: personal computers are valuable and cost-beneficial for those information needs of a "personal" nature. One can spend months researching the classes of problems that fall into this category, or take my simplistic approach in which I loosely define "personal" applications as those that are solvable by the computing power you can acquire for $5,000, a somewhat arbitrary clip level, perhaps, but not an unreasonable one in today's budgeting circumstances.

And these days, this investment buys computing components that are vastly improved over those of the first generation: a hard disk that, at last, provides popularly priced storage for decent-size — megabyte — files; a vast amount of random-access memory — several hundred kilobytes — to aid the functionality of OS controls; 16-bit technology — edging rapidly into 32 — for speedier calculations; a wide selection of I/O devices for special needs; better-than-ever software to increase personal productivity; and, of course, communications facilities to allow terminal access to larger machines.

To sum up, those users and DPers given to overstatements or understatements should moderate their views toward personal computers and accept the fact that personal computers represent only another set of options available for the organizationwide automated information system. Nothing less and nothing more. ‡

Bilingualism and the law

READER'S PLATFORM

ROY N. FREED

A serious language barrier separates many lawyers and computer executives without their ever being aware of that fact or of its adverse impact on many lawyers' clients.

Lawyers are making the great mistake of aping the language of the industry, usually without knowing that it is inapplicable to them, except as they are customers in the marketplace. In handling legal matters, they talk "computerese"—either to appear knowledgeable or because they don't know any better. In doing so, they shirk their professional responsibilities to their clients. Their clients talk computerese to them, not realizing how their valuable legal interests suffer in the process.

Consider in this regard the following actual, but camouflaged, example. In the acquisition agreement for an important transaction between a developer and a large manufacturer involving a novel, plug-in printed-circuit board and a related software program, a lawyer in a major Chicago law firm defined the term "product" to mean both the board and the magnetic diskette and related other material for the program. He then provided that the developer would deliver the product for evaluation and that the manufacturer had an option to buy the product if it liked it. He failed to recognize that, while his client needed these tangible things in order to assess the marketability of the product, the client would have to buy the know-how and copyrights in the diskettes and written materials in order to have the right to make and sell the product.

The lawyer was taken in by the way his client described the transaction. In the process, he failed to protect his client. His elegant agreement, actually based on a real estate form, would not have gotten for his client the very property rights intended to be secured for the high price if the seller's more sophisticated lawyer didn't pick up the fundamental flaw. This is not an isolated example.

Valuable properties

The valuable properties of many software houses and computer manufacturers will continue to be in jeopardy until their lawyers and executives become bilingual in their

See LAW page 35

Computerworld welcomes opinion pieces from its readers. Submissions to the "Reader's Platform" column should be typed, double-spaced and no longer than six pages. Computerworld reserves the right to edit them for the purposes of clarity and brevity. Send them to Editor, Computerworld, Box 880, 375 Cochituate Road, Framingham, Mass. 01701.

VIEWPOINT

QUALITY from page 31

that requirement. In other words, can it be reliably tested?

The requirements document is the most critical user document produced. As such, it must be the final source of what the system must do. And, of course, it must be under stringent change control.

Finally, the user, project manager and information services management must all agree that this step is critical and not just a necessary evil before we can start programming.

If the required cultural changes can take place in this area, then an organization can begin to take advantage of the true productivity benefits associated with delivering systems and data that do the job right the first time.

The second roadblock is due largely to a failure on the part of information services (with a notable lack of help from the quality group, if one even exists) to quantify clearly in dollars and cents the very real, tangible and direct costs of quality in a data processing organization.

Three components

Quality costs can be thought of as consisting of three components:

- *Prevention.* The cost associated with establishing an environment that reduces the likelihood of flaws being introduced into a system, such as training and standards.
- *Appraisal.* The cost associated with identifying flaws during the process, such as reviews and testing.
- *Failure.* The cost associated with both internal and external systems failure, such as rework and lost business.

Failure costs are, by far, the largest of the three.

Very few managers understand this equation, nor do they fully understand the "physics" of building reliable software. It is becoming increasingly clear when one examines the wealth of data and experiences on systems development that application development projects fall into several broad classifications that exhibit similar characteristics.

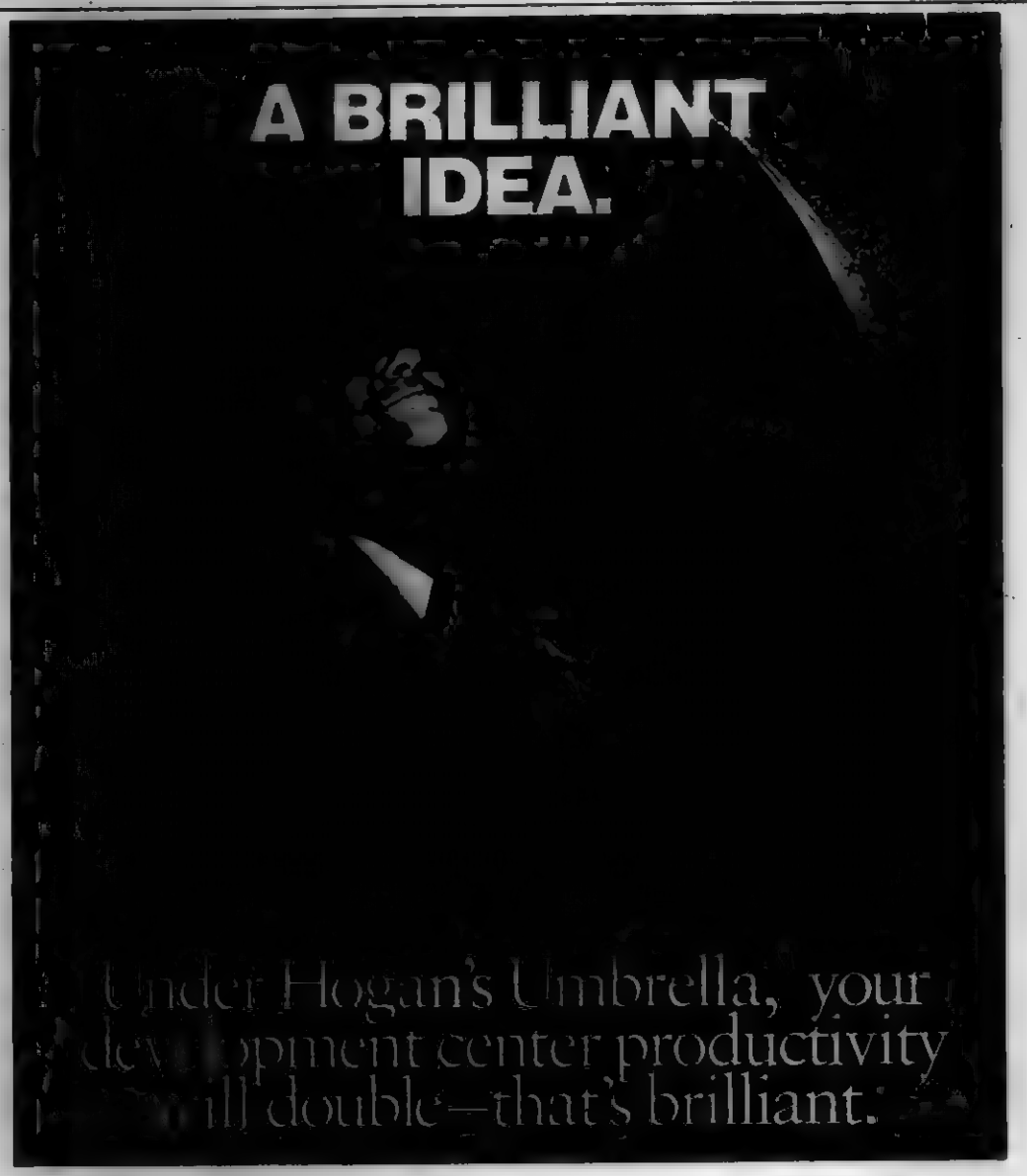
Furthermore, there are built-in causal relationships that can be exploited. For example, if one wants to control a particular dimension of a development effort, then one must have a disciplined control system for monitoring, measuring and reporting on that dimension. The typical dimensions are: time, cost, functional scope and user satisfaction. Another, by now almost classic, characteristic is that defects are exponentially more expensive to correct as the life cycle advances or that time, cost and functionality (even as rudimentarily measured by means of lines of code) define a feasible (and a corresponding unfeasible) region for project success. Further, these relationships are valid for most of what we refer to as maintenance efforts as well as for development.

Yet, there are hundreds of information services groups that every day start high-risk, high-user-expectation projects with no control systems, minimal disciplines and no true user or management commitment — projects that the "physics" would predict are going to be unsuccessful, high-cost, never-ending projects that won't fully meet the needs of the organization in any event.

To help companies compute the costs of quality related to information services, Guide, the IBM user organization, has established what may well be the single most significant effort related to quality costs in the industry via its recent Cost-of-Quality project. The results of this effort will be a substantial step toward not only changing senior management's beliefs and opinions regarding quality, but also in providing a process whereby quality costs can become an inherent and quantitative part of management's planning and decision making.

Quality is not only within our reach but, in many cases, well within our current capabilities. Further, quality data processing may be the best way for organizations to maintain (or even to raise) their profit margins without raising their prices. A quick assessment of failure costs in data processing can often uncover startling opportunities for cost reduction and profit improvement, to say nothing of improving customer relations and increasing business opportunities. The industry has matured now to the point where commitments to a quality information services organization are not only appropriate, but are essential if information services is to play any significant role in company management, direction and performance. ‡

Smith is president, specializing in quality, at Applied Information Development, Inc. in Oak Brook, Ill.



Imagine. A fully integrated development center system capable of upgrading and increasing output throughout the life cycle of both major and minor on-line and batch applications.

This completely automated approach to interactive development was critical in the development of our own highly successful line of applications software. That included design, management, programming, implementation, and maintenance of both on-line and batch applications. The Umbrella weathered well.

So well, in fact, users tell us that, "we beat our estimates by 50% on our very first major on-line application and that included our education time on the Umbrella."

There's a lot more the Hogan Umbrella can do. Just ask any Umbrella user...various combinations of DOS, VS, MVS, IMS, VSAM, CICS, IDMS. And ask Ed Lomax, Vice President, at (214) 386-0020. Make a brilliant decision today.

Send me more information on your UMBRELLA System.

Name:_____

Title:_____

Company:_____

Address:_____

City:_____ State:_____ ZIP:_____

Phone:_____

Hogan SYSTEMS

TOMORROW'S SOFTWARE. HERE TODAY.

Corporate Headquarters: 5080 Spectrum Drive, Dallas, TX 75248 ☐ Atlanta, Boston, Chicago, Dallas, Detroit, Los Angeles, New York, London, Australia and New Zealand ☐ TELEX 203927 ☐ (NASDAQ Symbol: HOGN)

'You're going to have to take it a little easier guy, you're starting to fall apart at the chips.'

SPECIAL INTRODUCTORY OFFER FOR NEW SUBSCRIBERS. SAVE $5.00, PAY ONLY $39.00 FOR A FULL YEAR'S SUBSCRIPTION.*

(Basic Annual Subscription Rate is $44.) *U.S. ONLY

No Other Publication Gives You SO MUCH Timely News, Money-Making Ideas & Management Information— ***PLUS*** *Specials & Bonus Issues!*

As a weekly newspaper, ***COMPUTERWORLD*** gives you thorough and timely coverage of news and ideas of interest to computer users in industry, business, government and education. Unlike monthlies, ***COMPUTERWORLD*** covers *hundreds* of relevant news items *each week*. *But beyond the "news" you get much more as a CW reader:*

- Weekly "In Depth" articles.
- Monthly "Special Reports" on selected subjects.
- ***COMPUTERWORLD BUYER'S GUIDE SERIES*** . . . a comprehensive series of product-specific lists and up-to-date information on each major product area.
- ***COMPUTERWORLD OA*** with incisive coverage of office automation.
- ***COMPUTERWORLD ON COMMUNICATIONS*** covers product and system developments in the rapidly changing communications field.
- **PLUS** Other Special Issues Throughout The Year!

SUBSCRIBE NOW

Complete Form On Reverse, Then Return In Attached Postage-Paid Envelope. Or Use Your Charge Card and Call TOLL-FREE: 1-800-343-5730.

☐ **Please enter my subscription (details on back)**

☐ **I'm already a subscriber, but I'd like you to change my:**

☐ address ☐ title
☐ industry ☐ other

My current mailing label is attached and I've filled in new information on the other side.

Put old label or label information here

COMPUTERWORLD

Please send me COMPUTERWORLD for one year. RATES: United States ~~$44~~;
Canada, Central & South America $110; Europe $165;
All Other Countries $245 (Airmail Service)

Special Introductory Offer
Only $39.00 Save $5.00

☐ Check Enclosed
☐ Am Ex ☐ BA/Visa ☐ MC (MC Only - List four digits above your name)

If charge we must have cardholder's signature: _____ Expiration Date: _____

First Initial		Middle Initial		Surname	
Your Title					
Company Name					
Address					
City		State		Zip Code	

Address shown is:
☐ Business
☐ Home

☐ Check here if you do not wish to receive promotional mail from *Computerworld*.

☐ Check here if you're interested in receiving information on *Computerworld's* Index.

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

CIRCULATION DEPT. 375 Cochituate Road, Rte. 30, Box 897,
Framingham, MA 01701-9985

Detach here, moisten and seal envelope securely before mailing.

1. BUSINESS/INDUSTRY (Circle One)
End Users
10 Manufacturer (other than computer)
20 Finance/Insurance/Real Estate
30 Medicine/Law/Education
40 Wholesale/Retail Trade
50 Business Service (except DP)
60 Government—State/Federal/Local
65 Public Utility/Communication Systems/Transportation
70 Mining/Construction/Petroleum/Refining
75 Other User _____
Vendors
80 Manufacturer of Computers, Computer-related Systems or Peripherals
85 Computer Service Bureau/Software/Planning/Consulting
90 Computer/Peripheral Dealer/Distributor/Retailer
95 Other Vendor _____

2. OCCUPATION/FUNCTION (Circle One)
11 President/Owner/Partner/General Manager
12 VP/Assistant VP
13 Treasurer/Controller/Financial Officer
21 Director/Manager/Supervisor DP/MIS Services
22 Director/Manager of Operations/Planning/Administrative Services
23 Systems Manager/Systems Analyst
31 Manager/Supervisor Programming
32 Programmer/Methods Analyst
35 OA/WP Director/Manager/Supervisor
38 Data Comm Network/Systems Mgmt
41 Engr/Scientific/R&D/Tech Mgmt
51 Mfg-Sales Reps/Sales/Marketing Mgmt
60 Consulting Mgmt
70 Medical/Legal/Accounting Mgmt
80 Educator/Journalist/Librarian/Student
90 Other _____

3. COMPUTER INVOLVEMENT (Circle all that apply)
Types of equipment with which you are personally involved either as user, vendor or consultant
A. Mainframes/Superminis
B. Minicomputers/Small Business Computers
C. Microcomputers/Desktops
D. Communications Systems
E. Office Automation Systems

©Sperry Corporation, 1983

A sure cure for the problem of information bottleneck.

Programming backlog is the source of the problem. Eliminate it, and you eliminate the bottleneck.

Which is precisely what Sperry has done with the MAPPER™ System.

With MAPPER, you work with the computer directly. You ask questions in plain English. And you get immediate answers.

And if the information you get raises other questions, you can ask them right away. With no delay for programming. Or reprogramming.

MAPPER is that powerful. It allows you to manipulate information in almost any way you want. And, interesting to note, it can even help your programmers become more productive.

AN AFFORDABLE SYSTEM.

You don't have to be a large company to have a MAPPER System. MAPPER can be scaled to the real and present needs of just about any size company. The cost of a MAPPER System makes it practical for even a department within a company to own its own system. Or you can time-share through a Sperry service bureau.

What you get for your money is a whole new order of efficiency in your day-to-day management tasks. Because you'll have the information you need right at your fingertips. Literally.

SEEING IS BELIEVING.

We've made some promises here that may sound extravagant. But if anything, our claims are on the conservative side. And to prove it, we offer you the opportunity to see a demonstration of MAPPER at work.

800-547-8362

But first, you might want to look over our MAPPER brochure. A copy is yours for the asking. Call toll-Free: 800-547-8362 (9 a.m. to 5 p.m. E.S.T.). Or send us the coupon.

MAPPER SYSTEM

Sperry Corporation CW1/15-19
Computer Systems
Department 100
P.O. Box 500
Blue Bell, PA 19424

Please send me a brochure on the MAPPER System.

CW1/15-19

Name_____

Title_____

Company_____

Address_____

City_____ State_____ ZIP_____

Telephone_____

We understand how important it is to listen.

SPERRY

VIEWPOINT

All I wanted was to buy a bag of groceries

READER'S PLATFORM

TERRI J. STEICHEN

The other day I wrote out a check to pay for groceries. The clerk told me, while looking over my check, that in the near future, the store was starting a new computerized check-approval system. I would have to make a new application if I wanted to keep paying for food with a check.

After over five years of biweekly or triweekly visits to this particular store, I didn't understand why I had to make out a brand-new application. But curious, I asked for a blank application.

The old system simply kept track of bad checks. If a person wanted to continue to cash checks, he had better not write checks he couldn't cover. It was simple. Apparently, it was too simple.

New form

The new application form demanded that I tell them my social security number (are they going to attach my old-age pension?), my drivers license number (which is the same), how old and fat I am, who is silly enough to employ me and where that silly employer does business — all of that in addition to the normal address and phone numbers.

Why, I asked, did I have to give out all this information just to continue to buy groceries as I have been doing for five years? "Because the old system didn't work well enough," the manager explained. I persisted a bit, though the manager looked increasingly uneasy and exasperated. "But why pick on me? I've never written a bad check!"

"You don't seem to understand," he said (this phrase became pretty familiar the more I pursued the matter). "The old system let too many bad check writers write bad checks."

New check approval

Now that, of course, makes sense. Because of the normal float and other delays, unscrupulous or careless people can go on for a long time before their bad check records catch up with them. I'm sure that the new computerized check approval system will be more effective at catching bad checks than the old one was. All that data about how old and fat I am could be useful in tracking me down, if need be. And to store and retrieve that extra information only takes a few more fields on the computer record — pretty trivial, from the technical standpoint.

There is only one problem. It takes me — a person with an unblemished record of trustworthiness (at least from the standpoint of my checking account) — and dumps me into a pot with the worst thieves in the country. For the store's ease of screening out crooks, I am presumed to be a crook until proven otherwise. That's just fine for the store and for the data processing processors. But what about me?

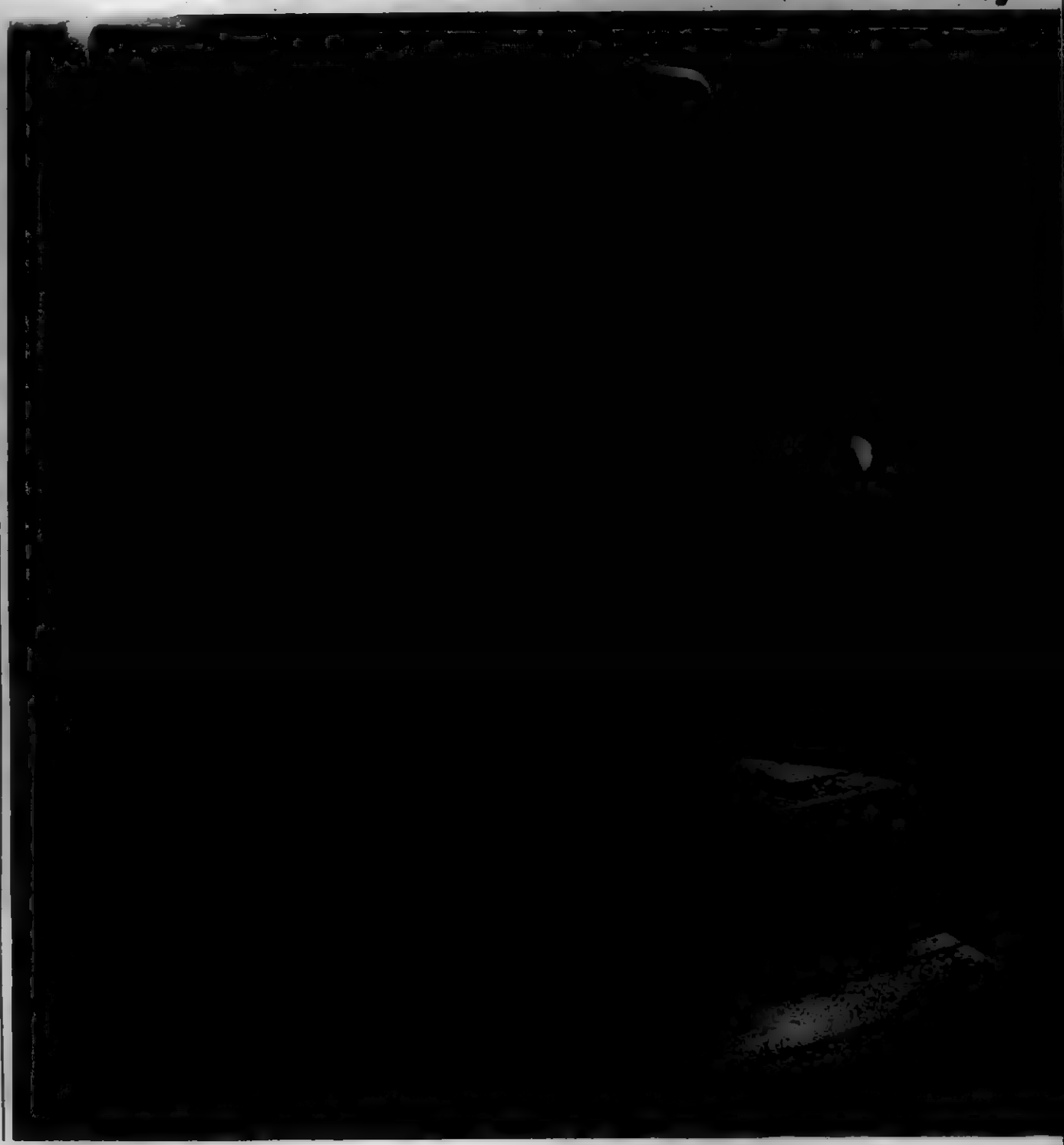
I don't like the mistrust and presumption of guilt that seems to come with so many computerized applications. Why does a store clerk have to presume every customer is in the credit companies' bad-credit listing, forcing me and all the other customers to wait while the clerk proves that is not so? In my case, I could have told him so if only he had asked me.

America is the world's great melting pot. That's a great concept because it means that we take the best the rest of the world has to offer, put it all together and come out with something even better — or that's what I thought it meant. But with the way that businesses are computerizing that melting pot, it seems as though something is changing, something quite important.

That's not logical, I know. It won't compute. But it bothers me. ‡

Steichen is president of New Perspectives Group, Ltd., a consulting firm based in Fairfax, Va.

The Texas Instruments Quite simply, the best on the market today.



LAW from page 31

respective languages. The property interests involved, although entirely traditional, are new to most lawyers, and they are prevented from recognizing those interests by the shorthand terms computer people have adopted for business purposes.

Being intellectual property rights, such as copyrights, trade-secret rights and patents, those interests are extremely fragile. They can be lost forever if they are not established firmly at their very inception. Lawyers and computer people, who ordinarily speak entirely different languages, simply must start communicating with each other effectively.

Out of pure self-protection, computer executives have to learn the types of properties their companies are involved with. They have to think in terms of copyrights, trade-secret rights and patents — the intellectual property rights. Tangible items reflect things in which those rights exist, being information in the case of patents and trade-secret rights, and ways of setting forth information in the case of copyrights. They are not necessarily the real subject matter of many transactions. Permissions to enjoy intellectual property rights owned by others are granted, and received, by licenses. With that knowledge, executives can guide their lawyers in designing transactions, or at least not divert them.

The word 'software'

Take the word "software," used as a noun, as another example. While business people usually are understood by their peers when they speak of "selling software," lawyers need more specific characterizations of the possible transactions in order to advise their clients correctly on tax liabilities, liability exposures and property interests. The rules of law in those and other areas are divided into many categories that have different qualities and consequences. Most of those categories continue to be applicable in the computer age. Sales taxes apply to transactions whose principal purpose is the transfer of tangible personal property at retail, such as the outright sale of a prerecorded diskette for a microcomputer program; they should not cover licenses to use trade-secret information about software programs until the legislatures so provide. Tangible personal property taxes apply to the ownership of that property, but not to a license to use such information. Similarly, the federal investment tax credit applies to tangible personal property but not to intangible property until Congress provides otherwise.

Knowledge of those different qualities is supposed to make it possible to predict legal treatments of actions under various circumstances. Predictability is essential in selecting business policies and designing business arrangements. It is essential in controlling costs of legal services and achieving desired property interests. Lawyers are expected to be able to predict legal treatments in most situations that confront their clients, and they should have the means to do so, largely through understanding the subject matter despite the computerese.

Hence, lawyers have to become proficient in translating from the computerese of "software" to the various intellectual property rights involved in particular situations. When they do, their clients will start to secure the level of legal service for which they are paying right now. ‡

Freed is a partner in the Boston law firm of Brown, Rudnick, Freed & Gesmer.

Professional Computer. personal computer And tomorrow.

For your best performance and productivity, rely on the TI Professional Computer.

Critics have called it "the machine IBM should have designed." And "the optimum personal computer." And thousands of demanding business and professional people have had similar praise for the design, software availability and dependability of the Texas Instruments Professional Computer. Here's why.

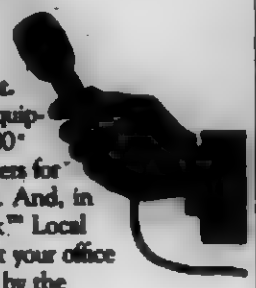
Best internal design.
With the TI Professional Computer, you avoid the possibility of computer underbuy or overbuy. Unlike IBM, our standard PC can grow to XT capability — so you don't have to choose between a PC or an XT. If you need more computer after you buy the standard TI Professional Computer, add features like internal memory up to 768K RAM. And internal 10 megabyte Winchester disk. Or other expansion capabilities which you can add using our 5 built-in option slots. So you get more computer without buying a new one.

Best graphics.
Our high resolution monitors give you some of the sharpest displays available, 3-plane graphics and the capability for 8 simultaneous colors or monochrome shades (IBM and Apple give you only 4). Plus, unlike IBM, the same software runs on either the color or monochrome monitor.

Best software available today.
Literally hundreds of third-party software packages are available for the TI Professional Computer. Including the best-sellers like Lotus 1-2-3™. TI and leading third-party software suppliers are committed to developing new programs to help keep your business ahead.

Best keyboard.
Superior design makes this the easiest to use keyboard. You get 12 programmable function keys for faster, easier use. Separate numeric keypad and cursor controls. And isolated edit/delete keys to prevent accidental loss of data.

Best new features for the future.
Come in to a participating dealer today for a demonstration of the TI Professional Computer using our revolutionary speech recognition† capability. Soon you will be able to add the recently announced Speech Command™ option to the TI Professional Computer. This will enable you to operate the computer with simple voice commands. Which lets you work a lot faster and easier.



Best support equipment.
We offer companion equipment like the OMNI 800* Model 850 and 855 printers for reliable hard copy output. And, in early 1984, the EtherLink.™ Local Area Network to connect your office workstations. All backed by the TI worldwide network of service and support.

See the TI Professional Computer for yourself. It is, quite simply, the best. Today and tomorrow. Now at participating ComputerLand stores and independent dealers. For the location nearest you, and answers to questions about your computing needs, call 1-800-527-3500.

TEXAS INSTRUMENTS
Creating useful products and services for you.

* OMNI 800 and Speech Command are trademarks of Texas Instruments Incorporated.
EtherLink is a trademark of 3Com Corporation.
1-2-3 is a trademark of Lotus Corporation.
†Voice input demonstrated nationwide. Available early 1984.
Copyright © 1983 Texas Instruments 1771-04OPC

Know why retailers everywhere are getting knoware™ fast?

Knoware™

- Teaches how to use a personal computer—in no time.
- Includes software programs that can be used—all the time.
- Makes personal computer learning enjoyable.
- Makes personal computer learning easy.
- Is a tool to be used at work or at home.

Available on Apple® II + and IIe, 64k. IBM® PC and XT, DOS 1.1 or 2.0, 128k, color graphics.

KNOWARE

301 Vassar Street, Cambridge, MA 02139

Knoware is a must for retailers because it

- provides personal computer education PLUS eight usable applications—all for $95 retail.
- helps sell hardware by letting PC buyers prove to themselves the benefits of personal computing and by letting them succeed on the first try.
- helps sell more software by providing a conceptual understanding of the benefits of best-selling applications software.
- means customer satisfaction by eliminating the frustration many new users feel once they get their personal computers home.
- is a terrific tool to train your salespeople. Knoware gets them up-to-speed quickly with personal computers. At the same time, customers can actually get themselves started on a personal computer, freeing up your staff to handle more sales opportunities.

Knoware supports dealers with

- special in-store demo copies of Knoware.
- point of sale materials.
- toll-free dealer phone line to Knoware.

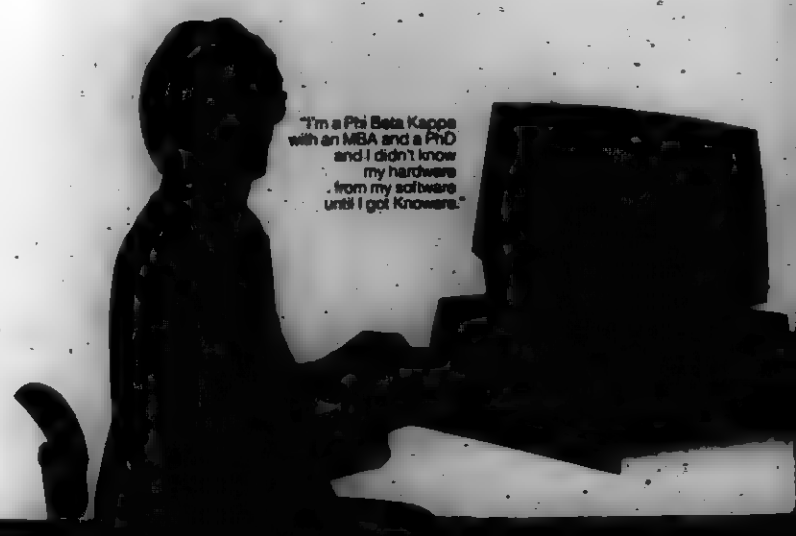
Knoware will continue to capture the public's attention with

- a major advertising and promotion program.
- the introduction of a family of products, including education on programming languages and best-selling applications, such as word processing, electronic spreadsheet and database.

Know who you have to contact to get Knoware fast?

SOFTSEL
1-800-645-7777

KNOWARE, INC.
1-800-843-5669



SOFTWARE & SERVICES

Alleviating backlog

Normalization technique a solution

By Joseph Tassone
Special to CW

The applications backlog, which averages 2½ years across the industry, has spawned the development of hundreds of new software products recently. Experts agree there are two ways to alleviate the problem. One is to increase the efficiency of DP professionals. The second is to provide end users with the capability of fulfilling their own requests. Either course requires that a manageable data storage and structure technique be provided.

Ideally, this technique would result in data arranged in the same logical and ordered format as it was prior to computerization, somewhat like a filing cabinet, but without the duplication of data across different departments.

This simple format is commonly referred to as a normalized data structure. Normalization is the process of unbundling and decomposing data to reflect logical information requirements.

Data base management systems (DBMS) are now expected to do more than merely store and control data. They are expected to provide a simple yet efficient means to fulfill information requirements. As a result, relational technology has received wide acceptance. So has the idea that data should be broken down and stored in a more fundamental form, whereby elemental data values can be utilized in a data base designed for greater flexibility. This is normalization.

In its simplest form, normalization is the process of structuring data so that it reflects the information requirements of the company and is never duplicated. Normalization cannot make conventional DBMS easier to use if navigational requirements are placed on the user or programmer. In a relational DBMS, the tabular files are navigated by the system itself. Normalization is ideally suited to relational data bases.

Normalization eliminates duplication of data, retains the logical relationships and

See DATA page 38

'Monitor' update out for CICS

Landmark Systems Corp. has announced Release 6.0 of its Monitor performance monitor and reporting system for users of IBM's CICS Release 1.5 and higher in IBM DOS/VSE, VS1 and MVS environments.

According to Landmark, the new release features an Activity Data Collection facility that captures all transaction-level resource utilization information on a high-performance Vsam data set. Advanced file design is said to ensure high performance and flexibility, and batch facilities are also provided, including a report writer plus a bridge which allows translation of Monitor data into IBM's Performance Analyzer II format.

The Online History Review is said to allow graphic or detail replay of CICS events and performance for any part of the day. A selection facility allows the user to look at the activity for specific transactions, programs, terminals and time periods. The package's Supertrace feature reportedly provides a selective, on-line transaction and system tracing capability that aids in tuning applications or in problem determination.

Features file analysis

Release 6.0 also features File Analysis, which gathers performance information for each file and DL/1 data base access and provides an on-line display of activity by channel, control unit, volume or file. An Extended Task Analysis facility allows on-line analysis of problem events.

The permanent license fee for Release 6.0 of the Monitor for CICS is $13,500 for the VS1 and MVS environments and $6,500 for the DOS/VSE environment, according to a spokesman for the vendor.

Landmark Systems, 4701 Upland Drive, Alexandria, Va. 22310.

Ada nearly ready for IBM micro

SOFTALK

PAUL GILLIN

In this age of the microprocessor, it seems nothing is legitimate unless you can run it on your IBM Personal Computer. The Ada programming language is no exception.

Alsys, Inc. of Waltham, Mass., plans to give Ada enthusiasts that capability later this year with two validated compilers for Intel Corp. 8086-based and Motorola, Inc. 68000-based microcomputers. The company will also offer a line of computer-assisted instruction software and videotapes and a set of canned Ada routines that businesses can buy rather than build themselves.

Cramming the technically rich Ada language into a micro has presented problems, according to Charles C. Patrick, Alsys' vice-president of marketing. "Developers have pretty uniformly had difficulties with compile times," he admitted. "But we're expecting to learn a lot from running and improving the compiler. We also expect hardware to continue making breakthroughs."

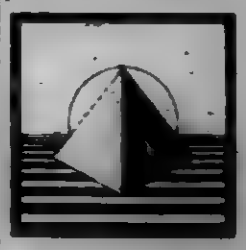
What is most interesting about Alsys' plan is its approach to portability. A key strength of Ada, which was commissioned by the U.S. Department of Defense (DOD) for military applications, is standardization. In order to bear the Ada name, a compiler must undergo a rigorous series of DOD-administered tests that involve running over 2,000 Ada programs. In theory, any Ada program should run on any Ada compiler.

Alsys hopes to overcome the issue of machine incompatibility by creating a "root" or front-end compiler that makes up about 80% of the total compiler code. Individual vendors can license the root, which is called Alsykit, and add the other 20% to customize the software to their own machines.

Alsys said that Alsykit can save a customer two-thirds of the cost and 80% of the time required to develop a validat-

See ADA page 42

Filing, multiple spreadsheet package out for IBM mainframes/46



Application development tool runs on System/36/46

INSIDE

■ CICS security system bows/42

■ Sperry users get performance management tool/42

■ Informatics T/S offers electronic mail/50

SOFTWARE & SERVICES

CUSTOMER INFORMATION					POLICY INFORMATION				
NUMBER	NAME	ADDRESS			NUMBER	TYPE	BILL DATE	AMOUNT	SALES CODE
100	Bill Jones	123 Main St. NY	NY	10019	28755	Auto	2/20/84	534.00	1
200	Ed Wilson	5 Third Ave. NY	NY	10017	12532	Fire	4/21/84	240.00	3
300	Mary Smith	21 Park Dr. Chicago	IL	60655	56432	Hlth	3/11/84	576.00	17
400	Bob Martin	6 Lisa Ave. Buffalo	NY	14202	89741	Auto	1/01/84	467.00	21
500	Jill Benson	18 Lake Pl. Warwick	RI	02886	40828	Life	4/24/84	227.00	9

POLICY INFORMATION				
NUMBER	TYPE	BILL DATE	AMOUNT	SALES CODE
14590	Fire	5/20/84	250.00	3
76890	Life	7/08/84	134.00	22
19834	Life	2/15/85	124.00	22
32456	Auto	4/24/84	525.00	8

Figure A: Unnormalized data structure

CUSTOMER NUMBER	CUSTOMER NAME	ADDRESS	CITY	ST.	ZIP
100	Bill Jones	123 Main St.	NY	NY	10019
200	Ed Wilson	5 Third Ave.	NY	NY	10017
300	Mary Smith	21 Park Dr.	Chicago	IL	60655

Figure B.

POLICY NUMBER	TYPE	BILL DATE	AMOUNT
28755	Auto	2/20/84	534.00
14590	Fire	5/20/84	250.00
29800	Hlth	4/20/84	197.00

Figure D

CITY	TYPE	SALES CODE
Buffalo	Fire	24
Buffalo	Hlth	23
Buffalo	Life	22
Buffalo	Auto	21
Chicago	Fire	14

Figure E

In the normalized data structures shown here, Figure B contains customer number, name, address, city, state, Zip Code where customer number is the key; Figure C contains customer number and policy number where customer number is the key; Figure D contains policy number, policy type, billing date, billing amount and where policy number is the key; and Figure E contains city and policy type and sales code where a composite key city/type is the key. In Figure E, since the salesman is functionally dependent on policy type in each city, a composite key is used.

CUSTOMER NUMBER	POLICY NUMBER
100	28755
100	14590
100	29800
200	12532

Figure C

DATA from page 37

stores the data in clusters of related values. Each of these clusters is identified or accessed by means of a key. The key value is used to locate all other related data.

Pyramided, maintained

Normalizing data does not mean that information processing throughout the data center has to be shut down to accommodate some exotic transformation process. Like a diet, it should be practiced and maintained for maximum effectiveness.

The steps involved in achieving normalized data are defined as levels or "normal forms." They are representations of the logical progressions required to reorganize the data. However, data does not have to proceed in a step-by-step order. It can be directly transformed from an unnormalized state to a normalized state. The third normal form is a tremendous benefit. It is more manageable, easier to access and more meaningful for users.

The most important rule of normalization is that every field (domain/column) within a record (tuple/row) is either part of the key or provides information about the key and only the key.

The unnormalized file in Figure A contains a string of related information. In conventional file structures, data was organized in long strings associated with specific applications. There was little thought of multiple uses of each piece of data.

Using this unnormalized file, the system would have to transfer each record in its entirety into main storage to process it, a very I/O-intensive procedure. Every application that requires a single component of the record must process the complete record.

To normalize the data, four separate files should be created (see charts).

Using normalized data, access of information is more efficient. Only the necessary information, related in significantly smaller blocks, is transferred, and the I/O rate is substantially decreased.

Normalized data model

The guidelines to follow to reach this normalized data model are:

- Decompose the data into its simplest form.
- Natural values in the fields can be different, but they must be the same type, such as fixed length.
- Only include logically related data within a single file.
- Use key data fields to identify non-key data fields.
- Be certain that all data within a file points to the key.
- Each field must provide only a single-valued fact about the key.
- Be certain that data fields are functionally dependent only on the key.

Toscano is a systems programmer specializing in CA-Universe, a relational DBMS, at Computer Associates International, Inc.

ELRON TECHNOLOGIES, INC.

אלרון מוגשיה אלקטרוניה בע"מ

The Venture Capital Arms of ELRON ELECTRONIC INDUSTRIES LTD. an ISRAELI hi-tech holding company is interested in financing and supporting new high-technology ventures in Israel, or in the U.S. with a branch in Israel.

ELRON offers:

- Support at the initiation stage in the U.S. and Israel
- Assistance in the development of business strategies and business plan
- Assistance in personnel recruiting The Elron group includes these companies: Elisra, Elscint, Fibronics, Optrotech, Zoran, Bio-Technology General.

For further details contact:

Gideon Tolkowsky
ELRON TECHNOLOGIES, INC.
1350 Ave. of the Americas
New York, NY 10019
(212) 887-1510/1511

ADDERS/Data Entry BEATS ALL OTHER DATA ENTRY SYSTEMS

ON SIMPLICITY, FUNCTIONALITY, AND COST

Simplicity : ADDERS/Data Entry runs on existing terminals under SHADOW II or CICS in pseudo-conversational mode. Non-D.P. staff can set up their own input screens to mirror source documents. No additional hardware needed!

Functionality : ADDERS/Data Entry offers all the function of the best key-to-disk systems plus on-line power and direct data entry.

Cost : ADDERS/Data Entry protects your resources by removing the need for specialized hardware and making optimum use of your mainframe power.

ADDERS/Data Entry is one of a group of integrated products that make common use of the **ADDERS** nucleus.

Call: 1 (800) 556-7845 now for a free trial.
Your payback can start in just three months.

Rendeck
5 Faneuil Hall Marketplace
Boston, MA 02109 • (617) 367-9180

The Solution.

Dial-Up 3270

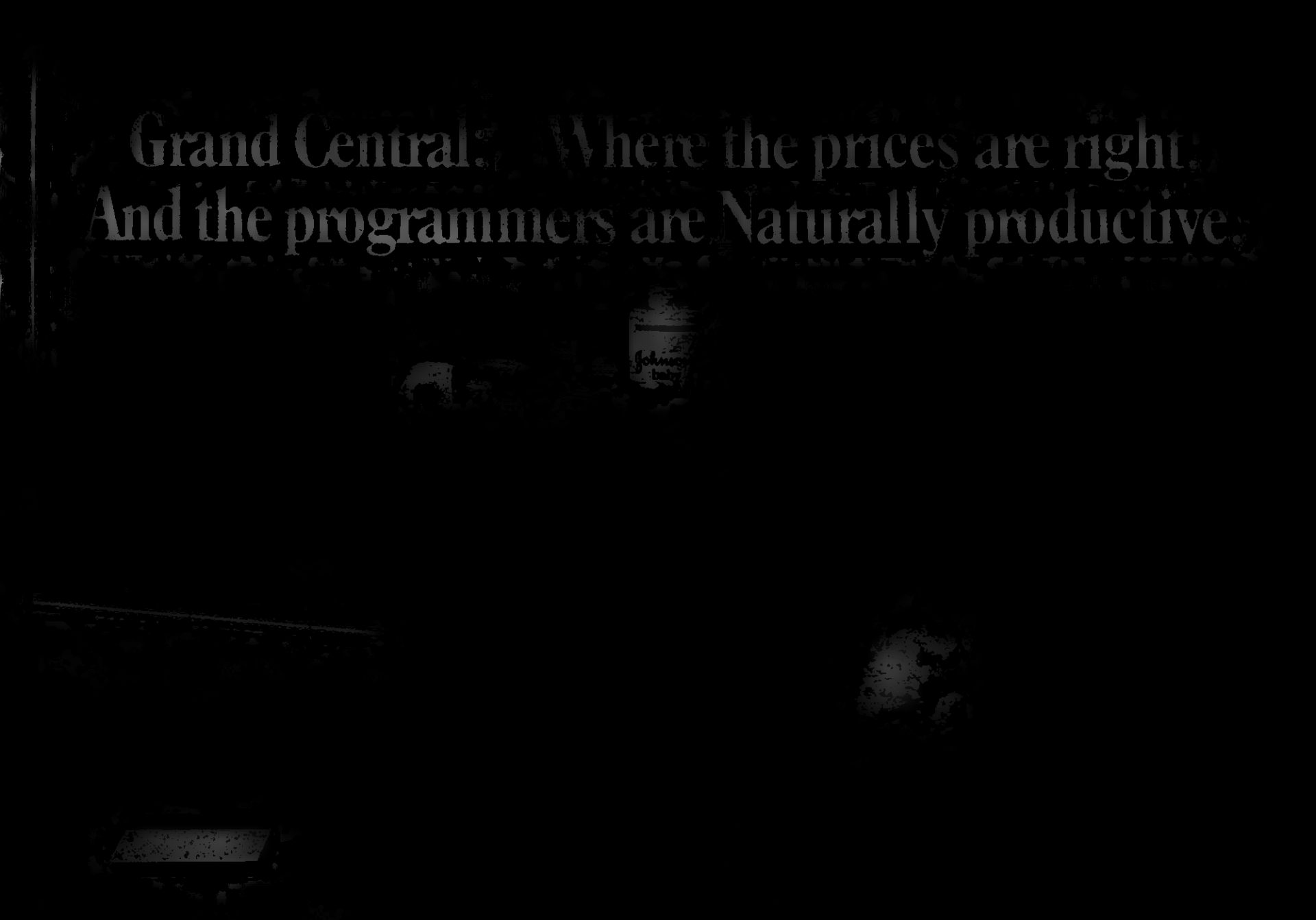
LineMaster An intelligent device for dial-in access to your mainframe 3270 Bisync line. **LineMaster** is a communications watchdog which keeps a line in service until a user dials in.

- For any remote 3271/4/6 line—up to 19.2K baud.
- Compatible with any 3270 BiSync emulator including microcomputers.
- Connects between modem and mainframe.
- Installs in minutes.

$639.

MicroFrame, Inc.
205 Livingston Avenue
New Brunswick, NJ 08901
(201) 828-4499

Grand Central: Where the prices are right.
And the programmers are Naturally productive.



Micro-to-mainframe:

Before you settle for solution, ask a few serious

Choosing a micro-to-mainframe communications system is no game.

If you make the wrong choice, the consequences can be very expensive.

So before you toy around with "easy" solutions, do yourself a favor and ask some serious questions.

You might want to start with these:

Will this product support full IBM Terminal Emulation?

Make sure the system you choose offers *full* protocol emulation. It should be able to emulate remote batch and interactive IBM terminals and terminal systems.

Does the company offer a variety of products to solve my problem?

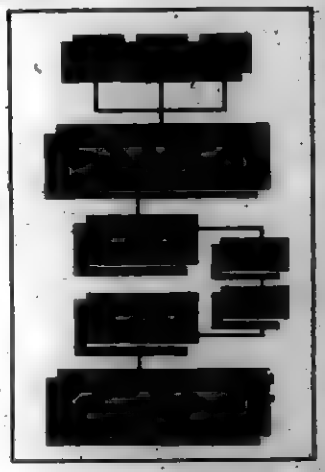
The manufacturer you select should be able to handle *any* operating environment. You should have your choice of stand-alone front-end processors, IBM PC or XT boards, or an OEM board. And make sure the products will run on the most popular operating systems, including CP/M, MS-DOS and UNIX.

Can I get fast answers to my questions?

Insist on toll-free access to qualified service personnel before and *after* the sale. A Product Support Group should be available during your normal business day.

What if I need a quick analysis of a problem?

If you run into a problem, you shouldn't have to sit through a lengthy question-and-answer session over the phone. Ask if the manufacturer has a Communications Test Center that allows for product testing over public phone lines. And find out if the product has internal diagnostics that point out problem areas right on the screen.



Suppose something goes wrong with the unit?

Be sure the company offers a service plan that includes a 30 day money-back guarantee and a 12 month warranty that includes a free replacement unit.

a simplistic questions.

What about future product development?

It's not enough for a company to solve your communications problems today. Ask about their commitment to R&D. Are they working on products you're going to need soon? If not, you might want to consider someone who is.

Who am I dealing with anyway?

In a market as volatile as this one, you need some reassurance that the people you buy from will be around to back up their products. Ask how long they've been in business. The longer, the better.

How much is all this going to cost?

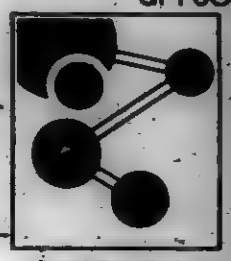
There are lots of micro-to-mainframe solutions with lots of price tags. But here's a point of reference for you:

Our own DataTalker™ product line will give you all the capabilities and services we've just described for as little as $695. Complete.

Granted, this isn't all the information you'll need to choose the right micro-to-mainframe solution. But it's a good start.

If you'd like to know more—and there certainly is more to tell—contact our Marketing Support Group at 1-800-321-7795.

We'll make sure you get the answers you need. And we won't play games.



Providing Data Communications Solutions

Winterhalter, Incorporated
3853 Research Park Drive,
P.O. Box 2180, Ann Arbor,
Michigan 48106, 313/662-2002,
800-321-7795, TELEX 234 216,
TWX 810-223-2423

DataTalker™

By Winterhalter, Incorporated

Winterhalter, Incorporated has been providing data communications solutions to major manufacturers of microcomputers and word processors since 1978. Our DataTalker front-end processors and PC boards are used by companies around the world, from start-up manufacturers to the Fortune 1000.

NASDAQ SYMBOL WNTL

SOFTWARE & SERVICES

SYSTEMS SOFTWARE

SOFTSYSTEMS, INC.
Security system

Softsystems, Inc. has announced its on-line security system for IBM CICS terminals and operators.

The system controls CICS access by operator and individual terminal, according to the vendor. For example, a CICS terminal in a payroll department cannot be accessed by a CICS operator in another department.

The security system consists of six modules: security manager, operator security, terminal security, conversion, initialization and terminal session module.

The system runs on CICS/VS Releases 1.4, 1.4.1 and 1.5. A one-time installation charge of $1,200 includes an installation tape, installation and system guide, security administration guide and one year of maintenance. The annual maintenance fee is $120.

Softsystems, 311 Mallick Tower, One Summit Ave., Fort Worth, Texas 76102.

MICHAELS, ROSS & COLE LTD.
MRC-Dictionary Release 2.0

Michaels, Ross and Cole Ltd. has announced an enhanced version of its MRC-Dictionary, a data dictionary designed to allow nontechnical users to employ relational data base management capabilities on the IBM System/38.

MRC-Dictionary Release 2.0 reportedly helps to drive other MRC-Query series modules, including MRC-Maintainer. The release is said to offer additional and faster editing capabilities as an adjunct to the System/38 data description specifications.

The dictionary module is priced at $1,140.

Michaels, Ross & Cole, Suite 501, 1301 W. 22nd St., Oak Brook, Ill. 60521.

PRODUCTIVITY AIDS

DATAMETRICS SYSTEM CORP.
Torch/PMS

Datametrics System Corp. has announced Torch/PMS, a performance management system for Sperry Corp. 1100 computers.

Torch/PMS helps identify and correct performance bottlenecks in early stages, the vendor claimed. It reportedly highlights work load and utilization trends for capacity planning and model building and is useful when collecting data needed for new equipment justification. More than 100 scatter plot diagrams are included with the package, the vendor said.

Installation and one year of software maintenance support are included in the initial lease of Torch/PMS, which is priced at $22,500.

The package comes with documentation, a one-year warranty, one day of on-site training, a plot interpretation handbook and one performance analysis study of the customer site.

Continued maintenance and support is available for $2,000 per year, beginning in the second year.

Datametrics System, Suite 201, 9940 Main St., Fairfax, Va. 22031.

IVAN SOFTWARE, INC.
Ivan-Lib/Ivan-Edit Release 3

Ivan Software, Inc. has announced Release 3 of its Ivan-Lib/Ivan-Edit software, designed to reduce program development time and increase programmer productivity.

Release 3 features Interactive Ivan Command Language and interactive utility capability for users of NBC Corp.'s VRX operating system.

The product reportedly allows the programmer to set up an unlimited number of text editing commands in a procedure for subsequent execution. Utilities, either user-written or vendor-supplied, can be set up in an interactive command procedure for execution in seconds.

Prices start at $5,000.

Ivan Software, 190 N. Keowee St., Dayton, Ohio 45402.

Continued on page 46

ADA from page 37

ed Ada compiler. That is no small task, as the company claimed 50 man-years of development went into the root compiler.

Hardware makers and systems developers can contact Alsys now to acquire Alsykit. The full compiler for the two microprocessors, called Alsycomp, will not be available until the end of the year.

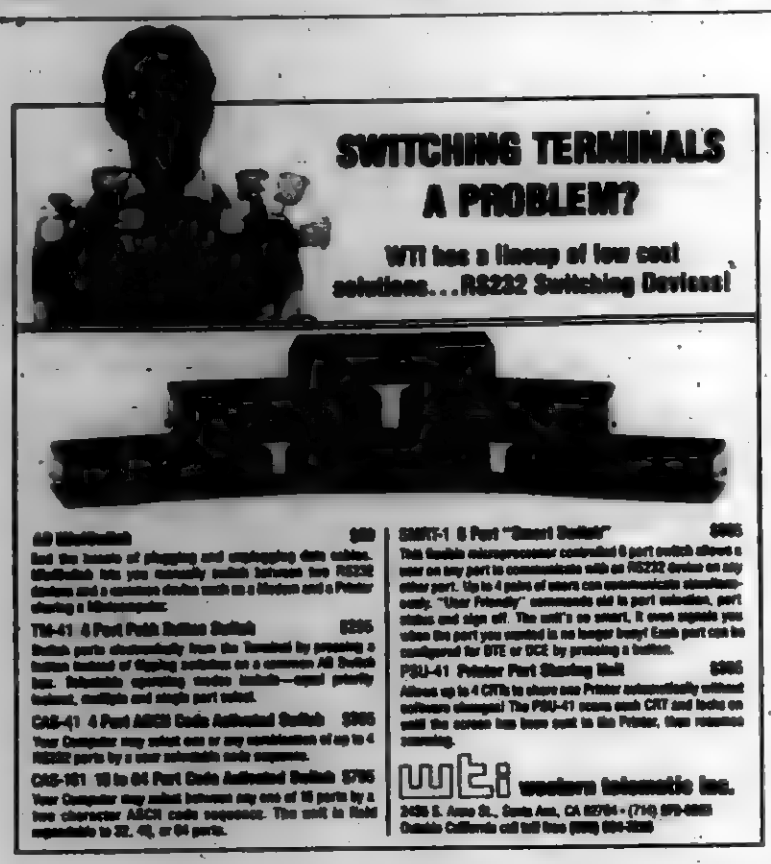
Also on the drawing boards at Alsys is a set of reusable Ada code that can save programmers the hassle of writing their own canned routines. Alsypac is a step toward the "software factory" concept for which Ada has been called the ideal language. Companies will be able to buy the routines they need and store them in a library for use in Ada programs. The routines will become available after the compiler is validated late this spring, Patrick said.

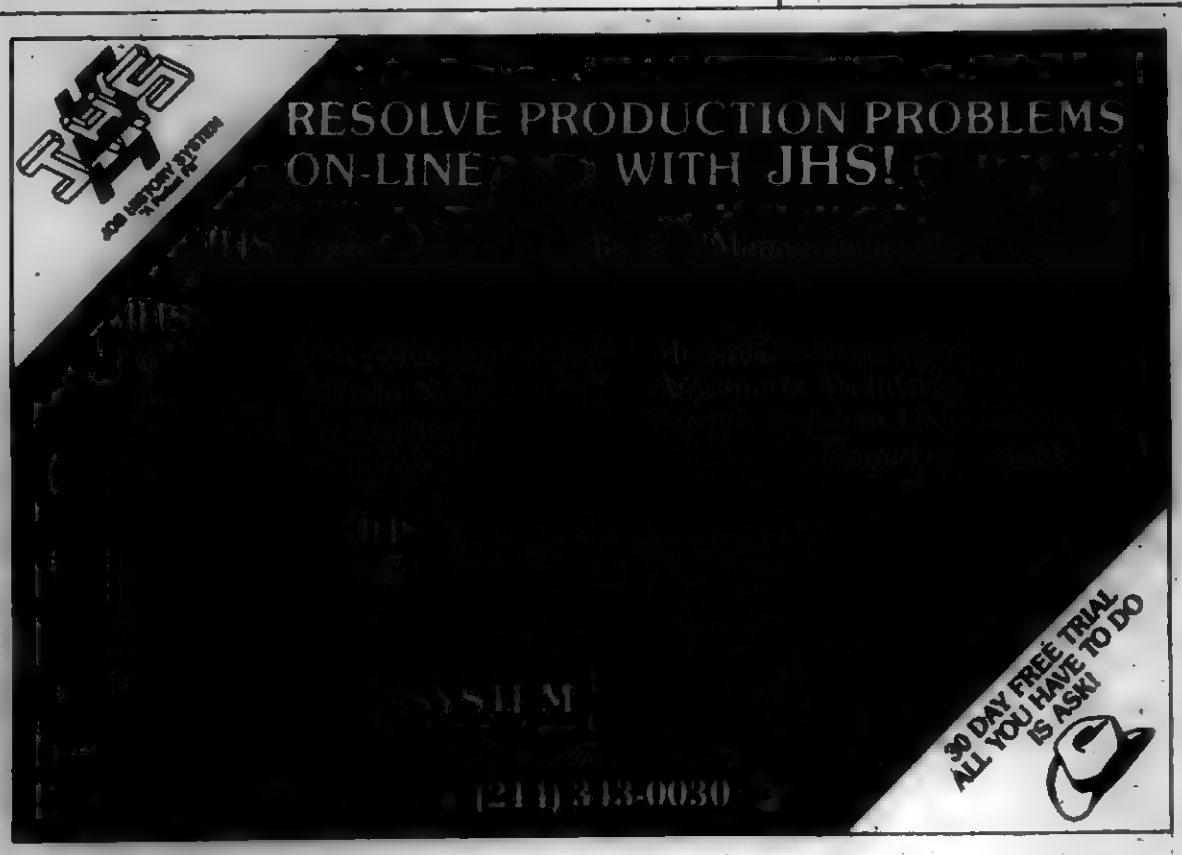
Alsys is betting its bankroll on the possibility that Ada will become one of the dominant programming languages of the 1980s and 1990s. Ada has inspired much controversy since development was undertaken in 1975. Critics say that it is too complex and that the learning curve is too high for Ada to replace Cobol. They also question the wisdom of spending the money to scrap millions of perfectly good business programs around the country in order to achieve the as-yet-unconfirmed benefits of Ada.

However, Ada proponents point to the fact that the language's modularity makes it well-suited for reusability, a factor that becomes more important as application backlogs grow. They also say that Ada's standardization eliminates the problem of maintaining old applications written in obscure languages and eases the burden of training new programmers in the quirks of a particular machine's language implementation.

Softech, Inc. predicted that the Ada market will reach nearly $750 million by 1986. Patrick noted that as many as 300 military projects could be programmed in Ada by that time. Alsys President Roy A. Finney added that, despite the controversy, several dozen books have already been published on Ada.

Alsys and others said the reason so few programmers are using Ada is that so few compilers are available. For that reason, companies like Alsys will be worth watching in the future. "It's such a large market that it's very difficult to quantify," Patrick said.





What three letters represent the most powerful on-line computer in business today?

TX

The most powerful on-line

Time was, the answer to the previous page was as easy as ABC.

But that was yesterday.

Today, the world of business computing is being introduced to a system featuring over two-and-a-half times the performance and twice the price/performance of its nearest competitor.

A versatile system. Able to compile the information of the largest corporations into a single relational data base. Instantaneously updated and fully available across the entire system.

An expandable and compatible system. Allowing the simple addition of future programs and equipment, without sacrificing past investments.

And most importantly, a system that won't let you down. Because its fault-tolerant design won't let itself down. Even if a major component fails.

This system isn't from IBM.

It's from Tandem.

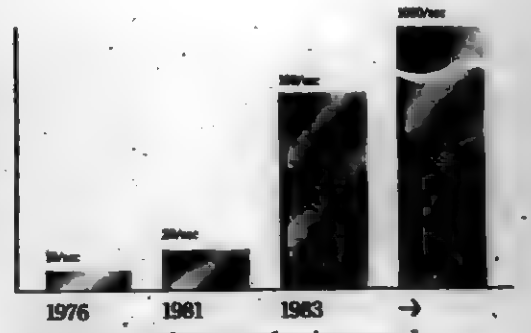
Introducing the NonStop TXP™ system.

TXP: 32-bit transaction processing.

The TXP system processes high volume loads faster and more economically than any other system. Executing over 100 transactions per second now and thousands of transactions in the near future.

It's built around multiple parallel 32-bit processors. Each addressing 16 MB of physical memory and over a gigabyte of virtual memory.

To help memory keep pace with that kind of processing, TXP pulls 64 bits on each memory access.



Our success can be summed up in a second. *Transactions per second. Numbers unsurpassed in the industry. On-line systems that fit your needs today. And tomorrow. With more processing power on the way.*

The TXP system also features parallel data paths. Manipulating 32 bits of information in a single cycle, two 16-bit operations in the same cycle.

And TXP incorporates extensive pipelining, to process multiple instructions simultaneously. Each processor overlaps instructions in three levels: Fetching one, while preprocessing a second, while executing a third.

While helping TXP deliver full 32-bit power, for less.

Cache memory pays off in faster response times.

Cache memory is a high-speed data storage area between the processor and main memory. It lets the processor store more frequently used information closer. So it can get to it faster.

And our tests have shown that the TXP cache memory has a 98% "hit rate." Which means the requested data is virtually always nearby for fast access.

The result? Larger volumes of work can be processed in shorter amounts of time. Helping TXP to be even more productive.

Making cache memory pay big dividends.

A system you'll expand, not disband.

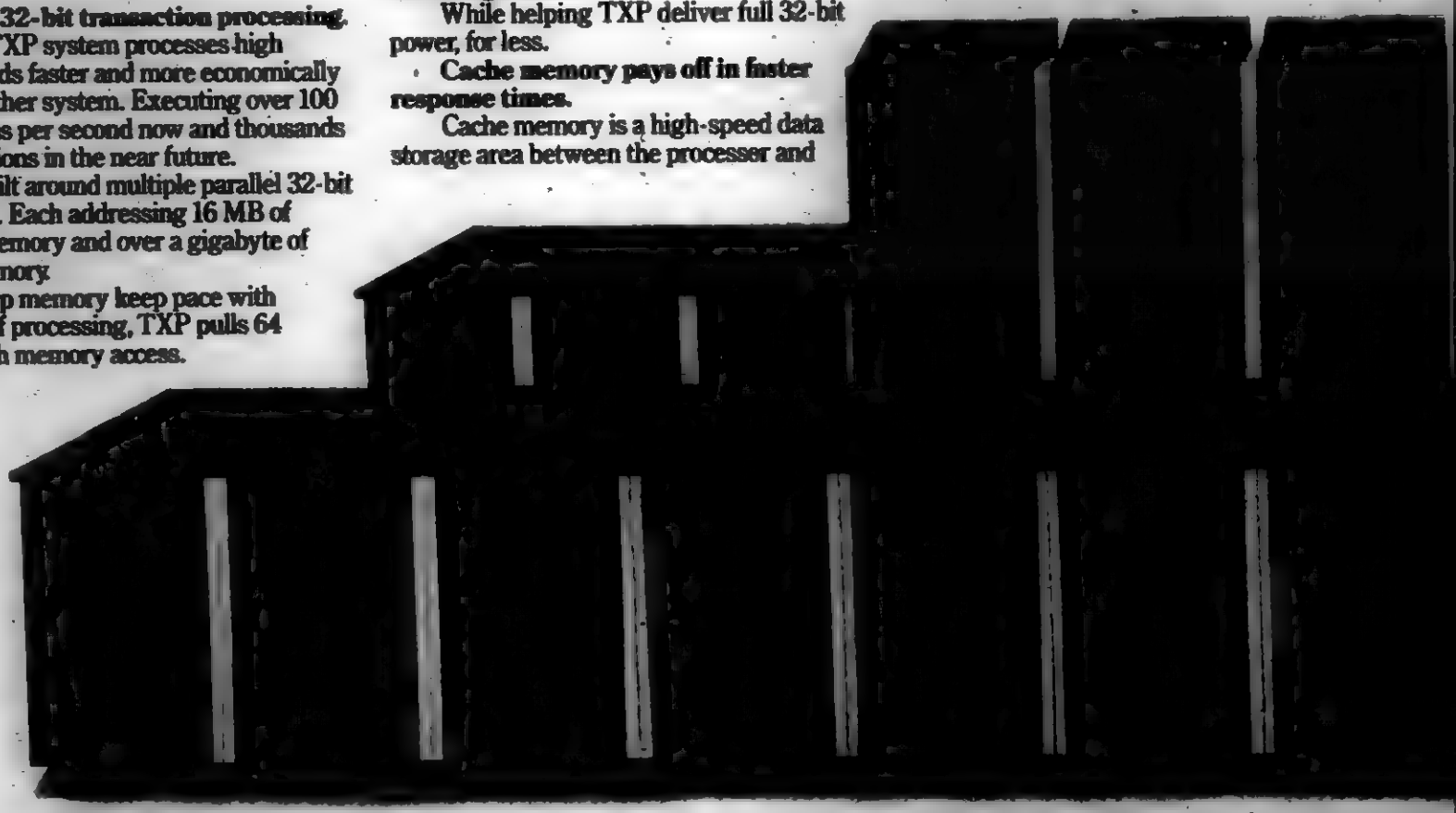
Most computer systems have very limited expandability. So if a company outgrows its computer's capacity, it usually means starting again from scratch.

Selecting and buying a larger and more expensive system.

Then reprogramming.

Then re-training.

Plus all the chaotic disruption and



XP

computer in business today.

massive loss of revenue that's unavoidable during the switch-over.

Not so with the TXP system.

It can expand from two to 16 processors. Increasing its power by a factor of eight.

That's more power than any of the largest mainframes.

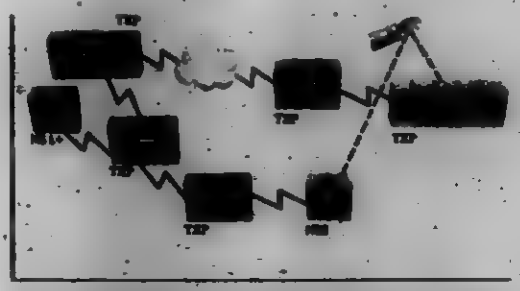
And the additional processors can be installed while TXP is running at full speed. No downtime. No reprogramming.

Still not enough power? Up to 14 TXP systems can be joined together by high-speed fiber optics. Linking the systems together as one computer with 224 processors.

But that still isn't the full potential of the TXP.

TXP systems at up to 255 sites can be joined in a worldwide network. Generating the power of over 4,000 processors.

And that gives TXP the most powerful on-line computer capacity in business.



The most powerful computer network in business today. *Users access a single unified global data base from any of thousands of terminals anywhere in the system.*

Expandability our competition wishes they could disband.

NonStop™ system compatibility from the people who started it all.

TXP can process more information and support more programs, users and devices than any other computer designed for on-line transaction processing.

Devices you most likely already have.

Even devices made by IBM.

But what if your company isn't quite ready for the TXP system's awesome power?

We suggest the Tandem NonStop II™ system. The second most powerful on-line computer in business today. The cost effective solution for medium to large corporations.

What if your company is somewhere between a Nonstop II and a TXP?

No problem. They can be combined. They can share the same data and programs. In fact, NonStop II and TXP processors can coexist in the same cabinets.

And what if your company needs even a smaller computer? We make a smaller computer. The Tandem NonStop 1+ system. Perfect for those low-volume sites where less processing power is needed.

Tandem literally wrote the book on NonStop™ transaction processing. That's because we introduced the first NonStop system.

Over eight years ago.

And for over eight straight years, despite attempts by others, we've continued to lead the industry.

Learn all about TXP, ASAP.

For complete literature, contact your local Tandem Sales Office.

Or write Tandem Computers Incorporated, 19333 Vallco Parkway, Cupertino, California 95014.

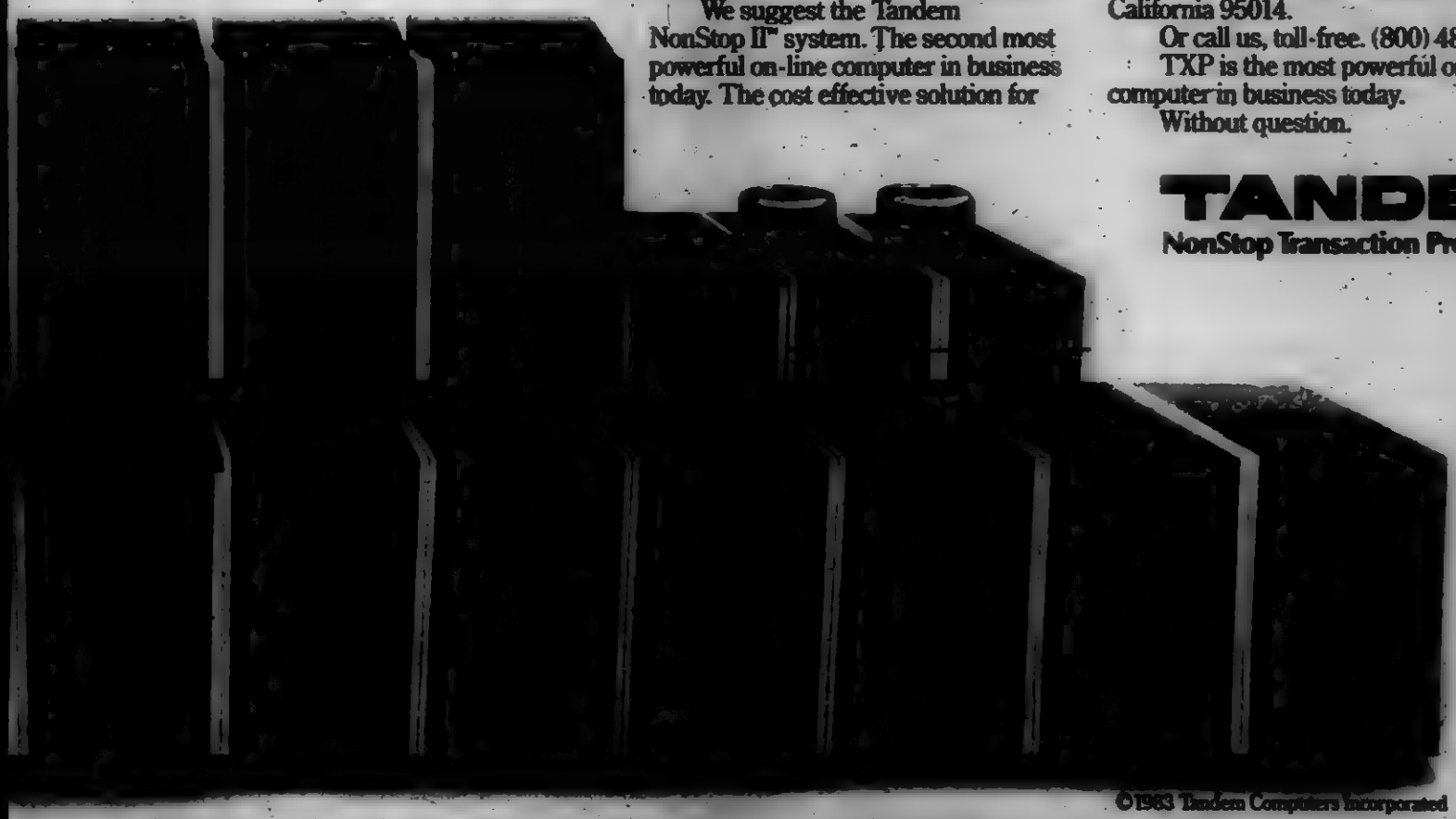
Or call us, toll-free. (800) 482-6336.

TXP is the most powerful on-line computer in business today.

Without question.

TANDEM

NonStop Transaction Processing



©1983 Tandem Computers Incorporated

WE WROTE THE BOOK ON DOCUMENTATION. AND THEN WE THREW IT AWAY.

Communication Sciences introduces Explain. *The system that puts your software documentation where you need it most—online and in your data base.*

With Explain, you can create online user help, training procedures, program documentation and more. Because Explain uses the power of your DBMS, you can maintain the documentation as easily as you do the rest of your business data.

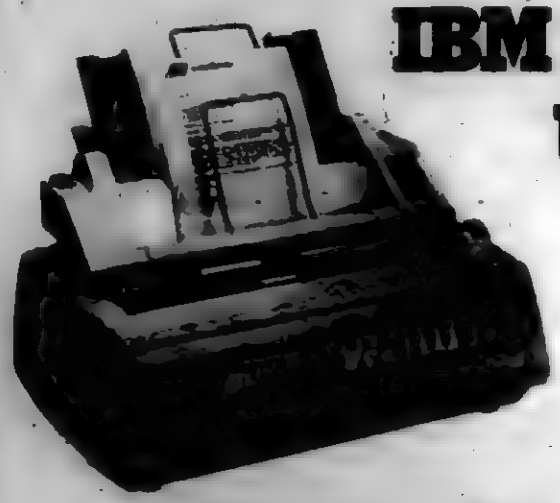
Access to the online documentation is at the user's fingertips. With simple commands, users can retrieve the help they need—directly from any application you link to Explain.

Chosen by Comserv Corporation as the online help system for AMAPS/3000, Explain is a powerful tool for both writers and readers of software documentation. And it's available to users of HP/3000/Image and IBM series. 30xx and 43xx systems.

With Explain, you can afford to throw the books away. And keep the documentation.

For more information: call us at (612) 332-7559, or write to Communication Sciences, Inc., 100 North Seventh Street, Minneapolis, MN 55403.

CSI
Communication Sciences Inc.



IBM 3270 Users:

Better than IBM 5210, the ISI-736 Printer is available now!

Solid Character. Letter Quality

Plug compatible with the 3287 for on-line printing from your IBM system. Optional Twinfeeder automatically feeds letterheads and second sheets selectively from trays under program control. Ideal for IBM CPU-based word processing software. Multiple fonts and separate pitches. Support most languages. Features include: programmable tray selection, underscoring, boldface type, subscripting and super-scripting. And no need to run SNA to use these features!

Call, write or TWX today!

Interface Systems, Inc.
9855 Interface Drive, Ann Arbor, MI 48103
Telephone (313) 769-5900. TWX 810-223-6058

SOFTWARE & SERVICES

Continued from page 42

APPLICATION PACKAGES

DECISION SYSTEMS
Worksheet

Decision Systems, a division of Interactive Data Corp., has announced Worksheet, said to be a mainframe reporting and data management system with built-in links to most microcomputer spreadsheet packages.

In addition to its mainframe reporting and data management capabilities, Worksheet enables users to transfer user-defined computations and formats from mainframe to micro with simple key commands, a spokesman said. The package also has the capability to transfer the substance of a work sheet as well as its numerical data.

The package was designed to work with the IBM Personal Computer and mainframes utilizing IBM's VM/CMS operating system. It reportedly operates in conjunction with Xsim, Interactive Data's applications software system. A permanent license for Worksheet costs between $20,000 and $30,000.

Decision Systems, 1033 Massachusetts Ave., Cambridge, Mass. 02138.

THE MEGA GROUP, INC.
Megafile

The Mega Group, Inc. has announced a filing system with relational data base functions and multiple spreadsheet capability for IBM mainframe users with little or no programming background.

Megafile is designed for systems using IBM 3270-type terminals and for integration with The Mega Group's Megacalc and Megalink software, which provide access to the IBM mainframe's memory.

The product's three-dimensional matrix permits the simultaneous access, manipulation and merging of data from more than 30 individual spreadsheets, according to the company. Data reportedly can be accessed in a variety of ways, including individual cells, a range of cells, a record and an assigned block of cells.

Spreadsheets and data bases created in Megafile can be downloaded to personal computers, including the IBM Personal Computer, Personal Computer XT and PCjr, according to the company.

Megafile is available now for IBM MVS/TSO environments and will be available for IBM VM/CMS environments during the first quarter of 1984.

The price for Megafile is $5,000 on the IBM 30 series and $4,000 for the IBM 4300 series.

The Mega Group, 3091 Business Center Drive, Irvine, Calif. 92715.

DATA BASE MANAGEMENT SYSTEMS

TOMINY, INC.
Data Base Plus

Tominy, Inc. has announced that its Data Base Plus application development system is now available for use with the IBM System/36.

According to the vendor, Data Base Plus is a family of software development tools, including a data base management system (DBMS) and a high-level programming language, that reportedly allows users to develop business application systems. With component modules, users define logical file structures, establish interrelationships between files, automatically store and retrieve data, access standard screen and print formats and inquire against the data base for reporting purposes.

The components of Data Base Plus are the DBMS, screen handler, print handler, utilities, query/report writer and the Data Base Plus Programming Language. In addition to the System/36, the components may be run with the IBM Personal Computer, System/34, Series/1 and the 4300, 30 series and 370 mainframes.

The vendor said that applications programs can be moved from one hardware system to another without code changes or program modification. Data Base Plus for the IBM System/36 is compatible with the IBM's SSP operating system and is priced at $19,500 for a one-time development system and an additional $5,000 for the Data Base Plus Programming Language.

Tominy, 4321 Malsbary Road, Cincinnati, Ohio 45242.

COMPUTER RESOURCES, INC.
Application Builder

Computer Resources, Inc. (CRI) has introduced Application Builder, an enhancement to its Relate/3000 relational data base management system for Hewlett-Packard Co. HP 3000 computers.

Builder is a fourth-generation system that permits screen-based applications to be developed quickly, according to the vendor. Builder applications are developed using a standard screen editor that simplifies development and testing. Screen definitions and Builder commands are placed in a single file.

A debugging facility is included to assist the application developer in isolating and correcting problems, reducing debugging and maintenance time.

A built-in testing capability can automatically test files for the user.

Builder directly interfaces with Relate's graphics system and report writer, a spokesman said. It also supports the use of function keys and can call subroutines.

Builder is available for $9,950; Relate for $18,500. Lease plans are available.

CRI, 5333 Betsy Ross Drive, Santa Clara, Calif. 95054.

COMPUTER ASSOCIATES INTERNATIONAL, INC.
Normalization: Guidelines for Practical Data Base Design

Computer Associates International, Inc. has announced a video training course intended to help data base users understand the normalization process of organizing a data base.

"Normalization: Guidelines for Practical Data Base Design," reportedly provides a brief historical perspective of data base management and a step-by-step tutorial approach to normalization. It is designed to help the data center understand the benefits of normalization and to provide the ability to design and manage

Continued on page 60

Introducing MARK V™ for CICS users: a *unique*, 4th generation non-procedural application development system that saves you time and money at every stage of your application life cycle. See it at a free seminar near you!

Informatics just broke the productivity barrier with MARK V, an extraordinary timesaving application development system. But, MARK V is not for everyone. *It may be for you if:*

- ☑ You need help in reducing your backlog of medium to complex CICS applications.
- ☑ You use CICS with IBM-supported data access such as VSAM or DL/I.
- ☑ Your CICS system demands highly efficient application execution.

Then, MARK V can help you produce efficient compiled applications that rival the execution of well-written COBOL—in less than half the development time!

Easy application development and maintenance is just the beginning!

MARK V improves productivity throughout the application development and maintenance cycle—not just in the coding—by providing:

- Interactive application design and simulation
- Easy to use, menu-driven specification language for development and maintenance
- Transparent and complete data access/communications control
- Automatically produced application documentation

That means, with MARK V your programmer need only specify the solution. MARK V generates the *complete* application. This methodology allows you to solve more complex problems more efficiently using less highly trained personnel—*and that saves you money!*

Reserve your place at a *free Seminar* on MARK V—the simple new way to develop and maintain your medium to complex CICS applications.

As a data processing professional, you're also a professional skeptic. But the simplicity, versatility and timesaving capabilities of MARK V are easy to see—and prove. To do so, simply mail the coupon below or call toll free. We'll reserve your place at a free MARK V Seminar in a city near you. But attendance is limited. So mail this coupon or call *today*.

informatics general corporation

THE SOFTWARE ENGINEERS

Register now for a Free MARK V Seminar! Mail this coupon or call toll free

1 800 227-3800, ext. 926

(In Canada, call collect, 0 415 [illegible]-7[illegible])

YES. I want to learn more about how MARK V can make my medium to complex applications development and maintenance both fast and easy.

☐ Please enroll me in the free seminar I have indicated below (check one). Call me with details on specific location and time. I understand that there is no cost or obligation.

☐	Dallas	February 14	☐	Oakland	February 15
☐	Boston	February 28	☐	New York	February 14
☐	Chicago	February 16	☐	Philadelphia	February 16
☐	Cleveland	March 1	☐	San Francisco	February 28
☐	Houston	February 15	☐	Toronto	March 14
☐	Los Angeles	February 21	☐	Washington, DC	February 22

☐ I cannot attend a Seminar. But please send me more information on the MARK V Application Development System.

Name _____

Title _____

Company Name _____

Phone Number _____ (include area code)

Address _____

City _____ State _____ Zip _____

Mail this coupon to: Informatics, MARK V Free Seminar, P.O. Box [illegible], Encino Park, CA [illegible]

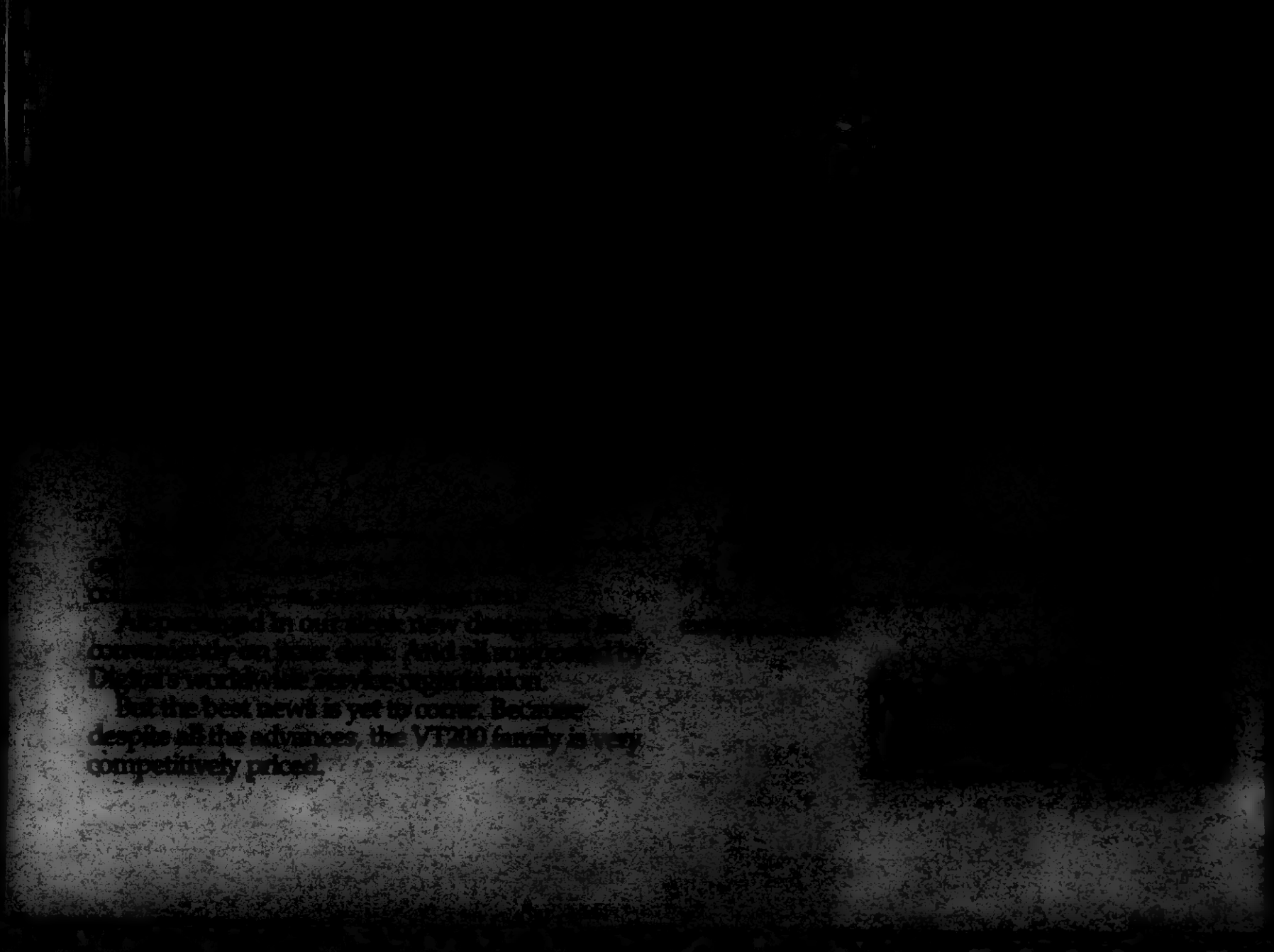
CVL-V

the largest-selling ASCII terminal in the world.

Now Digital advances this standard with the VT200 family.

Three new terminals that embody everything Digital has learned about how to make people

©Digital Equipment Corporation 1984



SOFTWARE & SERVICES

Continued from page 48

data more effectively, a spokesman said.

The video tape and accompanying course book are priced at $129.

Computer Associates International, 70 Jericho Tnpk., Jericho, N.Y. 11753.

ON-LINE DATA BASES

DATA RESOURCES, INC.; DATAPRO RESEARCH CORP.
Datapro/Online

Data Resources, Inc. and Datapro Research Corp. have announced a data base service called Datapro/Online, which contains information about computers, software and the companies that manufacture them.

According to a spokesman, the service provides subscribers with access to information drawn from Datapro's directories of product and vendor information.

The software data base, which is updated monthly, contains reports on software applications, products and companies. The microcomputer data base includes information such as system price, disk capacity, peripherals and communications capabilities. A data base of vendor profiles contains information on computer-related vendors referenced by city, state, product line and sales volume. The data base of on-line services allows users to locate vendors of information, such as stock market prices, newspaper articles and interest rates.

The annual subscription fee for Datapro/Online per company is $250, with an additional $120/connect hour charge.

Data Resources, 24 Hartwell Ave., Lexington, Mass. 02173.

REMOTE COMPUTING SERVICES

INFORMATICS GENERAL CORP.
Informail

Informatics General Corp. has announced Informail, an electronic mail application, for users of its time-sharing service.

Informail's security procedure allows each user to read only mail sent to his mailbox. All files are automatically duplicated to prevent accidental loss of a message, according to the vendor. The mail system includes a step-by-step list of options and on-line help screens for an inexperienced user, the vendor said.

Informail costs 5 cents per message and $25 per hour for users who meet the standard monthly minimum charge of $300.

Informatics General, 21031 Ventura Blvd., Woodland Hills, Calif. 91364.

METHODOLOGIES

QUANTITATIVE SOFTWARE MANAGEMENT, INC.
Slim

Quantitative Software Management, Inc. has announced the Slim service, a software development bid-evaluation service for software development managers.

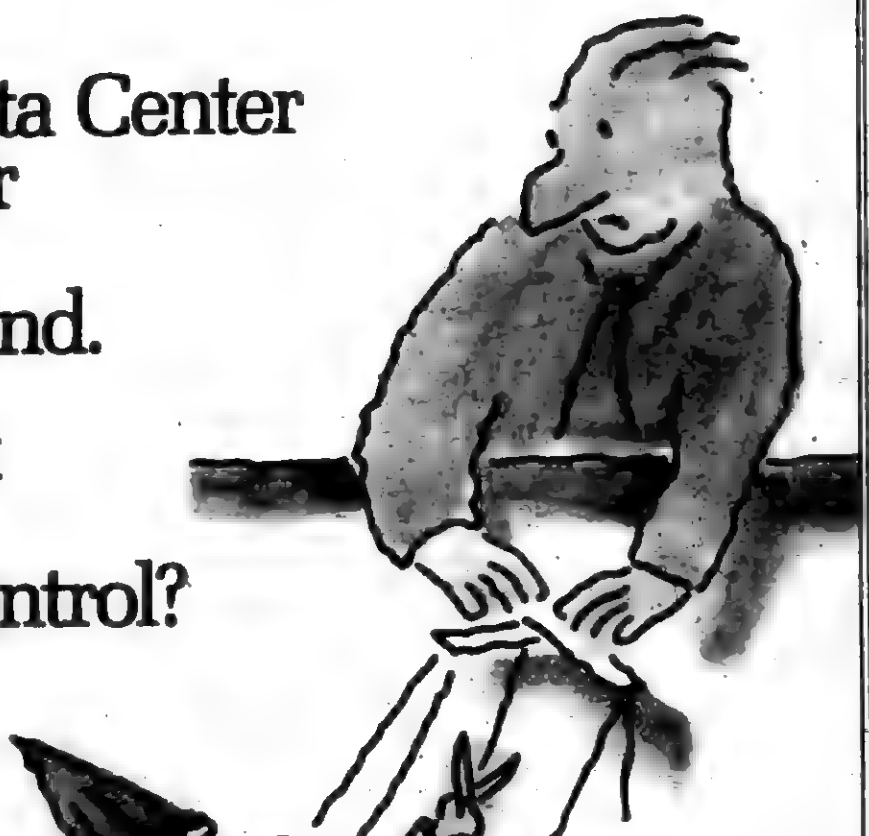
Quantitative Software Management personnel utilize the Slim technique to evaluate an organization's key criteria for cost, man-hours and time in software development projects. On a consulting basis, the Slim service is priced at $75,000, based on three software development bidders.

The Slim software can also be obtained on annual license for $25,000. It is compatible with the Hewlett-Packard Co. HP 80 series desktop computers, the HP 9800 series desktop computers and the Digital Equipment Corp. Decsystem 2060 mainframe.

Quantitative Software Management, 1057 Waverly Way, McLean, Va. 22101.

The Data Center is under your command.

But is it under your control?



Value Computing's systems management software automates the critical tasks of production forecasting and scheduling, capacity planning, and resource allocation and accounting, and brings those tasks under centralized control. Your control.

The effects on data center operations are immediate: a more stable production environment ... faster turnaround ... fewer manual procedures ... shorter night processing times ... fewer mistakes, mis... re-runs ... less management dependency on operations personnel.

In short, a smoother running, better performing data center; a center where managers get the most intensive use of all resources. Without making a major capital investment in additional CPUs or peripherals.

We don't believe there's a more cost-effective way to improve the performance of your data center or the value of its position in your company. Call us and find out why more than 1500 users agree.

Value Computing Software Systems:
DCMS—The most powerful and ...hensive production scheduling ...rol system available.
...-Charge—The industry stan... ...ting and computer billing.
VALU-LIB—An entirely new tape management system designed for today's VS environments.
SMF Express—A unique package for the management of important SMF data.

VALUE COMPUTING
THE OPTIMUM SOFTWARE FOR DATA CENTER MANAGEMENT
Value Computing, Inc., 400 N. Kings Highway, Cherry Hill, NJ 08034 (800) 257-8342. In New Jersey (609) 482-2800

Announcing Spring Courses
DP Education

IMS, CICS, VSAM and FOCUS® Course Offerings

Locations
Washington, D.C. Atlanta
New York City Dallas
San Francisco Cleveland
Hartford

For specific dates and locations or to obtain a free copy of our 1984 DP Education Catalog, please call (203) 646-3284.

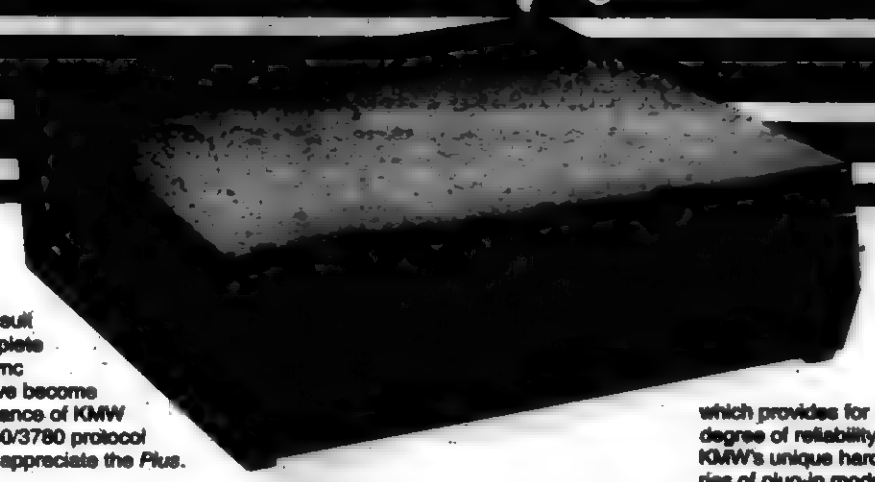
We make every bit count.

DBMI
Data Base Management, Inc.
1575 Tolland Turnpike,
Manchester, CT 06040 (203) 646-3284
*FOCUS is a trademark of Information Builders Inc.

IBM to ASCII

Fluent Communications From a Polished Performer

Series II *Plus*



We've added a little polish to our Series II family of protocol converters. The result is the Series II *Plus*, a complete line of SNA/SDLC and Bisync protocol converters. If you've become accustomed to the performance of KMW 3270, 3770, HASP and 2780/3780 protocol converters, you're going to appreciate the *Plus*.

Pluses

+ Diagnostics

The KMW Series II *Plus* provides three levels of extensive on-board diagnostics for trouble-shooting without ever opening the unit. Level one testing includes PROM and RAM tests as well as confidence tests of most system components. Level two testing is a much more comprehensive test of system components including I/O circuits. Level three is controlled via the system console and includes the ability to move data files to each of the supported peripheral devices.

+ Programmability

Host session and asynchronous device parameters are programmable via the setup mode on the system console. Programmable host session parameters include:

- log on information
- device address
- buffer size
- data rate

Programmable asynchronous device parameters include:

- device type
- character framing
- input mode
- data flow control
- output mode
- data rate

Setup data can be permanently held in EEPROM even when the Series II *Plus* is powered off.

+ Speed

Featuring a Z80A processor, the Series II *Plus* is capable of data rates up to 19.2 Kbps or, with optional Z80B processor and DMA, up to 56 Kbps as well as concurrent operation of up to 8 input/output devices at equivalent rates!

+ Code Compliance

The Series II *Plus* converters meet the FCC emissions requirements and are designed to satisfy those requirements when included in subsystems. The Series II *Plus* is also UL and CSA listed.

+ Fluency

The Series II *Plus* provides fluent communications in IBM SNA and Bisync protocols including 3770, 3270, HASP and 2780/3780. All Series II *Plus* converters support a multitude of input and output devices and are available with up to 8 ports (3 in 2780/3780 converters). You can count on the Series II *Plus* for fluent IBM to ASCII communications.

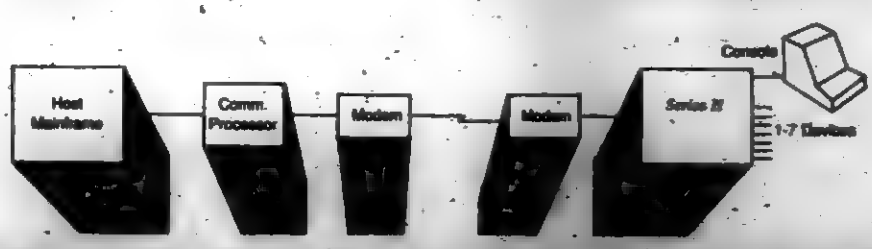
+ Hardware Design

Another Series II *Plus* advantage is the efficient hardware design of the unit. The sleek exterior lines give way to a plug-in modular interior which provides for maximum flexibility, a high degree of reliability and ease of maintenance. KMW's unique hardware design allows for a series of plug-in modules to provide device interfaces. Standard interface modules include Data Products 8 bit Parallel Printer Interfaces, Documation Parallel Card Reader and RS-232 Serial General Purpose Interfaces.

The reliability of the Series II *Plus* design is exemplified by an impressive mean time between failure of over 13,000 hours. That's a real plus.

With a mean time to repair of only 30 minutes, down time is always at a minimum.

The Series II *Plus* is engineered for performance and the proof is in the package.



A Special *Plus*

The Series II *Plus* is available in synchronous-to-synchronous configurations including 3770 to 2780/3780 or HASP to 2780/3780. If your applications require something special, check with KMW.

Add a little polish to your communication. The Series II *Plus* . . .
Fluent communications from a polished performer.

KMW SYSTEMS CORPORATION

8307 Highway 71 West • Austin, Texas 78735 • 512/288-1453 • TWX: 910-874-2005 CABLE: KMWSYS

Call Toll Free 800/531-5167

The CPT Solution that talks with mainframes in an important new way:

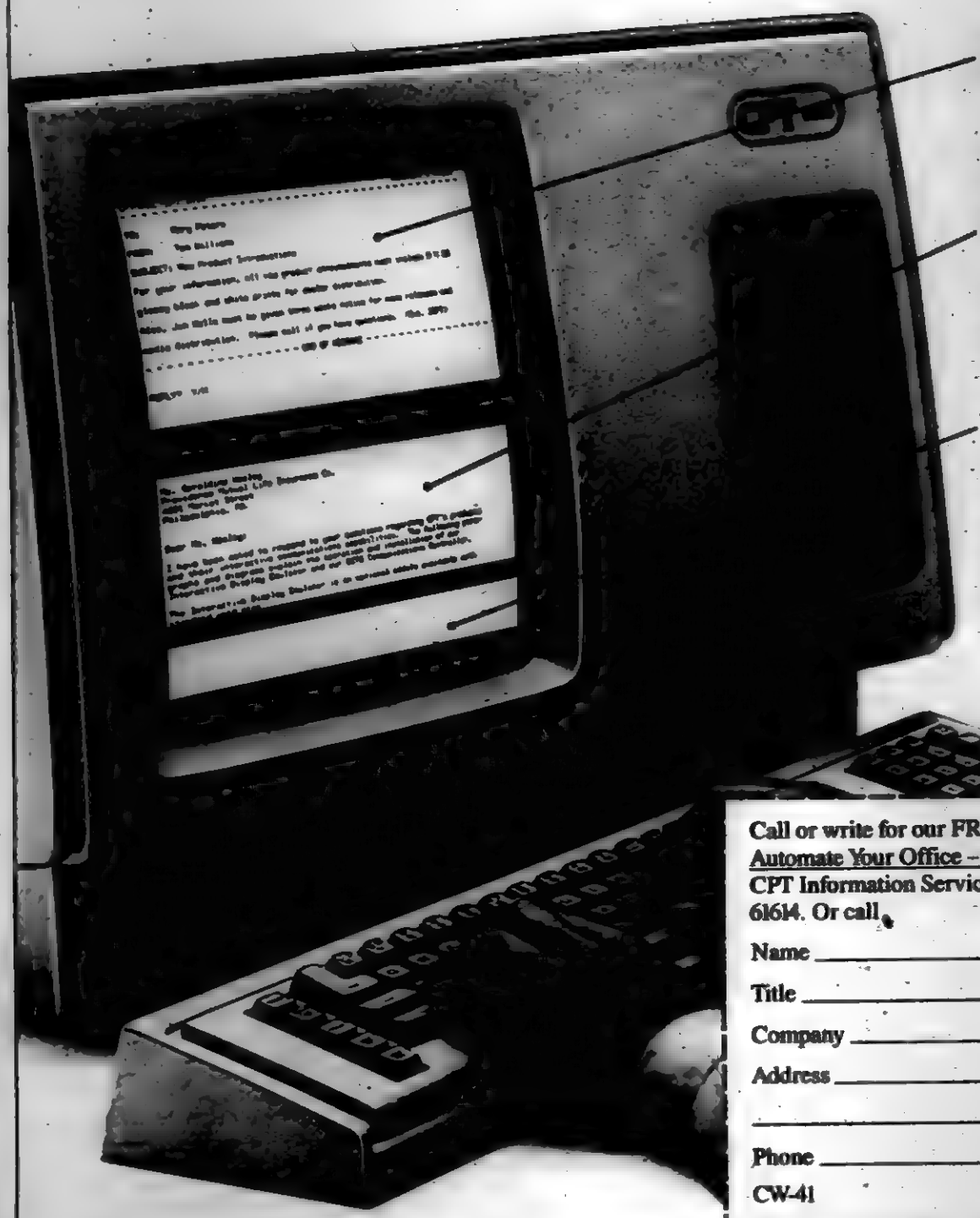
CPT solves the costly, cumbersome problem of separate data terminals and word processors at individual workstations.

An exclusive software breakthrough enables one CPT system to perform both functions. On the same screen. At the same time. We call it the CPT Interactive Display Emulator (IDE).

With this new CPT solution, an operator can transfer data processing information from a host computer (top window) directly to a word processing document-in-progress (middle window). Or vice versa. With just two keystrokes.

In addition, an optional CPT SNA communications controller can link up to 7 CPT systems together as part of an IBM 3270 network.

A few toll-free keystrokes on your telephone will bring you more information. And open some important new windows on the future.



Interactive Communications Window
A full 24-line by 80-column screen that displays information direct from a host computer.

Independent CPT Word Processing Window
A half-page display of the same CPT word processing that's earned a place on the Datapro Honor Roll for the last three years.

Word Processing Preview
Another standard CPT word processing feature. It lets you preview other pages in a document, or scan an entirely different document, without interrupting work in progress.

Specifications are subject to change at the discretion of CPT Corporation.

Call or write for our FREE 28-page booklet, How to Automate Your Office – One Step at a Time!™ Mail to CPT Information Service, P.O. Box 3900, Peoria, Illinois 61614. Or call. CW-41

Name _____

Title _____

Company _____

Address _____

_____

Phone _____

CW-41

Office automation you can't outgrow

CPT®

COMMUNICATIONS

Hughes proposes satellite system

WASHINGTON WIRE

PHIL HIRSCH

A satellite communications system that will enable users to communicate at 1.5M bit/sec through low-cost, small-diameter dish antennas was proposed by Hughes Aircraft Co. in a thick prospectus submitted to the Federal Communications Commission last month here in the nation's capital.

The company wants permission to launch two satellites which would operate in the 20- to 30-GHz (Ka) band.

This is a good deal higher than all previously announced commercial satellites that operate at either 4 to 6 GHz (C band) or 12 to 14 GHz (Ku band).

Satellite channels

Each of the new Hughes Galaxy satellites would provide a total of 3,072 one-way 1.5M bit/sec (T-1) channels through 32 transponders. The earth stations would employ a two-meter antenna and a 1W solid-state transmitter. Hughes expects the total cost of the ground terminal to be less than $50,000.

The system will support private and shared-use voice, video and data networks, the company added. Hughes intends to sell the transponders outright or lease them, although it may offer other terms.

Teleconferencing, high-speed document transfer, remote printing and other data transfer services will be the principal applications of the new system, Hughes said.

Growing demand

"A recent study indicates that the demand for teleconferencing will grow at an annual rate of 59%, reaching annual sales of $430 million by 1987." Hughes "anticipates that the advent of low-cost customer terminals and ancillary equipment made possible by the

See NUMBER page 54

Campus net passes test

Runs first year without major gliche

By Robert Batt
CW West Coast Bureau

SAN DIEGO — One of the country's first local-area networks linking an entire university campus has been up and running here for almost a year with no major hiccups.

Before San Diego State University took the plunge with a local-area network, it considered a number of options that would allow it to expand communications facilities for its 33,000 students. Some of those options, according to Robert Swanson, manager of technical support at the university's computer center, were quite exotic. They included:

- A citizens band radio facility.
- An on-campus microwave system.
- A communications system based on optical-fiber technology.
- Twisted-pair cable techniques that would require going point-to-point with all the terminals in the network.

"When you want your machines to have the ability to talk with one another, it is essential to have everything on a single wire, so in the end, we chose a coaxial cable approach," Swanson contended. The advantage to this approach was that the essential technology was available off the shelf.

'Technology was simple'

"The technology was simple, and the bandwidth for communications amazed us in its capabilities and range of capacity compared with the other devices we had looked at," Swanson said.

The university chose Sytek, Inc., a San Jose, Calif.-based manufacturer of broadband computer and telecommunications equipment to supply the interface to the network.

Xerox Corp.'s Ethernet was also considered, "but we did not want to have point-to-point baseband technology, which was all that was available at the time," Swan-

See NET page 54

DEC introduces KCT32 for VAX

MAYNARD, Mass. — Digital Equipment Corp. has announced the introduction of a board-level, front-end communications processor, the KCT32, that is reportedly designed for networking and custom communications applications on DEC VAX minicomputers.

Usable in most computer-to-computer and computer-to-terminal environments, the KCT32 has supporting software that allows it to run under the VAX/VMS operating system, according to a spokesman for the vendor.

The processor is said to use the DEC T11 chip and is targeted toward the banking, insurance and telecommunications markets.

The KTC32 has 56K bytes of programmable memory and implements DEC PDP-11 instructions, according to a vendor spokesman.

Special software can be developed on a VAX systems by using the VAX/VMS software support tools, according to the spokesman.

Single boards

The processor employs a single hex-width board and can be initialized by line, for either synchronous or asynchronous data transmission and reception, the DEC spokesman said.

It supports two lines at 64K bit/sec per line or a single line at 130K bit/sec, in full duplex mode, the DEC spokesman said.

The processor is priced from $6,900 to $7,400 with deliveries in the spring, according to DEC.

Digital Equipment Corp., Maynard, Ma. 01754.

Software allows HP 3000 to receive data from PBX/57

INSIDE

- Remote terminals will act as local terminals over packet-switched networks for users of a front-end processor/56
- Asynchronous Ascii CRT terminals or IBM Personal Computers can be attached to IBM 3274 and 3276 controllers as if they were IBM 3278 displays by using a protocol converter from Local Data Co./54
- Local network supporting multiple operating systems now available/57

Top Quarterback in the EDP

Why Beall?

1

2

3

John Beall & Company, Inc.

HUGHES from page 83

[new satellite system] will accelerate industry and government use of teleconferencing," a company spokesman said.

And since the 1.5M bit/sec channels to be provided by the new Galaxy satellites will be subdividable, the system will also provide "customized switched data circuits for private networks," according to a Hughes spokesman.

'Tremendous benefits'

Hughes added that the new system would "provide tremendous benefits for firms whose businesses involve information retrieval and manipulation."

Hughes said that demand for satellite communication channels will outgrow Ku and C band capacity by 1990.

It cited a recent Western Union Corp. report to the FCC which concluded that "available C and Ku band transponders will fall short of needed capacity by up to 315 transponders in 1990 and up to 1505 transponders in 2000."

The first of the two new satellites is scheduled to be launched in the fourth quarter of 1988, and the second one will be launched a year later. Each will serve the nation's 16 largest cities.

Time of experimentation

The Hughes application comes at a time when Japan and several European countries are experimenting with Ka band satellites.

If the new Galaxy system is approved, it probably will be the first one developed by a U.S. company for commercial service.

Hughes Communications Galaxy, Inc., a subsidiary of the aerospace firm, plans to operate the two new Ka band satellites.

Formerly known as Hughes Communications, Inc., the subsidiary already operates two communications satellites and is making plans for the future to launch two more in the lower bands.

NET from page 83

son noted.

According to the technical manager, the choice of broadband turned out to be a very smart move because it enabled the university technicians to use a wide range of frequencies to make any of its boxes operate.

"In other words, we were not forced to dedicate any particular frequency to a particular set of machines, with the result that any student or teacher can sit at one terminal and talk to any other machine in the network," Swanson maintained.

From the start, the project went like clockwork. Just three months after the initial detailed design was finished, the first transmission on the network took place. Within six months, Swanson said, the network was totally operational.

'The local-area network has completely altered our perspective of computing.' — Robert Swanson, technical support manager, San Diego State University.

Over the last year, the original network, containing 9,000 feet of cable, 200 interfaces to computer ports and terminals and three major mainframe systems, has been expanded twice, so that today the system stands at 16,000 feet of cable, over 300 ports or terminals and 11 major computer systems.

"Our computer simulation tells us that up to 32,500 terminals and computers can be placed on the network," Swanson said.

The present network contains a Control Data Corp. Cyber 170/750 number cruncher with 12 disk drives, five tape drives and two-line printers and one Digital Equipment Corp. VAX-11/780, two VAX-11/750s, one PDP-11/45, five PDP-11/44s and one PDP-11/34.

The Cyber machine communicates with the PDP-11/45 time-sharing system and the PDP-11/44s via communications boards.

Also on the network are 170 Decmate word processors, 90 CRT terminals and several Apple Computer, Inc. Apple II micros, one of which is used as a network manager and one that serves as a backup to the PDP-11/34.

Applications on the network include a transaction-oriented library circulation system; an administrative data acquisition system, used mostly for accounting data; a financial accounting system and a system for keeping all student records. All the instructional computer classes and research performed on campus is monitored on the network.

"The local-area network has completely altered our perspective of computing and allowed us to pursue the distributed processing environment that the campus requires," Swanson said.

Future additions to the network currently under investigation include a campus data security system using encryption techniques; an electronic mail facility that will be the university's first entry into office automation; and a digital private branch exchange system.

In addition, the university will soon be adding off-campus areas to the network, namely off-site student dormitories and a new research center located about a mile away from the main site.

Protocol Converters

Local Data Co.
Protocol converter enhancement

Local Data Co. has announced an enhancement to its protocol converter that allows an asynchronous Ascii CRT terminal or IBM Personal Computer to attach to IBM 3274 and 3276 controllers in emulation of the IBM 3278 Model 2 display station.

The Interlynx/3278 is a standalone controller that connects to an IBM Type A coaxial cable and converts the coaxial interface to an RS-232C Ascii interface, a spokesman said.

According to the vendor, the Interlynx/3278 protocol converter performs multiple interface and protocol conversion functions necessary for driving asynchronous minis and microcomputers; CRT word processing; port selection; and modem and hardcopy terminal communications into the coaxial ports.

Hardware and software changes are not necessary with the Interlynx/3278 protocol converter, according to the vendor.

An optional Personal Computer file-transfer package is available. Support for all Personal Computer compatibles, the Xerox Corp. 860 and the IBM Displaywriter is also available.

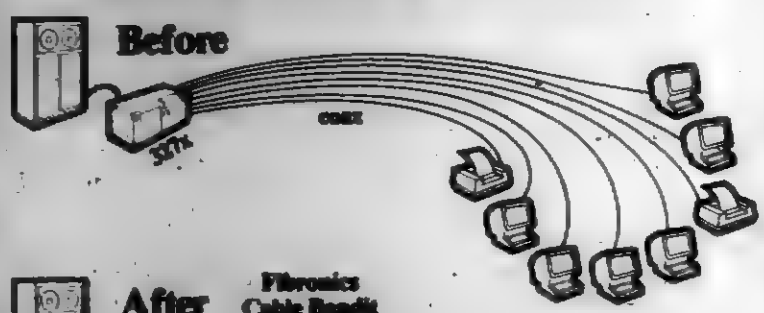
The price of the Interlynx/3278 is $1,395.

Local Data, Suite 706, 2701 Toledo St., Torrance, Calif. 90503.

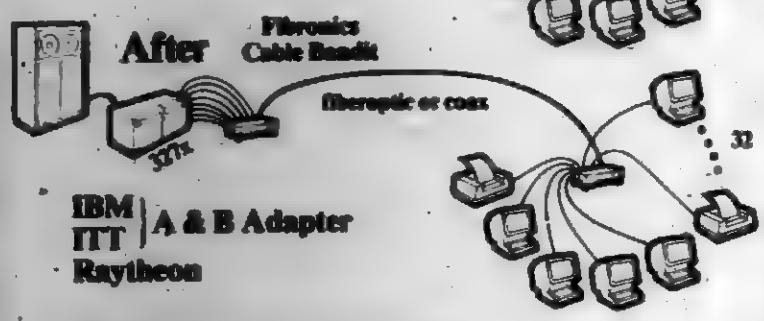
See PROTOCOL page 86

IBM® 3270 Users.

Before



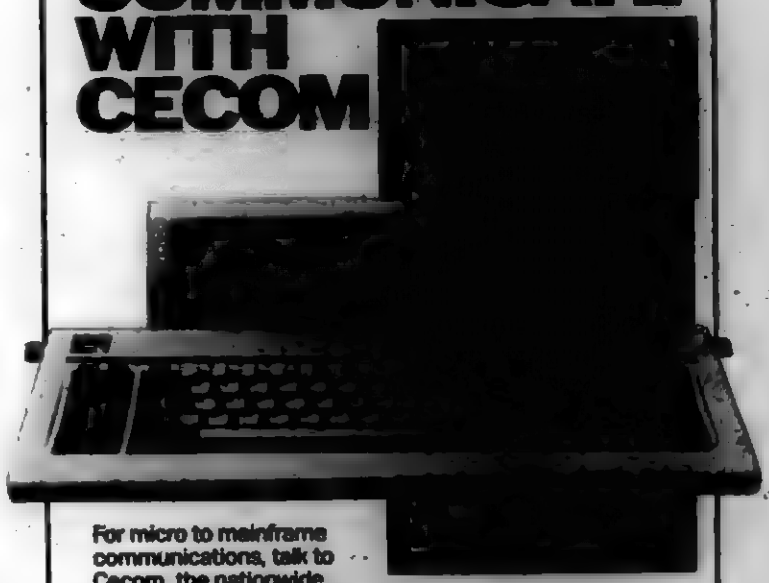
After Fibronics Cable Bundle



IBM
ITT
Raytheon
A & B Adapter

Fibronics International Inc.
fiberoptic communications
218 West Main Street • Hyannis, MA 02601 • (617) 778-0700 • Telex 951297

COMMUNICATE WITH CECOM



For micro to mainframe communications, talk to Cecom, the nationwide specialists in software and hardware links between mainframes and personal computers. Cecom puts uploading and downloading of data as well as file sharing at the fingertips of your personnel while maintaining the data integrity and system security you require. That means improved communications through the complete interaction and integration of the micros in your organization.

If it's an entire system you need, talk to Cecom. With offices from coast to coast, Cecom also does total system and network configuration, re-engineering, and refurbishing to put together the communications package you need.

For more information about Cecom or their many services, call or write:

3798 Williston Road
Minnetonka,
Minnesota 55343

cecom
cecom, incorporated
We Communicate!

Call Collect:
(612) 938-7178
(201) 244-1560

COMMUNICATIONS

Protocol from page 54

COMMUNICATIONS TECHNOLOGY CORP.
C-9424 RS-232/HP-IL Link

Communications Technology Corp. has announced the release of its C-9424 RS-232/HP-IL Link.

The Cmos C-9424 is compatible with National Semiconductor Corp.'s Cmos Industrial Microcomputer Bus (Cimbus) serial I/O board, with the capability for RS-232C-controlled asynchronous data transfer between a Cimbus Series/800 system and any compatible peripheral.

According to the vendor, it also contains all the circuitry for communications over the Hewlett-Packard Co. Interface Loop (HP-IL). In addition to the two serial communications channels, the C-9424 has provisions for 4K or 8K bytes of read-only memory (ROM), addressable on 4K-byte boundaries. There are 15 possible software-selectable bit/sec rates, ranging from 50 to 19,200.

The C-9424 comes with firmware in a single erasable programmable ROM, which provides an interface driver for the HP-IL, initialization routines and rudimentary debugging tools. The C-9424 is available immediately for $300, and quantity discounts are available.

Communications Technology, 2237 Colby St., Los Angeles, Calif. 90064.

HEWLETT-PACKARD CO.
HP Telex

Hewlett-Packard Co. has announced the HP Telex, a hardware and software package that allows telex messages to be sent from terminals connected to the company's HP 3000 business computer systems.

The product utilizes domestic and international telex networks of major U.S. carriers such as Western Union Corp., ITT World Communications, Inc. and RCA Global Communications, Inc., the vendor said.

Telex messages to be sent using a terminal connected to an HP 3000 may be composed directly on the HP Telex, or they may be composed with any of the HP word processors or other editors currently available on the HP 3000. Incoming messages may be received on any one of several HP printers, according to the vendor.

The system consists of a software package and a telex interface unit connected to the HP 3000. One telex interface can transmit or receive telex messages on the same line, and the software supports as many as eight units and telex lines connected to one HP 3000, the vendor said. The price for the software is $3,500, and the interface unit costs $2,645.

HP, 1820 Embarcadero Road, Palo Alto, Calif. 94303.

COMMUNICATIONS CONTROLLERS

INNOVATIVE ELECTRONICS, INC.
MC-80/600-1

Innovative Electronics, Inc. has announced the MC-80/600-1 communications processor. Emulating an IBM 3274-51C communications controller running configuration support level A, this device converts a Digital Equipment Corp. VT100-compatible terminal into an IBM 3277-1, 3277-2, 3278-1 or 3278-2 terminal communicating with the IBM host using the Ebcdic Binary Synchronous Communications protocol.

The product provides up to 16K bytes of read-only memory, 16K bytes of random-access memory and two serial communications ports. The price for the basic unit is $1,495.

Innovative Electronics, 4714 N.W. 165th St., Miami, Fla. 33014.

CABLESHARE, INC.
LSI-X.25 Front-End Processor

Cableshare, Inc. has announced X.29 functionality on its LSI-X.25 Front-End Processor, which reportedly allows remote terminals to communicate with host computers over a packet-switched network as if they were local terminals.

The X.29 support is said to provide host applications control over the functions and operational characteristics exhibited by a remote

Continued on page 87

COMMUNICATIONS

Continued from page 66

tics exhibited by a remote X.25 packet assembler/disassembler.

The front-end processor is designed for use on Digital Equipment Corp. PDP-11 and VAX-11 processors. It is said to handle all X.25 protocol internally.

It is supported for use on DEC's RSTS/E, RSX-11M (M-Plus) and VAX/VMS operating systems. The LSI-X.25 Front-End Processor is priced at $13,000.

Cablesharc, 20 Enterprise Drive, London, Ont., Canada N6A 4L6.

MULTIPLEXERS/ MODEMS

VISIONARY ELECTRONICS, INC.
Visionary 1200

Visionary Electronics, Inc. has introduced the Visionary 1200, a 1,200 bit/sec intelligent stand-alone modem that contains up to 48K bytes of memory for sending, receiving and storing messages, including telex and TWX.

The unit features automatic logon and automatic data capture and retrieval, as well as an internal clock/calendar and on-board software that allows it to send and receive messages automatically, even if the host computer is turned off. The Visionary 1200 transmits at either 1,200 or 300 bit/sec, has memory expandable to 48K bytes and includes two serial ports.

The Visionary 1200 is composed of a Bell 212A modem and an Intel Corp. 8085 microprocessor, while the unit's Cmos memory features full battery backup of all files. Additional automatic features include autoanswer, autodial, autoredial on busy or no answer and answerback. The price of the Visionary 1200 ranges from $795 to $1,095, depending on memory size.

Visionary Electronics, 141 Parker Ave., San Francisco, Calif. 94118.

COMMUNICATIONS SOFTWARE

THE TYPE AHEAD ENGINE CO.
PBX Engine

The Type Ahead Engine Co. has announced an interface package that reportedly transfers telephone traffic data from digital private branch exchange (PBX) systems to the Hewlett-Packard Co. HP 3000 minicomputer.

The PBX Engine is said to allow HP 3000 users to capture traffic data and use their own software or commercially available packages to analyze it.

The product is available at a price of $1,250.

The Type Ahead Engine Co., 534 Rosal Ave., Oakland, Calif. 94610.

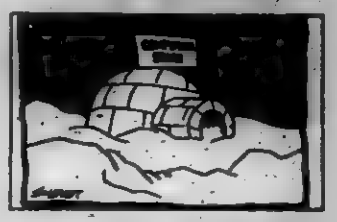
LOCAL-AREA NETWORKS

DIGITAL RESEARCH, INC.
DR Soft/Net package

A software package that can reportedly link microcomputers running its CP/M operating system via any local-area network was announced here by Digital Research, Inc.

Introducing its new DR Soft/Net package, the company claimed the product enables offices to tie together diverse personal computer workstations using local-area networks such as Xerox

Continued on page 68



Personal Queries And Reports On IBM/38?

FUSION 4/38, the first full information retrieval and presentation system for the non-technical user.

FUSION
PRODUCTS INTERNATIONAL

(415) 651-4749
PO Box Fusion
Mill Valley, CA 94942
Telex 176889 FUSION

COMMUNICATIONS

Continued from page 57

Corp.'s Ethernet, Datapoint Corp.'s Arcnet and Corvus Systems, Inc.'s Omninet.

The package is said to interconnect micros running any version of Digital's CP/M, CP/M 86 and Concurrent CP/M operating systems.

Networking features reportedly include file sharing, password protection, as well as record and file locking.

In conjunction with Concurrent CP/M, DR Soft/Net is said to provide a file-server capability at each workstation.

According to the vendor, users are able to share files and transfer information and perform other tasks while running an application.

DR Soft/Net does not require dedicating a separate workstation CPU to supervise networking, Digital claimed, and its multitasking capabilities also support transferring data between local and remote processors via a local network, thereby providing full distributed processing, according to Digital.

The product will be sold for $1,000. Digital Research also announced a new compiler design, which it claimed will increase the transportability of applications software.

The first example of the technology, a compiler for Fortran-77, will be released in January, the company said.

The Fortran-77 compiler, priced at $500, will be the first of five new compilers to use the technology and will run on Concurrent CP/M and CP/M 86 operating systems, a spokesman for Digital said.

According to Digital, it will offer IBM PC-DOS and Microsoft, Inc. MS-DOS capability. Compilers for Pascal, C, PL/I and C Basic programming languages will follow, the vendor added.

Digital Research, 160 Central Ave., Pacific Grove, Calif. 93950.

TEST EQUIPMENT

TELECOMMUNICATIONS TECHNIQUES CORP.
Enhancements

Telecommunications Techniques Corp. (TTC) has added two enhancements — a remote control option and an interface module — to its data error analyzers.

A remote control option that provides access through an RS-232 or IEEE-488 interface has been added to the firm's Fireberd 2000 data error analyzer, according to the vendor.

The remote control option is designed for remote access to a long-term, unattended test application, the vendor said.

The DS1 interface module for Fireberd 1500 and 2000 series analyzers acts as data terminal equipment and exchanges a return-to-zero bipolar data signal, a spokesman for the vendor said.

It operates in terminated or bridging mode and allows the measurement and injection of bit errors and bipolar violations, according to the vendor spokesman.

Adding the remote control option to an existing Fireberd 2000 costs $875; adding the DS1 interface costs $375.

TTC, 444 N. Frederick Ave., Gaithersburg, Md. 20877.

AUXILIARY EQUIPMENT

INTERNATIONAL DATA CORP.
Communications Technology Service

International Data Corp. has announced its Communications Technology Service (CTS) to provide businessman and government officials with information about technological advances, as well as the divestiture of AT&T.

Key elements of CTS are said to be a semimonthly bulletin reporting on and analyzing developments in the communications field and quarterly research reports covering industry issues, according to a spokesman for the vendor.

The service is available now at a charter rate of $10,000 per year until April 30 and at a rate of $16,000 thereafter.

International Data, Washington Division, Suite 240, 1500 Planning Research Drive, McLean, Va. 22102.

WESTERN TELEMATIC, INC.
DB-1

Western Telematic, Inc. has introduced its DB-1, a data booster that doubles cable transmission distance, according to the vendor.

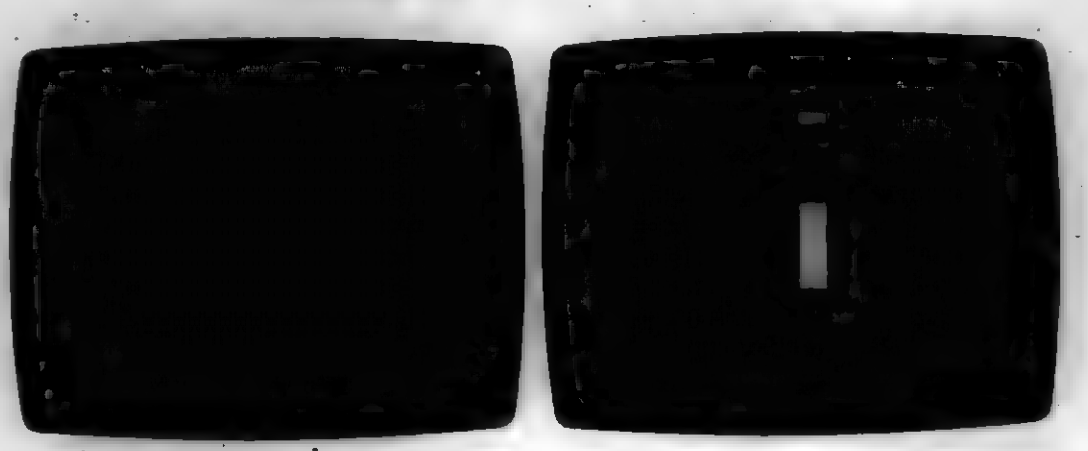
DB-1 acts as a line conditioner and signal booster for data and handshake signals.

The data booster plugs into a cable transmission line, receives signals, filters noise, improves electrical characteristics and boosts signal strength, the vendor said. The data booster also reportedly retransmits a signal downline.

DB-1 is priced at $95, according to the vendor.

Western Telematic, 2435 S. Anne St., Santa Ana, Calif. 92704.

INTELLECT.™
NO SOONER SAID THAN DONE.



To use INTELLECT, the natural language query system, all you have to do is ask—in everyday conversational English—and you'll retrieve. Immediately, in either text or full-color graphics.

INTELLECT, the world's only successful true natural-language query system, is an ideal tool for your information center. INTELLECT's powerful information retrieval capabilities are so advanced that it understands questions and responds with answers as if you were talking to a knowledgeable colleague. Executives access data themselves—more easily than ever before—without learning any technical jargon or "computerese." It's so easy to use, it doesn't even have a training manual!

Whether you use INTELLECT as a retrieval system or as an effective data analysis tool, it transforms raw data in the data base into information and presents it in finished color graphics in a matter of seconds. It's a live dynamic interface that fully integrates your existing database and graphic systems.

Already hard at work in hundreds of organizations, INTELLECT is ideal for marketing, finance, personnel, manufacturing, and banking applications.

INTELLECT is an important technological breakthrough. You can learn more about it by attending one of our nationwide seminars. Or put its amazing power at your fingertips in minutes with one of our demonstration tapes.

Call or send coupon for more details. Look into INTELLECT, and be an eyewitness to the future of computing.

Tell me more about INTELLECT.
Name _____ Title _____
Company _____
Address _____
City _____ State _____ Zip _____
Telephone _____
Hardware Type _____ Info Content _____
_____ Demo Tape _____ Seminar _____ Sales Presentation
ARTIFICIAL INTELLIGENCE CORPORATION
100 Fifth Avenue, Waltham, MA 02254 0-116

ARTIFICIAL INTELLIGENCE CORPORATION
100 Fifth Avenue, Waltham, MA 02254 617-890-8400

REPORT WRITER
for DEC computers
under RSTS and VMS
- Very powerful and user-friendly
- Better than DEC's Datatrieve
- Costs much less

etc ENTERPRISE TECHNOLOGY CORPORATION

"IDMS/R is the perfect DBMS for the IBM 4300 user."

Frank Chisholm*

Because IDMS/R, with its Automatic System Facility, makes your IBM 4300 as easy to use as a personal computer.

The Automatic System Facility (ASF) is so comprehensive and easy to use that all an IBM 4300 user need do to develop an application is to define a relational record. ASF then dynamically generates all necessary supporting structures including data definitions, screen formats, application processing logic, and documentation. In other words, the developer can witness the application being produced, literally, in seconds. This is what makes ASF a major advance over fourth generation languages. Thus IDMS/R is the perfect system for the IBM 4300 user with limited staff resources.

But suppose when you build a complex, high volume production application with IDMS/R, you desire outstanding performance. Typically, 5% of the data relationships (joins) in any application are accessed 95% of the time. With IDMS/R you can simply change these relationships to predefined joins and benefit from a dramatic boost in performance.

We call it Relational Fastpath. This is what makes IDMS/R a unique relational DBMS, and a perfect system with which to build production applications. In addition, IDMS/R has the most sophisticated back-up and recovery capability of any DBMS, a full integration with personal computers and a complete line of integrated financial and manufacturing applications.

In summary, IDMS/R was designed to satisfy the requirements of the IBM 4300 user who wants to develop both production and end user applications faster and easier.

For further information, attend a Cullinet Seminar. Mail the attached coupon or call the Cullinet Seminar Center at 800-225-9930 (in Massachusetts 617-329-7700).

*Frank L. Chisholm is Cullinet's Executive Vice President. Frank has worked closely with Cullinet users and prospective users for more than six years. As a key member of Cullinet's management team, Frank has contributed heavily to Cullinet's database product development strategy.

IDMS/R Seminar Cities and Dates

City & State	Date	City & State	Date	City & State	Date	City & State	Date
Allentown, PA	Mar. 1	Des Moines, IA	Feb. 16	New York, NY	Feb. 22	St. Louis, MO	Feb. 8
Atlanta, GA	Feb. 15	Detroit, MI	Feb. 9	Oklahoma City, OK	Feb. 9	Salt Lake City, UT	Feb. 21
Arlington Heights, IL	Feb. 23	Edmonton, AB	Feb. 15	Omaha, NE	Mar. 1	San Diego, CA	Feb. 23
Austin, TX	Feb. 14	Fort Wayne, IN	Mar. 6	Orlando, FL	Feb. 7	San Jose, CA	Feb. 14
Baltimore, MD	Feb. 21	Greenville, SC	Mar. 6	Oshkosh, WI	Feb. 28	Savannah, GA	Feb. 3
Bloomington, IL	Feb. 21	Hartford, CT	Feb. 14	Ottawa, ON	Feb. 1	Seattle, WA	Feb. 7
Boston/Westwood, MA	Feb. 23	Indianapolis, IN	Feb. 21	Ottawa, ON	Feb. 21	Somerset, NJ	Feb. 8
Bowling Green, KY	Feb. 1	Joliet, IL	Feb. 9	Philadelphia, PA	Feb. 8	South Bend, IN	Feb. 7
Bridgeport/New Haven, CT	Mar. 6	Kansas City, MO	Feb. 22	Pittsburgh, PA	Feb. 29	Springfield, IL	Mar. 5
Burlington, MA	Feb. 9	Lansing, MI	Feb. 1	Portland, ME	Feb. 21	Syracuse, NY	Feb. 14
Charleston, WV	Feb. 29	Los Angeles, CA	Feb. 9	Quebec City, PQ	Feb. 15	Tallahassee, FL	Mar. 1
Charlotte, NC	Feb. 23	Louisville, KY	Feb. 16	Quincy, IL	Feb. 29	Tampa, FL	Feb. 8
Cincinnati, OH	Feb. 7	Memphis, TN	Feb. 23	Richmond, VA	Feb. 8	Toledo, OH	Feb. 24
Cleveland, OH	Feb. 3	Miami, FL	Feb. 16	Roanoke, VA	Jan. 29	Toronto, ON	Feb. 2
Columbus, GA	Feb. 28	Moline, IL	Feb. 3	Rockford, IL	Feb. 14	Worcester, MA	Feb. 16
Denver, CO	Feb. 7	New Orleans, LA	Feb. 23	Sacramento, CA	Feb. 21	York, PA	Feb. 15

I'd like to attend your seminar on _____ (Date)

in _____ (City)

My computer is _____

Name/Title _____

Name/Title _____

Company/Department _____

Address _____

City _____

State _____ Zip _____

Phone ( ) _____

Mail to: The Cullinet Seminar Center
400-Blue Hill Drive, Westwood, MA 02090-2198

Database : Cullinet

From , to

Nobody puts ideas on paper so many ways.

If you're using your printer with a personal computer, you probably need one that can handle a variety of functions.

At the same time, the price should be in line with the computer itself. Low.

The pint-sized Dataproducts printer in the picture costs about as much as one good software package.

It prints spreadsheets, graphics and illustrations, labels, multi-part forms—even letters that look like they were typed.

But let's say you're running a big computer and it's hundred-page reports you need. Pronto. Or documents by the millions.

The printer on the right finishes a full computer printout page in less time than it takes to sneeze. At 2,000 lines a minute, it prints much faster than you can see. Three shifts a day. Year after year.

In between these two special-duty Dataproducts printers are whole families of other Dataproducts printers—daisywheel printers, non-impact printers, high-security printers for the government, and more.

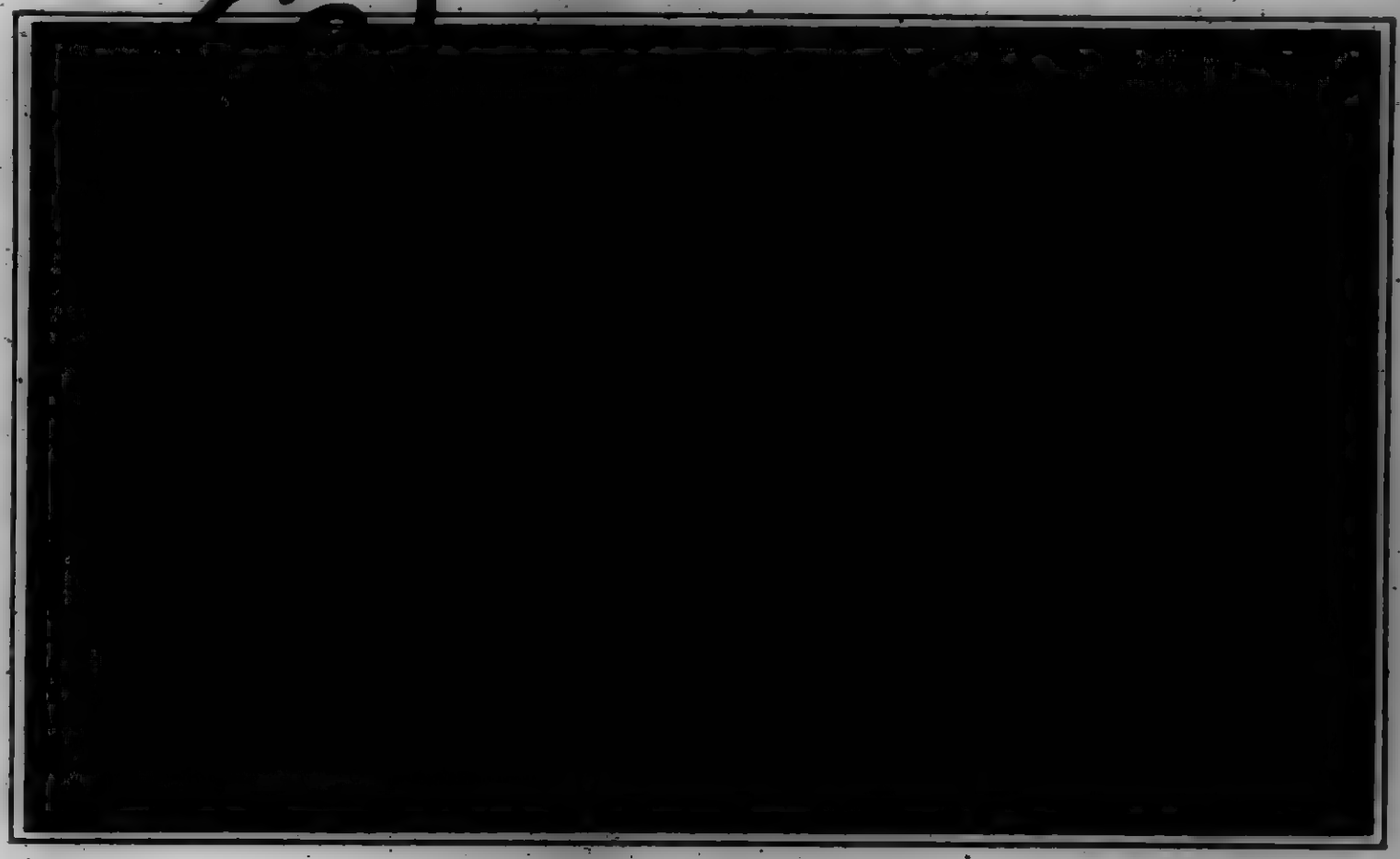
In fact, we make more different kinds of computer printers than any other independent printer company in the world.

Very likely we make one that fits your needs exactly.

Write us at 6200 Canoga Avenue, Woodland Hills, CA 91365. Or phone (818) 887-3924. In Europe, 136-138 High Street, Egham, Surrey, TW 20 9HL England.

Dataproducts computer printers.

IN DEPTH



Lessons from the best-sellers

A three-part series

With a little interpolation and almost no extrapolation, the current best-sellers on general management can be applied to the data processing department.

By J. Daniel Couger

For the first time since best-seller lists have been compiled, the top three in the nonfiction category are management-oriented books. Over the past six months, among the top three sellers have been 1) *In Search of Excellence*, 2) *The One-Minute Manager* and 3) *Megatrends*. Far down the list are the traditional top sellers: cookbooks, physical fitness advice and the sex manuals.

One can speculate on the reason: 1) the state of the economy, 2) the lack of quality in competing books or 3) the turn to seriousness resulting from worldwide crises. I favor a different explanation: The three books simply offer especially meaningful content.

These books would appear to be of interest primarily to boards of directors, chief executives and their immediate subordinates. Not so. They are also important to management at all levels within data processing. Granted, the reader must translate the general principles to the DP experience, and some appear to be only remotely related. But, with a little interpolation and almost no extrapolation, the guidelines in the three books have direct bearing on improving DP management.

I've taken on the task of translating — to DP circumstances — the key points of the three books. *In Search of Excellence* is analyzed here. Future issues will interpret the other two books.

The makings of success

With well over one million copies in print, *In Search of Excellence* is in a category attained by very few books. "It is not a book that is being bought solely by people in the hard-core business community," according to Dan Harvey, Harper & Row publicity director. "It is being bought by people who want to know how to run very small businesses, too."

Authors Thomas J. Peters and Robert H. Waterman Jr. report the results of a 2½-year research project on the key ingredients to success — not just a modicum level of success, but extraordinary success. Sustaining success is another selection criterion. For example, leading the Fortune 500 list this year was North American Coal Co., with an

Part one

increase in profit of 2,276%. Despite its spectacular performance, this company was not included in the compilation by Peters and Waterman. Its success is of short duration.

There is no way of knowing how many copies of *In Search of Excellence* have been purchased by DP managers. Although the title is intriguing to any manager, subjects such as acquisition would not appear to be of direct value to a DP manager. Surprisingly, the material in that section of the book is quite applicable to the DP environment. In fact, most of the book is relevant.

Defining 'excellence'

The researchers, funded primarily by McKinsey and Co., began with a selection of 75 highly regarded companies. They studied annual reports and conducted intense, structured interviews. They also examined some "underachieving" companies for purposes of comparison. "We didn't concentrate much on this," the authors said, "as we felt we had plenty of insight into underachievement in our combined 24 years in the management consulting business."

The researchers did not look extensively at small companies. "Our major concern," they said, "was and is with how big companies stay alive, well and innovative." Therefore, few firms in the sample had annual sales of less than $1 billion or histories shorter than 20 years.

Not all industries were covered. Included were:

1. High-technology companies, such as Digital Equipment Corp., Hewlett-Packard Co., Intel Corp. and Texas Instruments, Inc.
2. Consumer goods companies, such as Proctor & Gamble Co., Chesebrough-Pond's Inc. and Johnson & Johnson.
3. General industrial goods companies, which included Caterpillar Tractor Co., Dana Corp. and 3M (Minnesota Mining and Manufacturing Co.).
4. Service companies, such as Delta Air Lines, Inc., Marriott Corp., McDonald's Corp. and Disney Productions.
5. Project management companies, such as Bechtel Group, Inc. and Fluor Corp.
6. Resource-based companies, such as Atlantic-Richfield Co. (Arco), Dow Chemical Co. and Exxon Corp.

The researchers did not look extensively at small companies. "Our major concern," they said, "was and is with how big companies stay alive, well and innovative." Therefore, few firms in the sample had annual sales of less than $1 billion or histories shorter than 20 years.

The researchers chose six measures of long-term superiority. Three are measures of growth and long-term wealth creation over a 20-year period. Three are measures of return on capital and sales. The six are:

1. Compound asset growth from 1961 through 1980.
2. Compound equity growth from 1961 through 1980.
3. The average ratio of market value to book value.
4. Average return on total capital, 1961 through 1980.
5. Average return on equity, 1961 through 1980.
6. Average return on sales, 1961 through 1980.

To qualify as a top performer, a company must have been in the top half of its industry in at least four out of six measures over the full 20-year period. (In fact, of the 36 companies that qualified, 17 ranked in the top half on all six measures, and another six ranked in the top half on five measures). Thus, any top performer must have scored well over the long haul on both growth and absolute measures of economic health.

As a last screen, the researchers applied a "measure of innovativeness." They asked selected industry experts (for example, businessmen from within the industry) to rate the companies' 20-year record of innovation, defined as a continuous flow of industry bellwether products and services and general rapidness of response to changing markets or other external dynamics.

Characteristics of excellence

The researchers concluded that "the excellent companies were, above all, brilliant on the basics. Tools didn't substitute for thinking. Intellect didn't overpower wisdom. Analysis didn't impede action. Rather, these companies worked hard to keep things simple in a complex world. They persisted. They insisted on top quality. They fawned on their customers. They listened to their employees and treated them like adults. They allowed their innovative product and service 'champions' long tethers. They allowed some chaos in return for quick action and regular experimentation."

Eight attributes emerged as the most characteristic of excellent companies.

1. **A bias for action.** "Although analytical in their approach to decision making, the excellent companies are not paralyzed by that fact."

HUGHES

SOFTWARE SPECIALISTS, COMPUTER SCIENTISTS, DATA PROCESSING SYSTEM ENGINEERS

The people at Hughes Space & Communications Group are proud of their major contributions to space-borne communications.

They are leading the challenge to new technical horizons.

There is a unique team spirit at Hughes Space & Communications Group. A spirit that has created a solid commitment to using advanced technology to develop better and more effective communication.

At Hughes, we know software is *central* to continued success.

Work with some of the most modern and powerful computer equipment and development tools. With top software experts in the field... on projects of vital importance.

It is hard to beat all the advantages that software specialists have at Hughes.

Two-thirds of all commercial communications satellites currently operating were designed and built by the people at Hughes.

Become one of these people with the Space & Communications Defense Systems Division.

Electrical Engineer
Ability to design, interface, test and integrate digital hardware in data processing systems. Must have capability in application of microprocessor and/or bit slice technology. Strong writing skills essential. Requires BS or MS in EE. 10 years experience preferred.

MTS Programmer
Operating system programmer analyst to maintain and improve large scale computer operating systems in PWB/ENG Computer Center. Must have operating system support experience in DEC VMS or UNIX/PWB. Requires BS in CS.

To respond to these and other openings in both the Denver and Los Angeles areas, send resume to Ray Bevacqua at: Hughes Space & Communications, S41/A300, Dept. WC-821, P.O. Box 92919, Los Angeles, CA 90009.

Creating a new world with electronics

HUGHES

HUGHES AIRCRAFT COMPANY
Proof of U.S. Citizenship Required
Equal Opportunity Employer

SPACE & COMMUNICATIONS GROUP

■ "Ready — Fire — Aim" is a common practice. The objective is to get something started, then improve on it.

■ Objectives are set at a practical size — a fine sense of the doable.

■ "Chunking" is utilized — breaking things up to facilitate organizational fluidity and to encourage action.

2. Close to the customer. "The excellent companies learn from the people they serve. They provide unparalleled quality, service and reliability."

■ A paramount objective is performance. Maytag Co.'s devotion to dependability earns a 15% price premium while also maintaining top market share.

■ Many of the innovative companies get their best product ideas from customers. Allen-Bradley Co. was driven to robotics not by its central labs but by its customers. DEC relies on customers to find uses for its computers.

■ Emphasis on service. Frito-Lay, Inc.'s 99.5% service level is not just an objective but an accomplishment. Its market share and return on investment are the envy of the industry.

3. Autonomy and entrepreneurship. "The excellent companies foster many leaders and innovators throughout the organization."

■ They don't try to hold people on so short a rein that they can't be creative.

■ They encourage practical risk taking and support good tries.

■ They are a "hive" of champions. A champion is not an intellectual giant or blue-sky dreamer, but a pragmatic person who takes someone else's theoretical construct if necessary and bullheadedly pushes it to fruition.

4. Productivity through people. "The excellent companies treat the rank and file as the root source of quality and productivity gain."

■ Management gets out of the office and onto the floor.

■ Every employee is seen as a source of ideas, not just a pair of hands. RMI, an intensely people-oriented company, with hardly a penny in investment spending, realized an 80% productivity gain over three years.

■ Almost every management says that people are important — but in reality, few place people concerns first in priority as do those companies.

5. Hands-on, value-driven. "The basic philosophy of excellent companies has more to do with their achievements than do technological or economic resources, organization structure, innovation and timing."

■ These companies pay explicit attention to values.

■ All of them have a well-defined set of guiding beliefs on which all policies and actions are premised.

■ Ironically, the companies with the most quantified statements of mission (precise financial targets) have done less well financially than those with broader, less precise, more qualitative statements of corporate purpose.

6. Stick to the knitting. "While there are few exceptions, the odds for excellent performance favor those companies that stay close to business they know well."

■ The most successful companies diversify around a single skill — the coating and bonding technology of 3M, for example.

■ The next group, in descending order of success, branches out into related fields — for example, General Electric Co.'s leap from electric power generation turbines to jet engines (another turbine).

■ Finally, the highest risk area — acquiring "a window on a new skill." These companies make sure the acquisition size is manageable enough to allow early, painless integration.

The authors found that successful companies are a "hive" of champions. A champion is not an intellectual giant or blue-sky dreamer, but a pragmatic person who takes someone else's theoretical construct, if necessary, and bullheadedly pushes it to fruition.

7. Simple form, lean staff. "Making an organization work has everything to do with keeping things understandable for the tens of thousands who must make things happen. The excellent companies keep things simple."

■ Size generates legitimate complexity; nevertheless, staff is deliberately kept small.

■ Virtually none of these companies has a matrix organization. Even in Boeing Co., Inc., where many of the matrix ideas originated, people operate in a binary way — they are either a part of the project team or are part of a technical discipline. No confusion exists about questions such as, "Which boss do I report to on this one?" or, "Do I keep everyone informed?"

■ Decades ago, Americans got hooked on a span-of-control guideline of five to seven people. Many of the excellent companies use the flat organization — fewer than seven levels of management compared to the more than 12 levels found in

FALCON
on-line data entry that's above and beyond the ordinary

For an easy-to-use, completely interactive data entry system that's designed especially for the end user, you need FALCON.

FALCON operates standalone or as a task under CICS and the other major TP monitors giving you total flexibility and performance. It supports both DOS and OS operating systems to provide versatility and upgrading capabilities. And FALCON automatically converts VIDEO/370 formats.

FALCON's high-level security system protects your data against unauthorized access. It lets you decide which operators can use specific functions. And with FALCON you never worry about losing data. If the system fails, all data is recovered. If a terminal breaks down, just go to another terminal, rescue your data, and start working – right where you left off.

FALCON's on-line instructions help you design screen formats, enter and verify data, maintain files, create tables, and submit your own jobs. Just touch a key, tell FALCON what you want to do, and the instructions appear right on the screen.

With FALCON, you can make decisions based on the productivity of your operators without leaving your office. You can monitor the progress of all active terminals and view job accounting statistics on-line.

FALCON's built-in edits include table lookup, range testing, defaults, balancing, and much more. FALCON goes far beyond other data entry systems to let you use your terminal as an operator's console and view the activity and contents of the input and output queues.

So make sure you're getting the most from your resources. Choose FALCON. Call for a free trial. You'll be glad you made the right choice.

For more information contact
Phoenix Computer Corporation,
11949 Jefferson Boulevard,
Culver City,
California 90230.
Toll free (800) 255-5049 or
(213) 827-4500 in California.

FALCON

other corporations.

8. Simultaneous loose-tight properties. "The eighth item is mostly a summary point. It is the coexistence of firm central direction and maximum individual autonomy."

■ The excellent companies push autonomy down to the shop floor or product development team, but are fanatic centralists around the few core values they hold dear.

■ Cost control and efficiency *follow* from the emphasis on quality, service, innovativeness, result sharing, participation, excitement and a problem-solving focus that is tailored to the customer.

■ The nature of the rules is crucial here. The rules in the excellent companies have a positive cast. They deal with quality, service, innovation and experimentation. Their focus is on building, expanding, *the opposite of restraining*; whereas most companies concentrate on controlling, limiting, constraint.

Excellence in dp management

1. Proactive instead of reactive.

■ Opportunistic: The system plan is oriented toward under-girding the objective of the firm — it is not just a consolidation of user requests for applications.

■ Innovative: Systems are designed to give the firm a competitive advantage, not just efficiency. An example is the order system of American Hospital Supply Corp. where the service is so comprehensive that the firm gained a major share of the business.

■ Prototypic: Do it, try it, fix it.

2. Listening to the user — intently and regularly.

■ Openness: Avoiding the attitude that users don't know enough about the technology to make creative contributions to design.

■ Joint venture: Eliminating the "we/they" atmosphere. Cooperatively creating a "Maytag," resulting in the "lonely repairman" environment.

■ Service orientation: "When our customer looks good, so do we." Top executives who were previously DP managers believe that peer evaluations significantly affected their promotion.

3. Concurrence in objectives, freedom in design.

■ Avoiding myopia: Not limiting design alternatives in hopes of expediting system development. Assurance that the best solution is attained can occur with only 5% of the project budget devoted to this phase of the life cycle.

■ Designating presidents: Once the project objectives are clarified, letting the leader be "president of his company" — with considerable autonomy in meeting objectives.

■ Nourishing champions: "A new idea either finds a champion or dies" — Edware Schon.

4. People are our most important resource.

■ Grab a grizzly: Originated by Hewlett-Packard, this concept means that people will tackle almost impossible tasks when they believe they have personal impact on a worthwhile project.

■ Respect: "People will flood you with ideas if you let them. Treat people as adults. Treat them as partners. Treat them with dignity. Treat them with respect. Treat them — not capital spending and automation — as the primary source of productivity gains" — Peter Smith.

■ Feedback: Which one of us does not have almost instant recall on positive feedback, regardless of its remoteness? For example, we still remember the positive strokes from elementary teachers, coaches and counselors. Creative managers think of dozens of ways to encourage their people.

DP in some banks had disastrous results when it went into the service bureau business, just because it had excess capacity. The experienced competition clobbered them. Other banks were successful because they marketed their expertise — application packages. They used proceeds to underwrite more sophisticated applications than they could have otherwise afforded.

5. Demonstrating the value of values.

■ Value clarity: Translating the company's "guiding beliefs" into tangible entities. For example, identifying how system specifications can include provisions to enable a user department to achieve its quantitative objectives.

■ Value application: Making sure that the company's "guiding beliefs" are really guiding DP management actions.

■ Interaction: Managers who are also leaders are out interacting with their people — not to monitor performance but to encourage and share ideas and ideals.

6. Leveraging strengths.

■ Concentrating on lifestream systems: Ensuring the efficacy of those systems key to the life and

m3278/SPF puts micros on-line to mainfra

Included in the m3278/SPF package is FODX communications by CXI.

growth of the firm.

■ Judicious expansion: DP in some banks had disastrous results when it went into the service bureau business, just because it had excess capacity. Their experienced competition clobbered them. Other banks were highly successful because they marketed their expertise — application packages. They used proceeds to underwrite much more sophisticated applications than they could have otherwise afforded.

■ Evolution, not revolution: Only agree to be the beta test site — for both vendor hardware and system software — when you gain a quantum leap on competitors. Accept risk in high-ROI areas where you are most knowledgeable — application software.

7. Tight belt, loose coat.

Is it possible for a DP department to reach the plateau of excellence within a company that itself is not on the Peters/Waterman list? The answer is yes, unequivocally.

■ Destaffing: How? One way is rotating line people through staff positions to minimize "staff" attitude and to avoid staff empire-building.

■ Matrixless: Use "one-supervisor" philosophy. Clarity of direction offsets inconvenience and cost of going outside the project team for high-tech advice.

■ Looseness: Allowing undulating boundaries so teams can continuously interact and share ideas.

8. Centralized decentralization.

■ Flexibility: Using a fluid organizational structure to take advantage of technological advances. For example, as network costs diminish, transferring people and computing capability to user nodes to ensure close communication.

■ Centrality: Keeping at central core only those activities which will be diluted by decentralization, such as corporate system planning/control and design of company-wide systems.

■ Centralist values: When values are central, implemented in people-oriented programs, desired results in areas like standard-compliance and performance (both quality and quantity) follow naturally.

Milestone excellence possible

Is it possible for a DP department to reach the plateau of excellence within a company that itself is not on the Peters/Waterman list? The answer is yes, unequivocally. An example is the DP department of American Hospital Supply. Two others where I have observed conformance to a majority of the eight criteria for excellence are the Hartford Insurance Co. and Ford Motor Co.

An interesting question is whether the converse is true. Do any of the top achievers have a less than successful DP department? Data is not available to answer that question. On the other hand, there are some DP departments in the "excellent" companies whose excellence is generally recognized. Texas Instruments is one. Another is IBM.

Although only two excellence criteria refer specifically to people-orientation, that emphasis pervades. While company performance is the principal evidence of people-orientation, the authors included numerous supporting statements from managers.

Delta President Tom Beebe describes an open-door policy for everyone from pilots to flight attendants. No one — not the chairman, president or vice-president — has an administrative assistant whose job it is to screen such visitors. Hewlett-Packard's Bill Hewlett relates his conviction that employees want to do a good job, a creative job, and will do so if given the proper environment. Key here is treating workers with consideration and respect.

The following statement by Peters and Waterman not only summarizes the main factors which identify the excellent companies, it also serves well as the set of guiding beliefs for a DP department aspiring to excellence: "These companies are simultaneously externally focused and internally focused — externally in that they are truly driven by their desire to provide service, quality and innovative problem-solving in support of their customers; internally in that quality control, for example, is put on the back of the individual line worker, not primarily in the lap of the quality control department. Service standards likewise are substantially self-monitored. The organization thrives on internal competition. And it thrives on intense communication, on the family feeling, on open door policies, on informality, on fluidity and flexibility, on nonpolitical shifts of resources. This constitutes the crucial internal focus: the focus on people."

About the Author

J. Daniel Couger holds the title Distinguished Professor of Computer and Management Science at the University of Colorado, Colorado Springs. He has lectured in more than 50 countries and written 15 books and more than 60 papers.

Prior to his academic appointment, Couger served as a manager in the computer field. In 1977, he was selected as U.S. Computer Science Man of the Year.

mes and cuts application software backlog.

A recent survey found that an average mainframe user would have to wait 3½ years for development work to begin on an application requested today.

That's a long time to wait.

In the same study, managers felt on-line programming offered the greatest potential for reducing the backlog.

It was their number one choice.

If on-line programming offers the greatest potential for cutting application program development backlog, what's the problem?

Simply this.

A limited number of programmers have mainframe access at any given time.

m3278/SPF™ can help.

Programmers on staff become more productive.

Productivity is substantially increased with m3278/SPF.

Why?

Because the programmers' workstation is not down while programs are compiling or downloading.

Coding continues without interruptions.

You may be able to eliminate application backlog without adding programmers. But, it is comforting to know programmers can be added without the expense of another host.

A substantial increase in the number of on-line programmers is possible with m3278/SPF.

The number of on-line programmers is doubled with m3278/SPF™ when only 40% of the programming effort is in Edit/Browse mode. But, when 90% of the effort is Edit/Browse, a whopping 7 to 1 increase of on-line programmers is realized.

With m3278/SPF,* IBM PC users are directly on-line with the host computer via direct (coax) link at channel transfer rates.

Including uploading and downloading programs or datasets. Attaining dataset listings as well as creating local new files or editing pre-existing ones.

Your IBM PC is a distributed SPF workstation allowing simultaneous local and remote SPF software.

Microcomputer uses are unparalleled when m3278/SPF operates under PC-DOS.

In addition, a multitask version of m3278/SPF is available for concurrent CP/M-86 users.

Users can perform several tasks at one time by swapping between functions and programs instantly.

For example, editing, compiling, and transferring can be performed simultaneously.

m3278/SPF emulates the 3278 terminal, yet surpasses its capabilities.

No time lost re-educating programmers.

With m3278/SPF,* experienced programmers can quickly and easily recognize the SPF emulation characteristics and operate more efficiently.

Overloading eliminated.

By performing editing functions locally, problems related to mainframe overloading are eliminated.

Mainframe datasets or source programs can be brought down to the microcomputer. Using the same mainframe software in an off-line fashion, datasets can be modified and returned to the mainframe.

No overload. No downtime. No trouble.

How you can cut mainframe application software development backlog.

m3278/SPF™ is announced for the IBM Personal Computer* and all IBM board compatible 16-bit microcomputers.

To find out how m3278/SPF™ can help turn the 3½-year wait into a tolerable number, contact us today.

PHASER

Mainframe Software for Micros

PHASER SYSTEMS, INC., 24 CALIFORNIA ST., SAN FRANCISCO, CA 94111 • 415-434-8880

PC-DOS, IBM and SPF are registered trademarks of International Business Machines Company. CP/M is a registered trademark of Digital Research, Inc. PCDOS is a trademark of DR. and PHASER is a trademark of Phaser Systems, Inc.

Seiko Series 8600 MP

Seiko Series 8600 MP

16-bit 8086 CPU
Video Displays
Keyboards
256K RAM
20 Mb Hard Disk
1.0 Mb Floppy Disk
Thoroughbred 3.1 Multi-user Operating System

Open Systems Software

General Ledger
Accounts Receivable
Accounts Payable

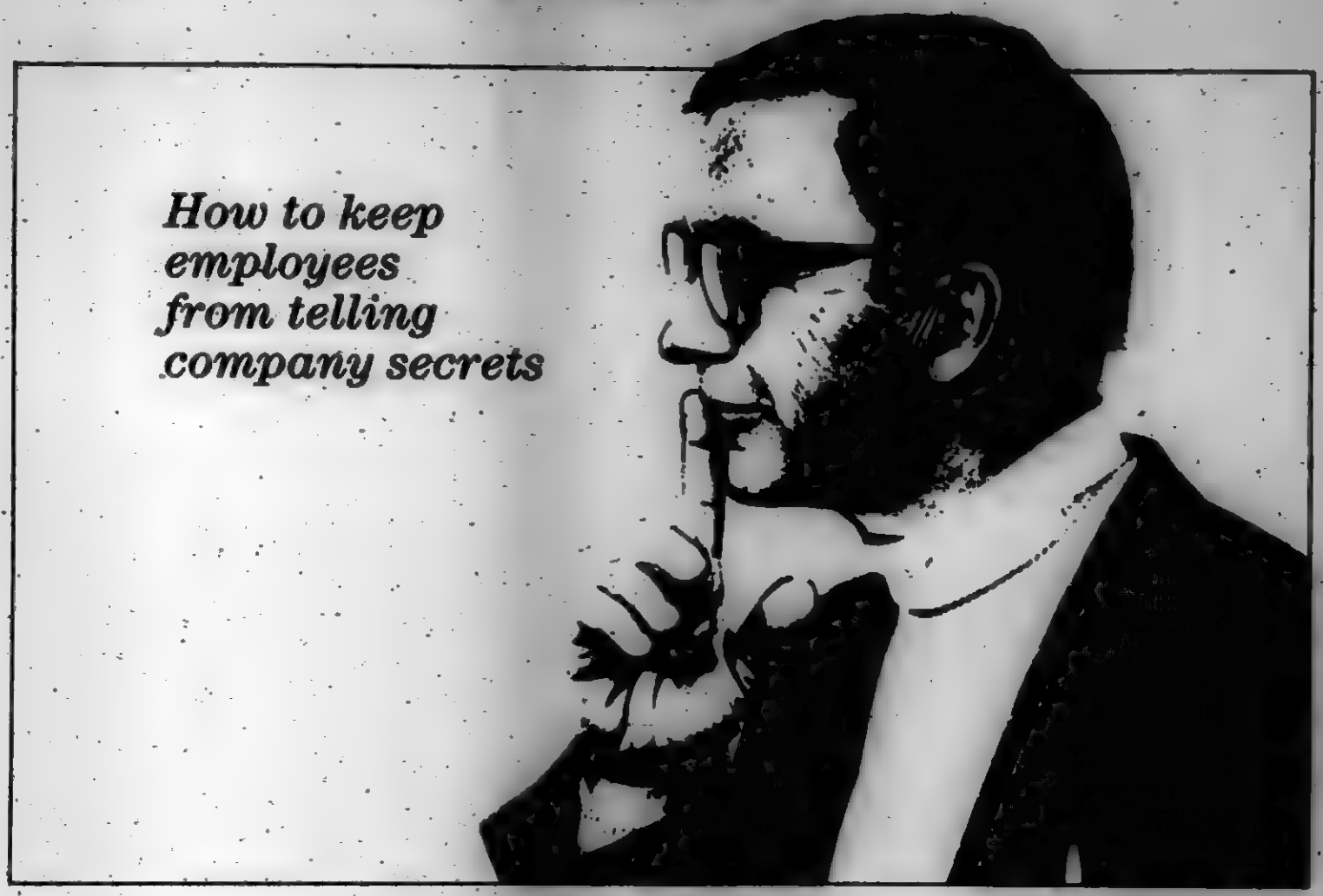
Total $10,995.00 Retail

Call toll-free 800-368-5010

SEIKO

The business computer that thinks ahead.

IN DEPTH



Negotiating, drafting, executing and enforcing employment contracts

The absence of a carefully drafted employment contract can be devastating to a firm whose business survival depends on the protection of its proprietary rights.

By Tobey B. Marzouk

Firms operating in the high-technology marketplace often commit a crucial business error: They fail to provide an employment contract that limits employees' ability to divulge confidential information and compete with or otherwise damage the employer.

Since the employment contract will ultimately govern relations between employer and employee, it is essential for any firm working in the high-tech area to establish careful procedures for negotiating the agreement. Failure to comply with certain procedural and legal requirements before executing a contract may nullify its effect or preclude its enforcement. A firm engaged in contract negotiations with prospective employees should observe the following guidelines.

1. Watch what you say during contract negotiations. Company representatives should be extremely careful in what they say to prospective employees. Even though a contract may be drafted to prevent an employee from enforcing oral commitments not embodied in that contract, a court may, in certain circumstances, rely on oral statements made by the employer to determine the meaning and intent of the parties.

In Weiner vs. McGraw-Hill, Inc., which was decided in New York in 1982, a prospective employee was assured by a company representative that the firm's policy was to terminate employees only for "just cause," and that employment at the company had the advantage of job security. The employment contract also referenced the employer's personnel handbook, which represented that "the company will resort to dismissal for just and sufficient cause only."

After several years of employment, the employee was dismissed for "lack of application." He subsequently brought suit against his employer for wrongful dismissal. The New York Court of Appeals held that the employee could sue his former employer based on the oral representations and assurances made to him prior to his employment, as confirmed by the statement of policy set forth in the firm's personnel manual.

Clearly, an employer should not make any gratuitous oral promises during contract negotiations. If relied upon by the

prospective employee, those promises may come back to haunt the employer later.

3. Carefully draft personnel policy manuals. In addition to oral assurances made by the employer during contract negotiations, written statements in office handbooks or personnel manuals may be used to expand an employee's rights under a contract. In several recent court cases, employees have been able to enforce personnel policy manuals as supplements to their employment contracts and thereby bind their employers beyond the specific terms of the individual contracts.

While a personnel manual serves the useful function of informing employees of company policies, a firm must exercise extreme caution in drafting the manual. A statement should be included that the manual is not intended to constitute any type of contract between the company and the employees. Include words to the effect that the policies set forth in the manual, particularly those involving employee terminations, are meant only as guidelines, not rigid standards.

This disclaimer should not, however, be used as a substitute for careful drafting of the manual's contents. Where the disclaimer contradicts other expectations raised by the contents of the manual, the ambiguity in the manual will be construed against the employer. In addition, the manual should not include unnecessary detail about termination policies. The more specific the standards and procedures for termination, the more likely an employee will claim substantive and procedural rights arising from the manual and the more likely a particular termination will violate the standards set forth in the manual.

In short, a personnel or office manual may be used against an employer. The employer should make every effort to limit the binding effect of the manual to avoid unforeseen liabilities to employees.

4. Give the employee ample opportunity to review the contract. Often, high-tech firms present a proposed employment contract to a new employee on his first day of work, thereby giving him no meaningful opportunity to review the contract or negotiate specific terms. As a matter of policy, however, the firm should provide the prospective employee a copy of the employment contract before he starts work. Following this procedure will guard against any allegation that the employee was placed at a disadvantage relative to the employer.

An employer who fails to give a prospective employee this opportunity to review the proposed contract may be unable to enforce it, particularly if a court concludes that the employee was not given a fair chance to negotiate the terms of his employment. In Pemco Corp. vs. Rose (decided in 1979), the defendant was offered and accepted employment with an engineering firm in West Virginia. Thereafter, the defendant canceled his housing lease in Washington, D.C., signed a contract to purchase a home in West Virginia and moved all his personal belongings to his new place of residence. When the defendant arrived at his employer's offices for the first day of work, he was asked to sign an "agreement" restricting his right to compete with his employer should he leave the firm.

Having already moved to West Virginia, the defendant had no choice but to sign the contract. In an action by the former employer to prevent the defendant from working for one of the employer's competitors, the court concluded: "Under the circumstances in which the employee found himself, it is beyond cavil that his ability to negotiate with respect to the postemployment restraint was markedly diminished. At the very least, the employee was not as freely able to bargain concerning the provision as he was at the time [he received the offer of employment]. The covenant not to compete was not a freely bargained-for term or condition of employment, but rather was a term or condition of employment extracted from or imposed upon an employee under circumstances which deprived him of any fair ability to negotiate."

Failure to provide the prospective employee with a

"Service is our middle name."

"We'll definitely be there Monday."

"Trust me."

TALK IS CHEAP.

Good service, however, isn't.

Which is why in the last three years Burroughs has invested over $100 million worldwide on improving our service and support.

For example, we spent a small fortune on the Burroughs Respond System—a sophisticated computerized operation that insures fast service for our customers. (Our average response time for mainframes is already under two hours, but we're determined to do even better.)

Our new $23 million Lisle Training Center is a "Service University" that trains many of our 16,000 service and support people in the latest state-of-the-art computer technology.

Our experts are taught, for example, to use a highly advanced diagnostic device called a logic analyzer which is remotely controlled so they can diagnose complex problems instantly from our customer support centers without the delay of travelling to your company.

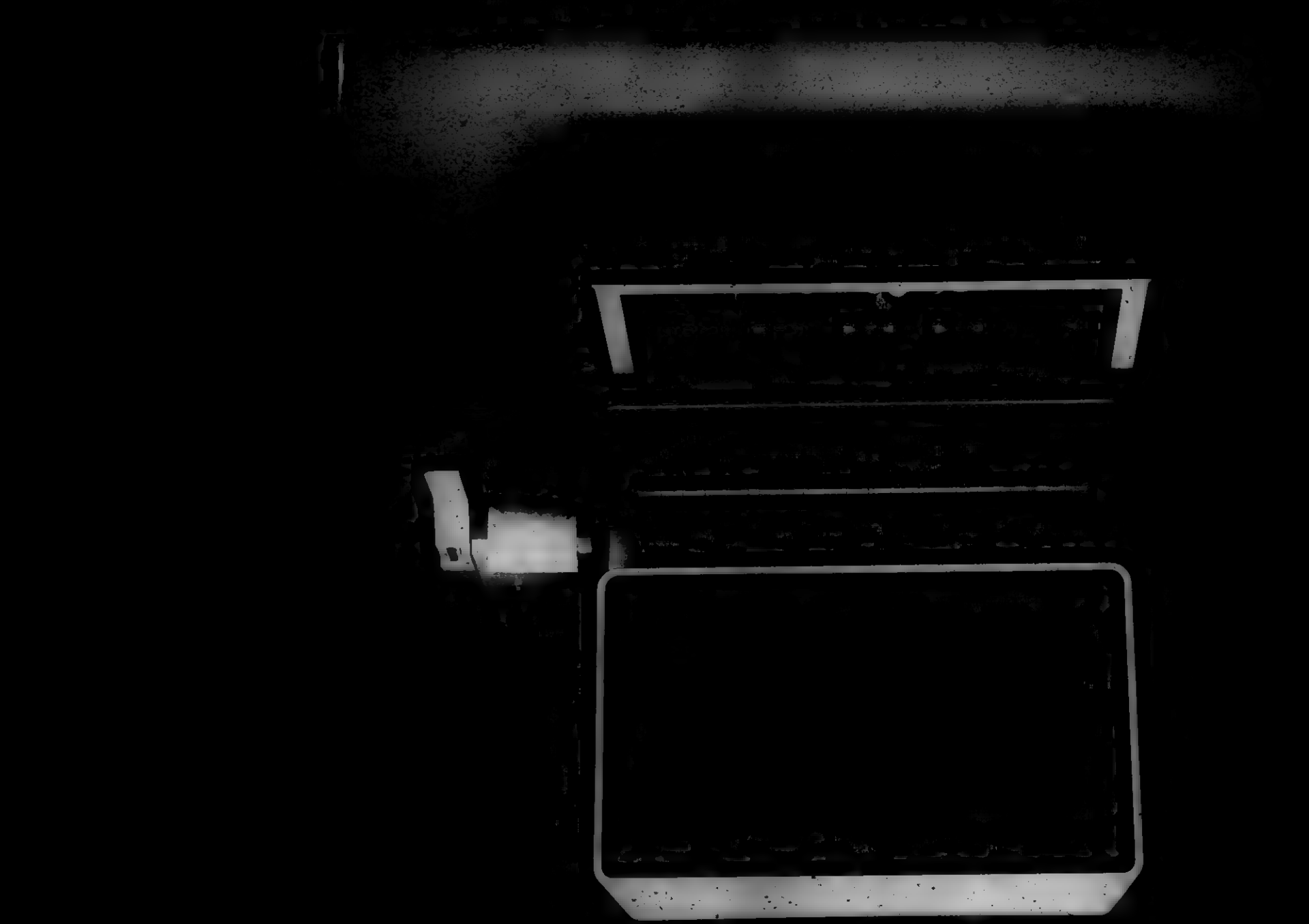
What's more, the new Burroughs Parts Inventory Management System is designed to get you the right spare part at the right place and at the right time.

What all this adds up to is that Burroughs is committed to doing everything humanly (and electronically) possible to provide our customers with the best service and support in the industry.

And with $100 million behind that commitment, it's a lot more than just talk.

Burroughs

THE QUESTION ISN'T WHO'S BIGGER. IT'S WHO'S BETTER.



PRESENTING THE ONLY 100-YEAR-OLD PERSONAL COMPUTER.

TOO MANY COMPUTERS, TOO FEW CHOICES.

With the personal computer shakeout at hand, people are beginning to ask some hard questions about personal computer companies.

Of the 200 or so personal computer companies now operating, how many have the resources to fully support their products? How many can offer the experience and financial strength of 100 successful years in business?

How many can provide in-depth sales and maintenance training to dealers? How many have actually done so?

How many have thousands of qualified field engineers in place throughout the nation? How many can back up their commitments to technical advancement with truly significant R&D budgets?

How many will even be making personal computers a few years from now, much less sustaining their commitment to their customers beyond 1990?

Companies that can answer those questions positively are the only real choices the personal computer user really has. There aren't many. And they're getting fewer all the time.

THE NCR PERSONAL COMPUTER.

That's why we developed the NCR Personal Computer. By all these criteria, it's the best choice for PC users.

For over 100 years, we've been helping businesspeople solve their problems. As a result, they believe in our products. And they trust our support before and after the sale.

They're not surprised to hear that NCR builds a dual 8/16-bit Personal Computer with up to 512K that runs CP/M* and MS DOS.* They expect it from NCR.

Nor are they surprised by our Personal Computer's other advanced features. Like superior color graphics. 20 programmable function keys. Windowing capabilities. Expansion slots for quick, in-the-field upgrades. A remarkable plug-in diagnostic module.

All in a box smaller than those of its leading competitors. Plus a software library that includes the majority of the most widely used packages.

They expect nothing less from NCR.

And neither should you.

ESTABLISHING BETTER INTERPERSONAL COMMUNICATIONS.

It can connect up to 64 PCs from most major manufacturers, with the latest local area network technology.

PCs in the network can access databases and share files, records and peripherals. That helps every member of an organization work together, with the same common information, at the lowest possible cost.

SOMETIMES IT'S BETTER TO BUY RETAIL.

THE NCR PERSONAL RETAIL COMPUTER.

No other company is better qualified to build a Personal Retail Computer than NCR.

We pioneered the cash register, back in 1884. Since then, we've continually enhanced new retail management technology. From small point-of-sale terminals to state-of-the-art, multi-user inventory management systems.

Our Personal Retail Computer is the first of a new breed. An advanced retail management system with all the capabilities of a powerful personal computer. All in one small package. And all designed with the experience of 100 years as the world's largest supplier of retail systems firmly in mind.

HOW TO SELL RETAIL.

It's easy.

The NCR name is a quick foot in the door. And from there on, the Personal Retail Computer's advanced features sell themselves.

The PRC comes with 256K of memory, expandable to 512K with a plug-in cartridge. An electronic cash drawer and a choice of a receipt or an 80-column report printer, or both, complete the hardware package.

But it's the PRC's retail management capabilities that make it such an easy sell.

First of all, it's easy to use. Really easy. 9 dedicated function keys handle standard transaction sequences with a single keystroke. Keying errors are easily corrected, eliminating time-consuming voiding procedures. Helpful screen messages, in plain English, guide clerks step-by-step through each transaction.

Commands are in plain English, too, so clerks don't have to be trained to remember confusing codes. And with an optional bar code reader, sales data can be fed into the system automatically.

The system is secure, as well as easy to use. Access is granted or denied by an I.D. number verification routine. And sensitive sales information can be password-protected, field by field.

And of course sales reports can be automatically generated by salesperson and item at any time during or after the business day. So users can keep better control of their business.

To extend that control even further, our optional Inventory Management software can store up to 19 separate facts about as many as 32,000 unique inventory items.

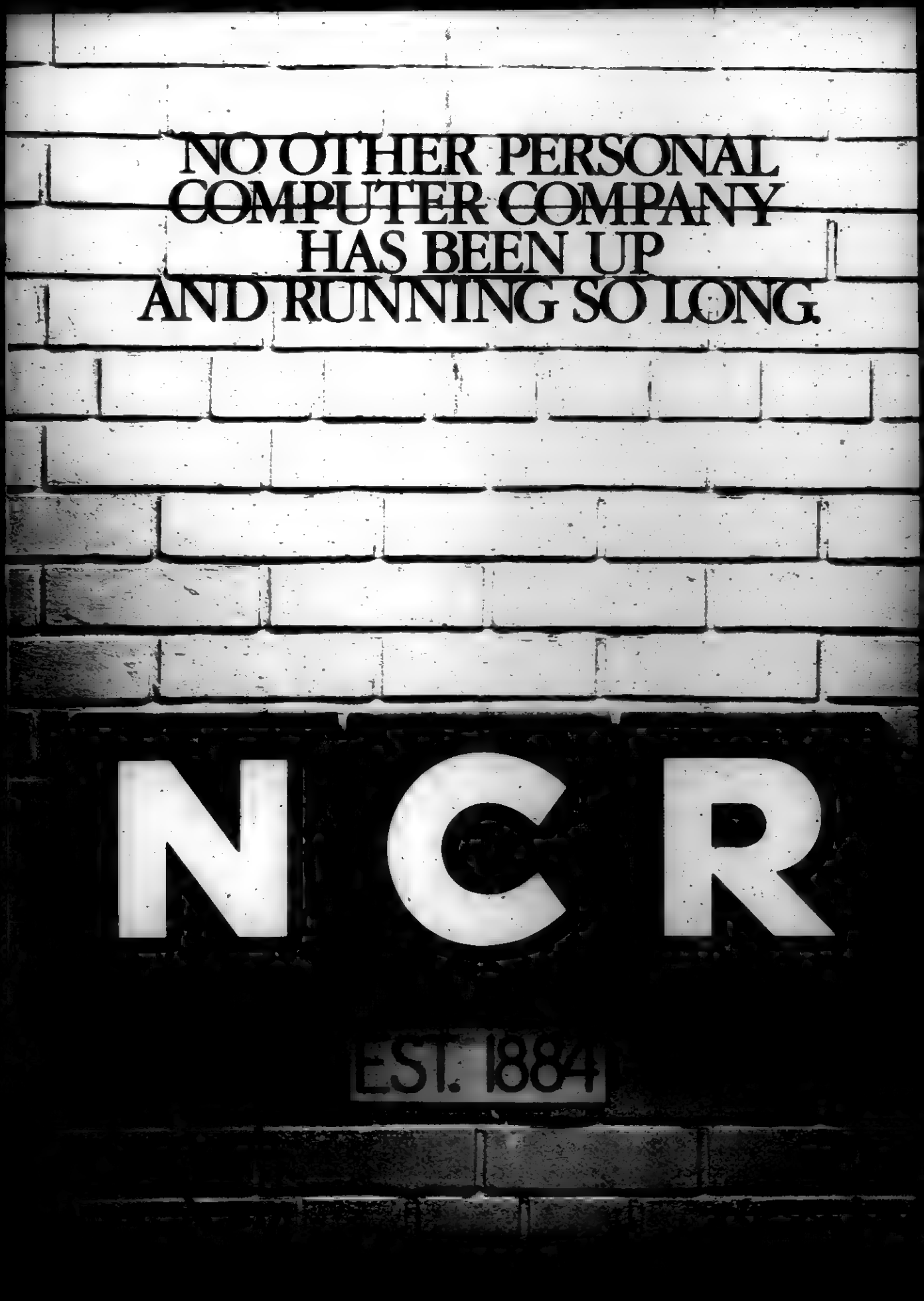
Inventory levels are then automatically displayed and adjusted during each sale, giving store managers a clear picture of what they have on hand at what prices. A CPA-recommended profitability index is an integral part of the package.

To make our retail management system into a complete company management system, our retail software can be interfaced with general accounting packages.

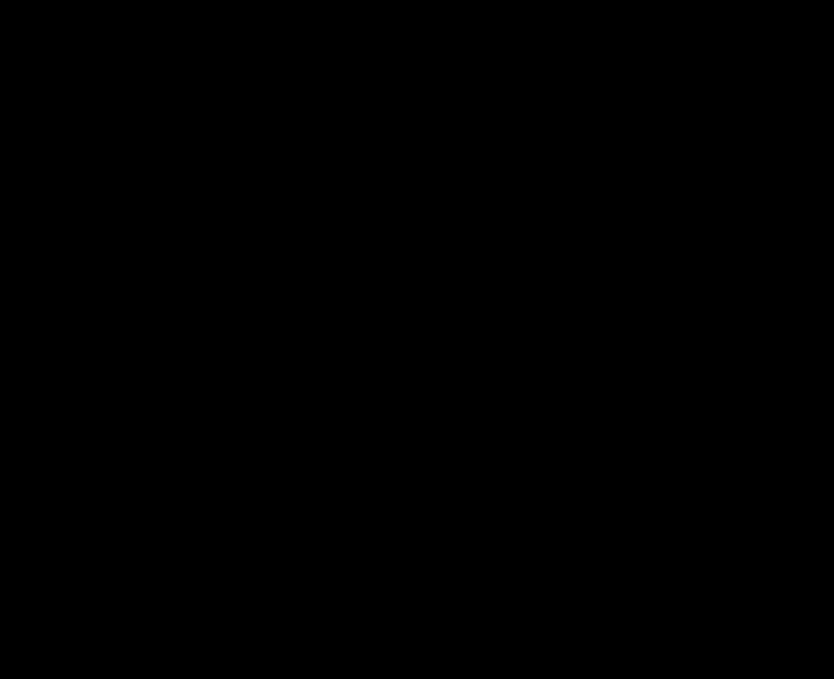
All at a price far lower than a traditional retail management system.

Surprised?

You shouldn't be.


NO OTHER PERSONAL
COMPUTER COMPANY
HAS BEEN UP
AND RUNNING SO LONG.
NCR
EST. 1884

CHOOSING THE
RIGHT COMPUTER COMPANY
IS EVEN MORE IMPORTANT
THAN CHOOSING
THE RIGHT COMPUTER.



NCR PERSONAL COMPUTER

Feature Highlights
- Integrated design with small footprint
- VLSI technology
- Dual processors (8/16-bit)
- Customer installable
- Monochrome or color display
- Customer upgradable
- Fully illustrated self-training documentation
- Industry standard I/O interfaces
- Expandable memory and disk storage
- Detachable low profile keyboard
- Easy-to-use diagnostic cartridge
- Industry standard operating systems
- Powerful graphic processor
- Windowing capabilities

Central Processor	Z-80A® 8-bit (4 MHz) 8088 16-bit (5 MHz)
Memory	RAM—64K Upgradable to 512K ROM—4K
Graphic Processor Memory	32K (monochrome) 96K (color)
Video Display	12" monochrome green/black or color 24 lines 80 characters/line 640 x 400 dot addressable
Keyboard	Detachable low profile Alphanumeric + numeric key pad 20 programmable function keys
Disk Drives	Configured with two flex disks or one flex disk and one Winchester disk
Flex Disk	5¼-inch integrated Double density, double sided 500 KB each unformatted 320 KB each formatted
Winchester Disk	5¼-inch 10 MB integrated or 30 MB external
Peripheral Adapter	Centronics parallel interface RS232C serial interface
Communications Adapter	RS232C serial interface (async.) NCR local area network interface
Operating System	CP/M,® MS-DOS®

Physical Dimensions	Processor	Keyboard
Height	14.9 in.	1.5 in.
Width	18.1 in.	16.9 in.
Depth	14.6 in.	8.5 in.
Weight	52.9 lbs	3.3 lbs
Environmental		
Operating Temperature	50-95°F	
Relative Humidity	20-80%	

PERSONAL RETAIL COMPUTER

256K Memory
Retail Management Software
RS-232C Interface
Electronic Cash Drawer
Centronics Interface
Choice of Receipt or 80 Column Printers (option)

NCR LOCAL AREA NETWORK

Transmission Rate	1 megabit per second
Transmission Link	Twisted pair cable, up to 4000 feet in length
Network Access Technique	CSMA
Users/Devices Connectable	64

FILE SHARER

I/O Processor	On-board RAM and controlware
Fixed Disk	10-32MBytes

Specifications subject to change without notice
*CP/M® is a registered trademark of Digital Research.
MS-DOS® is a registered trademark of Microsoft Corporation.
Z-80® is a registered trademark of Zilog Corporation.
Products for delivery in the USA will comply with appropriate FCC rules.

NCR
Dealer Marketing Division

NCR Corporation, World Headquarters, Dealer Marketing Division, Dayton, OH 45479
Nationwide (800) 222-1235. In Ohio (513) 445-2380. In Canada (800) 268-3966.

©1983 NCR Corporation

Printed in U.S.A.

copy of the employment contract prior to employment may seriously undermine the validity and enforceability of the contract.

4. Determine whether the prospective employee is bound by a prior employment contract. Given the frequency of job changes among professional employees at high-tech firms, an employer should know whether a prospective employee is bound by a contract with a former employer that restricts the scope of the employee's work. During contract negotiations, therefore, the employer should specifically ask the prospective employee whether the employee is still subject to a prior employment contract.

If the employee is not bound, then the employer should obtain a written assurance to that effect. If, however, the employee is subject to a prior employment contract, the new employer should consult with counsel to determine (a) whether and to what extent the contract does in fact restrict the prospective employee's ability to work for the new employer, (b) whether the restrictions are enforceable and (c) the manner in which the new employer should contact the old employer to discuss the scope and effect of the prior employment contract.

Absent a careful review of prior contractual restrictions on the prospective employee, the new employer and employee may find themselves subject to a suit for injunctive relief and/or damages by the former employee.

Drafting the contract

The terms and conditions in any employment contract generally depend upon the particular needs of the firm, as well as the prospective employee's scope of employment. The firm should draft the employment contract so as to protect its business interests and proprietary rights, while giving the employee a clear understanding of his obligations under the contract. The following guidelines should be considered in drafting an employment contract.

1. Protect trade secrets and confidential information through confidentiality and nondisclosure agreements. Perhaps the most important provision in any computer-related employment contract is a confidentiality and nondisclosure agreement. Under the terms of this agreement, the employee pledges to hold in confidence and not to disclose directly or indirectly trade secrets and confidential information obtained from the employer during the course of employment.

Such trade secrets and confidential information may include:

- Discoveries or inventions.
- Ideas or concepts.
- Software (object code and source code), regardless of the stage of development.
- Software documentation, including flowcharts and diagrams.
- Designs, drawings and models.
- Internal specifications and testing procedures.
- Data and data bases.
- Marketing, development and research plans.
- Novel techniques and procedures.
- Certain kinds of customer lists.
- Bidding policies and procedures.
- Miscellaneous marketing information concerning finances, pricing policies and price lists.

A confidentiality and nondisclosure agreement specifically restricts the employee from divulging to the public,

Given the frequency of job changes among professional employees at high-tech firms, an employer should know whether a prospective employee is bound by a contract with a former employer that restricts the scope of the employee's work.

Computer Interruptus

Midnight. And you wish you would be left in the dark. But miles away in the DP Department, a misplaced DD override, an invalid concatenation, or some other equally obscure JCL error brought production to a standstill.

And when the system breaks down, it's you or your staff they call up. Which usually means getting up and getting down there. And after a night like that, how productive will the morning be?

What a waste. If you had the JCLCHECK™ program, you wouldn't have JCL errors, period. None. Zilch. Zero.

Because the JCLCHECK program can catch any and all JCL errors and give you complete, on-line JCL validation and concise error diagnostics. Plus complete documentation on a job stream or entire production system suitable for insertion in the run book. And it can operate under TSO, TONE, ROSCOE or CMS.

Imagine, with no more JCL errors, your programmers can finally concentrate on what you hired them for: writing programs.

So what are you waiting for? Send the coupon or call us at (408) 554-8121 for details. We'll show you how the JCLCHECK program can bring your error detection out of the dark ages, increase production, and eliminate applications backlog. And that'll put you in the spotlight.

I'm frustrated and tired of JCL errors.
☐ Send me details on the JCLCHECK program.
☐ Have a representative call me.
NAME
TITLE
COMPANY
ADDRESS
CITY, STATE, ZIP
PHONE
OPERATING SYSTEM

Triangle Software Company
4340 Stevens Creek Blvd., Suite 108
San Jose, CA 95129

particularly the employer's competitors, any information treated as secret or confidential by the employer. To qualify for trade-secret protection, the information must fulfill three criteria. First, the information must be "used in one's business" and must give the employer an opportunity to obtain an advantage over competitors who do not know or use it (Restatement of Torts, 1939).

Second, the information must be unique or not commonly known. "[M]atters of public knowledge or of general knowledge in [the particular] industry cannot be appropriated by one as his secret" (Sperry Rand Corp. vs. Pentronix, 1970). With respect to software, uniqueness requires the application of "new principles and concepts with unique engineering logic and coherence" (Com-Share vs. Computer Complex, Inc., 1971) and the expenditure of time and money for the development of new software features that provide the employer a competitive advantage.

As a practical matter, most software will be treated as unique, since any given program will involve numerous algorithms and programming decisions that vary with each programmer and result in differences in "speed, accuracy, cost and commercial feasibility . . . from system to system" (Com-Share vs. Computer Complex, Inc.).

Third, to acquire trade-secret protection for business information imparted to an employee, the employer must treat such information as secret and must bind the employee, either expressly or implicitly, to preserve the trade-secret status of the information. This will require the employer to preserve confidentiality by instituting certain programs and policies, which will be discussed in detail below.

To ensure complete protection of its trade secrets, a firm should require its nontechnical support personnel, as well as its technical employees, to sign confidentiality and nondisclosure agreements. Nontechnical or lower-level employees often have access to considerable proprietary data. Absent a specific agreement, an employer may be unable to prevent such employees from divulging trade secrets or confidential business information.

Similarly, independent contractors and visitors may acquire or have access to a firm's trade secrets. To preserve the confidentiality of such information, the firm should also require these individuals to sign confidentiality and nondisclosure agreements.

Such agreements, when carefully enforced, serve to place employees and other affected parties on notice that their jobs might involve trade secrets. The employee is therefore more likely to be "secrecy conscious" and to exercise prudence with respect to confidential matters entrusted to him. Confidentiality and nondisclosure agreements can also assist the firm in convincing its existing and potential clients that confidential information submitted to it will be protected from disclosure. The firm is therefore advised to require all prospective employees and independent contractors, as well as visitors with access to confidential information, to sign such agreements.

2. Protect trade secrets and confidential information through covenants not to compete. In addition to

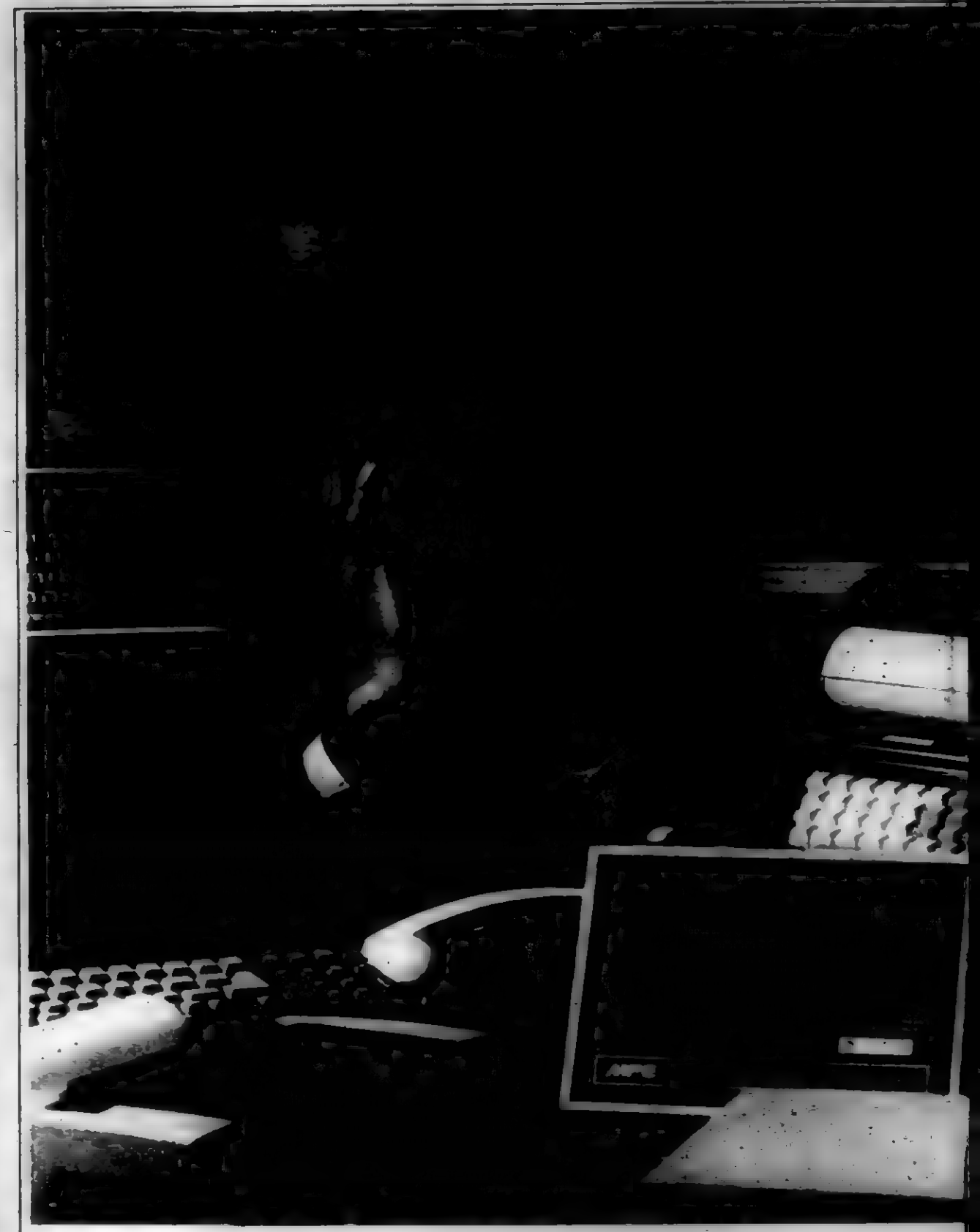
To ensure complete protection of its trade secrets, a firm should require its nontechnical support personnel, as well as its technical employees, to sign confidentiality and nondisclosure agreements. Nontechnical or lower-level employees often have access to considerable proprietary data.

demanding that employees, independent contractors and visitors execute confidentiality and nondisclosure agreements, an employer should protect his confidential information and trade secrets by requiring professional employees to sign covenants not to compete. A covenant not to compete seeks to prevent an employee with access to sensitive proprietary information from competing with or working in the same line of business as his former employer within a given geographic area and for a given period of time.

The practical effects of such a covenant are (a) to prevent the employee from directly or indirectly disclosing trade secrets to any new employer who might be in competition with the old employer, (b) to prevent other firms from "buying" confidential information by hiring employees of a competitor and (c) to prevent the employee from appropriating confidential information to start his own business.

3. Make sure the employment contract transfers to the employer the rights to all works by the employee. Under the Copyright Act of 1976, a computer program or other work prepared by an employee within the scope of his employment is a "work made for hire," and the employer or other person for whom the work was prepared is considered the author and owns all rights in the copyright.

Accordingly, absent an



employment contract that provides otherwise, copyright in all the works produced by an employee in fulfilling his duties vests with the employer. Some question, however, might arise as to whether an individual is an "employee" — under the direct control and supervision of the employer — or an independent contractor and whether work performed by an employee is within the scope of his employment. To avert any misunderstanding or confusion between the employer and the employee on these questions, the employment contract should include the following provisions, tailored to fit each employer's needs:

(i) All work by the employee or independent contractor is deemed to be a "work made for hire" to which copyright vests with the employer.

Firms should include a provision in all employment contracts restricting the employee, directly or indirectly through a family member or other person acting on his behalf, from serving as an officer, director or employee of another company without prior approval of the employer.

(ii) To the extent any work performed by the employee or independent contractor is not a "work made for hire," copyright in the work is assigned and transferred to the employer.

(iii) Copyright in any work performed during work hours (including lunch), on the employer's premises, or using the employer's facilities or money vests with and is transferred to the employer.

(iv) The employee must disclose, assign and transfer to the employer all patent and trademark rights to any ideas or inventions developed during the course of employment that involve the employer's business and products.

4. Include family members in the employment contract. Too often, computer firms fail to place any contractual restrictions on the employee's family. To prevent the improper or unauthorized use of trade secrets and confidential information by the employee and his family members, firms should include a provision in all employment contracts restricting the employee, directly or indirectly through a family member or other person acting on his behalf, from serving as an officer, director or employee of another company without prior approval of the employer. In addition, the employee should be restricted from owning an interest in any competitor of the employer, if such interest is significant enough to interfere or conflict with the employee's responsibilities and obligations to the employer.

The courts have held that such contractual provisions are reasonable and not in violation of antidiscrimination laws. In Moore vs. Honeywell Information Systems, Inc., for example, a federal district court upheld a policy restricting employees and their family members from working for or owning an interest in a computer firm's competitors. The court reasoned that where one family member, a spouse, is engaged in a competing business, "it would be perfectly reasonable to conclude that the interests of both parties will eventually intertwine, since the success of the spouse's competing business will be of a real and direct benefit to both spouses."

The court went on to note that in the computer industry, a company policy restricting family members is both reasonable and essential:

"Honeywell [the employer] is undoubtedly in possession of valuable trade secrets, such as software programs, marketing techniques, market studies and other valuable information developed perhaps at great cost to the company. The employment policy here seems to be a reasonable means to prevent the improper and unauthorized use of such information by persons or businesses which may unjustly benefit themselves with such information."

To avert any conflict of interest, therefore, a computer firm is well advised to place restrictions on family members of its employees.

5. Make sure the contract identifies a jurisdiction or forum whose law will govern.

The law governing employment and contractual relations varies from state to state. Accordingly, a firm should specify in the employment contract the jurisdiction or forum whose law will control the

ARE YOU SUFFERING FROM PERIPHERAL SCHIZOPHRENIA?

Having multiple suppliers for your data communications peripherals can pull your mind in all different directions.

You have to worry about service, about cost, about making sure you have the equipment and system you really *need*—now and in the future.

It's enough to boggle your mind.

At General Electric, we think our single-minded approach offers a higher degree of sanity.

Ah, simplicity.

Instead of multiple worries, you have one simple answer: General Electric. We begin by analyzing your needs—and likely growth pattern. Then, we help you decide on the distributive processing network system that's best for *you*.

And, since we don't have to promote a particular line or group, we'll help you build your system with components from one of the most comprehensive multi-manufacturer product selections in the business.

A sane approach to service.

You make one phone call. We have a nationwide network of over 60 service centers, including one near you.

Each not only has the service people you need, but also stocks a large selection of replacement parts, too—which usually adds up to *same day* response. In fact, we even carry the little stuff—like ribbon, paper, cassettes and discs—so you don't waste valuable space.

How our lease can cost you less.

All leases help to conserve capital and credit, eliminate obsolescence and hedge against inflation.

But with GE's service network *behind* the lease, you can help minimize *downtime*—which just could be the biggest cost-saving of all.

Help is on the way.

Shouldn't you find out more? Then call or write us now. 800-528-6050, Extension 406. (In Arizona, call 800-352-0458, Extension 406.)
General Electric Company
Communication Equipment Leasing
Building 4, Room 210
Schenectady, New York 12345

GENERAL ELECTRIC

MANUFACTURER'S
DISTRIBUTOR'S
WE CAN SELL & SERVICE
YOUR ELECTRONIC
PRODUCTS
SERVING S.E. MICHIGAN
SINCE 1965
CALL KEN AT WBM
313-478-7700

The use of arbitration to resolve contract disputes between an employer and an employee is usually less expensive and more speedy than court litigation and should be considered seriously by the employer.

interpretation and enforceability of the contract. The selection of a jurisdiction should be made in consultation with counsel, based upon such factors as whether the employer and employee have sufficient contacts with the particular state and whether the governing state law is favorable to the employer.

The contract should also require the employee to consent to jurisdiction in the appropriate state(s) most convenient to the employer. In this way, if legal action must be initiated against an employee to enforce the terms of an employment contract, the employer will not be required to litigate his case in a distant jurisdiction. Courts, however, will not enforce such provisions when they are so burdensome as to be unconscionable.

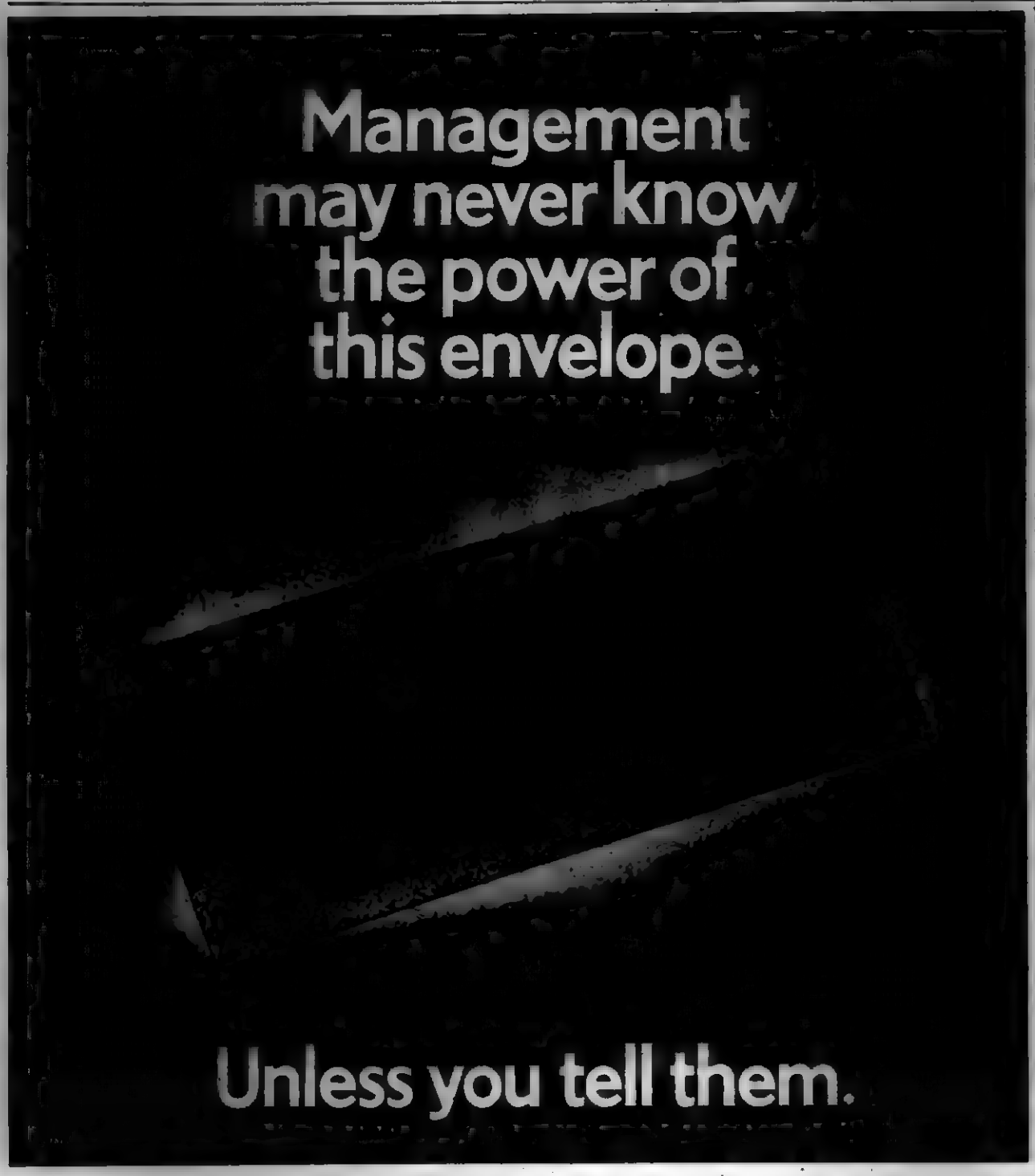
Finally, the employer might wish to require employees to submit certain contractual disputes to an arbitration board pursuant to standards and guidelines set forth in the employment contract. The use of arbitration to resolve contract disputes between an employer and an employee is usually less expensive and more speedy than court litigation and should be considered seriously by the employer.

6. Include a severability clause in the employment contract. A severability clause should be included in every employment contract. Such a clause states that every paragraph or condition in the contract is considered a separate entity and may be enforced separately, regardless of the validity of the remainder of the contract. If a contract lacks a severability clause, a decision by a court to strike one contract provision could void the entire contract. A severability clause therefore ensures that if one paragraph in the contract is declared invalid, the other paragraphs will remain enforceable.

7. Include an integration clause in the employment contract. Another provision that should be in every employment contract is an integration clause. This clause reflects the intention of the parties that the written contract is an integration of the entire agreement and constitutes the sole evidence of such an agreement. A typical integration clause reads: "The employee agrees that this contract is the complete and exclusive statement of the agreement beteen the parties, which supersedes all proposals or prior agreements, oral or written, and all other communications between the parties relating to the subject matter of this agreement."

The purpose of an integration clause is to prevent both parties from relying upon statements made prior to, during or after contract negotiations. In the absence of an integration clause, a court may be inclined to expand the contract terms by looking to the general subject matter of and the circumstances surrounding the contract, particularly if the contract is fragmentary, ambiguous or uncertain. To guard against allegations by the employee that the employer made various promises and assurances not embodied in the contract, an integration clause should be included as a standard provision.

8. Remind the employee of the legally binding effect of the employment contract. Every employment contract should end with a statement that the employee acknowledges that he has read the agreement and agrees to abide by its terms. In addition, the contract should state that it is legally



You don't have to tell management how easy it is to implement E-COM® service. That can be your secret. Tell them instead about the power of an E-COM service mailing. How letters can be sent right from the company computer. How the Postal Service prints, folds, inserts, seals and delivers these letters for you. How the distinctive blue envelopes of E-COM service lend visibility and impact to your mailing.

Since you're the one who gets E-COM service up and running, you have three options—all of them easy. First, you can write the system interface yourself. It takes about a day, and Postal Service consultants are standing by to give you any help you need. Second, you can buy a dedicated interface from a third-party vendor. Third, you can access E-COM service through an independent communications carrier, without bringing the system in-house at all.

As part of the D.P. department, you're in a unique position to tell your management about the power of E-COM service. So find out more. Call your local Postmaster. You may never again get so much credit for so little work.

E·COM

binding and that the employee has the right to consult with legal counsel concerning the contract terms. Such a provision will (i) stress to the employee the importance of the contract and the employer's intent to enforce it and (ii) place the employee on notice that an attorney may be necessary to review the contract.

Executing the contract

Execution of the contract is largely a formal, uncomplicated procedure. The employer, however, should adhere to the following guidelines.

1. Have the employee sign each page and initial important paragraphs of the contract. As a matter of policy, the employee should sign every page and initial all important paragraphs, particularly paragraphs involving confidentiality and nondisclosure agreements and covenants not to compete. This procedure will guard against any allegation that the pages of the contract were replaced. In addition, it will highlight significant clauses of the contract, thereby undercutting any claim by the employee that he did not read or was told to ignore certain important paragraphs.

2. Be careful with employment contracts with existing employees. Many high-tech firms begin as a small group efforts with "technically oriented" personnel who view attorneys as intruders in the firms' technical or business domain. This attitude has led to rude awakenings when, several years into operations, those firms realize they have no formal confidentiality agreements and covenants from their employees not to compete. The prime objective then becomes to secure such agreements at the least possible cost.

Before executing employment contracts with an existing employee, the firm should consult with legal counsel to determine whether the governing law requires that additional consideration be provided to the employee. Consideration is, in effect, something of value given in exchange for a promise. For a prospective employee, the consideration is that he will be employed and will receive a given salary and certain benefits in exchange for signing the contract and agreeing to be bound by its terms.

An existing employee who executes an employment contract, however, already has a job. Some jurisdictions have held that continued employment alone is not adequate consideration for an existing employee who is required to sign an employment contract containing restrictive covenants.

If an employment contract with an existing employee is governed by a jurisdiction that requires additional consideration, the employer should provide some benefit to the employee in exchange for his signing the contract. The benefit could be a small cash bonus, a salary increase or a job change. To ensure that no additional sums are spent, the firm could require existing employees to execute contracts prior to annual salary adjustments and treat the increase in salary as consideration for the contract.

Enforcing the contract

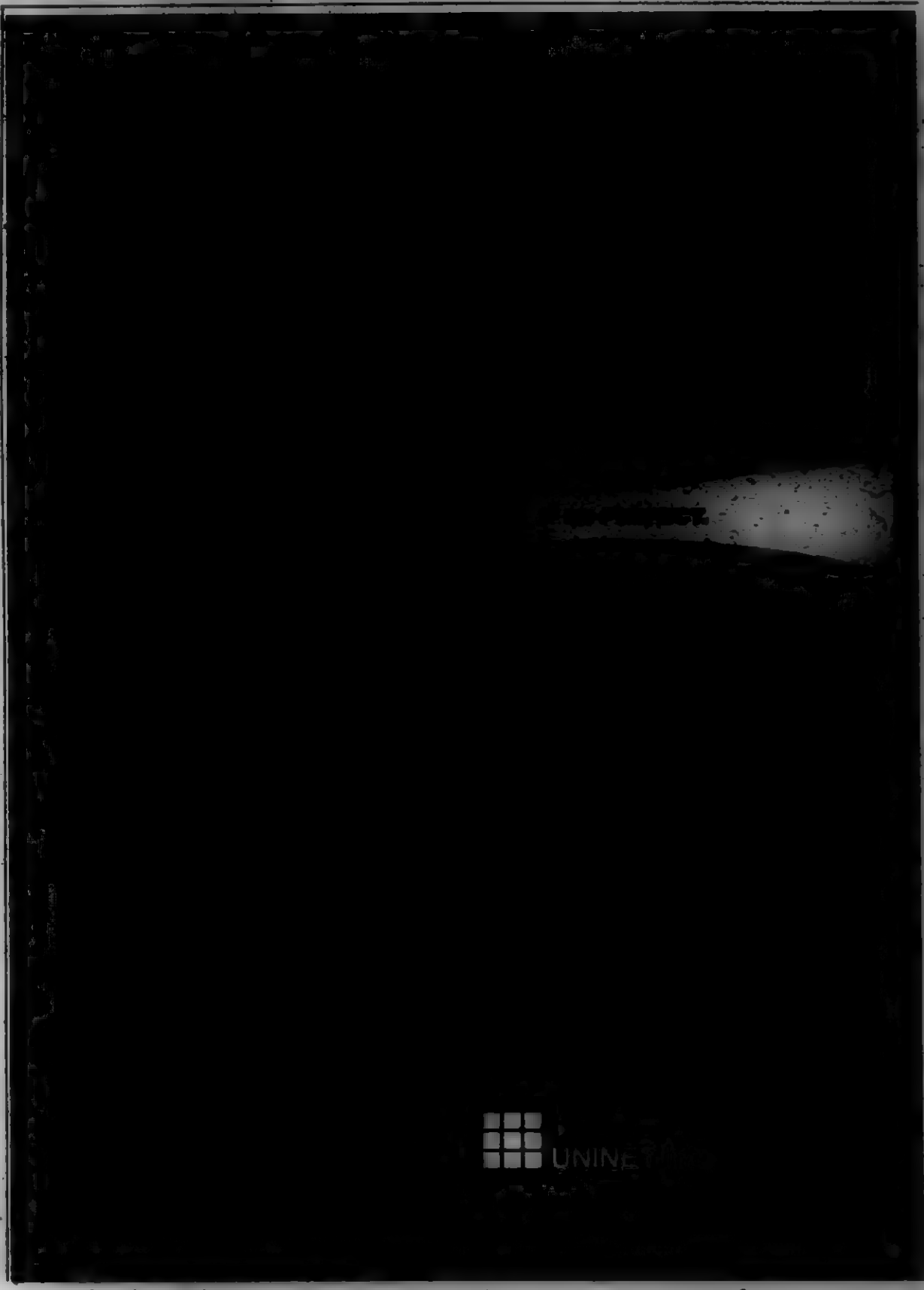
Most employees will abide by the restrictions in their employment contracts. In some instances, however, the firm will be required to enforce its contracts to ensure compliance by its employees. In this regard, a firm must be willing to take legal action when necessary and to implement certain in-house procedures to protect its interests.

1. Make sure the departing employee submits to an exit interview. Whenever an employee terminates his employment, an exit interview should be held to remind the employee of his obligations under the contract. Specifically, the interview should stress the importance of maintaining the firm's confidential information and trade secrets and should remind the employee of any covenants not to compete against the employer.

The employer also should require the departing employee to execute a termination agreement acknowledging obligations and restrictions set forth in the employment contract. Naturally, an employee's unwillingness to sign such an agreement will cast serious doubt as to whether the he will preserve the employer's trade secrets and otherwise comply with the employment contract.

2. Establish in-house policies regarding the use and disclosure of trade secrets. As discussed above, trade-secret protection for business information is available only if the employer makes efforts to maintain such information as secret. Accord-

Many high-tech firms begin as a small group effort with "technically oriented" personnel who view attorneys as intruders in the firms' technical or business domain. This attitude has led to rude awakenings when, several years into operations, those firms realize they have no formal confidentiality agreements and covenants from their employees not to compete.



MANUFACTURING MANAGEMENT SOFTWARE FOR HP3000

ingly, the firm must implement stringent security procedures and monitor compliance with such procedures. The following suggestions may be helpful to the firm seeking to maintain the confidentiality of its business secrets:

(i) Limit access to computer programs and proprietary business data on a "need-to-know" basis.

(ii) Limit access to sensitive areas to approved personnel only. Keep such areas segregated and locked securely.

(iii) Institute proper sign-out procedures in tape libraries. Restrict access to such libraries to designated individuals.

(iv) Place terminals with access to confidential data in segregated and safe areas. Use passwords or keys to limit access to highly sensitive files. Make sure passwords and keys are changed periodically.

(v) Monitor all copying of software, manuals and other confidential documents.

(vi) Dispose of paper, tapes, notes and other trash carefully.

(vii) Periodically instruct all personnel regarding security precautions. Post warning signs and security notices when appropriate.

(viii) Exclude all terminated employees from access to confidential data. If an employee leaves on bad terms, take further precautions such as changing terminal passwords and keys.

(ix) Label all confidential information as "SECRET AND CONFIDENTIAL." Each page of proprietary computer printouts should also be labeled confidential.

(x) Instruct employees not to leave confidential data unattended.

(xi) Monitor and review all speeches and publications to ensure that employees do not divulge trade secrets and confidential data.

(xii) Periodically review the security program in effect at the firm.

2. Remember that covenants not to compete provide only limited protection. The firm should realize that covenants not to compete do not provide unlimited protection against former employees. Indeed, the courts have placed various restrictions on the enforceability of such covenants. As discussed earlier, some courts require the employer to give additional consideration to an existing employee who agrees not to compete against the employer. In addition, covenants that place unduly restrictive limitations as to subject matter, geographic area or time will not be enforced.

Courts either will revise such covenants so as to protect equitably the interests of both the employer and employee or will strike the covenants in their entirety. Accordingly, the employer is well advised not to be overly greedy in efforts to restrict an employee's job mobility.

Finally, in some jurisdictions, all covenants not to compete are deemed to be void as a matter of public policy. The employer should therefore consult legal counsel to determine the law.

4. Be willing to enforce employment contracts to let the employees know you mean business. The firm should be willing and able to enforce its employment contracts for two reasons. First, active enforcement will alert other employees that their employer fully intends to hold them to their employment contracts. Second, selective enforcement or nonenforcement of restrictive covenants may undermine their effect. A court may conclude that the employer is not entitled to protection since other employees were allowed to violate their restrictive covenants. The employer should therefore initiate a policy of regularly enforcing restrictive covenants.

Only when a firm follows proper procedures in negotiating, drafting, executing and enforcing its employment contracts will it receive the necessary protection under law.

About the Author

Tobey Marzouk is an attorney with the law firm of Spriggs, Bode & Hollingsworth in Washington, D.C., where he specializes in computer law and federal court litigation. He serves on the board of advisors of the Computer Law Reporter.

No other 3270 protocol converter can match all these features.

Since 1977, hundreds of companies all over the world including Bell Labs, Citicorp, ITT, Litton, Westinghouse—have used Local Data products to make IBM communications easy and inexpensive.

We believe the DataLynx™/5274 is the best price/performance 3270 protocol converter on the market.

So, before you buy any other protocol converter at any price, compare the DataLynx/3274 features first. Then decide.

- SNA/SDLC or BSC protocols supported. SNA is PU type 2.
- BSC for EBCDIC and ASCII.
- 16 bit, 8 MHZ Intel 8086-2 CPU.
- Auxiliary printer support allows each async port to have a separately addressable 3287 type printer. This feature enables dial users to combine CRT and print data over one dial-up line.
- 80 types of ASCII async display terminals can emulate IBM 3278 display stations, and ASCII async printers to emulate IBM 528X printers.
- Micro to main-frame support with our FileLynx™/3278 program for the IBM PC and PC compatibles supports terminal emulation and file transfer (upload/download).
- Hard copy KSR support with our "Paper/3278".
- Unique "paging" feature supports emulation of *all* models of the 3278 display station.
- Pseudo-transparency feature allows host application to transmit character and control codes to async terminal devices (e.g., graphics terminals, graph plotters, mini-computers, high-speed printers with down-loadable forms control units).
- "Compu" support for micro, mini and instrumentation computers as terminal devices.
- Dual host support.
- PROM cartridge for easy user upgrade of firmware.
- Powerful, friendly configurator mode, using menus to allow parameter definition for sync ports, logical units, async ports and terminal characteristics, including help utility.
- Configuration values saved in non-volatile EEPROM.
- Monitor mode displays current status of all ports and logical units.
- May be connected to a host directly (in modem eliminator mode), or via modems on a dedicated multipoint or point-to-point line (dial-up or dedicated), via RS-232C sync ports.
- Data rates to 19,200 bps (sync & async).
- Async ports may be configured for any of 15 fixed bit rates or "autobaud", with or without parity checking, and with a specified character format.
- Simple DTE/DCE change on all ports.
- Flow control on async ports may be configured for physical and/or logical signalling.
- Virtual device support enables reconnect of dial users independent of physical port.
- Security through dual level password protection.
- Emulation of standard 3278 keyboard functions is tailored for each supported terminal type.
- 25th status line emulation.
- SAS graphics support.
- Base color support.
- 3278-5 (27 x 132 character screen) support on 9 channels with memory expansion option.
- LU configurator options provide support for various screen formats and printer page widths.
- Front panel includes 33 function status indicators.
- Self-test of channels, memory and firmware integrity is performed continually in background mode assisted by a "watchdog" timer.
- UL and FCC approved.

For more information about the remarkable DataLynx/3274 protocol converter, call or write today. And ask about our 30-day free trial program.

Local Data

DATALYNX/3274

Local Data

"Your Lynx to IBM."

LOCAL DATA · 2701 Toledo Street · Suite 706 · Torrance · CA · 90503 · Telephone (213) 320-7126 TLX 182518

IN DEPTH

The law of the industry, 1984

By Richard Raysman

The number of computer-related lawsuits jumped dramatically in 1983, and most were overlooked by the national press. Yet their outcomes mean much to the vendor and user communities as well as their attorneys.

The more well-known computer-related lawsuits of recent years have been analyzed at length — Glovatorium vs. NCR Corp., a user/vendor case; Apple Computer, Inc. vs. Franklin Computer Corp., a test of software copyright protection; and Computer Systems Engineering, Inc. vs. Qantel Corp., a distributor/vendor dispute.

But many other legal decisions in the industry were overlooked by the national press in the past year. The dollar amounts involved may have been relatively small or the trial locations far from the legal limelight of New York, California, Illinois and Washington, D.C. Nevertheless, these decisions can set precedents, thus influencing the way companies must do business.

The most common computer-related lawsuits involve a dissatisfied user filing suit against a vendor. The frequency of such suits has increased along with industry expansion and systems expenditures.

Cases in which one vendor sues another are becoming more common and may overtake

CW PHOTO BY GEORGE HIRAMA

Honeywell computers help Trailways move over 20 million people a year at the touch of a button.

Trailways faced a challenge recently. They wanted to improve cash management, the accuracy of pricing and scheduling, and the efficiency of their terminal operations.

So they came to Honeywell, and together we worked out a solution based on our microSystem 6/10. Now, at the touch of a button, ticket agents can see schedules, routes and rates for thousands of Trailways' destinations. The possibility of error is all but eliminated. The system even prints the tickets automatically.

Trailways' managers will benefit by having faster access to data. For example, the system facilitates interline accounting and furnishes feedback on marketing campaigns—a critical edge in a newly deregulated environment.

What's more, the microSystem 6/10 is easy to use, easy to program, and compatible with the Honeywell minicomputer and mainframe host at Trailways' home office. (Only Honeywell has total instructional set compatibility for micros, minis and mainframes.)

The microSystem 6/10 has 512K of memory. More than enough to handle the vast amounts of rate/schedule data Trailways must store, as well as information on daily transactions.

And the system is a snap to install, reliable, and backed up by Honeywell's nationwide service organization.

Information control. That's what keeps Big Red rolling.

For more information on the microSystem 6/10 and the advantages of full-line compatibility, call 800-328-5111, ext. 2708 (In Minnesota, call collect 612-870-2142, ext. 2708) or write Honeywell Inquiry Center, 200 Smith Street (MS 440), Waltham, MA 02154.

Together, we can find the answers.

Honeywell

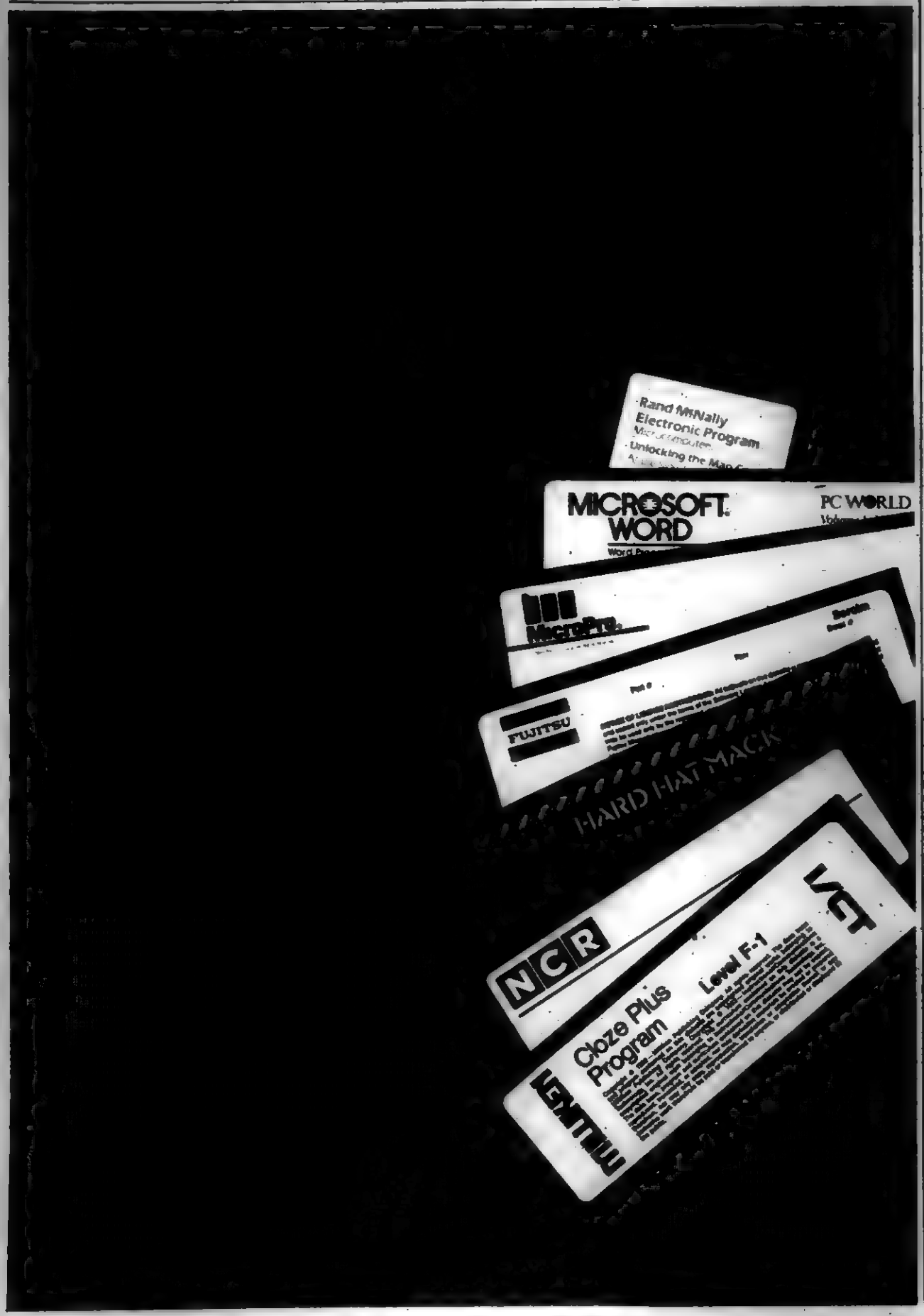
user/vendor lawsuits in importance. Usually, more money is involved in vendor/vendor litigation, and a small vendor's business may be at stake. A user typically sues a vendor over a specific transaction. Its business may also be at risk in cases where it must endure extreme delays or systems malfunctions resulting from actions of the vendor.

The lawsuit of Burroughs Corp. vs. Century Steel, Inc. is a good example of the troubles that can occur when a buyer of computer goods and services negotiates with the primary manufacturer but then finances the purchase of the equipment through a third-party leasing company. If difficulties subsequently transpire, the primary manufacturer will often claim that there was no "privity" of contract.

Without privity of contract, the primary manufacturer takes the position that the purchaser had no direct contractual relationship with the primary manufacturer, and therefore the primary manufacturer has no legal obligation toward the purchaser. If the legal concept of privity of contract is upheld by the courts, the primary manufacturer effectively insulates itself from legal obligations in any situation where a computer purchaser has financed the equipment through a third-party lessor.

Century Steel negotiated the purchase from Burroughs of a minicomputer and accompanying software. Burroughs agreed to deliver and install a workable software system to Century Steel. Since the buyer required financing, it negotiated a lease of the equipment for 60 months from a leasing company. In less than a year after the lease agreement was signed, it became apparent that Burroughs was unable to install the computer and software. Century Steel thus moved the Burroughs equipment out of its office to a warehouse and had another installed.

Subsequently, the leasing company filed a lawsuit against Century Steel for nonpayment of rent. Century Steel then cross-claimed against Burroughs, setting forth the legal position that if the leasing company were successful in its complaint against Century Steel, then Burroughs should be responsible for paying the judgment to the leasing company.



If the legal concept of privity of contract is upheld by the courts, the primary manufacturer effectively insulates itself from legal obligations in any situation where a computer purchaser has financed the equipment through a third-party lessor.

The trial court's decision, which was subsequently upheld in appeals court, determined that Century Steel was entitled to recover from Burroughs all of the rental payments paid by Century Steel to the leasing company.

The legal position of Burroughs, which was not upheld by the court, was that there was no privity of contract between Burroughs and Century Steel. Burroughs claimed that the equipment was sold to the leasing company, which, in turn, leased the equipment to Century Steel, and that Burroughs and Century Steel had no legal relationship. However, there were two equipment sales contracts signed by Burroughs and Century Steel, and those contracts were subsequently sold by Burroughs to the leasing company.

In making its decision, the trial court took into consideration that the leasing company did not make any representations or warranties with respect to the condition of the equipment and did not assume any liability for loss or damage resulting from delays of delivery or installation of the equipment.

Further, in the lease agreement, Century Steel received the benefit of any of the Burroughs warranties with respect to the agreement. The equipment was shipped and installed by Burroughs. Technical employees of Burroughs worked on the installation of the software at Century Steel's location.

The Goal News

LOGICAL beats PHYSICAL

For OS/VS

LOGICAL DUMP/RESTORE OFFERS VAST PERFORMANCE GAINS

We are pleased to report that the people who have tried FAVER/XP, the "smart" backup/restore system, are pleasantly surprised at the difference Logical makes.

Most people are used to a physical-design dump & restore system. To backup a single dataset across a number of packs, they have to physically back up each pack. The logical approach of FAVER/XP lets the system back up just the dataset you want, no matter how many volumes it occupies.

You can back up clusters, groups of clusters or an entire catalog this same way. It's much easier with FAVER/XP and everything happens faster.

Plus, FAVER/XP integrity-checks all VSAM datasets for errors before it backs up anything. If it finds anything, you know about it. If everything's OK, the backup runs automatically. You can rest easy that your backups are clean.

Just to be sure, though, you can invoke the COMPARE function to ensure that the backup tape contains exactly the same data as the disk.

Works with VSAMAID/XP for total VSAM management

Goal Systems International has revealed that they have an interface between the FAVER/XP Backup & Restore system and the VSAMAID/XP system which creates the only complete VSAM dataset management system available today.

During backup, the FAVER/XP special interface creates a historical file, which may then be used by VSAMAID/XP to create a "reconstitutions report" tape, ensuring

Begubb ip tgere. T svvribat vtrayn i zybirt nrfuva vaydr' cukir dyvs ygrqp cguv' kst' abt' jtun

FAVER/XP beats IDCAMS

In benchmark tests where an OS/VS installation runs backup & restore routines using IDCAMS and FAVER/XP, FAVER/XP completes the tasks required in half the time.

These figures are taken from actual timings made by product managers at Goal Systems International, the authors of FAVER/XP. They cover 100 product installations spanning five years of operation.

"The difference in speed is due to a systems design that combines the speed of a physical dump/restore with the

Users amazed at the difference

When polled by this newspaper, users of FAVER/XP revealed that the Logical approach to backup & restore is genuinely faster, more accurate, and easier to perform.

Ralph T. Bryan, Systems Manager at Turbo Rubber Company said, "Here we had been operating all these years working our tails off just to do an accurate backup & restore. And FAVER/XP comes along and automates the task. It's about time."

FAVER/XP and VSAMAID/XP are great news for OS/VS installations. They are two of the Extended Productivity Systems from Goal Systems International. Both are available for a free trial. Call Goal Systems toll free today.

800-848-4640

Goal Systems
Software Solutions

Goal Systems International, Inc.
5455 N. High Street
Columbus, Ohio 43214-1183
Phone (614) 888-1775

The trial court also found that the equipment sales contract that had been signed between Burroughs and Century Steel had not been abandoned or rescinded by mutual agreement and, thus, there was privity of contract between the two. The appeals court recognized that there was substantial evidence and support of the finding that Burroughs failed to deliver properly and install a workable software system.

The award in favor of Century Steel was upheld. But Century Steel had to endure litigation for more than five years.

When third-party financing is involved, a computer user can help to avoid claims of no privity of contract by making sure that there is a signed agreement directly with the primary manufacturer of hardware or the primary supplier of software. Then, if the system is not properly installed, the primary supplier cannot claim at a later date that there was no legal relationship with the end user.

Claims of fraud

Fraud claims have always been a serious threat to computer vendors because of the risk of substantial punitive damages associated with the final award. In Dunn Appraisal vs. Honeywell Information Systems, Inc., a trial with a judge and no jury, the judge awarded not only compensatory damages but also punitive damages plus attorneys' fees. This decision was unusual in that most often, punitive damages are awarded in jury decisions.

Dunn Appraisal was engaged in the automobile damage appraisal business. In 1975, Dunn was using an older Honeywell model computer and desired to upgrade its equipment. Over a period of almost one year, two sales representatives from Honeywell persuaded Dunn executives to upgrade to a newer model Honeywell computer.

One of the principal issues in the discussions between Dunn and Honeywell was that of program conversion. Approximately 400 programs were involved. Honeywell representatives understood that a successful conversion effort would take two to four man-years to complete.

Nevertheless, Honeywell sold the system to Dunn, assuring the company that Honeywell would convert all of the programs at no charge. Although there were 400 programs, the Honeywell representatives specified only 250 programs in the written agreement, assuring Dunn orally that the lower number was inserted simply to satisfy the Honeywell front office and that Honeywell would, in fact, convert all programs.

The trial court found that a relationship of trust and confidence existed between the parties. The Dunn situation is a good example of a fact pattern for a fraud claim: Dunn representatives were relatively unfamiliar with computers and relied primarily on Honeywell representatives for advice and guidance.

The trial court found that almost from the beginning, the conversion project was an "unmitigated disaster." After a period of time, Honeywell informed Dunn that it would not convert all of the programs, only the 250. Dunn was forced to hire an independent contractor to complete the job. Even after the deadlines had passed, Honeywell had not delivered all of its 250 programs. Many that had been delivered were incorrect.

After almost a year of attempting to perform the conversion, Dunn could not use either its old machine or its new one to conduct business. The trial court characterized the conversion effort as a "botched-up mess." Finally, Dunn terminated the agreement.

The trial court found that Honeywell had made material misrepresentations to Dunn in order to induce the company to enter into the contract. The misrepresentations included saying the Honeywell computer was best suited for the Dunn operation, that delivery and installation could be completed within three months and that conversion of the 400 programs could be accomplished with minor modifications and little or no disruption of Dunn's business. Other misrepresentations were that the new computer would improve Dunn's efficiency in serving its customers and that transition to the operation of the new computer could be accomplished without additional formal training or labor costs.

The judge in the trial court awarded Dunn $61,573 in compensatory damages, $30,758 in punitive damages plus attorneys' fees of $24,628. This award was upheld on appeal.

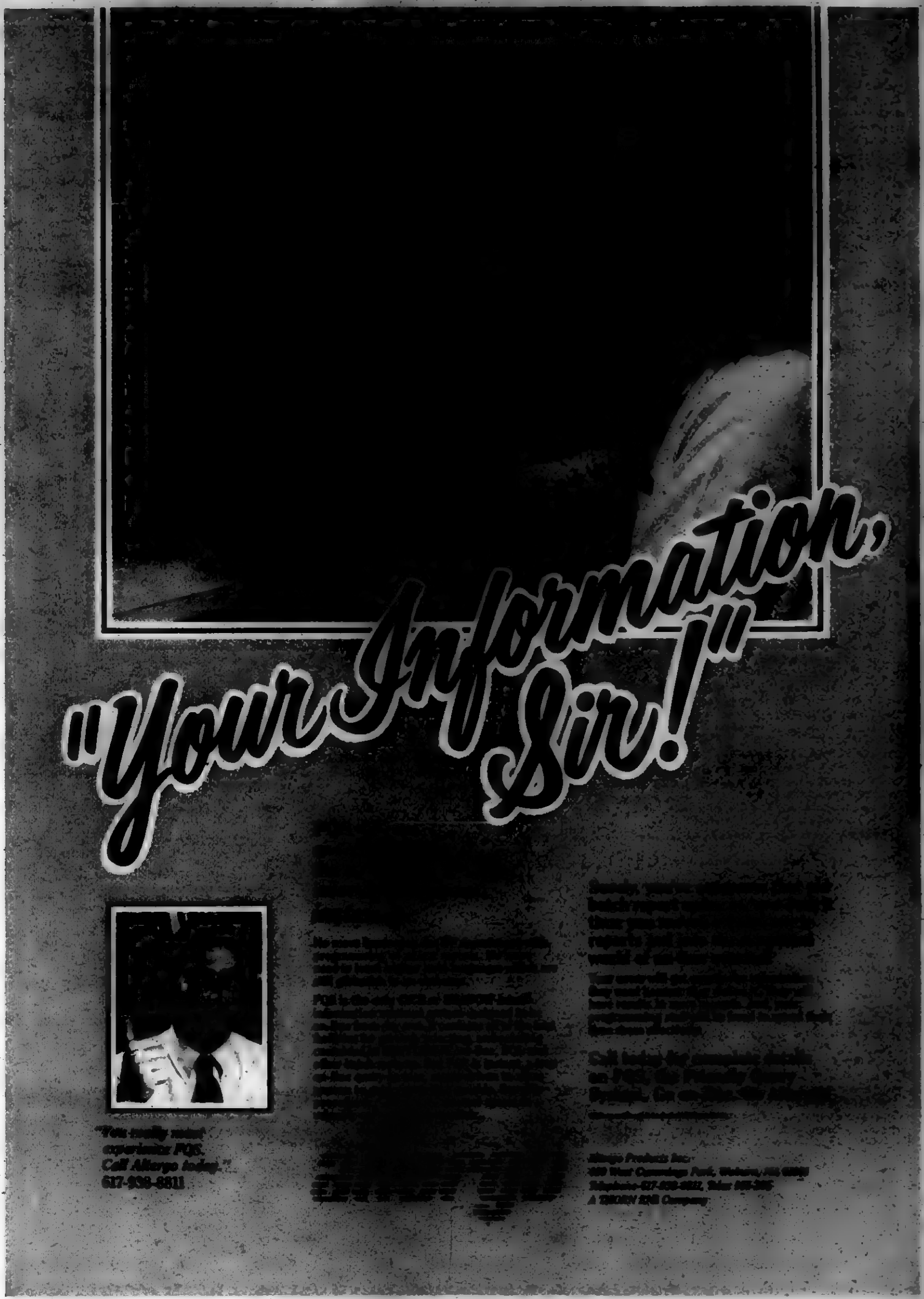
The Dunn result illustrates emerging trends in user/vendor litigation. Punitive damages were awarded and upheld, even though there was no jury involved; attorneys' fees were awarded by the court; and the court allowed compensatory damages for lost executive time. The trial court found numerous items of misrepresentation and good-faith reliance by the purchaser upon false and misleading statements made by the vendor.

Conversely, now that many computer purchasers are becoming more sophisticated in their knowledge, claims of fraud may not be as believable since the users are not relying as significantly on the vendor's representations as they have in the past. Many users are retaining independent consultants. Where users retain competent technical assistance, a fraud claim would be much more difficult for them to prove.

OEM/manufacturer relations

Not infrequently, small OEMs have difficulty entering into volume discount arrangements with primary manufacturers. The manufacturers

THOUSANDS OF SOFTWARE PROGRAMS ARE GATHERING IN NEW ORLEANS.
SOFTCON
SOFTCON EXHIBITORS


"Information, Your Sir!"
"You really must experience PQS. Call Allergo today."
617-938-8811

sometimes are understandably reluctant to become involved with OEMs who may be undercapitalized or poorly managed. As the computer industry continues to mature, manufacturers would rather do business with established OEMs and reduce involvement as much as possible with new ventures. Conversely, small OEMs just starting in business desire the opportunity to enjoy a mutually profitable relationship with the primary manufacturers.

An example of an initial relationship which did not develop amicably between a manufacturer and an OEM is described in the lawsuit Management Assistance, Inc. vs. Computer Dimensions, Inc. vs. Basic Four Corp. Computer Dimensions, a Georgia corporation in the business of designing, manufacturing and marketing computer systems and related components, desired to obtain from Basic Four a multiple system discount contract for the sale of computer systems in a dealership agreement. There were numerous discussions between representatives of Computer Dimensions and Basic Four. The only signed written agreements were purchase agreements where Computer Dimensions agreed to buy certain computer hardware and peripherals from Basic Four. After a dispute arose between Computer Dimensions and Basic Four, there was a subsequent supplemental agreement where Computer Dimensions agreed to pay Basic Four $10,000 in exchange for releasing Basic Four from any liability and delivery by Basic Four to Computer Dimensions of certain computer equipment.

There were also volume discount purchase orders signed by Computer Dimensions but not by Basic Four — thus, not mutually agreed written agreements. Basic Four sued Computer Dimensions for payment, and Computer Dimensions counterclaimed that Basic Four had fraudulently induced it to sign the settlement agreement. Computer Dimensions claimed that Basic Four had given oral assurances that after signing the settlement agreement, Computer Dimensions would become a Basic Four OEM dealer and could immediately start selling the Basic Four systems.

The court held that any reliance by Computer Dimensions on oral representations was unreasonable when the settlement agreement expressly released Basic Four from any liability and that Computer Dimensions was not prevented from reading the contract. The court seemed to take a rather impatient view of the claims by Computer Dimensions that in this vendor/vendor arm's-length negotiation, it was somehow induced to sign an agreement it did not understand. As a result, in a lengthy opinion, the court dismissed the Computer Dimensions claim of fraud.

This lawsuit is a good example of the difficulty that manufacturers and OEMs face in the coming years. OEMs should be careful that they do not rely solely upon oral assurances made by manufacturer representatives. When OEMs enter into bona fide written agreements with the manufacturer, the OEM should be certain to get a fully signed copy of that agreement before marketing the equipment to end users. Conversely, manufacturers, in order to avoid claims of fraud, should avoid letting OEMs think that they have a formal relationship with the manufacturer prior to the signing of a comprehensive written agreement.

When third-party financing is involved, a computer user can help to avoid claims of no privity of contract by making sure that there is a signed agreement directly with the primary manufacturer of hardware or the primary supplier of software. Then, if the system is not properly installed, the primary supplier cannot claim at a later date that there was no legal relationship with the end user.

Video games

The developers of video game cartridges have been fighting vigorously for the last several years to protect their products. Most of the lawsuits have been based upon copyright infringement claims against companies that have developed imitators to such video games as Pac-Man.

One of the more recent video game lawsuits, Atari, Inc. vs. JS&A Group, Inc., involves a dispute other than a game imitation. Atari game cartridges contain a silicon chip with read-only memory (ROM). Atari has copyrighted its video games as audiovisual works.

JS&A is a retailer of electronic products. The lawsuit involves a JS&A new product called Prom Blaster, a device that can duplicate video games. The JS&A advertisement states that "you simply plug in your Atari or Activision in one slot and a blank cartridge in another, press a button and three minutes later, you've created an exact duplicate." The Prom Blaster sells for $119.

JS&A claimed that the Prom Blaster was used primarily as a means of backing up copies of Atari 2600 compatible games. It was Atari's

FOR THREE DAYS IN TEXAS WILL TURN

No single computer, personal or otherwise, has so profoundly affected all of business and industry as the IBM Personal Computer.

And now, for three days only, you can see, touch, use and compare the hardware, software, peripherals and compatibles that run on, like or with this revolutionary machine. It's the PC *World Exposition* in Houston, and you are invited to join us.

You'll see hundreds of exhibits from all the product leaders. Both makers and marketers of hardware, software, printers, peripherals, add-ons and services in a giant exhibition and retail selling event. Here's a list of some of the product leaders you'll see:

Alpha Software Corp.
Anadex Inc.
Arbor Technology
Ashton-Tate
AST Research Inc.
Benchmark
BOS National Inc.
BPI Systems Inc.
Robert J. Brady Company
Braid Communications
Brown Disc Manufacturing
Business Computing
CDI
Celestial Software Inc.
Cermetek Microelectronics
Compaq Computer
Computercraft
Computer Intelligence
ComputerKnowledge Corp.
Computer Roomers
Computerworld
Computex Corporation
Contemporary Computer Wear
Corona Data Systems
Corvus
CPU Corporation
Creative Computer Products
Data Business Vision
Datamac
Data Storage Solutions
Data Translation Inc.
Decision Data Computer Corporation
Digital Communications Associates
Discortex Corp.
Distributed Logic Corp.
Dynax Distributors
Emulex Corporation
ENVAX Systems Inc.
ESC Technologies, Inc.
Everex Systems Inc.
Ferox Microsystems
Hayden Book Co. Inc.
Hewlett-Packard Company
Human Edge Software Corp.
I.B. Magazette
Independent Computer Consultants Associates
Information Builders
Inforunner
InfoWorld
Interface Inc.
International Computerised Linguistics
Interphase Corporation
Lexisoft Inc.
LPKF Pacific
Marc Software
MICRO MARKETWORLD
Micro-Design Inc.
Micro Line Inc.
Microtek Lab
National Instruments
NEC
Novation
Omega Software Inc.
Omni Graphics Inc.
On Trak Data Systems
OSM Computer Corp.
Palantir Software
Panamax Line Conditioning
P.C. Telemart
PC World
Pencept Inc.
Personal CAD Systems
Petroware
Phase Information Machines
Prentice Hall Business & Professional Division
Printronix Inc.
Que Corporation
Racal-Vadic
Roland DG
RTCS/Real Time Computer Science Corp.
Santa Clara Systems
Seequa
Sensor-Based Systems
Software Automation Inc.
Software Centre International
Software Solutions Inc.
Sorbus Service Division MAI
Sperry Corp.
Summagraphics Corporation
SWI International Systems
Sysprint Inc.
Systems Management Associates
Tall Grass Technology
TCS Software
Televideo Systems Inc.
3M Data Recording Products
Thunderhawk Corporation
Toshiba America Inc.
United Networking Systems Inc.
Vectrix Corp.
Verbatim Corporation
Vertex Systems
ZEDUCOMP

(Exhibitors as of Dec. 15, 1983)

contention in the lawsuit that the purpose and effect of the Prom Blaster was actively to induce and materially contribute to making infringing copies of Atari's copyrighted home video games. Atari sought a preliminary injunction to prevent JS&A from selling or distributing the Prom Blaster together with blank cartridges.

The court decided that it was not enough for JS&A to show that the Prom Blaster had a legal use such as backing up cartridges. The court determined that the Prom Blaster machine must have a substantial noninfringing use to avoid granting an injunction against its sale. The court determined that the primary and only substantial use of the Prom Blaster was the duplication of video games developed by companies other than JS&A. Thus, JS&A was likely to be held liable as a contributory infringer.

The Consolidated lawsuit is indicative of the serious difficulties that can occur between a manufacturer of computer equipment and its distributors. The maturing computer industry is now experiencing the manufacturer-distributor difficulties long common in other industries.

The court found that the archival argument was not valid since the tapes could only be destroyed by a mechanical or electrical failure but could not be reprogrammed or erased. As a result, the court granted a preliminary injunction in favor of Atari and against JS&A and enjoined JS&A from selling, marketing, distributing or otherwise disposing of the Prom Blaster.

The Atari lawsuit involves a novel approach to copying copyrighted video game programs. This decision is added to the already existing cases that prevent imitators of video games from infringing on copyrighted works.

Distributor, manufacturer

Virtually all computer and peripheral manufacturers currently market at least some of their products through distributors. Since the value of the equipment is often significant, disputes between manufacturers and their distributors are more frequently ending up in the courts.

A 1983 case between a distributor and a computer manufacturer where punitive damages were awarded by the trial court is Consolidated Data Terminals vs. Applied Digital Data Systems. The total award for Consolidated at the trial level was $585,489, which included $500,000 in punitive damages. The Ninth Circuit Court of Appeals reversed most of the award of the lower court including the $500,000 in punitive damages. Nevertheless, this lawsuit is illustrative of the risk to computer manufacturers in dealing with their distributors. It should also be noted that the punitive damage award was granted by a judge and not a jury.

Applied Digital Data Systems (Adds) was a manufacturer of CRT terminals. Consolidated Data Terminals (CDT) was a distributor of the terminals in California. Adds and CDT signed a written distributor agreement making CDT a nonexclusive sales outlet for Adds terminals. Adds promised to accept CDT purchase orders for a fixed price, and CDT promised to use its best efforts to promote Adds' product.

CDT further promised that it would not sell other competitive terminals. Adds subsequently began delivering terminals that did not meet their published specifications in Adds' promotional literature. In particular, the terminals would not operate at the advertised speed of 1,920 char./sec, and as many as 25% of the terminals were totally inoperative upon delivery.

Eventually, CDT bid on an order for 127 terminals to Intel Corp., a terminal user. Adds bid on the same project but came in at a higher price. When Adds discovered the lower CDT price, Adds reduced its asking price and was awarded the final contract to supply the terminals. When CDT learned of this undercutting action by Adds, combined with the technical difficulties of the Adds terminals, CDT terminated its distributor agreement with Adds and entered into distributor agreements with other terminal suppliers.

CDT then filed a lawsuit against Adds alleging breach of contract, breach of an implied covenant of good faith and fair dealing, unlawful interference with prospective business advantage and fraud in the inducement to enter the distributor agreement.

As noted above, the trial court awarded CDT damages on its claims, including a $500,000 punitive damage award based upon Adds' interference with the sale to Intel, the terminal purchaser. The trial court noted that "fraudulent conduct and wrongful interference with CDT's advantageous economic relationship with Intel was in knowing and conscious disregard of CDT's rights and interests." The Court of Appeals reversed all of the award with the exception of $15,000 awarded to CDT in direct, incidental and consequential damages for Adds' breach

FEBRUARY, ALL EYES IN TO THE IBM PC.

Plus, we'll present personal computer experts from around the nation in an up-to-the-minute conference program. You'll learn how to choose and how to use the technology and equipment surrounding the PC family of microcomputers. Here's a partial listing of the conference sessions:

Wednesday, February 1, 1984
User Sessions:
The Benefits of the IBM PC for Small Businesses
Financing Options and Tax Advantages
Available Add-Ons and Peripherals
Software: What's Available and How to Find It
What Do the Compatibles Have To Offer?
How I Became Compatible With My IBM PC
Medical/Dental Applications for the PC
The PC in the Law Office
PC's and Real Estate
Manufacturing Resource Planning with the PC
Investment Software for the PC
CPA Software: The Bottom Line
Software for Insurance Applications
Distributed Control Software for the PC

Thursday, February 2, 1984
User Sessions:
The Anatomy of the IBM PC
Defining Levels of Compatibility Between Systems
Overview of Compatibles: Desktops and Portables
Word Processing Software
Database Management Software
Business Graphics Software
Analyzing Your Software Requirements
Overview of Major Business Applications Software
Integrated Software Solutions

Friday, February 3, 1984
User Sessions: The PC in the Corporate Environment
Review of Policy and Planning Issues
Implementation Strategies
Use of PC to Mainframe Communications (Includes Security Issues)
Local Networking for the PC

Quite simply, the PC *World Exposition* is the biggest event in Texas for the most important computer in history.
Don't miss it.

FREE ADMISSION to one Conference Session of your choice. Just present this coupon at the Registration Desk any day of the Show, pay the regular $10 exhibits only admission and choose any one Conference Session free of charge. One coupon per person.

The PC World Exposition
Houston
February 1-3, 1984, Astro Hall

SAVE $5.00 on Full Exhibit & Conference Admission. Present this coupon at the Registration Desk and pay just $25.00 for a Conference Pass entitling you to attend all Conference Sessions and three days of exhibits. One person per coupon.

IT'S WHAT THE WORLD IS COMING TO.

The PC *World Exposition* is produced by Mitch Hall Associates in cooperation with CW Communications, Inc., publishers of PC World, MICRO MARKETWORLD, InfoWorld, and Computerworld.

Three-day admission to all exhibits and conference sessions is $30.00. Admission to the exhibits only for three days is $10.00. Show hours run from 10:00 AM to 5:00 PM Wednesday and Thursday, February 1 and 2, and from 10:00 AM to 3:30 PM on Friday, February 3. Conference sessions run from 8:30 – 10:30 AM and 2:30 – 5:30 PM on all three days.
For attendee and conference information, call CW Communications at 1-800-225-4698.
For information on exhibiting, call Mitch Hall Associates at 1-617-259-7400.

® signifies manufacturer's registered trademark.
™ signifies manufacturer's trademark.

of warranty with respect to the CRT terminals.

Regardless of the outcome of the Consolidated lawsuit, it is indicative of the serious difficulties that can occur between a manufacturer of computer equipment and its distributors. The maturing computer industry is now experiencing the manufacturer-distributor difficulties long common in other industries.

There have been a number of recent lawsuits addressing the issue of adequate protection of confidential technological information. A particularly good example of protection of sophisticated technology for purposes of protecting lead time was set forth in Textron, Inc. vs. Teleoperator Systems Corp. The Textron case dealt with the issue of an independent contractor, sophisticated in industrial robotics technology, providing confidential services for a valuable consideration.

Textron was in the business of making and selling machine tools and became interested in volume production of robots for industrial uses, such as in the automotive industry. Teleoperator had a reputation as an expert in the design of manipulators and robots. As a result of Textron's requirements, Textron and Teleoperator entered into an understanding that Teleoperator would develop an industrial robot designed for the benefit of Textron.

Although there was no formal contract, correspondence between the parties made it clear that Teleoperator would be permitted to utilize the resulting robot design in a noncompetitive manner with respect to Textron. For the design phase, Textron paid more than $800,000 in fees to Teleoperator. After the development effort and in contravention of their basic understanding, Teleoperator claimed the design as its own and indicated an intention to enter into competition with Textron. As a result, Textron brought an action for injunctive relief, which was granted after a four-day hearing.

The court observed that to permit Teleoperator to wrongfully appropriate technology which would thrust it into a competitive position it should not rightfully enjoy would inflict severe damages on Textron. The court further stated that the damage would be inflicted by virtue of a ruinous competition between the parties that their agreement did not contemplate; it was expected that Teleoperator would only be given rights to noncompetitive applications of the sophisticated technology.

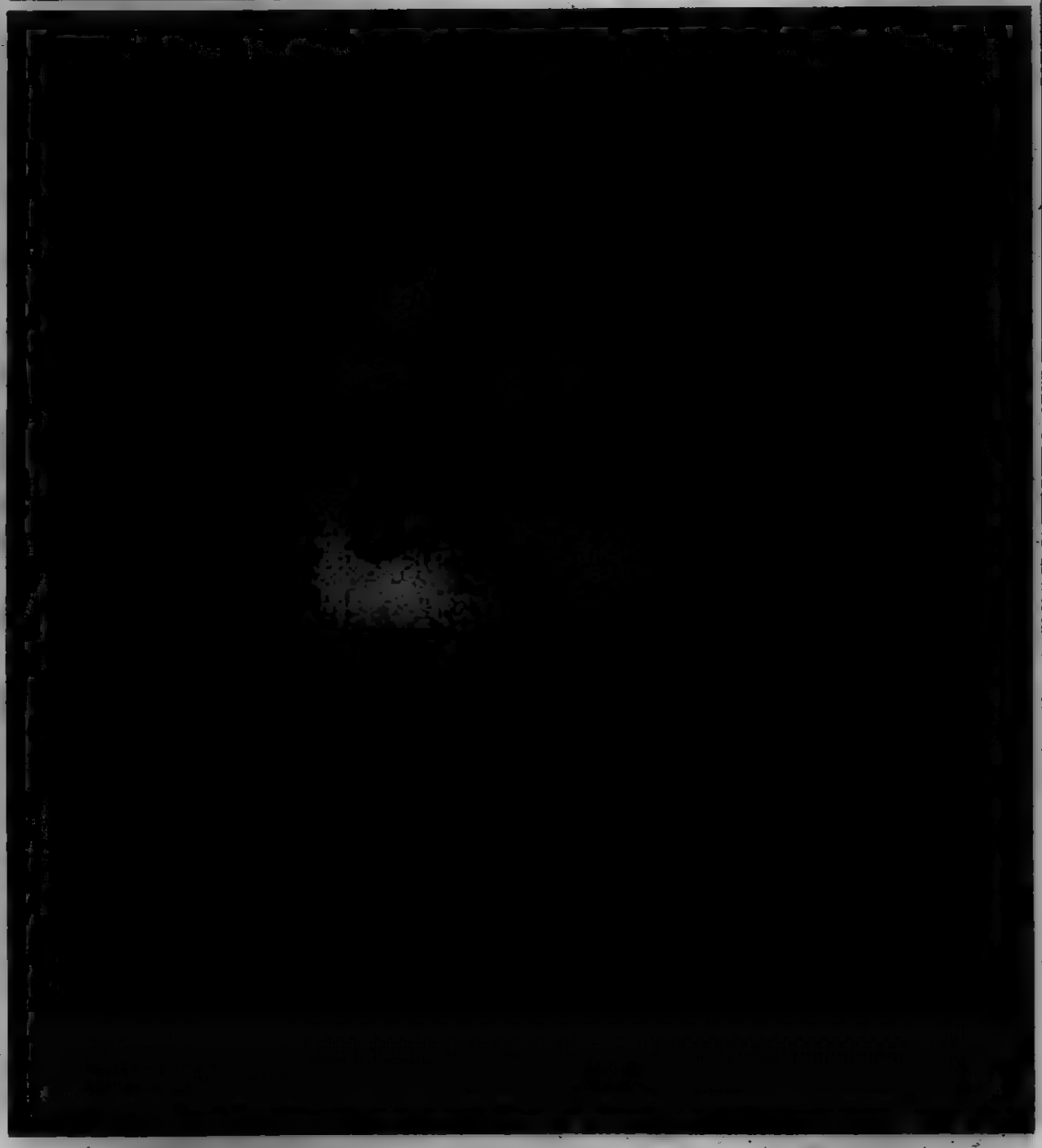
Companies often face difficulty when they must resort to retaining independent contractors to perform sophisticated and highly technological procedures. Having developed the technology, a consultant often wants to market the work to other organizations.

The Textron result shows the difficulties companies face when they must resort to retaining independent contractors to perform sophisticated and highly technological procedures. Once the consultant has developed the technology, it can be expected that he would want to market that technology to other organizations. However, since the purchasing company has spent a great deal of time and money in acquiring the confidential information, it would naturally want to protect the technology and lead time in the marketplace.

About the Author

Richard Rayman, an attorney with the New York City law firm of Brown, Rayman & Millstein, is chairman of the New York State Bar Association Computer Law Subcommittee. He coauthors a monthly column on computer law for the New York Law Journal.

Rayman specializes in contract negotiation, litigation, protection of proprietary rights in software and other computer-related legal areas. He is coauthor of "Don't Rush To Court If Your Computer Fails," which appears in this month's Harvard Business Review.



UDS raises the speed limit for dial-up modems

At last there's a 9600 bps modem designed especially for the dial-up telephone network.

Our 9600 A/B is the ideal modem for projected system growth. Realize immediate line-charge savings by moving from 208 A/B to 9600 A/B now! Then, if your system demands dedicated lines, simple strap modifications will convert your modems. Nothing else changes!

A faster turnaround time than 208 A/B's further increases the 9600 A/B's efficiency. Multiple test modes are selectable from the front panel.

Contact Universal Data Systems, 5000 Bradford Drive, Huntsville, AL 35805. Telephone 205/837-8100; TWX 810-726-2100.

Universal Data Systems

MOTOROLA INC. Information Systems Group

DISTRICT OFFICES:
Old Bridge, NJ, 201/251-0999 • Blue Bell, PA, 215/643-2330 • Atlanta, 404/998-2715 • Chicago, 312/441-7499 • Columbus, OH, 614/885-1885 • Boston, 617/875-8888 Richardson, TX, 214/690-0282 • Englewood, CO, 303/694-6543 • Houston, 713/988-5506 • Tustin, CA, 714/669-8091 • Mountain View, CA, 415/969-3323

Created by Daymarl Hall, Inc., Winter Park, FL

IN DEPTH

Who's in control here?

In order for micros to be integrated into the corporation, the DP charter must explicitly state who controls information management as well as the equipment and applications that support it.

By Jack Rahaim

The issue of micros in large organizations starts with the charter (real or perceived) of the DP department. In the past, there was no need to separate the role of information management — defining, processing, transmitting and storing information — from the equipment and applications that supported it. The DP department was the only show in town. Computer equipment was prohibitively expensive and complex for local organizational units or individuals.

But with the price and use barriers gone, suddenly the issue of charter becomes problematic: Who owns information management and who should own the equipment and applications that support information management?

There are a few alternatives for drawing up the DP charter:

- Define the charter to include *both* information management and the equipment.
- Define it as primarily information management and develop standards by which users can access and contribute to the organization's information.
- Be silent or unclear about the DP charter and deal with the issues on an ad hoc basis.

What follows is an attempt to clarify the issue of charter by examining the risks and opportunities that emerge from the use of micros locally.

Risky situation

Many DP professionals, although reluctant to admit it, have had virtually no experience with micros and their applications. They have developed a number of elitist attitudes about the equipment and the ability of users to do anything meaningful with it. The thought of unsophisticated users selecting, installing and applying micros is enough to cause sleepless nights for seasoned DP veterans.

Much has been written about the loss of control that DP suffers when users purchase and operate their own micros. This loss of control includes the risk that micro users will begin pressuring DP for more and better applications using centralized and local data bases, designed with the same type of human interfaces that are currently available in some of the good micro software packages. In addition, users will demand that new applications be developed more quickly and at a lower cost than DP has been able to deliver in

NESTU Presents: Two In-Depth Seminar Sessions
SET FOR FEB. 21 AT WELLESLEY COLLEGE
NORTH EAST SYSTEM THIRTY-EIGHT USERS will feature seminars:
☐ System 38 Past, Present & Future
☐ A System 38 Based Company MIS — The 5 Most Common Mistakes
Registration for the entire event is $38 for members and $55 for non-members. The price includes dinner.
NESTU
44 Temple Street
Name
Company/Organization
Street
City/State
Telephone
If Attending

the past. Micrp users generally will not understand the complexity of developing and operating a real-time, multiuser system.

At the other extreme is the risk that users will become permanently turned off to automation because of negative experiences with micros. Clearly, if the user becomes discouraged or threatened by automation, the job of DP becomes significantly more complex.

One of the most common complaints by DP managers in the past is that users lack systems understanding and/or appreciation. This lack of understanding has made it extremely difficult for both DP and the users to share ideas and language relating to business needs and the contribution automation could make.

The proliferation of micros (and good software) could, if managed properly, develop a new constituency of computer-literate users who are better able to articulate their needs and who will have a better understanding of both user and systems issues which emerge during automation. Providing DP department support and expertise to the users as they choose, purchase, install and begin using micros offers the opportunity to develop relationships which will benefit both the user and DP in the future.

The learning center can become the focal point for piloting new applications as well as supplying information and expertise on personal computer issues ranging from how to choose the right computer to how to use one productively on the job.

One excellent way to support users and develop good DP/user relationships is through the learning center. In its basic form, the learning center is a one-stop combination of hardware, software, resource people and instruction designed to introduce new users to the world of micros.

Most successful learning centers, however, gradually migrate into more than just places to learn how to use micros. The learning center can become the focal point for piloting new applications as well as supplying information and expertise on personal computer issues ranging from how to choose the right computer to how to use one productively on the job.

If the learning center is used properly, users will become knowledgeable about different equipment, the capabilities and limitations of each, as well as the applications software available. In addition, the user can be taught the importance of dealing with data consistently and the advantage of being able to share data across applications. At the same time, the DP group will gain insight into the users' needs and the kinds of support that will be required on an ongoing basis.

In this environment, DP can begin to win the cooperation and understanding of users and begin developing the ability to influence users. If DP positions itself as being supportive to micro users, users will naturally look to DP for advice and support. This situation will allow the development of a strategy to give both DP and the users the optimum combination of access and control to data.

If, on the other hand, users perceive DP as standing in their way in terms of mi-

SCIENCE/SCOPE

An optical fiber that survives baking, stretching, and radiation promises to find many important military uses. The aluminum-coated fiber, developed by Hughes Aircraft Company scientists, was subjected to severe environmental testing. It withstood temperatures up to 400°C, high strain (2%) at temperatures to 400°C, and a heavy (1 megarad) dose of cobalt radiation. Plastic-coated fibers would have melted, snapped, and lost their ability to transmit light. The metal-coated fibers will replace electrical wiring in many avionic and seaborne systems.

The new Telstar 3 communications satellite carries solid-state power amplifiers to boost its ability to carry TV, radio, voice, and high-speed data transmission services. Telstar 3, owned and operated by American Telephone and Telegraph Co., is the first Hughes satellite to use solid-state amplifiers. When combined with advanced signal transmission techniques, these devices allow the spacecraft to carry nearly four times as many telephone calls as other satellites in service. Current satellites almost exclusively use traveling-wave tube amplifiers. While these tubes use the satellite's solar-generated power more efficiently, the solid-state amplifiers are more reliable and will last longer.

Approximately 2900 U.S. and foreign patents have been granted to Hughes inventors in the last 15 years. To honor its best and brightest talent, the company each year presents the Lawrence A. Hyland Patent Award to a handful of its outstanding inventors. The award, which includes an honorarium, is named for the company's retired chairman of the board. A leading electronics inventor and radar pioneer, Mr. Hyland was granted nearly 40 patents. Among his earliest was the one for the first shielded spark plug that permitted radio equipment to be used effectively aboard aircraft. To date 104 inventors have received the Hyland award.

A new computer system promises to reduce scrap and rework, thereby helping one Hughes group slash costs by an estimated $1.5 million annually. The Quality Information System (QIS), now under development, will compile and analyze data on how defects happen and how they are corrected. Information will be made available to manufacturing employees for immediate feedback and for use during production. Data will also be kept in a central historical file for future reference. QIS is expected to improve quality by spotting problems that stem from faulty design, poor supplier quality, and improper manufacturing methods. In addition, by keeping track of how often certain hardware needs replacing, the system will help pinpoint problems with components or their applications.

An ultramodern facility spanning 1.75 million square feet is the showcase where outstanding Hughes engineering combines advanced manufacturing techniques and production processes. Our complex is complete, so we're looking for experienced and graduating engineers to work on such programs as: infrared thermal imaging systems, laser rangefinders and designators, and missile launching and guidance systems. Send your resume to Hughes Electro-Optical and Data Systems Group, Professional Employment, P.O. Box 913, E9/W101, Dept. SE, El Segundo, CA 90245. Equal opportunity employer.

Circle reader service card for more information
HUGHES
HUGHES AIRCRAFT COMPANY
For additional information please write to P.O. Box 11346, Marina del Rey, CA 90295

cro use in order to preserve DP's historical turf, the user will resist any attempts by DP to be involved with the issue of micros.

DP departments will not have many opportunities to develop strong relationships with users. The way in which DP assumes a leadership position (as opposed to an autocratic one) will determine the success or failure of both the users and DP. It is strongly recommended that a strategy be developed to provide strong DP support and leadership for the user. Do it now or run the risk of losing the users as allies.

The equipment

The approach most users are being advised to follow is:

- Decide what you want to do with the computer.
- Choose the software that will allow you to do what you want.
- Choose the hardware that will best run the software you have chosen.

Although this approach appears valid, it assumes that the user will be using the equipment in a stand-alone or stovepiped environment as opposed to an integrated work environment. Many micros were designed to be used as stand-alone applications machines. The reality of business, however, requires that information be shared and commonly understood.

It should be the role of DP to provide the expertise to assist users in choosing equipment that will satisfy their individual needs *and* integrate local (individual) applications with department-level data and applications and ultimately with corporatewide data and applications. As individual users, they will need the ability to integrate data between applications (data base to spreadsheet to word processing and graphics, for example).

Admittedly, most users will not understand the importance of this integrative approach. If they do not, credibility and influence become critical. If DP has positioned itself properly, the user will accept the notion of integration without really understanding it.

The opportunity is clear: to develop standards by which micros are purchased and interconnected. These standards, if handled appropriately, will be perceived as enabling by the users, and the result will be a network of computers that are truly integrated.

The risks are equally clear: If users ignore the need for standards, a Tower of Babel will develop with limited (or no) ability for users to deal with each other's data and applications. At this point, DP will probably take a considerable amount of heat for letting the company "do this to itself."

Road to minis

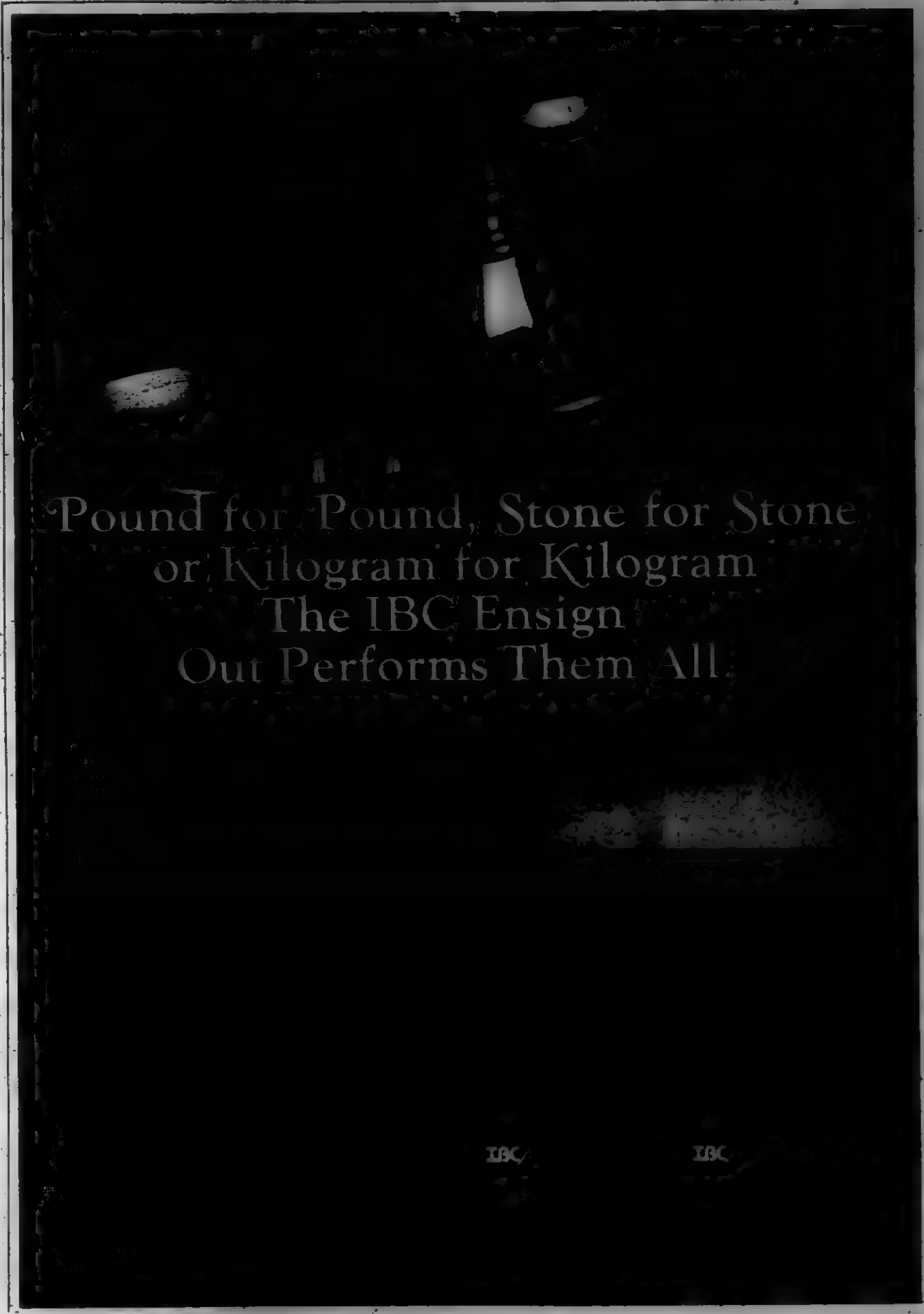
There are several reasons that the use of micros leads to minicomputers.

In a very short time, the difference between micros and minicomputers will become harder to define. They are rapidly approaching each other in terms of functions, multiuser capabilities and price.

As users begin understanding the value in integrating individual with department and department with corporate for both data and applications, the minicomputer becomes the logical choice at the department level to implement the integration.

It becomes the place where individual and department meet corporate from the point of view of data, applications and standards.

In a short time, the difference between micros and minicomputers will become harder to define. They are rapidly approaching each other in terms of functions, multiuser capabilities and price.



Apollo recognizes the fact that there are two sides to every professional.

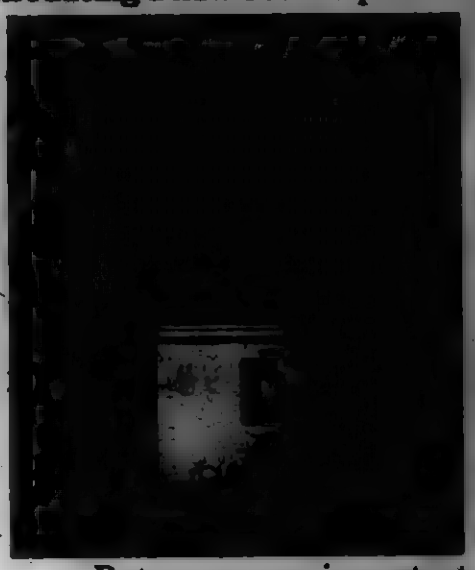
There's a part of a professional that involves their profession.

Then there's the part that goes to meetings, makes presentations, does budget, prepares documents.

According to recent reports, people who work with computers spend some 30% of their day working in their chosen profession. And 70% of their day just getting things done.

So we're announcing some ways for making better use of both sides of their day.

For starters, we've set some new standards in high performance workstations. By introducing a new set of Apollo computational nodes so fast you don't have to wait for them to figure out anything. Even when you're working on Solids Modeling, Image Analysis, Finite Element Analysis, and VLSI Design.



The power of a high-end 32-bit supermini at your desk for a fraction of the price.

The Apollo DN 660 and DN 460.

Inside you'll find up to 4 MB of main memory with full 32-bit architecture and an integrated hardware floating point unit. And enough power to handle up to 24 concurrent processes, each with up to 256 MB of virtual address space. Plus high resolution bit map graphics that among other things, can do area fills at up to 320 million bits per second.

In other words, they've got all the power of a high performance supermini like the VAX 11/780*. Except that they sit at a desk. And go for a fourth of the price.

But even more important, each DN 660 and 460 workstation node you add to the Apollo DOMAIN network adds power instead of taking it away. Because each is a 32-bit workstation with network wide virtual memory that lets all Apollo nodes share data, software, programs, and peripherals transparently across the network.

But we've also introduced software that helps professionals work with the other side of their work: DOMAIN Professional Support Services. With Document, Mail, Calc, Calendar and File. All based on the more complex needs of the professional. And fully integrated with your application programs. So you can do all your work on the same system.

All of which should come as a very welcome development to every professional. Because we at Apollo are not simply making computers. We're making workstations that work for professionals.

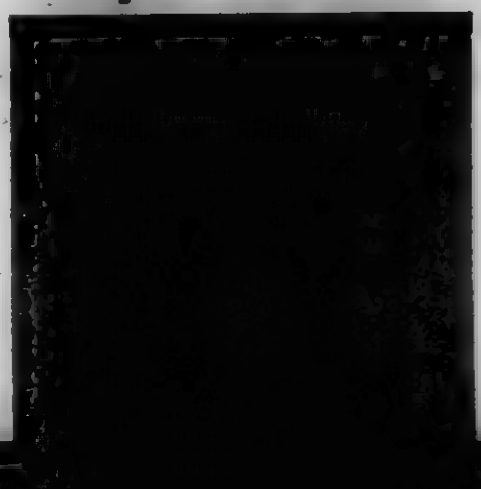
For more information call or write Marketing Services Director, Dept. J1, Apollo Computer, 15 Elizabeth Drive, Chelmsford, Massachusetts 01824 (617) 256-6600, ext. 6608.

The DN 660 and DN 460 can do state-of-the-art Finite Element Analysis at state-of-the-art speed.

They work on documents the way professionals work.

They do Electronic Mail, Filing and Calendar Management.

apollo



*VAX 11/780 is a trademark of Digital Equipment Corporation.

1983 was a very good year.

NCR introduced more major data processing products than any other high tech company.

NCR closes out its first century with one of its most impressive technological achievements, the NCR 9300. It's the first full 32-bit VLSI mainframe designed for business applications. The 9300 delivers the power of a mainframe at the price of a mini.

New computers for 1983 included the UNIX™-based Tower, a microprocessor with the power of traditional minicomputers. NCR also added new multiprocessors to our top-of-the-line 8600 mainframe series.

We introduced the NCR Personal Computer specifically designed for the business/professional market. It provides dual processor capabilities to enhance performance, and is the first personal computer designed with networking in mind. It can function as an offline computer, an online terminal to your mainframe, or networked with other NCR Personal Computers and other popular PCs.

We strengthened our position as the world's leading supplier of retail point-of-sale terminals by introducing a wide range of new products. Included is a terminal that looks up the prices of over 14,800 items stored in its own internal bubble memory.

Our number one position in automated bank teller machines produced the technology for self-service airline, ski lift and service station terminals. We are the leader in electronic banking networks and electronic funds transfer.

Why did NCR introduce all these high technology products in 1983? We wanted to get a good start on our second hundred years. For more information, call 1-800-CALL-NCR. In Ohio, 1-800-543-4470.

And 1984 will be even better.

NCR

1884-1984
Celebrating the future

UNIX is a trademark of Bell Laboratories.

People Express, one of America's fastest-growing airlines, chose an NCR 8600 series computer system to handle online reservations. NCR is a leader in online transaction processing equipment, communications and system software.

The Tower microprocessor packs a lot of computer power in a 29" x 27" x 7" package. Up to 16 operators, local or remote, can access the Tower at one time.

Debit cards and Electronic Funds Transfer became a reality in 1983. NCR is the leader in EFT technology today!

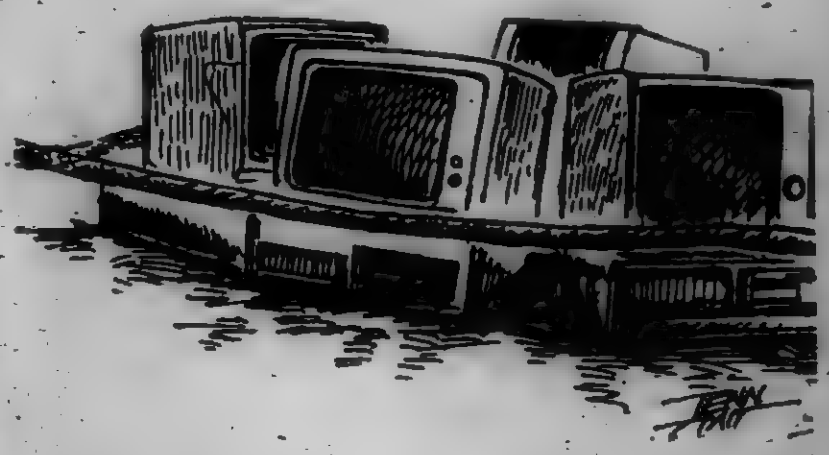
Bubble memory technology provides resident mass memory in the terminal for automatic price look-up for supermarkets and other retail stores.

The new NCR Personal Computer offers unsurpassed monochrome or color graphics. Industry standards are used throughout so the applications programs you need are available now.

New drive-through ATMs help the world bank on the go. NCR helped pioneer the regional electronic banking network and has installed more Automated Teller Machines worldwide than any other supplier.

The NCR 9300, a mouthful of computer power in a 50-pound box, was a big breakthrough in 1983. Add this 32-bit VLSI mainframe for a complete system price of less than $46,000!

Many managers are philosophically conservative when it comes to sharing data with middle managers and supervisors or across organizational lines. They will have to be convinced that sharing data offers more opportunities for productive use of information than it does risk for abuse.



It is just a matter of time until the new cliche about DP is how they are reacting to the explosion of minicomputers at the departmental level.

The use of minicomputers makes it all the more critical that DP appropriately handle users during the micro explosion. The cost and control implications will be significantly more serious for minicomputers than they are for micros.

Such issues as upward and downward compatibility, record-level security (that is, the ability to allocate by record who is allowed to access and update the data) as well as communications capability need to be understood and worked out early in the process in order to assure integration between the user and the rest of the DP environment.

The architectural considerations concerning distributed data bases, ownership of records, location and integration of applications programs and communications strategies will all become critical as more users demand and expect access to their data.

The data

Perhaps the first place where users and DP will understand the implications of systems integration will be in the area of data. Access, security, quality, integrity and synchronization of data will determine the success or failure of DP's strategy for dealing with microcomputers.

For many organizations, the issues of data base management have been few and fairly easy to manage so far. A finite number of data bases were managed and controlled by very few technocrats. Suddenly the concept of data access for multiple users opens a rat's nest of problems:

Data definitions: If users are to share data across organizations, systems and applications, a data dictionary approach will be required to manage the process. The data dictionary will need to contain data elements, who owns (and therefore updates) those elements, the commonly accepted definition(s) for those elements, the business rules and edits that apply, where they are used and in what environments (nodes, machines and so on) the elements are required. Without this commonality of understanding about data elements, there is little or no hope of ever being able to integrate data needs.

Data security: Users will quickly become unhappy with having to reenter data that exists somewhere else in the organization.

Depending on the nature of the data, the security issues may in fact impede true data integration until organizational privacy issues are resolved. Many managers are philosophically conservative when it comes to sharing data with middle managers and supervisors or across organizational lines. They will have to be convinced that sharing data offers more opportunities for productive use of information than it does risk for abuse.

Once the organizational issues are resolved, the technical issues regarding access and update will keep the DP department busy for some time.

As mentioned, record-level security is desired for minicomputers to be used in an integrated environment. Managers obviously have a need to access data from numerous data

We just made WORD-11 a native of VAX.

That's right. At Data Processing Design, we've just upgraded our popular WORD-11™ word processing package for DEC™ systems to native mode for VAX.™

Now users of DEC systems can enjoy even faster, more efficient operation. The Version 3.0 WORD-11 package provides easier, expanded system management, and supports new output devices—including laser printers.

By converting WORD-11 from Macro-11™ to full native Macro-32™ mode, we increased its efficiency and made it possible for you to optimize your system resources.

There are more enhancements, too. The new package includes scientific character set support for VT100™ terminals and the Diablo 630 ECS™ printer. Journaling. Military-style paragraph numbering to extend the existing standard outline paragraph numbering system. An advanced system management utility. And support for the Xerox 2700™ laser printer.

And, of course, Version 3.0 still has all the features that over 1500 computer installations worldwide depend on. Such as list processing, built-in dictionaries, automatic table of contents and footnoting, grammatical editing keys, and more.

For more information about WORD-11 Version 3.0, contact us at DPD. We'll be happy to provide complete details.

And point out the benefits of going native.

Data Processing Design, Inc.

[redacted]

CORPORATE OFFICE
1400 North Brasher
Anaheim, CA 92807
(714) 970-1515

NY OFFICE
420 Lexington Avenue, Suite 633
New York, NY 10170
(212) 687-0104

WASHINGTON D.C. OFFICE
4520 East-West Highway, Suite 550
Bethesda, MD 20814
(301) 657-4098

WORD-11 is a trademark of Data Processing Design, Inc.
DEC, VAX, Macro-11, Macro-32 and VT100 are trademarks of Digital Equipment Corporation.
Diablo, 630, Xerox® and 2700 are trademarks of Xerox Corporation.

#1 FOR TSO or VM/CMS
DYNACALC
The fastest and friendliest spreadsheet system
NEW ★Color Graphics ★Database Interface
IMPROVED ★Worksheet Consolidation ★VisiCalc® Support**
COMPARE US TO THE COMPETITION!
For a free 30 day trial call (312) 525-6400
ChicagoSoft 738 N. LaSalle - Suite 2 - Chicago, IL 60610
*Dynacalc is owned by Dynamark Corp.
**VisiCalc is a registered trademark of VisiCorp. VisiCorp is not associated with Dynacalc.

The user will have to be taught the significance of data and its relationship to time. Clearly, this is one of the more difficult challenges the DP department will face in managing the micro environment.

bases, and this need can hardly ever be neatly defined by the same groups of records for each application. For example, the view a user may need to have for on-line inventory or indirect labor may not (and probably does not) match the view the user should have for employee data. This variability will cause problems for the data base manager in terms of providing secure data partitions.

Data integrity: Most well-designed microcomputers provide the capability of down-line loading data to local disks. When this happens, it essentially cuts the user loose from the controlled environment that DP has created. And, if not managed properly, it can result in the user's data being terribly out of synch with the rest of the organization.

The other issue of concern is the ability for more than one user to update data.

The only safe way to deal with both of these issues is through control: controlling the data base so that it is always in synch with itself by developing strict update rules about when and how data changes. In some environments, such as payroll/personnel, a weekly view can be used, while in others, such as inventory control, strict update responsibilities will help with the data integrity.

The user will have to be taught the significance of data and its relationship to time. Clearly, this is one of the more difficult challenges that the DP department will face in managing the micro environment.

Administration: For many years, organizations have tried to ignore the relationship between automation and administration. In reality, an organization cannot successfully implement an automated solution to any problem that is not well-defined from an administrative point of view. The processes that users will invoke to do their work will have a major impact on the timeliness and usability of the resultant data.

More than likely, coordinating the administrative processes with the system will require close teamwork between the organizational entities responsible for each. In many cases, this interface will be new. Groups that are not used to working with each other or taking into account each other's needs will now have to learn how to integrate each other's needs. And, of course, automation may offer new opportunities for improving effectiveness and productivity of administrative processes.

The issue of charter appears to resolve itself best when DP plays the role of manager of information as a resource. "Data resource management" is the catchphrase of the day. DP will define what information, with what business rules, operating in what environments and interfacing with what other environments will be developed and supported. Properly communicated and explained to the users, this approach should result in a "win-win" situation for the organization.

About the Author

Jack Rahaim is corporate manager of personnel administration at Digital Equipment Corp. in West Concord, Mass. Prior to joining DEC 3½ years ago, he worked in the building automation field.

Rahaim is also on the adjunct faculties of Worcester Polytechnic Institute and Mount Wachusett Community College in Gardner, Mass.

Outpaced.*

This DP department doesn't have the skills to stay ahead of new hardware/software developments. DELTAK CAN HELP.

As the pace of technology keeps changing, even seasoned staffers find their skills are falling behind. Meanwhile, applications backlogs are skyrocketing. And in most companies, there's no sign of a departmental staff-up in sight.

That's the problem. So what's the solution?

It all starts with training. You see, a properly planned DP training program can help personnel gain the practical knowledge they need to stay up-to-date. It can also ease applications backlogs by boosting productivity.

And proper training starts with DELTAK. We offer over 800 multimedia and computer-based courses for all levels of MIS professionals, from COBOL programming to database management. And since we're the world's leading DP educator, we can show you the latest ways to keep your people informed and productive.

For all the facts, call or write DELTAK today. And watch the pace pick up right away.

DELTAK
East/West Technological Center
1751 West Diehl Rd., Naperville, IL 60566
(312) 369-3000 (800) 532-7666

*© Copyright 1983, DELTAK, Inc.

SYSTEMS & PERIPHERALS

SIT supermini systems debut

Use multiple microprocessor technology

By Patricia Keefe
CW Staff

SAN DIEGO — Syte Information Technology, Inc. (SIT) has announced its first product, a line of 32-bit networked engineering supermicrocomputer systems said to use multiple microprocessor technology.

Called the Syte Series 3000 Micromainframe, the product line reportedly offers the processing power of a mainframe in a desktop system.

"We intend to prove that multiple, tightly coupled microcomputers with state-of-the-art software technology are superior in performance and price to superminis like the [Digital Equipment Corp.] VAX-11/750 and the VAX-11/780 and low-end mainframes like the IBM 4300 series," Peter J. Shaw, president and chief executive officer at SIT, said.

'Virtual environment'

The Series 3000 Global Environment Manager (GEM) proprietary software reportedly allows the supermicros to run multiple operating systems on the same processor at the same time (with a multiple-window display), permitting the simultaneous use of applications software written for different operating systems, a capability that the vendor claims is an industry first. GEM creates a "virtual environment" giving each user access to the computing power of other stations, as well as to all other resources on the network, including peripherals, according to the spokesman.

The proprietary window-management software in the 3000 series allows vector graphics, bit-mapped graphics and interactive alphanumeric text within an unlimited number of windows on the display screen. In addition, software transportability is ensured among all Series 3000 models. Fortran, Pascal and C languages are available for the system, as is SIT's proprietary version of AT&T's System V, a version of Bell Laboratories, Inc.'s Unix operating system.

Each model in the 3000 series reportedly can perform floating-point calculations as fast as a VAX-11/750 for computer-aided engineering and design, and can also be used for word processing, data processing and other applications.

The Series 3000 proprietary multiple microprocessor hardware also provides performance enhancements such as paging, the vendor said.

Also, each workstation in the Series 3000 is equipped with a National Semiconductor Corp. NS 16000 series microprocessor and Xerox Corp. Ethernet networking capability. Each CPU is a single board said to include the NS 16032 16/32-bit microprocessor for executing code; an Intel Corp. 80186 microprocessor for direct-memory access, network and disk interfacing; and two Intel 8051 microprocessors — one for communications and another for diagnostic processing. Other features include cache memory, high-speed I/O and an Intel Multibus option.

A stand-alone station can be upgraded to local networking without software modifications, and multiple stations can be hooked together into a distributed network.

Engineering-oriented use

The first of the series, the Model 300, will be released later this month and was designed for use with a number of engineering-oriented applications. It consists of a CPU with 1M byte of memory, expandable to 16M bytes; a keyboard; and a 19-in. monitor in either monochrome or color. The monochrome monitor comes with high-resolution graphics (1,024 by 800 pixels); the color monitor has medium-resolution (640 by 480 by 4) bit-mapped graphics.

The end-user list price for the Model 300 is $21,900 with a monochrome CRT terminal; $24,900 for a system with a color monitor. Both systems include GEM, SIT's proprietary implementation of AT&T's Unix operating system and three programming languages. Further models are planned for the first six months of 1984, ranging in price from less than $20,000 to more than $40,000.

SIT, at 11339 Sorrento Valley Road, San Diego, Calif. 92121.

Fifth generation poses challenge

HARD TALK
TOM HENKEL

The fifth generation, a new class of processing systems which promise users high-speed and artificial intelligence capabilities, appears to be the latest challenge to world computer manufacturers. But while this new class of processors may revolutionize the way the world processes data, it also may alter the freedom computer makers have traditionally been able to exercise in offering products to end users.

Research toward the yet-to-be-developed fifth generation of processors has become the biggest political football ever to hit the high-tech business. It's the U.S. against the Japanese, with many government officials contending the U.S. has to remain on top or risk losing its respectability as a world power.

But the issues involved with fifth-generation systems go beyond the traditional one-upmanship that has traditionally been the driving force among vendors of large computer systems. The R&D money required to build a fifth-generation processor is incredible. New architectures, packaging techniques and circuit substrates must be developed. In addition, much research has to be done to understand the concepts of artificial intelligence and how they can be effectively used in a computer system.

The computer industry has been faced with challenges before, but this one is different. The financial incentives that push vendors and entrepreneurs are not as strong with fifth-generation systems as they are with commercial processing systems. Sure, there is a fertile market waiting to scoop up the first fifth-generation

See FIFTH page 64

EMULEX

Emulex Corp. Cuts Prices On Its Line Of Controllers/62

PTC

Paragon Technology Unveils Model 200 CAD System/67

INSIDE

■ IBM-Compatible Matrix, Line-Printers From Ampak/66

■ Power Supply Out for Small Systems/67

■ Memory Expansion Board for Multibus Systems/67

■ Security Device Protects Processors, Peripherals/66

■ Editing Terminal Gets Full-Page Display/62

Sperry terminal adds graphics to UTS 4000 line

BLUE BELL, Pa. — Sperry Corp. has expanded its UTS 4000 family of communications terminals by adding a programmable terminal with color graphics capabilities. The new unit was designed with a wide range of ergonomic features and reportedly can function as a personal computer, using Digital Research, Inc.'s CP/M 68K operating system.

Called the UTS 60, the unit comes with eight standard colors with another eight colors optional. The graphics capabilities can be used either on-line to a Sperry Series 1100 mainframe or in a stand-alone capacity using Sperry's Business Graphics Utility (BGU) package, the vendor said.

On-line graphics are provided as part of the Sperry Mapper applications development software. Hard copies can be obtained on any of three optional printers. When operating in a stand-alone capacity, the Dot Graphics Feature can be added for drawing lines, polygons, arcs, sectors, rectangles and circles in any of 16 colors. It is said to deliver 51 dot/in. both horizontally and vertically and runs in conjunction with BGU.

The UTS 60 features the 16/32-bit Motorola, Inc. 68000 microprocessor as its CPU and Zilog, Inc.'s Z80 as a secondary processor to control peripherals and the video section of the system. Other features include a low-profile keyboard; improved focus; a standard memory of 128K bytes, expandable to 2M bytes of error-correcting code memory; a CRT with a 14½-in. diagonal screen providing 80 char./line width; and data transmission at up to 9,600 bit/sec.

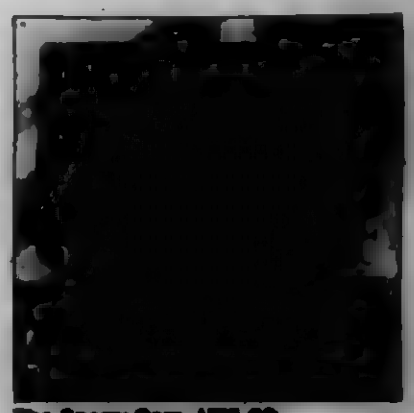
Several optional program products are available for the UTS 60 for a one-time fee. These include an edit processor ($1,080), a file-transfer utility ($1,200), diskette file utility ($600), BGU ($2,820), UTS Cobol ($3,990) and a character set utility ($1,200).

Two other utilities — the TTT Communications Utility ($50) and the Uniscope Communications Utility ($50) — are available for the CP/M 68K operating system.

Optional peripherals

Optional peripherals for the UTS 60 include the Model 31 correspondence-quality printer ($2,025, plus $30/year for maintenance); the Model 25 matrix character printer ($1,275, plus $38/year for maintenance); the Model 35 matrix printer with optional color and graphics features ($3,900, plus $40/year maintenance); and the Model 8441 mass storage subsystem ($3,940, plus $40/year maintenance).

The UTS 60 costs $5,995, which



The Sperry Corp. UTS 60

includes display keyboard, 8430 diskette subsystem and terminal control program, according to the vendor. Maintenance for the UTS 60 is $47/mo.

Sperry, P.O. Box 500, Blue Bell, Pa. 19424.

SYSTEMS & PERIPHERALS

TURNKEY SYSTEMS

ANN ARBOR TERMINALS, INC.
Guru

Ann Arbor Terminals, Inc. recently announced a full-page-display model of its Guru text editing terminals with 28K bytes of display memory, a user-definable display of up to 66 lines of 170 col. and memory of as many as 250 lines of up to 255 col.

The portrait-display Guru includes a variety of editing commands, including erase character, area, field, line and display; insert or delete character or line; push or pop line; insertion and replacement modes; and set editing extent, a company spokesman said.

A "zoom" feature reportedly allows users at a keyboard to move data on or off the screen for trade-off in character size and amount of data displayed. The terminal memory can be bidirectionally scrolled through as one large file or divided into software-defined pages, the spokesman said.

According to the company, the portrait-display option features a 15-in. CRT housed vertically to give the display the appearance of an 8½- by 11-in. page, and a Digital Equipment Corp. mode option permits the Guru to be used with standard DEC VT100 and VT52 terminal software.

The portrait-display model is priced the same as the standard Guru model at $2,395; delivery takes 30 days.

Ann Arbor Terminals, 6175 Jackson Road, Ann Arbor, Mich. 48103.

PROCESSORS

SIGNAL PROCESSING SYSTEMS, INC.
SPS-1000

Signal Processing Systems, Inc. (SPSI) has unveiled a data flow multiprocessor said to interface multiple processors and I/O devices through a smart memory. It also provides an overall control structure for high-speed, real-time applications, the vendor said.

Programmed in Fortran, the SPS-1000's smart memory acts as an address-generating processor to store and retrieve data and control streams for up to 15 attached processors. Byte-sliced and available in 8-, 16-, 24- and 32-bit configurations, the SPS-1000 reportedly can achieve computation rates to 1G operation/sec.

The SPS-1000 data flow processor, including block diagram compiler, is priced from $70,000, depending upon configuration.

SPSI, 223 Crescent St., Waltham, Mass. 02154.

AUTOCONTROL, INC.
Autolan

Autocontrol, Inc. recently announced a multiuser computer system that uses the Intel Corp. 8086 microprocessor and that reportedly allows a network of up to 255 addressable workstations.

Each workstation in the Autolan system may access disks and printers on all other workstations or may have its own disk storage system and printer, a company spokesman said.

Using a transmission rate of 848K bit/sec, the system allows disk space to be shared or assigned exclusively as needed, the spokesman said.

A basic system includes a Kaslak, Inc. AMX processor with 80K bytes of memory, 10M-byte hard disk drive, 5¼-in. double-sided floppy disk drive with 770K bytes of storage, two serial ports and Autolan software in programmable read-only memory. The basic system is priced at $4,395, with additional workstations available for $1,795 each.

Autocontrol, 11400 Dorsett Road, St. Louis, Mo. 63043.

DATA STORAGE

EMULEX CORP.
Controller price cuts

Emulex Corp. has reduced prices on a number of its disk and tape controllers for Digital Equipment Corp.'s Q-bus.

With savings ranging as high as 33%, the following models are included in the new pricing structure:

- The SC02 small/medium disk controller for use with DEC LSI-11 through LSI-11/23 Plus series of Q-bus computers. List price has been decreased 33%, or from $2,200 to $1,500/unit.
- The SC03 large disk controller for the Q-bus operating on the LSI-11/23 Plus. List price has been reduced 29%, or from $2,800 to $2,000.
- The TC02 tape coupler. List price has been reduced 33%, or from $1,800 to $1,200.
- The UC01 emulating host adapter. List price has been reduced 21%, or from $1,900 to $1,500/unit.

Emulex, P.O. Box 6725, 3545 Harbor Blvd., Costa Mesa, Calif. 92626.

TERMINALS

TELERAY, INC.
Model 72

Teleray, Inc. has announced an emulating terminal that is said to be fully software-compatible with both Digital Equipment Corp.'s VT102 and Data General Corp.'s D200 terminals. The Model 72 was developed to provide a single terminal for installations that run both DEC and DG CPUs, the vendor said.

Either of the Model 72's resident emulations can be called from its VT102/D200-compatible keyboard. Also, 32 (64, shifted) of its keys reportedly can be defined, with up to 8-char. sequences, to meet specific applications needs or user preferences.

The Model 72's two- (optionally four-) page display memory, either volatile or nonvolatile, can be reformatted by the user or processor to accommodate spreadsheets, tab listings or text, varying from a single page of

Continued on page 84

JES, RJE SUPPORT FOR 32XX PRINTERS!

Make Your Selection The One That Playboy, ITT Financial and Others Found So Productive.

Some of the major features of SYSD® are:
- Full screen PDS editor
- SPOOL Display
- SPOOL print to 32XX printer
- Automatic and selective printing
- Standard FCB forms control
- Job submission and status displays
- Data set utilities
- Low overhead
- VS1, MVS, CICS

Here's Three Good Reasons Why You Should Call Today:
- 30-day free trial
- SYSD is site licensed at $8,500
- SPOOL display/print (H&W's CPMS™ component) is licensed at only $5,880

CALL: (208) 377-0336

H&W

H&W Computer Systems, Inc. P.O. Box 4785, Boise, Idaho 83711-4785

CICS Solutions

Computerworld/Mexico talks to computer people south of the border.

There are currently 15,000 installed computers on 12,000 sites in Mexico. These include mainframes, medium and small computers as well as personal computers. Experts forecast the sale of small, medium and large computers to grow at an average annual increase of 20% during the 1980s, despite Mexico's current economic problems. Minicomputers will be in great demand since they are small, affordable and efficient. U.S. manufacturers have maintained a 80% market share for the past three years with sales of over $182 million. Computerworld/Mexico can bring your message to 10,000 key-decision makers in the Mexican computer community. Published on alternate Mondays, Computerworld/Mexico covers all the latest developments in hardware, software and terminals in addition to data processing and computer related subjects. Its goal is to provide useful information to data processing professionals throughout Mexico and Central America.

CW International Marketing Services is your one-stop advertising service in countries around the computer world. For more information on Computerworld/Mexico and the people who read it, just fill out and return the coupon below.

Diana La Pierraglia Manager, International Marketing Services
CW COMMUNICATIONS/INC.
375 Cochituate Road, Box 880,
Framingham, MA 01701
(617) 879-0700

CW COMMUNICATIONS/INC. Publishers of Computerworld and other leading computer publications around the world.

Please send me more information on:
☐ Computerworld/Mexico ☐ Your other foreign publications

Name _____ Title _____
Company _____
Address _____
City _____ State _____ Zip _____

"My old mainframe and my new word processor aren't on speaking terms."

Stop the shock...with Exxon office automation.

Today, many companies are shocked to discover that their electronic office machines can't talk to one another.

A shockproof system

That's why Exxon's products are designed to be part of a fully integrated, communicating office system. With a few simple keystrokes, you can initiate communications that take you just about anywhere you want to go.

Without the problems. Without the shock.

Exxon speaks your language

With communications options, our information processor can interact with most mainframe computers—and even function as a 3270 terminal. So it's easy to access your corporate data base, and retrieve the data you need.

In fact, you can even gain access to countless libraries of information, such as Dow Jones News/Retrieval® and THE SOURCE.℠ Or even send information via the Telex/ TWX® Network.

Build a shock-resistant office

Exxon's fully integrated line of information processors, controllers, and impact or ink jet printers work together to create one of the most flexible office systems available.

For more information

Call 800-327-6666, or write Exxon Office Systems, P.O. Box 10184, Stamford, CT 06904. We'll be happy to show you how our fully integrated office automation system with advanced communications can help shockproof your office.

EXXON OFFICE SYSTEMS

The future...without the shock.

Dow Jones News/Retrieval® is a registered trademark of the Dow Jones Co. THE SOURCE℠ is a service mark of Source Telecomputing Corporation, a subsidiary of The Reader's Digest Association, Inc. Telex/TWX® is a registered trademark of Western Union Telegraph Company.

SYSTEMS & PERIPHERALS

FIFTH from page 82

processors, but that market is made up of government agencies, many of which are top secret. There are few, if any, commercial firms waiting for someone to develop a fifth-generation processor.

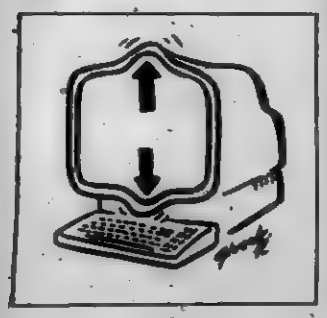
After all, what is the average DP executive going to do with very fast, artificially intelligent processors? The machines are going to be outrageously expensive, and they are not going to do accounts payable and receivable. The powers promised by fifth-generation technology may someday benefit commercial computer users, but initially they will be used to design weapons and manage missile guidance systems.

So guess who is pumping the most money into fifth-generation research projects? Government organizations like the Defense Research Projects Agency, which admits its primary interest in new technologies, particularly those employing artificial intelligence, is to build better defense systems.

Why not let the most likely users of fifth-generation processors foot the bill for their development? In theory that sounds fine. But it also marks a major change in the way U.S. companies do business. The government has always played a big role in pushing technological developments, while at the same time there has always been a separation between government and business. But in the case of fifth-generation technologies, it appears to be orchestrating many projects.

What happens if the lure of government fifth-generation funding becomes more appealing? Will the government, in effect, have control over the computer market? And what happens if the government money suddenly dries up? Not only will lots of researchers be left out in the cold, there will be many research projects which do not offer an immediate application in the commercial sector.

This may account for why many computer makers have steered away from embarking on fifth-generation projects. The investments required are very high, and while there is potential for developing very important commercial products from military projects, the payback appears to be better than 10, possibly 20, years off.



Continued from page 82

255-col. lines to 28 pages of 10-col. lines, or any other line/page combination within memory capacity. Other features include a 256-char. input buffer; two bidirectional, buffered RS-232 ports; five display attributes, seven area qualifiers, 224 displayable characters and a nonvolatile memory function, the vendor said.

Available in three CRT sizes (9, 12 and 15 in.) and three phosphors (white, amber and green), the Model 72 costs $1,535 in the 12-in. model.

Teleray, 6425 Flying Cloud Drive, Eden Prairie, Minn. 55344.

PARADISE SYSTEMS, INC.
Convertible

Paradise Systems, Inc. has introduced the Convertible, a device that converts any Ascii synchronous terminal into a personal microcomputer.

The Convertible has a built-in 256K-byte random-access memory (RAM) disk that, according to the vendor, delivers up to 10 times the speed of regular microcomputers. The user of Convertible then has access to productivity software available for microcomputers using Digital Research, Inc.'s CP/M operating system, converting data formats from one personal computer to another.

Convertible is reportedly able to read 5¼-in. diskettes formatted for a variety of personal computers.

Two RS-232C serial ports and one bidirectional Centronics Data Computer Corp. parallel port enable Convertible to connect to printers and other devices using the standard industry interfaces.

Single-sided, double-den-

"TIS GIVES BEST WESTERN INTERNATIONAL NEXT GENERATION TECHNOLOGY."

SYSTEMS & PERIPHERALS

sity disks are standard; double-sided are optional.

Users of the product can download large files from mainframe computers, edit or modify as needed at the terminal and then send the information back in its new form. Transmission rates range from 110 to 19.2K bit/sec, the vendor said.

According to the vendor, the product weighs 8 lb and is the size of a large book.

The Convertible costs approximately $1,000.

Paradise Systems, 150 N. Hill Drive, Brisbane, Calif. 94005.

SAGE COMPUTER TECHNOLOGY, INC.
Terminal; Winchester disk drive

Sage Computer Technology, Inc. has announced an ergonomic terminal available for all Sage microcomputers using a 40M-byte disk drive.

The terminal features a tilt-and-swivel screen with a 12-in., 24- by 80-col. wide, monochromatic (green or amber) high-resolution display. Medium-resolution business graphics are optional. Also included is a detachable alphanumeric keyboard with 96 Ascii character set and a compact 12¼- by 16¾-in. footprint.

The 40M-byte, 5¼-in. Winchester disk drive with 256K bytes of random-access memory has been added to the Multiuser Sage IV system. This reportedly doubles previous storage capacity and provides the option of 12M, 18M or 40M bytes of storage. It includes a 64K-byte floppy disk.

The terminal (No. PH0021) costs $590. The Winchester drive with floppy disk (No. SC0044) lists for $10,900, a spokesman said.

Sage Computer Technology, 4905 Energy Way, Reno, Nev. 89502.

PRINTERS/PLOTTERS

AMPAK BUSINESS SYSTEMS, INC.
ABS 400, 600, 1000 and 1500 band printers; ABS 150, 300, 600 matrix printers

Ampak Business Systems, Inc. (ABS) has announced a line of high-speed band and matrix line printers for IBM processors.

The ABS 400 band printer reportedly emulates an IBM 5225 matrix printer and replaces IBM 5211, 3262 or 5225 printers. It features a 400 line/min typical print rate (64-char. band); near-letter-quality printing; and 48-, 64-, 96-, 128- or 192-char. set capabilities. The unit costs $8,795, the vendor said.

The ABS 600, 1000 and 1500 band printers operate at 600, 1,000 or 1,500 line/min, respectively. They reportedly emulate the IBM 5225 and can be used in place of IBM's 5211, 3262 or 5225 printers.

Other features include operator-interchangeable bands, LED status display, self-test and long-life ribbon cartridge. The ABS 600 costs $9,750, the Model 1000 costs $14,395 and the Model 1500 costs $22,995, the vendor said.

The ABS 150, 300 and 600 (line/min) matrix printers cost $5,195, $7,395 and $9,195, respectively.

Features of this line include IBM 5225 emulation, a 9 by 9 dot matrix with descenders, double-height characters and optional graphics capability, according to the vendor.

Ampak Business Systems, 2640 Walnut, Tustin, Calif. 92680.

DAISY SYSTEMS HOLLAND BV
M20

Daisy Systems Holland BV has announced the M20, a letter-quality printer.

The M20 reportedly features a variety of interface control codes and is compatible with many other printers, including most Diablo Systems, Inc., Qume Corp. and NEC Corp. printers. Also, the units interact with virtually all computer/software combinations, the vendor claimed.

The Daisy M20 was designed for bidirectional printout, reportedly achieving 20 char./sec.

The Daisy M20 is priced at $990, according to a spokesman for the vendor.

Daisy Systems Holland BV, P.O. Box 1010, Torrance, Calif. 90505.

TIS

"TIS™ is truly a remarkable software system. With TIS operating at both the Strategic and Tactical levels of our organization, we now have a sophisticated software system capable of evolving as the needs of the company evolve. As far as I'm concerned, TIS is giving Best Western International the kind of next generation technology we need."

—Keith Barlow

Best Western International is the world's largest lodging chain. In the fast-paced lodging business, total control of accurate and timely information is no luxury. It's a vital necessity. For this reason, Best Western demands advanced software that can grow as its needs grow.

The TIS Solution

After a careful evaluation of several systems, Best Western chose TIS—Cincom's powerfully integrated data base management and application development system and winner of the Associated Information Managers' (AIM) Outstanding Information Technology Award.

TIS was brought up quickly. It was first used in a Strategic capacity to implement corporate payroll and personnel applications. Now, TIS is being used in both Strategic and Tactical operations throughout Best Western International to develop applications for financial, marketing, supply and other functions.

And, because the TIS Intelligent Query language provides easy access to corporate information, end-users are discovering that they can meet their own information needs without the aid of trained programmers.

TIS helped solve Best Western's immediate needs. More importantly, with TIS Best Western International now has a migration path to the future —with little concern for obsolescence.

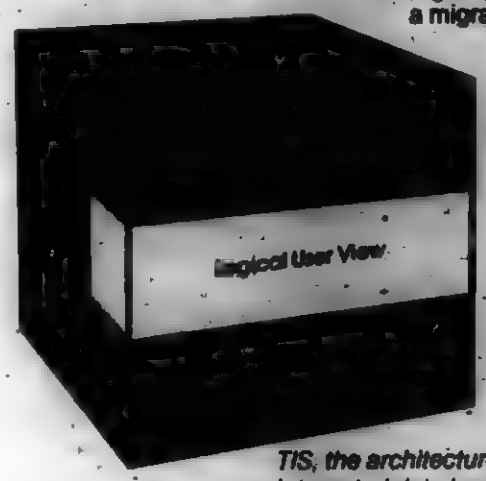
Modern Technology For Modern Needs

TIS is a totally integrated application development and information processing system. Its entirely new architecture is designed to meet a wide range of needs. Designed for complex, high volume data base environments, TIS provides:

- Full in-line integration, so that one system can be used to meet the needs of all users with unprecedented security and control.
- A relational view of data which gives programmers and end-users complete data structure independence.
- A powerful 4th Generation procedural language to serve requirements of both programmers and end-users.
- A new Data Manipulation Language so powerful only four commands are needed to handle even the most complex logical data base processing: GET, INSERT, UPDATE, DELETE.
- An Intelligent Query language to provide instant information to end-users for virtually all ad hoc needs.
- A new DBMS component that provides unique data structuring capabilities with high performance.

Check Into TIS For Your Company's Needs

TIS is giving Best Western International a migration path to the future. Isn't it time to find out what TIS can mean to the future of your company? For more information, or for answers to your specific questions, contact our Marketing Services Department, 2300 Montana Avenue, Cincinnati, Ohio 45211.



800-543-3010

(In Ohio: 513-661-6000)
(In Canada: 416-279-4220)

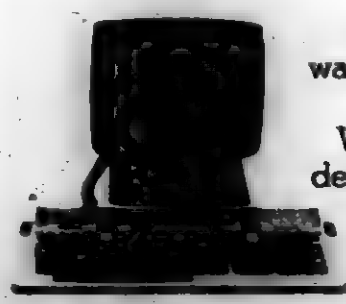
TIS, the architecture of the next generation of integrated data base technology.

Cincom Systems

Excellence in Software Technology.

TIS is a trademark of Cincom Systems, Inc.

WITH DATA GENERAL, YOU WON'T BE A PRISONER OF YOUR IN-BOX.



DATA GENERAL INTEGRATED OFFICE AUTOMATION

Burying information under a ton of mail at the bottom of your in-box is not the best way to get it when it's critical to a decision.

ELECTRONIC MAIL

With Data General's CEO® Comprehensive Electronic Office, information is delivered electronically. Instantly. Unerringly.

But that's only the beginning.

TOTAL OFFICE AUTOMATION

The CEO system automates just about everything in your office. CEO electronic filing files the way you do. Its electronic calendar keeps tabs on trips, appointments, and meetings—even confirming them all.

Of course, CEO includes easy-to-use word processing. And all this is integrated with data processing for total decision support.

DON'T DUMP YOUR EXISTING EQUIPMENT

Best of all, instead of having to dump your existing equipment to automate your office, you can build the CEO system around it.

Because it not only ties in with other Data General computers, but it also ties in with the most widely-used mainframe and word processor.

Instead of just a series of personal computers, each CEO workstation becomes part of a global network, with access to data from IBM mainframes.

AS LITTLE AS $5,000 A WORKSTATION

And with the CEO system, the cost per workstation can be as low as $5,000, depending on application.

CALL NOW

For more information on office automation that's a generation ahead, call: **1-800-554-4343, Operator 05A** or write Data General, M.S. CEO 05A, 4400 Computer Drive, Westboro, MA 01580.

Data General
a Generation ahead.

Copyright 1983 Data General Corporation, Westboro MA CEO is a registered trademark of Data General Corporation

SYSTEMS & PERIPHERALS

POWER SUPPLIES

BITS POWER SYSTEMS, INC.
Model UPS 200, 400

Bits Power Systems, Inc. has announced two uninterruptible power supplies that it says can be permanently on-line for small system users.

Model UPS 200 and Model UPS 400 are said to provide dedicated, continuous and isolated electrical power by using utility line power to maintain a full charge on internal gel-type batteries.

The units reportedly have visual, audible and remote alarm functions and a standard battery monitor. Standard full-load back-up time is said to be 10 minutes, although external 12-volt batteries may be plugged into the units for extended back-up time, the vendor said.

The Model UPS 200, a 200W unit, is priced at $795. The Model UPS 400, a 400W unit, is priced at $995.

Bits Power Systems, Suite B114, 11020 Audelia Road, Dallas, Texas 75243.

SAFT AMERICA, INC.
AC line conditioner; electromagnetic interference filter; transient voltage surge suppressor

The Electronic Systems Division of Saft America, Inc. has introduced a line conditioner to correct high- and low-output voltages, an electromagnetic interference filter and a surge suppressor for minis and microcomputers.

The Saft AC Line Conditioner reportedly provides power line isolation and regulation while suppressing high-voltage pulse energy and interference noise. It is said to adjust output voltage even if an electrical utility should drop the voltage. It is designed to filter out noise spikes and electromagnetic spikes, which could cause the system to lose memory, the vendor said.

The unit is rated at 500Vac and features a 3% harmonic distortion maximum for a resistive load, the vendor said.

The Saft Electromagnetic Interference Filter is said to suppress high-voltage pulse noise and medium- to high-frequency noise. It reportedly has a normal-mode attenuation of 40db-plus and a common-mode attenuation of 35db, the vendor said.

The Saft Transient Voltage Surge Suppressor is said to be a two-stage, high-energy clamping protector for equipment operated off a power line. It is designed for a response time faster than five nsec. It reportedly has a threshold level of 240V, with instant recovery.

All three products are scheduled for late January deliveries. The line conditioner is priced at $895, the interference filter at $39.95 and the surge suppressor at $149.

Saft Electronics Division, 3414 W. 14th St., Tempe, Ariz. 85281.

BOARD-LEVEL DEVICES

ADVANCED MICRO DEVICES, INC.
Am96/5282

Advanced Micro Devices, Inc. recently announced a memory expansion and I/O expansion board said to be compatible with Intel Corp.'s Multibus.

The Am96/5282 provides sockets for up to 256K bytes of erasable programmable read-only memory (Eprom), 128K bytes of random-access memory or 32K bytes of electrically Eprom, a spokesman said. The I/O portion of the board reportedly includes one RS-232C synchronous/asynchronous serial port, a parallel interface with 24 lines, counter/timers, a programmable interrupt controller and a connector permitting customized I/O.

The board can support 8- and 16-bit microprocessors by providing 20- and 24-bit addressing, 8- and 16-bit memory data and 8- and 16-bit I/O addresses. The product is priced at $995.

Advanced Micro Devices, 901 Thompson Place, Sunnyvale, Calif. 94086.

PARAGON TECHNOLOGY CORP.
Paragon Model 200

Paragon Technology Corp. (PTC) has introduced the Paragon Model 200, the second in a family of turnkey color computer-aided design (CAD) systems said to be closely tailored to the needs of printed-circuit board designers.

The multitasking Model 200 uses software developed by PTC's Swiss affiliate, EIE. The system reportedly is built around a 20-MHz Digital Equipment Corp. LSI-11/23 minicomputer with an independent 16-bit proprietary graphics processor. It offers 256K bytes of memory, enabling the user to design complex boards that measure up to 32-in. by 32-in. and contain as many as 500 equivalent integrated circuits and 64 layers.

The interactive Model 200 includes a 19-in., high-resolution 64-color display with pan and zoom features, a 20M-byte Winchester disk drive for archival storage and an 8-in. floppy disk drive, the vendor said. A separate video display console permits data entry and system control, while a desktop printer can be used to produce documents required for manufacturing.

The Model 200, which includes PCD II, printed-circuit design software, a line printer and a factory training course, costs $59,950.

PTC, 2190 Norse Drive, Pleasant Hill, Calif. 94523.

See [illegible] page 68

COMMUNICATION NETWORKS '84 offers you 100 solutions to your post-divestiture telecommunication problems.

Charles Wohlstetter, Chairman, CEO, Continental Telecom, Inc. Keynote

P.S. Pignlatelo, AT&T Information Systems Viewpoint

Mimi Dawson, F.C.C. Policy

Howard Anderson, The Yankee Group Futures

Amy D. Wohl, Advanced Office Concepts Micro Networks

As telecommunications and data processing managers, your success depends on keeping up to date with changing technologies. At COMMUNICATION NETWORKS you can choose from 100 information-packed sessions designed to help you succeed.

You'll learn how to survive the transition into the competitive telecommunications environment resulting from the AT&T divestiture. You'll discover new applications in Local Networks, Satellite, Bypass/DTS, Public and Private Data Networks, Interconnection, Micro Networking and new management technologies.

COMMUNICATION NETWORKS gives you twelve sessions focusing on "Network Technologies." Thursday, February 2, is "Microcomputer Networking Day," a full day devoted to teaching you how to get more from your PC than just stand-alone applications.

You may even choose to develop specific skills in one of the nine full-day "In-Depth" seminars. "In-Depth" seminars will be held on January 30, one day prior to the official opening of COMMUNICATION NETWORKS.

In just five years, COMMUNICATION NETWORKS has become the leading professional communications conference and exhibit in the nation. And COMMUNICATION NETWORKS '84 promises to be even better than ever—more sessions, more speakers, more exhibitors including American Satellite Co., AT&T Information Systems, COMSAT, Digital Equipment Corp., General DataComm Ind., General Electric Co., Integrated Communication Systems, General Electric Co., Microwave Link Operation, GTE Business Communications Systems, GTE Sprint Communications Corp., Harris Corp., DTS Div., Hewlett-Packard, M/A-COM, Mohawk Data Sciences, Northern Telecom, Inc., Scientific-Atlanta, Inc., Siecor Corp., 3M Business Communication Products, Ungermann-Bass, Inc., Uninet, United Technologies Communications Co. and many more offering the latest in products and services.

The DEC Rainbow 100+. The Rainbow 100+ system unit features 256A and 8088 microprocessors, a 10 MB Winchester hard disk, a dual floppy diskette with 400 KB capacity and synchronous communications, built-in terminal emulator, printer port and 128 KB of system memory.

As an added plus for CN '84 attendees . . . you'll have a chance to win a DEC Rainbow 100+ Computer System.

COMMUNICATION NETWORKS '84, will take place at the Washington Convention Center in Washington, D.C., the telecomm capitol. It will be held on January 31 - February 2, 1984.

Call toll-free 800-225-4698 (in MA, 617-879-0700) for more information. Or fill out and return the coupon below.

COMMUNICATION NETWORKS Conference & Exposition

Washington, D.C. · January 31–February 2, 1984

The Sixth Annual Communication Networks Conference & Exposition for the Telecommunications Business Professional

Washington Convention Center, Washington, D.C.

Register today!

Call 1-800-225-4698 or fill out this coupon and return it. We'll be glad to bill you or your company.

Name _____

Title _____

Company _____

Address _____

City _____ State _____ Zip _____

CW

SYSTEMS & PERIPHERALS

BOARD from page 67

INTERSIL SYSTEMS, INC.
ISB-3430

Intersil Systems, Inc. has announced the addition of the ISB-3430 CRT controller and keyboard/light pen interface card to its STD bus product line.

According to the vendor, the light pen interface can be used in a variety of applications.

The ISB-3430 is an STD bus-compatible card that provides the user with a general-purpose, 80- by 24-char. alphanumeric and character graphics generator, the vendor said.

The board features transistor-to-transistor-level video with separate vertical and horizontal synchronization. A user-programmable, electrically programmable read-only memory for special character generation is also included.

Other features include inverse video, half-intensity and blinking display, hardware scrolling and programmable video parameters. In addition, the card provides an 8-bit parallel input port and strobe, the company said.

The ISB-3430 is available now for $364.

Intersil Systems, 1275 Hammerwood Ave., Sunnyvale, Calif. 94086.

RELIANCE ELECTRIC CO.
Model 45C92

An intelligent memory module designed to provide nonvolatile, off-line program storage for Reliance Electric Co.'s (REC) Automate 15 programmable controller is now available from that vendor.

The Model 45C92 is said to be a memory-duplication storage-and-loading device that allows users to copy, store and load programs from the Automate 15. Off-line programming capability is provided when used with REC's Mini Programmer and Intelligent CRT Programmer, the vendor said.

Also, a 2K-bit by 8-bit nonvolatile memory provides memory storage integrity without the need for battery backup and is large enough to copy any Automate 15 application program, the vendor said. It connects to the Automate 15 and its programming devices via a 25-pin, D-shell connector on their serial communications ports. The Model 45C92 costs $110.

REC, 4900 Lewis Road, Stone Mountain, Ga. 30083.

AUXILIARY EQUIPMENT

CUSTOM SYSTEMS, INC.
BMX-1

Custom Systems, Inc. has announced a disk controller for Data General Corp. users.

Plug-compatible with the burst multiplexer channel on DG minicomputers, the BMX-1 is said to allow users to select any storage module drive-interfaced disk drive for use with the DG S-140, S-280 and MV series of processors.

The BMX-1 has four disk drive connect ports with software-configurable drive characteristics on a port-by-port basis. The unit uses electronically erasable programmable read-only memory technology, which Custom Systems said eliminates the need for switches and makes all functions configurable via downline-loaded software.

The BMX-1 features an on-board 32-bit error-correcting channel for error detection with burst error correction to 11 bits in length.

The BMX-1 controller is priced at $4,995 with quantity discounts available.

Custom Systems, 5850 Shady Oak Road, Eden Prairie, Minn. 55344.

ANCHOR PAD INTERNATIONAL, INC.
Crime Stopper

Anchor Pad International, Inc. (API) has announced a device said to prevent theft of computer time and unauthorized use. Together with the vendor's Security System, it protects the processor and its components from being physically stolen.

Crime Stopper aids security by preventing unauthorized persons from even putting the computer on-line, the vendor said. It can be used either as a stand-alone measure or in conjunction with the Security System. Crime Stopper is similar in concept to a bank's automatic teller machine and is available in two styles — allowing access by key or magnetic card, the vendor said.

Crime Stopper reportedly also controls the processor's monitor disk memory and printer. Other features prohibit thieves from unplugging the hardware. The product also protects equipment from power line surges or high-frequency noises, the vendor said.

Crime Stopper retails for $100 when used as a key-access device or $150 to $300 when used as a card reader. Prices can vary depending on user specifications.

API, 3224 Thatcher Ave., Marina Del Rey, Calif. 90291.

BELDEN/CPD
Power supply cords

Belden/CPD has introduced eight electric power supply cords, each with an Underwriters Laboratory temperature rating of 105 C.

The power cords come in unshielded or shielded models. The shielded models have a Beldfoil shield, a thin layer of aluminum foil bonded to a polyester film.

The cord conductors feature a box-contact design which prevents any molding compound from entering the contact area and results in enhanced electric performance, low temperature rise and additional mechanical strength, according to the vendor.

The cords are two meters in length and have a power rating of 1,250W, 10A and 125V, the vendor said.

The eight cords range in price from $4 to $5.

Belden/CPD, 2000 S. Batavia Ave., Geneva, Ill. 60134.

NATIONAL COMPUTER COMMUNICATIONS CORP.
Rental plan

National Computer Communications Corp., a distributor of microcomputers, CRTs, printers and modems, has announced a rental plan for selected products.

Formerly, the vendor sold products to end users or provided one-, two- or three-year leases. The distributor has introduced a month-to-month rental program said to allow end users to enter an agreement for equipment needed for a minimum of 30 days. Products available under this rental program include the Digital Equipment Corp. LA120, LA12, LA34, LA36 and VT220. Several Racal-Vadic, Inc. modems as well as Texas Instruments, Inc. terminals, Computer Devices, Inc. terminals and teletype terminals are also available.

National Computer Communications, 260 West Ave., Stamford, Conn. 06904.

New Inmac Catalog jam-packed with computer/wp supplies.

Yours free!

For fastest delivery of your free 160-page Inmac catalog, call 1 (800) 547-5444. 1 (800) 547-5447 in California.

Inmac Catalog Dept., 2465 Augustine Drive, Santa Clara, CA 95051
Please forward the Inmac catalog to my home address.

( ) PHONE
NAME
COMPANY
ADDRESS
CITY STATE ZIP

112112

Move up from your System/34 without losing your investment.

Why rewrite your software just because you've outgrown your System/34? With the ESCAPE/34 software package developed by Database Systems Corp., you can migrate all your System/34 applications to the Prime 50 Series of 32-bit computers. ESCAPE/34 makes up to 95% of your RPG II statements compatible with Prime. Any remaining statements are automatically flagged for you.

Then once you're in the Prime family, you'll never have to worry about growth again. All our computers are fully compatible, clear up to a system with 16Mb of memory and 5 billion bytes of storage. And you can keep growing, with the most versatile networking in the industry, fully integrated office automation software, extensive CAD/CAM capability, and over 1,000 third-party applications.

Send the coupon today for more information, or call our toll-free number. And help us save your software investment.

1-800-343-2540 In Mass., 1-800-322-2450

Yes, I want to save my software!
Send me the ESCAPE/34 brochure and a free "Save the Software" button.
Have a Marketing Representative call.
Name
Title
Company
Street
City State Zip
Telephone

Send to: Prime Computer, Inc.
Prime Park, MS 15-40
Natick, MA 01760

PRIME

CW1 16 84

MICROCOMPUTERS

Communications lacking in micros

MICRO BITS

THOMAS W MADRON

By Thomas Madron
Special to CW

Microcomputer communications programs abound — unfortunately most of them are inadequate for long-term use in large organizations.

The demands made on microcomputer communications are different for organizations than for individuals, and little of the difference is reflected in the many terminal programs available for almost any currently produced microcomputer. A discrepancy exists between software and hardware manufacturers in the audiences being targeted for micro communications. The perception of software manufacturers is undoubtedly that the primary market for communications programs lies in the personal (read: home) computer market. The major micro manufacturers, however, have clearly targeted large organizations as their primary market.

There also seems to be something of a problem revolving around the computing experiences of those designing microcomputer communications software. Many programmer/analysts seem to have had experience only on micros, or at best, on minis such as Digital Equipment Corp.'s VAX-11/700 series machines. The result of such experience (or inexperience) is a misperception of the needs for communications in large organizations and the production of communications software with an inability to communicate adequately with large IBM or IBM-compatible mainframes.

Most large organizations require some communications with IBM-style systems and many also require communications

See MICROS page 70

Turnkey out for Wang micros

Provides access to IBM mainframes

LOWELL, Mass. — Wang Laboratories, Inc. has introduced a turnkey product said to allow its Professional Computer or PIC professional image computer to access instantly an IBM mainframe data base when attached to an IBM 3270 terminal network.

Equipped with the 3278 Emulation Board, a Wang Professional Computer or PIC reportedly becomes an intelligent workstation replacement for a 3278 terminal, while maintaining the ability to operate concurrently and independently of host programs.

In addition to being a stand-alone system, the Professional Computer can be upgraded to a PIC, serve as a Wang Office Information System or VS workstation, be connected via a local interconnect option, attach to Wangnet and emulate non-Wang terminals, the vendor claimed.

Once the board is installed, a Professional Computer or PIC can attach in native mode to an IBM 3270 terminal network. Modems, telephone lines or special cabling are not required. Also, both IBM's Binary Synchronous Communications and Systems Network Architecture/Synchronous Data Link Control protocols are said to be supported.

Further, a Professional Computer or PIC with the emulation board has total display-symbol compatibility with all 3278 terminals on the network. When either microcomputer is in emulation mode, the 3278 Emulation Board maintains an image of the 3278 screen. This screen image is immediately retrieved and displayed when a user returns from local programming to 3278 emulation mode, the vendor said.

The board occupies only one I/O slot on the Professional Computer's chassis and does not reduce the amount of memory available to the user. Also, the microprocessor control program for the board resides on diskette. Other features include menu access to full screen host applications, verification of line activity and condition and an independent, on-board, serial RS-232 interface, said to alleviate the need for an IBM synchronous communications adapter board and to free an I/O slot normally required for such an interface.

Available as a stand-alone product or as an attachment to the Wangnet Cmux-3270 cable multiplexer, the 3278 Emulation Board is priced at $1,095.

Wang, 1 Industrial Ave., Lowell, Mass. 01851.

Nanostar 10 supports nine users

COSTA MESA, Calif. — Star Technologies, Inc. has introduced Nanostar 10, a microcomputer that, the company claimed, can support nine users.

The base system features 128K bytes of random-access memory, which is expandable to 512K bytes; a 10M-byte hard disk; nine RS-232 ports; one parallel port; and a 16-bit Fairchild Industries, Inc. 9445 microprocessor that operates at a speed of 18 MHz, according to the vendor. Operating systems used by Nanostar include Iris from Electronics Data System Corp. and Bits from Dynamic Concepts Corp.

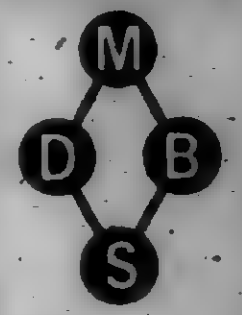
The microcomputer can be upgraded with 20M or 40M bytes of hard disk storage. A QIC-02 ¼-in. streamer tape, which reads data from a hard disk at a rate of 5M byte/min and provides 20M or 45M bytes of storage, can be added.

Star software reportedly can support as many as 65 users.

The base system costs $7,200, which does not include terminals.

Star Technologies, 3180 Pullman, Costa Mesa, Calif. 92626.

Plug-in board boosts Personal Computer XT's performance/73



MDBS III enhanced/76

INSIDE

■ Executive self-study course on micros/73

■ Execuport XL portable micro announced/72

■ Vertex announces 100M-byte Winchester disk drive/72

■ Software protection device for Apple micros/73

■ Graphics board for Kaypro micros/73

Software packages seen pivotal to micro training

By Anthony J. Pesce
Special to CW

Second in a Two-Part Series

Contrary to popular belief, there is no need, when conducting a training seminar on personal computers, to dive deep into hardware for the benefit of the management audience. The need to explain the attributes of read-only memory, random-access memory, erasable programmable read-only memory and so on only confuses the purpose of the seminar.

A pivotal point to be stressed in the discussion is the role of the software package. Perhaps this section deserves some special attention with regard to the overall success attributed to personal computers. There is a great deal of difference between using a personal computer and knowing how to program a personal computer in Basic.

The software discussion should touch on the cost-effectiveness of purchasing packages vs. paying for the development of custom software. At this point, there is an excellent opportunity to describe the function of the in-house support staff that management information systems (MIS) has assembled to address the needs of its personal computer users.

An overview of each of the functions that software can perform should be included in this section. By most standards, the likely candidate for heaviest use is the software that performs the function of spreadsheet analysis or electronic work sheets, generally referred to as modeling.

There are very few aspects of an organization that cannot be modeled. The decision-making process is not binary; it is iterative in nature. This fact points out the match between function and task that the personal computer brings to management's desk.

It is a simple tool for a simple but repetitive task. Managers who use modeling can demonstrate its time-saving capacity by showing examples of tasks that can be done faster and more efficiently using a personal computer with modeling software.

The education process is a matter of condensing experience and relating it to the use of personal computers via description of the concept in actual practice.

With surveys showing that one out of 10 executives is afraid of computers because he thinks he will be unable to adapt to the new technology, it is obvious why management does not immediately gravitate to micros. Yet when management is properly educated, it is amazed at the potential of these typewriter-televisions.

The ability to take columnar information and turn it into meaningful business graphics may be the dark-horse winner in the management popularity contest. Obstacles to using color graphics media, namely the time and cost related to a graphics arts project, simply do not exist any more. With the simplest of instructions, complex models can be translated into easy-to-understand graphics.

A recent Wharton Business School study outlined the reasons that business graphics were used by more top executives:

■ The average time for a meeting is reduced by 28%.

■ The presenter is perceived as more professional.

■ Complex and detailed information is understood more easily.

■ The persuasion power of the presenter is increased twofold.

In reality, man is a visual animal. Approximately 87% of all information taken in is stored visually — that is, graphically.

As the management seminar begins to approach the three-quarter mark, the subject of connecting to the big computer surfaces. The obvious opportunity to save the step of keying in the information to be used in the model is to have the host computer send the information to the personal computer via a telephone connection.

For years, the management participants have approved MIS budgets

See TRAINING page 76

ON-SITE MAINTENANCE SERVICE

- Maintenance contract prices up to 50% less than manufacturer's rates
- Fast response time — over 100 field technicians
- Most brands of equipment serviced
- On-site user training programs available

CALL FOR BROCHURE & PRICE LIST

LEWIS BUSINESS MACHINE SERVICE COMPANY
251 Park Avenue South, New York, N.Y. 10010
New York (212) 477-1666 • New Jersey, Connecticut, Massachusetts (800) 421-8782

MICROS from page 69

with other vendors' computers. It is important, therefore, for the designers of communications software to understand the issues that go beyond accessing other micros, or information utilities such as Source Telecomputing Corp.'s Source or Compuserv, Inc.'s Infoplex. One of the most important considerations is the need for adequate file transfer capabilities. While considerable effort has been expended in developing protocols for transferring files between micros, little effort has been made in understanding the file transfer problems in large organizations.

A second area often neglected is the fact that in large organizations communications speeds are not limited to 300 or 1,200 bit/sec. In fact, it is likely that most organizations would prefer to standardize on 9,600 or even 19,200 bit/sec. In a large organization communications will probably not be constrained to dial access to mainframe systems. With newer 16-bit machines, the speed problem may have been largely solved through the use of interrupt-driven CPUs (such as the Intel, Inc. 8088s). While many communications programs, even for Zilog, Inc. Z80s, allow file transfer to proceed at 4,800 or 9,600 bit/sec, normal interactive communications will bog down at that rate.

Reason for speed problem

One reason for the speed problem is that many of the programs have not been optimized for the higher data rates, except for file transfers. A second reason is that while the programs flow control file transfers, normal keyboard communications is not flow controlled. Yet, there are many instances where it is not only desirable, but necessary for keyboard-to-keyboard communications to be flow controlled. Flow control is the ability to do speed matching so that data is not lost because the receiving computer is too slow. The most common approach to flow control is to buffer incoming data and then have the receiving system send an X-off character telling the sending station to stop sending momentarily.

There is a major exception to what has already been said. There are a number of programs available for a wide variety of operating systems and a wide variety of microprocessors, which emulate IBM's 3270-type terminal. The 3270 uses a synchronous rather-than asynchronous protocol. The disadvantage with a 3270 emulator is that a specialized RS-232C board may be required and, more importantly, the 3270 approach is restricted to IBM-style communications. Most of the existing programs emulate a remote 3275, which requires a bisynchronous port on host, which may prove problematic under some operating environments.

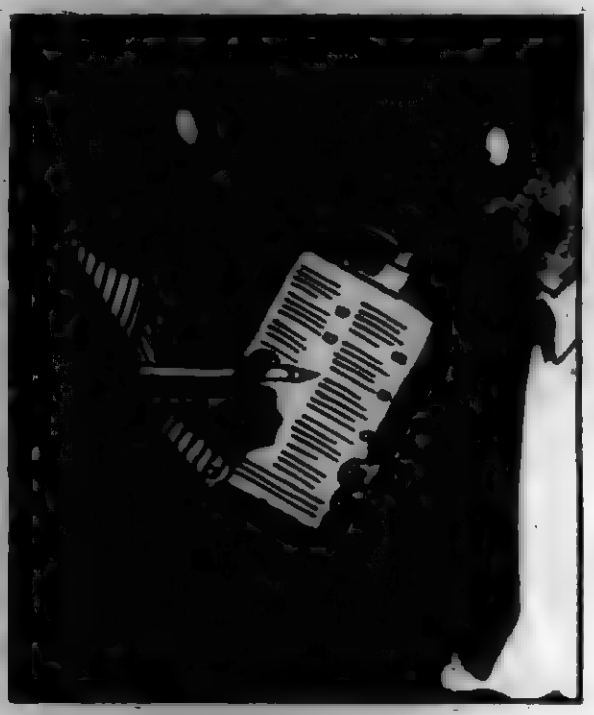
An alternative method for emulating IBM 3270-type communications is to use a protocol converter, which most frequently appears to the IBM mainframe as a 3274 cluster controller and is attached through a binary synchronous or Synchronous Data Link Control port of the front-end processor. If the organization has major systems from different vendors (IBM, DEC and others) the protocol converter solution may allow a single micro to communicate with all systems over an appropriate network and use all full screen functions of all or most systems.

If the Ascii terminal emulator on the micro and the protocol converter on the IBM-compatible system is used, then care must be taken in selecting the appropriate terminal emulator.

Software designers producing communications software for microcomputers need to catch up with the marketing strategies of the major manufacturers of micros. The software houses need to take a more comprehensive view of the communications needs of large organizations. A communications program designed to meet the needs of large organizations can also be made to meet the needs of individuals, but the reverse is not necessarily true.

Madron is manager of Computer Services at North Texas State University, Denton, Texas.

Can you answer these questions on local area networks the way you would have two years ago?



1. Is broad versus base band still an important issue?
2. Will local area networks and PBXs co-exist, be mutually exclusive or will one be subservient to the other?
3. What role does VLSI technology play in linking peripheral devices to local area networks?
4. What are the standards?

The March issue of *Computerworld On Communications* will give you answers to all the questions above—and much more. You'll get an overview that takes a close look at LAN products and technology and then examines it in the light of competing PBX technology.

You'll get information on linking mainframe computers and local area networks. You'll get an evaluation of token ring technology. And there's more! You'll get lots of special feature articles on communications topics from "Who the Bell operating companies are hanging from" to a profile of Rolm Corporation. Take a look at what some of our other features will cover for you:

- Communications processors.
- R&D in communications companies.
- Fiber optics.
- The low end of the PBX market.
- International record carriers.
- Workstation telephones.
- The future of Centrex.
- Protocol conversion.

Computerworld On Communications is designed to give you in-depth coverage of the broad spectrum of voice, image and data communications from a systems perspective. As a *Computerworld* subscriber, you'll be getting six issues of *Computerworld On Communications* in 1984—as part of your subscription! And if you need to be on the cutting edge of networking technology, you won't want to miss the March 14th issue.

If you've got communications products our readers should know about, then you need to get your ad reservation in by February 3rd. The materials are due one week later on February 10th. To reserve ad space in the March 14th issue of *Computerworld On Communications*, call one of the sales offices listed below, or call Ed Marecki, National Sales Director at 617-879-0700.

To: Ed Marecki, *National Sales Director*
CW Communications/Inc.
Box 880, Dept. A
Framingham, MA 01701

☐ *Please send me advertising information on Computerworld On Communications.*
☐ *Please have a sales representative call me.*

Name _____
Title _____
Company _____
Address _____
City _____ State _____ Zip _____
Telephone _____

Computerworld On Communications

SALES OFFICES
BOSTON/Chris Lee, Jayne Donovan, Michael Kelleher, Ron Masters, Jim McClure, Alice Langley (617) 879-0700
CHICAGO/Art Kenwick, Chris Lee, Jean Broderick (312) 827-4433
NEW YORK/Mike Masters, Doug Cheney, Ray Carbin, Jane Daly, Paul LaRegina, Cole M. Peterson (212) 557-6600
ATLANTA/Jeffrey Melnick, Mike Masters (404) 252-0743
SAN FRANCISCO/Bill Bixby, Brain Chamberlain, Theodora Parsons, A.G. Garrison, Barry Millman, Nicole Bastiaans (secretary) (415) 421-7760
LOS ANGELES/Brain Hackenmueller, Bob Hibbard, Bill Bixby (714) 251-1220

Soup up your Volkswriter.

Everybody knows Volkswriter, the word processing software package that's become synonymous with high performance. Now, there's a way to get even higher mileage out of your Volkswriter. Hook it up to a Dataproducts P Series dot matrix color printer.

The versatile P Series translates the executive class, word processing capabilities of the Volkswriter into brilliant full color charts, graphs and text. It delivers a full page of text quality print in nothing flat while its sheet feeder automatically prevents loading hassles. And the P Series uses pin feed or plain paper and has the brains to fill every appropriate line with crisp, sharp copy, even if it has to justify to do it. And the P Series color printer has dual speed capability for correspondence quality output for the Volkswriter's many word processing applications and high speed output for draft and spreadsheets.

The Dataproducts P Series color printer. Think of us as a supercharger for your Volkswriter.

For more information go to your nearest computer store and ask about the Dataproducts P Series color printer, or call Dataproducts, 1-800-258-1386.

Dataproducts computer printers

Nobody puts ideas on paper so many ways.

Volkswriter is a registered trademark of LIFETREE SOFTWARE, INC.

MICROCOMPUTERS

SYSTEMS

COMPUTER TRANSCEIVER SYSTEMS, INC.
Executport XL; Executport XL+

Computer Transceiver Systems, Inc. (CTS) has unveiled its first entry into the microcomputer market, the Executport XL series of portable micros, which reportedly features dual-processor expandability.

The Executport XL series is said to be lightweight, featuring both the 8-bit Zilog, Inc. Z80 processor and the 16-bit, Intel Corp.-designed 80186 processor. Because users can use Digital Research, Inc.'s CP/M and CP/M 86 and Microsoft, Inc.'s MS-DOS, they have access to a large base of software, the vendor said.

Two models are available: the XL and the XL+. Both models feature a 9- by 5-in. green phosphor screen that can display up to 132 col. by 24 lines and dual, double-sided, double-density, 5¼-in. floppy diskette drives with 800K bytes of formatted storage each. Other features include 22 programmable keys providing up to 44 user-defined, single-stroke functions. The units are self-contained in a leather-like case that fits under an airline seat.

The XL is based upon the Z80 processor and has 80K bytes of memory, while the XL+ adds a 16-bit coprocessor and associated 128K-byte memory to the basic machine.

In addition to CP/M and MS-DOS utilities, the following bundled software from Perfect Software, Inc. is included at no charge: Perfect Calc, Perfect Speller, Perfect Writer and Perfect Filer. The XL is priced at $2,695, and leases start at $99/mo. The XL+ lists for $3,495, and leases start at $130/mo. On-site service is included in the lease agreement.

CTS, P.O. Box 15, E. 66 Midland Ave., Paramus, N.J. 07652.

STORAGE

LOGICAL SYSTEMS, INC.
Diskdisk

Logical Systems, Inc. has introduced Diskdisk, a product that can be used to create a file that simulates a disk drive.

According to the vendor, with a double-sided, 40- or 80-track drive or a hard drive, logical drive partitions can be created as files on the physical drive.

All system functions are available as though this file were an actual physical drive, in other words, as a disk within a disk, a spokesman for the vendor said.

Diskdisk is available for Radio Shack TRS-80 Models I, II, III and Lobo Drive International's Max-80, running with Logical Systems' Lobo 5.1 operating system.

It is also available for the TRS-80 Model 4, running with Radio Shack's TRS-DOS operating system, the vendor said.

Each package costs $99, plus $3 for shipping and handling. A free catalog is available from the vendor, according to the spokesman.

Logical Systems, P.O. Box 23956, 5970 N. 55th St., Milwaukee, Wis. 53223.

VERTEX PERIPHERAL CORP.
V2100

Vertex Peripheral Corp. has added a 100M-byte unit utilizing thin-film media to its line of 5¼-in. Winchester disk drives.

Called the V2100, the drive has a 25-msec average access time and the ST412HP-standard, 10M bit/sec data transfer rate. It is intended for users with intensive microcomputing requirements, including multiuser, multitasking or image processing and net applications.

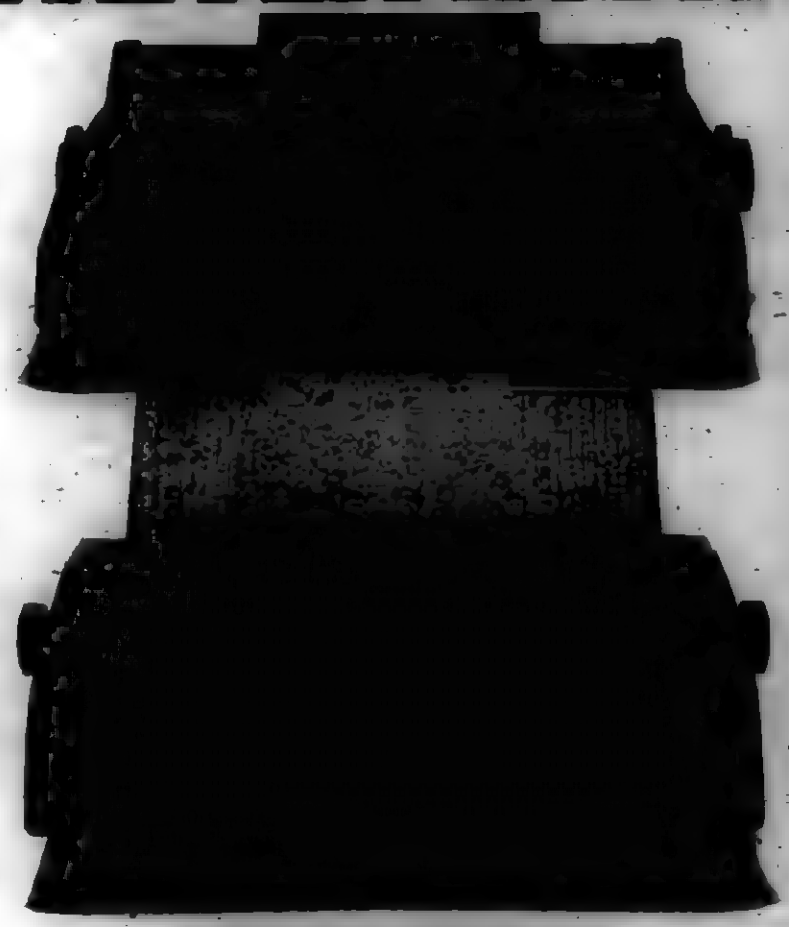
Other features include a dual-frequency, closed-loop servomechanism system, which allows continuous sampling and correction of head-to-track positioning as the disks rotate and a track density of 960 track/in. An automatic actuator lock and dedicated landing zone along with full shock mounting are said to counter potential shock and vibration damage.

The V2100 is available for a single quantity price of approximately $3,000 with OEM discounts available.

Vertex, 2140 Bering Drive, San Jose, Calif. 95131.

SPINWRITER INTR

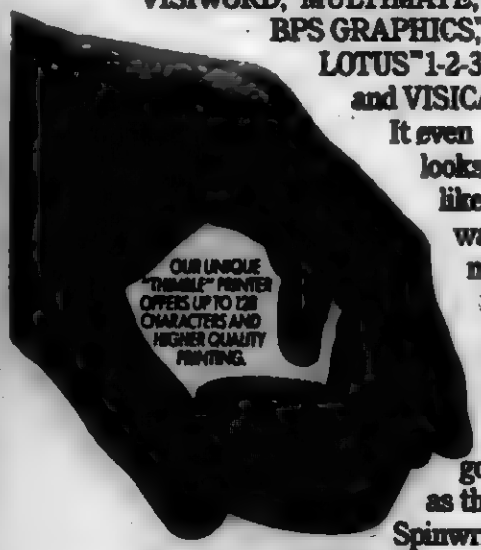
Now you have a choice of fully compatible Spinwriters for your IBM PC and XT.



NEC MODELS OFFER SPEEDS OF 200 AND 330 WORDS PER MINUTE.

First, a few words about the original, the Spinwriter 3550.

It was the first and only totally compatible letter-quality printer for the IBM PC. It plugs directly into the IBM PC and works with every piece of IBM PC software, as well as all popular third-party application packages, such as WORDSTAR,™ WORDPLUS,™ VOLKSWRITER,™ VISIWORD,™ MULTIMATE,™ BPS GRAPHICS,™ LOTUS™ 1-2-3,™ and VISICALC.™ It even looks like it was made for the IBM. Now, as good as the Spinwriter 3550 is, we recognize that a single printer can't take care of every business or professional office need. So we've added another IBM PC compatible Spinwriter: The 2050.



The new 2050 has a printing speed of 200 words per minute. And while it costs less, the print quality is still impeccable. So if low-volume letter-quality printing is what you need, the 2050 is your answer.

60 different print thimbles let your IBM PC look its best.

One of the things that gives our Spinwriter capabilities you can't even get on other printers is our unique "thimble." Each thimble holds up to 128 characters. You can even have two different type faces on one thimble or print multiple languages from a single thimble. Think of how handy

MICROCOMPUTERS

BOARD-LEVEL DEVICES

ORCHID TECHNOLOGY, INC.
Turbo-186

Orchid Technology, Inc. recently announced a processor/memory board and software package for the IBM Personal Computer XT and compatible microcomputers that reportedly will increase the processing speed of the micro from three to 10 times.

The Turbo-186 plug-in board contains an Intel Corp. 8-MHz 80186 microprocessor, a 16-bit data/memory bus and 128K bytes of system memory. In addition, sockets are provided for on-board memory expansion to 256K bytes, according to a company spokesman. The software allows programs based on IBM's PC-DOS and Microsoft, Inc.'s MS-DOS operating systems to run transparently on the 80186 processor. In addition, programs on the 80186 can be run concurrently, handling all machine I/O, and can provide disk caching and background printer spooling and communications, the spokesman said.

The package will be available in the first quarter of this year for about $1,000.

Orchid Technology, 47790 Westinghouse Drive, Fremont, Calif. 94538.

U-MICROCOMPUTERS, INC.
U-secrump/2

U-Microcomputers, Inc. has released a software protection device for Apple Computer, Inc. Apple II, Apple IIe and Apple III computers that plugs into any Apple expansion slot.

According to the company, U-secrump/2, a resin plated-circuit card, allows the end user to copy diskettes for backup in the normal way and allows transfer of software onto a hard disk or an 8-in. floppy disk or into a network.

The card includes firmware which checks out a 6-char. password and a 6-char. serial number. If the numbers don't match, the computer is halted and must be rebooted, the company said.

The price of the U-secrump/2 protection card is $40. Quantity discounts are available.

U-Microcomputers, 800 Broad St., Stamford, Conn. 06901.

JFN INDUSTRIES
AT-1 Video Attribute Add-On Circuit Board; GR-1 Graphics Upgrade

JFN Industries has announced a graphics upgrade and an add-on circuit board designed to provide screen highlighting for Kaypro, Inc. microcomputers.

The AT-1 Video Attribute Add-On Circuit Board and the GR-1 Graphics Upgrade reportedly let Kaypro users better utilize accounting programs and programs such as the Micropro International Corp. Wordstar word processing package. Available for the Kaypro 2 and Kaypro 4, the AT-1 is said to allow reverse video, reduced intensity, blinking, reverse screen, multiple terminal emulation and screen-to-printer dump. The terminal emulation code is designed to let Kaypro 2 and Kaypro 4 computers respond to codes used by the Kaypro 10, the IBM Personal Computer and the Televideo Systems, Inc. 925 terminal.

The GR-1 Graphics Upgrade reportedly is an add-on that connects directly to the Kaypro circuit board and adds Epson America, Inc. printer-compatible graphics and screen dump character translation, the vendor said.

Now available, the AT-1 with screen dump is priced at $149.95, while the GR-1 is priced at $49.95. The units are available together for $179.95.

JFN Industries, 961 N. Fuller Ave., Los Angeles, Calif. 90046.

AUXILIARY EQUIPMENT

LANGLEY-ST. CLAIR INSTRUMENTATION SYSTEMS, INC.
Soft-View

IBM Personal Computer users can switch to amber monitors with the installation of the Soft-View amber replacement CRT tube from Langley-St. Clair Instrumen-

Continued on page 76

ODUCES A SPINOFF.

that would be if your business is international.

On the other hand if you have special printing needs, you can opt for a full alphabet plus numbers, sub- and superscripting and scientific and arithmetic symbols.

Incidentally, for all their versatility, our inexpensive

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
ABCDEFGHIJKLMNOPQRSTUV
АБВГДЕЖЗИЙКЛМНОПРСТУФХ
ABCDEFGHIJKLMNOPQRSTUVWXYZ
A→Φ²₂ρ/~¹&\≠^⁹⁰¹²₃⁴₄⁵¹⁄₂⁶₆⁷₇⁸₈⁹₉
ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
ABCDEFGHIJKLMNOPQRSTUVWXYZ
¯£¡¯¸´§-£¢¤¿¯¡6ª°¶$ßÄ¨æ

SPINWRITER OFFERS OVER 60 DIFFERENT TYPE FACES.

thimbles last for over 30 million impressions.

So it won't end up costing you a fortune to look like a million.

No matter what form your business takes, Spinwriter can handle it.

A Spinwriter can actually help you put your communications in better shape. It can use any of our nine interchangeable forms handling options. And they can all be easily installed and changed by the operator.

Want to dash off a few hundred original letters to your customers? Our sheet-feeder is just the ticket. It will print on your letterhead and second sheet or envelope.

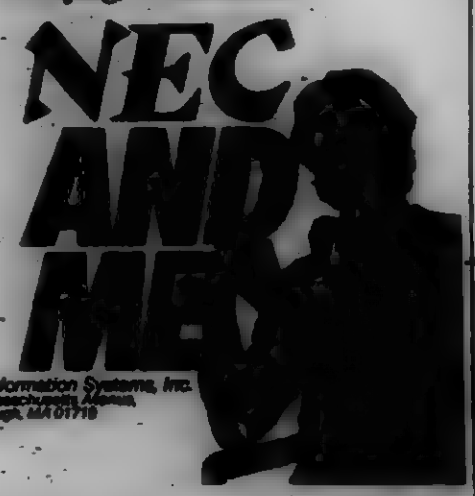
Standard features include continuous forms handlers that take paper up to 16 inches wide, variable size forms, and multi-part forms.

Spinwriters have a hard-earned reputation for reliability. Spinwriters hold the industry record for mean-time-between-failure. Over 3,000 hours. Which, in terms of average personal computer usage, adds up to more than two trouble-free years.

One reason for Spinwriters' staying power is the fact that we manufacture every major component. It also helps explain why NEC Information Systems is the number one supplier of letter-quality printers to PC users in America. Of course, someday you may need a little service. If you do, it's nearby. We have a large group of NEC-trained professionals all around the country. It's also quick. Because of our modular design, normal repairs take less than 20 minutes.

9 DIFFERENT NEC-BUILT FORMS HANDLERS. AUTOMATICALLY FEED ANY OFFICE FORM YOU HAVE.

You'll find Spinwriters at participating ComputerLand stores, Sears Business Systems Centers, IBM Product Centers nationwide, Entré Computer Centers and authorized NEC Spinwriter distributors. Or call 800-343-4418 for more information. And find out why more and more IBM PC users are saying, "NEC and me."



SPINWRITER CAN OPTIMIZE YOUR IBM PC COMMUNICATIONS.

NEC Information Systems, Inc.
1414 Massachusetts Avenue
Boxborough, MA 01719

NOW THAT EVERYBODY AND HIS BROTHER ARE GETTING INTO THE DATA BUSINESS, HOW DO YOU DECIDE WHO GETS YOURS?

Suddenly, companies that make everything from motor oil to wrapping tape are trying to make big money in the data business.

And so are hundreds of upstarts that never made a thing.

They all want a piece of your "office of the future." But how can you be sure *they* have a future?

Of course, that's no problem if your decision is ITT Courier.

With 325,000 terminals installed worldwide, we're neither a Johnnie-come-lately nor an upstart. Plus, we have the financial strength and the product pathway to give your office of the future a real future.

For instance, we can provide ASYNC terminals small in price. Or SNA terminals big on communications.

We can give your people personal computing power. Or a telephone system that lets them talk to computers and other people.

And, unlike everybody and his brother, you know you can count on us to be here from generation to generation.

Contact your nearest ITT Courier Representative. Or call the ITT Courier Sales Support Department at 1-800-528-1400, toll free.

ITT COURIER

YOU KNOW WE'LL BE AROUND.

Continued from page 73

tation Systems, Inc.

The tubes, which utilize European amber phospor, an etched antiglare faceplate and lead/strontium impregnated glass to block X rays, are said to be direct electrical and mechanical replacements for the original IBM tubes.

The Soft-View CRT tube replacement costs $90.95.

Langley-St. Clair Instrumentation Systems, 132 W. 24th St., New York, N.Y. 10011.

NETWORX
Wire Tree

Networx, a division of North American Philips Corp., has announced a four-outlet filtered power source for personal computers that reportedly protects against voltage surges, spikes and radio frequency interference.

The Wire Tree power source provides surge-limiting, solid-state circuitry in four grounded outlets, according to a Networx spokesman.

The product includes a 9-ft power cord and four peripheral power cords and is priced at $69.95.

Networx, 203 Harrison Place, Brooklyn, N.Y. 11237.

DIALOGUE SYSTEMS, INC.
Personal Computers: An Executive Self-Study Program

A self-study course designed for executives about the business applications of microcomputers has been developed by Dialogue Systems, Inc. in conjunction with Peat, Marwick, Mitchell & Co.

Called "Personal Computers: An Executive Self-Study Program," the course is divided into 12 modules, each of which requires 90 minutes of listening to audio cassettes.

In addition, an accompanying 150-page, self-study guide provides in-depth information about topics covered on the cassettes, unit summaries and a glossary of computer-related terms, according to Dialogue Systems.

The course is available for $275 from the DSI Micro Training Catalog.

Dialogue Systems, 770 Broadway, New York, N.Y. 10003.

TRAINING from page 69

that include an ever-growing expenditure for telecommunications. Again, this is a chance to educate management on the fundamentals of communications networks.

This topic lends itself to a discussion of the company's technology plan as it relates to the use of personal computers as management tools. Under this umbrella topic, the aspect of data management can be covered to show the value in controlling a set of information that is applicable to the person or the function that is using the system.

When discussing data management, it is appropriate to set guidelines for the organization. It gives the participants a feeling for the inbounds and out-of-bounds areas for the personal computer. Such functions as word processing fit comfortably within the capabilities of the system. However, typical uses of this capability show that draft memo writing, buck slips, sensitive communications and so on are more appropriate for management use.

Those typewriter-televisions are taking on more and more critical roles in organizations every day. The need to educate management on their potential is vital to the success of any plan for the implementation of personal computers in corporate business operations.

Soon, elementary schools in every state will have personal computers in every classroom via any one of the current bills before the U.S. Congress.

Introduction of H.R. 5573 started a national drive for education on the subject of computer literacy using personal computers.

There is no reason why intelligent, mature adults in the management community cannot also take advantage of this powerful new method of processing their organization's most valuable asset — its information.

A well-planned management education seminar on the subject of personal computers will go a long way in answering the question: "What are those typewriter-televisions anyway?"

Paoni is president of Personal Computer Management, Inc. of Wheaton, Ill., a consulting firm that provides seminars on personal computers for managers.

WHEN AMERICA'S TOP CORPORATIONS WANT TO CONTROL THEIR INFORMATION RESOURCES, THEY CALL HOLLAND.

Not so long ago, most companies believed that any information problem could be solved by adding another computer.

And another.

And another.

Inevitably, the legacy of that approach has been astronomical DP costs. Fragmented, redundant database systems. And untimely, inaccurate reports.

When those problems began to surface at some of the leading Fortune 1000 corporations, key executives all had the same response.

They called Holland Systems Corporation.

Working with top people in each department, we helped develop a functional business model of the organization. We then created the framework for designing and implementing a shared, integrated data and information system. And we left behind dynamic guidelines for meeting short- and long-term corporate information needs.

While our top-down Strategic Systems Planning™ product may complement BSP™ and similar methodologies, it goes much further. By combining appropriate software, education and method, SSP allows companies to prioritize and control data and information systems development. Often for the first time.

If you're interested in making information more manageable, call Tony Comanzi, Vice President, at 313/995-9595.

You'll be in good company.

Holland Systems Corporation
3131 South State Street S-303
Ann Arbor, Michigan 48104

BSP is a trademark of International Business Machines Incorporated.

HOLLAND SYSTEMS CORPORATION

Putting Information to Work.

VOLUME DATA ENTRY SERVICES

AKD

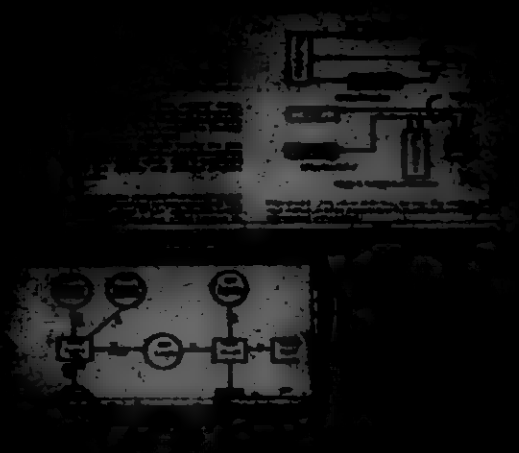
Call Our TOLL-FREE HOTLINE
For Instant Quotes
800-228-9410
FOR OVER 14 YEARS

AMERICAN KEY DATA

5214 S. 59th ST. • OMAHA, NE 68127

The genius of Team Xerox.

XEROX



The 8010 professional workstation has always been known as a computer of dazzling capabilities, especially in its graphics, information processing and document preparation.

But what some people may not know is that the 8010 is also the key element in Team Xerox, a system of office machines designed to work together like a team.

When part of an Ethernet network, the 8010 can work with a wide array of word processors, mainframes, personal and business computers, printers, electronic mail and file services, facsimile terminals, communicating Memorywriters, other networks and, of course, other 8010s. It also provides 3270 and TTY emulation.

Its full 17" bit-mapped screen lets you view two full pages simultaneously and open up to six documents at a time without covering up a previous document.

It's also the only workstation that can create and print documents in more than a dozen languages, including Russian and, for the first time, Japanese (Katakana, Hiragana and Kanji).

While other workstations may use Xerox innovations like the mouse, icons, windows, property sheets and combined text and graphics, the 8010 simply does more with them.

For example, the 8010's extensive software is fully integrated, to allow you to work with text and graphics simultaneously. You can draw a flowchart right in the middle of a full page of text without having to resort to a separate program and limited buffer "scratchpad" or "clipboard."

In terms of capabilities, ease of use and overall value, the 8010 would have to be considered the stellar workstation in the industry.

For more information, call 800-527-1922 (in Texas, 800-442-0152), or send in the coupon. Or ask anyone who's ever used the 8010.

*8 am to 5 pm Central Standard Time.

Xerox Corp., Box 470065, Dallas, Texas 75247.

☐ Please have a sales representative contact me.

☐ Please send me more information on the 8010.

Name_____ Title_____

Company_____

Address_____ City_____

State_____ Zip_____ Phone_____

013 1/1984

MICROCOMPUTERS

MICROSOFTWARE

LLOYD/HARVEY CORP.
Personnel and Activity Management System

The Lloyd/Harvey Corp. recently announced a management control system to provide project and resource management capabilities to users of IBM Personal Computers, Personal Computer XTs and compatible machines as well as Fujitsu Microelectronics, Inc. machines.

The Personnel and Activity Management System (Pams) reportedly enables users to monitor projects and activities through the total development life cycle, collect historical performance and cost data at various levels, provide critical path and project variance reporting, display forecast information graphically and forecast and monitor personnel performance.

A company spokesman said the package eliminates the need for technical knowhow or knowledge of computer terminology and affords the user menu-driven, command-line and soft-function key control.

The package requires two floppy disk drives, with a minimum of 320K bytes of memory each, or one 320K-byte floppy disk drive and one hard disk drive; minimum internal memory of 128K bytes; and DOS 1.1 or 2.0 from IBM or Microsoft, Inc.'s MS-DOS or Fujitsu's E-35 operating system.

A single-machine, single-site, one-time license for the package is priced at $3,500, which includes on-site installation and training.

Lloyd/Harvey, Suite 160, 18319 Delano St., Reseda, Calif. 91335.

NEGOTIATION INSTITUTE
Art of Negotiation Computer Preparation Program

The Negotiation Institute has announced its software package designed to help middle- and upper-level executives and others called upon to negotiate to prepare for those talks.

The Art of Negotiation Computer Preparation Program reportedly asks users questions to clarify their knowledge and understanding of the issues and positions of all the parties involved. It is also said to help develop strategies and negotiating gambits and to allow the user to print final and interim reports.

Available now for the Apple Computer, Inc. Apple II, IIe and III, the package is scheduled to be available for the IBM Personal Computer in early 1984.

It is priced at $495, according to the vendor.

Negotiation Institute, 230 Park Ave., New York, N.Y. 10169.

MICRO DATA BASE SYSTEMS, INC.
Report Definition Language; Interactive Screen Definition Utility

Micro Data Base Systems, Inc. (MDBS) recently announced a facility for its MDBS III data base management system, reportedly allowing users to specify characteristics of a desired report and the prompting behavior of a program which generates that report.

Report Definition Language (RDL), according to a company spokesman, is a C language program containing all necessary MDBS data access logic and handles all sorting, control breaks, formatting and computation, the vendor said.

Also announced was Interactive Screen Definition Utility (ISDU) to allow users of MDBS' Screen Master, an interactive screen I/O manager to build or revise a screen dictionary interactively.

Releases of both products will be available under IBM's PC-DOS, Microsoft, Inc.'s MS-DOS and Unix on the Digital Equipment Corp. PDP-11. RDL is priced from $1,400 to $2,500, and ISDU is priced from $450 to $700. Both products are marketed by International Software Enterprises, Inc.

International Software Enterprises, Suite 400, 55 W. Algonquin Road, Arlington Heights, Ill. 60005.

POLYGON ASSOCIATES, INC.
Poly-TERM; Poly-XFR; Poly-COM

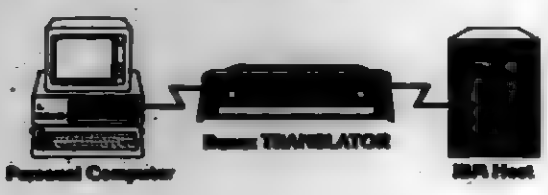
Polygon Associates, Inc. has announced upgraded versions of its emulation software, designed to allow the IBM Personal Computer to emulate the Digital Equipment Corp. VT100 series of terminals.

The company's Poly-T2M, Poly-XFR and Poly-COM had previously been available for Digital's Rainbow and Decmate II computers. Poly-TERM reportedly features emulation, while Poly-XFR features binary file transfer and Poly-COM combines the features of both. The software is said to allow the microcomputers to communicate with DEC PDP-11 and VAX-11 minicomputers.

The products are now available for $150 each, according to the vendor.

Polygon Associates, 9 American Industrial Drive, St. Louis, Mo. 63043.

The Easiest Way To Get Your IBM PC Talking With Your IBM Host Is With A Renex Protocol Convertor



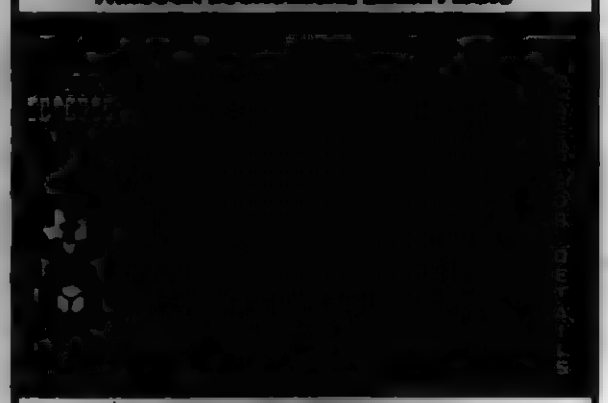
Renex has the best one!

RENEX CORPORATION
4501 Old Keene Mill Road
Springfield, VA 22150
(703) 451-2200
TWX 710-831-0237

Renex has the solution.

TERMINALS FROM TRANSNET

SLASH OPERATING EXPENSES THROUGH ECONOMICAL LEASE PLANS

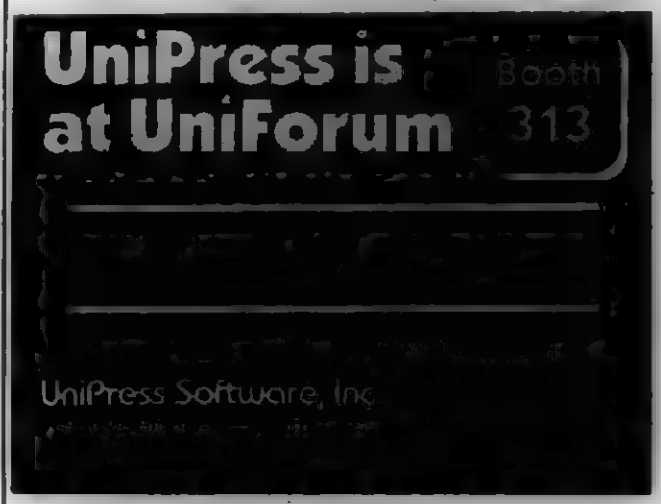


CALL ROSE
LEARN HOW YOU CAN OWN BY LEASING
IMPROVE CASH FLOW AND PROFITS
12-24-36 Month Leases PLUS Rentals

PERSONAL COMPUTER SYSTEMS
Visit our computer stores in Union and Ocean, NJ
AUTHORIZED RETAIL DEALER
APPLE® IIe, III and LISA — DEC RAINBOW — TI PROFESSIONAL

SOFTWARE • SUPPLIES • PERIPHERALS

UniPress is at UniForum Booth 313



DGA

Programming made more profitable with DGA

DGA offers you many unique time-saving features, all in an online interactive environment. Running under TSO, CICS, or VTAM in an OS/MVS system, consider the many advantages of DGA:

- **COBOL DATA DISPLAY** Dynamically maps COBOL layouts to file data. Browses, searches, updates, prints, selects and reproduces from screen display.
- **VSAM & ISAM SUPPORT** Creates, deletes, updates, compares, copies and prints records with no restrictions. All standard access methods supported with no file or record size restrictions.
- **INTERACTIVE COMPARE** Files, partial files, selected records or partial records are all accessible.
- **SCREEN GENERATOR** Uses screen painting to eliminate time-consuming CICS map coding.

If you'd like more information on how DGA will make your programming more profitable, write for our free brochure, or call 913-541-1502.

dpi
Data Products, Inc.
P.O. Box 14613
Lenexa, KS 66215

COMPUTER INDUSTRY

DEC: The revolving door

Personnel turnover significant

By Peter Bartolik
CW Staff

MAYNARD, Mass. — While Digital Equipment Corp. was going through some major financial changes during the past year, it was also experiencing significant personnel changes.

Since the beginning of 1983, DEC has officially announced the departure of six of its 28 vice-presidents, and DEC watchers claim the company has also experienced a large turnover rate at lower management tiers.

The most notable changes were the midsummer departures of C. Gordon Bell, vice-president of engineering, to join former Prime Computer, Inc. Chief Executive Officer Kenneth G. Fisher at his new venture, Encore Computer Corp. and the fall departure of Andrew C. Knowles III, vice-president of group management and considered to be the boss behind DEC's personal computer line, who left to take the presidency of Lexidata Corp. According to a DEC spokesman, Bell's duties were absorbed by Jack Smith, vice-president of manufacturing; splitting some of Knowles' duties were Joel Schwartz, vice-president and group manager of personal computers, and Edward Kramer, vice-president of corporate marketing.

Other departures from DEC included Robert Puffer, vice-president of storage systems manufacturing, who also went to Encore and whose duties were added to those already assigned F. Grant Saviers, formerly vice-president of storage systems engineering. Departing from responsibilities "unique to their own backgrounds and experiences" and not being replaced, according to the spokesman, were Richard

See CHANGES page 86

DEC settlement no surprise

INDUSTRY INSIGHT

BILL LABERIS

By Bill Laberis
CW Staff

The settlement reached between Digital Equipment Corp. and the U.S. government recently [CW, Jan. 9] and the accusations and counterclaims passed prior to settlement were not surprising when you consider — as DEC pointed out — that dealing with the government can be an imbroglio.

The government had accused DEC of fraudulently providing false pricing data in filling a $70 million minicomputer order in the late 1970s. But there was enough gray area in the government's claims to warrant the amicable $3.2 million settlement, instead of taking the case to court.

However, this was not the first time in recent months that DEC has had to settle with a government agency.

According to informed sources, the U.S. Customs Service launched what would become a 14-month investigation into DEC's import activities back in 1981. The investigation probed whether DEC had violated certain Customs statutes in nonpayment of import duties for goods made abroad and then shipped to DEC manufacturing facilities in the U.S. for assembly into various systems.

In particular, the government became suspect that DEC had violated provisions of Customs regulations pertaining to goods manufactured in the U.S., shipped abroad and then returned unused to the U.S. — so-called "American goods returned" statutes. Generally speaking, there is no import duty paid on such goods, as they were made in the U.S.

But what the Boston office of Customs investigated was whether DEC had la-

See SETTLE page 80

Cbema, Adapso study effects of information technologies/83

INSIDE

- Intecom, South Central Bell and Southern Bell ink $75 million pact/80
- Suit targets high-tech's exemption from wage law/81
- Group fosters information exchange among top execs/84
- McAuto acquires CSS/81

Commerce sees boom coming

By John Gallant
CW Washington Bureau

WASHINGTON, D.C. — The U.S. computer manufacturing industry will rebound strongly from a sluggish 1983 to see a real growth rate of 18% this year, and the software and services sector will do even better, according to the U.S. Department of Commerce.

Commerce statistics, prepared for the department's upcoming 1984 U.S. outlook report, show that the computing equipment industry, measured from the office equipment sector, shipped $41 billion worth of processors and peripherals last year, a 15% hike over 1982 figures.

"Assuming continued moderate recoveries in the U.S. and European economies during 1984," Commerce said, "U.S. computer industry shipments should increase by 18%, after adjusting for inflation. Shipments would then exceed $48 billion."

Reporting on international computer trade, the department said the strong dollar, combined with weak foreign economies, held the increase in exports to a mere 5%, for a total sales volume of $10.3 billion. Imports, however, rose by nearly 40% — to $4.1 billion — with Japanese imports showing a 113% jump.

In 1984, "exports will increase by 20% to more than $12 billion," Commerce said. "Assuming continued strong growth in imports from Far East suppliers, imports should register an increase of almost 60% [to $6.5 billion], resulting in the erosion of another $500 million in the U.S. computer industry trade balance."

Taking into account U.S. production, ex-

See COMMERCE page 86

Sperry, NCR, Honeywell eye plumper bottom lines

By Bill Laberis
CW Staff

With hopes buoyed by a generally bullish view of the economy in 1984, three of the top five non-IBM-compatible mainframers have predicted fatter bottom lines in both sales and profit over the next 12 months.

The companies — Sperry Corp., NCR Corp. and Honeywell, Inc. — predicted further that increased levels of research and development spending would sustain real market growth throughout the year, provided that the domestic economic boom continues and the international economy shows at least marginal improvement over the past three bleak years.

Of the three, Honeywell remained the most reserved in its look ahead. Edson Spencer, Honeywell's chairman, complained that business worldwide "remains concerned over an uncontrolled U.S. budget deficit that threatens a return of higher interest rates." Honeywell, too, has the least market success in 1983 of the noncompatible mainframers, which include itself, Sperry, NCR, Burroughs Corp. and Control Data Corp. — the so-called "Bunch."

While Honeywell managed to get back on a growth track in terms of sales and profit, most of the growth came from its noncomputer operations, such as manufacturing process control and instrumentation. The company's information systems wing contributes 30% of the total revenues, but only 20% of the profit. In its most recent reporting quarter, Honeywell's profits climbed 35% on a modest 5% revenue gain to $1.4 billion.

Exley

Remarking on Honeywell's computer operations, Spencer said the company hopes to cash in on cost-cutting measures instituted in the past 18 months, including two major layoffs. Honeywell also expects to begin volume shipments of its DPS 88, its largest mainframe, sometime this year. Banking on market acceptance of a string of new products introduced last year and on its thrusts into new markets,

Kreger

NCR said it is looking to duplicate the strong performance it registered — both in the market and on Wall Street — in 1983.

NCR's stock price climbed nearly 90% in the last 18 months, during which time the company took steps to shatter its transaction processing mold, announcing first-time products in the microcomputer, word processing and communications network areas.

"At present, we are at the midpoint in the introduction of our [very large-scale integration] generation products with a number of new offerings scheduled for release during 1984," Charles E. Exley Jr., NCR president and chief executive officer, said. "It is our goal . . . to make our 32-bit chip set one of the standard 32-bit microprocessors used by other system builders in the industry."

Sperry parlayed stepped-up cost cutting with sizable government contracts to get its Computer Systems Division back on track in 1983. However, as with other Bunch companies such as Honeywell and Burroughs that rely heavily on their installed mainframe base to market new products, Sperry's future performance remains a question.

Spencer

Most analysts, however, concede that 1984 will be a kind year to most

See SPERRY page 80

COMPUTER INDUSTRY

DG users group calls for papers

WESTBORO, Mass. — The North American Data General Users Group has issued a call for papers from users, independent software vendors and OEMs.

The papers will be considered for presentation at the Data General Corp. group's 1984 conference, which is slated for Aug. 27-30 in San Diego.

According to a spokesman for the group, topics for papers can include new discoveries, unique concepts or special knowledge in the areas of computer technology, management or marketing.

Presentations will be based on an abstract of the paper.

Abstracts are due before Feb. 27, the spokesman said.

Data General, 4400 Computer Drive, Westboro, Mass. 01580.

Southern Bells tie Intecom knot

ALLEN, Texas — Intecom, Inc. has inked a $75 million manufacturing and distribution agreement with South Central Bell and Southern Bell, allowing the communications companies to market Intecom's family of private branch exchanges (PBX) to their business customers in nine states.

Under the terms of the manufacturing and distribution agreement, Intecom will manufacture its PBX product line at its facility here, with the system then marketed by the Advanced Systems Division of Bell South, which is a holding company for Southern and South Central Bell.

Intecom will support initial installations of the PBX for Advanced Systems Division customers, while providing training and documentation for the operating divisions.

SETTLE from page 79

beled as American goods returned a number of components that were actually manufactured abroad and, therefore, required payment of import duties. The government found DEC had done this.

The next question was: Did the firm do so with willful and fraudulent intent?

The Boston office reported its findings of "numerous unit violations" to a district office of the U.S. Department of the Treasury, of which Customs is a part. The government declined to prosecute, apparently again finding enough gray area in the implementation of its own requirements.

The government is likely to be more aggressive in addressing the alleged conduct of the 10 semiconductor companies it has been investigating for the past two years. Included on the list of companies investigated are National Semiconductor Corp. and Fairchild Semiconductor Corp.

The government believes the firms falsified documents stating that chips sold to government agencies, the U.S. Department of Defense in particular, had passed required tests, when, in fact, they had not.

Bill Laberis is senior editor/industry at Computerworld.

SPERRY from page 79

major computer companies.

Growth anticipated

"We anticipate the continued strengthening of the general economy which, in turn, will trigger increases in capital expansion budgets and enhance computer demand through industry and government," according to Joseph J. Kroger, Sperry's Computer Systems Division president.

"As a result, we are projecting computer systems revenue to double over the next five years with an annual profit growth of 30% or more," according to Kroger.

Sperry's Computer Systems Division revenues for fiscal 1984, ending March 31, will be about $2.9 billion, according to a spokesman for the firm.

The Texas Instruments makes the best software

COMPUTER INDUSTRY

McDonnell Douglas acquires time-sharing firm

Gets Computer Sharing Services in $70 million deal

ST. LOUIS — Less than a month after its attempt to acquire Tymshare, Inc. fell through, McDonnell Douglas Corp. announced the recent acquisition of another computer time-sharing firm, Computer Sharing Services, Inc. (CSS).

The nearly $70 million deal, far smaller than the $370 package that cash-rich McDonnell Douglas tried to assemble for Tymshare, will result in CSS being incorporated as a subsidiary of McAuto, the firm's computer services division.

Robert A. Fischer, McAuto president, said that Jerrol Alkema will continue as CSS president.

Fischer said that 130 technical workers from McAuto's communications industry business unit and 35 marketing representatives will be assigned to CSS.

CSS, which had revenues in fiscal 1983 of $27 million, provides computer and data processing services to telephone companies as well as other commercial or business customers.

The company employs 275 people and operates a Honeywell, Inc.-based mainframe shop at its Denver headquarters.

Unions sue on wage law

WASHINGTON, D.C. — The computer industry's long-running battle against a federal law setting wages for government services contracts moved into federal court recently when labor unions sued to stop the Labor Department from granting high-technology firms an exemption from the wage law.

Earlier, the department had exempted from the provisions of the 1965 Service Contract Act agreements between private firms and government agencies for maintenance and repair of DP equipment, office systems and high-technology scientific and medical equipment (CW, Nov. 14, 1983).

Companies in those industries and their representatives here argued that the law, designed to prevent "wage busting" by firms seeking government contracts, should not apply to them because their service workers are highly paid and perform the same work at the same wages for government as they do for private organizations.

Labor agrees

Labor decided that applying the law to this type of work was unjustified.

Labor agreed with Congress' General Accounting Office, which said the exemption was warranted and that without it agencies might have difficulty obtaining services because providers would refuse government work rather than accept the regulated wage scheme.

Immediately after the exemption was finalized, the AFL/CIO and affiliated unions asked the District Court here to overturn the decision.

Unions upset

The unions called the Labor Department decision "arbitrary, capricious [and] an abuse of discretion."

The department is being supported in the suit by groups in favor of the exemption.

Those groups include the Computer and Business Equipment Manufacturers Association and the Computer and Communications Industry Association, which have filed amicus briefs backing the exemption.

Professional Computer perform even better.

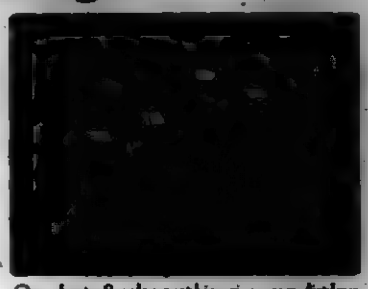
See the difference the TI Professional Computer can make with these best-sellers and hundreds more software packages.

Literally hundreds of third-party software packages are available for the TI Professional Computer. So with the TI Professional Computer, whether you need word processing, accounting, spreadsheets, data base management or advanced integrated programs, the best — and best-selling — software can help you meet virtually every business and professional need. But before you consider software alone, you should weigh one other very important point: the better the hardware, the more you get out of your software.

It's no wonder critics have called it "the optimum personal computer."

Popular Computing
October, 1983

The TI Professional Computer's outstanding monitor resolution and 8-color graphics make best-selling programs like Lotus 1-2-3™ sharper, easier to work with. And the fact that you can put three times the graphic information on your screen — in both color and monochrome — means you'll be able to take even greater advantage of the best graphics programs. For best-selling word processing packages like WordStar,™ TI's comfortable, typewriter-style keyboard is a natural. Anyone familiar with a standard typewriter keyboard can start to work immediately, without re-learning key positions.



Our sharp, 8-color graphics give your displays even more visual impact.

Texas Instruments has developed forward-looking programs to bring you innovative, easy-to-use technology.

One such package is NaturalLink™, TI's exclusive natural language interface program. NaturalLink lets you access information from subscription data base inquiry services, such as the Dow Jones News/Retrieval®

service, in plain English. So you don't have to memorize special codes to get the outside information your business depends on.

TI's revolutionary development of speech recognition is another way TI helps you get the most from your software.

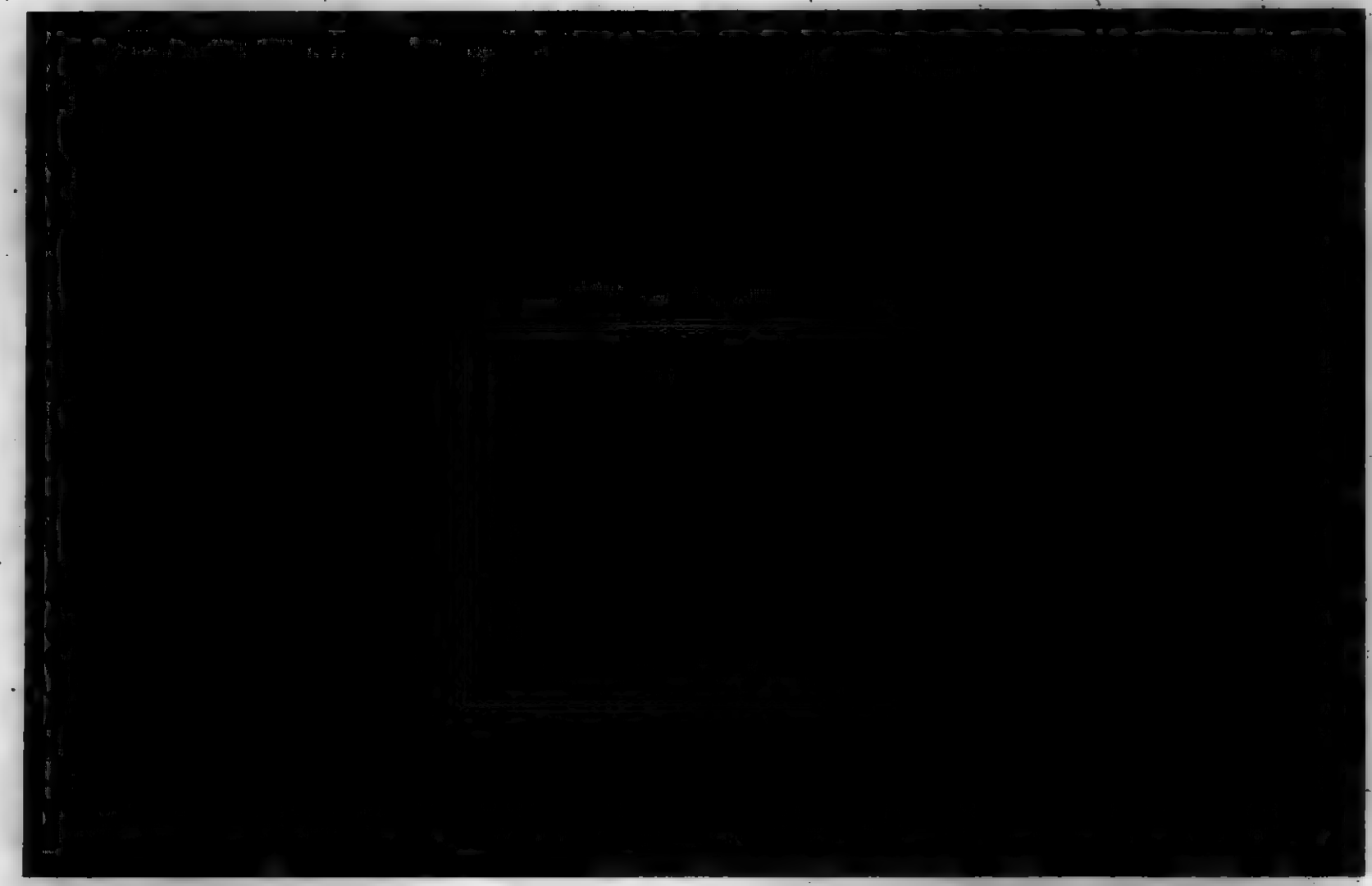
Leading third-party software suppliers are developing new programs to take advantage of TI's speech technology. In early 1984, with Speech Command,™ you'll be able to say things like, "Inventory analysis, please," and have a spreadsheet displayed instantly on your monitor. Voice-operation will make the TI Professional Computer easier to use than ever before.

If you're ready for the best — and best-selling — programs, you're ready for the Texas Instruments Professional Computer. Now at participating ComputerLand stores and independent dealers. For the location nearest you, and answers to questions about your computing needs, call 1-800-527-3500.

TEXAS INSTRUMENTS
Creating useful products and services for you.

1-2-3 is a trademark of Lotus Development Corp.
Dow Jones News/Retrieval is a registered trademark of Dow Jones & Company, Inc.
WordStar is a trademark of MicroPro International Corp.
NaturalLink and Speech Command are trademarks of Texas Instruments Incorporated.
Copyright © 1983 Texas Instruments

2771-CMW



The personal computer courted the workplace with endless promises.

A new era of problems was delivered instead. As MIS manager, you have observed: too many different brands of computers. Too many types of software. Software that's difficult to learn, limited and inconsistent in quality, and poorly backed up by manufacturers.

More troubling: there has been no way to control the information flow. No way to make these machines communicate with one another, or with the company's mainframe. No way to customize software to meet specific company needs.

Microcomputer chaos is likely to persist unless someone can bring in an effective system for managing them all, and introduce a measure of standardization.

That logical someone is you.

The logical solution is Visi On.™

What's good for the user is even better for the MIS Department.

Visi On is not a new computer.

It is not a new computer program.

Visi On is a completely new generation of business software that harnesses the power of the personal computer; a microcomputer applications manager designed to work in tandem with the operating system of the pc, and integrate any number of application programs.

Initially, four applications are available: Visi On Word,™ Visi On Calc,™ Visi On Graph,™ and Visi On Query.™ Totally redefined for the Visi On environment, each application includes features and functions that have dramatically improved performance.

Even more impressive, their strength is actually boosted when these applications are *combined.* Making maximum use of multiple electronic windows and a mouse, Visi On instantly transfers data between applications, demonstrating depth of integration to an unprecedented degree. Instead of doing just one job at a time, the user may move from project to project, backed up always by the full power of the machine.

And it's all remarkably simple. Visi On provides a single, sensible interface that makes every application easy to learn, and even easier to use.

There. Already it's getting quieter in your department...

ENTER VISI ON. Suddenly, every personal computer in your company becomes everything it ever promised to be.

Indeed, for MIS managers as well as for users, Visi On is a virtually instantaneous remedy for the problems experienced with personal computers.

Instantaneous? Yes. The system will work on most of the computers already in place. (Which also makes Visi On your simple-to-implement solution for standardizing systems and applications.)

On the off-chance a problem should befall a user, no problem. Each Visi On application program comes with the equivalent of 100 pages of Help text users may call on when there is a question. The more help the user gets from Visi On, the fewer the calls for help that come into your department.

The Visi On system also provides the basis for a complete package of communications programs. With applications software soon available, Visi On will allow personal computers to emulate both asynchronous and synchronous terminals.

And, Visi On will allow integration into local networks.

And more. And more. And more.

Additionally, Visi On is open-ended. New applications, new capabilities, and new peripherals will be added. Plus, Visi On architecture is open to all developers, with a Visi On Toolkit to help you custom design your own applications programs.

And with all of the above, Visi On introduces a new generation of software support. It's the most comprehensive program ever executed for microsoftware. Backed up by VisiCorp,™ the number one name in business software.

Sit back. Be pleased with yourself. And if you're far too modest for that, simply rest assured that legions of formerly disgruntled users now have you to thank for an efficient, productive new partnership with their personal computers.

Your management thanks you, too.

You were, after all, the one who recommended Visi On.

Visi On™

Visi On is now available for the IBM® Personal Computer XT, the Wang® Professional Computer, the Hewlett-Packard® Series 7000, the TI® Professional Computer, and the Compaq™ Plus.
Visi On, Visi On Word, Visi On Calc, Visi On Graph, Visi On Query and VisiCorp are all registered trademarks of VisiCorp.
© 1983 VisiCorp.

COMPUTER INDUSTRY

Cbema, Adapso groups to study technology's effects

By John Gantner
CW Washington Bureau

WASHINGTON, D.C. — Two computer industry trade groups headquartered here are completing plans for separate but similar organizations to study the societal effects of information technologies.

The Information Age Institute, a privately organized and supported entity representing manufacturers, users, professional societies and academia, will be announced soon by the Computer Business and Equipment Manufacturers Association (Cbema). And the Association of Data Processing Service Organizations, Inc. (Adapso) is completing work with members of Congress on legislation setting up a government commission on high-technology issues.

The Information Age Institute will provide information and education on issues such as public acceptance of new technologies in the work place and associated political issues and human resource problems, Cbema said.

While the institute's agenda will be determined by its participants, topics such as video display terminal safety and worker displacement and retraining were cited as examples of issues of interest to the new organization.

"Very good response"

Cbema spokeswoman Charlotte LeGates said the plan has been "presented to a large number of associations and other interested organizations, and we have gotten very good response."

Because commitments to the institute are incomplete, Cbema has not released the names of organizations interested in joining. But members could come from the computer and telecommunications industries, organizations representing attorneys and engineers and the banking, insurance and air travel industries, she said.

LeGates said the institute, to be based here, will be formally announced sometime during the first quarter of this year. The size and makeup of the institute's board of directors and staff will depend on how many join the effort, she said. She indicated the organization eventually may become affiliated with a university.

According to LeGates, the institute is necessary because "the ignorance of facts surrounding the introduction of technology . . . produces fantasies and fears that discourage people from using technology with the potential to help them."

Cbema hopes an independent, widely representative organization can provide credible information on this topic. "We can't wait around for the government to have 20,000 committees and think about it," she added.

Adapso, also concerned that these subjects are not being properly addressed in a public forum, is, however, taking a different approach. The association hopes to have a bill introduced in Congress soon to set up a blue-ribbon panel representing industry, government and academia.

Its purpose, according to Adapso spokesman David Sturtevant, will be "to look at all the issues relating to technology and its impact on society at large."

Congressional supporters of the idea have persuaded the association that the commission should be financed by the government and not the private sector in order to ensure it is nonpartisan, Sturtevant pointed out.

Although plans for the commission are not complete, he suggested it could last three or four years and cost about $2 million a year. According to present thinking, the panel would direct a small staff in collecting information and sponsoring studies on various high-technology issues, Sturtevant said.

Having established "a body of knowledge" on these issues, the commission would most likely issue a report indicating problems and concerns requiring government attention, he said.

Saying "everybody is talking about these problems in very general terms," Sturtevant said the association is "frustrated" it has not been able to get the commission legislation introduced earlier. Nevertheless, he said, Adapso is confident the bill will appear within the next few months.

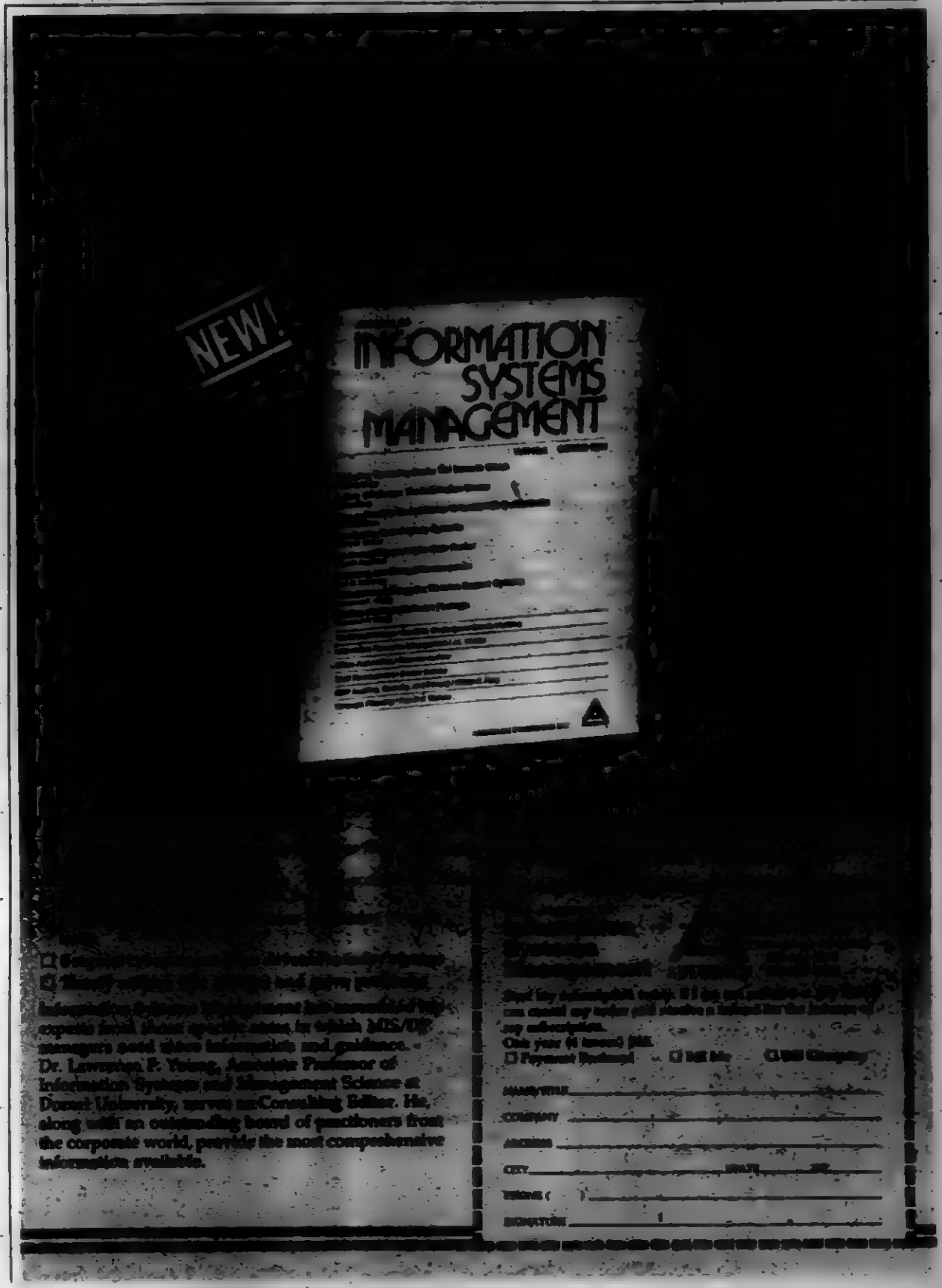
Houston to host Adapso meeting

ARLINGTON, Va. — The Association of Data Processing Service Organizations, Inc. (Adapso) will host its 60th Management Conference in Dallas March 19-21 at the Fairmont Hotel.

The conference will feature more than 40 workshops, seminars and programs covering management issues facing the membership.

Both members and nonmembers of Adapso are invited to attend, according to a spokesman for the association.

Adapso, Suite 300, 1300 N. 17th St., Arlington, Va. 22209.



Net facilitates data exchange among execs

Founded to improve caliber of Southern California CEOs

By Robert Stahl
CW West Coast Bureau

LOS ANGELES — In an age when access to relevant information can make the difference between success and failure for a high-technology company, a group of senior Southern California industry figures are trying to facilitate cooperation and exchange of information among key decision makers.

Focusing solely on the information needs of chief executives, the Southern California Technology Executives Network (Socalten) was founded last year on the principle that greater cooperation and exchange among chief executives will enable both the Socalten members and the high-tech community at large to gain greater competitive advantage.

"Our objective is to improve the caliber of chief executive officers [CEO] by increasing their overall management capabilities and practices. As a secondary consideration, we also want to gain some more recognition for Southern California as a region of high technology," explained Walter Bauer, president of mainframe software maker Informatics, Inc. and chairman of Socalten.

Since its incorporation, the network has signed on 73 chief executives, each paying a $1,000 annual fee. Other chief executives involved in Socalten include Thomas Ringer of Fujitsu Systems of America, Inc.; Gary Liebl of Microdata Corp.; and Richard Cortese of Alpha Microsystems, Inc.

> *Our research confirmed that the key to an organization's success is the CEO's performance in charting the company's strategic course, developing the management team and securing needed resources.*
> — Steve Panzer, Panzer, Swarts, Weiss & Co.

According to Bauer, about 80% of the companies that have joined the network to date are computer companies, with about three-quarters of those being software companies.

Critical success factors

Socalten is the brainchild of Steve Panzer and Jeff Weiss, partners in the Los Angeles-based management consulting firm of Panzer, Swarts, Weiss & Co. The idea, Panzer explained, arose from a study the firm conducted of critical success factors in 25 Calif.-based emerging high-tech companies, including Ashton-Tate, Corona Data Systems, Inc. and Ryan-McFarland, Inc.

"Our research confirmed that the key to an organization's success is the CEO's performance in charting the company's strategic course, developing the management team and securing needed resources," Panzer asserted. "However, when we began speaking with these executives, we sensed that most of them in Southern California experienced terrific isolation. They didn't feel they had the same network of support of their counterparts in the Silicon Valley or the Boston area," Panzer added.

In an attempt to fill this need, Socalten focuses on four key activities as a way of providing core information to its members:

- CEO round tables, comprising groups of 12 to 14 CEOs who meet once a month for intensive half-day sessions focusing on topics such as marketing, strategic planning, management development and finance.
- "The Executive Report," a monthly publication intended to provide a concise overview of relevant information from several key management, technical and market sources.
- Network conferences and seminars, in which industry leaders and experts participate. For example, the next full-day conference, titled "In Search of Excellence in the Management of High Technology," will concentrate on major industry trends, including the role of IBM.
- Membership Resource Directory, providing a description of each CEO member and his company.

MERGERS AND ACQUISITIONS

Perceptronics, Inc., Woodland Hills, Calif., has reached an agreement in principle to acquire **First Ann Arbor Corp.** of Ann Arbor, Mich., a research and development organization.

■

Wyly Corp. of Dallas has signed a letter of intent to acquire **Financial Systems of America, Inc.** of Winter Park, Fla.

■

Micom Systems, Inc. has completed its acquisition of **Industrial Computer Controls, Inc.**, Cambridge, Mass., a manufacturer of IBM-compatible protocol converters.

■

Eastman Kodak Co. has acquired the assets of **Mead Digital Systems**, a division of Mead Corp. Renamed Dicomix, the organization will continue operations in Dayton, Ohio.

■

Cognitronics Corp. has agreed in principle to acquire two San Diego-based companies, **American Computer Corp.** and **Administrative Systems, Inc.** (ASI), for an initial purchase price of $1.2 million, payable in a combination of cash and stock.

Future payments in cash and stock up to a maximum of $8.7 million are dependent on growth in revenues and earnings over the next 2½ years.

American, a hardware firm, and ASI, a software development company, have combined their products into turnkey systems for the health care industry.

■

Continental Telecom, Inc. (Contel) will acquire **Codata Systems Corp.** through the issuance of shares of Contel common stock in exchange for Codata's outstanding capital stock. Codata will be operated as a separate business entity by Cado Systems Corp., a member of Contel's Business Systems Group.

■

Crownsek, Inc. has bought a 35% interest in **Waterloo Microsystems, Inc.** and is launching an integrated office automation system utilizing IBM Personal Computers and the Waterloo Port software.

■

Emulex Corp. has announced an agreement in principle to acquire **Personal Systems Technology, Inc.** (Persyst), a maker of memory, graphics and communications hardware and software products for IBM and IBM-compatible personal computers. Basic terms of the acquisition call for Emulex to purchase 100% of Persyst's outstanding stock for 480,000 shares of Emulex.

■

Compucorp has entered into a definitive agreement with **Litton Industries, Inc.** to acquire an 80% interest in **Monroe Systems for Business, Inc.**, a Litton division.

■

United Telecommunications, Inc. has acquired **GTE Companion Service** from GTE Corp. for an undisclosed amount of cash.

■

Computer Horizons Corp. has acquired certain assets of **Cincinnati Applied Software, Inc.** of Florence, Ky., for an undisclosed cash amount.

■

Valid Logic Systems, Inc. has signed an agreement in principle to acquire **HHB-Softron** of New Jersey in exchange for stock valued at $5.5 million.

■

Recognition Equipment, Inc. (REI) has completed the purchase of all outstanding shares of stock of **Consolidated Computer International, Inc.** (CCI) for $2.7 million. In connection with the transaction, REI has entered into an agreement to manage the U.S. installed lease base of **Finecomp, Inc.** for a share of the lease revenue. CCI and Finecomp are U.S. subsidiaries of Nabu Manufacturing Corp. of Ottawa.

We've got the Swedish computer community covered. Have you?

In 1982, sales of computer hardware, software and services reached $1.2 billion in Sweden. This market is expected to grow at an annual rate of 18% with the government and manufacturing industry being most effected.

And now our new sister publication, *Computer Sweden*, can bring your advertising message to 20,000 professionals in this expanding marketplace. *Computer Sweden* is published bi-weekly in a tabloid format and will bring *Computerworld's* high standards and editorial quality to the Swedish computer community. Its circulation includes managers, marketing directors, engineering management at computer hardware, software and service suppliers, educators, consultants, DP managers and technicians.

CW International Marketing Services is your one-stop advertising service in countries around the computer world. For more information about *Computer Sweden* or any of our other foreign publications, just fill out the coupon below.

Diane La Muraglia
Manager, International Marketing Services
CW COMMUNICATIONS, INC.
375 Cochituate Road, Box 880, Framingham, MA 01701
(617) 879-0700

CW COMMUNICATIONS/INC.
Publishers of *Computerworld* and other leading computer publications around the world.

Please send me more information on:

☐ *Computer Sweden* ☐ Your other foreign publications

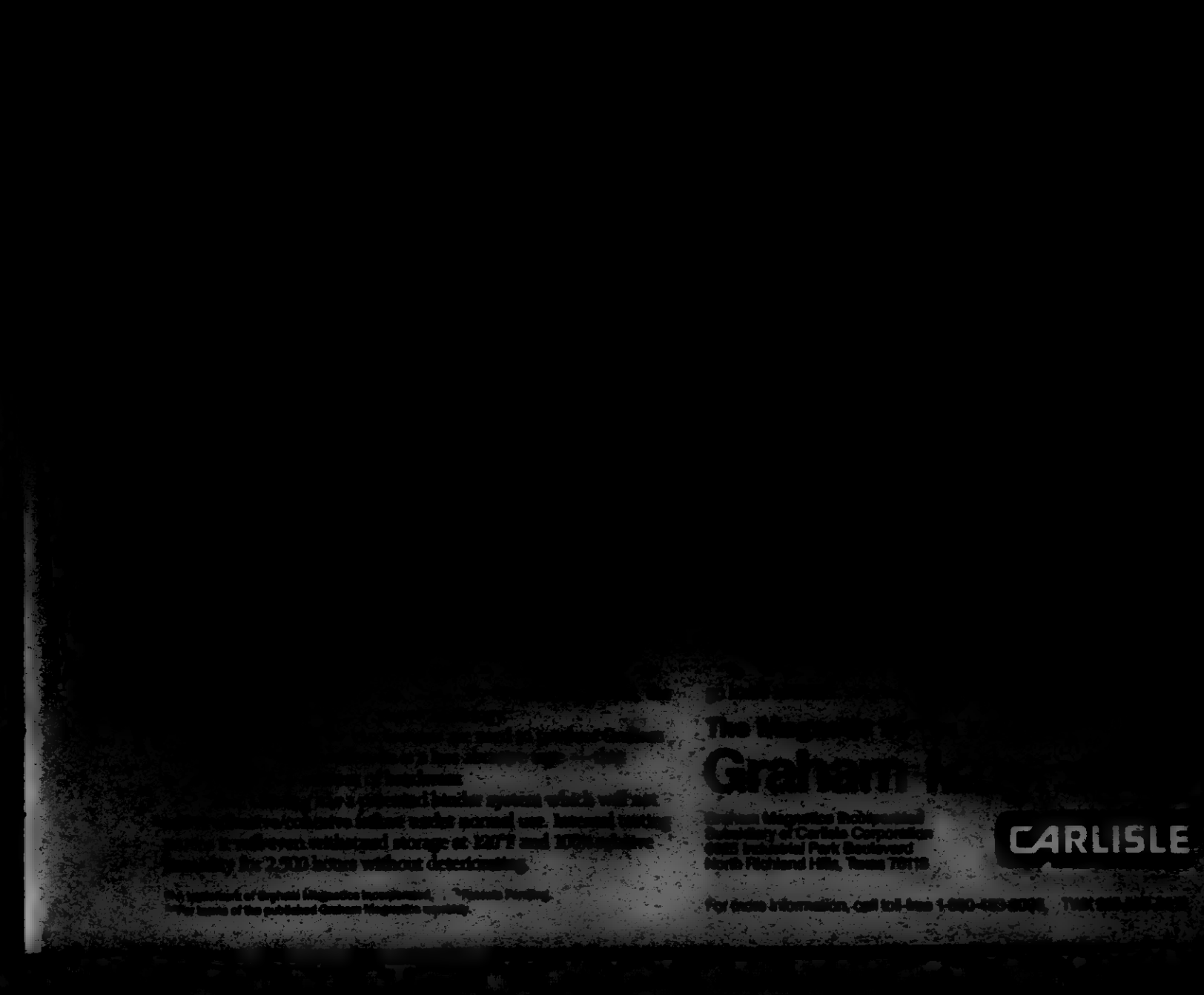
Name _____ Title _____

Company _____

Address _____

City _____ State _____ Zip _____

Introducing the only computer tape certified error-free at 6250 CPI



COMPUTER INDUSTRY

CHANGES from page 79

J. Clayton, vice-president of manufacturing technology, now vice-president at Thinking Machines, Inc.; Lawrence J. Portner, vice-president of corporate planning, who joined Apollo Computer, Inc.; and Roger Cady, vice-president of manufacturing distribution control product group, who did not announce his plans.

DEC has promoted two group managers to positions of vice-president and group manager: Samuel H. Fuller, who formerly headed corporate research and architecture and who now heads research and architecture, and Jeffrey C. Kalb, who headed the large-scale integration semiconductor group and is now vice-president over that group. Additionally, in January, DEC announced the appointment of Robert W. Taylor to head a new systems research center in Palo Alto, Calif.; Taylor formerly spent 13 years with Xerox Corp. in Palo Alto and previously managed the research programs at the U.S. Defense Advanced Research Projects Agency, which developed the Arpanet network.

Positive opportunity

In a recent interview, DEC President Kenneth H. Olsen said the vice-presidents left as friends, and the turnover "gives the opportunity for the bright, young grade of people to move in and take these jobs."

One DEC watcher, and sometimes critic, who agrees the changes are positive is Sonny Monosson, publisher of the newsletter "Monosson on DEC." "Any company that has grown as fast as [DEC] has probably stretched their people to the limit," he said in a recent interview with *Computerworld*. Monosson said he believes change is good for any firm and that the turnover gives DEC an opportunity to bring in new people.

Peter Lowber, who follows the company for The Yankee Group, Inc., disagreed: "I don't see how it could be good," he said. "They need the same engineering expertise they have lost."

Similar problems

Lowber believes all the established minicomputer companies are experiencing similar problems. "They're all running off to start-ups." Lowber said he thinks DEC does need new blood in the area of marketing, however.

Aaron Goldberg, DEC watcher with International Data Corp., said he was concerned with the "exodus" of people heading various "projects" for the company. Both Lowber and Monosson agreed. "They have left, too; [turnover] is just the same at the lower level," Monosson said.

None of the DEC watchers believed DEC is in any imminent danger as a result of the financial and personnel changes suffered in the past year. "There will be a DEC in 1990," Monosson's newsletter declared recently, "but a DEC confined to the technology it can command."

Lowber added, "I think DEC will hang in there; they will try to turn it around in 1984. I think they will be able to turn it around, but in a longer time frame than that."

COMMERCE from page 79

ports and imports, Commerce estimated the U.S. market for computer equipment will total about $40 billion in 1984, almost 23% more than in 1983. Imports will rise to 16% of that market, with the Japanese accounting for 10% of the market.

The government also reported employment in this sector increased 8.3% last year, from 336,000 to 348,000, and should climb another 4% this year, to 362,000.

Long-term prospects

Looking at the long-term prospects for this industrial sector, the department said: "The U.S. computer industry grew at an inflation-adjusted compound annual rate of about 19% from 1972 to 1981, when the recession lowered this average slightly. Several influences will act to depress the annual average to 17% a year through 1988, while imports could increase an average of 35% a year."

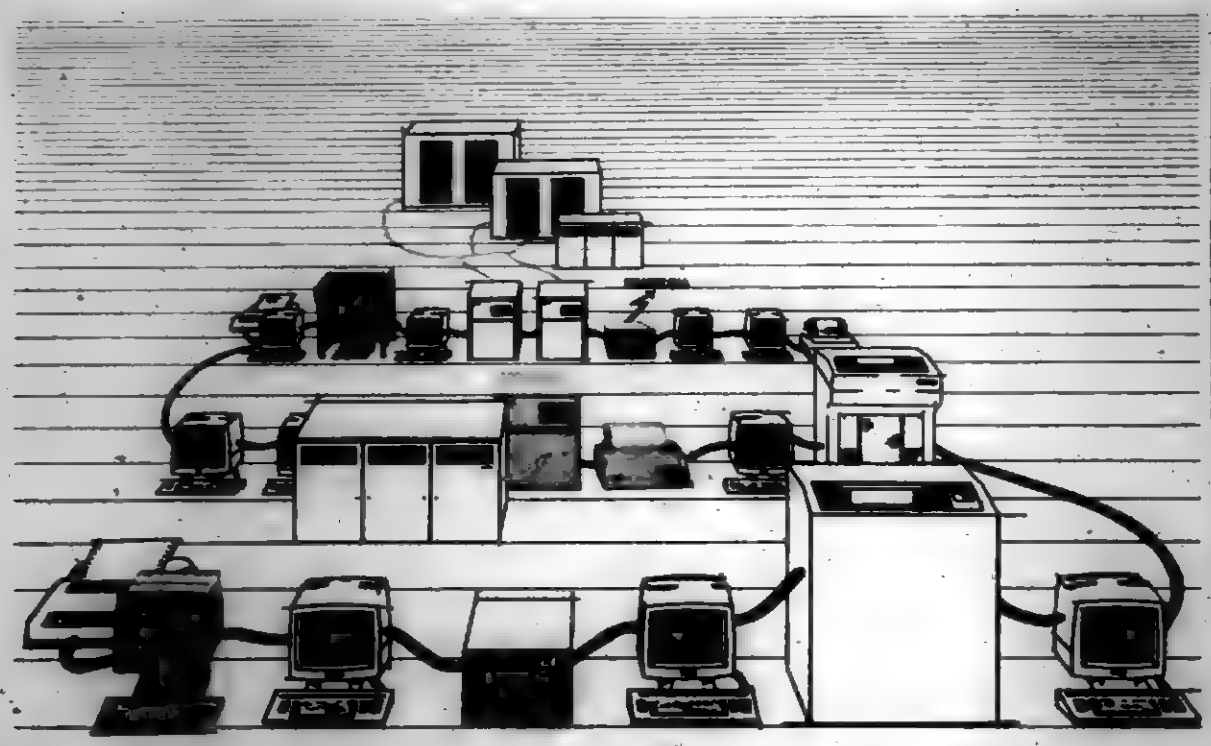
One of the negative factors, the department said, is the continued movement of production from the U.S. to foreign sites. This will be partly counterbalanced by increased use of automated production in the U.S., the continued introduction of high-value products, particularly those stemming from relationships with the semiconductor and telecommunications industries, and the rate at which foreign firms set up production facilities in the U.S.

"Foreign competition could act to restrain U.S. exports, keeping average increases at the 15% to 20% level rather than the 30-plus percent rates of previous years," according to Commerce.

Turning to the computer software and services industry, Commerce estimated that 1983 domestic revenues increased 20% to $31.6 billion. This was a slight improvement over the 18.5% increase the year before.

Commerce quoted U.S. Bureau of Labor Statistics' figures that suggested hiring in this industry expanded slowly during 1983 following a year in which declining demand in the U.S. and other countries held employment growth well below the 12% annual average from 1974 to 1981.

In 1984, assuming continued moderate economic recovery in the U.S., the domestic revenues of this industry should grow at a rate slightly below the historic average of 25%, and foreign revenues might improve only gradually because of the slow pace of recovery in major markets, the department said.



3270 Networking: No More No Man's LAN.

Imagine. 3270 Processing. IBM-Compatible Personal Computing. Local Area Networking. And SNA Compatibility. In One System.

Imagine a system that successfully settles the uncharted territory of 3270 local networking—that "no man's LAN" of unlinked and unrealized potential.

Imagine a system that delivers the power of 3270 processing, and the flexibility to build two local area networks from a single controller. Imagine being able to attach up to 120 devices to that controller. Or attaching four distinct controllers—and multiple coaxial links of up to 10,000 feet each—to any of those LANs.

Imagine the economies of a system that handles that networking with standard 3270 coax. That requires no commitment to special architectures or non-standard LAN technologies. And that, thanks to a multi-drop, station-to-station design, can eliminate thousands of feet of new coax.

Of course, such a system would have SNA compatibility. But it would also have a set of capabilities to dramatically increase throughput, while reducing hardware and support costs in any environment. Capabilities like multi-host and multi-personality support, application and address switching, and system printing.

This system would have multi-user personal computing "built into" the network—allowing you to assign true 16-bit computing power, maintain overall MIS control, and share expensive disks and printers.

Such a system would boast an intelligent display station that displays a mastery of ergonomic and aesthetic design. With multi-screen formats, anti-glare screen, low-profile keyboard, and a tilt-and-swivel pedestal with the smallest footprint in the industry. Such a system would also include a full line of printers.

Imagine. 3270 processing. IBM-compatible personal computing. Versatile, economical, powerful local area networking. In one system.

Braegen *has* imagined just such a system. They have designed it. Built it. And called it the ELAN™ System.

If such a system sparks your imagination, give us a call. We know the feeling. The Braegen Corporation, 525 Los Coches Street, Milpitas, CA 95035, (408) 945-8150; TWX: 910-338-7332.

Imagine. Then Braegen.

BRÆGEN

™ELAN is a trademark of The Braegen Corporation.

Since you'll be spending millions of dollars per month on data communications networks, you want all the information you can get. Right?

Here's how to get it.

Just wait for your February 27th issue of **Computerworld.** Then read the special report on Data Communications Networks from cover to cover. You'll get it all:

- *Local area networks*
- *public packet-switched networks*
- *private branch exchange (PBX) networks*
- *teleconferencing networks*
- *satellite networks*
- *CATV networks*
- *videotext and facsimile networks*
- *voice/data network integration*

You'll get tutorials — bylined opinion/analysis pieces by experts in the field on the use of networks and the future of the networking industry. You'll get case studies of how companies have used specific networks to solve specific business communications problems. And you'll get information on lots more — with articles on everything from microwave links to how AT&T's divestiture will affect voice/data networks.

If you spend — or are planning to spend — millions on data communications networks, then you can't afford to miss the February 27th special report on Data Communications Networks in **Computerworld.**

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

And, if you've got product or service ads that will help our readers make informed choices for 1984 — then you need to get your ad to us by February 10th. To reserve space in the February 27th issue, call one of the sales offices listed below, or call Ed Marecki, National Sales Director.

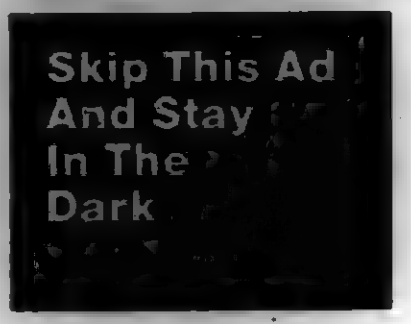
To: Ed Marecki, *National Sales Director*
CW Communications/Inc., Box 880, Framingham, MA 01701
☐ *Please send me advertising information for Computerworld.*
☐ *Please have a sales representative call me.*

Name _____
Title _____
Company _____
Address _____
City _____ State _____ Zip _____
Telephone _____
CW 2/10

Sales Offices
BOSTON/Chris Lee, Jayne Donovan, Michael Kelleher, Ron Mastro, Jim McClure, Alice Longley *(617) 879-0700* • **CHICAGO**/Art Komack, Chris Lee, Jean Broderick *(312) 827-4433* • **NEW YORK**/Mike Masters, Doug Cheney, Ray Corbin, Joan Daly, Fred LoSapio, Gale M. Paterno *(201) 967-1350*
ATLANTA/Jeffrey Melnick, Mike Masters *(404) 394-0758* • **SAN FRANCISCO**/Bill Healey, Ernie Chamberlain, Theodora Franson, Barry Milione, Nicole Boothman (recruitment) *(415) 421-7330* • **LOS ANGELES**/Bernie Hockswender, Bob Hubbard, Bill Healey (714) 261-1230

POSITION ANNOUNCEMENTS

AIRLINE SOFTWARE SYSTEMS



Respond To This Ad And Find Out What You've Been Missing!

Talk To United Airlines Before You Decide To Make A Move Or Stay Put.

If you have PARS (ACP/TPF) software experience and haven't talked to United Airlines, you are missing out on one of the most attractive career packages available.

Our APOLLO System is one of the world's most sophisticated interactive systems. Continued software development is taking United where no one has gone before. The pace of our work has created additional needs for software professionals with PARS (ACP/TPF) experience. And we have what it takes to make moving worthwhile.

Here Are Some Of The Features You Will Learn About

— Compensation—Perhaps the best in the industry and it's constantly being updated.

— Technical Advancement—Very flexible, highly defined career paths are available no matter what your level of experience.

— TLC—APOLLO is our future—our competitive edge—and everyone from the Chairman on down is behind the software team 100%.

—— A Brave New World—Learn where we are taking the reservations systems of the future. You'll be surprised.

—— Rocky Mountain High—All that Denver can offer and relocation help you need to make a smooth transition.

Can You Afford Not To Know More?

There's more to a United career than meets the eye. The potential itself makes it a "must" to at least talk to our people about what you can find here. Take that step this week.

UNITED AIRLINES

EXOPX/P.O. Box 66100
Chicago, IL 60666
Equal Opportunity Employer

Call Collect MONDAY-FRIDAY
303-779-2423

CITY OF APPLETON, WISCONSIN
INFORMATION SERVICES MANAGER

This position is responsible for the overall operations of the cities Information Services Department. Duties will include coordinating the development and growth of information services within the cities various departments, supervising department personnel, administration of department's budget and project management. Interested applicants must have extensive systems experience supplemented by at least 5 years management experience with primary responsibility for maintaining an online information services department. A bachelors degree in Computer Science or related field and governmental experience a plus. We offer a competitive salary with an excellent fringe benefits package. Interested applicants should send a resume with complete salary history, no later than January 27, 1984 to:

Director of Personnel
City of Appleton
P.O. Box 1857
Appleton, WI 54913

An Equal Opportunity Employer

Interested in Moving to Sunbelt Area?

Tennessee's Financial Placement Would Like to Hear From You.

The Banking industry is looking for qualified people at all levels and with various hardware/software experience. Two jobs now open are Programmer/Analyst, 3-5 years experience IBM 4341-I COBOL, salary open. Also Programmer/Analyst, 3-5 years experience NCR Criterion CIP, salary open.

Contact:
Walter Malone or Mary Thompson
Tennessee's Financial Placement
Employment Agency
P.O. Box [illegible]
Little Rock, AR 72[illegible]
AR WATS [illegible] from dist ext. [illegible]
Nat'l WATS [illegible] from dist ext. [illegible]
EOE

MOVE STAFF SOLUTIONS

Our computer can help you get here or stay here. Four WATS lines; 13 years' experience; 370 affiliated offices; 360+ current job orders; 3000+ company clients from Virginia to Texas to Florida! Send resume to:

DATA RESOURCES, USA
Division of Landrum Personnel Resources
P.O. Box 1373C
Pensacola, Florida 32596-1373
CALL TOLL FREE [illegible]
IN FLORIDA [illegible] COLLECT

MANAGER/TECHNICAL SUPPORT

An ideal Sunbelt location is only one of the many advantages you'll find with our Fortune 500 manufacturing company. We also offer attractive career opportunities to high achievers. Currently, we have a need for a Manager of Technical Support with:

- 3-4 years experience in management of a technical support area
- Knowledge of MVS, JES, VTAM, TSO and MS systems
- Leadership abilities and excellent communication skills
- Ability to maintain a close working relationship with the technical support group

Our company offers an excellent starting salary and a very competitive fringe benefits and relocation package. For confidential consideration, send your resume and salary requirements to:

Reply to CW-B4342
Computerworld
Box 880
Framingham, MA 01701

Equal Opportunity Employer M/F

NEW ENGLAND

DATABASE ADMIN	$[illegible]
SYS PROG MVS-DOS/VSE-VM/SP	$42,000
VAX/VMS-11/70/RSTS/E	$40,000
CICS COBOL/MACRO	$38,000
CONSULTANT	$37,000
ME, NH, VT	$35,000
BANKING SYSTEMS	$35,000
HONEYWELL/HP-3000	$33,000
PRG SYS-3/8/S/34	$32,000
PROGS COBOL/PL-1/BASIC	$28,000

LEAHY & COMPANY

Personnel Consultants
99 Broad Street, Suite 301
Boston, Mass. 02110
Telephone (617) 423-4488

MAINE

We have specialized in data processing professional placement in Maine for almost a fifth of a century. If you qualify for positions in the $25-40,000 range, please contact us in total confidence. Our clients pay our fees and provide relocation assistance.

ROMAC

477 Congress St.
Portland, Maine 04101
(207) 773-4748

SYSTEMS PROGRAMMER

MCNC is a not-for-profit corporation supported by the State of North Carolina and industry to develop a national research and educational program in Microelectronics. Our organization will be involved in manufacturing technology research in the semiconductor industry.

We are seeking an individual to design, document, code and maintain document production and presentation quality graphics software. Other duties will include recommending appropriate hardware, assisting in the formulation of objectives and providing general support programming for research activities within the Design Research and Technology Division.

Applicants should have a Masters Degree in Computer Science or equivalent programming experience and knowledge of the UNIX and "C" programming language. Experience in document production and high resolution plotters and terminals is desirable.

Please send resume to:

Human Resources Manager

MCNC

Microelectronics Center of North Carolina
P.O. Box 12889, Research Triangle Park, NC 27709
No Phone Calls Please

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 709 FRAMINGHAM, MA 01701

postage will be paid by

CIRCULATION DEPARTMENT

COMPUTERWORLD

375 Cochituate Road, Rte. 30
Box 897
Framingham, MA 01701-9985

We're Embarking on Exciting

New Directions

Signetics Corporate Information Services is embarking on exciting new directions, in a fast-paced, challenging environment where computers and advanced communications are the core of our Information Center. We've traveled a great distance in a short time, and offer tremendous growth paths for DP professionals ready to contribute.

You'll find Signetics at the leading edge of state-of-the-art hardware and software: IBM 3081-G, 3380 DASD, laser printers, VM/SP2, MVS/JES2, IMS/VS, TSO/SPF and over 40 other program products.

You're invited to set sail with us to break new ground in such exciting areas as: Distributed Data Processing; Integrated Systems; State-of-the-art Hardware and Software; New Applications Development; Worldwide Network; LAN; Office Automation Application; and personal computers.

Sunnyvale
California Opportunities

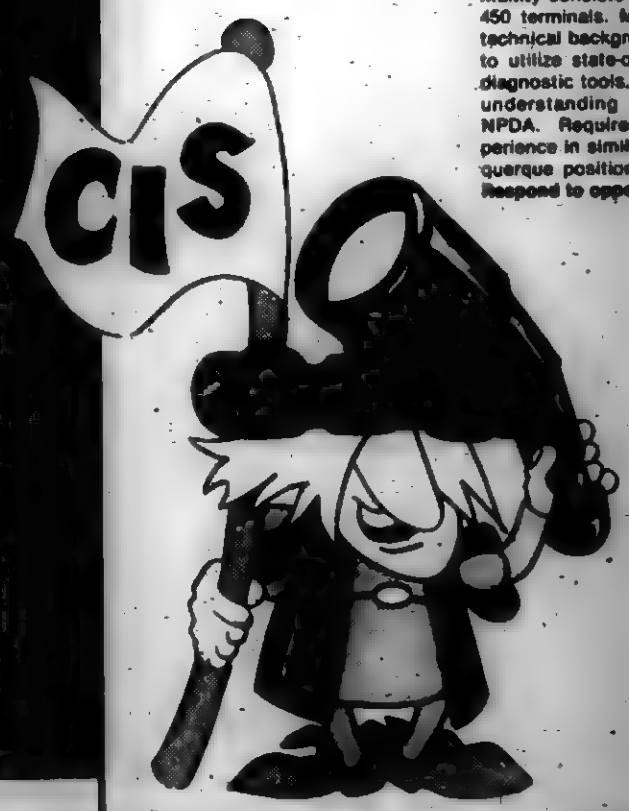
We have current opportunities available in our Sunnyvale, CA facility in the Corporate Systems Development area:

Sr. Programmer/ Analyst
BA or BS in Computer Science or Business and 4-6 years' experience in analysis/programming in an IBM MVS/JES2 environment are desired. Strong COBOL coding and debugging skills are necessary. Familiarity with IMS DB/DC is a strong plus. Openings are in finance, manufacturing and marketing applications. Respond to opportunity #906.

Sr. Systems Analyst
BA or BS in Computer Science or Business. Should have played a major role in systems development. Strong written and verbal communication skills are desired. Familiarity with structured methodology (such as SDM/70) is a plus. Successful candidate will implement financial, manufacturing or marketing systems and interface with other user groups. Respond to opportunity #908.

Data Base Analyst
You should have 5 years' experience in Data Processing, with 3 years in data base applications. Design and implementation of commerical applications also required. Data administration stewardship is a must. Respond to opportunity #910.

Network Control Operator
Monitor large IMS/VM Network utilizing SNA/SDLC. User community consists of approximately 450 terminals. Must have strong technical background and be able to utilize state-of-the-art network diagnostic tools. Must have basic understanding of NCCF and NPDA. Requires 2 years' experience in similar position. Albuquerque positions also available. Respond to opportunity #911.



Albuquerque
New Mexico Opportunities

We are moving our Corporate Computer Services to Albuquerque, New Mexico and are interviewing for positions which will play a key role in this move. All Albuquerque positions will start in California and then transfer to New Mexico with relocation assistance. This data center will consist of twin 308X processors supporting VM/CMS and MVS/JES2 users.

Computer Operations Shift Supervisor
Three-five years' operating experience (including 1 year in a supervisory role) in a large-scale IBM environment utilizing VM, IMS, MVS/JES2 software. Will manage operators, analysts and distribution clerks; coordinate user-programmer and upper management interface and monitor processing in a variety of support areas. Respond to opportunity #912.

Operations Analyst
Two+ years' experience in ABEND resolution and working knowledge of MVS JCL is required. Experience working with production cycles in a large IBM environment is necessary. Respond to opportunity #913.

Data Communications Analyst
Two+ years of hands-on experience in a large network control center. Will be responsible for problem diagnostics and terminal availability. California positions also available. Respond to opportunity #914.

Sr. Computer Operator
Two-five years of operator experience in a large-scale IBM environment utilizing MVS/JES2 and VM software. IMS and TSO experience a plus. Several shifts available. Respond to opportunity #915.

DEC Systems Programmer
BS or equivalent and 5+ years' experience required. Responsibilities include installation, maintenance and support of DEC Hardware/Software. Must have knowledge of VAX, PDP-11, VMS, and RSX 11M. Telecommunications and CAD/CAT/CAM knowledge desirable. Respond to opportunity #916.

Hardware Manager
BSCS and 4+ years' experience required. Will be responsible for management of computer hardware, including configuration layout and equipment installation, as well as vendor maintenance and problem resolution. Should have knowledge of environmental controls and performance characteristics of IBM equipment. Respond to opportunity #917.

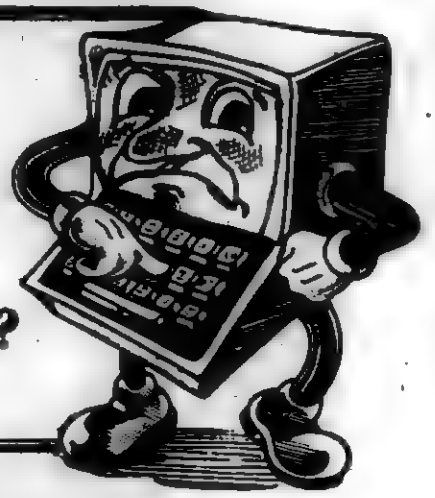
Sr. Systems Software Programmers
Five+ years' experience. Will be responsible for performance and future requirements planning of MVS/JES2 system supporting IMS/DC and TSO on an SNA network. Respond to opportunity #918.

We will be interviewing soon in the Chicago, IL, Dallas/Houston, TX, and Washington, D.C. areas. For more information, please call Kathy Connell, collect at (408) 746-2213 or forward a letter and/or resume indicating opportunity number to: Signetics Corporation, Professional Staffing, Attn: Kathy Connell, 811 East Arques Avenue, Mail Stop 2607, P.O. Box 3409, Sunnyvale, CA 94088-3409. We are an equal opportunity employer.

signetics

a subsidiary of U.S. Philips Corporation

SYSTEMS PROGRAMMERS



Do you feel "terminally ill" in your present position?

If all you do all day is "talk" to machines, maybe it's time to make a change. . .to cga

Cure your problem with an exciting new career at CGA. If you're comfortable working with people and enjoy the challenge of systems software development, please read on.

CGA Software Products Group is one of the largest systems software companies in the U.S. We're dedicated to the development and support of state-of-the-art systems software products.

Work directly with our clients, in product support and assist them with any problems or questions that may arise. A minimum of 2 years experience with MVS BCP internals is essential as is good communications skills and the ability to deal professionally with people of all levels. Knowledge of multiple CPU related software, preferably MSI, MSM or GCD would be a major asset. Some travel to SHARE, CMG and GUIDE meetings is also necessary.

You will find that being a member of our team is highly rewarding. We offer a superior salary and benefits package including profit sharing, major medical/life/health/dental insurance, tuition reimbursement, and relocation assistance.

Why waste time, call Chris Blum collect at (201) 946-7558 to arrange an immediate interview, or send him your resume in complete confidence.

Specialists in the Software Industry

cga Software Products Group

960 Holmdel Road, Holmdel, New Jersey 07733

An Equal Opportunity Employer M/F

BROWN UNIVERSITY

Brown University is involved in a major effort to bring state-of-the-art computing tools to the entire community of faculty, staff, and students. The last few years have seen the installation of the largest academic broadband network in the world connecting over a thousand terminals to more than a dozen mainframes. A $50 million project combining industry and University resources is currently developing workstation environments which allow for sharing and distributing information. The Computer Center, operating an IBM 3081 running VM/CMS, is looking for professionals to help provide services to users in this rapidly growing environment.

Manager of New Services

Share supervision of the technical staff of the Computer Center and manage the development of all NEW services to be delivered by the Center. Primary responsibilities include technical planning for hardware and systems software, managing the development of new hardware and software facilities, and the integration of new facilities into existing support services.

Applicants should have 1-3 years' experience managing a technical development group, a broad background in the current uses of computing, and experience integrating operating systems and applications software into cohesive facilities. Excellent interpersonal and communications skills and familiarity with the facilities and limitations of VM/CMS are also required. Experience connecting ASCII terminals and workstations to mainframes is highly desirable.

Systems Programmer

Will participate in system maintenance and the design and development of changes to the VM/CMS operating system and various systems software, install applications packages, and assist in the efforts to improve the interconnections between the 3081, the LAN, and workstations.

Applicants should have 3 years' experience maintaining and modifying the CP portion of VM/CMS, experience with non-SNA communications protocols in a heterogeneous environment and strong interpersonal and communications skills.

Interested persons should send their resume to Michael Brennan, Brown University, P.O. Box 1879, Providence, RI 02912.

Brown University is an affirmative action/equal opportunity employer

---

ARE YOU A SPERRY UNIVAC 1100 PROFESSIONAL?

If the answer is yes, TRANS AMERICA AIRLINE, a major international carrier, has a place for you in our Oakland, California headquarters office. We have immediate openings for experienced professionals:

MANAGER OF PROGRAMMING
SUPERVISOR-APPLICATION PROGRAMMING
SR. SYSTEMS ANALYST
DATA BASE PROGRAMMER
SR. APPLICATIONS PROGRAMMER
SYSTEMS SUPPORT PROGRAMMER

We offer competitive salaries and excellent benefits including Shared Flight privileges. Please send resume AND salary history to:

M.J. D'Elena
Trans America Airlines
P.O. Box 2994, Airport Station
Oakland, California 94614
Equal Opportunity Employer M/F/H

BANK PROGRAMMER/ ANALYST (2)

North Carolina

Due to branch automation, Peoples Bank has two immediate opportunities in our home office data center. Very attractive compensation program including profit sharing and thrift plan, comprehensive group insurance and excellent relocation assistance.

PROGRAMMER/ANALYST- Branch Automation

Requires minimum of one year experience in a bank or S & L, supporting IBM 4700 or 3600 branch automation system. Requires COBOL experience. Assembler knowledge helpful. Will be part of a branch automation/CIF team.

PROGRAMMER/ANALYST- Branch Automation & CIF

Same requirements as position described above. Experience with UCC CIF system with working knowledge of DBS helpful.

Please send resume or letter with salary requirements, in confidence to:

Robert H. Ferguson, III
Director of Personnel

Peoples Bank & Trust Company

"One Friendly Bank, Many Offices."

P.O. Box 872, Rocky Mount, N.C. 27801

An Equal Opportunity Employer

SYSTEMS PROGRAMMER

Aggressive Billion $, Sunbelt Bank, expanding its technical staff, seeks IBM Systems Programmer.

Our current environment includes RACF, JCS 2, CICS.

Candidate should possess application programming background and a minimum of three years 4341 MVS systems programming experience. Proficiency with SMP4 is a plus.

Send resume and salary requirements to:

Southern National Bank of N. C.
c/o Jerry M. Barnes
P. O. Box 1489
Lumberton, N. C. 28358

An Equal Opportunity Employer M/F/H/V

TECHNICAL CONSULTANT

A computer software and services company seeks a Technical Consultant. The Technical Consultant will have the following duties: Consult with product development personnel and participate in the development of data analysis software using state-of-the-art statistical techniques such as seasonal adjustment, regression analysis, Box-Jenkins forecasting and multivariate statistics. Consult with the company marketing personnel and clients concerning the most effective use of data analysis software. Recommend future data analysis direction for the company. An applicant must have the following minimum qualifications: (a) B.S. in statistics or econometrics; (b) Five years of experience using analytics in business or industry as a technical consultant or systems engineer, E.D.P.; and (c) Experience in the use of at least one statistical and one forecasting software package. The hours of work are 8:00 a.m. to 5:00 p.m., and the salary is $38,000.00. Interested persons should send resumes to 7310 Woodward Avenue, Room 415, Detroit, Michigan 48202. Reference Number 39183. Employer Paid Ad.

MANY OPPORTUNITIES EXCLUSIVES

3 Twin Cities Area firms seek M.I.S. Executives using ROBERT HALF OF MINNESOTA as their Exclusive Search Agent. In Health Care, the need is for a strong Manager to develop all systems, communications and do software enhancements (to $48K). A prestige consulting firm has opening for a one-person DP Audit and systems evaluation pro (to $50K); and a noted manufacturer w/DOS and CMS is ready to hire a Manager reporting to the M.I.S. Director (to $38K). If you have the relevant industry background and recent experience, call us today.

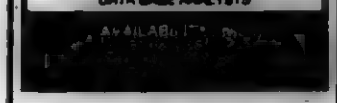
Mark Daniel or John Miller
ROBERT HALF
3600 IDS Center
Minneapolis, MN 55402
(612) 338-0601

Energy Management Application Engineer

Education Required: Graduate in an engineering curriculum of not less than 4 years or 4 or more years in engineering technology or related science curriculum from an accredited school or college. Education Desired: 4 years electrical engineering degree. Experience Required: 2 years in electric utility or process control with some mini-micro computer software experience. Experience Desired: 4 years with electric utilities and/or process control or 2 years in real time control software experience. Send resumes to:

Oglethorpe Power Corp.
2500 Woodcock Blvd.
Atlanta, Georgia 30341

FLORIDA CONNECTION



All Expenses Paid

Our clients, in urgent need of your expertise will pay all your expenses in relocating you to an area of Sun & Fun. No State Tax. Average Temperature 72F

TELECOMMUNICATION PROGRAMMERS
PROGRAMMER ANALYSTS
SYSTEMS ANALYSTS
SYSTEMS PROGRAMMERS
DATA BASE ANALYSTS

CRC Systems, Inc.

4020 Williamsburg Court
Fairfax, Virginia, 22032

CRC, a high-tech telecommunications organization needs

IMS DB/DC & CICS Analysts & Programmers

Full time employees or subcontractors. Call or send resume to:

Jim Lloyd, Vice President
(703) 385-0440.

NEW HAMPSHIRE

Where life and living is more than just work. As one of the most respected names in electronics, electro-optics and instrumentation, Kollsman is one of the largest employers in New Hampshire. We presently have excellent opportunities in our modern, Data Processing Center with state-of-the-art EDP equipment.

SYSTEMS PROGRAMMER: will design programs and maintain Honeywell DPS-6 computer software. Experience with GCOS's most important. DEF-II and FMS a plus.

PROGRAMMERS: will evaluate specifications, design, code and modify programs and perform testing. Must have a minimum of one year programming experience using COBOL, OS/JCL on IBM equipment.

COMPUTER OPERATOR/2nd Shift: will be responsible for the operation of an IBM 4341 OS/VS1 computer with associated peripheral equipment. Must have 2-4 years' related experience.

For consideration of any of these openings please send your resume, in confidence, to: Kollsman Instrument Company, Division of Sun Chemical Corporation, Attn: Dave Osgood, Technical Recruiter, Sun CW116, 220 D.W. Highway South, Merrimack, NH 03054.

Kollsman Instrument Company

Equal Opportunity/Affirmative Action Employer

AUBURN UNIVERSITY SYSTEMS SUPPORT SPECIALIST I

Systems Support Specialist I needed to maintain the general instructions of the system control program that controls the entire computer system. Will make changes to instruction sets. Provides installation, checkout and maintainteneance of many productivity software products and its interface to the system control program. Requires B.S. In Computer Science and one year of experience. Will accept M.S. degree in Computer Science in lieu of experience. Course work should include compiler development, PL/1, Simscript, 370 Assembly, Fortran, APL, GPSS, Cobol and some knowledge of microcomputers. Salary $19,200/year, 40 hours/week.

Interested applicants should send resumes to Doris Kindell, ASES, P.O. Box 2236, Opelika, Alabama 36803-2236 or apply in person at any Alabama State Employment Service. Job Order No. 0027748, E.E.O.

The Sperry Spirit
in Salt Lake City

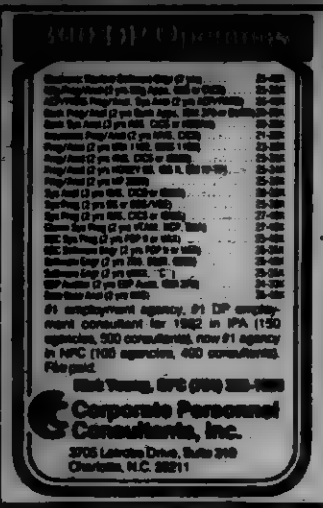
HOW TO MAKE OVER $80 000 00 A YEAR ON CICS COMMAND LEVEL PROGRAMMING

Acquire one of the most demanded & rewarding programming skills in months instead of 2 years. A complete self-study book based on CICS latest version 1.5, written in COBOL and with special emphasis on VSAM. It covers virtually every CICS technique you will ever need. Fifteen sample programs address all CICS major applications. Over 150 ready-to-use examples. Sample programs include: Menu, Add, Update, Delete, Browse, Print 24x80, Print 66x132, Print Any Size Report, Message Routing, Screen Refreshing, VSAM Alternate Index Setup and Manipulation, Constant Table Setup and Use and more.

It is hard to believe the learning can be so easy until you try it. In hours, you can start to create your own BMS maps; in days, you can start to write your own pseudo conversational CICS programs. Some CICS techniques are especially hard. When you are stuck for the technical problems, you'll be thankful you have this book.

Moonlighting on CICS projects is very rewarding. A typical 10-screen system can mean $15,000 cold cash. This book also tells you how to market your services, locate the contracts, write a proposal, make a presentation, quote the right price & draw a contract agreement without a lawyer.

But act now. Send $34.95 (plus $2.00 for shp. & hndl.) or $32. ea. for 2, $30 ea. for 3, $28. ea. for 4 and over. (shp. & handl. incl.) in Check or money order to: CCD ONLINE SYSTEMS, INC., P.O. BOX 795759, DALLAS, TX 75379. Allow 1 to 2 weeks for delivery. Full refund within 10 days if not satisfied.



Corporate Personnel Consultants, Inc.
3705 Latrobe Drive, Suite 249
Charlotte, N.C. 28211

Professional Master's Degree Computer and Information Science

Advance your career in information systems through Dartmouth's distinctive professional program. Our two-year program is designed to equip you to take a leading role in planning, designing, and developing effective business solutions to business problems.

In the CIS Program, you will study current methodologies for planning, analysis, and design; strategies and issues in the management of information systems; business organization; project management; database systems; networks and distributed processing; professional communication. Learn from guest lectures by practicing managers of information systems, case studies, and professionals-in-residence. An internship is required of each student.

If you have previous experience in the computing field but want to be equipped to assume more responsibility and leadership, consider joining us next year. For more information, write: Program in Computer and Information Science, Dept. C, Nathan Smith Building, Hanover, NH 03755.

Dartmouth College

KINGDOM OF SAUDI ARABIA
KING SAUD UNIVERSITY
ABHA BRANCH
ABHA SAUDI ARABIA

COMPUTER CENTER

The Department of Computer at King Saud University, Abha Branch has available the two following positions for the Academic Year 1983/84 which starts Febuary 1984

A. COMPUTER SERVICE MANAGER

QUALIFICATIONS REQUIRED

- Full Knowledge of Arabic language (reading and speaking
- Master Degree in Computer Science
- Several years of working experience in computer center
- Ability to recruit and train new staff
- Knowledge of MUS

JOB DESCRIPTION

- Managing the Computer Center
- Teaching some computer courses
- Training personnel for the computer center
- Improving computing facilities
- Developing computer programs for the University Branch Administration and the College

B. PROGRAMMER

QUALIFICATIONS REQUIRED

- Bachelor Degree in Computer Science
- Minimum of two years relevant experience
- Arabic knowledge will be an advantage but not conditional

JOB DESCRIPTION

- To assist in Programming Courses
- To assist in Training new staff
- To contribute the development of administrative system and scientific programs

THE BENEFITS OFFERED BY THE UNIVERSITY FOR THE TWO POSITIONS ARE:

- Free roundtrip airline tickets annually for the employee and his family
- Furnished accommodation or housing and furnishing allowance
- Monthly transportation allowance
- Relocation allowance
- End of service gratuity
- Free Medical and Dental care covering family
- Contribution by the University to cover tuition fees for non-Arabic-speaking children

Intended Applicants are kindly requested to send their application letters indicating the position applied for together with photocopies (non-returnable) of their academic diplomas and specialized experience certificates, and an updated resume to the following address:

KING SAUD UNIVERSITY
ABHA BRANCH
COMPUTER CENTER
P.O. BOX 418
ABHA — SAUDI ARABIA

A second copy of the above mentioned information should also be mailed to

KING SAUD UNIVERSITY OFFICE
3425 WEST LOOP SOUTH #450
HOUSTON, TEXAS 77027
Attention: Ms. Nikky Amin

Qualified candidates should furnish their correct addresses and telephone numbers where they can be reached for notification of place and date of scheduled interview.
Applications will be held in strict confidence.

OPPORTUNITY

At Citibank (South Dakota), N.A. opportunity is an everyday occurrence. Through aggressive marketing of our credit and banking products, this opportunity has led to outstanding success.

We are a relatively new organization in South Dakota having been established in February, 1981. Because of our success, our current staff is being significantly expanded in 1984. To meet this expansion, we are searching for experienced candidates who are seeking excellent career advancement opportunities. Under an OS/MVS IBM environment, the following positions are available:

- APPLICATION PROGRAMMING ANALYSTS
- MVS & CICS SYSTEMS PROGRAMMING ANALYSTS
- OPERATIONS TECHNICAL SUPPORT ANALYSTS
- TELECOMMUNICATIONS NETWORK OPERATIONS ANALYSTS
- PROJECT MANAGERS
- PROGRAMMING MANAGERS

We are seeking programming experience in both the batch and CICS areas with knowledge of either Automatic Teller Machines, Loans, Time Deposits, Demand Deposit Accounts, Automatic Clearing House, Hogan or Direct Mail.

If you are an aggressive professional seeking challenging work and satisfying rewards, we are what you have been looking for. We offer competitive salaries and benefits including relocation assistance. If you are interested, contact us at:

Suite 1186 - CW
Citibank (South Dakota), N.A.
P.O. Box 6000
Sioux Falls, SD 57117

An Equal Opportunity Employer M/F/V/H

Citibank (South Dakota), N.A.

CITIBANK

MANAGER/ FRANCHISE SYSTEMS

Where can you be responsible for a complete, automated system?

With the folks who do it right!

As technology becomes more advanced, so do we! We currently require a data processing/financial professional who can translate our current automated system to the many KFC Franchisee Operations.

Major responsibility will be the development and integration of hardware and software for KFC franchisees. This includes business analysis, training user groups and providing constant daily support. You will also be responsible for keeping abreast of technological advances and how they can effect operations.

We require a minimum of 3 years' strong accounting/auditing experience, as well as a technical background with micro-computers and/or small business computers. Degree in Accounting, Business or Computer Science and excellent communications ability essential. Travel will be required.

We offer an excellent salary and a comprehensive benefits package. If you would like to take on this challenge and become part of our fast moving company, please send your resume, complete with salary history and requirements, to: Ms. K. Brittain, Employment Specialist, Kentucky Fried Chicken, P.O. Box 32070, Department 292C, Louisville, KY 40232. An equal opportunity employer M/F.

Kentucky Fried Chicken.

BRYANT BUREAU HAS THE COMPUTER PROGRAM FOR YOU

If you're not accomplishing your career goals, let us put you in the right environment. Our national database of client companies are continually looking for progressive DP professionals who want to remain state of the art.

IBM Sr Systems Analyst - retail	to $38K
IBM MVS Data Base Administrator	to $38K
IBM Software Telecomm Specialist	to $38K
IBM Systems Pgmr OS MVS CICS	to $32K
IBM Systems Analyst - MRP	to $32K
IBM Pgmr Analyst OS MVS CICS	to $32K
HON Dis/WTP Software Support	to $38K
HON Hardware Planning Specialist	to $32K
BUR DMS II Data Base Admin	to $32K
BUR Interp MCP Support	to $32K
DEC VAX Macro Sr Systems Pgmr	to $38K
DEC VAX Satellite Programmer	to $31K

To become part of the growth in the 80's, contact the DP Division below.

Bryant Bureau.
DP Division
4350 S. Tamiami Trail, S-518
Sarasota, FL 33581
(800) 237-6467

DON'T DELAY CALL COLLECT TODAY:

For outstanding DP jobs in the BEST SOUTHEASTERN COMPANIES: Programmer/Analysts; Systems Analysts; DBA's; Technical Support.

All fees, relocations, and interview expenses paid by our clients.

Personnel Placement, Inc.
837-D Huffman Mill Rd.
Burlington, NC 27215
(919) 584-0001

PROJECT MANAGER

Prestigious CT. client seeking individual to manage all devel. proj. for growing ind. loc. Salary to $60,000.

ROBERT HALF
Of Hartford, Inc.
111 Pearl St.
Hartford, CT 01603
(203) 278-7170
Personnel Consultants

FACULTY POSITION IN COMPUTER SCIENCE

COMPUTER SCIENCE. Tenure-track, full-time undergraduate position in Computer Science at Lock Haven University beginning August 18, 1984. Rank and salary dependent upon experience and qualifications, up to $34,000.00 for a standard nine-month contract. Ph.D. in Computer Science preferred; Masters in Computer Science required. Business, industrial, or teaching experience in Computer Science required. Send vita, including unofficial transcripts, and letters of recommendation to Professor Ralph E. Kahn, Chairman, Computer Science Search Committee, Lock Haven University, Lock Haven, PA 17745. Applications will be accepted until position is filled.

THE UNIVERSITY OF TENN. AT MARTIN
DEPT. OF MATH AND COMPUTER SCIENCE
MARTIN, TENN. 38238

Assistant or Associate Professor of Computer Science, begin September '84. Requires MS or Ph.D in Computer Science or related area. Teaching experience is desirable. Primary responsibility: teaching 12 quarter hours of undergraduate courses. UTM is a primary campus of the UT system and stresses quality undergraduate education. Martin is a town of 8,000 located 120 miles northeast of Memphis. Send resume, transcripts and 3 letters of reference to Bill Austin, Chairman. Applications accepted through 3/1/84 or until filled.
UTM is an Equal Opportunity Affirmative Action Employer

To teach undergraduate Computer Systems Engineering Technology courses in a 4-year accredited college. M.S. required in Computer Systems, Electronics or related field. Industrial experience desirable. Deadline for application by March 2, 1984. Send resume to: Dr. Donald Theriault, Affirmative Action Officer, Oregon Institute of Technology, Oretech Branch Post Office, Klamath Falls, OR 97601.

HIRING?

More computer people read Computerworld than any other newspaper in the United States - more than half a million computer people every week. And, among our 529,650 readers at user organizations about half claim to look at recruitment ads at least every other week (only a small percentage say they never look at recruitment ads). No wonder Computerworld carries more recruitment ads for computer people than any other publication. To place your ad or to get a rate card with complete details on Computerworld Classifieds, call or write:

Classified Advertising
Computerworld
Box 880
Framingham, MA 01701
1-800-343-6474 — 617-879-0700

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

Free!

New 1984 Salary Data

No doubt, during 1983, you knew that many firms took a hard line on awarding salary increases—or, in some cases, even enacted across-the-board cuts.

Yet, on the other hand, did you know that salaries for *some* computer professionals *soared* right on through the uncertain business outlook?

Computer salaries are up.

The new, *1984 Computer Salary Survey and Career Planning Guide* is based on contacts with more than 44,000 computer professionals and 35,000 organizations. Not only are salary averages for fifty-eight positions reviewed (including ten new ones), but high and low compensation ranges are also provided.

Included are positions in programming, software, systems design, data base/data communications, Edp auditing, operations, computer sales, marketing, marketing support and management.

In addition, the new Survey details seven ways to maximize your chances of getting ahead through a proven, seven-step system that has helped thousands of computer professionals advance their careers.

Free to computer professionals.

The new 32-page Survey is available to you without charge. Since 1966, this annual report has helped approximately a quarter of a million computer professionals understand current trends in technology and compensation, realize how and where they fit in and what they need to do to reach their full potential.

You owe it to yourself—especially if most of your career lies ahead—to call or write today.

Call today for your complimentary copy.

Call the Source Edp office nearest you for a free copy of our new 32-page report. We'll mail a copy to you in strict confidence, without obligation.

If unable to call, write:

Source Edp
Department C82
P.O. Box 7100
Mountain View, CA 94039

When writing, please include your title.

source edp®

Personnel Services

The world's largest recruiting firm dedicated exclusively to the computer profession.

Source Edp offices

United States:

Alabama
Birmingham 205/982-8705

Arizona
Phoenix 602/279-1010
Tucson 602/792-0375

California
Northern
Mountain View 415/969-4010
Sacramento 916/446-3470
San Francisco 415/434-3410
Walnut Creek 415/945-1910
Southern
Fullerton 714/738-1313
Irvine 714/833-1730
Los Angeles/Downtown 213/688-6941
Los Angeles/South Bay 213/540-7800
Los Angeles/West 213/208-8111
San Diego 619/231-1900
San Fernando Valley 818/781-4800

Colorado
Denver 303/773-3700

Connecticut
Danbury 203/797-0880
Hartford 203/522-6580
New Haven 203/787-4566
Stamford 203/967-4888
Stratford 203/378-7240

District of Columbia
Washington D.C. 202/659-6656

Florida
Fort Lauderdale 305/491-0145
Jacksonville 904/356-1820
Miami 305/624-3535

Georgia
Atlanta/Downtown 404/588-9360
Atlanta/North 404/953-0300

Illinois
Chicago/E. Loop 312/861-0770
Chicago/W. Loop 312/346-1260
Oak Brook 312/986-0422
Rolling Meadows 312/392-0344

Indiana
Fort Wayne 219/432-7333
Indianapolis 317/631-2990

Iowa
Des Moines 515/243-0191

Kansas
Overland Park 913/888-8885
Wichita 316/688-1621

Kentucky
Louisville 502/581-9660

Louisiana
Baton Rouge 504/924-7183
New Orleans 504/561-8500

Maryland
Baltimore 301/727-4050
Greenbelt 301/441-8700
Towson 301/321-7044

Massachusetts
Boston 617/482-7613
Burlington 617/273-5160
Wellesley 617/237-3120

Michigan
Detroit 313/259-7857
Grand Rapids 616/459-8539
Lansing 517/484-4561
Southfield 313/352-8520
Troy 313/362-0070

Minnesota
Minneapolis
West 612/544-3800
Downtown 612/332-6480
St. Paul 612/227-6180

Missouri
Kansas City 816/474-3393
St. Louis 314/862-3800

Nebraska
Omaha 402/346-6388

New Hampshire
Nashua 603/880-4847

New Jersey
Cherry Hill 609/482-3800
Edison 201/494-2800
Morristown 201/267-3222
Paramus 201/845-3800
Princeton 609/452-7277

New Mexico
Albuquerque 505/247-4270

New York
Albany 518/482-3035
Buffalo 716/636-6630
New York City
Grand Central 212/557-6611
Penn Station 212/736-7445
Wall Street 212/962-6060
Rochester 716/263-2670
Syosset, L.I. 516/364-0909
Syracuse 315/422-2411
White Plains 914/683-8300

North Carolina
Charlotte 704/552-8577
Greensboro 919/379-1155
Raleigh 919/847-7665
Winston-Salem 919/724-6630

Ohio
Akron 216/535-1150
Cincinnati 513/769-5060
Cleveland 216/771-2070
Columbus 614/224-0660
Dayton 513/461-4660
Toledo 419/242-3601

Oklahoma
Oklahoma City 405/722-7410
Tulsa 918/599-7700

Oregon
Portland 503/223-5160

Pennsylvania
King of Prussia 215/265-7250
Philadelphia 215/665-1717
Pittsburgh 412/261-6540

Rhode Island
Providence 401/751-5995

South Carolina
Columbia 803/256-7446
Greenville 803/271-7044

Tennessee
Nashville 615/329-0995

Texas
Austin 512/478-9720
Dallas
Central 214/954-1100
North 214/387-1600
Fort Worth 817/338-9300
Houston
Downtown 713/751-0150
Galleria/Post Oak 713/439-0550
San Antonio 512/342-2828

Utah
Salt Lake City 801/595-3939

Virginia
McLean 703/790-9919

Washington
Seattle 206/454-5400
Spokane 509/838-7677

Wisconsin
Green Bay 414/432-1184
Madison 608/251-0184
Milwaukee 414/277-0345

Canada:

Ontario
Toronto
Don Mills 416/425-6720
Downtown 416/365-1125
Mississauga 416/848-3344

Senior Programmer/ Programmer Analyst

Yamaha International Corporation has two openings in our Information Systems Department; a Senior Programmer and a Programmer Analyst. Successful candidates should have 3 to 5 years programming experience within a business environment and experience on a Burroughs large system, CANDE and DMS II.

Duties will include business applications, writing program specifications, coding, testing and debugging programs. Good communication skills, both written and verbal are required.

Please respond with resume, complete with past salary and present requirements to: Patty Glenn

Yamaha International Corporation

P.O. Box 6600
Buena Park, CA 90622

Only complete resumes will be considered.

Equal Opportunity Employer M/F/H/V

Network and Communications Manager

The University of Alaska Computer Network

The UACN provides the statewide University of Alaska system of academic and administrative computing and data communications services. The Network and Communications Manager is responsible for evaluating communications service requirements and determining the facilities needed to meet those requirements. Also, this post is responsible for evaluating, coordinating and supervising the operation, maintenance, enhancement, and planning of the communications network and its facilities. The successful applicant must possess knowledge of communications network architectures, engineering, local area networks, and data communications. In addition, skill in the management and development of large data communications networks are required.

The position is based in Fairbanks, Alaska and will report to the Director of Network and Operations. The salary range begins at $42,765 DOE.

Application letters, together with a resume and at least 3 professional references must be postmarked by March 30, 1984 and sent to:

Statewide Office of Human Resource Development
University of Alaska
202 Tanana Drive
Room 1 Bunnell Building
Fairbanks, Alaska 99701

Your application for employment with the University of Alaska may be subject to public disclosure should you be among the finalists for the position.

The University of Alaska is an Equal Employment/Affirmative Action Employer and Educational Institution.

DATA BASE ADMINISTRATORS

TANDEM
- Online Applications
- Distributed Systems
- Relational - CODASYL

UNIVAC
- Requirements Analysis
- Logical Modeling
- Logical/Physical Design

DYNAMAC CORPORATION

Has immediate openings for DATA BASE ADMINISTRATORS at our Southern Maryland Facility in Lexington Park, Maryland on the Chesapeake Bay.

U.S. CITIZENSHIP REQUIRED

Qualified applicants should contact Personnel at (301) 499-2500, Ext. 330, and send resume to:

DYNAMAC CORPORATION
c/o Personnel Department
11140 Rockville Pike
Rockville, MD 20852

SUCCESS THRU QUALITY

An Equal Opportunity Employer

MARKET RESEARCH PROFESSIONALS

Bring Your Creative Talents And Expertise To

ITT Telecom

And Become An Important Part Of Our Telecommitment™

The ITT Telecommitment™ is a pledge to ourselves and to our customers that we are committed to achieving the highest level of technical excellence and leadership in fulfilling customer telecommunications requirements for voice, data and information transmission.

At ITT TELECOM, in Raleigh, North Carolina, our Telecommitment™ philosophy is backed by some of the most creative and talented professionals in the industry; a team dedicated to meeting the challenges of a fast-changing industry. If you feel your highly accomplished skills match our long-range goals, look into the positions offered with our BUSINESS and CONSUMER COMMUNICATIONS DIVISION and become an integral member of the number one team in telecommunications.

MANAGER MARKET RESEARCH

Responsibilities will include managing customer needs and competitor analysis. Required is experience in office automation, integration of data/voice, advanced terminal features and local/private wide-area networking. Familiarity with commercial specification requirements is highly desirable. MBA preferred along with 6-10 years experience of which 5 years should be in the data systems industry.

MARKET RESEARCH SPECIALIST

Specializing in the advanced voice/data terminal area identifying customer needs and performing competitive analysis, you will be required to analyze competitive product information, product pricing, evaluate new and/or competitive technologies and recommend related market strategies. MBA Degree desired along with at least 3 years experience preferably with a data industry systems manufacturer. Voice experience would be a plus. Familiarity with commercial specifications requirements desirable.

MARKET RESEARCH SPECIALIST

Supporting our MANAGER, Market Research/Intelligence, in analyzing our current telecommunications products data needs/enhancements for residential, key systems and PABX markets, you will be required to generate studies and analysis and maintain source documentation for current product non-voice enhancements while acting as a back-up to our manager regarding customer and competitive analysis for future voice related requirements. Along with a proven ability to interface effectively with middle and top management personnel, an MBA Degree and at least 3 years experience with a data industry systems manufacturer is desired. Voice experience would be a plus; familiarity with commercial specification requirements highly desirable.

In addition to excellent salaries, comprehensive benefits, and ample room for career development, our location will make your move to ITT Telecom complete. In Raleigh, you will find a bountiful collection of cultural, educational and recreational pleasures all designed to meet the personal preferences of the community. Relocation assistance will be provided; a full-time Relocation Coordinator is on staff to assist with your relocation from BEGINNING to END. Please send a detailed resume, indicating position of interest and including salary history in strict confidence to: **Senior Technical Recruiter, Department CW-116, ITT Telecom, Business and Consumer Communications Division, 2912 Wake Forest Road, Raleigh, North Carolina 27611.** An Equal Opportunity Employer M/F/H/V.

ITT Telecom
Business & Consumer
Communications Division

Systems Instructor/ Course Designer

Move up to the Leader

Bank of America, one of the world's leading financial services organizations, currently has an opening for Systems Instructor/Course Designer in the San Francisco Area.

In this position, you will be responsible for technical training of application programmers, including teaching the Analyst Training Class, TSO/ISPF Workshop series and IMS of Bank of America. You will team teach the ATC and jointly have the responsibility for instruction materials preparation, counseling, grading quizzes and programs, and design of new materials relative to the ATC. You will also develop and deliver new courses needed for the Application Systems Curriculum.

You should have 2-3 years' structured COBOL experience along with 1-2 years' JCL, TSO and/or MAESTRO experience. You should have course development experience and a good understanding of structured techniques. Three to four years' teaching Data Processing plus strong interpersonal and communication skills are required.

Bank of America offers an outstanding salary and benefits package designed to attract and maintain top professionals. Send your resume to: **Bank of America, Professional Recruitment, Dept. 3442-0116A, P.O. Box 37000, San Francisco, CA 94137.** An equal opportunity employer m/f/h/v.

Bank of America
The Professional's Choice.

Sohio

We're Sohio Petroleum Company, a Fortune 25 firm pioneering in the energy industry. In our Western Region headquarters, we're combining talented and creative minds with advanced technology to further our aggressive oil and gas exploration and production efforts.

Scientific Systems Planning Analyst

We're looking for a seasoned professional for our San Francisco Scientific Systems group. The successful candidate will have a wide breadth of knowledge in scientific computing technology and 5+ years' previous experience. You will use your demonstrated understanding of the latest technology to integrate user requirements and computer solutions in order to develop long-range proposals for scientific computer facilities. Both hardware and software knowledge essential.

The search for skilled professionals is an integral part of our expansion strategy. Experienced individuals should send a resume today to Judy Alter, Sohio Petroleum Company, S081, 50 Fremont Street, San Francisco, CA 94105. We are an equal opportunity employer M/F/H/V.

Your search leads to Sohio.

SOHIO

LEAD SYSTEMS PROGRAMMER

Kaiser Permanente Medical Care Program, the largest health maintenance organization in the world has an excellent career opportunity available for a lead systems programmer in Portland, Oregon.

The successful candidate will join the Information Services Department and will be responsible for developing and implementing computer systems methods and tools. The individual will evaluate and recommend communications, hardware and software systems. The position requires a college degree in computer science or related field and 5 years experience in systems programming in a medium to large IBM environment. Two years experience in data processing may substitute for 1 year of education up to a maximum of 4 years.

For immediate consideration send resume to:

Edgar P. Kaiser Health Center
Personnel Department Room 110
3600 N. Interstate Avenue
Portland, Oregon 97227

Kaiser Permanente Medical Care Program

An Equal Opportunity Employer/ Handicapped Hired

DIRECTOR COMPUTING AND INFORMATION SERVICES

THE UNIVERSITY OF GEORGIA

The University of Georgia invites applications and nominations for Director of the Office of Computing and Information Services. Responsibilities include management of the computing facilities (an IBM 3081D, two IBM 3081Ks AP systems, two VAX 780's, a CDC CYBER 835, a CDC CYBER 730, and a CDC CYBER 205), and a staff of 65. Qualified applicants should have at least five years supervisory and managerial experience in a large academic computing facility, a working knowledge of telecommunication networks and distributed data processing, appropriate technical background in computer systems and their uses, excellent oral and written communications skills, and should hold a degree from a recognized institution of higher education. Please submit resume, with references and salary requirements, postmarked by March 1, 1984 to: Dr. James B. Kennedy, Chairman, Screening Committee, Assistant to the President for Academic Affairs, The University of Georgia, Old College, Athens, GA 30602.

An Equal Opportunity, Affirmative Action Employer

PROJ. LDR. RETAIL

Mail software devel. co. requires min. 3 yrs. retail sys. applications mgmt. HP3000, IMAGE/NEW, COBOL experience required. Salary Ind. $35,000 (Fee Paid).

ROBERT HALF
of Providence, Inc.

76 Westminster St., Suite 600
Providence, RI 02903
(401) 274-6700
Personnel Consultants

DATA BASE ANALYST

Openings in the Florida Space Coast area. BS in Computer Science/IS preferred. 3+ yrs. experience in data base design/generation. Knowledge of ADABAS/NATURAL required. Responsibilities to include data base design and implementation, maintenance and tuning. Competitive salary and excellent benefits. Submit resume and salary history to:

EG&G Florida, Inc.
410 Highpoint Drive
Cocoa, FL 32926-6666

CALIF. & CICS

+ Openings in IMS, IDMS, MVS/VM Sys. Programmers

(714) 891-1244

CPU COMPUTER PROFESSIONALS UNLIMITED, agency

7011 Garden Grove Blvd.
Ste. D, Garden Grove, CA 92641

ATLANTA BANKING POSITIONS

$35,000 to $40,000

Need several Programmer/Analysts, Senior Analysts, and Team Leaders for Mid Shops. Relocation Expenses Paid.

Send resume to:

Jim Heard
EDP Consultants, Inc.
3067 Bunker Hill Road, Suite 204
Marietta, Georgia 30062
404-971-7281

LOOKING?

Find the job you want in Computerworld's classifieds. No other publication carries as many ads for computer professionals as Computerworld, so no other publication can give you as wide a choice of jobs, salary and location as Computerworld. You can even try a "Position Wanted" ad to look for exactly what you want, where you want.

Be sure you look over our recruitment ads every week, so you don't miss the opportunity that's just right for you.

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY
375 Cochituate Road, Box 880, Framingham, MA 01701/(617) 879-0700

DATA PROCESSING PROFESSIONALS

DATA RESOURCE CORPORATION, headquartered in Atlanta, is a leader in quality Contract Programming and Consulting. Our continued growth in the Southeast and Southwest has created opportunities for versatile Professionals with state-of-the-art skills in Programming and Systems Design.

We are currently seeking individuals with at least 3 years of oriented programming experience, strong technical backgrounds, and who possess the desire to work in challenging Data Processing environments. MIS and CICS skills are of special interest, as are the others in front of them.

We can offer you competitive salaries and comprehensive benefits package, including bonuses and profit sharing. If you're tired of working on a dead-end job with a dying firm, and progressive company with a bright future, then you've found it. Join DRC in your area!

For immediate consideration, please call BECKY KOLEY or CHARLIE WEILER at 1-800-241-4382, or send your resume to:

DRC

DATA RESOURCE CORPORATION
3391 Peachtree Rd.
Suite 100
Atlanta, GA 30041
(404) 455-7300
An EQUITABLE Company

Telecommunications Diagnostic Supervisor

The University of Alaska Computer Network. The UACN provides the statewide University of Alaska campuses with statewide and international computer and data communications services. The Diagnostic Supervisor is responsible for the installation, maintenance, and fault isolation of communications facilities. This position also supervises the telecommunications diagnostic staff and provides technical assistance to network users. The successful applicant must possess knowledge and experience with data communications, communications equipment and terminal interfaces, and network monitoring/testing facilities.

The position is based in Fairbanks, Alaska and will report to the UACN Network and Communications Manager. The salary range begins at $22,440 per year DOE.

Application letters, together with a resume and at least 3 professional references, must be postmarked by February 28, 1984 and sent to:

Statewide Office of
Human Resource Development
University of Alaska
302 Tanana Drive
Room 1 Bunnell Building
Fairbanks, Alaska 99701

Your application for employment with the University of Alaska may be subject to public disclosure should you be among the finalists for the position.

The University of Alaska is an Equal Employment/Affirmative Action Employer and Educational Institution.

OVERSEAS * TANDEM * ARABIAN GULF

Our client, engaged in sales, support and maintenance of Tandem computers and intelligent terminals is immediately seeking the following qualified personnel:

TANDEM
- Hardware Engineers
- Software Engineers
- Application Programmers

IBM
- Banking Terminal Programmers

One year contract includes housing, paid vacation, tax free income, auto allowance and possible family status. Call or send resume to:

Steve Eddington
International Personnel Inc.
2995 East Oakton, Suite C30
Arlington Heights, IL 60005
(312) 228-5050

Explore New Dimensions in Software Technology

With Sperry you will find challenging career opportunities while you work on the latest software technology with high-calibre professionals like yourself. Across the nation, our Technical Services Division is providing expertise in the design and development of major scientific, commercial, and defense software systems. Whether you're a MICROPROCESSOR SYSTEM DESIGN ENGINEER, A REAL-TIME SCIENTIFIC PROGRAMMER, AN OPERATING SYSTEM INTERNALIST, OR ONE OF MANY OTHER TYPES OF SOFTWARE SPECIALISTS YOU'LL FIND EXCITEMENT AND REWARD IN A NUMBER OF MAJOR AREAS:

- DEC and Univac real-time programming efforts for NASA Communications and Satellite Control Centers (Riverdale, MD)
- Univac 1100 System internalist, data base design, and application programmers for complex financial and communications packages (Wash. D.C., Harrisburg, PA and Newport, RI)
- Microprocessing System Engineering for the Navy's tactical Advanced Combat Direction System (San Diego, CA)
- Communications programming for real-time military communications efforts - AUTODIN, AMME, LDMX experience a plus. (Phoenix, AZ)

These are just some of the many fulfilling positions awaiting you at Sperry.
Complementing these dynamic openings, Sperry offers a highly competitive compensation and benefits program. To learn more, direct your resume to our Eastern and Western representatives. U.S. Citizenship required. Principals only. An equal opportunity employer M/F/V/H.

EAST
Sperry Corporation, Computer Systems,
Technical Services Division,
B. Glover, (Dept. CW), 1901 N. Moore St.,
Arlington, VA 22209

WEST
Sperry Corporation, Computer Systems,
Technical Services Division,
B. Elmer, PO Box 43525,
St. Paul, MN 55164-0525

SPERRY

©Sperry Corporation 1984

cga

Philadelphia Baltimore
Washington D.C. Richmond

CGA Computer Associates, the nations most dynamic consulting firm, has immediate openings for professionals experienced in the following:

- IMS DB/DC
- CICS
- IDMS-ADS/O
- SYSTEM 34/36

If you've ever considered moving up to consulting, we think you'll agree that CGA is your best choice. We offer:

- PERMANENT FULL-TIME EMPLOYMENT
- ON GOING EDUCATION
- TOP SALARIES AND BENEFITS
- DIVERSITY OF LOCAL ASSIGNMENT
- FORTUNE 1000 CLIENTS
- EXCELLENT CAREER GROWTH POTENTIAL

To find out more about these exciting career opportunities, please forward your resume in confidence to: CGA Computer Associates, 401 East Pratt Street, World Trade Center, Baltimore, MD 21202, or call (301) 837-0343.

For Philadelphia-Attn: JoAnn Russo For Washington DC-Attn: Midd Popp
For Baltimore and Richmond-Attn: Jack McFarland

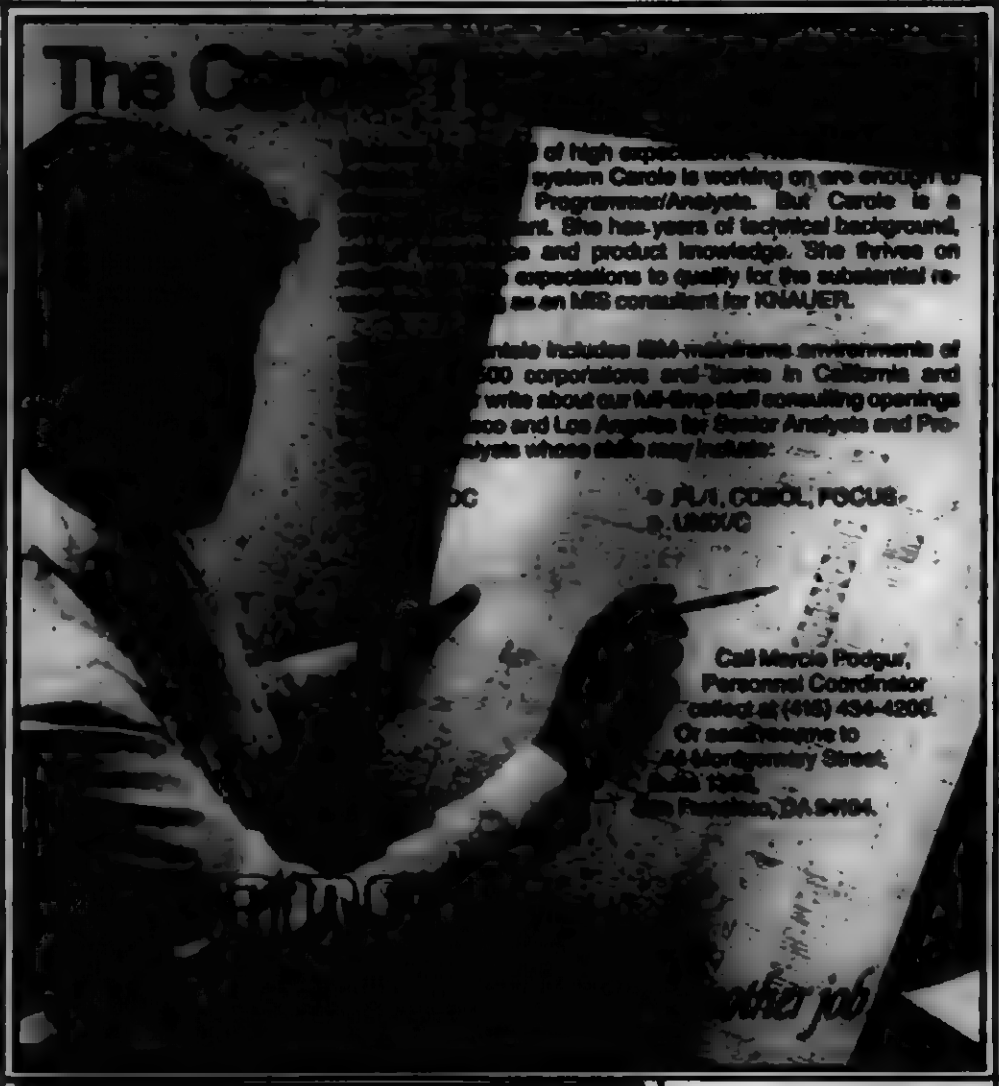
PROGRAMMER ANALYST

Avatar Properties, one of South Florida's largest land developers, located in Coral Gables, has an immediate opening for a self starter with a minimum of 3 years diversified experience using COBOL to develop on line and batch programs. Will be part of project group developing major applications on IBM PC's plus responsibility for maintenance of applications on IBM 4341. Experience with accounting, CICS, ROSCOE, and CBUCL are desirable. We offer an excellent salary and benefits package. Please send resume to:

Director of
Human Resources
AVATAR
201 Alhambra Circle
Miami, Florida 33134
305/442-7000

Equal Opportunity Employer

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS



SOFTWARE PROFESSIONALS

Where do you go for the latest thinking in

SOFTWARE DEVELOPMENT?

The answer is easy...

ADR.

We are one of the largest systems software product companies in the world and year after year we maintain a leadership position focusing on a single aspect of this large and growing industry...Software Development.

If your career is oriented towards systems and software development, you will want to consider a career with ADR in either Princeton, New Jersey or Dallas, Texas. Positions require experience in one or more of the following areas:

- IBM systems software development using IBM Assembler and Macro Language
- Personal/Micro Computer software development using "C" language
- Data Base/Data Communications software development.

APPLIED DATA RESEARCH offers continued opportunities for career development, a comprehensive benefits package and a salary fully commensurate with your experience and potential. For consideration, please forward your resume or call Gary Johnson, (201) 874-9000, APPLIED DATA RESEARCH, INC., Route 206 & Orchard Road, CN-8, Princeton, NJ 08540.

APPLIED DATA RESEARCH

An equal opportunity employer

SYSTEMS ANALYST -NETWORK

Middle South Services is the technical subsidiary of Middle South Utilities, one of the nation's largest power systems. We have a challenging career opportunity for a qualified Systems Analyst - Network.

You'll use your skills in module problem determination and recommendation for our Network Services section. Working out of a day-to-day operations mode, you will use your knowledge of BASIC, VTAM, IMS or CICS in an OS/MVS system to tune-up our telecommunications network. You'll also apply your knowledge of communications protocols to prepare programs for line transmission.

If you have several years of systems programming background in a telecommunications environment, and ideally have a BS in Computer Science or a related discipline, this new position will be highly rewarding.

Due to our size and scope of operations, we offer access for advancement, career stability and an excellent salary with major benefits. For more information, call our number below, or to apply directly send your confidential resume now to Richard Jackson or Byron Heath, MIDDLE SOUTH SERVICES, INC., P.O. BOX 61000, NEW ORLEANS, LOUISIANA 70161.

1-800-231-4491

In Louisiana, call collect (504) 569-4662

MIDDLE SOUTH SERVICES INC.

SR. CONSULTANTS DATA COMMUNICATION

Our client, a major international organization is seeking two Sr. level Consultants in the area of Network Planning, Design & Implementation. Must be experienced in evaluation and optimization of networks, strong analytical abilities and Project Leadership skills. Also required is a solid understanding of SNA/SDLC, ACF/VTAM, ACF, NCP & MMF concepts. Degree preferred. This organization offers excellent compensation along with a liberal relocation package. One position is available on the East Coast and one on the West Coast.

CALL SHEAR: (714) 754-0168

F-O-R-T-U-N-E
COMMUNICATIONS GROUP
17744 Skypark Circle, #290
Irvine, California, 92714

PROGRAMMER ASSEMBLY LANGUAGE

Questa Corporation, national leader in the exciting and dynamic field of television movie-on-computer systems, is forming a new team of software professionals.

Qualified candidates should have Assembly language experience. Be able to work with a minimum amount of supervision, and enjoy tasks requiring imagination and innovative solutions. Some travel and customer support may be required although this is primarily a software development position. Experience with Z-80 based microcomputers, communications protocols, and Local Area Network is a definite plus.

Send resume to Laurie Gaffney.

Questa Corporation
2440 S. Progress Drive
Salt Lake City, UT 84119
Phone (801) 974-0992

An Equal Opportunity Employer

SENIOR MEMBER OF TECHNICAL STAFF

A computer software service company seeks a Senior Member for its Technical Staff. Member will (1) design database system software for microcomputer and time-sharing systems, with emphasis on computer graphics and language interfaces, and (2) integrate microcomputer and main frame software. An applicant must have at least the following minimum qualifications: (a) Basic six-month course in computer programming; (b) Three and one-half (3-½) years experience as a senior member of technical staff or business programmer, including at least two years of experience with graphics and two years experience with a time-sharing system; and (c) Experience in at least one of the following computer languages: Fortran, Pascal or C. The hours of work are 8:00 a.m. to 5:00 p.m., and the salary is $28,700.00. Interested persons should send resumes to 7310 Woodward Avenue, Room 418, Detroit, Michigan 48202. Reference Number 30083. Employer Paid Ad.

VIRGINIA

DP MANAGER

Rapidly growing coastal Virginia co. seeks DP Pro to run a brand new 8/38 shop. Must know RPGII; RPGIII preferred. To $35K.

ROBERT HALF
OF VIRGINIA, INC.
600 Main Street—Suite 522
Richmond, Virginia 23219
(804) 648-3677

Burroughs/Banking

Project leaders and programmers needed for 1984 expansion by progressive bank service bureau with 25 Medium Systems and 2,000 terminals. Areas open include Technical Support, Online, IRA, Deposits, Loans and Product Definition.
Send resume and salary requirements to:

Susan J. Koebbing
First Financial
Management Corporation
3565 Buford Highway
Atlanta, Georgia 30341

PROJECT LEADER - Temp. project involv. automated telex network system controlling money transfers. Analysis, coding & testing of system, incl. assignment security nos. for account verification. 2 yrs exp or 2 yrs of programming. Knowl. of COBOL, JCL, MARK IV, MVS, TSO/SPF, PDP, IBM 3033. $34,800/yr. 35 hrs/5 days/wk. ACSIS, Inc., 90 John St., NY NY 10038. Send resumes.

NORTHERN CALIFORNIA

Let us help you explore the many career opportunities in Data Processing & Software/Hardware Engineering. Immediate openings in the San Francisco bay area, and in Sacramento and the San Joaquin Valley. Specific needs for systems programmers and for VAX, Burroughs and IBM main frame experience.

Your name, resume or present employer will not be given out without your prior permission.

Send resume in confidence to:
GEN BAUGHER & ASSOC.
980 University Ave, #101
Sacramento, CA, 95825

Systems Programmers
Applications Programmers
Manager for Network Services

Syracuse University announces the availability of positions for highly motivated people in its Academic Computing Center and its new CASE Center (Computer Applications and Software Engineering). The CASE Center is dedicated to industrial collaboration in research and education leading to the wider use of computer technology. The Center is designed to promote academic excellence and technological innovation in two principal areas: computer-enhanced reasoning and computer tools research in artificial intelligence.

The systems used here are VM/CMS and MVS on three IBM 4341 computers, with a large interactive/terminal network. Applicants for the programming positions must have a minimum of one year experience. VM/CMS experience is desirable; bachelor's degree preferred. Applicants for Manager of Network Services should have a minimum of 5 years experience with computer communication protocols, hardware, and software. Knowledge of computer networking essential. Supervisory experience desirable.

Syracuse University's benefits include competitive salaries, advanced degree opportunities, dependent scholarships, and generous vacation and retirement plans. Closing date for applications is February 10, 1984. Send resume for CASE Search Committee, Syracuse University, Personnel Department, Employ Office, Syracuse, New York 13210.

Syracuse University, located in beautiful and culturally rich central New York, is an Equal Opportunity Affirmative Action Employer.

RESULTS

Whether you're buying, selling, swapping, hiring or looking, you get results from Computerworld classifieds.

Maybe that's why Computerworld gets more classified advertising than all the other computer publications put together!

AT FAIRCHILD WESTON: INDIVIDUALS HAVE PROJECT RESPONSIBILITY

Look to Fairchild Weston if you seek the individual challenges, responsibilities and rewards of seeing projects through from start to finish. For 30 years, we've been the leader in EMR telemetry, signal processing and data acquisition systems. Our technological excellence and innovation have resulted in steady sales growth, creating exciting career opportunities for experienced engineering and/or computer science professionals.

The following positions require U.S. citizenship, and extensive background investigations may be conducted:

SOFTWARE Q.A. ENGINEER

An exciting career opportunity exists for an individual experienced in software quality assurance. We seek a person with strong leadership skills to develop and head our software Q.A. function. Experience with real-time software specifications, design, development and documentation desired. Experience with software Q.A. mil-standards required. The successful applicant will develop and implement a Q.A. program for our system software products. A BSEE or BSCS or applicable experience preferred.

SOFTWARE SPECIALISTS

Positions require experience in the design and implementation of large scale real-time systems utilizing structured methology. Experience with VAC-11, RSX-11M or VMS operation systems and assembly language/FORTRAN required. Knowledge of signal processing, graphics, data base implementation or large scale netted computer systems is highly desirable. Project leader position requires prior experience with proposal generation and cost estimating.

Fairchild Weston offers top compensation, liberal fringe benefits, relocation assistance, and a casual but challenging work environment.

Sarasota is a beautiful beach community on Florida's Gulf Coast. Sarasota enjoys a respected school system, attractive residential communities, a low tax structure, no state income tax, and a year 'round recreational climate.

For confidential consideration, please submit your resume, including salary history, to: Tom Salmon, Manager, Professional Employment.

FAIRCHILD WESTON SYSTEMS INC.

P.O. Box 3041
Sarasota, Florida 33578

An Equal Opportunity Employer

SENIOR DATABASE ANALYST

SEATTLE

Rainier Bank, one of the most progressive financial institutions in the Pacific Northwest, is currently seeking a Senior Database Analyst.

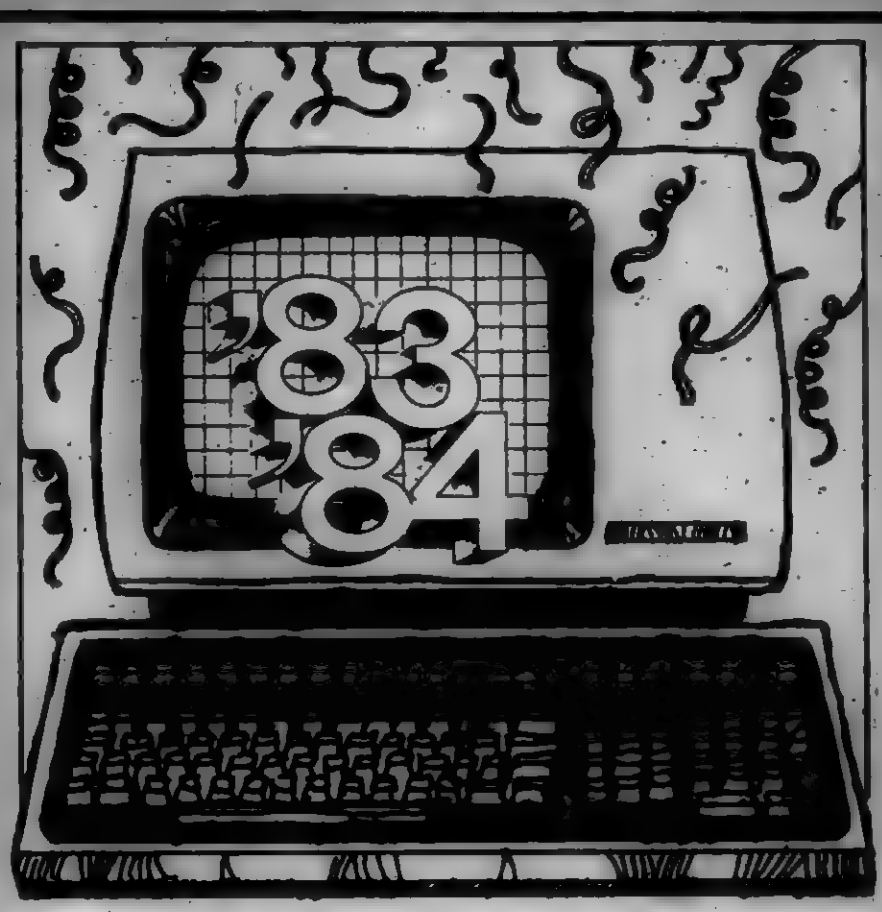
You will need 3 years of system programming or application experience, and must be able to design, code, test and debug programs using COBOL, and/or Assembler. In addition, you must be able to design logical and physical data base structures and should have extensive experience using appropriate IMS (DB/DC) utilities.

You will assist in the design, development, implementation and maintenance of database systems which includes consulting with technical personnel to resolve performance issues with physical database designs and applications and preparing backup, restart and recovery procedures.

Qualified applicants should address their resumes to: **Lisa Tolliver, Rainier Bank, P.O. Box 3966, Seattle, WA 98124.** Your initiative to contact us personally will be weighed more heavily than third party representation. We are pleased to be a leading Pacific Northwest equal opportunity employer *m/f/h/v*.

RAINIER BANK
We're Involved

Member FDIC



IT LOOKS LIKE ANOTHER BIG YEAR!

1983 was a year filled with accomplishments at Northrop Data Processing. We completed a major reorganization along divisional lines to enhance our responsiveness to a wide variety of needs. New Data Centers utilizing IBM's latest mainframes and operating systems were established. We introduced our first Information Service Center at the Aircraft Division and provided continued support to Engineering, Manufacturing and Financial functions.

1983 was a big year. As a service organization we can't rest on the success of last year. We must continue evaluating future needs and plan accordingly.

1984 promises to be a year of continued growth for both the divisions we service and ourselves. We will continue applications programming support to a full range of functional organizations and take on new challenges. In 1984, we will create additional Information Service Centers and establish the Applications Development Center as an aid to programmers. Continuing improvements to our network systems will include integration of personal computers into the framework of software services.

1984 looks like another big year for Northrop's data processing professionals. How does it look for you? If you don't see diversified challenge, success and reward coming with the new year, perhaps you should consider our broad range of opportunities.

- **Software Project/Product Management**
- **Computer Systems Planning**
- **Operating Systems Software Support Including Performance Tuning**
- **IMS Systems Software & Data Base Administration**
- **Graphics & Aeroscience Support Programming**
- **Manufacturing & Financial Applications Programming**

If you're experienced in any of these areas, we'll welcome your inquiry. For immediate and confidential consideration, send us your resume and, Happy New Year!

Mr. Cris Cristina
Engineering & Administrative Staffing
Dept. 1222/80 NA-CW 128306
P.O. Box 2116
Hawthorne, CA 90250

NORTHROP
Making advanced technology work.

Equal Opportunity Employer M/F/H
Proof of U.S. Citizenship Required

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

WE WANT WETWARE

FOR OUR DATA PROCESSING CLIENTS.

CompuSearch, a division of Management Recruiters, serves the nation's top companies and they demand the best DP specialists to fill their job openings. In turn, they offer positions with meaningful challenge, on-going training and defined promotional paths.

Call toll free 1-800-227-3800, Ext. 7017

COMPU SEARCH®

A Division of Management Recruiters International

EDP Auditor

A challenging career opportunity awaits the talented individual who would like to be a part of our rapidly expanding financial institution, located in one of the really great states, ALASKA! Immediate opening exists in our auditing department for an EDP Auditor.

Position requires a minimum of 2+ years experience in EDP auditing, computer operations at a supervisory level or a combination of programming and auditing experience. "Big 8" and industry experience will be considered. Familiarity with IBM systems COBOL, CICS, and Culhane-Culprit audit software helpful.

Submit resume including salary history to: B.A. Merkel, Personnel Director, P.O. Box 600, Anchorage, Alaska 99510. An equal opportunity employer.

National Bank of Alaska

Information Systems Opportunities

The continued growth of Fleming Companies, one of the nation's largest wholesale food distributors, with distribution centers throughout the United States, has created the need to expand our Information Systems team at our new and expanded corporate offices in Oklahoma City.

Programmer Analyst

3-5 years COBOL programming experience. DOS/VSE, VSAM and JCL. IBM 4331 hardware. MSA or INFOREM experience a plus for certain positions. Willing to travel 25%.

Systems Programmer

4 years experience with 1-2 years systems programming environment. Desired skills include DOS/VSE generation and maintenance; VM/370; CICS; VSAM; PANVALET/OWL; DYNAM/T. Willing to travel 25%.

Benefits Package

Fleming offers one of the best in the industry, including company paid medical, dental and life insurance, profit sharing, pension and stock purchase plan as well as our new "Stock Share" and 401K "Savings Plus" plans.

Call now! Join a company with a dynamic past and promising future. To schedule an interview, call Greg Belsheim, COLLECT (405) 840-7308, 8am - 5pm weekdays, Tuesday and Thursday until 8pm. If you are unable to call, send your resume with salary history to: Greg Belsheim, Fleming Companies Inc., P.O. Box 26647, Oklahoma City, OK 73126.

Fleming Companies, Inc.

Equal Opportunity Employer M/F

INFORMATION SYSTEMS SPECIALIST

Washington Metropolitan area professional association is seeking an individual with a BS degree in Computer Science and/or COP preferred. Minimum of 2 years experience in all aspects of programming and systems development. Supervisory experience helpful. Experience in computer use in publishing, text processing, database design and implementation and implementing search and retrieval systems is especially helpful.

We offer excellent benefits including 5 weeks of leave, paid dental insurance and flextime subsidy. Interested candidates are invited to send resumes to Personnel Department.

American Psychological Association
1400 North Uhle Street
Arlington, VA 22201

THE UNIVERSITY OF TEXAS AT TYLER

3900 University Blvd.
Tyler, TX 75701

Two Tenure-Track Positions in Computer Science. Salary and rank dependent on qualifications. Fall, 1984. Applications due March 15, 1984. Ph.D. in computer science or closely related discipline preferred with emphasis in programming languages, systems programming, operating systems, microcomputing systems, and programming methodology. Teaching load 12 hours. Contact Dr. R.H. Crawford (214) 566-1471, Ext. 268. AA/EOE.

Denver, Colo. Computer Services-Alloware firm has opening for Programmer Analyst. Candidate will: Convert engineering and geological data to computer format. Train subordinates. Evaluate hardware and software. Confer with technical personnel. Direct marketing. Prepare budgets. Requirements: Knowledge of petroleum industry, computer developments, and geological computer applications to exploration techniques and tools; managerial skills; B.S. in Computer Sci.; 4 yrs. exp. in job; $60,000/yr.; 60 hr/wk. Contact or send resume to Colo. Job Service Center, 1320 Fox St., Denver, CO 80204 and refer to Job Order #2256991.

TECHNICAL WRITER

Computer Software Manuals
Toronto, Canada

Long-term opportunity. Must be experienced and prepared to work under pressure of deadlines. Salary open.

Send resume and work samples to:

Personnel Manager
Infocentre Ltd.
6303 Airport Road
Suite 300
Mississauga, Ontario
Canada L4V 1R8

SOFTWARE DEVELOPMENT PROJECT MANAGER

Sacramento California company seeking a Contract Project Manager. Must have large systems development experience using IDMS database. Qualified candidates will have a Bachelor's degree and 10 years experience in systems analysis and design. Knowledge of group insurance industry would be a plus. Computer environment is IBM 4341 with VM, DOS/VSE, IDMS, and 60 on-line terminals. Compensation negotiable. Principals only. Send resume and salary history to C.E. Bradbury, V.P., ISD, P.O. Box 264800, Sacramento, CA 95826.

UNIVERSITY OF IOWA

SENIOR SYSTEMS PROGRAMMER

to perform software installation, maintenance, and performance tuning in an MVS/JES2 environment. Previous systems experience with large IBM systems is required. Experience with SMF, performance analysis, capacity planning and MVS/JES2 is desirable. The University of Iowa offers the advantages of a major university in a small mid-western city. Screening of candidates will begin 30 January 1984. Send resume with salary history to:

Howard W. Sarvis
System Support Manager
Wang Computing Center
University of Iowa
Lindquist Center
Iowa City, IA 52242

The University of Iowa is an Equal Opportunity/Affirmative Action Employer.

IDMS SR. PROG/ANALYST

Med. size mfr. of hi-tech machinery very much in need of sr. IDMS PrA who also knows CICS. Located in upbeat NY STATE city, pos. offers significant exposure & chance to build career in div. of major corp. $34,000. (Fee paid)

ROBERT HALF OF BUFFALO, INC.

1310 Liberty Bldg.
Buffalo, NY 14202
(716) 842-0801
(AGENCY)

There's No Time For DOWNTIME!

So while the industry works on your system's problems, let us work on your business problems. Advertise in—

COMPUTERWORLD CLASSIFIEDS!

One insertion will let a potential audience of over a half a million readers know what you are looking for or have to offer. Whether you are looking to recruit computer professionals, want to buy, sell or lease equipment, have computer time or services to offer, or software packages to sell, and more, Computerworld Classifieds will help you get a lot of exposure and get things done faster.

The open line rate is $8.05 per line and there is a minimum size of 1 column by 2" at a cost of $225.40. We can accomodate up to 5 columns and depth measurement increases by half inch increments.

Ads may be mailed in, cleanly typewritten, with a letter stating the size desired and the issue in which it is to be run. Our team of adtakers will take ads that require no artwork or borders over the phone. We also provide telecopier service.

Any borders, logos, or artwork should be sent in with your ad and must be dark and clear enough to be reproduced.

Computerworld comes out every Monday and our deadline for receiving ads is 10 days (or six working days) prior to the issue date desired.

First time advertisers must send payment along with their first ad.

Our mailing address is:

Classified Advertising
Computerworld
Box 880
375 Cochituate Rd.
Framingham, MA01701

ROCKY MOUNTAIN OR NATIONAL

Telecommunications/SNA ....C, UNIX, LAN, IBM protocols
Data Acquisition.....8 and 16 bit MPU's, mainframes
CAD/CAM and Graphics .....PASCAL, FORTRAN, PL/1

Data Base Development .....IDMS, IMS, DB/DC
Systems Analysis.....Business and Mfg. Appl.
Programming .....Scientific, High-Tech, Biomed

Margo Kolis/Vic Tuttle
Career Marketing Associates
7100 E. Belleview #208
Englewood, CO 80111
(303) 779-6090

SYSTEMS DEVELOPMENT

Extremely challenging positions require skills with IBM MS DMS COBOL and complete system life cycle experience. These opportunities represent the leading edge of sophisticated technologies with companies that manage growth and reward for performance.

Our clients have the most CHALLENGING and GROWTH ORIENTED career opportunities CALIFORNIA offers.

LOGICAL OPTIONS

One Market Plaza, Spear Tower, Suite 912/14C
San Francisco, CA 94105 • (415) 777-3900

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

COMBINE THE JOY OF TEACHING OTHERS WITH THE EXCITEMENT OF WORKING IN THE COMPUTER FIELD

Join the ranks of Saint Mary's College's growing, dynamic Computer Science Department. Teach state-of-the-art courses to excellent students in beautiful Winona, MN. Requirements: Master's degree (computer science preferred); proven teaching ability; experience in computer software. Opportunities include advancement in rank and tenure, and possible consulting work and summer employment. Salary dependent upon degree and experience. This position opens in the Fall of 1984. Initial preference given to applications received by February 1, 1984. Send resume to Paul Schumacher, Box 697, Saint Mary's College, Winona, MN 55987.

Equal Opportunity/
Affirmative Action Employer

BUSINESS APPLICATIONS PROGRAMMERS

New D.P. shop has immediate opportunities for experienced Business Applications Programmers. Positions require a minimum of three years experience in AR, AP, Payrolls or General Ledger. Utilizing COBOL and knowledge of FORTRAN preferred. Background in HP3000 desirable.

For immediate consideration, please send resume to:

Mr. Dan C. Quirk
Lockheed Space
Operations Company
7677 N. Atlantic Avenue
Cape Canaveral, FL 32920
(305) 799-8100

An Equal Opportunity Employer.

COUNSELOR/ PLACEMENT MGR

High base salary & incentive & stat triggs plus.

Our EDP placement dept is heavily supported with total & not! advertising. If you have a proven track record in data processing, are sales oriented, need challenge and want to participate in building a department in Southern California, contact Paul Gilbert, Robert Half Personnel (213) 386-6805

ROBERT HALF OF LA Personnel Services
3600 Wilshire, Suite 2000
Los Angeles, CA 90010

SYSTEMS ANALYST

Position available in expanding insurance firm located between Baltimore and Washington. Requires experience in COBOL, IBM main frame, and PMS system. Exposure to central software/data base systems a plus. Excellent working conditions with competitive salary and benefits. Send resume or call:

Rick Bauer
Montgomery Mutual
Insurance Company
17819 Meeting House Road
Sandy Spring, MD 20860
(301) 924-4700

LOCKHEED IS COMPUTING CAREERS.

With your future in mind, Lockheed Missiles & Space company is computing special careers in advanced technology. We've got all the right components to make this the opportunity of a lifetime. All we need now is for you to accept the challenge. Look over the descriptions listed below. One of them may be just what you've been waiting for.

ADVANCED COMPUTER / DIGITAL SYSTEM ARCHITECTS
R&D positions at various levels are available, for PhD and MS in Electrical Engineering/Computer Science with several years of experience, to study and create new systems based on non-Von Neumann architecture utilizing highly distributed and parallel multi-processors (supercomputers). Work involves all aspects of computer and digital systems, including system software/firmware design, processor networking, fault tolerance, multi-processor hardware architecture and implementation, and VLSI chip design. Experience with microcomputer and microprocessor systems and architecture is essential.

DIGITAL IMAGE PROCESSING SCIENTISTS
We're seeking PhD or MS level graduates in Electrical Engineering or Computer Science with specialization in digital image processing and familiarity with computer programming. Your experience should also include algorithm development, computer simulation, pattern recognition and digital image enhancement. Positions are available in the following areas:
- Image Correlation
- Artificial Intelligence
- Automated Industrial Inspection
- Target Classification Based on 3-D Imagery

SOFTWARE ENGINEERS
Positions are available for Software Engineers to perform computer programming, architecture design, code and checkout computer programs, and analyze the results of these programs.

SENIOR DATA SYSTEMS ANALYSTS
Design and develop programming systems for processing management and central data. BS in Computer Science or Math and 6-8 years of experience desired.

MICROCOMPUTER BASED CONTROL SYSTEMS DESIGNERS
Experience with microprocessors and microprocessor based development systems with a BSEE or BSCS desired.

DATA COMMUNICATIONS NETWORK SYSTEMS SPECIALISTS
Specialists are needed to perform network design, planning, coordination, installation and troubleshooting system with knowledge of network configuration, circuit testing, modem strapping. A BS CS/EE and 6-8 years of experience desired.

SR. SCIENTIFIC PROGRAMMERS
In this position, you will participate in the design, development and implementation of highly sophisticated programs on a large scale timeshare computer system with interactive graphics terminals using both Assembler and Fortran languages. A degree in Computer Science or closely related field with a computer background and four years experience with software design and development on a large scale timeshare operating system is required. Knowledge of structured programming concepts highly desirable.

SYSTEM PROGRAMMERS
We are currently seeking professionals with expertise in either operating systems programming using EXEC 1100 internals or IBM Assembler experience with IBM IMS, OS/MVS internals in software systems design and development activities. A BS in Computer Science and 4 or more years experience desired.

EXPERIENCE WITH SPECIAL ACCESS PROGRAMS AND CURRENT SIN DESIRED.

For immediate consideration, please forward your resume to Lockheed Missiles & Space Company, Professional Employment, Dept. 653-0116, P.O. Box 504, Sunnyvale, CA 94086. We are an equal opportunity, affirmative action employer. U.S. citizenship is required.

Lockheed Missiles & Space Company

Rapidly expanding Public Sector Data Processing Department seeks

Director Of Systems Development

We are looking for a Senior Manager to be responsible for comprehensive systems development and support of all administrative and fiscal applications. Our successful candidate will be capable of administering multiple major projects and heading up a working team of seven senior systems development managers and professional staff.

We require 5-7 years proven senior project management experience. On-line data base systems development consisting of large IBM mainframes, CICS/VSAM/COBOL/MVS/IDMS. Use of leading edge project life cycle management methods necessary.

Salary up to Mid $50's

Excellent fringe benefits including comprehensive health plan (major medical, optical, dental), four weeks vacation first year.

Please send resume with salary history in confidence. (Principals only). Write: Box 0114CW, c/o Suite 1100, 551 Fifth Avenue, New York, NY 10176. An equal opportunity employer m/f.

SYSTEMS PROGRAMMER

Cerro Metal Products a leading non-ferrous metal producer has an immediate opportunity available for a Systems Programmer. Individual must have IBM 4341, DOS/VSE-/CICS/DL-1 and Assembler language experience. Degree preferred.

Located near Penn State University in beautiful central Pennsylvania mountains we offer an excellent fringe benefit package. Submit resume and salary history in confidence to:

Thomas J. Meyer, Manager
Industrial Relations
CERRO METAL PRODUCTS
P.O. Box 388
Bellefonte, PA 16823

CERRO

Sr. Programmer/ Analyst

PL/1, DL-1, CICS Proficiency

Major division of the A.C. Nielsen Company, located along the foothills of Colorado, is seeking an individual with demonstrated competence in PL/1, DL/1 and command level CICS for major development projects.

If you meet this criteria and wish to expand your technical skills, we will interview you at our expense. We offer a marvelous location and challenging work in a technically exciting environment: IBM 3081K, MVS/XA, IMS, over 50 GIGA Bytes of on-line storage and international data communication network.

Qualified applicants please forward resume or personal letter with salary requirements to:

Shirley Chamblin
Director of Human Resources
Nielsen Neodata

Neodata Services
1265 Portland Place
Boulder, Colorado 80302

An Equal Opportunity Employer M/F

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

IBM SYSTEM/38, SERIES/1, 4300

Software Plus, Inc. Hunts For Data Processing Tigers who can sense and seize opportunity.

Proven products and aggressive marketing have positioned this New Jersey software and support company for growth in product development, project management, programming and consulting. Software Plus, Inc. provides software and support for IBM hardware only, so you'll need solid experience (at least 2 years) working in this environment. In under two years we've grown from 6 to 60 people and from $1 Million to $4 Million in sales. Our success starts with our people; we hire professionals, all tigers in their respective fields, who can grasp opportunity and thrive on producing quality work in a competitive market.

If you join us, you'll work with corporate and technical managers who provide meaningful direction. We offer a compensation program that recognizes and rewards talent and effort. Our benefits program includes life, health/disability, and dental. We are recruiting for the following positions.

IBM SYSTEM/38
PROJECT MANAGERS · CONSULTANTS
PROGRAMMER/ANALYSTS

At least 2 years of experience with knowledge of RPG III, CL and Utilities. Project Managers need a minimum of 2 years management experience.

IBM SERIES 1
PROJECT MANAGERS · CONSULTANTS
PROGRAMMER/ANALYSTS

At least 2 years of experience with knowledge of EDX. Project Managers need 2 years of development management experience.

IBM 4300
PROJECT MANAGERS · CONSULTANTS
PROGRAMMER/ANALYSTS

Minimum of 3 years experience with knowledge of CICS, DOS, DOS/VSE, COBOL, IMS and COMMAND/MACRO. Project Managers need 3 years of management experience.

All positions require good communication skills and organization.

Candidates, please submit your resume with salary history to:
PERSONNEL DEPARTMENT C

SOFTWARE PLUS, INC.
MEADOWS OFFICE COMPLEX
301 ROUTE 17 NORTH
RUTHERFORD, NJ 07070
Equal Opportunity Employer M/F

We do more for our clients because we expect more from ourselves.

CONSULTING
GO WITH THE BEST

Indecon is the leading consulting firm in the MIDWEST. We work exclusively with Fortune 500 companies using the newest technologies. WE OFFER:

- NO OVERNIGHT TRAVEL
- COMPETITIVE SALARIES
- TECHNICAL GROWTH
- NO LAYOFFS
- PAID OVERTIME
- CHALLENGE

- Positions available in INDIANAPOLIS and Central Indiana, CHICAGO and Suburbs, SPRINGFIELD and Central Illinois.

ONE OR MORE YEARS WORK EXPERIENCE in ANY of the following will qualify you:

- COBOL or PL/1 (MVS, DB or DC +)
- IMS, CICS or MVS Internals or Tuners
- 8100 PROGRAMMING
- PROJECT MANAGEMENT (Complex DB/DC + + +)
- SAS
- REAL-TIME ASSEMBLER (M6800 or INTEL 8080 +)
- OFFICE AUTOMATION (DEC or 8100)
- VAX/VMS INTERNALS
- INFORMATION CENTER (FOCUS or ADR)
- S/38 - RPG III

Send resume including location and salary requirements to:
Roger Johnson-Manager, Corporate Human Resources

INDECON, INC.

Arizona/California/Texas/Colorado/Florida/Boston
SCIENTIFIC OR BUSINESS PROGRAMMERS

All fees and relocation paid. $20-40,000

If you have a BSEE, BSCS, BS in Mathematics or Physics or equivalent, we need you right now.
For Business: OS/DOS/IMS/CICS/MVS/JES Prog/Anal/Systems/Data Base. All large scale installations.
For Scientific: experience in the computer, communications, semiconductor, or aerospace/defense industries.
Your name, resume, and present employer will not be given out without your permission.
For sincere personal service, please send a confidential resume to:
Don Pullman (602) 274-6666
PULLMAN PERSONNEL
3939 North Central Ave., Suite 600, Phoenix, Arizona 85012

HP-3000
PROGRAMMERS & ANALYSTS

We specialize in the placement of HP-3000 Analysts and Programmers and have numerous opportunities across the country for professionals with this experience. Our client companies include both small and large end-users as well as software development firms specializing on the HP-3000. Of particular interest is experience with SPEEDBASE, ASK, QUASAR, or RAPID.

For additional information regarding these positions, call Mr. Lee Mathis:
(804)490-2666 or
Forward Resume to:

Personnel Consultants of Virginia Beach
810 South Independence Blvd.
Virginia Beach, VA 23452

FLORIDA GOLD COAST
Prog. Analysts Syst. Prog. Capacity Planning

- IMS, COBOL, PL/1, BAL, RPGII, CICS, MODEL 204, BAL, DB/DC
- Series 1 EDX/EDL
- BURROUGHS COBOL
- NCR NEAT 3, COBOL

Enjoy the perfect climate while advancing your career in a state-of-the-art environment. All Fees Company Paid. Call (305) 731-2300 or write:

Spectra Professional Search
2550 W. Oakland Park Blvd. Suite 109
Fort Lauderdale, FL 33311

SYSTEMS SOFTWARE PROGRAMMER

The MIS Department of American Savings Association is seeking a Software Programmer to implement, modify and performance tune software packages. The individual we seek will have experience with CICS, ACF/VTAM, and ACF/NCP. We offer an excellent benefit program and competitive salary in a progressive environment for individual and professional growth. Individuals interested in this opportunity should submit a current resume and salary history to American Information and Systems Center, 12747 Olive Road, Creve Coeur, Missouri 63141.
EQUAL OPPORTUNITY EMPLOYER M/F/H

PROGRAMMER - Analysis, design & implement computer systems. Maint/enhance systems & provide vital skills to ensure efficient & cost effectv. operation. 2 yrs exp or 2 yrs in programming. Bach. degree in Sciences. Knowl. FORTRAN, PASCAL, IMP & ASSEMBLER. $25,000 Salary. AC-SIS, Inc., 90 John St., NY NY 10038. Send resumes.

Computerworld CLASSIFIEDS

Our business is to help you improve yours--

via programmers, analysts, engineers, terminals, printers, software packages, computer time, computer services,

exposure to an audience of over half a million readers NATIONWIDE...

...EVERY WEEK.

BUSINESS SYSTEMS PROFESSIONALS

LOF Glass is the largest division of Libbey-Owens-Ford Company. Headquartered in Toledo, OH, our continued expansion offers several highly visible career positions in a dynamically changing MIS environment.

SENIOR BUSINESS SYSTEMS CONSULTANT

Interface with user management and direct software projects. Positions require BS/BA + 4 years systems analysis experience or MBA/MS + 2 years systems analysis experience.

SENIOR ANALYST/PROGRAMMER

Analyze business systems needs and develop new systems using 4th generation software. Positions require BS/BA + 2 years programming and 3 years business systems analysis experience or MBA/MS + 2 years programming experience.

All positions require work experience in manufacturing applications in a large scale IBM or DEC VAX environment. TIS, American Software, McCormack & Dodge or MRP II experience highly desirable.

Send resume and salary history to:

General Director
Salaried Personnel
Libbey-Owens-Ford Company
811 Madison Avenue, P.O. Box 799
Toledo, Ohio 43695

DEC VAX VMS
1 PROJECT LEADER
4 ANALYST PROGRAMMERS
3 PROGRAMMERS

A dedication to customer service, creativity in product development, innovation in sales and marketing and a staff of top quality people have made us the #1 company in the highly competitive bedding gift industry. If you enjoy being with the best, here's your chance to join RUSS, the acknowledged leader and trendsetter in our field.

We are presently seeking people who will participate in a major software development project. Although this project has a definite scope of 1-2 years, our rapid pace of growth and expansion dictates the need to maintain and develop a highly effective M.I.S. support team. We are replacing existing hardware and implementing new systems on a distributed network of DEC VAX/VMS computers.

Programming will be in the BASIC language. Experience in a distribution-oriented company and DEC VAX experience is highly desirable.

If you seek a formidable challenge and outstanding opportunity for personal growth while being directly involved in state-of-the-art technology, submit resume to:

RUSS®

Corporate Director of Personnel
RUSS BERRIE & COMPANY, INC.
111 Bauer Drive
Oakland, New Jersey 07436
Equal Opportunity Employer M/F

Programmers

We're a large, well established Rocky Mountain holding company that has openings for Programmer/Analysts. Specifically, we need a **GENERAL LEDGER PROGRAMMER** who has 2-4 years of COBOL and general ledger programming experience. UCC experience helpful. IBM JCL in a large system necessary, and PL1 a plus. We also need **PROGRAMMER/ANALYSTS** for our Deposits and Investments Department who have 2 years COBOL or TL1 data base experience, with IMS experience desirable. We offer flexible salaries and excellent fringe benefits. If you would like to work in the Denver area and are qualified, send your resume in confidence to:

Betsy Powell
United Bank Service Company
5700 DTC Parkway
Englewood, CO 80111

Equal Opportunity Employer M/F/H/V

COMPUTER GRAPHICS CONSULTANTS WANTED

We wish to retain marketing consultants to prepare market research reports analyzing and forecasting the markets for computer graphics hardware and software.

Reply to CW-B4338
Computerworld
Box 880
Framingham, MA 01701

Data Processing

PROJECT LEADER

Harrah's Hotel & Casino in Atlantic City is currently recruiting for a Project Leader in our Data Processing Dept. Qualified applicants must possess a college degree in Computer Science, or related discipline and have at least 5 years analytical work experience. Also, applicants must have demonstrated proficiency in the application of a wide range of systems, projects and programming skills. Experience on IBM System 3 and System 38 is required. Qualified candidates should send resume & salary requirements to Carol Schmidt.

HARRAH'S

Atlantic City

Employment Office
1725 Brigantine Blvd.
Atlantic City, NJ 08401

Harrah's Atlantic City is an equal opportunity employer subject to the rules and regulations of the NJ Casino Control Commission.

University of Wisconsin - River Falls
Computer Science Faculty Positions

Applications are invited for three tenure-track positions beginning September 1, 1984. Responsibilities include instruction of twelve credits per quarter at the undergraduate level, student advising and curriculum development. Candidates with a Ph.D. in computer science are preferred, however, candidates with a Master's degree in computer science (or equivalent) will be considered. Salaries are competitive. Areas of interest which needed are operating systems, compiler design and management information systems.

The department has nearly 300 students majoring in computer science. Equipment includes a minicomputer laboratory and a DEC VAX-11/780.

University of Wisconsin-River Falls has a beautiful campus in a town of 9,000 population, 30 miles from Minneapolis-St. Paul.

Send resume, transcripts, and at least three letters of recommendation to:

Dr. Edward C. Mealy
Search and Screen Committee, Chairman
Department of Mathematics/
Computer Science
University of Wisconsin-River Falls
River Falls, WI 54022

Deadline date for applications will be April 1, 1984 or until positions are filled.

UW-RF is an equal opportunity/affirmative action employer.

DATA PROCESSING

THE DATA GROUP
POSITIONS IN GA., FLA. TN, SC, NC, ALA.

Salary is a partial listing of available employer FEE PAID positions. Call or submit your resume in confidence.

PROGRAMMER...Min. 2 yrs. IBM COBOL	$25,000
SYSTEMS ANALYST UNIVAC Assem	$25,000
PROG. ANALYST...TANDEM	$25,000
PROGRAMMER...PASCAL	$25,000
TECH SUPPORT...UPE, 70	$30,000
PROG./ANALYST...IMS DB/DC	$30,000
SYS. ANALYST...CICS or DMS II	$30,000
PROG. ANALYST...SERIES I RPG	$30,000
SYSTEMS PROG...MVS, SMP	$35,000
PROG. ANALYST...IBM 3600, STPS	$35,000
PROGRAMMER...UNIX C	$35,000
PROG. ANALYST...PL/1, CICS	$35,000
SR. SYS. ANALYST...UPE 90	$35,000
DBA...IMS DB/DC	$42,000

NO CONTRACT-ALL FEES EMPLOYER PD

THE DATA GROUP
3455 Peachtree Rd. N.E. Ste. 950
Atlanta, Ga. 30326
(404) 231-0764

Technical specialists

New and Progressive Software Development For Major Network and Operating Systems.

For exciting new challenges and greater opportunity, look to CIGNA, one of the nation's largest private investor owned insurance and financial services companies. A company where our on-going success continues to increase the importance and demand for newer and more progressive software development.

This has created many exceptional career opportunities within our Systems Division for talented software professionals in a wide variety of capacities. Right now, we have an immediate need for experienced individuals in the areas of:

Networking

This senior level position requires excellent diagnostic skills to analyze current and new network software packages for remedying existent problems and implementing new network software releases.

Minimum experience should include 5+ years in a large-scale IBM environment with solid background in ACF/VTAM, V2 – NCP, V2 – MSNF – NCCF/NPDA and knowledge of MVS operating systems. Proven project management experience is essential.

Operating Systems

This challenging, high-level position requires the ability to identify and solve systems problems to support and enhance MVS, JES2 with new operating system software.

Qualifications include 5+ years' programming experience, with 3 or more years in an IBM, MVS software support capacity. Knowledge of SMP and MVS system internals, Assembly language, and at least 6 months' experience on IBM, MVS stand alone dumps.

Excellent salary, comprehensive benefits and relocation program, and the stimulation of a progressive, supportive, high-tech environment will advance your career development. If interested in either of these specific openings or any other software opportunities, please forward your resume with salary history/requirements to: **Howard Cramer, CIGNA Corporation, Routing A-11, Hartford, CT 06152.**

CIGNA

An Equal Opportunity Employer, M/F/H/C

Data Processing

SUNBELT OPPORTUNITY

Daniel International is one of the largest engineering/construction firms in the nation. We currently have a need for the below listed individual in our Information Systems Division at our Corporate Data Center located in Greenville, South Carolina.

IDMS SYSTEMS PROGRAMMER

Our current DBMS software includes IDMS-DB, IDD, CULPRIT, OLQ, and IDMS "Tool Kit". Installation of IDMS-UCF and ADS-O is planned.

Responsibilities of this position include IDMS-DB/DC software installation and maintenance; DBMS software problem determination and resolution, software performance analysis and tuning, technical assistance and software evaluation; assist with development of Technical Standards/Guidelines/Procedures.

BS or equivalent in Computer Science or Math is required along with 1-2 years Assembler programming experience and 2-4 years programming experience in IBM MVS and CICS/VS (or IDMS-DC) environments. Exposure to IDMS-DB/DC in a systems programming or applications capacity preferred. Experience with IDMS-DC/UCF and ADS-O would be a plus.

In addition to a nationally competitive salary structure, we offer many improved benefits. These include short-term disability, salary continuation, accidental death coverage, medical insurance and corporate profit sharing.

If you are currently working as a Systems Programmer and meet the above requirements and are looking for a new challenge and career opportunity, send your resume including salary requirements, in confidence, to: **Alan Bean, DANIEL INTERNATIONAL CORPORATION, Daniel Building, Dept. 3-0370, Greenville, SC 29602.**

DANIEL INTERNATIONAL

THROW AWAY THOSE WINTER CLOTHES

PIA COBOL, CICS	12
PIA Lifeterm, CFO, Ufo 70, CFO+	12
Sr PIA Burroughs Banking	12
Sys Prog CICS/VS	12
Tech Sup Mgr	12
CAD/CAM VLSI Design	12
Consultant MBA	12
PIA Banking Deposits	12
Tech Sales DPU	12
Proj Mgr IBM OS CICS	12
PIA OE MBA Packages	12
Sales Mgr DPU - Midtec	12
PIA DMS Fin Sys	12
PIA IMS DB/DC Dev.	12
PIA Honeywell Hospital	12
Assembly/ Prog Backup/Learn	12
Telecomm Analyst	12
PIA CICS DL/I Hospital	12
IBM/PC Expert	12
Mgr DBA-IMS	12

COMPUTERPEOPLE

5720 N. Nebraska Blvd., Suite 204
Tampa, FL 33614
(813) 886-6168

We Serve Computer Professionals
- Exclusively -
And That's Important To You!

DATAPOINT/ DATABUS

A golden opportunity for the superior Datapoint pro to join this rapidly expanding real estate syndication firm. Solid mainframe programming skills coupled with superior systems support capabilities required. This position is instrumental in the formulation of a DP dept. Excellent perks. Midtown NYC location.

$35,000 FEE PAID

ROBERT HALF

Park Avenue
New York, N.Y. 10022
212-421-6800 (Agency)

LET YOUR MILITARY SOFTWARE EXPERIENCE WORK FOR YOU!

What's your military experience worth? If you are preparing to enter the civilian job market or have considered the possibility, then Computer Data Systems should be your first stop. Founded in 1968, Computer Data Systems, Inc. is a rapidly growing government-oriented, professional services and information processing firm. We have over 1500 employees—many are using their valuable military experience in the following areas:

APPLICATIONS

- MILITARY TELECOMMUNICATIONS
- MESSAGE SWITCHING
- PACKET SWITCHING
- TECHNICAL TRAINING
- MICROPROCESSOR DESIGN AND FABRICATION
- TECHNICAL WRITING

HARDWARE/SOFTWARE

UNIVAC, PASCAL, FRAME, C, IBM, ALC, DEC, ADA, INTEL, CMS, SYS/1000/7, ASSEMBLY

We offer competitive salaries and benefits that include life, health, and dental insurance, 100% tuition reimbursement and a profit-sharing retirement plan. If you want to know what your military experience is worth, send your resume with salary requirements to Clarence McGill (301) 657-1730.

Computer Data Systems, Inc.
Suite 200 W. Dept. 382
7315 Wisconsin Avenue
Bethesda, Maryland 20814

CDS and CDSI are Federally Registered Service Marks of Computer Data Systems, Inc.

An Equal Opportunity Employer M/F/H/V

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

COMPUTERS

ASG

MOVING INTO TOMORROW

SYSTEMS ENGINEER/ANALYST
SENIOR SYSTEMS ANALYST
PROGRAMMER/ANALYSTS
SR. PROGRAMMERS

ASG is expanding rapidly and is seeking experienced personnel to join our current staff of over 150 professionals in offices throughout the Washington metropolitan, Maryland and Virginia areas. ASG is looking for professionals with 2-4 years of experience on:

Hewlett Packard 3000 Model III, 40, 44 and 64
Wang VS, VS80, VS100

Send your resume highlighting HP and/or Wang experience.

SYSTEMS PROGRAMMERS

ASG is seeking experienced computer specialists to join our current staff.

Salaries to 55K

Sunnyvale, California

-Sr. Systems Programmers (Project Leaders)
4-8 years experience

-Systems Programmers
2-4 years experience
Requires extensive knowledge of:
VM/370, VM/SP and MVS

Will be responsible for installation and maintenance of VM/SP and special purpose monitor.

Silver Spring, Maryland

-Sr. Programmer/Analysts
VM,MVS
360/370 ALC
JOVIAL (desirable)

These Positions Require U.S. Citizenship

ASG offers excellent salaries, vacation, health and educational benefits and a challenging professional environment in which to advance. Send your resume with salary history and references, in confidence, to:

AUTOMATED SCIENCES GROUP, INC.
Personnel Department
700 Roeder Road MS5227
Silver Spring, MD 20910

An Equal Opportunity Employer

FACULTY POSITIONS IN COMPUTER AND INFORMATION SYSTEMS BLOOMSBURG UNIVERSITY

The Computer and Information Systems Department at Bloomsburg University has full-time, tenure-track positions available in the Fall, 1984. Opportunities exist for teaching, curriculum development, academic advisement and serving as department chairperson. Qualifications: an earned doctorate or an A.B.D. with a major in Information Systems; dissertation in the computer field; teaching and/or industrial experience desired.

Send detailed resume and names of three references to: Chairperson, CIS Search and Screen Committee, Bloomsburg University, Bloomsburg, PA 17815 postmarked by April 15, 1984.

Bloomsburg University is located in Northeastern Pennsylvania. It is a one-hour drive to the Pocono Mountains, three hours to New York or Philadelphia and an easy drive to all of New England and Canada.

Bloomsburg University is an AA/EOE. Minorities are especially urged to apply.

ATTENTION
DATA PROCESSING RECRUITERS

Opportunity in SUNNY St. Petersburg, FL for a good DP recruiter to take over established high producing accounts. We are a well known and respected recruiting firm - have excellent rapport and reputation with client companies and candidates. If you are an ethical and successful recruiter and would like to have a high income while enjoying the sunshine, call Mary Rawlins for further details.

Management Recruiters
of St. Petersburg
(813) 577-2116

Senior Editorial Opening in San Francisco

Computer Graphics World Magazine is looking for an experienced editor, with extensive knowledge of the computer graphics industry, to write feature material and solicit editorial contributions from diverse sources. This individual must be a self-starter and be able to articulate comfortably within the computer graphics community. Strong background in CAD/CAM preferred. Send resume and salary history to:

Randall Stickland
Publisher
Computer Graphics World
1714 Stockton Street
San Francisco, CA 94133

PROGRAMMER ACADEMIC SUPPORT
SEARCH REOPENED

Haverford College wishes to hire a person to do programming in support of faculty teaching and research efforts and to supervise student programmers. Requirements include a college degree, good communications skills, experience in user services, and knowledge of several languages (one of which is Pascal); preference will be given to candidates experienced with the IBM PC or the UCSD p-System. The salary will be commensurate with experience and qualifications. Send resume and the names of three references to: Edmund D. Stevens, Jr., Director of Academic Computing Center, Haverford College, Haverford, PA 19041. Haverford College is an affirmative action, equal opportunity employer.

Programmers/Analysts

Princeton University

Two positions are available in Campaign Information Systems to provide computer-based systems support for the fund raising activities of the University.

PROGRAMMER/ANALYST

Works with users of the Fund-Raising Information System to determine their needs, analyzes problems, develops specifications, produces detailed designs, implements and tests systems. Has technical responsibility for existing database system and performs tasks associated with maintenance and modification in collaboration with software vendor.

SYSTEMS PROGRAMMER/ANALYST

Provides technical support for a DEC VAX-11/780 computer system. Maintains VMS operating systems, analyzes performance, configures system, installs software, develops procedures, and administers system. Assist users at various levels in making maximum use of the system. Will have some responsibility for the Fund-Raising Information System. Experience with hardware and data communications desirable.

Both positions require Bachelor's Degree and 1-2 years of experience with BASIC and VAX/VMS, evidence of strong analytical skills and ability to communicate effectively both orally and in writing. Please send resume with salary requirements to: DOROTHY SCHOCK, PRINCETON UNIVERSITY, PERSONNEL SERVICES, CUIO HALL-CWB, PRINCETON, NEW JERSEY, 08544.

An Equal Opportunity/Affirmative Action Employer M/F

SUNBELT OPPORTUNITIES

Our client companies are hiring. Accelerated growth has created exceptional opportunities for highly motivated, technically proficient personnel. Qualified candidates should possess a minimum of 2 years of directly related experience in EDP and a proven background in one or more of the following technical areas.

CICS (Command/Macro) IMS DB/DC, IBM ASSEMBLER; ANS COBOL; PL-1; IBM 3600/4700- IDMS. HOGAN-CREDIT CARDS - UNIVERSAL VANTAGE LIFE - MANUFACTURING.

Systems Programmers - Project Leaders, Systems Analyst(s) and Programmer Analyst(s) are needed to fill current requirements. Clients provide excellent compensation - benefits, and in-house career progression. All fees including interviewing and relocation assumed by client companies. Send resume in total confidence to:

R. "Steve" Stevenson, Partner
JIM KING AND ASSOCIATES
1940 Gulf Life Tower
Jacksonville, FL 32207
(904) 398-7371

We're Looking for Computer Scientists

The University of Wisconsin-Eau Claire is accepting applications for several tenure-track faculty positions in the Department of Computer Science for the 1984-85 academic year, starting August 20, 1984. Responsibilities include teaching both introductory and advanced courses as well as providing academic advising to students.

Salaries are competitive and commensurate with qualifications and experience. University fringe benefits, such as health and life insurance are also provided. Qualifications include a master's degree (Ph.D. preferred) in computer science with emphasis in system software or hardware organization and experience with high level languages including PASCAL. Experience in microcomputers, graphics or secondary education applications are desirable but not necessary. If you are interested in joining a teaching community that is committed to the achievement of excellence, please submit a letter of application, resume and references to: Dr. David A. Nusser, Chairman
Department of Computer Science
University of Wisconsin-Eau Claire
Eau Claire, WI 54701
715-836-2526

UWEC **University of Wisconsin-Eau Claire**
AN EQUAL OPPORTUNITY EMPLOYER

THIS SPACE FOR HIRE.

(Inquire at Classified Advertising Department)

COMPUTERWORLD

Software Developers

(Chicago Location)

Experienced with:

- On-line interactive applications
- Multiple high level languages e.g. PL1, COBOL, C and PASCAL
- Compiler design
- Applications generator experience
- Data base management

Salary $35-$45K

Reply to CW-B4341, Computerworld,
Box 880, Framingham, MA 01701

An Equal Opportunity Employer

DP "Tiger" Wanted

We need an aggressive high talent programmer/analyst who expects to head a corporate DP shop within several years. Technical competence must be balanced with exceptional interpersonal skills and demonstrated success working with users in problem identification, system design and implementation. IBM experience helpful. Degree in computer science desirable. Fluency in COBOL required. This position is with the headquarters of a major retailing corporation located in the Midwest offering competitive salary, benefits and relocation. Send resume details of above experience along with salary requirements to:

Reply to CW-B4338
Computerworld
Box 880
Framingham, MA 01701

Personal computer users:

FOR FREE ACCESS TO A BETTER JOB CALL CLEO.

(213) 618-8880 (408) 294-2888
(415) 482-1550 (714) 476-8888
(619) 224-8888
Standard ASCII code
Access assistance
(213) 618-1625

CLEO

Computer Listings of Employment Opportunities

SUNBELT *IMS*

California to Florida

Immediate need for application and software IMS, CICS, IDMS, RAMIS, TOTAL and ADABAS professionals. Coast to coast coverage. Contact us now and realize higher salaries & earnings! Call collect or send resume.

SUPERIOR RESOURCES

Personnel Services - Employer Retained

17141 Ventura Blvd. #200
Encino (Los Angeles) CA 91316
(213) 995-4466

Member National Computer Assoc.

Manager, Software Development

...to lead 3rd-generation product development at FORMATION in Mt. Laurel, New Jersey.

You'll have full responsibility for managing product development and enhancement of our acclaimed MRP II system — FORMAN, a commercially marketed software tool that gives the manufacturing manager an on-line system to control inventories and workplace and production costs. This is a new system, developed with the latest technology including Virtual Operating Systems and the Formation-developed Database & Transaction Management System (TMS). FORMAN runs on any 370-compatible computer, including our own F4000, a 32-bit minicomputer.

● *To qualify, you must have at least a 10-year background, preferably in Database management systems and interactive applications...with well-honed and proven management and communications skills. (You must be particularly strong in scheduling, estimating, planning, and controlling.)* Reporting directly to a vice president, you'll oversee the work of our systems programming group, TMS, and our applications group. Current projects involve such enhancements and extensions to FORMAN as financial and order-entry packages.

This opening is immediate, and offers totally appropriate compensation (including stock options) and benefits within a results-oriented, completely professional environment. Formation enjoys considerable breadth for a company our size; in addition to software, we are involved in computer hardware development, design, manufacture, and service.

● *If you feel qualified for this highly responsible position and are interested in arranging an interview at your convenience... please send your resume (with salary history) to:* Vice President of Personnel, FORMATION, 823 East Gate Drive, Mt. Laurel, NJ 08054. Formation is an equal opportunity employer M/F.

formation®

Data Processing Professionals

The INFONET Group of Computer Sciences Corporation is more than an international computer communications and information processing network. We are the world's largest in Remote Computer Services, and due to unprecedented growth, we are currently expanding into state-of-the-art IBM technology. As a result of this expansion, we are seeking Data Processing Professionals in Los Angeles and Beltsville, Maryland, in the following areas:

NETWORKING
Design, develop and maintain communications software for the INFONET network. Participate in requirements analysis and the design phase of SNA/SDLC access methodology. (Los Angeles only)

SOFTWARE DEVELOPMENT
Responsible for new feature identification, specification, design and unit testing of IBM software products. (Los Angeles and Beltsville, Maryland)

SYSTEMS PROGRAMMERS
Design, develop and maintain operating systems software for INFONET's IBM and Univac based systems. (Los Angeles only)

TELECOMMUNICATIONS
Utilize skills in traffic analysis, communications procotol, tariffs, telecommunications hardware, and have a knowledge of communications software. (Los Angeles only)

For further information, and/or immediate consideration, please call in confidence:

800-643-7194
(213) 615-0311 Ext. 1264 (Calif. only)

or you may forward your resume immediately to: Dick Gunn

CSC
COMPUTER SCIENCES CORPORATION
INFONET GROUP
2100 East Grand Avenue
El Segundo, California 92045

Equal Opportunity Employer

The NS16000, Elegance Is Everything.

An elegant approach led to a very elegant solution — National's NS16000 microprocessor and its product family. The revolutionary top-down architecture delivers 32-bit power, and memory management capabilities on par with the latest mainframes. The upward-compatibility will accommodate a shift from 16- to 32-bit hardware. In essence, the NS16000 performs more like a computer than a chip, and we think that's a very elegant package.

A "Software-Intensive" Effort.

The NS16000 microprocessor is the springboard for an entire family of products currently being developed at National's Microprocessor Systems Division. The key to their success lies in the development of software that enhances the NS16000 family's performance, applicability, and elegance. From development through marketing, our "software-intensive" effort is rapidly gaining momentum as we develop demand-paged UNIX* systems based on Berkeley 4.1bsd and 4.2bsd for National's NS16032 and NS32032 microprocessors. We are also working with Bell Labs to define a version of SYSTEM V, . . ., etc., for NS16032 and NS32032. These developments are creating opportunities for software professionals to join us in the following areas:

Sr. Software Engineers: Language Tools Development

You will be involved with developing compiler code optimizer, linker, or debugger. Requirements include two to five years' of language tools development experience; including knowledge of "C", Pascal, FORTRAN, and UNIX.

Sr. Software Engineers: UNIX System Architect

You will be defining a version of SYSTEM V for NS16032 and NS32032. Two to five years' experience in UNIX kernel development is desired.

Sr. Software Engineers: UNIX Kernel Development

You will work on porting Berkeley 4.2bsd to NS16032 and NS32032 based microcomputer systems. Two to five years' experience in UNIX kernel development is desired.

Sr. Software Engineers: Networking

You will work with developing/porting networking software under Berkeley 4.2bsd on NS16032 and NS32032 based microcomputer systems. Two to five years' experience in networking protocol design and development is desired.

Software Engineers: UNIX Utilities Porting and Development

You will be involved with porting and developing UNIX utilities. One to five years' experience in UNIX is desired.

The Rewards Of Elegance.

The elegance and power of the NS16000 will become evident as more software is developed for it. And those who develop that software will reap the rewards, personally and professionally. That's definitely something to think about if you're ready to take on the challenge of our opportunities.

To learn more about National's Microprocessor Systems Division, send your resume to Dept. MS, National Semiconductor, P.O. Box 62499, Sunnyvale, CA 94088. We are an equal opportunity affirmative action employer. Principals only please.

*UNIX is a trademark of Bell Labs.

let's talk about your career.

National Semiconductor

SYSTEMS ANALYSTS AND PROGRAMMERS FOR SUNBELT LOCATIONS

Job dissatisfaction, complacency, and frustration are the biggest obstacles to overcome to achieve one's career goals. Every day new career opportunities pass us by because we are unaware of their existence. Let us keep you aware of what your true value is in the market place. Absolutely no obligation, please call or write Keith Reddick, CPC, Data Processing Specialist.

Dunhill
Of CHARLOTTE, INC.
[illegible]
Charlotte, North Carolina [illegible]
[illegible]
(NC Call)
(704) 542-0512

EMPLOYMENT SERVICE FOR PROGRAMMERS AND ANALYSTS

National Openings With Client Companies and Through Affiliated Agencies

Scientific and commercial applications • Software development and systems programming • Telecommunications • Control systems • Computer engineering • Computer marketing and support

Call or send resume or rough notes of objectives, salary, location restrictions, education and experience (including computers: models, operating systems and languages) to either one of our locations. Our client companies pay all of our fees. We guide, you decide.

RSVP SERVICES, Dept. C
Suite 700, One Cherry Hill Mall
Cherry Hill, New Jersey 08002
(609) 667-4488

RSVP SERVICES, Dept. C
Suite 211, Dublin Hall
1777 Walton Rd., Blue Bell, PA 19422
(215) 629-0585

From outside New Jersey, call toll-free [illegible]

RSVP SERVICES
Employment Agents for Computer Professionals

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

amdahl

Product Planners

Accept the challenge of planning the future of Amdahl's giant mainframes.

In 1970, a company was formed expressly to build one product: a mainframe computer that would outperform the mainframe that owned the market at that time. Today, that company is an international success story . . . a phenomenon. At the heart of the Amdahl phenomenon, talented planners can contribute to a second decade that will outstrip our first, with nearly double the growth.

If you have the imagination to use what you know about large-scale mainframe CPU's to project future customer requirements and industry trends, Product Planning at Amdahl could be in your future.

You'll provide a significant technical viewpoint between marketing requirements and engineering specifications; with emphasis on the bottom line impact on Amdahl. You'll write product requirements/specifications and interface heavily with Marketing, Engineering, Manufacturing and Architecture groups. Your business and technical skills will be focused on assisting top management in formulating product strategies and making key product decisions that will shape the future of Amdahl.

Requirements for the position include an MBA or BS/MS in EE or CS. Knowledge of the technical aspects of large mainframes, the dynamics of the large mainframe marketplace, and experience with the full product development cycle are definite assets.

Contact Kim Hawley at (800) 538-8460 ext. 7171 (in California, call (408) 746-7171 COLLECT). Or send your resume to Professional Employment, Amdahl Corporation, Dept. #1-010, P.O. Box 470, Sunnyvale, CA 94086. We are an equal opportunity employer through affirmative action.

the amdahl phenomenon

DATA PROCESSING

Instructor/Assistant Professor, Tenure Track position.

Teach at a university located on Grand Lake St. Marys in rural Ohio. Excellent recreational facilities offering advantages of small town living.

Develop and teach courses in Data Processing and related fields. Masters' degree with business and/or teaching experience required. Competitive salary with excellent fringes.

Submit letter and resume to: Assistant Dean, Western Ohio Branch Campus, Wright State University, 7600 State Route 703, Celina, OH 45822. Equal Opportunity, Affirmative Action Employer.

Applications should be received by January 31, 1984.

SYSTEM - 38 SPECIALIST $35,000

Int'l. mfr (BOSTON AREA) seeks tech proficient analyst to lead 38-based RPG III devel. You will lead design thru implem. of on-line interact DB appls. Exceptional oppty for accomplished P/A w/mgmt. pot. that thrives on complex sys. projs.

ROBERT HALF
of BOSTON, INC.
100 Summer Street
Boston, MA 02110
(617) 423-1300

DP PROFESSIONALS

MEDICAL ENGINEERING, INC., a dynamic medical software firm, seeks qualified professionals for their Corporate Data Center. Hardware environment includes IBM Systems 34, 36, 38, 4341 using RPG II, RPG III, DOS/ VSE/VM, COBOL under CICS in a national communications network. Minimum 1-2 years experience in programming/design, BA or BS preferred. Send resume and salary requirements to: MEDICAL ENGINEERING, INC., 2675 Winkler Ave., Suite 108, Fort Myers, FL 33901 or call (813) 939-6211.

DATA SYSTEMS PROGRAMMER ANALYST III

State of Wyoming. Requires 4 years experience as a computer programmer, including 2 years as a senior programmer. Degree in engineering, plus 2 years of computer graphics experience preferred. Location: Cheyenne, Wyoming. Salary Range: $2,130-$3,304/MO. Obtain applications by calling (307) 777-6738 or write to:

Wyoming State Personnel Division
Emerson Building
2001 Capitol Avenue
Cheyenne, Wyoming 82002

Submit application forms to above address no later than January 27, 1984. An Equal Opportunity Employer.

OPPORTUNITIES IN MAINE - N.H. FOR PROGRAMMERS/ANALYSTS

Enjoy the four seasons lifestyle of New England. We have several openings in Maine and New Hampshire for people with at least one year COBOL, RPG II/III experience. If you have IBM, Burroughs, DEC, VAX, Prime or Honeywell experience call today or send resume to:

Executive Search of N.E., Inc.
5 Canal Plaza
Portland, ME 04112
(207) 772-4377

SYSTEMS ANALYST- 1 yr

temp. project Irving. new issue of policies, as well as financial aspects of entering deposits, payments & withdrawals. Must have in-depth knowl. CICS Command Level, VM/CMS & VSAM. 3 yrs exp or 3 yrs programming. $34,800/yr. 40 hrs/5 days/wk. Spindells & Assoc., 1133 Ave. of Americas, NY NY 10036. Send resumes.

DATA PROCESSING INSTUCTOR(s)

Full time permanent, full time temporary - primary language COBOL. Hardware is IBM 4331 with DOS/VSE and ICCF. Must be certifiable. Start immediately. Contact Business and Office Supervisor, Dakota County Vo-Tech, Rosemount, MN 55068. Phone (612) 423-8231. EOE.

Banking

Programming, Systems, Management

Florida, Tennessee, Georgia, Louisiana, Mississippi & Texas

Over 100 Open Job Orders in the Above Listed States....Applications, Systems Internals and Data Base Positions Available....DOS/ DBAM/S IMS DB/DC HOGAN.....We Have 21 Burroughs Banking Jobs Listed.....
Mail Us Your Resume or Call.....Some of our Accounts Will Interview Without Resumes.

Executive Consultants
1650 Fairfield Avenue
Suite 102
Shreveport, LA 71101
(318) 222-1650

PROJECT MANAGER FINANCIAL MANAGEMENT INFORMATION SYSTEM (FMIS)

City of Los Angeles, CA. Contract salary range $66,600 to $84,888 D.O.Q. Reports to the elected City Controller and will implement study recommendations for a new financial management information system used by 34 City departments and bureaus. Requires 3 to 5 years of similar project management experience in a large organization plus strong knowledge of finance and data processing systems. Send resume to KORN/FERRY INTERNATIONAL, Attn: Norm Roberts, 1900 Ave. of the Stars, Ste. 1900, Los Angeles, CA 90067.

PROGRAMMER/ANALYST

Start the year off right with a career move. We offer promotion from within, exceptional salaries and fringes including bonus, paid over time, Blue Cross, dental, optical, etc. Join the elite of the profession which comprises our staff. Those with experience in one of the following only need apply:

RAMS COBOL
IBM 5/36 RPG II
D.E.C. VAX COBOL
D.E.C. DIBOL
IBM PL/1

Call or write to arrange a mutually convenient meeting.

RAMS SYSTEMS CORP.
2000 W. Maple Road
Suite 2012
W. Bloomfield, MI 48033
(313) 855-6377

HP-3000

Programmers, Programmer Analysts and Systems Analysts--Let us update you on the rapidly changing HP-3000 market coast-to-coast. To confidentially explore exciting new career opportunities, rush a resume or call Deanna Gray.

ALBUQUERQUE INC
1717 Louisiana NE, Dept. C
Albuquerque, NM 87110
(505) 265-1971
Equal Opportunity Employer Maintained

SUDDEN IMPACT MEP BANKING $25,000 - $100,000

You will create a sudden impact when Adams and Associates represents you to our key clients from coast to coast. As a respected name in search and recruitment for the banking industry, we can provide a unique confidential service. If you have 3+ years experience as a programmer, analyst, technical consultant, or manager go ahead and make my day and call:

Andy Pott
(919) 378-1391
Banking Division
Adams and Associates
P.O. Box 16282
Greensboro, NC 27406
Always Fee Paid

SYSTEMS PROGRAMMER

Opening for a Systems Programmer with 1-2 years MVS and/or UNIX experience. Environment:

MVS XA/3081K-32MB Loosely Coupled w/MVS SP
168AP/16MB w/JES2 Shared Spool TSO, CICS, Performance Measurement,and Tuning
MSNF TCAM networking to Germany

Seven VAX-11/780's w/ UNIX (Interactive's ISX)-Office Automation/ Personal Computers
Local Area Network between DEC, IBM, and Office PC's

Our Data Center supports CAS ONLINE, a major on-line chemical information service for customers world wide.

Applicants should have systems programming experience and a degree in computer science, mathematics, or related field; applicants should also be interested in becoming a member of a rapidly growing Data Processing environment at the current state-of-the-art. Interest in eventually moving into management a plus.

We offer a progressive benefits program, a pleasant and professional working environment, and salary scaled commensurate with your background and experience. To apply, please send your resume and salary history to:

CHEMICAL ABSTRACTS SERVICE

Employment Department
P.O. Box 3012
Columbus, OH 43210

Systems Analysts Florida

Top client, located in lovely Central Florida community needs 2 Sr. Systems Analysts with IBM-38 experience. Salary open, plus full relocation package and benefits. Excellent future with an exceptional company. No fees. Reply:

SEARCH ASSOCIATES, INC.
Executive Recruiters
3050 N.E. 2nd Avenue
Miami Shores, FL 33137
or call (305) 759-6700

FLORIDA COMPANY EXPANDS

A major Florida company is facing tremendous growth in 1984 calling for heavy expansion in DP. Need top quality programmer with 1 year + exp through project leaders with IBM, OS/MVS, & COBOL exp (database b/or linear exp a plus). Only career oriented quality professionals with high energy levels considered. Forward resume in confidence or call:

Management Recruiters
of St. Petersburg
7901 4th Street North, Suite 307
St. Petersburg, FL 33702
(813) 577-3116

DATAPOINT

- PROGRAMMERS
- ANALYSTS
- OPERATORS
- SALES PEOPLE

JOBS IN 40 US CITIES NATIONWIDE.
NOT AN AGENCY
SEND RESUME TO:

TIM TANNER
1377 K STREET, NW
SUITE 301
WASHINGTON, DC 20005

CURIOUS ABOUT CLASSIFIED?

If you are interested in advertising with Computerworld, but don't know how to do it, give us a call! We will be glad to send you our current rate card, which explains sizes, costs, deadlines and requirements. All you have to do is ask! Our toll free number is 800-343-6474, in Massachusetts call (617)879-0700, just ask for the Classified Advertising Department. Or, you can look for our classified order form located in the classified section of Computerworld. Fill it out, attach your ad with a check, and return it to us. Computerworld Classified Advertising, 375 Cochituate Rd., Box 880, Framingham, MA 01701. We're anxious to help!

APPLICATION SYSTEMS SUPERVISOR

Escape from routine...discover your place in the sun!

It's all waiting for you at Amerada Hess in the tropical splendor of the Virgin Islands.

A leader in the petroleum industry, Hess has an exceptional opportunity at our St. Croix oil refinery for an experienced Application System Supervisor with hands-on knowledge of IBM 4341 OS/VS 1 system. You'll put your 5-7 years' experience in programming and system design to practical use developing commercial programming applications in support of one of the world's largest oil refineries. This involves supervising the activities of 3-4 applications programmers who'll be assisting you step-by-step, from feasibility studies through project inception and development.

Requires a minimum of a college degree in Chemical Engineering, Computer Science or Business (MBA preferred), and strong background in business system analysis and project development; with a working knowledge of COBOL and PL-1.

We offer excellent salary, comprehensive benefits and all the pleasures of living in a Caribbean resort area. For immediate, confidential consideration, please send resume and salary history/requirements to:

David C. Roemer
Amerada Hess Corporation
One Hess Plaza
Woodbridge, NJ 07095
Equal Opportunity Employer

AMERADA HESS

Boeing helps systems programmers get their careers off the ground.

Boeing Computer Services puts systems programmers into an exciting computing environment, working with one of the world's leaders in software and computing solutions. We're at the forefront of linking mainframes to micros, developing information centers, designing networks and creating a wide variety of system and software applications.

Boeing is a great place to get your career off the ground and flying right. Now.

As you explore new hardware and software, you'll be backed by Boeing resources. Specially trained when necessary to operate emerging advanced systems. And allowed to implement and expand what you know.

We're currently seeking candidates with at least 3 years experience in one of the following:

- MVS systems programming
- VM (SP or 370) systems programming
- VTAM host support
- Dump shooting
- IBM data communications
- IMS systems programming
- CICS systems programming

There are several opportunities available. The emphasis ranges from new product development to maintenance and enhancement of existing offerings. Some positions require technical documentation skills and customer interface abilities. Your contributions will be rewarded with a comprehensive benefits package and salary fully commensurate with the professional challenges you'll meet.

Take advantage of this outstanding opportunity for systems programmers. Send resume and salary history in confidence to:

Walt Sanderson
Boeing Computer Services Company
7980 Gallows Court
Dept. CW 66
Vienna, Virginia 22180

An equal opportunity employer, m/f/h.

BOEING COMPUTER SERVICES

A Division of The Boeing Company

The Data Processor's Choice

CIBER

The Best And The Brightest Data Processing Professionals . . .

. . . have always found solid rewards and diverse challenges at CIBER. We're a respected Data Processing Consulting Firm that delivers a variety of applications development and software conversion services to our customers across the nation.

Currently we have positions for those who can work in a vertical capacity meaning analysis, programming, implementation and documentation with emphasis toward IDMS, IMS, CICS and many other state-of-the-art packages.

At CIBER, we respect your talents and efforts and encourage you to advance in your career. Our promotion from within policy, excellent compensation and attractive benefits package provide the stimulation to achieve your career objectives.

Our branch offices are located throughout the United States: Atlanta, Chicago, Dallas, Denver, Detroit, Houston, Phoenix, Sacramento, St. Louis, and Tulsa.

Call us collect or send your resume to:

CIBER
Personnel Resources
67 E. Weldon, Suite 121
Phoenix, Arizona 85012
(602) 234-0411

An Equal Opportunity Employer M/F

ELECTRONICS TECHNICIAN

European Stars & Stripes (ESAS), American newspaper published in Germany is looking for an Electronics Technician. Candidate must have at least 3 years of related experience in the computer science and electronic engineering field. Ability to carry out preventative maintenance and problem solving, both hardware and software of a multi-computer system (Pentalin 6500 and Hill 59 and peripherals) used for the editing and production of the ESAS Newspaper. Must be able to use all types of test equipment peculiar to the trade, including interfacing and testing with diagnostic programs.

$22,500 p/a (adjusted on Federal pay increases) are combined plus tax-free living quarters allowance, currently up to $8,400 p/a for employees with family or $4,400 without family, group insurance and reimbursement for relocation. Applicants must send full resume and make reference to this advertisement. Applications must be postmarked on or before January 23, 1984 and must be addressed to the Civilian Personnel Office in care of European Stars & Stripes, New York Operations, 200 7th Avenue, Room 401, New York, NY 10001.

S/38 Systems Analyst

ITT Transportation Distribution Services, located in Palm Coast, Florida, seeks a dynamic, well qualified individual for this newly created position. The successful candidate will be responsible for various systems development efforts relating to transportation, cost accounting, accounts payable, accounts receivable, and PC networking.

The qualifications required include:

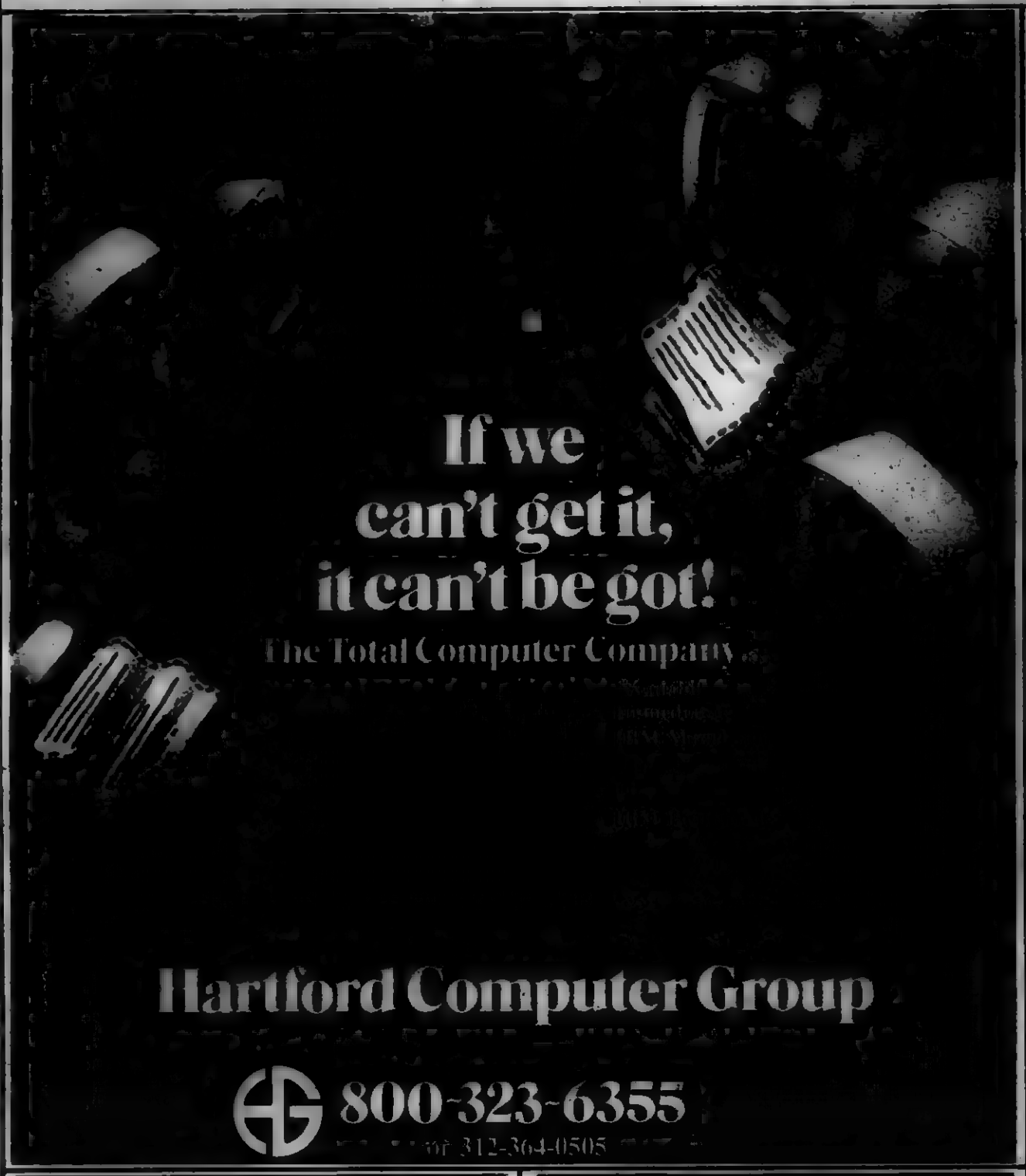
- Excellent knowledge of S/38 COBOL and CLP
- Proven track record in applications development
- Good communications skills/customer interface
- Bachelor's degree in Computer Science

We offer a salary commensurate with experience as well as an excellent benefits package. Please send resume and salary history in confidence to: J. Loucks, ITT Transportation Distribution Services, P.O. Box 1038, Palm Coast, FL 32037.

An Equal Opportunity Employer M/F

ITT TRANSPORTATION DISTRIBUTION SERVICES

BUY - SELL - SWAP



DSI

WE BUY SELL & LEASE!

BURROUGHS

Discover the DSI alternative.

800-641-5215

All equipment available immediately and guaranteed for Burroughs Maintenance.

DSI Serving the Burroughs Community Worldwide
2480 W. Alameda Ave., Denver, CO 80223 (303) 922-5331
TWX 910 931-0483

IBM

Series/1 • S/34 • S/36
S/38 • 4300
5110 - 5120 • S/32
BUY • SELL • LEASE
All models, systems & peripherals
AVAILABLE NOW!!
Ask about our 72 hour upgrade

(408) 425-7333

SOURCE
DATA PRODUCTS, INC.

FOR SALE
WANG 2200 MVP
128K, 2 LP's, 80MB Disk, 10MB Cart. Disk, 8M Floppy, 4 Terminals.
ALSO
IBM OSS
460, 440, and (2) 420's.
RFI
P.O. Box 2576
Redwood City, CA 94064
(415) 365-2566

WE BUY...SELL...LEASE...
Systems 34/36/38/4300
- Financial Advantage Is Yours Through CPU
- New Or Previous-Owner Processors Available
- Immediate Delivery
- IBM Maintenance
- Create Cash Flow With CPU Purchase/Lease-Back

Call 503/222-2226 Collect
CPU Sales & Leasing, Inc.
3477 Northwest Yeon • Portland, Oregon 97210
AMERICAN SOCIETY OF COMPUTER DEALERS

System/34 128K/84MB Printer 300LPM $1000. P/Mo. Sale/Lease
Sale/Lease 4341's Models K, L, M - GRP 1 & 2 Lease Term - 1 Yr or Longer
Control Units 3880 - B13 3880 - D13 Avail: March 1984 Sale/Lease
Controllers 3680 3803 3274 3276 Immediate Delivery
DASD 3380 3375 3370 3350 3344 3310 Immediate Delivery
Tape Drives 3420 3430 3410 8809 Immediate Delivery
Display Stations 3278 3279 3178 3277 Immediate Delivery
Printers
Computer Marketing Inc.
P.O. Box 5265, Philadelphia, PA 19126

NCR V-8650 Computer System
with (5) TTY computer terminals
(1) 600CPM card reader
(1) 7200-0805 CRT plus accessories
BURROUGHS B-1726 Computer System
with (1) B1726 CPU
(1) PC620-030 data recorder
(1) B9115 card reader
(1) B9247-13 printer plus accessories
Sell as system or separately
Best offer
Call Dave Conners
(617) 861-7167

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

COMDISCO

A Commitment To Excellence

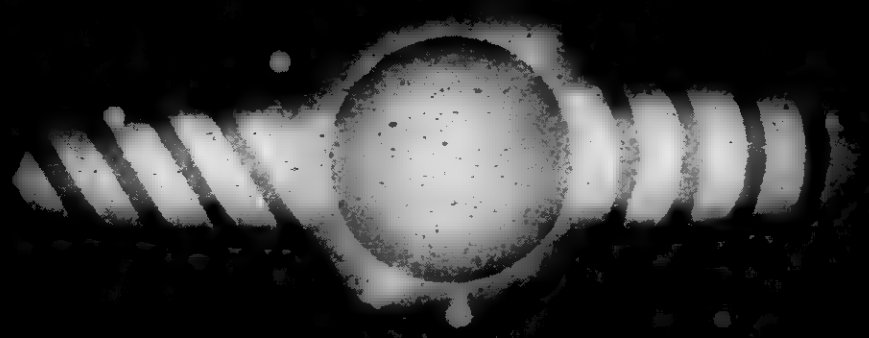
IBM PROCESSORS

- ☐ 3081
- ☐ 3083
- ☐ 3033
- ☐ 4341
- ☐ 4341/4381
- ☐ 4331-2/4361
- ☐ Amdahl V 7 and V 8 Available January February

IBM PERIPHERALS

- 3350
- 3880-1/2
- 3380 AA4/B4
- 3370/3375
- ☐ 3803-2
  3420-4/6/8
- ☐ 3705/3706
- ☐ 3725
- ☐ 3178/3278
- ☐ 3890

The Leader In Full-Service Leasing



MEMBER OF

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

SYSTEM/34
SYSTEM/36
SYSTEM/38
SERIES/1

FIND IT FAST IN OUR FAMOUS
COMPUTER MARKET ADVISOR
SEND US YOUR BUSINESS CARD
AND WE WILL SEND YOU A FREE COPY.

ECONOCOM

- BUYS
- SELLS
- LEASES
  - QUICK DELIVERY
  - COMPETITIVE PRICING
  - FLEXIBLE FINANCING
  - TRADE-INS ACCEPTED
  - PROFESSIONAL SERVICE
  - SHORT-TERM LEASING
  - LONG-TERM LEASING
  - PERIPHERAL LEASING
  - TAKE-OUTS DONE

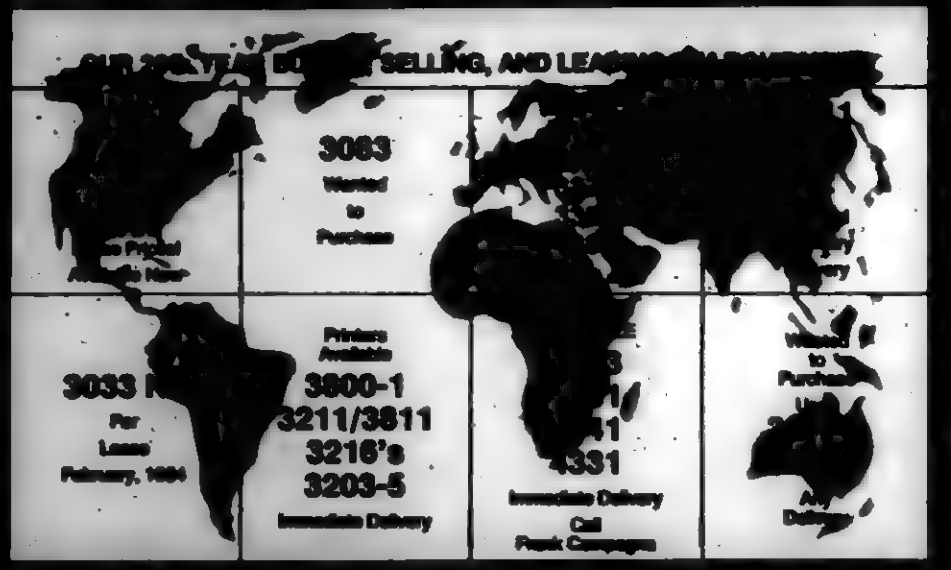
901-767-9130

ECONOMIC COMPUTER SALES, INC. • 845 CROSSOVER LANE • P. O. BOX 240297 • MEMPHIS, TENNESSEE 38124

For Rent or Sale
(15) HP 7260A Mark Readers
Immediate Delivery
Call
Data Rentals/Sales, Inc.
Mr. Krakover
(213) 598-3822
or Outside CA
(800) 421-4506

We'll keep you up to date week, after week, after week, after week, after week,

IPS Computer Marketing Corp.



TELEPHONE: (201) 262-9500 Telex: 642-197

C.D. SMITH & ASSOCIATES, INC.
DEC computer systems & options
12905 East Freeway, Suite 318
Houston, Texas 77015
(713) 451-3112
TELEX 76-2547

DEC

WE ARE BUYING: VAX 11/780

WE ARE SELLING:

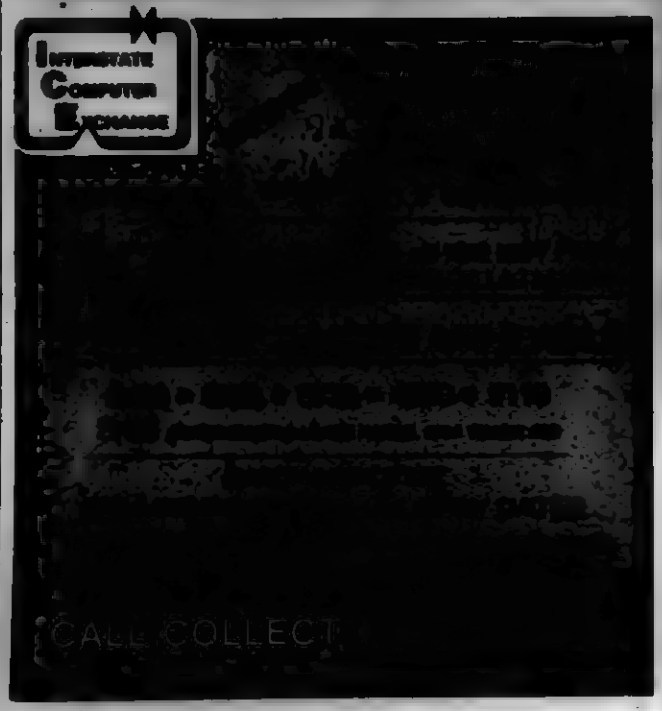
MS780-DC	5,000	DR8-W	1,495
MS780-CA	4,000	RA81-AA	18,000
MS780-DC	5,000	TS11-CA	10,000
FP780-AA	5,700	RP06-AA/PTR	9,000
DW780-AA	10,000	11/780 CPU	CALL

If you want on our Mailing List, call Valerie (713) 451-3112.

INTERPORT EQUIP. FOR SALE
ARC, DATASHARE
INFOSWITCH SYSTEMS

3 INFOSWITCH LDCS 13
2 INFOSWITCH LDCS 29
2 INFOSWITCH LDCS 27
1 INFOSWITCH LDCS 34
30 REMOTE ACCESS AMPS
6 TCS ASSY., SHELF, RACK, & POWER SUPPLY SETS
SS SPARE BOARDS & PARTS
1 6800 PROCESSOR 256K
4 6800 PROCESSOR 128K
2 6800 PROCESSOR 128K
1 3815 PROCESSOR 96K
1 3820 PROCESSOR 128K
6 RIMS
2 ACTIVE HUBS
7 MULTIPORT ADAPTERS
2 10/10 MB DISK DRIVES W/CONTROLLER
1 5MB DISK DRIVE W/CONTROLLER
1 40MB DISK DRIVE EXTENSION
1 120MB MIDS DISK DRIVE
1 6600 CENTRONICS PRINTER
1 GE PRINTER
4 FREEDOM PRINTERS
2 EPSON PRINTERS
2 3600 TERMINALS
3 6200 TERMINALS VERS
1 800BPI MAG TAPE DRIVE
2 LDS MODEMS
2 T-SWITCHS
1 A/B SWITCH

CALL: RAY MOTO
(562) 692-5211
(714) 894-4418



STC 8650
SALE LEASE
LOW LOW PRICES

PAM CHRISTIANSEN
MARKETEX COMPUTER CORP.

800-IBM-4341

Must Sell Available 2/1/84
DEC PDP 11/70
512KB MOS
(2 each) RP06
TE16
DH11AD
Call Jim
(713) 445-0062

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

ACM
Pioneer Computer Marketing
214/343-2904

BUY - SELL
LEASE
- All IBM Systems
- Peripherals
- Tapes
- Disks

SERIES/1
- Systems
- Features
- Peripherals

SYSTEM 34
- CPU
- Peripherals
- Upgrades

PIONEER COMPUTER MARKETING
11448 Pagemill Road
Dallas, Texas 75243
214/343-2904

STOP
YOU'VE FOUND IT!
IBM S/36
IBM S/34
IBM S/38
4331/4341
NEW
4361/4381
- One, Two or Three Year Leases.
- We Buy, Sell or Lease.
- New and Used Peripherals.
- Trade-ins Welcome.

TexCom
SAN ANTONIO
MEMPHIS • HOUSTON
(512) 349-9955
JOIN THE MORE THAN 150 OTHER MAJOR COMPANIES THAT CURRENTLY LEASE IBM EQUIPMENT FROM TEXCOM.

WANG WORD PROCESSORS
AT THOUSANDS OFF!
Guaranteed, remanufactured WPS 20, WPS 30 and Wangwriters available for immediate delivery. You don't pay a cent till Wang installs and places equipment under service contract. 15-day return privilege. Buy, Lease, Rent!
For Free Info and fast response call toll-free:
1-800-321-2986
ELECTRONIC OFFICE EXCHANGE, INC.
Dept. SCSCWD • Box 7037 • Ann Arbor, MI 48107

What makes Dataserv a world leader in the IBM marketplace?

Customer satisfaction.

Over 65% of Dataserv's business comes from previous customers or customer referrals.

dataserv

**** DEC ****
BUY—SELL—LEASE—TRADE—CONSIGN
SYSTEMS — PROCESSORS — OPTIONS
PERIPHERAL — MODULES — MEMORY
— SPARES —
NATIONAL COMPUTER EXCHANGE
(714) 990-5988
600 North Lunar Avenue, Brea, CA 92621
TWX: 910-596-1499

IBM UNIT RECORD EQUIPMENT & DISK DRIVES
DISK PACKS, CARTRIDGES, VAC. TAPE, ETC.

SALE OR LEASE
machines
026—029—082— 083— 084
085—087—088— 129— 514
519—548—557
disk packs
2316—3336(1)—3336(11)—3348(70)
5 MEG. TO 300 MEG. PACKS—NEW & USED
Highest Prices Paid for Used Packs & Machines
THOMAS COMPUTER CORPORATION
5633 W. Howard St. Chicago, IL 60648
800-621-3868 312-647-6868
Authorized Distributor — Memorex, CDC, 3M, BASF, Verbatim, Dysan

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

WE'RE NUMBER 1 FOR SERIES/1

Computer Options, Inc. is a major remarketer of both new and used IBM SERIES/1's and related peripherals. We offer your firm the option of purchase or a variety of custom leasing programs for your hardware acquisitions. Call us toll-free for more information.

AVAILABLE NOW FOR IMMEDIATE INSTALLATION

4955-F	4964-001
4955-E	4973-2
4959-A	4974-001
4962-2	4975-2L
4963-64A	1310

ALSO AVAILABLE-SYSTEMS 34 & 38

Call toll-free 800-328-5718

(In Minnesota, 612-544-8660)

COMPUTER OPTIONS, INC.
"the best option"
1660 South Highway 100
Minneapolis, MN 55416

DATA GENERAL SPECIALISTS
FOR
Surplus New & Used Equipment & Systems
with full depot repair facilities.
CALL US
WE TAKE THE TIME.
- WE CARE -
JM Associates
601 W. Chapel Avenue
Cherry Hill, NJ 08002
609-663-1115

WANTED TO BUY
DEC Equipment
Vax and PDP-11
Systems-Components-Peripherals
New or Used
Meadowbank Enterprises
Essex St. • Middleton, MA 01949
(617)777-4998

MEMORY BOARDS

LSI/11	8KB	$1095
VAX 11/780	2MB	$4300
ECLIPSE	8KB	$6700
NOVA 4	8KB	$4600

Call For Others
Now 100% Compatible

Buy/Sell/Lease
SWITCHING
IBM 2914/3814
Locom LCM-500
T-bar 3815/3816
DataSwitch 1000
Bell BCS-3/BCS-5
Digital Ind 3403/4101
Jack McAuliffe
4245 LBJ Freeway #216
Dallas, TX 75234
214-661-3661

IN STOCK!
Fujitsu Eagle
with cabinet, cables, slides & terminator:
$13,000
New Fujitsu SP 380
80 character per second, letter quality printer:
Introductory Special - $2,000
MANDREL
303-693-3035
2771 S. Jasper • Aurora, CO 80013

ALL NEW
DEC COMPUTERS
IN STOCK
RAINBOW 100
RAINBOW 100 Plus
DECMATE II MICRO-11
PDP-11/23 VAX's
COMPUTER SYSTEMS CORP
8040 Rock Hampton Ct. Authorized
Indianapolis, IN 46268 DEC
(1 800) 428-6714 Dealer
ALL SYSTEMS IN STOCK

ALL NEW DEC TERMINALS IN STOCK
CRT's

VT100-AA	NEW
VT101-AA	VT220-A
VT102-AA	VT240-A
VT125-AA	VT241-A

PRINTERS

LA100 (All Models)	LA50-RA
LA120 (All Models)	LQP03-AA
LA12 (All Models)	

COMPUTER SYSTEMS CORP
8040 Rock Hampton Ct. Authorized
Indianapolis, Ind. 46268 DEC
(1 800) 428-6714 Distributor
Best Pricing Available

NCR

1	8200 NCR Processor 32K Memory
2	Disk Drives 658/401 Model
1	Removable 1 Fixed Disk Each 4.9 MB Per Disk
1	NCR 796/101 Terminal
1	NCR Printer Model 349/300 Lines

Best Offer
(615) 893-7703

Your Full Service Computer Dealer
COMPUTER CORPORATION

DPB	S/34 S/36 S/38	Series/1	3270's
MAIN FRAMES PERIPHERALS COMMUNICATIONS	AND RELATED PERIPHERALS	•Systems Configured To Your Specs •All Features and Peripherals Available •Depot Repair Service	3277 • 3278 3274 • 3276 3271 • 3272
— Call — FRED HANSEN	— Call — RICHARD LORANG	— Call — JOHN BURLEW RANDY STONE	— Call — TERRY SMITH

TOLL FREE 800-527-6438 / IN TEXAS 214-330-7243
4573 South Westmoreland • Dallas, Texas 75237

PEARL HAS IBM 3741's

and we have System 34, System 36 and System 38 and a large inventory of CPU's, CRT's and printers. Call us about our flexible lease plans for buying, selling, leasing, renting and purchase/leaseback.

Call Dave Allen or Shirley Shreeve.
Pearl Computer Division
P.O. Box 24026 •4717 Centennial Blvd.
Nashville, TN 37202 (615) 383-8703

Inflation Fighters
Quality & Savings
Slightly used, Money Back Guarantee. Full Reels. All External Labels Removed Guaranteed for use at 800 BPI through 6250 BPI.

2400' Reel	$4.95 ea.
1200' Reel	$4.25 ea.
600' Reel	$3.50 ea.

All Tapes with Hanging Seals
We pay freight on orders over 200 tapes.
All orders shipped within 48 hours.
Call or Write
Computer Tape Mart
44A Seabro Avenue
N. Amityville, New York 11701
[516] 842-8512

AMDAHL V/8
FOR SALE
16 X 16
4096 SUBCHANNELS
HARDWARE MONITOR INTERFACE
(1) FEBRUARY 1, 1984
(1) APRIL 1, 1984
CALL: CHARLIE BERRY
MAJOR COMPUTER INCORPORATED
10237 YELLOW CIRCLE DRIVE
MINNETONKA, MN 55343
(612)933-6000

DATA GENERAL
New & Used Equipment
BUY. SELL. TRADE.
McINTYRE'S
Mini-Computer Sales Group Inc.
(313) 583-4100
TLX: 810-232-4066
Answer Back: MCDATAGEN MARS
32050 Edward Ave.
Madison Heights, MI 48071

BUY ..... SELL SWAP

Well-Equipped To Serve You In Buying or Selling:

HARDWARE

SOFTWARE

COMPUTER TIME & SERVICES

Over 500,000 computer people read **COMPUTERWORLD** every week. So, placing an advertisement with us is going to help you take care of your computer-related business...very quickly.

Deal us in on your business needs.

Call the Classified Department at 1-800-343-6474 or (in Massachusetts) (617) 879-0700 to place your ad.

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

HP

encore
(213) 452-0117

SYSTEMS
4341 4331
38 36 34
32 3
BUY • SELL • LEASE
COMPUTER BROKERS, INC.
2978 SHELBY ST.
MEMPHIS, TENNESSEE
CB
TOLL-FREE
800-238-6405
901-372-2622
PERIPHERALS
3203 3370
327X 3411
3350 3420
ASCO

"A COMPUTER LEASING COMPANY'S FINANCIAL STABILITY IS VITAL."

We said that in 1973, when Randolph became a subsidiary of The First National Bank of Boston . . . and we say it again, because it is still true and even more important today.

As an important part of The First National Bank of Boston, one of the nation's oldest and leading financial institutions, Randolph has a built-in financial stability that continues to be unique in the third-party computer leasing industry.

LEASING COMPUTERS IS OUR ONLY BUSINESS.

Randolph specializes in leases for IBM 3081, 303X and 4300 computer systems and peripherals . . . firm evidence that we plan to perpetuate our computer leasing activity.
Our people have an average of 18 years experience in the DP industry . . . from 360's to 3081's. They know all about alternative financing to be sure, but they also know their way around a DP department and the hardware in it.

WE SPECIALIZE IN SOLVING PROBLEMS.

Machine installed on a rental basis? Long wait for delivery? Stuck with a lease on your old machine? Own a 3081 but need cash? Whatever your problem, we can tailor a lease that will fit your exact needs and let you start saving money right away.

SAVE $80,000 EVERY MONTH FOR THE NEXT 5 YEARS.

You can lease the same 3081 that IBM rents for more than $180,000 per month from Randolph for less than $100,000 per month. If you're renting an older machine, we can save you even more—and you'll get about 4 times the throughput in the bargain.

WHEN IS THE BEST TIME TO TALK TO RANDOLPH?

The sooner the better. But it's never too late, even if you already have a machine installed.

Our 19 years in computer leasing gives added assurance that Randolph will continue as the leader in the computer leasing industry . . . continue to live up to the terms and conditions of our agreements . . . provide upgrades . . . fulfill all of our commitments.

LET RANDOLPH HELP YOU GET THE SYSTEM YOU NEED NOW, *NOW.*

We've already done it for many of the Fortune 500 companies . . . and we can do it for you. Call Joseph B. Kelly, Jr., Executive Vice President, 800-243-5387

537 Steamboat Road
Greenwich, Connecticut 06830
203 661-4200

Randolph

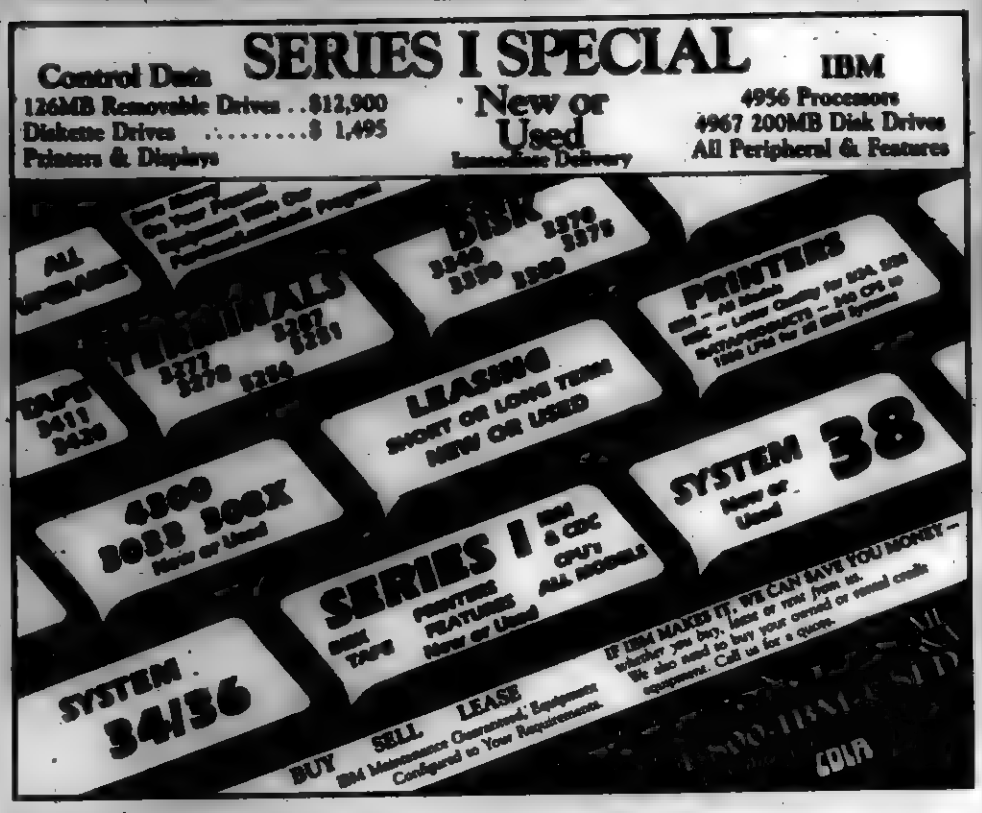
A MEMBER OF COMPUTER DEALERS & LESSORS ASSOCIATION RANDOLPH COMPUTER CORPORATION A subsidiary of THE FIRST NATIONAL BANK OF BOSTON BANK OF BOSTON

BUY • SELL • LEASE
SERIES-1
S/34 • S/36 • S/38
4300
S/23 S/32 5110-20
Tape • Disk • Printers • Tubes
AMCOM CORPORATION
5200 W 73RD ST • MINNEAPOLIS, MN 55435
(612) 835-4737
CALL TOLL FREE
800-328-7723

URGENT
For 2/15/84 Delivery
NEED TO BUY IN QUANTITIES
• 3350-A2
• 3350-B2
• 3830-2
USERS ONLY
CALL JOHN GILES
TOLL FREE: 800-325-0960
CSI
COMPUTER SALES INTERNATIONAL, INC.
P. O. Box 16264, St. Louis, Missouri 63105
CDLA

We've Got Your Number
S/34 ALL MODELS QUICK DELIVERIES
SERIES 1 CONFIGURED TO YOUR NEEDS
S/36 ATTRACTIVE LEASE RATES
S/38 NEW & USED MACHINES
5110/5120 NEW LOW PRICES
PERIPHERALS
CRT'S, PRINTERS, DISK, TAPE, MODEMS
CARLYN
COMPUTER SYSTEMS
9105-G Rockside Road Annandale, VA 22003
"CALL COLLECT" (703) 642-1950

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP



4341-M2
FOR LEASE!!
Coastal Computer Marketing
(800) 321-4069
(213) 986-4830
CDLA

3287-1
w/6331, 8700, 8Q0199
Qty. Available
GTE
(214) 783-1212
CDLA

We Buy & Sell
DEC
Systems
Components
Digital Computer Resale
call:713 445-0082
Houston, Tx 77080
CDLA

BUY • SELL • LEASE
SERIES 1
5110
XERXES
COMPUTER SALES
Minneapolis, MN 612-338-3042
800-328-3884

The nationwide market - a call away!

DEC/DG

SYSTEMS/PARTS/PERIPHERALS
NEW/USED/SURPLUS • DISCOUNT PRICES
Since 1977! Buy, Sell, Trade and Broker.

PHIL	BRYAN	JENNIFER
DG	11-VAX	8-LSI

CALL TODAY - (305) 392-2005
TELEX 568-670

thomas business systems, inc.
4301 Oak Circle - Unit 11 Boca Raton, Florida 33431

data 3 computer corporation
IBM PROCESSORS/PERIPHERALS

GSD		DPD
S/34	• BUY • SELL • LEASE • SUB LEASE •	4331
S/38		4341
SERIES/1		TAPE
S/36		DISK
S/32		PRINTERS
S/3		TUBES

- All Peripherals
- Special Features
- Upgrades
- Flexible Leases
- On-time Delivery
- Purchase/Leaseback

CDLA 800-328-7938

ALL NEW C.ITOH TERMINALS IN STOCK
CRT's
CIT-101 CIG-201 CIT-500
CIT-161 CIG-257 CIT-414
CIT-101e In Stock
PRINTERS
CI-8510 CI-300 (300 LPM)
CI-1550 CI-600 (600 LPM)
COMPUTER SYSTEMS CORP
Authorized CIE Distributor
Best Pricing Available

Processors	Peripherals	Printing Equipment
S/23	3741	1255
S/32	3742	1419
S/34	029/129	3800
S/38	5211	
5110	5251	
5114	5225	
5120 DATAMASTER	5256	
	3262	

SELLING?

Sell your product or service in Computerworld classifieds.

Join the thousands of advertisers who use our classifieds because they get results.

You can find buyers for discs and DEC's, terminals and timesharing, software and System 370's.

More than half a million active computer people read Computerworld each week, and you can reach them efficiently in Computerworld classifieds.

To place your ad, or to get a rate card with complete details on Computerworld Classifieds, call or write:

Classified Advertising
COMPUTERWORLD
P.O. Box 880
Framingham, MA 01701
1-800-343-6474
617-879-0700

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

CMI

3033
All models

3081
New or Used

Series 1
New 4958's, 4987 Disk
Used 4955F's, 4955E's
Immediate Delivery
Buy-Sale-Trade
Leases Available

3083
New or Used

3081/3083/3084
Lease Financing Available
For Your System or Ours
2, 3, 4 or 5 Year Terms

Series 1 I/O
New or Used
IBM/CPI/Professional
Data/Disk Controllers
Printers - ABC11/2/160
160 CPS-1132 LPM
Tape Controllers - Storage Unit
Comm 3705-4331
Disks - Peripherals
3-3705-II/3705
Buy-Sale-Trade Leases Available

Wanted
4381
Delivery Positions

Wanted
4341-M2
Call Now

3300 3600 3830
3340 3370 3333
3375 3380
Buy/Sell/Lease

CMI

SYSTEM 36
Monthly Lease Rates
Lower Than IBM Credit Corp.
2, 3, 4, or 5 year terms
Includes System 34 telecode

3725
Lease Financing Available
For Your System or Ours
2, 3, 4 or 5 Year Terms

3800
LASER PRINTERS
Model 1's
Available for Immediate Delivery
Model 3
Lease Financing Available - Any Term

8130's
Sale or Lease
Available Immediately

NEW 3230 PRINTERS
Greater Discounts Than IBM
Lease Available
3224-1 (140 LPM) $ 165/mo.
3224-2 (240 LPM) $ 195/mo.
Call For Short Term Rates
Immediate Delivery

3705-3704
Available for
Immediate Delivery
Sale or Lease
We Can Supply Models E through K
Call Us For Purchase/Leaseback
Of Your IBM Machines
And Save 30% Of Your Monthly Cost

DEC

RENT • BUY • UPGRADE • SELL

PDP, 11/03, 11/04, 11/23, 11/24, 11/34, 11/44, 11/70, VAX/730, VAX/750, VAX/780

SYSTEMS • OPTIONS • SUPPLIES

11/34	128K, Dual RLO2, DZ11-A, Dual H9642 (new)	$24,995
11/23+	256KB, Dual RLO2, DZV11-C, VT102, Basics (new)	$10,399
11/70	512KB MOS, LA36 (used)	CALL
VAX/780	1MB, RUA82, RLO2, VMS Basics (new)	CALL

Customized Configurations—Call With Your Request.

In Stock		Specials		In Stock	
11/24-BC (new)	$11,250		M811-PB (new)	$4,195	
DB11-A (unused)	$ 495		M8750-CA (new)	$4,195	
DWF32-AB (new)	$ 3,495		M8750-DC (new)	$5,995	
DUP11-DA (used)	$ 595		RH750 (used)	$2,995	
DZ11-F (used)	$ 3,150		RK611-EA (used)	$3,695	
H9642 (new)	$ 1,295		RL211-AK (new)	$6,495	
KT24 (new)	$ 750		RUA81-AA (new)	Call	
LP11-WA (unused)	$ 3,495		LT33-AA (used)	$ 495	

BROOKVALE ASSOCIATES
800-645-1167 NY: (516) 567-7777

IMMEDIATE AVAILABILITY:
SYSTEM/38
MODEL

ECONOCOM

COMPUTER LEASING

BUY · SELL · LEASE · TRADE
PURCHASE LEASEBACK . RENTAL CREDITS

SYSTEM 32's, 34's, 38's

4300's All Peripherals

303X's and Peripherals

360's, 370's All Peripherals and I/O

3270's CRTS, Printers & Controllers

MCC

(214) 258-0541
TWX 910-860-5285
METROPLEX COMPUTER COMPANY, INC.
Authorized to Service With Integrity

DATA GENERAL

Hanson Data Systems

NPA SYSTEMS INC.
Integrity Today for Tomorrow's Challenges

SPECIALIZING IN:
PURCHASE
SALE, TRADE,
LEASE, RENT,
AND SERVICE OF
Data General
EQUIPMENT

381 COATES AVENUE HOLBROOK, N.Y. 11741
TELEX # 510 222 6852
(516) 467-2500

FORSYTHE McARTHUR ASSOCIATES, INC.

DEALER / LESSOR OF IBM
Computers and Peripherals

Home Office
Chicago
919 North Michigan Avenue
Chicago, Illinois 60611
312 943-3770

Branch Offices
Atlanta 404 953-6457
Milwaukee 414 783-5544

CDA

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

DISK DRIVES · CONTROLLERS · PERIPHERALS · MEDIA

WANG · DEC

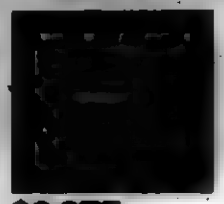
National authorized CDC OEM-Distributor offers new equipment, fully warranted for 90 days:

$12,900

CDC Model 9766 (300 Mb.) WANG Models 2285V-2, and 2285 (300 Mb.) DEC Model RM05 (205.1 Mb.)

$7,750

CDC Model 9762 (80 Mb.) WANG Model 2285V-1 (75 Megabytes). DEC Model RM03 (67.1 Mb.)



$8,875

CDC Model 9448 (66 Mb.) WANG Model 2280-3 (80.4 Mb.) WANG Models 2280 V-3, 8580 (80 Mb.) DEC Model RM07 (83.4 Mb.)

$20,825

CDC Model 9775 (676 Mb.) WANG Model 2285 V-3 (640 Megabytes). DEC Model 2-RM05s (512.2 Mb.)

ERST

INTERNATIONAL CORPORATION

225 Lafayette Street, New York, NY 10012

ERST is the largest dealer in pre-owned WANG equipment—2200, VS, WP (CPUs, Terminals, IOPs, Controllers, Printers, Memory Upgrades).

Need time give us a call . . . Toll Free **1-800-FOR-ERST** . . . In NY. **212-431-1100**

DEC

unbeatable combination

inventory at low, low prices.

Call toll free 800-328-7000

In Minnesota (612) 894-4020

MIDWEST SYSTEMS, INC.

Burnsville, Minnesota

Buy - Sell - Lease

S/32
S/34
S/38

IBM

3741
3742

CPU's CRT's PRINTERS ALL MODELS

PURCHASE/LEASEBACK
SHORT & LONG TERM LEASES

Computer Marketing of America, Inc.
P.O. Box 71
610 Bryan Street
Old Hickory, Tennessee 37138

1-800-251-2670
In Tennessee: 615-847-4831

NEW & USED EQUIPMENT FOR SALE BY END USER

DATA GENERAL

1) 6040 TTY PRT	3 400	3) 10128H 1/2 BAY CABS	350
2) 6273 LP2 PRINTER	1000	2) 11144A 1 BAY CABINETS	600
1) 6274 LP2 PRINTER	1600	1) 10758A 1 BAY IND. CAB.	
1) 6189 LP2 PRINTER (NEW)	1850	W/AIR COND. (NEW)	4400
1) 6191 LP2 PRINTER (NEW)	2350	1) 10758B 1 BAY IND. CABINET	
1) 6103 35 MB DISK (NEW)	5500	W/HEAT EXCH (NEW)	3900
2) 6103 35 MB DISKS	4800	6) 4341 ULM 5 BOARDS	700
4) 6070 20 MB S/S	2000	2) 7284 LP2 CONT	350
2) 6070A 20 MB DISKS	2000	1) 6027 35 MB CONT	700
1) 6027D 15 MB DISK (NEW)	1600	2) 6060H 4C 5 SLOT 64K	1395
1) 6060 12.5 MB DISK W/FLOPPY	3100		
1) NOVA 4X 5 SLOT 128K 15 MB DISK W/FLOPPY & ULM 5			12,100
1) NOVA 4X 5 SLOT 128K 12.5 MB DISK W/FLOPPY & ULM 6			12,800
1) ECLIPSE 6260 128K 12.5 MB DISK W/FLOPPY & 2 4227's			16,000

MODEMS & TERMINALS

11) VA1251 VADIC 1200 BAUD	125	11) 8212H MICOM MODEMS	1300
1) VA3451 VADIC 2400 BAUD	400	68) AU ACOUSTIC COUPLERS	
8) VA3455 VADIC 1200 BAUD	400	BELL 103-113 300	85
20) ADMBA L.S.I. TERMINALS	275	4) ADM5 L.S.I. TERMINALS	350

CONTACT: ROBERT FULWILER 214-238-0614

BUSINESS OPPORTUNITIES

WANTED SOFTWARE SOLUTIONS FOR THE HP3000

Hewlett-Packard is seeking quality software suppliers that address specific vertical markets in the NY/NJ area. If you have a unique application solution and want to take advantage of the financial, marketing, and technical incentive offered by Hewlett-Packard, call:

Lee Schatz
(201) 265-5000
Ext. 5407
or Sales Associate
(212) 971-0000
(516) 921-0000

HEWLETT PACKARD

NEW MARKET HIGH GROWTH

Telecommunications firm with nationwide market seeks to joint venture with entrepreneurial firm or individual with heavy experience in Data Base Management, ZIP + 4, Micro, Mainframe software development and installation.

High income potential. Send qualifications to Mileage Transfer, P.O. Box 736, New York, NY 10185.

BIDS & PROPOSALS

REQUEST FOR PROPOSAL

The Human Resources Administration-Department of Social Services is seeking Proposals for the Acquisition of an Accounts Receivable Software Package required for the Public Assistance Closed Case Collection System.

Proposals will be received by the Human Resources Administration Department of Social Services until 5:00 P.M. Wednesday, February 8th, 1984 to supply an Accounts Receivable Software Package to assist the agency in the recovery of over-payments made to former Public Assistance Recipients.

A Proposers Conference will be held at 10:00 A.M. on Wednesday, January 25th, 1984 at 2 Broadway, 6th floor, New York City.

A Request for Proposal may be obtained from the Human Resources Administration, Office of Data Processing, 2 Broadway, 6th floor, room 6705, New York, New York 10004.
Attention: Dennis Cribben (212) 309-6084

BUYING?

Whether you're looking for big computers little computers, terminals, printers, software, time sharing or services,

you'll find it in *Computerworld* classifieds.

Pages of ads every week, with everything from Discs to DEC's from time sharing to terminals, and software for every size computer system.

Call 800-343-6474 (or 617-879-0700) for more information

The Bulletin Board

IBM

3277-02
With 4633 Keyboard
Best Prices Anywhere
Call Mike Ewing
(214) 620-8360 In Texas
800-527-0420

FOR SALE
4981 SYSTEM
L2 4MB CPU
3505-2 1200 LPM
3270-A1/B1 (8)
3525-1A Type
$160,000. - Feb. 1
Call Bill Hogan
Computer Merchants Inc.
(914) 238-6631

IBM 4331-L2

FEATURE #'s: 1601, 2001, 2201, 3401, (2)-5701's, 5944, (8)-4962's, 6545, 6931, 1421.
1st Day Order Of Upgrade From 4331-L2 To 4331-D2 Is Also Available With Purchase.
AVAILABLE 3/15/84
$75,000.00
Dayton Newspapers, Inc.
45 S. Ludlow St.
Dayton, Ohio 45402
Jack Gaines
(513) 225-2312

IBM/PC
160 KB Disk,
64K, RBO $1750
IBM/XT - $4495
CHI, (804) 359-7280
Room 423, P.O. Box 27401,
Richmond, VA 23279

IBM

FOR SALE
S/38-644
w/3370 Disks
Will Modify To Suit
Call Ron Gibb
Computer Merchants Inc.
(614) 238-6631

PRINT TRAINS
IBM 1416 & 3218
Bought - Sold - Lease
Repaired - Reconditioned
COMPU-ACT COMPANY, INC.
(212) 888-8881

FOR SALE OR LEASE
64 Meg Upgrade (S/34)
5406-002, 5311, 5251-11
5/38
5418-002 Sys., 3640-A2, 1403, 3741 Series 1 (T200) 5406-002
5251-001 5406 & 5/38
Available Now At A Great Price!
DATAMARC (404)955-7400
6025 Peachtree Rd., Atlanta, GA 30360

Buy • Sell • Lease
IBM
Cougar Computer Corp.
Suite 210
26600 Euclid Office Plaza
Euclid, OH 44132
(216) 261-3660

SYSTEMS 34/36/38
Lease or Sale
$/36 DELIVERIES
WANT TO BUY S/34's
1-800-LEASPAK
In TX (817)268-0022

IBM

Buy ... Sell....Lease
IBM MICR
3890 - 1419
(813) 722-4534

BUY SELL LEASE
TRADE
S/34 S/36 S/36
Peripherals
All Guaranteed IBM Maint.
PROCOM
(212) 279-1717

SYSTEM/34's & 36's
For Sale or Lease
SYSTEM/34 UPGRADES
Immediately Available
Government Computer Sales
(512) 692-1289

FOR SALE
IBM SYSTEM 34
5340 Processor Model D01 64K 5340
Disk With 1110, 5211, 5360, and 3741
5211/288 300 LPM Printer
5251/11 Display Station
All Units Currently
Under IBM Maintenance
Larry J. Weiner
Imperial Corp Comp.
714/972-5711

SYSTEM 34
WANTED-BY END USER
128K/64KB Mfr. W/ Magazine
Maintenance Certificate
FI End User Only-No Dealers Pls.
Can Use Flr.-Terms.
708/668-6468
Dave Wells

IBM

4681-M02
March Delivery
Buy-Lease
No Brokers
Computer Staff, Ltd.
Wally Peterka
(212) 757-7488

AVAILABLE
4381-P2
Ship 4-13-84
Contact H. Miller
MPS CORP.
315/422-0484

SYSTEM/36's
All Models Available
2 Yr. Or 3 Yr. Leases
We Take S/34 Trade-Ins
STAR DATA SYSTEMS
1 (800) 531-5332
(512) 525-0525-Texas

For Lease Only
Available Immediately
4341-K01
5360-1
3525-2
Available 5/11/84
4381 P02
LaSalle Computer Corp.
(312) 368-0220

SYSTEM/34 UPGRADES
13 mg. to 27 mg. ..... Available
27 mg. to 64 mg. ..... Now
6 to 7 ..... Now
Available On Demand
Feature Work
Want to Buy S/34's
The Rail Support Group Inc.
(804) 358-4585

Lease/Rent
Any S/34 Config.
1 Month to 5 Years
Amcom Corporation
(800) 328-7723

Lease
System 36
256K/4A/200MB (B23)
3 yrs....$1,235/Mo 5 yrs....$795/Mo
Amcom Corporation
(800) 328-7723

45% OFF LIST
5340 MODEL 035
Available Immediately
Cost $21,800
CALL PAUL
(818) 578-5410

FOR SALE
IBM Comm. Ctrs.
2701-1 w/7897 & 8089
3704-A2 w/1841, 1842, 3660, 4680, 4701, 4711 & 4714
Call Mark Blaustein
(614) 238-6631

IBM SALE/LEASE
3271-2 (Qty) Avail 1/15
3277-2 (Qty) Avail 1/15
3287-1 (Qty) Avail 5/1
3274 61
S/34 S/36 4300X
Purchase-Lease Back Programs
VARGO COMPANIES
(313) 284-2858

FOR SALE/LEASE
3705 J1
Avail 2/1/84
Vargo Companies
(313) 284-2858
Ask For Kay or Pete

3031-6
Sell or Lease
Computer Savings Corporation
Tom or Sandy
(602) 971-3630

HEWLETT PACKARD

HP 3000
BUY & SELL
Complete Systems
Memory • Terminals
Disk Drives • Tape Drives
Maintenance Plans
Custom Configuration
Factory Parts & Accessories
(714) 556-3161
(213) 402-2040

HP 1000 HP 3000
Buy/Sell/Lease
Available From Stock
Systems • Terminals • Disc Drives
Tape Drives • Memory • Printers • Ports
30 Day Warranty
Guaranteed HP Performance
Computer Solutions, Inc.
(201) 575-6660

FOR SALE
HP 250 Model 30
Minicomputer with two 10LE MB Disc Drives (one with cassette tape drive), two 128 KB mem. boards, three console terminals, chsr. serial printer. Contact: Patty Davis (800) 527-4000.

AVAILABLE FOR LEASE
HP3000 SERIAL 44
1 Mag Memory
6 ATP 24 Port-Printer
7970E Tape Drive
7933H Disk Drive
2608A Printer
Software Support/Maintenance
Hardware Systems
1-800-538-3700
1-201-538-3701

Buy-Sell-Lease
HP3000 3X, HI, 4X
and related peripherals
Call Carol
CSU INDUSTRIES, Inc.
516-239-4310

MISC. SYSTEMS

DATAPOINT
System 1500 (New) $5,000
(2) 1201 Processors ..... $3,400 ea.
(3) 8011 Printers ..... $3,100 ea.
All Used Equipment
Is Under Maintenance
Phone Rob Hilton
(801) 527-1410 Ext. 270

MICRODATA REALITY 8000
128K Memory, 50 MEG Disk, 1600 BPI Tape, (16) Ports, Prism II CRT, Matrix Printer. Call John.
(214) 239-1300

FOR SALE
XEROX SIGMA-7
Complete Operational System With Full Set of Spare Modules and Parts. Includes RAD, Disk, Tapes, and Many I/O Devices.
Call (617) 369-7200
Richard Ain

For Sale
DATAPOINT 4630
300 LPM Printer
(216) 475-7870

DATA GENERAL

D.G. CRT's
Brand New
D-210 $795
D-211 $845
Desk Tops $Call
We Will Not Be Undersold on
Any New or Used D.G. Equipment
Kansas Data Systems
(212) 697-4284

PRIME

PRIME
LARGE SELECTION OF USED PRIME COMPUTER SYSTEMS ...SAVINGS TO 50%
Peripherals Also Available:
Memories-Disk Drives-Controllers
Modems-Terminals-Printers
1st SILVERS
...Your Alternate Source
A DATAMATION SERVICES, INC. COMPANY
3091 EAST CAMPBELL AVE.
PHOENIX, ARIZONA 85018
(602) 957-4888
ASK FOR DON OR MATT

BURROUGHS

BUY SELL LEASE
All Systems & Peripherals
AVAILABLE
• B1855 Sys • B1955 Sys
• B80s • B82ds
(Configured To Your Specs.)
SPECIAL: B1855 MEMORY
• 500 Terminals except 100 & 110
• TD830, MT869, MT885
• 300 & 307 Style Disk Drives
• Various Tape Sub-systems
• Memory Upgrades
• Printers 9245 & 9249 Styles
Guaranteed Burroughs Maint.
Depot Maintenance Available
COMPUTER PROVIDERS
(512) 346-7078
(Member SDA)

HONEYWELL

L62, L64 & 6/16 & 6/32 SYSTEMS
NEW & REFURBISHED
Systems • Peripherals • Memory
CRT's • Applications Software
SUBSTANTIAL DISCOUNTS!
Southmark Computer Services Ltd.
169 Barnum Rd.
Northboro, MA 01532
(617)393-6999
Telex 710-347-7574

L62, L64
L6/30, L6/60
PERIPHERALS
TERMINALS
UPS
96 Monmouth Ave.
Stoneham, MA 02180
(617)438-4999

SPERRY UNIVAC

V-77 600 SYSTEM
(2) 256K CPU w/2 Pages WCS
(2) 6433/20 200 MB Disk Cntrlr
(4) 10 MB Disk Drives
(2) 800 bpi Tape Drives
(2) 800/1600 bpi Tape Drives
(1) 300 LPM Printer
(1) 600 LPM Printer
THE EXCHANGES (206)854-0300
Ask for Tom 6400

CADE Data Entry System
(6) 1600/10 CPU's
128K Storage Expansion
80MB Disk Drive
1600 bpi 10½ Inch Tape Drive
300 LPM Printer
Fifty 1600 Series Key Stations
Used 18 Months
Sterling Dunham
(804) 358-2171

Your ad can be here for $130

ORDER FORM

COMPUTERWORLD BULLETIN BOARD

Issue Date: Ads can be accepted up until the Monday preceding the issue desired. Computerworld comes out every Monday.

Classifications: Most ads will be classified according to the brand of equipment that is being bought or sold. These classifications include Burroughs, Data General, Digital/DEC, Hewlett Packard, Honeywell, IBM, NCR, Sperry Univac, Salvage, Terminals, Misc. Systems and Miscellaneous.

Copy: Copy sent in via the mail or telecopier (telecopier extensions are 410 and 451) should be clearly typewritten. Ads may be given over the phone to our team of ad takers. The standard size is 1 column by 1 inch deep. These units may be combined to form larger sized ads. Describe the equipment, very briefly, give the price and the name of the person to contact. All ads will be set up using a standard format. No borders or logos are allowed.

Cost: The price for each standard unit is $130.00 (One unit minimum and no fractional units allowed.) There are no agency commisions and no quantity discounts.

Billing: Once you've written your ad, send (or call) it in with your name and address for billing purposes and we'll run it. (If your company has never advertised with us before, we request a check with your order.)

Date(s): _____

Signature: _____

Name: _____

Title: _____

Company: _____

Address: _____

Telephone: _____

Send this form to:

COMPUTERWORLD BULLETIN BOARD

375 Cochituate Road, Box 880,
Framingham, MA 01701

617-879-0700 800-343-6474

The Bulletin Board

DEC

DEC BARGAINS

11/84A CPU Set	$1,500
11/44 KE44-A "CM"	$2,975
44-MS750-C System Kit	$7,500
SDV11-AA	$495
DR750-AA	$2,400
DZ11 MUX Bd.	$1,150
DZS8-D	$1,575
FP11A	$1,100
RX11-B	$2,575
RX11-P	$950
MS11-MB	$1,375
MS750-DC	$4,800
MS750-FB	$2,695
MSV11-PK	$1,135
MSV11-PL	$1,275
PDP 11/84A-DC	$8,300
RLV11	$975
VAX 1MB MS750-CA	$2,695
VAX 1MB MS750-CA	$2,695

Call Ray at CEI, Inc.
(617) 275-6900

DEC

DEC & PRIME SPECIALS

- MSV50-FD — Avail Now — $4,500 ea.
- PDP 11/84A, Configured to your needs — Call
- RA60-AA — $6,500
- CDC 9775 600MB — Call
- CDC 9766 300MB — Call
- RP06-AA — Call
- VAX 11/750 1MB, 64K chip. New — Call
- RA60 — Call
- TU78 AB — Call
- Prime Computer Systems Available Upon Request

SEVCO INC.
(617) 435-6636

DEC NEW & USED

BUY — SELL — EXCHANGE

Systems • Processors • Memory Options • Peripherals • Modules

LAKEWOOD COMPUTER CORP.
[illegible]
(800)[illegible]

DEC

New Available in Stock!

Micro PDP-11 with 10 MSB, Winchester, (2) RX50 Floppy Drive, 256 KB Memory Inquire Price

PDP 11-03, RLV-11 Controller, 64KB Memory, LA 100 Printer, RT-11 License. $5,000

PDP 11-23 with RL02 Disks (2), 256 KB Memory, LA 180 Printer, RT-11 License. $12,000

LA 100 Printers with Connector $395

Other Configurations Available. Complete Range of DEC Compatible Software, Consultation.

E.E.C. Systems, Inc.
(617) 449-5100

BUY • SELL • TRADE

1170 Sys.	DZ11-E	RX750
DL11-E	FP11-C	RA60-AA
DL11-W	LA120-DA	RA60-AA
DMC11	M7269	RP04/6-C
DR11-B	M8012	RP06-AA
DZ11-B	MX11-CE	TE16 Mstr.

NEW YORK COMPUTER EXCHANGE
(516)752-0555 (800)645-9159

MISC.

SALE.....SALE.....SALE.....

USED, REFURBISHED, NEW EQUIPMENT, COMPUTER EQUIPMENT AND PERIPHERALS

COMPLETE SYSTEMS - MEMORY - TERMINALS - PRINTERS - DISC DRIVES - SOFTWARE - ETC..

DEC - INTEL - ALTOS - CENTRONICS - DIABLO - ONDATA - SHUGART - EPSON - TELEVIDEO - VISUAL - ETC..

CALL FOR AVAILABILITY AND PRICING

C M S
212/615-2000 EXT. 2004

Buy • Sell • Lease DATAPOINT

Cougar Computer Corp.
Suite 219
26600 Euclid Office Plaza
Euclid, OH 44132
(216) 261-2000

MISC.

WANT TO BUY

M.E.C. Astra Series Processors 2210, 220, 260, 280, 270
Printers-A-2100
CRT's-A-4010
Call Computer Provisions Corp.
(216) 248-7575

WANG

BUY - SELL
MVP/LVP - OIS - VS - PC
SYSTEMS IN INVENTORY
VS/80 - LVP - WP/300
AND PERIPHERALS
2240C - 2240R - 5536-4

[illegible]
(800) 877-[illegible]

WANG USERS.....

HAVE YOU HEARD ABOUT THE GROUP OF FORMER WANG EX-PLOYEES IN ATLANTA WHO BUY & SELL USED WANG EQUIPMENT AND PLUG COMPATIBLES?

L.C.A. (404) 977-[illegible] or 1-800-841-[illegible]

TIME MANAGEMENT?

EXECUTIVE SECRETARY & Sophisticated [illegible] Allocate for any VS on all work stations.

Send for VS Product List:

[illegible] Atlanta, GA [illegible]
(404) [illegible]

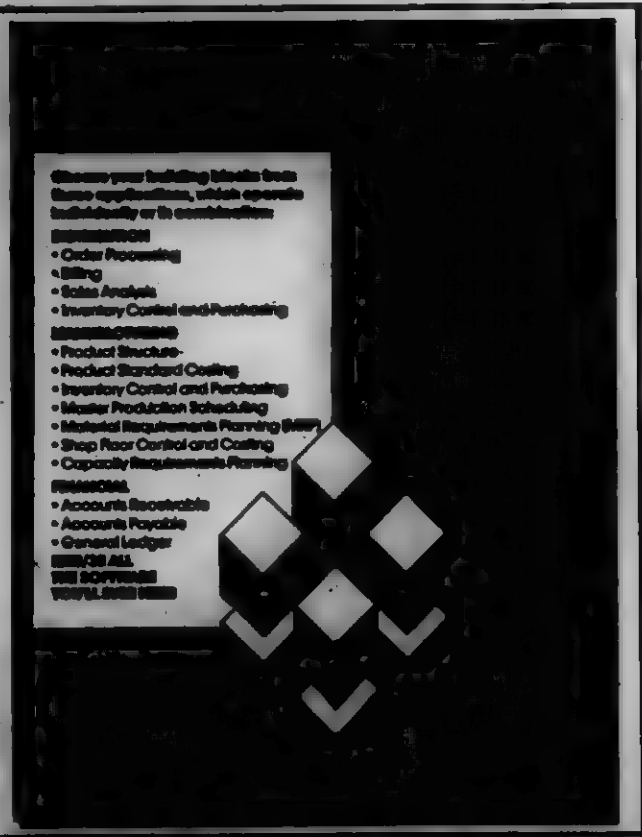
For Sale:
Spectral VS-80 Systems
Incl: 256-512K, 2 HD 8in's, 80 Meg "Piranha" 525 LPM Printer, Free Std. 8 Slot Also Available: CIS 110-4 (64 Meg) (617) 275-[illegible] CPU Systems Remarketing Specialists Since 1977

AVAILABLE 1/84

VS-80, 512KB Memory, 2DV80 80 Meg Drive, One 2DA60 DP Workstation, 2573 300LPM Band Printer, 22V80 Disk IOP, 2DV17-2 16 Port IOP.

P.O. Box 2810
Providence, RI 02940
(401) 272-[illegible]

SOFTWARE FOR SALE



Elegant Software

for IBM S/34, 36 and 38

General Accounting	Payroll/Personnel
Financial Reporting	Property & Equipment
Accounts Receivable	Report Writer
Accounts Payable	Oil & Gas
Order Processing	All Systems are:
Inventory Management	RPG II/RPG III
Sales Analysis	Data Base
Job Cost	Interactive

J.D. Edwards & Company
4940 South Syracuse Street/Suite 5500
Denver, CO 80237
303/773-3732

Dallas — 214/458-0636
Houston — 713/880-8278
Northern California — 415/697-7764
Southern California — 714/751-5302

CS SOFTWARE

VAX
PDP-11

Payroll • • Job Cost
General Ledger • • Fixed Assets
Accounts Receivable • • Accounts Payable
Inventory • • Order Entry
Client Writeup

Compu-Share

3824 - 50th St. • Lubbock, TX 79413 (806) 792-3785

WANTED SOFTWARE DISTRIBUTORS

- LUCRATIVE PROFIT MARGIN.
- SALES SUPPORT
- TRAINING SUPPORT
- JOIN THE TEAM DURING PRODUCT INTRODUCTION AND IT WILL COST YOU NOTHING.

VALLEY DATA BASE

COMPUTER PRODUCTS — HEWLETT PACKARD — SALES SERVICE

50 East Evan Hewes Hwy / P O Box 2855 / El Centro, CA 92244 / (619) 353-0410

IBM SERIES/1 ($FSEDIT Users Only)

Do yourself a BIG favor, switch to EXEDIT. 10 times faster & more powerful. EXEDIT saves time & money; eliminates $FSEDIT frustration.

For 3101B & 4978/9 terminals

Call or write for free demo diskette.

M & A Computer Systems
30 Hotaling Place #204
San Francisco, CA 94111
(415)434-3617

SERIES/1 SPECIALISTS

Agricultural Software For Sale

Agricultural Software Company is offering its state-of-the-art grain elevator and financial computer software (object and source code) for sale running on the PC-XT. Send replies to:

Reply to CW-84337
Computerworld
Box 880
Framingham, MA 01701

Sell Your Software in the Classified Pages of Computerworld

Call

800-343-6474

(or 617-879-0700)

for more information

WHAT does Classified Advertising Image in Computerworld add up to?

SUCCESS.

SOFTWARE WANTED

SOFTWARE WANTED FOR NCR VRX TRAN-PRO INSTALLATIONS

Banking applications, utilities and special software. Please forward marketing materials and user information to:

LIEBHERR-AMERICA, INC.
P. O. Drawer Q, Parkview Station
Newport News, VA 23605
ATTN: Data Processing Manager

AMERICAN SOFTWARE IN ITALY

The Gandalf SI Information Sovereign of Trento, Italy wants more American software in Italy. We are a major software house with 10 years of experience in providing quality software. American software is very much in demand in the world and it is heavily utilized in Italy. Especially an American software product is available in Italy 2 years or more after it's on shelves in America. We want to improve on this, so we are offering American software houses the following services: 1) To sell on an import agent who will introduce your American software into the Italian market. We will accept any type of software written for mini or micro computers. Originality is important. 2) To act as an investigator and consultant on the Italian computer market. 3) To establish a collaboration, a research with American software houses who want to sell their products in Italy. The Italian market is growing rapidly and promising is valid. Let's do this with success. Interested parties should write to our American contact: SI, P.O. Box 456, Hummelstown, PA 17036.

LET US MARKET YOUR PRODUCT

Leading vendor of IBM mainframe system software products seeks an additional product. We offer a worldwide distribution network and years of experience in introducing and developing products that are leaders in their market niches. As a publicly held company, we offer you the financial and marketing clout to make you wealthy. Call me directly for a quick decision.

Al DeVito (201) 946-7550
CGA Software Products Group

TIME & SERVICES

DATA CENTER SERVICES

BURNS

Computer & Memory Repairs

Any Ma... MI
CORE
DEC

SYSTEM DEVELOPMENT ON TSO/ISPF

at affordable prices
Full capacity of an IBM 3033
for daytime use in western U. S.
ISPF, COBOL, FORTRAN, PL/I, IMS,
ADF, VSAPL and other aids.

PRIMDATA OF SWEDEN
44 Montgomery St., Suite 500
San Francisco, CA 94104 • Tel (415) 956-2612

TRANSITION HELP TO MVS OR A BIGGER SYSTEM- reasonable prices

Full capacity of an IBM 3033
for daytime use in western U. S.
We can give you the computer, the time and the technical help.

PRIMDATA OF SWEDEN
44 Montgomery St., Suite 500
San Francisco, CA 94104 • Tel (415) 955-2612

MODELING, PROJECTIONS, HEAVY BATCH

with VSAPL, ADRS, ADI, SAS, APE, GPSS, MPSX or your own programs.
Full capacity of an IBM 3033
for daytime use in western U. S.
at reasonable prices.

PRIMDATA OF SWEDEN
44 Montgomery St., Suite 500
San Francisco, CA 94104 • Tel (415) 955-2612

Computer Services
4341-2 370/158-3
VS1-CICS-ROSCOE-DOS
REMOTE JOB ENTRY
CICS DEVELOPMENT
CICS PRODUCTION
CUSTOMIZED SOFTWARE
CONTACT JOE BARRETT
(201) 777-3454
15 MINUTES FROM LINCOLN TUNNEL
ONE PASSAIC STREET
WOOD RIDGE, N.J. 07075

Computer Time

IBM 4341

- OS/VS1
- VM/CMS
- Negotiable Rates
- Good Environment

Contact Ray Reuth
(212) 777-5040
ICCS
19 East 21st Street
New York, NY

WANTED: TIME ON BURROUGHS MAINFRAME

Fast growing corporation headquartered in Memphis, Tennessee wants to contract time on a large scale Burroughs system. Requirements call for major use of the mainframe system, shared or dedicated, for an on-line application during the hours 7 a.m.-9 p.m. Monday through Friday. The system must be up by March, 1984. This arrangement will require very little time and no investment by you. We will pay top dollar. Reply to:

TOMMY POWELL, VP OPERATIONS, DATA COMMUNICATIONS CORPORATION
3000 DIRECTORS ROW, MEMPHIS, TN 38131

901-345-3544

RENT TERMINALS or TIME

in the CLASSIFIED PAGES of COMPUTERWORLD.

CALL 800-343-6474 (or 617-879-0700)

for more INFORMATION.

VAX/VMS TIMESHARE

5¢

$2 PER HOUR CONNECT TIME
ONE MB DISK STORAGE INCLUDED
AVAILABLE NATIONWIDE VIA TELENET
LEASE-A-PORT™ WITH 10 MB DISK & NO CPU OR CONNECT CHARGES FOR $800 PER MONTH

INCON CORPORATION

VAX AND PDP DEVELOPMENT TIME

NO BLOCKCHARGES NO CPU CHARGES
Omnicomputer™
$7/$14
RSTS/E VMS
PER HOUR CONNECT TIME
BUDGET BYTES™ 212-944-9230
Omnicomputer, Inc.
1430 Broadway, New York, N.Y. 10018

COMPUTER TIME & TIMESHARING

- We are time brokers.
- IBM timesharing our specialty.
- Also RJE & batch time.

Call John Rudder at
Computer Reserves, Inc.
(201) 539-6700

ICOTECH
Innovative Computer Technology

COMPUTER SERVICES
IBM 3081 DEC-10
-Remote Job Entry -Online Processing
-Batch Processing -Timesharing
-Optical Mark Reading -Laser Printing
COMPUTER OUTPUT MICROFILM
-Datagraphix 1041 Auto-Comp
-Datagraphix Datamaster
-3200 DPI Capability
-Free Testing

Route 206
Raritan, NJ 08869
201-685-0100
Contact: Joyce Bagamian

CLASSIFIED ADVERTISING ORDER FORM

Computerworld's Classifieds work.

Issue Date: Ad closing is every Friday, 10 days prior to issue date.

Sections: Please be sure to specify the section you want: Time and Services, Software for Sale, Position Announcements and Buy/Sell/Swap. (Available upon request: Software Wanted, Business Opportunities and Real Estate).

Copy: We'll typeset your ad at no extra charge. Please attach CLEAN typewritten copy. Figure about 35 words to a column inch, not including headlines.

Costs: Our rates are $128.10 per column inch. (A column is 2" wide.) Minimum size is two column inches (2" wide by 2" deep) and costs $256.20 per insertion. Extra space is available in half-inch increments and costs $64.05. Box numbers are $15.00 extra.

Billing: If you're a first-time advertiser, (or if you have not established an account with us.) WE MUST HAVE YOUR PAYMENT IN ADVANCE.

Ad size desired: _____ columns wide by _____ inches deep.

Issue Date(s): _____

Section: _____

Signature: _____

Name: _____

Company: _____

Title: _____

Address: _____

Telephone: _____

Send this form to:

COMPUTERWORLD

CLASSIFIED ADVERTISING,

375 Cochituate Road, Box 880,
Framingham, MA 01701

Foreign Editorial/ Sales Offices

England: Terry Cartwright, EEC Publications, 196-200 Balls Pond Rd., London N1 4AQ. Phone: 01-359-3525. Telex: (851) 894085 (Computer Management, Computer Business Europe only).

Euan Rose, Bill Dunlop, Stephen Thomas, Beere Hobson Assoc., 345 Goswell Rd., Islington, London EC1V FHN. Phone: 01278 3415/6 (reps for all CWCI publications except Computer Management and Computer Business Europe).

W. Germany: Eckhard Ulpatel, CW Publikationens, Friedrichstrasse 31, 8000 Munich 40. Phone: (089) 38172-0. Telex: 5215350.

France: Axel Leblois, Le Monde Informatique, 185 Avenue Charles De Gaulle, 92200 Neuilly Sur Seine, Paris. Phone: 758.14.14. Telex: 613234 F.

Japan: Mr. Shuji Mizuguchi, Computerworld Japan, 7-4 Shintomi 1-Chome, Chuo-ku, Tokyo 104. Phone: (03) 551-3892, Telex: 252-4217 (Computerworld Japan only).

H. Kajiama, Tokyo Representative Group, Yaeguchi Bldg., 2-12-9 Kanda Jimbo-cho, Chiyoda-ku, Tokyo 101. Phone: (03) 230-4117/8, Telex: J26560 (reps for all CWCI publications except Computerworld Japan).

Australia: Alan Power, Computerworld Pty. Ltd., 37-43 Alexander Street, Crows Nest, NSW 2065. Phone: (02) 4395133, Telex: AA74782 COMWOR.

Brazil: Eric Hippeau, Data News, Computerworld do Brasil, Services e Publicacoes Ltda., Rua Alcindo Guanabara, 25/10th Floor 20031 Rio de Janeiro, RJ Brazil. Phone: (021) 240-8226. Telex: 2130839(WORD BR).

Mexico: Richard Small, Computerworld de Mexico, Oaxaca 21-2, Colonia Roma, Mexico City 7 D.F. Phone: (905) 514-4218, (905) 514-6309. Telex: 1771300 ACHAME, 1777809 ACHAME.

Spain: Nell Kelley, Computerworld/Espana, Gravina, 13, Madrid 4. Phone: 231-23-86; 231-23-88; 231-23-89. Telex: 47894(CW E).

Denmark: Preben Engell, Computerworld/Danmark, Gammel Strand 50, 1202 Copenhagen K. Phone: 01-1294-11. Telex: 27868 cwdan.

Sweden: Bengt Mannfelt, Computerworld/Sweden, Nova Media AB, Vartavagen 95, 11538 Stockholm. Telex: 8108089 NOVACW.

The Netherlands: Johannes A. Witvoet, Mgr. Dir., CW Communications B.V., c/o IDC Benelux, Prins Hendrikkaan II, 1075 Az Amsterdam. Phone: 020-791-692. Telex: (844) 15741.

Italy: Daniela Comboni, Gruppo Editoriale Jackson, s.r.l., Via Rosellini 12, 20124 Milano.

Argentina: Ruben Aguerre, Gen. Mgr., Computerworld Argentina, Av. Belgrano 406-Piso 9, CP 1092 Buenos Aires. Phone: 34-5683/5684.

Norway: Mr. Per Sandford, Editor, CW Norge A/S, Hovinveien 43, P.O. Box 2662, Tosyen, Oslo 6. Phone: 2/647725. Telex: (856) 76476

Singapore: Mr. David Noble, General Manager, Asia Computerworld, Pte. Ltd., 11-08/11-10 Goldhill Plaza, Newton Road, Singapore. Phone: 250-444. Telex: (786) RS 37003

Saudi Arabia: Mr. Omar Dawud, General Manager, Saudi Computerworld, P.O. Box 5455, Jeddah. Phone: 6678916/6660860. Telex: (926) 401205.

ADVERTISERS INDEX

Image Products ID/20
American Key Data 76
Apollo Computer ID/26-ID/27
Applied Data Communications 77
Artificial Intelligence 83
Ashton-Tate 85

John Scott Company 82
Avagen Corp. 84
Bermuda ID/8

Canon, Inc. 54
Canon 64-65
Communication Solutions 46
Comnet '84 87
Computer Tech Group 14
CPT, Inc. 63
Cullinet 89
CW Mexico 82
CW On Communications 78
CW Supplement 57
CW Sweden 84

Data Base Management 80
Data General 66
Data Processing Design ID/30
Data Systems for Industry ID/22
Datagraphix 22
Datapoint 11,12,15,69,71,72
DEC/ITC 48-49
Delrina ID/40
Desktop Computers 10
Dynamic ID/40

Ekon Technologies, Inc. 28
Enterprise Technology 83
Exxon Office Systems 60

Fiberlan 54
Fusion Products 87

General Electric ID/18-ID/19
General Research Corp. 28
Goal Systems International ID/27
Graham Magnetics 85
Group Operations 12

H & W Computer Systems 68
Hagan Systems 28
Hubbell Systems 76
Honeywell Information Systems ID/24-ID/25
Hughes Aircraft ID/2,ID/34

IBM 58
Information 47
Intecc 80
Innovation Data Processing 7
Integrated Business Computers ID/35
Interface Systems 40
ITT Courier 74-75

KMW Systems 81
Kurzweil 26

LSI Software Corporation 70
Local Data 6,ID/28

Mail Advertising Supply 86
Martin Marietta 28
Memorex 56-57
MicroAge 24
MicroFrame 86
MSA 120
MTI Systems Corp. 11,18,19
Mike Mauch & Associates, Inc. 9

NCR ID/9-ID/16
NCR Corporation 10
NCR Product Marketing ID/36
NEC 73-76
NESTU, Inc. ID/34
Northeast Expositions ID/30

Penn Applied Technology 87
PC World Expo ID/30-ID/31
Pioneer ID/4-ID/5
Phoenix Computer Corp. ID/3
Prime Computer 61

Randeck Corporation 30
Ranet Corp. 79
RTC Systems, Inc. 30

SAS 30-31
Signal Technology Inc. 18,19
SMC/Intech ID/6
Softech Microsystems 30
Software A G 30
Sperry Corp. 32
Stone Mountain Computing 6
Syscon 3
Systemware 42

Tandem Computers 42-43
Texas Instruments 34-35,36-37
Transnet Corp. 72
Triangle ID/17

Unitel ID/21
Unigrem 79
Universal Data Systems ID/32
USFS ID/30

Value Computing 30
Verbatim ID/26
Visicorp 62
VM Software 8

Wang Laboratories 15
Western Telematics 45
Wilson Business Machines ID/10
Whitehither Associates 40-41

Xerox 77

This index is provided as an additional service. The publisher does not assume any liability for errors or omissions.

Computerworld Sales Offices

Vice-President/Sales/Donald E. Pagan
Director/National Sales/Edward P. Manwell
Marketing Support Manager/Kathy Doyle
COMPUTERWORLD, 375 Cochituate Road, Box 880,
Framingham, MA 01701
(617) 879-0700

BOSTON SALES OFFICE (617) 879-0700
Northern Regional Director/Chris Lee
District Managers/Jim McClure, Ronald Maiore,
Jayne Donovan, Michael F. Kelleher
Sales Assistant/Alice Longley
COMPUTERWORLD, 375 Cochituate Road, Box 880,
Framingham, MA 01701

CHICAGO SALES OFFICE (312) 827-4433
District Managers/Arthur Kossack,
Sales Assistant/Joan F. Broderick
Northern Regional Director/Chris Lee
COMPUTERWORLD, 2600 South River Road, Suite 304,
Des Plaines, IL 60018

NEW YORK SALES OFFICE (201) 967-1380
Eastern Regional Director/Michael J. Masiero
Sr. District Manager/Doug Cheney
District Managers/Ray Corbin, Joan Daly
Account Executive/Fred Lo Sapio
Sales Assistant/Gale M. Palermo
COMPUTERWORLD, Paramus Plaza I,
140 Route 17, North, Paramus, NJ 07652

LOS ANGELES SALES OFFICE (714) 261-1220
District Managers/Bob Hubbard, Bonnie Hochenedel
Western Regional Director/William J. Healey
COMPUTERWORLD, 18008 Sky Park Circle, Suite 260,
Irvine, CA 92714

SAN FRANCISCO SALES OFFICE (415) 421-7330
Western Regional Director/William J. Healey
Account Managers/Barry Millions, Theodore Pearson,
Ernest Chamberlain
Account Manager, Classified/Nicole Boothman
COMPUTERWORLD, 300 Broadway, Suite 20,
San Francisco, CA 94133

ATLANTA SALES OFFICE (404) 394-0758
District Director/Jeffrey Melnick
Eastern Regional Director/Michael J. Masiero
COMPUTERWORLD, 1853 Foster Road, Suite D,
Atlanta, GA 30338

CLASSIFIED ADVERTISING (617) 879-0700
Al DeMilo
COMPUTERWORLD, 375 Cochituate Road, Box 880,
Framingham, MA 01701

CW INTERNATIONAL MARKETING SERVICES
General Manager/Diane La Muraglia
COMPUTERWORLD, 375 Cochituate Road, Box 880,
Framingham, MA 01701
(617) 879-0700

CW COMMUNICATIONS/INC.
Board Chairman/Publisher
Patrick J. McGovern
President
W. Walter Boyd
Senior Vice-President
Lee Vilmer

Group VP-Communications Services, Jack Edmonston. Group VP-Marketing, Margaret Pinton. VP/Marketing, Donald E. Pagan. VP-Finance, William P. Murphy. VP-Editorial, John Wilmerding.

Computerworld Headquarters: 375 Cochituate Road, P.O. Box 880, Framingham, MA 01701
Phone: (617) 879-0700, Telex: 95-1135.

SALES: Vice-President, Donald E. Pagan. National Director, Edward P. Manwell. Corporate Advertising Administrator, Frank Collins. Marketing Support Manager, Kathy Doyle. Display Advertising Supervisor, Anne Hadley. Display Advertising, Deborah Bryer, Pam Mickelbee, Edna Cotton, Carolyn Medeiros, Cindy Chelton. Classified Advertising Manager, William J. Mills.

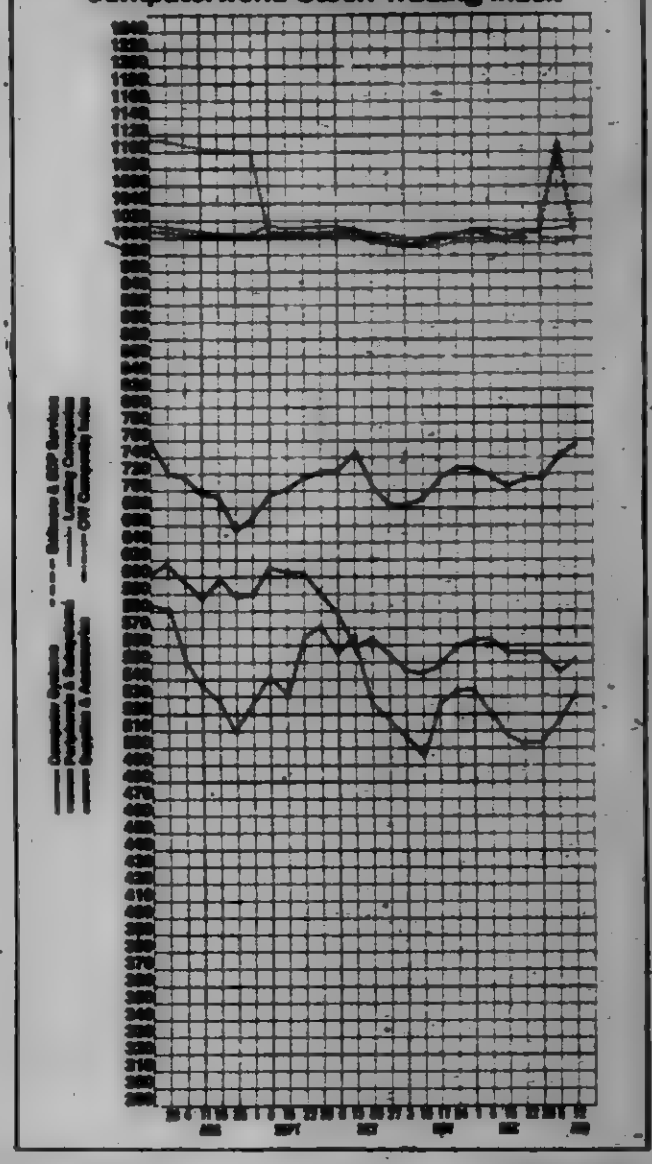
COMMUNICATION SERVICES: Group Vice-President, Jack Edmonston. Director Research, Kathryn Dresden. Sales Promotion Director, Liz Johnson.

PRODUCTION: Production Director, Peter Hoke. Production Manager, Marlene Sibbet. Page-Up Manager, Trish Gaudette. Systems Manager, Tom Pike. Typesetting Manager, Carol Polack. Art Director, Tom Monahan. Graphic Designer, Hank Fling.

CIRCULATION: Group Vice-President, Margaret Pinton. Circulation Manager, Jane Dunlevy. Fulfillment Manager, Maureen Burke.

Computerworld can be purchased on 35 mm microfilm through University Microfilms Int., Periodical Entry Dept., 300 Zeeb Rd., Ann Arbor, Mich. 48106. Phone (313) 761-4700. Computerworld's editorial policy is Checkbook Dept. for subscription information.

Computerworld Stock Trading Index



Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, JANUARY 11, 1984

All statistics compiled computed and formatted by TRADE QUOTES, INC. Cambridge, Mass. 02139

COMPUTER SYSTEMS

	1983-84 RANGE	CLOSE JAN 11	NET CHANGE	PCT CHANGE
ALPHA MICROSYSTEMS	11- 36	17 1/2	+ 3/4	+4.1
ALTOS COMPUTER SYST	9- 30	11 3/4	+ 1/4	+2.1
ANSAN. CORP	9- 37	15 1/8	+ 1/2	+3.4
APPLE COMPUTER INC	19- 82	38	+ 1/8	+0.4
AT&T	59- 76	66	+ 3/8	+0.6
AUTOMATIX CORP	19- 82	31 1/2	+ 3/4	+2.7
COMPUTER AUTOMATION	9- 17	9 1/2	+ 3/4	+8.6
COMPUTER CONSOLES	9- 30	18 1/8	- 3/4	-3.7
CONTROL DATA CORP	31- 63	53 1/2	+ 1/2	+1.0
CONVERGENT TECHNOL	19- 63	28 3/4	+ 1/4	+0.9
CRAY RESEARCH INC	19- 63	37 3/4	+ 1/4	+2.3
DATA GENERAL CORP	19- 63	42 1/2	+ 1/8	+0.3
DATAPOINT CORP	11- 36	20 3/4	- 1/8	-0.6
DIGITAL EQUIPMENT	65-132	74 1/8	+ 3/4	+1.0
ECCO INC	9- 16	13 3/4	- 1/8	-0.9
ELECTRONIC ASSOC.	9- 15	9 1/8	+ 1/8	+1.3
FLOATING POINT SYST	19- 63	29 3/8	+ 1/4	+0.9
FORONTO	23- 63	38 7/8	+ 1/8	+0.7
GENERAL AUTOMATION	9- 30	13 1/4	+ 1/8	+0.9
GOULD INC	19- 45	23 7/8	+ 1/8	+0.5
HARRIS CORP	29- 51	38 1/2	- 1/8	-0.3
HEWLETT-PACKARD CO	22- 63	41 3/8	- 1/8	-0.3
HONEYWELL INC	99-128	122	- 1/2	-0.4
IBM	97-128	122 1/8	- 1 5/8	-1.3
IPL SYSTEMS INC	9- 16	8 1/8	- 1/8	-1.5
K/A-COM INC	19- 36	21	+ 1/8	+0.6
HARRISON CORP SYSTS	7- 9		3/8	0
MANAGEMENT ASSIST	7- 16	10 3/4	+ 1	+0.6
MATHEMATICA ELECTRONI	67- 88	81 7/8	- 1 3/8	-0.6
MODULAR COMPUTER SYS	9- 15	9 1/2	+ 3/8	+4.0
NORTH DATA SCI	19- 58	35 7/8	+ 5/8	+1.8
MOTOROLA INC	82-140	125 3/8	- 1/8	-0.1
NAT'L SEMICONDUCTOR	19- 63	18 1/8	+ 1 1/8	+12.3
NCR	39- 58	55 1/8	+ 3/8	+1.6
PERKIN-ELMER	19- 63	37 3/4	- 1/8	-0.6
PRIME COMPUTER INC	11- 39	18 7/8	+ 1	+0.5
SPERRY CORP	31- 46	44 7/8	+ 1 1/8	+2.6
TANDON COMPUTING INC	11- 63	28 1/2	+ 7/8	+3.2
TANDY CORP	39- 63	58 3/4	- 1 1/2	-2.5
TELEVIDEO SYSTEMS	19- 41	19 3/4	- 1/8	-0.7
TELXON CORP	7- 16	10 3/8	- 3/8	-3.4
TEXAS INSTRUMENTS	71-128	120	+ 3/4	+1.9
ULTIMATE CORP	9- 16	15 7/8	+ 1/8	+0.8
VECTOR GRAPHICS INC	7- 14	7	+ 1/8	+0.8
WANG LABS "B"	19- 82	38	- 1/4	-0.6
WANG LABS "C"	31- 82	38 1/8	- 1/2	-1.3
XEROX CORP	59- 82	80 1/8	- 4/8	-0.9

LEASING COMPANIES

BOOTHE FINANCIAL CP	11- 28	24 1/4	+ 1/2	+2.0
COMDISCO INC	7- 48	29 3/4	+ 3/8	+1.1
CONTINENTAL INFO SYS	9- 16	9	+ 1/8	+0.8
DPF INC	9- 15	13 7/8	+ 1/8	+0.8
U.S. LEASING	19- 47	38 3/8	+ 3/8	+0.9

COMPONENTS

ADVANCED MICRO DEV	13- 37	32 3/8	+ 1/2	+1.6
ADV'D SEMICONDUCTOR	19- 63	37 3/4	+ 1/4	+0.6
ANALOG DEVICES INC	19- 63	36 3/4	+ 1/4	+0.6
ANALOGIC CORP	23- 37	25	+ 3/4	+3.0
APPLIED MAGNETICS CP	19- 37	35 3/8	+ 7/8	+2.6
TOSHIBA	19- 38	36 3/8	+ 3/8	+1.3

EXCH: N=NEW YORK; A=AMERICAN; P=PACIFIC; B=BOSTON; M=NATIONAL; W=MIDWEST; O=OVER-THE-COUNTER
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. ON LAST BID
(1) TO NEAREST DOLLAR

SOFTWARE & EDP SERVICES

ADVANCED COMP TECH	1- 8	4	+ 3/8	+23.0
ADVANCED SYSTEMS INC	9- 39	21	+ 1/4	+1.2
ADR COMPUTERS INC	7- 32	28 3/8	- 1/4	-0.8
AMERICAN SOFTWARE	17- 32	16	+	0.0
AMSOFT INC	9- 32	16 1/8	+ 1/8	+0.8
ANALYSTS INTL CORP	9- 23	13 1/2	+ 1 3/8	+11.0
APPLIED DATA RES.	9- 23	13 3/8	+ 3/8	+2.9
ASK COMPUTER SYSTEMS	9- 24	15	+ 1 1/2	+10.3
AUTOMATIVE COMP SYS	1- 3	3	+ 3/8	+10.3
AUTOMATIC DATA PROC	31- 44	38 1/2	+ 1 1/2	+4.1
CBA COMPUTER ASSOC	9- 17	13 3/4	+ 1/8	+0.9
COMPUTER ASSOC INT'L	9- 35	13 3/4	+ 3/4	+0.7
COMPUTER HORIZONS	9- 30	13	+ 1/4	+1.9
COMPUTER NETWORK	4- 10	7 3/8	+ 3/4	+11.3
COMPUTER SCIENCES	11- 23	20 1/2	+ 5/8	+3.1
COMPUTER TASK GROUP	9- 22	13	+	0.0
COMPUTER VISION	7- 22	12 3/8	+ 1/2	+3.7
COMPUTING SYSTEMS	7- 20	8 1/8	+	0.0
COMSERV CORP	7- 20	11 1/2	- 1/8	-1.0
COMSHARE	7- 14	12 1/2	- 1/8	-0.2
CULLINET SOFTWARE	12- 30	26 1/8	- 1/8	-0.3
CYCARE SYSTEMS INC	9- 27	16	- 1/8	-1.5
ELECTRONIC DATA SYST	19- 63	36 1/2	+ 1/4	+0.7
HUMAN SYSTEM INC	19- 53	21 3/8	- 3/8	-1.8
GENERAL ELECTRIC CO	59- 68	67 7/8	- 1/8	-0.2
GTE CORP	39- 63	53 1/4	- 1/8	-0.2
INFORMATICS INC	19- 34	21 1/4	+ 1/2	+2.3
INFOTRON SYSTEMS COR	39- 63	38	+ 1/8	+0.3
KEANE ASSOCIATES	9- 23	15	+ 1/2	+3.4
LOGICON	9- 23	15 1/8	+ 1/2	+3.4
MCI COMMUNICATIONS	13- 24	15 1/8	- 1/8	-1.6
MGIC INVSTNS CORP	39- 63	58	+ 3/4	+1.3
MANAGEMENT SCIENCE	19- 23	21 1/2	+ 1/2	+2.3
MANAGEMENT SCI AMER	3- 7	4	+	0.0
MATHEMATICAL APP GRP	19- 23	21 1/2	+ 1/2	+2.3
MICRO SYSTEMS INC	23- 63	38	+ 1/8	+0.3
MOHAWK-MEDEX CP	9- 32	9	- 1/8	-1.3
NATIONAL DATA CORP	9- 32	16 3/8	- 1/8	-0.7
ON-LINE SOFTWARE INT	17- 27	17	- 1/2	-2.8
PARAPHRIC SYSTEMS	9- 30	13 7/8	+ 7/8	+6.7
PLANNING RESEARCH	9- 21	17 3/8	+ 1/8	+0.4
POLICY MGMT SYSTS CP	19- 38	28 1/8	+ 3/8	+1.3
PROGRAMMING & SYS	1- 8	3 1/8	- 1/8	-3.8
REYNOLDS & REYNOLD	17- 35	28 1/8	+ 1/2	+1.8
SCI CORP	11- 34	28 1/2	+ 3/8	+1.4
SHARED MEDICAL SYST	13- 43	32 1/2	+ 1/8	+0.3
SCIENTIFIC COMPUTERS	9- 14	11 1/4	+ 1/8	+1.2
SOFTWARE AG	9- 17	13 1/2	+ 3/8	+2.9
TYMSHARE INC	12- 30	21 7/8	+ 7/8	+4.1
UNI COMP	1- 4	3 3/8	+ 1/8	+3.8
UNIV COMP	7- 17	10 3/4	+ 1/8	+1.1

PERIPHERALS & SUBSYSTEMS

AM INTERNATIONAL	7- 7	4	+ 1/2	+14.3
ANDERSON JACOBSON	9- 28	11 1/2	+ 1/2	+4.5
AUTO-TROL TECHNOLOGY	9- 28	15 1/8	+ 1/8	+0.8
CENTEC INC	7- 20	13 3/4	+ 3/4	+5.8
CENTRONIC INC	1- 4	1 3/8	+	0.0
CENTRONICS DATA COMP	9- 28	15 3/4	- 1/8	-0.8
CETEC CORP	9- 12	11	+ 3/8	+3.5
COMMETRONICS	7- 20	11 7/8	+	+0.1

SUPPLIERS & MISCELLANEOUS

COMPUTER DEVICES INC	1- 21	1	+ 3/8	+60.0
COMPUTER TRANSCEIVED	1- 12	4 3/8	+ 1/8	+39.0
COMPUTERVISION CORP	19- 63	43 3/8	+ 1/8	+0.1
CORVUS CORP	19- 38	17 3/8	+ 3/8	+2.1
DATAPRODUCTS CORP	19- 38	20 1/8		0.0
DATARAM CORP	19- 32	20 1/2	+ 3/4	+3.8
DATA SWITCH CORP	19- 31	21	+	+0.5
DATUM INC	7- 17	8 3/8		0.0
DECISION DATA COMPUT	7- 18	12 1/2	+	+0.0
DIGITAL-ELIXYR[1]	11- 39	14 3/8	+ 1/8	+0.8
ELECTRONIC M & M	9- 11	9	- 1/8	-1.3
EMDATA, INC	11- 19	11		0.0
EVANS & SUTHERLAND	9- 28	21	+ 1/4	+1.2
RANDOLF TECHNOLOGIES	9- 32	21 3/8	+ 3/8	+1.8
GEN'L DATA COMM IND	9- 28	14	- 1/8	-0.7
GREAT SOUTHWEST IND	1- 6	3/4		0.0
HUGHES TYM CORP	7- 31	23 3/8	+ 1 3/8	+10.5
ICOT CORP	7- 19	8 1/8	+ 3/8	+4.8
INFORMATION INTL INC	19- 32	23 1/2	+ 1/2	+2.2
INFORMATION SCIENCE	19- 17	13 1/2	- 1/2	-3.7
MAPCO CORP	11- 48	41 1/2	+ 3/8	+0.9
IPL SYSTEMS INC	7- 16	8 1/8	+ 1/8	+1.5
LUNDY ELECTRONICS	7- 16	11 7/8	+ 1/8	+1.0
MEDAGATA CORP	19- 19	13 1/8	+ 1/8	+0.9
MET DATA CORP	19- 34	21	+ 3/4	+3.7
MICRAM CORP	19- 32	22	+ 3/4	+3.5
NETWORK SYSTEMS CORP	19- 63	32 3/8	+ 1 3/8	+4.4
NO AMERICAN PHILIPS	59- 63	59	+ 1/2	+0.8
NORTHERN TELECOM LTD	31- 48	38 1/8	+ 3/8	+1.0
OMEN	1- 2	1 1/8		0.0
PARADYNE CORP	19- 38	15 1/8	- 1/2	-3.2
PENRIL CORP	7- 19	12 3/8	- 1/8	-0.8
PHOENIX AMERICAN INC	7- 19	14 3/8	+ 1/8	+0.8
PLESSEY CO (ADR)	39- 63	54 3/4	+ 1 3/8	+2.5
POINTMAKER INC	23- 34	23 1/2		0.0
RANTEK CORP	9- 34	14 3/4	+ 3/4	+5.4
RAYTHEON CO	49- 63	49 7/8	+ 1/8	+0.3
RECOGNITION EQUIP	9- 17	13 3/8	+ 1/2	+3.9
REMEX CORP	4- 9	6	- 1 1/8	-15.7
SANDERS ASSOCIATES	47-120	48	- 1/8	-0.2
SCAN DATA	1- 3	3/8	- 1/8	-25.0
SCAN-TRON CORP	19- 28	19 1/8	+ 1/8	+0.7
SCIENTIFIC ATLANTA	19- 38	15	+ 1/8	+0.8
STORAGE TECHNOLOGY	19- 32	14 1/8	+ 1/8	+0.7
SYKES DATATRONICS	1- 2	1 1/8	+ 1/8	+0.7
SYSTEMS & COMP TECH	39- 63	37 1/8	+ 3/8	+1.3
T BAR INC	7- 17	10 3/8	+ 3/8	+3.7
TAB PRODUCTS CO	9- 28	20 1/2	+ 1/8	+0.6
TANDON CORP	19- 38	19 1/2	+ 1/2	+2.5
TEC INC	1- 5	3 1/8	- 1/8	-3.8
TELEDYNE INC	1- 63	74	- 1/4	-0.3
TELEX	9- 32	27 1/8	+ 7/8	+3.3
TESDATA SYSTEMS CP	7- 17	8 1/2	- 3/8	-4.2
TIMEPLEX INC	7- 28	23 1/2	+ 3/8	+1.6
VIKING TECHNOLOGY	9- 28	18 3/4	+ 1/2	+2.7
AMERICAN MAR PROD	7- 23	24 1/2	+ 1/8	+0.5
BARRY WRIGHT	19- 38	38 1/2	+ 1/2	+1.3
DUPLEX PRODUCTS INC	12- 27	26 3/4		0.0
EMHART IND. PRIME	9- 28	23 7/8	+ 1 3/8	+7.2
3M COMPANY	49- 63	62 3/4	+ 1 3/8	+2.2
MIDDOT CORP LTD	28- 31	28 1/2	+ 1 3/8	+1.7
STANDARD REGISTER	11- 34	32 1/4	+	+2.1
WALLACE BUS FORMS	11- 28	28 1/8	+ 1 3/8	+4.8

15 pointed questions to ask MSA or any software supplier

These questions will help you when you sit down with individual software companies.

They're tough questions. Relevant ones. And any supplier who is worth his salt should be able to answer them without backpedaling.

Ask MSA

We'll answer all these questions to your satisfaction—plus any others you may have.

In fact, we're probably the best equipped to answer them. Because MSA is the software company. We offer the most complete line of totally integrated systems in the software industry, including financial, human resource and manufacturing.

So you avoid the headache of trying to tie together individual systems. (And the even bigger headache of adding to them.)

With MSA's integrated systems, there's no unnecessary duplication of data or effort. Reporting is faster. All your company's information is more timely and accurate—and in the right form.

Our technical edge comes from experience

Staying ahead is easier for a company that's steeped in software technology. MSA has spent years developing, refining, testing and enhancing our systems.

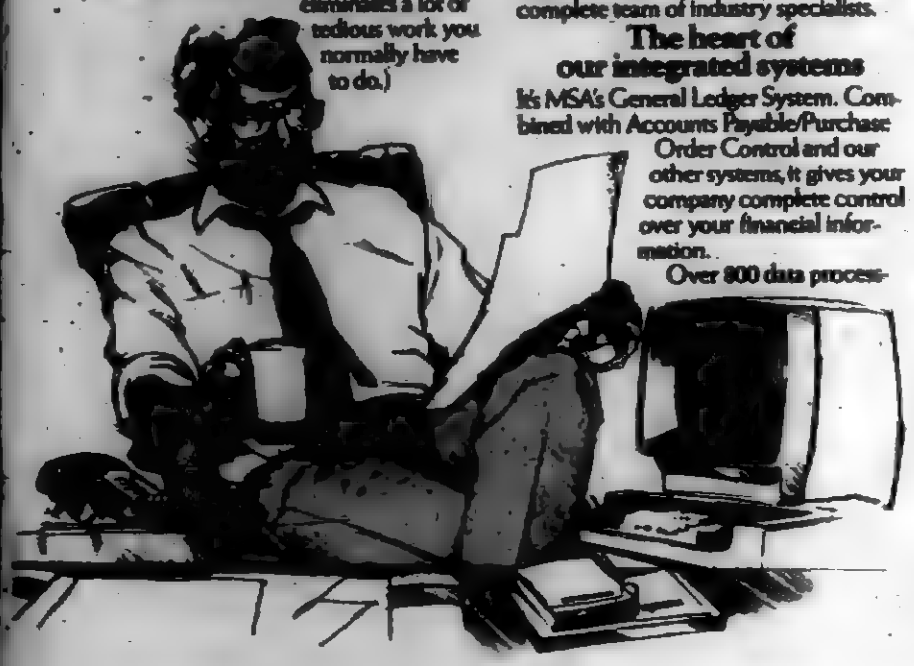
This year alone, we'll invest $25 million to make sure all our systems are technologically razor sharp. That gives us a decided advantage over flash-in-the-pan technology that may not have the bug-free logic of a more experienced system.

It also gives you a decided advantage over "custom" systems you have to update yourself.

MSA relieves you of that time-consuming burden. We update and enhance your software for a full year. Then we continue this service for a surprisingly low annual fee.

Maintenance includes keeping your system up-to-date technologically. Enhancing it with new features that make it work even harder for you.

And making sure it reflects changes in accounting procedures and government regulations, including 401(k), TEFRA, and FAS52. (That eliminates a lot of tedious work you normally have to do.)



Save this box. It can help you make an intelligent software decision.

1. Can you offer us a complete range of software systems designed to work together?
Or will we have to piece together a patchwork of systems?

2. Are your systems just record keepers, or can they really help us make decisions?
Can we pull together information from any of our integrated systems? In exactly the form we want it?

3. Can you provide business software for both mainframe and microcomputers?
Do you develop this software yourself or do you simply market it for another company?

4. Are your systems truly online so all of our information is current?
How many of your systems are online? How secure are they?

5. Will my company have to be the one that discovers the bugs in your brand new system?
Just how long have your systems actually been used, and how have they been tested?

6. Will you update your systems as technology advances and regulations change?
What are some of your most recent updates? Will you keep us current on regulatory changes?

7. Do your systems really do everything you say they will?
Or will we have to change them or add to them to get the features we want?

8. How long have you been in business?
What are your revenues? What is your growth record? Where will your company be five years from now?

9. How many systems has your company installed?
How many of these were installed in the past six months? How many of your earlier customers are still using —and liking—your systems?

10. Do your financial systems handle unlimited foreign currencies?
Do your financial systems use a common set of currency exchange rates?

11. Can you link our executives' computers directly to the mainframe—so they can get their own information?
Is that software available right now?

12. How will you make sure our own people thoroughly understand your system?
Do you have educational centers near us, or will we have to travel all the way across the country to find one? Will you be there to help during installation and after?

13. How many of your people specialize in software for my industry?
How many accountants work for you? Human resource specialists? Manufacturing experts?

14. Do your systems have built-in features that make them easier to use?
What happens if someone needs help figuring out a feature? Do you have online documentation that's easy to understand?

15. As my business changes will your system be flexible enough to change with it?
Or will we have to pay a lot to revamp it? Or even regenerate it?

© Management Science America, 3445 Peachtree Road, N.E., Atlanta, Georgia 30326

35,000 days of training

At MSA, we make sure your people have a firm grasp of our systems. Last year alone, we conducted more than 35,000 student days of customer training for over 1,800 companies. At education centers all over the world, as well as at our headquarters.

From training sessions to cassettes to complete, easy-to-understand documentation, MSA provides the most extensive Customer Education Programs in the industry.

And MSA systems are just as friendly as our people. Our online HELP feature actually guides users through our systems, and EASY-SCREEN™ lets them design their own screens without creating data processing nightmares.

If there's ever a question or problem with our systems, MSA customers are always close to service.

Our Account Managers are knowledgeable, responsive, and backed by a complete team of industry specialists.

The heart of our integrated systems

It's MSA's General Ledger System. Combined with Accounts Payable/Purchase Order Control and our other systems, it gives your company complete control over your financial information.

Over 800 data processing specialists, accountants, and financial experts work together to make MSA's financial systems the most advanced and most highly integrated in the industry.

MSA has the answers

Whatever your size—whatever your business—MSA has a total software solution.

We'll provide the highest quality integrated online software.

We'll tie your business and manufacturing software systems together, using our exclusive Extended Closed Loop™ manufacturing system.

We'll provide business software for your microcomputers, through our Peachtree Software Company.

We'll even link your microcomputers to your company's mainframe—with MSA's Executive Peachpak™ application software. A revolutionary concept that lets executives get the mainframe information they need through their personal computers.

MSA ready-to-install application software

1. General Ledger
2. Accounts Payable/Purchase Order Control
3. Budgetary Control/Encumbrance
4. Fixed Assets Accounting
5. Capital Expenditure Tracking
6. Forecasting & Modeling
7. Accounts Receivable
8. Order Processing
9. Foreign Exchange
10. Inventory & Purchasing
11. Payroll
12. Personnel Management & Reporting
13. Manufacturing Control System (MRP II)
14. Executive Peachpak™ II
15. Peachtree Software™ business systems for microcomputers
16. Peachtree Software™ office productivity systems for microcomputers

EASY-SCREEN, Executive Peachpak II, Peachtree Software, and Extended Closed Loop are trademarks of Management Science America, Inc.

Talk to us

If we've whetted your appetite with our 15 questions, clip the coupon below.

We'll send you a concise booklet that will help you even more in your deliberations. We'd also like to send you more information on how MSA can help you plan for software. And on individual systems.

Just fill in the information below, or contact Robert Carpenter at (404) 239-2000.

Management Science America, Inc.
3445 Peachtree Road, N.E.
Atlanta, Georgia 30326

☐ Please send me a free detailed brochure.
☐ Please send more information on the following systems. (Write numbers from product list)

Mainframe Computer Type/Model _____

Name _____

Title _____

Company _____

Address _____

City _____

State _____ Zip _____

Business Phone ( ) _____

CW17(1/15/84)

MSA
The Software Company

VOL 18
ISSUE 3A
JA 18 1984
UMI

Jan. 18, 1984
Vol. 18, No. 03A

IBM vs. AT&T · Death of the Resellers? · ISDN

On Communications

Hysterical Harry Newton

All Standard IBM 3270 Features

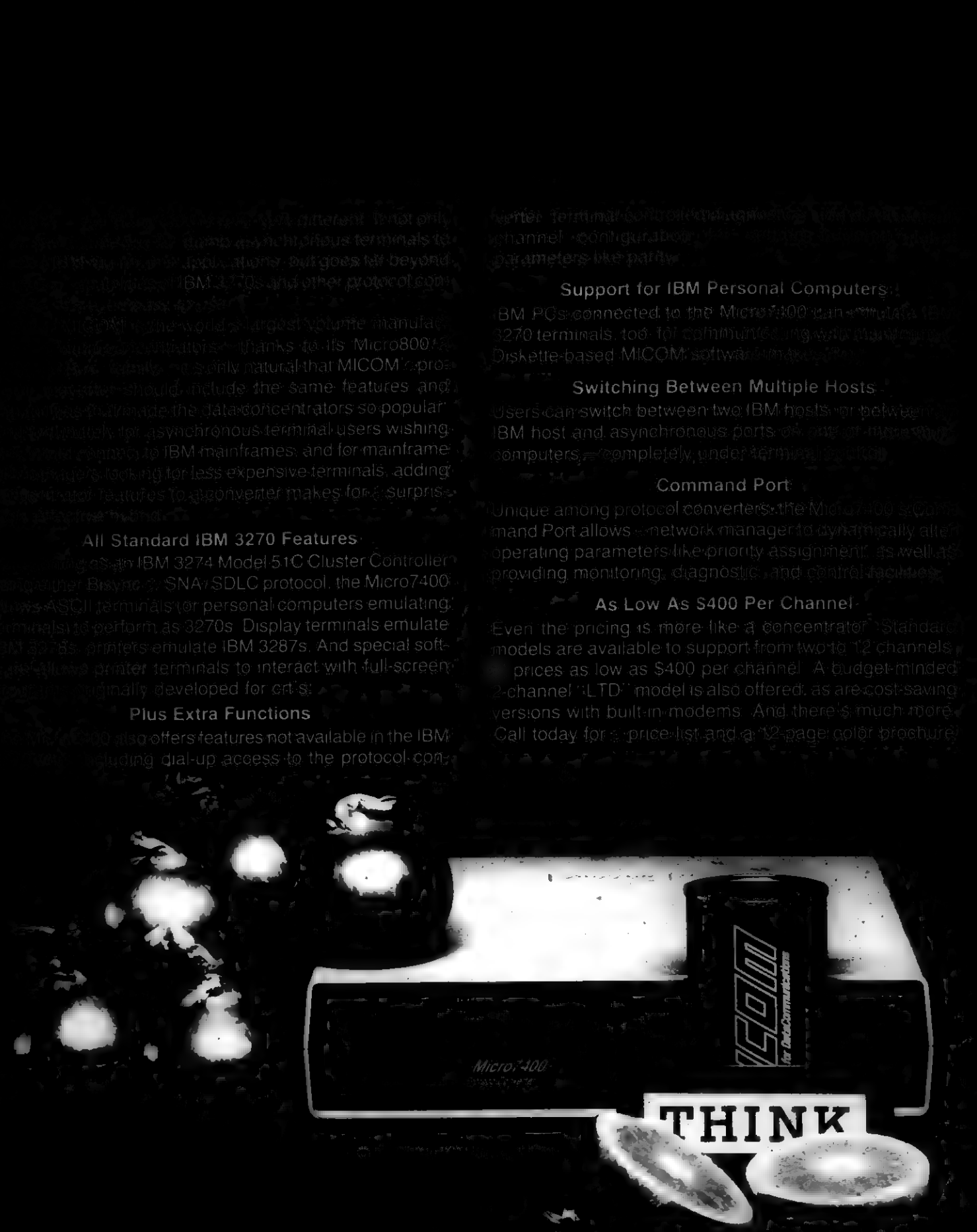
Plus Extra Functions

Support for IBM Personal Computers

Switching Between Multiple Hosts

Command Port

As Low As $400 Per Channel



MICOM

Chatsworth CA 91311 • Boston MA • (617) 527-4011 • Chicago • St. Louis, MO • (314) 576-7626 • Reading Berkshire RG20 • England

CONTENTS

11 **Death of the Resellers?**
By Don Gooding
The telephone resale industry may break down in a tangle of new regulations slated to govern it.

15 **Cellular Radio Technology**
By Gary W. Onanich
This incipient technology is getting a lot of attention, but what forces are driving the market?

20 **Hysterical Harry Newton**
By Bruce Hoard
A day in the tumultuous life of this month's coverboy. Includes the truth about Bulgarian pay phones.

Special Section: IBM vs. AT&T

25 **Geopolitical Strategies**
By Brian Jeffrey
The fight for superiority has already spilled beyond our shores and onto an international battleground.

29 **U.S. Affiliations**
By Alain Desrenne
The two giants are seeking advantages in the U.S. by selectively choosing technology partners.

33 **Workstation Wars**
By Brian Jeffrey
Will the race for dominance in the office automation market be terminal? Who will come out ahead?

37 **Morale and Management**
By Alain Desrenne
AT&T and IBM depend more on quality, reliability and service than on individual products.

43 **In the Balance**
Michael Killen, a consultant who has made bold predictions in the past, handicaps the high-tech heavyweights.

49 **The "New" AT&T**
By Albert H. Kramer
Is it true that the more things change, the more they stay the same? Will the post-divestiture AT&T turn out to be a wolf in sheep's clothing?

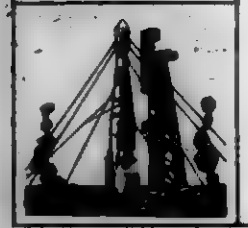
53 **Counting Down To ISDN Plug-In**
By Frank Gratzer
The superhighway of telecommunications networks is fast becoming a reality, but it is still plagued with pesky regulatory problems.

57 **Overnight Mail Services**
By Katherine Hafner
Absolutely, positively, the definitive scoop on overnight mail services in the electronic age.

63 **Gap in Human Communication**
By Patti Hartigan
You may have the most sophisticated system available, but still know nothing about communicating.

70 **Blasting the Way**
By Paul Charbonnet Jr. and Glenn Smith
Many previously deprived computers may now enjoy the luxury of synchronous communications.

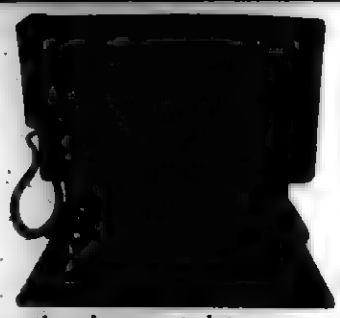
74 **Is the Voice-Data Mix Missing?**
By James N. Budney
The quest for this holy grail of communications winds its way through a variety of devices.



DEPARTMENTS

Editorial ____ 4
Dialogue ____ 6
Washington, D.C. ____ 9
At Large ____ 83
Pro & Con ____ 85
Exit ____ 88

GET EVERYBODY ON BOARD.



Now there's a way to let everyone in your company chip in.

AT&T Information Systems, the company whose unparalleled communications heritage has been bringing people together for 100 years, now brings your office together. With state-of-the-art office automation that's designed to get your company moving ahead.

Electronic Document Communications, now available on System 85 and DIMENSION PBX, is an easy-to-learn software application that's hard to beat. Because it integrates your office by letting everyone prepare, send and store documents and messages with the speed and efficiency of a computer. So you can have better access to the right information in the right form at the right time.

Electronic Document Communications can streamline your office in three ways:

Preparing Information—Reduces the time, effort, cost and wasted paper between drafts by electronically creating, editing and formatting documents and messages. "The Composer," a special software feature, checks spelling, grammar, punctuation and usage. EDC even measures whether documents are readable by technical and nontechnical readers.

Moving Information—Speeds documents to many people in different locations simultaneously so they can act decisively. EDC allows you to determine the timing and cost of delivery, and even check to find out when documents were received. Using a password ensures the privacy of your messages.

Managing and Storing Information—Locates documents, and retrieves and evalu-

ates contents quickly and easily with electronic files—while reducing the possibility of losing documents. An electronic "Mailbox" allows you to quickly determine which documents to read first. EDC reduces storing and filing costs with an electronic "Archives" that allows for either short- or long-term storage, and the "Wastebasket" which enables you to permanently delete items after a determined period of time. There's even an electronic "Calendar" that checks personal schedules and arranges mutually convenient meetings.

Not only will all these features help you further integrate your office, Electronic Document Communications is itself just one part of AT&T's line of completely integrated business systems. For state-of-the-art office automation, you can implement EDC in conjunction with other applications software like Message Center/Directory, a call coverage and message system. These office management applications are now available on System 85 and DIMENSION® 600 and 2000 systems with the Applications Processor.

The result is you'll be able to improve staff productivity at every level and get everybody on board. And as new features are developed in the future, they'll be compatible with your existing equipment.

EDC was developed by Bell Labs systems designers who now work for AT&T Information Systems Laboratories. AT&T Western Electric produces EDC, and AT&T Information Systems will maintain it with comprehensive, conscientious service from the largest service organization in the industry. To find out more, call toll-free 1-800-247-1212, Ext. 879M.

AT&T's Electronic Document Communications: It's part of the integrated office of tomorrow that you can board today.

AT&T
Information Systems

EDITORIAL

IBM at the Helm Again

The difference between personal computers and CRT terminals is getting more difficult to define as the markets they serve merge and grow larger. Not surprisingly, IBM is the company best positioned to reap the benefits of this profitable communications market. The question is, how much of the profits will be left for the competition?

IBM has a widespread installed base of mainframe computers. Those computers communicate with CRTs and personal computers via the synchronous communications mode. Most non-IBM CRT terminals and personal computers communicate via the asynchronous communications mode. IBM dominates the market for synchronous CRT terminals and personal computers. This means that IBM controls an extremely lucrative market.

International Data Corp. estimated that, at year-end 1982, there were approximately 4,365,000 synchronous communications terminals installed vs. 3,124,000 asynchronous models.

IBM has a solid grip on the synchronous CRT terminal market with its 3270 family of terminals and controllers. Currently, over a million of those units are installed. The 3270 series may not represent the ultimate in CRT terminal and controller technology, but it looks good when you are seeking IBM mainframe compatibility.

Just as importantly, IBM CRT terminals and Personal Computers are conversant with IBM's aging, but still ubiquitous Binary Synchronous Communications (BSC) networking protocol and Systems Network Architecture (SNA), the hydra that is succeeding BSC. SNA is a de facto networking standard similar in many of its aspects to the Open Systems Interconnect model being hammered out by the International Standards Organization (ISO). It will continue to thrive even after the long-awaited ISO model finally comes to fruition.

The asynchronous manufacturers seemingly do not want anything to do with the synchronous IBM world, even though the synchronous terminal market is growing faster in terms of shipments. On the other hand, IBM has taken an interest in the asynchronous world, having installed 90,000 of its asynchronous 3101 CRTs.

So much for CRTs. What about personal computers? There is no question about the current impact and future prospects for these revolutionary devices. Some pundits have gone so far as to predict that personal computers will destroy the CRT market. This seems an unlikely forecast, but it is ominous, none the less, for CRT manufacturers.

IBM made its intentions in the much-touted micro-to-mainframe link known dramatically last Oct. 18. It introduced the Personal Computer XT/370 and 3270 Personal Computer as complements to its already successful Personal Computer and Personal Computer XT.

The XT/370 offers IBM 3277 CRT emulation and connectivity to 3274 controllers. In addition, IBM says it offers roughly half the internal performance of the IBM 4321, a low-end mainframe. Beyond that, the XT/370 reportedly permits users to run many 370, 4300 series and 30 series programs unchanged on their desktops under the VM/CMS operating system. Users can access mainframe applications and concurrently use those applications with programs running under Microsoft, Inc.'s PC-DOS, the primary operating system for IBM's Personal Computer and Personal Computer XT.

The 3270 Personal Computer is said to let users access multiple host processors while retaining local computing powers. It offers the ability to run up to seven applications concurrently, four of which can emanate from a larger host such as 4300 or 3080 series processors.

Furthermore, the IBM machines may be modified for asynchronous communications with the addition of a card.

The announcement of these two products made life even more difficult for competing personal computer vendors. In the past, they could claim Personal Computer and Personal Computer XT emulation capabilities by modifying their microcomputers to act as dumb 3270-type terminals. Now that the ability to access mainframe applications running under VM/CMS has been added to the IBM repertoire, the competition has to go back to the drawing board and duplicate IBM's feat. In the meantime, IBM will be out selling computers.

IBM has put together an impressive line of products designed to sew up the IBM synchronous CRT terminal and personal computer marketplace. It seems well on its way to doing just that.

Computerworld On Communications

CW COMMUNICATIONS/INC.
Box 880, 375 Cochituate Road
Framingham, Mass. 01701

Board Chairman/Publisher
Patrick J. McGovern

President W. Walter Boyd
Senior Vice President Lee Vidmar
Group VP-Communication Services Jack Edmonston
Group VP-Circulation Margaret Phelan
VP-Sales Donald E. Pagan
VP-Finance William P. Murphy
VP-Editorial John Whitmore

Special Focus Publications Administrator Jenny Charlesworth

Editor Bruce Sinard
Managing Editor Paul Hartigan
Staff Writer Katherine Hafner

Art Director Tom Monahan
Art Assistant Marina Bonucci
Production Director Peter Holm
Production Manager Marlene Stibal
Production Assistant Laura Zuroff
Typesetting Manager Carol Polack

Advertising Traffic, Special Publications Elaine Carlos

Second-class postage paid at Framingham, Mass., and additional mailing offices. *Computerworld* (ISSN-0010-4841) is published weekly, except: January (6 issues), February (6 issues), March (5 issues), April (7 issues), May (5 issues), June (6 issues), July (6 issues), August (5 issues), September (6 issues), October (6 issues), November (6 issues), and a single combined issue the last week in December and the first week in January by CW Communications/Inc., Box 880, 375 Cochituate Road, Framingham, Mass. 01701.

Copyright 1983 by CW Communications/Inc. All rights reserved. Reproduction of material appearing in *Computerworld* and *Computerworld On Communications* is forbidden without written permission. Send all requests to Nancy Shannon.

Computerworld subscription prices: $1.50 a copy; U.S. — $44 a year; Canada, Central & S. America — $110 a year; Europe — $165 a year; all other countries — $245 a year (airmail service). *Computerworld On Communications* single copy price: $5.00. Four weeks notice is required for change of address. Please allow six weeks for new subscription service to begin.

Computerworld can be purchased on 35mm microfilm through University Microfilms Int., Periodical Entry Dept., 300 Zeeb Road, Ann Arbor, Mich. 48106. Phone: (313) 761-4700. *Computerworld* is indexed. Write to Circulation Dept. for subscription information.

PHOTOCOPY RIGHTS: Permission to photocopy for internal or personal use or the internal or personal use of specific clients is granted by CW Communications for libraries and other users registered with the Copyright Clearance Center (CCC), provided that the base fee of $3.00 per copy of the article, plus $.50 per page is paid directly to Copyright Clearance Center, 21 Congress Street, Salem, Mass. 01970.

Permission to photocopy does not extend to contributed articles followed by this symbol. ‡

POSTMASTER: Send Form 3579 (Change of Address) to Computerworld Circulation Dept., Box 880, 375 Cochituate Road, Framingham, Mass. 01701.

Computerworld On Communications is a member of the CW Communications/Inc. group, the world's largest publisher of computer-related information. The group publishes 42 computer publications in 18 major countries. Nine million people read one or more of the group's publications each month. Members of the group include: Argentina's *Computerworld/Argentina*; Australia's *Australasian Computerworld* and *Micro Computer Magazine*; Brazil's *DataNews* and *Microlmundo*; China's *China Computerworld*; Denmark's *Computerworld/Danmark* and *MikroData*; France's *Le Monde Informatique*; Germany's *Computerwoche*, *Microcomputerwelt* and *PC Welt*; Italy's *Computerworld Italia*; Japan's *Computerworld Japan*; Mexico's *Computerworld/Mexico*; Norway's *Computerworld Norge* and *MikroData*; Saudi Arabia's *Saudi Computerworld*; Spain's *Computerworld/Espana* and *MicroSistemas*; Sweden's *ComputerSweden*, *MikroDatorn* and *Min Hemdator*; the UK's *Computer Management* and *Computer Business Europe*; the U.S.' *Computerworld*, *Desktop Computing*, *Hot CoCo*, *InCider*, *InfoWorld*, *ISO World*, *Microcomputing*, *PC World* and *80-Micro*.

No Hassles

You're in charge of a large datacomm network. You're responsible for scores of lines, hundreds of users, thousands of terminals. Millions of dollars.

But what have you got?
Zillions of hassles.

Why?

- Because you can't see your network as your users do. You don't know if response time is too slow. Volume too high. Too many errors. And you don't know about problems until angry users call.
- Because you don't *really* know how well your network performs. Over-all. And by each application.
- Because you don't have color graphs and tables that chart performance and service levels, analyze past and preser use, pinpoint excess capacity, highlight saturation, simplify planning.
- Because you don't have real-time status and performance monitoring, much less full-color automatic alerts that spotlight problems.
- Because you need to save money on terminals and lines, but don't know which ones can be moved or eliminated.
- Because your network manages *you*—rather than vice-versa.

The Net/*Alert* network management system from Avant-Garde gives you a window into your network. At last, you can *manage* your network, cut costs, provide better service, and improve productivity.

Without the hassles.

Visit our booth at Communication Networks in Washington, D.C. for a *live* demonstration of the Net/*Alert* system.

If you can't make it because your network has you tied up in knots, fill in the coupon fast. We'll speed you information about Avant-Garde's products to simplify network management. Or call (609) 424-9620 and ask for Bill Ahlstrom.

Avant-Garde Computing Inc.
2091 Springdale Road
Cherry Hill, New Jersey 08003

Please rush me information about Net/*Alert*, *the* network management system.

My network has _____ lines and _____ terminals.

Host: _____ Protocols: _____

Name

Title

Company

Address

City State Zip

( )
Telephone

AVANT-GARDE
Computing Inc.

© 1983 Avant-Garde Computing Inc.
Net/*Alert* is a registered trademark of Avant-Garde Computing Inc.

In what areas do you see AT&T and IBM competing in the future?

Robert Pfluger, technology adviser, Shell Oil Co., Houston:

"Computers and telecommunications. With computers, AT&T will be in the microcomputer business within a year and potentially into large-scale computers later. IBM will be into the conventional telecommunications business through its association with Rolm [Corp.]. As to who will get what, I think both will retain strength in their respective areas of business right now. As for whether IBM will become a leader in communications and AT&T will become a leader in computers, I cannot say. It is too soon to tell."

Howard Talesnick, director of systems, Martin E. Segal Co., New York:

"It's a very serious question. The only thing that occurs to me is the development in hardware and what IBM is doing there. IBM has built its Information Network, and the acquisition of, or integration with Rolm, certainly makes it look like IBM is going after the communications market that has traditionally been served by AT&T. But AT&T is coming out with its own Unix-based hardware, and there has been talk about IBM coming out with hardware working with Bell's Unix system.

"I don't see how anyone can talk about forecasting market share, when there are so many developments taking place. AT&T comes out with hardware, and IBM expands its Information Network for communications. Obviously, these are areas of competition, but the future depends on the product development. For the most part, it will be a self-fulfilling prophesy. It also depends on how you define the market — the total computer market or just one piece.

"Obviously, the outsider's perception of what is taking place is that it looks like two types converging toward the same market. But that is superficial analysis. They happen to be getting closer to offering the same kind of utility. Obviously, it is incidental to their existing product line. I mean, how much is communications a total percent of IBM's business? And how much is AT&T's hardware business related to the whole communications business?

"Obviously, people have the expectation that they will be confronting each other. But what actually emerges depends on their own business plans and on what products they announce and implement."

Robert Handal, manager, telecommunications network services, Mobil Corp., New York:

"Right now, I think IBM has to sort out what to do with Rolm. I don't think IBM has its strategy set as to exactly how it is going to deal with Rolm. It is not clear how it will present that combination of organizations. I can see AT&T is still going to be dominant in communications. It has the network and research. I don't think Rolm can compete with that. I do feel, however, that IBM will have its edge because it has its [Systems Network Architecture] and hardware devices and every aspect of communications except the long lines network and [private branch exchanges (PBXs)].

"More and more, the PBX — which is what Bell is very good at — is looking like a computer. That will help Rolm in its relationship with IBM. Maybe then it can have a very serious effect, take an important market away from AT&T because of the switch.

"But I don't think that will occur because IBM has not sat down with its strategy board and said exactly what portion of the market it is going after and how it is going to do it.

"You will never knock IBM out of the computer area. It is only where the two meet that matters. IBM bought Rolm for the switch. It has everything up to the switch. AT&T has the network and the switch. They will only compete if they add things to the switches. IBM doesn't care as long as it is compatible with their products."

Tad Davies, manager of network communications, Bechtel International, San Francisco:

"IBM, of course, is part owner of Satellite Business Systems [SBS] right now. And I think that the role of communications — the PBX-type telephone communications and satellites — those are going to be the two disciplines of communications in computing, with a merging in the office workstation area. I believe that both of them will be the leaders in that field.

"I don't know if either one will take a dominant position. IBM

SAVE MONEY ON TALK FASTER.

THE CODEX 224 DIAL MODEM.

has a head start on personal computers, but as soon as the unregulated portion of AT&T is unleashed, it will be in that arena as well. In areas like that, one will be No. 1, and one will be No. 2. I doubt either will have the majority of the market. Of course, IBM has the head start: It will be tough to beat the Personal Computer.

"AT&T telephone stores will become computer marts, so to speak. I cannot really see AT&T getting into the large-scale mainframe business, but I can certainly see it getting into office automation and the movement of information. They both will be in that, and they will be in it rather heavily."

Edith Clouse, data communications analyst, Stauffer Chemical Co., San Francisco:

"I think IBM will possibly be entering the PBX market. I wouldn't be surprised if AT&T came out with some form of personal computer. It will definitely be entering the data processing market. I doubt AT&T would get involved in large mainframe computers.

"IBM might take away market share in the PBX area. In the microcomputer business, the market is still growing — the base market. But telephone systems are not new, and it is just a matter of getting new, better ones."

Thomas Isaacson, manager, telecommunications, SCM Corp., Stamford, Conn.:

"Competition between the two will be aggressive. It will be broader than competition with equipment, too. AT&T and IBM will both compete across the whole broad range of information management and transfer, and no area will be specific with either one of them. They will compete in all areas: That is their goal. Both want to offer a full range of capabilities, which includes all the traditional telecommunications capabilities and office automation, personal computing — those things.

"I think IBM will try to increase its percentage of ownership in telecommunications, either through acquisition of existing companies or by establishing its own capabilities. AT&T already has large mainframes. Now, it is a matter of making them available to users. AT&T has electronic switching systems that are enormously capable computers, but I do not think it will come out with mainframes to put on customer premises. Instead, AT&T will offer computing capabilities to users.

"I think both AT&T and IBM will become information processing companies; the distinction between the two will disappear."

Thomas Cooley, telecommunications consultant, General Mills, Inc., Minneapolis:

"Obviously, IBM is going to be in the telephone marketplace in the next couple of years, considering its association with Rolm. It will be interesting to see what kinds of products they bring into the marketplace. Through SBS and yet-to-be-announced divisions, IBM will start to offer value-added network capabilities. I think AT&T will try to compete in that area with their Net/1000 as well.

"But I think AT&T is behind in the terminal equipment area. And we will probably see more product announcements out of AT&T in the next couple of years. I do not think the System 85 is competitive yet. We will see replacements for its Horizon PBX system and expanded system products that go into larger line sizes. We will also see a personal computer from AT&T — probably in the next six months."

YOUR PHONE BILL.

If you're running 212 modems in a dial-up network, Codex has a new product that can significantly reduce your phone bills.

It's the Codex 224 modem.

At 1200 bits per second, the Codex 224 is fully compatible with Bell's 212 modem. But because the Codex 224 also runs at 2400 bits per second you can transfer more data faster and therein lies the economy.

You can run at 2400 bps full duplex asynchronous or synchronous over public telephone lines, even unattended. And because the Codex 224 incorporates advanced equalizers you're assured of high performance at higher speeds even over marginal lines. In addition, the Codex 224 automatically recognizes 1200 or 2400 bps transmissions and adjusts automatically.

And with faster file transfer and screen fills, people in the network will be able to get more done in the same time.

What all this means is that you can get better productivity and significant savings in your 212 network simply by installing Codex 224 modems.

The Codex 224, which meets the CCITT international standard, can be leased directly from Codex or purchased outright.

In short, you don't have to make a massive investment to run a better, faster, more economical network.

All you have to do is call Codex.

Call 1-800-821-7700 Ext. 895. Or write: Codex Corporation, Dept. 707-95, 20 Cabot Blvd., Mansfield, MA 02048.

codex

MOTOROLA INC.

LETTERS

'Is It Worth Doing?'

I would like to compliment you on the content of your September 28, 1983 *Computerworld On Communications*. The quality of the articles and their pertinence to today's business communications managers was exceptional.

In particular, the article entitled "Myths Behind Voice and Data Integration" by William Zachmann was noteworthy in that it addressed a viewpoint that has been hidden in the current media hype over data and voice integration in new private branch exchanges (PBXs). It is a valid editorial responsibility to expose the user to his need to ask, "Is it worth doing just because it can be done?" This article clearly suggests the jury is still out on the viability of the data and voice PBX solution to today's problems.

We look forward to your increased publication schedule in 1984.

Edward S. Milbury
Product Marketing Manager
Gandalf Technologies, Inc.
Wheeling, Ill.

Fill in your IBM micro/mainframe communications picture.

AST Research, the leader in IBM PC enhancement products, brightens your micro/mainframe communications picture with a full palette of economical, integrated hardware/software masterpieces. With AST Products, you can emulate IBM terminals or create PC-based Local Area Networks.

AST improves your office operating cost picture.

AST communications products give your IBM PC the flexibility to act as a terminal for your host system or as a stand-alone computer for smaller tasks. Your PC won't bog down the mainframe with unnecessary small jobs and local computing on the PC eliminates phone line charges too. Get the power of a mainframe when you need it and personal computer convenience right at your fingertips.

Applications solutions that are strokes of genius.

AST keeps pace with your ever-changing applications requirements with reliable, high quality, cost effective communications products. AST products provide support for Bisync and SNA/SDLC communications protocols as well as networking multiple PCs for sharing resources.

Choose AST products — by the numbers.

These AST communications packages are currently available:

1. **AST-SNA™** emulates a 3274/3276 controller and 3278 or 3279 display terminal using SDLC protocol.
2. **AST-BSC™** emulates 2770 batch RJE and remote 3270 display terminals using 3270 Bisync protocol.
3. **AST-PCOX™** allows your PC to connect to an IBM 3274/3276 cluster controller via coax cable and emulates a 3278 or 3279 display terminal.
4. **AST-3780™** emulates 2770, 2780, 3741, and 3780 RJE workstations using Bisync protocol.
5. **AST-5251™** emulates a 5251 Model 12 remote workstation connected to an IBM System 34, 36 or 38.
6. **PCnet™** is the first Local Area Network designed specifically for the IBM PC or XT and the PC-DOS 1.1 or 2.0 operating system.
7. **CC-232™** is a user-programmable dual-port card capable of communicating in Async, Bisync, SDLC or HDLC protocols.

Discover how well AST can fill in your micro/mainframe communications picture. For descriptive data sheets, write or call: AST Research Inc., 2121 Alton Ave., Irvine, CA 92714. (714) 863-1333. TWX: 295370ASTRUR

AST RESEARCH INC.

Number One Add-Ons For IBM PC.

IBM is a registered trademark of International Business Machines Corporation. PCnet is a registered trademark of Orchid Technology Inc. AST-SNA is a product developed by AST Research, Inc., and Wilmot Systems, Inc. AST-BSC is a product developed by AST Research, Inc., and Wilmot Systems, Inc. AST-PCOX is a product developed by AST Research, Inc., and Wilmot Systems, Inc. AST-3780 is a product developed by AST Research, Inc., and Wilmot Systems, Inc. AST-5251 is a product developed by AST Research, Inc., and Wilmot Systems, Inc. CC-232 is a product developed by CSS Inc. PCnet is a product developed by CSS Inc.

ALAN PEARCE

AT&T at the Regulatory Forge

Regulation — or the lack of it — is the single most important element influencing the future success of AT&T Communications, the successor to AT&T's Long Lines Division that is responsible for providing long-distance services. Competitors are fighting their battles against AT&T Communications before the Federal Communications Commission (FCC), the courts and Congress.

The prospects for approval of AT&T's massive tariff filing submitted before the FCC on Oct. 3, 1983 and slated for implementation this April 3 look good. This is because the proposed tariffs are fair. They were developed by AT&T under the intense scrutiny of the Justice Department, the FCC, AT&T's competitors, AT&T's customers, Congress and U.S. Federal District Court Judge Harold Greene, who is monitoring the Bell System breakup. The tariff filing was subjected to intense scrutiny, so it is highly unlikely that AT&T Communications made the tariffs anticompetitive.

Naturally, the tariffs are being strenuously opposed by AT&T Communications' competitors because, for the first time, there is going to be real competition in the toll telecommunications services market. These competitors want to keep the edge in pricing.

In addition, AT&T Communications will seek substantial deregulatory relief from the FCC over the next five years, looking ultimately to total deregulation. Prospects here also look good, as long as the FCC is headed by current Chairman Mark Fowler, a strict advocate of deregulation. "We are headed ultimately toward a regulation-free telecommunications marketplace," Fowler said. "Society deserves the benefits — not later, but now."

AT&T Communications is working toward that goal by lobbying for the deregulation of the introduction and pricing of new services in the marketplace. It also wants reduced FCC tariff requirements and the elimination of the long delays inherent in the compilation of supporting data in tariff and other filings. It will also seek forbearance from service-by-service regulation, which requires that rates for different services be set to produce equal earnings. It will also move quickly to define a set of existing services that should immediately be deregulated, including certain private-line and satellite-based services.

But this strategy would merely preface a huge effort to become totally deregulated at both the state and federal levels over the next five to 10 years. Fowler has already announced that he plans to launch an inquiry seeking to deregulate AT&T Communications totally. This plan is expected

ILLUSTRATION BY KRISTIE VANVALKENBURGH

to result in monumental opposition not only from competitors such as MCI Communications Corp., GTE Sprint Communications and others, but also from the many major customers of AT&T Communications.

Deregulation at the state level will probably be even more difficult, and AT&T Communications' current approach is to concentrate first on federal deregulation and then on a state by state reduction in the level of regulatory oversight. Before Jan. 1, 1984, AT&T Communications offered only interstate services and was only subject to FCC oversight. As a result, it is totally new to state regulation.

However, AT&T Communications' first concern is early FCC approval of its new tariff filing. It wanted to implement these tariffs by Jan. 1, 1984. Because of the complexity of the proposed tariffs, the FCC pushed that date back to April 3. At that time, AT&T Communications will begin a three-year effort to fight the competition head to toe.

Beginning in 1984 and continuing for a period of six years, the FCC will incrementally eliminate the $11 billion to $12 billion in annual subsidies that have traditionally gone from toll services to local telephone companies by increasing customer payments. In 1984, the local telephone companies will recover 40% of interstate nontraffic sensitive costs from customers in the form of a customer access line charge. The remaining 60% will be recovered from the interexchange carriers through the imposition of interstate access charges. However, the FCC mandates that the customer recovery must grow from 40% to 100% over the next six years, while the interexchange carrier recovery will diminish to zero.

The current pricing advantages of AT&T's competitors will erode over the next three years, assuming that Congress fails to act. Over that period, AT&T Communications has to pay the local telephone companies a premium. The reason behind this is that AT&T Communications enjoys superior connection capabilities. The premium is designed to give AT&T Communications' competitors a discount of 35% in 1984, 23% in 1985 and 12% in 1986. It will be terminated on Aug. 31, 1986, when the local telephone companies must provide equal access to all interexchange carriers.

The competitors are concerned that their costs are bound to rise over the next three years, while AT&T Communications' costs will fall dramatically. In the predivestiture environment, the Long Lines Division shouldered the vast majority of the subsidy flowing from toll to local service. Long Lines paid this subsidy on the separations and division of revenues process. The competitors paid for access to the local exchange companies based on the Exchange Network Facilities for Interstate Access (Enfia) tariffs, which were about 45% less than Long Lines' comparable costs. This equated to an average charge of 15 cents per minute for AT&T, but only 5 cents per minute for its competitors. This gap allowed the competitors to charge users less than AT&T for long-distance services.

In 1984, however, all of this will change. AT&T's competitors will have to pay a local exchange access of approximately 7 cents per minute, while AT&T Communications will pay a tariff of between 8 and 9 cents a minute.

There is a distinct danger that some of the competitors may be forced out of business. They are attempting to fight the implementation of AT&T's new tariffs, the deregulation of AT&T Communications and the elimination of the favorable Enfia tariffs.

Although H.R.4102, the Universal Telephone Service Preservation Act, has already been passed by the full House of Representatives, and its companion measure, S.1660, has been approved by the Senate Commerce Committee, it is unlikely that a single measure will emerge in the near future.

If enacted, bills such as H.R.4102 and S.1660 would significantly weaken the competitive position of AT&T Communications. They abolish the $2 and $6 per month customer access line charges for residences and single-line businesses, perpetuating the subsidies that AT&T Communications would have to pay to the local telephone companies. In addition, they perpetuate — at least for now — the Enfia tariffs, giving AT&T's competitors a 45% discount on the offering of interstate telecommunications services. This is substantial compared with the 35% discount going down to zero over the next three years.

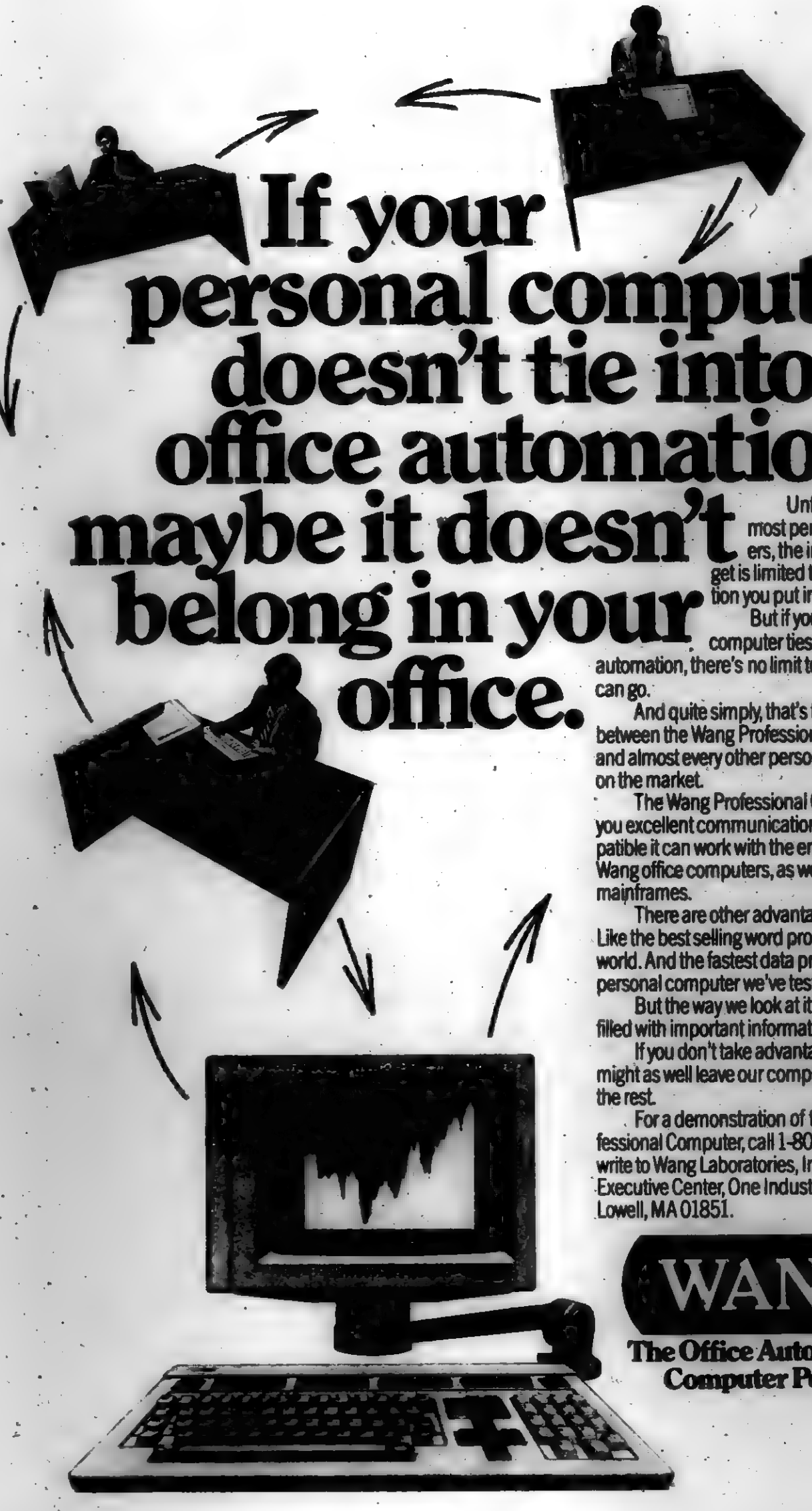
Sen. Howard Baker (R-Tenn.), the Senate leader, has promised that he will bring S.1660 to the floor of the Senate as soon as possible in January. But it is understood that the White House — which is strongly opposed to legislation weakening AT&T's competitive position — has instructed him to stall in order to kill any legislative initiative in 1984.

As a consequence, it appears that the possibility of legislation being passed in 1984 has been substantially reduced. The best time to get a bill through was before the Christmas recess. Once this failed, it gave AT&T Communications additional time to mount a massive lobbying effort against legislation.

The future looks good for AT&T Communications.

Assuming early implementation of its tariffs and no legislative restrictions on its operating flexibility, AT&T Communications will remain the dominant long-haul telecommunications carrier. Its competitors had better look out — the future for them is going to be hazardous and risky. ■

Pearce is president of Information Age Economics, Inc., Washington, D.C.



If your personal computer doesn't tie into office automation maybe it doesn't belong in your office.

Unfortunately, with most personal computers, the information you get is limited to the information you put in.

But if your personal computer ties into office automation, there's no limit to how far you can go.

And quite simply, that's the difference between the Wang Professional Computer and almost every other personal computer on the market.

The Wang Professional Computer offers you excellent communications. It is so compatible it can work with the entire family of Wang office computers, as well as most mainframes.

There are other advantages, of course. Like the best selling word processing in the world. And the fastest data processing of any personal computer we've tested.

But the way we look at it, your office is filled with important information.

If you don't take advantage of it, you might as well leave our computer home with the rest.

For a demonstration of the Wang Professional Computer, call 1-800-225-9264. Or write to Wang Laboratories, Inc., Business Executive Center, One Industrial Avenue, Lowell, MA 01851.

WANG

The Office Automation Computer People.

CC2

© 1983 Wang Laboratories, Inc.

Computerworld
On Communications

DEATH OF THE RESELLERS?

BY DON GOODING

Resellers were born from regulatory changes, and most will eventually perish from regulatory changes. The long-distance resale business began in 1981, when the Federal Communications Commission (FCC) allowed AT&T's Wide Area Telephone Service (Wats) and Message Toll Service (MTS) to be resold. About 200 resale common carriers, or resellers, are providing long-distance communications service today, with more companies entering the business each week. In spite of the recent entrepreneurial boom, though, resellers face an uncertain future. The Yankee Group expects only 20 to survive until 1988, with many facing potential extinction in the next two years — unless Congress comes to the rescue.

Resellers differ fundamentally from AT&T and other common carriers such as MCI Communications Corp.; they do not have networks. Instead, ▶

DEATH OF THE RESELLERS?

they resell the other carriers' network facilities, primarily AT&T's Wats facilities, but also private lines and switched services (see figure on Page 14). This distinction is beginning to blur since other common carriers such as MCI also resell Wats, and a number of resellers are building their own microwave and satellite links. In general, though, resellers can be characterized as packagers and resellers of others' networks.

Two conclusions can be drawn about the current and future state of the resale industry. First, the reason for the existence of resellers is, at least partially, the artificial gap between low-cost interstate private lines and Wats and higher cost MTS services. Resellers make their living marking up wholesale prices and selling services to users that could not economically use the same services if bought directly from AT&T.

Second, the gap between wholesale and retail prices will narrow in the future. Resale common carriers must develop distinctive services and build capacity in order to survive in the long term.

Four sets of issues will have direct bearing on the future success of the alternative carriers. These are:

- Divestiture;
- Entrance Network Facilities for Interstate Access (Enfia) and access charges;
- Federal and state regulation;
- Rate restructuring.

The Modified Final Judgement between AT&T and the Justice Department, issued last Aug. 11, stipulates that all long-distance carriers must be treated equally by the divested Bell operating companies. All central offices must offer nationwide equal-quality interconnection to the operating companies by no later than Sept. 1, 1986.

Many Bell operating companies will offer equal access to other common carriers and resellers much sooner than that, especially in major metropolitan areas, although rural areas may not see equal access until 1990.

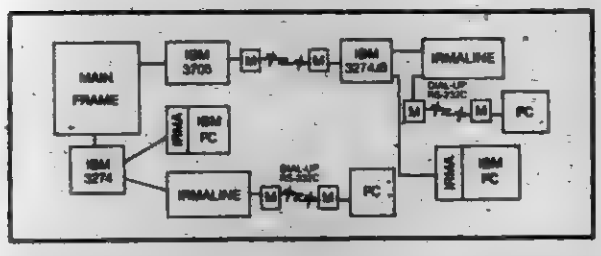
The most important change for resellers will be dialing parity. Instead of dialing up to 15 digits to access long-distance lines, resell customers will have to dial only four. Here's how it works: The operating companies will offer what they call "10XX" access to interexchange carriers. Under this scheme, all users will dial 10, but the next two digits dialed — the XX part of 10XX — will connect the user with one of up to 99 carriers.

In order to access customers, resellers are dependent on the facilities of local telephone companies. The price the alternative carriers should pay for these local facilities has been hotly debated since the industry's inception.

Local loop use is currently paid for under the Enfia tariffs filed by Bell and independent operating companies. Pure Wats resellers are not subject to Enfia tariffs, since the Wats rates already incorporate a subsidy for the local loop. However, since most large resellers use satellite and

The reason for the existence of resellers is, at least partially, the artificial gap between low-cost interstate private lines and Wats and higher cost MTS services. But the gap between wholesale and retail prices will narrow in the future.

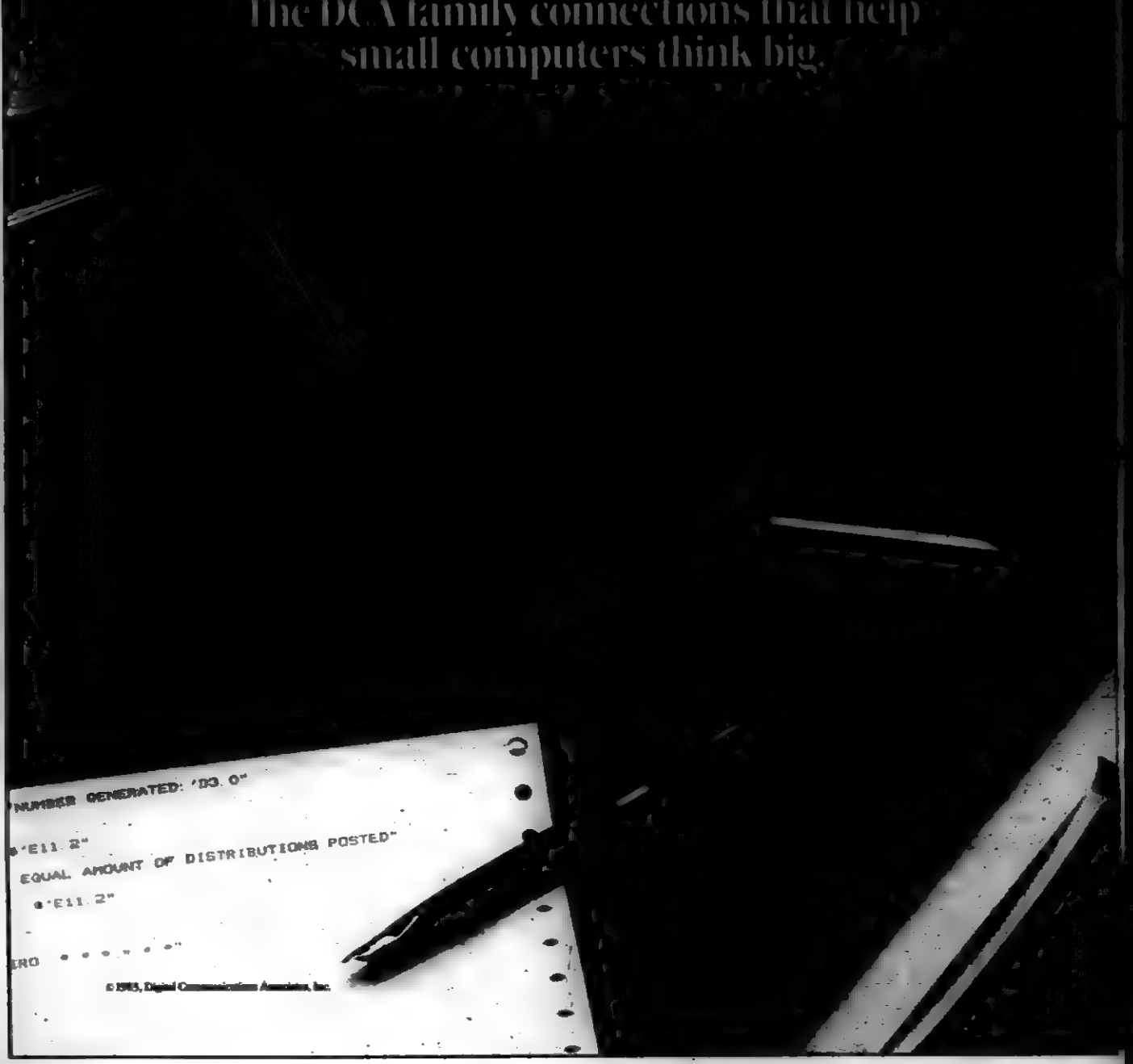
Here are two beautiful ways to get small computers on line with the mainframe quickly, easily and economically—yours from DCA, home of the industry's first coaxial cable links between small computers and IBM 3270 networks.



IRMA™ is the Decision Support Interface™ that gets IBM Personal Computers and IBM PC XTs into the 3270 mainstream via direct attachment to 3274 or 3276 controllers.

IRMA, IRMALINE, and Decision Support Interface are trademarks of Digital Communications Associates, Inc.

IRMA and IRMALINE.
The DCA family connections that help small computers think big.



FX lines, they are subject to Enfia for traffic routed to those services. The current rate is approximately $234 per month per line.

The FCC has developed a system of access charges that will replace Enfia and the separations and settlements procedures formerly used to provide a toll-to-local subsidy for the telephone companies.

The proposed charges, known collectively as carrier access elements, were filed on Oct. 3, 1983 and are scheduled to take effect on April 3, 1984. As a result of these new charges, end users will pay access charges, but the bulk of the local loop costs will still be borne by the interexchange carriers.

The proposed rates in some states not pooled with the ECA are triple the ECA rate. Interexchange carriers should examine the justification for these rates closely and challenge them if errors are found.

AT&T also filed new tariffs for all of its services last Oct. 3, and those are also scheduled to be implemented this April 3. These tariffs will be examined later in this article.

The carrier access elements — which do not apply to pure Wats resellers or resellers of MTS or Wats-like services — are divided into four categories. These are common line, end office, transport and other. The last category will not be discussed in this article.

■ *Carrier common line charges.* Every interexchange carrier will pay a per-minute charge for use of the local loop at each end of an interstate call. The carrier common line charge for AT&T will be 4.61 cents per minute at each end. Other common carriers — including MCI, GTE Sprint Communications and resellers such as U.S. Telephone Communications, Inc. — will receive a 35% discount off that amount. Every Bell and independent telephone company will charge the same rate, as their costs and revenues will be pooled by the Exchange Carriers Association (ECA). However, for the other three carrier elements, rates can and will vary significantly from state to state.

■ *End office charges.* The end office charges include elements for line termination, local switching and intercept. These charges add up to roughly 1.5 cents per access minute or 3 cents per conversation minute. Resellers and other common carriers except AT&T Communications will receive a 35% discount on the switching elements, at least until equal access is implemented.

■ *Transport charges.* A major cost disadvantage for resellers will come from the transport charges. These rates cover the cost of delivering an interstate call from the rate center in which the customer is located to the rate center in which the interexchange carrier's closest point of presence is located. The rates vary with mileage; for example, a reseller will pay .44 cents per minute to serve customers less than one mile away from its switch, but will pay 1.26 cents per minute for customers 20 miles away.

The proposed rates in some states not pooled with the ECA are triple the ECA rate. Interexchange carriers should examine the justification for these rates closely and challenge them if errors are found.

IRMALINE does the same for remote IBM PCs, IBM PC XTs, Apple Lisas and DEC Rainbows, among others, with just a local phone call to a nearby 3270 controller.

Both can go to work literally minutes out of the box. Both provide mainframe data access, selection and storage, and data communication back to the mainframe.

Put first things first. Find out more about the DCA first family of 3270 micro/mainframe connections. For information, write DCA, 303 Technology Park, Norcross, Georgia 30092. Phone (404) 448-1400, TLX 261333 DCA ATL. Or call us toll-free (800) 241-IRMA.

The new home of IRMA, IRMALINE and the rest of the TAC family.

dca Digital Communications Associates Inc

IBM PC and IBM PC XT are trademarks of International Business Machines Corporation. Apple and Lisa are trademarks of Apple Computer, Inc. Rainbow is a trademark of Digital Equipment Corporation.

DEATH OF THE RESELLERS?

An extra 2 or 3 cents per minute could severely decrease a reseller's profit margin.

Some of the proposed access rates filed are averaged across the country, meaning they are the same in every area of the country even though costs of service may vary from one area to another. Carrier common line charges are an example of this phenomenon.

Other access rates are averaged among a pool of telephone companies, and others are averaged within a study area. In most cases, this area is a telephone company's operating area within a single state.

Rates may be deaveraged in 1985 and beyond. Deaveraging closes the gap between charges and costs by allowing carriers to charge rates that compensate for costs in any given area. For example, carrier access elements could be charged in accordance with the time of day calls are placed. Such disaggregation was not encouraged for 1984 in the interest of simplicity. Deaveraging access charges could require tremendous amounts of paperwork, greatly increasing the complexity of establishing tariffs.

Federal regulators have been backing away from the resale industry since its inception. The Competitive Carrier Ruling adopted by the FCC in July 1982 endorsed the concept of forbearance for regulating resale carriers. That concept maintains that there will be no active regulation of resellers, but also stipulates that they must provide equal service at equal prices to all customers. The primary result of forbearance is that resellers do not have to file Section 214 applications, which are required for construction of common carrier facilities, and they no longer have to file tariffs.

State regulations are much more important to the resellers' future, since the resale of intrastate service is crucial to the viability of these carriers. Approximately 20 state agencies have allowed the resale of intrastate circuits, and the Association of Long Distance Telephone Companies (Altel), the reseller's trade association, has been working to open up other states.

Measured Wats rates are based on the amount of calling time used. Wats service based on a flat rate is also available. In most states, Wats resale is allowed only after measured Wats is implemented. But there are exceptions. Resale is allowed in Florida, but there has been a cap on the maximum monthly Wats bill of approximately $1,300. Resellers filling up measured Wats beyond that maximum essentially receive free service. This is one reason Florida is a hotbed of resellers.

On Oct. 3, 1983, AT&T Communications filed a 200,000-page proposal covering new rates for every service it offers, taking into account divestiture, access charges and changing costs. Specifically, proposed MTS rates will still be averaged, but charges for them will be decreased by approximately 10.5%, with the largest decrease for longer calls in the 431- to 925-mile band. In addition, proposed AT&T Wats rates will drop by an average of 6.9%, with the biggest savings for heavy Wats users. Proposed private line rates, as a whole, will see increases averaging 15%, although there are significant variations between services.

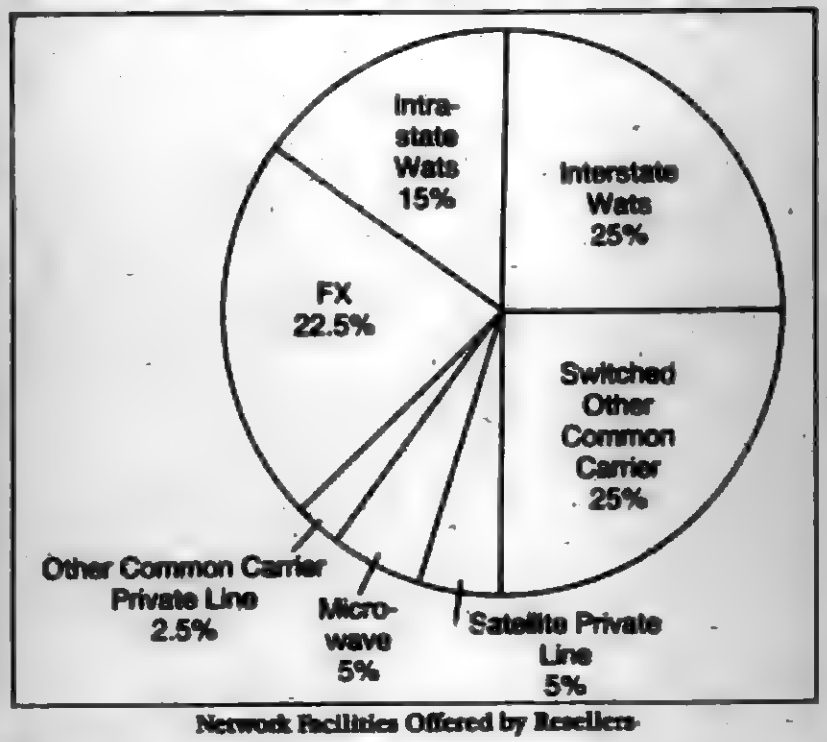
The scheduled implementation date for the proposed rates is April 3. All of them were suspended for investigation, and many are not expected to be approved.

If AT&T's MTS rates remain averaged, as the company has proposed, its night and weekend rates will barely cover the cost of line access — let alone other calling costs — while its business-day rates will produce a healthy profit. In 1984, a marginal increase in late-night traffic volume produces no extra profit (and perhaps even a loss), while a marginal increase in business day traffic is extremely profitable. Until access charges are changed (deaveraged) to reflect time-of-day use, AT&T Communications' marketing strategy will be driven by this price distortion. This can have serious effects on the competition.

Other common carriers and resellers will have to price their services similarly and will be forced to pursue business traffic and shy away from residential traffic. As a rule of thumb, carriers with a higher proportion of residential traffic will be under more earnings pressure than those emphasizing the business market. The impact of Wats rates on users depends on the volume of use. In addition, 20% of all access lines — those used under 10 hours per month — will see rate increases, reflecting the higher flat monthly fee. Users and resellers should note that AT&T did not attempt to increase its nationally averaged local access fee of $31.65 per month — except to add the $25 per month surcharge — because it had insufficient information on what the Bell operating companies would charge. This charge is certain to go up, raising Wats rates from the level filed on Oct. 3.

It is also worth noting that AT&T did not try to eliminate Wats as a service distinct from MTS. While Wats has a reprieve from regulatory scrutiny while the FCC recovers from this year's filings, I believe Wats will eventually be consolidated with MTS — perhaps by 1985, but more likely not until 1986 or 1987.

The FCC has been trying to determine the lawfulness of Wats tariffs ever since they were filed in the early '60s. In its current stage of investigation, the FCC is looking at the potential for a unified public-switched network tariff. While such a tariff would merge Wats and MTS, AT&T has indicated the tariff would include a discount for volume use. Thus, resellers could still receive a discount (although probably a smaller one) even if Wats were merged with MTS — and if AT&T's bulk discount were approved by the FCC.



Network Facilities Offered by Resellers

If AT&T's new tariffs are approved, voice-grade, private-line rates would increase significantly — 25-mile links by 61% and 500-mile links by 18%. Since many resellers use FX lines from AT&T, especially short ones in their regional networks, this rate hike will have a significant negative impact on the bottom line.

I have been anticipating a margin squeeze as a result of the post-divestiture rate changes, but the rates filed by the Bell operating companies and by AT&T Communications indicate a somewhat less severe impact than expected.

There are several negative factors involved:

- The price differential between the bulk capacity purchased (private lines and Wats) and the primary competing service (MTS) has been narrowed, slightly in the case of Wats and severely in the case of private lines.
- Resellers' regional traffic patterns require short private lines, for which the proposed rate increases were the highest.
- The carrier common line usage charge will significantly raise the cost of local access for companies reselling more than just Wats — for example, most large resellers.
- The local transport component of access charges will hit resellers and other common carriers hard, because they have few points of presence and a longer average distance between their switches and their customers.
- AT&T pricing does not cover the cost of access for marginal night and weekend calls, forcing resellers and other common carriers to base their pricing on accurate estimates of their time-of-day traffic mix.

The factors on the positive side are:

- Heavily loaded Wats lines would see rate decreases of about 10%, very close to the average MTS price cut of 10.5%.
- Transport circuits will be available at a slightly lower monthly rate than private lines for resellers that have the technical expertise to support them.

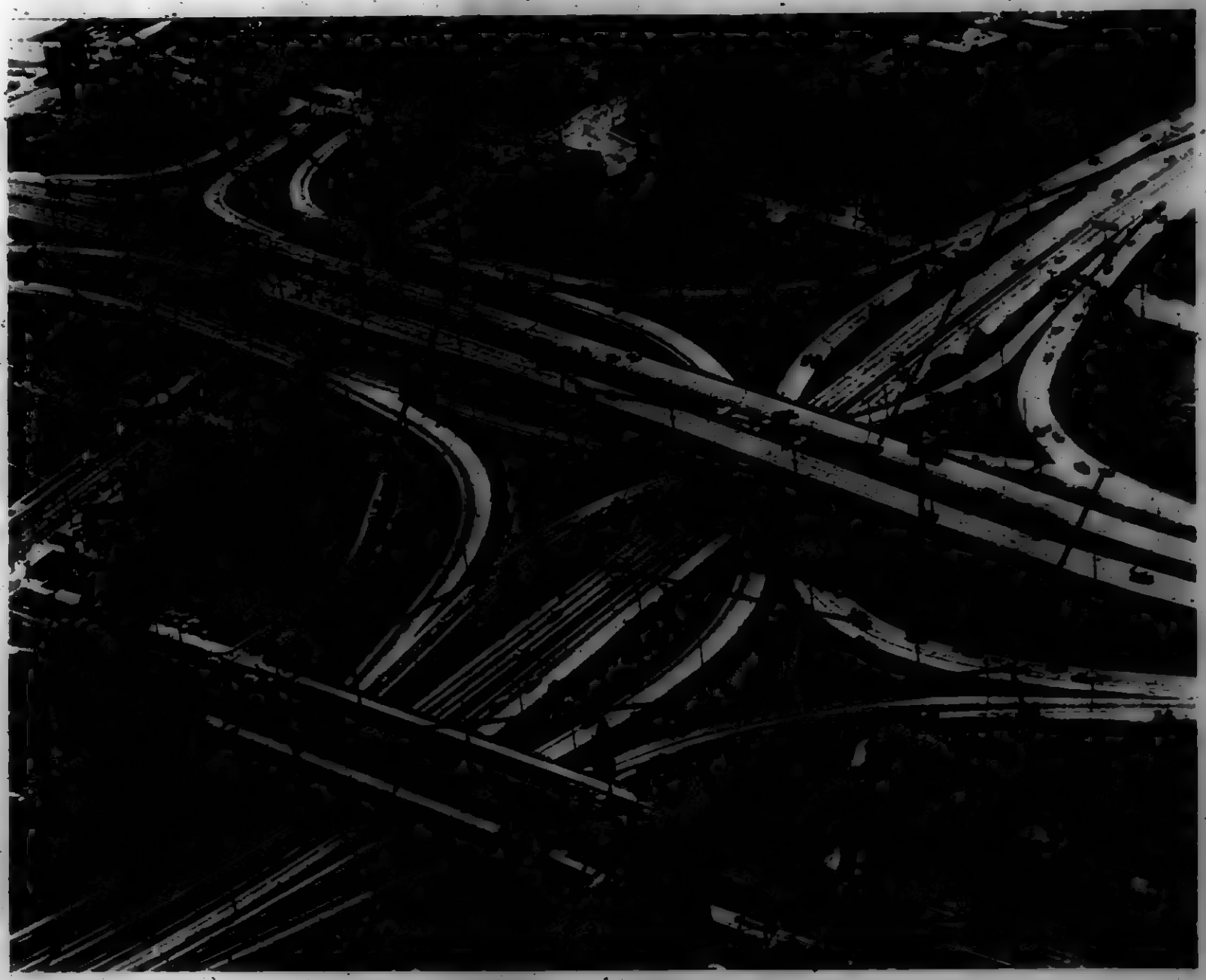
Overall, I expect that resellers' profits will be tightly pinched, if not entirely eliminated in many cases. The resellers that will suffer the least are those with an all-business customer base, with mostly resold Wats in their networks, with national versus regional calling patterns and with the expertise to perform end-to-end private-line support.

Perhaps the rates AT&T and the Bell operating companies file for intrastate communications will be even more significant. Resellers such as U.S. Telephone generate 40% or more of their revenue from intrastate communications. In this case, the news could be even worse for resellers — significant Wats rate increases relative to MTS and carrier access charges similar to those for interstate access. What conclusion can be drawn? Rough times are ahead for resellers, although niches still exist for those that can live on very slim margins.

Of course, all of this discussion is moot if our senators and representatives decide that it is time to put their footprints on the face of the industry. Communications legislation passed by the House of Representatives would eliminate the residential access charge and maintain Rnfia rates until equal access is implemented. Such a move would wipe out the decrease in AT&T's MTS and Wats rates, and perhaps even force a small rate increase. In addition, the drastic increase of resellers' local access fees would develop only with equal access implementation.

In short, resellers will greatly benefit if current legislation becomes law. While the long-term success will still depend on building facilities, resellers could have a financial respite. For resellers, which were born and will perish from regulatory changes, the most critical question now is: What will the Senate and the President do? ■

Gooding is a senior analyst with The Yankee Group, Cambridge, Mass.



TRAFFICKING IN CELLULAR RADIO TECHNOLOGY

BY GARY W. OZANICH

The next time you rent a car in Chicago, you have the option of conducting a business meeting from the middle of a freeway. The Chicago Metropolitan Statistical Area (MSA) has the first cellular radio telephone service, and the major car rental companies are among the first to install cellular phones or transceivers in a limited number of their luxury cars. Cellular radio provides mobile telephone service that is virtually indistinguishable from land-line service and is interconnected with the wire network.

Few technologies have been introduced with the fanfare and expectations that have accompanied cellular radio. This service will be available in most of the 30 largest MSAs within the next two years, and, depending on regulatory issues and the technology's success, most other areas of the U.S. should have cellular service by 1987 or 1988.

Whether the current enthusiasm for cellular technology is warranted is a difficult question. Cellular radio's most ardent backers talk of a future with cellular wrist-phones and briefcase telephones or of cellular as the ultimate bypass technology. Skeptics argue that cost considerations and competition from other forms of mobile communications will mean that the service will only be used by business executives in limited applications.

It is complicated to provide a realistic view of cellular radio because of numerous areas of uncertainty. It is necessary to consider the technology itself, state and federal regulations, cost and demand, competing technologies and rural vs. urban applications.

Cellular mobile radio is designed ▶

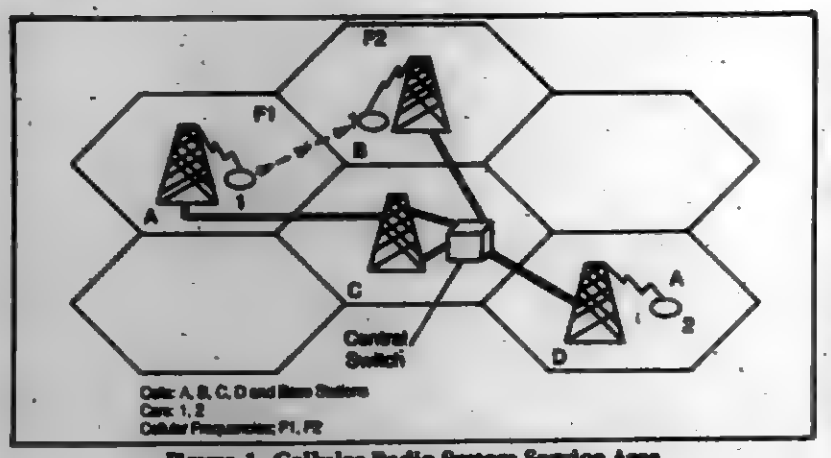


Figure 1. Cellular Radio System Service Area

to replace Improved Mobile Telephone Service (IMTS). IMTS uses 44 VHF radio channels to interconnect wireless mobile telephones with wireline telephone service. Wireline companies include the Bell operating companies and any independent telephone operating companies. IMTS uses an omnidirectional signal to service an area with a radius of up to 75 miles. It is fraught with problems such as high cost, signal degradation and limited capacity.

The issue of limited capacity is significant. With a limited number of frequencies being used to cover a wide area, there are severe constraints on the number of calls an IMTS service is able to handle. For example, New York Telephone's IMTS service for the metropolitan New York area can handle a maximum of 23 calls simultaneously. Thus, IMTS users experience long waits for open lines.

Cellular radio provides a solution to the capacity problem through a frequency reuse scheme. As shown in Figure 1, a cellular radio system divides a service area into several smaller cells. In actual implementation, the cells do not have the hexagonal shape shown in Figure 1. Each cell site contains a base station, consisting of low-power transmitters, receivers and control equipment. Each base station transmits only within its cell on preassigned frequencies. Spectrum management is achieved because the same frequencies are used by nonadjacent cells.

The base stations are connected to a central switching office. This switching office routes and tracks the cellular traffic. If a cellular phone is being used in a moving automobile, the signal is handed off from one cell to the next through the use of this centralized switch.

Cellular radio uses 40 MHz of spectrum (formerly used for UHF television channels 70 to 83) for service. These provide for a total of 666 channels, some of which are used for control circuits. The capacity of the system is technically unlimited: Cells may be subdivided into smaller cells while the power of transmission is decreased.

The number of cells in a particular service area will vary depending on use. Typically, a large metropolitan area will have from 12 to 18 cells, while a rural community may only have one or two cells. This variable cell size provides system operators with the opportunity to manage the cost of system operation by matching system size with demand.

The telephones vary somewhat in design, price and enhanced features, but their technical specifications are standard. Technically, there are two classes of phones: mobile phones, which are physically attached to an automobile; and portable phones, which have an internal power source and antenna. The portable units are extremely streamlined and include phones that can fit in the inside pocket of a suit coat.

In Chicago, the purchase price of a cellular phone is $2,600. A phone may be leased for $110 per month, including a buy-out option for $300 in 36 months. In addition, there is an installation fee of $200. Besides these costs, subscribers pay a monthly flat charge of $50, and an air time charge of 40 cents per minute from 7 a.m. to 7 p.m. and 24 cents per minute from 7 p.m. to 7 a.m. In all, cellular service costs roughly $12 to $15 per business day. In the intermediate term, costs will vary based on hardware pricing, system pay-back and tariffing.

Cellular radio is licensed by the Federal Communications Commission (FCC), with tariffing involving both federal and state policies. The FCC has been investigating the possibility of cellular radio since 1968. In 1971, Bell Laboratories detailed the technical aspects of cellular radio in an FCC filing. In 1977, two test systems, one in Chicago and one in the Baltimore and Washington, D.C. area, were authorized. In April 1981, the FCC established a nationwide allocation scheme for cellular radio systems.

In developing this licensing scheme, the FCC did not expect cellular radio to become the investment gold rush of the '80s. Each MSA, known as a Cellular Geographic Service Area (CGSA), will have two 20-MHz cellular sytems. One license is reserved for a local wireline company — for example, the local telephone company. The second will go to a non-wireline company. The wireline company is mandated to provide the non-wireline company with equal access to the local telephone exchange. In addition, each of these systems are mandated to provide access to resellers. These resellers will market their own hardware and service.

The FCC has already accepted applications for the 90 largest MSAs. Figure 2 summarizes the number of applicants for both wireline and non-wireline licenses. The reason that there are more applicants in markets 31 to 90 than in markets 1 to 30 is related to the staggered license schedule established by the FCC. The applications for the larger markets were accepted first, and the gold rush mentality has resulted in more applicants for subsequent markets.

The number of applicants for the licenses has resulted in a serious threat to expediting service and providing a competitive environment. In allocating the license, the FCC is faced with holding a full comparative hearing for

Markets	Wireline	Non-Wireline	Total
1 to 30	52	142	194
31 to 60	70	330	400
61 to 90	83	484	567
Total	205	956	1,161

Figure 2. Number of Applicants for Licenses

SPECIAL INTRODUCTORY OFFER FOR NEW SUBSCRIBERS. SAVE $5.00, PAY ONLY $39.00 FOR A FULL YEAR'S SUBSCRIPTION.*

(Basic Annual Subscription Rate is $44.) *U.S. ONLY

No Other Publication Gives You SO MUCH Timely News, Money-Making Ideas & Management Information— ***PLUS*** *Specials & Bonus Issues!*

As a weekly newspaper, ***COMPUTERWORLD*** gives you thorough and timely coverage of news and ideas of interest to computer users in industry, business, government and education. Unlike monthlies, ***COMPUTERWORLD*** covers *hundreds* of relevant news items *each week*. *But beyond the "news" you get much more as a CW reader:*

- Weekly "In Depth" articles.
- Monthly "Special Reports" on selected subjects.
- ***COMPUTERWORLD BUYER'S GUIDE SERIES*** . . . a comprehensive series of product-specific lists and up-to-date information on each major product area.
- ***COMPUTERWORLD OA*** with incisive coverage of office automation.
- ***COMPUTERWORLD ON COMMUNICATIONS*** covers product and system developments in the rapidly changing communications field.
- **PLUS** Other Special Issues Throughout The Year!

SUBSCRIBE NOW

Complete Form On Reverse, Then Return In Attached Postage-Paid Envelope. Or Use Your Charge Card and Call TOLL-FREE: 1-800-343-5730

☐ **Please enter my subscription (details on back)**

☐ **I'm already a subscriber, but I'd like you to change my:**

☐ address ☐ title
☐ industry ☐ other

Put old label or label information here

My current mailing label is attached and I've filled in new information on the other side.

COMPUTERWORLD

Please send me COMPUTERWORLD for one year. RATES: United States ~~$44~~;
Canada, Central & South America $110; Europe $165;
All Other Countries $245 (Airmail Service)

Special Introductory Offer
Only $39.00 Save $5.00

☐ Check Enclosed
☐ Am Ex ☐ BA/Visa ☐ MC (MC Only - List four digits above your name)

If charge we must have cardholder's signature: _____ Expiration Date: _____

First Initial	Middle Initial	Surname	
Your Title			
Company Name			
Address			
City		State	Zip Code

Address shown is:
☐ Business
☐ Home

☐ Check here if you do not wish to receive promotional mail from *Computerworld*.

☐ Check here if you're interested in receiving information on *Computerworld*'s Index.

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

CIRCULATION DEPT. 375 Cochituate Road, Rte. 30, Box 897,
Framingham, MA 01701-9985

Detach here, moisten and seal envelope securely before mailing.

1. BUSINESS/INDUSTRY (Circle One)
End Users
10 Manufacturer (other than computer)
20 Finance/Insurance/Real Estate
30 Medicine/Law/Education
40 Wholesale/Retail Trade
50 Business Service (except DP)
60 Government—State/Federal/Local
65 Public Utility/Communication Systems/Transportation
70 Mining/Construction/Petroleum/Refining
75 Other User _____
Vendors
80 Manufacturer of Computers, Computer-related Systems or Peripherals
85 Computer Service Bureau/Software/Planning/Consulting
90 Computer/Peripheral Dealer/Distributor/Retailer
95 Other Vendor _____

2. OCCUPATION/FUNCTION (Circle One)
11 President/Owner/Partner/General Manager
12 VP/Assistant VP
13 Treasurer/Controller/Financial Officer
21 Director/Manager/Supervisor DP/MIS Services
22 Director/Manager of Operations/Planning/Administrative Services
23 Systems Manager/Systems Analyst
31 Manager/Supervisor Programming
32 Programmer/Methods Analyst
35 OA/WP Director/Manager/Supervisor
36 Data Comm Network/Systems Mgmt
41 Engr/Scientific/R&D/Tech Mgmt
51 Mfg Sales Reps/Sales/Marketing Mgmt
60 Consulting Mgmt
70 Medical/Legal/Accounting Mgmt
80 Educator/Journalist/Librarian/Student
90 Other _____

3. COMPUTER INVOLVEMENT (Circle all that apply)
Types of equipment with which you are personally involved either as user, vendor or consultant
A. Mainframes/Superminis
B. Minicomputers/Small Business Computers
C. Microcomputers/Desktops
D. Communications Systems
E. Office Automation Systems

each market. With this procedure, all applications must be scrutinized in a formal adjudication with the license ideally going to the most suitable applicant. This process is costly, both in time and dollars.

The FCC's response to the overwhelming number of applicants for the 90 largest markets is to encourage joint ventures — termed settlements — between the applicants. Since there are relatively few telephone companies in each MSA, there are far fewer wireline applicants than non-wireline. As a result, in most situations, the wireline companies will be granted a construction permit and operating license before the non-wireline companies because of their mutual interdependence and alleged ability to settle on joint ventures quickly. This is known as the head-start problem of cellular service.

The economic effects of a wireline head start are still being hotly debated. It has been argued by some that, with limited demand at current prices, wireline companies will garner most of the available business.

This complicated issue involves not only the length of the head start but also pricing considerations and the role of resellers. One impact of a threatened head start is a result sought by the FCC: Non-wirelines are quickly negotiating settlements.

As indicated, markets 31 to 90 have far more applicants than markets 1 to 30. This severely impacts the ability to establish joint ventures. In these markets, the only approach appears to be hard-driving litigation to chase out unqualified applicants followed by settlements by remaining applicants.

On March 1, 1984, the FCC will begin accepting applications for markets 90 and beyond. This date could still be delayed. A tremendous influx of applicants is anticipated. On Oct. 6, 1983, the FCC announced that it was seeking comments on a proposal to allocate these licenses using a lottery as opposed to full comparative hearings. This has created an uproar among some applicants and their legal representatives.

An analysis of the FCC announcement suggests that the FCC is exploring the use of a lottery for three reasons: to expedite the introduction of service in the face of a tremendous number of applications, to force applicants to think twice about submitting a license due to risk and to force settlements among the applicants. This announcement can also have a detrimental effect on the licensing process, as it may attract some less qualified applicants willing to take a chance in a cellular casino.

If the FCC does move to a lottery, there is a significant probability of a court reversal upon appeal. The treatment of all applicants as equals is likely to be considered an arbitrary decision by some because it allows the smallest, most ill-prepared companies to share an equal footing with the largest and best prepared firms.

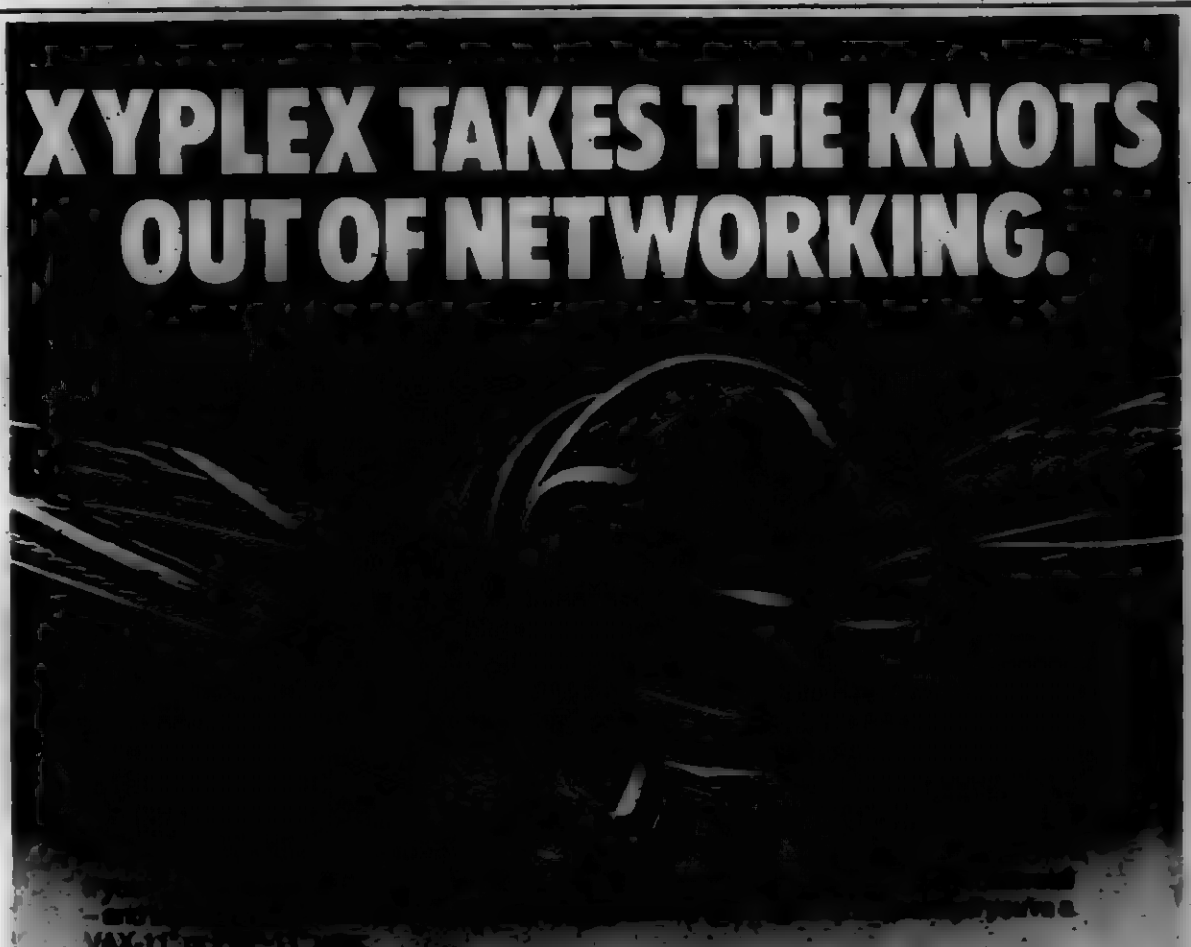
The FCC is exploring the use of a lottery for three reasons: to expedite the introduction of service in the face of a tremendous number of applications, to force applicants to think twice about submitting a license due to risk and to force settlements among the applicants.

A final regulatory issue is state regulation. After the AT&T divestiture, cellular radio will be offered by the regional Bell operating companies. As currently configured, cellular rates will be set at the state level, but some tariffing will also involve federal policy.

Following the Bell breakup, state regulators will be under significant pressure to find new revenue sources to subsidize residential telephone service. Cellular radio seems a likely target, as it is viewed as an enhanced service and will primarily be used for business purposes. Some analysts have predicted that cellular radio service will be tariffed to provide subsidy revenues. This would likely occur through the interconnect charges into the local loop.

At the federal level, there is significant debate about how cellular fits into the access charge scheme. As current policy is read, cellular may be subject to the same access charge as long-distance carriers such as MCI Communications Corp. and GTE Sprint Communications.

XYPLEX TAKES THE KNOTS OUT OF NETWORKING.



VAX-11* or PDP-11* user.

Featuring state-of-the-art technology, the XYPLEX System untangles the complexity that bogs down other integrated data communication systems.

A single coaxial cable will never tie you up.

Using XYPLEX locally, a single common cable can extend up to 32,000 feet and connect over 1,500 terminals . . . and personal computers with over 50 computer systems. Because you use less cable, your computer gains more space for more important data processing tasks at a much lower cost.

"Smart" hardware and software connections give your computer more free time.

With an intelligent microprocessor-based terminal cluster controller and a front-end host interface unit handling nearly all terminal and printer processing, your computer has more time to execute your specific business applications. And since character processing is also unloaded from the host, your terminals can run at their top speed.

So if you're a VAX-11 or PDP-11 user and networking isn't working out the way you'd planned, tie-into the XYPLEX System and see how easy and economical distributed data processing can be.

XYPLEX

XYPLEX Inc.
100 Domino Drive
Concord, MA 01742
617 371 1400

*VAX and PDP are trademarks of Digital Equipment Corp.
XYPLEX is a trademark of XYPLEX, Inc.

Year	New Subscribers	Total Subscribers	Growth Percentage	Monthly Subscription Cost	Yearly Revenues (Millions)	Growth Percentage
1984	15,000	15,000	—	$155	$ 27.9	—
1985	75,000	90,000	500%	$150	$ 162	481%
1986	120,000	210,000	133%	$125	$ 315	94%
1987	230,000	440,000	110%	$100	$ 528	68%
1988	270,000	710,000	61%	$ 85	$ 724	37%
1989	310,000	1,020,000	44%	$ 75	$ 918	27%
1990	340,000	1,360,000	33%	$ 70	$1,142	24%

Source: Link Resources

Figure 3. Cellular Radio Market Forecast

It is difficult to estimate the demand for cellular radio. Many industry analysts and license applicants have been excessively optimistic about the demand for service. The demand for cellular radio is extremely price-sensitive. Since cellular radio costs about $65 to $75 per month, there is virtually no nonbusiness user demand. Considering current prices, cellular radio will attract revenues only from business users.

A crucial element of this price is the telephone itself. The current transceiver cost of $2,600 will drop substantially and rapidly to a price of about $700 to $900. A price of $500 is definitely possible during the next few years. Yet, the high costs of system construction and interconnection will keep cellular radio priced at a premium for the next several years. Figure 3 illustrates Link Resources Corp.'s cellular radio forecast and anticipates price points during this decade.

Even if the price of cellular service does decrease, how profitable will it be? There are two major issues: First, resellers will exert downward pressure on margins. In Chicago, a reseller can lease 100 lines (numbers) from Ameritech Mobile Communications, Inc. for $42.50 per line per month — a $7.50 discount — and receive a 2% discount on air time. The reseller can price the service in any way desirable. As a result, a reseller can potentially import less expensive hardware and put together a lower cost package than a system operator. This will keep downward pressure on prices.

Second, the mobile delivery of voice service does not have sufficient dimensions for product differentiation. It will be difficult to compete on grounds other than price.

As discussed so far, cellular radio has been considered as a product complement to wireline service, a mobile delivery mechanism for voice services. In this mobile delivery arena, cellular radio will meet with a very tough competitor — paging services.

Paging services have been an explosive growth area. The variety of services include tone, voice, numeric and alphanumeric pagers. The FCC is in the process of licensing national paging services to provide for the interconnection of local paging companies.

There are currently about 2.2 million pagers in service. The cost of a pager depends on the type of service, but some types cost below $100 per pager.

In the paging industry, innovation has been impressive. Pagers capable of receiving up to 1,000 alphanumeric characters have been introduced recently. Furthermore, the inclusion of printing capabilities in alphanumeric pagers is anticipated. It may be argued that pagers, particularly alphanumeric ones, are attractive substitutes for cellular services. Much business communications is intrafirm, and paging may be considered both technologically and economically superior to cellular radio in many of these applications.

It is necessary to make one final point regarding the competition of cellular and paging: Cellular radio is an analog technology in an increasingly digital world. For example, alphanumeric pagers will be used as terminals for electronic mail, while cellular radio remains a voice-only service — or at best a potential connection for a modem. It is possible that future generations of cellular telephones will have built-in modems and associated digital communications capability. Currently, however, cellular radio is almost exclusively viewed as a product extension of existing wireline voice services.

Telephone services in rural areas present unique problems. The cost of constructing and installing capital equipment and providing service in thinly populated areas is extremely expensive. Given the AT&T divestiture, the lack of a significant population base over which to amortize costs may be an even greater problem. This breakup parallels telecommunications deregulation that is designed to price goods and services at cost as well as to instigate technological

An average sales call costs $300.

Now you can beat the averages.

You've watched it happen for a long time. Identifying your prospect, getting to him and finally selling him is getting more costly and less efficient.

The Technology Mart at Denver's new International Market Center offers you a profitable alternative to the old, exhausting process. As part of a state-of-the-art exhibit, educational and executive conference facility, the Mart will offer programs designed to attract qualified buyers. It's the one alternative that can lower both your cost per sale and your blood pressure, while supporting existing channels of distribution.

Most importantly, the new mart is strategically located in the heart of a burgeoning 11-state region that stretches from Mexico to Canada. It's a region with a proven growth rate in the consumption of technology products and services. The International Market Center Technology Mart offers an affordable, efficient way to penetrate this deep buyer base.

Leasing rates are most attractive now for late fall 1985 occupancy. To find out how your company can beat the averages, contact Bob Okonski, Vice President Technology Mart, International Market Center–Denver, 7951 East Maplewood Avenue, Suite 300, Englewood, Colorado 80111 (303) 694-1966.

INTERNATIONAL MARKET CENTER In Denver

Incomparable. World Class. At last.

A development of The Bill L. Walters Companies

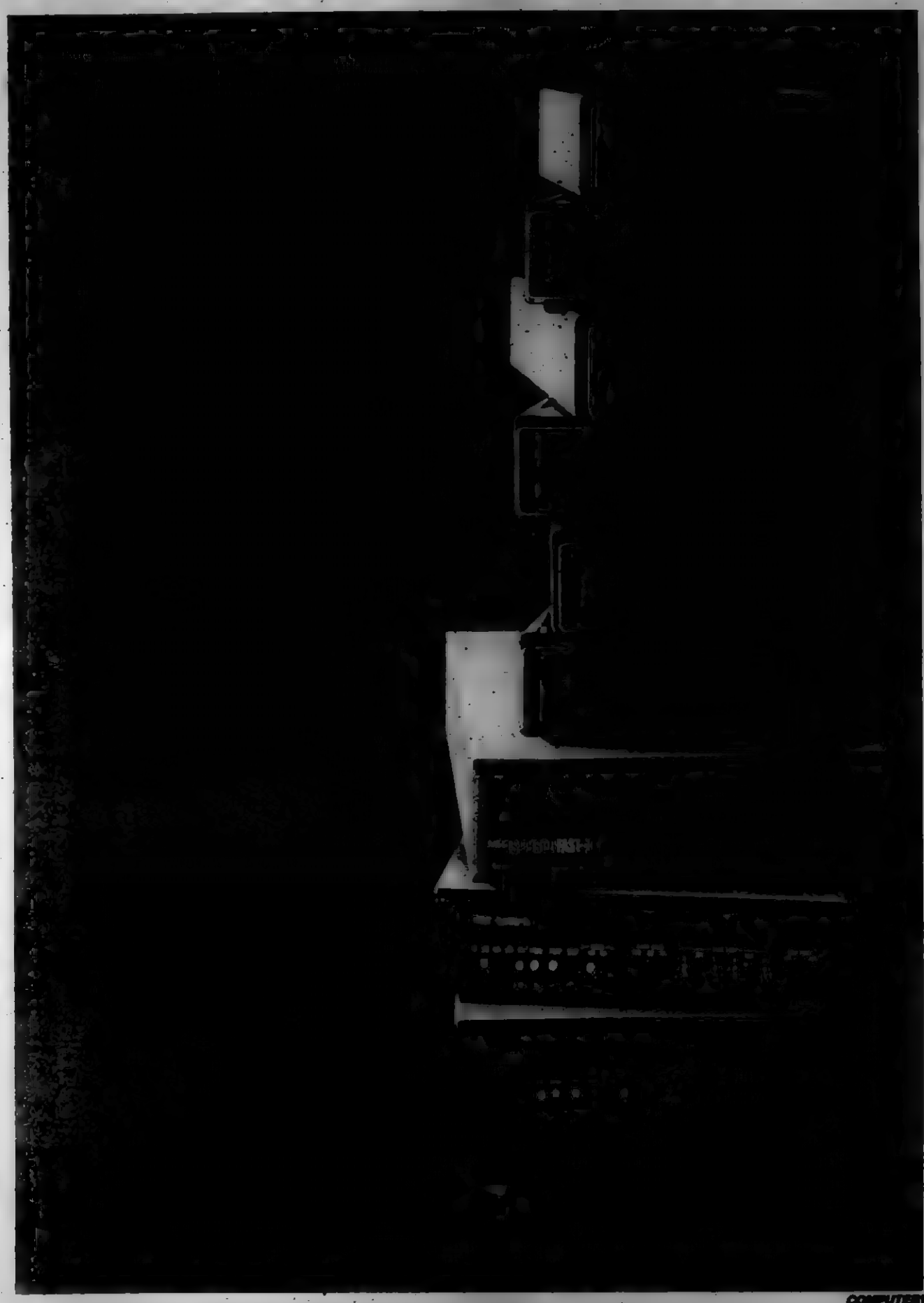
progressiveness. In this environment, rural areas will lose some cross-subsidies, and in most areas, standard telephone rates will increase substantially.

The cellular radio technology could provide a relatively low-cost means of providing rural telephone service. A one- or two-cell system may be lower in cost than a wireline network. However, the current price of the cellular telephone still makes the technology an unsuitable substitute for wireline service. As the price of cellular hardware decreases, a unique opportunity for this wireless service may exist in rural markets as a bypass technology.

THERE IS NO QUESTION that cellular radio is a technology of significant utility that will be highly visible in the '80s. It is being introduced into a highly uncertain marketplace, both relative to regulation and economics. During the next several years, the price of cellular radio will limit demand almost exclusively to business users. A rule of thumb would suggest a penetration rate of roughly 1% to 1.5% of the population in the major MSAs during the late '80s. The penetration of cellular radio is difficult to predict in smaller markets, as use is highly correlated to commuting time, as well as industrial development.

The technology itself is highly robust, having the ability to provide unlimited capacity. The cost of the cellular transceivers is likely to fall. The most optimistic cellular analysts see $20 Talkmen wrist-phones. This is theoretically possible, but a context is required to view the future of the cellular industry. This context is one of regulation, interconnection charges and competition. Cellular radio is likely to provide a good return on investment to reasonable system operators who try to be low-cost providers of service through efficient operation. ■

Ozanich is director of the New Electronic Media Program, Link Resources, 215 Park Ave., New York.



For NEC modems, contact your nearest distributor.

ARIZONA
Zeus Distributors
Phoenix, (602) 263-6022

CALIFORNIA
A Datacom Solution
Cypress, (714) 827-8480

Davis & Hanley, Inc.
Hayward, (415) 782-7575

Western Data Group
Walnut Creek, (415) 938-9582

COLORADO
The Hall Company
Littleton, (303) 798-4160

Martec Association
Englewood, (303) 779-8151

FLORIDA
Networks, Inc.
Miami Lakes, (305) 822-6750

GEORGIA
X Point Corporation
Norcross, (404) 446-2764

HAWAII
Data Management Association
Honolulu, (808) 531-5136

IDAHO
Alster Communications
Boise, (208) 362-1272

ILLINOIS
Interbusiness Corporation
Wheeling, (312) 459-8866

MASSACHUSETTS
CSI Systems, Inc.
Lexington, (617) 863-0525

MINNESOTA
B-Com
Minnetonka, (612) 474-3449

NEW JERSEY
Consolidated Data Systems, Ltd.
Bogota, (201) 487-7737

Freidman Associates, Inc.
Union, (201) 964-6200

TRD Distributors
Merchantville, (609) 354-1315

NEW YORK
J.F. Jordan Associates
Huntington, (516) 271-9478

OHIO
Delta Products
Euclid, (216) 731-3537

Gerhard & Associates
Columbus, (614) 488-9251

PENNSYLVANIA
American Datacomm, Inc.
Pittsburgh, (412) 381-1600

W.J. Wisely Associates
Norristown, (215) 539-1217

PUERTO RICO
Codecom
San Juan, (809) 781-9797

TEXAS
The Thorson Company
Austin, (512) 451-7527

The Thorson Company
Dallas, (214) 233-5744

The Thorson Company
Houston, (713) 771-3504

NEC
NEC America, Inc.
Data Communications Products

HARRY NEWTON

BY BRUCE HOARD

HARRY NEWTON

"Can I bum a smoke?" he asks a woman. He decides they will share an ashtray on the empty seat next to her. "Sharing an ashtray is like time division multiplexing," he notes. With Harry, telecommunications is a metaphor for life.

The primary objective of Harry's European trip was the Telecom '83 conference in Geneva, and he recalls his experiences there with enthusiasm. AT&T spent $12 million on its booth, he says, pacing up and down the aisle. The Russians spent $5 million on theirs. "And the Bulgarians have the best coin telephones in the world."

"Can I bum a smoke?" he asks a woman in the third row. Abashed, she hands him a cigarette. He decides they will share an ashtray on the empty seat next to her. "Sharing an ashtray is like time division multiplexing," he notes. With Harry, telecommunications is a metaphor for life. Tilting his head back and blowing smoke out his nose like a locomotive, he gets back into Europe and coin telephones. The Louvre has lots of paintings, but no coin telephones. He claims to have rented a telephone book in Paris. "Now I know why they want to replace their telephone books — there aren't any," he declares.

He makes more declarations: Videotex is good for "such useful things as getting the weather in northern Scotland." The West German government only allows TV between 4 p.m. and 11 p.m. Geneva pay toilets flush automatically when you stand up and break an electronic beam. On and on. Rapid fire. Harry in Europe.

His gray hair tousled, he pauses and twists, switching gears. "Let's talk about the industry. Where we're going is incredible."

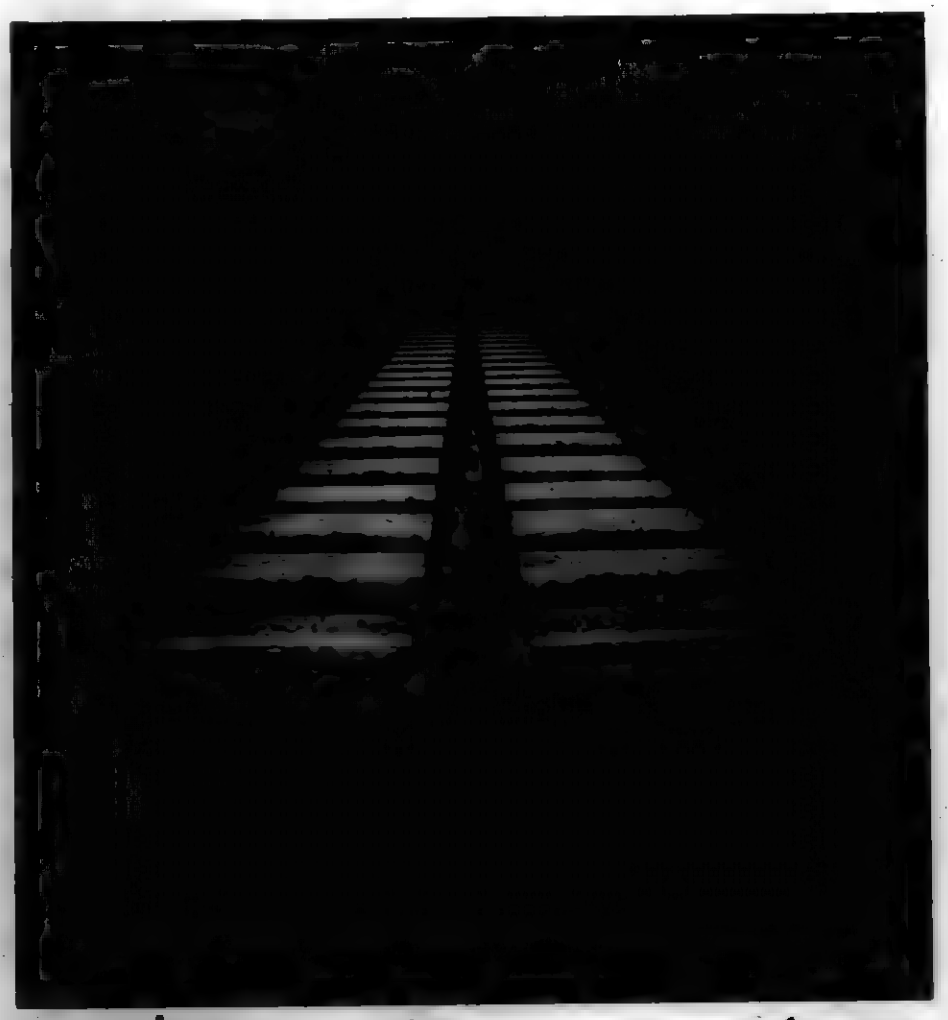
But then, abruptly back to Europe. He tried to hook the modem in his 1,200 bit/sec Radio Shack TRS-80 to a telephone line. No luck. Next memory: John deButts, the former chairman of AT&T, is now running European Postal Telephone and Telegraphs, the European equivalents of the U.S. Federal Communications Commission. "John deButts doesn't believe in competition — nothing," Harry claims.

Finally, Europe is left behind. "Let's talk about the U.S.," he says, sliding into his "Apostle of Success" role. "This is the right time to be in this business. The opportunities we face in the U.S. today are incredible." Harry, a native Australian turned American citizen, speaks with the zeal of a convert.

His voice takes on a serious tone as he deplores the downtrodden state of communications managers, many of whom are in his audience. There is a palpable mood change as he empathizes with their problems. "You can become entrepreneurs while working for someone else," he says. He mentions two users within large organizations that are making $300,000 in yearly salaries. The message is clear: If they can do it, so can you.

Harry believes that by the end of the decade, there will be an American trillionare, and that person may just come out of the telecommunications industry. "If he can make a trillion, you people can make a few thousand or a few million," he says.

At the age of 41, he has certainly been successful, but refuses to divulge whether he's cracked the million mark. One thing can be said with absolute certainty: When a person



Net/One offers something unique in local area networking. A track record.

In fact, Net/One® offers a number of things unique in local area networking. True vendor independence. Media independence—baseband, broadband, fiber optics, or any combination thereof. Remote bridges and local bridges to interconnect separate Net/One systems—broadband or baseband—between buildings, or between cities, worldwide.

And all this uniqueness becomes even more so when you look at our track record. We not only talk a great network, we've actually been delivering Net/One since July of 1980. Hundreds of our systems are already out there moving information for organizations like Control Data, Caltech, Fairchild, ITT, RCA, Boston University, U.S. Forest Service, and Ford Aerospace.

Let's talk about how to turn the equipment you have now—whatever it is—into the network you want, now, with a network you can have, now. And a network that can take you wherever you want to go from here. Net/One.

Ungermann-Bass, Inc., 2560 Mission College Boulevard, Santa Clara, California 95050. Telephone (408) 496-0111.

Net/One from Ungermann-Bass

© 1983 Ungermann-Bass, Inc.
Net/One is a registered trademark of Ungermann-Bass, Inc.

commands $12,500 for a two-day seminar, as Harry did on his London stopover, he is certainly riding the upside of the wealth curve.

Winding down, he is asked, "What qualifies you to be a telecommunications speaker?"

"Heavy self-promotion."

HIS FULL NAME IS Harry Newton. Period. And on the 30-mile ride into Chicago after lunch, he talks about where he comes from and what he does. He was born in Sydney, Australia in 1941. He lived there for 26 years. He earned economics and accounting degrees at Sydney University before migrating to the U.S. in 1967. He received an M.B.A. from Harvard Business School in the summer of 1969 and has lived in the U.S. ever since. His wife's name is Susan, and he has two children, Claire Elizabeth, who is 3½, and Michael Allen, who is 1½.

He founded his company, The Telecom Library, in 1972. He is president, and the firm publishes and distributes books (among them *The Magic of Becoming Successful* by Harry Newton), conducts seminars and offers consulting services. He is enthusiastic about *Teleconnect*, which was started last March. *Teleconnect* is not your average trade publication. Harry's inimitable touch — and byline — is everywhere. When you get right down to it, it is a Harry Newton tour de force.

In fact, sometimes Teleconnect resembles *Mad Magazine* more than a serious business publication. For instance, an item in last November's edition asked the question "Intel And Hershey To Merge?" And the answer? "Yes, they're merging to produce a 256K chocolate chip."

What kind of person would do these crazy things? He pauses when asked to define himself, looking out of the car window. At last, he has it. "I'd say I'm a high-tech telecommunications intellectual handyman."

This somewhat unwieldy sobriquet is soon followed by another, more lyrical one: "I would call myself an apostle of success."

It might be more appropriate to dub him an apostle/salesman, because his conversation is frequently punctuated with references to sales and marketing. You have to sell yourself, sell your ideas, sell your company. Harry tells a good story about the "self-immolation close," a somewhat apocryphal sales technique whereby a rookie salesman is told he must douse himself with gasoline and threaten to light up if the potential customer does not agree to buy.

Every occupational group should have a Harry Newton. Harry is the patron saint of telecommunications, the exemplar of what can be. He addresses his audience members as if they were family, chiding them and urging them to realize their potential. He really cares for them, but at the same time, he sees their weaknesses. He describes the typical telecommunications professional as "very conservative, unsure of his skills, a little insecure, lacking in formal and informal education and bruised because he is beaten up on by his bosses.

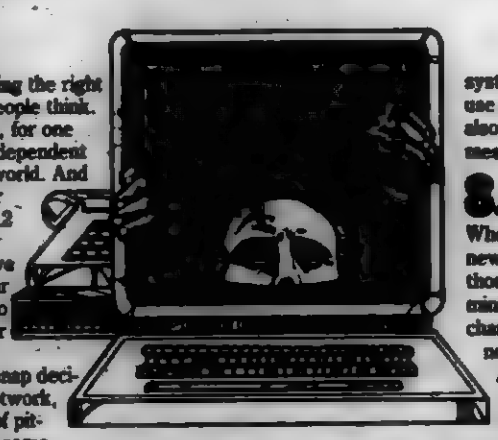
"I feel sorry for them, they're my people, I've known them for years." He says all this slowly, painfully and with compassion.

So how does this flamboyant, cocksure, Harvard-educated company president fit in with these people? He is asked if, when he speaks to them, he feels like the hometown boy that went away to success, only to return and find his friends still toiling at the local mill, locked into a lifestyle that will never change.

"So you see that too?" he replies as the car speeds along.

But Harry doesn't really believe that any of them are locked into

10 PITFALLS TO AVOID IN CHOOSING A PUBLIC NETWORK.



There's more to selecting the right public network than most people think.

How do we know? Well, for one thing, ADP is the largest independent computing company in the world. And when we built Autonet—our public data network—over 12 years ago, we did it right.

For another thing, we've listened very carefully to our clients. Especially those who have come to us from other networks.

So before you make a snap decision about a value-added network, why not look over this list of pitfalls? It just might save you some expensive mistakes.

1. Going Beyond the Outage Limits
Don't risk losing time and money to equipment outages. Every network's goal should be 100% uptime. If your network doesn't achieve at least 99.5% service availability, you don't need it.

2. The Low-Density Low Blow
Chances are, if your remote locations are really remote, you may have to pay more than you should. Other networks charge as much as $5 per hour extra for access from second or third tier cities. So be sure to compare their price schedules with your geographic distribution.

3. Personal Attention
You're going to want a lot of one-on-one support to help you control costs and increase efficiency as usage grows. Be sure you get it. Demand detailed usage summaries, customized if necessary. And make sure client support is part of the service agreement.

4. The More-Is-Better Myth
Many networks emphasize size over accessibility. So remember this: it doesn't matter how many access locations a network has. What matters is how many of them are where you need them to be. Make sure you're covered.

5. Back-Up at Black Market Prices
Don't pay double for redundancy. Make sure your network provides back-up host circuits that are effective, transparent and—above all—economical.

6. Future Shock
Can the network meet your future needs? Videotex and electronic mail included? Be sure you'll be able to get the services you need. Without going to another vendor or playing guinea pig to unproven technology.

7. Out-of-Date Updates
Does the network have a free on-line directory designed to keep you current on new services and access information? Ideally, that system should be interactive, easy to use and updated regularly. It should also give you a fast way to send messages to network headquarters.

8. The Great Software Experiment
When your network rolls out new software, be certain it's been thoroughly pre-tested on a pilot or mini-network. Never accept major changes in your software as part of a normal host interface arrangement. And never, never choose a network that schedules downtime when it will disrupt your service.

9. Troublesome Troubleshooting
"Fast response time" should also apply to service. You have every right to expect standardized "trouble ticket" reporting and tracking. And your network should be willing to call on top management to solve your problems, if that's what it takes.

10. Terminal Tomfoolery
When you invest in costly equipment, it should meet your needs — not someone else's shortcomings. Insist on optional functions for such things as special character-handling, speed, page width and other terminal features.

Now that you know some of the problems involved in choosing a public network, how do you go about avoiding them? You start by sending for our free information booklet, "Going Public: The ADP Guide to Value-Added Networks." Call or write for your copy today.

ADP Autonet
The Reliable Network Service
175 Jackson Plaza, Ann Arbor, Michigan 48106 313/769-6800

Autonet is a service mark of Automatic Data Processing, Inc.

anything of the sort. He believes the magic of becoming successful can touch them as it has touched him, and he pounds that message home. "It's a thankless job, and they haven't learned how to make it thankful," he says.

He cites IBM as an example of excellence, saying that company builds confidence in its users, wants them to be stronger so they'll know more and buy more. He puts AT&T at the other end of the spectrum, speaking of it with open contempt. AT&T used to be an exemplar also, a leader the industry could look up to, a good company to work for. Now he sees it as a tawdry caricature of its once-proud self. If it was up to Harry to redesign the AT&T logo, he would probably have kept the

bell but put a huge crack in it.

The car is pulling into the catacomb-like parking lot under Chicago's McCormick Place, the site of his second speech this day. He mounts the steps to the exhibition floor of the Intech '83 conference, where he plans to make a whirlwind inspection before speaking. He's forgotten just what it was he is supposed to speak on so he asks. The official topic is "How to Advance Your Career by Embracing Office High Technology." The actual presentation may cover anything.

Up on the floor, he commences the inspection. He is an entertaining guide, a raconteur with nonstop commentary. This company lacks direction; this one knows where it's going. That one used to. This one never will.

Ah, the AT&T booth. It's time for a little fun. Harry wants a hands-on demonstration; Harry wants to play. This request is met with frozen smiles. They know Harry at the AT&T booth. They're sorry but nobody is allowed to touch the equipment. Won't he let them show him how it works?

No. Harry wants to do it.

"I think we're not welcome here," he says offhandedly.

Not so, they assure him with now very thin, glacial smiles.

There is tension in the air. Will Harry attempt to play with the equipment anyway? Will he have to be forcibly restrained? Will the relative calm of the exhibition floor be broken by a stampede of beefy, whistle-blowing security guards? Will Harry lurch in the grip of a militant AT&T sales representative, kicking over tables, sending thousands of dollars worth of sophisticated equipment tumbling to destruction? The moment is upon us.

And Harry defuses it. Pointing to a terminal that strongly resembles a radar range, he observes, "This, by the way, was designed by a subsidiary of Amana Ovens." It is a funny comment, but the AT&T folks aren't laughing. Time to move on.

Five minutes later, he is greeted by a silent, dispersed audience of 10 people when he enters the posh, red-velvety Playhouse Theatre. "This is going to be the most expensive per capita speech in history," he mutters, taking the stage. But this audience will get the same treatment the $12,500 crowd got in London. Addressing the sparse audience, he says, "This is like somebody announced a war and nobody came." The audience laughs. He's got them already.

Eschewing the podium, he bums another cigarette and is off again. During this second talk of the day, he rolls off many of the same humorous aphorisms and anecdotes that marked his morning speech, but he's got plenty of fresh material. He talks of hospital operating expenses, jokes about Nancy Reagan, makes predictions for the future.

When, after the full hour-and-a-half, this speech too is done, he stays to pass out catalogues and sell autographed books at $5 each. Still talking as he autographs one, he declares, "This signature will be worth something if I get hit by a bus on the way out of here." ■

Hoard is editor of Computerworld On Communications.

WE HAVE 2400 GOOD WAYS TO UPGRADE YOUR DIAL LINE DATA COMMUNICATIONS

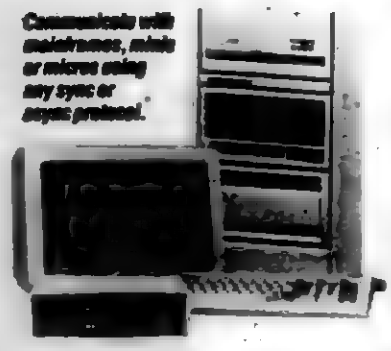
If you're still transmitting data over telephone lines at 1200bps, we'll show you how to save time and money. Our 2400bps full duplex dial modems give you all the performance, versatility *and reliability* that you require, at *half* the transmission cost, and twice the speed.

All CDS dial line modems operate at 2400bps full duplex with automatic 1200bps fallback *in both* synchronous and asynchronous modes. With our modems you can communicate from or to any terminal, micro, mini, or mainframe computer (even your PC), with support of BSC, HDLC, SDLC, X.25 or *any other* full or half duplex protocol.

Double your data rate and cut transmission costs with complete reliability.

And with CDS 2400bps full duplex dial modems, you won't have to sacrifice one bit of data integrity. Our modems all use advanced signal processing techniques, and feature automatic adaptive equalization. Sophisticated modem diagnostics including analog and digital self-test and an internal test pattern generator rapidly isolate modem faults. With a CDS 2400bps modem, your data will come through smoothly and accurately, even on poor telephone lines.

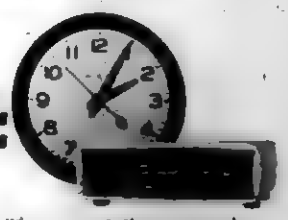
Communicate with mainframes, minis or micros using any sync or async protocol.



CDS modems combine user-friendly engineering with next-generation technology. Our touch sensitive front panel allows you to select the telephone line configuration, operating mode and diagnostic tests you need. An optional front panel synch/asynch selector lets you switch from synchronous to asynchronous transmission swiftly and easily, without monkeying around with internal modem straps.

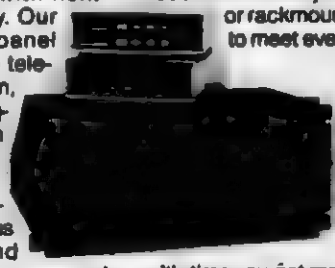
Our new 2400bps autodial modem eliminates extra telephone hardware and lets you leave your modem unattended...ready to communicate when telephone rates are lowest. It supports both touch-tone and rotary dialing systems and operates with "dumb" or intelligent terminals using keyboard or software controlled commands.

Send data at off-hour rates with 2400bps autodial.



We've built our reputation on products that give you advanced engineering at down to earth prices. Our 2400bps full duplex modems range from $995 to $1195 with attractive quantity discounts available.

There's a 2400bps full duplex dial modem in our family in either tabletop or rackmount configuration to meet every need.



Get the functions you want in the configuration you need from our full family of 2400bps modems.

It's time you got more data for your dollar. Call or write, Concord Data Systems, 303 Bear Hill Road, Waltham, Massachusetts 02154 (617) 890-1394, or contact the CDS representative nearest you.

CONCORD DATA SYSTEMS

LINKING COMMUNICATIONS TECHNOLOGY

SYDNEY (02) 887-1266, MELBOURNE (03) 543-1266, BRISBANE (07) 369-9466, PERTH (09) 328-9966, ADELAIDE (08) 223-1266, AUCKLAND (09) 444-9966, WELLINGTON (04) 736-866

See us at COMMUNICATION NETWORKS CONFERENCE & EXPOSITION
Washington, D.C. January 31–February 2, 1984

Special Section

GEOPOLITICAL STRATEGIES

By Brian Jeffrey

While the face-off between IBM and AT&T in the U.S. market seems to be developing into coalition warfare, a similar process seems to be starting in international markets, with the added complication that it involves not merely private companies but national Postal Telephone and Telegraphs (PTTs) and national governments.

But the world's two largest electronics companies cannot initiate aggressive strategies calling for a major expansion of overseas business in the politically sensitive telecommunications field ▶

without significant repercussions.

AT&T and IBM are both targeting international telecommunications markets, albeit from slightly different priorities. AT&T's main concern seems to be expanding its existing lines of business into international markets. IBM is looking to make the same kind of sideways move out of the computer business into communications abroad that it is attempting in the U.S.

The problem facing both companies, however, is that telecommunications remains a regulated business in virtually all the major overseas markets. Despite some liberalization over the last few years, transmission infrastructures are still typically controlled by national PTTs. In addition, the equipment business is dominated by a handful of favored national suppliers. They are Nippon Electric Co. (NEC), Fujitsu Ltd. and Hitachi Ltd. in Japan; the CGE Group and Thomson-CSF in France; Plessey, Inc. and General Electric Co. Ltd. in the UK; Siemens Corp. and AEG in Germany; Northern Telecom, Inc. in Canada; Italtel in Italy; Ericssen in Sweden; and Philips in the Netherlands.

The few companies without a strong national base — ITT and, to a lesser exent, Philips and Ericssen — have relied heavily on relationships with national subsidiaries with extensive local manufacturing and development activities. Thus, they too claim to be national suppliers. In particular, ITT has remained in the politically sensitive business of supplying the PTTs in many countries because of its highly decentralized approach. This approach is aimed at reassuring governments that they will not surrender any control over their national telecommunications industries by awarding business to a foreign company.

Until recently, IBM and AT&T did not desire to meddle in the patchwork of national jurisdictions governing the international telecommunications market and the political bargaining that goes with it. AT&T pulled out of the international telecommunications business in 1925, when it sold its operations outside North America to ITT. According to AT&T, the deal was made to enable the firm to focus better on its North American business. According to others, it was part of a deal with ITT to stay out of each others' markets. AT&T did not begin to get back into the international scene until the mid-'70s when, apparently in response to State Department prodding, it began to compete for some of the big telecommunications contracts put out by the developing countries.

While it was solidly entrenched in the computer markets of most of the major overseas countries, IBM did not make much of an effort to enter the international telecommunications market. It entered the computer services and private branch exchange (PBX) business in Europe, but was not a major player. The company's activities were low-key for several reasons: a lackluster product, the Carnation PBX, developed at La Gaude, which is generally regarded as one of IBM's worst research and development facilities; weak marketing; and the knowledge that the European PTTs and their favored suppliers would resist IBM's attempts to enter the market.

Moreover, the pressure of the U.S. antitrust suit, in which IBM's communications activities in Europe were cited, appears to have led to a deliberate de-emphasis on this area. IBM let it stagnate.

Both companies began to pay more attention in the late '70s, but for different reasons. For AT&T, the renewed emphasis on international sales was due to impending divestiture and a recognition that it needed to motivate itself in order to compete. A new subsidiary, AT&T International, was formed in 1980 to "satisfy international customers' information systems needs with profitable applications of AT&T technology, products and skills, providing

*Offer expires June 30, 1984. Major credit card required for individual membership.

©1983 Intelligent Technologies Corp. PC Express and Intelligent Technologies are trademarks of Intelligent Technologies International Corp. IBM is a trademark of International Business Machines Corp. THE SOURCE is a service mark of Source Telecomputing Corp., a subsidiary of The Reader's Digest Assn., Inc. DEC is a trademark of Digital Equipment Corp.

quality service through a coordinated, long-term presence," according to an AT&T spokesman.

AT&T recognized that it was going to end up competing across-the-board in the new information processing market in the U.S. But the primary emphasis of AT&T's international push was — and still is — on reestablishing itself as a major market player for big telecommunications procurements by PTTs.

By early December 1983, AT&T had landed a series of major international contracts. These include a microwave system, central office exchanges, PBXs and other equipment in Saudi Arabia; in Greece, a submarine cable linking the country with Egypt; central office exchanges in Korea; a microwave system in Ireland; in Taiwan, central office exchanges and cable linking the country with Guam; and central office exchanges in Egypt. AT&T was actively pursuing others. It had also formed a joint venture with the Dutch electronics giant Philips to market AT&T central office exchange systems in Europe, the Middle East, Africa, Latin America and in parts of Asia.

IBM's priorities have proven to be very different. Although not a competitor in the business of big ticket sales to PTTs, IBM had good reason to pay attention to them. After a long dormancy, the European PTTs and their Japanese counterpart, Nippon Telegraph and Telephone Corp. (NTT), began to show surprising signs of life in the late '70s. The British Post Office's Prestel videotex system also went public in 1979.

France, a little slower off the mark, responded with a series of programs revolving around the concept of Telematique — derived from telecommunications and informatique, the French term for data processing. This ambitious program was designed to develop a nationwide videotex network via the French PTT and was accompanied by a range of other projects supported by French authorities and covering many areas.

The Japanese countered with a series of programs covering areas such as mass facsimile and data base services. That program culminated in the Information Network System (INS), an ambitious long-range plan to integrate the new range of services into a common system based on a nationwide fiber-optic cable infrastructure. In addition, the Canadians got into the act with their Telidon videotex program.

IN RETROSPECT, the enthusiasm generated by these programs seems a little exaggerated. Videotex in particular proved to lack the commercial charms attributed to it. But the programs delivered a salutary shot in the arm to IBM. After years of suffering hostility from many host governments determined to promote their own computer industries and the assaults of their various national contenders, IBM finally seemed in a good position to do business.

Computer companies like International Computers Ltd. in the UK, CII-Honeywell-Bull in France, Siemens in Germany and Fujitsu, Hitachi and NEC proved to be a manageable threat. In fact, none of them would have survived against IBM in the computer market without large-scale government support and preference.

However, the new telecommunications programs posed another serious threat to IBM. The forthcoming merger of computer and communications technologies put the Europeans and Japanese back in contention. Using their control of the PTTs, governments could accord a preference to their national suppliers in the new markets far more effectively than had been the case in the computer industry. The result, as IBM rapidly recognized, was that IBM could easily be excluded from the communications systems and services areas that it had identified as primary engines of growth in

It's a call from a customer in New York who needs specifics on a business proposal. You talk briefly and then transmit the data to him in seconds from your IBM® PC with PC Express.™

Later, an electronic mail message arrives from your Houston office. New developments necessitate an immediate multi-city business trip. Again, over your IBM PC you make arrangements with your travel agent. Then you contact an information network for the latest weather in the cities you'll be visiting.

All through your IBM PC. All made possible by PC Express — a versatile, dynamic and interactive communications package on a single pc board. Complete with software on diskettes and tutorials. With PC Express, your IBM PC becomes far more than a computer.

PC Express lets you exchange both voice and data communications with other IBM PCs, XTs, IBM-compatible computers and mainframes. Including all the major information networks such as THE SOURCE.℠ THE SOURCE provides up-to-the-minute news, stock quotes, travel information, and virtual encyclopedias of data. Membership is included when you purchase PC Express.*

With PC Express, you can both send and receive electronic mail — even when you're not at the computer. A full-screen text editor makes composing your messages easy.

You'll also enjoy the versatile telephone management system. Use it to create an unlimited telephone directory from which you can automatically call numbers according to any parameters you set: area code, city, state, etc. For people who deal with people and information — bankers, lawyers, brokers, managers, sales professionals — it will be a valuable time and money saver.

In addition, PC Express lets your IBM PC communicate with mainframes and perform DEC™ VT100/52 emulation. PC Express is also available with SNA, allowing your IBM PC to emulate a 3274 cluster controller and 327X/3770 RJE terminals. So, for the first time, you can use the problem solving powers of both micro and mainframe software.

Contact your nearest dealer for a free demonstration. For the address, call 800-523-8396. See how much further you can go and how much faster you'll get there with PC Express.

Intelligent Technologies International Corp., 151 University Avenue, Palo Alto, CA 94301, (415) 328-2411.

PC Express from Intelligent Technologies™

all for you IBM PC."

the '80s. And there was nothing IBM could do about it.

The situation changed radically and agreeably for IBM from 1979 to 1981. The conservative government elected in the UK in 1979 favored deregulation of the telecommunications market and reduced state intervention. The following year, the Reagan administration came into power in the U.S. and revealed its intentions to take a strong line against Japanese protectionism. In Japan, the Nakasone administration proved receptive to the U.S. attitude; plans were made to make NTT a private company.

In France, the election of Francois Mitterand as president in 1981 brought in an administration that lacked its predecessors' enthusiasm for Telematique. It was receptive to IBM's arguments about its employment and R&D activities in France and its positive contribution to the French balance of payments. Even in Germany, where IBM had begun to face serious discrimination in favor of Siemens for public-sector purchases, divisions in the left-center government allowed the company better access to the German telecommunications market. In 1982, a more pro-American and antiprotectionist regime was elected.

All this represented a fairly radical reversal of IBM's fortunes. In all of the major overseas markets, IBM was faced with new opportunities, and it seized them. In November 1981, it landed a $22.5-million contract from the West German PTT to supply Series/1 and 4300-based controllers for the national videotex system. It also set about entering videotex markets elsewhere in Europe. In Japan, a combination of political pressure and the self-interest of Japanese companies allowed IBM to put together a formidable coalition of partners: Mitsubishi Corp., Japan's largest trading company, and Matsushita Electric, Japan's largest consumer electronics manufacturer. They joined a number of smaller companies as IBM partners targeting the new markets created by the INS program. In October 1983, IBM agreed to cooperate with NTT in the development of large-scale networking systems.

By early December 1983, IBM had brought about a major change in the competitive dynamics of the Japanese information processing market. Not only had it become an integral player in the INS program, it had also put together a formidable coalition of partners that looked hard to beat. More recently, the focus has shifted back to Europe, where IBM is looking for the same kind of substantial links it formed in Japan. It has been talking to a number of European groups about cooperating in telecommunications.

IBM's goal seems to be to establish itself as an integral player in other countries as it has in Japan. It plans to use cooperative agreements with PTTs and major telecommunications companies. Its attempts have been far-reaching. National aerospace companies have been approached, and there has been talk of IBM participating in various cooperative development projects and programs for the commercialization of products and technologies developed by small firms and academic institutions.

AT&T, like all companies in the big-ticket telecommunications business, has experience in horse-trading with governments. In Korea, AT&T used Western Electric to put the Lucky-Goldstar Group in the semiconductor business. It set up a joint venture with the Taiwan government to produce exchanges.

DESPITE ITS focus on the big-ticket market, AT&T is clearly looking for the same kind of partners as IBM — PTTs or private firms with an embedded presence in national telecommunications markets, good conventional and electronic distribution capabilities and political leverage with their host governments. AT&T is currently focusing on markets outside the mainstream, where competition from other international competitors is relatively weak. Its Dimension PBXs, for example, are sold via partners in Australia, Greece and Hong Kong and directly by AT&T International in other parts of Asia. The strategy of starting in the less developed, less competitive peripheral markets is similar to the way in which successive Japanese industries have begun their moves into world markets.

This is unlikely to last for long. After trial runs in the smaller markets, AT&T is likely to offer the same kind of trade-offs to the governments of larger countries trying to promote a national information processing industry with weak competitors and limited budgets. There are quite a few governments that fit that description. Prime candidates are the UK, Germany, Italy, Spain, Australia and Israel.

Despite claims to the contrary from both companies, IBM and AT&T are likely to start competing heavily in international markets in the near future, although in a different form than expected. They will compete for local partners, market access and political leverage.

This kind of competition, of course, is not new to the information processing industry. Most of the major players in both the computer and telecommunications business have played the game at one time or another. What is new, however, is that the world's two largest and most powerful electronics companies are starting to do it on a large scale.

At the moment, IBM looks stronger. With worldwide leadership in the computer industry and an embedded market presence in virtually all of the major single-country markets, it has more to offer its partners. Yet AT&T has some potent cards to play. Starting from a weaker position than IBM, it has been far more ready to transfer technologies and, under the right conditions, to accept local control of joint operations.

AT&T has also shown its willingness to provide support for local partners across a range of technologies. Central exchange, processor and semiconductor technologies, for example, all went to the Lucky-Goldstar Group. With Western Electric re-emerging as a force in the merchant semiconductor industry, tie-ups in this field may prove particularly attractive to overseas governments. Moreover, unlike IBM, AT&T has no existing market presence in the major international markets to protect and thus has less incentive to impose limitations on its local partners.

Looked at in that perspective, IBM looks less attractive as a partner. It has scarcely shown itself amenable to government-sponsored national information processing industries in the past. Its desire to retain control over its technologies is strong. It pulled out of the market in India altogether rather that accept a majority ownership of its subsidiary by Indians. Recently, it has also been aggressive against those infringing on its patents.

A remote AT&T offering a cornucopia of technologies, management and technical assistance and more substantial forms of support can look very attractive compared with an aggressive, proprietary IBM controlling a large chunk of the national computer market.

All of this opens up some interesting possibilities. A single major tie-up such as AT&T with Olivetti or IBM with British Aerospace — both of which have been seriously considered — could change the competitive position rapidly. Another possibility would be for IBM or AT&T to strike a deal with a national company, prompting that company's competitors to rush out and link up with the other American firm as a counterweight. This appears to be occurring already in Japan, where the formation of the IBM-Mitsubishi Group has triggered moves by Mitsui, Japan's second largest trading company, and Sony, Japan's second largest consumer electronics vendor, to bring AT&T into the Japanese market.

Alternatively, there is the possibility that escalation will occur as both companies seek to preempt the other. Both, for example, are looking at British Telecom, which has been turned into a private company, and NTT, which is in the same process, as potential distributors and joint-venture partners. And IBM has landed a contract with British Telecom to supply Series/1-based systems designed to enhance existing central exchanges. The contract, worth $7.1 million, involves hardware and software that provides some of the functionality of British Telecom's System X digital exchange for existing equipment. It is a stopgap measure until System Xs are available later in the decade.

Like the German PTT contract, it is small in dollar terms but a danger signal from AT&T's point of view. The central office exchange business is, after all, an important area to AT&T and not the sort of thing that IBM was expected to become involved with.

In short, there are quite a few wild cards out, and if IBM or AT&T starts playing them, there could be large-scale international competition between them sooner than is generally expected. Over the last few years, both companies have shown an increasing willingness to play these wild cards. Global competition, like global war, may prove to have its own dynamics. Once started, it is not clear that the timetable can be controlled by either party. ■

Jeffrey is director of research, International Technology Group, Palo Alto, Calif.

Special Section

U.S. AFFILIATIONS

By Alain Desrenne

A few years ago, when it first became clear that AT&T and IBM were likely to be released from their respective legal restrictions, there was a lot of speculation about the impending face-off between the two firms. It is surprising how much of the speculation was wrong. Certainly, there was some detailed analysis, but the largest failing was simply in imagination. Most analysts seem to have assumed that while both companies would become more aggressive and competitive, they would nevertheless follow the same behavior patterns as always.

And that, it rapidly transpired, was not the case at all. IBM and AT&T upset calculations about their strengths in products and technologies by going outside the company on a large scale. ▶

U.S. AFFILIATIONS

IBM started the ball rolling in July 1983 with its agreement with Mitel, Inc. for joint development of networking systems based on Mitel's SX-2000 private branch exchange (PBX). It followed up with similar agreements with Texas Instruments, Inc. for development of very large-scale integrated interfaces for its local-area network line and with Motorola, Inc. for a proprietary IBM cellular radio system.

In addition, Satellite Business Systems (SBS), the satellite communications firm in which IBM has a one-third share, filed with the Federal Communications Commission (FCC) in February 1983 for removal of the restrictions on its relationship with IBM. These restrictions were imposed as a condition of the company receiving an FCC license.

More visibly, IBM also bought 12% of Intel Corp. and 15% of Rolm Corp., with options with both companies to increase the holdings to 30%. IBM appears to have set about exercising these options by a string of small additional purchases.

AT&T began its moves in 1983. Agreements were announced with Coleco Industries, Inc., for an on-line games service; General Motors Corp., for a pilot mobile radio option on the latter's Buick Riviera; and with three companies — Wang Laboratories, Inc., Hewlett-Packard Co. and Bailey Controls — for joint equipment certification and the implementation of Dimension System/85 PBX interfaces. According to AT&T, similar agreements with other companies are in the works.

FOR BOTH FIRMS, THE process of forming tie-ups with other market players is far from over. Both are pursuing joint arrangements in the international telecommunications market. The list of U.S. tie-ups for both is obviously still far from complete. When it first became clear that IBM and AT&T were going to be deregulated, there was a tendency to assume that they would expand largely through in-house capabilities and the extension of existing operations. With this assumption, it was reasonable to suppose that the two would only be competing in the long term.

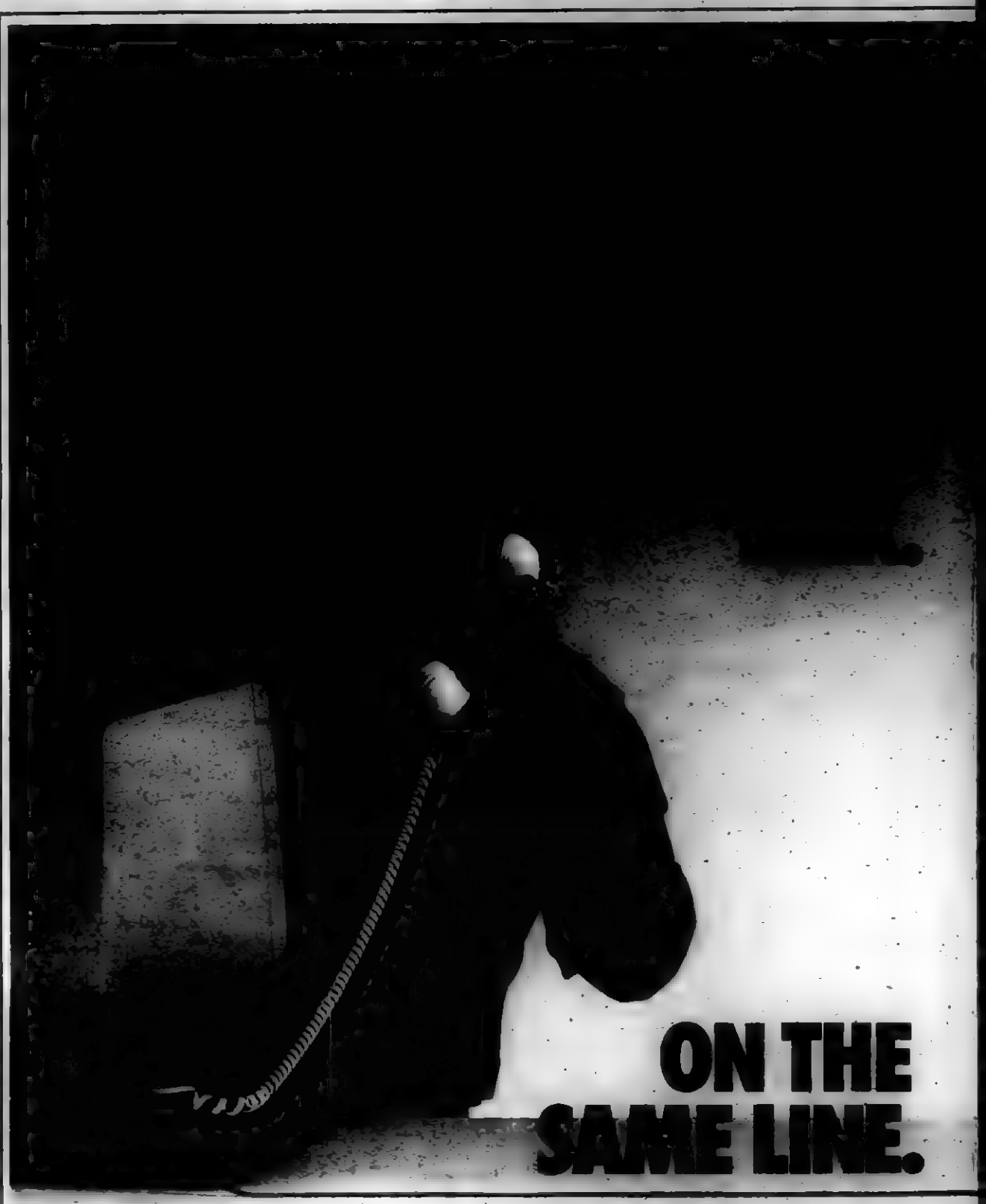
In reality, the competition is shaping up much faster, but in a different form. Both companies are forming tie-ups with direct competitors of the other. IBM is affiliated with Rolm, which competes directly with AT&T. In addition, AT&T is developing what will probably be a substantial relationship with Wang, which has been fighting a head-on battle with IBM for the office automation market for some time. Also, SBS has begun an aggressive campaign aimed at the market for AT&T bypass telephone services.

It looks like it will go further. IBM has covered several key communications areas that it had identified as areas of internal weakness — Rolm for PBXs, Motorola for cellular radio, its own Information Network for computer services, in-house capabilities and outside tie-ups for local-area networks. It still lacks a substantial presence in the mainstream telecommunications services market. SBS may supply part of this, but other tie-ups are also likely. There is really no reason why IBM should not buy 15% of MCI Communications Corp., General Instruments Corp. or one of the other big firms in this field.

AT&T got a later start, partly because its divestiture case dragged through Congress and the courts. But it is catching up fast. AT&T needs to form a partnership in the mainframe area, and Amdahl Corp. and National Advanced Systems, Inc. have been considered. In addition, AT&T recognizes that it needs a presence in the micro market faster than it could develop itself. It also needs to cover factory automation. The Bailey Controls arrangement covers only the process control business, and other sectors need attention.

Moreover, AT&T will probably cover its bases in such areas as local-area network systems, mass storage and video systems through outside arrangements. It can also be expected to expand its coverage of the minicomputer field to other companies. It is likely to follow IBM's example by buying into a state-of-the-art microelectronics firm. It is still unresolved whether AT&T will put itself into the IBM-compatible business.

As each company points out, these moves should not be interpreted as a competitive assault on the other. Both firms have done their homework on potential areas of diversification, and both have decided that most of the information processing market is a lucrative target. Similarly, both companies have investigated potential distribution channels — for example, the Bell operating companies, systems houses, third-party retailers, on-line services and telemarketing. Inevitably, both firms will use the same ones. As the two diversify and form new tie-ups, they will form the center of groups of companies that are the mirror image of each other.



The speed at which this situation has developed has been surprising — not least of all to AT&T and IBM. The sudden rash of tie-ups and buy-ins has turned out to be the result of approaches from potential partners more than the result of their own plans. IBM, for example, seems to have started with fairly limited objectives in the PBX field. It was more concerned with defending its flank in the Fortune 500 market against competition from PBX vendors than entering the market. Rolm had other ideas, and Rolm management approached IBM.

Similarly, IBM did not plan to buy into Intel, although it was looking at some fairly close licensing and development arrangements. Intel, however, was distinctly short on capital at the time and lacked the resources to respond to increased demand in the semiconductor market. This point appears to have been made by Intel management to IBM management. There were also reports that the clincher was the appearance of another large company as a would-be buyer.

Similarly, SBS clearly saw the advantages of a relationship with IBM, and IBM figures prominently in the company's attempts to build market awareness of its services.

In short, the appearance of groupings of companies around IBM and AT&T is proving to be the result of a desire to be tied up with the industry giants. It is not hard to understand this. With competition heating up in many sectors of the market, an IBM or AT&T affiliation is seen by more and more companies as a means of improving prospects and keeping shareholders happy. It is hard to find an affiliate of IBM that has not proudly advertised the relationship in its annual report. The remarkably good press generated by IBM has certainly helped stimulate the process, and it is likely that the same will happen for AT&T once it begins to show its capabilities.

Whatever the immediate motives of IBM, AT&T and their partners, it is clear that they represent part of a broader, long-term structural shift in the information processing industry.

Perhaps the best way of looking at it is to consider the industry's history. For the last 30 years, there have been successive waves of new companies: mainframe manufacturers such as IBM, Burroughs Corp., Sperry Corp., NCR Corp., Control Data Corp. and Honeywell, Inc.; the plug-compatible manufacturers; minicomputer companies such as Digital Equipment Corp., Data General Corp., HP and Prime Computer, Inc.; office automation vendors such as Wang, CPT Corp., NBI, Inc. and so on; personal computer firms such as Apple Computer, Inc. and Radio Shack; and home computer firms such as Commodore Business Machines, Inc., Texas Instruments and Atari Corp. Whether it is due to the speed of technological change in the industry or to the lack of flexibility of American corporate organization, the fact is that existing market leaders have failed to react fast enough to each new technology.

A similar process can be seen on the communications side, although AT&T's presence across the spectrum confuses the picture a little. In 1968, the Carterfone Decision created the Interconnect vendors — Northern Telecom Inc., Rolm, Mitel and so on — as a presence in the U.S. market. These firms pioneered the use of digital PBX technology. Specialist companies emerged as the leading players in other technologies, such as key systems, local-area networks and cellular radio.

The history of the information processing industry has involved specialized market players that may have diversified into other areas, but whose success has been built on a single-product market complex.

This picture is starting to change, driven by the convergence of technologies and markets. With previously distinct market segments starting to merge — a development reflected on the user side by increasing coordination and occasional merging of functions such as data processing, word processing and telecommunications — it is becoming necessary to cover the bases. As a result, the specialist vendors have scrambled to add other capabilities. Computer vendors added local-area networks, PBXs and word processors; PBX vendors added local-area network interfaces and intelligent workstations; and just about everyone added gateways of one sort or another.

Apart from the standards mess that this has created, there has been a rash of teams forming to address particular markets or technologies. A situation is starting to develop in which the specialist vendors — a category that includes firms as large as DEC, Wang or Rolm — is no longer a viable competitive entity except as a member of or supplier to larger, multitechnology groupings.

After several decades in which the trend has been toward specialization, the whole process is reversing itself. More than anything else, IBM's success in the personal computer market has signalled this. After a poor performance in

Make sure your modem has all these PC:IntelliModem features

Integrated Voice/Data
- Switch between voice and data communications
- Programmable telephone handset jack

Status Reporting
- Line status detection (dial tone, busy, ringing, voice answer, modem answer, incoming call)
- Audio monitor
- Programmable LED

PC:IntelliCom Software Included
- 99-name on-line telephone directory
- Auto-dial, auto-repeat dial, auto-answer
- Link to another number if busy
- File transfer
- Data capture to diskette
- Programmable auto log-on sequences

Compatible with Crosstalk™/PC-Talk III™

Receive Sensitivity: -50 dBm

Speeds: 110, 300, 1200 baud

PC to XT. That is. You've now ready to make connections with computers—and people—much faster and more conveniently. It's like getting a modem and a telephone for the price of a modem alone.

The ultimate status seeker.

The PC:IntelliModem also monitors your telephone line's status more closely than other modems. It listens to the line much like you do, and detects signals for dial tone, ringing, busy and voice—some of which other modems completely ignore. It then automatically takes the

start indication of
on, you always know
call is progressing.

A soft touch to

Included with our single plug-in modem board is PC:IntelliCom,™ our exceptionally easy-to-use software package. It guides you step by step during use, through on-screen menus, entry instructions, an

Or co
Bizcomp,
532 Wedd
Sunnyvale, Ca
408/745-1616.

You'll find there's
one modem that does it
all, including voice com-
munications: the PC:IntelliMo

PC:IntelliModem and PC:IntelliCom are trademarks of Business Computer Corporation. IBM is a trademark of International Business Machines Corporation. Crosstalk is a registered trademark of Microstuf Inc. PC-Talk III is a registered trademark of The Headlands Press Inc.

BIZCOMP®

We've got people talking.

minicomputers (the Series/1 was almost cancelled at one point as a complete failure) and office automation (the confusion created by the competition between Data Processing Division, General Systems Division and Office Products Division is still far from sorted out), IBM succeeded in catching the wave of micros and riding it. Moreover, it is looking at some of the new technologies — cellular radio, videotex and CATV.

AT&T is going the same way. Its immense installed base and marketing organization provide a current base of strength on which it can build in the long term through its financial resources, Bell Laboratories research and development and the manufacturing capabilities of Western Electric. The company is reasonably confident that it can catch new waves of products and technologies.

Its problem in the short term is like IBM's in PBXs: It must defend its flank against an erosion of its current position that could prejudice its long-term plans. Tie-ups with other companies provide an excellent way of achieving this. AT&T's affiliation with Wang gives it an indirect presence in the area of word processing systems. HP does the same in minicomputers.

At a time when market dynamics are pushing the information processing industry toward the formation of large, multitechnology and multimarket groupings, AT&T and IBM are emerging as the largest and most attractive poles toward which smaller, specialized vendors are gravitating.

IN THE LONG TERM, what form will these groups take? Perhaps it is too early to judge AT&T's future, but there are better indications for the IBM group. IBM is looking for substantial relationships with its key partners. A string of small additional purchases of the equity of Rolm and Intel indicate that IBM intends to take up the full 30% option on both in the not-too-distant future. It has bought into a number of other smaller firms over the last few years.

Other purchases in the 15% to 30% bracket are known to be in the works, and the company also appears to be experimenting with other ways of tying in key collaborators. For example, Xebec Systems, Inc., a firm that manufactures components for the XT, has recently indicated that it will purchase a significant amount of factory automation equipment from IBM and its value-added resellers. For a small company, its investment is substantial, which suggests that there is more to the relationship than meets the eye.

Combined with its third-party distribution activities, the grouping of companies around IBM is beginning to look like the big Japanese groups such as Mitsubishi Corp. and Mitsui & Co. Ltd. These groups are sets of companies linked by cross-shareholdings, interlocking directorships, supplier relationships and various joint marketing, development and financing tie-ups. The resulting grouping would possess the advantages of size without the inflexibility of a more rigidly structured organization.

From the initial across-the-board competition between IBM and AT&T via affiliates, it seems likely that more direct competition for systems and services will develop rapidly as the two extend their degree of control over and cooperation with the member companies of their groupings. Given the long-term trend toward the merger of markets and technologies and the increase in competitive pressure in many market segments, the dominant forces in the industry will move more increasingly toward concentration.

This raises some interesting points. While the small, entrepreneurial company should remain a viable entity for a long time, the medium-size vendors with historical strengths in a particular market may gradually disappear as they form part of larger groupings.

There are a number of historical situations in which pressures of economy of scale led to an industry shakeout. The automobile industry is a prime example. The end product of the shakeout was a handful of large companies competing directly in the market, but with a large and healthy — at least until 1979 to 1980 — sector of independent component, subsystem and specialty suppliers.

In the information processing industry, convergence may well play the same role as economy of scale did in the automobile industry. Neither the IBM nor AT&T groupings seem cast for the role of General Motors and Ford Motor Co. The market is unlikely to become quite as standardized, and antitrust limitations may continue to have some force. The two firms, though, are clearly going to emerge as the preeminent structures in the industry. A large number of specialist companies, suppliers and distributors will be linked to them.

The parallel between cars and information processing is accurate in another sense. The whole information processing complex, like the automobile industry 50 years ago, seems to be moving toward greater stabilization on the vendor side. This is happening as the increasing sensitivity of the market to economy of scale, mass-marketing and company images raises the ante and weeds out the weaker players. The result may be that the industry structure is maturing even as the market enters its period of greatest growth. ■

Desrenne is director of European Operations with International Technology Group, Palo Alto, Calif.

ENGINEERING PROFESSIONALS

(Local Area Network Development)
—East and West Coast Positions—

System Development Corporation, a leader in innovative computer systems technology has immediate opportunities for software professionals and test engineers who are interested in participating in a major company thrust to develop a local area network product line for large-scale Military and Intelligence System Applications.

The following positions exist in Santa Monica, CA, sunny, smog-free beach community:

- Communication System Engineering - Requirements analysis, protocol specification, performance verification, simulation studies and top level hardware/software specifications.
- Software Development - Communication/protocol and operating system software design and development, microprocessor program development, formal verification and trusted software development, systems programming, UNIX-PWB system development environment.
- System Test and Installation - Test plan design and specification, network performance measurement, installation and transition planning and formal system sell-off to customer.

To learn more about these challenging positions and others, send your resume immediately to:

Nancy Sullivan
System Development Corporation
2500 Colorado Avenue
Santa Monica, CA 90406

If you prefer suburban Philadelphia, which offers excellent quality affordable housing, review the following opportunities:

- Software Programmers and Test Engineers - software test procedures, assembly language, C and UNIX, Intel 8086, Intel MDS test stations, DOD documentation.

For more information about Paoli openings, rush your resume to:

Eloise Phillips
System Development Corporation
Custom Products Group
P.O. Box 517
Paoli, PA 19301

SDC offers a work environment where individual contributions are encouraged and rewarded. Learn more about the many benefits of an SDC career by rushing your resume to the listed individuals. Relocation assistance is offered for these positions.

U.S. Citizenship required
Equal Opportunity Employer M/F

SDC
System Development Corporation
A Burroughs Company

China Computerworld

电 脑 世 界

The only specialized computer publication written exclusively for the People's Republic of China (PRC).

The PRC is a huge country which now has a rapidly growing installed base of computers. And the future looks very bright for the Chinese EDP market.

Government plans call for extensive use of computers in the PRC's technological modernization, and annual EDP expenditures are expected to grow into the billions of dollars in the 80's.

A good deal of this money will be spent on foreign computer equipment and the purchase decision-makers for this equipment will be using *China Computerworld* to help them choose the products and the companies they need.

China Computerworld is a joint venture of the Fourth Ministry of Machine Building and CW Communications/Inc. Its 50,000 subscribers include the key government officials and computer managers who have EDP purchase decision authority.

China Computerworld is published on the fifth and twentieth of each month. Its tabloid newspaper format gives you a unique opportunity to introduce your products and services to this awakening giant of a marketplace.

CW International Marketing Services Department gives you one-stop advertising service in countries around the world. For more information about *China Computerworld* or any of our other foreign publications, just fill out the coupon below.

Diana La Muraglia, Manager, International Marketing Services
CW Communications, Inc.
375 Cochituate Road, Box 880, Framingham, MA 01701 • (617) 879-0700

Please send me more information on
☐ *China Computerworld* ☐ Your other foreign publications

Name _____
Title _____
Company _____
Address _____
City _____ State ____ Zip _____

CW COMMUNICATIONS/INC.
Publishers of *Computerworld* and other leading computer publications around the world.

Special Section

WORKSTATION WARS

By Brian Jeffrey

IBM and AT&T may soon clash in the all-important microcomputer market, a market that is rapidly proliferating.

Micros started life as personal computers, and IBM has taken to calling them workstations or discrete microprocessor-based computing devices. No matter what they are called, micros are important to both companies for two reasons. First, there is going to be a large number of them — more than 60 million by the end of the decade, according to IBM figures. Second, they occupy strategic positions in the information processing market on the ▶

desks of Fortune 1,500 executives, managers, secretaries and clerical workers.

They are also found in the offices and homes of small business principals and professionals. Micros are the direct human interface to the whole information processing complex. They are the vehicles through which new value-added communications systems and services will flow.

In addition, micros are eroding many of the traditional equipment markets for terminals, word processors, small business systems, minicomputers and even typewriters and programmable controllers. In the next decade, any company participating in these markets or selling communications systems and services is going to have to cover its bases in micros. This point has not been lost on IBM or AT&T.

In 1980 and 1981, IBM introduced two microcomputer systems — the Intel Corp. 8086-based Displaywriter and the Intel 8080-based System/23 Datamaster. These were mainly entries into traditional IBM lines of business, but aimed at lower level technologies such as word processing. It was in August 1981 that IBM moved into the then fast-growing personal computer market. At that time, personal computers represented a distinct type of product, a self-contained microprocessor-based system, typically in the $2,000 to $5,000 range with peripherals. Although personal computer users represented an occupational cross-section of U.S. business, they were typically young, well-educated and technically literate.

The distribution channels were specialized computer stores, and the applications were distinctive. Visicorp's Visicalc, which had done much to launch the whole market, was the leading package, and a handful of sophisticated word processing and data base management packages backed it up. Beyond these, there was a massive library of programs provided by third-party developers.

BY THE TIME IBM made its entrance, the market was changing. More than any other company, IBM was responsible for fragmenting the market. By the end of 1983, it was fielding a line of microcomputers that had grown from the Personal Computer to include the Personal Computer XT, the 3270 Personal Computer, the Personal Computer XT/370, the CS-9000, (a Motorola, Inc. 68000-based engineering workstation) two versions of PCjr, two 3270 terminals with personal computer bolt-on units (the Personal Computer/3278 and Personal Computer/3279) and, for the Japanese market, the 5550, an 8086-based Kanji character workstation.

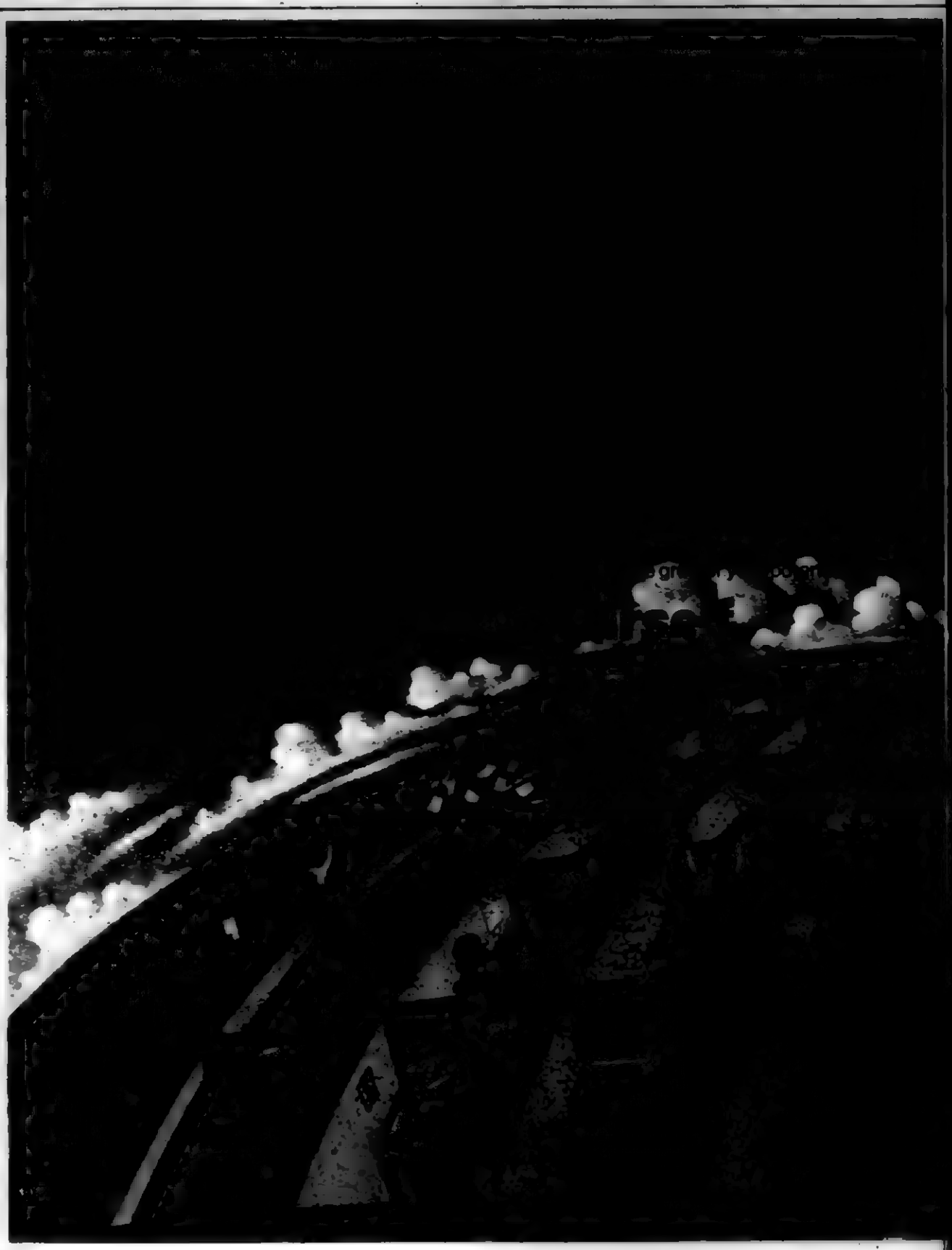
By year-end 1983, IBM had been marketing the Displaywriter and System/23 for some time and was preparing several new products in the supermicro and low-end brackets. IBM broke the microcomputer market into a number of distinct segments served by separate products and distribution channels. Briefly summarized, IBM's micro markets are:

■ *Host workstations.* These are for use in the Fortune 1,500 or other organizations with IBM central host processors. They are sold by the National Accounts and National Marketing Divisions. They combine the ability to manipulate host data with full-scale communications, personal productivity tools and software permitting local treatment of host data where appropriate.

IBM's mainstream product is the 3270 Personal Computer, which combines an Apple Computer, Inc.-type multiwindow format with personal productivity tools such as spreadsheets, light-duty word processing, personal filing and note pads. In short, the 3270 Personal Computer closely follows existing work patterns, and a clear distinction is made between mainstream — for example, host — and personal applications.

IBM offers the Displaywriter for secretarial applications involving heavy-duty word processing. Less sophisticated capabilities are available with the Personal Computer/3278 and Personal Computer/3279, or at the bottom of the line, the 3178 dumb terminal. Other products include variants of the Personal Computer XT supporting Visicorp.'s Vision and Lotus Development Corp.'s 1-2-3, which allow more sophisticated local treatment of host data. The XT/370 is designed for host programming and specialized data treatment, while the 4301, a desktop version of the 4300 series, facilitates more sophisticated executive and professional users.

The workstations in the Fortune 1,500 line are basically optional components of the total Systems Network Architecture (SNA)-based communications and office automation scenario offered by IBM. They support the data, text and, in the near future, voice capabilities available under this architecture. Leasing terms are available from IBM Credit



Corp. for the conversion of existing terminal bases and the installation of bulk lots of the newer workstation products.

■ *Small business systems.* These are for use by small organizations with up to 20 employees that cannot cost justify a larger system in the 30 series bracket. The primary requirement of these users is the automation of such procedures as accounting, inventory control, sales data management, letter preparation and mailing list management. These users require a considerable amount of hand-holding, particularly if they are converting from manual procedures, as is usually the case. For these users, IBM offers the Personal Computer XT, also available in an entry-level model, the Personal Computer and the System/23 Datamaster. The latter, however, is likely to be replaced by a new advanced workstation, a supermicro providing multiuser capabilities and allowing a migration path upward from the XT for the growing business.

This market is served by value-added dealers, which provide specialized software, support and guaranteed service, or by the local IBM Product Center, which provides less hand-holding but undertakes service, maintenance and training on a special basis. Alternatively, if there is no IBM Product Center in the vicinity, the Personal Computer and the XT may be purchased from a third-party retail store.

■ *Utility computers.* These are intended for users who already possess or have access to an IBM business computer or who otherwise do not require full-blown microcomputer capabilities. They are used mostly in the home for light-duty business processing in the evenings or on weekends. They are used to automate typing and for entertainment, personal filing, educational applications for children and students, on-line data base access and consumer electronic mail.

IBM's main products in this category are the two versions of the PCjr. The company is planning to add high-capacity storage media, video and data capabilities and access to videotex services. Later products will include a convenient portable system and a personal communications system to stay in touch while driving to work or traveling.

This market may be reached in two ways. First-time computer owners and purchasers will be able to obtain the new systems via IBM Product Centers, third-party computer stores and selected consumer retail outlets able to satisfy IBM marketing and service requirements. In addition, large-scale direct mail and telemarketing will be used for direct sales and to draw potential customers to local IBM Product Centers.

■ *Minicomputer-type systems.* In this market, powerful micros can take the place of older minicomputer systems for scientific, engineering, educational and some low-end business applications. IBM products also complement its larger minicomputer (Series/1) and mainframe (4300 series) lines. They include the CS-9000 and 4301, the latter representing the 4300 series, whose capabilities for scientific and engineering applications have not been reflected in their market penetration. Selected accounts are served by IBM Instruments and other specialized units. For the remainder of the market, conventional OEM channels are used.

■ *All-purpose small processors.* For this market, IBM offers stripped-down Personal Computers on an OEM basis. They may be used for a variety of control applications, factory device control, energy management and communications control. IBM already uses the Personal Computer for such applications in its own product line and will assist customers in the development of similar uses.

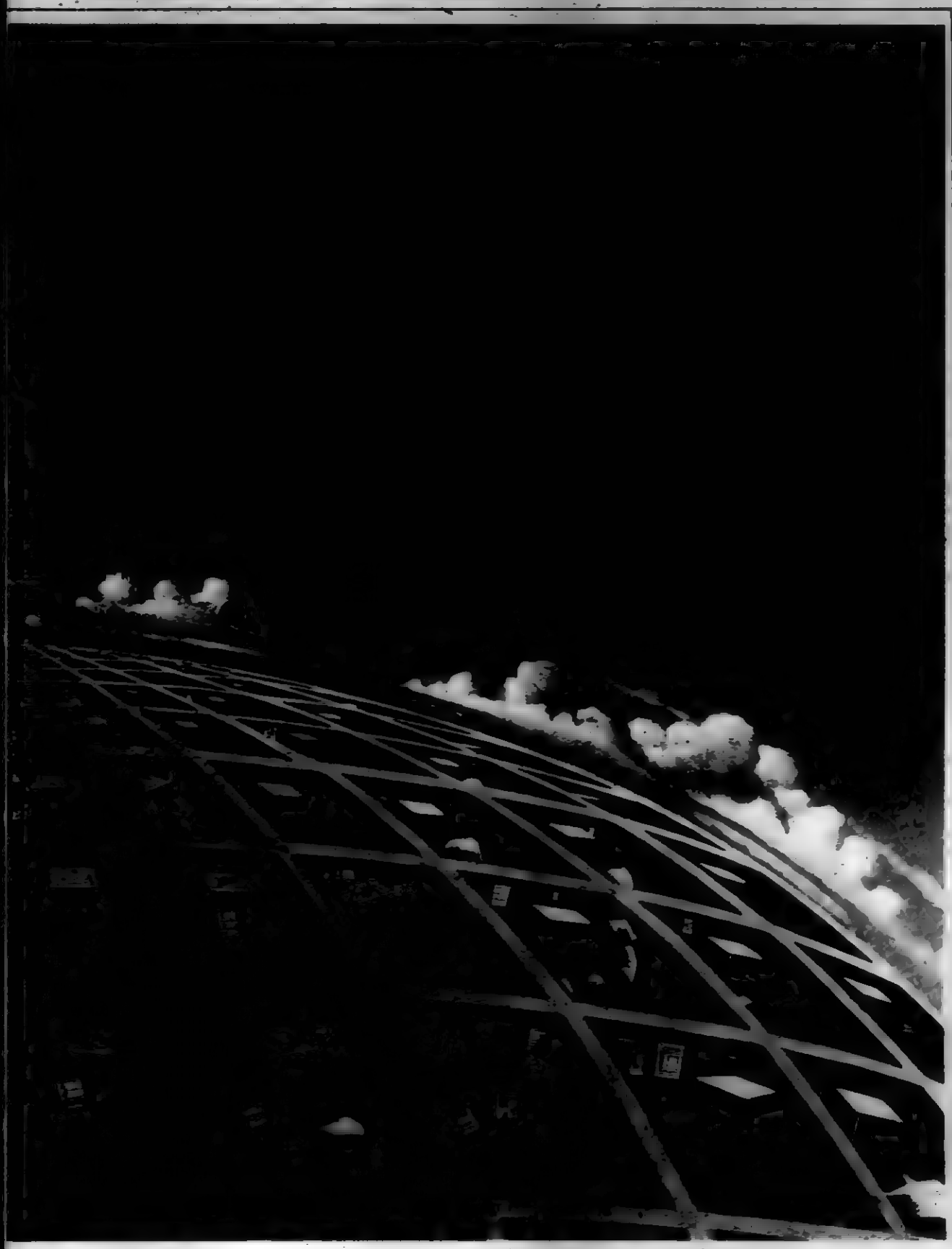
■ *Classical personal computers.* Users of these units are mainly interested in tinkering with applications such as Visicalc and Dungeons and Dragons, rather than serious applications. This user really should be buying an Apple IIe or a Lisa, but if he wants to buy from IBM, he can get a Personal Computer or an XT from a computer store or an IBM Product Center and run PC-DOS, Concurrent CP/M or Vision.

So much for the Personal Computer. IBM has, in fact, done an effective demolition job on the original market, channeling microcomputer technology more into its traditional lines of business and enabling it to leverage its corporate strengths. One of the more regrettable side effects, of course, is that IBM has pulled the rug out from under vendors such as Apple that have continued to build better products in the belief that this was still the key to success.

Like IBM, AT&T appears to recognize that microcomputers will be most useful supporting its mainstream lines of business. The three areas in which micros could perform this function at AT&T are:

■ As communications terminals for services such as AT&T Information Systems' Net/1000 and consumer and business videotex services.

■ As workstations in Fortune 1,500 environments, forming part of an



office automation scenario centered on the System/85 private branch exchange and its successors.

■ As options under a Unix architecture, forming the low end of a processor line passing through the minicomputer and potentially mainframe brackets.

It would make sense for AT&T — and IBM — to field an overlapping product line and bracket the market with a range of targeted distribution channels. Fortune 1,500 markets would probably best be handled by direct or joint marketing with a line that overlaps at the high end with the Unix line.

One such machine could be a 32-bit processor for the management and executive user, a more powerful and complex model than the IBM XT/370. It would be used for programming and specialized treatment. Other products for users with less demanding requirements could include simpler intelligent and dumb voice and data workstations such as the IBM 3270 Personal Computer, Personal Computer/3278, Personal Computer/3279 and 3178. Full communications support and industry standard operating systems and applications options would probably also be supported.

For the communications terminal market, AT&T wants to use its existing marketing strengths supported by direct mail, telemarketing and so on for the consumer and small business markets. It would also like to employ a variety of third-party retail and distributor channels.

For the Unix market, including the conventional minicomputer and supermicro markets, overlapping OEM and value-added channels would supplement AT&T's other marketing activities and cover any market niches not reached directly.

At this point, it is still unclear what AT&T will use as products. It has no presence in the existing microcomputer market and needs to penetrate the market fast, particularly in the office automation and communications services fields. Acquisitions are a possibility.

However, the most likely option involves partial buy-ins and/or marketing and development tie-ups with companies like Digital Equipment Corp., Apple and Commodore Business Machines, Inc. and others with market presence in key areas.

The synergy with Apple, for example, is so obvious that it would be surprising if it did not result in a relationship between the two. This would not preclude AT&T from introducing its own products either immediately or at a later date. As IBM has demonstrated, product overlap is a lesser evil than leaving gaps in the marketplace.

Competition between IBM and AT&T seems to be shaping up across the board, initially in Fortune 1,500 office automation markets, but later in the mini and supermicro fields.

Both companies will be competing more against other vendors than each other for a while, but given the speed with which IBM is coming on in this market and the likely impact of an AT&T entry, they are inevitably going to clash.

The communications terminal sector also looks set for a face-off. IBM is already promoting its business micros as information network terminals, and videotex access for its Personal Computer, XT and PCjr lines is a key component of IBM's move into this area this year.

The two firms are clearly going to be competing heavily for this market by the mid-'80s, with IBM initially pushing CATV-based services and AT&T pushing conventional on-line services.

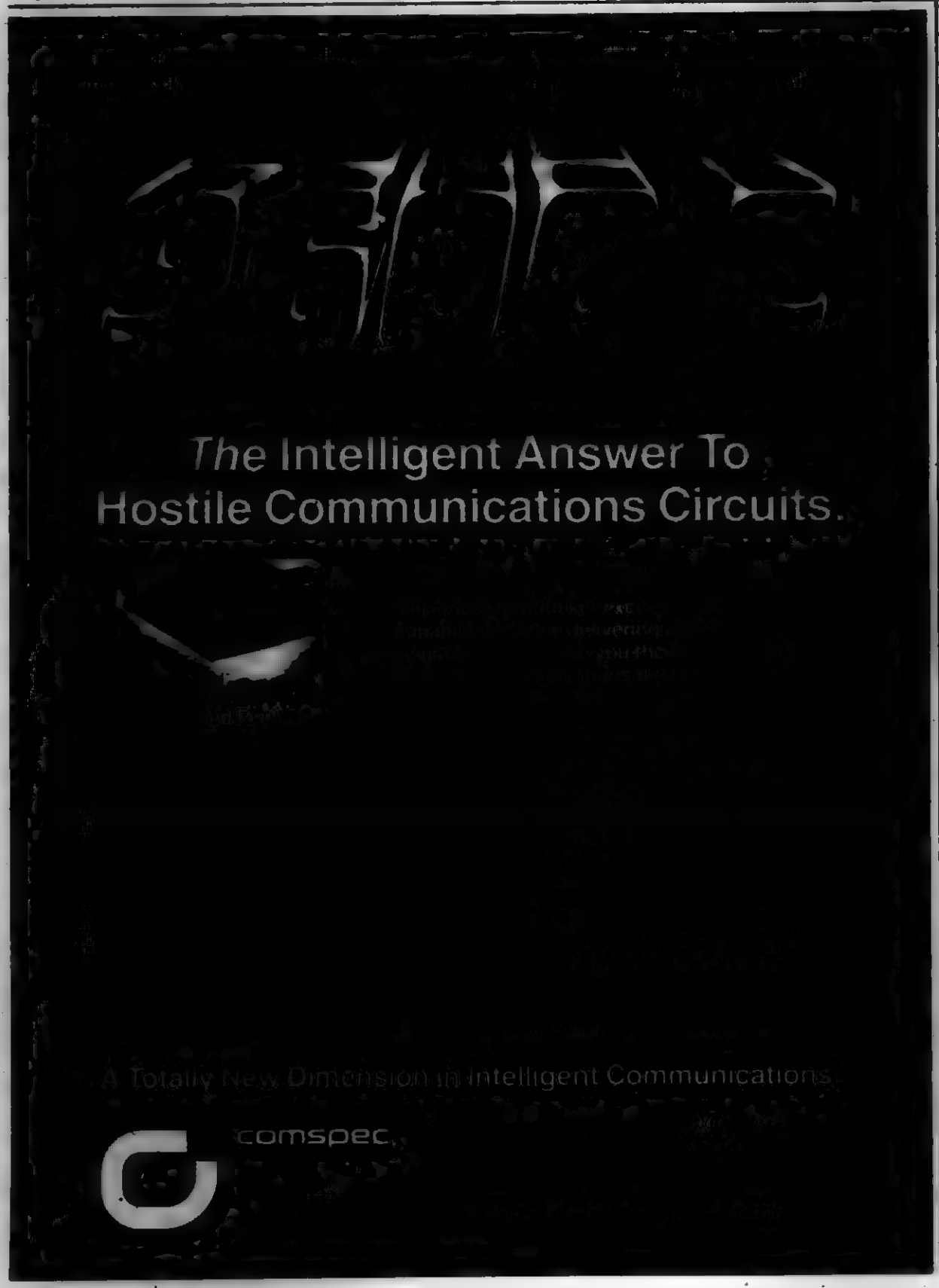
IN THE FINAL ANALYSIS, IBM's marketwide quality, service and support will play a crucial role. In buying an IBM micro, one is essentially buying IBM. There is a wide range of products available according to taste and requirements, but the particular box chosen is really a secondary concern. AT&T will stress conservative values like compatibility, reliability and service. This takes the focus of competition off a box-for-box, feature-for-feature basis.

That focus turns to IBM's name, its service organization and its ability to offer a totally integrated SNA-based communications scenario and videotex services to Fortune 1,500 firms.

IBM has reached a point at which AT&T is virtually the only company that can compete with it effectively. Like IBM, AT&T is likely to place the focus of competition on the capabilities of its organization and perhaps also its affiliates. It is clearly able to handle the same kind of mass-marketing campaign that IBM has begun.

The majority of potential micro users are uncomfortable with the new technology. IBM and AT&T offer reassurance in a field of vendors, most of whom still stress leading-edge capabilities. ■

Jeffrey is director of research, International Technology Group, Palo Alto, Calif.



Special Section

MORALE AND MANAGEMENT

By Alain Desrenne

The business of competing has received much attention lately, particularly in relation to AT&T, a company that supposedly cannot compete. IBM, on the other hand, has become a very competitive company.

This is a striking contrast, but just a few years ago, IBM was also known as a company that could not compete. Critics said that even though IBM was strong in the mainframe market, it could not compete in the newer, faster moving markets.

By the late '70s, IBM had acquired a reputation of being ▶

a musclebound giant. It was perceived as slow-moving, bureaucratic and riddled with a reluctance to consider solutions from outside. For much of the decade, it had mounted challenges in markets that had done less than set the industry on fire, such as the minicomputer and word processing equipment markets. Yet in October 1981, it began a massive corporate reorganization that preceded a blizzard of new product introductions, aggressive pricing and marketing strategies, innovative uses of third-party distribution, tie-ups with other companies and lawsuits.

Contrary to the general opinion in the industry, IBM accomplished this without large-scale outside hiring. The new "lean and mean" IBM is composed of many of the same people as the old IBM. The managers are long-time staff members, who only a year or two ago were running their bit of what was generally regarded as one of the most hidebound companies in the industry.

THE NEW SPIRIT AT IBM should not have come as a great surprise. As IBM employees like to point out, IBM had always been competitive. In the '50s and '60s, it fought a hard battle for the mainframe market and, in the '70s, fought off a new wave of competition from the plug-compatible vendors.

Moreover, IBM had always been competitive internally. Contention management, as IBM employees describe it, had always been the norm, with groups within the company competing heavily with each other. During the '70s, its three divisions serving the Fortune 500 market — the Data Processing Division (DPD), the General Systems Division (GSD) and the Office Products Division (OPD) — fought an intense, if fratricidal, battle for the office automation arena.

IBM's apparent lack of competitiveness was due to its preoccupation with host mainframes. Although it continued to market lines of office and small business products, IBM had become for all practical purposes a single-product company. It sold mainframes.

Like all single-product companies in a fast-changing industry, IBM discovered that success carried the roots of failure. The establishment of the 370 series architecture as the industry standard and the accumulation of end-user software investments reduced the game to an orderly hardware price/performance progression. This was dictated less by competition than by IBM's internal requirements. Even the appearance of the plug-compatibles did not significantly alter this situation: It just speeded up the process.

With an ongoing antitrust suit limiting the possibilities for diversification and with slowing growth and an aging management structure, IBM began to stagnate. Throughout the '70s, the mainframe lobby — composed of IBM employees who believed that very little of interest in computer technology had occurred since the mainframe — persisted in trying to fit the new technologies into the old mold. Systems Network Architecture (SNA) was introduced as a response to the appearance of minicomputers in IBM's large accounts. Even such things as word processing, local networking and personal computers were similarly dealt with by hanging them off hosts. Some of IBM's host-based office automation systems are perhaps best forgotten. Products such as the token-ring local-area network and the recently announced 3270 Personal Computer suggest that this orientation is far from dead.

The smaller systems groups, notably the GSD and the OPD, were more aware that a more effective response was necessary. As a result, systems such as the Series/1, 5520, Displaywriter and the Personal Computer began to find their way into large accounts to the confusion of all concerned. However, the small systems business, like other IBM lines of business, tended to be regarded as a sideline. It did not have a high status within IBM.

By the late '70s, the situation began to receive serious corporate attention. The company was losing many of its younger, more entrepreneurial managers. In addition, career blockage, IBM's commitment to lifetime employment, was reaching epidemic proportions. In addition, frustration with the firm's poor showing in the newer, high-growth markets was mounting.

The "wild ducks" — IBM's term for its more original and entrepreneurial managers — were traditionally tolerated rather than valued inside the company. But they were increasingly seen as a vital resource. With growth moving away from the old host complex and toward newer areas and with the prospect of the antitrust suit being dropped, IBM was going to need that type of manager to compete in new markets.

The reorganization and the large-scale diversification that began to be prepared in the 1979-80 time frame were to some extent a

IF YOU READ YEARS AND FROM IT WOULD BE CURRENT.

This product will comply with all applicable FCC rules prior to final delivery.

response to this. While management dissatisfaction was far from the only consideration in planning for the new structure and priorities, it was important. It was unusual for a U.S. corporation to factor employee satisfaction into multimillion-dollar diversification decisions. However, IBM has always been out of the mainstream of large U.S. firms in its emphasis on employee commitment and lifetime employment.

Whatever the intentions, the results were clearly beneficial to the wild ducks. In a massive series of reshuffling and diversification moves that began in 1981, management hierarchies were dislodged, and poor performers were sidelined en masse. The creation of new functions in new organizational units — notably in small systems and the independent business units — opened up opportunities for many of the more entrepreneurial managers.

The reorganization also created a structure that enabled the competitive spirit to be channelled outward against other companies rather than inward against other units within IBM. The National Accounts Division took the large accounts, and the National Marketing Division took the others. In addition, various independent units — later consolidated as the National Distribution Division — took third-party channels. Product development and manufacturing functions were consolidated to respond to their respective needs.

To deal with the problem of product overlap, IBM developed separate lines for each major market segment. The Fortune 1,500 market was turned over entirely to the mainframe lobby. Separate product distribution complexes were set up for such areas as small business systems, home and personal computers, OEM minicomputers and microcomputers, communications products and services and consumer products.

Distribution complexes were also set up for factory automation equipment, instruments, computer-aided design systems, medical electronics and specialized displays. In each case, the aim of the IBM unit handling the complex was to gain a share of the market. Overlap between product capabilities was dealt with by ensuring that separate distribution channels reaching distinct market segments were used. There were to be no repetitions of the office automation wars between the DPD, GSD and OPD.

IF THIS TRADITIONAL competitive spirit at IBM was to prove an asset, so, it turned out, was the traditional IBM corporate culture. This culture had always stressed a handful of key values — quality, reliability and service — rather than the advantages of particular products or technologies. As a result, its products obtained a reputation for being less than state-of-the-art. This was true, but beside the point: IBM was not competing on state-of-the-art technology. In the '50s and '60s, the key values were effective in the mainframe market.

IBM's emphasis on quality, reliability and service was singularly appropriate for host computing, a new technology that was still treated with suspicion in many organizations. Moreover, the introduction of host computing and the emergence of corporate DP centers meant the centralization of business data and processes on a single point of failure. Reliability, support and service, which IBM had made its keynotes, were powerful competitive tools.

This approach also proved effective in the office automation market during the '70s, serving to counteract the effects of some less than impressive systems. However, it seemed that the emphasis on realiability and service did not carry much weight in newer, faster growing markets outside the large accounts — for example, personal computers. But it soon became clear that that assumption was not right. IBM began a late-entry strategy with the IBM Personal Computer and, more recently, with other products and services.

IBM's strategy is clearly to let others pioneer a market. Leading-edge products are bought by leading-edge users. IBM enters at the point when products are standardizing and when the market is beginning to extend to the mainstream of business users — a group that is far more receptive to the issues of quality, reliability and service than pioneer users.

Seen in this perspective, IBM's rather staid corporate culture is proving to be a massive competitive asset. There was no need to change it to make the company more competitive, and IBM did not try to do so.

The net result was that IBM emerged in the '80s with few changes in its culture or orientation. It made a few technical adjustments. These involved breaking the hold of the mainframe lobby on corporate decision-making and confining it to the Fortune 1,500 market. It also involved rechannelling the energies and competitive spirit of its younger entrepreneurial managers into broader and newer markets. All in

THIS AD YEARS NOW, STILL

GTE presents Omni, the telecommunications system with a life span that's virtually limitless.

We've made obsolescence obsolete. As far as your telecommunications system goes, anyway.

No more changing the system every time your needs change. With GTE's Omni, the system is simply reprogrammed.

Omni is a modular system that allows you to easily add more capacity and features whenever the need arises. Often without installing new cables. (Or even touching a wire, for that matter.) So you'll always have the latest telecommunications capabilities.

And right now those capabilities are really extensive. (Including the latest data applications.) To make it even more attractive, you can frequently have all this installed using your existing telephone wiring.

Contact us today and find out more about this remarkable system. After you hear the whole story we think you'll agree that even the word "remarkable" is a bit of an understatement. For more information write Marketing Services, GTE Business Communication Systems Incorporated, 12502 Sunrise Valley Drive, Reston, Virginia 22096. OMNI Systems are available in Canada through AEL Microtel Limited (613) 342-6621.

We've simplified a complicated business.

GTE Business Communication Systems

all, it was not a bad performance.

IBM's problems, however, are insignificant beside those of AT&T. The company behaved like a utility for longer than anyone could remember and was heavily regulated for much of its history.

In 1968, the Carterfone Decision changed all that. In the wake of the decision, divestiture of the operating companies and the adoption of a more competitive posture became pressing needs as a slew of new competitors began to take chunks out of the company's markets.

As in the case of IBM, however, it would be a mistake to underestimate the extent to which AT&T was competitive during the '70s. AT&T was hampered by its existing commitments to the Dimension PBX line, regulatory problems and a natural reluctance to show too much aggressive behavior while the divestiture case was still in progress. Nevertheless, AT&T did compete heavily with the Interconnect PBX vendors, companies offering bypass long-distance telephone services, suppliers of customer-purchased telephone equipment and the like. The utility mentality was perhaps strongest in the operating companies and the Long Lines Division. Under the new structure, the former will no longer be part of AT&T, and AT&T Communications, the successor to Long Lines, will remain regulated. Moreover, as many AT&T staff were given the option of going with the regulated or unregulated entities, it is clear that many of the utility-minded have taken themselves out of the picture. And others have chosen early retirement.

In the remainder of the organization — and particularly in AT&T Information Systems — many of the same changes that have been noted in IBM also occurred. A succession of restructuring moves has broken up much of the entrenched management hierarchy. This reorganization left a new generation of managers, typically in their 40s or younger, in decision-making positions in most parts of the organization.

Moreover, some fairly substantial efforts have been made to overcome one of the key weaknesses of the old AT&T organization — the lack of contact between its different components. In addition to personnel transfers and changes in reporting structures, AT&T has run programs to put Bell Laboratories and Western Electric engineers out into the field.

The results, while variable, nevertheless belie the idea that AT&T is still the same static organization it was in the past. Similarly, most of AT&T Information Systems' regional units have been engaging in some fairly heavy training and retraining, and focus groups have been organized. In addition, customer interface sessions are occurring on a scale that would have been difficult to imagine only a few years ago.

Like IBM, AT&T also has a surprisingly strong tradition of internal rivalry to draw on, mostly between its regional units. Competition on service performance has been strong within the company for a long time. With service clearly a major competitive edge for the new competitive entity, it is a significant factor in assessing AT&T's likely future performance.

Unlike IBM, however, AT&T has gone in for some large-scale outside hiring exercises and has made deliberate attempts to change aspects of its culture. A group of executives recruited from outside by Archie McGill, the former president of American Bell, Inc., began to lay down potential changes in the mid-'70s. For a while, it looked as though American Bell, which has since been renamed AT&T Information Systems, was going to go in the direction McGill proposed. It would move toward becoming a systems vendor like IBM, with a product line and marketing staff drawn heavily from outside sources.

THE DEPARTURE OF McGill and many of the executives he brought in with him was perhaps inevitable. The dispute clearly went deeper than differences over product strategy and reporting structures. According to AT&T sources, the issue involved the extent to which AT&T was going to remain a communications company rather than a systems vendor. Many felt that McGill and his counterparts were taking the company too far too fast.

In retrospect, they were probably right: AT&T possessed a strong corporate culture, and that culture was heavily geared toward telecommunications. That covered such areas as PBXs and transmission technologies and involved a heavy orientation toward reliability and service of the communications infrastructure within companies. Thus, AT&T was probably in a better position than IBM, with its host mainframe focus, to take advantage of the convergence of computer and communications technologies.

An attempt to follow IBM onto its home ground would have been

matchmaker,

IBM Displaywriter & HEWLETT PACKARD Series 40 computer system & DATAPOINT 1560 data
processor & HONEYWELL Series 60 computer system & WANG System 35 word processor &
Series 3003 word processor & NCR Comten 3670 computer system & PHILIPS Series 3004 wo
reader & COMPUCORP 700 data terminal & HONEYWELL Series 62 computer system & RAY
& HONEYWELL microSystem 6/10™ microcomputer & EXTEL B315 data terminal & AM JAC
DATAPOINT 6600 data terminal & ANDERSON JACOBSON AJ833 data terminal & HONEYWELL DPS
HEWLETT PACKARD HP 3000 mainline & PHILIPS INFORMATION SYSTEMS Model 2001E word process
system & WANG System 30 word processor & PHILIPS 2002 Twin word processor & IBM Pe
JACOBSON AJ650 data terminal & TRS 80® personal computer & LANIER No Problem™ word pr
computer system & WANG 2200 computer system & APPLE IIe personal computer & AM JA
PHILIPS Model 2005 word processor & COMPUSCAN AlphaWord III® optical character reader
Series 44 computer system & NBI OASys 4000S word processor & EXXON 210 intelligent ty
computer system & EXXON 120 intelligent typewriter & APPLE II personal computer &
system & IBM Displaywriter & HEWLETT PACKARD Series 40 computer system & DATAPOI
VT 1300 word processor & HONEYWELL Series 60 computer system & WANG System 35 word pro
PHILIPS Series 3003 word processor & NCR Comten 3670 computer system & PHILIPS Serie
character reader & COMPUCORP 700 data terminal & HONEYWELL Series 62 computer syste
& HONEYWELL microSystem 6/10™ microcomputer & EXTEL B315 data terminal & AM JAC
DATAPOINT 6600 data terminal & ANDERSON JACOBSON AJ833 data terminal & HONEYWELL DP

© 1983 Infomod Communications Inc

difficult to manage. At a time when AT&T was having severe problems just getting its new structure to function properly, such an attempt made little sense. As a result, AT&T seems to realize that, for now at least, it is better playing from its strengths — which aren't small.

The introduction of outsiders at lower levels also seems to have caused more problems than anticipated. Originally, AT&T Information Systems planned a 50-50 mix of outsiders to veterans at corporate levels, with regional and functional units handling their own outside recruitment.

While integration problems were expected, the intensity of the frictions that developed between veterans and outsiders seems to have surprised everyone. The management styles of the newcomers were often highly individualistic and authoritarian. The rationale for this was that they were brought in to put the outfit in better shape, and that they should start by making a few changes. This was especially dangerous at AT&T, considering the many younger managers who regarded the reorganization as an opportunity to further their own careers within AT&T.

Those who seem to have adapted best to the AT&T environment tend to be managers not far removed from the archetypal AT&T employee — those who previously worked for companies with strong corporate cultures emphasizing organizational commitment rather than personal performance. The lesson has been learned, and outside hiring is being played down. The net result is that AT&T, like IBM, looks like it is coming through the reorganization and reorientation with a new generation of management, new perspectives and a largely intact corporate culture stressing quality, reliability and service. But IBM is still heavily oriented toward data processing, while AT&T is oriented toward communications.

The typical IBM employee and the typical AT&T employee also show some interesting similarities in personality. The new entrepreneurial managers are a slightly more complex breed than appears at first. AT&T and IBM sources agree that the best managers are those who are not motivated purely by personal success. They are, of course, not immune to financial considerations or to organizational power, but they also derive satisfaction from being part of a large organization in which their views carry some weight. As one AT&T executive, formerly with IBM, put it: "Some of us like to feel that we can influence the way things go, that what we do is going to matter. The financial considerations are there, of course, but I could probably do better with a smaller company. I like the kind of commitment here to customer service, that kind of thing. And I can have more of an influence here than in a smaller company."

BOTH IBM AND AT&T are sensitive to the issue of morale. The results of IBM's morale extend not merely to its own employees, but to its customers, competitors and the press. It seems to be taken for granted these days that IBM will succeed in whatever it touches. It is becoming a self-fulfilling prophecy. This is strong medicine for a corporate culture that lays strong emphasis on the organization's success and whose managers are often organizational entrepreneurs. IBM staff members feel they are no longer part of No. 1, to use the old '70s term. It is a little more than that. They feel they are part of The Winner, a firm that is visibly surpassing its competitors in one market after another.

AT&T, understandly, is not matching this. Poor press, the uncertainty surrounding the company over the last few years as its divestiture ran through the courts and the effects of having outsiders parachuted in to key positions have done much to keep AT&T morale low. Nevertheless, there are clearly good bases for a recovery. A new generation of management, a strong corporate culture and the company's financial, technological and marketing strengths suggest that a sustained show of competitive performance could get AT&T's personnel into the same kind of self-fueling morale that IBM has enjoyed.

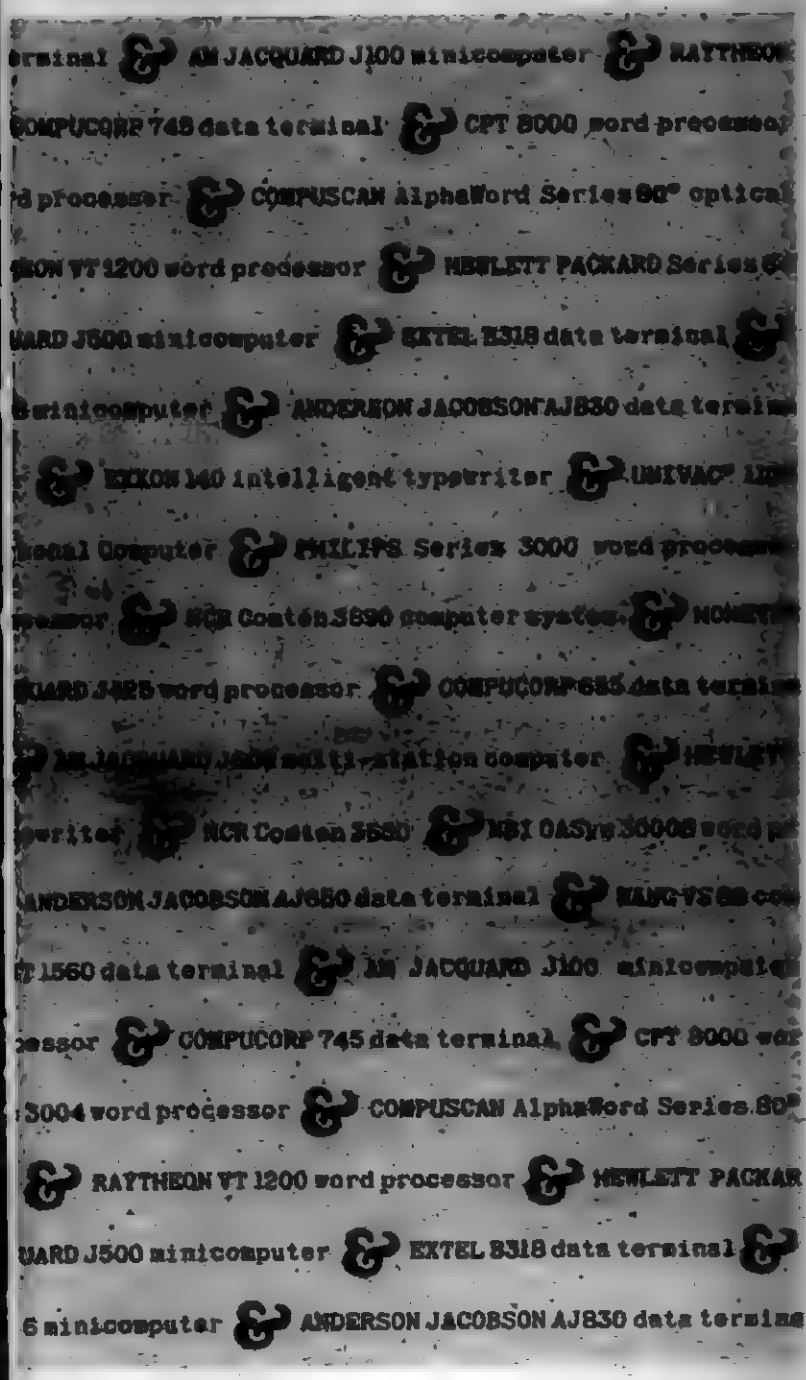
Competitive has a different meaning for IBM and AT&T than it has for most other firms. Both hold the high ground in terms of market presence, and both compete less on products than on values. They sell a kind of security that is attractive to much of the market. The values of quality, reliability and service are deeply embedded in their corporate cultures and maintained by managers and staff who feel motivated to do so.

The concept is simple — good organization, good teamwork, good morale. People.

And for the competitors of IBM and AT&T, it is something to think about for the next strategic planning session. ■

Desrenne is director of European Operations with International Techology Group, Palo Alto, Calif.

matchmaker.



A word processor and a computer aren't a match made in heaven.

Of course, neither are a telex machine and CRT. Or any of the machines listed here.

Rather, they're all matches made by us: ITT World Communications.

You see, until we came along, it wasn't very easy for businesses to send information from a word processor to a computer. Or from a telex to a CRT. Or vice versa.

Now all that (and more) is possible—by sending information through us.

Our network simply eliminates all the usual problems of unlike equipment.

So a company never has to be in the costly position of owning unneeded terminals, just to "talk" to other terminals.

Which means, you'll not only get the communications your company needs, but you could save money as well.

Advanced communications *and* economy?

It sounds like a perfect match to us.

For more information contact your local ITT sales representative or write Marketing Dept. A/PR, ITT World Communications, 100 Plaza Drive, Secaucus, NJ 07096.

ITT

Who says we're the best?

You do.

The facts are in. And we won. Again.

Data Communications' latest Brand Preference Survey, conducted by McGraw-Hill Research, shows GTE Telenet the number one data communications carrier in our category.

(We've won all previous surveys, too, but this time even more people gave us top billing.)

It figures. After all, GTE Telenet pioneered the system that allows your computers and terminals to talk to each other, wherever they are.

We're just a local phone call from hundreds of American cities, in all 50 states, plus 50 foreign countries.

And our network is universal. It handles a wide variety of equipment, speeds and protocols.

It's cost-effective, too. You don't have to incur any capital investment, and you're charged only for the time you use the network. This can amount to only pennies a minute, plus a monthly charge for computer access.

Telenet is reliable. Redundancy is inherent in the network. The system senses if equipment is out of action, and automatically routes data around the fault.

We don't like to brag, but it seems to us that you've just read the reasons why we won the Data Communications survey. Again.

If you'd like to know more about the number one way to send data, just call, toll-free 1-800-TELENET.

GTE Telenet

Special Section

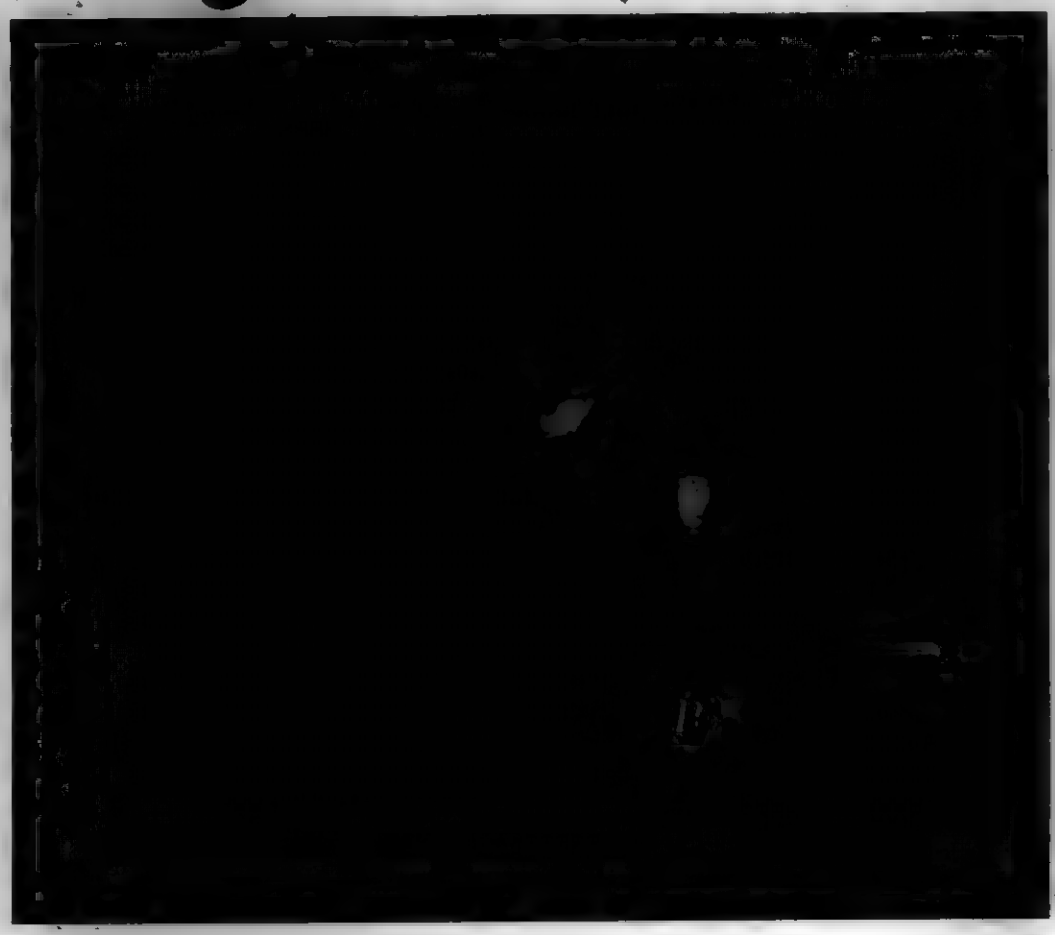
IN THE BALANCE

In November 1981, Michael Killen, president of the San Jose, Calif.-based consulting firm, Strategic, Inc., raised eyebrows and hackles when he boldly predicted that "Xerox [Corp.] is headed for the worst failure in the company's history. When Ethernet fails, everything will go with it."

Of course, Ethernet, Xerox's ground-breaking local-area network, did not fail, but the degree to which it has succeeded is still a matter of debate. At any rate, Killen's dire prediction put him and his company on the map. Since then, he has made many more predictions in the reports Strategic churns out on a variety of information processing subjects.

Computerworld On Communications *Editor Bruce Hoard contacted him recently to see how he views the possibility of future conflict between IBM and AT&T.* ▶

"IBM terminals n
says PCI.



Your IBM CRT can communicate with ASCII hosts, like DEC, as if it was a DEC terminal. With a stroke of the key from your IBM CRT on your desk, you become instantly DEC-compatible. Your IBM terminal is now a DEC VT-100 CRT, thanks to the PCI 74D *de*converter from Protocol Computers, Inc.

You don't have to buy new terminals; you already own them.

Your IBM 3278 is a multi-function performer. Talk to DEC hosts, including those running the Unix and VAX/VMS operating systems. Talk to Dow Jones™ News/Retrieval Service for the latest stock information. Dial-up The Source. Connect to your Local Area Networks. The PCI 74D makes previously inaccessible time-sharing and private ASCII networks instantly available.

With the stroke of the key, you're back talking to IBM.

The PCI 74D switches your IBM 3278 terminal into the ASCII mode when it receives a specific keyboard command sequence. Suddenly the asynch ASCII world is at your fingertips. And just as easily, with another stroke of the key, you're back to IBM.

The PCI 74D resides between the IBM controllers (3274s and 3276s) and the hosts (IBM and ASCII). Connections to the controller or host can be either direct or through a modem. The PCI 74D is transparent to the IBM host.

Full capabilities, both worlds.

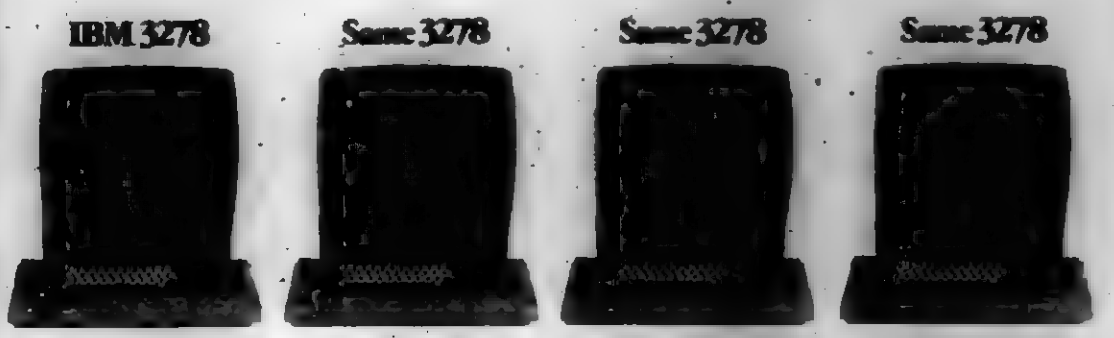
When your 3278 is in the ASCII mode, it can be a DEC VT-100 or TTY-compatible terminal. When your 3278 switches back to IBM, it regains its IBM screen capabilities, its 3278 identity. It's a split personality terminal, with the PCI 74D.

If you'd like to hear more about how to make your IBM world non-IBM compatible, get a dialog going with PCI today. To start your conversation, here's how to speak the language.

Glossary:

ASCII (American Standard Code for Information Interchange). The language spoken by DEC, not by IBM (without PCI).
ASYNCHRONOUS Start-stop communications technique used by low-cost low speed ASCII terminals and Personal Computers.
CoaxFACE™ Exclusive PCI device provides RS232C interface to coax cables for attachment of ASCII terminals to PCI converters.
DEC Digital Equipment Corpora-

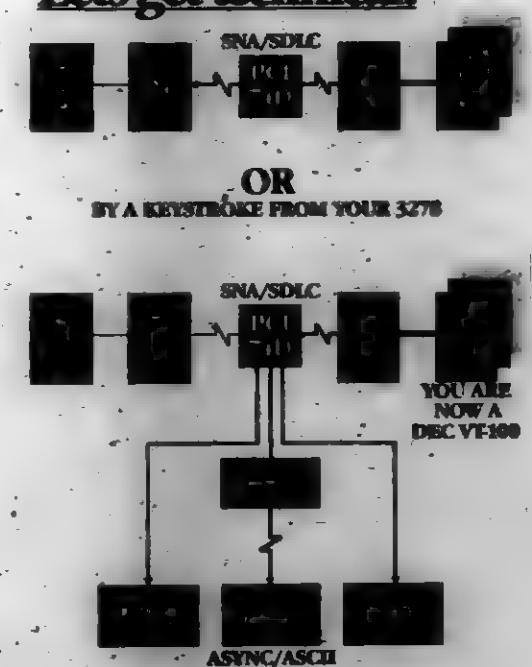
ow speak to DEC,"



tion. Used here as synonym for an ASCII host.
DECONVERTER (74D) Makes the IBM 3270 world ASCII-compatible.
FULL SCREEN The ability to modify an entire CRT screen of data without host interruption.
MODEMS Interface to allow digital devices to communicate over phone lines.
PaperCRT™ ASCII hard copy keyboard terminals have all the versatility of 3278 CRTs with this PCI option.
PCI (Protocol Computers, Inc.) We make the non-IBM world IBM compatible. Now we make the IBM world non-IBM compatible, too.
SDLC (Synchronous Data Link Control). Line protocol for data communications between IBM systems and terminals.
SNA (System Network Architecture). IBM's approach to data communications networking.
SNA/SDLC IBM communications; non-compatible with DEC (ASCII) communications (without PCI).
SYNCHRONOUS High speed, high cost data communications technique.
PCI 74D Deconverter makes the IBM 3270 world ASCII compatible.

3274/76 IBM controllers which support 3278s, 3287s in an SNA/SDLC network.
3278/79 IBM's CRT and color CRT.*
3178 IBM low cost CRT.*
3287 IBM's printer.*
*All non-compatible with DEC (ASCII) without PCI.

Let's get technical.



For more information call today, (800) 423-5904, (213) 716-5500 in California. Or write PCI, 6150 Canoga Avenue, Woodland Hills, California 91367-3773

The Micro Mainframe Link is available from PCI:

PCI 1076: ASCII to SNA/SDLC 3270 emulation.
PCI 1051: ASCII to Sys 34/36/38 5251 emulation.
PCI 74D: Deconverter that makes IBM CRTs ASCII-compatible.
PCI 1067: SNA/SDLC to ASCII 3767 emulation. The NTO alternative.
PCI 71B/SNA: BSC 3271 to SNA/SDLC 3274 emulation.
PCI 75B/SNA: BSC 3275 to SNA/SDLC 3276 emulation.
PCI 1071: ASCII to BSC 3270 emulation.
PCI 3780/SNA: SNA/SDLC to BSC 3780 emulation.
Videotex 67: SNA/SDLC to Videotex protocol conversion.
PCI's X.25 Series: PCI 73SX and PCI R73SX, SNA/SDLC to X.25 protocol converters for host and terminal connections respectively; PCI 1076X, ASCII to 3270 SNA/SDLC through X.25 networks, PAD included.
PCI's Networkers: Keystroke for keystroke 5251/11 and 3278 keyboard compatible ASCII CRTs.
PCI's IBM-PC software packages: For 3270 and System 34/36/38 emulation.

TWX 9104947941 PCI WHQ

"Hello DEC, this is IBM calling."

Name/Title
Company Name
Address
City State Zip
Phone
CW 1/86

PROTOCOL COMPUTERS, INC.
6150 Canoga Avenue Woodland Hills, CA 91367-3773
(800) 423-5904, (213) 716-5500 (In California)

PCI Making the non-IBM world IBM compatible.

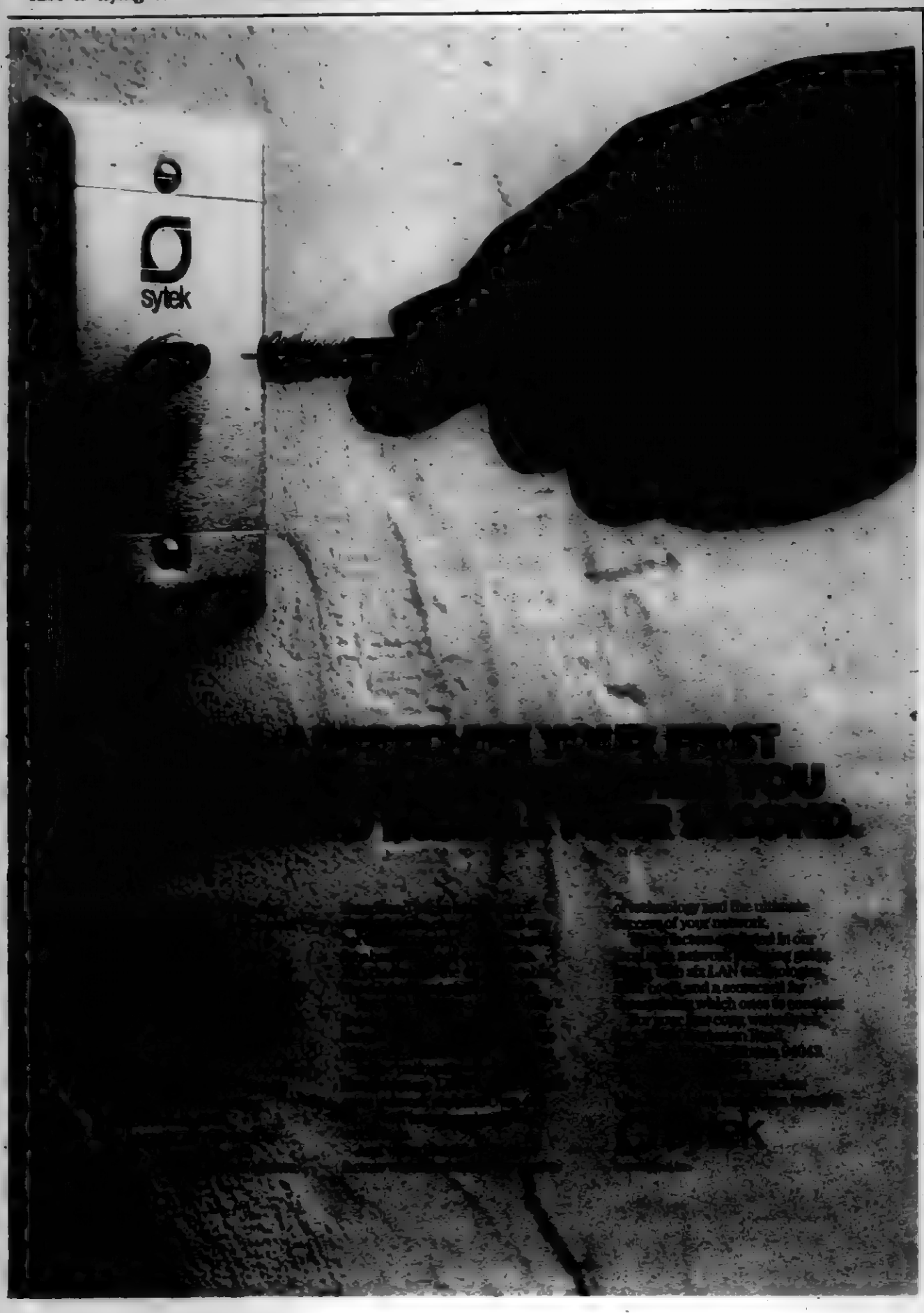
MICHAEL KILLEN

How competitive do you think IBM and AT&T will be over the next five years and in what areas?

AT&T will be as superior as they are right now in all types of communications. IBM will be no match for probably four years. However, within the office — except for its [private branch exchange (PBX)] — AT&T will have a real tough row to hoe.

IBM is trying to work with several of the Bell operating companies to fulfill its needs for local communications, and I think within a year we might hear some announcement where one of the Bell operating companies teams up with IBM in one or another area of communications.

"There is hardly any equipment out compared with what's going to be out in five years. They're both going to clash in office automation, and even though it's a little early to say right now, IBM will blow AT&T away."



To do what?

To complete the local loop-type transmission requirement, mostly within a city, not between cities, but communications within a city. Right now, IBM has nothing in the area of local communications. Take the city of Boston for an example. IBM has an interest in being able to have one company within Boston and another more easily communicate with each other — their data processing equipment, their office automation equipment. It is possible and likely that IBM will work some kind of arrangement with a local company. I've picked up information that Bell operating companies are already talking to IBM.

Refocusing this a little bit, what do you think will be the key areas of their competition? It sounds like you are saying, "One will be here, and one will be there." When they come together, where will they clash? Or will they keep dancing around each other?

I think they're going to clash. In the next three years or so, AT&T's No. 1 priority has to be to solidify its communications business in a competitive and a noncompetitive environment. That is one of its main goals over the next few years. But at the same time, one of its major priorities is to take its PBX line and expand it into office automation.

IBM's goal in the next few years is to move further away from data processing and more into office automation at all levels. That means both companies are moving toward each other. Both know that whoever controls the equipment on your desk or in your home has a lot to say about where you go to get your communications services. Office automation markets are exploding. But there is hardly any equipment out compared with what's going to be out in five years. AT&T wants a big chunk of that. So does IBM. They're both going to clash in office automation, and even though it's a little early to say right now, IBM will blow AT&T away.

Why?

By the late 1980s, the home computer, or the home information system,

should really come into its own. And at that point, IBM's test market for its IBM Personal Computer program should be over, and IBM should be going at the home market with some incredible home information products. At that point, there will be a need for people that have these systems in the home to communicate with companies and other people.

Thus, communications suddenly becomes much more important. Now, AT&T knows that too, so their goal will also be to put a tremendous amount of equipment in the home. The two of them are going to fight to put the equipment in the home, and later they're going to fight for the communications business that will be generated by that equipment.

"Remember, AT&T is going to be out of the local loop. The regional telephone companies and the independent telephone companies have that business. One thing AT&T must do is get back in the loop, especially if the old Bell operating companies get too friendly with the IBMs and MCI [Communications Corp.'s] of the world."

How could IBM control that communications business? By the kind of deals you're talking about with the Bell operating companies?

That's one possibility.

It seems like AT&T would be the odds-on bet to grab that communications portion of the deal.

Remember, AT&T is going to be out of the local loop. The regional telephone companies and the independent telephone companies have that business. One thing AT&T must do is get back in the loop, especially if the old Bell operating companies get too friendly with the IBMs and MCI [Communications Corp.'s] of the world.

AT&T could set up arrangements with cable companies, not necessarily buy them if they didn't want to, but really have long links with the cable TV companies. Then AT&T could bypass the local companies. Everybody can go in a lot of different directions.

How anxious are these two companies to battle each other?

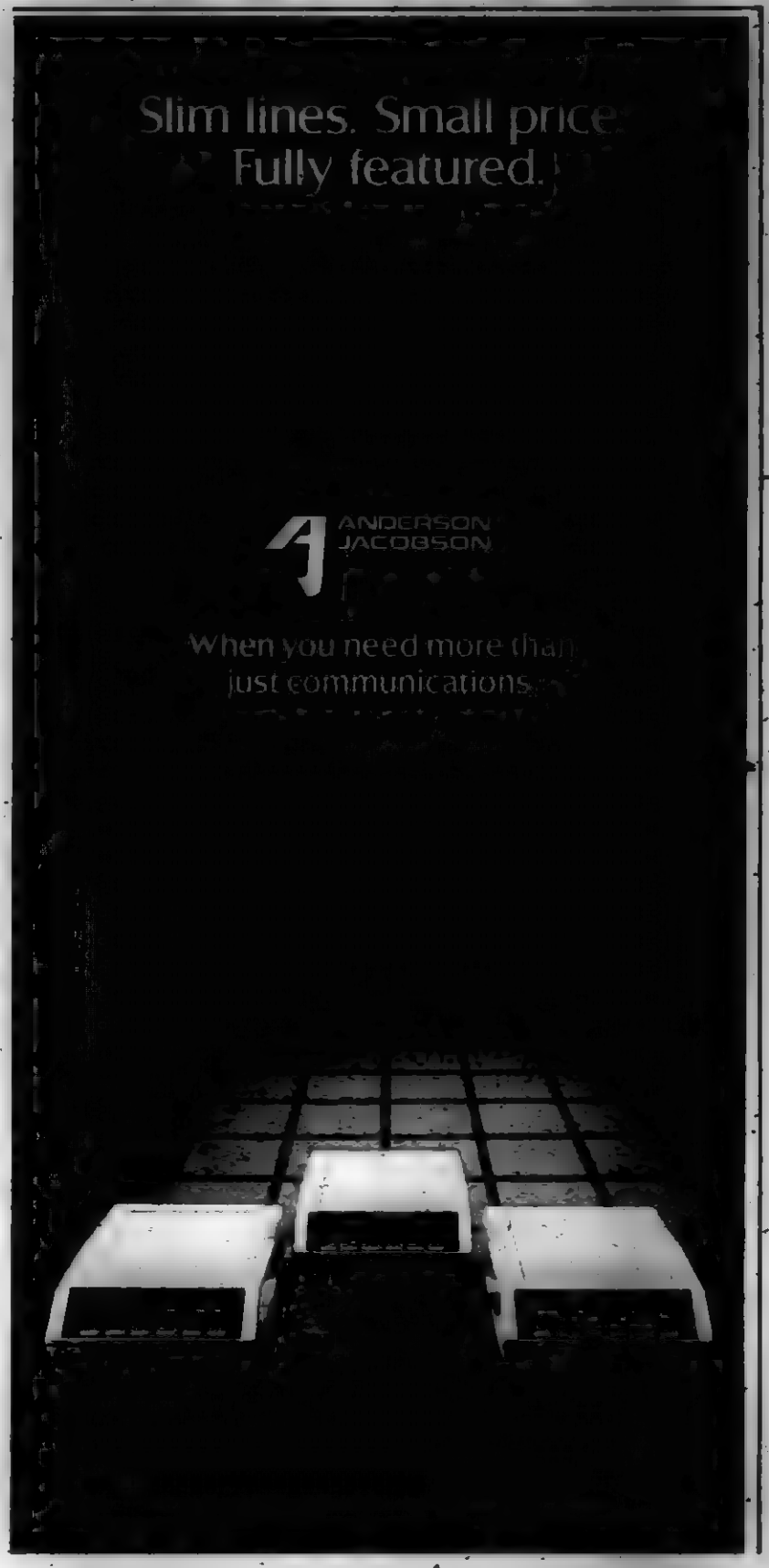
They're both paranoid of each other, I think. They're both thinking about each other. For example, take the Entry Systems Division people at IBM. Their strategy is to consider putting Unix 5 on a multiuser micro. With this rationale, AT&T is the licenser for Unix.

If IBM puts it on a micro and pays AT&T a license, it steals a lot of thunder from AT&T's assets with respect to Unix. AT&T will get a license fee, but IBM will keep its momentum going on selling systems and making money on the hardware.

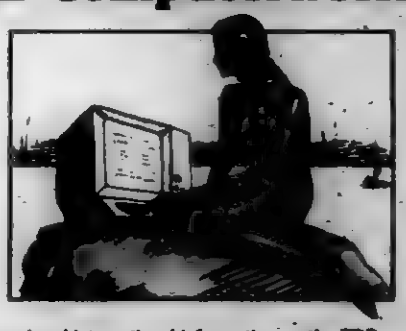
That is something that is constantly being tossed around at IBM as an offensive and, at the same time, a possible defensive move against AT&T.

Is it possible that one company could really hurt the other?

I don't think so. Each of them now has lots of alternative strategies. For example, IBM now has 15% of Rolm [Corp]. I don't think they've even begun to leverage that link. Even though Rolm announced a



Reach the Danish computer market with Computerworld/ Denmark.



The Danish EDP market is growing at an incredible rate of 23% annually. Last year, this market was valued at more than $185 million. And the U.S. is Denmark's major supplier of EDP products accounting for 40% of the country's computer equipment imports.

When Danish computer professionals with purchasing power want the most up-to-date local and international information on the EDP industry, they read *Computerworld/Denmark*, sister publication to *Computerworld*. *Computerworld/Denmark* is a bi-weekly newspaper serving the Danish computer community with the latest developments in hardware, software, terminals and other computer products and services. And, in every issue, the MicroWorld section reports on the special needs of the micro end-user and the status of the market.

So, if you'd like to market your products or services internationally, *Computerworld/Denmark* has a circulation of 20,000 computer professionals who would like to hear from you.

CW International Marketing Services will give you one-stop advertising service in countries around the world. We will translate your ad and bill you in U.S. dollars. For more information on *Computerworld/Denmark* or any of our other foreign publications, just fill out the coupon below.

Diana La Muraglia, Manager
International Marketing Services
CW Communications/Inc.
375 Cochituate Road, Box 880
Framingham, MA 01701
(617) 879-0700

CW COMMUNICATIONS/INC.
Publishers of *Computerworld* and other leading computer publications around the world

Please send me more information on
☐ *Computerworld/Denmark*. ☐ Your other foreign publications

Name _____
Title _____
Company _____
Address _____
City _____ State _____ Zip _____

MICHAEL KILLEN

new PBX recently, it is just the tip of the iceberg when it comes to possible alternatives for IBM.

What about users? How do users stand to gain from competition between IBM and AT&T?

Only the smart and well-informed will really benefit. There are going to be many more alternatives so the uninformed user isn't going to be able to pick out the best approach.

How does one become informed to the point where one can choose intelligently?

Users have to hire the best telecommunications and data communications people they can find. They have to nourish them, send them off to seminars, make sure they read everything. They have to go in and hire people from the old Bell operating companies, from the AT&T companies, from IBM.

"Changing from a noncompetitive business to a competitive business doesn't happen overnight. It is going to take AT&T three, maybe four years before they really have a good sales organization. Right now, they're playing a lot of games. They have assets that companies like IBM and telecommunications firms don't have."

They've got to put bucks in — into people and into educating them.

Conversely, how do users stand to lose?

By not being informed and not making investments properly with respect to data communications and telecommunications.

Much has said about the lack of aggressive, competitive sales experience at AT&T. How much will that hurt them against IBM?

It will hurt a hell of a lot. Changing from a noncompetitive business to a competitive business doesn't happen overnight. It is going to take AT&T three, maybe four years before they really have a good sales organization.

Right now, they're playing a lot of games. They have assets that companies like IBM and telecommunications companies don't have.

They take a look at all the expenditures a company has going toward AT&T companies, what kind of equipment they have on lease, whatever. And then they say, "If you buy new equipment, say in a different area, we will change your lease rate, your rental rate, whatever."

Sounds like the old migration strategy.

That's right. And what they are getting rid of is the stuff they're going to lose anyway. So they have a lot of installed equipment that they are changing to help them move forward into other areas.

How do other companies stand to gain from IBM vs. AT&T?

The little guy that makes computers or telecommunications equipment cannot hope to fight in the main line in the future. He can only pick peripheral markets that the two giants do not want and cannot handle. The two giants are just too big.

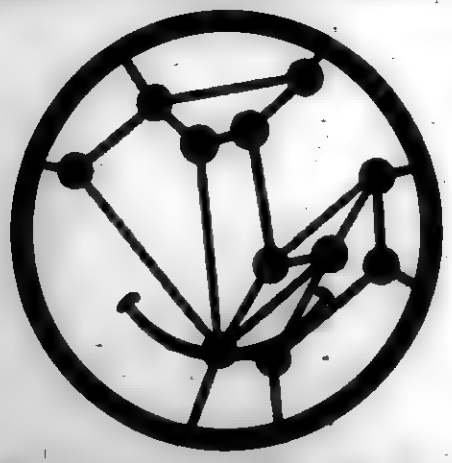
If you were IBM and planning to fight AT&T, where would you try to probe?

Right now, the only thing to worry about with AT&T is communications. Develop real good relationships with all the independent telephone companies. In addition, develop real good relationships with the cable TV companies so the transmission path is secure.

If you were AT&T, what do you want to do? How would you attack IBM?

I'd probably want to acquire channels of distribution, good sales organizations. It would be real nice for AT&T if they acquired Radio Shack. AT&T can build anything today if it really wanted to. The problem is conceiving the product and selling. They could go on an acquisition craze. ■

A Message From The Experienced Intelligent Network People



The "PC-Friendly" Network

TYMNET is the data network that's friendly to personal computers. Our network gives PCs the power to communicate with mainframes. And access 3270 applications. Even format, edit, and highlight like VT100s and 3270s.

We're implementing our X.PC protocol to provide error correction on the local loop and allow PCs to access up to 15 applications over one line—simultaneously.

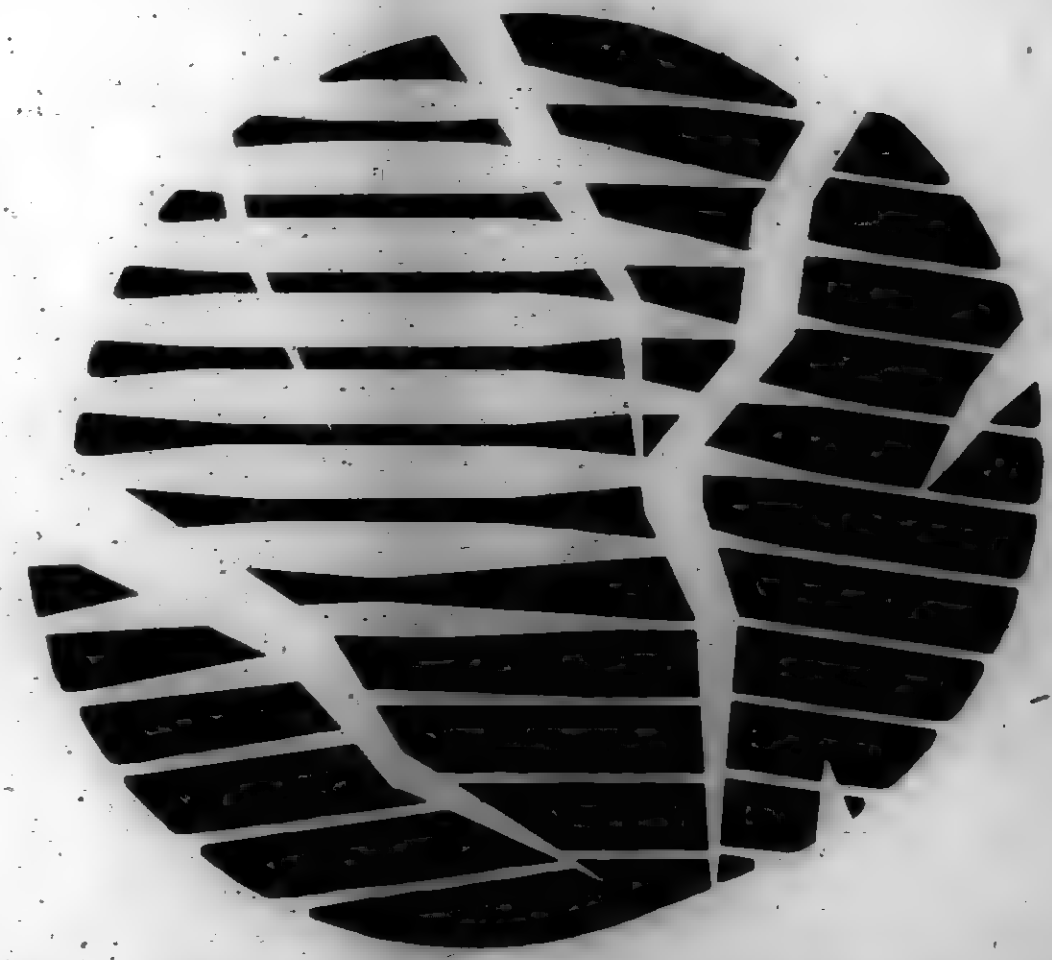
You may be already using PCs to access the latest stock quotes and news items. Why not expand their versatility and create the kind of PC work station that's truly productive?

Want to know more? Call us. We're the PC-friendly network people and the value-added distributor of PCs such as IBM and Digital: (408) 946-4900; TYMNET, Inc., 2710 Orchard Parkway, San Jose, CA 95134.

TYMNET®

Serving more than 7.2 million data calls per month

A Tymshare Company



THE MORE THINGS CHANGE, THE MORE THEY STAY THE SAME

BY ALBERT H. KRAMER

According to conventional wisdom, the telecommunications industry is about to undergo a fundamental revolution, a sea of change spawned by the 1984 divestiture of AT&T and the ongoing deregulation of major industry sectors and players.

The common myth — widely popularized by policymakers and the press — is that divestiture and deregulation are about to bring about a new competitive era.

But this era may not be quite what it has been made out to be.

Certainly, changes have occurred and will continue to occur. Already, the previously unheard-of has become common. AT&T is moving rapidly to sell equipment it once only rented. The soon-to-be-disowned regional operating companies are bypassing Western Electric in favor of multimillion-dollar procurement contracts with competitive independent manufacturers, such as ITT and NEC Information Systems, Inc.

But these changes and the AT&T divestiture might not be the start of something new. Rather, they might lead to the continuation of something old. Pending the resolution of several crucial questions, a new environment that fosters maximum competition in the telecommunications industry may not emerge. Instead, U.S. Federal District Court Judge Harold Greene and Federal Communications Commission (FCC) Chairman Mark Fowler may merely have extended the theory of workable competition.

A brief history is necessary to appreciate the difference between workable competition and maximum competition. In the late '60s and early '70s — when the FCC and the courts were giving their initial blessing to the radical idea of opening the once-monopolized telephone industry to competitive supply — the theory of maximum competition prevailed.

The policies embodied in such landmark rulings as the Carterfone Decision (1968), the MCI Decision (1969), the Mebane Home Telephone Decision (1975) and the Specialized Common Carrier Decision (1971) were designed to let competition flourish. The evolution of full-fledged competition among hundreds of entrepreneurial companies was envisioned. The entrepreneurial firms would vie with each other and with AT&T and the independent telephone companies to provide a host of innovative products and services.

The doctrine of maximum competition probably reached its zenith in 1976 and 1977. The U.S. Supreme Court refused to upset the FCC's establishment of an equipment registration program, replacing AT&T's costly and anticompetitive coupler arrangements. AT&T had required an expensive coupling device before customers were allowed to interconnect their own customer premises equipment to the network, allegedly to protect the telephone network from harm. ▶

After several years of struggle, the FCC adopted a registration program allowing any equipment certified to meet network technical standards to be connected to the network by means of a simple, inexpensive interface device.

In another development, the U.S. Appeals Court reversed a different FCC decision prohibiting MCI to launch its Execunet business service. In addition, Congress rebuffed several attempts by AT&T in the early '70s and thereafter to have so-called "Bell Bills" adopted. These bills would have outlawed competition altogether.

The past several years, however, have seen the full-scale emergence of the new theory of workable competition. In its most basic form, the theory maintains that competition should be allowed, but it is necessary to concentrate on allowing the telephone companies and industry giants to compete with each other. The theory further maintains that new suppliers have been encouraged to enter new markets, and it is time to open the unregulated markets to the regulated carriers. The new doctrine first surfaced in 1971 in the FCC's Computer Inquiry I, which allowed the independent telephone companies to provide data processing services through separate subsidiaries.

Since then, most of the inititiatives in Congress, the courts and the FCC have been designed to allow AT&T to compete in the data field as well. This involves either circumventing or repealing the primary barrier to workable competition. This barrier is the U.S. government's 1956 Consent Decree with AT&T, which prohibited the dominant carrier from entering the unregulated, nontelephone markets, principally data processing. With the adoption of the FCC's Computer Inquiry II Decision and the court's 1982 Modified Final Judgment, AT&T has succeeded in removing the restraints on its entry into the data field and other competitive ventures on an unregulated basis. Computer II simply bypassed the 1956 Consent Decree by interpreting the decree to allow these activities. Judge Greene's acceptance of the revised 1982 antitrust settlement repealed the 1956 agreement altogether.

Thus, the doctrine of workable competition has now reached maturity — blessed not only by the Supreme Court and the FCC, but by the Reagan administration and Congress as well. Instead of creating a brave new world of multifaceted competition, the two landmark policies could hasten the demise of such multiple choices.

In addition, the "level playing field" — which Congressman Tim Wirth (D-Colo.) alluded to in referring to a comprehensive rewrite of the Communications Act of 1934 — could become merely a battleground for Star Wars-type clashes between the industry giants. The revision of the Communications Act would have mandated that the communications giants could compete on an "equal" basis with small, budding entrepreneurs trying to enter the fast-growing field.

Although Computer II and the Modified Final Judgment have provided important clues about the direction of policy in the coming years, there are still several crucial questions pending. The answers, which are expected in the next few months, will clarify the degree to which policymakers are committed to creating a new era of robust, open competition or whether they would merely prefer extending the policies of workable competition. The issues include the disposition of the Bell Systems' in-place telephone systems and wire, the establishment of separate subsidiaries for the regional Bell operating companies' unregulated activities and the operating companies' ability to expand Centrex services.

To what extent will AT&T be allowed to use its multibillion-dollar base of in-place customer premises equipment to manipulate the market through dumping campaigns or new migration strategies? If the FCC permits the immediate, as opposed to phased-in, deregulation of that customer premises equipment at less than net book value or allows certain offsets to net book value, expect a fire sale. This sale will significantly dry up the market for all but the largest competitive suppliers. It will also set the stage for a new migration strategy by locking customers into long-term contracts on old products. Only AT&T can free those customers from those long-term contracts.

Although the FCC was not expected to rule on the question until late 1983, there are two indications that a fire sale is coming. First, Bell acknowledges it has lost $8 million this year on the prederegulation sale of home telephones because state regulators did not set the sales prices at levels high enough to recover the full investment in customer premises equipment. Second, AT&T has announced it will write off $7.2 billion worth of equipment assets, with a net effect against this year's earnings of $3.8 billion. This will permit the equipment to be dumped at bargain-basement prices in 1984.

To appreciate the magnitude of the unprecedented write-off, one

Some of the best names in software are quite attached to our network.

These people know PCs. They also know a good idea when they see one. That's why they're building future networking software around today's networking standard — Ethernet. And why they chose our PC networking system to help them do it. EtherSeries from 3Com.

What EtherSeries is doing for them.

"3 large, growing, and diverse Ethernets are at the heart of our software development activities. Our 3Com hardware has been very reliable — it has never failed us."
— Bill Gates, Chairman, Microsoft (Bellevue, Washington)

"We want to develop our popular dBase II® to a multiuser networked database environment. To meet the demands of our customers we chose the high-performance 3Com EtherSeries.™"
— David Clayton Cole, Chairman, Ashton-Tate (Culver City, California)

"The ease of sharing information and printers led our 1-2-3® advanced development team to choose 3Com's EtherSeries™ over all of the alternatives."
— Mitch Kapor, President, Lotus Development (Cambridge, Massachusetts)

"We wanted network software transparency. Our PFS:® software runs without ANY change on 3Com's EtherSeries™ — it protects our user's software investment."
— Fred Gibbons, President, Software Publishing (Mountain View, California)

"The Ethernet standard and 3Com's EtherSeries™ will be an important part of our in-house networking strategy. It provides the connectivity we require for our growing organization."
— Bob Frankston, President, Software Arts (Wellesley, Massachusetts)

"Our mainframe link software and Peachtree software ran perfectly in the 3Com environment. We dropped

must consider that the entire competitive interconnect industry sold $2.6 billion worth of equipment in 1983, only about one-third of the $7.2 billion pretax write-down of the same type of equipment AT&T took in one swift stroke of a pen.

Will the divested operating companies be allowed to use the same type of anticompetitive leverage with the millions of miles of installed inside wire they retain under the antitrust settlement? If so, expect them to use their bottleneck control of the embedded wire in a deregulated environment in familiar discriminating ways. This includes requiring customers of competitive customer premises equipment suppliers to buy the cable at exorbitant full replacement value, rather than the more equitable net book value. Unfortunately, neither Judge Greene nor the FCC has paid more than passing attention to the issue. However, several states, notably California and Texas, have implemented or are about to implement procompetitive plans that would require telephone companies to allow all customers to use that in-place premises wire for free.

Will the FCC require the operating companies to establish separate subsidiaries for the marketing of unregulated customer premises equipment, data products and enhanced services? A decision was pending at press time, with an appeal all but certain. Unfortunately, such a decision need never have been made if Judge Greene had accepted the original AT&T-Justice Department antitrust proposal, which would have removed the regional operating companies from the customer premises equipment business altogether. But in setting up the regional companies as the most viable competitive counterforce against AT&T Information Systems — the workable competition theory in action — Judge Greene has made it possible for most of the same threats that have plagued the development of full-fledged competition in the past to reemerge in the supposedly new environment.

In the past, such discrimination has taken two principal forms. The local telephone companies have used monopoly profits, derived from the provision of regulated basic local service to captive customers, to subsidize the price of their competitive unregulated customer premises equipment products and services. In addition, they have delayed service to users of competitive customer premises equipment firms.

SEVERAL SALIENT facts get lost in the widespread public empathy for the divested Bell operating companies. Each regional operating company will continue to serve between 70% to 90% of the population in its local franchised area, providing the necessary bottleneck control. Each will continue to operate in large, geographically contiguous areas — ranging from two states for the Pacific Telesis Group and 15 states for U.S. West — and in virtually all major metropolitan areas where most customer premises equipment competition occurs. In addition, alternate means to police anticompetitive behavior by the regional operating companies have proven inadequate.

Of all the unforeseen and unacknowledged consequences of divestiture and deregulation, perhaps none is as threatening to the future development of full competition as the revival of Centrex. In the Bell operating companies' multiple efforts to exploit Centrex service, with the acquiescence of policymakers at both the state and federal levels, the theory of workable competition has been carried to the ultimate. The potential victims are the competitive equipment suppliers and, ironically, the very policies on which the doctrine of workable competition stands — Computer II and the Modified Final Judgment.

Responding to the myth that the Bell operating companies are put-upon, state regulators are allowing the operating companies to freeze or reduce Centrex rates in order to stem the exodus of customers to technologically superior private branch exchange (PBX) and key systems supplied by competitive firms. Curiously, the residential user will be forced to pay to bail out large business and institutional customers of Centrex. But because the subsidies will be spread over such a large base of ratepayers, they are perceived as relatively painless.

The fear — that unless Centrex is protected now, the Bell operating companies will be unable to compete with AT&T and other giants in the new customer premises equipment markets of 1984 — is influential in efforts on Capitol Hill and at the FCC to reduce the new access charges for Centrex users. Centrex lines will be assessed at residential rates, not business rates, and the residential rates will be cheaper until 1989. The Bell operating companies are not satisfied to have their customers pay one-third the monthly rate that PBX customers will pay —

EtherSeries" right into our IBM Information Center and can now share disks and printers."
— Dennis Vohs, Executive Vice President, MSA (Atlanta, Georgia)

"We wanted the expandability of 3Com's Ethernet as a base for our networked products. VisiSeries" for EtherSeries" is the beginning of a family which will include VisiOn.""
— Dan Fylstra, Chairman, VisiCorp (San Jose, California)

What EtherSeries will do for you.

Tying into 3Com EtherSeries was a smart business move for these PC software experts. And it can be for you too. You'll maximize office efficiency, now. Cut operating costs, now. And you'll realize the full potential of your IBM PCs using software that is readily available off-the-shelf, now. All for the low price of $950 per link.

And until January 31, 1984, we'll give you our award-winning EtherMail — a $750 value — with the purchase of EtherSeries and three PC links.

EtherSeries is available at leading computer stores. Call or write Cory Randell at 3Com for more details.

☐ Please have your 3Com representative call.
☐ Please send me more information.
CW-1/19

Name _____
Title _____
Company _____
Division _____
Address _____
City/State/Zip _____
Phone _____

3Com Corporation, 1390 Shorebird Way, P.O. Box 7390, Mountain View, CA 94039. Phone (415) 961-9602.

3Com is EtherNet.

IBM PC is a registered trademark of International Business Machines. Lotus 1-2-3 is a trademark of Lotus Development Corp. PFS is a registered trademark of Software Publishing Corp. VisiSeries and VisiCorp are trademarks of VisiCorp.

that is, $2 vs. $6 per line. As a result, the Bell operating companies and their user allies are pressuring the FCC to charge Centrex users the same rate they would pay if using a comparably sized PBX.

Such a regulatory sleight of hand ignores reality. Because their lines are bundled at the on-premises switch, PBX users require far fewer trunk line connections to the telephone company's central office than Centrex users require. As a result, customers make far less use of the telephone company's facilities and should pay lower overall rates. If the regional Bell operating companies are successful in creating an artificial rate parity between Centrex and PBX, any notion of cost-based pricing — so essential to the development of maximum competition — will be lost.

Several operating companies' attempts to add new features to basic Centrex service are equally ominous. These features include least-cost routing, call forwarding and storage and automatic call distribution. Some operating companies are contemplating the addition of energy management systems through Centrex. Such proposed expansions strike at the heart of the Computer II plan, which drew a fundamental distinction between basic, regulated service, such as local exchange and Centrex, and unregulated customer premises equipment and enhanced services. Similarly, the expanded Centrex offerings could contradict the Modified Final Judgment as well, because many of the proposed new features could be categorized as information services, which the regional operating companies are prohibited from offering without the explicit permission of Judge Greene.

To date, Judge Greene has not addressed the issue. And the FCC has failed to respond to requests to reaffirm the clear-cut distinctions of Computer II by prohibiting the Bell operating companies from illegally commingling regulated and unregulated services through Centrex. Such commingling, if allowed to occur, will enable the Bell operating companies to enter the competitive information services market through the back door under the rubric of regulated basic exchange service.

The result could be the remonopolization of local markets that the antitrust settlement and FCC deregulation policy were designed to eliminate. The threat would be not only to equipment vendors, but to the many independent data processing and computer-related support industries currently emerging.

The questions raised by Centrex, separate subsidiaries, inside wire and embedded customer premises equipment apply primarily to the telecommunications equipment industry. But the theory of workable carrier competition is being extended to the intercity transmission sector.

For example, consider Judge Greene's refusal to force the operating companies to allow customers to presubscribe to competitive carriers for intra-Local Access and Transport Area toll calls. This decision handed the local telephone companies what amounts to a $5-billion annual in-state market. Or consider Greene's acceptance of the Justice Department's separate consent decree creating a major new long-distance carrier through the merger of GTE Sprint and Southern Pacific's Sprint operation. The FCC, too, has begun a proceeding designed to explore the feasibility of deregulating AT&T's long-distance operation next year, despite the fact that it still has a 95% market share. Taken together, these three actions indicate that in the near future, the competition in the long-distance market could be confined to the giants.

The issues affect not just competitive equipment and transmission firms, but the entire telecommunications industry — users as well as suppliers, data companies as well as telephone companies. At stake is the further development of maximum competition in an industry stifled for too long by the domination of a single company. If AT&T is given carte blanche to dump its embedded customer premises equipment on the market, or if the Bell operating companies are allowed to stifle competition by denying free access to bottleneck premises wire, how much will have changed?

Or if the regional operating companies are given free rein to mix regulated local exchange and Centrex operations with their competitive supply of unregulated customer premises equipment and enhanced data products and services, hasn't the alleged purpose of divestiture and deregulation — to expand competitive markets — been undermined?

Will anything have changed if, instead of an integrated Bell System monopoly, we have a landscape composed of a dozen smaller Goliaths? Or will such an altered environment give new meaning to the old axiom: The more things change the more they stay the same? ■

Kramer is general counsel, North American Telecommunications Association, and a partner in the Washington, D.C. office of Wood, Lucksinger & Epstein.

When you want to talk to IBM, talk to us.

Make the ASCII-SNA connection.

Looking for a way to get into 3270 applications without p... 3270 pr... Look to Per... Technology. Our SC... of protocol converters and terminal controllers can help you bridge the compatibility gap between IBM mainframes and low-cost ASCII peripherals. But this benefit is just the beginning.

SCAT systems also open the door to features and functions not available on IBM or other plug-compatible machines. The economy of using dial-up instead of dedicated phone lines. Elimination of coaxial cable. Support for multiple hosts. Datab... access for work... stations and personal computers. The freedom to link a wide range of ASCII terminals, printers and other devices to 3270 BSC or SNA systems. The choices—and the savings—are yours.

... SCATTER.

Menu driven from any ASCII peripheral, our versatile SCAT 2 is a multi-host terminal controller designed to meet the needs of growing networks. Expandable from 1 to 25 ports, SCAT 2 satisfies all BSC/SNA communications requirements.

True blue compatibility in a terminal.

An IBM lookalike right down to its 3278 keyboard, our SCAT 10 features a 14" non-glare tilt and swivel screen for optimum comfort. SCAT 10 is a cost-effective terminal for both stand-alone and cluster configurations.

Value-added versatility for OEM's.

Our SCAT 1 is a 3270 BSC/SNA add-on ... board ... to ... distributors an easy ... to penetrate a profitable market. SCAT 1 is compact, reliable and is a genuine value addition to ASCII peripherals. With the synchronous market growing at upwards of 20% per year, SCAT 1 is a product whose time has come.

1-800-822-2208

When you're ready to make the ASCII-SNA connection, we're here to support you with SCAT system solutions. Call us toll-free at the above number or at 206-881-6691 in Washington State. Peripheral Technology, Inc., 14784 NE 95th, Redmond, WA 98052.

Peripheral Technology, Inc

PHOTO © 1984 GEORGE CALLON

ISDN: THE COUNTDOWN TO PLUG-IN

BY FRANK GRATZER

Integrated services digital networks (ISDNs) are an important new means for telecommunications carriers to meet future digital voice and data transport needs. If they develop as planned, these futuristic networks will provide universal access to a wide range of business and residential communications devices.

Currently, individual voice and data transport services are offered to customers at specialized interfaces to different individual networks. For example, the circuit-switched telephone network carries voice or voice frequency data. AT&T's Dataphone Digital Service (DDS) provides private-line digital connections.

These and similar services provide valuable features. However, users are faced with different interfaces, protocols, access lines, error rates, reliability, maintenance procedures and a host of other changes when they use different services.

ISDNs are being designed so that a small family of customer/network interfaces can be used to support a wide variety of services. ISDN customer distribution equipment, such as local-area ▶

network gateways and private branch exchanges (PBXs), will integrate individual digital streams into a standard ISDN access stream (see Figure 1). An ISDN network interface would support simultaneous circuit-switched, packet-switched and non-switched services along with the associated signaling up to a maximum total interface speed. For example, proposed standard interface rates will include 192K bit/sec and 1.544M bit/sec. The user-perceived benefits of ISDNs will include stable, multipurpose interfaces; integrated access for a wide variety of services; and improved customer control over maintenance, network management and service provisioning.

The regional Bell operating companies are aggressively pursuing the installation of digital transmission and switching equipment that can provide the technical capability to offer ISDN services. Based on the anticipated Consultative Committee on International Telephone and Telegraph (CCITT) standards, public ISDNs should begin to be available between 1985 and 1986. CCITT study groups are working on those standards and are developing recommendations for approval in 1984. This work includes interface access types, performance, access arrangements, protocols, signaling, common physical interfaces and fundamental service elements. Users, manufacturers, public and private network providers, service vendors and terminal equipment manufacturers will all benefit by fully supporting these standards.

ISDNs are being planned to meet many different types of customer voice and data applications. These applications include meter reading, energy management, security, data base access and communicating word processors. They also include file transfer, facsimile, graphics, slow-scan TV, voice, bulk data transfer and eventually full-motion video.

For example, communications managers at major locations of large companies will want to transport simultaneously voice, inquiry/response data, facsimile and files. They will also want to conduct teleconferences among locations. Similar needs, but with a varying mix of applications, apply for smaller businesses and residences. In addition, to maximize the use of their facilities, users want to allocate their interlocation transport capacity among these different applications on a real-time basis as traffic needs change. ISDNs will allow this real-time capacity allocation.

Since ISDN applications will appear in a standard, digital format, the networks can be designed without knowing what the exact mix of future services will be. The public networks will be major providers of ISDNs. It takes many years to develop these large, ubiquitous networks. However, by having a target architecture that is robust to service forecast uncertainties, public network providers can confidently invest in ISDNs.

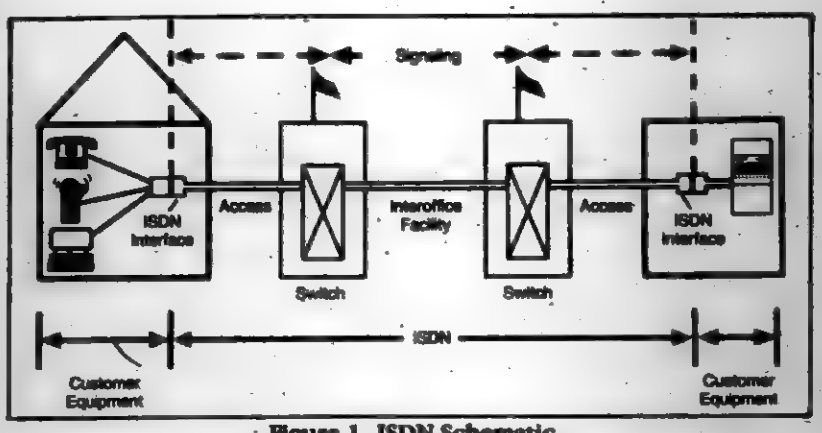


Figure 1. ISDN Schematic

Whatever individual services evolve, the basic ISDN transport capacity will be available to serve them all.

It is necessary to examine the basic architecture and attributes of ISDNs. ISDNs will provide end-to-end digital connectivity, clear channels, digital signaling, standardized interfaces, user control of bandwidth allocation and of some aspects of operation and access and service integration. These attributes are detailed below.

- ***End-to-end digital connectivity.*** Signals enter the network and are transported across it in digital form. They are delivered in this form to the distant user or to another connecting ISDN.
- ***Clear channels.*** Customers have full use of ISDN channels without restriction on bit sequence.
- ***Access and service integration.*** By means of a single access link, the user may access a range of network and vendor services simultaneously. The sharing of network equipment and its operation

across several services results in increased flexibility and reduced cost when compared with today's individual service-dependent equipment and operations.

■ *Small family of standard interfaces.* Only one interface will exist for a range of applications. A standard customer-to-network interface should result in a wide selection of ISDN-compatible terminals. The proposed standard ISDN interfaces allow independent evolutions of the network and of terminal equipment.

■ *Message-oriented digital signaling.* One of the fundamental advantages of ISDNs is message-oriented digital signaling. This will significantly impact existing voice and data applications. Message-oriented digital signaling provides faster call setup times.

■ *Customer control.* This allows a customer to allocate dynamically the capacity of the ISDN access link to different services and to select the network services desired. This is done in real time via customer-to-network signaling.

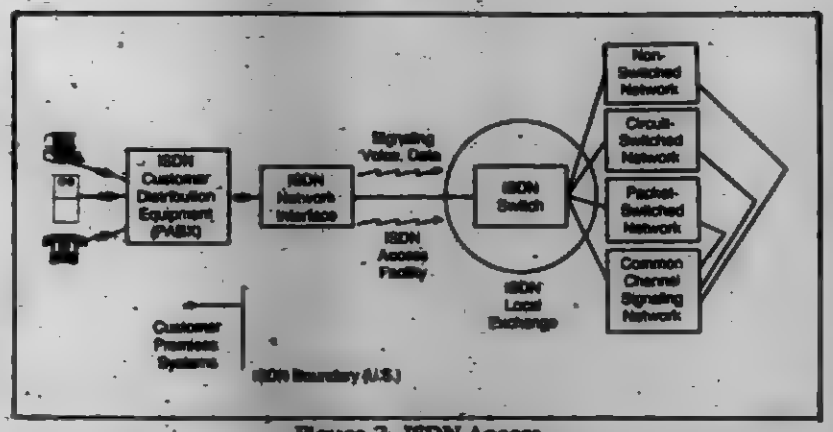


Figure 2. ISDN Access

The architecture shown in Figure 2 represents the first stage of ISDNs; access to the ISDN local exchange (switching office) is integrated, but the connecting transport networks are not. Customers perceive the system as integrated, since their network access is integrated. As technology progresses, the customer may not need to choose in advance between packet-, circuit- or non-switched service; the techniques may merge.

This merger might come through the development of burst switching or through fast packet switching. Both of these techniques take advantage of the characteristic bursts of voice traffic and the development of low bit-rate voice to switch voice and data at speeds of millions of bit/sec.

As part of their evolving communications networks, telecommunications companies and administrations in North America, Europe and Japan have been deploying increasing amounts of digital transmission facilities. They have also used space (analog) and time-division (digital) stored program-controlled switching systems over the past 20 years.

For example, in the regional Bell operating companies, the large majority of the metropolitan area transmission circuit miles are on digital carrier. The U.S., the UK, France, Canada, Japan, Italy and other countries have significant commitments to fiber programs and to exchange modernization through digital switching.

Digital systems have been used for growth and replacement of analog systems on a one-for-one basis in cases where the use of digital technology represented the less expensive alternative. The performance and operational advantages of digital systems have played a major part in economic considerations. The service opportunities offered by digital components and the motivating concept of evolving to an ISDN have only recently become major factors. ISDNs will be built based on this embedded digital technology, modifications of the technology and new technology specifically designed for ISDNs.

An important part of the developing CCITT recommended standards is the specification of ISDN network termination functions carried out in the ISDN line termination, the Network Termination 1 (NT1). NT1 is network-owned equipment on customer premises. It can provide network functions such as line termination, maintenance, testing, multiplexing and power feeding. The termination associated with NT1 is intended to provide a stable physical interface, independent of the transmission media employed. It is a key element in the ability of carriers to offer standard ISDN services.

ISDN standardized interfaces will encourage competition among network providers and among terminal equipment vendors, bringing substantial benefits to users. Competition will increase among terminal equipment vendors of all sizes, since no vendor can dominate the market

While everyone else has been squawking about private networks, one company has been quietly building them.

Today, with dozens of new companies and hundreds of unproven products all promising to perform networking miracles, the noise level has become exceedingly loud.

And the job of finding the right company to build your network has become more confusing than ever.

Meet BBN Communications. In the midst of the noise and confusion, we've been quietly building networks for government agencies and major corporations around the world. In fact, we built the world's first packet-switched computer network back in 1969.

But what sets us apart even more than our experience is the way we work. Instead of the usual short-term "fixes," we're committed to providing long-term solutions. So before we design your network, our communications consultants will analyze your specific needs—present and future. And based on them, establish your optimum network configuration. Then we'll build your network. Of course, even after everything is working to your satisfaction, we'll still be around to help with your future needs.

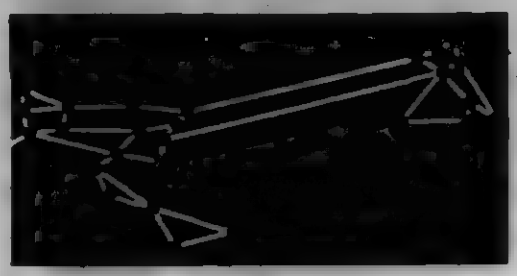
It takes more than computers to make a computer network.

Another thing that makes us different is that we manufacture a full line of our own proven networking hardware and software, not just a few isolated products. Including packet switches, terminal access devices, and electronic mail systems. All of which simply means we can supply everything you need.

Our communications processors are the most advanced available today.

What's more, our entire product line is fully X.25 compatible and easily interfaces with public data networks.

But state-of-the-art technology is just the beginning. We also provide a network operations center so you can monitor your entire network at a glance and control it almost as easily. We'll even run the center for you if you like. And to ensure maximum network reliability—and uptime—we offer round-the-clock field service by the most experienced communications engineers in the business.



Packet-switched networks built by BBN Communications link companies with offices around the world.

Just because we're the networking leader, don't think for a minute that we're resting on our accomplishments. Our R and D effort is one of the largest in the industry, with major programs in protocol development, network control, and future network applications. And, of course, our customers receive the full benefits of every breakthrough we make.

We're the networking leader.

Fifteen years ago, we pioneered packet-switching technology to build the Arpanet, the world's first packet-switched computer network. Today, Arpanet supports 10,000 users and over 300 different computers in the United States and Europe, and the technology we invented for it has become a cornerstone of the data communications industry.

As the networking leader, our customers include major financial, manufacturing, and industrial corporations from all over the world. Recently we've even been selected to build and run the U.S. Defense Department's major new computer network, the Defense Data Network.

So if you're tired of all the squawking, consider BBN Communications. We think it's about time you got your network, and some peace and quiet, too.

For a brochure on our complete networking capabilities, contact BBN Communications Corporation, 33 Moulton Street, Cambridge, MA 02238, (617) 497-2800.

BBN Communications Corporation

through promulgating de facto standards of their own choice.

A recent Federal Communications Commission (FCC) decision concerning DDS ruled that the channel service unit is actually customer premises equipment and not part of the network. The channel service unit is used to terminate the service and provides an access line terminating repeater, maintenance loop-around and signal conditioning. The FCC extended this ruling to include not only DDS, but all digital services. It implies that, in the U.S., digital services must terminate in bare wires or bare fiber rather than in the network channel terminating equipment chosen by the planners of public networks and by industry standards forums.

Unless it is modified, this decision would violate the preliminary international understandings already reached by CCITT on ISDN network interfaces. It would remove the NT1 equipment from the network side of the interface. The absence of this network termination would have serious implications for ISDNs. Rather than purchasing an ISDN standard terminal and being assured that it will work when plugged into an ISDN, a terminal with an integrated NT1 must be selected to match the specific loop transmission system being used.

The automated testing, provisioning and other operational procedures that must be part of feasible, economical ISDNs cannot be accomplished by public networks without some network equipment on customer premises.

Unless carriers are allowed to provide stable, well-specified interfaces without reaching into the domain of the user, the very concept of ISDNs is in jeopardy. Without this interface, carriers cannot guarantee the quality of the signal or the error rate to users under tariff..

But worst of all, the lack of a stable, well-specified ISDN boundary inhibits the ability of both the carrier and the equipment vendor to innovate separately and freely. If the customer's equipment has to be changed or modified to utilize any change in network technology, either substantial customer expense and inconvenience will occur or the carrier will be effectively precluded from utilizing the most economical and efficient technologies.

This discourages free and open competition among equipment vendors of all sizes, since terminals must be specialized to the specific technology used in a given network distribution area. ISDN terminals would lose portability, and small manufacturers would be discouraged from entering the market due to terminal specialization and nonstandard interface requirements. The interface defined for the customer must be independent of the facility and the maintenance procedures used to provide the ISDN service.

It is desirable for carriers, users and other interested parties to inform public policymakers that they want well-defined ISDN services, provided at clean ISDN interfaces. The technical flexibility in network termination equipment and in other aspects of ISDNs that the FCC and other public policymakers allow will be crucial to the success of public network ISDNs in the U.S.

ISDNs will be a driving force in bringing the benefits of the information age to business and residential users. The flexibility and standardized interfaces of ISDNs will allow public network providers to offer ISDN services in an economical, efficient fashion. They will also provide a procompetitive atmosphere for terminal equipment vendors and network providers, since they will have internationally accepted, rather than de facto, standards to meet. Users, vendors and carriers have a mutual interest in joining together to support ISDNs and ISDN standards. ■

Gratzer is technical assistant to the executive vice-president of the Central Services Organization, Basking Ridge, N.J.

Can you print 300 pages of data at your Remote site...In 5 minutes?

Yes, Paradyne's NEW 8360 Remote Page Printer Prints as fast as a Page a Second. Paradyne introduces high speed, non-impact remote printing — from one location to any other — at speeds up to 60 pages a minute, depending on line speed and data density.

No Host Remote Teleprocessing Software is Required. Communications requirements are handled through PIXNET®, Paradyne's communication system, and the page printer will operate without any changes to your existing applications programs.

With the 8360 your remote operators have the same functional capabilities as the data center operator. And the 8360 has the same capabilities as the system printer in your computer room.

Uses Standard 8½" x 11" copy paper.

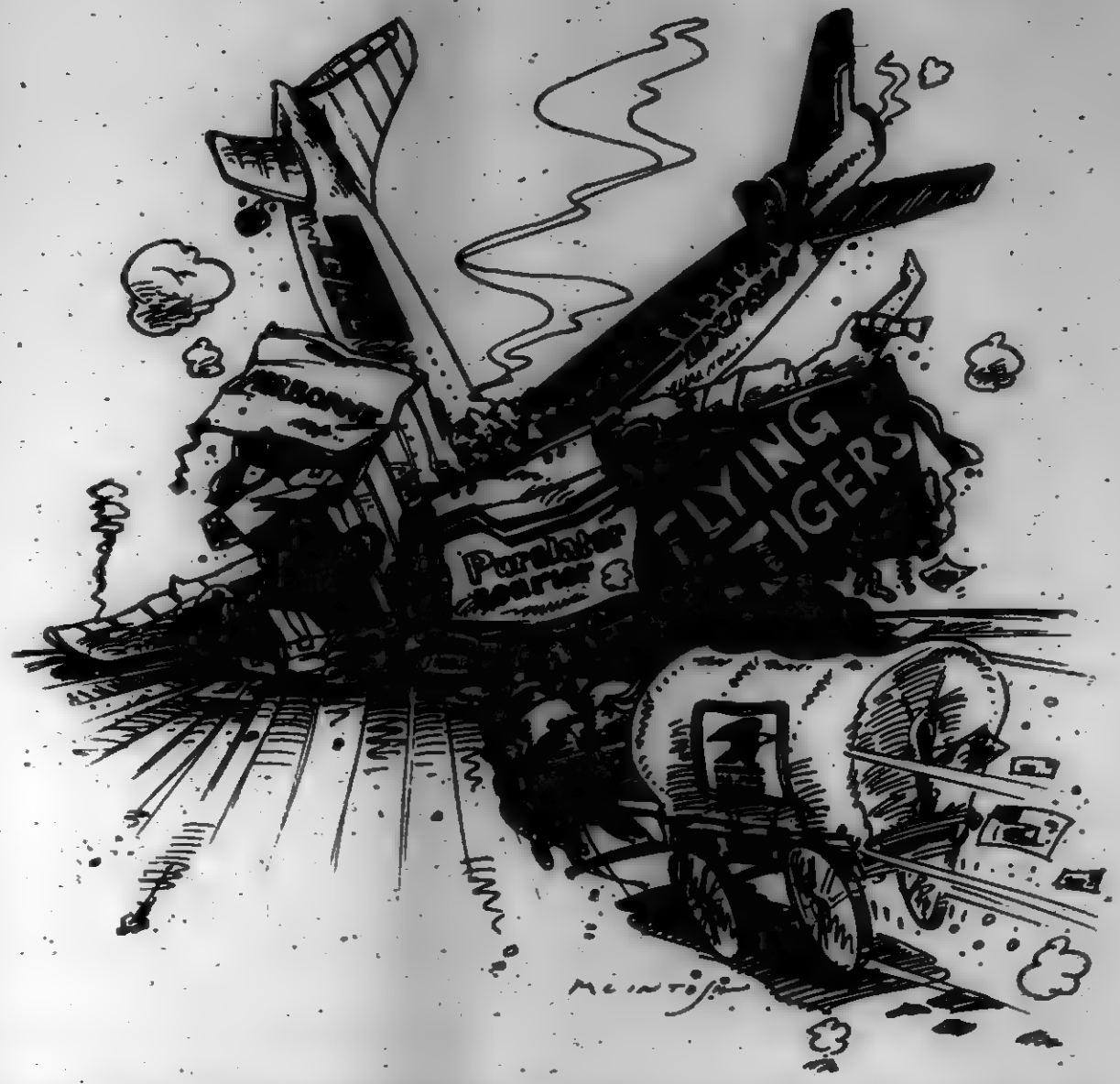
Compact in Size, Highly Reliable and Easy to Use. The 8360 is easy to install and it runs cool — all day long. You'll have a high quality printer designed to blend into your office environment with an operation that's so quiet your operator may have to check to see if it's finished printing.

A Price Breakthrough. Now, Paradyne offers your remotely located offices and plants the convenience of high quality, high speed printing...at a price that's a breakthrough in the industry. **Call 1-800-482-3333** and we'll tell you why. Plus, we'll give you the location of the Paradyne sales office nearest to you.

Meeting the Communications Challenge of the 80's

paradyne

Paradyne Corporation P.O. Box 1347 8550 Ulmerton Road, Largo, FL 33540



OVERNIGHT MAIL SERVICES: HEADING FOR A COLLISION

BY KATHERINE HAFNER

In the dawn of 1984, the overnight mail delivery market never looked stronger. The six major couriers serving domestic and international markets move an estimated 1.2 million documents and packages every night.

Although they deliver only a miniscule amount of mail compared with the 328 million pieces handled by the U.S. Postal Service each day, the express delivery services guarantee what a 20-cent postage stamp cannot: next day delivery.

Once Federal Express Corp. originated overnight mail delivery in the early '70s, other companies followed suit to create a strong marketplace. Increased competition has led to diversification, and electronic delivery is becoming a crucial part of the picture.

Some of the couriers speak of finely tuned plans for introducing electronic delivery into their service line. Others, while acknowledging the increasing importance of electronic transmission and instantaneous messages, speak of no direct strategy for digital delivery. Still others refuse to speak at all.

Federal Express, the acknowledged leader in the domestic overnight delivery market, has spent nearly five years planning for this year's introduction of a facsimile-based, two-hour guaranteed delivery service. Known internally as the Gemini Project, the new service is targeted at the market for graphics-based, time-sensitive material such as architectural and other graphics designs and other legal documents.

The technology behind the bellwether company's electronic delivery service is on the cutting edge of innovation. The service is based around approximately 2,000 NEC America, Inc. Group 4 facsimile machines, which will be scattered throughout Federal Express' vast network of dispatch stations for document transmission via telephone lines and satellites at speeds as high as ▶

56K bit/sec or as low as 2,400 bit/sec, reproducing between 15 and 30 pages per minute. The resolution on the fax machines is very high at 400 line/in., producing a reproduction that resembles a high-quality photocopy.

Though Federal Express has yet to establish firm pricing on the service, industry analysts and others close to the project predict the average price for sending a 10- to 12-page document will be approximately $40.

HIGH-VOLUME Gemini customers will be offered attractive discounts with the option of leasing a machine from Federal Express and bypassing the courier pickup. If a customer is transmitting to someone else leasing a facsimile machine from Federal Express, then pickup and delivery is eliminated completely.

Federal's investment in the Gemini Project is substantial, at an estimated $100 million, and the company is the first to admit the project's high risk. The service is expected to be operational between April and July of next year, and whether or not a firm customer base will develop is anybody's guess.

"I don't want in any way to paint this as risk-free," James Barksdale, chief operating officer and executive vice-president at Federal Express, said. "There are many risks attendant with this move. But we think we've done our homework."

The much-whispered-about Gemini Project will face its share of competition.

DHL Worldwide Courier Express, with a predominantly international customer base, plans to introduce its own image-based electronic delivery service that would serve the U.S., as well as international markets.

DHL started 10 years ago in the San Francisco Bay Area as an international service, introducing its domestic service last year. Although reluctant to offer details on the new service, DHL President Larry Roberts explained his company's decision to address the same market as Federal Express.

"If you can produce high-quality scan documents, then you have a very effective service moving anything," Roberts said. "That's what Federal Express is undertaking with Gemini, and it's what we're working on doing."

Federal's investment in Gemini is an estimated $100 million, and the firm is the first to admit the project's high risk. It is expected to be operational between April and July, but whether a firm customer base will develop is anybody's guess.

Known internally as Electronic Image Transfer (EIT), DHL's service will be ready "sometime in 1984," Roberts said.

"Our service is similar in terms of its being a scan copy of copier quality," Roberts said. "In terms of document reproduction, it's based on the new generation of equipment being built now. We can move digitized pages and either copy it locally or remotely so we can send documents wherever we want."

Although he refused to say who manufactures the

machines DHL will use, Roberts acknowledged that the electronic delivery is based on fax-like technology with extremely high resolution.

And like the Gemini Project, DHL's EIT will be offered in a number of options, giving customers the choice of operating the machines on their own premises or through what Roberts calls "electronically augmented courier service."

[redacted]

"Perhaps in the U.S. it is correct to say it will come down to a matter of advertising," Roberts said. "But the worldwide coverage makes it far more important than saying it all comes down to a matter of advertising."

But the DHL service may have an advantage over Federal Express' offering. While DHL has already built a substantial international network, Federal Express is still in the early stages of branching out across the Atlantic, with electronic or any other kind of delivery. And while Federal Express' machines will compose a dedicated system, making them compatible only among themselves, the DHL machines will be designed to communicate with any other Group 4 machine.

Notorious for its clever commercials, Federal Express is planning a major $5-million publicity drive for Gemini immediately after the service is announced. Despite Federal Express' traditional marketing power, Roberts is optimistic about EIT's chances for success.

"Perhaps in the U.S. it is correct to say it will come down to a matter of advertising," Roberts said. "But the worldwide coverage makes it far more important than saying it all comes down to advertising. They [Federal Express] have some delivery [in Europe], but we cover virtually every country in the world in virtually every city."

The new rack-mounted IBM 3868 Modem saves you space. And money. And effort.

Space, because IBM's new one-inch-wide vertical package allows you to mount up to 12 modems in one enclosure that fits a standard 19-inch rack.

Money, because each enclosure needs only one power supply and cooling system to support all of its modems.

And you manage your network with less effort because the IBM 3868 Modem has the same high availability and rock-steady reliability as other modems in the 386X Series—plus an enhanced Link Problem Determination Aid (LPDA).

Working with software available for many IBM host systems, the LPDA performs greater end-to-end management. Now line conditions are identified further downstream from the host, and in more detail. For example, conditions in any multi-point circuit can be pinpointed to a particular leg, including tailed configurations off multi-plexed links.

In fact, to help you keep your network humming, the LPDA and host software monitor and provide you with a line quality value, a receive signal level, an error-to-traffic ratio and modem self-test results to help you isolate line problems. Now you can more precisely communicate them to your communications carrier.

And because the 3868 Modem is so reliable, it's backed by a full three-year warranty.

Try them for up to four weeks: just select 2400, 4800 or 9600 bps line speeds. If you purchase in quantity, discounts are available.

To get your copy of a free brochure, or to arrange to have an IBM representative contact you, call toll-free, 1 800 IBM-2468, ext. 90. Call your IBM representative or return the coupon. IBM

IBM
DRM, Dept. BO/90
400 Parson's Pond Drive
Franklin Lakes, NJ 07417

☐ Please have an IBM representative call me.
☐ Please send me more information on the IBM Modem.

Name_____
Title_____
Company_____
Address_____
City_____ State_____ Zip_____
Phone_____
1-16

AS FEDERAL and DHL spend 1984 fighting it out over the market for image transmission, the other couriers are taking noticeably less risk. Purolator Courier Corp., whose ubiquitous "Overnight, not overpriced" motto takes direct aim at its competitors, recently signed an agreement with MCI Communications Corp. The deal involves MCI's new electronic mail service — MCI Mail — and Purolator will deliver documents transmitted over MCI's electronic mail network overnight.

MCI Mail guarantees delivery of a standard-size letter or other document by noon the next day in most cities. This service costs $6, which is 30% to 50% less expensive than that of most overnight couriers. Purolator's agreement with MCI involves two levels of service: the four-hour delivery by courier within 15 metropolitan areas for $25 and the $6 overnight delivery.

"MCI has teamed up with Purolator because it is a traditional communications company with no physical delivery system of its own," according to Walter Ulrich, president of Walter E. Ulrich Consulting, Inc. of Houston. He consults for several courier companies. "It is an

advantageous arrangement for both of them: MCI can leverage on Purolator's physical delivery service, and Purolator can generate some good volume delivering documents for MCI."

"MCI has the technical background and knowledge; we have the courier network they don't have," Hollis McLoughlin, director of marketing services at Purolator, said. "We see it as an extension of our product lines, giving us greater customer convenience and different products to different customers." In addition, Purolator has announced a merger with DHL calling for DHL to deliver Purolator's international mail. And in turn, Purolator will deliver much of DHL's domestic mail using Purolator's vast domestic network.

With operation of the new scheme beginning this month, the "arm's length agreement" represents part of Purolator's "strategic plan to go worldwide," according to McLoughlin. "We have the most extensive coverage in the U.S., and they have the most extensive coverage outside the U.S. Crossing borders is an extremely difficult thing to do. DHL has, without a doubt, done a great job at it."

Commenting on Gemini, McLoughlin said, "I don't think the courier business is running scared at all. A lot of our business will not be affected. We carry computer parts, pharmaceuticals and machinery. Gemini can't do that."

According to Ulrich, arrangements similar to the MCI-Purolator agreement are likely to be announced between couriers and communications companies, but so far no other overnight courier firm nor communications company has disclosed such plans.

Other couriers in the overnight delivery business, including Airborne Freight Corp., Emery Worldwide and Flying Tigers, have no concrete plans for electronically based delivery of images, text or other documents.

A spokesman for Emery declined to elaborate on the topic. "We have nothing really germaine we can say," Robert Sykes said. "We're looking into facsimile or electronic transmission from an international standpoint, but we don't have any plans in the works right now."

Flying Tigers, a subsidiary of Tiger International, also has no specific plans to enter the electronic delivery market. Principally an air cargo carrier, Flying Tigers plans to remain that way, according to a company spokeswoman.

With annual sales in excess of $300 million, Airborne is also staying clear of entering a market fraught with risk and is investing in its existing shipping network instead.

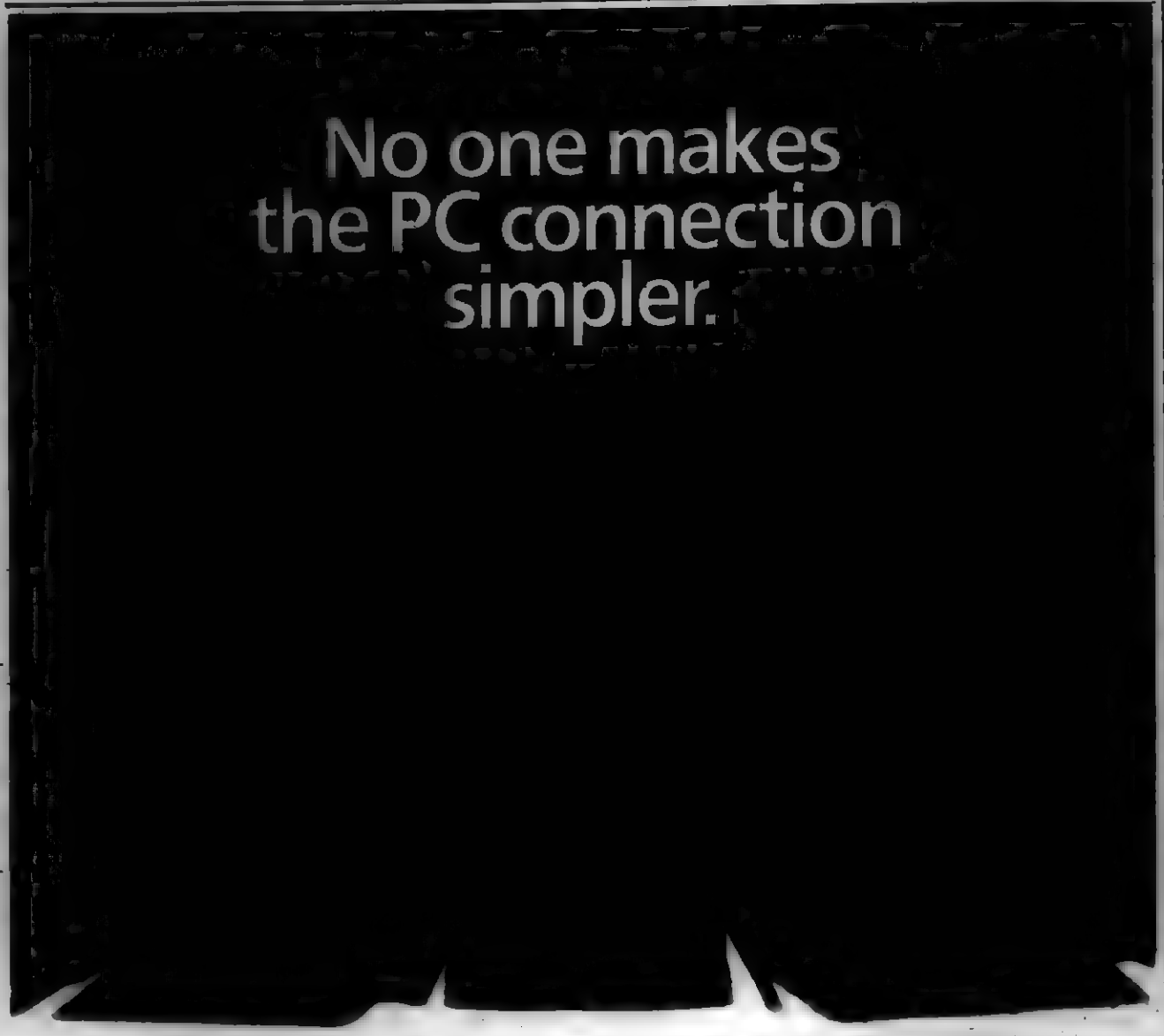
"Gemini is a concern because basically it's a different means of transporting some of the same envelopes and documents we transport today. Obviously, that's a threat," David Billings, vice-president of corporate systems at Airborne, said. "We see ourselves as a proactive force in improving productivity in the company, reducing overall costs and enhancing our position in the marketplace."

Billings pointed to Airborne's on-line air-bill tracking system, a network consisting of over 400 CRT terminals and 200 printers, transmitting over 150 million char./day. "In this business, having an effective on-line tracking system is key to the company's success," he said.

According to Billings, by placing personal computers and terminals at customer sites, Airborne is providing its clientele with the ability to trace shipments, an important aspect of the company's dependability. "There is a very important role for technology in the more traditional air express market," Billings said.

"It is not necessary to look at the more exotic leading-edge offerings like Gemini to make a case for the effectiveness of technology in improving productivity and reducing costs to gain a position in the market," he continued.

"We don't feel that a dedicated type of investment like Gemini is the only way to serve the



If you're looking for an easy, flexible cost-effective way to make the personal computer to mainframe connection, look no further.

ICOT's Virtual Terminal System™ provides you with a convenient and flexible way to connect personal computers to your IBM or IBM-compatible mainframe. It does so by performing line concentration, cluster control and terminal emulation simultaneously. You'll be able to connect a multitude of personal computers into a single front-end port, conserving your mainframe resources. And you won't have to make any hardware modifications to either the personal computers themselves or to your network controllers.

Put ICOT's VTS protocol converter in your existing 3270 network and virtually any personal computer will be compatible with your BISYNC or SNA/SDLC applications software. ICOT's PC connection also gives you the flexibility of dial-up and leased line communications, plus access security.

ICOT Delivers a Turnkey Solution.
And ICOT won't leave you with a stack of black boxes and a screwdriver. We deliver a turnkey solution, installing every VTS ourselves. Then we back each installation with on-site training and a nationwide field service organization that delivers full engineering and maintenance support.

Whatever your current network configuration and protocols, ICOT's Virtual Terminal System can help you make the PC connection. Pure and simple.

For more information about the ICOT Virtual Terminal System call or write:

ICOT ...the data communications company

ICOT Corporation, 830 Maude Avenue, P.O. Box 7248, Mountain View, CA 94039, (415) 964-4635 TWX 910-379-6479

Nearly Nine Million Computer-Involved People Around the World Rely on Our Publications For the News They Need.

We're CW Communications/Inc.; the world's largest publisher of computer-related newspapers and magazines. And wherever you go in the computer world, you'll find computer-involved professionals reading—and relying on—our publications. With highly trained and experienced editorial staffs all over the world, our publications give readers the best and most up-to-date information available in this rapidly changing industry.

Around the world:

We publish, co-publish or provide editorial services to the leading computer publications in the world, including publications in all of the following countries:
Scandinavia—Denmark, Sweden, Finland and Norway.
Western Europe—Germany, United Kingdom, France, Italy, Spain, Greece, the Netherlands.
The Mid-East—Kuwait, Saudi Arabia.
Asia/Africa—People's Republic of China, Korea, Japan, Singapore, Southeast Asia, South Africa.
The Southern Pacific—Australia.
Central and South America—Mexico, Brazil, Argentina, Chile.

In the United States:

In the world's largest computer market, we publish a whole series of publications that cover different aspects of the industry. Our largest publication, with more than half-a-million readers every week, is *Computerworld*, a weekly newspaper aimed primarily at larger computer users. Its companion publications include *Computerworld Office Automation*, *Computerworld On Communications* (each published semi-monthly) and a series of *Buyer's Guides* covering all major segments of the industry.

In addition, we publish *MICRO MARKETWORLD* for dealers, distributors, retailers and others involved in the microcomputer marketplace. For microcomputer users, we publish *InfoWorld*, *Microcomputing*, *PC WORLD*, *80 Micro*, *inCider*, *Run*, and *Hot CoCo*.

No one in the world publishes more computer information for more people in more countries than we do. And we'd be happy to give you more information on any of our publications. Just send a telex to our U.S. offices, attention CW International Marketing Services, (telex #95-1153) or write us at the address below.

CW COMMUNICATIONS/INC.
375 Cochituate Road, Box 880, Framingham, MA 01701
(617) 879-0700

major shipper," agreed Paul McNergney, vice-president of strategic planning at Airborne. "We don't have a standard product such as a Gemini design. We are placing the pieces together for a paperless shipping environment."

And then there is the U.S. Postal Service, which carries nearly 300 times the volume of all the other carriers combined, yet cannot make the dramatic moves that are open to the private sector. "We're foregoing some market areas because people are saying we won't have a federal agency in that kind of business," Jim Van Loozen, a Postal Service spokesman, said.

The Postal Service's sole foray into electronic delivery is its Electronic Computer-Originated Mail (Ecom), which the Postal Service implemented in 1981. To date, Ecom has been a dismal failure, falling far short of its anticipated volume. The Postal Service has steadily lowered its initial projections of 50 million pieces of first-class mail generated via Ecom annually. The 1983 volume of 18 million fell about 28% short of projection, and the Postal Service has no plans to expand Ecom.

The Postal Service is studying a second type of electronic delivery called Electronic Message Service System (Emss). It is a long-range, multimedia project. The goal of the plan is to replace Express Mail for next-day delivery with 87 delivery sites by 1995. According to Van Loozen, however, Emss is still in the research and development phase, with no active plans for its implementation.

Whatever soothsayers are projecting as the fate for the physical documents delivered by the Postal Service, that governmental entity remains optimistic, even if seemingly in defiance of reason.

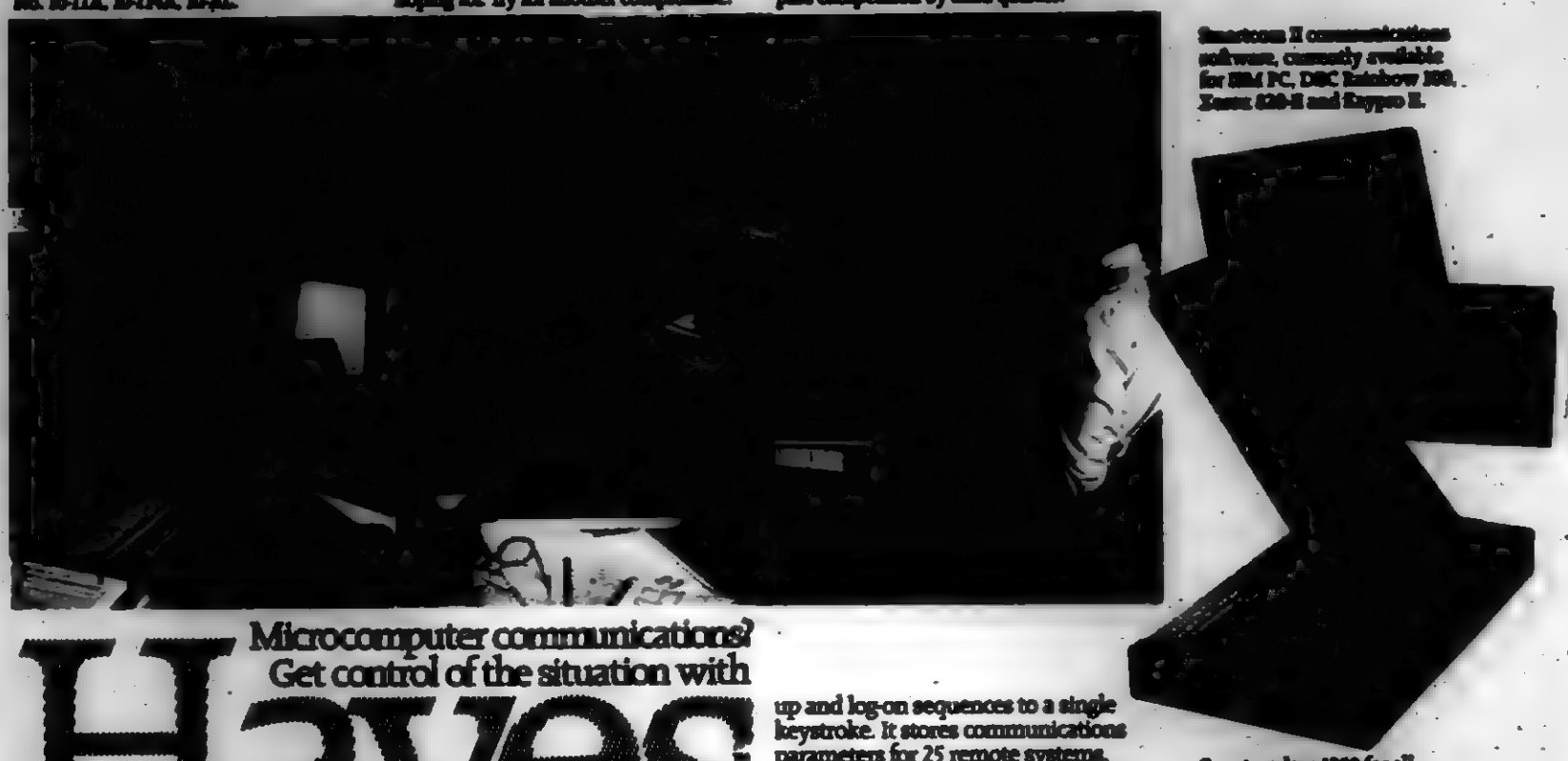
"Our feeling about electronic delivery is that it will indeed be a growing and increasingly important part of the communications marketplace," Van Loozen said. "However, we do feel that the assumption that the electronic age will take all our volume away is a gross overstatement. The same thing was said when the telegraph and telephone were invented." ■

Hafner is a staff writer for Computerworld On Communications.

To all reps: Price changes on following items effective immediately. No. 10-11A, 10-11AA, 10-AL.

Clain: The latest offer looks better, although it's still not what we were hoping for. Try for another compromise.

Just got the word from Gary. Increased our share by 6%. If trend holds, we'll pass competition by third quarter!



Smartcom II communications software, currently available for IBM PC, DEC Rainbow 100, Xerox 820-II and Kaypro II.

Smartmodem 1200 for all computers with an RS-232C interface; Smartmodem 1200B plug-in board for the IBM PC.

Microcomputer communications? Get control of the situation with Hayes.

Microcomputer communications can present the DP/MIS staff with a tangle of mis-matched hardware, user-hostile software, and a situation that can quickly get out of hand.

Hayes can help you avert that chaos, with a telecomputing system designed expressly for microcomputers.

A system so advanced, it's downright simple. Economical. And requires no handholding from you.

Hayes. The computer's telephone. Our Smartmodem 300™ and Smartmodem 1200™ connect to any desktop computer with an RS-232C port. They operate with rotary dial, Touch-Tone® and key-set telephone systems. At full or half duplex. And both feature self-test capabilities, as well as indicator lights and built-in speakers for monitoring calls.

The lower-priced Smartmodem 300 is ideal for local data swaps and communicates at 300 bps. A built-in speed selector on Smartmodem 1200 automatically detects transmission speeds (110, 300 or 1200 bps).

Smartmodem 1200B™ is also available as a plug-in board for IBM® Personal Computers. And Hayes manufactures the Micromodem IIe® for Apple® II, III, IIe and Apple Plus computers, as well. It comes packaged with Smartcom I™ communications software.

Speaking of software, more programs are written for Hayes modems than for any other. And that impressive list includes our own incomparable communications software. Smartcom II.™ Complete, menu-driven software for the IBM PC, DEC Rainbow 100,™ Xerox 820-II™ and Kaypro II.™ Even first-time communicators will find success with Smartcom II. Screen prompts guide users in the simple steps it takes to create, send, receive, list, edit, name and re-name files.

Tasks like simultaneously receiving, printing and storing data—completely unattended—are easily managed with Smartcom II, because it takes full advantage of Smartmodem's capabilities.

The program reduces lengthy dial-up and log-on sequences to a single keystroke. It stores communications parameters for 25 remote systems.

Plus, there's an on-line help feature that explains prompts, messages and parameters.

Our reputation speaks for itself. Hayes has five years of solid leadership in the microcomputer industry. Nationwide availability through retail computer stores. Trouble-free factory service and call-in assistance. A limited two-year warranty on all hardware. And the most efficient telecomputing system available. Anywhere.

If you're involved in linking micros or setting standards for configurations, remember this. Everything your people need to know about communications can be summed up in one word: Hayes.

Hayes®

Hayes Microcomputer Products, Inc., 5923 Peachtree Industrial Blvd., Norcross, GA 30092. 404/441-1617.

Smartmodem Specifications:
Low Speed Data Formats: (Smartmodem 1200 and Smartmodem 300) Serial, binary, asynchronous; 7 or 8 data bits; 1 or 2 stop bits; odd, even or no parity (0-300 bps).
High Speed Data Formats: (Smartmodem 1200) Serial, binary, asynchronous; 7 data bits; 1 or 2 stop bits; odd, even, or fixed parity or 8 data bits; 1 or 2 stop bits; no parity (1200 bps).
Dialing Capability: Touch-Tone® and rotary dial pulse dialing. Command Buffer: 40 characters.
Commands: (unnecessary with Smartcom II software) A: Immediate answer. A/: Repeat last command. C: Transmit Carrier. D: Dial command, including simple dialing, waiting for second dial tone, auto-dialing and other features. E: Local echo. F: Full/half duplex. H: Switch hook. M: Audio monitor. O: On-Line. P: Pulse dialing. Q: Quiet mode. R: Reverse originate/answer mode. S: [? "Set" commands] speed, escape code character, number of rings to answer on, etc. S?: Checks operational parameters above. T: Touch-Tone dialing. V: Verbal result codes.
Result Codes: (can be numeric/verbal) 0/OK: Command line ok. 1/Connect: Carrier detected. 2/Ring: Phone is ringing. 3/No Carrier: Carrier lost or never heard. 4/Error: Error in command line. 5/Connect 1200: Carrier detected at 1200 bps. (Smartmodem 1200 only.)
Audio Monitor: Two-inch speaker with volume control.
Rear Panel: On-off switch, power jack, RS-232C connector, modular phone jack connector, volume control.
Operation: Full or half duplex.
Data Rate: 0-300 bps and 1200 bps for Smartmodem 1200; 0-300 bps for Smartmodem 300.
Interface: RS-232C.
Intelligence: Z80™ microprocessor with 4K byte control program for Smartmodem 1200; Z8 microprocessor with 2K byte control program for Smartmodem 300.
Modem Capability: Bell System 103 or 212A compatible originate or answer mode for Smartmodem 1200; Bell System 103 compatible originate or answer mode for Smartmodem 300.
Receive Sensitivity: –9dBm for Smartmodem 1200; –45dBm for Smartmodem 300.
Transmit Level: –10dBm.
Registration: FCC registered for direct connect to the nationwide phone system. Connects with modular jacks RJ11W, RJ12C, RJ21W, RJ22C, RJ31W, RJ32C.
Power Pack: D.C. Input 120VAC, 60Hz, 15.5VAC output.
Size: 1.5" × 5.5" × 9.6"

Hayes® is a registered trademark of Hayes Microcomputer Products, Inc.
Smartmodem 300, Smartmodem 1200, Smartmodem 1200B, Smartcom I and Smartcom II are trademarks of Hayes Microcomputer Products, Inc.
Touch-Tone is a registered service mark of American Telephone and Telegraph.
IBM is a registered trademark of International Business Machines Corp.
Apple is a registered trademark of Apple Computer, Inc.
DEC Rainbow 100 is a trademark of Digital Equipment Corporation.
Xerox 820-II is a trademark of Xerox Corporation.
Kaypro II is a trademark of Non-Linear Systems.
Z8 is a trademark of Zilog, Inc.
©1983 Hayes Microcomputer Products, Inc.

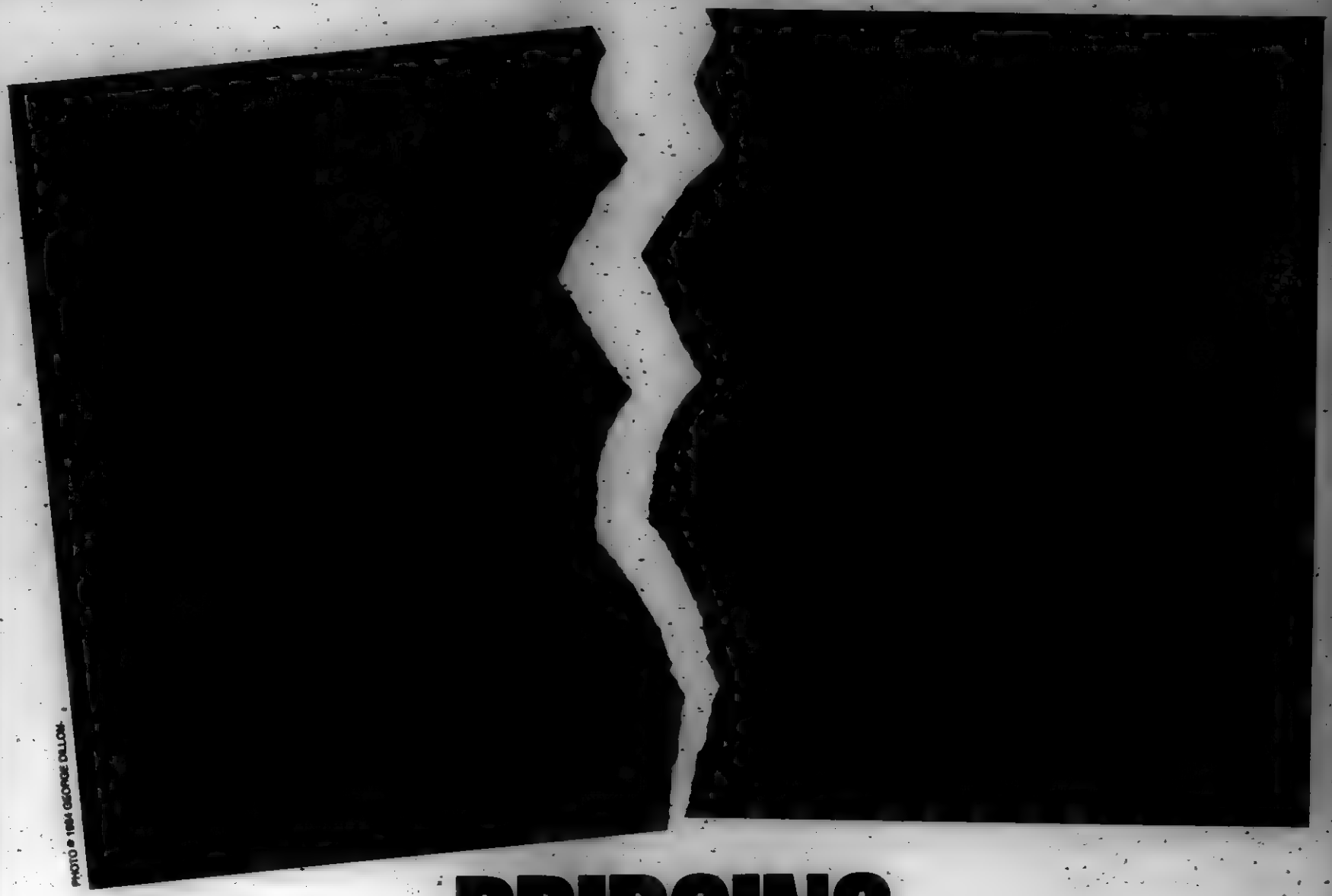


PHOTO © 1984 GEORGE DILLON

BRIDGING THE HUMAN COMMUNICATION GAP

BY PATTI HARTIGAN

If a vital link in your communications system breaks down, do you ignore it, hoping the problem will work itself out? Of course not. You troubleshoot the problem, analyze it and do something to fix it. And afterwards, you take steps to make sure the problem doesn't occur again.

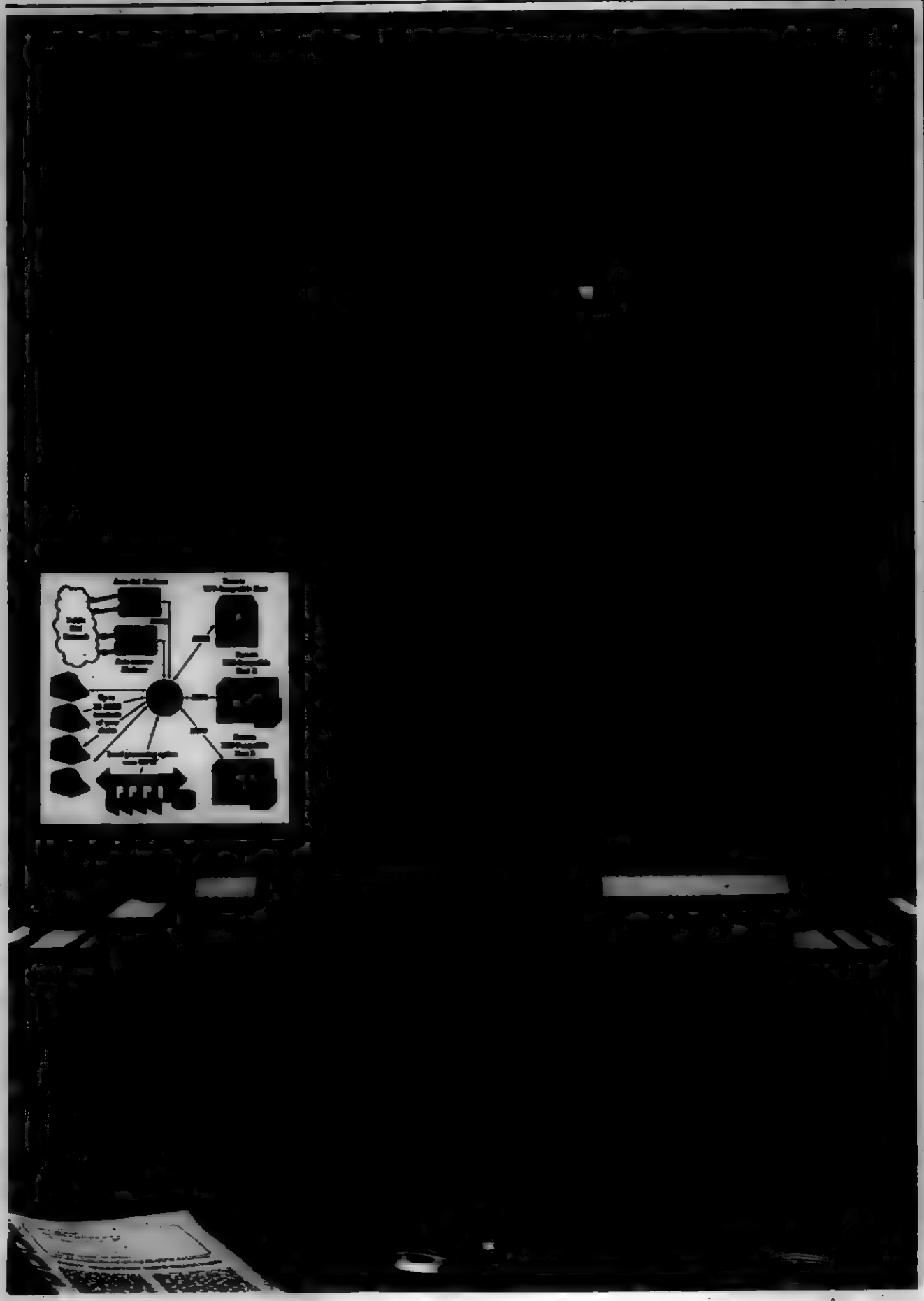
But what if the breakdown occurs in the oldest communication system around — the human communication network, a basic, essential system that is frequently taken for granted? Do you pinpoint the problem immediately or do days pass before you even notice something is wrong? And once the problem is recognized, how often do you say, "It's a personality conflict. There's nothing I can do to help; it will ▶

work itself out."?

The human communication network, like any other system, is composed of intertwining parts that interact to achieve certain goals. It is not immune to bugs, nor is it self-perpetuating. Its components, like the terminal on your desk or the mainframe in your computer room, need to be monitored and maintained.

While most firms devote significant funds and energy to maintain their sophisticated communications machinery, how many make a conscious effort to improve human communication? It is especially important for data processing departments to work on communication, according to Marsha Sinetar, an organizational psychologist who heads Sinetar & Associates, Inc., a human resources consulting firm. "Most DPers went into the field because they like working with things, not people. It is rare to find one who is a natural communicator," she observed.

It is not enough for the company to sponsor an annual pig roast nor to cater an occasional cocktail party. And it requires more than a brand new coffee machine or muzak in the ladies room.



An effort to improve interpersonal communication involves more than simply flooding employees with information. "Management may send out newsletters, have audiovisual presentations and say, 'Aha, we have good communications.' That is communications with an 's,' but it is not communicating," said Peter Bugbee, who is a principal and communication consultant with the Boston office of Towers, Perrin, Forster & Crosby (TPFC), a human resources consulting firm.

It is not enough for the company to sponsor an annual pig roast nor to cater an occasional cocktail party. It requires more than a brand new coffee machine or muzak in the ladies room.

As a general rule, the human communication system is directly related to the firm's management philosophy. If management is tight — that is, employees are closely supervised, mistrusted, given little responsibility — it is likely that the interpersonal communication system will be strained and employee satisfaction will be low. Scott Myers, a management research consultant based in Santa Barbara, Calif., explained, "A company's annual report can say 'People are our most important asset,' but then the firm shows no respect for its employees, has them punch a time clock and so forth. This is not the way to establish open communication."

Myers continued, "A company must provide the opportunity for people to be creative, to get feedback and recognition and to achieve their goals."

This is easier said than done. The first step toward improving the human communication system involves recognizing that it is vital to the organization, that it needs attention in order to flourish. Pleasant working conditions do not exist miraculously — they are the product of time, effort and thought. "Communication is an area that always needs work," explained Judith Larkin, an industrial psychologist and psychology professor

This Consultant Holds Up the Mirror

No question about it — it's always the manager's fault.

That is how Marsha Sinetar, an industrial psychologist, wraps up interpersonal communication problems that arise in organizations. To Sinetar, the source of the problem is clear: "If there is a communication problem, apart from a new company or a company undergoing change, the problem stems from the manager," she said.

"I see the work group as a mirror," she continued. "If the group is resistant, it reflects resistance on the part of the manager. If it withdraws, it reflects a manager that avoids addressing problems. If the group is confused, the manager communicates in a confusing way."

Sinetar is president of Sinetar & Associates, Inc., a consulting firm that specializes in human resources planning, development and mediation. Unlike other consultants, however, she sees a simple solution to communication problems. "I simply hold up the mirror," she explained. "I don't

"I see the work group as a mirror," Sinetar said. "If the group is resistant, it reflects resistance on the part of the manager."

do training. People don't need more information; they just need to recognize that they are responsible for communication. They alone hold the answer."

It is up to the manager, Sinetar claimed, to change his own attitudes and the way he treats others. The manager must be the exemplar for his department. Sinetar, who has been in the consulting business for ten years, has a hard-nosed attitude. "I'm getting less and less sweet," she said. "If I am not hard on the managers, they won't take the responsibilty."

Although she is somewhat draconian in her approach, Sinetar is optimistic about the possibility of creating a work environment where interpersonal relations thrive. "If a person ever worked in a place where things are fun, he never forgets it. It should be expected, but it's rare," she said.

"I worked for someone that cultivated that. Work was fun — like a Camelot." According to Sinetar, there is no reason why every office should not be its own miniature Camelot. The only thing that prevents this is a bad attitude, a selfish approach.

"I ask the team members to examine their own barriers. I don't encourage them to be critical of the manager, nor to damage other people. We don't attack, 'don't make others feel bad. We just simply communicate," she said.

"The point is to recognize one's individual responsibility, to realize that change must come from within. "You cannot change other people, but you can change the way you treat them."

According to Sinetar, it's a matter of deportment. "People say that they want a formula on how to behave at work. What they really want is a formula so they won't have to behave." Sinetar stressed that managers must demand their employees to speak politely and have good manners. But managers must act that way too. They must expect to be treated the same way that they treat others.

Sinetar stressed that both managers and employees must be self-reflective. She listed three questions that every employee must ask himself in order to judge how well he is communicating. Employees must ask:

- How comfortable am I getting or giving a compliment?
- How well do I take criticism from my boss? From my employees? How well do I give criticism?
- How quick am I to give constructive criticism? Do I jump the gun and give it when it is unnecessary? Or do I wait too long, exacerbating the problem?

After the self-reflection has occurred, the rest is easy. "It's simply a matter of getting managers to manage, which is essentially to communicate," Sinetar said. "It sounds like I'm beating a dead horse, but we need only use what we have. It's so simple, if people would only realize that communication is a two-way process and they must contribute their part. If communication breaks down, it's no one's fault but your own."

COMMUNICATION NETWORKS '84 offers you 100 solutions to your post-divestiture telecommunication problems.

Charles Wohlstetter
Chairman, CEO, Continental Telecom, Inc.
Keynote

P.S. Vigilante
AT&T Information Systems
Business Viewpoint

Mimi Dawson
F.C.C.
Policy

Howard Anderson
The Yankee Group
Futures

Amy D. Wohl
Advanced Office Concepts
Micro Networks

As telecommunications and data processing managers, your success depends on keeping up to date with changing technologies. At COMMUNICATION NETWORKS you can choose from 100 information-packed sessions designed to help you succeed.

You'll learn how to survive the transition into the competitive telecommunications environment resulting from the AT&T divestiture. You'll discover new applications in Local Networks, Satellite, Bypass/DTS, Public and Private Data Networks, Interconnection, Micro Networking and new management technologies.

COMMUNICATION NETWORKS gives you twelve sessions focusing on "Network Technologies." Thursday, February 2, is "Microcomputer Networking Day," a full day devoted to teaching you how to get more from your PC than just stand-alone applications.

You may even choose to develop specific skills in one of the nine full-day "In-Depth" seminars. "In-Depth" seminars will be held on January 30, one day prior to the official opening of COMMUNICATION NETWORKS.

In just five years, COMMUNICATION NETWORKS has become the leading professional communications conference and exhibit in the nation. And COMMUNICATION NETWORKS '84 promises to be even better than ever—more sessions, more speakers, more exhibitors including American Satellite Co., AT&T Information Systems, COMSAT, Digital Equipment Corp., General DataComm Ind., General Electric Co., Integrated Communication Systems, General Electric Co., Microwave Link Operation, GTE Business Communications Systems, GTE Sprint Communications Corp., Harris Corp., DTS Div., Hewlett-Packard, M/A-COM, Mohawk Data Sciences, Northern Telecom, Inc., Scientific-Atlanta, Inc., Siecor Corp., 3M Business Communication Products, Ungermaan-Bass, Inc., Uninet, United Technologies Communications Co. and many more offering the latest in products and services.

The DEC Rainbow 100+ The Rainbow 100+ system will feature Z80A and 8088 microprocessors, a 10 MB Winchester hard disk, a dual floppy diskette with 800 KB capacity and asynchronous communications, built in terminal emulator, printer port and 128 KB of system memory.

As an added plus for CN '84 attendees . . . you'll have a chance to win a DEC Rainbow 100+ Computer System.

COMMUNICATION NETWORKS '84, will take place at the Washington Convention Center in Washington, D.C., the telecomm capitol. It will be held on January 31 - February 2, 1984.

Call toll-free 800-225-4698 (In MA, 617-879-0700) for more information. Or fill out and return the coupon below.

COMMUNICATION NETWORKS
Conference & Exposition
Washington, D.C. · January 31–February 2, 1984

The Sixth Annual Communication Networks Conference & Exposition for the Telecommunications Business Professional
Washington Convention Center, Washington, D.C.

Register today!

Call 1-800-225-4698 or fill out this coupon and return it. We'll be glad to bill you or your company.

Name _____
Title _____
Company _____
Address _____
City _____ State _____ Zip _____

OC

at Canisius College in Buffalo, N.Y. "It's like a marriage. If communication fails, the marriage is more likely not to work. If the marriage fails, it is more likely due to a breakdown in communication than anything else," she said.

Some firms have in-house departments that specialize in handling employee relations. But many firms do not. There are, however, a growing number of human resource planning consultants and industrial psychologists that can help firms recognize, analyze and, in turn, solve their communication problems. The initial step, however, must come from within the firm.

According to Bugbee, "the request for assistance usually comes from the senior management group. Management notes a breakdown; there is always a trigger of some kind."

THAT TRIGGER CAN include symptoms such as low morale, general discontent, misinformation or confusion about one's role in the organization. In addition, symptoms can be as drastic as union organization attempts or massive walkouts. But it is absolutely vital to catch the problem before it gets out of control, and no company is immune to communication bottlenecks.

Breakdowns in data processing organizations occur within the department, but most frequently, between the department and the rest of the organization.

"With each other, DPers have few problems — they are a cohesive group, share their own language," explained Sanford Weinberg, an information systems professor at St. Joseph's College in Philadelphia. "They have a different vocabulary than upper management, however, and the two share a mutual disrespect. They use the vocabulary to hide what's going on." Breakdowns in communication, Weinberg maintained, stem from a difference in perspective. "DP is seen as having different goals than the rest of the organization," he said. "DPers are seen as a bunch of technocrats eager to centralize the system. They are viewed as empire builders."

But how do you bridge this perception gap? Education, Weinberg claimed, is the key. "A successful tactic," the professor explained, "would be to give non-DP managers courses in computer literacy and to give DPers workshops in management techniques. They have to reach a mutual understanding." According to Weinberg, one way to sidestep the problem is to hire people with both business and computer knowledge. Several universities offer a degree in information systems, which focuses on those two different disciplines.

EXPERTS AGREE THAT employee involvement is an essential factor in opening up communication. Management must get everyone involved in the problem solving, be it by teaching simple computer skills to nontechnical employees, holding brainstorming meetings or conducting corporatewide surveys.

Management consultant Myers, who conducted definitive human relations research at Texas Instruments, Inc. in the '50s, gave an example of a firm that failed to involve all its members in a decision-making process. The firm, a client of Myers, planned to change its timekeeping system from a Hollerith punch card procedure to a keypunch time clock procedure. "They asked me what I thought, and my personal reaction was that I didn't like it. It ties employees down, is inconvenient and shows a complete lack of trust in the employees.

"I advised management to consult the employees whose time was being recorded. As a result, the firm ended up with no machine at all, with employees charting their own time on the honor system," Myers said.

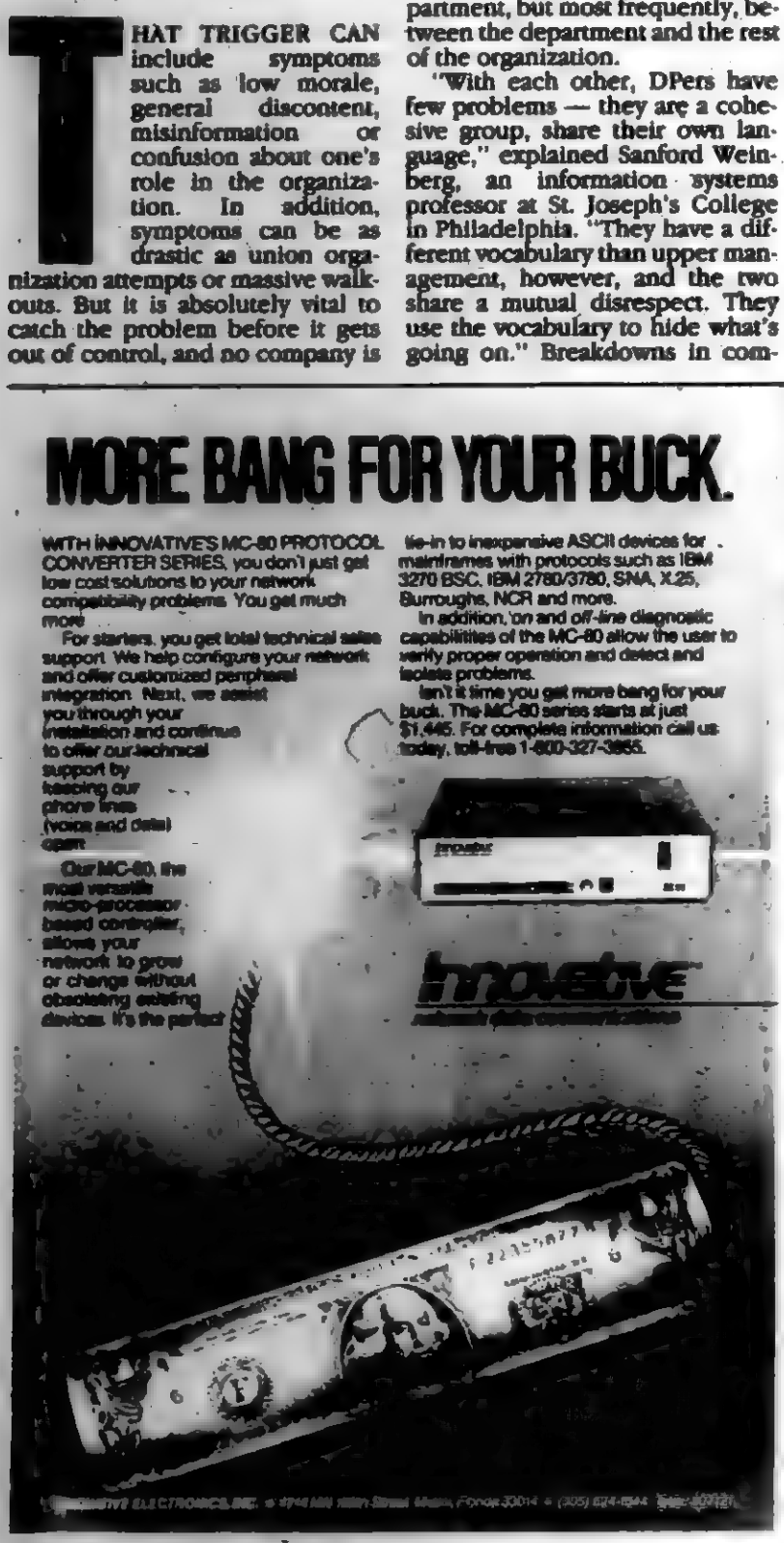
Granted, every case study is different, and there is no single solution to the human communication problem. But there are several things firms can consider when trying to improve their interpersonal communication. These include:

- *Training and education.* This can involve training in the importance of communication and in the development of interpersonal skills. It can involve computer literacy training for non-DP staff and management training for DP-related staff. In addition, employees can be educated on corporate history and policy, thus involving them more in their firm's operations and decisions.
- *Job requirement and performance appraisal.* Interpersonal comunication can be built into a manager's job description. "If improving interpersonal communication is a specific job requirement, there is built-in reinforcement at review time," Bugbee pointed out. "For example, if someone does not work to improve human relations in his department, he doesn't get the same raise as someone who does. That's a strong way to reinforce a message: Dollars speak loudly," he said.
- *Strengthen middle management.* Special attention must be given to improving management's communication skills. Middle management is a vital link in the human communication process. Bugbee explained, "It's like transmitting an electric current. It's strong at the source, but the further it travels, the weaker it gets. Communication is much the same way. The message is strong from the sender, but it gets distorted as it passes through different channels. It's up to middle management to keep it strong thoughout the chain."
- *Listening.* According to Larkin, listening is vital to the communication process but is frequently neglected. "Listening is where trust begins," she said. "If you don't listen, you don't understand problems."
- *Self-analysis.* Firms must identify their strengths and weaknesses and then analyze them and act accordingly. In addition, managers must look at themselves when trying to solve their firm's communication problems.

Organizational psychologist Sinetar stresses the importance of self-analysis. "It is important for people to be self-reflective. The answer to communication problems lies with individuals," she explained (see related sidebar on Page 65).

- *Corporate communication policy.* With the help of a consultant or on its own, a company can develop a communication policy, a manual that spells policy out in black and white and that can be readily referred to if problems arise.
- *Newsletters, audiovisual presentations and other media.* While such media are important, it is necessary to remember that they only part of the solution.

Most consultants agree that a healthy interpersonal communication system is directly related to



success. Both Myers and Bugbee pointed to the firms described in the best-selling book, *In Search of Excellence*, by Thomas J. Peters and Robert H. Waterman Jr. These highly successful firms have one thing in common: They take pains to improve their interpersonal communication system, to create an environment in which employees can work toward their own goals while working toward the goals of the organization. "As a general rule, good communication is a direct correlation to success," Bugbee noted. "If you look at the successful firms, first and foremost, they have a good overall communication process. Communication is nurtured at these firms; it is cultivated."

Myers agreed: "Of course communication is related to success; that's why democracy is inevitable. It is no longer possible for an autocratic manager to run an organization. Any company ruling its people with an iron hand will have trouble surviving."

While it is vital for firms to open up their human communication system, how hard is it to change an organization that has been entrenched in a tight management strategy for years and years? According to Myers, there is one simple condition in which it can be changed: "When the pain of the malady exceeds the pain of going to seek help." It can be done, but it isn't easy.

According to Bart Perkins, a management consultant with Norton, Nolan & Co., a Lexington, Mass.-based consulting firm, it is necessary to "get the organization to unfreeze itself. Something must trigger the change, and once it is made, it must be refrozen."

As a general rule, more and more firms are undergoing this "freezing process" and emphasizing the importance of interpersonal communication. "From my perspective, there is much more emphasis on communication skills — verbal and nonverbal," Bugbee explained. "Employers look closely at those skills, try to find people who can communicate. In the past, lip service was paid to it, but today it is becoming more and more important."

As companies realize the importance of human communication, they also become more aware of outside sources expert in the field. A word of warning, however, is necessary, according to Larkin. "There are a lot of fly-by-night outfits with packaged programs to apply to any situation — for example, time management. They teach you something that doesn't fit. They come in and promise the world, and they're not accountable. Some companies recognize this and are more selective," Larkin said.

According to Myers, there is one simple condition in which a long-entrenched tight management strategy can be changed: "When the pain of the malady exceeds the pain of going to seek help."

Larkin also warned that companies must do more than talk about improving their interpersonal communication. "Most companies want to present themselves as progressive, but it's one thing to talk about it and another to do it. Communication is an area that always needs work. It's an ongoing process. You never get there: You can always do more." ■

Hartigan is managing editor of Computerworld On Communications.

"GET IBM 3270, 3780 AND HASP COMMUNICATIONS— ADDING A ONE-BOARD PROCESSOR TO MY PC?"

"YOU CAN WITH PERSYST."

The Persyst DCP/88. The only compatible front end communications processor that can support a range of IBM communications.

It's a Persyst exclusive.

The DCP/88 distributed communications processor. A one-board computer that can be configured by software to handle communications between a PC and another computer system.

In fact, the DCP/88 enables the IBM or TI PC to support a range of sophisticated IBM communications—all with just one processor.

So it gives corporate users unprecedented, low-cost flexibility to incorporate the PC into virtually any environment.

Convert any PC into an IBM 3270 terminal. An IBM 2780/3780 RJE workstation. Or a HASP/RJE workstation—instantly.

Just combine the DCP/88 with Persyst software—and you can connect your PC to any compatible host mainframe or minicomputer.

PC/3270 enables your PC to emulate an IBM 3274 Cluster control unit and 3278 terminal, supporting up to four additional devices. Including a printer and three other PCs functioning as 3278 terminals.

PC/3780 converts your PC into a 2780/3780 remote job entry terminal that can send and receive batch files to and from the host.

And with PC/HASP, your PC instantly becomes a full-function HASP/RJE workstation that can support up to seven input and seven output multi-leaved job streams concurrently.

Capability to support your communications needs now. And in the future.

Because the DCP/88 supports bisync, SDLC, HDLC and async protocols, it is the only communications processor you'll ever have to buy.

Use it to connect your PC to an expanding network of IBM communications. Configure your system to meet virtually any communications need—without adding another piece of hardware. Or expense.

All of which makes the DCP/88 as practical as it is powerful.

The Persyst Coax/3278. Still another way to expand your IBM communications.

Here's another fast way to incorporate the PC into existing SNA or bisync data processing installations.

The Coax/3278. A single-slot expansion board that converts your PC into an IBM 3278 display terminal. And with its high-speed coaxial port, you can connect the PC directly to IBM 3274 or 3276 cluster controllers.

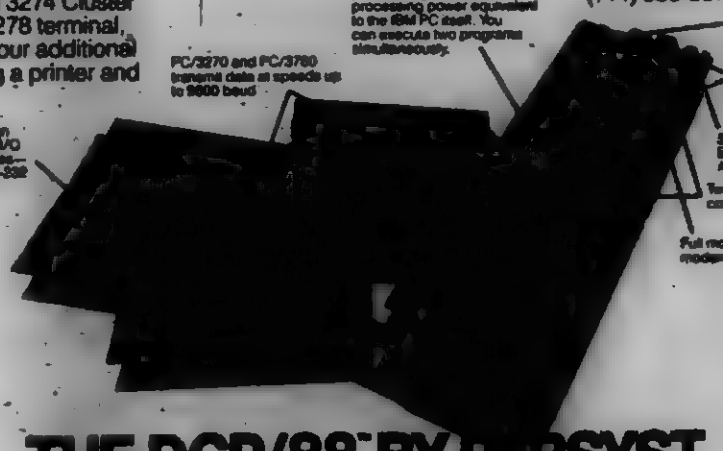
Sophisticated communications products for the corporate user. Insist on Persyst.

Persyst communications products are designed to make corporate information systems more powerful. And more efficient.

Write or call Persyst today for complete information.

PERSYST

Persyst Products, Personal Systems Technology, Inc., 15801 Rockfield Blvd., Suite A, Irvine, CA 92714. Telephone (714) 859-8871. Telex: 467864.



THE DCP/88™ BY PERSYST.

At NASA's Ames Research Center, hundreds of scientists share hundreds of programs on one large computer network:

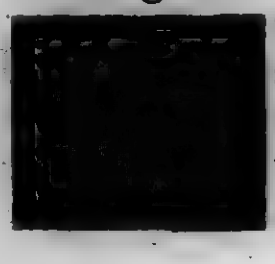
Digital's.

Aircraft design. Space biology. Computational fluid dynamics. Infrared astronomy. Interplanetary exploration. At NASA's Ames Research Center, the technology couldn't get more advanced. That's why Ames scientists share a network of over 50 of Digital's computers and two large mainframes.

Everyone on the Ames network has access to almost every computer on it. Researchers share not only data, but software, utilities, and peripherals as well. A program written anywhere is often useful everywhere on the network, so there is practically no duplication of effort and almost no need to retrain users when new programs are added. The savings, in time and money, are substantial.

The Ames network is an open-ended system. It has grown from one computer to over 50 in just eight years, with minimal disruption of service during its continuous expansion. Thanks to Digital's compatibility, even across generations, it wasn't necessary to replace any of Digital's computers. They simply added to them.

So if you're considering a network,



talk to Digital. We'll show you how you can start as small as you want. And grow as large as you need.

digital™

© Digital Equipment Corporation 1983.

BLASTing

THE WAY TO SYNCHRONOUS COMMUNICATIONS

BY
PAUL CHARBONNET JR.
AND GLEN SMITH

Minicomputer and microcomputer users now have several new options in data communications software. Packages are available that provide the error-free computer-to-computer data transfer that was previously available only on much larger systems. These packages are inexpensive and require little or no additional hardware. Despite their low cost, some of them rival even mainframe products in their reliability, efficiency and ability to cope with new communications media such as satellite links and local-area networks.

Most of these packages fall into the rapidly growing category of file-transfer utilites — that is, programs that exchange files (binary, text or data) between computers. They even work among computers with previously incompatible operating systems such as IBM Personal Computer to Digital Equipment Corp. VAX, or Apple Computer, Inc. to Data General Corp.

The key factor in the development of these products is that most micros and minis have only asynchronous communications capability. They are equipped with the low-cost interfaces and 300 bit/sec or 1,200 bit/sec modems required for supporting character-at-a-time terminals and printers. They cannot use mainframe data communications protocols such as IBM's Binary Synchronous Communications (BSC), Systems Network Architecture/Synchronous Data Link Control (SNA/SDLC) and X.25 High-Level Data Link Control (HDLC) because these protocols require expensive synchronous interfaces and modems designed specifically for processor-to-processor communications.

Most of the new communications software for small computers is based on protocols that can operate with asynchronous interfaces and modems. Such products allow the small system user to integrate terminal and data communications in a single hardware environment. All of the asynchronous protocols that have emerged use the standard synchronous technique for error detection: The data stream is divided into blocks, and the integrity of each block is monitored by appending a check-sum that is recomputed and compared with the original check-sum when the block is received.

It is in the area of flow control and block acknowledgement that vendors of asynchronous packages have diverged on two distinctly different paths: full-duplex and half-duplex. For this discussion, half-duplex and full-duplex refer to the protocol structure rather than the electrical/hardware interface. Full-duplex protocols send blocks of data in both directions simultaneously, whereas half-duplex can only send blocks in one direction at a time, analagous to a two-lane highway and one-way street with constantly reversing direction.

Half-duplex protocols send a block of data, then wait for the remote system to return an ACK code (BLOCK OK, CONTINUE) or NAK code (BLOCK BAD, PLEASE RETRANSMIT). These are known as ACK/NAK or stop-and-wait protocols; full-duplex protocols are continuous. Communications software packages that ▶

use half-duplex protocols are widely available, since they are easy to design and implement, although inherently inefficient. Most are based on the Ward Christensen protocol, a half-duplex protocol in the public domain.

The inefficiency of stop-and-wait protocols results from the dead time between blocks while waiting for the ACK or NAK code to arrive. Any delay in the communications link adds to this dead time and typically cuts the efficiency of half-duplex protocols by 50% to 80%. Propagation delays are the obstacle both on satellite links and in packet-switching networks and local-area networks, in which the passage of data is momentarily delayed at each node in the network. With the growing use of satellite links and networks, half-duplex protocols are losing favor.

Full-duplex protocols such as Blocked Asynchronous Transmission (Blast) transmit a continuous stream of data blocks while using the other half of the communications channel to receive block acknowledgements simultaneously. This structure is combined with the use of sliding window or pipelining techniques as employed by sophisticated synchronous protocols such as SNA/SDLC and X.25/HDLC. The end result is that full-duplex asynchronous protocols can endure significant propagation delay without losing efficiency. They are suitable for use in a variety of communications environments.

Selective retransmission is a refinement of the sliding window technique that greatly improves performance on noisy lines. With this feature, only the blocks that have errors induced by line noise need to be retransmitted. Without selective retransmission, all blocks that have been transmitted since the bad block must also be retransmitted. This difference can account for as much as an 80% throughput difference on some connections.

Communications Satellite Corp. recently published the results of benchmarks comparing the performance of Blast with the half-duplex Christensen protocol on a satellite link. The tests involved two microcomputers exchanging files via 1,200 bit/sec modems on a dialed telephone call that included a single satellite hop. Blast consistently achieved 50% greater throughput than the Christensen protocol. Furthermore, the throughput of the full-duplex protocol remained high even when line noise was induced by deliberately off-pointing the satellite antenna.

With the AT&T deregulation and the financial problems facing the independent operating companies whose line maintenance costs will no longer by subsidized by Bell, deteriorating lines may continue to produce increasing amounts of noise to plague data transmissions. At higher modem speeds, line noise becomes an even greater problem. As modem technology provides faster and cheaper modems, the necessity of full-duplex selective-retransmission automatic repeat request to handle line noise also increases.

As line noise increases with aging telephone lines, so do the chances of spurious ACK or NAK bytes and telephone line dropouts that cause computers to hang or become locked up waiting for vanished bytes. Many systems have been carefully set up to transmit long files operator-free at 2 a.m., only to hang in the middle of a file due to a lost line and have to be restarted from scratch at 8 a.m. Most full-duplex protocols are immune to line dropouts and spurious data. In addition, the more advanced utilities provide a time-out mechanism that automatically recovers after a line loss and then retransmits from the point of interruption, rather than from the beginning of the file.

Bell's announcement that it will no longer guarantee terrestrial service instead of satellite links after 1984 is significant. The user never knows whether a telephone call will be routed via land lines or satellite. Either way, the data throughput will be higher with a full-duplex selective retransmit protocol.

Features common to the better full-duplex and half-duplex utilities include support on a wide variety of systems; error-free transfer of text and binary data; ease of use, including menu selection of features; and low-cost, software-only implementation not requiring special hardware.

Sophisticated utilities such as Blast also provide these features:

- Very high resistance to noise by using small transmit blocks and bit-oriented protocol.
- Ability to patch existing files without transferring the whole file.
- Record access or the ability to extract data from a remote file without transmitting the entire file.
- Completely implemented use of full-duplex capability so that transmission of different files can occur simultaneously in both directions making optimum use of full-duplex facilities.
- Status reporting while transmission is in progress.
- Ability of either end to initiate file transfer in either direction.
- True unattended operation.

Mom Knows

When it comes to efficient communications-

MOM can fix you up with the hardware and software to turn your IBM PCs,™ DEC Rainbows,™ Apple Lisas,™ and other micros—as well as terminals—into full-function work stations. Instantly.

MOM, which stands for Marketing of Micros to Mainframes, specializes in distributing sophisticated, state-of-the-art interface equipment. You can depend on her to link your micros to host computers quickly. Efficiently. Problem-free.

MOM's old fashioned when it comes to product reliability, service and support. Her advice is sound. Trust her. MOM suggests only those products that will provide you with the solutions you need. Tell her what your needs are, MOM will tell you the best way to increase productivity as well as keeping costs down.

MOM knows the value of a dollar.

Money doesn't grow on trees. So solutions to today's business communication problems need to be

compatible with the next generation of technology. MOM stretches your computer investment dollars by adding processing capabilities to microcomputers and terminals, eliminating the need for additional expensive hardware. Data control is centralized in the mainframe.

Meet a few of MOM's family.

MOM markets a growing number of very impressive hardware and software products. Each one is compatible with a variety of microcomputers.

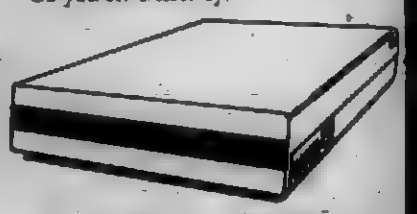
Meet IRMA.™

IRMA goes with CHARLIE, the IBM PC or XT.™ IRMA is a Decision Support Interface™—a printed circuit board

that slips into the PC and provides a direct link to the IBM mainframe computer. IRMA provides full 3278 emulation. She puts you on line with the mainframe—via a coax cable—giving you instant access to the big computer, the prime source of current data.

And then, of course, there's sweet IRMALINE.™

IRMA's sister, IRMALINE, links personal computers—no matter how remote—to IBM 3270 networks. And like her sister, IRMALINE is a Decision Support Interface. She lets you conduct 2-way phone communication with your mainframe via a 3270 terminal, from across town or around the world. IRMALINE connects you direct to your mainframe with a local phone call-rather than having to dial long distance. So you save money!



Team IRMALINE with IRMALETTE™—another member of MOM's family—to get the same data capture functions IRMA provides.

PC/COM.™ The perfect mate for IRMA.

This software system works in conjunction with IRMA to provide high speed transfer of files between the mainframe and the IBM PC or XT. PC/COM's universal file transfer capability is compatible with major IBM operating systems and associated application files. Single function keys provide users with easy-to-use menus to transfer text files, source programs, data and object files between the mainframe and the personal computer.

Users are subject to centralized mainframe control, so security is much tighter. MOM believes in keeping a tight lip.

AVATAR.™ MOM's UNIVERSAL TERMINAL CONVERTER.

AVATAR is MOM's self-contained microprocessor system that converts a terminal into a full-function, stand-alone personal computer. All it takes is a simple cable connection between

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 709 FRAMINGHAM, MA 01701

postage will be paid by

CIRCULATION DEPARTMENT

COMPUTERWORLD

375 Cochituate Road, Rte. 30
Box 897
Framingham, MA 01701-9985

The more sophisticated file-transfer utilities also adhere to the International Standards Organization's Open Systems Interconnection reference model. In the interest of future compatibility between various systems, this model requires that communications products be logically and structurally organized on a layered basis. In particular, the software layer that performs the application-specific function — in this case, file transfer — should be distinct from lower layers that implement the error-free protocol. If it is necessary to translate from one protocol to another — for example, SNA to X.25 — the applications layer can remain intact.

A layered structure is also complementary to the hierarchical organization of many large computer systems. For example, in order to access mainframe application software, it may be necessary to go through a front-end processor, a software level that performs user log-on and validation and a software level that performs code conversion — for example, Ascii to Ebodic. Each of these levels can be addressed by a separate layer to the communications product.

Vendors of small computers have not been slow to recognize the emerging asynchronous technologies. Recent announcements by Data General Corp. and Televideo Corp. of their own Blast protocol products have generated substantial interest by other vendors in industry standardization. Packaged, ready-to-use versions of Blast are already running on over 50 models of computers, enabling full communications of any binary data, messages, text or commands. Blast products exist for systems from a variety of vendors, including Data General, Hewlett-Packard Co., Texas Instruments, Inc. and others. They are also out for most CP/M, CP/M-86 and MS-DOS compatible systems and for DEC VAX, Apple units (both DOS 3.3 and CP/M), IBM Personal Computers and for Unix systems. Half-duplex mainframes can accommodate full-duplex protocol in firmware attached to any asynchronous port on the mainframe. Any computer running such a protocol can thus talk to any other computer running that same protocol, despite operating system incompatibilities. The software package itself converts the text file formats to the format of the other system. With utilities such as these, only one program is required to talk to many different systems, as the protocol is the same, thus eliminating the awkwardness and expense of multiple programs for multiple systems.

There are certainly situations in which the small-computer user should opt for synchronous communications. The host configuration is the key factor when relatively few small systems are involved in communication with an existing host.

Host systems that already have multiple asynchronous terminal ports may not also have available synchronous ports. For these systems, asynchronous is the obvious choice. The reverse is also true for some large IBM mainframes that have only synchronous ports or that cannot support the overhead of CMS or TSO required to use the available ports asynchronously. For these systems, the more expensive synchronous additions to the smaller systems may be valid choices.

Data volume is a significant factor. Synchronous modems allow higher speeds on dial-up lines. Therefore, if large amounts of data must be transmitted dial-up, synchronous is preferable to asynchronous. Several manufacturers, however, are now marketing 2,400 bit/sec and 4,800 bit/sec dial-up asynchronous modems, and these are rapidly reducing the gap between the ability of synchronous and asynchronous products to handle large volumes of data.

Cost is also a significant factor. The cost of a utility such as Blast ($250 per CPU) and a 1,200 bit/sec asynchronous modem ($395 and up) is substantially less than the cost of a popular BSC package, 1,200 bit/sec synchronous modem and special synchronous interface for an IBM Personal Computer (approximately $2,750 total). Other micro-to-mainframe connections are available in boards and protocol converters that typically cost around $1,000 per connection, plus modems. When many small systems are involved, the asynchronous alternative is clearly less expensive.

The emerging requirements for communications between low-cost computers can be served effectively without additional hardware by available asynchronous utilities using state-of-the-art protocols to provide sophisticated capabilities. They provide a means to use the common dial-up telephone lines, packet or local-area networks or satellite communications with high efficiency. As some of these protocols become de facto standards, they will provide mixed vendor communications capabilities similar to common synchronous protocols. ■

Charbonnet is director of marketing and Smith is vice-president, research and development, for Communications Research Group, Inc., Baton Rouge, La.

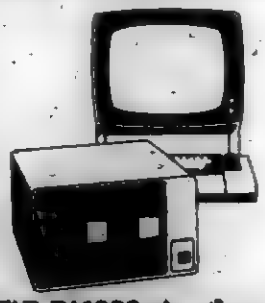
©1983, The MOM Corporation.

Best.

from micros to mainframe–MOM™ does it all.

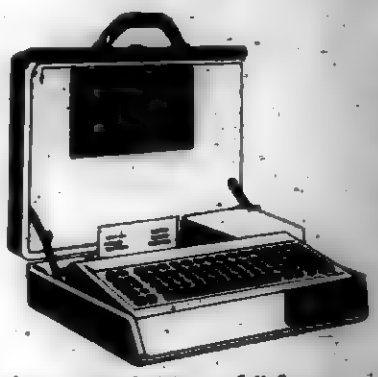
the terminal and the host system. No terminal modification is required. You get PC power on the terminal in addition to your normal terminal capability.

In addition, AVATAR is portable, so it's very easy and efficient to use. Buy AVATAR, and MOM will give you CP/M,® MS-DOS,™ WordStar,™ CalcStar™ and CBASIC™ software. Absolutely free! File transfer software is available as an optional feature.



AVATAR PA1000: Another way to talk to any computer.
The PA1000 protocol converter allows you to connect any asynchronous terminal or PC into an IBM 3270 network and simultaneously into any asynchronous host system. You can do it from either a local or a remote location. The PA1000 has additional ports to which you can attach a printer.

MOM even has a computer.
This small, professional computer in a briefcase caught MOM's eye.

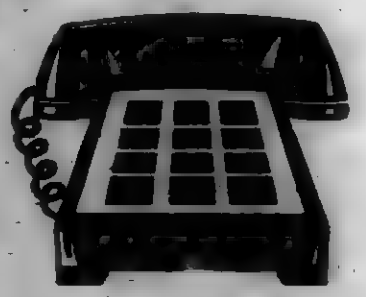


The PC Traveler™ is a full-function IBM-compatible, portable computer. A 28-pound wonder, it comes standard with a gas plasma display for 25 lines/80 characters, 128k RAM memory and an IBM PC-type removable keyboard. The dot matrix impact printer is bi-directional, 132 char-compressed.

The PC Traveler has graphics capability and communication options (300/1200 BPS internal modem). The 8 meg floppy disk is upgradable to 16 megs. The computer uses 16 bit, dual 80186 processors and is 10 times faster than the IBM PC.

Available for delivery, Jan., 1984.

MOM and PATCHES.™
Anything worth preserving is worth protecting, so MOM developed PATCHES. A patented chip protection system insures the integrity of her software. This system allows users to copy MOM's software for their internal use, while a companion chip installed in the PC prevents unauthorized use. PATCHES makes and keeps software and communications private and secure.



Call MOM. 1-800-241-1170.
MOM knows what's best when it comes to micro-to-mainframe access. She's made it her business to know the market. Just ask her about products. Bring your problems to her. Trust her for the best advice. MOM knows how to improve your communications network, and nobody is as cost and quality conscious as she.

Mom is Marketing of Micros to Mainframes, Two Northside 75, Atlanta, Georgia 30318.

MOM™

Specialists in Marketing of Micros to Mainframes.

A division of NPM, Inc.

MOM, PC/COM and PATCHES are trademarks of National Product Marketing, Inc.

IS THE VOICE-DATA MIX MISSING?

BY JAMES N. BUDWEY

Up until about 1979, the development of voice and data communications followed somewhat separate courses. The characteristics of data communications were so different from those of voice communications that different system solutions evolved to satisfy each. For data, it was generally necessary to communicate between a mainframe or minicomputer and other computers or dedicated terminals. For the most part, these systems were used by highly trained technical individuals.

Data use was highly concentrated with long communications holding times. Terminals and communications lines were operated for long periods by users who worked in real time to design software programs at the terminals. User locations were relatively clustered and easily reached with coaxial cable. Therefore, communications transmission was accomplished via coaxial cable, dedicated-loop systems and dedicated point-to-point, point-to-multipoint cabling.

Local-area networks and switches evolved to provide nondedicated or switched data communications for these users. Transmission bandwidths required to support data communications were generally no more than 9.6K bit/sec from each terminal, but reached megabit rates in some special cases. In situations where low data rate remote access was needed, modems were used to couple through the local premises voice network. The systems and applications associated with data communications were tightly managed by a group of technically proficient data processing specialists who had their own organizations, budgets and languages.

In contrast, voice telephone communications was required throughout an organization for use by both technical and nontechnical people. Access was provided by wiring a facility with ▶

PHOTO © 1984 ED BRAVERMAN

inexpensive, twisted copper wire pairs to all personnel locations. The bandwidth requirement for each voice telephone was nominally 4 KHz. This bandwidth was easily accommodated for long distances over the twisted-pair wiring.

Telephone conversations are short — usually about five minutes. Evolving telephone systems capitalized on this by providing only enough circuit paths to ensure that a user has low probability of blocking when phoning another station. As a result, all of the users do not have access to the system simultaneously. For these systems, about 50% to 60% of the users can simultaneously converse with each other at the same time.

In many cases, the organizational responsibility for managing the voice communications facilities became another of the facility manager's many responsibilities. Later, for larger organizations, this function was delegated to a professional telecommunications manager.

The telecommunications organizations were considered as overhead cost centers, and their expenditures and personnel were generally tightly controlled. Most of the people required to administer the system were telephone company employees whose fees were buried as part of the leased cost for telephone service from the telephone company. As private branch exchanges (PBXs) evolved, this scene changed slightly by requiring that more of the telephone administration burden be borne by the telecommunications organizations.

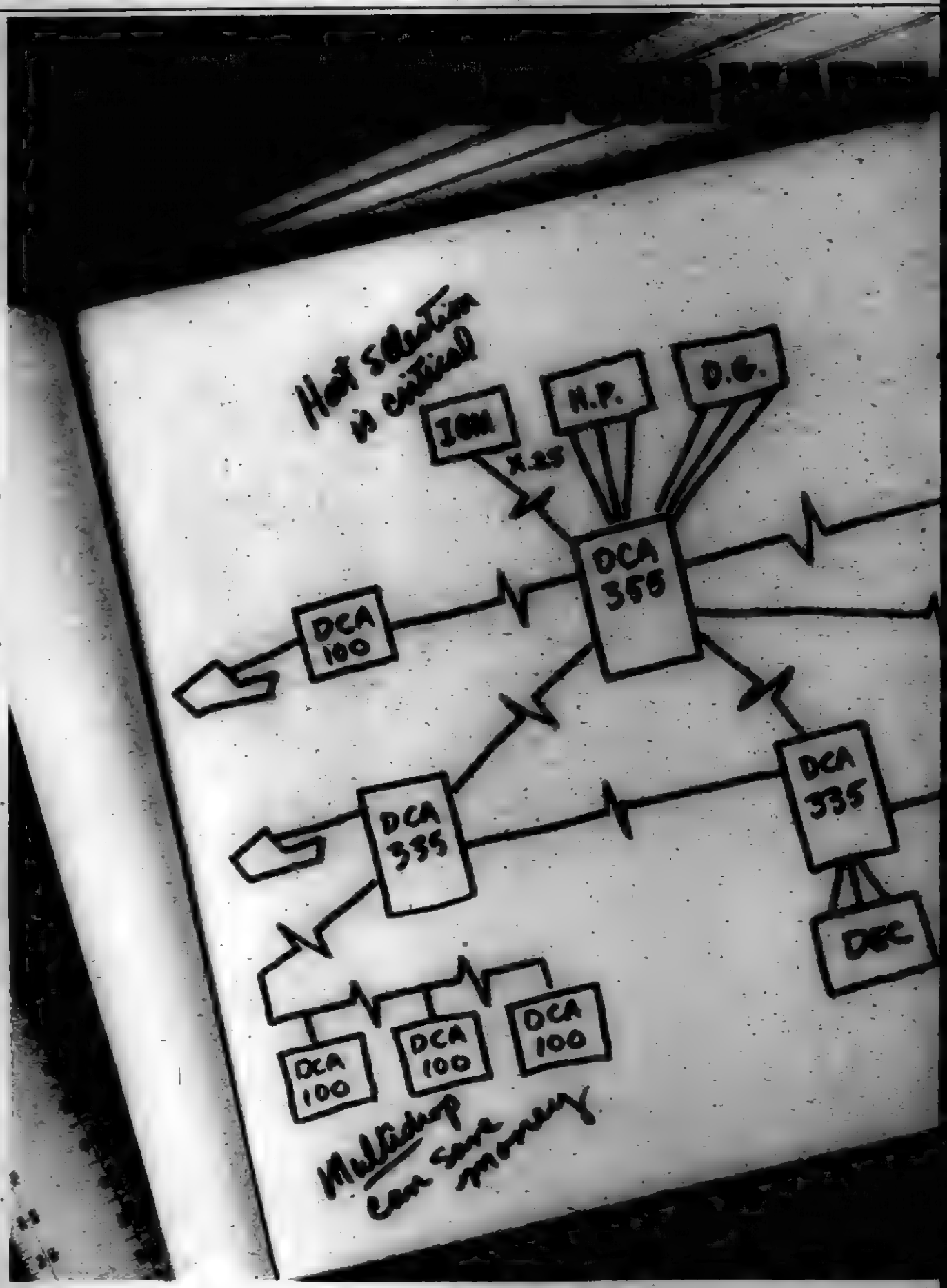
BEFORE 1980, voice and data integration was not a major issue and was accomplished by using modems to couple to the existing voice network. Because of the expense of modems and the limited bandwidth and capacity of the voice network, dedicated cable and loop systems were used. Totally integrated systems were not practical.

In 1980, a few integrated voice and data PBXs became available, and a small niche developed in the telecommunications marketplace. The users of such systems consisted of organizations with heavy data communications requirements, fairly technically oriented personnel and risk-tolerent managers willing to be pioneers in a new concept.

In many cases, the responsibility for managing the voice communications facilities became another of the facility manager's many duties. Later, for larger organizations, this function was delegated to a professional telecommunications manager.

The PBX systems available at that time were considered expensive by the telecommunications managers who compared them with the voice-only systems. This raised serious questions about the viability of the PBX as the office controller. Local-area networks received much attention from the data-oriented groups, and separate communications solutions for voice and data appeared more practical.

Around 1980, the key factor driving the market for integrated systems was



beginning to emerge, namely the proliferation of data equipment and data-based essential services to nontechnical personnel randomly located throughout a facility or campus. These services require that data communications be ubiquitous, as voice communications is. In addition, as people are relocated, their voice and data communications capabilities must follow. Separate systems for voice and data in this environment would sorely tax the resources of the organization and be awkward to administer.

When systems are integrated, a single group of technical administrators can focus on the interface requirements and protocols necessary to provide communications between equipment from different manufacturers.

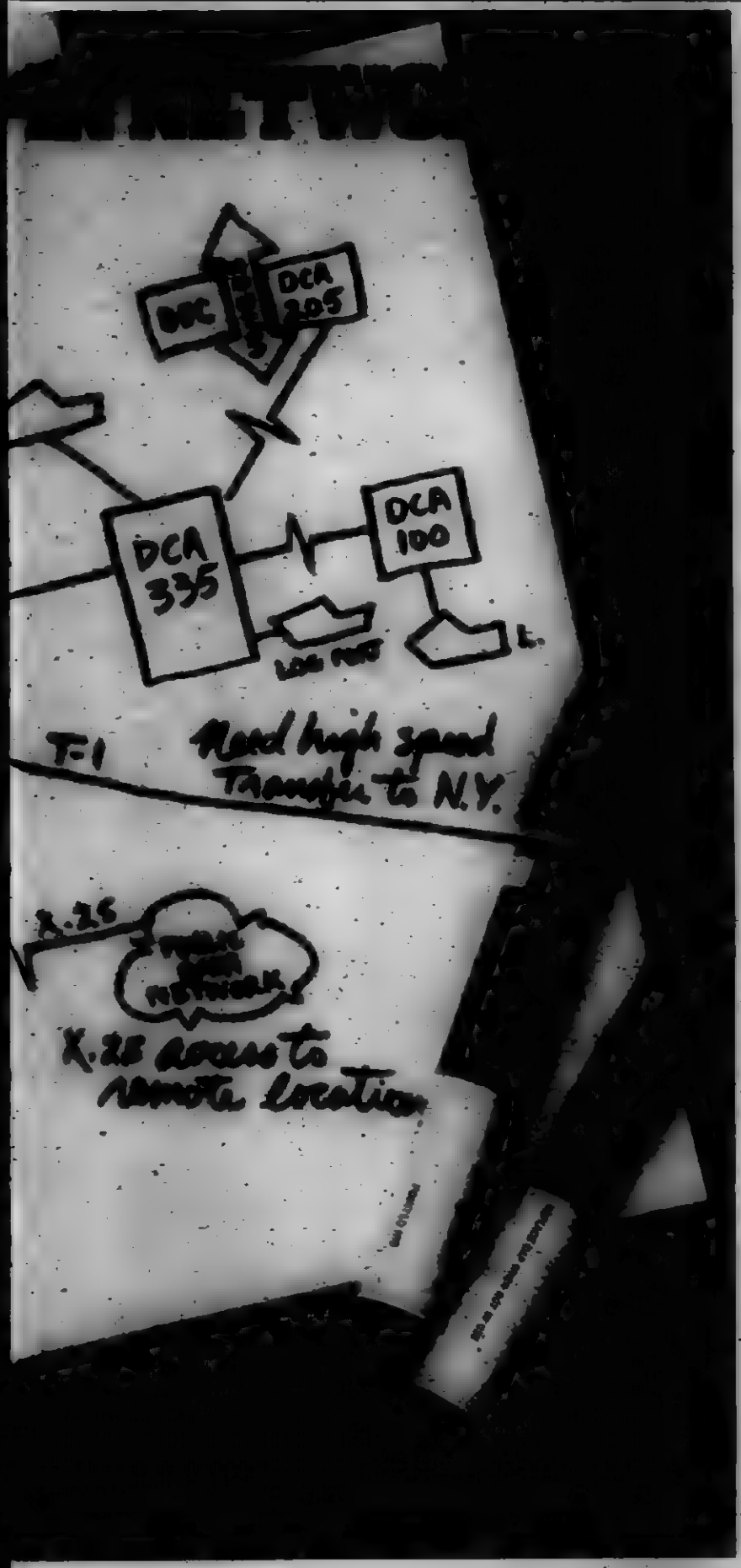
For example, duplicate sets of cabling would have to be strung to each location, one for voice and one for data, and existing conduits and ducts would have to serve many more cable runs from the separate voice and data organizations. Moreover, as moves or changes occurred, multiple groups would have to manage these moves, and multiple sets of cabling would have to be strung. In many cases, old cabling is simply abandoned and new cabling provided. This may seem to be a mundane problem, but many organizations are simply running out of conduit and duct space. It is expensive to add more to an existing facility. In addition, separate organizations and systems are not conducive to end-to-end integrated services.

When systems are integrated, a single group of technical administrators can focus on the interface requirements and protocols necessary to provide communications between equipment from different manufacturers. When properly implemented, the transmission requirements become transparent to the end user, and this stimulates more use.

Equipment and services requiring data communications to nontechnical personnel have begun to proliferate. A communicating word processor is an example of such a system. These word processors are currently penetrating the market at a growth rate of 15% per year. By themselves, however, word processors might not provide adequate justification for integrated voice and data systems, since they are being used for the most part by secretaries, who represent a small percentage of total personnel in an organization.

Other systems, such as electronic mail, personal computers and multifunction workstations extend the requirement for data communications to almost everyone. These systems are growing at annual rates of 25%, 20% and 50%, respectively.

YET THIS IS just the beginning. Off-premises networks that are available today promise access to a plethora of data-based information systems. Without this access, managers and staff members will be handicapped in the late '80s. Networks that provide end-to-end bandwidths of 1.54 MHz and



At DCA, we've developed what many regard as the most efficient, most effective networking design in the industry. We call it Integrated Network Architecture.® And here's what makes it work:

Complete network transparency. We make all our networking hardware to interface with all data processing hardware. So you don't have to modify your hosts or terminals.

Comprehensive network management. You can monitor transmissions, troubleshoot, even reconfigure parameters on-line from one central point. With a DCA network, you have total control.

Virtual circuit switching. For optimum efficiency, our network provides accessibility for any terminal to any host.

Error controlled transmission. Since we have practically erased the probability for undetected error, low-cost terminals can be used more reliably.

Compatible modular hardware. It makes our networks easy to maintain and inexpensive to expand. All you do is add—instead of replace—DCA components.

Integrated Network Architecture. Call us toll-free and we'll lay it all out for you: 1-800-241-5793. Or write: DCA, 303 Research Drive, Norcross, Georgia 30092.

dca
Digital Communications Associates, Inc.
DCA Products Are Available Worldwide.

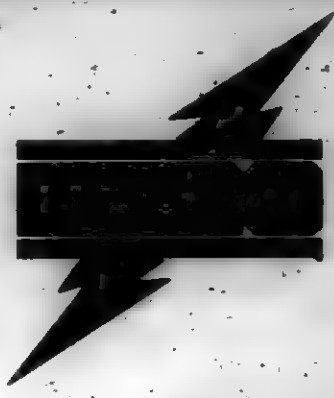
HERO SAVES IBM!

Incredible as it seems, even Big Blue needs to be bailed out now and then. Personal computers are such a runaway success, they're running Information Managers ragged. The problem is personal computers and mainframes don't always work together.

The result is Computer Shock. And nothing short of a HERO™ can cure it.

HEROISM COMES TO PERSONAL COMPUTING.

HERO is the intelligent, desktop Networked Personal Computer from MDS®. It does everything a personal computer can do. And lots that it can't. But HERO's main fame derives from its interaction with the mainframe.



INTELLIGENCE AT EVERY STATION.

Mated with the MDS SUPER 21™ Communications Processor, HERO can converse intelligently in IBM networks. HERO emulates IBM 3270 SNA and the 3776 remote-job-entry systems. Our SUPER SNA™ option gives you both on one communications link. HERO runs software under MS-DOS. Plus its own multitasking operating system.

HEROS UNITE AND CONQUER.

With MDS HERO and SUPER 21, you can access private, departmental and corporate databases. Instead of not working, your entire organization can be networking. Under your control.

And only MDS offers you INTELLIGENT 3270.™ So you can write your own programs and integrate them with data in the mainframe. HERO lets you retrieve information from the database, process it, display it and update it. Then either return it or store it locally.

EVEN HEROS NEED ALLIES.

In addition to HEROS, SUPER 21 is available with non-intelligent workstations within INTELLIGENT 3270 networks. MDS offer the PLUS 80™ family of plug-compatible controllers, printers and displays. They're directly interchangeable with corresponding IBM 3270 units.

MDS HERO MAKES A HERO OUT OF YOU.

With HERO and SUPER 21, your existing data processing investments become part of an ever-expanding fund of available data. All of it coordinated, cost-efficient and controllable.

MDS systems are planned for non-obsolescence. They're modular in design to accommodate future growth. So every MDS system, like a hero, is immortal.

GET THE ADVANTAGES OF BIG WITHOUT BEING BLUE.

MDS is a multidivisional, multinational corporation. We've grown by helping our customers to grow. By focusing our size and scope on responsiveness to their needs. Not just in IBM country, but beyond.

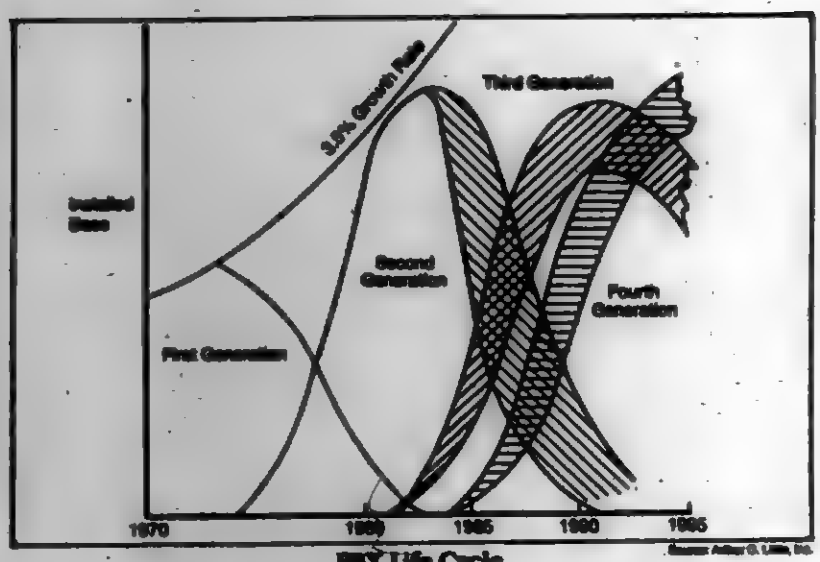
We can do the same for you, wherever you are. MDS offers service and support capability around the world, around the clock.

Ask our customers about us. And give us a call. Dial **800-MDS-HERO.** We'll show you how, when it comes to networking, MDS can help you unite and conquer.

MDS MOHAWK DATA SCIENCES

7 Century) Drive, Parsippany, New Jersey 07054. And over 430 locations, worldwide.

MDS is a registered trademark and HERO, SUPER 21, INTELLIGENT 3270, PLUS 80 and SUPER SNA are trademarks of Mohawk Data Sciences Corp. MS-DOS is a trademark of Microsoft, Inc.



PBX Life Cycle

above, distance-insensitive satellite coverage and wideband fiber-optic networks will transport services, such as those provided by Source Telecomputing Corp., MCI Communications Corp., Compuserve, Inc. and others. In addition, essential proprietary corporate data bases, developed and controlled by management information systems managers and other corporate staff, will also be transmitted over these networks.

As a result of the rapid market penetration of many of these systems and services, the trend toward integrated voice and data systems is beginning to spread to the mass business market. Most corporate telecommunications and teleprocessing managers are aware of these trends and expect the percentage of users of these services to increase dramatically within the next five years. As a result, they are scrutinizing new system procurements to ensure that they are future-proof to the extent that they can modularly accommodate these emerging services.

Since 1980, when the first integrated voice and data PBXs were installed, the manufacturers and the industry have matured, and many major issues and trends in integrated services have come into better focus. Today, suppliers of integrated voice and data PBXs are emerging as strong contenders for the integrated office communications controller role. Systems available today — and many more announced for delivery in 1984 — will provide integrated voice and data communications at relatively low incremental costs for data. In addition, some systems provide transmission rates as great as 1M bit/sec and employ the best elements of PBXs and local-area networks.

THE INSTALLED BASE of PBXs and AT&T's Centrex business telephone lines represents the total potential market for integrated voice and data PBXs. By the end of 1982, this installed base amounted to over 20 million lines, with an overall annual growth rate of about 3.5%. The value of this installed base — assuming total replacement by PBXs in 1983 — is about $20 billion. The annual market resulting from a growth of this base and a replacement of older switches with newer ones was over $2 billion in 1982..

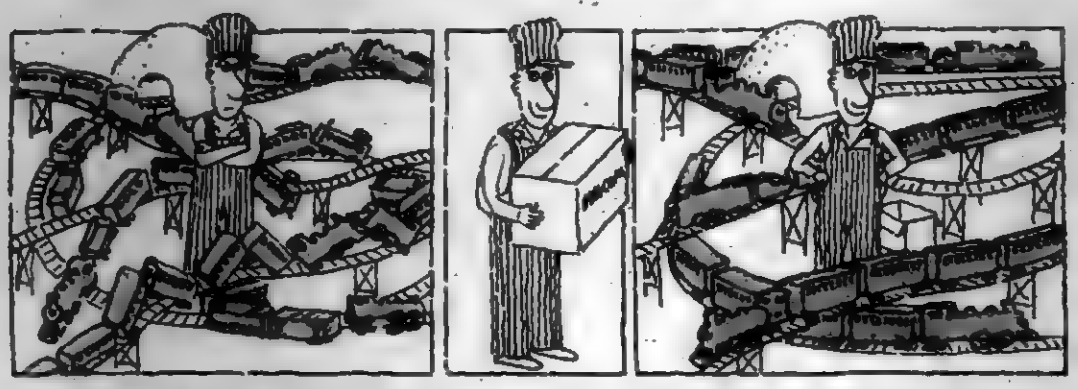
The installed base is currently comprised of several vintages of switching equipment. They include first-generation electromechanical and hard-wired electronic switches; second-generation centralized, computer-controlled, software-programmable, limited-capacity switches; and third-generation distributed processing, nonblocking, integrated voice and data switches with digital transmission capability from station to station.

The second-generation switches first appeared in 1975 when Rolm Corp. and Northern Telecom, Inc. introduced their CBX and SL-1 PBXs, respectively. These switches became popular quickly because they offered many convenient user features, ease of modification and upgrading and rapid payback. Shortly after Rolm and Northern Telecom introduced their switches, several other manufacturers introduced switches with similar characteristics.

All of these second-generation systems were designed mainly to provide voice-only communications, with all systems using analog transmission between the telephone set and the switch. Any switched data communication between stations required expensive

WHEN IT COMES TO CONTROLLING YOUR DATA NETWORK,

THE IDX-3000™ PUTS YOU ON THE RIGHT TRACK.



Control can be a major problem with a large network. That's why our IDX-3000 Local Communication System features the IDX-Net™ network controller. With IDX-Net, you handle configuration management on-line. You can manage major network topology changes, such as disaster recovery, with only a few keystrokes.

IDX-Net lets you access network control commands and diagnostics from any terminal in the network, including dial-up. This means that you, or MA-COM Linkabit's Hotline Service, can diagnose your problem in seconds without having to be in your computer room.

Programmability
IDX-Net's 68000-based network controller software provides you with the capability to interface host-resident application programs to the network. You can build-in your own custom-tailored network management features.

User convenience
In addition to traditional data PABX port contention and resource selection, IDX-Net provides your authorized users with many of the features offered by modern telephone systems. They can connect, disconnect and hold lines to multiple computer resources and execute third-party connects.

For the office of now
With the IDX-3000, you can start with a small system that fits your current needs and budget, then grow to obtain non-blocking, full-duplex asynchronous communication for as many as 3072 lines, all at data rates of up to 19.2 Kbps. The IDX-3000's proven TI-based technology is fault-tolerant, with optional redundancy features throughout its distributed architecture, and automatic, continuous self-testing. The IDX-3000 isn't one of those products of the future. It's here now—proven, in use, and backed by MA-COM, one of the nation's largest communication companies.

If you want to get control of your network, contact Ruth Stoffel at MA-COM Linkabit, 3033 Science Park Road, San Diego, CA 92121, toll-free (800) 626-6640 or (619) 457-2340. We'll put you in control.

© 1983 MA-COM Linkabit, Inc.
IDX-3000 and IDX-Net are registered trademarks of MA-COM Linkabit, Inc.

THE NETWORK YOU CAN CONTROL

MA-COM

modems and was generally limited to data rates less than 4,800 bit/sec. However, advanced voice-related features, such as least-cost routing, call detail recording, networking and others, further enhanced the benefits of the PBXs and stimulated sales.

Because these systems were designed to handle voice traffic, with relatively short conversations, the long holding times associated with data communications occupy and hold internal circuits normally shared by several voice users. As long as the data stations represented a small percentage of the total, these systems offered adequate capacity. However, as the percentage of data users grew, blockages occurred, preventing additional users from establishing connections.

By 1981, hundreds of station and system features were available on these switches, and the list of manufacturers providing second-generation switches grew to about 20. Rolm and Northern Telecom introduced integrated voice and data upgrades to their second-generation systems, and Intecom, Inc. delivered a new third-generation PBX. The Intecom system, unlike its predecessors, featured a totally nonblocking feature capable of digital transmissions from station to station.

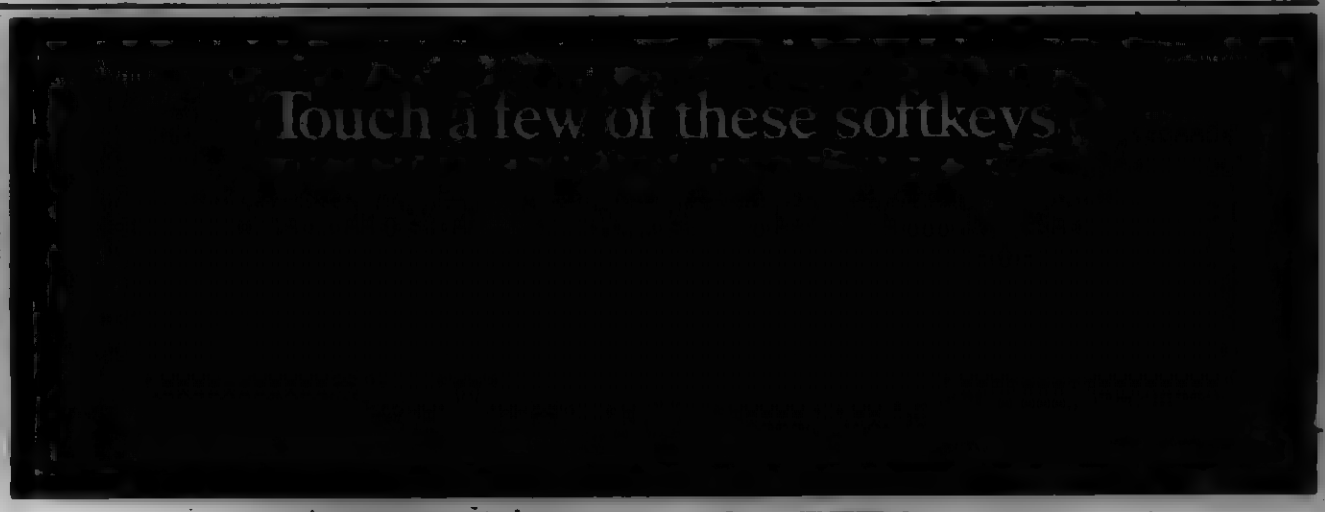
Even the voice signal was converted to digital form at the telephone. The system was also capable of distributing its switching equipment throughout a campus facility without degrading the features. This PBX was designed to accommodate heavy data communications requirements. Shortly after Intecom's product was released, Lexar Corp. introduced its own third-generation PBX, and other second-generation manufacturers began upgrading their systems as well.

In 1983, Ztel, Inc. and CXC Corp. both announced their fourth-generation systems using token-ring and Xerox Corp.'s Ethernet local-area network technology. They are scheduled for delivery this year. When these systems are fully developed, they will provide third-generation features in addition to advanced features such as distributed and layered software with functions that can be reallocated to various processors and station data rates that can be instantaneously increased to more than 10M bit/sec.

Integral local-area network technology is featured, and Ztel is offering a baseband token-ring system said to be compatible with IBM's still unannounced local-area network. CXC offers token-ring and Ethernet compatibility with a combined baseband and broadband system. Both systems promise time division multiplexing/post code modulation circuit switching and packet-switching capability, open system architecture, protocol conversion, high-level software languages, X.25 and T-1 interfaces and excellent modularity.

In addition, Northern Telecom announced its "Open World" development program, which promises compatibility be-

In 1983, Ztel, Inc. and CXC Corp. both announced their fourth-generation systems using token-ring and Xerox Corp.'s Ethernet local-area network technology. They are both scheduled for delivery this year.



and you'll know why HP's new Protocol Analyzer could pay for itself the next time you have a network problem.

Perhaps it's time you took control of your datacomm problems. The minute one of your datacomm interfaces crashes, you're faced with more than inconvenience. A bill for service calls, as you play "vendor roulette" trying to locate the problem, can run into thousands of dollars. If you're faced with a down network, it can cost a hundred times that.

Take control with HP's new 4955A Protocol Analyzer. Its softkey-guided interface lets you troubleshoot your datacomm problems *before* you call in repair personnel. And you can monitor, simulate and trigger from 50 bps to 72 kbps. Avoid vendor fingerpointing by quickly diagnosing DCE/DTE malfunctions and isolating the fault yourself. Nonintrusively monitor network traffic to catch protocol glitches before they turn into full scale problems. Save time bringing new datacomm equipment on-line simulating modems, line, CPU, and/or terminals.

Multiple display formats are dedicated to identifying protocol problems easily at the physical interface, frame, and packet levels. In one format, the 4955A will give you *data transmissions* with *lead transitions* so you can see handshaking faults at once.

The HP 4955A supports the major protocols and standard data codes. But what about your own unique protocols and architectures? Our datacomm-enhanced BASIC lets you program sophisticated test routines and perform higher-level protocol analysis. Create statistical displays (tables, graphs, histograms) and perform detailed message manipulation for your own network needs. Add to that the capability of printer output and you have permanent, long-term records of performance. Your efficiency is improved for network planning and expansion.

Communications debugging and trouble-shooting are done quickly and easily either on-line or in a post-processing mode. The 63 triggers, the most extensive in the industry, enable you to trap real time so you can catch elusive problems. The intelligent 128K-character capture memory saves you time by eliminating idles without sacrificing timing information. And you've just increased your real data storage!

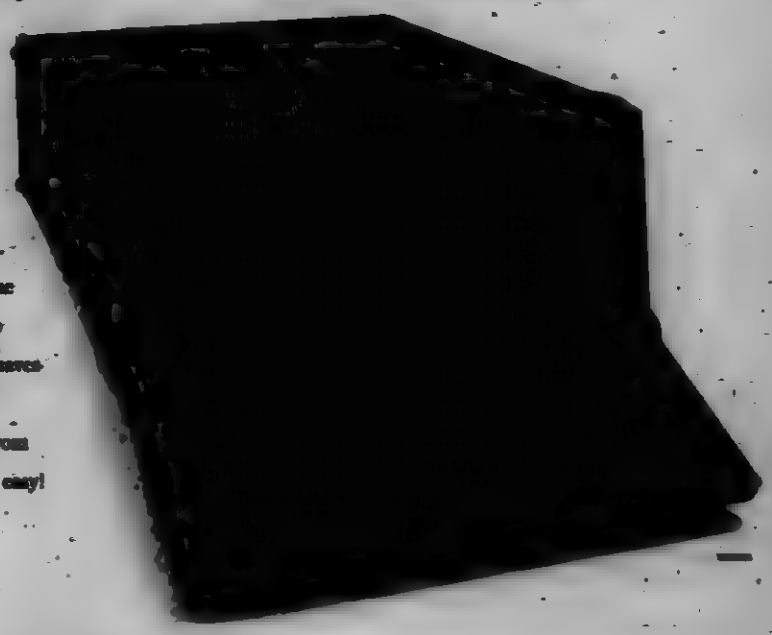
And the softkeys? They're the best feature! From power-on right through complex measurement sequences, they're dedicated to making your job easy!

In fact, so easy you're presented only with valid choices every time you select a menu setup or change. You don't have to memorize cryptic syntax.

The HP 4955A Protocol Analyzer. It speaks your language. It speaks your network's language. It's your key to rapidly solving network problems in the datacommunications marketplace.

For a technical data sheet, write to Hewlett-Packard, Literature Distribution, 1820 Embarcadero Rd., Palo Alto, California 94304 or for more information, call your local HP sales office listed in the telephone directory white pages. Ask for an HP Instruments Field Engineer.

HEWLETT PACKARD



See us at Communications Networks/'84, Washington D.C., Booth U

tween various data processing and office equipment products. AT&T announced its System/85 integrated voice and data PBX. Intecom also announced IBM 3270 protocol converters.

One of the major questions plaguing voice and data integration has been end-user prices. In 1979 and 1980, incremental prices for adding data ports to the voice network exceeded $1,500 per port. This price has dropped significantly. Currently, the incremental, end-user price to add data ports falls between $400 to $600 per port. The price reduction is due to significant equipment redesigns to accommodate data better and due to increased competitive pressures.

The trend is clearly set. The industry will continue to move toward integration of voice and data communications. And the number and usefulness of data-based services from public sources and internal corporate sources will increase.

The trend is clearly set. The industry will continue to move toward integration of voice and data communications both in on-premise and off-premise networks. At the same time, the number and usefulness of data-based services from both public sources and internal corporate sources will increase. More people are expected to depend on electronically delivered information.

Prices for integrated systems will continue to drop, with the incremental price to add a data port to an integrated voice and data PBX expected to reach $200 or less by 1987.

There will be a continual migration from the older generation systems to the newer systems. In the same way that second-generation switches replaced the first-generation switches, third- and fourth-generation switches will eventually dominate the market. The figure on Page 80 shows the life cycles of these systems over the next decade. The shaded areas of the curves represent the estimated extension of product life resulting from the upgrading of older generation switches by adding advanced generation features.

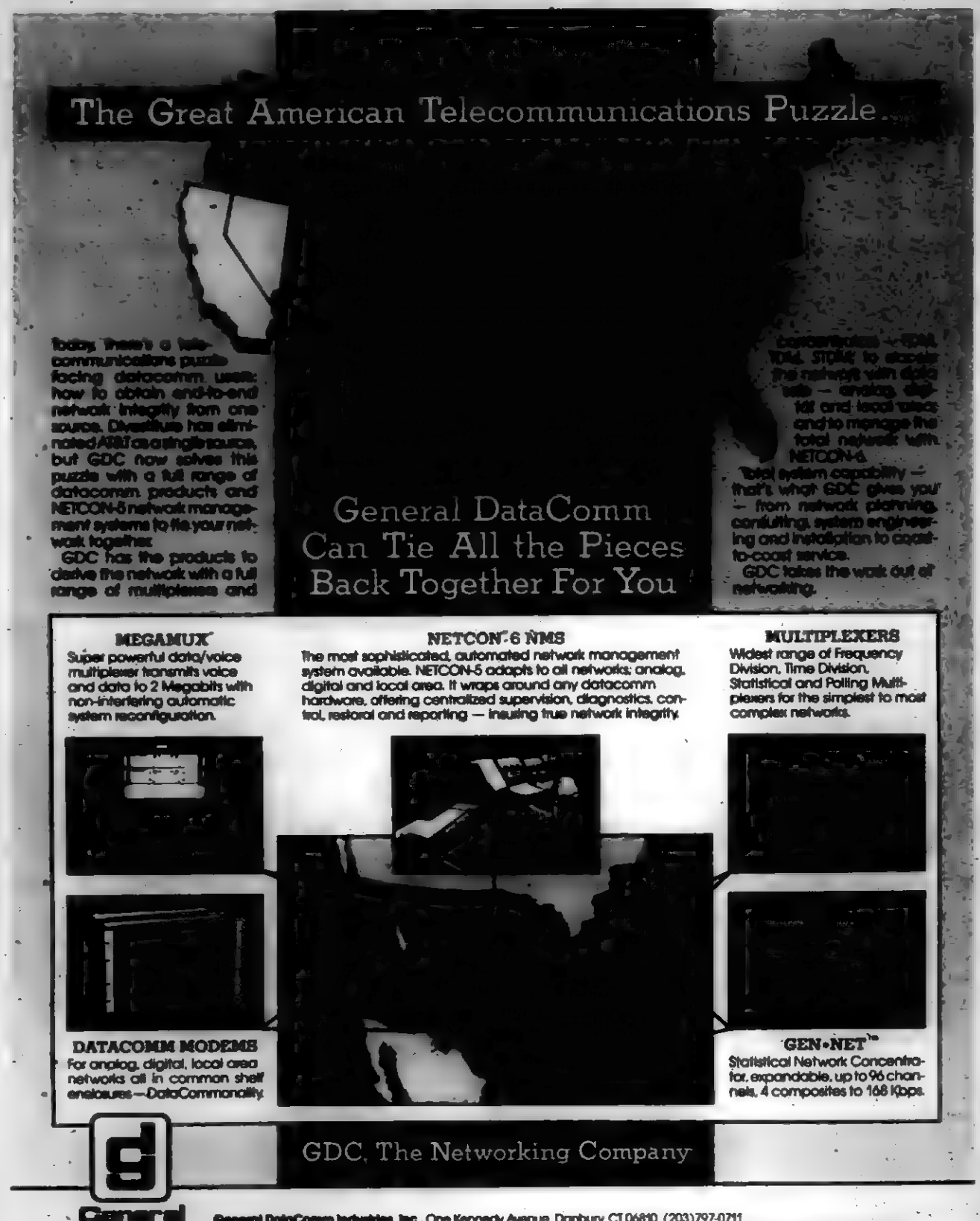
Centralized data processing, telecommunications and office equipment organizations will develop within end-user organizations in most industries. These organizations will assume the responsibility of integrating voice and data requirements, coordinate procurements and administer the system operations.

Suppliers will provide total packages including integrated voice and data communications and specialized application packages. New alignments will occur between distributors and manufacturers of telecommunications, data processing and office equipment.

These will provide end users broad product portfolios and application packages encompassing all of these technologies.

The issue of separate or integrated voice and data systems will dissolve, and new issues will replace it. Issues such as bit-rate capacity, protocol compatibility with other equipment and networks and user friendliness will continue to be important end-user buying criteria. ■

Budwey is a senior consultant with Arthur D. Little, Inc., Cambridge, Mass.



TOM WILLMOTT
& JOE PIERCE SR.

The Emerging Telecom Director

Currently, two impressive information processing trends are emerging. First, microprocessor-based systems now permit the distribution of computing power throughout every large organization, placing new emphasis on the end-user liaison role in the management information systems (MIS) group in general.

Second, the distribution of processing resources implies that these dispersed workstations and computers must communicate for maximum effectiveness. In many large corporations and government agencies, this subtle inference has focused attention on job descriptions relating to communications. Clearly, communications is the hot MIS job responsibility in the country today.

Nevertheless, interviews conducted by International Data Corp. (IDC) indicate that the availability of top-quality candidates for this position, especially in certain geographic locations, is almost more important than the money available to fund the requisition in an MIS budget.

There is a limited pool of communications management talent. Sometimes existing communications personnel have experience in voice, but not data, or in data communications, but not business management. In the area of private branch exchange (PBX) selection, for example, it is possible that a PBX purchased two years ago was acquired by a member of the organization's administration, rather than by MIS. This is simply because the voice communications manager did not report to the MIS group.

Historically, there have been three stages in the development of the communications function. In the first phase, which occurred in the '60s, the computer facility processed batch applications, and the communications function consisted primarily of terminals and peripherals hard-wired to the CPU.

In the second stage, which emerged from the installed base of minicomputers in the '70s, the communications environment was defined by leased telephone lines to remote sites for remote job entry applications and batch data file transfers. The communications function was critically important, but the job description was relatively limited in scope of opportunity.

Now we are entering the third stage — the age of networks. Communications is a value-added application, available on almost every conceivable microprocessor-based device, including word processors, personal computers, printers, copiers and scanning devices.

The problem from a technology management perspective is to define the optimum network for the organization. Perhaps every device does not need to communicate. Assumptions about critical business information and high-volume traffic links must be made in order to develop successful network strategies.

ILLUSTRATION BY BOB DAOU

Because the scope of the technical work has grown so dramatically and because the AT&T divestiture has only recently arrived at a moment of truth, few companies have had the luxury of devoting a full-time staff to long-range communications planning. Recruiting new talent has proven difficult and expensive.

When the perspective of the few local qualified candidates seems too narrow to help the organization draft a plan for sophisticated future systems or when there is simply no one from the outside with a good business management sense, it may be necessary for the information systems planning department to groom young, talented staff members for promotion to the new job descriptions.

IDC has isolated several major areas of responsibility pertaining to this expanding field. In the following sample case, we have structured the department with a director of telecommunications policy. The managers of telecommunications, office communications and network control report to this director.

It should be noted that the model is not a total solution for every organization, but it does offer a simple checklist for comparative purposes. The director's numerous responsibilities are outlined below.

The incumbent director of telecommunications policy will be responsible for the general coordination of communications systems and requirements, both voice and data, within the corporation. This includes the responsibility of managing data processing traffic and all office communications through the corporation's telephone systems.

In addition to the general duties described above, the director of telecommunications policy should be a member of the information resource planning board within the corporation. As such, he will be expected to formulate long-range forecasts of communications needs so that the corporation can better meet future demand. It is expected that the director of telecommunications policy will work with the director of data processing policy. Both report to the vice-president of information systems.

Although a heavy technical background is not mandatory, an ability to select and nurture technical managers is necessary. In addition, a college degree with at least 10 years of increasing supervisory and management experience in the data processing and/or telecommunications field is required.

The position is at the officer level with a salary range of $55,000 to $70,000 per year. In addition, the director of telecommunications policy reports to the vice-president of information resources.

There are several primary areas of concern beyond those specifically outlined for the director of telecommunications policy. First, he is responsible for telecommunications, defined as all voice and data traffic outside the corporate headquarters building. For example, he is responsible for liaison with AT&T Information Systems or bypass carriers, in coordination with PBX suppliers and the corporate office communications group.

He is also responsible for the installation of data lines within the corporation — for example, lines to remote terminals and lines between data centers.

Second, the director is responsible for office communications. His duties here include voice-only and internal-to-corporation communications. He manages office moves and telephone number changes. He is responsible for PBX analysis, least-cost routing and station message detail recording tracking. He is the liaison to finance.

This job might also focus on the key issue of the role of PBX in local-area network and local data traffic strategy. This assumes contact with end users and perhaps analysis of new low-end data and voice terminal products. The director is responsible for modems, coder/decoders and other options.

Third, the director of telecommunications policy plays a role in network control. He is responsible for troubleshooting and maintaining communications software packages, such as Vtam and Btam in IBM environments.

The director's duties include assessment of other issues, including migration from IBM Binary Synchronous Communications to Systems Network Architecture/Synchronous Data Link Control, market trends and network security. Node and link capacity planning also fall under this heading.

In addition, the director of telecommunications is heavily involved with DP strategists. He interacts with them in such areas as selection, installation and maintenance of sophisticated data switches.

From our market research and consulting perspective, these are the areas evolving as major topics of concern. Obviously, it will be difficult to fund or staff all the assignments on our sample chart immediately. However, we do recommend that the technical areas be covered in the electronic data processing planning group. This sample case can be used as a fundamental benchmark for your communications planning. ■

Willmott is director, user research, and Pierce is senior consultant, communications, IDC, Framingham, Mass.

Can you answer these questions on local area networks the way you would have two years ago?

1. Is broad *versus* base band still an important issue?
2. Will local area networks and PBXs co-exist, be mutually exclusive or will one be subservient to the other?
3. What role does VLSI technology play in linking peripheral devices to local area networks?
4. What are the standards?

The March issue of *Computerworld On Communications* will give you answers to all the questions above—and much more. You'll get an overview that takes a close look at LAN products and technology and then examines it in the light of competing PBX technology.

You'll get information on linking mainframe computers and local area networks. You'll get an examination of token ring technology. And there's more! You'll get lots of special feature articles on communications topics from "Who the Bell operating companies are buying from" to a profile of Rolm Corporation. Take a look at what some of our other features will cover for you:

- Communications processors.
- R&D in communications companies.
- Fiber optics.
- The low end of the PBX market.
- International record carriers.
- Workstation telephones.
- The future of Centrex.
- Protocol conversion.

Computerworld On Communications is designed to give you in-depth coverage of the broad spectrum of voice, image and data communications from a systems perspective. As a *Computerworld* subscriber, you'll be getting six issues of *Computerworld On Communications* in 1984—as part of your subscription! And if you need to be on the cutting edge of networking technology, you won't want to miss the March 14th issue.

If you've got communications products our readers should know about, then you need to get your ad reservation in by February 3rd. The materials are due one week later on February 10th. To reserve ad space in the March 14th issue of *Computerworld On Communications*, call one of the sales offices listed below, or call Ed Marecki, National Sales Director at 617-879-0700.

To: Ed Marecki, *National Sales Director*
CW Communications/Inc.
Box 880, Dept. A.
Framingham, MA 01701

☐ *Please send me advertising information on* Computerworld On Communications.

☐ *Please have a sales representative call me.*

Name _____
Title _____
Company _____
Address _____
City _____ State _____ Zip _____
Telephone _____

Computerworld
On Communications

SALES OFFICES

BOSTON/Chris Lee, Jayne Donovan, Michael Kelleher, Ron Mastro, Jim McClure, Alice Longley (617) 879-0700
CHICAGO/Art Kossack, Chris Lee, Jean Broderick (312) 827-4433
NEW YORK/Mike Masters, Doug Cheney, Ray Corbin, Joan Daly, Fred LoSapio, Gale M. Paterno (201) 967-1350
ATLANTA/Jeffrey Melnick, Mike Masters (404) 394-0758
SAN FRANCISCO/Bill Healey, Ernie Chamberlain, Theodora Franson, A.G. Germano, Barry Milione, Nicole Boothman (recruitment) (415) 421-7330
LOS ANGELES/Bernie Hockswender, Bob Hubbard, Bill Healey (714) 251-1230

ISI vs. Intelsat: Will ISI Stay Grounded?

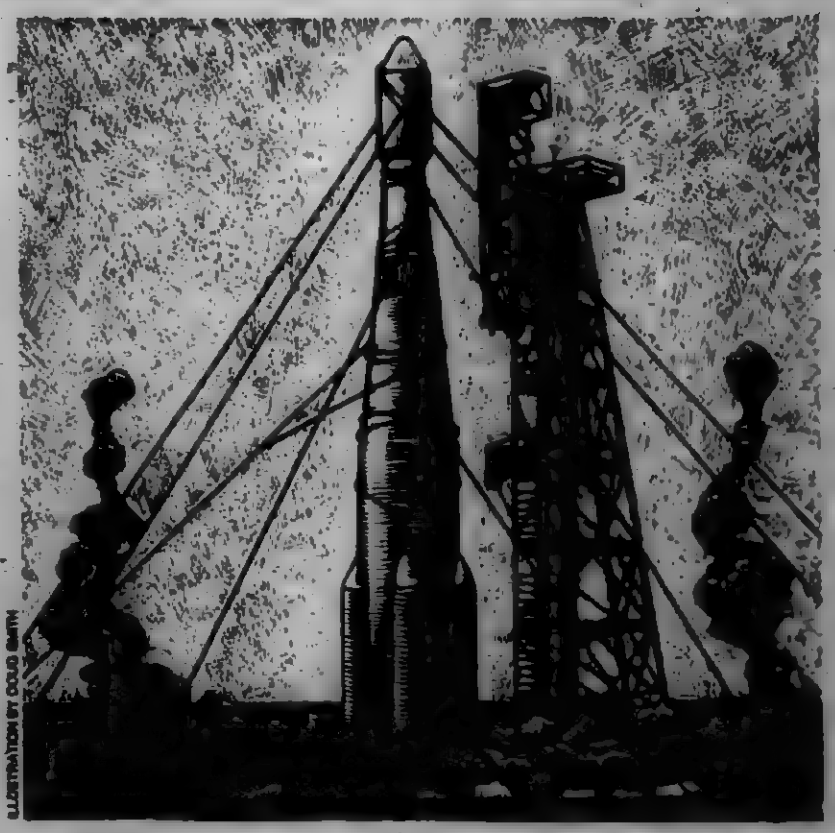


ILLUSTRATION BY DOUG SMITH

The current disagreement between International Satellite, Inc. (ISI) and the International Telecommunications Satellite Organization (Intelsat) stems back to 1962, when the Communications Satellite Act became law. The act called for the establishment of a single global satellite system. In February 1963, Communications Satellite Corp. (Comsat), a publicly owned private corporation that provides international and domestic communications services between the U.S. and foreign points, was formed as an outgrowth of the act. Intelsat, the vehicle for the global satellite system, was spawned on Aug. 20, 1964.

Today, Intelsat is comprised of 108 member countries, with Comsat as the U.S. signatory. Intelsat's global network transmits and receives telephone, teletype, data, facsimile and television communications, touching 172 countries and territories around the world.

On Aug. 12, 1983, ISI filed an application with the Federal Communications Commission, proposing to launch two satellites to provide the North Atlantic region with communications services — primarily in video distribution and data communications. Intelsat objects to the application, claiming it violates the Communications Satellite Act's commitment to Intelsat's "single global communications system."

ISI recognizes Intelsat's achievements, but argues that the 1962 act allowed other systems to be established "if otherwise required in the national interest." ISI claims that it will fill voids in video distribution and high-speed data and that its plans are in the national interest.

Computerworld On Communications *asked Comsat and ISI to recount their arguments for or against the application.*

PRO

International Satellite, Inc. (ISI) was formed to develop new satellite communications markets and services in the North Atlantic region. The principal participants in ISI are TRT Communications, Inc.; Satellite Syndicated Systems; and Kansas City Southern Industries, Inc. ISI has filed an application with the Federal Communications Commission (FCC), in which it proposes to construct, launch and operate two in-orbit Ku-band satellites that will be located at 56 degrees and 58 degrees west longitude.

From these orbital locations, ISI will be able to serve the entire continental U.S. as well as most of western Europe using customer premise, small aperture earth station antennae that will allow customers to transmit and receive signals directly with the satellite. ISI expects to serve primarily the video distribution and data communications markets.

The impetus for the creation of ISI was the conviction that Communications Satellite Corp. (Comsat) and International Telecommunications Satellite Organization (Intelsat), for all their unparalleled achievements, were neither adequately meeting nor even planning to meet the international satellite communications needs of the U.S. private sector in the North Atlantic region. About 85% of Intelsat's traffic and revenues come from the provision of ordinary voice telephone circuits. Despite a recent gradual widening of the scope of Intelsat's services, in ISI's view, there is still a need for more communications services and arrangements in the private sector. These services must extend beyond the traditional leased voice services on which Intelsat has concentrated.

ISI believes there is a substantial need for video program distribution services and, to a lesser degree, high-speed data. Specifically, such services need to be provided in a configuration that offers rooftop-to-rooftop capability — for example, one satellite hop from origin to destination. These services must also offer full continental U.S.-to-Europe coverage, full redundancy of equipment in the event of a facility failure and private user ownership of the facility. ISI plans to sell at least 50% of the spacecraft directly to users, reserving 15% to 30% for common carrier service at tariffed rates.

The ability to provide a direct link by satellite for customer location to customer location will substantially reduce the cost to wideband users: Double hops or lengthy land-line extensions can be eliminated. Moreover, by offering space segment capacity with unique capability at competitive rates and on innovative terms, ISI believes it will stimulate new regional satellite uses that would otherwise not be developed or would be delayed. The ISI proposal also advances important U.S. goals with respect to national security communications and trade in telecommunications services. It helps to assure that an independent regional satellite system in the Atlantic region is of U.S. origin.

ISI believes that its proposal will be beneficial to all concerned. This includes the U.S. private-sector user of telecommunications, the public domain that will invest in ISI and even the existing providers of international satellite services whose best competitive instincts have been allowed to lie dormant for too long.

ISI's proposed system offers

(Continued on Page 86)

CON

When the Communications Satellite Act became law in 1962, the U.S. committed itself to establish a global commercial communications satellite system. The act's goals are far-reaching and ambitious: to provide service to less economically developed countries, to use the electromagnetic frequency spectrum in as efficient and economical a manner as possible and to ensure that the benefits of the new technology are reflected in both quality of service and charges. For close to 20 years, Comsat and Intelsat have been achieving these goals.

Today, Intelsat is an internationally acclaimed political and commercial success composed of 108 member nations. It owns and operates satellites over the Atlantic, Pacific and Indian Ocean regions, carrying two-thirds of the world's international telecommunications traffic and all of its international television transmission.

Some 172 countries and territories around the world use the Intelsat system through 165 earth stations located on tiny Pacific islands, in the tropics of South America, the mountains of Asia and wherever there is a desire to communicate with other nations. In addition, 28 countries have used Intelsat to establish domestic communications networks bringing remote communities into the mainstream of their nation's activities.

The U.S. was the principal sponsor of Intelsat, and through it, the U.S. has assumed and maintained a leadership role in extending the benefits of modern satellite communications to all nations. Over the years, Intelsat has also provided a cooperative commercial mechanism for the development, utilization and management of scarce orbital arc and frequency spectrum resources.

At the same time, Intelsat has enabled the U.S. to obtain reliable and economical global communications services without relying on systems in which it has no representation or control.

Given this background of Intelsat's unequivocal success and benefits to the U.S., it is ironic that the U.S. has become the focal point of efforts to undermine the successful continuation of Intelsat's operation of a global commercial satellite system.

Recently, certain applications have been filed with the Federal Communications Commission proposing systems in competition with Intelsat. These applications contend that the Satellite Act leaves open the possibility of creating additional communications satellite systems. However, the act specifically permits creation of additional communications satellite systems only "if required to meet unique governmental needs or if otherwise required in the national interest." This language unequivocally makes it necessary for the proponents of any other system to prove that overriding national interests exist that require a separate system.

The proponents of these competing systems have adopted a dangerously casual approach to the application of certain articles of the Intelsat Agreement. This agreement requires all members, prior to establishing space segment facilities that are separate from Intelsat, to consult Intelsat to ensure that the separate facilities do not interfere technically with the Intelsat system and do not result in "significant economic harm" to Intelsat.

(Continued on Page 87)

PRO

(Continued from Page 85)

many advantages. It advances U.S. procompetitive policy, creates new markets, introduces new services, expands technological and price competition, offers flexible ownership or lease arrangements, advances U.S. policy on orbital resource allocation and provides diversity and emergency communications capability for the U.S.

ISI fully understands that its proposal raises important public policy issues. These issues turn on the meaning and intent of the Communications Satellite Act of 1962 and the provisions of the Intelsat Agreement. Both have crucial foreign policy dimensions.

Opposition to ISI has arisen from Comsat and Intelsat. Their opposition is based on the contention that approval of ISI would be a radical departure from the U.S.' historic commitment to the single global system.

The U.S. commitment to Intelsat must be properly understood. It is not unconditional; it is not exclusive; it is not inflexible. The telecommunications environment has changed dramatically since the international community adopted the Intelsat concept. More than half of Intelsat's member countries are participants in — or are actively studying participation in — regional communications satellite systems.

It is critical that U.S. policy adapt itself to the new environment in which Intelsat has emerged as a strong, successful institution. This certainly does not mean Intelsat's global mission is at an end, nor that it no longer has a vital role. It simply means that Intelsat must take a more flexible stance in which its institutional purposes and needs are complemented by those of other organizations.

The Communications Satellite Act of 1962 provided Comsat with a unique mandate to represent the U.S. in a "single global satellite system." At the same time, the act also provided that other systems could be established, if required, in the national interest. Intelsat, through its executive organ, has argued that U.S. approval of ISI would be inconsistent with the U.S. commitment to Intelsat because such approval would destroy or seriously wound Intelsat. The nonbinding standard to which the U.S. agreed is the avoidance of "significant economic harm" to Intelsat.

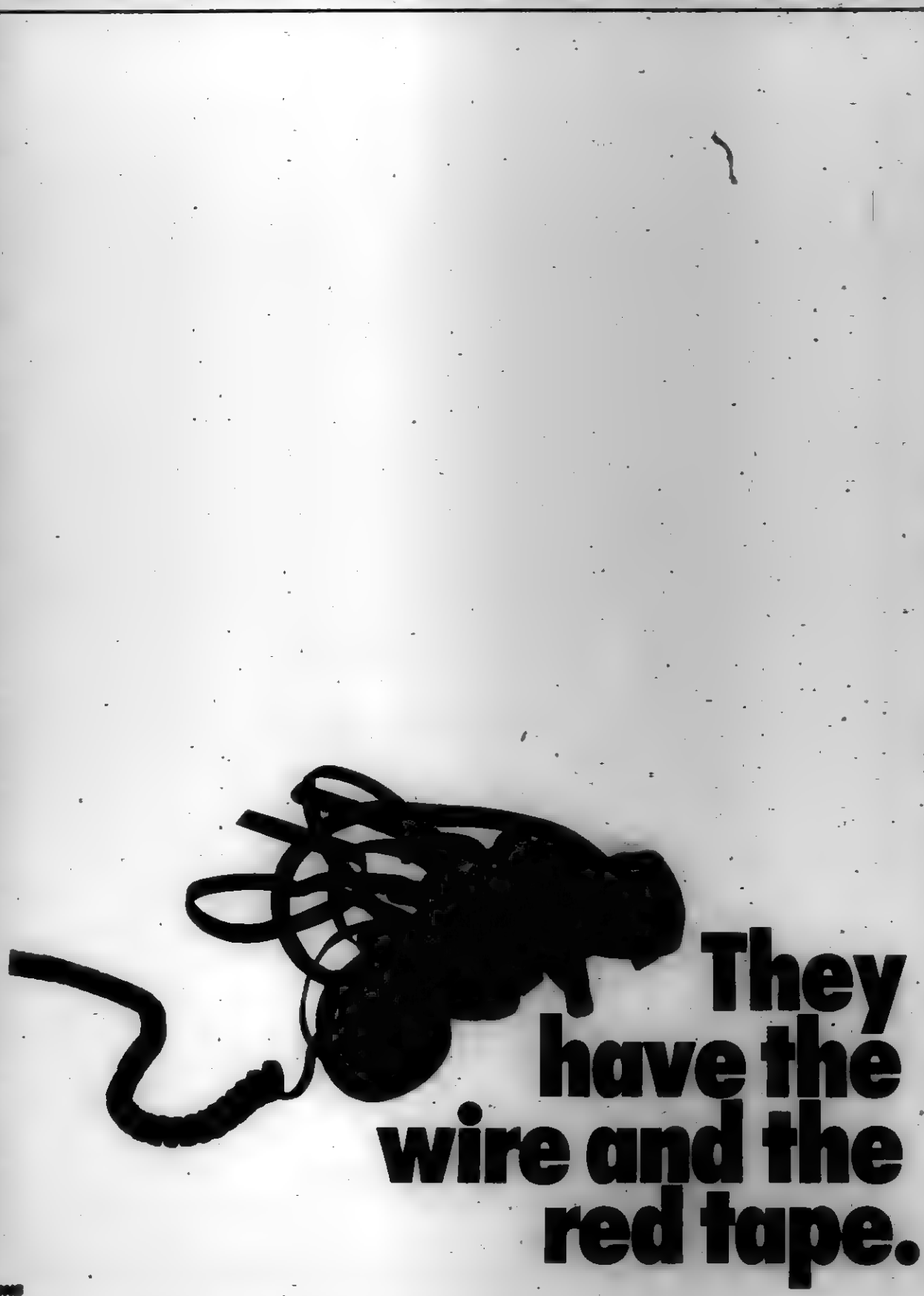
Keeping these coordination procedures in mind, ISI's application showed that ISI would not cause significant economic harm to Intelsat. In fact, ISI showed that over a period of seven years of operation, it would have a cumulative revenue impact of 3.18% on Intelsat, or a little over .5% a year. ISI noted that Intelsat has been growing at the rate of 15% to 20% a year, so a .5% annual impact would account for about two weeks' growth. Neither Comsat nor Intelsat has even attempted to refute ISI's economic assertion.

Intelsat claims that ISI will yield the benefits of the heavy North Atlantic route, weakening Intelsat so that it will have to raise rates or reduce service for the thin route countries in other regions of the world. There are many logical difficulties with this argument. Intelsat has not shown that the North Atlantic routes subsidize their thin ones. The only serious attempt to study the matter reached the opposite conclusion. The study was conducted in the summer of 1983 by Dale N. Hatfield Associates, a private consulting group, in support of the Orion Group application to the FCC.

It has been suggested that if ISI is allowed to proceed, precedent would be established and many other systems would be proposed. It is argued that Intelsat's future would be threatened by the large number of regional systems proposed. ISI has no way of predicting whether such a cascading effect would occur. ISI sees no reason why this speculative result should pose substantial dangers for the U.S. If the international community wishes to proceed in that fashion, the U.S. could not prevent it and might be better off on balance for the reevaluation.

The Intelsat system currently in place has served the U.S. and the rest of the free world well. ISI does not wish to undercut Intelsat. Approval of ISI does not signal any change in the U.S. commitment to Intelsat. It is, in fact, well within the clear parameter of the U.S. commitment. Certainly, the U.S. has not agreed to disregard its own national interest. No U.S. foreign policy objective would be impaired if Intelsat were to evolve gracefully away from the role of monopoly satellite communications supplier in the North Atlantic to a role that is complementary with that of other systems serving various regions.

A reassessment of the international satellite arrangement is healthy; the introduction of competition will lead to sharper, more innovative and creative planning and marketing within Intelsat and in the various regional systems. ■



CON

(Continued from Page 85)

Moreover, the contention that these other systems would offer services not currently available from Intelsat — specifically identified as switched message service, telex, video and digital communications — is simply incorrect. These services are either presently available or they are in the process of being implemented as standard Intelsat offerings.

With the initiation of its new International Business Services, Intelsat will be able to provide a flexible, totally digital, globally interconnected service. This service is expected to be designed to accommodate a full range of user applications. These will include such applications as telex, voice facsimile, data and teleconferencing.

Some 172 countries and territories around the world use the Intelsat system through 165 earth stations located on tiny Pacific islands, in the tropics of South America, the mountains of Asia and wherever there is a desire to communicate with other nations.

Most importantly, however, the establishment of separate systems would amount to a total reversal of U.S. policy towards Intelsat and would seriously harm U.S. foreign policy interests. The director general of Intelsat has expressed grave concern regarding the diversion of transatlantic traffic by a separate international system. In addition, the two highest governing bodies of Intelsat, the Meeting of Signatories and Assembly of Parties, have expressed similar concern.

This concern was expressed in a resolution, which was endorsed without dissent by 70 countries at the Intelsat Meeting of Signatories last April.

This same concern was also voiced at last October's meeting of the Intelsat Assembly of Parties. This meeting was attended by senior government officials from 80 nations.

Approval of these proposals would be perceived around the world as a U.S. effort to use the limited resources of the orbital arc and the radio frequency spectrum inefficiently. It would greatly exacerbate existing international tension over claims to access these resources.

Such a course would likely compromise important U.S. efforts to stave off proposals for planned assignments of these resources at the 1985 and 1988 Space World Administrative Radio Conference.

The field of international satellite communications has been remarkably free of the tension that has marked other areas of international trade. The principal reason for this is the prescience shown by the U.S. in deciding to sponsor and support a single global system — Intelsat.

THE U.S. HAS BEEN A primary beneficiary of that decision, gaining both cost-effective, high-quality communications as well as the positive trade benefits arising from the establishment and operation of the system. Favorable actions on the part of the U.S. government to permit competing international satellite systems would be seen around the world as casual disregard by the U.S.

Such an action would weaken its historic commitment to Intelsat and the objective for which the organization stands. This objective is to guarantee the provision of high-quality satellite communications to all the various areas of the world.

Actual establishment of one or more competitive satellite systems diverting traffic from Intelsat's high-volume routes would have a fundamental impact on the viability of the single global system. It would entail serious financial consequences to all Intelsat users.

Since the U.S. is by far the largest user of the Intelsat system, U.S. ratepayers would be among those adversely affected by these separate systems, whose proponents claim to be acting in their interests. ■

We have fast service.

That's the Telecom Plus Difference!

And one of the reasons we're one of the largest private telecommunications companies in the country.

We know that when your telephones aren't working, you're out of business. That's why we scrap the red tape and go all out. We'll have a local service team at your office in less than an hour in an emergency. That's a promise!

Telecom Plus is a national corporation built on a network of local operating companies. You get all the advantages of our corporate technical and financial resources.

Plus local service and accountability. For 10 telephone installations up to totally-integrated office telecommunications systems.

Call for a free survey of your telecommunications needs. Toll free 800-TEL-PLUS. Or send us your business card.
Telecom Plus, 48-40 34th St.,
Long Island City, N.Y. 11101
Attn.: Marketing Division A

TELECOM PLUS INTERNATIONAL, INC.

EXIT

Peter Crowley, above, is a hospital software writer from Salem, Mass. He submitted this brief anecdote about his early days in communications.

I was filled with a mixture of exhilaration and dread, facing the biggest challenge of my nascent programming career. A raw DP recruit, I faced 60 hours manning the last line of defense protecting 100 hospitals from the menace of computer chaos.

It was my first weekend on call.

Around my living room/command post, I deployed my weaponry: manuals, beeper, a telephone directory, CRT terminal and an unfamiliar meatloaf-shaped object with two padded black orifices — the modem. This was the magic box that would grant me access to faraway computers, allowing me to salvage ruined data files in distant lands with a few masterful keystrokes.

It was 2:30 a.m. when I was roused from dreams of DP derring-do by a call from Metropolis General Hospital. Critical nightly reports had inexplicably stopped printing, and all efforts to restart them had failed. I whipped into action, powering up the CRT and modem with one hand while punching the dial-up number into my telephone with the other.

I deftly swung the handset into the modem, only to discover that no amount of jiggling would persuade my high-tech wall telephone to fit into the modem's receptacle. Undeterred, I swiftly exchanged extension cords, moved the CRT into the dining room and stretched the kitchen telephone line to the modem.

I again hammered in the dial-up number and waited expectantly for the comforting whistle of the hospital's computer. Instead, I heard a languidly erotic female voice whisper, "Hello baby, how's my big sweet hunk?" I diplomatically explained that this dedicated line was not dedicated to the one she loved, and I tried the number again, at last successfully.

I will not detail my brilliantly calculated attack on the problem, whizzing through files, port assignments and job allocations, all in vain. When I called totally frustrated an hour later, the hospital had the explanation.

"The chaplain thought he could print out a patient list for nearby parishes by pushing the Local button," I was told. "We switched the printer back to On Line 45 minutes ago and tried to call you, but your line was busy."

Computerworld Sales Offices

Donald E. Pagan, Vice-President/Sales. Edward P. Marecki, Director/National Sales. Frank Collins, Corporate Advertising Administrator, Kathy Doyle, Marketing Support Manager. Elaine Carlos, Advertising Traffic, Special Publications. COMPUTERWORLD, 375 Cochituate Road, Box 880, Framingham, Mass. 01701. Phone: (617) 879-0700, Telex: 95-1153.

BOSTON SALES OFFICE: Chris Lee, Northern Regional Manager. Jim McClure, Ronald Manno, Jayne Donovan, Michael F. Kelleher, District Managers. Alice Longley, Sales Assistant. COMPUTERWORLD, 375 Cochituate Road, Box 880, Framingham, Mass. 01701, Phone: (617) 879-0700, Telex: 95-1153.

NEW YORK SALES OFFICE: Michael J. Masters, Eastern Regional Manager. Doug Cheney, Senior District Manager. Ray Corbin, Joan Daly, District Managers. Fred LoSapio, Account Executive. Gale M. Paremo, Sales Assistant. COMPUTERWORLD, Paramus Plaza I, 140 Route 17 North, Paramus, N.J. 07652, Phone: (201) 967-1350.

CHICAGO SALES OFFICE: Art Kossack, H. Newton Barrett, III, District Managers. Jean F. Broderick, Sales Assistant. COMPUTERWORLD, 2600 South River Road, Suite 304, Des Plaines, Ill. 60018, Phone: (312) 827-4433.

LOS ANGELES SALES OFFICE: Bob Hubbard, Bernie Hockswender, District Managers. Beverly Rass, Account Coordinator. COMPUTERWORLD, 18008 Skypark Circle, Suite 260, Irvine, Calif. 92714, Phone: (714) 261-1230.

SAN FRANCISCO SALES OFFICE: William J. Healey, Western Regional Director. Barry G. Milione, A.G. Germano, Theodora Franson, Ernest Chamberlain, Account Managers. Ruth Gordon, Account Coordinator. Nicole Boothman, Recruitment Account Manager. COMPUTERWORLD, 300 Broadway, Suite 20, San Francisco, Calif. 94133, Phone: (415) 421-7330.

ATLANTA SALES OFFICE: Jeffrey Melnick, District Manager. Michael J. Masters, Eastern Regional Manager. COMPUTERWORLD, 1853 Peeler Road, Suite D, Atlanta, GA 30338, Phone: (404) 394-0758.

ADVERTISERS INDEX

AMP 35
313-789-6800
Andersen Jacobson 67
408-263-8520
ART Research 8
714-863-1333
AT & T Information Systems 2-3
800-247-1212 ext 87501
Avant Garde 5
609-424-9520

BBN Communications Corp. 54-55
617-497-3800
Blocom 50-51
408-745-1616

Codex 6-7
800-821-7700 ext 606
Comnetix, Inc. 64
301-721-3666
Comnet '84 62
Compuvac, Inc. 58
713-461-4487
Concord Data Systems 24
617-890-1394
CWCI 61,64
CW International 32,47
Cylix 34-35
901-761-1177

DEC/Networking 68-69
Digital Communications Assoc./IRMA 76-77
800-241-5793
Digital Communications Assoc./TMC 12-13
800-241-IRMA, in GA 404-448-1400

General Datacom 58
203-797-0711
GTE Business Communications Systems 59-60
GTE Telenet 42
800-TELENET

Hayes Microcomputer 62
404-441-1617
Hewlett Packard/Telecommunications Div. 61

IBM 28-29
800-IBM-3468 ext 50
ICOT 60
415-964-4636
Innovative Electronics 66
800-327-3565
Intelligent Technology 26-27
415-328-2411
Interlan ..... Cover 4
617-682-3900
International Market Center 10
303-694-1966
IXT Workforce 40-41

Leading Edge ..... Cover 3
800-343-6833, in MA 617-828-8150

M/A Com Linkabit 56
800-638-0640, in CA 619-457-2340
MDS 70-71
800-MDS-HERO
Micom Systems ..... Cover 2
213-998-8844

National Product Marketing 72-73
800-241-1170
NEC America 19
800-538-8166, in CA 408-737-7111
Nielsen Corporation 38
201-942-5757

Paradyne 56
800-482-3333
Peripheral Technology, Inc. 53
800-822-3208, in WA 206-881-6861
Perygal 67
714-859-8871
Protocol 44-45
800-423-5994, in CA 213-776-5500

Racal 16
703-451-2200

System Development Corp. 52
Sytek Corp. 46
415-966-7333

Telecom Plus 65-67
800-TEL-PLUS
3COM 30-31
415-961-9602
Tymnet 48
408-946-4900

Unpronounceable 22
408-496-0111

Wang Laboratories 39
800-225-9264

Xyplex, Inc. 17
617-371-1400

This index is provided as an additional service. The publisher does not assume any liability for errors or omissions.

THE DAY THE IBM PERSONAL COMPUTER BECAME OBSOLETE.

NET/PLUS

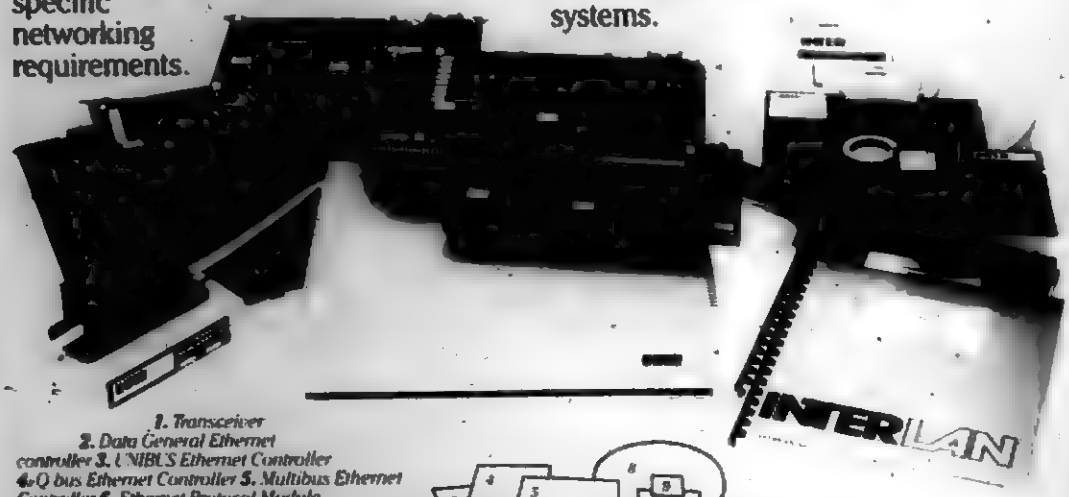
A True Multi-Vendor Local Area Network

NET/PLUS™ is a comprehensive Ethernet/IEEE-802.3 Local Area Network product line. It provides host-to-host, terminal-to-host, and device-to-device communications. And, in contrast to proprietary networks, NET/PLUS lets you tie together products built by different manufacturers, running under different operating systems.

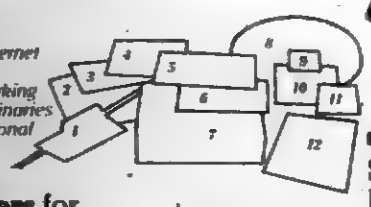
With NET/PLUS, different computers, from mainframes to personal computers, built by different manufacturers, running different software, are all tied together in a single resource-sharing network.

Plus Proven Network Building Blocks

Over twenty free-standing networking products together make up the NET/PLUS product line. You can buy a complete NET/PLUS solution, or choose individual products to meet specific networking requirements.



1. Transceiver 2. Data General Ethernet controller 3. UNIBUS Ethernet Controller 4. Q bus Ethernet Controller 5. Multibus Ethernet Controller 6. Ethernet Protocol Module 7. Network Terminal Server (NTS) 8. Networking Software Sources 9. Networking Software Binaries 10. Ethernet Controller Diagnostics 11. Personal Computer Networking Software 12. Comprehensive User Documentation



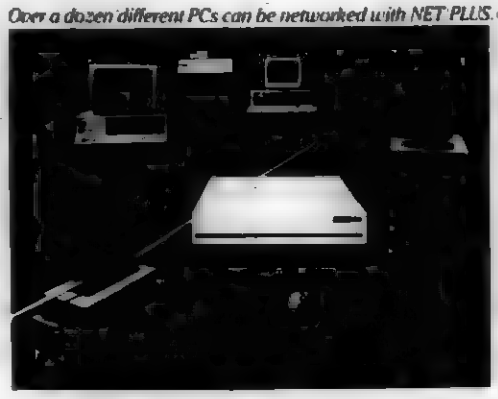
■ **ETHERNODE™ packages** incorporate controllers, networking software, transceivers, and cabling—all the hardware and software needed for host-to-host Ethernet communication among VAX/VMS, PDP-11/UNIX, RSX-11, and Multibus/UNIX systems.

■ **Communications controllers** for VAX, PDP-11, LSI-11, Nova, Eclipse, and MV Series, plus Multibus/68000, 8086, and Z8000 computers. Each DMA controller implements the entire Ethernet Specification and provides high-performance data transfers, extensive receive-data buffering for back-to-back frame reception, and a rich set of on-board diagnostics and network management statistics.

■ **Networking software packages** provide network-level and transport-level services for reliable, high-performance data communication. Written in portable C language, these packages implement the Xerox Network Systems (XNS) architecture and are optimized for Ethernet use. Packages are available for UNIX, VAX/VMS, and RSX-11 operating systems.

■ **Network Terminal Server (NTS),** the newest NET/PLUS product, provides virtual circuit interconnection between any two RS-232-C devices on the Ethernet. Available in four or eight ports, NTS electronically establishes, maintains, and disconnects virtual circuits between computer ports, terminals, personal computers, modems, and printers.

Over a dozen different PCs can be networked with NET/PLUS.



Typical applications include:
- port contention
- port switching
- resource sharing
- personal computer networking
- simplified RS-232-C wiring

■ **Multi-Vendor Personal Computer Networking Software** is available for over a dozen widely-used personal computers (including IBM, Apple, and DEC), microcomputer software development systems, and popular minicomputers. Terminal Emulation and File Transfer allow PC users to log on to other computers and freely access and transfer files throughout the network.

Networking Solutions

At Interlan, we have been delivering Local Area Network solutions since 1981, and today we have hundreds of customer installations. If you use or are considering Ethernet for reliable, high-speed communications in a multi-vendor environment, call or write for more information on NET/PLUS and the networking products that make NET/PLUS a reality.

Corporate Headquarters *3 Lyberty Way, Westford, MA 01886 (617) 692-3900 TELEX 95-1909* ***Eastern Regional Sales Office*** *10 Kearney Rd., Suite 24, Needham, MA 02194* ***Western Regional Sales Office*** *Embarcadero Corporate Center, 2483 Bayshore Road, Suite 101, Palo Alto, CA 94303* ***International Distributors*** *Toronto, Canada; London, England; Paris, France; Tokyo, Japan; Barcelona, Spain; Stockholm, Sweden; Zurich, Switzerland; Munich, West Germany*

INTERLAN
WE MAKE NETWORKS WORK.

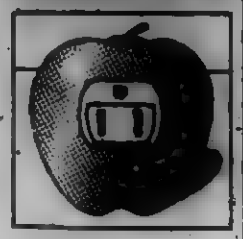
VAX, PDP-11, VMS, RSX-11, RT-11, and LSI-11 are trademarks of Digital Equipment Corporation. NOVA, ECLIPSE, and MV Series are trademarks of Data General Corporation. MULTIBUS is a trademark of Intel. UNIX is a trademark of Bell Labs. NET/PLUS and ETHERNODE are trademarks of Interlan, Inc.

VOL 18
ISSUE 4
JA 23 1984
UMI

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

COMPUTERWORLD

$1.50 A COPY; $44/YEAR | JANUARY 23, 1984 | VOL. XVIII, NO. 4



Apple
It bears fruit again: the Macintosh/8

In Depth
Interviews at AT&T: Vigilante, Casales, Schwartz/15/1

Hiring
What's important before, isn't always important after/15

SECTIONS

Editorial/24
Software & Services/30
Communications/49
Systems & Peripherals/73
Microcomputers/81
Computer Industry/95

CW
MI48106UIVMUIVYM FCWB
UNIVERSITY MICROFILMS
SERIAL PUBLICATIONS
300 N ZEEB RD
ANN ARBOR MI 48106

NEWSPAPER

UNIX: *The operating system of the '80s? Major developments at Capitol meeting*

DEC unwraps Ultrix-32

WASHINGTON, D.C. — Digital Equipment Corp. last week became the second major firm to introduce a Unix-based operating system when it announced Ultrix-32 for mid-range and high-end VAX-11 superminis. DEC's announcement at the Uniforum International Conference of Unix Users here came just one week after IBM unveiled its Unix version for the Personal Computer and Personal Computer XT.

Ultrix-32 joins VMS as the second operating system for the VAX-11 line. Based on technology from the University of California at Berkeley's Fourth Berkeley Software Distribution, Ultrix-32 is targeted principally at laboratories, universities and technical and commercial OEMs for value-added system development, computer-aided design and robotics.

The software is an interactive, virtual memory, time-sharing system that supports up to 16 users on a VAX-11/730, more than 32 users on a VAX-11/750 and 64 or more users on a VAX-11/780. It reportedly features a hierarchical file system with demountable volumes for improved performance, sharing of I/O resources among processes and asynchronous process execution.

Users who order the Ultrix-32 system will receive a Unix binary license directly from DEC, a spokesman said. An Ultrix-32 license can also be ordered as part of a VAX-11 System Building Block for new system purchasers or as an add-on product for either VAX/VMS users or VAX-11 customers with a third-party Unix license.

Deliveries of the Ultrix-32 operating system are planned for late spring. System Building Block kernels, including a VAX-11 processor, 2M bytes of memory and Ultrix-32 software, are priced at $23,500 for the VAX-11/730, $52,500 for the VAX-11/750 and $150,500 for the VAX-11/780 from DEC, Maynard, Mass. 01754.

AT&T, Digital Research tied

By John Gallant
CW Staff

WASHINGTON, D.C. — AT&T Technologies, Inc. and Digital Research, Inc. last week jointly announced a "cooperative relationship to expand the number of Unix System V applications software offerings."

Speaking at a press session at the Uniforum International Conference of Unix Users here, Jack Scanlon, vice-president of computer systems for AT&T, and Digital Research President John Rowley highlighted plans to develop jointly a Unix System V applications library for microcomputers. The applications library will include a line of applications and systems software designed to operate on several different microprocessors that run Unix System V.

For Digital Research, the agreement represents another major step into the Unix marketplace since it comes hot on the heels of the company's recently announced agreement with Motorola, Inc. (see story page 6). That agreement calls for Digital

See UNIX page 4

Other Unix-related developments:

■ *System V was not the only standard promoted for the Unix operating system (Page 4).*

■ *Digital Research, Inc. said it will implement its Concurrent DOS operating system on Motorola, Inc.'s VME/10, a 68000-based microcomputer that runs under Unix System V (Page 6).*

■ *IBM's announcement of a Unix-based operating system for its Personal Computer was heralded as a powerful endorsement of the multiuser microcomputer and programmer workstation concepts (Page 4).*

System V enhanced

By John Gallant
CW Staff

WASHINGTON, D.C. — AT&T Technologies, Inc. last week announced an enhanced version of Unix System V and three software packages for text processing, application programming and software development. The introductions were made here at the Uniforum International Conference of Unix Users.

Dubbed Release 2, AT&T Technologies' enhanced version of Unix System V will run programs about 5% to 10% faster than the present operating system in a typical program development environment, according to an AT&T spokesman. In addition, the user-to-operating-system interface functions have been improved, resulting in "significant efficiency improvements."

The enhanced Unix also offers greater job control, which will permit the user to shift between processing tasks, the spokesman noted. The release also provides electronic mail capabilities and includes reorganized and expanded documentation.

The first of the three packages announced last week, Documenters' Workbench text processing, allows a user to format text for display and typesetting. It reportedly supports a full range of output devices from printing terminals to typesetting equipment.

The Unix System Basic Language package is said to accommodate programming of simple applications for business and scientific environments. It reportedly includes several debugging features and is compatible with most microcomputer Basic software.

The third package, the Motorola Software Generation System, is for users developing software on Motorola, Inc.'s

See PACKAGES page 4

INSIDE

Say good-bye to Burroughs Corp.'s B6900 mid-range processors. Say hello to the A 9, poised to take on the IBM 4361 and 4381. Page 2.

■

The market for decision support systems has a new participant: Cincom Systems, Inc. Page 2.

■

Don't expect Trilogy Ltd.'s promised shipments of high-performance IBM-compatible mainframes to be on time. The company is having problems with the prototype semiconductor wafer around which the CPUs will be built. Page 12.

■

Better late than never? Raytheon Data Systems Co. made a limited entry into the crowded office automation arena last week. Page 12.

■

Programmers will be the employees most in demand during 1984, and corporate data processing and management information systems directors can expect median salaries of $65,400, Fox-Morris Personnel Consultants, Inc. found in a recent survey. Page 14.

■

In war-torn Nicaragua, special problems plague DP directors. Page 18.

■

Americans will be able to mail-order a $499, 32-bit system from Sinclair Research Ltd.'s U.S. operation this fall, the company promised this month. Page 22.

■

Pieces of architecture are already in place, so integrated services digital networks may soon be more than just a vision. Page 48.

■

What's Nu at Texas Instruments, Inc. is a 32-bit processor. Page 78.

■

Topping the wish lists of corporate IBM Personal Computer users are faster machines and links with mainframes. Page 81.

■

Things look like they're looking up for Digital Equipment Corp. After five straight reports of declining earnings, the company will today announce strong quarterly gains. Page 95.

■

Burroughs replaces B6900

By Patricia Keefe
CW Staff

NEW YORK — Burroughs Corp. last week replaced its B6900 line of mid-range processors with the A 9, a three-model series said to compete with IBM's recently announced 4361 and 4381 processors.

The A series, which Burroughs' Chairman of the Board and Chief Executive Officer W. Michael Blumenthal said will be enhanced to replace the entire B series of processors eventually, represents a departure from the internal architecture used in earlier systems.

Burroughs A 9

The most notable architectural change is the addition of three logical processors to the A 9's CPU. The logical processors allow the system to execute up to three internal operations at one time. They also allow the system to balance up to 10 tasks within the master control program. This gives the A 9 what amounts to a pipelined architecture, noted Leonard M. Bertagnolli, product manager of systems program management for Burroughs' Systems Products Group.

Overview of three models

The A 9 line consists of three models — B, D and F. The low-end A 9 Model B is roughly equivalent to IBM's 4361 processor. The top-of-the-line A 9 Model F is roughly equivalent to the IBM 4381. The Model B is field upgradable to the Model F or to the mid-range Model D processors, Burroughs said.

Each of the A 9 models can be equipped with a minimum of 6M bytes of main memory. The mid-range Model D can accommodate up to 12M bytes of main memory, and the Model F can use a maximum of 24M bytes of main memory, Burroughs said.

The A 9 systems use basically the same software and communications devices used on Burroughs' earlier B5000 and B6000 series processors. These include: Network Control, Message Control, Data Management, Work Management, Report Management, File Management, Text Editing, System Information Management and Network Management (Burroughs Network Architecture); Burroughs said.

According to Bertagnolli, the A 9 can run existing 5000 and 6000 series applications without modification. He added, however, that users may want to recompile 5000 and 6000 series programs eventually to make the most efficient use of the multiple task functionality offered by the logical processors.

Fred R. Meier, vice-president of program management of the Systems Products Group, noted that the A 9 requires half to three-fourths less power, air conditioning and floor space than the B6900. He added that the A 9 can accommodate up to 24M bytes of main memory, four times that of the B6900.

He also pointed out that the A 9 can support a data transfer rate of 6M byte/sec in a burst mode and 4.5M byte/sec in a sustained mode. Meier added that the A 9 offers roughly two times the internal throughput of the B6900 in sustained mode.

The vendor's Master Control Program provides the resource management for all three models of the A 9 family, Burroughs said.

Remote diagnostic capabilities, board-level replacements and customer support centers are also offered with the A 9, the vendor noted.

A basic configuration of the A 9 Model B processor with 6M bytes of main memory costs $351,100. The unit costs $14,631/mo on a five-year lease. The A 9 Model D with 6M bytes of main memory costs $433,900 or $17,973/mo on a five-year lease. The top-of-the-line Model F with 6M bytes of main memory costs $613,900 or $24,962 on a five-year lease plan, Burroughs said.

Burroughs is headquartered at Burroughs Place, Detroit, Mich. 48232.

Tough competitor or appeasement?

By Tom Henshel
CW Staff

NEW YORK — Burroughs Corp. executives bill the company's newly announced A 9 processor as a new technology replacement for the firm's B6900 line of machines. Two industry analysts contacted last week had a different assessment. They were convinced the new processor was designed more as an appeasement to Burroughs' user base than as a tough competitor of the upper end of IBM's 4300 line.

Burroughs appears to be playing the same basic marketing game as IBM in that it is steering away from adopting a new mainframe architecture strategy in favor of short-term performance enhancements to existing architectures, noted Tom Wilmott, an analyst with the Framingham, Mass., market research firm, International Data Corp.

Pointing out that all mainframe manufacturers will eventually be forced to depart from their current system architectures in order to achieve significant price/performance breakthroughs, Wilmott maintained that one of the best ways Burroughs could gain ground on IBM is to announce a series of processors that are so technologically superior to the IBM line that IBM users would have to take notice. The A 9 does not appear to offer that potential, he said.

Frank Gens, director of information systems research for The Yankee Group, a Boston-based market research firm, agreed with Wilmott's assessment. He added that the A 9 appears to deal with only one of Burroughs' two most pressing problems, that of preserving its current user base. Burroughs, Gens said, must not only preserve its current users, but also start to steal some business away from IBM if it plans to remain a competitor in the mainframe business.

The A 9 announcement appears to be a significant enhancement for current Burroughs users, but it will probably fail to turn the heads of current IBM users, Gens said.

Both Wilmott and Gens agreed that other mainframe vendors, such as NCR Corp. and Sperry Corp., have decided to market systems to specialized market niches rather than repeatedly go head to head with IBM.

"There seems to be a sense that Burroughs is not clear what its next step is going to be," Gens said, adding that a clear indication of what its large systems strategy will be over the next 10 years could significantly boost Burroughs' standing in the mainframe market.

Cincom enters decision support system market

By Paul Gillin
CW Staff

CINCINNATI — Cincom Systems, Inc. last week entered the decision support system market with a set of integrated mainframe-based applications designed around its Mantis fourth-generation language and application development system.

Cincom also announced a micro-mainframe link that provides real-time upload and download facilities between an IBM Personal Computer and a mainframe running Mantis. In addition, the company announced plans to make Mantis available on IBM's Personal Computer XT/370 when that system becomes available late this summer.

The decision support applications, called the Manage User Series, include separate mainframe software for text processing (Mantext), graphics (Mangraf) and a three-dimensional spreadsheet (Mancalc). Written in Mantis, the programs can move data, text and graphics freely between the applications and can call Mantis routines or be called by Mantis programs, a spokesman said.

Mantext performs most standard word processing activities and can combine data from existing files with newly created text, Cincom said. The software is oriented primarily toward creating large, structured documents and developing Mantis applications that require mixing text and data.

Mancalc is a three-dimensional spreadsheet with a maximum size of 999 rows by 999 columns by 999 pages.

Using Mantis, Mancalc can access data stored in Cincom Total and TIS files or IBM DL/1 and Vsam files and load it directly into the spreadsheet. When integrated with Mantis, a Mantis program can call Mancalc to perform a calculation during program execution and return to the program.

Mangraf produces graphics as direct output from an on-line application, Cincom said. It can access any data file in the corporate data base, perform statistical analysis and present the results in predefined graphs. Multiple graphs can be mixed on a screen and may incorporate data from multiple data bases. The product runs under IBM's CICS and requires IBM's Graphic Data Display Manager.

Mantis is a prerequisite for Mangraf and Mancalc. Mantext can be purchased separately. Both Mantext and Mancalc are compatible with Cincom's Environ/1, CICS or CMS operating environments. Mantext licenses for $40,000 in a large IBM DOS environment, $33,000 in a small DOS environment, $50,000 in an IBM OS environment and $60,000 under IBM's IMS/DC. Mangraf licenses for $16,500 and Mancalc licenses for $19,500, the vendor said.

PC Contact allows real-time downloading and uploading between IBM mainframes and IBM Personal Computers using Mantis. The software does not require intermediate files to pass data between the micro and the mainframe.

PC Contact gives the user the ability to perform interactive application development on the Personal Computer by making it appear that Mantis is running locally, the spokesman said.

PC Contact will be available in April at a price of $60,000 for the mainframe version and $1,000 per Personal Computer.

Cincom also said it plans to make a version of Mantis, called Cricket, available on the IBM XT/370 in September. Pricing and detailed technical specifications were not available.

Cincom is located at 2300 Montana Ave., Cincinnati, Ohio 45211.

MIS Directors, DP Managers, Data Administrators, Software Consultants

- Why you should be considering a relational data base system for your company.
- How a relational data base delivers the high performance your company needs.
- Why the relational data base is the only way you can increase productivity across the board.
- How a relational data base management system can effectively handle both production and information centers.
- Why the data processing community agrees data dictionary is not a luxury—it is an absolute requirement.
- Why you should not accept conventional definitions of "active" and "integrated" data dictionaries.
- How you can have all of the benefits of running your current system in a relational data base environment without any reprogramming work.
- How you can develop a "blueprint" or software strategy that can accommodate future technological advancement without becoming obsolete.
- How you can develop an effective corporate strategy that maintains control over personal computers and also complements the mainframe.
- How you can avoid selecting a fourth generation technology that is already outdated.
- Why your company must not only have fourth generation languages, but also high level extensions to COBOL for purchased applications and existing systems.

You are invited to attend an ADR® Seminar on these critical issues.

Because the companies that master the critical software issues of the 80's are the companies that will lead the 90's.

And the people who master these issues will help lead their companies.

DATES AND PLACES '84 SERIES

	JANUARY	15	SAN DIEGO	15	PHILADELPHIA
24	SAN ANTONIO	27	OTTAWA	17	PITTSBURGH
26	PHOENIX	29	BUFFALO	22	BOISE
31	DALLAS		**APRIL**	22	ROCHESTER
31	CHICAGO	3	LITTLE ROCK	24	PORTLAND, ME
	FEBRUARY	3	SOMERSET, NJ	24	SALT LAKE CITY
2	OMAHA	4	AUSTIN	29	BIRMINGHAM
2	SHREVEPORT	12	SAN JOSE	30	DETROIT
7	IRVINE, CA	12	RICHMOND	31	ATLANTA
7	ORLANDO	12	NEW YORK CITY	31	COLUMBUS
9	FT. LAUDERDALE	13	VANCOUVER		**JUNE**
9	SACRAMENTO	24	HOUSTON	5	ALBUQUERQUE
14	WASHINGTON, DC	24	ALBANY	5	TARRYTOWN
14	BALTIMORE	26	BOSTON	7	GARDEN CITY
21	CINCINNATI	26	NEW ORLEANS	7	MILWAUKEE
23	GRAND RAPIDS, MI		**MAY**	12	CALGARY
29	BLOOMINGTON, MN	1	MADISON, WI	12	PORTLAND, OR
	MARCH	1	GREENVILLE, SC	14	NATICK
1	GREEN BAY	1	OKLAHOMA CITY	14	SEATTLE
6	SAN FRANCISCO	3	COLUMBIA, SC	19	LOUISVILLE
6	MONTREAL	3	KANSAS CITY	19	TORONTO
8	TORONTO	3	DES MOINES	21	ST. LOUIS
8	HONOLULU	8	NEW YORK CITY	21	MONTREAL
13	FORT WORTH	8	CLEVELAND	26	HARTFORD
13	LOS ANGELES	10	SECAUCUS, NJ	28	PROVIDENCE
15	DENVER	10	INDIANAPOLIS	28	PHILADELPHIA

TO REGISTER, SEND IN COUPON OR CALL **800-368-3355**

APPLIED DATA RESEARCH, INC.
Route 206 & Orchard Rd., CN-8
Princeton, NJ 08540

☐ I want to attend. Please reserve ____ seats for the ADR seminar

to be held _____ (CITY) on _____ (DATE)

NAME _____ TITLE _____

COMPANY _____

ADDRESS _____

PHONE NO. _____

COMPUTER EQUIPMENT _____

☐ I can't attend, but please send me information on ADR's Blueprint for the 90's.

PACKAGES from page 1

68000 microprocessor. The package is said to ease software development by allowing developers to program in either the C language or in assembly language.

The enhanced version of System V is priced at $43,000 for the initial CPU. For a single CPU, the Documenters' Workbench costs $4,000; the Basic System, $5,000; and the Motorola Software Generation System, $7,500. AT&T Technologies can be reached through P.O. Box 25000, Guilford Center, Greensboro, N.C. 27420.

Other announcements

Other major Unix-related announcements made at last week's Uniforum Conference included the following:

■ **Data General Corp.** unveiled a series of enhancements for its UNIX/VS operating system, which is integrated with its 32-bit AOS/VS for its Eclipse MV family of minicomputers.

According to DG, the UNIX/VS enhancements were derived from AT&T's Unix System V operating system and include features compatible with the University of California at Berkeley's 4.1 Berkeley Software Distribution. The enhancements also include a screen editor, support for a variety of terminals and a C language C-Shell user interface. The system's visual editors reportedly enable users to display a portion of their data as a window into the file so information can be reviewed or changed when necessary.

The enhanced UNIX/VS is said to offer a choice of user interfaces, including the Berkeley C-Shell or the AT&T Bourne Shell. DG said it expects shipment of the enhancements in 90 days.

Initial license for UNIX/VS will range in price from $9,845 for 16 users to $27,845 for more than 64 users. DG is based at 4400 Computer Drive, Westboro, Mass. 01580.

■ **Oracle Corp.** added Unix System V to the family of operating systems supporting its Oracle relational data base management system (DBMS). In the Unix environment, disk space is allocated to the Oracle DBMS, and within this file system, Oracle allocates its own system tables, data dictionary and user tables. Oracle I/O requests bypass the Unix file system and disk buffer pool to go directly to the disk drivers, the vendor said, guaranteeing transaction integrity within the data base.

The System V version of Oracle operates in multiuser, Unix-based minicomputer and microcomputer systems.

The microcomputer version is priced at $600 for a single user and at $2,000 for up to eight users. For use on a Digital Equipment Corp. VAX-11/730 superminicomputer under the Unix System V, the Oracle DBMS is priced at $24,000, a vendor spokesman said. Oracle is located at 2710 Sand Hill Road, Menlo Park, Calif. 94025.

■ **Absolut Software, Inc.** introduced a line of business software modules for a wide range of processors running under Unix operating systems. As a group, the software packages are said to provide a sophisticated system of order entry, sales reporting, inventory and stock control, back-order and reorder data and billing detail.

The seven modules include manufacturers distribution, wholesale distribution, multistore retail distribution, mail order sales, accounts payable and receivable and a general ledger package.

Priced from $12,000 to $100,000 depending on the user's system and the modules chosen, they run on most 16- and 32-bit microcomputers with at least 20M bytes of hard disk storage, as well as on minicomputers and mainframes capable of operating in the Unix environment.

Absolut Software is based at 2001 Beacon St., Boston, Mass. 02146.

Firms back Isis as Unix standard

WASHINGTON, D.C. — Though it was not obvious from the posture of AT&T and others at the Uniforum Conference here last week, System V is not the only standard being promoted for the Unix operating system.

Four vendors of third-party software for the increasingly popular Unix system held a press conference to announce the formation of a standards consortium "dedicated to the promotion of interchanges of information between Unix applications." The four firms — Access Technology, Inc.; Quadraton, Inc.; Software Express, Inc.; and Unify Corp. — are backing the Independent Software Information Standard (Isis), a new Unix standard that, they said in prepared remarks, provides Unix users with "a superior level of integration, especially in the office automation area."

Representatives of the four vendors said that the consortium will be open to all third-party Unix software producers who agree to maintain compatibility with the standard interface as it evolves.

In a joint statement at the conference, spokesmen from the Isis consortium said they believe Unix's power and portability will make it a major operating system in business environments during the current decade. Jeff Hulton, vice-president of Access Technology, was selected chairman of the group, which also includes Karl Kleenig, president of Quadraton; William Adams, vice-president of marketing for Software Express; and Nico Nierenberg, president of Unify.

UNIX from page 1

Research to implement its Concurrent DOS operating system on Motorola's VME/10 microcomputer.

According to Rowley, the applications library will focus on three areas: software development and programmer productivity tools, commercial application packages and science and engineering applications. Scanlon said the library will initially target Intel Corp.'s 286 and Motorola's 68000 microprocessors.

Scanlon said also that AT&T viewed the applications library as "a critical step in the growth of Unix System V as an industry standard." AT&T began licensing Unix System V last year, and Scanlon said the Digital Research agreement, and possible similar future pacts, will enable the multitasking operating system to operate on "everything but the kitchen sink." Both Digital Research and AT&T will market applications library products, the first of which will be out in the last quarter of 1984.

According to Rowley, the two firms will jointly select "high-quality application packages" developed by independent software vendors and targeted toward System V. He said that AT&T and Digital Research will then "package and merchandise those products in a consistent manner." Rowley said the selection process is currently under way.

"We're convinced that within the desktop marketplace, Unix will be a high-dollar volume player. We expect to take a large chunk of that Unix market," Scanlon said. The AT&T executive also said that the divested giant plans to develop its own packages for inclusion in the library.

Both Rowley and Scanlon said the joint agreement bodes well for independent software vendors, who will soon be able, in Scanlon's words, "to port their Unix System V products across a wide range of hardware." He added that the move opens up the "entire marketplace" to the third-party developers.

Rowley said the merchandising aspects of the deal would be a positive force for development firms that lack "their own marketing strength." Scanlon would not divulge which microcomputers the applications library will operate on, but he said the models to be chosen will be based on the "number of boxes sold, focusing on the high-volume markets."

Neither Rowley nor Scanlon would expand on the specific details of the joint Digital Research and AT&T arrangement or on the procedures through which the selection and marketing of the products will take place. "Our primary focus at this time is microcomputers," Scanlon said. "But we fully intend to utilize the portability of Unix. We intend to make these same applications available across the entire price and performance range."

Scanlon added that the move would greatly increase the commercial value of Unix System V, which AT&T has chosen to support as the industrywide standard for the Bell Laboratories-developed operating system. When asked what effect the recently penned deal would have on the marketability of his firm's existing CP/M operating system, Rowley replied that Digital Research viewed the move as an opportunity to expand into another high-volume operating system environment.

IBM's '83 profits up $1 billion

ARMONK, N.Y. — IBM's 1983 profits jumped by more than $1 billion over 1982's earnings of $4.4 billion, the company reported last week.

Chairman John R. Opel, in releasing preliminary year-end financial results, said the $5.48 billion in earnings could be credited to "trends established in 1982" and the "strength of the IBM product line."

Revenues totaled $40.1 billion, up 16.9% from 1982.

Although the company's income from rentals was down 17%, sales jumped 28.4% and services rose 19.4%.

Per share earnings totaled $9.04 for 606.8 million outstanding shares, compared to $7.39 per share on 596.7 million shares the previous year. Earnings before income taxes were $9.94 billion in 1983, an increase of 24.7%.

For the fourth quarter of 1983, the company earned $1.86 billion or $3.06 per share on revenues of $12.89 billion. The 1982 fourth quarter profits were $1.5 billion on revenues of $11 billion for earnings of $2.50 per share.

Second-class postage paid at Framingham, Mass., and additional mailing offices. *Computerworld (ISSN-0010-4841) is published weekly, except: January (6 issues), February (5 issues), March (5 issues), April (7 issues), May (5 issues), June (6 issues), July (5 issues), August (5 issues), September (5 issues), October (5 issues), November (5 issues), and a single combined issue for the last week in December and the first week in January by CW Communications/ Inc., Box 880, 375 Cochituate Road, Framingham, Mass. 01701.*

Copyright 1984 by CW Communications/Inc. All rights reserved.

Computerworld can be purchased on 35 mm microform through University Microfilm Int. Periodical Entry Dept., 300 Zeeb Rd., Ann Arbor, Mich. 48106. Phone (313) 761-4700. *Computerworld* is indexed: write to Circulation Dept. for subscription information.

PHOTOCOPY RIGHTS: permission to photocopy for internal or personal use or the internal or personal use of specific clients is granted by CW Communications for libraries and other users registered with the Copyright Clearance Center (CCC), provided that the base fee of $3.00 per copy of the article, plus $.50 per page is paid directly to Copyright Clearance Center, 21 Congress Street, Salem, MA 01970.

Permission to photocopy does not extend to contributed articles followed by this symbol. ‡

Special requests should be addressed to Nancy M. Shannon, CW Communications/Inc. Box 880, 375 Cochituate Rd., Framingham, MA 01701. ISSN 0010-4841/82 $3.00 + $.60

$1.50 a copy; U.S. — $44 a year; Canada, Central & So. America — $110 a year; Europe — $165 a year; all other countries — $245 a year (airmail service). Four weeks notice is required for change of address. Please allow six weeks for new subscription service to begin.

ABP mcc

POSTMASTER: Send Form 3579 (Change of Address) to Computerworld, Circulation Dept., Box 880, 375 Cochituate Road, Framingham, Mass. 01701.

Thoroughbred

Meet the newest champion in the world's greatest sorting stable!

(SyncSort OS 2.5)

Call (201) 568-9700.

Find out why it takes a SyncSort to beat a SyncSort.

SyncSort OS 2.5

Performance Improvements

EXCPs: 35%
TCB CPU Time: 15%
SRB CPU Time: 25%

syncsort INC.

Here we go again—Improving the Sorting Breed!

That sleek young thoroughbred out in our main paddock is SyncSort OS, Release 2.5. It's by SyncSort 2.4 out of that celebrated brood mare, High Technology. And it's destined to win a lot of prizes on OS/VS and MVS/XA tracks.

IMPROVING THE UNIMPROVABLE: Until now, SyncSort 2.4 was the best OS/VS sort program ever bred. It was far faster than any IBM sort. And it was easier to use, too— thanks to a tack-room full of advanced features.

SyncSort 2.4 probably could have continued to win prizes for years. There was only one catch—it wasn't good enough for us.

PICKING TOMORROW'S WINNERS: We knew that new hardware and software systems would create opportunities for evolution of advanced sort programs. Speed would still be essential. But productivity would continue to skyrocket in importance. So that's the way we bred 2.5.

FASTER SORT PERFORMANCE: We've added new sorting techniques to SyncSort 2.5 to make it the only sort that outperforms 2.4. You can expect savings in critical resources up to those shown at lower left. And that can add up to a big increase in total systems throughput.

NEW PROGRAMMER PRODUCTIVITY FEATURES: As any seasoned sort-watcher knows, there's a lot more to data handling than sorting. SyncSort 2.5 introduces a Data Utility set that applies its proven techniques to a wide range of processing and reporting jobs.

For example, with a single execution, 2.5 can sort, format and present data in virtually any form you want:

- **SortWriter**—a powerful tool that can produce extensive reports as a by-product of your normal sorting—without user exits and the associated programmer investment. Headers, trailers, total and sub-total capabilities provide flexible formatting.
- **Record Formatting**—To existing features like INCLUDE/OMIT, INREC/OUTREC, SUM and others—all of which have been expanded—2.5 adds new and useful capabilities like data conversion, editing, insertion of literals.
- **Multiple Output**—From a single sorted file, you can create multiple files and reports. Each can include the same or different data as determined by INCLUDE, OMIT, OUTFIL or OUTREC parameters.

If you're tired of betting on sort programs that empty your pockets of resources and are tough to handle, give us a call. We'll arrange to have SyncSort OS 2.5 run a few furlongs on your own turf.

Syncsort Incorporated 560 Sylvan Ave., Englewood Cliffs, N.J. 07632

Digital Research, Motorola ink Unix-centered pact

By John Gallant
CW Staff

WASHINGTON, D.C. — Motorola, Inc. and Digital Research, Inc. announced a joint agreement here last week that calls for Digital Research to implement its Concurrent DOS operating system on Motorola's VME/10 microcomputer. Both companies hailed the agreement as a major move toward standardization of operating system software.

A Motorola spokesman said the move will enable full portability of application software between Unix System V, which already operates on the VME/10, and Digital Research's Concurrent DOS and its CP/M operating systems for 68000 microprocessor-based systems.

Concurrent DOS, which is written in C and is said to be a multitasking system, also provides support for IBM's PC-DOS, allowing application software developed for that system in a high-level language to be ported to the VME/10 as well.

The agreement, announced at the Uniforum International Conference of Unix Users here, also calls for Motorola and Digital Research to develop 19 software packages for the VME/10 under CP/M and Concurrent DOS. Concurrent DOS reportedly also includes windowing capabilities, local-area net and graphics support.

According to the spokesman, seven of the packages to be developed will support the VME/10 Unix System V operating system and will include Digital Research's programming languages.

The Digital Research programming languages reportedly provide application portability from CP/M and Concurrent DOS to Unix System V on the VME/10. The packages, CP/M, Concurrent DOS and a library of languages will be maintained and supported by Digital Research and will be marketed by both it and Motorola. When the development project is completed, it will be possible to transport source code from Concurrent DOS to Unix System V with little or no code conversion required, according to both firms.

During the first quarter of 1984, a number of CP/M products will be introduced, including a Digital Research C package, Pascal MT+ and C Basic compiler. The Concurrent DOS and Unix System V/68 products, which will be available at the end of 1984, will be source-code-compatible with CP/M-68000 languages.

The packages will be priced between $350 and $600 from Digital Research, P.O. Box 579, 160 Central Ave., Pacific Grove, Calif. 93950, and Motorola, P.O. Box 20912, Phoenix, Ariz. 85036.

Buy, lease or rent the new Lear Siegler ADM 11, ADM 12 and ADM 24E from MTI.

We are authorized distributors for all Lear Siegler terminals and printers.

These American-made beauties are easy on the eyes in more ways than one. They feature a non-glare phosphor display in a tilt-and-swivel console, a low profile DIN-standard keyboard with adjustable tilt, Selectric® layout, and a lot of other features designed for operator comfort.

The ADM 11 features separate cursor control keys logically arranged in a cross. The ADM 12 and ADM 24E are editing terminals. They both have programmable function keys, and for the OEM, the 24E has program space on the logic board which can be configured with ROM and RAM parts.

Whether you buy, lease or rent, you'll find MTI is the one source for all the terminals, peripherals, systems, applications expertise and service you'll ever need. And our prices are very competitive. Call us.

New York: 516/621-6200, 212/767-0677, 518/449-5959
Outside N.Y.S.: 800/645-6530
New Jersey: 201/227-5552
Ohio: 216/464-6688

mti AUTHORIZED DISTRIBUTOR

Applications Specialists & Distributors, New York, New Jersey and Ohio. DEC, Intel, Texas Instruments, Datapreducts, Lear Siegler, Diablo, Rapid Intecolor, Racal-Vadic, MODEM, Vantel, Davelcom, Dig. Eng., U.S. Design Cipher, Protocol Computers, MicroPro, Microsoft, Polygon and Select.

IBM crosses AT&T border

By John Gallant
CW Staff

RYE BROOK, N.Y. — IBM made the first foray into a segment of the microcomputer marketplace where it seems certain to lock horns with AT&T when it announced a Unix-based operating system for its Personal Computer and Personal Computer XT [CW, Jan. 16]. The IBM operating system reportedly includes facilities for program development, text processing and operation of a wide variety of existing application programs.

Dubbed the Personal Computer Interactive Executive (PC/IX), the operating system offers a full screen editor in addition to standard Unix system features. Personal Computer users will reportedly be able to process several tasks simultaneously with PC/IX.

PC/IX can reside with other operating systems on fixed disk so that more than one operating system is available to the user. Moreover, it is said to provide programs for file transfer to and from IBM's PC-DOS 2.0 operating system.

Comprehensive program

The Unix-based operating system, developed for IBM by Interactive Systems Corp. of Santa Monica, Calif., is said to be a comprehensive program product featuring a command language that interprets a user's commands for the system; the high-level C language, designed for structured programming; a file monitoring system; word processing; a hierarchical file system for file organization; and program development tools.

According to IBM, PC/IX is a recompiled set of Unix system source statements with a redesign of essential portions of code to improve performance and reliability. The full screen editor reportedly features multiple windows, which display one or more files and permit cursor positioning and window movement on the display screen.

IBM also said that keyboard functions can be used to reduce typing commands and that, by moving the cursor to the appropriate position, text can be moved to different positions within a file or to different files through "cut and paste" operations.

The 19 PC/IX diskettes are grouped into major functions such as basic system programming, communications and text processing, according to IBM.

The system runs on the Personal Computer with fixed disk expansion and the Personal Computer XT. All configurations require at least 256K bytes of memory, one dual-sided diskette drive and one 10M-byte fixed disk drive.

With a one-time license charge of $900, PC/IX is expected to be available beginning in April through IBM's National Accounts and National Marketing divisions. The National Accounts Division is located at 1133 Westchester Ave., White Plains, N.Y. 10604.

Signs of Unix support seen coming from IBM

By John Gallant
and Paul Gillin
CW Staff

IBM's announcement of a Unix-based operating system for its Personal Computer was a powerful endorsement of the multiuser microcomputer and programmer workstation concepts. The debut of the Personal Computer Interactive Executive (PC/IX) also signaled IBM's corporate strategy to compete in a Unix world, according to analysts contacted last week by *Computerworld*.

IBM's introduction of PC/IX [CW, Jan. 16], along with the release of the PCjr and the XT/370 late last year, was another step in the industry giant's strategy to blanket the low-end computer market, according to Richard McMahon, president of Acton, Mass.-based AMT Computer Consultants, Inc. "This is also a good forerunner of a larger strategy," McMahon explained. "It could very well be part of an overall game plan to support Unix across the entire line."

"We're all waiting for the other shoe to drop," agreed David Fiedler, editor of "Unique," a newsletter for Unix users. "When IBM says it will support Unix through its entire product line, that will be the really important announcement."

In fact, one observer was puzzled by IBM's decision to release PC/IX before making its anticipated announcement of Unix on a 4300 series superminicomputer. "I was hoping IBM would put its cards on the table and just announce its Unix policy," said Robert Marsh, president of Plexus Computer, Inc. and a director of USR/Group, a Unix users group.

Observers agreed that IBM's PC/IX announcement will bring order to an operating system that until now has lacked a strong vendor endorsement. "The move certainly legitimizes Unix," McMahon said. "It is now available for business applications, where before it was mostly geared to the scientific community. It means there will be wider acceptance of Unix, especially if it is also offered on mainframes and minicomputers in the future."

Fiedler said the PC/IX announcement gained additional importance because it came just before AT&T is expected to introduce its own Unix-based micro. "This will certainly take the wind out of any AT&T announcement," he said.

However, Marsh said the IBM announcement is more of a Big Blue effort to establish a market presence than to throw down the gauntlet in front of AT&T. "There are a whole slew of companies with versions of Unix ready to jump, and IBM is trying to establish position early before there's a lot of momentum in the other direction," he said.

McMahon said PC/IX makes the concept of a programmer workstation "quite a bit more viable."

Theirs:
STAIRS
Ours:
INQUIRE®

Apple comes out with 32-bit microcomputer

By Jeffry Beeler
CW West Coast Bureau

CUPERTINO, Calif. — Apple Computer, Inc. today radically restructured the high end of its personal computer line with the introduction of a transportable 32-bit micro that reportedly couples Lisa-like technology with a wide selection of personal productivity software packages.

Apple's long-awaited Macintosh machine serves as the entry-level member of a family of 32-bit personal computers that also include three replacements for the company's existing Lisa micro, introduced only about a year ago.

Announced alongside the Macintosh, one day before Apple's Jan. 24 annual security analysts meeting, the three Lisa newcomers include:

■ Lisa 2, which supports a microfloppy diskette unit, but no hard disk capability.

■ Lisa 2/5, which comes with a 5M-byte external storage module.

■ Lisa 2/10, which boasts a built-in 10M-byte disk system.

Built around an 8 MHz Motorola, Inc. 68000 microprocessor, Macintosh is reportedly aimed primarily at computer-illiterate knowledge workers in business offices, schools, scientific settings and homes. Roughly 70% of the products, which Apple hopes to produce and sell in the millions, will find their way into the commercial world, a spokesman for Apple predicted.

Although it will be distributed mainly through retailers, Macintosh will also be sold heavily through Apple's national account executives to Fortune 500 corporations.

Peripherals and software

The debut of Apple's 32-bit micro line coincided with the introduction of a host of Macintosh-compatible peripherals and communications aids, including an external microfloppy diskette system, numeric key pad and Apple Bus, a local networking facility.

Complementing the product family is a raft of previously unavailable software packages for applications such as business graphics, word processing, spreadsheet creation, micro-to-mainframe communications and project scheduling.

All three Lisa additions, as well as their Macintosh sister system, provide the same user interface, run the same software and use the same data interchange medium — an integrated 3½-in. floppy diskette, according to an Apple spokesman.

Apple credits the Lisa 2 machine with loading applications two to three times faster than the original Lisa, which the company has reportedly ceased manufacturing and selling. In addition, the trio costs thousands of dollars less than its year-old predecessor, which incorporated a 5¼-in. diskette unit.

Like all the Lisa models, Macintosh is configured with a mouse, uses icons extensively in its user interface, provides pull-down menus and displays multiple windows simultaneously. The entry-level personal computer also supports a "cut-and-paste" feature that allows data from one display window to be electronically transferred to another, the spokesman said.

Single-tasking product

But unlike Lisa, which can process several applications concurrently, Macintosh is only a single-tasking product. So although it can move data among different windows of the same application, the micro is unable to cut and paste among different applications without forcing users to swap diskettes, the spokesman said.

Macintosh's user programs will come primarily from the more than 100 independent vendors with which Apple is now said to be engaged in software development. Heading the list of outside application suppliers are companies like Lotus Development Corp., Microsoft, Inc. and Software Publishing Corp., the spokesman said.

A few of Macintosh's application packages, however, will originate directly from Apple itself, which will supply programs like Mac Paint, an extensive graphics facility, and Mac Write, a word processing aid.

Apple will also provide a family of software packages that will allow Macintosh to communicate with central host processors. Apple Line, for example, will turn the personal computer into an IBM 3278 look-alike,

See APPLE page 10

Customs sting nets 1,000 Apple II look-alikes

By John Gallant
CW Staff

CUPERTINO, Calif. — U.S. Customs officials said they anticipate criminal indictments will be brought against three alleged importers of counterfeit Apple Computer, Inc. microcomputers, following what investigators termed a private sting operation that recently netted as many as 1,000 Apple II look-alikes.

Armed with search warrants obtained on the basis of information provided by Apple investigators, Customs officers in mid-December raided three California companies and seized between 370 and 420 counterfeit Apple II computers. The raids took place at Super Computer, Inc. in Santa Ana, Extra Computer Corp. in San Francisco and A-Tek, Inc. in Cupertino, according to Customs Special Agent Rollin Klink.

At the same time, Apple authorities obtained a temporary restraining order against Extra Computer, enjoining the firm from selling approximately 645 additional Apple II counterfeits, a spokeswoman said.

Civil action

Jeffrey Blatt, a Beverly Hills, Calif., attorney who has represented Apple in copyright violation cases, said Apple then filed a civil action for a permanent injunction against Extra Computer. Blatt said Extra Computer subsequently agreed to a settlement whereby the firm paid Apple an unnamed sum and handed over components of the systems, including 645 motherboards and 1,400 erasable programmable read-only memories containing pirated Apple programs.

The raids, which were undertaken as part of Customs' Operation Tripwire, may result in the first U.S. criminal prosecution of counterfeit Apple computer importers. Joseph Russoniello, U.S. Attorney for the northern district of California, said his department has not yet decided whether to bring criminal charges against the firms involved. Those criminal charges could include smuggling, conspiracy, piracy and counterfeiting. He said similar charges are also under consideration by acting U.S. Attorney Alex Williams of California's central district.

Blatt said Apple will have to decide whether to file civil copyright infringement suits against the firms if federal authorities decide not to seek indictments. The attorney said Apple has filed some 35 copyright and patent infringement suits worldwide, and eight foreign cases have resulted in criminal prosecutions. Customs authorities estimated that more than 2,000 ersatz Apples were seized in the U.S. alone last year.

The December raids were the result of a private sting operation initiated by the Barrick Security Group, Inc., a San Mateo, Calif.-based investigation firm hired by Apple [CW, Sept. 26]. Barrick President Barry Bergman said the firm maintains data on "hundreds of individuals who deal in counterfeit goods." He said Barrick targeted importers who said they could provide "substantial numbers" of Apple II imitations. Using money provided by Customs officials, Bergman's investigators placed orders for the systems, which were then seized upon delivery.

Investigators would not divulge the manufacturers of the systems, but both Bergman and Klink said the computers, or their components, probably originated in Taiwan. Attorney Blatt said the Apple II computer has become a target for counterfeiters because it is easily built with off-the-shelf components and it enjoys broad software popularity. "We know the system is easily assembled in the Orient," Blatt explained. "Our estimates show that in the Far East phony Apples outsell the real thing by about 10 to one."

Customs officials estimated that each of the counterfeit systems was worth approximately $400. The department, Klink said, is continuing its investigations in conjunction with the U.S. Attorney's office. Blatt said Apple expects a decision on criminal indictments within the month.

COM-MAIL SYSTEMS WIN HANDS DOWN

GET A GRIP ON YOUR MAIL MANAGEMENT PROBLEMS.

Benchmark-winning performance nationwide makes COM-MAIL® products the industry standard for speed, accuracy and reliability.

SAVE WITH CARRIER ROUTE SORTING SYSTEM (CRSS). Optimizes postage discounts for greatest bottom line savings. Totally parameter driven. Needs no user coding. No royalty fees. Maintenance optional.

GET ZIP + 4 DISCOUNTS WITH EZ-9. Add the extra 4 digits to your ZIP codes — without programmer intervention — IN ONE PASS of an address file with a ZIP + 4 master file.

MORE HANDS DOWN WINNERS FROM COM-MAIL.
- EZ-5 Zip Code Correction
- List Conversion
- Duplicate Elimination (Merge/Purge)
- Generalized Selection
- Regular Presort
- Label Printing

HAND OVER YOUR MAILING PROBLEMS to the advanced mail management software system with proven performance and savings from day one! COM-MAIL's fully integrated systems, individually or in combination, turn mailing problems into profits.

CALL TOLL FREE
(800) 368-5806
LOCAL (202) 537-7281

COMNET®
COMPUTER NETWORK CORPORATION
COM-MAIL® Division, Dept. CW044
5185 MacArthur Boulevard, N.W.
Washington, D.C. 20016-3387
☐ I WANT TO SAVE MONEY IMMEDIATELY. CALL ME TO SET UP A FREE BENCHMARK.
☐ Send more information.
NAME
TITLE
COMPANY
ADDRESS
CITY
STATE ZIP
PHONE
Products require IBM/COMPATIBLE or UNIVAC 80/90 MAINFRAME

Apple seen betting the farm on Macintosh

By Robert Batt
CW West Coast Bureau

CUPERTINO, Calif. — Apple Computer, Inc.'s new generation of 32-bit personal computers, spearheaded by the long-awaited Macintosh, is seen by company executives and industry pundits alike as the firm's most important product announcement since the Apple II.

Apple has reportedly spent millions of dollars on product development and is expected to pour an additional $50 million into advertising the Macintosh in 1984 alone, prompting many observers to view the next two years as make or break time for the company's young, ambitious management team.

"This is clearly a bet-the-company product strategy, and if it doesn't work, by the time Apple regroups, it will have missed the whole next generation of personal computers and will be in serious trouble," asserted Mike Murphy, partner in a San Francisco-based investment analysis firm, Venture Capital Management, Inc.

For their part, Apple executives make no secret of the critical importance the new products have for the company's long-term viability.

'Current tech not sufficient'

Speaking at a press briefing prior to this week's launching of the Macintosh, a forthright Steve Jobs, chairman of Apple, declared:

"Our whole premise for the Macintosh is based on the fact that current technology is not sufficient to reach the tens of millions of people who need personal computers. If the people in this industry do not require radical technological innovation, then this company will not be here in two years' time."

However, few if any industry observers expect the Macintosh to be anything but an outstanding success.

"This is easily the best price/performance machine ever made. I think it will become the Apple II of the 1980s, and I see a very long life cycle for it, at least five years," said Ken Lim, personal computer industry analyst at the San Jose, Calif.-based market research firm, Dataquest, Inc.

Microsoft, Inc., one of more than 100 independent software vendors supporting the Macintosh, has committed a sizable portion of its new product development to the latest Apple line, and the company expects half of all its application program revenues in 1984 and 1985 to come from sales of Macintosh applications.

"To create a new standard takes something that's not just a little bit different. It takes something that's really new and captures people's imaginations. Macintosh meets that standard," commented Bill Gates, chief executive officer for Microsoft.

Apple's Jobs expressed the hope that what he called Macintosh's leapfrog technology will enable the computer to make huge inroads into small and medium-size businesses as well as the Fortune 500 corporations.

"Since IBM is going to be the service leader in the personal computer industry, we want to be the technology leader, producing low-cost personal computers. Our aim is to remove the need for massive service and support to the end user," he explained.

This is not to say that Apple's strategy for its new product line is without dangers. The most obvious potential pitfall is that the machines are not IBM-compatible. However, this does not seem to worry most industry analysts. A typical appraisal was offered by Greg Kelsey, investment analyst at the San Francisco firm, Hambrecht & Quist.

"There are good cost reasons for not making the Macintosh an IBM-compatible machine. In addition, with the Lisa models [Lisa 2, Lisa 2/5 and Lisa 2/10] having the capability to run both Macintosh software and IBM programs, there is a pretty good argument for saying that Macintosh does not need to be IBM-compatible, given the market it is chasing," he said.

According to Lim of Dataquest, the absence of MS-DOS compatibility is a positive virtue. "It is far too early in the life of the personal computer industry to standardize on one particular operating system. In addition, MS-DOS machines are becoming a dime a dozen, so manufacturing another Personal Computer look-alike is just as dangerous a strategy as putting out a non-MS-DOS device," he said.

Another possible danger is that, as Venture Capital Management's Murphy put it, "people just plain don't like the Macintosh" with its pull-down menus and a form factor that doesn't look like other computers.

Another potential pitfall, Murphy pointed out, is that in an attempt to save up to $50 million a year on inventory costs, Apple is adopting the Japanese method of depending on two weeks of inventory. "Apple is working with suppliers who have never performed such 'just-in-time-delivery' service before. It's a new thing for the U.S. electronics industry, and if it backfires it could cost Apple a lot of money and lost orders," he proclaimed.

2 Trillion

Last night we backed up two trillion (yes, that's 12 zeroes) characters of data, and checked our work.

VMBACKUP

We bring files back alive, the way they should be—readable, usable—which some "cut-rate" backup systems *don't* do. We verify the data before moving it to tape. That's why 75% of the Fortune 100 companies trust their vital data to VMBACKUP.

How do we do this?

- Start with a solid design.
- Take the best systems people in the VM community.
- Have them build it right.
- Add competent, helpful support people.
- Stay close to our customers.

And we create a winning situation for our users.

VM Software Inc.

(703) 821-6886

London • Frankfurt • Paris • Stockholm • Milan • Tel Aviv • Rio De Janeiro • Sydney • Tokyo

VMBACKUP Sounds Great!
☐ Call me.
☐ Send more information
I'd also like information on your other products checked.

☐ **VMACCOUNT:** Complete online collection, costing, & reporting
☐ **VMARCHIVE:** End-user initiated archive/restore to intermediate disk or tape
☐ **VMSECURE:** Complete security & directory management
☐ **VMTAPE/CMS:** Tape management featuring drive management, SL tape support, security, and audit file
☐ **VMLIB:** A source library control system offering compression, COPY/EXCLUDE cross reference, and management of the development process
☐ **VMSCHEDULE:** A complete scheduling and monitoring system for end-users.

Name _____ Title _____
Company _____
Address _____
City, State _____ Zip _____
CPU _____ Phone _____

1-CW-0184

2070 Chain Bridge Road • Suite 355 • Vienna, Virginia 22180 • 703/821-6886

Wafer woes plague Trilogy

CPU delays expected

By Peter Bochnik
CW Staff

CUPERTINO, Calif. — Trilogy, Ltd. said last week it had experienced problems with the manufacture of a prototype wafer-scale semiconductor device and as a result will experience a slight delay in the scheduled 1985 shipment of IBM-compatible, large-scale, high-performance computers.

Trilogy released a brief press release last Tuesday indicating that an added metal coating to the prototype wafer produced unsatisfactory results and that a revised procedure is expected to produce a completed wafer prior to the end of March.

Trilogy Vice-President Russell Drew told *Computerworld* the company has identified the problem and expects to complete the revised process "as early as February or as late as March." Drew said the original schedule had planned for completion at the end of this past December.

"It is not a monumental problem by any stretch of the imagination." The firm issued the announcement because it made a public stock offering in the last quarter of 1983 [CW, Sept. 12] and "wanted to alert everyone" about the delay, he said.

The company, founded in 1980 by Amdahl Corp. founder Gene Amdahl, had originally planned to ship its first IBM-compatible supercomputers in the third quarter of 1985, but now believes those shipments will not occur until the fourth quarter of 1985. The new computers are predicted to attain a performance rate of 32 million instructions per second.

The new technology purportedly will see "40 wafers replace 4,000 integrated circuit chips" [CW, Aug. 8]. Sperry Corp. previously invested $42 million to obtain a 15% interest in Trilogy [CW, June 13], and Digital Equipment Corp. invested $26 million for a 9% interest [CW, Aug. 8], with both companies obtaining the rights to use the new technology in future products.

A DEC spokesman said the problem as explained by Trilogy is not unusual in early stages of production. "Delays in new product development are to be expected in this industry," he said. A Sperry spokesman said his company did not wish to comment on Trilogy's announcement.

Drew said the additional metal layer would have completed the wafer module. That module, he said, is said to include the actual wafer configuration, which packs the capacity of 100 integrated circuits onto a 2½-in. wafer and the actual packaging, which encloses the wafer and contains the cooling portion of the module.

APPLE from page 6

while Mac Terminal will enable the machine to emulate teletypewriter-type terminals or Digital Equipment Corp. VT100s or VT52s, the spokesman said.

At Macintosh's heart is one printed-circuit board that contains all the product's digital electronics, including its 32-bit microprocessor, random-access memory (RAM), speech synthesis capability, 1M bit/sec serial port and mouse interface. The same 100-sq-in. board also houses the machine's Apple Bus hardware, which reportedly allows up to 16 Macintoshes, Lisas or other devices — including file servers and laser printers — to be interconnected in a local network.

With Apple Bus, each node in the 230.4K bit/sec network can be situated up to 1,000 ft away from any other hardware module, with a connection cost of $25 per device, the spokesman said.

Digital processing board

In addition to its other components, Macintosh's digital processing board incorporates 64K bytes of read-only memory, the vehicle for implementing all the personal computer's Lisa-like technology.

With its keyboard, 12-in. display screen and integrated 400K-byte microfloppy diskette unit, Macintosh weighs about 20 lb and occupies less than 110 sq in. of desk space, the spokesman said. The system also accommodates a second, optional microfloppy storage module that has to be added externally.

Though currently limited to 128K bytes of RAM, Macintosh will be upgraded to 512K bytes before year's end, when Apple replaces the machine's existing 64K-bit memory chips with 256K-bit components, the spokesman said.

For users of its original Lisa, Apple will furnish an upgrade kit that will allow customers to migrate to any of the machine's three additional models.

An upgrade to the Lisa 2/10 will cost $2,495, while a similar switch to the Lisa 2 or Lisa 2/5 will be free of charge, the source said.

Equipped with a minimum of 512K bytes of main memory and expandable to 1M byte, the Lisa 2, 2/5 and 2/10 cost $3,495, $4,495 and $5,495, respectively. Macintosh, by contrast, retails for $2,495.

Like Apple's existing Imagewriter laser printer, the 400K-byte add-on microfloppy storage unit sells for $495, compared with $129 for the numeric key pad. For the first 100 days after Macintosh's introduction, the Mac Paint and Mac Write software packages will be available at no charge. Thereafter, the programs will retail for $195, the spokesman said.

All four members of Apple's 32-bit personal computer family — as well as most of their hardware and software accessories — are available for sale immediately. First customer shipments of the external 3½-in. microfloppy module will begin March 31 from Apple at 20525 Mariani Ave., Cupertino, Calif. 95014.

WHAT TO LOOK FOR IN ON-SITE TRAINING

With all the technical training options around today, it's hard to figure out which company will offer the most professional, reliable on-site training. Here's Sys-Ed's checklist of key benefits that will make your training investment really pay off.

ARE THESE BENEFITS INCLUDED?	SYS-ED	OTHERS
• Qualified training consultant for needs analysis and skills inventory?	YES	NO
• Comprehensive, coordinated curricula of CICS, IMS, VSAM, TSO ISPF or MVS JCL training?	YES	NO
• Complete range of training for the IBM environment, including IDMS, DATACOM, ADABAS and FOCUS?	YES	NO
• Ongoing technical support?	YES	NO
• Satisfaction guarantee?	YES	NO
• Additional charge for customized training?	NO	YES
• Thousands of solid references?	YOU BET	?

If you ask other training companies the answers to these tough questions, you'll probably make the decision thousands of decision-makers like yourself made: to get your training from The Computer Education Professionals at Sys-Ed.

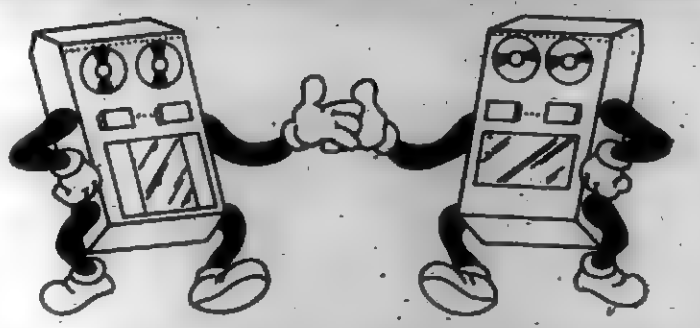
Write Sys-Ed or call 212-889-3386 for more information about the range of on-site course options. By the way, we also offer public, regional and consortium courses.

_____ Tell me about your on-site training.
_____ I'd like a schedule of your public courses in my area.
✓ Be sure to let me know about the Sys-Ed Multi-Course Discount and your Satisfaction Guarantee!

Name Company
Address City/State/Zip
Phone Number

SYS-ED.
The computer education professionals
One Park Avenue, New York, NY 10016 212-889-3386
New York • Chicago • Dallas • San Francisco • Los Angeles

OUR SWITCHES MAKE YOUR IBM SYSTEMS WORK LIKE A TEAM!



If you have more than one IBM or plug compatible processor, Digital can help you get the most for your hardware investment. Our switches allow you to achieve backup and peripheral configuration flexibility at a fraction of the cost you're probably thinking.

Whether you have two processors or more, Digital has a switch to suit your requirements.

- Model 4101 The lowest priced matrix switch on the market.
- Model 3421 The only manually operated channel switch in the industry.
- Model 3405 A remote controlled channel switch designed for underfloor installation.

DIGITAL CONTROLS

2779 Orchard Run Road • Dayton, Ohio 45449 U.S.A. • (513) 435-5465
Dallas 214-669-0089 New York 201-585-9416

*Registered Trademark

NEWS

Raytheon enters OA arena with 16-bit system

By David Myers
CW New York Bureau

NEW YORK — Raytheon Data Systems Co. made a late and limited entry into the crowded office automation arena here last week with a 16-bit Convergent Technologies, Inc. system aimed principally at the airline industry where the Norwood, Mass.-based division of the Raytheon Co. holds 85% of a $100 million installed base.

Although Raytheon Data officials at a press gathering at the World Trade Center disputed the term "value-added OEM," they admitted the RDS Signature 8300 office system unveiled here was almost wholly made by Convergent — except for an airline communications link written by Raytheon engineers and "housings" manufactured by Raytheon Data.

The system, able to host up to eight terminals, runs the Convergent operating system software, rechristened RDSOS, for the Raytheon Data product offering.

Jane Ellis, product marketing manager for interactive and distributed data processing systems, said Raytheon Data decided to stick with the Convergent operating system because "it's been on the market for the last two years. It's field-tested and debugged. It won't go through the birthing pains a lot of new operating systems go through. We thought it was important to have a stable operating system."

At the same time, Raytheon Data officials disclosed plans to bring a Unix-driven office system to market later this year, perhaps as early as spring. Jon O. Hooper, senior vice-president for marketing and field operations, said the Convergent-driven system was brought out first in order to get a jump on competitors.

"There have been a lot of announced signings with Convergent, but this is the first system to be brought to market," Hooper claimed. It is also the first complete system to be marketed by the long-time maker of terminals.

"That's where the market is going," Ellis declared. "Customers have these terminals; they want to do something more with them. They look at all this gear and ask, 'How can I marry it all together?' "

A local-area network connection to Xerox Corp.'s Ethernet will be available for the office system by April, according to Ellis.

The office computer, which can also run Digital Research, Inc.'s CP/M 86 and Microsoft, Inc.'s MS-DOS as "concurrent guest operating systems," is aimed at financial institutions and state and federal government agencies as well as airlines, Raytheon Data officials said.

Hooper said his company was not making a late break into office automation because "we already have the customer base in place." In addition to holding 85% of the airline-terminal market, Raytheon Data has installed terminals at 60% of U.S. insurance carriers, Hooper claimed.

The RDS Signature 8300 introduced here last week can operate as a one-terminal computer or as a clustered system with a master terminal and up to seven slaves sharing hard and floppy disks, according to Ellis.

Programming languages available for the system include Cobol, Basic, Fortran, Pascal and assembler. Other program tools include a text file editor, a debugger, a linker/librarian for code segment management and a queue manager for controlling spooled and batch processes.

Available with 15-in. eight-color or 12-in. one-color display monitors, the system is powered by an Intel Corp. IAPX 80186 microprocessor.

Raytheon Data said a typical word processing configuration, with one display terminal hooked up to dual floppy drives and a letter-quality printer, will cost $9,060. A four-terminal data processing cluster, made up of one floppy drive, a 20M-byte hard disk, one letter-quality printer, one high-speed dot matrix printer and one 80-col. dot matrix printer, is listed at $32,502.

Raytheon Data Systems is located at 1415 Boston-Providence Tnpk., Norwood, Mass. 02062.

Graphics meet set for Feb. 15

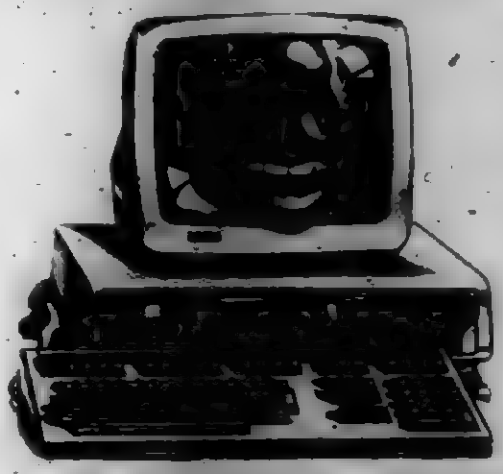
SAN FRANCISCO — Printing Industries of America, Inc. (PIA) will sponsor a conference here Feb. 15-17 on "Computer Graphic Networks 1984 to 1990."

The conference will be devoted to integrated systems and services that link graphics and visual media with computer and networking technologies.

Registration deadline for the conference is Jan. 27; fees are $495 for PIA members and $595 for nonmembers.

Information is available from Printing Industries of America, 1730 N. Lynn St., Arlington, Va. 22209.

Computer Communications?



Whether it's office to office, office to corporate computer or office to data base service, Polygon software delivers reliable data transfer.

We've been developing communications software for micros, minis and mainframes for over five years. Experience that has paid off with comprehensive programs, documentation and effective menus for optimum user performance.

It's simple. Whether you use a modem, direct cabling or local area networks, our software talks directly from computer to computer. One more good reason why Digital Equipment Corporation and Interlan, Inc. sell and support our communications software with their products.

So, if you want to communicate, and you want to do it economically, reliably and easily, communicate with us...we're Polygon Associates.

We have the software...

poly-TRM™ Asynchronous Terminal Emulation Software: For communication as a terminal to virtually any computer system including the Source[1], Dow Jones[2] and other commercial information services.

poly-BSC/RJE™ Bisynchronous Terminal Emulation: For Remote Job Entry (IBM 3780/2780) to IBM mainframes and compatible machines.

poly-BSC/3270™ Bisynchronous Terminal Emulation: For emulation of the IBM 3270 family of Information Display Systems, including file transfer.

poly-XFR™ File Transfer Software: For error-free ASCII and Binary file transfers among personal and minicomputers.

For all types of hardware...

Minicomputers using VMS, RSTS/E, RT-11 and RSX-11M Operating Systems[3]; Intel and Motorola development systems. Systems using CP/M[4] in a user tailorable version.

Plus we support personal computers from the following manufacturers: Apple Computers, Inc., Digital Equipment Corporation, International Business Machines Corporation, Jonos, Osborne Computer Corporation, Radio Shack/Tandy Corporation, Televideo Systems, Inc., Victor Technologies, Inc. and Xerox Corporation.

1 The Source is a service mark of Source Telecomputing Corporation, a subsidiary of the Reader's Digest Association, Inc.
2 Dow Jones is a trademark of Dow Jones, Inc.
3 VMS, RSTS/E, RT-11 and RSX-11M are trademarks of Digital Equipment Corporation.
4 CP/M is registered to Digital Research, Inc.
© 1983, polygon associates, inc.

polygon associates, inc.
9 American Industrial Drive, St. Louis, Missouri 63043
314/576-7709, TWX 910/764-0876

Hybrid access channels hot topic

CW AT ICA

By Phil Hirsch
CW Washington Bureau

FORT LAUDERDALE, Fla. — Integration of voice and data and enhancements to popular existing services were clearly on the minds of executives from three regional telephone holding companies who discussed their new offerings with managers of the nation's major corporate communications networks during the annual International Communications Association (ICA) conference here last week.

The speakers devoted much of their attention to discussing hybrid access channels capable of transmitting voice and data simultaneously or alternately over existing analog local loops; integrated access channels for those needing higher bit rates and greater capacity; and enhanced Centrex-CO facilities.

The regional holding companies represented at the meeting were Bell South (comprised of Southern Bell Telephone and South Central Bell Telephone Co.), Nynex (formerly the New York and New England Telephone companies) and the Pacific Telesis Group (formerly Pacific and Nevada Bell Telephone companies). All three plan to offer Local Area Data Transport (LADT) service and Circuit Switched Digital Channels (CSDC) by the end of this year.

Using existing loop

The LADT and CSDC technologies utilize existing analog local loops. In the former case, the loop carries voice in analog form and data at speeds up to 4,800 bit/sec in digital form. In the latter case, the data is transmitted digitally at speeds up to 56K bit/sec alternately with analog voice.

All three regional holding companies, meanwhile, are expanding their fiber-optic circuitry and greatly increasing their ability to provide high bit-rate services end to end. At the ICA seminar, Pacific Telesis Marketing Vice-President A. F. Boschulte indicated two ways his company plans to move present customers to these new offerings: those using private lines for low-speed data transmission are good prospects for LADT, he explained, while those using Datephone Digital Service will be offered CSDC.

Last week's discussions at ICA made it clear that the divested Bell operating companies are relying on their in-place Centrex-CO equipment to give them an advantage over competitors who market directly to the end user; it also is clear that Centrex is being enhanced as quickly as possible to maximize the advantage.

Pacific Telesis, for example, plans to offer its Cenpac within the next few months.

Cenpac, according to Boschulte, will enable users of the IBM Personal Computer XT and compatible personal computers to order Centrex feature changes on-line.

Nets called vital marketing weapon

By Phil Hirsch
CW Washington Bureau

FORT LAUDERDALE, Fla. — Telecommunications networks are becoming a valuable marketing weapon, consultant Howard Anderson said here last week.

By providing on-line access to specialized data bases, free or reduced-price terminals and similar assistance, Anderson told the International Communications Association (ICA) that banks, insurance companies and firms in several other industries are stealing a march on their competitors. One likely result is that the front office will pay more attention to the telecommunications area — a possibility that could result in a bigger budget for the telecommunications department, he said.

Anderson expects 80% of all managers and high-level executives to be accessible through workstations by the 1990s. However, those devices will undergo major changes, with the personal computer emerging as the most popular type of workstation, he predicted at the ICA meeting.

Telephone carriers and computer companies will be the major suppliers of workstation equipment, according to Anderson. "Telephones soon will be computers, while computers are rapidly evolving into computer telephones."

Northern Telephone Co.'s Displayphone and similar devices are the forerunners of this new terminal, Anderson said. Besides transmitting and receiving voice and text messages, the Displayphone will have local computing ability, compatibility with the IBM 3270 and possibly other DP terminals, touch-sensitive file access, voice as well as text message storage/retrieval capability, an attached printer and other peripherals.

Anderson also predicted that the mainframe processing load will increase rather than diminish because the growing workstation population means more internal and external communications.

AT&T offers hints of coming ISDN

FORT LAUDERDALE, Fla. — Possibly the most significant comment at the International Communications Association (ICA) seminar on upcoming carrier offerings came from Dennis White, a services planning manager for AT&T Communications, the company's long-distance services provider.

Describing the integrated access channels that AT&T expects to begin offering shortly, White said they will consist basically of 24-channel, 1.5M bit/sec transmission facilities leased from regional telephone holding companies and resold to users as part of a long-haul circuit capable of transmitting voice, data, video and facsimile signals on an integrated basis.

What the company is planning to offer, in other words, is the first commercial, end-to-end integrated services digital network (ISDN) service.

The service will appeal to only a small group of users — those with a lot of traffic — but it nevertheless will become available, if AT&T's plans materialize, well before any ISDN was generally expected to enter the market and well before similar technology goes into regular service in other countries.

Subdividable 1.5M bit/sec channels capable of carrying voice/data/image signals have been available for some time. What distinguishes the new offering is its ability to reallocate this bandwidth on a dynamic, customer-specified basis.

The 24 subchannels each operate at 64K bit/sec and can be used, according to White, for individual voice and data services (Wats, Message Toll Service, packet-switched and/or circuit-switched data) according to instructions from the user. The instructions reside within the network in an on-line data base that the customer can access directly via one of the 24 channels. If the user's needs change unexpectedly, he can change the instructions immediately.

Integrated access channels will reportedly save the user money because they will enable him to buy bulk transmission facilities costing less per channel than the same facilities procured separately. The savings, White said, could be as high as 40%.

Court upholds Litton award

WASHINGTON, D.C. — The U.S. Supreme Court last week upheld a $276 million award to Litton Systems, Inc. from AT&T, which had sought to overturn an antitrust damages suit won by Litton last February.

The court did not change the 2nd U.S. Circuit Court of Appeals ruling that AT&T excluded Litton from competing in the telephone terminal equipment mart. Litton, based in Beverly Hills, Calif., claimed that it was impeded when AT&T dragged its feet during Federal Communications Commission proceedings.

Here are a few good reasons why you should make Local Data your protocol converter company.

Local Data's comprehensive line of local and remote protocol converters have been used around the world to make async-to-IBM communications simple and economical.

DATALYNX™/3274.
DataLynx™/3274 remote async ASCII protocol converter supports SNA/SDLC or BSC protocols. 80 types of ASCII async terminals can emulate IBM 3278 display stations. RS-232C ASCII async printers can emulate IBM 328X printers.

DATALYNX™/3780.
DataLynx™/3780 async ASCII-to-IBM 5780, 2780, 2770 and 3741 protocol converter supports EBCDIC BSC protocol on one channel and async ASCII devices on the other two channels. Features include transparency, mini/micro support and free file transfer program.

INTERLYNX™/3278.
InterLynx™/3278 allows the attachment of low-cost ASCII CRT terminals or p.c.'s to 3274/3276/4701 and 43XX integrated adaptor Type "A" coax ports. InterLynx/3278 enables the user to use async CRT's on IBM systems and switch to async applications under terminal control.

FILELYNX™/3278.
For micro-mainframe file transfers.

INTERLYNX™/3287.
InterLynx™/3287 allows attachment of ASCII printers to IBM Type "A" coax ports or 3274/3276/4701 controller and 4321/4331 CPU's.

SNA LU1 SCS and LU3 capability are standard with the InterLynx/3287. Features include parallel and serial ports and front panel set-up.

For more information call today.

LOCAL DATA · 2701 Toledo Street · Suite 706 · Torrance · CA · 90503
Telephone (215) 320-7126
Telex # 182518

Local Data

Local Data
"Your Lynx to IBM."

Senators propose access charge modification

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — Resolution of the bitter battle over pending telecommunications legislation became more likely last week when it was learned that a coalition of Republican senators, led by Robert Dole of Kansas, will oppose the legislation if the Federal Communications Commission modifies its pending plan to charge for access to the dial-up telephone network.

Terms of the proposed modification were stated in a letter sent by Dole to Mark Fowler, chairman of the FCC. Dole proposed in his letter that:

■ The surcharge that the FCC wants to impose on each residential and single-line business local loop — initially amounting to $2/line per month — be deferred for a year.

■ The surcharge be capped at $4/line per month, at least through 1990.

■ Smaller independent telephone companies be free to continue collecting all long-distance network access fees from long-distance carriers (in other words, they would not have to be reimbursed partly for surcharges imposed directly on their local-exchange customers).

■ The differential between what other common carriers and AT&T Communications (formerly AT&T Long Lines) pay for local access under the FCC plan be adjusted in favor of the other common carriers.

Specialized carriers

Specialized carriers, who insist that the FCC's proposed differential would increase their costs to prohibitive levels, have strongly opposed the FCC plan, along with consumer groups and key members of the U.S. Congress.

Business communications users, along with most telephone carriers, approve the FCC plan.

The House last year passed a bill (H.R. 4102) that permanently bars imposition of surcharges on residential and single-line business users.

The U.S. Senate's companion bill (S. 1660), which is now awaiting a final floor vote, defers these charges for two years.

Support at ICA

Support for the "Dole compromise" was indicated last week in Fort Lauderdale, Fla., at a meeting of the International Communications Association (ICA), a users group of communications managers who work for the nation's largest companies.

Bob Bennis, director of communications for Westinghouse Electric Corp. and chairman of ICA's telecommunications policy committee, said that although the ICA much prefers the access charge plan that is proposed by the FCC, the ICA membership is aware that this is an election year, and any scheme that increases costs for large numbers of voters is unlikely to be popular on Capitol Hill.

AT&T Vice-President Larry Garfinkel, one of the company's chief legislative policymakers, was also present at the ICA meeting.

Garfinkel indicated a willingness to modify AT&T's position, but it was unclear whether the modification would be enough to get AT&T behind the Dole compromise.

According to Garfinkel, AT&T continues to oppose any delay in implementation of the residential/single-line business access surcharge, but it is willing to accept a smaller initial charge and, possibly, a more gradual build-up to the full amount than it had previously indicated.

Business users to gain from break up: AT&T

CW AT ICA

By Phil Hirsch
CW Washington Bureau

FORT LAUDERDALE, Fla. — Deregulation of AT&T's long-distance services will benefit business users as well as the company, AT&T Vice-President Larry Garfinkel said here last week.

Garfinkel asked communications managers from the nation's largest companies to help AT&T sell this idea in Washington, D.C., when he spoke before the International Communications Association (ICA).

Cost-based rates for business users will be one benefit of deregulation, said Garfinkel, who is the new chief services planner for AT&T Communications.

Garfinkel pointed out that under present tariffs, which are based on the separations-settlements process, companies that use interstate long-distance circuits pay more for these services than it costs the carrier to provide them.

The Federal Communications Commission's controversial access charge plan, now scheduled to go into effect next April, is intended to correct this alleged imbalance, Garfinkel indicated, and AT&T is working hard to get the access charge implemented.

However, he suggested that additional rate reductions would be forthcoming from deregulation — discounts for volume purchases of long-distance transmission facilities would be one example. Such discounts are commonplace in competitive industries, Garfinkel said.

More innovative services

More innovative services also would result from deregulation, Garfinkel argued. AT&T would no longer be required to announce its plans in advance to the FCC and, thus, to its competitors; and charges could be based on incremental costs that are much lower than the fully distributed costs now required.

Garfinkel pointed to several services AT&T has proposed in the last several months — audiographic teleconferencing, international videoconferencing, optional calling and new time-of-day pricing plans — that had to be abandoned or drastically changed because of FCC objections.

The FCC is now looking at whether and to what extent deregulation of AT&T Communications is necessary, Garfinkel said. He expects this proceeding to encourage significant relaxation of present restraints, probably on a service-by-service basis, in two to three years.

The FCC proceeding is known officially as Docket 83-1147.

Interested parties have been asked to submit their initial comments to the commission by Feb. 1; reply comments are due March 19.

During a question-and-answer session following his presentation, Garfinkel was asked whether AT&T's existing service to remote areas would suffer if its long-distance offerings were deregulated.

Garfinkel responded by asserting that the company is willing to guarantee "ubiquitous service" at rates pegged to the consumer price index or a similar inflation indicator.

Asked to comment on a major argument against deregulating AT&T Communications — that it presently has at least a 90% market share — Garfinkel responded that AT&T's share is 75% in the "competitive markets" which, he said, are confined to interurban communication among residential customers spending $25 or more per month and business customers spending $50 or more per month on interstate services. Other common carriers have the remainder.

Corporate customers

Garfinkel stressed that a large percentage of AT&T's revenue comes from a small number of corporate customers.

For example, 79% of the company's earnings from interstate business services are contributed by 2% of the customers; only about one half of 1% of those customers contribute nearly 20% of the company's business toll telephone revenue.

His underlying point was that because of this concentration, a deregulated AT&T would not neglect its corporate customers.

ON-LINE
HP3000 & DEC VAX
BUSINESS MANAGEMENT SYSTEMS
• CJ/PAYROLL
• CJ/PERSONNEL
• CJ/ADVANCED GENERAL LEDGER
• CJ/ACCOUNTS PAYABLE
• CJ/ACCOUNTS RECEIVABLE
SUPPORT MAINTENANCE ENHANCEMENT
COLLIER JACKSON, INC.

DEC TO IBM SNA

Now available...full SNA capability for your DEC computer! Comboard/SNA gives your terminals access to IBM interactive applications. Data can be transfered between systems transparently, all in the complete fully supported package from Software Results.

Comboard/SNA is a proven and reliable, single-board, 256KB communications computer that plugs into your DEC Unibus. Teamed with Comboard software, the system is a cost-effective solution to troublesome SNA communications problems.

Comboard/SNA allows your DEC to emulate an IBM PU Type 2 communications node. You have a full gateway into your SNA without the trouble of passing through a secondary network.

For further information, fill in the coupon below or call Software Results... the leader in DEC to IBM communications.

COMBOARD

SOFTWARE RESULTS CORPORATION
Call Toll-free
1-800-SRC-DATA
In Ohio call collect

Job-matching firms ride boom

By John Gallant
CW Staff

Touted by developers as the wave of the future in job hunting, most computer-based employment matching services are reaping the benefits of an improving U.S. economy through increased usage and an influx of investment capital.

"The upswing in the economy has had an incredibly positive impact," said Joseph Stacey, president of Bedford, Mass.-based Jobnet, Inc., in a recent interview. "Prospective customers are coming to us with pent-up demand. Now they're looking to hire sooner rather than later. We've seen a phenomenal growth in new customers and in interest in the service."

Jobnet provides employers with a data base of resumes submitted by job-hunting applicants. Among its present customers, Stacey estimated, usage of the data base has increased by several hundred percent.

"The [economic] situation is clearly improving, and our information says that trend will continue for the next couple of years at least," he added. "Our service will also continue to expand because we provide a steady flow of qualified applicants."

Stacey was not alone in his optimism. Base Network Corp. President Fred Robertson, whose firm offers the Contacts computerized recruitment service, said the outlook for the industry is excellent. "Our system usage is easily twice what it was three months ago. Things are really moving. It's like day and night compared to two years ago. We offer employers a chance to contain their hiring costs and reduce their employee search time, and both of those factors are very important today."

The brightening economy has given Chicago-based Contacts an additional boost. Robertson's firm recently concluded a million-dollar funding deal that will provide the capital necessary to expand Contacts' base of operations. "Due to the changing economy," Robertson said, "this has become a more viable option for venture capitalists."

Though it has yet to offer its services to the public, Careersystem, Inc. has also reaped the financial benefits resulting from the mending economy. The Palm Beach, Fla., firm is poised to enter the market for on-line employment services following a three-year data base development and test marketing project and a public stock offering that raised needed investment funds. "The solid response we had from our public offering showed that the interest in our type of service is out there," said President William Berry.

But the industry has had its casualties, too. One of the most promising of the on-line employment services — the Cambridge, Mass.-based Connexions Interactive Recruiting agency — recently suspended operations after less than a year on the market.

According to former President Robert Kvaal, the problem was a "matter of access to capital. The institutional investors just didn't materialize." Kvaal declined to expand further on the difficulties Connexions encountered, but hinted that the firm may resume operations in the future.

Connexions represented the sole sour note in a chorus of optimism sung by industry experts. "We have seen a marked increase in the amount of activity on our system," said Michael O'Connell, co-founder of Computer Search International, Inc.'s Employ on-line data base, which is offered through The Source information service. "The economy has opened up a lot more jobs. People were holding tight to their positions before; they were reluctant to move. But now they're really starting to get up and go."

Programmers top wanted list in '84

PHILADELPHIA — Programmers will be the employees most in demand during 1984, a year in which six out of 10 new jobs will be computer-related in some parts of the U.S., according to a survey by Fox-Morris Personnel Consultants, Inc.

The 10th annual survey of Fox-Morris recruitment and search offices throughout the nation showed that demand for programmers will increase by 18.7% over 1983 levels.

The company also predicted that corporate data processing and management information systems directors can expect median salaries of $65,400 or top salaries of $71,500, placing them eighth from the top in a list of projected salaries for management-level personnel.

On the list of high-demand job titles, electrical and electronics engineers are projected to see 18.5% more openings in their field than in 1983, software/systems engineers 15.1% more, systems analysts 13.8% more and MIS directors 8.9% more.

Fox-Morris President Sanford L. Fox said the proliferation of both business and personal computers will continue to stimulate the demand for data processing professionals at all levels. He said that six of 10 new jobs in the Midwest will be computer-related.

Among workers with two to six years of experience, median and top average salaries are expected to be $33,380 and $39,500 for electrical and electronics engineers; $31,570 and $33,800 for systems analysts; and $29,150 and $31,800 for programmers.

At the entry level, computer science graduates can expect median average salaries of $23,500 and top average earnings of $24,550, the company said. The report is available free from Fox-Morris, 1500 Chestnut St., Philadelphia, Pa. 19102.

TO ALL MSI AND TELXON USERS:

50% OFF ALL AZURDATA SCOREPAK™ TERMINALS.

While MSI and Telxon are discontinuing certain model terminals and offering close-out specials, the Azurdata Scorepak continues to be a top seller. The reputation of excellence and reliability established by the Scorepak makes it a consistent leader among portable data entry terminals.

In celebration of our Scorepak success, Azurdata is offering 50% off on all Scorepak terminals. If you were doing business with our competitors

and now find they will no longer support your needs—or maybe you're ready to trade-up to a winner—we want to hear about it at Azurdata! Call now, this is a limited time offer. But you can be sure it isn't "limited to stock on hand" because Azurdata recognizes a winner and the Scorepak is here to stay.

Azurdata

Azurdata, Incorporated
4102 - 148th Avenue N.E.
Redmond, WA 98052-5182

Seattle 800-426-8082 toll free
St. Louis 800-325-6121 toll free
Atlanta 404-482-8020

Azurdata is also a manufacturer of programmable terminals and a leader in application programs such as Shelf Price Audit, Direct Store Delivery, and Route Accounting.

Offer good on orders of 50 or more terminals. Orders must be received by February 29 and shipped prior to March 31. Offer does not include the Scorepak IV and is valid only in the continental United States.

Survey asks: What makes a good DPer?

By James Connolly
CW Staff

PALM BEACH, Fla. — When data processing managers hire data processors, they want the candidates with the greatest work experience, technical know-how and educational background.

But once on board, the "good data processor" should rely more on personality — logic, receptiveness and communication skills — than on technical ability to advance in a corporation.

Those were some of the conclusions of the "Professional EDP Hiring Study" conducted in November for Robert Half International, Inc., a recruiting firm specializing in data processing and financial personnel, by Burke Marketing Research of Cincinnati. The telephone survey, whose results were released to *Computerworld* last week, polled 50 DP managers and 50 top executives of Fortune 1,000 firms about their DP hiring practices, career growth for DP personnel and the relationship of DP personnel to the rest of their companies.

In listing the traits they look for when hiring experienced personnel, DP managers cited experience 62% of the time. Technical knowledge was mentioned 58% of the time, education 32%, personality 22% and job stability 20%.

Sixty-eight percent of the DP managers said they were responsible for hiring entry-level employees and 74% for experienced workers.

When asked what attributes a "good data processor" exhibits, the DP managers and corporate vice-presidents in 52% of the survey calls cited "personal attributes" such as logic (23%), interaction (15%) and communication (8%). In 46% of the calls, they cited "skills" such as technical expertise (16%), problem solving (10%) and training on equipment (9%).

Ninety-six percent of the 100 managers said DP personnel must communicate well to "get ahead," while "lack of motivation" was cited as the main reason for nonadvancement. Seventy-one percent of those polled said that data processors are "too DP-language-oriented."

'Scared of technology'

Robert Half, president of the recruiting firm, which is headquartered here, said in an interview last week that corporate leaders still tend to be "scared as hell of technology" and that they may be more impressed by a data processor's technical skills. "DP managers, on the other hand, assume the person has the skills. If the employee has had four years of Cobol, he should know Cobol. That may be why they are looking more at personal traits," Half said.

The survey also showed that 52% of the DP managers expect data pro-

See [illegible] page 16

DP managers, VPs part ways on question

PALM BEACH, Fla. — Data processing managers and company vice-presidents don't always agree when they're asked what makes a "good data processor."

The 50 Fortune 1,000 vice-presidents polled in a recent survey conducted for Robert Half International, Inc. here tended to define a "good data processor" according to skills, while data processing managers favored personal attributes such as logic and communications.

Lack of motivation

More data processing managers (40%) than top managers (18%) cited lack of motivation as the reason data processors fail to get ahead in companies, while top managers leaned toward personality deficiencies (30%) as the reason for failure to get ahead in companies.

Top managers felt strongly (48%) that data processing is an excellent field in which women can advance; this belief is held strongly by only 28% of the data processing managers polled.

The top managers also felt strongly (76%) that they and their peers should have a "working knowledge" of data processing procedures. Only 60% of the data processing managers agreed with that suggestion.

Meanwhile, the data processing managers (72%) disagreed more strongly than the top executives (54%) with the suggestion that data processors lack imagination.

DOS/VSE and CICS/VS Frustration?

BIM gets it out of your system.

BIM presents a line of proven programs that maximize your system's capabilities, saving you time, labor and expense. These program products help get the most out of your system and people.

BIM-EDIT — the editor with more than 25 significant features that ICCF can't match.
BIMSPOOL — Prints output in POWER/VSE spooling queue on local or remote 3270 terminal printers. (Received ICP Million Dollar Award 1982).
BIMSPOON — On-Line to Batch Print Spooling. Prints data passed from CICS application programs into the POWER spooling queue.
BIM-PDQ — POWER Dynamic Queuing performance enhancement. Eliminates 95% of the I/O to heavily used POWER queue.
BIM-CDMS — Comprehensive problem analysis and display of operational CICS system.
BIMTEXT — Word processing, document composition system. Create formatted documents from free-form input.
BIMSWAP — Switch local 3270 BTAM terminals between multiple CICS partitions without special hardware or additional ports.
BIMCMPRS — CICS 3270 data compression system. Reduces response time for remote terminals significantly. Available for OS/VS1 and MVS also.
BIMP3270 — Comprehensive CRT screen image print facility. Copy to terminal printers or spool queue for system printer.
BIMSERV — On-line display of library directories and entries, VSAM Catalog entries, disk VTOC's, etc.
BIMDSLOG — Console Message File display. Used by computer operations and programmers.
BIMMONTR — DOS/VSE System Status, Performance Measurement, and POWER Queue display.
BIMDEVC — Displays Logical Unit assignments for physical devices, to resolve operational problems.
BIMSUBMT — On-line Job Edit and Submission facility.

BIM programs are cost-efficient, many less than $800. You can save even more with our group package offerings. Products are available on permanent, annual, or monthly leases, and shipped on a 30-day free trial basis. Product documentation is available on request.

BIM also performs systems programming consulting, with consultants based in Minneapolis and Washington, D.C. Computer time services are also available on our 4331-2 system, on-site or remote.

BIM
BIM MOYLE ASSOCIATES, INC.
5788 Lincoln Drive
Minneapolis, MN 55436
612-933-2886
Telex 910-576-3137
Member Independent Computer Consultants Assn.

TSPRINT

SPOOL TO 328X
(Also 3262 and ASCII Printers)

VS1 and MVS
JES, JES2, and JES3
Local and Remote Printers
Control Printer Activity from ANY VTAM terminal using SPF-like Panels
Data Formatting Facility
BTAM and VTAM Support
Full FCB and UCS Support
No System Mods Required
Multiple Printers Run in a Single Address Space
Support For SCS Devices
SMF Accounting Records

Shares Printers With Other Applications

Worldwide Support
TONE Software Corp.
Free Trial

1736 S. Brookhurst, Anaheim, CA 92804
(714) 991-9460 Telex 181582

HIRING from page 15

cessing personnel to show more loyalty to their companies in the coming year and that the same percentage see DP departments as traditionally having higher turnover rates than other departments.

Half observed, "Computer people are more conscious of their profession — the hardware and software. Financial people are more conscious of the company. For the DP person to advance, he has to change that outlook, because the company, not the profession, writes the check. Somewhere along the line you have to say, 'This is where I am. I like it here. I'm going to stay.' "

The poll also showed that DP personnel usually are hired through help-wanted ads and recruiters. However, most managers said they have responded, not necessarily in the positive, to unsolicited letters.

Other findings included the following:

■ Seventy-five percent of the DP managers polled oppose the licensing of data processors.

■ Fifty-eight percent said computer science graduates should have more business or practical experience.

■ Only 7% said it is "likely" or "very likely" a head of data processing will become its company's chief executive officer within 10 years.

Those surveyed also were asked what advice they would give to a person entering data processing.

They responded with "communicate" (26%), "learn as much as you can" (16%), "business background" (14%) and "learn technical skills" (12%).

'Allow me to introduce my mother'

PALM BEACH, Fla. — Asked for the most unusual approaches that job applicants pulled out of their sleeves, some of the DP managers recently surveyed for recruiting firm Robert Half International, Inc. cited the predictable "inflated experience or resume."

But other managers, impressed for better or worse, had seen more original attempts to obtain interviews.

They included applicants using a sympathy approach — with crutches and wheelchairs, walking in unannounced and claiming a job, calling the managers at home, claiming to be programmers on the basis of having used a computer and saying they were writing a book on data processing.

One applicant told the interviewer she had won a contest for a free lunch, while another claimed to be more interested in the corporation's welfare than in his own.

Finally, a manager cited the old reliable ploy: An applicant brought his mother on an interview.

DG chief sees revenue growth of 20% to 25%

By Peter Bartolik
CW Staff

BOSTON — Data General Corp. should experience revenue growth of 20% to 25% annually over the next two years, but shortages of components, particularly semiconductors, could affect shipments and costs during 1984, company President Edson de Castro told shareholders at DG's annual meeting here last Tuesday.

Expressing optimism for continued growth in orders as reported for the past two quarters ending in September and December, de Castro said the firm's management team is concerned "about our ability to increase shipments as rapidly as orders come in [during] the months ahead. . . . Shortages of components, especially some types of semiconductors, are beginning to appear. If such shortages become significant, they may affect shipments or costs or both."

De Castro told shareholders that the board of directors intends to elect as a company vice-president Hisashi Tomino, president of DG's Japanese subsidiary, Nippon Data General Corp. He also announced the appointment of a board of scientific advisers comprised of professors from MIT, Stanford University, Carnegie-Mellon University's Robotics Institute and the University of California at Berkeley, including two specializing in robotics and artificial intelligence.

CW photo by P. Gerwitz

Edson de Castro

The company did not experience any problems during the quarter ended in December, but "it is a risk that may continue for much of 1984." Expanding later, he said problems are developing industrywide in the supply of random-access and read-only memories, gate arrays and also some components used in mass storage.

While sales and profits increased in the past two quarters, ending a three-year slump that saw annual profits dip from a high of $54.6 million in 1980 to $23.1 million last year, the profit margin for the first quarter ended in September was only 6.2% because of start-up costs for the Desktop Generation microcomputers and added expenses. By the end of 1984, that margin may increase to the low or mid-teens, de Castro said.

"We're saving $50,000 a year by eliminating SYSOUT printouts and installing JCLWTR."

That's the word from one user of AID's new JCLWTR system.

Instead of printing every production SYSOUT listing, JCLWTR stores them on disk where they're instantly accessible through special SPF screens or hard copy printouts.

The savings in paper, printing, handling, and storage costs add up so quickly that even medium and small shops can recover the system's minimal cost in just months.

JCLWTR installs on medium and large IBM systems operating under MVS and supports on-line interfaces to COM.

Find out how much you can save with AID's JCLWTR system. Send in the coupon, or call Lew Kabza at 312/654-3030.

AID Applied Information Development, Inc.
823 Commerce Drive,
Oak Brook, Illinois 60521

I'd like to know more about the JCLWTR system

Name/Title _____

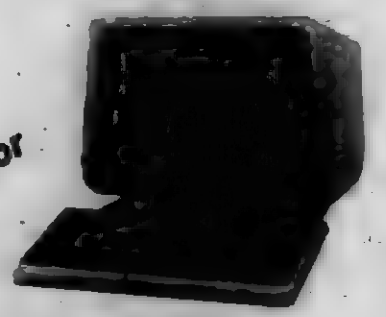
Company _____

Address _____

City/State/Zip _____

Phone ( ) _____

Three Reasons Why... No Other Burroughs Emulator Can Meet Our Standards



1. Features • • • 32 programmable function keys • • • complete keyboard reprogrammability • • • non-volatile RAM can store up to 375 characters • • • with power-on soft key storage can store in excess of 16K bytes of reprogrammed keystrokes.

2. Support • • • multi-million dollar inventory of PC's, CRT's, printers and modems • • • extensive leasing base to meet any budget • • • same day on-site service from nationwide service locations.

3. Price • • • limited time only special leasing price of $75/mo. including on-site service • • • and to totally convince you DASI will give you a two week Free trial so you can see the high standards of this Burroughs emulator for yourself.

The Visual 383 and DASI...
An Industry Leader for 15 Years

Call 800-257-7748 today
or fill out the coupon below for more information.

District Offices:
Atlanta (404) 998-2255
Boston (617) 769-6420
Chicago (312) 987-0440
Cleveland (216) 473-2131
Cincinnati (513) 793-4430
Denver (303) 337-4103
Detroit (313) 978-7309
Houston (713) 682-5985
Los Angeles (213) 532-2236
Minneapolis (612) 854-4465
New Jersey (201) 227-6080
New York City (212) 564-6301
Philadelphia (609) 228-6660
Phoenix (602) 254-1927
San Francisco (415) 872-1611
Seattle (206) 575-1448
Washington, DC (301) 498-3377

DAS DATA ACCESS SYSTEMS, INC.
Cole & Camden Avenues
P.O. Box 1230
Blackwood, NJ 08012
800/228-0700 800/257-7748
In NJ 800/232-4610

Name _____
Company _____
Address _____
City _____ St. _____ Zip _____
Telephone _____

Clip this coupon and mail today.

Comp-U-Card plys high-tech merchandising

comp/store

By John Gallant
CW Staff

STAMFORD, Conn. — With more than 60,000 items in its data base of brand-name consumer products, Comp-U-Card International, Inc. (CUC) here is bringing the techniques of merchandising into the computer age.

Touted by founder Walter A. Forbes as the leading national electronic merchandising service, CUC offers its more than one million subscribers the opportunity to obtain price and product information from the data base by telephone or through their own home computers. The firm is also carrying the technology a step further by installing in various retail outlets interactive videodisk terminals that enable customers to browse through the customized data base and place orders directly into the system.

CUC carries no inventory; instead, customer orders input into the system are transmitted to the selected vendor's warehouse or outlet to be shipped directly to the customer.

Forbes began building the network of retailers, distributors, wholesalers and manufacturers that offer products through the CUC data base in 1974. The service was originally offered only to telephone subscribers who called a toll-free 800 number to obtain price and product information. In 1979, CUC began Databucks, which Senior Vice-President E. Kirk Shelton said was the first interactive home computer shopping service.

Databucks, which was later to be expanded into the Comp-U-Store service, was initially offered through The Source network. Comp-U-Store is currently available through The Source, Dow Jones and the Compuserve information services and directly to members with a modem-equipped microcomputer.

CUC continues to expand the Comp-U-Store service into what Shelton described as an "electronic mall" by adding an extensive line of pharmaceutical and health care products and specialty items such as the Nieman-Marcus line of gourmet foods.

Until the Databucks service was instituted in 1979, all CUC's product information was maintained through an extensive manual system. The company then installed a Digital Equipment Corp. Decsystem-2060 mainframe with 2G bytes of memory and began the arduous task of building the 60,000-item data base and writing the proprietary operating system and data base management system software that drive the system.

"The initial phase of the project was to design a computer system that would parallel the manual system," Shelton explained. "The process of writing the code took more than two years. It had to be developed one piece at a time, and through each step we would maintain the manual system until we were certain the electronic system was up and running satisfactorily.

"The development process involved a ton of work, but the hardest thing was getting the right suppliers for the system."

CUC currently has a staff of some 30 programmers who maintain the software and data base, a task that Shelton said involves close to 100,000 monthly updates to keep product and price information timely. Aside from the users who access the data base through their own micros, CUC has a staff of some 100 people who operate a bank of microcomputer nodes which remotely access the mainframe from the company's headquarters here. The terminal operators man the telephones for CUC's still rapidly growing Comp-U-Card phone-in retail service.

The CUC system is equipped with a "least cost optimization" feature that chooses the best price among the vendors offering the same product through the system. Thus, vendors have to be price competitive in order to be selected, a situation that often leads to savings of up to 40% for CUC customers, Shelton said.

Comp-U-Mall marks next step in electronic shopping

STAMFORD, Conn. — Comp-U-Card International, Inc.'s (CUC) revenues increased nearly 140% in fiscal 1982 to reach $4.2 million. In the first three quarters of the firm's latest fiscal year, that figure has already grown to more than $5.5 million.

The bulk of CUC's revenues come from the $25 annual membership fee levied on subscribers. In addition, the company earns a percentage of each sale transacted through the network. The Comp-U-Card telephone retail service continues to account for a large portion of CUC's sales, and management expects that sales through Comp-U-Card will double every year for the next three years as a result of the firm's "aggressive direct marketing" techniques.

With Comp-U-Card, subscribers check on price and product information using a toll-free telephone number — (800) 843-7777. Utilizing the system's least-cost optimization feature, a CUC terminal operator provides a customer with the lowest cost listed among vendors for a particular item. The customer can then place an order, which CUC automatically transmits to the vendor's shipping center for fulfillment.

Comp-U-Card does not allow users to browse the data base; they must have a particular product in mind. But that limitation is overcome through Comp-U-Store, another CUC service, which allows customers with microcomputers to access the CUC data base through either an information service or their own modems. After the user enters some broad product characteristics, the system continues to prompt him to obtain more data. The user then receives on his micro a list of products that meet his criteria.

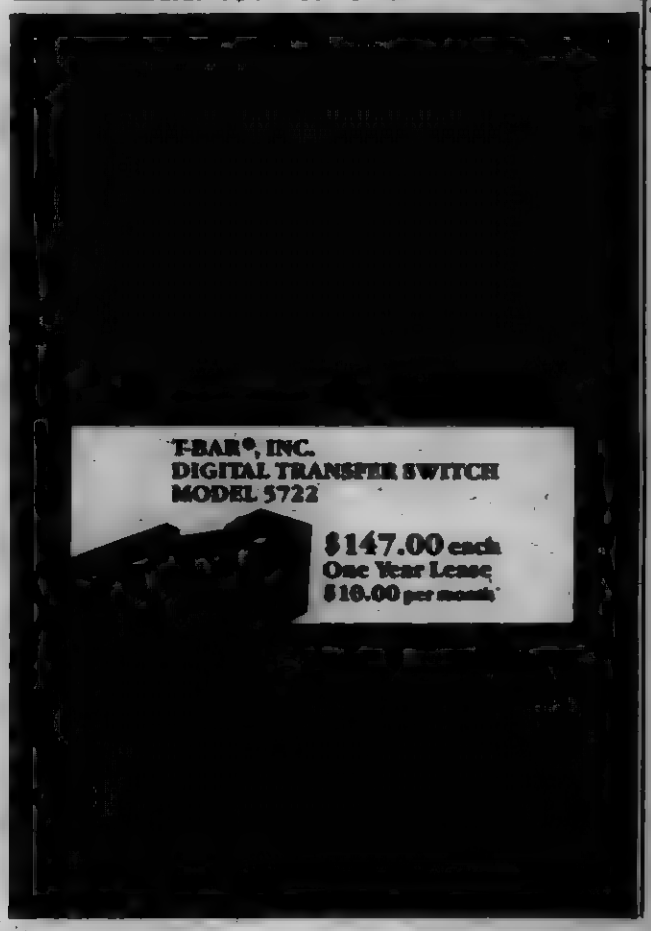
Along with the products, the CUC system chooses the best price among the vendors offering the products. The customer then enters his order directly into the system.

CUC Senior Vice-President E. Kirk Shelton expects use of the Comp-U-Store service to triple each year for the next three years. Comp-U-Store is currently being expanded into the Comp-U-Mall, a concept that will allow microcomputer users to shop from a variety of "stores" housed in an electronic mall.

In addition to the current offerings of 60,000 brand-name products, Comp-U-Mall will offer a discount drug store line, flowers and specialty items from selected catalogs such as Nieman-Marcus. Subscribers will shop in the electronic mall in the same manner as in the Comp-U-Store.

CUC is also making an extensive effort to market its recently announced Video Comp-U-Store. Unlike its other services, the Video Comp-U-Store is a point-of-sale service that makes use of a videodisk terminal to enable customers to browse the CUC offerings or a data base custom-designed for a particular vendor. At kiosks in selected retail stores, customers can call up product information and enter orders, which are transmitted directly to a delivery center.

Video Comp-U-Store is currently being tested in seven department store locations owned by Woodward & Lothrop, Inc. in Washington, D.C., Filene's in Boston and Dillard Department Stores, Inc. in Dallas.



BUILDING A COMPUTER CENTER?

If you're planning a new expanded or remodeled DP facility, you need Datasphere's help.

Since 1968 Datasphere's unique combination of products and services has saved dollars, frustration and time for large and small firms around the world.

From turnkey—design/build computer rooms to the smallest support equipment, we'll do all or part—on schedule, within budget! Datasphere is unique—we're engineers, contractors and suppliers specializing in computer facilities.

Supplying a full line of support equipment, including:

- *Uninterruptible Power Systems*
- *Computer Power Centers*
- *Computer Fire Protection Systems*
- *Computer Type Air Conditioning*
- *Gas Turbine/Diesel Generators*
- *Operation Command Centers*
- *Elevated Flooring*
- *Frequency Converters*
- *Line Filters*
- *Security Systems*
- *Systems Monitors*
- *Voltage Regulators*

CALL DATASPHERE NOW!
800-221-0575
In NEW JERSEY CALL: 201-272-1810
Write for additional information
datasphere, Inc. 49 Meeker Avenue, Cranford, N.J. 07016

NEWS

INTERNATIONAL REPORT

CW INTERNATIONAL NEWS NETWORK

AUSTRALIA

SYDNEY — Apple Computer Australia Pty. Ltd. has appealed Justice Beaumont's rejection of its suit charging Computer Edge Pty. Ltd. with breaching Apple's copyright on Applesoft and Autostart ROM. The appeal against Computer Edge and its managing director, Michael Suss, will be heard again by a full bench next month.

DENMARK

COPENHAGEN — NCR Corp. is continuing its quest to dominate the DP market in Scandinavia. Plans call for the vendor to open an Advanced Technology Center in Oslo, Norway, devoted to seminars and workshops in the application of state-of-the-art technology, Chief Executive Officer Bent Larsen said. Further, terms are being finalized for a joint venture with a leading Norwegian vendor, the Elektrisk Bureau, that sources here said will result in a Scandinavian organization larger than IBM.

FINLAND

HELSINKI — Finland's largest computer maker, Nokia, became Scandinavia's second biggest computer company by purchasing 70% of the holdings of the Swedish firm, Luxor. The acquisition was valued at around $20 million. Luxor, the Swedish state-owned electronics company, created the ABC Series of micros, which tops the list of best-selling microcomputers in Sweden.

FRANCE

PARIS — Olivetti and its French subsidiary, Logabax, are expected to introduce a microcomputer compatible with the IBM Personal Computer. The look-alike, jointly developed by Docutel/Olivetti and Logabax in Cupertino, Calif., is said to be a remake of the 1600 system from Eagle Computer, Inc. In France, the product reportedly will be called the LX 1600, handle two 360K-byte diskettes and feature a 10M-byte disk and be available by the summer in order to compete with the IBM Personal Computer and Personal Computer XT, sources said. The entry-level version is expected to cost $2,500.

Meanwhile, Olivetti will unveil the LX 1600 under its own label this quarter. It has been rumored that AT&T has already ordered 120,000 units of this product for its Italian subsidiary.

JAPAN

TOKYO — Japan's Information Industry Committee of the Industrial Structure Council called for legislation to protect software here and to help the growth of the indigenous software industry.

TOKYO — Fujitsu Ltd. has reached a six-year joint development agreement with Texas Instruments, Inc. The agreement allows TI to use Fujitsu's four types of bipolar transistor-to-transistor logic gate array technology and Cmos gate array technology in a variety of large-scale integration circuits.

TOKYO — Mitsubishi Electric Corp. has introduced a 16-bit small business system. Carrying a $12,723 price tag, Mitsubishi's Melcom 80 Model 8 is a low-end machine that runs under the Digital Research, Inc. MP/M 86 operating system and features data/job control, Japanese word processing and graphics.

NORWAY

OSLO — For the second time in its 20-year history, Norway's prestigious Industry Achievement Award went to a computer company when Norsk Data claimed the prize here on Jan. 9. Gisele Rutman, president of the institute that bestows the award, said Norsk was selected for its "stamina and staying power in exporting its product line to markets that are otherwise dominated by the Americans."

OSLO — John Sterns, president of Sterns Europe, met with his future European distributors here on Jan. 14 to discuss support for Sterns' various product lines. Sterns has reportedly introduced a personal computer that is based on Microsoft, Inc.'s MS-DOS operating system. It has a full-page screen option and is said to operate twice as fast as the IBM Personal Computer.

WEST GERMANY

FRANKFURT — Sales of the IBM Personal Computer here have not lived up to the vendor's expectations. Since the product's introduction one year ago, just 7,000 have been installed in the Federal Republic of West Germany, sources said. IBM reportedly plans to remedy this situation by restructuring its product sales and marketing arm here — an announcement that allegedly triggered the resignation of IBM's Frankfurt-based sales and marketing manager, Romin Neumeister, on Jan. 1.

CUT YOUR COBOL TEST & DEBUG TIME

Our XPF/COBOL™ can slash COBOL test & debug time. XPF/COBOL is a full screen, interactive SPF-like test & debug facility, that can pay for itself in months.

Full screen debugging enables IBM MVS programmers to watch the program execute, find and change COBOL data in COBOL format, run multiple tests, and even watch the program run in reverse.

Call your nearest sales office today, or send in the coupon below, for complete information.

Send me information on XPF/COBOL.

Name_____

Title_____

Company_____

Address_____

Send to:
Boole & Babbage
510 Oakmead Pkwy.
Sunnyvale, CA
94086

Boole & Babbage
The Information Resource Management Company

Los Angeles, CA (213) 642-7560
Sunnyvale, CA (408) 773-8811
Atlanta, GA (404) 451-0024
Chicago, IL (312) 629-8910
St. Louis, MO (314) 434-5100
Englewood Cliffs, NJ (201) 461-6006
Dallas, TX (214) 385-9076
McLean, VA (703) 448-9194

NEWS

Nicaraguan DP managers face special ills

By Barbara Schaffer
Special to CW

MANAGUA, Nicaragua — "Computerization is not a credential for acquiring privileges, it's a social duty." So reads a slogan on a classroom wall here at the Central Bank of Nicaragua's employee training center. Next to it hangs a Fidel Castro quote: "Sacrifices are fleeting. The only thing that stays with us is the satisfaction of having served the people."

In war-torn Nicaragua, many special problems plague DP directors. Government pressure to fight for the country's Marxist regime, an upside-down economy and a general lack of state-of-the-art technology combine to make Nicaragua one of the world's least desirable places for computer professionals.

An area of major concern for Central Bank's DP Director Eric Brenes is the lack of political commitment among DP people — thus the Marxist signs and slogans. Brenes claimed that "programmers tend to relate more to their computers than to how their work benefits the larger society . . . they tend to program without knowing or caring what the purpose of their work is."

Participation in the volunteer militias is unusually low among computer people, a fact that has not escaped notice in government circles, Brenes said. On the other hand, most computer professionals are not prodded into leaving their jobs to become active in Nicaragua's war efforts because their work is of such economic importance. For example, one of Brenes' computer operators was not allowed to volunteer for a coffee-picking brigade because there was no one to replace him at work.

Tough to keep trained staff

Nevertheless, Brenes maintained that holding onto computer operators, programmers and analysts in Nicaragua is one of his biggest problems. The Bank coordinates the activities of the country's seven nationalized banks and financial institutions. These banks would like very much to be able to double or triple their respective staffs (they currently employ about 250 computer professionals), but the country is suffering from an acute shortage of trained computer personnel, Brenes said.

Salaries in the state DP sector are not very attractive, Brenes admitted. Analysts pull in about 8,500 Cordobas a month ($850 at the official rate of exchange, but closer to $85 at the black market rate because American dollars are scarce). While DPers can make more money in Nicaragua's private sector, many experienced analysts and programmers leave the country for more lucrative jobs elsewhere, Brenes noted.

The ongoing shortage of qualified computer people has forced some of the banks to raid other banks' DP departments, tempting the more experienced staffers away with promises of more interesting assignments and slightly higher pay, Brenes said. Most of the banks' programmers are recent college or technical school graduates in their early twenties. Brenes himself is only 26.

Another obstacle Brenes must contend with — shared by both state and private enterprise here — is the lack of foreign reserves and credit needed for buying new equipment. (IBM is presently the only computer vendor operating in Nicaragua.) Brenes reported that the banks are now in the process of replacing their IBM System/34 minicomputers with IBM System/36 machines.

Brenes is also planning to have micros installed in all bank branches to record daily transactions. There are no plans for linking the micros to a central processor, however, because the telephone lines are not adequate to handle the job, he lamented.

Despite his inability to tie the smaller machines together, Brenes thinks microcomputer technology is particularly well-suited for Nicaragua because "it is less vulnerable to economic and political pressure than mainframe technology, especially in terms of maintenance."

Schaffer is a bilingual journalist and technical writer based in Berkeley, Calif., who recently visited Nicaragua. She acted as interpreter during training sessions on structured Cobol at the Central Bank of Nicaragua.

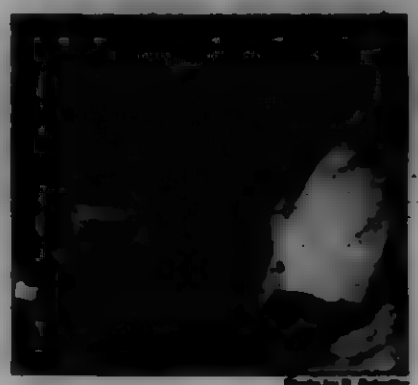


Photo by B. Schaffer

Brenes

The things we hear about General Electric service.

"YOU'RE SAVING US MONEY."

If time is money, downtime is disaster.

That's why GE computer and communication service people put such a high priority on fast response. And fixing your computer system and communication equipment right the *first* time.

Our service engineers and technicians know your system from modems to micros—over a wide variety of makes and models.

We get to you fast—through a nationwide service network. Plus, we have depot service that can save you time and money.

To keep costs down, you need your system up. You need GE.

For the service center nearest you, call 800-528-6050, Ext. 406. (In Arizona, call 800-352-0458, Ext. 406.) Or write: General Electric Company, Instrumentation and Computer Service, Dept. DC-7, 705 Corporation Park, Scotia, NY 12302.

GE. Because your system is only as good as its service.

GENERAL ELECTRIC

"First Chicago is launching a whole world of new banking services with ***Tandem NonStop Computer Systems.***"

Donald H. Hollis, Senior Vice President
Head – Systems and MIS
First Chicago Corporation
The First National Bank of Chicago

At The First National Bank of Chicago, providing responsive, on-line financial services for our customers is a major corporate priority. An important part of that commitment is the global implementation of core applications on Tandem NonStop Computer Systems.

Utilizing a common database structure on systems distributed throughout the world provides immediately useable information, uniquely suited to internal reporting and accounting. Included are such time sensitive items as foreign exchange and money market transactions, loan contracts and SWIFT transfers. We call this system F.I.R.S.T. (First Chicago International Real-time System for Transactions).

Tandem systems also support our installed and expanding consumer and commercial funds transfer, balance reporting, and cash management systems, which move billions of dollars for our customers daily. Our Cash Station ATM switch is an excellent example. The modular nature of the Tandem solution enables us to sustain and improve quality by adding such capabilities incrementally, where and when they're needed.

The Tandem systems are on-line in sixteen financial capitals around the world. And they are very reliable. We continue to be impressed with the systems, the support and with our employees' enthusiastic acceptance. They are helping us improve customer service.

The NonStop System. The only computer on the market today that can provide an integrated network of up to 255 16-processor systems, supporting thousands of terminals in an on-line, transaction-based environment.

Tandem. Fully supported by a worldwide sales, training, service and manufacturing organization.

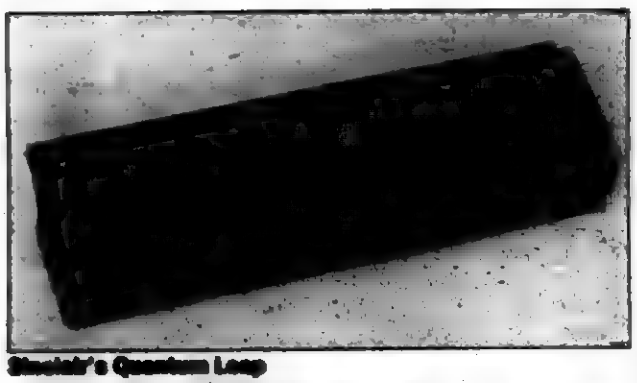
For more information on the Tandem application at First Chicago and a copy of our brochure, "Solutions in Banking," contact your local sales office or Tandem Computers Incorporated, 19333 Vallco Parkway, Cupertino, California 95014, U.S.A. Toll Free 800-482-6336.

TANDEM

NonStop Transaction Processing

EUROPE and U.K.

FAR EAST



Sinclair's Quantum Leap

Sinclair micro makes UK debut

By Rex Malik
Special to CW

LONDON — Americans will be able to mail-order a $499, 3-lb, 32-bit system with an 8-bit communications bus from Sinclair Research Ltd.'s U.S. factory this fall, Sir Clive Sinclair, chairman, said at a press conference here to introduce the machine to the UK market.

Slated for delivery to UK users late next month, the Quantum Leap (QL) machine features 128K bytes of random-access memory (RAM) (expandable to 640K bytes) and twin microdrives with 100K bytes each.

The system's communications bus is based on Motorola, Inc.'s 68008 microprocessor, which Sinclair said will soon become an industry standard.

The microcomputer runs on Sinclair's proprietary Qdos operating system and an enhanced version of the company's Basic software called Superbasic. Qdos is said to allow single users to perform concurrent multitasking.

London demonstration

At the London press conference, demonstrations of the machine showed a split CRT screen running six parts of a program each in different windows.

Sinclair claimed the system could handle concurrent processing up to 20 programs.

The 3-lb system also comes with a full-size keyboard and four basic software packages: a word processor, a spreadsheet, a data base management system with relational properties and screen editor and a graphics package.

According to the vendor, the QL can be compared to Apple Computer, Inc.'s Apple IIe, priced five times higher, and IBM's Personal Computer, priced seven times higher.

If Sinclair delivers, sources here believe the QL will redefine the microcomputer industry's price/performance parameters, making it very difficult for anyone else to compete in the short term.

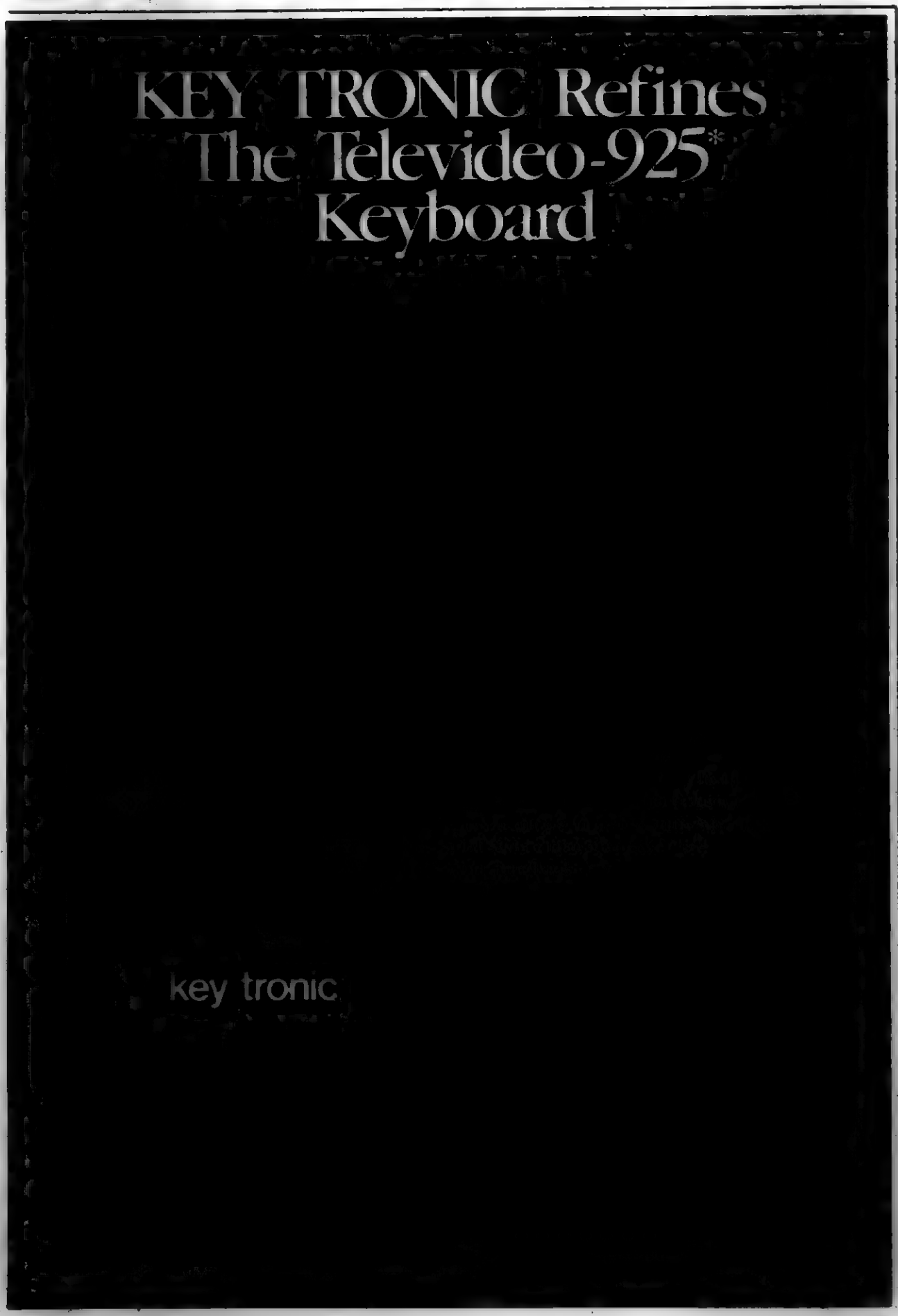
Sinclair gamble

On the other hand, Sinclair is taking a huge gamble: The QL is aimed at the home/professional/educational/business marketplace, while Sinclair had formerly confined its strategies to the low end of this arena.

Moreover, the QL is not compatible with previous Sinclair products, even though the vendor said the local-area network facility will allow Sinclair Spectrums and QLs to be configured on the same network.

Therefore, many industry watchers feel that the QL must be introduced with all the essentials already existing or shortly on the way in order for this product to fly. In keeping with this, Sinclair announced that the following QL peripherals and enhancements are now under development: a 512K-byte memory board extension, a Pascal compiler, a 68000 assembler, a terminal emulator, an analog digital interface, a Winchester disk interface, a modem, a parallel printer interface with multichannel sound generator and a 488 interface.

Malik is a freelance computer journalist based in London.



TURNAROUND TIME

LARRY E. LONG

Q For seven years I've been with a consulting firm where each promotion is an up-or-out decision. My last two promotions have been on time, and my supervisors have indicated that I'm doing what is necessary to be considered eventually for partnership.

A few recent events have caused me to rethink my career. Two very competent colleagues were denied partnership. This came as a surprise to everybody.

In addition, I've been offered an MIS management position with a client company that offers excellent advancement opportunities.

Given the inconsistency of evaluation criteria at my present firm, would you suggest that I resign and take the position at the client company?

A You're confronted with resolving the age-old question of risk vs. security.

If you enjoy consulting and aspire to partnership and feel comfortable with your progress toward that goal, pursue it.

If you feel ambiguous performance evaluation criteria preclude you from shaping your career destiny with good performance, perhaps you should leave the firm.

Q You came out against the use of logic aptitude tests as a means of determining a person's ability to become a programmer. I disagree.

Based on my experience, I agree that, as you stated, "people who fail the tests may make excellent programmers," but the other statement that "high scorers may never be able to program" is misleading. I have never known a trainee who scored high on an aptitude test who could not perform well in programmer training.

In fact, I feel confident to predict that a candidate who scores well on an aptitude test and has a strong interest in the work will invariably perform satisfactorily as a production/maintenance programmer.

We went through intervals of using or not using aptitude tests, along with normal interviewing and examination of prior work or schooling. The change in the failure rate was well correlated with the use of the aptitude test.

So, a standard programming aptitude test should be used to screen out the unsuitable applicants.

A During the 1960s and, to some extent, the 1970s, DP staffs were created from scratch with available people, most of whom knew little or nothing about computers. With virtually nothing to go on but past performance in an unrelated field, managers turned to aptitude tests as a means of determining an employee's potential to do programming.

This was fine for that era, but today the overwhelming majority of the people being employed in computer-related jobs have some work experience or education in the field. I contend that the proper evaluation of background information is a more effective predictor of success than an aptitude test.

I liken use of aptitude tests for screening to the use of grade point averages in the screening of students for on-campus interviews. Grade point averages do not reflect personality traits, ambition and enthusiasm. Likewise, neither do aptitude tests.

Q I recently received a degree in computer programming from a community college. Now I am attempting to find employment, but am finding three common responses: We are not hiring right now; send us your resume; and we don't hire entry-level people.

The third point, in particular, frustrates me and, I believe, many other would-be programmers. How can you get experience if you can't get a job?

How does a would-be programmer find that first job if he must have X number of years paid experience to work there?

A During the past year, I've received more mail on the issue of the hiring of entry-level people than on any other issue. The mail from MIS managers has been both pro and con, but as you might expect, the mail from professors and students has stressed the quality of the product and the economics of hiring recent graduates.

This may be of little solace to your immediate need, but the feedback I received from recent discussions with about 100 MIS managers is that they are beginning to view the hiring of entry-level people more favorably. Perhaps their change in attitude is a reflection of the change in the economy. Or it may be that MIS managers can't find experienced personnel or they are recognizing the potential contribution of graduates of good programs.

For whatever reason, I look for employers to return to college campuses in the spring with authorizations to fill plenty of entry-level positions.

Long is a professor at Lehigh University, a DP consultant and author. If you have a question you'd like him to address, send it to Larry Long, Editorial Department, Computerworld, P.O. Box 880, Framingham, Mass. 01701.

In a world of dumb printers, Memorex has a Remote Printing System that thinks for itself.

In theory, remote computer output printing is a dynamite concept.

Reports get out to the right people, right away. Turnaround time goes down, costs go down. Your central printer gets a break instead of a breakdown.

In theory.

Perhaps your own experience has been less than ideal. Because most remote printing systems aren't designed with enough control to manage a really heavy workload; there's no flexibility. No security measures, either.

But consider DPS by Memorex. The first Distributed Printing System with complete flexibility for the remote user, and complete control for the central site.

Why it's better.

For starters, installation is a matter of minutes, integrating perfectly into your MVS or VTAM System without modification and without an IPL.

Second, DPS will accept data from batch output, from a TSO data-set print command, or directly from user-written programs.

And the data stays confidential. You can assign specific or master passwords, and DPS will ignore any command that doesn't include your assigned code.

You can also specify that reports be printed on special forms (labels, checks, invoices, etc.).

Network control.

No matter how big the load, DPS keeps your system *manageable*. From either the central console or from remote terminals, you can enter commands such as start/stop, display, cancel, re-route, change copy count, priority, names or other attributes.

Data with a life of its own.

DPS keeps your reports safe from accidental erasure. You can print them or purge them, but DPS won't lose them, ever. Even after system error or failure.

Free 30-Day Trial.

We'll give you free installation and a 30-Day free trial to see how our system and your hardware can give you incredible printing performance.

Just call now (408) 987-9604, collect, or fill out the coupon below and send it *today!*

Remember—just because your current system falls short, doesn't mean you don't have a second chance. It just means you don't have DPS.

Memorex Corporation
San Tomas at Central Expressway, Santa Clara, CA 95052
ATTN: Software Marketing Manager, MS 1216

If DPS can think for itself, I'm interested in giving it some thought.

NAME:

TITLE:

COMPANY:

ADDRESS: STATE: ZIP:

TELEPHONE: EXTENSION:

MEMOREX
A Burroughs Company

ACM seeks papers

NEW YORK — The Association for Computing Machinery (ACM) is calling for papers for its 1984 Annual Conference which will explore the advanced integrated systems and new techniques of the 1990s. The theme of the conference, which will be held Oct. 8-10 at the San Francisco Hilton, is "The Fifth-Generation Challenge."

All papers and proposals for panels must be received by Feb. 15. Notifications of acceptance will be sent to authors by April 30.

Proposals should be sent to Program Chairman, ACM '84, Suite 303, 9900 Main St., Fairfax, Va. 22031.

Managers save data from fire

By James Connolly
CW Staff

HIGHLANDS, Texas — Officials of a local petroleum plant recently dashed across fire lines and into their smoked-filled offices to save computer disk packs and paper records seconds before the office burst into flames.

Sue Franta, data processing manager for Hi-Port Industries, Inc., led the charge when she, two other managers and her husband rescued a dozen 10M-byte disks and armloads of books while a Dec. 5 fire was leveling much of the sprawling petroleum products firm.

"We watched from across the street for about 40 minutes and didn't think the office was going to burn. When we saw the firemen couldn't contain it, we just ran into the building.

"There were no lights, but I knew where the packs were. We started grabbing them and handing them to people," Franta said. "Then the back door burst into flame. It didn't take minutes, just a second or two.

"All I remember after that is hauling it out the door. We were bumping into each other and everything. It must have looked like a Three Stooges movie."

The rescuers saved packs of the company's Data General Corp. CS-40, and, within days, were running their payroll, accounting and other programs on another company's computer in Houston, 25 miles away.

Most Hi-Port records were duplicated off premises, but the data for the two weeks prior to the fire and the data on paper could have been lost in the $20 million blaze. "We did lose some data, but nothing that we can't recoup through our backup," Franta said.

The fire struck at a time when the company was planning to upgrade its system and to develop a disaster plan.

"Let this be a lesson to everyone," Franta said.

Franta said she expected to be without an in-house system for several months as the company rebuilds. The firm resumed production days after the fire.

The blaze, of undetermined origin, was fueled by the oils, antifreeze and cleaning solvents that Hi-Port blends and packages. It leveled the building housing the computer.

"My brother is a volunteer firefighter and saved me a piece of the computer. It just crumbled in my hand," Franta said.

NETWORK HEALTHCARE

DATA COMMUNICATION NETWORKS AREN'T LIKE PEOPLE BUT...

One thing's for certain. Poor advice early in the design stage, the wrong equipment, or inadequate product support could make your network very sick.

We can help prevent that.

Meet ComDesign's data comm "doctors". They are a group of dedicated, service oriented data communication specialists. Talented, qualified, and helpful, they dispense the application engineering answers that will keep your network in the pink. For large networks or small. And you don't have to be a ComDesign customer to take advantage of this service. As a matter of fact, you'll never even need an appointment. Just use the toll-free number below. The doctor's always in.

(800) 235-6935
(805) 964-9852 in CA

ComDesign

751 S. Kellogg Ave. Goleta, CA 93117

Manufacturers of Advanced Statistical Multiplexers and Other Networking Products

Sage Faire Set for Reno

RENO, Nev. — Sage Faire '84, a conference on the future of supermicro computer technology sponsored by Sage Computer Technology, will be held Feb. 3-5 at the MGM Grand Hotel in Reno.

The cost of attending Sage Faire '84 is $10, if registration is done by form, or $15 by registering at the fair, the vendor said.

Additional information is available from Marion Kenefick, Burson-Marsteller, Suite 100, 2041 Mission College Blvd., Santa Clara, Calif. 95051.

SPECIAL INTRODUCTORY OFFER FOR NEW SUBSCRIBERS. SAVE $5.00, PAY ONLY $39.00 FOR A FULL YEAR'S SUBSCRIPTION.*

(Basic Annual Subscription Rate is $44.) *U.S. ONLY

No Other Publication Gives You SO MUCH Timely News, Money-Making Ideas & Management Information— ***PLUS*** *Specials & Bonus Issues!*

As a weekly newspaper, ***COMPUTERWORLD*** gives you thorough and timely coverage of news and ideas of interest to computer users in industry, business, government and education. Unlike monthlies, ***COMPUTERWORLD*** covers *hundreds* of relevant news items *each week*. *But beyond the "news" you get much more as a CW reader:*

- Weekly "In Depth" articles.
- Monthly "Special Reports" on selected subjects.
- ***COMPUTERWORLD BUYER'S GUIDE SERIES*** . . . a comprehensive series of product-specific lists and up-to-date information on each major product area.
- ***COMPUTERWORLD OA*** with incisive coverage of office automation.
- ***COMPUTERWORLD ON COMMUNICATIONS*** covers product and system developments in the rapidly changing communications field.
- **PLUS** Other Special Issues Throughout The Year!

SUBSCRIBE NOW

Complete Form On Reverse, Then Return In Attached Postage-Paid Envelope. Or Use Your Charge Card and Call TOLL-FREE: 1-800-343-5730.

☐ **Please enter my subscription (details on back)**

☐ **I'm already a subscriber, but I'd like you to change my:**

☐ address ☐ title
☐ industry ☐ other

My current mailing label is attached and I've filled in new information on the other side.

Put old label or label information here

COMPUTERWORLD

Please send me COMPUTERWORLD for one year. RATES: United States ~~$44~~;
Canada, Central & South America $110; Europe $165;
All Other Countries $245 (Airmail Service)

Special Introductory Offer
Only $39.00 Save $5.00

☐ Check Enclosed
☐ Am Ex ☐ BA/Visa ☐ MC (MC Only - List four digits above your name)

If charge we must have cardholder's signature: _____ Expiration Date: _____

First Initial		Middle Initial	Surname	
Your Title				
Company Name				
Address				
City		State	Zip Code	

Address shown is:
☐ Business
☐ Home

☐ Check here if you do not wish to receive promotional mail from *Computerworld*.

☐ Check here if you're interested in receiving information on *Computerworld*'s Index.

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Detach here, moisten and seal envelope securely before mailing.

1. BUSINESS/INDUSTRY (Circle One)
End Users
10 Manufacturer (other than computer)
20 Finance/Insurance/Real Estate
30 Medicine/Law/Education
40 Wholesale/Retail Trade
50 Business Service (except DP)
60 Government—State/Federal/Local
65 Public Utility/Communication Systems/Transportation
70 Mining/Construction/Petroleum/Refining
75 Other User _____
Vendors
80 Manufacturer of Computers, Computer-related Systems or Peripherals
85 Computer Service Bureau/Software/Planning/Consulting
90 Computer/Peripheral Dealer/Distributor/Retailer
95 Other Vendor _____

2. OCCUPATION/FUNCTION (Circle One)
11 President/Owner/Partner/General Manager
12 VP/Assistant VP
13 Treasurer/Controller/Financial Officer
21 Director/Manager/Supervisor DP/MIS Services
22 Director/Manager of Operations/Planning/Administrative Services
23 Systems Manager/Systems Analyst
31 Manager/Supervisor Programming
32 Programmer/Methods Analyst
35 OA/WP Director/Manager/Supervisor
36 Data Comm Network/Systems Mgmt
41 Engr/Scientific/R&D/Tech Mgmt
51 Mfg Sales Reps/Sales/Marketing Mgmt
60 Consulting Mgmt
70 Medical/Legal/Accounting Mgmt
80 Educator/Journalist/Librarian/Student
90 Other _____

3. COMPUTER INVOLVEMENT (Circle all that apply)
Types of equipment with which you are personally involved either as user, vendor or consultant
A. Mainframes/Superminis
B. Minicomputers/Small Business Computers
C. Microcomputers/Desktops
D. Communications Systems
E. Office Automation Systems

For the first time ever, you can get the most advanced Xerox manufacturing software, plus an IBM mainframe computer, in one complete, affordable system.

It's a new concept in computing. The Xerox Turnkey Manufacturing System includes everything you need for dependable, comprehensive information management. It's the very first system to bundle an IBM mainframe with efficient, industry-tested manufacturing, financial, and distribution software.

And because it's an off-the-shelf system, it can be acquired and fully installed at a price you never thought possible.

But price isn't the only thing that's remarkable. You get everything you need to run the system. You don't have to buy various components from different vendors and then build interfaces yourself. It's all been done for you. So there's no data processing staff to hire.

The Xerox Computer Services turnkey system has an advanced architecture that completely integrates business applications software, personal computing, information center software, decision support systems, a database manager, and fourth-generation languages. Each with user-friendly screens and "help" functions. Your current personnel can develop their own applications and handle their own information needs without assistance.

That means you get fast, economical installation, plus immediate payback in improved productivity and management control. All with minimum overhead.

And what about support? Xerox technical experts understand the manufacturing business and will help you with your system, from initial site planning to telephone hotline support after you're up and running. Of course, full documentation, training, and software maintenance are part of the package.

Best of all, this may be the last software decision you'll ever have to make. As your business expands and it's time to move to a larger computer, you can run the same software on any IBM mainframe, starting with the smallest 4300 series system up through the powerful 3084 model.

Have the best of both worlds in your world. If you need better control over your operations, but are concerned about finding a system that really fits your requirements and budget, let us tell you about our simple solution...the Xerox Turnkey Manufacturing System. Just fill in the coupon and we'll send you complete information and pricing by return mail. Or call Ron Rich at (213) 306-4000.

XEROX COMPUTER SERVICES CM01/3084
c/o Ron Rich, 5310 Beethoven Street
Los Angeles, California 90066

Your ad was very timely. We're planning on buying a new system within ☐ 30 days ☐ 90 days ☐ 6 months ☐ 1 year.

☐ Have a sales rep call me immediately.

☐ Send me more detailed information.

Name/Title _____

Company _____

Street _____

City _____ State _____

Zip _____ Phone _____

Xerox® is a trademark of XEROX CORPORATION.
IBM® is a trademark of International Business Machines Corporation.

NEWS

MANAGERS ON THE MOVE

Angelica Uniform Group of St. Louis has named KENNETH S. AULL manager of management information training for the MIS department. Aull will evaluate existing equipment and computer operating system programs for the manufacturer of uniforms in light of current and future processing requirements. He will also plan, guide and coordinate immediate and long-range conversion plans.

Aull holds a bachelor's degree in economics from Iona College in New Rochelle, New York and has over 14 years' experience in his field.

■

Carter Hawley Hale Stores, Inc. in Los Angeles, has announced that R. VINCENT COHANT has been named president and chief executive officer of the Information Services Division; WILLIAM F. JONES has been named senior vice-president of development; ROBERT M. HENAR has been named senior vice-president of computing and communications; and JOEL R. MONTGOMERY has been named vice-president of human resources for information services.

Carter Hawley Hale operates 125 stores through its department store division. The company also operates 37 high-fashion specialty stores through Bergdorf Goodman, Holt Renfrew and Neiman-Marcus.

JOHN ABERNATHY has been appointed director of information and data processing services for Pen-Well Publishing Company's Advanced Technology Group in Littleton, Mass.

Abernathy

Abernathy previously spent eight years with Hewlett-Packard and was responsible for technical support of the business computers at the Andover, Mass., manufacturing division and most recently for programming support of the inventory system at the Chelmsford distribution center.

He has also been systems manager for Travelers Insurance and programmer/analyst with DuPont Chemical.

Abernathy is a graduate of Gettysburg College with a bachelor's degree in mathematics. He received a master's degree in computer science from Rensselaer Polytechnic Institute.

■

RICHARD E. KRIEG has been named vice-president of computer systems development for Associates Bancorp, Inc., a subsidiary of The Associates Corp. Krieg is responsible for the management of application development, office information systems and data resource management.

Krieg joins The Associates with 20 years of experience in financial and systems experience, working most recently for Lincoln National Corp. as vice-president of data processing development.

Previous positions were with Consumer Systems Services Group and MSA, Inc.

■

JOHN W. MERRELL has been appointed an assistant vice-president in the electronic installations department of Metropolitan Life Insurance Co. in New York. Merrell is head of the software and operating systems services unit, which provides the systems software that runs at Metropolitan's several computer centers.

Merrell joined Metropolitan in 1973 as a planning consultant in electronic installations. He became a planning manager three years later, and in 1980, he was appointed a manager. Before joining Metropolitan, he held several positions with the Royal Insurance Co. in New York.

He received his B.A. degree in economics from Richmond College in 1972.

■

TERRY LEE SOCALL has been appointed as director of information services of Visual Services, Inc. in Bloomfield Hills, Mich. Formerly the manager of systems and programming at Detroit Metal Extruding Co., Socall is responsible for computer operations, systems and programming at VSI's corporate headquarters.

Socall earned he associate's degree at the University of Florida, Gainesville and his bachelor's in business management at Wayne State University in Detroit.

Visual Services, Inc. offers integrated merchandising services, such as contests, sweepstakes and coupons; industrial communications, direct marketing, motivation and incentive programs; and telemarketing packages, including rebates.

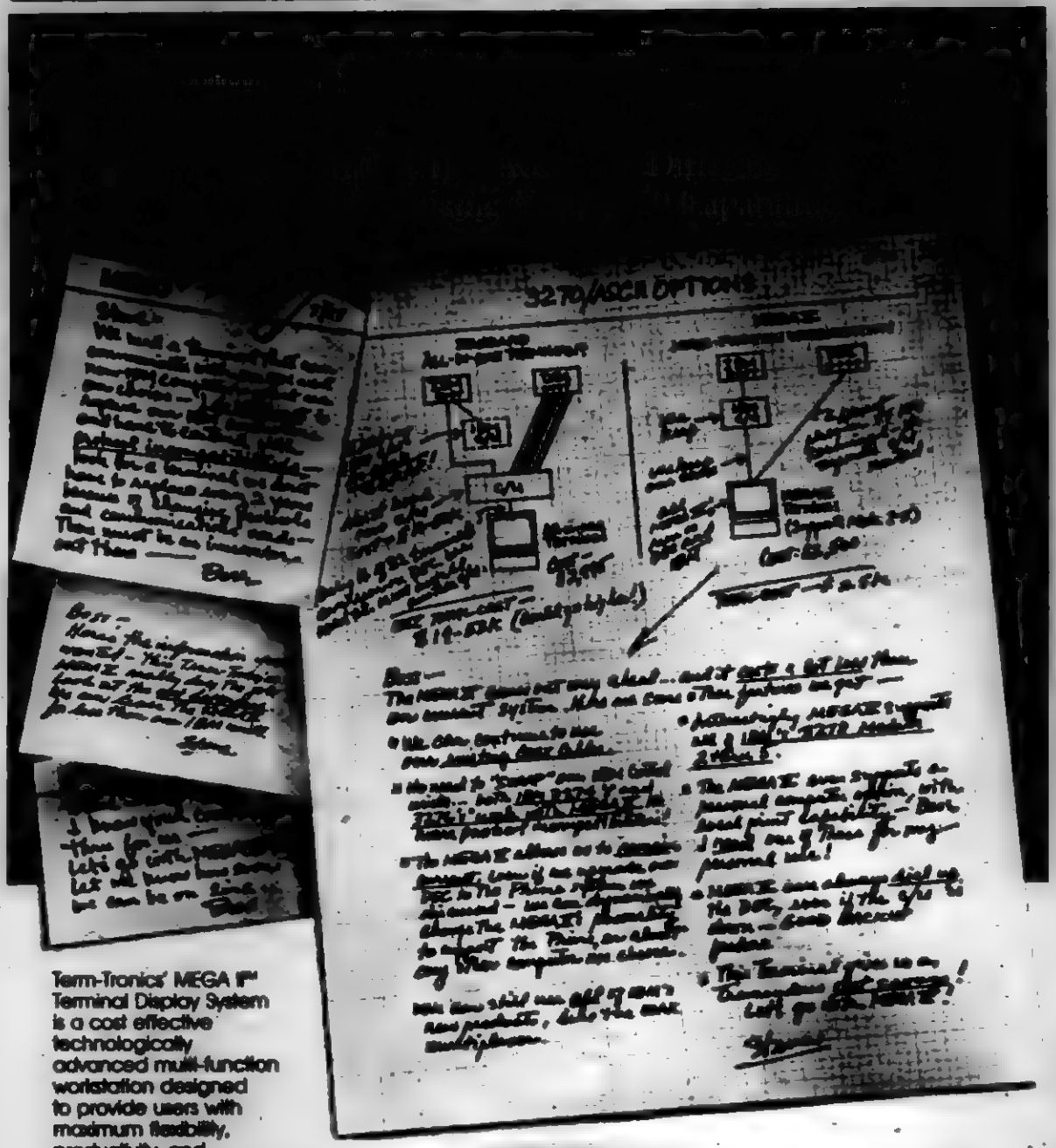
■

NBD Bancorp, Inc. has appointed JAMES R. BARLETT as senior vice-president of the Information and Operation Services Division of National Bank of Detroit, the corporation's principal subsidiary. NBD Bancorp is the parent company of 17 banks, as well as trust, mortgage finance, insurance and venture capital subsidiaries.

Barlett is responsible for the general direction of the operations area, such as computer services and trust operations, which provides support for the products and services offered by NBD Bancorp subsidiaries. He remains senior vice-president.

Barlett joined the bank in 1979 after serving as a consultant/partner with Touche Ross and Co. He was named senior vice-president in 1981.

He holds a B.S. degree in industrial management and an MBA from the University of Akron.



Term-Tronics' MEGA II™ Terminal Display System is a cost effective technologically advanced multi-function workstation designed to provide users with maximum flexibility, productivity, and convenience. The MEGA II™ will never become obsolete when your computer is changed or upgraded.

Regional Offices: Washington, D.C., New York, Chicago, Dallas, Houston, San Francisco, San Diego.

MEGA II

The Truly Generic Terminal System

TTI TERM-TRONICS, INC.

*IBM 3274, 3276, 3278, and DEC VT 100 are subject to trademark claims.

7406 Trade St., San Diego, CA 92121 (619) 271-1770

Videotex eyed as traffic stopper

By Paul Nussbaum
CW Staff

HONOLULU — Instead of building a highway or a public rail system to alleviate traffic congestion, city and state officials here are considering a videotex system.

Honolulu traffic is so congested that $20 million was spent by the Hawaii Department of Transportation to study possible solutions to the problem. City officials are considering rationing automobile travel and implementing road pricing, which would charge people for using certain roads, to alleviate congestion.

But "there is a limit to what rerouting and traffic control accomplish," said Carl Takamura, an aide to Hawaii's governor, George Ariyoshi. "What Honolulu needs is a revolutionary method to ease congestion."

One method, proposed by Aegis Systems Corp. in Tigard, Ore., is the purchase of a personal computer for every Honolulu home, business and office, along with the development of Autoride, an on-line transportation application. "Autoride will be a 24-hour, on-line system matching riders and drivers, arranging special transportation for elderly or handicapped people and possessing security features," explained Malcolm McLeod, a Department of Transportation economist.

The system so sparked the interest of Gov. Ariyoshi that he has scheduled a governor's conference for Jan. 31-Feb. 1 so opponents and proponents of the system can debate its merits. "There is at least a 50% chance that the system will be implemented," McLeod said.

Aegis estimated that $200 million would be required to implement the system. "It requires 320,000 personal computers, one or two mainframes and communications equipment," noted Robert Benke, president of Aegis.

But the price is less than that of comparable rail and bus system solutions. "Autoride's implementation cost is less than 20% of the cost for building a highway or transit system," Benke said. The cost of proposed public rail transportation system for Honolulu is estimated at $1 billion.

Autoride would match riders to taxis or private automobiles traveling to nearby areas.

"The system will use a more intelligent card than a magnetic-strip reader," Benke claimed. "The card would have a microprocessor. When a person enters a password, it will be written on the card rather than on a central data file."

In the proposed system, riders enter pickup points, destinations and times when rides are needed. Drivers enter routes, destinations, times of departures and vehicle registrations. Drivers may be either professional taxi drivers or residents.

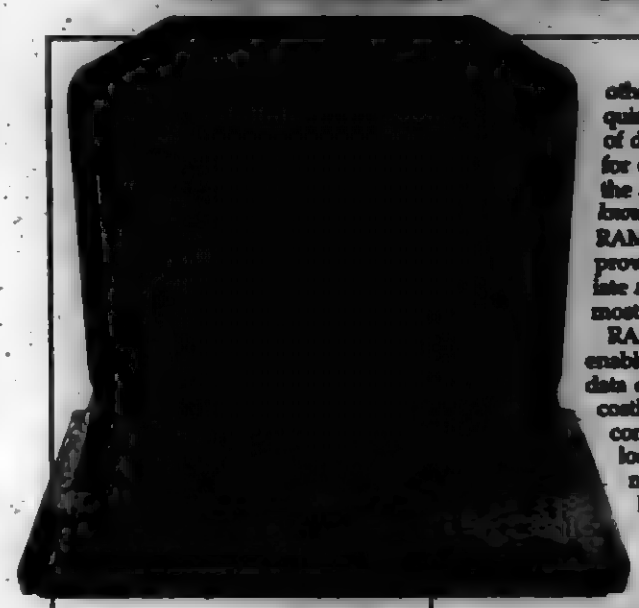
A mainframe would check driver registration to ensure that the driver has no criminal record and that the car is insured, then match riders to drivers. "The key is providing door-to-door service," Benke said.

Drivers and riders will not exchange money. "The system would be cashless," Benke noted. "At the end of the month, riders would be billed and drivers would be paid."

Drivers will either be paid cash or receive credit slips for gasoline. Credit slips will be used if Honolulu implements gasoline rationing as a means of curbing congestion.

Number of Automobiles on Oahu	
1970	325,000
1980	474,000
1990	694,000 (Projected)
Number of Residents on Oahu	
1970	630,528
1980	760,957
1990	847,000 (Projected)

WITH RAMIS II ENGLISH, THE COMPUTER HAS FINALLY LEARNED YOUR LANGUAGE.



Now, you can talk to your computer the way you talk to a colleague: in plain English.

Even if you've never been on speaking terms with a computer, RAMIS II's advanced knowledge-based technology lets you ask questions, obtain answers, even create reports in only a few minutes. As a result, you can work more effectively and productively—without having to learn a specialized computer language. You just use English.

RAMIS II: ARTIFICIAL INTELLIGENCE THAT DELIVERS REAL PRODUCTIVITY.

RAMIS II English combines years of research by Mathematica in linguistics and artificial intelligence with proven expertise in developing practical, easy-to-use software products. The result is maximum fluency with minimum demands on support staff. In fact, while other systems require days or weeks of dictionary setup for each application, the *extensive built-in knowledge base* of RAMIS II English provides immediate access to most data.

RAMIS II English enables you to access data directly, without costly and time-consuming downloading or reformatting, so the latest information is always available.

Wherever your data is stored—in RAMIS II databases; in ADABAS, IMS, TOTAL, or IDMS databases; or in VSAM or sequential files—there's only one language you need to know: English. And, because English comprehension is an integral part of RAMIS II, you have full access to all of its fourth-generation capabilities, from powerful reporting and analysis to full color business graphics.

THE BENEFITS OF RAMIS II ENGLISH SPEAK FOR THEMSELVES.

Teaching the computer to speak your language is the best way to put the vast power of today's computer systems directly into the hands of *every* user from *every* department. RAMIS II English is one more powerful demonstration by Mathematica of the increased productivity available through RAMIS II—the *real* leader in complete software for business.

RAMIS II ENGLISH MAKES IT EASY TO UNDERSTAND WHY WE'RE THE REAL LEADER IN COMPLETE SOFTWARE FOR BUSINESS.

Let RAMIS II English speak for itself. See it in action at one of our regional Product Demonstration Centers. For more information, contact your local Mathematica office, call toll free (800) 257-5171, or return the coupon below.

MATHEMATICA PRODUCTS GROUP

A MARTIN MARIETTA DATA SYSTEMS COMPANY
P.O. Box 2392
Princeton, NJ
08540

MATHEMATICA PRODUCTS GROUP
P.O. Box 2392, Princeton, NJ 08540

☐ I'd like to see a demonstration of RAMIS II English
☐ Please send a brochure describing RAMIS II English

Name
Title
Company
Address
Telephone
Computer Operating System

CW 1/23

RAMIS II...THE LEADER BY DESIGN

Boston (617) 357-9424 Chicago (312) 670-9730 Dallas (214) 788-1916 Houston (713) 680-0097
Los Angeles (213) 670-6962 New York (212) 980-9877 Princeton (609) 799-2000 San Francisco (415) 461-6315
Washington, DC (202) 484-5752 Basel (061) 439023 Bergen (5) 321350 Heidelberg (06221) 14081
Hong Kong 5-430714 Kingston (809) 929-9253 London (01) 940 2081 Milan (2) 346 4080 Montevideo (2) 980780
Ottawa (613) 236-9816 Paris (1) 776 41 71 Santiago (2) 31014 Singapore 272 9255 Stockholm (8) 520720
Sydney (02) 922 1477 Tel Aviv (052) 76944 Toronto (416) 220-0613

HP's IUG meet to address varied DP topics on Feb. 26

ANAHEIM, Calif. — A wide range of topics — data communications to application design — will be featured at the Hewlett-Packard Co. International Users Group (IUG) annual conference Feb. 26 to March 2 here at the Disneyland Hotel.

Hosting the event for IUG, a nonprofit association of HP computer users, will be the Southern Regional Users Group, a 700-member affiliate of the IUG. Delegates from HP will present lectures on HP software, support and future strategy. Software contributions will be distributed in the form of a swap tape.

More than 120 exhibits of HP 3000-related products will be featured at a vendor show.

About 1,800 participants are expected. The conference registration fee is $400.

Conference Manager, HP 3000 IUG, 2570 W. El Camino, Mountain View, Calif. 94040.

HP users groups to merge

MOUNTAIN VIEW, Calif. — By a nine-to-one margin, the 5,000-member Hewlett-Packard Co. HP 1000 International Users Group and the 2,000-member Hewlett-Packard HP 3000 International Users Group voted to consolidate their boards of directors.

Approximately 3,200 members voted before the Dec. 14 deadline. The officer staffs and many of the administrative functions for the two users groups have been merged for 2½ years.

"With the support of the members, the users group can now swing the doors open to users of other HP models, such as the HP 150," according to Bill Crow, association manager for both groups.

More effective unified

"HP computer users benefit from a unified users group. The more comprehensive we are, the more effective we are as an influential voice to HP and a resource for members," Crow said.

Membership in either group is priced at $400 for an institution, which includes a set of public-domain software, or $60 for an individual.

International Users Group, Inc., 2570 El Camino Real W., Mountain View, Calif. 94040.

Pick Spectrum set for Reno Feb. 22-24

RENO, Nev. — Pick Spectrum '84, sponsored by the International Data Base Management Association (IDBMA), will be held Feb. 22-24 at the MGM Grand Hotel here and will focus on computer education for the business professional. The conference is geared toward the Pick & Associates, Inc. Pick operating system.

Highlights of the computer conference include a series of sessions for business professionals, beginning with what a computer is and ending with an understanding of a total computer solution.

Among the 14 education sessions are ones concerning the difference between hardware, software and firmware; the definition of application software; word processing; computer communications; videotex; peripherals; and how to shop for a total computer solution.

Fifty exhibitors are contributing to the education sessions.

The full conference registration cost is $300. One-day registration costs $100, and the cost of attending the exhibits is $15, according to IDBMA.

IDBMA, Suite 210, 9470 Appaloosa Road, San Diego, Calif. 92131.

SIM extends paper deadline

WASHINGTON, D.C. — The Society for Information Management (SIM) has extended until Feb. 15 the deadline for paper submissions to its 1984 Society Awards Competition.

Papers must describe an MIS, an approach to developing information systems or a technique for improving or managing an MIS activity. They should also deal with completed systems, be less than 1,000 words and include a short description of the system.

The first-place winner will receive $5,000, and the paper will be printed in *MIS Quarterly*, published by the University of Minnesota. Awards of $3,000 will be made to runners-up; all finalists' papers will be reviewed for publication in *MIS Quarterly*.

R. Nancy Marble, Vice-President of Information Services, Federal National Mortgage Association, 3900 Wisconsin Ave. N.W., Washington, D.C. 20016.

68000-based
Just tell us

68000-based systems
to fit your
application.

High-level languages
and
applications software.

Intelligent
workstations.

Cromemco
means business.
Your business.

NEWS

Ergonomics seen key to better productivity

By Lynn Weber
CW Staff

Office automation and the new information technologies are today's lifelines to business productivity, profit and survival. But it's not enough just to put a personal computer or a terminal on a desk.

Mechanical engineering must go hand-in-hand with human engineering — ergonomics — if the automated office is to be effective, office designers and consultants told *Computerworld* recently.

From a public health and safety perspective, as many as 12 states are considering legislating ergonomic requirements for all work places that use modern technological devices such as CRT terminals.

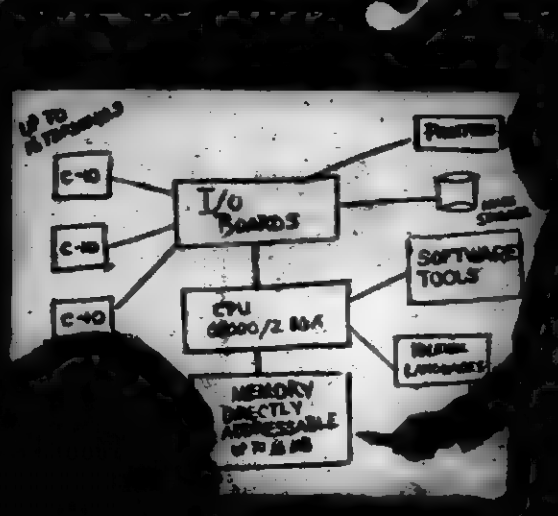
According to Carl Ross, a spokesman for Herman Miller, Inc., a New York-based manufacturer of office furniture and leader in the development of ergonomic furniture, there are studies that strongly suggest "with improved ergonomic workstations, there is increased worker productivity."

And Jeffery Simon, partner and senior vice-president in charge of technical services for SCR Design Organization, Inc., also of New York, noted that a major thrust at the recent International Facilities Managers Association conference in Denver was that companies are becoming much more aware of people and recognizing that people are their greatest resource. "When you look at the amount of money you spend yearly on facilities and equipment, etc., it still revolves around the person and quite often the person's salary," Simon noted. "Companies realize that absenteeism and productivity are going to make or break a business. They are tuning in on the worker — and ergonomics is one way of doing this."

"The central problem confronting all organizations is that existing facilities are built to mature standards — many 30 years old or more — that effectively support a mature, paper-based work process," according to a report, titled "Office Automation and the Work Place Standards in the '80s," written by Jon B. Ryburg, senior associate for the Facility Management Institute, a division of Herman Miller Research Corp. in Ann Arbor, Mich. "Everything in today's corporate environment, including furniture, lighting, windows, space standards and building utility systems, is geared to whatever technology and/or activities are ultimate

See OA page 30

systems.
what you need.



Ohio VDT bill called typical of state efforts

Legislation that attempts to regulate the use of video display terminals in the office environment is being prepared in many states across the country. Typical of this type of legislation, according to Janice Blood, a Boston spokeswoman for 9 to 5, an organization for working women, is Ohio's House bill 552, authored by Rep. Barbara Pringle.

The stated purpose of the bill is to require minimum occupational health and safety standards for operation of VDTs in places of employment. The bill specifies certain equipment requirements: that the terminals be placed on adjustable chairs and tables; that they be equipped with tilt screens or be placed on movable platforms and have detachable keyboards; that they be equipped with individual brightness and contrast controls; and that they come with noise reduction covers, have metal shielding on the transformer of the VDT to block radiation and be in an area where there is indirect lighting.

There is also a provision mandating rest breaks for workers and setting maximum exposure limits, a provision that employers give free eye exams at least once a year and a pregnancy consideration clause requiring employers to offer alternative duties at the same work site to pregnant VDT operators. The bill also

See Bill page 30

INTRODUCING
a new service
for financial institutions.
Data +
An information transfer system
of City National Bank.

DATA+ SM

Correspondent Banking
1801 W. Olympic Blvd.
Los Angeles, CA 90006
(213) 480-5523

OA from page 29

ly required to do paperwork."

The report noted that "the new technology of office automation is based on a new way of working. Slowly at first, but gradually, it involves more and more the use of computer support via terminals (and other devices) until the work activity has changed dramatically and the facility environmental support requirements are different."

Some of the factors for the basic automated office which should be considered for a safe and productive ergonomic environment include floor space, lighting, electrical service, room temperature, noise level, floor coverings and furniture requirements, such as desks, chairs and file cabinets.

Simon, an architect with SCR, a company which for its 5½ years in the business has specialized in corporate office interiors, observed that "quite often what we've seen in touring numerous office facilities is that people will have the CRTs on file cabinets next to them, with their knees pressed up against the side of the cabinet to get close and their backs arching away from the back of the seat. It shows that with the advent of automation in the office, the furniture which is generally existing or even if it is new, may not be properly designed for use with that equipment."

Broader approach

While the technology industry flourishes with more varied equipment offered by a greater number of vendors, standards for the industry remain in a state of flux. And according to Ryburg's report, "if mis-matches are to be corrected, a broader approach to new facility standards to support office automation is required."

A solution to the need for a new facility standard to support office automation in the 1980s must, the report stated, "include both comfort and productivity, or it will not be effective. And to be effective, the performance requirements for facilities must include the integration of people, process and place factors, not just one or two."

From a design perspective, one of the things Simon sees being stressed in interiors is flexibility, "so that the furniture you buy, the space you build, you're not painting yourself into a corner. You want the space and the furniture to be able to change to meet the needs of the equipment which may be coming in a year or that's not even known right now.

"There's so much talk about ergonomics going on today that most of the corporations know or have a sense of the importance of the situation," Simon said. "When we do an analysis of a setting, we bring the company up to speed if we see that they're really thinking in the dark ages — and we're going through this with a number of our clients."

Construction cost

In terms of cost, according to Simon, a fairly automated office should be planning $35 to $40 per square foot for construction costs, with some of that cost, potentially as much as $15 to $20, supplemented by the landlord.

In terms of furniture, filling in pieces including chairs and files, another $10 is often budgeted.

"I think that by giving people a good environment, one that is going to make their day, since people spend a large portion of their day at their place of work, you're in essence giving them a nice environment that makes their work easier, their attitudes better and their image for the company and respect for the company enhanced," Simon concluded.

NETWORKING VS. NOTWORKING:

ANNOUNCING THE NET RESULTS.

Linking micros to mainframes is one of the most pressing problems facing DP managers today. How do you bring all the computers in your company together so they can share information, resources, programs, and access the corporate data base without any loss of security?

SyFAnet

Networking is a nice concept but it won't work unless you have a system that works.

SyFAnet™ (System For Access network) is the network that works. The only complete solution on the market, ready to meet all your networking needs now.

SyFAnet gives you everything you ever wanted in a network: the ability to link PCs together, multi-function workstations, industry-standard software, global information access and unlimited expansion capabilities. All fully-integrated, and built upon a foundation of proven hardware and software.

Picture a powerful processor for every purpose—one for applications, another for sharing resources. This special architecture makes SyFAnet a more reliable network, with no single point of failure. Every time you add a terminal, you gain more power instead of losing it.

Our broadband bus offers more flexibility. So you can add more users whenever and wherever you want.

By adding microprocessor-based workstations and CP/M-86, SyFAnet gives you more functionality, too. You can upgrade easily without costly conversion, because our software remains the same at all levels.

And while *you* might get confused by the flurry of message traffic in the office, SyFAnet never does. Its unique version of collision avoidance means data doesn't get lost in the shuffle.

Because business doesn't stop at borders anymore, SyFAnet was designed with the whole world in mind. SNA and X.25 capabilities connect you to mainframes and networks around the world.

SyFAnet. Ready to solve your networking problems today and tomorrow. It's the network that works.

For more information, write or call today.

ComputerAutomation®
Commercial Systems Division

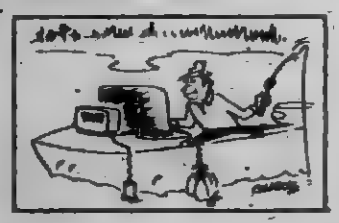
1800 Jay Ell Drive / Richardson, TX 75081
(214) 783-0993 / TLX: 4630023

*CP/M-86 is a registered trademark of DIGITAL RESEARCH, INC.

BILL from page 29

calls for semiannual inspections of the equipment and open documentation, making available the inspection records for review by VDT operators and/or their representatives.

The bill asks for penalties to be imposed on an employer for violations of the provisions amounting to $1,000 per day of violation.



FIXED PRICE COMPUTING SERVICE

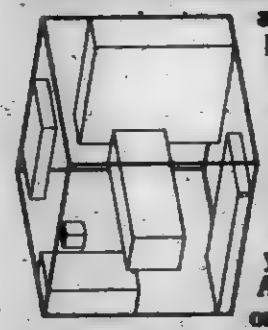
INTRODUCING SUBSCRIPTION SERVICE:

A Cost-Effective Alternative to Traditional Remote Computing Services or In-House Processing.

Now you can couple the benefits of a professionally managed remote computing service with the predictable cost associated with in-house processing. It's called Subscription Service, and it's available today from Martin Marietta Data Systems.

PREDICTABLE COST

Subscription Service is designed to keep your DP operation within budget. It curbs cost overruns by delivering a block of resources at an affordable *fixed price*—almost like the in-house machine.



But, unlike the in-house machine, your service doesn't degrade at peak-use periods, just when you need it most. And, when you're out of gas, you can upgrade easily. No lease payout. No hardware moves.

NO MYSTERY PRICING

Subscription Service unbundles the remote computing service offering to take the guesswork out of prices. Resource capacity and support levels are clearly defined and easy to understand. You buy what you need. Nothing more—nothing less.

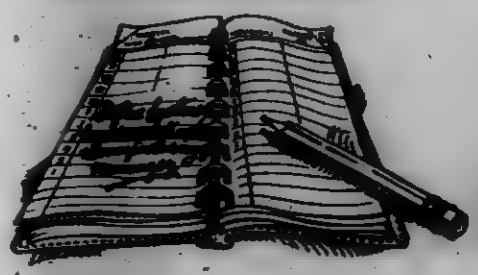
MORE TIME FOR YOUR USERS

It's a fact, a professionally managed computing service offers you *freedom* from day-to-day operational problems, giving you more time to focus on solutions to user problems. And, with an inventory of packaged solutions and productivity tools at your fingertips, the time and resource requirements to create a solution are greatly reduced.

COUPLE FREEDOM WITH AFFORDABILITY

Subscription Service is proof that you can get the best for less. All subscribers are linked to Martin Marietta's powerful host computers, providing the most up-to-date computing resources. You can depend on:

- ☐ Solid, stable, thoroughly-tested hardware, software and personnel
- ☐ Response time and throughput associated with IBM's fastest processors
- ☐ Access to hundreds of productivity tools and application systems
- ☐ Responsive technical consultants available around the clock



DISCOVER HOW SUBSCRIPTION SERVICE CAN WORK FOR YOU

If your budget for computer operations exceeds $20,000 per month for either remote computing service or in-house processing, then find out how much Subscription Service can save you. Or how much more service you can get for what you are currently spending. Or both! Simply return the attached coupon or call toll-free (800) 638-7080. In Maryland: (800) 492-7170.

Don't be underaid. Or sold a bundle. Get the precise level of resources you need with Martin Marietta's Subscription Service.

- ☐ Please send me your Remote Computing Services brochure.
- ☐ I'd like to have my subscription requirements sized. Have your representative call me.

Name: _____

Title: _____

Company: _____

City: _____

State: _____ Zip: _____

Phone: ( ) _____

Mail To: Martin Marietta Data Systems
Marketing Services Department, CWSS
6303 Ivy Lane
Greenbelt, MD 20770

MARTIN MARIETTA

Martin Marietta Data Systems

CALENDAR

WEEK OF FEB. 5

FEBRUARY 7-10, SEATTLE — Structured Systems Design. Contact: Georgenna Carson, Ken Orr and Associates, Inc., 1725 Gage Blvd., Topeka, Kan. 66604.

FEBRUARY 7-10, BOSTON — Data Communications. Contact: Ruth Dordick, Integrated Computer Systems, 6305 Arizona Place, P.O. Box 45404, Los Angeles, Calif. 90045.

FEBRUARY 7-10, SAN DIEGO — CAD/CAM Systems. Contact: Ruth Dordick, Integrated Computer Systems, 6305 Arizona Place, P.O. Box 45404, Los Angeles, Calif. 90045.

FEBRUARY 7-10, WASHINGTON, D.C. — Microprocessor Software, Hardware and Interfacing. Contact: Ruth Dordick, Integrated Computer Systems, 6305 Arizona Place, P.O. Box 45404, Los Angeles, Calif. 90045.

FEBRUARY 7-10, WASHINGTON, D.C. — Programming in C: A Hands-On Workshop. Contact: Ruth Dordick, Integrated Computer Systems, 6305 Arizona Place, P.O. Box 45404, Los Angeles, Calif. 90045.

FEBRUARY 7-10, SAN DIEGO — Software Project Management. Contact: Integrated Computer Systems, 3304 Pico Blvd., Santa Monica, Calif. 90405.

FEBRUARY 8, WALTHAM, MASS. — DP/User Interface. Contact: Chris Riopel, Conifer Computer Services, 370 Main St., Worcester, Mass. 01608.

FEBRUARY 8-9, CARY, N.C. — SAS Color Graphics Course. Contact: SAS Institute, Inc., P.O. Box 8000, Cary, N.C. 27511.

FEBRUARY 8-10, BOSTON — Advanced Office Automation for the 1980s. Contact: Software Institute of America, 339 Salem St., Wakefield, Mass. 01880.

FEBRUARY 8-10, NEW YORK — SAS Basics Course. Contact: SAS Institute, Inc., P.O. Box 8000, Cary, N.C. 27511.

FEBRUARY 8-10, AUSTIN, TEXAS — Performance Engineering of Software Systems. Contact: Information Research Associates, 911 W. 29th St., Austin, Texas 78705.

FEBRUARY 8-10, SAN FRANCISCO — Local-Area Networks. Contact: Systems Technology Forum, Inc., 9000 Fern Park Drive, Burke, Va. 22015. Also being held Feb. 29-March 2 in Washington, D.C.

FEBRUARY 9, NEW YORK — PC-DOS 2.0. Contact: Center for Advanced Data Processing, Inc., Suite 402, 450 7th Ave., New York, N.Y. 10123.

FEBRUARY 9, NEW YORK — Personal Computer Communications. Contact: Center for Advanced Data Processing, Inc., Suite 402, 450 7th Ave., New York, N.Y. 10123.

FEBRUARY 9-10, BOSTON — Troubleshooting the Data Communications Networks. Contact: The American Institute for Professional Education, Carnegie Building, 100 Kings Road, Madison, N.J. 07940. Also being held Feb. 16-17 in Seattle and Feb. 23-24 in Pittsburgh.

WEEK OF FEB. 12

FEBRUARY 12-14, DEERFIELD BEACH, FLA. — Outlook for Computer Printers. Contact: Institute for Graphic Communication, 375 Commonwealth Ave., Boston, Mass. 02115.

FEBRUARY 12-15, BALTIMORE — Prime Users Group East, 1984 Conference. Contact: Ray Grande, Prime Users Group, P.O. Box 138, South Attleboro, Mass. 02703.

FEBRUARY 13-14, BOSTON — Operating Systems for Personal Computers. Contact: The American Institute for Professional Education, Carnegie Building, 100 Kings Road, Madison, N.J. 07940. Also being held Feb. 23-24 in Chicago and Feb. 27-28 in Los Angeles.

FEBRUARY 13-14, BOSTON — Supporting and Maintaining the Data Communications Network. Contact: Data-Tech Institute, 386 Franklin Ave., P.O. Box 560, Nutley, N.J. 07110.

FEBRUARY 13-15, WASHINGTON, D.C. — Personal Computers in Business and Government. Contact: National Institute for Management Research, Department PR, P.O. Box 3727, Santa Monica, Calif. 90403.

FEBRUARY 13-15, CHICAGO — Microcomputer Data Base Management Systems. Contact: Software Institute of America, 339 Salem St., Wakefield, Mass. 01880. Also being held Feb. 27-29 in Atlanta.

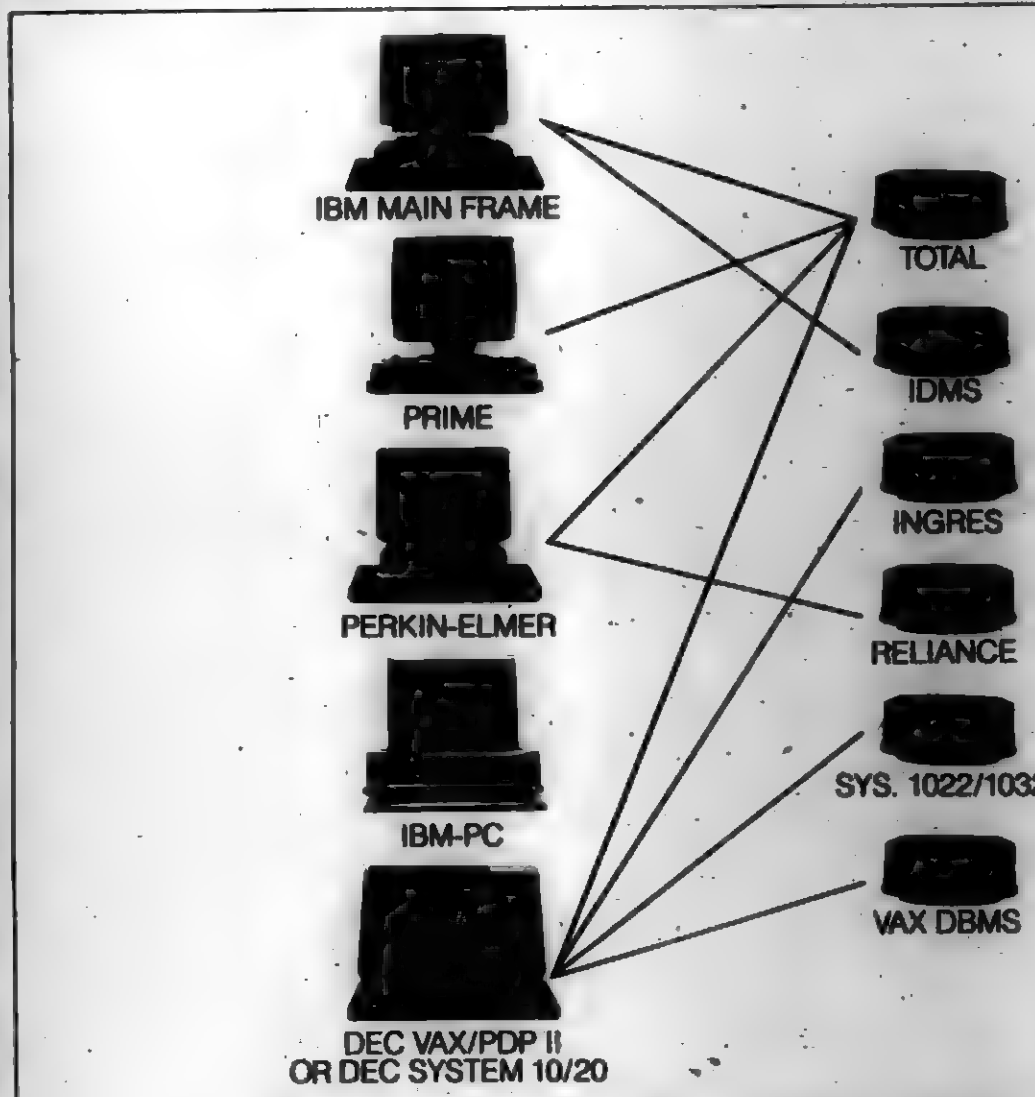
FEBRUARY 13-15, NASHUA, N.H. — Structured Testing. Contact: New Hampshire College Resource Center, New Hampshire College, 2500 N. River Road, Manchester, N.H. 03104.

FEBRUARY 13-15, BOSTON — Purchasing Management and the Computer. Contact: American Management Associations, P.O. Box 319, Saranac Lake, N.Y. 12983.

FEBRUARY 13-15, SARASOTA, FLA. — Office Automation. Contact: Management Information Systems, National Easter Seals Society, 2023 W. Ogden Ave., Chicago, Ill. 60612.

FEBRUARY 13-15, SAN FRANCISCO — Structured Design. Contact: Infosci, Inc., Box 7117, Menlo Park, Calif. 94026.

FEBRUARY 13-15, PORTLAND, MAINE — Systems Project Management. Contact: Association for Systems Management, 24587 Bagley



MIX VS.

No DBMS matches SEED for transportability. No DBMS offers you a wider range of hardware options now and for the future. Whether you opt for DEC, IBM, Prime, Perkin-Elmer or GOULD CSD.

And SEED lets you transport applications across machines—micro to mainframe or the reverse. SEED also provides the only compatible path from DEC 10/20 to IBM and VAX.

Because SEED is so transportable, it enables you to standardize development efforts to increase programmer productivity. In short, SEED helps you get the most out of both your hardware and your human resources. And we back SEED with our own resources—a team of experienced professionals that gives you personalized, on-going support and service.

Seed Software, 2300 Walnut Street, Suite 734, Philadelphia, PA 19103.

Road, Cleveland, Ohio 44130.

FEBRUARY 13-15, LOS ANGELES — Auditing and Security Concepts for IBM's MVS Operating System. Contact: MIS Training Institute, Inc., 4 Brewster Road, Framingham, Mass. 01701.

FEBRUARY 13-15, LOS ANGELES — Facilities for Auditing Within IBM's OS/VS Operating Systems. Contact: MIS Training Institute, Inc., 4 Brewster Road, Framingham, Mass. 01701.

FEBRUARY 13-15, LOS ANGELES — Audit and Control of CICS. Contact: MIS Training Institute, Inc., 4 Brewster Road, Framingham, Mass. 01701.

FEBRUARY 13-15, PARSIPPANY, N.J. — MVS Dump Debugging. Contact: Chubb Institute, 3 Sylvan Way, P.O. Box 342, Parsippany, N.J. 07054.

FEBRUARY 13-16, WASHINGTON, D.C. — CICS/VS Application Design. Contact: On-Line Software International, Fort Lee Executive Park, Two Executive Drive, Fort Lee, N.J. 07024.

FEBRUARY 13-16, FORT LEE, N.J. — CICS/VS Logic and Debugging. Contact: On-Line Software International, Fort Lee Executive Park, Two Executive Drive, Fort Lee, N.J. 07024. Also being held Feb. 13-16 in Washington, D.C.

FEBRUARY 13-16, LOS ANGELES — Vtam: From Start to Finish. Contact: On-Line Software International, Fort Lee Executive Park, Two Executive Drive, Fort Lee, N.J. 07024.

FEBRUARY 13-16, PHILADELPHIA — C Programming Workshop. Contact: Penn Hall, 1 Spruce Ave., Cardiff, N.J. 08232.

FEBRUARY 13-17, ORLANDO, FLA. — Vasm Programming. Contact: Harris Education Center, 6320 S. Orange Blossom Trail, Orlando, Fla. 32809.

FEBRUARY 13-17, DETROIT — Structured Analysis and Design Workshop. Contact: J. Baldwin, Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

FEBRUARY 13-17, WASHINGTON, D.C. — Work Load Analysis and Forecasting. Contact: Institute for Software Engineering, 510 Oakmead Pkwy., Sunnyvale, Calif. 94086.

FEBRUARY 13-17, TRUMBULL, CONN.— C Programming. Contact: Gregory Geiger, Sumter Ramo Information Systems, Trumbull Industrial Park, 35 Nutmeg Drive, Trumbull, Conn. 06609.

FEBRUARY 13-17, BOSTON — Structured Analysis and Systems Specification Workshop. Contact: J. Baldwin, Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036. Also being held Feb. 13-17 in Cleveland, Long Beach, Calif., and Melville, N.Y.

FEBRUARY 13-17, NEW YORK — CICS/VS Application Programming. Contact: On-Line Software International, Fort Lee Executive Park, Two Executive Drive, Fort Lee, N.J. 07024.

FEBRUARY 13-17, OAKBROOK, CALIF. — Effective Data Base Design. Contact: Institute for Software Engineering, 510 Oakmead Pkwy., Sunnyvale, Calif. 94086.

FEBRUARY 13-17, DENVER — Structured Analysis for Real-Time Systems. Contact: J. Baldwin, Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036. Also being held Feb. 13-17 in Palo Alto, Calif.

FEBRUARY 13-17, HOUSTON — CICS/VS Internals. Contact: On-Line Software International, Fort Lee Executive Park, Two Executive Drive, Fort Lee, N.J. 07024.

FEBRUARY 13-17, MINNEAPOLIS — Structured Analysis and Design. Contact: Institute for Advanced Technology, 6003 Executive Blvd., Rockville, Md. 20852.

FEBRUARY 13-17, ATLANTA — The Data Structured Systems Development Methodology. Contact: Georgianna Carson, Ken Orr and Associates, Inc., 1725 Gage Blvd., Topeka, Kan. 66604.

FEBRUARY 13-17, CHICAGO — Information Modeling Workshop. Contact: J. Baldwin, Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036. Also being held Feb. 13-17 in Philadelphia.

FEBRUARY 13-17, CHICAGO — Project Planning and Control Workshop. Contact: J. Baldwin, Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

FEBRUARY 14, NEW YORK — Introduction to Lotus 1-2-3. Contact: Center for Advanced Data Processing, Inc., Suite 402, 450 7th Ave., New York, N.Y. 10123.

FEBRUARY 14, NEW YORK — CICS/VS Concepts and Facilities. Contact: Teltech, 39 Broadway, New York, N.Y. 10006.

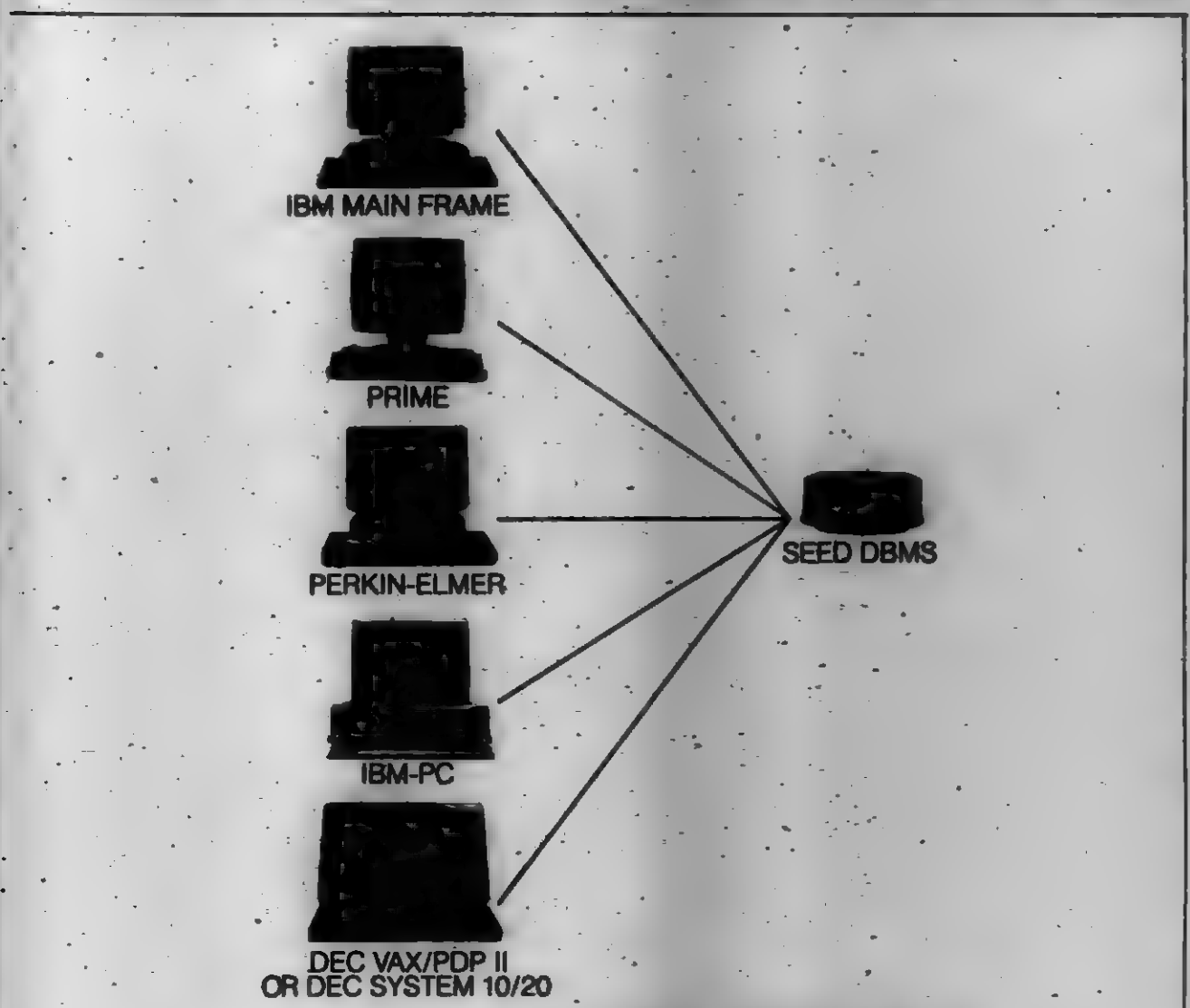
FEBRUARY 14-15, WHITE PLAINS, N.Y. — Frost and Sullivan's First Annual Automated Manufacturing Systems Conference: A Market Assessment. Contact: Carol Sapchin, Frost and Sullivan, Inc., 106 Fulton St., New York, N.Y. 10038.

FEBRUARY 14-16, PHILADELPHIA — 1984 Association for Computer Machinery (ACM) Computer Science Conference. Contact: ACM, 11 W. 42nd St., New York, N.Y. 10036.

FEBRUARY 14-16, CARY, N.C. — SAS Basics Portable Course. Contact: SAS Institute, Inc., P.O. Box 8000, Cary, N.C. 27511.

FEBRUARY 14-17, CHICAGO — Vasm for Systems Programmers. Contact: Software Information Services, P.O. Box 4132, Bellevue, Wash. 98009.

FEBRUARY 14-17, ANAHEIM, CALIF. — Data Base Management Systems: Mini, Micro and Distributed Applications. Contact: Ruth Dordick, Integrated Computer Systems, 6305 Arizona Place, Los Angeles, Calif. 90045. Also being held Feb. 28-March 2 in Baltimore.



MATCH

Send for your *FREE SEED Information Kit* today. Get all the details on how SEED DBMS increases productivity for managers, programmers and end-users, and how SEED makes DBMS maintenance and operation more economical. Send for the SEED DBMS Information Kit. It's yours FREE. CB2284

Or call us at (215) 568-2424. And be sure to ask for information on our FREE DBMS Seminars.

☐ Send me the FREE SEED Information Kit. ☐ Call me to discuss my specific requirements. ☐ Send me details on DBMS Seminars.

Name_____ Title_____ Company_____

Address_____ City_____ State_____ Zip_____ Telephone_____

☐ OEM ☐ System Integrator ☐ End User

Computer_____ Oper. Sys_____

UNITED INFORMATION SERVICES, INC.

SEED SOFTWARE, 3300 Walnut Street, Suite 734, Philadelphia, PA 19104

EDITORIAL

We need both

When daily newspapers started reporting last summer that computer hackers' footprints were showing up with increasing regularity in private data bases around the country, it didn't surprise anyone in the computer industry; unauthorized access has been a problem for years. Most of our lawmakers, however, were thrown into a tizzy. Many respond to the term "computer" with glazed eyes; throw in the term "hacker" and you can see them wondering how taxi drivers got involved in high-technology crime.

In short, the U.S. Congress is not prepared to consider issues relating to the introduction of high technology, issues that are fast taking center stage in public debate. Besides computer crime, these issues include VDT safety, privacy, copyrights and patents, manpower development, worker retraining and scientific education.

Congress' Office of Technology Assessment does good work on many of these issues, but the OTA is too reliant on the wishes of Congress for its work agenda and too deliberate to produce reports in a hurry. Militantly nonpartisan, the OTA never recommends courses of action and, in its efforts to represent all sides of a debate, too often produces only tepid, middle-of-the-road overviews of important, controversial issues. Its work is valuable, but it isn't enough.

Congress needs help, and it needs it right away. The proposal by the Association of Data Processing Service Organizations, Inc. that Congress set up a blue-ribbon panel of industry, academia and government representatives to study high-technology issues and their impact on society (CW, Jan. 16) is a good idea. A panel commissioned by Congress to report back in a short time with recommendations on these kinds of issues could be instrumental in shaping the information era in this country.

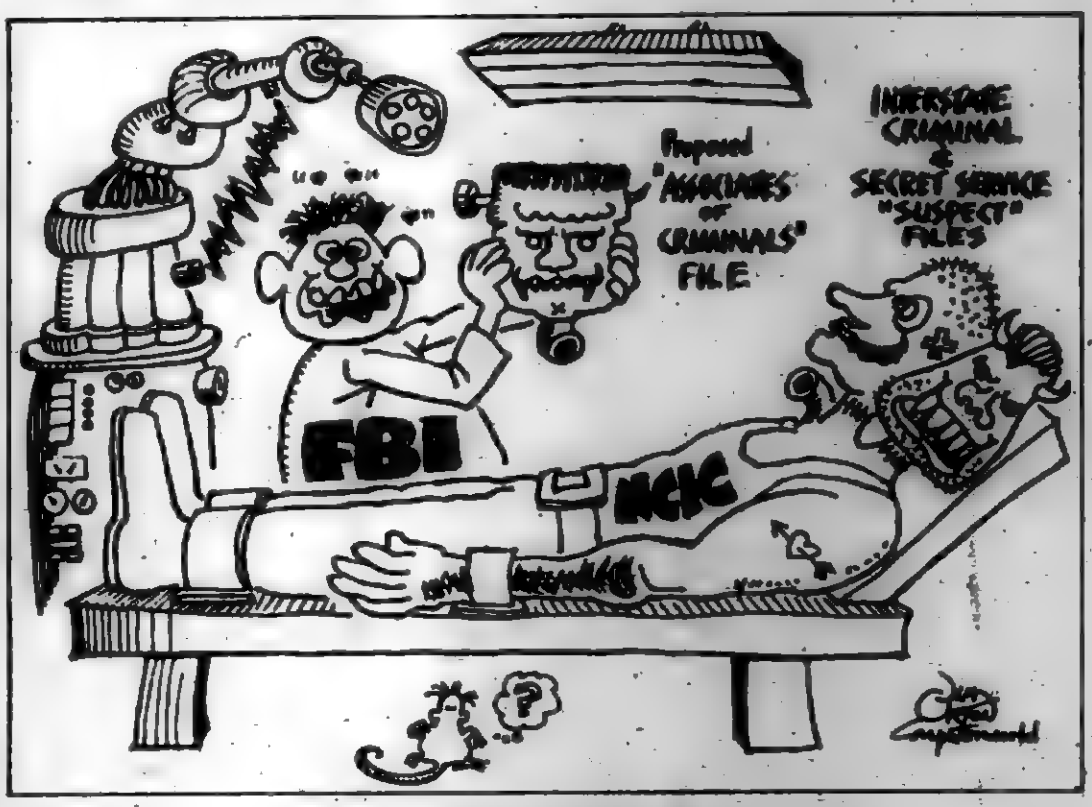
Of course, many in the computer industry will disagree with the findings and recommendations of this panel. There is nothing strange about that, and it does not invalidate the need for a rational approach to high-technology issues. Congress is going to consider these issues and pass laws on them no matter what. It is important that it have a firm, considered base of information when it does.

At first glance, it would seem the Information Age Institute planned by the Computer and Business Equipment Manufacturers Association may needlessly duplicate the work of the panel recommended by Adapso. But the two efforts are actually very complementary.

No one has a greater stake in the development of these issues than the information industry and its users. Various segments of these groups have begun lobbying Congress with their points of view. If they can formulate a unified approach to any of these issues, it will make whatever congressional action is needed that much easier and sensible.

If the Adapso- and Cbema-recommended panels differ on issues, it makes sense to have the opposing viewpoints quickly brought to light and clearly defined. And if the private sector and government-supported organization should happen to agree on approaches to various issues, the consensus will be overwhelmingly persuasive in whatever legislative action may be needed in the future.

The information era is hard upon us and will arrive with or without a rational, problem-solving effort, with or without congressional awareness and participation. The spread of high technology is a major societal development; things will go a lot more smoothly if all those affected, especially Congress, do some advance planning for it.



'Eat your heart out, Frankenstein'

LETTERS TO THE EDITOR

Policy should exploit man-machine work transfer

The excellent summation of industrial policy in the article "Industrial policies in an election year" (CW, Dec. 26-Jan. 2) alludes to a fact that raises serious doubts about the wisdom of that policy.

In its Republican and Democratic manifestations, it embodies the principle that labor is one of the primary factors of production.

Technology is providing cost-effective substitutes for a growing percentage of the labor applied to routine tasks

Advances in prospect indicate that the possibilities for the transfer of work from men to machines are virtually limitless.

Any policy that fails to exploit this potential in a rational manner could cause us to lag in productivity, innovation and cost-effectiveness. We would then lose markets and run the risk of domestic upheavals.

In my opinion, we would be better served by an approach that enhances individual freedom by giving positive effect to the seminal change that is taking place.

We should adopt an agenda that makes the most of the opportunity to transfer work to machines in a way that minimizes adverse consequences for people.

Brian Le Bart-Francis
Falls Church, Va.

Computerworld welcomes letters from its readers. Preference will be given to typed, double-spaced letters of 150 words or less; they may be edited for the purposes of clarity and brevity. Letters should be addressed to Editor, Computerworld, Box 880, 375 Cochituate Road, Framingham, Mass. 01701.

COMPUTERWORLD

Editor
John C. Wilmouth

Executive Editor
Rita Shaw

Assistant Managing Editor
Cheryl M. Gallo

Design Editor
Marjorie Magowan

Senior Editors
Software
Paul Gillin
Communications
Jim Bartimo
Phil Hirsch
Systems
Tom Henkel
Industry
Bill Laberis
Features
George Hayes
International Editor
Susan Delaney
Associate Features Editor
Barbara Von Sroyac
Staff Writers
James Batongalle
Peter Bochylk
James Connolly
John Gallant
Lynn Haber
Felicia Keefe
Paul Korzeniowski

Correspondents
New York
David Myers
Suite 763
401 East 80th St.
New York, N.Y. 10021
212/570-2135
Washington, D.C.
Bureau Chief: John Kilcrease
445 National Press Building
529 14th St., N.W.
Washington, D.C. 20045
202/347-5710
West Coast
Bureau Chief: Jeffry Beeler
Correspondent: Robert Batt
1020 Marsh Rd.
Menlo Park, Calif. 94025
415/328-6084

Chief Copy Editor
Donovan Wells
Assistant Chief Copy Editor
Kaitrin Gow
Copy Editors
Becky Bakke
Dave Bradford
Bruce Clare
Elizabeth Moss
Deborah Scaddo-Horn
Thomas Schmidt
Charlotte Ziems
Assistant to the Editor
Jane Fettig
Editorial Assistants
Mary DeCristofaro
Joyce Fultz

Contributors
Education
J. Daniel Couger
Human Communication
Jack Stone
Transparent Time
Larry Long
Telecommunications
Thomas Madison
The Data Center
John P. Murray
Lasers on Science
Charles P. Lecht
Special Publications
Computerworld Extra!
George Hayes, Editor
Computerworld on Communications
Bruce Hoard, Editor
Computerworld OA
Ann Dooley, Editor
Computerworld Buyer's Guide
Marsha Shoenthal, Editor

Main Editorial Office: Box 880, 375 Cochituate Road, Framingham, MA 01701 617/879-0700

Computerworld is a member of the CW Communications/inc. group, the world's largest publisher of computer-related information. The group publishes 44 computer publications in 16 major countries. Nine million people read one or more of the group's publications each month. Members of the group include: Argentina's Computerworld Argentina; Australia's Australasian Computerworld and Micro Computer Magazine; Brazil's DataNews and MicroMundo; China's China Computerworld; Denmark's Computerworld Danmark and AlleData; France's Le Monde Informatique; Germany's Computerwoche, Microcomputerwelt and PC Welt; Italy's Computerworld Italia; Japan's Computerworld Japan and PC Japan; Mexico's Computerworld Mexico; Norway's Computerworld Norge and AlleData; Saudi Arabia's Saudi Computerworld; Spain's Computerworld Espana and MicroSistemas; Sweden's ComputerSweden, AlleDatan and Min Handator; the U.K.'s Computer Management and Computer Business Europe; the U.S.' Computerworld, Desktop Computing, Hot CIOs, InCider, InfoWorld, Micro Marketworld, Microcomputing, PC World, Run and 99'Ahora.

VIEWPOINT

To see a world in a grain of sand

LIGHT ON SCIENCE

CHARLES P. LECHT

The impressive history of integrated circuits, or chips, has been beautifully documented in a book by Stan Augarten, a Silicon Valley writer for the *Peninsula Times Tribune*. Titled *State of the Art*, Augarten's book presents us with a neatly organized photographic history of the chip. He takes us from 1947 through 1983 in two-page couplets, one for text, the other a full-page photograph of contemporary chip technology.

The book's awe-inspiring photographs, presented in this way, give us a temporal perspective on chip development that is singularly rewarding in its unfolding pulchritude. The regularity of patterns achieved, be it found in the simplest "image sensor charge-coupled device" or the most complex "gallium arsenide superprocessor," would make a Navaho weaver green with envy and cause a nervous breakdown in the most competent Persian loomist. The beauty encountered in the contemplation of chip designs makes us wonder whether we are seeing the magnified handiwork of Lilliputian artisans. Like Gulliver unbound, we are amazed witnesses to science's architectural accomplishments in a much littler world.

Integrated circuit "architectronics" include just about every design ever made by man — and then some. That a single chip is usually far less than a quarter of an inch on a side and results from the collaborative effort of hundreds of technical specialists is truly astounding. Orchestration of their collective efforts rivals in complexity any that is needed to produce the objects of our macroscopic world. These multilayered mandalas etched in the realm of microscopy permit us an almost mystical vision that reaffirms what human beings can achieve through cooperation.

Fairchild flattening

Although research leading to today's chips includes work like that done at Bell Laboratories in the 1940s (for example, the Point-Contact Transistor), it was not until 1959 that Fairchild Camera and Instrument Corp. engineers invented a process that could literally level a transistor to operate in a wafer-thin plane and be one-sixteenth of an inch in diameter to boot. As Augarten says, and we can only agree, the transistor is "the wheel, the steam engine, the wellspring of electronics." We must then conclude that in the importance of things in our technological revolution, the Fairchild flattening stands out as monumental. It overcame a major obstacle to chip creation.

After 1959, the leveling process continued at an ever-accelerating rate. And as photolithographic methods, chemistry and engraving techniques improved, so did the potential for increasing the number of gates (that is, transistors) per logic chip while shrinking its planar dimension. The proximity of chip constituents and the laws of physics determined how close chip elements — transistors, circuits and all — could be brought together before the system broke down due to heat, magnetic interference, wandering particles or what have you. The microspace race was on.

The overriding motive in the competition to make the chip as small as possible was — and is — our need to conserve energy in a universe running out of it. Flattening, thus, made sense not only in logic processors, but also in those of memory. The power needed to drive memories on ferromagnetic cores was incredibly expensive compared with what is needed for even larger modern random-access memories (RAM) on chips. Thus, the impetus to produce maximum computing power with the least possible energy led to the microminiaturization of both logic and memory. This was done by further reducing their circuits — astoundingly, not necessarily in length, but in cross section — and reducing their components to pinpoint size and thin as chemistry would allow. That, in turn, resulted in more powerful computers, which (when applied to the process of generating even flatter, denser packaging) allowed us to create systems of even greater potency. And with these, increasingly beautiful and intricate designs emerged.

These I hold to be masterpieces of visual art. Today's artistic community might not catalog these as belonging to its aesthetic world; tomorrow's will. So, for the benefit of the future's chip aficionados, I offer a sampling of some recent classics.

American Micro Devices' Bit-Slice microprocessor of 1975, Model 2901, elaborates a landscaped layout of high-density tract housing suitable for sites on the moon or Mars.

The 1976 version of Zilog, Inc.'s Z80 processor, one of the most popular 8-bit processors ever made, suggests an undeniable resemblance to a modern Earth-city, complete with roads, gardens, apartment houses and parking lots.

The 1977 release of IBM's 64K-byte dynamic RAM is a symmetrical, gleaming beauty. Under a microscope and against a black background, it resembles nothing so much as a space colony in the luminescence of a golden sunset.

The 1979 version of the Motorola, Inc. 68000 and its successors appear as a huge governmental complex that would put Pentagon planners to shame.

And the chips kept getting better — and more beautiful. Xerox Corp.'s Optical Mouse, circa 1980, displays a checkered electronic labyrinth that would baffle the Minotaur. Texas Instrument, Inc.'s 1980 64K-byte dynamic RAM presents a textured column of Byzantine intricacy. The 1981 Hewlett-Packard Co. 32-bit microprocessor appears a keyboard music box containing all the works of Bach.

Possible interpretations of these morphistic mappings are limited only by our imaginations. It doesn't take much, however, to conclude that these patterns encapsulate and recapitulate our mid-cosmic reality in superdense format. The world of the microchip emerges as if it were a planetary surface seen from a satellite in the stratosphere. Yet each view seems to summarize our civilization's endeavors in art and science as though they were at arm's length in a gallery.

Marvel in form

The chip is truly a marvel in form as well as function. Concentrations of power enthroned in beautiful palaces of silver and sapphire, its chambers columned with gold and platinum, its corridors lined with niobium and other precious metals. And yet its chief constituent is the second most abundant substance on the surface of the earth: silicon.

Augarten points out that "in combination with oxygen, [silicon becomes] the chief ingredient of sand — which makes [William] Blake's lovely verse a fitting ode to the [integrated circuit]:

To see a world in a grain of sand
And a Heaven in a wild flower,
Hold infinity in your hand
And eternity in an hour."

Through continued chip evolution, we may yet fulfill Blake's yearning.

Lecht is chairman of Lecht Sciences, Inc., a New York-based think tank specializing in computer and communications technologies.

Confiscatability key to transporting micros overseas

HUMAN CONNECTION

JACK STONE

Isaac Newton I'm not, but I have recently discovered a new measure of systems quality — "figure of merit" we aging electrical engineers call it — which, though not expected to plunge the industry into technological turmoil, will surely enhance systems performance in one specialized set of circumstances, namely, when transporting one's beloved micro into the lesser civilized regions of the world.

To such conventional systems factors of maintainability, reliability, operability, survivability and shareability, I am adding the notion of confiscatability — the capability of a system to remain in its owner's possession while traveling overseas as opposed to being physically removed from same by members of the local constabulary, generally for an unfathomable reason.

Last winter, I met up with some difficulties in trying to motor my faithful Processor Technology Sol 20 across the Mexican border. It, a companion, my eldest son, Charlie, and I were bounced out of the country quite unceremoniously then because we were attempting to enter with the personal computer, in spite of the polished verbiage in Mexico's travel brochures and the assuaging statements of Mexico's tourism officials that "extend the hands of friendship to all visitors."

As near as we can figure, the customs officers were saying that they were protecting us from potential bandits or unscrupulous police personnel who might eye the machine during a "stakeout," place a high price on it (even though the market value of a six-year-old micro is something approaching that of a Timex 1000), intercept us on a lonely highway and take away the personal computer on some pretext or other, for example, smuggling.

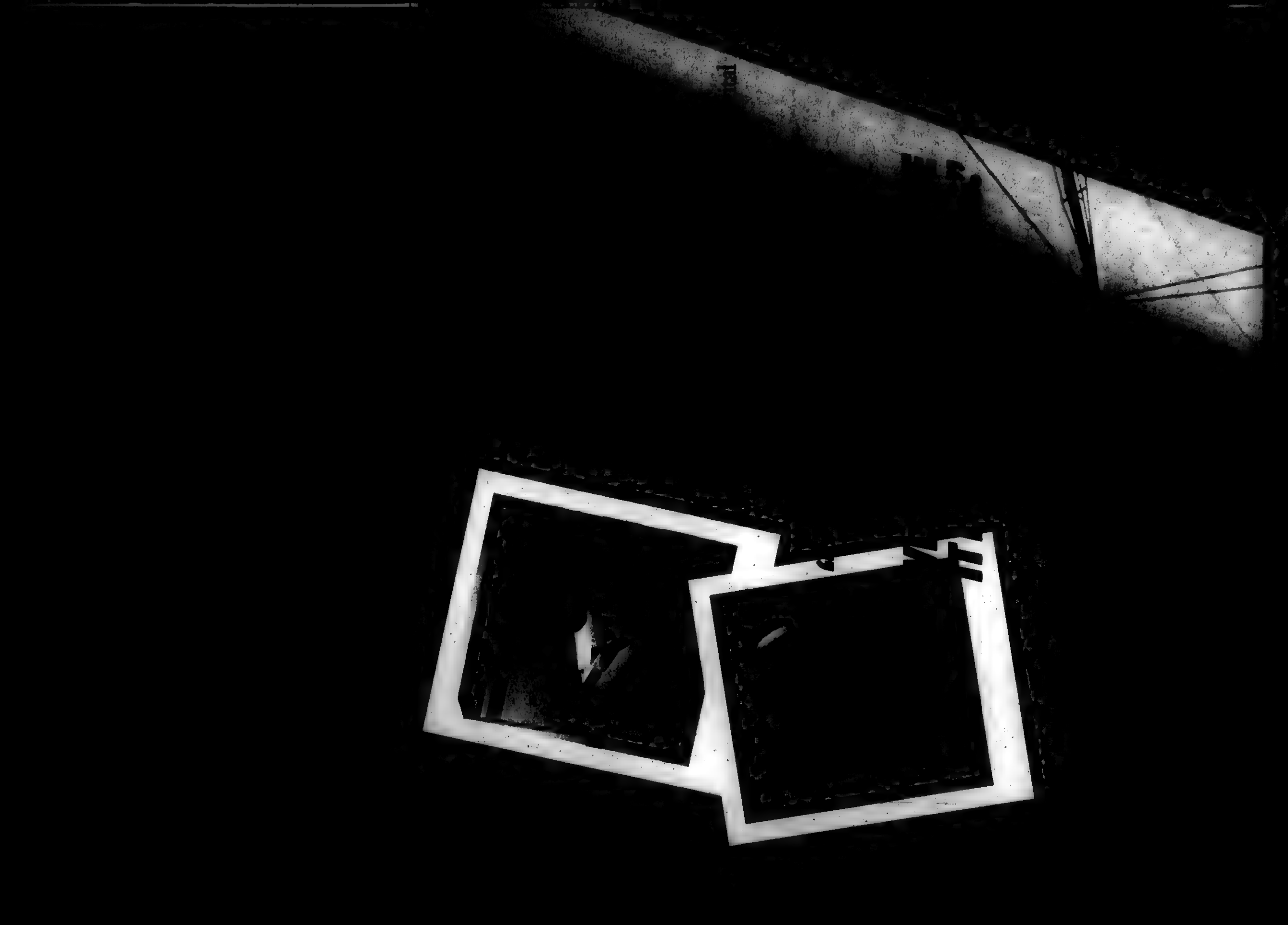
Well, it didn't take too much discussion to decide to make the trek again this year, what with all the bad weather lately, but it was not at all clear as to what computer facility we were going to take along. No way the Sol was going again, because it was proven that its "body print," that is, volume profile, was terribly obvious to the Mexican federales.

Osborne transportable

I returned again to the possibility of an Osborne Computer Corp. transportable that seemed initially appealing because of its packaging and its price (now a glorious bargain for only $600 from a K St. vendor for a used system, including Micropro International Corp.'s Wordstar, in spite of its ridiculous 5-in. amber screen.)

The body print was certainly better than the Sol's, but my interest began to wane after I attempted to pick up the machine, and I found that its 28 pounds seemed more like 128 pounds. Then I perked up when the salesman directed me to a special word processing package for the Osborne, called "Word-something-or-other," to be confused with all the other "Word"-oriented WP software titles. Then the salesman went on to advise me that he had no sample documentation. He wasn't sure what was provided, but he knew the programs were very "powerful" and "exactly what I needed," and "because I was such a good customer" (I'd never made a purchase there), he was going to give me 5% off.

I rejected the Osborne, not so much for its confiscatability, but for considerations of viability. Somehow, the idea of an archaic machine with unknown software supplied by an off-the-wall retailer seemed to fall just a bit short of my personal computer goals in spite of its highly favorable pricing.



VIEWPOINT

Moving into the world of technology

READER'S PLATFORM

ROBERT A. KING

Nine years ago it all began. The purpose was to supply the much-needed nutrition of fruit to the multitudes. The idea was to package the fruit economically and compactly and distribute it on schedule each quarter of the year. The idea emerged to dehydrate the fruit for distribution and sell hydrating machines to the consumers. A fruit indexing system was incorporated to access quickly the necessary items.

Basically, the system works like this. The consumer owns a cardboard-and-vinyl fruit storage unit in which he stores the current quarter's fruit shipment. As the need arises, he uses the fruit index to locate the correct fruit to be consumed. The consumer then removes the fruit and places it in the hydrating machine.

For years, business was adequate, but the number of consumers increased. As technology advanced, it was decided to develop and market a new system of fruit distribution; why should the consumer go to so much trouble to receive the necessary fruit nutrition?

One idea that is being considered is the "on-line" system. This is where all the consumers' fruit in a certain area is stored in one large main storage unit. The dehydrated fruit is shipped to this storage unit and then is made available to the consumers who use what are called "microdraters" and/or "minidraters." The consumer makes a connection to the main storage by pushing buttons that put him on-line.

He then uses the storage units' indexing system to locate the needed fruit. As it is located, it then is shipped to the individual through a pipeline for consumption.

Problem with systems

A problem with this system is that sometimes it is not possible to make an immediate connection to the main storage unit or is slow in doing so. Another difficulty is that sometimes the connection is broken at a critical time, and the fruit is dematerialized as it passes through the pipeline and is lost to the consumer.

Upper management chose the microdrater as the integral component for the new system and utilized existing employees' talents to finalize the system. The technological advantage of the microdrater is that it not only provides on-site storage, hydrates and spoon-feeds the fruit to the consumers, but it has a built-in indexing system that is energy efficient. This has been termed a "stand-alone" system.

This seems to be the system of the future, only there are a few bugs to be worked out. Being that the multitudes require so much fruit, technology has yet to produce an adequate storage bin for the microdrater. But time will take of this.

Also, whereas in the old system the fruit was loaded into storage by a human, the microdrater requires that the fruit be loaded mechanically from microdrater cartridges. In the past, the fruit was dehydrated and distributed for us by another company with the facility to do this. What has to happen now is to find a microdrater cartridge processor to perform a similar service for us. It will be at that time that the microdrater "stand-alone" system of fruit distribution will be in use by the multitudes.

A minor question arises when discussing this type of system: "Will the consumers be willing to pay the substantial monetary increase in the price of the microdrater over the manual hydrating machine that they now use?" Time will tell us that.

This concludes this business report. Thank you. ‡

King is computer operations manager at Micromedex, Inc. in Englewood, Colo.

Fill in your IBM micro/mainframe communications picture.

AST Research, the leader in IBM PC enhancement products, brightens your micro/mainframe communications picture with a full palette of economical, integrated hardware/software masterpieces. With AST Products, you can emulate IBM terminals or create PC-based Local Area Networks.

AST improves your office operating cost picture.

AST communications products give your IBM PC the flexibility to act as a terminal for your host system or as a stand-alone computer for smaller tasks. Your PC won't bog down the mainframe with unnecessary small jobs and local computing on the PC eliminates phone line charges too. Get the power of a mainframe when you need it and personal computer convenience right at your fingertips.

Applications solutions that are shadows of genius.

AST keeps pace with your ever-changing applications requirements with reliable, high quality, cost effective communications products. AST products provide support for Binsync and SNA/SDLC communications protocols as well as networking multiple PCs for sharing resources.

Choose AST products — by the numbers.

These AST communications packages are currently available:

1. AST-SNA™ emulates a 3274/3276 controller and 3278 or 3279 display terminal using SDLC protocol.
2. AST-BSC™ emulates 2770 batch RJE and remote 3270 display terminals using 3270 Binsync protocol.
3. AST-PORT™ allows your PC to connect to an IBM 3274/3276 cluster controller via coax cable and emulates a 3278 or 3279 display terminal.
4. AST-8700™ emulates 2770, 2780, 3741, and 3780 RJE workstations using Binsync protocol.
5. AST-5251™ emulates a 5251 Model 12 remote workstation connected to an IBM System 34, 36 or 38.
6. PCnet™ is the first Local Area Network designed specifically for the IBM PC or XT and the PC-DOS 1.1 or 2.0 operating system.
7. PC-232™ is a user-programmable dual-port card capable of communicating in Async, Binsync, SDLC or HDLC protocols.

Discover how well AST can fit in your micro/mainframe communications picture. For descriptive data sheets, write or call: AST Research Inc., 2121 Alton Ave., Irvine, CA 92714. (714) 863-1333. TWX: 910-595-1765

AST RESEARCH INC.

Number One Add-Ons for IBM PC.

SOFTWARE & SERVICES

The evolution of the meddlers

SOFTLINE

FRANK SWEET

"Why does the data base administrator keep meddling in my business? Worse yet, his goals are not the same as mine!" This often-voiced accusation is completely accurate. Data base administration does cross turf boundaries with distressing regularity. And its goals really don't seem to match those of the people whose business is meddled with. To see why this is inevitable, consider the data base administrator's evolution as an organizational unit.

The concept arose in 1971-72. Data base administration emerged when it appeared that shared master files were practical at last. Packages were being sold which seemed to solve the problems of different applications sharing the same set of files. A committee from IBM's Guide users group was formed to study the organizational implications, and the first data base administrator job description was published on Nov. 3, 1972. Later publications have not changed that description significantly.

But every one of the data base administrator's job functions was already in place in the traditional DP organization. File design, data security, file integrity, master backups, I/O software maintenance and training, data naming standards, record layout documentation and so forth were all being performed. In most shops, the tasks were being performed well. Since the job was getting done, why was the system changed?

The functions were dispersed throughout the organization. In the old DP shop, different people were responsible for different aspects of master file integrity:

- Users designed individual fields. For example, "marital status code" was defined to be 1-single, 2-married.
- Systems analysts designed records and files. They determined, for instance, that each purchase order record contained the field "vendor number" and

See MEDDLE page 40

CICS gets Executrieve

Eases on-line query for novices

FORT LEE, N.J. — On-Line Software International has announced a free-format, on-line IBM CICS query system that is said to use a simple English syntax.

ON-LINE SOFTWARE INTERNATIONAL

Called Executrieve, the product is designed for users with no programming experience. The software allows users to query the data base and develop reports that include graphics. It operates under CICS in IBM OS and DOS environments without modification or reformatting, a spokesman said.

Users access the mainframe through "views" or groups of data fields matched for various user groups. User groups only have access to fields defined by data processing. Executrieve's Content Addressed Method technology lets users locate information based upon content rather than pre-established keys or indexes, the spokesman said. It is said to use less overhead than standard accessing techniques.

A nine-tier system of security is provided, and record count limitations can be imposed. The system can be installed in a few hours, the company claimed.

Introductory pricing is $15,000 for DOS and $20,000 for OS until March 1, after which prices will rise to $18,000 for DOS and $24,000 for OS, according to the vendor.

On-Line Software International, Two Executive Drive, Fort Lee, N.J. 07024.

IBM hikes DSLO, license fees

IBM has increased its monthly license fees and Distributed System License Option (DSLO) prices on six program products.

IBM

The monthly license fee on the Professional Office System program product was increased from $600 to $700. Likewise, the DSLO for that package was increased from $450 to $525, IBM said.

The Cross System Product/Applications Development package now costs $135 for a monthly license and $140 for the DSLO. The product used to cost $160 for the monthly license and $120 under the DSLO, IBM said.

Applications execution

The Cross System Product/Applications Execution now costs $140 for a monthly license and $105 under the DSLO. The program used to cost $120/mo and $90 under the DSLO.

The Cross System Product is an applications generation package for use with IBM CICS, DOS/VS, VM/SP/CMS, MVS/TSO, SSX/VSE and DPPX/SP operating environments, a spokeswoman said.

Also increased were prices for three program products for IBM's 8100 distributed processing system.

The basic license fee for the 8100 message-handling facility, DPPX/Presentation Services 3640-Execution Manager, was increased from $71 to $75 for a basic license, and the DSLO has been increased from $52 to $64/mo.

Likewise, the DPPX/3640-Interactive Transaction Generator has been increased from $297 to $312/mo for a basic license, and the DSLO has been increased from $222 to $265/mo, the spokeswoman said.

Finally, the Distributed Office Support System/8100/Distributed Office Support Facility was increased from $178 to $187/mo for a basic license, according to the spokeswoman.

The DSLO has been increased from $133 to $159/mo, IBM said.

All price increases take effect in March 1984, the spokeswoman said.

IBM National Accounts Division, 1133 Westchester Ave., White Plains, N.Y. 10604.

Mantis out for CMS/41

stsc

STSC offers VM-based micro-mainframe link/42

STATS

Honeywell users get health care claims system/46

INSIDE

■ DOS to OS conversion tool unveiled/41

■ Report writer available for System/38/47

CICS Users: Increase System Uptime

Look at the benefits when you install DADS, a Dynamic Allocation-Deallocation Subsystem:

- Improve Mean Time to Recover
- Ease Batch Scheduling Constraints
- Avoid Initiation Delays
- Simplify Problem Determination
- Improve CICS System Productivity

Take DADS Advice for Greater CICS Availability

If you're a CICS/MVS user, take DADS advice today! Call collect 203 529 7126 or return this coupon to our attention.

CW-1/23/84

☐ Send me DADS for a 30 day free trial.
☐ I'm interested, please provide more information about DADS.
☐ Also please provide information about the complete family of software products available from STAR.

Name Title

Organization Telephone

Address

City State ZIP

STAR

Software Technologies and Research, Incorporated 41 New Britain Avenue Rocky Hill, CT 06067 203 529 7126

VM/SP Printer Roulette

Round and round it goes, where it prints nobody knows!

The stakes are high: Your corporate information. The game is fixed: You have little control of your print files or small printers.

Stop gambling. Stack the odds in your favor. The ACX-PM™ Printer Manager gives you complete control and management of your 326X, 328X, and ASCII printers.

No risk, 30-day free trial.

For more information, drop us your business card.

ACX

Automotive Computer Extensions, Inc.
3120 Belmont Road, Suite B
Downers Grove, Illinois 60515

©1983 ACX

or for faster access, (312) 971-1505.

EDP Auditors... Being Pigeon-Holed Seldom Leaves Room For Advancement.

Pigeon-Holing.

It happens all the time to EDP Auditors. Especially at major corporations and accounting firms. Just as soon as auditors build competency in one dimension, that's all they get to work on from that point on. Day in. And day out.

Not so at Blue Cross and Blue Shield of Greater New York.

We equate project diversity with professional development. Our auditing professionals get to do it all, across the full spectrum of dimensions. Auditing existing systems as well as those under development. Participating in Data Center reviews and technical audits. And utilizing computerized audit techniques to insure the adequacy of internal integrity controls. And they do it all under one roof...THERE IS NO TRAVEL REQUIRED. And because there isn't, there is plenty of time for continuing education, both internal and external...and it's on "company time," as well.

Our Data Processing environment is State-of-the-Art and includes IBM 3033 and 3081 mainframes operating under OS/MVS, PDP and Varian minicomputers, CICS on-line systems, TOTAL data base and much more.

If you're an EDP Auditor with the appropriate academic credentials, top communications skills, and at least 2-3 solid years' of experience, who, feels that being "pigeon-holed" is "for the birds," we invite you to pursue your career goals with us. You'll find compensation in excess of industry standards, benefits outstanding and an environment that's as professional as you are. For prompt and confidential consideration, please send your resume complete with salary history and requirements to: EDP Audit Recruitment, Department 631

Blue Cross Blue Shield
of Greater New York
622 Third Avenue
New York, NY 10017

Equal Opportunity Employer M F H V

SOFTWARE & SERVICES

MEDDLE from page 39

that the vendor master file was to be updated once each month.

■ Technical support selected and maintained nonapplication system software. System programmers were traditionally responsible for reorganizing loam files, defragmenting packages and training systems and peripherals personnel in Vsam use.

■ DP operations answered for the physical well-being of the files. Operations supervisors saw to it that backup copies were sent off-site and that vendor master files and vendor transaction files were kept on two different spindles.

File sharing demanded that the functions be consolidated. Something happened when file sharing among different users' applications became a realistic goal. It became evident that the central data pool could be achieved only if the responsibility for file integrity was centralized. To be shareable, files had to become orders of magnitude more reliable than ever before.

But consolidating the functions didn't eliminate them, hence the inevitable overlaps. Centralizing file reliability/integrity functions did not eliminate the concerns that older organizational units had toward master files. Indeed, such concerns cannot and should not be eliminated since, ultimately, computerized business data is the responsibility of the entire DP team.

Overlapping functions don't always match perfectly. The key concept is shared master files. The data base administrator's primary goal is to make master files shareable by all users and among all applications. Hence, the administrator is compelled to become involved in all aspects of file design and use in order to ensure that this goal is met:

■ Users — If three users have adopted a common set of marital status codes, but a new user wants to invent his own, the data base administrator reacts by encouraging the maverick to join the others.

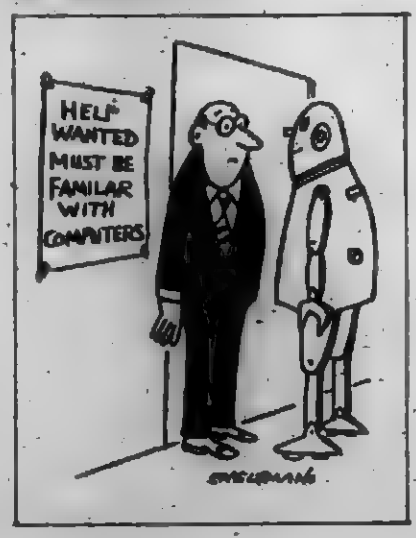
■ Systems and programming — If our vendor master file contains the "vendor address" data, but a designer wants to replicate this field on each purchase order record, the data base administrator will point out the ease of vendor master file access when printing or displaying a purchase order and the risk of inconsistency if the field is replicated.

■ Technical support — If disk access software is proposed which is more machine-efficient than the data base package but does not roll back abended transactions and batch jobs without intervention, the data base administrator becomes involved by arguing against its adoption. Without automatic rollback, the files could be used only one system at a time.

■ DP operations — If DP operations neglects to make periodic tape backup copies of the files or forgets to store the backups off-site, the data base administrator should detect the lack and inform appropriate management of the jeopardy to the firm's business data.

In sum, don't be embarrassed to accuse data base administrators of meddling in your business. You're right. They do. It's their job.

Sweet is corporate manager of data administration for the Charter Co. in Jacksonville, Fla., and a regular contributor to Computerworld's *Softline column.*



'Changer II' supports OS

HOUSTON — Software Dynamics Corp. has announced the Changer II IBM DOS to OS conversion system.

A spokesman said the Changer II system organizes and manages the conversion effort and speeds it up so that application system changes are frozen for a shorter period of time. The package is said to force conformance to OS standards and conventions, and it can be modified to satisfy standardization requirements.

The spokesman said that Changer II is not an emulator, but actually converts source program code. Changer II is said to simplify the development of OS JCL by calculating efficient disk space allocations, block sizes, number of sort work files and sort work space allocations. It also formats JCL according to predefined standards, the spokesman said. Changer II is also said to ensure adherence to uniform naming conventions throughout the system, and it produces reports that monitor and organize the conversion effort.

Various DOS to OS conversion options are available, including a one-year lease of the Changer II conversion system for $59,000.

Software Dynamics, Suite 1000, One Allen Center, Houston, Texas 77002.

Mantis enhanced

CINCINNATI — Cincom Systems, Inc. has announced an IBM CMS version of its Mantis fourth-generation application development system.

Mantis is described as an on-line, interactive application development system which, the vendor said, allows for the implementation of entire applications without the need for batch processing. In the CMS environment, according to a spokesman, Mantis eliminates the majority of operating system and teleprocessing monitor overhead associated with other environments.

With Mantis, programmers reportedly can create screens, test and debug applications, document systems, put systems on security menus and release applications for production. The fourth-generation language is said to combine the flexibility of procedural languages and the efficiency of interpretive languages to enable users to implement top-down design, structured coding, step-level refinement and prototyping of systems.

Reportedly, applications developed under CMS Mantis are transferable to IBM's CICS Environ/1 or Cincom's TIS environments without change. In the CMS environment, Mantis is said to run without isolating each user, and security is maintained for individual or department files without affecting other system users. The CMS version is said to work with a variety of file-access methods, including Vsam, Cincom's Total data base management system (DBMS), TIS DBMS and standard Mantis files. All output printing is automatically routed to the system printer.

The single-user charge for the CMS version of Mantis is $35,000 for IBM Models 4321, 4331, 4361, 370/125, 370/135 and 370/138; $45,000 for Models 4341, 4381 and 370/145 and up; and $64,000 for IBM's 30 series mainframes.

Cincom Systems, 2300 Montana Ave., Cincinnati, Ohio 45211.

Upgrades fit CMF, IMF

SUNNYVALE, Calif. — Boole & Babbage, Inc. has announced two information resource planning and control products, the CMF/Workload Planner and the IMF/System Manager.

The CMF/Workload Planner is a recent enhancement to the firm's Capacity Management Facility (CMF) architecture. It helps to provide future work load demand projections based on analysis of an organization's business activities.

According to the vendor, the Workload Planner analyzes historical work load activity data, condenses that data into a planning data base, determines transaction rate trends and constructs work load forecasts that are passed directly to CMF/Model, which produces projections of future service levels and resource requirements.

The IMF/System Manager, an enhancement to the IMS Management Facility, was designed to improve the quality of IBM IMS service. It replaces with menus the discrete commands and responses required by IMS and permits review and control of the IMS resource status via available panel displays, the vendor said.

The System Manager also automates routine procedures such as restarting transactions, programs or message regions following an abend; starting or restarting IBM integrated storage controller links; and notifying the appropriate personnel of significant occurrences within the system.

The Workload Planner is priced at $16,000 for the first CPU; the System Manager perpetual license fee is $28,500 for the first CPU.

Boole & Babbage, 510 Oakmead Pkwy., Sunnyvale, Calif. 94086.

The system that lets you forget to remember.

All you do is tell the NCR 5300 Computer Output Microfiche (COM) recorder how many duplicates you want. Then forget it. The recorder tells the new in-line duplicator what's needed. And that's what you get, completely collated.

NCR COM

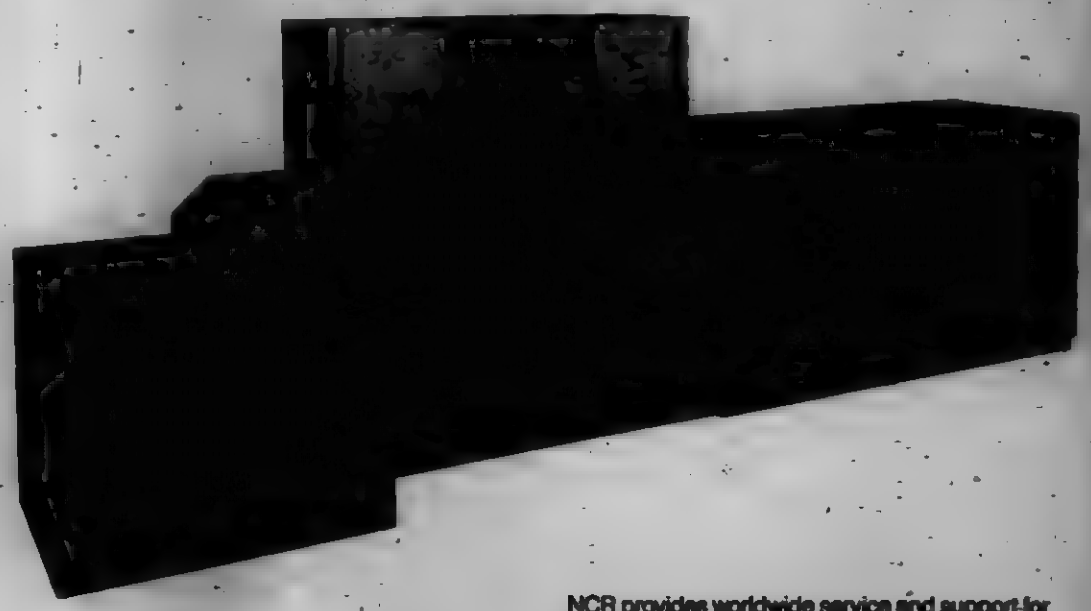
All that without operator intervention. And at the fastest speeds you'll find in any COM system.

The system is flexible, too. You can choose between wet or dry-silver recorders. And duplicators that produce vesicular or diazo copies.

However, don't take that string off your finger yet.

Wait until you've talked to your local NCR Micrographic representative. For more information call or write NCR Micrographic Systems Division, Box 606, Dayton, Ohio 45401. 1-800-543-8130 (in Ohio, 1-800-762-6517).

NCR
Micrographic Systems Division



NCR provides worldwide service and support for the NCR 5300 COM Systems.

SOFTWARE & SERVICES

Tool targets VM users

ROCKVILLE, Md. — STSC, Inc. has announced Dataport, said to be an information center tool that operates on IBM processors under IBM's VM/CMS and VM/SP operating systems and provides full screen data entry, display and analysis functions that interface with a variety of microcomputer and mainframe software products.

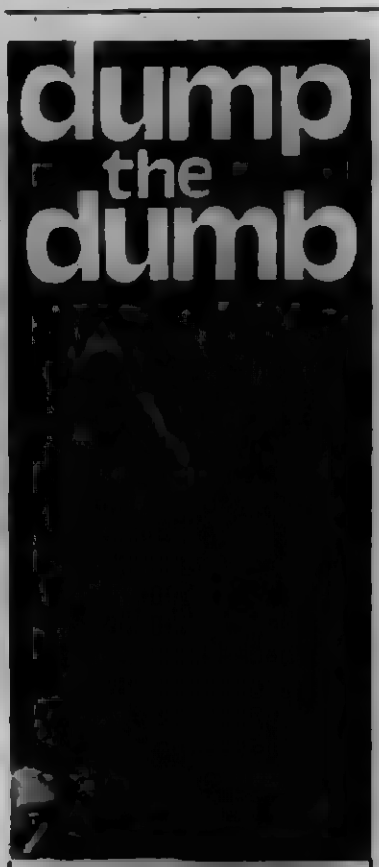
According to the vendor, Dataport's interfacing capabilities allow users to pull data from and send data to packages, including Information Builders, Inc.'s Focus; SAS Institute, Inc.'s SAS; Execucom, Inc.'s IFPS; IBM's ADES-II; Visicorp's Visicalc; and Lotus Development Corp.'s Lotus 1-2-3.

Dataport reportedly can also be interfaced with any mainframe or micro product that utilizes Software Arts, Inc.'s Data Interchange Format.

The vendor said Dataport uses spreadsheet-like windowing technology to handle full screen data entry and display, and it extends the two-dimensional spreadsheet format to as many as six dimensions. The package reportedly performs complex analysis through sophisticated computational logic and can perform calculations on entire rows or columns or on a single element.

Dataport is available for a one-time license fee of $19,000, with an additional charge between $2,000 and $4,000 for each interface.

STSC, 2115 E. Jefferson St., Rockville, Md. 20852.



REPLACE YOUR DUMB 5251'S OR 3278'S WITH SMART PC'S, XT'S, & BLUE LYNX™

Turn your PC or XT into a full functioning 5251 or 3276 terminal. With BLUE LYNX there is virtually no difference in operating a PC running under emulation from the terminal you're currently using. In addition to getting both online and offline capabilities BLUE LYNX gives you:

- PC printer and color monitor support
- Bidirectional file transfer capability

Insert the BLUE LYNX synchronous communications board into any slot in your IBM, PC or XT, load the BLUE LYNX program diskette, give your PC a station address and establish connection. No special host configuration is necessary.

BLUE LYNX 5251 Version 2—$690
ETU/34—$500* ETU/36—$500*
ETU/38—$500* *One time CPU charge
BLUE LYNX 3276 for SDLC or BSC—$690
BLUE LYNX 5251/3276 Combo—$1230
VTERM Asynchronous Communications and DEC VT emulation.—$160
(requires IBM Asynchronous Adapter)

212-684-7766
TECHNICAD SYSTEMS Inc.
25 Waterside Plaza NY NY 10010 1/84
BLUE LYNX is a trademark of Technicad Systems Inc.
BLUE LYNX 5251 is a joint development of Software Systems, Inc. of Jefferson City, Missouri & Technicad

Warner adds to data bank

NEW YORK, N.Y. — Warner Computer Systems, Inc. has announced the addition of the Disclosure II data base to its Financial Services Division data bank.

Disclosure II is said to be an enhanced data base that contains facts and figures on approximately 8,500 companies required to file annual and periodic reports with the Securities and Exchange Commission (SEC).

According to the vendor, more than 90 categories of information are available for each company, and standard reports include balance sheet information, income statements and financial ratios.

The fee structure, which is based on the type of reports accessed and the level of usage, ranges from $2 to $30 per connect hour.

Warner's Financial Services Division, 605 Third Ave., New York, N.Y. 10158.

Firm widens maintenance

OAK BROOK, Ill. — Sentinel Computer Services, Inc. has announced the expansion of its maintenance services to include the IBM System/34 and System/38 within its network maintenance agreement.

Effective immediately, Sentinel will provide maintenance, installation, discontinuance and relocation services in its recently established industrial and communications network maintenance program. Under the program, Sentinel will provide complete maintenance management services for organizations with complex teleprocessing networks.

A spokesman said the typical monthly maintenance fee for a System/34 user is approximately $207 and $395 for a System/38 user.

Sentinel Computer Services, Suite 360, 1010 Jorie Blvd., Oak Brook, Ill. 60521.

SYSTEMS SOFTWARE

KOORTRONICS, INC.
Hierarch — The Secure OIS System

Koortronics, Inc. has announced Hierarch — The Secure OIS System, which is said to secure printouts and access to all system resources for the Wang Laboratories, Inc. Office Information System (OIS) small business computer.

According to the vendor, the security system was designed to secure printouts and access to system resources according to the user's hierarchical authority, the particular device and the concerned library. The package includes user password logon and automatic logoff procedure, document antiaccess lock, library security and control over individualized local menus.

The vendor said the system is compatible with all Wang OIS software Releases 5.0 and higher and is supplied on two OIS salable diskettes. The package is said to occupy less than 1,200 sectors of the OIS system resident volume. The system is priced at approximately $10,000.

Koortronics, Two Park Ave., New York, N.Y. 10016.

HELP/38 SYSTEMS
Robot38 Version 3

Help/38 Systems, a division of Advance Circuits, Inc., has announced Version 3 of its Robot38, an automatic computer operator for the IBM System/38 mainframe.

According to the vendor, Version 3 contains 19 enhancements to the package, including Help text display, command prompting and syntax checking. Said to require four seconds of CPU time/hour, Robot38 reportedly improves response time for data entry operators by allowing the System/38 to be used up to 24 hours/day and by automating a number of maintenance tasks.

The productivity software is said to execute programs and commands without operator intervention or attendance, and it automatically schedules, runs and documents jobs during off hours.

The user can preschedule jobs to run at any time or on any selected date, with recurring jobs run on evenings or weekends, the vendor said. Robot38 will monitor and correct data communications line status, opening lines to receive transactions during night or day while maintaining system security.

Version 3 of Robot38 is leased for $30/mo per CPU or for a one-time cost of $1,100 per CPU.

Help/38 Systems, 15102 Minnetonka Industrial Road, Minnetonka, Minn. 55343.

D.B. SYSTEMS, INC.
Release 2.0 of Network Messenger

D.B. Systems, Inc. has announced Release 2.0 of its Network Messenger electronic mail system, which offers enhancements emphasizing office productivity and operational flexibility.

The enhanced version allows users to create various reusable letter, report and other formats to be stored permanently in a common or individual electronic filing cabinet. Message formats may be modified on-line and sent to various recipients as required, the vendor said.

Enhancements of the electronic mail system also provide for storage and on-line access to various system and office procedures that may be updated on-line by a central department, according to the vendor.

The DL/1 data base system operates under IBM's IMS/DC or CICS access methods.

The price is $7,900.

D.B. Systems, 3 S. Patton Ave., Arlington Heights, Ill. 60005.

TECHNETRONIC, INC.
Copernicus Model Release 2

Technetronic, Inc. has introduced its CPU-capacity management software for use in answering data center growth questions in IBM MVS and VM environments.

The Copernicus Model Release 2 predicts the effects on data center performance of hardware upgrades, work load increases and new applications.

According to the vendor, the software interprets column-of-numbers output, providing the user with a graphics display of its predictions. Results can be presented in any of the eight-color graphics formats included with Copernicus.

The product is available as an option for Technetronic's Copernicus 320 system for a one-time license fee of $7,000.

Technetronic, Suite 400, 7927 Jones Branch Drive, McLean, Va. 22102.

See SYSTEMS page 44

#1 FOR TSO or VM/CMS

DYNACALC

The fastest and friendliest spreadsheet system

NEW ★Color Graphics ★Database Interface

IMPROVED ★Worksheet Consolidation ★VisiCalc® Support**

COMPARE US TO THE COMPETITION!

For a free 30 day trial call (312) 525-6400

Chicago Soft— 738 N. LaSalle • Suite 2 • Chicago, IL 60610

*Dynacalc is owned by Dynamik Corp.
**VisiCalc is a registered trademark of VisiCorp. VisiCorp is not associated with Dynacalc.

For Florida school officials,
mean-driven applications come naturally

SOFTWARE & SERVICES

SYSTEMS from page 42

COMPUTER INFORMATION SYSTEMS OF MASSACHUSETTS, INC.
VMS/Actsys; Prolog

Computer Information Systems of Massachusetts, Inc. has announced a resource accounting package and utility designed for use with Digital Equipment Corp. VAX-11 computers running DEC's VMS operating system.

VMS/Actsys reportedly is a menu-driven resource accounting package that monitors and bills system resources and software usage.

Prolog, said to be an optional extension of VMS/Actsys, is a project resource accounting utility that lets the user switch projects without logging out and in repeatedly.

VMS/Actsys' billable resources are said to include connect time, CPU time, page faults, buffered I/O, direct I/O, volumes mounted, pages printed, disk storage and software license fees at prime and off-prime rates.

Resource usage information reportedly can be extracted interactively or set to run automatically at a user-specified time.

The products operate on single VAX-11 systems, VAX networks connected with DEC's Decnet and VAX clusters. They will be available in April.

VMS/Actsys is priced at $3,800 and Prolog at $900.

Computer Information Systems, 165 Bay State Drive, Braintree, Mass. 02184.

PRODUCTIVITY AIDS

PACER SOFTWARE, INC.
C68; A68; L68; Lib68; X68; S68

Pacer Software, Inc. has announced an integrated cross-development environment for the Motorola, Inc. 68000 family that runs on Prime Computer, Inc. Prime 50 series computers.

The new products that make up the environment are designed for companies that develop microprocessor-based hardware and are said to be suitable for educational settings that plan to teach microprocessor architecture.

The C68 is a C cross-compiler for the Motorola 68000 and is source-level-compatible with the Prime native-mode C compiler. Applications can be developed and debugged in the mini-based environment and later ported to the micro without losing compatibility, the vendor said.

The A68 is a Motorola Exormacs-compatible M68000 cross-assembler and includes support for long symbol names, multiple code sections and an extensive macro capability, the vendor said.

The L68 is a 68000 cross-linker with library support. The Lib68 is a 68000 object-module librarian.

The X68 is a cross-reference utility that can be utilized in conjunction with either L68 or A68. The S68, a 68000 simulator, is designed so that the content of the memory and registers can be examined and changed from within the simulator.

The C68, L68, Lib68 and X68 package costs $5,000. The A68, an add-on to the package, costs $2,000.

The A68, L68, Lib68 and X68 package sells for $3,000, while the S68 costs $1,500.

Pacer Software, 1297 Pearl St., La Jolla, Calif. 92037.

APPLICATION PACKAGES

META SOFTWARE, INC.
Charms

Meta Software, Inc. has announced the Chart Abstracting and Review Management System (Charms), which is said to be an on-line hospital-records software system.

According to the vendor, Charms is an interactive system that can be adapted to most hospital environments. The extensive clinical data collected by the system is integrated with a Diagnosis Related Grouping module, which generates the information on-line.

The system consists of three optional modules: The Medical Records Abstracting System (Mras) captures and provides clinical patient information and allows the user to enter, modify or make queries on all patient data, according to a spokesman for the company. The Missing Information Charts (MIC) module captures detailed information regarding the status of each patient chart. It reveals missing information, validates data and communicates that information to both doctors and management. The Utilization Review (UR) portion is a quality assurance system, which assists in the tracking of a patient's stay in the hospital, the spokesman said.

The Charms system was designed for use with IBM 370, 4300 and 303 series processors in IBM OS and DOS environments. The Mras module is priced at $50,000, the MIC module at $25,000 and the UR module at $25,000.

Meta Software, 1860 Broadway, New York, N.Y. 10023.

TEXPRINT, INC.
EZ Chart

Texprint, Inc. has announced EZ Chart, a graphics package for Digital Equipment Corp. PDP-11, LSI-11, VAX-11, PDP-10 and PDP-20 computers.

EZ Chart, which runs on either black-and-white or color terminals, produces four types of charts: line,

Continued on page 46

The Data Center is under your command.

But is it under your control?

Value Computing's systems management software automates the critical tasks of production forecasting and scheduling, capacity planning, and resource allocation and accounting, and brings those tasks under centralized control. Your control.

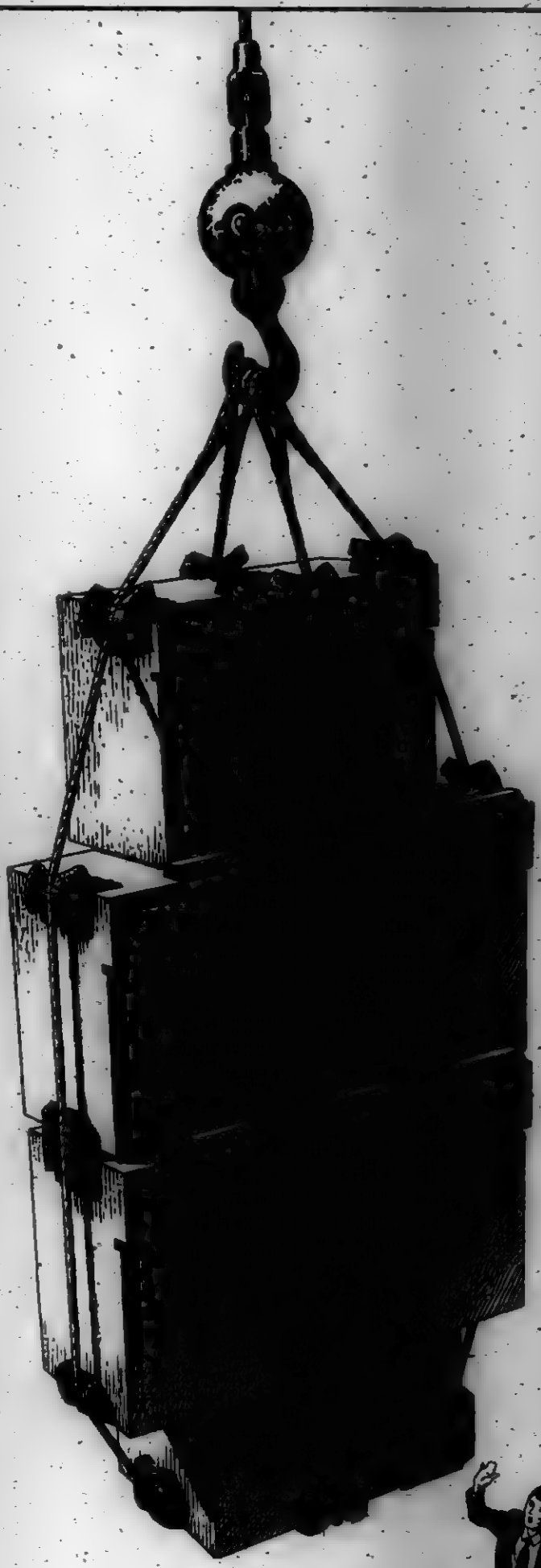
The effects on data center operations are immediate: a more stable production environment ... faster turnaround ... fewer manual procedures ... shorter night processing times ... fewer mistakes, misunderstandings, re-runs ... less management dependency on operations personnel.

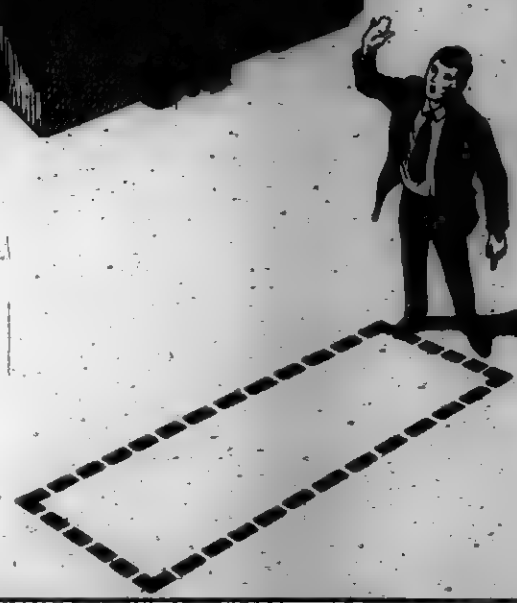
In short, a smoother running, better performing data center; a center where managers get the most intensive use of all resources. Without making a major capital investment in additional CPUs or peripherals.

We don't believe there's a more cost-effective way to improve the performance of your data center or the value of its position in your company. Call us and find out why more than 1500 users agree.

Value Computing Software Systems:
DCMS—The most powerful and comprehensive production scheduling and control system available.
Charge-A-Charge—The industry standard in job accounting and computer billing.
VALU-LIB—An entirely new tape management system designed for today's VS environments.
SMF Express—A unique package for the management of important SMF data.

VALUE COMPUTING
THE OPTIMUM SOFTWARE FOR DATA CENTER MANAGEMENT
Value Computing, Inc., 499 N. Kings Highway, Cherry Hill, NJ 08034 (800) 257-8242. In New Jersey (609) 482-2500





How to put 640 square feet of computer disk storage in a 7'x3' space.

There's no way to store that much data in that little space if you're using disk drives. Even 3380 class. But Masstor Systems' M860 Mass Storage System—a different kind of data storage technology—can solve the problem.

The entry-level M860 stores 55 billion bytes of data on-line and can be expanded to 440 billion bytes. At one-quarter the cost of disk. And less than 4% of the floor space. It also automates tape operations, making processing much faster and more economical.

The M860 is a third storage alternative for your IBM and other plug compatible mainframes. One that offers more on-line storage capacity for your new applications and requires no conversion of your existing programs. Masstor has an M860 solution for Sperry, Honeywell, DEC/VAX and CDC mainframes, too. As well as a way to hook them together in a network: MASSNET.

The M860 and MASSNET are two of a family of Masstor Systems' strategic products that allow you to move, store and share data efficiently and economically.

To find out more, contact Dave Ball at Masstor Systems Corporation, 5200 Great America Parkway, Santa Clara, California 95050. (408) 988-1008. And cut your data storage problems down to size.

MASSTOR SYSTEMS

Strategic solutions to moving, storing and sharing data.

SOFTWARE & SERVICES

Continued from page 44

bar, pie and scattergram, according to the company. The package runs interactively and includes a command-file feature for quick recall of often-used formats.

EZ Chart costs $995 for the RT-11 operating system and is priced at $1,750 for RSX-11M, RSTS/E, VMS, and Tops-20 operating systems.

Tenprint, 5 Blanchard Road, Burlington, Mass. 01803.

COMPUTECH CORP.
Group Rating and Sales Proposal System

Computech Corp. has announced its on-line, interactive Group Rating and Sales Proposal System (GRASP) for IBM 4300, 370 and 30 series processors.

Modular in design, GRASP is said to feature on-line entry of census and coverage data with automatic policy rating and proposal page generation. The system reportedly leads the user through a logical progression of data entry screens to enable input of employee census information and selection of appropriate levels of coverage for each line of insurance selected. Error messages alert terminal operators to omissions or invalid entries.

The system also is said to support production of multiple versions of a proposal from a single input of employee census data, and pending proposals are maintained on a separate GRASP data base for a user-specified time period. Built-in text editing facilities permit additions, deletions and changes to standard text paragraphs that the system creates based on the specific rating situation.

An integrated table management system is said to provide for on-line maintenance of multidimensional rate tables.

A permanent license for GRASP is priced at $220,000.

Computech, 2534 Main St., Glastonbury, Conn. 06033.

SOLUTIONS THROUGH ADVANCED TECHNOLOGY SYSTEMS, INC.
Claimsaver

Solutions Through Advanced Technology Systems, Inc. (Stats) has introduced Claimsaver, a health care claims processing system for Honeywell, Inc. computers.

The system processes different types of health care claims, accommodates a wide range of insurance coverage and produces various management reports, according to the vendor. The package is designed for businesses that process health care claims internally.

The software requires Honeywell's Gcos 3.0 operating system. The package's price ranges from $120,000 to $400,000, depending on the installation. Yearly maintenance fees consist of 10% of the software purchase price.

Stats, 244 Perimeter Center Pkwy. N.E., Atlanta, Ga. 30346.

MCBA, INC.
Fingraph-MCBA Connection

MCBA, Inc. has announced Fingraph-MCBA Connection (FMX), said to be a package that transforms MCBA's general ledger data into graphics input for the Fingraph visual management support system.

FMX compresses data from the General Ledger package and generates graphics reports that correspond to a user's tabular general ledger reports, the vendor said.

The package, written in Dibol, runs on Digital Equipment Corp. VAX-11 minicomputers. Single-CPU source code license is available for $1,000.

MCBA, 3441 Honolulu Ave., Montrose, Calif. 91020.

SHARED FINANCIAL SYSTEMS, INC.
ON/2

Shared Financial Systems, Inc. has announced ON/2, an on-line financial software system designed to run on the Stratus/32 continuous processing system from Stratus Computer, Inc.

ON/2 supports a range of banking services within a variety of operating systems. It offers transaction support for demand deposit, time deposit, certificate of deposit, credit card and access card applications through automated teller machines and manned and point-of-sale terminals. Multiple-host, multiple-device and switch-type configurations are also maintained.

Seven major subsystems are combined to process transaction requests from a local network, a switch or host communication system environment, an information service, a batch system interface or a network/system control service environment, a spokesman said. Other features include distributed processing capabilities, device independence, network settlement and reconciliation and multitasking system architecture.

The system will be available in May. It will be priced at $150,000 for a permanent license.

Shared Financial Systems, Suite 650, 15201 Dallas Pkwy., Dallas, Texas 75248.

COMPUTER DATA CORP.
Distribution Resource Planning

Computer Data Corp. has announced a resource planning system for the wholesale distribution industry.

The Distribution Resource Planning (DRP) system is designed to work with Computer Data's sales order processing, inventory control and purchase management systems.

It reportedly allows distributors to anticipate lumpy demand with increased visibility into the future. It is said to handle seasonal and other

NOW CCA'S MODEL 204 DBMS CAN DO SOMETHING EVERY EXECUTIVE CAN APPRECIATE.

SOFTWARE & SERVICES

changing customer ordering patterns, fluctuating transportation lead times and other variables.

The DRP is said to use various simulations for forecasting, making comparisons against actual historical performance and automatically selecting the strategy that most closely approximates actual performance.

The system runs on Hewlett-Packard Co. HP 3000 and Digital Equipment Corp. VAX-11 superminicomputers. It requires the sales order processing, inventory control and purchase management systems to operate.

The DRP will be available during the second quarter of 1984. The prerequisite systems are priced at $15,000 each, and the DRP costs $5,000.

Computer Data, Eighth Floor, 5757 W. Century Blvd., Los Angeles, Calif., 90045.

DATA BASE MANAGEMENT SERVICES

MICHAELS, ROSS & COLE LTD.
Mrc-Reporter Release 2.0

Michaels, Ross & Cole Ltd. has enhanced its Mrc-Reporter module for the IBM System/38, which allows users to create reports.

Release 2.0 of the report-writing module features shared-access path logic and free format-field entries that can be based on calculations from other fields. Other features include on-line Help, multilevel security, relational file joining, Boolean selection criteria and output device control, the vendor said.

Mrc-Reporter runs on the IBM System/38. A one-CPU license costs $1,140, and the maintenance fee is priced at 10% per year.

Michaels, Ross & Cole, Suite 501, 1301 W. 22nd St., Oak Brook, Ill. 60521.

BEDFORD RESEARCH ASSOCIATES, INC.
Interactive Signal Processing

Bedford Research Associates, Inc. has announced the Interactive Signal Processing package (ISP) for Digital Equipment Corp.'s VAX-11 series of processors.

In a single, integrated system, according to the vendor, ISP combines signal processing functions, data management, two- and three-dimensional graphics capabilities and an interactive programming language. The vendor said the unified analysis approach incorporated with the package will establish a controlled environment for research and development.

ISP is said to reduce signal processing research and development time. The package allows a user to interactively apply one or more of the 42 available signal processing functions to an array of sampled data. The sampled data, processing parameters and other associated information can be accessed through ISP's file-management capabilities. Signal data and processing parameters can be displayed in various two- and three-dimensional formats utilizing one of ISP's 15 graphics functions, according to a spokesman for Bedford Research Associates.

ISP is also programmable, allowing a user to develop more complex applications with loops, conditional branching and embedded arithmetic expressions.

The package licenses for $9,500, the spokesman said.

Bedford Research Associates, 4 DeAngelo Drive, Bedford, Mass. 01730.

LANGUAGES

MUMPS USERS GROUP
ANS Mumps: Software Engineering Evolution Toward the Fifth Generation

The Mumps Users Group has published *ANS Mumps: Software Engineering Evolution Toward the Fifth Generation*, which includes a section on the evolution of the programming language since its inception in 1966.

The publication also includes a 12-page set of tables comparing more than 40 available Mumps implementations and including the name, address and phone numbers of the sources. It also offers a list of hardware from 22 suppliers for which Mumps implementations exist.

A Software Engineering Methods section examines three implementations, including the development of a software data base, terminal-to-terminal portability and a color graphics workstation.

The publication is available for $5 for association members and $6 for nonmembers, plus a 10% shipping charge, according to a spokesman for the users group.

Mumps Users Group, Suite 208, 4321 Hartwick Road, College Park,

PERFORMANCE SOFTWARE GROUP
Fastran

Performance Software Group has announced Fastran, a compiler for Hewlett-Packard Co. HP 3000 Transact source code.

According to the vendor, CPU times are improved by two to 20 times using the compiler.

The product has been designed to run on any HP 3000. An HP SPL compiler is also necessary, the vendor said.

The price is $10,000.

Performance Software Group, P.O. Box 1464, Sandy Spring, Md. 20860.

TALK SENSE TO THE IBM PC.

Introducing PC/204, a link that lets PC users turn mainframe data into spreadsheets effortlessly.

PC/204, the newest productivity tool from Computer Corporation of America, is a powerful, efficient, easy-to-use software link between IBM personal computers and mainframes. It effectively answers the pressing problem of how to let corporate managers take full advantage of today's personal computers for making decisions, while also giving them access to the corporate database in a format they can use.

First, PC/204 guides PC users as they browse through the MODEL 204 database. Then it extracts the data they need and converts it into meaningful management information for spreadsheet analysis. Lotus 1-2-3 for example. And PC/204 does all that automatically. Without the PC user having to understand anything about mainframe technology.

If you aren't already using Lotus 1-2-3, we can supply it along with PC/204. Or you can use any current IBM PC business package.

While PC/204 is helping business managers, it's also helping MIS directors.

PC/204 uses the power and intelligence of the personal computer for increasing the overall efficiency of an application.

For one thing, it improves performance of the mainframe by offloading some of the processing to the PC, while reducing PC users' response time. It also makes communication between the PC and the mainframe more efficient.

What about security and control? PC/204 provides individual management views of the corporate database while still allowing PC users access to all the information they need.

PC/204 is the latest reason to get MODEL 204 DBMS which has been so highly rated for performance and programmer productivity.

For more information or to arrange for a demonstration of PC/204's capabilities, simply return the coupon or write to us on your letterhead.

Computer Corporation of America

Yes, please tell me more about: ( ) PC/204 ( ) MODEL 204 DBMS
( ) Send me a brochure.
( ) Send me info on free DBMS seminars, or call our seminar coordinator.

NAME _____ TITLE _____
COMPANY _____
ADDRESS _____
CITY _____
STATE _____ ZIP _____
TELEPHONE _____
Operating System: ( ) MVS ( ) DOS ( ) CMS ( ) Other: _____

Computer Corporation of America
Four Cambridge Center, Cambridge, MA 02142 (617) 492-8860 CW1/22PC

CCA's Executive DBMS Seminar Schedule

February	March	March (cont'd)	April	April (cont'd)
Denver	Salt Lake City	Richmond	Phoenix	Washington, D.C.
Dallas	Tulsa	Hartford	Little Rock	Boston
San Francisco	Houston	Rochester	New Orleans	Albany
Seattle	Portland, OR	Saddle Brook, NJ	Anchorage	Princeton
Los Angeles	Honolulu	New York	San Diego	Raleigh
Chicago	Minneapolis	Jacksonville	St. Louis	
Madison, WI	Detroit	Tallahassee	Cleveland	
Philadelphia	Columbus, OH		Dayton	
Boston	Louisville		Philadelphia	
Ft. Lauderdale	Pittsburgh		Norfolk	

SOFTWARE & SERVICES

REMOTE COMPUTING SERVICES

INFORMATION ACCESS CO.
Search Helper/prepaid searches

Information Access Co. (IAC) has announced the combination of its Search Helper microcomputer software with a package of prepaid searches designed to reduce the average cost of a search of a company's on-line data bases.

According to the vendor, Search Helper provides menus to coach the user in establishing search parameters off-line.

Once the search criteria are established, the package automatically dials IAC's Dialog Information Services, and the search begins.

Search Helper is currently designed for use with the IBM Personal Computer, the Apple Computer, Inc. Apple IIe and Apple II+ and the Eagle Computer, Inc. Eagle II.

The combination package includes an annual Search Helper license, priced at $200, and 700 prepaid searches, valued at $1,750, for a cost of $1,950.

The package is said to reduce the cost of a typical search from $15 to $2.50.

IAC indexes on-line through Dialog include Newsearch, the Magazine Index, the Trade and Industry Index, the Legal Resource Index and the National Newspaper Index, according to a spokesman.

IAC, 404 Sixth Ave., Menlo Park, Calif. 94025.

NEWTON-EVANS RESEARCH CO.
Guide to the Remote Computing Services Industry

Newton-Evans Research Co. has announced the publication of the third edition of its single-volume *Guide to the Remote Computing Services Industry.*

A condensation of its sources of information on the remote computing services (RCS) industry, Newton-Evans' guide is organized around four major sections.

The first section consists of extracts of original research reports based on periodic surveys of the RCS marketplace, plus results from studies planned for 1984 as they become published.

The second section is a collection of the firm's monthly publication "The RCS Industry Newsletter."

A third section includes detailed profiles of the most important RCS suppliers. The fourth section is an industry analysis.

The basic subscription price is $595.

Newton-Evans Research, Suite 204, 10176 Baltimore National Pike, Ellicott City, Md. 21042.

ON-LINE DATA BASES

CAUSE
On-line member data base

Cause, a professional association for development, use and management of information systems in higher education, has announced that on-line information from its members' institutional profiles is available to its members.

Information from 160 data processing departments with 10 types of applications, including financial management, admissions and records and physical operation, has been placed in a data base, according to the vendor.

Members call the Cause office, and staff members use an on-line system to find the needed information.

Data may be selected by a variety of categories. There is no charge for the service.

Cause memberships cost between $100 and $1,000, depending on the size of the institution.

Cause National Office, 737 29th St., Boulder, Colo. 80303.

METHODOLOGIES

AGS MANAGEMENT SYSTEMS, INC.
Structured analysis course

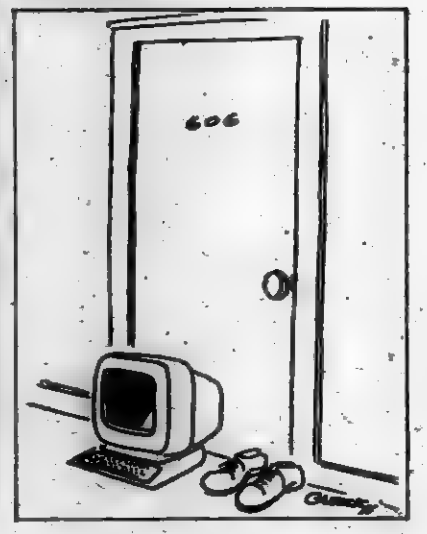
AGS Management Systems, Inc. has announced the first of a five-course series on structured techniques.

"Structured Analysis: Tools and Techniques" will be conducted Feb. 21-23 and March 27-29 at the AGS Training Center in Philadelphia.

The three-day workshop is designed as an introduction to the analysis process and will cover data-flow diagrams, data dictionaries and process descriptions, according to the sponsors.

The fee for the workshop is $550.

AGS Management Systems, 890 Valley Forge Plaza, King of Prussia, Pa. 19406.



COMMUNICATIONS

FCC still facing AT&T petitions

AT&T and its recently divested operating companies have begun another attempt to change the Federal Communications Commission's Second Computer Inquiry decision, this one aimed at the decision's provisions on protocol conversion.

Already pending at the commission are petitions from AT&T and the operating companies seeking reconsideration of a ruling last summer (Docket 81-216) that wideband channel interfaces constitute terminal equipment and that carriers must therefore order that equipment through separate subsidiaries or an equivalent alternative.

Bell South, one of the newly created regional holding companies, recently came up with an alternative that appears to be less than equivalent. And independent private branch exchange manufacturers have filed objections to "enhanced" Centrex-CO services that allegedly cross the line established in Computer Decision II between basic and enhanced services.

The latest development consists of petitions filed early this month by AT&T and two regional holding companies, American Information Technology (Ameritech) and U.S. West. They want the FCC to let AT&T and its former subsidiaries perform end-to-end protocol conversion as part of a basic transmission service.

In Computer Decision II, intranetwork protocol conversion is part of a basic service, but conversions involving information that reaches the end user are not. AT&T and the regional holding compa-

See AT&T page 51

ISDN tech building up

All-digital transmission evolving

By Lynn Haber
CW Staff

An integrated services digital network (ISDN) may be more a vision than a reality at the moment, but some pieces of its architecture are already in place.

For instance, AT&T last month announced its Circuit-Switched Digital Capability (CSDC) technology, which will let computers send voice, graphics and data transmissions at high speeds over the same lines that can be used for regular phone calls [CW, Jan. 9].

AT&T's ABS Net 1000, IBM's Information Network, the General Electric Information Services Co. (Geisco) and Tymshare Co. are also part of the evolution toward the all-digital transmission, switching and interfacing of voice, data, video and image applications.

"Some of these nascent ISDNs were in place all along, such as Geisco. Others are brand new — IBM's Information Network — and others are parcel parts of systems such as AT&T's ruddus network after the divestiture," according to Charles P. Lecht, chairman of Lecht Sciences, Inc., a New York-based creative lab and think tank.

Large-scale evolution

Dixon Doll, president of the DMW Group of Ann Arbor, Mich., said, "What you're really talking about, regarding the buildup of ISDNs, is the phaseout of the analog and the phase-in of the digital. And that's something that's been a very large-scale evolutionary process which began about 10 to 15 years ago."

The fundamental idea behind ISDNs is the notion of building one huge digital network in which a number of technologies are utilized to deliver a combination of dedicated lines, switch services and transaction communications to subscribers.

See ISDN page 51

Study finds ignorance of ISDNs

By Lynn Haber
CW Staff

WELLESLEY, Mass. — Ninety-one percent of data terminal manufacturers don't have a clue about what integrated services digital networks (ISDN) are. And of the 9% of data terminal manufacturers who have heard of ISDNs, none has begun an ISDN product planning strategy, according to a study recently released here.

An ISDN represents the future structure of the current public-switched telephone network. ISDNs combine voice, data, video and other communications services into a single digital link.

The study, "The ISDN Evolution: A Strategic Analysis," prepared by Venture Development Corp., reveals that data terminal manufacturers exhibit the lowest level of awareness pertaining to ISDN standardization activities among future ISDN hardware suppliers.

"Data terminal manufacturers typically follow the lead of manufacturers of equipment to which terminals are attached — and that is computers. They do what everybody else does," said Marc H. Rudov, manager of the communications consulting division at Venture Development.

"I guess they look at their business plans and they must not see anything

See STUDY page 54

Call records polled from multiple sites from CP National/57

Ultronic

An automatic switching device will interface most devices to host/61

WANG

Wang DVX enhanced/56

INSIDE

■ Another voice/data integrated workstation has been brought out by Ambi Corp./56

■ Amdahl Corp. announces a network concentrator/57

Orion Software unveils net for System/34, 36, 38

WALTHAM, Mass. — Orion Software, Inc. has introduced Network Orion, a modular family of generalized communications software for the IBM System/34, 36 and 38 user.

According to the vendor, Network Orion combines various methods of communication and types of traffic. The software includes data processing, telemessage (electronic mail) and text transmission. Users of the network can combine text and/or data files with telemessages for transmission to any remote location.

Information can be sent to other IBM System/34, 36 and 38 machines, to word processors from Wang Laboratories, Inc. and IBM and to simple remote data terminals. It also enables information to be sent via external networks.

Regardless of the destination system of networks, the procedures for transmitting information are identical. Through standard menus, the user specifies the information to be sent and addresses it to a location, a department or an individual user. Transmissions can be a free-form message, a word processing document, software and/or records from a data base file.

The intelligence of Network Orion is contained in three modules, the Network Orion Control Facility, the Text and Message Facility and the Remote Data Processing Facility.

The Network Orion Control Facility (NOCF) directs information traffic by reference to a predetermined network configuration. Initially, the network configuration and control rules are defined to NOCF as a series of profiles that detail the locations on the network, the machines connected at each location, authorized users or groups of users, transmission priorities and scheduled transmission events.

The Text and Message Facility (TAMF) provides for office automation facilities such as communication of information as free-form messages typed in at a keyboard, word processed documents, extracts from data base files or a combination. The information can be transmitted in a variety of ways, such as via General Electric Information Services Co.'s Quik-Comm electronic mail, direct dial to other System/34, 36 and 38 computers or word processors or via the Telex network.

The third module, the Remote Data Processing Facility (RDPF), was designed to meet the requirements for distributed data processing, including the transfer of data and program files, spool items, library and source members.

In addition, Remote Job Management allows jobs to be scheduled and executed at remote sites under control of the central site data processing management. Multisystem networks of System/34, 36 and 38 computers can thus update remote fields, perform software maintenance, execute jobs on a scheduled basis at remote sites and receive data from remote sites for consolidation reporting.

The communications options of Network Orion can be extended by adding new communications modules for other devices such as mainframe computers, other network facilities and office automation facilities. These will be made available according to demand and technological development, and the additions require no change to existing Network Orion locations other than the installation of new communications modules.

Typical applications include consolidation of information from several remote locations, the control and transfer of new application programs and procedures, data base updating, order processing between multiple sites, transmission and receipt of day-to-day operational transactions and other company reports, data processing or text-related activities, as well as single- or multiple-site electronic mail creation and transmission.

Network Orion is modularly priced. Licenses begin at $1,000 for a single-site electronic mail capability on a System/34 and 36. The new Network Orion is available for immediate delivery on a System/38.

Orion Software, Suite 300, 490-2 Totten Pond Road, Waltham, Mass. 02154.

!Candle Computer Report

Obtain incisive and technical information about IBM and compatible operating systems.

- CICS/VS 1.6 Migration
- CICS/VS 1.6.1 Features
- Paging Configuration Options
- MVS/XA I/O Concepts
- MVS/XA Coding Topics
- IMS 1.3 Announcement

These are just some of the articles that appeared during 1983 in the Candle Computer Report. To obtain your FREE subscription, complete and mail the form below.

!Candle®

10880 Wilshire Blvd, Suite 2404, Los Angeles, CA 90024 (213) 207-1400

☐ Enter my free subscription to the Candle Computer Report.

Mail to: Candle Computer Report, 10880 Wilshire Blvd., Suite 2404, Los Angeles, CA 90024

Name _____ Title _____

Company _____ Phone _____

Address _____

City _____ State _____ Zip _____

Please fill out completely before mailing

	Current	Future	When?
Operating System			
CPU			
CICS Level			
# CICS Terminals			
IMS Level			
# IMS Terminals			
VM Level			
# VM Terminals			

A-304

COMMUNICATIONS

AT&T from page 49

nies can convert the latter only if they first obtain a waiver from the FCC.

When the Computer Decision II protocol provision was adopted about three years ago, the FCC realized it might require modification and launched an inquiry (Docket 80-756).

FCC decisions

When the investigation was completed last November, the commission decided:

■ The basic protocol conversion policy would not be changed.

■ Conversion of control signals — for example, the dialing pulses used in telephone communication to designate the number of the called party and the address bits attached to data packets — are part of a basic service.

■ All other end-to-end signal conversions constitute enhanced services, but waivers will be granted more quickly and easily for some of these services than for others.

The favored group includes internetwork protocol conversions (X.25 to X.75) and "a change in electrical interface characteristics to facilitate transitional introduction of new technology." One example: the conversion of a digital voice input to an analog voice output.

In their petitions for reconsideration submitted this month, AT&T and the two regional holding companies objected strenuously to continuation of the waiver requirement.

AT&T contended that "an ad hoc waiver process is unworkable, harmful to competition and contrary to the movement toward minimization of regulatory oversight. . . . A carrier . . . cannot . . . invest . . . time, money and other resources in innovative design in the face of fundamental regulatory uncertainty over whether it will be allowed to use the product of its investment."

Waiver requirement

Because of the waiver requirement, AT&T added, carriers would have to reveal their business plans to competitors in advance. AT&T said the commission should "adopt rules permitting AT&T to provide code and protocol conversions on the same unrestricted basis as other carriers."

The three petitioners also said the FCC should:

■ Declare that all protocol conversions now performed within the network are "basic."

■ Allow the carriers to perform internetwork protocol conversions and "conversions of electrical signals incident to changes in transmission media or techniques" on a nonwaiver basis.

ISDN from page 49

"ISDN will consist of different pieces," Doll said. "It will consist of digital local distribution facilities, digital switches [and] digital long-haul services. [Long-haul services will be a mixture of satellite, fiber optics and microwave.]

"And the local distribution facilities or the regional or metropolitan services will be provided using combinations of coaxial cable and fiber and digital termination services. There will also be other technologies like local-area data transmission," Doll explained.

ISDN architecture

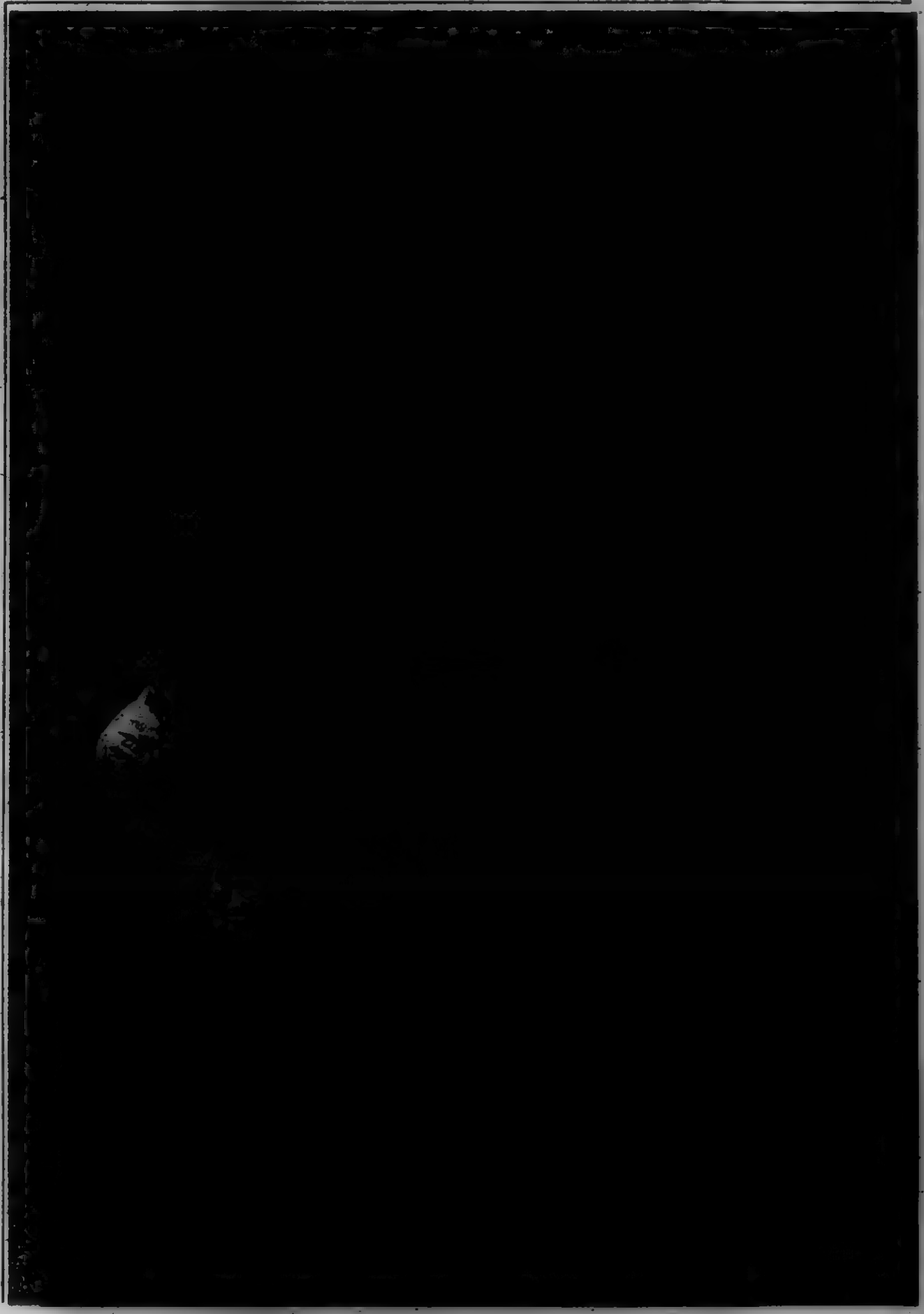
One way to conceptualize ISDN architecture is to think of it in terms of a big computer.

"Think of it as a massive hi-fi set which can handle everything from alarm signals to video signals and everything in between, at varying speeds and volumes. It will allow everything from the simplest sending of a message from point A to point B, to the sending of a whole television show, to doing data processing from the moment the data is received and shipped," Lecht said. "It's a big computer system as well as a massive network."

ISDN is an architecture, not a single system. There are bits and pieces of it in place now and some networks that more or less comply with the provisions of ISDN as it has been defined. "ISDN itself isn't the magic pot of gold at the end of the rainbow," Doll said. "It's a concept that will continue to evolve or change over time. There'll be a little bit more of it every year for as far out as one can see."

While these embryonic

See ISDN page 54



GET EVERYBODY ON BOARD.

Now there's a way to let everyone in your company chip in.

AT&T Information Systems, the company whose unparalleled communications heritage has been bringing people together for 100 years, now brings your office together. With state-of-the-art office automation that's designed to get your company moving ahead.

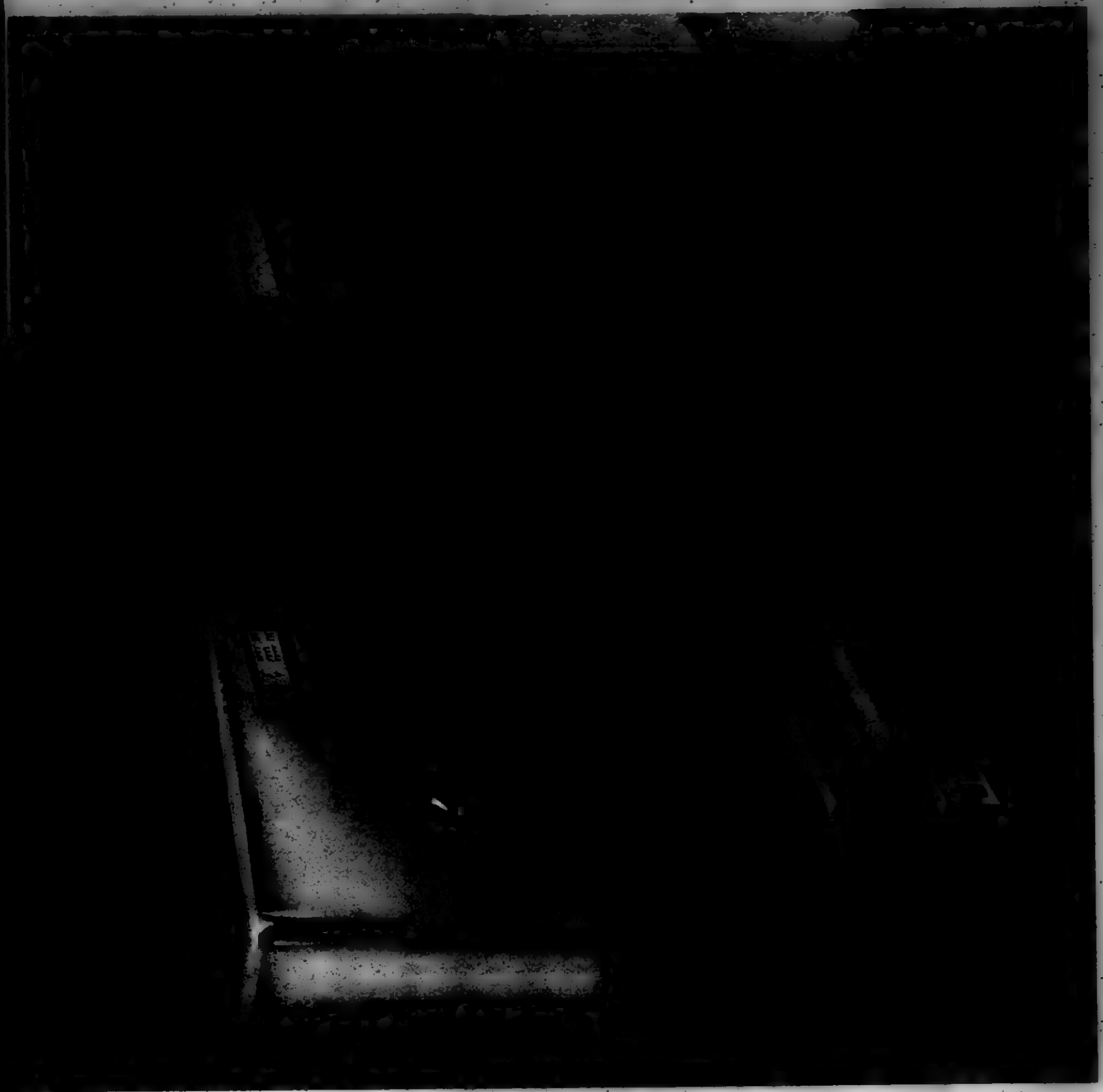
Electronic Document Communications, now available on System 85 and DIMENSION PBX, is an easy-to-learn software application that's hard to beat. Because it integrates your office by letting everyone prepare, send and store documents and messages with the speed and efficiency of a computer. So you can have better access to the right information in the right form at the right time.

Electronic Document Communications can streamline your office in three ways:

Preparing Information—Reduces the time, effort, cost and wasted paper between drafts by electronically creating, editing and formatting documents and messages. "The Composer," a special software feature, checks spelling, grammar, punctuation and usage. EDC even measures whether documents are readable by technical and nontechnical readers.

Moving Information—Speeds documents to many people in different locations simultaneously so they can act decisively. EDC allows you to determine the timing and cost of delivery, and even check to find out when documents were received. Using a password ensures the privacy of your messages.

Managing and Storing Information—Locates documents, and retrieves and evalu-



ates contents quickly and easily with electronic files—while reducing the possibility of losing documents. An electronic "Mailbox" allows you to quickly determine which documents to read first. EDC reduces storing and filing costs with an electronic "Archives" that allows for either short- or long-term storage, and the "Wastebasket" which enables you to permanently delete items after a determined period of time. There's even an electronic "Calendar" that checks personal schedules and arranges mutually convenient meetings.

Not only will all these features help you further integrate your office, Electronic Document Communications is itself just one part of AT&T's line of completely integrated business systems. For state-of-the-art office automation, you can implement EDC in conjunction with other applications software like Message Center/Directory, a call coverage and message system. These office management applications are now available on System 85 and DIMENSION® 600 and 2000 systems with the Applications Processor.

The result is you'll be able to improve staff productivity at every level and get everybody on board. And as new features are developed in the future, they'll be compatible with your existing equipment.

EDC was developed by Bell Labs systems designers who now work for AT&T Information Systems Laboratories. AT&T Western Electric produces EDC, and AT&T Information Systems will maintain it with comprehensive, conscientious service from the largest service organization in the industry. To find out more, call toll-free 1-800-247-1212, Ext. 879M.

AT&T's Electronic Document Communications: It's part of the integrated office of tomorrow that you can board today.

AT&T Information Systems

VAX USERS!
NOW GET SPREADSHEET
AND GRAPHICS IN ONE PACKAGE.
• Full business graphics • Advanced features • Affordable price
GRAPHIC OUTLOOK™
from STONE MOUNTAIN COMPUTING
1600 Cambridge Dr.
Santa Barbara, CA 93111 (805) 964-9101
VAX is a trademark of Digital Equipment Corporation

COMMUNICATIONS

ISDN from page 51

forms of ISDNs presently offer limited ISDN-type capabilities, the future use of a more solidly in-place system has far-reaching capabilities.

"They'll be used the way a computer would be used," Lecht said.

"Only this will be the computer of your dreams. What about a computer that not only distributes into different rooms in different buildings, but also to different cities and countries? You can still think of it as one computer which is in fact a house for other machines — thousands of machines in AT&T's case — so you have the capacity to have computer access and data delivery any place and the power to process in the network [rather than going] into your own data center," Lecht speculated.

"My forecast is that by the end of this decade, maybe 30% to 90% of all data processing in America will be acquired that way, that the majority of data processing — that is the powers that computer systems give us — will be distributable through networks [and] obtainable through networks, and nothing less than a terminal at the recipient's or deliverer's location is going to be required," according to Lecht.

STUDY from page 49

that's going to affect their business. Perhaps they think that this is so far into the future that they're not going to worry about it now," Rudov continued.

The Consultative Committee on International Telephony and Telegraphy (CCITT) has been developing worldwide ISDN standards during the past four years through a special study group. The CCITT will unveil its ISDN recommendations in Geneva, Switzerland, in November 1984.

Two basic factors

According to the study, the motivations for establishing ISDN standards originated from two basic factors. First, the telephone network — which originally was all analog — has been evolving increasingly into a digital network.

Second, as more corporate data is being routed outside companies' premises, use of the telephone system for data carriage has increased. Therefore, a symbiosis has developed between computing and communicating, and it becomes more logical and economical to combine voice and data into one standardized network — an ISDN.

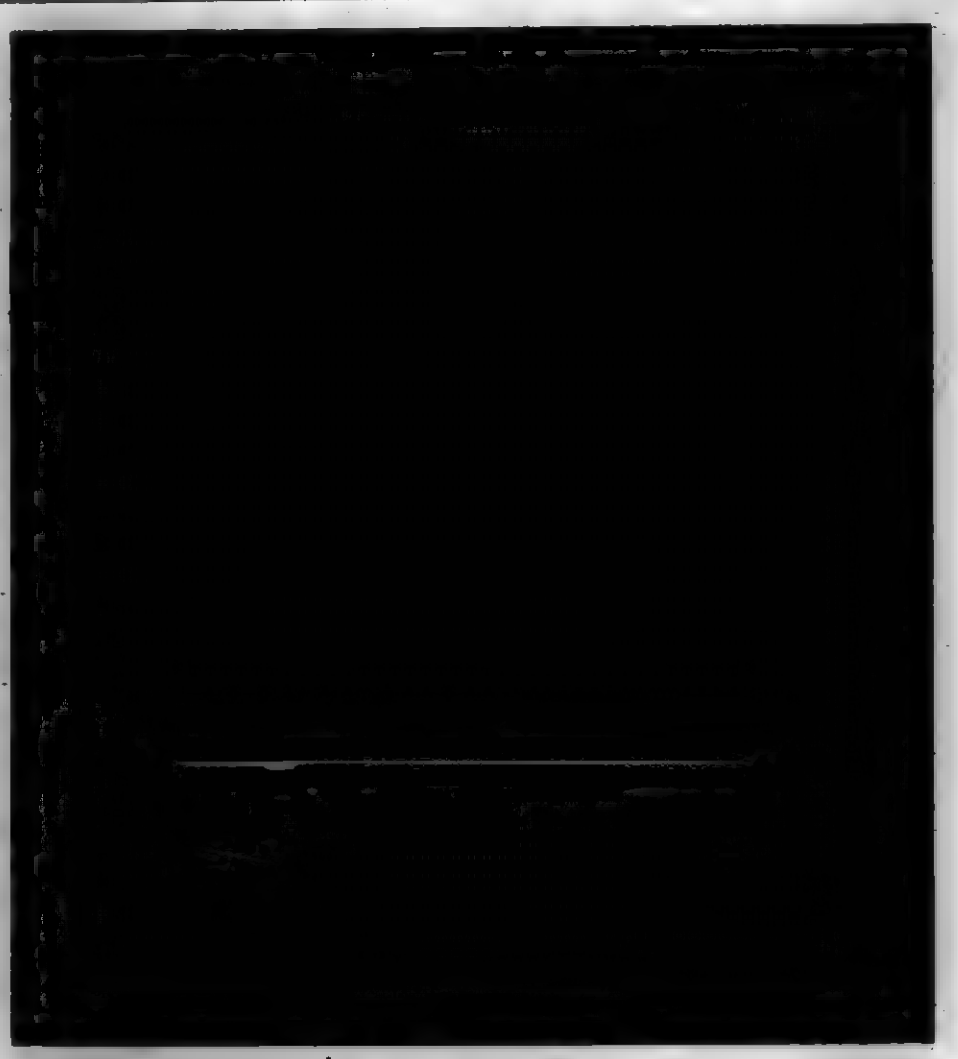
"There has never been a significant need for data terminal manufacturers to participate in those kinds of standards. They've had to think about RS-232, basically, and that's it," Rudov said. "Now a lot of data terminal manufacturers are starting to incorporate modems inside of their terminals, and the funny thing about that is ISDN will eliminate modems."

According to the report, the significance of this ignorance is that data terminals will be viewed second to telephones as the ubiquitous gateway to ISDN.

Rudov believes this situation may prompt foreign manufacturers to flood U.S. markets with ISDN-compatible terminals, as these manufacturers have been heavily involved in the ISDN standardization process.

The ISDN study is priced at $4,950.

Venture Development, One Washington St., Wellesley, Mass. 02181.



Now, a major advancement in Net/One local area networking. Lower cost.

Our new VLSI chip set has allowed us to do with one printed circuit board what we used to do in three. The result is a new Network Interface Unit, the NIU 150, that's half the cost of its predecessor, the NIU-1. In areas where a smaller number of either broadband or baseband connections are required, the pared-down NIU 150 brings per-port connection costs well below $500.

Streamlined NIU 150's mean more flexibility, too, by serving small equipment clusters in more diverse locations at a lower cost.

Like our other Network Interface Units, the new NIU 150 is equipped, off the shelf, to support most industry-standard equipment interfaces. And like our other NIU's it comes with complete network services software. It's also programmable, so special interface protocols can be added now or anytime in the future to support special equipment.

The broadband version of our new NIU 150 has an integral modem. Both baseband and broadband NIU 150's can accommodate up to six ports for device attachment.

Give us a call, or write for more information about turning the equipment you have now—whatever it is—into the network you need now, at a lower cost than was possible before.

Ungermann-Bass, Inc., 2560 Mission College Boulevard, Santa Clara, California 95050. Telephone (408) 496-0111.

Net/One from Ungermann-Bass

© 1983 Ungermann-Bass, Inc.
Net/One is a registered trademark of Ungermann-Bass.

OXFORD JUST TAUGHT CICS to COBOL

UFO/COBOL™ replaces Command Level COBOL with plain vanilla COBOL.

UFO/COBOL is the perfect answer to your procedural on-line programming needs. For the first time, all your COBOL programmers can now develop CICS applications without learning one word of new code. No longer will the lack of specialized Command Level programmers be a barrier to satisfying the growing demand for more on-line applications. Now your present staff can put their ANSI COBOL programming skills to work cutting your backlog of on-line applications…doing it faster, more efficiently, more automatically than ever before.

Without modifying your on-line environment or operating system, UFO/COBOL takes standard COBOL commands, and automatically translates them using a unique COBOL compiler into the language necessary for CICS program execution. Your ability to utilize the substantial benefits of the on-line environment increases enormously, while your programmers continue to write in a familiar and natural way.

An example of UFO/COBOL commands.

In COBOL	In Command level	In UFO/COBOL
DISPLAY (SCREEN-NAME)	EXEC CICS SEND MAP ('XDFHCMA') MAPONLY ERASE END-EXEC.	DISPLAY (SCREEN-NAME)
READ (FILE-NAME)	EXEC CICS READ DATASET ('FILE-NAME') INTO (FILE-NAME) RIDFLD (KEYNUM) END-EXEC.	READ (FILE-NAME)

UFO/COBOL defines CICS 3270 screens on-line.

In addition to extending the capabilities of your programmers, you'll find that UFO/COBOL is a powerful new method to speed-up the CICS application process dramatically. Built into UFO/COBOL is an interactive screen painting facility that lets you design CICS 3270 screens on-line. UFO/PAINT allows you to build or modify screens without writing one line of code. You design the screen simply by positioning fields where you desire. Then COBOL data descriptions are *automatically* generated from the screen.

UFO/COBOL makes prototyping easy.

By quickly defining a sequence of screens, you can prototype the final system…testing and modifying each screen before writing code. You can develop applications interactively with end-users, gaining all the efficiencies of their direct involvement.

Developed by Oxford…#1 in CICS application development.

UFO/COBOL is a development of Oxford Software Corporation, the leading independent supplier of on-line application development software. With more than 1500 installations of UFO…the premier, 4th generation non-procedural approach to application development …no one knows more about the CICS application development environment than Oxford.

If you'd like to learn how you can dramatically add to your on-line development capabilities, using your present programming skills, call in the leader. Call Oxford today at (800) 631-1615.

OXFORD SOFTWARE CORPORATION
174 BOULEVARD/HASBROUCK HEIGHTS, NJ 07604/201 288-4515

I'd like to schedule a UFO/COBOL demo. Please call to set a date.

Please send me literature on UFO/COBOL.

Name_____

Title_____

Company_____

Address_____

City_____ State_____

Zip_____ Phone (_____) _____ CW 1/89

W.S.A. Outside North America, contact one of the following WSA companies; Europe—Austria 0222-3135-1864; Benelux (NL) 03402-61088; France 1-284-2184; Greece 01-9680-631; Italy 011-517618; United Kingdom 01-950-3576; West Germany 02161-67604; Scandanavia (Sweden) 08-761-7380; Middle East/N. Africa—Greece 01-9680-631; S. Africa—11-37-3040; Israel—4-256195; India—(Madras) 44-89119; Asia—Hong Kong 05-866511-3; Japan (Nagoya) 052-211-5021; (Osaka) 06-445-7581; (Tokyo) 03-437-0821; Singapore 65-2253755; Australia—New South Wales 02-438-2477; South America—Brazil (Rio de Janeiro)-021-224-4378; (Sao Paolo) 011-258-1883.

Wang Labs introduces DVX upgrade

LOWELL, Mass. — Wang Laboratories, Inc. has announced the DVX Message Waiting Unit, DVX Feature Package 3.8 software and DVX networking capabilities — enhancements to the company's digital voice exchange (DVX), automated voice communications system.

The message-waiting unit, which sits under the user's telephone, notifies a person called by lighting a message-waiting lamp when a message is deposited in a DVX user's audio mailbox, either internally through DVX or externally by an outside caller, the vendor said. The price is $225.

DVX networking capabilities allow users to access all DVX functions in exchanging messages with individuals on other DVX systems. Software for the first phase of networking is $1,000/node plus a $10/mo license fee for each node.

DVX Feature Package 3.8 software provides users with a facility called Informational Services that allows information to be dispersed by phone to a large audience, regardless of whether or not the inquiry originates with a DVX or non-DVX user, the vendor said.

The information storage capacity of Informational Services consists of nine of the vendor's Voiceline audio mailboxes that hold up to 60 six-minute messages each. All that is needed to access the messages is a standard Touch-Tone-type telephone set, according to the vendor.

The product provides the following capabilities: message confirmation, mailbox scan, on-line directory, play positioning, password modification, 12-digit outbound calling and message purge. The price is $14,000 plus a $140/mo license fee.

Wang, One Industrial Ave., Lowell, Mass. 01851.

NCR Comten announces 4034 console

ST. PAUL, Minn. — NCR Comten, Inc. has announced the 4034 operator console for the company's 3690 data communications system.

The 4034 is available in two models. Model A-5 consists of an 80-char. by 24-line CRT with a detached keyboard and an 80-col., dot-matrix, bi-directional impact printer with stand and paper catcher. The printer attaches directly to the CRT, the vendor said. Model B5 comes without a printer and stand.

From the console, the network operator can control any local or remote communications processor in the network, reconfigure the relationship between lines and subchannels without regenerating the system software and execute network-control-program (NCP) line swaps.

The operator can also invoke utilities, traces and commands from the local console for remote nodes in an access-control-field/NCP network, the vendor said. The A-5 model costs $3,650. The B5 model is priced at $1,645.

NCR Comten, 2700 Snelling Ave. N., St. Paul, Minn. 55113.

Hmmm ... Worst data byte I've seen in a long time.'

Workstation out from Ambi

STAMFORD, Conn. — Ambi Corp. has announced an integrated voice and data executive workstation designed as a desktop, two-line, integrated voice and data private branch exchange (PBX).

The Ambiset reportedly combines telephone features with personal processing capabilities that can be upgraded to include compatibility with IBM and with computers using the Microsoft, Inc. MS-DOS operating system.

The unit is said to look like a business telephone with the addition of a typewriter keyboard and an 80-col. by eight-line display screen. It reportedly can be installed by plugging in to a standard analog RJ11 telephone jack for use on rotary and pulse lines.

It is said to feature 128K bytes of random-access memory (RAM) for general messaging functions; 64K bytes of battery-backed Cmos RAM to support a 250-entry, fast-dial directory; and 48K bytes of erasable programmable read-only memory that is set aside for special function keys.

These special function "learn" keys are designed to allow the user to teach the system how to handle special communications needs, the vendor said.

The suggested retail price is $2,495.

Ambi, 1639 Washington Blvd., Stamford, Conn. 06901.

PREVENT BAD

IT SPREADS.
CORRUPTS.
ERODES.
DESTROYS INTEGRITY.

Bad data is really bad news. Because it's impossible to get good information from bad data. And once bad data gets into a system, there is no cure. The bad simply gets worse.

There is only one way to guarantee good information: *PREVENT BAD DATA.*

TSI International can do just that. We're the good information specialists. With software designed specifically to make sure your data starts good and stays good. Our products will capture, control and deliver consistently good data to assure nothing but good information. You can depend on it. No one knows more about how to prevent bad data than TSI.

COMMUNICATIONS

COMMUNICATIONS CONTROLLERS

AMDAHL CORP.
4470 Network Concentrator

Amdahl Corp. has announced the 4470 Network Concentrator, a packet-switching product which allows users to communicate with private and public X.25 data networks and computer systems using the industry-standard IBM Systems Network Architecture (SNA). It is an extension of the company's 4400 series of communications products.

The product features single or multiple X.25 links to public data networks. It supports IBM 3274 and 3276 control units and associated printers and keyboard displays with up to seven Synchronous Data Link Control (SDLC) lines, 16 SDLC 3270-type clusters and 128 SNA logical units, the vendor said. The price is $12,500.

Amdahl, 1250 E. Arques Ave., P.O. Box 470, Sunnyvale, Calif. 94086.

VOICE/DATA COMMUNICATIONS

GTE BUSINESS COMMUNICATION SYSTEMS, INC.
Omni SI

GTE Business Communication Systems, Inc. has announced the Omni SI office communication system, an expansion of the company's private branch exchanges.

The system can handle up to 256 voice and data ports and is designed to serve businesses with between 20 and 200 employees, the vendor said.

The product utilizes dual-bus architecture — a pulse-code-modulation bus for voice and a packet bus for data. The product is available with specially designed packages for specific industries such as lodging and health care, the vendor said. The price range is $900 to $700 per line.

GTE Business Communication Systems, 12501 Sunrise Valley Drive, Reston, Va. 22096.

SURE COMMUNICATIONS, INC.
Solution III Telemanager

Sure Communications, Inc. has introduced the Solution III Telemanager, an automated, on-site telemanagement system designed to assist organizations with up to 3,000 extensions.

The system features a microcomputer, hard disk storage and a CRT and utilizes Digital Equipment Corp. hardware, the vendor said.

The product was designed to function in a regular office environment rather than a computer room and is compatible with almost every telephone system and telephone switch, according to the vendor. The price ranges from $40,000 to $45,000.

Sure Communications, 257 Park Ave. S., New York, N.Y. 10010.

CP NATIONAL
Telepol II

CP National's Software and Systems Division has introduced Telepol II, a telephone-traffic data storage system which allows polling of call records from multiple sites for processing on a central IBM mainframe.

The system collects telephone call records from almost any computerized telephone system and records them onto 5¼-in. flexible disks for later polling. It uses the IBM-compatible 3780 Binary Synchronous Communications protocol for polling, with a transmission speed of 1,200 bit/sec, the vendor said.

Processing on an IBM mainframe can be accomplished with the company's Telemanagement Software Systems. The price is $4,900.

CP National, 345 Old New Brunswick Road, Piscataway, N.J. 08854.

MULTIPLEXERS/MODEMS

TIMEX COMPUTER CORP.
TS2050

Timex Computer Corp. has announced the Timex Sinclair (TS) 2050 telecommunications modem, which allows users of the vendor's computers to use their telephones for services such as electronic mail and home banking and shipping.

The modem, when used with the TS1500 computer, provides an interactive system that can be used to communicate with other computers. The TS2050 is compatible with all Timex Sinclair personal computers and peripherals. It includes a Timex Smart Terminal I software cassette, which enables users to access computer subscription services and computer data bases immediately.

It also comes with modular phone cables and jacks for connection to standard or electronic telephones, a 9V ac adapter and a step-by-step instruction manual.

The TS2050 Telecommunications Modem has a retail price of $119.95.

Timex Computer, P.O. Box 2655, Waterbury, Conn. 06725.

GENERAL DATACOMM INDUSTRIES, INC.
4800S; 2128S

General Datacomm Industries, Inc. has introduced two modems, the 4800S and the 2128S Super Saver.

The 4800S is a switched network, key-featured, single card modem. It features asynchronous or synchronous operation with autodialing and autoselect request-to-send, clear-to-send delay.

Continued on page 59

DATA

FACETS. Preventing bad data begins with stable database designs. This leading edge design tool assists in all phases of database projects, from information analysis to finished design.

KEY/MASTER. From the moment you capture data, this widely used on-line data entry system helps you screen bad from good — to assure initial and ongoing accuracy.

DATA CATALOG 2. By applying inventory techniques to information, this dictionary system controls your good data — to keep it good.

DATA ANALYZER. As a powerful information center tool for the retrieval and analysis of production data, it will help turn your good data into good information.

DOCU/MASTER. A new way to deliver all your good information — from highly structured data to unstructured text. This on-line information system allows users to query any way they want.

TSI International. The good information specialists. For good data that produces good information, call us at 800-227-3800, Ext. 7005. You can rely on TSI.

TSI International

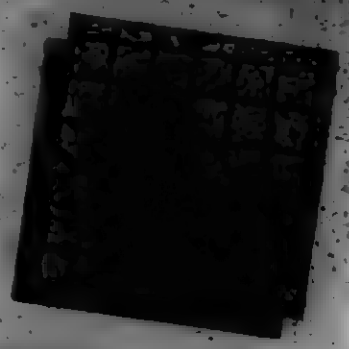
a company of The Dun & Bradstreet Corporation

187 Danbury Road Wilton, Connecticut 06897

The Goal News

For VSAM Dataset Management

AUTOMATIC BEATS MANUAL



VSAMAID/XP™ Slashes Man-Hours From VSAM Management

Goal Systems International has developed a product called VSAMAID/XP which makes virtually any systems person a VSAM expert. Data processing managers everywhere know that when VSAM is running, it is necessary to continually tune the system in order to keep response times within acceptable limits. Before VSAMAID/XP, that job required highly specialized technicians working full time to manually keep disk utilization and CPU overhead to a minimum.

VSAMAID/XP changes all that. The system eliminates the inefficiencies of VSAM and automates the tuning of VSAM files.

A historical file of all VSAM data sets in DOS/VSE, OS/VS1 and MVS is created from VSAM performance data. Then, as required, vital statistics are generated through VSAMAID/XP's Recommendations Processor, Device Capacity Processor or History File Treads Processor. Working through mathematical algorithms, VSAMAID/XP will tell you exactly how to best tune your system for your VSAM files. If you wish to see how altering various factors will change your efficiency, there is a modeling system built into VSAMAID/XP for that purpose.

Product Of New Software Technology

Calling on its highly skilled software development team, Goal Systems International began research on VSAMAID/XP in mid-1981. The system required the experience of telecommunications software experts, mathematicians, and skilled programmers to produce. "The challenge," a spokesman said, "was to make the system do all the work, yet allow the user to maintain control over a wide variety of VSAM data."

Some of the VSAM factors VSAMAID/XP handles include variable selection for key sequenced files, the use of free-space values, VSAM default parameters, allocation of virtual storage, records organization, most common access patterns, and more.

VSAMAID/XP makes its recommendations in the IDCAMS DEFINE format to simplify redefining each file.

Over 200 Systems On Trial in First Three Months

Named as the most popular product in the history of Goal Systems, VSAMAID/XP has been shipped to more than 200 sites for trial in its first three months of availability.

Works With FAVER/XP For Total VSAM Management

Goal Systems International has revealed that they have an interface between the FAVER/XP Backup & Restore system and the VSAMAID/XP system which creates the only complete VSAM dataset management system available today.

During backup, the FAVER/XP special interface creates a historical file, which is used by VSAMAID/XP to create a "recommendations" report. The report tells resource managers how to manage VSAM datasets for optimum space allocation and resource utilization. VSAMAID/XP recommendations may then be implemented with simple commands through the FAVER/XP Auto-Delete/Define facility.

"It seems like all we have to do is mention VSAM and people are eager to listen," said Jenny Yost, Sales Manager for the XP Product Line. "But then, installations are only now realizing that a great deal of manual labor is spent keeping VSAM files tuned. VSAMAID/XP can be installed in a few minutes; it will make its first recommendations after just one week of gathering [illegible] data. People quickly become delighted with [illegible]

VSAMAID/XP and FAVER/XP are great news for installations with VSAM. They are two of the Extended Productivity Systems from Goal Systems International. Both are available for a free trial. Call Goal Systems toll free today.

800-848-4640 (In Ohio, 800-628-4640)

Goal Systems
Software Solutions

Goal Systems International Inc.
5455 N. High Street
Columbus, Ohio 43214-1183
Phone (614) 888-1775

COMMUNICATIONS

Continued from page 87

The 4906S is available in a compact stand-alone enclosure or high-density rack-mount shelf that houses 16 modems.

The vendor's other new product is the 2123S Super Saver modem, an asynchronous, full-duplex modem designed for switched network operation. It is compatible with Bell 103, 113 and 212-type modems and allows any RS-232C-compatible asynchronous terminal to communicate with any other computer and a Bell 212-compatible modem.

According to the vendor, the 2123S has a digital adaptive equalizer that provides greater tolerance to telephone line impairments often found on the switched network. The list price of the 4906S is $1,645; the 2123S costs $495.

General Datacomm Industries, One Kennedy Ave., Danbury, Conn. 06810.

C-COR ELECTRONICS, INC.
Model 7140 modem

C-Cor Electronics, Inc. has announced the Model 7140 Synchronous Data Modem which operates at speeds up to 9.6K bit/sec.

The product is an extension of the company's Cableport 7100 Series Narrowband Modems for two-way broadband coaxial network applications.

The Model 7120 Voice Modem offers audio response up to 10 kHz for off-premises extension and bypass telephone applications. The Model 7130 provides medium-speed data transmission up to 19.2K bit/sec. All models operate in simplex, half-duplex and full-duplex modes, the vendor said. The prices are $675 for the 7120 Voice Modem, $625 for the 7130 Asynchronous Modem and $650 for the 7140 Synchronous Data Modem.

C-Cor Electronics, 60 Decibel Road, State College, Pa. 16801.

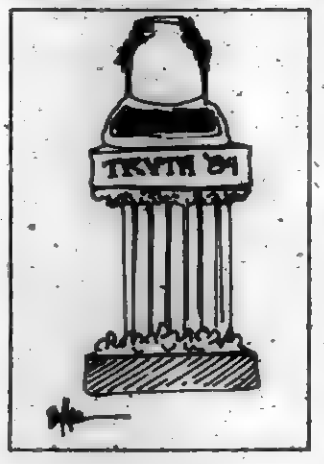
NOVATION, INC.
Access 1-2-3 package

Novation, Inc. has bundled its PC1200B smart modem with Crosstalk XVI from Microstuf, Inc., to create a data communications package for the IBM Personal Computer, Personal Computer XT and compatibles.

The system includes a modem, software and documentation and is part of Novation's communications system called Access 1-2-3. The modem is capable of full-duplex operation at either 300 or 1,200 bit/sec and can perform an automatic self-test and receiver alignment at power-on and can be put into analog or digital loop-back test modes, the vendor said.

The software package for the IBM Personal Computer is an intelligent terminal employing all the features of the modem to accomplish autodial, autologon and autoanswer and allows for disk-to-disk data transfer, according to the vendor. The price of the package is $595.

Novation, 20409 Prairie St., Chatsworth, Calif. 91311.



Turn Your Efforts Into $$$

Wanted: Software. Successful software company seeking additional products to market. Must run on IBM mainframes or PCM's. Prefer programmer/operations productivity aids. If you have written a program and you need an international company to market it for you, send an abstract of the product to:

Triangle Software Company

J. Zipp, Triangle Software
4340 Stevens Creek Blvd.
Suite 166
San Jose, CA 95129
(408) 554-8121.

THE NEWEST FEATURE ON THE 3000 FAMILY OF PRINTERS IS OUR NEW NAME.

Our 3000 family of printers has an impressive list of features. But the most prominent new change on our printers is our new name.

Formerly the Data Communication Products Department of General Electric, we're now independently owned...and our new name is Genicom.

So the GE 3000 family is now the Genicom 3000 family. But while the name has changed, the product retains its established superiority.

The Genicom 3000 series of output printers still features speeds from 40 to over 400 cps. Single or dual mode printing. Type quality from EDP to NLQ. Multi-color printing. Graphics. Selectable type fonts. American craftsmanship and more.

Genicom 3000 printers will be as popular as ever with end users as well as OEM's, distributors, retailers and dealers...thanks to our list of outstanding features, plus the unique compatibility advantages of several models all based on a single design.

And Genicom will also offer other products including our 2000 teleprinters and the soon to be introduced 4000 plastic matrix printers. You'll find we have the same complete product line we had with GE.

Genicom. We have proven products, experienced personnel, established manufacturing facilities, a nationwide service network, plus a new commitment to excellence that stands behind our new name.

Genicom Corporation, One General Electric Drive, Dept. M311, Waynesboro, VA 22980. In Virginia, call 1-703-949-1170.

GENICOM

For the solution to your printing needs call

TOLL FREE 1-800-437-7468

COMMUNICATIONS

TEST EQUIPMENT

B & B ELECTRONICS
Mini Tester Model 232MT

B & B Electronics has introduced the Mini Tester Model 232MT, a smaller version of the company's RS-232 Tester.

The Mini Tester features one male and one female connector for insertion into any RS-232 interface. Twenty-five pins are connected straight through, with seven lines connected to LEDs, which indicate the status of transmission data, receive data, request to send, clear to send, data set ready, carrier detect and data terminal ready, the vendor said.

The product measures 2¼ by 2¼ by ¾ in. and is available with two-color LED. Red and green LED can indicate a low, high or open condition.

The Mini Tester is priced at $49.95; with two-color LED, it costs $59.95.

B & B Electronics, Box 475, Mendota, Ill. 61342.

HEWLETT-PACKARD CO.
HP 4945A Time

Hewlett-Packard Co. has announced a transmission impairment measuring set (Time), designed for problem isolation on high-speed, data- and voice-grade circuits.

The HP 4945A Time reportedly combines a comprehensive measurement set, a wideband frequency range, convenient display formats, programmability and hard-copy capability through multiple I/O and remote testing capability.

The HP master/slave technique is said to increase productivity with one-person, two-way testing by allowing the local master set to control a remote slave set with automatic control and collection of slave functions and measurements.

The company offers delivery in eight to 12 weeks after receipt of order. The HP 4945A Time is priced at $14,950.

Hewlett-Packard, 1820 Embarcadero Road, Palo Alto, Calif. 94303.

DOLCH LOGIC INSTRUMENTS, INC.
SIP 80E

Dolch Logic Instruments, Inc. has introduced a serial interface probe that configures the front end of a logic analyzer for analysis of asynchronous V.24/V.28 RS-232 serial data.

The SIP 80E probe is available for use with the company's 4950A and 64300 logic analyzers. The probe connects into a serial communications link through standard RS-232C, 25-pin D connectors, according to the vendor.

Features of the probe include capabilities to monitor a serial link's send and receive lines simultaneously or individually and to transmit any selectable Ascii characters on those lines.

It accommodates data rates to 19.2K bit/sec, has a built-in clock burst generator for triggering on the first incoming character and maintains the timing relationships on the logic analyzer's screen by writing blank characters for unchanging and invalid characters. The price is $1,300.

Dolch Logic Instruments, 3052 Orchard Drive, San Jose, Calif. 95134.

AUXILIARY EQUIPMENT

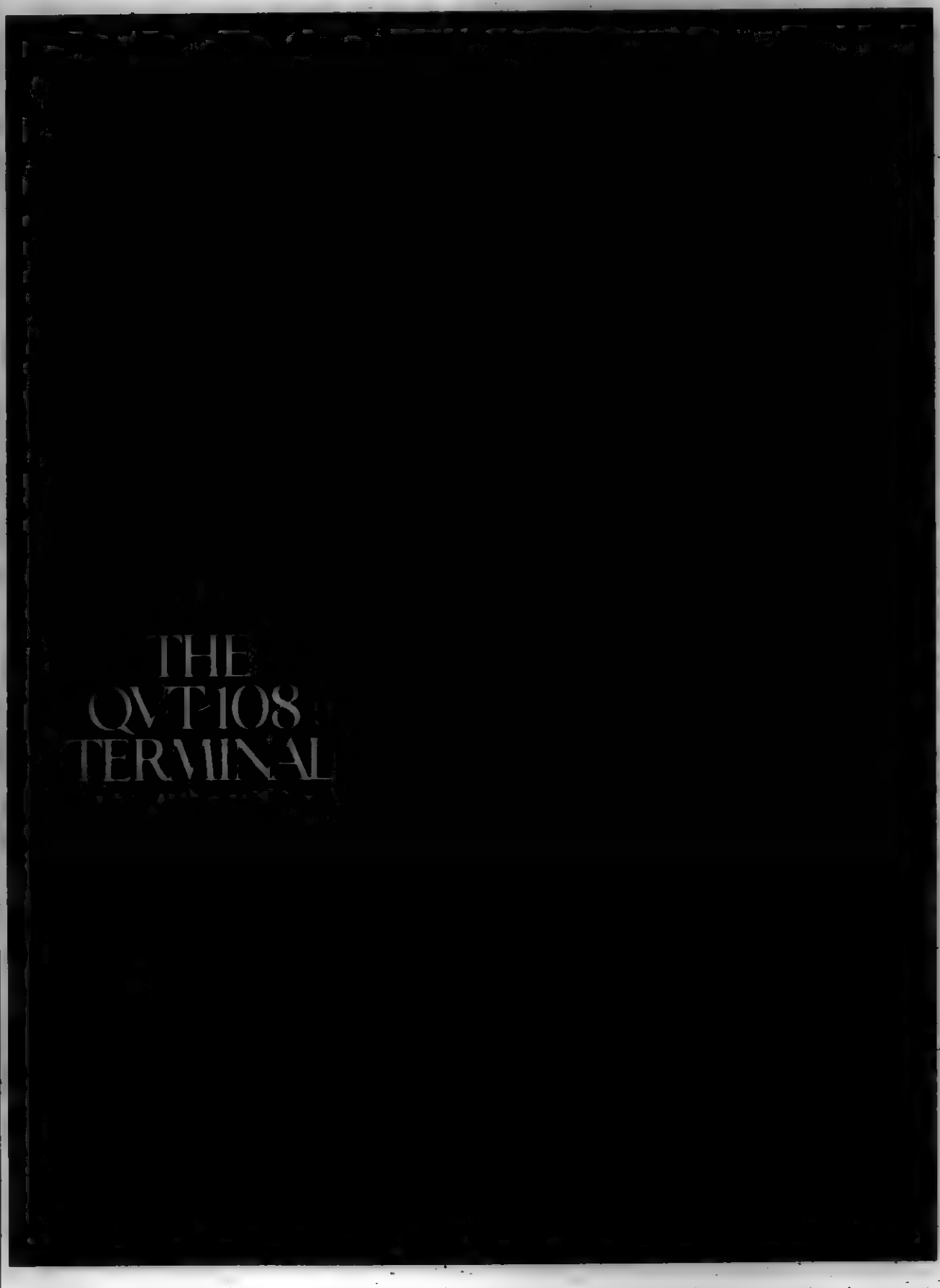
SATELLITE SEMINARS
Tele-Update '84

Satellite Seminars has announced a teleconference designed to inform major telecommunications users of current regulatory and technological changes and of their potential impact on rates and service options.

Scheduled for Feb. 9, Tele-Update '84 will be televised from Biznet, the U.S. Chamber of Commerce facility in Washington, D.C.

According to the vendor, key individuals, agencies and regulatory and technological developments will be featured in a four-hour program, which will also include background and identification of issues, discussion of bills still before Congress, court settlement provisions and other topics of interest to telecommunications users and associations.

The program will be broadcast to at least 25 downlink facilities at universities, hotels and other meeting sites in major metropoli-



COMMUNICATIONS

tan areas across the country. The registration fee for the teleconference is $75 in advance or $85 at the door.

Satellite Seminars, Box 364, Salt Lake City, Utah 84110.

DIGITAL MICROSYSTEMS, INC. Self-study course

Digital Microsystems, Inc. has added a self-study course for its Digital Research, Inc. CP/M, local-area network, manufacturing resource planning (MRP) system.

The system includes five workstations, 46M bytes of hard disk storage and networking and office automation software. The office automation software includes Perfect Software, Inc.'s Perfect Writer, Perfect Calc, Perfect Speller, Perfect Filer and an electronic mail system.

The MRP software includes material processing, sales order management, master scheduling, inventory control, work order processing, purchasing, inventory, shop floor control and job costing functions. The self-study course is a 14-unit course developed by Bourke-Arnold Enterprises, manufacturing training consultants.

In addition to the self-study materials, Digital Microsystems provides its customers with a one-day class concerning the office automation software and a one-day training session for the networking and MRP software. An MRP system costs $39,900.

Digital Microsystems, 1755 Embarcadero, Oakland, Calif. 94606.

HADAX PRODUCTS, INC. PC-Mate

Hadax Products, Inc. has announced the PC-Mate series of data switches. The series includes two push-button switches, each with an input panel connector, plus two output connectors mounted on 6-ft-long ribbon cables.

One switch has a 36-pin/36-lead switched interface for parallel printers, and one has a 24-lead switched D-25/RS-232 interface for serial printers, the vendor said. The price is $99.

Hadax Products, 79 Hazel St., Glen Cove, N.Y. 11542.

COMPUTER APPLICATION SERVICES, INC. Electronic Mail System

Computer Application Services, Inc. has introduced Electronic Mail System (EMS), a device that reportedly connects IBM mainframe computers running on either OS or DOS directly into Western Union Corp.'s Easylink. Easylink, in turn, supports such sites as TWX, Telex I and Worldwide Telex.

Easylink features automatic dialing and sign-on, transmittal of messages from EMS, inquiry of messages from Western Union and the distribution of Easylink messages to EMS mainframe users at IBM CICS terminals.

Typical users of the Easylink connection of EMS, according to the vendor, are purchasing departments who use it to send orders and sales departments who use it to send shipping confirmations.

EMS is a full-featured electronic mail system for IBM 3270 terminal networks running CICS. The system includes message forwarding, full screen message editing, route lists, tickler files, to-do lists and calendaring.

EMS is offered for $8,000 for the OS version and $7,500 for the DOS version. There is currently no separate charge for the Easylink connection.

Computer Application Services, Suite 210, 13535 Seal Beach Blvd., Seal Beach, Calif. 90740.

GILTRONIX, INC. 9000 series DCU; Selecto-Switch

Giltronix, Inc. has announced the 9000 series Distributed Control Unit (DCU), an automatic switching device for computer interfacing.

The DCU allows communications to be established between any device connected to one of the DCU ports. The product's automatic switching unit allows keyboard-controlled selection of peripherals and computer systems.

Prices range from $509 to $847.

The company has also introduced a Selecto-Switch system for the IBM Personal

Continued on page 68

QVT-108

The Great Emulator.

Qume's new QVT108+ VDU terminal emulates Televideo models 925, 920 and 912, making it a perfect fit for operators familiar with any of these terminals. It more than matches the Televideo 925 with sophisticated features like 11 function keys, 22 user-programmable functions, 12 editing functions, 25th status line, a menu set-up mode, two full pages of screen memory, and many other standard features.

The QVT108 takes up minimal workspace, and operators will love its ergonomic design: a non-glare green or amber screen with full tilt and swivel, a big 9 x 12 dot matrix for each character to minimize eye-strain, and a detached, low-profile, adjustable-tilt keyboard.

Engineered and built to Qume's exceptional reliability standards, the QVT 108 is backed by our six-month warranty and a nationwide service network. Features include:

• Local or duplex editing • 11 function keys (22 user-programmable functions avail) • Bidirectional auxiliary port • Two pages of screen memory • Line drawing graphics character set • Tilt/swivel, non-glare, green screen (amber optional) • 9 x 12 character cell resolution, 7 x 9 character size • Detached, low-profile, adjustable-tilt typewriter style keyboard with numeric pad • 24 lines x 80 characters with a 25th status (defeatable)/menu/user-programmable line • Screen-saver time out (an inactive terminal shuts off its screen after fifteen minutes with no screen data loss) • 6 video attributes: blink, blank, normal video, reverse video, underline, and half-intensity • Televideo model 925 code compatible • Emulations: Televideo 925 and 912/920 • Self test • Time of day • Monitor mode • Switching power supply (efficient operation and low power consumption)

Display Format
24 lines x 80 characters
25th status/set-up/user-programmable line

Character Formation
7 x 9 matrix in a 9 x 12 cell

Displayed Character Set
96 ASCII characters, 32 control character symbols, and 15 graphic symbols

Editing (Local and Duplex)
Cursor: up, down, left, right, home. Character/line insert and delete, erase to end of line/page, tab, back tab, alternate page.

Communications Interface
EIA RS232-C, optional current loop (active or passive)

Communications Protocols
DTR and/or XON/XOFF

Communications Modes
Full or half duplex, block line or block page; 7 or 8 data bits

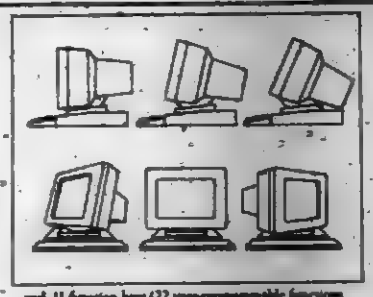
Baud Rates
16 selections from 110 to 19.2K

Auxiliary Port
Bidirectional. Modes: parallel, transparent, screen copy. EIA RS232-C

Screen
Tilt/swivel, 12-inch diagonal, non-glare green (optional non-glare amber, 14-inch screen)

Character Attributes
Blink, blank, normal video, reverse video, underline, half intensity

Keyboard
Detached, adjustable-tilt, low-profile (home row 30mm from work surface), alphanumeric keys, 14-key numeric pad, 11 function keys (22 user-programmable functions with shift), defeatable escapement and key click, 12 editing keys. Print, set-up, and scroll lock keys.



Fields
Protected and unprotected

Parity
Odd, even, mark, space, none

Screen-Saver
Screen shuts off after 15 minutes of inactivity without data loss (defeatable)

Screen Memory
Two pages

Set-Up Mode
Menu-style password in non-volatile memory (lithium battery with 7-year life)

Power Supply
Switching-type (low power consumption)

Options
Amber screen *
14" screen
20mA current loop
Special character sets

Command Set
Televideo 925 compatible

Emulations
Televideo 925
Televideo 912/920

Power Requirements
95-125 VAC
200-264 VAC
50/60Hz, 30W

Dimensions
Keyboard 1.5"(H) x 18"(W) x 8"(D)
Display 14"(H) x 13"(W) x 12"(D)

Weight
Keyboard 3 lbs., display 19 lbs.

Command Codes

Address cursor, row, column	ESC = r c
Address cursor, page, row, column	ESC – p r c
Auto page on	ESC v
Auto page off	ESC w
Back tab	ESC I
Bell	CTRL/G
Block mode on	ESC B
Transparent print on	ESC'
Transparent print off	ESC a
Carriage return	CTRL/M
Character delete	ESC W
Character insert	ESC Q
Clear all column tabs	ESC 3
Clear all to half intensity blank characters	ESC , .
Clear all to nulls	ESC *
Clear column tab	ESC 2
Clear unprotected to blank characters	ESC ; or CTRL 2 or ESC +
Clear unprotected to nulls	ESC)
Conversation mode	ESC C
Copy print mode on – aux port	ESC @
Copy print mode off – aux port	ESC A
Cursor down	CTRL/V
Cursor home	CTRL/A
Cursor left	CTRL/H
Cursor right	CTRL/L
Cursor up	CTRL/K
Disable bidirectional port	CTRL/T
Disable XON/XOFF control	CTRL/N
Disable status line	ESC k
Display user line	ESC g
Duplex edit on	ESC I
Enable bidirectional port	CTRL/R
Enable XON/XOFF control	CTRL/O
Erase to EOL with blanks	ESC T
Erase to EOP with blanks	ESC Y
Field tab	ESC i
Keyclick off	ESC (
Keyclick on	ESC)
Line delete	ESC R
Linefeed	CTRL/J
Line insert	ESC E
Load user line	ESC f (load) CR
Local edit on	ESC k
Lock keyboard	ESC 0
Monitor mode off	ESC a or ESC X
Monitor mode on	ESC U
New page	ESC K
Newline	CTRL/_
Normal video	ESC d
Previous page	ESC J
Print page	ESC P
Protect mode off	ESC '
Protect mode on	ESC &
Read cursor, page, row, column	ESC /
Read cursor, row, column	ESC ?
Reverse video	ESC b
Reverse linefeed	ESC j
Screen, blank	ESC o
Screen, normal	ESC n
Select termination character	ESC n (char)
Send line all	ESC 6
Send line unprotected only	ESC 4
Send message all	ESC s
Send message unprotected	ESC 5
Send page all	ESC 7
Send page unprotected only	ESC 5
Set column tab	ESC 1
Set cursor attributes	ESC (n)
Set printer termination character	ESC p (n)
Set video attribute	ESC G (n)
Tab	CTRL/I
Unlock keyboard	ESC "
Half intensity off	ESC (
Half intensity on	ESC)
Load time (in status line)	ESC sp 1 e,a,m,d,y
Read time	ESC sp 2
Special graphics off	ESC %
Special graphics on	ESC $

*Definitions and Televideo 925, 920, and 912 are registered trademarks of Televideo Systems, Inc.

Authorized Qume Distributor/Dealer

Qume Corporation
Koll Center
224 Brokaw Road
Suite 175
San Jose, CA 95112
(408) 920-2600

Qume Corporation
8011 Bristol Parkway
Suite 150
Culver City, CA 90230
(213) 410-1466

Qume Corporation
1820 East Gary Avenue
Suite 104
Santa Ana, CA 92705
(714) 957-4040

Qume Corporation
Shamrock Park Office
Suite 110G
2323 South Troy Street
Aurora, CO 80014
(303) 752-3000

Qume Corporation
2354 Hassell Road
Hoffman Estates, IL 60195
(312) 490-9320

Qume Corporation
5335 Far Hills Avenue
Suite 103
Dayton, OH 45429
(513) 439-0488

Qume Corporation
9925 Westridge Drive
Irving, TX 75063
(214) 659-0745

Qume Corporation
20 Maryland Road
Edison, NJ 08817
(201) 225-5006

Qume Corporation
99 Crosby Drive
Bedford, MA 01730
(617) 275-3200

Qume Corporation
4319 Covington Hwy
Suite 212
Decatur, GA 30035
(404) 284-8600

Qume.
A Subsidiary of ITT
Qume Corporation, 2350 Qume Drive
San Jose, California 95131

CANADA
QUME Canadian Office
207 Place Frontenac
PTE Claire
Quebec, Canada H9R4Z7
(514) 695-3837

ENGLAND
QUME (UK) Ltd
Bridgewater Close
Reading, Berkshire UK
PH 734-584-646

FRANCE
QUME GmbH,
Bureau de Liaison France
20 rue Hainers
92100 Boulogne, France
PH (1) 8082394

GERMANY
QUME GmbH
Eschener 31
4000 Duesseldorf 13
West Germany
PH 211743016

Contents of this publication may be preliminary and/or may be changed at any time without notice and shall not be regarded as a warranty

sample

Finally, someone who sees the forest. As well as the trees.

In their great rush to fill the office with personal computers, people lost sight of the ultimate objective. To work together more productively.

Then Sperry appeared.

With a remarkably simple solution. The Sperry PC.

It was personal, but not so personal that it would keep people from being part of a system.

It could run all of the software of IBM's PC.

It performed all the user-friendly functions people expected. It was, in fact, even friendlier than IBM's machine.

It had a more comfortable keyboard. A more dramatic display of graphics. And a high-speed "turbo" switch that allowed it to run 50% faster than IBM.

And it could keep people in touch with the most valuable resource an organization can have —the main computer.

No matter whose big system they have.

Sperry *or* IBM.

Or both.

The Sperry PC.

Admittedly, big picture.

But then, that's what happens when you look at the forest. As well as the trees.

See how the Sperry PC can work for you. Call 800-547-8362, toll-free. Or write us, Sperry Corporation, Computer Systems, Department 100, P.O. Box 500, Blue Bell, PA 19424.

© Sperry Corporation, 1983

SPERRY PERSONAL COMPUTER SPECIFICATIONS

OPERATING SYSTEM MS DOS Version 1.25 or 2.0 with G.W. BASIC	KEYBOARD 84 keys, 6 ft. cord
MICRO-PROCESSOR High-Speed 16-bit 8088	AUXILIARY MEMORY Up to two internal 5¼" diskettes 10MB internal fixed disk when configured with single diskette.
DISPLAY SCREENS High Definition monochrome display. High resolution color display. IBM compatible graphics.	USER MEMORY Standard 128K bytes, expandable to 640K
COMMUNICA-TIONS Built-in Asynchronous	DIAGNOSTICS Power-on self test
	CLOCK Time-of-day with battery back-up

The Sperry PC. What the personal computer should have been in the first place.

Ad# No. 100-83-8223—P/CS

Prepared by LEWIS, GILMAN & KYNETT, INC., Philadelphia.

COMMUNICATIONS

Continued from page 61

Computer, which eliminates the need for plugging and unplugging of cables connecting such peripherals as printers, plotters, terminals and modems to various computers, the vendor said. The system is available in more than 10 models. Prices range from $119 to $299.

Gilbreath, 3720 Fabian Way, Palo Alto, Calif. 94303.

XYPLEX, INC.
XP-UN32-A

Xyplex, Inc. has announced the XP-UN32-A, a host interface unit for the company's networking system.

The product is a 32-port version of the vendor's Digital Equipment Corp. Unibus host interface unit. The Xyplex system converts the terminal subsystem of DEC's VAX-11 minicomputer from a character-at-a-time system to an intelligent message processor. It provides the VAX/VMS system with equivalent capabilities of the IBM 3270 terminal family, the vendor said.

The unit provides a single-board interface for up to 32 or 64 ports via a single coaxial cable into a VAX computer system. The system supports up to 255 host interface units and cluster controllers connected to a single coaxial cable, which can be up to six miles in length, the vendor said. Unit price is $5,700.

Xyplex, 100 Domino Drive, Concord, Mass. 01742

ATTACHMATE CORP.
3270 Coax Interface

Attachmate Corp. has announced the 3270 Coax Interface, said to allow IBM Personal Computers to function as new IBM 3270 Personal Computers with more features and enhanced performance.

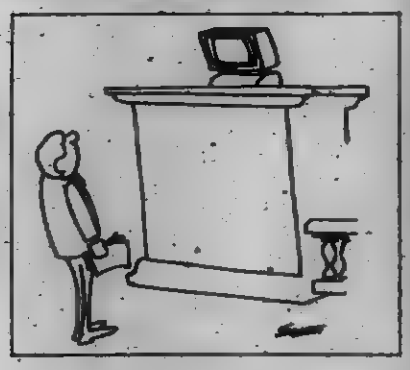
The 3270 Coax Interface adds Personal Computer-to-mainframe windows to IBM Personal Computers and their counterparts. When connected to mainframes, Personal Computers with the Attachmate 3270 can be transformed into as many as four terminals, the vendor said. The product can function with up to seven distinct programs, displaying each one in a separate screen window.

A lock and key secure access to the mainframe, the vendor said. A Personal Computer memory is not used, and 256K-byte capacity is an option on the board, the vendor said. The Attachmate 3270 Coax Interface costs $910.

Attachmate, 3241 118th S.E., Bellevue, Wash. 98005.

K-SYSTEMS, INC.
KTL-100

K-Systems, Inc. has introduced the KTL-100, a printed-circuit module that emulates Digital Equipment Corp.'s VT100 CRT terminal.



A dual-height board provides two full-duplex, serial asynchronous channels for keyboard and computer interface and an RS170 composite video output for a monitor. Installed into a standard DEC backplane or equivalent power source, the module implements the vendor's Advanced Video Option, including 80 and 132 columns, nonvolatile setup parameters and all display attributes, the vendor said. Its unit price is $600.

K-Systems, 3005 Lilac, Las Cruces, N.M. 88005.

TYMNET, INC.
Asynchronous Terminal Concentrator

Tymnet, Inc. has announced the Asynchronous Terminal Concentrator (ATC) for users to access its public and private packet data communications networks. The product reportedly serves up to eight simultaneous users.

The ATC measures 12 in. wide by 3 in. high by 12 in. deep. It performs automatic, independent speed detection in a range from 110 to 9,600 bit/sec. Integrated into the ATC is a set of hardware diagnostics, including communications and remote reporting software for both terminal and network connections, the vendor said. The price is $3,300.

Tymnet, 2710 Orchard Pkwy., San Jose, Calif. 95134.

DATA COMMUNICATIONS BROKERS, INC.
"Modem Options"

Data Communications Brokers, Inc. has introduced a videotape to be included in its training series.

"Modem Options" deals with the variety of modems on the market. The color videotape demonstrates what each modem option does and how it is used in various applications. Some modem options include constant carrier, switch carrier, receiver sensitivity level, equalization, automatic vs. manual answering and leased line vs. dial-up, the vendor said.

The videotape is available in ½-in. Betamax or VHS and ¾-in. U-Matic formats. Two-week rental is $40 for ½-in. and $50 for ¾-in. tapes. Tapes may also be purchased for $150 (½-in.) or $180 (¾-in.).

Data Communications Brokers, 3000 Research Road, Champaign, Ill. 61821.

HUGHES

Since you'll be spending millions of dollars per month on data communications networks, you want all the information you can get. Right?

Here's how to get it.

Just wait for your February 27th issue of **Computerworld.** Then read the special report on Data Communications Networks from cover to cover. You'll get it all:

- *Local area networks*
- *public packet-switched networks*
- *private branch exchange (PBX) networks*
- *teleconferencing networks*
- *satellite networks*
- *CATV networks*
- *videotext and facsimile networks*
- *voice/data network integration*

You'll get tutorials — bylined opinion/analysis pieces by experts in the field on the use of networks and the future of the networking industry. You'll get case studies of how companies have used specific networks to solve specific business communications problems. And you'll get information on lots more — with articles on everything from microwave links to how AT&T's divestiture will affect voice/data networks.

If you spend — or are planning to spend — millions on data communications networks, then you can't afford to miss the February 27th special report on Data Communications Networks in **Computerworld.**

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

And, if you've got product or service ads that will help our readers make informed choices for 1984 — then you need to get your ad to us by February 10th. To reserve space in the February 27th issue, call one of the sales offices listed below, or call Ed Marecki, National Sales Director.

To: Ed Marecki, *National Sales Director*
CW Communications/Inc., Box 880, Framingham, MA 01701

☐ *Please send me advertising information for Computerworld.*
☐ *Please have a sales representative call me.*

Name _____

Title _____

Company _____

Address _____

City _____ State _____ Zip _____

Telephone _____

CW 2/10

Sales Offices
BOSTON/Chris Lee, Jayne Donovan, Michael Kelleher, Ron Mastro, Jim McClure, Alice Longley *(617) 879-0700* • **CHICAGO**/Art Kossack, Chris Lee, Jean Broderick *(312) 827-4433* • **NEW YORK**/Mike Masters, Doug Cheney, Ray Corbin, Joan Daly, Fred LoSapio, Gale M. Paterno *(201) 967-1350* • **ATLANTA**/Jeffrey Melnick, Mike Masters *(404) 394-0758* • **SAN FRANCISCO**/Bill Healey, Ernie Chamberlain, Theodora Franson, Barry Millions, Nicole Boothman (recruitment) *(415) 421-7330* • **LOS ANGELES**/Bernie Hockswender, Bob Hubbard, Bill Healey (714) 261-1230

Cullinet

on Cullinet's New Software Products

"On April 19, 1983 Cullinet made a number of significant new product announcements. Since that date, these products have generated much interest and related discussion in the industry, in the trade press and at technical forums. The purpose of this brochure is to put these products in perspective for the reader. At the same time, the brochure highlights some of the key members of Cullinet's outstanding technical staff responsible for the design and development of these products. During the past decade, with products and people like these, Cullinet has continually achieved significant advances in the state of the art of software technology."

John Cullinane *founded Cullinet Software in 1968, with the, then revolutionary, idea of specializing in computer software products. Since that time, Cullinet has become the most successful and respected software products company in the world and the first such company to be listed on the New York Stock Exchange. John has always been committed to the concept of a user driven company, where success is measured by the success of the users of Cullinet products.*

As a tribute to Cullinet's success, John was elected CEO of the Year in the software industry in 1982. He is a graduate and Trustee of Northeastern University and Chairman of the Advisory Committee of its College of Computer Science.

What is

IDMS/R?

Ed Savoie *is Cullinet's Manager of Database System Software development. He joined Cullinet five years ago and has made important contributions to the development of IDMS. Today, Ed is responsible for the development of IDMS/R, the Integrated Data Dictionary and IDMS-DC. Ed is a graduate of Harvard University where he majored in Psychology.*

Thomas Nelson, *Director of Software Design and Integration, has contributed to most of the important technical accomplishments of Cullinet Software products for ten years, these include the IDMS-Central Version, Distributed Database System and the Universal Communication Facility. He is a key figure in the design of both IDMS/R and the Information Database. Tom is a graduate of Massachusetts Institute of Technology.*

IDMS/R is not only a relational database management system, but a particularly powerful one. IDMS was made relational by removing all pointers and allowing the user to define data as tables and providing the traditional relational operators such as selects, projects and joins. In other words, IDMS/R will more than satisfy the relational purist. The major benefit of any relational DBMS is the capacity to develop applications faster because the developer does not have to be concerned with the database design. IDMS/R provides this and much more.

For example, the Automatic Systems Facility (ASF) of IDMS/R is a major advance over fourth generation languages. ASF is so comprehensive and easy to use that all a user need do to develop an application is to define a relational record. Then the Automatic Systems Facility dynamically generates all necessary supporting structures including data definitions, screen formats, application processing logic, and documentation. In other words, the developer can witness the application being produced, literally, in seconds. Thus IDMS/R is the perfect system for the end user.

But suppose when you build a complex, high volume production application with IDMS/R, you desire high performance. Typically 5% of the data relationships (joins) in any application are accessed 95% of the time. With IDMS/R you can simply change these relationships to predefined joins and benefit from a dramatic boost in performance. We call it Relational Fastpath. This is what makes IDMS/R a unique relational DBMS, and a perfect system with which to build production applications. In addition, IDMS/R has the most sophisticated back-up and recovery capability of any DBMS, an absolute must for on-line applications.

In summary, IDMS/R was designed to satisfy the requirements of those who want to develop both production and end user applications faster and those who have the responsibility of processing them.

What is

The Information Database?

Don Heitzmann *is Cullinet's Director of System Software Development. Don joined Cullinet seven years ago. His early efforts were in design and development of IDMS-DC and he is now responsible for the complete IDMS database product line. Don is a graduate of Princeton University with a B.S. in Electrical Engineering and a Masters in Architecture.*

Ernie Peabody *is Cullinet's Project Leader for development of the Information Database. Ernie is uniquely qualified since he has experience in mainframe and personal computer processing and communications. Ernie holds a degree in Mathematics from the University of Kansas and a Masters in Computer Science from Georgia Tech.*

The Information Database is an extremely exciting product for those organizations who have studied it. They understand how important it is to the success of the Information Center concept and effective use of personal computers in their organization.

The Information Database is the critical link between an organization's data residing in databases or files located in the company, or in outside databanks, and personal computer users. While PC users can access an IDMS/R database directly, we believe that a typical company would prefer that their PC user community access a specialized database, containing pertinent information summarized from appropriate sources, rather than directly from production data.

The Information Database works this way: selected data (information) is automatically fed from IDMS/R eliminating duplication of data while ensuring timely and accurate information. Utilities are provided to feed the Information Database from various databases and files, including IMS and VSAM. The Information Database is the intelligent link because the PC users can get the information they need, without having to master mainframe systems. Facilities built into the Information Database and Cullinet PC software make this possible. The Information Database appears as a new directory on the PC, so users can move information down to the PC or up to the mainframe without having to learn a new language. As a result, the user can store a private database in the Information Database and make it available to other PC users. Sophisticated security techniques insure privacy where appropriate, while allowing sharing of information when desired.

This is why the Information Database is so important. It is the intelligent link between the PC and the mainframe and is a must for any company considering significant use of personal computers.

What About

Cullinet's PC Software?

Mary Kroening *is Manager of Cullinet's Personal Computer development project. She joined Cullinet in 1982, when Computer Pictures was acquired by Cullinet. Mary's experience in microcomputer software has been a key factor in accelerating Cullinet's entry into the personal computer field. Mary attended the University of California at San Diego where she worked on the UCSD Pascal system and the University of California at Berkeley where she majored in Computer Science.*

Dave LitwacR *is Cullinet's Vice President of Product Development. Dave oversees all Cullinet software development activities for the company. Previously Dave held key roles in Cullinet's entry into Applications Software and in the development of the Application Development System/Online. Dave joined Cullinet in 1976. He is a Cum Laude graduate of Brandeis University and holds a Masters in Computer Science from Boston University.*

The lack of an integrated software solution has existed on the personal computer just as it once did on the mainframe. The size of the computers may be different but the problems have been the same. Cullinet derived its initial success by pioneering the concept of a comprehensive and integrated software solution to the mainframe users' requirements. We have applied this same philosophy to the personal computer. As a result, Cullinet's PC software includes all the capabilities needed by the user including: spreadsheet, financial modeling, document processing, electronic mail, relational database, graphics and information management. Individually these components compare favorably with their respective equivalents on the market, but collectively Cullinet offers a unique capability to its PC software customers, namely a comprehensive and integrated solution.

However, we don't stop there. We have developed a very sophisticated and intelligent interconnection with the mainframe via Cullinet's Information Database and PC software. This connection allows the use of reports, graphs, spreadsheets and relational data tables stored on the mainframe as if they resided on the PC disk. The intelligent link enables the database to process user queries and updates regardless of the location of the data. The resulting information can be used as input for spreadsheets, or to create graphs and documents. This entire process of retrieval, analysis and presentation can be automated, and the results shared with other users via the Information Database.

The Cullinet PC software combined with the Information Database provides the solution to corporate information problems. We make it possible to organize corporate and personal data, regulate access to it, and provide the end-user with the tools they need to analyze and understand that information to make sound business decisions.

What About

Cullinet's Applications?

Fred Buckley *is Cullinet's Manager of Manufacturing Applications Software Development. His efforts have been crucial in achieving the integration that makes Cullinet's manufacturing system unique. Fred joined Cullinet in 1977. Fred holds a degree in Computer Science from Thames Valley State and is a member of the American Production and Inventory Control Society.*

Ed Blumstein *is Cullinet's Manager of Financial Applications Software Development and has directed Cullinet's rapid entry into this field. He joined Cullinet in 1981 with experience in database and applications software. Ed holds a B.A. in Economics from Brown University and an M.B.A. in Finance from Boston University.*

Cullinet's Financial and Manufacturing applications, designed in the 80's, are the first applications on the market that feature both vertical and horizontal integration. Vertical integration means the application is built with fourth generation languages fully integrated with a Database Management System including Decision Support Systems and Personal Computers.

Horizontal integration means all applications share a common database thus eliminating the traditional problems of duplicate data, multiple updates, file conversion, etc., associated with older applications. For example, the purchasing and accounts payable system share the same vendor file. One update to the database means that all applications using that data are updated.

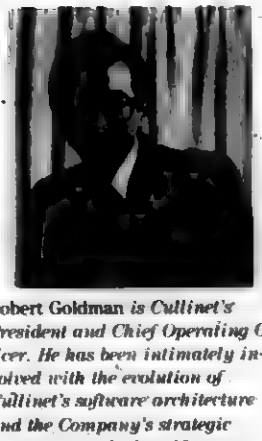
Also, Cullinet's applications are very easy to install and to tailor to the changing requirements of any organization. This is made possible through the use of a powerful fourth generation language. For example, all the on-line transactions of Cullinet applications are written using Cullinet's powerful Application Development System. In addition, information from Cullinet applications can be accessed and analyzed for senior management purposes using Cullinet's touch sensitive TREND-SPOTTER system or Cullinet's Personal Computer software.

The combination of horizontal and vertical integration means for the first time applications are available that meet the requirements of both the data processing and user management.

All successful applications software of the future will be built taking advantage of advanced database technology. Cullinet is the first to have introduced applications using this technology.

What About

Cullinet's Information Syst
Strategies for the 80's and



Robert Goldman *is Cullinet's President and Chief Operating Officer. He has been intimately involved with the evolution of Cullinet's software architecture and the Company's strategic direction for the last 10 years. Bob has consistently contributed to many aspects of Cullinet's success. He holds a Bachelor of Science Degree in Computer Science from Purdue University.*

Frank L. Chisholm *is Executive Vice President of Cullinet and is also responsible for the Company's extensive field operations, including sales and technical support activities. As a key member of Cullinet's management team, Frank has contributed heavily to Cullinet's product development strategy. Frank has been with the Company for over 6 years. He is a graduate of Pierce College with a degree in Computer Science.*

Often, as many as seven or eight major corporations from t
States and around the world visit Cullinet's headquarters i
Westwood, Massachusetts each day. They are coming in in
numbers because they've heard about what Cullinet is doi
information systems technology, and it sounds very excitin
After the meetings, the unanimous view is that what Cullin
doing "makes sense" and they are convinced that Cullinet
tion in Information Systems is the route that their respectiv
organizations should be taking. It is, in their opinion, the o
coherent and intelligent approach available. Specifically, t
the full integration of Database, Applications, Decision Su
Systems, Information Database and Personal Computer So
other words, a single source of software as opposed to the
tation which has plagued the computer user in the past.

Often, these visitors return to our headquarters with the I
other senior officers of their organization for an Executive
This Program is presented on a CEO to CEO basis. Senior m
ment is interested to learn that there has been more progre
in the delivery on the promise of computers for top manag
the past year than there has been during the previous twe
The promise of computers for top management is "knowi
they have a problem in time to take corrective action." In
accomplish this, it requires the full integration of Database
tions and Decision Support Systems. When management u
the importance of the integrated software solution, the re
renewed enthusiasm by them for support of the Informati
activities of their companies. They know that their respec
panies must put in place new information systems, fast, in
compete or even survive in the future. That, in the final a
what Cullinet is about, providing a complete and integrate
solution for the 80's and 90's.

tems
90's?

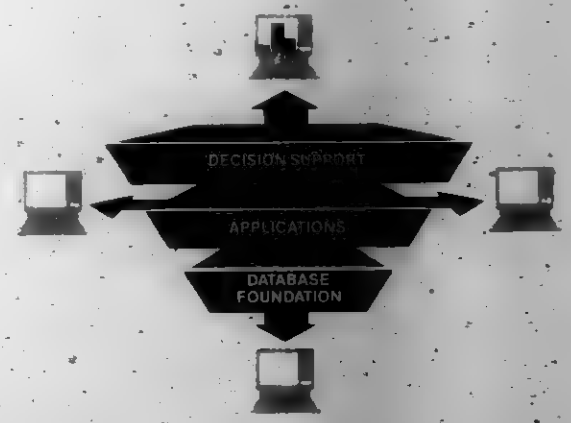
he United
n
creasing
ng in
ng to them.
net is
's direc-
ve
nly
his means
pport
ftware. In
fragmen-

President or
e Program.
manage-
ess made
gers during
nty years.
ng that
order to
e, Applica-
understands
sult is a
on Systems
tive com-
order to
nalysis, is
ed software

Winter Seminars 1984

continued

CITY & STATE	DATE	DB	FIN	MFG
Hartford, CT	Feb 14	•	•	•
Indianapolis, IN	Feb 21	•	•	•
Indianapolis, IN	Mar 27	•		
Jackson, MS	Mar 15	•		
Joliet, IL	Feb 9	•		
Kansas City, MO	Feb 22	•	•	•
Knoxville, TN	Mar 28	•		
Lansing, MI	Feb 1	•		
Lexington, KY	Mar 30	•		
Little Rock, AK	Mar 13	•		
Los Angeles, CA	Feb 9	•	•	•
Los Angeles, CA	Mar 27	•		
Louisville, KY	Feb 16	•		
Madison, WI	Mar 15	•		
Meadowlands, NJ	Mar 7	•	•	•
Memphis, TN	Feb 23	•		
Merrimack, NH	Mar 29	•		
Miami, FL	Feb 16	•		
Milwaukee, WI	Mar 7	•		
Minneapolis, MN	Mar 28	•	•	•
Moline, IL	Feb 3	•		
Montreal, PQ (French)	Mar 14	•	•	
Montreal, PQ (English)	Mar 21	•	•	•
Nashville, TN	Feb 16	•		
New Orleans, LA	Feb 23	•		
New York, NY	Feb 22	•		
New York, NY	Mar 20	•		
New York, Long Island, NY	Mar 27	•		
New York/Rye, NY	Mar 13	•	•	•
Oakland, CA	Mar 13	•		
Oklahoma City, OK	Feb 9	•		
Omaha, NE	Mar 1	•	•	•
Orange County, CA	Mar 6	•		
Orlando, FL	Feb 7	•		
Oshkosh, WI	Feb 28	•		
Ottawa, ON	Feb 1		•	•
Ottawa, ON	Feb 21	•		
Philadelphia, PA	Feb 8	•	•	•
Pittsburgh, PA	Feb 29	•	•	•
Portland, ME	Feb 21	•		
Portland, OR	Mar 15	•	•	•
Providence, RI	Mar 22	•		
Quebec City, PQ	Feb 15	•		
Quincy, IL	Feb 29	•		
Raleigh, NC	Mar 20	•	•	•
Richmond, VA	Feb 8	•		
Rochester, NY	Mar 28	•	•	•
Rockford, IL	Feb 14	•		
Sacramento, CA	Feb 21	•		
St. Louis, MO	Feb 8	•	•	•
Salt Lake City, UT	Feb 21	•		
San Antonio, TX	Mar 15	•		
San Diego, CA	Feb 23	•		
San Jose, CA	Feb 14	•	•	•
Savannah, GA	Feb 3	•		
Seattle, WA	Feb 7	•	•	•
Somerset, NJ	Feb 8	•		
South Bend, IN	Feb 7	•		
Springfield, IL	Mar 5	•		
Springfield, MO	Mar 29	•		
Spokane, WA	Mar 28	•		
Syracuse, NY	Feb 14	•		
Tallahassee, FL	Mar 1	•		
Tampa, FL	Feb 8	•	•	•
Toledo, OH	Feb 24	•	•	•
Toronto, ON	Feb 2	•	•	•
Toronto, ON	Mar 20	•	•	•
Tucson, AZ	Mar 20	•		
Vancouver, BC	Mar 14	•	•	•
Washington, DC	Mar 8	•	•	•
Wichita, KS	Mar 8	•		
Wilmington, DE	Mar 27	•		
Winnipeg, MB	Mar 6	•	•	•
Worcester, MA	Feb 16	•		
York, PA	Feb 15	•		



To find out more

Attend a Cullinet Seminar.

Cullinet will conduct seminars on the dates below. Check the listing and sign up for a seminar in your area.

Winter Seminars 1984

CITY & STATE	DATE	DB	FIN	MFG	CITY & STATE	DATE	DB	FIN	MFG
Albany, NY	Mar 13	•			Cincinnati, OH	Feb 7	•	•	•
Allentown, PA	Mar 1	•			Cincinnati, OH	Mar 21	•		
Atlanta, GA	Feb 15	•	•	•	Cleveland, OH	Feb 3	•	•	•
Atlanta, GA	Mar 28	•			Cleveland, OH	Mar 28	•		
Arlington Hts, IL	Feb 23	•	•	•	Columbus, GA	Feb 28	•		
Augusta, GA	Mar 14	•			Columbus, OH	Mar 9	•	•	•
Austin, TX	Feb 14	•			Davenport, IA	Mar 13	•		
Baltimore, MD	Feb 21	•	•	•	Denver, CO	Feb 7	•	•	•
Bloomington, IL	Feb 21	•			Des Moines, IA	Feb 16	•	•	•
Boston, MA	Mar 8	•	•	•	Detroit, MI	Feb 9	•	•	•
Boston Westwood, MA	Feb 23	•			Detroit, MI	Mar 14	•		
Bowling Green, KY	Feb 1	•			Edmonton, AB	Feb 15	•		
Bridgeport New Haven, CT	Mar 6	•			Ft Lauderdale, FL	Mar 22	•		
Burlington, MA	Feb 9	•			Ft Wayne, IN	Mar 6	•		
Charleston, WV	Feb 29	•			Ft Worth, TX	Mar 15	•		
Charlotte, NC	Feb 23	•	•	•	Grand Rapids, MI	Mar 27	•		
Chicago Rosemont, IL	Mar 20	•			Greenville, SC	Mar 6	•		

continued

Mail coupon or telephone (617) 329-7700. There is no charge for Cullinet seminars.

Sessions are held concurrently, so it is only possible to attend one seminar per date. Clearly indicate the seminar of your choice.

I plan to attend your seminar in:
( ) IDMS/R ( ) Financial ( ) Manufacturing

City on Date

Names and titles:

Organization: Address:

City: State: Zip: Phone:

Computer and operating system:

Cullinet Software, Inc. 400 Blue Hill Drive, Westwood, MA 02090-2198

CW

© 1984 Cul
400 Blue H
Westwood,
Printed in

Cullinet's New Software Development Center

Cullinet's new Software Development Center is an 80,000 square foot facility designed to enhance the software development process. The center is complete with conference, dining and athletic facilities. It was designed in conjunction with Cullinet's technical staff and provides a superb environment for the people who design and develop Cullinet Software Products.

llinet Software, Inc:
ill Drive
MA 02090-2198
U.S.A.

Interviews: Vigilante, Casales, Schwartz

AT&T is getting down to new business in 1984. Product introductions are scheduled for the second quarter; several major acquisitions and tie-ups are coming as well as new marketing and service policies.

Lead player in the organization is the new AT&T Technologies Group, which encompasses the old Western Electric organization, Bell Laboratories, AT&T International and AT&T Information Systems. Since Federal Communications Commission restraints oblige the company to keep its manufacturing and marketing activities separate, AT&T Information Systems will serve as the marketing end of the company for all except consumer products. AT&T Information

Continued on ID/3

Vigilante

Casales

Schwartz

Soup up your Volkswriter.

Everybody knows Volkswriter, the word processing software package that's become synonymous with high performance. Now, there's a way to get even higher mileage out of your Volkswriter. Hook it up to a Dataproducts P Series dot matrix color printer.

The versatile P Series translates the executive class, word processing capabilities of the Volkswriter into brilliant full color charts, graphs and text. It delivers a full page of text quality print in nothing flat while its sheet feeder automatically prevents loading hassles. And the P Series uses pin feed or plain paper and has the brains to fill every appropriate line with crisp, sharp copy, even if it has to justify to do it. And the P Series color printer has dual speed capability for correspondence quality output for the Volkswriter's many word processing applications and high speed output for draft and spreadsheets.

The Dataproducts P Series color printer. Think of us as a supercharger for your Volkswriter.

For more information go to your nearest computer store and ask about the Dataproducts P Series color printer, or call Dataproducts, 1-800-258-1386.

Dataproducts computer printers

Nobody puts ideas on paper so many ways.

Volkswriter is a registered trademark of LIFETREE SOFTWARE, INC.

AT&T interviews

Continued from IN/1

Systems employs about 100,000 people organized in a central staff and six regions. About 37,000 people will work in sales and marketing and 60,000 will move over from the operating companies to handle service. AT&T Information Systems takes over responsibility for the embedded base currently leased from the operating companies, and from there on in it will be competing with them as well as with the independents for the customer premises equipment market.

Under the current structure, AT&T Information Systems is headed by three coequal presidents, Frank Vigilante (product planning and development), Robert Casalet (marketing and sales) and Bruce Schwartz (service). All report to AT&T Information Systems Chairman Charles Marshall. In interviews last month with Brian Jeffery, research director of International Technology Group, they spoke on the market, competition and the plans and prospects of AT&T in the information processing marketplace.

Cover picture: "The Spirit of Service" illustrates the reputation for service AT&T would like to preserve as it enters a new era of business. Angus MacDonald patrolled the New York-to-Boston line during the blizzard of 1888. In June of that year, he posed for the photograph on which the drawing was based.

Frank Vigilante
President, Product Planning and Development
AT&T Information Systems

Nearly every major vendor wants to link up with us. And we will — we want to open our architectures, and we expect that from time to time you'll see announcements with major vendors about linking up with our systems. There's a lot of interest. I won't tell you names, but if you named six of the biggest companies around, probably four or five have called about wanting to link up with us . . . Many of them would like to go into business with us, but that's another story.

You have been quoted as saying that new products planned for 1984 will form part of a "general plan for data." What do you mean?

Well, instead of announcing one or two boxes, we would like to announce a little more in the way of architectural planning for data . . . I think it will be in the second quarter, although it could be later. We intend to relate announcements in several areas, probably local-area networking and some kind of processing, and perhaps some workstations. We would make an interrelated announcement and, of course, relate those products to our current line. Whatever we announce has got to relate to the rest of our product line so our customers know what we're doing.

How are you defining local-area networking?

What it means to me is a specialized network for certain customers. Not everyone needs a local-area network. We already have one in the System 85, and we will [enhance this capability] with other announcements. However, there are some customers who have large numbers of terminals that they want to connect to hosts. It doesn't pay to switch those, to make a lot of connections through a voice/data switch. So if they have hundreds of terminals connecting to hosts, then they should have a separate network to serve those rather than switching them through the System 85.

We can use the System 85 as is for most customer needs for interconnection of terminals and hosts. However, if there is a very large requirement, then we want a local-area network to take care of that.

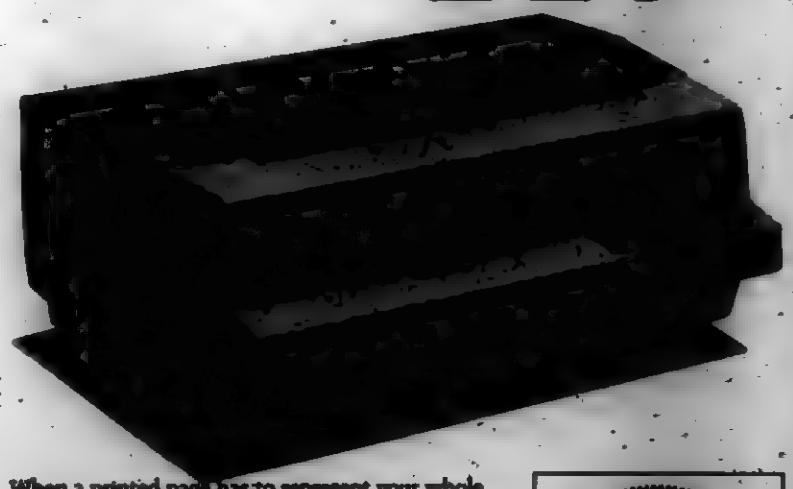
So you're talking about something that would allow a higher transmission speed?

Yes, but more important is high occupancy . . . It will have packet-switching.

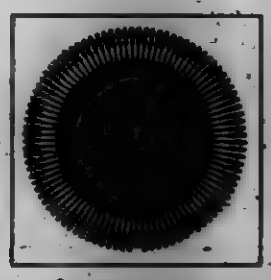
What do you regard as the main requirements for workstations?

One of them is that the stations that we put on work with some synergy with our switches so that we can use our own applications processors to work with them. We believe, like everyone, that we're evolving toward a point where a single station

Make it snappy.

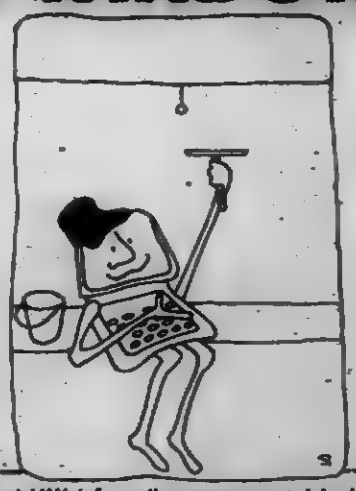


When a printed page has to represent your whole company, it'd better look sharp. Our DP-35 and DP-55 daisywheels rival the finest office typewriters for crisp clean impressions. And they zip along at just about a page a minute. Call your printer distributor. Or contact Dataproducts at (213) 887-8024, 6200 Canoga Avenue, Woodland Hills, CA 91365. In Europe, 136-138 High Street, Egham, Surrey, TW 20 9HL England.



Dataproducts Daisywheel Printers

MAKE YOUR VAX™ DO WINDOWS



SMARTSTAR™ is the first VAX information management tool that creates multiple window applications—and can scroll your screen to 400 lines. The SMARTSTAR family includes:

- SMARTDESIGN™ for designing applications without programming
- SMARTQUERY™ for powerful, easy-to-use application processing
- SMARTCALL™ when VAX host programming is required
- REQUEST for integrated report and query

Name _____
Title _____
Company _____
Address _____
City _____ State _____ Zip _____
Phone ( ) _____

SEND COUPON NOW FOR DETAILS AND JOIN THE 4TH GENERATION

STI Signal Technology, Inc.
5951 Encina Road, Goleta, CA 93117 (805) 683-3771 Outside California call toll-free (800) 235-0787
TWX 910-334-3471

or maybe two will perform most of the functions required.

So you'll get something that performs like a personal computer but at the same time works with at least mini-level hosts. I'm not talking about big mainframes; I'm talking about minis and superminis — our workstations will work directly with those. Probably, we would also provide some kind of compatibility with [Microsoft, Inc.'s] MS-DOS because that seems to be sweeping the field. [We want] to get as many capabilities in a couple of stations as we can.

You mentioned an announcement related to "some kind of processing." What will that involve?

We already have an application processor attached to the System 85. What we will be doing later is probably adding more power — we'll add an application processor that has more power than the current one, the AP 16. We'll add a bigger, more capable machine to that product line. The thing is that you have to handle large buildings. Some of the System 85s [with the larger processor] that we'll be putting in next year are for very large customers. And so they need a larger application processor than we currently have.

Do you see yourselves moving into the territory of the DP vendors with this?

Well, somewhat. We're talking about only a certain part of the range here. We'll have presence at the lower end and in the middle. We have no plans for anything more than that . . . The big mainframe business is not in our plans at this time.

So what you're talking about offering here is a communications architecture. Is that a reasonable description?

Yes.

Is this going to be comparable to, say, the IBM architecture?

Well, I suppose, broadly speaking, it will be, but SNA is primarily a linkage of computers, [particularly] the large systems that IBM offers. Our architecture is a linkage of, for example, a System 85 or a Dimension with our applications processors and with terminals. So broadly speaking, yes, we have an information systems architecture that we're evolving, but it's for different kinds of equipment than the SNA systems that IBM works with. Now at some point we need to link to SNA, and we will do that if we possibly can.

So you see yourselves coexisting with the IBM world?

No question about it, yes.

What kind of response have you been getting to the Unix operating system?

Unix is getting very popular, in many ways exceeding our expectations. There's plenty of evidence that Unix is becoming a very popular and broadly used operating system. Now I'm not saying it's going to supplant all the other operating systems, but it's going to take its place alongside all the others and be one of the more popular systems. I believe Unix has caught on. It was given to the colleges for a long time, and a lot of the students coming out want to work on Unix because they learned it in college. They bring it to the work place, and it seems to have caught on very well.

Have you found much acceptance of Unix from corporate DP departments?

I don't know the answer to that question. I think it's just beginning. It certainly hasn't had any penetration in the large mainframe operating systems area, no. But I believe it will.

What will be the relationship between the kind of solutions you've been describing and the broader services offered by AT&T Information Systems?

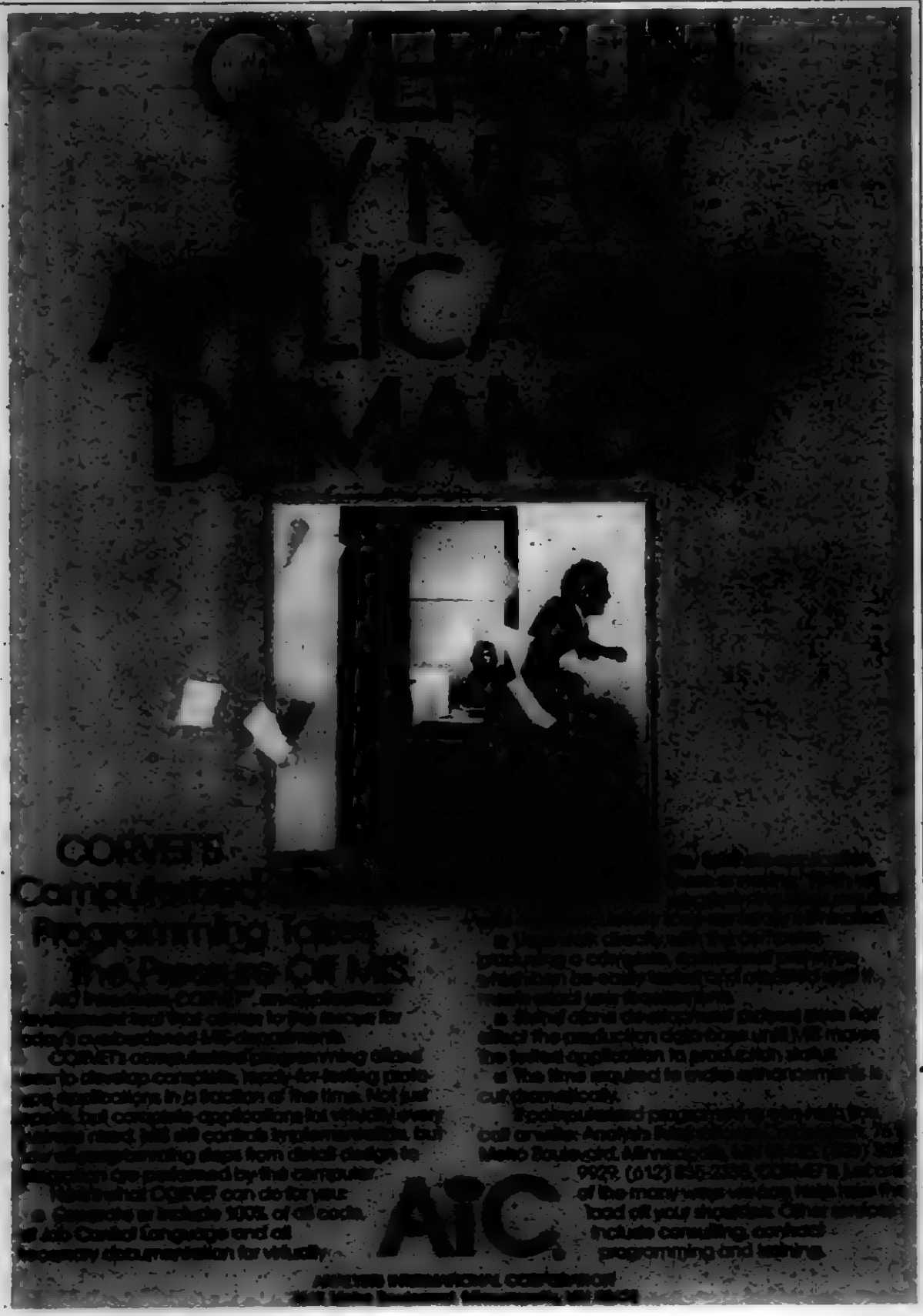
They're linked together. If there's an electronic mail system on a System 85 or on a related local-area network, we want to link it with a system like Net/1000, and we'll be able to move messages from our local system through . . . Net/1000 and on into either a terminal on a customer's premises that might be [linked to] one of our processors or somebody else's, or to another System 85. If you have a compatibility across the whole range of systems, you can move information from local to network and back down to local again as required.

So you're talking about a global architecture here?

Yes, we are. That's the kind of thing we've always done — we have networks across this country right now. Nobody else is anywhere near us on that, and we want to keep capitalizing on it. Our System 85 can be set up nationwide, System 85s that are linked together. It looks like one system. Nobody else can do that.

Do you find that your customers are looking for that type of solution?

Definitely. Our large customers — I could name you half a dozen, but I'm not going to — expect technological excellence from us, and they believe in the tradition of Bell Labs and Western Electric. And they also expect us to be excellent in networking. They know what we've always done — put together the world's largest



networks — and they want us to help them plan their networks. We're doing that.

So you are assisting companies in setting up their own networks?

If that's what they want to do. [Or] they can buy it from us and have us run it, or they can lease it from us. We've gotten very flexible. This is a big improvement as we're getting away from regulation. We've become very flexible in service arrangements and in pricing arrangements with customers, and we'll do whatever they want. We couldn't do that in the past.

With large customers, do you find you're dealing with a single set of decision makers or still with different departments such as DP, telecommunications and the like?

There's both, no question about it. The large customers in particular have several departments that get involved. Many customers are also trying to get some corporate control over expenditures, which is leading them to want to centralize more. What they try to do is make deals on a corporate level and then try to get some control over what's going on in the branches and remote locations. I think they're having some success.

When they do that, they want to deal with a large, dependable vendor, and we find them very much coming to us for that kind of operation. They can't afford to risk it with a fly-by-night who might be out of business in another year. There are a lot of people in this business now that aren't going to be in it in a few years. It's overcrowded right now, and a number of our competitors will be off doing something else in a few years.

Whether some of the computer companies will end up being in our business and we in theirs to a significant extent, I don't know. Everyone seems to think so. There's endless talk about our competing with IBM, DEC and the others, but that talk has been going on for a long time, and there really is not yet significant competition between us. Maybe there will be, but I think our main competitors will continue communications-based companies.

What competitors are you thinking about here?

I'll leave that to your imagination.

How do you see your relationship evolving with the Bell operating companies?

In the near term, we are largely going to be competitors of them. They are willing and able to sell customer premises equipment in their territories, and we'll be in competition with them in a number of cases. They will offer Centrex, and we will, of course, be competing against Centrex. In some cases, they will be offering products from other vendors, and we will be competing against those.

On the other hand, they'll be customers of ours for certain things, and so you'll get the kind of mixed relationship that is very common these days. Companies can be customers of each other and competitors with each other, and that's what's going to happen here.

But do you see the Bell operating companies emerging as fairly significant players in the marketplace?

I think they would like to be. It remains to be seen whether that will really happen.

A number of agreements have been announced relating to interfaces with AT&T equipment, notably Wang Laboratories, Inc., Hewlett-Packard Co. and Bailey Controls. Are we going to be seeing more of these?

Yes, there will definitely be more like that. Nearly every major vendor wants to link up with us. And we will — we want to open our architecture, and we expect that from time to time you'll see announcements with major vendors about linking up with our systems. There's a lot of interest. I won't tell you names, [but] if you named six of the biggest companies around, probably four or five of them have called me about wanting to link up with us.

How do you mean "link up"?

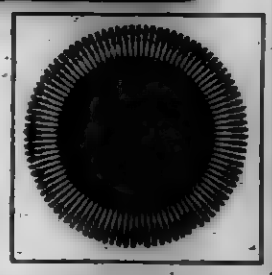
Just about anything, but the major thing would be general-purpose interfaces, high-speed data communications, document transfer, that kind of thing. Many of them would like to go into business with us, but that's another story.

Do you see AT&T making more substantial tie-ups with other companies, say by acquisition or joint venture?

Well, we're looking at a number of these. How many of them are sure, I don't know, but there's an interest. Just what we'll do [is] very sensitive information. But we certainly have an open interest, and my guess is

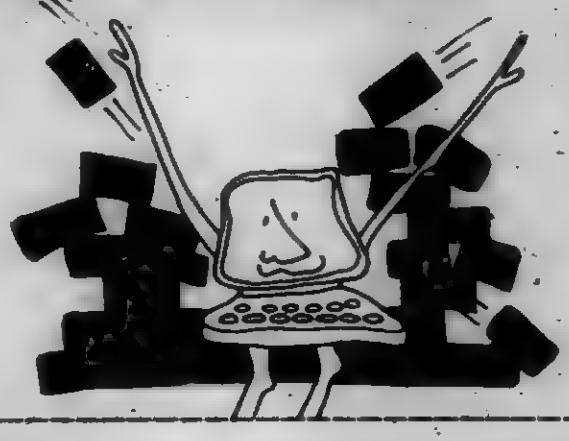
Better letters.

We can't help your spelling or grammar, but we can help your important correspondence look a little brighter than the next guy's. In less than a minute our DP-55 daisywheel dashes out a letter-perfect page. Throw out your white out, call your printer distributor. Or contact Dataproducts at (213) 887-3924, 6200 Canoga Avenue, Woodland Hills, CA 91365. In Europe, 136-138 High Street, Egham, Surrey, TW 209HL England.



Dataproducts Daisywheel Printers

BREAKTHROUGH IN VAX/VMS SESSION/IMAGE ACCOUNTING



Only TRACS™ allows examination and tracking of VMS session/image resource data by user, time interval, terminal port and other key fields. TRACS offers:

- General query and interactive capabilities
- Flexible report writer and graphics
- Full screen forms editor

Name _____
Title _____
Company _____
Address _____
City _____ State _____ Zip _____
Phone ( ) _____

SEND COUPON NOW FOR COMPLETE DETAILS!

STI Signal Technology, Inc.
5951 Encina Road, Goleta, CA 93117 (805) 683-3771 Outside California call toll-free (800) 235-0787
TWX 910-334-3471

VAX/VMS is a trademark of Digital Equipment Corporation

that we'll do some things as time goes on.

How is your relationship with Digital Equipment Corp.?

We have a long-standing relationship with DEC — we're very good customers of each other and have been for years. And I would say our relationship is still good. That's all I want to say.

We haven't seen any major encroachments from DEC on the Unix operating system.

I don't want to comment on that.

Where do you see AT&T Information Systems in five to 10 years?

The first thing I will tell you is that we will still be in business, and I expect we'll be prospering. We believe that working in an unregulated environment that is growing more unregulated with time, we can begin to improve our market share in all areas of voice communications and voice/data communications. And I expect that five years from now our market share in those areas will be considerably higher than it is now.

Whom do you see as your main competitors in that time frame?

One of them will probably be Northern Telecom. They're a reasonably broad-based company and I believe they'll continue to do well. Another that will hang in there is some collection of the Japanese companies. Nippon Electric seems determined to stay in this business, and obviously they have the resources to be successful, so I would expect Nippon Electric to be a significant competitor of ours indefinitely.

Whether some of the computer companies will end up being in our business and we in theirs to a significant extent, I don't know. Everyone seems to think so. There's endless talk about our competing with IBM, DEC and the others, but that talk has been going on for a long time, and there really is not yet significant competition between us. Maybe there will be, but I think our main competitors will continue to be some of the communications-based companies. Some of the others I believe will be gone by that time.

Some of the small PBX vendors have found a niche here and there, [but] I have serious doubts that they'll be able to survive standing on their own. They may get absorbed by others and in that way survive, but otherwise I don't see how they're going to make it in this business with the current competitive levels. But I could be wrong. The business could expand a lot more and make allowance for everyone.

What about competitors in the computer services business?

Well, we have some competition with them through our Net/1000 offering; there'll always be some competition there. We have competition there now with IBM, but it's not a big volume of business. That tends, in any case, to be an offering that we like to make together with our other products, and I don't see it dominating our business.

We can assist customers in setting up their own network, if that's what they want to do. Or they can buy it from us and have us run it, or they can lease it from us. This is a big improvement as we're getting away from regulation. We've become very flexible, and we'll do whatever they want.

How do you see the long-term changes in AT&T Information Systems?

Well, I guess the major change has been a lot of communications processing being added to our products. I don't want to call it data processing — that's not what it is. It is processing for communications, processing for networking, allowing people to communicate more easily. That's the area that I believe we will grow and prosper in because that's been our tradition, supported by very strong technology based on our Bell Labs roots.

Presumably you'll be more competitive?

There's no question about it. We have a strong thrust now, and I believe we'll continue to hone down the organization and sharpen our own competitive skills. Some of our obligations from the past give us a little more expense in some areas than we would like, but we're taking care of those things. We're very confident of success. I think when we get past all the regulatory hurdles — and we're almost there now — when we can spend our full energy on the business, we'll do very well.

Do you think that will be reflected in the public perception?

I already see a lot of perceptions turning around. When I see all the negative publicity we got a year ago, and I compare that to now, I think it's a lot better. There's still some negative stuff out there, but I see a lot of good things, too. It is turning around, and I believe there'll be a preponderance of good information about us in the press as time goes on, although there will always be people that find some fault with big organizations and want to kick us around a little bit. That's their prerogative.

Outpaced.

This DP department doesn't have the skills to stay ahead of new hardware/software developments.
DELTAK CAN HELP.

As the pace of technology keeps changing, even seasoned staffers find their skills are falling behind. Meanwhile, applications backlogs are skyrocketing. And in most companies, there's no sign of a departmental staff-up in sight.

That's the problem. So what's the solution?

It all starts with training. You see, a properly planned DP training program can help personnel gain the practical knowledge they need to stay up-to-date. It can also ease applications backlogs by boosting productivity.

And proper training starts with DELTAK. We offer over 800 multimedia and computer-based courses for all levels of MIS professionals, from COBOL programming to database management. And since we're the world's leading DP educator, we can show you the latest ways to keep your people informed and productive.

For all the facts, call or write DELTAK today. And watch the pace pick up right away.

DELTAK
East/West Technological Center
1751 West Diehl Rd., Naperville, IL 60566
(312) 369-3000 (800) 532-7666

© Copyright 1983, DELTAK, Inc.

Robert Casales
President, Marketing and Sales
AT&T Information Systems

The tendency is to characterize a solution as being offered by a company in a specific business. What we're talking about is solutions that cut across these definitions. It isn't that someone offers a computer solution and someone a communications solution. They both offer a solution that embodies the technologies of both computing and communications. We do not want our customers to think of decisions associated simply with hardware; we want them to think in terms of a much broader business context.

With the divestiture final, what are your priorities for AT&T Information Systems?

First of all, AT&T leads in and is committed to a major posture in the world of information movement and management. There is a great opportunity for our business in that environment. There is, we believe, a great need in the marketplace for the capabilities that we have as a corporation. AT&T Information Systems, then, is the deregulated entity with the mission to bring that technology and those products and services to the opportunities in the marketplace.

Now, we've looked at that marketplace in a very broad way, and we've cut it in ways that would segment functions, in ways that would segment customers, industries and so on. So when we talk about a direction for the corporation, we're talking about it in the context of a "polar direction."

In that context, we think about doing business in these arenas that you might want to segment along the lines of data and voice. For voice, [in terms of AT&T Information Systems], I mean the premises equipment and networks associated with voice; we look at enhancing services with computer-based applications in transfer, storage, retrieval, editing and so on.

[On the data side], we look at the office environment, what has been an office equipment environment but is really evolving to what we think of as an office automation environment. We perceive our potential to cut across all those segments.

Looking at the office automation environment, AT&T has traditionally been selling PBXs to telecommunications departments. How are you changing that emphasis now?

Well, we're finding that it is shifting in the marketplace itself. As the Fortune 500 companies begin to link their business strategies with their computer and communications strategies, the decisions that they make cut across all those areas. So when you market, you have to market to all of those areas — we market to the telecommunications manager, we market to the DP managers and we market to the decision-influencers.

So you will, in fact, be offering solutions that have previously been offered largely by computer vendors?

I think that's correct. I think it's important to recognize that often the tendency is to try and characterize a solution as being offered by a company that has been in a specific form of business. What we're really talking about here is solutions that cut across these definitions. It isn't that someone offers a computer solution and someone a communications solution.

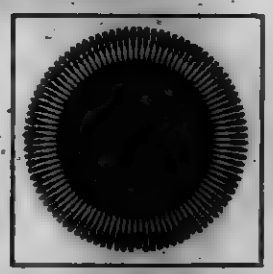
They both offer a solution that embodies a lot of the technologies of both computing and communications. We do not want our customers to think of decisions associated simply with hardware; we want them to think in terms of a much broader business context.

Do you see any shift in the market towards more centralized decision making in, say, office automation?

What we see in the marketplace is an enormous proliferation of divergent technologies — personal computing is an example. These divergent technologies create considerable pressures for managers — they have to ensure that the technologies now being utilized permit them to bridge from where they've been to where they believe they want to go. They have to be able to protect their investments in, for example, their word processing systems or their applications portfolio. So they need to know that new technologies permit them to utilize those applications and permit access to those applications to be expanded within their user groups. I think they are trying to manage both the centralization

Rough writer.

In the business machine torture chamber most of us call the office, one word processing printer shows true grit. We build our DP-Series daisywheels to keep turning out letter-perfect documents month after month. In the face of adversity, and in the hands of a secretary. Call your printer distributor. Or contact Dataproducts at (213) 887-3924, 6200 Canoga Avenue, Woodland Hills, CA 91365. In Europe, 136-138 High Street, Egham, Surrey, TW 20 9HL, England.



Dataproducts Daisywheel Printers

A Kodak Komstar 200 helped us recap $3000/mo. in paper alone for our JCL Sysout.

When a major tire manufacturer needed to handle JCL SYSOUT faster—without enormous labor and paper costs—they turned to Kodak.

The Kodak Komstar 200 microimage processor helped make it happen. And first-year savings alone were over half the processor's cost.

Find out how a Komstar processor can make jobs faster, easier and less costly. Send in the coupon today. Or call toll-free 1-800-44KODAK (1-800-445-6325), Ext. 301.

© Eastman Kodak Company, 1983

Send me the case history above and more information on the Komstar 200 microimage processor.

name _____

company _____

address _____

city _____ state _____ zip _____

telephone ( ) _____

Eastman Kodak Company
Business Systems Markets Division
Dept. DP4505, Rochester, NY 14650

SAS...
Power and Flex
to Meet All You

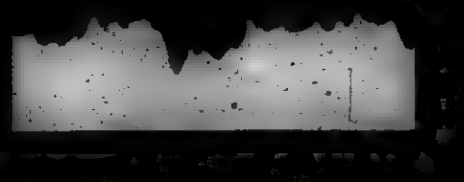
by SAS. Develop knowledge with the SAS System. A library of ready-to-use procedures gives you the power to analyze data without formal training. SAS even provides an on-line help facility. Or you can create your own help program. With a few English-like commands, you can use SAS for data analysis, market research, capacity planning, financial reports, summary statistics, charts, plots, personnel reports and many other jobs.

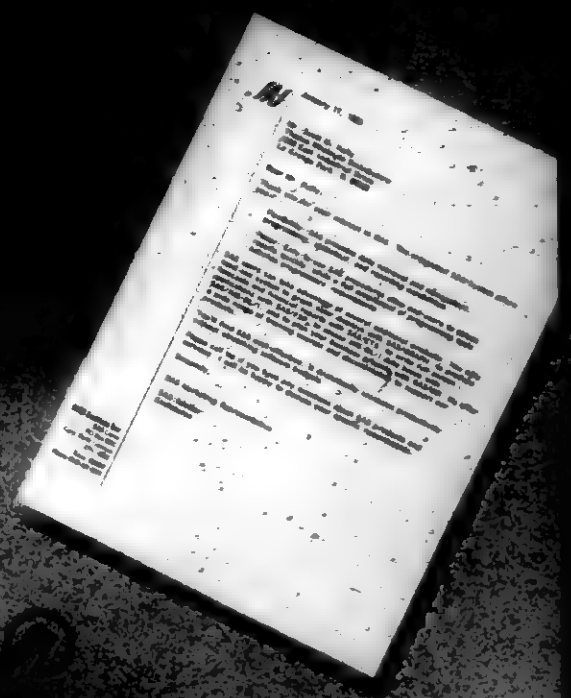
SAS/OR

SAS is the registered trademark of SAS Institute Inc., Cary, NC, USA. SAS/GRAPH, SAS/STAT, SAS/OR, products or service names are trademarks or registered trademarks of SAS Institute Inc. VAX is a trademark of Digital Equipment Corp., Maynard, MA, USA. Copyright © 1989 by SAS Institute Inc.

Available
for
IBM, DG ECLIPSE
and DEC VAX

ibility
r Needs





and the distribution of technology, and it's not an easy task.

You're talking about the integration of a number of different technologies here. How does local-area networking fit into the picture?

We see local-area networks as being really the highway that permits our customers to move information in different media — voice, data, video, graphics and so on. It's the highway for the various professionals and departments within the company that permits the integration of that information and its transfer to users in various forms. [It may be] high speed or the lower band speeds, but all of it will be managed on the network. It's an open approach. We think that's terribly important to productivity. Our customers can begin to manage the distribution of information to those in their business who need to have it.

So you would see those needs as something that could not be handled by existing PBX technology?

You have various transmission media — twisted pair, for example, which works very well in the context of a PBX, is a major component of the local-area network. You might have other requirements in terms of very high-speed data that might be outside the realm of the PBX, but that doesn't mean that you take it outside the local-area network. Our plan is to have a local-area network that is integrated with a PBX.

How do you see the future of the Centrex system?

I think Centrex has been a good service. The issue there really rests in how responsive it can be to the user, and I think the marketplace is looking for greater access, greater flexibility, greater control of the technology by the customer. I think that is more difficult to do with a service like Centrex.

Will we see more links between AT&T and other vendors, similar to the HP and Wang announcements recently?

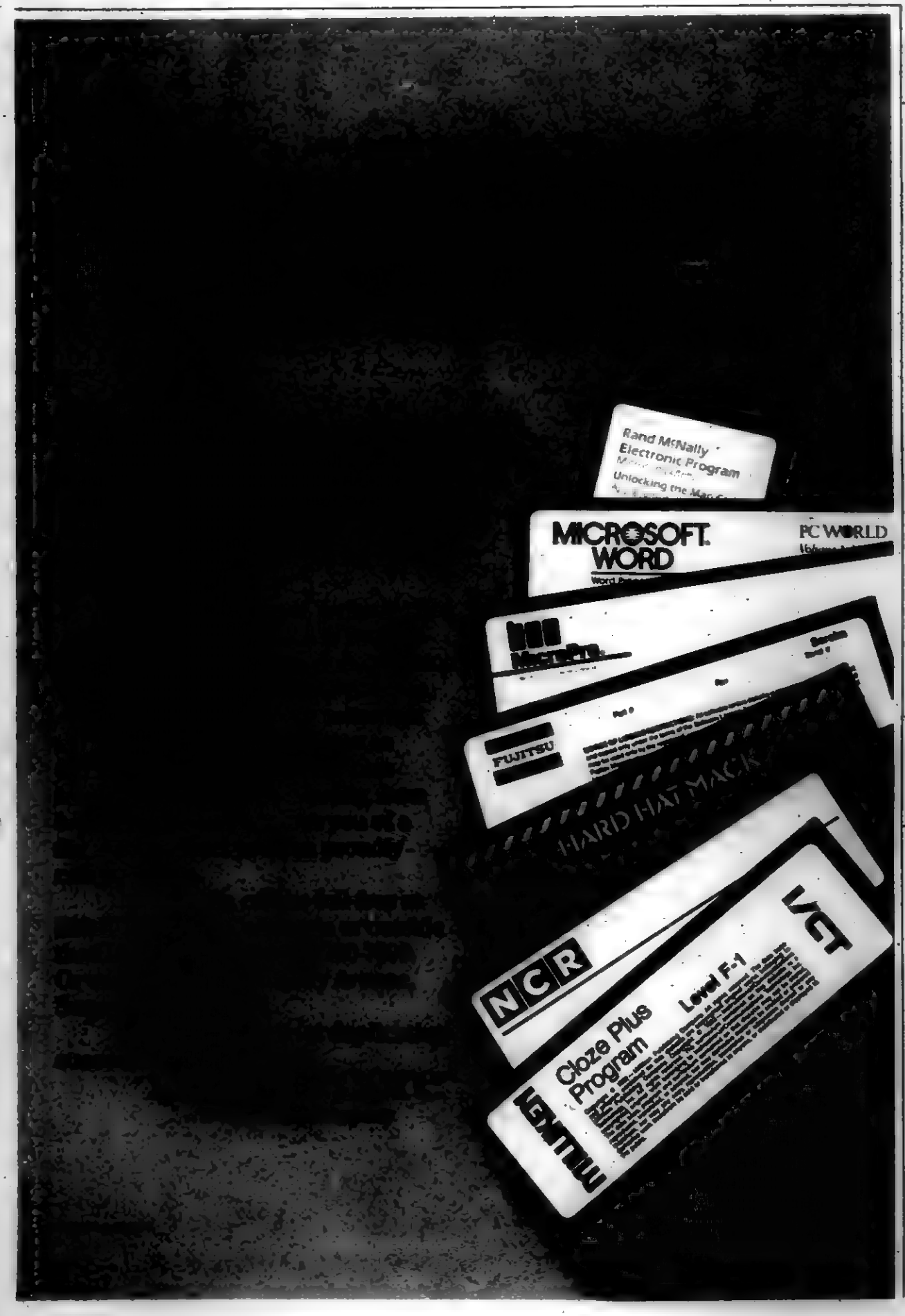
Yes, clearly, with vendors that have a vested interest in the marketplace we're talking about. Those who have a customer base that they want to protect, who want to ensure that their systems interact with ours so that the opportunities for utilization of their systems by their customers are maximized . . . This isn't the kind of game where any one company can be all things to all people.

One of the things we've been seeing in the marketplace is the emergence of IBM as a de facto standard. What is AT&T's position on standards matters?

If you mean in terms of, say, an IBM architecture that we would have to be compatible with in order to be successful, we clearly will be compatible. Do we need to be compatible with SNA [Systems Network Architecture] and SDLC [Synchronous Data Link Control]? Yes, we intend to and we will do that.

We have seen a number of statements from AT&T Information Systems that indicate you will be offering a distinct communications architecture next year. Is that correct?

Yes, you will see a communications architecture. That is part of our philoso-



NEW LIFE FOR 1401 PROGRAMS

CS-TRAN converts your 1401 object programs to COBOL for the mainframe or mini of your choice.

CS-TRAN is the *only* translator that accepts your object programs, patches and all, yet allows you to include actual COBOL paragraph names and record definitions.

If you'd like more details about new life for your 1401 programs just call or write Russ Sandberg.

C-S Computer Systems Inc.
200 South Main Street, P.O. Box 358
Manville, NJ 08835 • 201-526-6000

pby in terms of our business and in achieving what we expect to achieve in the marketplace, that that architecture will be open.

What about the low end of the PBX market, say the small business market? What penetration are you seeing there?

People want the capability for voice and data in communications in a way that doesn't require expensive capital outlays. They evaluate it with considerable price sensitivity, they want the function level that's appropriate to the needs of their business. I think they want access to those networking capabilities that permit them to grow their business and interact in various ways with other businesses.

So you are thinking in terms of providing the small businessman access to the outside world through data as well as voice, presumably through Net/1000?

That's correct. It's why the concept of our systems and network services being shared as well as dedicated is very important, because in sharing them, you then have a very low threshold of entry per user. You might use an example where a small business wants to use a service like Net/1000 for interactions and purchase orders — with us, or with one of their customers or suppliers. They would have a capacity in the network to do that and to utilize the technology and intelligence in the network to do that. [It] offers them considerable efficiencies and the potential for economies over other methods.

The issue of data base management is terribly important. What is, perhaps, paramount is the operating system software that supports those data bases and lets you begin that accessibility to a wide range of users . . . We see a tremendous amount of activity in the area of data base management and a tremendous opportunity for access to data base services. Data has to be packaged and then distributed to customers, and that distribution technology has to have access to a central data base and has to accommodate all the users on the other end.

What kind of market interest are you finding in data base services?

I think the issue of data base management is terribly important. What is, perhaps, paramount is the operating system software that supports those data bases and lets you begin that accessibility to a wide range of users. If you look at a service like videotex, critical there is the cost of the technology and the access that

China Computerworld 电脑世界

The only specialized computer publication written exclusively for the People's Republic of China (PRC).

The PRC is a huge country which now has a rapidly growing installed base of computers. And the future looks very bright for the Chinese EDP market.

Government plans call for extensive use of computers in the PRC's technological modernization, and annual EDP expenditures are expected to grow into the billions of dollars in the 80's.

A good deal of this money will be spent on foreign computer equipment and the purchase decision-makers for this equipment will be using *China Computerworld* to help them choose the products and the companies they need.

China Computerworld is a joint venture of the Fourth Ministry of Machine Building and CW Communications/Inc. Its 50,000 subscribers include the key government officials and computer managers who have EDP purchase decision authority.

China Computerworld is published on the fifth and twentieth of each month. Its tabloid newspaper format gives you a unique opportunity to introduce your products and services to this awakening giant of a marketplace.

CW International Marketing Services Department gives you one-stop advertising service in countries around the world. For more information about *China Computerworld* or any of our other foreign publications, just fill out the coupon below.

Diana La Muraglia, Manager, International Marketing Services
CW Communications, Inc.
375 Cochituate Road, Box 880, Framingham, MA 01701 • (617) 879-0700

Please send me more information on
☐ *China Computerworld* ☐ Your other foreign publications

Name _____
Title _____
Company _____
Address _____
City _____ State ____ Zip ____

CW COMMUNICATIONS/INC.
Publishers of Computerworld and other leading computer publications around the world

VM/CMS USERWARE™

A Family of VM Products

SO ADVANCED IT'S SIMPLE

In just 60 days over 100 sites installed the Simple Approach.

BACKUP/CMS
THE SIMPLE APPROACH TO BACKUPS
(VM/CMS Minidisk Backup/Restore Facility)

- Interactive use
- Incremental & full backup capability
- Dynamic password acquisition
- Tape management interfaces
- Online catalog allows a restoration with only two commands: a FIND and a RESTORE
- No batch processing of any kind

TAPELIB/CMS
THE SIMPLE APPROACH TO TAPE MANAGEMENT
(VM Tape Management Facility)

- Interactive commands
- Full support for SL or NL tapes
- Capability to share tapes
- OS/DOS tape management interfaces
- Manages tape drive allocation and tape requests
- Active tape catalog
- Full management & audit reports

FPT/CMS
THE SIMPLE APPROACH TO PROGRAMMER PRODUCTIVITY
(VM Programmer Productivity Tools)

- SECURE
- TSCAN
- MODZAP
- TAPECOPY
- SEARCH
- SCRATCH

- All three products can be installed and working for you in the same day, thus saving you valuable time, tape, manpower and computer resources.
- An easy to use online help facility is included with each product.
- No modifications to your VM system are required.
- VM/SP release 3.0 support available.

For under $10,000, you can put all 3 Userware™ products to work in your shop today! Why pay more?

Boole & Babbage, Inc.
510 Oakmead Parkway, Sunnyvale, CA 94086

For more information or a 30-day No Obligation Trial, call (800) 222-0550; in California call (408) 735-9550; or return this coupon:

Name _____ Title _____
Company _____ Phone # ( ) _____
Address _____
City _____ State _____ Zip _____

Boole & Babbage

The single source for harder working software.

you can offer for it. We see a tremendous amount of activity in the area of data base management, and I think a tremendous opportunity for access to data base services. If you look at the financial services industry, for example, you see more and more use of on-line data bases. Data has to be packaged and then distributed to customers, and that distribution technology has to have access to a central data base and has to accommodate all the users on the other end.

We're finding that it is shifting in the marketplace itself. As the Fortune 500 companies begin to link their business strategies with their computer and communications strategies, the decisions that they make cut across all those areas. So when you market, you have to market to all of those areas — to the telecommunications manager, to the DP manager and to the decision-influencers.

How do you see videotex evolving?

There's a lot of review of that question today, and, in fact, we've had discussions with some of our large customers. I think that [companies in] the marketplace are working to ascertain how that technology and service can be utilized in their business, especially that have broad-based consumer business. I think this is going to evolve in the course of the next few years, but I think it's kind of being shaped at this point.

AT&T Information Systems is obviously going to be presenting some new capabilities here. But then, so are a lot of your competitors. How is AT&T-IS different?

Well, I think that if you look at the world or the marketplace the way we have looked at it, and the way you and I have discussed it, AT&T-IS comes from a very strong base in terms of communications. I think the marketplace recognizes, as we recognize, that's what is really going to be at the hub of the integration that we talked about.

I really think that we are better positioned than any of our competition, and we have a very real distinction from our competitors in terms of our history and our knowledge, resources and service. That's really captured in our antecedents in Bell Labs, in Western Electric and in our long history of service to the marketplace. I don't think there are many competitors today that enjoy equal stature in terms of capabilities.

Who would you say does enjoy equal stature?

Well, if you were to say who enjoys the complement of R&D and service in the same way, I think IBM very much enjoys that reputation.

You've talked in terms of knowledge, resources and service here. You haven't talked about being innovative — AT&T has not recently had the reputation as an innovative company.

It's pretty tough when you have been primarily a regulated company to enjoy an innovative reputation. I think we have enjoyed a reputation of being innovative in our basic research and in some of our technologies. For example, cellular radio is an important technology and really we were ready to bring it to the marketplace about 10 years ago. The course of regulation has taken that much time. You can't enjoy an innovative reputation when you have to deal with the rigors of the regulatory process to bring technologies to the marketplace.

You have a liberal arts background.

I do — my college major was English. My background professionally is in marketing.

Has your original liberal arts background been an asset?

Very much so. What I think is of great benefit in a liberal arts background is the capacity to develop a capability in thinking, being able to understand issues and being able to translate thinking from the strategic to a tactical perspective. Being able to recognize that if you are in the business of dealing with the marketplace and with customers, much of your strategy must be driven from your capacity to think as an organization.

I think it's fundamental — if you think about all of the dynamism taking place in the market, you need the ability to understand and to respond quickly and to use different marketing techniques, to use a multitude of distribution channels, owned and nonowned, to be able to manage and stay ahead. Much of that, I think, resides with those companies that have the ability in their executive environment to understand and to have confidence in their thinking, confidence in their ability to take risks, confidence in the sense of perhaps not being afraid to make mistakes. And I think the better able a corporation is to think [in this way], the greater the success it will enjoy.

HOW TO GET A NETWORK OFF THE GROUND.

Codex 6000 Series Intelligent Network Processors for minicomputer networks.

Say you have a small minicomputer network. A dumb terminal here, a dumb terminal there, and a DEC, HP, Data General or some other minicomputer miles from either. They're probably joined by modems and phone lines. But that's no way to run an efficient, economical network. And it doesn't give you any room to grow.

To really get a network off the ground—to really get one running efficiently—you need to take a different route.

You need a Codex 6000 Series Intelligent Network Processor specifically designed to improve the efficiency of smaller networks.

In a minicomputer situation with as few as two dumb, asynchronous terminals, these statistical multiplexers will boost operating efficiency, reduce line costs and protect your data from errors caused by line disturbance.

The model 6001 can support as many as eight asynchronous terminals. The 6005, as many as 16 asynchronous and synchronous terminals. Or any combination of word processing or graphics terminals and printers.

Both models are inexpensively priced. So the money you save on line costs and error-free transmission will bring you a healthy return on investment quickly. Our Application Engineers offer planning expertise to help you get off the ground that much faster. And when you grow, we'll show you how these stat muxes can be linked to larger 6000 Series products as your networking needs expand.

In short, Codex 6000 Series Intelligent Network Processors can push your small network in the direction it ought to be going. Up.

Call 1-800-821-7700 ext. 898 for more information or write: Codex Corporation, Department 707-98, 20 Cabot Boulevard, Mansfield, MA 02048.

codex

MOTOROLA INC.

© 1983 Codex Corporation

Bruce Schwartz
President, Service
AT&T Information Systems

What is the AT&T Information Systems service organization going to look like in 1984?

It will consist of roughly 60,000 people. That is made up of about 30,000 systems technicians and 13,000 people in our business service centers. We have various groups of engineers, and the balance would be management and support personnel. In prior days, we had 22 operating companies, each with a service division, so we had 22 separate service organizations, so to speak. We've been molding that into a national service division headed up by six regions rather than 22 operating companies. So we have a substantially slimmed-down management staff as a result. And then sub-organizations to the regions — we had roughly 350 district level operations divided among the 22 operating companies. We've since reduced that to about 100 such district organizations.

What difference is the average customer going to see?

Let me talk about a couple of things in that area. Since we're nationally organized now, we have established a high-level maintenance surveillance operation — we call it National Customer Service — in Denver. From that location, we remotely monitor the higher end of our PBX switches on a constant surveillance basis. That's new, plus it's more efficient.

In addition, we've established some technical support centers in clusters on a national basis, and we've centered there some high-level expertise in voice, data and software. We call them Voitek, Datek and Softek — not very inventive, but they're pretty effective. The purpose is to give field personnel a close-by location where they can call for troubles that they're not able to fix right away. We've also established in each of the regions a high-tech laboratory. There we have models of each of our major products, so if we get into a difficult situation, we're able to simulate the trouble there with experts and talk the on-site technician through to a problem resolution.

Probably the thing the customers have noticed most is our new mode. We've been moving into this all through 1983 — it's not a "stroke of lightning" kind of thing. In the past, we had repair centers located in each of the Bell operating companies — thousands of them. People who had trouble would call into this repair center, and then the people there would assign the trouble reports to systems technicians on a random basis. So one customer might see four or five different technicans in any given period.

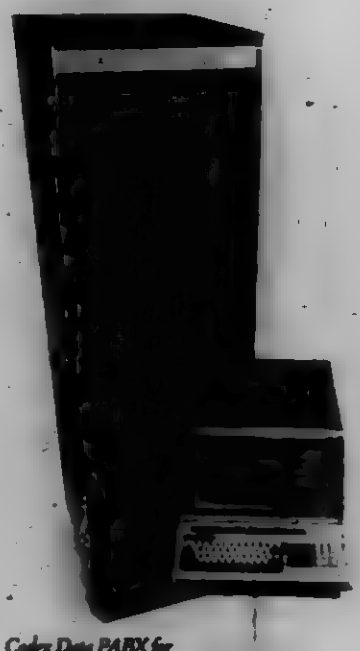
We've been putting in place for the last 12 to 14 months [a system where] we assign customers on a permanent basis to a particular technician who is dedicated to that account. The smaller customers may have one technician who has four or five customers on a permanent basis. That way we're able to zero in on our customers . . . Under the plan or reorganization, the overriding rule has been that people follow their work. So in a high percentage of cases, easily 90%, the technician who has been maintaining a customer's switch before divestiture will be maintaining it in the future. A lot of customers won't be seeing a change in personnel. But we'll have more of an entrepreneurial approach to service and maintenance.

Will we be seeing any major changes in service policies?

Yes, in fact there'll be several. As the rates go from regulated to unregulated, of course there's a lot of opportunity for change. We'll give to the customer more options on service arrangements. The customer may want maintenance eight to five, Monday through Friday — we'll have an

Let me say some of the things that haven't changed: dedication to service, a commitment to service that just transcends everything we do. I have an old picture in my office . . . of a lineman trudging through the night in the snow with a coiled wire over his arm, looking for a break in the line. That always kind of captures what you call the spirit of service. Maybe it's all corny, I don't know, but it's a deep heritage.

HOW TO GET A NETWORK OFF YOUR BACK.



Codex Data PABX for minicomputer networks.

You're in a situation now where there are more than 50 users in your minicomputer network. All of them working on dumb terminals directly linked to your processors. The situation is such that your processing capacity has just about reached its limit.

Do you add more minicomputers? Or do you add more processor ports?

Don't do either. There's a better way: The Codex IMS 7800 Data PABX.

Our Data PABX monitors and controls the way your people access your minicomputers. And it does such a good job that you can get more out of DEC, Prime, Data General or other minicomputers — even add more terminals — simply by making better use of what you already have.

So, for instance, instead of having dumb terminals dedicated to any single minicomputer, Data PABX lets you get any processor, from any terminal, from any point in your network.

This approach makes even more sense when you consider that any given terminal is only on-line about 20% of the day. It's a more efficient use of computer resources, more economical, and altogether easier to implement than any other option in front of you.

What's more, this approach is backed by Codex. Before the sale and after. So you know it will work when you install it. And you know it'll work long after.

Data PABX. It can cure all the pains of growth in a local or long-haul network.

Including the one in your lower back.

Call 1-800-821-7700 ext. 894 for more information or write: Codex Corporation, Department 707-94, 20 Cabot Boulevard, Mansfield, MA 02048.

codex

MOTOROLA INC.

We've been putting in place for the last 12 to 14 months [a system where] we assign customers on a permanent basis to a particular technician who is dedicated to that account. The smaller customers may have one technician who has four or five customers on a permanent basis. Under the plan of reorganization, the overriding rule has been that people follow their work.

arrangement for that. Other customers may want 24 hours, seven days a week, and we'll have an agreement in that. Others will want more — they may want someone to help design or plan their entire system. We'll have an arrangement for that.

You'll be offering more in the way of support for system design, configurations, that kind of thing?

Yes. We have in our group a tremendous network engineering capability — very good at network design, very good at network maintenance and very good at network monitoring. So we can monitor the performance of customer networks, recommend changes and more effective rearrangements. We know the communications business.

How will the kind of service you will be offering differ from that of your competitors?

I think it's substantially better. We're everywhere. We have a ubiquitous force, and they're highly trained. For example, we've trained a number of technicians this year in software . . . We've trained about 300 so far through this new software training. We review Unix, we review about four computer languages and do some basic programming. I've got to tell you, they're just like kids at a candy store. Those that have gone out to customers afterward are just eager to get in and [talk] with customers about how our applications processors interface with other applications. So we're going to continue that training as we need it.

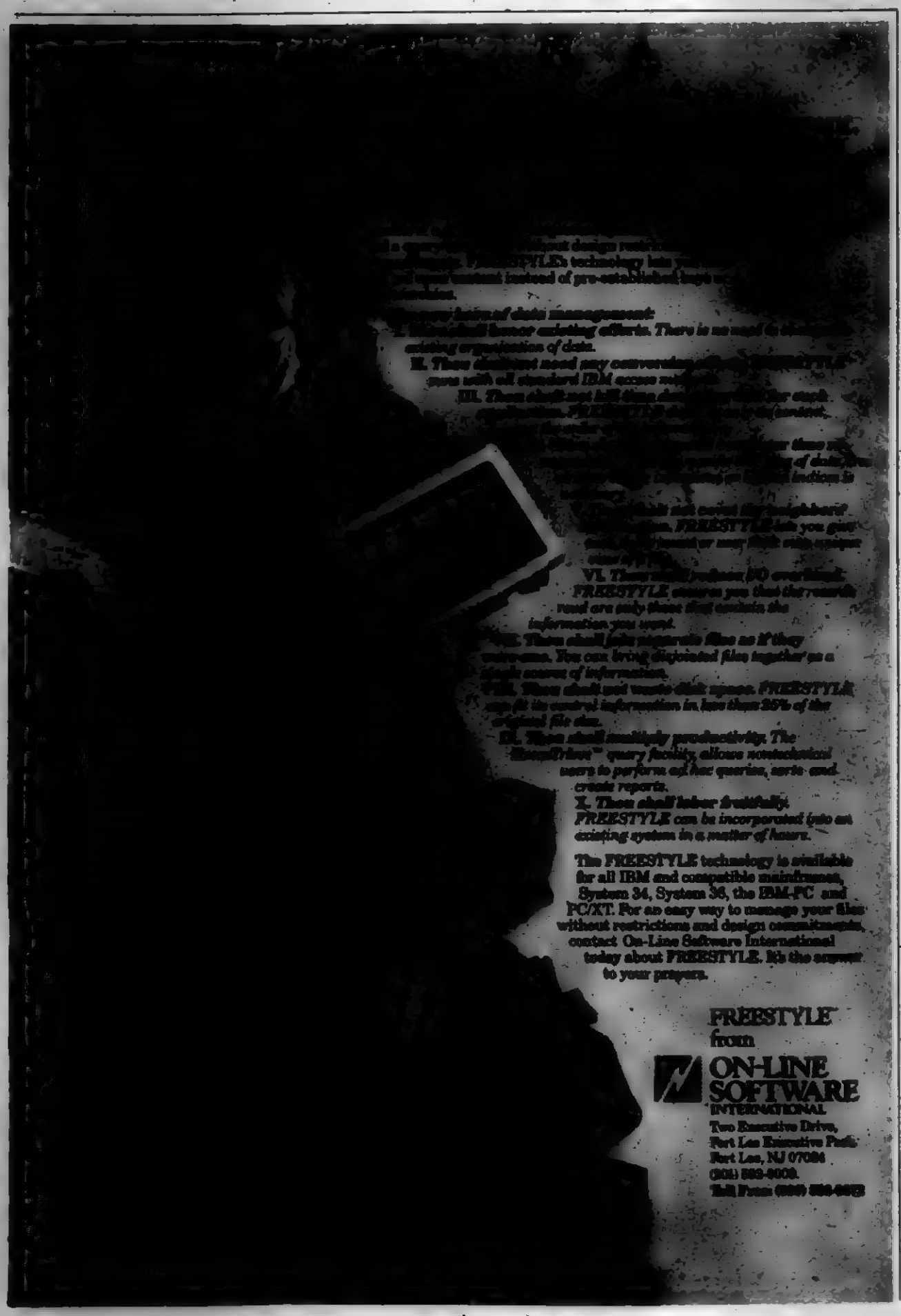
We have a nationwide remote maintenance testing system that's already deployed. And we have a nationwide spare parts inventory. We're really equipped. We're in all the major locations, where we have trained people. And we have an excellent reputation with our customers. We're not complacent about it; we're out to make it even better than it is. That is our major objective, to increase dramatically the level of customer satisfaction with our service.

How do you propose to do that?

In a number of ways. First and foremost is the process I described earlier where we have assigned a technician to accounts. We call it our customer service management system. It's the technician's account, and he or she becomes more deeply involved with it in performance. The technician knows how the system operates, how the customer wants it to operate.

Yes, but how do you judge performance?

Several ways, the most important of which is the customer satisfaction testing process we have where we constantly test customer satisfaction with the various aspects of our service. From



Abacer Friendly Report Processor For IBM/38?

Managerial support software that is truly easy to use.

Call or write for more details on FUSION 4/38.

FUSION
PRODUCTS INTERNATIONAL

(415) 461-4769
PO Box Fusion
Mill Valley, CA 94942
Telex 176099 FUSION

10,000 CICS Users Said There Had To Be A Better Way . . .

We Gave Them GENER/OL™

Feature for unique feature, GENER/OL is the leader in on-line CICS applications development. This 5-star performer channels on-line technology for maximum productivity, efficiency, and flexibility.

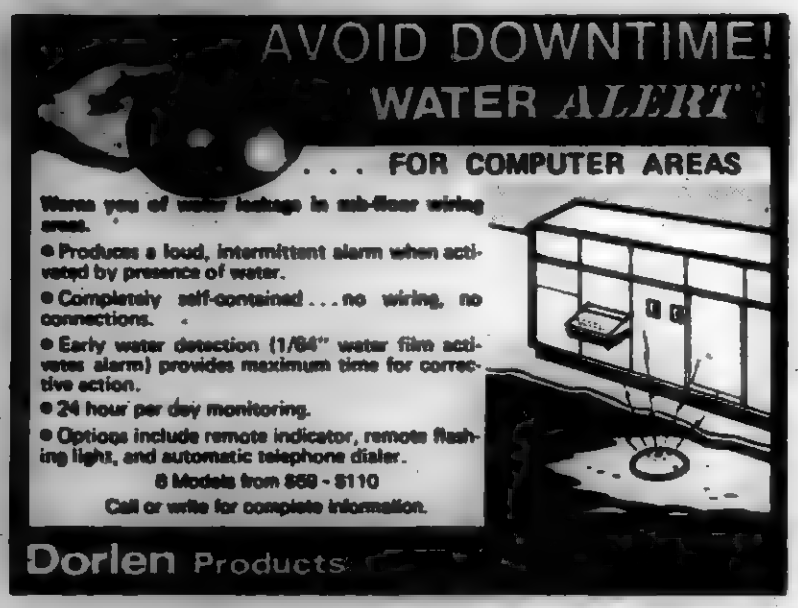
Complete with award-winning documentation and responsive support, GENER/OL offers uncommon software productivity in the Pansophic tradition.

Call us today for the performance of a lifetime!

PANSOPHIC®

(800) 323-7335

Pansophic Systems, Inc., 709 Enterprise Drive, Oak Brook, Illinois 60521. In Illinois, call (312) 986-6000.



PICK UP WHERE IBM LEAVES OFF.

Portable or desktop, you're way ahead when you pick up CORONA PC™ Because we give you everything you've ever wanted in an IBM[1]-compatible PC and more. For a great deal less.

COMPATIBLE AND MORE.

Our systems run all software that conforms to IBM PC programming standards. And the most popular software does.

We deliver twice the memory, with room for eight times as much.

We deliver a fast-access 320K floppy drive, a communication port and an improved IBM PC keyboard with indicator lights.

Our systems include high-resolution monitors (12" desktop, 9" portable) for crisper, cleaner displays, and both have built-in high-resolution graphics (640 x 325).

You get a complete system, ready to go to work.

MORE VERSATILITY.

With all the necessary features built into the main unit, the four expansion slots can be used for your special needs. For example, color or our optional 10MB hard disk.

Our RAM-disk software gives you temporary disk-type storage that works many times faster than disks.

PLUS SOFTWARE.

Our systems come with the operating system: MS-DOS.[2] A programming language: GW BASIC.[2] A training course: PC Tutor.[3] A professional word processor: MultiMate.[4] Plus DOS utilities and demonstration programs. Or you can get the p-System[5] from N.C.I. and write or run portable Pascal packages.

ALL FOR A GREAT DEAL LESS.

Even with all the extra features and performance, our systems still cost significantly less than the equivalent IBM PC.

Drop by your nearest CORONA PC dealer for a very convincing demonstration. Or contact us at 31324 Via Colinas, Westlake Village, CA 91361. (213) 991-1144 or (800) 621-6746 toll-free. Telex 658212 WSLK, in Europe 76066 CDS NL.

©Corona Data Systems 1983. 1. TM International Business Machines. 2. TM Microsoft. 3. TM Comprehensive Software Support. 4. TM Software Systems. 5. TM University of California.

corona™ data systems, inc.

IN DEPTH/AT&T's Schwartz

the start, we [cover] the salesman, the billing procedure, the order process — whether it's on time, whether people are courteous. It's a system we've had in operation for a couple of years now, so we know its statistical soundness. We do a lot of factual testing on how many customer complaints there are, how long it took us to process those complaints, how long it took to repair.

How important is the service function to selling AT&T Information Systems?

I've talked to a lot of customers lately about this and in a nutshell, as you add features and functions to your communications system, as your communications system becomes your information system, it becomes the way that you run your business. It's not just something you use to communicate on an intercom with your associates, or to get a call from outside — it is the way that you manage your business. Therefore, what becomes paramount above things like price, perhaps an extra whistle or gong [is] reliability. Reliability is very high on the list. Customers are absolutely aware of that.

Are you going to be making any major changes in pricing?

No, I wouldn't say "major." We'll provide more options to customers, and they'll be priced competitively. But I wouldn't say they'll be major changes.

AT&T Information Systems has concluded a number of agreements with companies like Wang and Hewlett-Packard for implementing interfaces. What is your position on systems attached to AT&T equipment in that way?

We're in the service business. We have a huge embedded base now, but it's not 100% Western Electric. We maintain equipment that is not Western Electric now, and I wouldn't see any reason to change that policy.

So you might be extending maintenance coverage to some of these other systems?

We'll have various maintenance agreements available for customers, and if they're part of a major AT&T Information Systems system, it may be part of the service.

How are your relations with the other divisions of AT&T Information Systems?

I think the Service Division is part of the team. We have a team approach, with the people with development, Bob Casales and his people with marketing/sales, our people with installation/maintenance . . . Everyone understands that while each is important, by itself it can't do much. If you had the best design group in the world, for example, and if you couldn't sell it, you really haven't accomplished much. Vice versa, if you have the best salesmen in the world and don't have a well-designed product, you're not going to be very successful.

You have been with the Bell system now for more than 30 years, starting as a lineman. How have you seen it change over that period?

I don't think I've seen any cataclysmic changes over that period. I've seen us move in the last year — AT&T Information Systems has put about 35 new products in our product line. Technology is moving at a much faster clip than it was 10 years ago. Let me say some of the things that haven't changed: dedication to service, a commitment to service that just transcends everything we do. So that's not changed. I have an old picture in my office of Angus MacDonald — perhaps you've seen it. It's a pretty famous picture, at least in the Bell system, of a lineman trudging through the night in the snow with a coiled wire over his arm, looking for a break in the line. That always kind of captures what you call the spirit of service. Maybe it's all corny, I don't know, but it's a deep heritage.

SYSTEMS & PERIPHERALS

TI to offer 32-bit CPU
First to use MIT's Nubus

By Patricia Keefe
CW Staff

AUSTIN, Texas — Texas Instruments, Inc. has introduced the Nu Machine, said to be the first commercial system to implement the 32-bit technology developed at MIT. TI now owns the rights to that technology, which it calls Nubus.

TI's first 32-bit processor, the Nu Machine is a high-performance system based on the 37.5M byte/sec Nubus, making the system particularly well-suited for applications requiring multiple or special-purpose processors, such as very large-scale integrated circuit design, printed-circuit board design, simulation and advanced software development, according to the vendor.

The system is expected to attract the interest of sophisticated end users, system integrators and OEMs in the scientific and engineering marketplace.

The Nu Machine is currently supplied with a Motorola, Inc. 10 MHz, 68010-based processor with a 4K-byte, 45-nsec cache memory and a memory management system implemented in hardware. Also included is a Unix-based operating system, high-resolution graphics display, mass-storage peripherals and an Intel Corp. Multibus subsystem.

TI's system reportedly supports 32-bit data transfer and addressing and can support future 32-bit microprocessors. The processor-independent Nubus also allows systems to be designed using other standard microprocessor families or special-purpose instruction sets.

The 800- by 1,024-pixel, 15-in., 60Hz, noninterlaced black-and-white display and bit-mapped graphics controller produce graphics and multifont text. Two

TI's Nu Machine

Winchester disk storage systems are available: a 474M-byte Winchester disk with 20-msec access time and an 84M-byte disk with 30-msec access time. For disk backup, ¼-in. streaming and ¼-in. cartridge units are available, the vendor said.

Also included are a high-bandwidth translator, said to provide an interface between the Nubus and Multibus systems, and a windowing system that provides capabilities for multiple virtual terminals on the Nu Machine's high-resolution display. Programming languages currently available include Fortran and C.

The basic Nu Machine is a small office model configured with a 68010 CPU, a 512K-byte memory, an 84M-byte disk, a ¼-in. cartridge tape, display, keyboard and mouse.

It is end-user priced at $53,450, the vendor said.

TI, P.O. Box 402430, Dallas, Texas 75240.

Oldies still goodies, but change to come

HARD TALK
TOM HENKEL

Computerworld, as do similar publications, talks endlessly about new products, new technologies and industry firsts. The fact is, most DP executives are in charge of what could best be described as ancient hardware — technology that is pushing 20 years old.

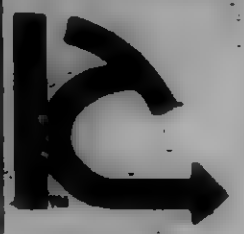
While there are outlandish stories about U.S. government agencies still using tube-based processors and dinosaurs like the Philco 2000, classics like IBM's 360 and 370 lines still make up about 10% of the domestic IBM installed base, according to the market research firm, International Data Corp. (IDC). Furthermore, IDC reports that there are still almost 600,000 traditional minicomputers currently in use — the kind most industry watchers wrote off two years ago. IDC predicts that it will take at least until 1985 for the 32-bit architecture made popular by the superminicomputer to become the dominant architecture among computer users.

So if your idea of a step-up in technology is a 370/158, you're not alone. There appears to be a big difference between the technologies that are ballyhooed on the business side of the computer industry and those that are actually used in the trenches — the DP shop.

But just because there is little hope your company will suddenly decide to embrace the latest in computer technology, explore gallium arsenide circuits or install optical disks does not mean you

See HARD TALK page 74

Replacement for DEC VT100 keyboard/77



Backup power source for small systems/79

INSIDE

■ Turnkey CAD/CAM system/74
■ International Technology Group expands integrity system/74
■ Disk controller for Data General systems/76
■ Touch-sensitive screen for DEC users/76
■ Turnkey system for small offices from Four Phase Systems/74
■ Disk drive cleaner/79
■ Drafting workstation from Gould/76

Unidot 32-bit systems debut
Based on Unix version

GOLDEN, Colo. — Unidot Systems, Inc. has announced two multiuser, 32-bit systems utilizing the University of California at Berkeley version of Unix.

Cerebra I is said to offer performance similar to Digital Equipment Corp.'s VAX-11/750 system, and the Cerebra II is said to be roughly equivalent to a DEC VAX-11/780 processor.

According to the company, the Unix-based systems will be useful in universities, government agencies and commercial organizations using eight to 32 workstations. Officials say that the systems' floating-point processor will be useful for computer-intensive applications.

The Cerebra systems are based on the National Semiconductor Corp. NS16032 32-bit microprocessor and reportedly feature virtual memory using software utilities distributed by the university.

The systems use the Intel Corp. Multibus, an IEEE 796 bus, to offer options for peripheral configuration, the vendor said.

They are said to feature 8K bytes of cache memory with a memory-cycle time of 45nsec.

Unidot's Cerebra

The Cerebra I has 2M bytes of main memory, 84M bytes of high-performance disk storage, a 16-line intelligent serial controller and either cartridge tape or floppy disk backup, a Unidot spokesman said.

The Cerebra II is said to include a second CPU with cache memory, eight additional serial lines and an additional 1M byte of memory.

The units are reportedly packaged in office-style pedestals with locks designed to prevent tampering of cables, boards or consoles.

Cerebra is the first system to be marketed by Unidot, which has operated primarily as a consulting firm for several years, the spokesman said.

The systems are scheduled for delivery in April, according to Unidot.

Prices start at $26,895 for the Cerebra I and $46,000 for the Cerebra II, the vendor said.

Unidot Systems, 600 Park Point Drive, Golden, Colo. 80401.

CAM/CAE stories needed for report

There's an automation revolution happening on the factory floor, and computerized manufacturing systems are leading the charge. *Computerworld*'s March Special Report will take an in-depth look at computerized manufacturing systems and how they are altering production, planning, operations and the relationship between DP departments and factory automation people.

The report will focus on computer-aided manufacturing and engineering, material requirements planning, robotics, inventory and shop floor control. More importantly, it will look at the impact of these technologies on traditional manufacturing operations.

Contributions are welcome in one of two forms: a tutorial covering a trend or an application story describing a case study of a particular user and product. Manuscripts should be three to six double-spaced typewritten pages in length. The deadline for all submissions is Feb. 10. Charts, photographs or other graphics are encouraged.

Authors should include with all submissions a very brief biography and a telephone number at which they can be reached. Articles should be sent to Bill Laberis or Pete Bartolik, *Computerworld*, 375 Cochituate Road, Box 880, Framingham, Mass. 01701.

SYSTEMS & PERIPHERALS

TURNKEY SYSTEMS

ULTIMACC BUSINESS SYSTEMS GROUP
Champ

The Ultimacc Business Systems Group, a subsidiary of Storage Technology Corp., has announced the Champ, a 16-bit multiuser turnkey business system based on the Fairchild Camera and Instrument Corp. 9445 microprocessor.

Aimed at businesses with annual sales of $1 million, the Champ consists of a central processing unit with 128K bytes of random-access memory, one 50M-byte hard disk drive, a 64 line/min bidirectional printer and two STC Model 4200 terminals, the vendor said.

The basic Champ system can accommodate up to six terminals. A 256K-byte memory upgrade allows users to add up to 15 terminals. A 30 line/min band printer and cash drawer module are also available, according to a spokesman for the vendor.

Designed to be used by operators without previous data processing experience, the system includes its own operating system, called the micro-Champ, peripherals, software documentation, training, telephone support, maintenance and financing, the vendor said.

The Champ system costs $35,000 and was designed for turnkey users in the wholesale/distribution industry. Additional terminals cost $1,950 each, the vendor said.

Ultimacc Business Systems, 4 North St., Waldwick, N.J. 07463

UNITRONIX CORP.
System 4000

Unitronix Corp. has announced its System 4000 with fixed Winchester disk drives of up to 800M bytes and an 80M-byte magnetic tape drive backup.

The System 4000 reportedly offers emulation of Digital Equipment Corp.'s RSTS/E, RSX-IIE and VMS, Unix and S&H Computer Systems, Inc.'s TSX operating systems and features 256K bytes to 1M bytes of main memory.

According to the company, the system is available with the DEC Micro-11, PDP-11/23 Plus, PDP-11/34, PDP-11/44, PDP-11/73 or VAX-11 processor and is compatible with existing 18-bit direct memory access controllers or DEC Q-bus interfaces, as well as 22-bit devices.

Unitronix also announced that the system offers both DEC and non-DEC peripheral options.

Other features are said to include a port serial interface for up to 64 terminals, a peripheral bus mapping module, 18- and 22-bit LSI-11 backplane handling old and new controllers and communications options to multiplexer and modems.

The system reportedly runs DEC diagnostics, according to the vendor.

It is available with a 160M-, 300M-, 500M- or 800M-byte fixed Winchester drive and with an optional 80M-byte removable Winchester drive for backup, the vendor said.

The system is available now at prices ranging from $29,000 to $53,000, depending upon the desired central processor.

Unitronix, 197 Meister Ave., Somerville, N.J. 08876.

CAV CORP.
Cav/Cad

CAV Corp. has introduced Cav/Cad, a turnkey computer-aided design and manufacturing (CAD/CAM) system that uses a 32-bit Motorola, Inc. 68000 microprocessor and the Unix operating system.

The system offers three-dimensional CAD; multiuser, multitasking capabilities; automatic dimensioning and bill of materials generation; and menu-driven graphics production, according to the vendor.

A base CAD/CAM system consists of a 68000 microprocessor; 1M byte of random-access memory, expandable to 5M bytes; 30M bytes of hard disk storage, expandable to 500M bytes; a graphics terminal with 1,024- by 1,024-pixel addressable resolution or a 1,024- by 768-pixel viewable resolution; a 1M-byte floppy disk drive; six RS-232 ports, which can be expanded to 12 ports; and a digitizing tablet.

The system can be expanded to support six users, a Touch-Tone screen, tape storage and a modem, according to CAV.

The system price is $50,000.

CAV, 3150 La Selva Drive, San Mateo, Calif. 94450.

FOUR PHASE SYSTEMS, INC.
Low-end turnkey system

Four Phase Systems, Inc. has announced a low-end turnkey system which can accommodate up to eight terminals using the firm's Vision distributed data processing software.

The system was designed to address a variety of applications and configuration requirements of the small-scale office environment. It will include a complement of peripheral devices, data transfer capabilities and software offerings, the vendor said.

The system includes 96K bytes of processor memory and 5M-byte disk capacity. The CPU incorporates the vendor's proprietary architecture, featuring window into memory and interrupt-free display. Each terminal reportedly can handle more than 10 keystroke/sec without any perceivable delay. The alphanumeric, keypunch-style keyboard was designed for data entry, IBM 3270 simulation and Vision, according to a spokesman.

The system is offered in two configurations: either with a bisynchronous communications controller or with a magnetic tape drive. A sample configuration consisting of a CPU, bisynchronous communications, eight terminals and keyboards and a lineprinter sells for $34,512.

Four Phase Systems, 10700 N. De Anza Blvd., Cupertino, Calif. 95014.

PROCESSORS

INTERNATIONAL TECHNOLOGY GROUP, INC.
Integrity system expansion

International Technology Group, Inc. (ITG) has announced the expansion of its Integrity computer system from 64- to 96-terminal capacity.

The system uses twin Data General Corp. Eclipse S/140 processors, each with 2M bytes of erasable correctable memory, and reportedly provides disk storage space of up to 2.4G bytes.

The Integrity operating system is compatible with Mini Computer Systems, Inc.'s Micos system. The ITG enhanced version of Micos Extensive Basic supports CALL routines, reducing a typical program size by 50%; offers Boolean logic to facilitate structured programming; and can address up to eight 600M-byte logical disk volumes, a spokesman for the vendor said.

The low-end, DG-based Integrity systems utilize single 128K-byte DG Nova series processors and support Control Data Corp. Lark II disk drives — 25M bytes fixed, 25M bytes removable, according to the vendor spokesman.

Nationwide hardware and operating system maintenance service is provided by ITG. All systems contain onboard diagnostics and are continuously monitored via ITG's remote support network.

Prices start at $175,000 for a dual-processor configuration with 64 terminals, ITG said.

ITG, 3 Barker Ave., White Plains, N.Y. 10601.

MicroAge

"BECAUSE WE COULDN'T AFFORD MISTAKES!"

"They guided us over the rough parts when we needed it"

"During September of 1982, we started our MicroAge Computer Store in Tulsa, Oklahoma with 3 people. Today we have 11 people working for us and we're still hiring. By following MicroAge's advice and marketing strategy when we started in business, we were able to reach Tulsa's business computer buyers in a much shorter time than we could have on our own."

"Both of us had technical backgrounds in computers but lacked the marketing experience necessary to reach our goals. We used MicroAge's experience and leadership to guide us through the rough spots and boost our sales and marketing potential.

"MicroAge . . . they helped us build a sales organization to reach the Oklahoma businessmen."

John E. Mosier
John Mosier
President

George McLendon
George McLendon
Vice President

To build your own professional computer sales organization with MicroAge write to:

MicroAge®
COMPUTER STORES
"The Solution Store"®
1857 West Alameda • Tempe, Arizona 85282
(602) 968-3168

OLDIES from page 73

can ignore technology. DP shops are changing at a much more rapid rate now. DP managers who used to plan on making hardware changes every five years are now making those changes in three. Larger shops say they re-evaluate their hardware needs every six months.

And let's face it, you probably won't be locked into your current job forever.

You might wind up staring at the cutting edge of technology sooner than you think. And you will certainly be in a more marketable position on the job market if you keep abreast of technology.

Introducing MARK V™ for CICS users: a *unique*, 4th generation non-procedural application development system that saves you time and money at every stage of your application life cycle. See it at a free seminar near you!

Informatics just broke the productivity barrier with MARK V, an extraordinary timesaving application development system. But, MARK V is not for everyone. *It may be for you if:*

- ☑ You need help in reducing your backlog of medium to complex CICS applications.
- ☑ You use CICS with IBM-supported data access such as VSAM or DL/I.
- ☑ Your CICS system demands highly efficient application execution.

Then, MARK V can help you produce efficient compiled applications that rival the execution of well-written COBOL—in less than half the development time!

Easy application development and maintenance is just the beginning!

MARK V improves productivity throughout the application development and maintenance cycle—not just in the coding—by providing:

- Interactive application design and simulation
- Easy to use, menu-driven specification language for development and maintenance
- Transparent and complete data access/communications control
- Automatically produced application documentation

That means, with MARK V your programmer need only specify the solution. MARK V generates the *complete* application. This methodology allows you to solve more complex problems more efficiently using less highly trained personnel—*and that saves you money!*

Reserve your place at a *free Seminar* on MARK V—the simple new way to develop and maintain your medium to complex CICS applications.

As a data processing professional, you're also a professional skeptic. But the simplicity, versatility and timesaving capabilities of MARK V are easy to see—and prove. To do so, simply mail the coupon below or call toll free. We'll reserve your place at a free MARK V Seminar in a city near you. But attendance is limited.
So mail this coupon or call *today*.

informatics general corporation
THE SOFTWARE ENGINEERS

Register now for a Free MARK V Seminar!
Mail this coupon or call toll free

1 800 227-3800, ext. 926
(In Canada, call collect, 0 415 [illegible]-7192)

YES. I want to learn more about how MARK V can make my medium to complex applications development and maintenance both fast and easy.

☐ Please enroll me in the free seminar I have indicated below (check one). Call me with details on specific location and time. I understand that there is no cost or obligation.

☐ Dallas	February 14	☐ Montreal	February 15
☐ Boston	February 28	☐ New York	February 14
☐ Chicago	February 16	☐ Philadelphia	February 16
☐ Cleveland	March 1	☐ San Francisco	February 28
☐ Houston	February 15	☐ Toronto	March 14
☐ Los Angeles	February 21	☐ Washington, DC	February 22

☐ I cannot attend a Seminar. But please send me more information on the MARK V Application Development System.

Name _____
Title _____
Company Name _____
Phone Number _____ (include area code)
Address _____
City _____ State _____ Zip _____

Mail this coupon to: Informatics, MARK V Free Seminar
P.O. Box 1452, Canoga Park, CA 91304 CW-AK

SYSTEMS & PERIPHERALS

DATA STORAGE

CUSTOM SYSTEMS, INC.
BMX-1 disk controller

Custom Systems, Inc. (CSI) has introduced a disk controller, the BMX-1.

The BMX-1 is plug-compatible with the burst multiplexer channel on Data General Corp. minicomputers. According to the vendor, it allows users to select any storage module drive-interfaced disk drive for use with the DG S-140, S-280 and MV Series CPUs.

The product offers the user four disk drive connect ports with software-configurable drive characteristics on a port-by-port basis.

According to the vendor, the unit uses electronically erasable programmable read-only memory technology, eliminating the need for switches and making all functions configurable via downline loaded software.

The BMX-1 contains a 32-bit error correction code, offering burst error correction to 11 bits in length.

The list price of the controller is $4,995, with quantity discounts available.

Custom Systems, 6950 Shady Oak Road, Eden Prairie, Minn. 55344.

INNOVATIVE DATA TECHNOLOGY, INC.
Magnetic tape subsystems

Innovative Data Technology, Inc. has introduced three ½-in. 9-track, 800/1600 byte/in. magnetic tape subsystems for the Small Computer Systems Interface (SCSI) Bus.

The tape subsystems, which boast IBM/Ansi/Ecma compatibility, use an intelligent controller embodded behind two of the tape transports and in a stand-alone 3½-in. chassis when used with the streaming recorder, the vendor said. Variable data block sizes are programmable in both the read and write mode up to a maximum of 32K bytes of buffer storage, the vendor said.

The magnetic tape subsystems feature full hardware and software compatibility with any host unit or other peripheral supporting the SCSI standard bus, the vendor said. In addition, the subsystems control up to four ½-in. Industry Standard Tape Transports, and all of the systems may use 7-, 8½- and 10½-in. standard reel sizes, the vendor said.

Other features include a tape-to-tape copy feature which can be implemented in the software, and over 40M bytes of data may be stored on a single 2,400-ft reel of tape, the vendor said.

Model TD1012/SCSI, which sells for $4,550, supports 9 tracks and 1,600 bit/in. in the start/stop mode operating at 12.5 in./sec or 100 in./sec in streaming mode. The data transfer rate is 20K byte/sec in start/stop mode and 160K byte/sec in streaming mode, according to the vendor.

Model TD1050/SCSI costs $5,150 and supports 7- or 9-track dual density 800 bit/in. and 1,600 bit/in. in start/stop mode operating at 45 in./sec. The data transfer rate is 72K byte/sec, the vendor said.

Model TD1750/SCSI sells for $5,950 and supports 9-track dual density 800 bit/in. and 1,600 bit/in. in start/stop mode operating at 75 in./sec. The data transfer rate is 120K byte/sec.

As options, rack enclosures, factory installation and maintenance contracts are available.

Innovative Data Technology, P.O. Box 178160, 4060 Morena Blvd., San Diego, Calif. 92117.

TERMINALS

KIMTRON CORP.
ABM 85H VT-52/100

Kimtron Corp. has introduced a terminal that reportedly emulates Digital Equipment Corp. VT-52/100 CRTs.

The ABM 85H VT-52/100 features green or amber characters, a 24-line by 80-col. screen, 16 programmable function keys, programmable cursor, an RS-232 port, user-selected embedded attributes and four international character sets, the vendor said.

By using different programmable read-only memories, the terminal also reportedly emulates Televideo Systems, Inc. 920, 925 and 950 or Data General Corp. D100/200 terminals.

The terminal is priced at $895.

Kimtron Corp., 2225-I Martin Ave., Santa Clara, Calif. 95050.

GOULD, INC.
PC Workstation

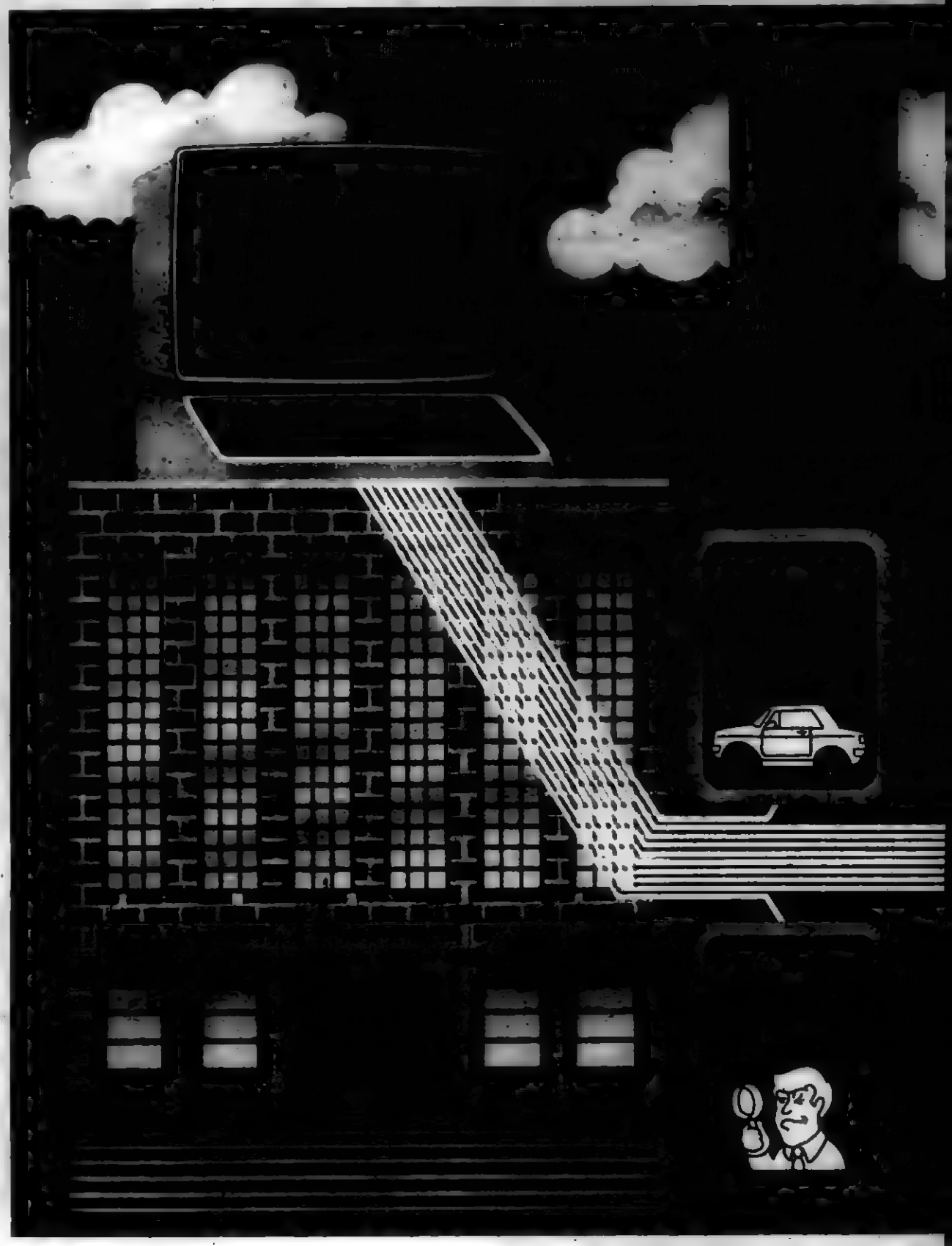
Gould, Inc.'s Modicon Programmable Control Division has announced a documentation and drafting workstation said to be compatible with many models of programmable controllers.

The PC Workstation includes a 16-bit processor and 512K bytes of program memory and a 16M-byte Winchester disk drive with a 5¼-in. floppy disk drive, the vendor said. The product reportedly provides text ladder diagrams and user-customized drafting for programmable controller equipment drawings.

The workstation also reportedly combines fully-formed graphics symbols with extensive commentary to produce high-resolution, informative displays.

The PC Workstation, including high-speed printer and software, is priced from $21,000, according to the vendor.

Gould's Modicon Programmable Control Division, P.O. Box 83-SVS, Andover, Mass. 01810.



SYSTEMS & PERIPHERALS

PENTA SYSTEMS INTERNATIONAL, INC.
Pentavision enhancements

Penta Systems International, Inc. has announced enhancements for its electronic graphics terminal, Pentavision, designed for use by publishers, in-plant printing operations and commercial typesetters using Data General Corp. computer systems.

According to a company spokesman, the enhancements allow precise lineup of type in made-up pages in the computer-assisted page-makeup terminal.

Features include visual locks that align type to alternative positions beyond the normal locking, based on the line measure and the quadding specified during original input. It also is said to allow automatic contouring of text by tracing an outline of the desired shape on Pentavision's bit pad, use of electronic scissors for cutting the page into sections for output and justification of type by feathering between lines or elsewhere in the text.

The terminals cost $33,995, according to the vendor.

Penta Systems, 1511 Guilford Ave., Baltimore, Md. 21202.

KEY TRONIC CORP.
KB 100

Key Tronic Corp. has introduced KB 100, a plug-compatible replacement keyboard for the Digital Equipment Corp. VT100 CRT terminal.

The KB 100 is a low-profile keyboard requiring less vertical space than the terminal's original keyboard, the vendor said.

Additionally, the KB 100 is intended for heavy office use and incorporates a microprocessor and solid-state capacitive switches.

Cost of the plug-compatible replacement keyboard is $379.

Key Tronic, P.O. Box 14687, Spokane, Wash. 99214.

KIMTRON CORP.
KT-7

Kimtron Corp. has announced a video display terminal featuring what the company describes as an ergonomic design.

The KT-7 terminal reportedly features a tilt-and-swivel screen, height adjustability, a 12-in., nonglare green or amber screen, menu setups and user-selectable hidden or embedded attributes. The menu setups, 20 programmable function keys with answer-back, are set from keyboard or host and stored in nonvolatile memory, according to the company.

The terminal is said to emulate the Televideo Systems, Inc. 920, 910 and 925 terminals and to offer code compatibility with the Televideo 924, 914 and 950. It reportedly can emulate other terminals with the addition of an optional programmable read-only memory.

The terminal is available now for $595.

Kimtron, 2225-I Martin Ave., Santa Clara, Calif. 95050.

DIGILOG, INC.
Remote Monitor Select Switch

The Network Control Division of Digilog, Inc. introduced the Remote Monitor Select Switch (RMSS), which reportedly allows users at a central location to monitor remote data circuits.

The system requires central and remote-site equipment. An Ascii terminal, master remote line monitor (RLM), data line monitor (DLM) and asynchronous modem are needed at the central site; the remote site requires a slave remote line monitor and RMSS. The Ascii terminal uses an RLM to monitor signal information. The signal causes RMSS to bridge the line so data traffic can be monitored by the DLM at the central site.

RMSS costs $325, which includes cables.

Digilog, 1370 Welsh Road, Montgomeryville, Pa. 18936.

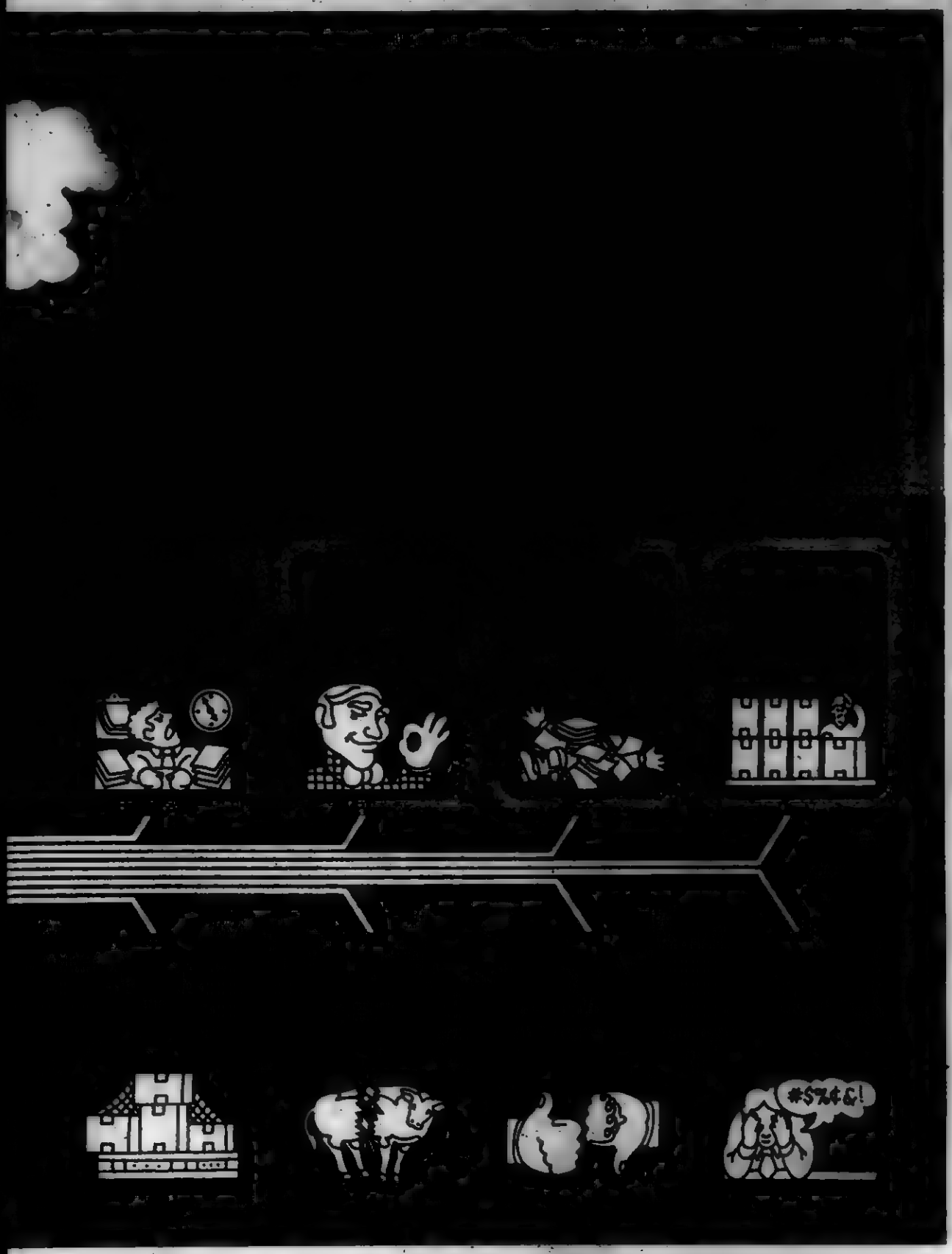
INTECOLOR CORP.
Fastscreen

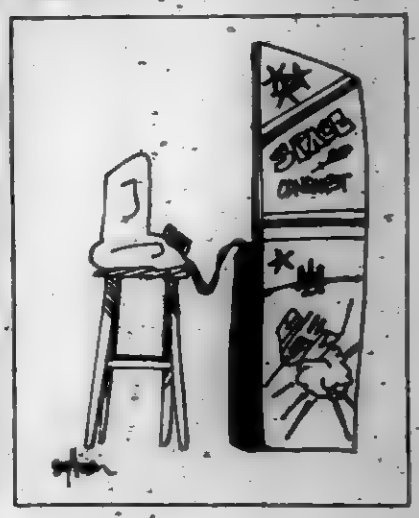
Intecolor Corp. has introduced a computer memory facility said to permit displays to be created on its 8001G color graphics terminal screen in one-quarter of a second.

Since it uses random-access memory, Fastscreen reportedly provides faster access to information than do conventional, flexible-media storage devices for process-control operations. Any of 63 different screens can be displayed on 8001G color graphics terminals equipped with single Fastscreen with 512K-byte storage. Up to 126 screens are available with dual Fastscreen, which provides more than 1M byte of storage.

Fastscreen is supplied on a printed-circuit board for use in the Intecolor card cage. The price for single Fastscreen is $1,245; the dual version is $2,450.

Intecolor, Intecolor Drive, 225 Technology Park, Norcross, Ga. 30092.





SYSTEMS & PERIPHERALS

PRINTERS/ PLOTTERS

GOLD KEY ELECTRONICS, INC.
Switchmate; Switchmate Jr.

Gold Key Electronics, Inc. (GKE) has announced the development of an intelligent printer switch for use with Digital Equipment Corp.'s LQP02 printer.

Switchmate reportedly allows as many as three Decmate system users to share the functions of a printer without having to wait for current printer activity. The sharing can be suspended at any time and dedicated to a single Decmate.

The switch is attached by cable to the Decmate systems and the LQP02 printer. Also offered is the Switchmate Jr., which has a two-user capability.

The Switchmate retails for $749 and the Switchmate Jr. for $499. Service and a warranty period are provided by the vendor.

GKE, P.O. Box 29, 735 Chestnut St., Manchester, N.H. 03105.

GRAPHICS SYSTEMS

TENTIME
Graphics T/S service; Management Touch

Tentime has announced two services for Digital Equipment Corp. users: graphics time-sharing capabilities for DEC VAX-11 users and Management Touch, said to provide a DEC VT100 with touch-sensitive screen capabilities.

Using a California Computer Products, Inc. Model 1051 plotter, contour mapping, bar charts, pie charts and bubble charts reportedly can be produced under the graphics time-sharing service.

Graphics features include dc servomotor drive, continuous drum roll, four-color pen action and .25mm resolution.

Time-sharing costs are $78/hour plus materials and a 15% surcharge on all materials, according to a vendor spokesman.

Management Touch consists of a touch-sensitive screen and logic board for $1,095.

A yearly maintenance service is also available for $150.

Tentime, 5375 Western Ave., Boulder, Colo. 80301.

POWER SUPPLIES

COMPUTER POWER SOLUTIONS, INC.
Electra-Guard

Computer Power Solutions, Inc. (CPSI) has expanded its line of electronic surge suppressors to include standby power supply systems.

The Electra-Guard standby power supply system comes in 200 Vac (optional 400 Vac) with an audible alarm and is sized approximately 6 by 11 by 13 in., a spokesman for the vendor said.

The unit itself is protected against line and battery fuses and a has a low battery cutout to protect against potentially damaging overloads, according to the vendor spokesman.

Suggested retail starts at $499.95 for the 200 Vac model.

CPSI, Suite 203, 3800 49th St. N., Pinellas Park, Fla. 33565.

TII ELECTRONICS, INC.
GPM-PX

TII Electronics, Inc. has enhanced its programmable power line monitor with a feature said to direct programming of power line fault thresholds by a front-panel keyboard.

The feature reportedly allows the operator to pinpoint fault conditions and to track and identify, via printout, power line problems such as high-line voltage, low-line voltage, voltage spike and drop, power failure and high-frequency noise.

Other features of the enhanced product, called GPM-PX, include a summary of events and threshold-setting capability, an RS-232 output, a dc high/low monitoring capability and spike amplitude window detection.

GPM-PX costs $1,950, the vendor said.

TII Electronics, 286 Terminal Road, East Setauket, N.Y. 11733.

THIS IS ONE FORM OF REAL TIME SCHEDULING.

ADC2 SOFTWARE IS ANOTHER.

Automated Data Center, ADC2, is *innovative* and *non-traditional* software that manages critical components of IBM's MVS computer operating system. It takes unique advantage of the MVS subsystem architecture.

It's intelligent software that's a real-time scheduler and monitor of job and system performance.

A software system that's very simple to use. Even for the novice.

ADC2 dynamically gathers job performance statistics and maintains this information as current and historical data for quick, on-line access.

Of course, ADC2 is designed to smoothly build schedules and access all your data center management information, ensuring increased control and throughput under the most demanding circumstances.

Additionally, your scheduling can be conveniently decentralized: different departments and remote sites are able to develop their own job schedules with simple commands.

And we made ADC2 extremely easy to implement. While other job scheduling systems typically require months and months of pre-planning and data entry, ADC2 can be productive the very same day it's installed.

It's that good.

For a demonstration of ADC2 or further information on the Cambridge A**2 family of high-performance software systems, we invite you to call Mr. Shawn McLaren direct: 415/941-4558.

He'll be glad to tell you about a software system that performs with flying colors.

The Cambridge Systems Group

24275 Elise, Los Altos Hills, CA 94022, U.S.A.
(415) 941-4558 • Telex 357437

London Paris Munich

SYSTEMS & PERIPHERALS

EDP POWER, INC.
Survivor

EDP Power, Inc. introduced the Survivor, a back-up power source for personal and small business computers.

The Survivor protects a computer from power flickers, power outages, line surges and brownouts, according to the vendor.

The product features automatic dc circuit breaker, two duplex outlets, a zero maintenance sealed battery and an automatic battery charger, the vendor said.

Three models provide 300, 400 or 1,000 watts of power and battery power that lasts 15 minutes or longer.

Prices for the Survivor back-up power source begin at $600, the spokesman said.

EDP Power, Suite 211, 1108A W. Devon Ave., Elk Grove Village, Ill. 60007.

EXIDE ELECTRONICS CORP.
Power Distribution Module

Exide Electronics Corp. has announced a line of power distribution systems for mainframe computers.

Exide's Power Distribution Module distributes and monitors power in a computer room, thus protecting it from voltage spikes, transients and other electrical surges, according to the vendor. The module has two options: metering and monitoring. The metering option displays output, voltage and other parameters, the vendor said. The monitoring module scans system parameters, stores 100 alarm conditions and provides printer or terminal interfaces, the vendor said.

The base system price starts at $3,760, a model with the metering option is priced at $4,800, and a module with the monitoring option costs $8,170.

Exide Electronics, P.O. Box 58169, Raleigh, N.C. 27658.

BOARD-LEVEL DEVICES

PRIVAC, INC.
Electro-Screen BT-1 2.0

Privac, Inc. has announced enhancements to its Electro-Screen BT-1 graphics board, designed for SS-50 and SS-64 buses.

Electro-Screen BT-1 2.0 enhancements reportedly provide 19.2K bit/sec character equivalent throughput, two-dimension output with scaling capability and rotation in one-degree increments.

Electro-Screen BT-1, equipped with a 6809 microprocessor, provides bit-mapped, 512- by 480-pixel resolution and 84- by 48-line text display, the vendor said.

The enhanced graphics board is priced at $795.

Privac, 3711 S. George Mason Drive, Falls Church, Va. 22041.

MOTOROLA SEMICONDUCTOR PRODUCTS, INC.
M68BSA1-1; M68BSA3; M68BSAC

Motorola Semiconductor Products, Inc. has announced support of its MC68008, MC68010 and MC68451 chips with a real-time bus state analyzer (BSA) and two additions to its series of personality modules.

The additions include:

- The M68BSA1-1 — An MC68000, MC68010 and MC68451 personality module. The M68BSA1-1 is a redesigned version of the vendor's MC68000 BSA1 personality module. The new product supports the MC68000 and expands its support to the MC68010 virtual memory microprocessing unit and the MC68451 main memory unit. It has two cable and probe/connector assemblies.
- The M68BSA3 — An MC68008 personality module. It supports the MC68008 microprocessing unit and has a cable and probe/connector.

Both of these personality modules require a third offering, the M68BSAC BSA control module.

The personality modules function with three BSA trigger modes (continuous trace, sequential and window) and provide address (software) and discrete (hardware) histogram displays, the vendor said. Also, the BSA1-1 and the BSA3 modules reportedly provide matching support for the MC6800, 68008 and 68010 emulator modes that are used in the vendor's HDS-400 hardware development station. Combined with the HDS-400, the BSA can provide complex event break points — specified by up to seven events from 79 qualifier lines — on other than program instructions.

Pricing for the control module and two personality modules is: $3,500 for the M68BSAC and $1,050 each for the M68BSA1-1 and M68BSA3.

Motorola, P.O. Box 20912, Phoenix, Ariz. 85036.

STD MICROSYSTEMS
Models 5870A and 5380A

STD Microsystems has announced two additions to its line of bus modules.

The Model 5870A is said to be a fully standard bus-compatible interface with Zilog, Inc.'s Z80 microprocessor.

The unit also offers a dual RS-232C serial interface. It contains two software programmable asynchronous or synchronous RS-232C serial channels with transmission rate selection and an optional crystal-referenced transmission rate oscillator, the vendor said.

The external RS-232C interface is configurable with data communications or terminal equipment and meets the requirements of RS-232C configuration F. The asynchronous configurations cost: $175 for 2.5 MHz, $200 for 4 MHz and $235 for 6 MHz. The synchronous configurations cost: $185 for 2.5 MHz, $210 for 4 MHz and $245 for the 6-MHz version, the vendor said.

Also unveiled was the Model 5380A Z80 dual parallel I/O module, also said to be STD-Z80 bus-compatible.

It reportedly provides four independent 8-bit I/O ports, two of which are capable of bidirectional I/O. The module has all bus signals fully buffered for minimum loading and maximum system expandability. The Model 5380A costs $150 for 2.5 MHz, $180 for 4 MHz and $210 for the 6-MHz version.

The STD bus interrupt daisy chain is implemented on board both modules, reportedly allowing serial priority interrupt arbitration within modules of the system.

STD Microsystems, 599 Sherman Ave., Palo Alto, Calif. 94306.

AUXILIARY EQUIPMENT

PERIPHERAL CONNECTIONS, INC.
E-Z-Reader

Peripheral Connections, Inc. (Percon) has introduced a bar code reader called E-Z-Reader, which supports the two most prolific industrial bar codes, 39 and interleaved 205, according to the vendor.

Communications are standard via an RS-232C port. There is a beeper to indicate a good read. Operator feedback is available by two LED host-controlled status indicators and a low-frequency tone, the vendor said.

The vendor said the product was developed for the customer who wants to read dot matrix or medium-density printed labels and have operator feedback.

The E-Z-Reader costs $395. An operating and installation manual is available for $20.

Percon, P.O. Box 1952, Eugene, Ore. 97440.

COMPUTRONICS LTD.
Forms Driver

Computronics Ltd. introduced Forms Driver, which supports Prime Computer, Inc. Forms software for Televideo, Inc. 925 and 950 and Hazeltine Corp. Espirit III terminals.

Forms Driver supports five types of cursors: blinking block, steady block, blinking underline, steady underline and none, the vendor said. The software allows the user to select the type of cursor used with Forms and when Forms is exited. Forms Driver supports reverse video and blinking characters, according to the vendor.

Forms Driver is available for a one-time license fee of $1,500 for each type of terminal.

Computronics, 150 North Ash, Wood Dale, Ill. 60191.

SWITCHMASTER CORP.
VS controller

Switchmaster Corp. has introduced a new control system for its line of IBM-compatible channel switches.

The VS controller includes specialized hardware and software to control a single channel switch as well as a network of channel switches.

The system reportedly allows up to 24 switches to be operated from a single CRT terminal.

The 880 series channel switch allows up to 16 strings of peripheral devices to be connected to as many as eight CPUs in any configuration, according to the vendor.

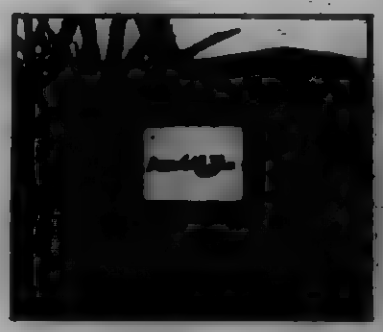
With the VS feature, the 880 can coexist in the same network with the previously announced 880 switch, the vendor said.

The switches range in price from $61,000 to $99,000.

The 880 switch reportedly includes the VS control system with a CRT terminal, but there is a charge of $8,900 for the feature when installed on the smaller switches.

Switchmaster, Suite 9, 35 Mitchell Blvd., San Rafael, Calif. 94903.

Saudi Computerworld is your link to the Saudi Arabian computer market.



The Saudi Arabian computer equipment market was worth $78 million in 1981. Researchers forecast a total market value of $222 million by 1987. The market is well-developed with computers, minis and mainframes, in virtually every sector. Government and related public organizations represent 50% of the market.

Now you can reach this valuable market with *Saudi Computerworld*. As part of *Computerworld*'s worldwide family of computer publications, *Saudi Computerworld* shares in the largest international computer information network. It is a monthly bilingual (Arabic/English) magazine circulated to 12,000 DP professionals in the computer user environment in the Gulf Peninsula. *Saudi Computerworld* reports on news and ideas of interest to small and large computer users in business, industry, government, and educational organizations.

CW International Marketing Services gives you one-stop advertising service in countries around the computer world. For more information on *Saudi Computerworld* or any of our other foreign publications, just fill out the coupon below.

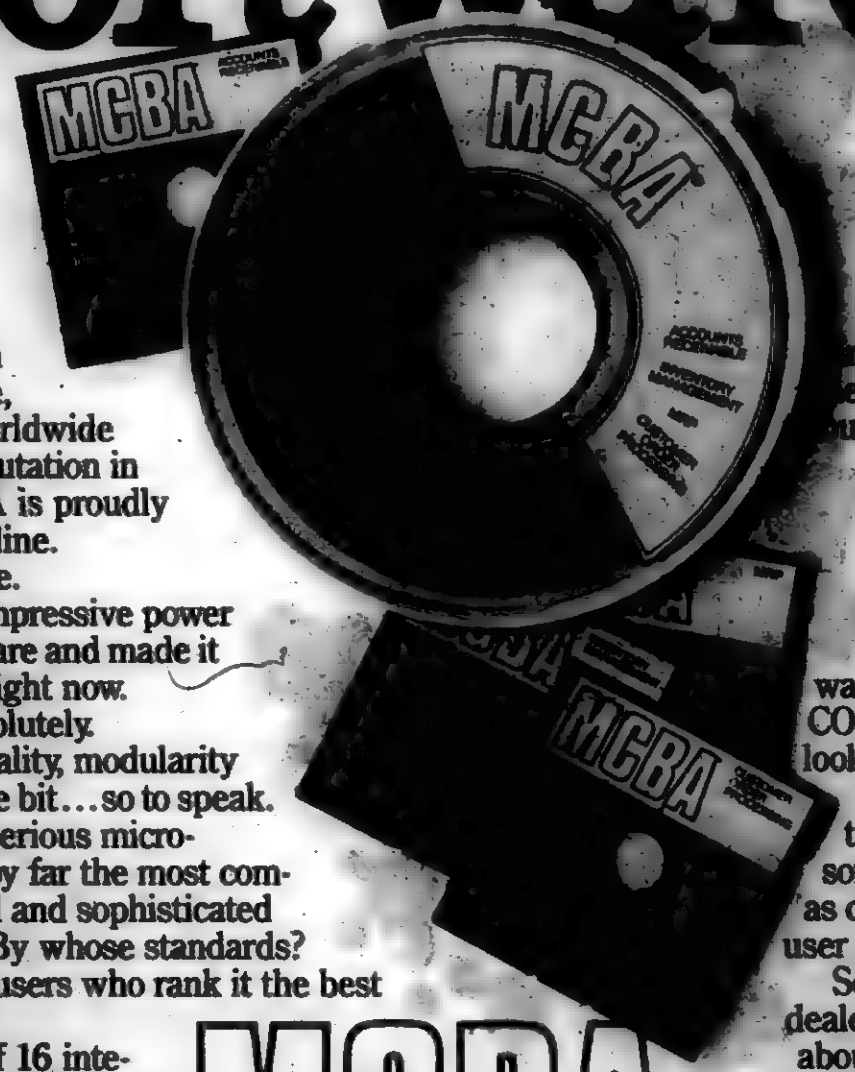
Diana La Pierre-Kelly, Manager
International Marketing Services
CW COMMUNICATIONS/INC.
375 Cochituate Road, Box 880
Framingham, MA 01701 (617) 879-0700

CW COMMUNICATIONS/INC.
Publishers of *Computerworld* and other leading computer publications around the world

Please send me more information on:
☐ *Saudi Computerworld* ☐ Your other foreign publications

Name _____ Title _____
Company _____
Address _____
City _____ State _____ Zip _____

MCBA introduces shrink-to-fit software.



With nine years in minicomputer software, 15,000 installations worldwide and an established reputation in the mini world, MCBA is proudly shrinking its software line.

Down to micro size.

We've taken the impressive power of minicomputer software and made it available for micros. Right now.

Alter the fit? Absolutely.

Alter the functionality, modularity and capability? Not one bit…so to speak.

This new line of serious microcomputer software is by far the most comprehensive, well-tested and sophisticated in the industry today. By whose standards? Thousands of MCBA users who rank it the best in the business.

MCBA's library of 16 integrated manufacturing, distribution and accounting packages can be installed in whatever combination

nd sequence a user eeds for his or her usiness.

It grows with businesses. No matter what size they are now. Or want to be later.

And MCBA software now runs in RM/COS,® UNIX™ and UNIX look-alike environments.

In other words, we've tailor-made our newest software to fit micros—as comfortably as it fits user needs.

So whether you're a dealer or a user, find out about it. Call us now at (818) 957-2900.

Shrink-to-fit software. For growing businesses.

MCBA®

Minicomputer Software for Micros.

RM/COS is a Registered Trademark [illegible] of Ryan-McFarland Corp. Unix is a Trademark of AT&T. MCBA is a registered trademark of MCBA, Inc.

MICROCOMPUTERS

Micro tools called short of user needs

By Peter Bartok
CW Staff

PALM SPRINGS, Calif. — Microcomputer software is working some wonders in the corporate environment, but a lot more innovation is required, according to systems designers for four top U.S. corporations who spoke here recently.

Systems executives for General Electric Co., Bank of America Corp., McKesson Corp. and Aetna Life and Casualty Co. shared their expectations with information industry representatives attending Infocorp's 1984 Strategic Issues Conference.

"We've got to deliver real data to the user in terms that he can deal with it," according to Coby Dunn, vice-president of interactive corporate services for Bank of America.

Dunn said his centralized data processing functions serve 10,000 users worldwide, along with several thousand word processing users, from seven mainframes.

Projects currently under way at Bank of America's new End-User Computing Department are focusing on integrating personal computers into vertical markets and building an extract facility to enable users to extract the data they are demanding. "Users are trying to get data off systems that aren't designed to give data in that format," he said.

Center of expertise

Jeffrey L. Ehrlich, manager of systems architecture with GE, said his department serves as the center of expertise for GE's 250 separate businesses and is responsible for distributing information, establishing policy and guidelines and major acquisition approval, among other functions.

Micro applications software has improved, and vendors are becoming more professional, he said, but several problems need to be resolved: "me-too products — we don't need a Dbase that is 10% faster"; unfinished products that don't perform to claims; overpriced software; and the perception that popularity equals quality. Ease of use is low on the list, he added. "The bottom line is getting the job done."

See EDGE page 84

CPU links top wish list

In poll of IBM micro users

By Paul Gillin
CW Staff

SAN JOSE, Calif. — Although most IBM Personal Computer users in large corporations believe their microcomputer acquisitions have been well worth the cost, they would like to see a faster machine and better provisions for connections to mainframes and other Personal Computers. Those are among the findings of a report released here recently by Strategic, Inc.

While most respondents said connections between Personal Computers and the mainframe and between individual Personal Computers are important, they indicated that no vendor yet deals effectively with both aspects of that communication. Most large users desire the connections to share expensive peripherals, programs and data, the survey said.

In order to deal with the problem, most users are actively considering purchasing a local-area network, the survey found. However, the report said no current local-area networks provide capabilities for efficient mainframe access, and most mainframes cannot function effectively as network controllers.

About two-thirds of the large users employ IBM 3270 emulation to access other systems, while over 35% wanted to use the Personal Computer strictly as a terminal. Over one-third wanted to use both computer and terminal capabilities.

The report surveyed 70 larger companies that use both the Personal Computer and at least one mainframe system and 100 smaller companies that use at least one Personal Computer and some other minicomputer or microcomputer. All of the organizations used at least one IBM Personal Computer.

Large users cite speed

Almost 90% of the large users stated that their Personal Computers allowed them to perform major applications faster; 83% said the micro improved work quality; and 68% said they had implemented applications that were not previously computerized.

However, 60% of the users indicated at least some interest in a faster version of the Personal Computer. Planned en-

See RESPONSE page 82

IBM micro strategy outlined

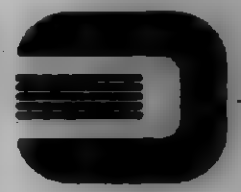
SAN JOSE, Calif. — IBM's business-based Personal Computer product line, including the Personal Computer XT, 3270 Personal Computer and Personal Computer XT/370, will be significantly enhanced over the next two years and phased out entirely by 1987 in favor of much more powerful products. IBM will also settle on an expensive price umbrella, under which all other vendors will compete.

Those are among the predictions contained in a report on the Personal Computer market released recently by Strategic, Inc. The report predicted that the high-growth phase for Personal Computer products will end by 1986, after which IBM's products will settle into a comfortable 30% growth rate.

The IBM price umbrella will be larger and higher for future products, largely because IBM's Independent Business Unit, which originally designed the products, has been absorbed into IBM's Entry Systems Division and will now bear the burden of higher research and development overhead, the study said. However, increasing price/performance pressure from plug-compatible vendors and major competitors will force Big Blue to improve performance to avoid losing market share.

IBM's 3270 Personal Computer and XT/370 effectively have no competition, and the company still controls the large

See STRATEGY page 82



Docutel/Olivetti releases IBM Personal Computer-compatible micro/86

Datamension enhances Report Manager spreadsheet/86

INSIDE

■ Toshiba bundles software into new micro/82

■ Appgen out for Microsoft Xenix/86

■ QDP multiuser micro runs Turbodos/87

■ Sharp APL runs on IBM Personal Computer/83

Quality you expect, at a price you don't.

BECK DOUBLE DENSITY DISKETTES

SINGLE SIDED $2.19 ea. / $2.79 ea. DOUBLE SIDED

Our message to you is simple. If you like the quality of Dysan, Verbatim, 3M, et al, you'll like the quality of Beck soft sector

5¼" flexible diskettes. The only major difference is cost. We're less expensive. In fact, a lot less expensive.

Why does Beck cost less?

Our philosophy is: Excellent quality and reliability, at a cost that beats the jacket off other diskettes. We can do it because we (1) put our money into the product, not mega-marketing schemes and fancy packaging; and (2) sell our money-saving 25-diskette pack to you direct via a toll free order line, so you get fast, door-to-door service efficiently.

What about quality and reliability?

At Beck we take no shortcuts. You get the best because we are committed to excellence. Every diskette is manufactured to very strict quality standards.

• Full 7 Year Warranty • 100% Certified, 100% Error Free • Satisfaction, Money Back Guarantee • Meets or Exceeds ANSI Standards

Order Now Toll Free (In New Hampshire call 924-3921)

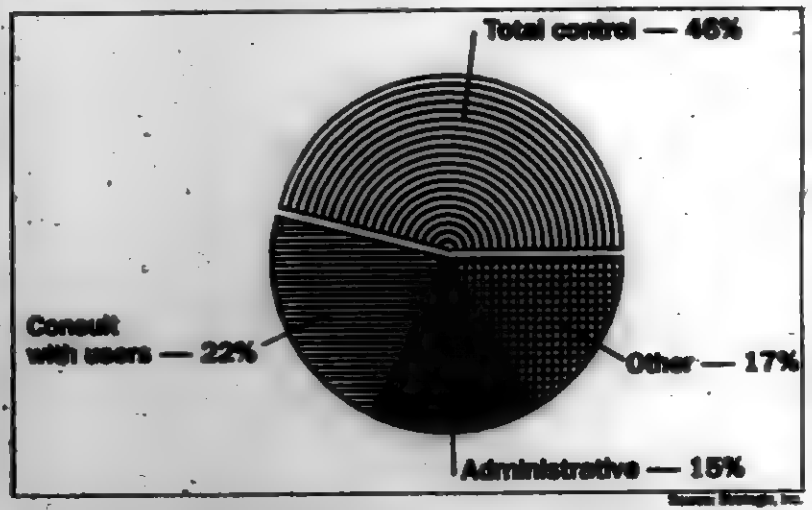
1-800-BECK MFG

Order Toll Free 1-800-232-5534. Available in 25 pack only, plus freight. Double density, soft sector diskettes complete with hub reinforcing rings, Tyvek envelopes, color coded user labels, and write protect tabs.

Door to Door in 48 hrs.

Corporate Accounts Welcomed • Credit Cards Only

P.O. Box 111, Main St., West Peterborough, N.H. 03468



DP department control of IBM Personal Computer acquisitions

MICROS from page 81

hancements include better printers, enhanced memory, graphics plotters and communications hardware and software.

File sharing between Personal Computers was cited as a need by over 75% of the users. In addition, 85% of the large users share their IBM Personal Computers among two or more people. In most cases, a primary user kept the computer in an office and secondary users occasionally employed it.

Most of the users in either type of organization were middle-level managers, the report stated. In large companies, purchase, installation, training and service are handled mainly by the DP department. Large companies also tend to purchase more complete systems than smaller companies, with over 70% of these configured with two floppy drives or 10M-byte disk drives. The report anticipated that over 80% of the large users who need access to central data files will install 10M bytes or more of hard disk capacity.

Twenty-five percent of the respondents cited spreadsheet analysis as their primary application. Financial applications and word processing were cited by about 15% of the large users.

Lotus Development Corp.'s Lotus 1-2-3 and Visicorp's Visicalc were the most popular application packages.

The report, "IBM PC User Reactions, Requirements and Plans — 1984," is priced at $950.

Strategic, P.O. Box 9747, San Jose, Calif. 95157.

STRATEGY from page 81

corporate market, the survey noted. Most competitors will be forced to compete in sales to smaller firms.

Main push

IBM's main push in 1984 will be with the 3270 Personal Computer, which will be promoted in IBM MVS and VM operating environments. The XT/370 will be enhanced this year to allow it to interact more effectively with mainframe systems, the report predicted. A possible improvement to the 3270 Personal Computer would be a menu-driven IBM TSO interface. Future versions of IBM's 3274 terminal could include a network controller supporting networks of 3270 Personal Computers and XT/370 workstations, the study said. Future versions of the XT/370 will probably feature larger disks and peripherals, as well as better integration of the VM/PC operating system within IBM PC-DOS environments.

The XT/370 is a strategically important, but technically weak, product that is seriously hampered by its limits of 416K bytes of physical memory in 370 mode and maximum performance of .1 million instruction/sec, the report stated. There is little integration of the XT/370 with the host processor.

However, the XT/370 continues IBM's push to make the mainframe the center of the information processing system and represents an effort to establish IBM as a leader in the personal workstation arena, the survey noted.

Toshiba unveils T300 updates

TUSTIN, Calif. — Toshiba America, Inc. has announced the enhancement of its 16-bit T300 Personal/Business Computer and its release as a system with bundled software.

The T300 Computing System reportedly features as software Microsoft, Inc.'s Multiplan and Softword Systems, Inc.'s Multimate. The standard system is said to include 192K bytes of random-access memory with an Intel Corp. 8088 microprocessor.

The enhancements reportedly include an option for Microsoft's MS-DOS operating system 2.0 Release 2.

The system is available for $3,090.

Toshiba America, Information Systems Division, 2441 Michelle Drive, Tustin, Calif. 92680.

IF EVER THERE WAS A YEAR
YOU SHOULD ATTEND INTERFACE...

1984 IS THE YEAR

Local area networking. Desktop integration. Digital networks. Voice, data integration. Workstation management. The AT&T divestiture. These are just a few of the concerns that confront you daily as data communications, DP and MIS professionals.

That's exactly why the 12th annual INTERFACE Conference and Exposition for the data communications community is more important than ever.

In Las Vegas, March 12-15.

Manufacturers, suppliers and carriers in the communications and information processing industries will be repositioning themselves to address vital end-user concerns—at INTERFACE '84

At INTERFACE '84, explore the numerous user strategies and the newest advancements in technology to help take the confusion out of the vast selection of systems integration opportunities open to you.

Participate in the INTERFACE conference—75 plus sessions and more than 200 industry speakers and analysts. Visit the big INTERFACE exhibit floor offering more than 1200 exhibit spaces of the latest products and services from giant companies as well as from future industry leaders.

Whether your focus is hardware-oriented or policy-oriented...from software systems to network controllers...you'll find your answers at INTERFACE '84.

For more information about the INTERFACE '84 Conference and Exposition, call (617) 449-6600.

INTERFACE '84
TWELFTH ANNUAL CONFERENCE & EXPOSITION
Co-Sponsored by BusinessWeek and Data Communications
March 12 to 15 □ Las Vegas Convention Center

A presentation of The INTERFACE GROUP, Inc., world's leading producer of computer conferences and expositions including INTERFACE, FEDERAL DP EXPO, COMDEX/Winter, COMDEX/Spring, COMDEX/Fall, COMDEX/Europe, COMDEX in JAPAN, the nationwide COMPUTER SHOWCASE EXPOs and The BYTE COMPUTER SHOWS.
300 First Avenue, Needham, MA 02194 • Offices in Ft. Lauderdale, Washington, D.C., Amsterdam and Tokyo.

Now you don't have to be rich to be powerful.

Riches and power don't always go together. Take Plexus, for instance. The world's most powerful UNIX*-based supermicros.

Powerful because multiple processors share the UNIX load. So processing power is distributed to where it does the most good.

Terminal I/O. Disk I/O. Data communications. And, of course, data processing.

Our unique architecture also lets us bring you the world's first UNIX Network Operating System (NOS). So you can combine Plexus systems in an Ethernet network for even more power.

NOS gives you real time, continuous access to files. From anywhere in the network.

Files are also updated on the same basis. So everyone in the network works with up-to-the-minute data. Automatically.

No waiting for file transfers. And that's a decided improvement over everything else that's out there.

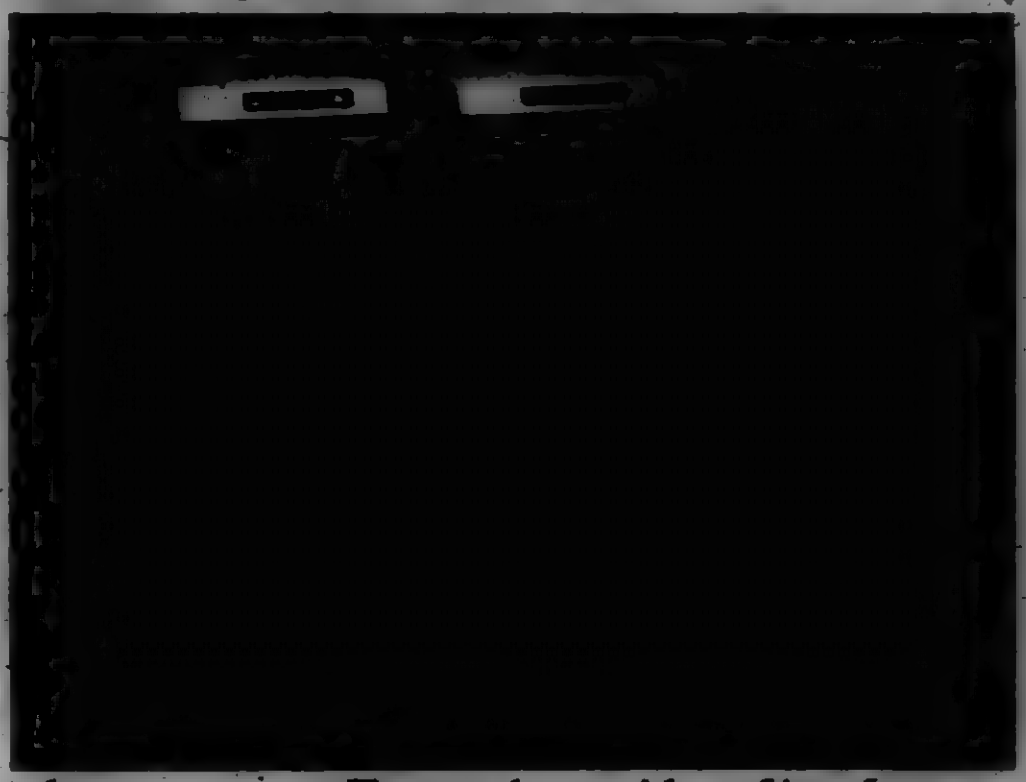
You also get to save money on powerful UNIX-based software, including COBOL, FORTRAN, Pascal, BASIC, and C. Database management and word processing, too. As well as hundreds of third party UNIX packages.

Plus our own software and maintenance support. And even a software referral service for your OEM programs.

Does all this make us expensive?

Absolutely not.

In fact, Plexus systems cost thousands of dollars less than the minicomputers we outperform.



To get a better idea of just how good that performance is, come get a demonstration. Call *800-528-6050*, ext. *1444*. In Arizona, *800-352-0458*, ext. *1444*. Or write Ralph Mele at Plexus Computers, Inc., 2230 Martin Avenue, Santa Clara, CA 95050.

You see? You don't have to be rich to be powerful. Just smart.

PLEXUS

Built for speed.

© Plexus Computers, Inc., 1985
*UNIX is a trademark of Bell Laboratories

Arete Systems comes out with microcomputer

SAN JOSE, Calif. — Arete Systems Corp. has announced the Arete 1000 microcomputer. The high-performance system reportedly utilizes the strengths of various microprocessors to achieve performance levels of more than 2.8M instruction/sec.

According to a company spokesman, the microcomputer was developed in response to marketing research that found most high-end computer companies provide more hardware than is effectively utilized within the system. That excess hardware increases cost and lowers reliability.

Three separate buses implement the Arete 1000 architecture. Up to four Motorola, Inc. 68000 microprocessors share a common main memory, which may be as physically large as 16M bytes. Main memory is accessed via a 32-bit processor memory bus. With the system's tightly coupled CPUs, the Arete 1000 achieves extremely rapid dynamic load leveling between processors, the vendor said.

The system is able to store and retrieve large amounts of data on as many as 60 terminals simultaneously from a common data base. The Arete 1000 is thus able to perform large jobs that have always been reserved for large minicomputers and small mainframes, the vendor claimed.

Mass storage is provided by an 80M- or 160M-byte Winchester technology Fujitsu Ltd. disk drive and an Archive Corp. 45M-byte streaming cartridge tape drive. To deal with the problem of fault tolerance, there is 100% redundancy in all electromechanical systems. Components such as the CPUs, less prone to failure, are not duplicated, the vendor said.

Prices range from $46,950 for the Model 1114, which includes one 68000 CPU, 16 serial ports, 2M bytes of random-access memory, 180M bytes of hard disk memory and 48M bytes on a streaming tape. A larger 1200 series unit costs $102,450. Model 1200 configurations include four 6800 CPUs, 60M bytes of random-access memory, 64 serial ports, 320M bytes of hard disk memory and 48M bytes on a streaming tape, the vendor said.

Arete Systems, 2040 Hartog Drive, San Jose, Calif. 95131.

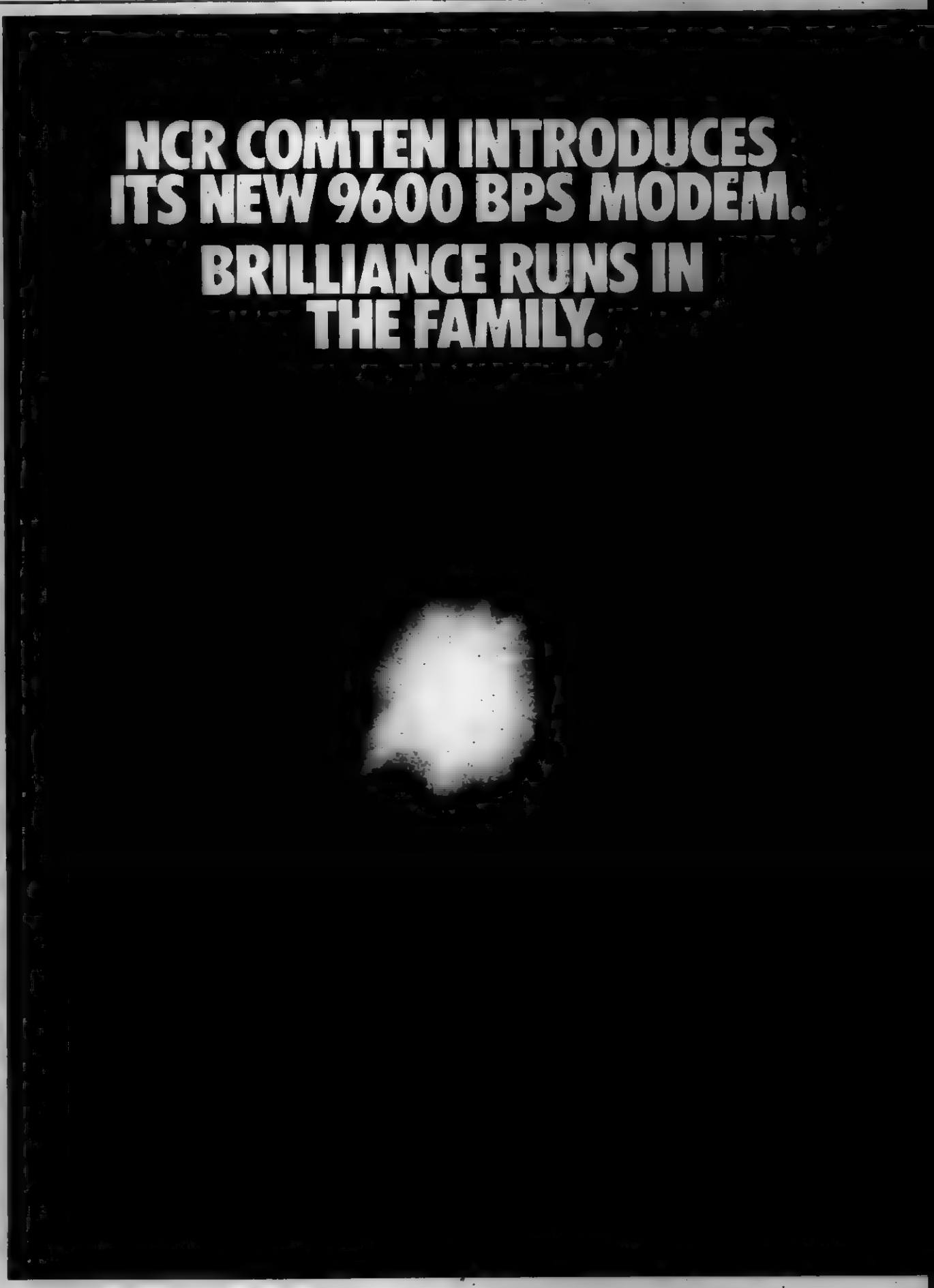
EXECS from page 81

At McKesson's divisions, according to Charles C. Hoerner, manager of office systems in the Information Services Division, similar problems exist as at GE and Bank of America. Additionally, he said, "Very often what [users] ask us for is not really what they need . . . [and] the tools that are introduced into the equation redefine the needs."

J. Curtis Roberts, director of systems architecture with Aetna, said that by the end of the decade his company expects to have some type of terminal on the desk of each of its 56,000 employees.

Before that can happen, Roberts said, it is necessary to meet several needs: communications innovations and standards to handle document interchange between personal computers and workstations "so the Personal Computer on my desk can look at and manipulate the document my secretary prepared on her workstation"; inexpensive and easy-to-install local-area networks for micro-to-micro file sharing and peripheral sharing; ease of use; multitasking of basic everyday applications; integrated software; and interfaces to mainframe host software.

All four executives said their companies have arranged for some type of discount program for employees to purchase micros for personal use. The day Bank of America announced the discount program, Dunn said, 1,100 orders were placed by employees.



Olivetti portable computer

Olivetti unwraps IBM-compatible micros

IRVING, Texas — Docutel/Olivetti Corp. has announced portable and desktop personal computers that are compatible with IBM Personal Computers.

The Olivetti personal computer is available in three desktop versions and two portable versions. The systems reportedly include video displays, detached keyboards and bundled tutorial and application software.

According to a spokesman, the products are capable of running most popular business applications software written for the IBM Personal Computer and use Intel Corp. 8088 microprocessors and the IBM PC-DOS operating system. They reportedly also can run on several other operating systems.

They are said to feature 12-in. green monochrome screens in the desktop models and 9-in. screens in the portable versions, with 640-by 325-pixel displays, reverse video, underlining, blinking and two levels of character intensity.

The standard versions, the DT-1 and P-1, are said to feature 128K bytes of memory and a single 320K-byte floppy disk drive. Models DT-2 and P-2 are said to include an additional floppy disk drive, while the desktop model, DT-HD, contains a floppy disk drive and a 10M-byte hard disk system.

The computers feature the vendor's Ram Disk, on which random-access memory can be isolated to function as an electronic disk drive for quick access.

The systems reportedly include built-in serial and parallel ports, internal disk drive controllers and video display interfaces.

Bundled application software is said to include Micropro International Corp.'s Wordstar word processing system, Infostar data base system and Calcstar spreadsheet program.

Suggested retail prices are $2,995 for the DT-1 and P-1, $3,295 for the DT-2 and PT-2 and $4,995 for the DT/HD.

Docutel/Olivetti, Office Products Division, 106 Decker St., Irving, Texas, 75062.

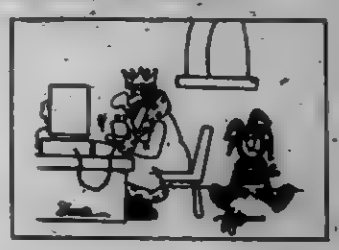
'Appgen' fits Xenix

HOUSTON — The Software Express, Inc. has announced a version of its Appgen applications generator package designed for use with Microsoft Corp.'s Xenix microcomputer operating system.

The Appgen applications generator is said to develop bug-free, self-documenting software and modify existing software to meet user needs. Appgen reportedly prompts the user through a series of English-language instructions, employing a menu-driven system that enables nontechnical programmers to develop applications packages.

The Xenix operating system, according to a spokesman, is compatible with most industry-standard microprocessors, including the Intel Corp. 8088, the Zilog, Inc. Z8000 and the Motorola, Inc. 68000. The Xenix version of Appgen is priced at $6,000.

The Software Express, Suite 220, 10103 Fondren, Houston, Texas 77096.



COMTEN SERIES 7160

9600 • 4800 BPS

GOOD NEWS COMES IN FAST PACKAGES.

Now the NCR Comten modem family is more flexible than ever. A *new* 9600 BPS modem joins our 4800 BPS model to give you a broader line of SNA-compatible modems. Even better, the new 7165 is available in both point-to-point and multi-point versions. It's fully synchronous. It operates over unconditioned, voice-grade leased lines, transmitting in full duplex mode.

That's more good news from NCR Comten, the recognized specialist in data communications processing systems. The new Comten 7165 not only delivers the speed, it gives you the reliability that NCR Comten has engineered into all its 7160 family modems. And unlike sideband modems, it delivers full compatibility with Systems Network Architecture.

YOU GET DSP, QAM AND MAINSTREAMING.

Digital Signal Processing—DSP—controls mod, demod, dynamic equalization and more. In fact, DSP—not analog—handles 98% of the modems' functions. Your benefits? Faster problem determination than with old-style analog methods. Fewer problems on problem lines. And freedom from component drift. You also get QAM, Quadrature Amplitude Modulation, one of the fastest, most stable transmission methods in the industry today.

SNA-compatible NCR Comten modems use the entire bandwidth. You get greater transmission integrity than with sideband modems, without transmission interruption. Their extensive diagnostics are part of the system so you don't have to cope with separate processors or extra black boxes. They fit easily into existing SNA networks. And they're up to all the standards, from RS232, V.24 and V.28 right through the CCITT recommendations on the phone line side.

INCREASED UP-TIME FROM A BRILLIANT DIAGNOSTICIAN.

The Comten 7165, like our 4800 BPS modem, comes with a range of diagnostics that can be initiated automatically by the host, or by the operator. First, of course, full SNA compatibility means that the host itself acts as the diagnostic monitor. Self-test, power loss, signal quality tests—and more—are all designed to let you test, check and log from one location.

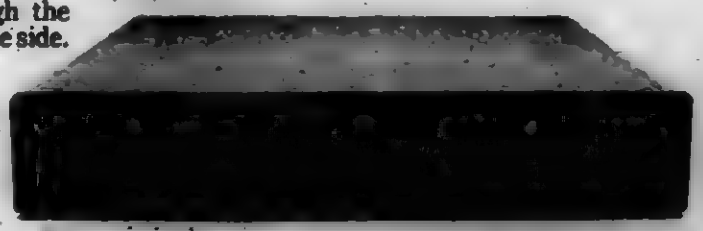
The diagnostics you control, right from the front panel, let you isolate user problems in the network. Interactive lights flash to indicate trouble—and tell you precisely where the trouble is.

THE FAMILY TO GROW WITH—AT A PRICE YOU CAN LIVE WITH.

Whether you've an SNA-compatible system or not, NCR Comten modems are the ones to grow with. Common family features and capabilities mean you won't get caught behind an electronic wall when it's time to expand your system. There's reliability, too. Our modems are rugged, easy to install and repair with your own staff. Or NCR Comten will do the installation and service wherever your site is.

Add in the support only a company with the resources of NCR can deliver, worldwide, plus a range of maintenance options that makes your job easier than ever before. You've got a flexible family of intelligent 4800 and 9600 BPS modems that deliver superior performance at a price that'll light up your life.

For more on the brilliant new Comten 7165, call or write NCR Comten, Inc., Dept. 8015, 2700 Snelling Avenue North, St. Paul, MN 55113. (612) 638-7944.



Information Hot Line 1-800/447-2935

Ask for Pam

NCR

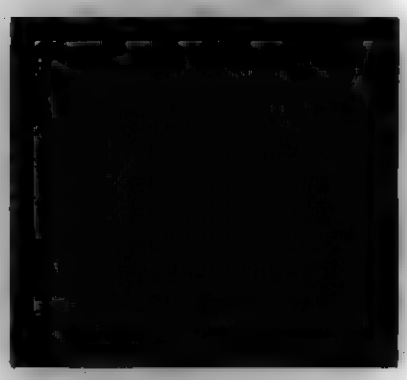
NCR Comten, Inc.

It's just not fair to claim that TEMPLATE® is the best graphics software available. Our competition's already discouraged.

And we like competition. We really do. It's just that it's difficult, if not impossible, to find graphics software as efficient and functional as TEMPLATE. Try as you might. TEMPLATE is the hands-down winner. With true device-independence and intelligence, total graphics functionality for CAD, scientific analysis, seismic work, process control, molecular modelling, and a host of other applications.

In almost any environment, whether it's batch or interactive, 2D or 3D, TEMPLATE wins. Benchmark tests prove it. TEMPLATE, besides being a true 3D graphics package for 32-bit or larger computers, features powerful commands that provide matchless productivity. TEMPLATE makes optimal use of available computer resources, giving you fast, efficient computer graphics program execution. And it supports over 125 graphics devices, from dumb terminals to sophisticated systems.

We also provide on-site installation and training, continuous updates, a regular flow of new device drivers, and ongoing documentation. What's more, we back you up with a telephone hotline so TEMPLATE software specialists can provide help if you need it.



But let's be fair. If you're looking for graphics software, call our competitors first. Find out what they have to say about theirs. Then call us, and find out why TEMPLATE really has no competition.

And why the competition has been so discouraged for so long.

MEGATEK CORPORATION
A UNITED TELECOM COMPANY
Making History out of State-of-the-Art

World Headquarters • 9805 Scranton Road • San Diego, California 92121 • 619/455-5590 • TWX: 910-337-1270
European Headquarters • 34, avenue du Tribunal-Fédéral • CH-1005 Lausanne, Switzerland • Telephone: 41/21/20 70 55 • Telex: 25 097 mega ch

SYSTEMS

QDP COMPUTER SYSTEMS QDP-400

QDP Computer Systems has announced the QDP-400 multiuser system based on Software 2000's Turbo DOS operating system and designed for increased system throughput.

The system features a standard 6 MHz Zilog, Inc. Z80B CPU for its master CPU and a Z80A CPU for each of the two to five individual slave CPUs, the vendor said. The QDP-400 master CPU has up to 256K bytes of random-access memory available, with 128K bytes for each of the user workstations.

The system is compatible with Digital Research, Inc.'s CP/M and MP/M operating systems and offers Turbo DOS memory and disk management and, when combined with QDP's bank-switched memory, provides more user storage, fast buffering and faster loading of programs and files, the vendor said.

Its configuration program allows the QDP-400 system to be used with most terminals, printers or modems. The system also features over 30M bytes of Winchester hard disk storage and a 1.2M-byte, 8-in. floppy disk with programmable drive shutoff, the vendor said.

Advanced QDP system features include an on-line Help program, a menu program, a hard disk format, system status and a hard disk diagnostic program, according to the vendor.

Prices for the system start at $9,995.

QDP, 10330 Brecksville Road, Cleveland, Ohio 44141.

ALPHA MERICS CORP. Datascribe 5

Alpha Merics Corp. has introduced the Datascribe 5, a microcomputer-based drafting system.

Datascribe 5 replaces the Datascribe IV and features an interface that supports both RS-232C and IEEE-488 protocols.

With the interface, the Datascribe 5 can be used as a stand-alone, keyboard-driven system for applying lettering or symboling to drawings or as a computer plotter, according to the vendor.

Also included in the product is a software emulation program that makes the Datascribe 5 compatible with application programs written to drive Hewlett-Packard plotters, the vendor said.

According to the vendor, the product can expedite preparation of schedules, charts, posters, formats, signs, parts lists, simple schematic diagrams and view graphs.

Datascribe weighs 29 lb and has a printing area of 18 in. by 39 in. Character heights are adjustable from 1/16 in. to 3⅛ in.

According to the vendor, users without computer-aided design (CAD) systems would be able to upgrade to any CAD system at any time.

Customers with CAD systems gain the benefits of a stand-alone Datascribe system and the advantages of a high-quality, low-cost flat-bed plotter, a company spokesman said.

The suggested retail price of Datascribe 5 is $8,450.

Alpha Merics, 20931 Nordhoff St., Chatsworth, Calif. 91311.

APPLIED INSTRUMENTATION CORP. Scout

Applied Instrumentation Corp. (AIC) has announced a stand-alone field microcomputer that measures hydrological, geotechnical and meteorological variables.

The Scout is a compact, battery-operated (three-month life span/battery) micro capable of storing approximately three months' worth of stand-alone measurements, recordings and control of multiple sensors. For example, a standard Scout with three sensors each recording every half hour and having 12K bytes of random-access memory (RAM) would record 48 sample/day on each sensor. At this rate, it would take 40 days to fill the RAM, a spokesman said. After expanding the same system to 56K bytes of RAM, it would take 200 days to fill the memory.

The Scout runs on the vendor's proprietary operating system and comes with 64K bytes of memory and up to four sensor interface cards, which support multiple channels of 4- to 20-mA current loop, 5V single-ended and mV differential, as well as digital I/O and supply sensor power. It has built-in RS-232C and current loop serial interfaces. All electronics are housed in one sealed enclosure and operate over a temperature range of -35 C to 65 C.

The user communicates with the Scout via any compatible hand-held terminal, and the cassette tapes are compatible with the Apple Computer, Inc., Apple II or IBM Personal Computer.

The Scout package, which includes the first interface card, a terminal and audio cassette, costs $3,950.

AIC, P.O. Box P195-169, Blaine, Wash. 98230.

CMA MICROCOMPUTER Computerized bulletin board

CMA Microcomputer has announced a computerized bulletin board service.

The service will allow users to share information, resolve problems and receive updated versions of the firm's applications packages, the vendor said.

Upon installation of the service, the vendor's Technical Center will be open to service users 24 hours a day during the business week. Users who

Continued on page 88

Large systems hardware is not an impulse buy.

Now there's a guide coming to you that will help with your homework.

The *Computerworld Buyer's Guide to Large System Hardware* is designed to give you a valuable, one-stop information source for large systems hardware and peripherals. Take a look at all the tools it will give you to help you make the right large systems choice:

- Large systems product listings, including mainframes, superminis, minis and small business systems and the terminals and peripherals designed to work with them. You'll get listings of printers, memory products, teleprinters, controllers, magnetic media and supplies, plotters, digitizers and much, much more.
- Vendor profiles that include company name, address, contact information, and primary markets served.
- An industry-specific editorial section that's designed to keep you right up to speed on the trends in large systems hardware. We'll give you news of the latest developments in mainframes, superminis and minis and their changing roles. You'll get information on the latest management techniques used in running data centers; planning for cost effectiveness and the new technologies in fifth generation computing.
- In addition to its comprehensive listings and editorial, the *Computerworld Buyer's Guide* will give you pages of detailed ads for large systems hardware products and peripherals that you can refer to all year long.

Each issue of the *Buyer's Guide* is updated before publication, and contains hundreds of listings that are accurate, complete and easy to use. The *Buyer's Guide to Large System Hardware* is distributed to *Computerworld*'s 114,000 subscribers in the U.S. — it's one more of the additional benefits you get as part of your *Computerworld* subscription. Look for it this April 16th.

And if you market your products to buyers of large systems hardware and peripherals, the *Buyer's Guide* will reach them with your product message just when they're researching products and vendors. Reserve space in the *Buyer's Guide* by March 2nd by calling one of the sales offices listed below, or call Ed Marecki, National Sales Director or Kevin McPherson, Product Manager, at (617) 879-0700.

To: Ed Marecki, *National Sales Director*
CW Communications/Inc.
Box 880
Framingham, MA 01701

☐ *Please send me advertising information for Computerworld Buyer's Guides.*
☐ *Please have a sales representative call me.*

Name _____
Title _____
Company _____
Address _____
City _____ State _____ Zip _____
Telephone _____ 3/2

COMPUTERWORLD BUYER'S GUIDE

Sales Offices

BOSTON/Chris Lee, Bill Cadigan, Alice Langley (617) 879-0700
CHICAGO/Chris Lee, Bill Cadigan, Jean Broderick (312) 827-4433
NEW YORK/Mike Masters, Tom Flynn, Gale M. Palermo (201) 967-1330
ATLANTA/Mike Masters, Tom Flynn (404) 394-0758
SAN FRANCISCO/Bill Healey, Ruth Gordon (415) 421-7330
LOS ANGELES/Bill Healey, Beverly Rose (714) 251-1220

MICROCOMPUTERS

Continued from page 67

are unable to call during regular business hours will be able to dial the service and leave a message for a technician. The technician will then prepare an answer or solution for the user and leave it on the message service. The service allows users to pick up updates when available or recover files which may have been lost due to hardware failures, the vendor said.

The extended service is free to users of the company's applications packages, which range in price from $49.95 to $1,700.

CMA - Microcomputer, 55722 Santa Fe Trail, Pecos Valley, Calif. 92284.

VISION-80 PTY., LTD. Five products for Apple II and IIe personal computers

Vision-80 Propriety, Ltd. has announced a series of five products for Apple Computer, Inc. Apple II and Apple IIe personal computers.

The Vision-80 circuit board plugs into the Apple motherboard, allowing a display of 80 columns of text with applications such as word processing, terminal emulation, data base and electronic spreadsheet, the vendor said. It costs $195.

The Vision 128/256 memory expansion card is said to be fully buffered with low power consumption and capable of replacing the 16K-byte random-access memory card used in many Apple IIs. It costs $295.

The Vision-VCE is a preboot disk for use with the Vision-80 board, allowing the user to see 80 columns of display with Visicorp's Visicalc. It costs $69.

Vision-AWII is said to be a preboot disk for Apple's Applewriter II word processing program, providing an 80-col. display when used in conjunction with the Vision-80 board. It costs $69.

The Vision-128 utility disk reportedly contains a variety of utility programs designed to take advantage of the extra memory of the Vision-128. It costs $79.

The products are available now through Vision-80 Pty., Ltd.'s U.S. distributor, Action Research Northwest.

Action Research Northwest, 11442 Marine View Drive S.W., Seattle, Wash. 98146.

NEC HOME ELECTRONICS, INC. New PC-8800 prices

NEC Home Electronics, Inc. has announced new bundled prices on its PC-8800 8- and 16-bit desktop personal computer systems.

The Smart Small Business package sells for $1,999 and the Middle Manager package for $2,499.

The first package features the PC-8801 8-bit CPU and keyboard with 64K bytes of random-access memory (RAM), the PC-8831 5¼-in., 640K-byte dual disk drive and the following 8-bit software: Wordstar and Mail Merge by Micropro International Corp.; Microsoft, Inc.'s Multiplan; Digital Research, Inc.'s CP/M 2.2; and two Microsoft Basic programming languages.

The Middle Manager package includes the PC-8801 8-bit CPU and keyboard with 64K bytes of RAM, as well as the PC-8801A-16 16-bit card with 128K bytes of RAM and Microsoft's MS-DOS operating system, the PC-8831 5¼-in., 640K-byte, dual disk drive and the same software as the Smart Small Business package.

According to the vendor, both packages are available with an 8-in., 2M-byte dual disk drive for an additional $800.

The PC-8800 system features high-resolution monochrome (640 by 400 pixels) and color (640 by 400 pixels) graphics. The detachable keyboard features a numeric key pad, five user-programmable function keys supporting 10 different functions and editing keys.

NEC Home Electronics, 1401 Estes Ave., Elk Grove Village, Ill. 60007.

CLM/SYSTEMS, INC. Unifier System

CLM/Systems, Inc. has announced the Unifier System, which is said to be a computer system for civil engineering, surveying, mapping, construction and utility organizations.

The multiuser, multitasking system includes a Sage Computer Technology Sage Super Microprocessor with 1M byte of random-access memory, an 18M-byte hard disk, floppy disk, two to four graphics terminals/workstations, multimode printer, plotter and interactive digitizer, according to the vendor.

Software, including an operating system, data base manager, word processor, spreadsheet, utilities and the complete CLM Cogo applications software package, is provided with the Unifier System.

The Unifier System costs under $25,000.

CLM/Systems, 3654 Gaidy Blvd., Tempe, Fla. 33611.

DATA TECHNOLOGIES INDUSTRIES Assistant CP/e

Data Technologies Industries has announced Assistant CP/e, an Apple Computer, Inc. Apple IIe-compatible

Continued on page 80

PROFESSIONALISM IS A COMMITMENT CERTIFICATION IS THE TEST

The 23rd Annual Examination for the CERTIFICATE IN DATA PROCESSING (CDP) has been scheduled for Saturday, May 5, 1984, at test centers throughout the world. Offered by the Institute for Certification of Computer Professionals (ICCP), the CDP certification program is directed primarily at business-oriented data processing people at the management and supervisory level.

If you are truly committed to professionalism, the CDP examination offers you an opportunity to validate your basic data processing knowledge and provides you with self confidence and a sense of professional identity in the data processing field.

CDP Examination content is updated each year, so give yourself time to review your knowledge in the field by mailing in the coupon below today. Application deadline is March 1, 1984.

☐ Send "Certificate in Data Processing Announcement and Study Guide," including an Application, Test Site List, Exam Content Outline, Bibliography, and Codes of Ethics, Conduct and Good Practice.

☐ Also send information on 1984 Certificate in Computer Programming Examination to be held on Saturday, December 8.

Name

Street Address

City State/Province Zip Code

MAIL COUPON TO:
Institute for Certification of Computer Professionals
Certification and Testing Section
7000 Old Oak Boulevard, Cleveland, OH 44130 CW01

COMPATIBLE CRT DATAPOINT COMPATIBLE CRT DATAPOINT

A CRT COMPATIBLE WITH DATAPOINT SYSTEMS

FOR ONLY $995*

SIMPLY AMAZING!

INTRODUCING KIE-3682
THE INTELLIGENT CHOICE

Today the intelligent Datapoint® user is demanding the KIE-3682. Why?. . .Because of the performance, economy and the service. Some of the standard features of the KIE-3682 are self diagnostics upon power up, printing from the screen directly to a serial printer, and displaying all control codes passed to the terminal. The KIE-3682 recognizes all DATABUS® software commands, and also enables the user to take advantage of Datapoint's® 5 function keys. An on site service contract is available through Western Union. The KIE-3682 carries a full 12 month factory warranty.

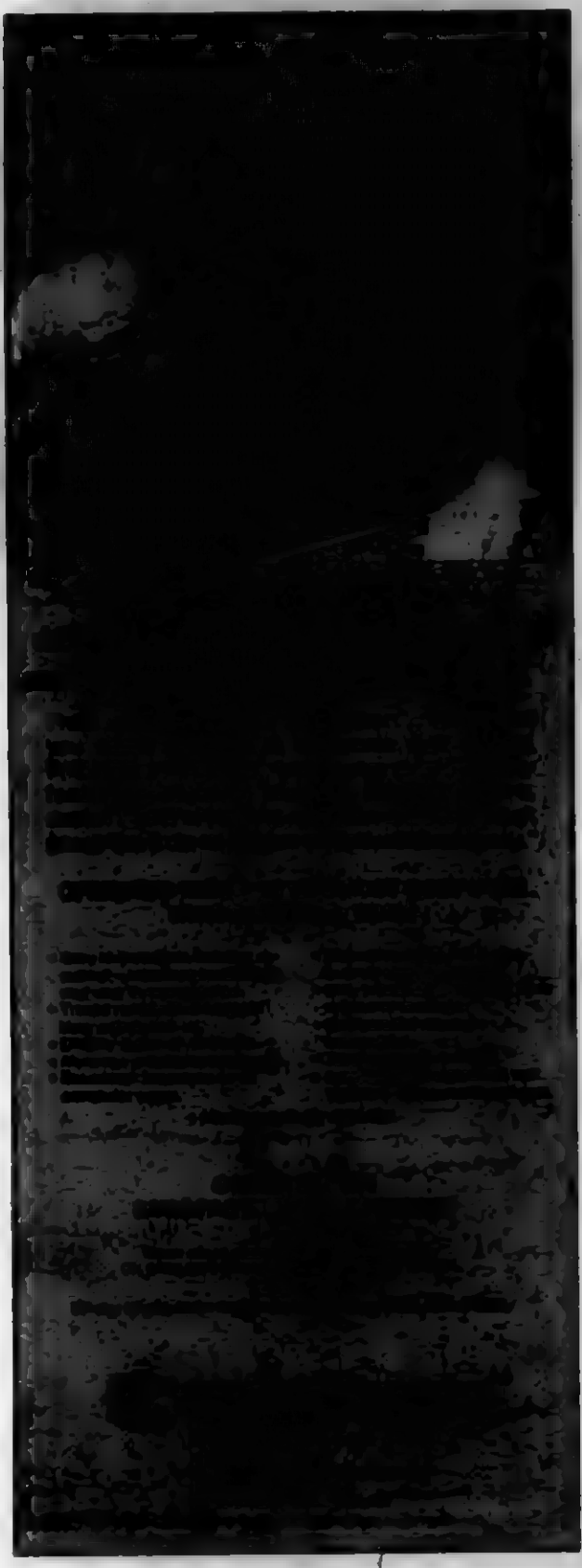
With all of the performance, economy and service, you can see why the intelligent Datapoint® user relies on the KIE-3682. Call today for more information, and be sure to ask about our 30 day, no risk plan.

KENNEWICK INDUSTRIAL
DATA PROCESSING DIVISION

113 EAST COLUMBIA DR.
KENNEWICK, WA 99336
509/582-5156

Datapoint and DATABUS are trademarks of the Datapoint Corporation.

DATAPOINT COMPATIBLE CRT DATAPOINT COMPATIBLE CRT



EQUITABLE LIFE
LEASING CORPORATION

OFFERS

OPERATING & TAX PRICED LEASES

FOR

DataGeneral

IBM

digital

PRIME

HEWLETT PACKARD

WANG

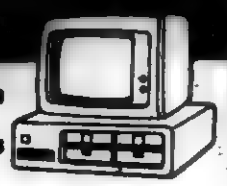
EQUITABLE LIFE
LEASING CORPORATION

For more information call any of the offices listed below

Atlanta
Boston
Chicago
Cincinnati
Cleveland
Dallas
Denver
Detroit
Houston
Kansas City
Los Angeles
Milwaukee
Minneapolis
New York
Orlando
Philadelphia
Pittsburgh
Portland
St. Louis

CORPORATE HEADQUARTERS

ON SITE MAINTENANCE SERVICE



- Maintenance contract prices up to 50% less than manufacturer's rates
- Fast response time — over 100 field technicians
- Most brands of equipment serviced
- On-site user training programs available

CALL FOR BROCHURE & PRICE LIST

LEWIS BUSINESS MACHINE SERVICE COMPANY
251 Park Avenue South, New York, N.Y. 10010
New York (212) 477-1666 • New Jersey, Connecticut, Massachusetts (800) 431-8782

MICROCOMPUTERS

Continued from page 88

microcomputer which can also run programs written for Digital Research, Inc.'s CP/M operating system.

The product features Zilog, Inc. Z80 and MOS Technologies, Inc. 6502 microprocessors, 64K bytes of random-access memory, a single-side, single-density disk drive, 14-lb weight, a monochrome monitor with 280- by 192-pixel resolution and a Centronics Data Computer Corp. parallel port. The microcomputer will bundle word processing and personal management software.

Assistant CP/e costs $1,595, a spokesman said.

Data Technology Industries, 701-A Whitney St., San Leandro, Calif. 94577.

STORAGE

AMDEK CORP.
AMDC-I; AMDC-II

Amdek Corp. has introduced two 3-in., microfloppy disk drive systems compatible with Atari, Inc. 400, 800 and XL series computers.

The AMDC-I, a single drive, provides up to 180K bytes of double-density, on-line formatted storage capacity.

The AMDC-II, a dual-drive, offers up to 360K bytes of double-density storage per side. The full capacity can be accessed by the user manually flipping it over, the vendor said.

According to the vendor, both units have an integral intelligent controller that is compatible with the Atari microcomputers.

Both units control up to four disk drives, each programmable for single- or double-density operation. The controller includes an Atari-compatible printer/plotter port.

According to the vendor, the two units may be used in conjunction with a 5¼-in. disk drive for Atari-compatible software.

The suggested retail price for the AMDC-I is $500; the AMDC-II is $650. The 3-in., double-sided cartridge is priced at $6.99.

Amdek, 2201 Lively Blvd., Elk Grove Village, Ill. 60007.

WINCHESTER SYSTEMS, INC.
Datasafe-8; MDS-256

Winchester Systems, Inc. has announced an 8M-byte Winchester disk system for the Intel Corp. Intellec Series II and III and the Mohawk Data Sciences Corp. MDS-800 microprocessor development system. It is said to be compatible with Intellec's operating system, Isis-II.

The Datasafe-8, based on a 5¼-in. disk drive, reportedly provides twice the system throughput of floppy drives. With 5M bytes of formatted storage capacity, the hard disk system has 39,168 blocks allocated in two directories.

The system offers a data transfer rate of 625K byte/sec with an average access time of 85msec. Drive mean time between failures is rated at 11,000 hours. Power consumption is 120W at 115/230 Vac line voltage. The Zilog, Inc. Z80-based controller includes 32-bit error-correction code with 11-bit burst error correction, the vendor said.

A print spooler option allows printing while programming, the vendor said. Its 256K-byte buffer holds about 60 to 80 pages.

Datasafe-8 costs $4,995 and has a one-year warranty. The MDS-256 print spooler option costs $1,250, also with one-year warranty, the vendor said.

Winchester Systems, P.O. Box 545, 14 Laurel Hill, Winchester, Mass. 01890.

BOARD-LEVEL DEVICES

ADVANCED MICRO DEVICES, INC.
Am94/2000; Am94/1590; Am94/1541

Advanced Micro Devices, Inc. has introduced a Multibus-compatible

Continued on page 92

Can you answer these questions on local area networks the way you would have two years ago?

1. Is broad *versus* base band still an important issue?
2. Will local area networks and PBXs co-exist, be mutually exclusive or will one be subservient to the other?
3. What role does VLSI technology play in linking peripheral devices to local area networks?
4. What are the standards?

The March issue of *Computerworld On Communications* will give you answers to all the questions above—and much more. You'll get an overview that takes a close look at LAN products and technology and then examines it in the light of competing PBX technology.

You'll get information on linking mainframe computers and local area networks. You'll get an examination of token ring technology. And there's more! You'll get lots of special features articles on communications topics from "Who the Bell operating companies are hoping fewer" to a profile of Rolm Corporation. Take a look at what some of our other features will cover for you:

- Communications procurement.
- R&D in communications companies.
- Fiber optics.
- The low end of the PBX market.
- International record carriers.
- Workstation telephones.
- The future of Centrex.
- Protocol conversion.

Computerworld On Communications is designed to give you in-depth coverage of the broad spectrum of voice, image and data communications from a systems perspective. As a *Computerworld* subscriber, you'll be getting six issues of *Computerworld On Communications* in 1984—as part of your subscription! And if you need to be on the cutting edge of networking technology, you won't want to miss the March 14th issue.

If you've got communications products our readers should know about, then you need to get your ad reservation in by February 3rd. The materials are due one week later on February 10th. To reserve ad space in the March 14th issue of *Computerworld On Communications*, call one of the sales offices listed below, or call Ed Manydel, National Sales Director at 617-879-0700.

To: Ed Manydel, *National Sales Director*
CW Communications/Inc.
Box 880, Dept. A
Framingham, MA 01701

☐ *Please send me subscribing information on Computerworld On Communications.*
☐ *Please have a sales representative call me.*

Name _____
Title _____
Company _____
Address _____
City _____ State _____ Zip _____
Telephone _____

Computerworld On Communications

SALES OFFICES

BOSTON /Chris Lee, Jesse Dawson, Michael Kelleher, Ron Masters, Jim McClure, Alice Langley (617) 879-0700
CHICAGO /Art Kenwick, Chris Lee, Jesse Broderick (312) 827-4433
NEW YORK /Mike Masters, Doug Cluney, Ray Corbin, Jean Daly, Paul LaRegina, Cole M. Petersen (212) 557-2600
ATLANTA /Jeffrey Mahnke, Mike Masters (404) 394-0700
SAN FRANCISCO /Bill Hanley, Rosie Chamberlain, Theodora Frances, A.G. Garrecht, Barry Millette, Nicole Bordeaux (manufacturer) (408) 435-7200
LOS ANGELES /Rosie Rockenwagner, Bob Hubbard, Bill Hanley (714) 251-1220

OEM alert: The new Perkin-Elmer 3205 packs supermini performance into a micro price tag.

Introducing the Perkin-Elmer 3205. Now OEMs and system integrators can provide 32-bit supermini computing power at micro system economics, without making any compromises.

No micro system can approach the per-terminal cost advantages of the Perkin-Elmer 3205 supermini. Or the migration paths. Or offer access to a common database.

No supermini system can touch the Perkin-Elmer 3205 proven price/performance statistics.

Small investment. Big potential.

A basic 3205 costs just $6,169* and includes a ½ megabyte of memory, eight communications lines, floating point and a lot more. There's even a microprocessor handling just communications support that has more power than you get in most complete microcomputers.

The 3205 can be expanded to 4 megabytes of memory, 16 communications lines and 1.2 gigabytes of disk storage. And every configuration in the broad 3205 range offers a choice of operating systems: our own Real Time OS/32 or one derived from the UNIX** operating system.

Fully configured value.

50 megabytes of fixed/removable Winchester disk memory, 8 communications ports and a full complement of related capabilities are included in a fully configured 3205 computer for only $15,469.* That lets you supply powerful computer systems your customers can afford to buy.

The support you need.

Perkin-Elmer has been an OEM supplier for over 15 years. We know how to support you. We have a worldwide service network, powerful, quality software, reliable hardware and the terms and conditions you need.

Mini/Micro/Maximization.

The Perkin-Elmer 3205 gives you the small purchase price of micro systems, and the power, growth potential and common database advantages of supermini systems.

For the complete story, call or write the Perkin-Elmer Corporation, Two Crescent Place, Oceanport, N.J. 07757. **1-800-631-2154.** In N.J., 1-201-870-4712.

*OEM quantity 100, U.S. only.
**UNIX is a trademark of Bell Laboratories.

PERKIN-ELMER

The science and computer company.
Where solutions come first.

MICROCOMPUTERS

Continued from page 90

SBX motherboard with six SBX connectors, as well as two SBX modules — a stepper-motor controller and a dual-channel serial communications controller.

The Am94/2000 motherboard's six SBX connectors provide support for single- and double-width modules not requiring direct-memory access. The motherboard also includes on-board Intel Corp. Multibus address decoding and data buffering and Multibus/SBX timing reconciliation, as well as two of the firm's Am8259A programmable interrupt controllers. The on-board SBX connectors can handle any 8- or 16-bit SBX module and provide for up to six single-width modules, one double-width and four single-width modules or two double-width and two single-width modules, the vendor said.

The Am94/1530 is a programmable dual-channel serial communications module. Enabling the designer to add incremental I/O capability to a Multibus system, the unit adds two RS-232C serial channels to any host board that includes an SBX bus-compatible connector.

Incorporating the 28530 serial communications controller, the Am94/1530 module handles a variety of communication formats, including asynchronous, binary synchronous, IBM High-Level Data Link Control and Synchronous Data Link Control protocols, the vendor said.

The Am94/1541 stepper motor controller is a programmable, single-width SBX module. Through its on-board 8-bit microcontroller integrated circuit, it can drive one four-phase stepper motor via either a program stored in the microcontroller or commands sent from the CPU board. A line is provided for an external clock to synchronize several Am94/1541s so that multiple stepper motors can be controlled synchronously. Also included in the module are buffered lines for external feedback from the devices controlled by the Am94/1541.

The single-quantity price of the Am94/2000 SBX motherboard is $495, while both the Am94/1530 dual-channel serial communications module and the Am94/1541 stepper motor controller cost $395 each.

Advanced Micro Devices, 901 Thompson Place, Sunnyvale, Calif. 94086.

MICROTEK, INC.
Price reductions

Microtek, Inc. has reduced the prices of its entire line of add-on products for Apple Computer, Inc. microcomputers.

Among the reduced products is a 128K-bit memory card, formerly $479, now available with Digital Research, Inc.'s CP/M operating system and Pascal enhancement diskettes for $299. The Q-Disc, a 128K-bit, solid-state disk emulation card supplied with CP/M and Pascal enhancement disks, Visicorp's Visicalc spreadsheet program expansion software and Artaci's Magicalc spreadsheet program, has been reduced from $529 to $399.

In addition, the Dumpling-GX graphics printer card now costs $89.95, down from $175. A complete pricing schedule is available from the company.

Microtek, 4758 Viewridge Ave., San Diego, Calif. 92123.

PROFIT SYSTEMS, INC.
Multigraph

Profit Systems, Inc. has announced the Multigraph board, a graphics board for the IBM Personal Computer.

The board works with either monochrome or color monitors. It features soft scrolling, 720- by 350-pixel resolution, 32K bytes of random-access memory and flicker-free scrolling, according to the vendor. The board runs software written for an IBM color board without requiring a color monitor. An option allows the use of a 132-col. monitor.

The board costs $499.

Profit Systems, P.O. Box 1089, Berkley, Mich. 48072.

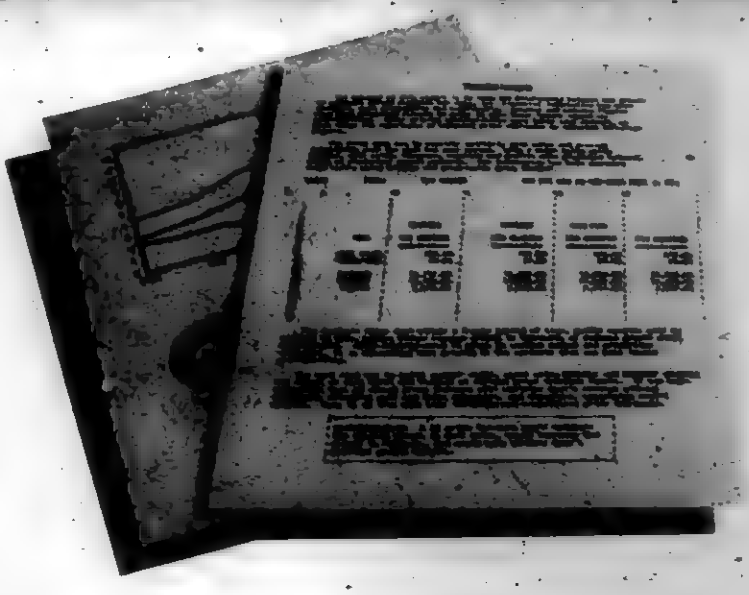
AUXILIARY EQUIPMENT

COMPUCABLE CORP.
IBM mono screen

Compucable Corp. has announced an enhancement screen for the IBM Personal Computer.

The screen enhances char-

NEW FROM CINCOM:
THE MANAGE USER SERIES™...
MAINFRAME PERSONAL COMPUTING POWER WITH DP CONTROL.



MICROCOMPUTERS

actor display and eliminates reflection and glare, according to the vendor. The screen's material consists of woven, black, optical-fiber mesh. The screen is housed in a polycarbonate frame, which reportedly eliminates electronic shock. A foam gasket around the frame holds the screen in place, while a pull tab on the frame's bottom is used for removing the screen.

The product costs $34.95.

Compucable Corp., Suite 6-J, 1440 South State College Blvd., Anaheim, Calif. 92806.

MICRO SOFTWARE

DATAMEDIXON CORP.
Report Manager

Datamexion Corp. has announced a new release of Report Manager, a three-dimensional, programmable spreadsheet for the IBM Personal Computer.

Enhancements exchange data between Report Manager and other software packages; sort columns, rows or pages; expand local and global formatting; support color monitors; and use full-word command prompts, according to the vendor. Twelve exec program statements and 11 additional preprogrammed functions have been added to the program, the vendor said. Reportedly, files created with the first version of the program are compatible with the latest release.

Report Manager costs $495.

Datamexion, 615 Academy Drive, Northbrook, Ill. 60062.

I.P. SHARP ASSOCIATES LTD.
Sharp APL/PC

I.P. Sharp Associates Ltd. recently announced the implementation of its Sharp APL development language in a package for the IBM Personal Computer.

Sharp APL/PC, according to a company spokesman, is compatible with Sharp's mainframe software products. The package reportedly incorporates all features of Sharp APL for mainframes.

The package for the Personal Computer runs as a user program under IBM PC-DOS operating system Versions 1.1 or 2.0. It includes the interpreter, file system, session manager, several auxiliary processors and utility software. Auxiliary processors reportedly provide access to the operating system, DOS files, asynchronous communications, the parallel printer and a full screen manager.

The package, including diskettes containing Sharp APL/PC and utility programs, APL stickers for the Personal Computer key buttons and manuals, costs $375 and will be available in the first quarter of this year. An APL-character read-only memory, enabling the Personal Computer to display APL characters, costs $25. A Sharp APL package for the IBM XT/370 will be available in the third quarter of 1984.

I.P. Sharp Associates, Suite 1900, 2 First Canadian Place, Toronto, Ont., Canada, MSX 1E3.

SOFTWARE DIGEST, INC.
Software ratings

Software Digest, Inc. has announced the availability of a newsletter that rates IBM Personal Computer software.

Programs are tested by 10 evaluators, then scored to produce ratings on each. Word processing program testing has been completed. Data base management systems and graphics programs are planned in the near future, the vendor said.

Newsletter rates range from $90 for a six-month trial series to $240 for a two-year subscription.

Software Digest, 1 Wynnewood Road, Wynnewood, Pa. 19096.

MANAGE USER SERIES

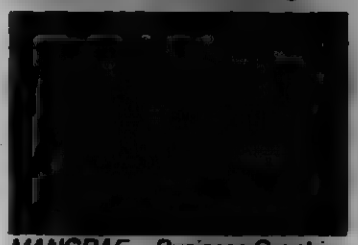
Cincom's new MANAGE USER SERIES™ combines the benefits of personal computing capability, mainframe power and greater data processing control into one comprehensive Decision Support System.

Personal Computing On The Mainframe

Simply explained, the MANAGE USER SERIES is Cincom's family of integrated mainframe software tools that work together as one powerful Decision Support System. No other software vendor offers such a wide range of Decision Support capabilities at the mainframe level.

Using the power and accessibility of the mainframe, MANAGE enables data processing to provide a wide range of personal computing capabilities while maintaining control over the corporate data resource. And because MANAGE has a conversational, user-friendly personality, it easily wins friends among end-users.

MANTEXT – Text Processing



MANGRAF – Business Graphics

MANCALC – Spreadsheet

Powerful Decision Support Tools

The MANAGE USER SERIES currently integrates four powerful tools that allow end-users to access, store and use production information from the corporate mainframe to aid in key business decision making:

- MANTEXT is a sophisticated free-form text processing system that enables users to access corporate files for the creation of business documents and corporate mailings.
- MANGRAF is an advanced business graphics tool that provides output from on-line applications using centralized production data base information.
- MANCALC is a 3-Dimensional electronic spreadsheet that facilitates "corporate-size" models and can automatically load information stored in corporate files, or build models based on private data as well.
- MANTIS is Cincom's industry acclaimed application development language. As the "integrator" of the MANAGE USER SERIES, MANTIS provides an effective bridge between the Development Center and the Information Center.

End-User Productivity Through Integration

The key to the power and versatility of MANAGE is its elegant integration. MANAGE provides the tools needed for preparation of business reports and day-to-day decision making. And because all components of MANAGE can access central or personal data files, users can merge a multitude of data types, display them graphically, simulate "what-if" futures and document the findings in one business report. The power of MANAGE is limited only by one's own creativity.

Another Major Cincom Technology

Like TIS,™ ULTRA Interactive Data Base System,™ MRPS™ and MANTIS™, MANAGE USER SERIES is a member of the integrated family of new Cincom software technologies. From data base to application software to Decision Support, the name Cincom has come to stand for excellence in software technology the world over.

For more information on MANAGE, or any of our new integrated software technologies, simply contact the Cincom Marketing Services Department, 2300 Montana Avenue, Cincinnati, Ohio 45211.

800-543-3010

(In Ohio: 513-661-6000)
(In Canada: 416-279-4220)

Cincom Systems

Excellence in Software Technology.

Only Lee Data's Universal Terminal System can satisfy all of your information processing needs... 3270, Async and personal computing.

Finally, there's a single, universal way to satisfy the individual information processing needs of all your people. From sales manager to accountant. From research to production. The Lee Data Universal Terminal System can do it all.

And our system is modular by design to provide you any or all of these cost-effective, problem-solving advantages:

3270-compatibility plus more

Combine complete 3270 system-compatibility with an innovative Lee Data design and you have a System that delivers greater convenience and flexibility.

Our System not only offers standard 3274-compatible local and remote control units, but now also provides combination local/remote controllers with a unique dual-host access capability.

In addition, you can choose from a full line of terminal capabilities, beginning with our cost-effective 3178-compatible display on up to our popular All-In-One Display which offers, in a single unit, four selectable screen sizes—including 132-column—a great advantage in program development, spread sheet applications and many others where flexibility is required.

3270-plus-Async: another cost-effective advantage

If your application needs currently find you switching between 3270 and VT100-style terminals to get the job done, Lee Data has a better way.

As part of our System, you can enjoy the further advantage of a 3270/Async capability that allows dynamic selection of 3270 and VT100 operating modes from a single Lee Data display. A simple command entered at the keyboard provides you access to applications running on an IBM CPU, non-IBM systems (such as DEC, H-P or Prime), as well as timesharing services. Another Lee Data solution to simplifying your company's terminal network.

And now integrated personal computing too

That's right! Now our System also includes a sophisticated personal computing package that can easily be integrated into an existing Lee Data 3270 system.

With our approach, you get continued interactive access to host-based files, plus all the advantages of professional business computing from the same Lee Data workstation.

Advanced features include a host file transfer capability, a single-board design, four standard system expansion slots and, of course, complete IBM-compatibility.

All these additional capabilities plus the same user-friendly Lee Data displays.

Plus these added benefits...

To any Lee Data System, add our unique Coax Eliminator products and realize additional savings of up to 85% in cabling costs alone.

Combine this with all the outstanding features already mentioned and you'll find a System offering everything you need for efficient, cost-effective operation.

Discover the advantages of our Universal Terminal System for yourself. For more information, call our system specialists toll free:

800/328-3998

Designers of innovative systems for the information worker

LEE DATA CORPORATION

7075 Flying Cloud Drive
Minneapolis, MN 55344
TWX 910-576-1690

COMPUTER INDUSTRY

DEC airs rise in earnings
After five quarters of decline

MAYNARD, Mass. — After five straight reports of declining earnings, Digital Equipment Corp. will announce today that earnings for the second quarter ended Dec. 31 exceeded results from the same period one year ago.

The company issued a preliminary report Jan. 13 which indicated that, prior to an audit review, earnings for the quarter would fall between $1.30 and $1.45, compared with the $1.08 figure of the corresponding quarter one year earlier. One financial analyst told *Computerworld* that part of the improved earnings may be attributed to increases in personal computer shipments and shipments of other equipment that were delayed during the first quarter of the present fiscal year.

Beginning in October 1982, the company disappointed the stock market with the first of five successive quarterly reports showing reduced earnings in comparison to year-earlier results. The disappointment culminated in last October's announcement that first-quarter earnings had plunged 72% to a dismal $15.9 million, or 28 cents per share [CW, Oct. 24, 31]. The first-quarter shortfall was linked by the company to lower than expected shipments of personal computers, delayed shipments of high-end peripherals and administrative problems.

The second quarter figures are significantly higher than had been predicted by Wall Street analysts, who had forecast earnings ranging from 28 cents per share to 90 cents per share.

DEC officials would not comment in detail on the unofficial results, but Alfred M. Bertocchi, vice-president for finance and administration, said the company had experienced strong customer demand for its VAX-11/780 superminicomputers, MicroPDP-11s, personal computers and office products.

Stephen K. Smith, an analyst who follows the company for Paine Webber Mitchell Hutchins, said the DEC announcement was certainly a good surprise, even if it

See DEC page 96

Intel, AMD semi sales booming

With recent announcements of its quarterly sales and earnings, Intel Corp. joined the $1 billion-plus vendor group, and Advanced Micro Devices, Inc. (AMD) continued its strong expansion, as semiconductor sales boomed.

Santa Clara, Calif.-based Intel closed out its fourth quarter and fiscal year posting sales of $1.1 billion, a 25% jump over 1982's annual total and the first time the company surpassed the $1 billion sales level. Intel's profit for the year increased threefold to $116 million or $1.05 per share, compared with earnings of $30 million or 32 cents per share, last year.

For the fourth quarter, Intel's sales climbed 39% to $332 million, compared with $239 million the same period a year earlier. Profit in the quarter was $47 million or 40 cents per share, 40% of the company's total profit for the year.

Commenting on Intel's performance, Gordon E. Moore, chairman and chief executive officer, said, "Our business outlook for 1984 is very strong, as the deluge of orders that hit us last June shows no sign of abating."

Quarterly sales and profit at AMD, for the company's third quarter, again surpassed previous highs. Sales totaled $154 million, 69% greater than the same period last year. Profit for the Sunnyvale, Calif., firm totaled $20 million or 35 cents per share, a better than threefold increase over the third quarter of last year.

Like other semiconductor companies reporting financial results in recent weeks, AMD reported record-setting research and development spending and lengthy order

See PROFITS page 103

IBM/Unix foster speculation

INDUSTRY INSIGHT

BILL LABERIS

While it came as no great surprise, IBM's announcement of Unix support on its Personal Computer line has fostered divergent speculation on just what the announcement means — to IBM, AT&T and the user community at large.

On the face of it, it looks as though, with widespread Unix acceptance, IBM could in time find itself in the pitiful position of its plug-compatible manufacturers, namely, at the mercy of AT&T-launched updates of the operating system, particularly as its usage proliferates among larger systems. If anyone knows the market power of the company holding the keys to the instruction set, it is IBM.

So why get behind the eight ball? The answer is that IBM has not, and it may, in fact, end up looking a lot rosier than AT&T in the Unix game.

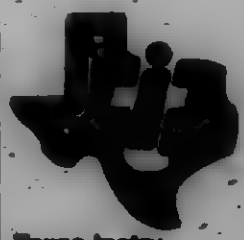
Welcomed relief

For one thing, IBM's endorsement of Unix, albeit token, will come as a welcomed relief to the growing legions of Unix aficionados. Their numbers are relatively small now, but bear in mind that Bell Laboratories has made Unix a fairly cheap tool for university use. According to International Data Corp., 90% of computer science majors in the U.S. (50% in Europe) have been exposed to Unix as a result.

Judging from comments passed at last fall's meeting of the Association of Data Processing Management Organizations, Inc., there is some animosity in both the Unix user and the third-party vendor communities toward AT&T, animosity that could work to IBM's great favor now.

Speaking at the meeting were the current and future heads of the Unix users group. Bob Marsh, chairman of Plexus Computers, Inc., claimed that AT&T has been an obstructionist force in the move-

See IBM page 96



Texas Instruments is sitting atop the merchant semiconductor heap/103

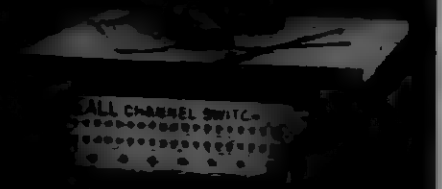
MCI

Earnings are flat but capital spending is booming at MCI/96

INSIDE

- Does IBM have two standards of industry conduct?/97
- A rainbow coalition of industry groups is attacking some taxing problems/96
- Erasable optical disks are on the way, but will take a few years getting here/100
- DG's financial performance leads the miniworld/101
- Things looking up at Honeywell/101

With BEALL Directing, Your Computers Never Miss a Beat



John Beall & Company, Inc.

IBM from page 95

want to promote Unix as an industry standard. In fact, the old Western Electric did not support Unix a year ago. In particular, Marsh knocked what he considered AT&T's onerous Unix licensing fees — in the neighborhood of $43,000 for the first copy and another $25,000 or so for redistribution rights.

'Enlightened view' urged

IBM's Unix endorsement "would be more valued," Marsh said at that time, adding that it was "just an accident" that AT&T owns the Unix rights. Both he and Mike Fiorio, also from the users group, called upon AT&T to adopt a more "enlightened view" toward Unix development. Each, however, doubted he would get what he wanted from AT&T in the near future.

But as a standard-bearer, IBM is second to none, even if the product is not IBM's to start with. The chances are good for those disenchanted with AT&T's Unix position that IBM will appear as a white knight, doing for the marketing of Unix as a standard what they say AT&T would not.

Meanwhile, IBM is not about to get locked into a Unix world of its own making. While IBM's endorsement will make third-party Unix vendors very happy, IBM doubtless has proprietary operating systems plans of its own for its low- and mid-range multiuser systems of the future. In the absence of any AT&T presence in the systems market at this time, IBM still calls the tune for the third-party software developers.

Most likely, IBM will gather as much of the Unix market as it can, particularly as it bolsters its thrust into the automated office, while trying to control the pace of Unix acceptance by keeping the third-party software vendors and the user community occupied with other systems. ■

DEC from page 95

was "still not tremendous."

Smith said he believes DEC revenues for the quarter were up 25% to 26% over the previous year. Some of that increase can be attributed to equipment shipments that had been deferred during the first quarter, he said. Accounting for catching up on the previous delays, revenue growth for the current year should be about 20% to 21% ahead of last year, he added.

Software available

DEC will probably report shipments of 30,000 personal computers for the quarter just ended, according to Smith, compared to just 19,000 in the previous quarter. "There is software available now, and [DEC is] offering free maintenance," Smith said.

The news may not be quite so good for the third quarter, in Smith's view. "I think quarter three [earnings] will be below quarter three last year. [DEC] has built up [its] expenses; [it has] added 2,500 to 3,000 employees," he said.

DEC was also the latest company to be involved in rumors of an imminent takeover by General Electric Co., according to a Boston newspaper.

Mark A. Steinkrauss, director of investor relations, issued a flat denial of such a prospect. "I don't know of any discussion between the two companies," Steinkrauss said.

With about 58 million shares issued, DEC's street value, based on the $78 per share closing value the day the company issued its preliminary report, is about $4.5 billion. The company does not appear to be very closely held, with founder and president Kenneth H. Olsen, the largest single shareholder, owning slightly more than 4% of issued shares, or 2.4 million shares, according to the latest financial report.

The General Electric Co. high-tech rumor mill was working overtime again this month, this time piping sounds that the cash-rich giant was considering buying none other than Digital Equipment Corp. The result, of course, was an upward spike in DEC's stock price, boosted even further by the good financial news from the No. 2 computer maker.

The fact is, given the approximately $5 billion in cash and liquid securities now hoarded by GE, the company can afford any U.S. computer company but one, IBM. The fact is, that DEC is but one of a string of companies named in recent months as possible takeover candidates.

Add Hewlett-Packard Co., Data General Corp., Gould, Inc. and Prime Computer, Inc. to the list. And in virtually every case, the initiation of a takeover rumor has provoked a buying spree in the allegedly courted company, despite there not being one shred of evidence that GE ever talked with any of the companies.

One wonders what the stimulus for all this rumor mongering might be. It is entirely possible that, by the time this column runs, GE could own DEC. But it is unlikely, notwithstanding DEC's relatively cheap stock price right now. Why blow the entire wad on one company, to whose systems the rest of GE would be ostensibly committed, when GE can buy several, smaller, high-growth firms or even large pieces of bigger firms, not unlike what IBM has done with Rolm Corp. and Intel Corp.?

And as far as the acquisition of HP is concerned (which would cost about as much as DEC — $4 billion to $5 billion), it seems that Mr. Hewlett and Mr. Packard have very little to gain at this stage of their lives in liquidating interest in the company they founded in a garage back during the Depression. The smart money is taking the GE rumors at face value.

FOR THREE DAYS IN TEXAS WILL TURN

No single computer, personal or otherwise, has so profoundly affected all of business and industry as the IBM Personal Computer.

And now, for three days only, you can see, touch, use and compare the hardware, software, peripherals and compatibles that run on, like or with this revolutionary machine. It's the PC *World Exposition* in Houston, and you are invited to join us.

You'll see hundreds of exhibits from all the product leaders. Both makers and marketers of hardware, software, printers, peripherals, add-ons and services in a giant exhibition and retail selling event. Here's a list of some of the product leaders you'll see:

Alpha Software Corp.
Anadex Inc.
Arbor Technology
Ashton-Tate
AST Research Inc.
Benchmark
BOS National Inc.
BPI Systems Inc.
Robert J. Brady Company
Braid Communications
Brown Disc Manufacturing
Business Computing
CDI
Celestial Software Inc.
Cermetek Microelectronics
Compaq Computer
Computercraft
Computer Intelligence
ComputerKnowledge Corp.
Computer Roomers
Computerworld
Computex Corporation
Contemporary ComputerWear
Corona Data Systems
Corvus
CPU Corporation
Creative Computer Products
Data Business Vision
Datamac
Data Storage Solutions
Data Translation Inc.
Decision Data Computer Corporation
Digital Communications Associates
Discortex Corp.
Distributed Logic Corp.
Dynax Distributors
Emulex Corporation
ENVAX Systems Inc.
ESC Technologies, Inc.
Everex Systems Inc.
Ferox Microsystems
Hayden Book Co. Inc.
Hewlett-Packard Company
Human Edge Software Corp.
I.B. Magasette
Independent Computer Consultants Associates
Information Builders
Inforunner
InfoWorld
Interface Inc.
International Computerised Linguistics
Interphase Corporation
Lexisoft Inc.
LPKF Pacific
Marc Software
MICRO MARKETWORLD
Micro-Design Inc.
Micro Line Inc.
Microtek Lab
National Instruments
NEC
Novation
Omega Software Inc.
Omni Graphics Inc.
On Trak Data Systems
OSM Computer Corp.
Palantir Software
Panamax Line Conditioning
P.C. Telemart
PC World
Peacept Inc.
Personal CAD Systems
Petroware
Phase Information Machines
Prentice Hall Business & Professional Division
Printronix Inc.
Que Corporation
Racal-Vadic
Roland DG
RTCS/Real Time Computer Science Corp.
Santa Clara Systems
Seequa
Sensor-Based Systems
Software Automation Inc.
Software Centre International
Software Solutions Inc.
Sorbus Service Division MAI
Sperry Corp.
Summagraphics Corporation
SWI International Systems
Syaprint Inc.
Systems Management Associates
Tall Grass Technology
TCS Software
Televideo Systems Inc.
3M Data Recording Products
Thunderhawk Corporation
Toshiba America Inc.
United Networking Systems Inc.
Vectrix Corp.
Verbatim Corporation
Vertex Systems
ZEDUCOMP

(Exhibitors as of Dec. 15, 1983)

Is IBM qualified to set all industry standards?

OUTSIDE LINES

BOB DJURDJEVIC

A modern version of a Greek tragedy, complete with sacrificial victim, has been unfolding in U.S. courtrooms on both coasts since last November.

In Connecticut, IBM filed suit against The Gartner Group, Inc., a Stamford, Conn.-based market research company, and the same day settled the case. In California five days earlier, IBM added a former Gartner employee, who was also an ex-IBMer, to the list of defendants in its civil lawsuit against National Semiconductor Corp. and its subsidiary, National Advanced Systems, Inc. (NAS).

Without admitting liability, The Gartner Group agreed to return any IBM "protected information" it may still have; to identify to IBM all persons who might have disclosed or may in the future disclose such information; and to cooperate with IBM in any investigation of disclosure.

Why did IBM continue litigation against an individual after it had forced his employer to its knees? Why had IBM waited so long to file the charges against him? How did IBM obtain evidence against him?

An IBM spokesman refused to comment about the case "since the matter is before the courts." The plaintiff's lawyer has advised his client to remain mum for the time being, too. But NAS President David Martin sees this as yet another IBM effort to make an example out of the individual's case. "IBM is on a self-appointed mission to clean up the industry to their set of standards," he said.

No wonder IBM's adversaries are giving up, when even a federal judge commended the parties in the IBM/Hitachi Ltd. case for their wisdom in arriving at a settlement. "This could be an industrywide standard for a dispute resolution," the presiding judge said.

The consequences of such settlements may also affect innocent observers. Let us assume one meets an IBM employee who voluntarily begins to spill the beans about his employer. If IBM were to act consistently, the listener, and not just the IBM employee, could be found "guilty" by IBM's standard if he did not report this incident "forthwith" to IBM.

In the past, many people have volunteered to assist IBM if the company's legitimate trade secrets were being threatened. But it is one thing to let each individual act in accordance with his conscience and another to have IBM tell you (as in the Gartner settlement) that you "shall notify IBM forthwith" and "shall cooperate with IBM's reasonable requests in an investigation of the circumstances."

If you were a journalist, for example, this could mean IBM has just put you out of business. Is IBM, therefore, attempting to extend its power not just over its employees and competitors, but also over the press and other third parties?

None of this is to take away IBM's right to protect its own trade secrets. But if new standards of business conduct are needed, such issues should be decided by our elected representatives and the industry as a whole, not just by a single competitor pointing a gun at the head of its adversaries.

How qualified is IBM for this self-appointed role? Is IBM itself above reproach?

A Phoenix-based law firm, Brown & Bain, was retained in 1981 by National Semi for another alleged trade-secret violation case. This case was settled in June 1982. Two months later, Brown & Bain advised National Semi that it would be acting for IBM, its old client, "in the pending dispute between National and IBM."

Ultimately, National Semi/NAS lawyers managed to get this law firm disqualified from the case. Though the court said there was no indication of unethical attitudes or practices as far as Brown & Bain was concerned, one cannot help wondering about IBM's business judgment, if not its motives, in retaining counsel which it knew had just concluded a case acting for the opposite side.

Or consider the preannouncement hype of the PCjr and the System/36. Media articles hurt IBM competitors' sales, as some buyers held back on their purchases until the IBM products were finally unveiled. The level of detailed product information which the press reported left little doubt that the source of that information must have originated inside IBM. Yet this time there were no lawsuits. No IBM employees were fired to set an example, at least as far as the public is aware.

Could it be that such information leaks are condoned, if not intentionally planted, if they serve IBM's purposes? If so, doesn't that make IBM a company with double standards? And if that's the case, is that the kind of company that should assume the role of setting the industry's business conduct rules?

Djurdjevic is president of Annex Holdings Corp. of Phoenix and publisher of the Annex Computer Report.

FEBRUARY, ALL EYES IN TO THE IBM PC.

Plus, we'll present personal computer experts from around the nation in an up-to-the-minute conference program. You'll learn how to choose and how to use the technology and equipment surrounding the PC family of microcomputers. Here's a partial listing of the conference sessions:

Wednesday, February 1, 1984
User Sessions:

The Benefits of the IBM PC for Small Businesses
Financing Options and Tax Advantages
Available Add-Ons and Peripherals
Software: What's Available and How to Find It
What Do the Compatibles Have To Offer?
How I Became Compatible With My IBM PC
Medical/Dental Applications for the PC
The PC in the Law Office
PC's and Real Estate
Manufacturing Resource Planning with the PC
Investment Software for the PC
CPA Software: The Bottom Line
Software for Insurance Applications
Distributed Control Software for the PC

Thursday, February 2, 1984
User Sessions:

The Anatomy of the IBM PC
Defining Levels of Compatibility Between Systems
Overview of Compatibles: Desktops and Portables
Word Processing Software
Database Management Software
Business Graphics Software
Analyzing Your Software Requirements
Overview of Major Business Applications Software
Integrated Software Solutions

Friday, February 3, 1984
User Sessions: The PC in the Corporate Environment

Review of Policy and Planning Issues
Implementation Strategies
Use of PC to Mainframe Communications (Includes Security Issues)
Local Networking for the PC

Quite simply, the PC *World Exposition* is the biggest event in Texas for the most important computer in history.
Don't miss it.

FREE ADMISSION to one Conference Session of your choice. Just present this coupon at the Registration Desk any day of the Show, pay the regular $10 exhibits only admission and choose any one Conference Session free of charge. One coupon per person.

The PC World Exposition
Houston
February 1-3, 1984, Astro Hall

SAVE $5.00 on Full Exhibit & Conference Admission. Present this coupon at the Registration Desk and pay just $25.00 for a Conference Pass entitling you to attend all Conference Sessions and three days of exhibits. One person per coupon.

IT'S WHAT THE WORLD IS COMING TO.

The PC *World Exposition* is produced by Mitch Hall Associates in cooperation with CW Communications, Inc., publishers of PC World, MICRO MARKETWORLD, InfoWorld, and Computerworld.

Three-day admission to all exhibits and conference sessions is $50.00. Admission to the exhibits only for three days is $20.00. Show hours: Wednesday and Thursday, February 1 and 2, 10:00 AM to 5:00 PM; Friday, February 3, 10:00 AM to 3:30 PM. Conference sessions run from 8:30 – 10:30 AM and 2:30 – 5:30 PM on all three days.
For attendee and conference information, call CW Communications at 1-800-225-4698.
For information on exhibiting, call Mitch Hall Associates at 1-617-229-7486.

® signifies manufacturer's registered trademark.
™ signifies manufacturer's trademark.

High-tech trade groups press for R&D bills

SAN JOSE, Calif. — As the U.S. Congress convenes this month to begin its election-year deliberations, a rainbow coalition of powerful, high-technology trade associations is pressing the Reagan administration to beef up its support for permanent tax incentives for their members.

With the current research and development tax credit provision due to expire at the end of next year, the Semiconductor Industry Association, together with the American Electronics Association, the Computer and Business Equipment Manufacturers Association and the Scientific Apparatus Makers Association, is seeking passage of the High Technology Research and Scientific Act now before Congress.

The act's companion bills — S. 2165, introduced in the U.S. Senate by Sen. John Danforth (R-Mo.), and H.R. 4475, sponsored by Rep. James Shannon (D-Mass.) — are intended to enhance and make permanent the R&D-tax credits included in President Reagan's 1981 Economic Recovery Tax Act and to improve the level of scientific education in U.S. colleges and universities.

The ad hoc group had prepared a study, "High Technology Tax Policies for the 1990s," which was to be presented in Washington, D.C., last week.

The study, prepared over the last year, contended essentially that many current tax policies are not well suited to aid in the economy's transition toward an internationally competitive technology-based economy.

"World leadership in the semiconductor industry is dependent in the long term on continuous innovations and an adequate supply of qualified scientists and engineers," Tom Hinkelman, president and executive director of the SIA, remarked. "Passage of this act will contribute substantially to our industry's ability to help to keep the U.S. in the forefront of technological innovation."

According to the four trade associations, the proposed act provides enhanced incentives for investment in R&D by expanding the current laws allowing tax credits for increased research activities and corporate funding of basic university research and by making the R&D tax credit a permanent part of the tax laws.

Hinkelman also called for swift action on the proposal, claiming that the election year hoopla will detract Congress from pressing legislative matters.

Lease a Magnuson PCM for a short term at low, long term rates...

We'll give you long term rates. You give us a short term commitment. With more processing power to the dollar, the Magnuson M80 is the most cost-effective alternative to IBM's 4300 series. Now Phoenix Leasing sweetens the deal by offering low, two-year rates on a lease you can cancel after every 6 months — with no penalties! **Phoenix Leasing means inexpensive flexibility.** Meet your immediate processing needs, without tying yourself to projected long term hardware requirements.

Compare Magnuson with IBM

		MIPS*
Magnuson	M80/42	.77
IBM	4341-1	.72
IBM	4341-10	.58
Magnuson	M80/32	.56
Magnuson	M80/31	.42
IBM	4331-2	.40
IBM	4341-9	.38
Magnuson	M80/30	.24

*COMPUTERWORLD estimates

...and get guaranteed support.

We'll give you these bargain rates, and we'll guarantee support. Our Magnuson M80's are supported nationwide by a major national service organization, so you can be sure of receiving prompt service, no matter where you are in the country. **Complete support guaranteed.** If we ever fail to provide you with satisfactory support, you are under no obligation to keep the system. It's as simple as that. **Complete systems, immediate delivery.** Phoenix Leasing has Magnuson systems in inventory ready for immediate delivery. And we can provide a complete system, including peripherals, all in one flexible lease package. **Backed by a company that knows what it's doing.** We've been leasing data processing equipment for more than 11 years, and we have acquired more than $500 million worth of equipment. We currently have over 6000 leases helping companies meet their data processing needs. **Call Kirby Fiegel today.** Don't miss out. Call Kirby at (800) 227-2626. (In California, call (800) 772-4021.) Find out how you can take advantage of this outstanding opportunity.

PHOENIX LEASING
495 Miller Avenue, Mill Valley, CA 94941

MCI posts flat earnings

WASHINGTON, D.C. — For the first time in several quarters, MCI Communications Corp. has posted flat earnings, attributing the results to heavy capital spending as the company prepares to compete with an unregulated AT&T.

MCI showed profits of $43.6 million, or 19 cents per share, for the fourth quarter, compared with $43.5 million, or 22 cents per share, for the same quarter a year earlier. Revenues in the period jumped 47% to $430 million, compared with $294 million a year ago.

For the year, MCI earned $203 million, or 89 cents per share, a 34% increase over last year's $151 million profit. Sales for the year totaled $1.5 billion, an increase of 67% over fiscal 1982.

Increased spending for communications lines leased from other long-distance competitors, which permitted MCI to offer customers interstate calling regardless of whether the call terminates in a city on the MCI network, also had a negative effect on the quarterly bottom line, the company said.

"The increased expense . . . is part of a strategy to build MCI's market share as rapidly as possible in anticipation of equal access," commented V. Orville Wright, president and chief executive officer.

Gould plans to sell division

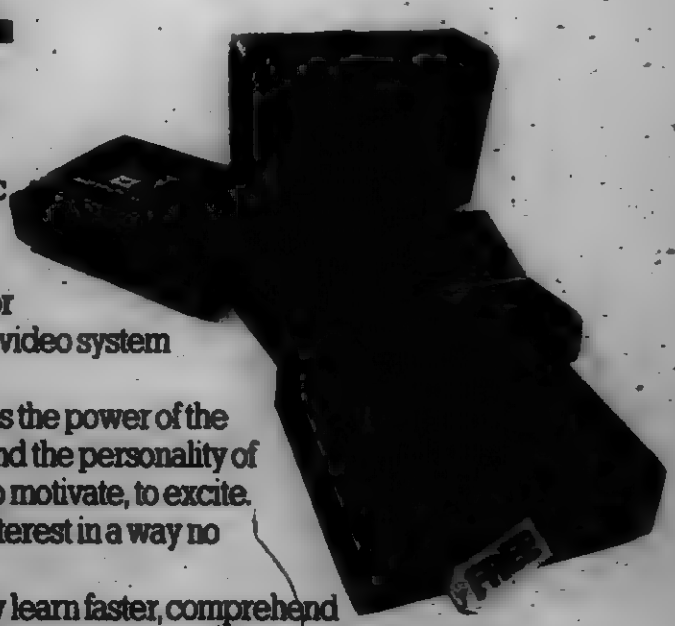
ROLLING MEADOWS, Ill. — Gould, Inc. is planning to sell its $26 million Power Conversion Division as a further move to focus its holdings more specifically on electronics, the company announced recently.

The company said the division's products are not strategically critical to its primary business base in computers, factory automation systems and other electronic components.

Gould declined to speculate on possible suitors for the division or on its asking price, saying only that the company has held discussions with several companies.

A WORD TO ANYONE LOOKING FOR UNIX TRAINING:

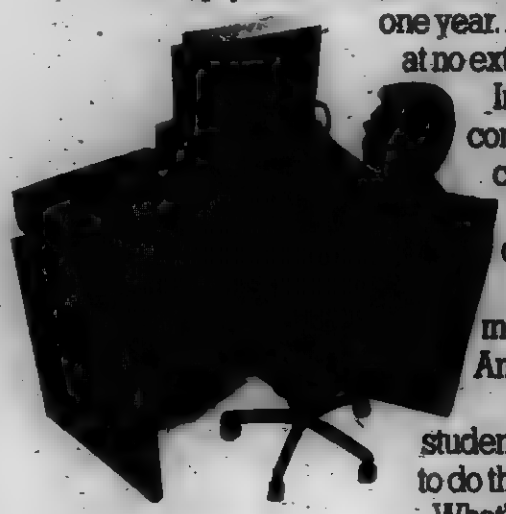
FREE.



Introducing Vision. The first Unix Interactive Video Training Curriculum. And our last Free Introductory Offer.

Now you can own an IBM Personal Computer, laser videodisc player, color monitor and Interactive Training System Controller, absolutely Free.

Simply lease our new Unix Interactive Training Curriculum for one year. And get this complete interactive video system at no extra cost.



Interactive video training combines the power of the computer, the speed of a laser disc and the personality of classroom instruction. To involve, to motivate, to excite. To capture and hold a student's interest in a way no other medium can.

Students learn by doing, so they learn faster, comprehend more and retain information longer. They spend less time away from the job. And are more productive once they return.

Because training is targeted, students learn only what they need to know to do the job. Now.

What's more, Vision was developed by Interactive Training Systems, the leader in interactive video training, and Computer Technology Group, the leader in Unix training.

The result? Unix training so fast, so effective and so affordable, we back it with a full 30-Day Money-Back Guarantee.

Take advantage of our Free Introductory Offer. Send in the attached coupon. Or call us at 1-800-227-1127.

AFTER MARCH 31, 1984 OUR FREE INTRODUCTORY OFFER IS NO LONGER FREE!

☐ Please have a representative contact me immediately.

☐ Please send me more information about Vision, the Unix Interactive Video Training Curriculum.

Name _____

Company _____

Title _____

Address _____

City _____ State ____ Zip ____

Telephone _____

Interactive Training Systems, Inc.
4 Cambridge Center, Cambridge, MA 02142

Exec views storage mart

PALM SPRINGS, Calif. — Erasable optical storage products will enter the market in 1987 and will impact both the high end and low end of the present magnetic storage market, according to Peter Lloyd, vice-president and general manager of Shugart Corp.'s Optimem Division.

Speaking here earlier this month at a session of Infocorp's 1984 Strategic Issues Conference, Lloyd predicted that 1984 "is the year of evaluation of (nonerasable optical) products by system companies and integration into the end-user market," and that 1985 will see a large volume of such products.

In 1986, he continued, will come the introduction of optical storage workstations.

Nonerasable optical storage, either read-only or write-once, will find a willing market because of high-storage capacity, user-friendliness and because there are many applications where erasability is not required, Lloyd said.

High-end hardware users will use nonerasable optical storage for its "greater off-line storage access" and comparatively low cost, he claimed, adding that the products will eventually replace tape libraries. Low-end hardware users will use the products for image storing and the ability to access large amounts of data at low costs, he continued.

Optical storage, in Lloyd's view, will follow the same trends as magnetic storage: lower cost, higher performance and smaller size. But, he added, reductions in cost and size will be faster than experienced by magnetic storage.

IEEE edition available

SILVER SPRING, Md. — The Institute of Electrical and Electronics Engineers (IEEE) has announced the availability of the fourth edition of its best-seller, *Tutorial: Software Design Techniques*, edited by Peter Freeman and Peter Wasserman, both of the University of California.

The edition includes 47 papers, 22 of which did not appear in the previous edition, and captures the latest ideas in software design, IEEE said.

Major enhancements include Freeman's original paper, "Fundamentals of Design," along with coverage of user interface design, object-oriented design, design of concurrent systems and integration of design into software development methodologies, IEEE said.

The book has been published for analysts, designers, programmers and managers seeking a broader perspective of software design, as well as for classroom use in software engineering courses.

The 736-page *Tutorial: Software Design Techniques* is priced at $20 for IEEE members and $32 for nonmembers.

IEEE, Suite 200, 1109 Spring St., Silver Spring, Md. 20910.

Hughes plans satellites

WASHINGTON, D.C. — Hughes Communications Galaxy, Inc. has hatched plans for a $450 million private satellite communications system designed to operate in a heretofore unused frequency band and to provide six times the communications capacity of existing domestic satellites.

Hughes has requested authority from the Federal Communications Commission to build, launch and operate two satellites that will function at 20 and 30 GHz, with the first satellite to be launched in late 1988. Both satellites' designs will be based on the Intelsat VI spacecraft Hughes is building for the Intelsat consortium.

The satellites' 5,000-lb payloads will provide 3,000 channels, each capable of transmitting one full-motion videoconferencing call or the equivalent amount of wide-band data service.

"The millimeter-wave technology needed to build this new generation of communications satellites has been developed for two decades here and elsewhere," commented Albert D. Wheelon, chairman of Hughes.

"The technology is ready now for commercial application . . . the lower frequency orbital positions are being filled rapidly, and it is timely to move ahead with a millimeter-wave system," according to Hughes.

IBM micro seen costly

SAN JOSE, Calif. — The IBM Personal Computer with a local-area network connection is too expensive to be used by more than a fraction of the office work force, according to a recently released report from Strategic, Inc.

In a study titled "Multi-User, Multiprocessor Computer Systems: Impact and Opportunities," the research and consulting firm concluded that a Personal Computer costing $3,000 to $4,000 with local-area network connections is not competitive with the offerings of vendors such as

COMPUTER INDUSTRY

Convergent Technology, Inc., Burroughs Corp., Molecular Computer, Inc. or NCR Corp.

"Today, with a multiuser microprocessor system supplied by these companies, it can cost less than $2,000 to put a workstation on an employee's desk and to be able to share data and costly peripherals among all the workstations," asserted Michael Killen, president of Strategic.

The report forecast the market for multiuser microcomputers, including Personal Computers and local-area networks, multiprocessors and shared-processor systems, will grow from $448 million in 1983 to $5.9 billion in 1987.

The report is priced at $1,500.

Strategic, Box 9747, San Jose, Calif. 95157.

DG reports strong gains

For first quarter

WESTBORO, Mass. — Citing continued growth in both orders and shipments, Data General Corp. reported strong gains in sales and profits for its first quarter that ended Dec. 17.

Sales totaled $230 million, a 28% jump compared with the same period a year earlier.

Profits jumped nearly threefold to $9 million, or 96 cents per share, compared with profit of $3 million, or 14 cents per share, last year.

Most demand continuing

According to Edson deCastro, DG's president, an increase in demand that began last summer for the company's minicomputer line has continued, as has the economywide increase in capital spending.

"If this trend in capital spending continues, I am optimistic about DG's prospects for strong growth," he commented.

"Sustaining that growth will depend not only on the continuing improvement in customer orders, but also on the availability of raw materials and components, primarily semiconductors," deCastro maintained.

Olivetti airs merger plan

DALLAS — Docutel/Olivetti Corp. has announced a consolidation and reorganization designed to streamline marketing operations for the company's office and financial product lines.

The reorganization combines the former office products and financial systems divisions into a single entity. The company said that, with the consolidation, it will institute three marketing-support units. The newly created customer service and telemarketing groups will work directly with office product dealers, while the third group, field marketing, will include automatic teller machine and terminal product sellers.

Approximately 60 positions will be eliminated as a result of the consolidation. John J. Douglas, company president, said the changes are steps in a long-range program to mesh the office products and financial systems operations into a single profitable organization "by concentrating personnel in key support and operations areas."

Honeywell sees profits

MINNEAPOLIS — Honeywell, Inc. announced Jan. 17 a 15.3% profit increase for fiscal year 1983 in comparison to the previous year. Profits from the Information Systems Division increased by $51 million over the same period, "largely as a result of aggressive cost-saving efforts."

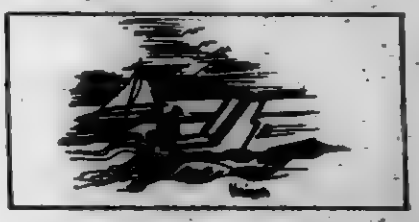
Total profits for the fourth quarter ended Dec. 31 increased by only $3.9 million over the $88 million reported for the corresponding period one year ago.

Income for the year ended Dec. 31 was $231.2 million on revenues of $5.7 billion; the previous year, the company had reported total net income of $206.6 million on revenues of $5.4 billion.

Edson Spencer, chairman and chief executive officer of the company, cited a sharp improvement in the company's computer business and a significant reduction in interest expense as the major reasons for the improved earnings.

Honeywell's Aerospace and Defense Division also reported a profit increase, $22 million, over the previous year, but the Control Products and Control Systems Divisions reported profit decreases of $33 million and $52 million, respectively.

The Information Systems Division, however, experienced a reduction in total yearly revenues of $19 million; Control Systems also reported reduced revenues, while the other two divisions increased revenues.



With a complete set of tools, you can build almost anything.

While other companies offer OEMs a few tools to build with, Cadmus provides the complete set.

For example, the Cadmus 9000 combines all the power of a mainframe, the speed of a mini, the price of a micro and the unlimited application flexibility of UNIX™ System V with Berkeley 4.2 enhancements.

All in a distributed environment.

In fact, the system's unique UNISON™ networking software provides the full resources of the entire network to any computational node through network-wide virtual memory with demand paging.

A 10 Mbit Ethernet™ or 50 Mbit fiber optic LAN serves as the interprocessor bus.

And comprehensive graphics, development and decision support tools facilitate graphics applications in a windowed, multiple process environment.

In addition, we support every Cadmus 9000 with Thunderbolt™ service that puts an engineer at your door anywhere in the country within 24 hours. Guaranteed.

To get the complete picture on this high powered graphics-oriented distributed system, call Cadmus at 617-453-2899.

The Cadmus 9000. Finally, you've got a complete set of tools.

CADMUS COMPUTER SYSTEMS The Distributed Mainframe.™

900 Suffolk Street, Lowell, MA 01854
USENET: ...helvetia!cadmus TELEX: 948257

ADF Users-Get A Grip!

Don't get carried away with ADF before you know how to use it right!

DKI's one week ADF class covers a wide variety of topics including: standards, procedures, usage guidelines, design methodology, coding techniques, testing, performance considerations and problem solving.

ADF Designers & Coders, Systems QA Personnel, DBA's, Performance Tuners and Project Managers will all benefit from attending our course.

COMPUTER INDUSTRY

SUPERSHORTS

Computervision Corp. has signed an agreement with **Invotech, Inc.** and **Richard Muther & Associates, Inc.**, under which the companies will jointly develop, market and support space and facilities planning software designed to meet the needs of architects, space planners and facilities managers.

■

The Ultimate Corp. has signed a four-year contract with **Bull Group, Paris**, under which Bull will supply Ultimate with up to $26.8 million of minicomputer systems. Bull will provide Bull Mini 6 systems, which are based on Honeywell, Inc. DPS 6/level 6 minicomputer systems, for distribution by Ultimate's international network of independent dealers.

■

Honeywell, Inc.'s Communication Services business has been elevated to divisional status. M.L. Jackson, who has served as director since 1980, has been promoted to vice-president and general manager of the new division.

■

Perception Technology Corp. (PTC) has announced an agreement with **AT&T Information Systems, Inc.** calling for the inclusion of PTC's Interactive Data Entry/Voice Response System in proposals by AT&T Information Systems to its customers for call-management systems. PTC will supply equipment directly to interested customers.

■

American Software, Inc. and **Pratech Research and Development Partnership** have announced the formation of a joint venture under which **American Research**, a subsidiary of American Software, will perform research pursuant to the development of two new application software products. The new products will be an accounts receivable system for IBM mainframe computers and manufacturing management application software for the IBM System/38.

■

Fujitsu Ltd. and **Texas Instruments, Inc.** have signed an alternate source agreement under which Fujitsu will supply semiconductor design and fabrication information to TI. Fujitsu has the option of using TI's computer-aided design tools for its gate arrays.

■

The Hall L. Hibbard Computer-Aided Aerospace Design Facility has been established at MIT through gifts from **Perkin-Elmer Corp.** and **Cadam, Inc.**, a subsidiary of **Lockheed Aircraft Corp.** Dr. Jack L. Kerrebrock, Richard Cockburn Maclaurin Professor of Aeronautics and Astronautics and head of MIT's Department of Aeronautics and Astronautics, said Perkin-Elmer has donated hardware and Cadam has donated software for the center. Each company gift is valued at about $250,000. Lockheed is providing a $50,000 operating fund for the first five years.

■

Ridge Computers, manufacturer of 32-bit personal computers, is offering discounts totaling $4 million on its computer systems to universities and national research laboratories. Under Ridge's special year-long "Commitment to Education" program, the first 100 universities and/or national research laboratories that qualify can buy a Ridge 32 computer for $19,900, a discount of 66% off the regular list price.

■

IBM recently donated $2.8 million to more than 1,100 colleges and universities under its IBM Matching Grants Program for Higher Education, bringing 1983 contributions to $10.8 million, up 20% over a year ago. For every dollar IBM employees and their spouses contribute to approved degree-granting colleges and universities, up to $5,000 per donor per college annually, IBM contributes two dollars to the educational institutions.

Communications.

How to tie things together today without being tied down tomorrow.

This April, *Computerworld Office Automation* will give you a close look at the world of communications products and services. You'll read about what's out there now and what's coming. And how to get started while leaving your architecture open for the technologies of the future. And you'll get it all from the perspective of end users who have to increase productivity now while making sure the their company's investment won't be obsolete in two years.

And that's not all. There'll be feature articles on:

- PBX versus local area networks and how they'll merge
- voice technology
- videoconferencing technology
- satellite technology
- inter and intra company communications strategies
- product evaluations and comparisons

And after we cover all the developments for you, we'll offer you strategies to link them all together into one integrated system.

Computerworld Office Automation is designed to give you OA information geared to the DP/MIS environment — in a way that no traditional office publication can. As one of *Computerworld*'s 114,000 subscribers in the U.S, you'll get six issues of *Computerworld Office Automation* in 1984 — as part of your subscription! And if your users need to increase their communications links, you won't want to miss this issue devoted to Communications in the office.

If you've got office automation and office communication products our readers should know about, then you need to get your ad reservation in by March 2nd.To reserve ad space in this April 11th issue of *Computerworld Office Automation*, call one of the sales offices listed below, or Ed Marecki, National Sales Director at 617-879-0700.

To: Ed Marecki, National Sales Director
CW Communications/Inc.
Box 880
Framingham, MA 01701

☐ *Please send me advertising information on Computerworld Office Automation.*

☐ *Please have a sales representative call me.*

Name _____
Title _____
Company _____
Address _____
City _____ State _____ Zip _____
Telephone _____ 4/11

Computerworld OFFICE AUTOMATION

BOSTON/Chris Lee, Jayne Donovan, Michael Kelleher, Ron Mastro, Jim McClure, Alice Longley, *(617) 879-0700*

CHICAGO/Art Kossack, Chris Lee, Jean Broderick, *(312) 827-4433*

NEW YORK/Mike Masters, Doug Cheney, Ray Corbin, Joan Daly, Fred LoSapio, Gale M. Paterno, *(201) 967-1350*

ATLANTA/Jeffrey Melnick, Mike Masters, *(404) 394-0758*

SAN FRANCISCO/Bill Healey, Ernie Chamberlain, Theodora Franson, Barry Millman, Nicole Boothman (recruitment), *(415) 421-7830*

LOS ANGELES/Bernie Hockswender, Bob Hubbard, Bill Healey *(714) 261-1630*

PROFITS from page 95

backlogs.

"Record R&D spending in the [third] quarter exceeded the $100 million annualized rate for the first time . . . and for the year to date was 18.5% of sales," said W.J. Sanders, chairman and president. "Pretax and net profit margins of 18% and 13%, respectively, were the highest since the 1974-75 recession."

Sanders said that new orders at AMD rose 26% in the quarter to $292 million, compared with the previous quarter, with this growth led by orders for microprocessors and telecommunications products.

Adapso names board

ARLINGTON, Va. — The Association of Data Processing Service Organizations, Inc. (Adapso), representing 650 software and service companies, has announced its slate of officers and directors for 1984.

Doug Altenbern, chairman and president of Endata, Inc., has been named board chairman, while Arthur Kramer, managing partner of Arthur Kramer & Co., was reelected vice-chairman.

Other officers include: George Raymond, president of Automatic Business Centers, treasurer; Fred Lafer, general counsel of Automatic Data Processing, chairman of the executive committee; and George Shea, corporate counsel of National Data Corp., vice-president of government relations.

Also named were Jay Goldberg, president of Software Design Associates, vice-president of competitive practices; J. Allen Hufft, president of University Computing Co., vice-president of educational and information-al services; John P. Imlay, chairman of Management Science America, Inc., vice-president of image.

Wang posts strong sales

LOWELL, Mass. — Wang Laboratories, Inc. continued on its strong and steady growth track in its second fiscal quarter, posting earnings and sales gains of nearly 40%.

Sales for the quarter totaled $515 million — in excess of $2 billion on an annual basis — compared with sales of $367 million in the same period last year. Profits for the quarter jumped to $48 million, or 35 cents per share, a 38% increase over last year.

In addition, new orders increased 34% to $618 million. The company reported that the earnings and sales gains were consistent with its business plans and were achieved "despite increased competitive pricing practices within the industry, which continued to affect profit margins adversely." The company further reported that a strong U.S. dollar reduced overseas profits, as 40% of Wang's sales are made abroad.

Wang recognizes need to coexist

Study analyzes leading OA vendors

FRAMINGHAM, Mass. — "Wang [Laboratories, Inc.] will never be, for all the users in its served markets, ' "the only office automation company you'll ever need," ' according to a report recently released here that analyzed the strategies of four leading vendors in various segments of the office automation market.

The first of two parts, "Major Vendor Strategies in the Electronic Office — Part 1," by Framingham, Mass.-based International Data Corp. (IDC), focused on Wang Laboratories, Inc., Digital Equipment Corp., IBM and Xerox Corp.

IDC prefaced its report with a qualifier: "Ranking in OA is a little like establishing suspension bridge records: define the relevant universe closely enough, and virtually any span can be the longest or tallest."

Nevertheless, the report did settle on a number of conclusions: IBM, in OA, as in virtually every other market, intends to be number one; DEC, which has billed itself as the Number 2 computer vendor, similarly intends to become the Avis of OA; Wang is still working to establish its claim as "the office automation company"; and Xerox "continues to search for a winning office strategy."

While Wang, at the end of 1982, had captured 51.4% of the installed base in the clustered word processing market, according to IDC, Wang has realized it will never be the only OA company for its customers and "must be able to coexist with systems that it will encounter in the larger world — that is to say, live with IBM." Wang dominated the markets of word processing and small business computers, but according to IDC, those markets are shrinking, and the company that made it being where IBM was not "cannot afford not to succeed in becoming a full-line office automation vendor."

IBM, according to IDC, "has set a goal of being the Number 1 player in the markets it enters, and there is no single compelling reason why this will not be the case in the office." However, IDC countered, users will "discover that there is still a long way to go before the diverse range of IBM devices is capable of genuinely unrestricted communication . . . IBM has gone too far along too many different paths to offer a uniform and relatively consistent set of office products."

'Ranking in OA is a little like establishing suspensions bridge records: define the relevant universe closely enough, and virtually any span can be the longest or tallest.' — IDC report.

IBM has already committed itself to a coherent office strategy, with integration riding the backs of Document Content Architecture and Document Interchange Architecture protocols being developed and publicized to permit document transfer among dissimilar devices, IDC concluded. While those protocols do not meet the criteria of a multiproduct-line, uniform user interface, other vendors will continue to develop their products along IBM's standards, according to IDC.

DEC's thrust into OA, with the introduction of its All-in-One software less than two years ago and a much-noted internal reorganization, has begun to sway the perception that the company could only deal with highly technical computer professionals, according to IDC. But perception remains the "primary strategic challenge" and will require a protracted and expensive marketing and promotional effort on DEC's part, IDC said.

Xerox, according to IDC, "does not seem to be nearly the force to be reckoned with that it did even 18 months ago." A "strategic drift" and lack of new products has seen the company lose momentum as a total systems supplier for the electronic office, the report said.

Part two of the report will include Data General Corp., Hewlett-Packard Co. and others, including a number of software companies.

IDC, 5 Speen St., Framingham, Mass. 01701.

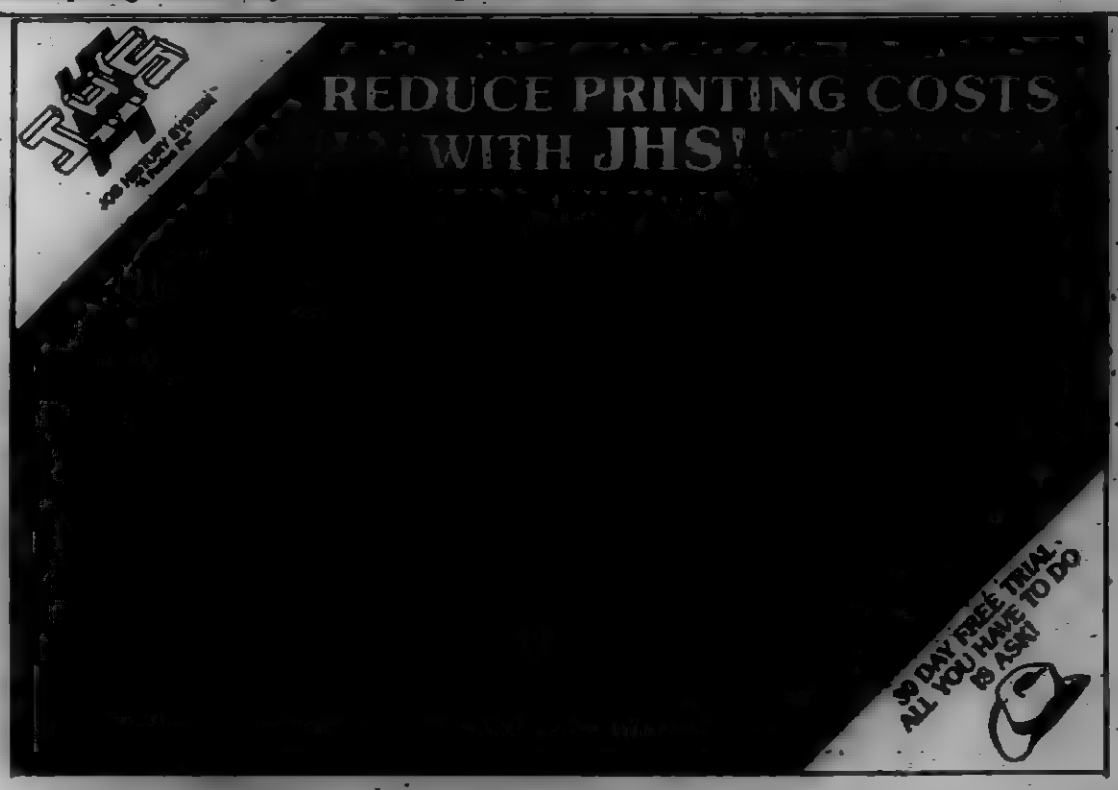
China-U.S. tech exchange set

SPOKANE, Wash. — A delegation of U.S. computer graphics specialists has been selected to conduct a three-week technical exchange with counterparts in the People's Republic of China.

Peter C. Wang, president of Automation Technology Institute, Inc. of Pebble Beach, Calif., has been named delegation leader, according to the People to People Citizen Ambassador Program, which selected the delegates and is sponsoring the exchange.

Through a series of seminars, meetings and on-site visits in several Chinese cities, the delegation of specialists will examine China's progress and needs in computer graphics technology, focusing particular attention on automated production, maintenance and retrieval of engineering data and the more traditional research areas.

Founded in 1956 by President Eisenhower to further international understanding, People to People International is now chaired by President Reagan.



POSITION ANNOUNCEMENTS

COMPUTER SCIENTISTS

WE NEED YOU TO HELP US DEVELOP A STATE OF THE ART SCIENTIFIC INFORMATION SYSTEM

At Chemical Abstracts Service, an established (founded 1907) world leader in scientific information services, we are continuing our development of an advanced, on-line information system serving the needs of the chemical community. Our development environment includes:

- [illegible] and 370/168AP mainframes
- VAX 11-780 and PDP-11 minis
- DEC PC-350's
- ADABAS, UNIX, MVS/XA, SNA, X25, RT11, Ethernet
- Programmer Workbench, TSO

SEVERAL POSITIONS AVAILABLE IN COLUMBUS, OHIO

DATABASE ANALYST

Must have strong skills in database design and administration to consult in the use of our current DBMS's, manage installation of enhancements to those DBMS's, evaluate new technology, design and implement databases, and establish standards and procedures for data and database administration. Requires a Bachelor's Degree or equivalent and experience in several of the following: use and maintenance of database software such as ADABAS or other inverted key, hierarchical, or relational systems; database design and implementation; data or database administration using a data dictionary; and use of end-user query languages.

DATA COMMUNICATIONS/NETWORKING ENGINEERS

To help design, develop, and support data communications networks for UNIX and IBM systems. Requires a Bachelor's degree or equivalent and 2-5 years experience in one or more of the following: UNIX internals; network protocols; Ethernet; PDP-11 and VAX architecture; IBM MVS or MVS/XA operating systems; and DEC RT11 operating system.

APPLICATIONS PROGRAMMER/ANALYSTS

To help develop both online and batch applications software in a UNIX and TSO environment. Work will include the full range of programming and analysis tasks - from problem definition, design using a formal methodology, coding and testing IBM 370 Assembler, PL/1, or C programs, to documentation and installation. Requires a Bachelor's degree or equivalent and experience in developing applications software via UNIX or TSO using languages such as 370 Assembler, PL/1, or C.

OFFICE AUTOMATION SYSTEM ENGINEER

To help design integrated office automation systems using advanced work-stations in a UNIX environment. This person will promote advanced office automation development and support other application development efforts. Requires a Bachelor's degree or equivalent and 2-5 years design and development experience in one or more of the following: office automation applications, UNIX based applications, online office automation system user interfaces, or distributed office systems using minicomputers and/or intelligent workstations.

If you are looking for challenging and rewarding job assignments, an ongoing career development program, a progressive benefits package, a professional working environment, and a salary commensurate with your background and experience, please send your resume to:

CHEMICAL ABSTRACTS SERVICE
Employment Department
P.O. Box 3012
Columbus, OH 43210

IIT RESEARCH INSTITUTE
Rome, New York

IIT RESEARCH INSTITUTE (IITRI) is an independent research organization founded in 1936 to provide research, development and design services to industry and government. Today, IITRI ranks as one of the largest and best known contract research organizations and continues to extend its capabilities to effectively meet research challenges of our changing society. The IITRI facility in ROME, NEW YORK has openings for experienced professionals to join a group of software engineers and computer scientists performing software engineering research and developing special purpose databases.

SOFTWARE TECHNOLOGY

B.S. or M.S. in Computer Science or related discipline; at least 2 years experience in one or more of the following areas:

• Systems Development • Networking • Software Tools/Methodologies • Office Automation • Data Base Management • Data Collection/Analysis • Software Metrics • Software Acquisition • Software Assessment.

Exposure to Unix, DoD applications and research methodologies a plus. Projects will support Ada*, STARS, DACS, and other DoD programs.

*Ada is a registered trademark of the U.S. Government (Ada Joint Program Office).

If you are interested in professional growth and increasing responsibility, in advanced educational opportunities, and would like to live in upstate New York where you'll enjoy casual living and easy access to year round recreational activities, send your resume to: Professional Employment, Dept. SR3, IIT Research Institute, 19 West 35th Street, Chicago, IL 60616. An equal opportunity employer M/F/V/H.

IITRI

SYSTEMS PROGRAMMERS

American Electric Power System's solid commitment to constant improvement for more than 75 years has meant better service at lower costs to its customers, as well as rewarding, challenging careers for the professionals who make improvements happen.

AEP's advanced, multi-state computer network, based in our new corporate headquarters in Columbus, Ohio has immediate opportunities for systems programmers.

Our current environment is dual IBM-3032 processors in Columbus and dual IBM-3033's in Canton, Ohio. We will soon be expanding our capabilities by installing an IBM-3081. Our operating system is MVS/SP with JES-2/ NJE shared spool. Real-time systems include TSO, CICS and ROSCOE.

The primary responsibility of these positions is to generate and maintain a large-scale, virtual-storage operating system. The ideal candidate will have a B.S. degree and a minimum of two years experience with SMP, MVS or JES-2.

We offer salaries based on experience and a comprehensive benefits package. If you are seeking real professional involvement, recognition and opportunity, please send your resume including salary history and requirements in confidence to:

AEP

Diana Mackey - Dept. CW
AMERICAN ELECTRIC POWER
SERVICE CORPORATION
1 Riverside Plaza
Columbus, Ohio 43215

An Equal Opportunity Employer M/F/H/V

COMPUTER SCIENTISTS

Center for Programming Science and Technology
of the
INSTITUTE FOR COMPUTER SCIENCES AND TECHNOLOGY

Challenging opportunities to direct and conduct research in the application of artificial intelligence to software development. Projects involve the exploration of knowledge-based technology to assist in the clarification of requirements and the construction of computer software. Laboratory based environment, with advanced facilities that include a Symbolics 3600, VAX 11/780 running VMS and UNIX based systems.

Graduate degree in computer science with demonstrated ability to direct and conduct research is required. The positions are at the GS-13/14/15 level ($36,192 to $55,327) and offer competitive salary, excellent career benefits, and other professional growth opportunities. Please send your Personal Qualifications Statement (SF-171) to:

U.S. Department of Commerce
National Bureau of Standards
Administration Building, Room A-166
Washington, D.C. 20234
ATTN: Mrs. Jo White (540-CW)

The National Bureau of Standards is located in modern facilities in Gaithersburg, Md. and is an equal opportunity/affirmative action employer. U.S. citizenship is required.

THROW AWAY THOSE WINTER CLOTHES

P/A COBOL, CICS	TO	$35K
P/A Lifeterm, CFO, Lib 70, CFO+	TO	$35K
Sr P/A Burroughs Banking	TO	$35K
Sys Prog DEC/VMS	TO	$35K
Tech Spt Mgr	TO	$40K
CAD/CAM VLSI Design	TO	$35K
Consultant MBA	TO	$35K
P/A Banking Deposits	TO	$35K
Tech Sales CPU	TO	$35K
Prod Mgr IBM OS CICS	TO	$35K
P/A OS MSA Packages	TO	$35K
Mktg Mgr CPU - Micros	TO	$35K
P/A DOS Fin Sys	TO	$35K
P/A IMS DB/DC Dev.	TO	$35K
P/A Honeywell Hospital	TO	$35K
Assembly Prog Banking/Loans	TO	$35K
Telecomm Analyst	TO	$35K
P/A CICS DL/I Hospital	TO	$35K
SNAPC Expert	TO	$35K
Mgr DBA-IMS	TO	$40K

COMPUTERPEOPLE
3720 N. Hoover Blvd., Suite 304
Tampa, FL 33614
(813) 885-0135
We Serve Computer Professionals
- Exclusively -
And That's Important To You!

COMPUTER ENGINEER

SOHIO CORPORATE RESEARCH

Combine your technical and interpersonal skills in supporting SOHIO's R&D staff with personal computer applications. Your diverse experience in micro, mini and mainframe computers, ideally coupled with your scientific degree (or equivalent experience) and 3 years of computer related application activities could qualify you for this challenging opportunity. Other key qualifications include specific experience in IBM/PC, DEC and/or CDC computers. Systems software support experience is highly desirable.

This position will provide a career-oriented individual with the opportunity to:

- Determine appropriate software and hardware for scientific and administrative applications.
- Select appropriate equipment for computer work stations.
- Work with and train R&D staff in the application of personal computers.
- Maintain current knowledge relative to a wide variety of software and hardware applications.

We offer an excellent compensation/benefits package, as well as the opportunity to grow technically at our new Corporate Research Center in Warrensville Heights. SOHIO's comprehensive relocation package for new hires includes all normal moving expenses. Homeowners also qualify for mortgage interest differential allowance, third party home purchase and other features typically restricted to internal transfers.

For prompt, confidential consideration, please send a detailed resume of your experience to:

Donald A. Huston, Senior Executive Recruiter
THE STANDARD OIL COMPANY (Ohio)
1424 Midland Building — 573CW • Cleveland, Ohio 44115
An Equal Opportunity Employer M/F/H/V
NO THIRD PARTY INQUIRIES, PLEASE.
"Help us Help to Assure America's Energy Future"

SOHIO

CITIES SERVICE
OIL AND GAS CORPORATION

Business Systems Programming Analysts
(Several Openings)

Ideal candidate has 2-6 years COBOL experience using OS MVS, JCL, TSO or CMS, IMS DB/DC (ADF) for large management information systems. Four year industry experience preferred. Typical positions are as team members of large projects with user support assignments. You will use state-of-the-art hardware and software as a member of our Tulsa headquarters staff.

Software/Hardware Systems Consultant - Capacity Planning and Performance Tuning

Position requires over four years experience in systems programming of multiple large IBM mainframes (MVS, JES 3, TSO, IMS, CICS, and Communications Networking). Tools available include RMF, MICS, OMEGAMON, NPA, CAPTURE/MVS, BEST/1, SMF, SAS, etc.

IMS and ADABAS Technical Consultants

Candidates must have a minimum of four years of database applications development. A strong knowledge of physical database design, performance problem solving and tuning is required. Position requires daily contact with project managers and systems engineers.

Salaries competitive and commensurate with experience. Excellent Fortune 50 benefits package (will relocate).

Send your resume today of work experience including current DP skills, salary, and your employment objectives to:

Cities Service Oil and Gas Corporation
c/o G. R. Farley
Box 300
Tulsa, Oklahoma 74102

Cities Service is the domestic oil and gas subsidiary of Occidental Petroleum Corporation.

An Equal Opportunity Employer

DATAPOINT
We sparked the revolution.

Seven years ago when DATAPOINT introduced the first local area network, ARC® (Attached Resource Computer®), we sparked a revolution in business communications. Today, DATAPOINT's comprehensive approach to office automation, communications, dispersed data processing and desktop computing continues to make major demands on software technology. If you are a degreed software development professional, and want to be involved in developing the most widely used LAN's in the world, then match your skills to the opportunities below:

4300 Systems Manager

If you are a Systems Programmer with experience in RAS, CICS, MVS and VM/VSE this will be your opportunity to run your own shop that is part of a state-of-the-art development center.

Operating Systems Programmers

From a creative point of view, you will design and implement current as well as future operating systems and utilities. You'll need knowledge of Assembly, Pascal and "C".

Office Automation Programmers

You'll be part of a highly skilled professional team developing the office of the future - stressing reliability and user friendliness. Programming experience using high level "C" and similar languages, and interactive software tools is desired.

Support Analysts

Your team will be the key in support of state-of-the-art operating systems, utilities, languages, communication and network products. You'll need to be a strong communicator and problem-solver. Systems programming and/or support experience helpful.

Documentation Writers

We're looking for proven communicators with skills in operating systems, languages, communications, and office applications. End-user documentation experience preferred. Knowledge of on-line documentation, "Help" facilities, and other user aids helpful.

Software Quality Analysts

Join a team that has high visibility in our quality-conscious organization. These positions involve systems test, analysis, planning, and development, as well as, software performance analysis and testing.

File Management & Languages Development Programmers

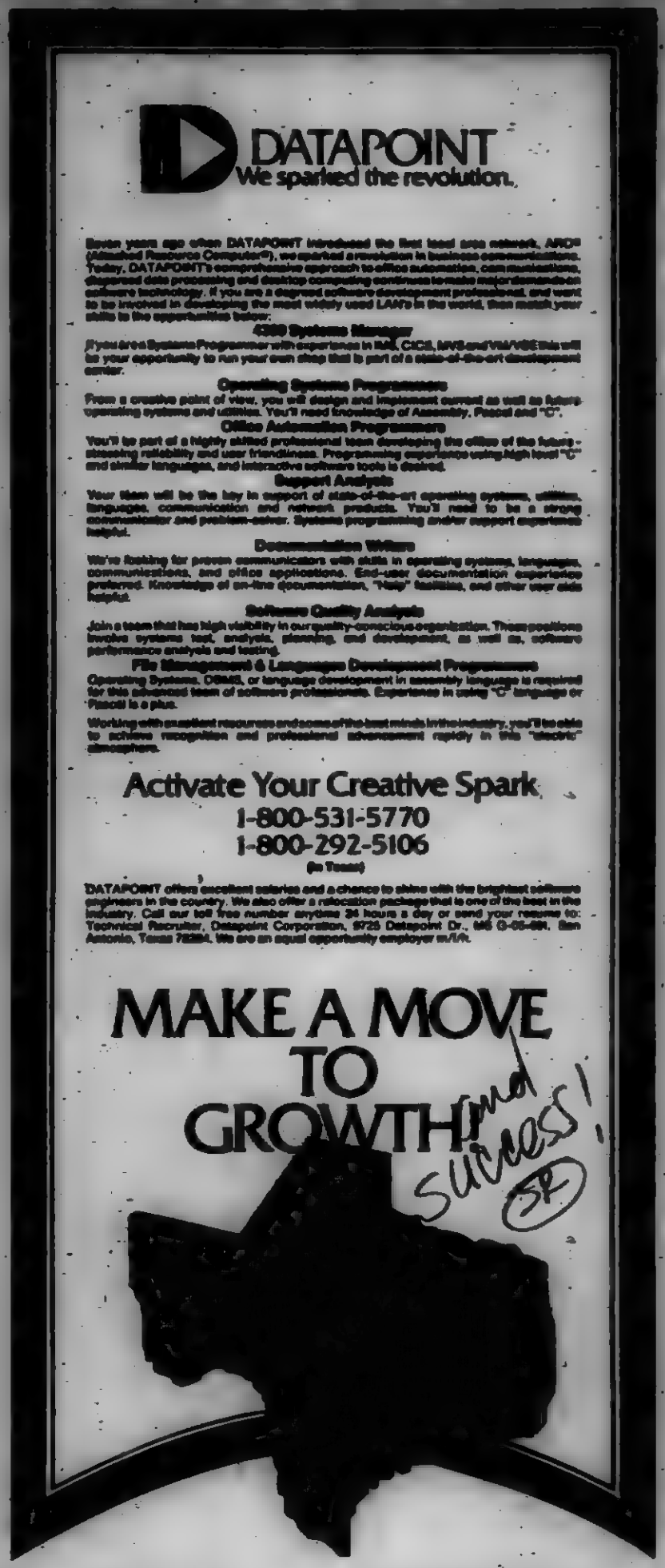
Operating Systems, DBMS, or language development in assembly language is required for this advanced team of software professionals. Experience in using "C" language or Pascal is a plus.

Working with excellent resources and some of the best minds in the industry, you'll be able to achieve recognition and professional advancement rapidly in this "electric" atmosphere.

Activate Your Creative Spark

1-800-531-5770
1-800-292-5106
(in Texas)

DATAPOINT offers excellent salaries and a chance to shine with the brightest software engineers in the country. We also offer a relocation package that is one of the best in the industry. Call our toll free number anytime 24 hours a day or send your resume to: Technical Recruiter, Datapoint Corporation, 9725 Datapoint Dr., M/S D-05-BR, San Antonio, Texas 78284. We are an equal opportunity employer m/f/h.



SR. SYS. PROG.

$900M div. of est. org. seeks systematic, tech. sharp internals pro. IBM 4341 OS/MVS, BAL, SMP, SYSGENS, JCL Mgmt. req. Tech challenging role w/key respon. on sharp tech. team. $30,000.

[illegible]
100 Summer Street
Boston, MA 02110
(617) 439-1300

ASSOCIATE UNIVERSITY REGISTRAR
UNIVERSITY OF FLORIDA

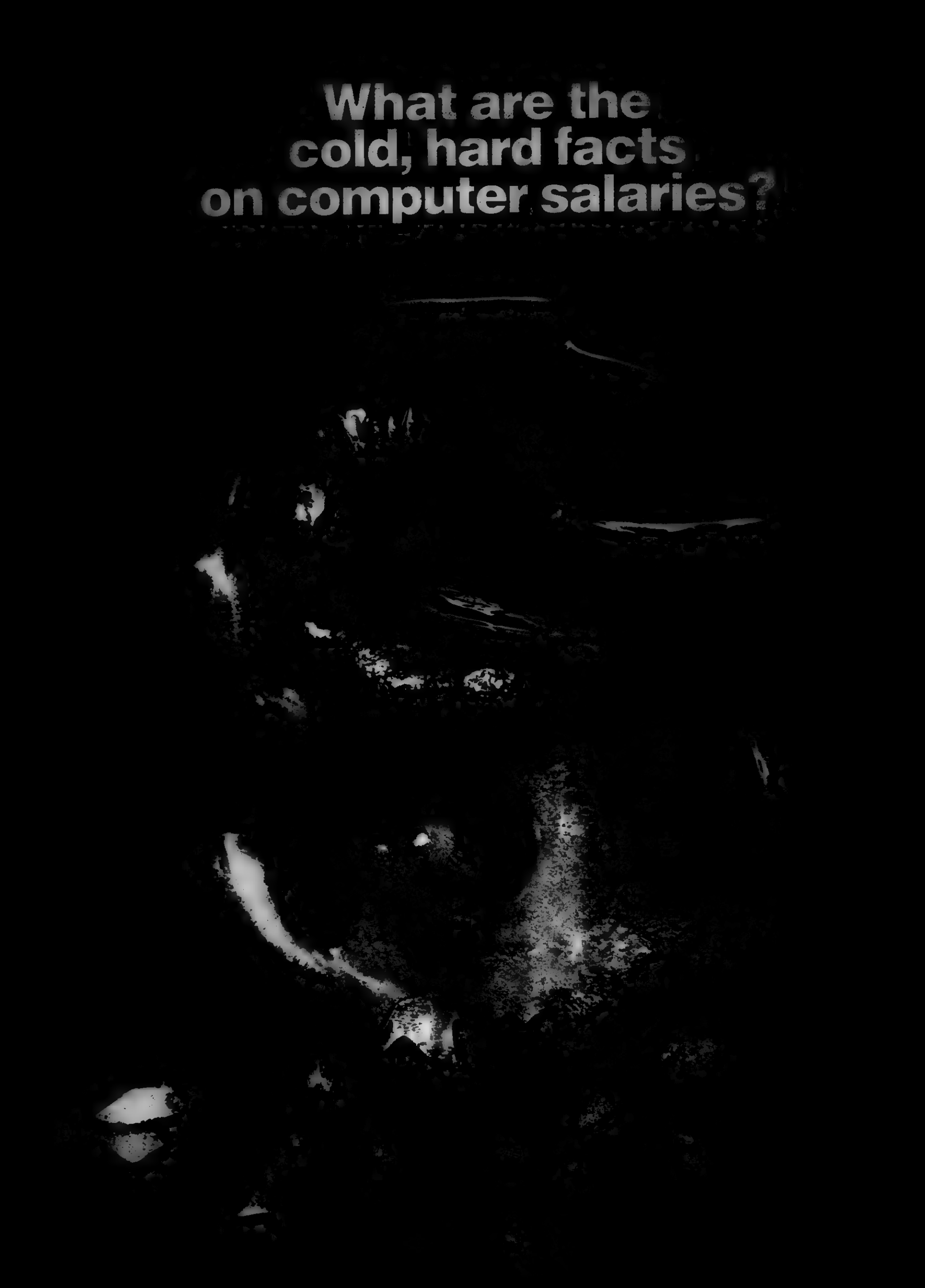
Associate Registrar for a large comprehensive University with a fully automated on-line admissions, registration and records system for an enrollment of over 34,000 students. Responsibilities include management of all records and registration functions including data processing for records and admissions. Must be experienced in the design, implementation and enhancement of complex on-line computer systems. Comprehensive management and personnel skills mandatory. The person in this position must supervise a diverse staff of over 50 people and coordinate activities with Deans and Department Chairs. Position requires a Bachelor's Degree and 5 years experience in admissions and registrations or records and registration, and college or university data processing techniques or other related areas. Salary negotiable in the range of $30,000 to $40,000. Send complete resume by February 20, 1984 to:

Dr. P. Jon Wise
University of Florida
[illegible]
Gainesville, FL 32611

University policy is to conduct all searches in the open subject to the guidelines of existing law.

EQUAL EMPLOYMENT OPPORTUNITY/AFFIRMATIVE ACTION EMPLOYER

What are the cold, hard facts on computer salaries?



Find out in our new, free Salary Survey.

No doubt during 1993, you knew that many organizations took a hard line on awarding liberal salary increases.

The effects of the salary freeze were felt by many computer professionals. Firms enacted across-the-board cuts, lowered compensation ranges for "new hires," restricted bonuses and benefits or set forth other policies to lower their personnel costs in countless situations.

Yet, on the other hand, did you know that salaries for *some* computer professionals *soared* right on through the uncertain business outlook?

A favorable climate for skilled professionals.

Our *1994 Computer Salary Survey and Career Planning Guide* will give you new insight on trends that impact compensation, provide current salary figures and review ways the computer profession will be affected in the future. It will also explain why many computer professionals are able to advance their careers more successfully than others.

In the new Survey, you'll learn how salary differences between computer professionals are becoming more pronounced than ever.

- How some professionals—performing the same work and having a similar amount of experience—are earning significantly more than their peers.
- Why some professionals now earn as much as 25% more than they did last year.
- What emerging skills are most in demand and which positions command high salaries now and in the future.
- How size of firm and computer installation greatly affects compensation levels.

Cold, hard data with helpful tips.

The new Survey is based on contacts with more than 44,000 computer professionals and 35,000 organizations. Not only are salary averages for fifty-eight positions reviewed (including ten new ones which we never before covered), but high and low compensation ranges are also covered.

Included are positions in programming, software, systems design, data base/data communications, Edp auditing, operations, computer sales, marketing, marketing support and management. The new 32-page Survey is available without charge.

Since 1966, this annual report has helped approximately a quarter of a million computer professionals understand current trends in technology and compensation, realize how and where they fit in and what they need to do to reach their fullest potential.

Source Edp is the world's largest recruiting firm devoted exclusively to the computer profession. Because each of our professional staff has had extensive computer experience prior to joining our firm, we are able to provide remarkable insight on computer careers.

You owe it to yourself—especially if most of your career lies ahead—to call or write for your free copy today.

Personnel Services

source edp®

The world's largest recruiting firm devoted exclusively to the computer profession.

Call Source™ today for your free copy.

Is your salary still frozen?

Call the Source Edp office nearest you for a free copy of our new 32-page report. We'll mail a copy to you in strict confidence, without obligation.

If unable to call, write:

Source Edp
Department CS3
P.O. Box 7100
Mountain View, CA 94039

When writing, please include your title.

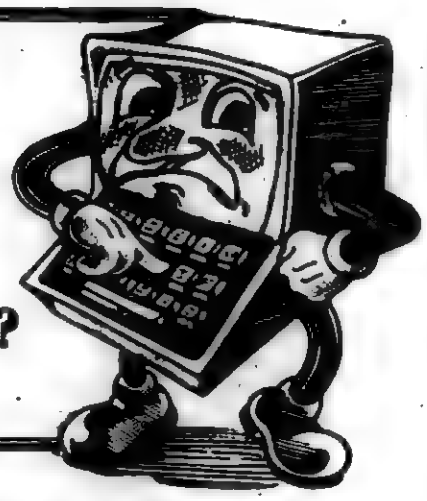
United States:

Alabama	
Birmingham	205/322-9745
Arizona	
Phoenix	602/279-1010
Tucson	602/792-0375
California	
Northern	
Mountain View	415/969-4010
Sacramento	916/446-3470
San Francisco	415/434-2410
Walnut Creek	415/945-1910
Southern	
Irvine	714/833-1730
Fullerton	714/738-1313
Los Angeles/ Downtown	213/688-6041
Los Angeles/ South Bay	213/540-7500
Los Angeles/West	213/203-8111
San Diego	619/231-1900
San Fernando Valley	818/781-4800
Colorado	
Denver	303/779-3200
Connecticut	
Danbury	203/797-0360
Hartford	203/522-6580
New Haven	203/787-4585
Stratford	203/375-7240
District of Columbia	
Washington D.C.	202/289-8255
Florida	
Fort Lauderdale	305/491-0145
Jacksonville	904/356-1520
Miami	305/624-3536
Georgia	
Atlanta	
Downtown	404/589-8350
North	404/953-0300
Illinois	
Chicago/E. Loop	312/861-0770
Chicago/W. Loop	312/346-1280
Oak Brook	312/986-0422
Rolling Meadows	312/392-0244
Indiana	
Fort Wayne	219/432-7333
Indianapolis	317/631-2800
Iowa	
Des Moines	515/243-8191
Kansas	
Overland Park	913/888-8885
Wichita	316/686-1621
Kentucky	
Louisville	502/581-0880
Louisiana	
Baton Rouge	504/924-7183
New Orleans	504/561-8080
Maryland	
Baltimore	301/727-4080
Greenbelt	301/441-8700
Towson	301/321-7044
Massachusetts	
Boston	617/482-7613
Burlington	617/273-5180
Wellesley	617/237-3130
Michigan	
Detroit	313/259-7857
Grand Rapids	616/459-8539
Lansing	517/484-4581
Southfield	313/352-6520
Troy	313/362-0078
Minnesota	
Minneapolis	
West	612/544-3828
Downtown	612/332-6460
St. Paul	612/227-6100
Missouri	
Kansas City	816/474-3388
St. Louis	314/862-3800
Nebraska	
Omaha	402/346-0709
New Hampshire	
Nashua	603/889-4047
New Jersey	
Cherry Hill	609/482-2808
Edison	201/494-2800
Morristown	201/267-3222
Paramus	201/845-3800
Princeton	609/452-7277
New Mexico	
Albuquerque	505/247-4270
New York	
Albany	518/462-2085
Buffalo	716/835-6630
New York City	
Grand Central	212/557-6611
Penn Station	212/736-7445
Wall Street	212/952-8000
Rochester	716/263-2570
Syosset, L.I.	516/364-0800
Syracuse	315/422-2411
White Plains	914/683-6800
North Carolina	
Charlotte	704/552-6577
Greensboro	919/379-1155
Raleigh	919/847-7805
Winston-Salem	919/724-0830
Ohio	
Akron	216/535-1150
Cincinnati	513/769-5080
Cleveland	216/771-2070
Columbus	614/224-0880
Dayton	513-461-4680
Toledo	419/243-3901
Oklahoma	
Oklahoma City	405/722-7418
Tulsa	918/599-7709
Oregon	
Portland	503/223-6180
Pennsylvania	
King of Prussia	215/265-7220
Philadelphia	215/665-1717
Pittsburgh	412/281-6540
Rhode Island	
Providence	401/751-0065
South Carolina	
Columbia	803/256-7449
Greenville	803/271-7044
Tennessee	
Nashville	615/259-0665
Texas	
Austin	512/479-0729
Dallas	
Central	214/954-1109
North	214/387-1600
Fort Worth	817/338-8300
Houston	
Downtown	713/751-0166
Galleria/Post Oak	713/439-0550
San Antonio	512/342-9888
Utah	
Salt Lake City	801/595-3000
Virginia	
McLean	703/790-0810
Washington	
Seattle	206/454-6400
Spokane	509/838-7577
Wisconsin	
Green Bay	414/432-1184
Madison	608/251-0184
Milwaukee	414/277-0345
Canada:	
Ontario	
Toronto	
Don Mills	416/425-5730
Downtown	416/865-1125
Mississauga	416/848-3044

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

SYSTEMS PROGRAMMERS

Do you feel "terminally ill" in your present position?



If all you do all day is "talk" to machines, maybe it's time to make a change. . .to cga

Cure your problem with an exciting new career at CGA. If you're comfortable working with people and enjoy the challenge of systems software development, please read on.

CGA Software Products Group is one of the largest systems software companies in the U.S. . We're dedicated to the development and support of state-of-the-art systems software products.

Work directly with our clients, in product support and assist them with any problems or questions that may arise. A minimum of 2 years experience with MVS BCP internals is essential as is good communications skills and the ability to deal professionally with people of all levels. Knowledge of multiple CPU related software, preferably MSI, MSM or GCD would be a major asset. Some travel to SHARE, CMG and GUIDE meetings is also necessary.

You will find that being a member of our team is highly rewarding. We offer a superior salary and benefits package including profit sharing, major medical/life/health/dental insurance, tuition reimbursement, and relocation assistance.

Why waste time, call Chris Blum collect at (201) 946-7500 to arrange an immediate interview, or send him your resume in complete confidence.

Specialists in the Software Industry

cga Software Products Group

960 Holmdel Road, Holmdel, New Jersey 07733

An Equal Opportunity Employer M/F

ASSIGNMENT OPPORTUNITIES IN EUROPE AND SOUTH AFRICA FOR DP PROFESSIONALS, BUSINESS ANALYSTS, ENGINEERS

GEC! is an internationally recognized consulting group who has earned a first class reputation in several countries in Europe, Africa and the Far East. Our insistence on excellence and integrity for our clients, and generous conditions and growth opportunities for our consultants, have ensured this success. For our continuing expansion in short and long term projects and training programs, we require

- DATA /BUSINESS ANALYSTS
- DB/DC PROFESSIONALS
- APPLICATION SPECIALISTS
- SYSTEM AND NETWORK PROGRAMMERS
- TECHNICAL COMPUTING ENGINEERS
- EXPERIENCED ANALYSTS/PROGRAMMERS
- TRAINING SPECIALISTS
- 8100 SPECIALISTS

If you are interested in our overseas positions, please send your detailed resume, professional and personal details and objectives, and earning expectations to:

GEC!

Head Office	Suite 407
Tour Winterthur	PO Box 10-626
Cedex 18	Carlton Centre
92095 Paris La Defense	Commissioner Street
France	Johannesburg 2000 SA
Telex ALSAG 612124F	S-3730 SA
Tel: (1) 778.79.49/1	(011) 331-3941

COMPUTER SCIENTISTS/COMPUTER SPECIALIST

Center for Programming Science & Technology of the INSTITUTE FOR COMPUTER SCIENCES AND TECHNOLOGY

Challenging opportunities to perform research, provide technical assistance in the use of new technology, and to develop technical standards and guidelines. Laboratory based environment, with advanced facilities that include VAX's, other UNIX based systems, database machines, and personal computers such as IBM and Apple Lisa.

Technical areas for which staff is currently needed include:

- Database Management Technology – Database Management Systems, Database Machines, Distributed Database Technology, Data Administration.
- Application Development Technology – Very High Level Languages, Program Generators, Advanced Software Development Environment.
- Knowledge-based Systems – Expert Assistance System Technology, Application to Software Development.
- Computer Security and Risk Management.
- System Architecture – Microcomputer Software Technology, Micro-Mainframe Link, Distributed Systems.
- Systems Programming – Database Laboratory Software Development.

Graduate degree in computer science or mathematics or equivalent experience with demonstrated ability to conduct research is required. Recent experience commensurate with Civil Service grade level in the area or areas of specialization is required.

The computer scientist positions range from GS-9 to GS-14 ($20,555 to $55,539) and the computer specialist position ranges from GS-12 to GS-15 ($30,402 to $46,587) depending upon qualifications and experience, and offer competitive salary, excellent career benefits, and other professional growth opportunities. Please send your Personal Qualifications Statement (SF-171) to:

U.S. Department of Commerce
National Bureau of Standards
Administration Building, Room A-123
Washington, D.C. 20234
ATTN: Ms. Jo White (640-CW)

The National Bureau of Standards is located in modern facilities in Gaithersburg, MD and is an equal opportunity/affirmative action employer. U.S. citizenship is required.

APS WANTS THE BEST... PROGRAMMER ANALYSTS

We are proud of our State and proud to serve Arizonans. As more businesses and industries locate here, Arizona Public Service Company faces increasing challenges. We welcome professionals who can help us grow.

Our Corporate Models Development Department has openings for Programmers with experience in Fortran, IMS, and TSO/SPF. A knowledge of PLI and SAS or Mark IV would be helpful. You would provide both design and development and support for our Decision Support, Financial Planning and Engineering Systems. 3 to 5 years experience on a large scale computer system is required.

Combine Arizona living with a dynamic career. Send your resume with salary requirements to:

V. L. Lim
ARIZONA PUBLIC SERVICE COMPANY
P.O. Box 21666, Station 1102 CW0123
Phoenix, Arizona 85036

An Equal Opportunity Employer M/F

APS. Arizona Public Service Company

FACULTY POSITIONS COMPUTER SCIENCE/ MATHEMATICS

Three positions are anticipated in the Mathematics and Computer Science Department for the Fall semester of 1984. One or more of the anticipated openings may become tenure track positions.

Applicants for the Computer Science positions must have at least a Master's degree in Computer Science and be prepared to enroll in a Ph.D. program. Applicants for the Mathematics positions must have a Ph.D. in Mathematics. Appointments will be made at the Assistant or Associate Professor rank commensurate with experience. Teaching responsibilities shall include upper-level undergraduate courses in computer science and/or mathematics, along with traditional introductory and service courses. Candidates with specified qualifications in both areas offer the greatest flexibility. New computing equipment currently being acquired will provide extensive support for separate administrative and academic systems.

Millersville University is the oldest of the 14 universities of the Pennsylvania State System of Higher Education. The campus is located in a suburb of historic Lancaster, oldest inland city in the U.S. Located less than three hours from New York City, Washington, D.C., and Philadelphia, it offers a pleasant atmosphere with easy access to the Jersey shore and the Pocono resorts. The department has 24 full-time faculty and offers a B.S. in Computer Science as well as the B.A. and B.S. degrees in Mathematics. Our programs are well respected in the region and have drawn highly motivated and able students.

Interested applicants should submit resume showing education and experience, transcripts of all graduate and undergraduate courses, and three letters of reference to: Dr. James A. Stager, Chairperson, Department of Mathematics and Computer Science, MILLERSVILLE UNIVERSITY, Millersville, PA 17551. Interviews will begin in mid-February and continue until suitable candidates are located.

Millersville currently seeks and is eager to receive applications from women and minority candidates. Affirmative Action/Equal Opportunity Employer.

Head, Library Systems Duke University

Duke University Libraries is seeking a strong individual to plan and coordinate the utilization of new technology to enhance Duke's present automated systems, while working toward implementation of an on-line, integrated library system. The position requires 3-5 years experience in analysis and programming, preferably in a library environment; demonstrated ability to plan, budget, analyze, program, work well with others, and communicate effectively both orally and in writing; documented knowledge of major computer programming language (COBOL experience with IBM or Tandem computers preferred), computer hardware, and library automation; supervisory experience and MLS from an ALA accredited program strongly preferred.

Duke has a superior benefits package and offers competitive salaries.

Letter of application and resume should be submitted to:

Library Personnel Office
210 Perkins Library
Duke University
Durham, North Carolina 27706

An Affirmative Action Equal Opportunity Employer

SYSTEMS PROGRAMMER

Aggressive Billion $, Sunbelt Bank, expanding its technical staff, seeks IBM Systems Programmer.

Our current environment includes RACF, JCS 2, CICS.

Candidate should possess application programming background and a minimum of three years 4341 MVS systems programming experience. Proficiency with SMP4 is a plus.

Send resume and salary requirements to:

Southern National Bank of N. C.
c/o Jerry M. Barnes
P. O. Box 1489
Lumberton, N. C. 28359

An Equal Opportunity Employer M/F/H/V

SOFTWARE ENGINEERS

OPTICAL DISK DEVELOPMENT OPPORTUNITIES

Storage Technology Corporation has announced the first high-performance optical data storage product for high-level electronic data processing. In only 14 years of existence, Storage Technology has grown from a minor supplier of computer peripherals to an industry leader with over $1 billion in sales. Located at the base of the beautiful Rocky Mountains near Boulder, Colorado, the Optical Disk Division has current needs for:

SENIOR MVS SOFTWARE DEVELOPMENT ENGINEERS

Primary responsibilities will include the design and implementation of data management software for the Optical Storage product line. The ideal candidate will be knowledgeable in MVS Architecture, proficient in 370 Assembler language and have direct experience with MVS internals.

TEST/STAFF TEST ENGINEERS

You will be part of a UNIX Programming team involved in the design and implementation of a large scale automated test floor software system written in the C language. Expertise in any or all of the following areas is required: design and implementation of database management systems, manufacturing systems, quality assurance systems, and local area networks. Knowledge of MVS/VM and computer hardware is desirable. BSCS or equivalent is required. Salary and grade will be commensurate with experience.

So, if you like challenging problems, high technology, an atmosphere of experienced professionals and the fast growing future of one of the most dynamic companies in the field, please call Dan O'Reilly collect at (303) 673-3034 or forward your detailed resume to his attention, Storage Technology Corporation, MD FF, Dept. 0123, #16, 2270 South 88th Street, Louisville, Colorado 80028. Equal Opportunity Employer.

Storage Technology

COMPUTER APPLICATIONS ANALYSTS

Mobil

Mobil Exploration and Producing Services Inc. (MEPSI) provides programming and data processing support to Mobil Oil Corporation's exploration and producing activities worldwide. Several openings are immediately available for experienced, preferably technically oriented, computer applications analysts/programmers. As a member of the Technical Applications Support Group, you will be involved in challenging assignments in support of our engineering and other technical departments.

Preferred candidates should possess:

- Minimum 3-5 years of technical programming experience or equivalent credentials. Oil & Gas industry experience desirable.
- High proficiency in use of IBM OS and/or VM computer systems (MVS, CMS, TSO, FORTRAN, PL/I, JCL, Utilities, PANVALET, FOCUS).
- BS degree in mathematics, engineering, or other industry-related technical profession.
- Willingness to accept domestic/foreign travel assignments of short duration.

Responsibilities include:

- Interact with units in MEPSI and other worldwide divisions within Mobil to interpret application needs and provide user support.
- Design, develop, implement, and maintain computer programs supporting the various technical departments.
- Write user/programmer support documentation.

Mobil offers the salary and comprehensive benefits package that you expect from an industry leader. Qualified candidates should send their resume to: Carol Redeker, Employee Relations, Mobil Exploration & Producing Services Inc., Dept. CW 123, P.O. Box 900, Dallas, Texas 75221.

An Equal Opportunity Employer, M/F.

Recognition For Excellence

ADVISORY SYSTEMS ENGINEER AND SR. SYSTEMS ENGINEER

Become associated with a firm which recognizes excellence in its employees and rewards accordingly.

IN GTE DATA SERVICES,

Our information sciences organization in Tampa, Florida, is responsible for the development and deployment of architecturally compatible hardware/software systems integrating voice, data and text in a distributed data environment utilizing end user computing and intelligent workstations.

We are interested in individuals with:

- Demonstrated creativity, ingenuity, judgment and breadth of comprehension
- Capability to perform with minimal direction
- Demonstrated leadership qualification in Information Management techniques
- Excellent oral and written communication skills

Advisory Systems Engineer - Telecommunication Planning

5-8 years experience in:

- Voice Networking Strategies
- Data Networking Strategies
- Simulation Modeling
- SNA Networking
- X.25 Networking
- Satellite Communications
- LANS
- Network Management

Sr. Systems Engineer - Data Administration

3-5 years experience in:

- Logical Modeling
- Userview Consulting
- Data Standardization Consulting
- Logical Model Synthesis
- Information Center Consulting
- Global Model Consulting
- Information Systems Planning
- Data Administration
- Data Security
- Dictionary Administration

Candidates should have a masters or bachelors degree preferably in Mathematics, Computer Sciences, Engineering, or equivalent.

Please submit a detailed resume with salary history to N. Fitzpatrick, Personnel Representative, Dept. CW, GTE Data Services, P. O. Box 1548, DC 136, Tampa, Florida 33601. An Equal Opportunity Employer.

GTE Data Services GTE

Data Processing

Explore The Infinite Boundaries Of Telecommunications

With Northern Telecom In North Carolina

There's no limit to the imagination, and there's no limit to how far yours can take you with Northern Telecom. We provide a foundation of years of innovation, give full support to good ideas, and provide a creative atmosphere to generate those ideas. Turning the possible into the probable and the probable into reality has made Northern Telecom the leader in digital switching systems.

People who want to explore their potential are invited to consider these immediate opportunities:

Data Base Analyst: Requires BSCS or equivalent with 4 years experience in data base design and administration utilizing IBM 370 and HP 3000. (1130-JD)

Data Base Manager: Requires BSCS or equivalent with 10 years experience in data base design and administration utilizing IBM 370 and HP 3000. (1130-JD)

Senior Systems Analyst: Requires BSCS or equivalent and 5-plus years experience in manufacturing systems utilizing HP 1000. (1140-JD)

Engineer-CIM: BSCS/Math or equivalent and a minimum of 3 years experience in computer integrated manufacturing applications. Distributed systems graphics and IMAGE experience a plus. Familiarity with HP 3000 desired. (1130-JD)

Senior Engineer-CIM-CAD/CAM: Requires BSCS/EE or equivalent, MS preferred, and a minimum of 5 years experience in CAD/CAM and the use of robotics. Familiarity with machine vision and computer controlled industrial processes desired. (1130-JD)

Senior Engineer-CIM-Computer Communications: Requires BSCS/EE or equivalent, MS preferred, and a minimum of 5 years experience in the implementation of computer communications. Requires at least 3 years experience in HP distributed systems, specifically DS-1000. Knowledge of HP 1000 RTE internals strongly desired. (1130-JD)

Senior Staff Engineer-CIM: Requires BSCS or equivalent, MS preferred, and a minimum of 5 years experience with large real time systems. Familiarity with distributed systems and strong system integration skills are essential. HP 1000 experience desired. (1130-JD)

North Carolina is a place where you can enjoy the high-technology challenge along with a scenic drive in the gently rolling hills, the sight of early morning mist among the pines and the quiet beauty of the nearby Smokies. We'll pay for your relocation and provide you with competitive compensation. Send your resume in confidence to the address below.

TO EXPEDITE CONSIDERATION, PLEASE INCLUDE THE CODE WHICH APPEARS AFTER THE POSITIONS OF INTEREST TO YOU ON THE FRONT OF YOUR MAILING ENVELOPE.

Manager, Professional Staffing-CW-123
Northern Telecom Inc.
P.O. Box 13818
4001 E. Chapel Hill-Nelson Hwy.
Research Triangle Park, N.C. 27709
An equal opportunity employer m/f/h/v

We hire talent

nt northern telecom

AMERICAN DIVERSIFIED

American Diversified Information Systems Division currently operates a 100-user network on VAX 11/780 equipment. We need highly motivated professionals to help expand our VAX cluster to a network serving over 1000 users nationwide by 1985. Our unique data center makes use of state-of-the-art hardware data base processors and the latest cluster and ETHERNET technologies. We currently have the following needs:

MANAGER, SYSTEMS DEVELOPMENT

Degreed professional with 6 years' data processing experience to supervise systems programming team, monitor system performance, maintain computer security and assist in hardware/system software selection and implementation. B.A. degree.

MANAGER, APPLICATIONS DEVELOPMENT

Full responsibility for corporate applications development. Must have 5 years' experience as skilled manager with heavy project planning, capable of supervising a team of systems analysts and programmers. Perform project planning, estimating and control. B.A. degree.

MANAGER, HARDWARE AND COMMUNICATIONS

Hardware and communications expert with a B.S. or B.A. in electronics and experience in the computer field to manage technicians team installing and maintaining computer, peripheral, telephone and communications equipment in our Costa Mesa based corporate office and area offices nationwide.

SYSTEMS PROGRAMMER

Thorough understanding of VAX internals to create and maintain system software, utility programs and application subroutine libraries. Will perform data base design, monitor overall system performance and provide technical assistance to the application programming staff.

SENIOR SYSTEMS ANALYST

Surveys, identifies and evaluates user requirements including developing building/contractor applications, requirements, program specifications, schedules, training materials, support and maintenance. Must be experienced in make/buy decisions and vendor negotiations.

PROGRAMMER/ANALYST

Performs detailed program design and implementation. Ability to assist in systems specifications and design preparation desirable.

SUPERVISOR, COMPUTER OPERATIONS

Computer operations experience should include shutdown/startup and system/users maintenance. Requires 2 years' college, 5 years' data processing experience and 3 years as computer operations supervisor. Requires knowledge of DCL command language.

ELECTRONICS TECHNICIAN

Knowledge of digital circuits and familiarity with oscilloscope and data line monitor for troubleshooting and diagnosis. This position involves installation and maintenance of terminals, modems, data concentrators, printers and other digital equipment.

Please send resume with salary history to:

Donna Mize
AMERICAN DIVERSIFIED COMPANIES
3200 Park Center Drive – Suite 1500
Costa Mesa, CA 92626

PROJECT MANAGER

Are you an MIS professional seeking the "leading edge" where the company's concern for the bottom line has been translated into a need to implement new and innovative information processing strategies? Join an MIS organization where keeping current with technology and strategy planning are considered key to solving business problems effectively. Take part in merging data processing, office automation and personal computing requirements into an integrated reality.

If you're a self-starter who feels a career is worth a little extra effort and have 4-10 years experience in designing, programming and installing manufacturing, marketing or financial applications, we're interested in interviewing you. S/34 and MAPICS experience a plus. Programming languages: COBOL, RPG and BASIC.

Nalge, an innovative division of Sybron, offers competitive compensation and benefit packages. Are you up to the challenge of the opportunity? Interested and qualified candidates should submit resume in confidence to:

Barbara McGraw
NALGE COMPANY
Division of Sybron Corp.
75 Panorama Creek Drive
Rochester, NY 14602

Nalge SYBRON

We Are An Equal Opportunity Employer M/F

DIRECTOR COMPUTING AND INFORMATION SERVICES

THE UNIVERSITY OF GEORGIA

The University of Georgia invites applications and nominations for Director of the Office of Computing and Information Services. Responsibilities include management of the computing facilities (an IBM 3081D, two IBM 3081Ks AP systems, two VAX 7870's, a CDC CYBER 855, a CDC CYBER 750, and a CDC CYBER 205), and a staff of 95. Qualified applicants should have at least five years supervisory and managerial experience in a large academic computing facility, a working knowledge of telecommunication networks and distributed data processing, appropriate technical background in computer systems and their uses, excellent oral and written communications skills, and should hold a degree from a recognized institution of higher education. Please submit resume, with references and salary requirements, postmarked by March 1, 1984 to: Dr. James B. Kennedy, Chairman, Screening Committee, Assistant to the President-Administration, The University of Georgia, Old College, Athens, GA 30602.

An Equal Opportunity, Affirmative Action Employer

ROBERT HALF

FLORIDA

Here's your chance to avoid the snow and cold.

PA - DOS/VS/COC/COBLAPG	$25K
TECH MGR - MVS/VSE/SYSGEN/4	$30K
PA - DOS/VSE/COC/LAN/ICWS	$24K
JR DBA - IMS/ULTILITIES	$22K
SYS PROG - MVS/SYSGEN/CICS/4	$30K
PA - OS/MVS/IMS/COBOL	$28K
PA - DOS/VSE/IMS/4	$28K
PA - MVS/COC/LAN/ICWS	$28K
TECH SUPP - GCOS 3 or 6/66	$22K
PROG SUPP - DOS/VSE/HOSPITAL	$20K
PA - SYS/34 - MAPICS - RPG II	$28K
DBA - IMS and mainframe	$28K
SYS PROG - VM/SYSGEN/4 yrs	$28K
DBA-HONEYWELL/IDS BOM II	$28K
SR PR - TANDEM/TAL/COBOL	$28K

Many others to choose from. All fees and relocation paid. Mail resume to or call collect:

STAN ALLEN
ROBERT HALF
OF TAMPA, INC.
1211 N. Westshore Blvd.
Tampa, FL 33607
(813) 879-6161

SYSTEMS PROGRAMMER

Southeast Location

Our company's outstanding growth in a manufacturing field has created an excellent career advancement opportunity for a Systems Programmer. This position includes responsibilities for installation, modification, and tuning of systems software, including: MVS, VTAM, JES, ROSCOE and TSO.

Qualified candidates should possess 3-5 years experience in systems programming, including exposure to IMS DB/DC systems, communications techniques and job entry subsystems.

We offer an excellent salary and benefits package. If your experience matches our requirements, we'd like to hear from you. For further information, send your resume and salary requirements to:

CW-84334
Computerworld
Box 880
Framingham, MA 01701

Equal Opportunity Employer M/F

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

Operations Manager
Anchorage, Alaska

Planning Research Corporation, the world's largest diversified professional services firm currently has a position available for an Operations Manager to be based in Anchorage, Alaska.

Duties will include direct supervision over technical staff and all phases of operation including computer operations, tape library functions, data control functions and data entry functions. Experience on Burroughs medium systems is a plus but not required. Full range of benefits offered.

For immediate consideration CALL John Wright COLLECT at (907) 271-4878 or, forward your resume to:

prc
Planning Research Corporation
701 C Street, Box 60
Anchorage, AK 99513

An Equal Opportunity Employer M/F/H/V

ASSISTANT DIRECTOR OF ACADEMIC SERVICES
UNIVERSITY OF NEVADA SYSTEM COMPUTING CENTER
(Position located on the University of Nevada Las Vegas campus)

This professional position supervises full time professionals engaged in faculty instructional academic computing and operation support software and documentation functions for the UNSCC's Academic site. The Academic site provides computing power for academic classes statewide, on machinery which includes a CDC CYBER 170, 2 Harris H-800's, and a DEC VAX 11/780.

The successful candidate will have at minimum a Master's Degree (with Ph.D preferred) and significant computer experience in the area of educational delivery. Experience in software support, documentation functions, and the supervision of others will also be considered.

Application deadline: March 9, 1984.

(Position to be filled on or before July 1, 1984)

Send resume and salary requirements to:

Mark Reed, Acting Director
University of Nevada
System Computing Center
Southern Nevada Facilities
4505 Maryland Parkway
Las Vegas, NV 89154

Copies of transcripts and three letters of recommendation will also be required for a complete application.

The University of Nevada System is an equal opportunity/affirmative action employer, and does not discriminate on the basis of race, creed, color, sex, age, national origin, handicap, or veterans status in any program or activity it operates.

SOFTWARE SPECIALISTS
WITH DIGITAL, YOU'LL SUPPORT NEW PRODUCTS THAT YOU HELP DEVELOP.

CALL (404) 953-0959, COLLECT MONDAY-FRIDAY, JANUARY 23-27, FROM 9 A.M. TO 5 P.M.

Learn how you can work at Digital's Customer Support Center in Atlanta. Field test new products and support product planning. Interact with design engineers. Help influence the final forms new products take. And then provide phone support to users of Digital's microcomputers over a vast range of scientific and engineering applications.

We are looking for Micro Specialists to provide MICRO-POWERED / PASCAL, VAXELAN, and DEC-PRO-11 support to customers, sales reps, and field specialists.

To qualify for these positions, you should have a B.S. in Electrical Engineering, Math, Computer Science, or equivalent and at least 2-4 years' experience developing software applications on micro-computers. You must have RSX-11 or VMS and RT-11 experience.

We are looking for Laboratory Specialists to provide support to engineers and scientists.

To qualify for these positions, you should have a degree in Electrical Engineering, Math, Computer Science, or equivalent and at least 2-4 years' experience developing software applications on micro-computers. You must have RSX-11 or VAX/VMS experience and knowledge of FORTRAN and BASIC. Knowledge of PC-350, PDP-11 hardware, or MACRO is desirable.

If you join us, you'll be rewarded with the fully competitive salary, excellent benefits, and unparalleled advancement opportunities only Digital, the world's second largest computer company, can provide.

So, if you want to support new products that you've helped develop, Digital wants to hear from you.

Call (404) 953-0959, collect, Monday-Friday, January 23-27, from 9 a.m. to 5 p.m:

Or, if you can't call, send your resume to: Employment Office, Digital Equipment Corporation, Dept. 0123 3804, 360 Interstate North Parkway, Atlanta, GA 30339.

We are an affirmative action employer.

digital™

Come to New Hampshire!

SYSTEMS PROGRAMMER

Our expanding Data Center is looking for an addition to its Technical Support staff. The ideal candidate will have at least 2 years experience in database and data communications.

CICS and IDMS experience a plus.

Systems configuration: IBM 3083 MVS/SP, CICS, JES2 IDMS.

Please send resume with salary history or complete confidence to:

Personnel Director

HOWARD JOHNSON COMPANY
The Netherlands Insurance Company
82 Maple Ave., Keene, NH 03431

SYSTEMS PROGRAMMER

Cerro Metal Products a leading non-ferrous metal producer has an immediate opportunity available for a Systems Programmer. Individual must have IBM 4341, DOS/VSE-/CICS/DL-1 and Assembler language experience. Degree preferred.

Located near Penn State University in beautiful central Pennsylvania mountains we offer an excellent fringe benefit package. Submit resume and salary history in confidence to:

Thomas J. Hagan, Manager
Industrial Relations
CERRO METAL PRODUCTS
P.O. Box 388
Bellefonte, PA 16823

CERRO

Dunhill Means Data Processing Professionals

At Dunhill of Charlotte our only business is finding the right people for the job. We represent many of the largest and most respected corporations across the country. That's why we can offer the busy data processing professional the opportunity to explore the job market without doing any more than simply working as a resume.

We are not asking you to make any commitment. There is never a fee with Dunhill of Charlotte, and all matters are held in strict confidence. What more could you ask for? We will also keep you up to date on industry trends and current salary ranges in the DP area.

Keep your career running in high gear by letting Dunhill of Charlotte find the opportunity you have been searching for as a professional. We want to go to work for you today! We specialize in the placement of Programmers, Analysts and Systems Programmers in the Carolinas and throughout the beautiful Southeast and Southwest. Give us a call now, or send your resume to:

Karla Reichle, CPC
Data Processing Consultant
6401 CARMEL ROAD
SUITE 107
CHARLOTTE, N.C. 28226
1-800-438-3913
In North Carolina, call collect (704) 542-0312

Dunhill of Charlotte, Inc.

An Equal Opportunity Employer M/F

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

- **SYSTEMS ANALYSTS**
- **ANALYST PROGRAMMERS**
- **PROGRAMMERS**
- **TECHNICAL SUPPORT**
- **FIELD ENGINEERS**
- **QUALITY ASSURANCE ANALYST**
- **TRAINING SPECIALIST**
- **SENIOR STAFF ANALYST**

We are changing the way America shops...through our "State of the Art" systems. Incorporated in 1970, we have grown to a "Fortune 500" Company with 158 Catalog Showrooms located in 31 states. Our revenues exceed 1.4 BILLION DOLLARS. A major factor in our remarkable growth has been the commitment to computer based "Total Systems Solutions."

We have opportunities for highly qualified EDP professionals in the following areas:

__DATA BASE - Design, Implementation and Data Administration in a DBIV-TP Environment

__DISTRIBUTION - Distributive Inventory Management, Transport Optimization, Automated Materials Handling, Space Utilization

__SHOWROOMS - In-store Inventory Management and Reporting, Financials, Personnel, State-of-Art Point-of-Sale with Complex Telecommunications Interfaces

__FINANCIAL - Fixed Assets, Cash Management, Automated Payables, General Ledger, Payroll, Accounts Receivable

__MERCHANDISING - Advertising, Replenishment, Product Class, Purchase Orders, Transfers

__SYSTEMS SOFTWARE/PROGRAMMING - Honeywell DPS-8 (Dual 6/70's), DPS-6 (Dual 6/70's) under GCOS-6/MOD, DPS-6/47 under GCOS 6-6/MOD, DPS-6, and Stratus Non-Stop

__PLANNING - Data Hardware and Software - Resources Evaluation, State-of-the-Art Technology Assessment, Product Reviews, Long-Range Planning

__QUALITY ASSURANCE ANALYST - Perform QA reviews on new Development Projects, Develop and Implement Systems and Programming Standards

__TRAINING - Professional Instruction for COBOL, BASIC, Structured Design, DBIV-TP and Data Base Design

__STAFF SUPPORT - Provide Operational Analysis, Budget and Expense Control, Planning and Administrative Support to MIS Organization

Applicants with college training in Computer Science or Business Information Systems desired, and a minimum of 2 years experience in Systems and Programming. Proficiency in BASIC and COBOL is required.

We also have openings for qualified

- **FIELD ENGINEERS**

The successful candidates will have experience with Hard Disks and Digital Logic Circuits.

We offer an above-average salary, commensurate with experience. Our Benefits Package includes Major-Medical, Hospitalization, Dental, Optical & Life Insurance, Retirement Plan, Profit Sharing, PAID RELOCATION, and much more.

SERVICE MERCHANDISE COMPANY, INC.

Send confidential resume with salary history, to:
Daryl Searcy, Manager of MIS Recruitment
P.O. Box 24600 (CW)
Nashville, TN 37202
Equal Opportunity Employer M/F/H/V

The Best And The Brightest Data Processing Professionals . . .

. . . have always found solid rewards and diverse challenges at CIBER. We're a respected Data Processing Consulting Firm that delivers a variety of applications development and software conversion services to our customers across the nation.

Currently we have positions for those who can work in a vertical capacity meaning analysis, programming, implementation and documentation with emphasis toward IDMS, IMS, CICS and many other state-of-the-art packages.

At CIBER, we respect your talents and efforts and encourage you to advance in your career. Our promotion from within policy, excellent compensation and attractive benefits package provide the stimulation to achieve your career objectives.

Our branch offices are located throughout the United States: Atlanta, Chicago, Dallas, Denver, Detroit, Houston, Phoenix, Sacramento, St. Louis, and Tulsa.

Call us collect or send your resume to:

CIBER

Personnel Resources
67 E. Weldon, Suite 121
Phoenix, Arizona 85012
(602) 264-6611

..."The Data Processor's Choice"

Florida's First Coast
Jacksonville, Florida

DATA CENTER MANAGER

Data Center specializing in bank processing, looking for the right person with a blend of experience and aggressiveness to continue our success in bank processing, EFT and ATM Networks.

NCR CIF/FOCIS experience mandatory. Send resume and salary history to Jon Thurman, 1565 Atlantic Blvd., Jacksonville, Florida 32207.

IBM PROGRAMMERS - ANALYSTS

The positions below reflect a portion of the active openings for which we are recruiting. They are with Fortune 500 and large regional firms across the country, with many openings in the Southwest.

BANKING
Sr. Systems Analyst - Hogan-Cash Mgmt. $35-38K
Programmer/Analyst CICS (COMMAND & MACRO) $28-30K

INSURANCE
Systems Analyst 5/7 yrs COBOL-IMS/VS, CICS/VS $35-40K
Programmer/Analyst 3/5 yrs COBOL-CICS/VS $28-32K

MANUFACTURING
Senior Analyst OS/VS COBOL - Mfg exps. $35-40K
Programmer/Analyst OS/VS IMS/VS - Mfg exps $28-34K

TECH. SUPPORT
Systems Programmer OS/MVS-CICS $35-38K
Systems Programmer - VM GURU $35-44K

Client companies assume all fees - including interviewing and relocation costs. Installations are "State of the Art" and offer excellent career path progression. Forward your resume now or call collect for additional information.

"Steve" Stevenson, Partner
Jim King and Associates

1000 Gulf Life Tower/Jacksonville, Florida 32207
(904) 396-7371

Software Promotion and Licensing Position Available

A Senior Research Engineer position is available for promoting, marketing, and licensing high-tech simulation engineering and project management software. An M.S.C.E. degree is required. Five or more years experience in engineering/computer applications is required. Experience in business aspects of engineering consulting and contracting is highly desirable. Salary commensurate with experience. Send resume, references, current salary, and availability information to: Dr. L. J. Sutton, School of Civil Engineering, Georgia Institute of Technology, Atlanta, Georgia 30332. Georgia Tech is an Equal Opportunity/Affirmative Action Employer.

Central Region and Western Region
Sales Manager

Growing CRT manufacturer seeking aggressive individuals with minimum of 5 years selling experience. Successful applicants will be responsible for sales to distributors, dealers, OEM's, and manufacturers' representatives. Heavy travel. Send resume and salary requirements to:

Micro-Term, Inc.
512 Rudder Rd.
Fenton, Missouri 63026
Equal Opportunity Employer

Systems Programmer

National manufacturer in western Kentucky needs a Systems Programmer. Position requires 2 years of systems programming experience with DOS/VSE and CICS. Experience with VM, COBOL, Assembler, process control and microprocessors would be beneficial.

Offering competitive salary, excellent benefits, and growth opportunity. Send resume and salary requirements to:

CW-84345
Computerworld
Box 880
Framingham, MA 01701
An Equal Opportunity Employer

SYSTEMS ANALYST - Design & development of industry specific computer based decision support systems for industrial efficiency. Develop relational database for all E gas companies using the CUEL/SCL language. Use C language to integrate existing microcomputer software products. Design & develop an integration of E gas accounting system. Consultancy in industrial surveillance & measurements. Design & develop hardware & software support systems. Requires: M.S. degree of equiv. in Industrial Engineering, 1 yr job experience or 1 yr experience in related completion of microcomputer software design necessary. Exp. with hardware & software support systems. Exp. in Decision Support Systems, knowledge of SCL/CUEL language, knowledge of C computer language, knowledge of Specialized Networks. Prep. questionnaire to work, 40 hrs/5 days (Mon to Friday) per week. APPLY TO: Texas Employment Commission, Dallas Texas, or send resume to Texas Employment Commission, TEC Building, Austin, Texas 78778. Job #3911064. An Equal Opportunity Employer.

APL San Francisco, Los Angeles, Atlanta, Boston
UNIX & C Northern Calif., Pacific N.W., Colorado

Career Opportunities to 48K

Career Opportunities to 36K

SUNDAY & ASSOCIATES
3741 17th St.
OAKLAND, CA 94612
(415) 893-8711
[Home of The Sunday News]

CALIF. & UNIX*
Openings in a variety of areas and disciplines.
(714) 891-UNIX*
CPU COMPUTER PROFESSIONALS UNLIMITED, agency
7411 Garden Grove Blvd.
Ste. B, Garden Grove, CA 92641
*UNIX is a trademark of Bell Laboratories

DIRECTOR OF INFORMATION SYSTEMS

American Council of Life Insurance seeks experienced individual to manage an expanding data processing operation and coordinate the planning and implementation of user oriented information and office systems throughout the organization. Experience with IBM System/38 required. Candidate must have demonstrated technical competence in computer operations, systems software and application systems development and maintenance. Additional requirements include minimum 7-10 years of data processing experience, prior management of equipment and manpower resources and proven ability to interact with top management. Salary commensurate with experience. Excellent benefits and downtown location convenient to subway. Send resume with salary requirements to:

Personnel Department
American Council of Life Insurance
1850 K Street NW
Washington, DC 20006

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

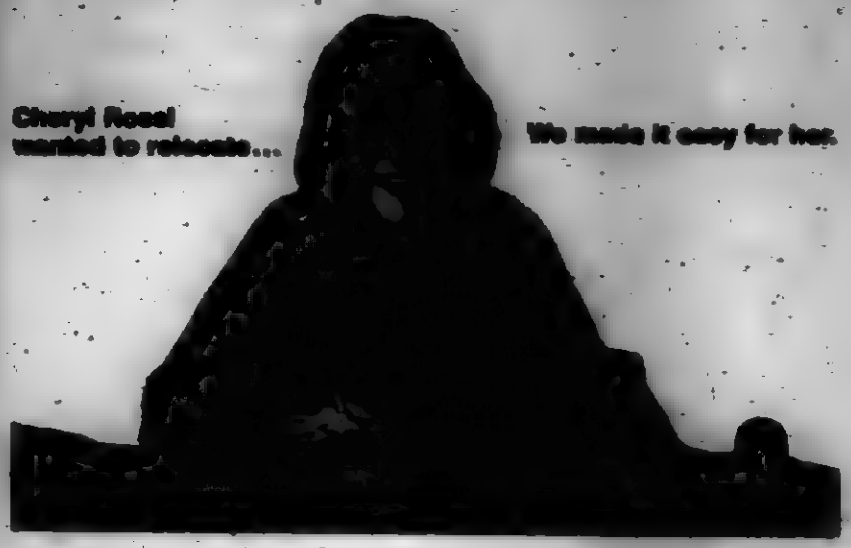
FIRST CLASS PERMIT NO. 709 FRAMINGHAM, MA 01701

postage will be paid by

CIRCULATION DEPARTMENT

COMPUTERWORLD

375 Cochituate Road, Rte. 30
Box 897
Framingham, MA 01701-9985



Cheryl had wanted, for a long time, to move to another city clear across the country. Her problem was that she lacked information about wage levels, cost-of-living expenses, housing, etc. Also, she was not sure of the best way to find a good EDP position in her preferred city.

She had gone to other placement firms that were not nationally structured to help her. Then she came to us... and we made it easy for her. We contacted our affiliated office in her preferred city, got all of the information she needed on wage levels, cost-of-living expenses, housing, etc. We also arranged five employment interviews for her. She accepted an EDP position she felt was ideal for her, and her new employer paid all her interview and relocation expenses.

We can do the same thing for you, as we have done for thousands of others. Come in. Call. Or mail your resume to the firm nearest to you. Confidentiality is assured. Company clients assume our fees.

ATLANTA: BAI Limited
235 Peachtree Street, Suite 1604-C
Atlanta, Georgia 30303 (404) 581-0945

BOSTON: Robert Kaven and Co., Inc.
North Beach Park, Suite Dpg, 181 Bedford Street
Lexington, Massachusetts 02173 (617) 861-1555

CHICAGO: Thos. Hintz & Associates
150 N. Wacker Drive, Suite 1700
Chicago, Illinois 60606 (312) 977-1600

COLUMBUS: Michael Thomas, Inc.
65 E. Wilson Bridge Road, Suite 291
Worthington, Ohio 43085 (614) 846-6660

DALLAS: DataPro Personnel Consultants
12720 Hillcrest, Suite 520
Dallas, Texas 75230 (214) 661-8800

DETROIT: Electronic Systems Personnel, Inc.
3000 Town Center, Suite 2580
Southfield, Michigan 48075 (313) 353-5150

FLORIDA: Data Sciences Personnel, Inc.
P.O. Box 8577
Hollywood, Florida 33084 (305) 491-8112

HARTFORD: Compass, Inc.
990 Asylum Avenue
Hartford, Connecticut 06105 (203) 549-4249

HOUSTON: Career Consultants, Inc.
2800 South Post Oak
Houston, Texas 77056 (713) 626-4100

INDIANAPOLIS: Computer Personnel Services, Inc.
107 N. Pennsylvania
Indianapolis, Indiana 46204 (317) 634-4712

KANSAS CITY: D. P. Career Associates
6405 Metcalf, Suite 502
Shawnee Mission, Kansas 66202 (913) 236-6200

LOS ANGELES: Superior Resources, Inc.
Personnel Service
17141 Ventura Boulevard, Suite 200
Encino, California 91316 (213) 986-4488

MILWAUKEE: EDP Consultants, Inc.
7332 West State Street, Suite 3
Milwaukee, Wisconsin 53213 (414) 475-6977

MINNEAPOLIS: Electronic Systems Personnel
858 Twin City Federal Tower, 121 S. 8th St.
Minneapolis, Minnesota 55402 (612) 339-6744

NEW JERSEY: Systems Search
80 Millburn Avenue
Millburn, New Jersey 07041 (201) 761-4488

NEW YORK: Data Associates, Inc.
7 Dey Street, Suite 410
New York, New York 10007 (212) 227-7070

NEW YORK UPSTATE:
CPA Associates Personnel, Inc.
2530 James Street
Syracuse, New York 13206 (315) 463-5325

NORTH CAROLINA: DataMasters,
Div. of TaskForce, Inc., PO Box 6668
Greensboro, North Carolina 27405
(919) 373-1405

PHILADELPHIA: Systems Personnel, Inc.
115 West State Street
Media, Pennsylvania 19063 (215) 565-9850

PHOENIX: Professional Career Consultants
4520 North 17th Street, Suite H101
Phoenix, Arizona 85016 (602) 274-6565

SAN FRANCISCO: The Computer Resource Group, Inc. Agency 303 Sacramento Street
San Francisco, California 94111 (415) 398-5330

SEATTLE: Hoover, Martin, Morris & Associates
1040 116th Avenue N.E.
Bellevue, Washington 98004 (206) 453-2700

WASHINGTON D.C.: EDP Systems Corporation
914 Lanterton Drive
Silver Spring, Maryland 20902 (301) 649-8171

Call the NCA firm nearest to you for Salary Survey and Relocation Information

National Computer Associates

EDP Placement Firms in Baltimore, Cleveland and St. Louis can learn about the many advantages of being members of National Computer Associates by calling Josh Todd (602) 274-6565

Applications Programmer/Analysts

The Computer Services Department of a major oil and gas firm is currently looking for several Applications Programmer/Analysts.

Candidates applying for either of the positions below should meet the following qualifications:

•A college degree in Computer Science, Mathematics or Business is preferred.

•A familiarity with a large scale IBM installation.

COBOL PROGRAMMER/ANALYSTS

•2-5 years experience in Business Applications utilizing COBOL is required.

•Good working knowledge of IBM JCL, TSO/SPF, PANVALET, IMS or ADF is a definite advantage.

GRAPHICS PROGRAMMER/ANALYSTS

•2-5 years experience in Graphics Applications utilizing FORTRAN or PL/1.

•A good working knowledge of IBM JCL, TSO/SPF, PANVALET, or D13000 is an asset.

Our client offers excellent starting salaries and career opportunities along with a convenient location in Southwest Houston. A comprehensive benefit package which includes health/dental insurance and savings/stock bonus plan is provided.

Please send resumes to file #0114, 7676 Woodway, Suite 264, Houston, Texas 77063. List separately any organizations to which your resume should not be sent, thus assuring your confidentiality.

Bernard Hodes Advertising
CONFIDENTIAL REPLY SERVICES

FACULTY POSITIONS IN COMPUTER AND INFORMATION SYSTEMS BLOOMSBURG UNIVERSITY

The Computer and Information Systems Department at Bloomsburg University has full-time, tenure-track positions available in the Fall, 1984. Opportunities exist for teaching, curriculum development, academic advisement and serving as departmental chairperson. Qualifications: an earned doctorate or an A.B.D. with a major in Information Systems; dissertation in the computer field; teaching and/or industrial experience desired.

Send detailed resumes and names of three references to: Chairperson, CIS Search and Screen Committee, Bloomsburg University, Navy Building, Box 1784, Bloomsburg, PA 17815 postmarked by April 15, 1984.

Bloomsburg University is located in Northeastern Pennsylvania. It is a one-hour drive to the Pocono Mountains, three hours to New York or Philadelphia and an easy drive to all of New England and Canada.

Bloomsburg University is an AA/EOE. Minorities are especially urged to apply.

Systems Programmer

A Research Scientist I position is available in the advanced systems development group of the GTRI/ES Systems Laboratory at Georgia Tech. Applicants must have an undergraduate degree in Computer Science and demonstrable skills working with mini and micro computers and in the C programming language. Experience using one or more of the following computers will also be considered: EMMA/20, DEC/VAX, DG/AV, HP/9000 and WICAT. Salary range is $22,000 to $27,000 depending upon experience. Applicants must be available starting in March 1984. Send resume (including names of references) and transcript of college grades to:

Mr. David B. Gibson
School of Civil Engineering
GTRI/ES Systems Laboratory
Georgia Institute of Technology
Atlanta, Georgia 30332-0355

Georgia Tech is an Equal Opportunity/Affirmative Action Employer.

UNIX*/C
$25,000 to $50,000
APPLICATIONS & SYSTEMS
Over 200 Openings Nationwide
Client co's pay all fees
Call or send resume
in confidence to:
J. ROGERS ASSOC
(609) 771-0202
2309 Princeton Pike, Dept C-D
Lawrenceville, NJ 08648
*UNIX is a trademark of Bell Labs

SAUDI ARABIA

SYSOREX INTERNATIONAL, a California Corporation and a rapidly growing systems management company now developing innovative multi-technology systems in Saudi Arabia has the following challenging positions:

DP PROJECT PLANNER

BS in computer science or related field. Minimum of 5 years experience involving data processing project planning, scheduling, customer relations, and management of computer operations or systems and programming groups. Must be familiar with CPM scheduling methods, project organization, presentation and training techniques. Must have demonstrated ability to work with senior management.

Responsibilities: develop and maintain detailed project schedules including computerized CPM schedules, distribute and explain project plans and schedules to project personnel, brief project manager on project status, and will assist project manager with liaison duties and client relations.

MVS SYSTEMS PROGRAMMER

BS in Computer Science or equivalent curriculum required. Minimum 4 years experience as a MVS systems programmer. Responsible for SYSGENS and application of systems maintenance. Knowledge of VM and VS1 a plus.

We offer an excellent benefit package including: medical, life, accidental death, disability and profit sharing plans. You will additionally receive 25 working days vacation, 15 holidays, free furnished housing, annual return home travel, paid relocation expenses, plus eligibility for present Federal Income Tax exclusions.

Please send resume INDICATING POSITION TITLE FOR WHICH YOU ARE APPLYING with present salary, to Personnel CW-122, SYSOREX INTERNATIONAL, INC., 10500 N. Tantau Avenue, Cupertino, CA 95014. U.S. CITIZENSHIP REQUIRED. INDIVIDUALS ONLY APPLY.

SYSOREX
Sysorex International Inc.

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

COMPUTER PROFESSIONAL

Career Growth Stability

near LAKE TAHOE

SENIOR PROGRAMMER/ANALYST

We are seeking a computer professional able to interface with key users to design, code and implement business applications that run efficiently in an interactive environment on an IBM System/38 Model 7.

Someone with:
- Minimum 4-5 years GSD-related experience
- Strong RPG II/III skills
- Recent IBM System/34 or System/38 interactive experience required

Send resume and salary history to:

BENTLY NEVADA

Electronic Instrumentation Manufacturer
Attention: Personnel/Recruiting
P.O. Box 157, Minden, NV 89423
(702) 782-9330

AN EQUAL OPPORTUNITY EMPLOYER m/f/v/h

Director Marketing

(SOFTWARE SUBSIDIARY)

We are a newly formed subsidiary of The MILTON BRADLEY COMPANY, established to develop and market our own line of proprietary software products. Our small group has a ground floor opportunity for an executive to head up all sales, marketing and business development activities for this start-up operation.

Reporting to the subsidiary President you will have the prime sales responsibility, and will personally present to top management of client companies. You will also be responsible for generating marketing plans, including advertising and promotional programs. In addition, you will need to have a thorough understanding of systems from mainframe to micro, and be capable of contributing to the creative process by identifying new product opportunities to be developed. A solid background in software sales and development is required.

If you feel well qualified for this exciting opportunity offering a highly competitive compensation arrangement and excellent benefits, please forward your resume (NO PHONE CALLS, PLEASE) including salary history to:

JAMES G. KENNEDY
Corporate Director
Executive Recruitment

MILTON BRADLEY COMPANY
P.O. Box 3400, Springfield, Mass 01101
Equal Opportunity Employer M/F

MB MILTON BRADLEY

Software Engineering Opportunities

Spokane, Washington

Instrumentation Laboratory Inc., a leading designer and manufacturer of medical instrumentation, is currently seeking experienced SOFTWARE PROFESSIONALS.

Principal responsibilities include developing Pascal, PL/M and assembler software modules as part of a development group designing products for the clinical laboratory.

Individual will generate software module specifications and design, code and debug the same. Interfacing these modules with other system modules will also be required.

Qualified candidates should have a BS degree in engineering, mathematics or computer science. Candidate must have a minimum of 4 years' relevant experience. Familiarity with implementation of 8085 based system a plus.

If you are interested in this opportunity, please CALL COLLECT:

1-(509)-456-3456

Or, send your resume with salary requirements to: Tom Garrett, Instrumentation Laboratory Inc., North 3808 Freya, Spokane, WA 99207.

Instrumentation Laboratory Inc.

An Equal Opportunity Employer M/F

SOFTWARE BUYER

We are a fast-growing computer retailer with stores throughout the Southeast. We are seeking a Software Buyer with past experience in the Microcomputer industry or related Electronics field.

Good knowledge of industry trends and manufacturers required. Prior purchasing experience preferred. College degree desired.

We offer an outstanding salary and benefits.

THE COMPUTER SHOPPE

Send confidential resume to:

Bill Calloway, V.P. of Recruitment
P.O. Box 24600 (SS)
Nashville, TN 37202

Equal Opportunity Employer M/F/H/V

SALISBURY STATE COLLEGE

Applications are invited for tenure-track and temporary positions for Fall 1984. Applicants must be able to teach middle and upper level courses in information systems or computer science. Rank and salary depend on qualifications; good teaching is essential, as is a master's in computer science or a related area.

Salisbury is a small city in a rural area, close to ocean beaches and the Chesapeake Bay. Send resume to

Dr. Bill Collins, Chairman
Computer Science Department
Salisbury State College
Salisbury, MD 21801

Salisbury State College is an equal opportunity/affirmative action employer. Women and minorities are encouraged to apply.

Programmer/ Analyst

We are a multi-company service industry group located in the Harrisburg, PA area. Currently we are seeking an experienced data processing individual to participate in the development of Medicare B systems design and program specifications. Additional responsibilities include participating in the conversion and implementation of customer files and systems to marketed products.

Requirements include the ability to effectively communicate with user personnel, a thorough knowledge of standard programming languages and current systems technology. Some travel is required.

We offer an excellent compensation package with advancement based on merit. Please send resume and salary history to:

CW-84044, Computerworld
Box 880 Framingham, MA 01701
Equal Opportunity Employer M/F

PROJECT LEADER/ DATA CONVERSION SYSTEMS

Industry leader offers excellent opportunity for extremely sharp degreed individual. Need indepth experience in systems design and analysis of distribution, warehousing and inventory control systems. Salary mid-30's plus bonus purchase. Mid-west.

SENIOR SYSTEMS PROGRAMMER

Highly successful firm has immediate needs for Sr. Systems Programmer. Will lead conversion from DOS/VSE to OS/MVS. Need strong MVS experience and knowledge of CICS. Position will lead to management. Salary 30K plus 20% bonus. Mid-west location.

PROJECT MANAGERS

Requires strong systems development in the areas of electronic fund transfer, demand deposits, savings, time deposits or loans. Knowledge of CICS a plus salary 30-40K. Mid-west location.

SR. SYSTEMS ANALYST

Industry leader needs Sr. CICS expert. Requires ability to supervise strong communications skills. 5 years online CICS design and working knowledge of Database. MID 30's Mid-west.

FEE PAID.
ALL INQUIRIES
STRICTLY CONFIDENTIAL

EFFECTIVE SEARCH INC.
1099 N. MERIDIAN
WICHITA, KANSAS 67203

NORTHERN CALIFORNIA

Systems Programmer — to $40K
MVS/JES2-3, SMA, CICS

Systems Programmer — to $38K
IBM 4300 DOS/VS-E, CICS/VS

Software Engineer — to $38K
Data Corr. nurtesstone Exp.

Programmer/Analyst — to $36K
VAX 11/780 Exp.

Programmer/Analyst — to $34K
Burroughs Mainframe

GEN BAUGHER & ASSOC.
950 University Ave, #101
Sacramento, CA., 95825

Software Development

Come see and still benefit SW Michigan. DSI is an engineering/systems house looking for software talent to assist exciting custom engineering projects. You must have 1-3 years experience in systems design and development on DEC minifrafro systems. Fortran a must, Pascal a plus. Career growth opportunities are unlimited in our growing company. Send resume in confidence to:

Digital Interface Systems, Inc.
Personnel Administrator
P.O. Box 769
St. Joseph, Michigan 49085
An Equal Opportunity Employer

DALLAS

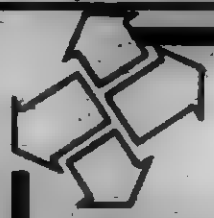
MGR/PROG

Several elite Dallas firms need S/34, S/38 coding expertise to serve as mgr/programmer. Salary to $32 - 35K. Send resume Richard Kennerly:

2720 Stemmons Frwy. 12077
Dallas, TX 75207 (214) 637-4360

DATA PROCESSING CAREERS

GIVE YOUR CAREER A SHOVE IN THE CLASSIFIED PAGES OF COMPUTERWORLD



At Control Data,
Success has many directions for...

Distributed Data Base Management System IBM Environment

VM/SP, CMS, MVS, PL/1, and Assembler

Control Data Corporation, on the San Francisco Peninsula, is looking for a few highly qualified professionals to design and develop a Distributed Data Base Management System. This system is to be implemented on IBM 303X, 43XX and IBM PC class machines utilizing our own packet network. We are looking for:

- Systems Architects
- Lead Programmers
- Programmers

Candidates require a minimum of 5 years' experience in the design and development of DATA BASE MANAGEMENT SYSTEMS, as well as experience with high level procedure languages and language design.

Control Data offers a competitive salary plan. Our benefits package includes health and dental insurance and tuition reimbursement. Take advantage of a career opportunity. Please call, visit or submit your resume to Tony Perez, Control Data Corporation-Data Services, 700 West Hamilton Ave., Campbell, CA 95008 (408) 866-3148.

CONTROL DATA

Addressing society's major unmet needs as profitable business opportunities.

An Affirmative Action Employer

EDP PROFESSIONALS

GROWMARK, Inc., a medium-sized agricultural firm, has immediate openings for qualified professionals seeking careers in a number of areas within Data Processing. Located in Bloomington, Illinois, a white-collar, two university community with excellent schools, shopping, recreational and cultural opportunities, we can offer challenging opportunities in the following areas:

TECHNICAL SPECIALIST

Responsibilities include installing, monitoring and maintaining vendor-supplied software. An ideal candidate would possess 3-5 years' experience with Honeywell GCOS-3 operating system in addition to being familiar with TDS, TP, database and communications.

PROGRAMMER/ANALYST

Responsibilities include programming in support of new development projects in addition to maintaining existing applications. And ideal candidate would possess at least two years' experience in a Honeywell environment, have the ability to write COBOL programs and possess knowledge of structured programming.

APPLICATION SPECIALIST

Responsibilities include system design and complex programming assignments in support of new development projects and existing applications. An ideal candidate would possess strong programming skills and/or design experience in addition to Honeywell background. Prior experience in data base and online transaction processing is desirable.

These positions offer excellent growth opportunities in addition to a competitive salary and benefit package. Interested candidates should send resume and salary requirements to:

Manager, Corp. Personnel
1701 Towanda Avenue
Bloomington, IL 61701
(309) 557-3416
AN EQUAL OPPORTUNITY EMPLOYER

GROWMARK INC.
SUPPLIES DIVISION

The NS16000, Elegance Is Everything.

An elegant approach led to a very elegant solution — National's NS16000 microprocessor and its product family. The revolutionary top-down architecture delivers 32-bit power, and memory management capabilities on par with the latest mainframes. The upward-compatibility will accommodate a shift from 16- to 32-bit hardware. In essence, the NS16000 performs more like a computer than a chip, and we think that's a very elegant package.

A "Software-Intensive" Effort.

The NS16000 microprocessor is the springboard for an entire family of products currently being developed at National's Microprocessor Systems Division. The key to their success lies in the development of software that enhances the NS16000 family's performance, applicability, and elegance. From development through marketing, our "software-intensive" effort is rapidly gaining momentum as we develop demand-paged UNIX* systems based on Berkeley 4.1bsd and 4.2bsd for National's NS16032 and NS32032 microprocessors. We are also working with Bell Labs to define a version of SYSTEM V, . . ., etc. for NS16032 and NS32032. These developments are creating opportunities for software professionals to join us in the following areas:

Sr. Software Engineers: Language Tools Development

You will be involved with developing compiler code optimizer, linker, or debugger. Requirements include two to five years' of language tools development experience; including knowledge of "C", Pascal, FORTRAN, and UNIX.

Sr. Software Engineers: UNIX System Architect

You will be defining a version of SYSTEM V for NS16032 and NS32032. Two to five years' experience in UNIX kernel development is desired.

Sr. Software Engineers: UNIX Kernel Development

You will work on porting Berkeley 4.2bsd to NS16032 and NS32032 based microcomputer systems. Two to five years' experience in UNIX kernel development is desired.

Sr. Software Engineers: Networking

You will work with developing/porting networking software under Berkeley 4.2bsd on NS16032 and NS32032 based microcomputer systems. Two to five years' experience in networking protocol design and development is desired.

Software Engineers: UNIX Utilities Porting and Development

You will be involved with porting and developing UNIX utilities. One to five years' experience in UNIX is desired.

The Rewards Of Elegance.

The elegance and power of the NS16000 will become evident as more software is developed for it. And those who develop that software will reap the rewards, personally and professionally. That's definitely something to think about if you're ready to take on the challenge of our opportunities.

To learn more about National's Microprocessor Systems Division, send your resume to Dept. MS, National Semiconductor, P.O. Box 62499, Sunnyvale, CA 94088. We are an equal opportunity affirmative action employer. Principals only please.

*UNIX is a trademark of Bell Labs.

let's talk about your career.

National Semiconductor

Systems Programmers
Applications Programmers
Manager for Network Services

Syracuse University announces the availability of positions for highly motivated people in its Academic Computing Center and its new CASE Center (Computer Applications and Software Engineering). The CASE Center is dedicated to industrial collaboration in research and education leading to the wider use of computer technology. The Center is designed to promote academic excellence and technological innovation in two principal areas: computer-enhanced reasoning and computer tools research in artificial intelligence.

The systems used here are VM/CMS and MVS on three IBM 4341 computers, with a large minicomputer/terminal network. Applicants for the programming positions must have a minimum of one year experience. VM/CMS experience is desirable; bachelor's degree preferred. Applicants for Manager of Network Services should have a minimum of 5 years experience with computer communication protocols, hardware, and software. Knowledge of computer networking essential. Supervisory experience desirable.

Syracuse University's benefits include competitive salaries, advanced degree opportunities, dependent scholarships, and generous vacation and retirement plans. Closing date for applications is February 10, 1984. Send resume to: CASE Search Committee, Syracuse University, Personnel Department, Skytop Office, Syracuse, New York 13210.

Syracuse University, located in beautiful and culturally rich central New York, is an Equal Opportunity Affirmative Action Employer.

SYSTEMS PROGRAMMERS

Large Detroit area manufacturing operation has immediate openings for an individual knowledgeable and experienced in VAX/VMS system, VAX-11 Fortran and Macro programming languages. 1-3 years experience in using RMS systems services, and RTL. Additional experience with computer graphics, database, Pascal and data base management systems is desirable. Responsibilities will include systems and application programming. This position is in an innovative, creative environment working with a small group of fellow professionals. We offer a unique package of benefits and career growth options. Salary commensurate with background and experience. Qualified applicants may submit their resume and salary history/requirements in confidence to: The Valeron Corporation, Attn: Dwight Jonn, Personnel Department, P.O. Box 3600-P, Troy, MI 48007. An Affirmative Action Equal Opportunity Employer. Males and Females are encouraged to apply.

EMPLOYMENT SERVICE FOR PROGRAMMERS AND ANALYSTS

National Openings With Client Companies and Through Affiliated Agencies

Scientific and commercial applications • Software development and systems programming • Telecommunications • Control systems • Computer engineering • Computer marketing and support

Call or send resume or rough notes of objectives, salary, location restrictions, education and experience (including computers, models, operating systems and languages) to either one of our locations. Our client companies pay all of our fees. We guide; you decide.

RSVP SERVICES, Dept. C
Suite 700, One Cherry Hill Mall
Cherry Hill, New Jersey 08002
(609) 667-4488

RSVP SERVICES, Dept. C
Suite 211, Dublin Hall
1777 Walton Rd., Blue Bell, PA 19422
(215) 629-0885

From outside New Jersey, call toll-free 800-257-8405

RSVP SERVICES
Employment Agents for Computer Professionals

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

IMS AND MVS PROFESSIONALS/ BOSTON AREA

Zayre Corporation, a Fortune 500 company, is presently seeking three experienced individuals for its corporate staff to support its operating systems, IMS Data Base Systems and Applications Development Systems.

We are a state-of-the-art leader in Data Processing, located in Framingham, MA, just 25 minutes from downtown Boston. We are a growing company that has earned a reputation as both an innovator and a leader in the American Discount Industry (of which Data Processing has played a major part).

Senior IMS Software Specialist

Our Operating Systems Support Group (OSSG) is seeking an MVS System Programmer with a minimum of 4 years experience to provide technical guidance in the efficient use of our systems software and hardware. Successful candidates should have knowledge of the MVS operating systems software and performance tuning skills. A knowledge of IMS/DC internal is needed and knowledge of VTAM and NCP communications is helpful.

IMS Data Base Specialist

Our Data Base Systems Support Group (DBSG) is presently seeking an experienced individual who is ready to move into a new sphere of challenge that will enhance his or her career and creativity in the world of data base design and usage. To qualify you must possess at least 4 years of experience in the design, analysis and Technical Support of IMS/VS Data Base applications. Your duties will include IMS support in all application systems development, logical and physical DL/1 Data Base design and implementation, problem determination, on-line screen design using MFS and the use of various IMS utilities.

Technical Team Leader

Take an active role in our success through new innovative applications and new systems development with a leader in Data Processing. To qualify, you must have 4-6 years of experience on IBM hardware, knowledge of OS/JCL, Cobol and On-Line Systems. IMS preferred.

Interested?

Take a look at Zayre and what we are doing in your profession. For consideration, send a detailed letter to Zayre Corp., MIS Recruitment, Speen St., Framingham, MA 01701, or call 617-620-3021, 10:00am - 5:00pm EST. All inquiries will be held in UTMOST CONFIDENCE. We are an equal opportunity/affirmative action employer.

Zayre

SYSTEMS PROGRAMMERS

Saudi Arabia 40,000 - 50,000 US Dollars Paid Tax Free, Plus Usual Middle Eastern Benefits.

Additional Systems Programmers are now required for multi IBM CPU Data Centres comprising 3000's, 4300's and a number of minis and micros.

DB/DC SYSTEMS PROGRAMMER

To be responsible for the technical support and monitoring of the DB/DC product environment and to develop software interfaces and support utilities.

At least 2 years ADABAS and NATURAL experience is required in installation, technical support and trouble shooting with emphasis on performance analysis and investigation. Knowledge of at least one TP monitor, ideally complete or CICS, is also required.

OS/TP SYSTEMS PROGRAMMER

To be responsible for the OS generation and TP interfaces. Essential experience must include in-depth knowledge of MVS and VM ideally with ACF/NCP and ACF/VTAM.

Please send your resume to Ms. Jenny Dalrymple-Hay at Dalroth and Partners Ltd., 4 Half Moon Street, Mayfair, London W1Y 7R1, England or Contact on UK 1.493 2847 quoting Ref. 5037.

SYSTEMS PROGRAMMER. Senior Operating. Design and implement new operating systems and tools using micro-computer and Bell Unix system. Design systems to be more compatible with existing systems. Provide technical leadership of network computer services operating from Ann Arbor to customers in Italy, Germany, Hawaii, Poland. Add as technical liaison between London office and European clients. Must be knowledgeable of all communications and Bell Unix systems familiar with computer Time-Sharing and Real-Time environment and network computer operations, able to assume technical leadership role. $2000 per month, 40 hours per week. M.S. Computer Science + 1 yr. exp. Send resume to Mich. Employ. Sec. Com., 7310 Woodward Ave., Rm. 418, Detroit, Mich 48202. Ref. no. 34884.

PHILADELPHIA

DATABASE ANALYST TO $40,000

Prestige suburban Phila client seeks degreed pro w/exp in IDMS or IMS. Bkgd in design, implementation & control of multi-user shared data bases. Environ is Lge IBM, OS/MVS. Potential for database Mgmt. All reloc expenses pd + top benefits. EXCLUSIVE. INTVWG NOW.

ROBERT HALF

SAVE PHILADELPHIA, INC.

3600 Market St., Suite 700
Philadelphia, PA 19104
(215) 386-4300

COMPUTER SCIENCE FALL 1984 CREIGHTON UNIVERSITY

Applications are invited for a tenure-track faculty position. Strong background in Computer Science required, Ph.D. preferred. Salary and rank are dependent upon qualifications. Applicants should submit dossiers and three reference letters to Dr. John N. Mordeson, Dept. of Mathematics/Computer Science, Omaha, NB 68178 by March 1st, 1984. Equal Opportunity Affirmative Action Employer.

Micro Support Analyst

We are seeking an internal consultant to function as liaison between MIS and a diverse user community for a major East Coast manufacturing company. A degree and 2+ years experience with micro-computers (knowledge of IBM or compatible PC's desired) and associated software is required. This position will provide technical consulting on PC's to both MIS and user personnel and will evaluate new software, hardware and software for the Information Center. Forward resume to:

Hallowell & Co.
7927 Jones Branch Drive
McLean, Virginia 22102
(703) 448-6186

Systems Analysts

One of the South's largest banks is seeking experienced Analysts to join its staff. These positions will function in a "state-of-the-art" environment, and require experience with large IBM mainframe operating under OS/MVS, in COBOL. For most positions, banking experience is not required, but helpful. An ATM-SYSTEMS ANALYST is also needed, and will be involved in a unique "linked" ATM network development. This requires CICS and ASSEMBLER, exposure to the "Hunter" and "Diner" systems would be a plus. Your expertise, enthusiasm, and hard work will be rewarded with an excellent salary and benefits package, full relocation expenses to the Southeast, and PAID OVERTIME. Call JERRY WOLCOTTCK, (collect) at (404) 327-6574, or send resume to P.O. Box 70040, Atlanta, Georgia 30358.

SALES/MARKETING

Sales/Marketing representative for a dynamic national and multinational, leading edge telemarketing operation. Candidate must have minimum two years software sales experience and familiarity with the Digital VAX/VMS operating system and corresponding marketplace. Excellent opportunity with an INC-500 company in beautiful Santa Barbara, California. Rewarding compensation plan. Send resume to:

STI Signal Technology, Inc.
5951 Encina Road, Goleta, CA 93117/(805) 683-3771

TECHNICAL SUPPORT ANALYSTS

1100 DATA BASE

We are seeking several senior level data base support analysts to join the staff of our MIS department's Data Administration and Applications Support group.

Specific responsibilities will include data base design, implementation, and maintenance, creation of an applications testing environment, resolution of production software problems, technical training and providing task leadership for junior staff members.

Desirable candidates will have the following experience:

- At least five years Sperry 1100 series programming.
- Intensive knowledge of COBOL and DMS 1100; 1100 Assembler desired.
- Logical and physical design of data bases.
- Training and support of COBOL applications programmers in development and production environment.

Education must include a Bachelor's degree, preferably in Computer Science, or equivalent business experience.

Please forward resume, including salary history, in complete confidence to: TECHNICAL RECRUITER.

Box MBWCW 3473
261 Madison Avenue • New York, New York 10016

Equal Opportunity Employer M/F

ARTHUR YOUNG

CURIOUS ABOUT CLASSIFIEDS?

If you are interested in advertising with Computerworld, but don't know how to do it, give us a call! We'll be glad to send you our current rate card, which explains sizes, costs, deadlines and requirements. Along with that, we'll send a demo paper which actually shows examples of ad sizes, typefaces, and prices. Our toll free number is 800-343-6474, in Massachusetts call 879-0700, just ask for Classified Advertising. Or, you can look for our classified order form located in the classified section of Computerworld. Fill it out, attach your ad with a check, and return it to us. We're at 375 Cochituate Rd., Box 880, Framingham, MA 01701. Send attn: Classified Advertising. We're anxious to help!

FIELD ENGINEERS

Dataserv Computer Maintenance is expanding nationwide. We now have immediate openings in major cities and will be adding more in the near future.

These are key positions and provide excellent opportunities that will lead to further promotion in a fast growing company. Excellent compensation plan and good fringe benefits for experienced individuals. Your potential for personal advancement with a $100 million plus company is the greatest right now as we expand.

We now have immediate openings in:

San Diego, California — FIELD ENGINEER
Immediate opening for experienced Field Engineer for support of IBM 3600 banking equipment.

Dataserv will soon have additional opportunities for field engineers and technical specialists in several other major cities throughout the United States. If you are considering a change in employment, contact Dataserv for a review of what we have to offer.

For immediate consideration and more information call Toll Free — 800-328-6729 or send your resume to: Bev Walters, Dataserv Computer Maintenance, Inc., P.O. Box 3003, Hopkins, MN 55343. We are an equal opportunity employer and all inquiries are considered confidential.

dataserv

---

amdahl

Peak Performance

Peak Performance. It's the essence of the Amdahl Phenomenon. People working together to keep us out front... way out front.

Systems Engineers
Los Angeles & New York

Join us and apply your thorough knowledge of data communications networks to our expanding sales effort. Required is 3-5 years experience in this field, which should include overseeing project management on large accounts. You'll be responsible for providing pre- and post-sales technical support to our sales team and customers.

Become a part of the Amdahl Phenomenon by rushing your resume to: J. Keller, 2500 Walnut Avenue, Dept. CW 1/23, Marina del Rey, CA 90291. We are an Equal Opportunity Employer.

the amdahl phenomenon

---

datasense

Datasense, the U.S. subsidiary of a well established British Software House, is seeking qualified staff to work in the Tampa Bay area. We seek professionals for other salaried OK contract positions with the following expertise/s:

IBM 43xx, COBOL, DOS/VSE
Knowledge & Experience of VSE/POWER/ICCF, ACP/TPF/TAM
Experience with Banking Systems
Knowledge & Experience of CICS desirable
IBM System/38, RPG III
Knowledge & Experience of Financial, Distribution or Manufacturing Systems

We offer high salaries, free medical insurance, relocation plus the opportunity for international travel within the Datasense Group. Please send Resume & Salary History to:

Director of Personnel
Datasense Inc.
One Plaza Place N.E., Suite 405
St. Petersburg, FL 33701

CSC CALL TO OPPORTUNITY

At Our Logistics Center Of Excellence

Computer Sciences Corporation has the experience, the technical capability, and the stimulating supportive environment to take your career farther...faster! The proof is in our opportunities.

To support our major long-term commitment to Logistics Management Systems, our Defense Systems Division has established a Logistics Center of Excellence in the Dayton, Ohio area. Play a key role in determining objectives and requirements of Automated Logistics Data Systems. Outstanding opportunities now exist for:

SYSTEMS ENGINEERS

Qualified candidates will have experience in structured systems analysis and design plus 5+ years' experience as a systems engineer in one or more of the following: Telecommunications, ADPE, Test & Integration. Additional background in logistics-oriented systems, distributed systems and engineering practices in accordance with Mil Spec highly desirable.

DATA BASE SPECIALISTS

Requires strong theoretical/implementation background in data base technology (minimum 3-5 years) and experience with data base management systems in a large business environment. Responsibilities will include: data base analysis, definition, organization, documentation, security and DBMS performance modeling. Successful applicants will participate in the design and development of a data base for a large integrated logistics systems.

Both of the above positions require a BA/BS degree in Computer Science, Math, EE or related disciplines. Advanced degrees preferred.

In addition to competitive salaries and an excellent benefits program, CSC offers challenge to match your abilities, high visibility and unequalled potential for career advancement. For immediate consideration, please forward your resume with salary history/requirements to: **Rob Harris**

CSC
COMPUTER SCIENCES CORPORATION

DEFENSE SYSTEMS DIVISION
6565 Poe Avenue
Suite 300, Dept. CW123
Dayton, OH 45414
An Equal Opportunity Employer
U.S. Citizenship required.

Programmer Analyst

Mid New York state metropolitan newspaper seeks experienced individual with 3-6 years COBOL and RPG II programming. Operating environment consists of an IBM 4341 using DOS/VSE, VSAM, ICCF and CICS. Newspaper background with accounting and data base concepts a plus. The successful candidate will be responsible for developing and implementing on-line and batch applications and should be familiar with IBM mainframe computer systems. Excellent benefit package and the possibility of management advancement. Salary commensurate with experience and capabilities. Apply by February 3, 1984 to:

Mrs. Teresa O'Connor
Capital Newspapers
Box 12919
Albany, New York 12212
Equal Opportunity Employer

Programmer/Analyst
(Printing/Publishing)

We are a major publishing company searching for a seasoned individual knowledgable of IBM 4341 DOS-VSE/CICS/ICCF and COBOL business systems, as well as minicomputer based on-line interactive photocomposition systems. Our systems are extremely diversified thus providing an excellent opportunity for a person with a well-rounded background in a variety of applications. Only individuals with a minimum of 3 years experience with printing/publishing/typesetting systems will be considered for this position. Excellent starting salary and relocation at our expense to sunny Palm Beach County on Florida's Gold Coast. Benefits include health, dental, life insurance and 3 weeks vacation per year. Send resume to:

Toby Cohen
Personnel Manager
NATIONAL ENQUIRER
Lantana, Florida 33464
(305) 586-1111

1984

Data Processing Professionals

Build Your Future With The CDI Professionals

There's a new era in data processing. And staying ahead of the technological advancements in hardware and sophisticated software development is no easy task.

But Computer Dynamics, Inc. is staying ahead, and rapidly expanding as we meet the data processing needs of our clientele — nationwide. Our 15 years' experience in the consulting, systems design and programming industry has provided us with the expertise and resources that few companies have.

If you're a data processing pro with desire to build a solid, successful career with an innovative pioneering leader, get acquainted with the CDI professionals. Due to our wide ranging career opportunities and project assignments, we're looking for self-motivated, experienced team players who wish to expand their professional talents...from **IBM/IMS, Model 204** Programmers to **CAD/CAM graphics** programmers and many other positions.

For more information on building a long-term, successful career as a **CDI PROFESSIONAL**, call collect or send your resume to the Computer Dynamics' office of your choice:

DETROIT
28792 Telegraph Rd.
Southfield, MI 48034
313/357-4200

HOUSTON
710 N. Post Oak Rd., #306
Houston, TX 77024
713/683-0134

DALLAS
4100 Spring Valley Rd.,
Suite 400
Dallas, TX 75234
217/788-2620

LOS ANGELES
8319 DeSoto Ave., #408
Woodland Hills, CA
91367
213/710-0234

FT. LAUDERDALE/MIAMI
8250 North Andrews Ave., #102
Ft. Lauderdale, FL 33309
305/492-9745

CDI COMPUTER DYNAMICS, INC.

Equal Opportunity Employer M/F

DATA PROCESSING MANAGER

KODIAK, ALASKA

$36,975-$47,169 Department Head. System analyst/programmer and supervises computer operations. Currently converting from IBM System/34 to System/36. Requires extensive computer programming knowledge in RPG II, RPG III, 2 or 3 years experience on System/34 or System/38. Municipal experience preferred. Submit resume to Borough Manager, Kodiak Island Borough, P.O. Box 1246, Kodiak, Alaska 99615.

Manager
Systems & Programming

Halbrecht & Co. has been retained by a major East Coast client who is seeking a Manager of Systems & Programming who has a successful track record in management (at least 3 years of second level management), possesses advanced industry knowledge of computer technology and an intimate understanding of user operations and problems. A BS is required with an advanced degree desirable, along with experience in a commercial product or manufacturing environment. Other traits should include systems experience in distributed or remote processing to a current site maintenance (IBM 4341's VisiCalc DOS/VSE and MVS), familiarity with structured techniques and system development methodologies, and be a self organized, flexible planner who works well with the user community. Any knowledge of HP-3000 series in a manufacturing plant environment is a plus. Forward resumes to:

Tom Mobley
Halbrecht & Co.
7927 Jones Branch Drive
McLean, Virginia 22102
(703) 442-0160

COMPUTER SCIENCE FACULTY POSITION

Four year, church related, accredited, liberal arts college with 1,200 students, seeks two faculty members to teach in a growing computer science program beginning September 1, 1984. Duties will include teaching, advising and committee assignments. Preference will be given to candidates with Ph.D. in computer science but will consider persons with a Master's degree. Experience or education in management and/or business administration is a plus. These are permanent faculty positions. Aurora College currently has 300 computer science majors. The program is supported by an on-campus VAX 11/780 computer with VMS operating system. Send vitae, transcripts and three references to Dr. AJ Anglin, Vice President for Academic Affairs, Aurora College, Aurora, IL 60506. Application deadline is February 24, 1984. An Equal Opportunity/Affirmative Action Employer.

DP MGR
IBM OS/VSE

International mfr of consumer products has extraordinary opptty for a high energy & dedicated DP Mgr. Candidate should be user oriented with similar background. Mostly IBM 4341, under OS/VSE operation. Don't pass this up. $40,000+ FEE PAID

ROBERT HALF
of New York, Inc.
666 Fifth Avenue
New York, N.Y. 10019
212-621-0500 (Appointment)

DATA PROCESSING DEPARTMENT MANAGER
Jakarta, Indonesia

An international energy corporation is looking for a Data Processing Department Manager for its Jakarta, Indonesia computer installation. This is a ground floor, start-up opportunity. The successful candidate should possess: A Bachelor's degree in Business Administration, Accounting, Computer Science or equivalent data processing experience; At least 5 years' experience in data processing weighted heavily toward management, systems analysis and design, and computer programming; Good interpersonal relationship skills; Fluent English and Bahasa Indonesian language skills; Experience on IBM systems/38, hardware and RPG 3 programming languages.

Indonesian nationals only should apply. Send resume and current reference to:

Manager of Information Systems
P.O. Box 116
Denver, CO 80201

ILLINOIS STATE UNIVERSITY
Information Systems/ Computer Applications

Tenure track faculty positions for Aug. 84 in an information systems/computer applications program. Areas: All considered. Special interest in structured analysis and design, on-line systems/data comm, software engineering. Qual: PhD and computer experience or MS and industry experience. Commitment to teaching and application driven research. Ability to relate to application areas (esp. Business, Education, Math) desired. Closing date: March 15, 1984 or when positions are filled. Contact: Chairperson, Applied Computer Science Department, Illinois State University, Normal, IL 61761

Equal Opportunity
Affirmative Action University

Programmer/Analysts
Full Time
$25-60K
Overseas
$1000-2000/WK
IMMEDIATE NEEDS

FORTRAN or C	NE, NY
IMS	Phila.
CICS	Phila.
COBOL-OS or DOS	NE, NY
Datapoint or HP or Wang	NE, NY
VAX/VMS or UNIX-C or Trak	NE, NY
IMS or 204 or IDMS	Phila.
PC's, Mini's/Micros	Conn.
Systems Progs	Phila.
TOAM, VTAM or Comtec'ns	NE, NY

ROSS ROGERS ASSOC.
(212) 921-1310
1140 6th Ave., NYC, NY 10036

REAL TIME SOFTWARE ENGINEERS

Litton Guidance & Control Systems, located in the West San Fernando Valley, is seeking Engineers to contribute positively to the development of state-of-the-art real time inertial navigation systems software. These positions require:

- Experience using at least one of the following high order languages-JOVIAL, ALGOL, ADA, PL1, FORTRAN plus a knowledge of assembler programming languages.
- Experience using one of the following computers in an s/w development environment. DEC-VAX 11/780, PDP 11 series, IBM 370, DG-Eclipse series.
- Knowledge of structured programming & development methodologies.
- Assignments are available for Engineers from recent graduates to 10 years +, BSEE or Computer Science is preferred.

For immediate consideration call or send resume to:

Don Krause
Professional Employment
(818) 715-4704

Equal Opportunity Employer M/F
U.S. Citizenship Required

Litton GUIDANCE & CONTROL SYSTEMS
5500 Canoga Ave
WOODLAND HILLS
California, 91364

HIRING?

More computer people read Computerworld than any other newspaper in the United States - more than half a million computer people every week.

And, among our 529,650 readers at user organizations about half claim to look at recruitment ads at least every other week (only a small percentage say they never look at recruitment ads).

No wonder Computerworld carries more recruitment ads for computer people than any other publication.

To place your ad or to get a rate card with complete details on Computerworld Classifieds, call or write:

Classified Advertising
Computerworld
Box 880
Framingham, MA 01701
1-800-343-6474 617-879-0700

THE RIGHT DOOR?

CONSULTANT SYSTEMS, INC.

1984

For many the career path is a dark hallway with many doors. Some say ENTER, but should really say EXIT. Some say NOWHERE, though you can't see it at the time. Some say ALMOST EVERYTHING YOU EVER WANTED, but they are locked.

At CONSULTANT SYSTEMS we have an open door policy. We've taken the excellent compensation, good fringe benefits, job security, and added:

VARIETY	(in assignments, systems and applications)
ENHANCEMENT	(building upon existing skills)
ADVANCEMENT	(based strictly on performance)
RECOGNITION	(visibility on projects of prime importance)
ELIMINATION	(Of corporate red tape)
ENVIRONMENT	(professionalism and personal growth)

As specialists in commercial data processing services, CONSULTANT SYSTEMS advises and assists major corporations in the areas of systems planning, technical support, customized application development, hardware-software evaluation and educational/training support.

Openings in many areas of the Continental U.S. Skills with IBM S/34, 36, 38 RAPID or Honeywell DSNTP or CICS or IBM DL/DC or HP IMAGE/QUERY or NATURAL/ADABAS are a plus. Call COLLECT or drop us a line. We have a lot to talk about.

A Happy New Year is just through an open door...

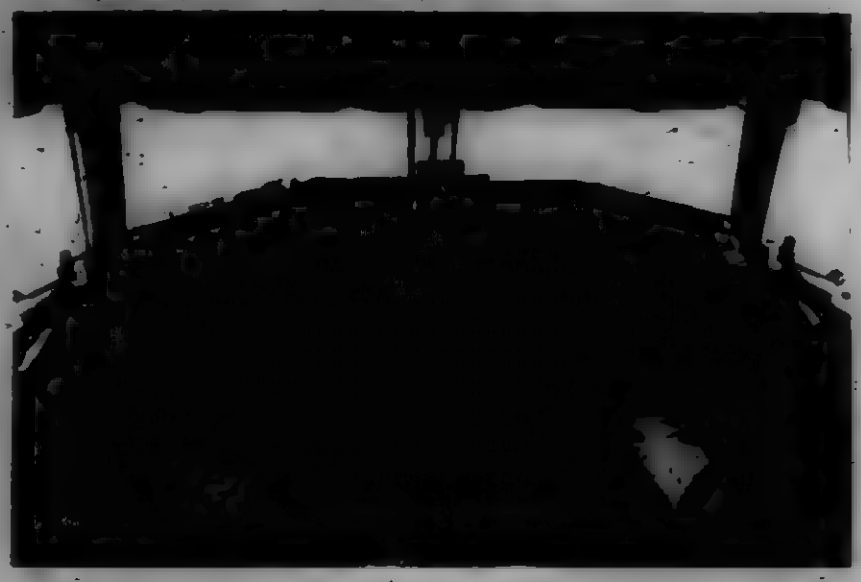
CONSULTANT SYSTEMS, INC.
Eastern Division

P.O. Box 14109, Pittsburgh, PA 15239
Robert E. Fields, Corporate Project Staffing
Call Collect (412) 795-8580

Equal Opportunity Employer M/F Subcontractors and vendors need apply

Good people making technology work.

Boeing helps systems programmers take control.



The cockpit of the Boeing 757/767 with digital instrumentation is the most advanced in the world. And software developed by Boeing Computer Services has been instrumental in helping assemble the thousands of parts necessary to give today's pilot complete control.

Boeing can help you take control of your career, too. As a systems programmer, you'll work for one of the world's leading software and communications services companies, and you'll take command of a wide range of challenging and exciting projects.

As you explore new hardware and software, you'll be backed by Boeing resources. Specially trained when necessary to operate emerging advanced systems. And allowed to implement and expand what you know.

We're currently seeking candidates with at least 3 years experience in one of the following:

- MVS systems programming
- VM (SP or 370) systems programming
- VTAM host support
- Dump directing
- IBM data communications
- IMS systems programming
- CICS systems programming

There are several opportunities available. The emphasis ranges from new product development to maintenance and enhancement of existing offerings. Some positions require technical documentation skills and customer interface abilities. Your contributions will be rewarded with a comprehensive benefits package and salary fully commensurate with the professional challenges you'll meet.

Take advantage of this outstanding opportunity for systems programmers. Send resume and salary history in confidence to:

Walt Sanderson
Boeing Computer Services Company
7980 Gallows Court
Dept. CW 67
Vienna, Virginia 22180

An equal opportunity employer, m/f/h.

BOEING COMPUTER SERVICES
A Division of The Boeing Company

MANAGER/TECHNICAL SUPPORT

An ideal Sunbelt location is only one of the many advantages you'll find with our Fortune 500 manufacturing company. We also offer attractive career opportunities to high achievers. Currently, we have a need for a Manager of Technical Support with:

- 2-4 years experience in management of a technical support area
- Knowledge of MVS, JES, VTAM, TSO and IMS systems
- Leadership abilities and excellent communication skills
- Ability to maintain a close working relationship with the technical support group

Our company offers an excellent starting salary and a very competitive fringe benefits and relocation package. For confidential consideration, send your resume and salary requirements to:

Reply to CW-B4342
Computerworld
Box 880
Framingham, MA 01701

Equal Opportunity Employer M/F

FOR ACHIEVERS ONLY

INTERMEDIATE to SENIOR LEVELS

- Software Development Mgr
- Technical Support Specialist
- Data Base Administration
- Voice/Data Communications
- Office Automation
- Microprocessor Software
- Systems & Programming Mgr
- EDP Audit/Security
- Systems Planning
- Manufacturing Systems

DEC, HONEYWELL, IBM, NCR, UNIVAC

BRUCE A. MONTVILLE
Managing Partner

EXETER 2100
National Recruiting Consultants
(603) 926-5712

TOLL FREE
1(800) 258 7328

COMPUTER PARK, P.O. BOX 4078
HAMPTON, NH 03842

FLORIDA

Superior career opportunities are immediately available for those Pros ready to advance.

[illegible] TECH SUPT ($[illegible] to 2A)	$[illegible]K
VP D.P. (Investment)	$[illegible]K
SYSTEMS Package ($[illegible] or 2A)	$[illegible]K
(IBM S/34/36)	$[illegible]K
(DEC)	$[illegible]K
(VAX)	$[illegible]K
PROGRAMMER/ANALYST (DEC Minis)	$[illegible]K
(Life-Cycle)	$[illegible]K
(DP)	$[illegible]K
(Minis exp)	$[illegible]K

We will confidentially represent you if you will submit resume and salary history to Mr. Dave Mitchell at:

FRANK LEONARD PERSONNEL
[illegible] N. Westshore Blvd.
Tampa, FL [illegible]
([illegible]) [illegible]-[illegible]

An Equal Opportunity Employer M/F
Client Company Pays All Fees

DATA PROCESSING MANAGER

Our client, a San Joaquin Valley newspaper, is seeking a data processing manager to join its management team.

The successful candidate will have 3 to 5 years data processing experience including 2 to 3 years in a supervisory role. Knowledge of the newspaper environment including typesetting and production desirable. Qualified applicants should also be knowledgeable in the IBM System 38 and 43XX series, and have the ability to supervise 5 to 7 staff members.

Attractive compensation package. For confidential consideration, please submit resume and salary history to: Executive Search, Dept. TBC, 400 South Hope Street, Los Angeles, CA 90071-2883. Equal Opportunity Employer.

Price Waterhouse

COMPUTING SERVICES MANAGEMENT

ARGONNE NATIONAL LABORATORY, one of the nation's leading R&D laboratories has three immediate, upper-level opportunities in its state-of-the-art Computing Services Division. Please join us for one of the following positions:

DEPUTY DIVISION DIRECTOR

High-visibility position will provide management and technical leadership support to the Division Director, serve as Director during absences, serve as spokesperson, lead selected projects and provide input on personnel and financial matters.

Position requires 4 or more years proven management level experience, plus successful experience at the technical working level in user services, design/maintenance of operating systems software, computer networking, or scientific applications software. Excellent decision-making, problem-solving and oral/written communication skills are essential. MS in computer science, engineering or related field preferred. Reply to Box J-CSD16819-21.

MANAGER OF SYSTEMS PROGRAMMING

This key position is responsible for management of complex systems programming functions for Argonne's central IBM complex, including supervision of technical and clerical staff in the installation/maintenance of IBM operating, interactive and accounting systems software, evaluation of new software applications, and review of system performance.

Position requires 5 or more years systems programming experience with proven expertise in management, budget control, and procurement procedures. Familiarity with MVS JES3 and VM/370 operating systems and Wylbur, CMS and CICS interactive systems is desirable. Must have excellent written/verbal communication, user interface and problem-solving skills. Degree in computer science, engineering or related area required. Reply to Box J-CSD19245-21.

MANAGER OF INFORMATION SYSTEMS

Position plays a leading role in determining the Laboratory's administrative information systems needs. This includes management of 20 + member staff responsible for information system design/implementation, preparation and update of annual budget and 3 year systems development/maintenance plan and administration of Laboratory and Division policies.

Position requires 10 or more years hands-on administrative data processing experience with increasing levels of responsibility, including both hands-on design and programming and management of these activities. Background must include in-depth knowledge of large system design methodology, database design, and strategic planning of information systems in a complex networked environment. Also requires strong planning and oral/written communication skills, and Master's degree in computer science, business administration or equivalent. Reply to Box J-CSD19244-21.

For prompt, confidential consideration, send letter or resume, indicating Box #, to:

Rosalie L. Bettino
9700 S. Cass Avenue
Argonne, IL 60439
Affirmative Action
Equal Opportunity Employer

EXPERIENCED DATA PROCESSING PROFESSIONALS

Dynamic Public Sector Organization has immediate openings for DP professionals. We offer a leading edge environment, utilizing large IBM installation, CICS/VSAM/COBOL/MVS/ IDMS.

MANAGER DATA BASE ADMINISTRATION

Experienced Data Base Administrator with a minimum of 6 years utilizing IDMS Data Base. Successful candidate will have full administrative and technical responsibility for planning and directing our new Office of Data Base Administration. This is a senior management position reporting directly to the DP department head. Salary range mid $30's depending upon experience.

SENIOR SYSTEMS PROGRAMMER - IDMS

Responsible for software development. Requires 3-5 years of systems programming experience with minimum of 1-2 years IDMS. Must be familiar with installation performance monitoring requirements, and problem determination/resolution. Experience in application development consulting and vendor interface a plus.

Opening also for Data Base Technician requires at least 2 years IDMS experience; Data Dictionary Administrator requires 1-2 years IDMS experience; Data Design Analyst requires 2 years IDMS experience.

Salary high $20's depending upon experience.

Extensive fringe benefits package includes liberal medical, dental, vision coverage. Four weeks vacation first year, 12 paid holidays, ongoing training program.

Send resume and salary history in strict confidence to:

Box CW-84047
Department
P.O. Box 880
Framingham, MA 01701

Equal Opportunity Employer M/F/H

Position: Senior Sales Representatives
Industry: Retail Manufacturing
Product: Computer Services

PM Realty Services is the premier supply of computer services to the rapidly growing retail manufacturing industry. Our growth has opened two senior sales positions in our Boston sales to sales management. History linked to requires in retail/manufacturing areas such as:

Hand/Portable/Calendar
Units/Cutlery/Tools
Tire Cord/Rubber/Plastic

Expected total compensation $50,000 to $75,000 (first year) consisting of: Salary, auto, commissions and bonus. Excellent benefits package. Please send your resume including educational data relating to:

Bob Stevens
Senior Vice President
PM Realty Services
370 East Green Street
Pasadena, CA 91101

Programmer

One of Southern California's major land developers has an immediate opening for a programmer with a minimum of 3-5 years experience with the System 38 plus RPG III. Must have project leader background and application knowledge/on-line order entry.

This is a newly created position within our growing corporation. Qualified applicants please send resume including salary history to:

Zesky Foods
Personnel Department
Building E
Division of Zesky Farms, Inc.
9104 East Studio St.
Commerce, CA 90040
EOE

SPECIAL ASST.

County Library

A management level position with Los Angeles County Public Library which serves a County population of 2,650,000 in 47 cities and most unincorporated areas, under the direction of the County Librarian. This position is responsible for the design, development, and implementation of Library automation systems. Requirements: completion of 30 graduate quarter/semester units in Library Science from an accredited library school; AND 3 yrs. highly responsible staff experience, analyzing and creating recommendations for the solution of problems of operations, procedure, personnel, budget, or personnel, one year of which must have been in the development and implementation of work systems and procedures-OR- 3 yrs. satisfactory experience developing and implementing automation systems for a large library. Salary range: $31,488-$38,964. Excellent benefits. For classification and/or additional information, call or write: Larry Mason, Personnel Officer, Los Angeles County Public Library, 7400 E. Imperial Hwy, P.O. Box 7011, Downey, CA 90241-7011. Tele: (213) 940-8564, Ext. 247

ROBERT HALF

ORLANDO

SYSTEMS PROGRAMMERS
CICS $30-40K
VM $35-40K(Specialty Personnel)
IMS $30-40K
USIX tech support $30-35K

PROGRAMMER ANALYSTS to $22,000
COBOL, CICS(Command or Macro)
OS or DOS

Mail resume or call:

DOROTHEA BAER
ROBERT HALF
OF ORLANDO
P.O. Box 17662
Orlando FL 32860
(305) 629-2536

DATAPOINT

- PROGRAMMERS
- ANALYSTS
- OPERATORS
- SALES PEOPLE

JOBS IN 49 US CITIES NATIONWIDE.
NOT AN AGENCY
SEND RESUME TO:

TIM TANNER
1377 K STREET, NW
SUITE 391
WASHINGTON, DC 20005

SENIOR PROGRAMMER ANALYST

Colorado's largest coal producer located in NW Colorado has opening for a Senior Programmer Analyst. Responsibilities include interface with computer users in design and implementation of new and maintenance of existing systems. Requires 3-5 years experience on HP3000 or IBM System 34 with RPG II background. Cobol preferred but not mandatory. High school graduate. College degree in Computer Science or Business Administration preferred. Salary mid $30's, excellent benefits. Send resume to:

Director of Human Resources
Colowyo Coal Company
8721 State Highway 13
Meeker, CO 81641

An Equal Opportunity Employer M/F/H/V.

D.P. Contractors

Top Rates - Bonuses

Talk with us about the benefits of being an EXPERT in the field of CONTRACTING/CONSULTING. We will review with you the range of challenging and high paying assignments available in New England, Washington D.C. area and the Southwest. Call (617) 237-1777.

the + EXPERTS
11 River Street, Wellesley, MA 02181

FACULTY POSITION IN COMPUTER SCIENCE

COMPUTER SCIENCE. Tenure-track, full-time undergraduate position in Computer Science at Lock Haven University beginning August 16, 1984. Rank and salary dependent upon credentials and qualifications, up to $34,000.00 for a standard nine-month contract. Ph.D. in Computer Science preferred. Masters in Computer Science required. Business, industrial, or teaching experience in Computer Science required. Send vita, including unofficial transcripts, and letters of recommendation to Professor Ralph E. Kuhn, Chairman, Computer Science Search Committee, Lock Haven University, Lock Haven, PA 17745. Applications will be accepted until position is filled.

SR. PROJECT LEADER/ PROJECT MANAGER

AUXTON COMPUTER ENTERPRISES, Inc., is a management consulting organization specializing in the development of business applications software for the communications industry. We are presently expanding our technical staff to meet the increasing demand for our software products and are seeking qualified personnel in the following areas:

Sr. Project Leader/ Project Manager

Project management background with 5 years + experience in the design and development of on-line systems. Candidates should be familiar with top down structured methodologies with experience in CICS, and COBOL in an OS/MVS or DOS/VSE environment.

PROGRAMMER ANALYSTS

3-5 years + experience programming COBOL and CICS (Command or Macro level) in an IBM mainframe environment. Experience with structured programming OL-1 helpful.

PROGRAMMER ANALYSTS

2 years + experience programming in PL/1 with exposure to CICS, or IMS DB/DC a plus. Candidate should be familiar with VS/AM and TSO/SPF.

If you're looking for a challenging position in the state-of-the-art environment, please send your resume along with salary history to:

MR. JAN ACKERMAN

AUXCO Auxton Computer Enterprises, Inc.

351 East Pine St., Suite 310, Orlando, Fla. 32801

AUXCO is an equal opportunity employer

There's No Time For DOWNTIME!

So while the industry works on your system's problems, let us work on your business problems. Advertise in–

COMPUTERWORLD CLASSIFIEDS!

One insertion will let a potential audience of over a half a million readers know what you are looking for or have to offer. Whether you are looking to recruit computer professionals, want to buy, sell or lease equipment, have computer time or services to offer, or software packages to sell, and more, Computerworld Classifieds will help you get a lot of exposure and get things done faster.

The open line rate is $9.15 per line and there is a minimum size of 1 column by 2" at a cost of $256.20. We can accomodate up to 5 columns and depth measurement increases by half inch increments.

Ads may be mailed in, clearly typewritten, with a letter stating the size desired and the issue in which it is to be run. Our team of adtakers will take ads that require no artwork or borders over the phone. We also provide telecopier service.

Any borders, logos, or artwork should be sent in with your ad and must be dark and clear enough to be reproduced.

Computerworld comes out every Monday and our deadline for receiving ads is 10 days (or six working days) prior to the issue date desired.

First time advertisers must send payment along with their first ad.

Our mailing address is:

Classified Advertising
Computerworld
Box 880
375 Cochituate Rd.
Framingham, MA01701

800 343-6474
(617) 879-0700

Sohio

We're Sohio Petroleum Company, a Fortune 25 firm pioneering in the energy industry. In our Western Region headquarters, we're combining talented and creative minds with advanced technology to further our aggressive oil and gas exploration and production efforts.

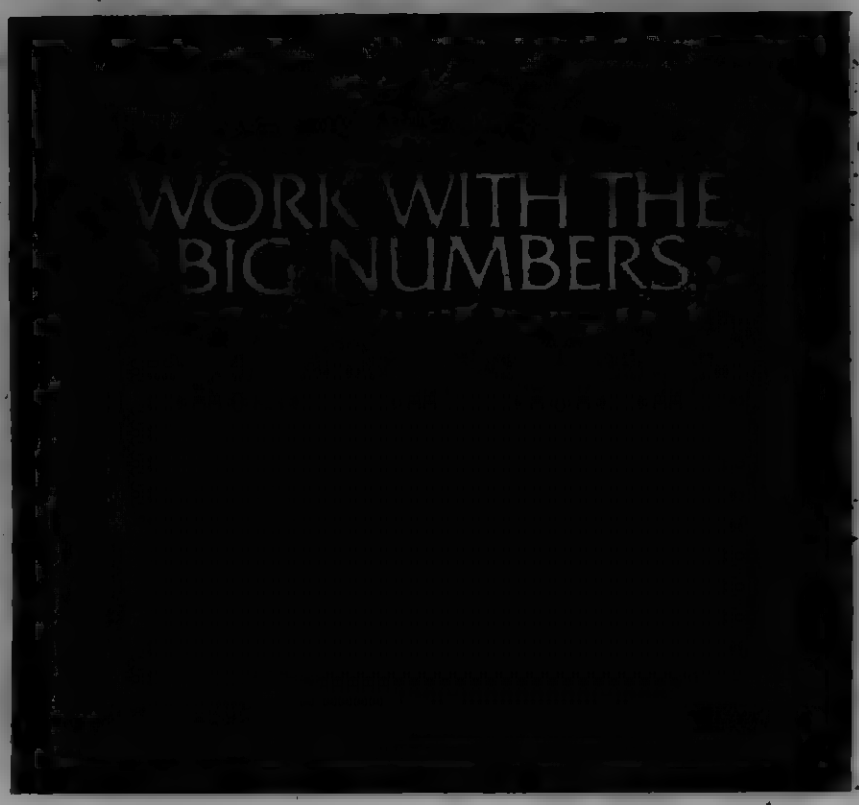
Scientific Systems Planning Analyst

We're looking for a seasoned professional for our San Francisco Scientific Systems group. The successful candidate will have a wide breadth of knowledge in scientific computing technology and 5+ years' previous experience. You will use your demonstrated understanding of the latest technology to integrate user requirements and computer solutions in order to develop long-range proposals for scientific computer facilities. Both hardware and software knowledge essential.

The search for skilled professionals is an integral part of our expansion strategy. Experienced individuals should send a resume today to Judy Alter, Sohio Petroleum Company, S081, 50 Fremont Street, San Francisco, CA 94105. We are an equal opportunity employer M/F/H/V.

Your search leads to Sohio.

SOHIO



Seven years ago, DATAPOINT introduced the world's first local area network, ARC® (Attached Resource Computer), and ignited a revolution in business communications. Today DATAPOINT continues to lead the way in versatile hardware and advanced software designed to meet the needs of modern business.

ARC local area networks are integrated in businesses around the world, linking multifunction workstations, printers, display systems, and processors. Providing machine to machine communications, working together with systems so advanced, they could only be DATAPOINT.

Others have joined the revolution, but DATAPOINT is the undisputed leader with more than 5,000 ARC local area networks installed. More than IBM, Xerox, and Wang combined. We are a proven success that can provide a basis for your successful sales career.

We now have positions available in almost every major market across the country. If you are a degreed sales professional with a solid track record in computer sales, call our 24 hour career hotline to learn about the DATAPOINT success and how you can join this growing team of professionals.

1-800-531-5770

1-800-292-5106
(In Texas)

DATAPOINT offers a very competitive compensation program and complete company benefits. If a call is inconvenient, send your resume with salary history to: Marketing Employment, Datapoint Corporation, 9725 Datapoint Dr., MS G-05-781, San Antonio, Texas 78284. We are an equal opportunity employer m/f/h.

DATAPOINT
We sparked the revolution.

CAD/CAM MARKETING MANAGER

As part of the world's leading contract research and development organization, we are at the forefront of CAD/CAM technology. We are now actively engaged in plans to market in the U.S. a new CAD/CAM software product that is being developed jointly with Battelle's Geneva, Switzerland laboratories. This product has been marketed in Europe by the Geneva Labs for several years and we need an experienced CAD/CAM marketer to assume a lead role in its introduction and marketing in the U.S.

The person we select will have a BS/MS in mechanical engineering or related field and several years experience in the use and marketing of CAD/CAM systems including their application to design, drafting and numerical control (NC). Willingness to travel from a headquarters in our Columbus, Ohio Laboratories essential.

Battelle offers a competitive salary, excellent benefit package and exciting opportunities for growth in our multidisciplined research environment. To pursue this challenging role, send your resume in confidence to Dick Shaw, Employment Dept. A-1.

Battelle

Columbus Laboratories
505 King Avenue
Columbus, Ohio 43201

An Equal Opportunity Employer

System Developers
800-235-5920

Inviting resumes from individuals in the more highly technical computer related vocations such as: PHD Computer Scientists, Operating System Developers, Data Base Developers, Parsing Specialists; Networks and Telecommunications, Architecture, Artificial Intelligence, Graphics Systems Developers, Microcodes and Firmware Developers, Compiler Development, etc. Special interest in emerging technology such as novel architecture, UNIX, ADA, etc. Similar interest in scientific applications developers including military, process control, data acquisition, telemetry and communications, CAD/CAM, simulation and modeling, etc.—we are a professional employment firm managed by graduate engineers. Fees are paid by the employer. All geographic locations. Send resume or call D.A. Radvine and ask for our free resume workbook & career planner.

Scientific Placement, Inc.
P.O. Box [illegible] Houston, TX 77024 713/[illegible]

UNIX is a trademark of Bell Labs.

TIRED OF THESE LONG COLD WINTERS?

DATA PROCESSING PROFESSIONALS with skills in Large Systems or Minis, DATABASE or ON-LINE SYSTEMS, consider a move to the beautiful SAN FRANCISCO BAY AREA

Our clients have the most CHALLENGING and GROWTH ORIENTED career opportunities CALIFORNIA offers.

LOGICAL OPTIONS
One Market Plaza, Spear Tower, Suite #2014C
San Francisco, CA 94105 • (415) 777 3988

WASHINGTON, D.C.

DP MGR S/36

Rapidly growing MD co. requires seasoned pro to manage ten. Must: know S/34; plan for growth; hire and train staff. $36K.

ROBERT HALF
OF WASHINGTON, INC.
7316 Wisconsin Ave. Ste 401
Washington, D.C. 20814
(301) 652-1000

M.I.S. RECRUITER

Fortune 500 retailer headquartered in the Sunbelt, with sales in excess of $1 BILLION, is seeking a Recruiter for the Management Information Systems area of the Company.

The successful candidate will have a minimum of 3 years experience in recruiting personnel, and at least 2 years "hands on" experience in MIS. Ability to recruit and technically converse with MIS personnel and candidates required. B.S. degree in Information Systems or Computer Science preferred.

We offer a top salary and benefits which include Paid Relocation.

Send confidential resume and salary history to:

CW-B4346
Computerworld
Box 880
Framingham, MA 01701

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

MAI & ALBUQUERQUE...

Quality Products & Quality Living!

We're on top, and we plan to stay there. As one of the fastest growing software companies in the country our accounting software packages are recognized as industry leaders. We're realizing our potential by employing the brightest and most dynamic people in the software field. In addition, we offer the best in Sunbelt living in this growing high tech area.

PROJECT SUPPORT SUPERVISOR
Minimum of 1 year supervisory or managerial experience in order to assume the responsibilities for telephone support of our accounting application software which runs on a variety of hardware options. Support involves all levels of the product. This position requires a Bachelors degree in Business Systems or Computer Science or equivalent work experience and a minimum of 4 years experience in programming and/or support.

QUALITY ASSURANCE SUPERVISOR
Minimum 1 year supervisory or managerial experience. Will assume responsibility for overseeing all quality assurance functions involving software and documentation through the various phases of the quality assurance cycle up to product release. Position requires establishing and maintaining communication channels between the engineering, documentation and quality assurance departments. The ability to design and implement test plans and procedures as well as test data is essential.This position requires a degree in Business or Computer Science with an accounting background and a minimum of 4 years experience in programming, support or quality assurance.

All inquiries and resumes should be submitted to: MAI/Basic Four Business Products, c/o Human Resources Dept., P.O. Box 9360, Albuquerque, New Mexico 87198. An Equal Opportunity Employer M/F

MAI Basic Four Business Products

HP PRO's !!

Our client company has experienced steady sales growth for the past 6 years, but the solid 5 will be underwhelmed by competition, with commitment to new Product Development and demand in both Domestic and Foreign markets. YOUR CAREER can be tailored to a START START UP PROJECT—Data Communications with a computerized network utilizing multiple HP3000's connected to an HP3000. Company has full relocation and benefit package including a stock purchase plan.

MULTIPLE OPENINGS

SYSTEMS ANALYST: 3-4 yrs. + exp. in FORTRAN, using IMAGE database and report. Have at least 1 yr. current HP exp...to $40K.

SUPERVISOR OF SYSTEMS: 5 yrs. + exp. in FORTRAN, IMAGE, currently working with HP hardware...to $45K.

For immediate consideration call Barry S. Bliss at (914) 471-5788 or send resume to:

Ethan Allen Personnel Agency
88 Academy Street
Poughkeepsie, NY 12601

MVS PROGRAMMER/ANALYST

Numerous positions are now available for large mainframe IBM P/A's. Majority of needs are in new development. Those are Blue Chip Minneapolis'ers. Four companies offering excellent starting salaries, excellent growth potential, state-of-the-art environment plus relocation packages. Requires 2+ yrs exp in COBOL, CICS/VS, on-line & plan. Salary Range from $25-35,000.

JOHN MILLER
MARK DAVID
ROBERT HALF
3535 IDS Center
Minneapolis, MN 55402
(612) 338-0001

MANAGER INFORMATION SYSTEMS
Immediate opening with Pepperidge Farm, Incorporated, a subsidiary of Campbell Soup Company, at its Richmond, Utah facility.
This opportunity will offer you advancement from your present programmer or analyst position. You will be responsible for the design, implementation and maintenance of IBM 3083 Data Processing System.
Degree preferred with solid experience with IBM S/38.
Live in northern Utah, near Utah State University, and have close access to recreational activities surrounding Logan, Utah. We offer competitive salary and comprehensive benefits package.
Send resume and salary history to:
Steve Lawson, Manager-Human Resources
Pepperidge Farm, Incorporated
P.O. Box 249
Richmond, Utah 84333
EQUAL OPPORTUNITY EMPLOYER

CHALLENGE...OPPORTUNITY GROWTH...

At Affiliated Banks Service Company, you will find a company dedicated to supporting it's professionals in an environment where an individual can find unlimited growth, both personally and professionally. Currently we have need for a NETWORK SYSTEMS PROGRAMMER to assist us with network growth.

Our network currently consists of 300 remote terminals/ATM's and over 400 teller terminal devices. Primary involvement of the selected individual will include installation of CICS 1.3, SNA protocols, and remote job entry for remote banks.

Working knowledge of ACF/VTAM, NCP and experience with CICS/VS Internal IBM MVS required. Qualified applicants must be able to solve problems independently and possess qualities needed for possible future promotion to supervisory role.

Located in Denver, Colorado, at the base of the beautiful Rocky Mountains, we offer an excellent starting salary and complete company paid benefits package. For immediate consideration, forward your resume, complete with salary requirements to: Personnel Department CW, AFFILIATED BANKS SERVICE COMPANY, 8401 Sulmeyer, Thornton, CO 80221.

Affiliated Banks Service Company

Equal Opportunity Employer M/F

SEATTLE-PORTLAND
THE BEAUTIFUL PACIFIC N/W

My clients have needs in the following areas:

Software Engineers - Graphics, Test, UNIX, Simulations, O/A, Configuration Management, Ad. C, etc.,

Systems - CDC, DEC, HP, CYBER, SEL, CRAY, IBM-Engineering/Scientific Applications.

Contact: Bob Clark
(206) 453-2700
HOUSER, MARTIN MORRIS & ASSOC.
[illegible]

IDMS
$41,000
1221 BRACE ROLAND PLAZA
ROCHESTER, NEW YORK 14604
716-232-4616

BUY - SELL - SWAP

SYSTEM/34
SYSTEM/36
SYSTEM/38
SERIES/1

FIND IT FAST IN OUR FAMOUS COMPUTER MARKET ADVISOR
SEND US YOUR BUSINESS CARD AND WE WILL SEND YOU A FREE COPY.

ECONOCOM
- BUYS
- SELLS
- LEASES

- QUICK DELIVERY
- COMPETITIVE PRICING
- FLEXIBLE FINANCING
- TRADE-INS ACCEPTED
- PROFESSIONAL SERVICE
- SHORT-TERM LEASING
- LONG-TERM LEASING
- PERIPHERAL LEASING
- TAKE-OUTS DONE

901-767-9130

ECONOMIC COMPUTER SALES, INC. • 845 CROSSOVER LANE • P.O. BOX 240297 • MEMPHIS, TENNESSEE 38124

SYSTEMS
4341 4331
38 36 34
32 3
BUY • SELL • LEASE
COMPUTER BROKERS, INC.
2978 SHELBY ST.
MEMPHIS, TENNESSEE
CB
TOLL-FREE
800-238-6405
901-372-2622
PERIPHERALS
3203 3370
327X 3411
3350 3420

COMDISCO

A Commitment To Excellence

IBM PROCESSORS

- ☐ 3081
- ☐ 3083
- ☐ 3033
- ☐ 4341
- ☐ 4341/4381
- ☐ 4331-2/4361
- ☐ Amdahl

IBM PERIPHERALS

- 3350
- 3880
- 3380 AA4/B4
- 3370/3375
- 3803-2
- 3420-4/6/8
- 3705/3706
- 3725
- 3178/3278
- 3890

The Leader in Full-Service Leasing

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

SHORT TERM LEASES AVAILABLE

CSI
CMA

Buy - Sell - Lease
S/32
S/34
S/38
IBM
3741
3742
CPU's CRT's PRINTERS
ALL MODELS
PURCHASE/LEASEBACK
SHORT & LONG TERM LEASES
Computer Marketing of America, Inc.
P.O. Box 71
630 Bryan Street
Old Hickory, Tennessee 37138
CMA
asi CO
1-800-251-2670
In Tennessee: 615-847-0031

Buy•Sell•Lease
SERIES 1
S/34 S/38
4300 s/[illegible]
5110 S/23
XERXES
COMPUTER SALES
1914 Harmon Place, Suite 610
Minneapolis, Minnesota 55403
800-328-3804/612-339-3042

For Sale
Sperry Univac
BC-7
System
256 Memory
40 MB Disk Cabinet
1 Line Printer - 300 LPM
5 CRT's workstations with standard keyboard
SOFTWARE:
Policy issuance
Cancellations
Earn Premium Reports
Claims Files & Reports
and others.
For more information please call:
INTERBANKERS
D. Madero
(000) 442-4401

New IBM Processors For Sale or Lease
Machines — Ship Date
4361-L5 with Features 1431, 1432 and 3801 — 9/17/84
4361-P2 — 4/8/84
4361-L1 — 10/8/84
(8) 5360-A11 with Communication — Now
Phoenix Computer Leasing
(602) 947-2808

4341-M2
FOR LEASE
Coastal Computer Marketing
(800) 221-4069
(213) 986-4830
CMA

You can get information on buying or leasing
IBM 34-36-38
as fast as you can dial
1/800/LEAS-PAK.
In Texas call 817/268-0023.
Up to 50% Savings
LPI
Leased System/36 deliveries, new displays and printers in stock. We want to buy your owned or rental credit equipment.
LEAS PAK INTERNATIONAL
P.O. Box 759 • Hurst, TX 76053 • 817/268-0023
Send for our free products and services brochure:
Name
Address
City State Zip
Phone
asi CO

IMMEDIATE AVAILABILITY:
SYSTEM/38
MODEL 7 GB
80% IBM LIST
ECONOCOM
CMA HEL

DATA GENERAL
Hanson Data Systems

SURROUNDS CHECKS PROCESSING EQUIPMENTS AND OTHERS
FOR IMMEDIATE SHIPMENT: 2 X B-9137 M.I.C.R. SORTER READER, EQUIPED WITH 10 POCKETS, 4 JET-INK ENDORSER AND MICROFILMER SELL WITH 4 x 4A CONTROLS. 1 X B9247-14 LINE PRINTER, 1 X B9111-1 CARD READER, 1 X B9460-15 TAPE ELECTRONIC-UNIT, AND 2 X B9485-2 F.E. DRIVE. ALL THESE EQUIPMENTS IN PERFECT CONDITION.
PRICE $125K U.S.
FOR INFORMATION CALL OR WRITE:
RENE LEBLANC, EP MANAGER
FEDERATION DES CAISSES POPULAIRES DESJARDINS
1, COMPLEXE DESJARDINS
MONTREAL, QUEBEC
CANADA, H5B 1B7
Tel: (514) 281-4000

BUY ..... SELL
SWAP
HARDWARE
SOFTWARE
COMPUTER TIME & SERVICES

Over 500,000 computer people read COMPUTERWORLD every week. So, placing an advertisement with us is going to help you take care of your computer-related business...very quickly.

Deal us in on your business needs.

Call the Classified Department at 1-800-343-6474 or (in Massachusetts) (617) 879-0700 to place your ad.

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

Pioneer Computer Marketing
214/343-2904

BUY-SELL LEASE
- All IBM Systems
- Peripherals
- Tapes
- Disks

SERIES/1
- Systems
- Features
- Peripherals

SYSTEM 34
- CPU
- Peripherals
- Upgrades

PIONEER COMPUTER MARKETING
11448 Pagemill Road
Dallas, Texas 75243
214/343-2904

What makes Dataserv a world leader in the IBM marketplace?

Customer satisfaction.
Over 65% of Dataserv's business comes from previous customers or customer referrals.

dataserv

STOP
YOU'VE FOUND IT!
IBM S/36
IBM S/34
IBM S/38
4331/4341
NEW
4361/4381
- One, Two or Three Year Leases.
- We Buy, Sell or Lease.
- New and Used Peripherals.
- Trade-ins Welcome.

TexCom
SAN ANTONIO
MEMPHIS • HOUSTON
(512) 349-9955

JOIN THE MORE THAN 150 OTHER MAJOR COMPANIES THAT CURRENTLY LEASE IBM EQUIPMENT FROM TEXCOM.

WANG WORD PROCESSORS
AT THOUSANDS OFF!
Guaranteed, remanufactured WPS 20, WPS 30 and Wangwriters available for immediate delivery. You don't pay a cent till Wang installs and places equipment under service contract. 15-day return privilege. Buy, Lease, Rent
For Free Info and fast answers call toll-free:
1-800-321-2986
ELECTRONIC OFFICE EXCHANGE, INC.
Dept. SCXCWD • Box 7337 • Ann Arbor, MI 48107

**** DEC ****
BUY—SELL—LEASE—TRADE—CONSIGN
SYSTEMS — PROCESSORS — OPTIONS
PERIPHERAL — MODULES — MEMORY
— SPARES —
NATIONAL COMPUTER EXCHANGE
(714) 990-5988
600 North Lunar Avenue, Brea, CA 92621
TWX: 910-596-1499

IBM UNIT RECORD EQUIPMENT & DISK DRIVES
DISK PACKS, CARD MODULES, MAG TAPE, PRINTERS

SALE OR LEASE
machines
026—029—082— 083— 084
085—087—088— 129— 514
519—548—557
disk packs
2316—3336(1)—3336(11)—3348(70)
5 MEG. TO 300 MEG. PACKS—NEW & USED
Highest Prices Paid for Used Packs & Machines
THOMAS COMPUTER CORPORATION
5833 W. Howard St. Chicago, IL 60648
800-621-3606 312-647-6880
Authorized Distributor – Memorex, CDC, 3M, BASF, Verbatim, Dysan

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

SERIES I SPECIAL

Control Data
126MB Removable Drives . . $12,900
Diskette Drives . . . . . $ 1,495
Printers & Displays

New or Used
Immediate Delivery

IBM
4956 Processors
4967 200MB Disk Drives
All Peripheral & Features

FIRSTPEAK
COMPUTER CORPORATION
Your Full Service Computer Dealer

DPD	S/34	Series/1	3270's
MAIN FRAMES	S/36	Systems Configured To Your Specs	3277
PERIPHERALS	S/38	All Products and Peripherals Available	3274
		Upgrade Support Included	3271
		— Call —	

Computer Marketing Inc.

System/34 12MB/64MB Printer 300LPM 5110s, P/Mts. Sale/Lease

Sale/Lease 4341's Models K, L, M - GRP 1 & 2 Lease Term - 1 Yr or Longer

Control Units 3880 - B13 3880 - D13 Avail: March 1984 Sale/Lease

Controllers 3880 3803 3274 3276 Immediate Delivery

DASD 3380 3375 3370 3350 3344 3310 Immediate Delivery

Tape Drives 3420 3430 3410 8809 Immediate Delivery

Display Stations 3278 3279 3178 3277 Immediate Delivery

Printers

CDLR

Computer Marketing Inc.
P.O. Box 5265 Philadelphia, PA 19126

PEARL HAS IBM SYSTEMS 34, 36, 38

and we have a large inventory of IBM 3741's, CPU's, CRT's and printers. We buy, sell, lease, rent and purchase/leaseback IBM Systems.

Call John Spight or Ken Warren

Pearl Computer Division
P.O. Box 24026 • 4717 Centennial Blvd.
Nashville, TN 37202 (615) 383-8703

BUY · SELL · LEASE

SERIES-1
S/34 • S/36 • S/38
4300
S/23 S/32 5110-20
Tape-Disk-Printers-Tubes

AMCOM CORPORATION
5200 W 73RD ST · MINNEAPOLIS, MN 55435
(612) 835-4737

CALL TOLL FREE
800-328-7723

USA
COMPUTER EXCHANGE, INC.

BUY • SELL • TRADE
DG • DEC
SYSTEMS • PERIPHERALS • MODULES
Call GEORGE H. TRABBOLD
617-668-6660

IBM
Series/1 • S/34 • S/36
S/38 • 4300
5110 - 5120 • S/32
BUY • SELL • LEASE
All models, systems & peripherals AVAILABLE NOW!
All sizes w/ 72 hour upgrades

(408) 425-7333
SOURCE DATA PRODUCTS INC.

EL CAMINO RESOURCES
offers:
4381-M2
DELIVERY POSITIONS AVAILABLE
early MARCH
APRIL
MAY
JUNE
(213) 995-2411
4527 N. Sepulveda Blvd.
Sherman Oaks, CA 91403

4381-M2
(408) [illegible]35

FREE
DEC and DATA GENERAL
Discount Guide
NEWMAN dda
(213) 994-3200

BASIC SYSTEMS HARDWARE, INC. CAN:

- Buy your S/34
- Lease you a S/34
- Sell you a S/34
- Save you $$$$$$$
- 3 Mos. FREE Maintenance with Purchase
- Plug thru Peripherals
- Software Support
- Upgrades
- Demo Site in Midtown Manhattan

Contact Ken Clarke, Branch Manager, BSH, INC.....488 7th Ave. NY, NY 10123 - 212-279-6167

STC 8650
SALE LEASE
LOW LOW PRICES

PAM CHRISTIANSEN
MARKETS COMPUTER CORP.

800-IBM-4341

Inflation Fighters
Quality & Savings

Slightly used. Money Back Guarantee. Full Reels. All External Labels Removed. Guaranteed for use at 800 BPI through 6250 BPI.

2400' Reel $4.85 ea.
1200' Reel $4.25 ea.
600' Reel $3.50 ea.

All Tapes with Hanging Seals

We pay freight on orders over 200 tapes. All orders shipped within 48 hours. Call or Write

Computer Tape Mart
44A Seabro Avenue
N. Amityville, New York 11701
(516) 842-8612

We'll keep you up to date week after week after week after week

SERIES/1
BUY OR NEW OR USED
OVER 2000 CUSTOMERS
S/38
4331
4341
ALL RELATED PERIPHERALS
S/34
SEE OUR NEW PRICES
S/36
SHORT/LONG TERM LEASES
3033
3081
CFI

HP
3000
encore
(213) 452-9117

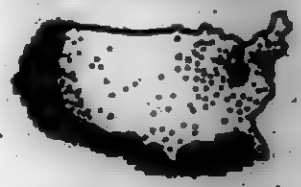
NPA
SYSTEMS INC.
SPECIALIZING IN:
PURCHASE
SALE, TRADE,
LEASE, RENT,
AND SERVICE OF
Data General
EQUIPMENT
(516) 467-2500

RANDOLPH'S APPROACH TO COMPUTER LEASING... AND WHY IT WORKS.

Started in 1964, Randolph has been saving its customers 30% to 70% of their DP hardware dollars . . .

And we *know* leasing is still the most financially attractive method of acquiring computer equipment at low cost without draining working capital.

But we learned early that the dollar-and-cents approach to computer leasing is only part of a company's concern. Equally important are: prompt installation . . . dependable servicing . . . flexible upgrade capabilities . . . and full support services. Our commitment to *this* approach is the key to satisfied customers . . . and our success.



RANDOLPH . . . COAST TO COAST

We presently serve customers in over 300 cities and towns from Maine to Hawaii.

EQUIPMENT ON THE MOVE

We have under management IBM computers with an original cost of over one-half billion dollars . . . and we're adding to this investment to meet the changing needs of our customers. Whether it's an IBM 3081 or 4300 system, additional tape drives, disk storage, printers or other peripherals, our equipment inventory is available to meet your company's requirements. Even hard-to-get machines are sought out and acquired for Randolph customers.

BUT . . . SERVICE MAKES THE DIFFERENCE

The real story behind Randolph's success is our approach to customer support services. To keep computer operations running smoothly and efficiently, these support services have proven to be valuable assets to our customers' D.P. operations.

Continuous IBM Maintenance Program
Manufacturer's service is available day or night, seven days a week, to insure optimal use of your system.

On-Going Technical Support
Randolph's technical staff is on call to help you reconfigure your system to meet changing data processing requirements.

Active Remarketing Division
We assure maximum return on your investment in computer equipment which you no longer use.

MEMBER OF THE FIRST NATIONAL BOSTON FAMILY

In 1972, The First National Bank of Boston purchased our S/360 leasing business, and we became a wholly-owned subsidiary.

With the Bank's financial capabilities behind us, Randolph customers benefit even more from the combined efforts of the best computer leasing and financing people in the United States.

HOW ABOUT YOU?

If your company is not presently leasing computer equipment from Randolph, you'll be interested in our new brochure outlining our special customer support services, and important facts on how we can reduce your computer costs. Call Joseph B. Kelly, Jr., Executive Vice President, 800-243-5307.

537 Steamboat Road
Greenwich, Connecticut 06830
(203) 661-4200 (800) 243-5307

Randolph

A MEMBER OF COMPUTER DEALERS & LESSORS ASSOCIATION · RANDOLPH COMPUTER CORPORATION A subsidiary of THE FIRST NATIONAL BANK OF BOSTON BANK OF BOSTON

URGENT

For 2/15/84 Delivery
NEED TO BUY IN QUANTITIES
• 3350-A2
• 3350-B2
• 3830-2
USERS ONLY
CALL JOHN GILES
TOLL FREE: 800-325-0960

CSI

COMPUTER SALES INTERNATIONAL, INC.
P. O. Box 16264, St. Louis, Missouri 63105

We've Got Your Number

S/34
ALL MODELS
QUICK DELIVERIES

SERIES 1
CONFIGURED TO
YOUR NEEDS

S/36
ATTRACTIVE LEASE RATES

S/38
NEW & USED MACHINES

5110/5120
NEW LOW PRICES

PERIPHERALS
CRT'S, PRINTERS, DISK, TAPE, MODEMS

CARLYN
COMPUTER SYSTEMS
"CALL COLLECT" (703) 642-1950

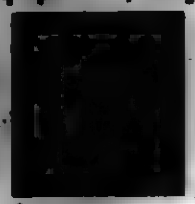
BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

DISK DRIVES • CONTROLLERS • PERIPHERALS • MEDIA

WANG • DEC

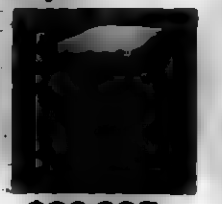
National authorized CDC OEM-Distributor offers new equipment, fully warranted for 90 days:

$12,900
CDC Model 9766 (300 Mb.) WANG Models 2285V-2, and 6985 (300 Mb.) DEC Model RM05 (256.1 Mb.)



$7,750
CDC Model 9762 (80 Mb.) WANG Model 2285V-1 (75 Megabytes). DEC Model RM03 (67.1 Mb.)

$8,875
CDC Model 9448 (80 Mb.) WANG Model 2280-3 (80.4 Mb.) WANG Models 2280 V-3, 6580 (80 Mb.) DEC Model RM07 (83.4 Mb.)



$20,825
CDC Model 9775 (675 Mb.) WANG Model 2285 V-3 (540 Megabytes). DEC Model 2–RM05s (512.2 Mb.)

ERST
INTERNATIONAL CORPORATION
225 Lafayette Street, New York, NY 10012

ERST is the largest dealer in pre-owned WANG equipment – 2200, VS, WP (CPUs, Terminals, IOPs, Controllers, Printers, Memory Upgrades).

Must have give us a call . . . Toll Free 1-800-FOR-ERST . . . In N.Y. 212-431-1100

AMDAHL V/8
FOR SALE
16 X 16
4096 SUBCHANNELS
HARDWARE MONITOR INTERFACE
(1) FEBRUARY 1, 1984
(1) APRIL 1, 1984
CALL: CHARLIE BERRY
MAJOR COMPUTER INCORPORATED
10637 YELLOW CIRCLE DRIVE
MINNETONKA, MN 55343
(612)933-0600

Burroughs B 1955 System
1 mb Memory
Available Immediately
Disk Drive
Controllers
6681/14 Line Printer
1000 LPM
Tape Drive/Controllers
Line Adapters
MT 880 Terminals
MT 885 Terminals
Now
(2) A9010 Printers
(1) DMA Packs
$97,000 or Make Offer
Always Under
Burroughs
Maintenance
1 Owner R.T. Brockman
1-800-231-6347

Processors	Peripherals	Terminals Equipment
S/23	3741	1255
S/32	3742	1419
S/34	029/129	3600
S/36	5211	
5110	5251	
5114	5225	
5120 DATAMASTER	5256	
	3262	

IN STOCK!
Fujitsu Eagle
with cabinet, cables, slides & terminator:
$13,500
New Fujitsu SP 380
80 character per second, letter quality printer.
Introductory Special - $2,595.
MANRES
303-693-3035
2771 S. Jasper • Aurora, CO 80013

Must Sell Available 2/1/84
DEC PDP 11/70
512KB MOS
(2 each) RP06
TE16
DH11AD
Call Jim
(713) 445-0082

IBM
3270

DEC

Check out our unbeatable combination – huge inventory at low, low prices.

Call toll free 800-328-7000
In Minnesota (612) 894-4020

MIDWEST SYSTEMS, INC.
[illegible] Riverwood Drive, Burnsville, Minnesota 55337

WANT TO BUY
SYSTEM/34 PERIPHERALS
5251's, 5291's, 5224's, 5225's, and 5256's
Call 214/258-0541
MCC METROPLEX COMPUTER COMPANY, INC.
320 Decker Drive • Suite 180 • Irving, TX 75062
TWX 910-860-5885

DSI
WE BUY SELL & LEASE!
BURROUGHS
Discover the DSI alternative.
800-641-5215
All equipment available immediately and guaranteed for Burroughs Maintenance
DSI Serving the Burroughs Community Worldwide
2480 W Alameda Ave Denver CO 80223 (303) 922 8331
TWX 910 931 0483

ALL 370 & 43XX SYSTEMS
CPU's & Peripherals
Purchased, Sold & Leased
CORPORATE COMPUTERS, INC.
Contact: Norm Berger
(203) 661-1500
118 Mason St., Greenwich, Conn. 06830
Member Computer Dealers & Leasing Association

Hardware, software, problems, people, pricing, ethics litigation, communication, macros, minis and micros.

We like to make an issue of it. EVERY WEEK.

MISSISSIPPI CENTRAL DATA PROCESSING AUTHORITY
Sealed proposals will be received by the CDPA, 508 Robert E. Lee Building, Jackson, MS 39201 for the following data processing equipment and services:
Request for Proposal No. 898, due 3:30 p.m., Tuesday, January 31, 1984, for the acquisition of a Harris 1650 upgrade for Jackson State University.
Request for Proposal No. 899, due 3:30 p.m., Thursday, February 2, 1984, for the acquisition of a computer system compatible with an IBM System/34 for Northwest Mississippi Junior College.
Detailed specifications may be obtained from the CDPA office. The CDPA reserves the right to reject any and all bids and proposals and to waive information.
Dorothy Hooper or Elaine Knowles,
State Central Data Processing Authority
601/359-1995

We Buy & Sell
DEC
Systems
Components
Digital Computer Resale
call:713 445-0082
800 Kenrick Ste C22 Houston, Tx 77060

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

CMI

3033
All models

3081
New or Used

Series 1
New 4952B's, 4967 Disk
Used 4952F's, 4952E's
Immediate Delivery
Buy-Sale-Trade
Leases Available

3083
New or Used

3081/3083/3084
Lease Financing Available
For Your System or Ours
2, 3, 4 or 5 Year Terms

Series 1 I/O
New or Used
IBM/CBC/Printronix/
Sycom/Data South/NEC
Printers - ASCII/3180
180 CPS-1136 LPM
Tape Controllers - Stand-up Unit
Dataco 3550B-4950B
Disks - Fixed/Removable
5.25B-344MB
Buy-Sell-Trade - Leases Available

Wanted
4381
Delivery Positions

Wanted
4341-M2
Call Now

3350 3880 3830
3340 3370 3330
3375 3380
Buy/Sell/Lease

SYSTEM 36
Monthly Lease Rates
Lower Than IBM Credit Corp.
2, 3, 4, or 5 year terms
Includes System 34 takeouts

3725
Lease Financing Available
For Your System or Ours
2, 3, 4 or 5 Year Terms

3800
LASER PRINTERS
Model 1's -
Available for Immediate Delivery
Model 3
Lease Financing Available - Any Term

8130's
Sale or Lease
Available Immediately

NEW 3224 PRINTERS
Greater Discounts Than IBM
Leases Available
3224-1 (140 LPM)$ 165/mo.
3224-2 (240 LPM)$ 185/mo.
Call For Short Term Rates
Immediate Delivery

3705-3704
Available for
Immediate Delivery
Sale or Lease
We Can Supply Models E through K
Call Us For Purchase/Conversion
Of Your IBLC Machines
And Save 50% Of Your Monthly Cost

CMI CORPORATION
A Torchmark Company

INTERSTATE COMPUTER EXCHANGE

EXPERTS IN **IBM**

BUY • SELL • LEASE • UPGRADE

S/34 • 40% - 60% off IBM LIST PRICE
• CUSTOM INSTALLATIONS

72 HR. UPGRADES AVAILABLE

S/38 • S/23 • S/32 • 4300 • 5110

S/36 OUTSTANDING LEASE RATES, S/34 TRADE INS

GUARANTEED!!
IBM MAINTENANCE • DELIVERY DATES
TOP $ PAID FOR S/34's and Peripherals

CALL COLLECT

IBM
SYSTEM/34
S/3 • S/32 • S/38
5291 • 5251
3741 • 3742

BUY • SELL • LEASE
REFURBISHED • RECONFIGURATED
SHORT-TERM LEASES
PURCHASE/LEASEBACK

Tennecom MARKETING INCORPORATED
210 SPACE PARK NORTH
P.O. BOX 248
GOODLETTSVILLE (NASHVILLE)
TENNESSEE 37072

800-422-1004
IN TENNESSEE CALL: (615) 859-3872

DEC

RENT • BUY • UPGRADE • SELL

PDP, 11/03, 11/04, 11/23, 11/24, 11/34,
11/44, 11/70, VAX/730, VAX/750, VAX/780

SYSTEMS • OPTIONS • SUPPLIES

11/24	16KB, Dual RL02, DZ11-A, Dual H9642 (new)	$24,995
11/23+	256KB, Dual RL02, DZV11-C, VT102, Bezzano (new)	$10,299
11/70	512KB MOS, LA36 (used)	CALL
VAX/780	16MB, PIA620, RL02, VMS Bezzano (new)	CALL

Customized Configurations--Call With Your Request.

In Stock		Specials		In Stock	
11/24-BC (new)	$11,299		RB11-PB (new)	$4,195	
DB11-A (unused)	$ 495		RB750-CA (new)	$4,195	
DWF32-AB (new)	$ 2,495		RB750-DC (new)	$6,995	
DUP11-DA (used)	$ 595		RH750 (used)	$2,995	
DZ11-F (used)	$ 3,195		RK611-EA (used)	$2,695	
H9642 (new)	$ 1,395		RL211-AK (new)	$5,195	
KT24 (new)	$ 795		RUA81-AA (new)	Call	
LP11-WA (unused)	$ 2,495		VT52-AA (new)	$ 495	

BROOKVALE ASSOCIATES
800-645-1167 NY:(516) 567-7777

NEW & USED EQUIPMENT FOR SALE BY END USER

DATA GENERAL

1) 6040 TPI PRT	$ 450	3) 1012N 1/2 BAY CABS	200
2) 6073 LP2 PRINTERS	800	2) 1144A 1 BAY CABINETS	600
1) 6074 LP2 PRINTER	1000	1) 1078A 1 BAY IND. CAB. W/AIR COND. (NEW)	4400
1) 6139 LP2 PRINTER (NEW)	1850		
1) 6181 LP2 PRINTER (NEW)	2250	1) 1078B 1 BAY IND. CABINET W/HEAT EXCH (NEW)	2800
1) 6103 25 MB DISK (NEW)	3050		
3) 6103 25 MB DISKS	4500	3) 4341 ULM 5 BOARDS	700
6) 6070 20 MB S/S	2300	3) 3664 LP2 CONT	600
1) 6070A 20 MB DISKS	2500	12) 6027 20 MB CONT	700
1) 4227D 15 MB DISK (NEW)	4800	2) 8260H 4C 5 SLOT BAK	1300
1) 6099 12.5 MB DISK W/FLPY	3100		
1) NOVA 4X 5 SLOT 128K 15 MB DISK W/FLOPPY & ULM 5			12,100
1) NOVA 4X 5 SLOT 128K 12.5 MB DISK W/FLOPPY & ALM 8			12,800
1) ECLIPSE S/30 128K 12.5 MB DISK W/FLOPPY & 2 4227'S			10,800

MODEMS & TERMINALS

11) VA1281 VADIC 1200 BAUD	125	11) 8612/24 MICOM MODEMS	1200
1) VA3451 VADIC 1200 BAUD	400	90) AU ACOUSTIC COUPLERS BELL 103-113 300	65
6) VA3455 VADIC 1200 BAUD	400		
30) ADMS L.S.I. TERMINALS	275	4) ADMS L.S.I. TERMINALS	300

CONTACT: ROBERT FULWILER 214-250-0614

BUY SELL LEASE 5120

4300's/3
S/38, S/1
S/36
S/34

Call Collect:
404-252-7480
DATAMARC
6065 Roswell Rd.
Atlanta, GA 30328

FORSYTHE McARTHUR ASSOCIATES, INC

DEALER / LESSOR OF IBM
Computers and Peripherals

FOUNDED 1971

Home Office
Chicago
919 North Michigan Avenue
Chicago, Illinois 60611
312 943-3770

Branch Offices
Atlanta 404 953-0457
Milwaukee 414 789-0644

CMA

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

IBM 3178 leasing

Flexible lease terms available
12, 24, 36 or 48 months

Hartford Computer Group

800 323 6355

The nationwide market - a call away!

DEC/DG

SYSTEMS/PARTS/PERIPHERALS
NEW/USED/SURPLUS • DISCOUNT PRICES
Since 1977! Buy, Sell, Trade and Broker.

PHIL	BRYAN	JENNIFER
DG	11-VAX	8-LSI

CALL TODAY - (305) 392-2005 TELEX 568-670

thomas business systems, inc.
4301 Oak Circle - Unit 11 Boca Raton, Florida 33431

SALE LEASE PURCHASE

DATA GENERAL

Desk Top Models 10, 20 & 30
MV/4000
MV/8000
C/350, C/150
S/250
Micro 4/X, 3/12, 1200, /280
GS/7 Expansion Chassis
Accelerator, 64Kb, I/O
Cache Memories
8/16 C/150 1Mb Memory
ALM-1/8, ULM-8, SLM-2, DCU/600
ASB-8, ATI-16, MC-8, MC-16
D210/D211/D410/D460 CRTs
D100/D200/D400/D600 CRTs
Desktop Printers
Laser Quality Printers
6160 75Mb Disk System
6161 147Mb Disk System
6250 35Mb Disk System
6060 12.5/1.2 Mb Disc System
6064 80Mb Disk System
6061/6062/6165 Tape Systems
6024/6026 Diskette Systems

AMES SCIENCES, INC.
301/229-8100

Available For Lease

4381 - M2 May 11
3370 A2 & B2 April

Maria Lawrence (415) 672-6060
Olympus Computer Marketing Inc.

System 38/36 34

- Significant Savings
- Trade-In Allowance
- Guaranteed full IBM Support
- You pay only after installation and IBM accepts the equipment under maintenance
- Fortune 500 references

Can you believe lease terms better than IBM?

- New Tax Lease
- Purchase/Lease Back
- Check IBM's New Plan A & B... then call Datacomp

The Datacomp Leasing & Service Group
Toll Free--1-800/[illegible]
New Jersey 201/467-8880
Chicago 312/[illegible]

C.D. SMITH & ASSOCIATES, INC.

DEC computer systems & options
12905-East Freeway, Suite 318
Houston, Texas 77015
(713) 451-3112
TELEX 76-2547

DEC

WE ARE BUYING: VAX 11/780

WE ARE SELLING:

MS780-DC	$ 800	DS5-W	1,400
MS780-CA	4,000	RA81-AA	18,000
MS780-DC	3,600	TS11-CA	10,000
FP780-AA	3,700	RP06-AA/-TB	8,000
DW780-AA	18,000	11/780 CPU	CALL

If you want on our Mailing List, call Valerie (713) 451-3112.

NCR - 8450

- N - Feature
- VRX - Feature
- 1 MEG Memory
- 10 CLC/MLA Lines
- Four 6590 Disc Spindles with IDC
- Twenty 6590 Disc Packs
- NCR - Maintained
- Perfect Condition
- Immediate Delivery
- Will Ship

--- MAKE OFFER ---

WINDMERE CORPORATION
4920 N.W. 165 STREET
HIALEAH, FLORIDA 33014
Phone (305) 621-2611
Attn: Data Processing

BUY / SELL / LEASE

IBM	AMDAHL
158	V/5
168	V/6
3031	V/7
3032-3033	V/8

INTERESTED IN ALL MODELS AND CONFIGURATIONS
ALSO, MODEL-FEATURE-MEMORY UPGRADES

HAVE REQUIREMENT FOR 3033-U16 WITH (1) 4660, (1) 6650, (2) 3380s.

WE WOULD LIKE TO TALK WITH YOU.
PLEASE CONTACT: DALE HAUGNER OR CHARLIE BERRY
MAJOR COMPUTER INCORPORATED
10827 Yellow Circle Drive
Minnetonka, MN 55343
(612) 933-6666

[illegible] computer.....
OUR

FOR SALE
SPERRY UNIVAC
BC7-900 SYSTEM
30 MB Disk Cabinet
600 LPM Printer
Two work stations
$15,500
Contact:
CENTRAL DATA SERVICES
1101 Grant Building
Pittsburgh, PA 15219
412 261-4300

Wanted
(1) IBM 2415 Tape Drive
(Model 405 is Acceptable)
Please Call Toll Free:
1-800-538-6000
In MA Call:
1-800-532-4094
Ask For Bob Ewing

COMPUTERWORLD CLASSIFIEDS WORK!

- POSITION ANNOUNCEMENTS
- BUY SELL SWAP
- SOFTWARE
- SOFTWARE WANTED
- TIME & SERVICES
- REAL ESTATE
- BUSINESS OPPORTUNITIES
- SEMINARS/CONFERENCES
- BIDS AND PROPOSALS

It's easy to advertise in COMPUTERWORLD. If you don't have an advertising agency to supply us with copy, layout and order, or camera ready mechanical, stat or film negative of your ad, just call one of our ad-takers at 1-800-343-6474. They will be glad to take your ad and typeset it in available fonts at no extra charge. If you have lengthy ads that require logos and artwork, just send a clean typewritten copy of your ad to the classified advertising department at COMPUTERWORLD (telecopier service is available); note the ad size you want; and, if you want your company logo to appear in your ad, please be sure to include a camera-ready copy with your insertion order. You should also supply any special borders, headlines and artwork that you want in your ad. Our Art Department will follow your suggested layout as closely as possible if you wish to send one.

Ad closing is every Friday, 6 working days prior to issue date.

Rates: Open rate is $128.10 per column inch. Columns are 2" wide. Minimum ad size is 2 column inches (1 column wide by 2 inches deep), and costs $256.20 per insertion. Additional space is available in half inch increments. Some sample sizes and costs are shown.

1 col X 4" -$512.40
2 cols X 4" -$1024.80
2 cols X 5" -$1281.00
2 cols X 8" -$2049.60

Discounts are available when you run more than 35 column inches of advertising in a year anywhere in Computerworld. Box Numbers are available, $15 per insertion.

To reserve space for your ad, or if you'd like more information on Classified advertising in COMPUTERWORLD, call our office nearest you.

Boston - (617) 879-0700 or (800) 343-6474 — New York - (201) 967-1330
Chicago - (312) 827-4433 — San Francisco - (415) 421-7330
Los Angeles - (714) 556-6400 — Atlanta - (404) 394-8738

TELECOPIER SERVICE - (617) 879-0700 or (800) 343-6474 ext. 451 or 410

William J. Mills, Manager Classified Advertising

The Bulletin Board

Buy • Sell • Lease

WANG

Present...
WANG USERS.....
HAVE YOU HEARD ABOUT THE GROUP OF FORMER WANG EMPLOYEES IN ATLANTA WHO BUY & SELL USED WANG EQUIPMENT AND PLUG COMPATIBLES?
(U.S.A. (404) 577-6566 or 1-800-241-5180

For Sale:
Several VS-80 Systems
Incl. 256-512K, 2 WE Std's, 80 Meg "Pennsy" 600 LPM Printers, Press Sold 5/90.
Also Available: OIS 115-5 (80 Meg)
(617) 273-4000
Ctrl Assoc.
Secondary Source Specialists
Since 1967

SPERRY UNIVAC

V-77 600 SYSTEM
(2) 256K CPU w/I Paper WCS
(2) 8425/50 200 MB Disk Drives
(4) 10 MB Disk Drives
(2) 800 bpi Tape Drives
(2) 800/1600 bpi Tape Drives
(1) 300 LPM Printer
(1) 600 LPM Printer
THE EXCHANGER (203)344-7000
Ask for TOM BAER

FOR SALE
SC-7 800
Available March 15
No Brokers
Call (303) 266-3666
Ask for Mr. Linder

PRIME

PRIME
LARGE SELECTION OF USED PRIME COMPUTER SYSTEMS ...SAVINGS TO 50%
Peripherals also available:
Memories-Disk Drives-Controllers
Modems-Terminals-Printers
1st SOLUTIONS
...Your Alternate Source
A DATAMATION SERVICES, INC., COMPANY
2001 EAST CAMPBELL AVE.
PHOENIX, ARIZONA 85016
(602) 957-0888
ASK FOR DON OR MATT

BURROUGHS

BUY SELL LEASE
All Systems & Peripherals
AVAILABLE
• B1955 Sys • B1965 Sys
• B90s • B900s
(Configured To Your Specs.)
SPECIAL: B1955 MEMORY
• 256 Thresholds priced 155 & 170
• TD830s, MT882s, MT980s
• 215 & 307 Style Disk Drives
• Various Tape Sub-systems
• M-Memory Upgrades
• Printers B246 & B248 Styles
Guaranteed Burroughs Maint.
Depot Maintenance Available
COMPUTER PROVIDERS
(216) 348-7878
(Akron 8004)

BUY • SELL • LEASE
B7700 • B1900 • B1955
(Factory Config., Install., Avail.)
B80 through B7900
B9348/9357/9362/9383 Disk
B9348/9474/48 Printers
Mag Tape Subsystems
TD830 • MT882 • SPO • Datacomm
TU80/CRT/11 Terminals
Installation & DEPOT M/A Available
LPP Corp. (212) 370-1100

DATA GENERAL

MV 6000/8000
2 Mb Memory Boards
Available Now
Liberal Trade In
On Your Old Boards

16-256 Yr.Mb System	$15,000
C-350 Yr. Mb System	$15,000
MV-6000 2 Mb System	Call
MV-8000 2 Mb System	Call
6060-H Nova 4S 64 Yb w/6046 & Lowboy Cab	$5,000
6060-H Nova 4X 256 Yb w/6046 (20 Mb) & Cab	$12,000
6061-H Nova 3D 256 Yb ULM II, 6046 & Cab	$7,000
6070 20 Mb Disk Subsystem	$4,000
6080 66 Mb Disk Subsystem	$12,000
6081 182 Mb Disk Subsystem	$14,000
6000 Systems Industrial Cabt	$500
9762 CDC 80 Mb Drives	$3,000
6099 Eclipse 256 Yb Memory	$2,000
6057 8140 256 Yb Memory	$2,000
6057 Nova 4X 256 Yb Memory	$2,000
6053 CRT Terminal	$975
6130 D400 Terminal	$1,200
6099 600/1600 Tape S/S	$10,000
6099-12.5 Mb Disk S/S	$2,000
6782 2 Mb MV 8000 Memory	Call
6705 512 Kb MV 6000 Memory	Call
4215 600 LPM Printer	$6,000

Int'l. Computing Systems Co.
(612) 941-2941

D.G. CRT's
Brand New

D-210	$795
D-211	$945
Desk Tops	Call

We Will Not Be Undersold on Any New or Used D.G. Equipment
Kenzie Data Systems
(212) 867-6884

DATA GENERAL

Data General
(5) 6400 Disk Subsystems $9,500 ea
(5) 6581 Disk Subsystems $14,500 ea
Call For Availability
Stewart Data, Inc.
(212) 344-0800

6214	600MB Subsystem	$25,000
6581	182MB Subsystem	$16,500
6581-A	182MB Add-On	$14,500
6581	80MB Subsystem	$8,500
6581-A	80MB Add-On	$6,500
6583	12.2MB Subsystem	$2,400
6583	10MB Subsystem	$2,400
6583	C/600-21/80 MOS	$3,000
6211-H	6120 64KB	$2,500
6060	Nova 3/12 64KB	$1,800
Data Networks		(201) 935-7551

HONEYWELL

L66, 6 & DPS 6 EQUIPMENT
NEW & REFURBISHED
Systems • Peripherals • Memory
CRT's • Applications Software
SUBSTANTIAL DISCOUNTS!!!
Mainframe Computer Hardware Ltd.
100 Riverfront Rd.
Manchester, MA 01932
(617)526-8000
TWX 710-347-7574

DEC

DEC BARGAINS

11/84A CPU Bd.	$1,995
11/44 KE44-A "CIS"	$2,975
4A-MS780-C Spares Kit	$7,500
SDV11-AA	$495
DR780-AA	$9,499
DZ11 MUX Bd.	$1,195
DZ32-B	$1,979
FP11A	$1,195
KK11-A	$1,795
KK11-S	$2,975
KW11-P	$350
MS11-MB	$1,375
MS780-DC	$4,950
MS780-FD	$2,995
MSV11-PK	$1,195
MSV11-PL	$1,275
PDP 11/84A-CC	$3,250
RLV11	$975
VAX 1MB MS730-CA	$2,995
VAX 1MB MS780-CA	$2,995

Call Ray at CEI, Inc.
(817) 275-6900

New Available in Stock!
More PDP-11 with 16 MB Winchester, (2) RD50 Floppy Drive, 256 KB Memory
Inquire Price
PDP 11-83, RLV-11 Controller, 64KB Memory, LA 120 Printer, RT-11 Licenses.
$8,800
PDP 11-23 with RL02 Drive (2), 256 KB Memory, LA 100 Printer, RT-11 Licenses.
$12,000
LA 100 Printers with Controller $525
Other Configurations Available.
Complete Range of DEC Compatible Software; Consultation.
E.E.C. Systems, Inc.
(617) 443-6100

DEC & PRIME SPECIALS
• MS780-PD
Avail Now $4,500 ea.
• PDP 11/84A, Configured to your needs Call
• RMD0-AA $6,200
• CDC 9775 600MB Call
• CDC 9766 300MB Call
• RPO6-AA Call
• VAX 11/780 1MB, 64K chip New Call
• RM05 Call
• TU78 A/B Call
• Prime Computer Systems Available Upon Request
SEVCO INC.
(617) 435-6030

DEC

DEC NEW & USED
BUY — SELL — EXCHANGE
Systems • Processors • Memory Options • Peripherals • Mini-Mics
LAZERSON BROKERS CORP.
[illegible] Sales St., Suite [illegible]
(800)[illegible]-[illegible]

DEC Equipment
Bought & Sold
Systems - Components
Peripherals
New Or Used
Needlework Enterprises
Main St., Maidstone, MA 01949
(617) 777-0000

RUA81-AA
RL02-AK
Special Sale
Brookvale Associates
(800) 646-1167
(516) 273-7777

SELL
2 VT100 w/AVO @ $750
2 DT-80/1 @ $650
Kennedy 9600
Tape Drive $750
Call (818) 748-3710

BUY • SELL • TRADE

1170 Sys.	DZ11-E	RK705
DL11-E	FP11-C	RM05-AA
DL11-W	LA120-DA	RM05-AA
DMC11	M7309	RPD40-C
DR11-B	M8012	RP06-AA
DZ11-B	MX11-CE	TE16 Mstr.

NEW YORK COMPUTER EXCHANGE
(516)752-0300 (800)645-6160

IBM

FOR SALE
S/38-544
w/3370 Disks
Will Modify To Suit
Call Ron Gibb
Computer Merchants Inc.
(914) 228-8881

PRINT TRAINS
IBM 1416 & 3216
Bought - Sold - Lease
Repaired - Reconditioned
DISKFU-ACT COMPANY, INC.
(818) 888-8481

IBM/PC
180 KB Disk,
64K, KBD $1799
IBM/XT $4495
CHI, (804) 359-7280
Room 423, P.O. Box 27401,
Richmond, VA 23279

IBM PERIPHERALS
3301-B1
3800-B2
2701-1
3262-1
3411-2
3803-1A
Computer Merchants Inc.
(914) 228-8881

Buy • Sell • Lease
IBM
Cooper Computer Corp.
Suite 219
26500 Euclid Office Plaza
Euclid, OH 44132
(216) 261-3666

SYSTEMS 34/36/38
Lease or Sale
S/36 DELIVERIES
WANT TO BUY S/34's
1-800-LEASPAK
In TX (817)268-0023

IBM

Buy ... Sell.... Lease
IBM MICR
3890 - 1419
(813) 722-4534

BUY	SELL TRADE	LEASE
S/34	S/36	S/38

Peripherals
All Guaranteed IBM Mdls.
PROCOM
(212) 279-1717

SYSTEM/34's & 36's
For Sale or Lease
SYSTEM/34 UPGRADES
Immediately Available
Southwest Computer Sales
(918) 665-1369

FOR SALE
4341 SYSTEM 01
3812 Processor Model 002 16K, 64KB Disk With 1116, 6611, 6640, and 3791
6611/6640 600 LPM Printer
6611/V11 Display Station
All Units Currently
Under IBM Maintenance
Larry A. Elkins
Imperial Oil Corp.
519/672-3711

4381-M02
March Delivery
Buy-Lease
No Brokers
Computer Stuff, Ltd.
Wally Petersen
(212) 757-7480

SYSTEM/36's
All Models Available
3 Yr. Or 5 Yr. Leases
We Take S/34 Trade-Ins
STAR DATA SYSTEMS
1 (800) 631-6662
(612) 823-6663-Texas

55% OFF LIST
6340 MODEL 236
Available Immediately
Cost $21,800
CALL PAUL
(619) 578-5410

For Sale
IBM 3370-A1 & 3370-B1
Want to Buy Any
IBM Equipment
Call Harry
(214) 438-6548

4341-L1
Available Now
Call Lakeside
Financial Corp.
(214) 522-8010

Eight IBM 3348 Data Modules
Best Offer
Call:
(213) 478-0991

WANTED: IBM SYSTEM 34, WITH COMM. ADAPTER, EIA INTERFACE, MAGAZINE, FEAT #4001, PRINTER AND CABLE THRU CRT'S. CONTACT GERALD MUNOZ AT (713) 442-4015.

For Sale
IBM 6670 Model II
Information Distributor
$22,625
Call Barbara Lester
1-800-323-3054

IBM

We Require an
IBM Systems 34 or 36
For Company Use.
No Brokers Please
(512) 646-3666

For Sale
4321-J01
1624K, 1401, 3203, 3211, 6640, 3201, 3301, 7871, 1403, 1288, 3272, 3411 Mod 3 & 3419-S.
Avail. Feb.
Western Data Sales, Inc.
213/ 370-6468

FOR SALE OR LEASE
3350-A2s
3350-B2s
Some Fixed Heads
(512) 478-6362

Sell Or Lease
Model Upgrade From 5B1 to 5BA
with 4 Comm. Line for S/88
Troy & Nichols, Inc.
(800) 851-8880
(818) 339-1814 - LA

Sale or Lease
System 38
Model 001
Troy & Nichols, Inc.
(800) 851-8880
(818) 339-1814 - LA

IBM/XTs 10MB $4,795
IBM/PC 0/0 D. $1,695
PC-3270/5251
Coaxial Adapters $1,195
8/34/36/38 3270
4680/4683/4690
Keyboard Overlays (800) 776-6676

IBM SALE/LEASE

3705 J1	Avail Now
3271-2 (Old)	Avail Now
3277-2 (Old)	Avail Now

S/34 S/36 4361
Purchase-Lease Buy Programs
VANCO CORPORATION
(212) 354-0300

FOR SALE
S/34
w/1255
For Banking
Call Ron Gibb
Computer Merchants Inc.
(914) 228-8881

IBM SYSTEM 23
Model 124
3 Diskette Controller Feature
Sort Feature
160 CPS Printer
$8,000
Roger L. Welsh Inc.
(719) 594-5414

3031-6
Sell or Lease
Computer Savings Corporation
Tom or Sandy
(602) 971-3330

More Bulletin Board on the next page.

ORDER FORM
COMPUTERWORLD BULLETIN BOARD

Issue Date: Ads can be accepted up until the Monday preceding the issue desired. Computerworld comes out every Monday.

Classifications: Most ads will be classified according to the brand of equipment that is being bought or sold. These classifications include Burroughs, Data General, Digital/DEC, Hewlett Packard, Honeywell, IBM, NCR, Sperry Univac, Salvage, Terminals, Misc. Systems and Miscellaneous.

Copy: Copy sent in via the mail or telecopier (telecopier extensions are 416 and 461) should be clearly typewritten. Ads may be given over the phone to our team of ad takers. The standard size is 1 column by 1 inch deep. These units may be combined to form larger sized ads. Describe the equipment very briefly, give the price and the name of the person to contact. All ads will be set up using a standard format. No borders or logos are allowed.

Cost: The price for each standard unit is $130.00 (One unit minimum and no fractional units allowed.) There are no agency commissions and no quantity discounts.

Billing: Once you've written your ad, send (or call) it in with your name and address for billing purposes and we'll run it. (If your company has never advertised with us before, we request a check with your order.)

Date(s): _____
Signature: _____
Name: _____
Title: _____
Company: _____
Address: _____
Telephone: _____

Send this form to:
COMPUTERWORLD BULLETIN BOARD
375 Cochituate Road, Box 880,
Framingham, MA 01701

617-879-0700 800-343-6474

The Bulletin Board

HEWLETT PACKARD

IMMEDIATE DELIVERY
Almost New

Hewlett Packard HP 3000, Model 48, fully configured with two processors and 2.35 Mb Core, eight user UNIX operating system, 554 Mb disc, two graphic terminals, 9-track and cartridge tape drives, 600 LPM printer, FORTRAN, C, and Pascal, full technical references.

Contact:
Ingell Corporation
Mr. Ray Kotowski
(419) 544-6000

HEWLETT PACKARD

HP 3000
BUY & SELL
Complete Systems
Memory • Terminals
Disc Drives • Tape Drives
Mainframes Parts
Custom Configuration
(Formerly Abbey & Associates)
(203) 655-4251
(212) 486-8845

HP 1000 HP 3000

Buy/Sell/Lease
Available From Stock
Systems • Terminals • Disc Drives •
Tape Drives • Memory • Printers • Parts
30 Day Warranty
Guaranteed HP Maintenance
Computer Solutions, Inc.
(201) 872-0400

HEWLETT PACKARD

HEWLETT PACKARD
1000 • 2000 • 3000
SYSTEMS & PERIPHERALS
BUY & SELL WORLDWIDE
EURODATA, INC.
(513)729-6466
Tlx: 288-3488

Buy-Sell-Lease
HP3000 3X, III, 4X
and related peripherals
Call Carol
CSU INDUSTRIES, Inc.
518-239-4310

MISC.

Buy • Sell • Lease
DATAPOINT
Cooper Computer Corp.
Suite 219
26500 Euclid Office Plaza
Euclid, OH 44132
(216) 261-6969

WANT TO BUY
N.E.C. Astra Series Processors
9210, 260, 280, 350, 270
Pictaro-A-2109
CRT's-A-4010
Call Computer
Providence Corp.
(216) 348-7976

MISC.

BUY - SELL - LEASE
DATAPOINT
HARDWARE & SOFTWARE
•Turnkey Systems •PIMS Software
On-Line Accounting
(713) 529-0515

For Sale
Telex
Terminals & Printers
(17) Terminals Model 6274-2
(17) Printers Model 6600-C
3 Networked Units for
Real Computer Systems
Post Union Plaza
201 South Tryon St.
Charlotte, NC 28202

MISC. SYSTEMS

For Sale
DATAPOINT
4630
300 LPM Printer
(216) 475-7878

Your ad can be here for $130

SOFTWARE FOR SALE

Need general accounting software for IBM System/38?

We've simply solved your problem.

LAWSON ASSOCIATES has solved it with the first general accounting software specifically designed for IBM System/38. Not merely compatible, but state-of-the-art to fully utilize your computer's capabilities. Compare. You won't find a total software solution like it anywhere else.

DESIGN FEATURES: They include: on line systems using data base management; menu driven, user friendly programs written in RPGIII, the System/38 language; and integrated modules. Their benefits: ease of installation and use, plus maximum employee productivity.

INTEGRATED MODULES: Those available include: General Ledger and Report Writer/Accounts Payable/Accounts Receivable/Fixed Assets/Payroll/Personnel/Purchase Order/Order Entry/Inventory Control

SERVICE FEATURES: Fully documented and supported. Onsite training and implementation. One year warranty. Available now for immediate installation.

For more information, please call or write:
Lawson Associates, 2021 East Hennepin Ave., Minneapolis, MN 55413
(612) 379-2633

LAWSON ASSOCIATES
WE SIMPLY SOLVE PROBLEMS

Changing Computers?

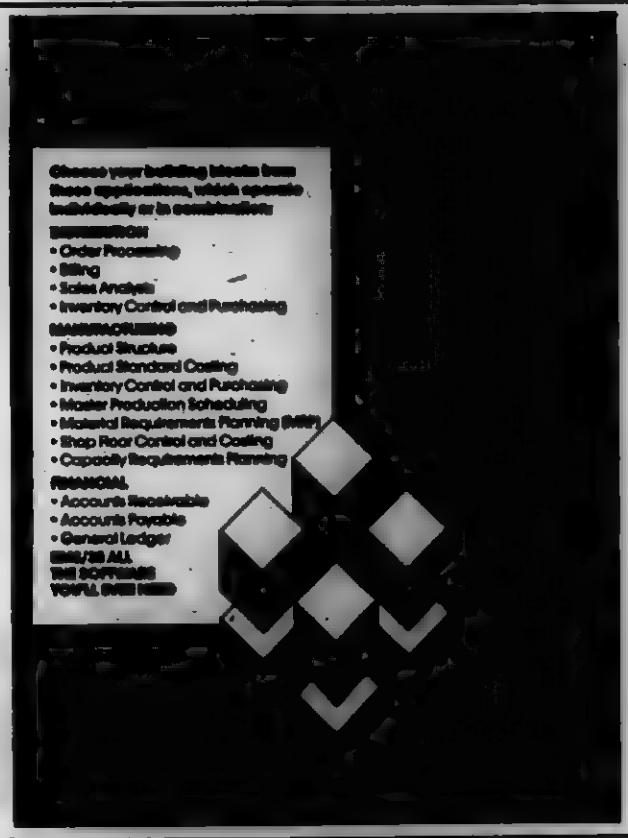
Retain your SOFTWARE INVESTMENT

Dataware's conversion approach provides the solution to management's conversion problems and facilitates the recovery of the initial capital investment in systems development.

- COBOL to COBOL
- AUTOCODER/SPS to COBOL
- EASYCODER/TRAN to COBOL
- BAL/ALC to COBOL
- DOS/ALC to OS/ALC
- PL/1 to COBOL
- RPG/RPG II to COBOL
- RPG/RPG II to PL/1

Faced with Conversion?
Call or write today

The Conversion Software People
Datawave, Inc.
2565 Elmwood Avenue
Buffalo, New York 14217
Phone (716) 876-6722
TELEX: 91519



SELLING SOFTWARE?

SELL IT HERE.

Place your ad in the BUY-SELL-SWAP pages of COMPUTERWORLD

1-800-343-6474 or
(In Mass.) (617) 879-0700

ROBOT XF38

minute System/38's real power!

For only $[illegible], this advanced computer operator runs jobs during off-hours and saves keystrokes. Runs Version 3 and 10 Enhancements plus 35 ways to edit printers, back-up disk space, and improve response time.

For FREE User Guide
CALL TOLL FREE
1-[illegible] Ext. 100

HELP/38

[illegible]

More IBM System/38 Users Are Choosing RTC Systems.

For technically superior software in a wide range of Financial, Manufacturing, Distribution and Management Business Systems.

The International Software Developers.

RTC Systems, Inc.
49 Plain Street
North Attleboro, MA 02760
(617) 695-3006

Speed-up your System/38

FRIEDMAN & ASSOCIATES, INC.
100 Walnut Road
Deerfield, Illinois 60015
(312) 948-7160

Totally on-line order entry, complete manufacturing systems, MRP with on-line net change

Fixed price software including conversion, management consulting, and years experience

We make it work!

SOFTWARE FOR SALE | SOFTWARE FOR SALE | SOFTWARE FOR SALE | SOFTWARE FOR SALE | SOFTWARE FOR SALE

CALC/1
Electronic Spreadsheet for your EDX

IBM SERIES/1

Modeled on the more popular Micro Processor packages

★Demo Diskette Available★
$500 per S/1

H & A Computer Systems
30 Holyoke Place #204
San Francisco, CA 94111
(415)434-3517

SERIES 1 SPECIALISTS

Elegant Software
for IBM S/34, 36 and 38

General Accounting	Payroll/Personnel
Financial Reporting	Property & Equipment
Accounts Receivable	Report Writer
Accounts Payable	Oil & Gas
Order Processing	All Systems are:
Inventory Management	RPG II/RPG III
Sales Analysis	Data Base
Job Cost	Interactive

J.D. Edwards & Company
4940 South Syracuse Street/Suite 600
Denver, CO 80237
303/773-3732

Dallas — 214/ 458 0696
Houston — 713/ 850 8275
Northern California — 415/ 697 7797
Southern California — 714/791 6992

WANTED
SOFTWARE DISTRIBUTORS

- LUCRATIVE PROFIT MARGIN.
- SALES SUPPORT
- TRAINING SUPPORT
- JOIN THE TEAM DURING PRODUCT INTRODUCTION AND IT WILL COST YOU NOTHING.

MILLEY DATA BASE

50 East Main Navajo Hwy / P. O. Box 2855 / El Cajon, CA 92244 / (619) 353-0410

TIME & SERVICES

New York Repair Depot Inc.

REAL COST SAVINGS

SUPER FAST TURNAROUND

VAX 750

Complete Repair Services Available for all makes:
Computer Boards
Memories
Peripherals
Cash Register Systems
USED & LIKE NEW DEC EQUIPMENT BOUGHT & SOLD

SYSTEM DEVELOPMENT ON TSO/SPF

at affordable prices
Full capacity of an IBM 3033
for daytime use in western U. S.
ISPF, COBOL, FORTRAN, PL/I, IMS,
ADF, VSAPL and other aids.

PRIMDATA OF SWEDEN
44 Montgomery St., Suite 500
San Francisco, CA 94104 • Tel (415) 955-2612

TRANSITION HELP TO MVS OR A BIGGER SYSTEM- reasonable prices.

Full capacity of an IBM 3033
for daytime use in western U. S.
We can give you the computer, the time and the technical help.

PRIMDATA OF SWEDEN
44 Montgomery St., Suite 500
San Francisco, CA 94104 • Tel (415) 955-2612

MODELING, PROJECTIONS, HEAVY BATCH

with VSAPL, ADRS, ADI, SAS, APE, GPSS, MPSX or your own programs.
Full capacity of an IBM 3033
for daytime use in western U. S.
at reasonable prices.

PRIMDATA OF SWEDEN
44 Montgomery St., Suite 500
San Francisco, CA 94104 • Tel (415) 955-2612

DATA CENTER SERVICES

BURNS

COMPUTER REPAIRS
DEC-DG
ALL BOARDS
1-2 WEEK TURNAROUND
MEMORIES
POWER SUPPLIES
DISKS PACKS AND TERMINALS
ANY MANUFACTURER

VAX 11/780 TIME $10 PER HOUR
TELENET INCLUDED
FORTRAN-BASIC-PASCAL-COBAL-DBMS-DATATREIVE - MANY MORE
NO CHG FOR SOFTWARE USE
COMPUTER TIMESHARING CORP
(619) 226-1334

VAX/VMS TIMESHARE
5¢
$2 PER HOUR CONNECT TIME
ONE MB DISK STORAGE INCLUDED
AVAILABLE NATIONWIDE VIA TELENET
LEASE-A-PORT™ WITH 10 MB DISK & NO CPU OR CONNECT CHARGES FOR $800 PER MONTH
MIDCOM CORPORATION

BUSINESS OPPORTUNITY

COMPUTER TIME RENTAL
IBM 4331
DOS/VSE - ICCS
All Shifts Available
3370 Disk, 3420 Tape
Dual Density
1403-N1,
2540 Reader/Punch
Reasonable Rates
Contact: Al Pietro
Fundamental Data Services
(212) 997-1411

Computer Services
4341-2 370/158-3
VS1-CICS-ROSCOE-DOS
REMOTE JOB ENTRY
CICS DEVELOPMENT
CICS PRODUCTION
CUSTOMIZED SOFTWARE
CONTACT JOE BARRETT
(201) 777-3454
15 MINUTES FROM LINCOLN TUNNEL
ONE PASSAIC STREET
WOOD RIDGE, N.J. 07075

VAX 11/780 AND PDP-11 DEVELOPMENT TIME
NO MINICOMPUTER TICK CHARGES / NO CPU CHARGES
Omnicomputer
$7/$14
RSTS/E VMS
PER HOUR CONNECT TIME
BUDGET BYTES™ 212-944-9230
Omnicomputer, Inc.

ICOTECH
Innovative Computer Techniques
COMPUTER SERVICES
IBM 3081 DEC-10
-Remote Job Entry -Online Processing
-Batch Processing -Timesharing
-Optical Mark Reading -Laser Printing
COMPUTER OUTPUT MICROFILM
-Datagraphix Mini Auto-Com
-Datagraphix Datamaster
-3850 SPI Capability
-Print Training
Route 206
Raritan, NJ 08869
201-526-6100
Contact: Joyce Bogenschutz

WANTED
SOFTWARE SOLUTIONS FOR THE HP3000
Hewlett-Packard is seeking quality software suppliers that address specific vertical markets in the NY/NJ area. If you have a unique application solution and want to take advantage of the financial, marketing, and technical incentive offered by Hewlett-Packard, call:
Lee Schulz
(201) 265-5000 Ext. 5407
or Sonia Abramson
(212) 971-0900
(516) 921-0300
HEWLETT PACKARD

CLASSIFIED ADVERTISING ORDER FORM

Computerworld's Classifieds work.

Issue Date: Ad closing is every Friday, 10 days prior to issue date.

Sections: Please be sure to specify the section you want: Time and Services, Software for Sale, Position Announcements and Buy/Sell/Swap. (Available upon request: Software Wanted, Business Opportunities and Real Estate).

Copy: We'll typeset your ad at no extra charge. Please attach CLEAN typewritten copy. Figure about 25 words to a column inch, not including headlines.

Cost: Our rates are $128.10 per column inch. (A column is 2" wide.) Minimum size is two column inches (2" wide by 2" deep) and costs $256.20 per insertion. Extra space is available in half-inch increments and costs $64.05. Box numbers are $15.00 extra.

Billing: If you're a first-time advertiser, (or if you have not established an account with us,) WE MUST HAVE YOUR PAYMENT IN ADVANCE.

Ad size desired: _____ columns wide by _____ inches deep.

Issue Date(s): _____

Section: _____

Signature: _____

Name: _____

Company: _____

Title: _____

Address: _____

Telephone: _____

Send this form to:

COMPUTERWORLD

CLASSIFIED ADVERTISING,

375 Cochituate Road, Box 880,
Framingham, MA 01701

Foreign Editorial/ Sales Offices

England: Terry Cartwright, EEC Publications, 196-200 Balls Pond Rd., London N1 4AQ. Phone: 01-359-3525, Telex: (851) 894065 (Computer Management, Computer Business Europe only).

Euan Ross, Bill Dunlop, Stephen Thomas, Beare Hobson Assoc., 345 Goswell Rd., Islington, London EC1V FHN. Phone: 01278 3415/6 (reps for all CWCI publications except Computer Management and Computer Business Europe).

W. Germany: Eckhard Ulpedal, CW Publikationen, Friedrichstrasse 31, 8000 Munich 40. Phone: (089) 39172-0. Telex: 5215360.

France: Axel Leblois, Le Monde Informatique, 185 Avenue Charles De Gaulle, 92200 Neuilly Sur Seine, Paris. Phone: 758.14.14. Telex: 613234 F.

Japan: Mr. Shuji Mitsuguchi, Computerworld Japan, 7-4 Shintomi 1-Chome, Chuo-ku, Tokyo 104. Phone: (03) 551-3862, Telex: 252-4217 (Computerworld Japan only).

H. Kajiama, Tokyo Representative Group, Yamaguchi Bldg., 2-12-9 Kanda Jimbo-cho, Chiyoda-ku, Tokyo 101, Phone: (03) 230-4117/8, Telex: J26860 (reps for all CWCI publications except Computerworld Japan).

Australia: Alan Power, Computerworld Pty. Ltd., 37-43 Alexander Street, Crows Nest, NSW 2065. Phone: (02) 4365133, Telex: AA74752 COMWOR.

Brazil: Eric Hippeau, Data News, Computerworld do Brazil, Servicos e Publicacoes Ltda., Rua Alcindo Guanabara, 25/10th Floor 20031 Rio de Janeiro, RJ Brazil. Phone: (021) 240-8225. Telex: 2130836(WORD BR).

Mexico: Richard Small, Computerworld de Mexico, Oaxaca 21-2, Colonia Roma, Mexico City 7 D.F. Phone: (905) 514-4218, (905) 514-6309. Telex: 1771300 ACHAME, 1777809 ACHAME.

Spain: Niall Kelley, Computerworld/Espana, Gravina, 13, Madrid 4. Phone: 231-23-86; 231-23-96; 231-23-98. Telex: 47894(CW E).

Denmark: Preben Engell, Computerworld/Denmark, Gammel Strand 50, 1202 Copenhagen K. Phone: 01-1234-11. Telex: 27566 cwden.

Sweden: Bengt Mannfeldt, Computerworld/Sweden, Nova Media AB, Vertavagen 55, 11536 Stockholm. Telex: 8105069 NOVACW.

The Netherlands: Johannes A. Wibaut, Mgr. Dir., CW Communications B.V., c/o IDC Benelux, Prins Hendriklaan II, 1075 Az Amsterdam. Phone: 020-791-692. Telex: (844) 15741.

Italy: Daniele Comboni, Gruppo Editoriale Jackson, s.r.l., Via Rosellini 12, 20124 Milano.

Argentina: Ruben Argento, Gen. Mgr., Computerworld Argentina, Av. Belgrano 406-Piso 9, CP 1092 Buenos Aires. Phone: 34-5883/5584.

Norway: Mr. Per Berrefjord, Editor, CW Norge A/S, Hovinveien 43, P.O. Box 2862, Tonyen, Oslo 6. Phone: 2/647725. Telex: (856) 76476

Singapore: Mr. David Nelds, General Manager, Asia Computerworld, Pte. Ltd., 11-08/11-10 Goldhill Plaza, Newton Road, Singapore. Phone: 250-444. Telex: (786) RS 37003

Saudi Arabia: Mr. Omar Dusuld, General Manager, Saudi Computerworld, P.O. Box 5465, Jeddah. Phone: 6575916/6560360. Telex: (926) 401205.

ADVERTISERS INDEX

ACK 46
American Telephone & Telegraph 52-53
Analysts International Corp. ID/4
Applied Data Research 3
Applied Information Development 16
A.R.T. Research 26
Asendata, Inc. 14

B I Maple Associates, Inc. 12
John Beall Company 26
Bell Manufacturing Company 81
Blue Cross & Blue Shield 40
Boole And Babbage, Inc. 18,ID/11

Cadmus Computer 100-101
Cambridge Systems Group 75
Candle Corporation 58
Canon 98-99
City National Bank 20
Codex Corp. ID/12,ID/13
Collier Jackson, Inc. 13
Comdisco 24
Comnet 6
Com/Peripherals 17
Computer Automation 20
Computer Corporation of America 66-67
Corona Data System ID/16
Cromemco Inc. 28-29
CS Computer Systems ID/16
Culinet 68-72
CW Buyer's Guide 87
CW Client ID/11
CW Office Automation 102
CW On Communications 30
CW Small 79
CW Supplement 64

Data Access 14
Data Knowledge, Inc. 102
Datagraphics ID/2,ID/3,ID/5,ID/7
Datasphere 17
DEC/KFN VAX 56-57
Dytek ID/8
Digital Control Corp. 19
Dorian Products ID/15
Dynamic 42

Eastman Kodak Co. ID/7
Equitable Life Leasing 60

Fusion Products 96

General Electric 10
GENICOM 60
Geoi Systems International 66

Hughes Aircraft 62

ICCP 90
Infodata Systems 7
Information 75
Information Sciences 48
Interactive Training Systems 89
Interface Group 82

Kennewick Industrial 88
Keytronic 28

LSM Software Corporation 30
Lee Data Corp. 94
Local Data 13

Martin Marietta 31
Master Systems 48
Mathematica 27
MCRA 30
Magstek 86
Memorex 22
MicroAge 74
MSA 76-77
MTI 8

NCR Comten, Inc. 54-55
NCR Corp. 61

On-Line Software ID/14
Oxford Software 88

Panasophic ID/15
PC World Expo 96-97
Perkin Elmer 91
Phoenix Leasing 98
Pierce Computer 60
Polygon 11

Qume 58-61

SAS Institute ID/9-ID/9
Signal Technology ID/3,ID/5
Software A G 45
Software Results 15
Sperry Corp. 63
Star Technologies 80
Steel Reddie 80
Sterling Software Marketing 14
Stone Mountain Computing 84
Syncsort 6
Syscd 10
Systemsware, Inc. 100

Tandberg Data 51
Tandem 20-21
Techland 43
Terratronics 86
Tone Software 15
Triangle Software 89
TSI International 56-57

Unger-mann-Bass 54
United Information Services 92-93

Value Computing 44
Van-Tel 100
Verbatim ID/10
VM Software 9

Xerox Corp. 95

This index is provided as an additional service. The publisher does not assume any liability for errors or omissions.

Computerworld Sales Offices

Vice-President/Sales/Donald E. Pagan
Director/National Sales/Edward P. Manoogian
Marketing Support Manager/Kathy Doyle
COMPUTERWORLD, 375 Cochituate Road, Box 880, Framingham, MA 01701
(617) 879-0700

BOSTON SALES OFFICE (617) 879-0700
Northern Regional Director/Chris Lee
District Managers/Jim McClure, Ronald Masiera, Joyce Donnelly, Michael F. Kelleher
Sales Assistant/Alice Longley
COMPUTERWORLD, 375 Cochituate Road, Box 880, Framingham, MA 01701

CHICAGO SALES OFFICE (312) 827-4433
District Manager/Arthur Kossack
Sales Assistant/Joan F. Broderick
Northern Regional Director/Chris Lee
COMPUTERWORLD, 2600 South River Road, Suite 304, Des Plaines, IL 60018

NEW YORK SALES OFFICE (201) 967-1350
Eastern Regional Director/Michael J. Masiera
Sr. District Manager/Doug Chaney
District Managers/Ray Corbin, Joan Daly, Paul La Sala
Sales Assistant/Gale M. Peterno
COMPUTERWORLD, Paramus Plaza I, 140 Route 17, North, Paramus, NJ 07652

LOS ANGELES SALES OFFICE (714) 261-1230
District Managers/Bob Hubbard, Bonnie Hoffmeister
Western Regional Director/William J. Healey
COMPUTERWORLD, 18005 Sky Park Circle, Suite 260, Irvine, CA 92714

SAN FRANCISCO SALES OFFICE (415) 421-7260
Western Regional Director/William J. Healey
Account Managers/Barry Wilkens, Tyrestam Pearson, Ernest Chamberlain
Account Manager, Classified/Wanda Stoffersen
COMPUTERWORLD, 300 Broadway, Suite 30, San Francisco, CA 94133

ATLANTA SALES OFFICE (404) 394-0758
District Director/Jeffrey Melnick
Eastern Regional Director/Michael J. Masiera
COMPUTERWORLD, 1953 Pasteur Road, Suite D, Atlanta, GA 30329

CLASSIFIED ADVERTISING (617) 879-0700
Al DeMilo
COMPUTERWORLD, 375 Cochituate Road, Box 880, Framingham, MA 01701

CW INTERNATIONAL MARKETING SERVICES
General Manager/Diane La Mongie
COMPUTERWORLD, 375 Cochituate Road, Box 880, Framingham, MA 01701
(617) 879-0700

CW COMMUNICATIONS/INC.
Board Chairman/Publisher
Patrick J. McGovern
President
W. Walter Boyd
Senior Vice-President
Lee Vance

Group VP-Communication Services, Jack Edmonston. Group VP-Circulation, Margaret Phelan. VP-Marketing, Donald E. Pagan. VP-Finance, William P. Murphy. VP-Editorial, John Wainwright.

Computerworld Headquarters: 375 Cochituate Road, P.O. Box 880, Framingham, MA 01701
Phone: (617) 879-0700, Telex: 95-1133.

SALES — Vice-President, Donald E. Pagan. National Director, Edward P. Manoogian. Corporate Advertising Administrator, Frank Collins. Marketing Support Manager, Kathy Doyle. Display Advertising Supervisor, Anne Hadley. Display Advertising, Deborah Bryer, Pam Valentinsen, Elaine Cotsell, Carolyn Medeiros, Cindy Chaisson, Mary Wisdish. Classified Advertising Manager, William J. Mills.

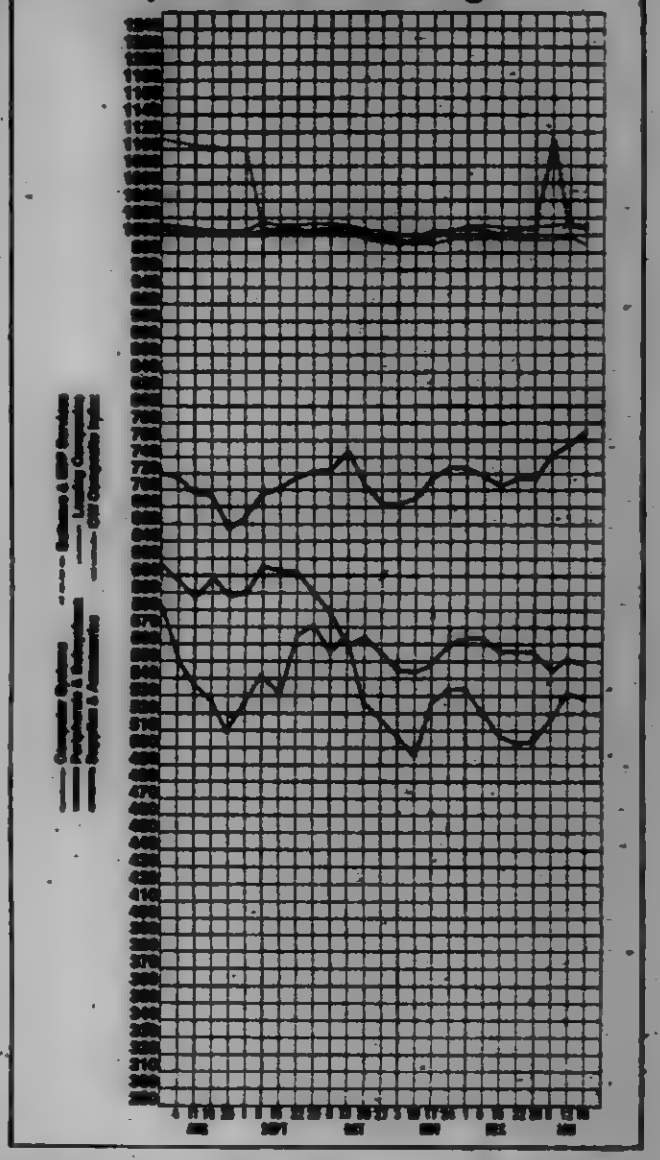
COMMUNICATION SERVICES — Group Vice-President, Josh Edmonston. Director Research, Kathryn Dickson. Sales Promotion Director, Liz Jurasits.

PRODUCTION — Production Director, Peter Hicks. Production Manager, Melissa Sibel. Paste-Up Manager, Trish Costello. Systems Manager, Tom Pilu. Typesetting Manager, Carol Polsoli. Art Director, Tom Monahan. Graphic Designer, Frank Ploy.

CIRCULATION — Group Vice-President, Margaret Phelan. Circulation Manager, Anne Dunlavy. Fulfillment Manager, Maureen Burke.

Computerworld can be purchased on 35 mm microform through University Microfilms Inc., Periodical Entry Dept., 300 Zeeb Rd., Ann Arbor, Mich. 48106, Phone (313) 761-4700. Computerworld is indexed, jointly in Computer Index, for subscription information.

Computerworld Stock Trading Index



Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, JANUARY 18, 1984

All statistics compiled, computed and formatted by TRADE QUOTES, INC. Cambridge, Mass. 02138

EXCH		PRICE 1983-84 RANGE (1)	CLOSE JAN 18 1984	NET CHANGE	WEEK PCT CHANGE
	COMPUTER SYSTEMS				
B	ALPHA MICROSYSTEMS	11- 24	17	+ 1/2	+2.8
B	ALTOS COMPUTER SYST	8- 38	11 1/2	- 1/4	-2.1
A	AMDAHL CORP	9- 39	18 1/2	+ 3/8	+2.0
O	APPLE COMPUTER INC	19- 83	82 3/4	+ 3/4	+0.9
B	AT&T	69- 70	69 5/8	+1 5/8	+2.4
B	BURROUGHS CORP	179- 28	31 1/4	+ 1/4	+0.4
B	COMPUTER AUTOMATION	9- 17	9 1/8	+ 3/4	+9.0
A	COMPUTER CONSOLES	9- 26	15 3/8	- 1/8	-0.2
O	CONTROL DATA CORP	21- 62	46	+1 1/2	+0.2
B	CONVERGENT TECHNOL	18- 41	28 3/8	- 3/8	-1.4
A	CRAY RESEARCH INC	20- 58	57 3/4	+ 3/8	+0.8
N	DATA GENERAL CORP	18- 47	43	+4 1/2	+10.5
N	DATAPOINT CORP	14- 28	28 3/4	+1 1/8	+0.5
N	DIGITAL EQUIPMENT	65-132	88 5/8	+10 3/8	+13.3
A	DSCO INC	9- 16	13 3/4	0	0.0
N	ELECTRONIC ASSOC.	9- 15	9 5/8	+ 3/8	+3.9
N	FLOATING POINT SYST	18- 44	34 1/4	-1 3/8	-3.8
N	FORWARD	22- 47	38	+ 1/8	+0.3
N	GENERAL AUTOMATION	3- 18	13 3/8	+ 1/8	+0.9
N	GRID INC	28- 44	35 1/2	+1 5/8	+4.7
N	HARRIS CORP	29- 91	41 7/8	+2 3/8	+6.0
N	HEWLETT-PACKARD CO	32- 68	44 5/8	+3	+7.2
N	HONEYWELL INC	90-136	120 3/4	-3 3/4	-2.4
N	IBM	97-126	120 1/2	-1 3/4	-1.4
O	IPL SYSTEMS INC	8- 14	9 3/4	- 1/2	-4.9
N	ITEL CORP	18- 36	20 7/8	- 1/8	-0.5
N	MARKSON COMP SYSTS	1- 8	5 3/8	0	0.0
N	MANAGEMENT ASSIST	7- 22	20 3/4	+2	+10.8
N	MATSUSHITA ELEC(ADR)	67- 88	81 1/2	- 3/8	-0.4
N	MODULAR COMPUTER SYS	8- 16	8	+ 1/2	+6.6
N	MOHAWK DATA SCI	10- 19	16 3/8	+ 1/2	+3.1
N	MOTOROLA INC	82-148	135 1/4	+2 1/8	-1.5
N	NAT'L SEMICONDUCTOR	15- 66	15 3/8	+ 1/8	+0.8
N	NCR	38-138	130	+ 7/8	+0.8
N	PERKIN-ELMER	17- 37	28 3/4	+ 1/4	+0.9
N	PRIME COMPUTER INC	11- 30	21 1/8	+2 1/4	+11.9
N	SPERRY CORP	21- 38	28 1/4	- 3/8	-1.3
N	TANDEM COMPUTERS INC	14- 44	37 1/2	+2	+5.6
N	TANDY CORP	34- 88	37 3/8	+ 7/8	+2.3
O	TELEVIDEO SYSTEMS	14- 41	16	+ 1/4	+1.6
N	TELXON CORP	8- 19	8 3/4	- 3/8	-4.0
N	TEXAS INSTRUMENTS	71-136	114 1/8	+2 1/8	+1.9
A	ULTIMATE CORP	8- 24	20 3/8	+1 1/2	+7.8
O	VECTOR GRAPHICS INC	2- 14	8	0	0.0
A	WANG LABS "B"	13- 42	28	-1	-2.7
A	WANG LABS "C"	11- 42	34 3/4	-1 3/8	-3.8
N	XEROX CORP	38- 82	48 3/4	+1 3/8	+0.7
	LEASING COMPANIES				
O	BOOTHE FINANCIAL CP	11- 35	34	- 1/4	-0.7
N	CONSISCO INC	7- 42	14 5/8	+6 1/8	+29.5
O	CONTINENTAL INFO SYS	3- 18	7 3/4	-1 1/4	-13.9
A	DPF INC	3- 13	14 3/4	+ 7/8	+6.3
N	U.S. LEASING	19- 47	38 5/8	+ 1/4	+0.6
	COMPONENTS				
O	ADVANCED MICRO DEV	62- 37	28 3/4	+ 1/8	+0.3
N	AMD'S SEMICONDUCTOR	12- 38	38 3/4	-1	-2.5
N	ANALOG DEVICES INC	18- 42	37 5/8	-1 1/8	-2.9
B	ANALOGIC CORP	20- 27	23 1/4	-1 3/4	-7.0
N	APPLIED MAGNETICS CP	16- 37	27 1/4	-1 1/8	-3.9
O	TERADYNE	14- 38	38 1/2	- 1/8	-0.3

EXCH: WHEN YOU'R A-AMERICAN; P-PACIFIC; B-BOSTON
I-NATIONAL; M-MIDWEST; O-OVER-THE-COUNTER
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

EXCH		PRICE 1983-84 RANGE (1)	CLOSE JAN 18 1984	NET CHANGE	WEEK PCT CHANGE
	SOFTWARE & EDP SERVICES				
O	ADVANCED COMP TECH	1- 8	3 3/4	- 1/4	-6.2
O	ADVANCED SYSTEMS INC	6- 22	10 3/4	- 1/4	-2.3
N	ADR COMPUTERS INC	7- 22	20 3/4	+1 1/4	+6.4
N	AMERICAN SOFTWARE	17- 31	18 3/4	- 1/4	-1.3
N	ANACOMP INC	4- 23	9 5/8	+ 1/8	+0.7
N	ANALYSTS INTL CORP	9- 26	12 3/4	- 1/4	-1.9
A	APPLIED DATA RES.	6- 27	22 5/8	+1 1/4	+5.2
N	ASK COMPUTER SYSTEMS	6- 21	18	0	0.0
O	ASTRONYME CORP INC	1- 7	3 3/4	- 1/4	-6.3
N	AUTOMATIC DATA PROC	21- 44	38 1/4	+1 3/4	+4.7
O	CDA COMPUTER ASSOC	9- 17	12	- 3/4	-5.9
O	COMPUTER ASSOC INT'L	6- 28	27 1/4	- 1/2	-1.8
O	COMPUTER HORIZONS	6- 26	19 1/2	+ 1/4	+1.3
O	COMPUTER NETWORK	4- 16	7 1/4	- 1/8	-1.8
N	COMPUTER SCIENCES	11- 25	21	+ 1/2	+2.9
O	COMPUTER TASK GROUP	9- 22	20 1/2	+1 1/2	+10.0
O	COMPUTER USAGE	9- 22	11 7/8	-1 1/8	-13.6
N	COMPUTERVISION	9- 28	9 1/2	- 3/4	-8.0
N	CONCORD CORP	9- 20	9	- 1/2	-7.8
O	COMSHARE	7- 16	11 3/4	- 3/4	-6.0
N	CULLINET SOFTWARE	13- 30	28 1/8	-1 3/4	-6.2
N	CYCARE SYSTEMS INC	9- 17	10	0	0.0
N	ELECTRONIC DATA SYST	18- 62	32 1/2	- 1/2	-0.7
N	HOGAN SYSTEM INC	18- 60	32 3/8	+ 3/4	+2.4
N	GENERAL ELECTRIC CO.	48- 80	68 3/4	-1 1/8	-1.6
O	GTE CORP	38- 49	46	- 1/4	-0.5
N	INFORMATICS INC	10- 34	22 3/4	+ 1/2	+7.0
O	INFOTRON SYSTEMS COR	20- 48	38	+ 1/2	+2.8
O	KRANZ ASSOCIATES	4- 10	8 1/8	+ 1/8	+3.0
A	LOGICON	23- 33	28 1/2	+ 1/8	+0.4
O	MCI COMMUNICATIONS	3- 20	18 3/4	+ 3/8	+4.1
O	MANET MCI AMER INC	8- 22	21 3/4	-1 1/4	-5.4
O	MATHEMATICAL APP GRP	10- 22	11 1/2	0	0.0
O	MICRO SYSTEMS INC	25- 60	44 3/4	-2	-4.3
O	MONITOR MICRO PT	0- 0	0	0	0.0
O	NATIONAL DATA CORP	9- 20	19 1/2	+ 3/4	+4.0
O	ON-LINE SOFTWARE INT	17- 27	27	0	0.0
O	PANSOPHIC SYSTEMS	4- 20	18 3/8	- 1/2	-2.8
O	PLANNING RESEARCH	4- 21	14 1/4	- 7/8	-5.8
O	POLICY MGMT SYSTS CP	15- 30	28 3/4	- 1/2	-1.7
N	PROGRAMMING & SYS	1- 8	5 1/8	0	0.0
O	REYNOLDS & REYNOLD	17- 32	30 1/2	- 3/4	-1.8
O	SEI CORP	11- 34	29 1/2	-1	-3.7
N	SHARED MEDICAL SYST	15- 43	31 1/4	-2 1/4	-6.7
O	SCIENTIFIC COMPUTERS	6- 14	11	- 1/4	-2.2
O	SOFTWARE AG	14- 17	13 1/8	- 3/8	-2.7
N	TYMSHARE INC	12- 30	20 1/2	-1 3/8	-6.2
A	UNI CORP	9- 18	14 3/4	+ 1/8	+0.8
N	UNLY CORP	7- 17	10 3/8	- 1/8	-1.1
	PERIPHERALS & SUBSYSTEMS				
O	AM INTERNATIONAL	5- 7	4 3/8	- 1/8	-2.7
N	ANDERSON JACOBSON	9- 28	10 1/4	-1 1/4	-10.9
O	AUTO-TROL TECHNOLOGY	8- 25	24 5/8	- 1/2	-1.0
O	BANCTEC INC	7- 25	15	- 3/4	-4.7
A	BERNTEK INT'L	6- 17	9	+ 1/8	+2.8
N	BOLT,BERANEK & NEW	9- 36	24	-1	-4.0
O	CANRAD CORP	1- 4	1 7/8	+ 1/8	+36.3
O	CENTRONICS DATA CORP	6- 28	18 1/8	+2 3/8	+17.2
A	DETEC CORP	6- 12	10 7/8	- 1/8	-1.1
O	DIGITRONICS	7- 26	16 3/8	-1 1/2	-12.8

EXCH		PRICE 1983-84 RANGE (1)	CLOSE JAN 18 1984	NET CHANGE	WEEK PCT CHANGE
O	COMPUTER DEVICES INC	1- 11	7/8	-	-8.0
O	COMPUTER TRANSCEIVER	4- 12	4 1/4	- 3/8	-12.8
O	COMPUVISION CORP	19- 38	33 1/4	+1 1/2	+9.6
A	COMRAC CORP	15- 38	17	- 3/8	-2.9
A	DATAPRODUCTS CORP	15- 41	36 1/2	- 1/8	-0.3
A	DATAVOX CORP	5- 12	10 3/8	+ 1/8	+1.2
O	DATA SWITCH CORP	15- 41	36	+1	+2.8
O	DATUM INC	3- 17	8	- 3/8	-4.5
O	DECISION DATA COMPUT	3- 10	10 7/8	+ 1/8	+1.0
O	DIGITAL RELUCTRE	11- 38	12 3/8	-1	-7.5
O	ELECTRONIC M & M	9- 11	9 3/8	- 3/8	-3.8
O	EXABYTE INC	15- 45	41 1/4	+1 1/4	+11.3
A	FYLDE & SUTHERLAND	10- 18	15 3/4	+2 1/4	+7.2
O	GANDALF TECHNOLOGIES	9- 22	8 3/4	+ 1/8	+1.2
O	GEN'L DATA COMM IND	9- 33	31 7/8	- 1/8	-0.4
O	GREAT SOUTHWEST IND	1- 6	3 3/4	0	0.0
N	HALTLINE CORP	7- 31	23 3/4	+7 3/8	+10.1
O	[illegible] CORP	3- 10	4 1/8	0	0.0
O	INFORMATION INTL INC	10- 22	19	- 1/2	-2.7
O	INFORMATION RESOURCE	12- 17	13 1/2	0	0.0
A	INTEL CORP	11- 48	38 1/4	-2 1/8	-5.4
O	IPL SYSTEMS INC	8- 14	9 3/4	- 1/2	-4.9
A	LANEY ELECTRONICS	7- 30	11 7/8	0	0.0
O	MEGADATA CORP	9- 19	11 1/2	- 3/4	-6.1
A	MST DATA CORP	10- 27	20 3/8	- 3/8	-1.8
O	MOHAWK CORP	8- 23	16 1/8	+ 1/8	+0.8
O	NETWORK SYSTEMS CORP	9- 34	31	+ 1/8	+0.4
O	NO AMERICAN PHILIPS	47- 78	68 1/2	- 1/2	-0.8
O	NORTHERN TELECOM LTD	22- 48	38 1/2	- 1/2	-1.3
O	ONEX	3- 8	2 1/4	0	0.0
O	PARADYNE CORP	10- 30	28	+1 3/4	+10.7
A	PENRIL CORP	7- 18	13 1/4	+ 3/4	+6.0
O	PHOENIX AMERICAN INC	7- 17	11 1/4	- 1/4	-2.2
O	PLESSEY CO (ADR)	25- 41	38 3/4	-1 1/8	-2.8
O	PRINTRONIX INC	23- 38	27 1/2	-1	-3.5
O	RANTEK CORP	8- 36	11 3/4	0	0.0
O	RAYTHEON CO	42- 70	68	+1 1/8	+0.3
A	RECOGNITION EQUIP	4- 17	13 3/8	+ 1/4	+1.8
O	ROLM CORP	40- 80	47 1/2	+2 1/2	+5.5
N	SANDERS ASSOCIATES	17-120	47 1/8	+1 3/8	+3.0
O	SCAN DATA	1- 3	3/8	0	0.0
O	SCAN-TRON CORP	12- 18	16 1/4	0	0.0
N	SCIENTIFIC ATLANTA	15- 23	15	0	0.0
O	STORAGE TECHNOLOGY	13- 33	18	- 1/8	-0.6
O	SYBES DATATRONICS	4- 27	4 3/8	- 1/8	-2.4
O	SYSTEMS & COMP TECH	28- 38	38 1/4	+1	+2.8
A	T BAR INC	7- 17	16 1/8	- 1/2	-3.0
A	TAB PRODUCTS CO	9- 30	23 1/8	- 1/8	-0.5
O	TANDON CORP	10- 38	18 3/8	- 3/4	-3.9
A	TEC INC	8- 12	8 1/2	+ 1/8	+1.7
O	TERTRONIX INC	24- 67	34 3/8	- 3/8	-1.0
N	TELEX	8- 32	27	- 1/4	-0.9
O	TESDATA SYSTEMS CP	3- 17	7 3/8	- 3/8	-10.2
A	TIMEPLEX INC	7- 30	21 1/8	+ 1/8	+0.5
O	VISUAL TECHNOLOGY	9- 38	10 3/8	0	0.0
	SUPPLIES & ACCESSORIES				
N	AMERICAN BUS PHONE	7- 23	21 3/8	+ 1/4	+1.1
N	DARRY MIDWEST	13- 32	32 1/2	0	0.0
A	DUPLEX PRODUCTS INC	12- 27	26 1/2	- 1/4	-0.9
O	EXECUTIVE BUS. PHONE	8- 26	23 1/8	- 3/8	-1.6
N	3M COMPANY	48- 86	80 3/4	-2 1/8	-2.6
N	HYCOR CORP LTD	28- 91	62 1/8	- 1/4	-0.3
O	STANDARD REGISTER	11- 34	32 3/8	+ 1/2	+1.5
N	WALLACE BUS PHONE	11- 33	28 1/8	+ 1/8	+0.4

SECURITY

Protect sensitive information with *Ven-Tel's 212 SECURITY PLUS*. Password restrict any terminal to calling only the destinations and applications you authorize. Telephone numbers, passwords, account numbers, and log-in codes are concealed to prevent unauthorized disclosure or use.

Ven-Tel security is not limited to password protection. You are secure in the confidence that your Ven-Tel modem is the most reliable and dependable in the world.

Security is the assurance that Ven-Tel has committed the investment in research, development and production facilities necessary to continued industry leadership and provide off-the-shelf delivery.

Security is knowing that the modem you buy from Ven-Tel is the most modern, technologically advanced product available on the market today. It is knowing that when you need help, a Ven-Tel technical support specialist is as close as a telephone call. It is the confidence that Ven-Tel will be there with service and support for your equipment as long as you own it.

For information call: (800) 538-5121

CUSTOM & OEM CONFIGURATIONS AVAILABLE

Ven-Tel 2342 Walsh Avenue, Santa Clara, California 95051 (408) 727-5721

VEN-TEL IS AN OEM SUPPLIER OF INTEGRAL MODEMS TO FALCO DATA PRODUCTS TERMINALS

VOL 18
ISSUE 5
JA 30 1984
UMI

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

COMPUTERWORLD

$1.50 A COPY; $44/YEAR | JANUARY 30, 1984 | VOL. XVIII, NO. 5

SPECIAL REPORT
Application packages: In search of the right stuff/follows **66**

Interview: IBM's director of security programs/**18**

Surprises in Dewar's survey/**17**

SECTIONS

Editorial/**42**
Software & Services/**46**
Communications/**59**
Systems & Peripherals/**67**
Microcomputers/**73**
Computer Industry/**81**

CW
MI48106GUIVYMUIVYMA FCb88
UNIVERSITY MICROFILMS INTL
SERIAL PUBLICATIONS
300 N ZEEB RD
ANN ARBOR MI 48106

NEWSPAPER

Candy maker, software firm in legal battle

By John Gantz
CW Washington Bureau

In a case that observers say could have a major effect on all software developers, Mars, Inc., the multibillion-dollar candy maker, is locked in a bitter legal battle on two continents with a flamboyant, high-flying Israeli software entrepreneur.

While the case involves such legal and technical esoterica as whether a certain software program was suited to production of shells of M&M candies but not the nougat centers of Mars Bars, the essence of the dispute is whether a software firm promised to develop software it knew it could not deliver.

According to documents from the federal court in New Haven, Conn., M&M/Mars, a Mars division, struck an agreement in May 1982 with an Israeli firm, Creative Output Ltd., to develop a Planned Order System, a software system for planning and executing customer orders for M&M/Mars products.

COL is run by Dr. Moshe Eliyahu Goldratt, an Israeli physicist, whose major claim to fame is an automated production process called Optimized Production Technology which, according to a recent article in *Fortune* magazine, he has pushed with messianic zeal and which has had great success in limited applications by a number of America's largest companies.

M&M/Mars had agreed in 1981 to license OPT for its nougat production through Creative Output, Inc., a Connecticut company

See MARS page 8

INSIDE

More than 75 processors from 26 vendors are pitted against the IBM 4300. Is a shakeout on the way? Page 4.

■

No more crosstown commutes for the first user of a service that combines an on-site micro with a remote supercomputer. Page 5.

■

How do you protect data transmissions in the computer age? Congress is looking into the question. Pages 6 and 7.

■

Another setback for software vendors and users came with the third ruling in six months that software is subject to state sales taxes. Page 8.

■

It's a hell of a town, Shearson/American Express decided, so it's building its $170 million DP center in Manhattan instead of New Jersey. Page 11.

■

Pennsylvania is a hard state for hackers. Its computer crime law takes effect this week. Page 13.

■

Amdahl Corp. has brought out a performance accelerator for two of its mainframes that are compatible with the IBM 3083. Page 67.

■

There's no new 32-bit superchief in Hewlett-Packard Co.'s future, the company announced, but it is planning another personal computer this spring. Page 81.

■

FCC affirms delay of some access fees

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — It took the Federal Communications Commission less than five minutes last week to decide, finally, to defer the biggest part of its upcoming surcharge for access to the long-distance network.

Wednesday's abbreviated meeting followed one on Jan. 19 at which the commission tentatively decided to defer the residential and single-line business surcharges. Specifically, the commission decided last week that residential and single-line business customers of local telephone companies will not have to pay a monthly access charge of $2/line beginning April 3. Beginning on that date, however, multiline business users will have to pay a monthly charge of up to $6/line.

At last week's meeting, the FCC deferred final action on several access-related matters of special interest to business users — whether the fee will be imposed on each access line connecting a customer's premises with a Centrex central office system and whether some relief will be provided to Foreign Exchange users which, under tariffs recently filed by the regional telephone holding companies, would be hit with mammoth increases in their monthly rates. At a press conference following last week's meeting, Jack Smith, chief of the FCC's Common Carrier Bureau, said he expects the commission to issue a final order covering the Centrex-CO

See FCC page 2

FYI

Accident modeler takes on the tough cases

By John Gantz
CW Staff

In 1980, goalie Jim Craig stood draped in an American flag before wildly cheering fans following the U.S. Olympic hockey team's victory over the Soviets in Lake Placid, N.Y.

In September 1982, Craig stood before the judge in a Massachusetts courtroom awaiting a verdict in a vehicular homicide case that stemmed from a May 29 automobile accident in which one woman was killed and two others injured.

Craig was acquitted, and much of the credit for that acquittal went to a soft-spoken computer expert whose testimony shed clear light on a trial that produced evidence as twisted as the two cars that collided on Rt. 6 in Mattapoisett, Mass., that long Memorial Day weekend.

As the Olympic hero breathed a sigh of relief, the expert — Dr. Yau Wu — chalked up another victory.

A former Boston University professor, Wu is no stranger to the courtroom. Using computerized accident reconstruction models he developed for the U.S. Department of Transportation, Wu has produced evidence for about 300 criminal and civil cases involving automobile accidents. He has been called to testify as an expert witness in more than 30 of those cases, almost all of which involved fatalities or severe injuries.

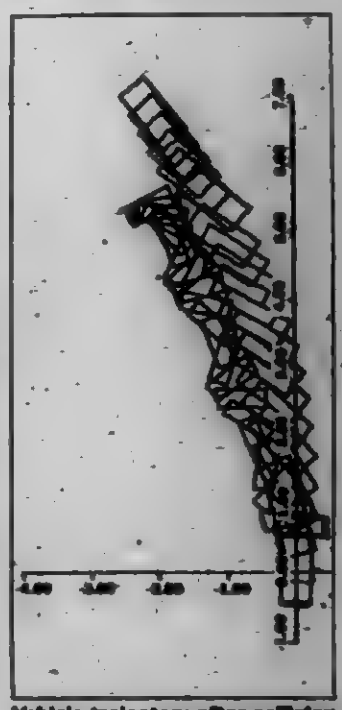
The president and sole employee of Dynamic Analysis Corp. in Concord, Mass., Wu has represented insurance companies, law firms, private citizens and most levels of the government in the legal arena. His rough, hand-drawn charts and graphs and the printouts from his Digital Equipment Corp. Decwriter are so convincing that the opposition usually decides to settle out of court rather than dispute Wu's version of events leading up to and following an accident.

In 1975, while Wu was teaching mechanical and aerospace engineering at Boston University, the U.S. Army asked him to develop a computer model that would predict the effect of a nuclear blast on Army vehicles, such as tanks and trucks.

On the basis of his success in that project, the DOT in 1976 gave Wu two years to upgrade the quality of its accident prediction model called Simulated Model of Automobile Collisions, developed by Calspan Technology Products, Inc.

"It took Calspan 10 years to develop Smac, but I didn't want to work with it. Mathematically, it was a very unstable model, and it was based on what I considered some very unsound assumptions," Wu explained in a recent interview in his Con-

See ACCIDENT page 4



Vehicle trajectory after collision

FCC from page 1

and Foreign Exchange questions next month.

Besides deferring residential and single-line business surcharges, the FCC made some other changes in its access charge decision last week. For business users, the most significant one concerns a $25/mo termination surcharge on private lines that bypass the local exchange network. The commission said that users certifying that their private lines do not interconnect with a local exchange will not have to pay the surcharge.

Effect on business users?

A bigger question, however, is what effect the deferral of the residential/small business surcharge will have on rates for business communications services.

The FCC said it deferred the residential and single-line business surcharges so it can study a number of related issues, such as the impact of the surcharge on bypass services. At the press conference, Common Carrier Bureau Chief Smith said his office has evidence of "widespread bypass."

That evidence includes data showing what percentage of business users in several states have already bypassed their local telephone networks and the impact on the revenues of the affected companies. Smith said a report containing this data and extrapolating the effects of additional bypass will be issued shortly.

FCC officials freely admitted that a big reason for deferring the residential/single-line business surcharges was political. It was widely believed that the commission was trying to forestall legislation which would bar the surcharges after June 1985, the date by which the commission expects to complete its study and have new "tariff arrangements . . . put in place," according to a commission press release.

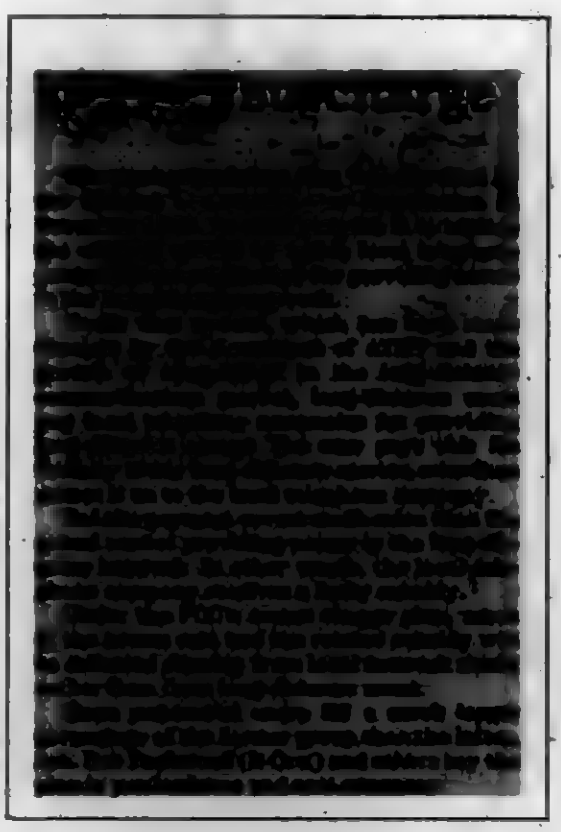
The effort to forestall legislation appeared to be successful.

Consideration of S. 1660

On Jan. 23, the Senate began considering S. 1660, a bill calling for a two-year deferral of the residential/single-line business surcharge. Authored largely by Sen. Bob Packwood (R-Ore.), a key Senate telecommunications policymaker, the bill is somewhat similar to H.R. 4102, the telecommunications legislation passed by the House of Representatives last year. The Senate bill is backed by state regulators, union and consumer groups but is opposed by business users, AT&T, the regional holding companies, the FCC and the Reagan administration.

As *Computerworld* went to press last week, the Senate was preparing to vote on a motion to table S. 1660.

According to a knowledgeable source, the motion will pass because "in an election year, no politician wants to deal with an issue that will alienate constituents or contributors. The FCC, by deferring the residential surcharge, has provided an acceptable way for senators to sidestep that choice."



Effect of decision on future rates?

WASHINGTON, D.C. — What effect will last week's decision by the Federal Communications Commission have on the rates that business users will pay in the future?

AT&T and the nation's local telephone companies filed tariffs reflecting the FCC's access charge plan last October. AT&T proposed an overall 10.5% reduction in long-distance dial-up Message Toll Service (MTS) rates, a 6.9% reduction in Wats charges and a 15.3% increase in private-line fees.

Earlier this month, the company said that based on a re-evaluation of its costs, MTS and Wats rates would be reduced more than promised earlier, while private-line charges would not rise as much [CW, Jan. 16].

AT&T stressed on both occasions that all estimates assume that a $2/mo access surcharge would be imposed on residential and small business users. When the FCC decided to defer those fees, FCC Chairman Mark Fowler admitted that "not much" of the promised reduction might be left as a result.

Under the original FCC access charge plan, an estimated $3.5 billion in costs now paid by long-distance users would have been shifted to local network users. Since virtually all of this "revenue requirement" was to be subtracted from AT&T's costs, the savings presumably were included in the promised rate reductions. Deferral of the residential/small business access surcharge reportedly will reduce the cost transfer to about $1 billion.

Centrex-CO issue focuses on lines

WASHINGTON, D.C. — The argument over whether the access surcharge proposed by the Federal Communications Commission should be imposed on each access line connecting a customer's premise with a Centrex central office (CO) system results from the greater number of access lines needed to connect users of this equipment to their telephone end offices than is required for on-premise private branch exchanges (PBX).

The FCC has received complaints about the surcharge not only from Centrex-CO users, but also from the former Bell operating companies that supply this equipment. The operating companies say that because of the higher access charges, they will lose business to competing PBX suppliers and will have to raise their local exchange rates to compensate for the loss of revenue.

When the commission considered this same basic issue last year, it ruled that users of Centrex-COs installed or ordered prior to July 27, 1983 would pay the residential access charge — $2/line per month — while the other Centrex-CO users would have to pay $6. The users and regional telephone holding companies are now asking the FCC to apply the $2 charge to all users and/or adopt a "PBX equivalency ratio" that would charge each user for a lesser number of access lines than the user actually has.

The FCC rejected both options last summer. It claimed that "if Centrex uses more lines, then Centrex necessarily creates more line costs."

Arinc anticipates surcharge troubles

WASHINGTON, D.C. — There are two basic problems with the upcoming access surcharges on Foreign Exchange users, according to Aeronautical Radio, Inc. (Arinc), which operates communications facilities for the nation's major airlines and is a major Foreign Exchange user:

- AT&T and, therefore, its customers will have to pay considerably more — 55% more — than other common carriers for local exchange access.

The justification for this differential is that the other common carriers will receive poorer quality access. But in the case of Foreign Exchange, Arinc said, the access provided to AT&T and the other common carriers is identical. As a result, the association has asked the Federal Communications Commission to make AT&T's Foreign Exchange access charge the same as the other common carriers' charge.

- Last October, most local telephone operating companies filed tariffs specifying what they wanted to charge for interconnecting their networks with the long-distance circuits of AT&T, MCI Communications Corp. and the other interexchange carriers. Charges for Foreign Exchange interconnections were raised as much as 1,800%, according to Arinc General Counsel John Bartlett. The present charge, on the average, is $30/mo for each local phone number assigned to the "open end" of a Foreign Exchange line, he explained, adding that under the pending local carrier tariffs, this charge would be $390.

Federal plan could save $29.5 billion in DP waste

By John Verity
CW Washington Bureau

WASHINGTON, D.C. — When it receives President Reagan's deficit-burdened federal budget this week, the U.S. Congress will also have before it a White House report recommending waste-reducing measures that in three years could save $424 billion, including $29.5 billion in DP and office automation expenses.

The recommendations are contained in a 656-page, two-volume study released in mid-January by the President's Private Sector Survey on Cost Control, better known as the Grace Commission after its chairman, J. Peter Grace, chief executive officer of W. R. Grace & Co. The DP/OA cost-cutting measures were prepared earlier by a special 44-member subcommittee of the Grace panel.

The subcommittee reported that "despite the fact that DP pervades the functioning of almost all aspects of the government, the estimate of federal DP expenditures is only $12 billion, about 1.6% of the total federal budget, but DP has the potential for savings far in excess of these annual expenditures."

A key finding of the DP/OA task force was that the government is not effectively managing its information technology resources. It recommended that the president appoint a federal information resource manager within a new White House Office of Federal Management.

The task force also said each agency should appoint a qualified top civil servant to oversee DP/OA within his agency who "should examine means of consolidating and enhancing the DP systems within the agency." This could lead to savings of $4.03 billion over the next three years. Noting that government teleprocessing costs are increasing by more than 25% a year, the panel said agency sharing of networks could save $517 million in three years.

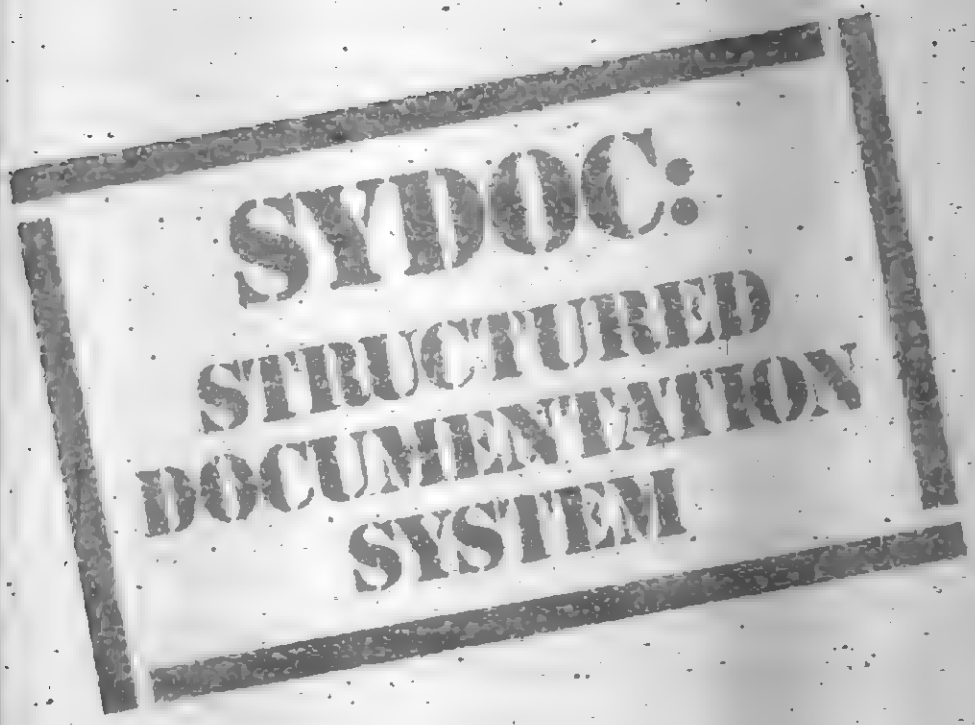
"SHOCKING!"

The Facts of Life About Maintenance and Documentation.

(And how SYDOC can change 'em!)

Call (201) 568-9700.

SYDOC:
Structured Documentation System



In keeping with our tradition of printing "all the DP news that fits," we present *Six Unexpurgated Facts About COBOL Maintenance and Documentation:*

1. Very few programmers—male of female—have ever established a meaningful relationship with documentation. What they produce is seldom very good—and it's almost never updated.

2. The result is a generation that might be called "Orphan COBOL Programs." They may have fathers. And they may have mothers. But birth certificates they have not got!

3. The rub comes when you try to update these orphans to meet the demands of the brave new world of DP. You can try to deduce the logic of such orphans by referring to the source code. But that's a slow and dangerous business. And your name had better be Sherlock Holmes.

4. Or you can simply ask the author of the program about the underlying logic. But guess what? He or she has just left for an exciting new job in Tahiti.

5. What you're probably left with is hand-drawn hierarchical charts—a long bus ride from structured programming techniques. And if you try to insert new code without understanding the logic, watch out. You'll probably introduce so many bugs you'll never be free of the exterminator!

6. The cost to society is high. It's been estimated that as much as 80% of your entire DP budget may be going into modifying complex COBOL programs!

WITH SYDOC YOU CAN SAY GOODBYE TO ALL THAT: SYDOC is not a sort but a new and exciting Structured Documentation System for OS/VS. It takes the responsibility for documentation out of the hands of programmers and puts it on the broad shoulders of the computer. SYDOC works three ways:

1. SYDOC IS GREAT FOR MAKING MODIFICATIONS: It works like an X-Ray. It analyzes existing programs and prints out charts that tell you everything you need to know about the program's logic, hierarchical structure, variables, and relationships between statements. You can quickly and safely pinpoint code to be changed. And you're far less likely to introduce bugs because you *know* the logic.

2. SYDOC IS GREAT FOR DOCUMENTING NEW BORNS: It tracks new programs and automatically produces first-rate structured documentation. You have an accurate and concise record of every program your staff develops. A record that can never be lured away by an executive recruiter.

3. SYDOC IS GREAT FOR MANAGERS: It permits you to establish uniform, structured-documentation standards and stick to them. You don't have to nag programmers about documentation. The ball is in the computer's court.

So if you'd like to reduce the size of your COBOL maintenance budget, give us a call. Dr. SYDOC will be glad to put you on his famous "Waste Watcher" diet!

syncsort INC.

Syncsort Incorporated 560 Sylvan Ave., Englewood Cliffs, N.J. 07632

NEWS

IBM 4300 rivals reach 95 in number

Despite seeming vigor, market may be on the wane

By Tom Henshel
CW Staff

The excitement had mounted to near-fever pitch five years ago as the computer industry awaited the introduction of IBM's E series processor. When it was finally announced as the 4300 series, the mid-range machine spawned a rush of both compatible and noncompatible processors that offered basically the same performance characteristics.

Today, there are at least 95 processors from more than 25 vendors pitted against the 4300 series. They range from low-end mainframes manufactured by such entrenched vendors as Burroughs Corp., Sperry Corp. and Honeywell, Inc. to high-end, 32-bit superminis made by Digital Equipment Corp., Prime Computer, Inc. and Data General Corp.

IBM's 4300 line alone contains 11 systems: the 4321, 4331-11, 4331-2, 4341-9, 4341-10, 4341-1, 4341-11, 4341-2, 4341-12, 4361 and 4381.

But the market for such systems may be on the wane, and most industry watchers think a shakeout is in the cards.

The transitory nature of computer markets is certainly not new. The rise and demise of the 16-bit minicomputer market is a classic example of how computer companies can be sent scavenging for market niches to sell their products. But in the case of 4300-class machines, the market was born, matured and now appears to be waning in less than five years — the same time frame many DP shops use to reevaluate their processing needs.

For users, a shakeout in the 4300 market could mean one of two things:

- The new processor purchased three or four years ago may have reached its limit when it comes to general business applications.
- Some vendors may wind up going out of business or dramatically changing their marketing focus for mid-range systems, perhaps switching from the general business arena to more specialized market niches.

Is the market for mid-range processors doomed? Most analysts agree the market will not simply vanish. It will, instead, change shape over the next few years, with most growth stemming from new applications of the machines.

Five years ago, when the 4300 was announced, the popular buzzword in the computer industry was "distributed data processing" (DDP), recalls Frank Gens, an industry watcher with The Yankee Group in Boston. Everyone was convinced that large corporations would distribute mid-range processors that would communicate with larger, centrally located mainframe processors.

The idea had merit, Gens said, but the unexpected happened. Microcomputers burst on the scene, sending a shock wave through the DP community that is still reverberating.

What once appeared to be a great idea — DDP — suddenly seemed less plausible. Mid-range processors require trained people to run them; in the case of large 4300 machines and their counterparts, Gens pointed out, up to a dozen highly paid computer technicians might be required at each remote location.

Micros, on the other hand, are "user-friendly," today's most popular buzzword. While they tend to offer less functionality than superminis or low-end mainframes, micros are cheap, easy to use and provide almost instant gratification to application-starved users.

But micros cannot bear all the blame for the fate of the mid-range processor market. To some degree, the sheep-like dependence on IBM by some computer vendors has lead them to the edge of a cliff.

"Typically, 'me too' products don't sell. Some firms have mistaken an [IBM] product upgrade for a whole new market," said Neil DiGeronimo, manager of high-technology research at the Cleveland-based market research firm Predicasts, Inc.

But DiGeronimo claimed there is still an ample supply of users for some mid-range processors. For example, the five big mainframers often referred to as "the Bunch companies" — Burroughs, Sperry, NCR Corp., Control Data Corp. and Honeywell — offer mid-range processors as a growth path for smaller system users. And superminis geared toward scientific applications, such as DEC's VAX-11 line, and processors manufactured by Harris Corp. and Gould, Inc.'s SEL Computer Systems Division have succeeded in identifying specialized applications like computer-aided design and manufacturing.

Ironically, the salvation of the mid-range processors may be the microcomputers that have displaced so many of them. The Yankee Group's Gens maintained that mid-range processors will make dandy intelligent controllers for networks of microcomputers. For that reason, The Yankee Group predicted minis will hold their own over the next four years, with about 30% of the total installed base of computer systems.

But Gens also noted the applications for those systems will change dramatically in that time.

MODELER from page 1

cord office. "I told the department that I wanted to develop my own model, and they laughed because I only had a two-year commission."

With a project team of four programmers, Wu built a complex mathematical model — dubbed Impact for Improved Mathematical Prediction of Automobile Collision and Trajectory — that proved to be an extremely accurate tool for predicting the extent of damage resulting from a two-car collision. DOT embraced the model, which was developed in Fortran on the department's Control Data Corp. mainframe in Rockville, Md., for automobile safety testing and safety design research.

When Wu tackles a case, he begins painstaking research into the details of an accident, poring over police reports, skid marks and crumpled vehicles to unearth the data that is fed into a model. Currently, Wu accesses a portion of the Impact model known as Impact Speed Estimator (ISE) stored on an IBM 370 mainframe at Boston University. While the entire Impact model is used to predict the outcome of a hypothetical collision, ISE aids Wu in reconstructing the events in an accident case.

The model, in return, yields such information as a vehicle's speed before impact, speed during braking and the angle of impact; this information usually points to the party at fault. If an accident involves more than two vehicles, Wu uses ISE to analyze the initial two-car collision and pieces together the rest of the puzzle with manual calculations. Thus far, his evidence has been accepted without reservation by the courts.

Wu, who says he is "well paid" for his efforts.

Second-class postage paid at Framingham, Mass., and additional mailing offices. *Computerworld (ISSN-0010-4841) is published weekly, except: January (6 issues), February (5 issues), March (5 issues), April (7 issues), May (5 issues), June (5 issues), July (5 issues), August (5 issues), September (5 issues), October (5 issues), November (5 issues), and a single combined issue for the last week in December and the first week in January by CW Communications/ Inc., Box 880, 375 Cochituate Road, Framingham, Mass. 01701.*

Copyright 1984 by CW Communications/Inc. All rights reserved.

Computerworld can be purchased on 35 mm microform through University Microfilms Int. Periodical Entry Dept., 300 Zeeb Rd., Ann Arbor, Mich. 48106. Phone (313) 761-4700. *Computerworld* is indexed: write to Circulation Dept. for subscription information.

PHOTOCOPY RIGHTS: permission to photocopy for internal or personal; use or the internal or personal use of specific clients is granted by CW Communications for libraries and other users registered with the Copyright Clearance Center (CCC), provided that the base fee of $3.00 per copy of the article, plus $.50 per page is paid directly to Copyright Clearance Center, 21 Congress Street, Salem, MA 01970.

Permission to photocopy does not extend to contributed articles followed by this symbol. ‡

Special requests should be addressed to Nancy M. Shannon, CW Communications/Inc. Box 880, 375 Cochituate Rd., Framingham, MA 01701. ISSN 0010-4841/82 $3.00 + $.50

$1.50 a copy; U.S. — $44 a year; Canada, Central & So. America — $110 a year; Europe — $165 a year; all other countries — $245 a year (airmail service). Four weeks notice is required for change of address. Please allow six weeks for new subscription service to begin.

ABC ABP mcc

POSTMASTER: Send Form 3579 (Change of Address) to Computerworld, Circulation Dept., Box 880, 375 Cochituate Road, Framingham, Mass. 01701.

Vista takes commute out of design firm's data

1ST USER

By John Gallant
CW Staff

ATLANTA — As if the task of inputting reams of numbers into a huge statistical model wasn't tedious enough, the employees of Dynaplan International Corp. faced another onerous chore — transporting that data some 35 miles by car each time the model had to be run.

After the 45-minute commute to United Information Services, Inc.'s (UIS) local service bureau here, one of Dynaplan's aircraft operation and air-control specialists would feed the data into a complex simulation model residing on the UIS mainframe.

But earlier this month, Dynaplan became the first user of UIS' Vista Service, which combines a Texas Instruments, Inc. microcomputer and UIS' communications and applications software. Since then, the consulting firm said, it has reaped time and money savings and gained access to a wealth of processing power.

Dynaplan is in the highly competitive field of airport design and airport terminal planning. In addition, the company does land-use modeling, financial feasibility analyses, heliport design and aircraft selection consulting for its clients.

Work involves INM

Much of Dynaplan's design and consulting work involves using the Federal Aviation Administration's Integrated Noise Model (INM), a program that simulates the noise levels generated at and around an airport by different types of aircraft. A copy of the INM program and a set of statistical data bases related to it are maintained on UIS' Atlanta mainframe.

In order to input the variety of statistics needed to run the model, Dynaplan, in the past, had to transport data physically to the UIS office, where the data was entered via a terminal or with punched cards. That often led to costly data entry errors.

"We had to send someone who knew how to operate the computer and who was familiar with the model. Unfortunately, that type of individual is not the best data entry clerk nor the best proofreader," noted Dynaplan President Gordon Jackson. "We would have the wrong number input in the wrong column, for example, and that would kill an entire run. That was a real problem because the model is horribly expensive to operate."

UIS' Vista Service has alleviated that problem, Jackson explained. The Vista Service is based on a TI Professional Computer with 256K bytes of main memory, two 360K-byte floppy disks and TI's Model 850 printer. UIS' Vistacom communications software allows the Professional Computer in Jackson's office to upload and download data from the Atlanta office's 16M-byte Cray Research, Inc. Cray-1/S supercomputer.

While the communications software enables the Professional Computer to emulate an asynchronous, Ascii-compatible terminal for interactive processing, Dynaplan's Jackson prefers a more cost-effective method of utilizing the Cray supercomputer's enormous power. Statistical data for the INM model is entered into the TI micro, then printed, checked for errors and uploaded to the mainframe for processing. The model's results are then downloaded to the micro for review.

"The ability to communicate with the mainframe from our offices has resulted in a great time savings for us," Jackson said. "But a greater benefit has been the improved accuracy with which we can set up our data base on the Professional. We are keeping errors to a minimum, and that accuracy cuts down the number of repeated processing runs, which are becoming even more expensive as the model is updated."

The Vista Service has also given Dynaplan the opportunity to utilize a variety of software packages written for the TI micro's operating system, Microsoft, Inc.'s MS-DOS. Dynaplan is currently running Management Science America, Inc.'s Peachtext word processing and Peachcalc spreadsheet packages. Jackson has chosen to maintain the data from those applications on the micro rather than uploading it to the UIS mainframe.

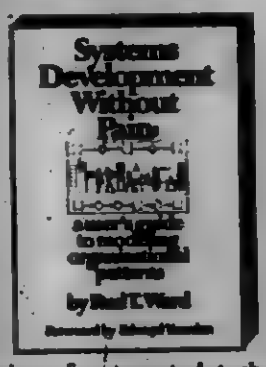
Dynaplan has yet to make use of applications developed for Vista by UIS, including its Vistaform data entry system and Multiplan modeling package.

Jackson chose the Vista Service after an extensive review of the microcomputers and remote computing services available. A similar service offered by Control Data Corp. was the only real competition in the selection process, he said, but Vista's micro-to-mainframe link feature and a comprehensive installation plan swayed the decision in UIS' favor. Moreover, the Vistacom software gave Dynaplan's staff the capability to access aviation data bases offered by other remote computing services.

ASML: Translated it means quality systems.

A user's guide to systems development from Yourdon Press.

Direct communication between DP professionals and users is crucial in developing a successful system. In *Systems Development Without Pain: A User's Guide to Modeling Organizational Patterns*, Paul Ward introduces A Systems Modeling Language (ASML), a step-by-step approach to defining systems requirements by identifying and modeling patterns in the work environment. ASML removes the usual language barriers between technical and nontechnical experts, enabling all users to effectively communicate their needs. The result is a system that finally fulfills the promise of automated technology, to enhance the user's productivity. Appropriate for both people experienced in systems development and novices, ASML builds on, but simplifies, the concepts of structured analysis. It is the first technique to integrate data modeling with process modeling, demonstrating the importance of their correlation. With ASML, a statement of requirements can be created quickly, since building a detailed model of a system to be modified is not necessary.



With nearly 200 diagrams and examples from everyday life, *Systems Development Without Pain* helps develop an open, trouble-free relationship among all the people involved in systems development.

288 pages, $27.50, softcover; ISBN: 0-917072-40-5

ORDERING INFORMATION: Specify quantity per title. Coupon prices include $1.25 per book for shipping & handling. Residents of WA, CA & NY states, add applicable sales tax. Orders must be prepaid in U.S. funds.
Or, charge your order on ☐VISA or ☐MASTERCARD.
Card No. _____
Signature _____
Expiration Date _____
☐ I want to improve user/analyst relations. Enclosed is $28.75 for each copy of *Systems Development Without Pain*, by Paul Ward.
☐ I want to ensure data security. Enclosed is $23.25 for each copy of *Building Controls into Structured Systems*, by Al Brill.
☐ I want to learn practical tips on analysis. Enclosed is $19.75 for each copy of *The Practice of Structured Analysis*, by Robert Keller.
☐ Please send me your current catalog and put me on your mailing list.
Name: _____
Company: _____
Business ☐ or Home ☐ St.: _____
City: _____ State: _____ Zip: _____
Business ☐ or Home ☐ Phone: (___) _____
Yourdon Press, Dept. CW1/30/84, 1133 Ave. of the Americas NY, NY 10036 (212) 391-2828 X3046 (800) 223-2452, X3046

YOURDON PRESS, 1133 AVE. OF AMERICAS, NY NY 10036
(800) 223-2452, EXT. 3046

Reformers argue '68 law leaves data vulnerable

By John Gallant
CW Staff

WASHINGTON, D.C. — Attempts to revise the 1968 federal wiretap law are raising questions about the confidentiality of data transmissions, which may be left unprotected by current legal safeguards.

A U.S. House of Representatives Judiciary subcommittee headed by Rep. Robert Kastenmeier (D-Wis.) began hearings last week to explore whether the 1968 wiretap statute should be rewritten to tighten what some telecommunications and civil liberties legal experts believe is a serious loophole. Other congressional panels, including a second House Judiciary subcommittee, this one headed by Rep. Don Edwards (D-Calif.), and a Senate Judiciary committee chaired by Sen. Charles Mathias Jr. (R-Md.), are also planning hearings on the topic.

The loophole, experts said, is that the 1968 law protects only aural (audible) telephone transmissions from unauthorized interception. The statute makes it a federal felony for a third party to tap into the conversations of others, with the exception of law enforcement officials who must first obtain a warrant for the wiretap.

The wording of the statute defines "intercept" as the "aural acquisition of information"; this leaves out digitized data transmissions because no "voice" sounds are generated.

Representatives on both sides of the issue admit that law enforcement authorities have not taken advantage of the loophole in criminal investigations, but revisionists are concerned that may change.

Because of the increasing importance of data communications, according to John Shattuck, director of the national office of the American Civil Liberties Union, the statute could give the federal government "greater search powers than it has ever had."

Shattuck believes "we need some sort of judicial warrant system. The law is clearly lagging behind our modern technology. This is a major concern for us and for many people in the communications industry."

A 1980 report drafted for the Senate by the U.S. General Accounting Office supports Shattuck's views. The study stated that "nonaural interception techniques" were being used more frequently and that data transmissions were "becoming less likely to be protected against unauthorized reception by current statutory provisions."

According to Kastenmeier, "the ability of new technology to go beyond such definitions and terms of invading personal privacy makes consideration of this issue most urgent."

Representatives on both sides of the issue admit that law enforcement authorities have not taken advantage of the loophole in criminal investigations.

U.S. Justice Department officials, however, are firmly opposed to any revisions to the 1968 wiretap law. Spokesman John Russell said the department is "comfortable" with the statute as it is written and added that it has "sufficient safeguards to protect individual rights."

Russell confirmed a recent statement by John Keeney, deputy attorney general in the criminal division, that the "current feeling [of the Justice Department] is that the 1968 wiretap law should not be changed. There would be simpler ways to take on computer crime," Keeney said.

When asked what those simpler methods are, Russell said that current federal wire fraud statutes provide sufficient protection against unauthorized data interception. Although federal law enforcement authorities are not required to obtain a warrant before tapping into data transmissions, it was the Justice Department's policy that "when in doubt, get a warrant," he maintained.

Panel chose not to include transmissions in statute

The U.S. Senate Judiciary Committee that drafted the 1968 wiretap statute made a conscious decision not to put data transmissions under the umbrella of protection afforded by that legislation, a key draftsman of the law said last week.

"The statute was only designed to deal with one problem — aural surveillance," G. Robert Blakey, former staff member of the Judiciary Committee, explained. "At that time, we had a consensus in Congress on the issue of wiretapping and bugging, and that was what we dealt with. We had no consensus on the interception of machine-based data or any other kind of surveillance."

Blakey, now a professor at Notre Dame Law School, thinks attempts by congressional panels and privacy groups to revise the 1968 statute may be misguided. "The loophole that they so solemnly announce simply does not exist. There is no loophole because the act was not intended to cover electronic data transmissions at all. That area brings up problems that are not at all related to wiretapping and bugging. We saw that as an issue to be taken up at a later point.

"Focusing on this 'loophole' is gimmickry," Blakey added. "It's a misfocused effort. People should really be talking about the privacy of computers against unauthorized access. They ought to address whether the current federal laws are adequate to deal with private or public access to machine-based data. That might help them to draft better legislation rather than simply revising the 1968 statute."

Protection of machine-based data, according to Blakey, was not a matter of public concern in the late 1960s.

"The problem today has nothing to do with the wiretap statute. Technological change is the problem. The rate of change has outstripped our legal system. That's a characteristic of a modern society."

In Blakey's view, there exists a body of federal statutes that is adequate to protect individuals and businesses from the unauthorized interception of data. He includes among those laws federal wire fraud statutes and the Civil Rights Act.

"There is no statute that deals specifically with the issue, but there is a group of federal laws that touch on it," he said.

Naisbitt to keynote users meet

RESTON, Va. — Software AG of North America, Inc. will hold its 13th Annual International Users Conference April 29 to May 3 in Anaheim, Calif. The keynote speaker will be John Naisbitt, chairman of the Naisbitt Group and author of *Megatrends: Ten New Directions Transforming Our Lives.*

Other speakers will include Thomas Blondi, Software AG vice-president of marketing, and Shaku Atre, president of Atre International, Inc.

In addition to general and technical sessions, the conference will feature education classes consisting of in-depth discussions between attendees and instructors. Classes will be offered on details of Software AG's Adabas, Natural and Complete products.

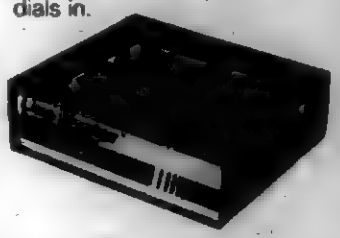
The registration fee is $595. Software AG is located at 11800 Sunrise Valley Drive, Reston, Va. 22091.

MANUFACTURING MANAGEMENT SOFTWARE FOR HP3000

The Solution.
Dial-Up 3270

LineMaster An intelligent device for dial-in access to your mainframe 3270 Bisync line. **LineMaster** is a communications watchdog which keeps a line in service until a user dials in.

- For any remote 3271/4/6 line—up to 19.2K baud
- Compatible with any 3270 BiSync emulator including microcomputers.
- Connects between modem and mainframe.
- Installs in minutes.



$639.

Microframe, Inc.
205 Livingston Avenue
New Brunswick, NJ 08901
(201) 828-4499

Panel on protecting data transmission urged

By John Hirshberg
CW Washington Bureau

WASHINGTON, D.C. — A special commission chartered by Congress may be needed to consider ways to protect communications privacy in the computer age, participants at House of Representatives hearings on the subject said last week.

"The essence of personal privacy protection is the assurance that private communications are protected," but in current congressional debate on computer security there is no common "moral or philosophical understanding" of how surveillance laws should protect competing interests in a technological era, Rep. Robert W. Kastenmeier (D-Wis.), chairman of the Judiciary Subcommittee on Courts, Civil Liberties and the Administration of Justice, said Tuesday.

The subcommittee is one of several in Congress concerned that existing laws, particularly the 1968 federal wiretap statute, do not adequately guard computer-based communications against electronic surveillance, from individuals and private and government organizations (see story on Page 6). While there is no widespread agreement that a new law is needed, there is general consensus that changing technology is raising new issues not covered under existing statutes.

Dr. Herman Schwartz, an American University Law professor, told Kastenmeier's subcommittee, "I have some difficulty understanding some of the current concern about loopholes" in the law. He argued that the wiretap law covers all verbal communications, whether analog or digital, and that all computer communications are protected under the Fourth Amendment, which provides protection from unreasonable searches and seizures.

Increased wiretapping

Schwartz, however, also said that "more people are being wiretapped today than ever before. . . . I think official electronic surveillance remains a distressing feature of modern America. Unfortunately, it will only get worse." He called interception of computer communications "a hard problem [which] should be faced directly as a special problem."

Other witnesses at the hearing said law enforcement abuses of wiretap law are to date minimal, particularly at the federal level, although there is more potential for abuse at the state level. It was also suggested that lack of manpower minimizes the amount of electronic surveillance conducted by state and local governments.

But privacy expert Dr. Willis H. Ware noted computers can be and are used to monitor digital communications, so lack of manpower will soon be no deterrent to widespread interception of computer communications. Ware, a member of the Corporate Research Staff of Rand Corp., said there is a need for a full understanding of the new technology, the problems it raises and their solutions.

Congress could rewrite the 1968 law or pass "a minimum patch . . . just to catch new technological developments," Ware said. But "my choice would be to do the whole job now, once and for all, and to get it off our minds. I do not see any risk attached to providing broad legal protection for any kind of information that is in transit on a communications channel, implemented in any technology and where the information can be represented in either analog or digital form."

Kastenmeier then proposed a "special, select commission to deal with the problems." Ware and Dr. Anthony G. Oettinger, chairman of Harvard University's Center for Information Policy Research, agreed a commission could be helpful. In particular, Oettinger said, it could develop an overall strategy for this issue, which could help individual congressional subcommittees in their deliberations on related issues.

In terms of protecting future modes of communications, however, Oettinger said "[protection] measures and countermeasures seem to keep pace with one another." He said we are entering an era when protection, particularly encryption, is available but will not be used because no one will take the initiative.

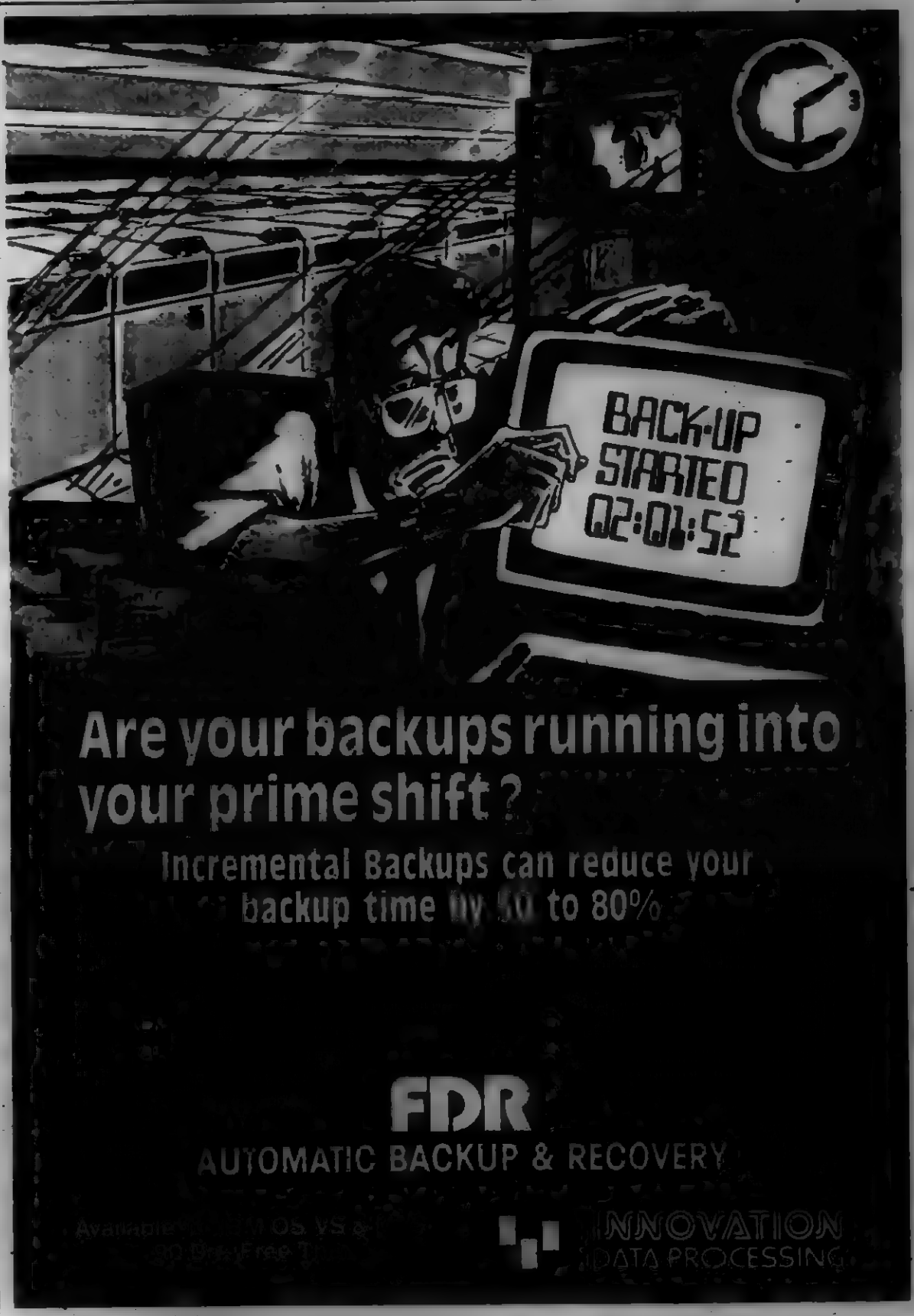
Before the breakup of AT&T, he added, the common carriers might have taken the responsibility to protect communications, but now the industry is too competitive for that, unless mandated by Congress.

Ware observed that it would be prohibitively expensive to retrofit existing communications channels to include adequate safeguards against interception.

But, he added, "the feasibility of gradually building in protection is there."

Kastenmeier said his main concern is for private citizens.

Ware agreed that "the computer people [can], if push comes to shove, take care of themselves. . . . It's the private citizen who is at risk" from electronic surveillance.



S.C. high court rules software tangible, taxable

By Bill Laberis
CW Staff

COLUMBIA, S.C. — For the third time in six months, a state high court has dealt a setback to software vendors and users, ruling that software is tangible personal property and, therefore, subject to state sales taxes.

In the latest ruling, handed down Jan. 10 by the Supreme Court of South Carolina, the DP department within a bank here lost its bid to overturn a lower court decision sustaining the bank's $2,376 sales tax payment for a personnel package bought in 1979. Citizens and Southern Systems, Inc. (CSS) had argued that it purchased knowledge and services — not tangible property — from Information Science, Inc. when it paid $59,000 for the personnel package. CSS is a subsidiary of Citizens and Southern National Bank here.

The high court ruled that the magnetic tape on which the program was delivered was "in a form which could be seen, weighed, measured, felt and touched and was, therefore, tangible personal property."

However, the court also said that had the program been delivered via phone lines or had a programmer or keypunch operator keyed in the code, the final product would not have been subject to the tax.

J. Christopher Henderson, legal counsel for CSS, said no appeal of the state ruling to the federal courts would be forthcoming. "The case as decided is wrong. I believe . . . but there are no grounds to bring this case to the federal level," he said in an interview last week.

The sales tax issue has gained prominence since last August, when high courts in both Vermont and Maryland issued definitive rulings on the application of sales taxes to software [CW, Aug. 22]. In both cases, the courts ruled against users who had contested their payment of sales taxes on mainframe software programs.

A month later, the high court in Michigan reversed a lower court ruling and upheld a user's claim that sales taxes should not be applied to custom mainframe software [CW, Sept. 26].

According to one legal specialist, the South Carolina ruling is indicative of a trend to tax software — all software — as a means of plumping state coffers. At present, more than a dozen states have tax codes that differentiate between custom and prewritten software, applying sales taxes only to the latter. But, the specialist said, users should beware that the definition of custom software can vary greatly from state to state.

"The fact that the price of a software package includes some service or maintenance, or just because it is a mainframe package that costs a lot, does not necessarily mean it's custom software," said L.J. Kutten, an attorney and author of *The Computer Buyer's Protection Guide*. "There are states where the definition of custom means the package was created specifically for one user."

Kutten said that court rulings from states like South Carolina and Vermont, which differentiate between programs delivered via tape and those delivered via telecommunications links, could promote more aggressive teledistribution of software.

Ronald Palenski, assistant general counsel for the Association of Data Processing Service Organizations, Inc., said he had hoped the more favorable Michigan decision would serve as a precedent for states grappling with the application of sales tax codes. The high court in South Carolina, he said, "took a somewhat simplified view of the matter, especially when you consider the state won't tax software delivered" by telephone but will if it comes on tape.

Link ties micro, DBMS

By Paul Gillin
CW Staff

MONTREAL — Micro Tempus, Inc., maker of the Tempus-Link micro-to-mainframe communications software, last week added a link between the IBM Personal Computer and most popular data base management systems (DBMS) and file structures.

Called Tempus-Data, the new software is said to allow users to retrieve selectively and reformat data from Vsam, Qsam, Isam and Bdam file structures for loading directly into microcomputer packages using Software Arts, Inc.'s Data Interchange Format (DIF). The vendor will also provide optional hooks into IBM's IMS/DL/1; Cullinet Software, Inc.'s IDMS; Intel Corp.'s System 2000; Cincom Systems, Inc.'s Total; Software AG of North America, Inc.'s Adabas; and Computer Corp. of America's Model 204 DBMS.

Tempus-Data relies on "virtual diskettes" that reside as Vsam files on the mainframe, according to Yvon Leveille, president of Micro Tempus. Each "diskette box" can contain up to 256 virtual diskettes, each having a storage capacity of 32K bytes to 15M bytes.

A Tempus-Data user can select information to the record and field level from the mainframe data base and extract it into new files on virtual diskettes. The extracted data can be rearranged in any order, the format and length of numeric fields can be modified and new fields may be created. Before reloading, a variety of optional operations can be performed on the extracted data.

Extracted data is loaded into the virtual diskettes in DIF format and can be copied or downloaded directly into the micro application. A list of 12 commands is used to perform all extracts and downloads, Leveille said. Tempus-Data is independent of communications methods. The product can be used with asynchronous and coaxial communications as well as with IBM 3274 and 3276 communications controllers and board-level coprocessors.

Tempus-Data, which requires Tempus-Link, was developed by Oceanic Information Systems, Inc. of Montreal. It is sold on a maximum concurrent user basis. This refers to the maximum number of users who can access the program at one time and is not related to the total number of Personal Computer users who have access to Tempus-Data.

The single-maximum concurrent user purchase price for Tempus-Data is $650 with volume discounts available. Access to Vsam, Isam, Qsam and Bdam file structures is standard with an additional 20% charge levied for access to each DBMS. The single-maximum concurrent user price for Tempus-Link is $995 with volume discounts available.

Micro Tempus is located at Suite 300, 440 Dorchester Blvd. W., Montreal, Quebec, Canada H2Z 1V7.

Tech acronym dictionary out

DETROIT — Gale Research Co. has published the "Dictionary of New Information Technology Acronyms," which defines more than 10,000 acronyms and abbreviations used in telecommunications, videotex, word processing, data processing and office automation.

Hardware, software, organizations and companies are included in the guide.

The manual is priced at $300 and is available from Gale Research, Book Tower, Detroit, Mich. 48226.

MARS from page 1

that markets the product and is owned by Goldratt and his brother, Israel Pengal, through a Dutch intermediary firm.

This agreement has also dissolved into a separate lawsuit in which M&M/Mars seeks $292,389.74 from COI for allegedly fraudulently assuring M&M/Mars that OPT, suited to "job shop" production like that of creating the sugar shell surrounding M&Ms — in which it proved extremely successful — would work on the "continuous flow" production of nougat, at which, M&M/Mars said, it was a dismal failure.

Denying the M&M/Mars allegations of nougat fraud, Robert Morris, an attorney for COI, noted the success of the system for M&M candy production and implied M&M/Mars has already received a greater than anticipated benefit from OPT. Lanny Davis, a Washington, D.C., attorney who specializes in computer law and is representing M&M/Mars, characterized Morris' comments as an interesting defense that has no basis in law.

In the Planned Order System case, M&M/Mars is seeking $998,623.14 which, it claimed, it lost in monies paid to COL and COI for the Planned Order System and in expenses for computer hardware supposedly necessary to implement the system which, M&M/Mars said, was never delivered, even after COL/COI was given several months of extra time. COL, for its part, has sued for payments due, breach of contract and damages to the tune of $17 million in a Tel Aviv court.

COI, in turn, claimed it had nothing to do with the Planned Order System and wants the money it said M&M/Mars owes for using OPT — more than $100,000 — and $1.5 million in damages. All sides are waiting for the New Haven court to rule on motions setting jurisdiction in the Planned Order System dispute and an attempt by M&M/Mars to attach COI assets so they cannot be transferred out of the country to the Israeli firm COL.

While the case is no doubt of interest to the candy industry, it has astounded the business world since Mars, a privately held McLean, Va.-based firm, is notoriously publicity shy and almost never pursues litigation. Industry observers can only guess at its annual revenues — perhaps in the neighborhood of $4 billion — and cannot remember the last time Mars representatives even spoke to the press.

Now Mars is talking to anyone who will listen. The reason, according to company spokesmen, is that the firm is "mad as hell," believing it was bamboozled by what one company representative called a "whiz kid software developer who promised the moon to get customers on the hook," only to ask for more time and money without ever delivering a usable product.

Should have known better

"This is happening all over the industry," a spokesman said, admitting that Mars, a huge multinational organization, perhaps should have known better. But, he added, "even the sophisticated [DP users] are mesmerized by whiz kids," although "very few have the resources or are willing to blow the whistle."

COL strongly denies the charges and insists it was right on target with the Planned Order System development. "We were most of the way toward solving the [Planned Order System] problems," Ira Grudberg, a New Haven attorney representing COL, claimed. Further, he said, the agreement was for a joint software development project involving personnel from both M&M/Mars and COL, who were acting as consultants, and was not a contract to deliver any specific product.

Grudberg added that M&M/Mars "contributed to the delay by changing specs . . . and in not getting a certain computer" necessary for the system.

Any precedent the case might set for the alleged promises of software developers could have a deep impact on the DP industry, but possibly the item of greatest interest to the industry is the motion by M&M/Mars that the OPT source code be examined by a court-appointed expert to determine if it could possibly have had any utility for nougat production. This is a motion the defendants understandably oppose vigorously.

This motion, with its potentially great repercussions for software developers, who guard nothing more zealously than the source code of their products, is now before court.

"IDMS/R is the perfect DBMS for the IBM 4300 user."

Frank Chisholm*

*Frank L. Chisholm is Cullinet's Executive Vice President. Frank has worked closely with Cullinet users and prospective users for more than six years. As a key member of Cullinet's management team, Frank has contributed heavily to Cullinet's database product development strategy.

Because IDMS/R, with its Automatic System Facility, makes your IBM 4300 as easy to use as a personal computer.

The Automatic System Facility (ASF) is so comprehensive and easy to use that all an IBM 4300 user need do to develop an application is to define a relational record. ASF then dynamically generates all necessary supporting structures including data definitions, screen formats, application processing logic, and documentation. In other words, the developer can witness the application being produced, literally, in seconds. This is what makes ASF a major advance over fourth generation languages. Thus IDMS/R is the perfect system for the IBM 4300 user with limited staff resources.

But suppose when you build a complex, high volume production application with IDMS/R, you desire outstanding performance. Typically, 5% of the data relationships (joins) in any application are accessed 95% of the time. With IDMS/R you can simply change these relationships to predefined joins and benefit from a dramatic boost in performance.

We call it Relational Fastpath. This is what makes IDMS/R a unique relational DBMS, and a perfect system with which to build production applications. In addition, IDMS/R has the most sophisticated back-up and recovery capability of any DBMS, a full integration with personal computers and a complete line of integrated financial and manufacturing applications.

In summary, IDMS/R was designed to satisfy the requirements of the IBM 4300 user who wants to develop both production and end user applications faster and easier.

For further information, attend a Cullinet Seminar. Mail the attached coupon or call the Cullinet Seminar Center at 1-800-225-9930 (in Massachusetts 617-329-7700).

IDMS/R Seminar Cities and Dates

City & State	Date	City & State	Date	City & State	Date	City & State	Date
Allentown, PA	Mar. 1	Detroit, MI	Feb. 9	New York, NY	Feb. 22	Salt Lake City, UT	Feb. 21
Atlanta, GA	Feb. 15	Edmonton, AB	Feb. 15	Oklahoma City, OK	Feb. 9	San Diego, CA	Feb. 23
Arlington Heights, IL	Feb. 23	Fort Wayne, IN	Mar. 6	Omaha, NE	Mar. 1	San Jose, CA	Feb. 14
Austin, TX	Feb. 14	Greenville, SC	Mar. 6	Orange County, CA	Mar. 6	Savannah, GA	Feb. 3
Baltimore, MD	Feb. 21	Hartford, CT	Feb. 14	Orlando, FL	Feb. 7	Seattle, WA	Feb. 7
Bloomington, IL	Feb. 21	Indianapolis, IN	Feb. 21	Oshkosh, WI	Feb. 28	Somerset, NJ	Feb. 9
Boston/Westwood, MA	Feb. 23	Joliet, IL	Feb. 9	Ottawa, ON	Feb. 21	South Bend, IN	Feb. 7
Bridgeport/New Haven, CT	Mar. 6	Kansas City, MO	Feb. 22	Philadelphia, PA	Feb. 8	Springfield, IL	Mar. 5
Burlington, MA	Feb. 9	Los Angeles, CA	Feb. 9	Pittsburgh, PA	Feb. 29	Syracuse, NY	Feb. 14
Charleston, WV	Feb. 29	Louisville, KY	Feb. 16	Portland, ME	Feb. 21	Tallahassee, FL	Mar. 1
Charlotte, NC	Feb. 23	Meadowlands, NJ	Mar. 7	Quebec City, PQ	Feb. 15	Tampa, FL	Feb. 8
Cincinnati, OH	Feb. 7	Memphis, TN	Feb. 23	Quincy, IL	Feb. 29	Toledo, OH	Feb. 24
Cleveland, OH	Feb. 3	Miami, FL	Feb. 16	Richmond, VA	Feb. 8	Toronto, ON	Feb. 2
Columbus, GA	Feb. 28	Milwaukee, WI	Mar. 7	Rockford, IL	Feb. 14	Winnipeg, MB	Mar. 6
Denver, CO	Feb. 7	Moline, IL	Feb. 3	Sacramento, CA	Feb. 21	Worcester, MA	Feb. 16
Des Moines, IA	Feb. 16	New Orleans, LA	Feb. 23	St. Louis, MO	Feb. 8	York, PA	Feb. 15

I'd like to attend your seminar on _____ Date

In _____ City _____ State or Int'l

Computer _____

Name/Title _____

Name/Title _____

Company/Department _____

Address _____

City _____

State _____ Zip _____

Phone ( ) _____

Mail to: The Cullinet Seminar Center
400 Blue Hill Drive, Westwood, MA 02090-2198
Cullinet Software products are designed to run on IBM 360/370, 30XX or 43XX or plug compatible computers.

Database: Cullinet

© 1984 Cullinet Software, Inc., 400 Blue Hill Drive, Westwood, MA 02090-2198.

College's computer pact under investigation

By James Connolly
CW Staff

DETROIT — A controversial computer pact was one of several contracts under scrutiny when the Michigan Department of Education recently sent an investigative team to Wayne County Community College here.

The contracts being examined at the 14-year-old school, which is suffering from declining enrollments and administrative turmoil, include one in which the college has paid more than $8 million since 1978 to Systems and Computer Technology Corp. (SCT) of Malvern, Pa., to upgrade and manage the college computer system. According to reports in *The Detroit News*, the college is committed to paying SCT another $3.8 million before SCT leaves in 1986. However, SCT spokesmen said the firm will collect no more than $1.2 million under the current extension.

The Detroit News also published reports in which school officials and consultants charged that SCT provided outdated software, assigned inexperienced employees to the college and repeatedly missed deadlines. But SCT officials and school officials who have dealt with the firm argued that the news reports were "biased" against SCT and that the Pennsylvania firm did the best job possible in an environment in which there were three college presidents in less than two years.

"I think we have done a fantastic job," SCT President Fred Gross said. "The point is that when we started work, there was practically zero computer support at the school."

The probe, ordered by the state legislature late last year, is headed by Phillip E. Runkel, state school superintendent, and will target various construction and service contracts. Runkel said of the SCT contract, "It is just too costly and a drain on needed funds from educational programs."

Runkel is investigating whether the 1978 award to SCT — contracted for $3.3 million — and subsequent contract extensions may have violated the state's competitive bidding policy. "If you haven't looked at the competition, you don't know what's available," he said.

SCT was hired in 1978 to develop a five-year plan for computer upgrading and rehired to manage the computer department, develop software programs and make recommendations for the purchase of a mainframe. That mainframe is a Honeywell, Inc. DPS-2, which the college uses for administrative purposes and as a host for various IBM minis used for computer training on the five college campuses.

The contract was most recently extended last October although, Gross said, SCT wanted to phase out the contract because of the "political environment" at the school.

Gross, who maintained that the SCT pact was exempt from any competitive bid regulations because it involved professional services provided by the sole qualified supplier, said he would give Runkel his "full support and cooperation." He said SCT has been a leading supplier of computer services to colleges for 16 years.

Meanwhile, Steven Racine, former director of budget and management for the college, said, "The taxpayers got cheated, but it wasn't SCT who cheated them. It was the management of the college and the trustees who failed to put pressure on their own people to be cost-effective."

Racine said the college administrations "wanted to go from nothing to state of the art in no time" and blamed missed deadlines on new administrations constantly changing priorities.

He also said the charges against SCT were undocumented and made by disgruntled or fired college officials who wanted to sabotage the computer program.

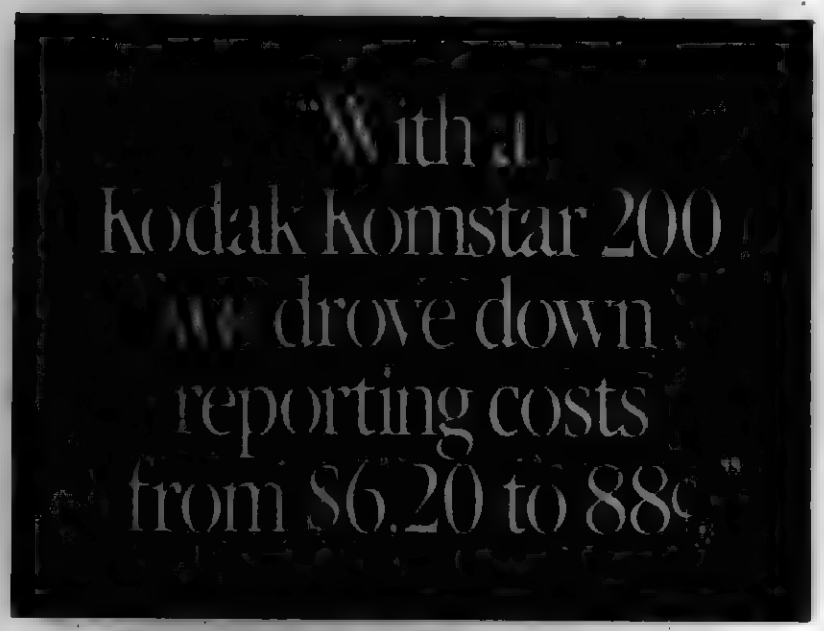
Meet to cover DP performance

PHOENIX — A four-day conference on "EDP Performance Management" is scheduled March 5-8 in the Holidome at the Metrocenter here.

Sponsored by Applied Computer Research, Inc. (ACR), publisher of *EDP Performance Review* and *EDP Performance Management*, the conference will explore management issues involved in improving data center performance and user service.

A preconference seminar, "Keeping the User Primary," will examine how users approach automation, how to achieve user consensus and how to recognize unstated goals of a user.

The cost of both the conference and preconference seminar is $525 to subscribers of *EDP Performance Review* or *EDP Performance Management* and $600 to nonsubscribers. The conference alone costs $450 to subscribers and $525 to nonsubscribers. ACR can be reached through P.O. Box 9280, Phoenix, Ariz. 85068.



When a major truck engine manufacturer needed to rev up output and reduce computer reporting costs, they turned to Kodak.

The Kodak Komstar 200 microimage processor did both. And offered a surprisingly fast payback.

Find out how it can work for you. Send in the coupon today. Or call toll-free: 1-800-44KODAK (1-800-445-6325), Ext. 302.

© Eastman Kodak Company, 1983

Send me the case history above and more information on the Komstar 200 microimage processor.

name _____

company _____

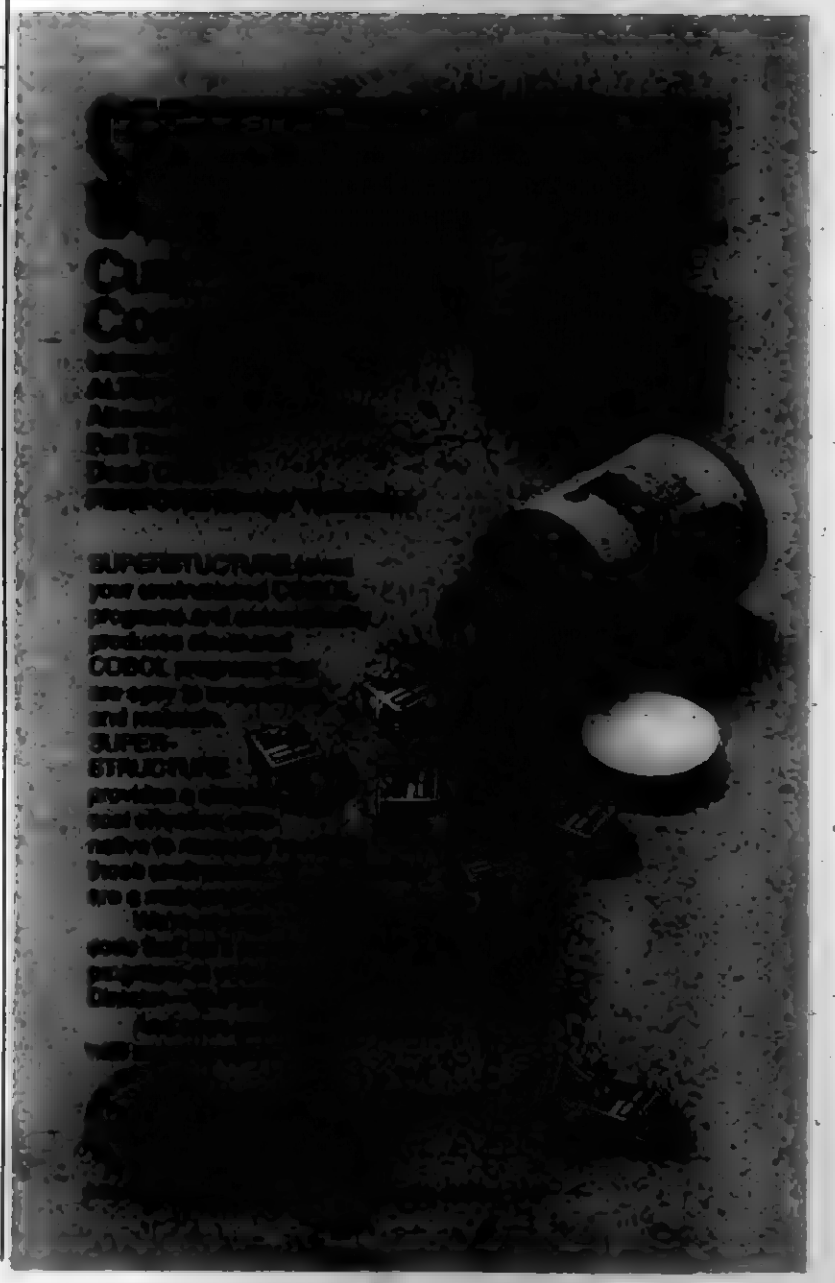
address _____

city _____ state _____ zip _____

telephone (____) _____

*For 1,000 pages of paper printout.

Eastman Kodak Company
Business Systems Markets Division
Dept. DP4586, Rochester, NY 14650

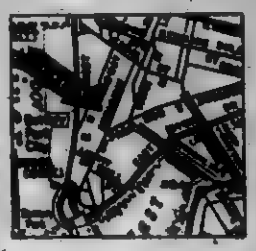


NEWS

Shearson to build DP center in Manhattan

By David Myers
CW New York Bureau

NEW YORK — Lured by tax abatements and a promise of lower electrical costs, Shearson/American Express, Inc. has agreed to build its $120 million data processing center along with an office tower in lower Manhattan rather than in New Jersey.



Sale of the city-owned, 172,000-square-foot site in the Tribeca neighborhood six blocks north of the World Trade Center for $23.9 million must still be approved by the city Board of Estimates and the New York state legislature.

However, in announcing the letter of intent signed by both Shearson and the city, Mayor Edward I. Koch said he anticipated "no problem in getting either the city or the state to pass on the deal."

Shearson would move its $100 million worth of IBM computer equipment into the 10-story structure in early 1986, according to Richard F. Morrison, executive vice-president and director of information services for the financial concern. Shearson's computer resources are now scattered over five different locations, and the lower Manhattan computer center "will allow us to tie them back together into one organization again," Morrison said.

Morrison described the new complex, on which construction is scheduled to begin in August, as the hub of Shearson's worldwide financial processing operations.

While city officials crowed over a victory in their bidding war against Jersey City, where Shearson had originally planned to build the complex, Morrison said the most important reason behind Shearson's decision to choose a city location was that the Tribeca site will enable the company to build a data processing center without buildings on either side of it.

"It's a security issue," Morrison said. "We wanted to build a stand-alone facility so that we can control access to it. In the financial community, the whole world revolves around data processing. We had to be sure we could secure the facility."

The computer building, designed by New York architectural firm Skidmore, Owens and Merrill, will also give Shearson the freedom to expand its data processing facilities as needed, Morrison said. "It's designed in such a way that if we outgrow any of the data centers, we can move the communications facilities out," he explained.

The data complex will also house Shearson's purchasing and printing operations as well as its communications equipment, according to Morrison.

In a deal hammered out with Deputy Mayor Ken Lipper, Shearson was offered a two-year, tax-free construction period to keep its computer works in New York. In the third year Shearson will receive a 100% abatement from its assessed property taxes, according to the terms of the deal worked out with the city fathers.

After that the abatement will shrink by 20% a year for four years. Eight years after ground is broken on the complex, Shearson must begin to repay the abated taxes at 10% a year.

The financial services company will have repaid the city within 17 years after the start of construction.

But in addition to the tax incentives, Shearson was also offered a low-cost power deal. In a tentative agreement worked out with John S. Dyson, chairman of the New York Power Authority, the state will provide hydroelectric power to the complex, skirting the local power company, Consolidated Edison.

Morrison told *Computerworld* that Shearson also plans to bypass New York New England Telephone Co. (Nynex).

Shearson is the latest organization to announce its intention to bypass Nynex, following on the heels of The Port Authority of New York and New Jersey, which has set up its own private branch exchange at the Port Authority Bus Terminal here [CW, Jan. 16].

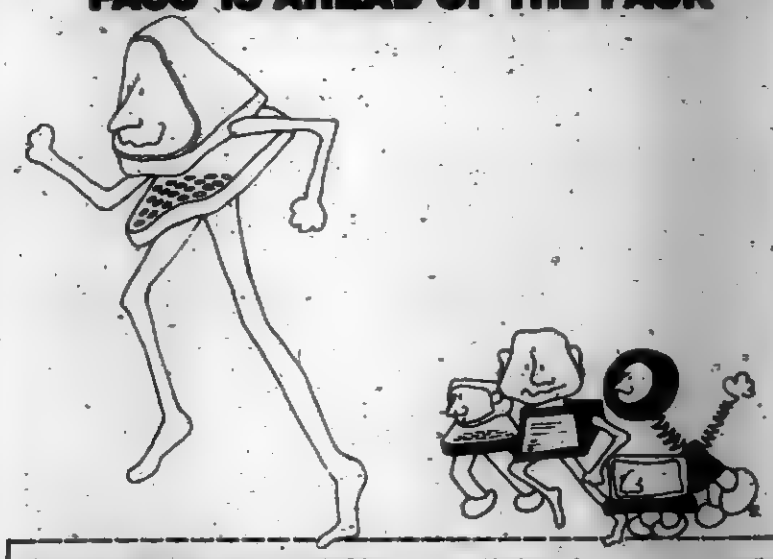
Directory lists 16,000 N.Y. Users

NEW YORK — A directory listing 16,000 computer users in the New York metropolitan area has been published by Computer Management Research, Inc.

The directory includes profiles of hardware, software, languages, data bases, consultants used, future plans, applications and DP executives' names, titles and telephone numbers.

The directory sells for $295 and is available from Computer Management Research, 20 Waterside Plaza, New York, N.Y. 10010.

FOR VAX™ RESOURCE ACCOUNTING, PACS™ IS AHEAD OF THE PACK



The competition isn't even close. PACS is so good, it's the only resource accounting package in DEC's™ EAS library. Here's why:

- Flexible billing algorithms
- User budgeting and port speed accounting
- EZLOG™ for true 3-level reporting by account, project and user

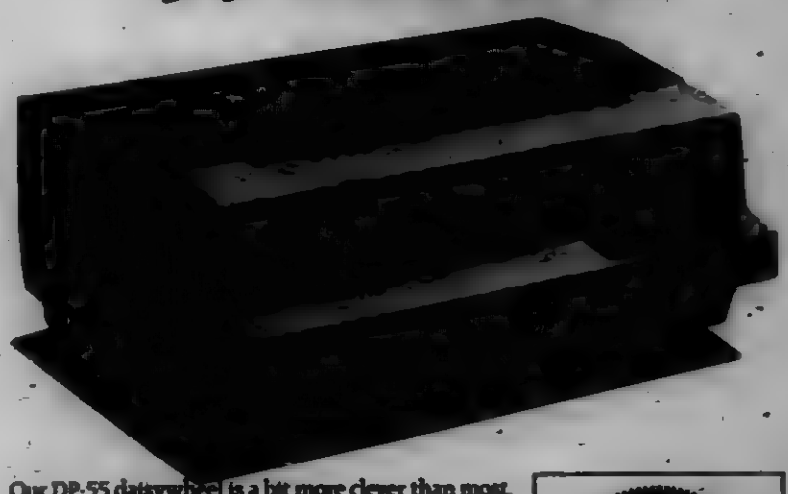
Name _____
Title _____
Company _____
Address _____
City _____ State _____ Zip _____
Phone ( ) _____

SEND COUPON NOW FOR COMPLETE DETAILS ON ALL THE PACS BENEFITS

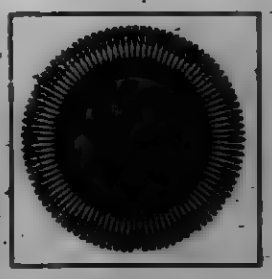
STI Signal Technology, Inc.
5951 Encina Road, Goleta, CA 93117 (805) 683-3771 Outside California call toll-free (800) 235-0797
TWX 910-334-3471

VAX and DEC are trademarks of Digital Equipment Corporation.

Brighter writer.



Our DP-55 daisywheel is a bit more clever than most. A digital status display tells you what it's doing as it prints, and how you can help when it doesn't. It can save you time and money, and that's just plain smart. Call your printer distributor. Or contact Dataproducts at (213) 887-3924, 6200 Canoga Avenue, Woodland Hills, CA 91365. In Europe, 136-138 High Street, Egham, Surrey, TW 20 9HL England.



Dataproducts Daisywheel Printers

Customs seizes VAX cargo as contraband

By James Connolly
CW Staff

A shipment of computer equipment allegedly once bound for the Soviet Union has been impounded by U.S. Customs officials pending a possible criminal prosecution.

The three cargo containers were confiscated on arrival Jan. 14 at Andrews Air Force Base near Washington, D.C., after the equipment's manufacturer, Digital Equipment Corp., agreed to purchase the contents from the government of Sweden. The contents are said to include a sophisticated VAX-11/782 supermini computer.

The twisting trail of international intrigue and delicate negotiations broke into the open in November when Swedish Customs and West German officials confiscated a total of 15 containers of DEC equipment. According to earlier reports [CW, Nov. 21, Nov. 28, Jan. 9], the equipment had been purchased from DEC by an as yet unnamed New York export firm which had obtained an export license to ship the sophisticated system to a South African firm.

The equipment, according to U.S. officials, was never unloaded in South Africa; instead, it was diverted to West Germany and Sweden, bound ultimately for the Soviet Union.

The South African firm was later found to be controlled by Richard Mueller, reputedly an agent for the KGB, the Soviet secret police and intelligence agency. Mueller, a native West German, has been banned by the U.S. Commerce Department from trading with U.S. companies. He remains a fugitive from a 1979 federal indictment charging him with violating export regulations in a separate case.

"The equipment is back in the U.S. [DEC] purchased the computer, but U.S. Customs seized it as contraband because there is fraud involved," said Charles Powers, spokesman for the U.S. Treasury Department.

That fraud, according to Powers, involved the attempt to divert the equipment to the Soviet Union. U.S. defense officials have said a VAX-11 could help the Soviets with computer-aided design and manufacture of sophisticated weapons.

No information from DEC

DEC spokesman Joseph Nahil said he had no information about DEC trying to reclaim the equipment. "It is nothing that we have discussed," he stated.

DEC reportedly shipped the equipment from Sweden to the air base in cooperation with U.S. Customs authorities, knowing that the materials would be confiscated. Nahil declined to reveal what his company is paying for the equipment; a spokesman for the Swedish Embassy in Washington, D.C., said only that the sale is based on "customs value."

Sweden offered to sell the equipment back to DEC after nobody claimed it in the wake of the November seizure. Swedish law requires the government to offer the original manufacturer first option to buy materials that the neutral country classifies as "war materials."

West German officials earlier returned to U.S. custody a VAX-11/782 dual processor and other equipment seized from the Swedish ship Ilgaren shortly before the vessel left the port of Hamburg, West Germany. That ship, one week later, docked in Sweden with additional containers that are believed to be part of the same consignment. An inventory of the equipment seized in both countries has not yet been made public, and the Swedes have classified their inventory top secret.

The West Germans made the seizure after U.S. Customs officials relayed a tip that the equipment was being diverted to the Soviet Union from its listed destination in South Africa.

Powers said the original exportation was a fraud because there never was an intent to send the material to South Africa. In New York, a federal prosecutor declined comment on whether any evidence of criminal wrongdoing has been presented to a grand jury.

However, customs officials reported that they eventually will move the equipment from the Washington-area warehouse where it is now to New York "for use as evidence in the trial."

"If after the trial it is forfeited, it becomes property of the U.S. government and is up for grabs among various agencies," customs spokeswoman Christine Fraser said.

When asked whether DEC stands to lose money if it cannot recover the equipment, Nahil said, "I don't think it comes down to a question of finances. I think the real issue is trying to be responsible and responsive in this kind of international matter."

Swedish authorities said the shipment would have passed undetected to the Soviet Union but for a customs policy of inspecting all shipments from South Africa.

IEEE changes Infocom site

SAN FRANCISCO — The site for the Infocom '84 Conference, set for April 9-12 by the Institute of Electrical and Electronic Engineers, Inc. (IEEE), has been moved to the Hotel Meridien at 50 3rd St. in San Francisco.

The original conference hotel was damaged by fire, necessitating the move.

Further information can be obtained from Steven H. Richman, AT&T Bell Laboratories, Room HO-3L-631, Holmdelm, N.J. 07733.

PROCMAN
THE
TSO CLIST COMPILER

RELEASE 2.0 NOW AVAILABLE

Release 2.0 includes:

- SORTED CROSS REFERENCE FACILITY
- CLIST MEASUREMENT FACILITY
- COMPILED vs. NON-COMPILED CLIST TRACE FACILITY
- TSO DYNAMIC STEPLIB ALLOCATION
- TSO DYNAMIC COMPILED CLIST LIBRARY ALLOCATION
- 40% FASTER THAN PRIOR RELEASE

PROCMAN
Continuing to Out-Accelerate the Competition...
and There's More on the Way!

Contact The CLIST EXPERTS At:
TONE Software Corp.
1735 S. Brookhurst, Anaheim, CA 92804 (714) 991-9460 Telex 181582

DGA

Programming made more profitable with DGA

DGA offers you many unique time-saving features, all in an online interactive environment. Running under TSO, CICS, or VTAM in an OS/MVS system, consider the many advantages of DGA:

- COBOL DATA DISPLAY
  Dynamically maps COBOL layouts to file data. Browses, searches, updates, prints, selects and reproduces from screen display.
- VSAM & BSAM SUPPORT
  Creates, deletes, updates, compares, copies and prints records with no restrictions. All standard access methods supported with no file or record size restrictions.
- INTERACTIVE COMPARE
  Files, partial files, selected records or partial records are all accessible.
- SCREEN GENERATOR
  Uses screen painting to eliminate time-consuming CICS map coding.

If you'd like more information on how DGA will make your programming more profitable, write for our free brochure, or call 913-541-1502.

dpi
Data Products, Inc.
P.O. Box 14613
Lenexa, KS 66215

This announcement appears as a matter of record only.

$2,200,000
EFT RESEARCH, L.P.

Crain & Co., Inc., announces the formation of EFT Research, L.P. This limited partnership has been formed to engage Lexicon Corporation in the research and development of a special communications terminal system for electronic funds transfer purposes.

Crain negotiated, structured and placed this limited partnership.

CRAIN

New York

Chicago, Fort Lauderdale, Jupiter-Tequesta, Los Angeles, Palm Beach, San Francisco, Seattle, Winter Park

Crain & Co., Inc., Member New York Stock Exchange Jan. 16, 1984

NEWS

Pa. law to provide stiff penalties for hackers

By John Gallant
CW Staff

HARRISBURG, Pa. — February will usher in a colder climate for this state's computer criminals.

Calling it a "modern tool to combat modern crime," Gov. Richard Thornburgh last month signed into law a bill that provides stiff penalties for hackers and other high-technology bandits. Effective Feb. 2, the law calls for two levels of criminal penalties for those convicted of engaging in illegal computer activities.

The statute, sponsored by state Rep. Samuel Rappaport (D-Philadelphia), puts Pennsylvania among the minority of states that have some type of computer crime legislation. The other 16 that have done so are Alaska, Arizona, California, Colorado, Florida, Georgia, Illinois, Michigan, Minnesota, Missouri, Montana, New Mexico, North Carolina, Rhode Island, South Dakota and Utah.

One section of the Pennsylvania law makes "gaining access to, altering, damaging or destroying any computer, computer system, software, program or data base with criminal intent to interrupt the functioning of any organization, to defraud or to steal services or property" a third-degree felony, punishable by a maximum fine of $15,000 and up to seven years in prison, according to Terry Williamson, deputy press secretary for Gov. Thornburgh.

The law's second section makes the same computer misuse a first-degree misdemeanor if the individual convicted is not utilizing the technology to commit a more serious crime, such as embezzlement. Williamson said the second section is specifically targeted toward hackers and provides for "some very tough misdemeanor-level penalties," including a maximum fine of $10,000 and a prison sentence of up to five years.

'Strong message'

At the December bill-signing ceremony here, attended by state Attorney General LeRoy S. Zimmerman and supporters of the measure, Thornburgh said, "This legislation will send a strong message to those who would use the computer to engage in illegal activities — whether their nature be devious or frivolous — that Pennsylvania is committed to ensuring that an instrument crucial to our modern economy is not used to threaten individual privacy and undermine commercial activity. Those who exploit this technological resource for criminal purposes should know they will be prosecuted to the fullest extent of the law."

The bill faced little opposition in the state legislature, according to Bridget Whitley, chief counsel to the House Judiciary Committee chaired by Rappaport. It was backed by the state's business leaders and law enforcement agencies, including the Philadelphia district attorney's office and the Pennsylvania Crime Commission, a clearinghouse for information on organized crime.

Whitley said the most difficult task was drafting legislation that will remain useful as technology and computer crime evolve over time. "We tried very hard to make this a state-of-the-art bill so it wouldn't have to be revised in the future. It was really a challenge to draft something that will have to deal with this technology five or 10 years from now.

"We even included concepts like the organic transfer of data, on the advice of a computer consultant who told us that biological technology will be feasible soon," Whitley maintained.

Prior to passage of the Pennsylvania law, which Williamson called "one of the toughest" in the nation, no specific anticomputer crime statutes were available to state prosecutors. Illegal computer activity could only be dealt with through broader "theft-of-services" legislation, according to deputy press secretary Williamson.

CORRECTIONS

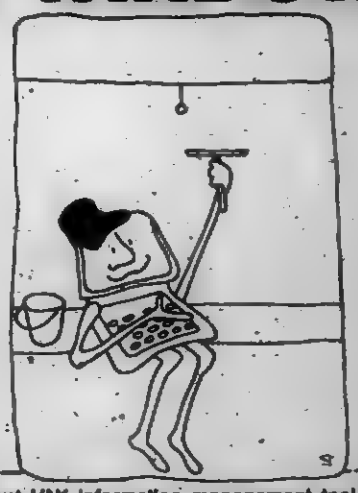
Wayne Smith, author of "Just what is quality, anyway?" [CW, Jan. 16], was identified as president, specializing in quality, at Applied Information Development, Inc. in Oak Brook, Ill. He is vice-president, quality, at that company.

The correct title of the conference being held this week in Washington, D.C., by the Professional Exposition Management Co. ["Calendar," CW, Jan. 9] is "Uniforum." The conference sponsor can be reached at Suite 205, 2400 E. Devon Ave., Des Plaines, Ill. 60018.

" 'PC Connection' Ties DG's Iris to IBM Micro" [CW, Dec. 5] incorrectly identified the Iris operating system as a product of Data General Corp. Iris is a product of Point 4 Data Corp. and runs on Point 4's Mark series of multiuser systems, DG Nova computers and other Nova-class minis.

In the Office Ware column of Dec. 5, an announcement of Keepit, a series of programs from Martin Marietta Data Systems, Inc. for the IBM Personal Computer, carried an incorrect price. The correct price for the program series is $450.

MAKE YOUR VAX® DO WINDOWS



SMARTSTAR™ is the first VAX information management tool that creates multiple window applications—and can scroll your screen to 400 lines. The SMARTSTAR family includes:

- SMARTDESIGN™ for designing applications without programming
- SMARTQUERY™ for powerful, easy-to-use application processing
- SMARTCALL™ when VAX host programming is required.
- REQUEST for integrated report and query

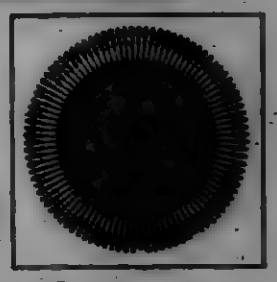
Name _____
Title _____
Company _____
Address _____
City _____ State _____ Zip _____
Phone ( ) _____

SEND COUPON NOW FOR DETAILS AND JOIN THE 4TH GENERATION

Signal Technology, Inc.
5951 Encina Road, Goleta, CA 93117 (805) 683-3771 Outside California call toll-free (800) 235-8787
TWX 910-334-3471
VAX is trademark of Digital Equipment Corporation

Heavy duty.

If you can't afford printer downtime, pick the ones designed to take all the punishment you can dish out and still keep printing. Our 35 and 55 character-per-second daisywheels print sheaves of crisp, sharp letters at doublettime, with never a moan or groan. Call your distributor. Or contact Dataproducts at (213) 887-3924, 6200 Canoga Avenue, Woodland Hills, CA 91365. In Europe, 136-138 High Street, Egham, Surrey, TW 20 9HL England.



Dataproducts Daisywheel Printers

DP security on the rise

Expert attributes it to world tension

By Robert Ball
CW West Coast Bureau

LOS ANGELES — Heightened world tension and the much-publicized increase in security measures in the nation's capital are having a ripple effect among computer users and manufacturers, according to a security expert.

Bill Stark, president of Stanley/Wacker, Inc. and a director of the International Association of Professional Security Consultants, said that in the last six months there has been a huge increase in demand for computer security advice.

"The wave of terrorism around the world has started something close to paranoia in the computer industry. This is good because, in the past, computer users have not been sufficiently aware of the dangers of inadequate protection, both for their own companies and for the national interest," Stark asserted in an interview here following a recent meeting of the association.

The security consultant, who recently testified before the U.S. House of Representatives Subcommittee on General Oversight and the Economy, said awareness of and responsibility for computer security measures must start with top-level management if security concerns are to filter down throughout the rest of an organization.

"The computer security director must be put on a senior executive level within a company and must be a person who has a background in all areas of security rather than simply being an ex-law-enforcement agent," Stark added. The major vulnerability for most computer users, he asserted, lies with internal personnel. "You would be amazed at how easily people give away information to someone who shouldn't have it. Because of complacency and out of a desire to facilitate information flow within an organization, people get cleared with information they really shouldn't have, and that is where the security breaks down."

Bill Stark

In an attempt to reduce computer security breaches, Stark's company, based in Tampa Bay, Fla., is providing a service to computer users and vendors called covert vulnerability assessment. Using information available to a would-be assailant, the consultants carry out a fake attack on a client company's security procedures; knowledge of the attack is confined to senior management. The goal is to steal information without anyone else knowing that a security breach has occurred.

Security risks outlined

In assessing the security procedures of one of its clients, an electronic toy manufacturer, Stanley/Wacker, Inc., made a detailed checklist of the security risks involved and recommended security improvements where needed. Two areas in particular, the marketing function and manufacturing facilities, received close scrutiny.

Among the security enhancements recommended in the marketing area were:

■ A thorough screening of all personnel — from secretaries to vice-presidents — involved with any aspect of major product developments.

■ A review of personal computer use, including methods for encoding software, logging on procedures and the use of passwords. The security consultant suggested the installation of telephone modem interfaces, which require users to enter passwords when logging on to a system; the use of an incorrect password automatically blocks that user from entering into the system.

■ Improved security procedures for the storing of disks and computer printouts. Stanley/Wacker helped its client put together a program under which it can classify information along U.S. Department of Defense lines — confidential, secret and top secret — and then restrict access according to those classifications.

■ More controlled access to copying facilities in classified areas of a company. "The aim is to make copy machines off limits to people who are not supposed to have access to the information. Printouts should also not be copied, except by approved personnel," Bill Stark, president of Stanley/Wacker, noted.

In the manufacturing area, security recommendations included:

■ Multiple sourcing of key materials. If a company purchases from only one or two suppliers, a competitor can often accurately assess the company's projected output, Stark explained.

"We sometimes recommend underbuying or overbuying and then readjusting in order to keep competitors off track."

■ A review of physical security in manufacturing areas so that top-secret material is not easily seen.

■ Screening of personnel involved in strategic company projects. In particular, the toy manufacturer was warned to beware of white-collar employees who regularly change jobs within the company, thereby gaining access to a wide range of information that could be useful if they set up in businesses of their own or go to work for a competitor.

■ The securing of meeting rooms prior to vital discussions in order to deter activities such as bugging. In particular, the consultant stressed, it is important to protect pricing information from getting into the wrong hands.

The PC's are coming!

More professionals will attend FOSE '84 than any other office automation conference and expo in America.

FOSE, the largest and most comprehensive program in the nation, has over 3 acres of exhibits on everything pertaining to the total office environment. See the most extensive and in-depth showing of the latest in personal computers and microcomputer systems and software available anywhere.

A day-long PC hands-on session for all conference attendees will feature PC implementation, integration, software, and graphics. In addition, a two-day PC Center will give attendees the opportunity to see and operate dozens of PC systems.

Don't wait. Don't delay. No need to stand in line. New for FOSE '84 is preregistration. Send for details on conference sessions plus list of exhibitors or call toll-free

800-638-8510 or 301-459-8383

KEYNOTE SPEAKER

John F. Cunningham, President and Chief Operating Officer, Wang Laboratories, Inc. Leader in office automation.

Mail this to: FOSE '84, National Trade Productions, Inc., 9418 Annapolis Road, Suite #206, Lanham, MD 20706.

Please send information for FOSE '84: ☐ conference ☐ exposition

Name _____ Title _____

Organization _____ Div. or Branch _____

Address _____ Mail Stop/Bldg. _____

City _____ State _____ Zip _____

FOSE '84 Federal Office Systems Expo

Washington, D.C. Convention Center
March 19-22, 1984

©Copyright 1983, National Trade Productions, Inc.

From AdaVISION

INTERACTIVE or LINEAR TRAINING in ADA: for as low as $4800?

HANDS ON ADA PROGRAMMING EXPERIENCE: for $2800?

ABSOLUTELY!!

Ada-VISION's superior modularity answers your Ada® Training needs! Ada-Vision's Series I Ada Linear Video Course consists of 16, 1-hour, Studio produced, Color Videotapes jammed full of real, running Ada programs, supported with line by line explanations. A 400-page Study Guide and the Military Standard, all for only $4800! At $360 per hour we are not only the most powerful Ada Videocourse training available, but also the most cost-effective!

Ada-VISION's SERIES I Ada INTERACTIVE VIDEOCOURSE consists of 40 Studio Produced Color Videotapes and Study Guide. In addition, we include a Color TV Monitor, an Industrial grade VCR Playback Unit, an Interactive Computer Interface, an 18-key Student Address Unit, and a Printer to document student performance and response time; all for the unprecedented price of $8400!

The Ada Series I Video Course is NOT a SEMINAR. It is an INTENSIVE...HIGH LEVEL COURSE, taught by the eminent Dr. Joseph T. Ryan. Former Science Adviser to the United Nations Command and a Charter Member of Sigplan. Dr. Ryan has taught every major compiler language on a worldwide basis for more than 20 years.

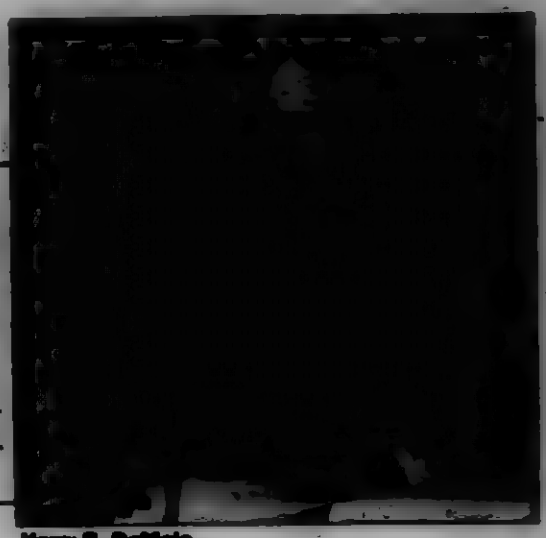
The interactive version continuously quizzes the student in a friendly television environment, and automatically reviews points of weakness, based on an incorrect response. The system combines the attention getting qualities of computer based quizzing and review with the superior and more flexible medium of videotape.

Two different, powerful Microcomputer configurations running in standard Ada syntax subsets, provide hands-on Ada programming experience to supplement each videolesson. Prices start at $2800!

A conversation with IBM's DeMaio

Commonsense approach to DP security

In any ranking of today's "hot" issues, computer system security is certainly one of the hottest. Boomin 1983 — the year of War Games and the hacker — served to point up just how vulnerable modern technology is to misuse and abuse, both from within and without. As director of data security programs for IBM, Harry B. DeMaio brings his own unique, commonsense approach to computer security. He has worldwide responsibility for coordinating IBM's representation to national governments, intergovernmental agencies, the media, industry and professional groups on the issues of security, auditability and systems management. He is also the industry giant's voice on the broader issues of privacy protection and international information regulation. In addition, DeMaio is charged with ensuring that all IBM divisions have the plans and products to support customer requirements for systems security. With stern visage and rumpled posture, DeMaio is a voice of authority in the area of data security. He was interviewed by Computerworld Staff Writer John Gallant.



Harry B. DeMaio

Is security technology — both in hardware and software — advancing fast enough to keep pace with the threats to data security?

Current security technology has some gaps in it. . . . We need, for example, to have personal identification capabilities more comprehensive than simply the password, which has some fundamental weaknesses inherent in it. There are technological approaches to that, which, at the moment, are not viable from a marketplace standpoint.

But I'm also concerned about whether the current technology is being used to its maximum. . . . There is a substantial amount of technology available in the area of access control, certainly in encryption, which is available in the market today and is not getting full usage.

In a ranking of threats to data security, you list external attack, or "hacking," as the least likely, yet that area has received the greatest publicity. Has that, perhaps misguided, emphasis on external attack shifted attention from more important concerns?

I don't think so. I don't think the average businessman has zeroed in exclusively on external attack. I think that to the extent it raises the awareness level on the security problem overall, it's had some beneficial effect. On the other hand, it's also raised the question in the public's eye of whether all telecommunications systems and all computing systems are susceptible to anybody who has a computer and a little bit of knowledge. That implies we've got a fundamental problem with anything that uses this modern technology, which is harmful.

According to a press release from your Armonk, N.Y., office, attention to data security has been a matter of company policy at IBM for some time. How is that policy evidenced?

In a variety of ways. We have made a number of contributions externally for studies in this area. Throughout IBM's history, we have also produced several thousand publications dedicated to this. At the moment, several hundred of those are actively useful. They range all the way from executive briefings right down to very detailed manuals on how to use a specific product.

That concern is also manifested in our product line. It's part of the fundamental design criteria for most of our products.

It's manifested in the number of classes and seminars we've run, both free of charge and for a fee. It's also manifested in our advertising. We've had a number of corporate advertising campaigns focusing on security; we plan to have another in the early part of this year.

We've worked in close harmony with governmental agencies, both

See DEMAIO page 16

It's About Time
You Found A
Professional Floppy
Disk Drive
Repair Service

For a low flat fee, we will repair all floppy drives, parts, steppers and heads, and labor included.

We offer: • Lowest flat fee pricing
• Fast turn around
• Full 90 day guarantee

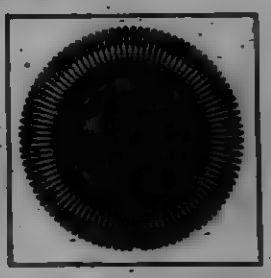
Additional services: • Floppy head refurbishment
• Qume printer repair

Call: (714) 770-6575

DUMONT
MAGNETIC TECHNOLOGY, INC.
4 WRIGLEY • IRVINE, CA. 92714

Mighty write.

This is the word processing printer built to survive the rigors of the office. Our heavy duty DP-Series daisywheels whisk out crisp, letter-perfect documents – hour after hour, month after month – without a whimper. Call your printer distributor. Or contact Dataproducts at (213) 887-3924, 6200 Canoga Avenue, Woodland Hills, CA 91365. In Europe, 136-138 High Street, Egham, Surrey, TW 20 9HL England.



Dataproducts Daisywheel Printers

DEMAIO from page 15

here and overseas, as to what should and should not be done to ensure that security is part of the social and political climate. We've talked to God knows how many members of the media on the topic, and we've tried to make ourselves as available as possible. We've trained our marketing organization in security issues and our support and development organizations as well.

You have said management must push security all the way back to the design stage. How can management in a user company affect the design of systems in a vendor firm?

What I meant was systems management, those people who have an affect on the development of applications. In the design stage, these people can ensure security in a number of ways. They can ensure it through quality assurance programs and by having people engaged in the specification process who can demand that, as part of the overall specifications for the application being developed, security will be a high-priority item.

Can they monitor that in any technical detail? That depends on the management involved. I know a fair number of managers who are not DP experts, but who can still ask some pretty intelligent questions when it comes to audit trails, when it comes to security, when it comes to whether information is protected or not. They also can be stubborn enough to say, "Show it to me, and show it to me in a way I can understand."

> ***"I know a fair number of managers who are not DP experts, but who can still ask some pretty intelligent questions when it comes to audit trails, when it comes to security, when it comes to whether information is protected or not. They also can be stubborn enough to say, 'Show it to me, and show it to me in a way I can understand.'"***
>
> **— Harry B. DeMaio, director of data security programs for IBM**

Can data be too secure?

Data can be too secure if there is more expense, both operationally and in terms of hardware and software being put on it, than it is really worth.

There is an economic aspect to this thing. If you're slowing down your operations, if you're making it impossible to do the job or if you're losing opportunities as a result of locking up information beyond its inherent value, the answer is yes, data can be too secure.

But, I want to make the point that that's a conclusion that should not be reached too glibly or too easily. If somebody says you have more security than you need, that ought to set off a few alarms before it is accepted.

What is the most important message you attempt to convey to users and users about data security?

I try to stress the importance of establishing some sort of evaluation scheme and developing a classification framework so they can build their security around the most important information items they have. That's not the easiest thing in the world to do. The problem with most large organizations is that if you regard all information as being in the same general class, that leaves you with a security task that's much too large to get your arms around. In the face of something that formidable, more often than not nothing happens.

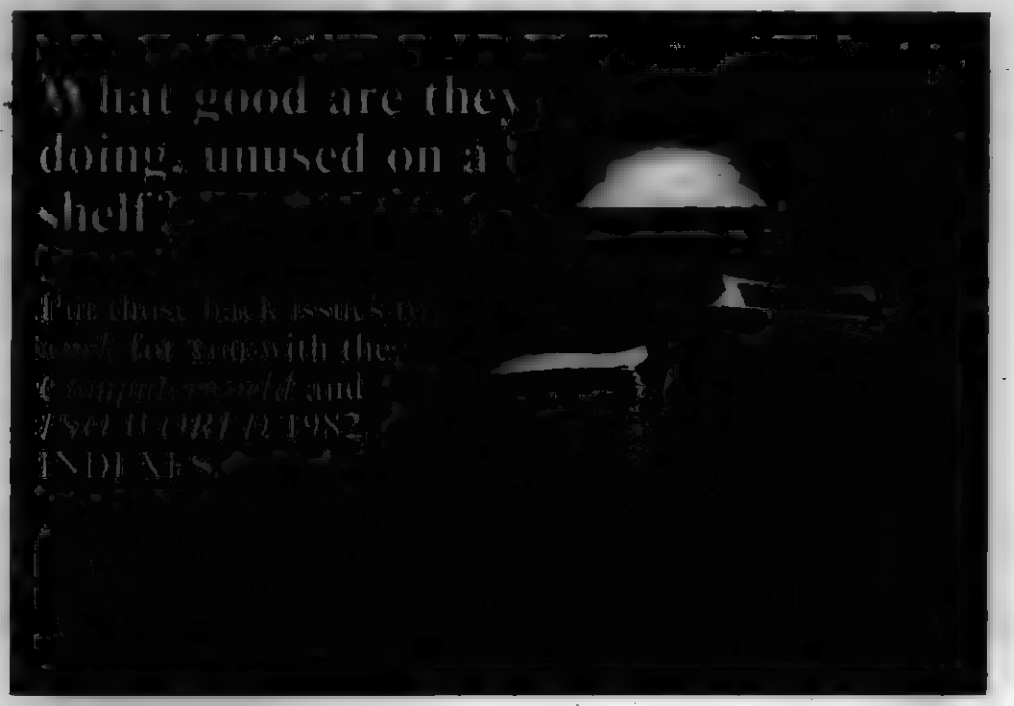
We try to persuade owners and users to develop, not in a highly scientific way or down to a dollars-and-cents detail, some general scheme for classifying that which you really regard as important. For example, if this data was lost or erroneously changed in some way, would it do significant damage to the corporation? You must do some ranking of data, even if it means listing the four or five most important items that would really sink the business if they were damaged or lost.

Is that something that is easily done?

First of all, it's not a data processing decision. It is a functional decision within the organization itself. It involves a certain amount of strategy, and it also involves a substantial amount of operational concern.

Without an awful lot of thought, you can arrive at least the first-round decisions, but then to prioritize in detail within that framework may get to be a problem. But there have to be some levels. For example: these things are important; these things I can do without; these are the things that we really, absolutely have got to have or we might as well pack up the business and turn this thing into a parking lot.

Too often there is a tendency to think just in terms of protecting the things you wouldn't want your competitor or outsiders to find out. It's the intelligence-community view of protecting state secrets. It's very important, but it's not the entire world. The other side is to determine those functional areas where susceptibility to fraud is a concern.



You'll get great material for reports, back-up material for purchase decisions, resource material for contracts, research results for long and short-range planning — in other words — a terrific reference library at your fingertips when you use one of our Indexes to access all the information that's stored in your back issues of *Computerworld*, *ISO WORLD*, and *Computer Business News*.

With the *Computerworld* Index, you get an easy reference (including page numbers and issue dates) to all the information that's packed into all 58 (including *Extra!* and *Computerworld OA*) 1982 issues — 2,636 pages of news, stories, In-Depths, Special Reports, interviews, applications stories, features and tutorials on everything from AFIPS to Zenith.

And in the *ISO WORLD* Index, you'll find entries from 3 issues of *ISO WORLD* and from 36 issues of *Computer Business News* — 913 pages of industry news and trends, features, new product announcements, marketing and distribution articles, perspectives, columns, and analyses; on everything from AB Dick to Zentec.

Whatever you're doing professionally — Changing systems and procedures, purchasing new equipment, drawing up a contract, doing salary reviews, looking for dealers, setting up a local area network, there'll be articles in back issues of *Computerworld* or *ISO WORLD* to help you. From government regulations, to current trends; from the phrases and misuses of an individual product to the pitfalls of OEM contracts — you've already got lots of professional research sitting on your shelf. Let the *Computerworld* Index or the *ISO WORLD* Index help you find it when you need it.

Take a look at just a few of the hundreds of entries listed in the *Computerworld* and *ISO WORLD* Indexes:

Index	Heading	# Entries
CW	Local Area Nets	70
CW	Microcomputers	81
CW	Graphics Systems	136
CW	Accounting Systems	101
CW	Disk Equipment	126
ISO	Dealers/Distributors	64
ISO	IBM-PC	84
ISO	Floppy Disks	81
ISO	Modems	45
CBN/ISO	Retail Stores	53

And that's a sample of just this year. We also have Indexes for *Computerworld* that go all the way back to 1976 and Indexes for CBN back to the first — (Nov. 1978-Dec. 1979)

If you don't have all the back issues of *Computerworld* and *ISO WORLD* that you need to get the articles you want, you can order back copies for the an entire year on 35mm microform from University Microfilm, Int., Periodical Entry Dept., 300 North Zeeb Road, Ann Arbor, MI 48106 —at very reasonable rates. Or you can simply take advantage of their reprint service for individual articles.

To get your Index, just fill out the coupon in this ad and send it with your check to Indexes/Marilyn Priante, Box 880, Framingham, MA 01701.

Year	Index	Price	Quantity	Total $
1982	Computerworld	$ 39.00		
1981	Computerworld	$ 35.00		
1980	Computerworld	$ 30.00		
1979	Computerworld	$ 25.00		
1978	Computerworld	$ 20.00		
All Computerworld Indexes for last five years (1978-1982)		$100.00		
1982	ISO WORLD	$ 39.00		
1981-1978	CBN	$ 60.00		

Add $1.25 shipping and handling for one book and 75¢ for each additional book. If your check is enclosed, we pay shipping costs.

Total cost _____

☐ Check enclosed ☐ MC (List four digits above your name)

☐ BA/Visa

☐ American Express _____ Expiration Date

If a charge, we need your signature

_____

Name _____

Firm _____

Street _____

City _____ State _____ Zip _____

Dewar's career survey disputes 'popularly held' opinions of DP professionals

Computer professionals expressed great satisfaction with their career advancement and particular jobs when they were interviewed for Dewars "White Label." And while 75% majored in some kind of mathematical or technical field, many expressed a high regard for "English" and other creative skills

Surprises for many

By Patricia Keefe
CW Staff

NEW YORK — Dewar's "White Label," the company responsible for those career achiever profiles of scotch drinkers you see in magazines and newspapers, has released the results of a nationwide survey that it claims will "hold surprises for many" by contradicting "popularly held" opinions about computer professionals.

The survey suggests that among computer professionals, the intrinsic rewards — such as creativity and learning — predominate over the extrinsic. Among the key findings:

■ Job satisfaction is extremely high despite long hours and pressure-filled environments.

■ Ninety-four percent of those polled would not leave the field; 81% would not even change to another area of DP. Those considering change most frequently cited the pursuit of a managerial role as the reason.

Moreover, 74% of those interviewed work more than a 40-hour week, while 60% also work weekends. Only 6% expressed any kind of dissatisfaction at all.

■ A liberal arts background and English language skills are considered very valuable to success by 45% of the respondents, despite employment in a technical field.

■ "Computer professionals are nearly unanimous in recognizing that narrow training alone is not the only thing conducive to career achievement," Dewar's said in its survey report.

■ Creativity is perceived as the single most important aspect of the job.

■ The "most purely practical" aspects — money, security and status — appear to be the least important.

■ Paperwork was the chief complaint of 42% of those polled, a burden that computers have failed to eliminate.

■ Other complaints included pressure (12%) and salary (9%).

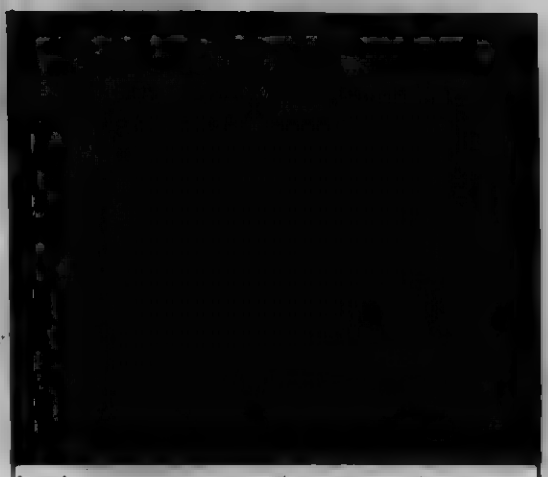
Designed and conducted for Dewar's by Research & Forecasts, Inc., the nationwide survey was conducted via random interviews held last January with over 300 employed computer professionals. The report on the survey's findings was recently published as a public service for college students and other job seekers.

After polling people representing a cross-section of six computer careers — educators, entrepreneurs, systems analysts, programmers, consultants and sales/marketing personnel — the survey concluded that computer professionals are "a highly satisfied and motivated group of hardworking individuals, who achieve a large measure of fulfillment through their work."

Said Dewar's: "Computer professionals' high level of satisfaction can be explained in part by their success in moving up the job ladder." More than half (54%) of those interviewed said they were as far along in their career as they thought they would be at that point five years ago. Another 28% found themselves further along their career path then they had anticipated.

Key to the successful pursuit of their careers

See CAREER page 18



DP job personalities

NEW YORK — Computer professionals can be broken down into three distinct categories determined by the degree of commitment they give to their jobs, in terms of both time and intensity, according to a survey sponsored by Dewar's "White Label."

The three working personalities identified in the survey are:

■ *Computerholics.* Comprising 22% of those computer professionals polled, they devote at least 50 hours a week to their jobs, frequently work weekends and function in "extremely hectic" work environments.

■ *Overtimers.* The majority (57%) of those polled, they work 41 to 50 hours a week.

■ *Nine-to-Fivers.* The remainder (21%) of the sample, they typically devote 40 hours a week or less to their jobs, rarely work weekends and work in a "generally steady or relaxed" work place.

The professionals in the three categories were found to be equally satisfied with their jobs and, with few exceptions, did not differ in terms of the goals they seek or the rewards they find in their work, according to the survey report.

Most of those interviewed worked either in small groups or independently. The exceptions, however, were "quite telling," Dewar's said.

For example, computerholics are nearly twice as likely as nine-to-fivers to seek personal growth in their careers — 55% ranked this nine or 10, on a scale of one to 10, compared with 41% of the overtimers and 29% of the nine-to-fivers. And computerholics are more likely to be motivated by strong personal interests in choosing their career path — 58% ranked this nine or 10, compared to 50% of overtimers and 43% of the nine-to-fivers.

In terms of work rewards, computerholics are far more likely to achieve satisfaction from helping others solve problems — 59% ranked this nine or 10, compared with 42% of overtimers and 36% of nine-to-fivers.

Moreover, the study found that computerholics bring an intensity to everything they do. They reportedly are better educated, valuing nonmath and non-computer-science courses more than their less driven colleagues. Also, they are twice as likely as the nine-to-fivers to believe that their careers are further along than they had expected they would be. Computerholics were found most prevalently among entrepreneurs and marketing personnel.

All charts from Dewar's Career Profile: Computer Professionals

Job mart explosion

NEW YORK — Don't be surprised if the next up-and-coming young hotshot bubbling over about his fast-track career in an advertisement for Dewar's "White Label" scotch turns out to be a computer professional. The explosion in the computer market has produced an accompanying explosion in the job market, according to the results of a nationwide survey recently released by Dewar's.

Careers in computer fields have expanded tremendously in the past few years, offering attractive positions and salaries in an otherwise depressed economy, the study said. The "gold-rush atmosphere" is spurred by tales of entrepreneurial wizards; classified sections are filled with ads for computer professionals; and courses that teach computer science and basic data processing skills represent one of the few educational fields showing any growth.

According to U.S. Department of Labor projections, the total number of people employed in the computer field is expected to reach 1.2 million to 1.3 million by the end of the decade, up from 750,000 in 1980, Dewar's said. The number of both programmers and systems analysts is expected to swell to about 350,000, yielding respective increases of one-half to two-thirds above 1980 levels.

Programming and software development offer by far the best job opportunities, according to two-thirds of the survey respondents. The second choice was computer applications, attracting the endorsement of a third of the sample. Only one in 10 polled cited entrepreneurship as offering the best job opportunity.

In terms of job opportunities for women and minorities, 96% of the survey sample strongly believes the DP field offers more to these groups than any other field; 48% declared DP offers

See JOBS page 18

Shop floor tech stories wanted

Computerworld's March 26 Special Report will take an in-depth look at computerized manufacturing systems and how they are altering production, planning, operations — and those delicate relationships between the traditional DP departments and the factory automation specialists.

The Special Report will focus on computer-aided manufacturing and engineering, manufacturing resource planning, robotics, inventory and shop floor control. More important, we will look at the impact of these technologies on traditional manufacturing operations.

If you would like to contribute a tutorial or application story to the report, send your three- to six-page double-spaced manuscript by Feb. 10 to Bill Laberis or Peter Bartolik, *Computerworld*, 375 Cochituate Road, Box 880, Framingham, Mass. 01701. Accompanying charts, photographs and other graphics are welcome.

CAREER from page 17

are traditional English language skills, according to 77% of those polled. The statistic is notable because 78% of those interviewed held college degrees in some kind of mathematics, science, engineering or computer-related field. Another 11% held degrees in other fields.

"While acknowledging the technical requirements of their field, computer professionals believe 'being creative' is the single most important aspect of their present jobs," according to Dewar's.

Job rewards

Another reason for the high level of job satisfaction is that the personal goals which led the survey respondents to seek a computer-related career have been fulfilled, according to the study. Strong personal interests, personal growth and employment opportunities play a major role; status and relocation possibilities are not strong incentives, the respondents said.

Topping the list of rewards gained from the work experience were the opportunities to be creative, learn new skills and solve problems. Working independently and socializing with colleagues also ranked high.

More information on the career reports is available through the Dewar's Center for Career Development, Suite 1100, 110 E. 59th St., New York, N.Y. 10022.

JOBS from page 17

"much more opportunity" to women and minorities. The report points to a recent National Science Foundation report, which estimates that the number of women in the computer field grew 44% between 1980 and 1982 alone.

However, the survey also quoted respondent Irene Anderson, an advisory systems engineer, whose enthusiasm was somewhat tempered. "There are opportunities for women — in a sense," she was quoted as saying in the booklet detailing the survey results. "There's a high percentage of women at the entry level. Women can get up to first- and second-level management, but after that the pyramid becomes very pointy, and the opportunities aren't there, except in theory. It's still a man's world."

One possible reason for this: Several survey findings concerning women DPers found that half the women, but only a fifth of the men, work 40 hours or less a week. At the other extreme, a third of the men, but only a tenth of the women, spend 51 hours a week or more working at their jobs.

In addition, survey results state that women in the field are "somewhat less likely" than men to have a college degree. This is broken down into 91% of 259 males and 76% of 42 females polled.

Survey respondents were also asked to advise people considering data processing as a career. The responses included:

- Get a broad education.
- Be sure you are really interested and capable.
- Get practical experience during college.

Now PCs and Mainframes Share the Workload. Datalex Software Gives PCs Data Entry Capability to Pass Clean Data to Your Host Computer.

Until Datalex you've had to turn personal computers into "dumb terminals" to communicate with a mainframe.

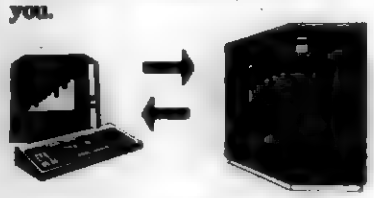
Now, data entry can be accomplished at the PC level. Then passed to a mainframe. Turning your PCs into integral units of your corporate data processing network. And freeing your host computer to work on the jobs it does best.

Get Up and Running with Entrypoint™ and Passport.™

Entrypoint is Datalex's high performance data entry software. It supports high volume, commercial grade data entry in a stand-alone or distributed environment.

Passport is our high quality, asynchronous remote communications program that provides error-free, bi-directional file transfer capabilities between most microcomputers and mini or mainframe hosts.

Together, they provide a communications link with your mainframe, batch management capabilities, high-volume capacity and an interactive screen. Which is more than any other system offers you.



And, like all Datalex software, they're available for personal computers from IBM, Digital Equipment Corporation, Hewlett-Packard, Sage, and others. And come with 90 days of installation and telephone hotline support.

All at a cost much lower than you'd expect.

For more information call Datalex at (800) 962-8888. In California, Alaska and Hawaii, call (415) 541-0780.

Yes, please put my corporation on the fast track to success. Send me more information on Entrypoint and Passport.

Name

Title Telephone

Company

Address

City State Zip

Datalex
650 Fifth Street Suite 406
San Francisco, CA 94107

Datalex

The personal computer courted the workplace with endless promises.

A new era of problems was delivered instead. As MIS manager, you have observed: too many different brands of computers. Too many types of software. Software that's difficult to learn, limited and inconsistent in quality, and poorly backed up by manufacturers.

More troubling: there has been no way to control the information flow. No way to make these machines communicate with one another, or with the company's mainframe. No way to customize software to meet specific company needs.

Microcomputer chaos is likely to persist unless someone can bring in an effective system for managing them all, and introduce a measure of standardization.

That logical someone is you.

The logical solution is Visi On.™

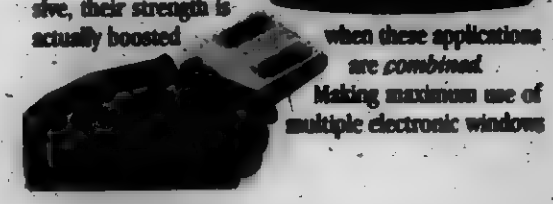
What's good for the user is even better for the MIS Department.

Visi On is not a new computer.

It is not a new computer program.

Visi On is a completely new generation of business software that harnesses the power of the personal computer; a microcomputer applications manager designed to work in tandem with the operating system of the pc, and integrate any number of application programs.

Initially, four applications are available: Visi On Word,™ Visi On Calc,™ Visi On Graph,™ and Visi On Query.™ Totally redefined for the Visi On environment, each application includes features and functions that have dramatically improved performance.

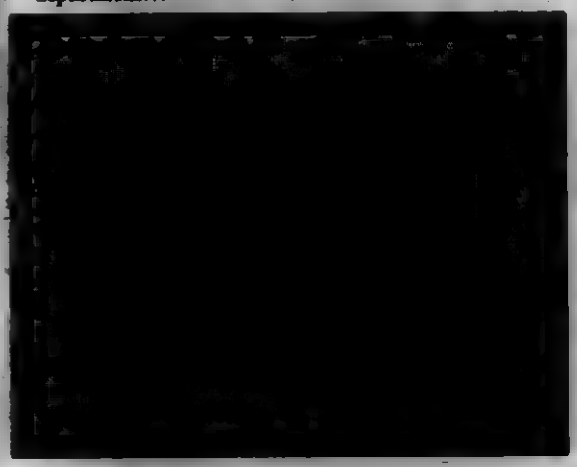


Even more impressive, their strength is actually boosted when these applications are *combined.*

Making maximum use of multiple electronic windows and a mouse, Visi On instantly transfers data between applications, demonstrating depth of integration to an unprecedented degree. Instead of doing just one job at a time, the user may move from project to project, backed up always by the full power of the machine.

And it's all remarkably simple. Visi On provides a single, sensible interface that makes every application easy to learn, and even easier to use.

There. Already it's getting quieter in your department...



ENTER VISI ON. Suddenly, every personal computer in your company becomes everything it ever promised to be.

Indeed, for MIS managers as well as for users, Visi On is a virtually instantaneous remedy for the problems experienced with personal computers.

Instantaneous? Yes. The system will work on most of the computers already in place. (Which also makes Visi On your simple-to-implement solution for standardizing systems and applications.)

On the off-chance a problem should befall a user, no problem. Each Visi On application program comes with the equivalent of 100 pages of help text users may call on when there is a question. The more help the user gets from Visi On, the fewer the calls for help that come into your department.

The Visi On system also provides the basis for a complete package of communications programs. With applications software soon available, Visi On will allow personal computers to emulate both asynchronous and synchronous terminals.

And, Visi On will allow integration into local networks.

And more. And more. And more.

Additionally, Visi On is open-ended. New applications, new capabilities, and new peripherals will be added. Plus, Visi On architecture is open to all developers, with a Visi On Toolkit to help you custom design your own applications programs.

And with all of the above, Visi On introduces a new generation of software support. It's the most comprehensive program ever executed for microsoftware. Backed up by VisiCorp,™ the number one name in business software.

Sit back. Be pleased with yourself. And if you're far too modest for that, simply rest assured that legions of formerly disgruntled users now have you to thank for an efficient, productive new partnership with their personal computers.

Your management thanks you, too.

You were, after all, the one who recommended Visi On.

Visi On is now available for the IBM® Personal Computer XT, the Wang® Professional Computer, the Hewlett-Packard® Model 9826, the TI® Professional Computer, and the Compaq® Plus.
Visi On, Visi On Word, Visi On Calc, Visi On Graph, Visi On Query and VisiCorp are all registered trademarks of VisiCorp.
© 1983 VisiCorp.

SAS...
Power and Flex
to Meet All You

Available for IBM, DG ECLIPSE and DEC VAX

ibility
r Needs

SAS

What's more, the SAS System now runs on Digital Equipment Corporation's VAX* 11/7xx series.

You get the same benefits of the SAS System on minis as on mainframes. To see for yourself, take advantage of our free trial.

In fact, users have ranked SAS in Datapro Research Corp.'s Top Rated Group for the past seven years. In the latest survey, SAS was one of the only two software packages to receive the honor.

The best in software and service. At a price you can afford.

SAS

DP director pockets fees for free service

By James Connolly
CW Staff

CLINTON, Miss. — City officials were disturbed but not outraged when the county data processing director pocketed the fees they paid to have their tax rolls processed on the Hinds County computer.

"It was the only way we could get it done," reasoned Mayor Walter Howell.

But the sheriff was called in when it was learned that the services for which Clinton reportedly paid Ray Palmertree almost $7,000 were provided free to other communities. Clinton and the county realized that Clinton, too, could have free service.

Address was clue

City and county officials said that since the early 1970s, Clinton paid Palmertree and his predecessor as much as $1,250 a year to run the city property tax bills on the county's computer. The arrangement came to light when Palmertree's $2,400 bill for his 1983 work carried his home address rather than the county courthouse in nearby Jackson.

The city and the county board of supervisors questioned why Palmertree, who is salaried at $33,500, was performing private work on the county's Sperry Corp. 90/40. The supervisors, noting that an assistant attorney general said it is illegal for public employees to use public property for personal gain, advised Clinton to pay the $2,400 to the county.

It was then that Clinton officials discovered that other small cities and towns that didn't have their own computers received similar services for free or for the cost of the tax forms. The city refused to pay, and the county supervisors agreed not to press for payment until an investigation is complete.

It also was revealed that Palmertree collected $75 and an assistant, Bob Flippen, collected $1,230 from the county school system for programming fees.

Some supervisors have demanded that Palmertree and Flippen, who also remains on the job, pay the county whatever they collected.

But Mayor Howell, in Palmertree's defense, said, "I think it reached a point where he couldn't do all of the required work in a 40-hour week. He was vastly understaffed. If he hadn't done it, then it wouldn't have gotten done, and we figured we were going to have to pay for the service wherever it was done."

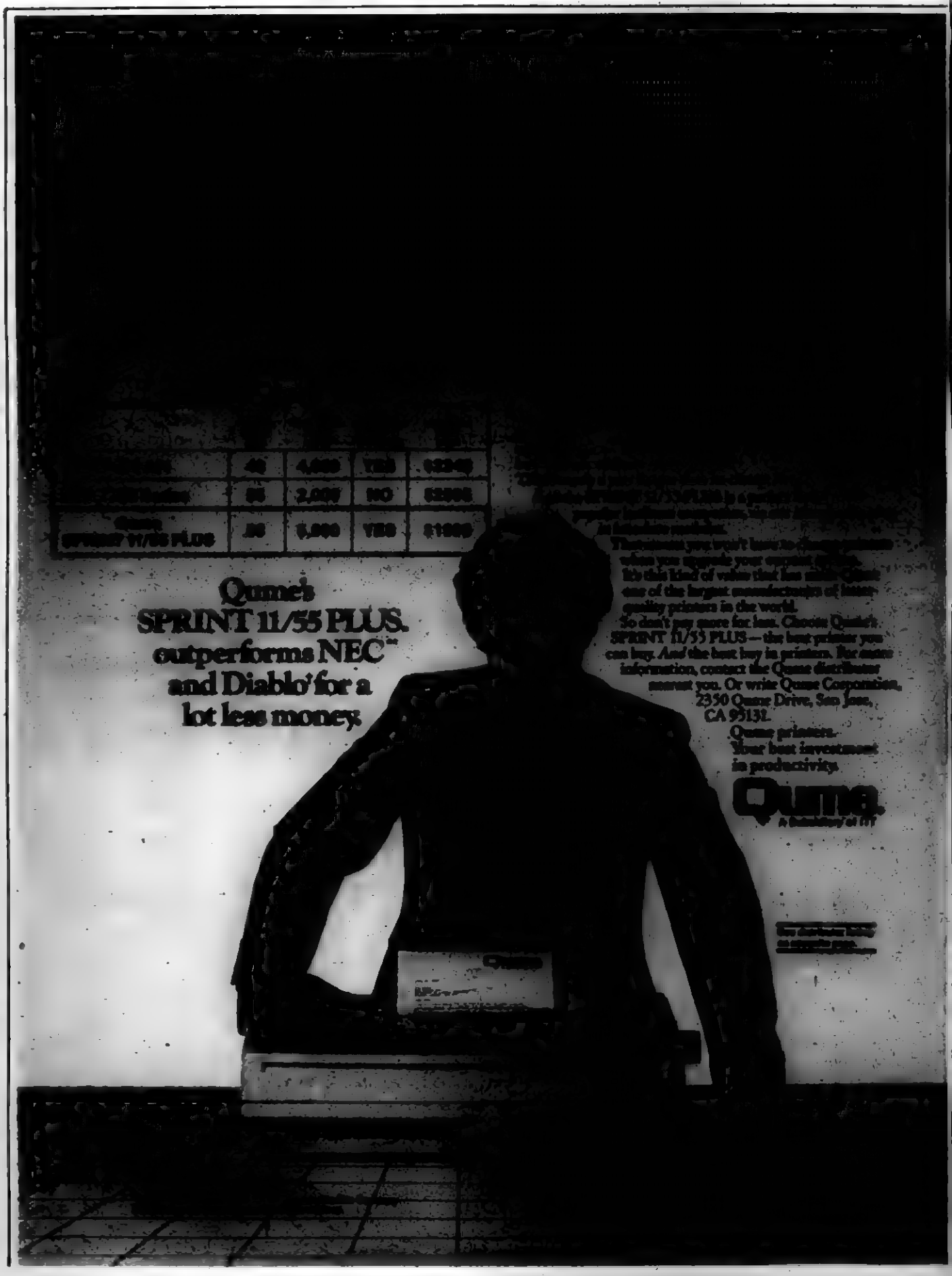
MANAGERS ON THE MOVE

MARVIN L. ZEICHNER has been promoted to head the newly created management information and software department at The Mitre Corp. in Bedford, Mass.

While at Mitre, which performs systems engineering for the U.S. Department of Defense and other government agencies at the federal, state and local levels, Zeichner has been a member of the technical staff and served as a group leader in several departments, including command and control systems, information distribution systems and bus network systems.

Zeichner has also been data processing manager for Albany Data Processing, Inc., vice-president of Computer Services, Inc. and an engineer for Raytheon Co., where he was a staff scholar.

He earned a bachelor's degree in electrical engineering from the City College of New York and an M.S. in mathematics and control systems from Harvard University.



IRS still depends on paper in computer age

By James Connolly
CW Staff

WALTHAM, Mass. — An estimated 96 million tax returns will pour into the Internal Revenue Service by April 15, piling onto a heap of more than 1.5 billion returns and other documents that the agency stores in a largely manual, hard-copy system.

Storing and retrieving those documents costs the IRS $35 million a year. It takes up to six weeks to retrieve a tax form, and there is almost no automated support — whether mainframe or micro — for IRS examiners and other personnel.

Decades into the computer age, the bureaucracy that is so much a part of the life of every American business and worker still relies on paper and the human hand, concedes the man in charge of IRS data processing.

"We really haven't supported our people the way we should. We have to get data to the people on the firing line. Now we hope to crank up something by the late 1980s," IRS Associate Commissioner M. Eddie Heironimus said at a recent tax seminar here.

For 1984, the IRS is stepping up its efforts to automate, particularly through the use of optical character recognition (OCR) equipment to process forms and laser disk storage to save storage costs and make data more readily available.

Employers have begun receiving OCR forms for use in making federal tax deposits to authorized banks. The forms, used in a pilot project in 1983 in the area served by the IRS' Cincinnati regional service center, are now being used nationwide.

The OCR forms replaced keypunch cards and were mailed to companies in December. Those forms are preprinted with taxpayer identifying information or are available blank in emergencies.

Employers may designate the forms for use in any tax quarter and for any of 10 different types of payments by blackening the appropriate boxes. In the past, specific cards were used for specific taxes in specific quarters. A slight mistake meant payments were improperly credited, and the taxpayer was judged delinquent.

"The OCR scanner can read, number and perform all other necessary processing of federal tax deposit cards at a rate of 10,000 an hour. In processing federal tax deposits alone, OCR has the potential for saving 20% of current processing costs and maybe more," reported Joseph H. Clooman, director of the IRS service center in Andover, Mass.

OCR equipment also will be used this year to process an expected 18 million individual returns on Form 1040EZ, the so-called short form. The 11-line form mailed to taxpayers Dec. 26 includes blocks for taxpayers to fill in appropriate numbers and instructions on how to fill in the form.

The 1040EZ form can be used by single taxpayers who earn less than $50,000 and have income only from wages, salaries, tips and interest.

The next form scheduled to be converted to OCR is Form 1099, the form banks use to report interest payments. However, 40% of the 1099 reports now go to the IRS on magnetic tape, ready to run.

In coming years, the IRS will install laser disk storage equipment at its 10 regional service centers. Those plans developed after the agency operated a pilot project at its Fresno, Calif., center last year.

"Right now we hope the centers can take all of their Form 941s [business returns] and put them on laser disk. Then if we need hard copy later, we can make it off the disk," he said.

"That means we could destroy the original hard copy, which, when we carry this out with other forms, could make the service centers virtually paperless," Heironimus said.

The goal is to give tax examiners the ability to call up a return on a display screen and conduct an audit without paper forms. Currently, less than 10% of the IRS examiners have access even to personal computers, and those people are using "Radio Shack-type home computers," noted Heironimus.

One area where the agency expects immediate success in several regional centers is with collections. On-line systems will allow collectors to call up delinquent accounts, have the system dial a telephone number and route it for the least expensive rates and make notations on whether the taxpayer promises payment.

But Heironimus said the biggest step the agency will take toward full automation will be when it goes on-line with a new system of mainframes, replacing its Honeywell, Inc. 2050A batch processing system and its Control Data Corp. 3500 on-line systems.

Those systems are programmed in assembler language, Heironimus said, while the IRS wants to use Cobol. The agency is in the process of rewriting its 2,400 programs, which already must be updated constantly as tax laws and regulations change.

When the Cobol system is ready, in two years, it will be used on Sperry Corp. 1100/80 series systems that are already in place in the service centers. The current system has been in place since 1962.

Controversial step

One of the more controversial IRS steps toward automation has been the experiment now under way in four districts, where the agency buys population-profile information from research firms, such as those that provide credit card companies with the names of prospective customers.

That data, according to IRS officials, gives the agency typical incomes for given neighborhoods. The information will let computers flag unusually low returns mailed from high-income neighborhoods and will let examiners decide whether those returns should be audited for fraud.

The agency met resistance to the program and found mailing list firms reluctant to sell the IRS the needed data. However, it found other firms willing to sell the data, and the pilot program is under way, despite objections from civil libertarians.

For your best investment in printers.
Call your nearest Qume distributor today.

United States:
American Calculator & Computer (205) 933-2344 – AL
Alsac Electronics (206) 643-9082 – WA
Anacomp (206) 881-1113 – CA, UT, WA
Anthem Systems (415) 342-9182 – CA
Bohlig & Associates (612) 922-7011 – MN
Butler Associates (617) 964-5270 – CT, MA
Byte Industries (800) 972-5948 (CA Only) (800) 227-2070 (Outside CA)
David Jamison Carlyle (213) 410-9250 – CA, CO, HI, IL, NJ, TX
Computers & Peripherals Int. (315) 476-6664 – NY
The Datastore (609) 779-0200 – NJ
Equipment Resources (404) 955-0313 – GA
Future Information Systems (212) 732-3905 – NYC
Gentry Associates (305) 869-7450 – FL, GA, LA, NC, SC, TN
Inland Associates (913) 764-7977 – KS
InterACT Computer Systems (704) 254-1949 – FL, GA, NC
Kierulff Electronics (800) 338-6811 – AZ, CA, CO, CT, FL, GA, MA, MD, MN, MO, NC, NJ, OH, OK, TX, UT, WA, WI
MA/COM-Alanthus Data (301) 770-1150 – MD
MicroAmerica Distributing (800) 431-7660 (MA Only) (800) 343-4411 (Outside MA) – CA, MA, TX
Midwest Microcomputers (419) 782-1115 – OH
National Computers Syndicate (312) 459-6400 – IL, MN
Pacific Mountain States (800) 272-3222 – CA, WA
P&R Associates (308) 371-4140 – CO, UT
PCA Microsystems (512) 654-4711 – TX
PCS, Inc. (214) 247-9946 – TX
Pioneer Electronics (301) 921-0660 – AL, FL, GA, MD, NC, PA
Polygon Industries (504) 834-7656 – LA
Printer Warehouse (213) 829-5483 – (CA Only) (800) 245-9812 – (Outside CA)
R.C. Data (408) 946-3900 – CA
Rudor Communications (212) 245-5508 – NYC
Schweber (800) 645-3040 – AL, CA, CT, FL, GA, IA, IL, MA, MD, MI, MN, NJ, NY, OH, OK, PA, TX, WI
Southern Microcomputer (305) 821-4237 – FL
Tak-Aids Industries (312) 870-7400 – IL, PA, TX
Terminal Rentals (714) 833-2414 – CA
Terminals Unlimited (800) 336-0423 – 24 Locations
Tricom (516) 483-9700 – NY
Unico (512) 451-0251 – TX
Western New York Computer (716) 391-4120 – NY

Canada:
Abacus Data Services (416) 677-9565 – Ontario
Datarep (416) 781-9135 – Ontario, Quebec
DataTech Systems (604) 479-7117 – Alberta, BC, Ontario
Data Terminal Mart (416) 677-0184 – Alberta, BC, Nova Scotia, Ontario, Quebec
Future Electronics (416) 697-7710 – Alberta, BC, Ontario, Quebec
Micro Distributing (604) 941-0822 – BC
Printers Data (416) 977-1711 – Ontario

Qume
A Subsidiary of ITT

Move up from your System/34 without losing your investment.

Why rewrite your software just because you've outgrown your System/34? With the ESCAPE/34 software package developed by Database Systems Corp., you can migrate all your System/34 applications to the Prime 50 Series of 32-bit computers. ESCAPE/34 makes up to 95% of your RPG II statements compatible with Prime. Any remaining statements are automatically flagged for you.

Then once you're in the Prime family, you'll never have to worry about growth again. All our computers are fully compatible, clear up to a system with 16Mb of memory and 5 billion bytes of storage. And you can keep growing, with the most versatile networking in the industry, fully integrated office automation software, extensive CAD/CAM capability, and over 1,000 third-party applications.

Send the coupon today for more information, or call our toll-free number. And help us save your software investment.

1-800-343-2540 In Mass., 1-800-322-2450

Yes, I want to save my software!
☐ Send me the ESCAPE/34 brochure and a free "Save the Software" button.
☐ Have a Marketing Representative call.
Name
Title
Company
Street
City State Zip
Telephone
Send to: Prime Computer, Inc. Prime Park, MS 15-40 Natick, MA 01760
CW 1 30 84

PRIME

Apple announces University Consortium program

Dartmouth to install Macintoshes

By Patricia Keefe
CW Staff

HANOVER, N.H. — "An apple for the teacher" will be taking on a new meaning for faculty and students at 24 colleges and universities across the country as a result of Apple Computer, Inc.'s new Apple University Consortium program.

The consortium was announced last week when Apple introduced its 32-bit Macintosh microcomputer [CW, Jan. 23]. Apple anticipates that by the end of 1984, at least 50,000 Macintosh micros will have been placed on college campuses nationwide.

Major universities such as Yale, Stanford, Dartmouth, Brown and the University of Michigan each expect to purchase $2 million worth of Apple products — mainly Macintoshes — over a three-year period, the vendor said. More than $60 million in commitments reportedly has been made to date under the consortium program.

At least 2,000 Macintoshs have already been earmarked for Dartmouth College here, where officials are planning to greet faculty and incoming freshmen with an offer they hope won't be refused when school opens next fall: a turnkey package at a discount price for personal use at home, in the office or in the dormitory.

Long a technological trailblazer in the academic community, Dartmouth, the birthplace of the first online time-sharing system and the Basic computer language, is about to embark on yet another pioneering odyssey. It will extend its 20-year-old campus time-sharing system into dormitories by way of personal computers linked to a campuswide network, the latter scheduled for completion this summer.

The preferred personal computer here is the Macintosh. Part of the new Apple 32 Supermicro family, the Macintosh is based on the same technology developed for Apple's Lisa, which incorporates a 32-bit Motorola, Inc. 68000 microprocessor, high-resolution graphics, windows, a mouse and a graphics interface said to allow users to utilize the machine without having to learn difficult computer commands.

The Macintosh is transportable in its own carrying case and contains 64K bytes of read-only memory and 128K bytes of random-access memory. An extensive library of software packages and peripherals is being prepared for the machine, which is aimed not only at the college market but at business markets and other professionals, Apple said. The vendor estimates that more than 500 packages will be available for Macintosh and Lisa models by the end of 1984.

Photo by A. Haughey

Accessing Dartmouth's on-line catalog

Dartmouth's computer store will also carry a few other alternatives — such as IBM's Personal Computer XT and PCjr. The Macintosh was chosen because it is "extremely powerful and user friendly," according to William Arms, vice-provost for computing and planning. "It has very good graphics and an excellent [propri-

See APPLE page 28

Minimal problems expected

By Patricia Keefe
CW Staff

HANOVER, N.H. — A campuswide time-sharing network of the magnitude planned at Dartmouth College here is not without its planning problems. But thanks to the Ivy League school's 20 years of experience operating its own network, any problems are expected to be minimal, according to William Arms, vice-provost for computing and planning.

College officials are planning to offer students the opportunity to purchase at a discount, over their academic tenure, their own personal computer. Students will be able to use the computer for stand-alone word processing and graphics production and as a link to the Dartmouth College Time-Sharing system and the services it offers. The school will provide Apple Computer, Inc.'s Macintosh, as well as some IBM Personal Computers and possibly some Digital Equipment Corp. micros.

The details involved in an undertaking of this size are many, including system security, training, user resistance, technical specifications and equipment and system access to all student, faculty, academic and administrative functions. However, many of these details have been minimized by procedures and services already provided by the school's Kiewit Computing Center.

One big detail — system security — might appear to be most important. The recent wave of publicity concerning student hackers, also called systems violators, suggests that by opening up its computer system to the student population, Dartmouth could be unleashing a serious threat to its system security.

Not so, Arms said, for two reasons. "First, we have a remarkably honest student population. At the same time, we also have 20 years of experience operating a very widespread computing environment." He noted that the school's Kiewit Computing Center staff has worked out simple but secure methods of protecting data.

"We actively encourage students to break our security measures — and to let us know," Arms said. "Lots [of students] have tried to break in, but there have only been three serious break-ins over the past 20 years, each of which has led to an improvement in security procedures."

A sudden rise in the computing population can also threaten the system's health, but Arms does not expect a sudden rash of system crashes and prolonged downtime during the fall semester. Acknowledging that the impact of the new user population on the central computer will be difficult to predict, the vice-provost said the school usually incurs annual system growth of 25% and is increasing the system size accordingly.

Training is another area of concern. It is one thing to encourage widespread computer use and to provide the necessary equipment; it is another to meet a horde of potentially frustrated end users.

Again, Arms considers Dartmouth more than adequately prepared. Within the computing center is a department called Service to Academic Users, with a staff of 12 professionals and 30 to 40 students. The size of the support staff is proportional to the number of services provided, not the number of users, Arms explained.

During Freshmen Week, time will be allotted to introduce students to their new learning tools. Further, Arms claimed the Macintosh is so user-friendly that the student learning time is relatively short. Videotaped instructions scheduled during the first few weeks of school will also be available.

Grants from Apple, the Sloan Foundation and Carnegie Corp. will provide funds to develop instructional materials and to train the faculty.

Dartmouth will turn to another existing service to provide students and faculty with computer equipment: the computer store, located in the computing center.

Honeywell and IBM terminal emulation at prices that will blow the socks off the competition.

We began by designing the best protocol converter on the market, favored for years by discriminating buyers, including several FORTUNE 500 companies. They like our quality. But they love our prices. As much as 60% below the competition. Line for line, we've got the best

Number of Lines/ System	Suggested List Price*
4	$ 4,620.
8	$ 5,620.
12	$ 6,620.
16	$ 8,620.
20	$ 9,620.
24	$10,620.
28	$11,620.

*Plus a one-time software use license of $500 per system. Call or write for complete price list and discount schedule.

product at the lowest price you'll find. Our MZ-80 is a real workhorse in a remarkably compact cabinet. And at the heart of it all, the 6 Mhz Z-80B™, the fastest, most powerful 8-bit cpu available. It will run bi-sync to your IBM-compatible host using ASCII CRT's to emulate 3270 terminals. Printers and other devices are also supported. For slightly more, we can handle most other popular host protocols, including Honeywell VIP.

But that's not all. There's a whole range of other functions this little wonder can perform. Try it risk free for 30 days, and if you're not completely satisfied, we'll take it back.

TC Thomas Engineering Company
1940 Oak Grove Road
Concord, CA 94518
(415) 689-8640

What three letters represent the most powerful on-line computer in business today?

TX

The most powerful on-line

Time was, the answer to the previous page was as easy as ABC.

But that was yesterday.

Today, the world of business computing is being introduced to a system featuring over two-and-a-half times the performance and twice the price/performance of its nearest competitor.

A versatile system. Able to compile the information of the largest corporations into a single relational data base. Instantaneously updated and fully available across the entire system.

An expandable and compatible system. Allowing the simple addition of future programs and equipment, without sacrificing past investments.

And most importantly, a system that won't let you down. Because its fault-tolerant design won't let itself down. Even if a major component fails.

This system isn't from IBM.

It's from Tandem.

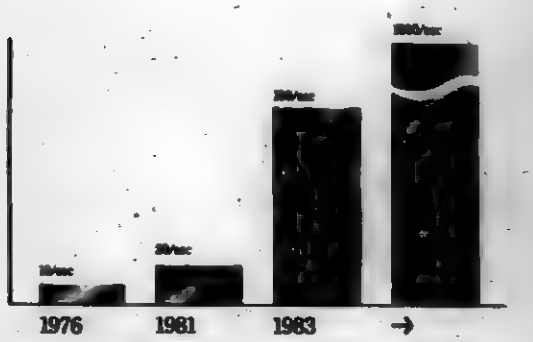
Introducing the NonStop TXP™ system.

TXP: 32-bit transaction processing.

The TXP system processes high volume loads faster and more economically than any other system. Executing over 100 transactions per second now and thousands of transactions in the near future.

It's built around multiple parallel 32-bit processors. Each addressing 16 MB of physical memory and over a gigabyte of virtual memory.

To help memory keep pace with that kind of processing, TXP pulls 64 bits on each memory access.



Our success can be summed up in a second. *Transactions per second. Numbers unsurpassed in the industry. On-line systems that fit your needs today. And tomorrow. With more processing power on the way.*

The TXP system also features parallel data paths. Manipulating 32 bits of information in a single cycle, two 16-bit operations in the same cycle.

And TXP incorporates extensive pipelining, to process multiple instructions simultaneously. Each processor overlaps instructions in three levels: Fetching one, while preprocessing a second, while executing a third.

While helping TXP deliver full 32-bit power, for less.

Cache memory pays off in faster response times.

Cache memory is a high-speed data storage area between the processor and main memory. It lets the processor store more frequently used information closer. So it can get to it faster.

And our tests have shown that the TXP cache memory has a 98% "hit rate." Which means the requested data is virtually always nearby for fast access.

The result? Larger volumes of work can be processed in shorter amounts of time. Helping TXP to be even more productive.

Making cache memory pay big dividends.

A system you'll expand, not disband.

Most computer systems have very limited expandability. So if a company outgrows its computer's capacity, it usually means starting again from scratch.

Selecting and buying a larger and more expensive system.

Then reprogramming.

Then re-training.

Plus all the chaotic disruption and

XP

computer in business today.

massive loss of revenue that's unavoidable during the switch-over.

Not so with the TXP system.

It can expand from two to 16 processors. Increasing its power by a factor of eight.

That's more power than any of the largest mainframes.

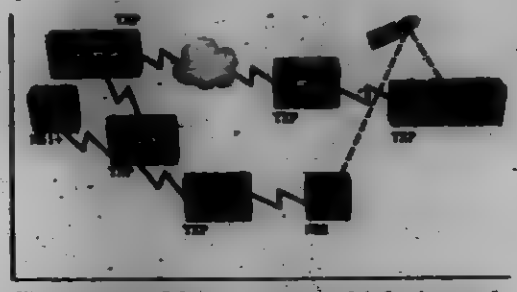
And the additional processors can be installed while TXP is running at full speed. No downtime. No reprogramming.

Still not enough power? Up to 14 TXP systems can be joined together by high-speed fiber optics. Linking the systems together as one computer with 224 processors.

But that still isn't the full potential of the TXP.

TXP systems at up to 255 sites can be joined in a worldwide network. Generating the power of over 4,000 processors.

And that gives TXP the most powerful on-line computer capacity in business.



The most powerful computer network in business today. *Users access a single unified global data base from any of thousands of terminals anywhere in the system.*

Expandability our competition wishes they could disband.

NonStop™ system compatibility from the people who started it all.

TXP can process more information and support more programs, users and devices than any other computer designed for on-line transaction processing.

Devices you most likely already have.

Even devices made by IBM.

But what if your company isn't quite ready for the TXP system's awesome power?

We suggest the Tandem NonStop II™ system. The second most powerful on-line computer in business today. The cost effective solution for medium to large corporations.

What if your company is somewhere between a Nonstop II and a TXP?

No problem. They can be combined. They can share the same data and programs. In fact, NonStop II and TXP processors can coexist in the same cabinets.

And what if your company needs even a smaller computer? We make a smaller computer. The Tandem NonStop 1+ system. Perfect for those low-volume sites where less processing power is needed.

Tandem literally wrote the book on NonStop™ transaction processing. That's because we introduced the first NonStop system.

Over eight years ago.

And for over eight straight years, despite attempts by others, we've continued to lead the industry.

Learn all about TXP, ASAP.

For complete literature, contact your local Tandem Sales Office.

Or write Tandem Computers Incorporated, 19333 Vallco Parkway, Cupertino, California 95014.

Or call us, toll-free. (800) 482-6336.

TXP is the most powerful on-line computer in business today.

Without question.

TANDEM

NonStop Transaction Processing.

©1983 Tandem Computers Incorporated

APPLE from page 24

otary] operating system designed around a user interface."

The private liberal arts school plans to purchase initially about 2,000 Macintoshes and to provide students with a package that includes the computer and some software at a significantly discounted price, about $1,250 (the Macintosh retails for $2,495). Payment will be spread out over the student's college career; when the student graduates, the computer will be his.

Both students and faculty will be strongly urged to use the computers, but no one will be forced, Arms said. "It is very important that [participation] be optional," the vice-provost explained, adding that it is not the school's job to tell the faculty how to teach, but rather to provide an environment to support it. Arms estimated that virtually 96% of the academic population has done some computing.

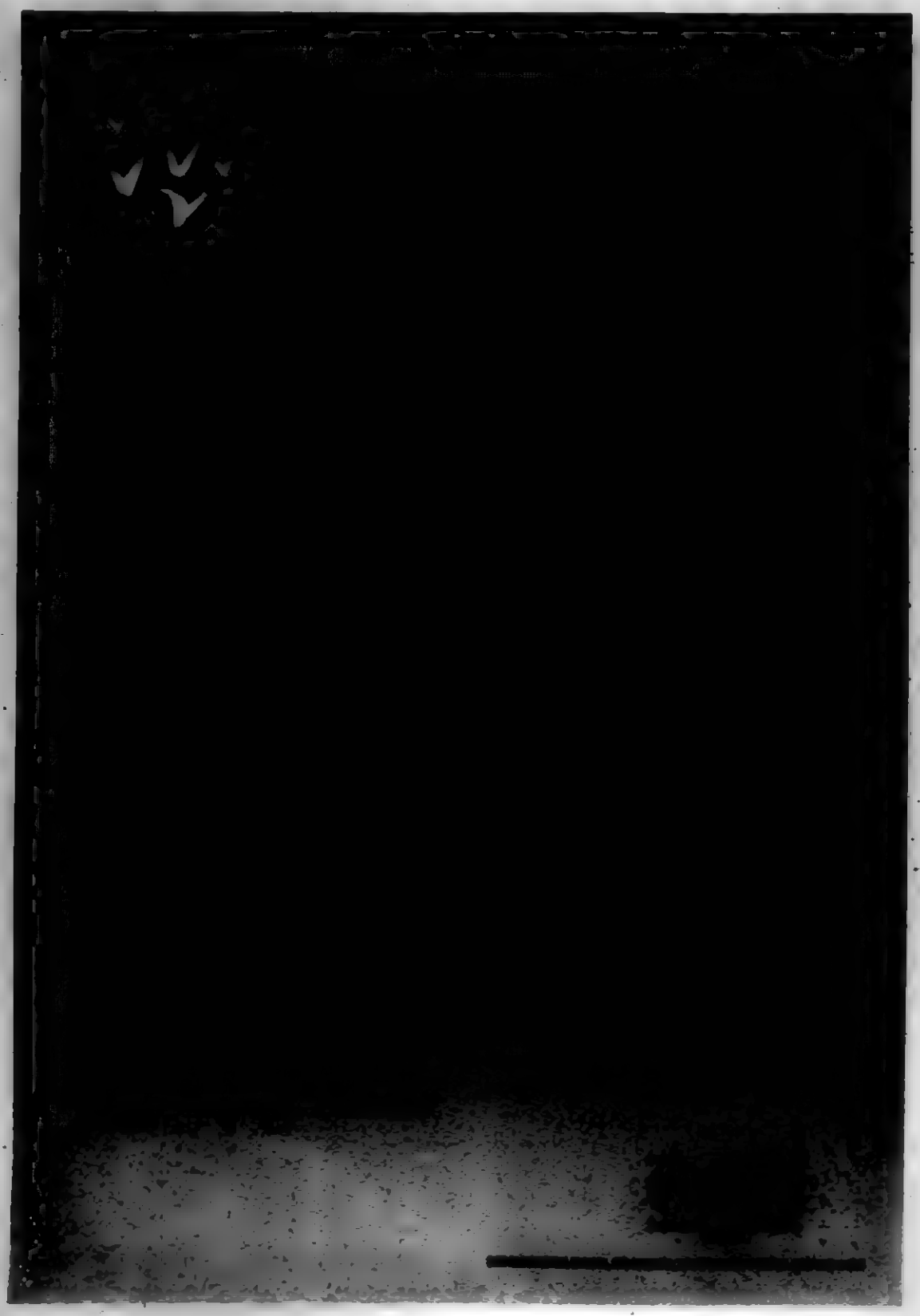
For students who do not want to buy the computer, Dartmouth will be adding a few personal computers to the "terminal clusters" now situated about the campus in public areas. However, Arms said the emphasis will be on private ownership. He noted that the personal computer has been priced so that it will be affordable by all students, including those receiving financial aid.

Students will be able to use their personal computers in either stand-alone mode or over the school network. In stand-alone mode, students can use their Macintosh to run a variety of graphics programs, avail themselves of word processing applications and write their own programs in Basic or Pascal. Using the campus time-sharing network, students can send electronic mail to faculty and friends, look up research materials in the library's computerized card catalog without leaving their rooms, perform statistical work and simulations and access the school data base.

For example, a student could write a term paper using word processing software in stand-alone mode and then link up to the time-sharing network to send the paper to a professor's electronic "address." Although the student will have a copy of the paper in his floppy disk library, getting a hard copy may be a little tricky. Nonetheless, the vice-provost said the school takes "full responsibility for providing enough public printers to meet demand." Placing printers in dorms is being considered.

Conference calls are another possibility through the time-sharing network, Arms added. Students will even be able to determine whether a book has been taken out before heading for the library, once circulation is input into the school's data base.

Course registration is computerized, as is student billing. Students present magnetic-striped identification cards when making purchases in the school's cafeterias and coffee shops, for example, and are billed accordingly. Once the network gets under way, these bills could be sent to students via electronic mail.



Dartmouth net subbing out terminals

HANOVER, N.H. — Personal computers are getting to the stage where they can be linked to function as efficiently as a mainframe-based time-sharing network, according to William Arms, vice-provost for computing and planning at Dartmouth College here.

"In the last 12 months, we have reached the crossover point where personal computers are good enough and cheap enough to [provide students with their own computers linked to the school's time-sharing system]," he said.

Dartmouth's plan to sell discounted personal computers for private student use next fall is "a big move from having [public] terminals in shared spaces," according to Arms, who believes today's powerful microcomputers have made such a move both possible and inevitable.

Moreover, Dartmouth views the insertion of computers in the academic environment as "a logical extension of what we've been doing in the past — a step forward on the curve of what we've been trying to do," the vice-provost added. Although some members of the academe believe computers are bigger than liberal arts, Arms holds that the reverse is true.

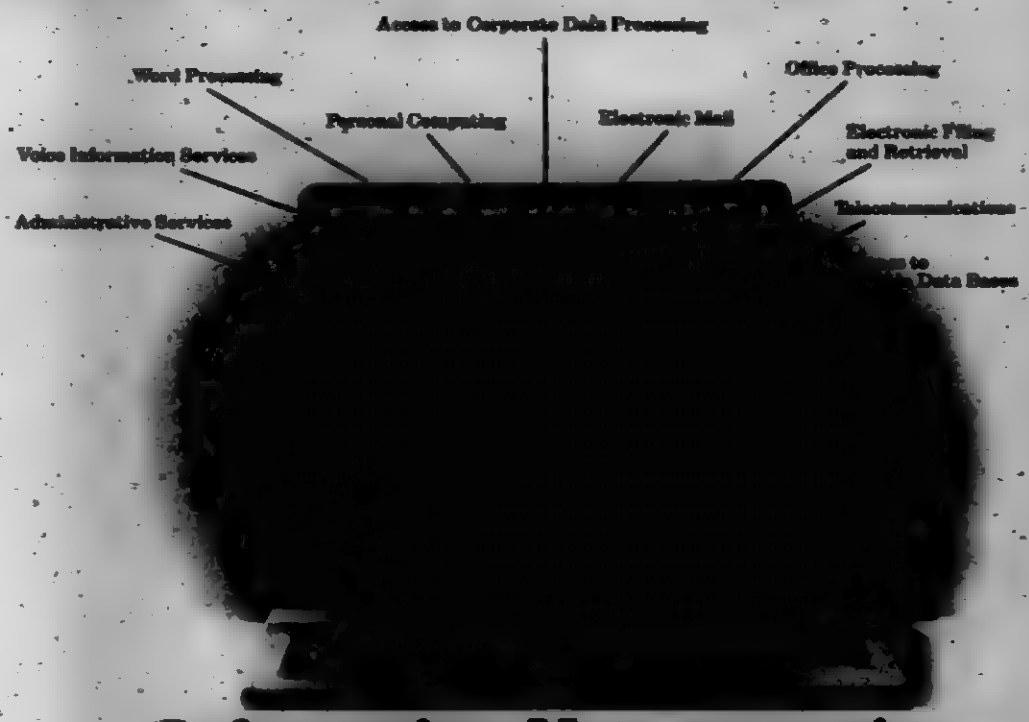
The growth of computing at Dartmouth has increased each year. In fact, Arms said, there has been no year when growth rose less than 10%. For example, the Amos Tuck School of Business Administration recently purchased 50 IBM Personal Computers [CW, May 16], resulting in a 1:7 ratio of computers to students. Reportedly, almost every course at Tuck requires the use of a computer in some way.

The school is beginning to see greater growth in this area, and as a result of its planned campuswide network of stand-alone/time-sharing personal computers, slated to take off this fall, it most certainly will experience a surge in computer use.

Currently, Dartmouth has a campuswide network that has been extended to all academic buildings except the medical school, a time-sharing system and support staff. All of the terminals within the network can talk to each other.

The school is also linked electronically to four or five colleges in the Northeast. "We had [most of this] for such a long time that a lot of things are routine," according to Arms.

SPERRYLINK™
OFFICE SYSTEM



Information. Not automation.

The office information system that puts the mainframe into the mainstream.

The SPERRYLINK Office System.

It's a personal computer. Time manager. Word processor. Data processor. Link to the corporation, and to the world outside. And it's a critical link to the wealth and immediacy of mainframe information, and the means to project it into the minute-by-minute business day.

And most importantly, any desk station can be any and all of these things, as intelligent as you want it to be—whenever and wherever the need arises.

When new needs arise, SPERRYLINK will rise to the challenge. Re-adapting as your company grows.

This is the SPERRYLINK System: built by people who see the mainframe not as a monolith, but as a readily accessible resource.

A system beyond conventional ideas of office automation. Beyond words and numbers, voice and image.

Because it doesn't just help people work better.

It helps people work together.

Sperry Corporation, Computer Systems, Department 100, P.O. Box 500, Blue Bell, PA 19124

SPERRYLINK is a trademark of Sperry Corporation. © Sperry Corporation 1983

SPERRY

We understand how important it is to listen.

NEWS

Booklet out for banks

WASHINGTON, D.C. — The American Bankers Association (ABA) has published a booklet featuring a checklist of factors to consider when choosing bank microcomputer software.

"What About Software? Selecting a Package for Your Bank's Microcomputer" is a three-part booklet covering a definition of the nature of software, an evaluation model to use in acquiring software and hands-on case studies in which the model is used in a banking context.

The authors of the publication are from Aurora Systems, Inc. of Madison, Wis.

Single copies of "What About Software" (No. 022600), which is part of the ABA's Competitech series of booklets, may be obtained for $20 by ABA members and $30 by others from Order Processing, ABA, 1120 Connecticut Ave. N.W., Washington, D.C. 20036.

An annual subscription to Competitech, published monthly and sponsored by 44 state banking associations, may be purchased by ABA members for $195 and by nonmembers for $275 from the ABA Accounting Department at the same address.

PC-World Expo starts Feb. 1

HOUSTON — PC-World Exposition, a three-day conference and exhibition on microcomputers, is scheduled at the Astrohall here beginning Feb. 1.

Richard Dalton, editor of *The Whole Earth Software Catalog*, will speak on "How I Became Compatible With My IBM PC." Other speakers and panelists include Rod Canion, president of Compaq Computer Corp.; *Infoworld* Consulting Editor John Dvorak; Harry Miller, Steve Cook and Andrew Fluegelman, editors of *PC World*; Esther Dyson, president of Rosen Research, Inc.; and Richard Rabins, president of Alpha Software, Inc.

Programs scheduled include sessions on hardware and software for professionals, networking, data base management and others.

Conference and exhibit admission is $30. More information is available from Mitch Hall Associates, P.O. Box 360, Westwood, Mass. 02090.

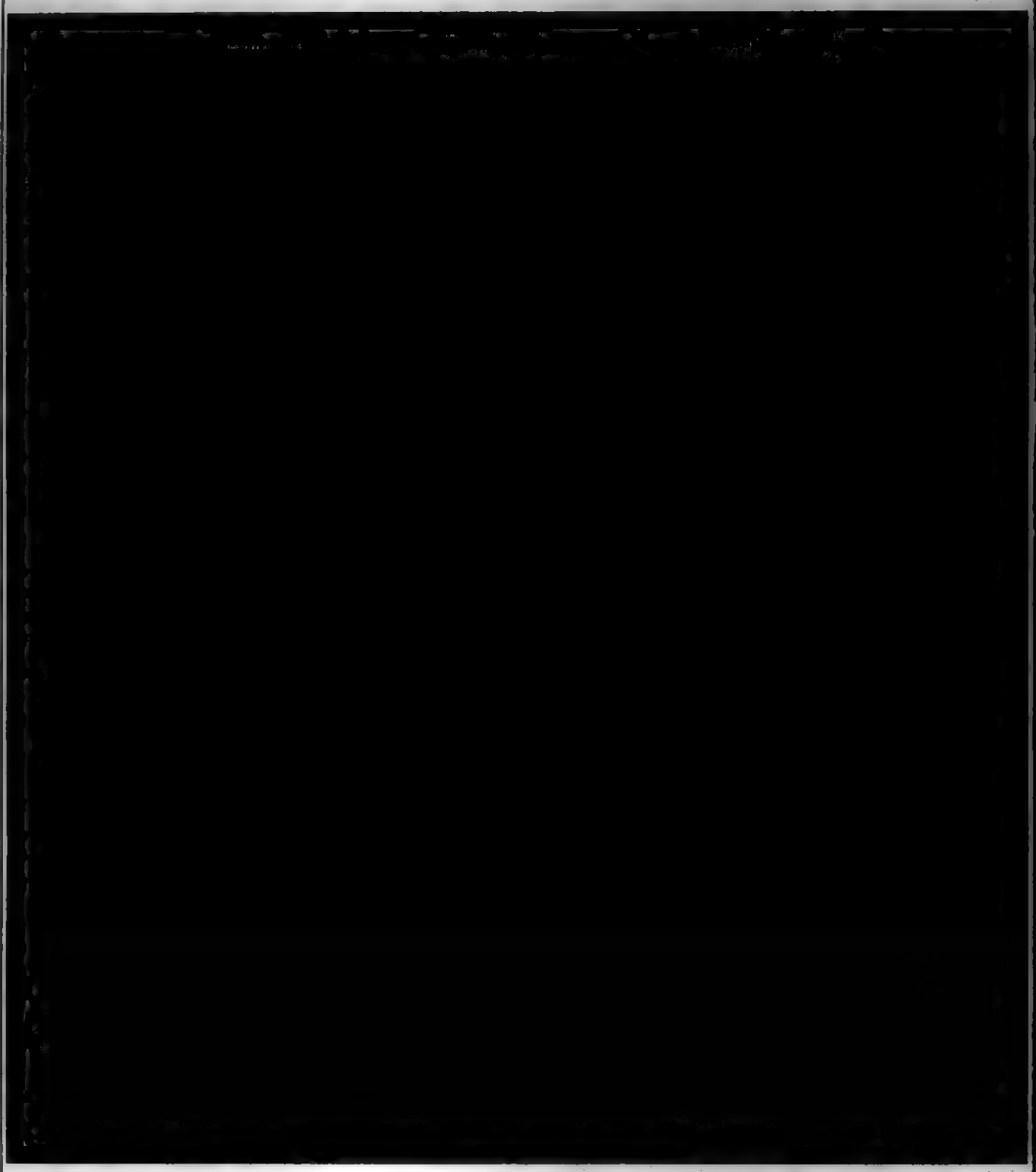
Siggraph accepting nominations

CHICAGO — The Association for Computing Machinery's Special Interest Group on Computer Graphics (Siggraph) is accepting nominations for the Computer Graphics Achievement Award, a $500 award that recognizes accomplishments in computer graphics. The award is given for development of algorithms, hardware design, innovative application of computer graphics and works of art.

Each nomination should include the name and address of the person nominated, a description of accomplishments, a statement by the nominator describing the significance of the accomplishment and the nominator's name, address and telephone number.

The award will be presented July 25 in Minneapolis during Siggraph '84, a five-day graphics conference.

Nominations can be sent to Siggraph '84 Conference Office, 111 E. Wacker Drive, Chicago, Ill. 60601.



Power. That's the key to CDI/100. It's a new concept in PC operating system environments so powerful, so personal and so remarkably flexible, that it can be tailored to the dimensions of any size operation.

We've integrated the best generic features of the minicomputer world with the convenience of Microsoft's MS-DOS.

The learning process is traversed as quickly and easily as an open door. What it brings to your IBM PC is a new generation of data base management capabilities in a system that becomes as personal as your fingerprint.

For virtually limitless application in a system that will

NEWS

Symposia to cover fourth-generation tools

WAKEFIELD, Mass. — Data management and fourth-generation language products for mainframes, minicomputers and microcomputers will be the focus of the National Data Base and Fourth-Generation Language (DB&4GL) Symposia Series for 1984.

The sponsor, Digital Consulting Associates, Inc. here, announced that the series will highlight recent developments in high-level fourth-generation languages, distributed data base architectures, prototyping, relational data bases and user-oriented data base management systems.

The DB&4GL Symposia Series will be held on four occasions throughout 1984 at the following sites: Los Angeles, March 6-9; Washington, D.C., April 24-27; Chicago, May 15-18; and New York, June 18-21.

Digital Consulting Associates' President Dr. George Schussel is scheduled to lead the first day of the symposium in an intensive review of data management principles. He is also expected to speak on the topic of information centers.

The fee for the entire four-day National DB&4GL Symposia Series is $750 from Digital Consulting Associates, 330 Salem St., Wakefield, Mass. 01880.

Method/1 users group to meet

ATLANTA — The annual Method/1 Users Group Conference is scheduled at the Terrace Garden Inn here Feb. 22-24, with about 80 to 100 companies using Arthur Andersen & Co.'s project management and systems development methodology expected to participate.

Ronald L. Culhum, an associate director of Arthur Andersen's Data Management Systems, will speak on automating the work of programmers, analysts and project managers and on methodologies for using high-level, fourth-generation languages.

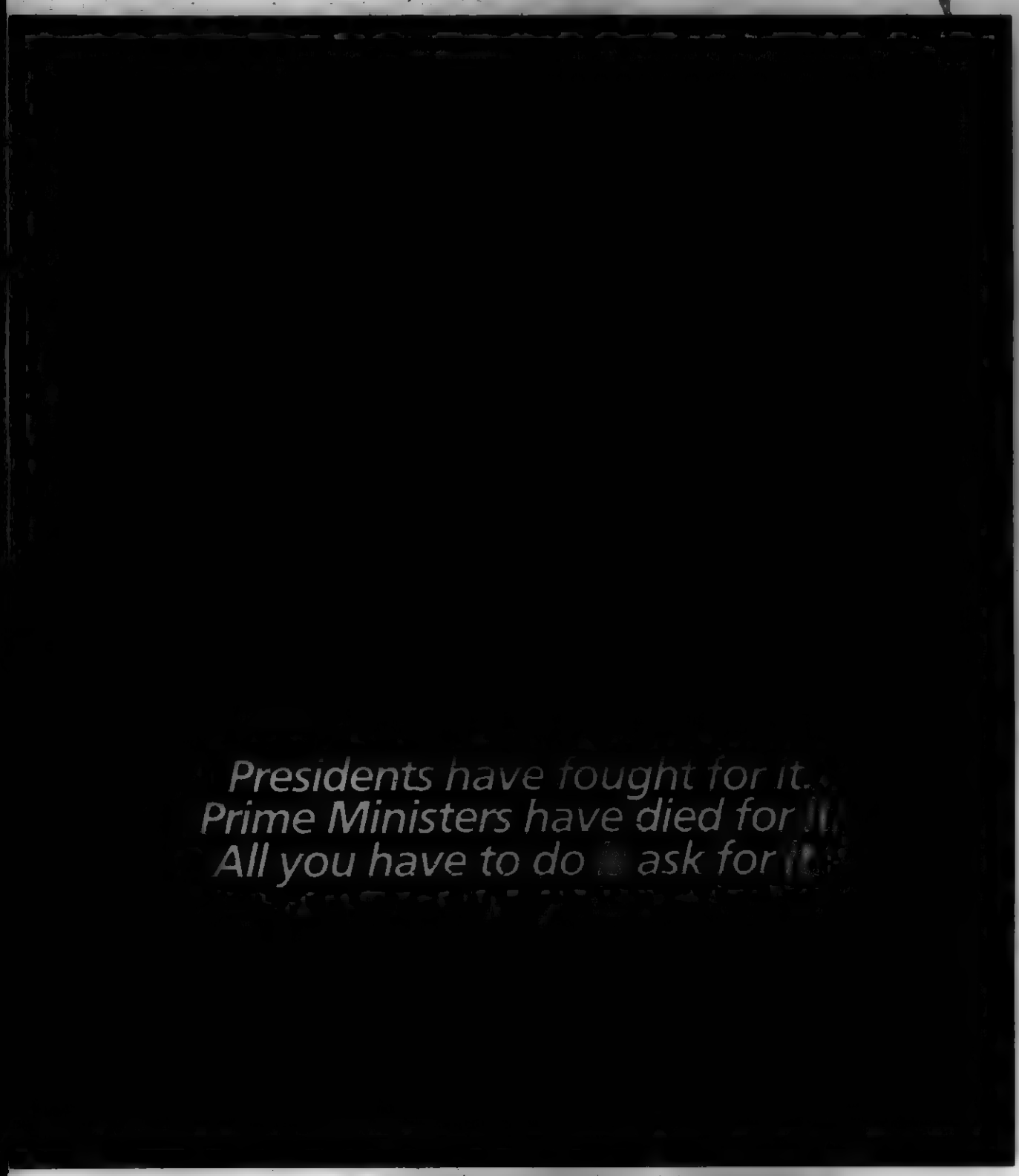
Registration fees are $250 for the first registrant from each firm and $150 for each additional registrant. More information is available from Arthur Andersen, 33 W. Munroe St., Chicago, Ill. 60603.

Osra to hold annual meet

LOS ANGELES — The third annual conference of the Office Systems Research Association (Osra) will be held Feb. 18-19 at the Los Angeles Hilton. The conference immediately precedes the American Federation of Information Processing Society, Inc.'s Office Automation Conference.

The Osra conference will include refereed paper sessions on technology and the office and personnel implications of office automation.

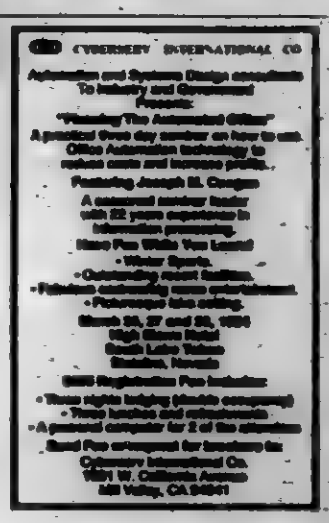
Attendance will be limited. Preregistration fees are $60 for Osra members, $85 for nonmembers. On-site registrations cost an additional $10. More information is available from Edward G. Thomas, 574 University Center, Cleveland State University, Cleveland, Ohio 44115.



grow just as far and just as fast as you do, ask for CDI/100, coming soon, wherever you buy your software. And look for us at SOFTCON, Booth L4077 Because personal power has never been this simple.

Exceptional New Software Concept
- Everyone's Filing System
- English-like Inquiry Language
- Dynamic Menu System
- Integrated Help Features
- Relational Data Management
- Enhanced Basic Compiler
- Dictionary Supported Data Base
- Work Flow Manager

CDI 100™
CDI, 1309 114th Ave. S.E. Bellevue, WA 98004
INCREASE YOUR PERSONAL POWER.™


CYBERNETY INTERNATIONAL CO
Automation and System Design consultants To industry and Government Presents:
"Planning The Automated Office"
A practical three day seminar on how to use Office Automation technology to reduce costs and increase profits.
Featuring Joseph H. Coogan
A seasoned seminar leader with 22 years experience in information processing.
Have Fun While You Learn!
• Water Sports.
• Outstanding resort facilities.
• Fabulous entertaining casino entertainment.
• Picturesque lake setting.
March 26, 27 and 28, 1984
High Sierra Hotel
South Lake Tahoe
Stateline, Nevada
$695 Registration Fee Includes:
• Three nights lodging (double occupancy)
• Three lunches and refreshments
• A personal computer for 2 of the attendees
Send Fee w/request for brochure to:
Cybernety International Co.
7901 W. California Avenue
Mill Valley, CA 94941

NEWS

INTERNATIONAL REPORT

CW INTERNATIONAL NEWS NETWORK

CHINA

SHANGHAI — The Shanghai Software Development Center opened here this month following the establishment of a similar center in Beijing. Since so much of China's computer activity is concentrated in the two cities, it is thought that the formation of these government-funded centers will make better use of China's resources. The charter of the centers is to undertake large software development projects for both domestic and foreign users.

BEIJING — Guangdong Computer Center has developed a Unix-based operating system said to run on a variety of large and small computer systems. While retaining the basic functions and features of Unix, the software also reportedly handles Chinese, Japanese, Russian and Greek character processing.

BEIJING — The TP series of microcomputers developed by the Beijing Polytechnical University is reportedly gaining in popularity in the U.S., Sweden, New Zealand and Africa. Industrial analysts here believe exports of the domestically produced single-board machine, based on the Zilog, Inc. Z80 microprocessor, will soar once an international distribution network is established.

JAPAN

TOKYO — Japan and the U.S. have agreed to extend for three more years a 1980 arrangement that enables Japan's Nippon Telegraph and Telephone Corp. to purchase American telephone equipment, according to a Japanese Foreign Ministry spokesman.

TOKYO — Mitsubishi Corp. has unveiled a videotex system called Mapservice that serves as a "town guide" to downtown Tokyo. Two of the Mapservice machines are set up in the Roppongi Information Center. They offer the user electronic information on a number of stores, restaurants, bars and discos in Tokyo. The system also provides hard copy. Now in its testing stage with an independent memory, Mapservice is expected to be on-line in March with daily news bulletins and a file of some 300 Tokyo stores.

KOREA

SEOUL — Samsung Electronics Co. and Hewlett-Packard Co. have signed an agreement to form a company to develop computer products and to sell and support HP products here. Called Samsung-Hewlett-Packard Ltd., the joint venture will be 55% controlled by the U.S. vendor. The agreement is subject to the approval of the Korean government.

SPAIN

MADRID — Some $600 million worth of government funds is reportedly being funneled into Spain's high-technology sector to spur the domestic market. The money is intended to expand Spain's production and reduce dependence on imports, according to Industry Minister Carlos Solchaga.

WEST GERMANY

COLOGNE — Honeywell Bull AG has introduced three additions to its Series 6 product line: Model 6/210, Model 6/290 and a microcomputer desktop system called Mikro 10. The Mikro 10 is said to be IBM-compatible and capable of emulating the IBM 3270 terminal. It runs under Honeywell's proprietary Gcos operating system and also runs Digital Research, Inc.'s CP/M and Microsoft, Inc.'s MS-DOS operating systems. A basic Mikro 10 configuration with 512K bytes of main memory and two 650K-byte floppy disk drives is priced at $5,720, with first shipments slated for April.

CONDOR
on-line programming that reaches new heights in productivity

To get the most from your IBM mainframe, you need CONDOR – a reliable, easy-to-use, high-performance system that soars above the rest through improved programmer productivity and low resource consumption. CONDOR's highly efficient processing methods and I/O facility improve system response time and can substantially expand the capacity of your CPU while minimizing personnel requirements.

You can write and edit programs with CONDOR and submit them for compile or execution. You can view and modify data from input and output queues, release or cancel jobs, and spool output to local and remote printers.

CONDOR's built-in library management system automatically reorganizes as you process for optimum conservation of disk space. In addition to offering stringent security against unauthorized access and supporting multiple versions, it provides detailed audit reports and program cross-referencing – both batch and on-line.

Boosting productivity even more, CONDOR's own high-level interactive programming language lets you create programs and JCL in a fraction of the time required with other languages. And a powerful set of interactive utilities makes system maintenance a breeze.

CONDOR operates standalone or as a task under CICS and the other major TP monitors to give you total flexibility, and it supports DOS/VS(E) and MVS operating systems for versatility and upgrading capabilities.

No wonder respondents to a recent Datapro survey rated CONDOR tops in reliability, efficiency, ease of use, ease of installation, support, and realized financial savings.

So for a system that out-performs the others and gives you complete control of all your data processing, choose CONDOR. Call for a free trial. You'll be glad you made the right choice.

For more information contact Phoenix Computer Corporation, 11949 Jefferson Boulevard, Culver City, California 90230. Toll-free (800) 255-5049 or (213) 827-4500 in California.

CONDOR

Teleconference set for April

PHILADELPHIA — The 1984 International Teleconference Symposium, which will examine the applications, techniques and benefits of teleconferencing and ongoing developments worldwide, will be held here April 3-5 at the Marriott Hotel.

The meet is cosponsored by Communications Satellite Corp. (Comsat); AT&T; ITT World Communications, Inc.; MCI International, Inc.; RCA Global Communications, Inc.; Satellite Business Systems; and TRT Telecommunications Corp. In cooperation with Intelsat, the symposium will be linked via satellite during portions of each day with Toronto, Tokyo, London and Sydney, Australia. On the second day of the symposium, the satellite will link with all these sites simultaneously, a spokesman said.

Prior to Feb. 1, registration is $495; after Feb. 1, registration is $595 from Comsat World Systems Division, Comsat, 950 L'Enfant Plaza S.W., Washington, D.C. 20024.

A WORD TO ANYONE LOOKING FOR UNIX™ TRAINING:

Guaranteed.

Introducing Vision. The first UNIX Interactive Videodisc Training Curriculum. And our 30-Day Money-Back Guarantee.

Simply lease any one of three Vision Courses: UNIX Overview, UNIX Fundamentals or 'C' Language Programming. If you're not satisfied, for any reason, return it for a full refund. No questions asked.

A Free IBM PC and Laser Discplayer.

Lease all three Vision Courses for one year. And we'll give you the use of a complete interactive videodisc system at no extra cost. You get an IBM PC, laser videodisc player, color monitor and Interactive Training System Controller. Absolutely Free.

Training in Action.

Interactive video training combines the power of the computer, the speed of a laser disc and the personality of classroom instruction. To involve, to motivate, to excite. To capture and hold a student's interest in a way no other medium can.

Students learn by doing, so they learn faster, comprehend better and retain information longer. Because training is targeted, they learn only what they need to know to do the job. Now.

What's more, Vision was developed by Interactive Training Systems, the acknowledged leader in interactive video training. And Computer Technology Group, a leader in UNIX training.

The result? UNIX training so fast, so effective and so affordable, we back it with a full 30-Day Money-Back Guarantee. (Frankly, it's one guarantee we're confident you'll never get to use.)

Send us the attached coupon. Or call us at 1-800-227-1127.

AFTER MARCH 31, 1984 OUR FREE INTRODUCTORY OFFER IS NO LONGER FREE!

☐ Please have a representative contact me immediately.

☐ Please send me more information about Vision, the UNIX Interactive Video Training Curriculum.

Name_____

Company_____

Title_____

Address_____

City_____ State____ Zip____

Telephone_____

™ Bell Laboratories

Interactive Training Systems, Inc.
4 Cambridge Center, Cambridge, MA 02142

BE A HERO. BUY A HERO.

Heros were meant to rise above it all. So why is it you keep getting caught in the middle? Is it your fault that personal computers in every department are hoarding data? They won't even have a simple conversation with the mainframe.

Why should you be pestered by complaints when work is lost? Or duplicated? Even triplicated? Not to mention what happens to costs.

Your organization is a victim of Computer Shock. Badly in need of a HERO™.

HERO RESCUES COMPUTER WORLD FROM CHAOS.

MDS HERO is the intelligent, desktop Networked Personal Computer. It does everything a personal computer can do. And more. But most of all, our HERO is famous for interacting—it works beautifully with mainframes.

With the MDS SUPER 21™ Communications Processor, HERO can converse intelligently on IBM networks. HERO emulates IBM 3270 SNA and 3776 remote job-entry systems. Our SUPER SNA™ option gives you both on one communications link.

HERO also runs software under MS-DOS. Plus its own multi-tasking operating system.

HEROS OF THE WORLD UNITE.

With HERO and SUPER 21 on your side, there's no end to what you can conquer. You can draw on private, departmental, and corporate databases. Bring individual workstations out from their isolation. Thanks to you, information will be bound together, in a network of organization. All under your control.

What's more, if you take advantage of our own INTELLIGENT 3270™ (only MDS has it), your people can write their own programs, and integrate them with data in the mainframe. Using HERO, you can reach into the database and retrieve information. Then either return it, or store it at the workstation.

HEROISM GETS REWARDED.

With our HERO and SUPER 21, you'll have what's out-of-control under control, fast. Your current data processing investments will become part of a growing bank of knowledge. All of it cost-efficient.

Besides, old HEROS never die. Nor do they fade away. They're modular in design, so they manage to be immortal. They grow with you. All the way.

YOU CAN BE BIG WITHOUT BEING BLUE.

MDS is everywhere Big Blue is. We even stretch beyond the Blue horizon. And we grew big for one big reason: we've helped our customers to grow.

MDS can do the same for you, too. Wherever you are on this Big Blue planet, we'll give you more than mere office automation. We'll organize your organization. Our service people will be at your beck and call. Around the globe. Around the clock.

So be a hero. Buy a HERO. Ask our customers about us. And give us a call. Dial **800-MDS-HERO.**

You'll soon see that heroism has its rewards.

MDS MOHAWK DATA SCIENCES

7 Century Drive, Parsippany, New Jersey 07054. And over 430 locations, worldwide.

MDS is a registered trademark and HERO, SUPER 21, INTELLIGENT 3270 and SUPER SNA are trademarks of Mohawk Data Sciences Corp. MS-DOS is a trademark of Microsoft, Inc.

NEWS

IEEE chief laments tech education

Dr. Richard J. Gowen

By John Gallese
CW Washington Bureau

WASHINGTON, D.C. — Declaring that American technological education "borders on a national disgrace," Dr. Richard J. Gowen, 1984 president of the Institute of Electrical and Electronics Engineers (IEEE), recently called for a national commitment to enhanced math and science education.

Gowen, vice-president and dean of engineering at the South Dakota School of Mines and Technology in Rapid City, told a press conference here that "as I look to the future, I am very concerned . . . about the technological literacy." He said schools are not adequately preparing students for a technological world and criticized what he sees as unsophisticated computer use in the classroom.

Gowen urged scientists and engineers to work with local school boards to design better math and science curricula and said there is a need to provide salary supplements for teachers in those disciplines.

The IEEE, with approximately 250,000 members in 120 countries, is in its centennial year, Gowen noted.

Discussing computers in the classroom, the IEEE president said, "we really haven't begun to use computers in education to their full capabilities."

Students must be prepared "so that they see a computer as you and I see a piece of paper . . . to take a computer and use it as an extension of their minds.

"The need today is for the engineers and scientists of this country to recognize the urgency of the need we have for math and science education in this country and to take action," Gowen said. Noting that the government is reluctant to initiate new programs and that bills to upgrade math and science education are stalled in Congress, Gowen urged technically trained people to become involved in local education programs.

On the national level, he called for special funds to support the education and salaries of math and science teachers. He also recommended financial support for teaching colleges. Salary supplements could keep qualified engineers and scientists from leaving schools for the private sector, he said.

Reiterating his concern that "we are falling behind [other countries] and unless we take action will fall further and further behind," Gowen described himself as optimistic that the U.S. will meet this challenge. "I believe that once we understand the problem, something will be done."

New edition out of IEEE guide

SILVER SPRING, Md. — The fourth edition of *Tutorial: Software Design Techniques* has been released by the Institute of Electrical and Electronics Engineers, Inc.'s (IEEE) Computer Society Press.

The fourth edition was edited by Peter Freeman of the University of California in Irvine and Peter I. Wasserman of the University of California in San Francisco.

The publication costs $20 ($32 for nonmembers) from the IEEE Computer Society, Suite 300, 1109 Spring St., Silver Spring, Md. 20910.

INTERNATIONAL DATA CORPORATION

IDC's 19th ANNUAL INFORMATION INDUSTRY BRIEFING SESSION

SESSIONS FILL FAST! Drop this card in the mail to reserve your seat at the IDC Briefing Session nearest you! Or, call Diane Testa at (617) 872-8200.

Name _____
Title _____
Organization _____
Address _____
City _____ State _____ Zip _____
Telephone _____

☐ Yes! I will attend the _____ (city) Briefing Session
☐ My check for $_____ is enclosed. ☐ Please bill me $_____
☐ Please send me more information

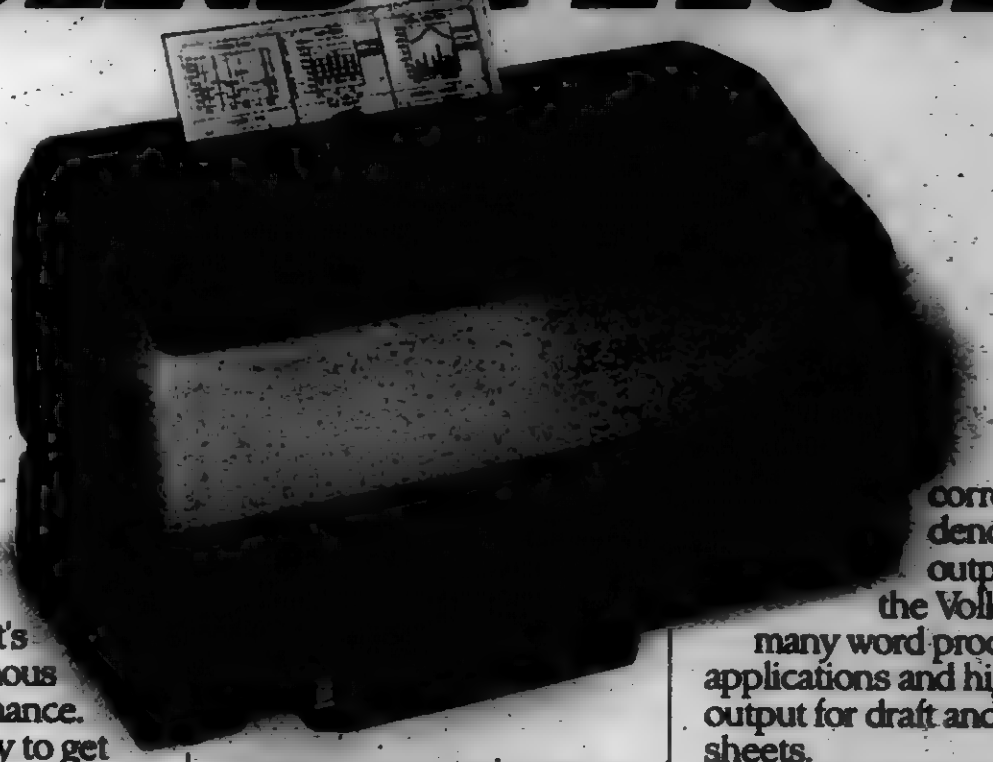
NOTE: Please copy this form for additional registrations.

Mail to: Diane Testa
International Data Corporation
Five Speen Street
Framingham, MA 01701

IDC INTERNATIONAL DATA CORPORATION

BS 1/30/84 CW

Soup up your Volkswriter.



Everybody knows Volkswriter,* the word processing software package that's become synonymous with high performance. Now, there's a way to get even higher mileage out of your Volkswriter. Hook it up to a Dataproducts P Series dot matrix color printer.

The versatile P Series translates the executive class, word processing capabilities of the Volkswriter into brilliant full color charts, graphs and text. It delivers a full page of text quality print in nothing flat while its sheet feeder automatically prevents loading hassles. And the P Series uses pin feed or plain paper and has the brains to fill every appropriate line with crisp, sharp copy, even if it has to justify to do it. And the P Series color printer has dual speed capability for correspondence quality output for the Volkswriter's many word processing applications and high speed output for draft and spreadsheets.

The Dataproducts P Series color printer. Think of us as a supercharger for your Volkswriter.

For more information go to your nearest computer store and ask about the Dataproducts P Series color printer, or call Dataproducts, 1-800-258-1386.

Dataproducts computer printers

Nobody puts ideas on paper so many ways.

*Volkswriter is a registered trademark of LIFETREE SOFTWARE, INC.

NEWS

CALENDAR

WEEK OF FEB. 12

FEBRUARY 14-17, LOS ANGELES — Data Communications: Components, Systems and Networks. Contact: Institute for Advanced Technology, 6003 Executive Blvd., Rockville, Md. 20852.

FEBRUARY 15, CHICAGO — The Fourth Annual Talmis Conference: The Industry Takes Stock. Contact: Talmis, 115 N. Oak Park Ave., Oak Park, Ill. 60301.

FEBRUARY 15, NEW YORK — Knowledgeman for Applications. Contact: Center for Advanced Data Processing, Inc., Suite 402, 450 7th Ave., New York, N.Y. 10123.

FEBRUARY 15-16, SALT LAKE CITY — Intermountain Telecommunications Show. Contact: Jon Taylor and Co., P.O. Box 356, Salt Lake City, Utah 84110.

FEBRUARY 15-17, NEW YORK — CICS/VS Recovery/Restart. Contact: Teltech, 39 Broadway, New York, N.Y. 10006.

FEBRUARY 15-17, ORLANDO, FLA. — Modern Auditing Concepts. Contact: MIS Training Institute, Inc., 4 Brewster Road, Framingham, Mass. 01701.

FEBRUARY 15-17, NEW YORK — Structured Technologies in Software Testing. Contact: Institute for Advanced Technology, 6003 Executive Blvd., Rockville, Md. 20852.

FEBRUARY 15-17, ATLANTA — Managing Application Software Support. Contact: Infosci, Inc., Box 7117, Menlo Park, Calif. 94026.

FEBRUARY 15-17, MONTEREY, CALIF. — Small Computers. Contact: Datequest, Inc., 1290 Ridder Park Drive, San Jose, Calif. 95131.

FEBRUARY 16, NEW YORK — Introduction to Dbase II. Contact: Center for Advanced Data Processing, Inc., Suite 402, 450 7th Ave., New York, N.Y. 10123.

FEBRUARY 16-17, NEW YORK — Computer Litigation 1984: Resolving Computer-Related Disputes and Protecting Proprietary Rights. Contact: Practicing Law Institute, 810 7th Ave., New York, N.Y. 10019.

FEBRUARY 16-17, NASHUA, N.H. — Corporate Problem Solving With Microcomputers. Contact: New Hampshire College, Resource Center, 2500 N. River Road, Manchester, N.H. 03104.

FEBRUARY 16-17, SAN FRANCISCO — Advanced Structured Techniques. Contact: Infosci, Inc., Box 7117, Menlo Park, Calif. 94026.

FEBRUARY 16-17, LOS ANGELES — Evaluation and Selection of Security Software. Contact: Margo Cohen, MIS Training Institute, Inc., 4 Brewster Road, Framingham, Mass. 01701.

FEBRUARY 17, NEW YORK — Executive Briefing. Contact: Center for Advanced Data Processing, Inc., Suite 402, 450 7th Ave., New York, N.Y. 10123.

WEEK OF FEB. 19

FEBRUARY 20, WASHINGTON, D.C. — Successful Strategies for Acquisition and Control of Microcomputers: The Revolution. Contact: Datamation Institute, Suite 415, 950 Boylston St., Chestnut Hill, Mass. 02167.

FEBRUARY 20-21, WASHINGTON, D.C. — Introduction to SPSS-X for New Users. Contact: SPSS, Inc., 444 N. Michigan Ave., Chicago, Ill. 60611.

FEBRUARY 20-22, ORLANDO, FLA. — PC Intro. Contact: Harris Education Center, 6220 S. Orange Blossom Trail, Orlando, Fla. 32809.

FEBRUARY 20-22, LOS ANGELES — 1984 Office Automation Conference. Contact: Trudi Riley, American Federation of Information Processing Societies, Inc., 1899 Preston White Drive, Reston, Va. 22091

FEBRUARY 20-23, SAN FRANCISCO — The 14th Annual Conference for Computer Output Micrographics. Contact: Computer Micrographics Technology, Suite 200, 100 N. Winchester Blvd., San Jose, Calif. 95128.

FEBRUARY 20-24, PHILADELPHIA — Advanced C Topics Seminar. Contact: Plum Hall, 1 Spruce Ave., Cardiff, N.J. 08232.

FEBRUARY 20-24, ORLANDO, FLA. — IDMS-DC Programming. Contact: Harris Education Center, 6220 S. Orange Blossom Trail, Orlando, Fla. 32809.

FEBRUARY 21, CARY, N.C. — SAS Services Workshop. Contact: SAS Institute, Inc., P.O. Box 8000, Cary, N.C. 27511.

FEBRUARY 21, NEW YORK — Advanced Lotus 1-2-3. Contact: Center for Advanced Data Processing, Inc., Suite 402, 450 7th Ave., New York, N.Y. 10123.

FEBRUARY 21-22, HOUSTON — CICS/VS Performance and Tuning. Contact: On-Line Software International, Fort Lee Executive Park, Two Executive Drive, Fort Lee, N.J. 07024.

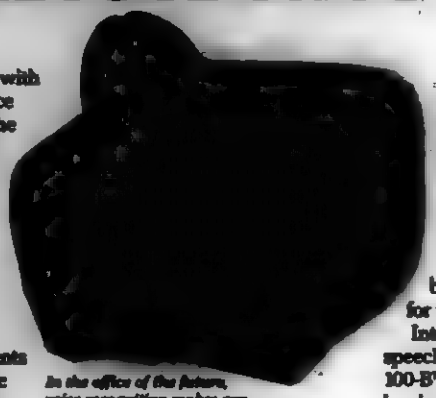
FEBRUARY 21-22, ORLANDO, FLA. — Computer Negotiations Workshop. Contact: International Computer Negotiations, Suite 1701, 200 St. Andrews Blvd., Winter Park, Fla. 32792.

FEBRUARY 21-23, SAN FRANCISCO — Structured Analysis. Contact: Infosci, Inc., Box 7117, Menlo Park, Calif. 94026.

FEBRUARY 21-23, SAN FRANCISCO — Structured Analysis: Tools and Techniques. Contact:

See Page, page 41

People talk. Interstate listens.



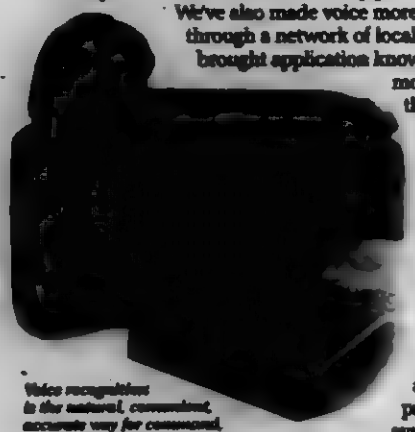
In the office of the future, voice recognition makes any telephone a computer input tool.

And we've responded with the broadest range of voice recognition products in the industry. Years of experience, a comprehensive product line, and price/performance leadership have firmly established Interstate Electronics as the largest U.S. supplier of voice recognition equipment.

We cover your requirements from evaluation hardware to volume production. On everything from chip-level recognizers to board-level products and complete systems.

Throughout our long-term commitment to voice, we've listened hard to meet your needs. As a result of widespread product acceptance, we've been able to drop prices dramatically.

We've also made voice more readily available through a network of local distributors. And brought application knowledge to more and more companies through in-depth Interstate workshops held across the country.



Voice recognition is the natural, convenient, accurate way for command, control and data entry when hands and eyes are busy.

We invite you to join with us in this healthy, growing market which is projected to hit $1-billion within the next ten years. And we'd like to give you a sampling of key products that are available now.

The first is a limited vocabulary, speaker-independent voice recognition component, priced below $6.00 in quantities. Designed for a wide variety of high-volume applications, Interstate's VRC008 puts voice control capabilities in the price range of appliances, games, and even toys.

In addition, we make and market a two-device NMOS chip set that recognizes up to 200 words or short phrases with 99 + % accuracy. This VRC100-2 can be easily incorporated into any computer peripheral manufacturer's product to create an extremely user-friendly interface.

The SYS300 is a complete speech recognition system with a vocabulary of 100 words or short phrases. Just plug it in to any RS-232C ASCII terminal and start talking. Interstate provides everything you need—recognition board, power supply, enclosure, cable, and microphone—for voice the easy way.

Interstate's board-level VRT300 is a high-accuracy, low-cost speech recognizer for DEC VT100™, C. Itoh CIT 101, Plessey PT 100-B™, and other compatible terminals. Interstate's complete hardware/software/firmware solution provides easy incorporation of voice input and is totally software-transparent. It offers recognition of 200 words with 99 + % accuracy.

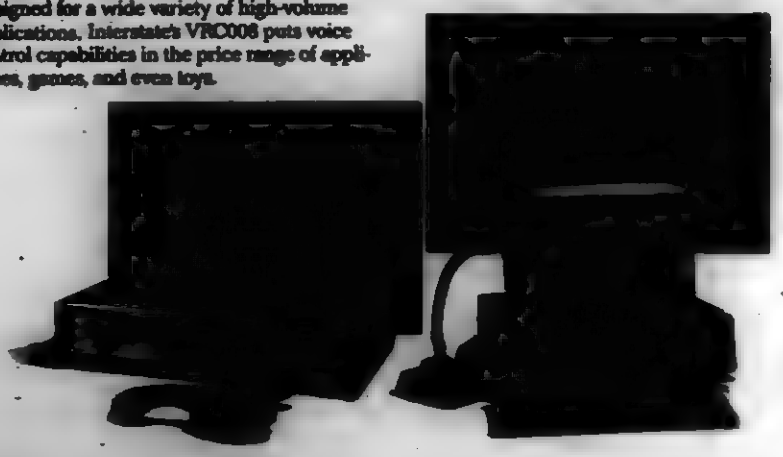
Quality control inspectors stay in touch with the computer—without touching the terminal.

This is just a portion of our present line, and a host of new products is currently under development. We're adding to our past breakthroughs in voice by working in such areas as personal computers, speaker verification systems for security, connected word recognition, and speaker-independent digit recognizers for the telephone.

As more and more people talk, we'll continue to listen. And continue to support the expanding needs for voice technology by opening up new applications.

We invite you to grow with us in this intriguing technology. For details, write or call: Director of Business Development, Voice Systems, Interstate Electronics Corporation, P.O. Box 3117, Anaheim, CA 92803, Telephone (714) 635-7210, (800) 854-6979, in California (800) 422-4580, TWX 910-591-1197, Telex: 655419.

VT100 is a trademark of Digital Equipment Corporation. PT 100-B is a trademark of Plessey Peripheral Systems, Inc.



INTERSTATE ELECTRONICS CORPORATION
A Figgie International Company

Interstate. The voice of authority.

Presenting the Stratus Office Solution™ (SOS). It Will Integrate Your Collection of Information-hungry IBM PCs into a Fault Tolerant Office System.

Somehow the personal computer revolution has become your personal problem, hasn't it? They're lined up with their IBM™ PCs demanding access. . . access to the corporate data files . . . access to shared data and hardware. . .

To compound the problem, the IBM PCs represent, for many of these users, their very first relationship with a computer of any kind.

You need a solution right now and it has to be comprehensive and so easy to understand that even your neophytes will be in high gear on day one. And if they're going to depend on it, it should be fault tolerant. What you need is the Stratus Office Solution (SOS).

SOS Combines Comprehensive Software and Fault Tolerant Hardware

Stratus is the company that made its mark with its hardware-based fault tolerant super-mini. Now it is offering a turn-key software package built around this super-mini that is made to order for companies with an IBM host and from 20 to several thousand independent IBM PCs and/or 3270 and/or conventional terminals.

Here's a quick look at what you get with SOS (without having to write a single program):

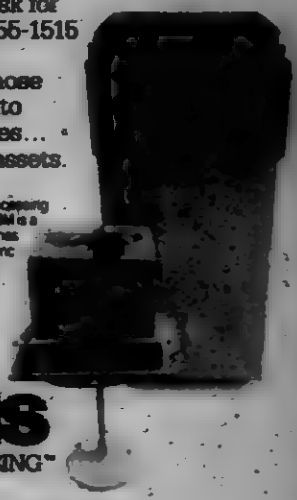
- ❑ Controlled IBM PC access to mainframe data
- ❑ Data exchange between IBM PCs

- ❑ Data conversion to 1-2-3™ and VisiCalc™ formats
- ❑ Electronic mail at IBM PC, 3270, or ASCII terminals
- ❑ Word processing on IBM PCs using WordStar,™ or MultiMate™ (a Wang-like word processing package)
- ❑ Text conversion from WordStar and MultiMate formats
- ❑ Stratus Word processing
- ❑ Shared access to Stratus printers and disks
- ❑ Calendar management at IBM PC, 3270, or ASCII terminals

SOS lets your collection of isolated PCs become part of an integrated, electronic office system. And unlike any other office system in the world, it is based on fault tolerant Stratus/32 hardware that provides continuous availability and transparent networking. Not only can you count on it to work well, you can count on it to always work.

Call Stratus today. Ask for Keith Johnson: 1-800-255-1515 or in Massachusetts: 1-617-653-1466. Turn those "personal" problems into personal success stories... and instant company assets.

Stratus Office Solution and Continuous Processing are trademarks of Stratus Computer, Inc. IBM is a trademark of International Business Machines Corp. VisiCalc is a trademark of VisiCorp, Inc. 1-2-3 is a trademark of Lotus Development Corporation. WordStar is a trademark of MicroPro International. MultiMate is a trademark of SoftWord Systems, Inc.



Stratus

CONTINUOUS PROCESSING™

Now that the world relies on computers it needs a computer it can rely on.

The tale of the mouse and the window (cont'd).

FEB. from page 38

Mary Alioto, AGS Management Systems, 320 Walnut St., Philadelphia, Pa. 19106.

FEBRUARY 21-23, NEW ORLEANS — Softcon. Contact: Northeast Expositions, 822 Boylston St., Chestnut Hill, Mass. 02167.

FEBRUARY 21-23, CHICAGO — Focus on Data. Contact: Robert W. Yearick, Du Pont Statistical Seminars, Room X-40226, Wilmington, Del. 19898.

FEBRUARY 21-23, DALLAS — Timeplex Multiplexing and T-1 Seminar. Contact: William A. Flanagan, Timeplex, Inc., 400 Chestnut Ridge Road, Woodcliff Lake, N.J. 07675.

FEBRUARY 21-23, ARLINGTON, VA. — SAS Basics Course. Contact: SAS Institute, Inc., P.O. Box 8000, Cary, N.C. 27511. Also being held Feb. 22-24 in Cary.

FEBRUARY 21-23, NEW YORK — CICS/VS Logic and Debugging. Contact: On-Line Software International, Fort Lee Executive Park, Two Executive Drive, Fort Lee, N.J. 07024. Also being held Feb. 28-March 1 in New York.

FEBRUARY 21-24, WASHINGTON, D.C. — CICS/Design. Contact: Comped Technical Corp., 10 E. 21st St., New York, N.Y. 10010.

FEBRUARY 21-24, LONDON — European Information Technology and Office Automation Exhibition. Contact: British Information Services, 845 Third Ave., New York, N.Y. 10022.

FEBRUARY 21-24, FORT LEE, N.J. — Vtam: Its Structure and How to Use It. Contact: On-Line Software International, Fort Lee Executive Park, Two Executive Drive, Fort Lee, N.J. 07024.

FEBRUARY 21-24, LOS ANGELES — CICS/VS Command-Level Debugging. Contact: Teltech, 39 Broadway, New York, N.Y. 10006.

FEBRUARY 21-24, SAN FRANCISCO — Vtam: From Start to Finish. Contact: On-Line Software International, Fort Lee Executive Park, Two Executive Drive, Fort Lee, N.J. 07024. Also being held Feb. 21-24 in Fort Lee.

FEBRUARY 21-24, NEW YORK — CICS Application Design. Contact: Syscd, One Park Ave., New York, N.Y. 10016.

FEBRUARY 21-24, LOS ANGELES — IMS/DB (DL/1) Application Programming. Contact: On-Line Software International, Fort Lee Executive Park, Two Executive Drive, Fort Lee, N.J. 07024.

FEBRUARY 22, NEW YORK — Dbase II Programming. Contact: Center for Advanced Data Processing, Inc., Suite 402, 450 7th Ave., New York, N.Y. 10123.

FEBRUARY 22, NEW YORK — CICS/VS Application Design. Contact: On-Line Software International, Fort Lee Executive Park, Two Executive Drive, Fort Lee, N.J. 07024. Also being held Feb. 24 and Feb. 29 in New York.

FEBRUARY 22-23, WASHINGTON, D.C. — The Institute of Electrical and Electronics Engineers (IEEE) 1984 Conference on U.S. Technology Policy. Contact: Lisa I. Ladaw, IEEE, Inc., Suite 606, 1111 19th St. N.W., Washington, D.C. 20036.

FEBRUARY 22-24, ARLINGTON, VA. — SAS Processing Course. Contact: SAS Institute, Inc., P.O. Box 8000, Cary, N.C. 27511.

FEBRUARY 22-24, RENO, NEV. — Fisk Spectrum '84. Contact: International Data Base Management Association, Inc., Suite 210, 9740 Appaloosa Road, San Diego, Calif. 92131.

FEBRUARY 22-24, BALTIMORE — Gateways to SNA. Contact: DataTech Institute, 295 Franklin Ave., P.O. Box 569, Nutley, N.J. 07110. Also being held Feb. 29-March 1 in Boston.

FEBRUARY 22-24, NEW YORK — Software Quality Assurance. Contact: McCabe & Associates, Suite 111, 5501 Twin Knolls Road, Twin Knolls Professional Park, Columbia, Md. 21045.

FEBRUARY 22-24, NEW YORK — Micro and Personal Computers: Technology and Applications. Contact: Institute for Advanced Technology, 6003 Executive Blvd., Rockville, Md. 20852.

FEBRUARY 22-24, IRVING, TEXAS — SAS Computer Performance Evaluation Course. Contact: SAS Institute, Inc., P.O. Box 8000, Cary, N.C. 27511.

FEBRUARY 23-24, HOUSTON — Recovery/Restart. Contact: On-Line Software International, Fort Lee Executive Park, Two Executive Drive, Fort Lee, N.J. 07024.

FEBRUARY 23-24, DENVER — The Fourth-Generation Data Management Software. Contact: Software Institute of America, 339 Salem St., Wakefield, Mass. 01880.

FEBRUARY 23-24, BOSTON — Digital PBX: Architectures Networks Systems. Contact: The American Institute for Professional Education, Carnegie Building, 100 Kings Road, Madison, N.J. 07940.

FEBRUARY 23-24, ORLANDO, FLA. — Computers in Construction. Contact: CIP Information Services, Inc., 1105-F Spring St., Silver Spring, Md. 20910.

FEBRUARY 24, SAN FRANCISCO — Overview of Software Engineering. Contact: Infosci, Box 7117, Menlo Park, Calif. 94026.

WEEK OF FEB. 26

FEBRUARY 27-28, NEWARK, N.J. — PC-DOS and the IBM Personal Computer for Mainframe Programmers. Contact: Solutions, Inc., P.O. Box 989, Montpelier, Vt. 05602.

FEBRUARY 27-MARCH 1, NEW YORK — Vtam: Structure and Programming. Contact: Teltech, 39 Broadway, New York, N.Y. 10006.

Lease a Magnuson PCM for a short term at low, long term rates...

We'll give you long term rates. You give us a short term commitment. With more processing power to the dollar, the Magnuson M80 is the most cost-effective alternative to IBM's 4300 series. Now Phoenix Leasing sweetens the deal by offering low, two-year rates on a lease you can cancel after every 6 months—with no penalties! **Phoenix Leasing means inexpensive flexibility.** Meet your immediate processing needs, without tying yourself to projected long term hardware requirements.

Compare Magnuson with IBM

		MIPS*
Magnuson	M80/42	.77
IBM	4341-1	.72
IBM	4341-10	.58
Magnuson	M80/32	.58
Magnuson	M80/31	.42
IBM	4331-2	.40
IBM	4341-9	.36
Magnuson	M80/30	.24

*COMPUTERWORLD estimates

...and get guaranteed support.

We'll give you these bargain rates, and we'll guarantee support. Our Magnuson M80's are supported nationwide by a major national service organization, so you can be sure of receiving prompt service, no matter where you are in the country. **Complete support guaranteed.** If we ever fail to provide you with satisfactory support, you are under no obligation to keep the system. It's as simple as that. **Complete systems, immediate delivery.** Phoenix Leasing has Magnuson systems in inventory ready for immediate delivery. And we can provide a complete system, including peripherals, all in one flexible lease package. **Backed by a company that knows what it's doing.** We've been leasing data processing equipment for more than 11 years, and we have acquired more than $500 million worth of equipment. We currently have over 6000 leases helping companies meet their data processing needs. **Call Kirby Fiegel today.** Don't miss out. Call Kirby at (800) 227-2626. (In California, call (800) 772-4021.) Find out how you can take advantage of this outstanding opportunity.

PHOENIX LEASING

495 Miller Avenue, Mill Valley, CA 94941

EDITORIAL

The Seducer

Since the first of the new year:

■ Teradata Corp. announced an integrated data base computer.

■ IBM revamped its System/38 line.

■ IBM put a Unix-like operating system on the Personal Computer.

■ Digital Equipment Corp. put a Unix-like operating system on the VAX-11 supermini.

■ AT&T enhanced Unix System V.

■ Burroughs Corp. introduced the A 9, a new line of mid-range processors.

■ Apple Computer, Inc. finally introduced the Macintosh.

■ Cincom Systems, Inc. entered the decision support system market.

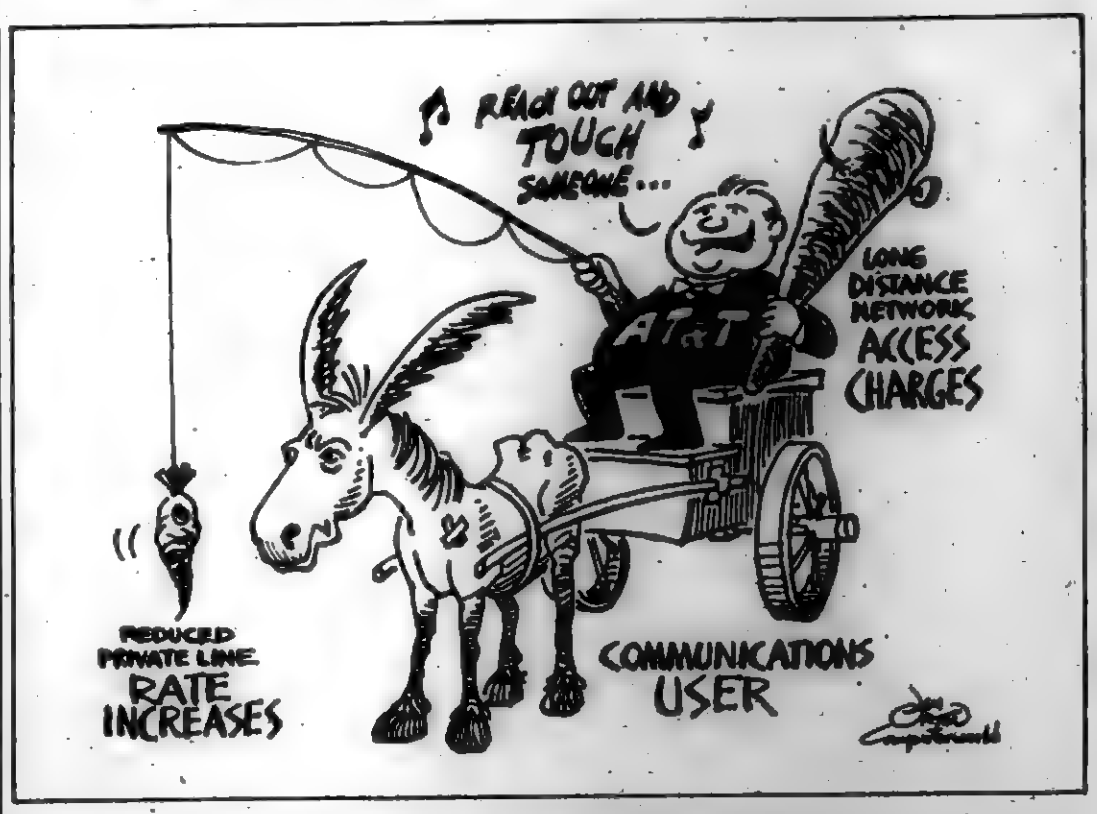
Those are just some of the significant computer industry developments that management information systems executives have had to absorb since Jan. 1. And they can expect many more as the recession continues to wind down and vendors respond to the loosening of user purse strings with ever more seductive displays of technology.

With this sort of temptation, it's understandable that the day-to-day reality of just getting the job done looks dull, especially in the middle of a long winter. It's hard to concentrate on the work at hand — implementing a new but predictable payroll package, updating a claims processing system, ironing out some problems in a receivables program — when tomorrow promises alluring technology.

But it's exactly that unrelenting, day-to-day reality that made us take notice of the results of a survey recently conducted for Robert Half International, Inc. The Half survey found that when data processing managers hire, they look for candidates with technical experience. After those candidates are hired, however, it is "personal attributes" — logic, receptiveness and communication skills — that become critical if they want to advance [CW, Jan. 23].

So we come thudding back to reality. We're reminded that it is the solution, not the machine — no matter how seductive — that is important. And it is the DPer who can explain that solution — not just code it — who will make the biggest mark on his user community.

The message? The coming year is certain to tantalize us with many technological enticements. But let's not be too dazzled by them. We've got a job to do.



LETTERS TO THE EDITOR

Another case for Mumps: running business operations

I was very pleased to see Casimiro Alonso's In Depth article "A case for Mumps" [CW, Jan. 9].

Mumps has, for years, suffered from a bad reputation. Many programmers view it as some sort of specialized language that can be used only in medical applications. As Alonso's article demonstrates, this lack of understanding is their loss.

We use Mumps to run all the business operations of our company. This includes order entry and inventory control, accounts receivable, general ledger and accounts payable, payroll, programming management, electronic mail and character and graphics generation through a VP-1 from Chyron Corp. We have one Digital Equipment Corp. PDP-11 at each of our three stations and another for our corporate headquarters. Response time is less than 1 sec, and our file storage efficiency is excellent.

I realize I am biased, but given the productivity and power, as demonstrated in the article, could *Computerworld* do more articles on this overlooked, but very useful, language?

W. Lowell Putnam
Director, systems development
Springfield Television
Springfield, Mass.

View of key decision maker ignores other DP heads

Charan S. Lohara's article, "Communications manager to emerge from automation" [CW Jan. 9], was extremely biased and not carefully thought out.

The communications manager is certainly an important individual in the corporate structure; however, to indicate that he should be the "key decision maker in a company's information management process" is shortsighted, to say the least. Lohara completely ignores the data processing manager, who handles the mainframe activities, and the department heads, who handle their own office automation equipment. These individuals are also decision makers in their own right.

The key decision maker should be the individual who is appointed to integrate and direct the functions of the three groups: data processing, office automation and telecommunications. Effective coordination should be his main goal. He may be able to obtain some cost savings from elimination of duplicate facilities, better scheduling and use of equipment, standardization of services to all departments and tighter management controls.

I'm disappointed that Lohara doesn't understand this new technologies concept.

Patrick T. LaBarbera
Telecommunications consultant
Midlothian, Va.

Computerworld welcomes letters from its readers. Preference will be given to typed, double-spaced letters of 150 words or less; they may be edited for the purposes of clarity and brevity. Letters should be addressed to Editor, Computerworld, Box 880, 375 Cochituate Road, Framingham, Mass. 01701.

COMPUTERWORLD

Editor
John C. Wilkinson

Executive Editor
Wm Sloan

Assistant Managing Editor
Cheryl M. Gallo

Design Editor
Marjorie Magowan

Senior Editors
Software
Paul Gillin
Communications
Jim Forbes
Phil Hirsch
Systems
Tom Henkel
Industry
Bill Laberis
Features
George Hoyer
International Editor
Susan Blakeley
Associate Features Editor
Barbara Von Sonyer
Staff Writers
James Bishopsmith
Peter Bochner
James Connolly

John Gallant
Lynn Haber
Patricia Keefe
Paul Krzeszowski

Correspondents
New York
David Myers
Suite 7G
451 East 58th St.
New York, N.Y. 10021
212/570-7135
Washington, D.C.
Bureau Chief: John Gantner
445 National Press Building
529 14th St., N.W.
Washington, D.C. 20045
202/347-8716
West Coast
Bureau Chief: Jeffry Beeler
Correspondent: Robert Batt
1020 Marsh Rd.
Menlo Park, Calif. 94025
415/328-8304

Chief Copy Editor
Donavon Wilk

Assistant Chief Copy Editor
Kathie Gow

Copy Editors
Becky Bakke
Dave Bradford
Bruce Crane
Elizabeth Moss
Deborah Scaduto-Hom
Thomas Schmitz
Charlotte Zarek

Assistant to the Editor
Jane Fettig

Editorial Assistants
Mary DeCristofaro
Joyce Fultz

Contributors
Education
J. David Cougar
Human Communication
Jack Stone
Transparent Time
Larry Long
Management
Thomas Madden
The Data Center
John P. Murray
Local on Science
Charles P. Lecht
Special Publications
Computerworld Retail
George Hoyer, Editor
Computerworld on Communications
Bruce Hoard, Editor
Computerworld OA
Ann Dooley, Editor
Computerworld Buyer's Guides
Marcia Stonecipher, Editor

Make Editorial Offices:
Box 880, 375 Cochituate Road, Framingham, MA 01701
617/879-0700

Computerworld is a member of the CW Communications group, the world's largest publisher of computer-related information. The group publishes 44 computer publications in 16 major countries. Nine million people read one or more of the group's publications each month. Members of the group include: Argentina's Computerworld Argentina; Australia's Australasian Computerworld and Micro Computer Magazine; Brazil's DataNews and MicroMundo; China's China Computerworld; Denmark's Computerworld Danmark and MikroData; France's Le Monde Informatique; Germany's Computerwoche, Microcomputerwelt and PC Welt; Italy's Computerworld Italia; Japan's Computerworld Japan and PC Japan; Mexico's ComputerworldMexico; Norway's Computerworld Norge and MikroData; Saudi Arabia's Saudi Computerworld; Spain's ComputerworldEspana and MicroBytemas; Sweden's ComputerSweden, MikroDatorn and Alla Hemdatorn; the UK's Computer Management and Computer Business Europe; the U.S.' Computerworld, Desktop Computing, Hot CoCo, InfoWorld, Macworld, Microcomputing, PC World, Run and SunWorld.

ONLY 76¢ A WEEK

So much, for so little . . . and all yours, as part of your COMPUTERWORLD subscription.

51 issues of **COMPUTERWORLD** plus special issues throughout the year including:

Computerworld OA—*incisive coverage about office automation*

Computerworld On Communications—*keep current with the rapidly changing communications field*

Computerworld Buyer's Guides*—*product-specific lists and latest information in major product areas*

With this order form, you pay only $39 (just 76¢ a week). That's a $5 savings off the basic annual rate of $44, an offer too good to pass up.

Now, get everything that's coming to you—Subscribe Today.

Complete Form On Reverse, Then Return In Attached Postage-Paid Envelope. Or Use Your Charge Card and Call TOLL-FREE: 1-800-343-5730.

☐ Please enter my subscription (details on back)

☐ I'm already a subscriber, but I'd like you to change my:

☐ address ☐ title
☐ industry ☐ other

My current mailing label is attached and I've filled in new information on the other side.

Put old label or label information here

COMPUTERWORLD

*U.S. Only

CW-139

Please send me COMPUTERWORLD for one year. RATES: United States ~~$44~~; Canada, Central & South America $110; Europe $165; All Other Countries $245 (Airmail Service)

Special Introductory Offer — Only $39.00 Save $5.00

☐ Check Enclosed
☐ Am Ex ☐ BA/Visa ☐ MC (MC Only - List four digits above your name)

If charge we must have cardholder's signature _____ Expiration Date _____

First Initial		Middle Initial		Surname	
Your Title					
Company Name					
Address					
City			State		Zip Code

Address shown is:
☐ Business
☐ Home

☐ Check here if you do not wish to receive promotional mail from *Computerworld*.

☐ Check here if you're interested in receiving information on *Computerworld*'s Index.

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

CIRCULATION DEPT. 375 Cochituate Road, Rte. 30, Box 897, Framingham, MA 01701-9985

Detach here, moisten and seal envelope securely before mailing.

1. BUSINESS/INDUSTRY (Circle One)
End Users
10 Manufacturer (other than computer)
20 Finance/Insurance/Real Estate
30 Medicine/Law/Education
40 Wholesale/Retail Trade
50 Business Service (except DP)
60 Government – State/Federal/Local
65 Public Utility/Communication Systems/ Transportation
70 Mining/Construction/Petroleum/Refining
75 Other User _____
Vendors
80 Manufacturer of Computers, Computer-related Systems or Peripherals
85 Computer Service Bureau/Software/Planning/ Consulting
90 Computer/Peripheral Dealer/Distributor/Retailer
95 Other Vendor _____

2. OCCUPATION/FUNCTION (Circle One)
11 President/Owner/Partner/General Manager
12 VP/Assistant VP
13 Treasurer/Controller/Financial Officer
21 Director/Manager/Supervisor DP/MIS Services
22 Director/Manager of Operations/Planning/ Administrative Services
23 Systems Manager/Systems Analyst
31 Manager/Supervisor Programming
32 Programmer/Methods Analyst
35 OA/WP Director/Manager/Supervisor
36 Data Comm Network/Systems Mgmt
41 Engr/Scientific/R&D/Tech Mgmt
51 Mfg Sales Reps/Sales/Marketing Mgmt
60 Consulting Mgmt
70 Medical/Legal/Accounting Mgmt
80 Educator/Journalist/Librarian/Student
90 Other _____

3. COMPUTER INVOLVEMENT (Circle all that apply)
Types of equipment with which you are personally involved either as user, vendor or consultant
A. Mainframes/Superminis
B. Minicomputers/Small Business Computers
C. Microcomputers/Desktops
D. Communications Systems
E. Office Automation Systems

CW-139

VIEWPOINT

Fourth-generation languages in client areas

THE DATA CENTER

JOHN P. MURRAY

The installation and effective operation of a sound data base management system (DBMS) can, if the DBMS provides a strong fourth-generation programming language, produce dramatic results in areas outside the management information services department. There is simply not any question, provided management information services handles the issue competently, that such a programming language will be both well received and heavily used by the client areas.

The result of such an effort can take at least some of the more immediate pressure off management information services, can increase client productivity and, perhaps most important, provides management information services clients with improved understanding of the management information services function and causes those clients to develop greater empathy for the function of information processing. There is nothing like having to do the job yourself to improve your understanding of the problems it presents.

Many installations go to great difficulties and considerable expense to install and operate a DBMS and then, for a variety of reasons, fail to reap many of the benefits of that system because the installation's management is unwilling to accept a reasonable amount of risk and to put forth a reasonable amount of effort to bring the benefits of the DBMS to the management information services clients. Such a circumstance is unfortunate. While much can be realized through even the restricted use of the DBMS, there are substantial benefits to be realized in the client areas if an aggressive effort is pursued to push that use out to those areas.

When I discuss this issue of increased client use of the fourth-generation languages with people in other management information services departments, I hear any number of reasons (none of which in my view is valid) why they are unwilling to expand the programming language to the client areas. The arguments range from "too heavy a use of the system resource" to "loss of management information services control" to "an unwillingness on the part of the clients to learn how to use the language."

'If the DBMS does, indeed, provide a good fourth-generation programming language (and some do not), every effort should be made to move as much of the programming, and later on, system design function, as possible to the client areas. This process has to be planned, it has to be managed and, most important, it has to be supported by management information services. If those criteria are followed, solid results can be obtained for all concerned.'

The right reason

I suspect that often the real reason has as much to do with management information services being fearful of relinquishing some of its areas of control and power as it has to do with any other reason. After all, if anyone with rather limited experience can write a program and obtain answers to their questions, what happens to management information services.

Regardless of personal concerns, if the DBMS does, indeed, provide a good fourth-generation programming language (and some do not), every effort should be made to move as much of the programming, and later on, system design function, as possible to the client areas. This process has to be planned, it has to be managed and, most important, it has to be supported by management information services. If those criteria are followed, solid results can be obtained for all concerned.

Of course there are inherent risks in such a process. The political considerations must be faced and handled. Hardware utilization will increase — the more being done, the more resource required — but much of this issue can be addressed through processing scheduling and system structure.

When the DBMS is in operation and the environment has stabilized, the next step is to begin an aggressive effort on the part of management information services to train clients in the use of the fourth-generation programming language. The goal here, which should be announced at the onset, should be to build an environment in which the clients can write and run their own programs and where, in time, they can accept increasing responsibility for the design and development of their own systems.

This training should be carried on by management information services on a formal basis. Training classes should be scheduled on a regular basis. These classes should be structured so that as clients obtain the basic programming skills, they can move to more advanced levels. The training should be followed up in order to determine its effectiveness and the degree to which those who have taken the training are using it to gain increased control of their particular areas.

Also, this training follow-up can be used to determine what changes should be made in the training program.

Opportunities to management

The ease of use of the good fourth-generation programming languages, combined with their effectiveness, present opportunities to management information services to begin to leverage the uses, and the ultimate benefits, of the technology to the organization at large.

Seeing the effort to provide expanded use of the fourth-generation languages through is, indeed, a time-consuming and often frustrating task for the management information services department. This is particularly the case in the typical management information services departments that already have more to do than they can handle; yet the results, if appropriately handled, outweigh the difficulties.

There are installations that have done a good job in this area. Anyone who has reservations about the effectiveness of such a program and its value to an organization should locate such an installation to find out how the job has been done. Our world is changing rapidly; if we do not remain ahead of our management information services clients, they will move ahead without us. We have a responsibility to make sure that what is being done is being done correctly. We may lose some of our control and authority as the technology improves, yet we still have the responsibility. We need to accept that responsibility.

Murray is director of management information services for Raycom Corp., Madison, Wis., and author of Management Information Systems as a Corporate Resource, *published by Dow Jones-Irwin.*

Where are the knowledgeable micro retailers?

HUMAN CONNECTION

JACK STONE

I'm willing to put aside, for the moment, my frustration, anxiety, depression and irritation with personal computer retailers to state that my preference is to work with the independents — those not directly owned, affiliated with the large chains or manufacturers — because the salesmen usually don't attempt to hide their ignorance. I laud these folks for their candor when they state, "I just can't keep up with every last detail on every machine we merchandise" even though many of them have no idea about what's involved with a machine system. The people I really fault are the managers who cannot produce even one representative in their outlets who has an operating knowledge of each machine on display, especially those in which I am personally interested.

If you haven't gone on the personal computer circuit lately, you have a big treat in store for you. The level of computer knowledge is so frighteningly shallow in most retail businesses that one is given to wonder why the majority of machines sold to new users aren't returned within the warranty period for "lack of performance," a nonbellicose expression that stands for "lack of use or understanding."

Nonconfiscatable machine

Take the case of my search for a nonconfiscatable machine, that is, one with a low profile, to take on my writing trips out of the country. After going round and round for weeks with the vendors, I finally decided the small lap type was the ticket simply because of its small body print, low weight and its price of $800. Its carryability is, far and away, the major feature since raw computer power, software support and LCD screen are shockingly limited when compared with the desktop machines at that price.

My systems strategy was this: I would type draft material into the machine while back-seating on the motor tour and dump random-access memory (RAM) onto a conventional tape cassette when its capacity is reached, about 10 double-spaced typewritten pages. Upon return, I would read the tapes directly into my Processor Technology Sol 20 "host" computer and transfer the files to disk. (I don't have the communicating software in my host).

Having evaluated demos of offerings from Tandy Corp., Epson America, Inc. and NEC Information Systems, Inc. at retail stores, I settled on the NEC because of its vast RAM — all of 16K bytes compared with Tandy's 8K bytes — and its huge display — all of 40 by 8 char., about twice that of the Epson. Naturally, before I purchased the machine, I wanted to validate that both the NEC and my host would read and write the same tapes.

After searching high and low in Washington, D.C., for dealers, I found only two. The salesman at the first store claimed that although he was heavily experienced in large mainframes, he was a little short of experience on the NEC.

The salesman at the second outlet — his colleagues identify him as the one who "really knows the machine" — wasn't much better, except that he was determined to solve the puzzle and took the machine and my tape recorder with him on a weekend retreat to resolve the matter.

Sensing that I was staring at a pending loss of an $800 investment, I exercised my right as a customer to drop out of the lap market and found a low-cost, guaranteed nonconfiscatable equivalent with a far better price: a spiral notebook and three ball-point pens.

VIEWPOINT

Electronic Peace Corps — an info exchange

READER'S PLATFORM

DAVID H. ROTHMAN

In a Boston suburb, an engineer earning $50,000 a year spends countless hours twiddling with his new IBM Personal Computer. The technology engrosses him, but he lacks a sense of purpose. In Southeast Asia, meanwhile, a young man is wrestling with calculations needed to build a hydroelectric dam. He thinks his figures are correct, but isn't certain, and thousands of people will die if the dam collapses.

Can the Massachusetts engineer somehow help his counterpart abroad?

There is a way, if politicians will for once appeal to the better instincts of technicians. An Electronic Peace Corps could bring the two people together and offer the Third World some of the best American technical expertise via computer networks.

Until recently, the idea would have been laughable. Computer terminals cost several thousand dollars each, and special lines to Asia all went for hundreds of dollars or more an hour. But now a lap-size computer from Radio Shack sells for around $1,000 in a version practical for short reports and electronic spreadsheets.

Much better, cheaper, simpler portables are on the way. What's more, thanks to satellites, international communications costs are plummeting to a fraction of earlier levels. MCI Communications Corp. has just started an electronic mail service with letters costing only $1 for about 1,000 words; and the service, although domestic, illustrates the decline in computer network prices.

Even today, a home computer user can send a four-page message over regular phone lines to an underdeveloped country in Asia for less than $20. Special computer lines and the right equipment could push the cost below $5.

So an Electronic Peace Corps wouldn't threaten the taxpayers. By exporting knowledge instead of people, it would give us more for our money.

Computer files

The U.S. government might keep computer files listing:

- Exact skills required in underdeveloped countries and teachable through computer links.
- People in underdeveloped countries who needed those skills and asked for Electronic Peace Corps help. Contrary to rumor, you don't have to be American or Japanese to benefit by way of computers. Even the mainland Chinese are building IBM-compatible micros for applications ranging from agriculture to water-power projects.
- American computer users, volunteers, who could teach Third World professionals via the networks.

Already an English teacher in Colorado has tutored students as far away as Australia via Source Telecomputing Corp.'s The Source, an electronic information service, and schools in the U.S. are going on-line. And there's no reason the Electronic Peace Corps couldn't use the same techniques Peace Corps-fashion. An expert in the U.S. might regularly correspond by computer with his less experienced counterpart abroad. Swapping complicated technical data, this could receive written answers either instantly or within a day. The Electronic Peace Corps' E-Mail could overcome time differences. The Massachusetts engineer could tap out his advice at night; his counterpart in Asia could read it during normal business hours.

Obviously, the Electronic Peace Corps wouldn't replace any Americans in the field; indeed it would help to install equipment and offer enough tutoring to get the communications links going.

Nor would the Electronic Peace Corps aid people directly at the village level. It would be elite-to-elite assistance, with the welfare of the nonelite mattering in the end, and its beneficiaries would write and read English or have access to translators. They would be a few, carefully chosen people, such as the young dam builder or:

- A public health administrator who wants to computerize his records so his people can spend more time in the field and less time being bureaucrats. Corpsmen might write programs specifically for that purpose. Also, the Electronic Peace Corps might contract with commercial firms to allow adaptation of existing software to Third World situations. Some programs might arrive by satellite.
- A doctor who wants to check diagnoses and determine drug dosages.
- A veterinarian baffled by an epidemic that is killing thousands of cattle in an already-impoverished area.
- A government administrator trying to establish a more efficient food distribution network.
- A civil engineer working on a

8 Good Reasons to Attend the James Martin Seminar

1. James Martin has been writing THE BOOK on the Computer Industry for over 3 decades.
2. He is the most sought after consultant in the Computer Industry.
3. His predictions and recognition of major computer developments are unsurpassed.
4. With over 31 top-selling books, Martin is the industry's #1 selling author of all time. His book, *Application Development without Programmers*, is the Computer Industry's #1 selling book of all time.
5. James Martin has the unchallenged reputation as the world's finest lecturer in his field. Over 20,000 individuals worldwide have attended the James Martin Seminars. Many return year after year.
6. James Martin "... can lay fair claim to being the most influential DP guru of all time." — *ICP Interface*
7. A fast-moving, high-density, interactive 5-day program packed with information for all DP designers, management, and staff. Quite honestly, the James Martin Seminar is the industry's best educational value for the money.
   - Attend the seminar designed to dramatically increase your DP capability.
   - A major increase in productivity is attainable through the methods taught in this seminar.
   - 5 days with James Martin will dramatically alter your approach to DP.

Many DP organizations are beginning to break the cycle of low productivity, poor responsiveness, and high application backlog of traditional DP. Now is the time for you to act. Attend the James Martin Seminar this spring. Learn the new technologies and their application to your organization. You'll discover why James Martin is ...

8. ... The Man the DP Experts Listen To!

Check the appropriate box on the coupon for more information on James Martin's 1-Day Seminar, THE END USER REVOLUTION for executives and professionals everywhere who ought to be using computers more effectively. This 1-day seminar will be held on the first day of the 5-day seminar.

Call (213) 394-8305 or mail the coupon today for a detailed brochure.

Washington, D.C.	April 2-6, 1984
San Francisco	April 9-13, 1984
Chicago	April 23-27, 1984
Boston	April 30-May 4, 1984

Send more information on the following James Martin Seminars

☐ New 1-day End User Revolution Seminar
☐ New 5-day DP Revolution Seminar

NAME
COMPANY NAME
ADDRESS
CITY/STATE/ZIP
TELEPHONE CW 1/30/84

TECHNOLOGY TRANSFER INSTITUTE
741 10th St., Santa Monica, CA 90402, (213) 394-8305

VIEWPOINT

road or bridge for isolated villagers who hope to sell food to cities.

■ A communications specialist who wants to modernize his country's phone service.

In many countries, the Electronic Peace Corps might concentrate on communications at first for obvious reasons. Even nations with primitive phone systems, however, can already accommodate some use of computers for international communications.

With communications links established, some Third World computer students, and perhaps others, could tap into Electronic Peace Corps-sponsored data banks at American universities. Electronic mail tutors could guide them through the electronic mazes. The Electronic Peace Corps' emphasis, of course, wouldn't just be on solution of immediate problems, but also on instruction. The goal would be the same as the traditional Peace Corps: to promote self-sufficiency. In the future, Third World countries might still use American computer banks for technical data, but now they wouldn't need guides. In some cases, in fact, Third World technical people would make contributions of their own to the data bases without leaving their countries.

Instruction in culture

Lest the Ugly American be transported abroad electronically, the Electronic Peace Corps corpsmen would receive instruction in cultural differences and general information about the country they were helping. They might attend special training sessions for several weeks. Then, having demonstrated their commitment, they would work for the Electronic Peace Corps from their homes at nights and on weekends.

Also to reduce costs and the chance of misunderstandings, corpsmen and the people abroad might use written communications rather than voice most of the time. They might start out exchanging questions and answers within strict formats. Eventually, the contacts between the volunteers and the people in the Third World might turn informal.

The Electronic Peace Corps, moreover, would offer other benefits. It would encourage computerization in underdeveloped countries. What better way to dramatize the usefulness of the technology and to glamorize the technical skills that some prestige-minded Third World universities have slighted.

Americans, too, through the Electronic Peace Corps, would come out ahead. In solving problems halfway around the globe without leaving their homes except for a few weeks, they'd gain an appreciation of the possibilities of telecommuting. That might help mitigate the effects of any future energy crisis. And mass telecommuting would also lower highway construction costs and, by reducing lengthy commutes, make life more bearable. The more people with computers, the more firms would offer telecommuting.

Also, the Electronic Peace Corps would be good news for the domestic computer industry, which would find a larger market for its products both here and abroad. Forget about the dangers of high-tech giveaways. The Electronic Peace Corps wouldn't pass on the secrets of the latest generation of mainframes. Instead, using already-common micro technology, it would help Third World professionals solve their countries' everyday problems. Remember, too, that many people in the Electronic Peace Corps wouldn't even be computer experts. They would simply be using electronic mail to pass on their technical skills to the Third World.

Yet another benefit of the Electronic Peace Corps could be a domestic offshoot. Its focus might be different. Because of lower communications costs, the domestic version might take more chances helping nonexperts without credentials. A gifted high school writer in Harlem, N.Y., might tap out short stories on a school computer; a famous author across town might zip the files back, with comments easily inserted electronically. Likewise, a Beverly Hills, Calif., executive might volunteer help to a small businesswoman in Watts.

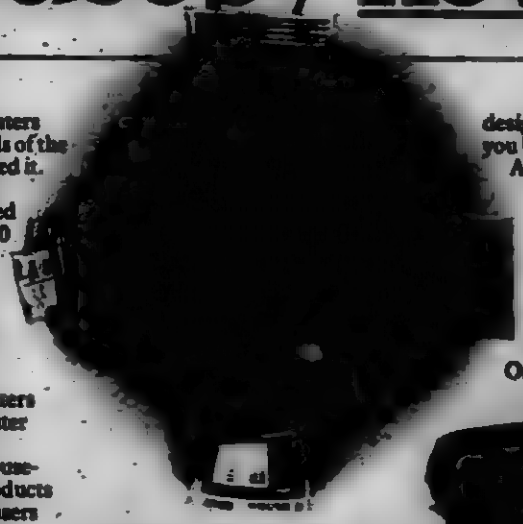
The most urgent need for Electronic Peace Corps-style assistance, however, is now in the Third World, where, because of technical backwardness, so many are starving. An excellent pilot site for the project might be Sri Lanka. Started with strong encouragement from Sri Lanka's president, the Arthur C. Clarke Centre for Modern Technologies is studying the use of telecommunications, computers and other high tech in the Third World.

A final question remains. Would enough American techies want to serve in the Electronic Peace Corps? Volunteerism is alive and well in scores of users groups that computer owners have formed to protect themselves against the wiles of salesmen and exchange technical information. American amateur radio operators have been sharing hints with their colleagues abroad for years. And without phone costs to worry about, many computer owners might be similarly helpful.

The Electronic Peace Corps, of course, should no more replace Volunteers for International Technical Assistance than it should compete with foreign-based groups such as the Arthur C. Clarke Centre. The Third World badly needs them all. Championing the Arthur C. Clarke Centre, a Sri Lankan diplomat quoted H.G. Wells' observation that human history was becoming "a race between communications and catastrophe." And the Electronic Peace Corps, in its own small way, could help to give the former a head start. $

Rothman is a free-lance writer in Alexandria, Va.

The printer for the people who need hardcopy now.



Dataproducts B-Series line printers help you put the paper in the hands of the people who need it. When they need it.

The family of three, the B-300, B-600 and the B-1000, was designed to whisk out the printout, from 300 lines per minute to as much as 1100 LPM. And to operate at those speeds day after day.

How could we build 160,000 line printers and not make an impression?

We've produced more line printers than all other independent computer printer makers combined.

So why isn't Dataproducts a household word? Because most Dataproducts line printers are delivered to end users with somebody else's name on them.

Virtually every major OEM in the business has selected our B-Series printers for the systems they sell. Each has made that selection after months, sometimes a year, of intensive evaluation.

More than anything else, they look for a machine that can perform reliably over a long period of time. Their reputations are at stake.

Which is why the safest choice for your company may be a printer you've never heard of.

The best printers are the easiest to use.

Dataproducts probably knows more about the people who use computer printers than anybody. We know how they slam cabinets. How they jam paper. How they smear ink on their pants.

We conceived the B-Series for the operator. Extensive diagnostics help the operator locate and correct troubles fast. Long-life ribbon cartridges are quick and clean to load. The machines open wide so all controls are easy to see and easy to reach.

In less than a minute, the operator can even change the print band—to a different typeface, a different language.

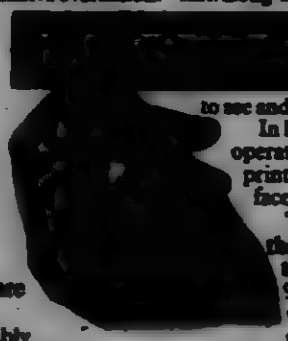
The best printers are the least expensive to own.

90% parts commonality within the family minimizes spares inventories and training. Power consumption is low.

Operators fix most problems. When they can't, the B-Series is designed to help service people get you back on-line quickly.

And because we make so many of these printers, we don't have to charge a lot of money for yours. You get low initial cost. And low cost of ownership.

If you'd like to know more about our B-Series printers, or the name of our distributor in your area, call (213) 887-3924. Or send the coupon below.



Dataproducts Corporation,
6200 Canoga Ave., Woodland Hills, CA 91365
☐ Send details! ☐ Send a sales rep!
Name
Title
Company
Type of business
Address
City State Zip
Telephone Ext

Also send information on:
☐ 120-300 LPM dot matrix printers ☐ Graphics and label printers ☐ 30-31 CPS letter quality printers ☐ 1500-2000 LPM high performance printers ☐ Printer supplies

Dataproducts is a registered trademark. B-300, B-600 and B-1000 are trademarks of Dataproducts Corporation.

DATAPRODUCTS
The Printer Company

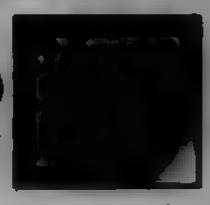


Figure $50 a line for programming.

When people look at business computers, they sometimes overlook a crucial consideration: the price of writing and maintaining software.

But we didn't. When we designed the HP 3000 family, we created special productivity tools to reduce the high price of developing applications software. With dramatic results.

Many HP 3000 customers now use 1/5th the amount of code writing these programs, compared with using high-level applications language. Since the average program costs you about $50 a line to develop, you can see why EDP budgets go so much further on an HP 3000.

You can use our development tools with the entire HP 3000 family. And, as all four systems are fully compatible, you can run the same, identical programs on your small branch office computer and on the big system in your regional headquarters. Without spending a penny to rewrite code or recompile.

Now divide by five.

Features like these have helped many of our customers recoup the entire price of the hardware by cutting the time and effort involved in developing and maintaining the software.

So if you're looking for ways to lower your computing costs, take a look at the HP 3000. Call your local sales office listed in the white pages and ask a Business Computer Specialist about the HP 3000. Or write for more information to Tom Rappath, Hewlett-Packard, Dept. 03185, 19447 Pruneridge Avenue, Cupertino, CA 95014. In Europe, write to Henk van Lammeren, Hewlett-Packard Nederland B.V., Dept. 03185, P.O. Box 529, 1180 AM Amstelveen, The Netherlands.

HEWLETT PACKARD

5091312

How To Get A Better Grip On Your 3270 Network.

With More Flexibility Than Ever Before.
Getting a grip on your 3270 applications is a real challenge. You've got to find the best way to bring IBM host applications to non-3270 terminals and personal computers. Without a lot of fuss and bother.

Fortunately, Datastream has a flexible solution. One that won't cost you an arm and a leg.

With our 3270 SNA or BSC Cluster Controllers, you can attach personal computers, ASCII terminals and printers to IBM hosts, giving more people 3270 functionality. And giving you more control of the computing activities in your company.

Our Multi-Path Controller allows personal computers and ASCII terminals to communicate not only with multiple IBM mainframes, but with minicomputers (including DEC®) and time-sharing hosts as well. It even allows personal computers and terminals in the network to talk to each other.

All Datastream controllers feature security, dial-in or direct-connect access, remote dial-in diagnostics and more.

To extend your 3270 investment even more, use our controllers with Datastream's low-cost Display Stations. They offer 3278 functionality keystroke-for-keystroke. Plus features even IBM doesn't have. Like DEC VT100 emulation. Remote dial-in. Additional soft keys. And other 3290-type keyboard features like 24 PF keys.

All this makes for a very tidy, secure, economical way to expand your network.

And put 3270 within everyone's reach.

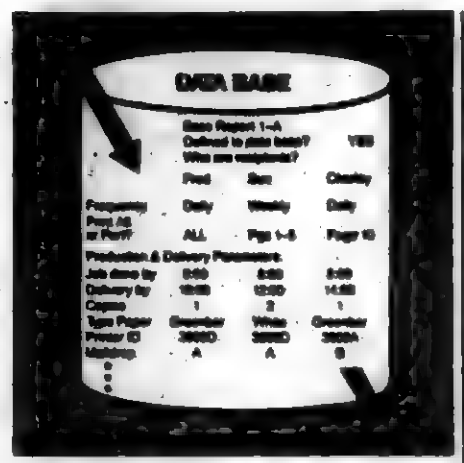
Call toll free: 800-952-2500
(Outside California)

DATASTREAM

2520 Mission College Blvd.
Santa Clara, CA 95050
408/986-8022

®DEC is a registered trademark of Digital Equipment Corporation.
©1984 Datastream

SOFTWARE & SERVICES



On-line package supports MVS

CHERRY HILL, N.J. — Value Computing, Inc. has announced an on-line software package that is said to allow IBM MVS sites to control better the format, length, routing and distribution of reports.

Called the Data Center Distribution System (DCDS), the product includes a data base that allows on-line forecasts to be generated of report production and availability. Before reports are printed out, they are matched with "customizing parameters" contained in the data base and broken up and individualized for each recipient. Parameters include paper, printer identification and delivery location. Only the Sysout DD JCL statement needs to be changed, according to a spokesman.

Recipients receive only the pages of each report that are specified in the data base. All reports that are to be printed on the same printers, in the same time frame and destined for the same mail drop location are printed together in an unbroken sequence to form a bundle. The bundle contains one job with one set of job separator pages. Each bundle is delivered whole to its preassigned mail drop where distribution takes place.

DCDS prints only the parts of a report for which a recipient asks. In beta test, the product has saved the average MVS installation between five and 10 boxes of paper per day, the spokesman said.

The product can be interfaced with the company's Data Center Management System, Comput-a-Charge, Valu-Lib and SMF Express, all of which share a common data base.

DCDS is priced from $40,000 and will be available in April.

Value Computing, 496 N. Kings Highway, Cherry Hill, N.J. 08034.

AT&T keynoter lauds Unix
Porting capability called revolution

By John Gallant
CW Staff

WASHINGTON, D.C. — Calling it one of the most important revolutions in the computer industry for the 1980s, a top executive of AT&T said the Unix operating system will "finally end the long tyranny of hardware" through its unique porting capabilities.

During his keynote address at the recent Uniforum International Conference of Unix Users here, Jack Scanlon, vice-president of computer systems for AT&T, said the expanding acceptance of Unix as an industry-standard operating system — in commercial applications as well as in its traditional role in scientific and engineering environments — will allow users to marry hardware and software in the system most applicable to their needs. "Unix has moved from an interesting research tool to a major force in the industry," Scanlon said.

Scanlon labeled IBM's foray into the Unix market with its PC/IX operating system as a positive step toward wider acceptance. He also maintained that Unix has become a "significant force within the government," having been utilized by the Departments of Defense, Energy and Commerce. In addition, Unix is gaining favor in several other agencies, including Agriculture, Transportation, Health and Human Services and the Interior, he said.

Scanlon said that he expects the total number of Unix installations to triple in 1984 and that revenues from Unix products sales and support will increase by a factor of five to more than $6 billion by 1986. He added that attendance at the Uniforum conference, which was expected to draw more than 8,000 visitors, was a sign of the increasing acceptance of and commercial interest in the operating system.

"Over 90% of our computer science graduates have had experience in using Unix," Scanlon said. "They have recognized the importance of the system's incredible versatility and its portability across a wide range of processors. All of these factors have increased the acceptance of Unix. What we are witnessing is a natural evolution of Unix into the commercial world."

The AT&T executive said a major problem in promoting Unix has been the lack of an industrywide standard. Scanlon said AT&T is working to overcome that obstacle by providing application packages and support for System V, which the industry giant has touted as the new Unix standard since licensing began last year. "We initially developed System V to maximize the synergy of our own programming staff. This system has withstood the test of one of the toughest agencies in the world, namely, AT&T," he said.

According to Scanlon, Unix represents a "classic match" between emerging market needs and advancing technology. Unix's porting and multitasking capabilities, he added, are crucial to the future proliferation of all levels of processors. "The software transparency between machines provided by Unix is critical. This system plays well on a whole range of hardware, allowing the networking of diverse capabilities," Scanlon said.

Unix also has proved a boon to indepen-

See UNIX page 50

ADR/Roscoe release backs IBM OS

PRINCETON, N.J. — Applied Data Research, Inc. has announced Release 5.3 of its ADR/Roscoe on-line programming system for IBM OS environments.

According to the company, enhancements include more flexible communications support, reduced terminal transmission for faster response times on remote terminals, an expanded and more efficient editing work area and an interactive user profiling system with new library security.

It also is said to feature IBM 3270 color graphics support for ADR's extended timesharing option (Etso), designed to let users execute applications in an interactive environment, the company said.

The enhanced version also features new structured programming constructs and enhanced memory management in the Roscoe programming facility, new system interface support and a message-switching facility, ADR said.

Permanent license prices for Roscoe are $49,700 for IBM MVS sites and $42,400 for non-MVS sites.

The permanent license price for Etso is $14,000.

Leases are also available, the vendor said.

ADR, CN-8, Rt. 206 & Orchard Road, Princeton, N.J. 08540.

Lotus

Lotus 1-2-3 tied to interactive Data Corp. network/58

INSIDE

- Issco graphics software drives new output devices/51
- Fesbe Group updates IBMS for large DEC computers/52
- Wang users get spreadsheet/58
- Project management system runs on System/38/52

DEC USERS DEC USERS DEC USERS DEC USERS DEC USERS DEC USERS DEC USERS DEC USERS DEC USERS

SATURN-CALC

ELECTRONIC FORECASTING AND FINANCIAL MODELING

Available for immediate delivery.

- Provides multiple worksheets in a file
- Outputs ASCII files compatible with WP SATURN and other applications
- Written in assembly language
- Supports most common CRT's — VT100, VT 52, ADDs, Hazeltine...
- Provides help text and prompts
- Supports variable width columns

FOR MORE INFORMATION CALL 800-328-6145

SATURN

SATURN SYSTEMS, INC.

8875 WASHINGTON AVENUE SOUTH, SUITE 210
MINNEAPOLIS, MN 55435 • 612/944-2452

DEC USERS DEC USERS DEC USERS DEC USERS DEC USERS DEC USERS DEC USERS DEC USERS DEC USERS

SOFTWARE & SERVICES

SYSTEMS SOFTWARE

AMALGAMATED SOFTWARE OF NORTH AMERICA, INC.
Acceler8

Amalgamated Software of North America, Inc. has introduced Release 2 of its disk management system for the IBM System/34.

The product, Acceler8, speeds disk accesses and reduces the need for key sorts and overflow indexes, the vendor said.

Two new procedures, Savefile and Retrfile allow users of Acceler8 to save and restore the index portion of a file along with the data, the vendor said.

In addition, the System/34's speed of random access is increased, while the amount of required storage is reduced with Acceler8.

The system can be leased for $150/mo per installation or purchased for a one-time license fee of $3,300.

Amalgamated Software of North America, P.O. Box 1068, Malibu, Calif. 90265.

BRITX PUBLISHING, INC.
Quicklib

Britx Publishing, Inc. has announced Quicklib, a library of public domain software for the IBM System/34 and 36 series computers.

The initial selection, consisting of approximately 50 entries, includes operator and programmer utilities, such as programs to change uppercase letters to lowercase letters, duplicate data files, index files and change record lengths or file sizes, according to the vendor.

The software was written by Britx Publishing personnel, and the company is soliciting public domain software from other sources for inclusion in the Britx library. Anyone who sends software that is accepted in the library will receive a free copy of the public domain software, the vendor said.

A copy of the public domain software is available for $10 from the publisher.

Britx Publishing, 1814 Capital Towers, Jackson, Miss. 39201.

DATANEX, INC.
General-purpose workstation package

Datanex, Inc. announced that its general-purpose workstation software, which uses the Hasp communications protocol, now supports Digital Equipment Corp.'s DMF 32 and DPV11 communications boards.

The package allows DEC's PDP-11 and VAX-11 minicomputers to communicate with other computers and networks, such as IBM mainframes and Control Data Corp.'s Cybernet networks, the vendor claimed.

Transmission speeds range from 2K bit/sec to 56K bit/sec, according to the vendor.

A single CPU license for VAX-11 systems is priced at $5,500. For PDP-11 systems, a single CPU source-code license ranges from $1,995 to $5,000, the vendor said.

An annual support and upgrade fee is priced at 15% of the purchase price.

Datanex, P.O. Box 1726, Eugene, Ore. 97440.

MASSCOMP; CREARE RESEARCH & DEVELOPMENT, INC.
Mc/link; Mc/hasp

Masscomp has announced a joint development venture with Creare Research & Development, Inc. of Hanover, N.H., for two software programs for Masscomp's MC-500 and Workstation 500 32-bit computer system under the Unix operating system.

Mc/link provides a communications facility between Masscomp systems and Digital Equipment Corp.'s VAX-11 series minicomputer running under DEC's VMS operating system.

The Mc/link program provides up to 63 virtual communications channels.

The Mc/hasp package is said to allow both Masscomp systems a complete batch job preparation and entry and postprocessing system for IBM, Control Data Corp. and other mainframe computers, the vendor said.

The package emulates a Remote Job Entry (RJE) station, and RJE can be accomplished over dial-up or leased telephone lines using synchronous modems, which typically operate at 4,800 or 9,600 bit/sec.

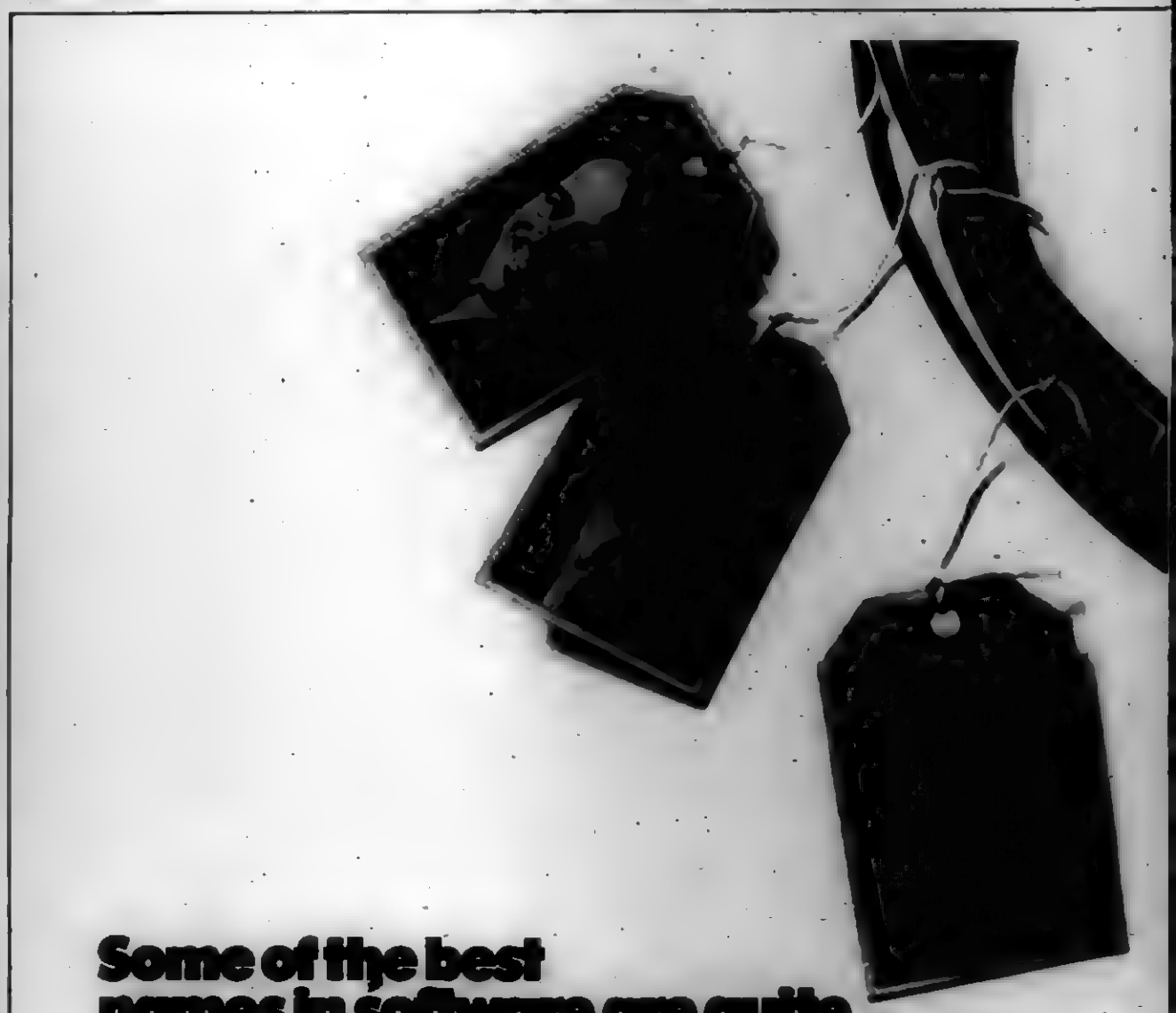
Each package costs $5,000.

Creare Research & Development, Great Hollow Road, P.O. Box 71, Hanover, N.H. 03755.

UNIX from page 40

dent software developers, Scanlon said, allowing them to offer their products in a greatly expanded market. More important, he added, acceptance of Unix means the elusive goal of programmer productivity may finally be within reach. "Programmer productivity will gear up at last," Scanlon said. "We will also be able to end the wasted effort of rewriting applications for new hardware or operating system environments. That means a savings of 20% to 50% of each programmer's time."

What's more, Unix will foster a "renaissance in computer architecture," Scanlon said. "Systems designers have been hamstrung for 20 years. Designers were only allowed to replicate old architecture because marketing insisted that the new system run the old software. It was a case of throwing new technology at old architecture. Unix has begun to change all that, allowing designers to utilize the system's high-level language and compilers."



Some of the best names in software are quite attached to our network.

These people know PCs. They also know a good idea when they see one. That's why they're building future networking software around today's networking standard — Ethernet. And why they chose our PC networking system to help them do it. EtherSeries from 3Com.

What EtherSeries is doing for them.

"3 large, growing, and diverse Ethernets are at the heart of our software development activities. Our 3Com hardware has been very reliable — it has never failed us."
— Bill Gates, Chairman, Microsoft (Bellevue, Washington)

"We want to develop our popular dBase II® to a multiuser networked database environment. To meet the demands of our customers we chose the high-performance 3Com EtherSeries."
— David Clayton Cole, Chairman, Ashton-Tate (Culver City, California)

"The ease of sharing information and printers led our 1-2-3® advanced development team to choose 3Com's EtherSeries® over all of the alternatives."
— Mitch Kapor, President, Lotus Development (Cambridge, Massachusetts)

"We wanted network software transparency. Our PFS:® software runs without ANY change on 3Com's EtherSeries® — it protects our user's software investment."
— Fred Gibbons, President, Software Publishing (Mountain View, California)

"The Ethernet standard and 3Com's EtherSeries® will be an important part of our in-house networking strategy. It provides the connectivity we require for our growing organization."
— Bob Frankston, President, Software Arts (Wellesley, Massachusetts)

"Our mainframe link software and Peachtree software ran perfectly in the 3Com environment. We dropped

SOFTWARE & SERVICES

PRODUCTIVITY AIDS

M. BRYCE & ASSOCIATES, INC.
Interface to Pride Automated Systems Design Methodology

M. Bryce & Associates, Inc. has announced an interface package for its Pride Automated Systems Design Methodology (ASDM) and Software House, Inc.'s System-1022 Data Base Management System (DBMS) software.

According to the vendor, the interface uses the logical data base design specifications generated from Pride ASDM to produce automatically the necessary physical file statements for System-1022. The bridge is said to be a productivity aid for users of the two products.

Pride ASDM is described as an integrated and automated approach for engineering and manufacturing information systems. System-1022 is described as a DBMS operating on the Digital Equipment Corp. Decsystem-10 and Decsystem-20 mainframes.

The interface is sold as a $7,000 option to Pride ASDM, which is priced at $80,000.

M. Bryce & Associates, 1248 Springfield Pike, Cincinnati, Ohio 45215.

IMSL, INC.
IMSL Library Edition 9.1

IMSL, Inc. has announced that its IMSL Library of mathematical applications is now available for use with the Gould, Inc. Concept/32 supermainicomputer.

According to a vendor spokesman, the IMSL Library contains 540 Fortran subroutines for a broad range of mathematical and statistical applications.

The software was designed to reduce the time and cost involved in developing application programs by allowing the programmer to select complete, fully tested subroutines from the library rather than writing them.

Dubbed Edition 9.1, the IMSL Library system is compatible with Concept/32 superminis using the Fortran 77+ compiler.

The spokesman said the library is useful in applications such as simulation, oil and gas exploration, communications, engineering and research and development.

A one-year license for the IMSL Library is priced at $2,500 or $1,700 for universities and colleges, the vendor said.

IMSL, NBC Building, 7500 Bellaire Blvd., Houston, Texas 77036.

APPLICATION PACKAGES

INTEGRATED SOFTWARE SYSTEMS CORP.
Configurator 8

Integrated Software Systems Corp. (Issco) recently announced expanded output device capabilities for its interface to its computer graphics software packages, Disspla and Tell-a-graf.

Additional devices supported by Configurator 8, the eighth release in a series of software device interface libraries, reportedly include the entire Seiko Instruments USA, Inc. D-Scan terminal family; Digital Engineering Corp.'s Gen II graphics retrofit board; the Benson, Inc. 9000 series electrostatic plotters; two C. Itoh Electronics, Inc. graphics terminals and Datagraph VTC 8001; and Jupiter Systems, Inc.'s Jupiter 7 and Modgraph GX 100 terminals.

A company spokesman said Issco's software packages run on popular mainframes and minicomputers from Apollo Computer, Inc., Burroughs Corp., Control Data Corp., Cray Research, Inc., Digital Equipment Corp., Hewlett-Packard Co., Honeywell, Inc., IBM, Perkin-Elmer Corp., Prime Computer, Inc. and Sperry Corp.

The announced release will be provided at no charge to existing customers. Disspla is priced from $9,500 to $61,000; Tell-a-graf is priced from $9,500 to $52,000.

Issco, 10505 Sorrento Valley Road, San Diego, Calif. 92121.

GARY BROWN ASSOCIATES, INC.
Fama/OL

Gary Brown Associates, Inc. has announced the Fixed Assets Management System/On-Line (Fama/OL) for the IBM System/36, which is said to utilize that hardware's ability to track data through variable access paths.

Fama/OL offers users an automated tool for complete asset accounting and property reporting and is easy to use, the vendor claimed. It is also available for the IBM System/34.

The system features extensive asset data designed to give the user a single source of reference control and analysis and management for assets, the vendor said.

Other features include the ability to parallel three modes of depreciation per asset, a choice of nine depreciation methods, 16 optional reports and the ability to handle multiple companies and divisions.

A complete On-Line Tax Reference Guide is provided, and data is said to be edited on-line for syntax and compliance with established tax regulations.

The system profile is easily modified to establish summarization levels and reporting control, the vendor said.

The Fama/OL package is priced at $3,200.

Gary Brown Associates, 322-B Edwardia Drive, Greensboro, N.C. 27409.

See WORLD page 52

EtherSeries" right into our IBM Information Center and can now share disks and printers."
—Dennis Vohs, Executive Vice President, MSA (Atlanta, Georgia)

"We wanted the expandability of 3Com's Ethernet as a base for our networked products. VisiSeries" for EtherSeries" is the beginning of a family which will include VisiOn.""
—Dan Fylstra, Chairman, VisiCorp (San Jose, California)

What EtherSeries will do for you.

Tying into 3Com EtherSeries was a smart business move for these PC software experts. And it can be for you too. You'll maximize office efficiency, now. Cut operating costs, now. And you'll realize the full potential of your IBM PCs using software that is readily available off-the-shelf, now. All for the low price of $950 per link.

And until January 31, 1984, we'll give you our award-winning EtherMail—a $750 value—with the purchase of EtherSeries and three PC links.

EtherSeries is available at leading computer stores. Call or write Cory Randall at 3Com for more details.

☐ Please have your 3Com representative call.
☐ Please send me more information.
CW 1/30
Name
Title
Company
Division
Address
City/State/Zip
Phone
3Com Corporation, 1390 Shorebird Way, P.O. Box 7390 Mountain View, CA 94039 Phone (415) 961-9602

3Com is EtherNet.

"Class II" is a registered trademark of Applicon-Data Logics Ltd. "3-D" is a trademark of Lotus Development Corp. "PFS" is a registered trademark of Software Publishing Corp. VisiSeries" and VisiOn" are trademarks of VisiCorp.

SOFTWARE & SERVICES

TOOLS from page 51

INFORMATICS GENERAL CORP.
Claim Receiver

Informatics General Corp. has announced a software product designed to speed movement of medical claims information from the National Electronic Information Corp. (Neic) clearinghouse to insurance companies.

Claim Receiver reportedly expedites claims as they are submitted to Neic by hospitals and transfers information to insurance companies that are Neic subscribers according to the UB-82 claim form recently approved by the federal government.

Claim Receiver operates in batch mode with IBM OS and DOS. It is said to feature a history file to provide a permanent audit trail and a file-control report.

The product is available at a price of $10,000.

Group Insurance Systems Sales, Informatics General, 9441 LBJ Freeway, Dallas, Texas 75243.

LEHIGH UNIVERSITY
Ecomacts; DSS/2; ODE/PDE

Lehigh University has announced three software systems for mathematical modeling, which are said to be designed for use with a variety of mainframe systems.

The systems are the Educational Computer-Based Models for Socioeconomic Technological Situations (Ecomacts) package, the Differential Systems Simulator, Version 2 (DSS/2) package and the Mathematical Software for Ordinary and Partial Differential Equations (ODE/PDE) package. A spokesman said the packages can be run on mainframes from manufacturers, including IBM; Amdahl Corp.; Burroughs Corp.; Control Data Corp.; Digital Equipment Corp.; Honeywell, Inc.; Prime Computer, Inc.; and Sperry Corp.

The spokesman said the underlying mathematics within the systems contain ordinary and/or partial differential equations, and all coding is in standard, transportable Fortran IV. All three systems are available on 9-track tape and range in size from 15,000 to 18,000 lines of Fortran IV.

The Ecomacts system is priced at $100, the DSS/2 system at $1,000 and the ODE/PDE system at $1,000.

Lehigh University, Whitaker No. 5, Bethlehem, Pa. 18015.

HEALTH INFORMATION SYSTEMS, INC.
Materials Management System

Health Information Systems, Inc. (HIS), has announced an on-line module for IBM mainframe systems that is designed for tracking inventory items used by the health care industry.

The Materials Management System reportedly is interfaced to other HIS systems, such as Accounts Payable and General Ledger. It is said to feature an English-language conversational mode with a "help" key feature and functions that include creating, editing and canceling purchase orders on-line and tracking inventory items requisitioned and dispensed to all hospital departments.

Available now, the system is priced at $45,000 as an additional module for HIS Accounts Receivable.

Health Information Systems, 4522 Hamilton, Brooklyn, N.Y. 11219.

COLLIER-JACKSON, INC.
CJ/Fixed Assets

Collier-Jackson, Inc. has announced CJ/Fixed Assets, an on-line, data base-oriented fixed assets accounting system for the Hewlett-Packard Co. HP 3000 that provides property depreciation and control for medium-size to large corporations.

At company, division and department levels, CJ/Fixed Assets is said to track property and create separate or consolidated reports. CJ/Fixed Assets is also said to allow users to define parameters to determine specific types of assets and sorting sequences for these reports.

The system can keep an unlimited number of books, the vendor said, allowing users to set up test books as well as standard accounting books.

CJ/Fixed Assets supports a variety of depreciation methods. The system automatically interfaces to CJ/Advanced General Ledger and can adapt to other automated general ledger systems. CJ/Report Writer is available as an add-on feature. The license fee is $18,000.

Collier-Jackson, 5709 Jetton Ave., Tampa, Fla. 33629.

THE FASBE GROUP, INC.
Version 3.4.6 of IBMS

The Fasbe Group, Inc. has enhanced its Interactive Business Management System (IBMS), a financial application package for Digital Equipment Corp.'s VAX-11, Decsystem-10 and Decsystem-20 computers.

The new release (Version 3.4.6) features on-line, interactive processing and increased throughput, according to the vendor. An allocation module which provides the user with fixed-amount, fixed-percentage and variable-percentage allocations in either update or nonupdate mode has been added to the general ledger subsystem.

The accounts payable system now includes multiple bank, recurring payment and one-time vendor processing capabilities. The security module provides encryption techniques for internal control, and a new report writer module uses English statements for report writing, according to the vendor.

A one-time CPU licensing fee for IBMS costs between $5,000 and $20,000.

The Fasbe Group, P.O. Box G, Nashua, N.H. 03061.

AGS MANAGEMENT SYSTEMS, INC.
PAC III

AGS Management Systems, Inc. recently announced that its Project Analysis and Control (PAC III) project management system is now available for use on the IBM System/36 running under IBM's CPF-BC operating system.

PAC III reportedly combines networking, resource scheduling, estimating and accounting functions in a single project management system that may be used by many groups within one company to provide a single standard for project management within the organization.

A company spokesman said new options for the package include management graphics in color to display schedules and budgets; network color graphics to provide a picture of network and critical activities; and an earned value option to help locate variances by comparing scheduled vs. actual performance in work effort and budget.

The package is priced from $40,000 to $56,000.

AGS Management Systems, Department MS, 320 Walnut St., Philadelphia, Pa. 19106.

SHIRLEY SOFTWARE SYSTEMS, INC.
Mister for DEC VAX-11s

Shirley Software Systems, Inc. has announced that its Management Information System for Time, Expenses and Resources (Mister) Project Management system is now available for use with Digital Equipment Corp.'s VAX-11 series of processors.

The Mister package consists of nine modules that are said to assist managers in planning, scheduling and monitoring work. The vendor said the package is useful in applications such as engineering design, construction, software development, public utilities planning, research and development and shipbuilding and repair.

Mister reportedly utilizes Critical Path Method techniques to schedule multiple projects with numerous activities per project. Network graphics are available on all standard plotters and many dot matrix printers, according to the vendor. The system reportedly offers more than 50 standard reports, and an on-line report generator feature creates customized output.

The Mister system also includes an interactive data entry module that asks users simple questions to assist in defining a schedule. The system was designed to operate on the VAX-11/730, the VAX-11/750 and the VAX-11/780 under the VMS operating system. Mister is priced

Continued on page 64

MicroAge®

"BECAUSE WE COULDN'T AFFORD MISTAKES!"

"They guided us over the rough parts when we needed it"

"During September of 1982, we started our MicroAge Computer Store in Tulsa, Oklahoma with 3 people. Today we have 21 people working for us and two stores. By following MicroAge's advice and marketing strategy when we started in business, we were able to reach Tulsa's business computer buyers in a much shorter time than we could have on our own."

"Both of us had technical backgrounds in computers but lacked the marketing experience necessary to reach our goals. We used MicroAge's experience and leadership to guide us through the rough spots and boost our sales and marketing potential."

"MicroAge . . . they helped us build a sales organization to reach the Oklahoma businessman."

John E. Mosier
John Mosier
MicroAge Franchisee

George B. McLawhon
George McLawhon
MicroAge Franchisee

To build your own professional computer sales organization with MicroAge write to:

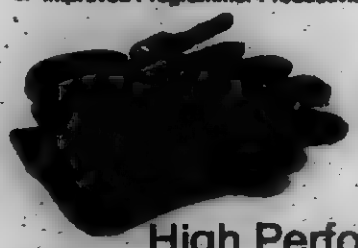
MicroAge®
COMPUTER STORES
"The Solution Store" ®
1457 W. Alameda • Tempe, Arizona 85282
(602) 968-3168

HIGH PERFORMANCE HANDLING

File-AID Puts You in the Driver's Seat to Access Data without Programming.

File-AID gives you high performance handling benefits.

- ☐ Immediate Data Access Without Programming
- ☐ Improved Testing Effectiveness
- ☐ Lower Conversion Costs
- ☐ Better Use of VSAM
- ☐ Reduced Production Delays
- ☐ Increased Security
- ☐ Improved Programmer Productivity



File-AID the Key to High Performance.

File-AID speeds up the utility functions associated with record and file handling.

File-AID is a dependable and reliable tool. And it is supported by a crew of professionals at Compuware, a company with over 2,000 users worldwide.

File-AID is flexible and able to respond in all situations: test and production; regular and special functions.

File-AID is efficient. It combines many utilities into one inexpensive, easy-to-use productivity tool.

File-AID gives the professional greater control over his data environment.

File-AID can put you in the driver's seat fast. It is easy to use and requires virtually no training. The menus, panels, tutorials and control information make it a natural extension of your current environment.

File-AID/SPF

All Access Methods.

File-AID/SPF supports BROWSE, EDIT & UTILITY functions for all standard IBM access methods.

Record/Member Selection.

File-AID/SPF provides expanded IF, AND, and OR logic for record or member selection and processing.

Logical JCL Processing.

File-AID/SPF recognizes JCL as a special format and JCL is treated as logical statements.

Improved Edit.

File-AID/SPF provides a record editor for all access methods with no record or file length restrictions.

New SPF Utility Functions.

File-AID/SPF provides many new utility functions including:

- ☐ Load module CSECT and directory entry mapping
- ☐ Selective COPY functions for records/members.
- ☐ New full function VTOC utility.
- ☐ Full VSAM cluster, alternate index and path support (display, delete, etc.) without the IDCAMS utility.

Ease of Use.

File-AID/SPF requires no training.

File-AID/BATCH

All Access Methods.

File-AID supports all standard IBM OS or VS access methods and device types.

Multi-Function Utility.

File-AID/BATCH is a parameter-driven utility which combines the most often used file and record handling functions.

- ☐ Print, list or dump whole records or portions of records.
- ☐ Copy up to 99 datasets without control cards while mixing any file organization or record format.

File-AID is a comprehensive, easy-to-use data manipulation utility.

- ☐ Selective retrieval or sampling from any file based on record position, or data contents to the bit level.
- ☐ Altering data format or record structure.
- ☐ Access multiple datasets.
- ☐ Accumulate data in any format.

Additional Information.

File-AID/BATCH provides complete audit trail information as well as concise control card error messages.

Flexibility.

The flexibility of File-AID/BATCH is demonstrated by its ability to combine data from different sources or to copy data from or to unlike devices or access methods or record formats.

Test Drive File-AID with a FREE PRODUCT EVALUATION TIME TRIAL

Get behind the wheel. Try File-AID's High Performance Handling with your own drivers and crew. For your FREE 30-day evaluation call 800-521-8353 (in Michigan or Canada: 313-540-0400).

☐ Trial Information ☐ Additional Product Information

Name _____

Title _____

Co. Name _____

Address _____

City _____ State ____ Zip ____

Phone _____ Operating System _____

File-AID

Corporate Headquarters
32100 Telegraph Road
Birmingham, Michigan 48010
(313) 540-0400

COMPUWARE

SYSTEMS SOFTWARE THAT MAKES SENSE

International Offices: New South Wales, AUSTRALIA Phone: (61-2) 816-1177 / Luton, Bedfordshire, ENGLAND Phone: (44-582) 39-483 / Paris, FRANCE Phone: (33-1) 247-1241 / Herzliya, ISRAEL Phone: (972-52) 58912 / Milano, ITALY Phone: (39-2) 346-2211 / Tokyo, JAPAN Phone: (81-3) 479-1650 / Oslo, NORWAY Phone: (47-2) 69-8570 / Bryanston, SOUTH AFRICA Phone (27-11) 678-6000 / Hamburg, W. GERMANY Phone: (49-40) 22-6201

SOFTWARE & SERVICES

Continued from page 82

between $26,000 and $75,000 depending on the number of modules selected.

Shirley Software Systems, Suite 202, 1936 Huntington Drive, South Pasadena, Calif. 91030.

DATA PROCESSING SERVICES, INC.
Distribution Processing System/38

Data Processing Services, Inc. has announced an integrated inquiry software system for distribution processing on the IBM System/38.

Distribution Processing System/38 consists of order processing, invoicing, inventory and accounts receivable programs, a spokeswoman said.

It reportedly fully integrates the inquiry system as a separate subsystem to give users ready accessibility to all levels of data. Access is gained through one "door" to save time, according to the vendor.

The system stores up to 20 inquiries for each user session, permitting review of previously selected data without reentry of selection criteria, the vendor said.

Other features include multicompany and multidivision processing, custom menus for each user and flexible pricing.

Distributed Processing System/38 pricing starts at $60,000 for a one-time license fee.

Data Processing Services, 8604 Allisonville Road, Indianapolis, Ind. 46250.

NATIONAL INFORMATION SYSTEMS, INC.
Version 4 of VUE

National Information Systems, Inc. has announced Version 4 of its VUE software, which it described as a computerized project management system.

The vendor said Version 4 features on-line Help messages, redesigned menus, a new command mode, expanded resource capabilities, a new time-schedule network and the incorporation of all processing into a single module.

VUE is said to accommodate the entering and reporting of information for planning, scheduling and tracking project activities.

The redesigned menus, Help messages and command mode reportedly combine to make the system easier to use, and the organization of the menus has been changed to improve the logical flow of information.

With the expanded resource capabilities, the user can now specify up to 100 resources for a project, as opposed to 10 resources in earlier versions, according to a spokesman for the vendor.

The time-schedule network report is said to provide bar chart information and precedence relationships of activities.

VUE runs on Digital Equipment Corp.'s VAX-11, PDP-11, Decsystem-10 and Decsystem-20, Hewlett-Packard Co.'s HP 3000, most Honeywell, Inc. computers and all Perkin-Elmer Corp. processors, according to the vendor.

It is priced between $5,000 and $22,500, depending on the operating environment and the options chosen, according to the vendor spokesman.

National Information Systems, 20370 Town Center Lane, Cupertino, Calif. 95014.

COMMUNICATIONS ANALYSIS CORP.
Moste

Communications Analysis Corp. has announced that its Management of System Telephone Expenses (Moste) system is now available for Digital Equipment Corp.'s VAX-11 series of superminicomputers and PDP-11 series of minicomputers.

Moste runs under DEC's VMS and RSTS/E operating systems. The software package processes telephone call detail records from the output of any private branch exchange or Centrex system. A series of telecommunications management and traffic analysis reports can be generated for control over telephone expenses.

According to the vendor, each call is identified by its precise city and state destination and is priced using appropriate rates. Calls are summarized at extension, department, cost-center, division and company levels.

Calls can also be organized by account codes for billing back charges to clients or tenants. Exception reports can be produced, listing all calls in excess of a predesignated threshold of minutes and/or cost.

According to the vendor, management reports allow calls to be accounted for at every level of an organization and allocated to justifiable budgets. Wats usage is also broken down, call by call, for internal control.

According to the vendor, Moste is fully documented and supported. Ongoing maintenance and updates are available to reflect rate, tariff and central office changes. Performance-critical portions of the program are implemented in assembly language, and reports are processed using DEC's VAX Basic.

The one-time license fee for the Moste system is $17,000. For companies with multiple locations, each additional switch location can be incorporated under the license for $3,500.

Communications Analysis, 100 Fountain St., Framingham, Mass. 01701.

MASSCOMP
KIC

Masscomp has announced the addition of the Kellers Integrated Circuit (KIC) application software program to the standard software library running on its 32-bit Unix-based MC500 series and Workstation

SOFTWARE & SERVICES

500 computer systems.

According to the vendor, KIC is an interactive color graphics program developed at the University of California at Berkeley for the mask-level design of integrated circuits. The program's color graphics editor can work with Nmos, Cmos and bipolar integrated circuit technologies, and it has symbolic layout and split-screen capabilities that reportedly provide a design tool for layout engineers, according to the vendor.

The KIC screen is said to incorporate both a coarse viewport and a fine-positioning viewport called a magnifying glass. The user creates geometries on a two-dimensional mask-coordinate system with integer coordinates.

The package reportedly supports several types of layout geometries, including boxes, polygons, wires, labels, lines, flashes, arcs and doughnuts. KIC supports layouts of up to 25 layers and can be recompiled to increase this standard maximum number of layers.

The MC500 series and the Workstation 500 processors reportedly both feature the high-performance computational and graphics display power needed for computer-aided design and engineering and other sophisticated tasks.

The KIC application software is free of charge to existing users. A typical configuration of the Workstation 500, including the standard software library with the KIC application program, is priced at $43,000, the vendor said.

Masscomp, One Technology Park, Westford, Mass. 01886.

HOURGLASS SYSTEMS, INC.
Calc Master

Hourglass Systems, Inc. has introduced a spreadsheet program for users of the Wang Laboratories, Inc. 2200 MVP, LVP, SVP and VP computer systems. Called Calc Master, the program incorporates consolidation, window access to other spreadsheets, alphanumeric sorting and logic comparison.

A typical Calc Master module contains a data capacity of up to 64 columns and 999 rows, the vendor said. For larger spreadsheets, the package has consolidation and file look-up features to transfer data among spreadsheets. In addition, Calc Master can be bridged to other programs such as accounting, sales records and inventory.

According to Hourglass Systems, Calc Master is designed around the concept of a cell which contains the data at the intersection of a column and a row. Any cells may contain text or numeric data. In addition, the program allows the user to vary column widths individually, control decimal and comma formats and use prefix characters such as the "$" sign, the company noted.

Other features of the package include global editing, data block moves, "if-then" logic, on-screen Help, sorting, regression analysis, curve fitting, random number generation for simulation and trigonometric and logarithmic functions.

Pricing for Calc Master begins at $495.

Hourglass Systems, P.O. Box 212, Glen Ellyn, Ill. 60138.

AGS MANAGEMENT SYSTEMS, INC.
PAC II; PAC III

AGS Management Systems, Inc. has announced that its PAC II and PAC III project management systems are now available for the Digital Equipment Corp. VAX-11 systems.

The VAX-11 versions of PAC II and PAC III have been improved with network and management graphics, the vendor said. The packages' network graphics are in color and are said to provide a clear picture of network and critical activities. Management graphics, also in color, displays schedules and budget information in pie charts designed for management presentations, the vendor said.

PAC II can plan, monitor, cost and analyze projects, the vendor said. In addition, it is said to simulate, schedule, allocate resources, evaluate networks, develop float, provide target scheduling and offer standard and custom reports.

PAC III is a network scheduler and cost processor and can direct and tract multitask projects across functional lines, the vendor said. It can be used by more than one group in an organization to provide an economical single standard for project management.

The VAX-11 version of PAC II is priced at $42,000, and the VAX-11 version of PAC III is priced at $56,000.

AGS Management Systems, Department MS, 230 Walnut St., Philadelphia, Pa. 19106.

STEEL HEDDLE MANUFACTURING CO.
AIM

Steel Heddle Manufacturing Co. has announced Application Integration Module (AIM), an enhancement to its Wizard Mail IBM mainframe electronic mail system.

The enhancement allows electronic messages to be integrated into in-house applications, according to the vendor.

Whenever a message is sent, an audible alarm is sent to a user's terminal, and a message appears on the screen, the vendor said. Wizard runs under CICS, BMS or VM operating system environments, the vendor said.

The program costs $395 without the new option, $495 with it. After March 1, the prices will rise to $895 and $995, respectively.

Steel Heddle Manufacturing Co., P.O. Box 1967, Greenville, S.C. 29602.

Introducing software for the IBM® PC with a $350 bonus!

Now's the time to invest in the business software you've wanted for your IBM PC.

Because for a limited time, if you buy any two of the famous business programs in the CP/M Applications Library,™ we'll give you the highly-acclaimed Concurrent CP/M™ operating system for your IBM PC—absolutely free. That's a bonus worth $350.*

Introducing SpeedStart™—the exclusive load-&-go software system.

The CP/M Applications Library offers more than just the best name-brand IBM PC software in the business. Each of our applications delivers the unmatched convenience of our exclusive SpeedStart single disk system.

SpeedStart is a special version of the powerful CP/M-86® operating system that's built into each of our software disks.

When you're ready to work, just load the disk, turn on your IBM PC and go!

SpeedStart eliminates the time-consuming task of loading a separate operating disk and then "installing" the software.

In fact, the SpeedStart system gets you to work faster and easier than any other software available today.

Best of all, it's yours at no extra cost.

What's more, SpeedStart can be by-passed to run software under the IBM PC operating system of the future—the remarkable, multi-tasking Concurrent CP/M.

The operating system of the future can be yours—free!

There's a good reason why Concurrent CP/M is receiving rave reviews by industry experts. It enables your IBM PC to run up to four separate jobs at the same time.

You can load all of your applications at once, and instantly switch from one program to the next with the touch of a key!

For example, by using WordStar® and SuperCalc®2 simultaneously, you can print documents while working on your budget. You can even exchange data from one application to another. The time-saving possibilities are endless.

Best of all, this $350 operating system is yours for the asking when you buy any two IBM PC business software packages from the CP/M Applications Library at your computer store.

But hurry, this special offer ends March 1, 1984! For the name of the nearest participating dealer call toll free:
800-227-1617, ext. 404
(in California, 800-772-3545, ext. 404).

DIGITAL RESEARCH™

Buy any two applications and get Concurrent CP/M FREE!

*Suggested retail price

IBM is a registered trademark of International Business Machines Corporation.
WordStar is a registered trademark of MicroPro International Corporation.
SuperCalc2 is a registered trademark of Sorcim Corporation.
The Digital Research logo and products are either trademarks or registered trademarks of Digital Research Inc. All rights reserved. ©1983 Digital Research Inc.

SOFTWARE & SERVICES

REMOTE COMPUTING SERVICES

INTERACTIVE DATA SERVICES, INC.
OID Data Base

Interactive Data Services, Inc. has announced a data base designed to compute the tax liability of buyers and sellers of original issue discount (OID) bonds.

The OID Data Base is available on magnetic tape sent monthly to banks, brokerage houses, insurance companies and other firms. It is based on an Internal Revenue Service (IRS) list of corporate and government obligations and is designed to reduce the amount of time needed to prepare IRS Form 1099-OID.

The service is priced at $1,800 per year.

Interactive Data Services, 22 Cortlandt St., New York, N.Y. 10007.

AUTOMATIC DATA PROCESSING, INC.
Automatic Price/Cost Updating

Automatic Data Processing, Inc. (ADP) has announced a price and cost inventory updating service for wholesalers and distributors.

Automatic Price/Cost Updating reportedly is available now on tapes fed into ADP clients' computers or as one of the series of on-line accounting services provided to clients using ADP printer terminals.

The service, used with ADP's order entry or inventory system, is designed to eliminate manual price recording by automatically updating inventory item prices through magnetic price tapes. The tapes are provided by third-party pricing companies.

According to ADP, prices for Automatic Price/Cost Updating are flexible, beginning at $50 per month.

Automatic Data Processing, One ADP Blvd., Roseland, N.J. 07068.

ON-LINE DATA BASES

LOTUS DEVELOPMENT CORP. INTERACTIVE DATA CORP.
Lotus-Interactive Data link

Lotus Development Corp. and Interactive Data Corp. have announced an agreement under which the Lotus 1-2-3 microcomputer spreadsheet system can be integrated with Interactive Data's family of micro-mainframe business products and data bases.

According to the firms, Lotus 1-2-3 is available to Interactive Data clients who use the IBM Personal Computer or Personal Computer XT to link to Interactive Data's worldwide micro-mainframe network of financial and economic data and business software. The firms said Lotus 1-2-3 can be linked to Interactive Data's proprietary analysis language, Xsim, and its data management language, XDMS.

The Lotus-Interactive Data link will also reportedly enable clients to communicate with the Chase Econometrics Division's data bases directly through 1-2-3. Clients will be able to access and download data directly into 1-2-3, manipulate the data without being connected to the mainframe and then upload the data to the mainframe. Under the agreement with Lotus, Interactive Data will become a value-added reseller of 1-2-3.

Lotus 1-2-3 can also be linked to Interactive Data's PC Screen, an investment industry package that enables an analyst to scan more than 5,000 companies to identify those meeting his financial criteria. As an example of pricing information, the vendor said Lotus 1-2-3 is available for $435 if purchased with PC Screen, which is licensed for $4,000 monthly.

Interactive Data, 486 Totten Pond Road, Waltham, Mass. 02154.

ITT DIALCOM, INC.
Compmail+

The Computer Society of the Institute of Electronic and Electrical Engineers (IEEE) has announced that electronic mail and information services are now available for use by its 80,000 members. The services, called Compmail+, are provided by ITT Dialcom, Inc.

Compmail+ subscribers will be able to communicate with each other via terminals and also order IEEE Computer Society publications electronically from an on-line catalog, IEEE said.

Other features will include on-line registration for IEEE conferences, seminars and meetings and electronic calls for papers in conjunction with those conferences, according to an IEEE spokesman.

A group bulletin board where members can post notices for all Compmail+ subscribers is also available. Access to the full range of ITT Dialcom information services is also available.

Compmail+ can be used with any Ascii-compatible terminal, personal computer or telex terminal. Each user will be responsible for his personal usage at charges of $16/hour.

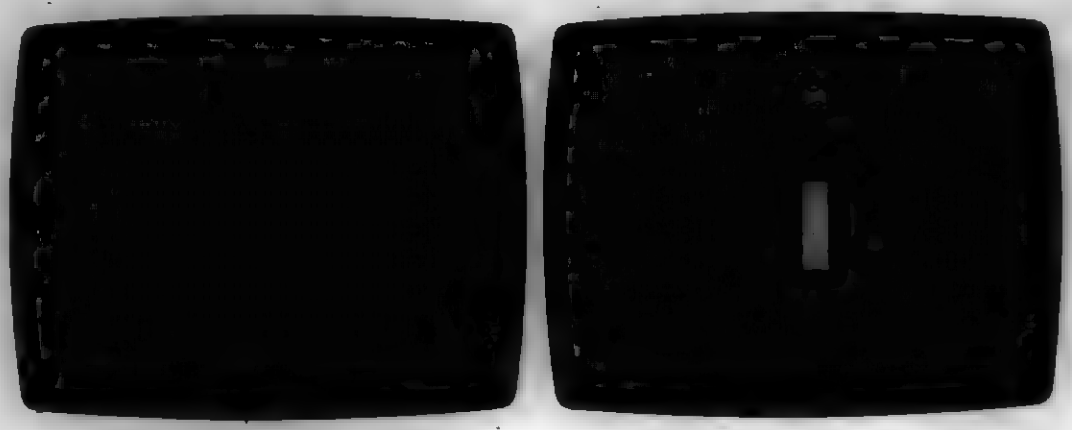
There are no start-up fees, enrollment fees or minimum charges except for direct billing clients who will have a $25 monthly minimum. IEEE members have credit card or direct-billing options.

Credit card billing, using either Visa or Mastercard, will be handled through the Maryland National Bank, the IEEE spokesman said.

A special introductory offer of a $30 credit against usage, excluding external data base fees, is available to IEEE members.

IEEE Computer Society, 1109 Spring St., Silver Spring, Md. 20910.

INTELLECT.™
NO SOONER SAID THAN DONE.



To use INTELLECT, the natural language query system, all you have to do is ask—in everyday conversational English—and you'll retrieve. Immediately, in either text or full-color graphics.

INTELLECT, the world's only successful true natural-language query system, is an ideal tool for your information center. INTELLECT's powerful information retrieval capabilities are so advanced that it understands questions and responds with answers as if you were talking to a knowledgeable colleague. Executives access data themselves—more easily than ever before—without learning any technical jargon or "computerese." It's so easy to use, it doesn't even have a training manual!

Whether you use INTELLECT as a retrieval system or as an effective data analysis tool, it transforms raw data in the data base into information and presents it in finished color graphics in a matter of seconds. It's a live dynamic interface that fully integrates your existing database and graphic systems.

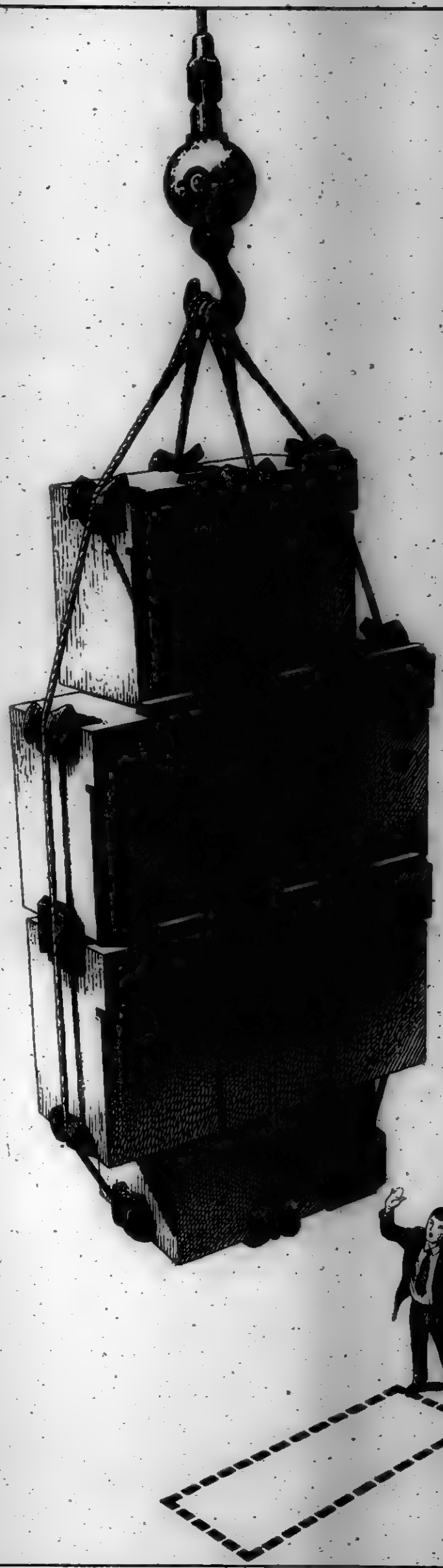
Already hard at work in hundreds of organizations, INTELLECT is ideal for marketing, finance, personnel, manufacturing, and banking applications.

INTELLECT is an important technological breakthrough. You can learn more about it by attending one of our nationwide seminars. Or put its amazing power at your fingertips in minutes with one of our demonstration tapes.

Call or send coupon for more details. Look into INTELLECT, and be an eyewitness to the future of computing.

Tell me more about INTELLECT.
Name _____ Title _____
Company _____
Address _____
City _____ State _____ Zip _____
Telephone _____
Hardware Type _____ Info Center? _____
_____ Demo Tape _____ Seminar _____ Sales Presentation
ARTIFICIAL INTELLIGENCE CORPORATION
100 Fifth Avenue, Waltham, MA 02254 C-139

ARTIFICIAL INTELLIGENCE CORPORATION
100 Fifth Avenue, Waltham, MA 02254 617-890-8400



How to put 640 square feet of computer disk storage in a 7′x 3′ space.

There's no way to store that much data in that little space if you're using disk drives. Even 3380 class. But Masstor Systems' M860 Mass Storage System — a different kind of data storage technology — can solve the problem.

The entry-level M860 stores 55 billion bytes of data on-line and can be expanded to 440 billion bytes. At one-quarter the cost of disk. And less than 4% of the floor space. It also automates tape operations, making processing much faster and more economical.

The M860 is a third storage alternative for your IBM and other plug compatible mainframes. One that offers more on-line storage capacity for your new applications and requires no conversion of your existing programs. Masstor has an M860 solution for Sperry, Honeywell, DEC/VAX and CDC mainframes, too. As well as a way to hook them together in a network: MASSNET.

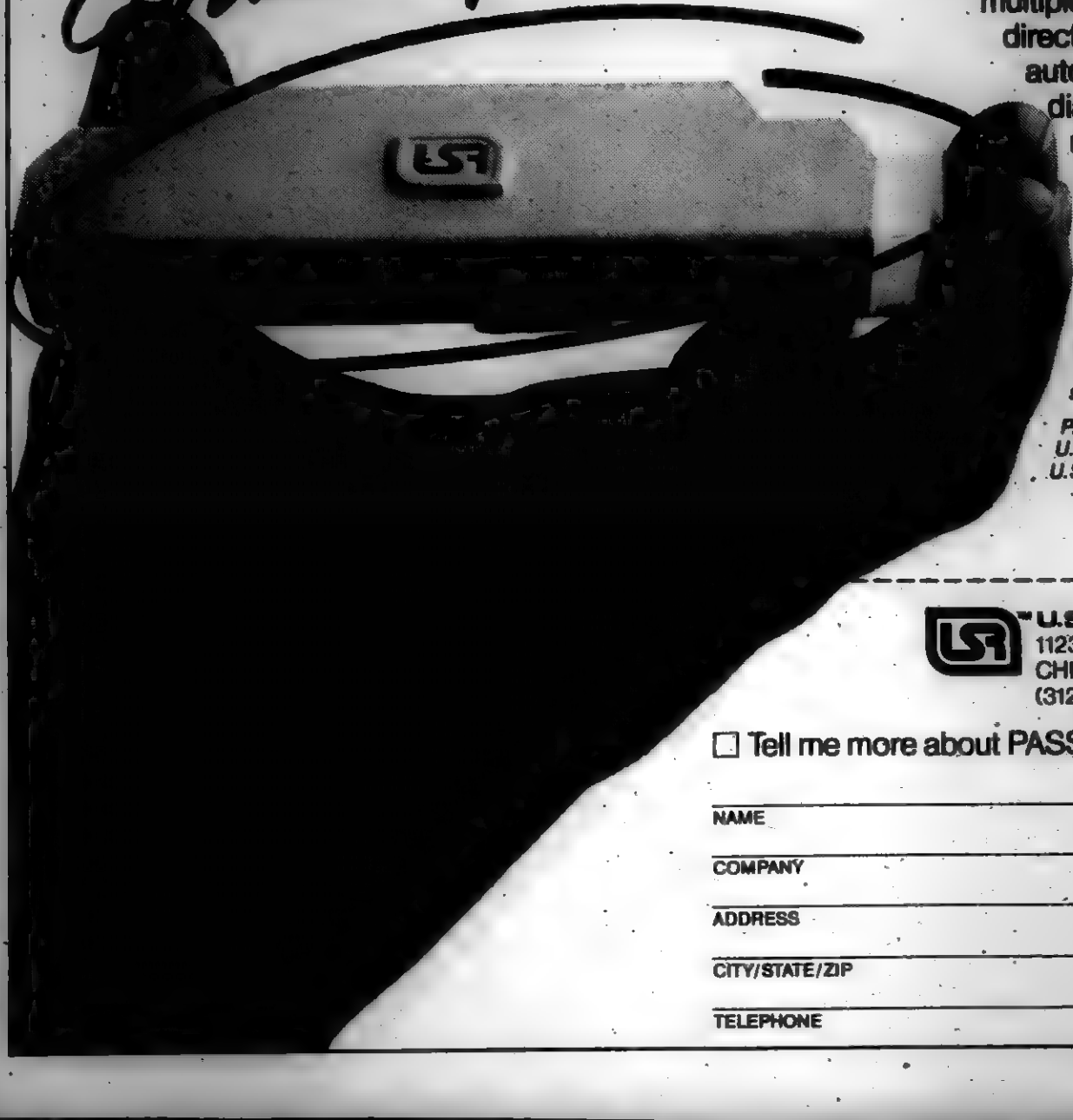
The M860 and MASSNET are two of a family of Masstor Systems' strategic products that allow you to move, store and share data efficiently and economically.

To find out more, contact Dave Ball at Masstor Systems Corporation, 5200 Great America Parkway, Santa Clara, California 95050. (408) 988-1008. And cut your data storage problems down to size.

MASSTOR SYSTEMS

Strategic solutions to moving, storing and sharing data.

Our Password™ modem's sophisticated new control panel



THE BUSIER YOU ARE, THE BETTER YOU LIKE IT.

PASSWORD™ is a modem so efficient and convenient there is little to do but turn it on to transmit at 300/1200 baud. Operating features include auto dial/answer, auto mode/speed select, full/half duplex. PASSWORD has all this, plus a two-year limited warranty, at a price of just $449.*

TELPAC™ telecommunications software (optional) programs PASSWORD to transfer files, in terminal or host mode, with multiple error checks. Phone directory gives choice of timed automatic or one-touch dial and logon. Command mode includes file display and update, menus and help, and much more. Write or call for complete specifications.

**Suggested list for PASSWORD complete with power, phone, RS232 interface cables. TELPAC software optional extra, $79.*

PASSWORD, TELPAC, USR logo and U.S. Robotics are trademarks of U.S. Robotics Inc.

U.S. ROBOTICS INC.
1123 WEST WASHINGTON
CHICAGO, ILLINOIS 60607
(312) 733-0497

☐ Tell me more about PASSWORD, TELPAC.

NAME _____

COMPANY _____

ADDRESS _____

CITY/STATE/ZIP _____

TELEPHONE _____

COMMUNICATIONS

Recruiting fires stoked
In telecommunications industry

NEW YORK — Hiring and recruiting in the telecommunications industry have started to heat up again. During 1983 the recession in hiring in the industry gradually ended, and the job market became markedly tighter, but the industry is still not up to prerecession hiring-activity levels, according to a survey recently released here.

The "15th Annual Telecommunications Salary Survey," by Personnel Resources International, Inc., also reported that prevailing industry salary rates have continued their climb, especially in telecommunications specialties experiencing tight supply conditions such as junior- and intermediate-level technicians in private branch exchange and data communications areas as well as design and systems engineers, advanced network planners and telecommunications software development personnel, according to the report.

> *"In the telecommunications manager, they're looking for someone with a more technical background . . . Ten years ago they just wanted somebody that knew something about phones. — Jay Jacobson, president of Personnel Resources.*

In order to fill the shortages in these job areas, Jay Jacobson, president of Personal Resources, said he anticipates retraining programs and a relaxation of degree requirements. "Some of these jobs will be filled with people from the military, and there will be some coming out of the telephone companies, but not many. Companies will relax their degree requirements, and they'll train technicians to be so-called engineers."

The first effects of the AT&T breakup to be seen in the manpower market are among independent suppliers, who hope to compete against Western Electric Co. in improving their sales to the regional telephone holding companies, the survey said. Jacobson has had requests from them for sales personnel and for systems, development and product-support engineers with experience with Bell or other suppliers.

According to the survey, Personnel Resources has had a number of requisitions from independent telephone companies for planning engineers and managers, both in engineering and marketing, with a preference for candidates with a B.S. in electrical engineering and an MBA for both functions. Some telephone companies sought sales and technical personnel for their unregulated sectors in the radio, interconnect, supply and consulting businesses.

Cellular radio has created demand for a large number of radio systems engineers, coordinators, technicians and salesmen. Manufacturers of cellular radio hardware also are seeking design and development technical personnel.

They especially are interested in technical personnel who can integrate telephone and radio equipment.

Specialized common carriers did not seem to be affected much by the recession and continued to look for all types of personnel. Some data carriers had special needs for engineers with backgrounds in packet switching, fiber optics and other new technologies. The demand from resale common carriers has been uneven, as some have experienced financial ups and downs. Satellite carriers listed fewer openings than in 1981.

Telephone interconnect companies continued to look for experienced marketing and installation personnel, but refined their needs and specifications, as their industry has reached a point of maturity.

Large telecommunications users, such as banks, insurance companies, general energy and manufacturing firms, started looking for analysts and telecommunications managers in late 1983 after a general hiatus, the survey said.

"In the telecommunications manager, they're looking for someone with a more technical background," Jacobson said. "Ten years ago they just wanted somebody that knew something about phones or someone who was a salesman for the telephone company. But now they want much more experience in networking and certain state-of-the-art equipment, and they want an engineering background or computer science background, where at one point a liberal arts or business degree seemed adequate."

According to Jacobson, telecommunications salaries increased an average of 8% to 9% last year, and he expects the market to pick up with the improving economy.

The survey is free.

Personnel Resources, 342 Madison Ave., New York, N.Y. 10173.

Tymshare service integrates nets

Tymshare, Inc. has announced a value-added data communications service called Edi-Net, which allows direct computer-to-computer transmission of business documents between different organizations with dissimilar computers and document formats.

The Edi-Net service integrates use of Tymshare's public packet data communications network, Tymnet, with a collection of processing capabilities to identify, process and deliver documents electronically, the company claimed.

Edi-Net delivers a highly formatted message that can be directly processed by the recipient's computer, Tymshare said.

For an organization capable of generating a standard message, Edi-Net provides a store-and-forward service for message distribution.

The service is capable of handling any standard message, including the Uniform Communication Standard, now used by the grocery industry, and the Ansi X12 standard.

The price for Edi-Net service ranges from 35 cents to 80 cents per 1,000 characters transmitted.

According to Tymshare, pricing is dependent upon communications options, time of day transmitted and total character volume.

Tymshare, 20705 Valley Green Drive, Cupertino, Calif. 95014.

E-Mail expected to precipitate major changes

PARSIPPANY, N.J. — The burgeoning acceptance of electronic mail as a viable messaging conduit spells major changes for both business and industry, according to a study recently released here.

By the close of 1983, 18% of all U.S. businesses used some form of computer-based electronic mail. And with close to 20% actively planning to implement electronic mail in the near future, a clear message in dollars and cents is beginning to get through to vendors, according to "The Report on Electronic Mail" by The Eastern Management Group.

Larger companies, as measured by the number of employees, have been the first to apply comprehensive electronic mail systems. The report states that 38% of all companies employing over 50,000 employees presently use electronic mail. Conversely, of companies with fewer than 1,000 employees, only 11% have considered the sometimes prohibitive expenses as justifiable.

Upward turn expected

According to John Malone, president of The Eastern Management Group, those figures are expected to take a turn upwards. "It's not surprising to find that of those organizations with over 50,000 employees that currently do not utilize electronic mail, close to 100% are either planning or considering its future use," he said. "What is somewhat startling is that well over 50% of businesses with less than 1,000 employees have similar intentions."

Aggregate revenues in 1983 from electronic mail technologies (excluding computer-based message systems) approached $1.5 billion, according to the study. Contributing to these revenues were monies from teleprinters (56%), store-and-forward voice systems and services (6%), intelligent copiers (11%) and facsimile units (27%).

"The next handful of years will be pivotal," Malone said. "Industry match-ups and conflicts which have been developing recently will intensify. Revenues from one technology will shift to another. Users, who have themselves become increasingly sophisticated, are not fond of redundancy — not in today's corporate environment where each dollar invested must be justified.

"A natural result of close technological scrutiny will be a reduction in consumption of overlapping instruments," Malone continued.

"Why sink money into telex, intelligent copiers and facsimile? Some industries are bound to suffer erosion as others prosper. The trick will be to anticipate in which direction the trends are heading," he said.

The report indicates that by 1987 electronic mail aggregate revenues will have more than doubled the 1983 total, as users pour close to $3.2 billion into the different technologies.

The report, which forecasts the spreading of electronic mail through 1991 for technologies such as computer-based message systems, telex, store and forward voice, facsimile and intelligent copiers, predicts a good deal of interindustry casualties. But, despite such casualties, the market as a whole will prosper.

The report costs $1,500.

The Eastern Management Group, 4 Century Drive, Parsippany, N.J. 07054.

Fenon brings out a full-duplex modem for use on a DDD network or two-wire private line/81

BRIEFS

■ Alaskan will get its first public packet-switched network. The $2 million network supplied by Tymnet will provide statewide access/82

■ The IBM Personal Computer and Personal Computer XT can now emulate the functions of an IBM 3780 or 2780 with terminal emulation products from Software Dynamics/81

■ A file controller for point-of-sale terminals debuts/81

■ A local-area network for Kaypro portable computers was brought out by Adevco. Up to 100 machines can connect/82

■ A fiber-optic video link providing four channels of color or black-and-white video was introduced by Anaconda/82

NEW FOR IMS

BMP RESTART
BATCH DL/I RESTART

Automatic restart of BMP and BATCH DL/I jobs

IMS input logtape never required for restart

Multiple restart options provided

Free 30 day trial

For faster action, call (713) 491-8800

BMC SOFTWARE

Please contact me with more information about
☐ BMP RESTART ☐ BATCH DL/I RESTART
I am interested in a free 30 day trial ☐

NAME_____
TITLE_____
COMPANY_____
ADDRESS_____
CITY_____ STATE_____ ZIP_____
TELEPHONE_____

Clip and Mail to: BMC SOFTWARE
CW P.O. Box 2002/Sugar Land, Texas 77478

COMMUNICATIONS CONTROLLERS

TRANSACTION MANAGEMENT, INC.
TMI-9110 Advanced File Controller

Transaction Management, Inc. has announced the TMI-9110 Advanced File Controller for its TMI-2100 point-of-sale terminals.

When the TMI-9110 is connected to the terminals through a high-speed communications link, it supports Universal Product Code symbol scanning for up to 50,000 items, according to the vendor.

Software specially written for drug stores is part of the system. Other components of the package include a 16M-byte, Winchester-style, fixed head disk; a 365K-byte, removable flexible diskette; data communications hardware; a CRT terminal; a keyboard; and a printer. The price for the TMI-9110 Advanced File Controller is $4,995.

Transaction Management, 100 Keystone Road, Montgomeryville, Pa. 18936.

PROTOCOL CONVERTERS

SOFTWARE DYNAMICS, INC.
SDI3780; SDI2780

Software Dynamics, Inc., has announced two communications emulators for the IBM Personal Computer and the Personal Computer XT.

The SDI3780 is designed to emulate the IBM 3780 RJE workstation. It is said to emulate all functions except Home Mode and On-Line Test Mode. The SDI2780 is said to emulate all functions of the IBM 2780, except Six-Bit Transcode, Synchronous Clock and Off-Line Operation.

According to the company, reading, printing and punching are simulated via disk or diskette and IBM PC-DOS-supported printers on both products. The software emulators require an expansion slot resident in a binary synchronous communications adapter board. Now available, the SDI2780 and SDI3780 are priced at $599.

Software Dynamics, P.O. Box 247, Dunedin, Fla. 34296.

MULTIPLEXERS/ MODEMS

INTERNATIONAL DATA SCIENCES, INC.
Models 6220; 6240

International Data Sciences, Inc. has announced the Model 6220 and the Model 6240 limited-distance modems.

The Model 6220 was designed for asynchronous operation over private or leased, two- or four-wire, nonloaded, metallic (twisted-pair) lines at speeds up to 9,600 bit/sec, the vendor said.

It can be used in both point-to-point and multidrop network configurations and is suited for local data distribution up to 16 miles, according to the vendor.

The Model 6240 can be used in both point-to-point and multidrop network configurations and is suited for short-haul data transmission.

It provides asynchronous operation at data rates of up to 4,800 bit/sec over loaded lines and up to 9,600 bit/sec over nonloaded lines, according to the vendor spokesman.

The Model 6220 is priced at $800, and the Model 6240 costs $400.

International Data Sciences, 7 Wellington Road, Lincoln, R.I. 02865.

ANCHOR AUTOMATION, INC.
Volksmodem

Anchor Automation, Inc. has announced the Volksmodem, which interfaces with most personal computers.

The modem features a 300-bit/sec operation, plug compatibility with any wall phone jack, full/half duplex switch, voice and data switch for phone use without modem disconnection, advanced Cmos low-power circuitry and standard 9V battery power with automatic selection of originate/answer mode, according to a vendor spokesman.

Volksmodem is priced at $79.95.

Anchor Automation, 6913 Valjean Ave., Van Nuys, Calif. 91406.

RIXON, INC.
R2424

Rixon, Inc. has introduced the R2424, a microprocessor-based full-duplex modem that operates over the direct distance dialing (DDD) network or two-wire private lines.

The modem operates synchronously or character asynchronously at speeds of 2,400 or 1,200 bit/sec.

For alternate voice and data operation, a front-panel talk/data switch is included to allow calls to be answered manually with the telephone or automatically under the control of the data terminal equipment, according to a spokesman for the vendor.

The R2424 is priced at $1,195, the vendor said.

Rixon, 2120 Industrial Pkwy., Silver Spring, Md. 20904.

LOCAL-AREA NETWORKS

ADEVCO, INC.
Web

Adevco, Inc. has announced the Web, a local-area network system for Kaypro Corp.'s Kaypro computers.

Continued on page 62

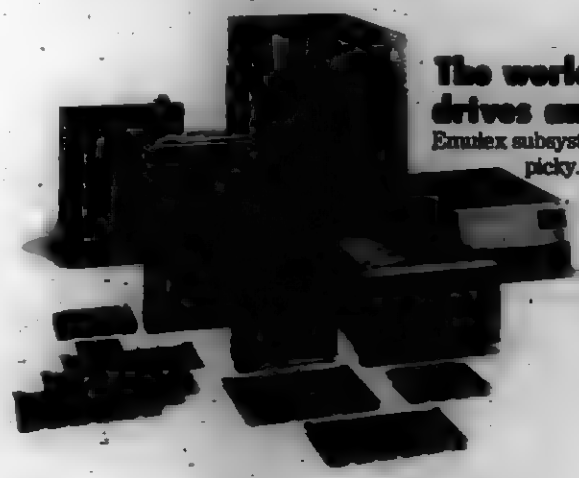
Everything a VAX user could ask for in a storage subsystem.

The Emulex package deal.

Software transparency, low prices, rental/purchase option plans, a trade-in program and a service security blanket. Included are pretested drives and controllers; direct factory installations; fulltime hardware/software applications assistance; and nationwide service through Control Data, General Electric and Tymshare.

Emulex innovation—introducing our Eagle disk/Keystone tape combination.

Where else can you get a unit that optimizes the Fujitsu Eagle's 1.8 MB/sec transfer rate and provides backup, archiving, journaling, and the media interchangeability of ½-inch tape? All in one 42-inch cabinet. Best yet, the PXD-51 is available in six DEC-emulating models for PDP and VAX users on the CMI, SBI or Unibus.



The world's best drives and controllers.

Emulex subsystems let you be very picky. You select proven tape drives and disk drives from 80 to 675 MBytes. Plus you can mix and match fixed and removable disk drives of varying sizes and configurations. At the heart of the subsystem is an Emulex controller designed specifically for your particular DEC CPU.

Emulex has been and continues to be the pioneer in DEC-compatible subsystems. And in each product our objective is clear: to make your DEC system faster, more efficient and capable of processing larger, more complex programs more reliably than any other alternative.

Find out more about the total Emulex package. Phone toll free: (800) 854-7112. In California: (714) 662-5600. Or write: Emulex Corporation, 3545 Harbor Blvd., Costa Mesa, CA 92626.

DEC and Unibus are registered trademarks of Digital Equipment Corp.
Eagle is a trademark of Fujitsu Corp.
Keystone is a trademark of CDC Corp.

EMULEX

The genuine alternative.

COMMUNICATIONS

Continued from page 61

The system consists of hardware modification and networking software. Connected by ordinary wire, each computer can communicate with every other computer on the network, the vendor said.

Up to 100 machines can plug into the net in any combination of Kaypro II, 4 or 10 computers. The system can operate over a distance of up to 2,000 ft. The product costs $350.

Adevco, P.O. Box 606, Camp Hill, Pa. 17011.

DATA LINK
Models 310, 310A; Model 310SC

Data Link has developed a family of local-area network products that utilizes existing twisted pair phone lines to form local data communications networks.

The Model 310 asynchronous line interface adapter was designed to operate in point-to-point, multipoint or switched user-routing networks. As many as eight simultaneous, full-duplex, 9,600 bit/sec data transmissions may take place over a single twisted pair, according to the vendor.

The 310A line interface adapter and a companion supervisory controller, the Model 310SC, were designed for local-area networks with as many as 999 addresses. With the Model 310 and a 310SC, over 30 users may operate on a single eight-channel bus.

Prices for the line interface adapters start at $350 for the Model 310 and $525 for the Model 310A.

Data Link, Suite D-1, 1035 N.W. 12th, Issaquah, Wash. 98027.

PERSONAL COMPUTER GATEWAY, INC.
Data Pouch

Personal Computer Gateway, Inc. has introduced Data Pouch, a personal computer networking system.

Some of the product's features include an RS-232 interconnect to virtually all personal computers, 80M bytes of disk storage and a star network rather than a ring network. Designed to be used by up to 16 users simultaneously, the product allows transmission speeds up to 9,600 bit/sec and direct-line or dial-up interfacing. It also lets users take advantage of existing in-house telephone wire or install standard four-wire lines, the vendor said.

The price for the 20M-byte model is $13,000; the 80M-byte model costs $18,000.

Personal Computer Gateway, 22 Daniel Road, Fairfield, N.J. 07006.

TEST EQUIPMENT

ANDERSON JACOBSON, INC.
EDR option board

Anderson Jacobson, Inc. has announced an error detection and retransmission (EDR) option board for the company's AJ 4048 full-duplex modem.

The board provides data transfer at 4,800 bit/sec in full-duplex, asynchronous data transmission.

Data flow from the terminal continues uninterrupted during the retransmission. A high-level data link control-like protocol eliminates delay by allowing the EDR to transmit new frames while waiting for old ones to be acknowledged, the vendor said. The price is $495.

Anderson Jacobson, 521 Charcot Ave., San Jose, Calif. 95131.

AUXILIARY EQUIPMENT

3M CORP.
API kit; BPI kit

The 3M Corp. has introduced an asynchronous protocol interface (API) kit designed for use with computers using serial communications, including many micros and minicomputers, and its biphase interface (BPI) kit, designed for operation with IBM 3278, 3276 and 3178 terminals.

The API kit can also be used to link the company's 900-page Search to its Micropoint II index processor, an electronic file-management system. The API kit operates at bit/sec rates from 50 to 19,200, using RS-232C ports and the Ascii code set, the vendor said. Each kit costs $2,495.

3M, P.O. Box 33600, St. Paul, Minn. 55133.

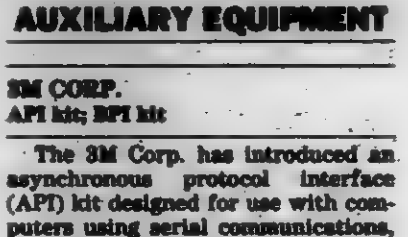
ANACONDA WIRE & CABLE CO.
Ericsson's ZAV 101 fiber-optic video link

Anaconda Wire & Cable Co., a member of the Ericsson Group, has announced Ericsson's ZAV 101 fiber-optic video link, which provides transmission of up to four channels of black-and-white or color video.

The link permits a transmission distance of 3 km (1.8 miles), which can be expanded to 8 km (5 miles) when several links are used in a series as repeaters. Signal bandwidth is 50Hz to 6 MHz. The price for a one-channel system is $1,790.

Anaconda Wire & Cable, 11200 W. 93rd St., Overland Park, Kan. 66204.

See AUXILIARY page 63



Has your most productive asset been working at half speed?

Look at it this way.

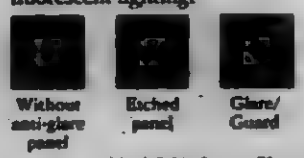
If you had to shade screen glare with one hand, enter data with the other. Hour after hour. Just how efficient would you be?

The fact is, CRT glare takes its toll. On your terminal users. And on department productivity.

But now there's a sensible solution.

Introducing Glare/Guard® anti-glare panels.

Glare/Guard instantly eliminates up to 94 percent of all CRT glare. Resolution is always sharp. And image brightness and clarity are dramatically enhanced—even under bright, fluorescent lighting.



Without anti-glare panel | Etched panel | Glare/Guard

The result? No screen washout.

Glare/Guard's secret is HEA®—a special High-Efficiency Antireflection coating we applied to the windows of NASA's Space Shuttle. And only Glare/Guard has it.

Glare/Guard's durable, laminated-glass design lasts indefinitely. It quickly retrofits to virtually every leading display terminal—no tools required. Its smooth surface is easily cleaned. And Glare/Guard sells for $99, regardless of display size.

Of course, there are less expensive anti-glare products available. But the nylon strands of mesh screens cause fuzzy images. While etched panels merely spread glare around and blur resolution.

Only Glare/Guard does exactly what an anti-glare panel is supposed to do. And that's getting your terminal user's attention out of the glare, and back onto the screen.

Glare/Guard panels cut glare 94%.

Call 800-447-4700 for free brochure.

Glare/Guard anti-glare panels are another quality product manufactured by OCLI. Just call us toll free and we'll send your free brochure, including our helpful sizing guide. Or write Glare/Guard, OCLI, Dept. 109D, 2789 Northpoint Parkway, Santa Rosa, CA 95407-7397.

OCLI

Better yet, place a trial order with your dealer and install Glare/Guard panels on your busiest terminals. You'll see the difference, instantly.

Glare/Guard® and HEA® are registered trademarks of OCLI—Optical Coating Laboratory, Inc. ©1983 OCLI—Optical Coating Laboratory, Inc. All rights reserved.

Glare/Guard®

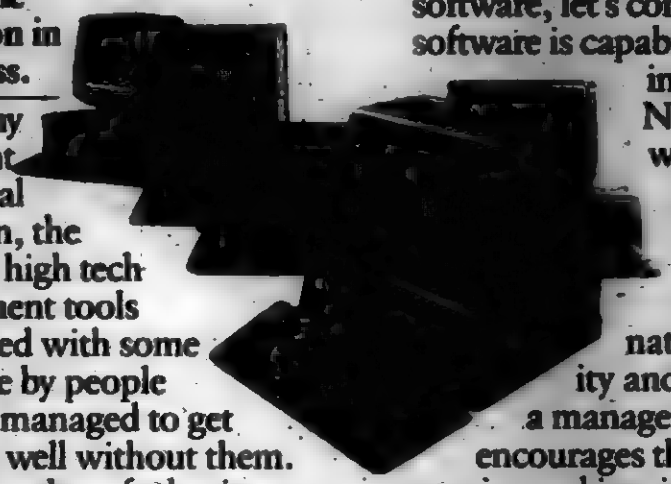
A difference you can see.

Let your people go.

Let's begin by giving you the credit you deserve.

You're part of an organization that's rushing past today's goals and is poised to boldly attack the future. You and people around you are capable of greatness and eager to prove it. The minds you need are in place. Now, set them free.

Join the revolution in progress.



Like any significant intellectual revolution, the arrival of high tech management tools was greeted with some reluctance by people who had managed to get on rather well without them.

But the value of a business person's time and the pressure of competition have made the personal computer a partner in our business life.

Given that as a fact, the question is, how do you make the talents of this new partner work to your advantage?

You have probably already made a decision—or you may be making it now—about the personal computer you'll employ.

But as you discover more about what this technology can accomplish, you'll find it essential to learn more about the software that drives the hardware.

Your next great decision.

Now that we've discussed the necessity of working with software, let's consider which software is capable of working with you.

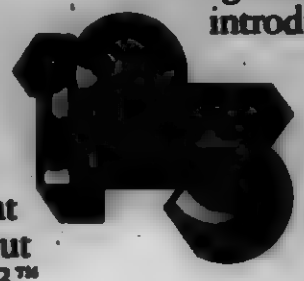
Naturally, we're somewhat prejudiced, but frankly, 1-2-3™ from Lotus™ is a classic combination of simplicity and sophistication; a management tool that encourages the computer novice and inspires the computer expert. That's why many people consider 1-2-3 from Lotus to be the most productive software in the world.

The fact is, while the phrase 'integrated software' has been tossed about by many software companies, 1-2-3 from Lotus made it a reality by combining spreadsheet, information management and graphic functions into one powerful, easy to use program.

Moreover, this program works at a pace up to five times faster than anyone else's.

Now we can't promise that you'll work five times faster. But we will guarantee that with 1-2-3 from Lotus, you'll be inspired to try.

The Lotus position.



Long before the world was introduced to 1-2-3 from Lotus, the lotus position referred to a posture of thoughtful repose, where the body was relaxed and the mind was set free to travel as far as it could.

And that concept of letting human intelligence seek its potential is the essence of Lotus today.

1-2-3 from Lotus is the first software that's truly compatible with the most incredible personal computer ever created—the human mind.

For we believe the best thing we could ever offer decision makers is the chance to discover how much they really can accomplish.

Let your people go.

For more information, call 1-800-343-5414 (In Massachusetts call 617-492-7870) and find out more about 1-2-3 from Lotus.

Lotus

The hardest working software in the world.

1-2-3 and Lotus are trademarks of Lotus Development Corporation. All rights reserved.

WITH DATA GENERAL, YOU WON'T BE A PRISONER OF YOUR IN-BOX.

DATA GENERAL INTEGRATED OFFICE AUTOMATION

Burying information under a ton of mail at the bottom of your in-box is not the best way to get it when it's critical to a decision.

ELECTRONIC MAIL

With Data General's CEO® Comprehensive Electronic Office, information is delivered electronically. Instantly. Unerringly.

But that's only the beginning.

TOTAL OFFICE AUTOMATION

The CEO system automates just about everything in your office. CEO electronic filing files the way you do. Its electronic calendar keeps tabs on trips, appointments, and meetings—even confirming them all.

Of course, CEO includes easy-to-use word processing. And all this is integrated with data processing for total decision support.

DON'T DUMP YOUR EXISTING EQUIPMENT

Best of all, instead of having to dump your existing equipment to automate your office, you can build the CEO system around it.

Because it not only ties in with other Data General computers, but it also ties in with the most widely-used mainframe and word processor.

Instead of just a series of personal computers, each CEO workstation becomes part of a global network, with access to data from IBM mainframes.

AS LITTLE AS $5,000 A WORKSTATION

And with the CEO system, the cost per workstation can be as low as $5,000, depending on application.

CALL NOW

For more information on office automation that's a generation ahead, call: **1-800-554-4343, Operator 05A** or write Data General, M.S. CEO 05A, 4400 Computer Drive, Westboro, MA 01580.

Data General
a Generation ahead.

Copyright 1983 Data General Corporation, Westboro MA CEO is a registered trademark of Data General Corporation

COMMUNICATIONS

AUXILIARY from page 82

RAPICOM, INC.
CCITT Group 3

Rapicom, Inc. has introduced the 5000 microprocessor-controlled CCITT Group 3 facsimile device, which provides a built-in 9,600 bit/sec step-down modem for a document transmission speed of 15 sec/page.

The product is a desktop digital facsimile transceiver that incorporates automatic broadcast functions via programmable memory.

Some features include memory storage of up to 100 telephone numbers for autodialing; an assigned three-digit code for accessing stored telephone numbers; and a redialing sequence if a remote terminal fails to accept a telephone call from the transmitting facility, the vendor said. The price is $6,200.

Rapicom, 7 Kingsbridge Road, Fairfield, N.J 07006.

DATA SWITCH CORP.
Model 600

Data Switch Corp. has introduced the Model 600 data processing switch designed for the one- or two-IBM or compatible CPU environment.

The Model 600 handles data throughput speeds of up to 8M byte/sec and supports data streaming. Synchronous switching allows switching onto and off of an active channel without interrupting CPU operations, the vendor said.

All equipment interconnections are displayed on the Model 600 control panel. Key-and-lock security is provided to prevent unauthorized configuration changes. The product also has a diagnostic display and built-in signal generator for monitoring signals passing through attached channels, according to the vendor. Its price is $25,700.

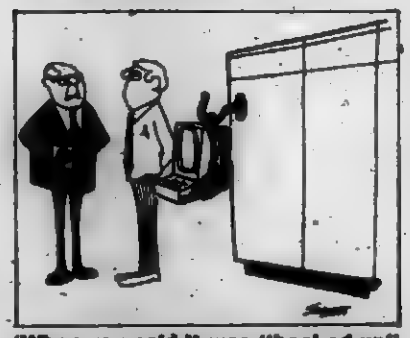
Data Switch, 444 Westport Ave., Norwalk, Conn. 06851.

WICAT SYSTEMS, INC.
ICI board

Wicat Systems, Inc. has announced an intelligent communications interface (ICI) board for use with the company's multibus product line (Systems 150, 155 and 169).

The ICI board features a local Motorola, Inc. 68000 processor dedicated to handling character I/O and contains 16K bytes of random-access memory for local program and data storage. It can support a maximum of eight RS-232 asynchronous I/O ports and performs data I/O at 9,600 bit/sec on all ports simultaneously, the vendor said. Prices range from $1,295 to $2,870.

Wicat Systems, P.O. Box 539, 1875 South State, Orem, Utah 84057.



"When you said it was "hooked up" to the mainframe, I thought you meant . . .

ADVANCED SYSTEMS CONCEPTS, INC.
AMI

Advanced Systems Concepts, Inc. has announced the AMI set of devices that allow from eight to 32 RS-232 data lines on a demand basis to transmit to one RS-232 output port.

The units can be used with bar code readers, optical character readers, hand-held terminals, word processing workstations or production line monitors.

Units simultaneously monitor all input lines. Transmission is bidirectional, and rates from 150 to 19.2K bit/sec are supported, the vendor said. Prices range from $1,843 to $2,643.

Advanced Systems Concepts, 385 N. Lake Ave., Pasadena, Calif. 91101.

Alaskanet now operational

ANCHORAGE, Alaska — Alaskanet, the first Alaska-based public packet data communications network, became operational in early January.

Supplied by Tymnet, Inc., the $2 million network provides statewide access through sites in Anchorage, Fairbanks, Juneau and Prudhoe Bay. An additional location in Seattle gives direct access from the 48 continental states.

Alaskanet is owned by Alascom, the operator of telecommunications services in Alaska. It was installed in seven months and consists of 17 interconnected nodes.

The network nodes provide host computer and terminal interfaces, switching, data flow and error control, user access and routing, remote monitoring and control and the recording of accounting information and other functions.

The primary "supervisor," a computer that selects the most efficient path from data source to destination, together with the network monitor and control system make up the network control center in Anchorage. A backup supervisor is located in Fairbanks. The system includes a remote monitor, control-diagnostic capabilities of the node and modem systems and 24-hour staffing at the control facility.

How to load your 38 for maximum MRP performance

Not many System/38 users know how. Perhaps you already found that out by using another system. If this is your first time, check out the features that are important to you. Our users enjoy the benefits of a closed-loop MRP II system that allows direct access for anyone to all the information stored. We have a query facility that lets you generate user reports. And we utilize an advanced data base architecture which increases programmer productivity, making changes needed for expansion simple and economical. We even have a PC link which lets you transfer information to your IBM Personal Computer for interaction with popular planning micro products such as 1-2-3® from Lotus.®

Loaded with RMS/38 the potent IBM System/38 can make your business hum with the precision these economic times demand. Loaded with anything else you may have to settle for second best. In the fiercely competitive arena for manufacturing management efficiency, where survival depends on increased productivity—and profits—the software system you use can spell the difference between satisfaction or frustration, maybe even success or failure.

Only RMS/38 has 15 powerful applications to provide you with all the ammunition you'll ever need for total control: Control not only of manufacturing but all those vital support functions as well, including distribution and finance. Total software...RMS/38!

Reduce inventory; eliminate parts shortages: acquire time for skillful buying; schedule production based on demand, not parts availability; determine whether to buy or build needed components; improve part number, inventory, and routing accuracy; and order in time for delivery on time. You can with RMS/38.

If your present MRP system, whether manual or automated, represents something less than a total integration of business and manufacturing systems; if it doesn't offer the distribution and financial support of closed-loop MRP II; if it doesn't offer you control in an unpredictable environment, then maybe it's time you investigated the building block software of RMS/38.

For a free demonstration or more information, contact PCR, Professional Computer Resources, 2021 Midwest Road, Oak Brook, IL 60521 (near Chicago). Also in New York, San Francisco and Los Angeles.

1-2-3® is a trademark of Lotus Development Corporation

pcr
ALL THE SOFTWARE YOU'LL EVER NEED.
312/932-2200

Since you'll be spending millions of dollars per month on data communications networks, you want all the information you can get. Right?

Here's how to get it.

Just wait for your February 27th issue of **Computerworld.** Then read the special report on Data Communications Networks from cover to cover. You'll get it all:

- *Local area networks*
- *public packet-switched networks*
- *private branch exchange (PBX) networks*
- *teleconferencing networks*
- *satellite networks*
- *CATV networks*
- *videotext and facsimile networks*
- *voice/data network integration*

You'll get tutorials — bylined opinion/analysis pieces by experts in the field on the use of networks and the future of the networking industry. You'll get case studies of how companies have used specific networks to solve specific business communications problems. And you'll get information on lots more — with articles on everything from microwave links to how AT&T's divestiture will affect voice/data networks.

If you spend — or are planning to spend — millions on data communications networks, then you can't afford to miss the February 27th special report on Data Communications Networks in **Computerworld.**

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

And, if you've got product or service ads that will help our readers make informed choices for 1984 — then you need to get your ad to us by February 10th. To reserve space in the February 27th issue, call one of the sales offices listed below, or call Ed Marecki, National Sales Director.

To: Ed Marecki, *National Sales Director*
CW Communications/Inc., Box 880, Framingham, MA 01701
☐ *Please send me advertising information for Computerworld.*
☐ *Please have a sales representative call me.*

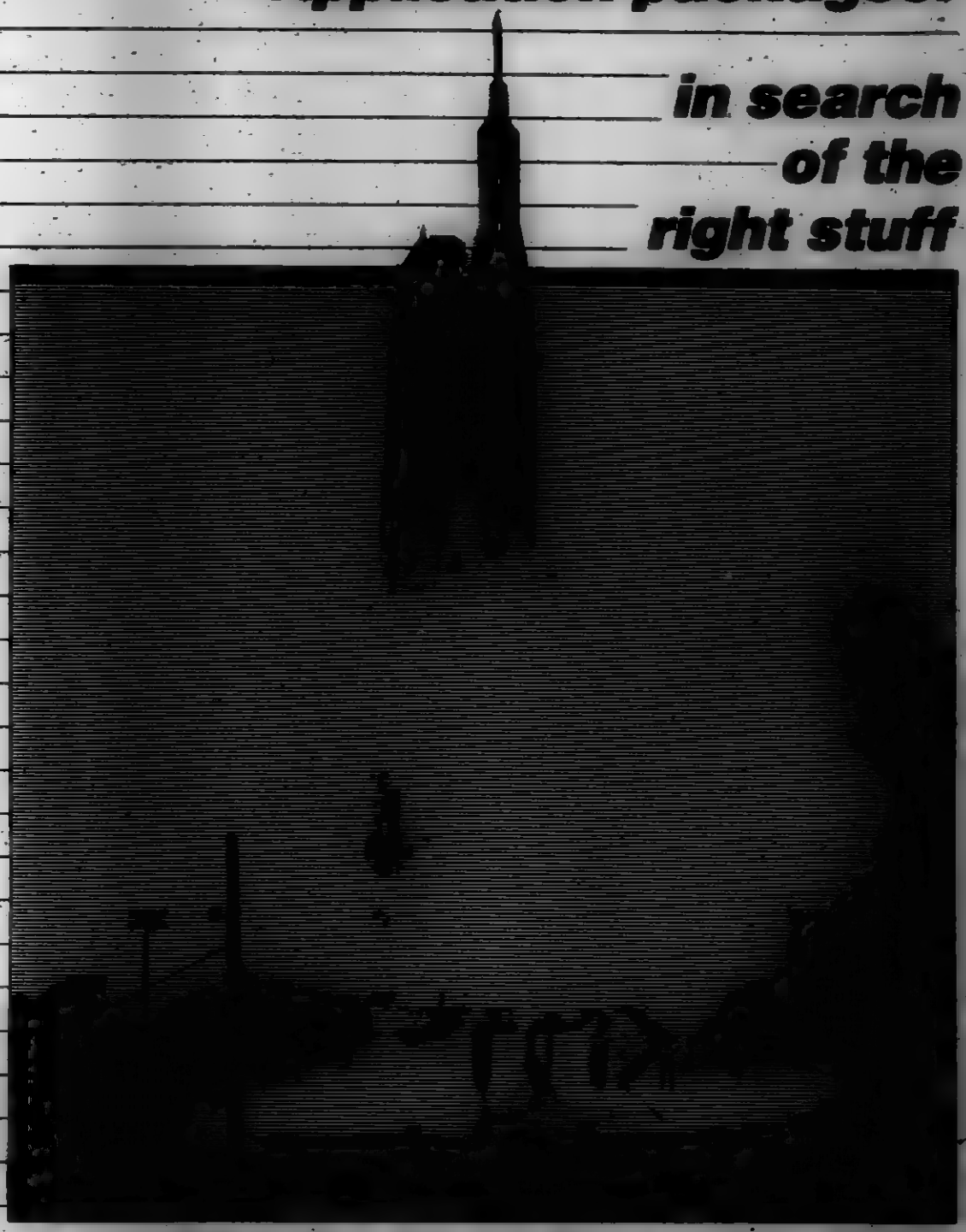
Name _____
Title _____
Company _____
Address _____
City _____ State _____ Zip _____
Telephone _____
CW 2/10

Sales Offices
BOSTON/Chris Lee, Jayne Donovan, Michael Kelleher, Ron Mastro, Jim McClure, Alice Longley *(617) 879-0700* • **CHICAGO**/Art Kossack, Chris Lee, Jean Broderick *(312) 827-4433* • **NEW YORK**/Mike Masters, Doug Cheney, Ray Corbin, Joan Daly, Fred LoSapio, Gale M. Paterno *(201) 967-1350* **ATLANTA**/Jeffrey Melnick, Mike Masters *(404) 394-0758* • **SAN FRANCISCO**/Bill Healey, Ernie Chamberlain, Theodora Franson, Barry Milione, Nicole Boothman (recruitment) *(415) 421-7330* • **LOS ANGELES**/Bernie Hockswender, Bob Hubbard, Bill Healey (714) 261-1230

SPECIAL REPORT

Application packages:

in search of the right stuff



Edited by John Gallant and Paul Gillin

January 30, 1984

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

SPECIAL REPORT

Avoiding the 'package trap': caution advised

By Howard Lee Bloom
and Richard Schneider
Special to CW

A lot has been written lately about the advantages of using packaged application software. Unfortunately, not enough attention has been given to the problems inherent in applying a generalized application design to a specific organization's unique set of objectives and constraints.

The "package trap" is the idea that the package itself solves the business problem. Its greatest danger is that once an application has been identified as amenable to a package-based solution, too little emphasis will be put on the analysis of the business problems that dictate the need for the system. Some symptoms of the package trap are:

- Users who are not willing to commit time on the front end to discuss their business problems.
- Unwillingness of management information systems staff to discuss the functionality of existing systems to be replaced by the new system and/or those with which it will interface.
- Users, in general, who do not really want to know how the package works.

Adaptations must be made to the systems development life cycle to facilitate a package-based solution. Some of the ideas expressed here are broadly applicable to all package-based implementations, while some are more narrowly focused on those systems that require a significant amount of package customization.

The first and probably most important step is to select a project team whose members have previously implemented large-scale application packages. The team can be nearly invaluable, particularly if the system requires a significant degree of customization.

Another benefit of using people with specific package experience is their knowledge of the vendor's support organization and the degree and kind of technical support the vendor is able to provide.

During the project's concept definition phase, the recognition and understanding of the business problem is paramount. Guard against "analysis on the periphery," where analysis is only performed on those business functions that appear to be outside the functionality of the package. Recognize that with a less-than-complete understanding of the business purpose of the system, any subsequent need for increased or modified functionality will prove difficult to implement.

'The "package trap" is the idea that the package itself solves the business problem. Its greatest danger is that once an application has been identified as amenable to a package-based solution, too little emphasis will be put on the analysis of the business problems that dictate the need for the system.'

It is never too early in the project to begin the fight against describing the package as a "black box." This syndrome holds that the user puts data into the package and gets results out — how the package works is of no importance. In a situation in which some customization is necessary, the black box approach immediately falls apart. How can a package be modified to accommodate a business function outside the package's scope if the package's structure is not analyzed and understood?

Even beyond the consideration of package modifications in the near term, it is important to look at the package as the basis of future system enhancements. The user must understand what functionality the system will support immediately and what functions the system may be modified to support in the future. The user must also recognize that the relative difficulty of accommodating new features will depend heavily on the package's technical architecture.

One significant opportunity presented by a package-based implementation is the ability to get some software up almost immediately. The vendor's "vanilla" software should be installed as soon as possible on the user's equipment. Once in place, this baseline software can be used to perform a wide array of functions, from modeling the production environment for hardware and communications analyses to prototyping user interfaces.

A corollary benefit of installing the package sooner is that it may be tested sooner. Do not assume that since a particular piece of software is in operation at several sites it will not contain bugs or undocumented features. A healthy dose of skepticism pays dividends. Develop a set of representative test data, and subject the "vanilla" package to thorough testing.

Structure the project's development plan so as to keep the software vendor off the critical path. Experience shows that vendors often cannot respond to subtle software problems without significant lead time. You also cannot rely on the vendor to describe the business implications of his software architecture. The project team members with previous experience with the vendor's package will be the best insurance against mismatches here.

When designing modifications and enhancements to software packages, there are a few subtleties to keep in mind. To achieve the true cost/benefit of a package-based application, efforts should be made to minimize the amount of modification. This approach will frequently require the user to choose between restructuring existing procedures to work with the package and customizing the package to work with existing procedures. Your efforts will be rewarded with substantially reduced development risk and long-term reliability and maintainability. During the system design phase, provision should be made for the way in which future vendor releases will be incorporated into the system.

Extensive testing is just as necessary for package-based applications as for custom systems. While the classic unit- or module-level test is not truly applicable to unchanged portions of the software package, it is appropriate for modules containing new or modified code. Consequently, a test plan should be developed during the system design phase which addresses the modular design of the new system as well as the business function it is meant to serve. It is crucial that the user participate heavily in all phases of testing.

Generally, vendor-supplied packages come equipped with some manner of user-oriented documentation. Significant savings may be achieved by incorporating that documentation into the system's user manual.

Structured walk-throughs are also a necessity; even more so when they address modifications to the package. These design walk-throughs should include not only the project development team, but also the system's immediate users and those in the DP organization who will be charged with maintaining the new system. Accelerate the development of modules that are to interface with existing systems.

Because it is prudent to keep the vendor and his product support staff off the project's critical path, it is also important to establish an error-analysis approach that exhausts all other possible sources for an error before turning to the vendor.

Bloom is a senior principal and Schneider is a principal with American Management Systems, Inc., in Arlington, Va.

INSIDE

Avoiding the 'package trap': caution advised/SR2
Analyze needs before selecting packages/SR3
Applications shopping: Don't buy until it fits/SR4
Don't expect magic from packaged software/SR5
Application myths hinder implementation/SR7
Use business sense when evaluating packages/SR8
System helps valve maker control inventory/SR10
System spices up restaurant's info exchange/SR12
Single-vendor purchases can lead to horror stories/SR13
Package implementation commands planning/SR15
Poor training renders packages worthless/SR16
Tool lets insurer cancel costly time-sharing/SR18
Prototyping slashes insurance firm's backlog/SR23
System tracks utility's construction needs/SR24
Tips on shopping for software/SR21
Fuel parts maker speeds operations via MRP/SR32
Hasty hardware decision plagues furniture firm/SR33
In-house system cuts number-crunchers' costs/SR37
System integrates payroll, personnel duties for city/SR40
System helps resolve DPer, end-user woes/SR43
How do you choose a personnel system?/SR45
Systems methodology wraps up the package/SR46
MRP software study/SR47
Tips for automating the general ledger/SR48
Package helps GTSI team grab Nasa contract/SR51
CBT maximizes railroad's end-user training/SR52
A view of the claims processing spectrum/SR53
Programmer's tool kit eases maintenance ills/SR56
Financial package increases user control/SR58
On-line system keeps subcontractors in check/SR59
Detailed evaluation key to package selection/SR60
Risks of custom-designed tools cataloged/SR62
Retail chain joins DP, financial operations/SR64
General ledger helps company pick up pace/SR66
Library use up 10% with on-line system/SR68
Firm handles decentralization with EMS/SR70

SPECIAL REPORT

Analyze needs before selecting packages

Requirements analysis valuable to modeling business functions

By A. E. Popek
Special to CW

Correctly defining and analyzing current and future business requirements is the best way to identify, select and implement application software packages effectively.

Although requirements analysis technology has been used traditionally for system and application development, the technology's methods for modeling business functions and data requirements are equally valuable for identifying or evaluating application software solutions.

Unfortunately, in many cases, packages are purchased to solve symptoms of much greater, unrecognized business problems. Data processing departments are now finding it necessary to follow a disciplined set of analytical procedures before and during the selection process. This procedure should include analyzing the functional and informational requirements that the package will address, identifying available packages that suit these needs, comparing the packages' capabilities with the defined requirements, identifying the costs for modifying the best-suited software, if necessary, and comparing the software's benefits to its cost.

The goal of requirements analysis is to create guidelines. These are derived by analyzing both the business area needing a solution and the application software candidates. The results of this analysis process can be used to compare the ability of the packaged software to solve the problem at hand. The guidelines also can be used to form an information base for computer applications solutions not yet existing.

The data processing department should begin to determine business requirements by conducting a systematic series of interviews with users. Following extensive interviewing, six tools can be used to model and analyze the functional and data requirements. These tools include global and detailed hierarchical models, information flow diagrams, a function/data matrix, data structure diagrams and a relational model.

Each model and each diagram builds on the analysis conducted with the previous model. The new models, created in proper sequence, verify the accuracy of previous models.

The first step in this analysis process is to create a hierarchical model that represents an overview of the business area or software package being studied. The hierarchical model reduces the area being studied to the functions it performs and depicts these functions graphically.

For example, in analyzing a warehouse's processes, the functions associated with buying parts and tracking vendors are organized graphically with the subfunctions of each process listed in a hierarchical model (Figure 1).

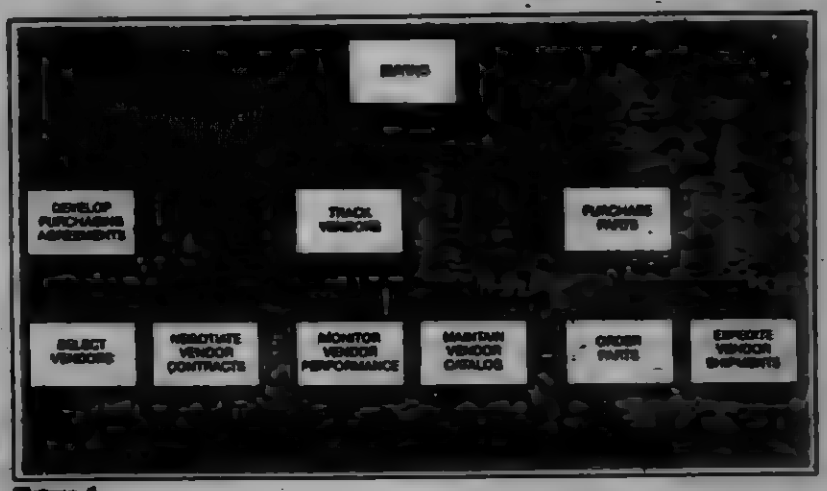


Figure 1

'The goal of requirements analysis is to create guidelines. These are derived by analyzing both the business area needing a solution and the application software candidates. The results of this analysis process can be used to compare the ability of the packaged software to solve the problem at hand.'

The functional components described in the hierarchical model are now used to create an information flow diagram. The information flow diagram graphically illustrates the relationships between business functions, the information, materials and data these functions use and internal and outside agents affecting that information.

For example, in purchasing parts, a purchase order for a vendor is one piece of information. The vendor order file is listed as an information stock. An information flow diagram graphically labels the function and stores it and both inside and outside agents to show the flow of information among them.

The information flow diagram is also useful in describing the relationship between the functions that computer applications should support and the information used by the functions to generate outputs. Guidelines for evaluating software packages can thus be established.

The requirements analysis process includes detailed steps for analyzing the models and diagrams once they are created. This procedure includes checking for problem areas such as functional overlapping and informational bottlenecks. If a problem is found in a diagram or model, the correction is then incorporated into all previous models.

Next, the information in the first two models is summarized in the function/data matrix that shows how each function creates or uses the identified data (Figure 2). For example, in analyzing the buying model, taking orders creates a customer order document, while answering customer inquiries uses this customer order document. In a correctly organized business, if a function creates data, another should use it. If there is a different situation, this is a sign that a problem exists.

To understand further the operation of a function, the detailed hierarchical model selects one functional component and reduces that to detailed procedures, events, conditions and decisions associated with that activity.

For example, to order parts, all the processes associated with this activity, such as getting parts for reordering, setting shipping instructions and filing purchasing orders, are represented in a hierarchical model. This detailed activity model thus creates precise specifications that can be used as criteria for comparing available software.

To take a more detailed look at the information the functions use, the data structure diagram takes actual data items, such as a vendor purchase order, and describes all their contents, such as vendor name, buyer name, purchase order number and purchase order date. As with the detailed activity model, this information is then depicted in a hierarchical model.

These data structure diagrams are then used to form a relational model, which is organized in table form. A relational model, such as one for all vendor information, consists of information that relates to each data item and illustrates the relationships between this data.

In application development projects, these detail-level models are a prerequisite for computer application design and, therefore, serve as an effective comparison tool. They also provide a base for sharing data between applications.

Once this modeling and analysis procedure is completed, a business in search of an appropriate software package knows exactly what functions the software must satisfy, what data is involved, how those functions relate to the data and how that data relates to other data within the business. In a broader sense, the business knows more about itself, about its problems and about how an application package can both help with those problems and operate with other existing computerized applications.

After the appropriate software candidates have been chosen, they are analyzed again using the same procedures. The specific requirements that each satisfies now can be compared and the best candidates chosen. The cost of modification is also calculated if that application package cannot solve all the problems in a designated area.

Developing an application software solution is greatly simplified using the technique of analyzing the business according to its detailed functional and informational needs. On the other hand, a business may discover after completing this comprehensive requirements analysis that a computerized solution is not necessary and that the problem can be rectified by other means.

Popek is executive vice-president of Technology Information Products Corp.

FUNCTION/DATA CLASS MATRIX FOR SALES AND BUYING BUSINESSES

FUNCTIONS \ DATA CLASSES	CUSTOMER ORDERS	CUSTOMER INQUIRIES	PRODUCT SPECIFICATION	TECHNICAL ADVERTISING	VENDOR PERFORMANCE	VENDOR CONTRACTS	VENDOR ORDERS	CATALOG	CUSTOMER ACCOUNTS	PART DEMAND	PART REQUISITIONS	VENDOR SHIPMENTS
TAKE ORDERS	C							U	U			
ANSWER CUSTOMER INQUIRIES	U	C						U				
INFORM CUSTOMER ABOUT PRODUCTS			C									
ANSWER TECHNICAL INQUIRIES		U	U					U				
ARRANGE TECHNICAL ADVERTISING			U	C								
MONITOR VENDOR PERFORMANCE					C		U					U
SELECT VENDORS			U		U	C		U		U		
NEGOTIATE VENDOR CONTRACTS						C				U		
ORDER PARTS						U	C	U			U	U
EXPEDITE VENDOR SHIPMENTS							U					
MAINTAIN CATALOG						U		C				

C—CREATES U—USES

Figure 2

SPECIAL REPORT

Applications shopping: Don't buy until it fits

Software should enhance, not revamp, operations

By Harvey H. Boyle
Special to CW!

When you are in the market for software, it seems that everywhere you turn you are barraged with advertisements.

The trade magazines are full of them; professional newsletters abound with new product releases; your mailbox is overflowing with unsolicited advertisements; and salesmen call you on the telephone to convince you of the merits of software you have never heard of and will probably never use. How do you wade through the reams of material available to come up with the software package most suitable to your application?

Researching software packages can be a time-consuming project that could ultimately wear you down to the point of accepting a package that only slightly resembles your original specifications. More than one highly competent decision maker has been reduced to babbling-idiot status after spending time in the software maze.

The main concept behind computerizing a specific area of your operation is to take advantage of the speed and efficiency the computer can provide.

Even the best package on the market is not going to improve a sloppy or misdirected procedure. Only you are capable of doing that. Prepackaged or off-the-shelf software should enhance your current operational procedures.

It should not cause you to revamp an entire department to fit the program more readily. If your current way of doing things is working well, don't stop searching until you find a software package capable of complementing your everyday business transactions.

Software-hardware compatibility

Keep in mind from the start that not all software is compatible with all hardware. This point alone could save you hours of valuable time. To begin, find out if the product that caught your eye is going to run on your present hardware system.

Next, find out how many packages have been sold and installed to date. Most new programs inevitably contain some bugs, so you are usually better off with a time-tested package. Ask for customers' names and phone numbers, and talk to these users. No one is going to give you a better idea of how the software actually works in a real-life situation, and no one is going to tell you more honestly about support, enhancements and overall performance. If you are refused access to present customers, keep looking.

Third, take a careful look at the documentation. If it in any way resembles instructions to the astronauts from National Aeronautics and Space Administration Control, change your mind about the package, unless the end users of the system thrive on highly technical jargon. Never be embarrassed by the fact that you do not understand the documentation.

It is the software vendor's responsibility to provide you with clear, concise and easy-to-understand directions. Don't let your lack of technical expertise be intimidating. Rather, demand documentation that accommodates all levels of computer understanding.

As more and more users voice their displeasure over documentation written for electronics engineers and computer science graduates, more vendors will finally admit that what has been done in the past is no longer acceptable. The price of your software program must include helpful, easy-to-use documentation, or you can eliminate another package from the pack.

Many software packages are available with enhancements at little or no cost to the user. If you are looking at one of them, make sure you have a clear understanding of what type of change is included in the price. Once you deviate from this standard, the cost to you can skyrocket. Before you buy, find out exactly what constitutes an enhancement vs. a more costly modification.

Source code availability

Will the software package you are considering provide you with the source code, or at least the file structure, so that minor changes can be handled by your technical people? If the source code is not provided, can it be purchased separately? Is there any software maintenance contract required, or is free customer support included on an ongoing basis? Is training necessary and if so, where is the training to take place. Who pays for the cost of training — is it included in the price?

If you are looking at one or more software packages and hoping to tie one to another, as is often the case with word processing packages, will they interface with one another? Can interface compatibility be designed by one of the vendors. How much will it cost?

Only by answering these questions can you find the solution to your specific software problems.

Boyle is a marketing representative for Whelan Associates, Inc., a computer systems consulting firm located in Spring House, Pa.

See Why Crwth Leads End User Training

1. COMPLETE CURRICULUM

Offering the only full curriculum of CBT courses for the End User, Crwth's product line ranges from computer literacy through fourth generation language courses. Crwth supports their material with continual updates and is backed by a knowledgeable team of professionals.

2. AUTHORED BY GARY DeWARD BROWN

Crwth provides the most experienced writing staff in the industry. Gary DeWard Brown, whose books include System/370 JCL, Beyond COBOL, and Surviving with Financial Application Packages, directs the Crwth writing staff and authors many of the courses.

3. SATISFACTION GUARANTEED

Crwth offers all its courses on a FREE TRIAL basis. Crwth is happy to make this guaranteed satisfaction offer because of confidence in their product. Each new course is tested extensively before it is made available to the public. If you are not 100% satisfied, just return to Crwth—NO CHARGE.

4. THE INFORMATION CENTER PEOPLE

As the Info Center has grown from concept to reality, Crwth has been there with support, guidance and quality courseware. Facilitating this phenomenal growth with computer based training, Crwth has earned its nickname—The Information Center People.

5. QUARTERLY NEWSLETTER

Crwth offers a FREE subscription to their quarterly industry newsletter upon request. The first quarter 1984 issue features a national survey of the current status of the Information Center.

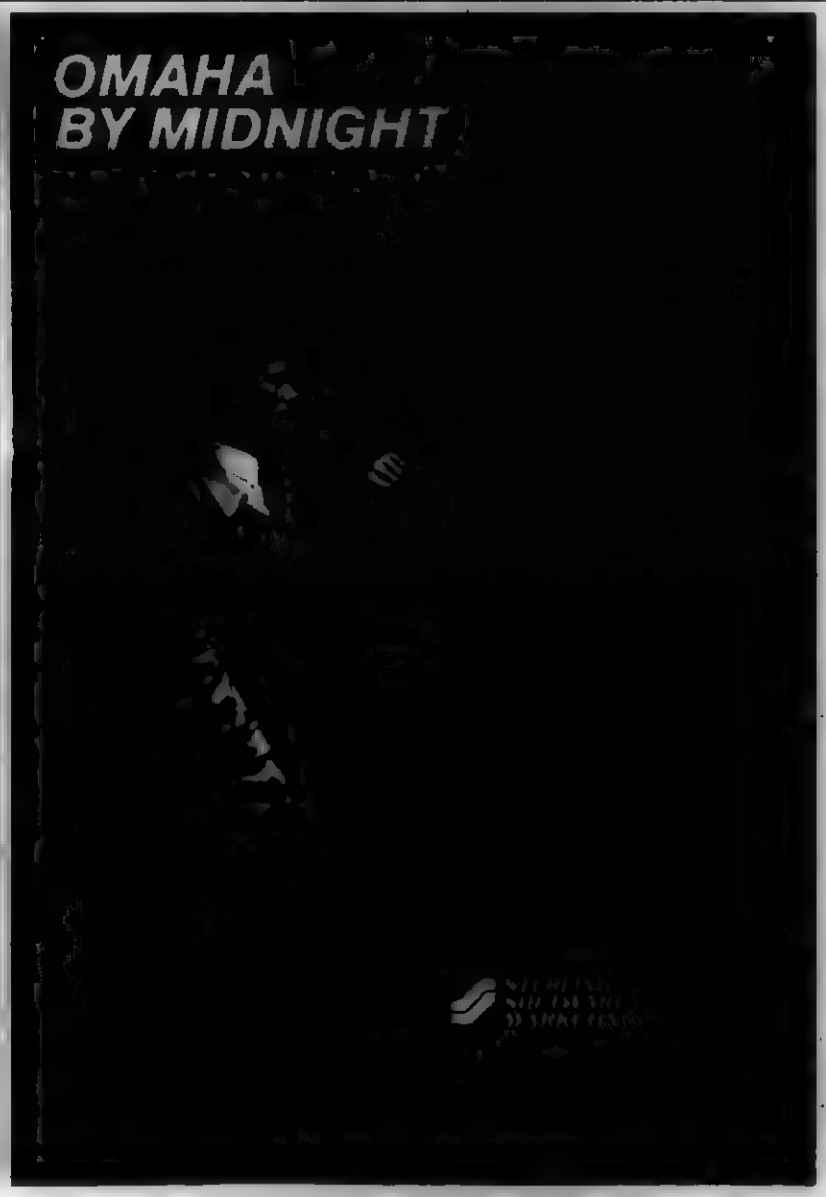
6. TOLL-FREE ASSISTANCE

Crwth realizes that questions arise when an immediate response is important. Their Info Center experts are just a toll-free phone call away.

800-282-2372
INSIDE CALIFORNIA 213-391-6788
CALL FOR A COMPLETE CATALOG!

CRWTH
The Information Center People

Please send me your CBT course information!
COMPANY _____
NAME _____ TITLE _____
ADDRESS _____
CITY _____ STATE _____ ZIP _____
Crwth Computer Courseware · 613 Wilshire Blvd. #200 · Santa Monica, CA 90401



10,000 CICS Users Said There Had To Be A Better Way . . .

We Gave Them GENER/OL™

Feature for unique feature, GENER/OL is the leader in on-line CICS applications development. This 5-star performer channels on-line technology for maximum productivity, efficiency, and flexibility.

Complete with award-winning documentation and responsive support, GENER/OL offers uncommon software productivity in the Pansophic tradition.

Call us today for the performance of a lifetime!

PANSOPHIC®

(800) 323-7335

Pansophic Systems, Inc., 709 Enterprise Drive, Oak Brook, Illinois 60521. In Illinois, call (312) 986-6000.

SPECIAL REPORT

Don't expect magic from packaged software

By John R. Wiek
Special to CW3

Applications packages have overcome one bad reputation — the not-invented-here syndrome — only to get another bad rap: Sometimes they fail, and worse. Sometimes they fail and use up a lot of time, money and people in the process.

There are many reasons for the failure of package solutions, but the reasons boil down to one simple truth: Packages are sometimes used to relieve an organization of its responsibility to do some aspect of the job of implementing an information system. But packages are not magic; they do not implement themselves, and they are not free from problems.

Many organizations find that applications packages are a valid solution to their information processing needs.

However, packages are not a panacea for the array of data processing problems to which they're often applied, such as multiple-year applications backlogs, shortages of skilled developers, long development lead times and the high cost of in-house development.

The following rules may help you avoid many of the mistakes and false assumptions that organizations make when choosing an applications package.

Analyze problem

Don't decide to buy a package until the problem has been analyzed. If you haven't gone through the analysis phase of the development cycle, how do you really know what kind of application needs to be developed? You can't solve any problem effectively until you know what problem you're solving.

There is a corollary to this rule: Don't assume the package vendor has done the analysis for you. It can be very comforting to think that the vendor has analyzed the problem. How else could the package have been created?

But the vendor has not analyzed *your* organization. You must answer these important operational questions: What procedures do you follow? How do you intend to modify them? What data do you use to operate your business? How do you define that data? You must know the answers if you are to make a good decision on which, if any, package is appropriate.

Make vs. buy

After this phase has been completed, you are ready to perform a make-vs.-buy analysis, and a third rule comes into play. Don't decide which package to buy until you are sure you need a package.

All too often a premature decision to buy a package is coupled with a decision to buy a specific package.

Consider all options, and perform a complete make-vs.-buy analysis, which will result in two decisions: That buying a package is either better or worse than in-house development and that, if buying is better, a specific package is better than the others and should be selected.

Wrong package

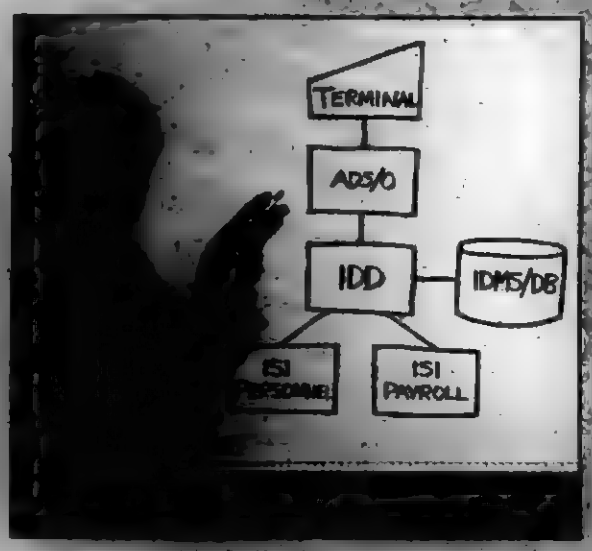
Don't assume a package will take less time, cost less money or require fewer resources. The wrong package, applied to the wrong problem, can waste enormous amounts of time and cost huge sums of money. Applications vendors can present any number of horror stories in which companies spend enormous sums of money and extended periods of time trying to implement the wrong package.

Also, don't assume buying a package relieves you of the responsibility to learn an application. Package acquisition is often viewed as a way

See ANALYSIS SR/8

No waiting.
No kidding.

"Today we are installing the industry's only native IDMS Payroll/Personnel System using ADS/O."
Bob Tinnon, IST Vice President of Product Management



Finally. The one and only completely native IDMS human resource solution. All of the dialogue screens, schemas and files reside on IDD. The entire on-line system has been developed using ADS/O exclusively. And there are no interface programs.

Now, you can receive it. Just like Ford Motor Company, Harvard University, TRW-ESL, Fluor Engineers, Inc. and the City University of New York. And these are many more.

We have the industry's most advanced system architecture. We offer more on-line (real-time) payroll/personnel expertise than any other vendor. We deliver the best system documentation in the business. We're committed to customer service and we're ready and willing to be on-site to help clients with any aspect of their installation. In addition to IDMS, our products run under IMS, NATURAL/ADABAS, CICS/VSAM and others. We'll be glad to tell you more. Just call.

Setting the standards for excellence.

INTEGRAL SYSTEMS INC.

165 Lennon Lane, Walnut Creek, California 94598
In the U.S. call toll-free 800-824-8199, in California 800-824-8198, locally and in Canada (415) 939-3900.

Sales and support offices located throughout North America.

SPECIAL REPORT

Application myths hinder implemention

By Ravi Nayar,
Gary Silvera and John Ward
Special to CW

In recent years, organizations have frequently turned to packaged software as a solution to their business systems needs, and industry experts predict this trend will continue well into the future.

While packaged software may offer significant benefits over custom-developed systems, organizations frequently encounter unique types of implementation challenges. The following are 10 common myths that have often hindered the implementation of packaged software.

Myth No. 1: Detailed implementation planning is a waste of time.

Organizations justify this belief by asserting that planning is unnecessary since the programs are already written. This is simply not true. Although the programs are written, all other tasks normally associated with systems development and implementation remain.

Further, the package implementation plan should be developed as more than just a checklist. It should include tasks, measurable goals, responsibilities and due dates. The implementation plan assists in measuring progress and is especially useful when specific tasks are not completed on time and revised target dates need to be established.

Myth No. 2: Support provided by the vendor will be sufficient to implement the system within the required time frame.

Vendors generally support their products well. However, unless the organization has contracted for a complete solution, where the vendor performs all aspects of systems implementation, the responsibility for implementing a successful system rests with the customer. This result cannot be achieved solely with vendor support because most vendors simply do not maintain the resources to support numerous implementations. User and DP involvement are required elements for a successful package implementation.

Myth No. 3: Since the programs are already written, nothing can go wrong.

Because packaged programs are usually written with optional features, everything can go wrong. Thus, many decisions must be made regarding utilization of these optional features. These decisions include developing classification schemes, reporting relationships, using report writers and screen generators, processing options, processing error rejections and ensuring security. User procedures should also be developed. The conversion effort itself involves many key elements, including building or converting files and developing data processing operating procedures.

Myth No. 4: If the package doesn't fit, modify it.

Before any decision is made to modify the package code, the organization should first determine whether the modification is truly necessary or is not implemented merely to install a nice feature that the old system happened to provide. If it is determined that a particular feature is required and would satisfy a legitimate business need, two alternatives to modifying the package should first be considered.

First, attempt to effect the modification through manipulation of the package's parameters and switches. Most packages have been designed to incorporate considerable flexibility through parameters, tables, switches and tools such as report writers and screen generators. If the requirements cannot be met with this approach, then consider a front-end or back-end approach as an alternative. This involves developing programs to perform the needed function external to the software package. The custom-developed programs either feed data to the software package or extract data from the software package.

Myth No. 5: Since a computer will be used, the DP department must be responsible for the project.

While active participation by the DP department is important, user involvement is more important. The user must feel comfortable with the package and all the related implementation decisions, because, in the final analysis, the package will become the user's system.

Myth No. 6: Since the programs are already written, only junior-level personnel need be assigned to the implementation project.

Junior-level personnel may be least suited for the implementation project. Typically these packages perform functions critical to the successful operation of the organization. Thus, decisions made throughout a package implementation will affect the way the business operates well into the future. It is important that supervisory-level personnel be actively involved throughout the implementation.

Myth No. 7: A project manager is not necessary.

A project manager, preferably from the user side, is an essential in-

See MYTH SR/8

We just made WORD-11 a native of VAX.

That's right. At Data Processing Design, we've just upgraded our popular WORD-11™ word processing package for DEC™ systems to native mode for VAX.™

Now users of DEC systems can enjoy even faster, more efficient operation. The Version 3.0 WORD-11 package provides easier, expanded system management, and supports new output devices—including laser printers.

By converting WORD-11 from Macro-11™ to full native Macro-32™ mode, we increased its efficiency and made it possible for you to optimize your system resources.

There are more enhancements, too. The new package includes scientific character set support for VT100™ terminals and the Diablo 630 ECS™ printer. Journaling. Military-style paragraph numbering to extend the existing standard outline paragraph numbering system. An advanced system management utility. And support for the Xerox 2700™ laser printer.

And, of course, Version 3.0 still has all the features that over 1500 computer installations worldwide depend on. Such as list processing, built-in dictionaries, automatic table of contents and footnoting, grammatical editing keys, and more.

For more information about WORD-11 Version 3.0, contact us at DPD. We'll be happy to provide complete details.

And point out the benefits of going native.

dpd Data Processing Design, Inc.

AUTHORIZED [redacted] COMPUTER CORPORATION

CORPORATE OFFICE
1400 North Brasher [redacted]
Anaheim, CA 92807
(714) 970-1515

NY OFFICE
420 Lexington Avenue, Suite 633
New York, NY 10170
(212) 687-0104

WASHINGTON D.C. OFFICE
4520 East-West Highway, Suite 550
Bethesda, MD 20814
(301) 657-4096

WORD-11 is a trademark of Data Processing Design, Inc.
DEC, VAX, Macro-11, Macro-32 and VT100 are trademarks of Digital Equipment Corporation.
Diablo, 630, Xerox® and 2700 are trademarks of Xerox Corporation.

ANALYSIS from SR/6

to cope with an inexperienced DP staff. Successful package implementation requires DP expertise in the applications area on how the package works and how it meets the needs of the organization.

Buying a package sometimes aggravates the problem of applications knowledge. You must not only learn how the organization works in the analysis phase, but also how the package works and how it can be adapted to the organization.

The problem of adaptation raises another issue. Don't over-modify a package. If you have to make significant changes to a package, it's probably the wrong package. Try to find a package that doesn't need to be heavily modified to meet your needs. Over-modification has many problems, including the cost of the modifications. Make sure you take this into account in your make-vs.-buy analysis.

Another important issue is who will make the modifications. If you modify the package at your organization, remember the cost of your time. If the vendor modifies it, make sure you add not only the cost for modification, but also the assignment of your staff to present your applications needs to the vendor.

Take into account the effect that changes have on vendor documentation. Also, be sure you understand the effect modifications have on vendor-supplied package maintenance and enhancements. If you are going to modify a system to the extent that vendor-supplied maintenance is no longer useful, that additional cost must be considered in your analysis also. Be sure you have carefully considered the implications of assuming the responsibility for all future package maintenance.

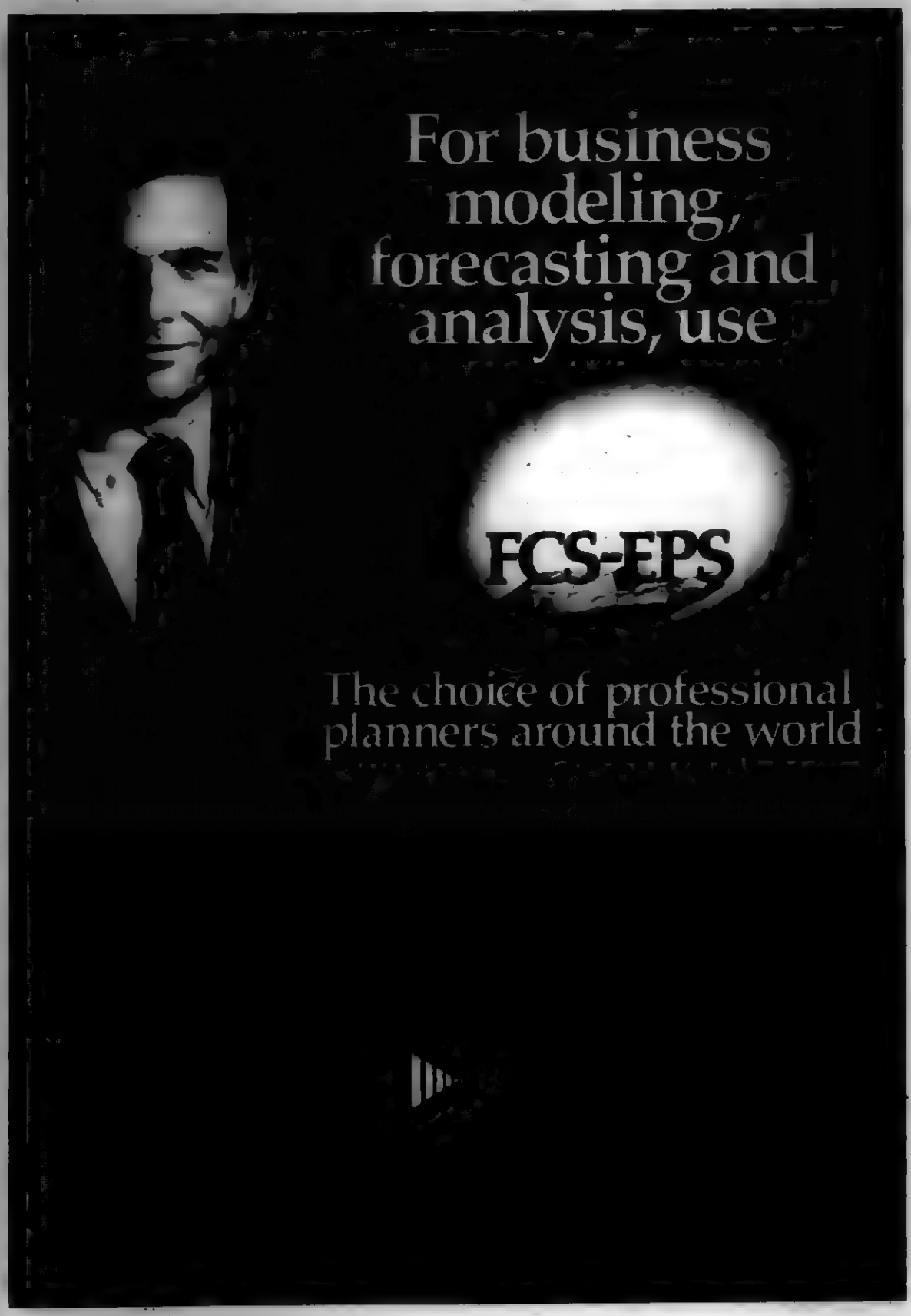
Don't ignore or underestimate the cost and time associated with education of users and the DP staff. Don't ignore education; you will pay the price eventually.

There can be other hidden package impacts that might not be immediately obvious. What effect does package acquisition have on data administration and efforts to build an integrated data base? The effects here may be subtle and the costs difficult to assess. However, you will pay a price down the road if a portion of corporate data is managed using tools that are incompatible with your other data bases.

Further, the data may not be controlled and secured consistently with your other data. Data from a key application may not be available through the set of tools you have provided to your users in your corporate information center. What price do you pay for not being able to integrate information easily from different vendors' packages to meet new business requirements?

The decision to buy a package involves hard work, careful analysis, an understanding of your organization and consideration of both short- and long-term effects. If approached correctly, a package can be a good solution to your organization's information processing needs. If approached incorrectly, a package can create problems as bad as or worse than the crisis it was intended to avert.

Wurk is vice-president for technology and co-founder of DRMS, Inc. of Naperville, Ill.



MYTH from SR/7

gredient for a successful package implementation. The project manager should, at a minimum, serve as an overall coordinator for the project, providing a single point of focus to direct and monitor the project resources.

Myth No. 8: Vendor training is not necessary.

Organizations often wrongly assume that the personnel assigned to the project are experienced in systems implementation and thus don't need any additional training or that vendor-supplied documentation can be used effectively on a self-study basis. As a result, vendor training is sometimes sacrificed in the contract negotiation process.

While vendor-supplied documentation is generally complete and accurate, it is normally intended to serve as a reference tool, supplementing the education available from the vendor. Documentation should not be viewed as a substitute for education. Project team members should receive vendor training, preferably at the vendor's education center.

Myth No. 9: Since the package is installed at hundreds of other companies, a systems test is not necessary.

A systems test is the test performed when the software is physically installed or loaded onto the computer. It should be performed because there are often installation-dependent factors that may make the DP environment unique. The vendor should be present at the time the systems test results are reviewed in order to help validate the results. Don't assume the system will install clean just because it is a package.

Myth No. 10: Since a systems test with vendor-supplied data has been performed, additional user-defined acceptance tests are not necessary.

User-defined acceptance tests are also a crucial ingredient for successful package implementation. The acceptance tests should be conducted after all parameters have been determined and installed. This will ensure that the package will perform the required functions in a manner acceptable to the organization.

Nayar, Silvers and Ward are managers in the management advisory services group of Deloitte Haskins & Sells.

SPECIAL REPORT

Use business sense when evaluating packages

By Arthur Wilmer
Special to CW

Application software packages exist to enhance, expedite and automate the processing needs of end users.

The reasons to buy and use an application package are time, money and effectiveness. Compared to the chief alternative, a custom-developed system, an application package can be up and running much sooner at a lower cost than a large development effort. The drawbacks are doubts about satisfying the company's particular needs, adaptability and the unknown factors that lie between promise and reality. These are all pragmatic considerations, but packages are often evaluated, selected and implemented in non-business-like ways that obscure their purposes.

Users typically go through a number of stages, including frustration and incapacity with their current system, justification and persuasion for a new system, hard work at coping with the old while contributing to the new and lots of waiting and placation while waiting for the shiny new system. Excessively high expectations can't help but lead to dissatisfaction and disappointment.

Rigorous efforts

The rigorous efforts involved in identifying and defining system requirements portend a product that will answer all of those needs. Packages are often sought because the scope and complexity of the needed system cannot be developed and delivered by in-house DP within a tolerable time frame. However, to expect a package to meet all requirements is folly. Packages are generalized software adaptable to many users, environments and needs. Because they are marketed widely, they are inherently less functional than in-house systems. They represent a compromise wherein a company foregoes some of its requirements to get a functioning system operational sooner.

Determining how much to forego with a package is an individual decision. As a yardstick, though, a good package should meet 90% to 95% of a company's requirements. An additional problem concerns the speed of implementation. In the back of most users' minds is the expectation that a package will be up and running immediately. This is unrealistic considering the time-consuming labors of loading data, learning the product, establishing procedures and controls and acclimating the staff to the product.

The decision to buy or investigate packages often breeds long, drawn-out analyses replete with committees and meetings. Vendors are analyzed, scrutinized and visited, the charter being to find the one and only package that's best for the company. Evaluation is a vital task and needs to be done well. If one package is clearly superior, that should be evident. Packages compare like most products in that they usually have contrasting advantages and disadvantages, so there often is no one package that is just right — yet many that will be suitable.

Prolonging evaluation exemplifies the law of diminishing returns in regard to time, the most precious commodity. This is time management, pure and simple. Don't forget the cost in labor of all those people at all those meetings. In cases where the choice is to build or buy rather than which to buy, the same warning applies with an added guideline: In-house development should be chosen only when the requirements are highly specialized.

Price is often an issue, not so much because of the expense itself but as a justifica-

See EVALUATE 22/10

IBM System 34/36 business software: 9,000 companies choose Para Research

In just three years Para Research has become the world's largest supplier of IBM System 34/36 software. The quality and reliability that's built into our software has made it a standard among IBM users. It's proven in 9,000 companies ranging from the Fortune 500 to companies with 50 employees.

Our software is backed by comprehensive documentation and responsive customer support. And it's surprisingly inexpensive. Each system is user friendly, and provides the quick response and accurate reports you need to improve every part of your business.

New Technology – IBM/36

IBM's new System/36 offers a powerful, versatile alternative to other minicomputers or even the IBM personal computer. It's designed as a small business system, but can support up to 30 terminals. The key to the System/36 is advanced technology. For example, multiple internal processors control specific system components and functions – such as work stations, printers, communication lines, disk and tape drives.

A single computer processor can do only one thing at a time. With the multiple processor design of the System/36, all processors can work concurrently on their own specific tasks. This means that the entire system can do more than one internal processor managing all operations. A 2-byte data path speeds data retrieval from memory. Built-in error checking and recovery provide maximum reliability. Extensive self-diagnostic and problem solving features help users troubleshoot and diagnose problems on their own. It all adds up to one of the most thoroughly tested and reliable IBM systems ever.

Word Processing

Easy Text is an easy-to-use system with on-line documentation. "How to Use Easy Text", a self-instructional feature, provides on-screen instructions. Users with little or no experience can generate letters, memos, reports, mass mailings almost immediately.

Create documents up to 99,000 lines or 2,200 paragraphs of text. Create page designs up to 132 print positions wide. Scan for key words and phrases, move text within a document, include text from one document in another. Tabbing, automatic centering, manual hyphenation, boldface printing, underlines, long-line entry, optional new page printing and delete option safeguards. With Easy Text, every work station on your computer can function as a word processor. $750. Free demonstration diskette available for 30 days.

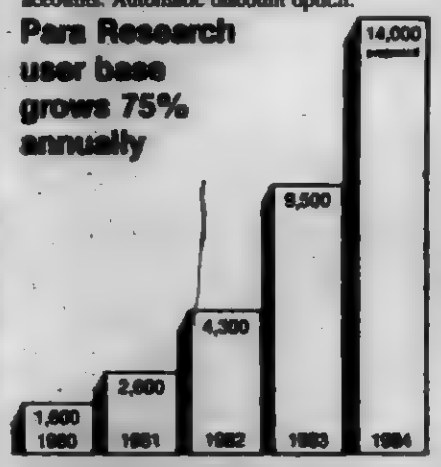
Financial Modeling

Easy Calc combines the best features of the best electronic worksheets. Use it for budgeting, cash flow analysis and sales forecasting with improved ease and power. Includes return on investment, depreciation and amortization. Create a spreadsheet in only 15 minutes. Create a format once, and then store it for future use.

Build formulas of up to 96 characters. Create worksheets with 52 columns and 999 rows. Columns vary from 8 to 14 characters. Consolidate 998 worksheets into one. Print up to nine integers to the left of the decimal. That's $999,999,999.99! Built-in error detection pinpoints exact error position. Designed for multi-work station environments. Choice of on-line or batch calculations. Learn to use Easy Calc in only a few short hours. $1,200. Free demonstration diskette available for 30 days.

Accounts Payable

Handles every facet of accounts payable – from invoicing through issuance of checks. Management reports provide up-to-date information on all payables. New features allow you to: take a discount amount after discount date, select a single batch of vouchers for updating to open payables file; report status of every vendor on a vendor analysis report. Multiple line distribution for up to 19 accounts. Automatic discount optio.n.



Full reporting for audit trails and processing of multiple accounting periods. System flags vouchers for payment. $1,500.

General Ledger

A multi-company system that can accommodate up to 99 companies and departments. Enables you to run different periods and different accounting years concurrently. Offers a variety of reporting options. Strategic Ratio, an added menu option, creates 30 different financial ratios to analyze assets, liabilities and equity. New features include: Run each company in the GL independently. Create a unique chart of accounts, run different year-end closings, print financial statements and reports for each company.

Design your own report formats. Maintain a file, run proof list from the same menu. New error message program locates and describes any problems. New reports include balance sheets and income statements broken down by department with percents and comparisons. $1,500.

Payroll

Payroll provides up-to-date costs of specific tasks for every department in your company. Employee master files for salary, hours and other payroll items are easy to maintain. User-friendly prompts provide complete instructions for each procedure. Up to 9 deduction types for each employee.

Multiple payroll data reports including check register, QTD 941s and 10 other reports. Runs payroll for 99 companies and any combination of companies. $2,000.

Fixed Assets

A complete depreciation scheduling program that produces two-year projections. Figures depreciation over user-specified fiscal periods based on the 1982 Economic Recovery Act using the Accelerated Cost Recovery System, the 1983 Reduced Basis ACRS or eight other standard depreciation methods. Separate depreciation for tax and book. Automatically produces general ledger entries. Accepts fully expensed or non-depreciable items for asset inventory control. A series of management reports tracks depreciation schedules, reports changes in those schedules, gives projections over a two-year period and reports assets subject to investment credit. $1,500.

Accounts Receivable

Available in open item or balance forward methods. For both methods, the system has cycle billing capability, allows printing of all statements on file or statements for specific customers. Provides up-to-date status of customer records, including current balance, aging, credit checking. Many report formats. Maintains a rolling 12- or 13-period history of customer activity. $1,500.

Billing

Includes order entry and invoicing as well as analysis of inventory and sale of items within your company. You can generate picking ticket listings by warehouse or item number and maintain data on orders before shipping and invoicing. The system places order quantities in reserve until you confirm the order, then reduces the quantity on hand. This allows you to enter freight charges before the invoice is sent. $1,500.

Inventory

Gives your company complete control over inventory, both on hand and on order. It provides nine reports to let you know the status of every item at any time. Inventory costs based on four methods: LIFO, FIFO, average cost and replacement cost. Up to 999 cost levels to value your inventory on a FIFO and LIFO basis. Standard unit price plus five alternate prices per item. $1,500.

FREE Documentation

For any program you're interested in, we'll send you a perfect bound book of documentation. These books are printed on high quality paper and contain between 100 and 300 pages. Each book is filled with detailed file layouts, flow charts, screens and reports that take you through each program step-by-step. All Para Research software comes with a 30-day money-back guarantee.

To get your free manuals for information on our line of IBM/36 accounting systems, call or write: Software Sales, Dept. CW17, Para Research Inc., 85 Eastern Avenue, Gloucester, MA 01930 (617) 283-3438.

SPECIAL REPORT

System helps valve maker control inventory

Percentage of orders filled on time skyrocketed

ROGERS, Ark. — Inventory accuracy and the percentage of customer orders filled on time have increased dramatically, while the dollar volume of aggregate finished goods and component inventory has plummeted since the Crane Co. implemented a new manufacturing system in its plant here.

Crane, a division of the Valves and Fittings Division of Crane USA, manufactures bronze, stainless steel and iron valves. Before Crane implemented the new software package, all of its manufacturing records were kept on cards and updated by hand. Workers pulling parts for a rush order sometimes forgot to account for them on the card file. And if a card was lost, the entire record was lost.

Mistakes caused huge inventory buildups at Crane. Often the purchasing department reordered an item simply because a vendor was giving a price break. "The inventory was unreal," Miriam Von Struble, purchasing manager, explained. "There was a 64-year supply on some things. And there were always missing items. We had no control."

In addition, she said, parts were not inspected as they were received from vendors. "We spent many hours just retooling parts so we could use them," said Bill Wells, machine shop general foreman.

In 1979 Crane-USA approved a plan to implement a Material Requirements Planning II system at the plant here. In December 1979, Management Science America, Inc.'s Manufacturing System was selected.

"We wanted it straight off the shelf — plain vanilla," said Robert Holiman, who was responsible for evaluating and selecting the software. "We also wanted every module they had to sell."

Once the system was chosen, Crane created a steering committee to establish business procedures compatible with the new software. One of its most important tasks was to create ironclad operating procedures and controls.

Under the new procedures, products would no longer be built without an engineering bill of material and specific manufacturing standards. "We can now provide accurate bills of material that truly represent the way the product is supposed to be built," Joe Weber, engineering manager, maintained.

The parts stockroom was another department where new procedures were implemented. "Now, there's only one way to put the inventory in and one way to take it out," Holiman said.

The receiving department also made changes. Employees are now issued drawings of each part ordered, and parts that do not match specifications are quickly rejected. As a result, suppliers no longer send unsatisfactory parts, Holiman said.

Plant Manager Russell Dutton said the change has had a ripple effect on the rest of the company. "In the assembly department, there are always matched sets of parts when they begin assembling a product," he said.

And in purchasing, according to Von Struble, "We're able to respond to the needs of production much faster now."

Crane's inventory has shot up to 96% accuracy, and the percentage of customer orders filled on time has doubled. Holiman, who became materials manager for Crane when implementation was complete, said Crane reduced its aggregate finished goods and component inventory from $8.5 million to less than $5.1 million in two years.

He attributed part of this improvement to Crane's review of its product line. With the new system, management was able to spot inventory that was not moving, and some of the products were either consolidated or discontinued.

Holiman said it is also simpler to maintain inventory with the new system. Stock receipts, for example, have been reduced from four documents to one.

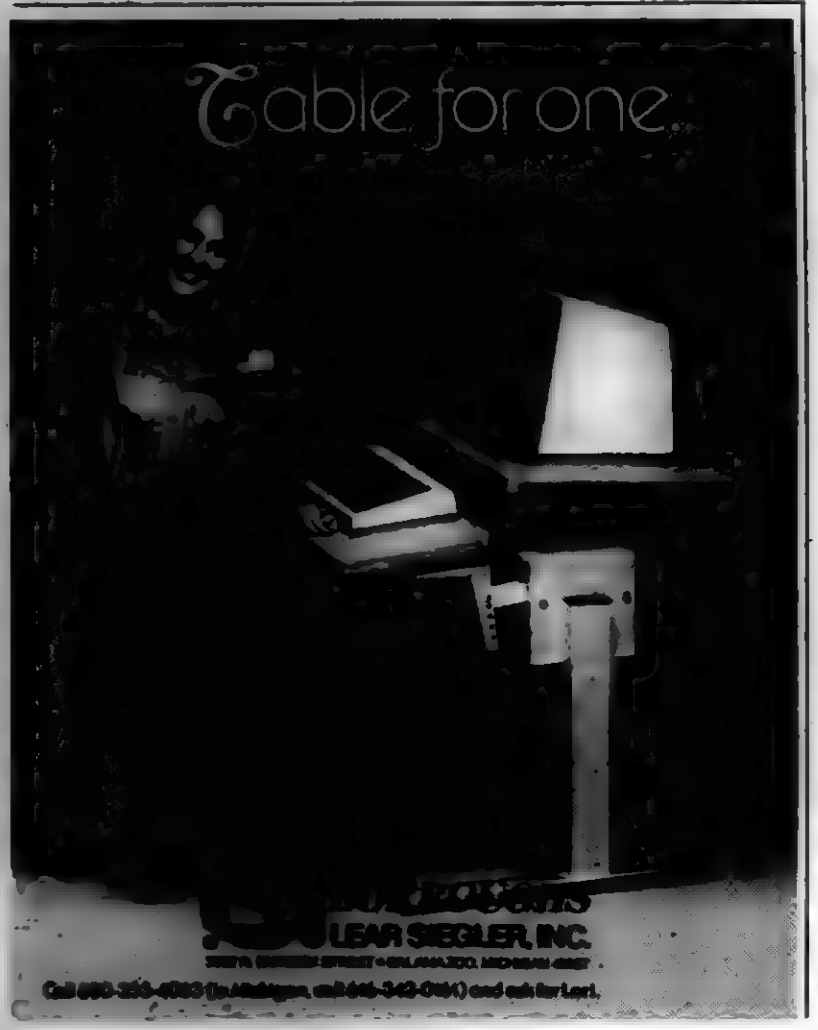
The final challenge was to communicate the information to Crane's other divisions in different parts of the U.S. "Because the new system makes problems visible, we now use the information it provides in monthly planning meetings with the divisions," said James Pool, the plant's master scheduler. "Each division knows what inventory the other has on hand and plans accordingly."

Now, he said, Crane stays within 10% deviation from the master schedule, predicted production hours and sales forecasts.

Moreover, Holiman said the company is no longer caught by surprise with unexpected problems. "We can see problems ahead of time, and we can actually do something about them," he said.

June Wesley accounts for storeroom contents. Source: Crane Co.

> *"Because the new system makes problems visible, we now use the information it provides in monthly planning meetings with the divisions. Each division knows what inventory the other has on hand and plans accordingly.* — James Pool, plant master scheduler.



EVALUATE from SR/9

tion for spending cash vs. authorizing in-house labor on applications software. Most companies are not accustomed to buying application software, and management often requires greater justification for what seems to be a large cost item. But when compared with mainframe hardware costs and the alternative of in-house development, application packages are often a good buy. Cost analysis is a key management task, yet basic business management often is forgotten when dealing with the new concept of buying application software.

Packages should be evaluated for functionality and effectiveness. Technical considerations, state-of-the-art factors and efficiency are not unimportant considerations, but they are secondary. What a system does is far more important than how it's done. Users often turn to DP for guidance in evaluation and selection and get an inverted prioritization — technical over functional. The tail is wagging the dog in such cases. User departments are responsible for the data in a system and, therefore, should be responsible for the means of processing that data.

The problems described above are not common to all package users, yet they are typical and frequent. What is common to all of them is that they can and should be dealt with as management problems. The newness of buying application software or the seemingly esoteric complexities of a computer product should not be an obstacle to exercising pragmatic judgment, common sense and sound business management. As users become more proficient in managing data and computerized systems, they will find they have made room for whatever new business problems are out there awaiting them.

Wittner is vice-president for development for Genesys Software Systems, Inc. in Lawrence, Mass.

More and more, personal computers in large organizations are dramatically improving productivity. But there's also a problem involved with this improvement. People are using many different, often incompatible microcomputers, yet they still need to share information, programs, and peripherals.

It's as if everyone had an automobile, but no highways leading to their destination. No traffic signs to follow. No rules of the road. The result? Mass confusion.

Until now, that is. Until Liaison from SofTech Microsystems.

Based on the p-System,™ the Universal Operating System,™ Liaison is a family of network software products that lets you establish a workable, efficient personal computer network. It allows personal computers and users to co-operate and work together so that your organization is altogether more effective. Liaison includes systems software products, such as an operating system, print servers and disk servers as well as development tools. And, a collection of network applications, including a database management package, electronic mail, and more.

Liaison lets you unite many different personal computers in an effective network. 8 and 16-bit machines from virtually all personal computer manufacturers (including IBM,® TI,® Corvus,® and Apple®) can all share programs, all work together, all co-operate.

So if you're tired of your different personal computers driving you to the brink of insanity, give us a call at SofTech Microsystems.

We'll show you how Liaison can get you back on the road to recovery.

SOFTECH MICROSYSTEMS

SofTech Microsystems, Inc.
16885 West Bernardo Drive • San Diego, CA 92127 • (619) 451-1230

Liaison, p-System, and Universal Operating System are trademarks of SofTech Microsystems, Inc. IBM is a registered trademark of International Business Machines. TI is a registered trademark of Texas Instruments, Inc. Corvus is a registered trademark of Corvus Systems, Inc. Apple is a registered trademark of Apple Computer, Inc.

Introducing Liaison.™ Software that allows personal computers to co-operate.

SPECIAL REPORT

System spices up restaurant's info exchange

With financial software, micro-to-mainframe link

PLEASANTVILLE, N.Y. — Application integration with microcomputer-to-mainframe linking capability was the answer for the daily corporate information requirements of Pizza Hut, Inc.

Pizza Hut, a leading pizza restaurant chain, recently upgraded its existing line of McCormack & Dodge Corp. on-line products to include McCormack & Dodge's recently released Millennium series.

Millennium offers an on-line, integrated systems application environment that incorporates uniform structure and consistent features across all applications, according to a spokesman. This common structure, based on generically defined program functions and reusable code, provides borderless query across all applications, real-time design and update of screens, on-line security to the field level and the optional interactive PC Link, allowing IBM Personal Computer-to-mainframe information exchange.

Now in its 26th year, Pizza Hut has shown healthy growth rates. The chain has restaurants in all 50 states and in 16 foreign markets, and management predicts the company and its franchisees will build a minimum of 200 restaurants per year for the next five years.

In 1979, Pizza Hut replaced all financial systems and accounting functions for its 2,000 company-owned restaurants with McCormack & Dodge software. Beginning with the G/L Plus general ledger system in 1979, Pizza Hut has purchased the A/P Plus accounts payable system, F/A Plus fixed assets system, CPA Plus, capital projects accounting system, H/R Plus human resource system and P/O Plus purchasing information system.

DP requirements

To accommodate data processing requirements that include up to 700,000 journals and 450,000 general ledger master file records, Pizza Hut maintains an IBM 158 and an IBM 3033 running under IBM's OS/MVS operating system. It is now awaiting delivery of an IBM 3081.

Ed Dreher, senior financial project leader for Pizza Hut, reports the company first became interested in the Millennium technology at the 1982 McCormack & Dodge User Conference in New Orleans.

In April 1983, Dreher went to McCormack & Dodge's headquarters in Natick, Mass., for a Millennium demonstration. "From that point on, we wanted to get up on the system as soon as we could," Dreher said.

Millennium's on-line capabilities, borderless query and PC Link were primary considerations for Pizza Hut, Dreher said. "With Millennium, we plan to decrease our closing schedule, partially because of the on-line posting feature," he said. "But also, because of the flexibility of the borderless query, we anticipate not having to run as many batch reports for closing.

"Millennium provides more accurate financial data," he added. "With the on-line, real-time update and query, we are able to see where we are now, as opposed to using data from the batch reports, which may have run the prior week."

Daily reporting requirements also will be reduced, Dreher noted. "For example, we run on-request Auditor [report writer] reports with our G/L Plus system, as well as daily requests for accounts payable, fixed asset and capital project information. Most of these requests should go away with Millennium's on-line inquiry," Dreher said. "We estimated that we spend a fair percentage of time researching one-time inquiries from our field offices. With on-line inquiry, they can look into it themselves."

Millennium's on-line Help documentation was another selling point, Dreher said. "It really talks you through the system. Also, Secure, the multilevel security system provided with the package, gives us the extra security to let us send a lot of functions out to the field offices. Previously, we didn't have the security to let our offices get into that information." With the PC Link, Pizza Hut's field offices can use the microcomputer as a terminal and can do spreadsheet and budgeting at the regional level.

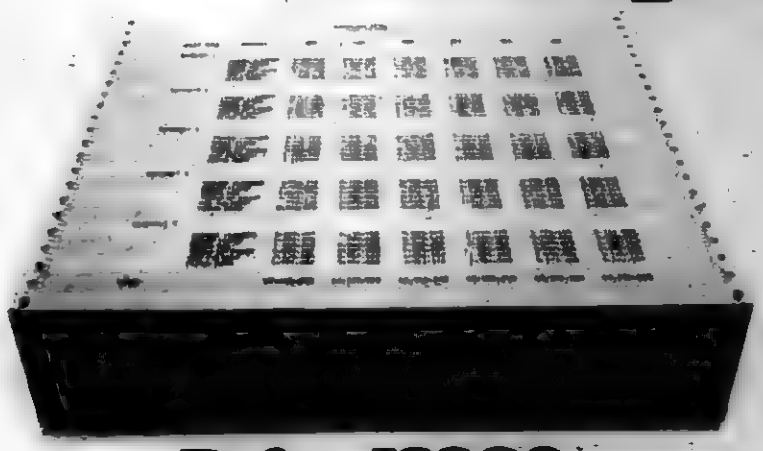
Interacting with non-McCormack & Dodge files is another important facet of Millennium for Pizza Hut, Dreher said. "For example, in our internal systems, we have a hierarchy of Pizza Hut reporting relationships," he noted. "With the foreign file feature of Millennium, we can give our people access to this data without having to write a special on-line inquiry system."

Pizza Hut plans to use a delivery scheduling system using the PC Link to access its order file. After downloading restaurant order information to the Personal Computer, the data can be used for order delivery. Another tentative plan is to use the system to bring in time sheets electronically from the field offices, he said.

"We also can see using the [PC] Link for consolidations," Dreher said. "We download the financial data to the [Personal Computer] and perform the consolidations there. Currently, consolidations are a man-

See LINK 39/14

Management will b
D.P. department



Before ISSCO

Time is too short to wade through mountains of data. Management wants you to cut the number of printouts without cutting key information.

Fortunately, there's ISSCO. Our graphics software makes it easy to turn a large stack of numbers, in any data format, into concise artist-quality charts and graphs.

But condensing facts and figures is only part of what you can do. ISSCO software is also valuable for presentations. It lets you take data directly from your computers and reproduce it on paper, overhead transparencies or 35mm slides.

And don't think you'll be getting those frazzled images and fuzzy

Single-vendor purchases can lead to horror stories

By Woodrow W. Chamberlain
Special to CW

There is really no need to document the advantages of using packaged software solutions.

In addition to the reduced time factor and cost considerations, the introduction of packaged software often helps to prevent new systems from being introduced which simply automate "business as usual."

However, a dangerous syndrome has been slowly developing within the DP organization relative to application software. It is the feeling that the best option available to a company is to "get the complete solution" from a particular vendor.

More than applications

To support this notion, a variety of vendors exist in the software business today that provide not only application packages such as financial and manufacturing systems, but also complete data bases, decision support systems and micro-to-mainframe links.

The clear-cut message of these vendors and the people who select them is that the up-front integration of a variety of software packages is of more value to the business than the individual functional excellence often provided by independent and separate software application vendors.

This reasoning is both specious and dangerous, since it shortchanges the decision makers in regard to the richness of information that can be provided by purchasing the best functional package available.

Problem is minimal

In truth, the problem of integrating a variety of today's packaged software is minimal. A DP organization that subscribes to the "purchase from one vendor" philosophy is reliving past horror stories about package integration that are no longer valid.

The one-vendor selection provides a more modern horror story. Specifically, it denies user functionality and organizational flexibility in the future because the marriage to a major vendor often results in a continuing erosion of reasonable alternatives.

This loss of flexibility, which is vital to the success of most businesses, cannot be overlooked. DP managers should always make selections based on maintaining maximum flexibility in the event that new technological developments occur. The single-vendor alternative commits a company to the fortunes of a single vendor and suggests that one vendor will be capable of maintaining state-of-the-art knowledge in all areas — an unreasonable supposition at best.

See VENDOR 59/14

New acquisition criteria spurring software changes

By John Connolly Jr.
Special to CW

The most dramatic change in applications software packages in two decades has occurred recently with the emergence of new acquisition criteria. Functional comprehensiveness and degree of functional fit with the acquiring company had been, in many cases, the sole determining factors.

The new criteria are related to the software technology used to implement the system. Senior management will no longer tolerate applications systems that are incompatible, non-integrated, expensive to maintain and difficult to enhance.

Management is looking beyond functional capabilities at any one time to an information strategy that allows applications to work together as a single system, to be tailored to meet unique requirements, to be implemented separately and to access application data for decision support. Above all, this strategy allows one set of software code to satisfy the diverse requirements of all operating departments and all levels of management.

Some of the specific criteria are as follows:

■ *On-line real-time* — The application must be built on advanced data base performance terminal networks and automatic backup and recovery for data integrity.

■ *Horizontal Integration* — All applications systems must work together automatically and be driven by one common data base. The order entry and accounts receivable systems use a single customer data base. The purchasing and accounts payable systems use a single vendor data base. Cash disbursements in accounts payable automatically generate the journal entries for the general ledger.

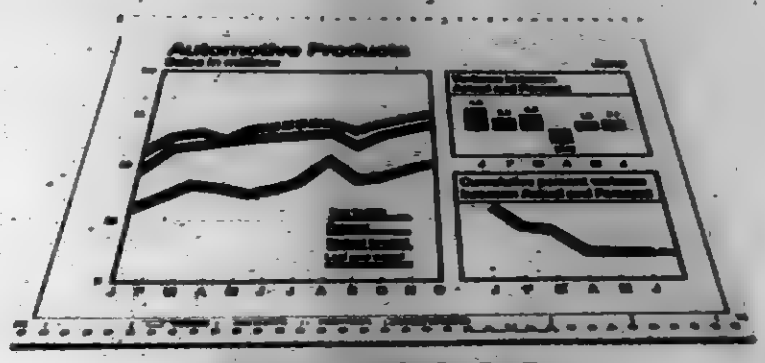
■ *Vertical Integration* — All applications systems are driven by a user-controlled application dictionary and developed using advance data base tools, such as a fourth-generation language, a report writer, a query language and information network methodologies.

■ *Information Center* — Application end users must have information center capabilities so they can generate their own reports, perform their own ad hoc queries and download summary or detail trend data directly from the application data base to a personal computer.

■ *Decision support systems* — Applications systems must be integrated with an intelligent personal computer-to-mainframe link. End users must have the ability to access the application data base directly and then perform analysis and modeling without having to enter any

See CRITERIA 59/14

e happy to hear the
is producing less.



After ISSCO

letters many people associate with graphics. ISSCO graphics are always sharp and clear.

Isn't it time your D.P. department started producing less? For a free copy of our 40-page manual, "Choosing the Right Graphics Devices," write ISSCO, 10505 Sorrento Valley Road, San Diego, CA 92121. Or call (619) 452-0170.

ISSCO GRAPHICS SOFTWARE

Draw faster conclusions with ISSCO.

VENDOR from SR/13

Carried to its logical extreme, if every manufacturer was to select all its application and operating software from a single vendor, then we could expect the world in the future to have one computer vendor, one software vendor, one car manufacturer and so on.

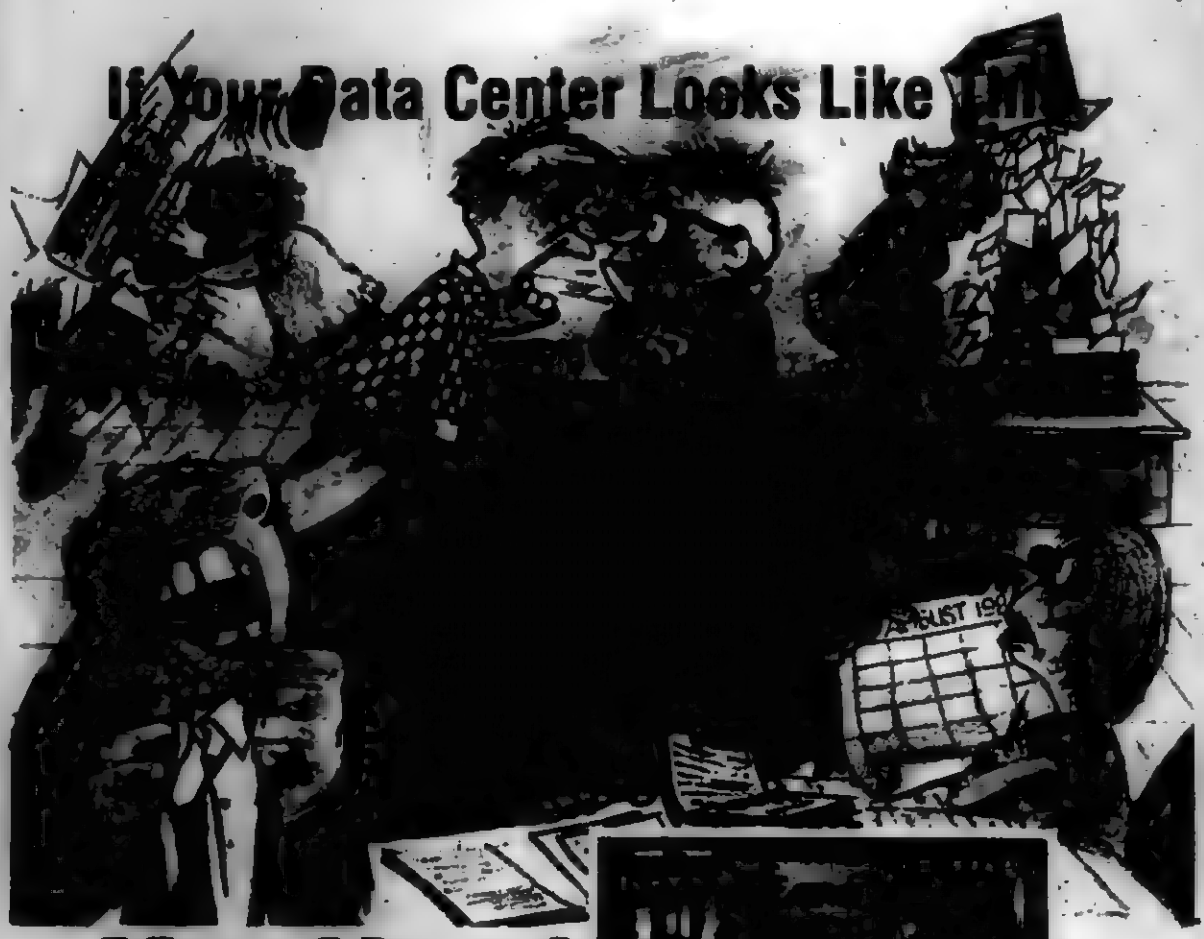
The nurturing of new developments and new products can only be realized by farsighted managers capable of making a decision to select the best products available on the market, forcing the industry to provide state-of-the-art products while allowing a maximum competitive posture in the international business scene.

The key question is why should data processing managers looking at application software behave any differently from their counterparts in computer operations?

They shouldn't, unless they want to be remembered as lacking the vision and the competence to select the right product at the right time, while constantly maintaining the maximum number of options for their organization.

Chamberlain is president of Ruth & Strong Systems Products, Inc.

'This loss of [organizational] flexibility, which is vital to the success of most businesses, cannot be overlooked. DP managers should always make selections based on maintaining maximum flexibility in the event that new technological developments occur. The single-vendor alternative commits a company to the fortunes of a single vendor and suggests that one vendor will be capable of maintaining state-of-the-art knowledge in all areas — an unreasonable supposition at best.'



APEX—Automated Production Control System. APEX is the most comprehensive production planning and workload management system available in today's market. APEX eliminates card handling and reruns due to setup errors, assures correct job sequencing, allows viewing of output before its printed, and provides immediate up-to-date status of all production processing. Some of APEX's powerful features include . . . Flexible Scheduling • Interactive Job Setup • Automatic Job Submission • Automated Restart/Recovery • Online Output Review • Management Reporting • Single Source of Production Information for IBM 370, 303X, 43XX and all PCM's, MVS, VS1 Environments.

If you're looking for ways to avoid the turmoil in production processing, then put APEX to work for you.

Johnson Systems 8300 Greensboro Drive, McLean, VA. 22102 1-800-368-1010 or (703) 821-1700
NATIONAL OFFICES: Chicago (312) 655-3460 San Francisco (415) 562-4618 Dallas (214) 247-3552

CRITERIA from SR/13

data redundantly or learn programming syntax and file structures.

Evolutionary — The applications system must be structured so that new capabilities can be added without conversion of existing code. Future applications must be integrated horizontally without disruption.

Technology integration — The software foundation supporting the application must be built on an architecture that will embrace any new technology. For example, a manufacturing control system must be architecturally structured to allow future integration of bar code scanning, computer-assisted design and manufacturing, automatic testing equipment and so on.

Results — Senior management is demanding cost-effective information systems that generate measurable results. Application systems must be able to show quantifiable productivity gains, improved operations, market penetration and financial performance.

The best example of applications software that is being acquired based on the new criteria is manufacturing software packages. The manufacturing industry has found that there is much common functionality across companies within a particular industry segment and even across industry segments.

The recognition that computerized manufacturing information systems can be used to plan material requirements, control material movement, control production orders, reduce manufacturing lead times, reduce inventory and define common functionality has provided the basis for the manufacturing software packages that are now available. Today there are over 100 manufacturing software packages on the market. The problem is that very few of these packages measure up to the new criteria.

In the past there was a general perception that all manufacturing software systems were similar in design, development and technique of implementation from a software technology standpoint. If a package met all requirements, it was assumed the package would provide the tools necessary to achieve benefits.

Based largely on the disappointing results of the older systems software, evaluation teams have started considering the software technology that drives the manufacturing functionality. Manufacturing management realizes that manufacturing applications software is not limited to reporting on what has happened, but rather is capable of planning and controlling the tactical and strategic operations of the company.

Donnelly is director of public and investor relations at Cullinet Software, Inc., in Westwood, Mass.

LINK from SR/12

ual effort."

Pizza Hut will be using Millennium's inquiry to access balance sheet information, Dreher explained. "We review our financial data at the end of the period. The type of information we want is basically exception reports. We used batch variance reports before; now it's on-line and real-time." Dreher noted that with Millennium, he expects to reduce processing by 15% to 20% across the total financial systems.

SPECIAL REPORT

Package implementation commands planning

By K. J. McElhenny
Special to CW

The lack of understanding of how long it takes to implement a software package successfully and of the kinds of resources needed to complete an implementation is a major problem many companies experience.

This lack of understanding has resulted in packaged software that has never gotten off the ground and packages that are implemented poorly, allowing them to operate to only one-tenth of their capabilities — sometimes with even less functionality than the system they replaced. It has also resulted in unfair criticism of the packages and their vendors.

Today's packaged systems are much more "user driven," meaning that people who use the application are actually designing and operating the systems. The benefit here is that one package can be general enough to satisfy the needs of many different companies, while it can be tailored by each company to meet specific requirements without programming changes.

Factors considered

When systems were developed in-house, people became aware of how much time and effort it took to design, build and implement a major system. Thus, these factors were considered in their planning. It was because of this awareness that people began to look for alternatives.

Software packages are sold as a fast and easy alternative to in-house development. That impression is aided by the claims of software vendors that their packages can be installed and running in three days. For your own protection, you must clarify the important difference between "installed" and "implemented."

"Installed" means that the software programs will reside on your computer, awaiting the information to make them functioning systems.

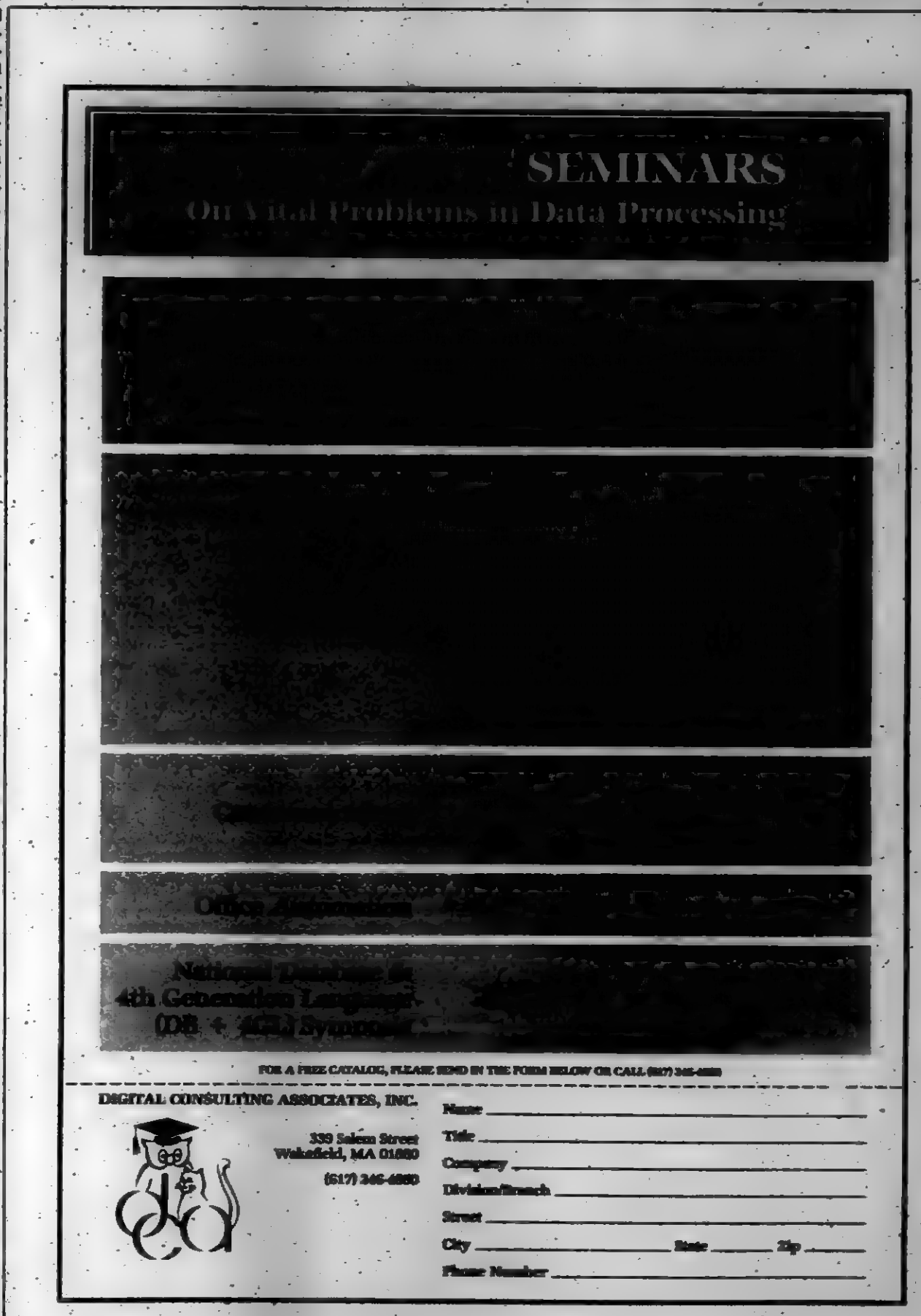
In other words, the programming and debugging are done. "Implemented" means that all information is loaded, all necessary interfaces have been programmed and tested, all systems and user personnel are competent in operating the system, all documentation is completed and the system has paralleled the old system to prove the validity of the functions and information.

As you can see, the terms are very different in their definition and, more importantly, in their impact on the purchaser. Therefore, it would be better to think of a software package as a means of eliminating only the time spent on initial systems design and programming, remembering that mass amounts of information must still be entered into the system.

Some suggestions that may help in planning for the implementation of a software package include:

- Prepare an implementation plan with realistic times, resources and targets.
- Have both data processing and application user resources dedicated to the project.
- The roles of individuals on the project team must be clearly defined, and regular meetings must be held to monitor progress.
- Make certain that the design is well thought out and documented and that everyone is in agreement before beginning.
- Know your application package. Get training and hands-on experience up front.
- Get outside help if it is needed, but never give up control of the project.

McElhenny is president of Kelon & Co., Inc., a Canadian firm specializing in financial systems software.



SPECIAL REPORT

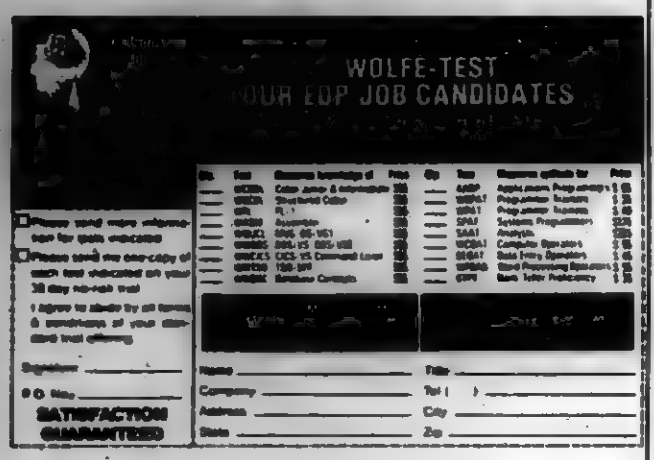
Poor training renders packages worthless

By Kathy Czech
And Kathy Telban
Special to CW

The software package met all criteria to solve the company's business problems. It was purchased and installed, but no one used it. Could it be that no one was properly trained?

When packaged software is chosen, a criteria list is usually developed, and the software is evaluated against it. Buried somewhere in that list is training. A software package must be able to solve the business problems of a company, but without proper training it could be ineffectively used and worthless. To avoid this, training must be a primary concern in the evaluation process.

In order to evaluate training, you must know what your training needs are and what the vendor will supply. To determine needs, examine the way the package will be implemented in the organization. Who and what jobs will the package impact? A list of those affected might be very limited in scope for a programmer productivity tool or very diverse with an information center package. Not everyone will require the same training.



Once you are aware of the various types of training required, determine how the training is to be achieved. Some training may be provided through an in-house training department. If you do not have an in-house training department, consult the vendor or an outside consultant.

What vendor supplies

In either case, it is important to be aware of exactly what the vendor can and will supply.

Training supplied by the vendor is usually of the "one course fits all" variety. For noncustomized courses, it is imperative that you examine the course material and carefully consider factors such as the training media employed, the location at which the training will take place, the availability and scheduling of training, course objectives and costs.

If the vendor provides customized courses, your homework has been done for you. You are now prepared to discuss the impact of the product and what you perceive to be the training needs.

Training programs, like every good program or software package, have design documentation. This documentation should consist of a course outline, course objectives, prerequisites and the target audience. The outline will provide an idea of the topics to be covered, and the objectives should point to what the student will be able to do after completing the training. Objectives should be stated as measurable actions. If there are no course objectives, be wary of the vendor's claims. Further investigation may be needed.

Ask if the course contains hands-on workshops. Surprisingly, most micro training does, but few mainframe vendors include this. Check to see if the workshop will be relevant to the student's on-the-job use of the product. An insurance company employee won't benefit from solving a hands-on problem designed for the manufacturing industry.

Unique audiences

The training analysis may have revealed that the software package will be utilized by different types of employees. Make certain the course addresses each of those unique audiences. Some vendors have separate courses for each audience, in other cases the course has been modularized to accommodate them.

The content of the training program is important, but just as important is the way in which the material is presented. Ask the vendor which medium is used in training — overhead transparencies, video disks, videotapes or computer-based training (CBT).

Which materials are provided with the software package, and which represent extra costs? The vendor may supply initial training with an instructor on-site at no cost and then sell you a video or CBT package for retraining. Some vendors will even sell their overhead transparencies with instructor notes and guidelines. When considering CBT, video disk or videotape, make sure the medium can be run on your current equipment.

If free training is provided, ask what the limitations are. There may be only one free class. Ask about the class size: Is there a limit on the number of students allowed before a charge is added on a per-head basis? Also, if purchasing multiple copies of the software, ask if the initial training will be provided for each copy purchased.

If there are other sites that will be accessing the software at a central location, determine how remote training will be coordinated.

Training site

Ask where the training is conducted. Is it at your site, the vendor's education center or a hotel? There is a real trade-off between travel costs and a productive environment. An employee cannot be learning if he is constantly being pulled out of class to solve daily problems. Also remember that training conducted far in advance of the product installation is often wasted.

Remember that training costs money. Always figure this into the initial cost of product implementation. In fact, training can sometimes cost as much as the software package itself. If the average programmer earns $26,100 and there are 261 working days in a year, that programmer costs the company $100 per day.

For 15 programmers to be in training for five days the cost will be $7,500, a figure that does not include the additional cost of employee benefits.

Added to that sum may be the cost of vendor training itself, which can vary between $500 and $1,000 a day plus travel expenses if the vendor is not local. For five days, that amount could be between $3,000 and $6,000. This brings the grand total for training to between $10,500 and $13,500 — for just one course.

Czech and Telban are educational consultants specializing in customized DP course development and training for Dallas-based Educational Horizons, Inc.

IP3: Non-Procedural COBOL for
IMS/DB IMS/DC CICS/VS VSAM

Creates the data division, the procedure division and bug-free native COBOL for batch and on-line applications. Plus on-line screen generation MFS BMS UCC-10.

COMPUTING PRODUCTIVITY, INC.
THE LARROW HOUSE
WAITSFIELD, VT 05673
(802) 496-5000
Los Angeles, CA Scottsdale, AZ

cpi

National Database and 4th Generation Language Symposium

DAY 1

The first day of THE NATIONAL DATABASE AND 4TH GENERATION LANGUAGE SYMPOSIUM (DB+4GL) will feature an accelerated class covering the important concepts of data management technology in the 1960s. This class will highlight the key tools necessary to develop modern software.

Symposium Chairman

Dr. George Schussel, *President, Digital Consulting Associates, Inc.* Dr. Schussel will lead the first day of the symposium, an intensive session covering fifty top data management products. Dr. Schussel is one of the best known and most widely respected lecturers on DBMS and 4th Generation Languages, having lectured before 12,000 professionals worldwide.

SOFTWARE PRODUCT PRESENTATIONS

DAYS 2 3 4

On Days 2, 3, and 4, the Symposium features one hour presentations on outstanding software products (partial list below):

VENDOR	(DB + 4GL PACKAGES)
Amcor Computer Corp.	AMBASE
Analysts International Corp.	CORVET
Applications Software Inc.	ASI/ST, ASI/INQUIRY
Applied Data Research	DATACOM/DB, IDEAL DATADICTIONARY
Battelle	BASIS
Burroughs	LINC
Christensen Systems Inc	TELON-ADS
Cincom Systems	TIS, ULTRA, MANTIS POWERHOUSE
Cognos Corp (Quasar)	CA-UNIVERSE
Computer Associates	MODEL 204, USER LANGUAGE
Computer Corp. of America	IP/3
Computing Productivity, Inc.	RTFILE
Contel Information Systems	IDMS/R,
Cullinet Software	Application Dev. System Decision Support System
D&B Computing Services	NOMAD 2
Data General	DG/DBMS, PRESENT
DeskTop Software Corp.	NPL
Digital Equipment Corp.	VAX INFO, ARCH.
Henco Software Inc.	INFO
Hewlett Packard	IMAGE
Hogan Systems	UMBRELLA
IBM Corp.	SQL/DS, DB2 DMS, DATA DICTIONARY
Infodata Systems	INQUIRE
Informatics General	MARK V, ANSWER DB, VISIANSWER
Information Builders Inc.	FOCUS
Info Tech, Inc.	DB/Product Line
Intel Corp.	SYSTEM 2000
Logica	RAPPORT
Mathematica Products Group	RAMIS II
National Information Systems	ACCENT R
Oracle Corp.	ORACLE
Pearlsoft	Personal Pearl
Perkin-Elmer	RELIANCE
Prime Computer Inc.	PRIME INFORMATION
Pro-IV Inc.	Pro-IV
Relational Database Systems	INFORMIX
Relational Technology, Inc.	INGRES
Rexcom Corp.	REXCOM
Scientific Info. Retrieval	SIR/DBMS
Seed Software	SEED
Sensor-based System	METAFILE
Software A G of N. A.	ADABAS, NATURAL
Software Craftsmen, Inc.	DB 1
Software House	SYSTEM 1022, SYSTEM 1032,
Sydney Dataproducts Inc.	CONQUER
3CI	INFOGEN
Tominy, Inc.	DATA BASE-PLUS
TOM Software	SPEED II
TSI International	FACETS
Tymshare Inc.	MAGNUM

GUEST LECTURER PRESENTATIONS BY THE WORLD'S SOFTWARE LEADERS:

TO REGISTER (OR FOR MORE INFORMATION): CALL (617) 246-4850 OR USE COUPON BELOW

REGISTRATION FORM

National Database and 4th Generation Language Symposium (DB + 4GL)

☐ Los Angeles (March 6–9) ☐ Chicago (May 15–18)
☐ Washington, DC (April 24–27) ☐ New York (June 18–21)

TYPE OF REGISTRATION

☐ Entire 4 day symposium including lunches, refreshments, all meetings, and copy of 500 page Proceedings of the National (DB + 4GL) Symposium . . . $750
☐ Multiple: When 2 or more registrants from a single company register together, the second and additional registrants are entitled to a $100 discount. This applies only for full, 4 day registrants $650
☐ First Day Only, including lunch, refreshments, and copy of Proceedings $375
☐ Proceedings only (orders must be prepaid) $250

☐ This registration confirms telephone registration.
☐ I do not wish to register at this time. Please put me on your mailing list.

METHOD OF PAYMENT

☐ Check Enclosed ☐ Purchase Order Attached.
☐ Bill my firm Attn: _____

Name _____
Title _____
Name _____
Title _____
Company _____ Div./Branch _____
Street _____
City _____ State _____ Zip _____
Phone No. (____) _____

Phone or mail to: **DIGITAL CONSULTING ASSOCIATES, Inc.**
339 Salem St., Wakefield, MA 01880
(617) 246-4850 (9 am–5 pm Eastern Time)

SPECIAL REPORT

Tool lets insurer cancel costly time-sharing

BOSTON — In the highly competitive insurance industry, sound planning and successful customer service are integral to a company's success.

So when Commercial Union Insurance Co. (CU) here replaced outside time-sharing services with an in-house, interactive computing facility, the company sought to reduce costs and respond more effectively to changing business requirements.

CU's goal was to find a product that would assimilate data for on-demand reporting, make projections for financial planning and perform sensitivity analyses to evaluate business alternatives and improve organizational performance.

After a careful evaluation, CU found that the ADR/Empire package from Applied Data Research, Inc. met its needs. "We were constantly having to constrain our analyses because of the cost of using a time-sharing service," said Steven Silva, manager of office information services for CU.

"With Empire, we can perform all the analysis required in-house, and we have a much more sophisticated tool than was available to us in the past. We still use external time-sharing, but only to supply us with external economic data which we bring in-house for analysis," Silva explained.

> *"Our organization requires an integrated approach to modeling that can only be achieved from a mainframe system.* — Steven Sparrow, manager of corporate planning systems.

CU has developed some 700 Empire models, which run on CU's Digital Equipment Corp. VAX-11 processors. More than 200 models are used by the Financial Reporting Department for financial statements and statutory reporting.

Models are also used for corporate planning, special risks, insurance plans, life insurance, R&D, telecommunications, tax, corporate accounting, analysis, expense budgeting, cost and expense, financial controls and financial systems. Financial planning reports that used to take seven people up to three weeks to perform are now done in a matter of days.

The first user of Empire at CU was the Corporate Planning Department. In one application, the department constructed a premium-and-loss model with a matrix of 1,100 rows by 130 columns.

The model uses data from offices across the U.S. and is designed to develop five-year plans to submit to CU's international headquarters in London. Output from the planning model is passed to a receivables model, which provides analysis of cash flow, income statements and balance sheets.

Models networked

The results are then passed to a policyholders surplus model. By networking the models, CU no longer has to gather and refine the information separately.

"To develop management plans requires a thorough review of the alternatives," said Steven Sparrow, manager of corporate planning systems. "Currently, we have 25 alternatives that we evaluate through the model using Empire's extensive "what-if" analysis tools. Using conventional programming methods or even microcomputers, we couldn't provide the same level of analysis to our management.

"The size and complexity of our organization requires an integrated approach to modeling that can only be achieved from a mainframe system," Sparrow contended.

In addition to using Empire in planning areas, the company is also using the package in its investment operation. Taking input from its investment brokers, CU can examine the effects of varying assumptions on the yields from its portfolio. With Empire's sensitivity analysis, the company can evaluate its exposure if earnings are not at the planned level.

"We know the data is correct with Empire because it is input on the terminal instead of being written down by someone in the home office," said Ron Breen, financial analyst in the Insurance Plans Department. "Calculations that use these numbers can be used in the models without fear of transcription error. This has saved my time and that of our managers and field people. Our expense allocation, which used to take a day and a half, is now completed in 24 minutes."

With the time saved by Empire, CU people are producing additional reports that aid management decision making by providing more intensive analyses.

"CU people who use Empire are becoming more creative," Silva said. "The bottom line is that, thanks to Empire, we are better able to assist users in identifying their business problems."

Argonaut

FINANCIAL SOFTWARE
SINCE 1971
ICP Million Dollar Awards

OUR ANSWER TO
MILLENIUM AND DINOSAURS

REAL-TIME PROCESSING, NOT JUST ON-LINE ENTRY/INQUIRY
Delivered in 1982
DATA IS UP-TO-THE-MINUTE, ACCURATE, AVAILABLE INSTANTLY
Delivered in 1982
DATA CAPTURE AT SOURCE WITH COMPLETE, IMMEDIATE VALIDATION
Delivered in 1982
HELP MESSAGES THAT YOU DEFINE AT THE FIELD LEVEL
Delivered in 1983
"BORDERLESS" INQUIRY AND RETURN
Delivered in 1983
SECURITY BY FUNCTION AND OPTION ACROSS ALL SYSTEMS
Delivered in 1983
INTEGRATED SYSTEMS USE COMMON DATABASE
Delivered in 1982
INTEGRATED SYSTEMS ALWAYS IN BALANCE
Delivered in 1982
DATA MUST ONLY BE ENTERED ONCE WITH ALL SYSTEMS UPDATED
Delivered in 1982
DOCUMENTATION IS MINIMIZED FOR FRIENDLINESS
Delivered in 1983
REPORTS MINIMIZED, QUERIES MAXIMIZED
Delivered in 1982
SAME REPORT WRITER FOR ALL SYSTEMS
Delivered in 1980
PERSONALIZED SYSTEMS TAKE HOURS/DAYS NOT WEEKS/MONTHS
Delivered in 1983
PERSONAL COMPUTER LINK
Available in 1984

PRODUCTS:

FIXED ASSETS	INVENTORY	PAYROLL
GENERAL LEDGER	ORDER PROCESSING	PURCHASING
HUMAN RESOURCES	PAYABLES	RECEIVABLES

PRICES:

MAINFRAME	$19,500 - $30,000
MINICOMPUTER	$ 6,000 - $16,500

ARGONAUT INFORMATION SYSTEMS, INC.
PHILADELPHIA • LOS ANGELES • LAKE TAHOE, NV • OAKLAND • 415-444-5954

- Faster access to vital accounting information
- Changing financial and human resource reporting requirements
- Training and documentation for both MIS and end users
- Standardizing applications across multiple hardware environments
- Finding a software partner who really understands accounting

is the problem...

Software is the solution
Software is the problem

Most software suppliers think they can meet your critical financial needs by selling you a tape in a box. Not Software International! Sure, we offer an outstanding collection of proven application software. But each Software International product also comes with a unique added feature: total on-going service and support. And that's one solution you can't get off the shelf.

Software International brings you high performance solutions.

variety Choose from a full range of application software, from our General Ledger and Financial Reporting System—the industry standard—to Payroll/Human Resources, Accounts Payable, Accounts Receivable and Fixed Asset Accounting. **accessibility** Software International products are ON-LINE and REAL-TIME, so your people have instant access to critical information. **adaptability** As business needs change, the robust feature contents and powerful tools inherent to Software International products let you react quickly. And a stream of product enhancements and up-dates keep you current. **support** For your complete peace of mind, each Software International product is installed on-site by our own skilled professionals. And followed up with on-site training which can be tailored especially for your requirements. Innovative and easy-to-use documentation is provided for DP professionals and end users. **compatibility** Our products perform on a wide variety of mainframes and minicomputers, so various corporate divisions can use functionally equivalent financial software. Unlike many vendors, our products run well because each is designed for the individual architectures of the hardware, not scaled down from a single mainframe product. **reliability** What's most important, we provide reliable, responsive service including a 12-hour a day telephone hotline, and continuing education by the most knowledgeable applications experts you can find. Put it all together, and you'll **discover** what over 5,000 successful corporations the world over have already found: Software International is the solution.

SOFTWARE INTERNATIONAL

Software International provides solutions to many of the world's leading corporations, including...

13 leading computer manufacturers
7 of the world's largest automobile manufacturers
7 major airlines · 11 financial service firms
5 international consulting companies
12 large insurance companies

And more than 3000 other installations large and small, worldwide. Some current customers include:

Manufacturing
Warnaco, Inc.
Kellwood Company
Aladdin Industries, Inc.
North American Philips Corporation
Reliance Electric Company
Digital Equipment Corporation
Ingersoll-Rand
Castle Company
Polaroid Company
Peugeot
Subaru

Chemical, Mineral and Allied Products
American Cyanamid Company
E.I. DuPont
Standard Oil Company of Ohio
General Tire and Rubber Company
Uniroyal, Inc.
New Jersey Zinc Company

Food
American Brands
Canada Dry
Carling O'Keefe
Miller Brewing Company
Chatham Super Markets
The Great Atlantic and Pacific Tea Company
Swiss Colony Data Center

Wholesale Trade, Durable and Non-Durable Goods
Ingram Book Company
Ames Department Store
Kay Jewelers, Inc.

Transportation
American Bureau of Shipping
GATX
Oshkosh Truck Corporation
United Technologies
Canadian National Railway
Atlas Van Lines

Hospitals
Lahey Clinic

Finance and Investment
Citibank, N.A.
United Merchants
Bowater, North America Corporation
R.J. Reynolds Industries, Inc.
Commercial Union Assurance Companies
Maine Blue Cross/Blue Shield
Dow-Jones

Communications
Panasonic
Warner Amex Cable

Hotels and Casinos
Harrah's
The Sands

Services, Business, Utilities, Retail
General Cigar Corporation
Revlon
Seiko
Boston Gas Company
Marshall's, Inc.
Levi Strauss of Canada

Call 1-800-343-4133 for solutions

Software International is a wholly-owned subsidiary of General Electric Information Services Company, which has over 190 sales and service offices worldwide. Call our toll-free number (or 1-800-322-0491 in Massachusetts) and ask for a copy of our High Performance Software brochure. Or write our Marketing Department at One Tech Drive, Andover, MA 01810.

SOFTWARE INTERNATIONAL

© Copyright 1984, Software International Corporation

SPECIAL REPORT

Prototyping slashes insurance firm's backlog

Exploiting nontechnical personnel's creativity

NEW YORK — When Equitable Life Assurance found that it had a tremendous programming backlog, a productivity team began looking for something that would not only reduce the logjam, but enable nontechnical people to participate in applications software development and maintenance.

The company decided that a four- to five-year commitment was the only way to improve productivity in applications development and maintenance. And the only way to achieve sustained productivity would be through an integrated data processing environment, said Joe Esposito, project manager of Equitable's Applications Productivity Group.

Equitable's decision to go integrated led them to look at prototyping. "We wanted a single-window approach, where people could get into a lot of different things quickly and easily and where learning was very fast," Esposito said. "We found that a lot of programming aids were addressing only one particular aspect or another. We figured the least productive thing we could do was to get together a whole bunch of so-called productivity tools that were all totally different from each other."

Equitable chose Hogan Systems, Inc.'s Umbrella integrated applications systems for very large banking and savings institutions. "With Umbrella, we have the ability to develop a program with a layer in between so that we can manipulate the layer and not have to change the program when the data in the layer changes," Esposito said.

Umbrella is an on-line, transaction-driven active "process and data dictionary" for both batch and on-line processing, Esposito explained. It makes available an extensive catalog of software modules. "We can have one team of people writing Cobol code, another team using some of the Umbrella functions — such as editing processes — and a third team doing error codes," Esposito said. "They don't have to know what each other is doing, and they don't have to know Umbrella to use Cobol or know Cobol to use Umbrella."

System development

Development of a system becomes a matter of choosing the proper components, supplying parameters to tailor the components to the application, then integrating into the final system any programming that is unique to the application, he said.

The Umbrella system has three major components: the Processing Environment Manager (PEM); the Production Support (PS); and the Application Support (AS).

PEM isolates the application software from the hardware and the operating system so that applications are independent of the operating environment. It also directs the processing mode and functions to maintain and control the processing dictionary that stores transaction definitions, programs, work to be accomplished, data groups, data bases, logic flow, variable data and screen formats.

PS is a series of systems that provide services to the applications and control the processing of exceptions, centralized applications and cyclical transactions. It also provides audit control totals.

AS accomplishes four interrelated tasks: elimination of redundant programming, simplification of program maintenance, creation of application systems and reduction of the training requirements and skill levels necessary to create and maintain application system software, Esposito said.

"Our nontechnical people can put up all their own tables, their own edited format abilities and all their own error messages and maintain them," he said.

A by-product of Equitable's use of Umbrella has been increased creativity, he added. Umbrella has permitted Equitable to go ahead with new applications programs by off-loading some of the nontechnical work to users and concentrating the efforts of the technical staff on the new programs. What might have taken five years under the old programming methodology may take half as much time now, he said.

There has been some resistance to Umbrella by the technical staff, particularly from those programmers who want to increase their marketability by learning IBM's IMS, Esposito said. With Umbrella, however, IMS and CICS skills may not be needed, a factor many systems people don't like to hear.

"What they haven't come to understand yet is that the thinking process, the human logic behind the real skill, can never be replaced by Umbrella" he said. "But Umbrella has freed them from those nontechnical tasks.

"The integration of telecommunications and data base through this one system — to be able to get into the technical environments as well as straight sequential files — will be the most important task facing programmers in the future," Esposito said. "Prototyping will enable the user to have input into systems design. And if a programmer or user has spent a week working on a prototype, it won't be thrown away."

See UMBRELLA SR/24

4th Generation Language for the Personal Computer

NPL® The ~~NonProcedural~~ NonProgrammers Language

The NPL Information Management System lets an end user build applications without becoming a programmer.

In less than one day, you will:
- create database files of your own
- specify edit and validation tests
- 'paint' data entry screens
- select, sort and merge data records, and
- print simple and formatted reports

NPL is available on the following microcomputers:
IBM-PC® & IBM-XT®, Apple® II & III,
DEC Professional® 350 & Rainbow® and the Sage II
...soon on Victor® 9000, Burroughs B20,
Hewlett Packard 9816.

If you like RAMIS II®, FOCUS® or NOMAD2® on big mainframe computers, you'll love NPL on a microcomputer..., the strong language similarity means zero training time.
The NPL System is an essential tool for your company's INFORMATION CENTER.

All for only $9501

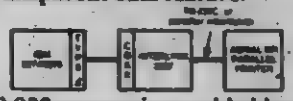
For more information, contact our Customer Services at 609/924-7111 or write:

DeskTop Software Corporation
228 Alexander Street, Princeton, NJ 08540

IBM PC & IBM XT are registered trademarks of International Business Machines, Inc., Apple II & Apple III are registered trademarks of Apple Computer Inc., DEC Professional & Rainbow are registered trademarks of Digital Equipment Corporation, Sage is a registered trademark of Sage Computer Technology, Victor is a registered trademark of Victor Technologies, Inc., RAMIS II is a registered trademark of Mathematica, Inc., FOCUS is a registered trademark of Information Builders, Inc., NOMAD2 is a registered trademark of D & B Computing Services, Inc.

For $1750 plug into the IBM 3270 with low-cost printers.

InterLynx™/3287 protocol converter features:
- Fully compatible with IBM 3274/3276 controllers.
- Use low-cost ASCII dot matrix and letter quality printers on 3270 controllers.
- 3270 Type A coax-to-async ASCII conversions.
- LU 3 (BSC) and LU1 (SCS SNA/SDLC) modes.
- Full operator panel (including reprint).
- Front panel menu setup.
- RS-232C and Centronics interface standard.
- Pseudo-transparent data feature.



Find out why over 2,000 companies worldwide use Local Data protocol converters to expand their IBM mainframe communication capabilities.
Call today for more information. And ask about our 30-day free trial program.

Local Data
INTERLYNX™/3287

LOCAL DATA • 2701 Toledo Street • Torrance • California • 90503
Telephone 213-320-7126/TLX 182518

"Your Lynx to IBM."

System tracks utility's construction needs

By keeping tabs on unusual materials requests

SAN DIEGO — Engineers at the San Diego Gas & Electric Co. (SDG&E) are organizing and budgeting transmission-line projects more efficiently with the assistance of a materials tracking system.

Designed with SAS Institute, Inc.'s SAS and SAS/FSP software, the tracking system helps ensure the availability of supplies in the right quantities for complex transmission-line projects. The system works toward reducing project delays and ensuring sufficient energy transmission.

Transmission-line projects often require large quantities of unusual materials. Engineers at SDG&E thus named their SAS-based tracking system the RUM System, an acronym for requests for unusual materials. Using the RUM System, users can document and track material requests and immediately identify the status of materials necessary for transmission projects prior to the construction phase.

Developed in three stages

The automated materials tracking system was developed in three stages. The first stage involved defining the data requirements for the system. These requirements were identified from the company's existing manual materials systems.

The second stage focused on the design of the data entry forms. The third stage was devoted to developing the software and procedures for updating and maintaining the data base. The computer language for the materials tracking system was also selected during the third stage.

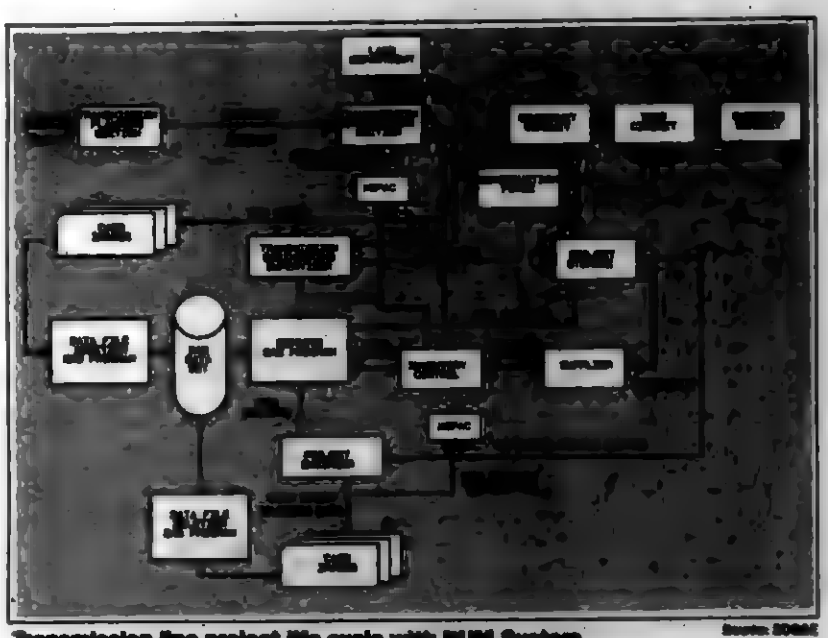
SAS was chosen as the development tool for the RUM System because of its high-level language capability and its comprehensive file-handling and report-writing facilities, according to Dr. Roger B. Glaser, senior management analyst at SDG&E.

Designed with SAS Institute, Inc.'s SAS and SAS/FSP software, the tracking system helps ensure the availability of supplies in the right quantities for complex transmission-line projects. The system works toward reducing project delays and ensuring sufficient energy transmission.

SAS/FSP and the addition of the Relational Algebraic Query Language (RAQL), developed for SAS at McGill University, add flexibility to the RUM System.

With SAS/FSP, users can edit and query the RUM data base in full screen mode. RAQL was initially used in the delete step, replacing a SAS Merge with a Minus operation.

The RUM data base is currently being reviewed to determine if it would be feasible to restructure it in a relational format, thus allowing greater query flexibility with RAQL.



Transmission-line project life cycle with RUM System. Source: SDG&E

Prototype model

SAS enabled the modeling of the prototype system in a timely and cost-effective manner, according to Glaser. Card images of the material data from the RUM forms are stored as an OS file for input into a SAS program.

This program adds the new materials data to the SAS data set, which serves as the data base for the RUM System. A second SAS program uses formatted output and Macro definitions to produce the RUM System's customized reports. These reports display the source data sorted according to the information needs of the report recipients.

"The RUM System was developed easily with SAS, and it exemplified the language's potential to increase productivity," Glaser stated. Consequently, a SAS training program was developed at SDG&E to encourage further employee productivity in many SAS applications.

"The SAS-based materials tracking system has also promoted communication between the diverse segments of SDG&E that coptribute to the successful completion of a transmission-line project," Glaser said.

"Reports from the RUM System have encouraged use of a common vocabulary, which in turn has reduced the possibility of misunderstandings between project participants," he said. "Other groups within the company with similar project responsibility are recognizing the RUM System as useful for their own materials tracking requirements," Glaser added.

At this time, SDG&E is purchasing a companywide material management information system. The company plans to use the graphics and statistical analysis capabilities in SAS for the new automated system.

RUM report sort fields, distribution and exhibit reference number. Source: SDG&E

Talking to the French computer world is now easier than you think...

...with our sister publication Le Monde Informatique.

France's rapidly growing market for computers and data processing systems is one of the largest in the world. Currently, the installed value of general purpose computer systems is more than $11.1 billion, and a tremendous continuing demand for data processing equipment will cause outside spending on computer-related equipment to increase at an annual rate of 16%, between 1981 and 1985.

When choosing new equipment and keeping up-to-date with this ever-changing industry, top systems executives will read *Le Monde Informatique*. *Le Monde Informatique* is a weekly tabloid newspaper with a uniquely targeted circulation of 22,000 copies. The circulation profile was developed by International Data Corporation, the world's leading EDP market research firm, to reach the decision-makers and buying influences at the most important DP facilities in France.

CW International Marketing Services Department can give you one-stop advertising service in countries around the world. For more information about *Le Monde Informatique* or any of our other foreign publications, just fill out the coupon below.

Diana La Muraglia,
Manager, International Marketing Services
CW COMMUNICATIONS/INC.
375 Cochituate Road, Box 880, Framingham, MA 01701 (617) 879-0700

Please send me more information on
_____Le Monde Informatique
_____Your Other Foreign Publications
Name_____
Title_____
Company_____
Address_____
City_____State_____Zip_____

Publishers of Computerworld and other leading computer publications around the world.

UMBRELLA from SR/23

Umbrella also affects maintenance, Esposito said, since it enables the rewriting of systems that might not have been economical or practical in the past. And it will have an impact on development center technology where the considerations of hardware, software and people come to bear.

"You're putting your technical programmers where they're most needed — on the technical jobs," Esposito said.

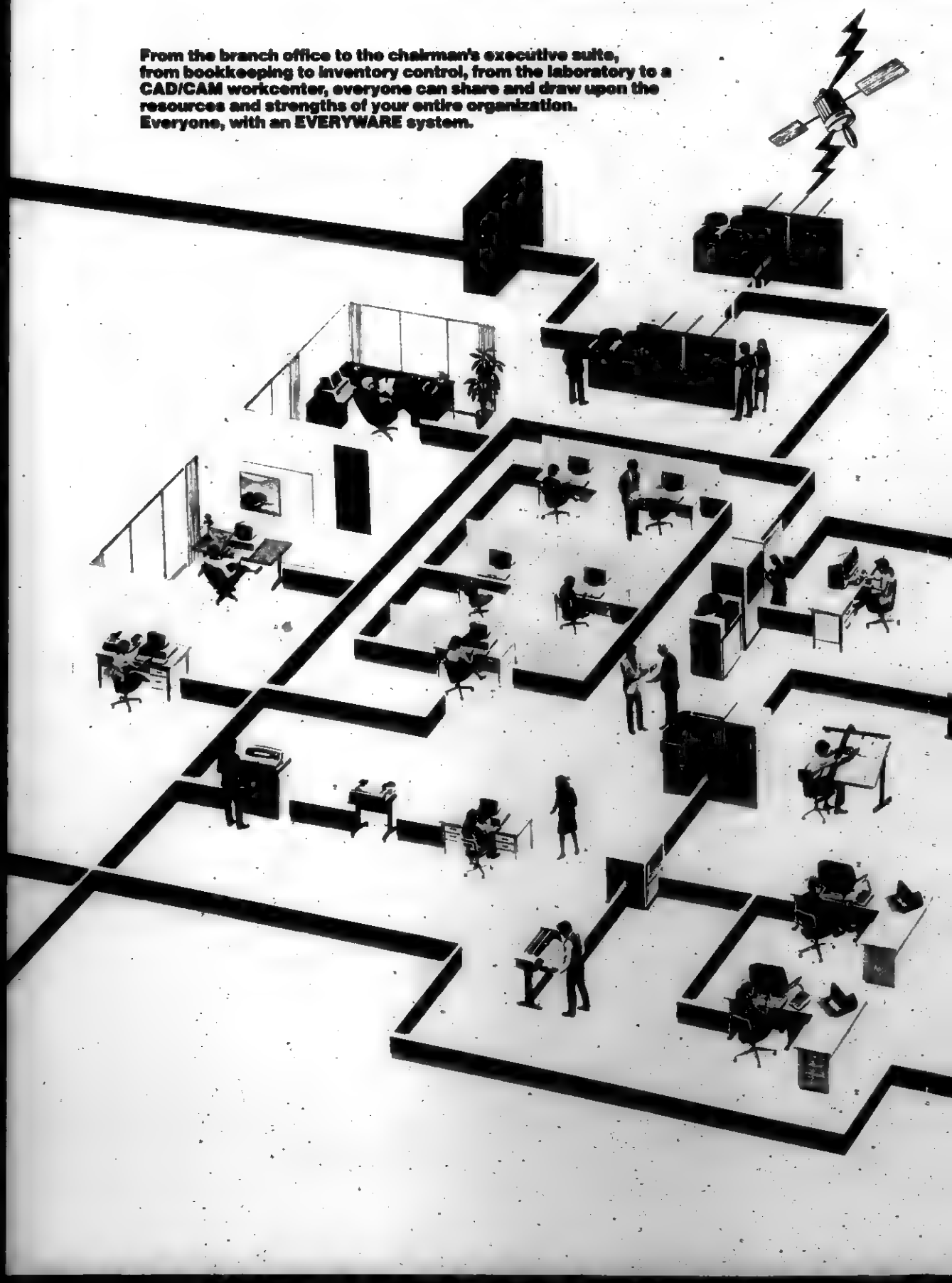
"You're writing programs that are easily maintained or changed when necessary, and when they're changed, the alterations are across the whole system."

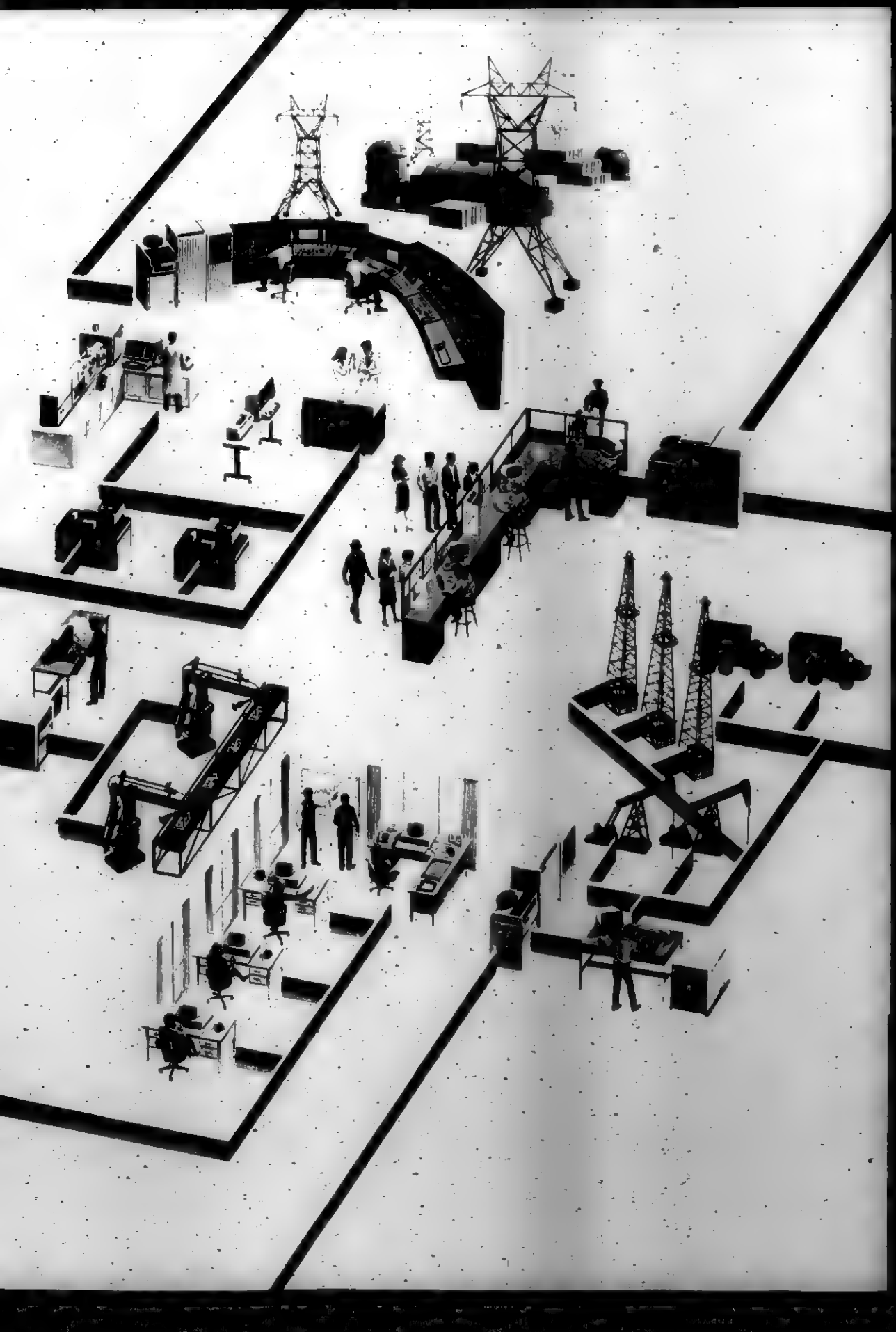
Where can you find the solutions to your compatibility, connectivity, portability, and expansion problems?

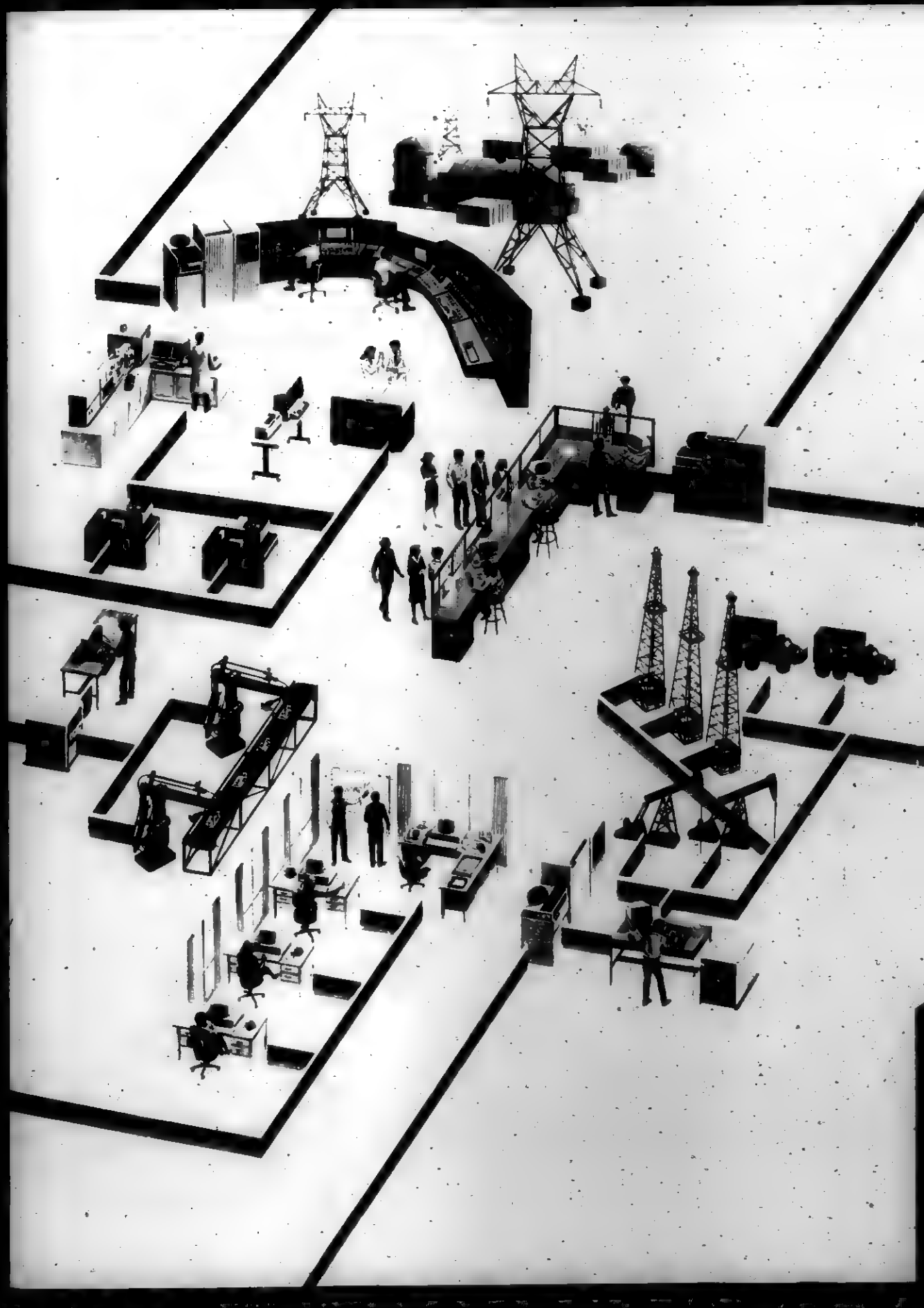
EVERYWARE™

from Perkin-Elmer.

From the branch office to the chairman's executive suite, from bookkeeping to inventory control, from the laboratory to a CAD/CAM workcenter, everyone can share and draw upon the resources and strengths of your entire organization. Everyone, with an EVERYWARE system.







EVERYWARE™ products from Perkin-Elmer.

Everything you need for the systems you want.

EVERYWARE hardware: a comprehensive selection.

Our computers range from the Series 3200 superminis—including the economical 3205 and the incredibly fast and powerful 3250XP—to the Series 7000 desktop professional computers, built around the powerful M68000 microprocessor. Since EVERYWARE hardware is based on a distributed processing architecture, it lets you bring the right amount of computing power right where you need it.

EVERYWARE software: unparalleled flexibility.

Since software is your biggest long-term investment, we set out to protect it with several key features. First, we offer a common operating system that spans our entire line of products. Derived from a UNIX* operating system, this common operating system offers programming productivity advantages. And, all our computers speak the same languages, FORTRAN and C. These languages are bridging tools that link this common operating system and our proprietary OS/32 operating system to give you both developmental advantages and real-time capability.

EVERYWARE software is more than operating systems and languages. It includes Reliance PLUS, a proven relational DBMS that shows how user-friendly a powerful transaction processing system can be. And there is the Resilient System, which links dual Series 3200 computers for high availability processing.

Finally, our operating systems allow you access to the huge library of existing third party software. For example, you can run a word processing package like VisiWord,™ or a spreadsheet like Supercomp-Twenty,™ and many other popular applications packages.

EVERYWARE communications: a commitment to standards.

EVERYWARE systems can share information with IBM environments via SNA or BSC using emulators for such products as IBM 3270, 3770, HASP and 2780/3780. You can form a local network or join one using Ethernet. And through Perkin-Elmer's PENnet-Plus you can use all the global facilities of the CCITT X.25/X.29 Packet Switching Network. EVERYWARE products conform to the ISO-OSI Reference Model, assuring long-term connectivity.

Perkin-Elmer introduces EVERYWARE™

At last, a comprehensive application of the world's major hardware, software and communications standards. For your present and next-generation information systems.

You've devoted a lot of time and money developing software programs to meet the needs of your organization. What happens when it's time to upgrade your hardware? Will your software make the transition smoothly? Especially now when the cost of writing and maintaining software continues to climb. How do you protect your existing investment and make all the right moves for the future?

The heart of the problem is the lack of universally applied hardware, software and communications standards. Now Perkin-Elmer has done something about it. Our EVERYWARE product family offers you proven, established and widely supported industry standards. You can live with them now. And tomorrow.

The compatibility and connectivity problem. The Perkin-Elmer solution: EVERYWARE products.

You face the challenge of developing new systems and software every day. Frequently, these systems have to become part of your existing processing environment. EVERYWARE products offer the ability to coexist with systems from other manufacturers. This has been achieved in three ways. First, by Perkin-Elmer's commitment to an industry standard operating system. Second, through our commitment to compatible languages. And finally, by our support of all of today's and tomorrow's major communications protocols. As a result, EVERYWARE computers can share information with other systems desk-to-desk, room-to-room, across town and across continents.

The portability problem. The Perkin-Elmer solution: EVERYWARE products.

The capability to efficiently port your software is another benefit of EVERYWARE products. From computer to computer, department to department, your programs retain their value, protecting your investment. You can develop software on an EVERYWARE computer in one system and port it to other EVERYWARE computers anywhere in your organization. For example, you can write software on a desktop microcomputer and run it on a supermini. And because EVERYWARE hardware supports an industry standard operating system, you have access to a vast library of third party software.

The expansion problem. The Perkin-Elmer solution: EVERYWARE products.

Perkin-Elmer offers one of the broadest ranges of computers in the world. It extends from 32-bit superminis to desktop workstations. So you can expand at your own speed, adding the power you need, whenever you need it. As more capacity is required, you simply connect additional processors. You can grow board-by-board, or by adding complete computer systems. Because of the built-in compatibility, there is no need to re-write your applications software. Existing programs continue to run without major alteration.

EVERYWARE™ systems

EVERYWARE systems. In finance and insurance.

Today a major nationwide financial network uses Perkin-Elmer computers to flash over 500,000 updates a day to over 11,000 terminals.

EVERYWARE systems. In flight simulation.

Perhaps the most graphic demonstration of Perkin-Elmer computer strength and real-time capability is in the re-creation of flight conditions for the training of pilots and astronauts in the United States and around the world.

EVERYWARE systems. In science.

Perkin-Elmer is the acknowledged leader in the computerization of the lab. We provide the same leadership in computers for seismic exploration and many other fields of science and research.

EVERYWARE systems. Everything you need from one respected source.

Perkin-Elmer is a major manufacturer of advanced computers. Our 32-bit supermini was the first of its kind and our supermini family is the broadest in the business. Computers from Perkin-Elmer are particularly sought after for use in demanding, high availability environments.

EVERYWARE software provides the flexibility to develop, port or purchase programming.

EVERYWARE communications products comprise the most comprehensive collection of protocols available from a single vendor.

These are decided advantages for those of you already using Perkin-Elmer computers. And exciting considerations for those now planning the evolution of information processing centers.

Write us or call today.
The Perkin-Elmer Corporation,
2 Crescent Place, Oceanport,
NJ 07757 U.S.A.
Tel: **800 631-2154**
toll-free or (201) 870-4712.

Perkin-Elmer is a registered trademark of The Perkin-Elmer Corporation.
EVERYWARE is a trademark of The Perkin-Elmer Corporation.
UNIX is a trademark of Bell Laboratories.
VisWord is a trademark of VisCorp, Inc.
Supercomp Twenty is a trademark of Access Technology, Inc.
IBM is a registered trademark of International Business Machines Corporation.

PERKIN-ELMER

Printed in U.S.A.

SPECIAL REPORT

Tips on shopping for software

By Helen R. Schlatt
Special to CW

Using purchased software packages will almost always be less expensive, take less time to get into operation and entail fewer risks than a development effort — assuming that the right package is obtained from the right vendor.

The steps involved in selecting specific software packages vary with each situation, but a general procedure is applicable in almost all cases. The basic features to look for and questions to ask are listed in the accompanying chart.

Once you have asked yourself these questions, the software you buy will at least be satisfactory for your purposes. The steps to be followed in selecting software packages include:

Classifying needs. If the computer must accommodate several different applications, decide which application is most important and choose the software for it first. Then check to see what good software is available to handle the less important applications on the same computer. If two or more applications have equal priority, you may have to compromise by selecting software to handle both applications adequately.

It is also useful to decide how essential the requirements are. Requirements may be categorized as fixed, flexible and optional. A fixed requirement means that certain functions must be performed in a specific way. For instance, a tax program should print the results in a form acceptable to the government.

A flexible requirement must also accomplish certain functions, but there is some freedom in how it does so. A payroll system, for example, must be able to calculate overtime hours, but it may not matter if straight-time pay and overtime pay are combined on a single check. An optional requirement is one that you could easily live without.

After defining and classifying requirements, write them down so that they can serve as a guide in evaluating software packages.

Make a requirements chart. You can make a requirements chart by using the specifications already developed, paying particular attention to fixed requirements. The result of this step will be a uniform means of evaluating products.

Define software capacity. The amount of data you expect the software to handle needs to be added to the requirements chart. Software capacity limits are set by the software author to ensure that the program can run in the memory available on the computer configuration for which it was designed. The present and anticipated data capacity for the next year or two should be estimated, and these numbers should be added to the requirements chart.

Given that a particular system can perform all the functions required for an application, determine how much data must be stored. Capacity is as much a question of hardware characteristics as it is of software limitations. Software product documentation should relate what kind of hardware char-

See GUIDE SR/35

Fill in your IBM micro/mainframe communications picture.

AST Research, the leader in IBM PC enhancement products, brightens your micro/mainframe communications picture with a full palette of economical, integrated hardware/software masterpieces. With AST Products, you can emulate IBM terminals or create PC-based Local Area Networks.

AST improves your office operating cost picture.

AST communications products give your IBM PC the flexibility to act as a terminal for your host system, or as a stand-alone computer for smaller tasks. Your PC won't bog down the mainframe with unnecessary small jobs and local computing on the PC eliminates phone line charges too. Get the power of a mainframe when you need it and personal computer convenience right at your fingertips.

Application solutions that ease shortage of qualified.

AST keeps pace with your ever-changing applications requirements with reliable, high quality, cost effective communications products. AST products provide support for Bisync and SDLC/HDLC communications protocols as well as networking multiple PCs for sharing resources.

Choose AST products — by the numbers.

These AST communications packages are currently available:

1. AST-PCS™ emulates a 3274/3276 controller and 3278 or 3279 display terminal using SDLC protocol.
2. AST-BSC™ emulates 2770 batch RJE and remote 3270 display terminals using 3270 Bisync protocol.
3. AST-PCOX™ allows your PC to connect to an IBM 3274/3276 cluster controller via coax cable and emulates a 3278 or 3279 display terminal.
4. AST-5780™ emulates 2770, 2780, 3741, and 3780 RJE workstations using Bisync protocol.
5. AST-5251™ emulates a IBM Model 12 remote workstation connected to an IBM System 34, 36 or 38.
6. PCnet™ is the first Local Area Network designed specifically for the IBM PC or XT and the PC-DOS 1.1 or 2.0 operating system.
7. PC-3287™ is a user-programmable dual-port card capable of communicating in Async, Bisync, SDLC or HDLC protocols.

Discover how well AST can fill in your micro/mainframe communications picture. For descriptive data sheets, write or call: AST Research Inc., 2121 Alton Ave., Irvine, CA 92714. (714) 863-1333. TWX: 910-595-1215

AST RESEARCH INC.

Number One Add-Ons for IBM PC.

Fuel parts maker speeds operations via MRP

WINDSOR, Conn. — A rapidly growing manufacturing company, Stanadyne Diesel Systems, discovered that its operations and administrative staff didn't have time to wait for information.

The company needed timely production data if it was going to achieve minimum inventories and delivery objectives. Based here, Stanadyne manufactures diesel fuel-injection pumps, nozzles and fuel filters for automotive, agricultural and industrial OEMs.

In 1977, the company began producing larger volumes of automotive products, moving from a job shop environment to that of a repetitive manufacturer. The company has also grown from a single- to a multiplant operation by building several manufacturing facilities in North Carolina.

It became obvious that Stanadyne had outgrown the Production and Inventory Control System (Pics) that had been in operation for more than 10 years. "It operated by processing manufacturing orders. We needed an 'orderless' system which would explode a master production schedule through bills of material, netting inventory as it went," said Jeff Anderson, manufacturing systems manager at Stanadyne.

"We also needed a material requirements planning [MRP] system which would net on-hand and in-process material, instead of on-hand and on-order," he said.

"Another problem we had to solve was that Pics ran once a week in a regenerative mode, forcing us to throw out our MRP each week and create another from scratch. We needed an MRP system which would run once a day and offer exception reporting."

To find the MRP system that answered all of these needs, Anderson and his committee evaluated 11 software packages. The group selected Pios, the manufacturing control system from On-Line Software International (OSI) of Fort Lee, N.J. Stanadyne installed the master production scheduling, bills of material, inventory and MRP modules of Pios.

"Pios was selected because it is compatible with the CICS/DL/1 environment running on our IBM Model 4341 mainframe," Anderson said.

"Pios also had a multiplant master production scheduling module, multiplant bills of material, which can be used for both MRP and production costing, and it provided inventory control by plant."

At Stanadyne, users design the changes they want for the system, and the data processing staff executes them. The staff has altered Pios to net inventory in-process as opposed to on-order and has masked order numbers from the shop floor and inventory staff.

Inventory module

Alterations also were made to the inventory module of Pios. "We don't move parts in and out of storage areas," Anderson said. "We now take inventory counts from the shop floor and backflush through the bill of material for each assembly to account for the pieces consumed. We altered the basic product to operate as a flow inventory."

Anderson added that the master production scheduling module was another factor in the decision to purchase Pios from OSI. "Although we assemble to customer orders, master production scheduling allows us to decouple MRP from those customer orders, providing a uniform load to the plant," he said. This module allows the planning staff to do online maintenance, simulation and capacity planning with graphics to portray resource loading.

SourceTools Increases
Programmer Productivity

Oregon
Software

1-800-547-3000

SPECIAL **REPORT**

Hasty hardware decision plagues furniture firm

By Roger Barnes
Special to CW:

When a national furniture manufacturer decided to install a preprogrammed manufacturing applications package on an IBM System/34, the promise was an operable system in three months for less than $120,000 with only one full-time DP employee. The reality was a $700,000 package modification bill, a computer system too complex for the company's operation and an annual maintenance budget of $120,000.

A Pacific Northwest agribusiness decided to upgrade its batch-oriented card system to an interactive accounting, personnel and inventory system. A Hewlett-Packard Co. HP 3000 with 40 terminals was installed, and a search was conducted for a preprogrammed applications package. The result was a system that did not have the capabilities of the old batch system, an annual DP operations budget twice as large as projected and a DP staff too busy with applications maintenance to do any project development.

The furniture manufacturer had to computerize to remain competitive. After assessing its requirements and a proposed DP budget, the company decided a packaged application would satisfy its requirements. Various vendors were contacted; documentation was reviewed; and the appropriate personnel attended demonstrations. A semidetailed requirements analysis was done, but a request for proposals was not prepared, and formal proposals were not required from the vendors.

Package with modifications

A package was chosen for its overall manufacturing control and accounting capabilities and because it had been installed successfully several times before. Prior to installation, several areas were identified where modifications were required and, with the advice of the vendor, modifications were budgeted at $50,000.

But what management was expecting and what the vendor was willing to provide for the money were different. As management saw what the computer could do, it wanted even more. Within months, the vendor was being asked to modify previous modifications.

A consultant was brought in to get the project under control, and a new programming contractor replaced the original vendor. By the time the company had invested $300,000 in modifications, it was too far into the project to stop. It could only put a moratorium on design changes and complete the programming based on the current change orders. By the

See COSTS SR/36

We've made it so easy to build expert systems, all you need is a pair of scissors.

It's true. With TIMM™ (The Intelligent Machine Model), just about anyone can now build a powerful expert system. Quickly. Easily. Without knowing a thing about computers. Just send us the coupon,or call, and we'll tell you all about this exciting breakthrough in artificial intelligence. Here are just some of TIMM's features:

- Knowledge engineering embedded in software
- Lets you quickly build prototype systems
- Is "domain-independent"
- Checks for consistency and completeness
- Learns by example, generalizes knowledge

SEND ME THE STORY OF TIMM™

Name _____
Company _____
Title _____
Address _____
City _____ State _____ Zip _____
Telephone _____

☐ Please call me. ☐ Send information only.

Mail to: TIMM, P.O. Box 6770, Santa Barbara, CA 93160-6770
Or call, toll-free, 1-800-235-6788. In California, call (805) 964-7724

The Software Workshop®
Artificial Intelligence Laboratory • General Research Corporation

VM/CMS USERWARE™

A Family of VM Products

SO ADVANCED IT'S SIMPLE

In just 60 days over 100 sites installed the Simple Approach.

BACKUP/CMS
THE SIMPLE APPROACH TO BACKUPS
(VM/CMS Minidisk Backup/Restore Facility)

- Interactive use
- Incremental & full backup capability
- Dynamic password acquisition
- Tape management interfaces
- Online catalog allows a restoration with only two commands: a FIND and a RESTORE
- No batch processing of any kind

TAPELIB/CMS
THE SIMPLE APPROACH TO TAPE MANAGEMENT
(VM Tape Management Facility)

- Interactive commands
- Full support for SL or NL tapes
- Capability to share tapes
- OS/DOS tape management interface
- Manages tape drive allocation and tape requests
- Active tape catalog
- Full management & audit reports

PPT/CMS
THE SIMPLE APPROACH TO PROGRAMMER PRODUCTIVITY
(VM Programmer Productivity Tools)

- SECURE
- TSCAN
- MODZAP
- TAPECOPY
- SEARCH
- SCRATCH

- All three products can be installed and working for you in the same day, thus saving you valuable time, tape, manpower and computer resources.
- An easy to use online help facility is included with each product.
- No modifications to your VM system are required.
- VM/SP release 3.0 support available.

For under $10,000, you can put all 3 Userware™ products to work in your shop today! Why pay more?

Boole & Babbage, Inc.
510 Oakmead Parkway, Sunnyvale, CA 94086

For more information or a 30-day No Obligation Trial, call (800) 222-6853; in California call (408) 736-6658; or return this coupon.

Name _____ Title _____
Company _____ Phone # ( ) _____
Address _____
City _____ State _____ Zip _____

Boole & Babbage

The single source for harder working software.

There isn't another in the world able to as advanced as For five go

1. The Millennium environment is borderless.

Unlike any other company's software packages, Millennium packages aren't walled off from each other by separate programs and commands. So you can cross instantly from one system to the next. You can ask a question in general ledger, immediately seek an answer on-line in accounts payable, and follow the track wherever it leads. Into fixed assets, purchase order management, anywhere. While traditional packages force you to work within the narrow confines of a given application, Millennium creates a limitless environment that enables you to access applications at will. With a single key, you're free to explore the vast entirety of your information universe. No other system works like Millennium, except your own mind.

2. Millennium has common functions across all applications.

Let's say you have a half dozen different packages. General ledger, accounts payable, and so on. In the past, that meant doing everything a half dozen times. Learning the different programs and commands for each application. Training users in data entry procedures for each one. From a training and service standpoint, Millennium is infinitely less complicated because the same set of functions governs all applications. You use, for example, the same real-time update procedures for accounts payable as fixed assets. Functions never change, only the data that defines the particular application. Once you learn one set of functions, you've learned them all. And you quickly find you're faced with a much lighter load of training, documentation and support requirements.

3. All Millennium systems are real-time, on-line.

Working in the borderless environment, you perform routine file maintenance on the spot as you cross from system to system. You can update fields, records or any other information in your files instantly. There's no waiting for batch processing. You get accurate, up-to-

McCormack & Dodge Corporation, 1225 Worcester Avenue, Natick, MA 01760. Sales and

software company give you anything Millennium.

od reasons.

the-second information the moment you need it. Today, not tomorrow when it's too late.

4. All Millennium systems are secure and friendly.

Although Millennium is borderless, the security is tighter than any border patrol. Totally comprehensive and user defined. You can set up any restrictions you want, right down to the field level.

Even the on-line HELP feature in Millennium is user-defined. Not only do you get comprehensive on-line documentation from McCormack & Dodge. But you're able to enter your own specific instructions and requirements on-line into the HELP data base, exactly the way you want them. This gives you complete flexibility to define corporate policies and procedures.

Millennium has a special ScreenPaint function that lets you design your own terminal screens quickly and easily. You can see and use your new screen format in a matter of seconds.

support offices throughout North and South America, Europe, Asia, Australia and Africa.

5. Millennium offers an interactive PC link.

This gives you an enormously powerful and effective managerial tool. Without leaving your desk, you can open up your mainframe to the analytical powers of your personal computer. You can selectively download specific data from the mainframe and study it, manipulate it and graph your results. When you've finished you can upload the data back to the mainframe in minutes.

Clearly, Millennium is the software of tomorrow. But only McCormack & Dodge can install it today.

Introducing Millennium. Tomorrow's software today.

- ☐ General Ledger
- ☐ Accounts Payable
- ☐ Fixed Asset Accounting
- ☐ Payroll/Personnel
- ☐ Purchase Order Management
- ☐ Capital Project Analysis

1-800-343-0325*

*Telex 174002

McCormack & Dodge

a company of The Dun & Bradstreet Corporation

COSTS from SR/25

tion modifications were halted, the system did not resemble the original package and did not run on the originally configured computer.

The main problem was that management would not stop making changes. There was no design freeze. Management did not control the modifications, change procedures or budget.

The programmers did not insist on a detailed requirements definition and instead made modifications based on their own assumptions. In this case, installing a preprogrammed application was more expensive than starting from scratch and developing a custom application.

This disaster could have been avoided with more attention and control by management and a more detailed assessment of the company's needs and the package's capabilities. Management should have developed a detailed requirements list prior to evaluating packages. A request for proposals should have been prepared and formal proposals solicited from the vendors.

After the package was chosen, detailed specifications for modifications should have been developed and agreed upon. A separate contract should have been negotiated for programming, including cost, schedules and modification approvals. Once the programming phase commenced, no changes should have been allowed until after the system had been up and running for six months.

The agribusiness company had ran running a batch-oriented card system for seven years. The annual maintenance cost of the hardware was expensive, breakdowns were frequent and the users were complaining that the system wasn't providing the information necessary to run their departments. Management decided to hire a DP manager to upgrade the system.

The new DP manager analyzed the hardware problems and interviewed the department heads to determine their requirements. Based on this information, he submitted a proposal for a new HP 3000 computer with 40 terminals. His presentation showed how he could save money and give everyone the information they needed. His request was approved immediately, and the HP 3000 was installed.

The DP manager then hired three new programmers to start rewriting the old batch systems to run on the new on-line system. He also began to look for an accounting package to run on the system. The DP manager did not understand accounting, nor did he consult with users about their requirements. He purchased a package that ran on the hardware as configured and had been used in the wholesale office supply industry.

A year and a half later, the package was not yet installed to an acceptable level, and the old hardware was still operating. The users had 207 change requests totaling 4,000 programming hours. The major problem in this case was the fact that the hardware decision was made before the applications requirements were thoroughly understood; consequently, the hardware dictated the software. When it came time to select the applications package, the users were not contacted.

Thus, the DP staff had no way of determining requirements or comparing package capabilities with requirements, and users felt left out of the process and, subsequently, weren't willing to help the DP staff or vendor install the package that had been forced upon them.

This disaster could have been avoided by taking an applications approach instead of a hardware approach to the system. The DP manager came to a small business with a small computer from a large government shop with multimainframes. The agribusiness needed a manager who was user- and applications-oriented. The analysis of the system should have been focused on detailed user requirements, and the users should have been involved in reviewing and approving the package selection and modification requirements.

Barnes is director of management services for San Francisco-based Moss Adams, certified public accountants.

GUIDE from SR/31

acteristics are required and should also describe any limitations inherent in the software.

Locate the packages. Identify software products that meet, or come close to meeting, the requirements. Read product reviews in computer magazines, scan product advertisements in trade periodicals, visit local computer dealers, contact your industry or trade association, talk to associates who have bought computer software for requirements similar to yours or call your accounting firm. Another source of information is published directories of software.

Rank the products. This is based on a tabulation of how closely the products meet the requirements. To be sure that the software is right for your business:

- Purchase or borrow the manual, and read it to understand the capabilities and limitations of the software.
- Attend a demonstration of the software — if possible, using some of your own data.
- Consider whether the people who will use the software can follow the instructions provided or will require special training.

If you do a thorough job in listing requirements in detail, one product should stand out above the others.

Schick is manager of management consulting services at Coopers & Lybrand in Springfield, Mass.

SPECIAL REPORT

In-house system cuts number-crunchers' costs

CHICAGO — Fritz & Griffin, a general accounting firm, is working at three times the volume it did a little over a year ago, when it used service bureaus to crunch numbers and prepare monthly financial statements for clients. But with the purchase of an in-house computer system, the company is paying no more to process the heavier work load.

"Cost and inflexibility of the service bureaus caused us to explore the advantages we could gain from purchasing our own system," according to Don Griffin, a partner at the firm.

"We engaged consultants to help us find the best system. We defined our current needs and projected out three to five years, knowing elastic capabilities would be needed if the system was to have a long life with us.

"In our eyes, software designed for IBM brands had an edge over other products, especially if IBM recommended or approved of the software," he said.

Fritz & Griffin settled upon software from the Management Control Systems Division of Informatics General Corp., Woodland Hills, Calif., and the IBM Datamaster computer. Today, the firm's system also has two hard disk drives, two terminals, two printers and a word processing package from IBM.

Range of clients

Fritz & Griffin is a generalist accounting concern with clients ranging from manufacturing to retailing to transportation. The firm also provides financial services to a farm, a restaurant and a private school.

"With such a varied clientele, our computer system had to fit the needs of a group of clients without regard to industry, size of company or volume of accounting needs," Griffin said. "After careful consideration, we decided the Informatics-IBM combination gave us the best system for that kind of flexibility."

For example, Fritz & Griffin functions as a complete accounting department for some clients, making their bank deposits, writing checks, submitting checks for signing and preparing a general ledger.

"To do that, we need an integrated system where the general ledger and accounts payable programs work together, and we don't have to reenter information from one program into the other," Griffin said.

"For instance, we invoke a program to pay a check and it's automatically posted into the general ledger. However, for certain clients, we bypass that function and just process checks after payment. Most of the systems we looked at couldn't do both."

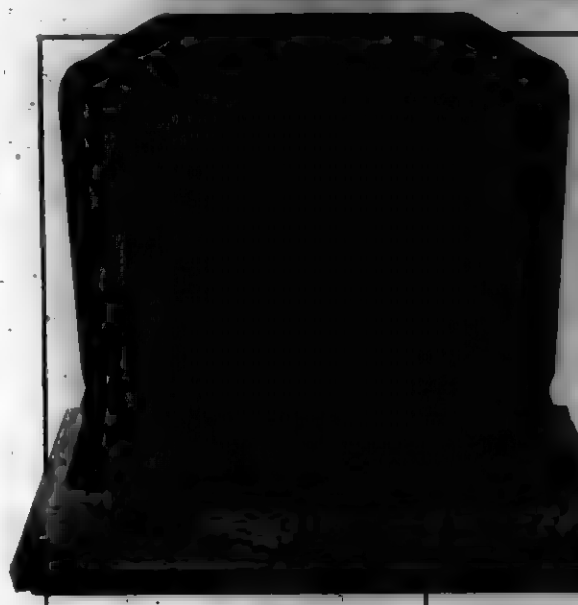
Fritz & Griffin does business differently now, because work is not sent to another location. The firm also takes some shortcuts that could not be done with service bureaus, he said.

Hash totaling was required down to account numbers with all figures tied in and zero balanced before a bureau could issue a financial statement. Accountants can now arrive at a preliminary profit figure without account number hash totals. They review an edit report to check for accuracy of posting, and then a final statement is issued.

In addition, all processing is run at night so accountants can work with fresh information every day rather than wait for mail or messenger delivery from the service bureau. "With the flexibility in our software system, we feel we can select a format for each client that will make the right impression.

"We've also been able to add or delete items depending on individual needs and even provide additional documents," Griffin added.

WITH RAMIS II ENGLISH, THE COMPUTER HAS FINALLY LEARNED YOUR LANGUAGE.



Now, you can talk to your computer the way you talk to a colleague: in plain English.

Even if you've never been on speaking terms with a computer, RAMIS II's advanced knowledge-based technology lets you ask questions, obtain answers, even create reports in only a few minutes. As a result, you can work more effectively and productively—without having to learn a specialized computer language. You just use English.

RAMIS II: ARTIFICIAL INTELLIGENCE THAT DELIVERS REAL PRODUCTIVITY.

RAMIS II English combines years of research by Mathematica in linguistics and artificial intelligence with proven expertise in developing practical, easy-to-use software products. The result is maximum fluency with minimum demands on support staff. In fact, while other systems require days or weeks of dictionary setup for each application, the *extensive built-in knowledge base* of RAMIS II English provides immediate access to most data.

RAMIS II English enables you to access data directly, without costly and time-consuming downloading or reformatting, so the latest information is always available.

Wherever your data is stored—in RAMIS II databases; in ADABAS, IMS, TOTAL, or IDMS databases; or in VSAM or sequential files—there's only one language you need to know: English. And, because English comprehension is an integral part of RAMIS II, you have full access to all of its fourth-generation capabilities, from powerful reporting and analysis to full color business graphics.

THE BENEFITS OF RAMIS II ENGLISH SPEAK FOR THEMSELVES.

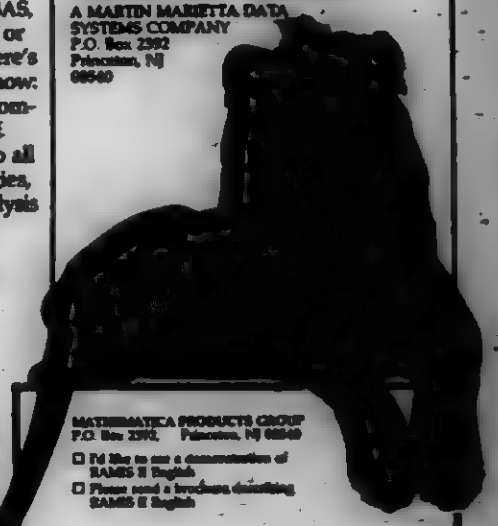
Teaching the computer to speak your language is the best way to put the vast power of today's computer systems directly into the hands of *every* user from *every* department. RAMIS II English is one more powerful demonstration by Mathematica of the increased productivity available through RAMIS II—*the* real leader in complete software for business.

RAMIS II ENGLISH MAKES IT EASY TO UNDERSTAND WHY WE'RE THE REAL LEADER IN COMPLETE SOFTWARE FOR BUSINESS.

Let RAMIS II English speak for itself. See it in action at one of our regional Product Demonstration Centers. For more information, contact your local Mathematica office, call toll free (800) 257-5171, or return the coupon below.

MATHEMATICA PRODUCTS GROUP

A MARTIN MARIETTA DATA SYSTEMS COMPANY
P.O. Box 2302
Princeton, NJ
08540



MATHEMATICA PRODUCTS GROUP
P.O. Box 2302, Princeton, NJ 08540

☐ I'd like to see a demonstration of RAMIS II English

☐ Please send a brochure describing RAMIS II English

Name

Title

Company

Address

Telephone

Computer Operating System

CW 1/30

MPG

RAMIS II...THE LEADER BY DESIGN

Boston (617) 357-9424 Chicago (312) 670-9710 Dallas (214) 788-1936 Houston (713) 626-6607
Los Angeles (213) 670-6563 New York (212) 980-9877 Princeton (609) 799-2400 San Francisco (415) 661-6315
Washington, DC (202) 484-5752 Basel (061) 429925 Bergen (5) 221260 Heidelberg (06221) 14051
Hong Kong 5-436714 Kingston (809) 929-7225 London (01) 580 2481 Milan (2) 346 8900 Montevideo (2) 916758
Ottawa (613) 236-9616 Paris (1) 776 41 71 Santiago (2) 31014 Singapore 273 9755 Stockholm (8) 520720
Sydney (02) 923 1677 Tel Aviv (052) 70264 Toronto (416) 226-6615

For years, Digital's VT100 terminal has been the CRT to choose if you want the most out of your computer. It has become the industry standard for reliability and ease of use. Not to mention the largest-selling ASCII terminal in the world.

Now Digital advances this standard with the VT200 family.

Three new terminals that embody everything Digital has learned about how to make people comfortable with computers. They offer non-glare screens that can be positioned for the best viewing angle. Keys that are so well arranged on our low-profile keyboard that you increase productivity and convenience. Fifteen programmable function keys eliminate keystrokes to speed up tasks. Plain-language setup commands to easily tailor the screen to each user. Plus, a built-in printer port for hardcopy convenience.

©Digital Equipment Corporation 1984

We've even included our most advanced video capabilities—like smooth scrolling and 132-column display—as standard features.

All packaged in our sleek new design that fits conveniently on your desk. And all supported by Digital's worldwide service organization.

But the best news is yet to come. Because, despite all the advances, the VT200 family is very competitively priced.

Simply stated. Digital has a terminal for you. Once again.

For the full story, call 1-800-DIGITAL, extension 700.

Scribe supports laser printers

You've heard a lot about laser printers . . . high print quality, attractive fonts, fast, quiet, affordable. But you haven't heard a lot about software to support them.

The Scribe Document Production System supports more laser printers than any other software. Laser printers like the Xerox 2700, 8700, 9700, the IMAGEN IMPRINT-10™, the Symbolics™ LGP-1, the CMS Lasergrafix 1200™, and soon the IBM 6670.

Buying a laser printer? No matter which one you choose, you'll get the most from it with Scribe.

For more information, contact
UNILOGIC, Ltd.
160 North Craig Street
Pittsburgh, PA 15213
412-621-2277

Scribe document production software is available for DEC 10, 20, and VAX, Prime, IBM mainframes, the Apollo and Sun workstations. "Scribe" is a registered trademark of UNILOGIC, Ltd.

UNILOGIC

SPECIAL **REPORT**

System integrates payroll, personnel duties for city

PORTLAND, Ore. — With 750 employees represented by 22 different employee groups and covered by nine union contracts, the port of Portland has its hands full in administering pay and benefits. Each contract specifies different wages and benefits. Overtime rates, holiday wages and holidays and the number of personal-leave days vary depending on the union in which an employee is a member.

"A computerized system that integrates payroll and personnel functions makes it easy to perform the numerous calculations needed to generate paychecks and benefits for both our union and nonunion employees," said Carol Byers, supervisor of the port of Portland's Human Resources Information Center.

The port of Portland administers five marine terminals, a ship repair yard, three airports and three industrial parks in three Oregon counties. It also directs economic development throughout the district and supports maritime, aviation and industrial facilities along with services and related business activities. The economic impact of the port's operations on the local economy is estimated at more than $6 million a day.

Changing pay rates

A packaged software system provides the port with the ability to handle frequently changing rates of pay, such as the quarterly cost-of-living increases mandated by union contracts.

"The system also enables us to retrieve payroll and personnel information rapidly and to compile insurance, workmen's compensation, tax and other reports," Byers explained.

The port's previous computer system automated some of the payroll functions and none of the personnel functions.

Most processing was handled manually, an arrangement that limited the number of reports the port was able to produce, Byers said.

The integrated payroll and personnel system was obtained from Information Science, Inc. The system automates the processing and recordkeeping of payroll and personnel information, including job, wage and education histories, benefits, work transfers, performance ratings and other data.

This data base permits the port to update an employee's payroll and personnel records from a single entry, Byers said.

Mass updates

The port also now has the ability to perform mass updates. Changes in salary grades and ranges for an entire group of employees may be accomplished through a single entry that commands the automated procedures, Byers said.

For integrating payroll, personnel and continuous employment history functions, it required an initial investment in equipment and software of approximately $70,000, she said. For the port to develop comparable software on its own would have required an investment of at least $300,000, Byers said.

That does not include the continuing costs of maintaining and updating the system for legislative and regulatory changes, she added.

Additionally, the port was able to convert its semiautomated payroll and manual personnel systems to a completely automated system in six months, compared to the two or three years projected to develop a similar system in house, according to Byers.

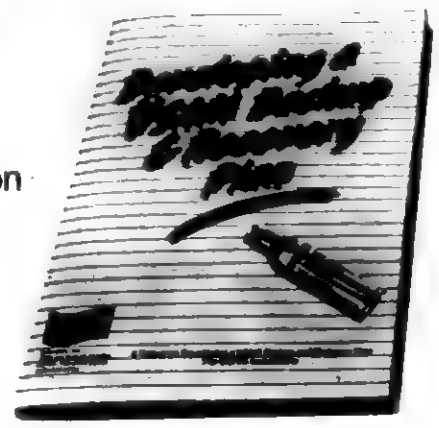
The port is now able to project compensation cost and to review, in detail, time and manpower assignments.

As a result, Byers said, its executives are able to analyse productivity and contain expenses.

FREE! FROM SOFTWORKS!

A Primer on VSAM Backup and Recovery for OS/VS.

- Background on DASD Management Concepts.
- VSAM DASD Space Management
- The Catalog/Dataset Synchronization Problem.
- Implications of Data Facility Extended Function (DF/EF).
- Developing a Backup & Recovery Plan.



To get your free copy, complete the coupon below and mail it to Softworks today!

FREE! Developing a VSAM Backup & Recovery Plan For OS/VS

In response to widespread interest in VSAM data integrity, Softworks has published "A Primer on Developing a VSAM Backup & Recovery Plan". It is available at no charge. Merely complete and return the coupon and your copy will be sent immediately.

☐ Yes. I am interested in VSAM Backup & Recovery. Please send me your primer on the subject.

☐ Also, please send me information on your line of products designed to help me manage my VSAM environment.

Name _____ Title _____

Company _____

Street/P.O. Box _____

City _____ State/Prov. _____

Zip/Postal Code _____ Phone No. _____

Operating System _____ No.'s Type CPU(S) _____

And mail to: Softworks, Inc.,
7700 Old Branch Avenue,
Clinton, Maryland 20735-9990

or call: (301) 868-4221
(800) 638-9254

SPECIAL REPORT

When buying a package . . .

By Harold M. Snider
Special to CW

When investigating the option of buying a software package, there are two questions that will generate the other questions you should ask. They are: "What should it do?" and "How should it be done?"

These are the same questions you would ask when hiring a person, buying a manufacturing machine or even commissioning a new building. It is important to begin the search at the conceptual level and, as criteria are met, continue the search by asking more detailed questions.

Application software packages must be evaluated from a business perspective. It is important to know at the outset whether the package will meet your business requirements now as well as in the future.

Vendor presentations

Usually, evaluations are performed by inviting vendors of the software to make presentations to a combined meeting of business and DP personnel. After all the presentations have been reviewed by the group, packages may or may not be recommended for continued evaluation.

Meetings are then scheduled so detailed business and DP questions can be answered by the vendors. Interviews with vendors' references may also take place. Eventually, the packages will be compared and a decision made.

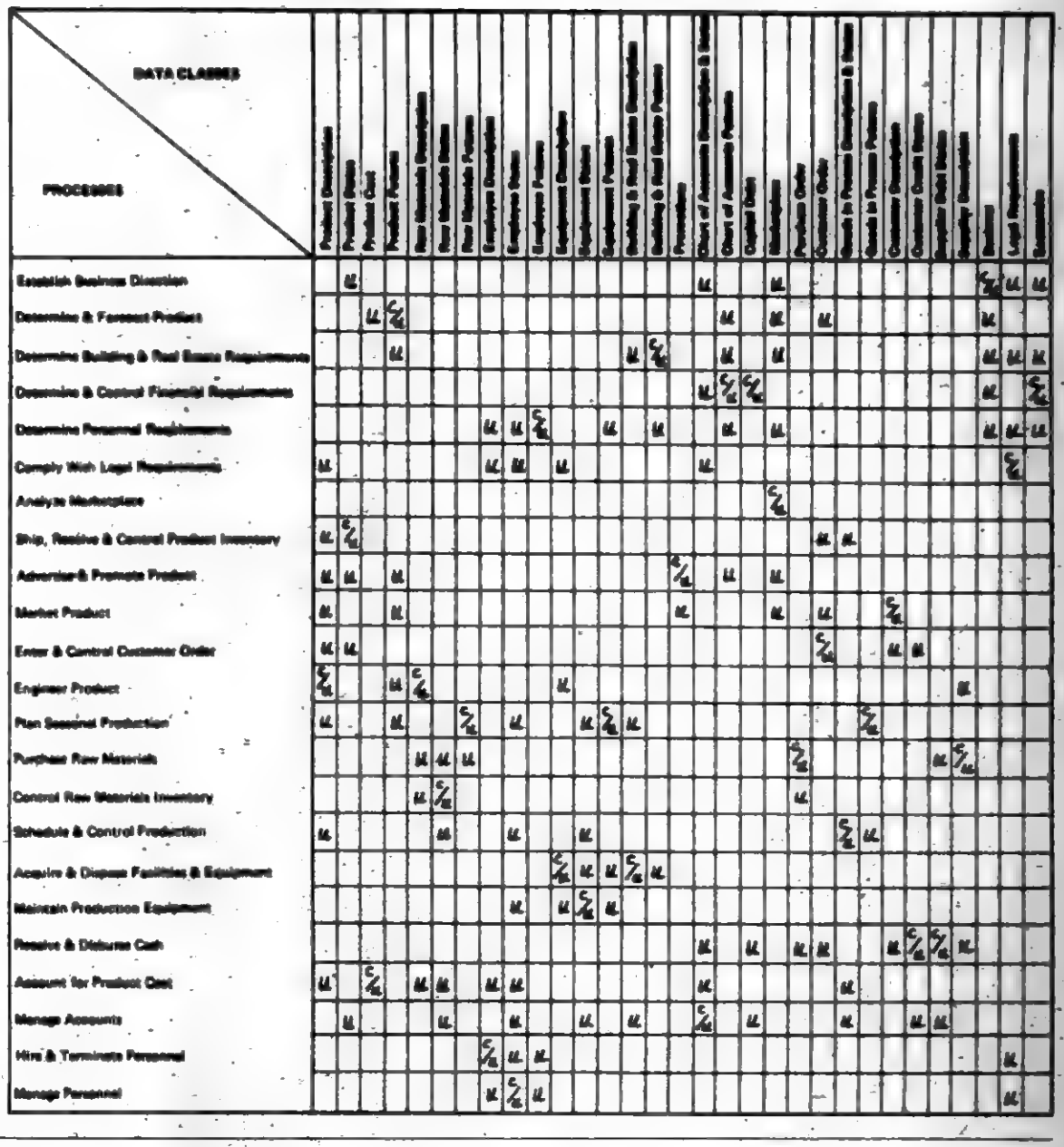
While this method is sound, key questions are often overlooked. Sometimes, knowledge of the answers would have influenced the final selection. Perhaps contracts would have been negotiated differently; budgets, deadlines or the overall implementation effort would have been estimated better; and roles and responsibilities of the vendor and the company would have been better defined.

Questions not asked

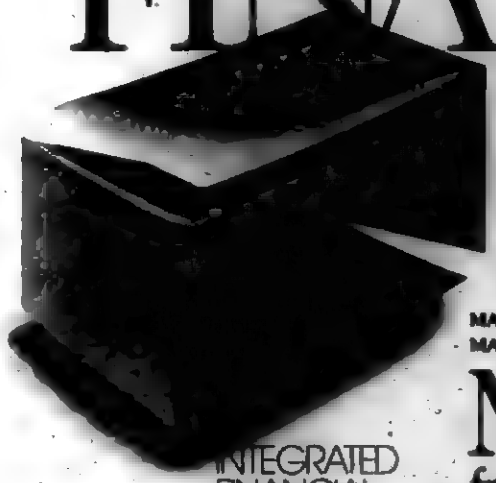
There are several reasons that important questions are not asked. For example:

- Vendors usually emphasize what a package will do, rather than what it won't do.
- When the package is to support a given product or service, the scope of the questioning may not include other aspects of the business affected by the package.
- When the package is to replace a current system, the focus may be on what the system does now rather than the business it will represent in the future.

See QUESTIONS 39/42



Turn Your VAX into a Total
FINANCIAL
Solution



INTEGRATED FINANCIAL MANAGEMENT SOFTWARE

ROSS INTEGRATES KEY FINANCIAL FUNCTIONS
MAPS is a new generation of software merging decision support tools and financial accounting applications into a powerful, flexible financial management capability. And all Ross products are fully on-line, interactive and bring you multi-user access.

MAPS/MODEL—Powerful financial modeling
MAPS/GRAPH—Quality business graphics
MAPS/DB—Flexible database management
MAPS/Pro—Micro modeling and graphics
MAPS/GL—Comprehensive general ledger
MAPS/AP—Full featured accounts payable

OUR SERVICE AND SUPPORT MAKE THE DIFFERENCE
We bring a commitment to our customers and products that reflects our 12 years of consulting experience. Our staff of experienced professionals can work closely with you to install our products, and to provide the ongoing training and support that make them true financial solutions.

MAPS from Ross Systems. The single source for integrated financial management software.

DEC and VAX are trademarks of Digital Equipment Corporation. MAPS and ROSS/NET are trademarks of Ross Systems, Inc.
MAPS/GL was developed by Price Waterhouse under the name "FAME" and adapted for the VAX by Ross Systems, Inc.

MAPS
from Ross Systems
Financial Software Solutions

DISTRICT OFFICES: Palo Alto, CA, San Francisco, CA, Los Angeles, CA, Dallas, TX, New York, NY

ROSS SYSTEMS

CORPORATE HEADQUARTERS: 1850 Embarcadero Road, Palo Alto, CA 94303. (415) 856-1850

QUESTIONS from SR/41

■ Questioners may assume topics have been covered by others in the company, usually when several groups are set up to focus on different aspects of the package.

Clearly, a framework is needed for any evaluation, one which will actually stimulate the questioning from both the business and, to some extent, the technical points of view. Applications software basically uses and creates data for some business purpose.

Determining where the application software differs from the business can be done in a structured way, if both the business and the software are described in the same terms, namely data and its relations to business processes.

The terms and chart described below will already be familiar to those organizations involved with IBM's Business Systems Planning (BSP) methodology.

A BSP study will produce an information architecture — a high-level description of the enterprise or business unit. Although it is created for strategic purposes and is required whether you are buying or building applications software, the architecture is also valuable as a framework for evaluating software packages.

One of the charts produced by the study, the data class/process matrix, indicates which data classes are created (C) and used (U) by each business process. (See Figure on SR/41.) "Business process" can be defined as a group of logically related decisions and activities required to manage the resources of the business. Processes must be defined by management. A business perspective, rather than a data processing perspective, is required.

"Data class" is a high-level grouping of data about things or entities that are significant to the organization. The data class/process matrix shows, at a high level, what information is required in order to perform the business processes.

Vendors can produce an architecture that describes their software in terms of the company's processes and data classes. For each business process, the chart must indicate which data classes are created and used by the vendor's software.

Obviously, the vendors must not be shown the architecture developed by the company, but they must be given definitions of all the terms used. Also, creation of the chart may be difficult for a marketing representative unless a reasonable amount of time is allowed for consultation with the system designers. One to three weeks' time should be sufficient.

When the vendors' charts are finished, they can be compared to the company's chart quite easily. Each square can be investigated in an orderly fashion.

Vendors can also be compared with each other on equal terms within the set framework. The charts will tend to stimulate the questioning rather than provide answers.

Potential questions

Some questions that might arise are:

■ Was a similar chart already available, based on the vendor's definition of business processes and data classes?

■ Was the vendor willing and/or able to produce the chart? If not, why? What are the implications for on-going support?

■ What processes are not supported? Why? What is the impact on the business?

■ What data classes are not supported? What is the impact on the business? What effort is required to support them?

■ What data classes are created by more than one process? Flexibility and complexity issues may arise.

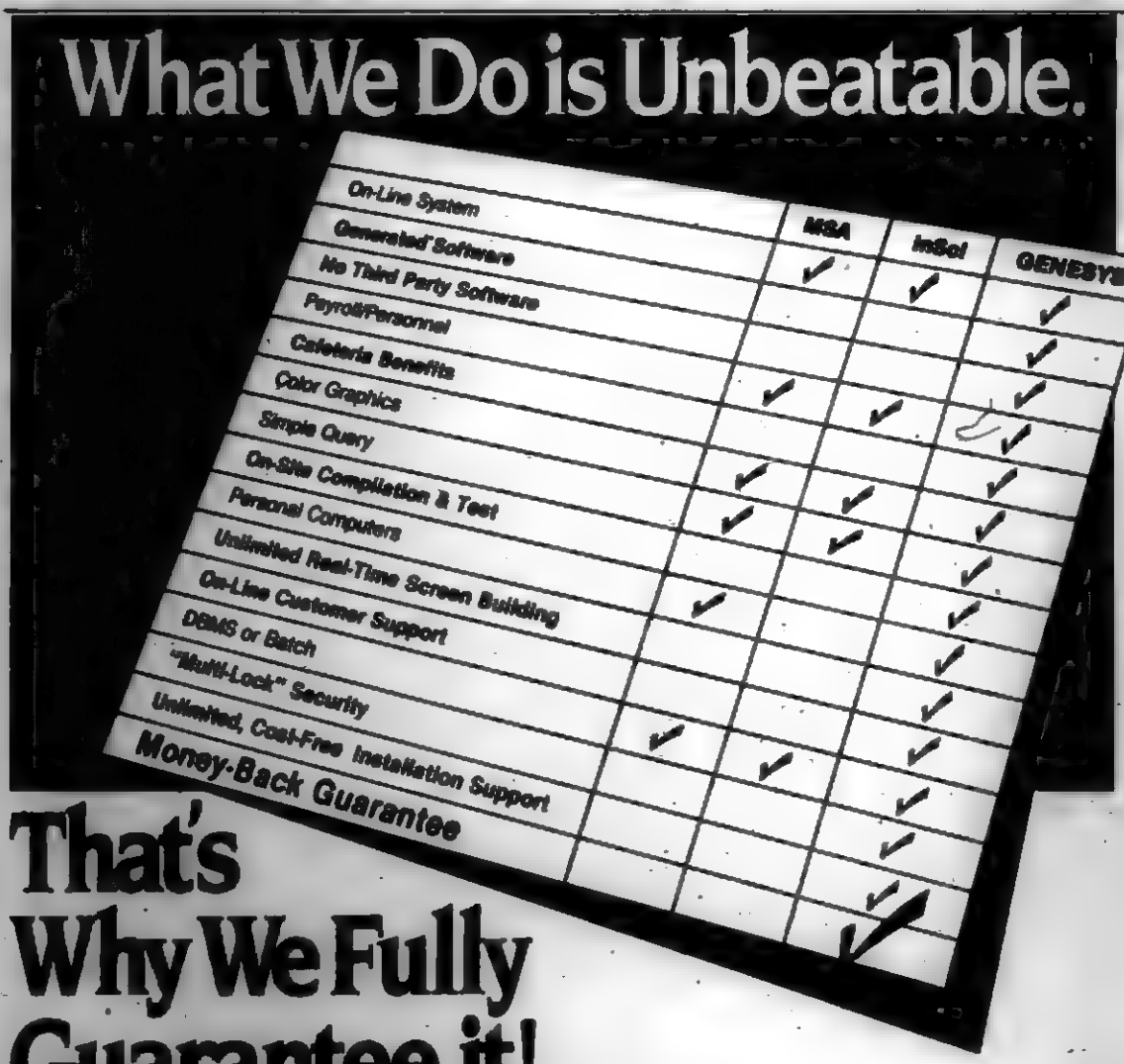
■ What data classes are used, but not created, by the vendor's system? Why? What effort is required for the company to provide the data to the system?

■ Where are the differences in the way the system uses and creates data to support the business? What is the impact?

Software package evaluations rarely conclude that a package matches all of the business requirements.

A decision must be made on the optimum solution, one which can best be identified by comparing the business and the package on equal terms.

Snider is senior systems specialist for Manufacturers Life Insurance Co.



That's Why We Fully Guarantee it!

Only One Human Resource Management System is good enough to be fully guaranteed. Genesys'. Our own people developed all of our software and systems. Our own people will also install our system, compiling and testing all our programs for you. Then our people will stand behind their work with a no-strings, money-back guarantee.

Genesys is simply unbeatable. Most Human Resource Systems contain the raw data you need for management reports, government compliance and to let you know "Is she promotable?". But you have to do a lot of work preparing data to get the information you want because they've added third party software.

Not so with Genesys. All our software is completely integrated and menu-driven. No matter what you need to know about Payroll, Personnel or Cafeteria Benefits, it's easy to get precisely the information in exactly the format you want. Just one keystroke gives you selective search, decision support, PC integration and color graphics. Real-time, from any office, anywhere in the country. With by far the tightest, most flexible security available.

We're so confident you'll be successful with Genesys we'll give an unconditional guarantee. How can you beat that? If you'd like more information on the Genesys HRMS or would like to attend an Executive Seminar near you, call Norman Bushee at (617) 685-5400.

Genesys, 10 Grafton St., Lawrence, MA 01843
Please send me information on:
☐ Genesys Seminars ☐ Payroll Accounting
☐ Personnel Administration
☐ Benefits Management
Name _____
Title _____
Company _____
Telephone _____
Street _____
City _____ State _____ Zip _____
IBM Hardware _____
AT-21

Genesys
SOFTWARE SYSTEMS, INC.

Genesys Software Systems, 10 Grafton St.,
Lawrence, MA 01843 (617) 685-5400

For The State Of The Art In HRMS
LOOK TO GENESYS FIRST!

"It's Your Home Computer."

INCREDIBLE...
TOO GOOD TO BE TRUE
OMNIBASE™
The Complete Statistical Analysis and Data Management Package similar to mainframe SAS® for IBM PC/XT
EFFORT
THE DATA BASE MANAGEMENT SPECIALISTS
212-435-7314
Rockefeller Center, P.O. Box 3012, New York, NY 10185
OMNIBASE is a trademark of Conceptual Software, Inc.
SAS is a registered trademark of SAS Institute, Inc.

SPECIAL REPORT

System helps resolve DPer, end-user woes

Demands on DPers cut

AUSTIN, Texas — The relationship between DPers and end users is in some ways like a marriage: It can have its strains as each struggles to understand the viewpoint of the other.

But the two groups at the Texas Department of Human Resources here have resolved many of their differences, and they give some of the credit to software from the Chicago-based firm of SPSS, Inc. The department has been using the SPSS Data Analysis System and the interactive SCSS Conversational System since 1978.

"Our end users know more about their systems than we do in the data processing shop," said Diana Williamson, director of the department's time-sharing user support section. "It makes sense to be talking to users about their files and what they want to do in their analysis, rather than just solving technical problems," Williamson added.

The department administers Texas' Aid to Families With Dependent Children program, food stamp program, foster care and adoption programs, Medicaid, health and employment services, disaster and refugee assistance, home energy assistance and other programs.

One out of six Texans

With a total budget in fiscal 1982 of almost $2 billion, the department estimates that each year its programs reach about one out of every six Texans. SPSS and SCSS software are used to organize and summarize data on most of these human services programs.

Williamson said that SPSS users can quickly handle most of their own questions by using the SPSS documentation.

Even though last month her department logged 1,600 SPSS accesses from 57 users, her shop gets called only for SPSS operational or syntax questions.

And the use of SPSS and SCSS has cut down on demands for her DP shop to come up with statistics and reports on an ad hoc basis.

User support section

The time-sharing user support section was formed two years ago, with SPSS as an end-user's tool. Users like Gary Anderson, a research associate in planning, have chosen SPSS and SCSS to analyze demographic and econometric data, surveys and internal department records for planning and forecasting. Anderson has trained about 100 people in SCSS in order to promote end-user "computing self-sufficiency."

"Under the old system, you might wait months for the DP shop to come through with some items of information — where in planning you need a quick response," he said. "By that time, invariably someone wants the information in a different format or with different variables."

"I'm a teacher by nature," said Dr. Michael Penticuff. "I've invested a lot of effort in SPSS personally." As director of data access in the program budget area, he supervises a staff of 17, most of whom use SPSS to analyze data.

"I help them to see the applications SPSS may have in their analysis, working side by side at the terminals.

"We need SPSS reporting facilities to answer an endless barrage of questions from the news media, legislators, people writing studies and administrators in other departments.

"Our analysts and researchers have to manipulate enormous data files constantly; with SPSS they can do that," Penticuff contended.

Department personnel use the packages heavily for statistics. Penticuff uses procedures such as Write Cases, Crosstabs Report and Frequencies.

"I've even used SPSS to fill out forms, which is not a statistical process at all. Reports that had been tak-

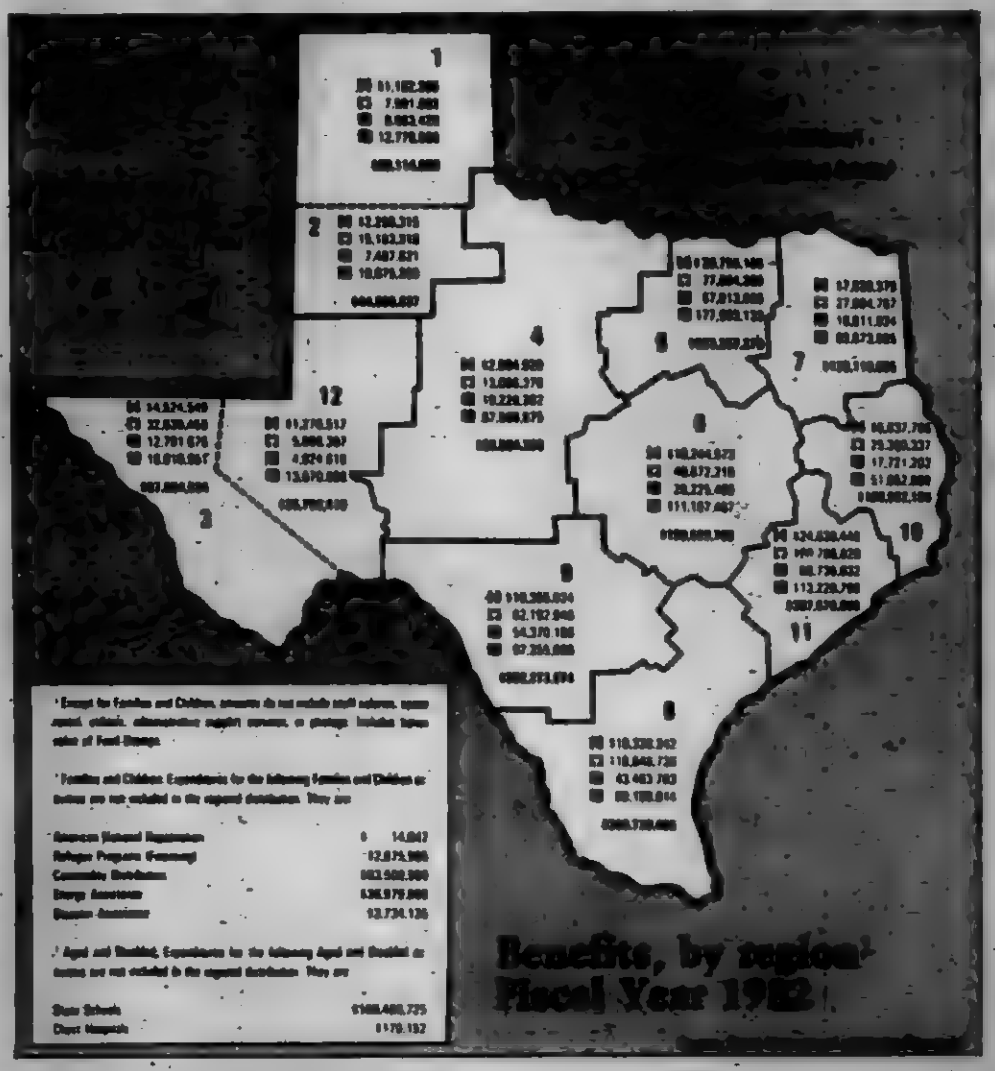
> *"Our end users know more about their systems than we do in the data processing shop. It makes sense to be talking to users about their files and what they want to do in their analysis, rather than just solving technical problems. —* Diana Williamson, director of the time-sharing user support section.

ing people several weeks or a month to complete are now a two-hour process. We prepare the data and use the Write Cases procedure to format the output," Penticuff added.

Anderson has become involved in exploring new applications for the SCSS and SPSS systems and promoting their use in state governments. He sees SPSS and SCSS as major decision support tools for bringing quicker, more-efficient analysis to areas of state government that need better ways to look at large aggregations of data.

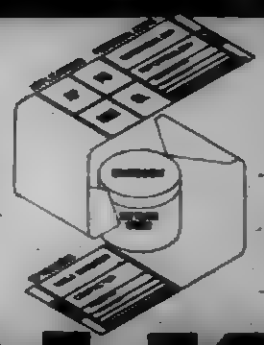
As for the marriage of convenience between the end-user planners and administrators and the DPers, Anderson said that it is going well.

"We've developed a training system with the support of the time-sharing user support section that seems to work for all of us," he said.



WALKER.
THE MOST
WIDELY-USED
FINANCIAL SYSTEMS
ON ADABAS.

Walker offers ADABAS users a real time, integrated, interactive financial system: Accounts Payable. Purchase Order. Materials Management.



General Ledger. Accounts Receivable. Call us for a full demonstration of the most complete financial packages available to run under ADABAS.

WALKER

WALKER INTERACTIVE PRODUCTS,
100 Mission Street, San Francisco, CA 94105

Atlanta	(404) 843-0050	Toronto	(416) 366-7296
Boston	(617) 227-6076	San Francisco	(415) 495-6611
Chicago	(312) 693-8680	New Jersey	(201) 368-1234
Houston	(713) 367-0026	New York	(212) 308-6770
Rocky Mtn.	(916) 546-5528	London	(44) 296-314-73

© 1983 Walker Interactive Products

"Your Information, Sir!"

FQS allows end-users to query the computer for every information request, *instantly.*

No more burdening the DP department with programming of ad hoc reports. No more need to learn higher level languages which are still gibberish to an end-user.

FQS is the only CICS or SHADOW-based information retrieval system designed to be on-line from day one. It contains all of the best facilities for sorting, selecting, and printing contained in EASYTRIEVE/on-line, SQL and other batch systems. But FQS is instant, a true on-line query system, menu-driven to allow anyone to get information quickly. Security procedures allow you to control access to valuable corporate information.

Surely, you've outgrown that old batch report writer by now. Isn't it time you moved beyond batch reports and into the simplified world of on-line queries?

Your users will get exactly the information they need because they define it. They will have results in mere seconds. And, your programming staff will be freed to spend their time more effectively.

Call today for complete details on FQS, the Friendly Query System. Go on-line. Go Allegro.

"Test really must experience FQS. Call Allegro today."
617-890-8811

Allegro Products Inc.
400 West Cummings Park, Woburn, MA 01801
Telephone 617-890-8811, Telex 955-395
A TIGON ESE Company

SPECIAL REPORT

How do you choose a personnel system?

Requirements list first priority

By Laura L. Vaughan
Special to CW

Today the broadening scope of human resource management requires decision making that directly affects internal policies, career development programs and organizational spending. Enter the computer and human resource management software. But how do you select a personnel system? Carefully.

The approach is much the same as screening applicants for qualifications. A human resource management system (HRMS) should be hired to do a job.

Selection depends upon understanding a system's strengths, limitations and potential to meet future needs.

An HRMS should never be selected by one individual. Since it will be implemented and utilized by a variety of people at different levels, key people from several areas should be designated as a selection committee so their input can be gathered from the very beginning.

Requirements list

One of your committee's first priorities should be to draw up a requirements list. This list is very similar to a job description. It should itemize both the basic and unique requirements you are looking for in a personnel system.

Keep your list concise and to the point, and identify the "must have," "desirable" and "wish-type" requirements separately.

This list can be developed into a questionnaire to be mailed to prospective vendors. Include a brief statement of your objective, and be sure to provide space so that the vendor can discuss product philosophy, service approach, maintenance policies and future enhancements to the product.

Package deal

It is important to remember that the personnel system and the vendor are a package deal. You are establishing a long-term business relationship. Exercise the same care you would in evaluating a candidate for upper management.

Pay particular attention to the following areas:

■ Fit. Does the system fulfill the majority of your requirements for processing and reporting? Define what is missing from each vendor package and narrow the selection down to those systems that meet most of your needs.

■ Flexibility. Will the system accommodate future changes and growth within your company? Does the system allow you to define what information is to be processed? Can you produce the reports you need? Can new companies, divisions or departments be added easily? Does it interface with a payroll system? Is it on-line? Are the contents readily available for immediate inquiry and/or modification? Can the information be displayed graphically?

■ Training. Is training provided for the data processing staff? The terminal operators? Personnel management? Consider what kind and how much training is available and where it is to take place.

■ Documentation. What type is provided? Is it clear, concise and readable? Remember, good documentation will assist in training new personnel employees.

■ Security. Can you add, delete or restrict terminal operators from specific areas in the system? Can operators be added or deleted easily? Is there an audit trail to track what changes were made and when?

■ Installation. Can the vendor meet your desired dates? Who will perform the installation? Can the vendor assist with any transfer of information from an existing system?

■ Support. This critical area is often forgotten in the evaluation process. Ask what the standard procedure for support is, and don't forget to ask about the availability of phone-in support.

■ Maintenance. Again, you are establishing a long-term commitment. What happens after the sale? Ask about a software maintenance agreement and review a copy of it.

■ Cost. Many factors affect the systems cost, and cost is not always indicative of quality. Does the cost include documentation? Installation? Training? What is the warranty?

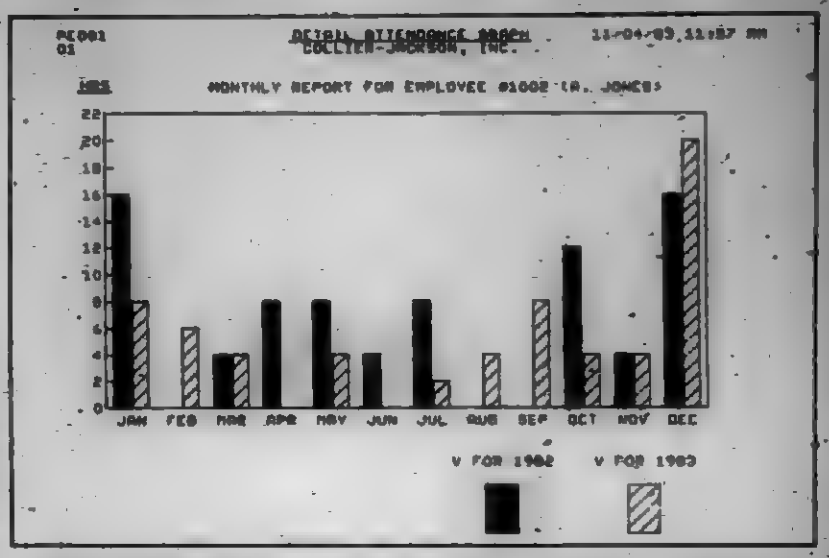
■ References. Contact several of the vendor's current customers to discuss their opinions of the vendor as well as its HRMS. If possible, talk to those references who are of a similar size in a similar type of business.

After reviewing the vendor information, you should have narrowed your selection to two or three vendors. If at all possible, visit the vendors' sites.

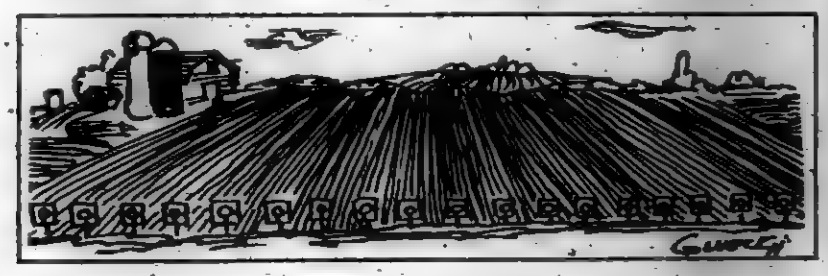
The importance of on-site visitation cannot be overemphasized. It gives you a chance to see the software in operation and to evaluate its ease of use. It also affords you the opportunity to get to know the firm's key people.

More than likely, you'll glean a feeling for the firm's personality and a better perspective of its operating philosophy. Very often, the on-site visitation will make the final decision an easy one.

Vaughan is financial systems sales manager at Collier-Jackson, Inc.



'If at all possible, visit the vendors' sites. The importance of on-site visitation cannot be overemphasized. It gives you a chance to see the software in operation and to evaluate its ease of use. It also affords you the opportunity to get to know the firm's key people. More than likely, you'll glean a feeling for the firm's personality and a better perspective of its operating philosophy. Very often, the on-site visitation will make the final decision an easy one.'



IF YOU'RE GROWING LIKE WALKER MAYBE YOU OUGHT TO GROW WITH WALKER.

Companies growing in the ADABAS, DL/1, IMS or virtually any major IBM environment* have discovered something: Walker's Integrated, Interactive Financial Software (II/FS), is a better way to grow.

Real-time Accounts Payable, Purchase Order, Materials Management, General Ledger, and Accounts Receivable. Call us for a full demonstration of Walker's "Better way to grow." The II/FS System.

WALKER

WALKER INTERACTIVE PRODUCTS, 100 Mission Street, San Francisco, CA 94105

*Operating environments: IBM 4300, 360/370, 303X,308X, MVS/XA, DOS/VS (E), SSX/VSE, IMS/DB-DC, CICS, VM/CMS, DL/1, COM-PLETE, ADABAS, IDMS/DB-DC, DATACOMM/DB-DC, VSAM, Shadow II

Atlanta (404) 843-0050
Boston (617) 227-8076
Chicago (312) 693-8680
Houston (713) 367-0026
Rocky Mtn. (916) 548-5528
Toronto (416) 366-7298
San Francisco (415) 495-8811
New Jersey (201) 368-1234
New York (212) 308-8770
London (44) 286-514-73

©1983 Walker Interactive Products

SPECIAL REPORT

Systems methodology wraps up the package

By John B. Toellner
Special to CW

Applications software packages can provide quick solutions for underbudgeted DP installations jammed with backlogs, but without adequate planning and control, the quick fix can become a slow drain on time and money.

How responsibilities and duties are performed directly affects the value and efficiency of any system. Unless procedural mechanisms exist to ensure that appropriate steps are taken at each point in a project, data resources can become uncontrolled and fragmented. Systems methodologies offer the planning, control and overall management that are essential in a productive information service department.

Both new technology and methodology are important. What is needed is a marriage of the immediate advantages of packaged software with the long-term benefits of good project planning. Because of the increasing use of applications packages, many systems development and management consulting firms are creating standards and procedures for the evaluation, modification and installation of packaged software.

A project may start because enhancements are needed on a package. Sometimes the package selection isn't made until the system and program design specifications are in place, usually because the software satisfies only a small portion of the system requirements.

In any case, a good methodology takes each situation into consideration. The evaluation process should encompass functional analysis to ensure that user requirements are being met, a definition phase to confirm that the software matches the specifications and a performance test to determine if the package performs appropriately.

If a few user requirements are not met, or some features and functions in the package exceed specifications, the modification process must be initiated. After all modification demands are identified, planning and estimating procedures should be undertaken. Massive modification to packaged software should be considered carefully. Experience has shown that such changes often create downstream complications and should, in most cases, be discouraged.

At a recent user conference sponsored by Spectrum International, Inc., a data processing systems development and management consulting firm, Abbott Laboratories reported on its experiences with modifying packages. The company's advice was not to modify, but instead, to create interface programs to resolve mismatches with user requirements.

The execution of interface and modification work is determined by the architecture of each methodology. At Spectrum, for example, analysts identified the work in the form of life-cycle tasks, walk-throughs and documentation requirements that were then given to the vendor. Life-cycle tasks included the preliminary design, detail and program designs and programming activities, as well as supplementary tasks unique to the process of installing purchased software packages.

Maintenance agreement

Another important installation activity is the determination of a maintenance agreement. Here there are no clear guidelines because the decision depends on the experience level of both the client and vendor staffs. Some software packages are best supported on a continuing basis by the vendor, but others can be handled through a transition process that gives maintenance responsibilities to the client in phases. In some cases, the best arrangement is for the purchaser to take responsibility immediately after initial implementation.

A systems methodology provides the guidance for easier maintenance and greater flexibility of packaged software. When using applications from multiple vendors, for example, it is difficult to have consistency from document to document and from project to project. With a methodology, where the architecture is designed to control the sequence and format of all project deliverables, consistency is ensured during installation.

A good methodology provides overall project management through planning and estimating functions. The information services department is forced to capture user requirements before large sums of money and a great deal of time are spent, whether it is for systems development, purchasing and installing software packages or project maintenance.

The key element in the methodology is to have the package software process merged into a single life cycle that will also serve other software projects.

Toellner is president and chairman of the board of Spectrum International.

Our online, interactive, integrated applications software can open new doors for you.

Computer Associates combined its superiority in systems design with solid business input to let you increase your company's efficiency—and improve your Data Center's productivity as well.

Our Advanced Business Software Series is a family of online, integrated—and interactive—components.

Each provides powerful, specific solutions to financial, distribution or administrative problems. Together, they form comprehensive, computer-efficient systems for every company operation—without impeding the Data Center.

Simple menus permit easy end user access to information—without programmer's help—and data is displayed in simple business language.

Conversion is fast and efficient. And because CA's complete line of products is integrated, your new efficiency will continue as your needs grow.

CA's applications family now includes General Ledger... Accounts Receivable... Accounts Payable... Financial Planner... Order Processing... Inventory Control... Asset Management... Job Cost... Purchasing... Personnel Management.

Our responsive service is already keeping over 13,000 Computer Associates customers satisfied. Bring new efficiency to your whole company. Contact your local CA business account manager for specifics on any or all of our products. Or call 800-645-3003. In NY: (516) 333-6700.

COMPUTER ASSOCIATES

COMPUTER ASSOCIATES INTERNATIONAL, INC.
125 Jericho Turnpike, Jericho, NY 11753

SPECIAL REPORT

MRP software study
Methods for evaluation

By Robert Clifford
and Anita Lang
Special to CW

The remarkable proliferation of manufacturing resource planning (MRP) software recently has made it difficult to compare competing products and to select a product that demonstrates the best fit with the way a manufacturer does business.

Over the course of the last year, Keane, Inc., a DP consulting firm in Lexington, Mass., conducted a study of companies purchasing such products. An in-depth interview was conducted with key personnel involved in the selection process from over 50 firms that had recently purchased and implemented MRP software. Additionally, data was collected on a more informal basis by Keane's marketing and sales staff, which contacted over 2,000 individuals by telephone and met with representatives from 150 companies actively looking to purchase MRP software.

Keane found that companies can be roughly divided into three groups in their approach to the MRP search. The large manufacturing firms with over $30 million in revenues, not surprisingly, had the most structured and disciplined methodology. Over 70% of these firms used a committee approach, generally involving six to eight players. Typically, these committees included the manufacturing manager, the controller, the MIS director, a data processing staff member and the operations and production managers. One-third of the firms also engaged the services of a consultant.

In short, these firms included key personnel in the selection process, not only to evaluate the software packages, but to establish the packages' acceptance criteria. These companies generally formulated a structured methodology that closely follows the six principles of productivity management (see chart above).

The middle tier of companies ($10 million to $30 million in revenues) tended to operate in a significantly less structured way. This group tended to have its short- and immediate-term needs very well defined, and senior management was intimately involved with the selection process. This group was less certain about projected needs for the future.

The decisions were generally made a lot quicker. While some companies used the committee approach, many went about selection in a more ad hoc way.

The small manufacturers were the least structured and organized in the selection process. These firms, for the most part, perceived their manufacturing environment to be in need of more stringent controls. There was also a perceived need to computerize, although the company's problems were often not well defined at this point.

A number of factors distinguish the more successful game players:

- While a committee approach often is helpful, the structure can often get in the way of making a sound business decision in a timely way.
- A number of committees attempted to reduce the management decision to a computerized model or to feature a checklist. While such tools can be effective in terms of organizing the evaluation process, they should not substitute for a sound management decision. Likewise, while private consultants can be enormously helpful in educating companies about such products, they should never make the final determining decision.
- The companies that appointed strong leaders supported by senior management to manage the selection process were often the most successful. These leaders delegated tasks to individuals on the committee or within the company, establishing both time frames and budgets.

Other important points to address in the selection process include:

- Making sure that your company can grow with the package you ultimately plan to purchase. Ensure upward compatibility in terms of the hardware.
- Determining that the product has been successfully installed elsewhere. Talk to other users.
- Ensuring that the company you plan to do business with will be around next year to support you.
- Asking if the vendor has the ability to customize and modify the package. If not, this work may ultimately be very costly. Determine at the outset how much support and training the vendor will provide as a part of the purchase price.
- Researching any number of documents that attempt to define what should be included in a standard manufacturing system. They can be enormously useful. These de facto standards say that a firm should look for a package that is on-line and real-time, is written in a popular language for ease of maintenance, is designed to allow for simplified modifications and is well documented.
- Getting in writing the vendor's promise that an enhancement or feature that is critical to your operation "will be available Jan. 1."

Clifford is the general manager for Keane's manufacturing products group. Lang is a marketing analyst for Keane's information services division.

Principles of productivity management

#1 FOR TSO or VM/CMS

DYNACALC

The fastest and friendliest spreadsheet system

NEW ★ Color Graphics ★ Database Interface

IMPROVED ★ Worksheet Consolidation ★ VisiCalc® Support™

COMPARE US TO THE COMPETITION!

For a free 30 day trial call (312) 525-6400

ChicagoSoft™ 738 N. LaSalle • Suite 2 • Chicago, IL 60610

*Dynacalc is owned by Dynasoft Corp.
**VisiCalc is a registered trademark of VisiCorp. VisiCorp is not associated with Dynasoft.

SPOOL DISPLAY/PRINT UNDER CICS!

Make Your Solution The One That Playboy, ITT Financial and Others Found So Productive.

Some of the major features of SYSD® are:
- Full screen PDS editor
- SPOOL Display
- SPOOL print to 32XX printer
- Automatic and selective printing
- Standard FCB forms control
- Job submission and status displays
- Data set utilities
- Low overhead
- VS1, MVS, CICS

Here's Three Good Reasons Why You Should Call Today:
- 30-day free trial
- SYSD is site licensed at $8,500
- SPOOL display/print (H&W's CPMS™ component) is licensed at only $5,880

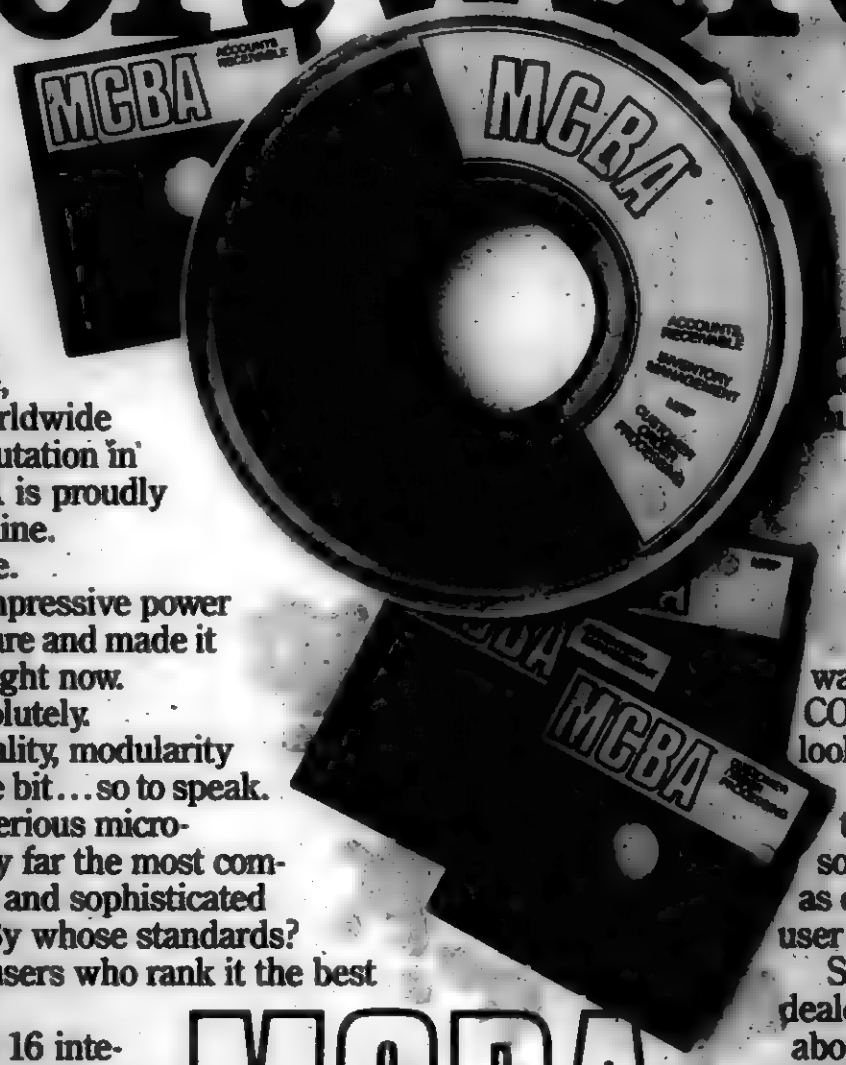
CALL:
(208) 377-0336

H&W

H&W Computer Systems, Inc. P.O. Box 4765, Boise, Idaho 83711-4765

CICS Solutions

MCBA introduces shrink-to-fit software.



With nine years in minicomputer software, 15,000 installations worldwide and an established reputation in the mini world, MCBA is proudly shrinking its software line.

Down to micro size.

We've taken the impressive power of minicomputer software and made it available for micros. Right now.

Alter the fit? Absolutely.

Alter the functionality, modularity and capability? Not one bit…so to speak.

This new line of serious microcomputer software is by far the most comprehensive, well-tested and sophisticated in the industry today. By whose standards? Thousands of MCBA users who rank it the best in the business.

MCBA's library of 16 integrated manufacturing, distribution and accounting packages can be installed in whatever combination

nd sequence a user eeds for his or her usiness.

It grows with businesses. No matter what size they are now. Or want to be later.

And MCBA software now runs in RM/COS,® UNIX™ and UNIX look-alike environments.

In other words, we've tailor-made our newest software to fit micros—as comfortably as it fits user needs.

So whether you're a dealer or a user, find out about it. Call us now at (818) 957-2900.

Shrink-to-fit software. For growing businesses.

MCBA®

Minicomputer Software for Micros.

RM/COS is a Registered Trademark [illegible] of Ryan-McFarland Corp. Unix is a Trademark of AT&T. MCBA is a registered trademark of MCBA, Inc.

SPECIAL REPORT

Tips for automating the general ledger

By Susan B. Kreuzer
Special to CW

The general ledger is the core of any accounting system and, as such, is one of the most valuable tools for management's day-to-day control and monitoring of the company's results and goals. It provides information through which management can measure performance against objectives, redefine the company's principal goals, monitor its cash position and identify changes in productivity and profitability.

Once the decision has been made to automate the general ledger and purchase a packaged product, there are a few important steps that should be followed.

Establish a project team. From the outset, a project team should be organized consisting of both accounting and DP personnel. Although a representative from the accounting department will ensure the quality of the solution provided by the software product, the data processing manager will maintain the ultimate responsibility for the entire system's efficiency.

It is the project team's responsibility to educate the corporation, including corporate management, accounting staff and data processing personnel. Corporate management should have realistic expectations regarding the time involved. Managers should be fully aware that it will be six months from the time the decision

See LEDGER SR/50

Northeast
March 21—Saddle Brook, NJ
28—New York City, NY
April 4—Philadelphia, PA
5—Boston, MA
11—Stamford, CT
12—Rochester, NY

South
March 22—Washington, DC
April 5—Tampa, FL
3—Miami, FL
17—New Orleans, LA
June 21—Charlotte, NC

Midwest
February 23—Kansas City, MO
March 6—Cleveland, OH
15—Chicago, IL
20—Cincinnati, OH
28—Pittsburgh, PA
April 5—Milwaukee, WI
12—Minneapolis, MN
19—Des Moines, IA
June 7—Memphis, TN

West
February 21—Seattle, WA
28—Dallas, TX
March 13—Newport Beach, CA
20—Denver, CO
April 3—Houston, TX
10—Portland, OR
24—Concord, CA
May 8—Portland, OR

Give your users spreadsheets with your existing CICS system:

OXFORD SOFTWARE CORPORATION

SPECIAL REPORT

LEDGER from 82/48

to automate is made to the time they will see any results.

The data processing department should be educated to the basic operating procedures of the accounting cycle.

The accounting department staff members should be educated to the benefits of the automated general ledger. They must be assured that their jobs are secure. Automating their function means many things for them in addition to the acquisition of new job skills.

Identify the system's requirements. It is essential for the accounting department and the data processing department to agree on the total benefits of the product. Compromise is often the order of the day. Typical questions asked by the accounting department are: Does the package accommodate most existing company procedures, codes and account structures? Does it eliminate redundancies and repetitive tasks? Does it provide regular reports in formats most useful to the company? Is it an on-line, interactive, real-time system?

While the on-line capabilities of a general ledger are popular with the accounting staff, DP managers are more concerned with the internal workings of the applications. They ask questions like: Do the packages generate a lot of I/O? How many CPU resources will be needed? Are there recommended cycles for the jobs? How much disk space will I need to allocate? How many DP personnel are required for installation and maintenance?

Delegate departmental tasks. The accounting department should put the manual general ledger in order, and the DP department should search for and evaluate software packages.

The data processing department should search for the ideal general ledger package for the corporation. The requirements are based upon the previously defined needs of both departments.

The departments should work simultaneously for the next two months on their separate projects.

Install and test the package. It should take only a few days to install the software package. This is primarily the responsibility of the software vendor. However, a representative from the DP department will want to know the way the system is installed, where it is located and what other packages can interface with it.

Implementation and testing of the product will take the DP department approximately 2 months. A representative of the accounting department should be available during this time for consultation and evaluation, since some modifications to the package may be necessary. This is where a user-defined system is advantageous. It provides parameters and file structures that do not restrict the user.

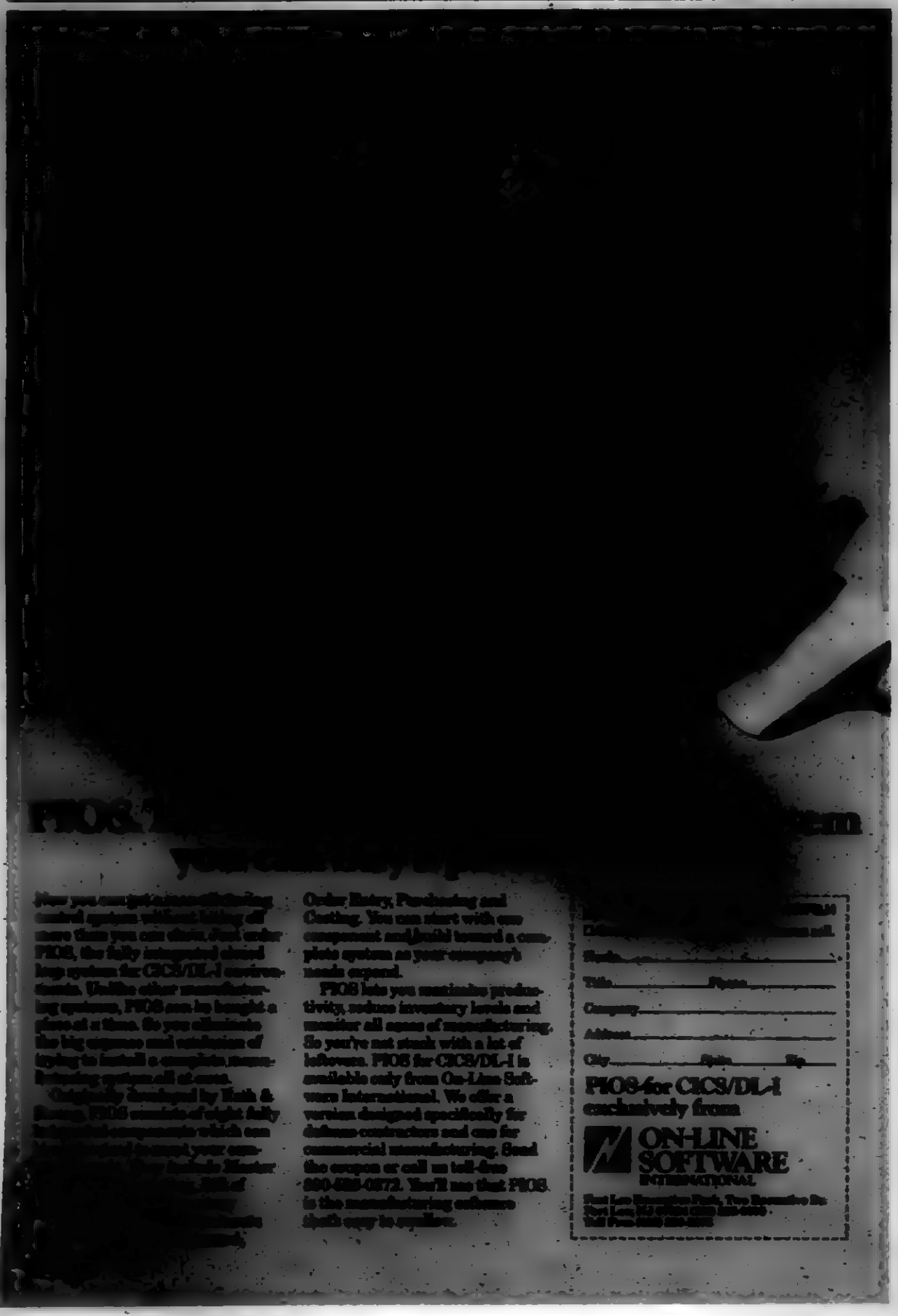
Run parallel general ledgers. To ensure the security and integrity of the corporate data, both the new system and the manual and computerized general ledger should run parallel for at least two months.

Compelling benefits

In addition to the basic savings of the manual clerical activities of posting transactions and producing reports, automation of the general ledger to an on-line system has other compelling benefits:

- A single input of the transaction means automatic posting, first to the relevant subsystem, then to the general ledger and any subsidiary balance sheets and operating accounts.
- Real-time processing means that data is always current to the last transaction.
- The accounting department has more control of its data and its schedule of output.
- The DP department is relieved of many of the programming and maintenance tasks required by batch systems.
- Reports are available sooner and without taxing the DP programming resources.
- The accuracy and security of the information recorded in the general ledger is improved.

Kramer is a certified public accountant and product manager for financial application products at Computer Associates International, Inc. in Jericho, N.Y.



SPECIAL REPORT

Package helps GTSI team grab Nasa contract

BETHPAGE, N.Y. — When the management contract renewal date for the National Aeronautics and Space Administration's (Nasa) space shuttle program came up last August, Grumman Technical Services, Inc. (GTSI), a division of Grumman Aerospace Corp., teamed up with Lockheed Corp., Morton Thiokol, Inc., Pan American World Services, Inc. and the help of a financial software system to challenge Rockwell International Corp. and its partners for the contract.

GTSI needed to put a management team into action quickly at the Kennedy Space Center in Cape Canaveral, Fla. Automated accounting, job cost and payroll procedures had to be set up within 90 days to handle the 1,000 employees that GTSI would need.

At the same time, the system had to meet the strict reporting and security procedures required by Nasa, according to Stu Cornell, GTSI's manager of data processing.

"We had a tough decision to make. There was no time to develop an entire accounting package for the shuttle program from scratch," Cornell said. Grumman Aerospace has an accounting system running on an IBM mainframe that was designed for over 25,000 employees. "We decided it would be too costly and time-consuming to modify that system for our needs," Cornell said.

Further complication

The situation was further complicated by the uncertainty of the management contract award. "We did not want to buy a computer and get stuck with hardware we don't need," Cornell said. "Leasing the hardware and buying the software was not a suitable option either."

Grumman decided to lease both the hardware and a packaged software system. A month-to-month lease, with an option to buy if the contract was awarded, carried the least risk, but there were very few firms willing to lease a computer system and proven software on a month-to-month basis, he said.

Off-the-shelf applications software from On-Line Accounting Systems, Inc. of Houston was recommended by George Smith, manager of data processing at Grumman St. Augustine, a subsidiary of Grumman Aerospace in Florida. Smith recommended the Fully Automated Management Information Solutions (Famis) accounting package from On-Line Accounting.

"Three years ago, Grumman St. Augustine began operations with 12 employees and projections for rapid growth," Smith said. "We needed to automate our accounting. We had to consider the trade-off between the number of hours it would take to develop a system in-house vs. purchasing prepackaged software."

Grumman St. Augustine needed a personnel file that could handle a wide range of deductions and variations in pay scales for union and non-union workers, provide instant access to current data and allow for budgeting.

"Most important, we needed a proven accounting package that would be backed by experienced personnel," Smith said. Since acquiring Famis, Grumman St. Augustine has grown to over 450 employees, Smith said. The system now handles over 28,000 general ledger records, with about 1,000 accounts payable checks written every month, labor distribution hours collected from time cards on a daily basis and 450 paychecks written every week.

GTSI contracted with On-Line Accounting to modify the software and lease it and the necessary hardware from Datapoint Corp. with an option to buy if Grumman won the contract.

Major modifications included expanding the job-charging fields to accommodate Nasa's requirements for job costing, rewriting the time-card input and reworking the interface between master files and the general ledger, Cornell said. The system was installed by the end of July 1983, and all modifications were handled by On-Line Accounting staff.

The Lockheed/Grumman/Thiokol/Pan Am team was awarded the management contract for the space shuttle program on Sept. 7, 1983. "We had less than 30 days to be fully operational," Cornell said.

"Despite last minute changes in government regulations and procedures, the Famis accounting package was fully operational by the official start-up date of Oct. 1," he added. A duplicate system was installed at the same time at the GTSI operation at Vandenburg Air Force Base, Calif., where future shuttle flights will occur.

Famis handles approximately 1,000 Grumman employees in Florida and California. It has the capability to handle all types of pay scales, pay policies, deductions and taxes, Cornell said.

"Security is essentially foolproof," he noted. "Each data entry person is assigned several levels of security and can only access data within those security levels."

consco

Fast, accurate, fully automated consolidations from consco

We're the only people who do consolidations the right way. In fact, that's been our specialty for more than a decade.

Since our System is dedicated to consolidations, you can expect a lot more from it. Your accountants will be freed from the tedious tasks to do the more important things. And your management will get powerful, useful reports that just weren't possible before.

Our system provides:

- automatic reconciliation and elimination of intercompany balances.
- multiple hierarchies (geographic, legal, etc.) including lower level consolidations (by groups, divisions, and so on).
- changes to hierarchies without reprogramming or restating past data.
- automatic creation of journal entries (tax, minority interest, etc.).
- no limit on the number of periods or kinds of data, including budgets, plans, and forecasts.
- currency conversion and planning using average, current, and historic rates in conformance with FASB 8 or 52.
- fast reports that allow multiple formats on a single page, ranking of any data, and preparation of analyses and operating statistics and schedules required by management, the SEC, and the IRS.

The Consolidation System has interfaced with practically all the major General Ledger packages, as well as our customers' in-house systems. Of course, it also interfaces pretty neatly with our own Accounting Information System.

Information processing beyond the General Ledger

The CONSCO Accounting Information System (AIS), using relational architecture, brings all your data together so you can get the reports and analyses you need to run your business. CONSCO specializes in the tough jobs. Even if your requirements are so complex you thought you had to have custom software, AIS can handle your needs at packaged software prices.

Features of the Accounting Information System include the following:

- all normal General Ledger and Subsidiary Ledger functions: accruals and reversals, standard entries, comprehensive allocation capability, detail analysis, and financial statements.
- absolutely no restriction on number of fields or field sizes.
- processing abilities are not limited to General Ledger data. Any number of subsystem and descriptive fields may be used for complete information processing.
- edit tables which incorporate full Boolean Logic. These tables may be changed at any time and may access any data field, hierarchical or otherwise.
- an unlimited number of budgets, revisions, projections, and statistics without the need for special account codes.
- unlimited time period history with the most efficient data storage organization.
- an extremely powerful Report Writer lets you use any data, even subledger and operations data, to create the reports your people need.
- full on-line capabilities for data entry, update, and inquiry.

CONSCO's commitment to you does not end with our software. We offer on-site training and support, and a CONSCO Users' Group.

Our customers include many of America's largest firms. So if you're looking for mainframe software that does your tough jobs and more, call or write us for more information.

CONSCO Enterprises, Inc.
888 Seventh Avenue
New York, N.Y. 10106
(212) 586-8701

© 1984 Consco Enterprises Inc.

SPECIAL REPORT

CBT maximizes railroad's end-user training

And keeps pace with emergence of info center

ST. PAUL, Minn. — "Two years ago, when I proposed to management that we look into adopting computer-based training [CBT], I had never met anyone who had learned a significant chunk of his job through a computer," said Pat Joyce, manager of training in the Information Resource Department of Burlington Northern Railroad here. "But it seemed a good way to attack computer phobia, and perhaps even computer illiteracy, at Burlington Northern."

Joyce's interest in CBT came about after he and his three-person staff had devoted eight years to training DP personnel. Multimedia training joined in-house and vendor-sponsored seminars as the training vehicles most often used. But as the company's information center began to emerge and involvement in end-user training began to expand, Joyce saw an additional reason to implement CBT.

'Joyce's interest in CBT came about after he and his three-person staff had devoted eight years to training DP personnel. . . . As the company's information center began to emerge and involvement in end-user training began to expand, Joyce saw an additional reason to implement CBT.'

"The information center was one of the end-user groups we initially surveyed regarding a CBT program," he explained. "I had been told that CBT is particularly cost-effective when many people need short-term training, so CBT seemed the ideal solution."

Joyce received the go-ahead to hire Kathy McGovern, a professional whose background in educational design included extensive work in CBT. She headed a four-person formal committee to begin reviewing CBT system software in order to bring its capabilities in-house. McGovern, Joyce, Kurt Haubrich, who was a third training professional, and Rick Perry, a systems programmer acting as the group's technical advisor, were the search group members.

"We already knew that we wanted to look at IBM's Interactive Instructional System and Phoenix from Goal Systems International, Inc. In addition, Scholar Teach III from Boeing Computer Services Co. was also under review," Joyce said.

"Our first step was to request a formal presentation from each vendor and put together an extensive request for written information on each product."

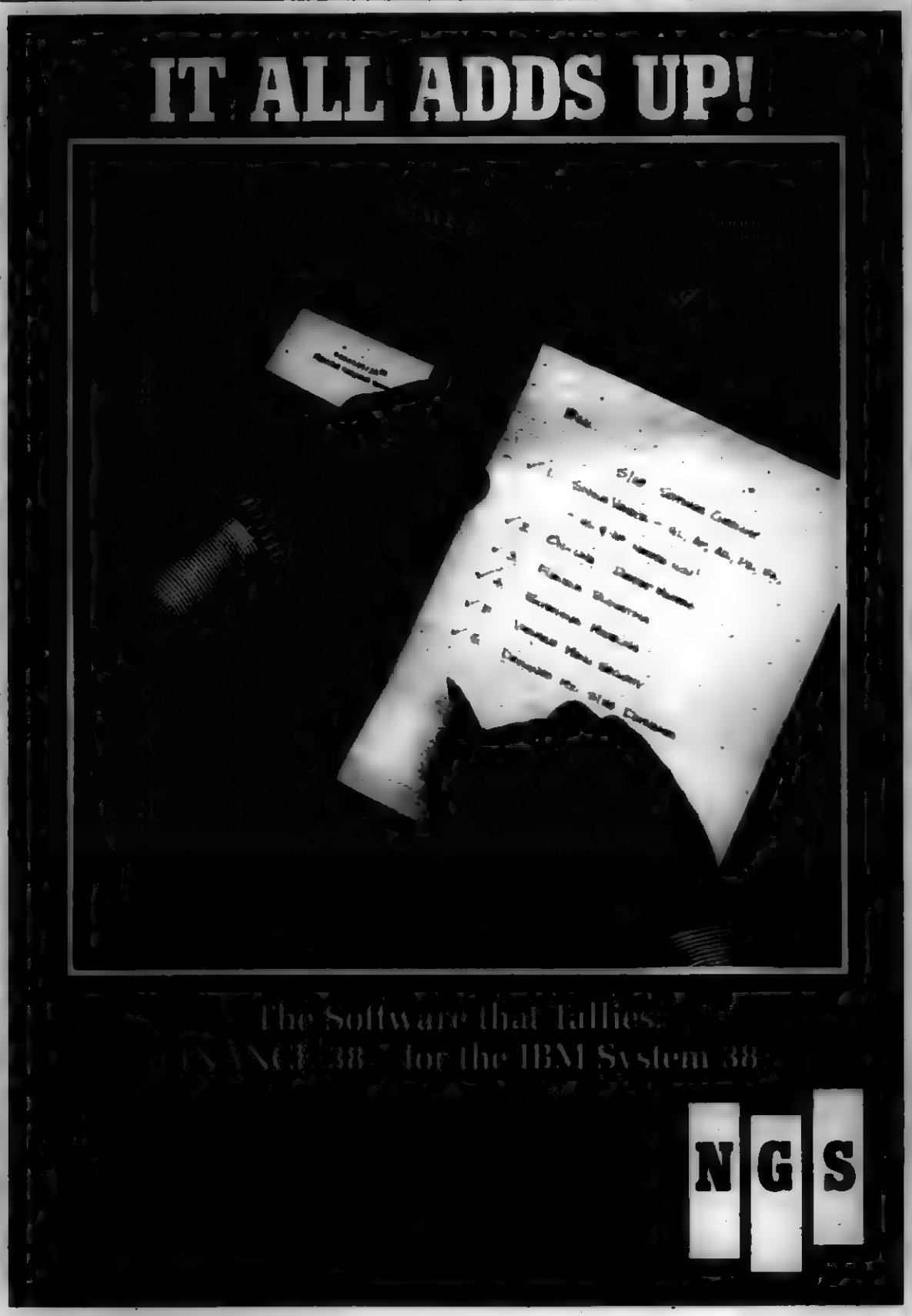
The Burlington Northern questionnaire asked about hardware requirements, installation procedures, CPU impact in multiprogramming environments and testing features. Vendors were asked if they had two authoring systems, one for programmers and one for nonprogrammers; how many current users were involved with the products; and whether customers included other railroad companies. Student registration, vendor-provided training, documentation, product trials, upcoming product development and system costs were other issues addressed by the document.

"We asked for a free, 60-day trial of the product," Joyce said. "Our plan was to put each of the three systems through as many hoops as possible, learning the product and then using it to develop a simple course."

The committee found Phoenix had superior editing capabilities, allowing the search group to create and run courses on-line without requiring batch runs, compilations or verifications, Joyce said. A perpetual Phoenix license was purchased in early 1983.

"Our first CBT project was to create a course to teach the marketing

See CBT SR/54



REPORT WRITER
for DEC computers
under RSTS and VMS
- Very powerful and user-friendly
- Better than DEC's Datatrieve
- Costs much less

etc ENTERPRISE TECHNOLOGY CORPORATION

SPECIAL REPORT

A view of the claims processing spectrum

Back-end, recording and adjudicating systems

By James H. Bowman
Special to CW

Processing of claims for health care employee benefits is an ideal on-line application for companies that self-administer their group health insurance programs and for administrators of multiple-employer trusts, insurance companies and other third-party administrators.

The job of choosing and installing one, however, is complicated by the spectrum of so-called automated on-line claims processing systems that are available.

Not all on-line claims processing systems are equivalent. They can be characterized as either back-end, recording or adjudicating systems (see Figure 1).

Back-end system

A back-end system is one in which results of manually settled claims are keyed to the system, and the system performs remaining clerical functions (in batch mode), producing such things as checks, statements of remittance, explanations of benefits for employees, check registers and other summary reporting.

Generally speaking, such systems handle clerical output chores, but do not contribute in any significant way to actual claims processing functions.

Recording systems are those that provide all clerical functions of back-end systems and also act during claims processing to provide automated recordkeeping and retrieval functions.

Such systems use the computer to eliminate essentially all of the paper that is created during manual claims processing.

Usually, manual work sheets are replaced with one or more on-line terminal displays, and a computerized claims history exists to replace family file folders.

Recording systems

Recording systems provide both clerical functions of back-end systems and file-handling functions. Such systems are still better described, however, as computer-assisted rather than computerized.

The final system category is the automated adjudicating system. It is designed to accept claims information at the same raw level of detail as exists on the claim and the accompanying health care providers' itemized bills and to actually do the adjudication of the claim.

Such systems provide clerical functions of back-end systems, file-handling functions of recording systems and actual claims adjudication functions.

Adjudicating systems afford maximum potential effectiveness in the man-to-machine ratio. They are also the most sophisticated and difficult to design and develop. They typically have the highest nonrecurring costs to select, acquire, install and start up.

They also have higher recurring operations and maintenance costs. However, the labor savings of automated adjudicating claims systems can be expected to more than offset their higher systems costs for sufficiently large-volume claims processing operations and correctly matched claims processing software packages.

Most systems now available are a cross between automated adjudicating and automated recording systems. Most are only partially capable of accepting itemized-bill-level data that is required to drive a truly automated adjudicating system.

Into conversion

Claims processors, with the notable exception of dental claims processors, typically convert itemized procedure-level information to a type of service or benefit level that is understood by the system.

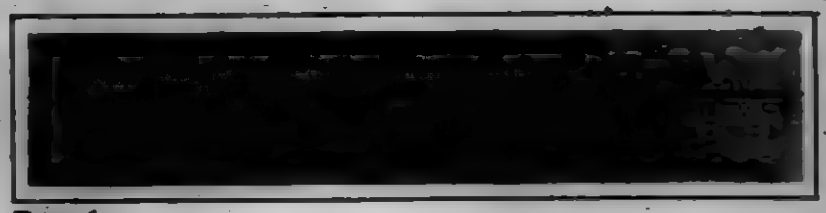


Figure 1

In so doing, the owner of the system is paying for this internal, manual claim-by-claim coding function. Typically, the coding function itself has already preadjudicated the claim because information goes into the system at the benefit level rather than the itemized bill level. The com-

See CLAIMS 59/54

Large systems hardware is not an impulse buy.

Now there's a guide coming to you that will help with your homework.

The *Computerworld Buyer's Guide to Large System Hardware* is designed to give you a valuable, one-stop information source for large systems hardware and peripherals. Take a look at all the tools it will give you to help you make the right large systems choice:

- Large systems product listings, including mainframes, superminis, minis and small-business systems and the terminals and peripherals designed to work with them. You'll get listings of printers, memory products, teleprinters, controllers, magnetic media and supplies, plotters, digitizers and much, much more.
- Vendor profiles that include company name, address, contact information, and primary markets served.
- An industry-specific editorial section that's designed to keep you right up to speed on the trends in large systems hardware. We'll give you news of the latest developments in mainframes, superminis and minis and their changing roles. You'll get information on the latest management techniques used in running data centers; planning for cost effectiveness and the new technologies in fifth generation computing.
- In addition to its comprehensive listings and editorial, the *Computerworld Buyer's Guide* will give you pages of detailed ads for large systems hardware products and peripherals that you can refer to all year long.

Each issue of the *Buyer's Guide* is updated before publication, and contains hundreds of listings that are accurate, complete and easy to use. This *Buyer's Guide to Large System Hardware* is distributed to *Computerworld's* 114,000 subscribers in the U.S. — it's one more of the additional benefits you get as part of your *Computerworld* subscription. Look for it this April 18th.

And if you market your products to buyers of large systems hardware and peripherals, this *Buyer's Guide* will reach them with your product message just when they're researching products and vendors. Reserve space in this *Buyer's Guide* by March 2nd by calling one of the sales offices listed below, or call Ed Marecki, National Sales Director or Kevin McPherson, Product Manager, at (617) 879-0700.

To: Ed Marecki, National Sales Director
CW Communications/Inc.
Box 880
Framingham, MA 01701

☐ Please send me advertising information for Computerworld Buyer's Guides.
☐ Please have a sales representative call me.

Name _____
Title _____
Company _____
Address _____
City _____ State _____ Zip _____
Telephone _____ 3/2

COMPUTERWORLD BUYER'S GUIDE

Sales Offices
BOSTON/Chris Lee, Bill Cadigan, Alice Longley (617) 879-0700
CHICAGO/Chris Lee, Bill Cadigan, Joan Broderick (312) 827-4433
NEW YORK/Mike Masters, Tom Flynn, Gale A. Peterno (201) 967-1390
ATLANTA/Mike Masters, Tom Flynn (404) 394-0756
SAN FRANCISCO/Bill Healey, Ruth Gordon (415) 421-7330
LOS ANGELES/Bill Healey, Beverly Rose (714) 261-1230

CLAIMS from SR/53

puter is merely reacting to declarations of benefits by claims processors rather than on itemized-bill-level data of original claims submissions.

In evaluating claims processing systems, it is essential to understand the difference between user-friendly (friendly to users) and non-user-friendly (friendly to nonusers) systems. Most systems marketed under the banner of user-friendly are more apt to be non-user-friendly and are somewhat user-unfriendly.

To the nonuser (typically the high-level buyer, who has probably never processed a claim), on-line systems, which are highly conversational and uncluttered by sparse data displays and small data entry increments, look very user-friendly. In reality, such systems that demonstrate extremely well for these basic nonuser purchasers do not work all that well for the personnel in the trenches.

'Changing claims administration systems is something that should be done no more than once every five to 10 years, and it is worth spending up-front money — even prior to beginning a procurement process — in order to improve chances of obtaining the best available system for both current and projected claims administration needs.'

Actual users of high-volume, production-oriented, repetitive task systems want systems that are simple, lean and fast. In short, users who know what they are doing do not want to be burdened with a system that is too slow because of non-user-friendly features.

It is essential that organizations have customized shopping lists prior to looking at systems. Unless internal professionals are available who have expertise in both claims administration and automated, high-volume transaction processing systems, external consulting assistance should be sought.

Changing claims administration systems is something that should be done no more than once every five to 10 years, and it is worth spending up-front money — even prior to beginning a procurement process — in order to improve chances of obtaining the best available system for both current and projected claims administration needs.

Deverman is founder and president of Medical Data Systems, an Albuquerque, N.M.-based consulting service organization specializing in automated claims processing and related information systems.

Cut Information Retrieval Down To Size

...with BRS/SEARCH— the Software That Comes In Mainframe, Micro and Mini Sizes.

BRS/SEARCH, the same information retrieval software that runs one of the world's largest online database systems is now available for your mainframe, mini, or micro computer.

BRS/SEARCH gives you instant access to all your own information, regardless of its length or format. Many powerful, easy-to-use features developed through millions of online searches have made BRS/SEARCH the system of choice among information professionals.

BRS/SEARCH runs on IBM and compatible mainframes, as well as 16 and 32 bit mini and micro computers. And because the search query language is the same no matter what size computer, you can use it on a variety of systems without any additional training.

For more information about these three new sizes of database software, call (800) 235-1209. Or write BRS Software Sales Support, 1200 Rte. 7, Latham, N.Y. 12110.

Dealer and OEM inquiries invited.

BRS SEARCH SOFTWARE

An ITG Company

CW/84

I'd like to know how to cut my information retrieval problems down to size. I am interested in SEARCH for the following systems:

Mainframe: .....
Mini: .....
Micro: .....

☐ Please have a salesman call.
☐ Send me more information.

NAME _____
COMPANY _____
ADDRESS _____
CITY _____ STATE _____ ZIP _____
PHONE ( ) _____

CBT from SR/52

department to use a new computerized transportation system," Joyce explained. "This corporate system allows our marketing specialists to estimate the costs independent truckers would incur for various contracts on which Burlington Northern is bidding. By knowing the approximate costs our competition faces, we can be more accurate in our own cost estimates and business forecasts."

Using Phoenix for the first time, McGovern completed the course in approximately three months, including a detailed course evaluation by nine people and error corrections using the Phoenix on-line editors. The course is designed in three parts, each offering about an hour of instruction.

Part one provides general information about how to take a CBT course. Part two presents three detailed case histories, which teach students how to deal with the variables used in cost estimating. Part three continues these problem-solving case histories and also teaches the student how to use reference materials. To date, 20 marketing and rate-setting professionals in the company have completed the course.

As Burlington Northern worked to author its own CBT course, the company also began looking at off-the-shelf vendor courses. An introductory multimedia course on the information center was selected from Deltak, Inc. as the first training a new information center end user receives.

Fifteen to 20 people view this course during a two-hour seminar and group discussion which is held almost weekly. Then, each end user is invited to the training center to learn DP skills. About 500 people have completed this introductory training.

"Six months ago we brought in a CBT course to teach report writing under [Information Builders, Inc.'s] Focus, and today 70 people have learned Focus from that course," Joyce said.

Every Burlington Northern user department has used CBT. "Two years ago, I was not involved in any end-user training at all; today I would say I divide my time evenly between standard application development staff training and end-user training through the information center," Joyce said. "I know the evolution is toward more and more end-user training, which means a larger share of my time will be devoted to CBT."

...before your users do.

Candle knows that when a business depends upon its IMS online system, that business is also vulnerable to the problems within that system. We developed RTA/IMS to help reduce user and customer frustrations because of poor response time. With RTA/IMS you won't be caught off guard by user complaints about poor response time. As a matter of fact, you can be warned when response times approach their thresholds, BEFORE your users perceive a serious problem.

For a graphic view of your response time, RTA/IMS features Moving Time Slot Analysis. RTA/IMS' "Fixed Window" will continuously monitor the 10-minute response history for the transactions selected, whether or not the "Response Threshold" has been crossed. For dynamic warning of problem transactions, RTA/IMS' "Dynamic Window" will display the 10-minute response graph only if the response time for the selected transaction has exceeded your acceptable response time level.

To recognize impending problems by spotting short-term trends, Time Interval Analysis presents response times for three distinct intervals such as 5, 15 or 30 minutes. To determine what your response time was for transactions at certain periods of the day (ex. 9:00-9:30, 9:30-10:00, 1:00-2:00, etc.), RTA/IMS' Selected Time Slot Analysis will display the response time for your specified transaction—that simple and that easy.

RTA/IMS' Moving Time Slot Analysis displays "Fixed Window" (right side of screen) and "Dynamic Window" (left side of screen).

RTA/IMS provides real-time feedback on IMS response time so that you observe short-term trends, receive dynamic warning of performance problems, and thus improve IMS service levels to your end users.

Candle

10660 Wilshire Blvd., Suite 2404
Los Angeles, California 90024
Phone 213-207-1400

☐ Please send me more information on RTA/IMS.

☐ Please enter my free subscription to the Candle Computer Report.

Name _____ Title _____

Company _____

Address _____

City/State/Zip _____

Phone _____

Candle

[illegible]

SPECIAL **REPORT**

Programmer's tool kit eases maintenance ills

By Russell P. Sarney
Special to CW

Are you maintaining an older application system and unable to find that program a co-worker wrote to patch up the pointer file? Does it take a long time to build that new subsystem — the one the user asked for eight months ago?

The following programmer's tool kit was developed to support a seven-year-old credit union package running on a dozen minicomputer user sites. It may help ease your application maintenance difficulties. The kit consists of the following:

A sorted directory table of contents.

This program searches a disk directory for all source, Job Control Language and text file names. It then sorts these names into alphabetical order. The program then opens each source or text file and prints the first line or identification title line. This listing is now a usable directory or table of contents of all programs on the disk. This is quite handy when you are troubleshooting and looking for a program.

A sorted program listing.

Using the same directory file, list all the programs in sorted order. Put them in binders and label them clearly. Often, interactive minicomputer programmers have a tendency to use their terminals to troubleshoot. Because this approach allows you only to "view" 24 lines of code at a time, you may miss the big picture or other potential trouble areas.

A customer service report (CSR).

The CSR form was designed to capture a description of problems and solutions or actions taken. This helps to identify problems with particular programs or user sites. You can identify steps that were taken the last time the problem occurred.

A key-word search program.

This program allows you to use up to 10 key words or parts of words to search a text file. The types of files for which this is effective would be one-line CSR summaries or the sorted table of contents. By automating the search method, you can reduce the time needed to locate a program or CSR summary.

A pretty print.

This is a structuring engine to rebuild selective programs. One developer actually built a program to align and indent source text built by over a dozen different programmers over the last seven years, each with his own style of coding. This program helped provide a more uniform look to the programs.

A survey guide.

A questionnaire can be developed to make sure that installation at each site will have a minimum number of surprises. This helps to capture some of the "blue sky" the salesman sold. If you have half-a-dozen programmer/analysts analyse the users' requirements, you will get half-a-dozen different requirement definitions. By having your "super" analyst write down all the questions that he would ask, you've got a better chance that all the other analysts using this survey guide will also ask these questions.

A program generator.

In several hundred programs, many functions are common to each. You can generalize each of these functions and put them in a copy library.

Clean up the record format library and generalize the file access schemes. Create an indexed "files definition" data dictionary that contains the characteristics of each file. The generator allows you to "paint" a screen before you commit it to code, and the same holds true for the report generation functions.

Most systems have some type of copy library function, a screen builder and a report generator. The difference here is that the generator binds all of these "independent" functions into a single interactive work session.

This tool kit has been evolving over the last four years. In order to have a chance at keeping up with the demand for computer usage, don't become static in the development of new tools.

Sarney is a DP consultant in Honolulu.

Packaged tool allows for growth

NEWTON, Mass. — The Shipley Company, Inc. is a leader in sophisticated surface chemistries, providing products and systems for printed circuits, microelectronics, plating on plastics and metal finishing applications.

As demands for Shipley's highly technological solutions to chemical problems increased, the company turned to computer systems for day-to-day business operations. Several years ago, the company installed an IBM System/3, which later was replaced by a Honeywell, Inc. Level 62 minicomputer that relied chiefly on "home-grown" software for the accounting functions.

It soon became evident that the software developed in house was too complicated to maintain. It also did not provide the flexibility needed by the accounting department to keep pace with the company's continuing success and expansion. Following a search for a packaged software solution, Software International Corp.'s General Ledger and Financial Reporting System was selected.

"Shortly before I joined the company, I had been involved in a comprehensive evaluation of the leading financial application packages, including Software International products," said Joseph A. Merchant, Shipley DP manager.

"Since Software International had a system for Honeywell Level 62 equipment, there was no need to go through a complete evaluation again, and we installed the Software International package. The decision to go with a packaged system also eliminated the full year's development time which the in-house group estimated would be needed to create an automated general ledger," Merchant said.

Within a 60-day period, Shipley was operational with the Software International General Ledger, and six months later the company completely cut over from its old manual system. The accounting staff, by taking advantage of the package's variable report writer feature, gained flexibility because staff members could design report formats any way they chose.

"About a year later," Merchant said, "as the IBM System/38 was about to be announced, Software International mentioned plans to drop support of the [Honeywell] 62 packages. However, Shipley was changing to the IBM System/38, so we worked out a plan to take advantage of the new computer's unique architecture and capabilities."

Merchant said that, as presently installed, the General Ledger package provides flexible product line reporting. The system is structured to mirror Shipley's product line organization accurately. Traditional profit-and-loss statements are provided vertically, and by using a matrix base, each product line is exploded. The chart of accounts and relationships file provides 10 levels of related accounts so that accountants can quickly post to the system, and all transactions are traced throughout the entire chart of accounts.

Prior to implementing the software package, the in-house system could handle less than 1,000 separate general ledger accounts. Today, Shipley has 10,000 accounts,

See LEDGER 59/58

ATTENTION
CICS/VS SOFTWARE USERS:

CICS TRAINING FOR THE REAL WORLD

- COMMAND LEVEL PROGRAMMING
- APPLICATION DESIGN
- TESTING & DEBUGGING PROCEDURES
- CICS/VS / IMS COMPARISON

All too often CICS courses are *TOO MUCH THEORY* and *TOO LITTLE REAL WORLD ORIENTED*. At CompEd, our courses are designed with the real world in mind, our highly skilled and experienced instructors utilize case studies from actual projects which are reinforced with "HANDS-ON" exercises and supported by concise state-of-the-art technical guides.

WE DON'T MERELY TELL YOU ABOUT CICS/VS, WE TEACH HOW TO US IT . . . EFFECTIVELY

For information call or write:
Paul E Saldo
Vice President

CompEd™
CompEd Technical Corporation
10 East 21 Street
New York, New York 10010
Tel.: (212) 505-0080
1-800-223-7822

More IBM System/38 Users Are Choosing RTC Systems.

For technically superior software in a wide range of Financial, Manufacturing, Distribution and Management Business Systems.

GBACS℠ Features:
- Designed Originally on Our Own System/38
- Written entirely in RPG III
- Designed to Maximize /38 Efficiency
- Code Master Subroutines
- Help Key
- One Set of Standards
- Fully Integrated Applications
- For a True Data Base System
- Ideal for Multiple Company, Division, and Department Data Management

Current Modules:
- Accounts Payable
- Accounts Receivable
- Credit Management
- Equipment and Vehicle Maintenance
- General Ledger
- Inventory Control
- Manufacturing
- Order Processing/ Invoicing
- Payroll
- Personnel Administration
- Purchasing
- Sales Analysis

℠General Business Applications Graphic System

For information contact Brian Sullivan at:

RTC Systems, Inc.

49 Plain Street, North Attleboro, MA 02760
(617) 695-5008

Introducing MARK V™ for CICS users: a *unique*, 4th generation non-procedural application development system that saves you time and money at every stage of your application life cycle. See it at a free seminar near you!

Informatics just broke the productivity barrier with MARK V, an extraordinary timesaving application development system. But, MARK V is not for everyone. *It may be for you if:*

- ☑ You need help in reducing your backlog of medium to complex CICS applications.
- ☑ You use CICS with IBM-supported data access such as VSAM or DL/I.
- ☑ Your CICS system demands highly efficient application execution.

Then, MARK V can help you produce efficient compiled applications that rival the execution of well-written COBOL—in less than half the development time!

Easy application development and maintenance is just the beginning!

MARK V improves productivity throughout the application development and maintenance cycle—not just in the coding—by providing:

- Interactive application design and simulation
- Easy to use, menu-driven specification language for development and maintenance
- Transparent and complete data access/communications control
- Automatically produced application documentation

That means, with MARK V your programmer need only specify the solution. MARK V generates the *complete* application. This methodology allows you to solve more complex problems more efficiently using less highly trained personnel—*and that saves you money!*

Reserve your place at a *free Seminar* on MARK V—the simple new way to develop and maintain your medium to complex CICS applications.

As a data processing professional, you're also a professional skeptic. But the simplicity, versatility and timesaving capabilities of MARK V are easy to see—and prove. To do so, simply mail the coupon below or call toll free. We'll reserve your place at a free MARK V Seminar in a city near you. But attendance is limited.
So mail this coupon or call *today*.

informatics general corporation

THE SOFTWARE ENGINEERS

Register now for a Free MARK V Seminar!
Mail this coupon or call toll free

1 800 227-3800, ext. 926
(In Canada, call collect. 0 415 ~~86~~-7182)

YES. I want to learn more about how MARK V can make my medium to complex applications development and maintenance both fast and easy.

☐ Please enroll me in the free seminar I have indicated below (check one). Call me with details on specific location and time. I understand that there is no cost or obligation.

☐ Dallas	February 14	☐ Detroit	February 15
☐ Boston	February 29	☐ New York	February 14
☐ Chicago	February 16	☐ Philadelphia	February 16
☐ Cleveland	March 1	☐ San Francisco	February 23
☐ Houston	February 8	☐ Toronto	March 14
☐ Los Angeles	February 21	☐ Washington, DC	February 22

☐ I cannot attend a Seminar. But please send me more information on the MARK V Application Development System.

Name _____

Title _____

Company Name _____

Phone Number _____
Include area code

Address _____

City _____ State _____ Zip _____

Mail this coupon to: Informatics, MARK V Free Seminar
P.O. Box 1482, Canoga Park, CA 91304 CW-AL

SPECIAL REPORT

Financial package increases user control

HOLMDEL, N.J. — Software vendors are used to the cautious analysis and painstaking research that always accompanies the selection of general ledger software. But, when the potential user is a software company, the supplier must be prepared for an extremely rigorous review.

When CGA Computer, Inc., a $33 million software products and consulting firm here, decided to upgrade its financial applications systems, the firm sought proposals from outside sources rather than devoting resources to develop packages in-house. However, the firm was not hesitant about devoting some of its software talent to ensuring that the best package was chosen.

"Principally, we wanted a package that would reflect current design techniques and allow for rapid expansion," said Peter Orenchuk, manager of internal systems and group leader of the selection team. "We did not want an old system that had been patched together to be everything to everybody."

Because of its user features and its ability to run on-line, CGA selected Computron Technologies' CAS/IV general ledger, accounts payable and accounts receivable systems. "One of the biggest features of the system," Orenchuk said, "is the control given to users. They do not have to understand how the system works because it comes with excellent inquiry techniques. Virtually all questions are answered on-line and within the program through interactive help facilities called Q-Mark and Q-Select."

Since practically all of CGA's more than 450 technicians are either on assignment or supporting their own software products, Orenchuk knew he would have a lean applications support team. "It was a plus that the products installed easily and required relatively little support or customization," he said. "Two days of training were all we needed. Within six weeks, we were parallel testing our financials from the beginning of our fiscal year.

"During that time, we generated 160 different reports from scratch. If those reports had to be programmed, we're talking months and months of programmer time."

Once the first run was completed, Orenchuk went to Bruce Posner, controller of consulting services, to get his reaction.

"The bottom line was that their system worked with very few glitches," Posner said. "I was able to cut closing time from five days to four. As far as I'm concerned, that is outstanding."

LEDGER from 32/32

and it generates financial statements for four product lines. Because the company now has worldwide operations, the system is being used for currency conversions.

"We often refer to our Ledger as living software," Paul Hoirtis, corporate controller, added. "As the company keeps expanding overseas, our requirements change.

"By allowing the accounting department to operate on its own, we can provide up-to-the-minute information without excessively burdening the DP department. By using the variable report writer, DP is also not saddled with extra documentation chores.

"The Software International Ledger is on-line, therefore we put a terminal directly in the accounting department.

"We also plan to install a dedicated printer in accounting, and they will not even have to depend on DP for hard copy of their reports," Hoirtis said.

AT LAST, A HIGH PERFORMANCE, RELATIONAL DATA BASE SYSTEM FOR YOUR PRODUCTION-ORIENTED VAX ENVIRONMENT.

SPECIAL REPORT

On-line system keeps subcontractors in check

AUSTIN, Texas — Underpay a subcontractor and he'll let you know loud and clear. Overpay him and you'll usually be able to get your money back — with some delay and embarrassment.

However, two firms that subcontract most of their work experience few of these payment problems because they use an on-line accounting system which includes subcontractors' status reporting.

"We are brokers of other people's services to the owner," explained Dee Lindley, president of the Ausland Construction Co., Inc. here. "We subcontract as much as we can and have a minimal field force, which is supervisory in nature. Our 'substat' report keeps us up to date as to the status of each subcontractor's program," he said. "It is instantly available, and if we have updated our cost data that morning, then our reports are current."

Ausland's system is Interactive Management Accounting Generator (Imag), an on-line construction software package written by D&S Systems, Inc. of Memphis. Designed primarily for NCR Corp. systems, at Ausland it runs on an NCR 9020 with 10M bytes of disk storage and two terminals.

At the George Sollitt Construction Co. in Wood Dale, Ill., and Seattle, "We sub out about 75% of our work," explained Controller Alfred F. Zabinski Jr. "We use Imag's subcontractors' status report, which maintains each sub's history for the life of a project. We have jobs that cost up to $17 million and last about three years." Sollitt has automated its costing and accounting procedures on an NCR 9020.

"In the past, we had a punched-card computer for accounts payable and payroll only," Zabinski said. "It took us three weeks after month end to get our general ledger posted. Now it's completed within four days."

Sollitt's Seattle office has an NCR 8150 minicomputer with a CRT and can tap into the same current job-cost and subcontractor status information as the four CRTs in Wood Dale. The 8150 transmits payroll data to the 9020. After processing, it sends back report and check information to be printed on the Seattle machine. This communications link has operated on a dial-up basis since December 1981.

Terminal display

"We can now give a project manager or a customer information such as job cost to date or labor cost to date while he waits on the phone, just by displaying it on a terminal," Zabinski said.

About 75% of Sollitt's jobs are bid and the rest negotiated. Usually the $40 million-a-year concern does its own concrete work then subs out the rest. It employs up to 300 workers during peaks.

Sollitt's Imag comprises payroll, payroll reports, job-cost reports, subcontractor status, accounts payable, accounts receivable, general ledger and fixed assets.

"Once a cost is keyed in, it immediately goes throughout the system updating everything it should," Zabinski said. "And we can get the information out easily, either in detail or in summary form."

At Ausland, the Imag modules include payroll and reports, job cost, subcontractor status, estimating, check reconciliation and general ledger. But the most important application is job costing, according to Lindley.

About 80% of Ausland's work is in negotiated design-and-build projects in the $400,000 to $700,000 range.

"In dealing with subs, Imag and the computer won't write a check for too large an amount, for example. They just won't let us overpay somebody," Lindley said.

New Generation Architecture
Integrated Components
The ULTRA Logical User View
800-543-3010
Cincom Systems

SPECIAL REPORT

Detailed evaluation key to package selection

By Tony B. Dappe
Special to CW

If you begin with the assumption that selecting a software package will provide a quick and cost-effective solution to tight deadlines, large backlogs and slim programming budgets, you are a prime target for the marketing sales pitches and a potentially unsuccessful project installation. Software vendors thrive on this type of environment to turn a quick sale.

As a result, these packages are given to the client, and their successful installation is dependent on the client. Then the client tries to make the software packages fit the business needs of the corporation if, indeed, the business needs have been defined. This thorough evaluation is the first and most important step in avoiding missed deadlines and overrun budgets.

The first step to a successful project is to get upper management to support the project without dictating unrealistically tight time schedules and budget restraints. Management should understand that a successful installation requires an appropriate time and money commitment. A detailed work plan depicting the project team's process should be presented to upper management prior to beginning so that management will understand and appreciate what is involved in a major installation. This plan should include input from both data processing and full-time user personnel.

Another important ingredient is to have an active working review committee on hand that can speak for the areas to be affected by the new package.

Step two is to send a "request for information" with the general requirements you are trying to address to potential vendors. While this correspondence is progressing, the project team should develop a detailed set of user requirements for the new system.

These requirements do not address the solutions or the "how to," but only the specific user requirements.

The review committee established for the project or projects should be intimately involved in reviewing, agreeing on and approving the developed user requirements. These requirements are developed through extensive interviews in the user community and from expertise on the project team.

When looking for an integrated system, the final step is to combine the requirements of each subsystem into an integrated evaluation criterion. Now you are ready to begin evaluating software packages.

Know potential packages

The project team should become as familiar with potential vendor software packages as possible. This can be accomplished by reviewing the material returned in response to your request for information, attending vendor software package seminars and investigating vendor documentation on the software packages.

When your project team is thoroughly versed on your business requirements and the potential vendors' materials, it is time for an intensive questioning period with the potential vendor. Invite potential vendors to participate in the session, and instruct each vendor to have its technical staff available for this process.

Each vendor should be asked if the requirement can be met and to explain specifically how its package would satisfy the requirement. The "how" is as important as the "if" because of the inefficiencies or problems which can be caused by inappropriate solutions.

After narrowing the field to a few vendors, a final analysis should be conducted. Client interviews, a vendor home-office visit and the execution of a test case developed by our project team are good techniques. Obtain a client list from the top two vendors, and request visits to six of their clients in similar lines of business. The remainder of the project team may conduct phone interviews with the remaining clients.

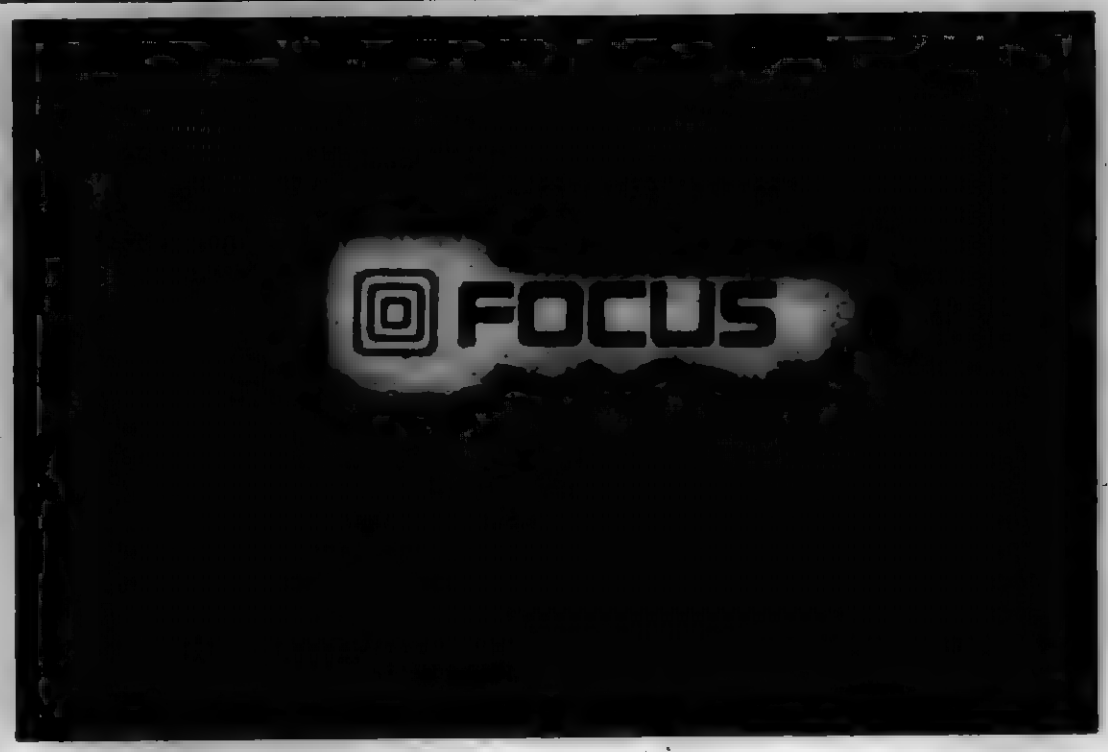
The last step, which could prove to be the most important, is the execution of a sample test case. Most vendors are not prepared to do this, or they will want to execute their own "canned" test case. A good test case could take as long as a week to execute, but the time is well spent.

With this thorough analysis, the project team should be able to make a recommendation to upper management. Once upper management gives their approval, it is time for contract negotiation.

Make sure you negotiate every substantive item up front and include it in the contract. The client has much more leverage before the selection and negotiation process is completed and the contract signed. Clients should understand that a standard vendor contract is only a starting point for negotiations.

Dappe is manager of the financial and accounting systems at Valero Energy Corp. in San Antonio, Texas.

ONE LANGUAGE. ONE SOLUTION.



THE KEY TO INFORMATION CENTER PRODUCTIVITY.

In today's Information Center environment the #1 application development tool is Information Builders' FOCUS. No other product offers the productivity and full range of functions provided by FOCUS...all within one nonprocedural language!

FOCUS' powerful relational facilities enable you to quickly build new systems. You can create new files within minutes using simple English commands, as well as query and report from existing files (VSAM, OSAM, IMS, IDMS, etc.) in your Information Center.

This increases programmer productivity by hundreds of percent, and allows end users to perform their own ad hoc queries, reports, financial modeling, graphics and statistical analysis after only a few hours familiarization.

And, there's PC/FOCUS too. It expands your PC into an Information Center with the same relational database, screen manager and data analysis facilities found in mainframe FOCUS. Plus, it enables you to download, manipulate and/or upload data extracted from mainframe files and DB's, all with full FOCUS security.

The FOCUS system. The language that unlocks productivity in your Information Center. For details write to: Don Wszolek, Dept. M5, Information Builders, Inc., 1250 Broadway, New York, NY 10001.

INFORMATION BUILDERS, INC.

New York: (212) 736-4433 • Washington, D.C.: (703) 276-9006 • St. Louis: (314) 434-7500 • Chicago: (312) 789-0515
Dallas: (214) 659-5970 • Palo Alto: (415) 326-5614 • Los Angeles: (213) 615-0735 • Houston: (713) 952-0360
Dealer inquiries invited

The Goal News

LOGICAL beats PHYSICAL

For OS/VS

LOGICAL DUMP/RESTORE OFFERS VAST PERFORMANCE GAINS

We are pleased to report that the people who have tried FAVER/XP, the "smart" backup/restore system, are pleasantly surprised at the difference Logical makes.

Most people are used to a physical-design dump & restore system. To backup a single dataset across a number of packs, they have to physically back up each pack. The logical approach of FAVER/XP lets the system back up just the dataset you want, no matter how many volumes it occupies.

You can back up clusters, groups of clusters or an entire catalog this same way. It's much easier with FAVER/XP and everything happens faster.

Plus, FAVER/XP integrity-checks all VSAM datasets for errors before it backs up anything. If it finds anything, you know about it. If everything's OK, the backup runs automatically. You can rest easy that your backups are clean.

Just to be sure, though, you can invoke the COMPARE function to ensure that the backup tape contains exactly the same data as the disk.

Works with VSAMAID/XP for total VSAM management

Goal Systems International has revealed that they have an interface between the FAVER/XP Backup & Restore system and the VSAMAID/XP system which creates the only complete VSAM dataset management system available today.

During backup, the FAVER/XP special interface creates a historical file, which may then be used by VSAMAID/XP to create a "recommendations" report. The report tells resource managers how to manage VSAM datasets for optimum space allocation [illegible]

FAVER/XP beats IDCAMS

In benchmark tests where an OS/VS installation runs backup & restore routines using IDCAMS and FAVER/XP, FAVER/XP completes the tasks required in half the time.

These figures are taken from actual timings made by product managers at Goal Systems International, the authors of FAVER/XP. They cover 100 product installations spanning five years of operation.

"The difference in speed is due to a systems design that combines the speed of a physical dump/restore with the [illegible] design philosophy of logical file access," said Theodore Pepper, Chief Developer at Goal.

Users amazed at the difference

When polled by this newspaper, users of FAVER/XP revealed that the Logical approach to backup & restore is genuinely faster, more accurate, and easier to perform.

Ralph T. Bryan, Systems Manager at Turbo Rubber Company said, "Here we had been operating all these years working our tails off just to do an accurate backup & restore. And FAVER/XP comes along and automates the task. It's about time.

"We had depreciated away our investment in our old physical [illegible]

FAVER/XP and VSAMAID/XP are great news for OS/VS installations. They are two of the Extended Productivity Systems from Goal Systems International. Both are available for a free trial. Call Goal Systems toll free today.

800-848-4640

Goal Systems
Software Solutions

Goal Systems International, Inc.
5455 N. High Street
Columbus, Ohio 43214-1193
Phone (614) 888-1775

SPECIAL **REPORT**

Risks of custom-designed tools cataloged

By Jan Hallmen
Special to CW

Recent substantial awards for damages against a major computer manufacturer because of its failure to deliver software that worked as promised have pointed out the risk involved in the use of custom-designed software.

The awards further demonstrate that this risk is as great when the software is developed by a supposedly competent system design house as when the user's own programmers write it.

The decision to use custom-designed software must be based on total trust that the person making the promise to create the software will do so in the expected time frame and for the expected cost.

Performance must be good enough so that a day's work can be done in a day, without adding personnel or computer hardware. Few professional system design houses can deliver all this. An organization that is not professionally developing computer systems can hardly expect to do as well.

Fortunately, it is no longer necessary to rely on custom-written software. Industry-standard operating systems such as Unix and Digital Research, Inc.'s CP/M have provided software developers with a large enough market for their products that they can afford to have software on the shelf.

A prospective computer user can now see his proposed system in operation before he invests in either software or hardware. He can see the functions it performs, how easy it is to use and its speed and flexibility. He can also size up the support organization behind it, which is one of the most important considerations in choosing a system.

Vendor dependence

A user of any computer software, whether custom or packaged, is highly dependent on the software vendor for training, maintenance, problem resolution and enhancements.

No business can trust the control of its operation to a system backed by a computer store specializing in games. Instead, the prospective computer buyer should look for an organization dedicated to a consultative approach to selling business systems, in which the dealer will analyze the organization's operations and recommend an appropriate system.

A prospective computer user should also demand that one party take responsibility for the computer hardware, software and support. The price of computer hardware and packaged software belies their actual complexity. Together, hardware and software compose a single system, and only a computer systems professional is qualified to analyze how they work together.

In fact, many good computer system organizations simply will not sell hardware and software separately since they must know both intimately in order to properly support their customers.

Custom-designed problem

When software is custom-designed for a user, probably no more than three people know how the system really works. Turnover of DP personnel is remarkably high, and even if the programmer stays within the same organization, he may have forgotten a lot about how your system works when you call for help.

The only realistic solution to this problem is to use packaged software and to make sure you are using an up-to-date version.

Reputable business software publishers maintain a staff of support personnel that understands the software. If your revision is more

See MORE SR/84

More people in your position choose ASK.

After all the sales hype, analyses and benchmarks, the choice of a manufacturing system often comes down to a gesture of faith.

Don't make it blindly.

First consider why ASK inspires the confidence of more MIS professionals. (And why customer referral has made us the biggest in our field.)

Then consider this. Our MANMAN® software integrates manufacturing and financial operations more completely. So you'll never find yourself at a staff meeting accounting for your lack of cost accounting. Or your choice of a system.

Then consider the best part. You can fully implement MANMAN on a VAX or HP 3000 in under a year. So the information burden shifts from your shoulders sooner. And smoother. Because with our comprehensive training and documentation, your users quickly learn to help themselves to all the information they need.

Find out firsthand why more people choose ASK. Contact Carol Singh at (415) 969-4442 or 730 Distel Drive, Los Altos, California 94022. Get a customer referral. Then call and ask someone in your position about MANMAN.

What you hear will answer your every prayer.

ASK

THE PEOPLE WHO KNOW MANUFACTURING.

VAX is a registered trademark of Digital Equipment Corporation.

© 1983 ASK Computer Systems Inc.

How to control a world you can't always predict.

Cullinet's integrated manufacturing software.

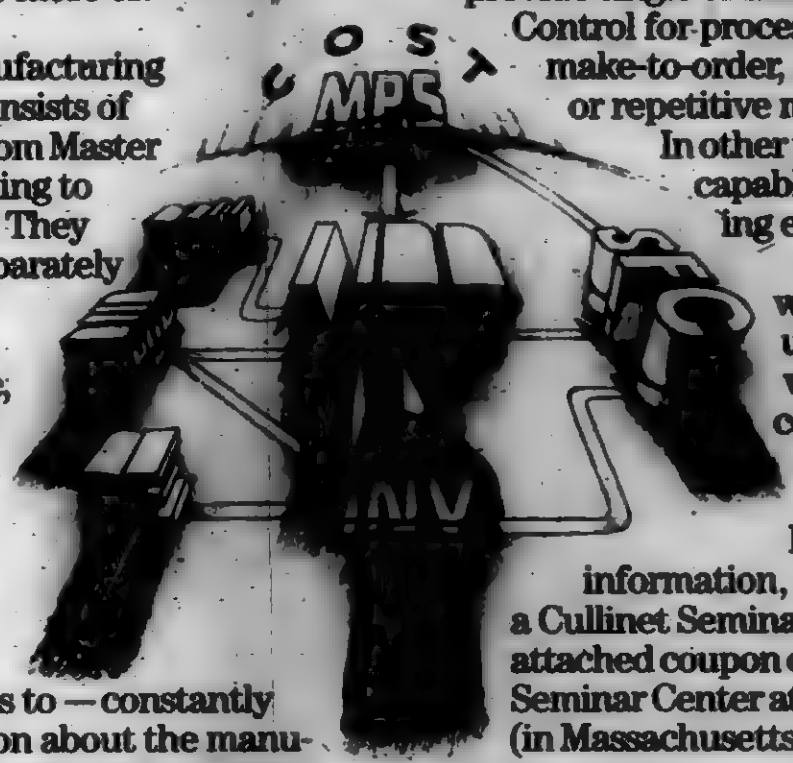
Cullinet has a software system that provides manufacturers with the one thing they could use more of: control.

A Cullinet Manufacturing Software System consists of eight applications from Master Production Scheduling to Shop Floor Control. They can be purchased separately or as a completely integrated system.

As a net-change, closed-loop MRP II system, Cullinet's Manufacturing Software provides manufacturing personnel with an accurate reflection of — and easy access to — constantly changing information about the manufacturing cycle. At any point in the cycle.

With this kind of timely information, variables that might influence inventory, resources, personnel, production, distribution, indeed, the very profitability of a manufacturing concern can be accounted for. And, once accounted for, controlled.

A very flexible system, Cullinet's Manufacturing Software can bring high-level control to any manufacturing environment however unique or personal your individual style and approach. It can provide single or multi-plant controls. Control for process manufacturing, make-to-order, make-to-stock, or repetitive manufacturing. In other words, it is equally capable in any manufacturing environment.



So even if your world changes in unpredictable ways, we can give you control over it.

Cullinet's Manufacturing Software. For further information, attend a Cullinet Seminar. Mail the attached coupon or call the Cullinet Seminar Center at **1-800-225-9930** (in Massachusetts 617-329-7700).

I'd like to attend your seminar in (city)_____ on (date)_____

Company_____

Name/Title_____

Name/Title_____

Company/Department_____

Address_____

City_____ State_____ Zip_____

Phone (___) _____

Mail to: The Cullinet Seminar Center, 400 Blue Hill Drive, Westwood, MA 02090-2198
Cullinet Software products are designed to run on IBM 360/370, 30XX or 43XX or plug-compatible computers. 1/30-CW

MANUFACTURING SEMINAR CITIES AND DATES

Atlanta, GA	Feb. 15	Des Moines, IA	Feb. 16	Pittsburgh, PA	Feb. 29
Arlington Heights, IL	Feb. 23	Detroit, MI	Feb. 9	St. Louis, MO	Feb. 8
Baltimore, MD	Feb. 21	Hartford, CT	Feb. 14	San Jose, CA	Feb. 14
Charlotte, NC	Feb. 23	Indianapolis, IN	Feb. 21	Seattle, WA	Feb. 7
Cincinnati, OH	Feb. 7	Kansas City, MO	Feb. 22	Tampa, FL	Feb. 6
Cleveland, OH	Feb. 9	Los Angeles, CA	Feb. 9	Toledo, OH	Feb. 24
Denver, CO	Feb. 7	Philadelphia, PA	Feb. 8		

Manufacturing: Cullinet

© 1984 Cullinet Software, Inc. 400 Blue Hill Drive, Westwood, MA 02090-2198

My Top Management Is Impeding Company Growth.

Top managers must think programmers grow on trees.

Every time a top manager comes around with an urgent request for information, I have to pull somebody off another job and put them to work writing code.

After I give my top managers what they want, nine times out of ten they come back and tell me they've changed their mind. They want the information in a slightly different format or with a few additional items thrown in. And then they've got the nerve to complain about my maintenance costs!

I'm not saying top managers don't have valid requests for information. I am saying that I'm working with finite resources. Every additional fire drill means something else gets put off. I'm nearly a week behind right now just updating my database.

How do I feel about top managers? I think we ought to lock them in the executive washroom for a month to give me time to get caught up.

SPECIAL REPORT

Al Parkinson, vice-president for information systems at J. Pascal, Inc.

Retail chain joins DP,

MONTREAL — At J. Pascal, Inc., a chain of hardware and furniture retail stores based here, C. Emmett Pearson, vice-president for finance, and Al Parkinson, vice-president for information systems, have adjoining offices in the company's executive headquarters.

The proximity of these two executives is hardly coincidental. Rather, it typifies the way Pascal is interrelating its financial and DP operations. It is also indicative of the ways Pascal is creating new computerized approaches to financial records, reporting and management systems, as well as how it views the creative use of generic software packages.

Pascal, founded in 1903, has grown over the past 80 years into one of eastern Canada's leading specialized retail and wholesale chains. With annual revenues at $210 million, the company operates 23 hardware and hard-goods stores in Quebec and Ontario provinces, four furniture showroom and warehouse outlets serving principal cities and a newly opened furniture showroom in Quebec City.

New procedures

Managers are introducing new administrative and financial procedures that place priority on the need for incisive and timely information in all phases of Pascal's operations. According to Pearson, the creative use of computerized systems is helping to make Pascal's management style even more effective. All major systems interface with the general ledger, from which all top management reports are produced.

In its headquarters here, Pascal operates a Honeywell, Inc. DPS 7

RISK from SR/62

than a year out of date, don't expect the support people to know its details. The publisher's support group is most often a backup for the dealer's own support group, which should be the first contact if you need help.

A great temptation for a prospective user of a software package is to ask that "a few changes" be made to it. This is probably the biggest mistake the buyer can make. He already recognizes that the package is appropriate to his business. What he doesn't realize is that any change made in the system will probably render his software incompatible with new revisions issued by the publishers.

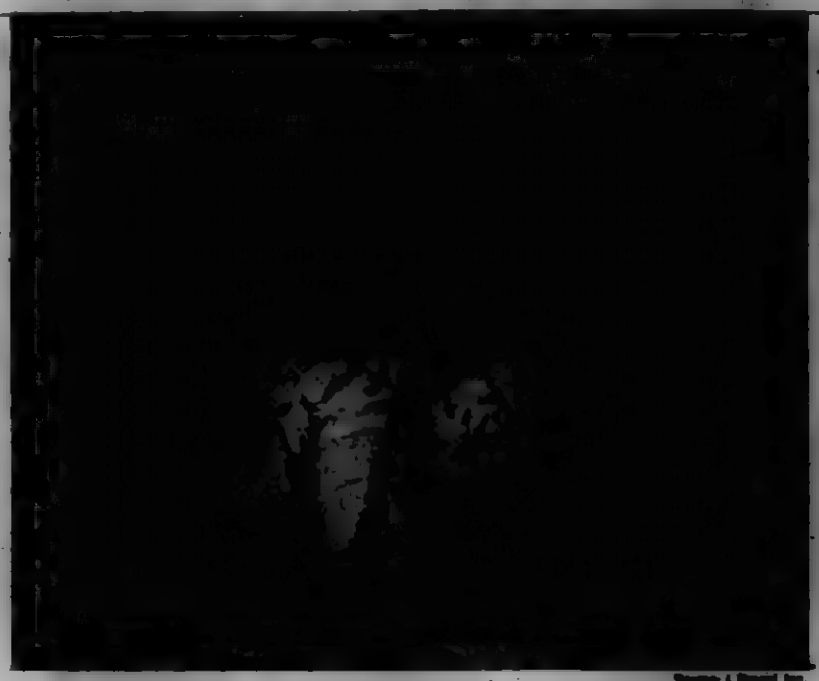
He will not only be unable to take advantage of enhancements provided in subsequent revisions, but he will lose the backing of the support organizations set up for him by both his dealer and the software publisher. The prospective user must weigh the great cost of this loss of support against the economic value of the changes.

Instead, it might make more sense to choose a different package. Software packages are now available that provide options to accommodate different ways of doing business, all within the capabilities of the package. Likewise, business software packages exist that incorporate ad hoc query languages, user-definable report writers and spreadsheet and graphics interfaces.

Other considerations for the use of software packages are implementation time and cost. Development of custom software requires detailed system design, programming and documentation. These are immediately available with packaged software, and, in some cases, training can often begin even before the hardware is installed.

The above issues are far more important than the difference in cost between custom and packaged software. In fact, for all the above reasons, using an appropriate software package, even if it costs more than custom software, may be the wisest choice.

Huffman is vice-president in charge of product development at Absolut Systems, Inc., a Boston software development house.



C. Emmett Pearson, vice-president for finance at J. Pascal, Inc.

financial operations

computer, a Level 64 computer and two Level 6 minicomputers, along with groupings of Honeywell terminals. The four retail furniture warehouses and showrooms use Honeywell Level 6 minicomputers to control stock merchandise. Data in the DPS 7 computer is maintained with Honeywell's IDS II data base system.

The close management ties between Pearson's financial services and Parkinson's data processing department are manifested in the numerous ways they integrate financial requirements with automated systems.

"The primary purpose of computer systems at Pascal is to provide management with the tools to control two essentially different operations — furniture and hard goods," Parkinson said.

Update data base

It is important that information from inventory and other systems be fed into the general ledger financial data base that is used in preparing reports for Pascal management. The goal is to maintain low, yet adequate, inventory levels as well as to get stock to where it is needed and to have adequate supplies in both warehouses and stores. Pascal's installation of several financial programs is demonstrated in this new management reporting strategy.

In early 1983, the company purchased Final IV, a general ledger and financial management system developed by New York City-based Mingham & Oellerich, Inc. In its selection of a suitable system, Pascal established a number of rigid requirements, Pearson said.

The company, intending to concentrate the use of its programming staff in retail inventory, warehousing, delivery and point-of-sale systems, required a general ledger system that would function with little assistance from the programming staff. While it recognized that retail systems constantly change due to the introduction of new technology in store automation, Pascal sought a general ledger and financial management program that was easy to maintain.

The retail chain set several interrelated objectives for financial reporting and its integration with the Final IV general ledger system. It had to increase the speed with which financial reports could be prepared and have the ability to generate special reports based on "what-if" questions. For example, if a lease was to be renewed at one store, Final IV would have to prepare break-even analysis reports that would enable Pascal management to decide whether it should renew the lease, close the store or perhaps move the store to another location. In addition, Pascal expected that the financial system would help reduce the size of the assigned clerical staff.

Pascal was confident that a general ledger system could handle the routine entry and recordkeeping functions, but it looked to Final IV to produce financial and related management reports as well. Similarly, Pascal wanted to avoid installing a separate financial modeling system, so the general ledger software needed to be flexible and powerful enough to accommodate this growing requirement.

Accounting language

Pascal said Final IV met the firm's requirements because it generates special reports through its Natural Accounting Language (NAL), which gives the accounting department the ability to create computer reports without the intervention of a programmer.

NAL enables financial managers without computer experience to create special reports, such as cash flow, sales analysis and inventory position as well as one-time reports that can show, for example, how much the company spent for car leases for its salesmen.

Final IV also prepares the standard array of general ledger and financial reports, including profit and loss, balance sheet, expense reports, budget reports and cost center analyses.

My MIS Director Is Impeding Company Growth.

Every time I want to get information out of our computer, here's the process I go through.

I submit a request to MIS.

Sometimes they're back to me in a flash, sometimes I wait an eternity. There's no predicting.

For an answer, they give me a ream or two of computer listings that I can't understand.

I sort it out only to find that MIS misinterpreted what I wanted. I got the wrong information, and I'm right back where I started.

In the meantime, the competition's making mincemeat out of my sales force.

I'm ready to hang my MIS director from the nearest tree.

SPECIAL **REPORT**

General ledger helps company pick up pace

HALIFAX, N.S. — To keep pace with its growth, an insurance company here has installed a general ledger system which has allowed it to maintain up-to-date figures and budget quarterly instead of annually.

When it mushroomed from a small insurance company to a large one in just five years, Maritime Life Assurance found that its 25-year-old accounting system could not keep pace with its growth.

"Before, it took forever to get cost summaries," according to Mary Holmes, who serves as budget controller at Maritime Life's Halifax headquarters. "Now we don't have this problem. The new quarterly cost statements require no manual calculation and can be interpreted at a glance."

After evaluating financial packages from several software vendors, the Canadian insurance company purchased the Management Science America, Inc.'s (MSA) General Ledger System in October 1981. On Dec. 17, 1982, the system was up and running.

Maritime Life's accounting department can now track product sales, complete cost reporting each quarter and maintain up-to-date figures.

Maritime Life's old accounting system, which was developed in late '50s, initially had an account structure that was easily understood, but its logic was lost over time.

In addition, the company's old card system was limited to handling $99 million, despite corporate assets totaling over a billion dollars.

Although the old system's reporting was adequate, changes presented major problems. According to Harrison Robbins, comptroller and project manager for Maritime Life's new accounting system, "it became rather cumbersome."

Maritime Life's target was flexibility. The company also wanted a system that was effective, easy to change and responsive to its expansion needs. The company was especially interested in features such as ledger and customer reporting, account reconcilement, automatic accrual reversals and automatic recurring entries. "We knew what features we wanted, so we went for it," Robbins recalled. "We tried to implement as many as possible at the outset."

Accounting tasks

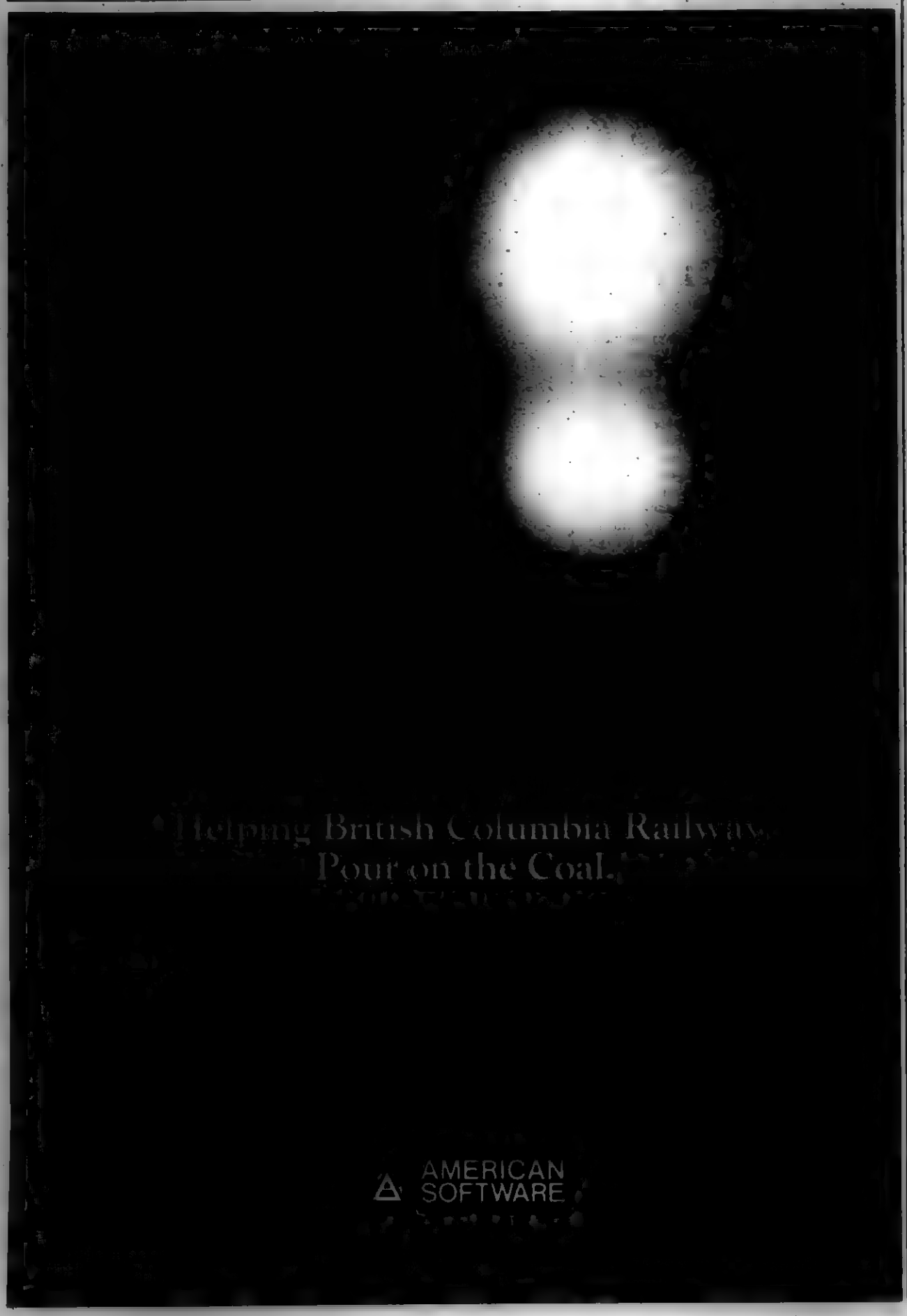
After Maritime Life's project assistant Marg Huxtable documented the old system, she interviewed people about their accounting requirements. Edith Rick, systems analyst, evaluated each accounting task, preparing to interface the new package with the administrative systems of the group and individual insurance areas. During this time, she reduced 80 computer accounting jobs to 10.

In October 1982, Wendy Paterson, test coordinator, began directing full-time testing. The purpose was to run operations through the old and new systems, comparing results. "Parallel testing lasted 2¼ months and went right on schedule," Paterson said.

"Installing the package was the easiest part of the process," Robbins said.

According to Holmes, the greatest gain is in budgeting. For the first time, Maritime Life can budget quarterly instead of annually.

Monthly reporting gives Maritime Life more accurate expense reports. "With the old system, if anything was in error — like booking something to the wrong center — nothing could be done. Now, with the expense report, we can see what's missing and clean it up right away. The result is no surprises at quarter end," Holmes noted.



Introducing the THEMIS Management Information System.™

THEMIS Gets Everyone Pointing In The Same Direction.

THEMIS gives top managers instant access to the information they need to make their company grow. That relieves MIS directors of a major programming burden thereby freeing up resources they can use to improve their company's operation.

With THEMIS top managers simply ask their computer a question in simple English. Their answer comes back in seconds. If THEMIS doesn't understand the question, it requests clarification. It's an artificial intelligence software package that makes this possible. THEMIS learns from its users, and it remembers everything it's taught.

THEMIS installs easily on any Digital VAX with a VAX/VMS operating system. It works with VAX Datatrieve or selected independent database management systems. THEMIS requires only minimal programming support.

Get everybody in your company pointing in the same direction. Ask for a demonstration today. For more information on THEMIS or on our customized artificial intelligence software capabilities, write Frey Associates, Inc., Chestnut Hill Road, Amherst, NH 03031, or phone 603-472-2800.

Frey Associates, Inc.
Artificial Intelligence Division

THEMIS Management Information Systems is a trademark of Frey Associates, Inc.

VAX, VAX/VMS and Datatrieve are trademarks of Digital Equipment Corporation.

SPECIAL **REPORT**

Library use up 10% with on-line system

MENOMONIE, Wis.—What may be the only library in the state with an integrated circulation, catalog and acquisition system has increased its usage by 10% in the past year.

The 200,000-volume library at the University of Wisconsin-Stout moved into new quarters in January 1983 and went on-line with an automated catalog, automated checkout and check in and automated acquisition of new materials a year later. Student and staff use grew in the months that followed.

"Our use is up 10% over a year ago, and I believe it is due to a combination of our having a new facility and an on-line catalog. It's much faster, much more efficient access to bibliographic information," according to John Jax, assistant dean of Learning Resources.

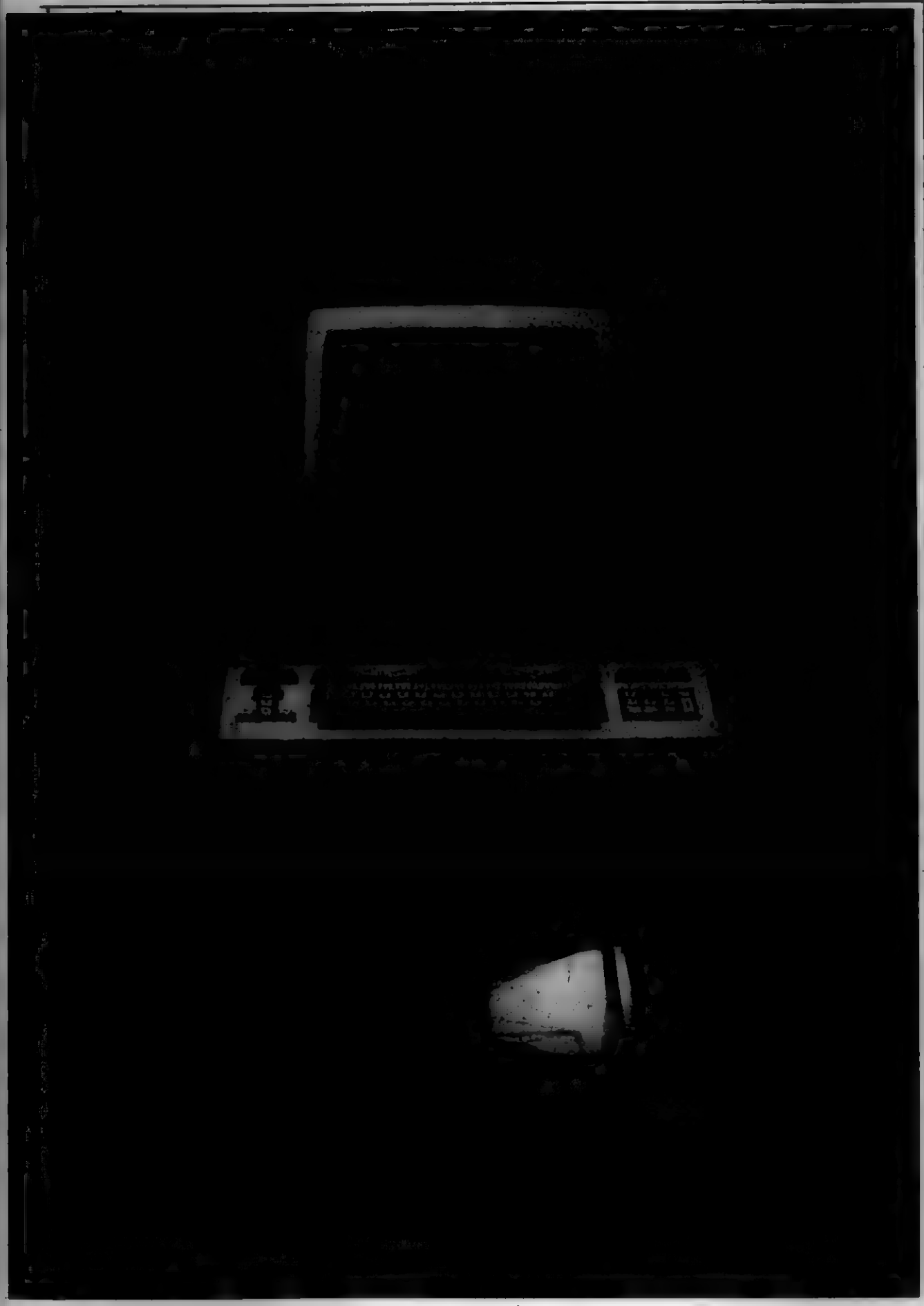
The library uses Data Phase Corp.'s Alis II software package on a Data General Corp. S/140 minicomputer. The students and library staff have access to the system through 25 Zentec Corp. Model 35 terminals.

Jax reported that the on-line catalog helps students in their research. "The computer allows you to use whichever search term you want and to get more information faster. By typing in a word or name, you get a printout showing authors, subjects and where the volumes are in the library. In the past the student would have had to copy everything down by hand."

Another feature that he cited tells the student immediately whether the book is checked out, available, on order or on the reserve list. That, he noted, "eliminates a lot of frustration" as students no longer search the stacks for books that are missing.

Each week the system mails notices to borrowers who have overdue volumes, and it records check ins and checkouts via optical character readers (OCR) "10 times faster than the old method" of shifting keypunched book cards, Jax reported. Those OCRs are used to read the codes on the volumes and on the identification card of the borrower. A due date is automatically recorded, and the transaction is added to the patron's borrowing history.

For Jax, as an administrator, a primary convenience is the system's ability to generate and track new book orders, orders that the library staff mail to publishers. While that order is being filled, the system notifies card catalog users that the book is expected soon.



Accounting system

But it also adds the transaction to an accounting system. "When we want an item we enter the author's name, the title and other relevant information. The system then kicks out an order form, but also establishes a departmental code and an account number so we can tell in a cumulative sense how much any department or faculty member has ordered in a given time. It helps us to apportion funds according to the proportion of majors on campus. That way you don't have some minor department spending two thirds of your budget," Jax reported.

The previous systems, installed beginning in 1966, were IBM, most recently a Series 4300, using keypunch and collator. Those systems, and a microfiche catalog added in 1973, offered no on-line capabilities, Jax said.

In its first year in the new $6.7 million building, the library recorded 450,000 users. For the months of February, March and April of 1983, attendance figures jumped by 28%, 25% and 33% over the same time periods for 1982. For the year 1983, usage was up 10%. Jax said that enrollment remained the same for those two years.

LOOK INTO OUR MANUFACTURING CONTROL SOFTWARE.

YOU WILL FIND OVER 700 INSTALLATIONS ALREADY BENEFITING FROM IT.

Benefiting through reduced inventory costs, increased productivity and improved customer service.

MAS-Manufacturing, the closed loop Manufacturing Resource Planning System from Martin Marietta Data Systems, has been delivering key benefits like this to hundreds of companies around the world for over a decade.

YOU WILL FIND A FLEXIBLE SOFTWARE SYSTEM AND HARDWARE INDEPENDENCE.

MAS-Manufacturing is the fully integrated on-line Manufacturing Control System with the built-in flexibility to be used in a wide variety of manufacturing companies—both large and small. And since our system is made up of integrated modules, your company can implement them as your business or budget dictates. Without the overhead of installing functions not required.

MAS-Manufacturing delivers results by synchronizing the six most critical elements of your company's manufacturing operation:

- ☐ Master Production Scheduling
- ☐ Inventory Control
- ☐ Manufacturing or Shop Floor Control
- ☐ Purchasing
- ☐ Cost Control
- ☐ Engineering Control

And we're flexible when it comes to providing you with the hardware option that meets your requirements. MAS-Manufacturing operates on *a wide variety of computer systems* from IBM mainframes and 4300 series computers (including the 4321/SSX) to Hewlett-Packard 3000's and DEC VAX minicomputers. For use on your machine or we'll supply the hardware too.

You can even use MAS through our Remote Computing Service, avoiding any hardware investment or commitment. And, because of the hardware versatility of MAS-Manufacturing, the system can easily be brought in-house in the future.

MARTIN MARIETTA

YOU WILL FIND UNBEATABLE SUPPORT, TRAINING, AND DOCUMENTATION.

As with every Martin Marietta product, you and your company can rely on us for full support. Our manufacturing and data processing specialists are always ready to assist you throughout each step of the planning, installation and implementation.

You will also find us ready to address your needs for software customization and user training. We can provide you with full maintenance services—including a special Customer Service Hotline.

And to top it off, you will be pleased to find that our documentation is as comprehensive as you would expect from an industry leader.

YOU WILL DISCOVER A GROWING MAS FAMILY OF PRODUCTS.

We recognize that there is more to a manufacturing company than manufacturing control. To meet your company's complete needs, we offer a growing family of MAS products including:

- ☐ MAS-Manufacturing
- ☐ MAS-Personnel and Payroll
- ☐ MAS-Financials
- ☐ MAS-Project Management
- ☐ MAS-Decision Support

Not to mention the 100-plus software packages offered on our remote computing services network.

We plan to continue our efforts as your total information services company by adding even more quality products to our growing MAS family.

YOU WILL REALIZE THAT RESULTS ARE ONLY A COUPON AWAY.

Whatever your manufacturing control or information services requirements, we have a system which can give you tangible, bottom line benefits. Fill out the coupon and mail it—we'll send you complete details on how Martin Marietta Data Systems products can start paying off for your company right away. Or, better yet, call us toll-free at (800) 638-7080. In Maryland, (800) 492-7170.

I'D LIKE A CLOSER LOOK.

Send me more information on MAS-Manufacturing software. Also include details on:

- ☐ MAS-Personnel and Payroll
- ☐ MAS-Financials
- ☐ MAS-Project Management
- ☐ MAS-Decision Support

Name _____

Title _____

Company _____

Address _____

City _____ State _____

Zip _____ Phone _____

MARTIN MARIETTA DATA SYSTEMS ©
Marketing Services, CW-P
6303 Ivy Lane
Greenbelt, Maryland 20770

SPECIAL REPORT

Firm handles decentralization with EMS

NEW YORK — Decentralized administration gave the Metropolitan Life Insurance Co. a chance to provide better policyholder service, support of the field force and a broader labor base when it shifted home office functions into nine regional head offices during the 1970s.

But despite decentralization, most insurance application paper files remained at the home office here, and the company needed a communications system to transmit both the regional officers' requests for data and the data itself.

To deal with that communications problem, Metropolitan implemented an electronic mail system known as the Administrative Electronic Message System (Adems). The basis of Adems is On-Line Software International's Omnicom package.

From a pilot project involving two head offices and the home office, Metropolitan's use of Adems has grown to include eight departments spread out over 12 locations. Adems is expected to be a key element in the Metropolitan communications network when the company places 1000 Honeywell, Inc. Level 6 minicomputers in sales offices throughout the U.S.

"We think Adems can grow exponentially in the near future as we move into our Sonic [Sales Office Network of Intelligent Computers], which is scheduled to be completed by the end of 1984," according to Michael Reilly, manager of corporate office automation.

Reilly said that a search for an electronic mail system began in 1979 and will be enhanced this month when Metropolitan implements Omni-Link, On-Line's third version of Omnicom.

The insurance company had been using Telex for interoffice communications and started the pilot program in two head offices with Telex backup, Reilly added.

"The Telex operation had many shortcomings. Its work flow was labor-intensive and time consuming. It had a high error rate because of all the people-handling that was involved in the processing of requests and transmission problems," according to Elisabeth Gabrynowicz of Metropolitan's corporate communications office.

For example, clerks in the head office prepared information forms and forwarded them to a Telex clerk, who would batch process the work and prepare a paper tape to run at a scheduled time for transmission to a support unit.

The support unit would then collate the messages, date stamp them and complete file requisition forms, which would be sent to the file division for further collating and stamping before a file clerk would search the files for the requested information, fill in the answers on the information request form and relay the form back to the Telex operator for transmission back to the head office clerk.

"With Adems, a major change was made in operational work flow for the policy requests. Since there were terminals near the correspondents and clerks, they could now key their own requests for policy information and those requests would be sent directly to a printer terminal in the head office," Gabrynowicz said. She reports that requests were received directly by the filing unit and could be answered directly.

Rise in interest

"As the efficiency and the ease of the system became more and more apparent, the other head offices started to express interest in using it," she added.

Gabrynowicz reported that since full implementation, Metropolitan has had a smoother work flow for information requests and responses, eliminated 17 handling steps for each request, saved $90,000 in Telex costs and eliminated numerous forms.

Adems, which operates on Metropolitan's IBM 3081 MVS with CICS, has saved the company $150,000 in the transmission of policy data such as medical histories and policy status updates, according to Gabrynowicz.

She declined to say what the system cost Metropolitan, but mentioned that the list price is $52,000 for a single CPU license. The company has expanded the system to include other departments, Gabrynowicz said.

"Adems has saved Metropolitan money and has improved the time service for handling our policyholders' insurance activities," Gabrynowicz concluded.

Computer Communications?

Whether it's office to office, office to corporate computer or office to data base service, Polygon software delivers reliable data transfer.

We've been developing communications software for micros, minis and mainframes for over five years. Experience that has paid off with comprehensive programs, documentation and effective menus for optimum user performance.

It's simple. Whether you use a modem, direct cabling or local area networks, our software talks directly from computer to computer. One more good reason why Digital Equipment Corporation and Interlan, Inc. sell and support our communications software with their products.

So, if you want to communicate, and you want to do it economically, reliably and easily, communicate with us...we're Polygon Associates.

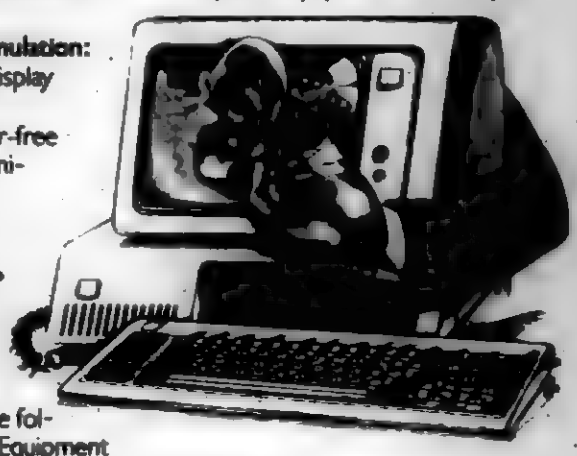
We have the software...

poly-TRM™ Asynchronous Terminal Emulation Software: For communication as a terminal to virtually any computer system including the Source[1], Dow Jones[2] and other commercial information services.

poly-BSC/RJE™ Bisynchronous Terminal Emulation: For Remote Job Entry (IBM 3780/2780) to IBM mainframes and compatible machines.

poly-BSC/3270™ Bisynchronous Terminal Emulation: For emulation of the IBM 3270 family of Information Display Systems, including file transfer.

poly-XFR™ File Transfer Software: For error-free ASCII and Binary file transfers among personal and minicomputers.



For all types of hardware...

Minicomputers using VMS, RSTS/E, RT-11 and RSX-11M Operating Systems[3]. Intel and Motorola development systems. Systems using CP/M[4], in a user tailorable version.

Plus we support personal computers from the following manufacturers: Apple Computers, Inc., Digital Equipment Corporation, International Business Machines Corporation, Jonos, Osborne Computer Corporation, Radio Shack/Tandy Corporation, Televideo Systems, Inc., Victor Technologies, Inc. and Xerox Corporation.

1 The Source is a service mark of Source Telecomputing Corporation, a subsidiary of the Reader's Digest Association, Inc.
2 Dow Jones is a trademark of Dow Jones, Inc.
3 VMS, RSTS/E, RT-11 and RSX-11M are trademarks of Digital Equipment Corporation.
4 CP/M is registered to Digital Research, Inc.
© 1983, polygon associates, inc.

polygon associates, inc.
9 American Industrial Drive, St. Louis, Missouri 63043
314/576-7709, TWX 910/764-0876

FRIENDLY • INTELLIGENT • EFFICIENT • NEAT
KNOWLEDGE man
The all-in-one software package that "out-thinks" the competition
EFFORT
THE DATA BASE MANAGEMENT SPECIALISTS
(212) 435-7314
Rockefeller Center, P.O. Box 3012, New York, NY 10185
Knowledgeman is a trademark of Micro Data Base Systems, Inc.

SYSTEMS & PERIPHERALS

Amdahl power aid out

SUNNYVALE, Calif. — Repeating a marketing concept it used nearly a decade ago, Amdahl Corp. recently announced a performance accelerator for its 5840 and 5850 mainframes. The processors are compatible with IBM's 3033 series of processors.

Called the 580/Accelerator, the unit allows operators to increase processor performance manually during periods of increased demand. This allows users to handle extraordinary work loads without upgrading to a larger processor, the vendor said.

Depending on the installed processor and desired performance level, users can select one of three options:

- Option 1 allows a 5840 user to increase performance to a 5850 level (a performance increase of 25% to 30%).
- Option 2 increases the performance of a 5850 processor to the level of a 5860 mainframe (a performance increase of 30% to 35%).
- Option 3 increases the performance of a 5840 processor to that of a 5860 (a performance increase of 60% to 70%).

In each case, the acceleration occurs when a console operator issues a single command. A second command restores the processor to its original performance level, the vendor said.

The accelerator will be available in the first quarter of 1984 and costs $2,500 when installed in the factory or $3,000 when installed in the field. Operating charges are $200/hour for Option 1, $275/hour for Option 2 and $475/hour for Option 3, Amdahl said.

The accelerator is virtually identical to a marketing technique Amdahl used in the late 1970s on its 470 line of mainframes, noted Jack Hart, an analyst with International Data Corp. (IDC), a Framingham, Mass., market research firm.

"I think it's a very clever idea," Hart said, noting that the accelerator options could give Amdahl the upper hand when a user is considering bids from IBM and Amdahl.

"If I were an owner of a bigger [Amdahl] model, I'd be upset," Hart said, noting that larger users are not given the option of slowing their processors down when they do not need full power, thereby paying less.

Amdahl, 1250 E. Arques Ave., Sunnyvale, Calif. 94086.

XT, Datamaster: which is better?

IBM, which historically has baffled users with overlapping product lines, appears to have added two more systems to the list.

Both the popular Personal Computer XT and the older System/23 Datamaster cost about $10,000, are based on Intel Corp. microprocessors and are geared toward the same base of small business users. In fact, the two systems are sold side by side in IBM Product Centers.

The Personal Computer XT has been one of IBM's most successful products. Over the past six months, microcomputer dealers have been unable to keep the processors in stock, and IBM has admitted it cannot manufacture the processors fast enough to fill demand. While industry watchers do not call the Datamaster a failure, they are quick to point out that the system never experienced the overwhelming success of the Personal Computer XT — even though it was on the market long before the current boom in microcomputing.

Which system is better? Industry watchers like John Hemphill, vice-president of PC Technology for Richardson, Texas-based Future Computing, Inc., said it is not so much a question of superiority but of which system best suits the user's needs. Hemphill, however, noted that technological timeliness appears to play a key role in the user's decision. One dealer in used computers, for example, noted the Datamaster is not a hot seller.

The Datamaster was announced on July 28, 1981, two weeks before the IBM Personal Computer. It was billed as an entry-level addition to IBM's line of small business computers and sported an 8-bit Intel 8085 microprocessor plus a main memory capacity ranging from 64K bytes to 128K bytes. The unit can per-

See COMPARE page 68

pinetree
Portable terminal for data entry/70
aviv
Tape controllers for DEC systems/70

INSIDE

■ POS terminal from Fujitsu/71
■ Printer subsystem line enhanced/71
■ Eight-color terminal from C3, Inc./71

Stratus offers supermini peripherals

Stratus Computer, Inc. has announced an integrated disk subsystem, a tape drive and price reductions on disk drives for the firm's Stratus/32 line of 32-bit superminicomputers.

The integrated disk storage subsystem, called the Mass Storage Subsystem, consists of 448M bytes of Winchester disk drives. The unit also includes intelligent directors and microprocessor-based controllers. The vendor said the unit can increase raw data throughput by 45%. The unit can reportedly boost total system performance by 25%.

Up to six mass storage controllers can be connected to a single Stratus/32 processing module. Each controller can support up to eight storage directors, each of which operates a mass storage disk drive. This, the vendor said, allows a single CPU to address up to 48 disk drives with more than 21G bytes of on-line storage.

The mass storage controller handles all disk I/O operations in a reportedly fault-tolerant environment.

The mass storage director controls the access to data on a disk drive, buffered data blocks being transferred to and from the disk, and monitors status information, the vendor said.

The mass storage controller costs $9,000, the mass storage director costs $5,000, and the mass storage disk drive costs $25,000, the vendor said.

The firm also announced a rack-mount-

See STRATUS page 66

Caltech microprocessors may rival supercomputers

By Tom Henkel
CW Staff

PASADENA, Calif. — When linked together in sufficient quantities, microprocessors can rival the performance of the fastest processors in the world.

That is the theory that a group of researchers at the California Institute of Technology (Caltech) here are working to turn into reality. The result of their work, dubbed the Cosmic Cube, is a scientific processor made up of Intel Corp. 8086 microprocessors and Intel 8087 floating-point processors.

Currently, Caltech has developed three computer systems employing microprocessor-controlled nodes. The largest, a 64-node processor, reportedly offers approximately one-tenth the power of a supercomputer like the Cray Research, Inc. Cray-1. According to one of the Caltech project's lead researchers, Charles L. Seitz, an associate professor of computer science, the unit costs about $80,000, compared with the Cray-1's $7 million-plus price tag.

The two other processors, one with four nodes and one with eight nodes, are used for software development.

Emphasizing that it still is an experimental architecture, Seitz's co-researcher, Geoffrey Fox, a professor of theoretical physics and dean of educational computing at Caltech, said the Cosmic Cube offers potentially 1,000 times the performance of currently available supercomputers.

The advantage of the Cosmic Cube design, Seitz said, is that a virtually unlimited number of nodes can be linked to tackle a large program. Both Seitz and Fox explained that programs particularly suited for processing on supercomputers are not so much complex as they are extremely large.

Seitz pointed, for example, to a weather forecasting program that evaluates the atmosphere in every square mile on the Earth's surface and requires dealing with an enormous amount of information. The calculations necessary to evaluate the atmosphere within each square mile block, however, are not extremely complex.

Supercomputers operate by identifying similar operations (such as additions, subtractions and divisions) and performing them concurrently. However, current supercomputer architectures suffer from limits on how many concurrent operations can be performed at one time.

The Cosmic Cube architecture, Seitz explained, can be expanded with a virtually unlimited number of nodes that would, in effect, solve the concurrency limitations.

But one problem is that the Cosmic Cube's architecture does not lend itself to processing the same algorithms used on conventional supercomputers such as the Cray-1 or Control Data Corp.'s Cyber 205. While the Cosmic Cube is capable of executing the Fortran-based applications developed for supercomputers, many of those applications may have to be rewritten to take advantage of the concurrency offered by the Cosmic Cube.

Both Seitz and Fox estimated it could take 10 to 20 years before processors like the Cosmic Cube take the place of currently used supercomputers.

But Seitz believes a commercial product using the Cosmic Cube architecture may be available in about five years.

See COSMIC page 66

COMPARE from page 67

form both DP and word processing functions, drawing from a list of IBM-developed program products, according to an IBM spokesman.

The Datamaster can accommodate a 30.8M-byte hard disk drive and uses an embedded operating system that the user cannot change or alter. Black-and-white graphics capabilities are also available on the Datamaster, IBM said.

Strongest points

Perhaps the Datamaster's strongest points are its ability to use a Basic compiler, which is compatible with the Basic used on the larger IBM System/34, and its ability to connect up to four dumb terminals, making it a multiuser system.

The Personal Computer XT appears to do the Datamaster one better in almost every category.

The XT is based on a newer Intel microprocessor, the 16-bit 8086. The unit can make use of an enormous software base, namely the host of programs designed to operate under Digital Research, Inc.'s CP/M, Microsoft, Inc.'s MS-DOS or IBM's version of MS-DOS, the PC-DOS operating system. Users also have the option of switching operating systems.

The XT offers a maximum of 640K bytes of main memory, but can only use 10M bytes (20M bytes with an expansion feature) of hard disk storage when purchased from IBM. However, Hemphill noted that vendors of XT-compatible products offer hard disk drives with up to 80M bytes of storage.

The XT also tends to be a stand-alone system. Hemphill noted that multiple terminals cannot be attached to an XT processor that uses the basic MS-DOS operating system. The Future Computing analyst was also quick to point out that several XT-compatible vendors, such as North Star Computers, Inc., have skirted the multiuser question by linking XT users via a local-area network.

Overshadowed by micro boom?

One Datamaster user, Daniel Grabenstein, a business consultant in Harrisburg, Pa., said the processor may have been overshadowed by the boom in microcomputers.

Grabenstein, who uses the system to perform contract general business services, noted that while his system has worked well for the past two years and he is generally happy with it, the Datamaster lacks the ability to use popular microcomputer operating systems. Noting the popularity of such operating systems as Digital Research's CP/M, Grabenstein said he could expand his business if he could use the Datamaster to write microcomputer programs.

Hemphill noted that the advantage of either the System/23 or Personal Computer XT is in the eyes of the beholder. The Datamaster is typically sold as a turnkey system from IBM. The XT, while offering the capability to use many vendors' software packages, requires some shopping.

"Lots of customers do not use the latest and greatest hardware," Hemphill said.

UNIX™ & C

HANDS-ON TRAINING

A complete Curriculum for:

End Users Management Applications Staff Technical Support

COURSES	NEW YORK	BOSTON	WASHINGTON, D.C.	SAN FRANCISCO	CHICAGO	DALLAS	LOS ANGELES	TUITION	SEQUENCE TUITION†
UNIX Overview	Jan 10	Mar 1 Mar 6	Nov 8 Jan 10 Mar 6	Oct 11 Nov 15 Mar 13	Oct 18 Dec 6	Jan 3 Feb 21 Apr 3	Jan 3	$ 225	$860
UNIX Fundamentals for Non-Programmers*	Jan 11-13	Nov 2-4 Mar 7-9	Nov 9-11 Jan 11-13 Mar 7-9	Oct 12-14 Nov 16-18 Mar 14-16	Oct 19-21 Dec 7-9	Jan 4-6 Feb 22-24 Apr 4-6	Jan 4-6	$ 755	
UNIX Fundamentals for Programmers*	Jan 16-18	Oct 3-5 Nov 7-9 Mar 12-14	Oct 3-5 Nov 14-16 Jan 16-18 Mar 12-14	Oct 17-19 Nov 28-30 Mar 19-21	Oct 24-26 Dec 12-14	Jan 9-11 Feb 27-29 Apr 30- May 2	Jan 9-11	$ 735	$1125
Shell as a Command Language*	Jan 19-20	Oct 6-7 Nov 10-11 Mar 15-16	Oct 6-7 Nov 17-18 Jan 19-20 Mar 15-16	Oct 20-21 Dec 1-2 Mar 22-23	Oct 27-28 Dec 15-16	Jan 12-13 Mar 1-2 May 3-4	Jan 12-13	$ 490	
"C" Language Programming*	Jan 23-27	Oct 10-14 Nov 14-18 Mar 19-23	Oct 10-14 Nov 28- Dec 2 Jan 23-27 Mar 19-23	Oct 24-28 Dec 5-9 Mar 26-30	Oct 31- Nov 4	Jan 16-20 Mar 5-9	Jan 16-20	$1225	
Shell Programming*	Jan 30-31	Oct 17-18 Nov 28-29 Mar 26-27	Oct 24-25 Dec 5-6 Jan 30-31 Mar 26-27	Oct 31- Nov 1 Dec 12-13 Apr 2-3	Nov 7-8	Jan 23-24 Mar 12-13	Jan 23-24	$ 490	$1125
Going Advanced UNIX Commands*	Feb 1-3	Oct 19-21 Nov 30- Dec 2 Mar 28-30	Oct 26-28 Dec 7-9 Feb 1-3 Mar 28-30	Nov 2-4 Dec 14-16 Apr 4-6	Nov 9-11	Jan 25-27 Mar 14-16	Jan 25-27	$ 735	
UNIX Internals	Feb 6-10	Oct 24-28 Dec 5-9 Apr 2-6	Oct 31- Nov 4 Dec 12-16 Feb 6-10 Apr 2-6	Nov 7-11 Apr 30- May 4	Oct 3-7 Nov 14-18	Jan 30- Feb 3 Feb 21-25 Mar 19-23	Jan 30- Feb 3	$1375	
UNIX Administration*	Feb 14-16	Apr 10-12	Feb 14-16 Apr 10-12	May 8-10		Feb 7-9 Mar 27-29	Feb 7-9	$ 735	
Advanced "C" Programming Workshop*	Feb 27-29	Apr 30- May 2	Feb 27-29 Apr 30- May 2	May 14-16		Feb 13-15 Apr 2-4	Feb 13-15	$ 735	$1125
Advanced "C" Programming Under UNIX*	Mar 1-2	May 3-4	Mar 1-2 May 3-4	May 17-18		Feb 16-17 Apr 5-6	Feb 16-17	$ 490	
Bridging UNIX Fundamentals and "csh" Shell*				April 9-13			Feb 27- Mar 2	$1225	

*Including hands-on training workshops ™UNIX is a trademark of Bell Laboratories †Savings for consecutive seminar dates

CALL FOR DETAILS ON: • VIDEO-BASED COURSES • IN-HOUSE SEMINARS

To reserve your seminar space now or for additional information, call:
(800) 621-3155 or in Illinois (312) 987-4000 8:30-5:00 central time.

Computer Technology Group UNIX seminars are presented by experts experienced in teaching UNIX as well as in designing and implementing UNIX-based systems.

COMPUTER TECHNOLOGY GROUP
Our business is UNIX training.

COMPUTER TECHNOLOGY GROUP
Telemedia, Inc.
310 S. Michigan Ave., Chicago, IL 60604

STRATUS from page 67

able streaming tape drive. The front-loading unit reads and writes a standard ½-in., reel-mounted tape. In a streaming mode, the unit operates at 100 in./sec at 1,600 bit/in. The unit can also operate at 50 in./sec at 3,200 bit/in. In a start/stop mode, the drive operates at 25 in./sec.

The tape drive can be used either as a backup for data stored on disks or as a data storage unit for tape data processing applications. The unit costs $10,000, the vendor said.

Lastly, Stratus cut the price of its 14SM-byte Winchester disk drives by 22%. The units were reduced from $16,000 to $12,500.

Stratus, 6 Strathmore Road, Natick, Mass. 01760.

COSMIC from page 67

about five years.

Currently, the nodal processors consist of board-level units comprised of a total of 78 chips, including the 8086 and 8087 microprocessors and 136K bytes of random-access memory. "Physically, the machine occupies about 6 cubic feet, making it fit on the average desk, and uses 700W of power," Seitz noted.

The Cosmic Cube processors use the C programming language. Digital Equipment Corp. VAX-11 superminicomputers work as front-end processors.

The researchers are working on a second project aimed at reducing the 78-chip nodal processor to a one- or two-chip device called a Mosaic, which, Seitz said, can be as small as a micron. The scientists hope the Mosaic will be able to do everything the nodal processor can do.

While Caltech is not alone in investigating supercomputer theories based on parallel processing, Fox contended that the university is one of only a few working with an actual prototype. The Cosmic Cube research is being carried out with funding from the Defense Advanced Research Projects Agency and the U.S. Department of Energy, two organizations that have vowed to fund experimental artificial intelligence projects.

However, according to Seitz and Fox, the artificial intelligence applications of the Cosmic Cube are somewhat questionable. If Caltech is successful in developing the single-chip Mosaic, Seitz noted, such a device could be integrated into a symbolic processor to speed up voice or image processing.

BASF

SYSTEMS & PERIPHERALS

DATA STORAGE

MAXELL CORP. OF AMERICA
DC 301

The Computer Products Division of Maxell Corp. of America has announced an optical disk drive.

The glass-based, 12-in. disk — Model No. DC 310 — can store 1.6G bytes of information or 46,000 pages of information when both sides are used, the vendor said. With a track density of 16,000 track/in. and a recording density of 19,500 bit/sec, recording is performed by the sector system allowing for random access.

The product is a joint development of Hitachi Ltd. and Hitachi Maxell and achieves a minimal bit error rate, the vendor said. The disk, in addition, can be linked into Hitachi's Hitfile 60, an optical disk storage system designed for document filing and mainframe linkup, according to the vendor.

The optical disk sells for $200. A two-sided disk costs approximately $300.

Maxell Corp. of America, 60 Oxford Drive, Moonachie, N.J. 07074.

AVIV CORP.
TFC 825; TFC 925

Aviv Corp. has announced a series of magnetic tape controllers designed for compatibility with Digital Equipment Corp. TS11 controllers.

The TFC 825 and TFC 925, each available in three versions, are offered for use with DEC LSI-11, PDP-11 and VAX series processors using 800, 1,600, 3,200 and 6,250 bit/in. drives.

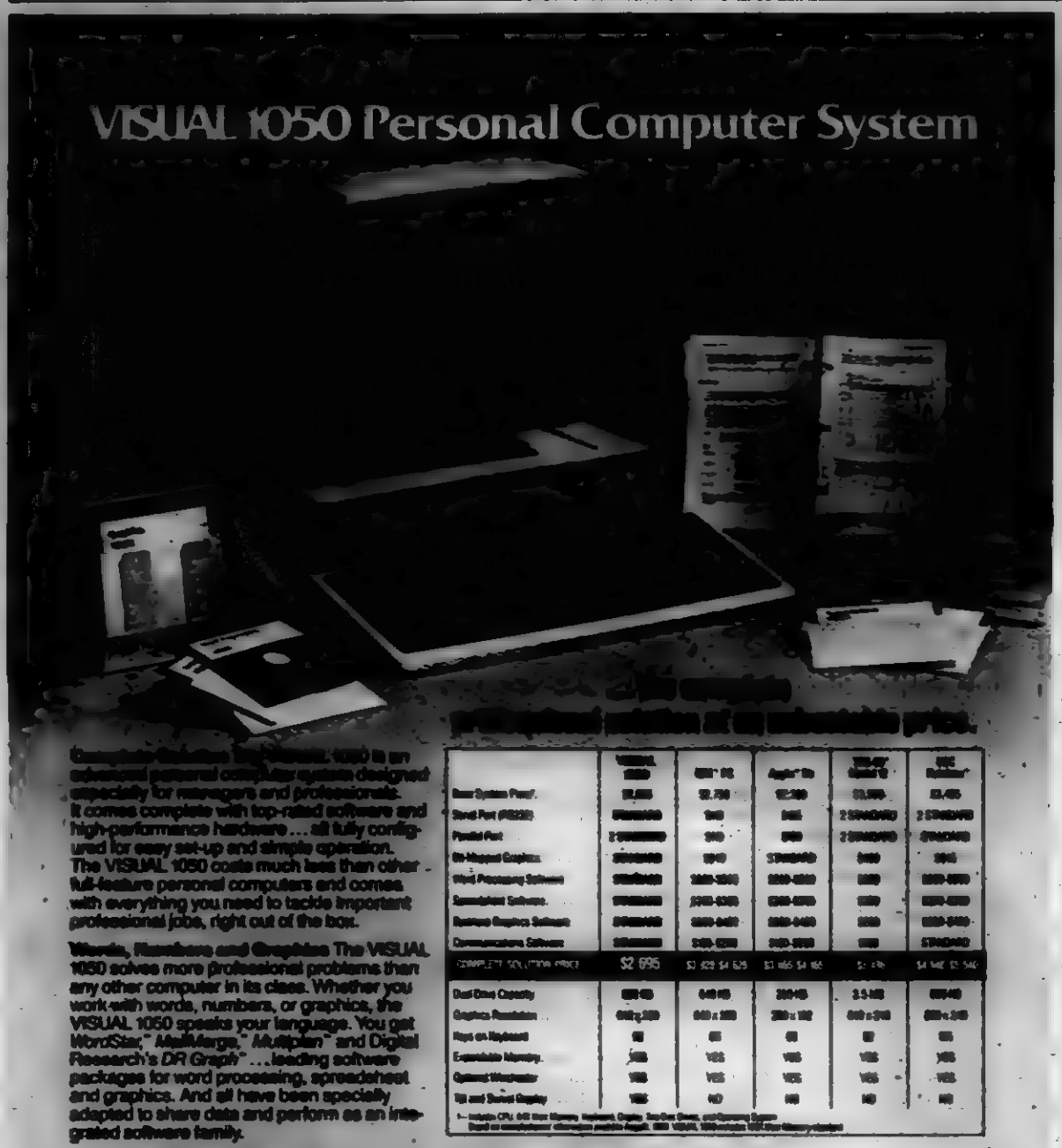
Of the three versions available, one is for use with Pertec Computer Corp.-type streaming and formatted start/stop drives, another for low-speed (50 in./sec) Storage Technology Corp.-compatible group coding recording start/stop drives and the third for high-performance (125 in./sec) Storage Technology-compatible group code recording start/stop drives, according to the company.

The TFC 825 reportedly is a DEC Unibus-compatible, single hex-size board. The device is transparent to DEC and Bell Laboratories versions of Unix.

The TFC 925 is said to be compatible with the DEC Q-bus and a single quad card controller. It reportedly has the same features as the TFC 825, as well as 22-bit addressing and block mode direct memory access transfer.

The products are available for $2,950 each.

Aviv Corp., 26 Cummings Park, Woburn, Mass. 01801.



Unbeatable Value $2,695 is the total retail price for the VISUAL 1050. You get the best and most popular software packages, ready to run on hardware which offers the features and quality you should demand. Two high capacity disc drives. 128K memory standard. Fast, bit-mapped graphics. Full size green screen.

Standard printer and communication ports. Rugged 93-key keyboard with special WordStar engravings. You can't buy a more complete hardware and software solution at anywhere near the price.

See for yourself*

Visual Technology Incorporated
540 Main Street, Tewksbury, MA 01876
Telephone (617) 851-5000. Telex 951-539

*Registered trademark of Visual Technology Incorporated

PROCESSORS

CAMBRIDGE DIGITAL SYSTEMS, INC.
System 58

Cambridge Digital Systems, Inc.'s System 58 line of desktop Digital Equipment Corp. Q-bus-compatible minicomputers is available in higher performance configurations that are said to incorporate larger capacity Winchester disk drives and a variety of removable media mass storage devices.

System 58 is integrated with DEC's PDP-11 family. Processor options for the System 58 include the DEC LSI-11/73, LSI-11/23 Plus, LSI-11/23 and Cambridge Digital's own Motorola, Inc. 68000/68010-based Univac CPU.

Greater mass storage capacities are now available with the 10.4M-, 20.8M- or 41.6M-byte Winchester drives.

The mass storage subsystems reportedly emulate DEC'S RL01 and RL02 drives on an RLV22 controller. Optional backup devices for the System 58 include removable cartridge disks or floppy diskettes.

The System 58 is priced from $8,000.

Cambridge Digital Systems, P.O. Box 568, 65 Bent St., Cambridge, Mass. 02139.

TERMINALS

SCREEN DATA CORP.
Power Screen

Screen Data Corp. has introduced a dynamic microfilter, the Power Screen, said to eliminate the static electric field which surrounds the face of a video display terminal.

The static electric field reportedly can cause skin discomforts and can also be a source of microcircuitry failure.

The vendor said computers can generate a static charge of up to 50,000V, creating a positive-ion electric field.

The Power Screen eliminates static electricity and blocks out reflective light with identical features found in the vendor's standard antiglare screen.

The antiglare screen's nylon microfilter attaches to the face of the computer terminal, and 100 different models in various sizes fit most of the available 400 CRT terminal makes and models, according to a spokesman for the vendor.

The Power Screen costs $49.50, and the antiglare screen costs $39.50.

Screen Data, 240 Cedar Knolls Road, Cedar Knolls, N.J. 07927.

PINETREE COMPUTER SYSTEMS, INC.
DP 2502 portable terminal

Pinetree Computer Systems, Inc. recently announced the DP 2502 hand-held data capture, data entry computer terminal to be used in con-

SYSTEMS & PERIPHERALS

junction with two data receivers, the DPR 1002 standalone receiver and the DPR 1012 15-in. circuit board that resides in an IBM Personal Computer.

The DP 2502 reportedly provides fully integrated, two-way communications, transmitting captured data over standard telephone lines at 1,200 bit/sec to either model data receiver. The receiver accepts the data, reformats it as required by the host computer and delivers the data to the host at 9,600 bit/sec.

The hand-held terminals are priced at $895, the DPR 1002 is $2,350 and the DPR 1012 is $1,750.

Pinetree Computer Systems, Suite 3000, 8600 Freeport Pkwy., P.O. Box 610883, Dallas, Texas 75261.

FUJITSU SYSTEMS, INC.
Fujitsu 7990

Fujitsu Systems, Inc. has introduced a point-of-sale master terminal that reportedly can support up to 10 Fujitsu 7880 slave terminals.

The Fujitsu 7990 features plasma display, 256K bytes of random-access memory (RAM), 384K bytes of bubble memory, a 128K-byte removable bubble memory cartridge and an RS-232 interface. Options include an internal modem and up to 1M byte of bubble memory.

According to the vendor, the product is geared toward stores with 10 terminals or less that handle a large number of transactions each day. The plasma display is said to improve data entry and reduce training time.

The terminal will be available in September for $7,695.

Fujitsu Systems of America, No. 620, 9841 Airport Blvd., Los Angeles, Calif. 90045.

PRINTERS/ PLOTTERS

INNOVATIVE ELECTRONICS, INC.
Innovator 202-FC

Innovative Electronics, Inc. has announced extended communications capabilities for its Innovator 300 line/min printer subsystem.

The Innovator 202-FC is said to provide emulation of IBM 2780 and 3780 terminals.

It reportedly supports space compression and expansion, processor interrupt reception, conversational mode, reception of Ebcdic transparent data, component selection, vertical format control and horizontal format control.

The system is controlled by a micro-based, single-board computer system. The programmable controller is used to implement complex communications protocols.

It also is said to feature a comprehensive set of diagnostics, designed to allow the user to verify proper operation of the printer system.

The printer uses heavy-duty chain technology and has a nominally rated print speed of 300 line/min and 400 line/min with use of a 48-char. set.

It is available in 132-col. and 80-col. models.

The 132-col. printer is priced at $5,495.

Innovative Electronics, 4714 N.W. 165th St., Miami, Fla. 33014.

MICRO PRODUCTS CO. DIVISION OF C3, INC.
MPC 2150

The Micro Products Co. Division of C3, Inc. has announced a bit-mapped, eight-color graphics terminal, designed to emulate the Intelligent Systems Corp. Intecolor 8301R terminal.

The MPC 2150 reportedly features a 48-line by 80-col. display which may be overlayed by a pixel-addressable graphics display yielding a resolution of 480 pixels by 384 pixels.

It also is said to offer 16 shiftable and 32 programmable function keys on an extended keyboard as a standard feature.

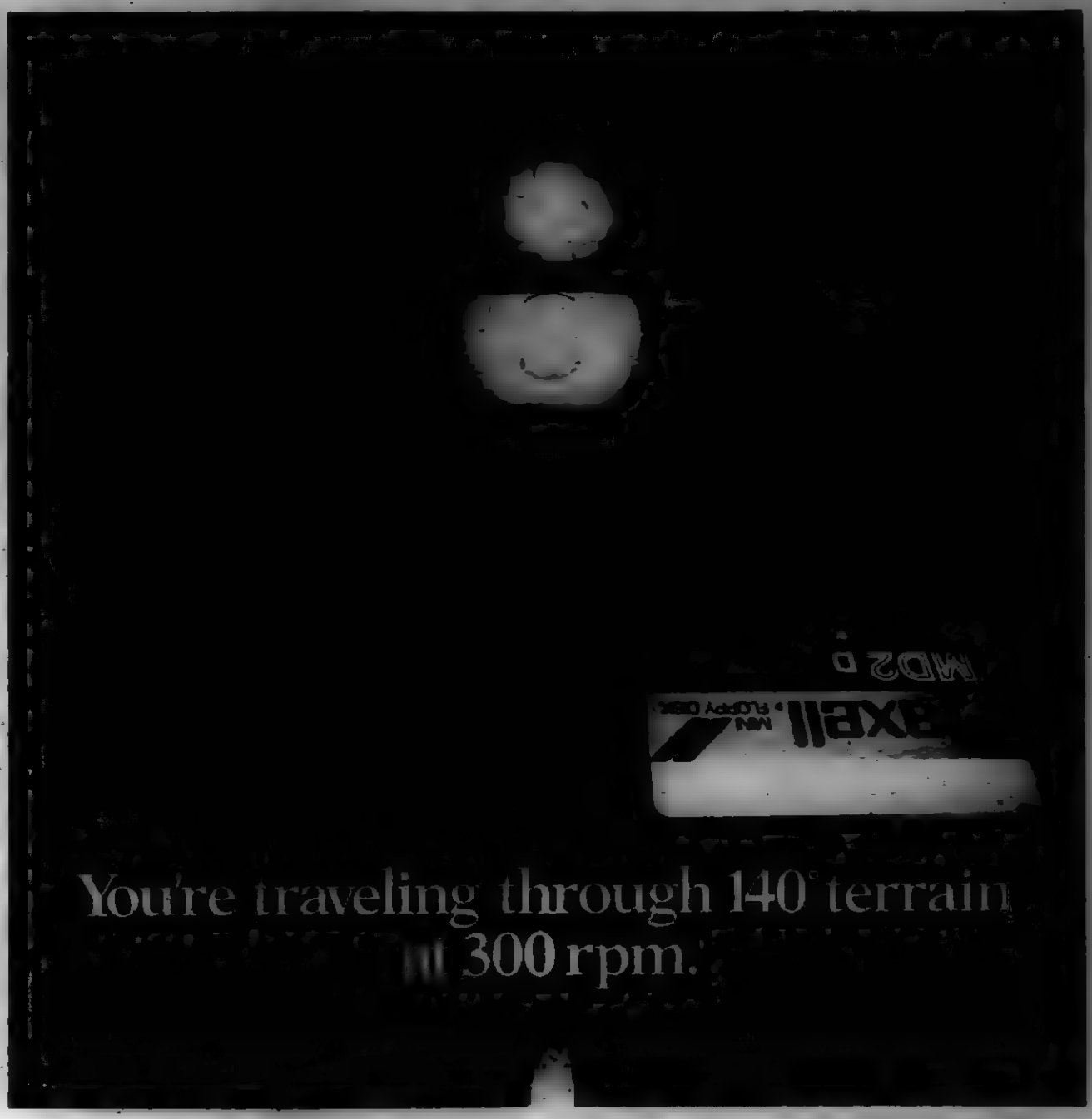
Other features reportedly include English-language set-up menus stored in nonvolatile random-access memory and multiple pages of video memory to allow local and on-line editing of graphics designs and text.

Shipments are scheduled to begin in the third week of February.

The MPC 2150 is priced at $3,995 in single-unit quantities.

C3, 11485 Isaac Newton Sq. S., Reston, Va. 22090.

See PRINT Page 72



Only one disk guarantees safe passage through the torrid zone of drive heat. Maxell.

A lifetime warranty. And manufacturing standards that make it almost unnecessary.

Consider this: Every time you take your disk for a little spin, you expose it to drive heat that can sidetrack data. Worse, take it to the point of no return. Maxell's unique jacket construction defies heat of 140°F. And keeps your information on track.

And Maxell runs clean. A unique process impregnates lubricants throughout the oxide layer. Extending media and head life. How good is Gold?

Maxell's the disk that many drive manufacturers trust to put new equipment through its paces. It's that bug-free.

So you can drive a bargain. But in accelerated tests, Maxell floppys lead the industry in error-free performance and durability. Proving that if you can't stand the heat you don't stand a chance.

maxell.
IT'S WORTH IT.

Maxell Corporation of America, 60 Oxford Drive, Moonachie, N.J. 07074 201-440-8020

SYSTEMS & PERIPHERALS

PRINT from page 71

VECTOR GENERAL, INC.
VG 8250 enhancements

Vector General, Inc. has announced enhancements for its VG 8250 computer-aided design and manufacturing (CAD/CAM) graphics display system which the vendor said will increase the system's cost effectiveness.

The enhancements are reportedly a mini version of the VG 8250's channel control unit, which can support four sites, and a mini version of the firm's remote display controller, capable of supporting four stations. The enhancements take the form of monochrome stroke monitors. Ergonomic improvements include a ratio CRT and a low-profile function switch box.

The firm also added firmware to enhance CAD/CAM display processing functions contained in the mini remote display controller. Vector General's Color Stroke Shadow Mask Display Station is an option to the controller.

The VG 8250 is a plug-compatible replacement for the older IBM 3250 display system; it is used with IBM and IBM-compatible computers. The channel data control unit, the remote data control unit and four display station monitors cost $93,500.

Vector General, 31300 Oxnard St., Woodland Hills, Calif. 91367.

EVANS & SUTHERLAND COMPUTER CORP.
PS 330 price reductions

Evans & Sutherland Computer Corp. has announced price reductions of approximately 40% for its PS 330 graphics systems.

Company officials said improvements in the underlying integrated circuit technology have decreased the cost differences between high-performance and low-performance systems.

The price for the PS 330, consisting of a control unit with 1M byte of memory, a 19-in. color calligraphics display, a keyboard with 12 function buttons and a data tablet, has been reduced from $84,995 to $48,000.

The price for the system with a black-and-white monochrome display has been reduced from $60,000 to $40,200.

The new prices are now in effect.

Evans & Sutherland, 580 Arapeen Drive, Salt Lake City, Utah 84108.

BOARD-LEVEL DEVICES

1ST SOLUTIONS; CYBERSYS, INC.
4M-byte memory board

1st Solutions and Cybersys, Inc. have jointly announced a 4M-byte memory board for Prime Computer, Inc. systems.

The product occupies a single standard board slot and provides 4M bytes of error-correcting memory for Prime Models 150 through 850 and the 2250.

According to the vendors, the board may be interleaved with another 4M-byte board or up to four 1M-byte boards.

Orders are being accepted, with delivery within 30 days. The price is approximately $20,000.

1st Solutions has also announced an upgrade plan whereby existing Cybersys P1024 memory boards can be upgraded to 4M-byte capacity, with a 30-day lead time.

1st Solutions, Suite 107, 2001 E. Campbell, Phoenix, Ariz. 85016.

MOTOROLA SEMICONDUCTOR PRODUCTS, INC.
VM03 single-board microcomputer

Motorola Semiconductor Products, Inc. has introduced a single-board microcomputer said to add virtual memory plus hardware memory management features to its Versamodule family of micro system components.

Model VM03 reportedly incorporates a Motorola, Inc. 68010 virtual memory micro processing unit operating at 10 MHz, plus a 68451 Memory Management Unit to afford relocation and protection of user tasks.

Features include a Versabus Interrupt Handler and Interrupter and I/O channel interface.

Model VM03 costs $3,900 for quantities of one to five.

Motorola Semiconductor Products, P.O. Box 20912, Phoenix, Ariz. 85036.

NETWORKING VS. NOTWORKING:

ANNOUNCING THE NET RESULTS.

Linking micros to mainframes is one of the most pressing problems facing DP managers today. How do you bring all the computers in your company together so they can share information, resources, programs, and access the corporate data base without any loss of security?

SyFAnet

Networking is a nice concept but it won't work unless you have a system that works.

SyFAnet™ (System For Access network) is the network that works. The only complete solution on the market, ready to meet all your networking needs now.

SyFAnet gives you everything you ever wanted in a network: the ability to link PCs together, multi-function workstations, industry-standard software, global information access and unlimited expansion capabilities. All fully-integrated, and built upon a foundation of proven hardware and software.

Picture a powerful processor for every purpose—one for applications, another for sharing resources. This special architecture makes SyFAnet a more reliable network, with no single point of failure. Every time you add a terminal, you gain more power instead of losing it.

Our broadband bus offers more flexibility. So you can add more users whenever and wherever you want.

By adding microprocessor-based workstations and CP/M-86, SyFAnet gives you more functionality, too. You can upgrade easily without costly conversion, because our software remains the same at all levels.

And while *you* might get confused by the flurry of message traffic in the office, SyFAnet never does. Its unique version of collision avoidance means data doesn't get lost in the shuffle.

Because business doesn't stop at borders anymore, SyFAnet was designed with the whole world in mind. SNA and X.25 capabilities connect you to mainframes and networks around the world.

SyFAnet. Ready to solve your networking problems today and tomorrow. It's the network that works.

For more information, write or call today.

ComputerAutomation
Commercial Systems Division
1800 Jay Ell Drive / Richardson, TX 75081
(214) 783-0993 / TLX: 4630023

*CP/M-86 is a registered trademark of DIGITAL RESEARCH, INC.

MICROCOMPUTERS

Betamax decision won't hurt users

micro BITS

TOM HENKEL

What implications does the U.S. Supreme Court's ruling in the Sony Corp. Betamax case hold for microcomputer users? In a matter of speaking, the jury is still out; but experts tend to agree the impact on microcomputer users, especially corporate users, will be minimal.

The Supreme Court ruled that it is permissible to copy, for private use, television programs that can be received free over the airwaves.

While few microcomputer programs can be found floating around in the atmosphere, some of the underlying issues in the case may affect the micro sect.

For example, New York attorney Herbert Swartz noted that for the first time, the court has ruled it is permissible to make complete copies of a copyrighted document — in this case, a television program.

Permissible to copy?

Does that mean it is also permissible to make single complete copies of software programs? Maybe, Swartz said, if the person doing the copying is clever. Can you make wholesale copies of Visicorp's Visicalc for 500 corporate executives? No, that is still illegal. And don't hold your breath waiting for the situation to change.

"I don't think anyone can conclude (the Supreme Court's decision) is an open invitation to record software in a commercial setting," noted Washington, D.C., attorney Jon Baumgarten, a partner in the firm of Paskus, Gordon and Hymen.

Baumgarten said the Betamax decision will actually make it harder for corporations to copy software blatantly, because in ruling that copies of copyrighted material can only be made for private, home use, the court has more clearly stated that copying software for commercial use is wrong.

Clearest message

What may be the clearest message from the Supreme Court ruling probably means little to micro users. In making its decision, the court ruled that manufacturers of recording equipment, such as video cassette recorders, cannot be held liable for the legal abuses of their customers.

But in the computer industry, that is a moot point. In 1980, the U.S. Congress ruled that it is permissible for computer users to make backup, or archival, copies of software and data. And equipment to make such copies can legally be bought and sold.

What the Supreme Court's decision has failed to address is the practicality of enforcing copyright laws. The corporation that makes multiple copies of microcomputer software for internal distribution is most likely breaking the law. But catching up with the offenders is another story.

Tom Hemnes, a partner in the Boston firm of Foley, Hoag and Eliot, noted "in large-scale copying, one tends to find out about it." Using the example of a corpo-

See COPIES page 74

Portable mart to tighten

Vendor opportunity remains

By Eric Sander
Special to CW

Times are good for the companies tagging along behind IBM's Personal Computer with Personal Computer-compatible portable micros. This corner of the personal computer market features some of the industry's greatest success stories.

But this happy condition won't last indefinitely for portable computers, according to industry analysts, who warn of much rougher competition just over the horizon. International Resource Development, Inc. in Norwalk, Conn., predicts "kamikaze" price wars. "A year from now, it'll be a very difficult market," said Aaron Goldberg of International Data Corp. in Framingham, Mass. "The easy windows are going to close."

These predictions sound very much like those for the overall industry, and the reason is straightforward: For the most part, this is not a niche market.

Two long-term developments are blurring the edges of the market. First, most manufacturers of portable micros increasingly emphasize other features (price and software availability) over portability. Ask them about their competition, and they usually mention desktop computers. And second, many suppliers of 8-bit portables have undertaken the long trek toward Personal Computer compatibility.

A large portion of this big market also wants, or thinks it needs, an IBM-compatible machine. Like many other dealers, Bob Wolff of Wolff Computers in New York said there's "tremendous hype" for Personal Computer compatibility, but he added that "we want to be in on the hype."

And, of course, the sales. Future Computing, Inc. of Richardson, Texas, predicts that about 800,000 Personal Computers and Personal Computer-compatibles will be sold this year in the U.S., 90,000 of them portables for business use. Next year, the total will rise to more than 1,620,000 systems, including 180,000 portables.

See PORTABLES page 74

'Espionage-proof' portable debuts

MOUNTAIN VIEW, Calif. — Grid Systems Corp. recently announced what it calls "the first espionage-proof portable computer," featuring twice the random-access memory (RAM) of previous Grid models.

The company also announced a 256K-byte RAM entry-level micro, a 512K-byte micro with built-in modem and a 17% price reduction of the model formerly known as Compass.

GRiD

The Model 1107 microcomputer provides 512K bytes of RAM, along with 384K bytes of nonvolatile bubble memory. Encased in magnesium to resist detection and decoding of radio signals that may be emitted by unshielded computers, the product weighs 13½ lb, will fit in a space the size of half a standard-size briefcase, houses a full-size, flat-panel screen and uses Intel Corp. 8086 and 8087 microprocessors, according to a spokesman.

The entry-level product, Model 1100, also reportedly features Intel 8086 and 8087 microprocessors and flat-panel screen, weighs 10 lb and features 256K bytes of RAM and 384K bytes of bubble memory.

The Model 1109 features a 300/1,200 bit/sec modem and 512K bytes of RAM using 256K-bit chips developed by Hitachi Ltd.

The Compass, now renamed the Model 1101, offers the same features as the Model 1100, along with the 300/1,200 bit/sec modem, according to the vendor spokesman.

Prices for the product line are: Model 1107, $12,495; Model 1100, $5,995; Model 1101, $6,795; and Model 1109, $7,995, the vendor spokesman said.

Grid Systems, 2535 Garcia Ave., Mountain View, Calif. 94043.

STM introduces transportable micro

MENLO PARK, Calif. — STM Electronics has announced a 17-lb, IBM Personal Computer-compatible transportable computer said to feature an integrated 16-line LCD, 40-col. thermal printer, modem and data communications abilities, built-in speaker phone, software and execution time almost as fast as the IBM Personal Computer.

The STM Personal Computer comes standard with a 16-line by 84-char. LCD with 540- by 200-pixel resolution for graphics.

An expanded display capability for standard video monitors supports "windowing" software and allows the user to choose between a 25-line by 80-col. and a 132-col. display with 640 by 400 pixels for high-resolution graphics.

The unit features 256K bytes of random-access memory, expandable to 512K bytes, and has dual 1M-byte floppy disk drives. These double-sided, double-density drives give the user a total of 1.6M bytes of formatted storage and roughly 1,200 pages of text and eliminate the need for add-on disk drives.

This feature gives the STM Personal Computer the largest standard floppy disk storage capacity of any transportable computer, the vendor claimed.

The product is driven by Intel Corp.'s 80186 microprocessor, which is compatible with both the IBM Personal Computer and Microsoft, Inc.'s MS-DOS 2.0.

An automatic dial and answer direct connect modem for data communications is also offered. Programmable between 300 and 1,200 bit/sec, the modem supports electronic mail, telex and networking with other STM Personal Computers and provides access to some information systems, the vendor said.

Prices for the STM Personal Computer will begin at $3,000. A desktop version will be priced starting at $2,500.

STM Electronics, Suite 250, 530 Middlefield Road, Menlo Park, Calif. 94025.

Bubble tec

Bubble memory for mass storage on VME-Bus systems/78

Communications package links Zenith Z-100 with DEC CRTs/77

apple

Cobol, Fortran compilers for Apple's Lisa/78

INSIDE

- Graphics design system based on IBM micro/78
- North Star announces preconfigured version of Horizon 8/16/78
- Data encryption board for IBM micros/78
- Power switching supplies for micros/78

PORTABLES from page 73

Strictly speaking, nothing in this world is fully IBM-compatible, except the Kit 1 from Colby Computer in Palo Alto, Calif., which allows users to repackage their Personal Computers in a portable unit. Compatibility depends on the system's ability to mock exactly IBM's copyrighted read-only memory instructions and the individual software package's use of direct hardware calls (which bypass the operating system). In short, it's a black art.

Meanwhile, there's a host of other contenders, both established entries and start-ups, each with its own strategy, despite a wide perception that the window is closing. Because start-up costs are high, critical components are in short supply, and retail shelves are jammed.

Strategic Technologies, Inc. of Norcross, Ga., plans to sell a "PC Traveler" model, which features a plasma screen display, dual Intel Corp. 80186 chips, a built-in printer and 6M bytes of hard disk cartridge storage. The company plans to build at least 13,000 systems in 1984. Ivy Microcomputer Corp. in Wilmington, Mass., plans to augment dealer sales for its new Personal Computer-compatible portable with distribution through department stores.

At the same time, just about everyone else in the marketplace from Apple Computer, Inc. to Victor Technologies, Inc. is expected to introduce a portable personal computer. To complicate matters further, several other interesting lightweight, 16-bit machines now available are not positioned as IBM-compatible portables but may indicate future competition.

These are the Mobile Office from Gavilan Computer Corp. in Campbell, Calif.; the Model 1101 (formerly Compass) from Grid Systems Corp. of Mountain View, Calif.; and the PC-5000 from Sharp Electronics Corp. in Paramus, N.J.

These machines have base prices ranging between $2,000 and $9,000 and very different configurations. They are aimed at very different customers, but they all weigh less than 15 pounds and run Microsoft, Inc.'s MS-DOS.

Some in the industry expect notebook-size computers like the PC-5000, which has an 8-line, 80-char. LCD screen, to compete in a broader market when the displays are full size. Sharp Marketing Manager Lou Ferri said that Sharp could provide a 24-line screen now, but will wait until that seems cost-justified. For many applications, the current display "is not a problem," Ferri maintained. "You're looking at one-third of a standard 24-line screen, and we feel that's adequate."

The one question in the future of portables is IBM. Future Computing thinks IBM plans to introduce a portable business system. The research firm forecasts that Big Blue will ship 40,000 such systems next year, according to analyst William Ablondi, although Future hasn't fleshed out details on what the product will look like.

Many others doubt IBM will bother. "It's ridiculous to think that IBM would introduce a product that would compete with the [Personal Computer], although the Peanut might run some [Personal Computer] software," said Herbert Kummer, marketing director at Seequa Computer Corp. in Annapolis, Md.

Another concern is what happens when IBM's production capability begins to catch up with demand. "To a certain extent, we'll all enjoy IBM's inability to deliver enough," according to Otrona Advanced Systems Corp. President James Lindner. But, like others, he predicts that even if two million Personal Computers roll off IBM's assembly lines next year, an enormous market remains for other manufacturers.

"The market is so big that everyone can play," Kummer said. A Compaq Computer Corp. spokesman noted the IBM shortage, but pointed out that "there's been a shortage of [Compaq Computer] Compaqs too — I don't know to what extent that's benefited IBM." Slightly more seriously, another Compaq spokesman said that if IBM ships two million Personal Computers, the company's position will be enhanced by further acceptance of the Personal Computer de facto standard.

So despite the predictions of hard times down the road, the present looks highly promising. There's room for many contenders, Goldberg said — "if they run their businesses very well."

Eric Bender is an Associate Editor of Micro Marketworld, *a sister publication of* Computerworld, *in which this article originally appeared.*

COPIES from page 73

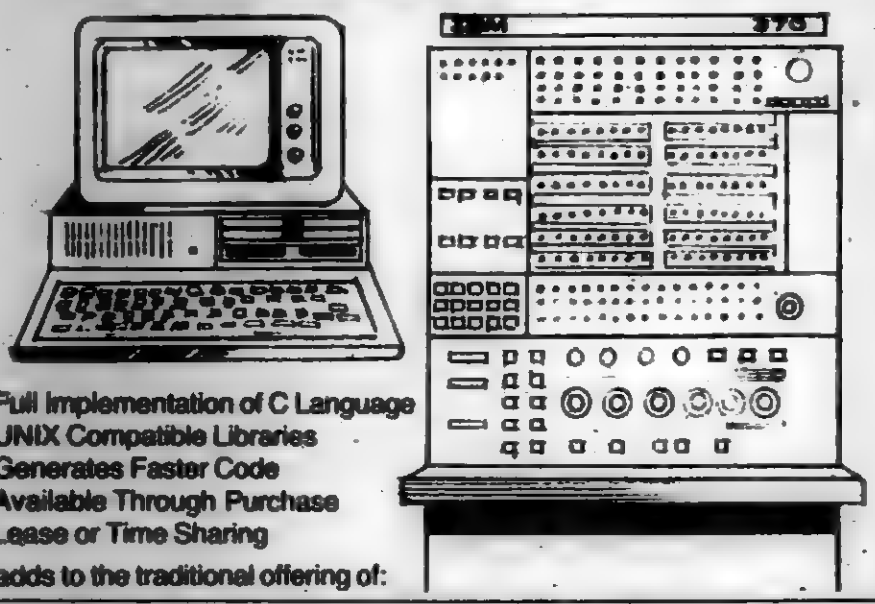
ration making copies of microcomputer software for about 500 micros, there will probably be about 2,000 employees who may suspect the company is illegally copying software.

With that many people in on the corporate secret, word is probably going to get back to the software vendor. A small corporation or a home user, on the other hand, is much more difficult to detect.

Hemnes compared the software copier to a counterfeiter, noting that in many cases, it is only when both get greedy that they are usually discovered.

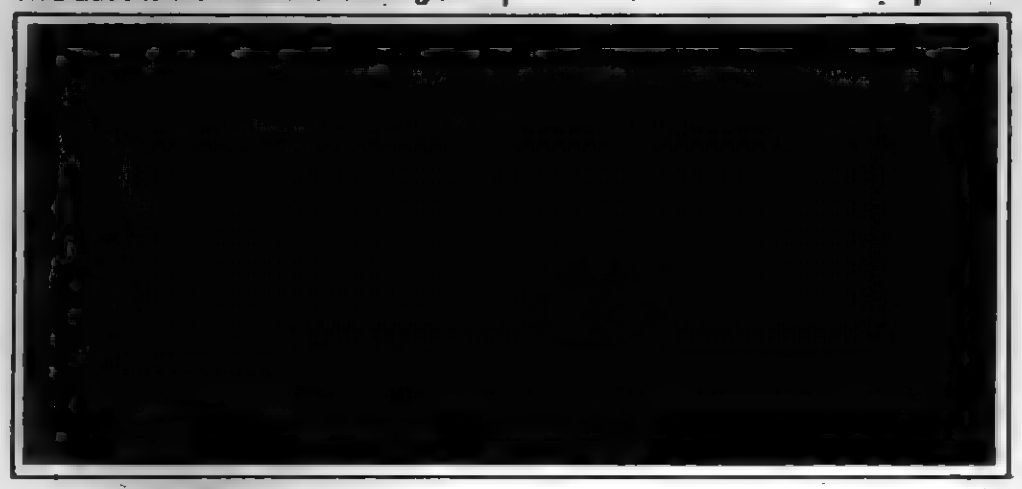
C and Pascal on the 370!

NOW the same dependable Whitesmiths compilers from the IBM PCJr. to the 370.



- Full Implementation of C Language
- UNIX Compatible Libraries
- Generates Faster Code
- Available Through Purchase Lease or Time Sharing

This adds to the traditional offering of:



Whitesmiths, Ltd.

97 Lowell Road ● Concord, MA 01742 ● (617) 369-8499

TLX 750246 SOFTWARE CNCM See us at SOFTCON Booth 138

UNIX is a trademark of Bell Laboratories; Rainbow, PDP-11, DOS, RSX-11, RT-11, VAX and VMS are trademarks of Digital Equipment Corp.; CP/M is a trademark of Digital Research Co.; MC68000 and VERSAdos are trademarks of Motorola, Inc.; UNIPLUS is a trademark of Unisoft, Inc.; IBM PC, PCjr, PC-DOS and IBM 370 are trademarks of International Business Machines Corp.; Idris is a trademark of Whitesmiths, Ltd.

Distributors: Australia, Foreman Pty. Ltd., Hurstville, (612) 570-6100; Japan, Advanced Data Controls Corp., Chiyoda-ku, Tokyo (03) 263-0383; United Kingdom, Real Time Solutions, Douglas, Isle of Man (0624)3403; Sweden, Unisoft A.B., Goteborg, 031-13-36-32

MICROCOMPUTERS

SYSTEMS

NORTH STAR COMPUTERS, INC.
Horizon 8/16

North Star Computers, Inc. has announced a version of its Horizon 8/16 microcomputer preconfigured for two users which will allow customers to buy the new multiuser, multiprocessor computer with a 5M-byte hard disk.

The Horizon 8/16 system can support up to eight users for less cost than the initial two-user bundles, the vendor said. A 15M-byte Horizon 8/16 for eight users would cost less than $1,300 per user.

In addition, a two-user Horizon 8/16 configuration is available with a 30M-byte hard disk for $7,699. A 15M-byte, two-user configuration sells for $6,699, and the 5M-byte hard disk for two users costs about $2,600 per user, the vendor said.

North Star Computers, 14440 Catalina St., San Leandro, Calif. 94577.

AUTOGRAPHIX, INC.
Autographix 200

Autographix, Inc. has introduced the 200, a computer graphics design system based on the IBM Personal Computer. Presentation-quality graphics can be produced as 35mm slides, view graphs, color prints, black-and-white hard copy or video electronic boardroom visuals.

The system incorporates the IBM XT version of the Personal Computer with 256K bytes of random-access memory standard. Graphics capabilities are enhanced by a graphics display processor, which permits two images to be stored in the memory simultaneously. Two monitors are included with the system, a black-and-white monitor and a red-green-blue monitor.

The price of the Autographix 200 is $35,500, with an additional charge of $750 for installation and training.

Autographix, 100 Fifth Ave., Waltham, Mass. 02154.

SPECTRAVIDEO, INC.
SVI-728; Family Pak Plus; 328 Mark II Pro systems

Spectravideo, Inc. has announced two systems using the Microsoft, Inc. MSX hardware and software configuration.

The SVI-728 reportedly is a Digital Research, Inc. CP/M-based machine featuring a Zilog, Inc. Z80A microprocessor. The system is scheduled for release in April.

The company also is marketing its Family Pak Plus and 328 Mark II Pro systems using the SVI-328, full-stroke, CP/M-based computer. The Family Pak Plus is said to include the SVI-328, offering 32K bytes of read-only memory (ROM) and 80K-byte random-access memory (RAM), expandable to 96K bytes of ROM and 144K bytes of RAM.

The 328 Mark II Pro system reportedly features six expansion slots, two disk drives, an 80-col. card, 12-in. monochrome monitor, and an 80 char./sec dot matrix printer and six software programs.

The SVI-728 is expected to have a suggested retail price of $349; the Family Pak Plus and the 328 Mark II Pro are priced at $599 and $1,695, respectively.

Spectravideo, 39 W. 37th St., New York, N.Y. 10018.

STORAGE

PERCOM DATA CORP.
PHD hard disk drives

Percom Data Corp. has announced a generation of high-performance hard disk drives for a variety of personal computers, including IBM's Personal Computer, that are said to support IBM's PC-DOS 2.0. operating system.

The PHD product line reportedly will provide users with speed enhancements and efficient implementation of cache memory. Caching design permits Percom's hard disk drive to work with the host computer so that the most used files are actually stored and processed in memory.

The caching driver will have a suggested retail value of $149.95. A caching driver software upgrade kit will cost $50.

Percom Data, 11220 Pagemill Road, Dallas, Texas 75243.

BUBBLE-TEC DIVISION OF PC/M, INC.
VMI-1 magnetic bubble mass storage memory system

The Bubble-Tec Division of PC/M, Inc. recently announced a magnetic bubble mass storage memory system providing up to 256K bytes of nonvolatile memory for use with microcomputers utilizing the VME-Bus system architecture.

The VMI-1 reportedly includes one or two 1M-bit, bubble memory devices and can be expanded to provide as much as 8M bytes of bubble memory. A controller designed around a Zilog, Inc. Z80 microprocessor reportedly controls bubble device formatting and control and interfaces the bubble memory system to the VME-Bus structure.

The access time of the system reportedly averages under 50 msec, and the effective rate from and to the system is said to exceed 120K bit/sec, the vendor said.

The system is priced at $1,790. A spokesman said a 128K-byte version is also available.

Bubble-Tec, 6500 Sierra Court, Dublin, Calif. 94568.

BOARD-LEVEL DEVICES

OKIOK DATA LTD.
IBM Personal Computer Data Encryption Board

Okiok Data Ltd. has introduced a data encryption board for the IBM Personal Computer, Personal Computer XT and compatible computers.

The encryption/decryption process can be done transparently with disk accesses or communications protocols. Any file may be replaced by an encrypted copy using the data encryption standard algorithm.

An optional secure drive software module automatically encrypts and decrypts data written to a disk as it is read back. This is done transparently and supports all standard IBM disk utilities, Okiok said. The data encryption board requires one short slot on the Personal Computer motherboard and is priced at $400.

Okiok Data Ltd., 3945 St.-Martin Blvd. W., Laval, Quebec, Canada H7T 1B7.

AUXILIARY EQUIPMENT

KEY TRONIC CORP.
Models KB5151J; KB5151

Key Tronic Corp. has announced a full-travel, plug-compatible keyboard said to provide for enhanced operation of IBM's PCjr. In addition, it also unveiled a plug-compatible keyboard for IBM's Personal Computer and Personal Computer XT.

Designed for the IBM PCjr, the Model KB5151J reportedly is a deluxe version of Key Tronic's previous KB5150 keyboard, which has a separate cursor pad and function keys placed across the top. The unit comes standard with the cable connection so that it can be used in any environment. It costs $255.

Designed for the IBM Personal Computer series, the Model KB5151 is said to be a low-profile unit featuring separate cursor command keys, a separate numeric pad, top-row function keys with removable template and a pencil-and-book holder ridge.

In addition, the unit offers familiar typewriter key placement, LED status indicators on all lock keys and incorporates solid-state capacitive switches, microprocessor electronics and positive tactile feedback. The KB5151 has a suggested list price of $255.

Key Tronic Corp., P.O. Box 14687, Spokane, Wash. 99214.

AMDEK CORP.
Color IV

Amdek Corp. has introduced Color IV, a color monitor compatible with the IBM Personal Computer and the Digital Equipment Corp. Rainbow microcomputer.

Color IV is available in two versions, with either red-green-blue analog or digital input. It will display the 16 colors of the IBM Personal Computer or the RS170A, red-green-blue signal of the DEC Rainbow.

According to the vendor, the monitor has 720 by 420 line resolution with a .31mm dot pitch CRT. It has a character display capability of 96 by 24. The cabinetry of the monitor was developed for either industrial environments or commercial applications, a company spokesman said.

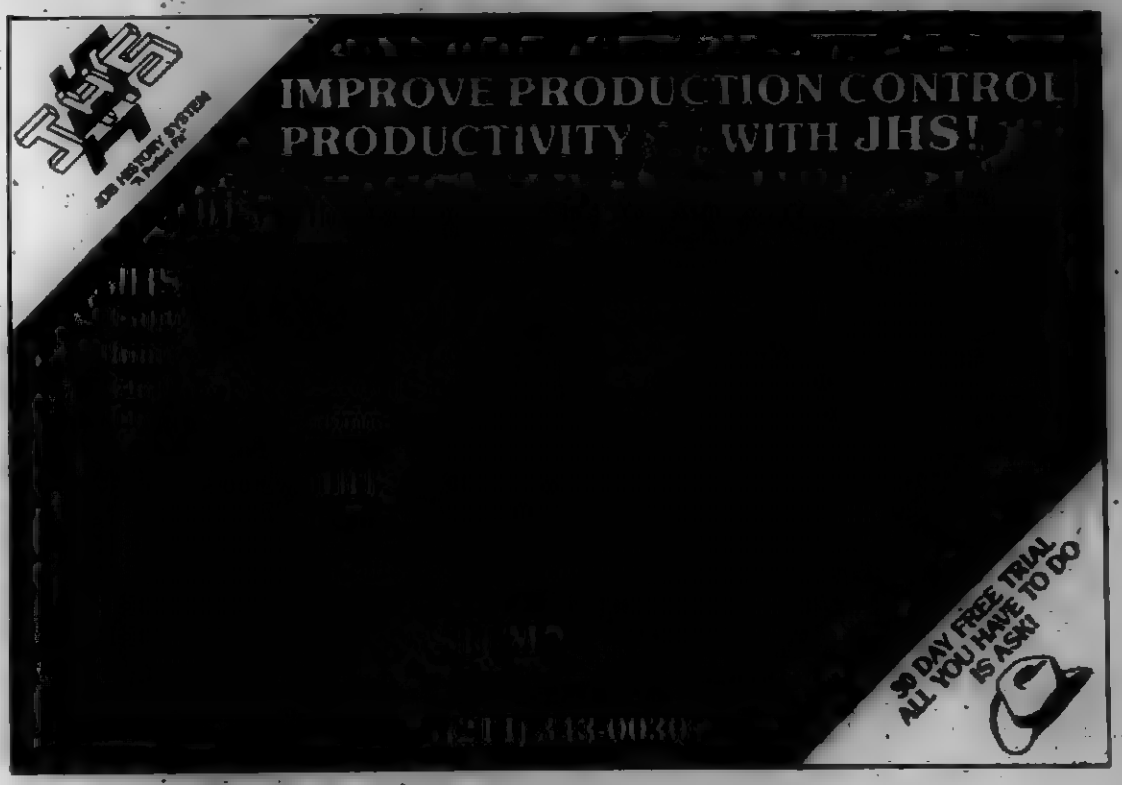
The suggested retail price of the Color IV is $995.

Amdek, 2201 Lively Blvd., Elk Grove Village, Ill. 60007.

SIERRACIN/POWER SYSTEMS, INC.
SC1142; SC1143 power-switching supplies

Sierracin/Power Systems, Inc. has announced two power-switching supplies designed for microcomputer applications, the SC1142 and the

Continued on page 78



MICROCOMPUTERS

Continued from page 76

SC1143.

The SC1142 features 62W of power, sufficient for two floppy disk drives; the SC1143 supplies 100W of power, enough for a floppy and a hard disk drive, according to the vendor. The power supplies feature dual input of 90 to 132 and 180 to 248 Vac and 47Hz to 63Hz. They fit in a 6-in. by 12-in. by 2¼-in. chassis.

The SC1142 costs $95; the SC1143 is priced at $95.

Sierracin/Power Systems, 20500 Plummer St., Chatsworth, Calif. 91311.

PC SOFTWARE INTEREST GROUP
IBM programs book

PC Software Interest Group has introduced a book that lists hundreds of public-domain and user-supported programs for the IBM Personal Computer.

Programs cover a wide range of topics, from financial analysis to communications to games. Copies of the book are available for $2.95 plus $1 shipping.

PC Software Interest Group, Suite 150R, 1556 Halford Ave., Santa Clara, Calif. 95051.

BSR (USA) LTD.
AM Computer Care Line

BSR (USA) Ltd. has imported the AM Computer Care Line from Denmark. The products are said to help protect hardware and software from harm caused by dust, static and smoke particles.

The Diskette Safe Pack is a protective mailing box designed to protect 5¼-in. and 8-in. diskettes from electrical and physical damage. It costs $5.

Also offered is the CCC-2 Computer Cassette Cleaner, with cleaning cassette, brush and 20 ml of cleaning fluid, and a Computer Screen Cleaner Kit with 20 ml of cleaning fluid and cleaning cloth — both for $9 each. The CKC-1 Computer Keyboard Cleaner, consisting of 50 chemically treated tissues, costs $12.

BSR (USA), Rt. 303, Blauvelt, N.Y. 10913.

HOFFMAN COMPUTER PRODUCTS
Copy protection services

Hoffman Computer Products, a diskette duplicating firm, has introduced copy protection services for the IBM Personal Computer and Commodore Business Systems microcomputers.

According to the vendor, the service is in response to the problem of software piracy (two to 10 illegal copies of software are made for every legal copy). Services are currently available for copying disks in the 5¼-in. format, single- or double-sided. The basic charge for copying in the 5¼-in. format (in quantity) is less than 30 cents per diskette per side.

Hoffman Computer Products, 1720 Flower Ave., Duarte, Calif. 91010.

MICRO SOFTWARE

BOS NATIONAL, INC.
Mboe/5; Microcobol adaptions

Bos National, Inc. has announced that the Mboe/5 multiuser operating system and Microcobol have been adapted for the IBM Personal Computer and the Personal Computer XT, giving users the ability to add two CRT terminals and to achieve time-sharing capabilities.

Any program or system written in Bos/Microcobol will run on the Personal Computer or Personal Computer XT without recompilation or relinking, according to a spokesman for the vendor.

Porting of such programs and data files to the Personal Computer and XT from other Bos-supported computers can be done by direct transfer of media on 5¼-in. diskettes or using the remote communications feature of Mboe/5 via the serial port of the XT.

The Mboe/5 with runtime Microcobol sells for $1,050.

Bos National, 2560 Royal Lane, Dallas, Texas 75229.

STONEWARE, INC.
Advanced DB Master

Stoneware, Inc. has announced an enhanced version of the DB Master, a computerized filing system for the IBM Personal Computer, Personal Computer XT and compatible machines.

No programming is required to use Advanced DB Master, the vendor said. Advanced DB Master allows the user to store, search, restructure and calculate information and print out customized reports. The user determines how the information is organized.

Features include keystroke macros, text editing and merging, computed fields, user-defined reports, dynamic value tables, array searches, audit trail, screen forms, browse mode, required fields, error prevention, various field types, print buffer and data exchange with other programs and computers.

The system is priced at $595.

Stoneware, 50 Belvedere St., San Rafael, Calif. 94901.

NELSON DATA RESOURCES, INC.
Lazycoder II

Nelson Data Resources, Inc. has announced the second release of Lazycoder program development aids for the IBM Personal Computer and Personal Computer XT.

Continued on page 77

Do you know the only place where you can find...

...all the major developments in office and data technology ? Ways to improve communication and efficiency in office organization ? The latest in word and data processing ? A comprehensive display of microcomputers and personal computers ? All you need to know about information science – from office computers to complete systems ?

You don't ?

Answer:

World Centre for Office and Data Technology

CeBIT

Further information from:
Hannover Fairs Information Center
Salem Industrial Park
Route 22 East, Whitehouse NJ 08888
Tel.: (201) 534-9044, (800) 526-5075 (toll free) · Telex: 833483

... at the Fair of Fairs

Wednesday, 4th – Wednesday, 11th April

Hannover Messe '84

Continued from page 76

Lazycoder II was designed for the professional programmer. It designs and edits screens for the generation of three types of file maintenance programs — sequential, random and indexed, the vendor said.

Screens may be designed using the top 23 lines of the screen as an electronic blackboard. Screen design has functions such as draw line, frame screen and input field definitions. A high-speed index support module called Fabs/PC gives the Personal Computer the capability of supporting indexed files. Generated programs may be modified to support multiple data screens, the vendor said.

The retail price of $450 includes Fabs/PC, an assembly language module that requires rapid access to very large data files, Fabs/PC sample programs, manuals for Lazycoder-Screen II and Fabs/PC.

Nelson Data Resources, P.O. Box 24247, Omaha, Neb. 68124.

SMC SOFTWARE SYSTEMS
Thoroughbred Operating System

SMC Software Systems, a division of Science Management Corp., has introduced a multiuser, multiprocessing operating system for the IBM Personal Computer XT.

According to the vendor, the Thoroughbred/OS will support three terminals and one printer and allows for simultaneous processing of multiple applications.

The product was designed to turn a single-user Personal Computer XT into a two-user system by adding one terminal and upgrading to 256K bytes of memory.

For a three-user system, a third terminal plus an IBM asynchronous communications adapter are required.

The product offers Personal Computer XT users a line of business and productivity software that includes Thoroughbred Idol, a data base manager, seven accounting modules and full-color business graphics.

The Thoroughbred/OS can be installed on a partitioned hard disk that is shared with IBM's PC-DOS so that users are able to store both the Thoroughbred software and the PC-DOS software on the same hard disk.

The product retails for $795, the vendor said.

SMC Software Systems, 1011 Rt. 22, Bridgewater, N.J. 08807.

UNIPRESS SOFTWARE, INC.
Apple Lisa Unix enhancements; Unify

Unipress Software, Inc. has announced enhancements to its Unix operating system for Apple Computer, Inc.'s Lisa microcomputer.

The Apple Lisa Unix, a full Bell Laboratories System III with enhancements, includes support for Corvus Systems, Inc. 10M-, 20M- and 40M-byte disk drives, as well as the 5M-byte Apple Profile hard disk drive.

According to the vendor, the disks are available from Unipress. The full System III, multiuser Apple Lisa Unix, including C development tools and text processing tools, is priced at $1,495 and is available immediately, the vendor said.

The vendor's Unify data base system is also available for $1,400.

Unify includes a query language, report writer and interactive data entry and validation, according to a spokesman for the vendor.

Unipress Software, 1164 Raritan Ave., Highland Park, N.J. 08904.

BRODERBUND SOFTWARE, INC.
Bank Street Writer

Broderbund Software, Inc. has introduced the Bank Street Writer for the Commodore Business Machines, Inc. Commodore 64 computer.

Features of the program include universal search and replace, block move and unmove, automatic centering and indent, inverse highlighting of text, word wrap, disk storage and retrieve functions with password protection, according to a spokesman for the vendor.

Bank Street Writer comes with a tutorial on a disk that teaches basic principles of word processing. A reference manual and a backup disk are provided free of charge.

The program is available now in disk format for $69.95, the spokesman said.

Broderbund Software, 17 Paul Drive, San Rafael, Calif. 94903.

CONCENTRIC DATA SYSTEMS, INC.
Concentric Information Processor

Concentric Data Systems, Inc. recently announced a data base/information management and report writing program for the IBM Personal Computer that reportedly requires no command language and can be integrated with Visicorp's Visicalc and Lotus Development Corp.'s Lotus 1-2-3.

The Concentric Information Processor allows users to see the results of report writing directly on the screen as they will appear in final reports, according to a company spokesman. A horizontal scrolling capability reportedly allows 132-col. reports to be visually defined using an 80-col. display.

The package is priced at $395 and will be available this month.

Concentric Data Systems, 18 Lyman St., Westboro, Mass. 01581.

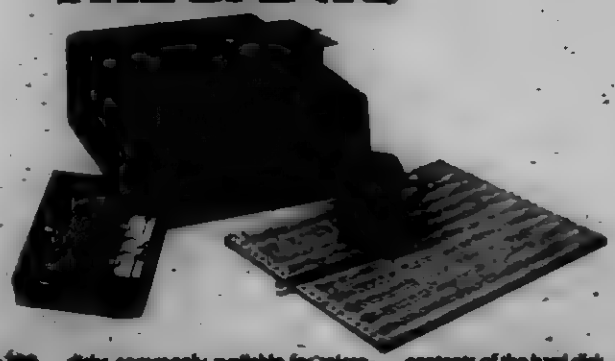
MARK OF THE UNICORN, INC.
PC/Intercomm

PC/Intercomm, a data communications package developed by Mark of the Unicorn, Inc., is now available for use on the Zenith Data Systems Z100 personal computer. The package is

Continued on page 78

1000 FLOPPY DISKS

VS.
THE BANK.



Savings you can take to the bank: 200 MB only $2,195. CORVUS is proud to introduce the BANK.

It's the most dramatic breakthrough in low cost, high capacity mass memory systems since CORVUS introduced the Winchester disk for microcomputers in 1979.

The BANK's removable tape cartridges hold up to 200 megabytes of information. That's equal to 1000 double density floppies or 10 times the capacity of the largest hard disks commonly available for microcomputers. You can use the BANK to complement a Winchester disk. It has 19 times the capacity.

And the BANK's cartridges are removable for unlimited capacity and storage.

On-line archival back-up you can bank on. You can use the BANK as a random access archival device. If your Winchester disk fails, you can restore selected volumes without having to restore the entire contents of the hard disk.

The BANK is the perfect solution to your back-up storage problems as a shared storage device on OMNINET™ — the leading Local Area Network for microcomputers.

Call CORVUS for the name of the dealer nearest you. We're sure you'll smile ... all the way to the bank.

For more information contact: CORVUS SYSTEMS, 2100 Corvus Drive, San Jose, CA 95124, 1-800-4-CORVUS.

CORVUS
THE NETWORKING COMPANY

The BANK connects to various brands of computers using OMNINET Local Area Network TRANSPORTER™ interface cards. The BANK is currently available for the CORVUS CONCEPT™ and the IBM PC™
CORVUS, THE NETWORKING COMPANY, the BANK, OMNINET, CORVUS CONCEPT and TRANSPORTER are trademarks of CORVUS SYSTEMS, INC. IBM and IBM PC are trademarks of International Business Machines.

MICROCOMPUTERS

Continued from page 77

said to allow the Z100 to emulate Digital Equipment Corp.'s VT100 CRT terminal.

With PC/Intercomm, Z100 users can communicate with DEC host minicomputers and run full screen applications programs, the company said.

The package communicates at speeds up to 9,600 bit/sec.

PC/Intercomm has 30 programmable function keys and operates under 128K bytes of memory with one disk drive and an RS-232 Asci communications port.

Priced at $99, the product is available at Zenith dealers.

Mark of the Unicorn, 222 Third St., Cambridge, Mass. 02142.

RYAN-MCFARLAND CORP.
RM/Cobol; RM/Fortran compilers

Ryan-McFarland Corp. has announced its RM/Cobol and RM/Fortran compilers for businesses using the Apple Computer, Inc. Lisa microcomputer.

Both languages are configured to run under the Microsoft, Inc. Xenix and Unisoft System Corp. Unipius operating systems.

The RM/Cobol compiler is available now, while the RM/Fortran is scheduled to be available by the end of January.

The suggested retail price for each compiler is $1,250, the vendor said.

Ryan-McFarland, 609 Deep Valley Drive, Rolling Hills Estates, Calif. 90274.

DECISION STRATEGIES, INC.
Garden State DRG Support System

Decision Strategies, Inc. has announced a set of microcomputer-based software modules designed to help hospitals implement federal Medicare reimbursement programs.

The Garden State DRG Support System is designed to operate on an IBM Personal Computer or Personal Computer XT as a standalone system or as a support system for other computer systems or services. Features reportedly include the ability to integrate with other systems on an upload or download basis and the ability to review patient records while the patient is still in the hospital.

Total hardware and software cost for the system, available now, ranges from $15,000 to $30,000.

Decision Strategies, 174 Forbes Road, Braintree, Mass. 02184.

SOFTWARE TECHNOLOGY FOR COMPUTERS, INC.
Creator

Software Technology for Computers, Inc. has announced a software package designed to enable personal computer users to tailor a variety of applications to their particular needs.

The Creator reportedly runs on the IBM Personal Computer; the Apple Computer, Inc. Apple II and IIe computers; the Compaq Computer Corp. Compaq Portable Computer; and other IBM-compatibles.

According to the company, users can design their own programs by selecting one of 10 ready-to-customize work areas and then answering English-language questions that appear in a step-by-step process on the screen. The Creator is also said to offer additional English-language routines outside of those 10 areas.

Among the applications included are word processing, data base management, bar graphs, mailing list and invoicing.

The package is priced at $300 for the IBM Personal Computer and Compaq and costs $250 for the Apple II and IIe.

Software Technology for Computers, 153 California St., Newton, Mass. 02158.

VAN L. ENTERPRISES
Format 1-2-3

Van L. Enterprises has introduced Format 1-2-3, a general-purpose utility for the IBM Personal Computer that converts reports and data files into a format compatible with the Lotus 1-2-3 spreadsheet program from Lotus Development Corp.

Format 1-2-3 is said to convert any alphanumeric text file into a form that is recognized and directly loadable by Lotus 1-2-3. According to the company, the utility program can convert

Continued on page 79

MICROCOMPUTERS

Continued from page 78

entire reports; conversely, the user can select specific variables or columns to be converted.

Format 1-2-3 requires a Personal Computer with 64K bytes of memory, one disk drive and the PC-DOS 2.0 operating system.

It is available for $100, according to a spokesman for the vendor.

Van L. Enterprises, Box 849, Marina, Calif. 93933.

MICROGRAFX
PC-Draw Version 1.3

Micrografx recently announced PC-Draw Version 1.3 to provide users of its IBM Personal Computer graphics package with color support, presentation graphics, improved user prompts, improved windowing and color overlay capability.

The company also announced support for the Hewlett-Packard Co. HP 7470A plotter.

The enhanced version of PC-Draw also reportedly provides improved user prompts for parameter entry, improved symbol scaling and an improved alternate text with characters said to utilize 50% less string space than in the previous version.

Version 1.3 is available to existing users for $50, a spokesman for the vendor said. A module for support of the HP-7470A plotter is available for $50, along with a plotter driver for $50, the spokesman said.

Micrografx, Suite 708, 1701 N. Greenville, Richardson, Texas 75081.

NEC INFORMATION SYSTEMS, INC.
Graphplan

NEC Information Systems, Inc. recently announced that users of its APC microcomputers may now obtain Chang Laboratories, Inc.'s Graphplan package, which runs under Digital Research, Inc.'s CP/M 86 operating system and includes an electronic spreadsheet and business graphics.

The package is reportedly compatible with Chang's Microplan package and allows users to edit data, perform mathematical and statistical computations, do "what-if" analysis and perform numerical ranking of data and alphabetical sorting of rows and columns.

Graphplan will operate on both color and monochrome display terminals and is available for $295.

NEC, 5 Militia Drive, Lexington, Mass. 02173.

RADIO SHACK
Color Disk Graphics; Pocket Organizer

Radio Shack recently announced software packages for its TRS-80 Color Computer and the TRS-80 Pocket Computer 2.

The Color Disk Graphics package reportedly allows plotting of color charts and graphs on the Color Computer. The package requires either 16K-byte or 32K-byte versions of the Color Computer with extended color Basic, a color television, disk drive and the vendor's Disk Controller Pack.

Pocket Organizer is a personal organizing aid for the Pocket Computer 2 that reportedly stores a list or queue of things to do. Using the package, lists of appointments, activities or tasks may be reviewed, edited, deleted, printed and saved on tape.

Color Disk Graphics is priced at $49.95, and Pocket Organizer is priced at $19.95.

Radio Shack, 1800 One Tandy Center, Fort Worth, Texas 76102.

TELEVIDEO'S 970: GET IN ON THE ANSI BOOM.

The TeleVideo 970 Terminal. The computer professionals' most powerful ticket to the emergence of the ANSI standard.

The overwhelming acceptance of ANSI X3.64 has revolutionized the future of trans-system communication and software compatibility. Now TeleVideo steps forward with the ultimate complement to that revolution. The ANSI equipped TeleVideo 970 terminal.

The 970 takes the lead in utilizing the advantages of the ANSI code structure. It's 32 non-volatile function keys literally automate ANSI code command entry. Other features include VT-100 compatibility, block mode operation, block graphics and attributes and a totally reconfigurable keyboard. An RS232 printer port with built-in buffer is standard. All this is packaged in the 970's unique vertical convection cooling tower. It protects sensitive circuitry without the noise of conventional fan-cooled construction.

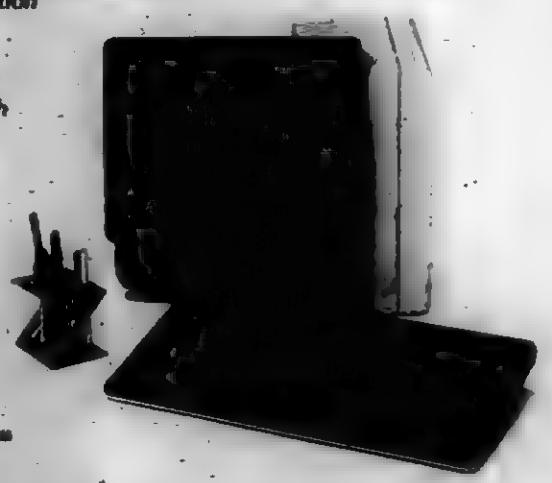
In terms of operator comfort the 970 has no equal. The keyboard with ten-key accounting pad is ergonomically designed with a naturally contoured palm rest and sculpted keys. The non-glare 14 inch screen allows maximum readability in either the 80 or 132 column format. And you can display double-high, double-wide characters on the same fatigue-free background we've been applauded for throughout the industry. Screen tilt adjusts at a touch to further fight operator discomfort.

Of course, as with all TeleVideo terminals, 970 service is available nationwide from General Electric Instrumentation and Computer Service Centers.

The 970. A combination of power, ease of use and TeleVideo reliability at a time you need it most. The ANSI boom is here. Get in on it with the TeleVideo 970.

Call us at 800-538-8725 for more information (in California call 408-745-7760) or contact your nearest TeleVideo office:

California/Santa Ana	714-557-6095
California/Sunnyvale	408-745-7760
Georgia/Atlanta	404-399-6464
Illinois/Chicago Area	312-351-9350
Massachusetts/Boston	617-668-6891
New York/New Jersey	201-267-8805
Texas/Dallas	214-980-9978
France/Paris	33-1-687-3340
United Kingdom/Woking, Surrey	44-9905-6464



GET IN ON THE BOOM.™

TELEVIDEO TERMINALS

TeleVideo Systems, Inc.

Personal Queries And Reports On IBM/38?

FUSION 4/38, the first full information retrieval and presentation system for the non-technical user.

FUSION

PO Box Fusion
Mill Valley, CA 94942
Telex 176949 FUSION

Seiko Series 8600 MP

Seiko Series 8600 MP

- 16-bit 8086 CPU
- Video Display
- Keyboard
- 256K RAM
- 20 Mb Hard Disk
- 640 Kb Floppy Disk
- Thoroughbred 16 Multi-User Operating System

Open Systems Software

- General Ledger
- Accounts Receivable
- Accounts Payable

Total $10,995.00 Retail

Call toll-free 800-368-5010

SEIKO

The business computer that thinks ahead.

COMPUTER INDUSTRY

FCC edict raises MCI, GTE spirits

INDUSTRY INSIGHT

BILL LABERIS

If nothing else, the Federal Communications Commission's (FCC) reluctant decision this month to scale down access charge increases for AT&T competitors has removed a lot of the uncertainty that had clouded matters for companies like MCI Communications Corp. and GTE's Sprint.

First, it should be noted that the pressure brought to bear on the FCC by Congress, the U.S. Justice Department and others to ease up on access charges of AT&T's competitors was warranted. Why should the MCIs and Sprints pay 75% of the access charges borne by AT&T when they do not have anything approaching 75% equal access to the networks of the local phone companies (nor will they for some time to come)?

Also, AT&T's implied threat, that it would lower long-distance rates only if the FCC maintained its access charge structure, may prove just that, as the company will likely still cut long-distance rates, to meet the competition, if for no other reason. AT&T was undoubtedly happy that the FCC and not Congress will be the final arbiter in the access charge matter, as Congress was leaning toward a rate structure that might have proven unjustifiably harsh on AT&T.

As a result of the revised FCC decision, MCI and its brethren this year will face access charges in the $335 per month per line area — more than the $234 mulled by Congress and far less than the $560 under the FCC's original plan. The difference between what AT&T pays — about $740 — and what its competitors pay will be erased once all long-distance suppliers have true equal access to the local phone companies' networks.

MCI said the savings it realizes via the revised plan will not impact its aggres-

See FCC page 92

HP axes 32-bit supermini plans

By Jeffry Beeler
CW West Coast Bureau

PALO ALTO, Calif. — Hewlett-Packard Co. has dropped its plans to announce a 32-bit supermini that would compete with Digital Equipment Corp.'s VAX-11 series, but it will add a second model to its family of mainstream personal computers this spring.

HP has decided "to skip the interim step" of adding a 32-bit processor to its existing 3000 series of 16-bit minicomputers, a company spokesman disclosed during a Jan. 20 telephone interview. Instead, the firm intends to develop an alternative computer line "based on a 'breakthrough' technology now under development in our labs."

The spokesman declined to reveal any specifics about the experimental technology or to predict when it will become commercially available, although he ruled out the possibility that the successor to HP's 3000 line would be introduced this year.

The source also refused to discuss details of HP's upcoming personal computer announcement other than to say that it will involve new peripherals and an additional processor, which will be "related" to the company's existing Model 150 micro.

HP's recent decision to bypass the 32-bit supermini arena contrasts sharply with the company's earlier statements about its short-term business systems plans. In November 1982, when it introduced its 32-bit, 9000 series engineering workstation, the firm publicly committed itself to developing a commercial version of the same product.

But 14 months later, during a Jan. 18 security analysts' meeting, HP reversed its original position and cited lack of user demand as the main reason behind its unexpected shift in strategy. "The announcement of a 32-bit business computer is apparently of much greater interest to security analysts, who are watching DEC and its VAX systems, than it is to our customers," the spokesman said.

For users of the company's 3000 series business minis, the main systems concerns are preservation of their existing software and HP's ability to periodically enhance the product line's throughput and other performance features, he added. Thus far,

See HP page 92

NCR, Burroughs earnings up

Two of the "bunch" — NCR Corp. and Burroughs Corp. — have reported strong increases in both sales and earnings for 1983, with bottom lines buoyed by especially strong fourth-quarter performances.

NCR reported record profits of $286 million, or $10.55 per share, for the year ended Dec. 31, a 23% increase over the previous year.

The company also announced that it had increased the quarterly dividend from 65 cents per share to 80 cents per share, and the board of directors will ask shareholders at the annual meeting April 18 to approve a 4-for-1 stock split. That split would make 3.2 million shares available for options and other purposes, NCR said.

Fourth-quarter earnings increased by $20.4 million, 22% over the year-ago quarter. Revenues rose by 6% for the year to $3.7 billion and for the quarter by 7% to $1.06 billion, according to the company.

NCR President and Chief Executive Officer Charles E. Exley Jr. said incoming orders were up substantially for the year and the fourth quarter across the company's major product lines. Profits in the last quarter benefited from "effective control of costs, expenses and asset levels."

With the company just entered into its century year, Exley said NCR is beginning 1984 "in the strongest financial position in recent company interest." Liquid assets and internally generated funds will allow the company to finance development programs readily, he added.

Burroughs last week reported that 1983 earnings increased to $197 million or $4.60 per share. The earnings, which included fourth-quarter profits of $81.4 million providing $1.81 per share, jumped from

See NCR page 92

Micro watchers say Apple's Little Mac could bring out the worst in IBM and others/93

As remote computing's fortunes decline, Boeing seeks more fertile fields/86

INSIDE

- Ad hoc industry group bending ears in Washington in fight for favorable tax treatment/82
- Study group advising Reagan on ways to defuse labor-business friction/85
- Microsoft was number one in 1983, but look out for Lotus in '84/86

A Way to Keep Computers on the Right Track

John Beall & Company, Inc.

Industry gets a voice in tax reform debate

By John Gallese
CW Washington Bureau

WASHINGTON, D.C. — Mindful that 1984, an election year, will see much talk about tax reform but very little action, the Ad Hoc Electronics Tax Group has entered the debate with recommendations for a united industry push for more favorable tax treatment, an effort the panel hopes will bear fruit in the coming years.

At a Jan. 18 press conference here, members of the group, which represents 20 leading electronics industry firms, including Control Data Corp., Data General Corp., Digital Equipment Corp., Harris Corp., Hewlett-Packard Co., Honeywell, Inc., IBM, NCR Corp. and Sperry Corp., presented its report to five industry associations [CW, Jan. 23].

Among the recommendations submitted to the associations for consideration and support were:

- A permanent research and development tax credit and extension of the 1981 law that instituted the credit to cover depreciation on R&D equipment.
- Extension of recent, favorable equipment-investment tax incentives to the more short-lived equipment common to high-technology electronics companies.
- More favorable tax treatment for industry foreign income and employee equity participation programs and amended foreign tax-credit provisions.
- A value-added tax as the mechanism for whatever additional revenues Congress decides are necessary to balance the national budget.

Robert Kirkwood, HP director of government affairs and chairman of the ad hoc panel, said he expects the associations may differ in what recommendations, if any, they decide to support. The report was praised by the American Electronics Association, the Computer and Business Equipment Manufacturers Association, the Electronics Industries Association, the Scientific Apparatus Makers Association and the Semiconductor Industry Association.

Kirkwood said the year-long study effort was necessary because the many pieces of legislation to assist high-technology firms are stalled in Congress. He said the industry realized it must develop a consensus on tax reform before these and related proposals come up for serious congressional consideration.

Kirkwood suggested the report could become a blueprint for a candidate's efforts to solicit support from high-technology industries. For instance, he said, if a candidate does not support permanency of the 1981 R&D tax credit, it would be "a telltale sign" that he is not supportive of high technology.

The recommendations are especially suited for the electronics industry, according to Emil Sunley, director of tax analysis for Deloitte Haskins & Sells, which provided economics advice to the ad hoc group. Sunley noted that high-technology firms pay higher taxes than other industries. He cited statistics showing the 1982 effective tax on U.S. income was 26.5% for computer and office equipment firms and 23% for firms in the instrument industry. This compared, he said, to an overall corporate effective tax rate of 16.1%.

In general, Sunley said the electronics industry does not benefit from the "incentive structure" of the current tax code, which he said is aimed at manufacturing firms that are heavily debt-financed, rely on long-lived equipment and concentrate on domestic operations.

Electronics firms, with their need for large sources of capital, large R&D expenditures, quickly obsolete equipment and international scope of operations, are under a disadvantage in current tax law, he said.

NCR from page 81

1982 full-year earnings of $117.6 million and $2.80 per share.

The company reported 1983 revenues of $4.38 billion, up 5% over 1982, while fourth-quarter revenues grew by a record 17% to $1.3 billion compared with the same period a year ago.

Chairman W. Michael Blumenthal said, "The strong order trends are a confirmation that our investments in research and development, service and support, and product quality are being recognized in the marketplace."

Blumenthal cited the B7900 and B4900 mainframes, Memorex 3680 thin-film disks and terminal products as new items that were "well received."

FOR THREE DAYS IN TEXAS WILL TURN

No single computer, personal or otherwise, has so profoundly affected all of business and industry as the IBM Personal Computer.

And now, for three days only, you can see, touch, use and compare the hardware, software, peripherals and compatibles that run on, like or with this revolutionary machine. It's the PC *World Exposition* in Houston, and you are invited to join us.

You'll see hundreds of exhibits from all the product leaders. Both makers and marketers of hardware, software, printers, peripherals, add-ons and services in a giant exhibition and retail selling event. Here's a list of some of the product leaders you'll see:

Alpha Software Corp.
Anadex Inc.
Arbor Technology
Ashton-Tate
AST Research Inc.
Benchmark
BOS National Inc.
BPI Systems Inc.
Robert J. Brady Company
Braid Communications
Brown Disc Manufacturing
Business Computing
CDI
Celestial Software Inc.
Cermetek Microelectronics
Compaq Computer
Computercraft
Computer Intelligence
ComputerKnowledge Corp.
Computer Roomers
Computerworld
Computex Corporation
Contemporary ComputerWear
Corona Data Systems
Corvus
CPU Corporation
Creative Computer Products
Data Business Vision
Datamac
Data Storage Solutions
Data Translation Inc.
Decision Data Computer Corporation
Digital Communications Associates
Discortex Corp.
Distributed Logic Corp.
Dynax Distributors
Emulex Corporation
ENVAX Systems Inc.
ESC Technologies, Inc.
Everex Systems Inc.
Ferox Microsystems
Hayden Book Co. Inc.
Hewlett-Packard Company
Human Edge Software Corp.
I.B. Magazette
Independent Computer Consultants Associates
Information Builders
Infotunner
InfoWorld
Interface Inc.
International Computerized Linguistics
Interphase Corporation
Lexisoft Inc.
LPKF Pacific
Marc Software
MICRO MARKETWORLD
Micro-Design Inc.
Micro Line Inc.
Microtek Lab
National Instruments
NEC
Novation
Omega Software Inc.
Omni Graphics Inc.
On Trak Data Systems
OSM Computer Corp.
Palantir Software
Panamax Line Conditioning
P.C. Telemart
PC World
Perscept Inc.
Personal CAD Systems
Petroware
Phase Information Machines
Prentice Hall Business & Professional Division
Printronix Inc.
Que Corporation
Racal-Vadic
Roland DG
RTCS/Real Time Computer Science Corp.
Santa Clara Systems
Seequa
Sensor-Based Systems
Software Automation Inc.
Software Centre International
Software Solutions Inc.
Sorbus Service Division MAI
Sperry Corp.
Summagraphics Corporation
SWI International Systems
Sysprint Inc.
Systems Management Associates
Tall Grass Technology
TCS Software
Televideo Systems Inc.
3M Data Recording Products
Thunderhawk Corporation
Toshiba America Inc.
United Networking Systems Inc.
Vectrix Corp.
Verbatim Corporation
Vertex Systems
ZEDUCOMP

(Exhibitors as of Dec. 15, 1983)

COMPUTER INDUSTRY

Macintosh debut seen testing micro rivals

By Robert Batt
CW West Coast Bureau

SAN FRANCISCO — The anticipated long-term success of Apple Computer, Inc.'s newly launched Macintosh personal computer [CW, Jan. 23] has led some industry observers to speculate about the impact on the company's microcomputer rivals, most notably IBM and AT&T.

Mike Murphy, partner in the investment analysis firm of Venture Capital Management, Inc. and coauthor of the California Technology Stock Letter, believes the introduction of the Macintosh will reveal weaknesses in IBM's Personal Computer product line.

"With Apple gearing up for an annual production of 600,000 Macintoshes, the new product will reveal a flat spot in demand for IBM's [Personal Computer], and the shortage of IBM machines will end. This will help dispel the mystique in the marketplace about the [Personal Computer] and will cause headaches for both IBM and IBM look-alike products," he asserted.

Greg Kelsey, investment analyst at Hambrecht & Quist, maintained that the Macintosh, which is expected to add up to 40% more to Apple's current revenues of almost $1 billion, will also give Apple added status among its dealer network.

IBM's increasingly successful attempts to sell the Personal Computer through its direct sales force have left many distributors anxious about their future partnership with Big Blue, he said.

Apple, on the other hand, intends to use its strength in the dealer network to promote its new product offerings, and the company claims the Macintosh will be sold by all 1,500 of its accredited dealers in North America, plus 1,500 dealers overseas.

Industry experts also expect the Macintosh to affect purchasing decisions in medium- and large-scale corporations and slow down the acquisition of IBM Personal Computers.

The data processing manager, Murphy asserted, will want to take a close look at Apple's new product line before buying further quantities of IBM Personal Computers.

Murphy claimed the Macintosh will force IBM to head user complaints that programs are running too slowly on the Personal Computer and will encourage Big Blue to come out with a new version with an upgraded chip — a variant of Intel Corp.'s powerful new 80186 — by the fall of this year.

Murphy predicted that IBM will ask semiconductor manufacturer Intel to design a proprietary chip for the Personal Computer that will put independent software developers in the delicate position of having to choose between supporting IBM microcomputers or go to its competitors such as Apple.

This view was reinforced by Ken Lim, personal computer industry analyst at Dataquest, Inc., a San Jose, Calif.-based market research firm. "IBM is not going to leave the [Personal Computer] architecture as open as it currently is for too much longer," he attested.

According to industry pundits, the other company most likely to be affected by a successful Macintosh drive will be AT&T, owner of the rapidly rising Unix operating system.

Murphy claimed there is a strong possibility that AT&T will be interested in acquiring Macintosh on an OEM basis for the purpose of running Unix on the new machine.

"If AT&T comes out with a multiuser microcomputer system, it makes good technological and business sense for them to sign an OEM agreement with Apple in order to develop a single-user system as well," he suggested.

In the event of such a scenario, Murphy added, personal computer users will be confronted with three different standards — an IBM standard, a Unix-based standard from AT&T and an Apple 32-bit standard.

FEBRUARY, ALL EYES IN TO THE IBM PC.

Plus, we'll present personal computer experts from around the nation in an up-to-the-minute conference program. You'll learn how to choose and how to use the technology and equipment surrounding the PC family of microcomputers. Here's a partial listing of the conference sessions:

Wednesday, February 1, 1984
User Sessions:
The Benefits of the IBM PC for Small Businesses
Financing Options and Tax Advantages Available Add-Ons and Peripherals
Software: What's Available and How to Find It
What Do the Compatibles Have To Offer?
How I Became Compatible With My IBM PC
Medical/Dental Applications for the PC
The PC in the Law Office
PC's and Real Estate
Manufacturing Resource Planning with the PC
Investment Software for the PC
CPA Software: The Bottom Line
Software for Insurance Applications
Distributed Control Software for the PC

Thursday, February 2, 1984
User Sessions:
The Anatomy of the IBM PC
Defining Levels of Compatibility Between Systems
Overview of Compatibles: Desktops and Portables
Word Processing Software
Database Management Software
Business Graphics Software
Analyzing Your Software Requirements
Overview of Major Business Applications Software
Integrated Software Solutions

Friday, February 3, 1984
User Sessions: The PC in the Corporate Environment
Review of Policy and Planning Issues
Implementation Strategies
Use of PC to Mainframe Communications (Includes Security Issues)
Local Networking for the PC

Quite simply, the PC *World Exposition* is the biggest event in Texas for the most important computer in history.
Don't miss it.

FREE ADMISSION to one Conference Session of your choice. Just present this coupon at the Registration Desk any day of the Show, pay the regular $10 exhibits only admission and choose any one Conference Session free of charge. One coupon per person.

The PC World Exposition
Houston
February 1-3, 1984, Astro Hall

PC WORLD EXPOSITION

SAVE $5.00 on Full Exhibit & Conference Admission. Present this coupon at the Registration Desk and pay just $25.00 for a Conference Pass entitling you to attend all Conference Sessions and three days of exhibits. One person per coupon.

IT'S WHAT THE WORLD IS COMING TO.

The PC *World Exposition* is produced by Mitch Hall Associates in cooperation with CW Communications, Inc., publishers of PC World, MICRO MARKETWORLD, InfoWorld, and Computerworld.

Three-day admission to all exhibits and conference sessions is $30.00. Admission to the exhibits only for three days is $10.00. Show hours are from 10:00 AM to 5:00 PM Wednesday and Thursday, February 1 and 2, and from 10:00 AM to 3:30 PM on Friday, February 3. Conference sessions run from 8:30 – 10:30 AM and 2:30 – 5:30 PM on all three days.
For attendee and conference information, call CW Communications at 1-800-225-4698.
For information on exhibiting, call Mitch Hall Associates at 1-617-329-7400.

® supplier manufacturer's registered trademark.
™ supplier manufacturer's trademark.

Big Eight firm buys Macintosh

NEW YORK — Peat Marwick, the international accounting firm, has bought 2,500 Apple Computer, Inc. Macintosh microcomputers introduced just last week.

The computers and peripheral equipment will cost Peat Marwick $7.5 million and reportedly will be used with the accounting firm's proprietary software — Systems Evaluation Approach Computerized Audit Supports (Seacas) — beginning after the April delivery of the micros.

Peat Marwick partner in charge of auditing, John D. Collins, said the Macintosh could "dramatically reduce" the projected five-year estimate for realization of Seacas' full potential. The Macintoshes will be used by Peat Marwick's 7,000 auditors for communications, analysis and modeling.

IT'S HERE.

The local area network solution from AT&T: DATAKIT VCS.

Now dissimilar computers and terminals can exchange information with low delay and high reliability. With the WESTERN ELECTRIC® DATAKIT™ Virtual Circuit Switch (VCS) from AT&T.

DATAKIT VCS is based on a "kit" of compatible hardware modules that can help create a highly efficient local area network. Then easily expand to link local area networks into wide area networks.

Part of an integrated family of data networking products designed to enhance your data communications capabilities, DATAKIT VCS will improve productivity and cut costs by eliminating the need for special interfaces.

AT&T

Its leading-edge modular architecture, developed and proven reliable at AT&T Bell Laboratories, offers unparalleled flexibility for future growth. Within AT&T, DATAKIT VCS is already serving business needs. There are 25 DATAKIT VCS hubs connecting 600 terminals and 50 host computers. A network that will triple in size this year to service 11 locations in four states.

DATAKIT VCS: the local area network solution from AT&T. It could be working for you right now.

©1984 AT&T Technologies Inc.

COMPUTER INDUSTRY

Group to advise Reagan on industrial policy

By John Gantz
CW Washington Bureau

WASHINGTON, D.C. — A primarily Democratic study group of labor, industry and former government leaders this month recommended a coalition of their three sectors to advise the president on industrial policy matters.

The Industry Policy Study Group worked for a year to develop ways to defuse what it sees as a growing adversarial relationship between business and labor as the country moves away from reliance on traditional manufacturing and toward a more service-oriented, high-technology economy.

Chief among its recommendations is an Industrial Development Board, representing government, business and labor, to advise the president and develop "cooperative strategies to promote industrial growth." The board would allow consultation with industry and labor groups and make sure the government does not work against private sector efforts, the study group said.

The board would be supported by an Industrial Finance Administration, initially controlling $5 billion, that would provide loans, guarantees and other support on a 50:50 basis for private programs to advance U.S. industrial competitiveness. The finance group would implement the president's program and not act as an independent financial organization.

R&D urged

In addition, the panel called for an expanded commitment to technological research and development. "One of the first subjects on the board's agenda should be to consider expanding federal assistance for research and development," possibly through a new, separate agency, "with greater attention to manufacturing processes and commercial applications," the study group said.

The group said U.S. industry has developed a strong "knowledge and research capacity" but has in some cases underinvested in development of marketable products and processes. The U.S. may also want, as other countries have decided, to increase "support for and coordination of industrial R&D as a central element of programs designed to promote particular high-technology industries," the panel's report said.

The panel was put together by the Center for National Policy, a research organization chaired by former Secretary of State Cyrus Vance, which is made up primarily of prominent Democrats. The panel included W. Michael Blumenthal, chairman, Burroughs Corp.; Morton H. Meyerson, president, Electronic Data Systems Corp.; Senators Bill Bradley (D-N.J.) and Edward M. Kennedy (D-Mass.); Glenn Watts, president, Communications Workers of America; and other leaders.

At a press conference this month, Irving S. Shapiro, former chairman of E. I. du Pont de Nemours and Co., said the traditional adversarial relationship between major economic sectors in this country is impeding industrial development in the U.S., particularly where this country competes with foreign nations that have strong government-supported industrial policy mechanisms.

But, he said, "We offer no industrial policies today." Rather, he said, the panel was recommending a process to facilitate a sensible and cooperative approach to solving problems of trade, business development and employment.

Lane Kirkland, president of the AFL-CIO, said organized labor has a large stake in the development of U.S. industrial policy because labor pension funds, now representing approximately $700 billion to $800 billion, constitute the largest and most rapidly growing source of capital formation in this country.

Workers should be able to ensure that these funds are used for "constructive and productive" uses that will make this country more competitive internationally, and not spent primarily to finance corporate mergers and other purposes, which, he said, "do not enhance the domestic economy or the employment prospects of working people."

The panel's report comes as Democrats and Republicans have begun lining up their respective industrial policies as the campaigns for the upcoming general election go full force. Both parties have recommendations for cooperative development of industrial policies. However, the Republicans have steadfastly refused to consider any government financial agency to implement industrial policy.

Boeing Computer to enter net services mart

NEW YORK — After withstanding a year of 7% growth while the rest of the computer industry boomed, Boeing Computer Services Co. (BCS) has decided to expand business beyond its original time-sharing base. At a press conference here earlier this month, Robert L. Dryden, BCS president, said the company is entering the commercial information networking services market.

The $800 million Bellevue, Wash.-based unit of the Boeing Co. thus becomes the second time-sharing firm this year to announce a new business direction as a vehicle to expand without depending so heavily on remote computing, a slice of the industry which stagnated last year. Earlier this month, Comshare, Inc., an Ann Arbor, Mich.-based time-sharing company, trumpeted a "complementary marketing pact" with IBM on its System W decision support system software (CW, Jan. 9).

Time-sharing firms "will fail unless they meet the challenges of the changing marketplace," Dryden said in prepared remarks delivered to reporters and analysts here. The new moves, he said, were designed to put the company back on a faster, 20%-plus growth track.

In a series of announcements, Dryden said BCS will this year:

- Begin to offer end-to-end networking capabilities for customers that already have data processing equipment installed. The Boeing commercial network will provide host-to-host and terminal-to-host communications no matter what the brand name on the host computer or interactive terminals, Dryden said.
- Initiate sales of its Systems Network Architecture (SNA) services to the merchant market. First-time SNA users may buy into Boeing's network, while users with an SNA network of their own may connect up to Boeing's in order to gain access to the firm's remote computing services.
- Begin to deliver remote computing services to large-scale data centers on a fixed-price and fixed-resource basis. However, John Spencer, marketing director, said BCS had yet to settle on a fixed-price schedule.
- Begin consulting with companies in search of an "integrated solution to their office information system problems," Dryden said, adding that Boeing would guide its consulting clients "without allegiance to a particular hardware product." The new services include requirement definition, systems analysis, design, integration and implementation.

Dryden also announced the formation of a software and education products group. The marketing organization will peddle Boeing-developed software used in office integration and information centers and for manufacturing and engineering as well as productivity tools for DP workers and education, he said.

Capping his announcements, Dryden told reporters that BCS had captured an $18.6 million contract to build an X.25 communications net for the commonwealth of Pennsylvania.

TIME
Your Most Precious Resource

In any business, time is money! This is especially true when dealing with Data Communication Networks where system performance and RESPONSE TIME is critical to the user.

Degradation of system performance (responsiveness) is inevitable as customer work loads increase. Installing faster, more sophisticated hardware is a popular but temporary solution. It is only a matter of time until the problem reappears.

Questronics offers a solution through statistical performance analysis of your system. Over seventy-five categories of line utilization and response time information can be generated in eleven different reports (hard copy and/or data based).

Questronics model CPA/7 is setting the standard in the industry by providing vital performance statistics in the areas of:

- User/System Response Time
- Line Utilization
- Character Transmission Counts
- Transmission Errors
- Host Resident Time
- Network Transmission Time
- Polling Counts
- Poll List Wrap Time
- Histograms
- Alarm Conditions

Utilizing this information, DataCom managers can then make the crucial decisions necessary to fine tune and balance the network. Each line may also be further refined to greater efficiency, enabling planning and projection for new growth.

Call Questronics and discuss your situation. We'll give you straight answers.

Answers through Analysis
QUESTRONICS INC.
3595 South West Temple, #5 • Salt Lake City, Utah 84115 • (801) 262-0923 • TWX 910-925-4000

Apple reports 75% profits drop

CUPERTINO, Calif. — On the eve of its big Macintosh announcement last Monday, Apple Computer, Inc. announced quarterly financial results that showed a nose dive in profits despite a 48% gain in sales.

As expected, profits dropped 76% to $5.6 million, or 10 cents per share, compared with $23.5 million, or 40 cents per share, the same period a year ago. The profit line included $2.5 million gained from the settlement of a patent infringement suit brought against Franklin Computer Corp., in which Franklin also agreed not to infringe on Apple's copyrights.

Sales in the quarter swelled to $316 million compared with $214 million the first quarter a year ago. The company also closed the quarter with nearly $188 million in cash.

Most apparent from the results were the increases in research and development (78%), marketing (89%) and cost of sales (85%), each of which grew twice as fast as the growth in sales volume. Stepped-up spending in these areas were required to meet the market challenges and increasing competition in the small systems area, the company had said previously.

John Sculley, president and chief executive officer, said the company experienced record sales of 100,000 units of its Apple IIe, which at the same time suffered from downward price pressure. Profits continued to be adversely affected by "significant increases in . . . expenses and decisions related to our product strategy and organization consolidation," Sculley said.

COMPUTER INDUSTRY

Prime's earnings dip; DEC's rise

Prime Computer, Inc. announced last week that its 1983 profits dropped more than 27% from the year-earlier figures, while the leading minicomputer vendor, Digital Equipment Corp., as expected, reported second-quarter earnings were up 32%, a vast improvement over its disappointing first-quarter losses.

Joe M. Henson, president and chief executive officer of Prime, said his company in the fourth quarter ended Dec. 31 showed "substantial progress from the third quarter in terms of revenue growth, profitability and management of expenses."

Fourth-quarter profits, however, lagged behind year-earlier reports by more than $12.1 million. For the year, the company showed a profit of $32.5 million, or 68 cents per share, compared to fiscal 1982 profits of $44.9 million, or 90 cents per share.

Revenues at Prime for the fourth quarter of 1983 and the entire year were substantially ahead of the previous year's revenues. For the quarter, revenues increased $24.5 million to $142.8 million; for the year, revenues grew almost $80 million to $516 million. Henson cited those revenue figures and accelerating orders as evidence the company is positioned "to benefit from an improved economy."

DEC, following its preliminary report a week earlier [CW, Jan. 23], reported profits for the second quarter ended Dec. 31 were up $30.5 million over year-earlier figures to $80.4 million, or $1.41 per share, with revenues increasing 40% over the same period from $1.01 billion to $1.4 billion. Profits for the first six months of the current fiscal year still lagged $21 million behind the first six months of the previous year as a result of the poor first quarter.

The company said it experienced a sharp increase in shipments and orders for personal computers, as well as strong demand for its VAX-11/730, VAX-11/750, Micro PDP-11 computers and office products.

Leasing firm targets SNA

RALEIGH, N.C. — SNA-COM Associates, Inc. is a newly formed leasing and consulting company specializing in products that operate under IBM's Systems Network Architecture (SNA). The founder and president, David R. McCormick, spent 32 years with IBM before starting SNA-COM Associates.

The company will focus on communication controllers (3705, 3725), clustered controllers (3274, 3600, 4700, 8100), terminals (3178, 329X, 360X, 470X), workstations, Personal Computers, Displaywriters, modems and protocol converters.

It will also offer consulting for network growth in non-SNA protocols, migration aids and voice/data local-area network relationships. Technical assistance will be available for backup, reconfiguration and recovery.

SNA-COM, 1001 Navaho Drive, Raleigh, N.C. 27609.

VAX® USERS!
NOW GET SPREADSHEET AND GRAPHICS IN ONE PACKAGE.
• Full business graphics • Advanced features • Affordable price
GRAPHIC OUTLOOK™
from STONE MOUNTAIN COMPUTING
1096 Cambridge Dr.
Santa Barbara, CA 93111 (805) 964-9101
VAX is a trademark of Digital Equipment Corporation

Can you print 300 pages of data at your Remote site...In 5 minutes?

Yes, Paradyne's NEW 8360 Remote Page Printer Prints as fast as a Page a Second. Paradyne introduces high speed, non-impact remote printing — from one location to any other — at speeds up to 60 pages a minute, depending on line speed and data density.

No Host Remote Teleprocessing Software is Required. Communications requirements are handled through PIXNET®, Paradyne's communication system, and the page printer will operate without any changes to your existing applications programs.

With the 8360 your remote operators have the same functional capabilities as the data center operator. And the 8360 has the same capabilities as the system printer in your computer room.

Uses Standard 8½" x 11" copy paper.

Compact in Size, Highly Reliable and Easy to Use. The 8360 is easy to install and it runs cool — all day long. You'll have a high quality printer designed to blend into your office environment with an operation that's so quiet your operator may have to check to see if it's finished printing.

A Price Breakthrough. Now, Paradyne offers your remotely located offices and plants the convenience of high quality, high speed printing...at a price that's a breakthrough in the industry. Call 1-800-482-3333 and we'll tell you why. Plus, we'll give you the location of the Paradyne sales office nearest to you.

Meeting the Communications Challenge of the 80's

paradyne

Paradyne Corporation P.O. Box 1347
8550 Ulmerton Road, Largo, FL 33540

Senate export bill debate renews controversy

By John Gantz
CW Washington Bureau

WASHINGTON, D.C. — The 98th Congress returned for its second session last week expecting renewed debate over high-technology export controls, a controversial topic that has heated up dramatically in the two months since Congress adjourned.

Before Congress adjourned last year, the House had passed an updated version of the Export Administration Act, which governs export licensing. The House bill was fairly moderate and had been endorsed by industry. But the Senate had not finished action on its version of the legislation, and export licensing is currently handled under an interim extension of the older export control law.

Certain factions within the Reagan administration, particularly in the Treasury and Defense Departments, have been pushing for stricter licensing procedures. It was expected that this battle, whose outcome is still unsure, would be fought during the upcoming Senate deliberations. But the outlook for Senate adoption of the moderate approach has dimmed considerably.

The recent highly publicized seizure of American-made computers illegally destined for the Soviet Union [CW, Nov. 21, 28] has strengthened the position of export control hardliners. The Commerce Department is now proposing tightening standards for obtaining a single export license for multiple sales of certain high-technology products.

The Commerce proposals have been in the works for about a year, but coming just as Congress starts its final debate on the export bill, they have provoked strong reaction from high-technology industries.

Computer and Business Equipment Manufacturers Association (Cbema) President Vico E. Henriques, for example, issued a statement decrying the administration's effort to link the computer equipment seizure with the export bill renewal. "The administration argument is that the current licensing procedure is too lax, allowing high-tech companies to ship sensitive equipment to our enemies," he said.

Henriques continued: "The argument that the [Export Administration Act] needs more review layers is incorrect. So is the implication that the high-tech industry is trying to weaken safeguards against shipments of critical goods and technologies to America's enemies."

He argued that stricter license review practices "would not necessarily have prevented the attempted diversion" of computer equipment to the Soviet Union. "U.S. industry and government can't afford to waste time, money and manpower in a meaningless exercise in paper-shuffling. Government needs to devote its resources to enforcement so that those who try to divert high-tech exports to our enemies are caught and prosecuted," Henriques said.

Airline to ship DP equipment

NEW YORK — A service specializing in air transport of sensitive computer equipment has been announced by Sureway Air Traffic Corp.

Computer Express was designed to meet the specialized transport needs of hardware and software manufacturers and other users who move equipment sensitive to jarring, temperature and changes in humidity and magnetic field.

Randy Catlin, vice-president of Sureway, said, "In the 20 years we've been in business, we've never had as many requests as in the last two years for personalized, individually tailored transport in the computer industry."

Sureway, 36-14 33rd St., Long Island City, New York 11106.

Inman to chair ATP group

WASHINGTON, D.C. — Adm. Bobby Inman (USN Ret.) last week was named chairman of the Alliance for Telephone Progress (ATP), a group of companies and trade associations recently formed to amend telephone access charge legislation now pending in the U.S. Senate [CW, Jan. 16].

Inman, deputy director of the Central Intelligence Agency from 1981 to 1982 and director of the National Security Agency from 1977 to 1981, is chairman and chief executive officer of Microelectronics and Computer Technology Corp. in Austin, Texas.

Members of ATP reportedly represent more than one-half of all business phone usage in the U.S.

COMPUTER INDUSTRY

Study views software mart
Microsoft seen top independent

DALLAS — Microsoft, Inc. has begun 1984 as the largest independent personal computer software publisher. And the three largest publishers of software for office personal computers are also the leading personal computer manufacturers — IBM, Radio Shack and Apple Computer, Inc. — according to the recently released "Office Personal Computer Software Market Report" by Future Computing, Inc.

IBM and Radio Shack each sold between $110 million and $130 million in software for office personal computers in 1983, while Apple totaled more than $65 million. Meanwhile, Microsoft jumped ahead of Visicorp in independent vendor sales, posting software sales of more than $65 million, while Visicorp recorded between $50 million and $55 million in sales last year.

The 300-page report estimated the total value of software sold for office personal computers will climb from the 1983 level of $1.4 billion to $6.7 billion by 1988.

Top-selling spreadsheet

The report also asserted that Lotus Development Corp., a relative newcomer, sold between $45 million and $50 million of its 1-2-3 spreadsheet software, with sales exceeding 20,000 units per month, making it the top-selling spreadsheet program. units per month and sold over 600,000 copies in 1983, making it the most widely used spreadsheet program.

In addition, the report said Micropro International Corp.'s Wordstar word processing package is selling at more than 15,000 units per month, slightly ahead of Apple's Apple Writer. Future Computing estimated that 300,000 to 350,000 copies of both packages are now in use, not counting those units bundled with personal computer hardware.

Ashton-Tate's Dbase II and Software Publishing, Inc.'s PFS File are the most popular data base programs, the study reported, with Ashton-Tate's revenues around $35 million to $40 million in 1983, a dramatic increase over the 1982 $7 million to $8 million level.

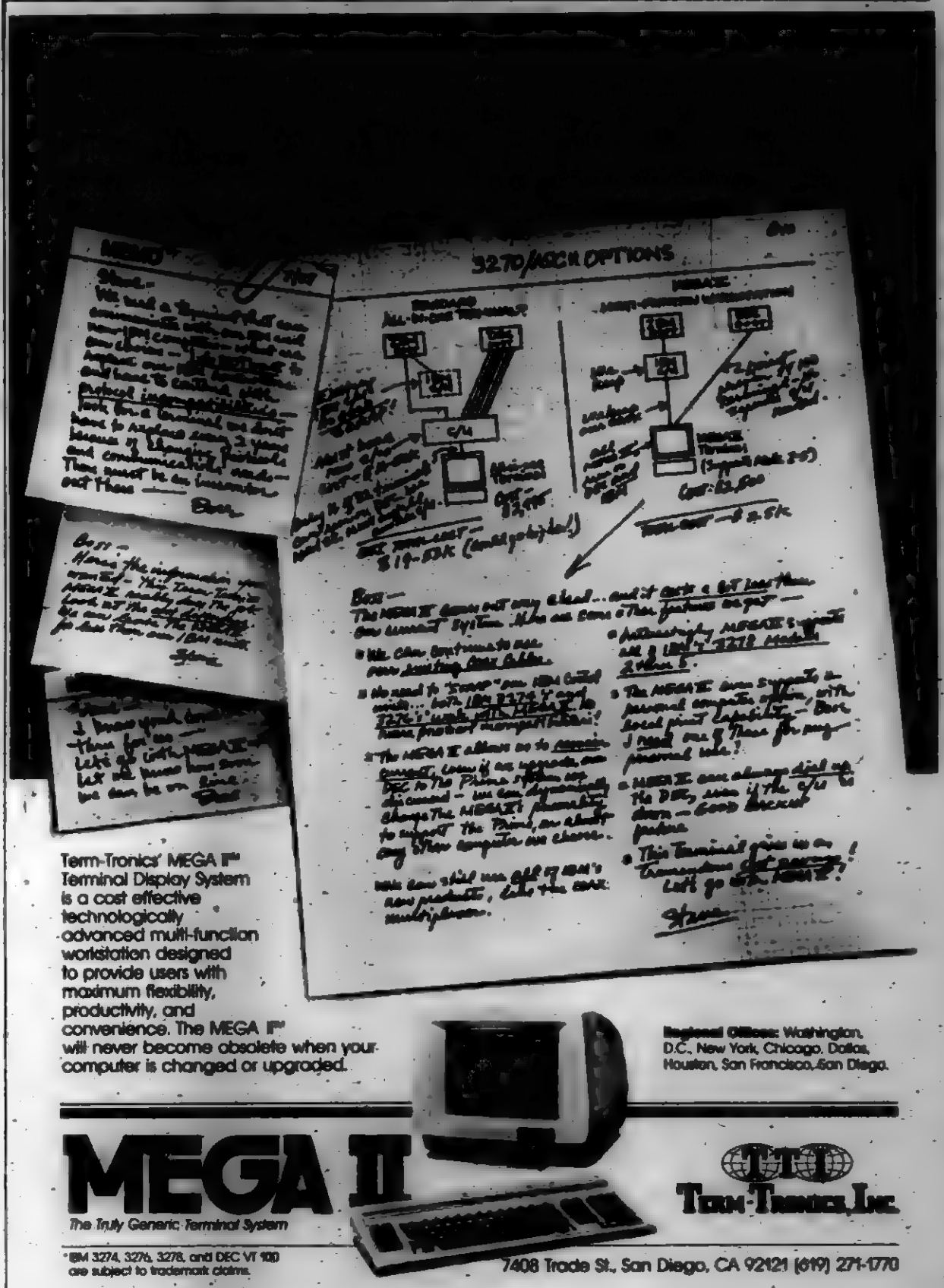
The market for accounting software, the report continued, reached nearly $300 million for office personal computers last year, up from the $150 million to $170 million level in 1982. The report also indicated that the market for Apple II and Apple II-compatible software will grow to over $800 million over the next three years from a current level of $330 million.

The IBM Personal Computer and Personal Computer-compatible software market, the report added, will grow at more than 60% a year on average over the next five years, from $500 million in 1983 to $6.3 billion by 1988. Big Blue, the report contended, will retain less than 20% of the market for this software by 1988, with third-party software firms accounting for the rest.

"The Office Personal Computer Software Market Report" is available for $3,000.

Future Computing, 900 Canyon Creek Center, Richardson, Texas 75080.

'It's called 'cheap-net'!



Term-Tronics' MEGA II™ Terminal Display System is a cost effective technologically advanced multi-function workstation designed to provide users with maximum flexibility, productivity, and convenience. The MEGA II™ will never become obsolete when your computer is changed or upgraded.

Regional Offices: Washington, D.C., New York, Chicago, Dallas, Houston, San Francisco/San Diego.

MEGA II
The Truly Generic Terminal System

TTI Term-Tronics, Inc.

*IBM 3274, 3276, 3278, and DEC VT 100 are subject to trademark claims.

7408 Trade St., San Diego, CA 92121 (619) 271-1770

COMPUTER INDUSTRY

NICKELS & DIMES

Honeywell, Inc. has authorized a 2-for-1 stock split in the form of a stock dividend, with additional shares to be issued on or about Feb. 6 to shareholders of record Jan. 6.

■

Bolt, Beranek & Newman, Inc. has filed a registration statement with the Securities and Exchange Commission covering a public offering of up to 927,500 shares of common stock. The underwriting group will be led by Merrill Lynch Capital Markets.

Monolith-Weber Corp. has announced revenues of $5.6 million and a net loss of $112,000, or 3 cents per share, for the three months ended Nov. 30, compared with revenues of $5.5 million and earnings of $296,000, or 8 cents per share, for the comparable period last year.

■

Ask Computer Systems, Inc. has reported earnings of $1.9 million, or 16 cents per share, for the second quarter of fiscal 1984, ended Dec. 31, a 127% increase over second-quarter fiscal 1983 earnings of $841,000, or 8 cents per share. Revenues increased 75% to $15.1 million from $8.7 million for the same period last year.

■

Computer Sciences Corp. reported a 9% profit increase on 2% lower revenues for the third quarter ended Dec. 31. Net earnings were $4.2 million, or 30 cents per share, compared with $3.9 million, or 28 cents per share, a year ago. Revenues were $168.5 million for the period, compared with $172.3 million for last year.

■

Seagate Technology, Inc. has reported a 351% increase in revenues and a 370% increase in net income for the second quarter ended Dec. 31, compared with the same period last year. Revenues were $91.7 million, up from $20.3 million, and income rose to $9.6 million, or 22 cents per share, from $2 million, or 5 cents per share, a year ago.

■

FCC from page 81

sive capital spending plan in any way.

However, Karen Mulvaney, who tracks MCI for Rothchild Consultants in New York, said the savings could be applied directly to capital spending or advertising costs, putting less pressure on the company to go to money markets or the stock exchange for funds. Mulvaney added that MCI cannot really accelerate its expansion program any more than it has, as "it's growing its network as fast as it can."

But don't be surprised to see MCI give an extra boost to its electronic messenger service, MCI Mail, started last October. Already the service has 80,000 subscribers, with an attainable goal of 200,000 by year's end. MCI would like it to become a money-maker soon, and a little extra investment now might hasten movement into the black.

■

By now most everyone has experienced Apple Computer, Inc.'s thoroughly unique Orwellian television advertisement, the one with the blonde woman heaving a sledge hammer through a megamonitor being viewed by legions of automatons.

The ad, part of Apple's $16 million media blitz, has people scratching their heads about its meaning, especially people who don't work with computers day after day. But it shouldn't leave any doubt about its effectiveness. With one strategic 30-second spot during the Superbowl, Apple became as talked about at water coolers last Monday as the big game itself. Even if you didn't get the gist of the meaning, you certainly came away with the words Apple and Macintosh emblazoned on your mind.

As to the meaning — obvious to some, obscure to many — Orwell's state and its ubiquitous, mind-narrowing messages have been replaced by IBM in the Apple scenario. Macintosh will liberate users from a burgeoning IBM world, giving them a fresh and clearly preferable departure from the offerings of the monolithic blue giant, the message continues.

Comparing Apple's ad with the more mainstream exhortations of IBM, or any other vendor for that matter, is like comparing the Superbowl with the world curling championships. But will it sell computers?

■

What's up, DEC?

That's what a lot of analysts and Digital Equipment Corp. watchers have been asking for the past several months. First the company shocked the industry with its dismal first-quarter results last October, then reshocked most analysts this month in posting record sales and profits that were double most predictions.

While this recent upbeat piece of news from DEC provoked a 10-point spike in its per-share stock value, at the same time it has DEC watchers wondering just what is going on. How could things deteriorate so quickly and unexpectedly in one quarter, then bounce back so resoundingly the next? Just what were those administrative foul-ups to which the company attributed its first-quarter failings? Will the next surprise be a sooner-than-expected high-end VAX announcement?

There is one surprise to be unveiled the first week in February concerning a major thrust by DEC into a new arena, the $2 billion off-site storage and recovery market. We'll have to wait to see what that and other surprise announcements bring from DEC.

HP from page 81

customer feedback reportedly indicates widespread satisfaction with the firm's efforts to keep the 3000 family technologically current.

"Our existing product line doesn't suffer either in price/performance comparisons or in benchmark tests with competing systems already available in the marketplace," the spokesman said.

In other developments during the recent security analysts' meeting, HP Executive Vice-President Paul Ely reportedly declined to discuss the Model 150's projected sales figures for the first two months of this year. But in a move that the spokesman characterized as "highly unusual," Ely did project the company's combined 1984 microcomputer shipments at more than 200,000 units.

The HP 150, HP's first personal computer optimized for business applications, will account for "well over half" of those predicted shipments. Although it was introduced only last September, the HP 150 has already attracted 679 authorized dealers — a higher than expected sign-up total — and will likely gain another 300 or so additional dealerships by mid-year, the spokesman said.

OS/VS Training at Chubb

Job Control Language	**$495**
February 6-8	New Jersey
April 2-4	New York City
June 4-6	New Jersey
MVS Dump Debugging	**$495**
February 13-15	New Jersey
May 7-9	New Jersey
VSAM in COBOL	**$495**
February 27-29	New Jersey
May 14-16	New Jersey
ANS COBOL	**$1200**
March 5-16	New Jersey
OS/370 Assembler	**$1200**
March 19-30	New Jersey

In addition to public offerings, courses are presented in-house and to regional training groups in a consortium format.

For more information, write for your free catalog or call (201) 285-9700.

CHUBB INSTITUTE
9 Sylvan Way
Parsippany, NJ 07054

BECOME A VSAM EXPERT.

SysEd's new 5-day VSAM course will make you a VSAM expert. You'll not only learn how VSAM works, but *how to make it work well*, and what to do if things go wrong. Even if you're already using VSAM, you'll gain a better understanding of its capabilities and flexibility . . . like how to select among the options VSAM offers for configuring data sets, both batch and on-line.

Our hands-on case study instruction begins the very first day. You'll write and test three real-life programs and use Access Method Services on our own 4341 / II computer. There are eight 3270 terminals dedicated to the class. You'll receive individual attention from our experienced teachers, and you'll want to bring your actual programming and debugging problems to class.

SysEd's VSAM course contains the most up-to-the-minute information available anywhere, including the latest features and capabilities of VSAM, and is in line with state-of-the-art hardware.

SysEd courses are held weekly and on weekends at our training centers in New York City, Chicago, San Francisco and Dallas. On-site courses at your own computer installation are also available. *Classes are limited.* For early enrollment or more information call Dave Shapiro (212) 889-3386.

SYS-ED™

ONE PARK AVENUE, NEW YORK, NY 10016 • (212) 889-3386

The Easiest Way To Get Your IBM PC Talking With Your IBM Host Is With A Renex Protocol Convertor

Renex has the best one!

RENEX CORPORATION
(703) 451-2200
TWX 710-831-0237

Renex has the solution.

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 709 FRAMINGHAM, MA 01701

postage will be paid by

CIRCULATION DEPARTMENT

COMPUTERWORLD

375 Cochituate Road, Rte. 30
Box 897
Framingham, MA 01701-9985

Can you answer these questions on local area networks the way you would have two years ago?

1. Is broad *versus* base band still an important issue?
2. Will local area networks and PBXs co-exist, be mutually exclusive or will one be subservient to the other?
3. What role does VLSI technology play in linking peripheral devices to local area networks?
4. What are the standards?

The March issue of *Computerworld On Communications* will give you answers to all the questions above—and much more. You'll get an overview that takes a close look at LAN products and technology and then examines it in the light of competing PBX technology.

You'll get information on linking mainframe computers and local area networks. You'll get an examination of token ring technology. And there's more! You'll get lots of special feature articles on communications topics from "Who the Bell operating companies are buying from" to a profile of Rolm Corporation. Take a look at what some of our other features will cover for you:

- Communications processors.
- R&D in communications companies.
- Fiber optics.
- The low end of the PBX market.
- International record carriers.
- Workstation telephones.
- The future of Centrex.
- Protocol conversion.

Computerworld On Communications is designed to give you in-depth coverage of the broad spectrum of voice, image and data communications from a systems perspective. As a *Computerworld* subscriber, you'll be getting six issues of *Computerworld On Communications* in 1984—as part of your subscription! And if you need to be on the cutting edge of networking technology, you won't want to miss the March 14th issue.

If you've got communications products our readers should know about, then you need to get your ad reservation in by February 3rd. The materials are due one week later on February 10th. To reserve ad space in the March 14th issue of *Computerworld On Communications*, call one of the sales offices listed below, or call Ed Marecki, National Sales Director at 617-879-0700.

To: Ed Marecki, *National Sales Director*
CW Communications/Inc.
Box 880, Dept. A.
Framingham, MA 01701

☐ *Please send me advertising information on* Computerworld On Communications.

☐ *Please have a sales representative call me.*

Name _____
Title _____
Company _____
Address _____
City _____ State _____ Zip _____
Telephone _____

Computerworld
On Communications

SALES OFFICES

BOSTON/Chris Lee, Jayne Donovan, Michael Kelleher, Ron Mastro, Jim McClure, Alice Longley (617) 879-0700
CHICAGO/Art Kossack, Chris Lee, Jean Broderick (312) 827-4433
NEW YORK/Mike Masters, Doug Cheney, Ray Corbin, Joan Daly, Fred LoSapio, Gale M. Paterno (201) 967-1350
ATLANTA/Jeffrey Melnick, Mike Masters (404) 394-0758
SAN FRANCISCO/Bill Healey, Ernie Chamberlain, Theodora Franson, A.G. Germino, Barry Milione, Nicole Boothman (recruitment) (415) 421-7330
LOS ANGELES/Bernie Hockwender, Bob Hubbard, Bill Healey (714) 261-1230

Communications.

How to tie things together today without being tied down tomorrow.

This April, *Computerworld Office Automation* will give you a close look at the world of communications products and services. You'll read about what's out there now and what's coming. And how to get started while leaving your architecture open for the technologies of the future. And you'll get it all from the perspective of end users who have to increase productivity *now* while making sure the their company's investment won't be obsolete in two years.

And that's not all. There'll be feature articles on:

- PBX versus local area networks and how they'll merge
- voice technology
- videoconferencing technology
- satellite technology
- inter and intra company communications strategies
- product evaluations and comparisons

And after we cover all the developments for you, we'll offer you strategies to link them all together into one integrated system.

Computerworld Office Automation is designed to give you OA information geared to the DP/MIS environment — in a way that no traditional office publication can. As one of *Computerworld's* 114,000 subscribers in the U.S, you'll get six issues of *Computerworld Office Automation* in 1984 — as part of your subscription! And if your users need to increase their communications links, you won't want to miss this issue devoted to Communications in the office.

If you've got office automation and office communication products our readers should know about, then you need to get your ad reservation in by March 2nd.To reserve ad space in this April 11th issue of *Computerworld Office Automation*, call one of the sales offices listed below, or Ed Mareski, National Sales Director at 617-879-0700.

To: Ed Mareski, *National Sales Director*
CW Communications/Inc.
Box 880
Framingham, MA 01701

☐ *Please send me advertising information on Computerworld Office Automation.*

☐ *Please have a sales representative call me.*

Name _____

Title _____

Company _____

Address _____

City _____ State _____ Zip _____

Telephone _____ 4/11

Computerworld
OFFICE AUTOMATION

BOSTON/Chris Lee, Jayne Donovan, Michael Kelleher, Ron Mastro, Jim McClure, Alice Longley, *(617) 879-0700*

CHICAGO/Art Kossack, Chris Lee, Jean Broderick, *(312) 827-4433*

NEW YORK/Mike Masters, Doug Cheney, Ray Corbin, Joan Daly, Fred LoSapio, Gale M. Paterno, *(201) 967-1350*

ATLANTA/Jeffrey Melnick, Mike Masters, *(404) 394-0756*

SAN FRANCISCO/Bill Healey, Ernie Chamberlain, Theodora Franson, Barry Milione, Nicole Boothman (recruitment), *(415) 421-7330*

LOS ANGELES/Barnie Hookswender, Bob Hubbard, Bill Healey *(714) 261-1250*

POSITION ANNOUNCEMENTS

Data Processing

SENIOR PROGRAMMER/ ANALYST

MBA GENERAL LEDGER or SHAW LOAN SYSTEM (CL70/IL80)

Relocation to Atlanta

One of the South's leading financial organizations, based in Atlanta, currently seeks a Senior Level Programmer/Analyst to join the Financial Group.

You will participate in major conversion to IBM 3083, including IMS DB/DC applications. To implement this procedure we are seeking 4-5 years programming experience in a large IBM Mainframe, COBOL, Banking Environment, working directly with the SHAW LOAN SYSTEM (CL70/IL80) or MBA GENERAL LEDGER. The "analytical problem solver" we seek will also have had previous experience in an OS/MVS environment with an emphasis on IMS DB/DC, in addition to excellent communications skills and the ability to advance in our progressive operation. Successful candidates will have an opportunity to increase their skills with state-of-the-art hardware and software technology.

Along with an excellent starting salary, we are prepared to offer a comprehensive benefits program, paid overtime and much more. For prompt consideration, please call collect:

Felicia McAleer
(404) 257-6971
or
(404) 636-1000

...or send resume to:

P.O. Box 76948
Atlanta, GA 30358

An Equal Opportunity Employer M/F/H/V

PROGRAMMER

(SOUTHEAST FLORIDA)

MARTIN MEMORIAL HOSPITAL is seeking an Applications Programmer to accept a challenging and rewarding position in our progressive health care setting. The successful applicant will have a minimum of 2 years experience with the following: IBM 4341 DOS/VSE, CICS/VS command level, COBOL, VSAM and ICCF. DL1 and health care industry background is a plus.

We are located on the East Coast of Florida, 40 miles North of the Palm Beaches within easy driving distance of Miami and Orlando areas. Interview expenses will be paid. Please send resume and salary history in confidence to:

Professional Recruiter
MARTIN MEMORIAL HOSPITAL
P.O. Box 2286
Stuart, FL 33495

Equal Opportunity Employer M/F

Accountemps puts the pro in edp PROductivity.

There's no longer a reason for data processing work to fall behind—Accountemps professionals are available on a moment's notice. Specialists in systems analysis, programming, computer operations, data entry and even word processing.

Accountemps specialists are the ideal solution when work starts to pile up—when employees are sick or on vacation—or when specific projects must be completed quickly and cost effectively. And because they're slightly over-qualified, they need little or no orientation. They get right to work and finish the job right the first time—and quickly too.

A call to any one of 80 offices in the United States, Canada and Great Britain will bring you the help you need immediately—for a day, a week, a month or longer—whenever you need them—evenings or weekends.

accountemps.
Rent an Expert...

© 1984 Robert Half International Inc. All offices independently owned and operated

Arizona/California/Texas/Colorado/Florida/Boston
SCIENTIFIC OR BUSINESS PROGRAMMERS
All fees and relocation paid. $20-40,000

If you have a BSEE, BSCS, BS in Mathematics or Physics or equivalent, we need you right now.
For Business: OS/DOS/IMS/CICS/MVS/JES Prog/Anal/Systems/Data Base. All large scale installations.
For Scientific: experience in the computer, communications, semiconductor, or aerospace/defense industries.
Your name, resume, and present employer will not be given out without your permission.
For sincere personal service, please send a confidential resume to:
Dan Pullman (602) 274-5666
PULLMAN PERSONNEL
3839 North Central Ave., Suite 506, Phoenix, Arizona 85012

SYSTEMS DEVELOPMENT

Extremely challenging positions emphasizing skills with IBM MVS COBOL and complete system life cycle experience. These opportunities represent the leading edge of sophisticated technologies with companies that anticipate growth and reward for performance.

Our clients have the most CHALLENGING and GROWTH ORIENTED career opportunities CALIFORNIA offers.

LOGICAL OPTIONS
One Market Plaza, Spear Tower, Suite 2261AC
San Francisco CA 94105 • (415) 777-3988

ROCKY MOUNTAIN OR NATIONAL

Telecommunications/SNA	C, UNIX, LAN, IBM protocols
Data Acquisition	8 and 16 bit MPU's, mainframes
CAD/CAM and Graphics	PASCAL, FORTRAN, PL/1
Data Base Development	IDMS, IMS, DB/DC
Systems Analysis	Business and Mfg. Appl.
Programming	Scientific, High-Tech, Biomed

Margo Kelle/Vic Tuttle
Career Marketing Associates
7100 E. Belleview #206
Englewood, CO 80111
(303) 779-0660

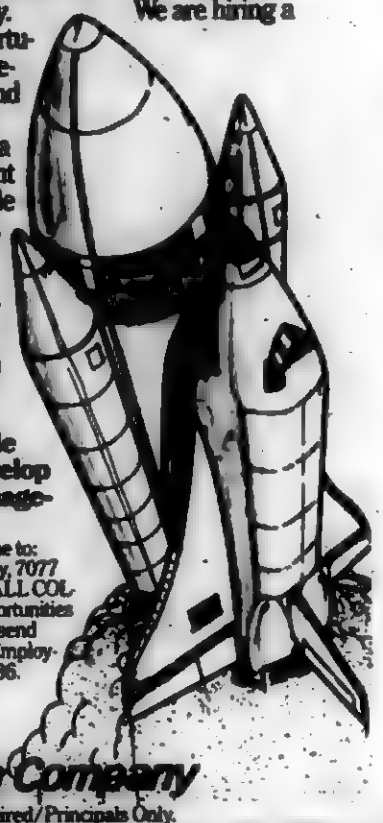
POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

COMPUTER PROFESSIONALS

With Current Experience In Applications Software, OS/SW, Communications Networks, Compilers, DBMS and Development Tools.

We are now assuming our responsibilities as the Shuttle Processing Contractor for NASA at the Kennedy Space Center, Florida and the U.S. Air Force at Vandenburg Air Force Base, California. This six year contract (with options to fifteen years) will provide you with a secure opportunity to join the team of professionals like yourself who are making a significant contribution in the manned space program.

If you are an experienced computer professional whose goal is more challenging and rewarding work in a state-of-the-art environment, look to Lockheed Space Operations Company. We are hiring a number of professionals, like you, to fill opportunities involving the development and enhancement of: Applications Software (Real-time and Interactive), Operating Systems Software, Communications Networks, Compilers, Data Base Management Systems and Development Tools. You will be working on the Space Shuttle Launch Processing Systems (LPS), which is a highly distributed network of over 300 MODCOMP Super Mini Computers and a large number of Honeywell 6000's with over 3.5 billion bytes of mass storage. Some of these opportunities will involve a three month program to become familiar with the entire LPS and the space system unique OS/SW.



We also have opportunities available for MIS Applications professionals to develop a wide variety of on line Data Base Management Systems.

For immediate consideration call or send your resume to: Donald C. Quirk, Lockheed Space Operations Company, 7077 North Atlantic Avenue, Cape Canaveral, Florida, 32920. CALL COLLECT (305) 799-0100. Candidates who wish to pursue opportunities located at Vandenburg Air Force Base, California should send their resume to: Lockheed Space Operations Company, Employment Office, 1100 West Laure Avenue, Lompoc, CA, 93436.

Lockheed
Space Operations Company

An Equal Opportunity Employer/U.S. Citizenship Required/Principals Only.

WALKER WALKER WALKER WALKER WALKER
INTERACTIVE PRODUCTS

Walker Interactive Products' high tech solutions for financial applications software has placed us at the TOP of the software industry. We offer excellent opportunities for rapid advancement in a state-of-the-art technology.

INSTALLATIONS SPECIALISTS

New York, Chicago, Atlanta or San Francisco

- Three or more years systems programming in multiple operating systems, teleprocessing, and database environments such as VM/CMS, IMS DB/DC, IDMS DB/DC, ADABAS, COM-PLETE, CICS and DL 1.
- The ideal candidates will also be familiar with IBM mainframe environments.
- We are seeking sharp individuals who also enjoy troubleshooting and possess excellent interpersonal skills.
- These are positions involving customer contact and requiring 75% travel.

SENIOR PROGRAMMER ANALYST

- You should have 4+ years Cobol programming experience in an IBM mainframe environment.
- We also require experience in maintenance programming with accounts payable, purchase order and materials management systems.
- ASSEMBLER programming experience is a plus.
- Heavy analysis experience is also a plus.

In addition to high growth potential in a progressive environment,we offer an excellent salary and benefits package. Please send your resume to the Director of Human Resources, Walker Interactive Products, 100 Mission St., Ste. 300, San Francisco, CA 94105. EOE

Systems Programmers

GIBBS & HILL, Inc., an internationally known Architectural/Engineering firm has immediate openings for two (2) senior level Systems Programmers in its New York headquarters.

Individuals selected for these positions will assume technical responsibility for implementing MSNF-based distributed network between our IBM 3033 in New York, an IBM 3032 in Pittsburgh and a newly specified IBM 4341 in our San Jose office. These individuals will also be responsible for the start-up of the San Jose computer installation.

Experience in MVS, JES 2 and NCP SYSGENS using SMP is a must. Capacity planning and performance monitoring experience, and experience with MSNF is a plus.

Salaries are fully commensurate with experience. Some travel between New York and San Jose will be required.

Professionals with 3 or more years of solid systems programming experience can investigate these employment opportunities by calling Jerry Hancewitz of the Information Resources Management Division at (212) 760-6061, or by mailing a resume complete with salary history, to: Joe Albert, Manager of Employment, Dept. COM-130, Gibbs & Hill, Inc., 11 Penn Plaza, New York, NY 10001.

Gibbs & Hill, Inc.
DEDICATED TO EXCELLENCE
NEW YORK • SAN JOSE
A DRAVO COMPANY

SENIOR PROGRAMMER ANALYST

Colorado's largest coal producer located in NW Colorado has opening for a Senior Programmer Analyst. Responsibilities include interface with computer users in design and implementation of new and maintenance of existing systems. Requires 3-5 years experience on HP3000 or IBM System 34 with RPG II background. Cobol preferred but not mandatory. High school graduate. College degree in Computer Science or Business Administration preferred. Salary mid $20's, excellent benefits. Send resume to:

Director of Human Resources
Colowyo Coal Company
9777 State Highway 13
Meeker, CO 81641

An Equal Opportunity Employer M/F/H/V.

The City of Las Cruces, New Mexico (55,072 MSA population) has a vacancy for a Programmer Analyst. Must have BBA, BSCS or equivalent plus 2 years experience in EDP applications analysis and business programming using COBOL. Salary is $19,821 - $23,850 per year depending upon experience plus benefits. Send current resume by February 17, 1984 to A.J. Robertson, Personnel Department, Drawer CLC, Las Cruces, NM 88004. AA/EEO Employer.

NH - MAINE

DP PROFESSIONALS

We have numerous clients seeking qualified people with experience in COBOL, RPG, DOS or OS. Financial and manufacturing applications. All vendors considered. Excellent salary, benefits and relocation plans.

Fee paid. Reply in confidence to:

ROGERS AND SEYMOUR
PROFESSIONAL CONSULTANTS
94 Auburn St. - Portland, Me. 04103

COMPUTER PROFESSIONALS JOIN THE 4TH GENERATION TECHNOLOGY

If you have experience in developing computer-business applications with...

FOCUS, RAMIS II, NOMAD, etc.

MVC Associates is a leading fourth generation consulting and education firm.

Join us in this time of tremendous growth - where opportunities are here for the taking.

You must be ambitious and possess:

- experience with RAMIS II, FOCUS, or NOMAD
- 3 years of solid business applications development
- effective communications and interpersonal skills

Top salary plus generous bonuses are among the benefits available.

Call or write today and tell us about yourself.

DON CRAN

MVC ASSOCIATES, INC.
(specialists in fourth generation systems)
11 Skokie Boulevard - Suite 209
Lake Bluff, Illinois 60044
312/295-3344

The Position
Manager EDP Operations

Ground floor opportunity. Present DP vendor to be replaced by an 80s computer facility. Will be the individual participating in all phases of its selection and installation.

The Organization

Major financial health and welfare fund administering a health care reimbursement system for its 54,000 members and their families. Current DP support supplied by off-site vendor, supporting 150 locations.

The Job

Hardware changes will likely be a medium sized mainframe, with networking, terminal expansion. Hardware must be evaluated, chosen, ordered and installed. Present mini-mainframe system to be replaced with yet to be chosen vendor supplied system. Staff must be hired and trained. Operational procedures must be developed and documented. Data bases must be built, using data from current system. Both tests must be run in parallel, evaluated, then switched. Systems operations must be organized and scheduled.

Experience

Five to ten years in EDP, including minimum of three years at a managerial level. Specific responsibility in hardware evaluation, planning, operation and installation. Proven ability in managing a medium sized DP installation. Broad experience with a variety of computer systems.

The Incumbent

Will be relied upon to make the major decisions necessary to design, staff, install and manage a new computer system. Will occupy a prominent position in the organization with far-reaching contact with all levels of the organization. Will be relied upon to make reasonable decisions necessary to keep DP operations up to date.

Compensation

Competitive salary, dependent upon individual's background, plus bonus, life and retirement benefits. Minimum $50K base salary during successful system installation.

Send Resume and Salary Requirements to:

CW-B4551
Computerworld
Box 880
Framingham, MA 01701

DATA PROCESSING PROFESSIONALS

DATA RESOURCE CORPORATION, headquartered in Atlanta, is a leader in quality Contract Programming and Consulting. Our growth in the Southeast and Southwest has created opportunities for versatile Professionals with state-of-the-art skills in Programming and Systems Design.

We are seeking individuals who desire to work in various stimulating Data Processing environments. IMS and CICS skills are of special interest, as are the abilities to travel or relocate.

We offer you competitive salaries and comprehensive benefits programs, including bonuses and profit sharing, and overtime pay. If you are searching for a growth opportunity with a dynamic and progressive company with a Management team that "puts people first", then DRC is your answer.

For immediate consideration, send resume to 3301 Buckeye Rd., Suite 103, Atlanta, GA 30341, or call BECKY FINLEY or CHARLIE WEXLER at 404-455-7260, or toll free:

1-800-241-8002

DRC

EOE

Some of the current opportunities available are in positions such as:

MICROWAVE DATA TRANSMISSION SYSTEMS

Communications Systems Engineer
Experience in RF communication system technology with experience in data link systems, radar tracking systems and/or command and control systems, threat evaluation, multi-plexing and encoding techniques.

Digital Systems Engineer
Experience in digital communication system technology with real-time data link systems, multiplexing and encoding techniques, analog/digital interface, micro-processor design/application system integration and test.

Telecommunications Systems Engineer
Prefer exposure to digital subscriber instruments and transmission components.

Scientific Programmers
Experience in real-time process control, PDP-11, HP-9845, UYK/20, UYK/44 type hardware, FORTRAN IV, BASIC, CMS-2 languages, RSX-11M and/or SDEX 20 operating systems.

Sr. RF Design Engineers

Test & Reliability Engineers

COMMUNICATIONS AND TERMINAL PRODUCTS

Terminal Design Engineers
Will be involved in the development of the new terminal products. Should have a BSEE plus minimum of two years logic design experience working with microprocessors and digital circuitry. Assignments include peripheral interface design, telephonics communications, graphics and color terminal design.

Programmers
Positions require BSCS/BSEE and minimum one year experience in assembly level Z80 and/or M68000 programming. Assignments in computer terminal and small system development involving personal computing and CP/M operating system, graphics and CRT control, communications, I/O control, LAN and PDN development plus other challenges at the forefront of microprocessor system application.

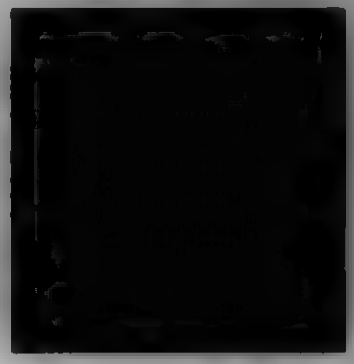
Address all employment inquiries to:

Sperry
Computer Systems
B. Dawson
322 North 2200 West
Salt Lake City,
Utah 84116

Sperry in Salt Lake City

Sperry (Communications and Terminal Products, and Microwave Data Transmission Systems), will surprise you with uncommon opportunities for career growth in data communications, computer research and development, and microwave communications systems for military programs. The company is committed to research and maintaining a leading edge technology in both hardware and software systems.

Salt Lake City is a center for culture in the west. There's the Utah Symphony, the famed Ballet West, The Mormon Tabernacle Choir, theatres, an art complex, and a strong educational life built around the University of Utah, Westminster College, Brigham Young University, as well as other major universities and junior colleges in the immediate area. Coupled with the grandeur and lifestyle of the Great Salt Lake Valley, a career at Sperry can be one of the most pleasant surprises one could uncover for a rewarding future.



SPERRY

We are an equal opportunity employer m/f/h/v.

© Sperry Corporation 1986.

TANDEM EXPERTISE
IS YOUR KEY TO SUCCESS IN INFORMATION SERVICES AT ENTRE'

Entre Computer Centers, Inc., America's fastest growing franchisor of retail computer stores, is looking for first rate Programmer/Analysts. TANDEM product line knowledge is a must. Familiarity with Accounting and Distribution application areas is desirable.

These positions offer outstanding professional compensation and exceptional growth opportunity in an exciting ' can do ' environment. Our corporate headquarters are conveniently located in Northern Virginia with easy access to the nations capitol.

To pursue these opportunities further, call or send your resume with salary history to:

Mr. Neil J. Dworsky
Director, Information Services

ENTRE

1951 Kidwell Drive, Suite 400
Vienna, VA 22180
(703) 883-0660

Sorry, no entry level positions are available at this time.

BRYANT BUREAU HAS THE COMPUTER PROGRAM FOR YOU

If you're not accomplishing your career goals, let us put you in the right environment. Our national database of client companies are continually looking for progressive DP professionals who want to remain state of the art.

IBM 370 expert, heavy DOS/ASO.	to $50K
IBM DBA Specialist	to $50K
NON IBM/VP Software Specialist	to $50K
NON IBM Software Support	to $50K
DEC VAX/UNIX, C Project Leader	to $50K
DEC VAX/VMS DECNET Expert	to $50K
IBM CICS/VS Specialist	to $50K
IBM DB2 DB Designer	to $50K
IBM Ops Prog, COBOL, CICS	to $50K
IBM PA DOS/VSE, COBOL, MS	to $50K
IBM Sperry MAPPER/Client Srvr	to $50K
IBM PA CMOS, Banking	to $50K

To determine each of the specialties for the IBM's, contact the DP Division below.

Bryant Bureau

DP Division
4350 S. Rockwell Trail, S-510
Sarasota, FL 33581
(813) 957-4007

PAYROLL/PERSONNEL SYSTEMS

We need experienced professionals with knowledge of one or more commercial Human Resource System packages especially IMSA, IBI, SMSCI and McCormack & Dodge.

Consultant opportunities are available at several locations. Openings require individuals with strong applications knowledge, proven communications skills and

- Project Management Experience
- Technical & Analysis Expertise on IBM, HP 3000 with on-line application experience
- Training, Documentation and Applications experience

Business Information Technology offers a full range of consulting services to Industrial, Educational, Financial, Government, Medical and High Tech. clients. We have offices on the east and west coasts and serve clients across the nation. Our benefits and compensation are excellent. For immediate consideration, please send your resume and a letter describing your experience to:

Business Information Technology, Inc.

PO BOX 8213 • Newark, Delaware 19711 • (302) 366-8262
PO BOX 83 • Concord, California 94522 • (415) 671-0885

—An Equal Opportunity Employer—

What are the cold, hard facts on computer salaries?

Find out in our new, free Salary Survey.

No doubt during 1983, you knew that many organizations took a hard line on awarding liberal salary increases.

The effects of the salary freeze were felt by many computer professionals. Firms enacted across-the-board cuts, lowered compensation ranges for "new hires," restricted bonuses and benefits or set forth other policies to lower their personnnel costs in countless situations.

Yet, on the other hand, did you know that salaries for *some* computer professionals *soared* right on through the uncertain business outlook?

A favorable climate for skilled professionals.

Our *1984 Computer Salary Survey and Career Planning Guide* will give you new insight on trends that impact compensation, provide current salary figures and review ways the computer profession will be affected in the future. It will also explain why many computer professionals are able to advance their careers more successfully than others.

In the new Survey, you'll learn how salary differences between computer professionals are becoming more pronounced than ever:

- How some professionals—performing the same work and having a similar amount of experience—are earning significantly more than their peers.
- Why some professionals now earn as much as 25% more than they did last year.
- What emerging skills are most in demand and which positions command high salaries now and in the future.
- How size of firm and computer installation greatly affects compensation levels.

Cold, hard data with helpful tips.

The new Survey is based on contacts with more than 44,000 computer professionals and 35,000 organizations. Not only are salary averages for fifty-eight positions reviewed (including ten new ones which we never before covered), but high and low compensation ranges are also covered.

Included are positions in programming, software, systems design, data base/data communications, Edp auditing, operations, computer sales, marketing, marketing support and management. The new 32-page Survey is available without charge.

Since 1968, this annual report has helped approximately a quarter of a million computer professionals understand current trends in technology and compensation, realize how and where they fit in and what they need to do to reach their fullest potential.

Source Edp is the world's largest recruiting firm devoted exclusively to the computer profession. Because each of our professional staff has had extensive computer experience prior to joining our firm, we are able to provide remarkable insight on computer careers.

You owe it to yourself—especially if most of your career lies ahead—to call or write for your free copy today.

Personnel Services
source edp
The world's largest recruiting firm devoted exclusively to the computer profession.

Call Source today for your free copy.

Is your salary still frozen?

Call the Source Edp office nearest you for a free copy of our new 32-page report. We'll mail a copy to you in strict confidence, without obligation.

If unable to call, write:

Source Edp
Department CS3
P.O. Box 7100
Mountain View, CA 94039

When writing, please include your title.

United States:

Alabama
Birmingham 205/322-8145

Arizona
Phoenix 602/275-1010
Tucson 602/792-0375

California
Northern
Mountain View 415/969-4910
Sacramento 916/448-3470
San Francisco 415/434-3410
Walnut Creek 415/946-1919
Southern
Irvine 714/833-1720
Fullerton 714/738-1313
Los Angeles/Downtown 213/688-0941
Los Angeles/South Bay 213/540-7800
Los Angeles/West 213/203-8111
San Diego 619/231-1900
San Fernando Valley 818/781-4800

Colorado
Denver 303/773-3700

Connecticut
Danbury 203/797-0880
Hartford 203/522-6580
New Haven 203/787-4586
Stamford 203/967-4888
Stratford 203/375-7240

District of Columbia
Washington D.C. 202/293-6886

Florida
Fort Lauderdale 305/491-0145
Jacksonville 904/356-1538
Miami 305/624-3536

Georgia
Atlanta/Downtown 404/588-8380
Atlanta/North 404/953-0930

Illinois
Chicago/E. Loop 312/861-0770
Chicago/W. Loop 312/346-1260
Oak Brook 312/986-0422
Rolling Meadows 312/392-0344

Indiana
Fort Wayne 219/432-7333
Indianapolis 317/631-2800

Iowa
Des Moines 515/243-0191

Kansas
Overland Park 913/888-8885
Wichita 316/688-1821

Kentucky
Louisville 502/581-8880

Louisiana
Baton Rouge 504/924-7188
New Orleans 504/561-8000

Maryland
Baltimore 301/727-4080
Greenbelt 301/441-8700
Towson 301/321-7044

Massachusetts
Boston 617/482-7813
Burlington 617/273-6180
Wellesley 617/237-3120

Michigan
Detroit 313/259-7807
Grand Rapids 616/459-8539
Lansing 517/484-4561
Southfield 313/352-8520
Troy 313/362-0070

Minnesota
Minneapolis
West 612/544-3800
Downtown 612/332-8480
St. Paul 612/227-8100

Missouri
Kansas City 816/474-3388
St. Louis 314/862-3800

Nebraska
Omaha 402/346-0700

New Hampshire
Nashua 603/880-4047

New Jersey
Cherry Hill 609/482-2800
Edison 201/494-2800
Morristown 201/267-3222
Paramus 201/845-3800
Princeton 609/452-7277
Somerville 201/526-8686

New Mexico
Albuquerque 505/247-4878

New York
Albany 518/482-3005
Buffalo 716/835-6830
N.Y.—Grand Central 212/557-8611
N.Y.—Penn Station 212/736-7445
N.Y.—Wall Street 212/952-8000
Rochester 716/263-2870
Syosset, L.I. 516/364-0800
Syracuse 315/422-3411
White Plains 914/683-8300

North Carolina
Charlotte 704/552-6577
Greensboro 919/379-1155
Raleigh 919/847-7805
Winston-Salem 919/724-0930

Ohio
Akron 216/535-1180
Cincinnati 513/769-5080
Cleveland 216/771-2070
Columbus 614/224-0880
Dayton 513-461-4880
Toledo 419/242-3201

Oklahoma
Oklahoma City 405/722-7410
Tulsa 918/599-7700

Oregon
Portland 503/223-6180

Pennsylvania
King of Prussia 215/265-7280
Philadelphia 215/665-1717
Pittsburgh 412/281-8848

Rhode Island
Providence 401/751-8085

South Carolina
Columbia 803/256-7446
Greenville 803/271-7044

Tennessee
Nashville 615/256-0885

Texas
Austin 512/479-0728
Dallas
Central 214/954-1188
North 214/387-1600
Fort Worth 817/338-8300
Houston
Downtown 713/751-0100
Galleria/Post Oak 713/439-0580
San Antonio 512/342-8888

Utah
Salt Lake City 801/595-0800

Virginia
McLean 703/790-0818

Washington
Seattle 206/454-8400
Spokane 509/838-7577

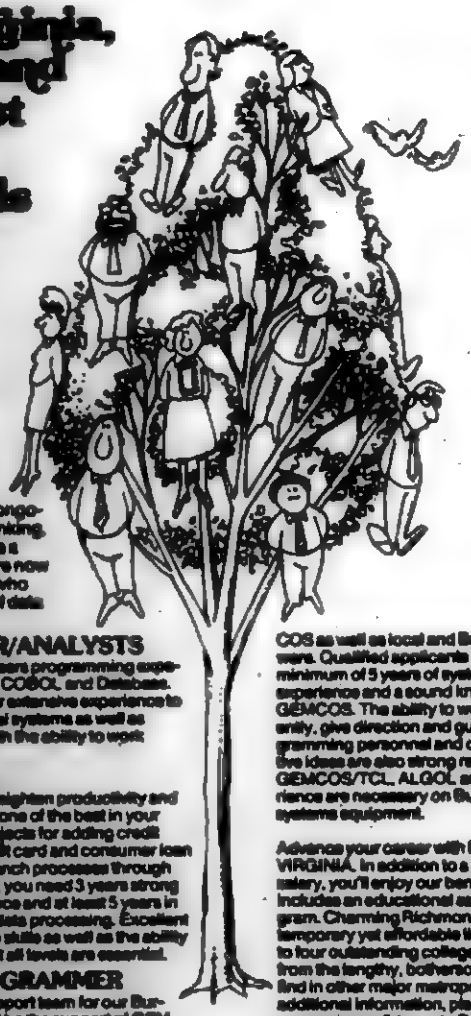
Wisconsin
Green Bay 414/432-1184
Madison 608/251-0104
Milwaukee 414/277-0346

Canada:

Ontario
Toronto
Don Mills 416/445-5720
Downtown 416/865-1125
Mississauga 416/848-3344

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

At Bank of Virginia, we understand that the best computer professionals don't grow on trees



That's why our offers are better, and we've structured our environment to lend itself to advancement.

Through a solid commitment to ongoing expansion and innovative thinking, BANK OF VIRGINIA has become a pacesetting industry leader. We're now seeking exceptional individuals who want to join our fast-track team of data processing professionals.

SENIOR PROGRAMMER/ANALYSTS
Positions require a minimum of 5 years programming experience which should include heavy COBOL and Database. Successful candidates will use their extensive experience to design and implement new financial systems as well as enhance existing ones, coupled with the ability to work independently.

SYSTEMS ANALYSTS
If perfecting excellent systems to heighten productivity and flexibility intrigues you, and you're one of the best in your field, you'll enjoy our two major projects for adding credit scoring/risk monitoring to our credit card and consumer loan systems and a study to improve branch processes through advanced technologies. To qualify, you need 3 years strong financial systems analysis experience and at least 5 years in programming or related technical data processing. Excellent analytical and writing/presentation skills as well as the ability to work independently with users at all levels are essential.

SENIOR SYSTEMS PROGRAMMER
You will be part of our technical support team for our Burroughs 7900. Your major duties will be the support of GEMCOS as well as local and Burroughs software. Qualified applicants will possess a minimum of 5 years of systems support experience and a sound knowledge of GEMCOS. The ability to work independently, give direction and guidance to programming personnel and develop innovative ideas are also strong requirements. GEMCOS/TCL, ALGOL and COBOL experience are necessary on Burroughs large systems equipment.

Advance your career with BANK OF VIRGINIA. In addition to a competitive salary, you'll enjoy our benefits package that includes an educational assistance program. Charming Richmond, VA offers a contemporary yet affordable lifestyle, proximity to four outstanding colleges and freedom from the lengthy, bothersome commute you find in other major metropolitan areas. For additional information, please forward your resume in confidence to D. Gregg Paul, BANK OF VIRGINIA, Operations Center, P.O. Box 25870, Richmond, VA 23260, or telephone (804) 747-3828.

We are an equal opportunity employer

Bank of Virginia

Greyhound is on the move for professionals interested in the diversity and advancement opportunities offered by our Fortune 100 corporation. Challenge, excitement and a fast-paced growth environment are waiting for you at our corporate headquarters in Phoenix.

We have an IBM/MVS environment running state-of-the-art systems. We are currently seeking career oriented individuals to join our Systems Support Group.

SYSTEMS PROGRAMMER

to assume responsibility for ACF/ VTAM/NCP in an MVS environment. The ideal candidate will also have experience in one or more or the following: 37X5, MSNF or distributed processing. The current environment consists of a national SNA communications network involving local and remote hosts, terminals, and distributed systems.

APPLICATION SUPPORT SPECIALIST

to assist the development of effective and efficient Data Communications program applications through 1) technical review of application design 2) application design assistance and 3) development, maintenance and enforcement of standards. Other areas of responsibility will include technical support of the CICS software products. We need a professional with no less than 3 years direct experience with IBM's CICS product and who will welcome the high level of personal interaction needed in this exciting position.

We offer an excellent compensation and benefits package including medical and dental coverage for you and your dependents. To be considered for these positions, please forward your resume including salary history and requirements to:

Manager of Employment and Employee Relations
THE GREYHOUND CORPORATION
Greyhound Tower Plaza 6
Phoenix, AZ 85077

No agencies please
Equal Opportunity Employer M/F/V/H

First National Bank in Albuquerque

PROGRAMMER/ ANALYSTS

The Information Systems Department of First National Bank in Albuquerque has excellent opportunities for Programmer/Analysts to become involved in development and maintenance of both online and batch application systems. We currently run two 4341 computers with MVS and JES2.

Our Information Systems Development Department is seeking professionals with appropriate degrees and/or experience in banking applications as well as experience in IBM/370 Assembler and COBOL. Also helpful would be CICS and OS/JCL coding experience.

First National Bank offers an excellent compensation and benefits package. Please submit resume and salary history to:

Employee Relations Manager
First National Bank in Albuquerque
P.O. Box 1305
Albuquerque, NM 87103

We are an equal opportunity employer m/f/h

The First National Bank of Albuquerque
New Mexico's Largest Home-Owned Independent Bank - Member FDIC
Convenient Locations City-Wide

SENIOR SYSTEMS ANALYST
CLARK COUNTY, LAS VEGAS, NV
SALARY $26,868-$35,388 ANNUALLY
NO STATE INCOME TAX
PAID RETIREMENT

Managerial responsibilities. Performs technical and analytical work in planning the overall requirements for computer services. Any combination of education and experience equivalent to a Bachelor's Degree in Computer Science or related field and two (2) years experience as a Programmer Analyst; or two (2) years of college in Computer Science or Data Processing with three (3) years experience in Computer Programming and two (2) years experience as a Programmer Analyst. Apply By: Applications will be accepted until sufficient qualified applications have been received. Apply To: Clark County Personnel, 225 Bridger Avenue, Las Vegas, NV 89155. AA/EEO.

NEW ENGLAND EDP OPPORTUNITIES

Outstanding opportunities exist in New England for Project Leaders, Business Programmers, Systems Analysts, Programmer Analysts, Systems Engineers with two plus years experience.

Experience quality at its' wide achieving your career goals. Call or write today in total confidence.

KUEBLER ASSOCIATES
Data Processing Division
Executive Office Center
Two Monument Square
Portland, ME 04101
(207) 774-0180

PROGRAMMER ANALYST

Programmer position for Siemens/PDP 11 Patient Data Management System. BS/BA required. In lieu of a bachelor's degree, 4 years of significant relevant programming experience in addition to some formal training program in computer programming is required. Working knowledge of PDP 11 FORTRAN and PDP 11 RSX-11 operating system required. One year of programming experience in PDP 11 FORTRAN and PDP 11 RSX-11 operating system preferred. Experience in DECNET communications software preferred. Resumes with salary history to: Joseph F. Dyro, PhD, CCE, Director, Biomedical Engineering, University Hospital, Stony Brook, NY 11794.

DATA PROCESSING/COMMUNICATIONS

MARKETING REPRESENTATIVES

If You Believe In Yourself
Join A Company That Believes In You

Terminals Unlimited is a 1980s success story. In only five years, we have experienced phenomenal growth. Why? . . .

Because there's no market saturation for our product: selling, leasing and servicing state-of-the-art in processors, terminals, printers, and other peripheral equipment . . . and meeting a very diverse range of customer needs.

Because of our goal: A nationwide organization completely devoted to providing the best there is in customer service.

If You Believe In Our Goal . . .

And you're a real professional experienced in selling data communications systems, computer products, and supplies; if you have direct sales experience with government or commercial clients; if you can appreciate our potential . . . talk with us.

Terminals Unlimited offers an excellent base salary, one of the best commission plans in the industry, and competitive fringe benefits.

If You're Our Kind of Professional . . .

Let us know. Send us your resume — or call David Owens directly at (703) 237-8666.

Terminals Unlimited, Inc.

David M. Owens, President
TERMINALS UNLIMITED
350 S. Washington Street
Falls Church, Virginia 22046
An equal opportunity employer

Systems Engineers
Software Architects and Developers

Freedom to make a difference

AT&T Bell Laboratories has openings in the following areas of expertise:

- ☐ Communications planning
- ☐ Communications protocols
- ☐ Computer networking
- ☐ C'
- ☐ Database management
- ☐ Digital services
- ☐ Distributed signal processing systems
- ☐ Local area networks
- ☐ Market definition for new technologies
- ☐ Measurement systems
- ☐ Network optimization tools
- ☐ Network planning
- ☐ Operations automation
- ☐ Packet switching
- ☐ Performance measurement and analysis
- ☐ Software development tools
- ☐ Subjective testing
- ☐ UNIX™ Operating System
- ☐ UNIX System applications

These openings are at our facilities in New Jersey, Illinois, Ohio, Pennsylvania and Massachusetts.

Having an impact, doing important work, creating something significant–even memorable–there's no feeling in the world quite like it.

We offer you an excellent opportunity to make this kind of technical contribution...

Because of the variety and interdisciplinary nature of our work.

Because of the considerable resources placed at your disposal.

Because of the caliber of the people around you.

Because of the freedom to pursue your own approaches to problems.

And because we are now free to take the knowledge behind the most extensive and sophisticated communications network in the world and apply it in new ways-to new markets.

With the development of new and expanding projects, we are seeking people who can evaluate alternative architectures, perform competitive analyses, assess service viability, define, implement and measure systems or develop strategies to get products to market.

If you have a Master's or PhD in Systems Engineering, Computer Science, Electrical Engineering, Mathematics, Physics, Statistics or Operations Research with hardware and/or software experience–or a BS in these fields with a minimum of 5 years highly relevant experience –and are looking for a chance to make a difference, please send your resume to:

Director, Technical Employment,
AT&T Bell Laboratories,
Dept. 63/4904/84
150 John F. Kennedy Parkway,
Short Hills, New Jersey 07078.

An equal opportunity employer

AT&T Bell Laboratories

EDP Professionals

Middle South Services has one of the South's largest data processing centers serving one of the nation's largest power systems. Middle South Utilities, our parent company, is a major electric utility. Our hardware environment includes two IBM 3081s, and IBM 4341 and Tandem mini 16s. If you are a career-minded EDP professional, we have the following opportunities available:

PLANNING AND CONTROL ANALYST A current opening exists in our Planning and Control section for an Analyst to work on the implementation and training of a systems development methodology package. The ideal candidate will have a B.A. in Business and 2-3 years experience in a computerized environment monitoring compliance with systems development standards, with an emphasis on planning and control. Experience in development of methodology is a strong plus with experience on methodology software packages.

PROJECT LEADER With strong hands-on management background to work on an on-line distribution, construction and operating system. Requires at least 1-plus years experience as a first-line supervisor or lead analyst on a medium to large-scale system utilizing IMS DB/DC and involving maintenance, enhancement and program performance.

ANALYST/PROGRAMMER (DATA SECURITY) An experienced computer professional is needed to work with the development and support of data security requirements for on-line systems. The ideal candidate will have previous applications programming experience utilizing IMS DB/DC along with a desire to develop technical and analytical skills pertaining to security issues. Previous data security experience preferred, especially heavy usage of ACF 2.

SR. ANALYST/PROGRAMMERS (APPLICATIONS) Several positions are currently open for experienced IMS DB/DC Analyst Programmers. Experience with COBOL or PL-1 in plant maintenance or business applications is needed. ADF experience is helpful but not required.

Due to our size and scope of operation, we offer access for advancement, career stability and an excellent salary with major benefits. For more information, call our number below or to apply directly, send your confidential resume to Byrnes Heath or Richard Jackson, MIDDLE SOUTH SERVICES, INC., P.O. BOX [illegible], NEW ORLEANS, LA 70161.

1-800-231-4481
In Louisiana, call collect (504) [illegible].

MIDDLE SOUTH SERVICES INC.
An Equal Opportunity Employer M/F

IMAGINATION

REALIZATION

Imagine becoming a vital member of a corporation whose sole business is Data Processing!

Imagine your talents and ability being challenged in the real world!

Realize your full potential at FINANCIAL INFORMATION SERVICES.

The time has never been better to join FIS! Our unprecedented growth and rapid expansion plus new product developments have created these openings:

SAL ANALYST PROGRAMMERS

Minimum 3 years IBM Assembler with knowledge of CICS tables & Control Blocks. Must be able to work with minimum supervision while analyzing and coding new & existing systems from walk-through to implementation.

COBOL ANALYST PROGRAMMERS

Minimum 3 years COBOL Analysis & Programming. Proficiency in VSAM, dump analysis, testing techniques, utilities and JCL and ability to work with minimal supervision required.

SYSTEMS ANALYSTS

Minimum 3 years experience plus knowledge of COBOL and broad applications background. Applicants will have a demonstrated ability to communicate effectively with users, learn quickly and be self-motivated. Project management a plus.

MANAGER RESOURCE PLANNING

Will head up state-of-the-art department. CICM, SMF and SMF, proficiency in computer languages, modeling/queuing theory and MVS, impact forecasting, measure CPU hardware.

FIS has a state-of-the-art shop, 7000 terminals with CICS, VSAM and VSAM exclusively utilizing IMS/VS II in a multi-CPU environment processing nearly 3 million transactions DAILY.

We offer an attractive compensation package and the opportunity to be an integral part of the innovation at FIS. Send your resume to [illegible], or call TOLL FREE 1-[illegible].

FINANCIAL INFORMATION SERVICES
10805 Old Mill Road
Omaha, Nebraska 68154
An Equal Opportunity Employer

CITIES SERVICE OIL AND GAS CORPORATION

Business Systems Programming Analysts
(Several Openings)

Ideal candidate has 2-6 years COBOL experience using OS MVS, JCL, TSO or CMS, IMS DB/DC (ADF) for large management information systems. Four year industry experience preferred. Typical positions are as team members of large projects with user support assignments. You will use state-of-the-art hardware and software as a member of our Tulsa headquarters staff.

Software/Hardware Systems Consultant - Capacity Planning and Performance Tuning

Position requires over four years experience in systems programming of multiple large IBM mainframes (MVS, JES 3, TSO, IMS, CICS, and Communications Networking). Tools available include RMF, MICS, OMEGAMON, NPA, CAPTURE/MVS, BEST/1, SMF, SAS, etc.

IMS and ADABAS Technical Consultants

Candidates must have a minimum of four years of database applications development. A strong knowledge of physical database design, performance problem solving and tuning is required. Position requires daily contact with project managers and systems engineers.

Salaries competitive and commensurate with experience. Excellent Fortune 50 benefits package (will relocate).

Send your resume today of work experience including current DP skills, salary, and your employment objectives to:

Cities Service Oil and Gas Corporation
c/o G. R. Farley
Box 300
Tulsa, Oklahoma 74102

Cities Service is the domestic oil and gas subsidiary of Occidental Petroleum Corporation.

An Equal Opportunity Employer

PROGRAMMER/ANALYSTS

Expanding Central New Hampshire life insurance company has employment opportunities for Programmer/Analysts.

Immediate openings include:

Programmer/Analyst with one to three years programming experience in COBOL and ASSEMBLER.

Programmer/Analyst with strong math background and/or actuarial experience, and two to four years FORTRAN programming experience.

Interested applicants should forward resume and salary requirements to Angela Fleury, Human Resources, Chubb LifeAmerica, One Granite Place, Concord, NH 03301.

DATA PROCESSING SPECIALIST

To create, promote, and present seminars on systems analysis, programming, and project management. 80% out of LA overnight. $30,000+ per year. Requires minimum BS in Computer Science, 5 years programming + analysis + project management, created 5 seminars, presented 15 seminars, formal trainer training. Send resume and data sat to:

Job Number 8372
P.O. Box 595
Sacramento, CA 95804

Must later than February 14, 1984.

SYSTEMS ANALYST

Bay Medical Center, a progressive 441 bed acute general care hospital, has an opening for a Systems Analyst to perform systems analysis and design functions. Other responsibilities include hardware planning, coordinating testing and implementation with users and vendors, and assist and assist in training users. Candidate required to possess Bachelors degree in Computer Science or Business with 2 years experience as Systems Analyst. Ability to communicate with department and a competitive benefit package offered. Send resumes and salary requirements to Human Resources Department, Bay Medical Center, [illegible] Columbus Avenue, Bay City, MI 48706, (517) 894-6455.

An Equal Opportunity Employer

SAUDI ARABIA
LAND OF CHALLENGE
LAND OF REWARD

NATIONAL MEDICAL ENTERPRISES, INC., a proprietary Health Care Corporation, also provides medical personnel, equipment and management services to hospitals throughout the United States and 13 foreign cities.

Outstanding employment opportunities are currently available in Saudi Arabia to Hewlett-Packard professionals. The successful candidates will know COBOL, Image, View, and have a minimum of three years experience with HP3000 hardware. Those with additional knowledge of healthcare systems will receive top priority.

- **COMPUTER CONSULTANT:** Consults with the data processing manager, systems analysts, and administration to clarify program intent, indicate problems, determine and implement necessary changes in order to support medical and financial data. Degree plus minimum 5 years experience required.
- **SYSTEMS ANALYSTS:** Specifies, designs and maintains computerized systems for various hospital units. Degree plus minimum 3 years experience required.
- **PROGRAMMER ANALYSTS:** Coordinates and defines specifications for system design, enhancement and modification. Degree plus 1-3 years experience required.

In addition to a competitive base salary and bonus, the contracts provide free housing, transportation, and a total of eight weeks paid vacation leave with liberal travel opportunities.

For immediate consideration, please send resume to:

NATIONAL MEDICAL ENTERPRISES, INC.
International Group, Attention: Galen Wood
P.O. Box 2140/Dept. C48K14/3
Santa Monica, CA 90406

Equal Opportunity Employer

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

PROGRAMMER

Bro's, Inc. located in Springfield, VA, one of Washington, DC's fastest growing retail companies, is seeking an experienced Programmer.

You should have a minimum of four years full-time programming experience and at least two years experience on an IBM S/34, S/36 or S/38 preferred. You should have the ability to work in a teamwork environment and be able to work flexible hours, including some evening and weekend hours.

We offer excellent paid company benefits, including a pension plan. Salary commensurate with experience. Interested candidates are invited to forward a letter and resume with salary history to:

Diane Kelley
Bro's, Inc.
7921 Woodcliff Court
Springfield, VA 22151

EMPLOYMENT OPPORTUNITIES

Growing Palm Beach County, Florida is seeking applicants for 2 new positions in the Management and Program Evaluation Department.

Systems Analyst - working with the County Data Processing Department in the implementation of a countywide data processing plan. Degree in Computer Science or Certified Computer Programmer or Certified Data Processor and 3 years experience in systems analysis and COBOL.

Programmer Analyst - most programs will be written in COBOL for IBM/CICS series 4341. Degree in Computer Science or Certified Computer Programmer or Certified Data Processor and 3 years experience in COBOL programming.

We offer excellent benefits including paid health and life insurance, retirement, vacation, sick leave and educational opportunities.

Send resume (indicating position of interest) to:

Palm Beach County
Personnel Department
P.O. Box 1989
West Palm Beach, FL 33402

EQUAL OPPORTUNITY EMPLOYER M/F/H

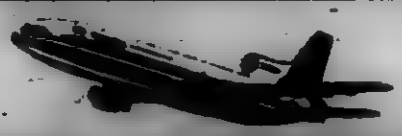
D.P. ANALYSTS/ PROGRAMMERS

Cincinnati and national based companies require DP professionals from $20K-$42K. We will work in confidence within your restrictions on salary and responsibilities. Call or write Fred Turtoh.

The Angus Group Inc.
2307 Victory Parkway
Cincinnati, Ohio 45206 • (513) 961-5870
Personnel Services to Business

HI-TECH LONG ISLAND COMPANIES
need all levels exp $30-$60K including management in communications, supporting systems programming robotics AI graphics CAD CAM array processing DBMS etc
HUNTINGTON PERSONNEL CONSULTANTS
INC 234 Main St Huntington NY 11743
(516) 549-8880

npc NATIONAL PERSONNEL CONSULTANTS



COMPUTER PROFESSIONALS

JOIN ONE OF THE WORLD'S FASTEST GROWING AIRLINES (SINGLE OR FAMILY STATUS)

SAUDIA is one of the world's fastest growing international airlines, which now operates over 60 jet transport aircraft to major cities in Asia, the Middle East, Europe and North America. SAUDIA's expansion has created opportunities for key management and analyst positions in the Computer Operations and Development section of its Data Services Department at its Jeddah headquarters. The processing power of multiple 3XXX IBM mainframes is provided to all major functional areas of the airline, using standard IBM software products (MVS, CICS, IMS DB/DC, TSO) and well-established proprietary packages (Lifeskies, TOTAL).

We are now looking to appoint the following computer professionals:

MANAGER, COMPUTER OPERATIONS
$3699 Per Month Tax Free*

The Computer Operations function is responsible for the integrity of SAUDIA's data processing operations, which include multiple on-line systems (IMS and CICS) operated around-the-clock and internal timesharing (TSO) during normal working hours. The role of Manager, Computer Operations is to direct the activities of a Staff Manager-Computer Operations, who is responsible for the supervision and scheduling of shift personnel, and a Project Manager-Technical Support Group, who is responsible for the implementation and maintenance of procedural standards and quality control of production systems. The manager also has cost center responsibility for the operation of the data center. A minimum of ten years large-scale IBM computer operations experience, or a bachelor's degree and at least six years relevant experience, is required. Proven management skills and at least two years prior experience with MVS operating systems, change control procedures, and system performance standards is also required.

MANAGER, MARKETING SYSTEMS
$3699 Per Month Tax Free*

The Marketing Systems function is responsible for monitoring the functional performance of the hosted reservations service, coordinating system requirements with affected user departments, and participating in feasibility studies for new reservations/departure control enhancements and evaluations of alternative reservations software packages. The role of the Manager, Marketing Systems is to manage a group of PARS/ACP applications analysts and to coordinate directly with SAUDIA's Marketing department on all matters relating to airline reservations, passenger handling, travel agency automation, and departure control systems. A bachelor's degree and project management experience is required, with a minimum of ten years IBM analyst/programming experience and at least three years direct involvement with an ACP system for reservations and/or departure control.

SENIOR SYSTEMS ANALYST
$2801 Per Month Tax Free*

Experienced senior analysts are required in several positions to lead requirements analysis and program specification efforts to define system requirements for application development. Functional areas include financial systems, accounting, maintenance & engineering, and flight operations. Prior experience in COBOL applications and structured programming techniques required; exposure to YOURDAN and/or SPECTRUM methodologies, previous airline experience, and working knowledge of IMS and/or TOTAL databases helpful. A minimum of two years relevant software development experience, or a bachelor's degree and six years experience, required in a large-scale IBM environment with on-line and/or DBMS applications.

BENEFITS

Free furnished air-conditioned housing and utilities • Paid medical insurance • 30 day vacation with positive space travel for family to and from domicile • Free or reduced rates on SAUDIA and other airlines • Retirement program (social insurance after 15 years service) • Household shipment from domicile to Saudi Arabia and back • K-8 schooling for children — out of Kingdom financial assistance for other grades • Annual service increase and eligibility for yearly merit bonus based on performance.

*The indicated salaries are available to U.S. and Canadian citizens, and have been converted from Saudi Riyals to U.S. dollars at the current rates of exchange, which are subject to fluctuation. Salaries are tax-free, subject to normal qualifications.

Positions are offered on a two-year contract. In your reply, please indicate your position preference. Send resume to:

SAUDI ARABIAN AIRLINES
Administrative Recruiter, Dept. M-CW
2420 Pershing Road, Suite 333
Kansas City, Mo. 64108

saudia

HOW TO MAKE OVER $80,000.00 A YEAR ON CICS COMMAND LEVEL PROGRAMMING

Acquire one of the most demanded & rewarding programming skills in months instead of 2 years. A complete self-study book based on CICS latest version 1.5, written in COBOL and with special emphasis on VSAM. It covers virtually every CICS technique you will ever need. Fifteen sample programs address all CICS major applications. Over 150 ready-to-use examples. Sample programs include: Menu, Add, Update, Delete, Browse, Print 24x80, Print 66x132, Print Any Size Report, Message Routing, Screen Refreshing, VSAM Alternate Index Setup and Manipulation, Constant Table Setup and Use and more.

It is hard to believe the learning can be so easy until you try it. In hours, you can start to create your own BMS maps; in days, you can start to write your own pseudo conversational CICS programs. Some CICS techniques are especially hard. When you are stuck for the technical problems, you'll be thankful you have this book.

Moonlighting on CICS projects is very rewarding. A typical 10-screen system can mean $15,000 cold cash. This book also tells you how to market your services, locate the contracts, write a proposal, make a presentation, quote the right price & draw a contract agreement without a lawyer.

But act now. Send $34.95 (plus $2.00 for ship. & handl.) or $32. ea. for 2, $30 ea. for 3, $28. ea. for 4 and over. (ship. & handl. incl.) in Check or money order to: CCO ONLINE SYSTEMS, INC., P.O. BOX 795759, DALLAS, TX 75379. Allow 1 to 2 weeks for delivery. Full refund within 10 days if not satisfied.

300 DP Openings

#1 employment agency, #1 DP employment consultant for 1982 in RPA (139 agencies, 900 consultants), now #1 agency in NPC (160 agencies, 450 consultants). Fee paid.

Mark Young, CPC (704) 535-1555

Corporate Personnel Consultants, Inc.
3959 Latrobe Drive, Suite 310
Charlotte, N.C. 28211

Professional Master's Degree Computer and Information Science

Advance your career in information systems through Dartmouth's distinctive professional program. Our two-year program is designed to equip you to take a leading role in planning, designing, and developing effective business solutions to business problems.

In the CIS Program, you will study current methodologies for planning, analysis, and design; strategies and issues in the management of information systems; business organization; project management; database systems; networks and distributed processing; professional communication. Learn from guest lectures by practicing managers of information systems, case studies, and professionals-in-residence. An internship is required of each student.

If you have previous experience in the computing field but want to be equipped to assume more responsibility and leadership, consider joining us next year. For more information, write: Program in Computer and Information Science, Dept. C, Nathan Smith Building, Hanover, NH 03755.

Dartmouth College

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

Software engineers. The time is now.

Computers play a vital and ever-increasing role in every step of production at Kodak. And we need skilled professionals who want to share in the challenges and rewards of technological leadership.

We're looking for talented software and computer engineers with a BS or MS and technical experience in minicomputer and microprocessor systems used in the development of software for real-time equipment control. Assignments may involve design of software systems for products or manufacturing control; programming mini- and/or microcomputers; integrating computer software and hardware into complex electromechanical systems; and quality assurance of computer programs.

Kodak also has opportunities for electrical engineers in the areas of design and development, video, test, systems and optical engineering.

We offer competitive salaries, liberal benefits, and opportunities for individual contribution and growth. Positions are available now. If you have the necessary skills and drive to meet the challenge of working for a corporation in the forefront of technology, send your resume today.

Personnel Resources
Dept. DCPW
Eastman Kodak Company
Rochester, NY 14650

Kodak. The right place. The right time.
An equal opportunity employer

Experienced Programmer/Analysts

CALL US...

We'll Help You Grow

M.I.S. International is Michigan's largest software services corporation supplying data processing professionals to Midwest area companies. In addition, AUTOFLEX, Inc., a subsidiary of M.I.S., is heavily involved in the design and development of Robotics equipment and software systems.

If you have at least one year of experience in any of the following disciplines and desire a high tech, state-of-the-art environment, call Personnel Recruitment or forward your resume.

- IMS DB/DC with COBOL or PL/1
- CICS with COBOL or PL/1, DOS/OS
- PL/1, OS/MVS
- COBOL using TSO/SPF or VM/CMS
- PL/1 with MULTICS
- FORTRAN with VAX and VMS
- IBM PC with Communications

MIS INTERNATIONAL INC.

24855 Southfield Road
Southfield, Michigan 48075
(313) 552-0550
(800) 521-2144
Equal Opportunity Employer
"A Total Systems Company"

SR. TECHNICAL SYSTEMS ANALYSTS

The Andover manufacturing facility of Fortune-100 Raytheon's Missile Systems Division, is an innovative leader in the field of automated electronic manufacturing, from microelectronic components to phased array radars. We have immediate needs for Senior Technical Systems Analysts with a high degree of technical knowledge in computer operating systems, program languages, and data base design and access methods. Environment is IBM 3033 MVS SP1.1

You will provide expertise to programmers for the design and development of data based systems, provide assembler language and user assistance for programmers, provide assistance in compiling educational seminars, and develop and implement major operating system modifications.

You will also be responsible for the installation of new systems (MVS/SP 1.3) and new releases of existing operating systems, as well as assisting in the planning of various hardware and software requirements.

BSEE or BSCS and 3-5 years experience and thorough knowledge of SMP, IBM utilities and assembler language coding are necessary.

Raytheon offers an excellent salary/company-paid benefits program. Please send resumes to: Steve Anderton, Raytheon Company, Employment Office, 350 Lowell Street, West Andover, MA 01801.

RAYTHEON

RAYTHEON COMPANY
MISSILE SYSTEMS DIVISION

An Equal Opportunity Employer

DATA PROCESSING PROFESSIONALS

USA Inc. has immediate openings for data processing professionals with 2-3 years of IBM mainframe experience.

We are seeking
- PROGRAMMERS
- PROGRAMMER ANALYSTS
- CICS, IDMS, AND IMS EXPERTS

USA Inc. is a software development and consulting group providing services to the data processing community.

We offer an excellent compensation and benefit package.

Please send your resume to
[illegible]

USA

An Equal Opportunity Employer M/F

Banking Burroughs

Southern Location
Medium System
$550 Million Bank
Florida Software Installed
All Expenses Paid

Executive Consultants
1600 Fairfield Avenue
Suite 102
Shreveport, LA 71101
(318) 222-1600

MANAGER OF SYSTEMS PROGRAMMING

Must have management experience with systems personnel and be able to develop subordinates.

Experience required: VTAM network support, big SSC and SDLC Lines, NAVE, JSMS, CICS, SMP, and VTAM Macros.

In addition to a challenging position we provide an outstanding compensation package.

Send your resume with salary requirements to:

[illegible]

EEO Employer

SYSTEMS ANALYST

ARGONNE NATIONAL LABORATORY is a multi-discipline research institution operated by the University of Chicago under contract to the Department of Energy. Current and planned research covers a broad span of energy and environmental projects.

We are seeking a Systems Analyst to participate in a multi-year project which will result in the replacement of existing accounting and budgeting systems with an integrated financial management information system. The individual hired will have an unusually rewarding opportunity to work through all phases of the systems development life cycle.

Qualifications include a BS/MS degree in Computer Science or Business Administration (or equivalent) and 5 or more years of experience in programming and systems design, as well as demonstrated capability in recent data base/data communications projects. Knowledge of financial planning and accounting principles is required, in addition to experience in a large-scale IBM installation running MVS or VM.

Our southwest Chicago suburban location offers a campus-like work environment. Excellent benefits include 5 weeks annual vacation to all staff employees. For prompt consideration, please send resume to:

R. Bettiker
Box J-CSD-16946-81
9700 S. Cass Avenue
Argonne, IL 60439
Affirmative Action/Equal Opportunity Employer

Systems Analyst/Programmers

Expanding systems staff needs individuals to work with IBM 5/38 and 5/34. Positions require 2-3 years experience in RPG, and on-line manufacturing environment helpful. Salary based on experience.
Send your resume with salary history and requirements in confidence to:

Queen Carpet Corp.
P.O. Box 1527
Dalton, GA 30722-1527
Attn: Claude Bell

SR. SYSTEMS PROGRAMMER

We are seeking a highly motivated, results oriented Systems Programmer to join our IBM mainframe (4300) environment. Previous experience of 2-3 years as Systems Programmer with DOS/VSE, CICS, DL/1, DOS, installation, modification and tuning of system software is required. Hospital background a definite plus. We offer competitive salaries and excellent benefit program. Please send resume to Personnel Director.

New England Memorial Hospital
5 Woodland Road
Stoneham, MA 02180
an equal opportunity employer, m/f

SENIOR PROGRAMMER ANALYST

Three to six years experience in designing and programming business systems. COBOL, IBM, JCL/VSAM, CICS.

SENIOR SYSTEMS PROGRAMMER

Two to five years experience, IBM software environment, IBM assembler, DOS - VSE, VM/CMS, CICS, VTAME.

We are a well established and growth oriented integrated oil and gas company situated in pleasant Brigham City, Northern Utah.

Please send your resume with salary requirements to:

Dalon Clark
Data Processing Manager
FLYING J, INC.
P.O. Box 678
Brigham City, UT 84302
Equal Opportunity Employer

DATA PROCESSING
COMPUTER PROGRAMMER

PROGRAMMER/ ANALYST

Assignment: Saudi Arabia

Litton Data Command Systems, a major multi-national engineering firm, has an outstanding opportunity for a Programmer Analyst.

In this position you will be responsible for maintaining COBOL programs of existing inventory control systems and for the evaluation, design of new systems utilizing IBM 4300 series hardware in a DOS/VSE environment; act as assistant supervisor for programming and analyst personnel and for duties associated with logistical information processing systems.

Your background should include a minimum of 5 years relevant work experience, four within a data processing environment and two years in programming/systems positions. Experience in COBOL necessary with PL/1 and assembler language a plus. Knowledge and experience with VTAM, CICS/VS, IOCP required. Bachelor's degree required.

We offer competitive salaries, outstanding benefits and overseas package. Please forward your resume to: Professional Employment, Dept. 841-07, Box 9089, Agoura Hills, CA 91301-0889.

LITTON DATA COMMAND SYSTEMS

Equal Opportunity Employer M/F/H

SYSTEMS ANALYSTS AND PROGRAMMERS FOR SUNBELT LOCATIONS

Job dissatisfaction, complacency, and frustration are the biggest obstacles to overcome to achieve one's career goals. Every day new career opportunities pass us by because we are unaware of their existence. Let us keep you abreast of what your true value is in the current years. Absolutely no obligations, please call or write Keith Perkins, CPC, Data Processing Specialist.

Dunhill

OF CHARLOTTE, INC.
8401 Central Road, Suite 107
Charlotte, North Carolina 28262
800-438-3018
(NC Call)
(704) 541-3018

CAREERS IN MANAGEMENT INFORMATION SYSTEMS AT ... HARRIS

In Florida.

You know how important it is to work with a company that offers exciting career opportunities, competitive salaries, full employee benefits, and management appreciation for a job well done. **HARRIS** offers all this and much more. We are a highly-diversified, international Fortune 200 communications and information processing company with fiscal year 1984 sales projected at $2 billion. Our products, systems, networks, and components are sold in more than 100 nations world-wide. And we offer these challenging positions on sunny Florida's exciting Space Coast, located thirty miles south of Cape Canaveral and one hour from Disney World and Epcot.

TELECOMMUNICATIONS

Manager: Responsible for all voice/data communications services for our Government Systems Sector, including system design, installation, operation, and maintenance of digital PBX and local area network. BSEE preferred; US citizenship required.

Data Communications Analyst: Responsible for data communications planning and system engineering, new service specifications, ordering and installation coordination, and problem resolution. Five years experience in data communications required, with knowledge of communications equipment and common carrier services. BSEE required.

Software Specialist: Works with users to implement on-line systems in IDMS/DC and CICS and provides training in these systems. Plans future software usage strategies and assists with conversions to newer systems. Must have three to five years experience in developing on-line systems, one year in IDMS/DC environment, BSCS, BSBA, or degree in related discipline required.

Network Analyst: Provides guidance and direction to M.I.S. management and data communications user community. Responsible for project coordination for large corporate data center. Knowledge of SNA software and hardware required. BS required.

Tariff Analyst: Analyzes national and state communications tariffs for impact on users. Will become expert on regulatory issues. Three to five years in modeling, business analysis, and statistical analysis is required. BS in Statistics, Financial Analysis, or related discipline.

Voice Communications Analyst: Assists in the management and procurement of PBX systems. Includes requirements analysis, cost justification, selection, and project management of implementation. Three years related experience. Bachelors degree required.

ENGINEERING SOFTWARE

Specialist: Supports Computer Automated Engineering (CAE) in electrical and mechanical areas. Examines, helps select, and tests software packages. Maintains knowledge of tools and has knowledge of languages such as ADA, *C*, and LISP. Provides technical supervision of small Engineering Computer Center. BSEE required. Masters preferred.

Programmer: Prepares and supervises preparation, testing, and documentation of programs, and reviews existing programs to recommend changes. Three years experience in engineering applications. BSCS or BSEE required.

SYSTEMS

Financial Systems Analyst: Assists users in implementation and turnkey problem resolution, and maintenance of financial package software. Must know COBOL and OS/JCL. 15% travel. Knowledge of IDMS/DC preferred. BS required.

Technical Representative: Responsibilities include systems analysis, project management, and customer account management. Experience with large-scale MVS or VM data center and JES3, TSO, VM/CMS required with knowledge of FOCUS, SAS, IDMS, IFPS, INFO a plus. BS required, MBA a plus.

Senior Systems Programmer: Responsible for data base and data communications software systems, including ACF/VTAM, ACF/NCP, TSO, IDMS/DB-DC, and CICS. Three years experience in an IBM MVS/SP environment required. VM/SP experience a plus. BS required. Masters a plus.

Billing Analyst: Responsible for maintaining charge-back system for computer resource utilization, system modifications, and management reporting. Three years programming experience in large IBM mainframe MVS environment and 1+ years of SAS programming experience required. Prior billing experience and use of JARS a plus. Bachelor's degree required.

SECURITY

Analyst: Evaluates, assesses and eliminates areas of vulnerability in current data processing systems. Requires experience with IBM 3081, 4341, and 3705 systems. BSCS or BSEE required. Masters preferred.

LOCAL INTERVIEWS

Members of our MIS Senior Staff will be traveling to several cities around the country in mid February to discuss these and other exceptional opportunities. Find out what HARRIS can mean to you and your future. To arrange for a confidential interview, call Susan Standley collect at 305/724-3915.

Or send your resume to:

Susan Standley
HARRIS Corporation
1025 W. NASA Boulevard
Melbourne, Florida 32919

An equal opportunity employer M F H V

HARRIS

MAPPER

RUN DESIGNERS

Call Agnes (212)-867-0219

An Equal Opportunity Employer M/F

3,000 SUNBELT OPENINGS

D.P. - ROBERT MONTGOMERY

Prog. Anal. (3 yrs H/P & COBOL)	to $33,000 NC location
Prog. Anal. (3 yrs Mfg. CICS & COBOL)	to $33,000 NC location
Prog. Anal. (2 yrs banking B&S & COBOL)	to 29,000 VA location
Sys. Progs. (2 yrs MVS or IMS)	to $40,000 NC location
Sys. Progs. (2 yrs NCP & VTAM)	to $40,000 FL location
Sys. Anal. (2 yrs tel. appl. & COBOL)	to $35,000 TN location

ENGINEERING - MIKE HUNTER

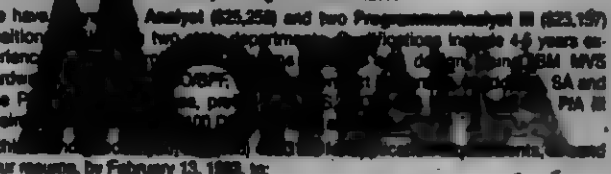
Systems Engineer(CRI)	to $70,000
Software Mgr's (Communications)	to $55,000
Software Engr. (Telephony)	to $50,000
Sr. Software Engr's (Mini-CRC or SYTEC)	to $35,000
Software Engr's (Microprocessor)	to $35,000

Fox-Morris is the nation's largest personnel consultant firm, with over 100 offices located throughout the nation. For a more understanding of our clients needs call 919/872-5040 or send resume to:

FOX-MORRIS ASSOCIATES
3101 Poplarwood Court
Raleigh, NC 27625

STATE OF MONTANA

Relocate to the year-round majestic beauty of Montana. Enjoy the unsurpassed hunting, fishing or backpacking opportunities, or experience the winter wonderland by snowmobiling or skiing. Work in Helena, a small city centrally located in the state between Glacier and Yellowstone National Parks. Live affordably within walking distance of [illegible] on country acreage within minutes.



We have [illegible] Analyst ($25,258) and two Programmer/Analyst III ($23,197) position[illegible] two [illegible] Qualifications include 4-6 years experience [illegible] IBM MVS hardware [illegible] SA and one P[illegible] PIA III desir[illegible] If th[illegible] your resume, by February 13, 1984, to:

State of Montana
Department of Revenue
Research and Information Division
Mitchell Building
Helena, Montana 59620

An Equal Opportunity Employer

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

SYSTEMS PROGRAMMER

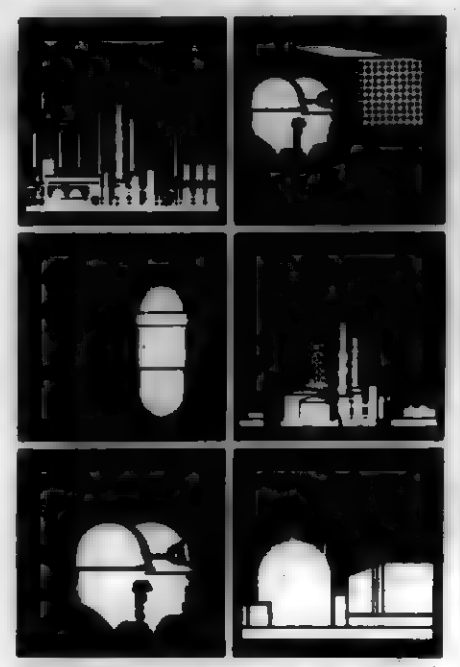
Challenges matched to your expertise ...facilities to make the most of it.

As a diversified leader in energy systems, Combustion Engineering is advancing the technologies needed for energy solutions. In our highly sophisticated state-of-the-art Computer Center located in Windsor, Connecticut, we're solving complex business problems by applying the capabilities of one of the most comprehensive data processing and communications networks in operation. The challenges are here for those who are up to them. The environment is right for demonstrating technical leadership.

As a Systems Programmer, you will be heavily involved in modification and maintenance of IBM systems control programs, as well as major subsystems and access methods. Your qualifications will include a minimum of 4 years experience with the internal structure of JES-3 and at least one of the following major IBM systems control programs or subsystems: MVS, SMP/SMPE or VM.

In addition to offering an excellent salary and a fully-paid benefit package, we provide computer time during the day. No more having to be at the Data Center at midnight to do your testing.

For prompt, confidential consideration, forward your resume, including salary requirements, to: Mr. Vincent C. Vallario, Jr., Combustion Engineering, 90 Lamberton Road, Windsor, CT 06095.



COMBUSTION ENGINEERING

The Energy Systems Company

An equal opportunity employer, m/f

MCI INVESTS!

IN PEOPLE... EQUIPMENT... NETWORKS... YOU

Washington, DC Metro Opportunities

These are incredibly exciting times at MCI... and incredibly opportune times for energetic data processing professionals ready to make a big career move. Without question, the most dynamic technical revolution in the world today is in telecommunications.

And MCI is leading it!

Right now we have urgent needs for:

SENIOR GRAPHICS ANALYSTS

You will lead the development of graphics software for our Control Center utilizing state-of-art technology. You should have a solid background in scientific or engineering graphics applications in a real-time or interactive minicomputer environment.

SYSTEMS PROGRAMMERS

You will be our in-house expert in PRIME minicomputer internals and provide technical support to one of our key programs. You should possess an excellent knowledge of mini operating systems internals, assembly language and have had two or more years' experience as a PRIME systems programmer.

Relocation assistance is available.

If you would like to become a part of this elite team of professionals, call Jim Moore collect at (703) 442-3457, or send your resume and salary requirements to: Human Resources, MCI Telecommunications Corporation, 701 South 12th Street, Dept. 402, Arlington, Virginia 22202. An Equal Opportunity Employer M/F/H/V.

MCI Telecommunications Corporation

Compiler Developers

There are several opportunities to join a team of software engineers that have established an excellent record in the field of commercial compiler development. Reporting directly to the Section Head commercial compiler development, you will assume a technically challenging role that will lead to excellent growth opportunities...opportunities that exist only with a computer manufacturer.

Ideally, you will have a total of 2-6 years' experience in compiler development. One position in particular requires in-depth experience with code generation.

To investigate these positions, please forward your resume to Russ Whyte, Honeywell Information Systems, MS804 B5L, 300 Concord Road, Billerica, MA 01821. An Equal Opportunity Employer M/F/H.

Together, we can find the answers.

Honeywell

Outstanding Software Opportunities

ISC Systems Corporation designs, manufactures and markets on-line terminal systems for financial institutions. We are seeking additional SOFTWARE PROFESSIONALS with assembler language experience. Our system utilizes a unique architecture incorporating a Z-80 microprocessor and a sophisticated multi-tasking operating system.

Installation Software Engineers

Our software engineers are responsible for coding and installation of our customized financial applications software. Customer interface is required. For the San Juan opportunity, you must be bilingual Spanish/English. We have openings in the following areas:

Atlanta Dallas Colorado San Juan Glendale Menlo Park

In addition, we have additional opportunities in our Atlanta Regional Headquarters:

Software Customer Support Manager

This position requires prior experience directing on-going software support combined with a strong technical background, preferably with microprocessor-based assembler. Strong customer relations skills and prior experience managing a small group of professionals is also required.

Systems Conversion Specialist

This individual interfaces closely with customers to develop functional specifications. You must have heavy experience with banking operations and data processing. Travel required.

We offer competitive salaries including incentive bonuses, company paid benefits and flexible working hours. Send resumes to: Mike Robertson,

ISC SYSTEMS CORPORATION
1100 Circle 75 Parkway, Ste. 300
Atlanta, GA 30339
equal opportunity employer

DP POSITIONS SEATTLE/PORTLAND

MVS, Sr. Systems Programmer $40K

Sr. IMS Systems Prog. 40K
Systems Performance-data base consultant to applications group.

Sr. Programmer/Analyst 30K
Financial app. CICS/DL/1 on-line interactive.

Programmer/Analyst 25K
CICS/DL/1 or VSAM on-line dev.

Sr. PIA IMS applications dev. ..... to 40K

Data Admin. Analyst ..... to 40K
Data resources Mgmt lead DP design.

Please forward resume immediately to:

HOUSER, MARTIN MORRIS & ASSOC.
(206) 463-2700
Bellevue, 10455-116th Ave. N.E.
Bellevue, WA 98004

Systems Manager (Financial/Administrative)

The Medical University of SC is seeking applicants for Financial/Administrative Systems Manager. Applicants should possess a Master's degree in business administration and an undergraduate degree in computer science (or the equiv), and at least 5 years experience to include on-line multi-processing systems, data base access methods and testing systems of commercial code preferred. Must have proven capabilities and skills. Additional certification (e.g. CDP, CCP(Business), or CPA) must desirable. Faculty teaching appointment possible. Located in coastal, southeastern coastal city. Excellent fringe benefits. Salary range $26,100 to $35,500. Qualified applicants send resume to:

Ms. Joan Strickland
Employment Manager
Medical University of SC
Summerall Center
Charleston, SC 29425
EOE M/F/H

Data Processing Systems Engineer IV $33,676 Annual

Install/maintain IBM operating systems VM, DOS/VSE, and CICS. Degree with major in data processing or computer science and 4 years experience as systems programmer/engineer or equivalent. Close is 2/17/84. Apply in confidence to:

Snohomish County Personnel
First Floor Administration Bldg.
Everett, Washington 98201
(206) 259-9442
E.O.E.

LOOKING?

Find the job you want in Computerworld's classifieds. No other publication carries as many ads for computer professionals as Computerworld, so no other publication can give you as wide a choice of jobs, salary and location as Computerworld.You can even try a "Position Wanted" ad to look for exactly what you want, where you want.

Be sure you look over our recruitment ads every week, so you don't miss the opportunity that's just right for you.

Experienced Computer Sales & Marketing Representatives

Get off the sales rollercoaster with strong sales support, stability...and opportunity.

The HP Way.

If you're tired of the same old promises, consider Hewlett-Packard. We have outstanding opportunities for career-minded professionals with 2 or more years' specialized sales experience in the minicomputer field. With a degree in engineering, physics, math, computer science, business or the equivalent combination of education and experience, you could qualify for consideration.

1. Bellevue, WA
2. Santa Clara, CA
3. N. Hollywood, CA
4. Los Angeles, CA
5. Englewood, CO
6. St. Paul, MN
7. Rolling Meadows, IL
8. Farmington Hills, MI
9. Dallas, TX
10. Houston, TX
11. Atlanta, GA
12. Raleigh, NC
13. Orlando, FL
14. Lexington, MA
15. Paramus, NJ
16. Valley Forge, PA
17. Rockville, MD

and other cities across the U.S.

Careers are yours for the making.

HP offers more than a job. You can reach the top of your field right across the nation. But you'll need to be creative, enthusiastic and have the business maturity and technical know-how to interface effectively with end user decision makers.

Two areas of opportunity for Experienced Field Sales Representatives -

Technical Computer Sales

These positions are responsible for selling HP's technical computer products to scientific, technical and manufacturing customers in your assigned territory.

Besides degree or equivalent, 2 years' successful CAE/CAD/CAM or manufacturing minicomputer sales experience is desirable.

Commercial/Business Computer Sales

These positions are responsible for selling large-scale minicomputers, primarily to the manufacturing market. As well as managing the existing customer base in your assigned territory. Besides degree or equivalent, 2 years' successful business computer sales experience is desirable.

Invest in your future... long term.

We rank high among major computer companies in terms of sales growth, earnings, product innovations and employee retention. This means career stability... year in and year out. It starts with in-depth training for up to 10 months, covering every aspect of the business... from learning the HP product line to the most sophisticated sales techniques. You'll quickly gain hands-on experience working with senior HP people.

With HP you'll reap the benefit of rapid production, delivery and installation, plus strong pre-and post-sale technical support. Because our credo is "productivity - not promises."

Consider the HP advantages.

Besides excellent compensation and benefits, you'll find your career progression with us a lot smoother than what you've experienced in the past. For immediate consideration, please send your resume with salary history, indicating your preferred city.

Eastern Region
Murray Kaplan
HP Dept. CW
4 Choke Cherry Rd.
Rockville, MD 20850

Midwest Region
Barbara Moyer
HP Dept. CW
5201 Tollview Drive
Rolling Meadows, IL 60008

Southern Region
Karl Paul
HP Dept. CW
2000 South Park Place
Atlanta, GA 30339

Susan Benson
HP Dept. CW
930 E. Campbell Road
Richardson, TX 75081

Western Region
Blair Farr
HP Dept. CW
3939 Lankershim Blvd.
N. Hollywood, CA 91604

HEWLETT PACKARD

An Equal Opportunity/Affirmative Action Employer
No Agencies Please

COBOL/CICS PROGRAMMERS

With Financial Programming Experience

ORLANDO, FLORIDA

Système, one of the fastest growing companies in the financial systems manufacturing industry, is now adding IBM capabilities to its established DEC shop. Utilizing the latest in minicomputer based terminal systems, our products are designed to automate banking financial functions. We're well financed, well-organized and solidly on our way to industry leadership.

To qualify for these start-up opportunities you must have at least 3-5 years COBOL/CICS experience *with financial (banking, S&L) applications*. Hands-on experience with IBM 4300 or IBM 34/36 also necessary. (Knowledge of both is a strong plus.)

As a member of the Système team, you'll enjoy an excellent salary, comprehensive benefits, and the kind of career potential that can only be found in a vital growing organization. For immediate consideration, please send your resume in confidence to: Personnel Manager, Dept. CW-130

Système Corporation
3443 Parkway Center Court
Orlando, Florida 32804
(305) 298-8180

Equal Opportunity Employer M/F

ADP COORDINATOR
- for 3000-bed health care system in Ohio to serve as Senior Program/Systems Analyst to establish and maintain a new state-of-the-art ADP system. Must have specific knowledge of mini-computers, DEC hardware, operational systems, MUMPS and other application programming languages. 3 yrs. experience in a computer field such as computer specialist or ADP system design. Salary based on experience. Benefits: Medical retirement plan, group health/life insurance, sick leave, vacation leave, 9 paid holidays/year. Contact: Personnel Service, Cleveland VA Medical Center (Brecksville Unit), 10000 Brecksville Road, Brecksville, OH 44141. Telephone (216) 526-3000, ext. 201, 202, 452.

SUNBELT *IMS*

California to Florida

Immediate need for application and software DBA, CICA, ISMS, PARMS, TOTAL and ADA-ABAP professionals. Coast to coast coverage. Contact us now and make future moves a necessity! Call collect or send resume.

SUPERIOR RESOURCES

Personnel Services - Employer Retained

17141 Ventura Blvd. #205
Encino (Los Angeles) CA 91316
(818) 385-4488

Member National Computer Assoc.

VM SYSTEMS PROGRAMMERS

intel

It's 72° in Phoenix today!

Start the year off with a change. Intel Corporation, a frontrunner in microprocessor technology is looking for VM Systems Programmers for our facility in sunny Phoenix, AZ. Our environment includes IBM 3081K-24, 3083, 3032 and 4341 processors running VM/SP and HPO. Requirements include IBM assembler language, VM installation and maintenance and EXEC experience. SSCS and 1 to 5 years experience is necessary.

For prompt consideration, call Mike Gore Collect at (602) 869-4469 or send your resume to Intel Corporation, Dept. 7452, 2402 W. Beardsley Rd., Phoenix, AZ 85027. An Equal Opportunity Employer M/F/H.

Additional opportunities exist in Santa Clara, CA; Portland, OR; plus Field Sales/Service openings throughout the entire U.S.

intel winners by design

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

You've Earned The Right To Have A Choice And The Right Choice is

THE NORTHERN TRUST...

Our reputation for professional excellence is based on the combined talents of many different people with many different areas of expertise. In our progressive technological environment you'll be involved in a variety of DB system functions. Our state-of-the-art environment will allow you to choose either a technical or a management career path. And best of all, at THE NORTHERN TRUST your individual accomplishments will be recognized.

SR. PROGRAMMER/ TECHNICAL ANALYST— DEC-VAX

Position requires 1-3 years background on DEC-VAX hardware and 1-2 years FORTRAN programming experience. Primary responsibility will be the development of our new state-of-the-art Electronic Delivery System using specialized 4th generation software. Several openings, all requiring user contact.

MINI COMPUTER/ TELECOMMUNICATIONS SUPPORT

Position requires 2+ years programming on mini's, excellent communication skills and knowledge of mini BAL, MVS Utilities, TSO and JCL are a definite plus. Selected candidate will provide systems programming support for our mini computer & telecom systems. Duties involve problem determination & resolution, vendor interface, performance monitoring & tuning and consulting/ assisting application development activities.

You have a choice, so make the right choice and accomplish your goals...THE NORTHERN TRUST. Send resume in confidence or contact: M. SCHNEIDER (312) 630-6000 EXT. 3000

The Northern Trust Bank

50 South La Salle Street
Chicago, Illinois 60675

An Equal Opportunity Employer M/F

EXPERIENCED UNIVAC MANAGERS & TECHNICIANS

Grumman Data Systems has many openings available for experienced UNIVAC 1100 personnel, at various levels, in these categories:

- SYSTEMS PROGRAMMING
- DATA BASE ADMINISTRATION
- DATA COMMUNICATIONS
- COMPUTER OPERATIONS

These openings are in New York City and our Long Island facilities and they offer outstanding career opportunities.

Grumman Data Systems offers a competitive salary, superb comprehensive company paid benefits including health, dental, an incentive bonus program and of course, relocation.

Insofar as we have so many openings in each category, we urge you to respond promptly by forwarding your resume, in confidence, to:

Henry Meyers, Dept. CW 122
GRUMMAN DATA SYSTEMS
1111 Stewart Avenue
Bethpage, NY 11714

GRUMMAN

An Equal Opportunity Employer
U.S. Citizenship Required

Systems Administrator

Applications are now being accepted for a supervisory level position in the City of Grand Rapids data processing center. The position offers a wide latitude for initiative and personal growth. An IBM 4381 is currently in use.

Grand Rapids is located in the heart of Western Michigan's West Michigan Recreational Region and offers recreational activities are close at hand. Within 30 miles of beautiful Lake Michigan with its sand beaches.

Applicants should have college degree with a sound base of past experience including some supervisory background.

Salary range: $27,457 to $34,670 per year plus a full range of fringe benefits. Appointment at above minimum salary dependent on qualifications.

An affirmative action and equal opportunity employer.

Send resume to Andrew R. Vanderwerp, Personnel Director, Room 310, City Hall, Grand Rapids, Michigan 49503.

MIDWEST PROGRAMMER/ ANALYST

Material handling company is seeking several individuals to join industrial/process control software team. D.E.C. R.S.X. and V.A.X. Fortran and/or Pascal Degree in computer science or equivalent. At least 2 years in design /programming of integrated systems. Communication skills required. Send resume to:

CONCO-TELLUS INC.
SOUTH 14TH AVENUE
MENDOTA, IL 61342

Equal Opportunity Employer

Programmers

If you are mobile and wish to work for a large consulting firm and have:

OS, COBOL, TSO

We Need 20 for our Client Company
We Also Need 5 With CICS
Salary to $30K

Mail Resume or Call Collect:
Executive Consultants
1499 Fairfield Avenue
Suite 102
Shreveport, LA 71101
(318) 222-1999

PROGRAMMERS • SYSTEMS ANALYSTS • PROGRAMMER/ANALYSTS
IMS • IDMS • CICS • COBOL • C-BASIC • PL/I

Help CGA set the standard in consulting.

Over the last 15 years, CGA has acquired a solid reputation as the number one DP consulting firm in the nation. Our people built that reputation by insisting on the highest standards of integrity, achievement, and technical excellence.

If you're a DP/Professional with at least two years experience who shares the same standards we do, CGA can offer you challenging assignments, a state of the art work environment, and an exciting career. Our salary/benefits program matches the demands of the job.

Help set the standard. Call CGA today, or send your resume in complete confidence to:

Allen Services Division
212 West National Road
Vandalia, OH 45377
800-543-7863. In Ohio, call
(513) 898-1299 collect.

cga

Setting the Standard in Consulting

CONTRACT SR. PROGRAMMER/ANALYSTS up to $30/Hour

Positions are immediately available in many locations in Texas, Louisiana & Oklahoma.

To qualify for one of these positions, you must have a minimum of 3 to 5 years experience as a:

SR. SOFTWARE PROGRAMMER - 3033
SR. DATA BASE ADMINISTRATOR - IMS, DB/DC
SR. PROGRAMMER/ANALYST - IMS, DB/DC, FOCUS, PL/1
SR. PROGRAMMER/ANALYST - CICS, COBOL
SR. PROGRAMMER/ANALYST - ADA-BASE
SR. PROGRAMMER/ANALYST - HP 3000
SR. PROGRAMMER-COBOL, PL/1, TSO, SPF

Applicants ready to begin NOW, please forward your resume and call George Johnson COLLECT between 8am - 6pm (CDT) for an interview appointment in your city.

JPS, Inc.

2525 FM 149 • #291 • Houston, TX 77070
Out of State-1-800-231-5965
In Texas-713-370-6565

NO AGENCIES PLEASE
POSITIONS AVAILABLE EVERYDAY EVERYWHERE IN THE USA.

we are an equal opportunity employer m/f

GIBRALTAR

PROGRAMMER ANALYSTS

Gibraltar, a leader in the financial industry, has immediate career opportunities available for experienced Programmer/Analysts in our Burbank Data Processing Center. Requirements include at least 2 years on-the-job experience in an IBM DOS/VSE or OS/MVS Assembler language environment. CICS experience is a plus.

Our benefit package includes excellent medical/life/dental insurance as well as a mortgage and auto loan assistance program. 1984 promises exceptional growth for Gibraltar. To find out how you can become a part of this growth, please send your resume to:

Sarah Christensen
Sr. Technical Recruiter

GIBRALTAR FINANCIAL GROUP
12309 Oxnard Street, W-4
North Hollywood, CA 91606

T.M.

GIBRALTAR FINANCIAL GROUP

An Equal Opportunity Employer M/F/H/V

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

PROGRAMMER/ ANALYST

We are a leading university seeking a COBOL programmer/analyst with 4+ years experience on HP3000. Image, Query, Vista, Cobol, SPL a plus. Will develop and support ongoing administrative systems such as registration, grades, attendance, A/P, A/R, etc.

Excellent benefits include one month vacation, free tuition, comprehensive health insurance.

Send resume including salary history and requirements to:

MS. L. MeADAMS,
Personnel Dept.
NEW SCHOOL FOR SOCIAL RESEARCH
66 W 12 St
New York, N.Y. 10011

An Affirmative Equal Opportunity Employer

RAISING CAREERS SOUTHEAST

Renowned DP banking agency for Project Mgrs, Project Leaders, Prog Analysts & Programmers with majors, bons, transitional DBMS software exp., desktop plus, track transfer, OPCS and Cash Mgmt, RDBMS software desired plus.

MFG. OPPTYS

Business Systems Consultant - requires knowledge of budget planning, inventory control, distribution, and order processing. Individuals should have strong user interface skills. Limited travel required.

Business Systems Analyst - requires exp with automated systems. Tech skills should include COBOL, online systems design/implementation.

For further information on the above and other excellent opptys for career growth, contact Larry Stone at (704) 375-0892 or send resume in confidence to:

FOX-MORRIS
212 S. Tryon St/Suite 1360
Charlotte, NC 28281

SYSTEMS PROGRAMMER

Aggressive Billion $, Sunbelt Bank, expanding its technical staff, seeks IBM Systems Programmer.
Our current environment includes RACF, JCS 2, CICS.
Candidate should possess application programming background and a minimum of three years 4341 MVS systems programming experience. Proficiency with SMP4 is a plus.
Send resume and salary requirements to:

Southern National Bank of N. C.
c/o Jerry M. Barnes
P. O. Box 1489
Lumberton, N. C. 28359

An Equal Opportunity Employer M/F/H/V

Programming

•Senior Programmer Analysts •Systems Analysts •Senior Systems Analysts •Software Support Specialist

Computer Sciences Corporation's National Flood Insurance Program is continuing its expansion into numerous projects that offer opportunities ranging from heavy restructuring and enhancements through "groundbreaking" systems analysis, design and development, to requirements identification and specification writing. The following positions may contain the senior analysis functions, the technical development, or increasing responsibilities that will advance your current career.

• Senior Systems Analysts and Systems Analysts

This unit will aid in initiating a major, nationwide sub-system that emphasizes extensive specification writing, requirement and element analysis, general design and development, and heavy client interface. Qualifications include minimum six years of COBOL programming, preferably on OS IBM environments, two years of independent systems analysis, and good written and verbal communications skills. CICS experience, project leadership, and insurance applications are extremely desirable.

• Senior Systems Analysts and Senior Programmer Analysts

This team will be responsible for major systems and programming analysis, redesign, redevelopment, and modification efforts for primary sub-systems. Qualifications include three to six years of COBOL programming background. MSA, accounting/financial applications and CICS experience extremely desirable.

• Software Support Specialist

This individual will provide technical guidance and procedural development for our data processing center, specializing in all systems programming functions. These responsibilities include analyzing software utilization, developing all performance measurement and benchmark testing efforts, and system optimizing and troubleshooting the major on-line systems. Qualifications include five to twelve years of systems programming background including heavy OS MVS internals, command level CICS, and two years operational knowledge of DASD and VSAM.

Our environment features the IBM 4341 and 3083, running OS MVS, CICS, and TSO SPF.

CSC offers easy access off the Beltway, a professional work atmosphere, competitive salaries, and a benefits package including tuition reimbursement, pension plan, stock option, credit union, and employer-paid medical/dental plans.

For immediate consideration, please call Mr. Rex Scott at (301) 982-2107 or send resume. After-business-hours and weekend interviews can be arranged at your convenience.

CSC
COMPUTER SCIENCES CORPORATION

N.F.I.P.
9901-A George Palmer Highway
P.O. Box 450
Lanham, Maryland 20706
An Equal Opportunity Employer

Data Processing

LEAD SYSTEM ANALYST

American Isuzu Motors, an automotive importer/distributor, is seeking an experienced System Analyst with a background in project management.

The successful candidate will have a B.A. degree or equivalent and 2 - 4 years previous experience as a lead system analyst. Two years supervisory experience required with business knowledge of automotive industry desirable. Good written and verbal communication skills necessary.

The primary responsibility is to compile business requirements for computer system design which includes operation survey, data base and general system design, and preparation of documents for users and programmers.

We plan to upgrade our system in '84 and '85 corresponding with the growth of our company. We offer excellent company paid benefits including all-group insurance.

Send resume with salary history to:

American Isuzu Motors Inc.
P.O. Box 2280
City of Industry, CA 91746
Attn: Personnel Dept.

Principals Only
NO TELEPHONE CALLS PLEASE

ISUZU

Equal Opportunity Employer M/F

DATAPOINT

- PROGRAMMERS
- ANALYSTS
- OPERATORS
- SALES PEOPLE

JOBS IN 40 US CITIES NATIONWIDE.
NOT AN AGENCY
SEND RESUME TO:

TIM TANNER
1977 K STREET, NW
SUITE 201
WASHINGTON, DC 20006

WASHINGTON D.C.

DATABASE SPECIALIST

Know IMS, IDMS, or Model 204? YES! Our client needs you now for brand new projects! Experienced professionals required. To $55K.

ROBERT HALF
OF WASHINGTON, INC.
7315 Wisconsin Ave Suite 400
Washington, D.C. 20814
(301) 656-1600

NEW FACULTY POSITION
GRADUATE SCHOOL OF BUSINESS NEW HAMPSHIRE COLLEGE

The Graduate School of Business is seeking a full-time graduate faculty member in the area of:

COMPUTER INFORMATION SYSTEMS (CIS)

NEW HAMPSHIRE COLLEGE is a private, coeducational institution located on a dual-site campus in Manchester and Hooksett, New Hampshire. The College's facilities include an outstanding business library and state-of-the-art computational systems; its central location provides easy access to the high-tech environs of Boston for research and other activities, and to New England's diverse recreational areas.

The GRADUATE SCHOOL OF BUSINESS offers both MBA and MS degree options in a number of business disciplines. The enrollment of 1,400 full and part time students is served by a FTE faculty of 40.

Excellent benefits and salary package.
Closing date is 3/15/84.

Send resume to:
Dr. Jacqueline F. Mera, Dean
Graduate School of Business
New Hampshire College
2500 River Rd., Manchester, NH 03104

new hampshire college

New Hampshire College
is an equal opportunity/affirmative action employer

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

Systems & Applications Programmers

NCR's growth in Office Automation Systems generates openings in Columbia, South Carolina

NCR's Office Systems Division in Columbia is responsible for the success of the WORKSAVER and a family of multi-function, shared resource systems. These systems, designed to increase productivity and solve problems in the office environment, have met with strong customer demand, creating several new openings in our R&D facility.

The areas include:

Distributed Systems Software Development

Including microcomputer operating systems, I/O drivers, distributed Db management systems, SW to control peripheral interfaces, electronic mail SW for UNIX* based systems, networking capabilities, and systems test/integration.

Customer Service Support Center

Provide direct customer support via "800" toll free service including fault isolation, problem resolution in operating systems, systems and applications SW, communications, a variety of SW development tools and vertical market applications.

Third Party Software Acquisition Specialist

Providing third party SW for the Division Marketing organization, including locating, evaluating, negotiating contracts, internal marketing, and marketing support.

Qualifications for these positions include BS/MSCS and experience in one or more of the following:

- DBM, DDP
- UNIX*, CTOS, CP/M, MS-DOS
- IMS, CICS, DISOSS, FOCUS
- DISTRIBUTED OFFICE AUTOMATION DATA COMMUNICATIONS, TELECOMMUNICATIONS, SNA
- TECHNICAL SUPPORT TO CUSTOMERS
- MICROCOMPUTER EXPERIENCE
- PASCAL, BASIC, FORTRAN, COBOL, PL/1 and C
- MICROCOMPUTER SOFTWARE SALES EXPERIENCE

Explore the career opportunities that the $3.5 billion NCR Corporation offers...along with the many attractions of Columbia's sun-belt location. Send confidential resume with salary history to: Gordon Davidson, Personnel Resources, Dept. N66, NCR Corporation, 3325 Platt Springs Road, West Columbia, South Carolina 29169.

NCR
Complete Computer Systems

An equal opportunity employer

*UNIX is a trademark of AT&T Bell Laboratories

BUSINESS SYSTEMS ANALYST

Bank of Boston, New England's #1 Bank, is seeking a Business Systems Analyst for our Systems Research Department, Information Systems and Services Division.

You will cross divisional lines to conduct independent feasibility studies and analyze business problems and opportunities, as well as new Bank services. You will define problems, plan and conduct research, and plan and implement recommended solutions. You will also develop and write procedures, policy bulletins and manuals governing systems and operations.

You must have a relevant college degree and three to four years of systems exposure, preferably in banking. You must also possess superior analytic and communication skills (written and verbal), and self-confidence to work in a multi-project environment under tight time constraints.

If you think that you are among the top 10% of your peers and that you qualify for this position, please send your resume and salary requirements to Thomas Mateen, Bank of Boston, P.O. Box 1976-SSC, Boston, MA 02105.

1784

BANK OF BOSTON

© 1984 The First National Bank of Boston

An Equal Opportunity Employer M/F

HIRING?

More computer people read Computerworld than any other newspaper in the United States - more than half a million computer people every week.

And, among our 529,650 readers at user organizations, about half claim to look at recruitment ads at least every other week (only a small percentage say they never look at recruitment ads).

No wonder Computerworld carries more recruitment ads for computer people than any other publication.

To place your ad or to get a rate card with complete details on Computerworld Classifieds, call or write:

Classified Advertising
COMPUTERWORLD
Box 880
Framingham, MA 01701
1-800-343-6474
617-879-0700

Pacific Telecom's aggressive diversification into new markets and strong traditional bases of operation in telecommunications have created a new opportunity for a

PROGRAMMER/ ANALYST

in the beautiful Pacific Northwest

Specify, code and test computer programs, working with our Systems Analyst. In addition, you will be involved in translating information requirements into systems design, analyses and documents user needs and keeping abreast of technological developments in order to participate in the development of computer application systems.

Candidates will have 2-4 years VAX programming experience and knowledge of BASIC, COBOL and FORTRAN . Datatrieve and FMS experience desirable.

Our salaries and benefits are outstanding as is our new Corporate Headquarters environment.

PACIFIC TELECOM

For consideration, please send your resume, with salary history to, or phone Isaac Dixon, Personnel Analyst, PACIFIC TELECOM, P.O. Box 9901, Vancouver, WA 98668-9901. (206) 696-6891. Equal Opportunity Employer.

Programmer Analyst

The Trane Company, a leading manufacturer of air conditioning products has positions available for programmers and programmer analysts.

Programmer Analyst

Applications include marketing, manufacturing and financial systems development in an MVS, IMS, DB/DC environment.

Micro Software Programmer

Provide technical hardware and software support of micro computers with access to Trane host computers.

The Trane Company headquarters are in LaCrosse, Wisconsin, a beautiful, medium-sized city on the Mississippi River. LaCrosse is a business, cultural, educational and recreational center and an ideal place to live and work. Interested candidates should send resume and salary history in confidence to:

Staff Employment
The Trane Company
Department 133
3600 Pammel Creek Road
LaCrosse, Wisconsin 54601

TRANE™

An Equal Opportunity Affirmative Action Employer M/F/H

ACP PARS TPF

100 + current openings for systems and applications specialists (non-contract). 1-10 years experience. $25,000 to $65,000. Our clients' present needs also include several manager positions.

We specialize exclusively in ACP/PARS/TPF and are in contact with all 40 installations across the country. Whatever your salary, geographic or career goal, we can help. Your resume will be handled in absolute confidence and NEVER will be submitted to a company without your prior approval. Send resume or call

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

DIRECTOR OF M.I.S.

Join one of the world's most respected medical test manufacturers now establishing a new headquarters operation in an attractive mid-West city. You report to the V.P. Finance for this autonomous division of a two billion dollar manufacturing company.

The environment is a 4000 user supporting array of three manufacturing locations, on the VAX, CICS and COPICS. Responsibilities will be relocation of 4000 to the mid-West headquarters, staff to support the expanded responsibilities and support of COPICS implementation at the third manufacturing facility.

Prior experience must include track record, manufacturing, 4000, MRP II, Manager or Director M.I.S. (Dir), multi location support.

Personal qualities required: enthusiasm, team player, communications skills, analytical. Thrive on responsibility and accountability.

We want a pro who would enjoy an opportunity to participate in a demanding business with a management team who's committed to success and understands the vital contribution they need from MIS.

Reply to CW-B4888
Computerworld
Box 880
Framingham, MA 01701

UNIVERSITY OF CALIFORNIA, BERKELEY
ASSISTANT VICE CHANCELLOR-INFORMATION SYSTEMS AND TECHNOLOGY

Newly created position responsible for formulation and evaluation of policies for development and management of all campus information and computing systems, services, facilities and networks. Assist the administration in the selection and implementation of such policies. Supervise administration of campus computing facilities. Provide liaison between segments of the computing community, the administration, and external agencies. Reports to Vice Chancellor-Research. Position available July 1, 1984. Preference given to applicants eligible for regular faculty position.

Qualifications: Demonstrated managerial competence and ability; capability of performing functions outlined above; experience and skill-ware in computing and information systems.

Salary: Negotiable

Send application with full professional resume and five references by March 1, 1984, to: Chair, Search Committee, Office of Vice Chancellor-Research, 200 California Hall, University of California, Berkeley, California 94720.

The University of California is an Equal Opportunity, Affirmative Action Employer.

Systems Manager (Medical)

The Medical University of SC is seeking applicants for Medical Systems Development Manager. Applicants should have a Master's degree in computer science and an undergraduate degree in health care science (or vice versa), and at least 5 years experience in hands on multi-processing, interactive data base access methods and installation of IBM Patient Care System. Must have proven managerial skills. Additional certification (e.g. CDP, MIYASCP), MRA) most desirable. Faculty teaching appointment possible. Located in cosmopolitan, southeastern coastal city. Excellent fringe benefits. Salary range, $25,100 to $35,600. Qualified applicants send resume to:

Ms. Jean Strickland
Employment Manager
Medical University of SC
Bunnerstall Center
Charleston, SC 29425
EOE M/F/H

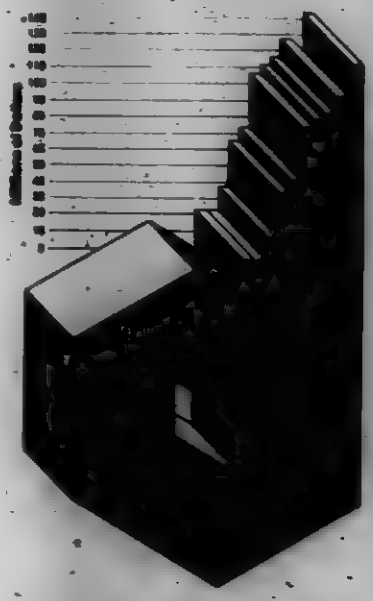
SR. PROG. ANALYST INTERNATIONAL DIV.

An oppty for growth & international travel exists with major pharmaceutical co. Ideal candidate should possess strong accounting background; RPG II or COBOL & business application exp. User interface is essential.
$37,000 FEE PAID

ROBERT HALF
Robert Half International, Inc.
320 Fifth Avenue
New York, N.Y. 10001
212-221-0808 (Agency)

Engineers & Software Designers

BE A PART OF A LIVING AMERICAN SUCCESS STORY!



Since 1961, we have grown from 11 to over 750 employees. As of third quarter, 1983, sales have grown from market entry to over $87 million and order backlog to over $144 million. The reason? Customer oriented design, marketing and servicing of advanced digital switching systems that meet the needs of today...and tomorrow. If you would like to be part of a group that is writing a new chapter in telecommunications history, consider the following areas:

CALL PROCESSING

Design and development of real time telephone, attendant, trunk control and call processing software. Will be heavily involved in the development of central office (Class 5 switch).

MAINTENANCE/DIAGNOSTICS

Design and development of configuration, control and diagnostic software for distributed processing systems.

OPERATING SYSTEM

Design and development of real time operating systems software for distributed microprocessor based systems.

SWITCH ADMINISTRATION

Design and development of administration, data base and message accounting software.

All positions require a BS/MS CS, EE, Math or related discipline. Experience with assembly language and/or "C" highly desirable.

We can offer competitive salaries, extensive company-paid benefits, and excellent potential for professional recognition and advancement. For prompt consideration, please send your resume to:

Staffing Manager
Dept. CW0130E
Digital Switch Corporation
P.O. Box 830911
Richardson, Texas 75083-0911

equal opportunity employer

HELP WRITE A NEW CHAPTER IN TELECOMMUNICATIONS HISTORY

DATA PROCESSING POSITIONS

The New Jersey Department of Higher Education is currently seeking individuals with a solid record of performance and experience in the areas listed below:

TECHNICAL SUPPORT SERVICES
Manager Technical Support Services
Systems Programmers
OPERATIONS
Communications Control Specialist
Computer Operators
DP Librarian
SYSTEMS AND PROGRAMMING
Project Coordinators
Systems Analysts
Applications Programmers
ADMINISTRATION
Administrative Analyst
(DP and Management)

Relevant equipment includes: IBM 4300X mainframe supporting MVS/SP, JES2, TSO/SPF, CICS, GDDM/PSF, BAS Graph, ACF VTAM, NSNF and NCCF/NPDA; This system will support 8100 DPCX/DOSF systems and 3270 terminal users through an IBM 3725 communications processor.

Closing date for accepting resumes will be February 10, 1984. Send resume and salary requirements to:

Personnel Office-DP-4
New Jersey Department of Higher Education
225 West State Street
Trenton, New Jersey 08625

Affirmative Action/Equal Opportunity Employer Veteran's Preference is Encouraged

---

FACULTY POSITION

Applications are invited for a tenure-track faculty position and several anticipated tenure-track positions, in the Computer Science department at Instructor, Assistant, Associate, or Professor level. Starting date is August 16, 1984. A Ph.D. in Computer Science or closely related field is preferred. For Associate or Professor level the candidate must have a Ph.D. in Computer Science or related field with either teaching or industrial experience. The Computer Science department is a part of a newly created Center for Aerospace Sciences. The department offers a full range of undergraduate courses to 600 majors and a variety of service courses to the general student body. The computer equipment includes IBM 4341, Interdata 832, PDP 11/44 and various microcomputers. Addition of IBM 3081 and a VAX is expected in the spring of 1984. The department is expecting to be in the new multi-million dollar Aerospace Sciences building in January of 1984. Numerous opportunities exist in cooperation with aerospace research projects. A Masters program in Computer Science is currently being developed. Salary is open and competitive. Benefits include TIAA-CREF and Blue Cross - Blue Shield. A Group disability insurance is also available. The candidate must be either a U.S. citizen or eligible for permanent resident status. Deadline to apply is March 15, 1984 or until the position is filled. Send resume and three letters of reference to: Dr. Mark Tuley, Computer Science Department, Box 6161 University Station, Grand Forks, ND 58202. UND is an equal opportunity institution.

PA

There is a POSITIVE ALTERNATIVE for your career!

We are a progressive consulting firm located in Atlanta, Georgia. We have permanent positions available of most skill levels. Current needs are:

CICS • DL1 • COBOL
LIFE COMM • LIFE 70
UNIVAC-1100 • DMS-1100 • TIPS • HVTIPS
TANDEM • COBOL • TAL

We offer dental, major medical, life, prescription card, between project pay (you would be permanent staff), overtime pay, and expenses if travel is required.

To pursue your Positive Alternative, send your resume today.

PROGRAMMING ALTERNATIVES, INC.
7094 Peachtree Industrial Blvd.
Suite 295, Norcross, Georgia 30071
(404) 447-8773

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

AUDITOR – EDP

The World Bank, a leading international institution in the field of economic development with Headquarters in Washington, D.C., invites applications from qualified men and women for the position of Auditor-EDP in its Internal Auditing Department. The Auditor is expected to have in-depth competence in data processing and current EDP audit techniques and will participate as a member of a team of EDP specialists in performing audit assignments. After gaining familiarity with the Bank's environment, the Auditor will be expected to perform audit assignments independently.

The successful candidate will, under the general supervision of the Deputy Internal Auditor, be responsible for:

i) reviewing EDP application systems under development or in production for controls and effectiveness;
ii) carrying out operational audits of the computer facilities and information-resource activities in the Bank;
iii) developing and implementing appropriate EDP audit procedures to assist senior auditors in the financial/accounting/operational audits involving EDP systems;
iv) developing and maintaining internal departmental computer systems.

REQUIREMENTS

1) Graduate level education in Accounting, Business Administration and/or Computer Science. A professional qualification and experience in public accounting would be desirable.
2) At least five years' experience in the development and implementation of major business applications and/or systems consulting.
3) Programming knowledge of COBOL and other business-oriented programming languages.
4) Experience with IBM and Burroughs computers, data-base management systems, and intelligent terminals.
5) Excellent written and spoken communication skills.

The World Bank offers a competitive salary and benefits package. The position is based at the Bank's headquarters in Washington, D.C. Please send a detailed resume, quoting reference number: 4-3-USA-9801 to:

The World Bank
Staffing Division
1818 H Street, N.W.
Washington, D.C.20433, U.S.A.

SUNBELT OPPORTUNITIES

For professional and geographic fulfillment, the Sunbelt is where it's at. Enjoy a challenging work environment in "State-of-the-Art" installations and in your leisure time enjoy a life-style that blends with a temperate climate. Our Fortune 500 clients are seeking qualified EDP professionals with a minimum of one (1) year experience in an IBM environment. Client companies assume all fees including interviewing and relocations costs.

DATA BASE	TO
Data Base Administrator(s) IMS IDMS	$48K
Data Base Analyst(s)	$40K
Sr IMS Systems Progis)	$40K
IMS Systems Progis)	$36K

APPLICATIONS:	TO
Project Leaders IMS, VS, MFG, COBOL	$36K
Project Leaders MFG	$36K
Sr Systems Analyst(s) IMS, VS, COBOL	$34K
Systems Analyst(s) CICS, MFG/Financial	$34K
Programmer Analyst(s) IMS, VS	$32K
Programmer Analyst(s) COBOL/ALC	$30K
Programmer(s) COBOL/ALC, DOS/OS	$28K

TECHNICAL SUPPORT	TO
Sr Systems Progis) MVS-SYSGEN'S	$48K
Systems Progis) OS, SVS-MVT, SYSGEN'S	$38K
Systems Progis) OS/DOS, ALC, CICS	$28-34K

Send Your resume in confidence or call collect:

"Steve" Stevenson, Partner
Jim King and Associates

1948 Gulf Life Tower/Jacksonville, Florida 32207
(904) 399-7371

Data Processing Professionals

Your success begins with the basics. At Crum & Forster Corporation your success will be based on a firm foundation—the foundation of a Fortune 50 organization with a corporate history going back for nearly a century. From this solid base you can continue to build and shape your career the way you want to, with the building blocks of your own professional abilities, experience and ambition. Here is a 1984 update and a preview of our coming attractions as we continue to build for the future:

Your success is based on a strong foundation at:
CRUM & FORSTER CORPORATION

We are now an MVS/XA shop, and come this spring we will be upgrading our 3081 to a new 3084, and we will be putting the finishing touches on 20,000 additional square feet for our brand new computer facility. We currently have the following professional positions at our Morristown headquarters:

Systems Programmers

3-5 years experience in MVS/SP operating systems JES 2, TSO, MVS/EXITS and SMF. BAL and COBOL coding required. Openings exist in Program Products and Security areas of Technical Services.

Telecommunications Technician

Minimum 5 years telephone, modems, and front-end processor experience. Must have digital and analog test equipment experience and be familiar with IBM protocols.

Data Dictionary Senior Analyst

Data Base startup—4 years minimum experience in data dictionary/catalogue implementation.

Data Dictionary Specialist

To perform data entry and assist in standards and procedures pertaining to dictionary environment.

Programmer/Analysts

3-5 years experience to work on a variety of applications in both batch and CICS areas.

EDP Auditors

Proven EDP audit experience in large mainframe environment, preferably with CICS experience.

We offer competitive salaries based on market value, and a comprehensive benefits package including dental plan and 100% tuition refund.

For immediate consideration please send complete resume in confidence, stating salary progression and requirements to: Personnel Manager, Crum & Forster Corporation, 305 Madison Avenue, Morristown, New Jersey 07960. An equal opportunity employer.

Crum & Forster Corporation

SENIOR PROGRAMMER/ANALYST

Senior Programmer/Analyst, 12 month position. Duties include: supervising lower grade programmer/analysts, analyzing programs and adapting electronic data processing to management methods and functions; planning and preparing the technical reports, system documentations and instructional manuals related to the capabilities of PDP 11/70 and PDP 11/780 systems. Qualifications: Master's Degree in Computer Sciences or related field with a minimum of 4 years experience; must have strong background in BASIC Plus programming, experience with WISE and PDSE DMS; previous experience with Digital Equipment and RSTS/E Operating Systems. Salary: $30,000. Send letter of application, resume, and supporting credentials to: Louisiana Office of Employment Security, 1102 East Georgia Avenue, Ruston, LA 71270. (318) 255-2586. Job Order #416738. An Equal Opportunity Employer.

IMS/VS DB/DC

SALARY $28K to $40K

Phoenix firm has immediate and future positions available for experienced IMS/VS Programmer Analysts in a manufacturing environment. Programming tools installed include TSO/SPF, COBOL and structured programming methods. MRP or banking experience is highly desirable. These positions are to support large scale new development and conversion with both technical and project management growth potential for the selected candidates. Interested parties should write or call:

Systems Performance Engineering Corp.
(602) 996-3770
2970 N. Hayden Rd. #125-312
Scottsdale, AZ 85251

SYSTEMS PROGRAMMER

Are you a Systems Programmer with 3-4 years experience in an MVS environment including CICS, TSO, VTAM, and NCP? Are you looking for a position that offers an opportunity for advancement into management, a competitive salary, and a relocation package? If your answer is YES, send your resume to:

SUSAN ZARBOCK
THE LOMBARDO MUTUAL INSURANCE COMPANY
P.O. Box 969
Mansfield, Ohio 44901-0969
An Equal Opportunity Employer

COMPUTER SCIENCE/ MATHEMATICS.

Tenure Track position to teach undergraduate courses in computer science and math, starting in Sept., 1984 in a Catholic, liberal arts college. Masters required, Doctorate preferred (may be in field other than CS or math). Salary competitive. Send resume and 3 letters of recommendation by March 1st to Andrew Kreutzer, Chair, Department of Computer Science/Mathematics, Allentown College, Center Valley, PA 18034. EEO/AA Employer.

ROMAC.

If you know a byte from a bite, here's something to chew on.

If you specialize in data processing we have something in common: we specialize in the same field. We place men and women with your background, and we just may have the opportunity you've been waiting for. Our client companies (the best in the business) assume our fees. Naturally all replies are held in confidence. ROMAC® offices are located throughout the East and Midwest. NO RESUME NEEDED.

Meet with Success.

CONNECTICUT
MASSACHUSETTS
NORTH CAROLINA
FLORIDA
MINNESOTA
OHIO
NEW JERSEY
PENNSYLVANIA
GEORGIA
NEW YORK
RHODE ISLAND
MARYLAND
WASHINGTON D.C. AREA

FLORIDA

The Jarvis Walker Group is pleased to announce that it has opened a Tampa Bay office to service the needs of its Florida clients and those DP professionals presently residing in Florida or interested in relocating to this area.

Initial assignments for corporate clients in Central Florida include openings for individuals with experience in:

- Planning and developing corporate data communications networks.
- Providing software support for IMC, CICS, MVS, UNIX.
- Designing and implementing large scale data base systems.
- Designing and implementing application systems using COBOL, PL-1, CICS and IMS.

Salary on these positions ranges from $25,000 to $50,000. If you would like information on any of these positions or have an interest in the Florida marketplace, please call or send resume/letter to:

Jarvis Walker
A DIVISION OF
HUMAN RESOURCE MANAGEMENT, INC.
3118 Gulf-To-Bay Boulevard
Clearwater FL 33519
813-725-2544

Martin Marietta Aerospace

Data Processing Opportunities

Martin Marietta Aerospace, NASA's prime contractor for the Space Shuttle External Tank has immediate openings for Data Processing professionals. Because we actually manufacture the external tank, you'll get to see the actual results of your efforts.

COMPUTER PROGRAMMER/ANALYSTS

Immediate opportunities exist for individuals experienced in:

- **UNIVAC 1100**
  ASC11 COBOL
  DMS 1100
  DDL, SDDL, DMU
  DML, QLP
  DPS 1100, TIP
  D/B Editor

- **APPLICATION EXPERIENCE**
  Shop floor control, Scheduling, Manufacturing, Inventory, Purchasing, Configuration Management, Quality, Engineering.

- **DATA BASE OPENINGS**
  Analyst, Design, Administrators with above hardware, software and applications experience.

- **CAD/CAM PROGRAMMER/ANALYST**
  Experience in Software and System Administration in Computervision with a BA/BS preferred.

These opportunities exist at our Michoud Assembly Facility located in suburban East New Orleans.

Qualified candidates interested in learning more about these opportunities at Martin Marietta should forward resumes, including salary history, to: Martin Marietta Aerospace, Denver Glazier, Dept. CW-130, P.O. Box 29304, New Orleans, Louisiana 70189. We are an equal opportunity employer, m/f/h.

MARTIN MARIETTA

Software Engineers!

Xerox introduces a team approach to the future.

Our Resources. Your Resourceful Mind.

Office Automation. It's heralded as the answer to industry's declining white-collar productivity. Where will the office of the future take us? What will it take to get us there?

Xerox feels the answers lie in a collaboration of resources. We call it TeamXerox. Our proven resources: product development, management skills, strategic planning and a firm foothold in today's office is part of the solution. You are the other. Your resourceful mind is the catalyst behind problem-solving innovations, and imaginative planning to keep technology one step ahead of demand.

TeamXerox. It's our approach to an exciting future. Be a part of the success. We have opportunities for Software Engineers at our Office Products Division in Dallas, Texas. Qualified applicants must have the following general credentials:

- 1-10 years product development experience with recent experience on Mini/Micro computers with office automation software.
- Experience with Assembler language and either PASCAL or C languages.
- A BS or MS in Computer Science is highly desirable.
- Experience with CP/M, MS/DOS or UNIX.

The successful candidates will apply their software development skills in the following areas:

- **PROFESSIONAL WORKSTATION**
- **ELECTRONIC TYPING**
- **COMMUNICATIONS**

Qualified candidates must have U.S. citizenship or be registered alien.

As you would expect from an industry leader, Xerox Corporation can offer you an exceptional salary and benefits program along with a relocation package. Send your resume to: **Employment, Xerox Corporation, Information Products Division, MS 180, Dept. CW-130, 1341 W. Mockingbird Lane, Dallas, Texas 75247.** Xerox is an affirmative action employer.

XEROX

Senior Technical Advisor

C&L

An opportunity to work on the leading edge of computer audit technology. Consider working with the top international specialists at Coopers & Lybrand designing an innovative approach to auditing Fortune 500 clients. Use your creative talents to design documentation aids and software specifications for sophisticated data processing environments. Develop your platform skills by presenting this new methodology to clients and staff.

Competitive starting salary is complemented by a comprehensive benefits package. Resumes, which must indicate salary history in order to be considered, should be submitted to:

Coopers & Lybrand

Coopers & Lybrand
Administrative Personnel
Department CW
1251 Avenue of the Americas
New York, N.Y. 10020

An Equal Opportunity
Affirmative Action Employer M/F

Sunbelt Programmer Analyst Positions

Charlotte, NC area software consulting firm looking for programmer analysts with some or all of the following skills:

- One or more years of RPG II on System/34-38. COBOL helpful.
- One or more years of RPG II and/or COBOL on System/36.
- Knowledge of BASIC helpful.

We are an experienced and growing professional firm with an established customer base, solid reputation and excellent references. We offer an excellent salary and benefits package.

If the opportunity to work on varied systems in different industries appeals to you, send your resume and salary history in confidence to:

Computer Systems, Inc.
100 Dave Lyle Boulevard
Suite 101
Rock Hill, SC 29730

PROGRAMMER/ANALYST

Ready to peak in maintenance? Major midwest service org. seeks individual with 3+ yrs. COBOL, DBMS, structured techniques. To $30K. FEE PAID

UNIX & "C"

Looking to upgrade your position? Subsidiary of Fortune 500 Corp. seeks B.S. in E.E. or C.S. to take on role of Systems Engineer. Must have 3+ yrs. programming with UNIX or Pascal, "C", 8086 Assembly, Pascal, and MACRO. To $35K. FEE PAID

ROBERT HALF of St. Louis

7700 Florissant Blvd.
St. Louis, MO 63136
(314) 727-1000

DATA PROCESSING DEPARTMENT MANAGER

Jakarta, Indonesia

An international energy corporation is looking for a Data Processing Department Manager for its Jakarta, Indonesia computer installation. This is a ground floor, start-up opportunity. The successful candidate should possess: A Bachelor's degree in Business Administration, Accounting, Computer Science or equivalent data processing experience; At least 5 years experience in data processing weighted heavily toward management, systems analysis and design, and computer programming; Good interpersonal relationship skills; Fluent English and Bahasa Indonesian language skills; Experience on IBM system/38, hardware and RPG 3 programming language.

Indonesian nationals only should apply. Send resume and current salary status to:

Manager of Information Systems
P.O. Box 118
Denver, CO 80202

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

SOFTWARE PROFESSIONALS -

IS YOUR VALUE A WELL KEPT SECRET?

At BGS your efforts, ideas, enthusiasm and innovations are not only encouraged but recognized, depended upon, and rewarded. Period - as in not usually the case elsewhere - BGS professionals see the results of their efforts by maintaining involvement with products from planning through customer use. Our existing products - BEST/1, CAPTURE, CRYSTAL, and INFOBASE - are used by over 600 large MIS facilities, worldwide, and have been the result of our recognition of individual contributions.

If recognition of your efforts is important to you, and if you selfishly envy of the following records, your interest in BGS is important to us!

MVS DEVELOPMENT MANAGER

Lead a team of systems and programming specialists in clarifying and developing product enhancements and new products. The ideal candidate will possess: a degree (MS preferred) in Computer Science, Mathematics, or a related field; a strong technical background in MVS, IMS, CICS; and a proven ability to manage systems professionals.

NETWORK COMMUNICATIONS ANALYST

Responsible for shaping the next generation of BGS network products. Position requires solid network communications, interpersonal, and analytic skills. Experience with voice networks, LAN's, SNA or network performance evaluation and design are real pluses.

DATABASE PERFORMANCE ANALYSTS (IMS DB/DC, FASTPATH, IDMS)

Challenged to dig deeper into the way IMS or IDMS software performs? Take responsibility for an entire CRYSTAL modeling library product and future product line extensions. CRYSTAL is a software tool used to predict the performance of new applications. Database administration or support experience desired.

SENIOR PERFORMANCE ANALYSTS

We need people with advanced degrees in Mathematics or Computer Science to help us develop and extend simulation and analytic modeling methods for use in our performance software products. Candidates should have graduate training in mathematical performance modeling methods. Experience in the areas of VM, MVS or SNA is particularly desirable.

IMS & CICS PERFORMANCE SPECIALISTS

Capable of designing extensions to our performance modeling and evaluation products for IMS or CICS workloads. Position requires: knowledge of IMS or CICS performance and capacity management methodologies; a technical degree; and experience with large programs developed and run under MVS/TSO, VM/CMS, TSO/SPF. Ability to analyze data using SAS a plus.

Additional attractions at BGS include flexible work schedules, an easily accessible location in one of the most enjoyable parts of the country and, of course, a full benefits package including medical/dental coverage and tuition reimbursement.

Please respond to Employee Rel. Personnel Administrator.

BGS SYSTEMS, INC.

One University Office Park
Waltham, MA 02254
(617) 891-0000

Equal Opportunity Employer M/F/H/V

DATA PROCESSING OPPORTUNITIES

Diversified and growing billion dollar financial holding company in the Florida Sunbelt is seeking highly motivated professionals to staff its Data Processing Division. Positions presently available include:

COMPUTER OPERATOR

Third shift opening. Minimum 2 years operations experience. Must have knowledge of IBM 4341, CICS, DOS/VSE JCL; previous experience with PDP 11/34 helpful.

VP OPERATIONS

10 years experience with IBM hardware (4341), CICS, DOS/VSE. Management and supervisory experience working with multi companies in medium to large environment desired. Responsible for production control, instituting control procedures, forecasting equipment upgrades and configurations, large terminal network.

INTERMEDIATE PROGRAMMERS

Minimum 3 years experience including COBOL, BAL, DOS/VSE, JCL and CICS.

SENIOR & LEAD PROGRAMMERS

Minimum 5 and 6 years experience respectively, including BAL, DOS/VSE, JCL and CICS. Responsible for implementation of new applications and maintenance of current applications.

SENIOR USER COORDINATORS

Minimum 5 years DP experience with 2 years programming and systems analyst responsibilities. Strong verbal and written communication skills a must. Experience with financial applications, banking and/or mortgage lending desirable.

AVP USER SERVICES

Minimum 8 years systems analyst experience with project management emphasis. Responsible for controlling the installation and maintenance of all banking related systems, coordinating communications with end users.

AVP APPLICATIONS

Minimum 8 years experience with background in IBM COBOL, BAL, DOS/VSE, CICS, JCL. Responsible for controlling installation and maintenance of application software. Heavy experience with management of technical implementation of software desired.

The successful candidates will enjoy a challenging and dynamic environment with growth opportunity. Starting compensation will be attractive to proven professionals. Please send a detailed resume specifying desired position with salary history to:

CITIZENS FEDERAL SAVINGS & LOAN
1150 West Mcnab Road
Ft. Lauderdale, Florida 33309
An Equal Opportunity Employer, M/F

Programmer Analyst

Minicomputer Manufacturer expands system. Prepares program to process business and accounting data. Supervises programming personnel. Conducts training and refresher sessions for clients. Two years COBOL programming experience, six months on-line environment, one year Manufacturing payroll system required. Knowledge of Manufacturing labor law and other government regulations. Spanish language. Remote Payroll System experience. Degree in accounting, engineering, computer sciences, or business administration. $24,000 annual salary. Apply at Texas Employment Commission, Brownsville, Texas or send resume to Texas Employment Commission, TEC Building, Austin, Texas 78778. J.O.#2611168. AD PAID BY AN EQUAL EMPLOYMENT OPPORTUNITY EMPLOYER.

DATA PROCESSING PROFESSIONALS

Now is the time to explore career opportunities in the Carolinas and the Southeast. We are retained by several client companies to provide top quality Data Processing professionals who thrive in a progressive, stable work environment. With your career goals in mind, we develop a marketing strategy that matches your talents and experience with that of our corporations. Salaries are highly competitive and all fees are company paid. If you are ready to advance your career in Data Processing, please call or send your resume in strict confidence to:

Mark Steele
Dunhill of Asheville
Executive Park
Suite 104
Asheville, NC 28801
(704) 253-0797

COMPUTER SCIENCE INSTRUCTOR

B.S. degree in computer science, math, or closely related area. Master's degree preferred. Knowledge of BASIC, COBOL, FORTRAN, and RPG languages. Two (2) years work experience in programming/applications. Prefer prior teaching experience. Salary dependent upon education/experience, competitive benefits. Applications accepted until position filled. To apply contact: Personnel Office, Lake City Community College, Route 7, Box 374, Lake City, FL 32055, (904) 758-1822, ext. 318.

EA/EO EMPLOYER

SYSTEMS ANALYST
THE NEW YORKER MAGAZINE

Creative technical person needed to develop new systems, enhance existing applications, optimize system performance and maintain RSTS operating system.

Must have excellent Basic, Fortran, and RSTS skills and a B.S. in Computer Science or equivalent work experience. Excellent benefits including dental.

Send resume with salary history in confidence to

CW-B4583, Computerworld
P. O. Box 880,
Framingham, MA 01701
EEO Employer

The Department of Statistics and Computer Information Systems

anticipates tenure track openings for 84/85 and invites applications for assistant professors with the following specialities: small computers, database, graphics, telecommunications, distributed data processing, networking, human factors, and programming languages and operating systems. Candidates must have a PhD; business experience preferred. Rank and salary open, depending on qualifications.

The School of Business and Public Administration is accredited by the American Assembly of Collegiate Schools of Business and offers the BBA, the MBA, and MS degrees.

Send resume to: Chairman, Department of Statistics and Computer Information Systems, Baruch College, Box 513, 17 Lexington Avenue, New York, NY 10010.

Baruch College
The City University of New York

An equal opportunity / affirmative action employer.

Systems/DB Programmers

A Southwest Fortune 500 Company has openings in Corporate Headquarters' large IBM main frame environment.

Systems Analyst — Responsible for designing and maintaining IMS Data Bases and providing technical support to application development teams. A four-year degree with 5-7 years DP experience, including 2 plus years with IMS DB/DC, is desired. CICS experience helpful.

Systems Programmer — Responsible for installing, maintaining and supporting IMS/VS (DB/DC) and related program products. Requires 2-5 years experience in an MVS environment installing and maintaining system software using SMP. BS in Computer Science or related field desired.

Environment includes IBM 3081 K with MVS/SP1.3, IMS DB/DC, CICS, UCC10 Data Dictionary, with plans to install IBM DB2 in 1984.

An excellent salary and benefits package is offered, including relocation assistance. For prompt and confidential consideration, send resume to:

CW-B4584
COMPUTERWORLD, BOX 880
FRAMINGHAM, MA 01701

EOE M/F

CURIOUS ABOUT CLASSIFIED?

If you are interested in advertising with Computerworld, but don't know how to do it, give us a call! We will be glad to send you our current rate card, which explains sizes, costs, deadlines and requirements. All you have to do is ask! Our toll free number is 800-343-6474, in Massachusetts call (617)879-0700, just ask for the Classified Advertising Department. Or, you can look for our classified order form located in the classified section of Computerworld. Fill it out, attach your ad with a check, and return it to us. Computerworld Classified Advertising, 375 Cochituate Rd., Box 880, Framingham, MA 01701. We're anxious to help!

BANKING SYSTEMS

PROGRAMMERS
SYSTEMS ANALYSTS
QA ANALYSTS • OPS SUPPORT
TECH SUPPORT MANAGER

Are you ready for a new challenge? Texas American Services offers state-of-the-art systems and applications training for qualified professionals. This spring we are moving to a beautiful new facility. We have openings at all levels in just about all of the main stream commercial banking applications:

CHECK PROCESSING, DEPOSITS, LOANS, FINANCIAL, H/R, ATM
(COBOL, CICS, OS/MVS JCL)

In our operations center we need a

TECH SUPPORT MANAGER
(OS/MVS System Internals, JES 2, CICS, Performance Tuning)
and an
OPERATIONS SUPPORT MANAGER
(hardware and environment planning, contigency planning, systems training, OS/MVS JES 2 experties).
We also have openings for
JCL SPECIALISTS
(OS/MVS JCL, ABEND Diagnostics).
Our QA department is searching for a
QUALITY ASSURANCE ANALYST
(EDP Audit, Business degree, communications skills).

For more information about these and other data processing career opportunities give us a call at (817) 338-9616 or send your resume to:

Texas American Services Inc.
Attn: Bob Silver
P.O. Box 292 • Fort Worth, Texas 76101

principals only
an equal opportunity employer m/f

TEXAS AMERICAN SERVICES INC.

COMPUTER SYSTEMS PROFESSIONALS

Learn Why RCA Has The Challenge You've Been Looking For!

RCA's Corporate Information Systems & Services is looking to add very special Computer Professionals to our team at our Cherry Hill, New Jersey campus, just 15 minutes from Philadelphia.

Working in an ultra-modern environment with the latest computing technologies, these professionals will help support two large-scale corporate computer centers that support RCA's world-wide locations. Our equipment includes IBM 3081's a 3083, 3033, 3032, and a 370/ 168 operating under MVS and VM/370. Current plans call for the establishment of multiple distributed systems based on the IBM 4300 family.

VM Systems Programmer

...with at least 5 years VM Systems experience and extensive background in operating systems modifications and problem analysis. Could be proficient with Assembly language and a higher-level language such as FORTRAN, PL/1 or APL. Degree required, preferably in Computer Science, Math, Physics or Engineering.

Data Communications Systems Programmer

...with basic knowledge of hardware such as modems, lines, multiplexors, concentrators, etc., plus Comten/IBM 3705/3725 Gen development experience. You should also have a working knowledge of SNA and MVS and/or VM. Degree required, preferably in Computer Sciences.

Capacity Planner

...to develop systems to measure and forecast use and performance of corporate computers using tools like MICS, BEST/1, and OMEGAMON. Must be able to recommend changes and upgrades to management. You should have at least two years experience in capacity planning or performance management for large IBM systems, plus a degree, preferably in Computer Science.

Computer Services Representative

...to act as liaison between internal personnel and our customers, including consultation on new process technology, cost effective use of resources, new development efforts, and coordination of processing with Center Operations and the customer community. You should have excellent communicative skills, a minimum of 3 years of management experience in MIS and engineering disciplines, and 3 years of MIS systems expertise. Degree required, advance degree preferred.

TALK WITH RCA TODAY! We'll be glad to arrange evening or weekend interviews at your convenience, or you can call or stop in at our Cherry Hill campus anytime for a tour of the facility. See first-hand just how pleasant a challenging work environment can be.

Call Pat O'Neill between 9 a.m. and 6 p.m., on (609) 338-6517 to arrange an interview or send your resume to Pat at RCA Corporation, Building 201-2, Route 38, Cherry Hill, New Jersey 08358.

Equal Opportunity Employer

RCA
A Tradition Of This Nature!

HUGHES

SYSTEM/SOFTWARE ENGINEERS

Hughes Support Systems in Southern California, is seeking Systems/Software Engineers for a multi-million dollar program implemented in a real-time, closely coupled, multi-processing environment. A minimum of three years experience is preferred. Areas of interest include real-time operating systems such as SEL's MPX-32 and DEC's RSX and VMS. Experience with I/O Drivers is a definite plus. We also need people who have successfully performed complex system modelling and analysis activities in the past.

At Hughes, we offer competitive salaries and outstanding benefits including family medical, dental and vision-care insurance.

Let's discuss our mutually beneficial future. Mail your resume to: Lowell Anderson, A1/1B404, Hughes Support Systems, Dept. 025, P.O. Box 9399, Long Beach, CA 90810-0399.

Creating a new world with electronics

HUGHES
HUGHES AIRCRAFT COMPANY

Proof of U.S. Citizenship Required
Equal Opportunity Employer

SUPPORT SYSTEMS

SOFTWARE SYSTEMS COORDINATOR

San Diego City Schools
$34,584 to $42,288 annually
*Career Position
*Excellent Benefit Package Includes 4 week paid annual vacation

San Diego City Schools has a management vacancy for the person with progressively responsible experience in the generation and maintenance of OS/VS1 or MVS operating systems. Experience in VM/SP, VSAM, DATA BASE, and CICS/VS is desirable.

Submit detailed resume immediately under covering letter to: San Diego City Schools, 4100 Normal Street, San Diego, CA 92103. (619) 293-8189.

Qualified candidates will be contacted at once to schedule interviews.

AN EQUAL OPPORTUNITY EMPLOYER

CALIF. & CICS
+ Openings in IMS, IDMS, MVS/VM Sys. Programmers
(714) 891-1244
CPU COMPUTER PROFESSIONALS UNLIMITED, agency
7041 Bolsa Ocean Blvd.
Ste. B, Huntington Beach, CA 92647

SOFTWARE PROGRAMMERS

ICL, a proven leader in the development of distributed micro-computers and information processing systems, has several challenging career opportunities at our R&D and customer support offices in Upstate New York. Expanded product lines and innovative applications have created opportunities for enthusiastic and dedicated S/W professionals to support worldwide sales of our distributed micro-computers.

PROGRAMMER—TELECOMMUNICATIONS

Responsible for problem analysis, program development, coding, troubleshooting and documenting communication protocols for distributed micro-computers. 3-6 years of programming experience with micro-processor systems and a working knowledge of assembler are required.

PROGRAMMER ANALYST

Provide on-site system and application support in products installed at a Major NYS Account. 3-6 years of experience with micro-processor systems, distributive processing, communications and application development. Assembler/COBOL coding is desirable.

We offer a variety of challenging assignments, multi-directional career opportunities, and an attractive benefit and compensation package. Professionals dedicated to advancing innovative distributed processing hardware/software should send their resume, in confidence, to:

ICL
ICL
Employee Relations
Route 12 North
Utica, New York 13502

Equal Opportunity Employer M/F/V/H

Computer Technology

Sundstrand, a Fortune 500 industry, has an immediate opening for a Section Manager-Computer Software Technology.

The qualified professional we are seeking will have a college degree in computer science and five years' management or supervisory experience with data processing personnel. IMS database management experience would be a definite plus. A technical background in operating systems for large scale mainframes and a thorough knowledge of general purpose system software are necessary to effectively function in this position.

As our section manager your major responsibilities will be in the installation, generation and modification of all computer software including current systems, related programs and packages, and other internally designed software.

Sundstrand is headquartered in Rockford, Illinois with facilities located worldwide that design, manufacture and market our proprietary aerospace and industrial systems. We offer a competitive salary and a strong benefit package including health and dental, and a liberal holiday schedule. To be considered for this management position, please send your resume and salary history in confidence to: Kathi Handee • Sundstrand Corporation • 4747 Harrison Avenue • P.O. Box 7003 • Rockford, IL 61125.

SUNDSTRAND
An Equal Opportunity Employer

CAREER OPPORTUNITIES IN STATE GOVERNMENT

The New Jersey Department of Labor has immediate career opportunities in our Division of Systems and Communications. Our configuration consists of 2 processors; a 3081-D16 and a 3083 supporting 3380, 3350, and 3330 DASD; tape units; Xerox laser printers and a nationwide network of over 700 terminals. Our software environment consists of the latest releases of MVS, ADF/MCP, ADF/VTAM, CICS and IMS plus many supporting software products. We use both ROSCOE and TSO as interactive development tools. We are a COBOL shop primarily, using Command Level CICS for most on-line applications and we also use SAS and EASYTRIEVE languages in addressing user requests.

APPLICATION PROGRAMMERS/ANALYSTS

Candidates who apply should have a college degree and 3-5 years of recent application design experience or programming experience in COBOL. Applicants who do not hold a degree may qualify if they have 6-7 years recent appropriate experience. The most desirable candidates will have been in designing general business applications or designing code for general business applications utilizing both batch and on-line environments. Supplemental experience in either SAS or EASYTRIEVE is also desirable.

SYSTEMS PROGRAMMERS

Candidates who apply should have a college degree and 3-4 years of recent system programmer experience in any of the above areas. Applicants who do not possess a degree may qualify if they have 7-8 years of recent system programming experience. The experience may be as a specialist in any of the above product areas.

Candidates interested in a career opportunity with a medium sophisticated data processing facility located in Central New Jersey, close to Princeton University and other top rated schools as well as historic and cultural events, should submit a resume with salary history in confidence to:

New Jersey Department of Labor
Office of Personnel Services
Room 1213
John Fitch Plaza
Trenton, NJ 08625
Attn: Glenn Christensen

IMS SYSTEMS PROGRAMMER OPPORTUNITY

BancOhio National Bank, recognized as a leader in advanced business data processing among financial institutions, is seeking a seasoned professional to work with IBM's Relational Data Base architecture (DB2, QMF, SQL).

Successful candidate must have 3 or more years experience working with the interface of IMS, Relational Data Base and CICS experience are a strong plus.

This position provides an excellent opportunity for professional growth and development within a highly sophisticated and dynamic data processing environment which includes a Tandem Non-stop II, 3 IBM 3083's, OS/MVS, JES3, IMS DB/DC, and CICS.

If you meet the qualifications and have the ability to communicate well with peers, users, and management, we would be very interested in talking with you. In addition to an excellent salary, we offer an attractive benefit and relocation package. Interested and qualified candidates please send resume and salary history, in strict confidence, to:

Jeffrey D. Russell
Technical Recruiter - S/P
BANCOHIO NATIONAL BANK
770 West Broad St. - LL
Columbus, Ohio 43251
An Affirmative Action/Equal Opportunity Employer
No Agencies Please

Data Processing Opportunities in Florida

At Sun Bank Service Corporation you'll get all the technical challenge, state-of-the-art environment, and growth opportunities that you can handle. We are a wholly owned subsidiary of Sun Banks, Inc. with 8.4 Billion in assets, more than 260 banking offices throughout Florida, a highly developed Information Center, and one of the largest ATM networks in the nation. We are also currently involved with the installation of several HOGAN Systems and a statewide Branch Automation System.

Due to our recent merger with Flagship Banks, Inc. and our current growth and expansion we have many positions open at all levels. Ideal candidates will have 3-8 years IBM OS/MVS experience using COBOL, and IMS DB/DC in a banking environment.

SYSTEMS ANALYST & PROGRAMMER ANALYST

All levels including Project Leaders

- DEPOSITS
- ITEMS PROCESSING
- PAYROLL
- LOANS
- ATM

SYSTEM PROGRAMMERS

- IMS DB/DC
- MVS
- VTAM NCP

Complete benefits, competitive salary, liberal relocation assistance, and future minded management are all part of the Sun Bank package geared to the high level professional we seek.

If interested in joining an aggressive and dynamic state-of-the-art organization in the "Heart of the Sunshine State," please send resume in confidence to: Technical Recruiter, Sun Bank Service Corporation, 7360 Lake Ellenor Drive, Orlando, FL 32809.

SUN BANK SERVICE CORPORATION

An Equal Opportunity Employer M/F/H/V

Sun Banks

ROBERT QUINN ASSOCIATES
(agency)

An executive search and consulting firm is currently interviewing for key client positions.

S/P: Project leader, software support and development, vendor environment, OS/MVS

DBA: IMS, data modeling techniques for development of large scale corporate data base

S/P: OS/MVS, VTAM, CICS

System Consultant: equipment planning, IMS, capacity planning.

For detailed information regarding these and other opportunities call or write:

ROBERT QUINN ASSOCIATES
P.O. BOX [illegible]
SAN FRANCISCO, CA 94188
(415) 775-6163

WARNER BROTHERS WANTS YOU !

If you are an EDP Auditor with minimum of 1 year EDP Audit experience including mainframe interface then we want you. PC knowledge a plus. Good salary and benefits package. Call immediately for an appointment.

Abby Arsinoff
(213) 954-2427

SUDDEN IMPACT
[illegible]

You will create a sudden impact when Adams and Associates represents you to our key clients from coast to coast. As a respected name in search and recruitment for the banking industry, we can provide a unique customized service. If you have 3+ years experience as a programmer, analyst, technical consultant, or manager (or close) and desire top pay and perks:

Andy Park
(213) 275-1291
Banking Division
Adams and Associates
P.O. Box 14662
Greensboro, NC 27415
Always Free Paid

There's No Time For DOWNTIME!

So while the industry works on your system's problems, let us work on your business problems. Advertise in–

COMPUTERWORLD CLASSIFIEDS!

One insertion will let a potential audience of over a half a million readers know what you are looking for or have to offer. Whether you are looking to recruit computer professionals, want to buy, sell or lease equipment, have computer time or services to offer, or software packages to sell, and more, Computerworld Classifieds will help you get a lot of exposure and get things done faster.

The open line rate is $8.15 per line and there is a minimum size of 1 column by 2" at a cost of $238.20. We can accomodate up to 5 columns and depth measurement increases by half inch increments.

Ads may be mailed in, clearly typewritten, with a letter stating the size desired and the issue in which it is to be run. Our team of advisors will take ads that require no artwork or borders over the phone. We also provide telecopier service.

Any borders, logos, or artwork should be sent in with your ad and must be dark and clear enough to be reproduced.

Computerworld comes out every Monday and our deadline for receiving ads is 10 days (or six working days) prior to the issue date desired.

First time advertisers must send payment along with their first ad.

Our mailing address is:

Classified Advertising
Computerworld
Box 880
375 Cochituate Rd.
Framingham, MA 01701

800 343-6474
(617) 879-0700

EMPLOYMENT SERVICE FOR PROGRAMMERS AND ANALYSTS

National Openings With Client Companies and Through Affiliated Agencies

Scientific and commercial applications • Software development and systems programming • Telecommunications • Control systems • Computer engineering • Computer marketing and support

Call or send resume or rough notes of objectives, salary, location restrictions, education and experience (including computers, models, operating systems and languages) to either one of our locations. Our client companies pay all of our fees. We guide, you decide.

RSVP SERVICES, Dept. C
Suite 700, One Cherry Hill Mall
Cherry Hill, New Jersey 08002
(609) 667-4450

RSVP SERVICES, Dept. C
Suite 211, Dublin Hall
1777 Walton Rd., Blue Bell, PA 19422
(215) 629-0566

From outside New Jersey, call toll-free 800-223-0183

RSVP SERVICES
Employment Agents for Computer Professionals

THE RESUME SYNDROME

19 of 20 Resumes end up in somebody's wastebasket. If you want your resume to be the 1 in 20 that gets results, send $5.00 for our booklet, "How to Write A Resume." To receive a FREE COPY, attach a copy of this ad to your resume and mail it to (in U.S.A. only):

Dawkin Associates, Inc.
4000 MacArthur, Suite 3000
Newport Beach, CA 92660

COMPUTER SYSTEMS PROFESSIONALS

Participate In Challenging Projects At Our Advanced Technology Research Center

As a dynamic part of a Fortune 150 corporation, Babcock & Wilcox enjoys a worldwide reputation for technological innovation and excellence. These immediate opportunities are at our modern R&D facilities in Alliance, Ohio, a pleasant and uncrowded Midwest city.

SYSTEMS & SOFTWARE GROUP SUPERVISOR

The heavily experienced professional we seek will supervise development and implementation of Applied Mathematics/Scientific Programming and Business Systems. You'll also propose and manage projects in support of an engineering staff. A PhD in Applied Mathematics is preferred, with at least 10 years experience, including some supervisory background. Excellent oral and written communications skills are required.

OFFICE AUTOMATION AND PERSONAL COMPUTING SPECIALISTS

In these diverse positions, you'll be involved with evaluation, implementation and support of office automation equipment. You'll also have the opportunity to develop your expertise in supporting VAX Systems Software. You should have at least 5-8 years of related background including personal computer evaluation and applications, and word processing on PDP-11 or VAX equipment. Excellent oral and written communications skills are required as is a BS/BA in Math, Computer Science or a related discipline.

VAX SYSTEMS ENGINEERS

If you are a Fortran Senior Systems Programmer with VAX VMS background, these postions offer you the opportunity to enhance your digital communications skills. Your at least 5-8 years of experience should include hardware/software configuration. You will have the opportunity to develop voice communications expertise. A degree in Math, Computer Science or EE is required.

Salary and benefits are excellent as is the potential for career development. For confidential consideration, please send your resume to: Roseann Taylor, Division Personnel Manager, ALLIANCE RESEARCH CENTER, Babcock & Wilcox, Research & Development Division, 1562 Beeson Street, Alliance, Ohio 44601. An Equal Opportunity Employer M/F/H/V.

Babcock & Wilcox
Research & Development
a McDermott company

Software Sales Staff Expansion

Join the exciting national expansion of our sales staff which is chartered to double in the coming months creating openings in 20 major metropolitan areas. Our revenue and staff has increased over 70% in recent years and one-third of our sales representatives are earning in the 6 figures.

We have only 2 key requirements.

- You must be one of the top performers in your company.
- A minimum of 2 years' experience selling software to IBM or compatible mainframe environments.

Software AG develops, markets and supports an integrated line of "off the shelf" systems software packages. Our extremely successful product line includes the following:

- **ADABAS**—award winning DBMS which manages the storage, retrieval, and manipulation of data contained in computer storage devices.
- **NATURAL**—a leading 4th generation on-line programming language.
- **COM-PLETE**—TP software package which manages the flow of data without complexity.

We've developed an unsurpassed line of products which meet today's information center/development center needs—while providing flexible tools to anticipate tomorrow's demands as well.

If you sincerely seek a challenging opportunity which gives unique experience, greater rewards, and satisfaction in selling state-of-the-art software packages, then this is **THE opportunity** to pursue.

We want to speak with achievers who are meeting, or exceeding, quota. **CALL us now at (800) 336-3761, ext. 600,** (703) 860-5050, ext. 600 or send resume to 11800 Sunrise Valley Drive, Dept. 1500 Reston, Virginia 22091

SOFTWARE AG
OF NORTH AMERICA, INC

Equal Opportunity Employer M/F

Senior Information Center Consultant

(INQUIRE Specialist)

We have an excellent opportunity in our Information Center in the San Francisco Bay Area for a Senior Consultant with at least two years' experience using Infodata Corporation's INQUIRE software in a variety of applications. We require a minimum one year of experience using VM/CMS operating system and excellent communications and training skills.

The successful candidate will be the lead authority on the INQUIRE language within the company and will report to the Information Center Manager.

Duties will include determining feasibility as well as designing and implementing data bases for a wide range of applications; consulting with end user departments to identify computer automation opportunities which can be accomplished without application programmers; training employees to use various main frame and microcomputer software including INQUIRE; and providing hotline support in INQUIRE and other software to end users and application programmers.

As a major corporation, we have an excellent compensation and benefits package. All responses will be held in strict confidence. If you meet our criteria, please send your resume and salary history to Box 10721, 120 Second Street, San Francisco, CA 94105.

An equal opportunity employer.

FLORIDA OPPORTUNITIES

Richard P. Wills, a multi-office organization with 13 years experience in Data Processing placement has outstanding opportunities for qualified individuals in state-of-the-art environments throughout Florida. We currently have openings for: Systems Managers, Project Leaders, Programmers & Systems Analysts, Tech Support and Communications. Positions are in large MIS installations. Salaries range from $30-40K depending upon background and qualifications. All fees, interview and relocation expenses are paid by our client companies.

Now is the time to take advantage of the growth opportunities and your many recreational advantages of living in Florida. Contact:

Tony Wells

(813) 877-6788
4202 Kay Bailey Blvd.
Suite 100
Tampa, FL 33607

BANKING

Programmers
Senior Programmer Analysts
Project Leaders/Managers

We have a number of major bank clients who are in a major redevelopment and expansion mode. Large IBM, MVS, deposit and/or loan experience are the buzzwords. Send your resume to:

ROMAC.
One Steuben Place, 2nd Floor
Albany, NY 12207
518-462-6644

LABORATORY AUTOMATION APPLICATIONS

Wyeth Laboratories, a leading pharmaceutical firm, is seeking qualified individuals with hardware and software experience associated with laboratory automation systems. We are expanding our current staff to accommodate increasing demands in basic research areas. These new positions include a Laboratory Automation Specialist and a Senior Laboratory Automation Specialist, and are now available with our Biomedical Data Systems group in Radnor, a highly attractive Main-Line Suburb of Philadelphia.

Responsibilities of these positions will be to interface data acquisition and control hardware with computer system software and to provide continual computer hardware and software support for laboratory automation projects. Applicants must have at least two to four years of proven scientific programming experience using BASIC, FORTRAN, or PASCAL languages. A thorough knowledge of data acquisition techniques, laboratory instrument interfacing and basic electronics is mandatory. A bachelor's degree in the natural sciences, engineering, or computer science is required, and an advanced degree preferred. Strong verbal and written communication skills are essential.

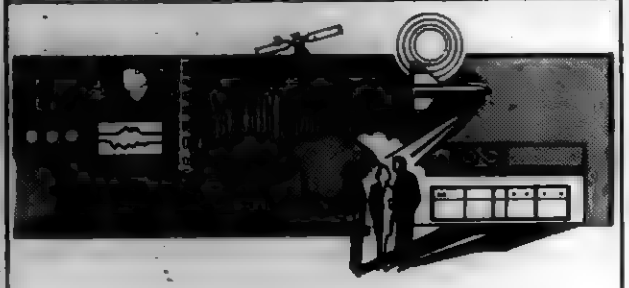
These positions offer excellent starting salaries and include an attractive package of fringe benefits. Qualified individuals are invited to apply by forwarding a resume in confidence to: Personnel Department:

Wyeth Laboratories, Inc.
P.O. BOX 8299
Philadelphia, PA 19101

Equal Opportunity Employer, M/F/H

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

Kearfott momentum. Propelling advances in software... and in careers.



Software professionals who set their sights high will find Kearfott an ideal environment for wider career latitude and exposure to new and developing technologies. In operating systems...commercial applications...and computer software engineering. Right now we're involved in some of the most stimulating projects which depend on strategic software advances in communications, logistics, MIS, and guidance systems.

Join an elite operating systems software group at our Data Center, one of the country's most sophisticated information processing centers, where state-of-the-art innovations are the norm. You'll be maintaining IBM and Amdahl mainframe computers with supporting software that includes MVS/SP3, JES2, IMS DB/DC, CICS, WYLBUR, TSO ACF/VTAM, GDDM, and numerous compilers and program products. Via advanced communication links this Center is tied into all our plants, and you'll be equipped for an instant interchange of technical data. And have the opportunity to support user-friendly software and microcomputers, become involved with educating company users, and consult on and resolve daily problems.

Underlying Kearfott's ability to maintain technical leadership is a solid MIS base whose software applications include accounting, finance, payroll, inventory, and manufacturing controls. In MIS, you'll be part of a team involved in COBOL programming, CICS, MVS, IMS, data base design, and telecommunications.

The challenges in software engineering at Kearfott are ongoing with a broad technological scope: realtime software development...simulation or validation techniques...firmware and microprocessors...Kalman filtering...Fortran, JOVIAL or ADA compilers. If you have strengths in these areas, let us tell you about the diversity of our minicomputer projects and resources.

If you have a minimum of 3 years experience in a large-scale IBM system, with HP, DEC, or airborne minicomputers or microcomputers in realtime military systems, begin your rewarding career path now with Kearfott. Find out why software professionals can aim high here by sending your resume to: E.J. Murphy, Singer Company, Kearfott Division, 1150 McBride Avenue, Little Falls, NJ 07424.

Kearfott

a division of The SINGER Company

An equal opportunity employer, m/f, who creates opportunities.

FIELD ENGINEERS

SYS 34/38, 360/370 I/O, 370, 4300, 3000. Immediate openings in Chicago and Pittsburgh area. Excellent benefit package. Send resume and salary requirements.

Hartford Technical Services
365 Bolmerio Drive
Wood Dale, IL 60191
(000) 333-0000

Data Base Administrator II

The Medical University of SC is seeking a Data Base Administrator with 5 or more years experience and at least a Master's degree in computer science to work on IBM 3081 computer system. Extensive knowledge of data base systems is required with ability to help plan and implement such a system to assist in educational goals and objectives. Communication and managerial skills important. Faculty teaching appointment possible. Excellent fringe benefits. Salary range $25,130 to $32,000 per year. Located in cosmopolitan, southeastern coastal city. Qualified applicants send resume to:

Ms. Julia Goldsteel
Employment Manager
Medical University of SC
Personnel Center
Charleston, SC 29425
EOE M/F/H

In a bind?

Do you need real professionals? Advertise in **Computerworld** to find exactly who you're looking for. Because...More computer people read **Computerworld** than any other newspaper in the United States--more than half a million computer people every week. And, among our 529,650 readers at user organizations, about half claim to look at recruitment ads at least every other week (only a small percentage say they never look at recruitment ads). No wonder **Computerworld** carries more recruitment ads for computer people than any other publication.

To place your ad or to get a rate

Call or write:

Classified Advertising

Computerworld

Box 880

Framingham, MA 01701

(617) 879-0700

(800) 343-6474

SAUDI ARABIA

SYSOREX INTERNATIONAL, a California Corporation and a rapidly growing systems management company now developing innovative multi-technology systems in Saudi Arabia has the following challenging position:

DATA SECURITY SPECIALIST

Responsible for the design, acquisition and implementation of state-of-the-art security techniques to protect all electronically stored data.

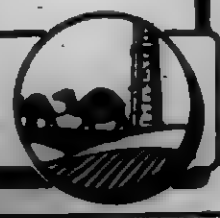
BS/BA degree required plus a min. 5 yrs. experience in data security for large scale systems, with RACF experience a plus.

We offer an excellent benefit package including medical, life, accidental death, disability and profit sharing plans. You will additionally receive 25 working days vacation, 15 holidays, free furnished housing, annual return home travel, paid relocation expenses, plus eligibility for present Federal Income Tax exclusions.

Please send resume with present salary to: Personnel, CW-130, SYSOREX INTERNATIONAL, INC., 10600 N. Tantau Ave., Cupertino, CA 95014. U.S. CITIZENSHIP REQUIRED. INDIVIDUALS ONLY APPLY.

SYSOREX

Sysorex International Inc.



We're On Top & We Plan To Stay There

As one of the fastest growing microcomputer software companies in the country, our accounting software packages are recognized as industry leaders. We're realizing our potential by employing the brightest and most dynamic people in the microcomputer software field. Our rapid growth has created the need for two exceptional people for these newly created professional positions:

REGIONAL SALES MANAGER

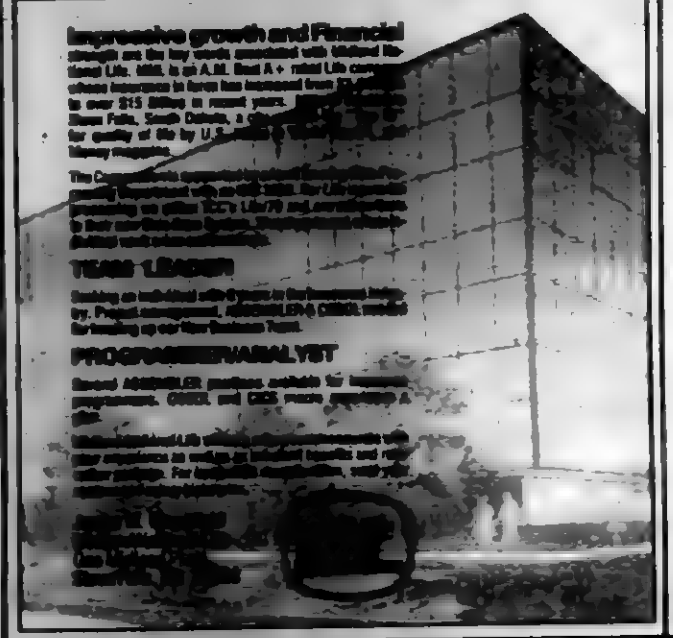
Pursue sales/marketing of our software product line through a group of independent sales representatives and a personal sales effort. 3 years sales experience in small business computer systems and a thorough understanding of retail distribution channel required. Excellent communications and marketing skills necessary. Positions available on east and west coasts.

O.E.M. ACCOUNTS MANAGER

Responsible for sales/marketing of MAI/Business Basic Micro (B/SM) language and accounting applications to OEM's and computer hardware manufacturers. Minimum 3 years sales experience in major account environment is required. Exceptional communications and marketing skills necessary.

Please send resume to: MAI/Basic Four Business Products, Attn: WW Personnel, 601 San Pedro NE, Albuquerque, NM 87108. EOE M/F.

MAI Basic Four Business Products



Impressive growth and Financial

TEAM LEADER

PROGRAMMER/ANALYST

datasense

Datasense, the U.S. subsidiary of a well established British Software House, is seeking qualified staff to work in the Tampa Bay area. We seek professionals for either salaried OR contract positions with the following experience:

IBM 43xx, COBOL, DOS/VSE
Knowledge & Experience of VSE/POWER/ICCF, ACF/VTAM
Experience with Banking Systems
Knowledge & Experience of CICS desirable

IBM System/38, RPG III
Knowledge & Experience of Financial, Distribution or Manufacturing Systems

We offer high salaries, free medical insurance, relocation plus the opportunity for international travel within the Datasense Group. Please send Resume & Salary History to:

Director of Personnel
Datasense Inc.
One Plaza Place N.E., Suite 400
St. Petersburg, FL 33701

HARDWARE/SOFTWARE PLANNING PROFESSIONALS:

At General Dynamics Data Systems Division, we provide computing power to support our Corporation's diverse, high-technology programs. Right now, we're looking for three computer professionals to work at our St. Louis headquarters:

MANAGER OF HARDWARE/SOFTWARE PLANNING
You will provide strategic computer configuration planning for our Data Centers using workload forecasts; develop and maintain hardware/software multi-year plans, and evaluate and introduce emerging technologies.

COMPUTER SERVICES SPECIALIST
You will define and administer hardware/software configuration management for our large computing complexes; define, review and approve change-control procedures for our Data Centers.

COMPUTER SERVICES SPECIALIST
You will develop annual hardware/software plans, assuring proper execution through purchasing, and provide technological planning information to Center Directors, Account Managers and Division Headquarters.

All positions require at least 10 years' hands-on experience in hardware/software configuration, evaluation and planning for large, IBM mainframe systems; CDC/UNIVAC and DEC operating experience a plus. You should also have good understanding of software used on IBM systems (MVS, JES3, TSO, IMS, CICS), some background in computer center operations and good oral and written communications skills. BSEE, BSCS or related degree required.

General Dynamics offers a competitive salary and comprehensive benefits, which include savings/stock investment plans, life insurance and medical/dental insurance for you and your family.

Send your resume, in confidence, to: **J.H. McBeth, Director of Computing Systems Plans & Control, General Dynamics, Data Systems Division, Personnel Department, 12101 Woodcrest Executive Dr., Drawer 008, St. Louis, MO 63141.**

GENERAL DYNAMICS

Data Systems Division

U.S. Citizenship Required
An Equal Opportunity Employer, M/F

SYSTEMS/SOFTWARE PROFESSIONALS

SMS has the answers to your most frequently asked questions.

1. Is the applications/hardware environment advanced and diversified enough to provide long-term challenge, stimulation and growth?

SMS houses one of the nation's most sophisticated data centers. Our hardware configuration includes multiple IBM mainframes (3081s, 3033s, 4341s and others) and an array of supermini computers (VAX 11/780, 11/750, 11/730 and others). These systems support 6500 terminals nationwide and provide over 800 users with over 70 M.I.P.S of processing power. Within this environment, SMS professionals handle ongoing software development assignments for a broad range of technologies including networking, distributed processing and data base management systems used in data intensive health care environments.

2. Realistically, what are the opportunities for management and technical advancement?

Since 1969, SMS has been growing at an annual rate of 25%. Our growth alone has created exceptional opportunities for career development. Also our industry is changing. Our emphasis on managing information creates continued opportunities for people who can make difficult management and technical decisions.

3. How much autonomy should I expect?

At SMS the emphasis is on getting the job done. We know that technical professionals accomplish a lot more when they are given the freedom and support they need to do their best work.

4. Describe the work environment.

SMS's World Headquarters is situated on 116 acres in Malvern, PA (just 30 minutes from Center City Philadelphia) and incorporates our 82,000 square foot data center. Our campus-like setting offers plenty of space for outdoor activities and is uniquely conducive to accomplishment. And our location off of Route 202 places you in the middle of one of the nation's leading high tech centers.

5. Salary and benefits?

SMS's salaries are fully competitive with the leaders in the data processing industry. Our benefits package includes dental, tuition, stock purchase, and retirement/savings plans. Relocation assistance is available for eligible, experienced professionals.

VAX SYSTEMS DEVELOPMENT

Senior/Intermediate Level Technical & Management Openings

These positions present exceptional opportunities for Systems/Software Professionals to assume leadership positions in one of the world's largest, most advanced VAX systems development environments. Specific openings at SMS World Headquarters in Malvern, PA include, but are not limited to, the following:

Applications Development
Communications Systems Development
Performance Analysis
Sub-systems Development
Systems Architecture Development

Positions are also available for **IBM OS/COBOL Applications Development Programmers** to work with the latest CICS/DBMS technologies and on the development of advanced communication interfaces (including local area networks) between distributed DEC and large scale IBM host systems.

For consideration forward your resume to: SMS, Department CW-8CZ, 51 Valley Stream Parkway, Malvern, PA 19355. An equal opportunity employer.

Shared Medical Systems Corporation

INFORMATION SYSTEMS FOR THE HEALTH CARE INDUSTRY. TWICE THE CAREER POTENTIAL.

SMS

BBN Communications designs, manufactures, installs and operates wide-area data communications networks through a vertically integrated offering of products and services unmatched in the industry. We are able to do this by attracting and motivating the best talent available and by nurturing an outstanding environment in which to do creative and innovative work.

Our rapid growth in the computer communications field has created the need for another kind of communications expert.

MARKETING COMMUNICATIONS SPECIALIST

Responsibilities will include researching and writing technical product articles, brochures, and case studies as well as working with our ad agency in producing various sales and marketing literature. There will be additional involvement in preparing and coordinating various sales presentations and slide shows.

Requires a self-starter with a BS/BA degree or equivalent plus minimum of three years' marketing communications experience in the computer/data communications field.

To apply, please send resume and salary requirements to Linda Schoeman, BBN Communications Corporation, 70 Fawcett Street, Cambridge, MA 02238. An Equal Opportunity Employer M/F.

BBN Communications

Join The Network Pioneers

A Subsidiary of Bolt Beranek and Newman Inc.

BETTER YET - CONNECTICUT

Several leading Connecticut employers have significant career opportunities for experienced Technical Support personnel. All positions feature excellent transportation programs. Connecticut's quality of life is among the best nationally, with fine schools, reasonable taxes and housing, and many outstanding recreational offerings.

Senior Systems Programmer
OS/MVS
$41,000
Fortune 100 Manufacturer

Systems Programmers
OS/MVS
To $41,000
Fortune 100 Manufacturer

Systems Performance Measurement
OS/MVS and MVS
To $35,000+
Major Insurance Company

For information on these and other exciting career opportunities, call Dennis Very collect at (203) 278-0040, or send your resume to:

RJS ASSOCIATES
RJS ASSOCIATES
361 Asylum Street
Hartford, CT 06103

ASSISTANT DIRECTOR INFORMATION SYSTEMS

The Assistant Director reports directly to the Director of Information Systems and is responsible for the overall operations of the central computer and its staff. Specific responsibilities include the selection, installation and management of system software and utilities and coordination of the implementation of application systems. The Assistant Director also acts as a liaison with faculty and other computer staff. Dutchess Community College uses an IBM 4341, VM/CMS, DOS/VSE, WYLBUR, TOTAL, etc., MS-DOS and OASIS micros. Bachelor's degree in Computer Science/Data Processing or related field required. Master's degree preferred. 3-5 years of progressively responsible experience, preferably in an educational setting. Salary range $28,000-$35,000. Complete resume including salary history by February 15 to Fred Higgins, Personnel Administrator, Dutchess Community College, Pendell Road, Poughkeepsie, NY 12601. An Equal Opportunity/Affirmative Action Employer.

IMS APPLICATIONS PROGRAMMER/ANALYSTS

Positions available in Phoenix, Arizona

The Business Systems Development group which supports our charge card operations center in Phoenix, is expanding project areas and will require individuals for various programmer/analyst positions.

Requirements include a minimum of 2 years OS COBOL applications programming experience in an IBM compatible environment utilizing JCL, MVS, TSO and IMS batch and/or on-line applications.

Senior and lead positions require 4 to 6 years experience with systems analysis and design in an IMS environment.

American Express has state-of-the-art computer equipment which includes (3) 3081s, (2) 3033s, and (2) 3032s.

Salary commensurate with experience, and an excellent benefits package is available.

Qualified candidates may request an application be mailed to them by calling (602) 954-1741. Resumes and applications may be sent to:

American Express
P.O. Box 13781 Phoenix, Arizona 85002

BUY - SELL - SWAP

One-stop computer leasing.

The Total Computer Company

Available Immediately
IBM Mainframes
IBM Peripherals

Hartford Computer Group

800-323-6355
or 312-364-0505

SYSTEMS
4341 4331
38 36 34
32 3
BUY • SELL • LEASE
COMPUTER BROKERS, INC.
2976 SHELBY ST.
MEMPHIS, TENNESSEE
CB
TOLL-FREE
800-238-8405
901-372-2622
PERIPHERALS
3203 3370
327X 3411
3350 3420
asCd MEMBER

DSI
WE BUY SELL & LEASE!
BURROUGHS
Discover the DSI alternative.
800-641-5215
All equipment available immediately and guaranteed for Burroughs Maintenance
DSI Serving the Burroughs Community Worldwide
2480 W. Alameda Ave., Denver, CO. 80223 (303) 922 8331
TWX 910 931 0483

PEARL HAS IBM 3741's

and we have System 34, System 36 and System 38 and a large inventory of CPU's, CRT's and printers. Call us about our flexible lease plans for buying, selling, leasing, renting and purchase/leaseback.

Call Dave Allen or Shirley Shreeve.
Pearl Computer Division
•P.O. Box 24026 •4717 Centennial Blvd.
Nashville, TN 37202 (615) 383-8703

---

* * * * DEC * * * *
BUY—SELL—LEASE—TRADE—CONSIGN
SYSTEMS — PROCESSORS — OPTIONS
PERIPHERAL — MODULES — MEMORY
— SPARES —
NATIONAL COMPUTER EXCHANGE
(800) 624-9299
600 North Lunar Avenue, Brea, CA 92621
TWX: 910-596-1499 (714) 990-5988

We Buy & Sell
DEC
Systems
Components
igital
omputer
esale
call:713
445-0082
600 Kenrich Ste C22
Houston, Tx 77060

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

COMDISCO

A Commitment To Excellence

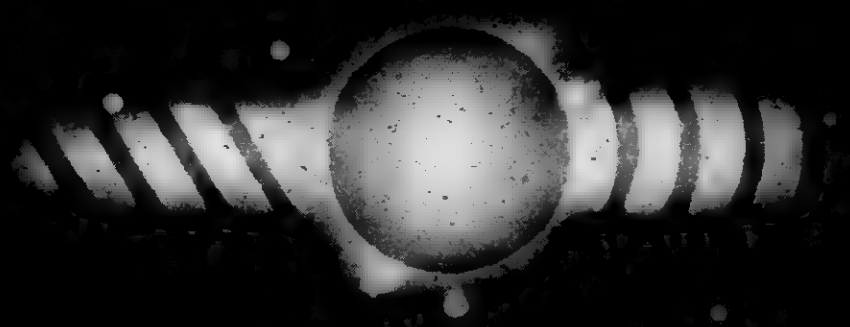
IBM PROCESSORS

- ☐ 3081
- ☐ 3083
- ☐ 3033
- ☐ 4341
- ☐ 4341/4381 Overland Available
- ☐ 4331-2/4361 Overland Available
- ☐ Amdahl V 7 and V Available January February

IBM PERIPHERALS

- 3350
- 3880-1 2 3
- 3380 AA4 B4
- 3370/3375
- 3803-2
- 3420-4/6/8
- 3705/3706
- ☐ 3725
- ☐ 3178/3278
- ☐ 3890

The Leader In Full-Service Leasing



A MEMBER OF [illegible]

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

SYSTEM/34
SYSTEM/36
SYSTEM/38
SERIES/1

FIND IT FAST IN OUR FAMOUS
COMPUTER MARKET ADVISOR
SEND US YOUR BUSINESS CARD
AND WE WILL SEND YOU A FREE COPY.

ECONOCOM

- BUYS
- SELLS
- LEASES

- QUICK DELIVERY
- COMPETITIVE PRICING
- FLEXIBLE FINANCING
- TRADE-INS ACCEPTED
- PROFESSIONAL SERVICE
- SHORT-TERM LEASING
- LONG-TERM LEASING
- PERIPHERAL LEASING
- TAKE-OUTS DONE

901-767-9130

ECONOMIC COMPUTER SALES, INC. • 845 CROSSOVER LANE • P.O. BOX 240297 • MEMPHIS, TENNESSEE 38124

IBM

5110 5120
3741 3742
DATAMASTER

1255 MICR

SYSTEMS
34 36 38 32 23
All Associated Peripherals

BUY SELL LEASE

• Printers, Display Stations
• Upgrades & Factory Add-ons
• Trades Taken
IBM Maintenance Considered

Call Today for Quotation
(615) 352-6565

SOUTHERN
DATA SYSTEMS
Nashville, Tennessee

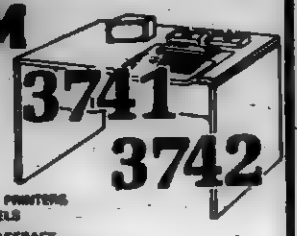
IPS Information Processing Systems Inc

TELEPHONE: (201) 262-9500 Telex: 642-197
Member ICCA

Buy - Sell - Lease

IBM

S/32
S/34
S/38



CPU's CRT's PRINTERS
ALL MODELS

PURCHASE/LEASEBACK
SHORT & LONG TERM LEASES

Computer Marketing of America, Inc.
P.O. Box 71
516 Bryan Street
Old Hickory, Tennessee 37138

CMA

1-800-251-2670
In Tennessee: 615-847-4831

C.D. SMITH & ASSOCIATES, INC.

DEC computer systems & options
12605 East Freeway, Suite 318
Houston, Texas 77015
(713) 451-3112
TELEX 76-2547

DEC

WE ARE BUYING: VAX 11/780

WE ARE SELLING:

MS750-DC	6,500	DR8-W	1,495
MS750-CA	4,000	RA81-AA	16,000
MS780-DC	5,000	TS11-CA	10,000
FP780-AA	5,700	RP06-AA(PTS)	6,000
DW780-AA	10,000	11/780 CPU	CALL

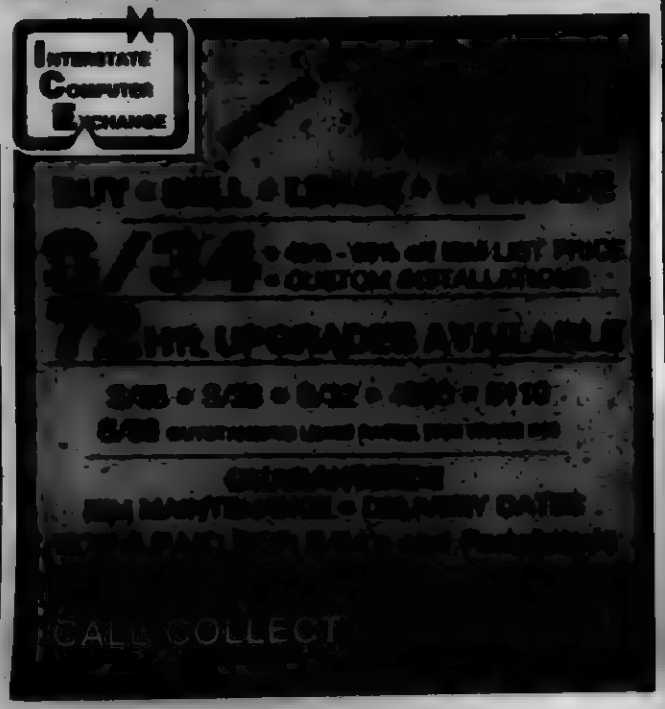
If you want on our Mailing List, call Valerie (713) 451-3112.

Floating Point Systems
Array Processor AP-120B

- 128K Words Of 38 Bit, 167ns Fast Main Data Memory
- 4K Words RAM Table Memory
- 2.5K Words ROM Table Memory
- 4K Words Program Source Memory
- Hardware Interface for DEC PDP II Series

Scientific Apparatus Exchange
(415) 864-1179

INTERSTATE COMPUTER EXCHANGE



BUY • SELL • LEASE • UPGRADE

S/34 • 40% - 70% off IBM LIST PRICE
• CUSTOM INSTALLATIONS

72 HR. UPGRADES AVAILABLE

S/32 • S/34 • S/36 • 4300 • 8100

S/32 CUSTOMIZED LEASE PAPER FOR VENDOR USE

CUSTOMIZED
IBM MAINTENANCE • DELIVERY DATES

CALL COLLECT

Inflation Fighters

Quality & Savings

Slightly used, Money Back Guarantee. Full Reels. All External Labels Removed Guaranteed for use at 800 BPI through 6250 BPI.

2400' Reel	$4.95 ea.
1200' Reel	$4.25 ea.
600' Reel	$3.50 ea.

All Tapes with Hanging Seals

We pay freight on orders over 200 tapes.
All orders shipped within 48 hours.
Call or Write

Computer Tape Mart
44A Seabro Avenue
N. Amityville, New York 11701
[516] 842-8512

IBM
3270

FREE
DEC and DATA GENERAL
Discount Guide
Call or write for your copy TODAY!

NEWMAN dda GNA
(313) 994-3200 814JCW

WHAT does Classified Advertising linage in *Computerworld* add up to?

SUCCESS.

PCM

Pioneer Computer Marketing
214/343-2904

BUY - SELL
LEASE
- All IBM Systems
- Peripherals
- Tapes
- Disks

SERIES/1
- Systems
- Features
- Peripherals

SYSTEM 34
- CPU
- Peripherals
- Upgrades

PIONEER COMPUTER MARKETING
11448 Pagemill Road
Dallas, Texas 75243
214/343-2904

STOP
YOU'VE FOUND IT!
IBM 5/36
IBM 5/34
IBM 5/38
4331/4341
NEW
4361/4381
- One, Two or Three Year Leases.
- We Buy, Sell or Lease.
- New and Used Peripherals.
- Trade-Ins Welcome.

TexCom
SAN ANTONIO
HOUSTON
(512) 349-9955
JOIN THE MORE THAN 150 OTHER MAJOR COMPANIES THAT CURRENTLY LEASE IBM EQUIPMENT FROM TEXCOM.

WANG WORD PROCESSORS
AT THOUSANDS OFF!
Guaranteed, remanufactured WPS 30, WPS 20 and Wangwriters available for immediate delivery. You don't pay a cent till Wang installs and places equipment under service contract. 15-day return privilege. Buy, Lease, Rent!
For Free info and fast answers call toll-free:
1-800-321-2966
ELECTRONIC OFFICE EXCHANGE, INC.
Dept. SC3CWD • Box 7337 • Ann Arbor, MI 48107

HOW TO SAVE $30,000 PER MONTH ON A 3083 LEASE.

Lease the same 3083 that IBM leases for over $92,000 per month from Randolph—for less than $62,000 per month. That adds up to savings of $1,440,000 over a four-year lease period. If you're renting an older machine, Randolph may save you even more—and you'll get about four times the throughput in the bargain.

WHEN IS THE BEST TIME TO TALK TO RANDOLPH ABOUT LEASING A 3083?

Now—because Randolph has 3083's available for 4th quarter delivery. But it's never too late, even if you already have a machine installed. Whatever your situation, we can tailor a lease that will fit your exact needs and let you start saving money right away.

TALK TO RANDOLPH NOW.

We can solve problems like these, and more . . .
Stuck with a lease on your old machine?
We'll sublease it, and provide a new lease on a 3083.
Own a 3083 but need cash?
Sell your machine to Randolph, and we'll lease it back to you.
Machine installed on a rental basis?
We'll show you how to end the lease and install a new 3083. Any termination charges can be folded into your new Randolph 3083 lease.

LEASING COMPUTERS IS OUR ONLY BUSINESS.

At Randolph, our people have an average of 18 years in the DP industry . . . from 360's to 3081's. They know all about alternative financing to be sure, but they also know their way around a DP department and the hardware in it.

WE LEASE MORE THAN 3083's.

Whatever your needs, now is the time to talk to Randolph. We provide leases for IBM 303X, 4300 and 3081 systems and peripherals—disks, tapes—as well as 3083's.

UNIQUE FINANCIAL STABILITY.

We're an important part of one of the nation's oldest and leading financial institutions . . . The First National Bank of Boston. 19 years in computer leasing gives added assurance that Randolph will continue as the leader in the computer leasing industry . . . continue to live up to the terms and conditions of our agreements . . . provide upgrades . . . fulfill all of our commitments.

LET RANDOLPH HELP YOU SAVE $30,000 PER MONTH.

We can solve a lot of problems for you, and save you money, too. Talk to Randolph now . . . call Joseph B. Kelly, Jr., Executive Vice President, 800-243-5307.

537 Steamboat Road
Greenwich, Connecticut 06830
203 661-4200 • 800 243-5307

Randolph

A MEMBER OF COMPUTER DEALERS & LESSORS ASSOCIATION RANDOLPH COMPUTER CORPORATION A subsidiary of THE FIRST NATIONAL BANK OF BOSTON BANK OF BOSTON

URGENT
For 2/15/84 Delivery
NEED TO BUY IN QUANTITIES
• 3350-A2
• 3350-B2
• 3830-2
USERS ONLY
CALL JOHN GILES
TOLL FREE: 800-325-0960
CSI
COMPUTER SALES INTERNATIONAL, INC.
P. O. Box 16264, St. Louis, Missouri 63105
CDLA

We've Got Your Number
S/34 ALL MODELS QUICK DELIVERIES
SERIES 1 CONFIGURED TO YOUR NEEDS
S/36 ATTRACTIVE LEASE RATES
S/38 NEW & USED MACHINES
5110/5120 NEW LOW PRICES
PERIPHERALS
CRT'S...PRINTERS...DISK...TAPE...MODEMS
CARLYN
COMPUTER SYSTEMS
8100-G Braddock Road Annandale, VA 22003
"CALL COLLECT" (703) 642-1950

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

WE'RE NUMBER 1 FOR SERIES/1

Computer Options, Inc. is a major remarketer of both new and used IBM SERIES/1's and related peripherals. We offer your firm the option of purchase or a variety of custom leasing programs for your hardware acquisitions. Call us toll-free for more information.

AVAILABLE NOW FOR IMMEDIATE INSTALLATION

4955-F	4964-001
4955-E	4973-2
4959-A	4974-001
4962-2	4975-2L
4963-64A	1310

ALSO AVAILABLE-SYSTEMS 34 & 38

Call toll-free 800-328-5718

(In Minnesota, 612-544-6660)

COMPUTER OPTIONS, INC.
"the best option"
1660 South Highway 100
Minneapolis, MN 55416

S/38
S/36
S/34
Series 1

Buy... Sell... Lease...

- Immediate availability
- 5224 & 5291 • Upgrades
- Short term leases • Trade-ins
- Guaranteed IBM maintenance

The Datacomp Leasing & Service Group, Inc.

Toll Free 800/323-3929

Chicago 312/323-1200 New Jersey 201/467-8686

DATA GENERAL
New & Used Equipment

BUY. SELL. TRADE.

mcINTYRE'S
Mini-Computer Sales Group Inc.

(313) 583-4100

TLX: 810-232-4606
Answer Back: MCDATAGEN MAHS

39000 Edward Ave.
Madison Heights, MI 48071

BUY / SELL / LEASE

158	V/5
168	V/6
IBM	AMDAHL
3031	V/7
3032-3033	V/8

INTERESTED IN ALL MODELS AND CONFIGURATIONS
ALSO, MODEL-FEATURE-MEMORY UPGRADES

HAVE REQUIREMENT FOR 3033-U16 WITH (1) 4680, (1) 6650, (2) 3650s.

WE WOULD LIKE TO TALK WITH YOU
PLEASE CONTACT: DALE HAUGHER OR CHARLIE BERRY
MAJOR COMPUTER INCORPORATED
10237 Yellow Circle Drive
Minnetonka, MN 55343
(612) 933-6666

IN STOCK!
Fujitsu Eagle
with cabinet, cables, slides & terminator:
$13,000
New Fujitsu SP 380
80 character per second, letter quality printer.
Introductory Special - $2,500

MANDERS
INTERFACE SOLUTIONS INC.
303-693-3035
2971 S. Jasper • Aurora, CO 80013

FOUR PHASE SYSTEMS
Will Buy or Lease
IV/60 Processors
W/192 KB Mem,
40 MB Disc.
(Brokers Welcome)
Reply to CW-84050
Computerworld
Box 880
Framingham, MA 01701

CPR:RESALE

Computer Products & Repair

No charge to tell the Data General world.

Call us to list the DG equipment you have to sell or buy. There are no fees. CPR's large, computer-based sales force will find you a MATCH TODAY through national phone sweeps, direct mail, and advertising.

Buy at the price you want. Sell at the price you need.

$2 Million is also available to buy and sell your inventory fast, with aggressive trade-ins, and leasing through national firms.

Expect the price you want TODAY with CPR:RESALE.

CPR gets you results.

California: 800-392-2917

800-843-2047

1930 Fourteenth Street, Santa Monica, California 90404 213-450-0010

IBM
Series/1 • S/34 • S/36
S/38 • 4300
5110 - 5120 • S/32
BUY • SELL • LEASE

All models, systems & peripherals AVAILABLE NOW!

Ask about our 72 hour upgrade

(408) 425-7333

SOURCE
DATA PRODUCTS INC
1114 Wesley St. Santa Cruz, CA 95062

DATA GENERAL SPECIALISTS
FOR
Surplus New & Used Equipment & Systems
with full depot repair facilities.
CALL US
WE TAKE THE TIME.
- WE CARE -
JM Associates
991 W. Chapel Avenue
Cherry Hill, NJ 08002
609-663-1115

EL CAMINO RESOURCES LTD.

offers:

4381-M2
DELIVERY POSITIONS AVAILABLE

early MARCH
APRIL
MAY
JUNE

(213) 986-2411

4827 N. Sepulveda Blvd.
Sherman Oaks, CA 91403

Burroughs B, 1855 System

1 mb Memory
Available Immediately

- 200 Disk Drive
- 200 Controllers
- 6347/14 Line Printer
- 1000 LPM
- Tape Drive/Controllers
- Lane Adapters
- MT 985 Terminals
- MT 985 Terminals

Many
(6) AP/310 Printers
(10) Disk Packs

$97,000 or Make Offer
Always Under Burroughs Maintenance
1 Owner R.T. Brockman
1-800-231-6347

LEASING A LARGE COMPUTER?

Look for the best deal in the classified pages of *Computerworld*

Call

800-343-6474

(or 617-879-0700)

for more info.

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

CMI

3033 All models

3081 New or Used

Series 1 New 4690's, 4697 Disk Used 4690's, 4695's Immediate Delivery Buy-Sale-Trade Leases Available

3083 New or Used

3081/3083/3084 Lease Financing Available For Your System or Own 2, 3, 4 or 5 Year Terms

Series 1 I/O New or Used Buy-Sale-Trade Leases Available

Wanted 4381 Delivery Positions

Wanted 4341-M2 Call Now

3270 3278 3279 3274 3276 3287 Buy/Sell/Lease

CMI

SYSTEM 36 Monthly Lease Rates Lower Than IBM Credit Corp. 2, 3, 4, or 5 year terms. Includes System 34 Upwards

3725 Lease Financing Available For Your System or Own 2, 3, 4 or 5 Year Terms

3800 LASER PRINTERS Model 1 Available for Immediate Delivery Model 3 Lease/Financing Available - Any Term

8130's Sale or Lease Available Immediately

3705-3704 Available for Immediate Delivery Sale or Lease We Can Supply Models E through H Call Us For Purchase/Lease/Upgrade Of Your NCR Mainframe And Save 20% Of Your Monthly Cost

3278 - 3274 - 3287

FOR THE BEST PRICE AVAILABLE ON ONE AND TWO YEAR LEASES

CONTACT JERRY SMITH (408) 745-4297

ATARI

HP 3000

encore (213) 452-9117

DEC

RENT • BUY • UPGRADE • SELL

PDP, 11/03, 11/04, 11/23, 11/24, 11/34, 11/44, 11/70, VAX/730, VAX/750, VAX/780

SYSTEMS • OPTIONS • SUPPLIES

11/34 128K, Dual RL02, RZ11-A, Dual H9642 (new) $34,995
11/23+ 256KB, Dual RL02, RZV11-C, VT102, Receiver (new) $16,250
11/70 512KB MOS, LA36 (new) CALL
VAX/750 1MB, RA60, RL02, VT52 Receiver (new) CALL

Customized Configurations—Call With Your Request.

In Stock		Specials		In Stock	
11/34-BC (new)	$11,250	MS11-PB (new)	$4,195
DB11-A (unused)	$ 695	MS750-CA (new)	$4,195
DMF32-AB (new)	$ 3,495	MS750-DC (new)	$3,995
DUP11-DA (used)	$ 995	RH750 (new)	$2,295
RZ11-F (new)	$ 2,195	RM11-EA (new)	$3,695
H9642 (new)	$ 1,395	RL211-AK (new)	$6,495
KT24 (new)	$ 795	RQA01-AA (new)	Call
LP11-WA (unused)	$ 2,495	VT52-AA (new)	$ 495

BROOKVALE

800-645-1167 NY: (516) 567-7777

DATA GENERAL

Hanson Data Systems

Must Sell Available 2/1/84

DEC PDP 11/70

512KB MOS (2 each) RP06 TE16 DH11AD

Call Jim (713) 445-0082

FORSYTHE McARTHUR ASSOCIATES, INC.

DEALER / LESSOR OF IBM Computers and Peripherals

Home Office Chicago 919 North Michigan Avenue Chicago, Illinois 60611 312 943-3770

Branch Offices Atlanta 404 953-9457 Milwaukee 414 785-0544

CDR

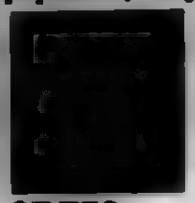
BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

DISK DRIVES · CONTROLLERS · PERIPHERALS · MEDIA

WANG · DEC

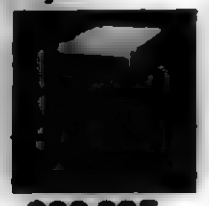
National authorized CDC OEM-Distributor offers new equipment, fully warranted for 90 days:

$12,900
CDC Model 9766 (300 Mb.) WANG Models 2285V-2, and 2285 (288 Mb.) DEC Model RM05 (256.1 Mb.)

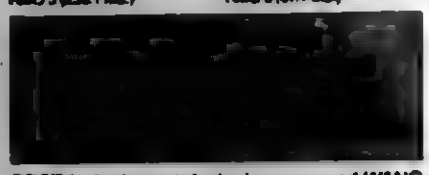


$7,750
CDC Model 9762 (80 Mb.) WANG Model 2285V-1 (75 Megabytes). DEC Model RM03 (67.1 Mb.)

$8,875
CDC Model 9448 (96 Mb.) WANG Model 2280-3 (80.4 Mb.) WANG Models 2280 V-3, 8580 (80 Mb.) DEC Model RM07 (83.4 Mb.)



$20,825
CDC Model 9775 (675 Mb.) WANG Model 2285 V-3 (640 Megabytes). DEC Model 2-RM05s (512.2 Mb.)



ERST
INTERNATIONAL CORPORATION
225 Lafayette Street, New York, NY 10012

ERST is the largest dealer in pre-owned WANG equipment – 2200, VS, WP (CPUs, Terminals, IOPs, Controllers, Printers, Memory Upgrades).

Next time give us a call . . . Toll Free 1-800-FOR-ERST . . . In N.Y. 212-431-1100

NEW & USED EQUIPMENT FOR SALE BY END USER

DATA GENERAL

1) 6040 TTY PRT	$ 495	3) 10132N 1/2 BAY CABS	300
2) 6273 LPS PRINTER	6000	2) 11444A 1 BAY CABINETS	150
1) 6974 LPS PRINTER	11000	1) 14591A 1 BAY BKD. CAB.	
1) 6150 LPS PRINTER (parts)	11000	W/AIR COND. (NEW)	4495
1) 6101 LPS PRINTER (parts)	6000	1) 14592 1 BAY BKD. CABINET	
2) 6105 25 MB DISK (NEW)	2995	W/HEAT EXCH (NEW)	3995
2) 6105 25 MB DISC	2000	2) 4241 ULM 5 BOARDS	700
2) 6105 25 MB DISC	2000	2) 6064 LPS CONT	650
1) 6070 20 MB SMD	2000	1) 6027 80 MB CONT	1200
1) 6070A 80 MB DISCS	2000	2) 6053H IC 8 SLOT 6W	1300
1) 6027D 15 MB DISK (NEW)	4000		
1) 6066 12.5 MB DISK W/FLOPPY	3100		
1) NOVA 4X 8 SLOT 128K 12.5 MB DISK W/FLOPPY & ULM 5			12,100
1) NOVA 4X 8 SLOT 128K 12.5 MB DISK W/FLOPPY & ULM 5			12,600
1) SOLID® 6450 128K 12.5 MB DISK W/FLOPPY & 2 4027'S			14,500

MODEMS & TERMINALS

11) VA1261 VADIC 1200 BAUD	195	11) 6012/24 MICOM MODEMS	1200
1) VA3451 VADIC 1200 BAUD	495	36) ALI ACOUSTIC COUPLERS	
2) VA3455 VADIC 1200 BAUD	495	SELL 103-113 300	95
36) ADMA L.S.I. TERMINALS	275	4) ADMS L.S.I. TERMINALS	350

CONTACT: ROBERT FULWILER 214-368-6614

BASIC SYSTEMS HARDWARE, INC, CAN:

- Buy your S/34
- Lease you a S/34
- Sell you a S/34
- Save you $$$$$$$$

- 3 Mos. FREE Maintenance with Purchase
- Plug thru Peripherals
- Software Support
- Upgrades
- Demo Site in Midtown Manhattan

Contact Ken Clarke, Branch Manager, BSH, INC.....499 7th Ave. NY, NY 10123 - 212-279-6107

FOR SALE:
Unisys Computer Equipment
(1) 90/30 Computer with one megabyte main memory
(1) Printer
(1) Card Reader
(6) Disk Drive
(6) Disk Drive
(3) Universo U14 Tape Drive
(11) UTS-20W Display Terminal
(6) UTS-400 Slave Terminal
(1) UTS-4040 Cluster Controller
(1) UTS-400 Terminal Control
(1) DPQ Printer
Please contact
James G. Heilmann
The Sandisk Corporation
15 Plumb Street,
Milton, WI 53563
Phone: (608) 868-7618

SHUGART
Floppy Drives
Double Sided Double Density
SA460
In Stock
Quick Delivery
Single Piece Price
Starting at $250
Contact Steve Barker
(401) 766-3233 or
(401) 766-6126

SELLING?

Sell your product or service in Computerworld classifieds.

Join the thousands of advertisers who use our classifieds because they get results.

You can find buyers for disks and DEC's, terminals and timesharing, software and System 370's.

More than half a million active computer people read Computerworld each week, and you can reach them efficiently in Computerworld classifieds.

To place your ad, or to get a rate card with complete details on Computerworld Classifieds, call or write:

Classified Advertising
Computerworld
P.O. Box 880
Framingham, MA 01701

The nationwide market - a call away!

DEC/DG

SYSTEMS/PARTS/PERIPHERALS
NEW/USED/SURPLUS • DISCOUNT PRICES
Since 1977! Buy, Sell, Trade and Broker.

PHIL	BRYAN	JENNIFER
DG	11-VAX	8-LSI

CALL TODAY - (305) 392-2005 TELEX 568-670

thomas business systems, inc.
4301 Oak Circle - Unit 11 Boca Raton, Florida 33431

M/G SETS CHILLERS
for
3033/308X
BUY SELL LEASE
612-944-8552

Buy•Sell•Lease
SERIES 1 S/34 S/38 4300 S/370 5110 S/23
XERXES
COMPUTER SALES
Minneapolis, Minnesota
800-328-3804/612-339-3042

AMDAHL V/8
FOR SALE
16 X 16
4096 SUBCHANNELS
HARDWARE MONITOR INTERFACE
(1) FEBRUARY 1, 1984
(1) APRIL 1, 1984
CALL: CHARLIE BERRY
MAJOR COMPUTER INCORPORATED
10237 YELLOW CIRCLE DRIVE
MINNETONKA, MN 55343
(612)933-6000

DCM
DIVERSE COMPUTER MARKETERS INC

BUY • SELL • LEASE
- *Fast Delivery*
- *Configured to Your Requirements*
- *Short & Long Term Leases*
- *Excellent Rates & Prices*

S/34 • S/36 • S/38 • 4300
All Models • Upgrades • All Peripherals

SPECIAL
3033 "N" Series Memory 8 meg • 8650 Data Streaming
4331-J01 • 3262-001 • 3278-A02 • 3310-8800 • 3203-005
3274 Communication Controllers - Local & Remote

For complete details call
(313) 855-5980
Dallas/Ft. Worth (817) 735-9811
Toronto (416) 498-5737

BUY • SELL • LEASE
SERIES-1
S/34 • S/36 • S/38
4300
S/23 S/32 5110-20
Tape • Disk • Printers • Tubes
AMCOM CORPORATION
5200 W 73RD ST - MINNEAPOLIS, MN 55435
(612)835-4737
CALL TOLL FREE
800-328-7723

ALL 370 & 43XX SYSTEMS
CPU's & Peripherals
Purchased, Sold & Leased
CORPORATE COMPUTERS, INC.
Contact: Norm Burger
(203) 661-1500
115 Mason St., Greenwich, Conn. 06830
Member Computer Dealers & Lessors Association

MEMORY BOARDS

LSI/11	64KB	$1995
VAX 11/780	2MB	$4300
ECLIPSE	1MB	$5700
NOVA 4	1MB	$4600

Call For Others
Now 100% Compatible

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

SERIES I SPECIAL

Control Data
126MB Removable Drive . . $12,900
Diskette Drives . . . . . $ 1,495
Printers & Displays

New or Used
Immediate Delivery

IBM
4956 Processors
4967 200MB Disk Drives
All Peripheral & Features

EL CAMINO RESOURCES LTD.

offers:

4341-P12

Lease program available for:

4361
3178

We will buy or sublease:

3033

Ask for:
MEL KLEINMAN
(818) 986-2411
4827 N. Sepulveda Blvd.
Sherman Oaks, CA
91403

data3

IBM PROCESSORS/PERIPHERALS

GSD: S/34 · S/38 · SERIES/1 · S/36 · S/32 · S/3

DPD: 4331 · 4341 · TAPE · DISK · PRINTERS · TUBES

BUY • SELL • LEASE • SUB LEASE

- All Peripherals
- Special Features
- Upgrades
- Flexible Leases
- On-time Delivery
- Purchase/Leaseback

CDLA

BUY-SELL-LEASE

SERIES/1

SAVE ON NEW OR USED
OVER 2000 CUSTOMERS

S/38
4331
4341

ALL RELATED PERIPHERALS

S/34

SEE OUR NEW PRICES

S/36

SHORT/LONG TERM LEASES

3033
3081

3350 3370 3340
3380 3375 3344
3411 3420 3430
3278 3274 3276

Call toll-free 800-328-5718
(in Minnesota, 612-544-8660)

COMPUTER OPTIONS, INC.
"the best option"
1660 South Highway 100
Minneapolis, MN 55416

CDLA

NPA
SYSTEMS INC.

SPECIALIZING IN:
PURCHASE
SALE, TRADE,
LEASE, RENT,
AND SERVICE OF
Data General
EQUIPMENT

(516) 467-2500

IBM UNIT RECORD EQUIPMENT & DISK DRIVES
DISK PACKS DATA MODULES MAG TAPE DISKETTES

SALE OR LEASE

machines
026—029—082— 083— 084
085—087—088— 129— 514
519—548—557

disk packs
2316—3336(1)—3336(11)—3348(70)
5 MEG. TO 300 MEG. PACKS—NEW & USED
Highest Prices Paid for Used Packs & Machines

THOMAS COMPUTER CORPORATION
5833 W. Howard St. Chicago, IL 60648
800-621-3986 312-647-6999
Authorized Distributor – Memorex, CDC, 3M, BASF, Verbatim, Dysan

Systems/34
128K/16MB
Printer 3262LPM
$1600. P/Mo.
Sale/Lease

Sale/Lease
4341's
Models K, L, M - GRP 1 & 2
Lease Term -
1 Yr or Longer

Control Units
3880 - B13
3880 - D13
Avail. March 1984
Sale/Lease

Controllers
3880 3803
3274 3276
Immediate Delivery

DASD
3380 3375-3370
3350 3344 3310
Immediate Delivery

Tape Drives
3420 3430
3410 8809
Immediate Delivery

Display Stations
3278 3279
3178 3277
Immediate Delivery

Printers
4245 3262 3289
3211 1403 3262
3289 3287 3288

CDLA

Computer Marketing Inc.
P.O. Box 5265, Philadelphia, PA 19128

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

System 34s • 36s • 38s • 4300s
3270s • 370s • all peripherals and I/O
214/258-0541

MCC
Metroplex Computer Company, Inc.
320 Decker Drive, Suite 180 • Irving, Texas 75062 • TWX 910-860-9285

BIDS & PROPOSALS

ATTENTION: COMPUTER HARDWARE MANUFACTURERS AND THIRD PARTY VENDORS

The New York City Human Resources Administration Department of Social Services is seeking proposals for the acquisition of computer hardware including a mainframe CPU and central site peripherals to replace existing equipment which will be traded in as part of the acquisition plan.

Proposals will be received by the Human Resources Administration Department of Social Services until 5:00 P.M., Tuesday, February 21, 1984.

A proposer's conference will be held at 10:00 A.M. on Tuesday, February 14, 1984 at 2 Broadway, 6th floor, New York City.

Request for proposals may be obtained beginning 9:00 A.M. on January 30, 1984 from the Office of Data Processing at 2 Broadway, 6th floor, room 6705, New York, New York 10004, Attention: Dennis Cribben (212) 376-6081.

BUSINESS OPPORTUNITIES

DEC
Check out our unbeatable combination:
Huge inventory at low, low prices.
Call toll free 800-328-7000
In Minnesota (612) 894-4020
MIDWEST SYSTEMS, INC.
Riverwood Drive, Burnsville, Minnesota 55337

3033

ACQUISITIONS/ DISPOSITIONS

ICS CYBERNETICS

Call Us-Principals Only Please

Corporate Office
224 Harrison
Syracuse, NY 13202
(315) 474-1246
John Allen

Central Region
8155 Huron River Dr.
Dexter, MI 48130
(313) 668-7188
Tom Shipley

USA COMPUTER EXCHANGE, INC.
BUY • SELL • TRADE
DG • DEC
SYSTEMS • PERIPHERALS • MODULES
Call GEORGE H. TRAFFORD
617-935-6666

SALE LEASE PURCHASE
DATA GENERAL

Desk Top Models 10, 20 & 30
MV4000
MV8000
C300, C/150
S/250
Nova 4/X, 3/12, 1200, 1200
4227 Expansion Chassis
Minicomputer, 64Kb, I/O
Software Maintenance
6/16 C/150 1Mb Memory
ALM-16, ULM-8, SLM-2, DCL/200
ASB-8, ATI-16, MC-8, MC-16

D210/D211/D410/D460 CRTs
D100/D200/D400/D600 CRTs
Desktop Printers
Letter Quality Printers
6160 73Mb Disk System
6161 147Mb Disk System
6236 35Mb Disk System
6666 12.5/1.2 Mb Disk System
6234 80Mb Disk System
6021/6026/6125 Tape Systems
6666/6669 Diskette Systems

AMES SCIENCES, INC.
301/228-6100

AUCTIONS

"The undersigned will sell at Public Auction on Tuesday, January 31, 1984 at 10:00 A.M. (local time) our right, title and interest in and to the goods described as follows:

One (1) IBM computer system (CPU) model 5340-F37, serial #30080 with: (1) Printer, model 3262-5bl, serial #12214; (5) Unit groups (Displays #6251-11; Keyboards #4600 and cable groups #2665), serial nos. K7724, D1582, A6203, A6467 and 32643 with the following software packages:

(1) Address Book
(1) Inventory Management
(1) Sales Analysis
(1) Accounts Receivable
(1) Order Processing
(1) Accounts Payable

The auction will take place on the premises of Pickens Kane, 411 Halsted, Chicago, IL 60610.

The terms of the sale are a minimum down payment of 25% in either cash, certified or cashier's check at the time of sale with the balance due within 24 hours and the undersigned reserves the right to bid on said equipment.

CREDIT ALLIANCE CORPORATION"

SOFTWARE SERVICES

Associate Branch Manager

We are a national leader in IBM Software Consulting services. To meet the software needs of our rapidly growing marketplace, we are seeking additional associates, nationwide. Inquiries from experienced NIS executives, software related sales professionals and practicing independents are being considered.

If you are an accomplished individual now contemplating entrepreneurship as an avenue for greater success, we would like to hear from you. Our opportunity is success-proven and offers outstanding earnings potential. For consideration in your locality, please write detailing your experience or send resume to:

Box NBWC 5339
261 Madison Avenue
New York, NY 10016

WANTED SOFTWARE SOLUTIONS FOR THE HP3000

Hewlett-Packard is seeking quality software suppliers that address specific vertical markets in the NY/NJ area. If you have a unique application solution and want to take advantage of the financial, marketing, and technical incentive offered by Hewlett-Packard, call:

Lee Slade
(201) 265-5352
Ext. 5467
or Sada Albanese
(212) 971-5559
(914) 921-5559

HEWLETT PACKARD

COMPUTER SYSTEM DISTRIBUTORS and OEM's wanted for sales of systems to pharmacies and durable med supply houses. Data Comm pkg available also. All run on DEC 11's plus PC350. Send inquires to AUTO-SCRIPT, 11 Mountain Ave., Bloomfield, CT 06002.

SOFTWARE SYSTEMS HOUSE

Turnkey operation. Copyrighted programs. Complete documentation support. Substantial customer base. Since 1975.

Jean Percy
Saber Realty
800 South Brookhurst
Anaheim, CA 92804
(714) 778-4680

BUYING?

Whether you're looking for big computers little computers, terminals, printers, software, time sharing or services, you'll find it in Computerworld classifieds.

Pages of ads every week, with everything from Discs to DEC's from time sharing to terminals, and software for every size computer system.

You'll find what you need in Computerworld classifieds.

Call 800-343-6474 (or 617-879-0700) for more information

The Bulletin Board

Buy . Sell . Lease . Buy . Sell . Lease . Buy . Sell . Lease . Buy . Sell . Lease

MISC. SYSTEMS

COMPUSTAR BY INTERTEC DATA SYSTEMS

Includes (5) Model 10 Terminals, (1) Model 20 Terminal, (1) COMPUSTAR Disk Controller, (1) CDC-CMD 80MB Disk Drive, Accounting Software by TCS, In addition, (20) SOROC IO 140 Terminals, (20) PRENTICE 1200 Baud Modems, INFOREX 1309 Processor 64KB, (7) Key Stations, (5) Channel Tape Drive.

Immediate Delivery For All or Part

(800) 722-1666
(213) 776-0360

For Sale
DATAPOINT 4630
300 LPM Printer
(216) 464-8620

PRINTERS

PRINTERS
IBM 3203-5's
IBM Maintained
Ready For Immediate Delivery
Contact (612) 736-6368
Extension 348
Clive Pinnello

IBM

For Sale or Lease

3081-G16	April 84
3081-G24	April 84
3803-2	May 84
3420-6 (4) D/D	May 84
3274-D31	Feb 84
3287-1	Feb 84
5340-D23	Feb 84

Need To Buy
4341-M2 July 84
Computer Services Int'l
(201) 569-6123

FOR SALE
4331-J1 SYSTEM
w/Communications
3411/3419 Tapes
3262-1 Printer 650 LPM
3340-A2/B2 DASD 280 MB
3278-2 Displays
$53,500
Available Now Mid-West
Call Bill Hagen
Computer Merchants Inc.
(914) 238-8831

PRINT TRAINS
IBM 1416 & 3216
Bought - Sold - Lease
Repaired - Reconditioned
COMPU-ACT COMPANY, INC.
(513) 859-9491

IBM

Buy - Sell - Lease
IBM
Cougar Computer Corp.
Suite 210
30850 Euclid Office Plaza
Euclid, OH 44132
(216) 261-3660

SYSTEMS 34/36/38
Lease or Sale
$/36 DELIVERIES
WANT TO BUY S/34's
1-800-LEASPAK
In TX (817)860-8822

Buy ... Sell ... Lease
IBM MICR 3890 - 1419
(813) 722-4534

BUY	SELL TRADE	LEASE
S/34	S/36	S/36

Peripherals
All Guaranteed IBM Maint.
PROCOM
(212) 279-1717

SYSTEM/34's & 36's
For Sale or Lease
SYSTEM/34 UPGRADES
Immediately Available
Southwest Computer Sales
(512) 699-1200

IBM

WANTED: IBM SYSTEM 34, WITH COMM. ADAPTER, EIA INTERFACE, MAGAZINE, FEAT #4601, PRINTER AND CABLE THRU CRT'S. CONTACT GERALD MUNOZ AT (719) 442-4015.

Want To Buy
3370
Call:
Dick Daniels
1-800-238-6405

FOR SALE
IBM 4341 L-10
With 1870
Available March 1984
Call (214) 991-2911

3277-2
w/4959
79 Key 66/CDC Typewriter Keyboard
Stored Refurbished Ready To Go
$699.
ICCI, Inc.
Call Fred Simonds
(201) 994-9696

S/34's Available From End-User
Model F37 Available 3/15/84 for lease
Model F39 Available 3/15/84 for sale
Model C04 Available 4/15/84 for sale
Contact: Brad Carpenter
Hyatt Div., The Dexter Corp.
716-372-6300

IBM/PC
160 KB Disk,
64K, KBD $1678
IBM/XT $4498
CHI, (804) 359-7290
Room 423, P.O. Box 27401,
Richmond, VA 23279

SYSTEM/36's
A11*A12*A22*B23*B24
Available Now!
FOR SALE OR LEASE
STAR DATA SYSTEMS
1 (800) 531-5052
(512) 822-5052-Texas

FOR SALE
S/34's
C/23 D/34
Peripherals To Suit
Call Louis Felder
(914) 238-8831

IBM FOR SALE/LEASE
3277-2
w/4951 $175 Ea.
3271-2
w/7921, 3289 $375 Ea.
(Quantities Limited)
VARGO COMPANIES
(213) 284-8888

FOR LEASE
NEW 3370's
A2/A12 B2/B12
April Delivery
Plan Ahead
Call Howard King
Computer Merchants Inc.
(914) 238-8831

FOR SALE
SYSTEM 34 UPGRADES
AVAILABLE IMMEDIATELY

64 Meg	$5,500.
128 Meg	$13,000.
128K	$7,300.

Prices Include Delivery and Installation
Call Fred
(516) 579-6410

4361-ML5
Ship Date - 3/15/84
Lease Only
Call Bob McIntyre
Datalease Corp
(203) 222-0178

IBM

Immediate Availability
IBM 5251 Mod 11
w/5250 and 4250 option
5 each
Will Sell Separately
$1,575 each
Call Pat
(212) 668-8311 ext. 5

IBM 3262 Printer
Available Immediately
$12,000
Call Pat
(212) 668-8311 ext. 5

FOR SALE (All Upgrades & Systems)
64 Meg Upgrade ($/34)
5494-C06, 5211, 5251-11
120K (5 To 7 Per Sec)
Magazine For 5494
Series 1 (1130)
5471-001 5494 & 5110
Available Now At A Great Price!
DATAMARC (404)955-7400
5555 Peachtree Rd., Atlanta, GA 30341

IBM System 5340-F37
With 3 Communication
Lines & 3262-B01 Printer
Available Immediately For Lease
$1,000 Per Month
Call George Schultz
(612) 345-6666
TEXCOM

DATA GENERAL

MV 8000/6000
2 Mb Memory Boards
Available Now
Liberal Trade In
On Your Old Boards

16-6/20 ½ Mb System	$18,000
C-350 ½ Mb System	$10,000
MV-8000 2 Mb System	Call
MV-8000 2 Mb System	Call
6060-H Nova 4S 64 Kb	$6,500
w/6045 & Lowboy Cab	
6065-H Nova 4X 256 Kb	$12,500
w/6045 (2X) Mtg Cab	
6061-H Nova 3D 256 Kb	$7,500
LLM 5, 6045 & Cab	
6270 20 Mb Disc Subsystem	$4,500
6260 96 Mb Disc Subsystem	$12,500
6261 192 Mb Disc Subsystem	$14,500
6020 Systems Interface Card	$500
6762 CDC 80 Mb Drive	$2,500
6256 Eclipse 256 Kb Memory	$2,500
6257 S140 256 Kb Memory	$2,500
6257 Nova 4X 256 Kb Memory	$2,500
6053 CRT Terminal	$975
6130 D400 Terminal	$1,200
6026 800/1600 Tape S/S	$10,500
6099 12.5 Mb Disc S/S	$2,500
6708 2 Mb MV 8000 Memory	Call
6708 512 Kb MV 8000 Memory	Call
4315 600 LPM Printer	$5,200

Int'L Computing Systems Co.
(612) 941-8941

New DG CRT's

D-210	$795
D-211	$945
D-410	$1295
D-460	$1395

Desktops 15% to 30% Off List
Any & All DG Cables In Stock
We Will Not Be Undersold On
Any New or Used DG Equipment
Texas Data Systems
(713) 667-4044

SPERRY UNIVAC

V-77 600 SYSTEM
(2) 256K CPU w/2 Pages WCS
(2) 6400/600 288 Mb Disk Drives
(3) 10 MB Disk Drives
(2) 800 bpi Tape Drives
(2) 6250/1600 bpi Tape Drives
(1) 300 LPM Printer
(1) 600 LPM Printer
TIME EXCHANGE (800)645-4600
Ask for TOM EAGE

FOR SALE
(1) 1100/60 Processor 32kW/Words
(1) Tape Controller
(2) 8046 Disk Controllers
(2) 1600 BPI Tape Drives
(2) 8460 Disk Drives
(1) 770 1400 LPM Printer
(1) 4013 Console
We Sell All or Any Part
Contact Bonnie Williams
(516) 935-7721

BURROUGHS

BUY SELL LEASE
All Systems & Peripherals
AVAILABLE
• B1855 Sys • B1865 Sys
• B80s • B82s
(Configured To Your System)
• Visual 200 Terminals
• 200 Terminals model 100 & 110
• Trendata, MTI800s, MTI900s
• 200 & 287 Byte Disk Drives
• Various Tape Sub-systems
• Memory Upgrades
• Printers 600 & 1040 lpm
Guaranteed Burroughs Maint.
Depot Maintenance Available
COMPUTER PROVIDERS
(216) 349-7979
(Member ADAPSO)

FOR SALE
BURROUGHS
B-1810 SYSTEM
48MB 207 Dual Disk Drive
1048 KB Memory
6MHZ Processor, 6MHZ Clock
6245-6 Printer, Control
1MB Memory Base
192MB DP Drive Control
Con Control, Display
210-009 20KVA 3 Phase Pwr Ctr
Exp Cabinet, 2 I/O Exp
2 SAL Controls
2 TD831's W/TD15 Keyboards
Under Burroughs Maintenance
P.O. Box 355,
Casper, WY 82602
307-265-1891 - Ma/Bell

HONEYWELL

LEVEL 6 & DPS 8 EQUIPMENT
NEW & REFURBISHED
Systems • Peripherals • Memory
CRT's • Applications Software
SUBSTANTIAL DISCOUNTS!!
Symbiosys Computer Services Ltd.
109 Bedford Rd.
Northboro, MA 01532
(617)393-3399
TWX 710-347-7574

L62, L64
L6000, L6000
PERIPHERALS
TERMINALS
URS
99 Montvale Ave.
Stoneham, MA 02180
(617)438-4300

PRIME

PRIME
LARGE SELECTION
OF USED PRIME
COMPUTER SYSTEMS
...SAVINGS TO 50%
Peripherals also available:
Memorex-Dtc Drives-Controllers
Modems-Terminals-Printers
1st SOLUTION
...Your Ultimate Source
A DATAMATION SERVICES, INC., COMPANY
3901 EAST CAMPBELL AVE.
PHOENIX, ARIZONA 85018
(602) 957-0660
ASK FOR DON OR MATT

More Bulletin Board on the next page.

ORDER FORM

COMPUTERWORLD BULLETIN BOARD

Issue Date: Ads can be accepted up until the Monday preceding the issue desired. Computerworld comes out every Monday.

Classifications: Most ads will be classified according to the brand of equipment that is being bought or sold. These classifications include Burroughs, Data General, Digital/DEC, Hewlett Packard, Honeywell, IBM, NCR, Sperry Univac, Salvage, Terminals, Misc. Systems and Miscellaneous.

Copy: Copy sent in via the mail or telecopier (telecopier extensions are 410 and 451) should be clearly typewritten. Ads may be given over the phone to our team of ad takers. The standard size is 1 column by 1 inch deep. These units may be combined to form larger sized ads. Describe the equipment very briefly, give the price and the name of the person to contact. All ads will be set up using a standard format. No borders or logos are allowed.

Cost: The price for each standard unit is $130.00 (One unit minimum and no fractional units allowed.) There are no agency commisions and no quantity discounts.

Billing: Once you've written your ad, send (or call) it in with your name and address for billing purposes and we'll run it. (If your company has never advertised with us before, we request a check with your order.)

Date(s): _____

Signature: _____

Name: _____

Title: _____

Company: _____

Address: _____

Telephone: _____

Send this form to:

COMPUTERWORLD BULLETIN BOARD

375 Cochituate Road, Box 880,
Framingham, MA 01701

617-879-0700 800-343-6474

The Bulletin Board

DEC

DEC BARGAINS

11/84A CPU Set	$1,495
11/44 KD44-A "D6"	$2,975
AA-C278B System Kit	$8,950
BDV11-AA	$495
DR750-AA	$3,495
DZ11 MUX Bd.	$1,195
DZ32-S	$1,975
FP11A	$1,195
RX11-A	$1,795
RX11-S	$2,375
XBV11-P	$350
MS11-MB	$1,375
MS750-DC	$4,995
MS750-FD	$2,995
MSV11-PK	$1,195
MSV11-PL	$1,375
PDP 11/84A-DC	$8,395
RLV11	$975
VAX 1MB MS750-CA	$2,995
VAX 1MB MS750-DA	$2,995

Call Ray at CEI, Inc.
(617) 275-6900

Now Available In Stock!

More PDP-11 with 10 MSB Memory, (8) RX50 Floppy Drive, 2MB Bb Memory Duplex Price

PDP 11-60, RLV-11 Controller, 64KB Memory, LA 180 Printer, RT-11 License. $9,999

PDP 11-60 with RL02 Disk (5), 64 KB Memory, LA 180 Printer, RT-11 License. $12,999

LA 180 Printer with Controller $695

Other Configurations Available
Complete Range of DEC Compatible Subsystem Connection.

E.E.C. Systems, Inc.
(617) 449-6180

DEC

DEC & PRIME SPECIALS

- MS750-FD Avail Now $4,500 ea.
- PDP 11/84A, Configured to your needs. Call
- RA60-AA $6,200
- CDC 9775 300MB $2,995
- CDC 9766 300MB $2,995
- RP06-AA $2,995
- VAX 11/780 1MB, 64K chip Now $22,995
- RA60 $2,995
- TU78 A5 $2,995
- Prime Computer Systems Available Upon Request

SEVCO INC.
(617) 435-6630

DEC NEW & USED

BIT — SELL — EXCHANGE

Systems • Processors • Memory Options • Peripherals • Modules

LEEWOOD EXPEDITER CORP.
(402)292-2546

DEC Equipment

Bought & Sold
Systems - Components
Peripherals
New Or Used

Massachusetts Enterprises
Essex St., Middleton, MA 01949
(617) 777-4666

We Buy and Sell DEC Systems and Components.

Alphabyte, Inc.
900 S. State College Blvd.
Fullerton, CA 92631
(714) 680-6511

DEC

11/70 System

½ MEG Core
1 MEG Monolithic
FP11-C, RH70
$39,000
Call Ed
(781) 282-6360

VAX RESOURCE ACCOUNTING

$1200.00 U.S.
ON LINE-MENU DRIVEN
DISK ACCTG-MGMT REPORTS
Virtual Computing
#103, 835-11 Ave. S.W.
Calgary, Alta., Canada T2R0C9
(403)262-7440

DEC Micro/PDP 11

20% Off with Software
Available Immediately
Call:
(804) 320-7860

FOR SALE

Refurbished
Guaranteed
96 Each DECWriter LA180
Pdl Keyboard
$1695 Each
Call Harold
Trail Blazer Systems
(415) 969-3900

BIT • SELL • TRADE

1170 Sys.	DZ11-E	RH70
DL11-E	FP11-C	RA60-AA
DL11-W	LA180-DA	RA60-AA
DMC11	M7269	RP04/6-C
DR11-B	M8012	RP06-AA
DZ11-B	MX11-CE	TE16 Mstr.

NEW YORK COMPUTER EXCHANGE
(516)752-0555 (800)645-6156

DEC

RUA81-AA
RL02-AK
SPECIAL SALE
BROOKVALE ASSOCIATES
(800) 645-1167
(516) 273-7777

MISC.

WANT TO BUY

N.E.C. Astra Series Processors 4210, 220, 230, 260, 270
Printer-A-2100
CRT's-A-4010
Call Computer Providence Corp.
(219) 240-7870

Buy • Sell • Lease
• Short Term Rentals •
DATAPOINT
FOR SALE

3400	Revs	$1,195
3450	Multiports	$995
6600	CRT's	$1,295
1550	Systems	$1,295

Cougar Computer Corp.
(219) 291-3660

For Sale
(14) Memorex CRT's with Power Swivel Tilt Bases
(2) Read-Rite Modems
(2) Texas Instruments Controllers
(2) Wallet Terminals
(2) West. Elec. Telephone Modems
(1) Western Electric Teleprinter
(1) Applied Digital Data Systems CRT

Contact Bill Pardee
(408) 279-8211

WANG

BUY - SELL
MVP/LVP - OIS - VS - PC
SYSTEMS IN INVENTORY
VS/80 - MVP - WP/230
AND PERIPHERALS
2246C - 2346R - 5236-4
Hardware Maintenance Available
(404) 971-6000

Pssssst...
WANG USERS.....

HAVE YOU HEARD ABOUT THE GROUP OF FORMER WANG EMPLOYEES IN ATLANTA WHO BUY & SELL USED WANG EQUIPMENT AND PLUS COMPATIBLES?
LC.A. (404) 977-4266 or 1-800-241-3189

TIME MANAGEMENT?

EXECUTIVE SECRETARY II. Expanded message/calendar/meeting scheduling as a module of the word processing software for any VS on all work stations.

Send for VS Product List:
Information Networks Systems, Inc.
[illegible]
M.S. Berlin (216) 291-1616

For Sale:
Several VS-80 Systems
Incl. 256-512K, 2 VS Str's, 80 Meg "Phoenix", 300 LPM Printer, Photo EMUL Sets. Also Available: OIS 105-1 (80 Meg)
(617) 272-6200
CPR Associates
Secondary Source for Refurbished Wang Equipment

For Sale:
Wang OIS 105-1 System
Includes 4.25mb Fix Disk and Cartridge 35K VS, Stn. and 64K VS, Stn. Printer w/Short Pdr & Stacker Cabinet
Priced to Sell
$10,500
(201) 540-0700 or (201) 334-1797

HEWLETT PACKARD

HP 3000
BUY & SELL
Complete Systems
Memory - Terminals
Disk Drives - Tape Drives
Maintenance Parts
Custom Configuration
(Formerly Philips & Associates)
(800) 538-2241
(312) 455-2440

BUY & SELL
1000 & 3000
Systems • Components
WESTERN DATA SALES, INC.
(213) 373-9403

Buy-Sell-Lease
HP3000 3X, III, 4X
and related peripherals
Call Carol
CSU INDUSTRIES, Inc.
516-239-4310

Call
(800) 343-6474
Or
(617) 879-0700
To
Place
Your
Ad
Today

SOFTWARE FOR SALE

DOS VSE VM CMS OS USERS

- ON-LINE, REAL-TIME APPLICATIONS SOFTWARE
- ANSI COBOL – CICS COMMAND LEVEL

CUSTOMER ORDER MANAGEMENT – IMSS/COM™
- ORDER ENTRY, SHIPMENT PROCESSING and BILLING
- INVENTORY CONTROL and ACCOUNTING
- ORDER and SALES ANALYSIS
- COST OF SALES, A/R & G/L INTERFACE
- SPECIAL PRICING and PROMOTIONS
- SHIPMENT POOLING and ROUTING

ACCOUNTS RECEIVABLE – IMSS/AR™
- CASH APPLICATION (ON-LINE and/or AUTOMATIC)
- ON-LINE INQUIRY and AGEING (ITEMS and PAYMENTS)
- STATEMENTS
- PAYMENT HISTORY and ANALYSIS
- G/L INTERFACE

ACCOUNTS PAYABLE – IMSS/AP™
- ON-LINE VOUCHERING
- CASH REQUIREMENTS and INVOICING
- VENDOR HISTORY and ANALYSIS
- G/L INTERFACE

- YOUR SYSTEMS INCLUDE:
  - VSAM or IDMS DATA BASE ACCESS
  - SOURCE CODE, CONTROL TABLES & JCL
  - USER, SYSTEM, & OPERATIONS MANUALS
  - TRAINING, EDUCATION, SYSTEMS & PROGRAMMING SUPPORT
  - LOCAL and REMOTE PROCESSING
  - MULTI-COMPANY/MULTI-WAREHOUSE CAPABILITY
  - CUSTOMIZATION SUPPORT WITH WARRANTY

HIGH QUALITY, LOW COST IBM SYS34/36 SOFTWARE

$800 per PACKAGE:
ACCOUNTS PAYABLE
GENERAL LEDGER
PAYROLL
INVENTORY CONTROL
ACCOUNTS RECEIVABLE

$600 per PACKAGE:
ORDER ENTRY/BILLING
PURCHASE ORDERS

INCLUDES COMPLETE SOURCE
(30 DAY MONEY BACK GUARANTEE)

HEINECK ASSOCIATES, INC.
SMALL SYSTEMS DIVISION
DEPT. CW, ONE CARRIAGE COURT
STONY BROOK, NEW YORK 11790
(516) 751-6835

CS SOFTWARE

VAX
PDP-11

Payroll • • Job Cost
General Ledger • • Fixed Assets
Accounts Receivable • • Accounts Payable
Inventory • • Order Entry
Client Writeup

Compu-Share
3824 - 50th St. • Lubbock, TX 79413 (806) 792-3785

SELLING SOFTWARE?

SELL IT HERE.

Place your ad in the BUY-SELL-SWAP pages of COMPUTERWORLD

1-800-343-6474 or (In Mass.) (617) 879-0700

Series 1

Communications
Transmit or Receive
any File
Attended or Unattended
CORRM/1
Paragon Computer Company
524 Union St., #208
San Francisco, CA 94133
(415) 398-7228

SYSTEM 32/34/36
SOFTWARE SALE
- School Dist. System
- County Govt. System
- Law Firm (WP) Mgt.
- Medical Clinic Prg.
- CPA Client Acct.
- Dist. Water Billing/Acct.
- General Accounting
- Accounts Payable
- Accounts Receivable
- Many Others

All Resale Rights Included
Respond To:
Software Sale
1241 S. Ward Ct.
Lakewood, CO. 80226

IBM SERIES/1

Utilities for the IBM SERIES/1 computer reduce software development time:

1. EDXREF - Sets sorted cross-reference dictionary of data names & labels used in EDX source programs.
2. EDXCMP - Finds and prints specific disk and tape records in hexadecimal format.

New versions now available. Many companies have purchased these programs at $00 each. More info. sent upon request.

LEGLER SYSTEMS COMPANY
29 Charles Hill Road
Orinda, CA 94563
(415) 254-1294

SOFTWARE FOR SALE | SOFTWARE FOR SALE | SOFTWARE FOR SALE

More IBM System/38 Users Are Choosing RTC Systems.

For technically superior software in a wide range of Financial, Manufacturing, Distribution and Management Business Systems.

The International Software Developers.

RTC Systems, Inc.

49 Plain Street
North Attleboro, MA 02760
(617) 695-3009

Elegant Software
for IBM S/34, 36 and 38

General Accounting	Payroll/Personnel
Financial Reporting	Property & Equipment
Accounts Receivable	Report Writer
Accounts Payable	Oil & Gas
Order Processing	All Systems are:
Inventory Management	RPG II/RPG III
Sales Analysis	Data Base
Job Cost	Interactive

J.D. Edwards & Company

4940 South Syracuse Street/Suite 800
Denver, CO 80237
303/773-3722

Dallas — 214/ 490 0836
Houston — 713/ 850 8278
Northern California — 415/ 697 7764
Southern California — 714/751 8282

SOFTWARE WANTED

AD SPACE For Sale

Call 1-800-343-6474
(in Mass.) (617) 879-0700
or send materials to:
COMPUTERWORLD Classifieds
Box 880
375 Cochituate Road
Framingham, MA 01701

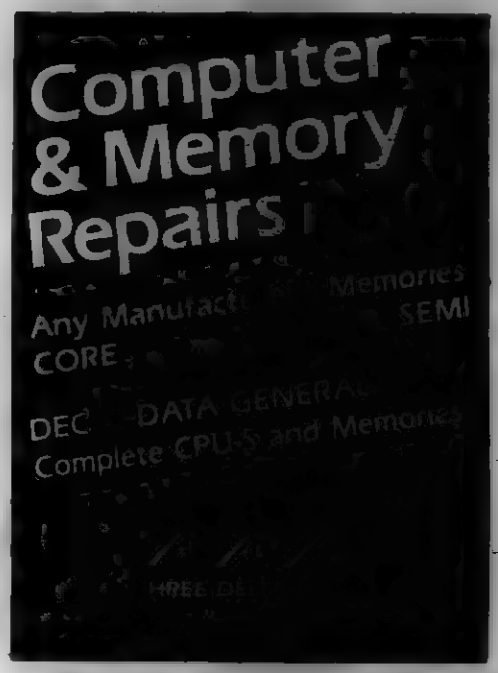
System/36 Software Wanted

National marketer of IBM based computer systems is seeking candidates with finished distribution rights for software packages which are currently installed on the IBM System/36. Both vertical and horizontal market oriented software systems will be considered. For more information contact:
Don Middleton
Vice President, Marketing
MSCS
7099 Trade Street
San Diego, CA 92121
(619) 578-6640

TIME & SERVICES

VAX 11/780 AND PDP-11 DEVELOPMENT TIME
NO WILDCORE TICK CHARGES / NO CPU CHARGES
Omnicomputer
$7/$14
RSTS/E VMS
PER HOUR CONNECT TIME
BUDGET BYTES™ 212-944-9230
Omnicomputer, Inc.
1430 Broadway, New York, N.Y. 10018

We'll keep you up to date week after week after week



SYSTEM DEVELOPMENT ON TSO/SPF

at affordable prices
Full capacity of an IBM 3033
for daytime use in western U. S.
ISPF, COBOL, FORTRAN, PL/I, IMS,
ADF, VSAPL and other aids.

PRIMDATA OF SWEDEN
44 Montgomery St., Suite 500
San Francisco, CA 94104 • Tel (415) 956-2612

TRANSITION HELP TO MVS OR A BIGGER SYSTEM- reasonable prices

Full capacity of an IBM 3033
for daytime use in western U. S.
We can give you the computer, the
time and the technical help.

PRIMDATA OF SWEDEN
44 Montgomery St., Suite 500
San Francisco, CA 94104 • Tel (415) 956-2612

MODELING, PROJECTIONS, HEAVY BATCH

with VSAPL, ADRS, ADI, SAS, APE,
GPSS, MPSX or your own programs.
Full capacity of an IBM 3033
for daytime use in western U. S.
at reasonable prices.

PRIMDATA OF SWEDEN
44 Montgomery St., Suite 500
San Francisco, CA 94104 • Tel (415) 956-2612

?? CONVERTING ??
IBM MAINFRAME
TO WANG VS

We Convert:
COBOL/RPG/CICS/JCL

1. We review your system on site
2. You supply source, JCL, test data
3. We convert on our VS
4. We review results and make final tests on site

Contact:
Joseph Salvatore, President
Manufacturing Control Systems, Inc.
Suite 460, 345 Third Street
Niagara Falls,
New York 14303
716-285-4425

DATA CENTER SERVICES
TWO (2) 3033U-16
BURNS

Computer Time

IBM 4341

- OS/VS1
- VM/CMS
- Negotiable Rates
- Good Environment

Contact Ray Rauth
(212) 777-5040
ICCS
19 East 21st Street
New York, NY

Computer Services

4341-2 370/158-3

VS1-CICS-ROSCOE-DOS

REMOTE JOB ENTRY
CICS DEVELOPMENT
CICS PRODUCTION
CUSTOMIZED SOFTWARE

CONTACT JOE BARRETT
(201) 777-3454

15 MINUTES FROM LINCOLN TUNNEL
ONE PASSAIC STREET
WOOD RIDGE, N.J. 07075

VAX/VMS TIMESHARE

5¢

$2 PER HOUR CONNECT TIME
ONE MB DISK STORAGE INCLUDED
AVAILABLE NATIONWIDE
VIA TELENET
LEASE-A-PORT™ WITH 10 MB DISK
& NO CPU OR CONNECT CHARGES
FOR $800 PER MONTH

Hudson Corporation
(714) 556-0311
(213) 516-0550
(714) 558-0370

ICOTECH
Innovative Computer Techniques

COMPUTER SERVICES
IBM 3081 DEC-10
- Remote Job Entry
- Batch Processing
- Optical Mark Reading
- Online Processing
- Timesharing
- Laser Printing

COMPUTER OUTPUT MICROFILM
- Cartographic Mini Auto-Comp
- Cartographic Datamaster
- 3330 API Capability
- Free Testing

Route 206
Raritan, NJ 08869
201-704-0100
Contact: Joyce Bagaglia

CLASSIFIED ADVERTISING ORDER FORM

Computerworld's Classifieds work.

Issue Date: Ad closing is every Friday, 10 days prior to issue date.

Sections: Please be sure to specify the section you want: Time and Services, Software for Sale, Position Announcements and Buy/Sell/Swap. (Available upon request: Software Wanted, Business Opportunities and Real Estate).

Copy: We'll typeset your ad at no extra charge. Please attach CLEAN typewritten copy. Figure about 25 words to a column inch, not including headlines.

Cost: Our rates are $126.10 per column inch. (A column is 2" wide.) Minimum size is two column inches (2" wide by 2" deep) and costs $252.20 per insertion. Extra space is available in half-inch increments and costs $94.05. Box numbers are $15.00 extra.

Billing: If you're a first-time advertiser, (or if you have not established an account with us,) WE MUST HAVE YOUR PAYMENT IN ADVANCE.

Ad Size desired: _____ columns wide by _____ inches deep.

Issue Date(s): _____

Section: _____

Signature: _____

Name: _____

Company: _____

Title: _____

Address: _____

Telephone: _____

Send this form to:

COMPUTERWORLD

CLASSIFIED ADVERTISING,

375 Cochituate Road, Box 880,
Framingham, MA 01701

Foreign Editorial/ Sales Offices

England: Tony Cartwright, EEC Publications, 196-200 Balls Pond Rd., London N1 4AG. Phone: 01-356-3525. Telex: (851) 894085 (Computer Management, Computer Business Europe only).

Euan Rose, Bill Dunlop, Stephen Thomas, Beare Hobson Assoc., 345 Goswell Rd., Islington, London EC1V 7NN. Phone: 01278 3415/6 (reps for all CWCI publications except Computer Management and Computer Business Europe).

W. Germany: Eckhard Utpadel, CW Publikationens, Friedrichstrasse 31, 8000 Munich 40. Phone: (089) 38172-0. Telex: 5215350.

France: Axel Leblois, Le Monde Informatique, 185 Avenue Charles De Gaulle, 92200 Neuilly Sur Seine, Paris. Phone: 758.14.14. Telex: 613234 F.

Japan: Mr. Shuji Mizuguchi, Computerworld Japan, 7-4 Shiromi 1-Chome, Chuo-ku, Tokyo 104. Phone: (03) 561-3882, Telex: 252-4217 (Computerworld Japan only).

H. Kajama, Tokyo Representative Group, Yamaguchi Bldg., 2-12-9 Kanda Jimbo-cho, Chiyoda-ku, Tokyo 101, Phone: (03) 230-4117/8, Telex: J26560 (reps for all CWCI publications except Computerworld Japan).

Australia: Alan Power, Computerworld Pty. Ltd., 37-43 Alexander Street, Crows Nest, NSW 2065. Phone: (02) 4395133, Telex: AA74752 COMWOR.

Brazil: Eric Hippeau, Data News, Computerworld do Brazil, Servicos e Publicacoes Ltda., Rua Alcindo Guanabara, 25/10th Floor 20031 Rio de Janeiro, RJ Brazil. Phone: (021) 240-8225. Telex: 2130839(WORD BR).

Mexico: Richard Small, Computerworld de Mexico, Oaxaca 21-2, Colonia Roma, Mexico City 7 D.F. Phone: (905) 514-4218, (905) 514-6309. Telex: 1771300 ACHAME, 1777809 ACHAME.

Spain: Neil Kelley, Computerworld/Espana, Gravina, 13, Madrid 4. Phone: 231-23-86; 231-23-92; 231-23-89. Telex: 47894(CW E).

Denmark: Preben Engell, Computerworld/Denmark, Gammel Strand 50, 1202 Copenhagen K. Phone: 01-1234-11. Telex: 27566 cwdan.

Sweden: Bengt Mannfelt, Computerworld/Sweden, Nova Media AB, Vartavagen 55, 11539 Stockholm. Telex: 8105099 NOVACW.

The Netherlands: Johannes A. Witvoet, Mgr. Dir., CW Communications B.V., c/o IDC Benelux, Prins Hendriklaan 8, 1075 Az Amsterdam. Phone: 020-791-692. Telex: (844) 15741.

Italy: Daniele Comboni, Gruppo Editoriale Jackson, s.r.l., Via Rosellini 12, 20124 Milano.

Argentina: Ruben Argento, Gen. Mgr., Computerworld Argentina, Av. Belgrano 406-Piso 9, CP 1092 Buenos Aires. Phone: 34-5883/5884.

Norway: Mr. Per Berrefjord, Editor, CW Norge A/S, Hovinveien 43, P.O. Box 2662, Tosyen, Oslo 6. Phone: 2/647725. Telex: (856) 76475

Singapore: Mr. David Naidu, General Manager, Asia Computerworld, Pte. Ltd., 11-08/11-10 Goldhill Plaza, Newton Road, Singapore. Phone: 250-444. Telex: (789) RS 37003

Saudi Arabia: Mr. Omer Duaulti, General Manager, Saudi Computerworld, P.O. Box 5455, Jeddah. Phone: 6675916/6650380. Telex: (928) 401205.

ADVERTISERS INDEX

ADA Vision 14
Alcargo Products SR/44
American Software, Inc. SR/66
American Telephone & Telegraph 84
Argonaut Information Systems SR/18
Artificial Intelligence 56
ASK SR/62
AST Research SR/31

BASF 69
John Beall Company 81
Beehive International SR/66
BMC Software 60
Boole and Babbage Inc. SR/23
Borrough SR/10
BRS SR/54

Candle Corporation SR/55
CGA Software 28
Chubb Institute 90
Cincom SR/58-SR/59
CompED SR/54
Computer Associates SR/46
Computer Automation 72
Computer Distributors 30-31
Computer Technology Group 68
Compuware 83
Comsco SR/51
Corodale 86
Corvus 77
Crelin & Co., Inc. 12
CPI SR/16
CRWTH SR/4
Cullinet 9,SR/48
CW Buyer's Guide SR/53
CW France SR/24
CW Index 16
CW Office Automation 92
CW On Communications 91
CW Supplement 86
Cybernetv International Corp. 81

Data General 64
Data Processing Design SR/7
Datalex 18
Dataproducts 11,12,13,15,37,45
Datastream 48
Data Systems for Industry 8
DISC/TPG SR/28-SR/29
Desktop Software SR/23
Deutsche Mouse-U. 76
Digital Consulting Associates SR/15,SR/17
Digital Research 54-55
Dumont Magnetic Technology 15
Dynamic SR/47

Eastman Kodak Co. 10
Effort SR/42,SR/70
Emulex Corp. 61
Enterprise Technology SR/53
EPS Inc. SR/2

Frey Associates SR/64,SR/65,SR/67
Fusion Products 78

General Research Corp. SR/33
Genesys Software SR/42
Goal Systems International SR/61
Group Operations 10

Hewlett-Packard 46-47
H&W Computer Systems SR/47

IDC 26
Infomatics SR/57
Information Sciences SR/26
Information Builders SR/60
Innovation Data Products 7
Integral Systems Inc. SR/6
Interactive Training Systems 32
Interstate Electronics 36
INSCO SR/12-SR/13

Johnson Systems SR/14

Local Data SR/28
Lotus Development Corp. 63

Martin Marietta SR/40
Masstor Systems 57
Mathematica SR/27
Maxell Corp. 71
MCBA SR/45
McCormack & Dodge SR/34-SR/35
MDS Systems 34-35
MicroAge 53
MicroFrame 6
Micro-Term 89
MSA 132

National Trade Products 14
New Generation Software SR/52

OCLI 62
On-Line Software SR/50
Oregon Software SR/32
Oxford Software SR/49
Panosphic Systems SR/5
Para Research SR/9
Paradyne 87
PC World Expo 82-83
Perkin Elmer SR/25-SR/30
Phoenix Computer Corp. 33
Phoenix Leasing 41
Polygon Associates SR/70
Prime Computer 22
Professional Computer Res. 85
Protocol 40

Questronics 86
Qume 23-25

Remex 39
Ross Systems SR/41
RTC Systems, Inc. SR/56

SAS Institute 20-21
Saturn Systems 49
Signal Technology, Inc. 11,13
SMC/Intech 80
Softech Microsystems SR/11
Software Int'l SR/19,SR/20-SR/21,SR/23
Softworks, Inc. SR/40
Sperry Corp. 29
Sterling Software SR/4
Stone Mountain Computing 67
Stratus Computer 39
Syntsert 3
Sysod 90
Systemware, Inc. 75

Tandem Computers 26,26-27
Technology Transfer Institute 44
Televideo Terminal 78-79
Term-Tronics 80
Thomas Engineering 24
3COM 50-51
Tsac Software 12

Unilogic, Ltd. SR/40
U.S. Robotics, Inc. 58

Visicorp 19
Visual Technology 70

Walker Interactive SR/42,SR/45
Whitesmiths, Ltd. 74
Wolfe Computer Testing SR/16

Yourdon 5

This index is provided as an additional service. The publisher does not assume any liability for errors or omissions.

Computerworld Sales Offices

Vice-President/Sales/Donald E. Pagan
Director/National Sales/Edward P. Marwald
Marketing Support Manager/Kathy Doyle
COMPUTERWORLD, 375 Cochituate Road, Box 880,
Framingham, MA 01701
(617) 879-0700

BOSTON SALES OFFICE (617) 879-0700
Northern Regional Director/Chris Lee
District Managers/Jim McClure, Ronald Masiero,
Jayne Donovan, Michael F. Kelleher
Sales Assistant/Alice Longley
COMPUTERWORLD, 375 Cochituate Road, Box 880,
Framingham, MA 01701

CHICAGO SALES OFFICE (312) 827-4433
District Managers/Arthur Kossack,
Sales Assistant/Joan F. Broderick
Northern Regional Director/Chris Lee
COMPUTERWORLD, 2600 South River Road, Suite 304,
Des Plaines, IL 60018

NEW YORK SALES OFFICE (201) 967-1360
Eastern Regional Director/Michael J. Masiero
Sr. District Manager/Doug Cheney
District Managers/Ray Corbin, Joan Daly, Fred La Sapio
Sales Assistant/Gale M. Palermo
COMPUTERWORLD, Paramus Plaza I,
140 Route 17, North, Paramus, NJ 07652

LOS ANGELES SALES OFFICE (714) 261-1230
District Managers/Bob Hubbard, Bernie Hockenmaier
Western Regional Director/William J. Hadley
COMPUTERWORLD, 18008 Sky Park Circle, Suite 260,
Irvine, CA 92714

SAN FRANCISCO SALES OFFICE (415) 421-7330
Western Regional Director/William J. Hadley
Account Managers/Barry Milano, Theodora Pressen,
Ernest Chamberlain
Account Manager, Classified/Rosie Scotteron
COMPUTERWORLD, 300 Broadway, Suite 20,
San Francisco, CA 94133

ATLANTA SALES OFFICE (404) 394-0759
District Manager/Jeffrey Melnick
Eastern Regional Director/Michael J. Masiero
COMPUTERWORLD, 1653 Peeler Road, Suite D,
Atlanta, GA 30338

CLASSIFIED ADVERTISING (617) 879-0700
Al DeMilo
COMPUTERWORLD, 375 Cochituate Road, Box 880,
Framingham, MA 01701

CW INTERNATIONAL MARKETING SERVICES
General Manager/Diane La Muraglia
COMPUTERWORLD, 375 Cochituate Road, Box 880,
Framingham, MA 01701
(617) 879-0700

CW COMMUNICATIONS/INC.
Board Chairman/Publisher
Patrick J. McGovern
President
W. Walker Boyd
Senior Vice-President
Lee Vidmar

Group VP-Communication Services, Jack Edmonston. Group VP-Circulation, Margaret Pinton. VP-Marketing, Donald E. Pagan. VP-Finance, William P. Murphy. VP-Editorial, John Wainwright.

Computerworld Headquarters: 375 Cochituate Road, P.O. Box 880, Framingham, MA 01701
Phone: (617) 879-0700, Telex: 95-1153.

SALES — Vice-President, Donald E. Pagan. National Director, Edward P. Marwald. Corporate Advertising Administrator, Frank Collins. Marketing Support Manager, Kathy Doyle. Display Advertising Supervisor, Anne Hadley. Display Advertising, Deborah Bryer, Pam Valentines, Elaine Caron, Carolyn Medeiros, Cindy Chaloa, Mary Waddick. Classified Advertising Manager, William J. Mills.

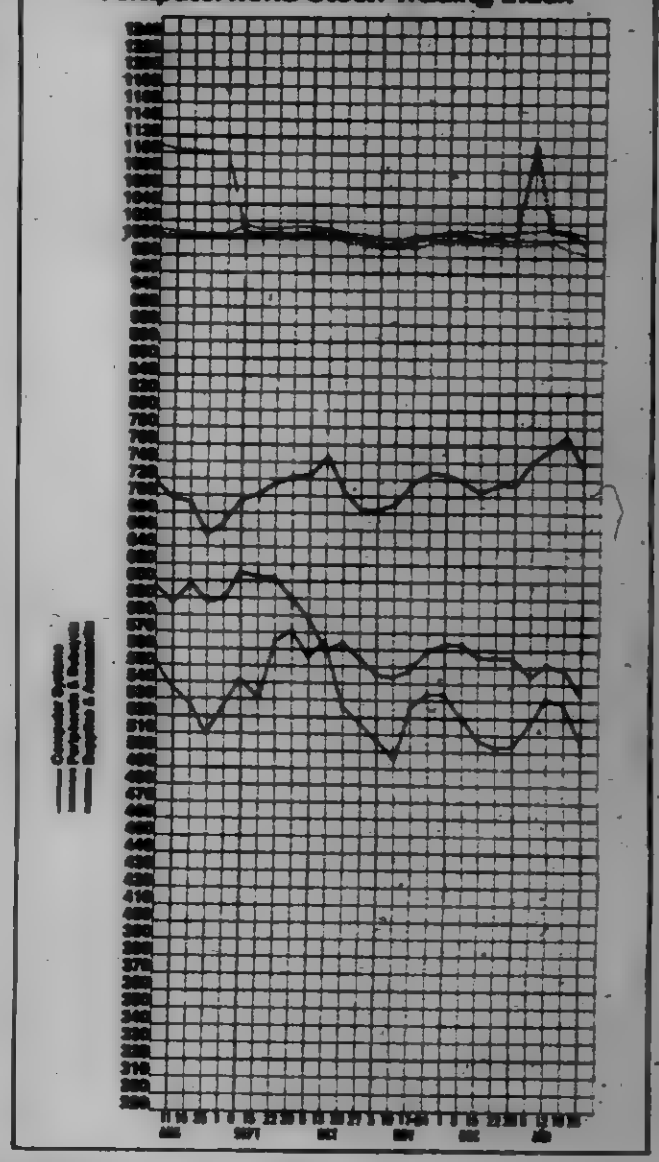
COMMUNICATION SERVICES — Group Vice-President, Jack Edmonston. Director Research, Kathryn Denison. Sales Promotion Director, Liz Johnson.

PRODUCTION — Production Director, Peter Hahn. Production Manager, Marlene Sibel. Paste-Up Manager, Bob Gaudette. Systems Manager, Tom Pilla. Typesetting Manager, Carol Polcari. Art Director, Tom Monahan. Graphic Designer, Hank Ring.

CIRCULATION — Group Vice-President, Margaret Pinton. Circulation Manager, Jane Dasbeck. Fulfillment Manager, Maureen Burke.

Computerworld can be purchased on 35 mm microform through University Microfilms Int., Periodical Entry Dept., 300 North Zeeb Rd., Ann Arbor, Mich. 48106. Phone: (313) 761-4700. Computerworld is indexed within its Circulation Dept. for subscription information.

Computerworld Stock Trading Index



Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, January 25, 1984

All statistics compiled computed and formatted by TRADE QUOTES, INC Cambridge, Mass. 02139

COMPUTER SYSTEMS

	1983-84 RANGE (1)	CLOSE JAN 25	NET CHANGE	WEEK PCT CHANGE
ALPHA MICROSYSTEMS	11- 24	16 1/2	-0 1/2	-14.7
ALTOS COMPUTER SYST	9- 20	11 1/4	- 1/4	-2.1
ARDENT CORP	9- 20	15 3/8	-1 1/8	-5.7
APPLE COMPUTER INC	19- 63	27	-1 3/4	-6.6
AT&T	58- 78	66 3/4	- 7/8	-1.3
BURROUGHS CORP	39- 58	51 3/8	- 1/2	-0.9
COMPUTER AUTOMATION	9- 12	8 3/4	- 1/2	-5.4
COMPUTER CONSOLES	5- 14	10	- 0/8	-3.3
CONTROL DATA CORP	31- 62	47	-	-0.0
CONVERGENT TECHNOL	15- 41	23 3/4	+1 3/8	+6.1
CRAY RESEARCH INC	53- 88	82 7/8	+2 7/8	+3.6
DATA GENERAL CORP	30- 67	46 1/4	-1 3/4	-3.7
DATAPOINT CORP	11- 36	20 1/2	- 1/4	-12.1
DIGITAL EQUIPMENT	88-132	86	+1 3/8	+1.6
ECCO INC	9- 16	13 5/8	- 1/8	-0.9
ELECTRONIC ASSOC.	5- 15	9 3/8	- 1/8	-1.3
FLOATING POINT SYST	19- 44	32	-2 1/4	-6.6
FONSONO	25- 47	37	-2	-5.1
GENERAL AUTOMATION	9- 17	13	-1 3/8	-10.2
GOULD INC	19- 44	34 1/8	+1 3/8	+3.8
HARRIS CORP	29- 51	41 1/4	- 3/8	-1.4
HEWLETT-PACKARD CO	33- 68	62 1/8	+2 1/2	+3.8
HONEYWELL INC	88-138	118	+3 3/4	+3.2
IBM	97-134	119 3/8	+3 1/8	+2.7
IPL SYSTEMS INC	3- 14	5	- 3/4	-13.0
M/A-COM INC	20- 36	18 3/4	-1 1/8	-5.7
MANNESMANN CORP SYSTS	1- 3	3 3/8	0	0.0
MANAGEMENT ASSISTS	7- 23	22 1/8	+1 3/8	+6.6
MATSUSHITA ELEC(ADR)	47- 88	68 1/8	+ 3/8	+0.7
MODULAR COMPUTER SYS	5- 15	9	0	0.0
MOHAWK DATA SCI	10- 18	14 7/8	-1 1/2	-9.1
MOTOROLA INC	82-148	130 3/4	-7	-5.2
NAT'L SEMICONDUCTOR	19- 80	16 3/8	-2	-10.9
NBI INC	21- 51	28	+ 1/8	+0.4
NCR	39-136	121 3/4	-1 3/4	-1.9
PERKIN-ELMER	17- 37	29 3/8	-2 3/8	-7.7
PRIME COMPUTER INC	11- 30	18 5/8	-1 1/2	-7.1
SPERRY CORP	21- 50	44 3/4	-1 1/2	-3.1
TANDEM COMPUTERS INC	11- 68	14 3/4	-2 3/4	-7.9
TANDY CORP	35- 68	36 1/8	-1 1/2	-3.9
TELEVIDEO SYSTEMS	16- 41	14 3/8	-1 3/8	-10.1
TELXON CORP	9- 18	16 3/4	+1	+10.2
TEXAS INSTRUMENTS	71-178	136 1/4	-4 7/8	-3.4
ULTIMATE CORP	9- 24	18 5/8	-1 3/4	-8.6
VECTOR GRAPHICS INC	2- 11	2 3/8	+ 3/8	+18.7
WANG LABS "B"	19- 42	31 3/8	-2 3/8	-6.8
WANG LABS "C"	11- 42	31 3/8	-2 3/8	-6.8
XEROX CORP	36- 82	68 3/4	-1	-2.0

LEASING COMPANIES

BOOTHE FINANCIAL CP	11- 37	35 1/2	+1 1/2	+4.4
CONDISCO INC	7- 42	13 5/8	-1	-6.8
CONTINENTAL INFO SYS	9- 18	7 1/2	- 1/4	-3.2
DPF INC	9- 19	13 3/4	-1	-6.7
U.S. LEASING	19- 47	38 3/8	- 1/4	-0.6

COMPONENTS

ADVANCED MICRO DEV	13- 37	25 1/4	-2 1/2	-9.0
ADV'D SEMICONDUCTOR	13- 38	24	-2 3/4	-7.4
ANALOG DEVICES INC	19- 36	32 5/8	+4	+14.0
ANALOGIC CORP	20- 27	22	-1 1/4	-5.3
APPLIED MAGNETICS CP	19- 37	23	-4 1/4	-15.5
TERADYNE	14- 38	28 1/2	-4	-12.3

EXCHG (4=NEW YORK; A=AMERICAN; P=PACIFIC; B=BOSTON; I=INTERNATIONAL; R=REGIONAL; O=OVER-THE-COUNTER)
B-T-C PRICES ARE BID PRICES AS OF 3 P.M. EST LAST BID
(1) TO NEAREST DOLLAR

SOFTWARE & EDP SERVICES

ADVANCED COMP TECH	7- 8	8 3/4		0.0
ADVANCED SYSTEMS INC	9- 22	18 1/2	- 1/4	-1.3
ADR COMPUTERS INC	9- 22	20 1/4	- 1/2	-2.4
AMERICAN SOFTWARE	17- 31	17 3/4	-1	-5.3
AMACOMP INC	7- 22	8 1/4	- 5/8	-11.1
ANALYSTS INTL CORP	9- 20	12 1/4	- 1/2	-3.9
APPLIED DATA RES.	9- 21	16 3/8	-2 1/4	-7.3
ASK COMPUTER SYSTEMS	9- 21	18 1/2	- 1/2	-2.6
AUTOMATIVE CORP INC	11- 7	7 3/8	- 3/8	-13.6
AUTOMATIC DATA PROC	21- 47	38 3/4	-1 1/2	-3.8
CBA COMPUTER ASSOC	9- 17	11 1/2	- 1/2	-4.1
COMPUTER ASSOC INT'L	9- 28	25	-2 1/4	-8.2
COMPUTER HORIZONS	7- 24	14 3/4	- 1/2	-3.3
COMPUTER NETWORK	5- 12	7 1/2	- 1/8	-0.4
COMPUTER SCIENCES	11- 30	20	-1 1/2	-6.2
COMPUTER TASK GROUP	7- 22	10	- 1/2	-0.0
COMPUTER VISION	7- 22	11	- 7/8	-7.3
COMPUTONE SYSTEMS	7- 28	7 1/4	- 1/4	-3.3
COMSERV CORP	7- 28	9 1/4	- 1/4	-2.6
COMSHARE	7- 19	10 3/4	-1 3/8	-11.7
CULLINET SOFTWARE	13- 38	32 1/8	+2	+6.1
CYCARE SYSTEMS INC	9- 27	16 1/2	- 1/2	-2.6
ELECTRONIC DATA SYST	19- 42	34 1/4	-1 1/4	-3.5
HUDSON SYSTEM INC	19- 32	28 3/4	-2 3/8	-11.7
GENERAL ELECTRIC CO	51- 62	54	-2 3/4	-4.8
GTE CORP	39- 54	48 3/4	- 1/4	-0.5
INFORMATICS INC	3- 11	3 3/4	-1	-21.1
INFOTRON SYSTEMS COR	19- 43	32 1/2	-1 1/2	-4.4
KEANE ASSOCIATES	7- 23	8	- 1/2	-5.8
LOGICON	9- 21	20 1/2	0	0.0
MCI COMMUNICATIONS	19- 34	24 5/8	-1 1/8	-7.1
MDBT SCI AMER INC	19- 34	20 1/4	-1 1/2	-6.9
MATHEMATICAL APP GRP	29- 32	11 1/2	0	0.0
NICON SYSTEMS INC	29- 48	41 3/4	-2	-4.7
NOVOCIN-WEBER CP	9- 22	8	-1	-11.1
NATIONAL DATA CORP	9- 22	16 1/2	0	0.0
ON-LINE SOFTWARE INT	19- 42	16	-	-0.0
PANSOPHIC SYSTEMS	9- 26	18 3/4	- 3/8	-2.2
PLANNING RESEARCH	9- 22	21 1/4	-1	-4.1
POLICY MGMT SYSTS CP	17- 35	32 3/4	-2	-5.8
PROGRAMMING & SYS	7- 8	4 7/8	- 1/4	-4.9
REYNOLDS & REYNOLDS	17- 34	26 1/2	-3	-7.8
SEI CORP	11- 29	29	-1 1/2	-4.9
SHARED MEDICAL SYST	11- 49	28 1/2	-1 3/4	-5.8
SCIENTIFIC COMPUTERS	3- 14	11 1/4	- 1/4	-2.2
SOFTWARE AG	9- 17	12 1/4	- 7/8	-6.6
TYMSHARE INC	13- 28	18 7/8	- 3/8	-1.9
URS CORP	7- 28	14 1/8	- 3/8	-2.2
WYLY CORP	7- 17	11 1/8	+ 1/8	+1.7

PERIPHERALS & SUBSYSTEMS

AM INTERNATIONAL	2- 7	3	- 3/8	-10.0
ANDERSON JACOBSON	9- 22	10 1/8	0	0.0
AUTO-TROL TECHNOLOGY	9- 22	23 1/2	-1 1/8	-4.6
AMETEK INC	9- 22	13 3/4	- 1/4	-1.3
BERKIVE INT'L	7- 15	8 1/2	- 3/8	-4.1
COLT INDUSTRIES A PFD	9- 16	22 3/4	- 1/4	-1.2
DARNEY CORP	1- 4	2	+ 1/8	+6.6
CENTRONICS DATA CORP	9- 22	18 7/8	+ 3/4	+4.1
CETEC CORP	9- 22	10 3/8	- 1/2	-4.6
CORROTHERM CP	7- 20	16 7/8	+ 1/2	+3.0

	1983-84 RANGE (1)	CLOSE JAN 25	NET CHANGE	WEEK PCT CHANGE
COMPUTER DEVICES INC	1- 21	1 1/8	-	-4.7
COMPUTER TRANSCEIVER	9- 22	4 1/8	- 1/8	-2.9
COMPUTERVISION CORP	19- 52	40	- 1/4	-0.6
CONRAC CORP	19- 32	26	-	-0.0
DATAPRODUCTS CORP	19- 41	22 1/8	- 3/8	-1.7
DATARAM CORP	3- 12	7	- 1/8	-1.8
DATA SWITCH CORP	19- 42	28	- 1/2	-1.8
DATUM INC	5- 17	7 3/8	- 1/8	-1.9
DIGITAL DATA CORP	9- 22	13 1/2	- 1/2	-3.6
ELECTRONIC MEMORIES	11- 28	16 1/2	- 3/8	-2.2
GENERAL DATA COMM	11- 28	16 1/2	- 1/2	-2.9
GERBER SCIENTIFIC	11- 28	16 1/2	- 1/2	-2.9
GRAPHIC SCANNING CP	9- 22	7 3/4	- 1/4	-3.1
GRID SYSTEMS CORP	11- 28	16 1/2	- 1/2	-2.9
HARRIS CORP	29- 51	41 1/4	- 3/8	-1.4
HEWLETT-PACKARD CO	33- 68	62 1/8	+2 1/2	+3.8
HONEYWELL INC	88-138	118	+3 3/4	+3.2
IBM	97-134	119 3/8	+3 1/8	+2.7
IPL SYSTEMS INC	3- 14	5	- 3/4	-13.0
M/A-COM INC	20- 36	18 3/4	-1 1/8	-5.7
MANNESMANN CORP SYSTS	1- 3	3 3/8	0	0.0
MANAGEMENT ASSISTS	7- 23	22 1/8	+1 3/8	+6.6
MATSUSHITA ELEC(ADR)	47- 88	68 1/8	+ 3/8	+0.7
MODULAR COMPUTER SYS	5- 15	9	0	0.0
MOHAWK DATA SCI	10- 18	14 7/8	-1 1/2	-9.1
MOTOROLA INC	82-148	130 3/4	-7	-5.2
NAT'L SEMICONDUCTOR	19- 80	16 3/8	-2	-10.9
NBI INC	21- 51	28	+ 1/8	+0.4
NCR	39-136	121 3/4	-1 3/4	-1.9
PERKIN-ELMER	17- 37	29 3/8	-2 3/8	-7.7
PRIME COMPUTER INC	11- 30	18 5/8	-1 1/2	-7.1
SPERRY CORP	21- 50	44 3/4	-1 1/2	-3.1
TANDEM COMPUTERS INC	11- 68	14 3/4	-2 3/4	-7.9
TANDY CORP	35- 68	36 1/8	-1 1/2	-3.9
TELEVIDEO SYSTEMS	16- 41	14 3/8	-1 3/8	-10.1
TELXON CORP	9- 18	16 3/4	+1	+10.2
TEXAS INSTRUMENTS	71-178	136 1/4	-4 7/8	-3.4
ULTIMATE CORP	9- 24	18 5/8	-1 3/4	-8.6
VECTOR GRAPHICS INC	2- 11	2 3/8	+ 3/8	+18.7
WANG LABS "B"	19- 42	31 3/8	-2 3/8	-6.8
WANG LABS "C"	11- 42	31 3/8	-2 3/8	-6.8
XEROX CORP	36- 82	68 3/4	-1	-2.0

SUPPLIES & ACCESSORIES

AMERICAN BUS FORMS	7- 23	20	-1 3/8	-6.4
BARRY WRIGHT	13- 28	23 1/2	+	+2.2
DUPLEX PRODUCTS INC	13- 27	23 3/8	+ 1/8	+0.5
ENNIS BUS. FORMS	9- 18	13 1/4	0	0.0
IN COMPANY	19- 38	27 1/2	-2 3/8	-8.2
PRENTICE CORP LTD	29- 57	42 1/4	0	0.0
STANDARD REGISTER	11- 34	32 1/4	- 1/2	-1.5
WALLACE BUS FORMS	11- 28	17 7/8	- 3/8	-2.1

15 pointed questions to ask MSA or any software supplier

These questions will help you when you sit down with individual software companies.

They're tough questions. Relevant ones. And any supplier who is worth his salt should be able to answer them without backpedaling.

Ask MSA

We'll answer all these questions to your satisfaction—plus any others you may have.

In fact, we're probably the best equipped to answer them. Because MSA is the software company. We offer the most complete line of totally integrated systems in the software industry, including financial, human resource and manufacturing.

So you avoid the headache of trying to tie together individual systems. (And the even bigger headache of adding to them.)

With MSA's integrated systems, there's no unnecessary duplication of data or effort. Reporting is faster. All your company's information is more timely and accurate—and in the right form.

Our technical edge comes from experience

Staying ahead is easier for a company that's steeped in software technology. MSA has spent years developing, refining, testing and enhancing our systems.

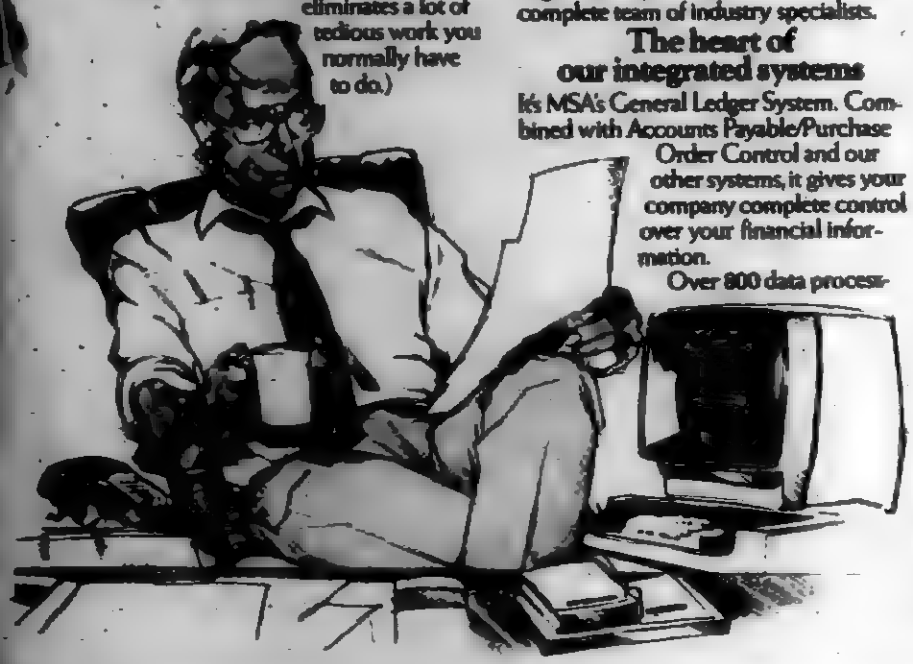
This year alone, we'll invest $25 million to make sure all our systems are technologically razor sharp. That gives us a decided advantage over flash-in-the-pan technology that may not have the bug-free logic of a more experienced system.

It also gives you a decided advantage over "custom" systems you have to update yourself.

MSA relieves you of that time-consuming burden. We update and enhance your software for a full year. Then we continue this service for a surprisingly low annual fee.

Maintenance includes keeping your system up-to-date technologically. Enhancing it with new features that make it work even harder for you.

And making sure it reflects changes in accounting procedures and government regulations, including 401(k), TEFRA, and FAS52. (That eliminates a lot of tedious work you normally have to do.)



Save this box. It can help you make an intelligent software decision.

1. Can you offer us a complete range of software systems designed to work together?
Or will we have to piece together a patchwork of systems?

2. Are your systems just record keepers, or can they really help us make decisions?
Can we pull together information from any of our integrated systems? In exactly the form we want it?

3. Can you provide business software for both mainframe and microcomputers?
Do you develop this software yourself or do you simply market it for another company?

4. Are your systems truly online so all of our information is current?
How many of your systems are online? How secure are they?

5. Will my company have to be the one that discovers the bugs in your brand new system?
Just how long have your systems actually been used, and how have they been tested?

6. Will you update your systems as technology advances and regulations change?
What are some of your most recent updates? Will you keep us current on regulatory changes?

7. Do your systems really do everything you say they will?
Or will we have to change them or add to them to get the features we want?

8. How long have you been in business?
What are your revenues? What is your growth record? Where will your company be five years from now?

9. How many systems has your company installed?
How many of these were installed in the past six months? How many of your earlier customers are still using —and liking—your systems?

10. Do your financial systems handle unlimited foreign currencies?
Do your financial systems use a common set of currency exchange rates?

11. Can you link our executives' computers directly to the mainframe—so they can get their own information?
Is that software available right now?

12. How will you make sure our own people thoroughly understand your system?
Do you have educational centers near us, or will we have to travel all the way across the country to find one? Will you be there to help during installation and after?

13. How many of your people specialize in software for my industry?
How many accountants work for you? Human resource specialists? Manufacturing experts?

14. Do your systems have built-in features that make them easier to use?
What happens if someone needs help figuring out a feature? Do you have online documentation that's easy to understand?

15. As my business changes will your system be flexible enough to change with it?
Or will we have to pay a lot to revamp it? Or even regenerate it?

© Management Science America, 3445 Peachtree Road, N.E., Atlanta, Georgia 30326

35,000 days of training

At MSA, we make sure your people have a firm grasp of our systems. Last year alone, we conducted more than 35,000 student days of customer training for over 1,800 companies. At education centers all over the world, as well as at our headquarters.

From training sessions to cassettes to complete, easy-to-understand documentation, MSA provides the most extensive Customer Education Programs in the industry.

And MSA systems are just as friendly as our people. Our online HELP feature actually guides users through our systems, and EASY-SCREEN™ lets them design their own screens without creating data processing nightmares.

If there's ever a question or problem with our systems, MSA customers are always close to service.

Our Account Managers are knowledgeable, responsive, and backed by a complete team of industry specialists.

The heart of our integrated systems

It's MSA's General Ledger System. Combined with Accounts Payable/Purchase Order Control and our other systems, it gives your company complete control over your financial information.

Over 800 data processing specialists, accountants, and financial experts work together to make MSA's financial systems the most advanced and most highly integrated in the industry.

MSA has the answers

Whatever your size—whatever your business—MSA has a total software solution.

We'll provide the highest quality integrated online software.

We'll tie your business and manufacturing software systems together, using our exclusive Extended Closed Loop™ manufacturing system.

We'll provide business software for your microcomputers, through our Peachtree Software Company.

We'll even link your microcomputers to your company's mainframe—with MSA's Executive Peachpak™ application software. A revolutionary concept that lets executives get the mainframe information they need through their personal computers.

MSA ready-to-install application software

1. General Ledger
2. Accounts Payable/Purchase Order Control
3. Budgetary Control/Encumbrance
4. Fixed Assets Accounting
5. Capital Expenditure Tracking
6. Forecasting & Modeling
7. Accounts Receivable
8. Order Processing
9. Foreign Exchange
10. Inventory & Purchasing
11. Payroll
12. Personnel Management & Reporting
13. Manufacturing Control System (MRP II)
14. Executive Peachpak™ II
15. Peachtree Software™ business systems for microcomputers
16. Peachtree Software™ office productivity systems for microcomputers

EASY-SCREEN, Executive Peachpak II, Peachtree Software, and Extended Closed Loop are trademarks of Management Science America, Inc.

Talk to us

If we've whetted your appetite with our 15 questions, clip the coupon below.

We'll send you a concise booklet that will help you even more in your deliberations. We'd also like to send you more information on how MSA can help you plan for software. And on individual systems.

Just fill in the information below, or contact Robert Carpenter at (404) 239-2000.

Management Science America, Inc.
3445 Peachtree Road, N.E.
Atlanta, Georgia 30326

☐ Please send me a free detailed brochure.
☐ Please send more information on the following systems. (Write numbers from product list)

Mainframe Computer Type/Model _____

Name _____

Title _____

Company _____

Address _____

City _____

State _____ Zip _____

Business Phone ( ) _____

CW17a(1/30/84)

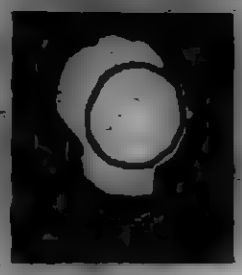
MSA
The Software Company

VOL 18
ISSUE 6
FE 6 1984
UMI

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

COMPUTERWORLD

$2.00 A COPY; $44/YEAR | FEBRUARY 6, 1984 | VOL. XVIII, NO. 6



Product Spotlight
A look at operating systems for micros/14-15

The 3270
Will the micro obsolete the terminal?/5

In Depth
Megatrends and DP trends/23

SECTIONS

Editorial/42
Software & Services/47
Communications/57
Systems & Peripherals/63
Microcomputers/73
Computer Industry/87

C8
MI48106UL VYMUI VYMA FCaaD
UNIVERSITY MICROFILMS INTL
SERIAL PUBLICATIONS
300 N ZEEB RD
ANN ARBOR MI 48106

NEWSPAPER

Ungermann-Bass adds fiber-optic local net

By Lynn Haber
CW Staff

WASHINGTON, D.C. — In a move to cover all bases in the local-area network arena, Ungermann-Bass, Inc. took the wraps off a fiber-optic, Ethernet-compatible local-area network at last week's Communication Networks Conference & Exposition here.

The result of a joint marketing agreement with Siecor Corp., maker of Siecor Fiberlan, a fiber-optic transmission subsystem, Fiber Optic Net/One is an expansion of Ungermann-Bass' existing baseband and broadband systems. It was designed to bring to local-area networks such fiber-optic features as noise immunity, secure transmission and the ability to communicate over longer distances.

With the addition of an optical fiber local-area network to its product line, Ungermann-Bass is effectively allowing users to select the medium or combination of media most appropriate to their application, a spokesman claimed. By using either network bridges or repeaters, users can interconnect baseband, broadband and optical-fiber Net/One systems, he said.

Targeted primarily at users who want to extend the transmission range of an installed, coaxial, carrier-sense multiple access with collision detection local network or users who need to install a network that provides high reliability under adverse environmental conditions, Fiber Optic Net/One is available in single- or multiple-cable configurations and operates at a 10M bit/sec data rate.

Net/One network interface units use electro-optical transceivers to provide the transmission interface to the optical fiber medium, the vendor said. This interface reportedly meets the specifications of Xerox Corp.'s Ethernet and employs access methods and collision detection signals functionally identical to those used

See NETWORK page 10

CW AT COMNET

CW photo by L. Hilton

Comnet '84 attracted a variety of visitors.

Satellite service set by Hewlett-Packard

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — Hewlett-Packard Co. and Vitalink Communications Corp. last week announced a satellite-based voice/data private network service priced substantially below competing terrestrial microwave facilities. The joint venture marks the entrance of processor maker HP into the increasingly competitive telecommunications market.

The satellite service, available immediately, allows HP 3000 users to bypass the telephone network and communicate with each other through earth stations supplied by Vitalink and satellite channels provided by Western Union, Inc.'s Westar IV satellite. The software needed to interface the HP 3000s to the Vitalink earth stations has already been developed, according to a Vitalink press release issued here last week at the Communication Networks Conference & Exposition.

An HP spokesman noted that because the HP 3000 can emulate IBM processors, users of IBM mainframes can also transmit voice and data over the satellite network.

The network will provide a two-way 56K bit/sec channel for $1,500/mo, according to George Ward, president of Vitalink, a three-year-old company partly owned by Western Union and General Electric Co. "The conventional microwave link used for this purpose typically costs $8,000 to $9,000 a month," Ward noted.

However, there will be some additional charges. The user must either buy an earth station costing $120,000 per site or lease one for $2,000/mo. There is also a one-time charge of $20,000 for the HP interfacing software.

HP representatives will be the user's initial point of contact for the satellite service; they will sell and lease the Vitalink facilities

See HP page 9

TOP OF THE NEWS

Storage Technology Corp. has failed for the second time to expand its product line into the processor field. This time it killed a project to develop a high-performance, IBM-compatible mainframe. Page 2.

■

A workstation with limited artificial intelligence that lets DP novices communicate with host processors in a nontechnical vocabulary was unveiled by Microdata Corp. Page 2.

■

President Reagan is asking more for federal R&D but less for the National Bureau of Standards' DP standards program. Page 6.

■

The Accunet Packet Switched Service will be available nationwide by year-end, an AT&T spokeswoman said last week. Page 11.

■

Will supermicros kill off 16-bit minicomputers? A recent study suggests they will. Page 62.

■

Although it was officially announced only two weeks ago, Apple Computer, Inc.'s Macintosh has already spurred announcements of compatible software. Page 73.

FYI

High-tech Robin Hood pays piper

By John Gallant
CW Staff

OLYMPIA, Wash. — When it came time for Stanley Syngsted to order up a round of beers at Charlie's Tavern here, he always outdid the other patrons by buying the quart-size bottles.

Syngsted liked attention, said bar manager Jim Silva, and he always had lots of money to spend and to loan to other customers who were down on their luck. Unfortunately, the money wasn't his.

State police said that between April 1982 and March 1983, Syngsted, an information supervisor for the state's Department of Social and Health Services, used the agency's Sperry Corp. Model 1100/82 mainframe to issue himself some $17,000 in fraudulent payments.

State Police Lt. Ed Crawford said the Olympia native designed the computer program that issued the funds. According to Crawford, Syngsted had the checks made out to one Stanley Lyngsted at his home address — the missing letter in his surname designed to throw auditors off the trail.

Crawford said Syngsted was thorough about destroying computerized evidence of his wrongdoing, but he overlooked the canceled checks, which investigators seized upon as evidence.

Syngsted was arrested and pleaded guilty to first-degree theft. But he claimed he had given all the stolen money to the broke and unemployed patrons of Charlie's Tavern.

Instantly, bartender Silva said, the media seized on Syngsted as "a Robin Hood of the computer age." The tavern was besieged by writers from local and national newspapers and by television crews, including ABC and NBC.

At his sentencing last July, Syngsted told Thurston County Superior Court Judge Hewitt Henry that he could "fill the courtroom" with the people who had benefited from his ill-gotten gains. The judge was not impressed. Telling reporters he was not at all pleased at playing the role of Sheriff of Nottingham, Henry sentenced Syngsted to the maximum 10 years in prison.

Speaking last week from the Cedar Creek Corrections Center in Little Rock, Ark., Syngsted said he decided to finagle with the state computer only when his own funds

See FRAUD page 8

STC drops mainframe plans, cites tech, cost problems

By Peter Bernelli
CW Staff

LOUISVILLE, Colo. — Storage Technology Corp. (STC) has terminated a project to produce and market an IBM-compatible mainframe computer because of technological problems and increasing cost estimates.

The Jan. 26 announcement that STC is ending work on a mainframe that, in the words of a company spokesman, proved to be "not a complete computer" was the second time in 16 months STC abandoned major hardware development efforts it had planned to expand its product line beyond storage systems.

The mainframe project was announced three years ago [CW, Jan. 19, 1981] under joint agreement with the newly formed Storage Technology Partners, with planned shipments in early 1984 of a high-range mainframe using Cmos technology, with expected performance rates of three million to 14 million instructions per second. Reportedly, some $70 million had been raised since then to fund the effort.

The recent announcement marks the second failure by the mass storage producer to extend its product line into the processor field. Less than two years ago, STC announced it had abandoned development of the Virtual Storage System (VSS), a back-end processor, or data base machine, that had been announced one year earlier [CW, Aug. 9, 1982].

Kenneth Bosomworth, industry analyst and president of International Resource Development, Inc., told *Computerworld* that STC's mainframe development program may have stemmed from overconfidence resulting from the company's broad market penetration with magnetic storage products.

"Probably, [STC] should not have gone into [mainframes] to begin with," Bosomworth said. "I think they were tempted into it because they have such good customer accounts [with] monthly billings in the hundreds of thousands and even millions of dollars. They probably figured, why not produce mainframes as well and take IBM out [of those accounts] completely?

"It must have been tempting from the market-access standpoint."

Bosomworth added that development of both the mainframe and the earlier VSS may have diverted resources that could have been put to better use. "You only have a limited amount of engineering talent and resources to spread around," he said, adding that STC may have been better off "protecting their strong areas in magnetic storage and, perhaps, optical storage."

In a brief statement announcing the end of the mainframe development effort, Jesse I. Aweida, chairman of STC, said the termination was unavoidable. "Delays in completing the development program have reduced the likelihood of successfully marketing the mainframe computer," Aweida said. Continuation of the project would have risked further delays and called for substantial additional funds, he added.

STC Vice-President Ronald B. Weinel told *Computerworld* a number of factors went into the decision to cancel the project. In particular, recent tests showed "the computer was functioning and performing complex tasks, but was not a complete computer." He said 15% to 20% of the mainframe's very large-scale integration chips "were not performing" up to expectations.

The company had only recently informed the 200 to 300 investors in Storage Technology Partners that the expected shipment date of the mainframe had been put back to late 1984, Weinel said.

He added that STC management felt "the potential for successfully marketing the product was slipping" and expected costs to complete the project were significant. Asked if IBM's aggressive pricing and product announcement strategies were a factor, he replied, "We anticipated that the longer it took us to [produce the mainframe], the more we would be in direct competition with them."

Weinel would not comment on whether the company plans in the future to concentrate on storage technology or to try again to expand its product line into other areas.

The company, which has experienced losses for two straight financial quarters, said the canceled project should produce a substantial write-off in the fourth quarter and "add to the losses from ongoing operations expected for that quarter."

STC expects to terminate 400 employees who had been involved in the project. Weinel said that despite layoffs of 400 in October 1982 and 500 in March 1983, employment levels had just about climbed all the way back up before the announcement.

Microdata workstation features limited AI

By Jeffry Beeler
CW West Coast Bureau

LOS ANGELES — Microdata Corp. last week extended its product line downward with the introduction of an intelligent workstation that reportedly provides limited artificial intelligence and allows computing novices to communicate with central processors in a nontechnical vocabulary.

The Microdata 1000 was designed to operate either in stand-alone mode or as a terminal linked to an IBM or Microdata host computer. The workstation is packaged with Natural Language, an inquiry-processing software module that enables the workstation to "learn" new user words or commands as it discovers them, according to a Microdata spokesman.

For example, if the 1000 encounters a word not previously included in its data dictionary, a definition is requested, and the response is used to update its lexicon. When it encounters the same word again, the workstation grasps the meaning immediately, the spokesman said.

Natural Language also allows the 1000 to draw logical inferences from incomplete or unclear user inquiries and to adapt itself automatically to differing styles of personal expression. If, for example, a query is only partially decipherable, the product interprets the command as best it can and then asks if its interpretation is correct, the spokesman said.

Natural Language interfaces users to the relational data base management system already residing in the 1000's Micro-Reality software, a previously unavailable subset of Microdata's existing Reality control program.

Micro-Reality is bundled in the 1000 with two other operating systems: Convergent Technologies, Inc.'s Ctos and Microsoft, Inc.'s MS-DOS. Ctos allows the workstation to run a family of Convergent-developed applications, while MS-DOS enables the machine to support Microsoft's Multiplan spreadsheet package.

All the Convergent-written programs are decision support tools for office automation and allow the workstation to perform applications like word processing, business graphics, electronic mail and project-scheduling tasks.

With the introduction of the 1000, Microdata's product line now consists of four software-compatible systems capable of supporting one to 208 concurrent users. The other three members of the company's product family include the Reality small business system, the Sovereign distributed processing system and the Sequel 32-bit large business system.

Works as stand-alone or terminal

Built around Convergent Technologies' Ngen intelligent workstations, the 1000 can operate either as a stand-alone unit or as a system terminal linked to an IBM mainframe or to a larger Microdata processor. To permit communications with IBM CPUs, the Microdata product optionally supports the 3270 bisynchronous transmission protocol or can operate in a Systems Network Architecture environment, the spokesman said.

The 1000 also can be interconnected with up to three other Microdata workstations to form a local network in which all constituent terminals can share hard disk storage, printers or similar systems resources.

In a typical local network, one of the nodes acts as a master and is equipped with at least one 10M- or 20M-byte hard disk unit. The other three workstations, meanwhile, serve as satellites and support 5¼-in. floppy disk modules, each holding up to 630K bytes.

With its Intel Corp. 80186 microprocessor, the 1000 operates at 8 MHz, three times faster than the IBM Personal Computer, Microdata claimed. It incorporates a bit-mapped display with 720- by 348-pixel resolution, quadrupling the pixel density of the Big Blue product. The workstation also holds up to 1M byte of main memory and as many as four 10M- or 20M-byte hard disk units, for a total external storage capacity of 80M bytes.

In a basic configuration, a master Microdata workstation, designated the 1000/40, incorporates a 12-in. display, 512K bytes of main memory, three operating systems and a 10M-byte disk unit.

The 1000/40 costs $8,075. With the hard disk excluded, the system becomes a satellite 1000/10 configuration, which costs approximately $4,000.

Both workstation versions will be available for shipment during the first quarter from Microdata at 17481 Red Hill Ave., Irvine, Calif. 92714.

NEWS SUMMARY

An early user of a Cobol code generator reports 90% reductions in programming time 4

IBM's 3270 Personal Computer probably will not render obsolete its own 3270 series of terminals, DP managers and industry analysts say 6

The Reagan administration again is trying to cut most of the National Bureau of Standards' DP standards program from the federal budget 6

A central data base is providing MIS managers with on-line access to descriptions of thousands of microcomputer software packages 6

The Vault Co.'s "complete" offsite data protection includes an escrow service for source code 8

Comnet '84: Three bypassers say the benefits are more than financial . . . AT&T says it will attach the Datakit virtual circuit switch to its Dimension System 85 later this year . . .

Dixon Doll talks T-1 . . . AT&T's Accunet packet service will be available nationwide by year-end . . . Attendees are told micros are not impacting PBXs 14

Four of the five bidders in Delaware's $50 million bond sale declined the state's suggestion to go electronic 15

A series of software programs will reportedly help senior managers deal more effectively with subordinates and peers 17

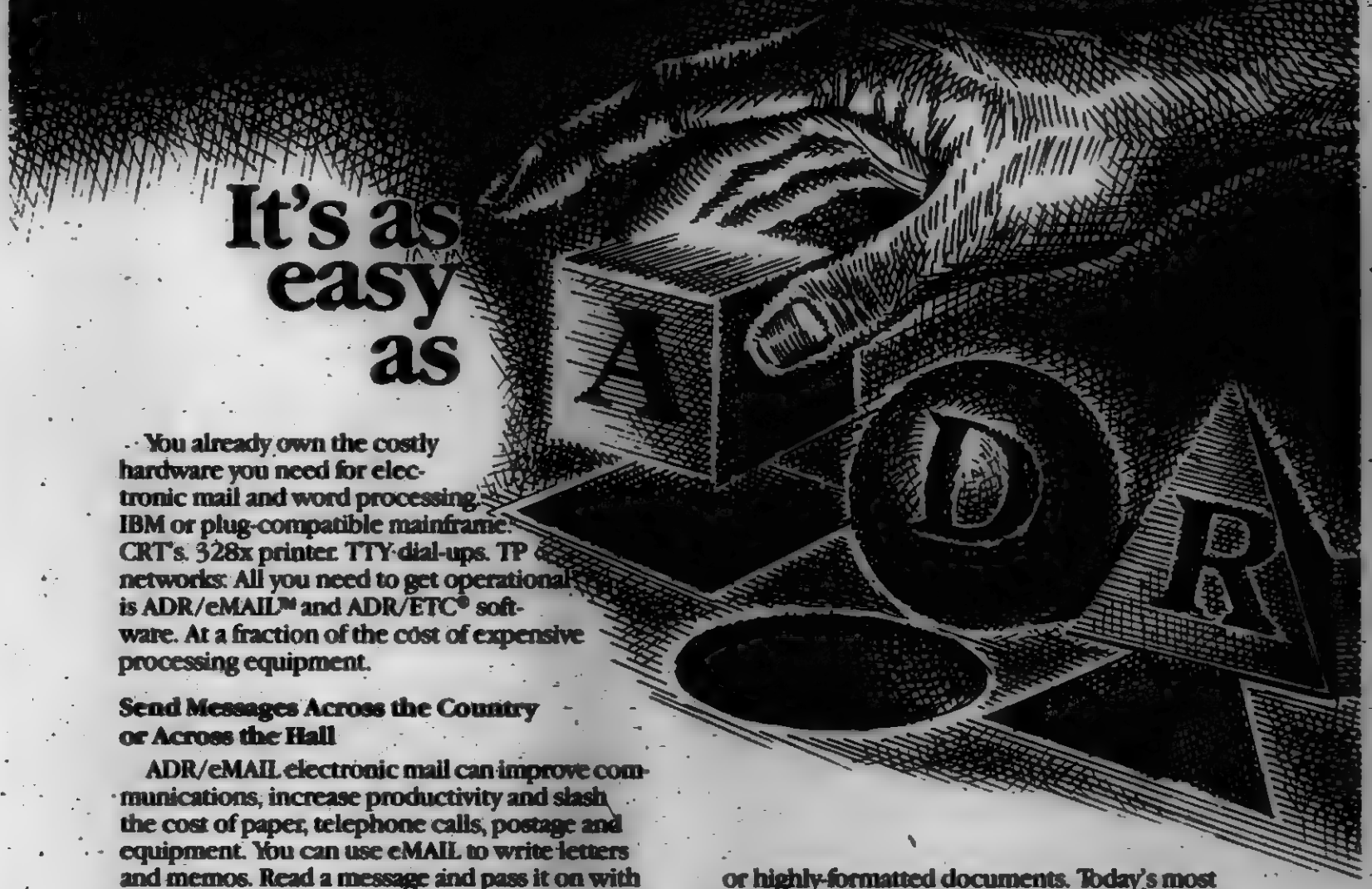
Minnesota is using a computer program to see if highway construction contracts show evidence of bid-rigging 18

A court in Taiwan has handed out prison sentences to six computer executives for copying Apple Computer, Inc. software 26

Turnaround Time 25
International Report 27
Calendar 30

OFFICE AUTOMATION

Electronic Mail and Word Processing



It's as easy as

You already own the costly hardware you need for electronic mail and word processing. IBM or plug-compatible mainframe. CRT's. 328x printer. TTY-dial-ups. TP networks. All you need to get operational is ADR/eMAIL™ and ADR/ETC® software. At a fraction of the cost of expensive processing equipment.

Send Messages Across the Country or Across the Hall

ADR/eMAIL electronic mail can improve communications, increase productivity and slash the cost of paper, telephone calls, postage and equipment. You can use eMAIL to write letters and memos. Read a message and pass it on with comments. Keep copies permanently. Send a message to a person, group or department. eMAIL can be accessed from any location in its terminal network – not just from your regular office. With eMAIL, you can't misplace, forget about, or spill coffee on, your mail. You can actually handle all your mail in only 15 or 20 minutes a day. Best of all; ADR/eMAIL is simple to learn – anyone can use it.

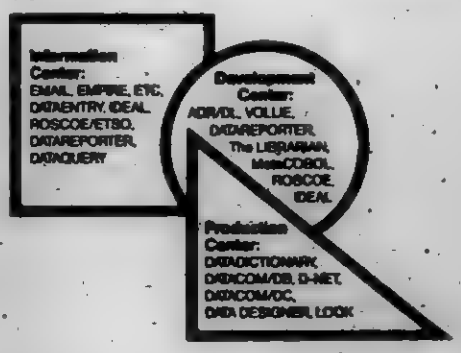
ADR/eMAIL is Integrated With ADR/ETC Word Processing

eMAIL includes an interface to the ADR/ETC word processor for sending and receiving large or highly-formatted documents. Today's most versatile and powerful word processor, ETC lets you generate simple memos, extensive proposals, catalogs, manuals and one or 100,000 personalized letters. It even allows you to link your word processing activities to your data processing systems. ETC also interfaces with typewriter terminals and hardcopy printers for boardroom quality documents.

ADR® is Ready When You Are

Call or write for more information on how you can increase office productivity, boost employee morale and cut costs substantially. It's as easy as A D R.

APPLIED DATA RESEARCH, Route 206 & Orchard Road, CN-8, Princeton, NJ 08540, (201) 874-9000



APPLIED DATA RESEARCH

The one vendor software solution

Cost of Cobol generator pays off for small user

By Paul Gillin
CW Staff

TAMPA, Fla. — For a small programming installation like that at Duval-Bibb Co. here, a $30,000 investment in a programmer productivity tool is a major expense. But the magazine distributor's DP department decided the expense was worth it after estimating that the tool would increase productivity by the equivalent of two to three staff members.

Duval-Bibb became one of the first users of Computer-Aided Programming (CAP), an intelligent code generator from Netron, Inc. of Toronto that runs on Wang Laboratories, Inc. machines. CAP employs reusable Cobol code and a functional programming concept called a "frame" to incorporate separately compiled and linked subroutines and customized code to significantly cut down on the time required to develop applications.

> *'It's very fast. . . . In the past we've budgeted five days for a reasonably sized report program, including design, test and documentation. With CAP, the coding and testing portion virtually disappeared. Three days worth of work collapses to less than half a day.'* — Leslie Feasey, manager of information systems at Duval-Bibb Co.

CAP uses a fill-in-the-blanks approach and a sophisticated full screen editor that enables programmers to avoid much of the mundane coding that is required to generate routine applications, according to DP staff members at Duval-Bibb. The product also allows programmers to break out of the frame to add custom code where needed. Users can design their own frames and save common subroutines for future use.

Used in all development

At Duval-Bibb, CAP was installed on a Wang VS90 last spring and is now used in all new development, according to Leslie Feasey, manager of information systems. In addition, the software is used extensively to regenerate modules of code that are scheduled for routine updates and maintenance.

In one case, programmers regenerated an entire application using CAP after they figured it would take only 1¼ days longer than the 26¼ days scheduled for updating the program. The program, a data-entry application that updates six files at once, "is one of the real nasties in the library," Feasey said.

In addition, the staff has developed two major projects using CAP, which together incorporate nearly 20,000 lines of code. CAP is best for standard programs like report generation, data entry and file management, Feasey said.

"It's very fast," he commented. "In the past we've budgeted five days for a reasonably sized report program, including design, test and documentation. With CAP, the coding and testing portion virtually disappeared. Three days worth of work collapses to less than half a day."

Creating a standard report involves writing "very little code," according to Rick Deland, a programmer/analyst. "The main thing you do is go into the report description, lay out the report as you'd like to see it, define the screens, and that compiles into a frame. Then you change a few parameters and it compiles," he maintained.

Because CAP uses pretested, canned subroutines, applications are easy to modify, Feasey noted. "You just put a break in a routine, write the code and recompile," he said. "It adds most of the hooks."

For Duval-Bibb programmers, the CAP full screen editor is the product's most useful feature. Using a scrolling feature, the editor can accommodate screens of up to 100 lines, can edit a screen at a time and can display all error messages at once, Deland said. "It allows you to display a file or run a program while you're still editing a file," Deland said. "You can also tell it in what order you want fields to be edited."

CAP has also reduced the need to write working storage code. "In the past, a pretty complicated report program involved laying out a lot of working storage," Deland said. "In CAP, the working storage that relates to the file is done for you. You're not involved with working storage in most cases."

The screen editor is "head and shoulders above the Wang editor," said Fred Mortimer, a senior analyst. "You can lay out and modify a screen in 10 to 15 minutes."

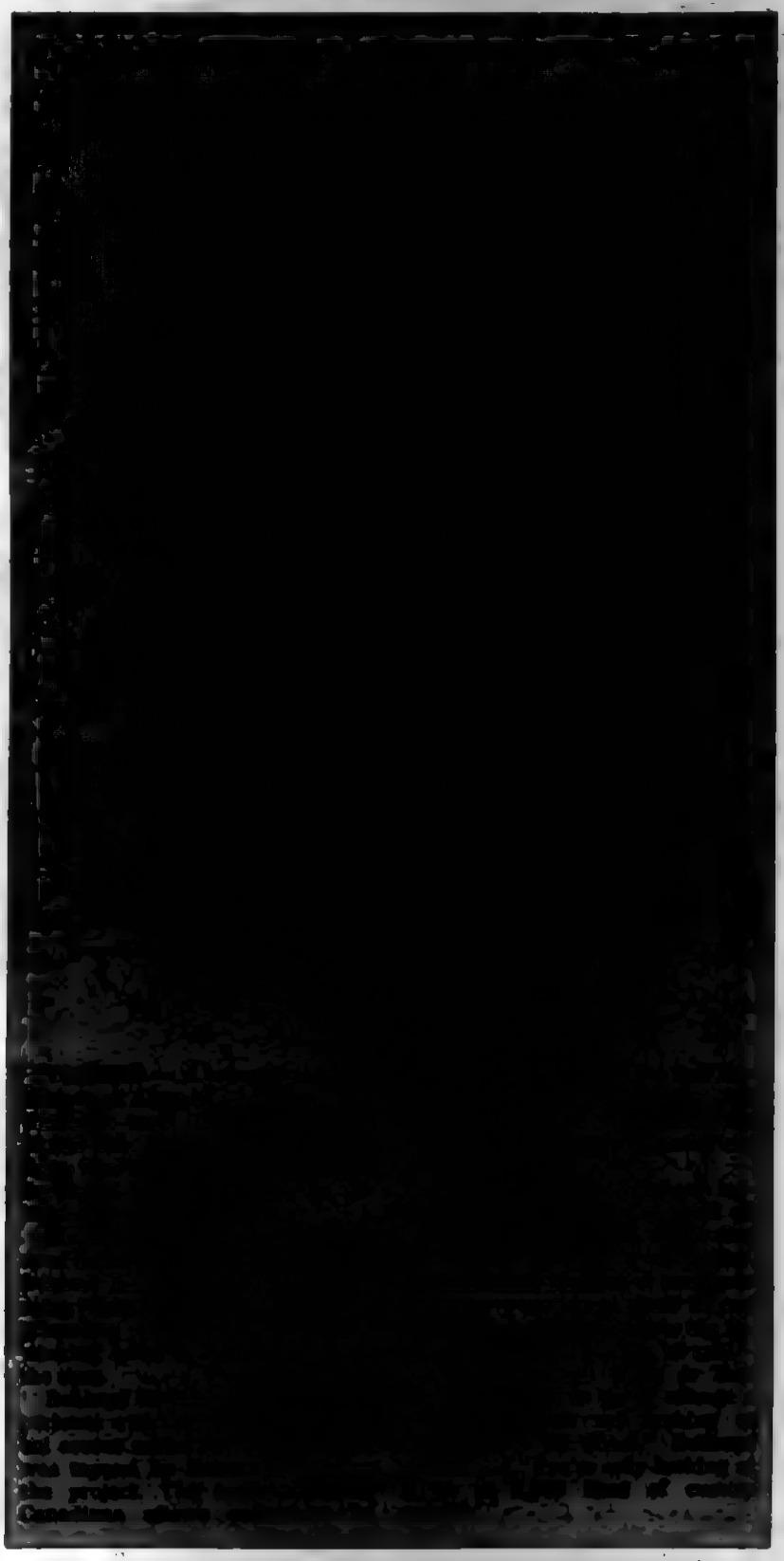
The CAP environment section presents multiple directories on a single screen. A programmer can call up a screen by positioning the cursor next to the screen name and can use up to 32 programmed function keys to make standard changes. "We've been able to go in and rearrange an 18-column report in less than a day," Mortimer said. "Any screen generating I've done in the last six months, I've done with CAP."

Some reservations

Programmers noted that CAP is still not appropriate for most large applications. "It has real trouble with update programs," Deland said. "You still have to write about 90% of the code from scratch."

"In the real heavy computational program," Feasey added, "you end up writing most of the code by hand. You only save 20% to 30% of the time."

Staff members also pointed out that while a programmer can be productive on CAP after only three days of training, proficiency takes a good deal longer to achieve. "It's easy to get started, but even after six months you're still learning," Feasey said. "Learning it thoroughly is fairly complicated."



Second-class postage paid at Framingham, Mass., and additional mailing offices. *Computerworld (ISSN-0010-4841) is published weekly, except: January (6 issues), February (5 issues), March (5 issues), April (7 issues), May (5 issues), June (5 issues), July (6 issues), August (5 issues), September (6 issues), October (5 issues), November (6 issues), and a single combined issue for the last week in December and the first week in January by CW Communications/ Inc., Box 880, 375 Cochituate Road, Framingham, Mass. 01701.*

Copyright 1984 by CW Communications/Inc. All rights reserved.
Computerworld can be purchased on 35 mm microform through University Microfilm Int. Periodical Entry Dept., 300 Zeeb Rd., Ann Arbor, Mich. 48106. Phone (313) 761-4700. *Computerworld* is indexed: write to Circulation Dept. for subscription information.
PHOTOCOPY RIGHTS: permission to photocopy for internal or personal; use or the internal or personal use of specific clients is granted by CW Communications for libraries and other users registered with the Copyright Clearance Center (CCC), provided that the base fee of $3.00 per copy of the article, plus $.50 per page is paid directly to Copyright Clearance Center, 21 Congress Street, Salem, MA 01970.
Permission to photocopy does not extend to contributed articles followed by this symbol. ‡

Special requests should be addressed to Nancy M. Shannon, CW Communications/Inc. Box 880, 375 Cochituate Rd., Framingham, MA 01701. ISSN 0010-4841/82 $3.00 + $.50
$2.00 a copy: U.S. — $44 a year; Canada, Central & So. America — $110 a year; Europe — $165 a year; all other countries — $245 a year (airmail service). Four weeks notice is required for change of address. Please allow six weeks for new subscription service to begin.

ABC ABP mcc

POSTMASTER: Send Form 3579 (Change of Address) to Computerworld, Circulation Dept., Box 880, 375 Cochituate Road, Framingham, Mass. 01701.

NEWS

Execs: 3270-PC won't displace 3270 terminal

By Paul Kwasnicwski
CW Staff

Will IBM's 3270 Personal Computer render obsolete its own 3270 series of terminals? The answer to that question is "probably not," based on recent *Computerworld* interviews with DP managers and industry analysts who believe functional limitations and cost will prevent corporations from replacing 3270 series terminals with 3270-PCs.

"When the 3270-PC was introduced, I thought it would provide the mainframe link that corporate users desired," said Ron Goldfarb, manager for office automation at Pratt & Whitney Aircraft Co., based in Hartford, Conn. The microcomputer apparently did not fufill this need: "A user can access mainframe data, but it isn't easy to use that data with Lotus Development Corp.'s 1-2-3 or other microcomputer applications [software]."

The problem is caused by the incompatibility of mainframe and microcomputer data formats. IBM mainframes store data in Ebcdic format; Personal Computers use Ascii format.

Converting mainframe data for microcomputer applications is a tedious process. A user who wants to do so needs the proper software and temperament. First, he must load and run one of the micro-to-mainframe links which reformat data in one of the seven windows available on the 3270-PC. (Visicorp's Visianswer, Management Science America, Inc.'s Peachlink and McCormack & Dodge Corp.'s PC Link are three products that provide this type of link.) Next, the user must store the reformatted data on the microcomputer note pad icon which is used to transfer data between applications running in different windows. After he has utilized the data in the appropriate applications, he has to reverse these steps to send the file to the mainframe.

Windowing capability

The 3270-PC can load microcomputer software in seven windows, four of which can be used for mainframe applications. It is this windowing capability that separates 3270-PCs from 3270 terminals — a distinction for which users pay dearly, according to Dale Kutnick, executive director at The Yankee Group, the Boston-based market research firm.

"IBM would be happy if everyone replaced 3270 series terminals with 3270-PCs," Kutnick said. "The 3270-PC costs approximately three times as much as a 3178, the least expensive 3270 series terminal. Since terminals are used primarily for data entry, window capabilities are really not needed. [Data entry] department managers could not justify the cost of the 3270-PC."

Higher costs do not stop with the stand-alone system. "Since the 3270-PC does not have multiplexer capabilities, it needs its own line to communicate with the host," Kutnick pointed out. "Communication costs would rise significantly if one replaced terminals with these microcomputers."

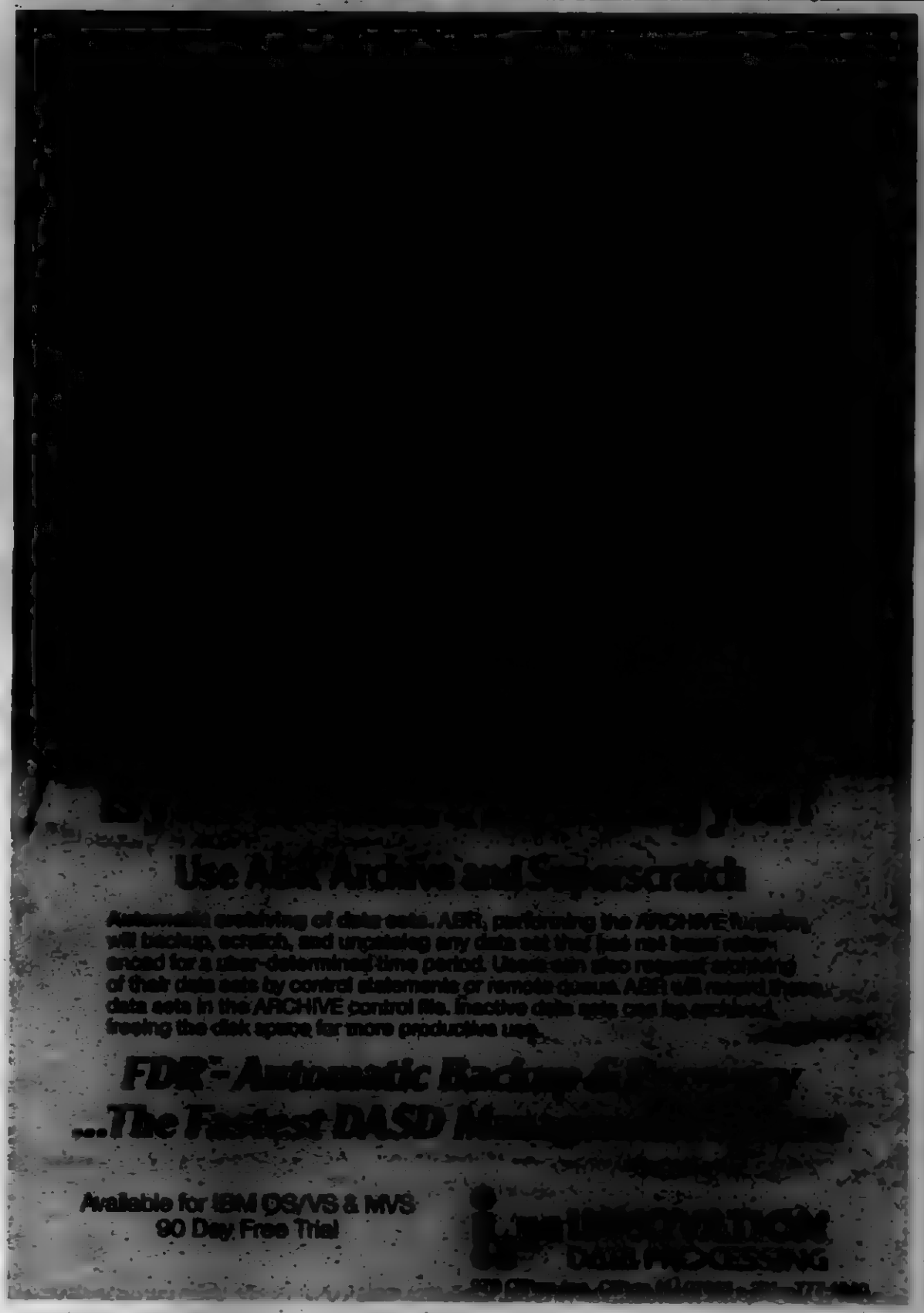
While the 3270-PC does not offer financial benefits to data processing managers, it will help IBM's bottom line. The 3270-PC represents Big Blue's latest attempt to protect what it perceives as its turf — data processing departments in large corporations. "IBM is tightening its open architecture, so it can have more control over the market," said Will Zachmann, vice-president of corporate research for International Data Corp., a market research firm in Framingham, Mass. "The 3270-PC is not aimed at the terminal market but at those trying to sell to the IBM corporate marketplace."

The micro, industry analysts say, was designed to keep computer retailers away from IBM accounts. Retailers like Entre Computer Centers, Inc. and Computerland Corp. packaged non-IBM products, such as terminal emulator boards, with IBM Personal Computers and called on IBM accounts that wanted a mainframe link. Since the retailer — not the IBM sales representative — could provide it, retailers sold huge quantities of IBM Personal Computers to IBM mainframe installations.

IBM kicked up its heels, limiting 3270-PC sales to its account representatives and designing the new system in such a way that upgrading from an IBM Personal Computer to a 3270-PC is not realistic. "IBM's rationale is that a mainframe link requires more than just a microcomputer," Kutnick said. "It requires communications capability, software and system-specific items. Its sales force understands those needs."

Because of its high cost and limited functionality, analysts predict small numbers of sales for the 3270-Personal Computer.

However, industry observers do predict continued growth in the 3270 series terminal market. "The 3270-PC does not mean the death of 3270 series terminals," Kutnick said. "There is a need for data entry functions. It is a viable market."



White House seeks jump in R&D but cuts for NBS

By John Gallant
CW Washington Bureau

WASHINGTON, D.C. — The Reagan administration asked for a 14% increase in federal research and development support in the fiscal 1985 federal budget sent to Congress last week. Total R&D funding would reach $63 billion, a $6 billion increase over this year's request.

The budget document emphasized a "high priority" for "R&D that is appropriate for federal support." In contrast, the administration continues to seek cuts in programs it wants the private sector to support, particularly the National Bureau of Standards' (NBS) Institute for Computer Sciences and Technology (ICST), whose funding would be cut 50% to $5 million under the Reagan plan.

Currently financed at approximately $10 million a year, the ICST program includes monies for the federal DP standards program and several computer research projects. It is the standards program the administration has sought to thrust onto the private sector. Congressional opposition, however, has so far kept this program within NBS.

In the overall 1985 Reagan budget, totaling $925 billion, support for basic R&D would increase 10% from $7.2 billion to $7.9 billion, which the White House estimated would equal a real growth above inflation of about 6%.

The $63 billion requested for total R&D funds emphasizes Defense Department programs and the programs of the National Science Foundation (NSF). NSF is tasked with strengthening engineering research and training and providing better access for scientists to advanced computer facilities.

Funds for NSF-supported R&D programs would rise by about $170 million, or 14%, to more than $1.4 billion in 1985. These funds are primarily aimed at supporting research in academic institutions through project grants emphasizing, among other things, engineering and better university research instrumentation.

The administration said it will provide special funds to increase access of academic scientists to supercomputers, providing not only computer time and technical support but also support for communications, equipment and other costs for remote access by scientists at their university laboratories.

Specifically, the NSF mathematical and physical sciences program, which includes access to computing facilities and research in computer science, such as new computing methods based on parallel processing and new mathematical structures and techniques, would receive $417 million in 1985, up from $359 million this year.

The NSF engineering program, which supports work to increase U.S. capabilities in such areas as computer and systems engineering, would be financed at $147 million, up from $121 million in 1984, under the Reagan budget. The bulk of federal R&D funds are slated for Defense Department programs, which include a number of programs in computers, semiconductors and electronics. Defense R&D funds will total $33.9 billion in 1985, a $6.2 billion, or 23%, increase.

Chemnet may be marketed

By David Myers
CW New York Bureau

NEW YORK — Chemical Bank may change from user to vendor by offering its telecommunications network capabilities to the merchant market later this year.

James Mayer, senior vice-president of telecommunications, confirmed last week that the bank is studying the possibility, but said a decision is in "the discussion stages" and still "months away." Yet to be answered are questions of security, product quality and regulation, he said.

If Chemical Bank does decide to plunge into the networking mart, it could provide electronic mail and applications-level capabilities with access to any of the distributed nodes on its already installed Chemnet, according to Mayer. This could ultimately mean an entrance by the bank into the time-sharing business.

Chemnet, planned three years ago, was completed for internal use in mid-1983 and incorporates a network architecture that in some cases was ahead of what IBM, Digital Equipment Corp. and Wang Laboratories, Inc. were able to offer it, Mayer said.

"We've worked along with the vendors and replaced the household stuff as soon as products were ready. Our approach is to standardize. That's what . . . makes the [network] product marketable," Mayer said.

Sperry posts earnings increase

NEW YORK — Citing improved earnings in each of its operating units, Sperry Corp. last week posted an 84% increase in earnings on a modest 1% jump in sales for its third quarter.

Profits totaled $74 million, or $1.42 per share, compared with $40 million, or 90 cents per share, the same period a year ago. Sales totaled $1.8 billion compared with $1.7 billion a year ago.

Sperry attributed its earnings jump to increased sales volume in its defense and aerospace operations, lower interest expenses and "continuing cost-cutting measures throughout the company."

For MIS execs, data base details micro software

By Jeffry Dexter
CW West Coast Bureau

WALNUT CREEK, Calif. — A marketing services firm has applied high technology to one of MIS management's newest but most vexing problems — the rapidly growing volume of end-user requests for information about microcomputer software packages. What it has come up with is a nationwide telemarketing service that provides on-line access to a central data base that reportedly describes thousands of personal computer programs.

Targeted mainly at business users in large corporations, the data base contains reviews, evaluations and general descriptions of each of the products listed in its software catalog. Also included with each item in the One Point Electronic Catalog is information about pricing, warranties, support and maintenance, according to Stevan Cloudtree, president of privately held ITM, the service's founder.

To gain access to the data base, a user dials ITM's phone number through a local modem and enters a password with his terminal keyboard; the user can either browse through the data base contents or conduct structured searches for specific kinds of packages.

"Each product in the electronic catalog is coded with up to 10 subject identification codes, much like a library's Dewey Decimal system," Cloudtree said. "So a user can search the data base by product name or publisher. In addition, if a subscriber wants, for example, an MRP program that interfaces with a particular accounts payable package and runs on a [Texas Instruments, Inc.] machine, he can string codes together to structure the search for exactly what he wants."

If a user finds a package that meets his needs, he can flag the appropriate item in the data base, enter his address and other shipment information and order the product. After paying a one-time setup fee of $100, the customer will receive a copy of the requested program through the mail within a few days, Cloudtree said.

Because it has its own source of supply and ships software in large volumes, ITM can typically make its products available to subscribers for discounts ranging from 20% to 30% or more, he added.

Since it went into operation in mid-December, the One Point service has already attracted roughly 200 subscribers, many of them large corporations like Pepsico, Inc. and Exxon Office Systems Co., Cloudtree said. Information systems managers reportedly account for an estimated 40% of the electronic catalog's total user base.

"What we're finding in our market studies is that MIS managers are being inundated with requests to research software packages and advise users about which microcomputer program they should buy," Cloudtree said. With One Point, they can quickly gather large amounts of information about many competing packages and then narrow the range of options down to four or five finalists. A key advantage of ITM's electronic catalog is that it can be easily operated by technically unskilled employees.

Echoing Cloudtree's comments about One Point is one of the service's users, Joe Nicholson, who recently left the New York-based software and consulting firm of Monchick-Weber Corp. to form Belvedere Microsystems, Inc. As a Monchick-Weber consultant, Nicholson found the electronic catalog "extremely valuable," primarily because of the extensiveness of the service's product data base.

"One Point gave us the opportunity to examine many software packages in a single source and find out what's currently available on the marketplace," Nicholson recalled. "We could never have learned about such a wide variety of products from computer stores, which usually offer only one choice of each type of package."

Based on a Compupro Systems, Inc. 816 microcomputer running Digital Research, Inc.'s MP/M operating system, One Point's data base currently lists some 3,500 packages, including the best known spreadsheet, word processing, graphics and other business-oriented microcomputer programs. An additional 1,260 titles are scheduled to be added to the catalog within the next 30 days or so.

CORRECTIONS

"DEC unwraps Ultrix-32" [CW, Jan. 23], which stated that Digital Equipment Corp. was the second major firm to introduce a Unix-based operating system, should have stated that DEC was the second major firm in recent weeks to introduce a Unix-based operating system. Several other major vendors have announced versions of Unix.

"Ingres update offered" [CW, Jan. 9] incorrectly stated the version number of the new release of Relational Technology, Inc.'s Ingres data base management system. The correct release is Version 2.1.

The last line of the address of the Mumps Users Group was inadvertently omitted from an article in the Jan. 23 Software and Services section. The full address is Suite 308, 4321 Hartwick Road, College Park, Md. 20740.

The correct price of Caleshare, Inc.'s CSI-X.25 Data Concentrator [CW, Dec. 12] ranges from $2,735 to $4,195 for four- to 16-port configurations.

CGA Software Products Group, Inc.'s Single Image Software Version 7.1 is an enhanced version of the software that is now available for IBM MVS/XA, not a new product as indicated in "Utility Offered for MVS/XA" [CW, Dec. 26-Jan. 2]. Also, the correct lease prices are $675/mo per site for Multiple Systems Integrity Facility; $450/mo each for Multiple Systems Manager and Global Console Director; and $1,575/mo per site for the three together, known as Single Image Software.

LONE EAGLE

SyncSort CMS:
It's a species all by itself!

(The only high-tech sort for VM/CMS.)

Call (201) 568-9700.

Liberate your sorts and your programmers.

What is that soaring so effortlessly up there in the data-processing heavens? Is it a bird? Is it a plane? Is it a man?

Nope, it's a Supersort – SyncSort CMS. And it does for VM/CMS what other versions of SyncSort have done for OS/VS and DOS/VS(E).

A couple of years ago there was no such animal as a high-performance sort program for VM/CMS. As a result, certain kinds of processing were just plain impossible with the system. It's a miracle that VM/CMS survived at all.

Then SyncSort CMS was hatched. It was the first and only sort program designed exclusively for VM/CMS. And it gave leading-edge processors a powerful tool for liberating the potentialities of their system.

In a little over a year, SyncSort CMS has acquired over 350 users. It's growing at a faster rate than either SyncSort OS or DOS were at a similar stage in their development. Here are some of the reasons for that astonishing growth:

1. SOARING PERFORMANCE. SyncSort CMS includes many of the technical breakthroughs we pioneered in OS and DOS sorting – innovations that are now patented.

The best way to find out what this revolutionary new sort program can do for you is simply to try it. You'll be amazed at how little VTime, TTime, Elapsed Time and SIOs it requires. You'll note a sharp drop in response times and a surprising increase in system throughput.

2. FINE-FEATHERED FEATURES. SyncSort CMS liberates programmers. Using the program's full range of features, you can often produce a simple report in one day rather than five. These can do the following:

- Select relevant records;
- Reformat records on output;
- Perform summaries of designated numeric fields;
- Produce reports with pagination, headings, dates.

3. GREATER VERSATILITY. SyncSort CMS is a bird for all seasons:

- It can be invoked from other COBOL, PL/1 or BAL programs.
- It sorts CMS, SAM (OS or DOS) or VSAM files.
- It dynamically allocates space on TDSK.

4. TOP-FLIGHT SERVICE. Ours is the best in sorting. More than 85% of all inquiries are resolved within 24 hours.

If you'd like to realize the full potential of VM/CMS, give us a call, and we'll introduce you to SyncSort CMS. It's a great chance to replace a vulture with an eagle!

SyncSort CMS
Performance Improvements

VTIME: 50%
TTIME: 60%
SIOs: : 75%

syncsort INC.

Syncsort Incorporated 560 Sylvan Ave., Englewood Cliffs, N.J. 07632

Vault takes page from Brinks

By John Gallant
CW Staff

ATLANTA — Laurence Murphy thinks data should be treated the same way Brinks, Inc. handles money. So when the vice-president of the armored car company failed in 1981 to convince his peers at Brinks that the time was ripe to enter the information security marketplace, he joined forces with real estate investment specialist Richard Ornstein to establish the Vault Co. here.

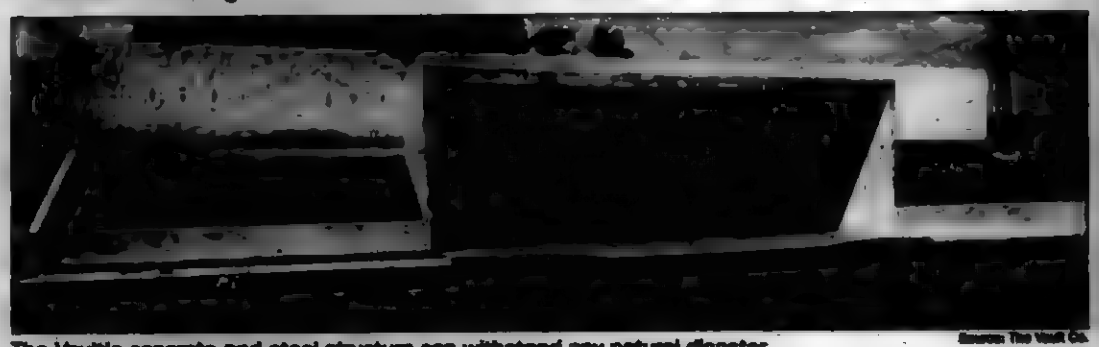
The Vault, according to Murphy, is the first facility to offer "complete off-site data protection," which he said includes guaranteed physical security and environmental safety, in addition to the Vault's software source-code escrow service. The Vault's data library was built to store as many as 100,000 computer tapes inside a concrete-and-steel structure, which, Murphy claimed, can easily withstand any natural disaster.

Murphy said it costs clients an average of $1 per disk each month to store computer tapes in the Vault's data library. Considering the value of the data stored on those tapes, he said, that expense is minimal.

Asked what makes the Vault different from other data storage and disaster recovery facilities, Murphy replied, "Most of these so-called off-site facilities are nothing more than warehouses. We provide total physical and environmental security, in addition to escrow services you could only get from a bank before. We are a trained third party equipped to provide complete data security and disaster recovery services."

According to Murphy, the data library is watched over by closed-circuit television monitors and bonded security guards behind bullet-proof glass. Only a trained data librarian utilizing a computerized tape retrieval system has access to the tapes stored in the library, which is both temperature and humidity controlled and equipped with a Halon fire-protection system. Clients must undergo a signature-matching process to verify their authority to take delivery of tapes.

In addition to magnetic tapes, the Vault was designed to house data stored in hard copy, hard disk packs, diskettes, microform, microfilm and cassettes. Clients can transport their media to and from the facility via the Vault's own environmentally controlled vans, which maintain constant temperature and humidity levels. Constructed of more than 3.6 million pounds of concrete and steel, the Vault incorporates physical security techniques recommended by experts at IBM and the Federal Reserve Bank, Murphy said. A mobile storage system in the data library utilizes tape racks that move along rails built into the concrete floor.



The Vault's concrete-and-steel structure can withstand any natural disaster.

Source: The Vault Co.

Banks linking fingerprint scanners to terminals to foil thefts

By David Myers
CW New York Bureau

NORTH WHITE PLAINS, N.Y. — Would-be holdup men hoping to steal some of the millions of dollars that banks transfer over the wires each day may find themselves foiled by a device invented by a four-year-old company here just coming out of its development phase.

Fingermatrix, Inc. has already installed 17 of its digital fingerprint scanners in banks such as Chase Manhattan and Chemical Bank in New York and First Interstate and Wells Fargo in California. The scanners sit next to the banks' terminals and must be stroked before a user can gain access to a terminal. Only authorized users — whose fingerprints are kept in digital form in the bank's mainframe system and accessed by the terminal to which the scanner is attached — are granted access to the terminals.

"The scanning takes roughly a second," explained Richard C. Kjeldsen, finance vice-president for the company. "The device compares the user's fingerprint to a digital record of what the print is supposed to look like and either verifies it and permits access or denies access."

The scanning device is linked to a controller, which then plugs into the terminal, such as an IBM 3270. Modifications in the mainframe's operating system software are required to make the scanner work, according to Kjeldsen.

The two-piece setup costs approximately $6,500.

Kjeldsen said the scanner was developed to prevent electronic funds transfer heists from inside a bank. "With wire transfers carrying half a million to a million dollars a shot, you might want to require the user to verify his identity before each transaction," Kjeldsen said.

The scanning device also prepares an audit trail for each transaction, keeping track of who logged on to the system at that terminal, how long he had access and how much money he added to or subtracted from the bank's accounts.

But the device is effective for foiling outside-the-bank-walls capers, too. "Since the system is configured to require fingerprint verification before access is granted, it can prevent wiretap thefts," Kjeldsen said.

Fingermatrix, a public company that raised $5.5 million in its second offering last December, foresees other uses for its scanning device. "In hotels you might register with a fingerprint and use that instead of a key to get into your room. Ultimately, the fingerprint might even take the place of a plastic (credit) card," Kjeldsen said.

But the company is not insensitive to potential abuses of its biometric access system.

"Eventually, one could conceive, if one were so inclined, a system that could track the comings and goings of the populace. But we view that as an abuse, and it can be protected against," Kjeldsen said. "It's not quite as threatening as people might perceive."

FRAUD from page 1

ran dry. "I figure I gave away between $20,000 and $30,000 of my own money," said Slyngsted, who now programs Apple Computer, Inc. microcomputers for prison administrators. "If I had it to do all over again, I'd still give away the money. I've been broke myself — I know what it's like."

Slyngsted said he never claimed to be a high-technology Robin Hood; that title was thrust on him by reporters.

State police agreed that Slyngsted just didn't make it as a crusader for the poor. "The claim that he gave all that money away was just an attempt to minimize his sentence," Crawford said. "He had this reputation for being a big spender down at Charlie's Tavern, where he would buy everyone rounds of drinks. He was also a big talker and that was part of his downfall."

At Charlie's Tavern nowadays, Slyngsted is a frequent topic of conversation. It's true, Silva said, that the bar's new celebrity once gave an unemployed carpenter $600 so he could buy a new truck. But the newspapers' claims that Slyngsted casually dropped $100 tips for the bartenders were totally false.

"Sure, he loaned people money and wouldn't take it back," Silva said. "But a lot of that was just him trying to be a big man. He wasn't what the papers cracked him up to be. He did it all for attention."

According to Slyngsted, the Department of Social and Health Services has filed suit for triple damages to recover the purloined funds. The state has already attached his retirement fund and savings, and he claimed authorities are demanding at least $30,000 more in repayment.

And to add insult to injury, Slyngsted has been permanently banned from Charlie's Tavern.

"He's been permanently kicked out," Silva said. "He gave us a bad rap. He made this place look like a home for the poor and downtrodden. He made it sound like this was some sort of skid row joint. We serve the businessmen of Olympia here," Silva added.

Benefits of bypass lauded

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — Bypass facilities pay for themselves in three years or less, but the nonfinancial benefits of bypass may be even more important, three companies that bypass the telephone network said here last week at the Communication Networks Conference & Exposition (Comnet '84).

Instead of waiting months for the phone company to supply a 56K bit/sec channel, William H. Traylor said he can obtain the needed capacity almost immediately because his bypass network has the necessary bandwidth and is easily reconfigurable. Traylor, director of corporate communications for Wang Laboratories, Inc., manages a broadband cable network that ties together his company's facilities in and around Lowell, Mass. The cable, leased from a local CATV company, is now 47 miles long; it is being expanded to 70 miles.

Wang's bypass system supplants 4,500 voice-tie lines and 100 data circuits, Traylor reported, but it has far more capacity than that — 10 full-motion video channels for teleconferencing and 31 T-1 (1.5M bit/sec) channels. Thirty-six of the T-1 channels are used for voice communications; each T-1 carries 44 digitized voice signals, coded at a rate of 32K bit/sec. The remaining 45 T-1s are used for data transmission at speeds up to 56K bit/sec.

Traylor said the cost of the new cable system is less than $40,000 a month. The formerly used leased facilities cost $67,000 a month.

A vote for satellite

Satellite channels are "the corporate telecommunications network of the future," contended Dale Cunningham, telecommunications director of Harris Corp. Satellite channels provide the flexibility required by present corporate data communications — the ability to transmit voice, data, image and video bit streams on a dynamically reconfigurable basis — and they are less expensive than comparable terrestrial bandwidth, he said.

Harris is now using satellite circuits to connect its headquarters in Melbourne, Fla., with company sites in the West. Cunningham reported that a 1.5M bit/sec satellite link between Melbourne and Dallas costs $26,000 a month; AT&T's Accunet 1.5 service costs $34,500. Between Melbourne and the West Coast, the satellite facility is nearly $50,000 a month cheaper — $26,000 vs. $74,000 for Accunet 1.5.

Cunningham predicted that many corporate users are also going to be driven to bypass facilities because of the AT&T divestiture.

Possibly the largest bypass network to be built recently is the Westinghouse Electric Corp. digital integrated network, which utilizes 2 GHz, 12 GHz and 18 GHz microwaves to interconnect 20 switches serving some 17,000 station lines within the Pittsburgh metropolitan area.

Dr. K. Banerjee of GTE Business Communications, Inc., which supplied the switching equipment, reported at Comnet '84 that Westinghouse expects to save $66 million during the first 10 years the new network is in operation.

Datakit-System 85 tie set

WASHINGTON, D.C. — AT&T's Dimension System 85 private branch exchange will become interfaceable to local-area networks later this year, AT&T Information Systems, Inc.'s head of product development, Frank Vigilante, said here last week in an interview at the Communication Networks Conference & Exposition (Comnet '84).

Some arrangement of Datakits will be added to the existing System 85 architecture later this year, Vigilante said.

The Datakit, a virtual circuit switch, is the central element in a star-type local-area network announced late last year by AT&T [CW, Dec. 12].

The addition of this capability to the System 85 has been widely predicted for some time by consultants, but Vigilante's statement was the first official confirmation that it is being planned.

Adding the Datakit to the System 85 is intended to enlarge its prospective market. Users with heavy data communications requirements would be able to route that traffic through an alternate switching device, thus reducing the danger of blocking service to their voice terminal users.

HP from page 1

as well as the HP software. "This is a major shift in our market presence," said Jeff Williams, HP's product line manager for the new service. The joint venture with Vitalink will enable the HP user to obtain services it must now obtain from several suppliers, Williams added.

Vitalink, a manufacturer of satellite earth stations and supplier of satellite-based private networks, has negotiated similar joint ventures with Tandem Computers, Inc. and Electronic Data Systems, Inc.

■ BDS / Dataproducts Plug-Compatible Printers
■ Built for Handling Continuous High-Volume Output

IBM · DEC · HP
BURROUGHS BDS

■ Since 1975, the Largest Independent Supplier of Plug-Compatible Printer Systems
■ Over 5,000 Systems Installed
■ Complete Line of High Quality Daisy Wheel, Matrix and Band Printers. 55 CPS to 2000 LPM
■ 30-50% Savings
■ Quick Delivery (30 Days or Less)
■ Reliability Built-In (BDS Controllers and Interfaces)
■ Low Maintenance Cost
■ TRW Nationwide Service
■ Price Includes Installation and 90 Days Parts and Labor Warranty

I would like more information on plug-compatible printers
☐ 55 CPS Daisy Wheel Printer
☐ 80-300 CPS Matrix Printer
☐ 300-2000 LPM Band Printers

Name
Title
Company
Address
City State Zip
Phone ( )

(415) 965-8115

BDS Corporation
900 Rancho Ave.
Mountain View, CA 94040

U.K. (726) 73333 Australia (03) 561-6961

Doll sees T-1 dynamic mux bowing this year

COMNET '84

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — Dynamic multiplexers able to connect multiple voice and data channels to 1.5M bit/sec (T-1) transmission channels and reconfigure them in real-time to meet changing traffic demands should become available within the coming year, consultant Dixon Doll said here last week.

This development will be one of several reflecting the emergence of a new network architecture based on the integration of voice and data bit streams, Doll told the Communication Networks Conference & Exposition (Comnet '84) held here. Two basic factors are responsible for the new architecture:

■ The growing use of computerized workstations — including personal computers — by information workers, thus increasing the need for data communications facilities.

■ The divestiture/deregulation of AT&T, resulting in a much bigger and more lucrative data communications market in which AT&T as well as its former operating companies are able to market additional products and services.

T-1 channels are a basic element of AT&T's marketing strategy, Doll contended. The company is now aggressively promoting them as backbone links in corporate communications networks, and a number of vendors are now developing dynamic multiplexers to enhance the T-1 channel's usefulness.

Meanwhile, thanks largely to recent tariff changes, the T-1 is becoming increasingly cost-effective, Doll noted. When used to carry voice and data, it offers many users the same economies of scale.

Doll believes AT&T's recently introduced Datakit virtual circuit switch [CW, Dec. 12] is another key element in the company's new data communications architecture. He expects the Datakit, which is the central element in a star-shaped local-area network, to be connected to the System 85 voice/data private branch exchange (PBX), thus providing an efficient way of interconnecting all of a user's low- and high-speed data terminals.

For the user with a voice-only PBX, Doll said that one option is to route traffic, wherever possible, over common local loops to the PBX or an adjacent point and divert it from there to separate voice and data switching devices.

Let us bear your PC burden.

General Electric now offers relief for busy managers of information systems: complete service for your company's personal business computers. On-site right where they are, or at GE service centers from coast to coast.

With GE as your service source, you choose any one of several service options that's best for you. For example, we have a program that provides you with a loaner while your PC is at our service center. If you opt for on-site contract service, we can respond fast, day or night, if something goes wrong.

So take a load off your shoulders. For more information, call Bob Rachowski, Manager—National P.C. Service Sales, (518) 385-4892.

Put GE on your PC.

General Electric Company
Instrumentation & Computer Services Dept.
1 River Road, Building 6, Room 208
Schenectady, NY 12345

GENERAL ELECTRIC

NETWORK from page 1

in Ethernet baseband systems.

Star couplers available for Fiber Optic Net/One allow connection of up to 62 NIUs per star, with the added capability to interconnect stars. The maximum distance between NIUs in single-star configurations is 2,800 meters, according to the vendor.

The cost of an entry-level system with 12 device-interface ports begins at $25,000, including NIUs, Network Management Facility software, transceivers, star couplers and the Network Operating System software. A typical Fiber-Optic Net/One with 200 device-interface ports costs $135,000.

Further information is available from Ungermann-Bass, 2560 Mission College Blvd., Santa Clara, Calif. 95050.

New SBS service

Also at Comnet '84 last week, Satellite Business Systems (SBS) announced a communications network service called the Skyline Network Service. An enhancement of SBS' Series B communications network service, Skyline will provide integrated voice, data and image transmission for applications ranging from telephone calls to videoconferencing and electronic mail.

The service will be implemented in phases beginning in the second quarter of 1984 and will be available 24 hours a day. There is a $15 minimum monthly usage charge.

Day, night and weekend rates can be obtained from SBS, 8283 Greensboro Drive, McLean, Va. 22102.

Modems from DEC

In another announcement made at Comnet '84 last week, Digital Equipment Corp. introduced the DF100 series of modems, which features 1,200 to 9,600 bit/sec operating speeds, integrated automatic calling and standard RS-232C and RS-423A interfaces.

The five modems in the series, the DF104, DF112, DF126, DF127 and DF129, use the same circuit cards or modules in both stand-alone and rack-mount versions. Prices range from $545 for the rack-mounted, terminal-end, 150- and 2,400 bit/sec DF104 modem to $3,045 for a stand-alone, DF129 9,600 bit/sec, leased-line modem.

Further information is available from DEC, Maynard, Mass. 01754.

NEWS

AT&T packet net promised by year-end

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — AT&T said here last week that its previously announced Accunet Packet Service will be available nationwide by year-end through a six-node network.

The Accunet Packet Service is an upgrade of AT&T's Basic Packet Switching Service (BPSS) [CW, Sept. 26]. Accunet allows users to share switching and transmission facilities; BPSS users share only the switching facilities. Moreover, while BPSS is available at 9,600 and 56K bit/sec, Accunet also includes 4,800 bit/sec service.

The Accunet offering, unlike packet-switched services marketed by Tymnet, Inc., GTE Telenet, Inc. and other independent vendors, does not include protocol conversion because of a limitation in the Federal Communications Commission's Second Computer Inquiry decision.

It will, however, be directly accessible by any terminal or customer host computer that supports the CCITT X.25 standard set of essential features, said Judy Arenstein, who is in charge of marketing the offering.

Arenstein announced Accunet at the Communication Networks Conference & Exposition (Comnet '84), where she was among the speakers at a session on public data networks.

Accunet Packet Service will be priced considerably below BPSS, according to Arenstein. "Based on our present thinking," she said, "the port charge will be 35% less than what BPSS users pay," while the usage charge — both for packets transmitted and calls requested — will be 50% less.

Volume and time-of-day discounts are planned. Arenstein said users transmitting "more than 12,000 or 15,000 packets per month" would qualify for reduced rates.

Tariff submitted next month

A tariff covering Accunet will be submitted to the FCC next month. It will carry an effective date 45 days after the submission date, Arenstein said. The first two Accunet Packet Service nodes, in New York and Chicago, are already up and operating. Four others — in Atlanta, Dallas, Los Angeles and Denver — are scheduled to begin operation before the end of this year.

Although Accunet Packet Service initially will support only X.25, it will be in enhanced version of that protocol's set of essential features. Arenstein said the enhancements consist of "fast select," "fast select acceptance," accommodation of up to 256 outstanding data packets, window sizes of either two or three packets and hunt-group support.

Support for the CCITT X.75 internetwork protocol is scheduled to be added in 1985, she noted.

U.S., Japan sign extension of sales pact with NTT

WASHINGTON, D.C. — Japanese and U.S. government officials last week extended for three years an agreement to facilitate the sale of U.S. telecommunications equipment to Nippon Telegraph and Telephone Public Corp. (NTT), Japan's communications monopoly.

Some U.S. government and industry representatives have criticized Japanese performance under the existing agreement, but a recent survey of American telecommunications companies found most in favor of extending the arrangement as the best means for gaining access to NTT's $9 billion annual equipment purchases.

In 1983, U.S. sales to NTT totaled $140 million, up from $12 million in 1981 but still far short of the $700 million in Japanese telecommunications sales to the U.S. last year. New terms under the extension signed here last week will allow U.S. firms to participate on an equal basis with Japanese companies in NTT early-stage research and development activities and allow U.S. firms to submit contract bids in English. NTT will also translate contract terms into English for U.S. suppliers under the new terms.

The extension was signed by U.S. Trade Representative Bill Brock and Japanese Foreign Minister Shintaro Abe. Both praised the agreement as a major step forward in U.S.-Japanese trade relations.

However, a number of telecommunications trade problems still remain. In particular, Japan continues to refuse to buy U.S. satellites, insisting that Japan develop its own space capabilities. In addition, the U.S. State Department is negotiating with Japan on that country's proposal to deregulate part of the NTT monopoly, specifically in the private provision of value-added networks, a move that is likely to include restrictions on participation by non-Japanese-owned companies.

If it seems like you never have enough good programmers, Wiley has some very good news for you.

THE WILEY DATA PROCESSING TRAINING SERIES

To look at the ads in computer magazines these days, you'd think the answer to every business data processing problem was some new piece of equipment. But you know your job better than that. Hardware isn't going to get you out from under your programming backlog. People are.

Training people to get the job done—and training for *less*—is what the Wiley DP Training Series is all about. It's a comprehensive series of field-proven, fully self-instructional courses in applications programming, written and tested by nationally known DP trainers. No expensive "bells and whistles"—just sound, structured programming skills, taught in a practical, step-by-step format that works.

Use them for in-house training sessions (our **Leader's Guides** make it easy for you to conduct your own training seminar). Or give them to your employees for self-study. Either way, you can train new programmers or improve the productivity of your present staff—and do it at a fraction of the cost of canned DP training packages or seminars.

- **A practical job-skills orientation**—with hundreds of on-the-job examples and exercises, plus self-tests, sample input and output, and plenty of practice in real applications problem-solving.
- **Machine independent**—use with IBM, DEC, Burroughs, Honeywell, and other hardware—you can even train on microcomputers!
- **Complete training in COBOL programming in just 4 books** (15-20 hours of study for each) takes trainees from knowing no programming at all to advanced COBOL commands and techniques
- **Low cost**—only $49.95 per volume (less than the cost of leasing a conventional A/V program for one month!)

Future courses cover Ada, JCL, OS Assembler Language, System 370 Architecture, and other topics. For complete information, write to Kent Livingston, Dept. 4-1365. Or order direct by phone, and examine any course FREE for 30 days.

Write today for more information on any of these Wiley Data Processing Training courses.
Each self-contained volume can stand alone, or work as part of an integrated training program.

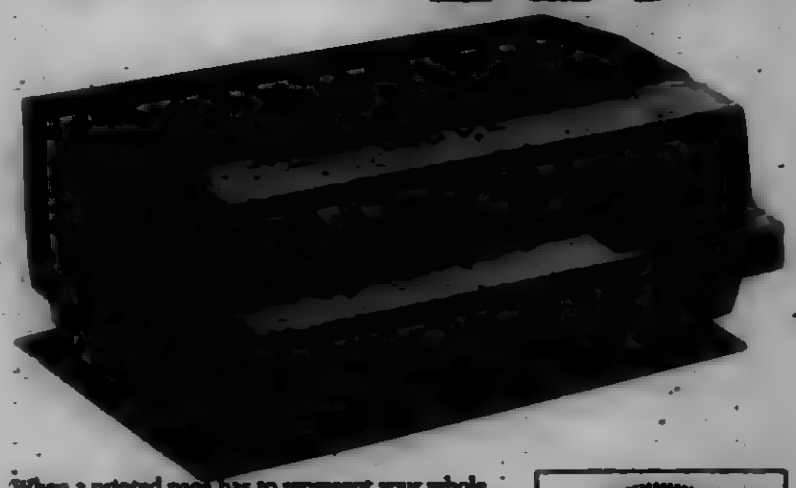
CALL TOLL FREE
1 800-526-5368
In New Jersey, call collect (201) 748-6781
Order code 04-1365

See us at ACM.

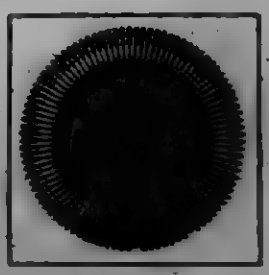
JOHN WILEY & SONS, Inc.
605 Third Avenue
New York, N.Y. 10158

In Canada: 22 Worcester Road, Rexdale, Ontario M9W 1L1. Prices higher in Canada 4-1365

Make it snappy.



When a printed page has to represent your whole company, it'd better look sharp. Our DP-35 and DP-55 daisywheels rival the finest office typewriters for crisp clean impressions. And they zip along at just about a page a minute. Call your printer distributor. Or contact Dataproducts at (213) 887-8024, 6200 Canoga Avenue, Woodland Hills, CA 91365. In Europe, 136-138 High Street, Egham, Surrey, TW 20 9HL, England.



Dataproducts Daisywheel Printers

Micros seen causing minimal PBX delays

COMNET '84

By Lynn Haber
CW Staff

WASHINGTON, D.C. — When private branch exchanges (PBX) are used for switching data from personal computers, the micros' "holding times" will not be long enough to have a major impact on the PBXs — and if they are, there is something that can be done to correct the problem, Dr. James Jewett told a session entitled "Personal Computer User Patterns and Their Effect on Corporate Networks" at last week's Communication Networks Conference & Exposition (Comnet '84) here.

Jewett, who is president of Telco Research, Inc. in Nashville, reported that about 85% of personal computer usage in organizations does not involve communications. In many organizations, he noted, that figure goes as high as 98%.

"Most statistics show that during business hours, the impact of personal computers on networks has not been [major] in the sense that traffic looks a lot like voice traffic when you separate it into early morning/late afternoon hours vs. the rest of the business day [9 a.m. to 4:30 pm.]," Jewett said.

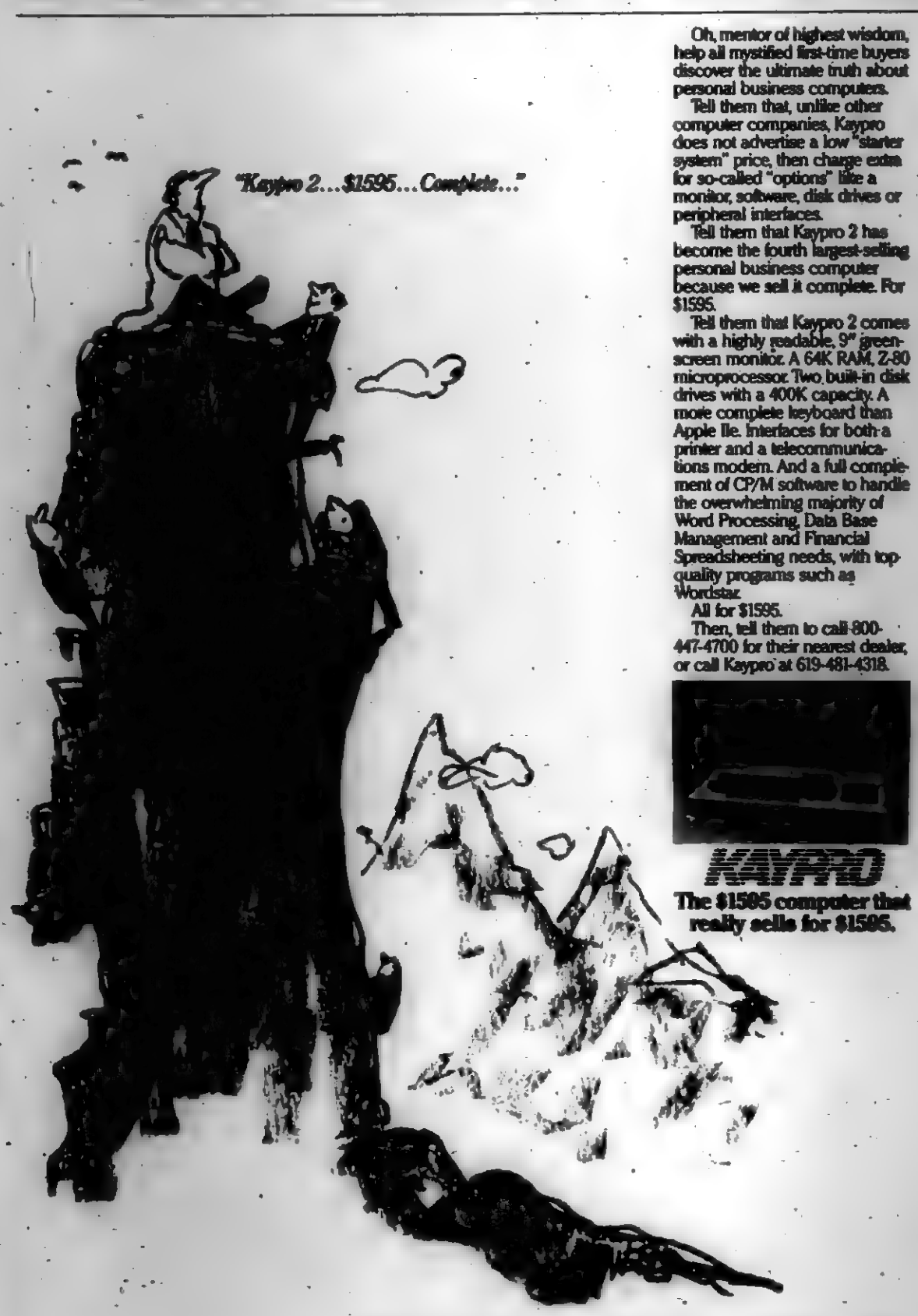
Therefore, fears of PBX engineering problems from long holding time due to things like personal computer terminal traffic do not hold, according to the speaker. And the use of standard traffic engineering formulas is acceptable when calculating PBX implementation.

"One of the greatest problems with personal computers is to take a given as a given," Jewett said. "The demand for personal computer usage can be very much designed to manipulate demand."

One way to improve a corporate network's service level is to look into personal computer applications and design the personal computer network with the aid of the telecommunications department. Because most organizations are buying microcomputers at a rapid rate and controls and coordination of micro usage aren't stabilized, traffic is going "topsy-turvy," according to Jewett.

"Organizations must come up with some policies to coordinate decision-making and applications design," he said. "Today's problems are not with PBX design, but with organizational planning and understanding of needs."

"Before [AT&T's] divestiture, networks that were centralized were economic. Centralized tandem networks with local networks tied into them aren't economically justified anymore," Jewett said. "There's a trend against the economic justification of networks which is allowing more and more locations to be segmented away from the network — and micros are playing a bigger role in that."



Keynoter calls for integration

By Lynn Haber
CW Staff

WASHINGTON, D.C. — Integration of technology, management, planning and organizational structure is the key to successful computer/communications networks of the future, according to Dr. Howard Frank, president of Contel Information Systems, Inc. Frank delivered the keynote address on "Network Technologies" at the Communication Networks Conference & Exposition (Comnet '84) held here last week.

Frank addressed the issue of integration as the next necessary step to meet the challenges of the 1990s. "In-house and in the industry, we must take all of the things we've been doing in the last decade — building information systems — and make them work together," Frank said. "If we don't do that, we will continue to propagate stand-alone systems, which present part of the problem and part of the solution, and which have to be updated so frequently that you never catch up."

The true merger of the computer and communications fields evolved in the decade between 1970 and 1980, according to Frank. Today, we are faced with networks that are both computing- and communications-oriented. "The way I would describe the network of 1984 is via distributed data processing with intelligence — at the terminal, the controller, peripherally at the network, within the network, at the front end, the host and at the back end," Frank said.

Communications nets are smart and getting smarter because of a decrease in computing costs compared with the cost of communications. "With the use of more sophisticated computing techniques, you can now pack more things into the network over the same basic communications lines of yesterday," Frank said.

State nixes nonpaper bonds

By James Connolly
CW Staff

DOVER, Del. — "Book entry" state and municipal bonds — bonds that are recorded electronically rather than on paper — probably will have their time, but that time hasn't arrived yet, the state of Delaware recently discovered.

Four of the five bidders in the state's $50 million bond sale last month declined the state's suggestion that they stop issuing paper certificates to investors.

But even officials of the securities firm that won the bid with a conventional proposal admitted that state and municipal bonds will inevitably follow the lead of U.S. government securities.

"We are in favor of book entry and think it is inevitable that it is going to become an everyday occurence. We had a few big customers who were not ready to go that way, although they too are in favor of book entry in the long run," said Peter T. Clarke, a vice-president of Morgan Guaranty Trust Co. of New York.

Morgan Guaranty produced the low bid for the Delaware bonds with an interest rate of 8.28%, despite having to pay an extra $1 per bond toward the state's expense for producing paper bonds.

Noting that he expects the majority of new bonds to be in book entry form in a year, Clarke said he sees no logistical or computer problems with administering book entry systems; however, he said investors have been cautious because of what they perceive as legal problems in some states. "Registered bonds were the same way when we went from bearer bonds to registered bonds, but it did come about," he noted.

Less expensive than paper bonds

The driving force in the Delaware proposal was State Treasurer Janet C. Rzewnicki, who claimed that book entry bonds would be significantly less expensive than paper bonds not only when issued but when transferred. She said the $1 per bond charge will cover only a fraction of the cost. She also cited the improved security aspects and reduction in "hassles" in book entry systems.

"We still feel very strongly that the market is going to come around. It's just a matter of time. We were happy to see that the only bidder that chose the book entry system this time [Prudential Bache Securities] had a very competitive bid [8.35%].

"I know that other states are planning to try book entry, and I fully expect it to be in use by the time we have our next bond issue in a year or so," Rzewnicki reported.

Martin Marietta wins bid

WASHINGTON, D.C. — The U.S. Department of Transportation announced last week that it has awarded Martin Marietta Corp. a $484 million contract to manage the Federal Aviation Administration's (FAA) $10 billion air traffic control system upgrade project.

Martin Marietta, the aerospace hardware producer whose headquarters are located in nearby Bethesda, Md., has teamed with six subcontractors for the five-year contract, which carries options of three-year and two-year extensions.

The group will review and oversee the development of the National Air Space System; it will also provide software validation and various technical support services to the FAA.

The National Air Space System plan, which was inaugurated two years ago, will reportedly include replacement of the IBM 360-era computers that support the current air traffic control system, development of new software for increased FAA automation and the phasing in of more sophisticated controller equipment and flight-support facilities, including new radar, communications, landing and weather-reporting systems.

Martin Marietta said it expects to have as many as 1,000 persons working on the FAA project at the height of the contract.

Eastern reverses micro policy

MIAMI — Reversing an earlier ruling, Eastern Airlines has decided to let passengers use portable personal computers and other battery-powered electronic equipment on board its airplanes.

Eastern said it reached its decision last week after extensive testing had produced no evidence that such equipment interfered with aircraft navigation and communications equipment.

Electronic equipment tested and approved by the airline for on-board use included personal computers, electronic games, solid-state calculators, hearing aids, heart pacemakers and portable recorders, a spokesman noted.

The airline said that it will continue to prohibit the use of walkie-talkies and radio-controlled toys and that, as a precautionary measure, neither personal computers nor recorders can be used during takeoffs and landings.

MAKE YOUR VAX™ DANCE

The QUICKSTAR™ family of VAX utility programs increases speed, efficiency and user enjoyment. QUICKSTAR includes:

- QUICKSTAT™ for interactive system status monitoring
- QUICKTALK™ for speedy inter-terminal communication
- QUICKCHANGE™ for username switching with no manual logout/login

Name _____
Title _____
Company _____
Address _____
City _____ State _____ Zip _____
Phone ( ) _____

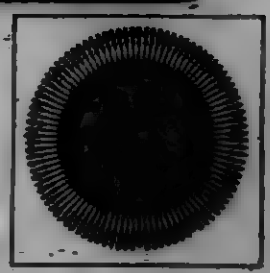
SEND COUPON NOW FOR COMPLETE DETAILS!

STI Signal Technology, Inc.
5951 Encina Road, Goleta, CA 93117 (805) 683-3771 Outside California call toll-free (800) 235-8787
TWX 910-334-3471

VAX is a trademark of Digital Equipment Corporation

Better letters.

We can't help your spelling or grammar but we can help your important correspondence look a little brighter than the next guy's. In less than a minute our DP-55 daisywheel dashes out a letter-perfect page. Throw out your white out, call your printer distributor. Or contact Dataproducts at (213) 887-9924, 6200 Canoga Avenue, Woodland Hills, CA 91365. In Europe, 136-138 High Street, Egham, Surrey, TW 20 9HL England.



Dataproducts Daisywheel Printers

Micro operating systems: a crowded stage

PRODUCT SPOTLIGHT

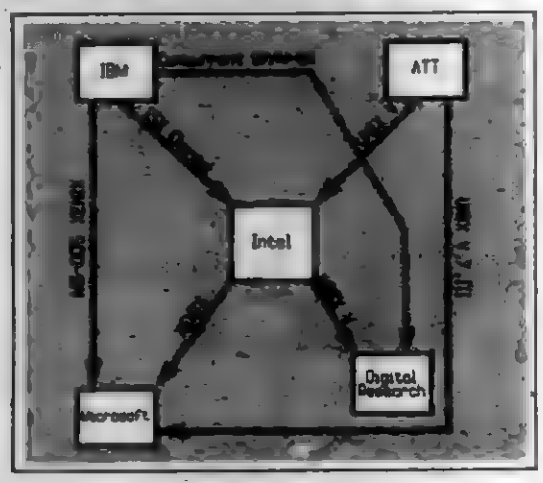
By Patricia Keefe
CW Staff

You've bought microcomputers for your end users. Should you stay with what you've got, or should you line up your users on the leading edge? And what is the leading edge when it comes to microcomputer operating systems?

If you've been watching the marketplace drama along with everyone else, you know that the scenario for microcomputer operating systems is changing simply because micros are becoming more powerful. The previous stars — Digital Research, Inc. and Microsoft, Inc. — may soon find themselves playing cameo roles as AT&T and IBM take center stage.

While this is supposed to be The Year of Unix, not everyone is giving it rave reviews. But no matter what view of Unix is entertained — bloated and overhyped or the greatest thing since digital transmission — it appears that the 15-year-old operating system developed by Bell Laboratories will, by default, become the standard for microcomputer-based multiuser, multitasking and/or networked environments.

Why by default? Because 32-bit micros are expected to replace 16-bit micros soon, and Unix currently is the most popular hardware-independent, multiuser, multitasking operating system that can run in 32-bit environments. Moreover, Unix has achieved its popularity virtually on the strength of its own merits, as enthusiastic users — rather than vendors with something to gain — spread the word. So fixed is Unix's rising star that industry observers consider only one competitor capable of upstaging it. That competitor is, of course, IBM.



Strategic, Inc. chart

Key business relationships

IBM recently announced a Unix-like operating system for its Personal Computer (CW, Jan. 16), which many Big Blue watchers saw as an endorsement of Unix. Others, however, are convinced that IBM's announcement was merely a "smoke screen" or "preemptive strike" and that it is planning a VM-based operating system which could dethrone or at least provide an alternative to Unix.

At the same time, some analysts have not ruled out the possibility that an operating system developed by a lesser entity could rise to the top. Moreover, vendors of 16-bit operating systems such as Microsoft (MS-DOS and Xenix) and Digital Research (CP/M 86, Concurrent CP/M, MP/M and CP/M 68K) are not expected to fade away quietly (see story on page 15).

Another twist

There is another twist to what some have called "the battle of the microcomputer operating systems." Communications giant AT&T has announced its intention to move into the office product sector at the same time that IBM is said to be poised for entry into the telecommunications field. This will pit two of the largest corporations in the world against each other on two stages.

However, the general view is that AT&T is just learning how to compete and has its hands full juggling many roles under its current reorganization. Since it has no track record in the computer industry, it is bound to stumble, according to analysts interviewed recently, almost all of whom "would bet on IBM every time," in the words of Mac Lewis, president of the Irving, Texas-based Systems Center, Inc., a microcomputer communications software vendor.

IBM is expected to unveil a VM-based operating system for 32-bit and up machines later this quarter. "The Unix bandwagon is too strong for IBM to ignore, but it obviously doesn't want to use plain vanilla Unix," remarked Brian Jeffery, director of research for International Technology Group in Palo Alto, Calif.

Jeffery predicts that in addition to PC/IX, its Unix look-alike, IBM will endorse Xenix — Microsoft's version of Unix System III — for its Personal Computer series. However, Strategic, Inc. President Michael Killen and other analysts believe an IBM version of Unix will effectively kill Xenix.

Another option for IBM is the adaptation of a System/36-like operating system to run on the IBM Personal Computer. Frank Gens, The Yankee Group's Director of Information Systems Research, noted that this would allow Personal Computer users to migrate to larger IBM systems.

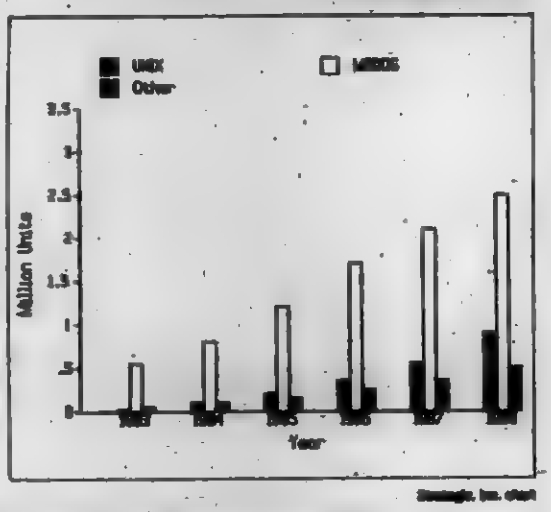
Beyond that, analysts expect IBM to offer a proprietary operating system that is a superset of Unix running under VM. IBM recently had seven or eight different Unix-related projects under way, but it decided about a month ago to consolidate those efforts. According to Gens, IBM has two ways to attack:

- It can go on the defensive and use a proprietary operating system to "suck in" users over a one-way bridge to IBM products.
- It can take the offensive, going against the idea of proprietary operating systems on the grounds it may encourage movement away from its hardware. IBM could assume that by providing a Unix-compatible system, it would be easier for users to move over to IBM. "This is an aggressive strategy that supposes that competitively priced hardware and functions will make it attractive enough," Gens said.

Robert Fertig, president of Enterprise Information Systems, Inc., agreed: "IBM is looking at the situation and realizes that it can't stop Unix from moving forward, but it can enlarge on Unix, providing features to entice users over a one-way bridge to IBM systems."

It is generally agreed that Unix has a lot to offer. It is said to be the most portable and open-ended operating system on the market today. Among

See SYSTEMS page 16



Strategic, Inc. chart

Market for 16-bit business computers

Some guidelines for evaluating operating systems

Evaluating operating systems is not quite as cut and dry a task as comparing hardware configurations. Nevertheless, it can be done.

"First, determine what problem you want to solve, what applications are available and what operating systems they run on," advised Michael Killen, president of Strategic, Inc., a San Jose, Calif.-based research house. In many cases, the operating system and hardware are secondary to the application, noted Mac Lewis, president of Systems Center, Inc. in Irving, Texas.

The increasing demand for portability between systems has resulted in efforts toward providing that capability in systems that are currently lacking in this area. Unix is considered by many analysts to be the most portable operating system on the market today.

Assuming that application package and operating system incompatibilities can be solved, a user might wonder why he should bother to examine any operating system features further. Consultants warn that just because two operating systems run the same package, it doesn't mean the end result will be the same.

Performance, for example, can differ. Some operating systems provide faster turnaround and response time than their competitors.

Also of importance is the environment within which the operating system runs: stand-alone, clustered or connected to a mainframe. A user who currently has a single-user, multitasking configuration but foresees moving to a multiuser configuration down the road not only does not want a single-user, single-tasking system, he wants one that will allow him to upgrade to the desired capabilities.

When choosing a personal computer and an operating system, limits are set on the software that will be available. If the operating system is changed, users are confronted with the nightmare of converting their existing applications, consultants warned.

Other issues of concern to the consultants and analysts recently interviewed include:

- Support — on several levels. Killen urges users to consider who will support their operating system. What type of documentation is available? Programmers need to consider whether an operating system will support the programming language they want to run.
- Required memory. Application programs are not the only system components with specific memory requirements. "If you have a 64K-byte system and the operating system requires 32K bytes, that won't leave you with breathing room," Killen warned. If there are multiple users, will a hard disk be required?
- Record locking. Will the operating system allow multiple users to access simultaneously the same data while, at the same time, protecting one user from another's updates?
- Language. According to International Data Corp., a market research firm based in Framingham, Mass., there is a trend emerging to move from operating systems to high-level languages as standards for portability. Digital Research, Inc. and Microsoft, Inc. are said to be writing operating systems in C and providing C compilers as part of their move toward Unix compatibility.
- Ease of use. How user-friendly or business-oriented is the operating system? One frequent complaint about operating systems such as Unix, which have migrated down from larger machines, is that they are too complex and technical as opposed to business-oriented.

Leading micro operating systems threatened

PRODUCT SPOTLIGHT

By Patricia Keefe
CW Staff

The growing power of microcomputers, some of which are capable of running mainframe applications, has created a corresponding need for more powerful and versatile operating systems. And as end users and vendors cast about for one to meet this need, it has become clear that the operating systems currently dominating the 16-bit microcomputer market will not be enough.

The search for a more powerful, hardware-independent operating system that can run in a multiuser, multitasking environment represents a solid threat to the market positions of Microsoft, Inc. and Digital Research, Inc., the vendors of those 16-bit, primarily single-user operating systems.

Microsoft is currently the lead runner, with an estimated 90% share of the market for 16-bit, single-user business operating systems. However, some analysts believe AT&T's Unix could spell doom for the high-flying vendor and its Unix look-alike, Xenix.

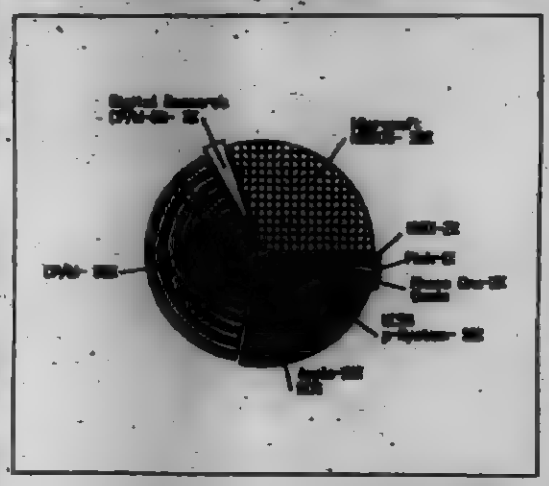
The same industry analysts believe Digital Research, which was unable to repeat in the 16-bit market its success in the 8-bit operating systems market, may be down but not yet out.

Regardless of whatever new directions the operating system market takes, there will continue to be a market for Microsoft's single-user, 16-bit MS-DOS and Digital Research's 8-bit CP/M and 16-bit, single-user CP/M 86 "from 'Mom-and-Pop' shops using unsophisticated, unintelligent stand-alones," predicted Robert Fertig, president of Enterprise Information Systems, Inc. in Greenwich, Conn.

Moreover, IBM's PC-DOS, its MS-DOS look-alike, still has a long life ahead of it. "IBM can't afford to and has no incentive to walk away from all those PC-DOS users," claimed Barbara S. Iagur, a microcomputer analyst for Paine, Webber, Mitchell & Hutchins in New York.

Differences between IBM's PC-DOS and Microsoft's MS-DOS are technically insignificant, although there are some important user differences, analysts agreed. According to Michael Killen, president of Strategic, Inc., PC-DOS was IBM's attempt to differentiate itself from everyone else, to get people to develop products for the Personal Computer market as opposed to other vendors' products that run MS-DOS.

Both Digital Research and Microsoft are widely credited with creating the generic — hardware-independent — operating system, which may well



Business operating systems market share, 1983

have accelerated the growth of the microcomputer industry. But neither vendor can afford to rest long on its laurels — not with AT&T Technologies, Inc.'s plans to support Unix System V; not with IBM's recent release of PC/IX, a Unix-like operating system for its Personal Computers ["IBM crosses AT&T border," CW, Jan. 23]; and not with IBM's rumored plans to release its own VM-based proprietary operating system.

With AT&T and IBM facing off in the multiuser, multitasking 16- and 32-bit future of microcomputing, Digital Research and Microsoft are working hard to preserve a position for themselves in what many analysts believe will be a Unix world. Those plans may be shaped by what Killen sees as the difference between the two companies: "Microsoft has the marketing, while Digital Research has more technicians."

Both vendors are working on what will eventually be a full integration of CP/M, DOS and Unix system environments, according to Fertig. In addition, both vendors have worked hard to court Japanese, Taiwanese and other foreign vendors in an attempt to make their operating systems the primary ones for microcomputers entering the U.S. market.

Moreover, Digital Research and Microsoft also provide language and compiler products. "Digital Research has good business in compilers, running on either CP/M or MS-DOS," said Mac Lewis, president of Systems Center, Inc. in Irving, Texas. "There are a lot more people buying compilers than is generally recognized."

Although neither Digital Research nor Microsoft has shown any interest in pursuing larger system markets, Strategic believes that this will change in a few years as both discover opportunities to move their programming language products (implemented in C) to other Unix systems, which traditionally comprise larger systems. In particular, Strategic predicts computer manufacturers of all sizes will be interested in having Microsoft's Xenix enhancements for their systems.

Other opportunities ahead for the two competitors include meeting expected user demand for functions such as voice input, artificial intelligence in system and application software, more elaborate graphics, extreme simplicity of command structure and programs that teach themselves and provide detailed assistance when required, according to Strategic.

"The greatest challenge facing Microsoft and Digital Research is to keep up with new software technologies in the face of mounting competition and to balance what can be done with what current systems can support and what users are willing to pay," Strategic concluded.

Digital Research challenged

One of the fathers of the generic — hardware-independent — micro operating system, Digital Research, Inc., has gone from total control of the 8-bit segment of the microcomputer operating systems market to second-best in the 16-bit segment of that market. And with the industry on the edge of creating a 32-bit, multiuser, multitasking standard, Digital Research may be facing its toughest challenge yet.

Although Digital Research was commonly viewed as having the 8-bit market sewn up with CP/M, IBM seriously snagged any dreams that Digital Research may have had for dominance of the 16-bit market when it endorsed Microsoft, Inc.'s MS-DOS for the IBM Personal Computer.

According to industry observers, IBM approached both vendors, but only Microsoft was willing to acquiesce to IBM's terms. Today, 90% of the 16-bit machines sold reportedly run under MS-DOS or its look-alike, IBM's PC-DOS.

"IBM talked to both, but Microsoft put together a package that suited IBM, including a few million for the license [for MS-DOS]. IBM got it for nothing," said Michael Killen, president of Strategic, Inc. "Digital Research didn't want to [suit IBM] and was a little narrow-minded in terms of what [IBM's endorsement] meant in the long run."

Although IBM later licensed Digital Research's 16-bit offering, CP/M 86, for the Personal Computer, that came much later, at a much higher price.

These same observers believe Digital Research has been playing catch-up ball ever since Microsoft eclipsed CP/M 86 with MS-DOS via the IBM endorsement. A recent report, "Digital Research/Microsoft — The Key Issues," by Strategic, is very critical of Digital Research's strategy and suggests that unless the vendor develops a coordinated plan of attack, it may be reduced to little more than a substitute player.

At least one consultant has gone on record as having said that in order to survive in the 16-bit world, Digital Research must recognize MS-DOS as the de facto standard and move toward compatibility with that system, which Digital Research has been trying to do. For example, it has a built-in DOS switch in its Concurrent CP/M 86 and is working on a Concurrent DOS operating system.

Another step in this direction is thought to be Digital Research's an-

See CP/M page 16

Weeds in Microsoft garden?

Microsoft, Inc. is the No. 1 vendor of 16-bit microcomputer operating systems, with a 90% market share and Xenix, a popular Unix look-alike that has made it the leading independent Unix software house, according to the market research firm Strategic, Inc. of San Jose, Calif.

Nonetheless, it will find competing in a Unix-dominated marketplace no bed of roses.

It was a nod from IBM that allowed Microsoft to overtake Digital Research, Inc. in the 16-bit microcomputer operating systems arena; when IBM endorsed Microsoft's MS-DOS for the Personal Computer, software writers lined up to develop programs compatible with MS-DOS. Not content to rest on its laurels, Microsoft developed its own version of Unix, dubbed Xenix.

Given its current market share and IBM's interest in Xenix, one might think Microsoft's place is assured in the multiuser, multitasking microcomputer operating systems marketplace. But according to industry analysts, there are a number of weeds that could sprout in Microsoft's garden of success and choke its position of dominance.

Despite MS-DOS's current and continued popularity in the single-user, 16-bit operating systems marketplace, MS-DOS as it now stands is not appropriate for IBM's plan to interlink Personal Computers, according to some analysts. Although Microsoft has been promising a multiuser upgrade to MS-DOS, users and vendors have grown tired of waiting, asserted Michael Killen, president of Strategic, Inc.

Microsoft is also expected to push Xenix heavily. "Xenix could offer a gateway between Personal Computers and other IBM systems," said George Colony, managing director of Forrester Research, Inc.

But research analyst Kenneth Lim of Dataquest, Inc. disagrees. "At one time, Xenix had a better chance of doing it, but IBM has moved away toward its own version of Unix," he said.

Xenix could run into several problems. First, it needs to be upgraded to Unix System V. Second, in addition to competing with Unix, it will have to compete with IBM's PC/IX and any other proprietary operating system that IBM may introduce.

Strategic's report noted that "if IBM were to create its own operating system for microcomputer products with MS-DOS compatibility or

See MS-DOS page 16

SYSTEMS from page 14

its features are a hierarchical file system, networking, on-line documentation, high-level languages and computer-aided instruction, to name a few.

Many analysts agree Unix is well-suited for the 32-bit environment. Lewis suggests a likely entry point for Unix would be a $20,000 system with 10M to 20M bytes of hard disk storage and 512K to 1M byte of memory. However, the publisher and editor of the "Unique" newsletter for Unix users, David Fiedler, thinks the $8,000 to $12,000 range is more realistic.

Chris Christiansen, who is also an analyst with The Yankee Group, thinks Unix is "the only viable alternative" for users who can't handle VM, but want to move beyond Microsoft's single-user MS-DOS system. Furthermore, he said, small vendors and developers can't afford the investment required by VM.

But Unix is not without its problems, according to even those analysts who give it the nod as the next microcomputer operating system standard. Its biggest problems are that it is difficult to use for nonprogrammers and non-DPers (Unix has earned a reputation as an operating system loved by programmers, but loathed by applications developers), it is not business-oriented enough and it requires an enormous amount of memory.

Moreover, few analysts believe there is a need for Unix at the 16-bit level, and most claim there is little Unix-based software for small micros. Kenneth Lim, a research analyst with Dataquest, Inc., maintained, "Unix has no importance in the micro market," primarily because the powerful and sophisticated system has yet to prove itself in the business environment.

Unix System V and VII, the two latest upgrades, have done little to alleviate this problem. Lewis said the two versions do not offer record locking and that multiuser business applications are difficult to run under Unix. Nonetheless; Unix is an idea whose time has come, Fertig said. And once AT&T unveils its promised 32-bit office system, even more attention will be focused on Unix.

The system is based on AT&T's 3B series of superminis, which runs under Unix [CW, Oct. 31]. According to "Unique," the series will run on Unix System V or System V Release 2, an upgrade the newsletter said will soon be released offering "better and more communications and networking support, but no file or record locking." The end-user price will be from $8,000 to $20,000, the newsletter predicted.

The strategic moves of the two giant competitors will not necessarily be the determining factor in the battle of the operating systems. Analysts are quick to stress that software houses and third-party developers could hold the winning hand. IBM and AT&T will have to expend a considerable effort courting this segment of the market and providing it with applications tools to make its job easier.

Remember the Seminar of 1776?

If Computers Existed 200 Years Ago, These Men Would Qualify as Seminar Leaders for Technology Transfer Institute

BENJAMIN FRANKLIN

As developer of the Post Office would discuss office automation and electronic mail.

ALEXANDER HAMILTON

Electronic banking and transfer of funds.

JOHN HANCOCK

Encryption and security.

THOMAS JEFFERSON

The inventor of indoor plumbing would discuss local area networks.

YOU WON'T FORGET THE SEMINARS OF 1984!

When you need to learn about a specific subject within the computer/communications and data processing industry, you really should learn from an expert. As those men were so considered 200 years ago, so will our speakers be 200 years from now. Call or send for our newest Spring 1984 brochure outlining all of our offerings. We urge you to attend one of our seminars and discover why TTI seminars have become the standard in the field against which others are measured.

Call or write for further information: (213) 394-8305

Please send me more information on the seminars I have checked

- ☐ Database: A Manager's Guide — HOLLAND — Los Angeles March 19–21, 1984; Toronto April 9–11, 1984; New York May 7–9, 1984
- ☐ Database: A Builder's Guide — HOLLAND/COLE — San Francisco April 2–5, 1984; New York May 21–24, 1984
- ☐ Implementation of Database Systems — GOMEZ/GOODMAN — Boston April 23–25, 1984
- ☐ Relational Data Base — CODD/DARNOVSKY — San Francisco April 30–May 2, 1984
- ☐ Executive Strategies for the Information Age — HOLLAND — Washington D.C. May 15, 1984
- ☐ Information Center Software Selection — ATRE — San Francisco May 21–23, 1984
- ☐ Operating Systems and Computer Applications — KLEINROCK — Washington D.C. April 3–6, 1984
- ☐ SNA — MARKOWITZ/GOMEZ — Washington, D.C. April 23–25, 1984
- ☐ Experts on Networks — KLEINROCK/GOMEZ/ROBERTS — Washington, D.C. Apr 30–May 3, 1984
- ☐ Strategic Planning for Telecommunications — McCULLAN/GUEST — Washington D.C. May 7–9, 1984
- ☐ The Integrated Value-Added PBX — CROCKER — Washington D.C. May 21–23, 1984
- ☐ IBM MVS I/O Configuration Management — ARTIS/GUSEK — Los Angeles March 26–28, 1984
- ☐ Structured Techniques for Fourth Generation Languages — McCLURE — Washington, D.C. April 2–4, 1984
- ☐ Capacity Planning — GIZZO/GOODMAN/KORNETSKY — New York April 9–11, 1984
- ☐ Controlling Software Projects — DeMARCO/LISTER — Los Angeles April 9–11, 1984; New York June 11–13, 1984
- ☐ The Micro-Mainframe Connection — McCULLAN/MADNICK — New York April 23–25, 1984
- ☐ Evolving to Electronic Banking — SVIGALS/LOMB — Washington, D.C. May 14–16, 1984
- ☐ Strategic Planning for Office Automation — WOHL/MORGAN — San Francisco May 14–16, 1984

NAME

COMPANY NAME

ADDRESS

CITY/STATE/ZIP

TELEPHONE CW 2684

TECHNOLOGY TRANSFER INSTITUTE
741 10th Street, Santa Monica, CA 90402

CP/M from page 14

nouncement of GSX software for MS-DOS and PC-DOS. GSX is Digital Research's graphics package, which is based on the proposed Graphical Kernel System that it is trying to push as a graphics standard, according to analysts, who are generally positive about the software. In the meantime, in addition to its 16-bit operating system, CP/M 86, Digital Research has brought out CP/Net; Concurrent CP/M for multitasking, single-user operations; and MP/M for multiuser, multitasking environments.

Perhaps with the adage, "If you can't beat 'em, join 'em," in mind, Digital Research seems to be taking moves to strengthen its position in a Unix world. It has working agreements with two chip makers, Intel Corp. and Motorola, Inc., the latter announced at the Uniforum International Conference of Unix Users two weeks ago [CW, Jan. 23].

At Intel, Digital Research has taken over a project previously handled by Microsoft — porting Unix System V to Intel's 80286 chip. Fertig believes that as a result of this arrangement, Digital Research may be able to gain a dominant position in the 16-bit marketplace.

MS-DOS from page 14

if AT&T were to change licensing terms drastically for Unix, Microsoft could lose a major market share and a large fraction of its income."

Third, analysts do not expect IBM to endorse any particular version of Unix, but rather to allow its machines to run on everything. "Recent moves indicate that IBM will not support one operating system or another in the way that it did with MS-DOS," according to Barbara S. Isgur, a microcomputer analyst for Paine, Webber, Mitchell & Hutchins. "Instead, IBM will let the market sort it out." This means Microsoft cannot expect to get the same boost for Xenix that it got for MS-DOS from IBM.

Possibly as part of its Unix strategy, Microsoft has released Version 3.0 of MS-DOS, a C-code implementation of MS-DOS, complete with Unix-like features. The planned upgrades will move MS-DOS closer to Xenix. "Microsoft is well aware that the key to holding onto both markets is maximum application portability and evermore added value. The enhancements that Microsoft is making to both MS-DOS and Xenix are not available anywhere else and will not be for some time," the Strategic report said.

COMPUTERWORLD READER QUIZ

YES	NO	
☐	☐	1. Is *Computerworld* on your desk every Monday morning?
☐	☐	2. Do you receive *Computerworld On Communications* and *Computerworld Office Automation* every other month?
☐	☐	3. Do you know about the latest job position announcements? (when you've still got time to send your resume)
☐	☐	4. Can you rely on *Computerworld Buyer's Guides** for product information? . . .
☐	☐	5. Do you know the very latest news in the computer field?

If you've answered **NO** to any of the above, you're probably reading someone else's issue of *Computerworld.* Don't you need your own? When you're a subscriber, we'll guarantee that *Computerworld* is on your desk every Monday morning. And, what's more, as part of your subscription, you'll receive all of our special-focus publications.

Now's your chance to say YES! Subscribe today for a full year of Computerworld at our special introductory rate of $39 (save $5 off the $44 annual subscription rate).

Complete Form On Reverse, Then Return In Attached Postage-Paid Envelope. Or Use Your Charge Card and Call TOLL-FREE: 1-800-343-5730.

☐ **Please enter my subscription (details on back)**

☐ **I'm already a subscriber, but I'd like you to change my:**

☐ address ☐ title
☐ industry ☐ other

Put old label or label information here

My current mailing label is attached and I've filled in new information on the other side.

COMPUTERWORLD

*U.S. Only

CW-138

Please send me COMPUTERWORLD for one year. RATES: United States ~~$44~~;
Canada, Central & South America $110; Europe $165;
All Other Countries $245 (Airmail Service)

Special Introductory Offer—
Only $39.00 Save $5.00

☐ Check Enclosed
☐ Am Ex ☐ BA/Visa ☐ MC (MC Only: List four digits above your name)

If charge we must have cardholder's signature: _____ Expiration Date: _____

First Initial	Middle Initial	Surname	
Your Title			
Company Name			
Address			
City		State	Zip Code

Address shown is:
☐ Business
☐ Home

☐ Check here if you do not wish to receive promotional mail from *Computerworld*.

☐ Check here if you're interested in receiving information on *Computerworld's* Index.

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

CIRCULATION DEPT. 375 Cochituate Road, Rte. 30, Box 897,
Framingham, MA 01701-9985

Detach here, moisten and seal envelope securely before mailing.

1. BUSINESS/INDUSTRY (Circle One)
End Users
10 Manufacturer (other than computer)
20 Finance/Insurance/Real Estate
30 Medicine/Law/Education
40 Wholesale/Retail Trade
50 Business Service (except DP)
60 Government—State/Federal/Local
65 Public Utility/Communication Systems/Transportation
70 Mining/Construction/Petroleum/Refining
75 Other User _____
Vendors
80 Manufacturer of Computers, Computer-related Systems or Peripherals
85 Computer Service Bureau/Software/Planning/Consulting
90 Computer/Peripheral Dealer/Distributor/Retailer
95 Other Vendor _____

2. OCCUPATION/FUNCTION (Circle One)
11 President/Owner/Partner/General Manager
12 VP/Assistant VP
13 Treasurer/Controller/Financial Officer
21 Director/Manager/Supervisor DP/MIS Services
22 Director/Manager of Operations/Planning/Administrative Services
23 Systems Manager/Systems Analyst
31 Manager/Supervisor Programming
32 Programmer/Methods Analyst
35 OA/WP Director/Manager/Supervisor
38 Data Comm Network/Systems Mgmt
41 Engr/Scientific/R&D/Tech Mgmt
51 Mfg Sales Reps/Sales/Marketing Mgmt
60 Consulting Mgmt
70 Medical/Legal/Accounting Mgmt
80 Educator/Journalist/Librarian/Student
90 Other _____

3. COMPUTER INVOLVEMENT (Circle all that apply)
Types of equipment with which you are personally involved either as user, vendor or consultant
A. Mainframes/Superminis
B. Minicomputers/Small Business Computers
C. Microcomputers/Desktops
D. Communications Systems
E. Office Automation Systems

CW-138

Programs help DP managers deal with staffs

By Robert Batt
CW West Coast Bureau

PALO ALTO, Calif. — A new series of software programs that reportedly enable senior managers to deal more effectively with their subordinates and peers is the center of increasing attention from computer users.

The three programs — The Management Edge, The Negotiation Edge and The Sales Edge — elicit from the user information about himself, the situation involved, the goal and the opponent or employee. Manufactured by Human Edge Software Corp., a newly formed company here, the packages run on microcomputers manufactured by IBM and Apple Computer, Inc. and on IBM-compatible microcomputers. The programs are the brainchild of Human Edge Software's co-founder, James Johnson, a clinical psychologist and former project director at IBM.

Using elements of psychological testing, game theories and expert systems, The Management Edge, for example, conducts a "dialogue" with the end user to elicit the fine points of strategy and to construct tactical plans that are customized to the user, client or setting.

The information is presented to the user in the form of a printout that "walks" him through the proper scenario to achieve the resolution of the problem.

"The Management Edge was very useful in determining what approaches I should take in dealing with particular situations," explained Robert Spiegelman, recently appointed director of the Kalamazoo, Mich.-based W.E. Upjohn Institute for Employment Research. "It showed me that I needed to act in a more confident, informal and interactive manner than I was used to. As a result, I have become much more accessible to the people I work with."

Spiegelman, former director of the Social Economic Research Center at SRI International, Inc., said that The Management Edge proved particularly useful in boosting a project on the employment implications of robotics, which had been moving very slowly.

The Negotiation Edge

Working with The Negotiation Edge, a manager answers a number of basic questions about himself, the other individual involved in the situation and the environment, and then he states his objectives. The computer then produces a step-by-step strategy comprised of opening bids, counteroffers, strategies for working with the other person, methods of countering objections and closing techniques.

According to Hal Ditmer, a partner and principal in the San Francisco consulting firm Sierra Resource Group, The Negotiation Edge was critical in a recent joint venture deal. "The program was very helpful in identifying the other person's personality traits. It showed me that the negotiation called for a logical, detached approach which appealed to the other person's intelligence and enabled him to make the offer.

"As a result, he made a proposal that I was amazed at," Ditmer said.

In another case, Bob Honig, marketing sales director of Silicon Valley, Calif.-based Victor Aviation Services, Inc., used The Sales Edge program to make major aircraft engine sales. "I use the package when I think I may have a stumbling block with a particular customer. I am able to build up a profile of the client and work out various strategies for closing a sale.

"Recently, I used the program to make a sale to the president of a local flying club. If I had used my normal routine, I would have scared the customer off because of his particular personality. By using the program, I was given essential ideas on how to succeed with him.

"I always follow the recommendations of the program to a tee," Honig added.

According to Human Edge Software, which put a $250 price tag on each of the three programs, no prior skill in computers is required to use the programs, and the entire interaction usually takes no more than 30 minutes.

"The Management Edge offers a new method of understanding and communicating with co-workers, subordinates and superiors by presenting expert management advice that can enhance the user's overall performance," Johnson said.

More self-help software

WOODLAND HILLS, Calif. — A psychologist here has developed four self-help programs for people experiencing psychological problems: "Handling Relationship Problems," "Coping with Stress," "Handling Depressed Feelings" and "Treating Sexual Problems."

"Many people who need help don't pursue it because they can't afford counseling or are too embarrassed to admit that they need it," said Dr. Robert Eeitman, the developer. "Personal computers alleviate these problems."

After the user enters data on menu-driven screens, each program helps to identify feelings or beliefs that create the problem and offers guidance to help solve it, according to the vendor of the software, Psycomp, Inc.

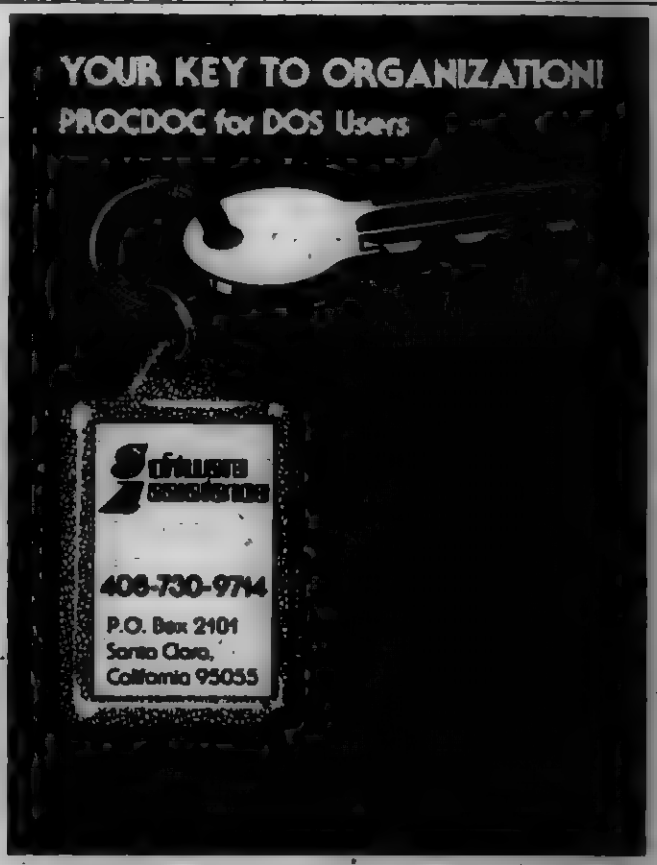
"These programs are not designed to correct serious psychological problems," said Nick Barnett, a Psycomp spokesman.

"They help cure minor problems or can be used with other psychological tools to treat serious problems," he said.

The programs, which cost $89.95 each, run on the Apple Computer, Inc. Apple IIe or the IBM Personal Computer, according to a Psycomp spokesman.

Psycomp, Inc. is located at Suite 101, 22035 Clarendon St., Woodland Hills, Calif. 91367.

YOUR KEY TO ORGANIZATION!
PROCDOC for DOS Users



408-730-9714
P.O. Box 2101
Santa Clara,
California 95055

Rough writer.

In the business machine torture chamber most of us call the office, one word processing printer shows true grit. We build our DP-Series daisywheels to keep turning out letter-perfect documents month after month. In the face of adversity, and in the hands of a secretary. Call your printer distributor. Or contact Dataproducts at (213) 887-3924, 6200 Canoga Avenue, Woodland Hills, CA 91365. In Europe, 136-138 High Street, Egham, Surrey, TW 20 9HL England.

Dataproducts Daisywheel Printers

Program tracks bid-rigging for Minnesota

By Paul Hemmesheimer
CW Staff

ST. PAUL, Minn. — The Antitrust Division of the Minnesota attorney general's office is using a computer program to evaluate highway construction contracts for evidence of bid-rigging.

Minnesota awarded $213.4 million worth of state and federal highway construction contracts in 1983. "Previously, the only way to track bid-rigging was a hit or miss approach," said Mark Steadman, an investigator in the antitrust division. "It was difficult to sort the volume of contracts written. Randomly, we would search files for cases of grossly disproportionate pricing. This program provides an organized approach. It helps us collect, analyse and interpret data."

The program produces statistical reports from parameters entered by investigators and a data base storing contract information. "The reports eliminate cases where pricing is reasonable and help identify construction projects with possible bid-rigging," explained Steven Kilgriff, an assistant attorney general. "Since installing the system 14 months ago, the number of cases under investigation has increased dramatically."

No charges yet

But no one has yet been charged with bid-rigging, which generally occurs when two or more contractors agree in advance who will win a public construction contract. "The computer is a useful tool for identifying possible bid-rigging cases," Kilgriff said. "Proving that bid-rigging occurs is an involved, time-consuming process." Nevertheless, "while I can't point to actual indictments since we began using the system, I will say that we have worked more efficiently and effectively since the program was installed. There are more cases under investigation now than there were previously."

The program was designed by the Massachusetts attorney general's office with funds from the U.S. Justice Department. "In 1981, our office became interested in the program," Kilgriff said. "The Mass. attorney general's office gave us the program. Currently, there are approximately 20 states using the program."

The Minnesota attorney general's office uses a Control Data Corp. Cyber 170/835 mainframe-based, time-sharing system residing at the University of Minnesota. Tailoring the program for Minnesota cost less than $5,000, according to the attorney general's office. "Time saved using the system paid for the original investment," Kilgriff said.

NETWORK HEALTHCARE

DATA COMMUNICATION NETWORKS AREN'T LIKE PEOPLE BUT...

One thing's for certain. Poor advice early in the design stage, the wrong equipment, or inadequate product support could make your network very sick.

We can help prevent that. Meet ComDesign's data comm "doctors". They are a group of dedicated, service oriented data communication specialists. Talented, qualified, and helpful, they dispense the application engineering answers that will keep your network in the pink. For large networks or small. And you don't have to be a ComDesign customer to take advantage of this service. As a matter of fact, you'll never even need an appointment. Just use the **toll-free** number below. The doctor's always in.

(800) 235-6935
(805) 964-9852 in CA

ComDesign
751 S. Kellogg Ave. Goleta, CA 93117

Manufacturers of Advanced Statistical Multiplexers and Other Networking Products

Bank meet set for L.A.

LOS ANGELES — James Wiesler, vice-chairman of the Bank of America, will deliver the keynote address for Expo '84, the Electronic Banking Conference and Equipment Exposition. The conference, sponsored by the Bank Marketing Association, Western Chapter, and co-sponsored by the Inter-Financial Association, will be held March 4-7 at the Hyatt Hotel here.

The conference will focus on the latest developments in electronic funds transfer and will feature more than 50 speakers participating in 43 separate educational sessions.

Registration is $465 for the first registrant and $385 for additional registrants.

More information is available from The Bankers' Institute, 21 Tamal Vista Blvd., Corte Madera, Calif. 94925.

Only Lee Data's Universal Terminal System can satisfy all of your information processing needs... 3270, Async and personal computing.

Finally, there's a single, universal way to satisfy the individual information processing needs of all your people. From sales manager to accountant. From research to production. The Lee Data Universal Terminal System can do it all.

And our system is modular by design to provide you any or all of these cost-effective, problem-solving advantages:

3270-compatibility *plus more*

Combine complete 3270 system-compatibility with an innovative Lee Data design and you have a System that delivers greater convenience and flexibility.

Our System not only offers standard 3274-compatible local and remote control units, but now also provides combination local/remote controllers with a unique dual-host access capability.

In addition, you can choose from a full line of terminal capabilities, beginning with our cost-effective 3178-compatible display on up to our popular All-In-One Display which offers, in a single unit, four selectable screen sizes—including 132-column—a great advantage in program development, spread sheet applications and many others where flexibility is required.

3270-plus-Async: another cost-effective advantage

If your application needs currently find you switching between 3270 and VT100-style terminals to get the job done, Lee Data has a better way.

As part of our System, you can enjoy the further advantage of a 3270/Async capability that allows dynamic selection of 3270 and VT100 operating modes from a single Lee Data display. A simple command entered at the keyboard provides you access to applications running on an IBM CPU, non-IBM systems (such as DEC, H-P or Prime), as well as timesharing services. Another Lee Data solution to simplifying your company's terminal network.

And now integrated personal computing too

That's right! Now our System also includes a sophisticated personal computing package that can easily be integrated into an existing Lee Data 3270 system.

With our approach, you get continued interactive access to host-based files, plus all the advantages of professional business computing from the same Lee Data workstation.

Advanced features include a host file transfer capability, a single-board design, four standard system expansion slots and, of course, complete IBM-compatibility.

All these additional capabilities plus the same user-friendly Lee Data displays.

Plus these added benefits...

To any Lee Data System, add our unique Coax Eliminator products and realize additional savings of up to 85% in cabling costs alone.

Combine this with all the outstanding features already mentioned and you'll find a System offering everything you need for efficient, cost-effective operation.

Discover the advantages of our Universal Terminal System for yourself. For more information, call our system specialists toll free:

800/328-3998

Designers of innovative systems for the information worker

LEE DATA CORPORATION

7075 Flying Cloud Drive
Minneapolis, MN 55344
TWX 910-576-1690

See us at Booth #130 at the 1984 Office Automation Conference

"First Chicago is launching a whole world of new banking services with ***Tandem NonStop Computer Systems.***"

Donald R. Horton
Head - Systems and MIS
First Chicago Corporation

At The First National Bank of Chicago, providing responsive, on-line financial services for our customers is a major corporate priority. An important part of that commitment is the global implementation of core applications on Tandem NonStop Computer Systems.

Utilizing a common database structure on systems distributed throughout the world provides immediately useable information uniquely suited to internal reporting and accounting. Included are such time sensitive items as foreign exchange and money market transactions, loan contracts and SWIFT transfers. We call this system F.I.R.S.T. (First Chicago International Real-time System for Transactions).

Tandem systems also support our installed and expanding consumer and commercial funds transfer, balance reporting, and cash management systems, which move billions of dollars for our customers daily. Our Cash Station ATM switch is an excellent example. The modular nature of the Tandem solution enables us to sustain and improve quality by adding such capabilities incrementally, where and when they're needed.

The Tandem systems are on-line in sixteen financial capitals around the world. And they are very reliable. We continue to be impressed with the systems, the support and with our employees' enthusiastic acceptance. They are helping us improve customer service.

The NonStop System.

The only computer on the market today that can provide an integrated network of up to 255 processor systems supporting thousands of terminals in an on-line, transaction-based environment.

Tandem. Fully supported by worldwide sales, training, service and manufacturing organization.

For more information on the Tandem application at First Chicago and a copy of our brochure, "Solutions in Banking," contact your local sales office or Tandem Computers Incorporated, 19333 Vallco Parkway, Cupertino, California 95014. U.S.A. Toll Free 800-482-6336.

TANDEM

NonStop Transaction Processing

EUROPE and U.K.

ITALY

SWITZERLAND

WEST GERMANY

FAR EAST

JAPAN

Planning for XA
Taking the Trauma Out of Conversion

TechTran announces a one-day briefing designed as an unbiased analysis of the impact of XA in IBM MVS and OS/VS1 installations. Explore the motivation behind converting to XA and its potential benefits and risks.

Learn what you can do today to make the transition as painless and cost effective as possible.

Locations and Dates

Stamford, CT	March 12	Toronto	March 14
New York	March 13	San Francisco	March 16

For further information and a TechTran brochure, contact Art Solomon. **TechTran** (203) 348-4412
a subsidiary of Gartner Group

NEWS

Fose '84 slated for March 19-22

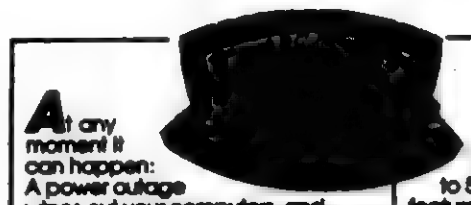
WASHINGTON, D.C. — The Eighth Annual Federal Office Systems Expo (Fose '84) will take place March 19-22 at the Convention Center here. Conference organizers expect conference and show participants to include office automation decision makers from both the federal and the commercial sectors.

Fose '84 will feature hands-on activities as well as lectures. Included will be a personal computer center, where registrants may experiment with personal computer hardware and software, and the Office Automation Game, where up to 125 people can practice management "game plans."

The first day will be set aside for 10 conference sessions, at a one-day cost of $150. The four-day conference will cost $375 for registrants signing up before Feb. 10 and $395 after then.

The show portion of the expo will run from March 20-22 at a cost of $95 per day. Registration is free until Feb. 25 and is $15 at the door.

More information is available from the show organizer, National Trade Productions, at 9418 Annapolis Road, Lanham, Md. 20706.



At any moment it can happen: A power outage wipes out your computers, and when it does, you lose big—in time, money and in important data.

What's more, power fluctuations are not only a problem for computers, but for many other types of sensitive electronic equipment. Telecommunications systems, security equipment, process-control devices and laboratory instruments—all rely on clean, continuous power.

Elgar has the solution—an Uninterruptible Power System (UPS) that provides total protection against out-of-the-ordinary power conditions for your AC line. In addition to blackout protection, an on-line UPS constantly filters the utility and regulates the output voltage, eliminating virtually every power line problem without interruption or switching.

Available in models ranging from 400 VA to 25 kVA single-phase and 10 to 50 kVA three-phase. Elgar UPS feature full kVA load rating from 0.7 lagging to 0.9 leading P.F. All three-phase and single-phase units rated 15 kVA and higher include a full electronic static switch as a standard feature. Other models are available with the static switch as an option.

Elgar can deliver the right system for you—from the Mini-UPS, designed primarily for low power applications such as microprocessor-based systems, data acquisition equipment and smaller microcomputers—to the large 50 kVA UPS employed with large data processing equipment or other sensitive systems.

To put it simply, when you order a UPS from Elgar, we'll deliver complete, continuous power from clean-up to back-up—and a much rarer commodity: peace of mind.

This sight strikes terror in the hearts of all computers.

Powerful Solutions for Advanced Technology

Call today for complete information:
1-800-854-2213

ELGAR
An Onan/McGraw-Edison Company
8225 Mercury Court
San Diego, California 92111
Telephone (619) 565-1155
TWX: 910-335-1246 Telex: 6834028

AUUA meet to be held in Nashville

NASHVILLE — More than 90 work sessions are being planned for the four-day spring conference of the American Unibank Users Association, Inc. (AUUA), which will be held at the Hyatt Regency here March 19-22.

AUUA is a group of about 1,000 computer user companies throughout the U.S. and Canada that holds semiannual conferences for the purpose of exchanging information in the data processing field.

A keynote speaker has yet to be announced, but common interest groups — education, management "game plans," state and government — and product line groups will be featured.

The conference registration fee is $150 before March 5 and $180 after that date. More information is available from Gail DeLaurier, Small Business Administration, 5906 Bedford Lane, Clinton, Md. 20735.

ACM meet scheduled

CHICAGO — The Association for Computing Machinery's (ACM) North Central Regional Conference on March 22-23 will focus on strategies for integrating microcomputers and mainframes in a work setting. Hosted by the Chicago Chapter of ACM, the conference will be held at the Midland Hotel in downtown Chicago.

Cost of registration is $300. More information is available from Sharon Pyrce Kaminecki, Conference Chairwoman, North Central ACM '84, P.O. Box 2381, Chicago, Ill. 60690.

"IDMS/R represents a major advance in database technology."

Dave Litwack*

David Litwack is Cullinet's Vice President of Product Development. Mr. Litwack has contributed significantly to the many technical advances Cullinet has achieved in database software products, including IDMS/R. Mr. Litwack joined Cullinet in 1976. He is a Cum Laude graduate of Brandeis University and holds a Masters in Computer Science from Boston University.

Because IDMS/R is the first relational DBMS designed for both the DP professional and the end user.

IDMS/R is not only a relational database management system, but a particularly powerful one. IDMS was made relational by removing all pointers and allowing the user to define data as tables and providing the traditional relational operators such as selects, projects and joins. The major benefit of a relational DBMS is the capacity to develop applications faster because the developer does not have to be concerned with the database design. IDMS/R provides this and much more.

For example, the Automatic System Facility (ASF) of IDMS/R is a major advance over fourth generation languages. The ASF is so comprehensive and easy to use that all a user need do, to develop an application, is define a relational record. The Automatic System Facility dynamically generates all necessary supporting structures including data definitions, screen formats, application processing logic, and documentation. So, the developer can witness the application being produced, literally, in seconds. This capability makes IDMS/R the perfect system for the end user.

Data processing professionals can use the ASF to help develop production applications. The ASF can be used to build a prototype that can be enhanced, using Cullinet's fourth generation language, ADS/OnLine, into a complex production application. But, when they build a complex high volume application using IDMS/R, DP professionals require outstanding performance. Typically, 5% of the data relationships (joins) in any application are accessed 95% of the time. With IDMS/R, they can simply change these relationships to predefined joins and benefit from a dramatic boost in performance. We call it Relational Fastpath. Relational Fastpath makes IDMS/R a unique DBMS and a perfect system for DP professional's system development needs.

In addition, IDMS/R has the most sophisticated back-up and recovery capability of any DBMS, full integration with personal computers and is also integrated with Cullinet's complete line of financial and manufacturing applications.

In summary, IDMS/R was designed to satisfy the requirements of those who want to develop applications faster and those who have the responsibility of processing them.

For further information, attend a Cullinet Seminar. Mail the attached coupon or call the Cullinet Seminar Center at 1-800-225-9930 (in Massachusetts, 617-329-7700).

IDMS/R Seminar cities and dates

City & State	Date	City & State	Date	City & State	Date
Albany, NY	Mar 13	Ft. Worth, TX	Mar 15	Ottawa, ON	Feb 21
Allentown, PA	Mar 1	Greenville, SC	Mar 6	Philadelphia, PA	Feb 8
Atlanta, GA	Feb 15	Hartford, CT	Feb 14	Pittsburgh, PA	Feb 29
Arlington Hts., IL	Feb 23	Indianapolis, IN	Feb 21	Portland, ME	Feb 21
Augusta, GA	Mar 14	Jackson, MS	Mar 15	Portland, OR	Mar 15
Austin, TX	Feb 14	Joliet, IL	Feb 9	Quebec City, PQ	Feb 15
Baltimore, MD	Feb 21	Kansas City, MO	Feb 22	Quincy, IL	Feb 29
Bloomington, IL	Feb 21	Lexington, KY	Mar 30	Raleigh, NC	Mar 30
Boston, MA	Mar 8	Little Rock, AK	Mar 13	Richmond, VA	Feb 8
Boston/ Westwood, MA	Feb 23	Los Angeles, CA	Feb 9	Rockford, IL	Feb 14
		Louisville, KY	Feb 16	Sacramento, CA	Feb 21
Bridgeport/ New Haven, CT	Mar 6	Madison, WI	Mar 15	St. Louis, MO	Feb 8
		Meadowlands, NJ	Mar 7	Salt Lake City, UT	Feb 21
Burlington, MA	Feb 9	Memphis, TN	Feb 23	San Antonio, TX	Mar 15
Charleston, WV	Feb 29	Miami, FL	Feb 16	San Diego, CA	Feb 23
Charlotte, NC	Feb 23	Milwaukee, WI	Mar 7	San Jose, CA	Feb 14
Chicago/ Rosemont, IL	Mar 20	Montreal, PQ (French)	Mar 14	Springfield, IL	Mar 5
				Syracuse, NY	Feb 14
Cincinnati, OH	Mar 21	Nashville, TN	Feb 16	Tallahassee, FL	Mar 1
Columbus, GA	Feb 28	New Orleans, LA	Feb 23	Toledo, OH	Feb 24
Columbus, OH	Mar 9	New York, NY	Feb 22	Tucson, AZ	Mar 20
Davenport, IA	Mar 13	New York, NY	Mar 20	Vancouver, BC	Mar 14
Des Moines, IA	Feb 16	New York/Rye, NY	Mar 13	Washington, DC	Mar 8
Detroit, MI	Feb 9	Oakland, CA	Mar 13	Wichita, KS	Mar 8
Detroit, MI	Mar 14	Omaha, NE	Mar 1	Winnipeg, MB	Mar 6
Edmonton, AB	Feb 15	Orange County, CA	Mar 6	Worcester, MA	Feb 16
Ft. Wayne, IN	Mar 6	Oshkosh, WI	Feb 28	York, PA	Feb 15

Visit us at Syscon, Feb 21–23, Booth #A1500.

I'd like to attend your seminar on _____ (date) in _____ (city)

Computer _____

Name/Title _____

Name/Title _____

Company/Department _____

Address _____

City _____ State _____ Zip _____

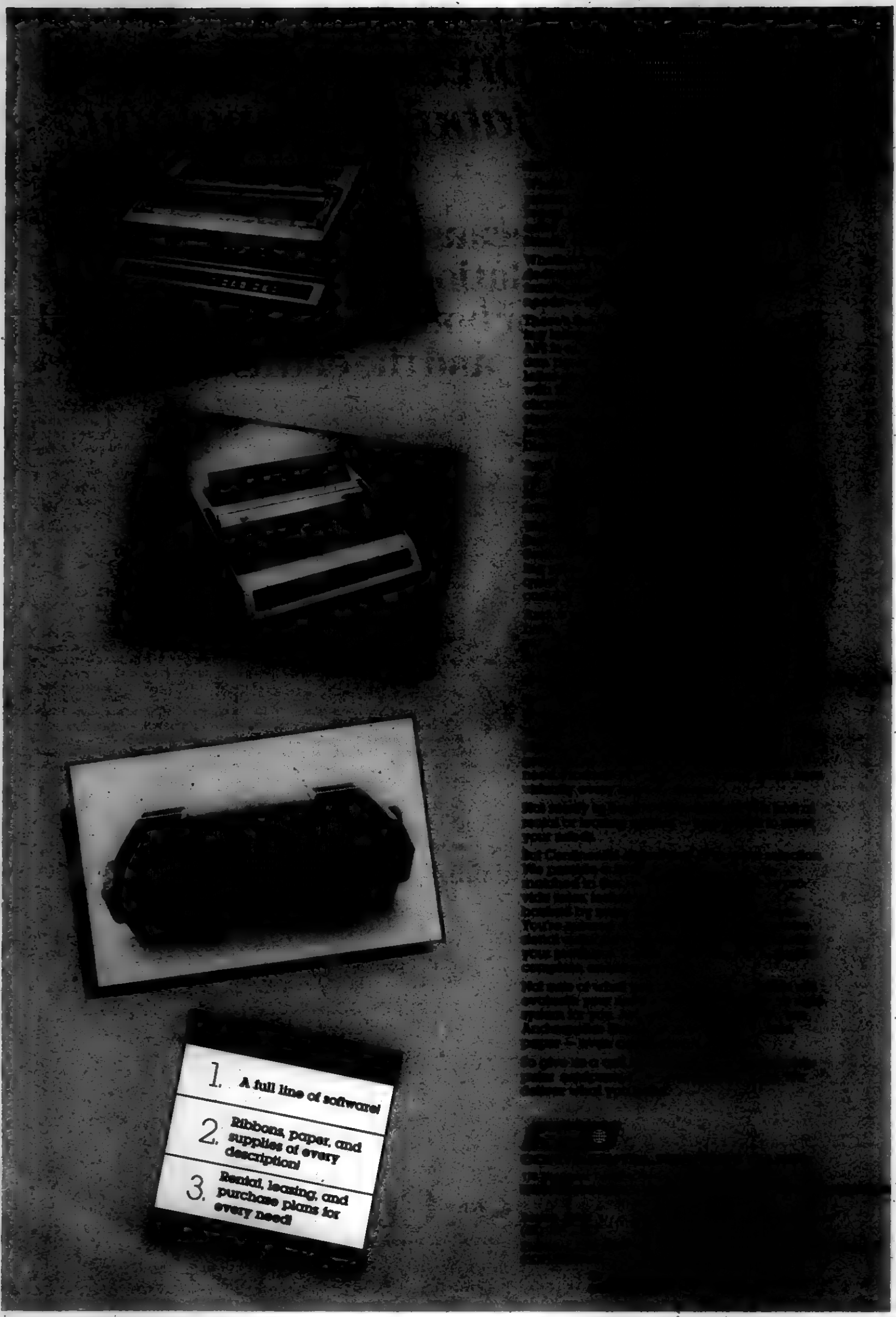
Phone ( ) _____

Mail to: The Cullinet Seminar Center, 400 Blue Hill Drive, Westwood, MA 02090-2198

Cullinet Software products are designed to run on IBM 360/370, 30XX or 43XX or plug-compatible computer systems. 2401W

Database: Cullinet

© 1984 Cullinet Software, Inc., 400 Blue Hill Drive, Westwood, MA 02090-2198


1. A full line of software!
2. Ribbons, paper, and supplies of every description!
3. Rental, leasing, and purchase plans for every need!

TURNAROUND TIME

LARRY LONG

Q I've been unhappy in my current position for the last two years. However, I've been reluctant to seek another job, primarily because of the cost of relocating.

I'm gaining good experience, but my current employer is top-heavy. If I stay here, I may never go past project leader.

Now with an upswing in the economy and lower interest rates, I'm feeling more confident about changing jobs. But before I polish up my resume, I would appreciate your thoughts on whether you think this is a good time to enter the job market.

A You are not alone. Thousands of computer professionals have been biding their time until the time is right to seek employment elsewhere. I would not be surprised if one out of five people in the computer career fields changes jobs by the end of the year.

I'm going to step out on a limb and predict a substantial increase in the demand for computer professionals by April or May. It will again be a seller's market for qualified, experienced professionals and to a lesser extent for recent graduates. The seller's market may only last through the summer, but every indicator points to increased activity for this marketplace.

An improved profit picture is causing companies to relieve hiring restrictions that have been in effect for as much as three years. The depressed economy, however, has had little effect on the demand for information services. Managers have continued to demand more and more services, but in many organizations the MIS head count has decreased.

The net effect of this imbalance in demand for services and MIS personnel is that companies are going to have to hire not only for 1984, but for 1982 and 1983. Openings are for new positions and for positions that were vacated and not filled.

Q Our college's development office recently informed us that funds have been made available to purchase 20 personal computers in each of the next two years. A committee of four, which I chair, selected the [name omitted] personal computer because it offered more memory and cost less than the other four micros evaluated.

Several department chairmen, the director of admissions and now the president of the college have expressed concern over our decision. They feel that we should have selected the IBM Personal Computer or one that is compatible with it.

If we order the personal computer we selected, we can get 20% more personal computer than if we ordered the IBM machine. The administration will not stand in our way, but do you think the extra hardware is worth the possible repercussions?

A I do not make hardware decisions in this column, but I will highlight a few points for your consideration.

One has only to pick up the latest business or computer periodical to get a feel for the enormous impact of the IBM Personal Computer. To a great extent, its success has stifled entrepreneurial innovation. Even major manufacturers are producing or planning to produce microcomputers that are, to varying degrees, compatible with the Personal Computer.

Like the hula hoop and pet rocks, the IBM Personal Computer is a phenomenon. This is reality. IBM has publicly announced its intention to increase substantially production of the machine. Also, the number of IBM-compatible personal computers is growing.

From a practical standpoint, I cannot help but share the concern of your college administrators. You must weigh the value of the additional hardware against the probability that your students will see either an IBM Personal Computer or a lookalike when they graduate.

Q I have 10 years of hands-on computer training and am solely responsible for processing and maintaining a utility billing and a payroll system. I had three days of on-the-job training and attended three week-long training seminars. I have not attended college, but I am definitely interested in both broadening my computer skills and in companies interested in helping me do so.

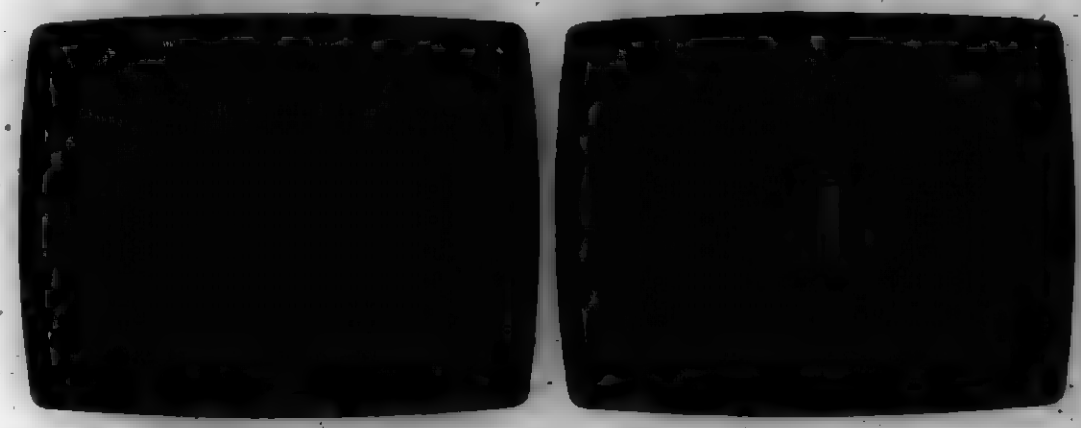
Would I be considered experienced? Do I have management potential? Are there companies out there looking for me?

A Certainly you have experience and, perhaps, even management potential. But realistically, in today's competitive environment, you will need a degree to leverage your experience into more advanced positions.

Data processing and computer science have become glamour careers and lured tens of thousands of people into degree programs. This dramatic increase in the number of people holding computer-related degrees has almost made possessing some kind of degree a requirement for DP management positions.

Long, president of Long and Associates, is a consultant, lecturer and author in the field of information services. If you have a question you'd like him to address, send it to Larry Long, Editorial Department, Computerworld, P.O. Box 880, Framingham, Mass. 01701.

INTELLECT.
NO SOONER SAID
THAN DONE.



To use INTELLECT, the natural language query system, all you have to do is ask—in everyday conversational English—and you'll retrieve. Immediately, in either text or full-color graphics.

INTELLECT, the world's only successful true natural-language query system, is an ideal tool for your information center. INTELLECT's powerful information retrieval capabilities are so advanced that it understands questions and responds with answers as if you were talking to a knowledgeable colleague. Executives access data themselves—more easily than ever before—without learning any technical jargon or "computerese." It's so easy to use, it doesn't even have a training manual!

Whether you use INTELLECT as a retrieval system or as an effective data analysis tool, it transforms raw data in the data base into information and presents it in finished color graphics in a matter of seconds. It's a live, dynamic interface that fully integrates your existing database and graphic systems.

Already hard at work in hundreds of organizations, INTELLECT is ideal for marketing, finance, personnel, manufacturing, and banking applications.

INTELLECT is an important technological breakthrough. You can learn more about it by attending one of our nationwide seminars. Or put its amazing power at your fingertips in minutes with one of our demonstration tapes.

Call or send coupon for more details. Look into INTELLECT, and be an eyewitness to the future of computing.

[illegible]
Tell me more about INTELLECT.
Name _____ Title _____
Company _____
Address _____
City _____ State _____ Zip _____
Telephone _____
Hardware Type _____ Info Center? _____
_____ Demo Tape _____ Seminar _____ Sales Presentation
ARTIFICIAL INTELLIGENCE CORPORATION
100 Fifth Avenue, Waltham, MA 02254 C-88

ARTIFICIAL INTELLIGENCE CORPORATION
100 Fifth Avenue, Waltham, MA 02254 617-890-8400

NEWS

Taiwan court sentences six for 'bad Apples'

By Patricia Keefe
CW Staff

TAIPEI, Taiwan — A court here has sentenced six computer executives to eight-month prison terms for copying Apple Computer, Inc. software, the first such victory for Apple in its bid to halt the proliferation here of "bad Apples" — pirated copies of its products.

Moreover, the ruling marks the first time computer piracy has been punished with jail terms in Taiwan, according to Apple attorney Jeffrey Blatt, an attorney with the Beverly Hills copyright and patent firm of Brealkley, Sokoloss, Taylor & Zafman.

It has been a busy year in the courts for Apple. Overall, the microcomputer maker has filed about 35 copyright and patent-infringement suits around the world, eight of which have resulted in criminal cases in foreign courts, Blatt said.

Those eight cases resulted in suspended sentences, which is very common in these cases, even in the U.S., according to Edward Taylor, a principal with the Beverly Hills firm. Although there are a "whole slew of companies" that have filed copyright and patent-infringement suits in Taiwan, Taylor believes Apple is the only computer manufacturer.

Customs' Bipolar

In addition to Apple's vigilance, the U.S. Customs Office has seized more than 2,000 ersatz Apples for copyright and patent violations under its Tripwire operation to combat fraud.

The six executives, all from different companies, were convicted in district court here of illegally copying two copyrighted programs for the Apple II: Auto-Start ROM [read-only memory] and Applesoft Basic.

Convicted were Kuo Chung-tin, general manager of Pison Science Technique Co.; Lei Yun-su, president of Lei-Ming Enterprises Co.; Liao Tseng-iu, general manager of Apollo Computer Co., which has no connection to the Chelmsford, Mass.-based company of the same name; Charles Chen, general manager of Sound Electronics Co.; John Lee, manager of IDA Computer Co.; and Lee Shian-yi, president of Main City Enterprise Co.

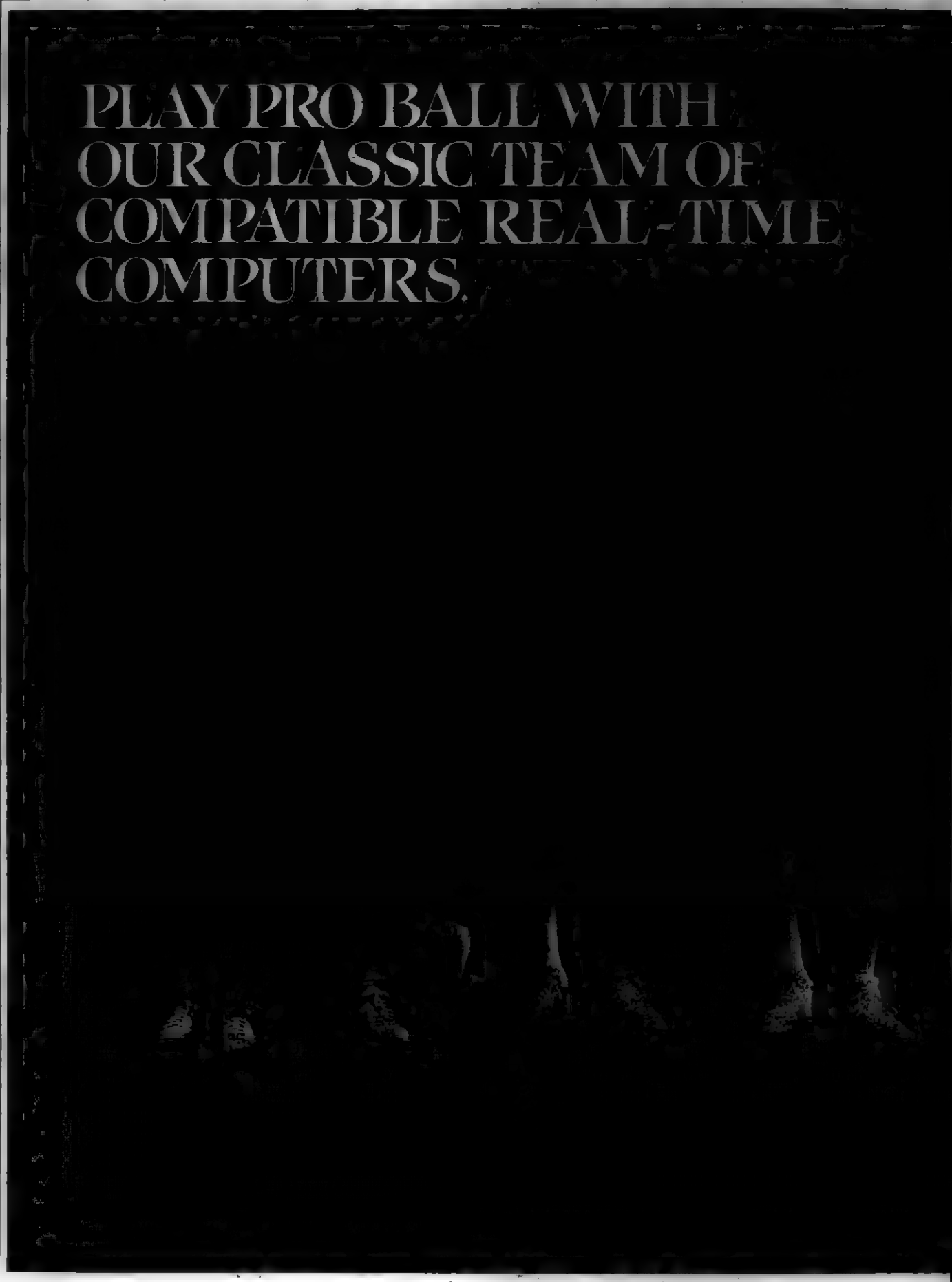
Some of the defendants plan to file appeals. Until the outcome of those appeals, the six defendants reportedly have ceased marketing machines that resemble Apple's.

There appears to be some confusion over Taiwan's copyright laws, last updated in 1964, years before the arrival of the computer piracy issue. Questions have been raised about whether Taiwan's copyright laws cover software, programs or data for computers.

Some attorneys here believe that Taiwan's copyright provisions protect printed words only. It is on this basis that at least one of those convicted is said to be basing his appeal.

Draft revisions to Taiwan's copyright laws covering software are under consideration by Taiwan's legislature. The revisions reportedly protect software as a literary work, and at least one member of the Interior Ministry's copyright committee has been quoted as saying he considers software a literary work. Moreover, the ministry is said to have granted as many as 20 foreign and domestic companies software copyrights despite the lack of an "express provision" of the law.

The Taiwan government has become more responsive to this issue for a number of reasons, Taylor said. "First of all, it doesn't help their image very much. They want to build a computer industry, but not one built on copies."



NEWS

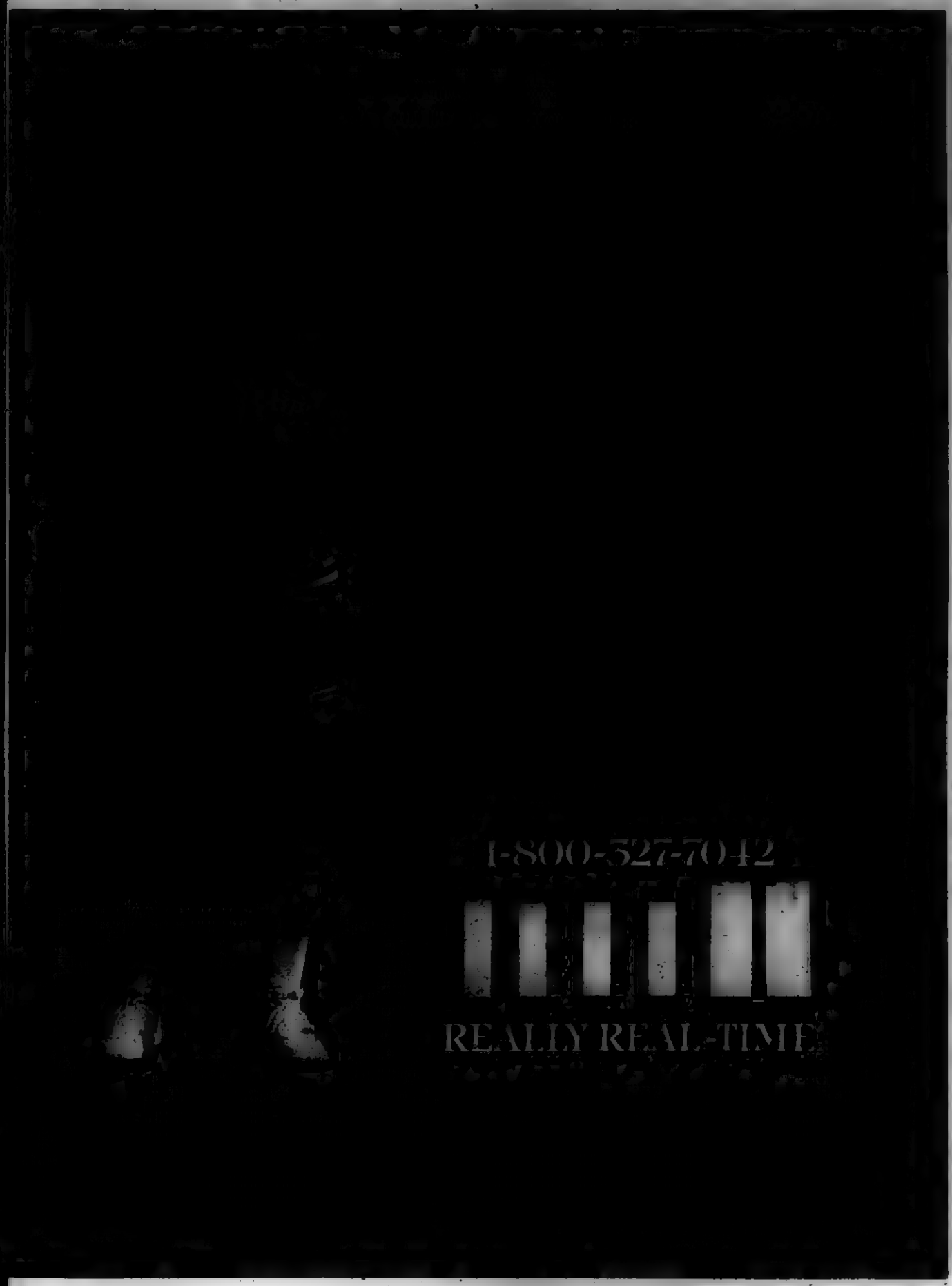
INTERNATIONAL REPORT

AUSTRALIA

MELBOURNE — The Australian and New Zealand Banking Group (ANZ) recently followed Westpac's lead toward a cashless society when it purchased a 32-bit Tandem Computer, Inc. TXP processor for the development of its own electronic funds transfer system. The Tandem machine, believed to have cost over $450,000, will initially front-end ANZ's two IBM 3081 mainframes.

CLAYTON — Monash University is seeking a company to manufacture and market commercially its custom-made local-area network system called Monet. A university source said Monet interconnects 450 IBM 3270 terminals and 150 computer ports on 14 Digital Equipment Corp. VAX-11 superminis equipped with IBM's Systems Network Architecture/Synchronous Data Link Control.

CROWS NEST — Several newer and cheaper data base management systems outperform older and costlier systems in terms of efficiency, flexibility and ease of use. This was the response from a recent survey of Australian users. The product which scored the highest marks was Sir/DBMS from Sir Australia Pty. Ltd., which runs on IBM and IBM-compatible machines. Sir/DBMS received higher marks from users than IBM's own IMS and it costs less than IMS.



FRANCE

PARIS — The urgent need for telecommunications standards in Europe was recognized here by the directors of the European Postal and Telephone Administration last month. The directors acknowledged that the telecommunications and data processing industries are merging, and common standards are crucial to enable European manufacturers to compete with American giants such as AT&T and IBM.

PARIS — In the wake of Apple Computer, Inc.'s Macintosh announcement, retailers and distributors here have said IBM will soon cut Personal Computer prices for big customers by 7%. The Personal Computer distributors, which number about 130 (Apple has 350), speculate that IBM will rebound during 1984 with introductions of a portable microcomputer, a microcomputer based on Intel Corp.'s IAPX 286 and a multiuser system.

JAPAN

TOKYO — A color television/microcomputer called Paxon has been unveiled here by General Corp., a medium-scale integrated manufacturer of electrical appliances. The machine is said to run under the MSX Basic operating system and feature a 2,000-char. display screen. Pricing on the system starts at $544. The keyboard is sold separately at a cost of $78.

TOKYO — Sord Computer Corp. has released a textbook-size microcomputer called The Success, which comes equipped with Sord's Integrated Software System. The software features an English-word processor, communications capabilities, a calculator and Sord's I-Pips programming language. The system's 32K-byte memory is expandable to 64K bytes. Options include microcassette data recorders, a thermal printer and a bar-code reader. The Success costs $761, the vendor said, and will be marketed in the U.S. as well as in Japan.

WEST GERMANY

LUDWIGSHAFEN — Industry watchers here maintain that manufacturers of IBM plug-compatible machines and its close competitors are gearing up to fight IBM in the mid-range computer arena. Burroughs GmbH's A-Series is thought to be a strong rival for IBM's 4361/4381 systems, and BASF recently introduced two models (7/71 and 7/72), which are based on Hitachi Ltd.'s M 260 machine.

IEEE offers job bank service

WASHINGTON, D.C. — The U.S. Activities Board (Usab) of the Institute of Electrical and Electronics Engineers (IEEE) has announced a service designed to help members find employment.

The Professional Engineering Employment Registry (Peer) allows members to place their resumes in a data base that employers with job openings can examine for candidates.

There is no charge to the applicant for the employment service, according to Richard J. Backe, employment assistant task force chairman for Usab.

Peer is operated on behalf of IEEE by Jobnet, Inc., a Massachusetts firm, Backe maintained.

Peer applications and further information for IEEE members and employers are available from Peer, which is located at Suite 608, IEEE Washington Office, 1111 19th St. N.W., Washington, D.C. 20036.

Asis seeks candidates

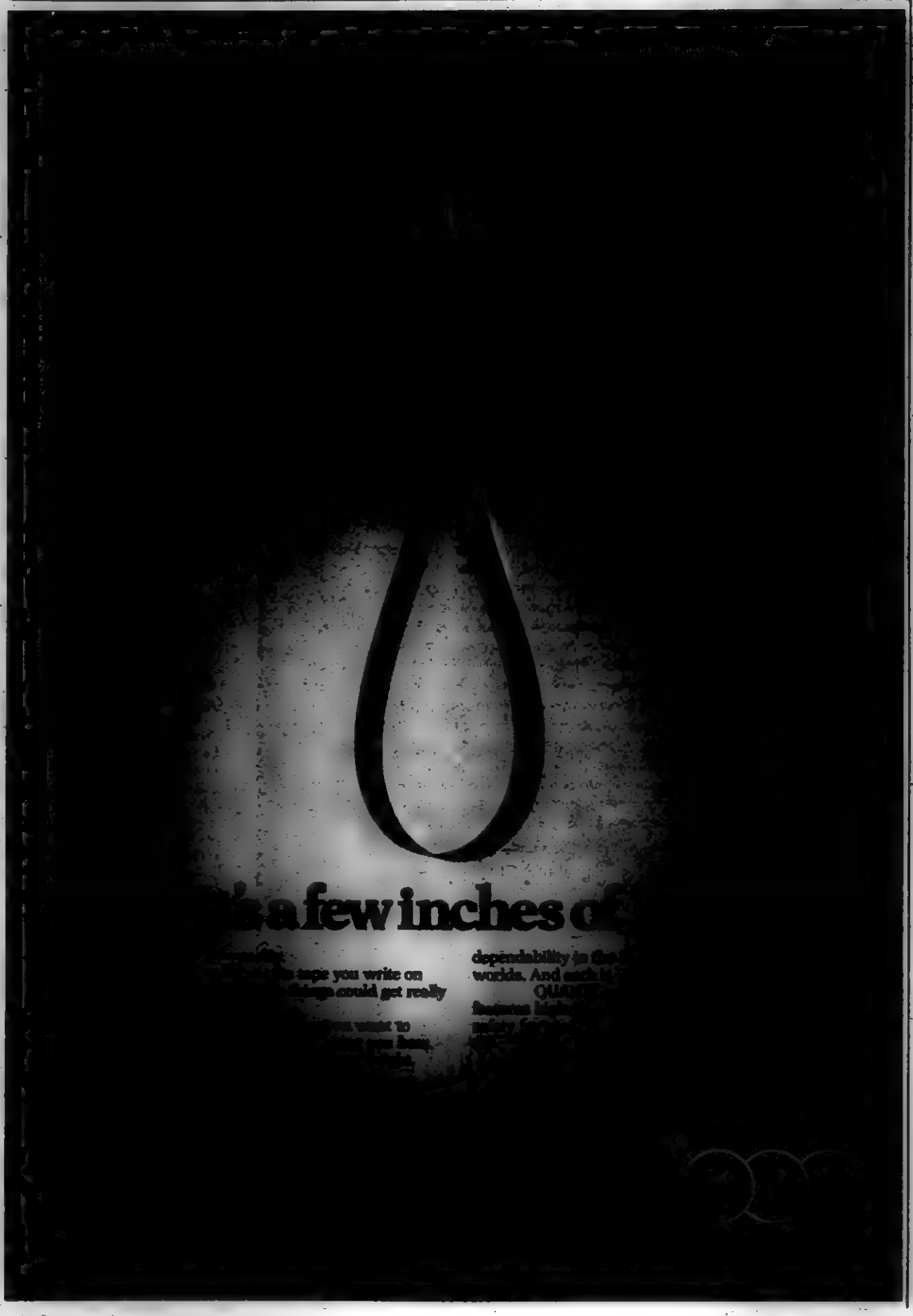
WASHINGTON, D.C.— The American Society for Information Science (Asis) is accepting nominations for three annual awards: the Institute for Scientific Information (ISI) Dissertation Scholarship Award, Student Paper Contest Award and Outstanding Teacher Award. Asis plans to present the awards during its annual meeting, scheduled Oct. 21-26 in Philadelphia.

The $1,000 ISI Dissertation Scholarship Award is given to an active doctoral candidate in an information science, degree-granting institution. The candidate must have completed course work and had a dissertation proposal accepted by the institution. Candidates should submit a description of the research, a schedule for completion, a budget, a list of financial support, names of dissertation adviser and committee members and a cover letter from the adviser endorsing the proposal. Nominations must be submitted by July 1.

Asis plans to award round-trip travel expenses and registration fee for its annual meeting to the Student Paper Contest Award winner. Any student not in a doctoral program is eligible; papers must be endorsed by a faculty member and submitted by June 15.

The Outstanding Science Teacher Award will be presented to a teacher who has demonstrated sustained excellence in teaching information science. Candidates who teach an information science topic on a continuing basis in an academic or nonacademic setting are eligible for the $500 award. Deadline for filing nominations is June 15.

Nominations should be submitted to Betty Foley, Asis Headquarters, 1010 16th St., Washington, D.C. 20036.



'VDT News' published

NEW YORK — The first issue of "VDT News," a newsletter that examines the health and safety risks associated with video display terminals, was published last month by "Microwave News," a publication that reports on non-ionizing radiation.

The bimonthly newsletter will examine health problems, such as eye strain, back and neck aches, radiation-induced cataracts, miscarriages and fetal abnormalities, according to the publisher.

"There is need among employees and employers to understand better the possible health risks linked to VDTs," Louis Slesin, "VDT News" publisher, said.

A one-year subscription costs $18 for individuals and $35 for institutions through P.O. Box 1799, Grand Central Station, New York, N.Y. 10163.

[illegible] yes

Candle knows that when a business depends upon its IMS online system, that business is also vulnerable to the problems within that system.

[illegible]

[illegible]

[illegible]

[illegible]

For a graphic view of your response time, RTA/IMS features Moving Time Slot Analysis. RTA/IMS "Fixed Window" will continuously monitor the 10-minute response history for the transactions selected, whether or not the "Response Threshold" has been crossed. For dynamic warning of problem transactions, RTA/IMS' "Dynamic Window" will display the 10-minute response graph only if the response time for the selected transaction has exceeded your acceptable response time level.

To recognize impending problems by spotting short-term trends, Time Interval Analysis presents response times for three distinct intervals such as 5, 15 or 30 minutes. To determine what your

RTA/IMS Moving Time Slot Analysis displays "Fixed Window" (right side of screen) and "Dynamic Window" (left side of screen).

response time was for transactions at certain periods of the day (ex. 8:00-8:30, 9:30-10:00, 1:00-2:00, etc.), RTA/IMS' Selected Time Slot Analysis will display the response time for your specified transaction – that simple and that easy.

RTA/IMS provides real-time feedback on IMS response times so that you observe short-term trends, receive dynamic warning of performance problems, and thus improve IMS service levels to your end users.

Candle

[illegible] Wilshire Blvd., Suite 2404
Los Angeles, California 90024
Phone 213-207-1400

☐ Please send me more information on RTA/IMS.

☐ Please enter my free subscription to the Candle Computer Report.

Name _____ Title _____

Company _____

Address _____

City/State/Zip _____

Phone _____

Candle

[illegible] Wilshire Blvd., Suite [illegible], Los Angeles, CA [illegible]

NEWS

CALENDAR

WEEK OF FEB. 26

FEBRUARY 26-MARCH 2, ANAHEIM, CALIF. — HP 3000 International Users Group's (IUG) Annual European Conference. Contact: Leslie Nicholson, HP 3000 IUG, 2570 W. El Camino Real, Mountain View, Calif. 94040.

FEBRUARY 27, NEW YORK — Introduction to the IBM Personal Computer. Contact: Center for Advanced Data Processing, Inc., Suite 402, 450 7th Ave., New York, N.Y. 10123.

FEBRUARY 27-28, BOSTON — Software Tools for Distributed Support Systems. Contact: Dr. Warren G. Briggs, Suffolk University School of Management, Beacon Hill, Boston, Mass. 02114.

FEBRUARY 27-28, DALLAS — How to Manage Data and Information as a Resource. Contact: Barnett Data Systems, 19 Orchard Way N., Rockville, Md. 20854.

FEBRUARY 27-29, MINNEAPOLIS — Data Communications: Networks Design and Optimization. Contact: Institute for Advanced Technology, 6003 Executive Blvd., Rockville, Md. 20852.

FEBRUARY 27-29, ATLANTA — Microcomputer Data Base Management Systems. Contact: Software Institute of America, 339 Salem St., Wakefield, Mass. 01880.

FEBRUARY 27-29, WASHINGTON, D.C. — Federal Software Procurement. Contact: National Institute for Management Research, P.O. Box 3727, Santa Monica, Calif. 90403.

FEBRUARY 27-29, DENVER — Operations Management and Data Control. Contact: Eric Franks, The Seminar Broker, 3212 W. 133 Ave., Broomfield, Colo. 80020.

FEBRUARY 27-29, SAN FRANCISCO — Managing the Maintenance of Programs and Systems. Contact: Infosci, Inc., Box 7117, Menlo Park, Calif. 94026.

FEBRUARY 27-MARCH 1, SAN FRANCISCO — Compcon '84. Contact: IEEE Computer Society, 10662 Los Vaqueros Circle, Los Alamitos, Calif. 90702.

FEBRUARY 27-March 1, SAN FRANCISCO — Data Base Administration and Control Workshop. Contact: Institute for Advanced Technology, 6003 Executive Blvd., Rockville, Md. 20852.

FEBRUARY 27-March 2, INDIANAPOLIS — Structured Analysis and Design Workshop. Contact: J. Baldwin, Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

FEBRUARY 27-MARCH 2, ORLANDO, FLA. — CICS Programming. Contact: Harris Education Center, 6220 S. Orange Blossom Trail, Orlando, Fla. 32809.

FEBRUARY 27-MARCH 2, NEW YORK — CICS/VS Command-Level Debugging. Contact: Taitech, 39 Broadway, New York, N.Y. 10006.

FEBRUARY 27-MARCH 2, NEW YORK — CICS/Command. Contact: Comped Technical Corp., 10 E. 21st St., New York, N.Y. 10010.

FEBRUARY 27-MARCH 2, HOUSTON — Structured Analysis and Systems Specification Workshop. Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036. Also being held Feb. 27-March 2 in Philadelphia.

FEBRUARY 27-MARCH 2, PHOENIX — Structured Analysis for Real-Time Systems. Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

FEBRUARY 27-MARCH 2, BOSTON — CICS/VS Internals. Contact: On-Line Software International, Fort Lee Executive Park, Two Executive Drive, Fort Lee, N.J. 07024.

FEBRUARY 27-MARCH 2, NEW YORK — CICS/ Testing and Debugging. Contact: Comped Technical Corp., 10 E. 21st St., New York, N.Y. 10010.

FEBRUARY 27-MARCH 2, ATLANTA — Systems Analysis and Design. Contact: Institute for Advanced Technology, 6003 Executive Blvd., Rockville, Md. 20852.

MARCH 1, NEW YORK — PC-DOS 2.0. Contact: Center for Advanced Data Processing, Inc., Suite 402, 450 7th Ave., New York, N.Y. 10123.

MARCH 1, INDIANAPOLIS — Computerized Personnel/Payroll Seminar.

MICRODATA INTRODUCES THE RELATIONAL OFFICE.

IT'S WHERE YOU'VE ALWAYS WANTED TO WORK.

NEWS

Contact: Iscol, 95 Chestnut Ridge Road, Montvale, N.J. 07645. Also being held March 1 in Toronto.

MARCH 1, NEW YORK — PC Communications. Contact: Center for Advanced Data Processing, Inc., Suite 402, 450 7th Ave., New York, N.Y. 10123.

MARCH 1-2, LOS ANGELES — Data Communications: Advanced Concepts, Products and Services. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held March 5-6 in Boston.

MARCH 1-2, NEW ORLEANS — Security Management Forum. Contact: Institute for Software Engineering, 510 Oakmead Pkwy., Sunnyvale, Calif. 94086.

MARCH 1-2, ATLANTA — Intellectual Property in the Computer Industry: A Management and Legal Perspective. Contact: Department of Continuing Education, Georgia Institute of Technology, Atlanta, Ga. 30332.

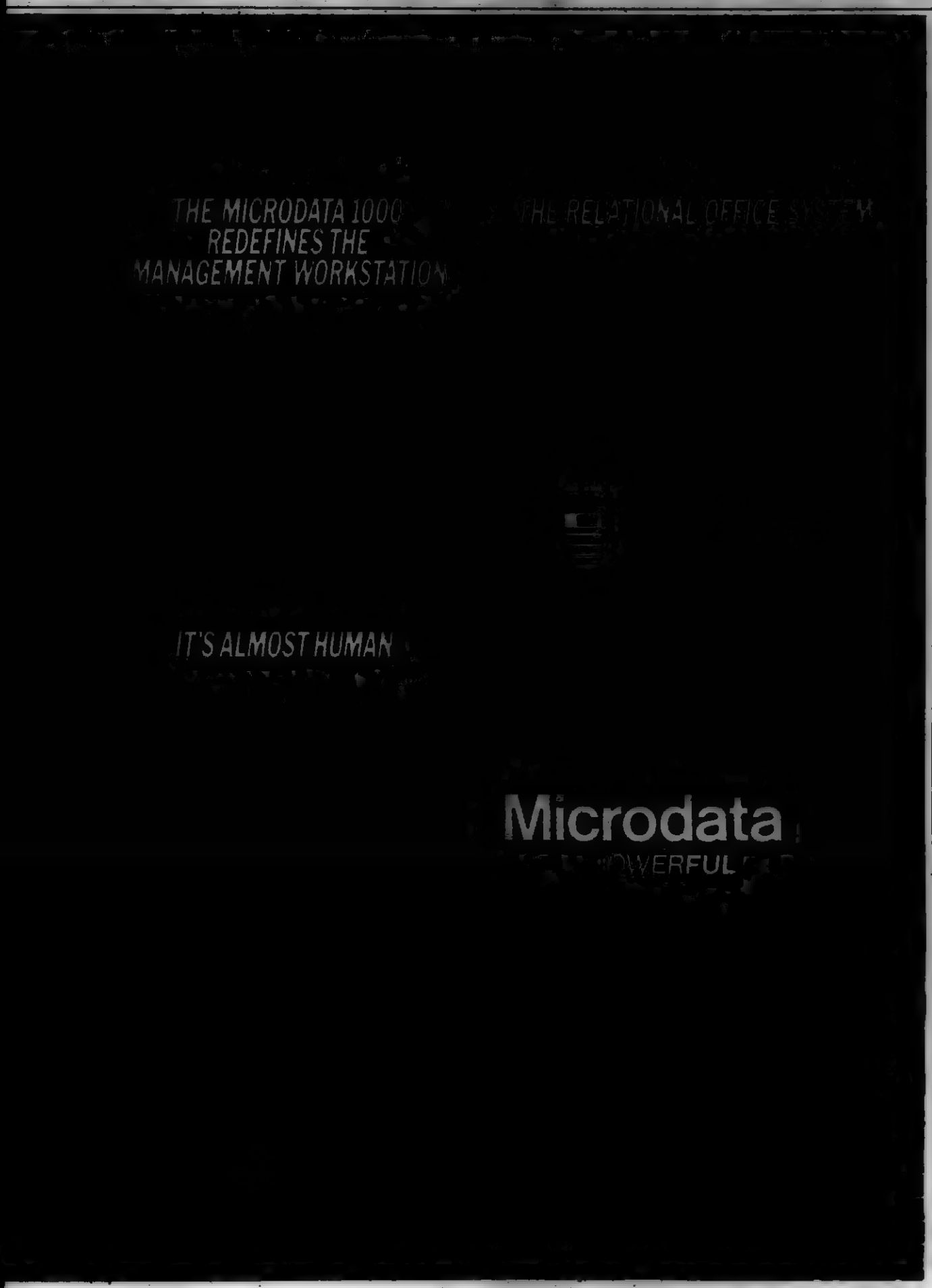
MARCH 1-2, CHICAGO — The Fourth-Generation Data Management Software Seminar. Contact: Software Institute of America, 339 Salem St., Wakefield, Mass. 01880.

MARCH 1-2, WASHINGTON, D.C. — Security in the Electronic Office: Micros, Word Processors and Workstations. Contact: Computer Security Institute Educational Resource Center, 43 Boston Post Road, Northborough, Mass. 01532.

MARCH 1-2, CHICAGO — Computer Networks: Protocols, Standards and Compatibility. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

MARCH 1-2, ATLANTA — Software Maintenance. Contact: U.S. Professional Development Institute, Software Development in Government, Department A, 1620 Elton Road, Silver Spring, Md. 20903. Also being held March 8-9 in Los Angeles and March 15-16 in Washington, D.C.

MARCH 1-2, LOS ANGELES — Micro/Personal Computer Operating Systems (Unix, Xenix, MS-DOS, CP/M, Etc.). Contact: Software Institute of America, 339 Salem St., Wakefield, Mass. 01880.



WEEK OF MARCH 4

MARCH 4-7, LOS ANGELES — Expo '84, Electronic Banking Conference and Equipment Exposition. Contact: The Bankers Institute, 21 Tunal Vista Blvd., Corte Madera, Calif. 94925.

MARCH 5, RALEIGH, N.C. — Structured Systems Development. Contact: J. Baldwin, Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

MARCH 5, WASHINGTON, D.C. — Introduction to Micros. Contact: U.S. Professional Development Institute, Microcomputers in Government, Department AB, 1620 Elton Road, Silver Spring, Md. 20903. Also being held March 12 in Denver, March 19 in New York and March 26 in Seattle.

MARCH 5-6, ORLANDO, FLA. — CICS/TX Design. Contact: Harris Education Center, 6220 S. Orange Blossom Trail, Orlando, Fla. 32809.

MARCH 5-6, LOS ANGELES — Local-Area Networks: Selection Guidelines. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

MARCH 5-6, NEW YORK — CICS/VS Testing and Debugging. Contact: Data Base Management, Inc., 1075 Tolland Tnpk., Manchester, Conn. 06040.

MARCH 5-6, ROCHESTER, N.Y. — Operating Systems for Personal Computers. Contact: The American Institute for Professional Education, Carnegie Building, 100 Kings Road, Madison, N.J. 07940.

MARCH 5-6, ST. LOUIS — Supporting and Maintaining the Data Communications Network. Contact: Data-Tech Institute, 386 Franklin Ave., P.O. Box 560, Nutley, N.J. 07110. Also being held March 12-13 in Orlando, Fla., March 19-20 in Princeton, N.J., and March 26-27 in Stamford, Conn.

MARCH 5-7, NEW YORK — Computer Phobia? Contact: American Management Association, 135 W. 50th St., New York, N.Y. 10020. Also being held March 5-7 in Los Angeles, March 19-21 in Boston and March 26-28 in Chicago.

MARCH 5-7, DSS

See [illegible] page 32

MARCH from page 31

MOINES, IOWA — **Systems Project Management.** Contact: Association for Systems Management, 24587 Bagley Road, Cleveland, Ohio 44138.

MARCH 5-7, WASHINGTON, D.C. — **Decision Support Systems.** Contact: U.S. Professional Development Institute, Decision Support Systems, Department K, 1620 Elton Road, Silver Spring, Md. 20903.

MARCH 5-7, ENGLEWOOD CLIFFS, N.J. — **VM Systems Management.** Contact: Institute for Software Engineering, 510 Oakmead Pkwy., Sunnyvale, Calif. 94086.

MARCH 5-7, NEW YORK — **SAS Basics Course.** Contact: SAS Institute, Inc., P.O. Box 8000, Cary, N.C. 27511.

MARCH 5-7, CHICAGO — **Introduction to Data Communications.** Contact: Systems Technology Forum, 9000 Fern Park Drive, Burke, Va. 22015. Also being held March 5-7 in Dallas, March 19-21 in Washington, D.C., and March 26-28 in Los Angeles.

MARCH 5-7, NEW YORK — **Data Communications: An Introduction to Concepts and Guidelines.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

MARCH 5-7, NEW YORK — **Computer Contracts.** Contact: Joanne Flynn, Brandon Consulting Group, Inc., 1775 Broadway, New York, N.Y. 10019.

MARCH 5-7, CHICAGO — **Data Communications for Microcomputers: Acquisition, Application and Implementation.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

MARCH 5-7, NEW YORK — **Network Management and Control.** Contact: Systems Technology Forum, 9000 Fern Park Drive, Burke, Va. 22015.

MARCH 5-7, DALLAS — **Managing Application Software Support.** Contact: Infosci, Inc., Box 7117, Menlo Park, Calif. 94026.

MARCH 5-7, NEW YORK — **Data Communications: Network, Design and Optimization.** Contact: Institute for Advanced Technology, 6003 Executive Blvd., Rockville, Md. 20852.

MARCH 5-7, WASHINGTON, D.C. — **X.25 and Packet-Switching Networks.** Contact: Systems Technology Forum, 9000 Fern Park Drive, Burke, Va. 22015.

MARCH 5-7, WASHINGTON, D.C. — **Structured Techniques in Software Testing.** Contact: Institute for Advanced Technology, 6003 Executive Blvd., Rockville, Md. 20852.

MARCH 5-7, DENVER — **Office Automation: Strategic Planning, Design and Implementation.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

MARCH 5-7, WASHINGTON, D.C. — **Data Communications System Components.** Contact: Systems Technology Forum, 9000 Fern Park Drive, Burke, Va. 22015. Also being held March 26-30 in Atlanta.

MARCH 5-8, DALLAS — **IMS/VS Application Development Facility II.** Contact: Data Base Management, Inc., 1075 Tolland Tnpk., Manchester, Conn. 06040.

MARCH 5-8, PHOENIX — **The Fifth Annual Conference on DP Performance Management.** Contact: Applied Computer Research, P.O. Box 9280, Phoenix, Ariz. 85068.

MARCH 5-9, BOSTON — **Information Modeling Workshop.** Contact: J. Baldwin, Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036. Also being held March 5-9 in Dallas.

MARCH 5-9, WASHINGTON, D.C. — **CICS/VS Command-Level Programming.** Contact: Data Base Management, Inc., 1075 Tolland Tnpk., Manchester, Conn. 06040.

MARCH 5-9, DENVER — **Structured Analysis and System Specification Workshop.** Contact: J. Baldwin, Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036. Also being held March 5-9 in Honolulu.

MARCH 5-9, ORLANDO, FLA. — **Managing the Audit of Computer-Based Bank Systems.** Contact: Darlene Floading, Bank Administration Institute, 60 Gould Center, Rolling Meadows, Ill. 60008.

MARCH 5-9, CHICAGO — **Structured Design Workshop.** Contact: J. Baldwin, Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036. Also being held March 5-9 in Houston.

MARCH 5-9, RICHMOND, VA. — **Systems Analysis Workshop.** Contact: Brandon Systems Institute, 4720 Montgomery Lane, Bethesda, Md. 20814.

MARCH 5-9, LONG BEACH, CALIF. — **Advanced Structured Analysis.** Contact: J. Baldwin, Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

MARCH 5-9, PORTLAND, ORE. — **Structured Systems Analysis and Design.** Contact: Hudson Henry and Associates, Inc., 4526 S.E. Kelly, Portland, Ore. 97206.

MARCH 5-9, PHILADELPHIA — **Structured Analysis and Design Workshop.** Contact: J. Baldwin, Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

MARCH 5-9, PHILADELPHIA — **CICS Command-Level Applications Programming.** Contact: Comped Technical Corp., 10 E. 21st St., New York, N.Y. 10010.

MARCH 5-9, HONOLULU — **Structured Analysis for Real-Time Systems.** Contact: J. Baldwin, Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

MARCH 5-9, ORLANDO, FLA. — **IDMS-DC Programming.** Contact: Harris Education Center, 6220 S. Orange Blossom Trail, Orlando, Fla. 32809.

No other 3270 protocol converter can match all these features.

Since 1977, hundreds of companies all over the world including Bell Labs, Citicorp, ITT, Litton, Westinghouse—have used Local Data products to make IBM communications easy and inexpensive.

We believe the DataLynx™/3274 is the best price/performance 3270 protocol converter on the market.

So, before you buy any other protocol converter at any price, compare the DataLynx/3274 features first. Then decide.

- SNA/SDLC or BSC protocols supported. SNA is PU type 2.
- BSC for EBCDIC and ASCII.
- 16 bit, 8 MHZ Intel 8086-2 CPU.
- Auxiliary printer support allows each async port to have a separately addressable 3287 type printer. This feature enables dial users to combine CRT and print data over one dial-up line.
- 80 types of ASCII async display terminals can emulate IBM 3278 display stations, and ASCII async printers to emulate IBM 328X printers.
- Micro to main-frame support with our FileLynx™/3278 program for the IBM PC and PC compatibles supports terminal emulation and file transfer (upload/download).
- Hard copy KSR support with our "Paper/3278."
- Unique "paging" feature supports emulation of *all* models of the 3278 display station.
- Pseudo-transparency feature allows host application to transmit character and control codes to async terminal devices (e.g. graphics terminals, graph plotters, mini-computers, high-speed printers with down-loadable forms control units).
- "Compu" support for micro, mini and instrumentation computers as terminal devices.
- Dual host support.
- PROM cartridge for easy user upgrade of firmware.
- Powerful, friendly configurator mode, using menus to allow parameter definition for sync ports, logical units, async ports and terminal characteristics, including help utility.
- Configuration values saved in non-volatile EEPROM.
- Monitor mode displays current status of all ports and logical units.
- May be connected to a host directly (in modem eliminator mode), or via modems on a dedicated multipoint or point-to-point line (dial-up or dedicated), via RS-232C sync ports.
- Data rates to 19,200 bps (sync & async).
- Async ports may be configured for any of 15 fixed bit rates or "autobaud", with or without parity checking, and with a specified character format.
- Simple DTE/DCE change on all ports.
- Flow control on async ports may be configured for physical and/or logical signalling.
- Virtual device support enables reconnect of dial users independent of physical port.
- Security through dual level password protection.
- Emulation of standard 3278 keyboard functions is tailored for each supported terminal type.
- 25th status line emulation.
- SAS® graphics support.
- Base color support.
- 3278-5 (27 x 132 character screen) support on 9 channels with memory expansion option.
- LU configurator options provide support for various screen formats and printer page widths.
- Front panel includes 33 function status indicators.
- Self-test of channels, memory and firmware integrity is performed continually in background mode assisted by a "watchdog" timer.
- UL and FCC approved.

For more information about the remarkable DataLynx/3274 protocol converter, call or write today. And ask about our 30-day free trial program.

Local Data DATALYNX/3274

SAS® is the registered trademark of SAS Institute, Inc.

Local Data
"Your Lynx to IBM."

LOCAL DATA • 2701 Toledo Street • Suite 706 • Torrance • CA • 90503 • Telephone (213) 320-7126 TLX 182518

IN DEPTH

Megatrends

Lessons from the best-sellers

A three-part series

The information systems manager who succeeds in the "megatrend era" will be the one who balances the technical with the behavioral — recognizing employee needs for a high-touch, participatory working environment.

By J. Daniel Couger

We are living in a time of parentheses, according to John Naisbitt, author of the best-seller *Megatrends*. It is the time between eras.

"Amid the sometimes painful and uncertain present, the restructuring of America proceeds unrelentingly," he writes. Nevertheless, "We have not quite left behind the either/or America of the past — centralized, industrialized and economically self-contained. We are clinging to the known past in fear of the unknown future."

Naisbitt's Washington, D.C.-based consulting firm conducts research on social, economic, political and technological movements in the U.S. Among his clients: AT&T, United Technologies Corp., Control Data Corp. and Atlantic Richfield Co.

Megatrends (Warner Books, $17.50; paperback, $8.95) identifies 10 "restructurings" in defining the new society. These trends will significantly affect information systems managers.

I have summarized the Naisbitt book in two categories: 1) macroanalysis — the key points underlying each megatrend and their impact on each of us as members of society and 2) microanalysis — the primary effects on the information systems field. This analysis reveals that for the first time, systems managers have the opportunity to move from a *supportive* role to a *lead* role in taking their companies from the industrial to the information era.

Naisbitt's research group used a trend extrapolation methodology consisting of three components:

1) Content analysis. Based on a technique used by intelligence agencies during World War II, this approach measures the contents of newspapers. About 6,000 newspapers, both U.S. and foreign, are examined each month. Content analysis effectively monitors social change because the news hole is a closed system. When something new is introduced, something else must be omitted.

2) Analysis of activities in bellwether states. In interpreting its research data, the Naisbitt group "learned that there are five states in which most social invention occurs in this country;

Part two

the other 46 are, in effect, followers." The key indicator state is California, with Florida a close second. The other three trend-setting states are Washington, Colorado and Connecticut.

3) **Extrapolation.** "Trends, like horses, are easier to ride in the direction they are already going," Naisbitt says. "You may decide to buck the trend, but it is still helpful to know it is there."

Examining the megatrends

Megatrend No. 1: Although we continue to think we live in an industrial society, we have, in fact, changed to an economy based on the creation of information.

For the first time, our economy is based on a key resource that is not only renewable but self-generating. The telephone, computer and television have merged into an integrated communications system that will fuel the information society the way energy — electric, oil, nuclear — kept the industrial society humming and the way natural power — wind, water and brute force — sustained agricultural society.

For example, between 6,000 and 7,000 scientific articles are written each day. The amount of scientific and technical information now increases 13% per year, which means it doubles every 5½ years. But the rate will soon jump to perhaps 40% per year because of new, more powerful information systems and an increasing population of scientists. That means the data will double every 20 months.

In the information society, we have systematized the production of knowledge and amplified our brainpower. To use an industrial metaphor, we now mass-produce knowledge, and this knowledge is the driving force of our economy.

Computer skills will be needed in up to 75% of all jobs by 1990. Being without computer skills is like wandering around the Library of Congress with all the books arranged at random, with no Dewey decimal system, no card catalog and no friendly librarian to serve your information needs.

Megatrend No. 2: We are moving in the dual direction of high tech/high touch, matching each new technology with a compensatory human response.

When we moved from an agricultural to an industrial society, we moved more industry into our farms. In about 1800, 90% of our population produced 100% of the food. Today, only 3% of the population produces 120% of the food we need.

We will increasingly run our factories with information rather than laborers. Robots will play a big role. Conservative estimates predict that by 1990 we will be producing 17,000 robots per year and that the total robot work force will reach 80,000. Most experts would double those figures.

We must learn to balance technology with human spiritual demands. Indeed, something else has been growing alongside the technological invasion. For example, as hospitals become environments of fluorescent lights, stainless steel and computers, home births are growing more common and an increasing number of chronically ill patients are choosing hospice care. The more technology we introduce into society, the more people will want to be with other people.

Megatrend No. 3: No longer do we have the luxury of operating within an isolated, self-sufficient, national economic system; we must acknowledge that we are a part of a global economy.

Sweden, Denmark, Norway and Switzerland now lead the U.S. in per capita income. Third World nations have entered phenomenal boom cycles. Over the next decade, we will see a number of new "Japans." The 20 fastest growing economies for the period between 1970 and 1977 were all Third World countries. Some were oil-exporting countries — Saudi Arabia and Iran, for instance. But the vast majority were not. Botswana's economy grew at an annual average of 15.8% and South Korea's at nearly 10%. The economic powers of the Third World are growing with purpose and design: South Korea, Taiwan, Brazil and Singapore invested between 25% and 35% of their gross national products in their economies, nearly twice the rate of the U.S..

During the past decade, the Third World has begun to take up most of the world's industrial tasks. By the year 2000, Third World countries will manufacture as much as 30% of the world's goods.

Rather than reinvest in the industries that once made this country, the U.S. must move toward enterprises of the future.

Megatrend No. 4: We are restructuring from a society run by short-term considerations and rewards in favor of dealing with things in much longer time frames.

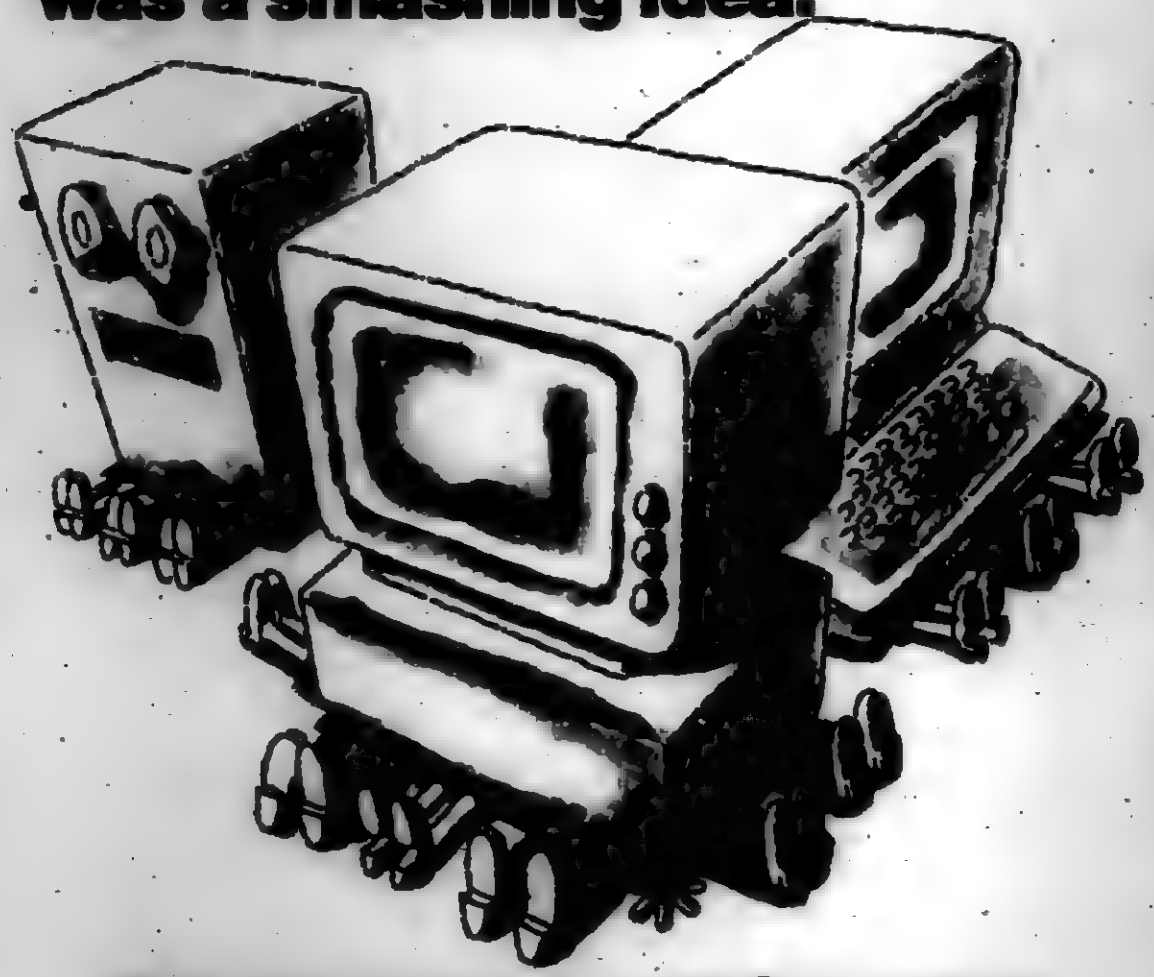
"Get me through the next election or the next board meeting" seems a prevalent attitude, with the result that American government and industry suffer a kind of tunnel vision and find it hard to change.

The criticism about short-term management is becoming widely accepted by the business community itself. Of nearly 1,000 top executives surveyed recently by the Chicago management research firm, Heidrick and Struggles, 76% said there has been a damaging overemphasis on immediate financial goals.

The question for the 1980s is, "What business are you really in?"

Megatrend No. 5: In cities and states, in small organizations and subdivisions, we have rediscovered

Providing your employees with the latest office technology was a smashing idea.



Now you need one solution to keep them on top of it all.

With all the subtlety of a bomb, technology has arrived in your organization. And its effect on productivity can be devastating. Even your most skilled, most motivated employees may be hard-pressed to keep up.

The solution is comprehensive, continuous education and training. And DELTAK, the world leader in training programs and services, can help.

For your DP professionals, there's a wide range of job-specific multimedia and computer-based skills courses. For managers and end users, we offer microcourseware and video briefings covering critical business issues.

And to complete your expanding training needs, DELTAK now provides comprehensive consulting, professional classroom instruction and major city workshops.

So call today and find out how DELTAK can help your people stay on top of some very pressing problems.

DELTAK
East/West Technological Center
1751 West Diehl Rd., Naperville, IL 60566
(312) 369-3000 (800) 532-7886

© 1984, DELTAK Inc.

the ability to act innovatively and to achieve results from the bottom up.

Our society is converting from centralization to decentralization. Centralized structures are crumbling across our country. But society is not falling apart. People are building the country into a stronger, more balanced, more diverse society. It doesn't matter who is president, and Congress has become obsolete. Local initiatives attract intense political activity, and real political power — that is, the ability to get things done — has shifted to the states, cities, towns and neighborhoods.

Megatrend No. 6: We are shifting from institutional help to more self-reliance in all aspects of our work.

For decades, institutions such as the government, the medical establishment, the corporation and the school system were America's buffers against life's hard realities (the needs for food, housing, health care, education). Slowly we began to wean ourselves from our collective institutional dependence, learning to trust and rely only on ourselves.

In a sense, we have come full circle. We are reclaiming America's traditional sense of self-reliance after four decades of trusting in institutional help. No one believes anymore that institutions can care for us as well as we can do things for ourselves, with the result that we are increasingly disposed to manage our own lives.

Megatrend No. 7: We are discovering that the framework of representative democracy has become obsolete in an era of instantaneously shared information.

Participatory democracy is revolutionizing local politics in America and is bubbling upward to change the course of national government as well. Initiatives and referenda are tools for the new democracy. In 23 states and 100 cities in which initiatives are legal, voter turnout is 20% higher than in states without such voter options.

Political scientist Harlan Cleveland wrote on the power of participatory democracy: "The tidal wave of social change these past 20 years — environmental sensitivity, the demographic transition, civil rights for all races, the enhanced status of women, recognition of rights of consumers and small investors — was not generated by the established leaders, but boiled up from the people at large."

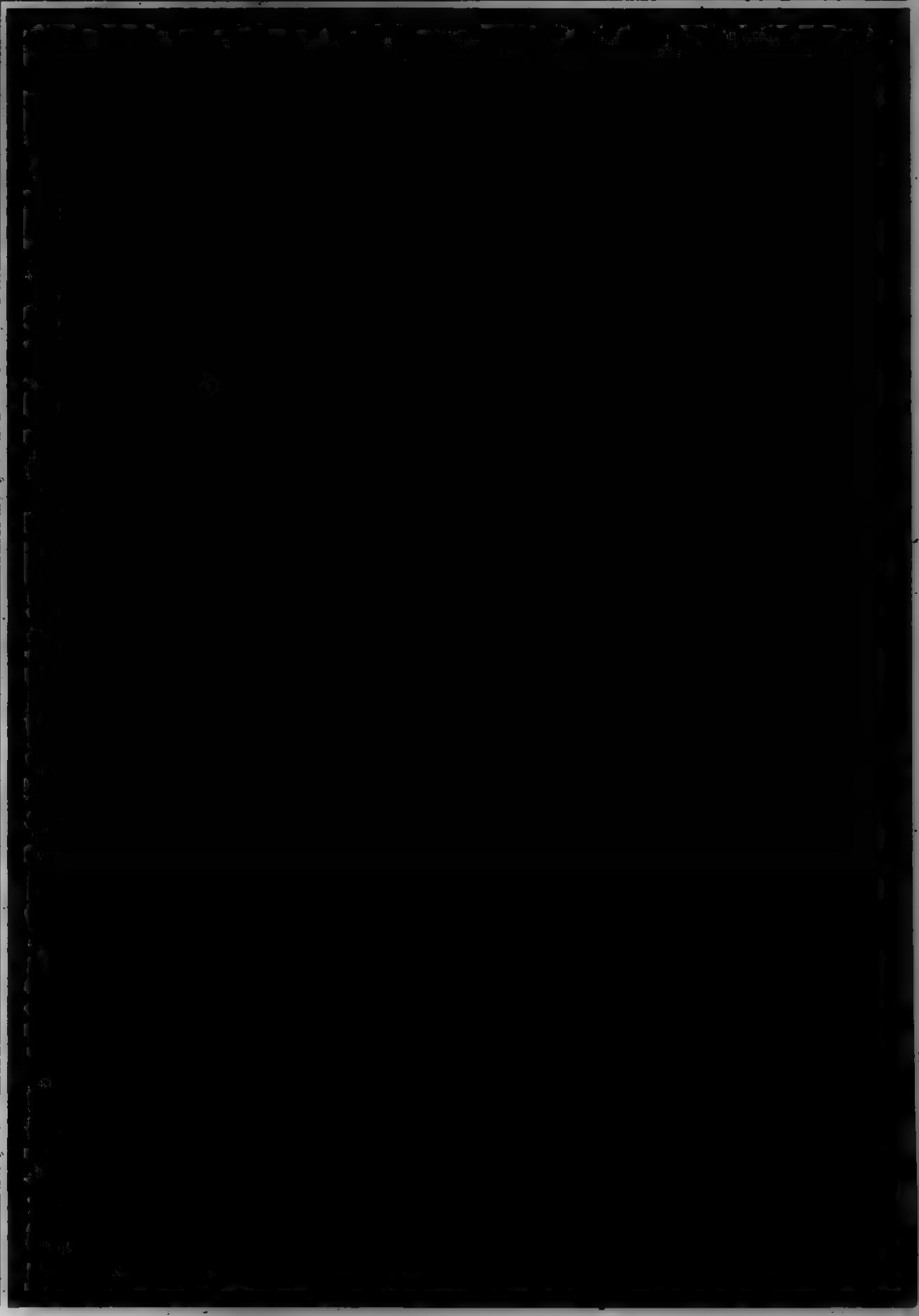
Megatrend No. 8: We are giving up our dependence on hierarchical structures in favor of informal networks.

The pyramidal power structures in which people at the top give the orders are being superseded by networks: people talking to each other, sharing ideas, information and resources. The point is often made that networking is a verb, not a noun. The important part is not the network, the finished product, but the process of getting there — the communication that creates linkages between people and clusters of people.

Vehicles for networking include phone calls, air travel, books, phantom organizations, papers, pamphleteering, photocopying, lectures, workshops, parties, grapevines, mutual friends, summit meetings, coalitions, tapes, newsletters.

"Networks are appropriate sociology — the human equivalent of appropriate technology — providing a form of communication and interaction that is suitable for the energy-scarce, information-rich future of the

Networks offer what bureaucracies can never deliver — the horizontal link. This connection is enormously liberating for individuals. Hierarchies promote moving up and getting ahead, producing stress, tension and anxiety. Networking empowers the individual, and people in networks tend to nurture one another.



GET EVERYBODY ON BOARD.

Now there's a way to let everyone in your company chip in.

AT&T Information Systems, the company whose unparalleled communications heritage has been bringing people together for 100 years, now brings your office together. With state-of-the-art office automation that's designed to get your company moving ahead.

Electronic Document Communications, now available on System 85 and DIMENSION® PBX, is an easy-to-learn software application that's hard to beat. Because it integrates your office by letting everyone prepare, send and store documents and messages with the speed and efficiency of a computer. So you can have better access to the right information in the right form at the right time.

Electronic Document Communications can streamline your office in three ways:

Preparing Information—Reduces the time, effort, cost and wasted paper between drafts by electronically creating, editing and formatting documents and messages. "The Composer," a special software feature, checks spelling, grammar, punctuation and usage. EDC even measures whether documents are readable by technical and nontechnical readers.

Moving Information—Speeds documents to many people in different locations simultaneously so they can act decisively. EDC allows you to determine the timing and cost of delivery, and even check to find out when documents were received. Using a password ensures the privacy of your messages.

Managing and Storing Information—Locates documents, and retrieves and evalu-

ates contents quickly and easily with electronic files—while reducing the possibility of losing documents. An electronic "Mailbox" allows you to quickly determine which documents to read first. EDC reduces storing and filing costs with an electronic "Archives" that allows for either short- or long-term storage, and the "Wastebasket" which enables you to permanently delete items after a determined period of time. There's even an electronic "Calendar" that checks personal schedules and arranges mutually convenient meetings.

Not only will all these features help you further integrate your office, Electronic Document Communications is itself just one part of AT&T's line of completely integrated business systems. For state-of-the-art office automation, you can implement EDC in conjunction with other applications software like Message Center/Directory, a call coverage and message system. These office management applications are now available on System 85 and DIMENSION® 600 and 2000 systems with the Applications Processor.

The result is you'll be able to improve staff productivity at every level and get everybody on board. And as new features are developed in the future, they'll be compatible with your existing equipment.

EDC was developed by Bell Labs systems designers who now work for AT&T Information Systems Laboratories. AT&T Western Electric produces EDC, and AT&T Information Systems will maintain it with comprehensive, conscientious service from the largest service organization in the industry. To find out more, call toll-free 1-800-247-1212, Ext. 879M.

AT&T's Electronic Document Communications: It's part of the integrated office of tomorrow that you can board today.

AT&T Information Systems

1980s and beyond," write Jessica Lipnack and Jeffrey Stamps in *Nose Age*.

Experienced networkers claim they can reach anyone in the world with only six interactions. Naisbitt claims he can reach "anyone in the U.S. with only two — three at the very most — exchanges." Although sharing information and contacts is their main purpose, networks can go beyond the mere transfer of data to the creation and exchange of knowledge. As each person in a network takes in new information, he synthesizes it and comes up with new ideas.

Networks offer what bureaucracies can never deliver — the horizontal link. This connection is enormously liberating for individuals. Hierarchies promote moving up and getting ahead, producing stress, tension and anxiety. Networking empowers the individual, and people in networks tend to nurture one another.

Megatrend No. 9: More Americans are living in the South and West, leaving behind the old industrial cities of the North.

The old economic axis between New York and Chicago is being replaced by a new Los Angeles-and-Houston axis. Perhaps more important than the political or demographic changes is the economic growth that supported and encouraged the population shift.

Two out of three new jobs were created in the Sunbelt or western states between 1968 and 1978. The U.S. Labor Department calculates that the Northeast and Midwest gained only 6.1 million to the South and West's 12.3 million.

Megatrend No. 10: From a narrow either/or society with a limited range of personal choices, we are exploding into a freewheeling multiple-option society.

There are more than 752 models of cars and trucks sold in the U.S.; one store in New York stocks 2,500 types of light bulbs. The basic idea of the multiple-option society has spilled over into other important areas of our lives: religion, the arts, food and, finally, in the extent to which cultural, ethnic and racial diversity are now celebrated in America.

More than ever before, people live alone — one in four is a single-person household, compared with one in 10 in 1955. Single-person households are so numerous that the basic building block of society may become the individual rather than the family.

Effects on MIS

1. Industrial society is becoming an information society. We are drowning in information but starved for knowledge.

This level of information is clearly impossible to handle by present means. Uncontrolled and unorganized information is no longer a resource in an information society. Instead, it becomes the enemy of the information worker. Scientists who are overwhelmed with technical data complain of information pollution and charge that it takes less time to do an experiment than to find out whether or not it has already been done.

Information technology brings order to the chaos of information pollution and, therefore, gives value to data that would otherwise be useless. If users, through information utilities, can locate the information they need, they will pay for it. The emphasis of the whole information society shifts, then, from supply to selection.

This principle is the driving force behind the new electronic publishers who provide on-line data bases, communications channels for sorting and selecting. These new businesses are selling a medium, not information as such.

In an industrial society, the strategic resource is capital; 100 years ago, many people may have known how to build a steel plant, but few could get the money to do it. Consequently, access to the system was limited. But in our new society, as Daniel Bell first pointed out, the strategic resource is information — not the only resource, but the most important. With it, access to the economic system is much easier.

2. Forced technology is becoming high tech/high touch. High-tech robots and high-touch quality circles are moving into our factories at the same time — and the more robots, the more circles.

When high tech and high touch are out of balance, conflict results. Concern about personal privacy erupted just as computer systems became widespread in society.

Whenever institutions introduce new technology to customers or employees, they should build in a high-touch component. If they don't, people will try to create their own or reject the new technology.

3. The national economy is becoming a world economy. We have two economies in the U.S. today: a sunrise economy and a sunset economy.

As the Third World prepares to take over the major industrial tasks, the developed countries must move on to the new enterprises. We are in the midst of doing that right now. In the industrialized nations, we have two separate economies: sunrise and sunset industries. This dual economy has caused much confusion in analyzing our economic situation.

What sort of structural-adjustment policy would work best in this country? Generally speaking, the government should stay out of the way of the sunrise industries (electronics, software, cable television, biotechnology) and allow the mature industries to level off.

MIGRATING TO MVS/XA THIS YEAR?

Don't be a lonely pioneer.

Much has been said about the complexity of the migration to XA. The destination is clear but the route is still hazardous. The good news is that you don't have to "go it alone" any longer. The experiences of others who have blazed the trail before you have been collected by ASI. Benefit from these experiences. Learn while these pioneers tell you where they found problems, and where and how they found the help they needed. They'll also tell you the effort they needed and the resources they used. ASI has a new series of courses available to help you plan your migration and utilize the potential of XA. This resource is available to you today to help in your migration.

ASI's help does not end with the migration. Once you are there, consolidate your position by using the remainder of ASI's vast MVS/XA training curriculum to show your staff how to manipulate and take advantage of this new environment.

For details of our special introductory offer covering "MVS/XA Migration Considerations" and "Harnessing the Productivity Potential of XA" call or write ASI today.

ASI

Advanced Systems, Incorporated
2340 South Arlington Heights Road • Arlington Heights, IL 60005

Toll-Free Customer Number:
(800) 323-0377
Illinois and Canada call collect: (312) 593-0377

Of course, sunrise industries will not account for all future growth. Established businesses, where we are still competitive and where demand remains strong, will continue to grow: aerospace, all of the information processing and telecommunications industries, health care and medical technology.

Information will be the new economic good, and as of now, at least, the U.S. is the world's leading supplier of information. But America has no manifest destiny to maintain its lead.

Despite some worker opposition, factory automation continues. There are only about 1,000 robots in the U.S. auto industry today, but they

In a constantly changing world, strategic planning is not enough; it becomes planning for its own sake. Strategic planning must be geared to a strategic vision with a clarity that remains in spite of the confusion natural to the first stages of change.

are earning their keep and gaining a reputation for productivity as well. Quality robots that cost $50,000 each can work two shifts a day for eight years. That figures out to about $5 per hour — quite a bit less than the typical $15 per hour for an auto worker's salary and benefits.

Instead of constantly bemoaning the loss of the old industries, we must explore the adventurous new technologies: electronics, biotechnology, alternative energy sources, mining of the seabeds and robotics. Ten years from now, the electronics industry will be bigger than the auto and steel industries are today. The U.S. alone will need a million or more programmers by the end of the decade.

4. Short-term approaches are turning to long-term. We must reconceptualize what business we are in, or conceptualize what business it would be useful for us to think we are in. Furthermore, when the situation is constantly changing, the process of reconceptualization must itself be constant.

The word "process" should be emphasized. It is not something bought from the outside, but something that occurs inside an institution (with influence and instruction from what is going on outside). It is the hard work of colleagues rigorously questioning every aspect of an institution's purpose — and questioning the purpose itself. The purpose must be right, and it must be a shared vision, a strategic vision.

Strategic planning is worthless unless there is first a strategic vision. A strategic vision is a clear image of what you want to achieve, which then organizes and instructs every step toward that goal. The extraordinarily successful strategic vision for the National Aeronautics and Space Administration was, "Put a man on the moon by the end of the decade." That vision gave magnetic direction to the entire organization. Nobody had to be told or reminded of where the organization was going. Contrast the organizing focus of putting a man on the moon by the end of the decade with, "We are going to be the world leader in space exploration."

In a constantly changing world, strategic planning is not enough; it becomes planning for its own sake. Strategic planning must be geared to a strategic vision with a clarity that remains in spite of the confusion natural to the first stages of change.

5. Centralization is giving way to decentralization. By 1976, America's 200th anniversary, we had turned the corner: The growing strength of the decentralization trend surpassed the receding tendency to centralize. Yet the pull of decentralization extends far beyond politics and geography. It is structuring the transformation of social relationships and social institutions as well.

Decentralization creates more opportunities and more choices for individuals. Because business is decentralized, you can find a job close to where you want to live in a rural area — or almost anywhere else. Your home computer and word processor will enable you to work at home in an isolated area if you are one of the few who takes that course. On the other hand, the cities that some leave will become less crowded and more pleasant for the others who stay.

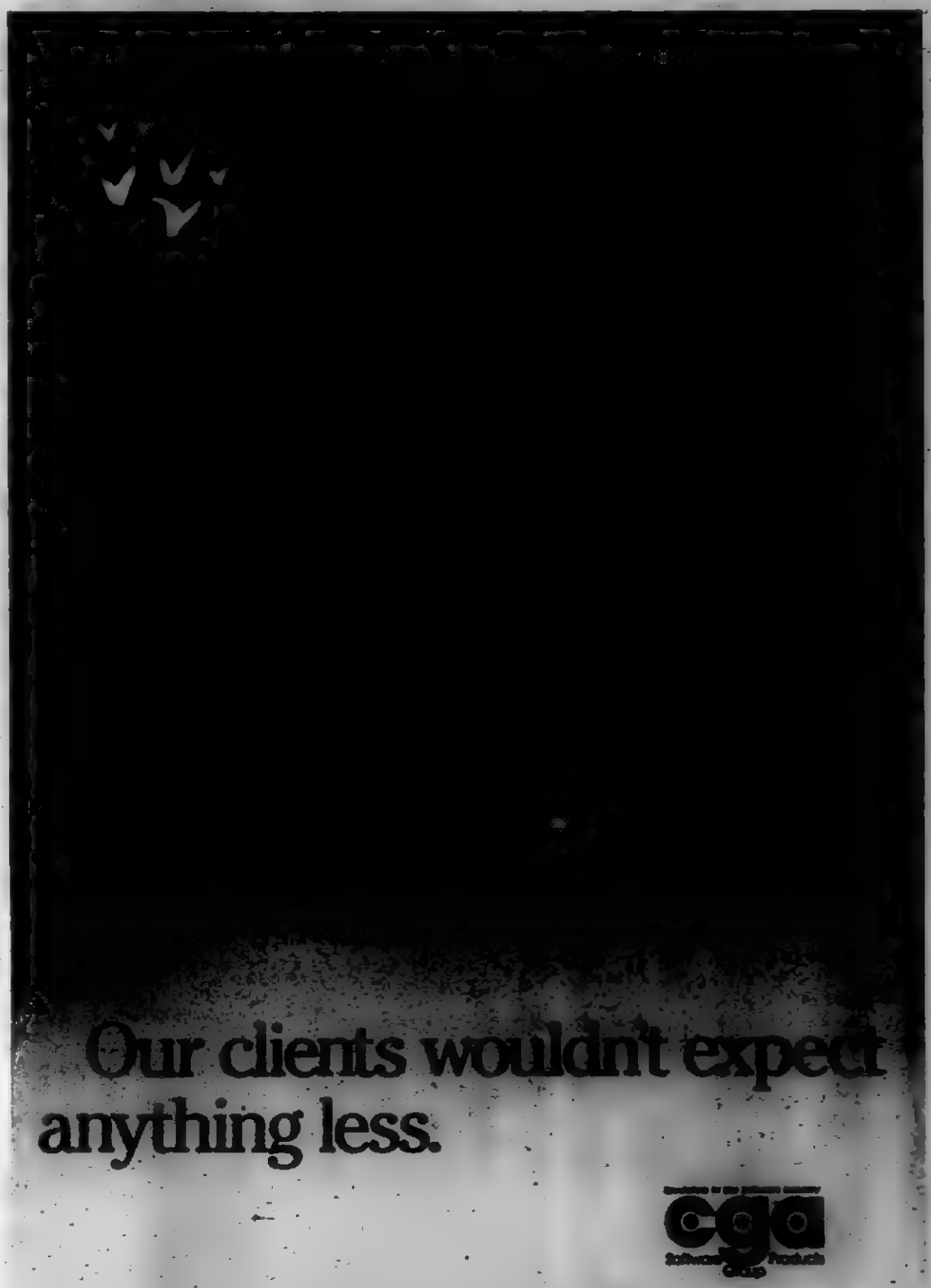
6. Institutional help is being replaced by self-help. The macroeconomics of the industrial-welfare state is yielding to the microeconomics of the information self-help society. We are shifting from a managerial society to an entrepreneurial society.

Somewhere between the shift from institutional help to self-help comes the question, "Can I really do it on my own?" For some people, there is a crisis of confidence, a fear that one is not yet up to the challenge of self-help, perhaps a desire to cling to the comfort of depending on others. Others are very assertive about taking care of things themselves.

Whether we like it or not, self-help fits the political and economic mood of the country.

7. Representative democracy is yielding to participative democracy. The new leader is a facilitator, not an order giver.

Any number of issues can be termed "workers' rights" — privacy, due process (in any dismissal



action), free speech, protection in whistle blowing, participation in management, flexible work contracts, equal pay for work of comparable value or an employee newspaper that is free to take on management. But the first four issues are most readily recognized as crucial. Citizens possess the first three rights outside of work, and people generally agree that it is highly unjust to penalize a worker for speaking out against illegal or immoral behavior on the part of his employer.

The Naisbitt study signals a powerful mismatch between workers and the way they are treated on the job. Now, workers are better educated, more self-confident about governing themselves (in politics and at work) and, consequently, more likely to demand fair treatment. At the same time, they feel they are being treated less fairly than workers in the 1950s.

The need, then, is for leaders (managers) who can facilitate employees' involvement in decision-making processes.

2. Hierarchies are "out," networking "in." Network-style management, now evolving, will be rooted in informality and equality; its communication style will be lateral, diagonal and bottom-up.

From Sweden comes a vision of the future corporation as a confederation or network of entrepreneurs. Employees who function as entrepreneurs are called intrapreneurs by the Foresight Group, which has created a school in Filipstad, Sweden, to teach intrapreneurship to both employees and corporate managers.

The main idea is to reverse the creative inertia in many large corporations by developing the *inside* entrepreneur. The Foresight Group believes there are a lot of good ideas within organizations for new businesses.

The company that can learn how to get people to actualize those ideas will have tapped a gold mine.

Both parties profit: The intrapreneur gets the company's good name, contacts, resources and money. The company keeps a creative person who may otherwise leave to start a new business and gains the potential to develop a profitable new in-house business.

3. The North-South split is presenting a crisis in infrastructure, which will eventually force both North and South to reexamine economic goals and purposes.

For the skilled and the mobile, and especially the young, the cities represent the promise of continued growth and prosperity. But what are the prospects for the unemployed in the North? Moving to the Southwest is an option many have taken. But if a person doesn't want to move, he must adapt by acquiring skills in a sunrise industry operating in his area. Life choices are no longer either/or.

Cities in the North are undergoing dramatic change. Manhattan will continue to be an important information-switching station for the world, while the four boroughs around it

Systems managers have the knowledge and opportunity to assume the key role in facilitating their firms' transitions from the industrial to the information era. They can help management formulate a strategic vision and convert it to a strategic plan.

decline. Lowell, Mass., the birthplace of the industrial revolution in America, has lost its industrial base, but it is today the world headquarters for Wang Laboratories, Inc., one of the leaders in the information society.

4. Either/or society is becoming a multiple-option one. You can tell you are being educated if your options are increasing and that the reverse is happening if they are decreasing.

Similarly, a society can tell it is growing if the options for its citizens are increasing. It is extraordinary for a society as mature as the U.S. to be growing — at least by this measure — so vigorously. Soviet bloc countries are stagnant by comparison.

Much of the multiple-option nature of the U.S. is addressed to our own individuality. We have greater and greater opportunities for self-expression — in education, religion and the arts, in our work as well as in the marketplace.

Information systems managers have the knowledge and the opportunity to assume the key role in facilitating their companies' transitions from the industrial to the information era. They can aid company management in formulating a strategic vision and then converting it to a strategic plan. This effort will be less than successful without equal attention to the other megatrends, such as the behavior consequences of the information era.

About the author

J. Daniel Couger holds the title Distinguished Professor of Computer and Management Science at the University of Colorado, Colorado Springs. He has lectured in more than 50 countries and written 15 books and more than 60 papers.

Prior to his academic appointment, Couger served as a manager in the computer field. In 1977, he was named U.S. Computer Science Man of the Year.

More professionals will attend FOSE '84 than any other office automation conference and exposition in America.

FOSE is the **largest** national office technology conference and exposition in the country – more than 250 exhibitors in 1984.

FOSE is the **most comprehensive** office systems program in the **nation** – over 3 acres of exhibits on **everything** that pertains to the total office environment.

No other office systems conference in the world features more **timely** topics than FOSE – 60 conference sessions, 10 full-day intensives, 100 internationally renowned speakers.

Don't wait. Don't delay. Don't stand in line. New for FOSE '84 is **preregistration.** Send for details on conference sessions plus list of exhibitors or call toll-free

800-638-8510 or 301-459-8383.

KEYNOTE SPEAKERS

John F. Cunningham, President and Chief Operating Officer, Wang Laboratories, Inc. Leader in office automation

Admiral H. G. Rickover, USN ret. Authority on government procurement, father of the nuclear navy.

FOSE HIGHLIGHTS

PC's – comprehensive showing of the latest in personal computers and microcomputer systems and software; day-long PC hands-on sessions for all conference attendees; also for conference attendees only, the opportunity to operate dozens of PC systems in the two day PC Center.

Micrographics, integration strategies, local area networking, telecommunications, and more!

FOSE '84, National Trade Productions, Inc., 9418 Annapolis Road, Suite #206, Lanham, Maryland 20706

Please send information and preregistration forms for FOSE '84 ☐ conference ☐ exposition W

Name _____ Title _____

Organization _____ Div. or Branch _____

Address _____

Mail Stop/Bldg. _____

City _____

State _____ Zip _____

Country _____

Phone _____

© Copyright 1983, National Trade Productions, Inc.

March 19-22, 1984
Washington, D.C. Convention Center

FOSE '84™
Federal Office Systems Expo

OXFORD JUST TAUGHT CICS to COBOL

UFO/COBOL™ replaces Command Level COBOL with plain vanilla COBOL.

UFO/COBOL is the perfect answer to your procedural on-line programming needs. For the first time, all your COBOL programmers can now develop CICS applications without learning one word of new code. No longer will the lack of specialized Command Level programmers be a barrier to satisfying the growing demand for more on-line applications. Now your present staff can put their ANSI COBOL programming skills to work cutting your backlog of on-line applications…doing it faster, more efficiently, more automatically than ever before.

Without modifying your on-line environment or operating system, UFO/COBOL takes standard COBOL commands, and automatically translates them using a unique COBOL compiler into the language necessary for CICS program execution. Your ability to utilize the substantial benefits of the on-line environment increases enormously, while your programmers continue to write in a familiar and natural way.

An example of UFO/COBOL commands.

In COBOL	In Command level	In UFO/COBOL
DISPLAY (SCREEN-NAME)	EXEC CICS SEND MAP ('XDFHCMA') MAPONLY ERASE END-EXEC.	DISPLAY (SCREEN-NAME)
READ (FILE-NAME)	EXEC CICS READ DATASET ('FILE-NAME') INTO (FILE-NAME) RIDFLD (KEYNUM) END-EXEC.	READ (FILE-NAME)

UFO/COBOL defines CICS 3270 screens on-line.

In addition to extending the capabilities of your programmers, you'll find that UFO/COBOL is a powerful new method to speed-up the CICS application process dramatically. Built into UFO/COBOL is an interactive screen painting facility that lets you design CICS 3270 screens on-line. UFO/PAINT allows you to build or modify screens without writing one line of code. You design the screen simply by positioning fields where you desire. Then COBOL data descriptions are *automatically* generated from the screen.

UFO/COBOL makes prototyping easy.

By quickly defining a sequence of screens, you can prototype the final system…testing and modifying each screen before writing code. You can develop applications interactively with end-users, gaining all the efficiencies of their direct involvement.

Developed by Oxford…#1 in CICS application development.

UFO/COBOL is a development of Oxford Software Corporation, the leading independent supplier of on-line application development software. With more than 1500 installations of UFO…the premier, 4th generation non-procedural approach to application development …no one knows more about the CICS application development environment than Oxford.

If you'd like to learn how you can dramatically add to your on-line development capabilities, using your present programming skills, call in the leader. Call Oxford today at (800) 631-1615.

OXFORD SOFTWARE CORPORATION
174 BOULEVARD/HASBROUCK HEIGHTS, NJ 07604/201 288-4515

☐ I'd like to schedule a UFO/COBOL demo. Please call to set a date.

☐ Please send me literature on UFO/COBOL.

Name_____

Title_____

Company_____

Address_____

City_____ State_____

Zip_____ Phone (_____) _____ CW28

W.S.A. Outside North America, contact one of the following WSA companies; Europe—Austria 0222-3135-1654; Benelux (NL) 03402-61088; France 1-294-2184; Greece 01-9560-631; Italy 011-517618; United Kingdom 01-950-3578; West Germany 02161-67604; Scandanavia (Sweden) 08-761-7380; Middle East/N. Africa—Greece 01-9560-631; S. Africa—11-37-3040; Israel—4-256195; India—(Madras) 44-89119; Asia—Hong Kong 05-865511-3; Japan (Nagoya) 052-211-5021; (Osaka) 06-445-7581; (Tokyo) 03-437-0821; Singapore 65-2253755; Australia—New South Wales 02-436-2477; South America—Brazil (Rio de Janeiro) 021-224-4378; (Sao Paolo) 011-258-1983.

EDITORIAL

No. 2? Stay tuned

If you can't be No. 1, the next best thing is to solidify your position as No. 2. And that is exactly what Apple Computer, Inc. has done.

Everyone knows Apple has a new microcomputer, the Macintosh. And just about everyone also knows that Apple's future as a competitor in the microcomputer business hinges on the Macintosh.

Why? Because for months, in numerous interviews with the media and in its advertising, Apple has been drumming it into our heads.

And the approach has worked. Apple appears to have emerged from the pack of 150-plus microcomputer vendors as *the* challenger to IBM.

But let's put the marketing hype aside for a moment. Most industry watchers agree the microcomputer market is headed for a big shakeout, and vendors that do not offer a unique, identifiable product are clearly headed for trouble.

Amidst this turmoil in the microcomputer industry, Apple has boldly staked its claim as the No. 2 vendor. The move is bold because a year ago Apple's hot new product, the Lisa, flopped. Its critics said the machine was too expensive, too slow and did not offer precious IBM compatibility.

Some critics went so far at the time as to predict Apple's demise. Now, Apple appears to be back in the running with a faster, cheaper version of the Lisa (although, at least for the moment, it still does not offer IBM compatibility).

Why does Apple appear to be a tougher contender today than it was a year ago? Because today Apple is doing a better job of hyping its products — a lesson learned from the master of hype, IBM, which had the industry abuzz over what the Peanut would look like.

But Apple dispensed with the secrecy and told everyone the details of the Macintosh while still maintaining an aura of mystery. Will the Macintosh make it? Will Apple announce IBM compatibility? Will Apple survive?

Those questions may not be answered for a while. Perhaps during next year's Superbowl?

Stay tuned.

LETTERS TO THE EDITOR

Value range not meant to be interpreted as damage claim: IBM

Computerworld's coverage of IBM's settlement with National Semiconductor Corp. and its subsidiary, National Advanced Systems, Inc. ["IBM, NAS settle case," CW, Jan. 16], misleads your readers about damages purportedly sought by IBM.

It is the value to IBM of the trade secrets obtained by National Semiconductor/National Advanced Systems — not IBM's damages — which was estimated to be between $750 million and $2.5 billion.

At no time was that value range meant to be interpreted as a damage claim.

We stated many times — in our amended complaint, in the courtroom and in a press release on Dec. 2, 1983 — that reports of high damage claims were in error.

IBM's primary objective was to obtain the injunctive relief necessary to protect against misappropriation and misuse of IBM trade secrets and confidential information. We stated clearly that the amount of damages was unknown and that if the defendants had not used the information and had not distributed it to others, damages would be minimal, if any.

Edward Nanas
Director of Information
Office of Director of Information
IBM
Armonk, N.Y.

Big Blue not alone in maintaining compatibility within product line

It was with interest and a discriminating eye that I read your article, "An IBM Look at the History of Computers" [CW, Dec. 26/Jan. 2].

I take strong exception to a statement at the close of the text: "Not coincidentally, the 370 also capped an effort begun with the company's 360 series to make all its equipment compatible — yet another concept that IBM pioneered."

To say that this statement is inaccurate is a kindness. It is, in short, misleading. It leaves the reader with the impression that IBM's product line is compatible between series, when anyone who has gone through the arduous task of conversion can tell you that this simply is not the case.

I know of only one of the major vendors that has maintained compatibility across its line of computer processors, and that vendor is Burroughs Corp., not IBM. Burroughs has not only taken great pains to establish compatibility within its product line, but has also managed to accomplish this same feat within the different generations of its computers.

To imply, therefore, that it is IBM that deserves accolades for this concept is to do a disservice to your readers and to Burroughs.

John R. Vetters
Dayton, Ohio

Computerworld welcomes letters from its readers. Preference will be given to typed, double-spaced letters of 150 words or less; they may be edited for the purposes of clarity and brevity. Letters should be addressed to Editor, Computerworld, Box 880, 375 Cochituate Road, Framingham, Mass. 01701.

COMPUTERWORLD

Editor
John C. Wilbrandt

Executive Editor
Rita Shaw

Assistant Managing Editor
Cheryl M. Gallo

Design Editor
Marjorie Magowan

Senior Editors:
Software
Paul Gillin
Communications
John Dix
Phil Hirsch
Systems
Tom Henkel
Industry
Bill Laberis
Features
George Harrar

International Editor
Susan Blakeney

Associate Features Editor
Barbara Van Scoyoc

Assistant Features Editor
Elizabeth Morse

Special Reports Editor
Donovan White

Staff Writers:
Peter Bartolik
James Connolly
John Gallant
Lynn Haber
Patricia Keefe
Paul Korzeniowski
David Olmos
Edward Warner

Correspondents:
New York
David Myers
Suite 7G
401 East 80th St.
New York, N.Y. 10021
212/570-2135
Washington, D.C.
Bureau Chief: Jake Kirchner
445 National Press Building
529 14th St., N.W.
Washington, D.C. 20045
202/347-8718

West Coast
Bureau Chief: Jeffry Beeler
Correspondent: Robert Ball
1080 Marsh Rd.
Menlo Park, Calif. 94025
415/328-8084

Chief Copy Editor
Kathie Gow

Assistant Chief Copy Editor
Charlotte Zibura

Copy Editors:
Becky Batcha
Dave Boulland
Bruce Crane
Deborah Scaduto-Hoin
Thomas Schmidt

Assistant to the Editor
June Fellig

Editorial Assistants:
Mary DeCristoforo
Joyce Fiuta

Contributing Editors
Education
J. David Cougar
Human Communication
Jack Stone
Telecommunications Times
Larry Long
Microcomputers
Thomas Madron
The Data Center
John P. Murray
Local on Software
Charles P. Lecht

Special Publications
Computerworld Extra!
George Harrar, Editor
Computerworld on Communications
Bruce Hoard, Editor
Computerworld QA
Ann Dooley, Editor
Computerworld Buyer's Guide
Marcia Blumenthal, Editor

Main Editorial Office: Box 880, 375 Cochituate Road, Framingham, MA 01701 617/879-0700

Computerworld is a member of the CW Communications/inc. group, the world's largest publisher of computer-related information. The group publishes 44 computer publications in 18 major countries. Nine million people read one or more of the group's publications each month. Members of the group include: Argentina's *Computerworld Argentina*; Australia's *Australasian Computerworld* and *Micro Computer Magazine*; Brazil's *DataNews* and *MicroMundo*; China's *China Computerworld*; Denmark's *Computerworld Danmark* and *MikroData*; France's *Le Monde Informatique*; Germany's *Computerwoche*, *Microcomputerwelt* and *PC Welt*; Italy's *Computerworld Italia*; Japan's *Computerworld Japan* and *PC Japan*; Mexico's *ComputerworldMexico*; Norway's *Computerworld Norge* and *MikroData*; Saudi Arabia's *Saudi Computerworld*; Spain's *ComputerworldEspana* and *MicroSistemas*; Sweden's *ComputerSweden*, *MikroDatan* and *Min Hemdator*; the U.K.'s *Computer Management* and *Computer Business Europe*; the U.S.' *Computerworld*, *Desktop Computing*, *Hot CoCo*, *inCider*, *InfoWorld*, *Micro Marketworld*, *Microcomputing*, *PC World*, *Run* and *80-Micro*.

VIEWPOINT

Pundits and predictions

LECHT ON SCIENCE

CHARLES P. LECHT

Getting the "right stuff" — the lowdown on what's happening in the computer industry, the information needed to create a credible and enduring plan for corporations gone electronic — is becoming increasingly difficult. Without it, planners and management have little hope of controlling their overall operating costs, a growing portion of which is for technology. Where the user community can look to find the right stuff is the subject of today's whimsy.

At the start of each New Year, the business of getting out annual forecasts of computer industry events consumes the time of corporate planners, financial analysts, manufacturers' strategists, research institutions and just about anyone else with crystal balls big enough to dare try to see into our computer future.

Pundits one and all each must vault the abyss between what is and what will be in their annual showpiece forecasts, then live with the reward or shame that these may bring. The former involves praise and money; regarding the latter, a year-long chorus of the hee-haws and cat calls from a balcony of Italian opera critics on hearing the croak of a diva's diving voice just begins to suggest the kind of ridicule possible.

The user/purchasing community is the ultimate benefactor of the accurate results of our pundits but, my friends tell me, these are increasingly useless these days: When our industry analysts reach consensus on a matter, it's usually unimportant; when their opinions are scattered all over the lot, a key issue is invariably involved.

For example, I've seen forecasts of between two and five million personal computers to be sold in 1984 from some highly reputable sources. When the cream of our computer-analyzing community cannot come up with an answer to this question with less than a 150% difference in result, something is amiss. If these figures came out of our purveyor community we might not be so surprised; we are naturally quite skeptical of their prognostications, betting that whatever they may proffer is tarnished by self-interested motives.

But when emanating from the best and brightest of nonaligned analysts, it's rather frightening. A grade-school lab teacher would flunk any student turning in measurements so deviant. And December 1983's sales of home computers and software so far exceeded that forecasted that we can only conclude that when it was made our pundits were out to lunch.

Pundits' fantasies

Divining the business plans of our most successful technology contenders — by deduction or otherwise — must be the objective of every persevering pundit. The megabucks poured into creating these by our industry's preeminent companies frequently exceed the totaled sales of their second-tier competitors. Where can we expect to find better information or more accurate verification than in their own forecasts? But acquiring these legally — that is, through respectable business practice — is nearly impossible. It's no surprise that every pundit worth his salt has fantasies of somehow acquiring the business plans of IBM, AT&T or Motorola, Inc. That is the stuff of which dreams — and fortunes are made.

I stress "legally" because only the Lord knows how many analysts couldn't wait for their dreams to come true and hopped the barrier between ferreting and filching, hoping He wasn't watching. It's ironic that even if our major corporations wanted to give us their plans, the Justice Department and/or the Securities and Exchange Commission would inhibit this by accusing them of "information trafficking," thereby scaring the wits out of loquacious executives who may be willing to spill the beans.

More significant is the fact that the laws of business combat call for the wholesale outwitting of adversaries. These rules include not only secrecy but also the age-old practices of deception through camouflage and other such maneuvers. Thus, even if the right kinds of corporate information were freely issued, we still would have no way of knowing what was truthful.

Now don't misunderstand me; I do not mean to infer that the preponderance of corporate spokesmen routinely and purposefully misrepresent key information or shirk their duty by failing to provide us with the factual basis for believing it.

What I do mean is that today's public pronouncements on important technological issues suffer from increasing obscurity, perhaps the same confusion that characterizes our swiftly changing conception of what constitutes a computer system, be it big or little. My guess is that like most people these days, many analysts are no longer quite so sure. This may help to explain the wide variances in their predictions.

Quixotic quest

Lacking the resources of the big guys or the banditry of the bad guys, most pundits must rely upon their wits to obtain data from documents in the public domain and sources connected with the headquarters of our industry leaders. It is, therefore, not surprising that a typical day in the life of a typical pundit usually involves a quixotic quest for — the right stuff.

"How much was spent on programming in America last year?" a voice asks our typical pundit at 9 a.m. He doesn't know but offers to find out. He phones an analyst friend who promises to get back to him as soon as he calls an associate who's sure to have the answer. Before closing the conversation, the friend asks, rather sheepishly, if he is aware of how many persons programmed at least one line of code in 1983. He doesn't know — or care, for that matter — but he is now obliged to learn.

Our pundit calls a second friend for an answer to the question of the first. The second promises to answer our hero's question that afternoon — after receiving his pledge to obtain the total capacity of computer storage media produced in America between 1975 and 1990.

Now burdened with three unanswered questions, our pundit dials his Penultimate Source who refers him to an Ultimate Source — but only after receiving a commitment to find out whether gallium arsenide technology is becoming more popular

See PUNDITS page 46

Don't let your software get the best of your system

HUMAN CONNECTION

JACK STONE

As it has been all through the computer age, new software continues to open the doors to a world of exciting possibilities for productivity advances, as well as an accompanying galaxy of opportunities for misuse, counterproductivity and excessive costs.

With all the powerful hardware floating around, many tend to forget that the penalties in systems performance that must be endured to support increased functionality of certain software may not justify its acquisition.

This column is intended as a reminder that, in spite of plummeting hardware prices, software efficiency is a subject that cannot be ignored.

Excellent examples of this issue are found in word processing software where software inefficiencies are directly measurable in terms of extended time for hands-on sessions. Take, for example, the "speller" software that's all the rage in office circles.

Let's start with the capability of viewing the context narrative of a mismatch word, that is, one that has no match in the master dictionary. One software package makes it mandatory that the operator view each word in context before selecting a disposition for it. On the face of it, this feature is very impressive, but it turns out that it not only slows down — way down — the spelling analysis, but it is also unnecessary in most cases because the writer/operator usually recalls the narrative from memory.

A better approach, used in several programs, is to make optional both the storage of contextual information during the initial spelling scan of the narrative and its display during the disposition phase of the mismatched words.

Personal dictionary

Another feature of spellers is the personal dictionary, which may be optionally concatenated to the master dictionary. Typical packages allow the operator to dispatch mismatch words directly to the personal dictionary, a choice that seemingly speeds its creation. This option, in my opinion, is a poor choice to select because words assigned to the personal dictionary should not only be carefully checked for spelling errors before their entry but their alternate forms should be probed for in the master dictionary and included in the personal dictionary if necessary — a task that may be time-consuming. The point is that the effort involved in developing the personal dictionary should not be overlooked.

Then there's the "window" fad that's rapidly coming upon us. At first blush, it seems really neat to have "two to eight" files displayed together before your very eyes. However, if you have been fooling around with word processing at all lately, you would know that most of the time you want to devote the entire screen to text for simple entry and edit purposes.

A little experience with Micropro International Corp.'s Wordstar proves this: "Command Help" screens — a rudimentary form of window — occupy a good part of the display and cause considerable increases in scrolling time, plus plenty of distractions from the text edit process; its designers, of course, recognized this and provided commands to suppress the Help screens.

Capacity confusion

And on the subject of Wordstar, one of its prominent features is that a document file is not restricted in size to random-access memory (RAM), but to the capacity of the disk storage. True enough, but what is meant is the "net" capacity of disk storage after allocating space for Wordstar's work files and the document backup file.

Even deleting the backup file, I couldn't save a 150K-byte file on a 256K-byte disk — not enough space. And with this size file and a small RAM, circa 48K bytes for me, I waited seemingly forever to get the cursor to move from the bottom to the top of the file, in stark contrast to the time for movement in a RAM-only file — as designed into certain software — which is negligible.

Software functionality is wonderful: Just be sure you don't forget what you are paying for in terms of systems degradation or development expense.

Letters to Stone should be addressed to him at P.O. Box 33600, Washington, D.C. 20033.

VIEWPOINT

The real strengths of relational systems:

READER'S PLATFORM

E.F. CODD
C.J. DATE

The essence of William H. Inmon's In Depth article "What price relational?" [CW, Nov. 28], Inmon's principal message, in other words, is that "poor performance . . . is inherent to the relational environment." The argument presented in support of this conclusion is that relational systems will be running a mixture of planned transactions and ad hoc queries (short-running activities and long-running activities, to use Inmon's terms), and that those two kinds of activity are mutually disruptive.

Now it is true for any system (not just a relational one) that these two kinds of activity will tend to interfere with each other somewhat, and there is no harm in drawing attention to that fact. But to suggest that relational systems will, therefore, have significantly worse performance than less flexible (hierarchical or network) systems is completely unwarranted for at least the following two reasons:

■ First, it is an apples-and-oranges comparison. It is extremely difficult to perform any kind of ad hoc activity at all on hierarchical and network data bases, with the result that those systems are almost invariably (de facto) devoted to planned activities. This fact does not mean that users would not like to be able to perform ad hoc access to those data bases if they could.

■ Second, there is no requirement to mix the two kinds of activity in a relational system. It is ridiculous to suggest that "no . . . controls are imposed" in the relational environment. Of course such controls can be imposed, if the installation requires them. Even then, if such controls do prove necessary in certain installations, the user will still enjoy all the other advantages of relational technology (ease of use, speed of application development, resilience to change and so on) and in addition will be able to perform ad hoc access at controlled times. Furthermore, there will be many installations where such controls will not be necessary, because the overall performance requirements will be less stringent. Control vs. performance is a trade-off like any other.

Inmon makes a large number of specific but unsubstantiated claims regarding the performance (actual or potential) of relational systems. He says that "a typical relational environment consists of many separate tables, none of which are physically connected," and that therefore the system has to "search for data in diverse places and [has to] construct relationships dynamically."

Such statements demonstrate a thorough confusion between the physical and logical levels of the system. Inmon seems to be unaware of — at least he makes no reference to — the many physical-level (implementation) facilities that have been provided in relational systems specifically for performance reasons. Those facilities include (but are not limited to) the following:

■ Physical data clustering (both intra- and intertable): Tables can be physically connected or stored physically close to one another (even interleaved, as in a hierarchic or network system), if required — but they don't have to be. Note that physically separate tables are actually a better structure (from a performance standpoint) for many applications.

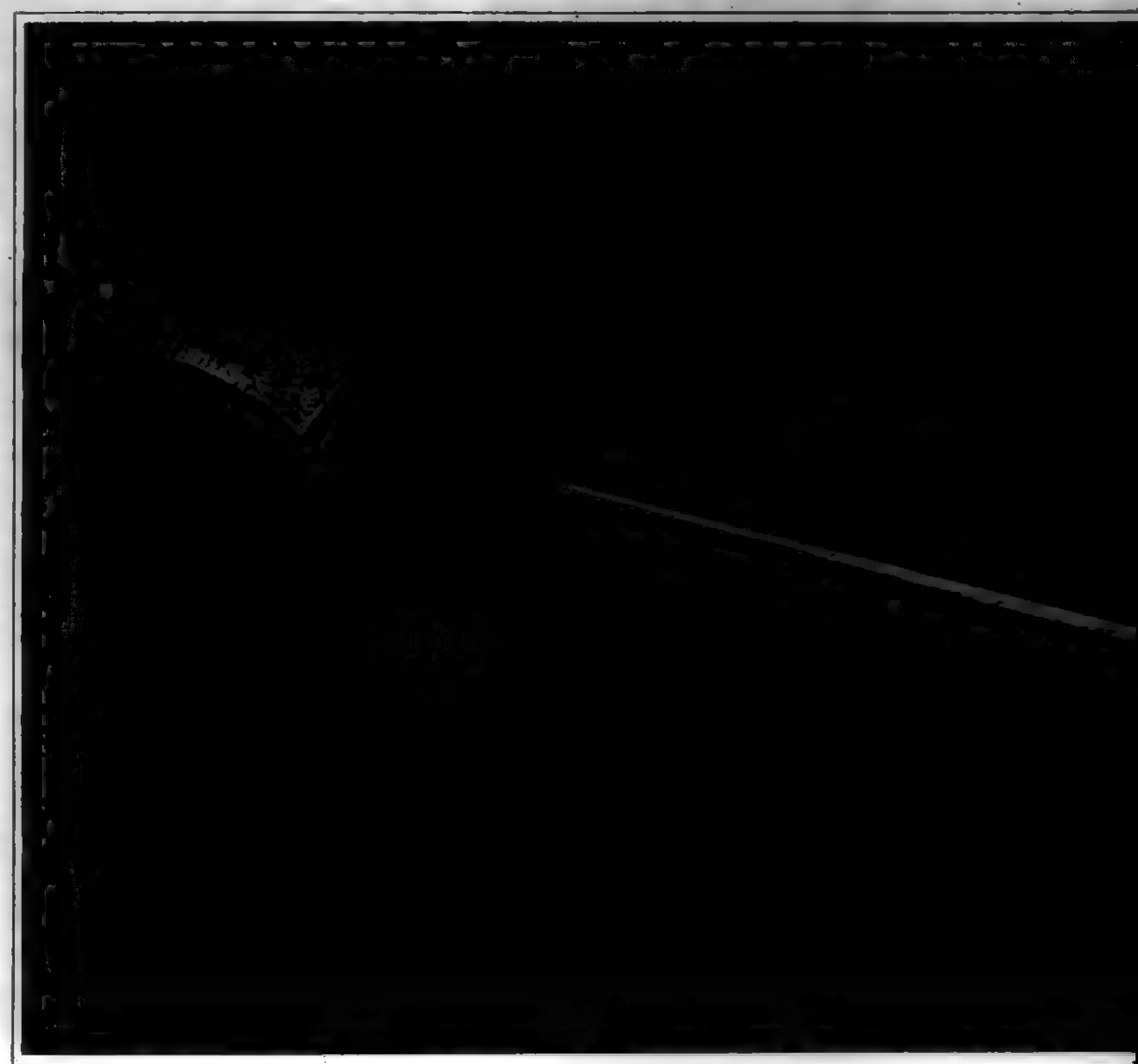
■ The optimization compiler technology pioneered in System R (and subsequently incorporated into the IBM products SQL/DS and DB2) means that a significant portion of the process of "searching for data and constructing relationships" is done statically, instead of dynamically, which thereby reduces the amount of runtime I/O.

■ The provision of indexes and the ability to create and destroy indexes dynamically represent an important aspect of performance that is totally ignored in the article.

There are numerous additional errors of fact and judgment in the article. Some of the more egregious ones are as follows:

■ Inmon states that "resistance to the notion that relational systems do not perform poorly goes back to the relational movement itself . . ." He seems to be saying here that "the relational movement" (whatever that is) has always claimed that relational systems do perform poorly. Surely that cannot be what he meant. More to the point, he goes on to say that "the relational movement is founded in a batch mentality." In fact, exactly the opposite is the case: The original intent was to make the data base directly accessible to *end users* (implying interactive access).

■ "Given the syntax of a language like SQL, it is very difficult, if not impossible, to separate requests" — that is, into long-running vs. short-running — "until runtime." Actually this is untrue, though it is true that systems today do not attempt to make such a separation.



MSA introduces the shortest distance between two points.
New MSA Order Processing.

MSA's remarkable new Order Processing System keeps every order on track and on schedule.

It automatically checks credit and inventory availability. Schedules shipping. Bills customers. Immediately throws a red flag if there's a problem.

Then resumes the process when the problem is resolved.

It's the perfect way to keep your customers satisfied.

Now they won't have to wait while your customer service representative keys in line after line of information. The system automatically displays addresses, preferred shipment and other order-related information.

It also instantly checks current credit records, saving your service representative that time-consuming task.

Customer inquiries are a snap with MSA's

VIEWPOINT

Two experts review the performance issue

■ The "second operating system solution" (involving the temporary removal and subsequent reinstatement of long-running activities) is absurd and would not be worth discussing here at all, were it not for Inmon's final remark to the effect that the notion of "the standard work unit" is "violated at a most basic level by relational systems." This is arrant nonsense, as the most superficial examination of a system such as DB2 (for example) would immediately demonstrate.

■ "In Codd's original specification of the relational environment, it was specified that content-addressable memory be used, rather than conventionally addressable memory." This is completely untrue. There was never any suggestion on the part of either of the undersigned that content-addressable memory was a prerequisite to good relational performance, and the success of modern relational systems (implemented on conventional memories) has shown that indeed it is not.

■ "Much has been said about user satisfaction, nearly all of it at the syntax level." It is absurd to suggest that the many benefits of relational systems — increased productivity, ability to prototype, direct end-user access and so forth — derive exclusively from the syntax of the user language. To take one simple example, the fact that the relational user can dynamically join any number of tables *without having to be aware of the physical representation of those tables in the data base*, which is a significant ease-of-use and productivity factor, is certainly not a question of syntax.

The general tone of Inmon's article is reminiscent of the unfounded criticisms of stored-program computers that appeared when those computers were first under consideration as products. A typical claim at that time was that sorting data on stored-program computers, for example, must inevitably be slower than sorting data using punched-card equipment.

Today, nobody would make any such claim. When a new technology is introduced, there is never any shortage of people ready to decry it; the absence of adequate knowledge of the technology in question does not seem to deter people from making such attacks. If the picture presented in Inmon's article were even close to the truth, is it likely that so many software vendors would be working so hard to provide relational products, and so many users would be so loudly demanding them? ‡

Codd, the original architect of the relational model, is an IBM Fellow in research. Date is an author, lecturer and consultant specializing in relational data base systems.

PUNDITS from page 43

than the Josephson Junction-based stuff for very high-speed integrated circuits.

Phoning the Ultimate Source, who holds him on the line while making a call, our indefatigable analyst learns the answers to the last two of his questions. With the requested figures cascading from his mouth like falling dominoes, he relays the newly acquired information to the Penultimate Source, then to the second person he called, who thereupon supplies him with an answer for the first person he called, who thereupon provides him with an answer to the original question.

To the original caller he triumphantly proclaims — "four billion dollars, give or take a hundred million" — gilding the lily of his day's success by asking if there is any other way he can be of assistance. "As a matter of fact," his friend replies, "I need to know which is preferred for use in very high-speed integrated circuits: gallium arsenide or Josephson Junction-based technologies?"

Our pundit is startled; the Ultimate Source had just given him the answer. He responds smugly: "Gallium arsenide, naturally. Everyone knows that." The caller thanks him, adding that he wanted to confirm the answer he'd just given to another friend — the friend was, of course, the Ultimate Source. And so it goes. Could anyone disagree that it's a hard-knocks life being a pundit prognosticator? His plight may be as pathetic, in fact, as that of the typical user of his prognostications. It's no wonder that all of the computer industry's punditry lives for the same fantasy. They dream of boarding a jet, reaching into the seat-pocket for the in-flight magazine and finding a portfolio in its stead. On it, big as life itself, are the words: "TOP SECRET: The IBM Corporate Plan, 1984."

Visions of a yacht in a Galapagos lagoon inevitably end the dream. For this is indeed the stuff of which fortunes are made. The right stuff.

Lecht is chairman of Lecht Sciences, Inc., a New York-based think tank specializing in computer and communications technologies.

system. It lets you review the status of orders, prices, credit or inventory availability at a moment's notice. You can change orders easily.

And the system is flexible enough to handle special requests for shipping vendors, packaging, delivery dates or special handling procedures.

Just as important, MSA's online realtime system helps you control internal costs. It moves orders along without costly error or duplication of effort. It provides current information on pricing, discounts and special sales agreements with individual customers.

And it's a powerful tool for controlling inventory, since you can conveniently check on inventory status daily.

You'll find MSA's new Order Processing System flexible and easy to use. It works with the MSA Manufacturing System to let you schedule production more efficiently. And promise ship dates to customers more confidently. Of course, it's also perfectly integrated with MSA's Financial System.

If your company is ready for a dramatic improvement in your order processing, contact Robert Carpenter at (404) 239-2000. Or write Management Science America, Inc., 3445 Peachtree Road, N.E., Atlanta, Georgia 30326.

MSA
The Software Company

Navigate through performance problems with EPILOG™/MVS

Before EPILOG/MVS, performance problems were often hidden in piles of printouts and pages of reports.

With EPILOG/MVS, you can find the answers to your questions about...user response... service levels...capacity management... and more.

The problems of wading through masses of data are now solved by a breakthrough in EPILOG/MVS. It's called the System Performance Navigator. With it you visually identify a problem area on the CRT (example, Figure 1: long response time of 1.81 seconds on Tuesday, July 5) and simply put a command character on this problem line (for example, "D" for degradation and "R" for resource utilization). The System Performance Navigator will immediately generate the next display customized to the specific problem area.

EPILOG/MVS guides you from problem to solution in as little as three easy steps. The System Performance Navigator allows you to navigate: from weekly summary information to hourly details, from service levels to degradation analysis, and from degradation analysis to resource analysis.

EPILOG/MVS: Simple to use—but powerful!

For more information, contact your Candle representative.

!Candle·

10880 Wilshire Boulevard, Suite 2404
Los Angeles, California 90024
(213) 207-1400

Figure 1—*User notes long response time for July 5, and enters "D" to generate degradation display in figure 2.*

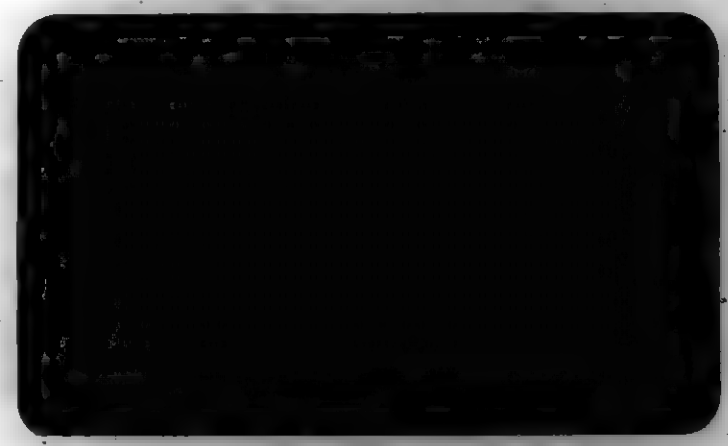


Figure 2—*User observes that Private Page-In Wait is a problem and enters "R" to generate page dataset activity display in figure 3.*

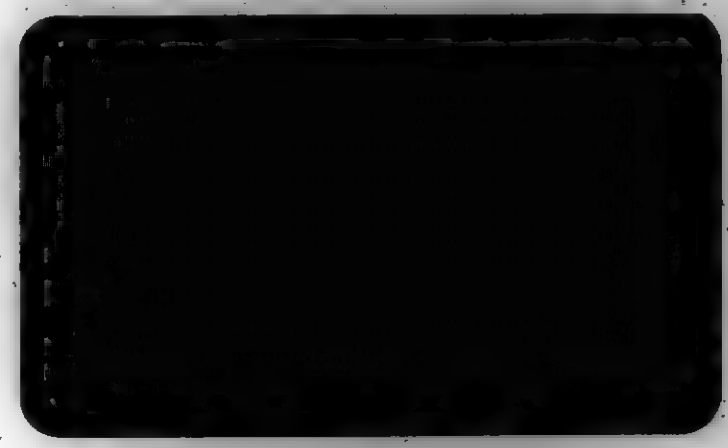


Figure 3—*For detailed analysis of the paging resource, EPILOG/MVS shows statistics on both the page datasets and the DASD devices they reside on. This screen shows the cause of the problem: device contention causing very high busy rates on devices 150-152 which contain the local page datasets.*

☐ Please send me more information on EPILOG/MVS.

☐ Please enter my free subscription to the Candle Computer Report.

Name/Title

Company

Address

City/State/Zip

Phone

!Candle·

Dept MI • 10880 Wilshire Blvd., Suite 2404 • Los Angeles, CA 90024

A-21

SOFTWARE & SERVICES

Will 1984 be Cincom's year?

SOFTALK

PAUL GILLIN
CW Senior Editor

Look for 1984 to be a big year for Cincom Systems, Inc. The Cincinnati-based vendor of systems software and the highly successful Total data base management system (DBMS) has been eerily quiet for the last two or three years. The reason is that it has been in a period of intensive research and development activity that is just beginning to show fruit, according to company officials.

Cincom's recent announcement of a set of decision support applications based on the mainframe and a version of its Mantis application development system for the IBM Personal Computer XT/370 is the first of what could be a flurry of product activity from Cincom this year.

The company will round out its manufacturing product line with a vendor analysis and purchase system, a $1.5 million-line bear of an application that will give it a functionally complete offering in this area. We can also expect to see some general financial applications released this year, led off by an accounts receivable package. The move will put Cincom into an increasingly crowded market that now includes some of its major competitors in the data base field.

Expect to see a kernel of the company's TIS data base product released as a relational DBMS in an effort to provide an upgrade path for current users of Total.

The kernel will include the underlying data base structure, In-Line Directory, physical data manager, Logical User View and directory; it will not include most of TIS's programming facilities.

The announcement would also be an attempt to help define a market for TIS, which is one of those rare products that can't be easily pigeonholed. Cincom calls it an "integrated data base system," but the DBMS component only makes up about 10% of the TIS code. By re-

See CINCOM page 56

Vendor blasts HP users group
Cites unfair rating

By Jeffry Scaler
CW West Coast Bureau

AUSTIN, Texas — A local software supplier is threatening to sue a Hewlett-Packard Co. users group to protest the allegedly invalid results of a recent membership survey in which the vendor's main product received only lukewarm customer-satisfaction ratings.

Of the more than 60 survey respondents who evaluated the performance of Protos Software Co.'s fourth-generation programming language, only half are named in the company's master list of certified customers, according to Protos Vice-President Gary Simmons.

The rest of the respondents are apparently nonusers who generally expressed considerably more dissatisfaction with the product's operation than the bona fide customers and, thus, substantially lowered Protos' overall score, Simmons said.

In addition to contaminating the survey findings and casting doubt on the study's validity, the performance ratings have harmed the software company's sales and have provided advertising fodder for at least one prime competitor, he complained.

"We already know of one person who wanted to buy our product and whose preference originally had the inside track," Simmons said. But opponents of the proposed purchase "seized upon the survey results and ultimately used them to shoot the acquisition down. There's no question in my mind that the impression the survey has left in some potential customers' minds has been a factor in their analysis of our product."

Concern about the survey's possible impact on Protos' sales prompted the firm last month to draft a letter demanding that the HP 3000 International Users Group revise the disputed findings and print the changes in its monthly magazine, *Interact*. But thus far, the demand has failed to produce the desired result.

"The information we released in our survey is exactly what we initially said it would be — our members' opinions about a broad range of products for the HP 3000," said users group Executive Director William Crow. "We never tried to qualify our

See PROTOS page 56

On-line Software's Freestyle debuts

FORT LEE, N.J. — On-line Software International has announced Freestyle, a data base access system that the vendor said allows users to access selectively, manipulate and update data regardless of how that data is organized or stored.

The Freestyle system is said to be based on the company's Content Address Method technology, which allows data access by the content of a record rather than through traditional keys. The system reportedly "fits" its information into less than 25% of the original file size, offering improved disk space efficiency.

Four components of Freestyle are currently available, including the Freestyle dictionary, end-user functions that include a free-format query language, an applications program interface and the Content Address Method technology. A fifth component scheduled for release in March 1984 reportedly will provide the ability to connect indirectly related information from multiple files.

Freestyle is said to operate by creating a content index of data and then using that index to locate data. Even data that is not structured by means of a data base management system (DBMS) can be treated as a single source of information and used accordingly, the vendor said.

Freestyle was designed to operate on IBM processors in conjunction with IBM's Vsam, Isam and Bdam access methods. The vendor said it can also be used with most currently available DBMS. The introductory price for Freestyle is $50,000.

On-line Software International, Fort Lee Executive Park, Two Executive Drive, Fort Lee, N.J. 07024.

FIRST CONCEPT

Link ties variety of mainframe data bases to IBM Personal Computer/48

Transportable DBMS debuts for IBM, Honeywell systems/48

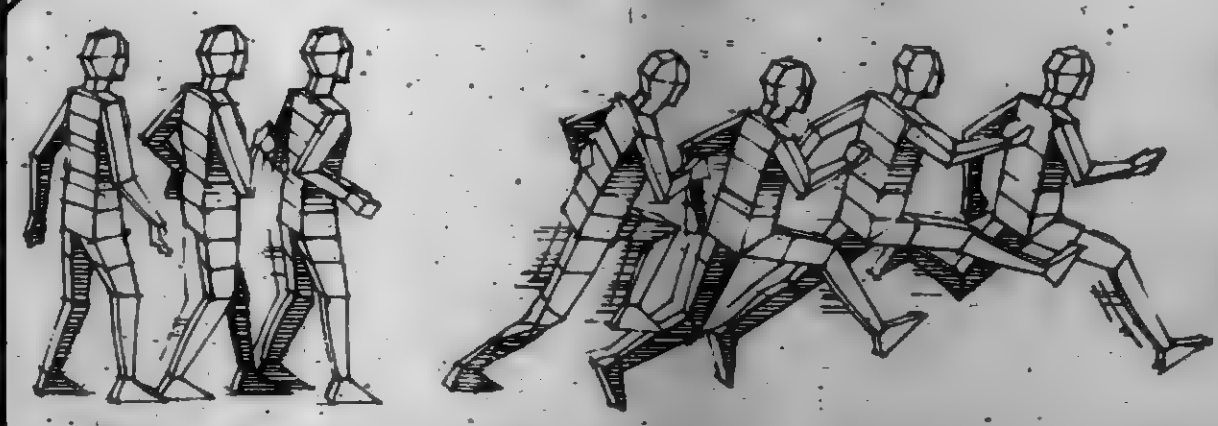
INSIDE

Systems Software/48
DBMS/56
Languages/56
Methodologies/56

MVS Users

Announcing!

Catalog Performance Optimizer (CPO)



Eliminate master catalog searches, reduce response time and CPU overhead automatically!

Duquesne Systems Inc.
Two Allegheny Ctr.
Pittsburgh, PA 15212
Call our Marketing Department:
1-800-323-2800.
Inside PA: 412-323-2800

Micro-mainframe link targets IBM users

ROCHESTER, N.Y. — First Concept Technologies, Inc. has announced a microcomputer-to-mainframe link that reportedly will support Basic and Pascal programs on the IBM Personal Computer and a variety of data base management systems (DBMS) on IBM mainframes.

Called Interchange/1, the system is said to allow microcomputer applications to access and update records contained in an IBM mainframe data base. Interchange/1 reportedly operates in conjunction with such mainframe systems as Cincom Systems, Inc.'s Total and TS2; Cullinet Software, Inc.'s IDMS; Software AG of North America, Inc.'s Adabas; and Vsam. A spokesman said the system runs under the host teleprocessing monitor and is independent of the operating system.

With Interchange/1, according to a spokesman, the user issues basic get, insert, update and delete commands and operates on logical, flat records. The system performs all translation necessary to access the mainframe data base. Utilities are also provided that accommodate the uploading and downloading of data, and the download utility prompts for file and any Boolean criteria, retrieves matching records from the data base and displays, prints or writes the records to a user-specified micro file.

A customer moving from one DBMS to another requires no modifications to the micro-based Interchange/1 modules. The logical nature of the system's commands insulates the user from DBMS changes.

In the initial release, Interchange/1 will support Pascal or Basic programs on the IBM Personal Computer. Support is also provided for the Radio Shack TRS-80, Apple Computer, Inc. microcomputers and the Wang Laboratories, Inc. Professional Computer. An unlimited usage license for Interchange/1 is $45,000.

First Concept Technologies, P.O. Box 23510, Rochester, N.Y. 14692.

ACT announces portable DBMS for minis, CPUs

NEW YORK — Advanced Computer Techniques Corp. (ACT) has announced Clio, a transportable data base management system for minicomputer and mainframe systems.

According to the vendor, Clio uses ACT's proprietary data allocation method known as Virtual Space, which allows the system to assign a virtual address to data elements that are independent of storage device and data relationships. Clio reportedly permits any type of relationship to be defined, including hierarchies, networks, relational inverted files and qualifiers.

The system is said to support a layered information organization with concurrent on-line and batch data base access. It includes host language interfaces for Cobol, PL/I, Fortran and assembler programs, and its virtual space architecture provides for data structuring, data base modification and growth and data compression.

Clio reportedly also includes a set of support tools, including a data dictionary, report writer, query language, data manipulation language and text editor. Transaction journalization and data base roll-back recovery facilities ensure data integrity across system or program restarts.

Clio is available for IBM 360 and 370 mainframes and for plug-compatible mainframe systems under IBM's MFT, MVT, VS1/2, MVS and VM/CMS operating systems. It is also available for Honeywell, Inc.'s DPS 6 Level 6 and DPS 7 Level 64 processors under the Gcos operating system. Its license price ranges between $40,000 and $80,000 depending on the host system.

ACT, 16 E. 52nd St., New York, N.Y. 10016.

SYSTEMS SOFTWARE

UNIVERSITY COMPUTING CO. UCC-8 Release 2.0

University Computing Co. has announced Release 2.0 of its UCC-8 data center management software, which includes enhancements to the system's change management capabilities.

UCC-8, which runs on IBM mainframes in IBM MVS and VS operating system environments, is said to give data center directors control over help desks, network control centers, change control and inventory management processes. Enhancements to the package include program function keys for screen processing, automatic notification of overdue tasks and capabilities for user formatting of additional comments screen permitting the duplication of existing working documents.

A vendor spokesman said that UCC-8, through its on-line capabilities, allows managers to look directly into their operational environment as the software encompasses every activity taking place within a data center. The spokesman said the modeling functions of the package's

Continued on page 49

SOFTWARE & SERVICES

Continued from page 48

change management capabilities were enhanced also.

UCC-8 Release 2.0 is priced at $40,500.

University Computing, UCC Tower, Exchange Park, Dallas, Texas 75235.

LEVI, RAY & SHOUP, INC.
Dynamic Report System

Levi, Ray & Shoup, Inc. has announced the Dynamic Report System (DRS) which, the vendor said, is a utility package to transfer IBM CICS on-line print loads to the JES II and JES III components of IBM's MVS operating system.

According to the vendor, DRS's dynamic file allocation bridge between CICS and the JES spool data sets operates on a line-by-line or on a completed report basis.

DRS is said to utilize subtasking to eliminate interference with CICS. In addition, report application programs link to the appropriate DRS interface modules and pass report parameters via a call. The calls create new reports, add print lines and terminate reports, according to the vendor.

DRS operates under all releases of MVS, JES and CICS/VS. It is priced at $3,500.

Levi, Ray & Shoup, P.O. Box 18598, Dallas, Texas 75218.

STERLING SOFTWARE MARKETING, INC.
ESP Release 2.0

Sterling Software Marketing, Inc. has enhanced its Execution Scheduling Processor (ESP), a job scheduling system for IBM 370 mainframes.

The system consists of two modules: dependent job control and job submission systems. The package features data set trigger, automatic JCL tailoring and historical tracking, according to the spokesman.

The JCL tailoring capability allows a user to include or exclude portions of a procedure, the vendor said.

The package runs under any release of IBM's MVS operating system. For one CPU, each module costs $12,000; together, the two modules sell for $21,600.

Sterling Software Marketing, Crocker Bank Building, 1007 Seventh St., Sacramento, Calif. 95814.

MARTIN & MARTIN TECHNICAL SERVICES
Telescope

Martin & Martin Technical Services has announced Telescope, described as a tool for the IBM CICS programmer in IBM's MVS operating system environment.

Telescope is said to consist of more than 30 on-line transactions and a TSO cross-region monitor. The system features a dynamic storage map, memory display and optional memory alter, detailed terminal information and detailed Vsam file information.

Telescope is designed for MVS users of CICS Version 1.5 or 1.6. The system is priced at $5,000 or can be leased for $200 per month, the vendor said.

Martin & Martin Technical Services, 1626 Stafford Drive, Orlando, Fla. 32809.

SYNCSORT, INC.
Syncsort OS Release 2.5

Syncsort, Inc. has announced Release 2.5 of Syncsort OS, said to be a sort and merge program for IBM's OS operating system environment.

According to a spokesman, enhancements to Release 2.5 include data utility features that provide report writing, field manipulation and multiple output capabilities.

Syncsort OS Release 2.5 can sort and manipulate data and present the output in user-specified report form. Its report writing capabilities — dubbed Sortwriter — include headers, trailers, totaling and subtotaling and page and section levels, the spokesman said.

A multiple output feature can reportedly produce any number of separate outputs from one pass of the sort and direct each output to a different device.

Used in conjunction with the sort's selection and formatting functions and Sortwriting features, this allows the simultaneous generation of a variety of reports, which are individually formatted and contain unique records, according to the vendor spokesman.

Release 2.5 of Syncsort OS is licensed for three years at $7,600, the vendor said.

Syncsort, 560 Sylvan Ave., Englewood Cliffs, N.J. 07632.

PRODUCTIVITY AIDS

BSC, INC.
Flexsys 4

BSC, Inc. has introduced Flexsys 4, an application generator that runs on IBM Series/1 minicomputers.

The generator features menu-driven screens, commands on each menu and screen-building capability, according to the vendor. Features include automatic changing, deleting and adding of records to a screen, sorting on any or all fields and support for subtotal, subheading, header and page-footing options.

The system consists of two modules: an application development module costs $10,000, and a customizing feature sells for $800.

BSC, 1505 Roswell Road, Marietta, Ga. 30062.

INTERACTICS, INC.
Smash Release 5.0

Interactics, Inc. has announced an enhancement for its Special Module for Application Screen Handling (Smash), an interactive Cobol screen generator that runs on Prime Computer, Inc. minicomputers.

Release 5.0 generates an audit trail in a file maintenance program and features a recovery program that rebuilds a master file, according to the vendor. The system creates documentation for a terminal user whenever an add, change or delete module is used.

A one-time licensing fee costs $5,000 with a 10% annual charge for maintenance.

Interactics, 7303 Marisol St., Houston, Texas 77063.

MANAGEMENT AND COMPUTER SERVICES, INC.
Datamacs II

Management and Computer Services, Inc. has announced that its Datamacs automatic test data generator is now available for Honeywell, Inc.'s Gcos 3 and Gcos 8 operating systems.

The software, according to the vendor, will be offered both as a stand-alone package — Datamacs II — or in combination with its Tracmacs audit path analyzer system. Datamacs II is said to facilitate the creation and maintenance of test data for software testing, and it allows quality assurance techniques to be built into programs to guarantee that they meet requirements.

Datamacs II is priced at $26,000, and Tracmacs is priced at $20,000. Discounts are available when the systems are purchased together.

Management and Computer Services, Great Valley Corporate Center, Valley Forge, Pa. 19482.

APPLICATION PACKAGES

MCBA, INC.
Release 3 accounts payable

MCBA, Inc. has announced Release 3 of its accounts payable package written in Cobol for Wang Laboratories, Inc.'s Wang VS series computers.

The enhanced package reportedly includes an interface to MCBA's Release 3 general ledger, purchase order and receiving and mailing list packages. It features a user-defined general ledger account number format allowing up to 21 characters in up to five levels.

One-time source code licenses range from $2,000 to $6,000.

MCBA, 9441 Hermosa Ave., Montrose, Calif. 91020.

SAGE DATA, INC.
Sagegraf

Sage Data, Inc., has announced a graphics product designed to enhance the performance of Isaco, Inc.'s Tell-A-Graf on IBM VM/CMS.

Sagegraf reportedly provides Tell-A-Graf users with menu-driven selection and execution of graphics, an integrated time series data base manager and error-free downloading

Continued on page 50

TSO USERS
Poor Response Time
High Paging Rates
Improve your TSO performance with FSE+

Compare these features:

- Up to 50% less overhead than SPF
- Full-Screen Editor (LRECL up to 4096)
- Data Set Manager (Controls TSO files)
- JES Sysout Previewer (Direct from JES Spool)
- File listing facility (LRECL up to 32760)
- Programmable function keys
- Split-Screen facility (Two fully-active screens)
- Customer-defined exit facility (Controls all FSE+ functions)
- FSE+ tuning parameters (Optimize performance)
- Structured menus for new users
- Command oriented for experienced users
- MVS 3.8, SP and XA support
- Free trial period

Call or write for details
Applied Software, Inc. 840 U.S. Highway #1, Suite 250
P.O. Box 13027
North Palm Beach, FL 33408 (305) 626-4818

COMBOARD / HASP

the low overhead DEC/IBM interconnect

Your DEC computer has more important things to do than be a processor for your IBM communications. Save valuable computing capacity by handling your interconnect workload with a COMBOARD.

COMBOARD is a 16 bit CPU based single board computer that plugs into your DEC UNIBUS™. Then the COMBOARD, not the DEC host, handles all the real-time interrupts and protocol processing associated with data communications.

COMBOARD's low overhead means your DEC users still get quick response time at their terminals. Your CPU capacity is used for applications software, yet your data communications thruput remains high.

COMBOARD models 631,731 and 1231 support transfer rates from 2400 to 56,000 bps, and are the leaders in DEC to IBM or CDC interconnects.

For more details dial toll free - -
1-800-SRC-DATA
In Ohio, dial --
1-614-421-2094

SOFTWARE RESULTS CORPORATION
2687 Silver Drive
Columbus, Ohio 43211
TWX 810-482-1631

COMBOARD™ Software Results Corporation
DEC UNIBUS™ Digital Equipment Corporation

SOFTWARE & SERVICES

Continued from page 48

of presentation-quality graphics plot files to the IBM Personal Computer.

Sagegraf has a one-time fee of $8,500 per CPU. SagePC, with communications and graphics terminal emulation capabilities, costs $250 per Personal Computer, while additional hard-copy graphics device drivers for the Personal Computer cost $100 each.

Sage Data, 104 Carnegie Center, Princeton, N.J. 08540.

GEOGRAPHIX, INC.
Graphix-11

Geographix, Inc. has announced that its Graphix-11 business graphics software is now available for use with all operating systems for Digital Equipment Corp.'s LSI-11, PDP-11 and VAX-11 series processors.

In addition to its original DEC RT-11 version, the vendor said, Graphix-11 can be operated with DEC's RSX-11M, RSTS/E, VMS and TSX-Plus operating systems. Graphix-11 produces line graphs, bar charts, pie charts and scatter grams using dot matrix printers.

The system either operates in an interactive question-and-answer format or is driven by a keyword file as part of a larger application, the vendor said.

The RT-11 and TSX-Plus versions of Graphix-11 are priced at $1,095, the RSX-11M and RSTS/E versions at $2,095 and the VMS version at $2,950, according to the vendor.

Geographix, 156 N. Third St., Philadelphia, Pa. 19106.

COMMERCIAL SYSTEMS LABORATORIES, INC.
CS Ware

Commercial Systems Laboratories, Inc. has announced CS Ware, which combines the company's general business accounting applications and report and inquiry program generators.

The package includes five accounting modules: CS accounts receivable; CS accounts payable; CS general ledger; CS payroll; and CS order entry/inventory.

CS Ware can run on the entire family of Data General Corp. processors utilizing DG's Interactive Cobol (Icobol) software. CS Ware may also operate under DG's AOS and AOS/VS operating systems.

CS Ware integrates user-defined data dictionary elements and Icobol copy libraries to generate inquiry and report programs in each application module.

CS Ware costs $10,000.

Commercial Systems Laboratories, 459 N. Dean Road, P.O. Drawer 2710, Auburn, Ala. 36830.

AMERICAN SOFTWARE, INC.
Application package enhancements

American Software, Inc. has announced enhancements to three of its application packages for IBM 4300 series and larger mainframes under IBM's DOS/VS operating system using Vsam.

Release 11.2 of its Inventory Management System software has been enhanced to provide better planning capabilities and more precise exception messaging and reporting, the vendor said.

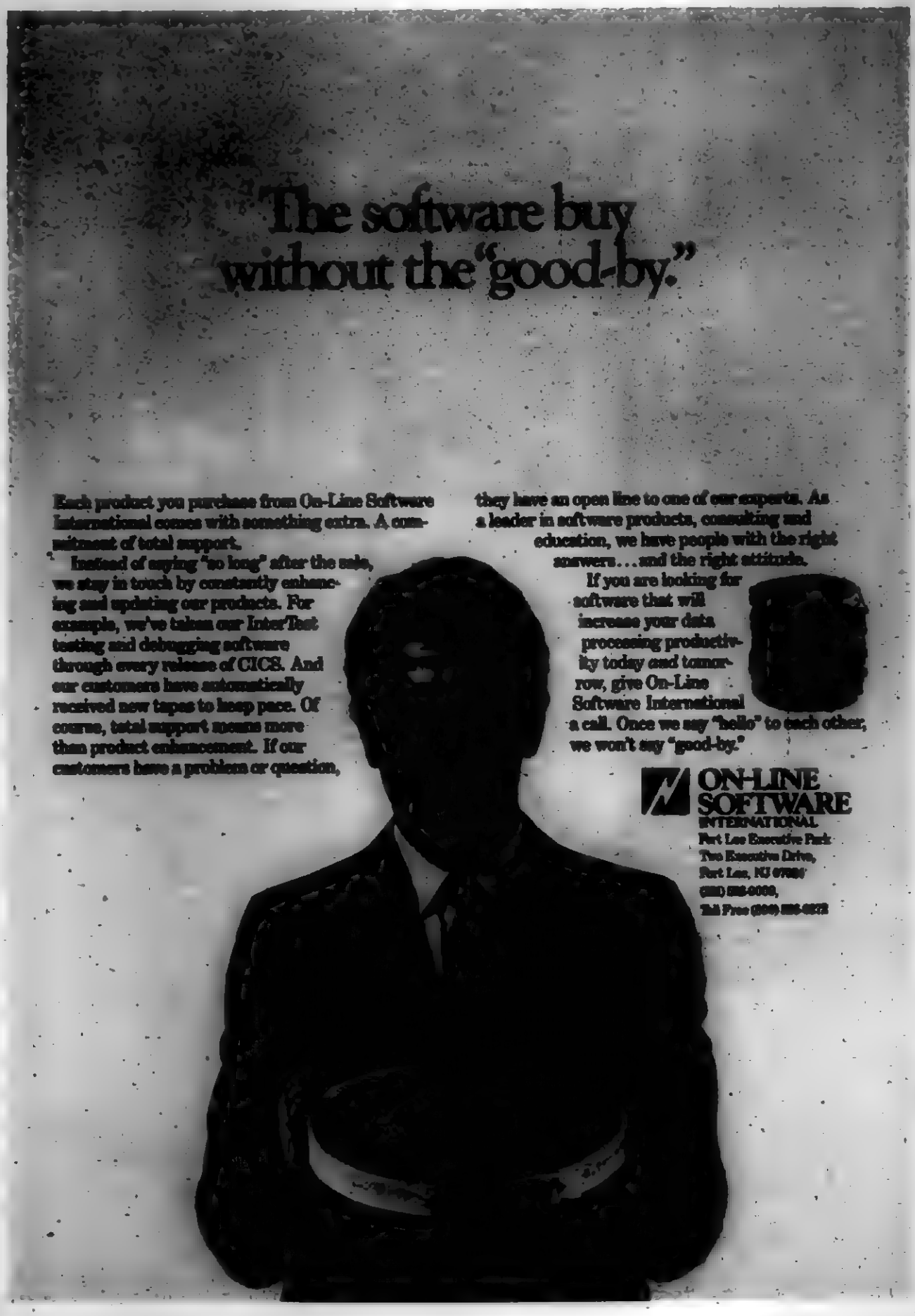
The package's Inventory Evaluation Subsystem has been rewritten so that summary results showing inventory investments necessary to accomplish customer service or in-stock objectives can be produced for historical comparison.

American Software also enhanced its Sales Forecasting System, adding more user controls and greater simulation capabilities.

Its Fixed Asset Accounting System has been enhanced with an on-line security feature that allows users to assign, by password, those functions and screens each user is allowed to access, according to the vendor.

The enhancements to each package are provided at no cost to current users. The Fixed Asset Accounting Sys-

Continued on page 84



For CICS DOS VS &
IPCP opens and closes CICS files from batch partitions with a single execute statement.
• enable/disable transactions
• and many other CEMT functions
• eliminate PAUSE statements
• keep CICS up 24 hours
• free 30 day evaluation period
• $950 one time or $48/month
J. W. LAMPI, INC.
8180 Benjamin St. NE
Minneapolis, MN 55432
(612) 571-3934

Soup up your Volkswriter.

Everybody knows Volkswriter, the word processing software package that's become synonymous with high performance. Now, there's a way to get even higher mileage out of your Volkswriter. Hook it up to a Dataproducts P Series dot matrix color printer.

The versatile P Series translates the executive class, word processing capabilities of the Volkswriter into brilliant full color charts, graphs and text. It delivers a full page of text quality print in nothing flat while its sheet feeder automatically prevents loading hassles. And the P Series uses pin feed or plain paper and has the brains to fill every appropriate line with crisp, sharp copy, even if it has to justify to do it. And the P Series color printer has dual speed capability for correspondence quality output for the Volkswriter's many word processing applications and high speed output for draft and spreadsheets.

The Dataproducts P Series color printer. Think of us as a supercharger for your Volkswriter.

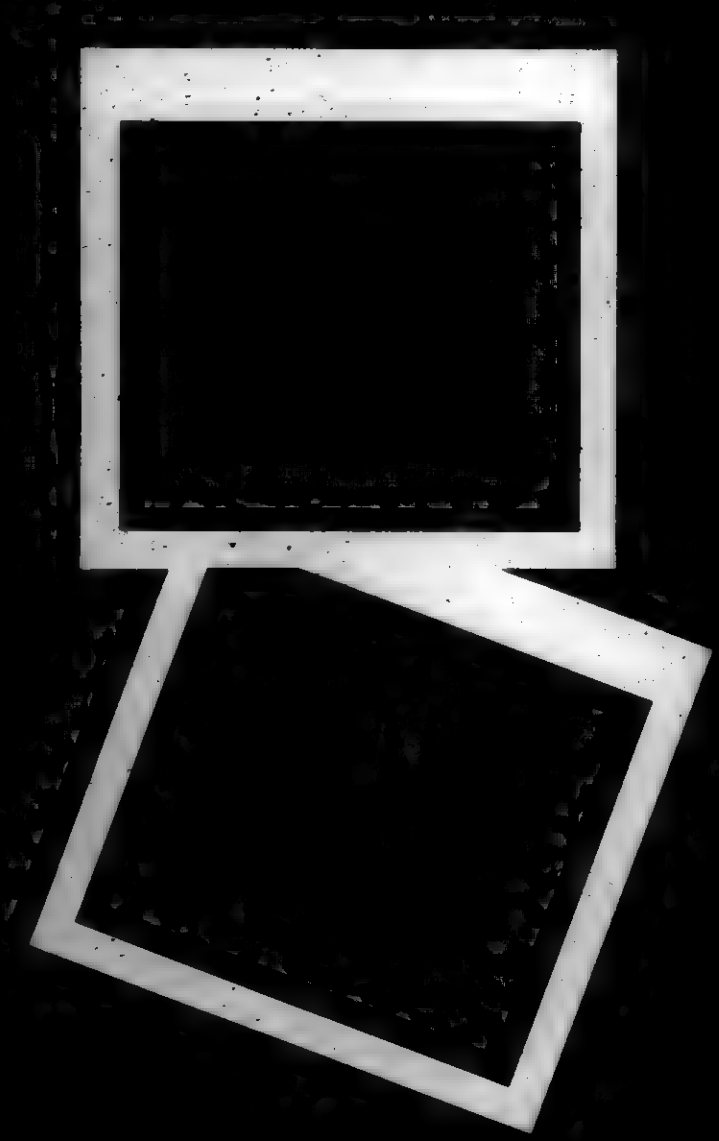
For more information go to your nearest computer store and ask about the Dataproducts P Series color printer, or call Dataproducts, 1-800-258-1386.

Dataproducts computer printers

Nobody puts ideas on paper so many ways.

Volkswriter is a registered trademark of LIFETREE SOFTWARE INC.

"WITH VAX WE CAN BUILD MARKET SHARE ANYWHERE WE SEE AN OPPORTUNITY."
John J. Clancy, Senior Vice President, Industry and Product Management, McDonnell Douglas Automation Company



SOFTWARE & SERVICES

Continued from page 50

tem is priced between $25,000 and $50,000.

The Inventory Management System is priced between $20,000 and $150,000, and the Sales Forecasting System costs between $18,000 and $150,000, depending on the modules and features selected, according to the vendor.

American Software, 443 E. Paces Ferry Road, Atlanta, Ga. 30305.

COMPREHENSIVE SOFTWARE DESIGN, INC.
Magics enhancements for System/38, System/36 users

Comprehensive Software Design, Inc. (CSD) has announced that its IBM System/34 Manufacturing, Accounting and Production Information Control System (Magics) enhancements are now available for users of IBM's System/36 and System/38 processors.

The enhancements include CSD's Multiple Warehouse material requirements planning (MRP) system, which allows manufacturers with multiple manufacturing facilities to process MRP for all manufacturing locations.

CSD's Vendor Release System will inform vendors when, where and what to ship in order to meet scheduled based on the latest MRP requirements generation.

The vendor said prices for the software packages range from $800 to $6,000.

Comprehensive Software Design, Suite 115, 22371 Swan Road, South Lyon, Mich. 48178.

AUTO-TROL TECHNOLOGY CORP.
Plan; Illustrator

Auto-Trol Technology Corp. has announced two application packages for its Advanced Graphics Workstation 32-bit computer-aided design and drafting systems for architectural design and drafting. The packages will also operate on Auto-Trol's Advanced Raster Workstation, which is designed to run on Digital Equipment Corp.'s VAX-11 series of 32-bit processors.

Plan is an architectural drafting and documentation system that will aid in creating floor plans and reflected ceiling plans, a spokesman said. It reportedly enables a designer to generate door and finish schedules automatically. It provides design symbols such as doors, windows, electrical symbols and bathroom fixtures.

Illustrator is an architectural rendering design system providing over 70 symbols, including people, automobiles and vegetation, for the designer's use in creating high-quality presentation renderings of plan and elevation views. It features figure manipulation capabilities that enable the user to create symbols.

Plan is priced at $1,750 per copy and Illustrator at $1,000 per copy.

Auto-Trol Technology, 12500 N. Washington St., P.O. Box 33815, Denver, Colo. 80233.

CREATIVE COMPUTER RESOURCES, INC.
Utility billing system

Creative Computer Resources, Inc. (CCR) recently announced a billing and file maintenance package designed for water districts utilizing the IBM System/38.

The company sells the system is a standard package that is then customized by CCR to meet the needs of individual clients, a spokesman said.

The package reportedly tracks customers' daily water consumption, generates monthly utility bills, produces individual billing forecasts and maintains records on each account in the system.

The base price of the package is $40,000.

CCR, Suite B-103, 151 Kalmus, Costa Mesa, Calif. 92626.

KENCOR CORP.
Patient Accounting System Software

Kencor Corp. has introduced Patient Accounting System Software (Pass), a medical accounting and statistical system designed for the Wang Laboratories, Inc. VS computer.

The Pass package consists of patient scheduling, patient billing and accounts receivable modules. The package maintains patient diagnoses, medical procedures and administrative information, according to the vendor. Reportedly, the package

Fill in your IBM micro/mainframe communications picture.

AST Research, the leader in IBM PC enhancement products, brightens your micro/mainframe communications picture with a full palette of economical, integrated hardware/software masterpieces. With AST Products, you can emulate IBM terminals or create PC-based Local Area Networks.

AST improves your office operating cost picture.

AST communications products give your IBM PC the flexibility to act as a terminal for your host system or as a stand-alone computer for smaller tasks. Your PC won't bog down the mainframe with unnecessary small jobs and local computing on the PC eliminates phone line charges too. Get the power of a mainframe when you need it and personal computer convenience right at your fingertips.

Applications solutions that are shadows of genius.

AST keeps pace with your ever-changing applications requirements with reliable, high quality, cost effective communications products. AST products provide support for Bisync and SNA/SDLC communications protocols as well as networking multiple PCs for sharing resources.

Choose AST products — by the numbers.

These AST communications packages are currently available:

1. ASTRIDA™ emulates a 3274/3276 controller and 3278 or 3279 display terminal using SDLC protocol.
2. AST-RJE™ emulates 2770 batch RJE and remote 3270 display terminals using 3270 Bisync protocol.
3. AST-POOL™ allows your PC to connect to an IBM 3274/3276 cluster controller via coax cable and emulates a 3278 or 3279 display terminal.
4. AST-9750™ emulates 2770, 2780, 3741, and 3780 RJE workstations using Bisync protocol.
5. AST-4361™ emulates a IBM Model 12 remote workstation connected to an IBM System 34, 36 or 38.
6. PCnet™ is the first Local Area Network designed specifically for the IBM PC or XT and the PC-DOS 1.1 or 2.0 operating system.
7. CC-285™ is a user-programmable dual-port card capable of communicating in Async, Bisync, SDLC or HDLC protocols.

Discover how well AST can fill in your micro/mainframe communications picture. For descriptive data sheets, write or call: AST Research Inc., 2121 Alton Ave., Irvine, CA 92714. (714) 863-1333. TWX: 3106781911

AST RESEARCH INC.

Number One Add-Ons For IBM PC.

SOFTWARE & SERVICES

produces Medicare, Medicaid and private patient bills and statistical reports, including the Bureau of Community Health Services Common Reporting Requirements.

Pass costs between $25,000 and $50,000 for a one-time licensing fee. Yearly maintenance costs vary from $200/mo to $500/mo.

Kencor, 3647 All-American Blvd., Orlando, Fla. 32810.

CONTINENTAL HEALTHCARE SYSTEMS, INC.
DRG Module

Continental Healthcare Systems, Inc. has announced a modular software add-on package designed to provide automated medication recordkeeping for its Pharmakon minicomputer systems.

The Diagnostic Related Group (DRG) Module is said to integrate clinical and financial data to provide medication reports and other pharmacy management reports relating to diagnostic related groups, the disease categories carrying fixed Medicare and Medicaid fees.

The module reportedly uses DRG numbers to maintain pharmacy records by patient name, medication, physician, discharge and type of case. It is available for Pharmakon Systems 200, 400 and 1000 at a price of $5,000.

Continental Healthcare Systems, 8900 Indian Creek Pkwy., Overland Park, Kan. 66210.

HARPER AND SHUMAN, INC.
CFMS

Harper and Shuman, Inc. announced Computer-Based Financial Management System (CFMS), an interactive architecture and engineering system that runs on Prime Computer, Inc. Series 50 minicomputers.

The system features project control, accounting, financial reporting, billing, payable and multidivisional systems integrated into one application. The software requires 1M byte of main memory and 20M bytes of auxiliary storage. The system features interactive data entry, editing and reporting capabilities.

Prices for a one-time licensing fee range from $14,000 to $25,000.

Harper and Shuman, 68 Moulton St., Cambridge, Mass. 02138.

DATA BASE MANAGEMENT SYSTEMS

UNITED INFORMATION SERVICES, INC.
Catalogue

United Information Services, Inc. (UIS) has announced an enhanced data dictionary for the Digital Equipment Corp. VAX-11 version of its Seed data base management system (DBMS).

Called Catalogue, the dictionary is part of Seed's application development system and is said to offer users of the DBMS reporting capabilities for improved communication, analysis and control. Catalogue allows data to be tracked during the continuing development of a data base.

The Seed DBMS includes the application development system, decision support option and the Catalogue data dictionary. The VAX-11/730 version of Seed is priced at $24,500, the VAX-11/750 version at $35,000 and the VAX-11/780 version at $49,500.

UIS, P.O. Box 8551, Kansas City, Mo. 64114.

SYSTEM SUPPORT SOFTWARE, INC.
Quikwrite enhancements

System Support Software, Inc. has announced enhancements for its Quikwrite, an end-user report writing system.

The release is designed to provide increased functionality and greater ease of use by nonprogrammers.

The release reportedly features native support for IBM Vsam files, automatic access to table functions, additional built-in exit points for inserting user-written subroutines, a free-form dictionary maintenance program and new verbs, including attach, average and onbreak.

Quikwrite is designed to run on IBM mainframes, including the IBM 360, 370 and 4300 series, and is available now.

Quikwrite is priced at $8,500 for IBM DOS and $9,500 for IBM OS.

System Support Software, 5230 Springboro Pike, Dayton, Ohio 45439.

NATIONAL COMPUTING INDUSTRIES, INC.
Tums Release 5.0

National Computing Industries, Inc. has announced Release 5.0 of its Total Utility Maintenance System (Tums), which supports Cincom Systems, Inc.'s Total data base management system (DBMS).

The vendor said Tums is a utility maintenance system developed to support the Total DBMS when used in conjunction with IBM mainframes.

The new release supports Total Series 80 and TIS and IBM disk devices, including the 3375 and 3380 disk drives.

Vsam support has been added for count-key data and fixed-block architecture devices in addition to features designed to increase loading and unloading performance.

Tums is priced at $3,950 for IBM's DOS/VSE operating system and $4,450 for the IBM OS/MVS operating system.

National Computing Industries, 6075 Roswell Road, Atlanta, Ga. 30328.

NATIONAL DATABASE AND 4TH GENERATION LANGUAGE SYMPOSIA

Los Angeles (March 6-9) • Chicago (May 15-18)
Washington, DC (April 24-27) • New York (June 18-21)

Featuring Presentations by

Richard Cobb, Pres.	Mathematica Products
Henry T. Cochran, Pres.	Henco Software, Inc.
Dr. Edgar Codd	IBM Fellow
Gerald Cohen, Pres.	Information Builders, Inc.
Chris J. Date, Pres.	C. J. Date, Inc.
Herb Edelstein, VP	Seed Software
Larry Ellison, Pres.	Oracle Corp.
Orland Larson, Database Specialist	Hewlett-Packard
John Maguire, Pres.	Software AG of N.A.
Thomas Nies, Pres.	Cincom Systems
Mike Potter, Chairman	Cognos Corp.
Dr. George Schussel, Pres.	Digital Consulting Assoc.
Greg Scott, Pres.	MAG Software, Inc.
Kenneth Sloan, Product Manager	ADR
Dr. Michael Stonebreaker, VP	Relational Technology, Inc.

The first day of the National Database and 4th Generation Language (DB + 4GL) Symposium will feature an accelerated class covering the important concepts of data management technology that will be required in the 1980's. Data Base Management Systems (DBMS), Teleprocessing Monitors, Query Packages, Reporting Systems, Data Dictionaries, Micro/Mainframe links and 4th Generation Languages will be highlighted as the key tools necessary to develop modern software. The first day will be taught by Dr. George Schussel.

Days 2–4 of the DB + 4GL Symposium will feature technical presentations by the top software product vendors in data management including:

Amcor Computer Corp.	DeskTop Software Corp.	Perkin-Elmer
Analysts International Corp.	Digital Equipment Corp.	Prime Computer, Inc.
Applications Software, Inc.	Henco Software, Inc.	Pro-IV, Inc.
Applied Data Research	Hewlett-Packard	Relational Database Systems
Battelle	Hogan Systems	Relational Technology
Burroughs	IBM Corp.	Rexcom Corp.
Christensen Systems, Inc.	Infodata Systems	Scientific Info. Retrieval
Cincom Systems	Informatics General	Seed Software
Cognos Corp. (Quasar)	Information Builders	Sensor-based Systems
Computer Associates	Info Tech, Inc.	Software AG of N.A.
Computer Corp. of America	Intel Corp.	Software Craftsmen, Inc.
Computing Productivity, Inc.	Logica	Software House
Contel Information Systems	Mathematica Products Group	Sydney Dataproducts, Inc.
Cullinet Software	National Information Systems	3CI
D & B Computing Services	Oracle Corp.	Tominy, Inc.
Data General	Pearlsoft	TSI International

Call now for immediate registration or more information
(617) 246-4850

Digital Consulting Associates
339 Salem Street/Wakefield, Ma 01880

SOFTWARE & SERVICES

LANGUAGES

INTERNATIONAL ELECTRONIC MACHINERY, INC.
Fortran-77 compiler

International Electronic Machinery, Inc. has announced a Fortran-77 compiler for Hewlett-Packard Co. series 200 desktop computers.

The compiler is compatible with Ansi-Fortran 77 compilers used on mainframe computers.

The compiler reportedly allows programmers to effectively use the graphic and I/O capabilities of Series 200 microcomputers.

It costs $1,200, the vendor said.

International Electronics Machinery, P.O. Box 1818, Fort Collins, Colo. 80522.

LOGITECH, INC.
Modula-2

Logitech, Inc. has announced a Modula-2 compiler for the Digital Equipment Corp. VAX-11 family of supermini computers under DEC's VMS operating system.

Modula-2 is a general purpose programming language with systems programming capabilities. The compiler, which was developed at the University of Hamburg, West Germany, is said to generate VAX native object code, while separately compiled Modula-2 modules are linked with the VAX/VMS linker. According to the company, the VAX/VMS Symbolic Debugger can be used to debug Modula-2 programs.

Features specific to the VAX/VMS environment are said to include four floating data types, including Byte (8-bit), Shortword (16-bit), Quadword (64-bit) and Octaword (128-bit).

The price for a single computer license is $1,500 per year with 90 days of maintenance. Additional maintenance is available for $300 per year.

Logitech, 165 University Ave., Palo Alto, Calif. 94301.

METHODOLOGIES

CARA CORP.
Cara Systems Development Standards enhancements

Cara Corp. has announced a price increase and enhancements to its Cara Systems Development Standards. The customized software and service package, customized for each client, is designed to assist organizations in systems development, according to a spokesman for the vendor.

Enhancements are said to include Cara's Epsilon automated estimating support tool, a software package designed to run on IBM mainframes under TSO; Wang Laboratories, Inc. 2200 VS80 minicomputers; and IBM Personal Computers.

Additional enhancements are said to include Cara's training program and training manual, "Heueristic/Prototyping Considerations," which deals with problem-solving by experimentation; a professional systems analyst development seminar tailored to each organization; Cara's "Software Selection Guidelines and Techniques" publication.

The price increase from $31,500 to $41,500 goes into effect March 15.

Cara, Suite 110, 611 East Butterfield Road, Lombard, Ill. 60148.

RATING from page 47

respondents and never guaranteed that all the people who completed our survey form would be bona fide users."

But although he rejects Simmons' claim that the survey presents Protos' product in a misleading light, Crow did recently offer the company an opportunity to air publicly its gripes through *Interact*'s letters-to-the-editor column. In response to the software vendor's persistent criticisms, he also recently issued a brief disclaimer advising users group members to take the survey findings with a proverbial grain of salt.

For Protos, both of Crow's attempted remedies fall woefully short of their intended mark. A general disclaimer, Simmons said, would be insufficient to counteract a misconception about a particular company's product, and a Protos-written letter of complaint would carry far less weight than a formal retraction from the group itself. In a letter sent last month to the users group's headquarters, Protos "indicated its willingness to initiate legal action if we don't do as they ask," Crow said.

The object of the six-year-old vendor's simmering discontent is the latest edition of the users group's annual membership survey, which solicits performance evaluations about the HP 3000 itself and its full range of hardware and software accessories.

Jointly funded by HP and the users group, the survey's most recent installment was mailed early last year to nearly 4,200 members, who were asked to rate their products' operation on a scale of zero to four. As defined by the survey's creators, zero represents the lowest degree of user satisfaction and four the highest. Recipients were asked to evaluate Protos' product and four competitors.

Of the almost 1,800 members who returned questionnaires, 66 gave an opinion on the Protos language, which earned an average rating of 2.67. A top rating of 4.0 indicates a "very satisfied" user, while scores of 3.0 and 2.0 correspond to "satisfied" and "neutral," respectively.

Disappointed by its product's less-than-glowing performance grades, Protos supplied Crow with a copy of its certified customer list and asked him to check its contents against the names of the 66 survey respondents. Only 33 of the names were found to appear in both sets of data, but as a whole, the subgroup of bona fide users evaluated Protos at 3.06, considerably higher than the product's official, published rating.

CINCOM from page 47

leasing the DBMS module separately, the company hopes to provide a method for users to migrate to TIS's data base structure and then add the application development facilities when it is ready to make the financial and organizational commitment.

Also look for activity in the area of network management. Cincom has long espoused the distributed data base concept and offers a vehicle to run applications written for the Digital Equipment Corp. VAX-11 superminis on IBM mainframes. The company's strength in providing systems software for a broad range of processors makes it a natural to provide some path for piecing them all together. In combination with TIS, a network management facility would be a major step in preparation for a full distributed processing system.

Notably absent from Cincom's Jan. 18 announcement of an IBM Personal Computer-CPU link was an agreement with a microcomputer vendor. Most sellers, of course, have chosen to link up with Visicorp or Lotus Development Corp. to develop routines to optimize downloading into those vendors' popular Personal Computer-based packages. Cincom has an agreement up its sleeve as well, but it won't be with Lotus or Visicorp. Officials aren't saying just who will be the lucky recipient yet, but expect an announcement soon.

Cincom may cap off all this activity later in the year with a public stock offering. With expected 1983 revenues of more than $70 million, it would be one of the largest software firms ever to do so. Cincom President Tom Nies has been a vigorous opponent of public offerings until this point, saying that stock market pressure typically prevents firms from investing heavily in any R&D that doesn't boost the bottom line. However, in a recent interview Nies indicated he has softened a good deal on the stock offering question.

DOS/VSE and CICS/VS Frustration?

BIM gets it out of your system.

BIM presents a line of proven programs that maximize your system's capabilities, saving you time, labor and expense. These program products help get the most out of your system and people.

BIM-EDIT — the editor with more than 25 significant features that ICCF can't match.
BIMSPOOL — Prints output in POWER/VSE spooling queue on local or remote 3270 terminal printers. (Received ICP Million Dollar Award 1982).
BIMSPOON — On-Line to Batch Print Spooling. Prints data passed from CICS application programs into the POWER spooling queue.
BIM-PDQ — POWER Dynamic Queuing performance enhancement. Eliminates 86% of the I/O to heavily used POWER queue.
BIM-CDIS — Comprehensive problem analysis and display of operational CICS system.
BIMTEXT — Word processing, document composition system. Create formatted documents from free-form input.
BIMSWAP — Switch local 3270 BTAM terminals between multiple CICS partitions without special hardware or additional ports.
BIMCMPRS — CICS 3270 data compression system. Reduces response time for remote terminals significantly. Available for OS/VS1 and MVS also.
BIMP3270 — Comprehensive CRT screen image print facility. Copy to terminal printers or spool queue for system printer.
BIMSERV — On-line display of library directories and entries, VSAM Catalog entries, disk VTOC's, etc.
BIMSOSLOG — Console Message File display. Used by computer operations and programmers.
BIMSCNTR — DOS/VSE System Status, Performance Measurement, and POWER Queue display.
BIMDEVC — Displays Logical Unit assignments for physical devices, to resolve operational problems.
BIMSUBMIT — On-line Job Edit and Submission facility.

BIM programs are cost-efficient, many less than $900. You can save even more with our group package offerings. Products are available on permanent, annual, or monthly leases, and shipped on a 30-day free trial basis. Product documentation is available on request.

BIM also performs systems programming consulting, with consultants based in Minneapolis and Washington, D.C. Computer time services are also available on our 4331-2 system, on-site or remote.

BIM 8 I MOYLE ASSOCIATES, INC.
5788 Lincoln Drive
Minneapolis, MN 55436
612-933-2885
Telex 910-576-3137

ACCESS +

+ produces CICS retrievals and batch reports without programming
+ allows end-users to produce reports with less than 1 hour of training
+ can be installed in 30 minutes for a 30-day in-house trial

the query + report writer for CICS

($16,000 DOS / $24,000 OS)

PRO-SOURCE
THE PRODUCTIVE RESOURCE COMPANY

1235 NORTH LOOP WEST, SUITE 704
HOUSTON, TEXAS 77008
OFFICE (713) 680-9500

COMMUNICATIONS

Fiber net ties 27 Miami buildings

MIAMI — To meet this city's growing demand for communications — both voice and data — occupants of 27 buildings in the financial district talk via pulses of light over hair-thin glass fibers.

When the digital lightwave network is completed in 1985, a total of 30 buildings in the Bell Point-Brickell Ave. district of the city, which includes brokerage houses, banks and high-rise condominiums, will be a part of the most extensive lightwave installation of its kind in the world. The system will be able to handle 672 simultaneous telephone calls or equivalent amounts of data or television over each pair of fibers.

The lightwave system servicing Miami's "Wall Street" is known as a Fiber SLC (subscriber line carrier) system. It is a rugged system, specifically designed for the telephone loop — the facilities that connect a customer with a local switching office.

Financial fiber

Bell Laboratories worked with Southern Bell Telephone Co. to tailor the lightwave network for Miami, and AT&T Western Electric Co. manufactured the system for installation by Southern Bell.

"It's the right kind of system for this particular situation," said Larry Mixon, spokesman for Southern Bell. "The fiber-optic system has better applications for technology and for a financial district that transmits large quantities of data. It will afford us greater capacity to handle the kinds of things these types of customers will want — like quantity and speed."

Hub of net

The hub of the communications network is a Southern Bell switching center, which sends out three half-inch cables, each containing 144 glass fibers. One goes to the Bell Point area and two to the Brickell Ave. area, where they fan out in individual fiber pairs to the buildings.

Lightwave systems solve one of the thornier problems faced by this and other U.S. cities, which is a growing shortage of underground space for cables and electronic equipment. Fibers take up little space in ducts, and electronic and optical equipment isn't required for signal boosting within local transmission systems.

"If we hadn't gone to half-inch fiber cables for this project, we'd have had to install 20 copper cables, each of them the diameter of a fist, just to meet today's demands," said Al Naranjo, engineering manager at Southern Bell. "And to keep pace with the growth we expect, we'd have had to install two more cables each year for the next three years. Then we'd have had to dig up the streets to make room for more cable in ducts and manholes."

Naranjo expects the network's capacity will be sufficient for many years. Each pair of fibers now carries 96 simultaneous voice calls, or a combination of voice, data and private-line services. (One fiber carries incoming calls and the other outgoing calls.) Next year, Southern Bell plans to increase sevenfold the amount of calls each pair can handle by expanding the terminal equipment.

"The system is ideal for this area because of its ruggedness," said Greg Greco

See FIBER page 58

Telecom Canada

New option makes international packet-switched net more accessible/58

Network system products designed for Perkin-Elmer Corp. superminis/58

INSIDE

Communications Controllers/58
Voice/Data Communications/58
Communications Software/58
Multiplexers/Modems/58
Test Equipment/58
Auxiliary Equipment/58

PBX integration urged by voice-mail users

Private branch exchange (PBX) integration is the feature most desired by voice-mail system owners, according to a report recently released here.

The report, titled "The Voice Mail Industry: A Strategic Analysis," published by Venture Development Corp., stated that 33% of current voice-mail system users claimed that PBX integration, which provides functions like automatic telephone-answering and message-waiting notification, tops the list of desirable voice-mail system items.

These systems provide computer-controlled deposit, storage and delivery of voice messages, allowing nonsimultaneous, verbal communications between two parties located anywhere in the world.

Without PBX integration, a voice-mail system must be reached through a separate telephone number by the caller and be periodically queried for messages by its subscriber. These inconveniences can be eliminated by making voice mail a standard PBX function, the report stated.

Additional voice-mail features desired by system owners include message desk, message-waiting indicator, address verification, subscriber directory, message delivery verification, intersystem networking, user-configurable management reporting and programmable message delivery time.

The voice-mail industry, which garnered $35.2 million in combined 1983 hardware and services revenues, will experience a compounded annual growth rate of 185% through 1987, when industry revenues will total $2.3 billion. Of these revenues, $1.9 billion will come from voice-mail hardware which is integrated into PBX systems. The study is available for $3,290 from the publisher.

Venture Development is at One Washington St., Wellesley, Mass. 02181.

System installed to curb illegal textile shipments from Taiwan

EL SEGUNDO, Calif. — A communications system that is designed to curb illegal textile shipments from Taiwan to the U.S. and improve the tracking of textile imports against U.S. quotas recently became operational here.

The system was developed for the Taiwan Textile Federation (TTF) by Computer Sciences Corp., located here, and its Taiwan representative, China Data Processing Center.

According to Jim Furlong, a spokesman for Computer Sciences Corp., the system, which began functioning Jan. 1, is part of the company's network data communications service called Infonet, a worldwide data network which offers remote computing services. The data center utilizes an IBM 3083 and Sperry Corp. computer equipment.

"The way the system works is that the trade association of Taipei [Republic of China], through a computer on their end of the line, sends the information concerning authorized textile shipments via communications satellites in our network to our Infonet data center in the Washington area. We store it for the convenience of the U.S. Customs Service who then reaches over via the network and takes it into their computer," Furlong said.

As shipments arrive at U.S. seaports or airports, customs officers using remote Raytheon Co. terminals linked to the agency's IBM 3083 computer are able to verify the description, value and quantity of the goods with the information stored in the computer.

The system allows the trade association to inform the U.S. Customs Service of exactly what textile products have been cleared for shipment to this country for inclusion under the quota assigned to Taiwan by the U.S. government. Only those shipments recorded in Customs Service computers will be allowed entrance when goods arrive at the U.S. entry points.

In April and May 1983, customs reportedly seized $1.2 million worth of illegal shipments, Furlong said.

Taiwan's textile trade with the U.S. runs about $1.5 billion a year, with the TTF administering the quota on behalf of local manufacturers. Some textile traders have been known to forge TTF documents to enable their goods to gain entry to the U.S., thereby excluding legitimate shipments that arrive later and are barred from entry because the quota has already been filled.

According to James Mahan, a spokesman for the Customs Service, the Taiwanese government picks up a summary of all the visas they issue each week and to whom they were issued. "This information comes into customs' computers in the U.S. from all of its ports of entry once a week," Mahan said. "What we do is match their listing against the visa that is accompanying the merchandise to find out whether it's a false visa or not. And this is the way that we seize illegal merchandise."

The system is working very well so far, Mahan said. Future plans call for implementing satellite communications for the system to provide timely information on a daily basis, he noted.

Ansi, CSA publish first joint standard

To aid videotex/teletext growth

The American National Standards Institute (Ansi) and the Canadian Standards Association (CSA) have published a North American standard to help accelerate the commercial development of videotex/teletext services in the U.S. and Canada.

The standard provides manufacturers and those involved in supplying and transmitting text and graphics for electronic banking, shopping, news, entertainment, interoffice and other communications with an agreed-upon information interchange format for developing their products and services.

The standard sets formats, rules and procedures for encoding alphanumeric text, redefinable characters and pictorial information in many colors.

It accommodates 7-bit and 8-bit bytes, depending on implementation needs.

Videotex/teletext services are available commercially on other continents, mainly Europe, but they are available only on a limited basis in the U.S. and Canada.

The groups that developed Ansi X3.110-1983 and CSA T500-1983 point out that without a standard, hardware and software manufacturers, information providers, publishers and transaction services such as banks and retailers, have been reluctant to make the investments necessary for wide use of videotex/teletext in North America.

The Ansi X3.110/CSA T500 standard is titled Videotex/Teletext PLPS and is the first joint U.S. and Canadian standard in the information processing field.

Copies of the standard are available for $20 each.

Ansi, 1430 Broadway, New York, N.Y. 10018.

FIBER from page 57

of Bell Laboratories. "It operates flawlessly without air conditioning in the hot, damp basements of the Bell Point-Brickell Ave.-area buildings."

The Bell Point-Brickell Ave. project is one of 20 lightwave systems under construction by Southern Bell this year. But the popularity of loop lightwave systems is growing rapidly among all the former Bell operating companies.

"In 1984, about 30% of all new loop systems installed by telephone companies are expected to be lightwave," said Bob Parthum of AT&T Western Electric. "Within the next few years, lightwave should account for more than half of all new systems."

You Can Read Some of the Dumps... Some of the Time...

In the past, programmers had to slave over monumental stacks of paper to resolve abends.

Trying to convert hexadecimal numbers like four score and seven or debating over where the abend occured was as tough as splitting logs.

But then was brought forth a new notion — Abend-AID. It was a great moment in dump history. Programmers were emancipated as the drudgery of solving abends was abolished. They were free to devote their time to more productive tasks.

Abend-AID transfers the burden of debugging from the programmer to the computer. Abend-AID output shows What Happened, When it Happened, Where it Happened and supplies the necessary supporting data in an easy-to-use format that can almost fit on the back of an envelope (10-12 pages, in English).

Abend-AID is available for both IBM OS and DOS installations. Listed below are unique Abend-AID options for your specific needs.

☐ **Abend-AID/COBOL** — The first practical source level debugging tool.
☐ **Abend-AID/SPF** — 80 column "easy-to-use" viewing capability which permits programmers to interactively debug abends at their terminals.
☐ **Abend-AID/ONLINE** — 80 column CRT output for easy viewing.
☐ **Abend-AID/DOS/DLI & Abend-AID/OS/IMS** — Features special diagnostic routines for IBM's data base systems.

Free Abend-AID Product Evaluation.

For additional product information, or to arrange for your 30-day FREE evaluation of Abend-AID, just give us a call at 800-521-9353 (In Canada or Michigan, 313-540-0400), or clip your business card to this ad and mail it to: Compuware, Systems Software Division, 32100 Telegraph Road, Birmingham, Michigan 48010.

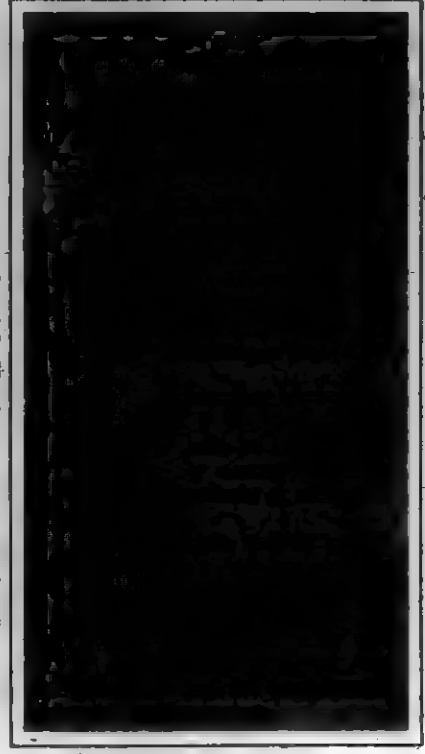
Abend-AID. The civil way to address program abends and cancels.

Aid

COMPUWARE
SYSTEMS SOFTWARE THAT MAKES SENSE

Corporate Headquarters
32100 Telegraph Road
Birmingham, Michigan 48010
(313) 540-0400

International Offices: New South Wales, AUSTRALIA Phone: (61-2) 888-1177 / Luton, Bedfordshire, UNITED KINGDOM Phone: (44-582) 28-463 / Paris, FRANCE Phone: (33-1) 247-1341 / Herzlya, ISRAEL Phone: (972-52) 58862 / Milano, ITALIA Phone: (39-2) 345-2231 / Tokyo, JAPAN Phone: (81-3) 479-1600 / OSLO, NORGE Phone: (47-2) 59-5570 / Bryanston, SOUTH AFRICA Phone: (27-11) 706-5000 / Hamburg, DEUTSCHLAND Phone: (49-40) 23-3251.



Datapac adds three countries

OTTAWA — Telecom Canada has added three countries to its Datapac International service and announced an option called a network-user identifier (NUI), which makes the international service more accessible.

The new additions to the service, which is provided in conjunction with Teleglobe Canada, are in Denmark, Greece and Norway. With the expansion, Telecom Canada's nationwide, packet-switched Datapac network provides access to similar networks in 37 countries.

The NUI option makes possible overseas connections for customers using Datapac 3101, which allows Ascii and teletypewriter terminals to communicate through Datapac. The NUI option allows these customers to place third-party calls from public-dial ports to foreign packet-switched networks.

The NUI can also be used to place domestic calls and calls to U.S. networks from public-dial ports.

The monthly rate for NUI is $27.80 (Canadian) each; plus $2.20 (Canadian) for each additional NUI. A one-time installation fee, per request, is $55.65 (Canadian).

COMMUNICATIONS

COMMUNICATIONS CONTROLLERS

MATROX ELECTRONIC SYSTEMS LTD.
Cem-1

Matrox Electronic Systems Ltd. has announced the Cem-1, a single-board I/O communications controller, which is plug-compatible with the IEE-P796 (Multibus).

The controller has an onboard bidirectional, 16-bit parallel port that provides interface to Digital Equipment Corp.'s DR-11W or equivalent interface card. The port allows direct communications between the Multibus-based system and DEC's VAX supermini, PDP-11 or LSI-11 minicomputer at rates up to 400K word/sec. The price is $2,495.

Matrox Electronic Systems, 5800 Andover Ave., Montreal, Quebec, Canada H4T 1H4.

KMW SYSTEMS CORP.
VP-10 Vector Processor

KMW Systems Corp. has announced the VP-10 Vector Processor, a controller that allows the connection of raster output devices to a mainframe computer.

The product accepts random vectors, symbols and other graphics information from a host mainframe, translates the data at computer speed and drives the various output devices at rated speed, the vendor said.

The VP-10 has a vector capacity of 200,000. Other features include a 128K-bit semiconductor-based memory, color support for both intensity modulated and dithered devices, diagnostics and integrated communications. Prices range from $5,000 to $10,000.

KMW Systems, 8307 Highway 71 W., Austin, Texas 78735.

COMPUTRONICS, INC.
Network version

Computronics, Inc. has introduced a version of its Network that adds support for additional automatic dialing modems.

According to the vendor, a Prime Computer, Inc. computer user can communicate with another computer using one of its existing asynchronous multiline controllers. Any system communicating asynchronously in Ascii can be accommodated. Network can be used to communicate with systems from Prime, IBM, Digital Equipment Corp., Hewlett-Packard Co., Data General Corp. and Sperry Corp.

According to the vendor, neither special software on the remote system nor a device to support communications is necessary. The price is $1,200.

Computronics, 130 N. Ash, Wood Dale, Ill. 60191.

VOICE/DATA COMMUNICATIONS

FUJITSU SYSTEMS OF AMERICA
PSC/I

Fujitsu Systems of America has introduced the Point-of-Sale Communications System/I (PSC/I) for the IBM Series/1.

The product provides an interface between store-level point-of-sale (POS) systems and central data processing sites. PSC/I supports the company's 7680 and 7990 POS terminals, its 7110 Terminal Support Processor and the TEW 2001 POS terminal. It was designed to operate exclusively on the IBM Series/1, the vendor said.

The system offers execution of data collection and reformatting, file upload/download, message distribution, POS terminal parameter maintenance/downloading and reporting, a company spokesman said. PCS/I costs $35,000 and will be available in July.

Fujitsu Systems of America, 9841 Airport Blvd., Los Angeles, Calif. 90045.

REMINGTON RAND CORP.
Serif workstation enhancements

Remington Rand Corp. has announced added data communications capabilities to its Serif workstation.

The communications features provide automatic dialing and answering and memory password recall. Other product features include access to telex networks for domestic and international communications; access to information services, airline information and other business data; and on-line connect to Westlaw for legal case data bases, the vendor said. The price is $600. Optional software costs $450.

Remington Rand, 9950 W. 74th St., Minneapolis, Minn. 55344.

ON-LINE!
IMP3000 & DEC VAX
BUSINESS MANAGEMENT SOLUTIONS
COLLIER JACKSON, INC.

Need general accounting software for IBM System/38?

We've simply solved your problem.

LAWSON ASSOCIATES has solved it with the first general accounting software specifically designed for IBM System/38. Not merely compatible, but state-of-the-art to fully utilize your computer's capabilities. Compare. You won't find a total software solution like it anywhere else.

DESIGN FEATURES: They include: on line systems using data base management; menu-driven, user friendly programs written in RPGIII, the System/38 language; and integrated modules. Their benefits: ease of installation and use, plus maximum employee productivity.

INTEGRATED MODULES: Those available include: General Ledger and Report Writer/Accounts Payable/Accounts Receivable/Fixed Assets/Payroll/Personnel/Purchase Order/Order Entry/Inventory Control

SERVICE FEATURES: Fully documented and supported. Onsite training and implementation. One year warranty. Available now for immediate installation.

For more information, please call or write: Lawson Associates, 2021 East Hennepin Ave., Minneapolis, MN 55413 (612) 379-2633

LAWSON ASSOCIATES
WE SIMPLY SOLVE PROBLEMS

Transaction Data unveils product line

Transaction Data Systems, Inc. has announced the Freedom Network System, a family of data communications products that range from single software packages to complete custom-designed, turnkey data networks.

The system software was designed to operate on Perkin-Elmer Corp.'s supermini-computer systems. These packages include Packet Network Facility for building private packet switching networks; Network File Service Facility and File Transfer Facility for network operating system services; and Micom Multiplexer Emulation Facility, according to a spokesman for the vendor.

The network system supports all IBM protocols, including Systems Network Architecture/Synchronous Data Link Control as well as Sperry Corp., NCR Corp., Control Data Corp., Burroughs Corp. and X.25 protocols.

Individual software modules range from $2,500 to $5,000. Complete network systems range from $80,000 to $3 million.

Transaction Data Systems, 5750 Major Blvd., Orlando, Fla. 32805.

VAX USERS!
NOW GET SPREADSHEET AND GRAPHICS IN ONE PACKAGE.
• Full business graphics • Advanced features • Affordable price
GRAPHIC OUTLOOK™
from STONE MOUNTAIN COMPUTING
1098 Cambridge Dr.
Santa Barbara, CA 93111 (805) 964-9101
VAX is a trademark of Digital Equipment Corporation

Think of us as the only TRUE TSO for VS1.

Because we are.

TONE 3
HIGH PERFORMANCE-LOW OVERHEAD

- Edit with full screen capability
- Internal reader job submit
- Output retrieval with RES support
- System maintenance
- Program development
- Data entry
- System debugging
- Text editing
- Performance monitoring support
- User command interface
- Interactive program execution
- Operations console support
- Dataset maintenance
- Catalog management
- Standard IBM TSO commands
- Enhanced 3270 usability
- Full ASCII terminal support
- No user mapping
- No TCAM
- No VS/2 overhead

TONE Software Corp.
1735 S. Brookhurst
Anaheim, CA 92804
(714) 991-9460 Telex 181502

COMMUNICATIONS

COMMUNICATIONS SOFTWARE

CONTEL INFORMATION SYSTEMS, INC.
Mind/Voice

Contel Information Systems, Inc. has introduced Mind/Voice, an interactive software-based system for the analysis of telephone traffic originating at a single location.

The product is used to design optimal mixes of Wats facilities. The system considers the use of the tie lines — private branch exchange (PBX) to PBX — and Foreign Exchange lines — PBX-to-distant-city telephone company exchanges. It will also consider the tariffs of specialized common carriers, as well as AT&T's current and proposed tariffs, the vendor said.

The traffic analysis subsystem reads call-record data, organizes the information into an accessible data base and produces analytic and management reports, which give the user a profile of the existing traffic and how it is handled, according to the vendor. The license costs $3,500/year.

Contel Information Systems, 130 Steamboat Road, Great Neck, N.Y. 11024.

APPLIED VOICE TECHNOLOGY
Phonexpress; Phoneforms; Voicepak

Applied Voice Technology (AVT) has introduced three software board products that allow users to create voice-messaging and response systems on S-100 bus-based computer systems.

According to the vendor, the three voice-processing packages — Phonexpress, Phoneforms and Voicepak — can be used with proprietary software and run under Digital Research, Inc.'s CP/M 86 and MP/M 86 operating systems.

Phonexpress is a voice-mail package that digitally records, stores and plays back voice messages for up to 300 users using one to four telephone lines. It includes all software and documentation, a voice I/O processor and from one to four telephone-line cards. Costs for a single-line package are $4,500, with an additional $1,000 for each additional line card.

Phoneforms is a voice-oriented data collection and retrieval utility that allows users to create custom-voice questionnaires at the telephone.

It can be combined with Phonexpress to form a voice-messaging environment to support data collection. It is priced at $3,000.

Voicepak is a package of Pascal subroutines that handles telephone activity, processes Touch-Tone data and records and plays back speech, the vendor said.

The programs cost $750 as add-ons to the Phonexpress package or may be purchased for $2,500 as a package, which includes the necessary I/O processor and/or a telephone-line card.

Applied Voice Technology, Suite 5A, 2103 Harrison Ave., Olympia, Wash. 98502.

MULTIPLEXERS/MODEMS

PRENTICE CORP.
Auto-dialing modem

Prentice Corp. has introduced a 1,200 bit/sec autodialing modem that utilizes two custom Cmos integrated circuits to achieve full-duplex, Bell 212A-compatible operation, tone sensing, voice/data control and RS-232C operations.

Features include full call-progress tone sensing of dial tone, busy tone, remote ring and voice, according to a spokesman for the vendor.

There is also a function that eliminates the need for option switches or special EIZ RS-232 cables, the spokesman said. The price for the modem is $475.

Prentice Corp., 966 Caspian Drive, P.O. Box 3544, Sunnyvale, Calif. 94088.

ANCHOR AUTOMATION, INC.
Signalman Mark XII

Anchor Automation, Inc. has introduced the Signalman Mark XII, an autodial, autoanswer modem.

Some of the product's features include manual operation through a keyboard without computer coding, or automatic operation to answer and originate calls at 1,200 bit/sec for Bell 212A compatibility and up to 300 bit/sec for Bell 103. The product also detects dial-tone and busy signals, automatically displaying dialing status on the CRT, the vendor said.

The Mark XII uses a standard RS-232 serial interface with a built-in cable, comes equipped with two telephone jacks and cord and is directly connected to a wall-telephone outlet, according to the vendor. The price is $399.

Anchor Automation, 6913 Valjean Ave., Van Nuys, Calif. 91406.

TEST EQUIPMENT

TELPAR, INC.
DCT-100 Datacomm Tester

Telpar, Inc. has announced the DCT-100 Datacomm Tester, an enhancement to the standard RS-232C "breakout box" marketed by the company.

The tester provides the industry-standard breakout panel with the additional ability to print out the received or transmitted data stream on a 20-col. thermal-printer integral with the tester.

The tester also provides verification of transmitted data and commands and time to analyse and study the data and commands. The price is $995.

Telpar, 4137 Billy Mitchell Road, Addison, Texas 75001.

AUXILIARY EQUIPMENT

PERIPHERAL TECHNOLOGY, INC.
Scat Network Controller

Peripheral Technology, Inc., a manufacturer of IBM 3270 terminal controllers, has introduced the Scat Network Controller (SNC), an expansion feature for Scat 3 protocol converters.

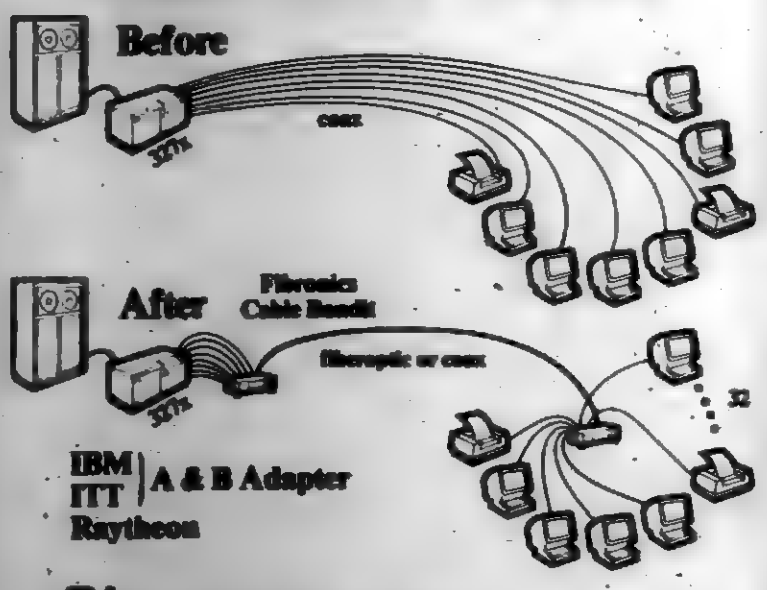
According to the vendor, the product allows up to 25 Ascii RS-232 communications ports under a single control-unit address. The vendor's standard protocol converters provide from three to five IBM 3270 ports per unit.

SNC may be distributed up to 4,000 feet using RS-422. The product allows distribution throughout buildings or across campuses without the expense of coaxial cabling, the vendor said.

The price for the three-port SNC is $795; the five-port SNC is $995, according to the vendor.

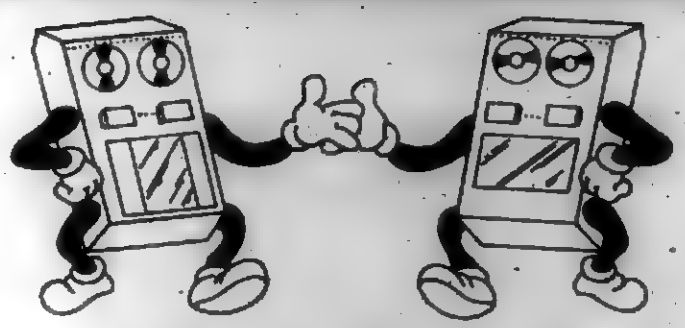
Peripheral Technology, 14784 N.E. 95th, Redmond, Wash. 98052.

IBM® 3270 Users.



Fibronics International Inc.
fiberoptic communications
218 West Main Street • Hyannis, MA 02601 • (617) 778-0700 • Telex 951297

OUR SWITCHES MAKE YOUR IBM SYSTEMS WORK LIKE A TEAM!



If you have more than one IBM or plug compatible processor, Digital can help you get the most for your hardware investment. Our switches allow you to achieve backup and peripheral configuration flexibility at a fraction of the cost you're probably thinking.

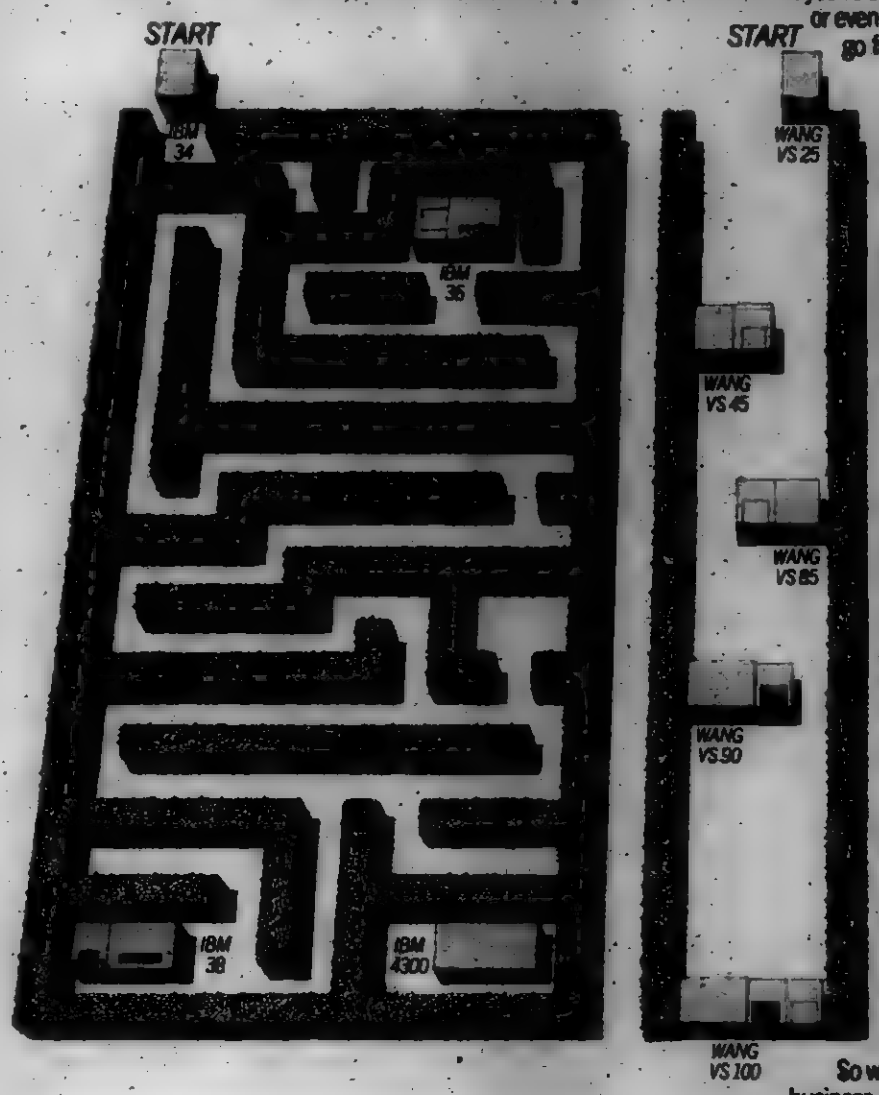
Whether you have two processors or more, Digital has a switch to suit your requirements.

- Model 4101 The lowest priced matrix switch on the market.
- Model 3421 The only manually operated channel switch in the industry.
- Model 3403 A remote controlled channel switch designed for underfloor installation.

DIGITAL CONTROLS

2779 Orchard Run Road • Dayton, Ohio 45449 U.S.A. • (513) 435-5455
Dallas 214-869-0089 New York 201-585-9416

Compared to IBM, Wang has the growth path of least resistance.



If you're currently considering an IBM 34 or even a 36, consider this: where do you go from there?

To an IBM 38? Sure, if you want to spend up to 18 months converting to a different operating system, different source codes, and different software.

To an IBM 4300? The same problem again. Only magnified. Because if the IBM 34 and 36 have little in common with the IBM 38, the IBM 38 has nothing in common with the IBM 4300 (logo excepted).

Now consider the Wang VS line.

One operating system that supports the same software, utilities, and documentation. A line that's compatible from top to bottom and bottom to top. A line that's compatible with other Wang equipment as well as most mainframes, including IBM. And a line that can tie you into total office automation faster and easier than any other systems available anywhere.

But even if you only need a single computer, a Wang VS is a better choice. Because every VS offers data processing, voice, graphics, electronic mail and extensive networking. And only a Wang VS offers Word Processing Plus, feature for feature the most comprehensive word processing software in the world.

So whether you plan to buy just one business computer or a whole lot, the Wang VS line is simply the best way to go. And the only way to grow.

Compare it to IBM; it's easy to see why Wang offers the growth path of least resistance.

For a demonstration of Wang VS computers, call 1-800-225-9264. Or write to: Wang Laboratories, Inc., Business Executive Center, One Industrial Avenue, Lowell, MA 01851.

WANG

The Office Automation Computer People.

© 1983 Wang Laboratories, Inc.

EQUITABLE LIFE
LEASING CORPORATION

OFFERS

OPERATING & TAX PRICED LEASES

FOR:

DataGeneral

IBM

digital

PRIME

HEWLETT PACKARD

WANG

EQUITABLE LIFE
LEASING CORPORATION

For more information call any of the offices listed below

Atlanta	Detroit	Minneapolis	Pittsburgh
Boston	Houston	New York	Portland
Chicago	Kansas City	Orlando	St. Louis
Cincinnati	Los Angeles	Philadelphia	Salt Lake City
Cleveland	Milwaukee	Phoenix	San Francisco
Dallas			Seattle
Denver			Washington D.C.

CORPORATE HEADQUARTERS

SYSTEMS & PERIPHERALS

What solid-state means for you

SHOP TALK

HOWARD DICKEN

During this last year, the semiconductor industry has been promoting the new developments in solid-state memory. But what does it mean to your computer equipment or data processing capabilities?

For example, this year a half-dozen semiconductor companies announced the availability of the first samples of a 256K-bit dynamic random-access memory (RAM).

As shown in Table 1 (see page 68), these new developments have been occurring approximately every three years since 1970, and the next improvement is expected in 1986.

This increase in memory means (again referring to Table 1) the cost per bit of memory has been decreasing over 30% per year for the last 14 years. This cost improvement curve, which is expected to continue, translates into a similar cost/performance improvement for the computer hardware.

Operating speed improved

In addition to less expensive hardware, improvements in solid-state memory also improve the operating speed of processors. As a rule, the larger the number of bits that are packed onto a chip, the denser the circuits must be to access the memory.

This has a direct impact on the internal performance of computer systems, often rated in terms of millions of instructions per second. The use of higher capacity chips, particularly in large computer systems, offers several advantages.

In large systems, for example, the majority of memory takes the form of hard magnetic disks. This is still the lowest cost approach (see Figure 1 on page 68); however, the access time is much slower than with semiconductor memory.

As semiconductor costs continue to decrease, more of the computer's active

See MEMORY page 68

Study predicts microminis may finish off 16-bit minis

By Patricia Keefe
CW Staff

CUPERTINO, Calif. — The demise of the 16-bit minicomputer is a trend industry watchers have been predicting for some time. In response to sagging sales related to higher performance superminicomputers and less expensive microcomputers, makers of traditional 16-bit minicomputers have been struggling to find niche markets for their products. But now the end may truly be near.

According to a recent study, a new class of processor, the microminicomputer — sometimes called the supermicrocomputer — may pound the final nail into the 16-bit minicomputer maker's coffin. Microminis appear to do everything the older 16-bit machines could do, but are more reliable, less expensive and take up less space.

Now what happens to all the 16-bit minis? Users may find themselves holding what amounts to outdated hardware. In addition, if the proliferation of microminicomputers continues, control of corporate computing may slip through the hands of the DP department and into the laps of end users, according to consultant Andrew Allison, who prepared the report, "Managing the Microminicomputer Explosion: A Guide for Manufacturers, Users and Third Party Participants" for Electronic Trend Publications here.

Microminicomputers are one of the most significant outcomes of the confluence of a

See MINIS page 66

Market share by type of computer, 1982-1987

Chart: Electronic Trend Publications

Mirage available for DG Eclipse MV

WESTBORO, Mass. — Data General Corp. has announced that Rational Data Systems, Inc.'s Mirage system is available on DG's Eclipse MV series processors. The Mirage system, which consists of the Mirage M102 processor, lets Eclipse MV users run microcomputer software based on Digital Research, Inc.'s CP/M 80 operating system on DG's 16- and 32-bit computers.

The Mirage M102 processor reportedly can occupy any I/O slot in a standard chassis and allows Eclipse users to run programs written for the CP/M operating system. The M102 contains two Zilog, Inc. Z80A-based micros, each with 64K-bytes of random-access memory and asynchronous communications ports. The system also contains CP/M, a variety of utilities and the Mirage "server."

The Mirage system is available as a package with hardware and software for two users for $3,295. Rational Data Systems also offers the Mirage F109 Floppy Disk Subsystem as an option for $1,495.

DG, 4400 Computer Drive, Westboro, Mass. 01581.

Xerox announces 2700 II printer with SNA interface capability

EL SEGUNDO, Calif. — An enhanced model of the Xerox 2700 distributed electronic printer that can interface with IBM's Systems Network Architecture (SNA) was announced recently by Xerox Corp.

Called the Xerox 2700 II, the unit reportedly can be used for printing in an SNA environment.

Also announced were two software packages for the 2700 II, which are said to enhance the printer's capabilities for creating documents. The programs are called Remote Print Management Facility (RPMF) and Document Composition Facility-Xerox Postprocessor (DCF-XP).

Like the 2700, the 2700 II will continue to be used for remote or distributed printing or for printing directly from small business computers and minicomputers. It can store 256K bytes of memory, compared with 64K bytes on the 2700. The font capability per page was also enhanced, allowing up to 16 different fonts to be used on each printing job. Eleven foreign languages were also added to the printer, the vendor said.

The 2700 communicates in a binary synchronous mode over IBM 2770, 2780 and 3780 protocols. The 2700 II can operate as a distributed printer in IBM 3274/3276 (using the Xerox 274 interface) and 3770 networks (via the Xerox 271 communications module) using SNA Synchronous Data Link Control.

The 274 enables interactive printing in the 3274/3276 environments, while the 271 allows the 2700 II to handle batch printing jobs in IBM 3770 environments, the vendor said.

The RPMF package reportedly helps to manage the creation, storage and printing of forms and charts on the 2700 II. It is the 2700 II version of the Xerox Host Forms Description Language, used on Xerox 9700 and 8700 printers and allows most charts and forms designed for those printers to be recompiled for printing on the 2700 II, the vendor said.

The second software package, DCF-XP, is said to interface the 2700 II to the IBM Document Composition Facility, a page composition software package.

Current 2700 printer customers can have their machines upgraded on-site to the 2700 II. There is a $1,000 upgrade charge for purchased units.

Single-unit purchase price for the 2700 II is $19,995. On a two-year lease, with a monthly printing volume of 5,000 pages, the price for a 2700 II is $600/mo. Also, both software packages — RPMF ($3,870 for a single-user, one-time license fee) and DCF-XP ($6,000 for a single-user, one-time license fee) — and the 271 communications module ($2,750 purchase price) will be available in the second quarter of 1984. The 274 interface ($2,375 purchase price) controller will be available in the third quarter of 1984, Xerox said.

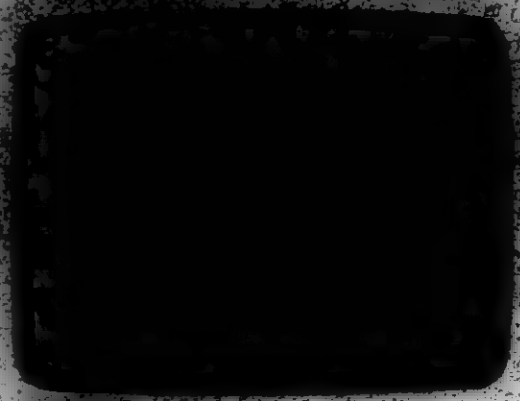
Xerox, 880 Apollo St., El Segundo, Calif. 90245.

Amdahl Corp. recently announced 15% lease-price increases on its 8000 series of direct access storage devices. The increases go into effect April 23, a spokeswoman said.

INSIDE

Turnkey Systems/68
Printers/Plotters/69
Graphics Systems/70
Power Supplies/70
Board-Level Devices/70
Auxiliary Equipment/72

SAS...
Power and Flex
to Meet All You



SAS/OR

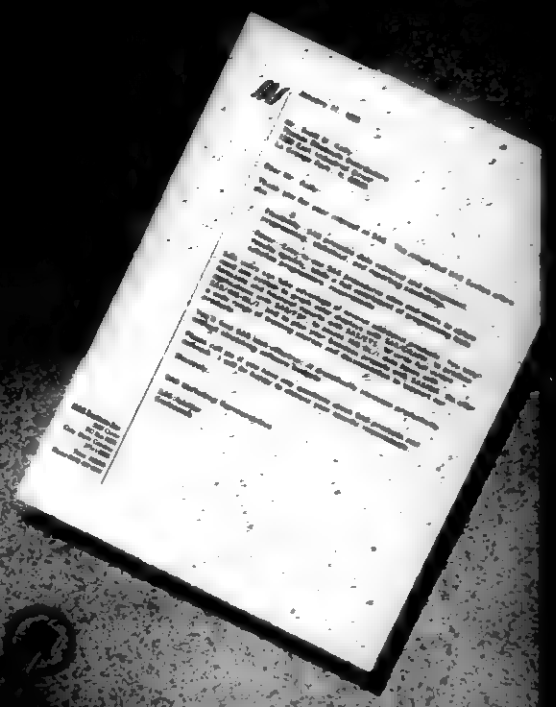
You get a tenfold advantage with the SAS System. A library of ready-to-use procedures gives you the power to analyze data without formal training. SAS even provides an on-line help facility. Or you can create your own help program. With a few English-like commands, you can use SAS for data analysis, market research, capacity planning, financial reports, summary statistics, charts, plots, personnel reports and many other jobs.

SAS/ETS

SAS is the registered trademark of SAS Institute Inc., Cary, NC, USA. STAT/GRAPH, SAS/ETS, SAS/OR, SAS/AF, SAS/IML and SAS/CPE are trademarks of SAS Institute Inc.
VAX is a trademark of Digital Equipment Corp., Maynard, MA, USA. Copyright © 1985 by SAS Institute Inc.

Available for IBM, DG ECLIPSE and DEC VAX

ibility
r Needs



SAS gives time.

SYSTEMS & PERIPHERALS

TURNKEY SYSTEMS

CLIMAX COMPUTER CORP.
Screenstor

Climax Computer Corp. recently announced a peripheral device to provide existing RS-232C-equipped terminals with off-line intelligence and memory storage.

Called Screenstor, the product reportedly links any host computer and terminal equipped with RS-232C ports to provide up to 100 pages of terminal memory with scrolling facilities, up to 100 pages of static memory storage off-line, parameter and character conversion features and translation facilities to standardize different terminals.

The device contains an auxiliary port to control a slave printer or other serial device. The unit also provides battery backup of 2K bytes of parameter storage and reportedly will operate in the same environment as the connected terminal.

The device is priced at $485.

Climax Computer, Suite 105-172, 4790 Irvine Blvd., Irvine, Calif. 92715.

SPERRY CORP.
Sperrylink Model 30 price cuts

Sperry Corp. has announced price reductions, effective immediately, for peripheral components on its Sperrylink Model 30 desktop workstation.

Under the new pricing structure, a typically configured Sperrylink Desk Station, which includes a workstation, diskette subsystem, printer and appropriate software, has been reduced to $7,869.

Additional price reductions are as follows:

- Diskette expansion — a 10% price cut from $700 to $630.
- Draft printer, 160 char/sec — a 32% price cut from $1,875 to $1,275.
- Draft printer, 160/40 char/sec — a 34% price cut from $2,125 to $1,395.
- Model 0431 Correspondence Quality Printer — a 23% price cut from $2,641 to $2,025.
- Forms tractors — a 34% price cut from $495 to $329.
- Cut sheet feeder — a 25% price cut from $995 to $745.

Sperry Computer Systems Operations, P.O. Box 500, Blue Bell, Pa. 19424.

NORTHERN TELECOM, INC.
Displayphone enhancements

Northern Telecom, Inc. announced an enhanced keyboard and other features for its Displayphone terminal.

The keyboard was designed with full-size keys that operate like a standard-size keyboard. The keyboard extends in front of the Displayphone and can be stored inside when not in use, according to the company. Also, the key caps can be changed to accommodate special key designations for other terminal types, such as an on-line IBM 3278.

Other enhancements reportedly include a cap lock function that allows the user to lock the alphabetic character keys in the uppercase mode, while leaving the numeric keys unaffected; automatic logon with password entry; a terminal identification feature that enables the Displayphone to respond to various computer systems; and an 81-number directory that allows users to designate entries as either digitone or rotary dial calls.

The Displayphone costs $1,295. Existing models can be upgraded with the new keyboard and features for $150 per unit or with just the firmware for $65 per unit.

Northern Telecom, P.O. Box 1222, Minneapolis, Minn. 55440.

PRINTERS/ PLOTTERS

XEROX CORP.
9700 Model V; 8700 Model V

Xerox Corp. has announced enhancements for its 9700 and 8700 laser-printing systems.

The 9700 Model V and 8700 Model V reportedly produce higher quality output than standard 9700 and 8700 models because of an improved imaging subsystem and an advanced Xerographic engine.

The printers were designed for use with the Xerox graphics system, which enables photographs, line art and other illustrations to be merged with text to produce publications, reportedly within hours.

In the new printers, the subsystem is said to feature a more tightly focused laser beam for better control of the dots comprising an image. Also, the Model V versions are said to use the Xerox 9600 Xerographic engine for a more efficient image transfer system.

The Model V printers are now available in New York, Chicago and Los Angeles, and will be available throughout the U.S. during the second quarter of 1984.

Purchase prices for the 9700 Model V start at $412,000, while two-year leases for printing volumes of one million page/mo start at $13,500/mo.

Purchase prices for the 8700 Model V start at $226,000, with a two-year

Continued on page 70

ALUMINUM
Disc Pack Cases ● Mag Tape Reel Cases

#6122 1 to 10 Canisters
#6126 1 to 14 Thinline
#6127 1 to 18 Tapemaster or EZ-II
#6148 DISC PACK CASE CAPACITY — 1 3336 Disc Pack 3 Phoenix Cartridges 3 5440 Cartridges 5 2315 Cartridges
#6118 1 to 5 Canisters
#6116 1 to 7 Thinline
#6128 1 to 9 Tapemaster or EZ-II

See your local dealer, or call/write —
ALUMINUM CASE CO.
3333 W. 48th Pl. • Chicago, Illinois 60632 (312) 247-4811

DOS VSE VM CMS OS USERS
● ON-LINE, REAL-TIME APPLICATIONS SOFTWARE
● ANSI COBOL - CICS COMMAND LEVEL
■ CUSTOMER ORDER MANAGEMENT - IMSS/COM™
•• ORDER ENTRY, SHIPMENT PROCESSING and BILLING
•• INVENTORY CONTROL and ACCOUNTING
•• ORDER and SALES ANALYSIS
•• COST OF SALES, A/R & G/L INTERFACE
•• SPECIAL PRICING and PROMOTIONS
•• SHIPMENT POOLING and ROUTING
■ ACCOUNTS RECEIVABLE - IMSS/AR™
•• CASH APPLICATION (ON-LINE and/or AUTOMATIC)
•• ON-LINE INQUIRY and AGEING (ITEMS and PAYMENTS)
•• STATEMENTS
•• PAYMENT HISTORY and ANALYSIS
•• G/L INTERFACE
■ ACCOUNTS PAYABLE - IMSS/AP™
•• ON-LINE VOUCHERING
•• CASH REQUIREMENTS and INVOICING
•• VENDOR HISTORY and ANALYSIS
•• G/L INTERFACE
● YOUR SYSTEMS INCLUDE:
VSAM or IDMS DATA BASE ACCESS
SOURCE CODE, CONTROL TABLES & JCL
USER, SYSTEM, & OPERATIONS MANUALS
TRAINING, EDUCATION, SYSTEMS & PROGRAMMING SUPPORT
LOCAL and REMOTE PROCESSING
MULTI-COMPANY/MULTI-WAREHOUSE CAPABILITY
CUSTOMIZATION SUPPORT WITH WARRANTY

POWER
Twenty years ago, "computer power" was synonymous with larger IBM mainframes.
We know, we were around then.
Today protocol converters allow PC's and terminals to use the vast power of the largest IBM systems.
Call us, we're Com/Peripherals...we can help you "power-up" your system.
PROTOCOL COMPUTERS, INC.
ASCII TO SNA/SDLC EMULATION
MODEL 176-3 (3 PORT)
Price $2900.00 each
Two Year Lease
$145.00 per month
COM/PERIPHERALS, INC.
Distributors of quality data communications and terminal equipment for sale or lease.
87 Water Mill Lane, Great Neck, New York 11021
(516) 487-0590 — Out of Town, Call Collect.

ANS COBOL & OS/370 Assembler
Training at Chubb
ANS COBOL .....March 5-16
OS/370 Assembler .....March 19-30
Join the group of satisfied clients at Chubb Institute. Our ANS COBOL and OS/370 Assembler classes are skills oriented. Emphasis is placed on the practical knowledge needed to be immediately productive. Students design, code, test and debug real-life projects. Informative lectures, and comprehensive manuals guarantee a solid understanding.
Classes are presented publicly in New Jersey, in-house and to regional training groups in a consortium format.
For more information on the courses offered by Chubb Institute send for your free catalog or call (201) 285-9700.
CHUBB INSTITUTE
9 Sylvan Way
Parsippany, NJ 07054

THE FIRST MOBILE COMPUTER.

THE COMPLETE COMPUTER FOR THE MOBILE PROFESSIONAL.

Professionals on the move in today's productivity-paced business environment have to run a little faster just to keep up.

They can easily spend half their time in airports, taxis, lobbies and hotels unable to do the work they'd like to get done.

But we have a solution.

Give them the powerful 9 pound, 16-bit computer that works when and where they do.

Give them an advanced battery-powered printer that attaches securely on the computer.

Give them an interactive human interface and operating environment that takes only 15-30 minutes to learn.

And unique field-oriented software that comes in rugged plug-in capsules.

In short, give them the Gavilan™ mobile computer.

PORTABLE TURNED PRACTICAL.

Never has there been a complete business computer system as sophisticated, yet as lightweight, as the Gavilan.

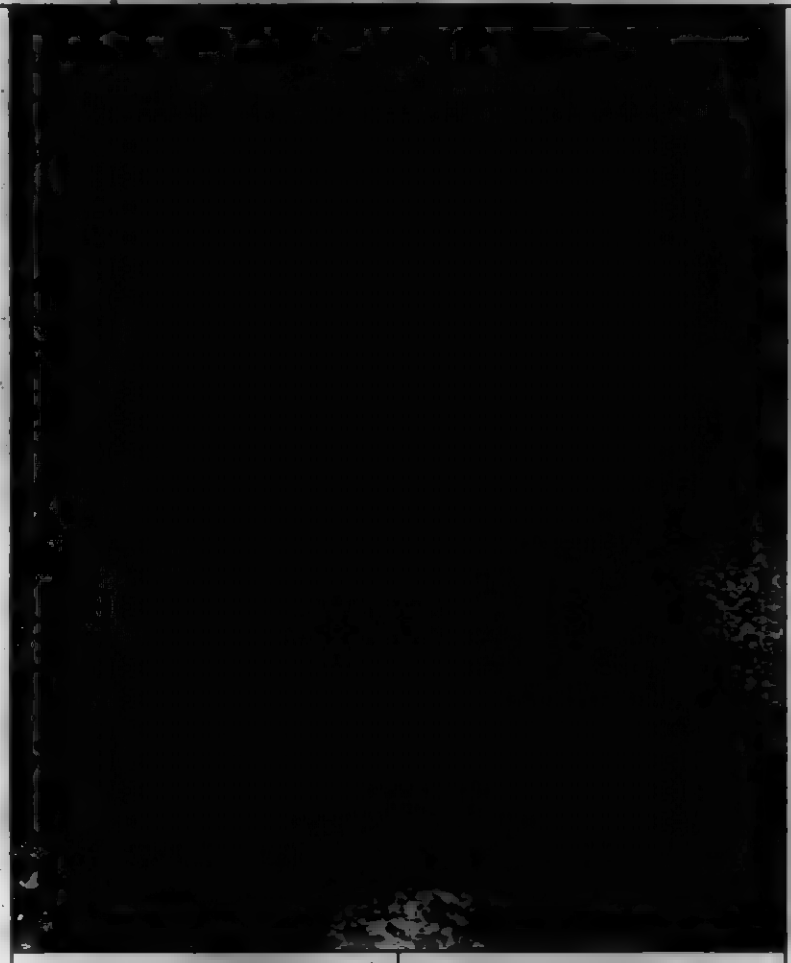
Self-contained, rechargeable 8-hour batteries free the user from external power constraints.

The 8 line X 80 character screen eliminates the need for an external monitor, although you can add one if you wish.

The full-size typewriter keyboard makes data entry as convenient as it is in desktop systems.

A built-in 3½" microfloppy disk drive and modem provide the capabilities of data handling and transmission where they never before existed.

And a 50 character per second printer gives the mobile professional in the field the immediacy of hard copy text, forms, charts, spreadsheets and graphics.



All in a compact 14 pound mobile office.

WE BUILT A MORE MOBILE MOUSE.

The success of any computer depends in part on the "friendliness" and accessibility of the user interface.

Especially in the field.

A standard mouse interface is fine for the expanse of a desktop, but not for work on the move.

So with the Gavilan, we incorporated a built-in touch panel: the first fully integrated computer mouse.

It's a pressure-sensitive pad just above the keyboard. Finger movements across the touch panel control the on-screen movements of a cursor.

But like a mouse, the Gavilan touch panel actually executes virtually all of the user commands, saving the keyboard for typing only.

Through the touch panel, users store and retrieve data. Cut and paste. Move documents. Scroll through pages of information. Zoom out for a complete look at the format of a document. Or even ask the computer what just happened and what to do next. With one finger.

SOFTWARE IN A CAPSULE.

The intuitive ease of talking to the computer through the touch panel is made possible by the unique Gavilan operating environment and software packages.

The applications packages come in durable capsules called CapsuleWare.™ They plug directly into the body of the computer, adding no additional volume. The operating software, (GO System™) then lets each of the applications communicate with each other through a common interface and a sharing of data.

The result is a completely integrated information environment that lets the user combine spreadsheets, graphics and word processing text together.

All in the same uninterrupted user mode.

OUTWARD MOBILITY FOR USERS, UPWARD MOBILITY FOR OEMs.

The Gavilan mobile computer and its CapsuleWare programs are creating vertical market demands—both in MS/DOS and the Gavilan operating environment—for software packages completely unrealized one short year ago.

That means new opportunities in applications development far beyond the typical office-bound programs. From air and sea navigation to banking services. Journalism to field auditing. Anthropology to insurance.

And that means you've got the chance to be first in your chosen field.

A position we strongly advocate.

Gavilan Computer Corp.
P.O. Box 5004
Campbell, CA USA 95008
(408) 379-8000
Telex 4991278 GVLN US

Gavilan

Gavilan, CapsuleWare and GO System are trademarks of Gavilan Computer Corporation. MS/DOS is a trademark of Microsoft Corporation.

Viva Italia

Now you can speak Italian to 35,000 DP professionals.

Computerworld/Italia, one of the latest additions to our international network of publications, brings the high quality of editorial that is associated with *Computerworld* to the Italian DP market. Its circulation consists of 35,000 DP professionals in computer user environments throughout Italy including the leading decision-makers in the various industries. *Computerworld/Italia* is published weekly.

The Italian computer market is expected to reach sales of over $1 billion in 1983. The booming demand in every category of the Italian computer and peripherals market provides excellent opportunities for U.S. manufactured equipment. The single largest buyers of computers in Italy at this time are manufacturers.

CW International Marketing Services can give you one-stop advertising services in countries around the world. For more information on *Computerworld/Italia* or any of our other foreign publications, just fill out the coupon below.

Diana La Fauci Maraglia, Manager, International Marketing Services
CW COMMUNICATIONS, INC.
375 Cochituate Road, Box 880, Framingham, MA 01701 • (617) 879-0700

Please send me more information on
☐ *Computerworld/Italia* ☐ Your other foreign publications

Name _____
Title _____
Company _____
Address _____
City _____ State _____ Zip _____

CW COMMUNICATIONS/INC.
Publishers of Computerworld and other leading computer publications around the world.

VAX/VMS SOFTWARE

RESOURCE MANAGEMENT and CHARGEBACK SYSTEM

DP Managers use ARSAP for:

- User and Project Accounting
- Monitoring Usage and Trends
- Controlling Performance
- Billing for Services

Also Available for RSTS and RSX Systems

GEJAC COMPUTER CORP.
P.O. Box 186
Riverdale, MD 20737 (301) 864-3700

VAX, RSX, and RSTS are trademarks of the Digital Equipment Corp.

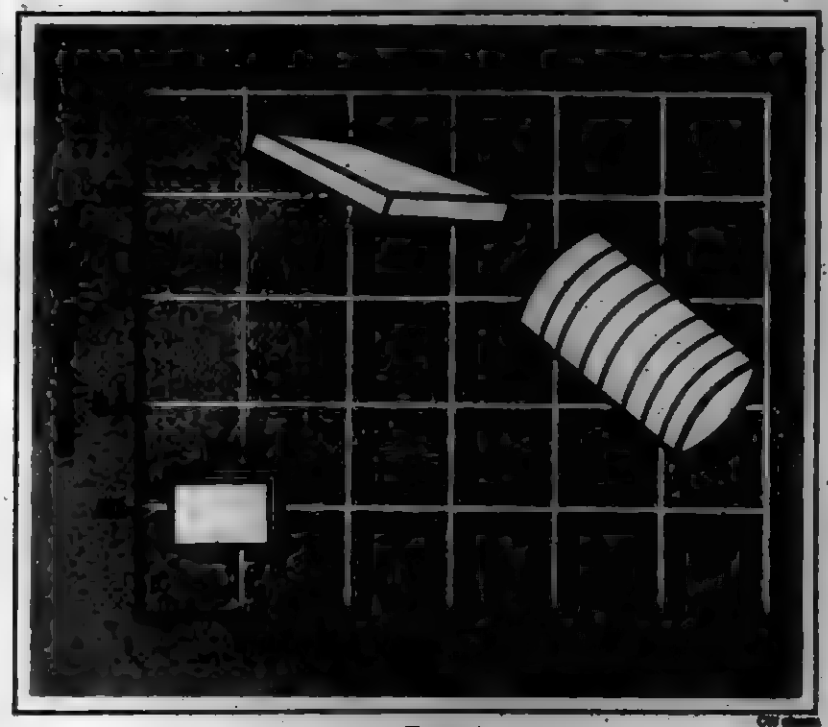


Figure 1

MEMORY from page 63

memory can be put in dynamic RAM. The result is an increase in system performance.

How much memory is needed? The words for this article were typed on a portable computer that required only 2,500 bytes of memory to store the data.

Typically, 3,000 bytes are required for one page of text. Thus, each 256K-bit dynamic RAM chip could store approximately 10 pages of written material.

The bottom line is that if present trends continue, your data processing equipment will continue to improve in performance, cost less and occupy less desk or floor space.

These same trends will also allow the benefits of various artificial intelligence computing capabilities, such as Natural Language and Expert Systems, to become cost-effective and economically viable for a wide range of business applications.

Dicken is president of DM Data, Inc., a Scottsdale, Ariz., technology research firm.

Table 1

MINIS from page 63

number of market forces said to be reshaping the computer industry, the report said. Chief among those forces are the accelerating trends in circuit density and speed and the increasing integration of computer and communications capability.

One area of predicted impact is market share. The total mini- and microminicomputer market will increase from $9 billion in 1982 to an estimated $25 billion in 1987. But the share held by 16-bit minis will decline from 66% to 18%. Use of microminicomputers, on the other hand, will increase from 6% to 48%, the study predicted.

Major Impact

For users, the major impact will be a plethora of products and suppliers capable of providing more computer and communications capability than most users can use. "Integration of these products and services into the corporate environment requires careful selection, procurement and installation planning," the report warned.

This planning should take into account overall corporate information goals and objectives, the proper role of the management information systems group and the human obstacles to widespread computer utilization. Moreover, such planning should not be left entirely in the hands of the DP staff, the report suggested.

Whether developed with the support of a management information systems group or independently, small-computer procurement policies are needed by even the smallest user, the study said.

"Failure to develop these will result in a costly proliferation of essentially similar, but incompatible, systems," the report said.

Procurement policies can be administered through the use of in-house channels of distribution such as centralized purchasing, an in-house computer store or volume purchase agreements. Product and supplier evaluation criteria should take into account the needs of inexperienced computer users.

The report costs $985 from Electronic Trends Publications, located at Suite 372, 10080 N. Wolfe Road, Cupertino, Calif. 95014.

MAGIC OPTICS AND
SOFTWARE

Faster response time is at your fingertips!

Please contact me with more information on the 3270 OPTIMIZER.

☐ IMS ☐ CICS

NAME _____

TITLE _____

COMPANY _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

TELEPHONE _____

Clip and Mail to:
CW

BMC SOFTWARE
P.O. Box 2002/Sugar Land, Texas 77478

SYSTEMS & PERIPHERALS

Continued from page 69

lease starting at $7,400/mo with a monthly printing volume of 400,000 pages.

Xerox, Printing Systems Division, 880 Apollo St., El Segundo, Calif. 90245.

GRAPHICS SYSTEMS

WAYNE KERR, INC.
Artworker

Wayne Kerr, Inc. recently announced Artworker, a stand-alone printed circuit board computer-aided design system.

Based on Mos Technologies, Inc.'s 6502 microprocessor, the Artworker system provides two levels of operation, according to a company spokesman: the "Designer" level, providing a computerized version of a conventional drawing board with on-screen message functions guiding the operator at every step; and for more highly skilled operators, "Designer Plus," allowing the user to input connectivity information as components are placed on the layout and to place tracks on the board exactly where desired.

The product features 16 pad sizes, ranging from .02 in. to .5 in., and four pad shapes, said to provide greater precision in the design process. The spokesman said the product also has a virtually unlimited number of package styles and pad layouts.

Eight user-definable track and line widths are reportedly visible on the screen, and 17 layers of possible design space, with each layer measuring 25 in. by 25 in., reportedly provide room for silk-screen masters, drilling diagrams and solder masks in addition to actual printed circuit board layers.

The product is priced at $24,950 and is available this month with a 30-day delivery.

Wayne Kerr, 400 W. Cummings Park, Woburn, Mass. 01801.

POWER SUPPLIES

RKS INDUSTRIES, INC.
RLM power line monitor

RKS Industries, Inc. has introduced the RLM power line monitor, a device that alerts users to power condition changes in computer equipment lines.

According to the vendor, a high proportion of computer malfunctions are due to fluctuating power conditions — dips, spikes, surges and voltage changes. With the monitor, the faceplate indicates a change to dangerously low or high line voltage and voltage spikes or drops, via a red light and alarm.

The monitor plugs directly into the wall outlet and monitors the power entering a workstation computer or peripheral. It can be used before computer equipment is installed to determine the status of power in various parts of the facility, a company spokesman said.

The RLM monitor sells for $245 per unit, with a 10% discount for quantities of five or more.

RKS Industries, 4555 Scotts Valley Drive, Scotts Valley, Calif. 95066.

TRANSWESTERN PRODUCTS CORP.
Ultraguard series

Transwestern Products Corp. has announced an uninterruptible power supply for business computers.

According to the vendor, the Ultraguard series is an ac-powered, battery backup power source for use with small computer systems and instruments that must remain operational during ac power blackouts. An indicator light gives continuous status of the power condition, and a tone alerts the user when the unit is operating on battery power.

Ultraguard provides up to 30 minutes of power to the computer system, allowing the operator to save current work in progress and shut the system down to avoid data loss or system damage, a company spokesman said.

The unit weighs 15 lb and provides 200W of uninterruptible power.

The price is $649, with volume price discounts available.

Transwestern Products, 1711 Senter Road, San Jose, Calif. 95112.

K/W CONTROL SYSTEMS, INC.
UPS inverter and controller module

K/W Control Systems, Inc. recently announced an uninterruptible power supply (UPS) inverter and controller module for its Piller 40K and 75K Vac 60 and 415 MHz frequency converters installed at sites utilizing IBM and Amdahl Corp. mainframes.

The module and an available battery package are reportedly field-installable and are said to extend the normal 500 msec power failure ride-through of the 60 and 415 MHz frequency converters up to 30 minutes or 15 minutes at full load.

The module reportedly monitors incoming utility line voltage, as well as the frequency at the terminals of the frequency converter. Upon detection of below-acceptable power levels, the controller automatically transfers the input over to the battery inverter system, according to a company spokesman.

The inverter, control package and contactors are housed in a single enclosure designed to be mounted on top of or beside the frequency-converter cabinet.

The module is priced at $15,500, and the price of the battery backup depends on configuration.

K/W Control Systems, R.D. No. 4, Box 114C, S. Plank Road, Middleton, N.Y. 10940.

DISCWASHER CO.
Spikemaster

Discwasher Co. announced Spikemaster, a multimode surge protector.

The product works in common mode and differential modes, reportedly incorporating five surge-suppression devices with a five-part filter section. Spikemaster features four sockets, a circuit breaker, an on/off switch with indicator light, 15A backup capacity and a 6½-ft cord, according to the vendor.

Spikemaster costs $79.95.

Discwasher, 1407 N. Providence Road, P.O. Box 6021, Columbia, Mo. 65205.

BOARD-LEVEL DEVICES

EMULEX CORP.
TC05; TC15

Emulex Corp. has introduced the TC05 and TC15 tape couplers to provide software-transparent storage and backup capabilities for any of Digital Equipment Corp.'s LSI-11, PDP-11, VAX-11 or Micro/PDP-11 series

Continued on page 72

TANDEM TANDEM TANDEM

Use your experience on the Non-Stop II to build a state-of-the-art network serving the banking industry.

MSI Continental Systems, Inc. is assembling a team of professionals to lead its leadership in the Financial Services field.

Systems programming positions available for:
Programming in TAL (Hardware Troubleshooting)
Performance tuning
3270, 3780 and SNA protocols
Connection and compatibility necessary

Applications programming positions:
Project leader experience
On-line programming using enscribe
Structured techniques
Data Base systems
Four years experience (IBM helpful)

APPLICANTS ONLY, PLEASE

For qualified professionals these openings represent excellent opportunities. Starting salaries are commensurate with experience. Relocation expenses are accepted. Interested applicants should send a resume to:

MSI CONTINENT SYSTEMS, INC.
HUMAN RESOURCES DEPARTMENT
P.O. BOX 1370
WEST MEMPHIS, AR 72301
OR CALL
(501) 735-4555
EOE M/F

HEADACHES?

GET FAST RELIEF WITH YOUR VERY OWN...

PERSONAL DATASET MANAGER

PDM is the latest addition to ASTUTE, the Data Set and Catalog Management System for MVS and VS1.

With PDM, you can:
- display information about your data sets in an easy-to-use scrollable format
- select individual data sets, and perform operations such as scratch, rename, browse, or call any program
- invoke ISPF browse or edit, or call any CLIST

Preliminary tests have shown that the use of PDM will save more than 50% of the CPU and elapsed time normally required by more traditional data set maintenance methods.

ASTUTE gives you PDM, plus over 45 other powerful and easy-to-use functions that provide complete control over your catalog and DASD environment. 45-day free trial available.

Call us today for more information!

and... ASTUTE WON'T UPSET YOUR BUDGET!

✔ DON'T MISS THIS...

Our complimentary seminar series will start this year in San Francisco on February 23, 1984. Call now for reservations.

ASTCO the software development specialists

333 Alvarado Avenue • Palo Alto, CA 94306 • 415-856-8766

Close your eyes. Now have someone read this to you.

You are blind. A student. Facing four years of college. With about thirty-two textbooks to read. Plus fifty supplemental texts. How are you going to manage?

With Recording for the Blind. Since 1951, we've helped over 60,000 blind, perceptually and physically handicapped students get through school. By sending them recordings of the books they need to read. Free.

Recording for the Blind is non-profit, and supported by volunteers and contributions from people like you who can imagine what it's like to be blind.

Your tax-deductible donation will help our students meet their educational goals. We'd all be grateful.

If you want to know more about us, write: Station E
Recording for the Blind, Inc.
215 East 58th Street, New York, NY 10022
(212) 751-0860

Recording for the Blind, Inc.
AN EDUCATIONAL LIFELINE

"They promised me service like I've never seen.

I never saw it."

Stop the shock...with Exxon office automation.

Today, more and more companies are shocked over the time it takes to service their office automation equipment.

Shockproof your office automation

With Exxon office automation, "service shock" is a thing of the past. Because we provide service for every product we sell — quickly and efficiently.

If you ever need to call the Exxon toll-free service number, a service operator will immediately determine if your problem is operational or equipment oriented. If it's operational, a service specialist will duplicate your steps on live equipment to determine the best solution. If your trouble is with the equipment itself, a service call will be arranged instantly.

Ready where you are

The Exxon service organization covers virtually every county in America. And that means it's faster and easier for us to repair your equipment right in your office.

Computerized service system

From the time you purchase your equipment from an Exxon sales branch, our computerized service management system will maintain a complete service record of all your office equipment. So even before our field engineer arrives, we can begin to diagnose your problem.

For more information

Call 800-327-6666, or write Exxon Office Systems, P.O. Box 10184, Stamford, CT 06904-2184. We'll be happy to tell you about our basic maintenance agreement and customer service system.

Service to Exxon products is provided through the Exxon Office Systems Customer Service Organization, independent sales agents, and Western Union Telegraph Company Field Service Division.

EXXON OFFICE SYSTEMS

The future...without the shock.

SYSTEMS & PERIPHERALS

Continued from page 70

CPUs using Control Data Corp.'s Sentinel start/stop streaming ¼-in. cartridge tape drive.

Incorporating Emulex's bipolar, bit-slice microprocessor technology, the microprogrammed firmware on the board supports tape-streaming operations automatically, the vendor said.

Both couplers, when combined with the Sentinel drive, reportedly provide functional emulation of the DEC TS-11 tape subsystem, operating transparently to the standard DEC RSX-11M, RSX-11M-Plus, RSTS-E, RT-11 and VMS operating systems and diagnostic hardware. Both incorporate a 3.5K-byte buffer, are packaged on a single, quadwide printed-circuit board and require 5V at 6A. Tape transport is via a single 34-conductor flat cable.

The TC05 embeds directly into a DEC Q-bus backplane slot of the LSI-11 and Micro/PDP-11 series computers. It supports 22-bit addressing, providing a 4M-byte memory capacity on the LSI-11/23 Plus and Micro/PDP. The TC15 embeds in a Unibus SPC slot of the PDP-11 or VAX-11 CPU.

List price for the TC05 is $1,200/unit; the TC15 is $1,400/unit.

Emulex, P.O. Box 6725, Costa Mesa, Calif. 92626.

FORCE COMPUTERS, INC.
SYS68K/Dram-2; SYS68K/CPU-2

Force Computers, Inc. has introduced two memory boards, the SYS68K/Dram-2 and SYS68K/CPU-2.

The Dram-2 contains 2M bytes of random-access memory (RAM) on a double Eurocard form factor.

Standard features include byte parity checking with parity-fail indication; word and data transfers and access of 190 nsec (write) and 300 nsec (read).

The selectable base address for each of two memory banks includes mirror mode capability. The software-programmable access modes for each bank include read/write, read only, write only and no access, the vendor said.

The CPU-2 is a second-generation CPU board for the VME bus. It was designed for use in applications which require multiprocessor/multimaster capability, particularly in industrial control and multiuser micro systems.

The heart of the CPU-2 is the Motorola Corp. 68000 microprocessor. The standard board is delivered with the 8Hz version, and optional processors include the 10 MHz 68000 or the 68010 unit with virtual memory capability. The CPU resides on an eight-layer double Eurocard.

One feature of the CPU-2 is 256K bytes of dual-ported RAM. The RAM allows asynchronous, high-speed access from the local processor bus, as well as from the global VME bus. The RAM is expandable to 1M byte.

The additional I/O channels on the CPU-2 consist of a serial I/O multiprotocol RS-232C interface with software-programmable bit/sec rates; a parallel interface with 24 bidirectional I/O lines; and an on-board floppy disk controller, which can handle up to four 5¼-in. disk drives.

Operating software systems for the CPU-2 from Force Computers are the SYS68K/Coherent, a multiuser operating system, and the SYS68/Rtosk, a real-time operating system.

The unit price for the Dram-2 is $5,590; the CPU-2, including monitor, is $1,795, according to the vendor spokesman.

Force Computers, Suite 150, 2041 Mission College Blvd., Santa Clara, Calif. 95054.

ARIUM CORP.
Memory option

Arium Corp. has introduced two configurations of a nonvolatile memory option for its MLA100 logic analyzer.

The MLA100 samples data up to 32 channels wide at speeds of up to 100 MHz and has timing, state and disassembled code displays. It includes a 32-channel logic pod, the vendor said.

The basic setup memory option saves eight complete machine setups in permanent storage, even when the power is turned off, making it useful for field work and production testing, a company spokesman said.

The expanded version of the option includes the setup memory option plus an A/B memory option, which provides the ability to save, store, recall and edit a whole captured data memory set.

The basic nonvolatile memory option sells for $485, with the expanded version costing $795. Delivery is four weeks after receipt of order.

Arium, 1931 Wright Circle, Anaheim, Calif. 92806.

AUXILIARY EQUIPMENT

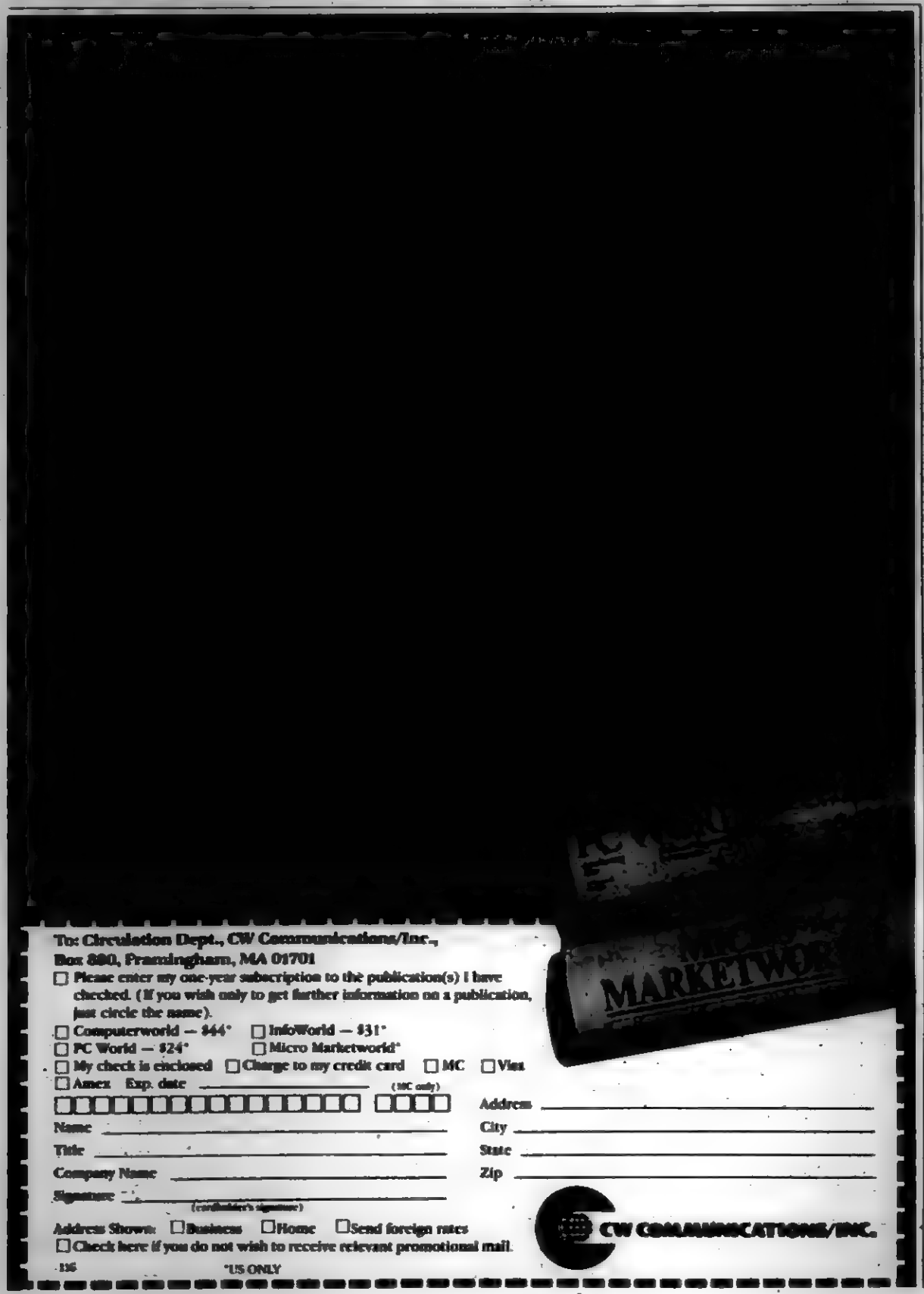
UNITED SOFTWARE SECURITY, INC.
Lazerlock

United Software Security, Inc. has announced Lazerlock, a hand-held decoder designed for computer security.

Lazerlock safeguards personal computers, mainframes and remote terminals, according to the vendor. Systems that use Lazerlock can insert security checks at any point in a program. Lazerlock does not use passwords or hardware encryption, according to the vendor.

Lazerlock is priced between $100 and $200, depending on the features required.

United Software Security, 6867 Elm St., McLean, Va. 22101.



To: Circulation Dept., CW Communications/Inc.,
Box 880, Framingham, MA 01701
☐ Please enter my one-year subscription to the publication(s) I have checked. (If you wish only to get further information on a publication, just circle the name).
☐ Computerworld — $44* ☐ InfoWorld — $31*
☐ PC World — $24* ☐ Micro Marketworld*
☐ My check is enclosed ☐ Charge to my credit card ☐ MC ☐ Visa
☐ Amex Exp. date _____ (MC only)
☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐ ☐☐☐☐
Name _____ Address _____
Title _____ City _____
Company Name _____ State _____
Signature _____ Zip _____
(cardholder's signature)
Address Shown: ☐ Business ☐ Home ☐ Send foreign rates
☐ Check here if you do not wish to receive relevant promotional mail.
116 *US ONLY
CW COMMUNICATIONS/INC.

MICROCOMPUTERS

Speech systems gaining ground

MICRO BITS

THOMAS MADRON

Speech systems are likely to become the major new I/O devices of microcomputing in the middle to late 1980s.

In the quest for user-friendliness, a number of devices have been proposed over the last few years. We have seen menu systems depending on key strokes, light pens, mice, touch screens and now, after 10 or 15 years of development, cost-competitive speech systems on microcomputers. Few techniques are more natural than being able to give a computer voice commands.

The ability to talk to a computer has been an image presented to us in science fiction for many years. HAL, the mentally ill computer in *2001, A Space Odyssey* by Arthur C. Clarke, depicted the computer as a villain. Then there was Mr. Spock's talking computer on board the *Enterprise* in the television show *Star Trek*. Those science fiction computers of the 60s possessed the ability to accept intelligent speech commands as well as to synthesize speech in order to respond to requests.

Fluent conversational speech recognition and response of the kind used on the *Enterprise* involve what artificial intelligence researchers have termed a "model of the domain of discourse" resulting in a recognition process called "understanding." The actual devices on the market in 1984, by way of contrast, are much simpler, using a pattern-matching technique rather than understanding.

Speech recognition can be defined in various ways. There are speaker-dependent and speaker-independent systems. HAL, in *2001*, used a speaker-independent approach — it was able to recognise the speech of all the crew members. Many of the contemporary 1984 systems are speaker dependent — they must be trained to recognize the speech of a single individual. The computers in both *2001* and on the *Enterprise* were also

See SPEECH page 74

Macintosh spurs software
From third-party vendors

By Jeffry Beeler
CW West Coast Bureau

Though officially introduced only two weeks ago, Apple Computer, Inc.'s Macintosh supermicro has already spurred the announcement of an assortment of third-party software packages and independently developed peripherals.

On the software side, the newly available Macintosh accessories include revised versions of five existing Microsoft, Inc. applications and a raft of other third-party packages, including:

- Xenix, Microsoft's Unix look-alike operating system, which will be supported by the recently introduced Lisa 2/10.
- An interactive, multitasking program development system from Creative Solutions, Inc.
- A rewrite of Software Publishing Corp.'s PFS line of information management programs.

On the hardware side, the list of independently supplied Macintosh-compatible accessories includes two peripherals from Tecmar, Inc. — a 5M-byte removable cartridge subsystem and a Bell 212A-compatible modem interface that reportedly replaces traditional telephones. Also available as peripherals with Apple's smallest 32-bit micro is a family of Davong Systems, Inc. hard disk modules capable of storing 5M to 40M bytes.

Ranging in estimated price from $1,995 to $4,500, the Davong disk systems will become available during the first quarter. Davong is located at 217 Humboldt Court, Sunnyvale, Calif. 94086. The Tecmar cartridge subsystem and phone modem interface cost approximately $2,000 and $300 to $500, respectively, and will be available late in the first quarter or early in the second from Tecmar at 6225 Cochran Road, Cleveland, Ohio 44139.

Macintosh also reportedly comes with an intelligent, front-end processor that allows the Apple micro to communicate with IBM or IBM-compatible central mainframes. Winterhalter, Inc.'s Data Talker II enables the personal computer to emulate IBM's 3200 series interactive displays as well as a broad selection of the industry giant's remote-batch terminals, according to a Winterhalter source.

With documentation, warranty and installation, the micro-to-mainframe link retails for $995 and can be obtained from Winterhalter at 3853 Research Park Drive, Ann Arbor, Mich. 48104.

See APPLE page 86

How are corporate micros working?

The dust from the corporate microcomputer boom is finally starting to settle. For many firms, the mad dash to buy and install microcomputers is giving way to developing plans for coordinating and controlling microcomputer use.

How are microcomputers working out in your organization? *Computerworld* will publish its second annual "Micros in Big Business" Special Report this April. This special section will focus on the success and failure of micros in large organizations. Included will be articles covering: micro-to-mainframe links, microcomputer networks, compatibility issues and the growing concern of security and data protection.

If you have a story you would like to share (either bitter or sweet), *Computerworld* would like to hear from you. Contributions should take one of two forms: a tutorial article discussing an issue or trend in corporate microcomputing, or a user story outlining a firm's experience with micros.

Articles must be typed, double-spaced and no longer than eight pages. Artwork, such as charts, graphs or photographs, is encouraged. Authors should also include a brief biography and a phone number where they can be reached.

The deadline for submissions is March 5. Articles should be addressed to: Donovan White, Special Reports Editor, *Computerworld*, 375 Cochituate Road, Box 880, Framingham, Mass. 01701.

IBM

IBM said it has begun volume shipments of its PCjr micro along with a dozen programs. In addition, IBM announced a free, dial-up assistance service for novice users and a $380 subscription software service that offers dial-up technical aid and a monthly newsletter.

INSIDE

Systems/80
Printers/Plotters/82
Board-Level Devices/82
Auxiliary Equipment/84
Micro Software/84

Quality you expect, at a price you don't.

BECK DOUBLE DENSITY DISKETTES

SINGLE SIDED $2.19 ea. / $2.79 ea. DOUBLE SIDED

Our message to you is simple. If you like the quality of Dysan, Verbatim, 3M, et al, you'll like the quality of Beck soft sector

5¼" flexible diskettes. The only major difference is cost. We're less expensive. In fact, a lot less expensive.

Why does Beck cost less?

Our philosophy is: Excellent quality and reliability, at a cost that beats the jacket off other diskettes. We can do it because we (1) put our money into the product, not mega-marketing schemes and fancy packaging, and (2) sell our money-saving 25-diskette pack to you direct via a toll free order line, so you get fast, door-to-door service efficiently.

What about quality and reliability?

At Beck we take no shortcuts. You get the best because we are committed to excellence. Every diskette is manufactured to very strict quality standards.
• Full 7 Year Warranty • 100% Certified, 100% Error Free • Satisfaction, Money Back Guarantee
• Meets or Exceeds ANSI Standards

Order Now Toll Free (in New Hampshire call 924-3821)

1-800-BECK MFG

Door to Door in 48 hrs.

Order Toll Free 1-800-232-5634. Available in 25 pack only, plus freight. Double density, soft sector diskettes complete with hub reinforcing rings, Tyvek envelopes, color coded user labels, and nonmetallic write protect tabs.

Corporate Accounts Welcome • Cash Customers Only

P.O. Box 111, Main St., West Peterborough, N.H. 03468

SPEECH from page 73

able to recognize connected words rather than being limited to individual words separated by silence. Human speech and hearing deal mostly with the recognition and generation of connected words. Computers with the ability to recognize connected words are a reality in 1984.

The wedding of telephone technology with microcomputing is a somewhat natural outgrowth of the commercial availability of reasonably priced speech systems. Managers and other information workers spend a great deal of their time using the telephone. The ability to manage the use of the telephone, and the tools for doing so, can be an important means for productivity improvement. A major application, therefore, will likely be the use of a microcomputer as a super-intelligent telephone.

The product that engendered a certain amount of excitement for me was the introduction of the Speech Command System (SCS) for Texas Instruments, Inc.'s Professional Computer late last year. Not long after its introduction, I was able to obtain a speech command board and the associated software to review the system. At a list price of about $2,600, SCS is not an inexpensive peripheral, but it costs considerably less than many other commercial speech products.

At its inception, the SCS provided software support for three basic speech functions: telephone management, telephone sending and answering services and a transparent keyboard utility. The software package also includes a primitive daily calendar program as a throwaway since it doesn't use or depend on speech.

Part of the transparent keyboard facility is the ability to deal with the telephone through the "smartphone" option, which makes it possible to answer the phone (using a headset) with the computer. It is also possible to associate a spoken word or phrase with a telephone number. When the word is spoken, the associated phone number is dialed automatically. The numeric keyboard of the Professional can also be used as a normal telephone keypad when speech recognition has not been invoked.

Other telephone controls allow the user to transcribe a message, record it digitally on disk, then have the processor dial one or many phone numbers and deliver the message. In an office environment with several TI micros, it would be possible to set up a system of electronic mail using speech rather than written documents.

The SCS, through the use of the transparent keyboard facility, allows the association of spoken commands with characteristic keystrokes. The structure of the system is such that it uses a pattern-matching scheme, but can still cope with connected speech patterns.

Speaker-dependent system

A related set of commands are grouped together in a vocabulary. When a word is added to a vocabulary, it must first be enrolled, then trained through an updating process. It is, therefore, a speaker-dependent system. It is possible for me to speak the words, "Get me the directory on the Winchester," to obtain a directory listing. "Directory" and "Winchester" are keywords which are now accessible through the use of the SCS, but they can only be selected out by SCS when embedded in a larger document.

As implemented on the TI micro, speech recognition is limited to vocabularies of 50 words or phrases. Up to nine vocabularies can be active at any one time, depending on memory, so the 50-word limitation is not very severe. A technique is provided to go from one vocabulary to another.

While the SCS has voice synthesis capabilities, they are not implemented as general-purpose tools, although the speech playback features of the system are termed synthesis by the documentation.

TI has opted to produce a software development system that allows programmers to build new applications, but the price of that system is purported to be around $8,000. It was initially designed for the use of software developers. That price tag not only inhibits individuals from using it, but could retard development because it cuts out many small software houses.

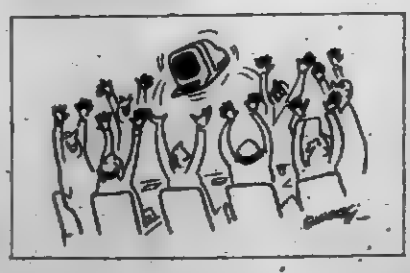
Whatever its shortcomings, the SCS is an exciting product. It is also unique in terms of the price compared with the capabilities of the system. It could be improved by providing a speech synthesis capability similar to that used by Votrax, Inc.

Keyboardless uses

In addition to providing a user-friendly computer environment, speech systems will likely find great use in situations where the user cannot be bothered by the keyboard (in some manufacturing processes, for example), for unique assistance to the handicapped and to simplify the tasks required in some jobs.

Over the next decade, I suspect that we will see speech systems become common on a wide variety of computers. The ability to talk to your computer will go a long way in providing a truly user-friendly computing environment.

Madron is manager of computer services at North Texas State University, Denton, Texas.



CUT YOUR COBOL TEST & DEBUG TIME

Our XPF/COBOL™ can slash COBOL test & debug time. XPF/COBOL is a full screen, interactive SPF-like test & debug facility, that can pay for itself in months.

Full screen debugging enables IBM MVS programmers to watch the program execute, find and change COBOL data in COBOL format, run multiple tests, and even watch the program run in reverse.

Call your nearest sales office today, or send in the coupon below, for complete information.

Send me information on XPF/COBOL.

Name_____

Title_____

Company_____

Address_____

Send to:
Boole & Babbage
510 Oakmead Pkwy.
Sunnyvale, CA
94086

Boole & Babbage
The Information Resource Management Company 2

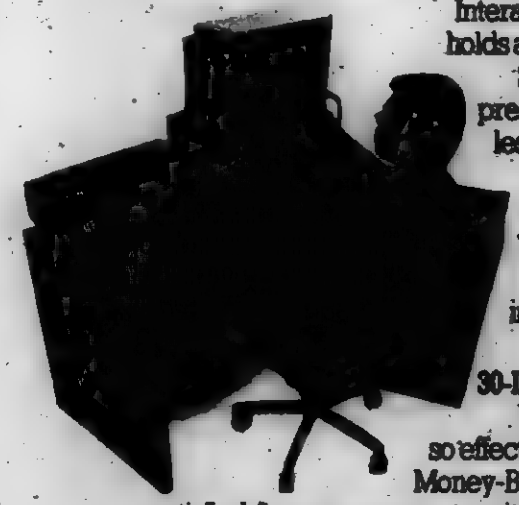
Los Angeles, CA (213) 642-7560
Sunnyvale, CA (408) 773-8811
Atlanta, GA (404) 451-0024
Chicago, IL (312) 629-8910
St. Louis, MO (314) 434-5100
Englewood Cliffs, NJ (201) 461-6006
Dallas, TX (214) 385-8076
McLean, VA (703) 448-9194

A WORD TO ANYONE LOOKING FOR UNIX™ TRAINING:

INTERACTIVE

Introducing Vision. The first UNIX Interactive Videodisc Training Curriculum.

Why interactive? Because it combines the power of the computer, the speed of a laser disc and the personality of classroom instruction. It engages; it motivates, it excites.



Interactive Videodisc Training captures and holds a student's interest in a way no other medium can.

Students learn by doing, so they learn faster, comprehend better and retain information longer. They spend less time away from the job. And are more productive once they return.

What's more, since the training is highly targeted, they learn only what they need to know to do the job. Now.

Who Developed Vision?

Vision was developed by Interactive Training Systems, the acknowledged leader in interactive video. And Computer Technology Group, a leader in UNIX training.

The result? A training curriculum that brings the concepts and language of UNIX to life.

30-Day Money-Back Guarantee.

Vision Interactive Videodisc Training is so fast, so effective and so affordable, we back it with a 30-Day Money-Back Guarantee. If you're not completely satisfied, for any reason, return it for a full refund. No questions asked.

Free Introductory Offer.

Lease all three Vision Courses for one year. And we'll give you the use of a complete interactive videodisc system. Free. You get an IBM PC, laser videodisc player, color monitor and Interactive Training System Controller. Absolutely Free.

Take advantage of our Free Introductory Offer. Send in the attached coupon. Or call us at 1-800-227-1127. And, yes, the call is Free too.

AFTER MARCH 31, 1984 OUR FREE INTRODUCTORY OFFER IS NO LONGER FREE!

☐ Please have a representative contact me immediately.

☐ Please send me more information about Vision, the UNIX Interactive Video Training Curriculum.

Name _____

Company _____

Title _____

Address _____

City _____ State _____ Zip _____

Telephone _____

Interactive Training Systems, Inc.
4 Cambridge Center, Cambridge, MA 02142

Figure $50 a line for programming.

When people look at business computers, they sometimes overlook a crucial consideration: the price of writing and maintaining software.

But we didn't. When we designed the HP 3000 family, we created special productivity tools to reduce the high price of developing applications software. With dramatic results.

Many HP 3000 customers now use 1/5th the amount of code writing these programs, compared with using high-level applications language. Since the average program costs you about $50 a line to develop, you can see why EDP budgets go so much further on an HP 3000.

You can use our development tools with the entire HP 3000 family. And, as all four systems are fully compatible, you can run the same, identical programs on your small branch office computer and on the big system in your regional headquarters. Without spending a penny to rewrite code or recompile.

Now divide by five.

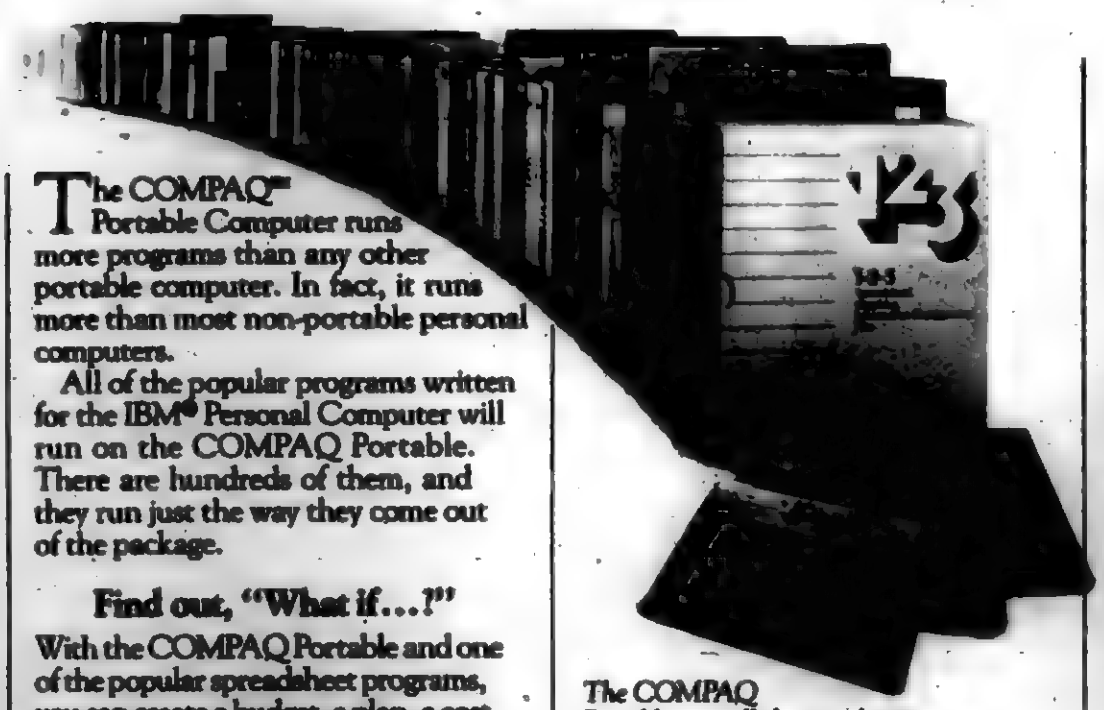
Features like these have helped many of our customers recoup the entire price of the hardware by cutting the time and effort involved in developing and maintaining the software.

So if you're looking for ways to lower your computing costs, take a look at the HP 3000. Call your local sales office listed in the white pages and ask a Business Computer Specialist about the HP 3000. Or write for more information to Tom Rappath, Hewlett-Packard, Dept. 03185, 19447 Pruneridge Avenue, Cupertino, CA 95014. In Europe, write to Henk van Lammeren, Hewlett-Packard Nederland B.V., Dept. 03185, P.O. Box 529, 1180 AM Amstelveen, The Netherlands.

HEWLETT PACKARD

Computer stores were full of programs for the COMPAQ Portable before there *was* a COMPAQ Portable.

Here's why.



The COMPAQ Portable runs all the popular programs written for the IBM Personal Computer.

The COMPAQ™ Portable Computer runs more programs than any other portable computer. In fact, it runs more than most non-portable personal computers.

All of the popular programs written for the IBM® Personal Computer will run on the COMPAQ Portable. There are hundreds of them, and they run just the way they come out of the package.

Find out, "What if...?"

With the COMPAQ Portable and one of the popular spreadsheet programs, you can create a budget, a plan, a cost analysis or an estimate. In minutes you can do updates that normally take hours. You can examine several alternatives in less time than it would take to do a single problem by hand.

Spend more time thinking and less time crunching numbers.

Money management made portable

With the COMPAQ Portable you can take advantage of financial programs for professional money management.

Receivables programs tell you who owes money and since when. Payables programs give you control of outgoing cash. General ledger programs record financial histories. Payroll programs keep records and generate checks. Inventory management programs help you control investment.

You can take computerized accounting wherever you need it and keep closer contact with your company's financial status.

Word processing to go

Imagine the power of a *portable* word processor. Choose from a wide variety of programs to meet your specific writing application with the COMPAQ Portable.

With word processing programs and an optional printer you don't have to start fresh when you need to make revisions. You can change formats, move paragraphs, and automatically search for the parts that need to be updated.

In other words, you can work smarter—not harder.

Computer conversations

There are a number of communications expansion boards and programs available for the COMPAQ Portable.

Some allow you to access a variety of central computers over the phone. You can have headquarters information wherever you travel.

With others you can pull facts from data banks on thousands of topics.

Others enable you to send electronic mail.

A world of business information is available wherever you and the COMPAQ Portable go.

...and lots of others

There are programs for designing graphs and charts, for tracking complicated schedules, and for electronic filing. There are powerful integrated programs that let you perform several tasks after entering data only once.

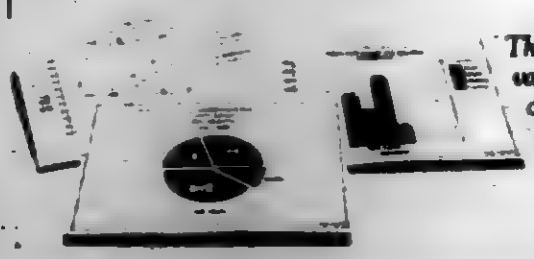
The wealth of programs and convenience of portability make the COMPAQ Portable the most useful personal computer on the market.

The COMPAQ Portable comes standard with one 320K byte diskette drive and 128K bytes of memory. A second diskette drive and additional memory are available.

The bottom line is this—you just can't buy a more practical, useful, productive computer.

For the location of the Authorized Dealer nearest you, call 1-800-231-0900.

©1983 COMPAQ Computer Corporation
COMPAQ™ is a trademark of COMPAQ Computer Corporation.
IBM® is a registered trademark of International Business Machines Corporation.



The COMPAQ Portable runs a variety of programs for designing color charts and graphs that can enhance your business presentations.

COMPAQ™

Geisco joins ranks of IBM remarketers

ROCKVILLE, Md. — Continuing a trend of time-sharing vendors marketing specialized versions of IBM Personal Computers, General Electric Information Services Co. (Geisco) has thrown its hat into the IBM value-added remarketer arena.

According to a Geisco spokeswoman, the company will offer Personal Computers along with systems consulting, assistance in hardware selection, installation, testing and training on custom and package applications. The spokeswoman added that a typical configuration available through Geisco includes the IBM Personal Computer or Personal Computer XT, modem, graphics printer and communications software.

Depending on the configuration, prices begin at approximately $6,000, plus application software.

In connection with the announcement, Geisco introduced what it called four software enhancements for the IBM Personal Computer. The enhancements include the Time Sharing Interface (TSI) Version 2.0, which was described as a communications package to link the microcomputer to General Electric Co.'s worldwide teleprocessing network.

Geisco also made available Tabol, a financial management system that features a file option that enables it to read or write data files compatible with Visicorp's Visicalc package. The Tabol-Visicalc interface provides a means to consolidate multiple sets of Visicalc data, and it allows Visicalc data files to feed Tabol production application systems. Data transfer from Visicalc to Geisco's Mark III teleprocessing service is said to allow for more complex Tabol processing, reporting, consolidation, data base management and graphics.

Geisco's Fortran Subroutines Library includes hardware-related routines such as the ability to modify keystroke functions for creating boxes and windows, creating graphics and managing communications and files.

The IBM Personal Computer Hierarchical Indexed Sequential Access Method (Hisam) data base software introduced by Geisco facilitates development of applications that couple Geisco Mark III Service hosts and the Personal Computer, according to the spokeswoman.

For Geisco clients, TSI Version 2.0 is priced at $50 a copy, the Fortran Subroutines Library is priced at $495 and the Personal Computer-Hisam system is priced at $300. The Tabol Visicalc interface is included in the cost of Geisco's Mark III teleprocessing service.

Geisco, 401 N. Washington St., Rockville, Md. 20850.

Phaze unveils Gemini, boasts IBM capability

SCOTTSDALE, Ariz. — Phaze Information Machines Corp. has introduced its 3270/Business Computer called Gemini.

According to a company spokesman, the system combines the capabilities of an IBM 3278 CRT terminal with IBM Personal Computer-compatible operations and software.

Gemini can alternate between concurrent 3270 and Personal Computer modes via single keystroke keyboard commands without loss of session. The file transfer capability allows for the transfer of data from the mainframe to the personal computer for editing and for the return of that information to the host.

The extended capabilities of Gemini permit the data transfer to be performed in a number of different ways.

As a business computer, Gemini uses an array of software compatible with the IBM Personal Computer, including Lotus Development Corp.'s Lotus 1-2-3, Microsoft, Inc.'s Multiplan, Visicorp's Visicalc, Micropro International, Inc.'s Wordstar and Metasoft Corp.'s Benchmark, according to the spokesman.

Two 5¼-in. 320K-byte disk drives and 128K bytes of random-access memory (upgradable to 256K bytes) are standard features of Gemini, which will operate under MS-DOS, PC-DOS and CP/M 86.

Gemini connects directly to IBM 3274 or 3276 controllers via coaxial cable. It supports light-pen functions and has additional features such as reverse video, attribute display, automatic video shutdown and security key lock.

The Gemini uses an 87-key typewriter keyboard with 24 program function keys as standard features; other options are available, the vendor noted.

Gemini will be available for shipment the first of the year. The single-unit price is $4,250.

Phase Information Machines, 7650 E. Redfield, Scottsdale, Ariz. 85260.

Computer Communications?

Whether it's office to office, office to corporate computer or office to data base service, Polygon software delivers reliable data transfer.

We've been developing communications software for micros, minis and mainframes for over five years. Experience that has paid off with comprehensive programs, documentation and effective menus for optimum user performance.

It's simple. Whether you use a modem, direct cabling or local area networks, our software talks directly from computer to computer. One more good reason why Digital Equipment Corporation and Interlan, Inc. sell and support our communications software with their products.

So, if you want to communicate, and you want to do it economically, reliably and easily, communicate with us...we're Polygon Associates.

We have the software...

poly-TRM™ Asynchronous Terminal Emulation Software: For communication as a terminal to virtually any computer system including the Source[1], Dow Jones[2] and other commercial information services.

poly-BSC/RJE™ Bisynchronous Terminal Emulation: For Remote Job Entry (IBM 3780/2780) to IBM mainframes and compatible machines.

poly-BSC/3270™ Bisynchronous Terminal Emulation: For emulation of the IBM 3270 family of Information Display Systems, including file transfer.

poly-XFR™ File Transfer Software: For error-free ASCII and Binary file transfers among personal and minicomputers.

For all types of hardware...

Minicomputers using VMS, RSTS/E, RT-11 and RSX-11M Operating Systems[3]; Intel and Motorola development systems. Systems using CP/M[4] in a user tailorable version.

Plus we support personal computers from the following manufacturers: Apple Computers, Inc., Digital Equipment Corporation, International Business Machines Corporation, Jonos, Osborne Computer Corporation, Radio Shack/Tandy Corporation, Televideo Systems, Inc., Victor Technologies, Inc. and Xerox Corporation.

1 The Source is a service mark of Source Telecomputing Corporation, a subsidiary of the Reader's Digest Association, Inc.
2 Dow Jones is a trademark of Dow Jones, Inc.
3 VMS, RSTS/E, RT-11 and RSX-11M are trademarks of Digital Equipment Corporation.
4 CP/M is registered to Digital Research, Inc.
© 1983, polygon associates, inc.

polygon associates, inc.
9 American Industrial Drive, St. Louis, Missouri 63043
314/576-7709, TWX 910/764-0876

Fujitsu unveils Micro 16s

LOS ANGELES — Fujitsu Systems of America has introduced the Fujitsu Micro 16s, a microcomputer which incorporates both 8- and 16-bit microprocessors.

According to the vendor, the microcomputer is suited for use with the firm's 7850 and 7990 point-of-sale terminals and 7110 terminal-support processor. It incorporates interchangeable microprocessors, including an 8-bit Zilog, Inc. Z80A microprocessor and an Intel Corp. 16-bit 8086 microprocessor.

The system offers 128K bytes of memory, which can be expanded to 1M byte of internal storage. It features two minifloppy disk drives with 320K bytes of auxiliary memory on each and a 98-key keyboard, including 10 user-programmable keys and a separate numeric pad, the vendor said.

The Micro 16s comes standard with Digital Research, Inc.'s CP/M 86 operating system and is bundled with Micropro International Corp.'s Wordstar word processing program, Sorcim Corp.'s Supercalc 2 electronic spreadsheet and Digital Research's GSX graphics software.

The base system price of the Micro 16s is $3,695.

Fujitsu Systems of America, 2841 Airport Blvd., Los Angeles, Calif. 90045.

MDB Micro/32 debuts

ORANGE, Calif. — MDB Systems, Inc. has introduced the MDB Micro/32, a 32-bit computer system that features the Motorola, Inc. 68000 microprocessor and the vendor's Regulus, a Unix-compatible operating system.

The MDB Micro/32 contains a single quad-size CPU board and 512K bytes of random-access memory.

The Regulus operating system features user source compatibility with Unix V6, 7 and System III and offers support of all Unix kernel features, multikey B-tree Isam and Digital Equipment Corp. VAX/PDP-11 cross-support, according to a vendor spokesman.

The MDB Micro/32 is priced at $11,995, including a Regulus user license. Discounts for quantity purchases are available, the spokesman said.

MDB Systems, 1995 N. Batavia St., Orange, Calif. 92665.

SYSTEMS

D.J. DESANDRO & CO., INC.
Simple Librarian System

D.J. DeSandro and Co., Inc. recently announced software and hardware package designed for applications where extensive cross-referencing is desired, such as for libraries, medical offices, legal offices and so forth.

The Simple Librarian System includes an OSM Computer Corp. Zeus 4 microcomputer with a 1.2M-byte, 5¼-in. floppy disk drive and 5¼-in. hard disk drive. Storage capacities range from 6.3M bytes to 25M bytes. Also included with the system is OSM's Muse operating system with features said to be similar to Digital Research, Inc.'s CP/M and MP/M systems.

A basic package includes the Zeus 4, two CRT terminals and one letter-quality printer for $10,000. The system reportedly can support up to 10 CRT terminals.

D.J. DeSandro and Co., P.O. Box 19786, Houston, Texas 77027.

SWEDA INTERNATIONAL, INC.
9800 Retail Control System; Sweda Business System

Sweda International, Inc., a division of Litton Industries, has introduced the 9800 Retail Control System and the Sweda Business System. The two products are aimed at point-of-sale users.

The 9800 Retail Control System is said to be a general-purpose, distributed processing computing system consisting of up to 64 microprocessor-based devices integrated into a dedicated local-area network, the vendor said.

Musys Corp.'s Turbodos operating system controls the multiuser network and shares a common pool of 5¼-in., slim-line and full-height mass storage devices. Configurations from a single 320K-byte floppy disk through multiple drives with up to 600M bytes of storage are offered, the vendor said.

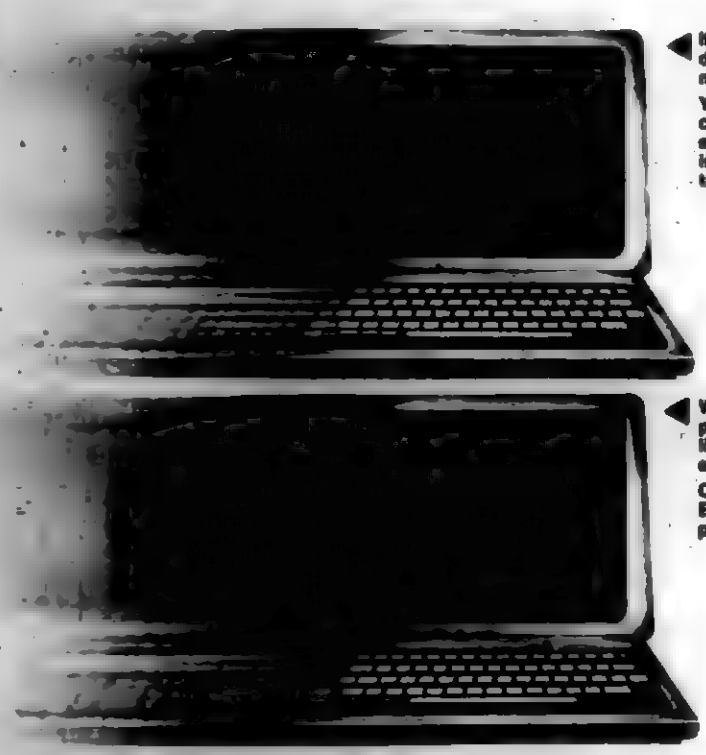
The 9800 series point-of-sale terminal is also programmable in higher level languages, the vendor said. The local-area network utilizes coaxial cable and operates at a data rate of 800K bit/sec., utilizing carrier-sense, multiple access/collision detection, according to a spokesman for the vendor.

The Sweda Business System was designed to integrate a range of Sweda point-of-sale devices, including the 9800 Retail Control System, with local and corporate-level processing capabilities.

The basic Sweda Business System includes an 8-MHz, 16-bit processor, 256K bytes of memory, monochrome CRT, keyboard, RS-232-C serial ports, a parallel printer port and a universal power supply. Optional

Continued on page 82

THE ENCRYPTOR™
Data Security at An Affordable Price



If your microcomputer data looks like this, it's not secure.
Your confidential reports, client or customer files, and other critical business information can be tampered with or stolen.

With THE ENCRYPTOR™ products, your data looks like this — and it's totally secure.
Only individuals with Encryptor keywords can process your data.

Please send me information about The Encryptor™ products. I'm particularly interested in:
☐ Stand-alone micro application
☐ Micro-to-micro application
☐ Micro-to-mainframe application
☐ Total system application

Name
Title
Organization
Address
City
State Zip
Telephone ( )

Futurex Security Systems™
A Division of Jones Futurex™ Inc.
9700 Fair Oaks Boulevard
Fair Oaks, CA 95628

By physically transforming data, THE ENCRYPTOR™ products provide complete protection for stored or transmitted information. They eliminate unauthorized access, manipulation, or theft of such confidential information as:
- Corporate trade secrets
- Customer or client files
- Electronic fund transfers
- Personnel records

THE ENCRYPTOR™ products are reliable, high-speed devices that can be applied to micro-to-mainframe, micro-to-micro, and stand-alone micro configurations. They comply with the national Data Encryption Standard (DES) and allow for implementation of Message Authentication Code (MAC) for electronic fund transfers.

THE ENCRYPTOR™ products offer the easy-to-use, cost effective solution to your data security problems. For more information, return the coupon or call Futurex Security Systems™ at 800-251-5112 (800-251-5111 inside California).

FUTUREX™

Futurex Security Systems™
9700 Fair Oaks Boulevard
Fair Oaks, CA 95628
(916) 966-6836

A Division of Jones Futurex™ Inc.

CW 2/84

Communications.

How to tie things together today without being tied down tomorrow.

This April, *Computerworld Office Automation* will give you a close look at the world of communications products and services. You'll read about what's out there now and what's coming. And how to get started while leaving your architecture open for the technologies of the future. And you'll get it all from the perspective of end users who have to increase productivity *now* while making sure the their company's investment won't be obsolete in two years.

And that's not all. There'll be feature articles on:

- PBX *versus* local area networks and how they'll merge
- voice technology
- videoconferencing technology
- satellite technology
- inter and intra company communications strategies
- product evaluations and comparisons

And after we cover all the developments for you, we'll offer you strategies to link them all together into one integrated system.

Computerworld Office Automation is designed to give you OA information geared to the DP/MIS environment — in a way that no traditional office publication can. As one of *Computerworld's* 114,000 subscribers in the U.S, you'll get six issues of *Computerworld Office Automation* in 1984 — as part of your subscription! And if your users need to increase their communications links, you won't want to miss this issue devoted to Communications in the office.

If you've got office automation and office communication products our readers should know about, then you need to get your ad reservation in by March 2nd.To reserve ad space in this April 11th issue of *Computerworld Office Automation*, call one of the sales offices listed below, or Ed Marecki, National Sales Director at 617-879-0700.

To: Ed Marecki, *National Sales Director*
CW Communications/Inc.
Box 880
Framingham, MA 01701

☐ *Please send me advertising information on Computerworld Office Automation.*

☐ *Please have a sales representative call me.*

Name _____

Title _____

Company _____

Address _____

City _____ State _____ Zip _____

Telephone _____ 4/11

Computerworld
OFFICE AUTOMATION

BOSTON/Chris Lee, Jayne Donovan, Michael Kelleher, Ron Mastro, Jim McClure, Alice Longley, *(617) 879-0700*

CHICAGO/Art Kossack, Chris Lee, Jean Broderick, *(312) 327-4455*

NEW YORK/Mike Masters, Doug Cheney, Ray Corbin, Joan Daly, Fred LoSapio, Gale M. Paterno, *(201) 967-1660*

ATLANTA/Jeffrey Melnick, Mike Masters, *(404) 394-0758*

SAN FRANCISCO/Bill Healey, Ernie Chamberlain, Theodora Franson, Barry Milione, Nicole Boothman (recruitment), *(415) 421-7330*

LOS ANGELES/Bernie Hockswender, Bob Hubbard, Bill Healey *(714) 261-1230*

MICROCOMPUTERS

Continued from page 60

hardware components include 256K bytes of memory increments, an 8-color CRT with bit-mapped graphics, 5¼-in. floppy disk drives and various floppy/rigid disk drive combinations, the vendor said.

The Retail Control System costs $3,000, and the basic Sweda Business System costs $3,000.

Sweda International, 34 Maple Ave., Pine Brook, N.J.

MOSTEK CORP.
VME Matrix 68K

Mostek Corp. has introduced a multiuser system designed around the firm's MK68000 microprocessor.

The VME Matrix 68K combines the expandable 16-bit VME bus with the Unix operating system, meeting the requirements of current 16-bit applications. The unit can be expanded to support 32-bit applications in the future.

According to the vendor, the system features a 10-slot card cage with three slots available for system expansion, allowing the user to select those functions needed for a specific application. It has 640K bytes of main memory and five serial ports.

A 36M-byte Winchester disk drive and a 5¼-in. double-sided, double-density floppy disk drive are also supplied with the system.

The single-unit price is $16,500.

Mostek, 1215 Crosby Road, Carrollton, Texas 75006.

PRINTERS/ PLOTTERS/ PERIPHERALS

FUTURENET CORP.
D1 Plothp

Futurenet Corp. has introduced D1 Plothp, a pen-plotter interface which prints graphics created with an IBM Personal Computer on Hewlett-Packard Co.'s 7580, 7585 or 7470 plotters.

The interface works Futurenet's Dash-1 Schematic Designer and produces C- and D-size schematics for engineers, according to the vendor. The interface produces output on sheets of paper, vellum or double-matted polyester film.

The interface is priced at $600.

Futurenet, 21018 Osborne St., Canoga Park, Calif. 91304.

BLUE CHIP ELECTRONICS, INC.
Model M120/10

Blue Chip Electronics, Inc. has announced a 120 char./sec dot matrix printer designed for direct interface with the Commodore Business Machines, Inc. Commodore 64 personal computer.

The Model M120/10, now available, has a standard Centronics Data Computer Corp. parallel interface

STEARNS COMPUTER SYSTEMS CORP.
Optional 54-line feature

Stearns Computer Systems Corp. has added an optional 54-line feature to its 12-in. or 15-in. terminals. The terminals are used on the firm's desktop microcomputer.

The 15-in. terminal features full-page, white-on-black display. The 12-in. terminal uses black-and-white, green, amber or eggshell characters. A 15-in. display is also available.

The terminals, with expansion board and software, add approximately $1,300 to the purchase price of a Stearns microcomputer.

Stearns Computer Systems, 10901 Bren Road, Minnetonka, Minn. 55343.

and the capacity to accept optional RS-232C serial and IEEE-488 interfaces.

The suggested retail price for the printer is $349.

Blue Chip Electronics, 7406 E. Butherus Drive, Scottsdale, Ariz. 85260.

STORAGE

APPLE COMPUTER, INC.
Duodisk

Apple Computer, Inc. has introduced a floppy disk drive unit that contains two half-high, 140K-byte drives side-by-side in a single case.

Called Duodisk, the unit offers compatibility with Apple II software. A spokesman said the unit costs less than two separate Disk II drives. The Duodisk meets the dual-drive configuration needed for many software programs, the vendor said.

Duodisk is the same width as the Apple II and can be placed between the computer and the monitor. Technical features include a disk-ejection mechanism and an advanced head-positioning mechanism that, according to the vendor, gives a more precise reading of half-tracks.

Duodisk comes with a controller card that connects it to any Apple II, Apple II+ or Apple IIe.

Apple Computer, 10260 Bandley Drive, Cupertino, Calif. 95014.

BOARD-LEVEL DEVICES

VIRTUAL MICROSYSTEMS, INC.
Spectrum

Virtual Microsystems, Inc. has announced Spectrum, a board which transforms a Digital Equipment Corp. VT-100 terminal into a microcomputer.

Spectrum features 512K bytes of random-access memory, Intel Corp.'s 80186 and 8088 and Zilog, Inc.'s Z80 microprocessors, according to the

The 80186 microprocessor provides back-end host communications at a speed of 56K bit/sec. The 8088 provides 256K bytes of storage for Microsoft, Inc.'s MS-DOS operating system. The Z80 allows the user to run programs on Digital Research, Inc.'s CP/M operating system.

Spectrum does not include a floppy disk drive, so any microcomputer software has to be loaded by a hardware utility and accessed by the terminal.

The board costs $2,450; mainframe software prices range from $1,600 to $3,500.

Virtual Microsystems, Suite 720, 2150 Shattuck Ave., Berkeley, Calif. 94704.

CURTIS, INC.
Romdisk

Curtis, Inc. has announced Romdisk, an accessory card for the Apple Computer, Inc. Apple II that provides one full diskette of user-stored program files loaded in erasable programmable read-only memory (Eprom).

With Romdisk, a menu-builder program is provided to allow selection of the program files to be loaded, and Romdisk can automatically generate the menu or desired program file.

Romdisk may be used in on-line systems and is said to allow Apple II microcomputers to be used as workstations without handling diskettes. Up to four Romdisks can be used in one microcomputer, the vendor said.

Romdisk requires either the DOS 3.33 or Prodos operating system and will allow programs that can be copied using operating system utilities to be user-loaded into the Romdisk Eprom memory.

Romdisk is priced at $499.

Curtis, 22 Red Fox Road, St. Paul, Minn. 55110.

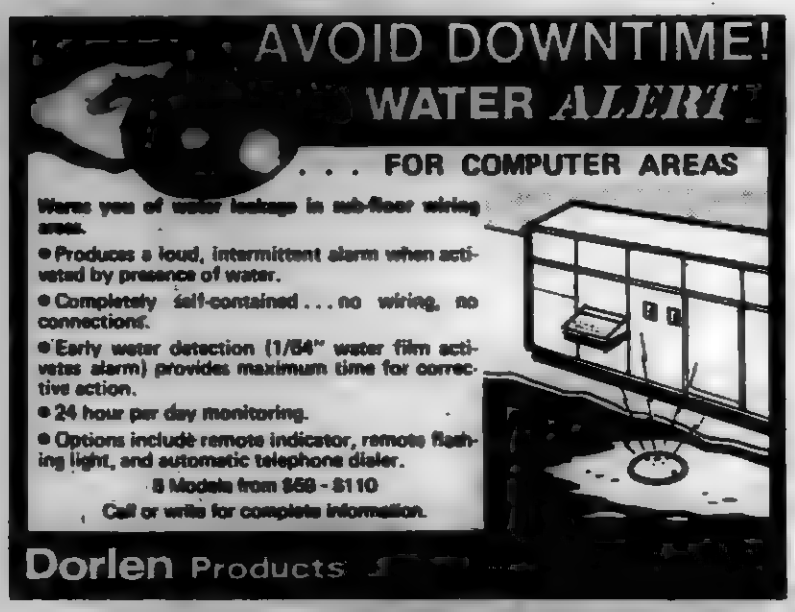
HEURIKON CORP.
MLZ-92A

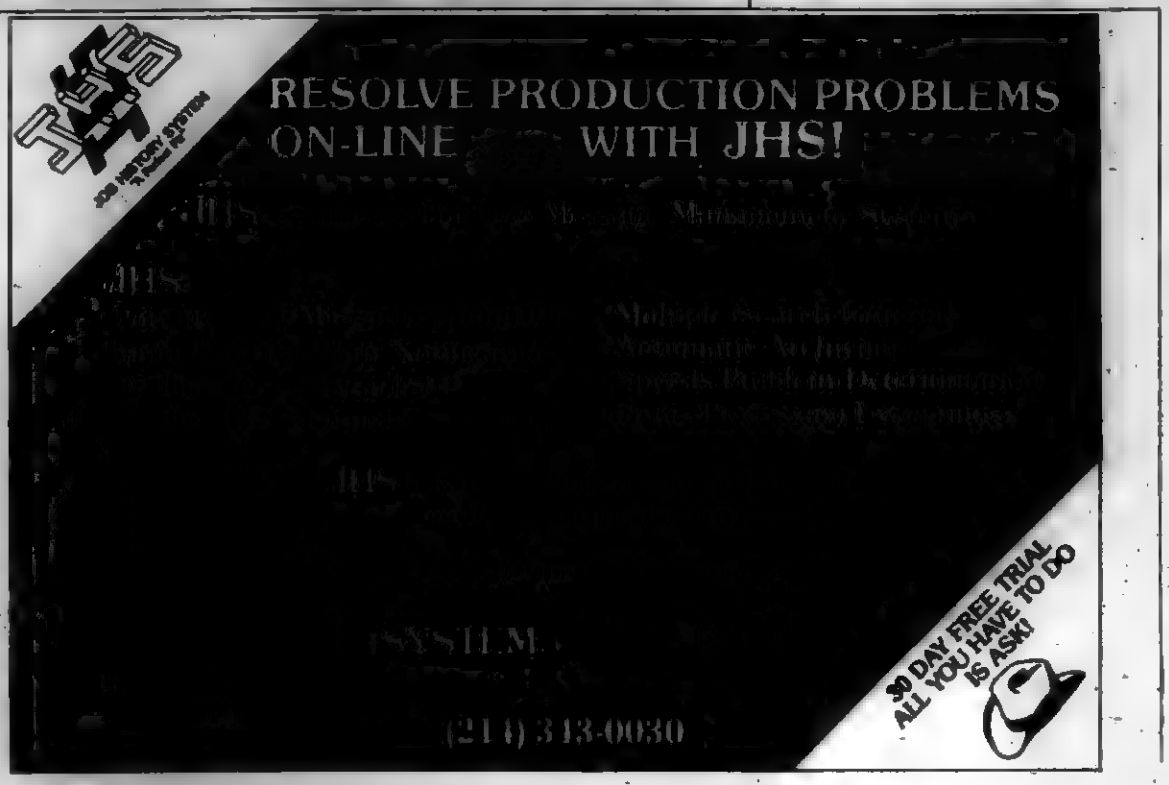
Heurikon Corp. has announced a single-board processor designed to run multiuser operating systems without additional cards on its Intel Corp. multibus systems.

The MLZ-92A is now available for OEMs and for sale as a stand-alone unit, according to the company.

The MLZ-92A features the Zilog, Inc. Z80A microprocessor and Digital Research, Inc.'s CP/M operating sys-

Continued on page 64





"The computer is down."

Every day another business goes "on line." Every day the world becomes more dependent on computers. And every day it becomes more important for the world to have a computer that won't go down, or even skip a heartbeat.

Over the past decade there have been computers designed to withstand hardware failures and eliminate downtime. However, all previous approaches depend heavily on software techniques to provide fault tolerance. A comparison of these old systems with the new Stratus/32 Continuous Processing™ System will illustrate how far we have come in one leap, by using advanced hardware technology instead of complex software.

How the Stratus Hardware Solution Supersedes the Software Solutions.

Stratus's hardware design means that fault tolerance is invisible to your application programs and users. You can even move previously developed applications to Stratus with NO CHANGES and NO PERFORMANCE LOSS for fault tolerance. In contrast, the software-based systems require complex, performance-stealing software in order to implement fault tolerance. This means that new programs are more difficult to develop, they run slower, and existing programs can't be run without major changes.

An added benefit of the Stratus fault tolerant design is that you can expand your system with additional processors as your computing needs grow. In fact, you can have up to 32 fault tolerant processors, 2000 communication lines, and 100 billion bytes of storage in a single Stratus system.

Hardware Self-checking Causes a Breakthrough in Service.

Each Stratus/32 tests itself EIGHT MILLION TIMES A SECOND while it executes your programs, so faults are detected BEFORE they corrupt your data. And when there is a failure, there's no need to rush to call your Stratus service technician. For one thing, the failed component, be it a CPU, controller, disk, or power supply, has a partner that continues operations as usual (without slowing down the system), so there's NO DOWNTIME. In addition, repairs can be made WITHOUT STOPPING THE SYSTEM. It is so easy to repair a Stratus/32 that our service is provided at about one-half the average price charged by other computer manufacturers.

$140,000, Software Included.

Our prices are competitive with "normal" systems (i.e. ones that do not provide fault tolerance), and substantially lower than the software-based fault tolerant systems. $140,000 buys you a complete four megabyte 32-bit system with 60 megabytes of disk storage, magnetic tape drive, and system SOFTWARE. If you like our hardware, you will be even more impressed with our software. (A common reaction among our users.) Briefly, our software offering includes VOS (a virtual operating system), transaction processing, networking, IBM communications, data management system, interactive forms builder, symbolic debugger, COBOL, Basic, PL/1, Fortran, Pascal, word processing...

To get more information call us at 617-653-1466.

The computer you can count on has arrived.

Stratus

CONTINUOUS PROCESSING™

Now that the world relies on computers it needs a computer it can rely on.

MICROCOMPUTERS

Continued from page 82

tem. It is said to have 128K-byte parity, protected random-access memory and the ability to access 1M byte through its 20-bit, memory-mapped multibus interface.

Off-card I/O can be accessed through the I/O map, and hardware arbitration allows communication with the multibus in the master, slave or multimaster mode, according to the company.

It features four RS-232 serial ports, two of which can be configured for RS-422, while an optional Centronics Data Computer Corp.-compatible parallel interface is available.

The MLZ-92A is priced at approximately $1,150 in quantities of 100.

Heurikon, 9001 Latham Drive, Madison, Wis. 53713.

AUXILIARY EQUIPMENT

COMPUTER LITERACY, INC.
Compututorial

Computer Literacy, Inc., an educational systems company, has introduced audio cassette training programs called Compututorial.

The first Compututorial has been developed to train users of the PFS: File program on the IBM Personal Computer. The package provides marketing opportunities for the retailer, a company spokesman said.

Compututorial is priced at $39.95.

Computer Literacy, P.O. Box 49146, Cincinnati, Ohio 45249.

MICRO LOGIC CORP.
Micro Chart No. 7

Micro Logic Corp. has introduced the Micro Chart, a plastic reference card for programming Intel Corp. 8086 and 8088 microprocessors.

According to the vendor, the card is No. 7 in a series and covers conversion of instructions to and from hexadecimal instruction descriptions, cycle time, addressing modes, flag codes and diagrams on a two-sided, two-color, full-page sheet.

Micro Chart No. 7 costs $5.95, plus $1 for postage.

Micro Logic, P.O. Box 174, 100 Second St., Hackensack, N.J. 07602.

FLIPTRACK LEARNING SYSTEMS
Audio cassette tutorials

Fliptrack Learning Systems has published audio cassette tutorials for users of the IBM Personal Computer XT using Lotus Development Corp.'s 1-2-3 financial spreadsheet package.

"How to Operate the IBM XT" was designed to teach the user how to utilize the XT's special keys and commands; load and run basic programs; format, copy and check diskettes; and copy, rename and erase individual files.

"How to Use Lotus 1-2-3" instructs the user on all the essential 1-2-3 commands and built-in functions needed to develop spreadsheets, data bases and graphics presentations. It also discusses how to sort and select entries and how to display and print results in a variety of formats, the vendor said.

Both tutorials consist of four spoken-voice cassettes that require about two hours each and may be played on any standard cassette player. The tutorials are available from the vendor for $75 each.

Fliptrack Learning Systems, Suite 200, 999 Main St., Glen Ellyn, Ill. 60137.

PRENTICE CORP.
Popcom Model X100

Prentice Corp. has announced the Popcom Model X100 communications modem for users of personal computers and microcomputers.

The voice and data-handling feature of the modem includes call-progress monitoring and detection for dial tones, busy signals, remote ringing, voice, data and line-current disconnect. The modem is compatible with 103, 113 and 212A dial-up modems and connects to all standard single- and multiline phone equipment, the vendor said.

The modem offers compatibility with currently available communications software packages and adapts to a variety of RS-232 interface cables, according to the vendor. The price is $475.

Prentice, 366 Caspian Drive, P.O. Box 3544, Sunnyvale, Calif. 94088.

MEMOREX CORP.
Type D, Type E disks; head-cleaning system; data cassette

Memorex Corp. has announced single- and double-sided 5¼-in. floppy disks, both with 96 track/in., a 5¼-in. disk drive head-cleaning system and a 15-min. data tape cassette.

The single-sided Type D and double-sided Type E disks are said to provide twice the storage capacity of standard double-density disks. The head-cleaning system is inserted as an ordinary disk for 30 seconds and may be used up to 30 times. The data cassette provides storage of up to 72K bytes and is said to provide faster data loading and access.

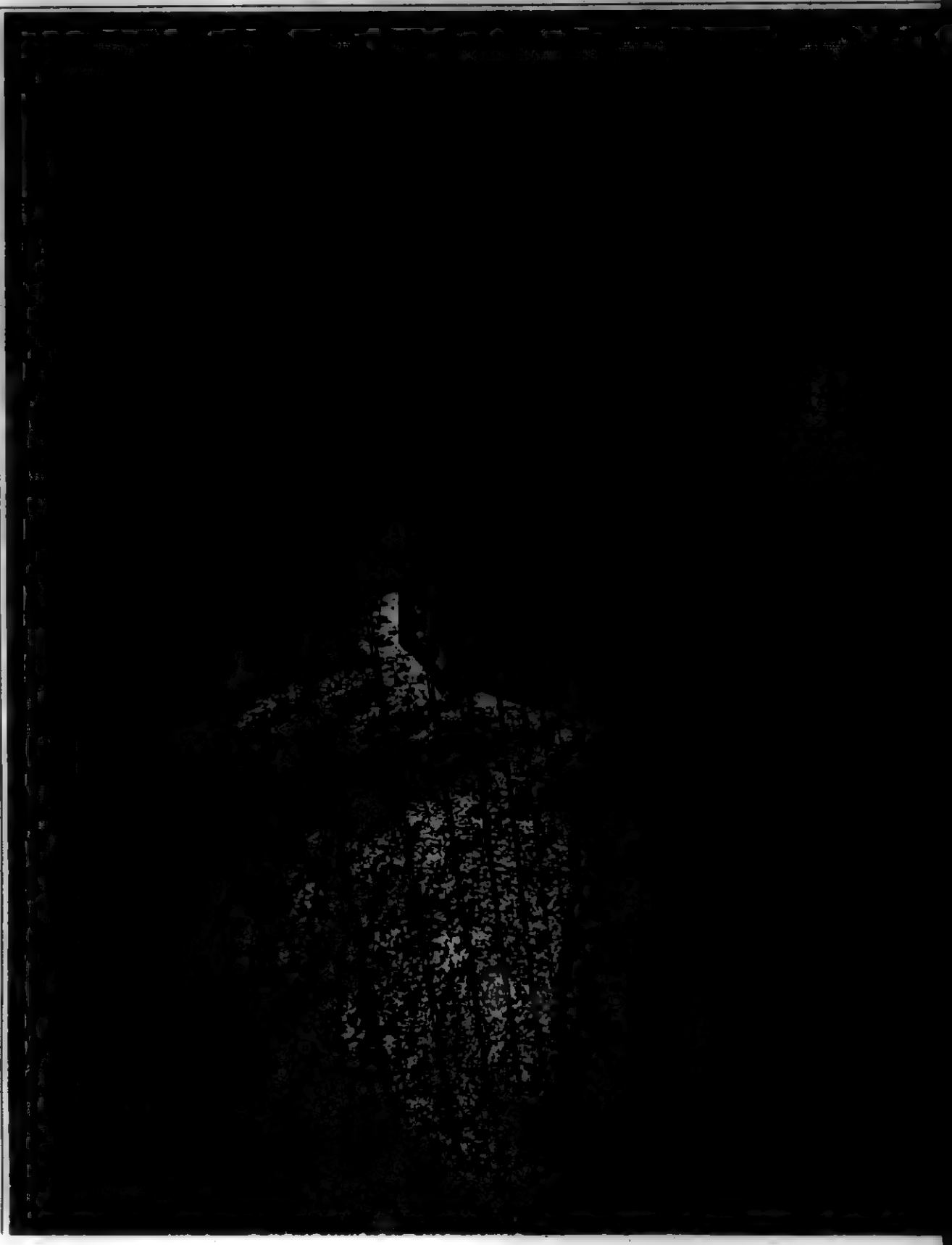
Suggested prices are: Type D disk, $49.99; Type E disk, $68.99; head-cleaning system, $21.49 for package of 10; and data cassette, $3.39.

Memorex, San Tomas at Central Expwy., Santa Clara, Calif. 95052.

MICRO SOFTWARE

SOFTWARE PUBLISHING CORP.
PFS:Access

Software Publishing Corp. recently announced a software communica-



MICROCOMPUTERS

tions package said to provide data encryption along with access to dial-up services for users of microcomputers running under Microsoft, Inc.'s MS-DOS and on Apple Computer, Inc.'s Apple IIe.

PFS:Access reportedly stores dial-up and logon sequences to connect users automatically to frequently used services, including electronic mail services provided by Western Union Corp.'s Easylink and MCI Communications Corp.'s MCI-Mail; data base services provided by Dow Jones & Co.'s Dow Jones News Retrieval, Source Telecomputing Corp.'s The Source and Compuserve Corp.'s Compuserve; and Bankamerica Corp.'s Home Banking service.

Users reportedly can select connection to a service by pushing one key. The package works with many serial interface cards and supports most popular modems with 300 bit/sec and 1,200 bit/sec transmission speeds, according to a spokesman for Software Publishing.

The MS-DOS version will be available in March for a suggested retail price of $95, and the Apple version will be available in May for a suggested retail price of $70.

Software Publishing, 1901 Landings Drive, Mountain View, Calif. 94043.

RESPONSE, INC.
PC/Coder Version 2.06

Response, Inc. recently announced an enhanced release of its program development system for the IBM Personal Computer and Personal Computer XT that reportedly includes a 20% to 25% faster program generation routine.

Release 2.06 of PC/Coder also provides function key usage and additional user-defined error trapping routines, according to a company spokesman.

The enhanced version is available to licensees of previous versions at no charge. PC/Coder is priced at $450.

Response, 606 2nd St., Jackson, Miss. 56143.

VIA COMPUTER, INC.
Micro/Prophit

Via Computer, Inc. has introduced Micro/Prophit, a financial modeling system for the IBM Personal Computer and Personal Computer XT.

According to the vendor, the system was previously only available through Control Data Corp.'s time-sharing services.

Micro/Prophit is an enhanced version of the vendor's Propfit II, expanding its power and capabilities. It is an alternative to planning tools such as Lotus Development Corp.'s Lotus 1-2-3 and Visicorp's Visicalc, a company spokesman said.

According to the vendor, Micro/Prophit uses an MS-DOS operating system with a minimum of 192K bytes of memory. The package allows users to develop model sizes of up to 9,000 lines by 126 col.

Micro/Prophit is priced at $695.

Via Computer, 7177 Construction Court, San Diego, Calif. 92121.

NOVELL, INC.
Netware/O

Novell, Inc. has announced that its network operating system software, featuring a mainframe-like file server with security management capabilities, is now available for the Cervus Systems, Inc. Omninet network.

The package, called Netware/O, allows up to 64 IBM Personal Computers, Personal Computer XTs or similar systems to share up to 150M bytes of disk storage attached to a central Netware file server.

Netware/O provides information-sharing functions to support transaction processing, record locking and direct communications between networked stations.

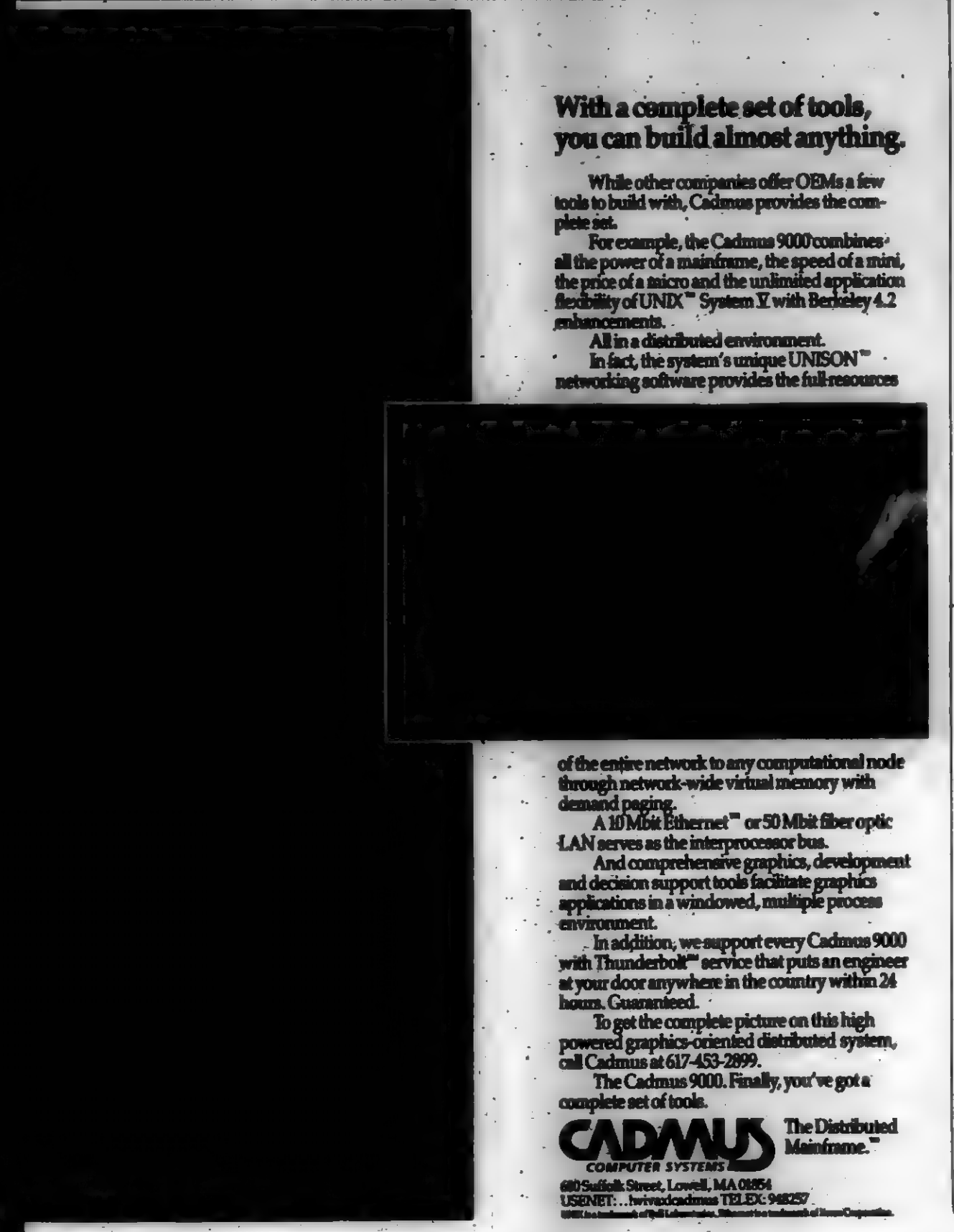
It also administers printing tasks to shared printers, maintains duplicate directories and provides utilities to recover files that are accidentally erased.

Netware/O supports IBM PC-DOS 1.1, PC-DOS 2.0 and Digital Research, Inc. CP/M 86 operating systems, all of which can be used on one network without partitioning the shared disk, according to Novell.

Each microcomputer workstation requires a minimum of 64K bytes of memory.

Netware/O costs $1,495.

Novell, 1170 N. Industrial Park Drive, Orem, Utah 84057.



With a complete set of tools, you can build almost anything.

While other companies offer OEMs a few tools to build with, Cadmus provides the complete set.

For example, the Cadmus 9000 combines all the power of a mainframe, the speed of a mini, the price of a micro and the unlimited application flexibility of UNIX™ System V with Berkeley 4.2 enhancements.

All in a distributed environment.

In fact, the system's unique UNISON™ networking software provides the full resources of the entire network to any computational node through network-wide virtual memory with demand paging.

A 10 Mbit Ethernet™ or 50 Mbit fiber optic LAN serves as the interprocessor bus.

And comprehensive graphics, development and decision support tools facilitate graphics applications in a windowed, multiple process environment.

In addition, we support every Cadmus 9000 with Thunderbolt™ service that puts an engineer at your door anywhere in the country within 24 hours. Guaranteed.

To get the complete picture on this high powered graphics-oriented distributed system, call Cadmus at 617-453-2899.

The Cadmus 9000. Finally, you've got a complete set of tools.

CADMUS COMPUTER SYSTEMS

The Distributed Mainframe.™

680 Suffolk Street, Lowell, MA 01854
USENET:...twivax!cadmus TELEX: 948257

UNIX is a trademark of Bell Laboratories. Ethernet is a trademark of Xerox Corporation.

Announcing Spring Courses

DP Education

IMS, CICS, VSAM and FOCUS® Course Offerings

Locations
Washington, D.C. Atlanta
New York City Dallas
San Francisco Cleveland
Hartford

For specific dates and locations or to obtain a free copy of our 1984 DP Education Catalog, please call (203) 646-3264.

We make every bit count.

DBMI

Data Base Management, Inc.
1075 Tolland Turnpike,
Manchester, CT 06040 (203) 646-3264

*FOCUS is a trademark of Information Builders Inc.

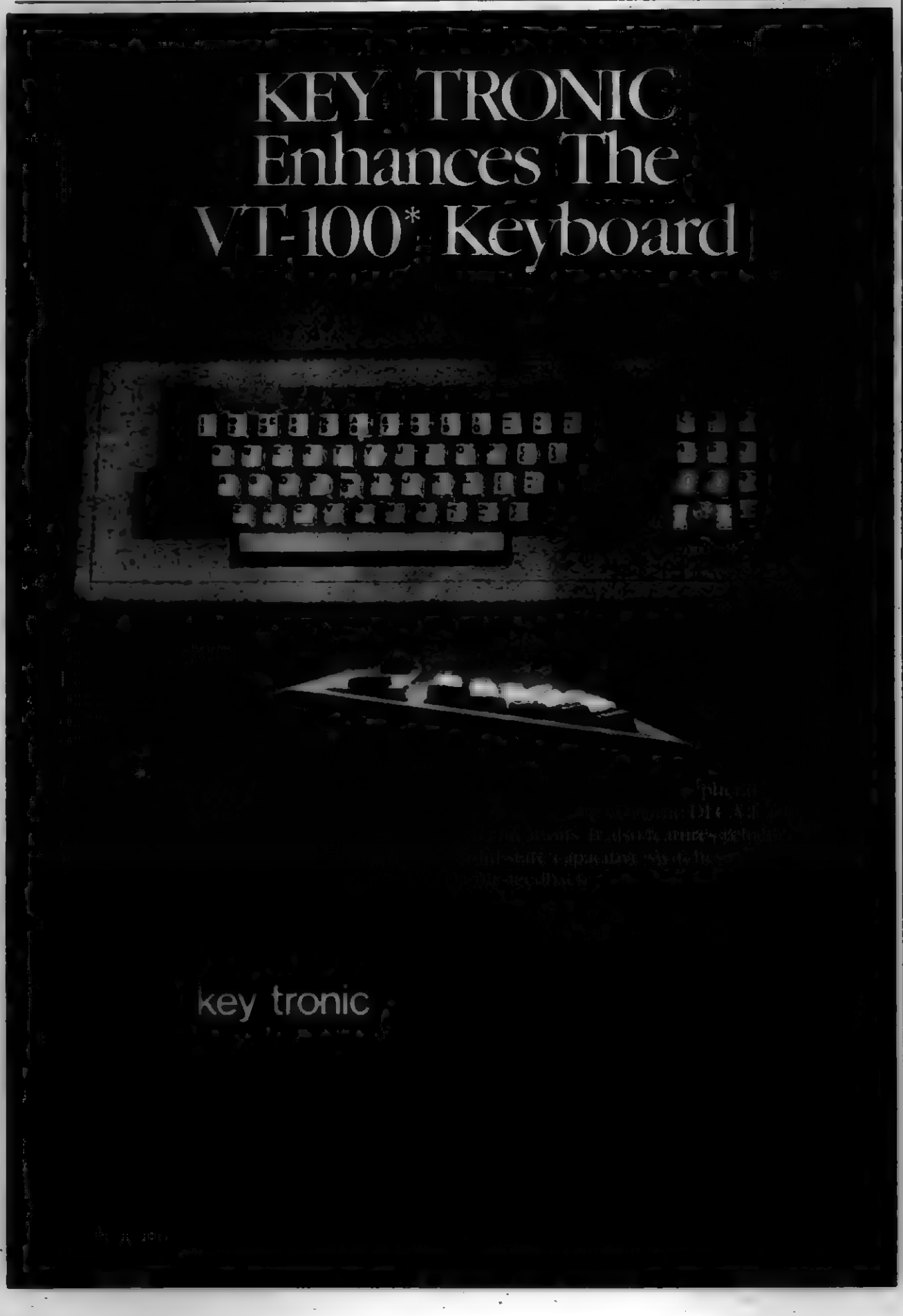
APPLE from page 73

Microsoft's contribution to Macintosh's lineup of third-party software includes its Multiplan spreadsheet package, Basic programming language, Word text processing program, Chart and File. Formally introduced at Apple's Jan. 24 shareholders' meeting, all five products have long been available with IBM's Personal Computers and have recently been modified to support all the features of Macintosh's user interface, according to a Microsoft source.

Multiplan costs $195 and like Basic, which sells for $150, is available now. Word and File also retail for $195 each but will remain unavailable until the second quarter. Sales of Chart, priced at $125, will begin in March from Microsoft at 10700 Northup Way, Bellevue, Wash. 98004.

Like its IBM-compatible predecessors, the Macintosh version of Software Publishing's PFS program line embraces PFS:File and PFS:Report. File aids information management through its filing, sorting and searching features, while Report summarizes information and performs necessary calculations. Both products retail for approximately $100 and will become available during the second quarter from Software Publishing, which is located at 1901 Landings Drive, Mountain View, Calif. 94043.

Also intended to operate with Apple's entry-level, 32-bit micro is Creative Solutions' Mac-Forth, a software development system that reportedly combines the best features of the Forth programming language with Macintosh's windowing capability, menus, mouse support and file structure. A Mac-Forth license sells for $250 from Creative Solutions, located at 4801 Randolph Road, Rockville, Md. 20852.



Third-party tools target Macintosh

Third-party software packages from smaller vendors will also soon be available with the Macintosh. These include:

■ Naru Enterprises, Inc.'s Fact Finder, which reportedly boosts information storage and retrieval productivity. It costs $100 and will become available during the second quarter from Naru Enterprises at P.O. Box 206, Deer Harbor, Wash. 98243.

■ A recent adaptation of Desktop Software Corp.'s NPL Information Management System, a fourth-generation language that purportedly allows computing novices to develop data base management applications. The NPL Information Management System is projected to cost $950 and to be released in April from Desktop at 228 Alexander St., Princeton, N.J. 08540.

■ Four standard accounting programs from BPI Systems, Inc. The packages will sell for $395 each and will start finding their way into customers' hands this spring from BPI at 3423 Guadalupe, Austin, Texas 78705.

■ Haba Systems, Inc.'s Habadex product, which is said to maintain appointment calendars electronically and simplify both telephone dialing and record keeping. Habadex will cost $195 and is to be available April 1 from Haba Systems at 15154 Stagg St., Van Nuys, Calif. 91405.

■ Think Tank, an outline-processing aid slated to cost less than $2,000 and to be released during the second quarter from Living Videotext, Inc. at Suite 232, 1000 Elwell Court, Palo Alto, Calif. 94303.

■ CRT Plus, a decision support tool that Aurora Systems, Inc. will be selling to financial institutions for an estimated $995, plus a $150 annual maintenance fee, from 2423 American Lane in Madison, Wis. 53704.

■ Human Edge Software Corp.'s series of three business strategy application programs, consisting of Sales Edge, Management Edge and Negotiation Edge, each of which sells for $295. Unlike Sales Edge, which will begin to be sold during the second quarter, the other two programs will become available in the latter half of 1984 from its developer, Haba, at 2445 Faber Place, Palo Alto, Calif. 94303.

COMPUTER INDUSTRY

Whither STC after mainframes?

INDUSTRY INSIGHT

BILL LABERIS
CW Senior Editor

Storage Technology Corp.'s (STC) recent announcement that it has scrapped its mainframe development efforts was certainly a surprise, especially to anyone who has spoken lately with Jesse Aweida, chairman and founder.

Interviewed by *Computerworld* in mid-December, Aweida boasted that STC's mainframe would compete against the offerings of IBM with success similar to what STC experienced selling its 3350-look-alike disk drives a couple of years ago.

Now it appears that STC's mainframe efforts have been torpedoed by a number of adversities, not the least of which was the perceived inability to compete against IBM's strongest suit — mainframes.

Chip failures

The official word was that very large-scale integration chip failures caused delays that "reduced the likelihood of successfully marketing the mainframe computer." The question is, what growth path will STC choose now? And what can the company do to restore some of the credibility it lost with this — the second announcement of a major project gone sour — in the last 18 months? The company in August 1982 abandoned plans to market its Virtual Storage System, a complex back-end storage system, one year after announcing the product with great fanfare.

Right now, the mainframe disk drive market belongs to IBM, which shipped an amazing 43,000 spindles for its 3380 thin film head version in 1983, while compatible vendors like Memorex Corp. and STC watched their 3380-like machines trickle out of the loading docks. The bad news for the compatibles here is that IBM will likely announce a quad-density version of the 3380 this year, a machine capable

See STC page 88

Wang eyes overseas market
Seen key to future growth

By Peter Bartoli
CW Staff

PALM SPRINGS, Calif. — "Five out of every six office workers get up, put on their clothes and go to an office that is outside of the U.S."

Additionally, 78% of the gross worldwide product is outside of the U.S.

For that reason, according to J. Carl Masi Jr., senior vice-president of international operations at Wang Laboratories, Inc., U.S. computer vendors are particularly anxious to tap the international sales market.

In a recent interview here, Masi claimed that Wang's international market is growing at a rate three times faster than its nearest competitor. But the percentage of revenues Wang realizes from foreign sales is still too low in comparison to that of other companies, he added.

Wang realizes about 35% of its total revenues from foreign sales, according to Masi, while IBM realizes about 45%. At the same conference Masi was attending here, a Prime Computer, Inc. executive said his company realized half of its total revenues from foreign sales.

When Wang reached $1 billion in revenues in 1982, the company set a new goal of reaching $5 billion by 1990, but is growing faster than that, according to Masi. "If the target is $5 billion, I'd like [international sales] to be half of that," he said.

Because of the potential user base outside the U.S., Masi added, "we're under potential. It stands to reason we should be doing more."

Wang makes direct sales through 20 different subsidiaries and sells into a total of about 100 international markets, he said. Outside the U.S., approximately 7,000 people are employed by Wang, about half of them service related; about 4,000 others are involved in exclusive sales of Wang products, according to Masi.

Wang in recent years has become more involved in foreign investment, he said. At first, the company established manufacturing facilities in "tax havens" of Puerto Rico and Ireland. More recently, it has invested in foreign countries for other than tax reasons, such as for having manufacturing facilities near the markets.

Masi

U.S. companies desiring to sell successfully in foreign countries, particularly to the large public sector, must be willing to meet those countries' demands for investment. "They want to see employment and export, and they want to see technology transfer and value added," he said.

> *'If the country has demonstrated an instable economy or political structure and there's a high chance of nationalization, you're more likely not to put in an expensive manufacturing plant.'* — J. Carl Masi Jr., senior vice-president of international operations, Wang Laboratories, Inc.

In every country where Wang has established manufacturing facilities, he added, 50% or more of its supplies come from the local economy.

"By 1990, every major subsidiary we have will have its own manufacturing facility. Eighty percent to 90% of international requirements will be developed [outside the U.S.]," he said.

Such investments require a degree of caution, he said. "If the country has demonstrated an unstable economy or political structure and there's a high chance of nationalization, you're more likely not to put in an expensive manufacturing plant," he said. "You're more likely to put in a [research and development] facility."

The bottom line, he added, is what the company expects to get out of the commitment. Balancing company expectations against the internal factors of a particular country is something he does "by feel and by gut and by talking to people." Wang has no group of international policy advisors, he said.

See WANG page 88

WANG

Having scrapped plans to build its own chips, Wang buys 15% of a San Jose, Calif.-based chip maker/93

intel

Intel's output for 1984 is already spoken for, as the firm goes all out to expand capacity and make supply meet demand, its president said/95

INSIDE

- TI and Motorola still sit atop the merchant semiconductor heap, but AMD and the Japanese are making strong market bids/90
- Ada is DOD's chosen son, and plenty of companies are jumping on what promises to be a multi-billion-dollar bandwagon/94

AT&T's profits plunge

NEW YORK — AT&T reported that fourth-quarter profits declined 68% over year-earlier figures as a result of $1 billion in reorganization costs and that a previously announced multibillion after-tax charge reduced profits for the year to a low $249 million, or 13 cents per share, compared to the previous year's earnings of $7.28 billion, or $3.40 per share.

Charles L. Brown, chairman of AT&T, said the last financial report of a consolidated Bell system would confuse investors because of the special charges. "I therefore want to stress that, in the main, they reflect one-time, one-of-a-kind events which are a consequence of the breakup of the Bell system," he said.

Taken at face value, $1.4 billion in reorganizational and other costs and $5.5 billion in after-tax charges produced a fourth-quarter loss of $4.87 billion, reportedly the largest loss ever posted by a U.S. corporation. Revenues for the fourth quarter increased over the year-earlier quarter 5.4% to $17.6 billion and for the year increased 6.6% to $65.1 billion.

Income for the quarter was $623.2 million, or 62 cents per share, and reflected one-time costs resulting from an estimated $1 billion in reorganizational costs, costs associated with last summer's strike against AT&T and $176 million paid over to Litton Industries, Inc. as the result of an antitrust judgment.

The charge-off of $5.5 billion resulted from equipment write-offs and accounting changes and was higher than the $5.2 billion that AT&T had predicted last October, reportedly because final figures showed less equipment on hand and less value.

TI down $145 million in '83

DALLAS — Losses in the home computer market and a final exit from consumer computer sales cost Texas Instruments, Inc. approximately $660 million during fiscal year 1983, the company reported Jan. 27. Even with an extraordinary tax benefit of $193 million, TI's operations overall produced a net loss of $145.4 million, or $6.09 per share.

After pulling out of the home computer business late last year [CW, Nov. 7] the company realized fourth-quarter profits of $77.5 million, or $3.23 per share, up 82% from year-earlier results. The fourth-quarter profits included "better than expected sales" of the TI 99/4A home computer, with bargain-basement prices that leveled off under $49 per unit and reductions in software prices resulting in sales producing an $11 million profit from previously written-off inventories.

Overall, the company experienced a 6% increase in net sales to $4.5 billion for the year. Excluding the consumer computer products, the company's operations produced a net sales increase of 10% and profit increase of 73%, company President J. Fred Bucy and Chairman Mark Shepherd noted.

The home computer bail-out and cash needs of other operations pulled TI's cash reserves and short-term investments down from the $420 million reported one year ago to $185 million at the end of 1983. Nevertheless, the two executives said, "We believe our current cash position and available financing sources will support TI's future growth."

The company reported accelerated capital expenditures during the

See TI page 88

Wanted: factory automation stories

There's an automation revolution happening on the factory floor, and computerised manufacturing systems are leading the charge.

Computerworld's March Special Report will take an in-depth look at computerised manufacturing systems and how they are altering production, planning, operations and those delicate relationships between traditional DP departments and factory automation specialists.

The report will focus on computer-aided manufacturing and engineering, materials requirements planning, robotics, inventory and shop-floor control.

More importantly, the report will look at the impact of these technologies on traditional manufacturing operations.

If you would like to contribute a tutorial or application story to the report, send your three- to six-page, typed, double-spaced manuscript to Bill Laberis or Pete Bartolik, *Computerworld*, 375 Cochituate Road, Box 880, Framingham, Mass. 01701.

The deadline for all submissions is Feb. 10. Accepted articles sent with accompanying charts, black-and-white photographs or other camera-ready graphics will receive top priority.

HIGH PERFORMANCE

NOW AVAILABLE IN A THREE-SPEED

INTRODUCING THE NEW DS 220 MULTI-MODE MATRIX PRINTER

First there was the Datasouth DS180. The original high-performance printer. The printer that raised the standards of on-the-job performance to new heights. A tough act to follow.

And now, following in the same tradition, is the new Datasouth DS220. State-of-the-art performance, taken to higher levels. In a new 3-speed multimode form. Ready to run data, near letter quality and graphics output—in a single printer.

At data speed, the Datasouth DS220 leaves competitors in the dust. By using high speed tabbing to zip over blank spaces and true logic seeking to print the next available character, the Datasouth DS220 charges through printed copy at speeds rivaling more expensive line printers.

At 40 CPS NLQ speed, the Datasouth DS220 creates near letter quality output with the kind of class that might make you wonder if it was produced by a daisy wheel printer. With its fine tuned 18 x 48 dot matrix, multiple fonts are produced with the precise clarity required for word processing applications.

And for graphics, the Datasouth DS220 adds high performance style to popular microcomputer applications programs through high resolution dot addressable output. Sharp new details emerge from business charts and graphs, and engineering drawings.

And those are just its printing capabilities. Its fully instrumented dashboard allows push button programming of up to fifty features for forms control, communications and print style selection.

Best of all, the Datasouth DS220 costs much less than you might expect for a high performance three speed. Go to your nearest showroom and run a Datasouth DS220 through the gears. See how little it costs to own three high performance printers in one high performance package.

south

HIGH PERFORMANCE MATRIX PRINTERS

Find Datasouth Printers At Participating Computerland Stores And Other Fine Dealers.

Datasouth Computer Corporation
Box 240947 · Charlotte, NC 28224
704/523-8500 · Telex 6843018 DASOU UW

WANG from page 87

"You have to be close to it. . . . I travel about 50% to 60% of the time, and I talk to political leaders as well as other people," Masi said.

But daily operations require dependence on others, Masi continued. "Unless there are emergencies, it makes sense to have local managers running the country."

In international markets, Wang is in the top three or four computer vendors in most areas, No. 2 in some and No. 1 in others that are less mainframe-oriented, he said. "Around the world, the No. 1 competitor is IBM. Then after that it's Digital Equipment Corp. — it used to be Hewlett-Packard [Co.]," according to Masi.

TI from page 87

fourth quarter, reaching a 40% increase and a total of $478 million for the year, representing major expenditures for new semiconductor processing capacity and government electronics facilities.

Semiconductor orders and shipments grew strongly throughout the year and reached record levels during the fourth quarter, TI said.

Additionally, the company said, the TI Professional Computer experienced a positive quarter-to-quarter trend during the year, and the demand for TI's Business Systems picked up in the second half of the year.

STC from page 87

of twice the 3380 storage at less than twice the 3380 price. Having long ago recovered its 3380 research and development monies, IBM will continue to dominate this market, leaving little on the table for its competitors.

STC's tape drive sales will remain healthy, but again IBM may announce an 18-track successor to its 3420, whose priced was chopped a few months back. While an IBM announcement may actually benefit STC, rumored to have its new tape drive waiting in the wings, the question is how much.

How about STC's optical storage subsystem? Until someone comes out with a functional erasable model, optical storage will remain a pipe dream, at least for the massive installed IBM mainframe customer base.

Nonetheless, STC is well poised in the optical disk market, should it ever develop.

So where will the company look to grow from here? Good question, and one which Aweida should look to answer fairly soon. STC cannot live off IBM's 3350 mistakes forever.

Since you'll be spending millions of dollars per month on data communications networks, you want all the information you can get. Right?

Here's how to get it.

Just wait for your February 27th issue of **Computerworld.** Then read the special report on Data Communications Networks from cover to cover. You'll get it all:

- *Local area networks*
- *public packet-switched networks*
- *private branch exchange (PBX) networks*
- *teleconferencing networks*
- *satellite networks*
- *CATV networks*
- *videotext and facsimile networks*
- *voice/data network integration*

You'll get tutorials — bylined opinion/analysis pieces by experts in the field on the use of networks and the future of the networking industry. You'll get case studies of how companies have used specific networks to solve specific business communications problems. And you'll get information on lots more — with articles on everything from microwave links to how AT&T's divestiture will affect voice/data networks.

If you spend — or are planning to spend — millions on data communications networks, then you can't afford to miss the February 27th special report on Data Communications Networks in **Computerworld.**

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

And, if you've got product or service ads that will help our readers make informed choices for 1984 — then you need to get your ad to us by February 10th. To reserve space in the February 27th issue, call one of the sales offices listed below, or call Ed Marecki, National Sales Director.

To: Ed Marecki, *National Sales Director*
CW Communications/Inc., Box 880, Framingham, MA 01701
☐ *Please send me advertising information for Computerworld.*
☐ *Please have a sales representative call me.*

Name _____

Title _____

Company _____

Address _____

City _____ State _____ Zip _____

Telephone _____

CW 2/10

Sales Offices
BOSTON/Chris Lee, Jayne Donovan, Michael Kelleher, Ron Mastro, Jim McClure, Alice Longley *(617) 879-0700* • **CHICAGO**/Art Kossick, Chris Lee, Jean Broderick *(312) 827-4433* • **NEW YORK**/Mike Masters, Doug Cheney, Ray Corbin, Joan Daly, Fred LoSapio, Gale M. Paterno *(201) 967-1350*
ATLANTA/Jeffrey Melnick, Mike Masters *(404) 394-0758* • **SAN FRANCISCO**/Bill Healey, Ernie Chamberlain, Theodora Franson, Barry Milione, Nicole Boothman (recruitment) *(415) 421-7330* • **LOS ANGELES**/Bernie Hockswender, Bob Hubbard, Bill Healey (714) 261-1230

TI, Motorola pace merchant semi world: ICE

By Robert Stahl
CW West Coast Bureau

SCOTTSDALE, Ariz. — Texas Instruments, Inc. and Motorola, Inc. remain the top two merchant semiconductor manufacturers worldwide, with Advanced Micro Devices, Inc. (AMD) and Toshiba Ltd. making major gains, according to a recently released report by Integrated Circuit Engineering Corp. (ICE).

The ICE report, "Status 1984 — A Report on the Integrated Circuit Industry," said TI remains the top merchant integrated circuit supplier, with sales estimated at $1.45 billion, out of total semiconductor revenues of $1.55 billion.

Motorola's semiconductor revenues also reached $1.55 billion, with sales of integrated circuits topping the billion-dollar mark for the first time, totaling $1.04 billion. These figures, the market research firm added, reflect increases of almost 30% for both companies during 1983.

Merchant semiconductor sales refer to chips made by manufacturers that are sold to system houses, as opposed to chips used for internal consumption. In terms of pure volume, IBM is the world's leading semiconductor manufacturer, but it consumes virtually all of the semiconductors that it produces.

According to ICE, Motorola remains the top merchant supplier of discrete semiconductors, those individual transistors capable of performing only one function, with 1983 shipments estimated at $510 million, an increase of 21% over the previous year.

TI, on the other hand, continues its exodus from the discrete market, with sales in that area down by almost 40% from 1982 levels of around $160 million, the report added.

Among the second tier of integrated circuit manufacturers, ICE claimed, AMD has climbed to No. 9 in the industry, passing both Fairchild Camera and Instrument Corp. and N.V. Philips, the Dutch manufacturer, for that spot.

Japanese suppliers also continue to show vigor, with Toshiba Ltd. passing National Semiconductor Corp. for the No. 5 position.

NEC Information Systems, Inc. remains the leading Japanese integrated circuit producer, ranking third in the top 10.

"The top two American producers managed to stave off the challenge from NEC for the No. 2 spot largely because the U.S. economic recovery led that of Japan, and the unprecedented demand for bipolar devices favored the American suppliers," said William Strauss, ICE vice-president. Strauss explainedthat bipolar devices constitute a smaller share of integrated circuit production in Japan than they do in the U.S.

Worldwide production

Worldwide semiconductor production for 1983 is estimated by ICE at $21.4 billion, (including nonmerchant, or captive, suppliers such as IBM and Hewlett-Packard Co.), a 20% rise over 1982.

Integrated circuits accounted for $16.6 billion of that figure, Strauss said, with U.S. merchant integrated circuit production pegged at $7.8 billion, a 26% increase over the previous year.

Basing its calculations on a poll of major manufacturers, ICE estimated a 29% jump in merchant integrated circuit production for 1984.

Although U.S. integrated circuit plant capacity increased 15% during 1983, ICE claimed utilization rose only 3.5%, thereby contributing to increased backlogs and delivery lead times.

According to the report, some moderate relief is in sight, with capacity forecast to increase 12% in 1984 and plant utilization expected to rise 8.3%.

The report estimates Japanese integrated circuit production during 1983 at $4 billion, a 31% jump over 1982, and ICE forecasts only slightly less growth this year, with shipments predicted to be up by 28%. Japanese semiconductor capital spending, the report added, continues to grow at a rate over twice that of the U.S., up 47% in 1983, vs. 20% for U.S. companies.

Europe behind

European integrated circuit production, the report continued, has lagged behind that of the U.S. and Japan, with 1983 sales of $965 million, up 16% over 1982.

However, the report foresees a 22% increase this year. "For the first time, European [integrated circuit] production has passed discrete semiconductor production," Strauss noted.

Among the nonmerchant semiconductor houses, IBM continues to lead the pack, with an estimated 1983 production value of $2.4 billion. Western Electric Corp. was a distant second, with a production value of $390 million.

The 152-page report is priced at $195.

Ics, 15022 N. 75th St., Scottsdale, Ariz. 85260.

IS YOUR COMMUNICATIONS NETWORK BREAKING UP?

Don't miss
"MANAGING THE COMMUNICATIONS NETWORK."
Exclusively from
Computerworld Reports.

How many vendors, how many different technologies does it take to make your network work? How many end users, how many decision makers *can* it take before something—or someone—cracks up? And does the telephone company break-up mean telecommunications tie-ups?

These are some of the critical questions posed by host John Gantz in "Managing the Communications Network," third in a lively, provocative series presented on 30-minute videocassettes and produced by DELTAK and CW Communications.

This month, you'll get the views of an industry expert, an MIS director, and a leading communications consultant. And be sure to stay tuned, because next month's Report will address another vital concern: the AT&T divestiture and its impact on information management. Watch for future Reports on subjects such as application development centers, artificial intelligence, end user training, the maturing information center, and more.

To learn all the signs of network break-up before your organization cracks up, order Computerworld Reports: "Managing the Communications Network." Call DELTAK order entry at (312) 369-3000; (416) 678-9222 in Canada.

DELTAK
East/West Technological Center
1751 West Diehl Rd., Naperville, IL 60566
(312) 369-3000 (800) 532-7888

375 Cochituate Road
Box 880, Framingham, MA 01701
(617) 879-0700

© Copyright 1984, DELTAK, Inc.

Introducing MARK V™ for CICS users: a *unique*, 4th generation non-procedural application development system that saves you time and money at every stage of your application life cycle. See it at a free seminar near you!

Informatics just broke the productivity barrier with MARK V, an extraordinary timesaving application development system. But, MARK V is not for everyone. *It may be for you if:*

- ☑ You need help in reducing your backlog of medium to complex CICS applications.
- ☑ You use CICS with IBM-supported data access such as VSAM or DL/I.
- ☑ Your CICS system demands highly efficient application execution.

Then, MARK V can help you produce efficient compiled applications that rival the execution of well-written COBOL—in less than half the development time!

Easy application development and maintenance is just the beginning!

MARK V improves productivity throughout the application development and maintenance cycle—not just in the coding—by providing:

- Interactive application design and simulation
- Easy to use, menu-driven specification language for development and maintenance
- Transparent and complete data access/communications control
- Automatically produced application documentation

That means, with MARK V your programmer need only specify the solution. MARK V generates the *complete* application. This methodology allows you to solve more complex problems more efficiently using less highly trained personnel—*and that saves you money!*

Reserve your place at a *free Seminar* on MARK V—the simple new way to develop and maintain your medium to complex CICS applications.

As a data processing professional, you're also a professional skeptic. But the simplicity, versatility and timesaving capabilities of MARK V are easy to see—and prove. To do so, simply mail the coupon below or call toll free. We'll reserve your place at a free MARK V Seminar in a city near you. But attendance is limited. So mail this coupon or call *today*.

informatics general corporation

THE SOFTWARE ENGINEERS

Register now for a Free MARK V Seminar! Mail this coupon or call toll free

1 800 227-3800, ext. 926

(In Canada, call collect, 0 415 ~~980~~-7192)

YES. I want to learn more about how MARK V can make my medium to complex applications development and maintenance both fast and easy.

☐ Please enroll me in the free seminar I have indicated below (check one). Call me with details on specific location and time. I understand that there is no cost or obligation.

☐ Dallas	February 14	☐ Montreal	February 15
☐ Boston	February 28	☐ New York	February 14
☐ Chicago	February 16	☐ Philadelphia	February 16
☐ Cleveland	March 1	☐ San Francisco	February 23
☐ Houston	February 15	☐ Toronto	March 14
☐ Los Angeles	February 21	☐ Washington, DC	February 22

☐ I cannot attend a Seminar. But please send me more information on the MARK V Application Development System.

Name _____

Title _____

Company Name _____

Phone Number _____ (include area code)

Address _____

City _____ State _____ Zip _____

Mail this coupon to: Informatics, MARK V Free Seminar, P.O. Box 1462, Corona Port, CA 92864 CW-AO

COMPUTER INDUSTRY

NICKELS & DIMES

Lee Data Corp. has announced third-quarter revenues of $26.4 million, a 70% increase over the same period last year. Net income for the quarter was $4.6 million, up from $3.3 million a year ago. Revenues for the first nine months were $67.6 million and earnings were $12.3 million, up 88% and 69%, respectively.

■

Bolt, Beranek & Newman, Inc. has reported net income for the second quarter ended Dec. 31 of $1.3 million, or 17 cents per share, compared with $757,000, or 11 cents per share, for the second quarter of 1983. Sales were $25.2 million, up 21% over the same period last year.

■

NBI, Inc. has reported a 24% increase in revenues, but a 13% decrease in earnings, for the second quarter ended Dec. 31. Revenues were $44.7 million, compared with $36.1 million for last year, while income was $3.3 million, or 33 cents per share, compared with $3.8 million, or 38 cents per share last year.

■

Harris Corp. has reported sales of $472 million and net income of $18.6 million, or 46 cents per share, for its second quarter ended Dec. 30, compared with sales of $434 million and a profit of $15.6 million, or 40 cents per share, for the comparable period in 1982.

■

Gould, Inc. has reported net earnings for fourth-quarter 1983 of $25.2 million, or 56 cents per share, compared with $20.3 million, or 46 cents per share, for the same period last year. Sales for the period totaled $342.3 million, a 10% increase over fourth-quarter 1982. Net earnings for the year declined slightly from $79.9 million in 1982 to $79.2 million in 1983. Discontinued operations produced a loss of $15.1 million, or 33 cents per share, against the $12.9 million, or 30 cents per share, earned in 1982.

■

Ungermann-Bass, Inc. has reported revenues for the year ended Dec. 31 of $25.4 million, up 125% from 1982. Net income was $1.9 million, or 14 cents per share, compared with $308,000, or 2 cents per share, in the prior year.

■

Micom Systems, Inc. has reported sales for the third quarter ended Dec. 31 of $34.3 million, up 62% over the same period last year. Earnings increased 63% to $5.5 million, or 35 cents per share.

■

Computer Consoles, Inc. has reported a 31% increase in revenues and a 40% increase in net income for fiscal 1983. Revenues hit $103.6 million, and net income rose to $10.4 million, or 87 cents per share, compared with $7.4 million, or 66 cents per share, for 1982.

■

Stratus Computer, Inc. reported annual sales in 1983 of $20.6 million, compared with $5.5 million the previous year, while profit for the period jumped to $2.2 million, or 13 cents per share, from 1982's net loss of $1.2 million, or 30 cents per share. Sales in the fourth and final quarter totaled $6.7 million, with earnings of $1 million.

'The computer is going through the files now, chief.'

IBM/36 INFO CENTER. TODAY!

PC INTERFACE AVAILABLE

Call or write for details on FUSION/36 Information Center. Includes integrated retrieval processor (report/queries) personal database and IBM PC Interface to S/36 files.

FUSION

(415) 461-4760

LARKSPUR, CA

DIMENSION. THE MOST COMPATIBL COMPUTER YOU CAN BUY.

dimension 68000

SUPERSHORTS

Grumman Data Systems has created a new division, Systems Maintenance Services, to expand its computer maintenance and service facilities in New York. Alan R. Andrus has been named president of the division.

■

Digital Equipment Corp. has unveiled a program designed to assist universities integrate personal computers into nontraditional disciplines. With $16 million worth of DEC hardware, Partners for the Advancement of Computers in Education will aim to foster development of instructional methods and software while increasing student and faculty productivity, DEC said. Fifteen universities have been selected to participate.

■

Honeywell Information Systems and Textronix, Inc. have signed a cooperative marketing agreement under which Textronix will receive assistance from Honeywell in marketing its computer display terminals, copiers and plotters to Honeywell customers in the U.S. Textronix will be responsible for marketing and maintaining the products, which will support Honeywell's entire computer line.

■

General Electric Information Services Co. has become an IBM value-added dealer for the IBM Personal Computer.

■

Xerox Corp. and Advanced Computer Communications (ACC) will both market ACC communications software products, which enable Xerox systems products to operate compatibly with Digital Equipment Corp.'s VAX and PDP-11-based systems which use the VMS, RSX-11 and Unix operating systems.

■

AT&T Information Systems has signed a contract with American Express Co. to design, build, install and maintain an integrated voice and data information system which will serve American Express' new headquarters in New York. The value of the agreement during the first five years is in excess of $20 million.

■

National Semiconductor Corp.'s subsidiary National Advanced Systems (NAS) will provide hardware maintenance nationwide to Magnuson M80 series customers of Phoenix Leasing, Inc., a wholly owned subsidiary of Phoenix American. Under the agreement, Phoenix Leasing will provide logistical support and Magnuson parts to NAS. NAS will offer Phoenix customers the option of contracting for the NAS total support package, which includes a complete range of services for the IBM or IBM-compatible data processing center.

■

Perkin-Elmer Corp. has formed a third-party ventures group under the direction of Richard E. Dural within its Data Systems Group. According to Dural, "The charter of the newly formed organization is to complement the Perkin-Elmer supermini computer and desktop workstation line with products supplied by software houses and independent hardware manufacturers for the commercial and scientific markets."

MOST POWERFUL,
E PERSONAL

Wang buys 15% of VLSI

LOWELL, Mass. — Wang Laboratories, Inc. recently announced the purchase of 15% or 2.8 million shares of VLSI Technology, Inc. for $34 million.

The two companies recently signed a technical support and cooperation agreement whereby VLSI will provide Wang with access both to its software design technology and to its integrated circuit wafer-processing capacity.

Based in San Jose, Calif., VLSI develops and markets a series of software products and services for the design of custom and semicustom very large-scale integrated circuits and also designs, manufactures and markets custom and semicustom integrated circuits.

DOD push of Ada spawns business bonanza

OUTSIDE LINES

BOHDAN O. SZUPROWICZ

In the early 1970s, the Department of Defense (DOD) began to develop a uniform, all-purpose computer programming language in an attempt to simplify the use of a variety of computing hardware and to control its skyrocketing software costs, currently running over $10 billion a year.

The result is one of the most advanced computer programming languages, Ada, on whose development DOD has already spent about $20 million. Initial Ada compilers and software development tools are now being validated by DOD, and 1984 will probably see the emergence of a new industry dedicated to the development of Ada applications software.

Proponents of Ada see it as an advancement in the art of programming, because the new language allows use of application programs on any computer model, making programmers independent of computer hardware. Ada language is supported by IBM and Intel Corp., which gives it a lot of credibility.

On the other hand, because it is so comprehensive, it is not among the most user-friendly computer languages. Its critics believe it will never become widely used by the programming community. But if Ada is to save billions for DOD, the reluctance of present software suppliers who stand to lose lucrative contracts is expected.

Since DOD is the largest software consumer in the world, its preference for Ada is being closely watched by software companies who see a new business bonanza in Pentagon programs such as these. Some even believe that Ada will affect more software professionals during the 1980s than Cobol did in the 1960s and 1970s. Others are rushing to set up specialized shops developing Ada . . . in anticipation of a market takeoff in 1986 which is expected to reach $1 billion well before 1990.

DOD itself expects to save $24 billion by the year 2000 from use of Ada. Through its directives, DOD is also in a position to make Ada mandatory in development of embedded computer systems, whose software is expected to cost $4 billion in 1984 alone.

Latest forecasts suggest that expenditures on embedded computer systems in modern weapons platforms will increase even faster than previously reported and may reach $30 billion by 1990.

Since DOD is the largest software consumer in the world, its preference for Ada is being closely watched by software companies who see a new business bonanza in Pentagon programs such as these. Some even believe that Ada will affect more software professionals during the 1980s than Cobol did in the 1960s and 1970s. Others are rushing to set up specialized shops developing Ada programming tools, workstations and training programs in anticipation of a market takeoff in 1986 which is expected to reach $1 billion well before 1990.

Some forecasts even suggest that commercial use could demand as much as $100 billion worth of Ada software during the 1990s.

About two dozen small companies have already decided to place their bets on the Ada sweepstakes, developing compilers and workstations for use by the Ada programmers of tomorrow. Some are indistinguishable from run-of-the-mill software startups, but a few appear to be catching the eye of the venture capitalists and investment bankers who understand what is at stake.

Intelligenetics Corp. claims to be the first company to produce commercial Ada applications software and is already planning to raise $14 million through its first public offering, now being readied. The company is a minicomputer systems integrator and needs the capital to produce a microcomputer for Ada multiprocessing applications.

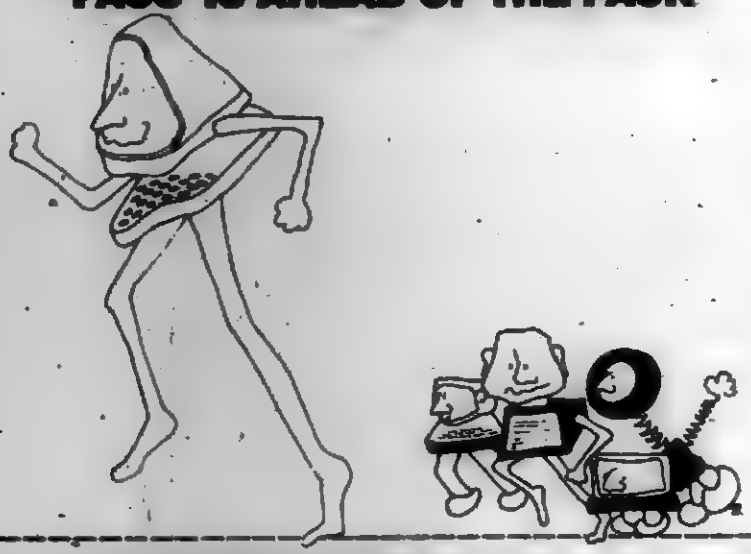
Computer Thought, Inc. is a 1981 start-up that combines the techniques of artificial intelligence with specialized hardware to develop a workstation for learning Ada programming. The company received two rounds of financing from leading venture capital firms. The array of smart money investors it has attracted suggests that the company's thoughts about Ada may be on the right track indeed.

Telesoft, Inc., a 1981 start-up, was among the original Ada compiler developers and has already sold over 350 units to commercial and military customers. The company is developing Ada compilers and microcomputers using the Unix operating system and has an Ada compiler for the IBM Personal Computer.

Intermetrics Corp. and Softech, Inc. are two Ada pioneers that developed compilers for the U.S. Air Force and U.S. Army, respectively. Both have grown in sales to over $20 million each. Softech is hedging its bets by developing operating systems for microcomputers that are portable from one popular machine to another.

But perhaps the most intriguing of new Ada ventures is **Alsys Microsystems Corp.**, a subsidiary of a three-year-old French company headed by Jean Ichbiah, one of the leading Ada designers and an original developer. The U.S. subsidiary is marketing low-cost Ada compilers for microcomputers and has a training system for the IBM Personal Computer. Its ambition is to become the leading Ada micro software supplier.

FOR VAX™ RESOURCE ACCOUNTING, PACS™ IS AHEAD OF THE PACK



The competition isn't even close. PACS is so good, it's the only resource accounting package in DEC's™ EAS library. Here's why:

- Flexible billing algorithms
- User budgeting and port speed accounting
- EZLOG™ for true 3-level reporting by account, project and user

Name
Title
Company
Address
City State Zip
Phone ( )

SEND COUPON NOW FOR COMPLETE DETAILS ON ALL THE PACS BENEFITS

STI Signal Technology, Inc.
5661 Encina Road, Goleta, CA 93117 (805) 683-3771 Outside California call toll-free (800) 235-0787
TWX 910-334-3471

VAX and DEC are trademarks of Digital Equipment Corporation

Martin Marietta division grabs $102 million Labor contract

WASHINGTON, D.C. — The U.S. Department of Labor has awarded Martin Marietta Data Systems, Inc., a division of Martin Marietta Corp., a $102 million contract to design, install and maintain a computerized information system for the department's Division of Federal Employees' Compensation.

The contract, to be spread over eight years, involves designing an application system to handle claims examination, financial management, rehabilitation, medical support, case maintenance, district office support and national office support for the more than 2.8 million federal employees covered by the federal compensation program.

Martin Marietta Data Systems will install IBM 4300 series mainframes to provide automation in the division's national office and in district offices across the country. The company will also train federal employees to operate the system, handle all data conversion from the current system to the new system and maintain the facilities for eight years.

Martin Marietta Data Systems has proceeded along a rapid growth path for several quarters now, exercising the financial muscle of its parent to purchase Mathematica, Inc. for $30 million last August [CW, Aug. 8, 1983]. The company's strategy remains to make applications and system software independent from the hardware, while targeting the low-end mainframe and superminicomputer offerings of IBM, Digital Equipment Corp. and Hewlett-Packard Co.

Output for '84 already spoken for: Intel chief

By David Myers
CW New York Bureau

NEW YORK — With 28 new buildings under construction, Intel Corp. is adding production capacity as quickly as it can and will catch up with its backlog of semiconductor orders "at the next recession," according to company President Andrew S. Grove.

Addressing a meeting of stock analysts here late last month, Grove said Intel's entire 1984 production volume of memory chips and microprocessors is already spoken for. New orders will not be filled before next year, he added.

"We're going to catch up at the next recession. We'll be in a precise balance of supply and demand for about 35 seconds," Grove quipped.

Grove said the semi maker's revenue growth was limited by its ability to catch up with the backlog of orders. Even so, in 1983 the Santa Clara, Calif.-based company earned $116 million, almost quadruple its $30 million profit in 1982.

Grove said Intel officers expected "a pretty good year" in 1984. He declined to be more precise, beyond saying that the company expected to contribute "several tens of millions" to its employee profit-sharing fund, while last year it contributed only around $1 million.

The chip maker's rebound from two years of lagging profits was charged by fast sales of its 8086 microprocessor, which had grabbed a 72.3% share of the 16-bit microcomputer market by year's end, according to Grove.

Pointing to a chart that showed a steep growth curve for the 8086 since its introduction in 1982, Grove said, "If we could meet actual demand for the product, that line would be vertical."

The Silicon Valley firm had introduced the 8086 and added wafer fabrication capacity during the recession in order to be ready for any upturn in the U.S. economy. "But we did not anticipate the strength of this recovery sufficiently," Grove said.

In his first speech in two years before Wall Street analysts, Grove said Intel was attempting to standardize microprocessors for the computer industry "so that we can move forward without requiring further software development." He also said that Intel would be graduating to 6-in. wafer fabrication from 4-in. wafers. Grove said 2,200 chips could be carved out of a 6-in. wafer, as opposed to 400 from a 4-in. slice of silicon.

Grove

"But we won't see the benefits of this for a long time," Grove cautioned, saying he shared it as "an indication of the type of thing we are doing beyond adding brick and mortar" — building new plants, that is.

In addition, Grove revealed that Intel is negotiating second-source licensing pacts with two different semiconductor makers in order to increase the market supply of 8086-type microprocessors. And the company is looking to work out deals to rent still other manufacturers' wafer-fabrication facilities in order to free Intel production room for 8086 manufacture, he said.

Despite a recent push of its single-board computer systems business, Grove vowed that Intel would never become "a systems-dominated company." And despite a clear lead for U.S. semiconductor makers over their Japanese rivals, Grove said, "It is important for us in this industry not to be lulled by this. I can't picture a roomful of Japanese execs saying, 'We lost this one, gentlemen. Let's go back to making motorcycles.'"

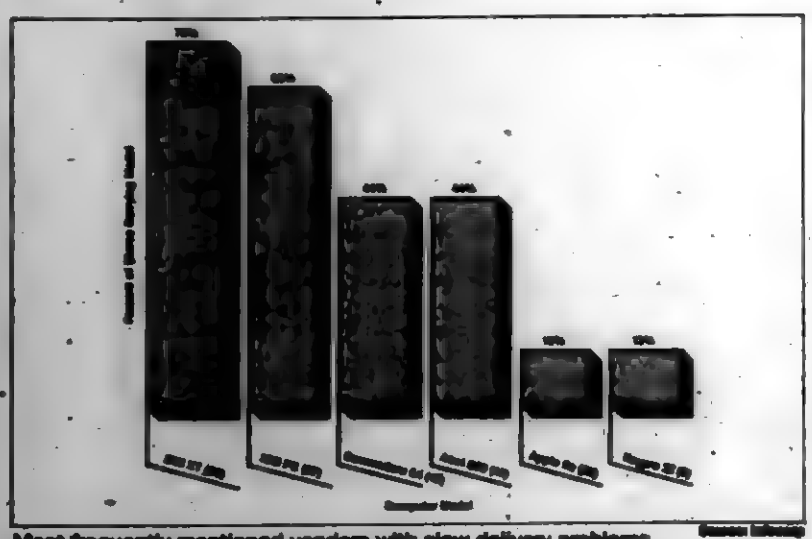
Micro dealers form group

TUSTIN, Calif. — The American Microcomputer Dealers Association (Amda) has been formed in response to a survey that indicated "a void exists in an industry that is rich in hardware technology and software development, but poor in the area of serving computer dealers directly."

Amda said it will provide services in areas of interest to resellers. Members have access to a range of financial and marketing tools through Amda/Net, a subsystem of the GTE Telenet Communications Corp. Mailnet network. Depot and on-site maintenance programs are available also through an Amda service provider.

A group health and business insurance package designed specifically for computer dealers is available to members, as are a full-service credit union and discount travel services.

Amda membership costs $195 per year from Amda at Suite 200, 17842 Irvine Blvd., Tustin, Calif. 92680.



Most frequently mentioned vendors with slow delivery problems.

Apple holds lead; IBM closes micro gap: study

CUPERTINO, Calif. — Apple Computer, Inc. has maintained and even increased its lead in terms of volume share of personal computer sales in retail stores.

But IBM, too, has increased its share of retail sales and has done so at a faster rate than has Apple or any other personal computer competitor.

These were some of the conclusions reached in a recent study of computer store sales for the third quarter of 1983 by Infocorp, which polled 322 retail outlets in its survey.

Infocorp's data established that Apple's share of retail store sales volume of microcomputers rose to 44.6% from 42.4%, despite prior predictions that the company would suffer a devastating loss in share during the third quarter. IBM's share rose to 35% from 30%, giving Apple and IBM nearly three-quarters of the retail store market share for personal computers.

At the same time, other data indicated IBM has surpassed Apple in total share of the personal computer market. Apple relies on the retail store channel almost exclusively to sell its machines, while a significant portion of IBM's micro sales are made by its direct marketing force, Infocorp said.

In addition, the survey discovered that the hottest microcomputer system in the retail chain is IBM's Personal Computer XT, with 72% of the dealers who carried both the Personal Computer XT and Apple's Lisa reporting greater customer interest in the IBM model. "This seems to further attest to the significant inroads IBM has made in the retail store channel," Infocorp noted.

The demand for IBM's micro products, however, has not been matched by adequate deliveries from the company, the survey continued. "The situation remained acute for the [Personal Computer] XT, but was alleviated somewhat . . . for the [Personal Computer]. Apple's IIe delivery improved significantly," the survey found.

Other major survey findings included:

- Microcomputers from Digital Equipment Corp., especially the Professional, and from Osborne Computer Corp. were the most overstocked machines in the dealers' inventories. Further, in a survey category dubbed "Sales vs. Expectations," DEC's machines did "relatively poorly."
- The reliability of Commodore Business Machine, Inc.'s Model 64 worsened in the period surveyed, while poor reliability reports increased "dramatically" for Kaypro, Inc.'s II and 4 models.
- Both Commodore and Osborne were rated "poor" in terms of product support.
- While the Apple IIe was rated as the machine easiest to sell to the home and school markets, IBM dominated the small, medium and large business markets, as well as professional applications.
- Apple and IBM dominated retail store sales to the government sector.

Infocorp, 20395 Pacifica Drive, Cupertino, Calif. 95014.

INTERNATIONAL DATA CORPORATION

PLAN TO ATTEND THE [illegible] EVENT THAT CAN [illegible] THE FUTURE OF YOUR BUSINESS!

IDC's 19th ANNUAL INFORMATION INDUSTRY BRIEFING SESSION.

Sponsored by International Data Corporation, the leading market research analysis, consulting and publishing firm for the Information Processing Industry.

SESSIONS FILL FAST! Drop this card in the mail to reserve your seat at the IDC Briefing Session nearest you! Or, call Diane Testa at (617) 872-8200.

Name _____

Title _____

Organization _____

Address _____

City _____ State _____ Zip _____

Telephone _____

☐ Yes! I will attend the _____ (city) Briefing Session.

☐ My check for $_____ is enclosed. ☐ Please bill me $_____

☐ Please send me more information

NOTE: Please copy this form for additional registrations.

Mail to: Diane Testa
International Data Corporation
Five Speen Street
Framingham, MA 01701

IDC INTERNATIONAL DATA CORPORATION

IDC V3084 CW

"Hello, Dr. Smythe? This is Fred Kane's computer . . .

POSITION ANNOUNCEMENTS

Experienced Computer Sales & Marketing Representatives

Get off the sales rollercoaster with strong sales support, stability...and opportunity.

The HP Way.

If you're tired of the same old promises, consider Hewlett-Packard. We have outstanding opportunities for career-minded professionals with 2 or more years' specialized sales experience in the minicomputer field. With a degree in engineering, physics, math, computer science, business or the equivalent combination of education and experience, you could qualify for consideration.

1. Bellvue, WA
2. Santa Clara, CA
3. N. Hollywood, CA
4. Los Angeles, CA
5. Englewood, CO
6. St. Paul, MN
7. Rolling Meadows, IL
8. Novi, MI
9. Dallas, TX
10. Houston, TX
11. Atlanta, GA
12. Raleigh, NC
13. Orlando, FL
14. Lexington, MA
15. Paramus, NJ
16. Valley Forge, PA
17. Rockville, MD

and other cities across the U.S.

Careers are yours for the making.

HP offers more than a job. You can reach the top of your field right across the nation. But you'll need to be creative, enthusiastic and have the business maturity and technical know-how to interface effectively with end user decision makers.

Two areas of opportunity for Experienced Field Sales Representatives -

Technical Computer Sales

These positions are responsible for selling HP's technical computer products to scientific, technical and manufacturing customers in your assigned territory. Besides degree or equivalent, 2 years' successful CAE/CAD/CAM or manufacturing minicomputer sales experience is desirable.

Commercial/Business Computer Sales

These positions are responsible for selling large-scale minicomputers, primarily to the manufacturing market. As well as managing the existing customer base in your assigned territory. Besides degree or equivalent, 2 years' successful business computer sales experience is desirable.

Invest in your future... long term.

We rank high among major computer companies in terms of sales growth, earnings, product innovations and employee retention. This means career stability... year in and year out. It starts with in-depth training for up to 10 months, covering every aspect of the business... from learning the HP product line to the most sophisticated sales techniques. You'll quickly gain hands-on experience working with senior HP people.

With HP you'll reap the benefit of rapid production, delivery and installation, plus strong pre-and post-sale technical support. Because our credo is "productivity - not promises."

Consider the HP advantages.

Besides excellent compensation and benefits, you'll find your career progression with us a lot smoother than what you've experienced in the past. For immediate consideration, please send your resume with salary history, indicating your preferred city.

Eastern Region
Murray Kaplan
HP Dept. CW
4 Choke Cherry Rd.
Rockville, MD 20850

Midwest Region
Barbara Moyer
HP Dept. CW
5201 Tollview Drive
Rolling Meadows, IL 60008

Southern Region
Kari Paul
HP Dept. CW
2000 South Park Place
Atlanta, GA 30339

Susan Benson
HP Dept. CW
930 E. Campbell Road
Richardson, TX 75081

Western Region
Blair Farr
HP Dept. CW
3939 Lankershim Blvd.
N. Hollywood, CA 91604

HEWLETT PACKARD

An Equal Opportunity/Affirmative Action Employer
No Agencies Please

DATA PROCESSING

SYSTEMS PROGRAMMER (PRIME)

We are seeking an innovative, creative individual with 1-4 years quality technical experience supporting PRIME SYSTEMS, preferably 750, 850 and/or 9950. Experience with PRIMOS, MIDAS+, PRIMENET and other relevant software is required. This position involves total responsibility for PRIME software including software evaluations, recommendations, and support. Opportunities exist for growth and development in an IBM environment. The candidate we are seeking will join a staff of 4 systems programmers currently supporting 2 4341G2 with VM/SP, DOS/VSE, CICS and DBMS.

We offer a 5% employment bonus, competitive salary, benefits and excellent growth opportunities. For immediate consideration, please send your resume or phone:

Randel Sanders
TIME INSURANCE COMPANY
815 West Wells
Milwaukee, WI 53203
Telephone: (414) 271-3011
Equal Opportunity Employer M/F

TIME

PROGRAMMERS AND ANALYSTS

Growing software services company involved in implementing several HOGAN systems at leading California financial organizations is searching for Hogan expertise. You will be assigned to one of our Fortune 500 financial clients and be an integral part of their Hogan implementation process. We offer high salaries, bonuses, fringe benefits and relocation. Send resume or call collect at (213) 380-2681.

cps Computerized Programming Systems Inc.
3600 West 6th Street, #309
Los Angeles, California 90020

NEW ENGLAND'S FINEST

Opportunities are abounding — We can find you the finest positions available in New England or most any place of your choosing. We have the finest client base of High Tech, Manufacturing, Insurance, Banking and Service Companies with state-of-the-art environments. Positions at every level. Minimum one year experience.

Software Development	**to 52K**
DBA/Data Analyst	**to 50K**
Project Leader	**to 48K**
Systems Programmer	**to 42K**
Systems Analyst	**to 40K**
Programmer Analyst	**to 38K**

Send resume in confidence or call Mitch Price or Linda Kalajian toll free (800) 628-3374 or in Massachusetts call (collect) (413) 781-0982.

MEMBER npc 130 affiliates coast-to-coast

dps Specialists
DYNAMIC PERSONNEL SYSTEM
PO Box 539
West Springfield, MA 01090

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

JOIN A TEAM ON THE LEADING EDGE OF TECHNOLOGY!

Computer Consoles, Inc. designs, manufactures, markets, and services a variety of minicomputer-based fault-tolerant information systems. Located in Rochester, New York, we have all the cultural and educational advantages of a large metropolitan area as well as the ambience and scenic beauty of a small, relaxed town.

CCI currently has opportunities for:

GROUP LEADER/SOFTWARE ENGINEERS

You will be responsible for the design and implementation of data base applications and utilities or fault-tolerant operation system development, including developments of a multi-processor UNIX*-compatible transaction processing system. We prefer a technical degree plus a minimum of 2 years' experience. Knowledge of "C", UNIX and data structures and experience with data bases in minicomputer Real Time or on-line environment and/or DB internals are pluses.

DATA MANAGEMENT SYSTEMS DESIGNER

You will be a member of a team responsible for designing and developing an interactive transaction data management system. This includes an integrated data dictionary, query editor and advanced files access method. A non-procedural commercial application generator and forms manager provide easy-to-use facilities for end-users. The total system is integrated into PERPOS™, CCI's multi-processor Power 5™ family of systems and office automation products. We prefer a B.S./M.S. in C.S./E.E. plus 4-5 years' experience in system design and development of data management systems. Experience with UNIX and "C" is highly desirable.

SENIOR SYSTEM SPECIALIST

You will be the lead designer and developer of advanced R&D projects that will extend CCI's Power Series of fault-tolerant systems. An advanced degree with extensive experience in UNIX operating system development are required. Additional experience with other operating systems and hardware system design is highly desirable.

*UNIX is a trademark of Bell Labs.

We offer challenging assignments, opportunities for growth, attractive compensation, and a benefits package that includes dental and profit sharing plans. Please send your confidential resume, including salary history and indicating position of interest, to:

CCI
COMPUTER CONSOLES INCORPORATED

S.C. Hoskins
Computer Consoles, Inc.
97 Humboldt Street
Rochester, New York 14609
Equal Opportunity Employer M/F/H/V

THE SCHUMANN CONSULTING GROUP

We are a respected consulting group with approximately 250 employees. For the past 12 years, we have been providing a wide variety of services in the fields of management, organisation and data processing on behalf of important clients at home and abroad. Within the field of EDP, especially concerning system consulting, we belong to the leading companies in Europe. We are now considerably expanding our "System Consulting" section and are therefore looking for several new members of staff.

We require:

System Specialists for interesting and demanding system-related assignments, both German and International, using IBM equipment (Reference: 103).

You should have the following qualifications:

- sound theoretical training with degree or equivalent in mathematics, computer science or engineering
- wide experience in system programming and generation
- practical experience in installation and management of DB/DC systems
- detailed knowledge and several years' experience in one of the following fields:
  - Networks, especially SNA
  - MVS system programming and tuning with emphasis on VTAM
  - VM/CMS system programming and tuning with a DOS/VSE and MVS background
  - DDP, especially 8100
  - Data communications, especially CICS
- good knowledge of English and at least basic German

Successful candidates will not only have the necessary professional experience, but also the ability to apply their particular experience as skilled consultants. They will also need flexibility, willingness to undergo further training at all times, with our support, as well as the drive and ability to work as part of a team.

For the right candidates, we are offering competitive salaries and results-oriented bonuses. Please write to us, quoting the above reference, and enclosing all relevant credentials. For further information by telephone, ask for Mr. Tuechler. Tel.: Cologne 798091(-95).

All applications will be treated with complete confidentiality.

INC
AG, Radeberger Straße 192
5000 Koeln 51, W. Germany

TULANE UNIVERSITY

ASSOCIATE PROVOST FOR COMPUTING

Tulane University has a major commitment to its position as a research and teaching center and is seeking an Associate Provost for Computing to provide leadership to this institutional commitment. Primary responsibilities are planning, control and evaluation of computing needs and services, establishment of and monitoring guidelines for computing services, formation of the budget, oversight of communications between user groups and the Computer Center, facilitation of computing growth and active leadership of the University's effort to stay abreast of and capitalize on advancing information technology.

Tulane computing is presently comprised of two distinct user groups: academic and administrative. The administrative units include Admissions, Registrar, Financial Aid, Student Services, Personnel, Payroll, Development, Financial Accounting, and Institutional Research.

Academic computing responsibilities involve (1) user needs assessment for both faculty and students, (2) expansion of user services, and (3) planning for personal computer networking, software development, and departmental workstations. Users include faculty in all disciplines with regular computing requirements for instructional and operational research and the teaching population.

The individual must have the technical skills which will allow for effective assessment and planning for computing needs of the University community. Managerial effectiveness will be used as an important criterion in candidate selection.

Salary: Negotiable depending on background and experience.

Qualifications: Minimum of a Bachelor's Degree (Master's degree or Ph.D. preferred).
1. Experience in planning and developing computer systems.
2. Experience in developing user-oriented relations between computing staff and the user communities.
3. Technical and administrative experience related to the management of a computer center.
4. Extensive knowledge of Information Systems used for administrative and academic computing.

Application Procedure: Applicants should submit a resume, cover letter, and names, addresses and phone numbers of five references to whom to speak about the applicant's professional abilities. The deadline for applications is March 15, 1984. Send materials to: Francis L. Lawrence, Assistant Vice President and Provost, Tulane University, New Orleans, LA 70118.

Tulane University is an Affirmative Action/Equal Opportunity Employer

---

We need DATA PROCESSING PROFESSIONALS to upgrade our '84/85 systems

(CONSIDER THE POSSIBILITIES)

American Isuzu Motors, an automotive importer/distributor was founded in 1980. Since then we have grown rapidly and are currently seeking experienced data processing professionals in the areas listed below:

LEAD SYSTEM ANALYST

We need an experienced System Analyst with a background in project management. The successful candidate will have a B.A. degree or equivalent and 2 - 4 years previous experience as a lead system analyst. Two years supervisory experience required with business knowledge of automotive industry desirable. Good written and verbal communication skills are necessary. The primary responsibility is to compile business requirements for computer system design which includes operation survey, data base and general system design, and preparation of documents for users and programmers.

SYSTEM PROGRAMMER

We seek an individual who is qualified to design, program and maintain computer software. This position requires a B.A. degree, five years system programmer experience and three years IBM DOS and IBM VTAM experience. Responsibilities include reviewing and analyzing software supplied by the manufacturer and determine optimum configuration required for the installation.

We plan to upgrade our system in '84 and '85 corresponding with the growth of our company. We offer excellent company paid benefits including all-group insurance.

Send resume with salary history to:

American Isuzu Motors Inc.

P.O. Box 2208
City of Industry, CA 91746
Attn: Personnel Dept.

Principals Only
NO TELEPHONE CALLS PLEASE

ISUZU

Equal Opportunity Employer M/F

DIRECTOR,
ADMINISTRATIVE COMPUTING CENTER
NORTHERN ILLINOIS UNIVERSITY

Duties and Responsibilities: Manage the design, development, production and maintenance of administrative data processing and management information systems. Supervise a staff of 34 including 28 professionals. Report to the Executive Director of Computing Facilities.

Qualifications: Minimum of a Bachelor's Degree with a Master's Degree preferred. Knowledge of an administrative computing environment is required. The ability to motivate and work closely with management personnel is essential. Technical computing expertise and management experience are essential. Must have demonstrated verbal, written and interpersonal skills. Preferably not less than three years management experience managing large project implementation on a multi-user system in a database, on-line transaction environment. University experience is desirable.

Position: NIU is a university of 26,000 students located 65 miles west of downtown Chicago in the city of DeKalb. The university runs an Amdahl 470 V/8 mainframe system with 12 megabytes of main memory running under MVS. On-line systems run under CICS and the ADABAS database system is used for many administrative applications.

Salary: This is a 12-month position. Salary range - high thirties to low forties, depending on experience and qualifications. Position available May 1, 1984. Application deadline March 16, 1984. To apply please send a resume and a list of three references to:

Search Committee,
Director Administrative Computing
Executive Director of Computing Facilities
Northern Illinois University
139 Swen Parson Hall
DeKalb, Illinois 60115

Equal opportunity, affirmative action. Title IX and Section 504

UNIVAC

Programmers, Systems Analysts, Data Base Analysts, Systems Programmers—let us update you on the rapidly changing UNIVAC market coast-to-coast. To confidentially explore exciting new career opportunities, rush a resume or call Gary Repetto, CPC.

BUREAU OF
ALBUQUERQUE INC
1717 Louisiana NE, Bldg. C
Albuquerque, NM 87110
(505) 883-1971
Exclusively Employer Sponsored

CHAIRMAN
- COMPUTER AND INFORMATION SCIENCE
FORDHAM UNIVERSITY

Fordham invites applicants with proven achievements in research and teaching to apply for the Chairmanship of the newly established department. This position will carry an 80% load. Salary is negotiable. The new Chairman will be expected to establish a major in Fordham College. Consequently leadership will be required in developing the curriculum, the faculty and ultimately a research program appropriate for computer and information science in a liberal arts environment. Fordham University has consistently attracted an exceptionally talented student body with a wide variety of backgrounds. This should together with its proximity to New York City offer a stimulating atmosphere for combining teaching, research and culture. Send VITA and the names and addresses of at least three references to:

Philip G. Clapwell, Search Committee
Chairman, Computer Services,
Fordham University,
Bronx, New York 10458.

Nominations and applications will be accepted until the position is filled. Fordham University is an Equal Employment Opportunity/Affirmative Action Institution.

ROMAC

Personnel & Accounting/Financial Consultants (Agency) specializes in the placement of Data Processing, Accounting, Banking and Financial Personnel. All Fees are paid by our client companies. Below are representative opportunities. Qualified candidates are invited to call or write for appointment. NO FEE/SALARY NEEDED. Replies held in confidence.

SOFTWARE ENGINEER

$42,000

1221 [redacted] PLAZA
[redacted] NEW YORK 14604
716-232-4610

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

ROBERT HALF

SEATTLE

EDEC & SYSTEMS PROGRAMMER

Seeking individual with 2+ years internal, systems and software problem diagnostic experience on Sperry Univac 1100 under EXEC 8. Telecommunication and networking experience desirable.
To mid $30's

SOFTWARE ENGINEER

Seeking individual with 2-5 years software programming experience with IBM OS MVS.
Mid $30's

DATA BASE ANALYST

Headquarters of national firm seeks individual with 3+ years data processing experience in IBM OS environment, including 2+ years DL/1 and COBOL to join data base group. Will assist in all areas of data base planning, design, testing, and implementation. Position provides excellent opportunity for learning and career growth in the data base area.
Salary $30's

Sheila Petersen
ROBERT HALF
of Seattle, Inc.
900 University St., #2224
Seattle, WA 98101
(206) 624-6600

ALASKA

FORTRAN P/A

Anchorage firm seeks scientific programmer/analyst with 1 to 4 years experience programming in FORTRAN on DEC or CDC equipment. Must have solid knowledge of analysis, design and implementation techniques. $30s–42,000

COBOL P/A

National firm seeks individual with 3–4 years experience programming in COBOL on IBM MVS with JES II, VSAM, and CICS. Position involves 70% new system development and 30% maintenance.
$30s–$40,000

Sheila Petersen
ROBERT HALF
of Seattle, Inc.
900 University St., #2224
Seattle, WA 98101
(206) 624-6600

NEW YORK

SOFTWARE PROJECT MANAGER
VAX/Digital

If you desire challenge, within a fast track organization, then this situation is ideal. Our client, a multi-million dollar transportation corp, has an immediate need for a Software Project Manager. All candidates must have experience in IBM and/or Digital and prior project management experience. Development and modification of software packages, understanding of data base concepts, financial applications and a minimum of 5 years programming BASIC and/or ASSEMBLER is essential. Growth situation with high visibility. Fee Paid. $60,000

DATA PROCESSING MANAGER
IBM OS/VSE
FORTUNE 500

Prestigious manufacturer of consumer products has opply for Data Processing Manager with knowledge of IBM 4341, under OS/VSE. Candidate should be user oriented with manufacturing background. High energy and dedicated individual needed. Fee Paid.
$40,000

ROBERT HALF
of New York, Inc.
522 Fifth Avenue
New York, NY 10036
(212) 221-6600

ALBUQUERQUE

PROJECT LEADER
PROCESS CONTROL

Responsible for design and development of hardware and software for hosts processing. Must have process control exp. Fortran/Assembler exp and G clearance.
Salary $30s–40,000

Bish Stamos
ROBERT HALF
of New Mexico
P.O. Box 3630
Albuquerque, NM 87190
(505) 884-4567

MINNESOTA ST. PAUL

SVS II
MVS/XA/CICS/DB

Multi-area firm leading up staff of consultants and senior consultants in response to increasing demand by small and medium-sized co's. Expertise in design of systems of all sizes and Bachelor's degree required.
Salary Mid-$30's to Mid-$40's

Mark David
John Miller
ROBERT HALF
of Minnesota, Inc.
3600 IDS Center
Minneapolis, MN 55402
(612) 339-6601

ST. LOUIS

DATA PROCESSING MANAGER

Rare to promotion the top spot in an IBM DOS/VSE shop is now available. Requires BS degree and 4–6 years as Project Leader or DP Manager. Also must have manufacturing applications experience.
Salary $30s,000

DEC FORTRAN ANALYST/PROGRAMMER

Major development project needs experienced DEC VAX Fortran programmers to work on large research effort. Must have BS degree. Any exposure to DEC systems software is a definite plus.
Salary $30s–40,000

RPGII PROGRAMMER/WRITER

Southern Missouri manufacturer seeks individual with 2 years experience who will program in RPGII and manage the DP department. Will work on development in a S/34 environment.
Salary To $27,000

Randy Pace or
Warner Coffman
ROBERT HALF
of St. Louis
7733 Forsyth Blvd.
St. Louis, MO 63105
(314) 727-1535

TENNESSEE

MIS DIRECTOR

$100MM Division of $3 Billion Conglomerate is looking for someone with mature managerial skills. Degree required with MBA desired. Must have 10–15 years fast-track experience including systems planning, and development, data base concepts, EDP operations and integrated office systems. Excellent communication skills, tact, and diplomacy needed in dealing with upper management. Highly visible position!

ROBERT HALF
of Nashville, Inc.
1101 Kermit Drive, Suite 407
Nashville, TN 37217
(615) 361-4060

SOUTHERN CALIFORNIA

PROGRAMMER/ANALYSTS
DEC VAX/VMS/DB

Major financial institution offers career opportunity for intermediate PROG/ANAL with financial (bank or S&L) background.
To $28,000

ROBERT HALF
of L.A.
3660 Wilshire, #6000
Los Angeles, CA 90010
(213) 380-6666

MIAMA

SR PROGRAMMER

Progressive organization seeking degreed individual experienced in Financial Applications in BASIC environment. If you have minimum 3 yrs exp in Software Development and strong interpersonal skills, this opportunity is for you. Fee Paid. Salary to $30,000

ROBERT HALF
of Miami, Inc.
3655 Le Jeune Rd., #914
Coral Gables, FL 33134
(305) 447-1757

SAN FRANCISCO

SR DATA BASE ANALYST

South Bay firm seeks individual w/ 3+ years IMS as DBA. IMS performance tuning (DBA/DC), disk management, VSAM & structural systems design are required. Will relocate.
$35–45,000

INTERNAL EDP AUDITOR

Company 1½ hours east of San Francisco seeks Auditor w/ financial & operations capability. 3/4 systems & 1/4 audit. Some systems design on IBM 4341. CIA & CPA +. Will relocate.
To $43,000

SR ANALYST

Peninsula firm seeks individual w/ financial and/or insurance applications in IDMS (3 yrs minimum), COBOL (OS) environment to act as tech consultant on IBM 4341 system. 5–7 yrs exper. Will relocate.
$37,000 midpt

SR P/A

South Bay firm seeks individual w/ 3 yrs COBOL, 1 yr CICS, VM/CMS, DOS/VSE to program for corporate HQ. Focus would be a plus. Need good debugging skills. May pay relocation.
To $35,000

APPLICATIONS MGR / TEAM LEADER

East Bay firm seeks individual w/ min 4–6 yrs HP 3000 w/ COBOL, Basic, Image, Query, VSAM 3000, View 3000 to act as technical specialist – Sr P/A. Will relocate if outstanding.
$35,000+

QUALITY ASSURANCE ANALYST

South Bay firm seeks individual w/ 2–4 yrs software quality assurance and configuration mgmt exper. Software development leadership or exper helpful HP system. Will relocate.
$30–35,000

PROGRAMMER/OPERATOR

Reno firm seeks individual w/ IBM S/34 – RPG II exper to supervise 2 & head department. Conversion to S/38. Great benefits. Will relocate.
$20–30,000

Pamela Brown
ROBERT HALF
of Northern California
111 Pine Street, 15th Floor
San Francisco, CA 94111
(415) 434-1600

BOSTON

TECH SVCS DIR

Progressive $2B firm seeks proven exp to oversee the DBA & tech support depts. Multi-CPU IBM OS/MVS IMS DB/DC mainframe shop w/ extensive on-line network. Exciting oppty to manage the tech growth of a dynamic org.
$55,000

IMS TEAM LDR

Super career oppty awaits the tech skilled proj ldr. A strong bkgrd in IBM OS IMS DB/DC COBOL req'd. This Fortune 500 co offers hvy admin/tech involvement w/direct tech support $30s.
$30,000

OS/SVS SYS PROG

Prestigious firm area org seeks BAL internals pro for challenging lateral in an IBM OS/MVS XA environ. Upward mobility for the tech specialist.
$30,000

ROBERT HALF
of Boston, Inc.
100 Summer Street
Boston, MA 02110
(617) 482-1600

PROVIDENCE

MVP SYSTEM DEVELOPMENT

New sys devel programming w/COBOL & SPG II on IBM 4331. Sr P/A blkgrd w/strong user interface skills. Will work independently. Rpts to MIS director.
$30,000

ROBERT HALF
of Providence, Inc.
70 Westminster St.
Suite 800
Providence, RI 02903
(401) 274-5700

DAYTON

EDP AUDITORS

Growth oppty's available in both mfg & service industries for EDP auditors with 1+ yrs exp. Fin'l & oper EDP audit exp with good written & oral comm skills. Exp with both prog & audit is best. CPA, CIA, or CISA a +++.
Salaries $30s

ROBERT HALF
of Dayton, Inc.
Box 788, MidCity Station
Dayton, OH 45402
(513) 294-6600

WASHINGTON

NEW DATA CENTER

First rate financial services co seeks a staff of 20 for a new IBM 4341 shop. COBOL, SAS, SPSS programmer analyst needed now!
To $30,000

ROBERT HALF
of Washington
7316 Wisconsin Ave.
Suite 401
Washington, DC 20014
(301) 652-1600

WESTERN MICHIGAN

SOFTWARE SPECIALISTS

Progressive companies offer 3 tech careers. Senior MVS person for leadership role in conversion.
To $40,000

Promotable tech specialists, MVS preferred, ACF/VTAM accepted.
To $27,000

DOS/VS or VSE staff position, will train person with 1–2 years exp/aptd.
$20–30,000

Joe Grabinski
ROBERT HALF
of Western Michigan, Inc.
Suite 302, 130 Division N.
Grand Rapids, MI 49503
(616) 459-8333

HARTFORD

SVS SYS PROG

Career oppty for MVS-XA prof'l exp prog to join an staff of growing ind co. Excellent benefits, relocation ass. Full relocation.
$30–35,000

VM SPECIALIST

Indl+oth VM sys exp, internals & part blkgrd req'd to assume lead role in multi sys co expanding in 1984.
$30–40,000

IMS DB/DC

Outstanding oppty for indiv with DB/DC. Must have exp in logical/physical data base design & strong tech skills. Suburban loc, many extras.
$30–40,000

DATA BASE (IMS or IDMS)

New pos in sen grp to formulate data base design, modeling & architecture for long-range corp planning. 3 yrs exp in data base qualifies for this highly visible staff pos.
$30–35,000

PERF SPEC

Lge IBM D/C seeks sr indiv to direct all perf/cap planning activities for multi-div corp. State-of-the-art shop with aggressive 1984 expansion plans.
$30–35,000

DP MANAGER

Multi div corp seeks prof'l degreed indiv to manage data ctr, tech & opns staff. Exc growth pot. S/38 exp a plus.
$30–35,000

DEC/VAX

5+ yrs DEC/VAX or 11/70 exp req'd for 1984 expansion oppty with hi-tech co. Work on corp on-line dev sys. Exc benefits, suburban loc.
$30–40,000

ROBERT HALF
of Hartford, Inc.
111 Pearl Street
Hartford, CT 01603
(203) 278-7170

BUFFALO

SR ANALYST/PROG

Major W NY fin'l org w/rapidly growing IBM sys & prog dept want to hire several analysts & programmers to devel & support corp fin'l apps. Req min 3 yrs exp & knowl of COBOL & CICS. Prof exp in IDMS, IMS & HOGAN sys. Fantastic oppty to join successful bus w/ sophisticated data sys plans.
To $30,000

ROBERT HALF
of Buffalo, Inc.
1310 Liberty Bldg.
Buffalo, NY 14202
(716) 842-0801

NEW ORLEANS

SR SYSTEMS ANALYSTS

Hdq &/or fin systems appx. IBM mainframe ideal w/2 yrs of app sys design & development exp. IMS/DB/DC a plus.
$42,000

SR PROGRAMMER ANALYSTS

Several yrs COBOL exp on IBM mainframe working w/ structured programming techniques. On-line, IMS/DC exp pluses.
$42,000

SYSTEMS PROGRAMMERS

Several yrs managing operating systems, software support & disk space featuring IBM mainframe, DOS, Syncsort.
$30,000

ROBERT HALF
of New Orleans
P.O. Box 57629
New Orleans, LA 70157
(504) 525-6385

MILWAUKEE

SOFTWARE PROGRAMMER

Huge financial services firm seeks person to transfer conversion to MVS. Will be key decision-maker in bringing staff to state-of-the-art technology. Communications experience a plus.
To $40,000

CONSULTANT

Opportunity to work dynamically with variety of environments. Seeks COBOL or RPG with 3+ years high-level experience. Enjoy the varied exposure of high-visibility, top-salary consulting world
$21–28,000

Helen Krueger or Mark Steil
ROBERT HALF
of Wisconsin
777 E. Wisconsin Ave.
Milwaukee, WI 53202
(414) 271-HALF (271-4253)

AUSTIN

ENGINEERING DATA BASE MANAGER

Five to ten years exp in scientific or engineering environment. Strong Codasyl or data base and CAD exp essential.
To $50,000

LIFE INSURANCE EXPERTS

COBOL or Assembler language IBM mainframe exp. Multiple openings.
To $35,000

SYSTEMS PROGRAMMERS

OS/MVS or DOS/VSE exp. CICS, VTAM, NCP and VM a big plus.
To $40,000

John P. O'Keefe
ROBERT HALF
of Austin, Inc.
400 E. Anderson #204
Austin, TX 78752
(512) 459-6660

SAN ANTONIO

SR SYSTEMS ANALYST

Degree preferred – not req'd. Must have 5+ yrs exp with IBM Series 1, EDX, RPG. Audio response – PC exposure a PLUS. This position is an overview of department – studying the effect appls to company need. Very visible and exciting. Exceptional benefits.
$30–35,000+

NETWORK ANALYST

Degree preferred. 5+ yrs in Technical Support capacity. IBM 3705, SNP, VTAM, Gens/Dumps, Dataset analyst, transmission design. Company is expanding – converting from Burroughs to IBM 43XX, OS, CICS, etc. Potential of position is only limited by you.
$30–35,000+

DP MANAGER

Degree req'd, Must to 3yrs 36 – RPG III, total design and start-up experience. Able to hire, analyze, manage and overall be a working mgr. Appls are Distr/Retail/Wholesale. Position is in Central Texas – beautiful and quiet. Department scheduled to be 7–10 people by 1986.
$40,000

All positions above and many more are in Texas where "Long Necks," "Armadillos" and the "Cotton Eyed Joe" call home.

Bob Baldauf
ROBERT HALF
of San Antonio, Inc.
8343 El 10 West, Suite 800
San Antonio, TX 78201
1-800-531-6408
In TX dial (512) 736-0437

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

Data Processing

SAUDI ARABIA

SYSOREX INTERNATIONAL, a California Corporation and a rapidly growing systems management company now developing innovative multi-technology systems in Saudi Arabia has the following challenging positions:

SR. DATABASE DESIGNER

BS required with 6-10 yrs. experience in business applications; possesses in-depth experience with database management systems; understands fundamental cost/performance tradeoffs between various physical organizations possible in database management systems; has a sound working understanding of Structured System Analysis and Design tools, including Data Flow Diagrams, logical data analysis, logic tools, transform and transaction analysis, etc., comfortable working in "team" environment.

QUALITY ASSURANCE PROGRAMMER

Bachelor's degree required with 4-6 yrs. data processing experience which includes application design, program development, systems library administration, development and documentation of standards, and usage of databases and data dictionaries.

Training in a structured methodology of system development and installation, top-down testing of systems, application design and programming, and system library management.

SR. DATABASE/ DICTIONARY SPECIALIST

Bachelor's degree required with 6-10 yrs. data processing work experience which includes: a minimum of 1 year specific experience using the DATAMANAGER product, systems analysis and design, program development, development and documentation of standards, database administration, and data dictionary management.

Training in database management systems, structured methodology of system development, integrated data dictionaries, file access methods, data security and control, data analysis/normalization, data modeling, and performance tuning.

MVS SYSTEMS PROGRAMMER

BS in Computer Science or equivalent curriculum required. Minimum 4 yrs. experience as a MVS systems programmer. Responsible for SYSGENS and application of systems maintenance. Knowledge of VM and VS1 a plus.

We offer an excellent benefit package including: medical, life, accidental death, disability and profit sharing plans. You will additionally receive 25 working days vacation, 15 holidays, free furnished housing, annual return home travel, paid relocation expenses, plus eligibility for present Federal Income Tax exclusions.

Please send resume, INDICATING POSITION TITLE FOR WHICH YOU ARE APPLYING, with present salary to Personnel Dept. CW-2/6, SYSOREX INTERNATIONAL, INC., 10590 N. Tantau Avenue, Cupertino, CA 95014. U.S. CITIZENSHIP REQUIRED. INDIVIDUALS ONLY APPLY.

SYSOREX
Sysorex International Inc.

MANAGER MFG INFO SYSTEMS

Minneapolis. Prod location of Pentair 800 Sec. 4300 Sales locations w/OOS and EMS has new opening for data processing professional with at least 2 years management experience. Immediate project is to implement and enhance integrated computer based manufacturing, inventory planning and control. Job #4884. FEE PAID.

MARK DAVID
JOHN MILLER
ROBERT HALF
3636 IDS Center
Minneapolis, MN 55402
(612) 339-0601

PROGRAMMER/MANAGER

Under guidance of Director maintain/modify/enhance TOPS-20 operating system. Will be responsible for overseeing day-to-day operation of computer facility. Supervise staff of 6. Coordinate intra classes. Interface with users and oversee vendor negotiations. Prefer experience with TOPS-20 and POP-11 programming. Knowledge of hardware design and debugging techniques. Familiar with VAX computer, Unix interests and network protocols. Requires substantially more than 40 hours/week. Must work well under time-pressure. Submit detailed resume to:

Stanford University
Personnel-Ref. 21986
Attn: Art Wilson
Stanford, CA 94305
(415) 497-9117

CONSULTANTS to $350/DAY

$60,000

PER ANNUM

NYC/NJ/CT

Call or forward resume to:

PARAMOUNT CONSULTANTS CORP.
95 MADISON AVENUE
New York, NY 10016
(212) 684-6606

— SUNBELT CAREERS —

PIA's, S/P's, SW ENG's

Our clients need your experience in CICS, IMS, IDMS, S/36, PC's, HP 1000/3000, ALC, RSX-11M, VAX/VMS, UNIX, C

Hundreds of openings nationally easily searchable on our DEC PDP11/44

Call to inquire or send resume today. Our 15th year as recruiters.

TOLL FREE
800-334-4839
In NC (919)484-4101

P.O. BOX 35825
FAYETTEVILLE, N.C. 28303

SYSTEMS ANALYST

Position available in expanding insurance firm located between Baltimore and Washington. Requires experience in COBOL, IBM main frame, and PMS system. Exposure to control software/data base systems a plus. Excellent working conditions with competitive salary and benefits. Send resume and salary history in confidence to:

Box CW-04686
Computerworld
P.O. Box 880
Framingham, MA 01701

REGIONAL SALES MANAGERS (2)

New York - Chicago

Recruit, train and motivate independent reps and distributors. Handle large OEM and end-user accounts. 3-5 years experience data communications product sales. No telephone calls please. Principals only. Write Wayne Thalls, Backus Data Systems, 1440 Koll Circle, San Jose, CA 95112.

SENIOR RPG III PROGRAMMER/ANALYST

Computer department of Los Angeles based office needs a Senior Programmer/Analyst with 5 years of experience using RPG programming language to take charge of all systems analysis and application programming of our new IBM System 38 computer. Required at least 2 years experience programming the IBM System 38.

We offer a competitive salary and an excellent benefit package.

Please send resume with salary requirements to:

P.O. Box 79017
Los Angeles, CA 90079

SOFTWARE SYSTEMS PROGRAMMERS

The Industrial Technology Institute is an innovative, professional group working with academic, industrial, and government partners who have invested substantially to create a major intellectual center for R & D in the exciting new area of industrial automation. We have an immediate need for the following professionals:

- **Senior UNIX Systems Programmer:** A UNIX systems programmer is needed to work with researchers on the installation and development of computing facilities. Key responsibilities will be to develop, enhance, and maintain systems software, to implement network connections with various installations, and to troubleshoot system problems (hardware and software). The successful candidate must have extensive experience with UNIX system programming and structured design, and knowledge of compiler development concepts.
- **Factory Software Systems Programmer:** This professional will develop software for research projects in the area of Integrated Flexible Manufacturing Systems. Responsibilities include implementation of the Institute's Manufacturing System Control Software package for real-time control of factory environments. Considerable knowledge and maturity in the use of high level programming languages, software engineering techniques and real-time control systems is required. Experience with UNIX and either Ada or the C programming language is desirable.
- **Database Systems Programmer:** The successful candidate will develop a query-oriented user interface for the Institute's Information and Communications Center and will design and implement database-oriented applications, as well as select or help develop a bibliographic information retrieval system. Minimum of 3 years experience in user-oriented support programming role, experience with database management systems (in particular, relational), knowledge of typical database applications (financial, human resources, bibliographic, etc.), proven experience with structured programming techniques and project life cycle management. Must have excellent communication skills. Prior experience with UNIX and compiler development a real plus.

We offer a competitive salary and benefits package, and an excellent opportunity to become part of a dynamic, growing organization. If you are interested in learning more, please send resume in confidence to: J. Bob Noel, Department DSC-cw, Industrial Technology Institute, P.O. Box 1485, Ann Arbor, MI 48106. A non-discriminatory, affirmative action employer.

iTi
INDUSTRIAL TECHNOLOGY INSTITUTE

TECHNICAL SERVICE

Newly created department within the Operations Group, creates immediate opportunities in this highly visible section.

MANAGER OF TECHNICAL SERVICE

We're looking for a proven leader to manage a technical staff supporting the Operations Department. Requirements include:

Computer Science Degree
3 years experience in technical support management
Working knowledge of Burroughs and Tandem systems
COBOL, ASSEMBLER, TAL language experience

Duties include staff administration; evaluation, installation and support of all system software and hardware.

SOFTWARE SPECIALIST, TECHNICAL SUPPORT

Requirements include:

Computer Science Degree preferred
3-5 years experience in a technical support or programming position
Working knowledge of Burroughs or Tandem systems
COBOL, ASSEMBLER, TAL language experience

Duties include equipment utilization forecasting, forecasting, database administration, installation and maintenance of operating system software, diagnosis of software and hardware failures and supervision of recovery procedures. Internal consulting and training.

The S & L Computer Trust offers a total salary and benefit package that ranks among the best in Des Moines. Initial salary for both positions is based on previous experience and individual qualifications. Qualified applicants should send resume to:

S & L COMPUTER TRUST OF DES MOINES
Attn: Human Resources Department
607 Walnut Street
Des Moines, Iowa 50309

An Equal Opportunity Employer M/F

SYSTEMS ANALYST

Bay Medical Center, a progressive 441 bed acute general care hospital has an opening for a Systems Analyst to perform systems analyses and design functions. Other responsibilities include hardware planning, coordinate testing and implementation with users and systems personnel and to assist in training users. Candidate required to possess Bachelors degree in Computer Science or Business with 2 years experience as Systems Analyst. Salary commensurate with experience and a comprehensive benefit package offered. Send resume and salary requirements to Human Resource Department, Bay Medical Center, 1900 Columbus Avenue, Bay City, MI 48706, (517) 894-6400.

An Equal Opportunity Employer

MOVE AWAY SOUTH NOW!

Our computer can help you get here or stay here. Four WATS lines; 13 years' experience; 270 affiliated offices; 300+ current job orders; 2000+ company clients from Virginia to Texas to Florida! Send resume to:

DATA RESOURCES, USA
Division of Landrum Personnel Resources
P.O. Box 13730
Pensacola, Florida 32588-1373
CALL TOLL FREE (800) 874-0487
IN FLORIDA (904) 434-3321 COLLECT

Don't let time run out.

If you're a corporate executive asking that certain data processing key individual, hand over your hiring needs to ROMAC®, and you'll be dealing with consultants whose experience is in the discipline they serve, a combination you'll find extremely efficient.

We know the pulse of the market and our continuous advertising and market intelligence provides us with a constant flow of quality applicants.

ROMAC® prescreens, interviews and checks references before providing you with the best possible candidates available, enabling you, our client, to make the most intelligent hiring decisions.

Meet with Success.

CONNECTICUT
140 Sherman St.
Fairfield 06430
203-255-9145

One Financial Plaza
Hartford 06103
203-525-9897

FLORIDA
888 W. Cypress Creek Rd.
Ft. Lauderdale 33309
305-928-8811

One Tampa City Center
Tampa 33602
813-228-0227

GEORGIA
3340 Peachtree Rd., NE
Atlanta 30326
404-231-3535

MAINE
477 Congress St.
Portland 04101
207-773-4740

MARYLAND
20 So. Charles St.
Baltimore 21201
301-625-0400

MASSACHUSETTS
125 High St.
Boston 02110
617-482-6644

One Newton Exec. Park
Newton 02162
617-969-4040

MINNESOTA
4449 IDS Center
Minneapolis 55402
612-333-8436

NEW JERSEY
3-30 Rt. 17
Paramus 07652
201-845-7440

NEW YORK
One Steuben Place
Albany 12207
518-463-4444

40 Linsdrum Blvd
Buffalo 14221
716-833-4350

One Marine Midland Plz.
Rochester 14604
716-232-4440

NORTH CAROLINA
380 W. Fire St.
Winston-Salem 27104
919-725-7033

OHIO
111 W. First St.
Dayton 45402
513-461-1373

849 National City Bank Bldg.
Cleveland 44114
216-771-0022

PENNSYLVANIA
1700 Market St.
Philadelphia 19103
215-568-4610

RHODE ISLAND
1139 New London Ave.
Cranston 02920
401-463-7600

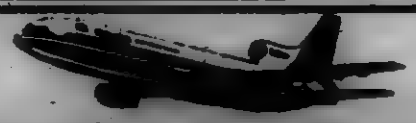
WASHINGTON D.C. AREA
1400 Wilson Blvd.
Arlington, VA 22209
703-525-5160

ROMAC.
Source & Associates • Personnel Consultants

MIAMI UNIVERSITY
SYSTEMS ANALYSIS DEPARTMENT

Applications are invited for faculty positions beginning August 1984. Candidates should have expertise in computer systems (software engineering, analysis, design, database, telecommunications) or in the area of operations research, particularly as applied to the analysis of forecasting, inventory, production and/or computer systems. A Ph.D. or an M.S. with industrial experience is preferred. Duties are teaching, research, and public service. Rank and salary will be commensurate with qualifications.

Send resume to Donald Kellogh, Systems Analysis Department, Miami University, Oxford, Ohio 45056. Miami University is an equal opportunity/affirmative action employer.



COMPUTER PROFESSIONALS

JOIN ONE OF THE WORLD'S FASTEST GROWING AIRLINES (SINGLE OR FAMILY STATUS)

SAUDIA is one of the world's fastest growing international airlines, which now operates over 68 jet transport aircraft to major cities in Asia, the Middle East, Europe and North America. SAUDIA's expansion has created opportunities for key specialist and analyst positions in the Planning and Control section of its Data Services Department at its Jeddah headquarters. The processing power of multiple 3033 IBM mainframes is provided to all major functional areas of the airline, using standard IBM software products (MVS, CICS, IMS DB/DC, TSO) and well-established proprietary packages (Librarian, TOTAL).

We are now looking to appoint the following computer professionals:

SENIOR STANDARDS SPECIALIST
$2801 Per Month Tax Free*

The Standards function is responsible for establishing and maintaining guidelines for all aspects of computer systems development — functional specifications, technical designs, programming specifications, applications programs (COBOL and PL1 source code, CICS routines, and IMS DB/DC techniques), and user documentation. Senior Standards Specialists participate in Quality Review meetings to insure compliance with standards or to authorize specific waivers. SPECTRUM and YOURDAN methodologies are employed. The position requires at least eight years of practical EDP experience in software development, with a minimum of two years involvement with formal standards and structured programming practices for a large-scale IBM installation.

SENIOR INFORMATIONS SYSTEMS PLANNING ANALYST
$2801 Per Month Tax Free*

The Information Systems Planning function is responsible for the development and maintenance of SAUDIA's plans for data processing activities and facilities. A long-range Information Systems Plan (ISP) has already been developed, and the planning function is responsible for maintaining this ISP and determining the resources required to carry out the ISP. This requires the identification of the hardware, software, and staff resources necessary to satisfy the requirements of planned new projects and the maintenance of existing systems. The position requires a bachelor's degree and at least eight years of relevant experience, with a minimum of two years direct involvement in either equipment evaluation, systems software evaluation, or software development planning. Prior experience with DBMS and systems development methodologies desired, and effective writing skills required. An operations research background would also be beneficial.

SENIOR METHODOLOGY SPECIALIST
$2801 Per Month Tax Free*

The Quality Assurance function is responsible for reviewing all areas of Data Services' operations with respect to compliance with applicable policies, standards and procedures. The Senior Methodology Specialist will convene Quality Review meetings at specifically designated points in the development cycle of applications software. Specific attention is directed to project control, utilizing SPECTRUM and Nichols NS800 methodologies. The Senior Methodology Specialist should have a minimum of eight years practical experience in a large-scale commercial IBM environment, and at least two years related quality assurance experience. Prior exposure to system development methodologies and data base management systems required.

SENIOR SOFTWARE TRAINING SPECIALIST
$2801 Per Month Tax Free*

The Skills Development function is responsible for the training of both computer operations and software development staffs. The Senior Software Training Specialist will develop and deliver on-the-job skills enrichment training for applications programmers and systems analysts, primarily in the areas of structured programming, COBOL, and CICS. In addition, there is an on-going testing and programmer trainee evaluation program to administer. At least six years prior experience required, with a knowledge of YOURDAN methodology preferred.

BENEFITS

Free furnished air-conditioned housing and utilities • Paid medical insurance • 30 day vacation with positive space travel for family to and from domicile • Free or reduced rates on SAUDIA and other airlines • Retirement program (social insurance after 15 years service) • Household shipment from domicile to Saudi Arabia and back • K-8 schooling for children — out of Kingdom financial assistance for other grades • Annual service increase and eligibility for yearly merit bonus based on performance.

*The indicated salaries are available to U.S. and Canadian citizens, and have been converted from Saudi Riyals to U.S. dollars at the current rates of exchange, which are subject to fluctuation. Salaries are tax-free, subject to normal qualifications.

Positions are offered on a two-year contract. In your reply, please indicate your position preference. Send resume to:

SAUDI ARABIAN AIRLINES
Administrative Recruiter, Dept. C-W2
2420 Pershing Road, Suite 333
Kansas City, Mo. 64108

saudia

ASSOCIATE UNIVERSITY REGISTRAR
UNIVERSITY OF FLORIDA

Associate Registrar for a large comprehensive University with a fully automated on-line registrar, registration and records system for an enrollment of over 34,000 students. Responsibilities include management of all records and registration functions including data processing for records and admissions. Must be experienced in the design, implementation and enhancement of complex on-line computer systems. Comprehensive management and personnel skills necessary. The person in this position must supervise a diverse staff of over 50 people and coordinate academic activities with Deans and Department Chairs. Position requires a Bachelor's Degree and 5 years experience in admissions and record/registrar or records and registration, and college or university data processing techniques or other related areas. Salary negotiable in the range of $30,000 to $40,000. Write complete resume by February 29, 1984 to:

Mr. R. Jon Eller
University of Florida
4th Floor Stadium
Gainesville, FL 32611

University policy is to conduct all searches in the open subject to the provisions of existing law.

EQUAL EMPLOYMENT OPPORTUNITY/AFFIRMATIVE ACTION EMPLOYER

PROGRAMMER/ ANALYST

Morris County manufacturer seeks Programmer/Analyst with 2-3 years' hands-on experience. Knowledge of RPGII and COBOL required. Familiarity with Wang VS/100 a plus. Excellent growth potential with well established company including solid compensation and benefits package. Send resume including salary history to:

CHRYSLER
8 Fernwood Road
Florham Park, N.J. 07932
Equal Opportunity Employer M/F

ROCKY MOUNTAIN OR NATIONAL

Telecommunications/SNA ....C, UNIX, LAN, IBM protocols
Data Acquisition ....8 and 16 bit MPU's, mainframes
CAD/CAM and Graphics ....PASCAL, FORTRAN, PL/1

Data Base Development ....IDMS, IMS, DB/DC
Systems Analysis ....Business and Mfg. Appl.
Programming ....Scientific, High-Tech, Biomed

Margo Kelo/Vic Tuttle
Career Marketing Associates
7100 E. Belleview #208
Englewood, CO 80111
(303) 770-8888

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

COMPUTER PROFESSIONALS

Reynolds Aluminum has multiple openings for computer professionals, at its Richmond, Virginia corporate headquarters. The environment consists of multiple large systems utilizing MVS/SP 1.3, JES2, TSO/ISPF, ACF/VTAM, CICS, and IMS/DB, as well as support for distributed S/36 systems. Successful applicants will possess a college degree or compensating experience, and enjoy working with a team of highly skilled and motivated professionals in an atmosphere of challenge and growth provided by a Fortune 150 company. Richmond offers excellent educational, cultural, and recreational opportunities.

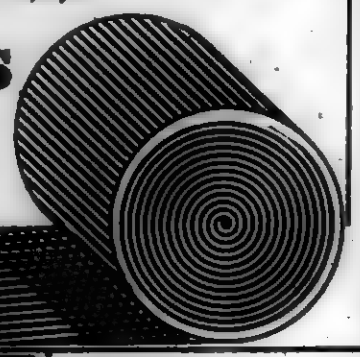
Positions are open in the following disciplines:

APPLICATION SYSTEMS ANALYSTS
APPLICATION PROGRAMMERS
DATA BASE ANALYSTS
SYSTEMS PROGRAMMERS
COMMUNICATIONS ANALYSTS

Applicants in the above disciplines require a minimum of 2 years experience in the applied area of interest. Analytical and leadership skills are desired.

Competitive salary commensurate with experience, includes outstanding fringe benefits package. Please send resume in confidence, outlining work and salary history to: J.M. Killen, Personnel Manager,Corporate Administration, Reynolds Metals Company, P.O. Box 27003, Richmond, VA 23261. Equal Opportunity Employer.

REYNOLDS METALS COMPANY



We Challenge You...

Consider Graco for: Opportunity
Technical Challenge
Professional Growth

Graco, the world leader in pumping and fluid handling systems located in Minneapolis, is looking for talented EDP professionals. If you welcome challenge and want to work in an environment that has a strong commitment to quality - consider Graco.

Manager of Systems Software
Will lead our technical support department in software selection, vendor relations and intra-corporate communications.

Systems Programmer
A technical specialist experienced with DOS, MVS and IBM large system environment. S and A, and data communications experience desired.

Programmer Analyst/Sr. P.A.
The individuals we need should have experience with COBOL. A minimum of 3-5 years of applications experience required.

Graco operates in a IBM 3083 environment utilizing VM over MVS, DOS/VSE, CICS-VS and DL-1.

We offer the right individual a challenging, rewarding environment, relocation and an excellent compensation package commensurate with your experience. To be considered for these opportunities, mail your resume in confidence to:

GRACO
Employment Administration
P.O. Box 1441
Minneapolis, MN 55440
Equal Opportunity Employer M/F

DATA PROCESSING OPERATIONS MANAGER

Leading New York City manufacturing firm has a key position for an experienced Data Processing Operations Manager to plan, direct, and control the activities of DP operations, exclusive of the systems design and programming functions.

Specifically, this will include developing and establishing departmental standards and procedures and assigning work to the operations staff, preparing activity and progress reports pertaining to the activities of this section, and coordinating the maintenance and servicing of all equipment related to the EDP function.

The selected professional will be degreed in Computer Science or the equivalent, and have 3-5 years hands-on experience with Hewlett Series 3000 mini-computers. General programming experience and exposure to key entry supervision within a manufacturing environment are desirable. Technical expertise with H-P 3000 operating systems is essential; exposure to ASK-MANMAN systems is desirable.

This highly visible position commands an excellent salary augmented by a comprehensive benefits package within our progressive, dynamic environment. For consideration, please RUSH resume, indicating salary history, in confidence to:

Box MBWWSJ 3515
261 Madison Avenue, New York, NY 10016
Equal Opportunity Employer M/F/H

Programmer/ Analysts

NCR's personal computer has a strong software appetite. Satisfying it assures recognition.

NCR Engineering & Manufacturing in Liberty, near Clemson and Greenville, South Carolina is giving our highly successful and powerful personal computer for business and professional users new-generation enhancements.

We are forming new teams. Their mission is to give our single station (and LANS capable) personal computers new software flexibility, and to create the software of the future. More specifically and immediately we seek people to...

- Design/modify BIOS and utilities systems
- Design, develop and debug software for advanced personal computers
- Specify, design and write diagnostics
- Design and specify HW/SW architecture, communications and graphics for new 16 and 32 bit personal computers

Qualifications needed? BS or MS degree in CS, CE or EE, and experience with MS/DOS, CP/M, and UNIX* based systems. Knowledge of HW/SW interfaces, software tools and high level languages essential.

Our location, in the rolling foothills of the Blue Ridge Mountains in northeastern South Carolina, offers impressive lifestyle-/cost-of-living advantages. Nearby Clemson and Furman Universities give you fine resources for advanced study.

Investigate fine salary, benefits, and outstanding career prospects in software with $3.7 billion NCR. For prompt, confidential consideration, send resume with salary history to: Ms. Terrell Isaacs, NCR Corporation, Dept. P56, 1150 Anderson Drive, Liberty, South Carolina 29657.

NCR
Complete Computer Systems

An equal opportunity employer

*UNIX is a trademark of AT&T Bell Laboratories

PROGRAMMER

Analyst/Programmer

Levi Strauss & Co., the world's leading apparel manufacturer, currently has positions available for a self-motivated Analyst/Programmer in our offices located in Waco, and Irving, Texas, and Henderson, Nevada.

You will participate in the analysis, design, programming and testing of distribution programs (allocations, invoicing, shipping). You will also interact heavily with users.

Two to three years' experience in systems design, implementation and modification of DOS systems is required, as well as COBOL and ALC experience. You must also be able to react quickly in problem determination and solution, and to work with a team plus be willing to take the lead in on-site support. Travel may be required. Experience in VSAM, DOS/VSE, PANVALET, ICCF, DOS/JCL, CICS, CA-Driver, and DYNAM/T/DPI desired.

We offer a competitive salary and complete benefits package. Apply by sending your resume, including salary history, to Dept. AN-11, Levi Strauss & Co., 1155 Battery Street, P.O. Box 7215, San Francisco, CA 94120-6914. We are proud to be an equal opportunity employer through affirmative action.

LEVI'S.

Quality Never Goes Out of Style

COMPUTER SYSTEMS PROGRAMMERS

Baltimore County Government is accepting applications until 2/17/84. Separate applications must be filed for each level. All levels require a Bachelor's Degree in Business or Public Administration, Accounting, Information Technology, Statistics, Mathematics, Data Processing or Engineering.

COMPUTER SYSTEMS PROGRAMMER I ($21,327 - $27,891) requires Bachelor's Degree plus 2 years programming or systems analysis experience. COMPUTER SYSTEMS PROGRAMMER II ($24,184 - $30,274) requires Bachelor's Degree plus 3 years programming or systems analysis experience, including 1 year of software programming, operating systems maintenance and telecommunications software systems maintenance. COMPUTER SYSTEMS PROGRAMMER III ($27,891 - $34,388) requires Bachelor's Degree plus 5 years programming or systems analysis experience, including 3 years of software programming, operating systems maintenance and telecommunications software systems maintenance.

Additional programming or systems analysis experience may substitute for required education on a year for year basis up to a maximum of 4 years for each level.

For applications call Baltimore County Office of Personnel at (301) 494-3135.

Baltimore County Government is an Equal Opportunity Employer.

VAX * PL1

PROGRAMMER/ANALYST

Want ROBOTICS & ENGINEERING?
EVEN BETTER!
CALL AGNES - (212) 867-0219
(strict confidentiality)

An Equal Opportunity Employer M F

Engineering

R&D ENGINEERS

We are recruiting personnel for a high level R&D facility which develops new microcomputer technology for a major East Coast computer manufacturer. The following positions are available immediately:

PRODUCT DEVELOPMENT MANAGER- must have considerable knowledge and experience of both hardware and software design and development. Must be familiar with the microcomputer industry and have experience with coordinating the activities of a staff of engineers in an aggressive R&D environment.

SENIOR MICROCOMPUTER PROGRAMMERS- must have 10-15 years of in-depth experience with Z80's, 8086's, etc. and with heavy emphasis on operating systems such as CPM, MS DOS.

FIRMWARE PROGRAMMER- Must be familiar with V30 and 8086 Assembly language. Hardware experience very desirable.

CORPORATE DP MANAGER- 15-20 years experience with DEC systems, with special emphasis on VAX.

SR. MICROPROCESSOR LOGIC DESIGNER- must have 5-10 years experience with microprocessors and digital design; assembly language programming experience desirable.

SOFTWARE COORDINATOR- Will assist software vendors in implementing application programs; extensive experience in writing application programs required.

These six positions will be filled immediately and additional positions are available for:

ANALOG AND DIGITAL TECHNICIANS and ELECTRONIC DRAFTSMEN.

WILTON HEAD ISLAND

Our R&D facilities are located in this world famous resort where you'll enjoy golf, tennis, boating, deep sea fishing and miles and miles of some of the most beautiful and secluded beaches on the East Coast. In addition to a modern, well-appointed facility, you'll appreciate the island's excellent schools, active social life and yearround temperate climate. You will receive the best compensation package in the industry, and be an active participant in developing new computer concepts and technology. RESPOND NOW! For prompt consideration, call (803) 842-2511, or submit a resume, including salary history and salary requirements to:

Donald Reed
Support Services Manager
FOXFIRE DEVELOPMENT CORP.
The Professional Bldg., S-309
Hilton Head Island, SC 29928

All inquiries will be held in the strictest confidence. EOE M/F.

MEET THE CHALLENGE

Hayes Hayes Hayes Hayes Hayes Hayes Hayes Hayes

. . . with Hayes in Atlanta!

At Hayes Microcomputer Products, we're challenging the future of the telecomputing industry today . . . stretching technology beyond its limits with ongoing research . . . and providing some of the top technical minds in the world with the most advanced tools available — like computer-aided engineering systems and automated assembly and manufacturing, including robotics equipment.

The Challenge is Tomorrow . . . Put Hayes in Your Future!

TECHNICAL SUPPORT ANALYST

Will conduct ongoing research and evaluation of new microcomputers, peripherals, operating systems, development languages, editors, application software, and other products as requested by management. Will prepare reports and development strategies to be used by the marketing department, design analysts, and programmers. Must have a 4 year degree in computer science, electrical engineering or related field. Should have previous experience with at least two different microcomputers, including hardware architecture, operating system, development languages and related peripherals with at least 2 years programming experience on microcomputers. Must have designed and prepared programming specifications for at least one application.

SOFTWARE DEVELOPMENT PROGRAMMERS/ANALYSTS

Responsibilities will include the development of high quality programs using Pascal and other high level languages. Should be experienced with microcomputers including operating systems, local area networks and applications programming. Should be familiar with standard design, test and documentation techniques. BS/MS Computer Science or equivalent and previous microcomputer experience required; training/experience in assembly programming beneficial.

SENIOR DESIGN/ APPLICATIONS ANALYST

Responsibilities will include the design and development of application programs for Burroughs and Personal Computers to be closely tied in a network. Applications to include Data Base, Time Management and Communications, etc. Should be experienced with microcomputers, operating systems, networks and applications. Experience with design methods, Pascal or other high level languages and good communications skills required. BS/MS Computer Science or equivalent and previous programming and design experience on the project leader or senior analyst level required.

Our Norcross location, a convenient suburb of Atlanta, offers a moderate cost of living, a mild-but-seasonal climate and a vast array of year-round cultural and recreational activities. Hayes offers a state-of-the-art working environment that affords career challenge with the fourth fastest growing private company in the nation . . . along with unlimited advancement potential. The compensation package is exceptional and includes a comprehensive profit sharing program.

To receive prompt consideration, please send resume and salary requirements in confidence to:

Hayes

HAYES MICROCOMPUTER PRODUCTS, INC.
Dept. CW-2684
5923 Peachtree Industrial Blvd.
Norcross, GA 30092

An Equal Opportunity Employer M/F

We don't stand on our past accomplishments . . . and we'll never stand still.

VM/MVS SYSTEM PROGRAMMER

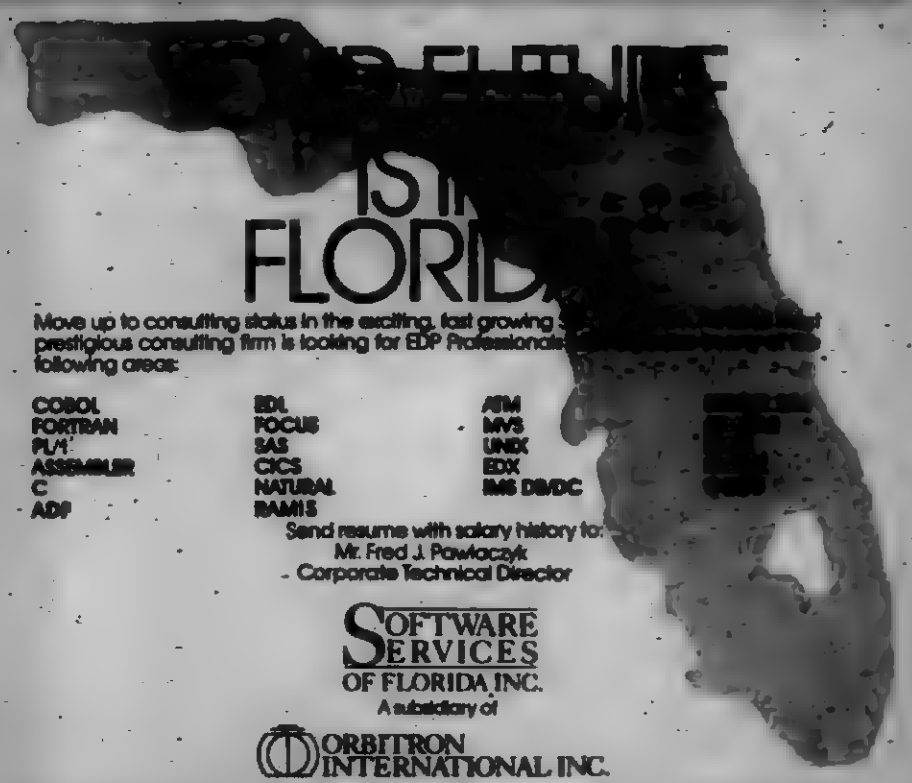
Mayo Clinic has an opening for an experienced VM/MVS System Programmer. The position requires a minimum of 4 years experience in a large systems environment. Mayo Clinic is running multiple IBM 3033's using VM, MVS, TSO, ISPF, . . . supporting online data communication/database applications. Preference will be given to persons with a degree in computer science.

Mayo Clinic with 800 staff physicians, 800 physicians in residency training programs, 700 students and other allied health educational programs, and 5500 paramedical personnel provides an exciting environment for the professional in this position. Mayo also provides an attractive compensation package including an outstanding personal security and benefits program.

Interested and qualified candidates should send a resume to:

A.W. Bigbee
Personnel Section
MAYO CLINIC
200 1st Street S.W.
Rochester, MN 55905

We Are An Equal Opportunity Employer



Move up to consulting status in the exciting, fast growing [illegible] prestigious consulting firm is looking for EDP Professionals [illegible] following areas:

COBOL	EDL	ATM	[illegible]
FORTRAN	FOCUS	MVS	[illegible]
PL/1	SAS	UNIX	[illegible]
ASSEMBLER	CICS	EDX	[illegible]
C	NATURAL	IMS DB/DC	[illegible]
ADF	RAMIS		

Send resume with salary history to:
Mr. Fred J. Pawlaczyk
Corporate Technical Director

SOFTWARE SERVICES OF FLORIDA INC.
A subsidiary of
ORBITRON INTERNATIONAL INC.

PARAGON CROSSING SUITE 124 11300 4TH STREET NORTH ST. PETERSBURG, FLORIDA 33704 (813) 577-1475

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

SOFTWARE SPECIALISTS!

ARE YOU EXPANDABLE?

Are you ready to advance and willing to accept an outstanding career opportunity with a professional team of top financial software specialists in beautiful Orlando, Florida? If your answer is "yes", then *Florida Software Services, Inc.* is looking for you!

PROGRAMMERS
with a minimum of 2 years experience in CICS, COBOL, ASSEMBLER, or RPG II

SYSTEM PROGRAMMERS
with a minimum of 3 years experience in DOS/VSE

SYSTEM DESIGNERS
with a minimum of 3 years experience in Banking or Financial Applications

Maximize your true potential in a quality environment! Realize the top salary and company benefits you deserve! Experience the warm, wonderful & affordable Florida lifestyle!

If you're ambitious, committed, and experienced, you're ready for one of the best opportunities in America today.

Florida Software Services, Inc. — *We are your future!*

Send resume to:

The Service Company

FLORIDA SOFTWARE SERVICES, INC.

All replies will be kept in strict confidence.
No Smokers Please.

SENIOR SCIENTIFIC PROGRAMMER ANALYST PHARMACEUTICAL RESEARCH

Our Computer Services Department announces an opening for a Senior Scientific Programmer/Analyst with IBM VM/CMS experience.

Bachelor's degree in Computer Science or equivalent and at least 3 years programming experience required. Experience with statistical software packages (SAS, BMDP) and PL/1 or FORTRAN required and strong communication skills highly desirable.

Located near Albany, New York, we offer excellent salary and benefits plus career growth within a dynamic organization. Send resume and salary requirements to:

Mr. William P. Sheldon
Employee Relations Administrator
STERLING-WINTHROP RESEARCH INSTITUTE
A Division of Sterling Drug, Inc.
Columbia Turnpike, Rensselaer, N.Y. 12144
Equal Opportunity Employer M/F/H

FOR ACHIEVERS ONLY

INTERMEDIATE to SENIOR LEVELS

- Software Development Mgr
- Technical Support Specialist
- Data Base Administration
- Voice/Data Communications
- Office Automation
- Microprocessor Software
- Systems & Programming Mgr
- EDP Audit/Security
- Systems Planning
- Manufacturing Systems

DEC, HONEYWELL, IBM, NCR, UNIVAC

BRUCE A. MONTVILLE
Managing Partner

EXETER 2100
National Recruiting Consultants
(800) 555-4712

TOLL FREE
1-(800) 258-7328

COMPUTER PARK, P.O. BOX 4978
HAMPTON, NH 03842

SUNBELT OPPORTUNITIES

For professional and geographic fulfillment, the Sunbelt is where it's at. Enjoy a challenging work environment in "State-of-the-Art" installations and in your leisure time enjoy a life-style that blends with a temperate climate. Our Fortune 500 clients are seeking qualified EDP professionals with a minimum of one (1) year experience in an IBM environment. Client companies assume all fees including interviewing and relocations costs.

DATA BASE	TO
Data Base Administrator(s) IMS IDMS	$48K
Data Base Analyst(s)	$40K
Sr IMS Systems Prog(s)	$40K
IMS Systems Prog(s)	$36K

APPLICATIONS	TO
Project Leaders IMS, VS, MFG, COBOL	$36K
Project Leaders MFG	$36K
Sr Systems Analyst(s) IMS, VS, COBOL	$34K
Systems Analyst(s) CICS, MFG/Financial	$34K
Programmer Analyst(s) IMS, VS	$32K
Programmer Analyst(s) COBOL/ALC	$30K
Programmer(s) COBOL/ALC, DOS/OS	$28K

TECHNICAL SUPPORT	TO
Sr Systems Prog(s) MVS-SYSGENS	$48K
Systems Prog(s) OS, SVS-MVT, SYSGENS	$36K
Systems Prog(s) OS/DOS, ALC, CICS	$28-34K

Send Your resume in confidence or call collect.

"Steve" Stevenson, Partner
Jim King and Associates

1940 Gulf Life Tower/Jacksonville, Florida 32207
(904) 399-7371

ADP COORDINATOR

- for 3000-bed health care system in Ohio to serve as Senior Program/Systems Analyst to establish and maintain a new state-of-the-art ADP system. Must have specific knowledge of mini-computers, DEC hardware, operational systems, MUMPS and other application programming languages. 3 yrs. experience in a computer field such as computer specialist or ADP system design. Salary based on experience. Benefits: Medical retirement plan, group health/life insurance, sick leave, vacation leave, 9 paid holidays/year. Contact: Personnel Service, Cleveland VA Medical Center (Brecksville Unit), 10000 Brecksville Road, Brecksville, OH 44141. Telephone (216) 526-3030, ext. 201, 202, 462.

EMPLOYMENT SERVICE FOR PROGRAMMERS AND ANALYSTS

National Openings With Client Companies and Through Affiliated Agencies

Scientific and commercial applications • Software development and systems programming • Telecommunications • Control systems • Computer engineering • Computer marketing and support

Call or send resume or rough notes of objectives, salary, location restrictions, education and experience (including computers, models, operating systems and languages) to either one of our locations. Our client companies pay all of our fees. We guide, you decide.

RSVP SERVICES, Dept. C
Suite 700, One Cherry Hill Mall
Cherry Hill, New Jersey 08002
(609) 667-4488

RSVP SERVICES, Dept. C
Suite 211, Dublin Hall
1777 Walton Rd., Blue Bell, PA 19422
(215) 629-0595

From outside New Jersey, call toll-free 800-257-8188

RSVP SERVICES
Employment Agents for Computer Professionals

Data Processing Opportunities

Oklahoma City Location

If you are interested in designing and implementing a state-of-the-art computer system, the Hertz Corporation has outstanding career opportunities for you.

At our Worldwide Reservation Center in Oklahoma City, you will receive the ground floor opportunity to develop large scale software systems in support of our highly distributed field location. We currently are expanding and have professional career opportunities available for:

PROGRAMMERS
PROGRAMMER ANALYSTS

Preferred qualifications:
- 3-5 Years in Data Processing
- Mini Computer Implementation and/or Design Background
- Communications Experience
- Familiarity with Structured Methodology
- Cobol
- Background in Designing Large Software Systems

These positions offer competitive salaries and excellent benefits. Please submit both your resume and salary history to:

Hertz

The Hertz Corporation
Attn: Don Barnes
10401 North Pennsylvania
Oklahoma City, OK 73120
EOE M/F/H/V

FORDHAM UNIVERSITY
Department of Computer and Information Science

Applications are invited for two tenure track faculty positions at the Assistant and/or Associate Professor level with Fordham College's newly established Computer and Information Science Department. Candidates should hold or be very close to holding an earned doctorate in computer science, information systems or closely related fields and should have a special interest in teaching and research in a computer undergraduate program. Salary is negotiable. Research support includes a DEC system 2060 which will shortly be networked with three VAX-11/780's, two of which will be clustered. Send VITA and the names and addresses of at least three references to:

Philip G. Chanon, Search Committee
Chairman, Computer Science,
Fordham University,
Bronx, New York 10458.

Nominations and applications will be accepted until the position is filled. Fordham University is an equal Employment Opportunity/Affirmative Action institution.

UNIX
Software Engineer
San Francisco, CA
$48,000 Plus
Equity Stock Available

Use your UNIX internals to join an exciting new R&D project in the Bay area. Interviewing and relocation paid by client company.

General Employment Enterprises, Inc.
Business Executives Division
1 Market Plaza, Suite 2015
San Francisco, CA 94105
(415) 896-0511

KEEP IT SIMPLE

Call a Headhunter who "specializes" in:

Technical Support
Telecommunications

Call BRENDA CAREY today at (919) 584-5591.

---

16 HONEYWELL Analysts

Needed immediately in 5 companies in 7 states Blue Chip Benefits plus fees, relocation/interview expenses fully paid. From programmers, Sys. Anal. Data Base Analysts, Technical Support. Salaries range from $19,000 to 44,000.

Call Jane Green today at (919) 584-5591 COLLECT

Personnel Placement, Inc.
837-D Huffman Mill Rd.
Burlington, NC 27215

LIFE 70/LIFE COMM DP PROFESSIONALS

Our client, a leader in the insurance industry is expanding their Atlanta MIS Department and urgently needs Project Leaders and Senior Business Systems Planning Analysts experienced with life insurance software packages.

This is an IBM OS/MVS-COBOL/ASSEMBLER environment. Excellent salary, benefits and relocation package. For prompt consideration contact:

(404) 951-1266
Anderson/Watson & Associates
Executive Search Consultants
1827 Powers Ferry Road
Building #3
Atlanta, GA 30067

PROGRAMMER SYSTEMS DESIGNERS AND ANALYSTS

Accounting background a plus. Minimum 5 years experience with Basic language. N.E. PA area.

Call collect Robert Davis, SLC Graphics, Inc. (717) 655-9661

Or resume to:
50 Rock Street
Hughestown, PA 18640

Make a Significant Contribution

HP3000 Specialists

With an international reputation for leadership in the development and commercial application of laser technology, Spectra-Physics' ongoing growth has created the need for Corporate MIS expansion and divisionalization of some MIS support groups to focus more effectively on specific requirements and applications of each division.

Channel your HP3000 expertise into Spectra-Physics' worldwide network of distributed HP3000 computer systems with these growth opportunities to be involved in the design and development of new applications for manufacturing, marketing or financial systems at Corporate San Jose and Mountain View locations on the SAN FRANCISCO PENINSULA. We seek highly motivated, creative programming professionals with a range of 2-6 years experience and skills in the following areas:

- IMAGE ■ COBOL
- QUIZ/QUICK ■ KSAM
- M&D Financial Software
- MRP Manufacturing Systems

Our growth and diversity continue as key innovators to a $3.2 billion market. We provide full support to talented professionals interested in advancement, excellent salaries & benefits, including flexible working hours, and a creative, stimulating work environment. Please send your resume with salary history to Loa Gray, Spectra-Physics, 3333 North First St., San Jose, CA 95134. We are an equal opportunity employer m/f/h. Principals only, please.

Spectra-Physics

High Tech '84 Opportunities $30,000-$65,000+

The coast-to-coast Fox-Morris recruitment network has placed thousands of hi-tech executives in key positions with leading companies during more than two decades. A few examples of choice 1984 opportunities include:

DIS & CONSULTING. $50K. Sys. dvlpmt pros w/IBM large scale bkgd w/popular SW (IMS, CICS, etc.) *M. Ferger. New York*

TECH. MGRS. (3). $30K. IMS bkgd w/mktg / consulting exp. for branch-office leadership. *M. Ferger. New York*

SYS. DESIGNER to $40K. Develop new concepts for software/hardware arch. for info retrieval. MW *A. Thomas. Cleve.*

OPERATIONS MGR. $40K. 3033 MVS shop seeks strong mgr. to take charge. *H. Greene. Phila.*

PROGRAMMER/ANALYST to $40K. BSCS & 3+ yrs. exp. on complete software sys. & ASSEMBLER & 'C' *D. Weikel. Pitts.*

TRUST SYSTEMS. $35K. Hi-caliber analyst w/strong financial/trust/portfolio systems exp. *H. Greene. Phila.*

MINI SYSTEMS. $35K. Oppty. for technically strong prog./analysts w/exp. w/ PRIME, DG, DEC, Fortran, PL-1 *H. Greene. Phila.*

SR. PROG./ANALYST to $32K. Deg. w/3 yrs. IBM exp. w/COBOL, CICS, VSAM, ISAM, SAM, DL-1 *D. Weikel. Pitts.*

To discuss your career goals, in confidence, with one of our experts, call or send resume today.

PHILA., PA 19102—1500 Chestnut St. 215-561-6300 (H. Greene)
ATLANTA, GA 30346—47 Perimeter Ctr. 404-393-0833 (D. Desmond)
BALTIMORE, MD 21204—409 Washington 301-296-6666 (C. Newman)
CHARLOTTE, NC 28201—212 S. Tryon St., Suite #1350 704-375-8466 (L. Stone)
CLEVELAND, OH 44131—4401 Rockside 216-524-4305 (A. Thomas)
DALLAS, TX 75240—5501 LBJ Freeway 214-934-2300 (P. McLaughlin)
HOUSTON, TX 77056—3000 Richmond 713-622-8300 (R. Myers)
McLEAN, VA 22102—8200 Greensboro 703-790-1335 (G. Nugent)
NEW YORK, NY 10119—One Penn Plaza 212-947-4466 (M. Ferger)
NEWTON, MA 02195—159 Wells Ave. 617-332-9090 (A. Gelb)
ORANGE, CA 92668—505 City Parkway West 714-634-2600 (J. LaBorde)
PITTSBURGH, PA 15222—4 Gateway Ctr. 412-232-9410 (M. Leely)
PRINCETON, NJ 08540—3490 Route 1 CN 5100 609-452-8120 (T. Jeske)
RALEIGH, NC 27625—3101 Poplarwood Ct. 919-872-2600 (M. Hunter)
SAN FRAN., CA 94111—601 Montgomery 415-398-4383 (J. Qing)

FOX-morris
personnel consultants

Programmers.

Systems Programmers

Name the company that is delivering the most powerful and reliable IBM-compatible processor in the world. Then look into National Advanced Systems career opportunities — and be a part of that company.

Systems Engineers

Openings in: NEW ORLEANS, PHOENIX, MONTREAL, TORONTO, SAN FRANCISCO, LOS ANGELES and NEW YORK CITY.

As a SE you will provide technical support for the sales effort which will include assisting the sales staff with technical studies, equipment configurations, presentation of products, software package analysis and capacity planning. You will also be involved with proposal preparation. Requirements include a minimum of eight years' experience with extensive skills in at least one major operating system (MVS, VM, DOS).

Systems Support Representatives

Openings in: LOS ANGELES, SAN FRANCISCO, PHILADELPHIA, NEW YORK/NEW JERSEY, TORONTO and GERMANY (fluency in German required).

As a SSR you will technically support our customers; provide educational support to NAS personnel and orchestrate formal classes for customers. You will also be involved in installation planning and operator training. Requirements are 10 years' DP experience with extensive skills in at least one major IBM operating system (MVS, VM or DOS). We favor skills in and exposure to areas such as: project planning and management; telecommunications; capacity planning and tuning; architecture and hardware; multiple operating systems; and major subsystems (IMS, CICS, VTAM).

Systems Support Representative — Branch Manager

Opening in: LOS ANGELES AREA

As SSR Branch Manager you will be responsible for the supervision of all software service activities in the branch office. Additional involvement will be in planning and scheduling of software support activities and overall supervision. You will set objectives, assign tasks, monitor and evaluate assignments to ensure goals are met. This position will also be responsible for the budget, headcount, equipment and supplies. Requirements include a minimum of eight years with directly applicable software systems experience; a computer science/technical degree is preferred.

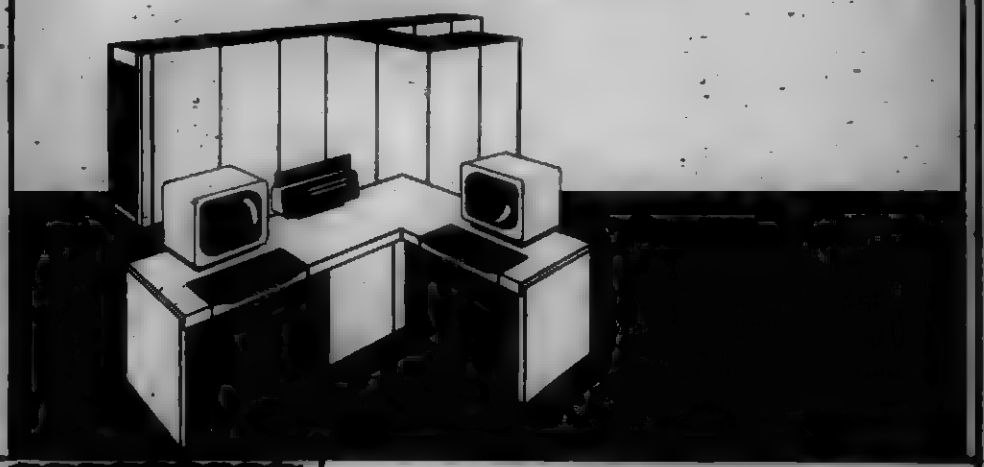
If you are looking for an exciting, highly technical career, then look at NAS. We offer excellent salaries and benefits, as well as opportunities for growth and development for our staff.

For immediate consideration, please call, or send your resume to Joy Molnar, National Advanced Systems, 800 East Middlefield Road, Mountain View, CA 94043; (415) 962-6273. We are an equal opportunity, affirmative action employer.

The Complete Computer Company

National Advanced Systems

A Subsidiary of National Semiconductor



UNIX*/C

$25,000 to $50,000
APPLICATIONS & SYSTEMS
Over 300 Openings Nationwide
Client co's pay all fees
Call or send resume
in confidence to:
J. ROGERS ASSOC
(609) 771-0282
2999 Princeton Pike, Dept C-D
Lawrenceville, NJ 08648
*UNIX is a trademark of Bell Labs

PROJECT MANAGER SOFTWARE DEVELOPMENT

Santa Barbara based division of Data Resources, Inc. which sell information products to the health care industry needs an experienced technical manager who has worked on significant software development projects.
If you are expert with VM/CMS, SAS, MVS, or UNIX and want to lead a small team of programmers in developing an end-user system being a supervisor with a large MIS maintenance, send your resume to:

SYSTEMETRICS, INC.
A division of Data Resources, Inc.

Hospital Products Division
Personnel Department
101 West Anapamu St.
Santa Barbara, CA 93101

An Equal Opportunity Employer
A Division of McGraw-Hill, Inc.

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

H-E-B FOODS + DRUGS

We Make It Happen

MIS Opportunities In The Sunbelt

H.E.B. is a billion dollar corporation that is one of the fastest growing companies in the country. We present a sophisticated MIS environment; IBM3083, MVS/SP, IMS, TSO/SPF. As a result of continued expansion, we have the following needs:

DATABASE ANALYST

This is the highly visible position that reports directly to the Manager of Systems Support. You will have complete responsibility for database design and analysis. The qualified candidate must possess a Bachelors degree, with at least 3-5 years of experience in data processing. Also required is experience in database design and analysis (IMS/VS).

SYSTEM DESIGNERS

We seek skilled design professionals that have extensive background in analysis and user interface. A Bachelor's degree is strongly preferred, as is experience with IMS DB/DC. A minimum of 2 years experience in application development in COBOL programming is essential. Exposure to micro's and mini's is helpful.

We offer an excellent salary and highly regarded benefits in addition to a climate that is sunny year-round, a generous relocation plan, and no state income tax. Send your resume with salary history in strictest confidence to: Mr. Ron Ervin, H.E.B. Grocery Company, P.O. Box 19000, San Antonio, Texas 78219-0200. Or call collect (512) 828-9221.

We are an Equal Opportunity Employer.

FIELD ENGINEERS

Tymshare, a recognized leader in the management of computerized information and communications services, is currently seeking field engineers in the Los Angeles and San Francisco areas. The successful candidates will have a minimum of five years mainframe repair experience, including two or more years of DEC PDP 11 or VAX experience, and the capability to perform on-site hardware repairs. These are intermediate level positions.

For immediate consideration, please call collect or send your resume to:

Tymshare, Inc.
11050 Artesia Blvd.
Cerritos, CA 90701
Attn: Russ Rawlings or Jim Visley
(213) 402-5151

Tymshare, Inc.
39100 Liberty St.
Fremont, CA 94538
Attn: Bill Wu
(415) 794-2416

Additional openings exist in Washington, D.C., Dallas, TX, and Chicago, IL.

Equal Opportunity Employer M/F/H

TYMSHARE

programmer /analyst

Stimulating Challenge Awaits You in Nashville

Apply your programming, analytical and design expertise to a variety of challenging assignments, consider this exceptional opportunity with AVCO AEROSTRUCTURES, a leading producer of aircraft structural assemblies.

Our highly versatile position requires a manufacturing-oriented data processing professional with the following qualifications:

- Minimum of 3 years related experience
- Demonstrated skill in TSO/SPF, OS/MVS JCL
- Proficiency in COBOL, CICS, VSAM and Assembler utilizing IBM 3033 hardware (370 architecture)
- An appropriate college degree

We offer an exceptional salary/benefits and relocation package as well as a contemporary, affordable lifestyle in a comfortable 4-season climate. For immediate and confidential consideration, please forward your resume and salary history to: Employment Supervisor (SAK), AVCO Aerostructures Division,
P.O. Box 210,
Nashville, TN 37202.

AVCO

An Equal Opportunity Employer M/F

TECHNICAL SOFTWARE SUPPORT

Due to unprecedented growth in our Technical Support area, AMERICAN EXPRESS in Ft. Lauderdale, Florida has immediate openings for MVS/XA Systems Programmers currently working in an IBM 3081/84 environment. These positions will provide you with the ultimate technical challenge. The selected individuals should possess experience in the following areas:

- **MVS Software Specialist**
- **DASD Management Software Specialist**

AMERICAN EXPRESS is a fast track, aggressive corporation that will demand the maximum of your capabilities. In return, we will provide an excellent salary plus incentive that will keep pace with your rapid growth. In addition, a comprehensive relocation package will be provided.

If you believe you have the ability to be part of our number one Technical Support team, please call one of our Technical Specialists collect at (305) 473-3737 or 3738 any evening between 5:00 p.m. and 8:00 p.m., from February 6th to 10th, to discuss your future with the world's leading financial services company. If you are unable to call, please send your resume to R. Webb.

AMERICAN EXPRESS TRAVEL RELATED SERVICES COMPANY, INC.
777 American Expressway
Ft. Lauderdale, FL 33337

An Equal Opportunity Employer

DIRECTOR TELECOMMUNICATIONS

Halbrecht & Company is conducting a search for a Director of Telecommunications. This position will supervise 22 reporting through 3 managers (NETWORK OPERATIONS, VOICE AND DATA COMMUNICATIONS).

Premium is on a solid manager with good interpersonal skills as the person will be required to give presentations to senior management and board members. Responsibilities will include planning, budgeting, and staffing for the above areas. This person will insure that both operational and strategic objectives are developed and met. As such a background in strategic planning is essential so as to lead managers through a continuous process of coordinating corporate business plans.

Telecommunications experience is necessary but secondary to good management skills. A good conceptual knowledge of VTAM, NCP, SNA, etc. is required. Other pertinent information: Budget $10 mm; Education BA/BS; Location Southeast; Hardware IBM 3033, 3083 (MVS/VM/CMS/TSO). For more information (703) 442-8165 or forward resume to:

Tom Maltby
Halbrecht & Co.
7927 Jones Branch Drive
Suite 400
McLean, VA 22102

Everett, Washington

Dual CPU VM/DOS VSE CICS VSAM Environment

SYSTEMS ENGINEER IV
Up to $33,676 DOE. Senior level Systems Programmer to maintain and enhance operating system software.

DATA BASE ADMINISTRATOR
Up to $27,492 DOE. Experienced in data base systems with opportunity to participate in creation, installation and maintenance of data bases.

Challenging opportunities to become part of management team and establish future direction of department. Close to $30,000. Apply in confidence to:

Snohomish County Personnel
1st Floor, Administration Bldg.
Everett, Washington 98201
(206) 259-9442
EOE

Give us your resume

We'll give YOU San Francisco!

Some people come to sail on the Bay, some to ski in the Sierras, and some to snorkle in Santa Cruz. But the professional climate is the real reason, and every bit as exciting.

There's nobody better qualified than CRG to introduce you to San Francisco. We've been here longer—know everyone in EDP worth knowing, and our list of client companies reads like the Who's Who of the business world.

Send your resume today, or call. All fees, interview, and relocation expenses are paid by our clients.

Computer Resources Group, Inc.
303 Sacramento St., San Francisco, CA 94111
(415) 398-3636 or 3060 Olcott St., Santa Clara, CA 95051,
(408) 727-1660

CRG AFFILIATES IN 27 MAJOR U.S. CITIES National Computer Associates

An employer-retained professional placement service

BIRMINGHAM-SOUTHERN COLLEGE
COMPUTER SCIENCE

Assistant, Associate, or Full Professorship available Fall, 1984 to teach undergraduate courses. Ph.D. preferred, MA acceptable. Strong student orientation. Salary in mid to high thirties depending on degree and experience. Excellent fringe benefits include TIAA-/CREF, medical coverage, and tuition remission for dependents. Write for complete position description or send applications to:

Dean W.E. Moomaw
Birmingham-Southern College
Birmingham, Alabama 35254

Birmingham-Southern College is an affirmative action, equal opportunity employer. Applications will be received until the position is filled.

DATA PROCESSING PROFESSIONALS

Now is the time to explore career opportunities in the Carolinas and the Southeast. We are retained by several client companies to provide top quality Data Processing professionals who thrive in a progressive, stable work environment. With your career goals in mind, we develop a marketing strategy that matches your talents and experience with that of our companies. Salaries are highly competitive and all fees are company paid. If you are ready to advance your career in Data Processing please call or send your resume in strict confidence to:

Mark Rhodes
Rowan of Asheville
Executive Park
Suite 104
Asheville, NC 28801
(704) 298-0737

SYSTEMS PROGRAMMER

Aggressive Billion $. Sunbelt Bank, expanding its technical staff, seeks IBM Systems Programmer.
Our current environment includes RACF, JCS 2, CICS.
Candidate should possess application programming background and a minimum of three years 4341 MVS systems programming experience. Proficiency with SMP4 is a plus.
Send resume and salary requirements to:

Southern National Bank of N. C.
c/o Jerry M. Barnes
P. O. Box 1489
Lumberton, N. C. 28359

An Equal Opportunity Employer M/F/H/V

NOW HIRING
DP PROFESSIONALS
SALARY UP TO $41,200.

- SYSTEMS SUPPORT SPECIALIST
- SENIOR DATA BASE ANALYST
- SENIOR SYSTEMS ANALYST
- SENIOR PROGRAMMER ANALYST

Qualifications: BS, BA or equivalent, plus 2-4 years experience in a large data processing on-line configuration, operating under OS/MVS using primarily COBOL. Knowledge of IMS desirable.

Send resume to: State of Arkansas, Department of Computer Services, P.O. Box 3155-C, Little Rock, Arkansas 72203 or apply in person at #1 Capitol Mall, Room 3D-107. Phone (501) 371-5788.

Programmer/ Analyst

Business Applications

Triad Systems Corporation is an industry leading computer systems company which develops, manufactures, and sells on-line multi-terminal business computer systems to warehouses, wholesalers, and retailers in the automotive, tire and hardware industries. Products range from small microprocessor-oriented systems to large minicomputer systems. We have 100 marketing and support offices throughout the U.S., Canada, and England. We currently have a need for a top-notch business applications Programmer/Analyst.

Responsibilities will include the analysis, design, development and modification of computer programs for minicomputer turn-key systems utilizing COBOL.

Requirements are a bachelor's degree in business with a major in management information systems, computer science, math or equivalent, and 2 OR MORE years of COBOL programming experience.

Salary will be commensurate with experience and includes an excellent benefits package. For immediate consideration, send your resume to Triad Systems Corporation, Division 1603, 1252 Orleans Drive, P.O. Box 61779, Sunnyvale, CA 94088-1779. We are an equal opportunity employer.

TRIAD

Take The Step

Greyhound Food Management

gfm

COMMUNICATIONS-POINT OF SALE

We are seeking a professional Communications Analyst to head up a nationwide data collection point-of-sale project. Greyhound Food Management operates food service facilities thoughout the United States in business/industrial accounts and public restaurants. We are in the start-up phase of a nationwide point-of-sale data collection network. Qualified candidates should have 4-5 years experience in financial communications systems. Initial activities will include analysis of in-store hardware in network requirements definition. As a subsidiary of the Greyhound Corporation, our environment features:

1. IBM 3033, MVS-SP, 3705, CICS, TSO/SPF
2. Challenging assignments
3. Professional development of your talents

In addition to an excellent salary, one of the industry's best benefit packages is offered including:

life insurance
stock purchase program
credit union
medical and dental insurance
long term disability

For immediate consideration, we invite you to submit your resume and salary history in confidence to:

Manager of Staffing
GREYHOUND FOOD MANAGEMENT, INC.
Greyhound Tower - 3169-CW
Phoenix, AZ 85077

gfm

equal opportunity employer m/f

Begin your career with one of the nation's most progressive power utilities and develop a professional lifestyle full of challenge and reward.

The Salt River Project, for over 80 years the source of central Arizona's water and power, is expanding its highly sophisticated data processing operations. We've doubled our DP staff in the last five years and are planning for even more growth. The opening of our new data center by 1985 and the extraordinary growth rate of the high technology community in Phoenix make the Salt River Project ideal for data processing specialists seeking a stimulating, state-of-the-art environment.

SYSTEMS PROGRAMMER

To be responsible for MVS system, network software and program products maintenance. Desired knowledge: VTAM, NCP, MSNF, MVS/SP, assembly language, use of TSO/SPF and CRT. A minimum of 2 years experience installing, generating and maintaining VTM, NCP or MVS required.

SYSTEMS PROGRAMMER

To gather data and perform analysis for computer capacity planning and provide data to the long-range planning function of Information Systems as well as maintaining various software packages. Position requires a degree in Mathematics, Computer Science or scientific areas with knowledge of statistics. A minimum of 2 years experience as a Systems Programmer and practical experience with SAS, MICS, BEST 1, and CAPTURE preferred.

Enjoy your leisure time exploring the endless opportunities for recreation and sunny distractions offered by our action oriented climate. Within minutes of the office, you can reach clear lakes, superb golf courses, western riding, tennis, gourmet dining, and sophisticated entertainment. Just a bit further away, some of the nation's best skiing, available year-round!

Learn more about the stable, rewarding opportunities Salt River Project offers. Send your resume with salary history to: S. Kranicz, Salt River Project, Dept. CW 206, P.O. Box 1980, Phoenix, AZ 85001.

Salt River Project

WATER ◆ POWER

An Equal Opportunity Employer

Sr. Systems Programmer

Our client, a rapidly expanding service organization is seeking an individual with a solid technical background for this key position. Responsibilities will include general support of the operating system and several special projects. Knowledge of DOS or OS in an IBM environment is required. MVS, XA or conversion experience is a plus. Relocation and interview expenses. First years earnings to $40,000.

Senior Programmer/Analyst

Our client, one of New England's fastest growing service organizations, is seeking an individual with a solid technical background and management potential. This position offers challenging assignments and a fast track to management. The environment is IBM running OS/VS1, migrating to MVS, XA. CICS is a plus. Full relocation package available. First years earnings to $35,000.

Personnel Consultants of Nashua
808 W. Hollis Street, Dept. C
Nashua, New Hampshire 03062
(603) 880-1888
An Equal Opportunity Employer

PROGRAMMER/ANALYSTS JOIN THE SOFTWARE PROFESSIONALS

Systemation, Inc was founded in 1968 and serves over 700 clients. We continue to reflect the growth of the software industry as a leader in planning, designing, programming and implementing software systems for companies of all types.

Due to our continuing expansion we are seeking additional software professionals to fill positions in the Florida and Ohio areas. Applicants should be experienced in the following skills:

- SYSTEM 2000
- NATURAL
- ADABAS
- IDMS/DC

As a software professional with Systemation you will have the chance to participate in a wide variety of challenging and diversified assignments. You will gain entry into the fastest growing and most important segment of the data processing field. If you are interested in a career which will enhance your professional development, call collect or send resume to:

SYSTEMATION, Inc.
The Software Professionals
Attention Pat Frey
Three Commerce Park Square
23200 Chagrin Boulevard
Cleveland, Ohio 44122
(216) 464-8410

Ft. Lauderdale Office
2740 North State Road No. 7
Suite 200
Ft. Lauderdale, Florida 33313
(305) 484-8282

Orlando Office
101 Skyview Road
Suite 100
Altamonte Springs, Florida 32714
(305) 788-0700

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

The best is yet to come... and we'll show you how to get it!

Career advancement depends to a great extent on having a maximum number of career opportunities from which to select the most promising. No one can show you more than National Computer Associates... and no one can match the skillful services of our consultants in helping you get what you want.

Come in. Call. Or mail your resume to the firm nearest to you. Company clients assume our fees.

[illegible]

Call the NCA firm nearest to you for Salary Survey and Relocation Information.

National Computer Associates

SENIOR ADABAS SYSTEMS PROGRAMMERS

Change to Initiate, create and lead with America's fastest growing Telecommunications corporation!

MCI continues to forge ahead in the country's most exciting industry... telecommunications. With the right background and drive, you can walk in and assume a leadership position in our corporate headquarters.

You will utilize your experience in ADABAS to install and maintain our ADABAS DBMS. You should have a strong background in MVS systems software and be able to determine problems on a systems level. You will work with the latest ADABAS packages and be involved with major systems conversion to ADABAS. Knowledge and experience with MOJURE DBMS, CICS, and performance tuning a plus. Positions available in Virginia and Maryland suburbs of Washington, D.C., with relocation assistance available.

For immediate consideration, call Bruce Robbins at (703) 486-4484, or send your resume in complete confidence to: MCI Telecommunications Corporation, 701 South 12th Street, Dept. 218, Arlington, VA 22202. An Equal Opportunity Employer.

MCI Telecommunications Corporation

USER PROGRAMMER NEEDED

The Consumer Financial Institute is the largest on-line/ planning independent provider of personal financial planning. We are looking for a person to join our technical staff to work on the design and enhancement of CFI's computer based financial planning products.

Our environment includes HP3000's, Cobol's, IMS FORTH and a Xerox 9700 laser printer.

The position will entail working with CFI specialists, marketing and product design staff in building new financial planning products. Our newest product will be a PC based personal financial planning tool using a windowing system and color graphic display.

The ideal candidate will have had experience in developing systems that are directly usable by customers and users. In addition you should have 3-5 years COBOL experience and the desire to work in a small highly-tech team.

As a small rapidly growing company, CFI offers you the opportunity to have a substantial impact on the organization and its products using some of the latest hardware and software tools available.

If you are interested send a resume, including salary requirements to:

Box 01
The Consumer Financial Institute
P.O. Box 97
Hamilton, MA 01936

The City of Gainesville has Key Start-Up Roles

Come to Gainesville, Florida; home of the University of Florida, where the average temperature is 70 degrees and enjoy the Sunbelt living and education of a small town environment with convenient access to Florida's famous beaches and tourist attractions. These are several new opportunities managing the installation, implementation, administration and maintenance of the City's Information Management System for Municipal and Utility operations utilizing the Intel iRMX 86/88 Series computer.

- System Development Manager ($34,368-$54,148) Outstanding leadership and technology skills and systems analysis and programming.
- System Support Manager ($34,368-$54,148) Proven ability as a results-oriented individual to solve problems in data center operation, systems programming, and communications.
- Computer Systems Analyst ($23,284-$36,708) Responsible for programming ($24,428), quality assurance, training and office systems, analysis and development of financial systems, and user coordinators analysis for data, telephone and radio.

Application deadline is 2/29/84; send resume and application to:

City of Gainesville, Human Resources Div.
P.O. Box 490
Gainesville, FL 32602
Affirmative Action/
Equal Opportunity Employer

DP POSITIONS SEATTLE/PORTLAND

MVS, Sr. Systems Programmer $40K
Sr. IMS Systems Prog. 40K
Systems Performance-data base consultant to applications group.
Sr. Programmer/Analyst 30K
Financial app. CCMOL1 on line transaction.
Programmer/Analyst 30K
CICS/DL1 or VISAM on-line dev.
Sr. PIA IMS applications dev. ..... to 40K
Data Admin. Analyst ..... to 40K
data resources Digest load DP design.

Please forward resume immediately to:

HOUSER, MARTIN MORRIS & ASSOC.
(206) 453-2700
0-88216, 1000-116th Ave. N.E.
Bellevue, WA 98004

DATA PROCESSING

We are searching for experienced, enthusiastic individuals who wish to contribute to an active progressive data processing team. If you are self-motivated, career-oriented, and possess the following qualifications, we would like to hear from you.

SYSTEMS PROGRAMMER

Applicants should have 2-3 years experience in system programming and a Degree in Computer Science. Will have primary responsibility for the generation, maintenance and tuning of the VM and DOS/VSE operating systems on IBM 4381 and 4341 mainframe hardware. Must have knowledge in CICS and assembler language.

Excellent benefits and salary. Send resume and salary history by February 15th to:

Attn: Personnel Department
(NO TELEPHONE INQUIRIES, PLEASE)

Liggett & Myers Tobacco Co.
P.O. Box 1572, Durham, NC 27702
An Equal Opportunity Employer

PROGRAMMERS
HIGH DOLLAR CONTRACTS IN NYC

Long term. Generous Per Viem. Particular interest in the following skills:

ADR New Products
HOGAN Software
IDMS/ADSO

Call or send resumes to Ray Sherrin

(212) 230-4780

Vectron Systems Inc., One Penn Plaza, Ste. 1429, New York, NY 10119. An equal opportunity employer.

Vectron Systems Inc.

BOOMTOWN' DP PROFESSIONALS RICHMOND, VA

If you are looking for opportunity, it's here and includes a climate, geography and economy that makes Richmond one of the most attractive locations in the country.

STEVE BARLEY, CDP, CPA

DON RICHARD OF RICHMOND
919 East Main Street
Richmond, VA 23219
(804) 644-8851

Have You Considered Teaching?

Growing enrollments have resulted in excellent career opportunities in teaching at nationally recognized suburban Kansas City community college.

To qualify you must be degreed, have data processing work experience, and be able to teach in such areas as COBOL, IBM OS/VS JCL, ALC, RPG II, and Microcomputers.

We offer the right candidate a nine-month, salary-track contract; a competitive salary; full insurance options; paid sabbatical; professional development allowance; and an innovative, state-of-the-art environment.

For more information, call or write:

Personnel Office
JOHNSON COUNTY COMMUNITY COLLEGE
12345 College Blvd. at Quivira
Overland Park, KS 66210-1299
(913) 541-3577
An Equal Opportunity Employer

PROGRAMMER/ANALYST

St. Luke's Hospital's expanding Data Processing Department has an immediate opening for a full-time Programmer/Analyst. Preferred applicant will have a minimum of 5 years verifiable experience and/or training as a Programmer/Analyst and have IBM DOS/VSE, CICS and COBOL experience. Enjoy excellent benefits and salary. You will have the opportunity to learn, grow and achieve in a professional working environment that is well planned and managed with a priority and organization. For consideration, please call:

Personnel Department
ST. LUKE'S HOSPITAL
916 East 1st Street
Duluth, MN 55805
218/726-5416 (Collect)
Equal Opportunity Employer
Duluth Regional Trauma Center

DATAPOINT

- PROGRAMMERS
- ANALYSTS
- OPERATORS
- SALES PEOPLE

JOBS IN 40 US CITIES NATIONWIDE.
NOT AN AGENCY
SEND RESUME TO:

TIM TANNER
1377 K STREET, NW
SUITE 201
WASHINGTON, DC 20005

SYSTEM 36 PROGRAMMER/ANALYST

St. Louis based travel company is expanding the data processing department. Seeking two System 36 Programmers/Analysts with minimum of 1-2 years experience in the design and coding of RPG III programs. Good benefits, pleasant working conditions and a chance to grow with an expanding company. Send resume and salary history to:

Linda Sizemore - Consultant
Grant Cooper and Associates
2349 Schuetz Road, Suite 40
St. Louis, MO 63146
(314) 567-4884

DALLAS

IMS DB-DC
PROG-ANALYSTS

Dallas Needs You Now

Several top Dallas firms have immediate needs for these skills. Reliable pgm. To $40K. Contact:

2720 Stemmons Frwy. 12079
Dallas, TX 75207 (214) 637-8369

DATA PROCESSING CAREERS

SOUTHEAST

Programmers	$26,000
Programmer Analysts	$30,000
Systems Analysts	$35,000
Software Support	$40,000
Project Leaders	$40,000
Mgr. Tech. Support	$45,000

Sawyer Associated Systems specializes exclusively in EDP. All interview and employment costs paid by client companies. Mail confidential resume or call Joe Sawyer (803) 242-3582.

SAWYER ASSOCIATED SYSTEMS
P.O. Box 6049
Greenville, South Carolina 29606

Software Development

Come see and still beautiful SW Michigan. DIS is an engineering/systems house looking for software talent to start exciting custom engineering projects. You must have 1-2 years experience in systems design and development on DEC minicomputer systems. Fortran a must. Pascal a plus. Career growth opportunities are unlimited in our growing company. Send resume in confidence to:

Digital Interface Systems, Inc.
Personnel Administrator
P.O. Box 706
St. Joseph, Michigan 49085
An Equal Opportunity Employer

Hydra-Matic Division of General Motors Corporation

Exceptional career opportunities for Information Systems Professionals exist at our divisional office in Ypsilanti, Michigan. This rapidly growing division is looking for high potential candidates to fill immediate openings. Opportunities exist for:

Programmer Analyst
Successful candidates will have 3-5 years experience in writing PL1 programs in IMS DB/DC environment. Knowledge of CMS is desirable.

Software Systems Programmer
Successful candidates will have 3-5 years experience in software support of IBM Systems. Candidates should have a working familiarity with the internal MVS, JES2 and MVS program products. Previous experience in performance tuning is highly desirable.

Software Systems Programmer
Successful candidates will have 3-5 years experience in support of IBM Systems. Candidates should have a working knowledge of CICS, VTAM and MVS program products.

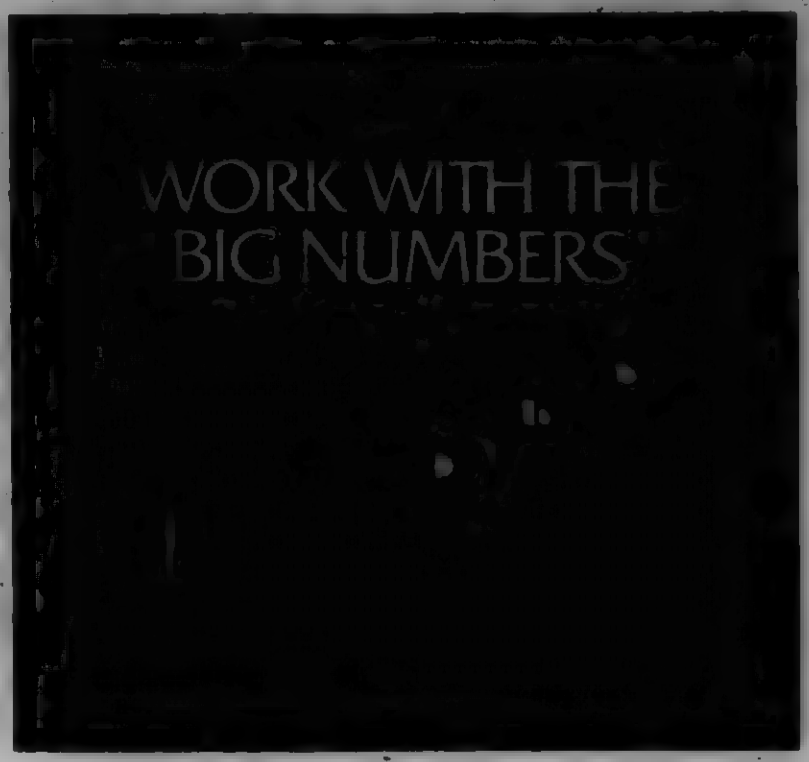
Communications Systems Programmer
Successful candidates will be experienced in generating and support of IBM SNA Communications Software. Candidates should also have a working familiarity with the internals of VTAM and NCP.

Candidates should have a bachelor's degree in a related field. Salary for these positions will be commensurate with your experience and education.

If you believe you qualify for any of these positions and wish to discuss them with us submit your resume and salary requirements in confidence to:

S. J. Snipes
Salaried Personnel
Hydra-Matic Division of GMC
Ypsilanti, Michigan 48197

An Equal Opportunity Employer, M/F



Seven years ago, DATAPOINT introduced the world's first local area network, ARC® (Attached Resource Computer), and ignited a revolution in business communications. Today DATAPOINT continues to lead the way in versatile hardware and advanced software designed to meet the needs of modern business.

ARC local area networks are integrated in businesses around the world, linking multifunction workstations, printers, display systems, and processors. Providing machine to machine communications, working together with systems so advanced, they could only be DATAPOINT.

Others have joined the revolution, but DATAPOINT is the undisputed leader with more than 5,000 ARC local area networks installed. More than IBM, Xerox, and Wang combined. We are a proven success that can provide a basis for your successful sales career.

We now have positions available in almost every major market across the country. If you are a degreed sales professional with a solid track record in computer sales, call our 24 hour career hotline to learn about the DATAPOINT success and how you can join this growing team of professionals.

1-800-531-5770

1-800-292-5106
(In Texas)

DATAPOINT offers a very competitive compensation program and complete company benefits. If a call is inconvenient, send your resume with salary history to: Marketing Employment, Datapoint Corporation, 9725 Datapoint Dr., MSG-05-781, San Antonio, Texas 78284. We are an equal opportunity employer m/f/h.

DATAPOINT
We sparked the revolution.

The California Institute of Technology, renowned as a center of education and research of the highest caliber, is seeking experienced professionals to fill the following positions:

Assistant Director, Software Development

Working closely with other concerned members of the campus community, this individual will identify, design and implement software systems at Caltech. This will include project management, continuous review of developments in local area networking and operating systems, supervision and/or project implementation, promotion of the initial release of new products, and supervision of the development of documentation and seminars, as required. This senior-level position requires a Bachelor's in Computer Science or related field plus at least 5 years of appropriate experience or, preferably, a PhD. A demonstrated knowledge of modern operating systems, programming languages, software architecture and software management is also required.

Educational Computing Project Leader

Reporting to the Dean for Educational Computing, this individual will coordinate the integration of computers into the Caltech curriculum. In doing so, this individual will provide advice and technical support on the hardware and systems software of various equipment used in educational computing; supervise and/or author various software projects, especially the necessary graphics packages needed in the broad scientific education provided by Caltech; review, in detail, developments in networking, graphics, databases and other relevant packages developed by groups at Caltech and JPL; and maintain a broad understanding of overall developments in this field. This position requires a broad knowledge of modern computer hardware and software, as well as an expertise or interest in scientific application programming. In addition, a Bachelor's or equivalent in both Computer Science and another science, along with the ability to manage software projects and supervise students, is required.

Both positions require individuals with excellent oral and written communication skills, as well as the ability to work independently. For consideration, please send a resume with salary requirement to: Supervisor of Employment, CALTECH, Pasadena, CA 91125. *Equal Opportunity Employer M/F*

Caltech

DATA PROCESSING SYSTEMS ANALYST

Boise, Idaho

The Idaho Department of Health and Welfare is accepting applications for two positions in Boise.

These positions analyze and evaluate user problems and formulate logical statements of business problems; devise procedures for solutions of the problems which may involve the use of data processing systems and programming.

Positions require experience with documenting computer procedures, writing administrative procedures, developing program specifications, designing application systems and project scheduling when planning the development of a new project. Also requires background as a project leader and experience making presentations to users and/or management.

Salary range is $23,388 to $31,392 (negotiable) plus good fringe benefits program. For application forms, contact Joan Swanson, Health & Welfare Personnel, 450 W. State, Boise, Idaho 83720 or call (208) 334-4088. Please reply to advertisement by February 14, 1986.

Equal Opportunity Employer M/F/H/V.

ENJOY TAX FREE INCOME IN SAUDI ARABIA

Our client has an immediate need for:

SOFTWARE A.G. PRODUCT SUPPORT for ADABAS, NATURAL, COMPLETE

Base Salary to 40K plus all overseas benefits including free housing, car allowance, free medical, annual bonus scheme, trips home, 24 days paid vacation and public holidays.

Our growing products and user base demand additional skilled personnel in our product support group in Riyadh. If you have worked closely with Software A.G. products, up to a point where you can install and help users with technical problems, then we want to hear from you. Remember that we now have a community of sophisticated users with full DBA functions, and some are implementing into centers with proper data administration. You will learn from these people, and in helping them you will be assisted by the Software A.G. technical support division (Reston, Virginia) and a worldwide network of affiliates providing similar services.

Include in your resume emphasis on Software A.G. products and your specific involvement. Also provide details of operating systems utilized and other vendor products (DB/DC area) which you are familiar with.

Closing date is February 20. Include telephone number(s) and best time to contact. Send resumes and salary history to:

Deirdre Fleming

INTERNATIONAL INFORMATION SERVICES
255 Glenville Road, Greenwich, CT 06830

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

Aerojet ElectroSystems, a high-tech company, has immediate openings in its Telecommunications organization for:

COMMUNICATIONS SOFTWARE PROJECT SPECIALIST

Develop monitoring and control software for network management on a broad-band Local Area Network. Will be responsible for coordinating software implementations on the IBM 3083, VAX 11-780 using higher-level protocols among the various computing resources.

Degree in Computer Science or equivalent with strong emphasis on distributed processing and telecommunications, plus at least 5 years' experience in designing and implementing communications software.

NETWORK ARCHITECTURE SPECIALIST

Design a network architecture to provide on-going reliable telecommunications services, utilizing and building upon the existing broad-band Local Area Network. Objectives include the provision of a data communications facility tying together all computing hardware. (Long-term goals of integrating data, video and voice into a single telecommunications network).

Degree in Engineering, Math, Computer Science, etc. plus 10 years' experience in computer systems design (5 of which were in telecommunications). Requires in-depth knowledge of telecommunications technologies and extensive experience in data network design.

Excellent salary and employee benefits

* Our facility is located 26 miles east of Los Angeles in the San Gabriel Valley...near prestigious Cal Tech, and a short drive to relaxing Palm Springs and Lake Arrowhead, the ideal summer and winter resort.

Send resume and salary history to:

R. Wilson, Professional Placement

P.O. Box 296-CW/CS
Azusa, CA 91702

Current openings require U.S. Citizenship

Principals only, please

An Affirmative Action Employer

- A Commitment to Technical Excellence

ACP/TPF SENIOR PROGRAMMERS SYSTEMS PROGRAMMERS

Our client, located at a beautiful sight in Northern California, is the leader in its industry and a company you can be proud of.

Due to expected expansion, the realtime applications environment is to be re-architected and rewritten to accommodate new services and large volume increases. This is a ground floor fresh opportunity to be in from the start on this several year project.

Outstanding compensation, benefits, thrift plan and relocation package. Professional working environment. For confidential consideration, please submit resume to: Realtime, 1201 Howard Ave., Suite 102, Burlingame, CA 94010, or call Sam Parise (415) 579-6666. Equal Opportunity Employer. Employer retained.

Realtime Associates

Agency of Northern California

CONTRACT PROGRAMMERS

We have many current project requirements LOCALLY and MIDWEST for experienced Data Processing Professionals. If you are an Independent Contractor or want to work at consulting as a full-time employee and possess at least 3 years in any of the following:

- IBM/OSDC, PL 1, BTS
- IBM/DBDC, COBOL, ADF
- DEC/DL1, COBOL or ALC
- DG/DOS, PL1, COBOL or ALC

Contact Paula Thomas at (513) 898-2600 or mail resume to:

DSS CORPORATE SERVICES SYSTEMS
1 First National Plaza, Ste. 1616
Dayton, OH 45402

An equal opportunity employer

SYSTEMS ANALYSTS AND PROGRAMMERS FOR SUNBELT LOCATIONS

Job dissatisfaction, commuting, and frustration are the biggest obstacles to overcome to achieve one's career goals. Every day new career opportunities pass us by because we are unaware of their existence. Let us keep you abreast of what your next move is in the market place. Absolutely no obligations, please call or write Todd Perkins, CPC, Data Processing Specialist.

Dunhill

OF CHARLOTTE, INC.
6917 Carnet Road, Suite 107
Charlotte, North Carolina 28211
800-438-2012
(NC Call)
(704) 542-4212

COMPUTER SCIENCE INSTRUCTOR

B.S. degree in computer science, math, or closely related area. Master's degree preferred. Knowledge of BASIC, COBOL, FORTRAN, and RPG languages. Two (2) years work experience in programming/applications. Prefer prior teaching experience. Salary dependent upon education/experience, competitive benefits. Applications accepted until position filled. To apply contact: Personnel Office, Lake City Community College, Route 7, Box 378, Lake City, FL 32055, (904) 752-1822, ext. 313.

EQUAL EMPLOYER

The City of Las Cruces, New Mexico (55,072 MSA population) has a vacancy for a Programmer Analyst. Must have BBA, BSCS or equivalent plus 2 years experience in EDP applications analysis and business programming using COBOL. Salary is $19,821 - $23,850 per year depending upon experience plus benefits. Send current resume by February 17, 1984 to A.J. Robertson, Personnel Department, Drawer CLC, Las Cruces, NM 88004. AA/EEO Employer.

FIELD ENGINEERS
Join a Winner

Computer Systems Support Corporation, one of the oldest and largest 3rd party maintenance companies specializing in Data General equipment, continues to expand.

We now have immediate openings for key positions in major U.S. cities and will be adding more locations in the near future.

We provide excellent opportunities for advancement and a top notch compensation, Mega benefit package for qualified, experienced individuals.

Interested applicants wanting to join our fast growing team should have maintenance experience in one of the following areas:

1. Field service experience on Data General based systems.
2. Depot experience on Data General equipment and associated peripherals.
3. Repair experience on IBM PC's and XT's.
4. Office management experience for opening new field offices.

For immediate consideration and more information call collect to Mr. George R. Moore at 301-693-6660 or send resume to:

CSSC
15895 Galliher Dr.
Gaithersburg, MD 20877

PORTLAND, OREGON

Interview and relocation paid.

Unix, C $30K - $46K

Several Project Engineers and Project Managers level positions open. Profit sharing paid monthly.

HW/SW

$30K - $40K 2 positions requiring 80286 or equiv., 3-5 yrs. exp. test, analog and assembly.

Software

$30K - $40K experience graphic design for fast growth company. Excellent stock options.

Array

$30K - $40K Software/Hardware Engineer, degreed, exp. in design of array processors. Profit sharing.

All fees paid by our client companies, call or send your resume in confidence. We specialize in High Tech, many other openings available.

(503) 227-1461
HEADHUNTERS
National Agencies, Inc.
4700 SW Macadam Blvd.
Portland, OR 97201

COMPUTER SCIENCE FACULTY OPPORTUNITIES

The University of Southern Colorado is pub-lic/state university now openings for depart-ment head and tenure track faculty positions. Qualifications: Ph.D. in Computer Science or closely related field, significant teaching and industrial experience, consulting, and research. Faculty positions require M.S. degree; Ph.D. is preferred. The department has a bach-elors B.S. program oriented toward DP/MIS, ACM, or equivalent curricula. Areas of teach-ing include D.P., Pascal, Ops. Sys., Sys. Anal, AI, Cobol, and, DBMS, Data Struc., Comp. Arch., Microprocessors, Graphics, File, D.P. Management, Programming Languages. Op-portunities exist for undergraduate and grad-uate course development. Research opportu-nities complementary desired in one position.

Pueblo is a non-bell community located beside the Rocky Mountains, famed for abundant recreational and cultural activities. High quality of life. The University has 6,000 students (50% CBT regional). Send resume and references by March 15, 1984 to

ASET Search Committee,
University of Southern Colorado,
Pueblo, CO 81001.

An Affirmative Action, Equal Opportunity Employer.

HP-3000 PROGRAMMERS & ANALYSTS

We specialize in the placement of HP-3000 Analysts and Programmers and have numerous opportunities across the country for professionals with this experience. Our client companies include both small and large end-users as well as software development firms specializing on the HP-3000. Of particular interest is experience with MM3000, ASK, GUASAR, or RAPID.

For additional information regarding these positions, call Mr. Lee Martin:

(804)460-3666 or
Forward Resume to:

Fortune
Personnel Consultants
of Virginia Beach
510 South Independence Blvd.
Virginia Beach, VA 23462

PHILADELPHIA

We have been retained to market an-chitecturally for Manufacturing Fortune 50 major software HI-VISIBILITY agency. PAID RELOCATION & TOP BENEFITS. Client seeks:

ASSOC DIRECTOR MIS TO $60,000 BROAD-BASED APPS

MBA or MIS/Computer w/Associate MBA preferred/more, solid analytical design skills & ability to market self to user depts. Database or multi-project mgmt exp +.

SYSTEMS CONSULTANT TO $45,000 MANUFACTURING APPS

Degreed BTO w/Associate IBM hardware/more, sound common skills & bus. MPG sys. Database, proj mgmt. ADP or BOMP +.

ROBERT HALF

1617 JFK Blvd. Suite 1955 Penn. Plaza
Philadelphia, PA 19103
(215) 568-6900

COMMUNICATIONS SPECIALIST

Consulting group of Big 8 CPA firm has an urgent need for an expert in all aspects of IBM data communications. Manager position with partnership potential in 1-3 years. Salary completely open.

ROMAC.
4416 IDS Center
Minneapolis, MN 55402
612-339-0126

COMPUTER SCIENTIST to conduct applied research and advanced development in new computer system programming productivity software tools. Work will involve extensions to IBM's MVS/XA and VM/SP operating systems as well as investigations into the uses of microprocessors. Candidates must have a M.S. in Computer Science with knowledge of state-of-the-art computer software, particularly MVS/XA and VM/CMS operating systems on IBM 3081 computers. They also must possess knowledge of micro-computer hardware. Working hours: 8:00 AM - 4:00 PM, Monday-Friday. Salary $1,700.00 per month. Applicants should send their resumes to 7310 Woodward Avenue Room 418, Detroit, MI 48202. Reference #1484. An employer paid advertisement.

Programmers/Analysts

Banking/Manufacturing

VM-HRB-IMS-DOS/VSE-CICS-Tandem
LOTUS
Top Salaries - Fee Paid

Call or Send Resume
(800) 643-3466 then dial 683
(501) 225-7583
P.O. Box 6563
Little Rock, AR 72216

Thomason's Financial Placement
Employment Agency, EOE

TIRED OF THESE LONG COLD WINTERS?

DATA PROCESSING PROFESSIONALS with skills in Large Systems or Minis, DATABASE or ON-LINE SYSTEMS, consider a move to the beautiful SAN FRANCISCO BAY AREA

Our clients have the most CHALLENGING and GROWTH ORIENTED career opportunities CALIFORNIA offers.

LOGICAL OPTIONS
One Market Plaza, Spear Tower, Suite 2201C
San Francisco CA 94105 • (415) 777 3888

SENIOR PROGRAMMER

Fast growing national corp. seeking experienced S/38 RPG III Programmer. South Florida location. Excellent salary and benefits. Send resume and salary history to:

Diversified Services Inc.
Mr. Medina
3875 NW 25th Street
Miami, FL 33142

Systems Analyst - Data Processing
The incumbent analyzes current systems and procedures and designs alternative approaches to current operations; organizes and prepares documentation; reviews requests for additional computer services and coordinates the implementation of new application software.

Appropriate Data Processing degree or equivalent experience and 3 years of systems related experience with state-of-the-art Honeywell experience preferred.

Starting Salary Range - $18,488 to $24,877. Send a letter of interest, official transcripts (if applicable), a resume, and three recent letters of recommendation dated within the last two years to: Carol M. Swanson, Director of Personnel, Lamar County Community College, 2400 North Main Road, Blytha, Ohio 44256. Incomplete Files Will Not Be Considered. Application Deadline 3/2/84 (postmarked). AA/EOE

WASHINGTON, D.C.

VP MIS

Rapidly growing non-profit co. seeks polished professional manager to build internal MIS department. Administrative and DP skills must be outstanding B.A. required, M.B.A. preferred. $60K

ROBERT HALF
OF WASHINGTON, INC.
7310 Woodward Ave. Ste 401
Washington, D.C. 20014
(301) 652-7600

PROGRAMMER/ ANALYST (2)

Expanding Data Processing Department with a commitment to bringing new manufacturing systems utilizing state-of-the-art technology has created this opportunity. Manufacturing firm engaged in a heavy equipment environment using COBOL and CICS in an IBM OS/MVS or IBM DOS/VSE shop is required. DL/1 and CORCS experience a plus, college degree preferred - salary commensurate with experience. Send resume and salary history to:

Keshong Cramer & Associates,
Waverly Operations, AMCA International Corporation, 105 - 12th St., S.E., Waverly, IA 50677.
Attention: Personnel.

An Equal Opportunity Employer

Harris Helps You Make The Most Of Your Ability

HARRIS COMPUTER SYSTEMS DIVISION presently has excellent opportunities available for the following:

PRODUCT MARKETING PROFESSIONALS

COMMUNICATIONS

Professional with communications experience needed to coordinate communications product line from market requirement or product inception through introduction initial sales or enhancements to product termination. Minimum Technical Bachelor's degree and 4 plus years communications experience with networks, switches, modems, and third party suppliers.

PERIPHERALS

Professional with expertise in peripheral products will coordinate the peripheral product line from market requirement or production inception through introduction initial sales or enhancements to product termination. Minimum Technical Bachelor's degree and 4 plus years peripherals experience in product design, testing, integration, or product management.

SYSTEM SOFTWARE DEVELOPMENT

Immediate openings for Systems Software Developers with a BS or MS in Computer Science and development experience in one of the following:

- Compiler Development
- Data Communications, specifically network and standard protocol implementation

We offer attractive salaries together with comprehensive benefits. For further information, please submit resume, in confidence to Jan Jeter, Personnel Department, HARRIS COMPUTER SYSTEMS DIVISION, 2101 West Cypress Creek Road, Fort Lauderdale, FL 33309-1892.

HARRIS

An Equal Opportunity Employer, M/F

EDP PROFESSIONALS

Exciting plans in data processing require us to recruit new talent that is self-motivated, innovative and technically competent to participate in systems and application projects. Our environment includes 3 IBM 3033's, OS/MVS, and a Tandem Non-Stop II. If you are a career-minded EDP professional, we have the following opportunities available:

ANALYST PROGRAMMER

Requires 2 years OS COBOL experience with sound working knowledge of IMS on line programming preferred. Will be working with IMS data base in an on line mode.

(BASIC) SENIOR ANALYST PROGRAMMER

Individual must have 4-5 years programming and analysis experience in a DEC environment with an in-depth knowledge of BASIC. Will provide support for our internal DEC VAX/VMS Timesharing users.

LEAD ANALYST PROGRAMMER

Must have 5 years design and analysis, together with project management experience in a large DP environment. Will design a plan for integrating Point-of-Sale into BancOhio's existing Anytime Bank network. Will also evaluate software packages and third party processing capabilities. Previous electronic banking experience extremely valuable.

In addition to changing assignments, we offer opportunity for growth, attractive compensation and a comprehensive benefits package. Please send your confidential resume, including salary history and indicating position of interest, to:

Jeffrey D. Russell
Technical Recruiter - S/P

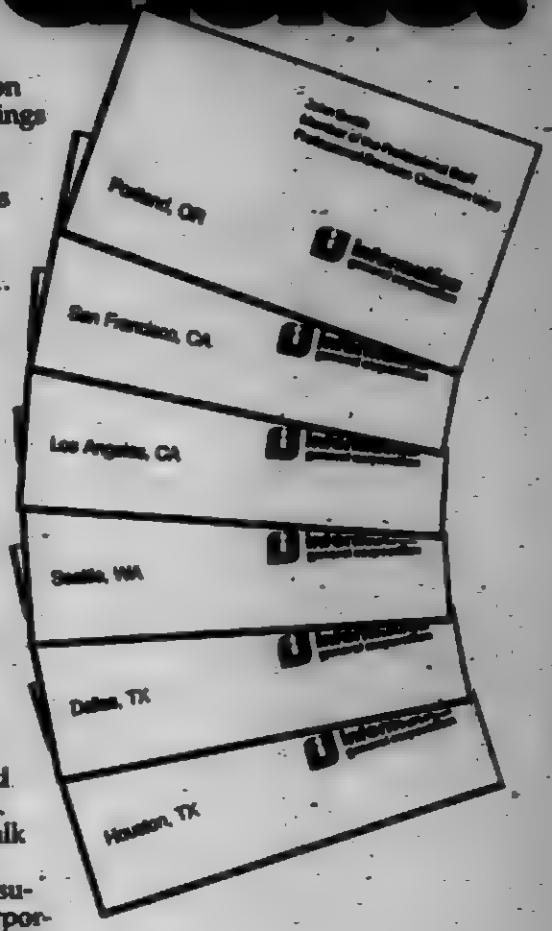
BANCOHIO NATIONAL BANK

770 West Broad St. - LL
Columbus, Ohio 43081
(614) 463-8028

An Affirmative Action/Equal Opportunity Employer

Consultants, Analysts and Programmers

Your Choice.



You can join Informatics' Professional Staff at the location of your choice. We have openings for DP Professionals with growth-oriented technical and consulting skills. Requirements include at least two years of experience on large-scale IBM systems using COBOL or PL/1. It's a plus if you also have experience in IMS, MARK IV or CICS.

Informatics has completed twenty successful years of providing professional services for systems development and consulting projects. Present activity includes development assignments on major state-of-the-art systems for a variety of application areas. The most advanced development techniques are emphasized for all assignments.

If you are interested in a professional career, pick a card for the location of your choice. Call toll free 800-527-4631 to talk with us. In Texas, call collect 214-669-0831. Or send your resume to Infotmatics General Corporation, 9441 LBJ Freeway, Suite 410, Dallas, TX 75243. We are an equal opportunity employer.

informatics general corporation

Portland, OR · **Los Angeles, CA** · **Dallas, TX**

San Francisco, CA · **Seattle, WA** · **Houston, TX**

INSURANCE CONSULTANT SOUTHWEST

Client company currently has several openings for highly motivated, technically strong Senior Programmers with life insurance experience.

Requirements include 3 or more years' experience with life systems and IBM assembler and/or COBOL.

Opportunity to work with a strong professional team of insurance installation experts. Travel to a variety of client environments. Excellent living and working environment in which to advance.

Excellent salary and relocation package.

Call collect or send confidential resume to:

Jack Edwards, FLMI
380 Maple Ave. West
Vienna, VA 22180
(703) 281-0919

Bill De Feniak, FLMI
314 N. Garfield
Hinsdale, IL 60521
(312) 887-9760

Jack Edwards Associates

SENIOR EDP AUDITOR

As an EDP Audit professional at Foster Farms, you will play a vital role within the company. Your high technical skill level will be a key factor. You should also have the ability to work with various financial and manufacturing systems.

Primary responsibilities will be to: evaluate and test security and control of computer operations, programs and systems; review new systems for proper internal controls and development methodology; apply computer-assisted audit techniques using audit software; provide technical assistance and training to the general Audit Staff; and assist in the development of EDP audit plans and schedules.

Foster Farms is the largest poultry process in the Western United States with Corporate offices located in California Central San Joaquin Valley approximately 90 miles east of San Francisco.

We require a Bachelor's Degree and good written and oral communication skills. you will appreciate our competitive salary/benefits plan and attractive sunbelt location. For immediate confidential consideration, send your resume outlining your career experience to:

FOSTER FARMS
ATTN: BOX FIN
P.O. BOX 457
1000 Davis St.
Livingston, CA. 95334

EOE
Principals Only

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

EXPERIENCED UNIVAC MANAGERS & TECHNICIANS

Grumman Data Systems has many openings available for experienced UNIVAC 1100 personnel, at various levels, in these categories:

- SYSTEMS PROGRAMMING
- DATA BASE ADMINISTRATION
- DATA COMMUNICATIONS
- COMPUTER OPERATIONS

These openings are in New York City and our Long Island facilities and they offer outstanding career opportunities.

Grumman Data Systems offers a competitive salary, superb comprehensive company paid benefits including health, dental, an incentive bonus program and of course, relocation.

Insofar as we have so many openings in each category, we urge you to respond promptly by forwarding your resume, in confidence, to:

Henry Meyers, Dept. CW 122
GRUMMAN DATA SYSTEMS
1111 Stewart Avenue
Bethpage, NY 11714

GRUMMAN

An Equal Opportunity Employer
U.S. Citizenship Required

EDP INCORPORATED

Our Clients need good

Analysts
Programmers
Tech Specialists

Let us help you connect with outstanding career opportunities in the *SOUTHEAST*

Our clients have many challenging positions available.

Send your resume today, before your position is filled. All fees paid by our client companies.

EDP INCORPORATED
Suite 305, Fairview Plaza One
Charlotte, NC 28210
704/554-1101

CALIF. & UNIX*
Openings in a variety of areas and disciplines.
(714) 891-UNIX*
CPU COMPUTER PROFESSIONALS UNLIMITED, Agency
7011 Garden Grove Blvd.
Ste. D, Garden Grove, CA 92641
*UNIX is a trademark of Bell Laboratories

THIS SPACE FOR HIRE.

[Inquire at Classified Advertising Dept.]

SOFTWARE ENGINEERS

Sandia National Laboratories is seeking people with advanced degrees combined with either academic emphasis or equivalent experience in the following areas:

Computer performance measurement and analysis of large mainframe computer systems.

Networking a variety of machines at high speed over short distances in a central computing environment.

Local area networking of an expandable set of IBM compatible machines using SNA as a foundation.

Operating systems analysis and enhancement on one or more of CRAY, CDC or IBM MVS or VM.

Sandia National Laboratories offers careers where the rewards equal the challenge. As one of the country's largest research and engineering facilities, Sandia is an innovative force in the fields of national security, R&D and energy. We offer both professional challenge and the rewards of a casual, outdoor lifestyle in sunny New Mexico. Sandia's benefits package includes paid health care, life insurance, retirement and 24 days vacation.

Qualified candidates are requested to send resumes to: John L. Wheeler, Staff Recruiting and Employment Division, 3531-90, Sandia National Laboratories, Albuquerque, NM 87185.

Equal Opportunity Employer M/F/V/H
U.S. Citizenship Required

Sandia National Laboratories

BUY - SELL - SWAP

SYSTEM/34
SYSTEM/36
SYSTEM/38
SERIES/1

ECONOCOM

- BUYS
- SELLS
- LEASES

- QUICK DELIVERY
- COMPETITIVE PRICING
- FLEXIBLE FINANCING
- TRADE-INS ACCEPTED
- PROFESSIONAL SERVICE
- SHORT-TERM LEASING
- LONG-TERM LEASING
- PERIPHERAL LEASING
- TAKE-OUTS DONE

FIND IT FAST IN OUR FAMOUS COMPUTER MARKET ADVISOR
SEND US YOUR BUSINESS CARD AND WE WILL SEND YOU A FREE COPY.

901-767-9130

ECONOMIC COMPUTER SALES, INC. • 645 CROSSOVER LANE • P. O. BOX 240297 • MEMPHIS, TENNESSEE 38124

Buy•Sell•Lease
SERIES 1
S/34 S/38
4300 S/[illegible]
5110 S/23
XERXES
COMPUTER SALES
1914 Harmon Place, Suite 210
Minneapolis, Minnesota 55403
800-328-3884/612-339-3042

IBM
3270

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 709 FRAMINGHAM, MA 01701

postage will be paid by

CIRCULATION DEPARTMENT

COMPUTERWORLD

375 Cochituate Road, Rte. 30
Box 897
Framingham, MA 01701-9985

There's only one name you need to know in leasing.

Greyhound.

When it comes to equipment for your company, there are a lot of decisions to be made. Decisions like whether you purchase or lease, where to actually find the equipment you need, and how to finance it.

To make those decisions, all you need to know is Greyhound Computer Corporation. Whether you decide to lease or purchase, we'll work with you to customize your equipment for your particular business. And we'll also work with you on the financing of that equipment.

At Greyhound Computer Corporation we've been leasing, servicing, refurbishing, maintaining and providing financing for computer and other equipment for over 20 years.

So the next time you have a lot of decisions to make about high-tech equipment, make them easier. Call Greyhound Computer Corporation.

Regional Offices

Mike Coale Eastern Regional Headquarters	**(617) 272-6110**
Dave Hyland Western Regional Headquarters	**(415) 283-8980**
John O'Shea Central Regional Headquarters	**(312) 799-9100**
Ron Gall Southern Regional Headquarters	**(512) 451-9121**

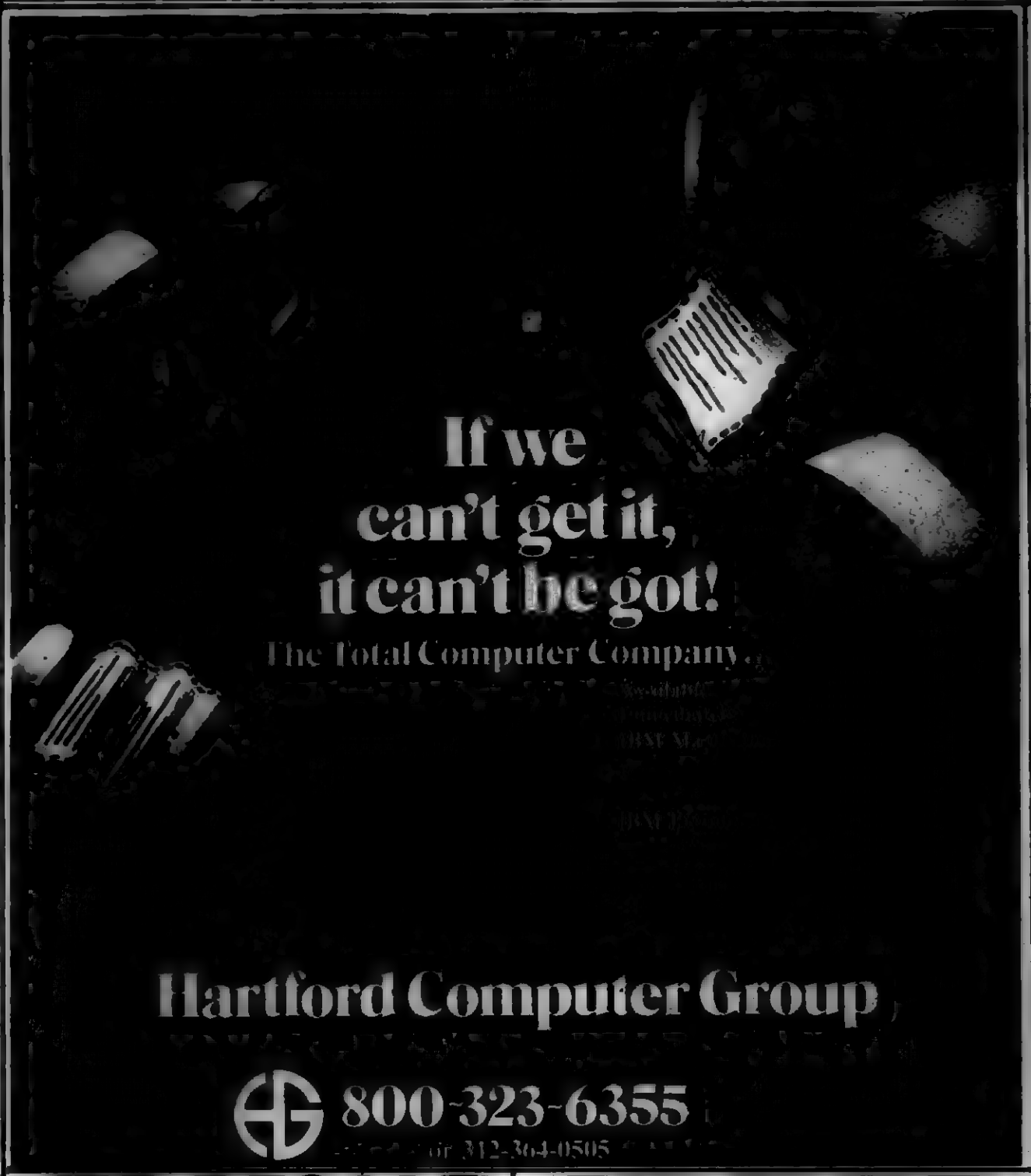
Sales Offices in:

Atlanta, Austin, Boston, Chicago, Dallas, Houston, Los Angeles, New York, Philadelphia, Phoenix, Pittsburgh, San Francisco

GREYHOUND COMPUTER CORPORATION

A subsidiary of The Greyhound Corporation

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP



C.D. SMITH & ASSOCIATES, INC.
DEC computer systems & options
13925 East Freeway, Suite 310
Houston, Texas 77015
(713) 451-3112
TELEX 79-2547

DEC

WE ARE BUYING: VAX 11/780

WE ARE SELLING:
MSV11-DC 2,000 DR11-W 1,495
MSV11-CA 1,000 RA81-AA 18,000
MSV11-DC 2,000 TE11-CA 10,000
RX02-AA 2,700 RF08-AA/RF30 6,000
DW780-AA ..... 15,000 11/780 CPU ..... CALL

If you would on our Mailing List, call Yolanda (713) 451-3112.

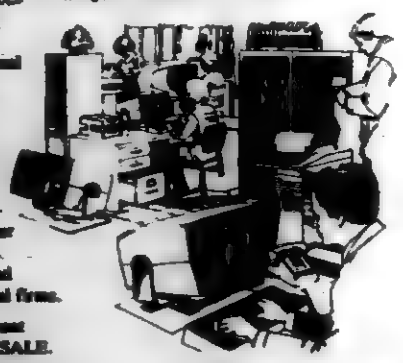
BUY / SELL / LEASE
158 V/5
168 V/6
IBM AMDAHL
3081 V/7
3032-3033 V/8
INTERESTED IN ALL MODELS AND CONFIGURATIONS
ALSO, MODEL-FEATURE-MEMORY UPGRADES

HAVE REQUIREMENT FOR 3033-U/6 WITH (1) 4300, (1) 8550, (2) 3350s.

WE WOULD LIKE TO TALK WITH YOU
PLEASE CONTACT: DALE HAUCHER OR CHARLIE BERRY
MAJOR COMPUTER INCORPORATED
14567 Yellow Circle Drive
Minnetonka, MN 55343
(612) 933-0000
computer
MCI

IBM
Series/1 • S/34 • S/36
S/38 • 4300
3110 - 3120 • S/32
BUY • SELL • LEASE
All models, systems & peripherals
AVAILABLE NOW!
Ask about our 72 hour upgrades
(408) 425-7333
SOURCE DATA PRODUCTS, INC
1114 Water St. Santa Cruz, CA 95062

CPR:RESALE
Computer Products & Repair

No charge to tell the Data General world.
Call us to list the DG equipment you have to sell or buy. There are no fees. CPR's large, computer-based sales force will find you a MATCH TODAY through national phone sweeps, direct mail, and advertising.
Buy at the price you want. Sell at the price you need.
$2 Million is also available to buy and sell your inventory fast, with aggressive trade-ins, and leasing through national firms.
Expect the price you want TODAY with CPR:RESALE.

CPR gets you results.
California: 800-392-2317
800-843-2047
1830 Fourteenth Street, Santa Monica, California 90404 213-450-0010

DEC
RENT • BUY • UPGRADE • SELL
PDP, 11/03, 11/04, 11/23, 11/24, 11/34, 11/44, 11/70, VAX/730, VAX/750, VAX/780
SYSTEMS • OPTIONS • SUPPLIES
11/24 ... Dual RL02, DZ11-A, Dual H9642 (new) ... $20,000
11/23+ ... 256KB, Dual RL02, DZV11-C, VT102, Rxxxxx (new) ... $16,250
11/70 ... 512KB MOS, LA36 (used) ... CALL
VAX/780 ... RA60, RL02, VS50 Rxxxxx (new) ... CALL
Customized Configurations—Call With Your Request.

In Stock		Specials		In Stock	
11/34-BC (new)	$11,200	DB11-B (new)	$ 495	DB11-P8 (new)	$1,195
DB11-A (unused)	$ 495	DMF32-AB (new)	$ 3,495	DMF32-AA (new)	$ 2,995
DMP11-DA (used)	$ 995	DZ11-F (new)	$ 3,100	H9642 (new)	$ 1,350
KT24 (new)	$ 700	LP11-SA (xxxxxxx)	$ 3,495	RL211-AK (new)	$5,400
				RUA81-AA (new)	Call
				VT52-AA (used)	$ 495

BROOKVALE ASSOCIATES
800-645-1167 NY: (516) 273-7777

IN STOCK!
Fujitsu Eagle
with cabinet, cables, slides & terminator:
$13,000
New Fujitsu SP 380
80 character per second, letter quality printer:
Introductory Special - $2,595
MANDERS
303-693-3035
2771 S. Jasper • Aurora, CO 80013

FOR SALE
XEROX 1200
Model-3 (On Line Only)
$12,000 Or Best Offer
Avail. 6/84 Or Sooner
Sandoz Inc.
(201) 386-8142

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

COMDISCO

A Commitment To Excellence

IBM PROCESSORS

- 3081
- 3083
- 3033
- 4341
- 4341/4381
- 4331-2/4361
- Amdahl Available February

IBM PERIPHERALS

- 3880
- 3880-11
- 3380 AA-4, B4
- 3370/3375
- 3803-2
- 3420-4/6/8
- 3705/3706
- 3725
- 3178/3278
- 3890

The Leader in Full-Service Leasing

A MEMBER

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

BUY-SELL-LEASE

SERIES/1

SAVE ON NEW OR USED
OVER 2000 CUSTOMERS

S/38
4331
4341
4361
4381

ALL RELATED PERIPHERALS
SHORT/LONG TERM LEASES

S/34

SEE OUR NEW PRICES

S/36

SHORT/LONG TERM LEASES

3083
3081

LEVERAGED LEASES

3350	3370	3340
3360	3375	3344
3411	3420	3430
3278	3274	3276

Call toll-free 800-328-5718
(in Minnesota, 612-544-8660)

COMPUTER OPTIONS, INC.
"the best option"
1660 South Highway 100
Minneapolis, MN 55416

asCd

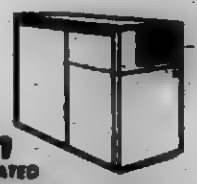
IBM S/34

All Machines Refurbished and Painted
Any Configuration
IBM Maintenance Certified
Installation Available

Complete Systems
All Peripherals

ALL UPGRADES

MODEMS
3741
3742



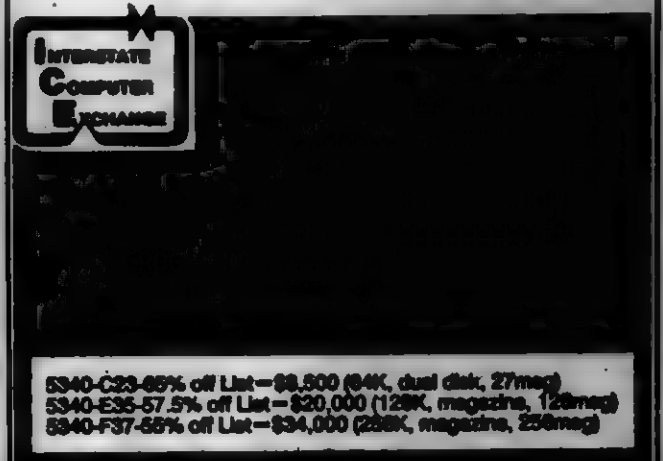
Tennecom
MARKETING INCORPORATED
P.O. BOX 248 GOODLETTSVILLE (NASHVILLE) TENNESSEE 37072

asCd MEMBER AMERICAN SOCIETY OF COMPUTER DEALERS

800-422-1004
In Tennessee: 615-859-3872

BUY • LEASE • SELL

INTERSTATE COMPUTER EXCHANGE



5340-C23-65% off List—$8,500 (64K, dual disk, 27meg)
5340-E35-57.5% off List—$20,000 (128K, magazine, 128meg)
5340-F37-55% off List—$34,000 (256K, magazine, 256meg)

TOP $ PAID FOR S/34's and S/38's

CALL COLLECT

NEW & USED EQUIPMENT FOR SALE BY END USER

DATA GENERAL

1) 6040 TTI PRT	$ 400	3) 10130N 1/2 BAY CAB	300
2) 6973 LP2 PRINTER	600	2) 11444A 1 BAY CABINETS	600
1) 6974 LP2 PRINTER	1000	1) 10788A 1 BAY IND. CAB.	
1) 6180 LP2 PRINTER (NEW)	1950	W/AIR COND. (NEW)	4400
1) 6181 LP2 PRINTER (NEW)	2250	1) 10788 1 BAY IND. CABINET	
1) 6189 25 MB DISK (NEW)	6000	W/HEAT EXCH (NEW)	5000
2) 6186 35 MB DISKS	4000	8) 4341 ULM 5 BOARDS	700
6) 6970 20 MB S/S	3000	6) 3284 LP2 CONT	600
6) 6970A 20 MB DISKS	2000	12) 6027 20 MB CONT	700
1) 62270 15 MB DISK (NEW)	4800	2) 6980N 4C 5 SLOT S/K	1395
1) 6088 12.5 MB DISK W/FLPY	3100		
1) NOVA 4X 5 SLOT 128K 15 MB DISK W/FLOPPY & ULM 5			12,100
1) NOVA 4X 6 SLOT 128K 12.5 MB DISK W/FLOPPY & ALM 8			12,800
1) ECLIPSE S/80 128K 12.5 MB DISK W/FLOPPY & 2 4227's			16,800

MODEMS & TERMINALS

11) WA1281 VADIC 1200 BAUD	125	11) 801/224 MICOM MODEMS	1200
3) WA3451 VADIC 1200 BAUD	400	60) AU ACOUSTIC COUPLERS	
1) WA3456 VADIC 1200 BAUD	400	BELL 103-113 208	85
38) ADM3A L.S.I. TERMINALS	275	4) ADM5 L.S.I. TERMINALS	350

CONTACT: ROBERT FULWILER 214-239-0814

DATA GENERAL
New & Used Equipment

BUY. SELL. TRADE.

McINTYRE'S
Mini-Computer
Sales Group Inc.

(313) 283-4100

TLX: 810-232-1886
Answer Back: MCDATAGEN MANS

32000 Edward Ave.
Madison Heights, MI
48071

BASIC SYSTEMS HARDWARE, INC. CAN:

- Buy your S/34
- Lease you a S/34
- Sell you a S/34
- Save you $$$$$$$
- 3 Mos. FREE Maintenance with Purchase
- Plug thru Peripherals
- Software Support
- Upgrades
- Demo Site in Midtown Manhattan

Contact Ken Clarke, Branch Manager, BSC, INC. 489 7th Ave. NY, NY 10123 - 212-279-0167

M/G SETS CHILLERS

for

3033/308X

BU[illegible]SE

612-944-8552

Inflation Fighters

Quality & Savings

Slightly used. Money Back Guarantee. Full Reels. All External Labels Removed Guaranteed for use at 800 BPI through 6250 BPI.

2400' Reel	$4.95 ea.
1200' Reel	$4.25 ea.
600' Reel	$3.50 ea.

All Tapes with Hanging Seals

We pay freight on orders over 200 tapes. *All orders shipped within 48 hours.*

Call or Write

Computer Tape Mart
44A Seabro Avenue
N. Amityville, New York 11701
[516] 842-8512

CMI

CMI

3081
New or Used

3081/3083/3084
Lease Financing Available
For Your System or Ours
2, 3, 4 or 5 Year Terms

Wanted
4341-M2
4341-L01
Call Now

Series 1
New 4955's, 4967 Disk
Used 4955F's, 4955E's
Immediate Delivery
Buy-Sale-Trade
Leases Available

3083
New or Used

3725
Lease Financing Available
For Your System or Ours
2, 3, 4 or 5 Year Terms

Series 1 I/O
New or Used
IBM/CDC/Printronix/
Datum/Data South/NEC
Printers - A9C11/31/5E
180 CPS-1120 LPM
Tape Controllers - Bus&Tag Unit
Datum 9000-4000
Disks - Fixed/Removable
5.25"-8"/9"
Buy-Sale-Trade Leases Available

3350 3850 3830
3340 3370 3330
3375 3380
Buy/Sell/Lease

3033
All Models

SYSTEM 36
Monthly Lease Rates
Lower Than IBM Credit Corp.
2, 3, 4, or 5 year terms
Includes System 34 Interests

8130's
Sale or Lease
Available Immediately

3800
LASER PRINTERS
Model 1's
Available for Immediate Delivery
Model 3
Lease Financing Available - Any Term

3033
All Upgrades

3042
Attached Processor
Available Now

NEW 5224 PRINTERS
Greater Discounts Than IBM
Leases Available
5224-1 (140 LPM) $185/mo.
5224-2 (240 LPM) $199/mo.
Call For Short Term Rates
Immediate Delivery

3705-3704
Available for
Immediate Delivery
Sale or Lease
We Can Supply Models E through K
Call Us For Purchase/Lease/Lease-back
Of Your MLC Machines
And Save 50% Of Your Monthly Cost

DCM DIVERSE COMPUTER MARKETERS INC.

BUY • SELL • LEASE
- Fast Delivery
- Configured to Your Requirements
- Short & Long Term Leases
- Excellent Rates & Prices.

S/34 • S/36 • S/38 • 4300
All Models • Upgrades • All Peripherals

SPECIAL
3033 "N" Series Memory 8 meg • #4850 Data Streaming
4331-J01 • 3262-001 • 3278-A02 • 3310-8809 • 3203-005
3274 Communication Controllers - Local & Remote

For complete details call
(313) 855-5960
Dallas/Ft. Worth (817) 735-9811
Toronto (416) 498-6737

DSI

WE BUY SELL & LEASE!

BURROUGHS

Discover the DSI alternative.
800-641-5215
All equipment available immediately and guaranteed for Burroughs Maintenance
DSI Serving the Burroughs Community Worldwide
2480 W. Alameda Ave., Denver, CO 80223 (303) 922 8331
TWX 910 931 0483

You can get information on buying or leasing
IBM 34-36-38
as fast as you can dial
1/800/LEAS-PAK.
In Texas call 817/268-0023.

Up to 50% Savings

LPI

LEAS PAK INTERNATIONAL
P.O. Box 759 • Hurst, TX 76053 • 817/268-0023
Send for our free products and services brochure.
Name _____
Address _____
City _____ State _____ Zip _____
Phone _____

Limited Systems/36 deliveries, new displays and printers in stock. We want to buy your owned or rental credit equipment.

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

TexCom

Join the more than 200 other major companies that lease IBM equipment from TexCom - the IBM specialists.

WE BUY • SELL • LEASE

SERIES I
- All features and peripherals available
- Buy, sell, trade
- Leases available

4361/4381
- Two, three and four year leases

IBM S/34
IBM S/38
- All models and peripherals available

IBM S/36
- 1, 2, and 3 year leases
- We take S/34 trade-ins

4331/4341
- 1, 2 and 3 year leases
- All models available

TERMINALS
5291 5225 3278
5251 3277 3287
5256 3279
AVAILABLE NOW

DISKS
3370 3380 3340
3375 3350
AVAILABLE NOW

WE WANT TO BUY
- Your IBM systems and peripherals
- Your rental credit equipment

MEMPHIS • SAN ANTONIO • HOUSTON

AEL (512) 349-9955 BSCO

AVAILABLE FOR LEASE ONLY

Availability Date: April 1, 1984

3033-A16	Processor
3830	Extended Channels
4800 (2)	Data Streaming
3F0870	RPO Connection
3036-1	Console
3037-1	Power & Coolant Distribution Unit
3042-1	Attached Processor
3066-1	Console
3037-1	Power & Coolant Distribution Unit
3068-1	Multiprocessor

Contact Jack Northrop
215/964-2000

LFC

CDLA Member Computer Dealers & Leasing Association

Three Radnor Corporate Center
Radnor, Pennsylvania 19087
(215) 964-2000

Buy - Sell - Lease

S/32
S/34
S/38

IBM 3741 3742

CPU's CRT's PRINTERS
ALL MODELS
PURCHASE/LEASEBACK
SHORT & LONG TERM LEASES

CMA

Computer Marketing of America, Inc.
P.O. Box 71
618 Bryan Street
Old Hickory, Tennessee 37138

BSCO

1-800-251-2670
In Tennessee: 615-847-0831

WANT TO BUY
SYSTEM/34 PERIPHERALS
5251's, 5291's, 5224's, 5225's, and 5256's

Call 214/258-0541

MCC METROPLEX COMPUTER COMPANY, INC.
320 Decker Drive • Suite 180 • Irving TX 75062
TWX 910-860-5888

4331-K2 AVAILABLE
CPU's & Peripherals
Purchased, Sold & Leased

CCI CORPORATE COMPUTERS, INC.

Contact:
Norm Berger

(203) 661-1500
115 Mason St., Greenwich, Conn. 06830
Member Computer Dealers & Lessors Association

The nationwide market - a call away!

DEC/DG

SYSTEMS/PARTS/PERIPHERALS
NEW/USED/SURPLUS • DISCOUNT PRICES
Since 1977! Buy, Sell, Trade and Broker.

PHIL	BRYAN	JENNIFER
DG	11-VAX	8-LSI

CALL TODAY - (305) 392-2005
TELEX 568-670

thomas business systems, inc.
4301 Oak Circle - Unit 11 Boca Raton, Florida 33431

SALE LEASE PURCHASE

DATA GENERAL

Desk Top Models 10, 30 & 50
MV4000
MV8000
C/330, C/150
6/650
Nova 4/X, 3/12, 1200, 1220
6057 Expansion Chassis
Micronova, 640k, I/O
Eclipse Memories
6716 C/150 1Mb Memory
ALM-16, 12-M-5, 6LM-5, DCU/60
AMB-6, ATI-16, IAC-6, IAC-16

6210/6211/6416/6420 CRTs
D100/D200/D400/D600 CRTs
Desktop Printers
Letter Quality Printers
6160 72Mb Disk System
6161 147Mb Disk System
6058 80Mb Disk System
6059 12.5/1.2 Mb Disk System
6034 80Mb Disk System
6021/6026/6125 Tape Systems
6040/6060 Diskette Systems

AMES SCIENCES, INC.
301/220-8100

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

Pioneer Computer Marketing
214/343-2904

BUY - SELL
LEASE
- All IBM Systems
- Peripherals
- Tapes
- Disks

SERIES/1
- Systems
- Features
- Peripherals

SYSTEM 34
- CPU
- Peripherals
- Upgrades

PIONEER COMPUTER MARKETING
11446 Pagemill Road
Dallas, Texas 75243
214/343-2904

What makes Dataserv a world leader in the IBM marketplace?

Customer satisfaction.

Over 65% of Dataserv's business comes from previous customers or customer referrals.

dataserv

HP 1000 3000 64

encore
(213) 452-9117

NPA SYSTEMS INC.

SPECIALIZING IN:
PURCHASE SALE, TRADE, LEASE, RENT,
AND SERVICE OF
Data General EQUIPMENT

10,000 SQ. FT. WAREHOUSE FULLY STOCKED
201 COATES AVENUE HOLBROOK, N.Y. 11741
TELEX # 510 222 0892
(516) 467-2500

System/34
12MB/64MB
Printer 300LPM
$1000. P/Mo.
Sale/Lease

Sale/Lease
4341's
Models K, L, M - GRP 1 & 2
Lease Term -
1 Yr or Longer

Control Units
3880 - B13
3880 - D13
Avail: March 1984
Sale/Lease

Controllers
3880 3803
3274 3276
Immediate Delivery

DASD
3380 3375 3370
3350 3344 3310
Immediate Delivery

Tape Drives
3420 3430
3410 8809
Immediate Delivery

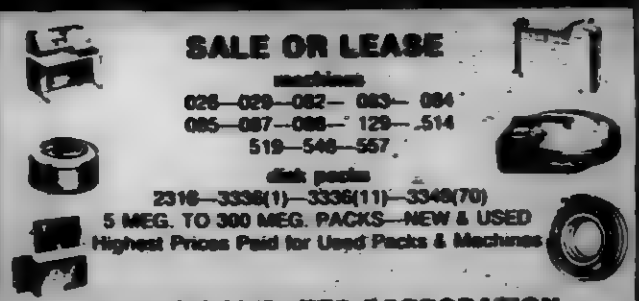
Display Stations
3278 3279
3178 3277
Immediate Delivery

Printers
4245 3800 3889
3211 1403 3262
3800 3287 8809

COLA

Computer Marketing Inc
P O Box 5265 Philadelphia PA 19125

IBM UNIT RECORD EQUIPMENT & DISK DRIVES
BUY-SELL-LEASE-SWAP-REPAIR-SERVICE



SALE OR LEASE

machines
026—029—082— 083— 084
085—087—088— 129—.514
519—548—557

disk packs
2316—3336(1)—3336(11)—3349(70)
5 MEG. TO 300 MEG. PACKS—NEW & USED
Highest Prices Paid for Used Packs & Machines

THOMAS COMPUTER CORPORATION
6633 W. Howard St. Chicago, IL 60648
800-621-3606 312-647-6666
Authorized Distributor — Memorex, CDC, 3M, BASF, Verbatim, Dysan

SHORT TERM LEASES AVAILABLE

PEARL HAS IBM SYSTEMS 34, 36, 38

and we have a large inventory of IBM 3741's, CPU's, CRT's and printers. We buy, sell, lease, rent and purchase/leaseback IBM Systems.

Call John Spight or Ken Warren

Pearl Computer Division

P.O. Box 24026 •4717 Centennial Blvd.. Nashville, TN 37202 (615) 383-8705

* * * * DEC * * * *

BUY—SELL—LEASE—TRADE—CONSIGN

SYSTEMS — PROCESSORS — OPTIONS

PERIPHERAL — MODULES — MEMORY

— SPARES —

NATIONAL COMPUTER EXCHANGE

(800) 624-9299

600 North Lunar Avenue, Brea, CA 92621

TWX: 910-596-1499 (714) 990-5988

MISSISSIPPI CENTRAL DATA PROCESSING AUTHORITY

Sealed proposals will be received by the CDPA, 508 Robert E. Lee Building, Jackson, MS 39201 for the following data processing equipment and services:

Request for Proposal No. 890, due 3:30 p.m., Friday, February 17, 1984, for the acquisition of a computer system capable of running the MUMPS interpreter and COSTAR application software for the Mississippi State University College of Veterinary Medicine.

Request for Proposal No. 891, due 3:30 p.m., Wednesday, February 22, 1984, for the acquisition of a LISP-based microcomputer system that will be used for artificial intelligence studies by the Mississippi State University Computer Science Department.

Detailed specifications may be obtained from the CDPA office. The CDPA reserves the right to reject any and all bids and proposals and to waive informalities.

Dorothy Hooper or Elaine Keesee,
State Central Data Processing Authority
601/359-1365

National Computer Equipment Corporation

4341 CPUs AVAILABLE NOW

EXAMPLE: 4341-K1
S/N 75421
FOR SALE OR
SHORT-TERM LEASE

JOE MICHAELS
313-774-7400
800-NAT-COEC

CDA

LEASE • PURCHASE • SELL

IBM SYSTEMS

- *Purchase-Lease Back*
- *Customized Leasing*
- *Upgrade Flexibility*
- *All models and peripherals*

612-941-0510

WINTHROP FINANCIAL CORPORATION

computer sales & leasing division

6400 Flying Cloud Drive • Eden Prairie, Minnesota 55344 • 612/941-0510

System 38/36 34

- Significant Savings
- Trade-In Allowance
- Guaranteed Full IBM Support
- You pay only after installation and IBM accepts the equipment under maintenance
- Fortune 500 references

Can you believe lease terms better than IBM?

- New Tax Lease
- Purchase/Lease Back
- Check IBM's New Plan A B C... then call Datacomp

The Datacomp Leasing & Service Group

Toll Free -1-800/223-6999
New Jersey 201/467-0660
Chicago 312/280-1260

We Buy & Sell DEC Systems Components

call:713 445-0082

Digital Computer Resale

600 Kenrick Ste C22 Houston, Tx 77060

STC TAPE/DISK

BUY • SELL • LEASE

(408) 241-3676

SYSTEMS
4341 4331
38 36 34
32 3
BUY • SELL • LEASE
COMPUTER BROKERS, INC.
2978 SHELBY ST.
MEMPHIS, TENNESSEE
CB
TOLL-FREE
800-238-6405
901-372-2822
PERIPHERALS
3203 3370
327X 3411
3350 3420

IBM
5110 5120
3741 3742
DATAMASTER
1255 MICR
SYSTEMS
34 36 38 32 23
All Associated Peripherals
BUY SELL LEASE
• Printers, Display Stations
• Upgrades & Features/Add-ons
• Scales/Tables
• IBM Maintenance Guaranteed
Call Today for Quotation
(615) 352-8565
SOUTHERN DATA SYSTEMS
Nashville, Tennessee

"A COMPUTER LEASING COMPANY'S FINANCIAL STABILITY IS VITAL."

We said that in 1973, when Randolph became a subsidiary of The First National Bank of Boston . . . and we say it again, because it is still true and even more important today.

As an important part of The First National Bank of Boston, one of the nation's oldest and leading financial institutions, Randolph has a built-in financial stability that continues to be unique in the third-party computer leasing industry.

LEASING COMPUTERS IS OUR ONLY BUSINESS.

Randolph specializes in leases for IBM 3081, 303X and 4300 computer systems and peripherals . . . firm evidence that we plan to perpetuate our computer leasing activity.

Our people have an average of 18 years experience in the DP industry . . . from 360's to 3081's. They know all about alternative financing to be sure, but they also know their way around a DP department and the hardware in it.

WE SPECIALIZE IN SOLVING PROBLEMS.

Machine installed on a rental basis? Long wait for delivery? Stuck with a lease on your old machine? Own a 3081 but need cash? Whatever your problem, we can tailor a lease that will fit your exact needs and let you start saving money right away.

SAVE $80,000 EVERY MONTH FOR THE NEXT 5 YEARS.

You can lease the same 3081 that IBM rents for more than $180,000 per month from Randolph for less than $100,000 per month. If you're renting an older machine, we can save you even more—and you'll get about 4 times the throughput in the bargain.

WHEN IS THE BEST TIME TO TALK TO RANDOLPH?

The sooner the better. But it's never too late, even if you already have a machine installed.

Our 19 years in computer leasing gives added assurance that Randolph will continue as the leader in the computer leasing industry . . . continue to live up to the terms and conditions of our agreements . . . provide upgrades . . . fulfill all of our commitments.

LET RANDOLPH HELP YOU GET THE SYSTEM YOU NEED NOW, *NOW*.

We've already done it for many of the Fortune 500 companies . . . and we can do it for you. Call Joseph B. Kelly, Jr., Executive Vice President. 800-243-5382

537 Steamboat Road
Greenwich, Connecticut 06830
203 661-4200

Randolph

A MEMBER OF COMPUTER DEALERS & LESSORS ASSOCIATION RANDOLPH COMPUTER CORPORATION A subsidiary of THE FIRST NATIONAL BANK OF BOSTON BANK OF BOSTON

BUY • SELL • LEASE
SERIES-1
S/34 • S/36 • S/38
4300
S/23 S/32 5110-20
Tape-Disk-Printers-Tubes
AMCOM CORPORATION
5200 W 73RD ST • MINNEAPOLIS, MN 55435
(612) 835-4737
CALL TOLL FREE
800-328-7723

URGENT
For 2/15/84 Delivery
NEED TO BUY IN QUANTITIES
• 3350-A2
• 3350-B2
• 3830-2
USERS ONLY
CALL JOHN GILES
TOLL FREE: 800-325-0960
CSI
COMPUTER SALES INTERNATIONAL, INC.
P.O. Box 16264, St. Louis, Missouri 63105

We've Got Your Number
S/34 ALL MODELS QUICK DELIVERIES
SERIES 1 CONFIGURED TO YOUR NEEDS
S/36 ATTRACTIVE LEASE RATES
S/38 NEW & USED MACHINES
5110/5120 NEW LOW PRICES
PERIPHERALS
CRT'S, PRINTERS, DISK, TAPE, MODEMS
CARLYN
COMPUTER SYSTEMS
"CALL COLLECT" (703) 642-1950

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

SERIES I SPECIAL

Control Data
126MB Removable Drives . . $12,900
Diskette Drives . . . . . $ 1,495
Printers & Displays

New or Used
Immediate Delivery

IBM
4956 Processors
4967 200MB Disk Drives
All Peripheral & Features

DISK DRIVES · CONTROLLERS · PERIPHERALS · MEDIA

WANG · DEC

National authorized CDC OEM-Distributor offers
new equipment, fully warranted for 90 days:

$12,900 CDC Model 9766 (300 Mb.) WANG Models 2285V-2, and 6585 (288 Mb.) DEC Model RM0 5 (256.1 Mb.)

$7,750 CDC Model 9762 (80 Mb.) WANG Model 2285V-1 (75 Megabytes). DEC Model RM0 3 (67.1 Mb.)

$8,875 CDC Model 9448 (85 Mb.) WANG Models 2280 V-3 (80.4 Mb.) WANG Models 2280 V-3, 6580 (80 Mb.) DEC Model RM0 7 (83.4 Mb.)

$20,825 CDC Model 9775 (675 Mb.) WANG Model 2285 V-3 (640 Megabytes). DEC Model 2-RM0 5s (512.2 Mb.)

ERST
INTERNATIONAL CORPORATION
225 Lafayette Street, New York, NY 10012

ERST is the largest dealer in pre-owned WANG equipment—2200, VS, WP (CPUs, Terminals, IOPs, Controllers, Printers, Memory Upgrades).

Would these give us a call . . . Toll Free **1-800-FOR-ERST** . . . In N.Y. **212-431-1100**

DEC

unbeatable combination
inventory of low, low prices

Call toll free 800-328-7000
In Minnesota (612) 894-4020

MIDWEST SYSTEMS, INC.
Burnsville, Minnesota 55337

FORSYTHE McARTHUR ASSOCIATES, INC.

DEALER / LESSOR OF IBM Computers and Peripherals

Home Office
Chicago
919 North Michigan Avenue
Chicago, Illinois 60611
312 943-3770

Branch Offices
Atlanta 404 [illegible]
Milwaukee 414 [illegible]

CDR

DATA GENERAL

Hanson Data Systems

For Sale
DEC 2040
With 256K
32 Ports
2 each TU45's
2 each RPO6
Call Henry
(713) 445-0082

WANG WORD PROCESSORS
AT THOUSANDS OFF!

1-800-321-2966

IBM SYSTEM **34**
Buy
Sell
UPGRADES
Lowest Prices
Call Collect:
404-252-7490
DATAMARC
6065 Roswell Rd.
Suite 320
Atlanta, GA 30328
S/1
S/38

AUCTIONS

PUBLIC AUCTION
2 DAYS
By Order of Directors
Closing Mountain View Facility - ONLY
DICTAPHONE CORPORATION
1220 Charleston Road
Mountain View, California
Thursday, February 23rd at 10:00 AM
& Friday, February 24th at 10:00 AM
COMPUTERS - ELECTRONIC PARTS INVENTORY - OFFICE FURNITURE & EQUIPMENT - HUNDREDS OF: DESKS, CHAIRS, FILE CABINETS, ETC. - TYPEWRITERS - TEST EQUIPMENT - TEKTRONIX SCOPES - MAINTENANCE SHOP - WAREHOUSE EQUIPMENT
69,000 Sq. Ft. Plant
Inspection:
- Tuesday, February 21st
From 10:00 AM - 4:00 PM
Wednesday, February 22nd
From 10:00 AM - 4:00 PM
Also, Sale Day
From 8:00 AM - 10:00 AM
Call Or Write For Free Descriptive Brochure:
GOLDEN STATE AUCTIONEERS, INC.
1991 Ygnacio Valley Road, Suite 200
Walnut Creek, California 94598
(415) 937-1555

BIDS & PROPOSALS

REQUEST FOR PROPOSAL

The City of Alexandria, Virginia, Public Schools, will receive and open proposals in the Finance Office, 3001 West Braddock Road, Alexandria, VA 22302 on March 1, 1984 at 2:00 pm for a HUMAN RESOURCE MANAGEMENT SYSTEM. The Alexandria City Public Schools reserves the right to disregard any irregularities in any proposal and to reject, without explanation, any or all proposals. Proposal information may be obtained from the City of Alexandria School Board Administration, Finance Office, 3001 West Braddock Road, Alexandria, VA 22302, between the hours of 8:30 am and 4:30 pm, Monday thru Friday. The telephone number in the Finance Office is (703) 998-2100.

John D. Johnson, III, Superintendent of Business Services and Transportation

RFP Number 83-84-005

Request For Proposal
Automated Circulation Control System

The Brooklyn, Queens Borough, and New York Public Library will be accepting proposals for an automated system to control the circulation of library materials. The total system must be capable of supporting in excess of 40 million circulation, plus related transactions entered at more than 600 terminals located throughout the City of New York. Proposals are to include the equipment for a communication network to support this system. However, vendors of communications equipment may submit proposals for these facilities separately. A Request for Proposal (RFP) for this project may be obtained by writing to Ms. Barbara Tregar, NYU Circulation Control Project, The New York Public Library, Tilden Building, 455 Fifth Avenue, New York, NY 10016. Request for a copy of the RFP must be accompanied by a non-refundable fee of $50 payable to the New York Public Library by check or money order to the New York Public Library.

"A request for information for Automated Pupil Transportation Routing System is available to prospective bidders. Contact Mr. Kevin Alworth at (212) 784-3313, extension 264 for additional information."

The Bulletin Board

SPERRY UNIVAC

V-77 866 SYSTEM
(1) 866K CPU with Pages 9/20
(3) [illegible] 828 MB Disk Drives
(3) 10 MB Disk Drives
(2) 800 IPS Tape Drives
(1) [illegible] Tape Drives
(1) 600 LPM Printer
(1) 300 LPM Printer
Will Sell/Lease/Trade
Ask for Tom [illegible]

HEWLETT PACKARD

HP 3000
BUY & SELL
Complete Systems
Memory • Terminals
Disk Drives • Tape Drives
Miscellaneous Parts
CenAm Corporation
(Formerly Kirby & Associates)
(800) 526-4264
(213) 426-8468

HEWLETT PACKARD
1000 • 2000 • 3000
SYSTEMS & PERIPHERALS
BUY & SELL WORLDWIDE
EURODATA, INC.
(613)725-6666
Tlx: 053-3533

Buy-Sell-Lease
HP3000 3X, III, 4X
and related peripherals
Call Carol
CSU INDUSTRIES, Inc.
516-239-4310

BURROUGHS

BUY SELL LEASE
All Systems & Peripherals
AVAILABLE
- B1855 Sys - B1855 Sys
- B900s - B900s
(Configured To Your Specs.)
- Wang 300 Terminals
- B90 Terminals model 100 & 110
- TD830s, MT980s, MT990s
- 200 & 307 Byte Disk Drives
- Various Tape Sub-systems
- Memory Upgrades
- Printers 0600 & 0640 Styles

Guaranteed Burroughs Mdnt.
Depot Maintenance Available
COMPUTER PROVISIONS
(216) 248-7878
(Member BDA)

BURROUGHS

B97 • SELL • LEASE
B1700 • B1800 • B1900
[illegible]
[illegible]
[illegible]
[illegible]
[illegible]
TRADE • UPTIME • B97 • Customer
TURNKEY Terminals
Installation & DEPOT MAI Available
[illegible] Corp. (216) 975-7100

PRIME

PRIME
LARGE SELECTION
OF USED PRIME
COMPUTER SYSTEMS
...SAVINGS TO 50%
Peripherals also available:
Memories-CRT's-Drives-Controllers
Modems-Terminals-Printers
1st SOURCE
...Your Alternate Source
A DATAMATION SERVICES, INC., COMPANY
2001 EAST CAMPBELL AVE.
PHOENIX, ARIZONA 85016
(602) 957-0669
ASK FOR DON OR MATT

MISC.

WANT TO BUY
N.E.C. Astra Series Processors
#210, 220, 230, 250, 270
Printers-A-2100
CRT's-A-4010
Call Computer
Providence Corp.
(216) 348-7878

BUY - SELL - LEASE
DATAPOINT
HARDWARE & SOFTWARE
•Turnkey Systems •FAMIS Software
On-Line Accounting
(713) 529-6613

Buy • Sell • Lease
• Short Term Rentals •
DATAPOINT
FOR SALE
8466 Printers $1,195
8466 Memories $800
8466 CRT's $1,250
1865 Systems $1,995
Computer Computer Corp.
(216) 291-6969

HONEYWELL

[illegible]
512K CPU
60 MB Disk (FP + 14)
1,200 LPM Printer
1600 BPI Tape & Controller
3-7981 CRTs
Available August 81/84
Buy Our Equity and
Take Over Last 13 Months
of P&H Operating Lease
(214) 934-0747

MISC. SYSTEMS

For Sale
DATAPOINT
4630
300 LPM Printer
(216) 464-6620

•CONTROL FUTURE
DATA SERIES 2000
More processor development systems supporting 8 and 16 bit processors. Single or multi user configurations. Prices downright VB call for.
Contact Cadlet
4701 Preston Road #3
Santa Clara, CA 95054
(408) 980-4827

DEC

DEC BARGAINS

11/84A CPU Set	$1,595
11/44 KE44-A "DIS"	$2,975
4A-CI780 System Kit	$6,800
BDV11-AA	$495
DR780-AA	$8,400
DZ11 MUX Bd.	$1,125
DZ32-S	$1,870
FP11A	$1,195
KK11-A	$1,795
KK11-S	$2,875
KW11-P	$330
MS11-MB	$1,275
MS780-DC	$4,850
MS780-FD	$2,995
MSV11-PK	$1,195
MSV11-PL	$1,275
PDP 11/84A-DC	$3,350
RLV11	$975
VAX 1MB MS780-CA	$2,995
VAX 1MB MS780-CA	$2,995

Call Ray at QEI, Inc.
(617) 275-6900

New Available In Stock!
Micro PDP-11 with 10 MB0 Winchester, (2) RX50 Floppy Drive, 2MB RB Memory
Inquire Price
PDP 11-03, RLV-11 Controller, 64KB Memory, LA 180 Printer, RT-11 License.
$4,000
PDP 11-03 with RL02 Drive (5 MB KB Memory, LA 180 Printer, RT-11 License.
$12,500
LA 180 Printer with Controller
$625
Other Configurations Available
Complete Range of DEC Compatible Software, Consolidation.
E.E.C. Systems, Inc.
(617) 449-5180

DEC & PRIME
SPECIALS
- MS780-FD
Avail Now $4,500 ea.
- PDP 11/70
Configured to your needs Call
- RMO5-AA $6,500
- CDC 9775 600MB Call
- CDC 8760 300MB Call
- RP06-AA Call
- VAX 11/750 1MB, 64K chip Now Call
- RM05 Call
- TU78 A8 Call
- Prime Computer Systems Available Upon Request
SEVCO INC.
(617) 436-6636

DEC

DEC NEW & USED
BUY — SELL — EXCHANGE
Systems • Processors • Memory
Options • Peripherals • Modules
LACKAWAY COMPUTER CORP.
1800-A Main St., Lake Geo, SC 29650
(800)845-5845

DEC Equipment
Bought & Sold
Systems - Components
Peripherals
New Or Used
Manufacturer Enterprises
Essex St., Middleton, MA 01949
(617) 777-6666

VAX
RESOURCE ACCOUNTING
$1200.00 U.S.
ON LINE-MENU DRIVEN
DISK ACCTG-MGMT REPORTS
Virtual Computing
#1008, 888-11 Ave. S.W.
Calgary, Alta., Canada T2R0C9
(403)265-1448

BUY • SELL • TRADE

1170 Sys.	DE11-E	FP700
DL11-E	FP11-C	RM05-AA
DL11-W	LA120-DA	RM05-AA
DMC11	MF288	RP04/5-C
DR11-B	MR912	RP06-AA
DZ11-B	MR11-CE	TE16 Mstr.

NEW YORK COMPUTER EXCHANGE
(516)752-0088 (800)645-5166

DATA GENERAL

DESKTOP GENERATION
We are generating Desktops.
Models 10, 20 & 30 at
lowest prices available!
Call Tami Peterson
Track Data Corporation
(216) 848-4888 or (800) 336-0113

NEW DG CRT's

D-210	$795
D-410	$1395
D-460	$1395
Desktops	10% to 20% Off List
Emulog 200	$995

Any & All DG Cables In Stock
We Will Not Be Undersold On
Any New or Used DG Equipment
Nuvoo Data Systems
(216) 657-4564

WANG

Pssst...
WANG USERS.....
HAVE YOU HEARD ABOUT THE GROUP OF FORMER WANG EMPLOYEES IN ATLANTA WHO BUY & SELL USED WANG EQUIPMENT AND PLUS COMPATIBLES?
I.C.A. (404) 977-4388 or
1-800-241-3188

For Sale:
Several VS-80 Systems
Incl: 256-512K, 2 WK Stn's, 80 Meg "Phoenix", 600 LPM Printers. From $60K Each.
Also Available: OIS 115-3 (80 Meg)
(617) 272-6200
OPA Associates
Brownsburg, Indiana Specialists
Since 1978

For Sale
Wang OIS 106-1
System
Includes 4.25MB Fix Disk and Diskette 30K Wk. Stn. and 64K Wk. Stn. Printer without PIP & Shared Control
Priced to Sell
$16,500
(404) 448-6748 or (404) 396-1797

1 MB VS 100 Memory
(New) $7,000
22V26A IOP (New) $3,000
128 K MVP Memory (New) $800
22276 Async $800
2261P Daisy Printer $2,300
(203) 261-6004
Telex 706689

IBM

FOR SALE BY OWNER
(1) 3272-2
(9) 3277-2, 4828GB
(14) 3277-2, 4828GB
10 units include 6580 Printers
Best Offer
Call Fred Krueger
414-871-0826

IBM/PC
160 KB Disk,
64K, KBD $1675
IBM/XT $4495
CHL (804) 359-7280
Room 423, P.O. Box 27401,
Richmond, VA 23279

FOR SALE
4331-J1
SYSTEM
w/Communications
3411/3410 Tapes
3262-1 Printer 650 LPM
3340-A2/B2 DASD 280 MB
3278-2 Displays
$53,500
Available Now Mid-West
Call Bill Hagan
Computer Merchants Inc.
(914) 238-6631

PRINT TRAINS
IBM 1416 & 3216
Bought - Sold - Lease
Repaired - Reconditioned
COMPU-ACT COMPANY, INC.
(513) 683-8401

Buy - Sell - Lease
IBM
Cougar Computer Corp.
Suite 219
28600 Euclid Office Plaza
Euclid, OH 44132
(216) 261-3600

Buy ... Sell .... Lease
IBM MICR
3890 - 1419
(813) 722-4534

BUY	SELL	LEASE
	TRADE	
S/34	S/36	S/38

Peripherals
All Guaranteed IBM Mdnt.
PROCOM
(212) 279-1717

FOR LEASE
NEW 3370's
A9/A12 B2/B12
April Delivery
Plan Ahead
Call Howard King
Computer Merchants Inc.
(914) 238-6631

SYSTEM/36's
A11*A12*A22*B22*B24
Available Now!
FOR SALE OR LEASE
STAR DATA SYSTEMS
1 (800) 531-5662
(512) 822-5662-Texas

FOR SALE
SYSTEM 34 UPGRADES
AVAILABLE IMMEDIATELY
64 Meg $4,000
128 Meg $12,000
136K $7,000
Prices Include Delivery and Installation
Call Paul
(516) 579-6410

4361-ML5
Ship Date - 3/15/84
Lease Only
Call Bob McIntyre
Datalease Corp
(203) 222-6170

IBM

For Sale, IBM System 34-CPU with 192K Main Memory, Disk Drive and Data and 5811 Model II Line Printer - 600 LPM, 1600 bands 10 variable bands, 64 types, and is excellent condition. Make offer. Contact: R.L. Hayes, Business Manager, The Hotch Kiss School, Lakeville, CT 06039, (203) 435-2851. Capable also with 3B printing over 600LPM. Asking $65,000.

3033
Operational Configuration
3042-1 For Sale
3832 Wanted
ICS Cybernetics
(313) 665-7166

IBM 370/138 CPU
1/2 Meg With 3046
Power Unit
Make Offer
(317) 664-3971

FOR LEASE
Immediate Availability
System 34-E36
System 34-C20
System 38-A12
System 38-B20
(512) 476-5582

FOR SALE
S/34's
C/20 D/24
Peripherals To Suit
Call Louis Felder
(914) 238-6631

3277-2
w/4828
Rental - Refurbished
- Qualified For MA
KCI, Inc.
Call Fred Smarrito
(201) 994-6666

2030
CPU
Plus Peripherals
Call Dick Zoch
(212) 994-6777
MICR Data Systems
New York, NY

For Sale
IBM System/34
CPU Model 4360
128K of Memory
120 Meg Disk Storage
Diskette Magazine Drive
For More Info Call
(614) 366-6166
Between 2-6pm

NEW 5291-1 CRT's
Avail Now Full Warranties
1 Yr. 2 Yr.
$129/Mo. $99/Mo.
Vargo Companies
(313) 254-2950

SYSTEMS 34/36/38
Lease Or Sale
S/36 DELIVERIES
WANT TO BUY S/34's
1-800-LEASPAK
In TX (817)268-6626

For Sale or Lease
3081-D24 April 84
Computer Services
International
(201) 539-6123

Available
4361-ML5
Ships 2/17/84
Call Robert Frank
MCI Computer Corp.
(415) 364-6666

ORDER FORM
COMPUTERWORLD BULLETIN BOARD

Issue Date: Ads can be accepted up until the Monday preceding the issue desired. Computerworld comes out every Monday.

Classifications: Most ads will be classified according to the brand of equipment that is being bought or sold. These classifications include Burroughs, Data General, Digital/DEC, Hewlett Packard, Honeywell, IBM, NCR, Sperry Univac, Salvage, Terminals, Misc. Systems and Miscellaneous.

Copy: Copy sent in via the mail or telecopier (telecopier extensions are 410 and 451) should be clearly typewritten. Ads may be given over the phone to our team of ad takers. The standard size is 1 column by 1 inch deep. These units may be combined to form larger sized ads. Describe the equipment very briefly, give the price and the name of the person to contact. All ads will be set up using a standard format. No borders or logos are allowed.

Cost: The price for each standard unit is $130.00 (One unit minimum and no fractional units allowed.) There are no agency commissions and no quantity discounts.

Billing: Once you've written your ad, send (or call) it in with your name and address for billing purposes and we'll run it. (If your company has never advertised with us before, we request a check with your order.)

Dateline: _____
Signature: _____
Name: _____
Title: _____
Company: _____
Address: _____
Telephone: _____

Send this form to:
COMPUTERWORLD BULLETIN BOARD
375 Cochituate Road, Box 880,
Framingham, MA 01701
617-879-0700 800-343-6474

SOFTWARE FOR SALE

Software Tools for the VAX and PDP-11

Evans Griffiths & Hart, Inc. offers packages for VMS, RSTS/E, and RSX-11M that save time and improve productivity

DATA ENTRY

- **KDSS**, a complete multi-terminal key-to-disk data entry subsystem.
- **TAM**, an efficient multi-terminal screen-handling facility for the development of transaction-processing applications.

RSTS/E MIGRATION TO VAX/VMS

- **BOSS/V**, a RSTS/E subsystem for VAX/VMS written in VAX-11 MACRO. Supports an extensive subset of RSTS/E monitor calls. Provides most of the standard RSTS/E features, like CCLs, send/receive, shared libraries, RSX directives, and RSTS/E-style file update mode. (Also distributed by Online Data Processing, Inc.).

DATA COMMUNICATIONS

- **DIALUP**, a comprehensive, efficient link between RSTS/E and other systems using asynchronous terminal lines. Supports CPU-efficient, reliable file transfers, virtual terminals, auto-dialing, and the use of command files and macros.
- **BSC/DV**, a device driver for the DEC DV11 synchronous multiplexer. (VMS and RSTS/E only).
- **COLINK**, a convenient, efficient link between two RSTS/E systems using DMC11s or DMR11s. Supports file transfers, virtual terminals, and across-the-link task communication.

RECORD SELECTION & SORT UTILITIES

- **VSORT & FSORT3**, extremely fast sort packages for VMS and RSTS/E.
- **VSELECT & SELECT**, extremely fast VMS and RSTS/E packages for scanning files to extract records that meet user-specified selection criteria.

Evans Griffiths & Hart, Inc.
55 Waltham Street
Lexington, MA 02173
(617) 861-0670 TWX 710-326-0103

EG&H

Need general accounting software for IBM System/38?

We've simply solved your problem.

LAWSON ASSOCIATES has solved it with the first general accounting software specifically designed for IBM System/38. Not merely compatible, but state-of-the-art to fully utilize your computer's capabilities. Compare. You won't find a total software solution like it anywhere else.

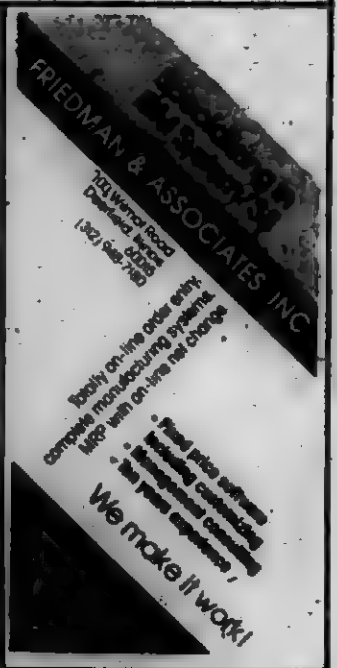
DESIGN FEATURES: They include: on line systems using data base management; menu driven, user friendly programs written in RPGIII, the System/38 language; and integrated modules. Their benefits: ease of installation and use, plus maximum employee productivity.

INTEGRATED MODULES: Those available include: General Ledger and Report Writer/Accounts Payable/Accounts Receivable/Fixed Assets/Payroll/Personnel/Purchase Order/Order Entry/Inventory Control

SERVICE FEATURES: Fully documented and supported. Onsite training and implementation. One year warranty. Available now for immediate installation.

For more information, please call or write:
Lawson Associates, 2021 East Hennepin Ave., Minneapolis, MN 55413
(612) 379-2633

LAWSON ASSOCIATES
WE SIMPLY SOLVE PROBLEMS



CURIOUS ABOUT CLASSIFIEDS?

If you are interested in advertising with Computerworld, but don't know how to do it, give us a call! We'll be glad to send you our current rate card, which explains sizes, costs, deadlines and requirements. Along with that, we'll send a demo paper which actually shows examples of ad sizes, typefaces, and prices. Our toll free number is **800-343-6474, in Massachusetts call 879-0700, just ask for Classified Advertising.** Or, you can look for our classified order form located in the classified section of Computerworld. Fill it out, attach your ad with a check, and return it to us. We're at 375 Cochituate Road, Box 880, Framingham, MA 01701. Send attn: Classified-Advertsing. We're anxious to help!

The Proven Solution

***SAFS™ Financial Systems for the IBM S/34, 36, 38**

Find out why major corporations and smaller companies alike are glad they turned to SAFS™ financial software.

Accounts Payable • General Ledger
Fixed Assets • Payroll • Word Processing

Features Include:

- use of up to 13 fiscal periods
- MAPICS conversion facility
- true multi-company design
- consolidated statements
- simultaneous multi-period processing
- data base design
- written in RPG II/RPG III

Support • Service • Custom Enhancements

Call or write: Schwartz & Assoc., Inc.
P.O. Box 1069
Cambridge, MA 02142
(617) 498-8742

*SAFS trademark of Schwartz & Assoc., Inc. Financial Systems

Fixed Assets System For VAX

Calculating depreciation got you down? Know where all your assets are at? Use PLYCOM's Fixed Assets System for software that is easy to use, yet effective. Gives you a complete solution. Includes all the forms, procedures and programs necessary to give management full control over the asset reporting function. Includes excellent documentation and complete support. Features:

- Easy to use menus
- Completely interactive
- Book and tax depreciation
- Multi-division or multi-company
- Audit reporting
- Disposal reporting
- Property tax reporting
- Asset movement reporting
- Depreciation forecasting
- Acquisition reporting
- Interface to General ledger
- For VAX/VMS

Plycom services, inc.
P.O. Box 380465
San Antonio, TX 78280
(512) 734-4366

Changing Computers?

Retain your SOFTWARE INVESTMENT

Dataware's conversion approach provides the solution to management's conversion problems and facilitates the recovery of the initial capital investment in systems development.

- COBOL to COBOL
- AUTOCODER/EPS to COBOL
- EASYCODER/TRAN to COBOL
- BAL/ALC to COBOL
- DOS/ALC to OS/ALC
- PL/1 to COBOL
- RPG/RPG II to COBOL
- RPG/RPG II to PL/1

Faced with Conversion?
Call or write today

The Conversion Software People
dataware, inc.
2565 Elmwood Avenue
Buffalo, New York 14217
Phone (716) 876-8722
TELEX: 91519

SOFTWARE FOR SALE | SOFTWARE FOR SALE | SOFTWARE FOR SALE | SOFTWARE FOR SALE

DECISION SUPPORT.

NGS is now an IBM S/38 VAR.

NGS

NEW GENERATION SOFTWARE, INC.

341 Lincoln Street, Roseville, CA 95678 Phone [illegible]
Outside California Call Toll Free 800 874-1226

Elegant Software

for IBM S/34, 36 and 38

General Accounting	Payroll/Personnel
Financial Reporting	Property & Equipment
Accounts Receivable	Report Writer
Accounts Payable	Oil & Gas
Order Processing	All Systems use:
Inventory Management	RPG II/RPG III
Sales Analysis	Data Base
Job Cost	Interactive

J.B. Edwards & Company

4940 South Syracuse Street/Suite 1000
Denver, CO 80237
800/ 776-2732

Dallas — 214/ 458-9696
Houston — 713/ 680-8676
Northern California — 408/ 997-7764
Southern California — 714/751-8302

More IBM System/38 Users Are Choosing RTC Systems.

For technically superior software in a wide range of Financial, Manufacturing, Distribution and Management Business Systems.

The International Software Developers.

RTC Systems, Inc.

40 Plain Street
North Attleboro, MA 02760
(617) 695-8008

SOFTWARE WANTED

System/36 Software Wanted

National marketer of IBM based computer systems is seeking exclusive national distribution rights for software packages which are currently installed on the IBM System/36. Both vertical and horizontal market oriented software systems will be considered. For more information contact:

Don Middleton
Vice President, Marketing
NMCS
7998 Trade Street
San Diego, CA 92121
(619) 578-6940

BUSINESS OPPORTUNITIES

Sell Our Software To Your Market.

Manufacturers Reps & Consultants: Expand your market with a new generation of integrated microsoftware. SensesOne-Plus from Executec integrates twelve applications for the business and financial executive.

Newest version* is now ready for shipment to qualified representatives. You receive complete sales and training tools, and access to a customer support hotline.

Limited number of distribution relationships available. Call Carol Harris at (800) 527-4258 or (214) 239-8080 in Texas. Executec Corporation, 12200 Park Central Drive, Dallas, Texas 75251

*Previous version of SensesOnePlus reviewed in Fortune, December 26, 1983

WANTED SOFTWARE SOLUTIONS FOR THE HP3000

Hewlett-Packard is seeking quality software suppliers that address specific vertical markets in the NY/NJ area. If you have a unique application solution and want to take advantage of the financial, marketing, and technical incentives offered by Hewlett-Packard, call:

Lee Schatz
(201) 265-5000
Ext. 5457
or Bonnie Abramson
(212) 971-0000
(516) 501-0000

HEWLETT PACKARD

TIME & SERVICES

DEPOT
COMPUTER REPAIRS

DEC-DG-IBM PC
ALL BOARDS
1-2 WEEK TURNAROUND
90 DAY WARRANTY
MEMORIES
POWER SUPPLIES
ANY MANUFACTURER

[illegible] 992-3290

DATA CENTER SERVICES

TWO (2) 3033U16

BURNS

CONVERTING IBM MAINFRAME TO WANG VS

We Convert:
COBOL/RPG/CICS/JCL

1. We review your system on site
2. You supply source, JCL, test data
3. We convert on our VS
4. We review results and make final tests on site

Contact:
Joseph Salvatore, President
Manufacturing Control Systems, Inc.
Suite 400, 345 Third Street
Niagara Falls,
New York 14303
716-285-4435

Computerworld CLASSIFIEDS

Our business is to help you improve yours–

via programmers, analysts, engineers, terminals, printers, software packages, computer time, computer services, office space, advertising for seminars & conferences, business opportunities, AND...

exposure to an audience of over half a million readers NATIONWIDE... ...EVERY WEEK.

COMPUTER TIME RENTAL

IBM 4331
DOS/VSE - ICCF
All Shifts Available
3370 Disk, 3420 Tape
Dual/Density
1403-N1,
2540 Reader/Punch
Reasonable Rates
Contact: Al Palmo
Rentamatic Data Services
(212) 997-1411

VAX 11/780 AND PDP-11 DEVELOPMENT TIME

NO RELOCORE TICK CHARGES / NO CPU CHARGES

Omnicomputer

$7/$14

RSTS/E VMS

PER HOUR CONNECT TIME

BUDGET BYTES™ 212-944-9230

Omnicomputer, Inc.
1430 Broadway, New York, N.Y. 10018

COMMERCIAL DATA PROCESSING

4341-2 370/168-3

OS-DOS-VM/CMS
CICS-ROSCOE
REMOTE JOB ENTRY
CICS DEVELOPMENT
CUSTOMIZED SOFTWARE
XEROX LASER PRINTING

Contact Greg Gorab
(201) 777-3454
15 MINUTES FROM LINCOLN TUNNEL
ONE PASSAIC STREET
WOOD RIDGE, N.J. 07075

VAX/VMS TIMESHARE

5¢

$2 PER HOUR CONNECT TIME
ONE MB DISK STORAGE INCLUDED
AVAILABLE NATIONWIDE VIA TELENET
LEASE-A-PORT™ WITH 10 MB DISK & NO CPU OR CONNECT CHARGES FOR $800 PER MONTH

MIDCOM CORPORATION

(714) 89WU11
(213) 519-0880
(714) 848-0370

COMPUTER TIME & TIMESHARING

- We are time brokers.
- IBM timesharing our specialty
- Also RJE & batch time.

Call John Rudder at
Computer Reserves, Inc.
(201) 666-5700

ICOTECH

Innovative Computer Techniques

COMPUTER SERVICES
IBM 3081 DEC-10

-Remote Job Entry -Online Processing
-Batch Processing -Timesharing
-Optical Mark Reading -Laser Printing

COMPUTER OUTPUT MICROFILM

-Holographic Mini Auto-Comic
-Holographic Datamaster
-6250 BPI Capability
-Free Testing

Route 202
Raritan, NJ 08869
201-534-6123
Contact: Joyce Bagenstos

CLASSIFIED ADVERTISING ORDER FORM

Computerworld's Classifieds work.

Issue Dates: Ad closing is every Friday, 10 days prior to issue date.

Sections: Please be sure to specify the section you want: Time and Services, Software for Sale, Position Announcements and Buy/Sell/Swap. (Available upon request: Software Wanted, Business Opportunities and Real Estate).

Copy: We'll typeset your ad at no extra charge. Please attach CLEAN typewritten copy. Figure about 25 words to a column inch, not including headlines.

Cost: Our rates are $128.10 per column inch. (A column is 2" wide.) Minimum size is two column inches (2" wide by 2" deep) and costs $256.20 per insertion. Extra space is available in half-inch increments and costs $64.05. Box numbers are $15.00 extra.

Billing: If you're a first-time advertiser, (or if you have not established an account with us,) WE MUST HAVE YOUR PAYMENT IN ADVANCE.

Ad size desired: _____ columns wide by _____ inches deep.

Issue Date(s): _____

Section: _____

Signature: _____

Name: _____

Company: _____

Title: _____

Address: _____

Telephone: _____

Send this form to:

COMPUTERWORLD

CLASSIFIED ADVERTISING,

375 Cochituate Road, Box 880,
Framingham, MA 01701

Foreign Editorial/ Sales Offices

England: Terry Cartwright, EEC Publications, 196-200 Balls Pond Rd., London N1 4AQ. Phone: 01-359-3525, Telex: (851) 894085 (Computer Management, Computer Business Europe only).

Euan Rose, Bill Dunlop, Stephan Thomas, Deare Hobson Assoc., 345 Goswell Rd., Islington, London EC1V FNN. Phone: 01278 3415/6 (reps for all CWCI publications except Computer Management and Computer Business Europe).

W. Germany: Eckhard Utpadel, CW Publikationens, Friedrichstrasse 31, 8000 Munich 40. Phone: (089) 39172-0. Telex: 5215350.

France: Axel Leblois, Le Monde Informatique, 185 Avenue Charles De Gaulle, 92200 Neuilly Sur Seine, Paris. Phone: 758.14.14.. Telex: 613234 F.

Japan: Mr. Shuji Mizuguchi, Computerworld Japan, 7-4 Shintomi 1-Chome, Chuo-ku, Tokyo 104. Phone: (03) 551-3662, Telex: 252-4217 (Computerworld Japan only).

H. Kajiama, Tokyo Representative Group, Yamaguchi Bldg., 2-12-9 Kanda Jimbo-cho, Chiyoda-ku, Tokyo 101, Phone: (03) 230-4117/8, Telex: J26860 (reps for all CWCI publications except Computerworld Japan).

Australia: Alan Power, Computerworld Pty. Ltd., 37-43 Alexander Street, Crows Nest, NSW 2065. Phone: (02)-4395133, Telex: AA74752 COMWOR.

Brazil: Eric Hippeau, Data News, Computerworld do Brazil, Servicos e Publicacoes Ltda., Rua Alcindo Guanabara, 25/10th Floor 20031 Rio de Janeiro, RJ Brazil. Phone: (021) 240-8225. Telex: 2130838(WORD BR).

Mexico: Richard Small, Computerworld de Mexico, Oaxaca 21-2, Colonia Roma, Mexico City 7 D.F. Phone: (905) 514-4218, (905) 514-6309. Telex: 1771300 ACHAME, 1777809 ACHAME.

Spain: Neil Kelley, Computerworld/Espana, Gravina, 13, Madrid 4. Phone: 231-23-85; 231-23-86; 231-23-88. Telex: 47894(CW E).

Denmark: Preben Engell, Computerworld/Denmark, Gammel Strand 50, 1202 Copenhagen K. Phone: 01-1294-11. Telex: 27566 owdan.

Sweden: Bengt Mannfeldt, Computerworld/Sweden, Nova Media AB, Vertavagen 55, 11536 Stockholm. Telex: 8105099 NOVACW.

The Netherlands: Johannes A. Wibrost, Mgr. Dir., CW Communications B.V., c/o IDC Benelux, Prins Hendriklaan II, 1075 AK Amsterdam. Phone: 020-791-692. Telex: (844) 15741.

Italy: Daniele Comboni, Gruppo Editoriale Jackson, s.r.l., Via Rosellini 12, 20124 Milano.

Argentina: Ruben Argento, Gen. Mgr., Computerworld Argentina, Av. Belgrano 406-Piso 9, CP 1092 Buenos Aires. Phone: 34-6583/5584.

Norway: Mr. Per Berrefjord, Editor, CW Norge A/S, Hovinveien 43, P.O. Box 2662, Toeyen, Oslo 6. Phone: 2/647725. Telex: (856) 78478

Singapore: Mr. David Naidu, General Manager, Asia Computerworld, Pte. Ltd., 11-08/11-10 Goldhill Plaza, Newton Road, Singapore. Phone: 250-444. Telex: (786) RS 37003

Saudi Arabia: Mr. Omar Dusuki, General Manager, Saudi Computerworld, P.O. Box 5455, Jeddah. Phone: 6675916/6650380. Telex: (928) 401205.

ADVERTISERS INDEX

Ad Council 70
Advanced Data Technologies 66
Advanced Systems, Inc. 26
Alcorpo Products 26
Aluminum Case Co. 68
American Telephone & Telegraph 36-37
Applied Data Research 3
Applied Software 49
Artificial Intelligence 28
A.S.T. Research 54
ASTOD 70

B I Moyle Associates, Inc. 66
BDS Computer Corp. 9
Beck Manufacturing Co. 73
BSC Software 66
Bowie & Babbage 74

Cadmus Computer 64-65
Candle Corporation 39,46
CGA Software 20
Chubb Institute 66
Collier Jackson, Inc. 69
Comdesign 15
Compaq 79
Com/Peripherals, Inc. 66
Compuware 58
Continental Resources 24
Cullinet 22
CWCI 72
CW Italy 60
CW Office Automation 21
CW Supplement 56

Data Base Management 25
Dataproducts 11,15,17,51
Datasouth 28
DEC/RSX VAX 52-53
Deltak 24,59
Digital Consulting Associates 61
Digital Controls Corp. 60
Dorian Products 62
Duquesne Systems, Inc. 47

Eiger Corp. 32
Equitable Life Leasing 63
Exicon Office Systems 71

Fibronics 60
Fusion Products 58

Gavilan 67
Gejac 66
General Electric 10
Goal Systems 48

Hewlett-Packard 76-77

Information 61
Innovation Data Processing 5
Interactive Training Systems 75
International Data Corporation 56

James Futurevi 59

Kaypro 14
Keytronic 56

J.W. Lampl, Inc. 56
Lawson Associates 59
Lee Data Corp. 19
Local Data 32

McCormack & Dodge 122
Memorex CTD 38
Micro Craft Corp. 92-93
Microdata 30-31
Mid Continental Systems, Inc. 70
Modcomp 26-27
MSA 44,45

National Trade Productions 69

On-Line Software 50
Oxford Software 41

Polygon Associates 72
Pro-Source 58

SAS Institute 94-95
Signal Technology Inc. 13,94
Software Assistance 17
Software Results 48
Stone Mountain Computing 58
Stratus Computer 83
Syncsort 7
Systemware, Inc. 82

Tandem Computers 30-31
Technology Transfer Institute 16
TechTran 22
Teletype Corp. 35
Tesa Software 58

Wang Laboratories 81
John Wiley & Sons 11

This index is provided as an additional service. The publisher does not assume any liability for errors or omissions.

Computerworld Sales Offices

Vice-President/Sales/Donald E. Fagan
Director/National Sales/Edward P. Marecki
Marketing Support Manager/Kathy Doyle
COMPUTERWORLD, 375 Cochituate Road, Box 880,
Framingham, MA 01701
(617) 879-0700

BOSTON SALES OFFICE (617) 879-0700
Northern Regional Director/Chris Lee
District Managers/Jim McClure, Ronald Mosley,
Jayne Donovan, Michael F. Kelleher
Sales Assistant/Alice Longley
COMPUTERWORLD, 375 Cochituate Road, Box 880,
Framingham, MA 01701

CHICAGO SALES OFFICE (312) 827-4433
District Managers/Arthur Kossack,
Sales Assistant/Joan F. Broderick
Northern Regional Director/Chris Lee
COMPUTERWORLD, 2600 South River Road, Suite 304,
Des Plaines, IL 60018

NEW YORK SALES OFFICE (201) 967-1380
Eastern Regional Director/Michael J. Masters
Sr. District Manager/Doug Cheney
District Managers/Ray Corbin, Joan Daly, Fred Lo Sapio
Sales Assistant/Gale M. Palermo
COMPUTERWORLD, Paramus Plaza I,
140 Route 17, North, Paramus, NJ 07652

LOS ANGELES SALES OFFICE (714) 261-1229
Senior District Manager/Bob Hubbard
District Manager/Sandy Hockenmaier
Western Regional Director/William J. Healey
COMPUTERWORLD, 18008 Sky Park Circle, Suite 200,
Irvine, CA 92714

SAN FRANCISCO SALES OFFICE (415) 421-7330
Western Regional Director/William J. Healey
Senior District Manager/Barry Milione
District Managers/Theodore Pierson, Ernest Chamberlain
Account Manager, Classified/Nicole Bockman
COMPUTERWORLD, 300 Broadway, Suite 20,
San Francisco, CA 94133

ATLANTA SALES OFFICE (404) 394-0758
District Manager/Jeffrey Melnick
Eastern Regional Director/Michael J. Masters
COMPUTERWORLD, 1553 Peeler Road, Suite D,
Atlanta, GA 30338

CLASSIFIED ADVERTISING (617) 879-0700
Al DeMito
COMPUTERWORLD, 375 Cochituate Road, Box 880,
Framingham, MA 01701

CW INTERNATIONAL MARKETING SERVICES
General Manager/Diane Li Muraglia
COMPUTERWORLD, 375 Cochituate Road, Box 880,
Framingham, MA 01701
(617) 879-0700

CW COMMUNICATIONS/INC.
Board Chairman/Publisher
Patrick J. McGovern
President
W. Walter Boyd
Senior Vice-President
Lee Vidmar

Group VP-Communication Services, Jack Edmonston. Group VP-Circulation, Margaret Phelan. VP-Marketing, Donald E. Fagan. VP-Finance, William P. Murphy. VP-Editorial, John Wilkinson.

Computerworld Headquarters: 375 Cochituate Road, P.O. Box 880, Framingham, MA 01701
Phone: (617) 879-0700, Telex 95-1153.

SALES — Vice-President, Donald E. Fagan. National Director, Edward P. Marecki. Corporate Advertising Administrator, Frank Collins. Marketing Support Manager, Kathy Doyle. Display Advertising Supervisor, Anne Hadley. Display Advertising, Deborah Bryer, Pam Valentinas, Elaine Carlos, Carolyn Medeiros, Cindy Cleaves, Mary Wheeler. Classified Advertising Manager, William J. Mills.

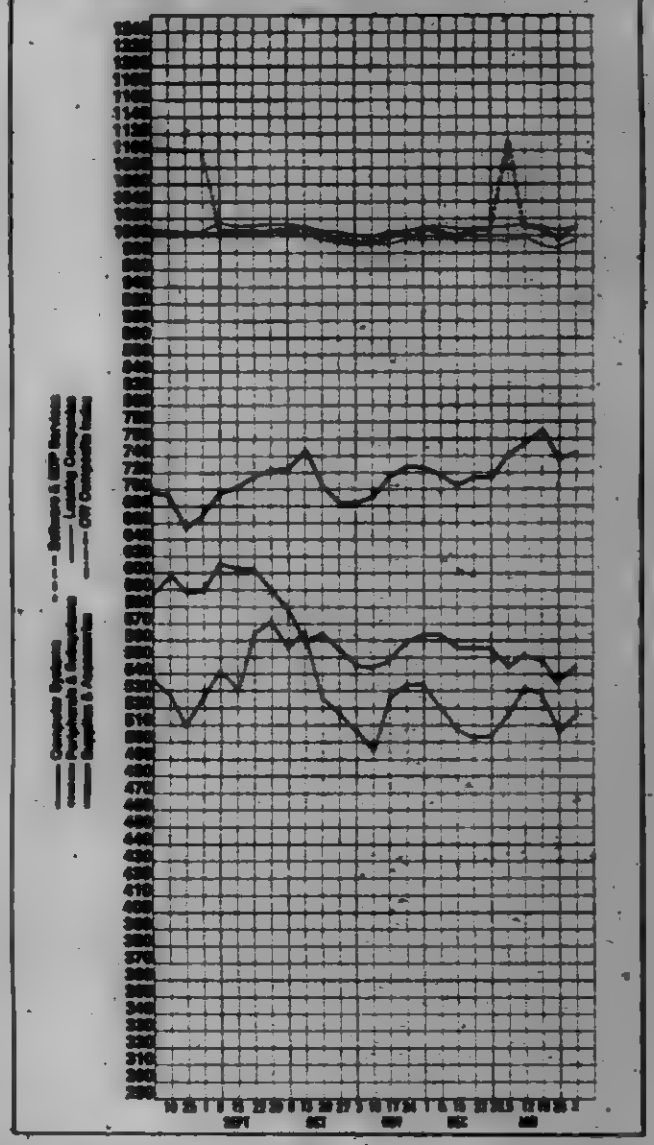
COMMUNICATION SERVICES — Group Vice-President, Jack Edmonston. Director Research, Kathryn Dawson. Sales Promotion Director, Liz Johnson.

PRODUCTION — Production Director, Peter Holm. Production Manager, Marlene Sokol. Paste-Up Manager, Trish Gaudette. Systems Manager, Tom Pike. Typesetting Manager, Carol Polack. Art Director, Tom Monahan. Graphic Designer, Hank Fling.

CIRCULATION — Group Vice-President, Margaret Phelan. Circulation Manager, Jane Desilets. Fulfillment Manager, Maureen Burke.

Computerworld can be purchased on 35 mm microform through University Microfilms Int., Periodical Entry Dept., 300 Zeeb Rd., Ann Arbor, Mich. 48106. Phone: (313) 761-4700. Computerworld is indexed. Write to Circulation Dept. for subscription information.

Computerworld Stock Trading Index



Computerworld Stock Trading Summary

All statistics compiled computed and formatted by TRADE QUOTES, INC. Cambridge, Mass. (02139)

CLOSING PRICES WEDNESDAY, FEBRUARY 1, 1984

COMPUTER SYSTEMS

		1983-84 HIGH	1983-84 LOW	CLOSE	NET CHGE	PCT CHGE
B	ALPHA MICROSYSTEMS	11- 24	13 3/4	- 3/4	-5.1	
B	ALTOS COMPUTER SYST	6- 20	10 1/2	- 3/4	-6.8	
A	ANSWER CORP	6- 20	15 3/8	0	0.0	
B	APPLE COMPUTER INC	14- 32	20 3/4	+2 3/8	+9.7	
B	AT&T	80- 97	84 3/4	0	0.0	
B	BURROUGHS CORP	48- 78	52 1/4	+ 1/2	+0.9	
B	COMPUTER AUTOMATION	6- 17	9 3/4	- 1/2	-4.9	
A	COMPUTER CONSOLES	6- 16	17 3/8	- 1/8	-0.8	
B	CONTROL DATA CORP	31- 69	49 3/4	- 1/4	-0.8	
B	CONVERGENT TECHNOL	30- 61	39 1/2	-3 1/8	-13.8	
B	CRAY RESEARCH INC	39- 77	57 1/2	-3 3/8	-10.1	
B	DATA GENERAL CORP	11- 47	41 1/8	-4 1/8	-9.1	
B	DATAPOINT CORP	11- 38	22	-1 1/2	-6.3	
B	DIGITAL EQUIPMENT	68-132	88 1/8	-3 7/8	-4.2	
A	DICO INC	9- 16	12 1/2	- 1/8	-0.9	
B	ELECTRONIC ASSOC.	7- 15	8 7/8	-1 1/2	-17.5	
B	FLOATING POINT SYST	24- 44	39	-2 1/4	-5.5	
B	FOXBORO	32- 67	38 3/4	-2 1/4	-5.5	
B	GENERAL AUTOMATION	9- 17	13 1/8	-2 1/8	-13.9	
B	GOULD INC	28- 46	31 1/8	-2 1/4	-6.8	
B	HARRIS CORP	29- 51	38 3/4	-4 1/8	-9.6	
B	HEWLETT-PACKARD CO	72- 98	98	-3 1/8	-3.0	
B	HONEYWELL INC	88-138	118 3/4	- 3/4	-0.6	
A	IBM	93-134	119 3/4	-1 3/8	-1.1	
B	IPL SYSTEMS INC	9- 14	9 1/2	+ 1/2	+10.0	
B	M/A-COM INC	17- 36	17 1/4	-2 1/2	-12.6	
B	MANAGEMENT ASSIST	7- 20	22 3/8	+ 1/8	+0.2	
B	MITSUBISHI ELEC(ADR)	47- 88	88 1/4	+1 1/8	+1.3	
B	MODULAR COMPUTER SYS	6- 13	8 3/8	- 3/8	-4.3	
B	NORTH DATA SCI	10- 18	10 7/8	0	0.0	
B	MOTOROLA INC	82-148	117 1/2	-8 3/4	-6.9	
B	NAT'L SEMICONDUCTOR	12- 28	16 1/4	-4 1/8	-19.8	
B	NBI INC	11- 31	14 1/4	-3 1/8	-18.0	
B	NCR	39-136	117 1/4	-4 1/8	-3.4	
B	PERKIN-ELMER	17- 37	25 7/8	-2 1/2	-8.8	
B	PRIME COMPUTER INC	11- 30	17 7/8	-1 3/4	-8.9	
B	SPERRY CORP	21- 39	48 1/4	-1 1/2	-3.0	
B	TANDEM COMPUTERS INC	14- 28	22 3/8	-1 3/8	-5.8	
B	TANDY CORP	14- 28	26 7/8	-1 1/8	-4.0	
B	TELEVIDEO SYSTEMS	13- 25	15 1/8	-1 1/8	-6.9	
B	TELXON CORP	9- 18	11 1/2	- 3/4	-6.1	
B	TEXAS INSTRUMENTS	71-176	157	- 1/4	-0.1	
B	ULTIMATE CORP	9- 24	17 1/8	-1 3/8	-7.5	
B	VECTOR GRAPHICS INC	9- 14	9 1/2	- 1/8	-0.8	
A	WANG LABS "B"	19- 42	29 3/8	-1 1/2	-4.9	
A	WANG LABS "C"	21- 42	29	-1 3/8	-4.5	
B	XEROX CORP	50- 78	62 1/4	-4 1/2	-6.7	

LEASING COMPANIES

B	BOOTHE FINANCIAL CP	11- 22	20 1/4	- 1/4	-1.2	
B	CORDISCO INC	7- 15	11 1/4	- 3/8	-3.2	
B	CONTINENTAL INFO SYS	3- 15	7	- 1/2	-6.6	
B	DPF INC	8- 15	15 3/8	- 3/8	-2.7	
B	U.S. LEASING	29- 47	38 3/8	-1	-2.7	

COMPONENTS

B	ADVANCED MICRO DEV	19- 37	28 3/8	-4 3/8	-13.6	
B	ADV'D SEMICONDUCTOR	19- 38	29 3/4	-3 1/4	-10.4	
B	ANALOG DEVICES INC	19- 32	22 1/4	-2 3/8	-7.9	
B	ANALOGIC CORP	19- 27	20	-3	-13.0	
B	APPLIED MAGNETICS CP	19- 37	22 3/4	-3 1/4	-12.7	
B	TERADYNE	14- 38	20	-3 1/2	-13.4	

EXCH: B=NYSE; A=AMERICAN; P=PACIFIC; O=OVERTHE-COUNTER; I=INTERNATIONAL; M=MIDWEST; Q=NASD-INTERCONTINENTAL
N-I-C PRICES ARE BID PRICES AS OF 3 P.M. ON LAST BUSINESS DAY
111 TO NEAREST DOLLAR

SOFTWARE & COMP SERVICES

		1983-84 HIGH	1983-84 LOW	CLOSE	NET CHGE	PCT CHGE
O	ADVANCED COMP TECH	1- 6	3 3/4	0	0.0	
O	ADVANCED SYSTEMS INC	6- 22	10 1/2	- 1/4	-2.3	
O	ADR COMPUTER SYSTEMS	6- 22	20 1/8	0	0.0	
O	AMERICAN SOFTWARE	3- 11	7 1/2	-1 3/4	-18.9	
O	ANACOMP INC	3- 8	3 3/4	- 1/4	-6.3	
O	ANALYSTS INTL CORP	9- 19	11 1/4	-1 1/8	-10.0	
O	APPLIED DATA RES.	1- 3	2 1/8	- 1/8	-5.8	
O	ASK COMPUTER SYSTEMS	1- 3	1 7/8	- 1/8	-6.6	
O	AUTOMATIVE COMP INC	1- 3	2 3/8	0	0.0	
O	AUTOMATIC DATA PROC	31- 50	50 3/8	+1 3/8	+2.7	
O	CBA COMPUTER ASSOC	1- 3	2 1/8	-1 1/8	-34.1	
O	COMPUTER ASSOC INT'L	31- 67	67 3/4	-1 1/4	-1.8	
O	COMPUTER HORIZONS	9- 17	13 1/8	-2 1/8	-13.9	
O	COMPUTER NETWORK	1- 3	1 7/8	-1 1/8	-37.5	
O	COMPUTER SCIENCES	11- 24	16 1/2	-1 1/2	-8.3	
O	COMPUTER TASK GROUP	3- 7	5 1/8	-1 1/8	-18.0	
O	COMPUTER VISION	1- 3	1	- 1/8	-11.1	
O	COMPUTING SYSTEMS	1- 3	1 1/8	0	0.0	
O	COMSHARE CORP	7- 15	9 1/2	- 3/8	-3.8	
O	CONDUIT	7- 15	10 1/2	- 1/4	-2.4	
O	CULLINET SOFTWARE	19- 37	26 7/8	-4 1/8	-9.7	
O	CYCARE SYSTEMS INC	1- 3	1 3/4	- 1/8	-6.6	
O	ELECTRONIC DATA SYST	19- 34	28 3/4	- 1/8	-0.4	
O	HOSKA SYSTEM INC	1- 3	1 7/8	- 1/8	-6.6	
O	GENERAL ELECTRIC CO	49- 61	57 3/8	+1 1/8	+2.0	
O	GTE CORP	29- 43	43 1/4	+1 1/8	+2.7	
O	INFORMATICS INC	3- 6	3 3/4	- 1/8	-3.2	
O	INFORMATION SYSTEMS COM	19- 34	33	-1 1/8	-3.3	
O	ADAMS ASSOCIATES	4- 10	8	- 1/2	-5.8	
O	LOGICON	9- 19	13 3/8	- 3/8	-2.7	
O	MCI COMMUNICATIONS	3- 11	5 1/4	- 3/8	-6.7	
O	MICRO SYSTEMS INC	3- 6	3 1/2	- 1/8	-3.5	
O	MATHEMATICAL APP GRP	1- 3	1 1/8	-1 1/8	-50.0	
O	MICRO SYSTEMS INC	3- 6	3 1/2	- 1/8	-3.5	
O	MORGAN-KEEGAN CO	9- 15	9 1/2	- 1/8	-1.3	
O	NATIONAL DATA CORP	19- 34	18 1/2	- 1/2	-2.6	
O	ON-LINE SOFTWARE INT	3- 7	3 1/2	- 1/2	-12.5	
O	PANAPHIC SYSTEMS	1- 3	1 1/8	-1 1/8	-50.0	
O	PLANNING RESEARCH	1- 3	1 3/4	- 1/8	-6.6	
O	POLICY MGMT SYSTS CP	19- 38	29 3/4	- 1/4	-0.8	
O	PRINTRONIX & SYS	11- 24	14 3/4	- 1/4	-1.6	
O	REYNOLDS & REYNOLD	11- 24	16 1/4	- 1/4	-1.5	
O	SBI CORP	1- 3	1 1/8	-1 1/8	-50.0	
O	SHARED MEDICAL SYST	11- 24	19 3/4	- 1/4	-1.2	
O	SCIENTIFIC COMPUTERS	1- 3	1 1/8	-1 1/8	-50.0	
O	SOFTWARE AG	11- 17	12 1/2	0	0.0	
O	TYMSHARE INC	11- 24	15 1/8	- 3/4	-4.7	
O	UMS CORP	7- 15	11 3/4	- 1/8	-1.0	
O	UNIV CORP	7- 15	9 3/4	- 1/8	-1.2	

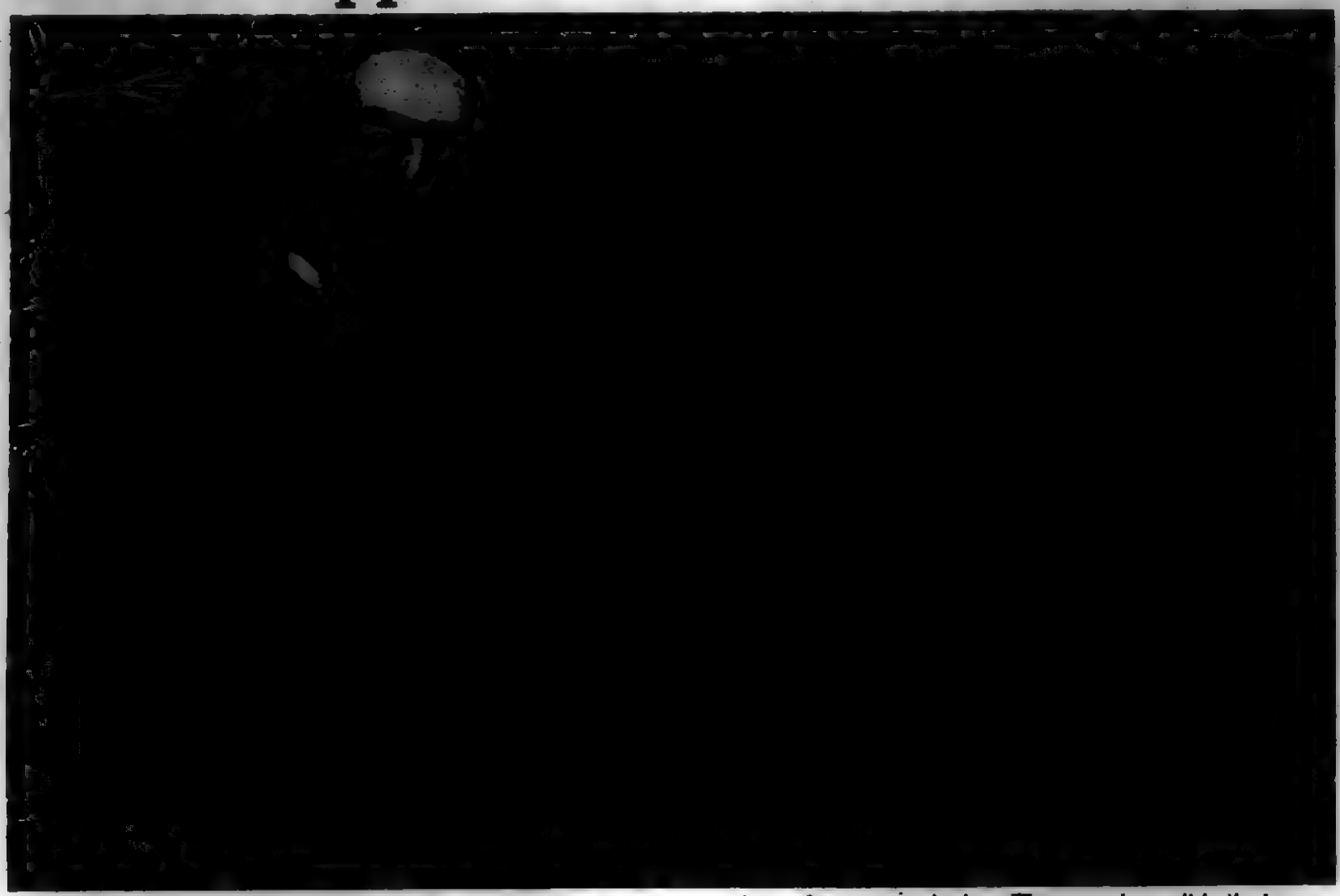
PERIPHERALS & SUBSYSTEMS

A	AM INTERNATIONAL	3- 7	4 1/8	- 1/8	-2.1	
A	ANDERSON JACOBSON	3- 7	4 3/8	- 1/8	-2.8	
A	AUTO-TROL TECHNOLOGY	3- 7	4 1/2	- 1/8	-2.7	
A	CORECTEC INC	3- 7	4 1/2	-1 1/8	-20.1	
A	DATAPOINT CP'L	19- 38	21 1/2	-1 1/8	-5.0	
A	DATA-SCANNER & MSG	3- 7	4 1/8	-1 3/8	-7.5	
A	EXABYTE CORP	3- 7	4 1/8	- 1/8	-2.1	
A	GERBER SCIENTIFIC INC	3- 7	4 1/8	- 1/8	-2.1	
A	GRAPHIC SCIENCES	3- 7	4 1/8	- 1/8	-2.1	
A	INTERACTIVE SYSTEMS	3- 7	4 1/8	- 1/8	-2.1	
A	MOHAWK DATA SCIENCES	3- 7	4 1/8	- 1/8	-2.1	
A	OPTICAL DATA SYSTEMS	3- 7	4 1/8	- 1/8	-2.1	
A	PRINTRONIX INC	3- 7	4 1/8	- 1/8	-2.1	
A	QUANTUM CORP	3- 7	4 1/8	- 1/8	-2.1	
A	SCIENTIFIC DATA SYST	3- 7	4 1/8	- 1/8	-2.1	
A	SYSTRON DONNER CORP	3- 7	4 1/8	- 1/8	-2.1	
A	TALLY CORP	3- 7	4 1/8	- 1/8	-2.1	
A	TELEX	3- 7	4 1/8	- 1/8	-2.1	
A	TELEVIDEO SYSTEMS	3- 7	4 1/8	- 1/8	-2.1	
A	TRIDENT	3- 7	4 1/8	- 1/8	-2.1	
A	VISTA GRAPHICS	3- 7	4 1/8	- 1/8	-2.1	

SUPPLIES & ACCESSORIES

A	ADDITRON BAR PRINT	3- 7	4 1/8	- 1/8	-2.1	
A	DARBY GRAPHIC	3- 7	4 1/8	- 1/8	-2.1	
A	DATA-TECH INSTRUMENTS	3- 7	4 1/8	- 1/8	-2.1	
A	DATUM INC	3- 7	4 1/8	- 1/8	-2.1	
A	DUPLEX PRODUCTS INC	3- 7	4 1/8	- 1/8	-2.1	
A	GRAPHIC SCIENCES	3- 7	4 1/8	- 1/8	-2.1	
A	IN COMPANY	3- 7	4 1/8	- 1/8	-2.1	
A	KEYPOINT CORP LTD	3- 7	4 1/8	- 1/8	-2.1	
A	STRANDBERG ENGINEER	3- 7	4 1/8	- 1/8	-2.1	
A	WALLACE BAR PRINT	3- 7	4 1/8	- 1/8	-2.1	

The man who taught financial software to A.B. Dick, Alberto Culver, Hershey Foods, Hartz Mountain, Howard Johnsons, Newsweek, National Steel, Philip Morris, Parker Pen, Pabst, Pillsbury, Pepsi-Cola and Dr Pepper.



He's Alan Rick, a McCormack & Dodge training instructor. A member of a teaching team which has won the reputation, hands-down, for the best hands-on training in the financial software industry.

Clients find our training schools as valuable as our software packages. Enrollment has grown from less than 300 in 1977 to over 3,000 in 1981. People have come from more than 150 Fortune 500 companies. From departments with such demanding workloads that any system but the fastest and most powerful is simply out of the question. Whether it's for accounts payable, capital projects analysis, fixed assets, general ledger, payroll/personnel or purchase order management.

At McCormack & Dodge, we work hard to make our schools—and our entire company—as user-oriented as the software we design. The usual result is that people who sit down and talk to us do more than just talk. They become customers. We'd like to show you why.

Tomorrow's software today.

☐ General Ledger ☐ Payroll/Personnel
☐ Accounts Payable ☐ Purchase Order Management
☐ Fixed Asset Accounting ☐ Capital Project Analysis

1-800-343-0325*

*Telex 174002

McCormack & Dodge

a company of The Dun & Bradstreet Corporation

McCormack & Dodge Corporation, 1225 Worcester Road, Natick, MA 01760. Sales and support offices throughout North and South America, Europe, Asia, Australia and Africa.

VOL 18
ISSUE 7
FE 13 1984
UMI

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

COMPUTERWORLD

$2.00 A COPY; $44/YEAR | FEBRUARY 13, 1984 | VOL. XVIII, NO. 7

In Depth
C.J. Date defends relational system performance ID/15

Lost in space
Satellite launch goes awry/11

Thomas Nies
Cincom's chief talks about data base trends/17

SECTIONS

Editorial/80
Software & Services/90
Communications/91
Systems & Peripherals/99
Microcomputers/107
Computer Industry/121

CB MI48109UIVMUIVMA FCAMB
UNIVERSITY MICROFILMS INTL
SERIAL PUBLICATIONS
300 N ZEEB RD
ANN ARBOR MI 48106

NEWSPAPER

Investors sue after STC ices CPU project

SAN FRANCISCO — Storage Technology Corp.'s recent cancellation of a project to develop an IBM-compatible processor resulted in the filing in federal court here last week of a class action suit charging the company with securities fraud and racketeering.

The suit, filed by the Chicago law firm of Katten, Muchin, Zavis, Pearl & Galler, charges STC with stock fraud and seeks actual damages of $10.6 million and punitive damages of $20 million. It also seeks unspecified additional damages that may be tripled under the provisions of the federal Racketeer Influenced and Corrupt Organizations Act, a statute generally used by the federal government to prosecute organized crime figures.

Donald E. Egan, the attorney who filed the suit, charged that STC had created a partnership to finance the processor project and, four months before canceling the project, obtained $10.6 million from 181 new limited partners who were given "written statements and misrepresentations of material facts that were untrue or misleading."

Also named in the suit was the investment firm of Smith, Barney, Harris, Upham and Co.

STC killed the project to develop a high-performance, IBM-compatible mainframe after citing technological problems and increasing cost estimates [CW, Feb. 6].

At press time, STC had no comment.

Supermini hits campaign trail with Cranston

CAMPAIGN '84

By James Connolly
CW Staff

WASHINGTON, D.C. — What may be the most sophisticated in-house computer system ever used by a presidential candidate is helping U.S. Sen. Alan Cranston (D-Calif.) in his try for the Democratic nomination.

Cranston, ranked as low as sixth in polls that show him more than 40 percentage points behind former Vice-President Walter Mondale, apparently is the only one of eight candidates to use a minicomputer and the first to use a supermini in his campaign headquarters.

Like the competing organizations, the Cranston campaign uses computers for mass mailings of political and fund-raising letters, for scheduling and for income and expense reports for the Federal Election Commission. But while the other campaigns use service bureaus and in-house microcomputers, the Cranston for President Committee has a Digital Equipment Corp. VAX-11/750 in its headquarters here and DEC Rainbow micros in its New Hampshire and Iowa field offices.

"We made a decision well back in 1982 to go in-house," Alex Thurber, the committee's director of information systems, said. "A campaign doesn't have the time to wait for someone else to do its processing. We

See CRANSTON page 4

M&D offering tool to build applications

By Paul Gillin
CW Staff

NATICK, Mass. — McCormack & Dodge Corp. last week continued its foray into the systems software market by releasing as a package the system development software used to build its Millennium application series.

Millennium:SDT can be used to build IBM CICS applications that are fully integrated with mainframe-based M&D Millennium applications, including general ledger, fixed assets, human resources, accounts payable, purchase order and capital project analysis.

The package incorporates both interpretive and generative capabilities as well as reusable code, M&D said. Application definition is accomplished by creating data base records for files, records and fields, screens, queries and search fields.

M:SDT programs can call literals, variables and parameters and map them directly to the screen, eliminating CICS mapping and security, according to an M&D spokesman.

M:SDT uses M&D's procedure definition language, Millennium:PDL, to access and process data within the data bases. M:PDL uses an English-like syntax and arithmetic and logical operators to execute complex expressions.

On-line features offered with M:SDT and all Millennium products include multi-

See M&D page 6

PROFILE

He heads 'two-in-one' department

By James Connolly
CW Staff

SMYRNA, Tenn. — Logic says it is a mismatch, a marriage in which the partners have little in common and little to say to each other.

But Nissan Motor Manufacturing Corp. U.S.A. says that upon closer inspection, the "mismatch" makes sense.

Nissan merged its information systems with its purchasing department.

The apparent illogic lies in the fact that the departments cover so little common ground. But "we put the two groups together because they don't go together," emphasized Robert A. Frinier, who became vice-president of purchasing and information systems on Jan. 1.

"We think we figured out a way to have systems report to a division where it can be run without bias," Frinier explained. "Purchasing in this facility doesn't place much of a demand on the [DP] systems, at least much less than finance or production control. Our consultants said the systems organization needs a place where it can get top-level support and not be biased by the person in charge being primarily responsible to other areas."

That bias, he noted, could result in a department head tailoring information systems to his own needs at the expense of other departments or paying too little attention to information systems.

Frinier

"We think this concept might knock the computer industry on its ear," according to 42-year-old Frinier, who has a background in production control. Formerly with Ford Motor Co. in Michigan, he has been with Nissan since 1980, working with system users in production and with consultants and technical personnel in developing flowcharts for system interfaces between the new facility here and Nissan's headquarters in Japan.

Frinier heads a department of 70 people, some of whom previously worked in information systems when it was controlled by the Finance Division. Responsibility for information systems was shifted from the Finance Division on Jan. 1, at a time when company President Marvin

See NISSAN page 2

TOP OF THE NEWS

Victor Technologies, Inc. has earned the unhappy distinction of becoming the third microcomputer maker in six months to file for protection under Chapter 11 of the Federal Bankruptcy Code. Page 2.

■

The Federal Communications Commission modified access surcharges for Foreign Exchange and Wats users, but retained the $2/mo and $6/mo fees per line for Centrex-CO. Page 2.

■

Digital Equipment Corp. has become the first major computer vendor to enter the off-site storage and recovery business. Page 4.

■

DP salaries are up sharply from six months ago, a recruiting firm reported. Page 9.

■

Supercomputer maker Denelcor Corp. has jumped on the Unix bandwagon. Page 69.

■

The Goodyear Blimp is not the only big thing for which the company could become famous. Goodyear Aerospace Corp. researchers claim they have developed a computer system with the fastest I/O rate in the world. Page 99.

■

Victor petitions for Chapter 11

Third micro maker in six months to file

By Patricia Keefe
CW Staff

SAN JOSE, Calif. — Bowing to pressure from its many creditors and several lawsuits, Victor Technologies, Inc. last week voluntarily filed for protection under Chapter 11 of the U.S. Bankruptcy Code.

With an estimated $70 million in unsecured debt, Victor became the third microcomputer maker in six months to seek court protection.

Victor said its manufacturing unit, which is also named Victor Technologies, Inc., has consented to a separate, involuntary bankruptcy petition filed last week in federal Bankruptcy Court here by six creditors, whose unsecured claims total over $12.8 million. The latter petition sought to force the California-based manufacturing unit into Chapter 11, where it could reorganize and work out a debt schedule under court protection from creditors' lawsuits.

According to a statement released by Victor, two other units also filed voluntary petitions: Victor United, Inc., the U.S. distribution subsidiary, and Victor Technologies International Sales Corp.

The vendor's European and Canadian distribution operations are insulated against claims against the U.S. entities, Victor said.

Victor has reached an agreement with its largest secured creditor, Security Pacific National Bank, under which the bank will finance "near-term manufacturing and distribution needs," a spokeswoman for Victor said. That agreement is subject to approval by the Bankruptcy Court.

Victor said it will continue to supply an adequate amount of computers to its U.S. and foreign distribution outlets.

As part of a restructuring of operations, Victor has terminated 300 employees in the U.S., leaving approximately 570 employees worldwide, the spokeswoman said. Victor declined to comment further.

Second suit

Another suit filed last week, this one by the advertising and public relations firm of Doyle Dane Bernbach International in federal Bankruptcy Court in Manhattan, seeks $8.3 million — $3.3 million for services performed (media buying) and $5 million in damages. That suit accuses Victor of providing false financial statements that overstated the micro maker's true worth and failed to disclose losses suffered in 1982, according to spokesman Robert Frost. The suit also names as a defendant Kidde, Inc., which owns a majority share of Victor, and Kidde President Fred R. Sullivan.

Victor has had a tough two years financially, suffering losses of approximately $3 million in 1982 and $47 million to date in fiscal 1983. Its overall debt reportedly tops $100 million.

The Chapter 11 filing highlights the failure of a creditors' committee established in late 1983 to help Victor devise a plan for paying a debt then estimated at $90 million. Negotiations between Kidde and the committee reportedly broke down, resulting in a successful bid to force Victor into Chapter 11.

Access fee cut for Wats, kept for Centrex

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — The surcharges for accessing the dial-up telephone network will remain the same for Centrex-CO (Central Office) users, but the surcharges for Wats and Foreign Exchange services will be modified, the Federal Communications Commission ruled earlier this month.

Immediately afterward, Jack Smith, chief of the FCC's Common Carrier Bureau, indicated he is still hoping for some reduction in AT&T's upcoming long-distance rates. He said he "would like to see something in the neighborhood of" a 5% to 8% reduction in the proposed rates for Message Toll Service (MTS).

The FCC's latest action on its access surcharge plan was taken at a Feb. 3 meeting. Specifically, the commissioners:

■ Reaffirmed an earlier decision under which Centrex-CO users whose systems were in place or on order as of July 27, 1983 will pay an access surcharge of $2/mo per line, while those using newer systems will pay $6/mo per line. The fees will begin April 3 and continue until sometime in 1985 when, depending on the outcome of an upcoming FCC study, they may be altered.

■ Converted the closed end of each Wats line from an interstate to an intrastate facility. Under the earlier scheme, a user would have paid a direct charge of $25/mo per line termination beginning April 3. Now the user will pay the local telephone company a maximum $6/mo per line access surcharge, plus a varying amount to AT&T based on Wats usage. The FCC anticipates, however, that the latter fee will be absorbed rather than passed on by the phone company, a spokesman said.

■ Restructured Foreign Exchange access surcharges so that at least some users of this service will pay less.

The commission decided that a telephone operating company providing local exchange facilities at the "open" or remote end of a Foreign Exchange circuit can charge only 45% of the MTS/Wats access fee rather than an equivalent amount. Although this change will tend to drop Foreign Exchange rates below what they would have been, the total bill is likely to go up significantly when compared with present rates because of pending increases for jurisdictionally interstate short-haul Foreign Exchange access circuits.

However, rates for similar long-haul circuits of 25 miles or more generally have not been increased and in some cases have been lowered, the spokesman said.

One problem that remains to be resolved, the spokesman added, involves local telephone companies not equipped to meter usage. In the past, they have charged each Foreign Exchange user for 4,400 min/mo of use, which forced those with lower calling volumes to subsidize those with higher volumes. The commission is studying this problem and a decision is imminent, the spokesman said.

NISSAN from page 1

Runyon instilled new vice-presidents for product control, engineering and planning and finance as well as for purchasing and information systems.

The highly automated plant has been producing an average of 7,000 light trucks a month since beginning production last June, according to Frinier.

"I don't have a very strong computer background from a technical point of view," the Nissan executive acknowledged.

He noted, "Initially, I'm spending 80% to 90% of my time on information systems, learning as fast as I can.

"I have people working for me who have been with information systems for a while. So they're teaching a newcomer," he said.

NEWS SUMMARY

Digital Equipment Corp. has entered the off-site storage and disaster recovery business 4

Honeywell, Inc. reduced the purchase prices of some DPS 8 and DPS 88 mainframes 4

An analyst's tool is addressing the programming problems of the year 2000 7

The Postal Service has issued final regulations on submitting mail with nine-digit zip codes 8

Source EDP, a recruiting firm, reported that salaries in the computer profession are up sharply from six months ago 9

The on-board computer failures of the *Columbia* space shuttle flight have been diagnosed and an additional quality control procedure was established by IBM to prevent a recurrence 10

Two communications satellites intended to transmit voice, data, video and facsimile traffic failed to reach proper orbit after their launch from the space shuttle *Challenger* 11

The U.S. Air Force debuted the first of 153 Sperry Corp. mainframes being installed under the largest computer contract in history 12

Digital Equipment Corp. President Kenneth Olsen last week promised "drastic" cuts in system prices 12

The quality assurance coordinator of a Boston bank talks about her job 14

A strategic planning company, Cross Information Co., suggests how users can deal with the effects of the AT&T divestiture 15

California legislators have introduced a bill to increase flexibility in prosecuting hackers 16

Interview: Thomas M. Nies, president of Cincom Systems 17

Attendees at the 1984 Insurance and Protection Conference of Financial Institutions were advised to coordinate micro strategy 19

PC World Expositions: Rivalry between IBM and Apple highly evident . . . New family of IBM-compatible micros, Winchester disk controller among the debuts at the show 22-23

Bottom-up system design is the corporate personal computer networking approach for the '80s, Amy Wohl said recently 24

Mobile robots are being sold to prisons for tasks too boring or too dangerous for humans 31

Users at the State University of New York at Albany are designing their own programs 34

An on-line data base is helping a Libbey-Owen-Ford division identify sales opportunities 36

ITT Publishing has reduced DP operating costs by 50% since converting from batch 37

An Atlanta public utility has built a modeling data base that is shared by engineers, systems analysts and planners 40

A building supplier bought a program generator to develop its own accounting application without writing all the code from scratch 42

A CAD system cut the time that Ross Gear spends designing tooling for truck manufacturing 45

Wells Fargo Bank saved $250,000 by switching to dry COM 47

International Report 26
Managers on the Move 26
Off the Press 32
Calendar 54

Thoroughbred

Meet the newest champion in the world's greatest sorting stable!

(SyncSort OS 2.5)

Call (201) 568-9700.

Find out why it takes a SyncSort to beat a SyncSort.

SyncSort OS 2.5

Performance Improvements
EXCPs: 35%
TCB CPU Time: 15%
SRB CPU Time: 25%

Here we go again—improving the Sorting Breed!

That sleek young thoroughbred out in our main paddock is SyncSort OS, Release 2.5. It's by SyncSort 2.4 out of that celebrated brood mare, High Technology. And it's destined to win a lot of prizes on OS/VS and MVS/XA tracks.

IMPROVING THE UNIMPROVABLE: Until now, SyncSort 2.4 was the best OS/VS sort program ever bred. It was far faster than any IBM sort. And it was easier to use, too— thanks to a tack-room full of advanced features.

SyncSort 2.4 probably could have continued to win prizes for years. There was only one catch—it wasn't good enough for us.

PICKING TOMORROW'S WINNERS: We knew that new hardware and software systems would create opportunities for evolution of advanced sort programs. Speed would still be essential. But productivity would continue to skyrocket in importance. So that's the way we bred 2.5.

FASTER SORT PERFORMANCE: We've added new sorting techniques to SyncSort 2.5 to make it the only sort that outperforms 2.4. You can expect savings in critical resources up to those shown at lower left. And that can add up to a big increase in total systems throughput.

NEW PROGRAMMER PRODUCTIVITY FEATURES: As any seasoned sort-watcher knows, there's a lot more to data handling than sorting. SyncSort 2.5 introduces a Data Utility set that applies its proven techniques to a wide range of processing and reporting jobs.

For example, with a single execution, 2.5 can sort, format and present data in virtually any form you want:

- **SortWriter**—a powerful tool that can produce extensive reports as a by-product of your normal sorting—without user exits and the associated programmer investment. Headers, trailers, total and sub-total capabilities provide flexible formatting.
- **Record Formatting**—To existing features like INCLUDE/OMIT, INREC/OUTREC, SUM and others—all of which have been expanded—2.5 adds new and useful capabilities like data conversion, editing, insertion of literals.
- **Multiple Output**—From a single sorted file, you can create multiple files and reports. Each can include the same or different data as determined by INCLUDE, OMIT, OUTFIL or OUTREC parameters.

If you're tired of betting on sort programs that empty your pockets of resources and are tough to handle, give us a call. We'll arrange to have SyncSort OS 2.5 run a few furlongs on your own turf.

syncsort INC.

Syncsort Incorporated 560 Sylvan Ave., Englewood Cliffs, N.J. 07632

DEC enters records management business

By Bill Laberis
CW Staff

Eyeing a potential $2 billion-plus market, Digital Equipment Corp. is slated to announce today that it is diving headlong into the records management business, the boldest such move to date of any major computer vendor.

DEC has committed an undisclosed but obviously substantial capital investment to state-of-the-art facilities in Burlington, Mass., and will open similarly sized facilities in Chicago, Los Angeles and Toronto by mid-spring.

The company will open an additional 20 off-site storage and recovery facilities during 1985 and another 17 the following year, giving the company the most extensive records management network in the industry. The 41-site network will place a DEC facility within driving distance of more than three-quarters of the major DP shops in the U.S., the company claimed.

"Our commitment is national. We see a very large vacuum in this area, and users are rapidly awakening to the need for such services," said David B. White, national marketing manager for DEC's Record Management Services, headquartered in Stow, Mass. "It's a question of demand-pull, and that demand is getting much stronger."

Records management and off-site storage, White said, is not practiced as a very sophisticated art at many DP shops. Storage and protection of vital tapes and disks often consists of placing the material in an on-site cabinet. White cited one Boston-area information manager who protected vital disks by taking them home at night and locking them in her bedroom closet.

"A study we undertook showed a U.S. market for off-site records storage of about $2 billion annually," said David L. Early, DEC's Records Management Services manager. "We also found there are no vendors operating in all major U.S. cities, which we will."

Early said that about half the existing market is serving its own storage needs, including those DP sites that store records in cabinets and closets. Only about 15% of the potential market is being served by outside records management vendors.

CW photo by B. Laberis

White

DEC is banking on users becoming more aware of potential disasters that could cripple both DP and corporate operations if adequate off-site storage and backup is not provided.

Through a series of seminars being conducted around the country, DEC is trying to convince DP managers that extra care should be taken to protect corporate information assets and that this extra care should be extended to off-site storage. DEC is initially targeting users in high-transaction environments, such as banking, hospital and computer-aided design and manufacturing shops.

DEC's Burlington facility is equipped with massive, climate-controlled vaults for storing either paper, hard disk or tape records. Individual records are identified only by bar coding. Each vault is protected by six levels of security before entry can be gained, and each can store 200,000 disk packs or 157,000 tapes.

The location, type and processing requirements of each record are controlled by an in-house VAX-11/750 superminicomputer paired with a series of DEC RM05 disk drives. The site, identical to the others planned for DEC's network, will feature tape and disk reconditioning equipment.

Honeywell drops some DPS 8, DPS 88 purchase prices

PHOENIX — Honeywell, Inc. recently dropped the purchase price on most of its DPS 8 and DPS 88 mainframes, lopping off as much as $200,000 from the price tag of some models. Lease and rental prices were not affected.

Highlights of the price-cutting announcement include:

■ Reductions of up to 20% on DPS 8/70 and DPS 8/62 processors using the firm's Gcos, Multics and CP-6 operating systems.

■ A 12% reduction in the purchase price of add-on processors for the DPS 8/70, DPS 8/62 and DPS 8/49 lines.

■ Price reductions ranging from 32% to 58% for upgrades on some DPS 8 models and reductions of 20% on memory upgrades for the entire DPS 8 and DPS 88 mainframe lines.

■ A 30% reduction in monthly maintenance fees for some DPS 8 models.

■ An extension of the warranty on all DPS 8/52, 8/62 and 8/70 processors from 30 to 90 days.

All of the price changes are in effect now, a spokeswoman said. For example, the purchase price of a DPS 8/62 CPU running under the Gcos operating system was cut $130,000 and now costs $550,000. The DPS 8/62M, which uses Multics, was reduced from $725,000 to $595,000, and the DPS 8/62C (the CP-6 version) was reduced from $825,000 to $695,000.

Honeywell's top-of-the-line DPS 8/70 was reduced $200,000. A central system using the Gcos operating system now costs $700,000. The Multics and CP-6 versions of the system were also reduced by $200,000; the 8/70M costs $750,000, and the 8/70C now costs $800,000, the spokeswoman said.

The prices of additional processing units for the Gcos, Multics and CP-6 versions of the 8/70 were cut 12%, from $655,000 to $575,000. The price of an additional processor for the DPS 8/62 was cut by 5%; it now costs $475,000.

The purchase price for the DPS 8/49 and 8/49C processors was dropped from $175,000 to $135,000.

The cost of migrating to larger configurations of the DPS 8 line was cut by as much as $90,000. As an example, the Honeywell spokeswoman said, an upgrade from a DPS 8/47 to an 8/49, which formerly cost $52,000, now costs $22,000.

The price cuts were made by Honeywell's Large Computer Products Division, P.O. Box 800/a-79, Phoenix, Ariz. 85066.

CRANSTON from page 1

like to have some lead time when we're working on a project, and a service bureau doesn't always allow you that."

Moreover, Thurber said, "the cost isn't comparable. It would be two or three times more expensive for us to go outside."

Cranston's system has 10 DEC VT102 terminals and two DEC LN01 laser printers. The printers produce 36,000 pages of letters and reports each week. Leased for $10,000 per month, the system includes 4M bytes of internal and 500M bytes of disk storage.

The committee's Issues Department uses the system as a word processor to develop position papers, usually drawing on stored reference materials that Cranston has built up as a senator.

Two terminals are used to process response mail, requests for position papers, campaign literature and campaign materials such as buttons and bumper stickers.

The scheduling office uses two terminals not only to coordinate the candidate's schedule, but to compile the two or more screens of data he will need for each personal appearance.

That data includes a crowd profile for political and security purposes and a list of the type of questions the candidate might be asked. The office also gathers similar materials for VIPs who might substitute for Cranston.

Other terminals are used by the campaign treasury, which compiles monthly reports for internal and FEC use on funds raised and expenses. The system tracks contributions to determine if they qualify for federal matching funds or if a contributor may have exceeded the legal limit. The data base for the fund reporting uses 50M bytes of storage and has names and other information for 31,000 active contributors.

The final two terminals are used for direct voter contact, compiling mass mailing letters and envelopes that are assembled and shipped by an off-site mail service and for updating telephone lists for the phone banks in field offices.

At any given time, the telephone banks may have access to 300,000 names of probable voters, caucus attendees and people whose backgrounds indicate they might support a Cranston candidacy. Those lists are forwarded to field offices in New Hampshire, Iowa and other early primary and caucus states. There, telephone interviews narrow the lists to identify the people Cranston targets, and the results are recorded on magnetic tape for entry into the headquarters' computer.

The people on the new list are then targeted for follow-up letters, which are sometimes personalized to reflect the concerns that were discussed with the telephone workers days before.

Second-class postage paid at Framingham, Mass., and additional mailing offices. *Computerworld (ISSN-0010-4841) is published weekly, except: January (5 issues), February (5 issues), March (5 issues), April (7 issues), May (5 issues), June (5 issues), July (5 issues), August (5 issues), September (5 issues), October (5 issues), November (5 issues), and a single combined issue for the last week in December and the first week in January by CW Communications/ Inc., Box 880, 375 Cochituate Road, Framingham, Mass. 01701.*

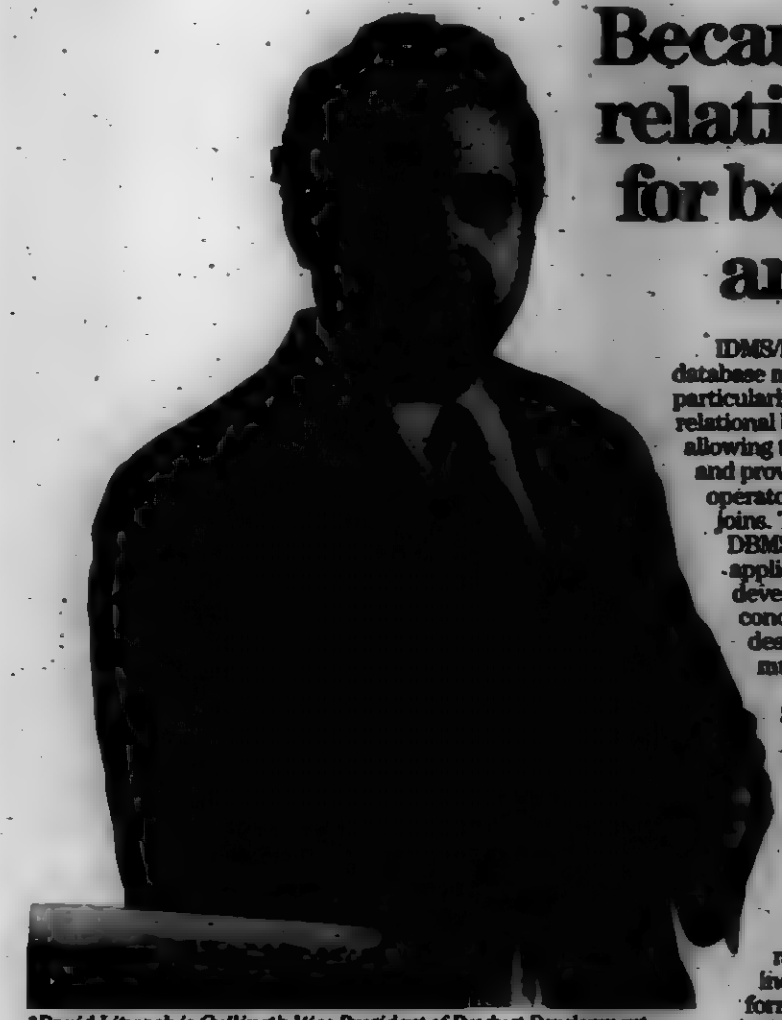
Copyright 1984 by CW Communications/Inc. All rights reserved.
Computerworld can be purchased on 35 mm microform through University Microfilm Int. Periodical Entry Dept., 300 Zeeb Rd., Ann Arbor, Mich. 48106. Phone (313) 761-4700. *Computerworld* is indexed: write to Circulation Dept. for subscription information.
PHOTOCOPY RIGHTS: permission to photocopy for internal or personal; use or the internal or personal use of specific clients is granted by CW Communications for libraries and other users registered with the Copyright Clearance Center (CCC), provided that the base fee of $3.00 per copy of the article, plus $.50 per page is paid directly to Copyright Clearance Center, 21 Congress Street, Salem, MA 01970.
Permission to photocopy does not extend to contributed articles followed by this symbol. ‡

Special requests should be addressed to Nancy M. Shannon, CW Communications/Inc. Box 880, 375 Cochituate Rd., Framingham, MA 01701. ISSN 0010-4841/82 $3.00 + $.50
$2.00 a copy: U.S. — $44 a year; Canada, Central & So. America — $110 a year; Europe — $165 a year; all other countries — $245 a year (airmail service). Four weeks notice is required for change of address. Please allow six weeks for new subscription service to begin.

POSTMASTER: Send Form 3579 (Change of Address) to Computerworld, Circulation Dept., Box 880, 375 Cochituate Road, Framingham, Mass. 01701.

"IDMS/R represents a major advance in database technology."

Dave Litwack*



*David Litwack is Cullinet's Vice President of Product Development. Mr. Litwack has contributed significantly to the many technical advances Cullinet has achieved in database software products, including IDMS/R. Mr. Litwack joined Cullinet in 1976. He is a Cum Laude graduate of Brandeis University and holds a Masters in Computer Science from Boston University.

Because IDMS/R is the first relational DBMS designed for both the DP professional and the end user.

IDMS/R is not only a relational database management system, but a particularly powerful one. IDMS was made relational by removing all pointers and allowing the user to define data as tables and providing the traditional relational operators such as selects, projects and joins. The major benefit of a relational DBMS is the capacity to develop applications faster because the developer does not have to be concerned with the database design. IDMS/R provides this and much more.

For example, the Automatic System Facility (ASF) of IDMS/R is a major advance over fourth generation languages. The ASF is so comprehensive and easy to use that all a user need do, to develop an application, is define a relational record. The Automatic System Facility dynamically generates all necessary supporting structures including data definitions, screen formats, application processing logic, and documentation. So, the developer can witness the application being produced, literally, in seconds. This capability makes IDMS/R the perfect system for the end user.

Data processing professionals can use the ASF to help develop production applications. The ASF can be used to build a prototype that can be enhanced, using Cullinet's fourth generation language, ADS/OnLine, into a complex production application. But, when they build a complex high volume application using IDMS/R, DP professionals require outstanding performance. Typically, 5% of the data relationships (joins) in any application are accessed 95% of the time. With IDMS/R, they can simply change these relationships to predefined joins and benefit from a dramatic boost in performance. We call it Relational Fastpath. Relational Fastpath makes IDMS/R a unique DBMS and a perfect system for DP professionals' system development needs.

In addition, IDMS/R has the most sophisticated back-up and recovery capability of any DBMS, full integration with personal computers and is also integrated with Cullinet's complete line of financial and manufacturing applications.

In summary, IDMS/R was designed to satisfy the requirements of those who want to develop applications faster and those who have the responsibility of processing them.

For further information, attend a Cullinet Seminar. Mail the attached coupon or call Cullinet at 1-800-225-9930 (in Massachusetts, 617-329-7700).

IDMS/R Seminar cities and dates

City & State	Date	City & State	Date	City & State	Date
Albany, NY	Mar 13	Indianapolis, IN	Feb 21	Omaha, NE	Mar 1
Allentown, PA	Mar 1	Indianapolis, IN	Mar 27	Orange County, CA	Mar 6
Atlanta, GA	Mar 28	Jackson, MS	Mar 15	Oshkosh, WI	Feb 28
Arlington Hts., IL	Feb 23	Kansas City, MO	Feb 22	Ottawa, ON	Feb 21
Augusta, GA	Mar 14	Knoxville, TN	Mar 28	Pittsburgh, PA	Feb 29
Baltimore, MD	Feb 21	Lexington, KY	Mar 30	Portland, ME	Feb 21
Bloomington, IL	Feb 21	Little Rock, AK	Mar 13	Portland, OR	Mar 15
Boston, MA	Mar 8	Los Angeles, CA	Mar 27	Providence, RI	Mar 22
Boston/ Westwood, MA	Feb 23	Louisville, KY	Feb 16	Quincy, IL	Feb 29
Bridgeport/ New Haven, CT	Mar 6	Madison, WI	Mar 15	Raleigh, NC	Mar 29
Charleston, WV	Feb 29	Meadowlands, NJ	Mar 7	Rochester, NY	Mar 28
Charlotte, NC	Feb 23	Memphis, TN	Feb 23	Sacramento, CA	Feb 21
Chicago/ Rosemont, IL	Mar 20	Merrimack, NH	Mar 29	Salt Lake City, UT	Feb 21
Cincinnati, OH	Mar 21	Miami, FL	Feb 16	San Antonio, TX	Mar 15
Cleveland, OH	Mar 28	Milwaukee, WI	Mar 7	San Diego, CA	Feb 23
Columbus, GA	Feb 20	Minneapolis, MN	Mar 29	Springfield, IL	Mar 5
Columbus, OH	Mar 9	Montreal, PQ (French)	Mar 14	Springfield, MO	Mar 29
Davenport, IA	Mar 13	Montreal, PQ (English)	Mar 21	Spokane, WA	Mar 28
Des Moines, IA	Feb 16	Nashville, TN	Feb 16	Tallahassee, FL	Mar 1
Detroit, MI	Mar 14	New Orleans, LA	Feb 23	Toledo, OH	Feb 24
Ft. Lauderdale, FL	Mar 22	New York, NY	Feb 22	Toronto, ON	Mar 20
Ft. Wayne, IN	Mar 6	New York, NY	Mar 20	Tucson, AZ	Mar 20
Ft. Worth, TX	Mar 15	New York/ Long Island, NY	Mar 27	Vancouver, BC	Mar 14
Grand Rapids, MI	Mar 27	New York/Rye, NY	Mar 13	Washington, DC	Mar 8
Greenville, SC	Mar 6	Oakland, CA	Mar 13	Wichita, KS	Mar 8
				Wilmington, DE	Mar 27
				Winnipeg, MB	Mar 6
				Worcester, MA	Feb 16

Visit us at Spfcon, Feb 21–23, Booth #A1506.

I'd like to attend your seminar on _____ (Date) in _____ (City)

Computer _____

Name/Title _____

Name/Title _____

Company/Department _____

Address _____

City _____ State _____ Zip _____

Phone ( ) _____

Mail to: Cullinet Software, Inc., 400 Blue Hill Drive, Westwood, MA 02090-2198 ATTN: Corporate Meetings

Cullinet Software products are designed to run on IBM 360/370, 30XX or 43XX or plug-compatible computers. 2/13 CW

Database: Cullinet

© 1984 Cullinet Software, Inc., 400 Blue Hill Drive, Westwood, MA 02090-2198

NEWS

M&D from page 1

less query, multilevel security, screen building and Auditrack, which maintains a history of file maintenance transactions.

The product substantially reduces I/O by creating a separate record, which includes screen formats, the spokesman said. "Once a screen is formatted, a call is issued for the data rather than the screen specifications," he explained. Data is reformatted and normalized before loading into the application.

Millennium builds a component that summarizes the screen format, bypasses CICS mapping and allows the entire screen to be retrieved as one component. "There is only one I/O and one normalizer," the spokesman noted.

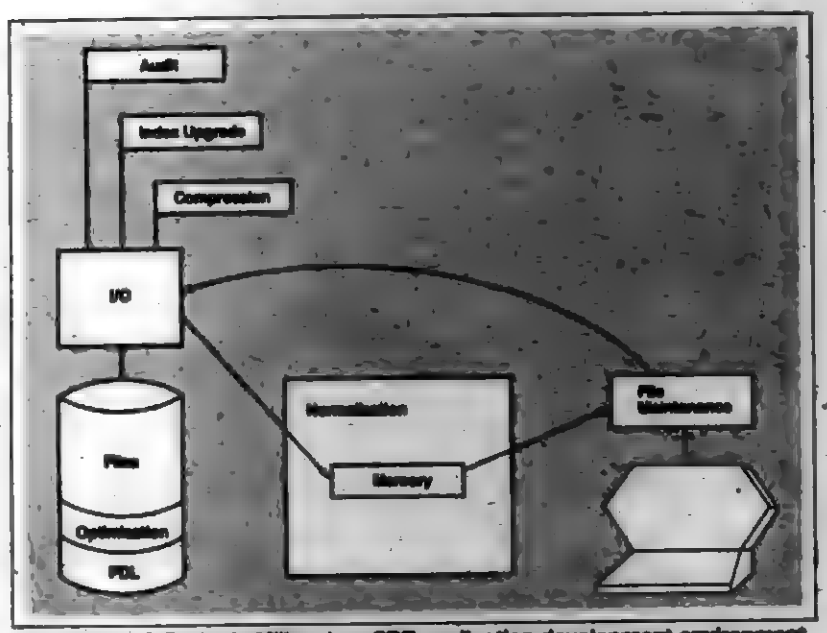
PDL uses macros to allow subroutines from Cobol or PDL programs to be loaded and linked into M:SDT applications, according to the vendor. A normalizer checks the data dictionary to handle field discrepancies within programs, and an on-line logic tester checks the logic to ensure that the code is executable.

When the program compiles, it is "normalized" as a single record, which reduces program size, the spokesman said. For example, the company's G/L Plus package consumed 900K bytes of virtual memory in its original form, but occupies only 700K bytes after normalization.

A separate index called a "key file" resides on the host and maps back to the physical data. Data can thus be presented in any logical view desired by the user.

M:SDT can be used either to develop new applications or to modify existing on-line or batch applications, according to John Landry, senior vice-president of research and development. "Millennium doesn't know one of our applications from somebody else's," he said. "It gives you the ability to retrofit existing applications using standard [IBM] Vsam files. You can be processing on-line general ledger and jump to batch, and Millennium doesn't know the difference."

M:SDT also incorporates a "screen hold" feature, which lets the user suspend a dialog with one application, start a dialog with another application and return to the original dialog. Up to 99 such "pages" can be initiated and suspended concurrently.



McCormack & Dodge's Millennium:SDT application development environment

Software developed under M:SDT is also fully compatible with M&D's Interactive PC Link connection between the IBM Personal Computer and the mainframe. Requests can be defined on the Personal Computer and data downloaded and uploaded from mainframe applications.

Available immediately, M:SDT licenses for $90,000 from M&D, 1225 Worcester Road, Natick, Mass. 01760.

ANALYSIS

M:SDT signals M&D attack on 'total solutions' mart

With its announcement of Millennium:SDT (M:SDT), a systems development tool, McCormack & Dodge Corp. (M&D) has clearly stated its intention to attack the "total solution" market already targeted by a number of systems software vendors.

The release is the company's third announcement in the past 13 months centered around Millennium, a development tool that uses a data base approach to build integrated applications.

By releasing Millennium as a product, M&D is taking a tack similar to that of Cullinet Software, Inc., which writes applications in its own Application Development System/On-Line development product, and Hogan Systems, Inc., which offers Umbrella, the development system it used to build its line of applications.

M&D officials believe the company is better positioned to attack the systems market than are vendors that are tied to an older generation data base management system (DBMS) on which applications are built.

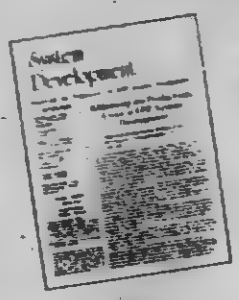
The company's Millennium development environment is organized around the inverted list DBMS, an architecture that is gaining popularity because it can offer a variety of logical user views while still providing for easy mapping through the data elements. In an expensive development effort, M&D is gradually rewriting nearly all of its applications using Millennium.

M:SDT is not intended to be sold stand-alone for customers not using M&D applications. But that does not mean M&D will not offer stand-alone systems software in the future. M&D said a separate DBMS product is within the realm of possibility, and John Landry, senior vice-president of research and development, affirmed that the company is considering releasing a version of Millennium for IBM's Personal Computer XT/370 for use primarily as a development tool.

How to improve productivity in EDP system development

System Development

The Newsletter for Improving Productivity in EDP System Development



Each issue of System Development contains the latest ideas and developments to help you ensure the timely completion of system projects, reduce growing development backlogs, and control development backlogs, and control development costs at all levels. We continuously survey the field and highlight the most practical ideas for productivity improvement from user experiences, conferences, the literature, and products. You get a concise, monthly review of the best ideas and methodologies in use.

- Save time each month in reading and research—we bring it all together
- Just one important idea could save you thousands in development costs

$75.00/Year

☐ Please enter my trial subscription to System Development and send me the first month's issue FREE. If I wish to keep System Development coming for the next year I will honor your $75 invoice.
☐ Send me more information about your monthly newsletter, System Development.

Name/Title _____
Company _____
Address _____
City/State/Zip _____

ACR Call Collect (602) 995-5929

Applied Computer Research, Inc. • P.O. Box 9280 • Phoenix, AZ 85068-9280

Sperry to teach quality circles

PRINCETON, N.J. — Sperry Corp. is taking its internally developed quality circles program public via two five-day facilitator training sessions scheduled for Feb. 27-March 2 and March 26-30 at the Nassau Inn here.

The program was developed by Sperry's Computer Systems Education Center and facilitators throughout the company. It consists of three levels of training, including special programs for facilitators, leaders and group participants.

A quality circles facilitator trains the leaders and acts as a coach, communicator and overall coordinator of the circles.

The sessions run from 8 a.m. to 5 p.m. Registration for both training sessions is limited to 24 participants. Each session costs $795, which includes handouts and manuals, but not hotel accommodations.

More information is available from Sperry through P.O. Box 1110, Princeton, N.J. 08540.

The problem you may not know you have

There is a bug in every Cobol program in your library.

You probably don't know about it, and you almost certainly haven't had to worry about it yet. But when it shows up, it will hit your entire shop, reducing data entry procedures to a mush of error messages.

By Paul Gillin
CW Staff

NOVI, Mich. — When systems analyst William Schoen has presented DP managers with that pitch, he has understandably piqued their interest. But he has had trouble getting them to take his case seriously when they find out what the bug is.

The problem is the year 2000. The turn of the calendar presents a procedural issue that is acknowledged occasionally in trade conference jokes and DP shop banter but has attracted little serious attention in the industry.

The root of the issue is the industrywide standard of using two-digit date fields in Cobol programs. Error-checking procedures typically rely upon dates proceeding sequentially, with one year's date being greater than that of previous years.

However, programs will be thrown for a loop after the turn of the century when they have to cope with the two-digit date field "00" being greater than "99." Schoen ticked off the problems that will arise if the issue is not dealt with: "Program logic is going to malfunction all over the place. Sequential data processes are going to abend. A great many on-line modules won't accept the new dates because they include sequence checks. Most sorts won't work, and a great many literals won't work."

200???
S M T W T F S

Perhaps understandably, the issue has received little serious attention from a DP community that is concerned with more immediate problems. But Schoen claims data processing should start paying attention now to the problem of making programs "year 2000-compatible" in order to avoid headaches when the time of reckoning draws near.

He rationalizes that most large firms maintain a library of thousands of Cobol programs, most of which have at least one date field. In addition, many of those programs have literals, sequence processes and error checks interspersed throughout, meaning that they will require modification in several places.

"You can't assume every date field has the word 'date' in it," Schoen said. "You also can't assume every field that looks like a date field is a date field. You're going to have to look at every program and figure it out."

For that reason, he said, the "black box" approach of simply running every program through a modification routine is impractical. Some date fields are bound to be missed.

See 2000 page 8

Manager gets 16-year jump on Cobol bug

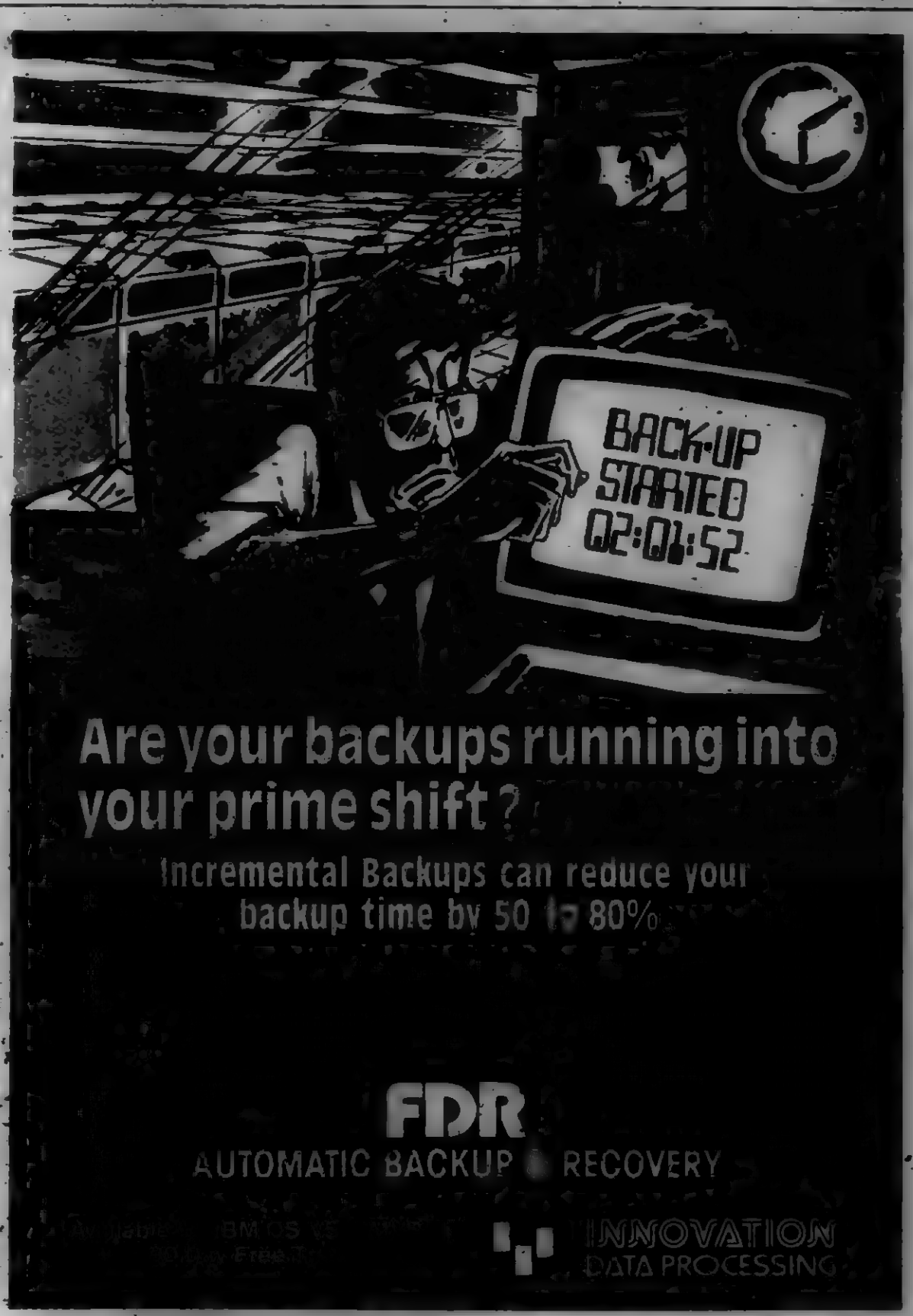
TOLEDO, Ohio — Although he agrees that making Cobol programs "year 2000-compatible" is not an issue of immediate concern, a DP manager here has elected to become the first user of a set of subroutines designed to make the transition to the new millennium a smooth one.

Michael Ehrick, director of computer services at Libbey-Owens-Ford, Inc., became interested in preparing Cobol programs for the inevitable march of time after he received a direct mail advertisement from William Schoen, a systems analyst based in Novi, Mich.

Schoen's Charmar Enterprises, Inc. markets a product that addresses the problems that may emerge when the year 2000 arrives and plays havoc with date fields in existing Cobol programs (see related story). His product is "a subroutine that does some elegant arithmetic routines that let you compare date fields with two-digit years in such a way that the year '00' is greater than the year '99,'" Ehrick said. Schoen also offers an approach to sorting so that the same end is achieved, according to Ehrick.

Ehrick put Schoen in contact with Libbey-Owens-Ford's manager of application development. The company expects to begin including the subroutine in new applications as soon as the next development project is undertaken.

The subroutines are "nothing an advanced computer science major couldn't do," Ehrick said. But, he added, "a lot of creative thought went into this, along with a lot of dogmatism."



New Zip+4 rules ease access to discounts

By John Gantner
CW Washington Bureau

WASHINGTON, D.C. — The U.S. Postal Service (USPS) has issued new regulations to make it easier for mass mailers to obtain discounts by using nine-digit Zip Codes. The post office hopes the regulations will greatly increase participation in the new postal automation program.

The Zip+4 program went into effect late last year after several years of controversy. However, the hoped-for success of the program, designed to bolster USPS productivity through greater automation, has been slow in developing, in part because mailers have had problems converting their address files to the longer Zip Codes.

The new regulations, published Jan. 31, should make it easier for firms to qualify for the one-half cent discount for every piece of mail that carries a Zip+4 code while phasing in full conversion to the new numbers, according to USPS and postal experts.

Postal regulations allow mailers to obtain a three cent discount for each piece of first-class mail delivered to a post office in bundles presorted by five-digit Zip Codes. Before the rules were modified, 100% of those letters had to carry a nine-digit code in order to qualify for the additional one-half cent discount.

But problems with the computerized Zip+4 data base tapes available from USPS and private sources have made it very difficult to convert all files to the Zip+4 program.

These difficulties have not deterred the USPS from expanding its use of new automated reading and sorting equipment needed for the Zip+4 program. At a recent USPS Board of Governors meeting, postal officials said the machines are reliably sorting approximately 50% of the mail they handle — far above the break-even point, they said. The board then approved the next phase of equipment procurements, totaling $450.2 million in machinery.

The new regulations . . . should make it easier for firms to qualify for the one-half cent discount for every piece of mail that carries a Zip+4 code while phasing in full conversion to the new numbers.

To prod more mailers to use the longer Zip Codes, the new postal regulations allow comingling of five- and nine-digit Zip Coded mail in presorted bundles of 500 letters. Only the letters with the nine-digit codes will qualify for the extra one-half cent discount but, on a temporary basis, mailers will not have to separate mail into the two presort categories.

By having to separate the two categories, mailers would have had to forfeit the three cent discount in order to qualify for a one-half cent discount, which understandably limited Zip+4 participation. Under the new rules, until Feb. 1, 1985, at least 85% of the pieces in the combined batches must have Zip+4 numbers. From then until Oct. 1, 1985, at least 90% must bear those numbers. Thereafter, no comingling will be allowed, and presorted five- and nine-digit Zip Coded mail must be bundled separately. Reacting to these changes, James E. Pehta, vice-president of List Processing Co., Lombard, Ill., said the rules will bring into the Zip+4 program many of the largest mailers, whose participation "is key to the success of the [Zip+4] program," but who have been "sitting on the fence" because of the problems they have had in qualifying for the discount.

Pehta, whose firm offers automated Zip Code services, is a member of the USPS Mailers Technical Advisory Committee, which represents private sector views to the agency and which helped to develop the new regulations.

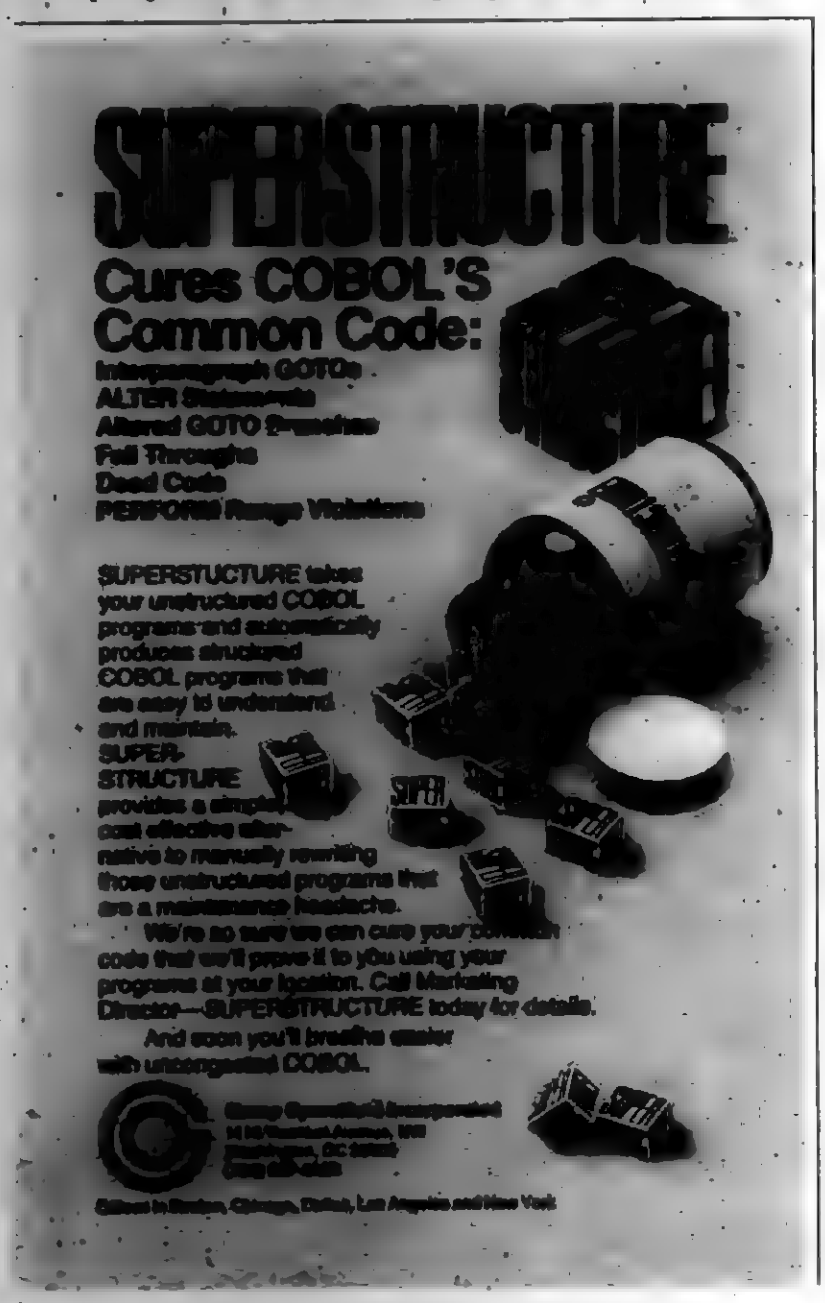
According to Pehta, of the 67 billion pieces of first-class mail delivered in fiscal 1983, 13 billion were presorted.

About 4,000 of the largest mailers in the U.S. produce approximately 40% of the mail, he added.

Pehta predicted that as a result of the new regulations, the amount of mail with nine-digit Zips might hit two billion pieces in the first year, up from an estimated 300 million that could have been expected without the more relaxed regulations.

He also noted that the new regulations contain provisions mailers must follow to certify that their mail meets requirements of the new rules. These will help the USPS track use of the Zip+4 numbers.

The USPS can use this statistical data to support requests for even larger Zip+4 discounts, according to Pehta, who said a three to five cent discount for machine-readable Zip+4 coded mail within four to five years is possible.



Burroughs releases laser printer

DETROIT — The North American release of the first laser printer for Burroughs Corp. mainframes was announced by the company last week. The B9290-30, a 30 page/min intelligent laser printing system that operates on-line with Burroughs systems, was first introduced in France seven months ago.

The B9290-30 is compatible with Burroughs B2900, B4900, B5900, B6900, B7900 and the recently released B9 mainframes. Running in a continuous print mode, the laser printer reportedly operates under both printer and host system software control.

Burroughs said the printer allows flexibility in the design of printed forms (printing logotypes and signatures), the placement of data on the forms and the assembly of completed reports. Images are created by a laser diode with a resolution of 57,600 dot/sq in.

The B9290-30 can print on two sides of uncoated, 8½- by 11-in. plain bond paper in either the portrait (standard text) or landscape (columnar) format with no loss of speed and completely collate and stack completed reports in distribution order, the vendor said.

The B9290-30 is priced at $65,000 from Burroughs, 1 Burroughs Place, Detroit, Mich. 48232.

2000 from page 7

The only real solution is to write all new programs to be year 2000-compatible.

Not surprisingly, Schoen has developed a method to do that. The Charmar Correction is a package consisting of two Cobol subroutines that can be inserted into new programs to resolve the problem. The $995 purchase price also includes an analysis of the problem and a methodology to deal with it.

Programs made to work

"They make programs work right, and they include directions to make sorts simple," he said.

Schoen has done some calculations to show why it makes sense to tackle the problem today. He figures it costs $300 to modify a program, and there is a minimum of 50 programs per programmer in the average corporate library. Assuming that half of those programs will need to be modified, that comes to a cost of $7,500 per programmer if the conversion is left until the last minute.

Based on scans of existing libraries, Schoen has decided that if firms begin implementing the changes now, by the year 2000 less than 2% of their programs will require modification. If they wait just six years to begin the process, the figure balloons to 25% to 30% of their library.

"Why should companies continue to write software that is not year 2000-compatible when it's just as easy to do it the right way now?" he reasons. Not many DP managers have bought his argument so far. He has been escorted out of buildings by security officers more than once, Schoen said.

Schoen's Charmar Enterprises can be reached through P.O. Box 702, Novi, Mich. 48050.

Recruiter says DP paychecks much fatter

Computing systems managers earning $41,500 to $66,800

By Peter Bartoli
CW Staff

MOUNTAIN VIEW, Calif. — Salaries in the computer profession are up sharply from six months ago, and there is an expansion in demand for various types of computer skills, according to a survey just released by Source EDP.

In its "1984 Computer Salary Survey and Career Planning Guide," the recruiting firm reported median compensation levels, along with high and low ranges, based on an analysis of more than 44,000 computer professionals who used the company's services during 1983.

"Salaries throughout the computer profession are on the rise, with most of the increase occurring during the last six months," the company reported. "In comparison with data available just six months ago, salaries are up sharply."

The report listed salary data for 11 nonmanagement positions at various levels of experience, four management positions at small, medium and large DP operations and three sales positions.

Changing technology

Changing technology is greatly impacting the hiring outlook for professionals in the DP industry, according to the report. "While it was once cost prohibitive for smaller companies, today, sophisticated computing power is being realized by even the smallest business establishment," according to Source EDP.

At the same time, "Large corporations are finding more uses for computing." The implications for career planning are twofold, according to the report: "Professionals in the user environment should broaden their exposure to such areas as distributed processing, end-user information center products, networking and communications in order to stay in the mainstream of career development."

Secondly, "new opportunities will develop in key disciplines within vendors of mini and microcomputers in the areas of software development, commercial and scientific systems development, programming, marketing and marketing support and within service organizations that support manufacturers' systems by providing time-sharing, turnkey applications, consulting services and more."

The report also said the career opportunities in the area of industrial automation may be the most exciting as the shift to automation, "only in its infancy," increases demand for computer-aided design and manufacturing systems designers and programmers and others.

Median salary ranges

Median salary ranges for managerial positions at small to large operations, Source EDP said, are: technical services managers, $40,800 to $54,900; systems and programming managers, $40,800 to $51,300; operations managers, $29,000 to $42,000; and computing systems managers, $41,500 to $66,800.

The highest median salary level for computer professionals in nonmanagerial positions and with two years' or less experience was $29,100 for systems programmers, closely followed by data communications programmers and programmer analysts at $28,800 and data base specialists at $28,400.

Other nonmanagerial positions with two years' or less experience were senior analysts, project leaders and consultants, $26,200; DP auditors, $25,500; software engineers, $25,300; mini/micro programmers and programmer analysts, $22,000; engineering/scientific programmers and programmer analysts, $21,100; commercial programmers and programmer analysts, $20,800; and computer operators, $15,000.

Median salaries for those positions with more than four years' experience (six years for software engineers and senior analysts) were data base specialists, $42,900; systems programmers, $41,500; senior analysts, $41,400; data communications programmers and programmer analysts, $40,700; DP auditors, $40,300; software engineers, $38,200; mini/micro programmers/analysts, $36,800; engineering/scientific programmers/analysts, $35,100; commercial programmers/analysts, $33,800; and computer operators, $23,700.

Median salaries for sales positions ranged from $25,000 for sales/technical support representatives with one to two years' experience to $55,300 for sales managers.

Source EDP's report is available free to computer professionals from Source EDP, Department DX-400, Box 7100, Mountain View, Calif. 94039.

Just published:

CICS for the COBOL Programmer Part 1: An Introductory Course

If you work with CICS...as a manager, a trainer, or a COBOL programmer...you should get a copy of *CICS for the COBOL Programmer, Part 1: An Introductory Course.*

Why? Because this new book zeroes in on the basics of CICS, leaving aside the features you won't use right away.

So beginners can use it to learn CICS without getting bogged down in a lot of detail. Experienced CICS programmers can use it to gain a better understanding of CICS that will help them produce more efficient programs. And everyone in your shop can use it as a reference manual to save time and coding errors.

Here's just some of what you'll find in this book:

- the meanings of the critical terms and concepts that apply to CICS
- how to use basic mapping support (BMS) macros to create a mapset...the special assembler program that defines screen formats for a CICS program
- 4 CICS terminal-handling commands that let COBOL programs communicate with 3270 terminals
- 5 CICS file-handling commands that let COBOL programs access VSAM key-sequenced (or ISAM) files
- 3 CICS program-control commands that let you transfer control from one COBOL program to another
- pseudo-conversational programming ...what it is, why you have to use it, and how it complicates the logic in a COBOL program
- why program efficiency is vital under CICS...and how to write programs that make the best use of your computer's resources
- how to design a *structured* CICS program
- how to test CICS programs using top-down testing
- how to debug CICS abends using either the Execution Diagnostics Facility (EDF) or a storage dump

4 reasons why this book works

1. To learn CICS programming, you have to grasp several complex concepts all at the same time. This book works because the author, Doug Lowe, carefully explains how each of these concepts relates to the whole.

In contrast, most courses present each CICS element separately, without showing relationships. No wonder so many people are baffled by CICS!

2. Doug spent a lot of time choosing a usable—and teachable—subset of CICS for this book. As a result, you won't learn *every* CICS feature...just the most useful ones. And you'll build a solid foundation for learning the additional CICS elements ...like alternate indexing, queue management, and terminal paging...that will be covered in *Part 2: An Advanced Course* (available late this year).

3. Doug gives you plenty of coding models in this book...for CICS elements, common COBOL routines, and BMS map definitions. I'm convinced these examples, more than any other factor, will help you understand how the new elements and routines work. And I know your productivity will go way up if you use these models when you write your own CICS programs.

4. Although effective program design is critical to the success of any programmer, I've yet to see a CICS course that deals adequately with the subject. In fact, most of them don't say anything about design at all.

In contrast, this book stresses effective, structured design. So you'll learn to break programs down into logical units that are easier to code, test, debug, and maintain.

Why wait? Get a copy TODAY

If you want to know more about how to develop CICS programs...or you need a practical, easy-to-use reference with plenty of examples...get *CICS for the COBOL Programmer, Part 1* TODAY. I think you'll be surprised at how much knowledge and reference material you can get for $25!

Our unlimited guarantee

You must be satisfied. Our books must work for you, or you can send them back for a full refund...no matter how many you buy, no matter how long you've had them.

To order, call 1-800-221-5528 / In California, call 1-800-221-5527 (8 to 4 Pacific Std. Time)

OR Mail the coupon below

Do you have some questions about VSAM file handling in COBOL?

If so, get a copy of *VSAM for the COBOL Programmer*. This practical, how-to guide will teach you all about using VSAM files in COBOL programs

That means you'll learn: the COBOL elements for handling key-sequenced, entry-sequenced, and relative-record VSAM files; why error processing is a must for VSAM files; how to use the IDCAMS utility; how to code the DOS or OS JCL for programs that use VSAM files; and more!

Mike Murach & Associates, Inc.
4222 W. Alamos, Suite 101
Fresno, CA 93711 • 209-275-3335

Mike Murach & Assoc., Inc., 4222 W. Alamos, Suite 101, Fresno, CA 93711

Dear Mike: Please send me the books I've indicated below. I must be completely satisfied, or I'll send them back at any time for a full refund.

_____ CICS for the COBOL Programmer: Part 1, $25
_____ VSAM for the COBOL Programmer, $15

☐ Bill me for the books plus shipping and handling (and sales tax in California).
☐ Charge the books plus shipping and handling (and sales tax in California) to my _____ Visa _____ MasterCard:
Card number _____ Valid thru (mo/yr) _____
Cardowner's signature _____
(not valid without signature)
☐ I want to SAVE shipping and handling charges. Here's my check or money order for full payment. Calif. residents, please add 6% sales tax to your order total. (Offer valid in U.S.)

Name & Title _____
Company (if any) _____
Address _____
City, State, Zip _____ C1/1

Little fear of DP glitches on 'Challenger'

IBM diagnoses 'Columbia' malfunctions to prevent recurrence

By Peter Bochnik
CW Staff

CAPE CANAVERAL, Fla. — Despite the many problems experienced last week during the mission of the space shuttle *Challenger*, there was little fear that the computer malfunctions experienced during *Columbia's* previous mission would recur.

At the end of *Columbia's* mission in December, two of the four IBM Advanced System/4 Pi Model AP-101 computers shut down [CW, Dec. 19]. When the firing of thrusters aboard *Columbia* jarred the ship, the No. 1 computer shut down, and its guidance and navigation tasks were assumed by the No. 2 computer. Five minutes later, after another thruster firing, the second computer also shut down. That computer was restarted, but failed again during the landing.

Following the flight, IBM removed the computers and stripped them down to pinpoint the problems. Both failures were believed to have been caused by objects floating around in circuit boards and causing electrical shorts. IBM implemented an additional testing procedure to ensure the problems would not occur in the future.

In the No. 2 computer, according to a spokesman for the National Aeronautics and Space Administration (Nasa), "a microscopically small solder ball loose in one of the circuits escaped detection in quality checks. In zero gravity it would drift over and short out the circuits."

In the No. 1 computer that could not be restarted, "a small flake of gold-plated carbon, scrap from the circuit board, jammed into circuits and caused a permanent short."

Joseph Melitano, spokesman for IBM's Space Shuttle Program, said the causes were "identified with a high degree of certainty," but not 100% certainty because during attempts to recreate the failures, the computers "did not re-abort out."

Nasa spokesman Terry White said, prior to *Challenger's* launch, that there was little concern about a recurrence during the latest mission, even though *Challenger's* computers were not stripped down, because the computers aboard that shuttle "have flown on three previous flights with no problem at all." Melitano said the *Challenger* computers were subjected to standard tests.

According to Melitano, IBM has initiated additional testing procedures called particle impact noise detection (Pind). A "highly sensitive audiovisual system is placed against the computer, which is given a jolt to see if the [Pind] system can pick up any movement," he explained. "If [engineers] hear any noise, they'll take the component apart or even take the computer away."

During the Pind test, the computer components are vibrated and then shocked to determine if any objects are loose within them.

Equipment designed for use in space is designed to exacting military specifications and subjected to rigorous testing that has no comparison in the production of commercial equipment, Melitano said. "The equipment is built and tested to withstand the shock of lift-off and the heat of reentry and to operate in a weightless environment. Redundancy is the key ingredient. All these systems are designed to take the impact of any number of failures."

Source: Wide World Photos

The space shuttle 'Challenger'

Ifip schedules security meet

TORONTO — The International Federation for Information Processing (Ifip) has scheduled its second International Congress and Exhibition on Computer Security Sept. 10-12 here.

The theme of the congress will be "Computer Security — a Global Challenge." Sessions will cover computer security, contingency planning, data and facility protection and implications of systems security.

Registration costs $442 prior to May 30, $479 prior to July 30, $516 before Sept. 1 and $553 for late registration from the International Security Congress, Inc., 160 Duncan Mill Road, Don Mills, Ont., Canada M3B1Z5.

SAVE MONEY ON TALK FASTER.

THE CODEX 224 DIAL MODEM.

Failed orbit sinks use of $75 million satellites

By Lynn Weiner
CW Staff

CAPE CANAVERAL, Fla. — Two $75 million communications satellites launched by the space shuttle *Challenger* failed to achieve orbit, rendering them useless as transmitters of voice, data, video and facsimile traffic.

Launched on Friday, Feb. 3, from *Challenger's* cargo bay, the *Westar VI* communications satellite, owned by the Western Union Co. of Upper Saddle River, N.J., ran into problems "some time late that afternoon," according to a spokesman from Western Union.

The second satellite, the *Palapa B-2*, owned by the government of Indonesia, failed to achieve proper orbit after it was launched last Monday, Feb. 6.

Both satellites were built by Hughes Aircraft Co. and were to be boosted into high Earth orbit by a payload assist module made by McDonnell Douglas Corp. Each satellite was insured for about $100 million.

According to a National Aeronautics and Space Administration (Nasa) spokesman, a malfunctioning booster rocket may have affected the proper positioning of the satellites. The *Westar VI* was supposed to have reached geosynchronous orbit — the point in space where the orbit of the satellite matches the rotational speed of the Earth — at an altitude of 22,300 miles.

The launching of the *Westar VI* was to have marked Western Union's first decade in space and the 10th anniversary of the first launch of a U.S. domestic communications satellite. The initial launch took place in April 1974. Western Union currently has four domestic communications satellites in space, the *Westar II, III, IV* and *V*.

The *Westar VI* was a 24-transponder C-band satellite, similar to *Westar IV* and *V*. As a future customer of *Westar VI* services, Vitalink Communications Corp., a three-year-old company partially owned by Western Union and General Electric Co., had purchased two of the transponders. Vitalink was "well insured" for the loss, a Vitalink spokeswoman said.

Vitalink currently leases two transponders on *Westar IV* and intended to move its customers from *IV* to *VI*. "In terms of Vitalink's operation, our customers will feel absolutely no interruption in service," the spokeswoman said. "We plan to extend our leases on *Westar IV*, and with our coverage for the space we owned on the *VI*, we will be pursuing the lease or purchase of new transponder space."

The spokesman for Western Union confirmed "business as usual" for customers on the existing four satellites. Some of the print media customers, which use the satellites to transmit facsimile communications traffic to their various regional printing plants from which local distribution takes over, include the *Wall Street Journal, U.S. News and World Report, Time, Sports Illustrated* and *People Magazine*.

According to a Western Union spokesman, the firm will explore ways to utilize its integrated satellite and terrestrial microwave network to handle the communications traffic slated for *Westar VI*. The firm is also exploring the possibility of leasing capacity from other carriers.

Construction and planning for *Westar VII* are already under way, with a projected launch date for fall 1985.

Because of the *Westar VI* launch failure, Western Union will attempt to move that date up, the spokesman said.

Will mishap hike insurance rates?

NEW YORK — The insurance industry is feeling repercussions from the failures to properly launch two $75 million communications satellites from the space shuttle *Challenger* this month.

The *Westar VI* communications satellite owned by Western Union Co. was insured for $105 million; Western Union had paid a premium of about $5.5 million for the policy. Alexander & Alexander Services, Inc., a New York brokerage company, was the underwriter for the policy, according to a Western Union spokesman.

The anticipated increase in the use of communications satellites and, therefore, the increased likelihood that other launches could go awry may elevate the cost of insuring such ventures, according to insurance industry experts.

The Western Union spokesman refused to speculate on how an increase in insurance rates would affect satellite customers. "I'd say it's premature to say what effect increases in insurance costs will have for us. This is a situation where we're just going to have to wait and see what happens in the future."

YOUR PHONE BILL.

If you're running 212 modems in a dial-up network, Codex has a new product that can significantly reduce your phone bills.

It's the Codex 224 modem.

At 1200 bits per second, the Codex 224 is fully compatible with Bell's 212 modem. But because the Codex 224 also runs at 2400 bits per second you can transfer more data faster and therein lies the economy.

You can run at 2400 bps full duplex asynchronous or synchronous over public telephone lines, even unattended. And because the Codex 224 incorporates advanced equalizers you're assured of high performance at higher speeds even over marginal lines. In addition, the Codex 224 automatically recognizes 1200 or 2400 bps transmissions and adjusts automatically.

And with faster file transfer and screen fills, people in the network will be able to get more done in the same time.

What all this means is that you can get better productivity and significant savings in your 212 network simply by installing Codex 224 modems.

The Codex 224, which meets the CCITT international standard, can be leased directly from Codex or purchased outright.

In short, you don't have to make a massive investment to run a better, faster, more economical network.

All you have to do is call Codex.

Call 1-800-821-7700 Ext. 895. Or write: Codex Corporation, Dept. 707-95, 20 Cabot Blvd., Mansfield, MA 02048.

codex

MOTOROLA INC.
Information Systems Group

© 1983 Codex Corporation.

SEE US AT INTERFACE, LAS VEGAS, MARCH 12-15, BOOTH #736.

Air Force launches Sperry pact

CW photo by J. Connolly

Air Force Staff Sgt. Lawrence Thompson operates Sperry 1100/60 at Langley Air Force Base.

By James Connolly
CW Staff

HAMPTON, Va. — Installed under the largest commercial computer contract in history, a Sperry Corp. 1100/60 mainframe here at Langley Air Force Base last week became the first of 153 new U.S. Air Force computers to be fully operational.

The Langley system, like other Phase IV Program systems that will be installed at 118 air bases throughout the world, will manage base-level administrative tasks such as supply, maintenance, accounting, property inventory and personnel. The systems at the other bases are at various stages of installation, but Defense Department and Sperry officials said that all of the $480 million contract's 153 systems, which include regionalized primary systems and backups in some areas, will be operational by the July 1, 1985 target date.

Assistant Secretary of the Air Force Russell D. Hale, Sperry Corp. Computer Systems President Joseph J. Kroger and Gen. W.L. Creech, commander of the Tactical Air Command, headquartered here, officially opened the Langley computer room last week.

At Langley, chosen for the first installation because the Air Force felt it was typical of large air bases, the 1100/60 is located on the first floor of a three-story red-brick building. But throughout the 400-acre base are some 400 Sperry UTS-40 terminals and printer-terminals linked to the mainframe.

Those terminals will be used by personnel in various departments and air wings to order supplies, keep maintenance records on aircraft and handle other administrative tasks.

"With this system," Hale said, "supply people for once in their lives are going to be able to understand their roles, how they fit in." It is the Air Force's first true distributed data processing, he added.

Hale stressed that it is crucial for the Air Force to be able to manage spare parts and maintain its aircraft and that base-level supply is more important to the Air Force than to other services because only the Air Force fights from its home bases.

Hale cited the fact that the Air Force uses 57 different types of aircraft engines as an example of the supply problem's complexity. The computers will be used to track the thousands of spare parts needed. They will also track fuel supplies, munitions and ground vehicles.

In addition, the processors will maintain personnel, medical and payroll records for more than 10,000 military and 1,200 civilian employees at Langley.

The base is home for the 48th Fighter Interceptor Squadron and various airlift, communications, training and support groups, both active and reserve.

Nineteen configurations

The 1100/60, which will be installed in 19 different configurations at the different bases, replaces a combination of Burroughs Corp. 3500 and Sperry 1050 mainframes purchased in the 1960s. Those 277 systems are scheduled to be replaced by an average of about 10 of the 1100/60s per month.

Implementation of the Phase IV Program involves converting 320 software systems that are unique to the Air Force and hundreds of other programs that are unique to individual bases or commands.

Sperry won the eight-year contract a year ago after a head-to-head "compute-off" that pitted Sperry against Burroughs in a 26-month contest to determine which company and system could best convert 1.5 million lines of Air Force software at the lowest price. The contract could soar to more than $1 billion by the year 2002 if Sperry wins two six-year extensions, which Hale noted could involve major upgrades in the systems.

"This system is upward growth-compatible. If Sperry comes out with a new whatever, we can integrate it into our system. It's a system for the 1990s," he said. In addition to the 153 mainframes, the contract calls for Sperry to supply 7,000 terminals by July 1985 and a total of 20,000 terminals by the end of the contract.

In addition to the Air Force contract, Sperry's defense contracts include three pacts, worth more than $1.5 billion, to supply computers to the U.S. Navy and a $1 billion contract to provide electronics and weapons for six Canadian frigates.

VIDEOTEX IS NOW!

Enjoy the advantages of information services through videotex . . . now.

Comparatively low in cost and truly user friendly, videotex meets the ever-growing needs for the two-way exchange and distribution of information. Using color and powerful graphics, videotex offers tools and techniques difficult to attain through traditional data processing methods.

Using a TV set as a terminal, videotex provides effective internal information services, handles electronic messaging, or links to other computer-based information sources.

Videotex systems available from Videotex America are easy to install, simple to operate and provide access by users in a very simplistic manner.

Videotex is part of the very cutting edge of the information revolution, and now is the time to determine what role this exciting new technology will play in your company's future. Videotex is new . . . and Videotex America can show you how to make the most of it.

VIDEOTEX AMERICA

For more information, write to: Hugh Wagner, Vice President, Marketing, Videotex America, 2375 Morse Ave., Irvine, CA 92714

DEC chief promises drastic price reductions

By David Myers
CW New York Bureau

NEW YORK — Buyers of Digital Equipment Corp. systems can look forward to "drastic" price reductions over the next year and a half, according to Kenneth H. Olsen, president and founder of what is now the second largest computer maker in the U.S.

Addressing stock market analysts here last week, Olsen said the overall cost of a computer system will not drop as steeply as the price of its central processing unit. However, the price drop-offs will be the steepest in DEC's 26 years of business.

"We never use the word 'price cutting.' We like to think we're the ones who introduce new technologies and new low prices," Olsen said when asked if DEC would lead prices downward for the rest of the computer industry. He added, however, that as "the cost of computing is coming down, people's taste for computing is on the rise. That's the compensating factor."

Olsen also told the analysts that DEC has recovered from its disastrous first quarter, when profits crashed by 72%. Second-quarter results, released a week before Olsen faced Wall Street, showed DEC's profits climbing once more, up 32% over the year-ago quarter.

The quick turnaround was caused by an internal change in the method of measuring sales success. "The change was insignificant," according to Olsen. "All we said is, 'We're going to measure you differently — by sales department rather than by product line.' "

The internal change also explained the management defections DEC suffered in the first quarter, Olsen said. "It made a few people who had been doing it the old way for 23 years unhappy. [Their leaving] really had little to do with what we went through in quarter one."

Not all analysts convinced

But not all analysts were convinced. Frederic H. Cohen of L. F. Rothschild, Unterberg, Towbin said recent top-flight emigres from DEC's engineering ranks had "not been replaced by equivalent people. Key people have a [financial] stake in [Data General Corp.] and have a reason to stay. That's not true at DEC. Why would the flow of people to other companies not continue?"

However, John J. McManus, an analyst at Bear, Stearns & Co., said DEC, "like IBM," is "ripe for the raiding. There are always going to be people leaving. We can't lose sight of their tremendous market share."

Olsen complained that critics of DEC had jumped all over the company after its first-quarter results were posted. "We should not be measured by our participation in the fast-growth, sometimes fast-decline segments of the industry," the DEC chief said.

"We have dull customers with dull applications, as opposed to robots and home computers and the like. But we like that market. It's challenging, but it's stable," he said.

In discussing product strategy, Olsen divided DEC's plans into three parts for the stock analysts:

■ DEC will continue to "concentrate on VAX," including the eventual appearance of "Venus," the high-end machine now five years in development. In addition, the two-board Microvax I is due to appear later this year with the single-chip Microvax II to follow in 1985.

Olsen

■ DEC will continue to "tie all our customers together through clustering," either "on the disk side" or through Xerox Corp.'s Ethernet network. All DEC equipment is now compatible, Olsen said, with some links to IBM and Wang Laboratories, Inc. hardware also having been forged.

■ Personal computers will continue to play "a large part in our systems," Olsen said. "The work will be highly shared between personal computers and the VAX." However, he noted that it will be "a long time before [the personal computer market] settles down."

Olsen also revealed that a "medium-size project" now under way at DEC is developing a "simple computer that goes very fast" and which is based on "a completely different architecture" than the rest of the Maynard, Mass.-based computer maker's line.

"All the uses for this we're not sure of yet," Olsen said, vowing the new machine would not become the company's "main line."

Olsen said the biggest problem faced by the No. 2 computer vendor is deciding which markets to remain a competitor in and which to abandon.

"Most of the challenges are our own. We believe it's too easy to blame your problems on the government — that's a good Puritan tradition," Olsen said.

Cut Information Retrieval Down To Size

...with BRS/SEARCH— the Software That Comes In Mainframe, Micro and Mini Sizes.

BRS/SEARCH, the same information retrieval software that runs one of the world's largest online database systems is now available for your mainframe, mini, or micro computer.

BRS/SEARCH gives you instant access to all your own information, regardless of its length or format. Many powerful, easy-to-use features developed through millions of online searches have made BRS/SEARCH the system of choice among information professionals.

BRS/SEARCH runs on IBM and compatible mainframes, as well as 16 and 32 bit mini and micro computers. And because the search query language is the same no matter what size computer, you can use it on a variety of systems without any additional training.

For more information about these three new sizes of database software, call (800) 235-1209. Or write BRS Software Sales Support, 1200 Rte. 7, Latham, N.Y. 12110.

Dealer and OEM inquiries invited.

BRS SEARCH SOFTWARE
An ITG Company

I'd like to know how to cut my information retrieval problems down to size. I am interested in SEARCH for the following systems:

Mainframe: .....
Mini: .....
Micro: .....

☐ Please have a salesman call.
☐ Send me more information.

NAME
COMPANY
ADDRESS
CITY STATE ZIP
PHONE ( )

NEWS

Bank's quality assurer has lofty goals

By Bill Laberis
CW Staff

BOSTON — Karen Jacobs said she was typical of a lot of young people during the 1960s, shunning any sort of goal orientation in favor of simply putting in her eight hours and going home.

But today, after 22 years with the same company, Jacobs' professional world is almost entirely goal-oriented. As quality assurance coordinator at the Shawmut Bank here, the 39-year-old Jacobs oversees a reporting system designed to ensure that the bank's DP shop meets service goals the shop helps develop, while ensuring further that users get what they need from the DP shop — no more, no less.

Trained initially as a clerk/typist and later as a budget specialist, Jacobs spent nearly 11 years in Shawmut's data center in various clerical and administrative capacities before moving up to quality assurance five years ago. Her move coincided with the bank's implementation of a performance appraisal system set up to monitor DP performance and productivity.

"I'm the liaison between EDP and the users, via the reporting system," Jacobs said in a recent interview. "The idea from the beginning was to open communication between EDP and the user. I think in the last few years here we've helped break down a common misconception that EDP people are untouchable."

Photo by P. Kaczanowski
Karen Jacobs

To accomplish such lofty goals as DP-user harmony, Jacobs said she first had to hone her own communication skills before applying them to two groups of people who in many shops mix about as well as oil and water.

"It helps to be a good organizer and to know the resources available to you when it comes to resolving a minor conflict before it becomes a major blowout," she said. "You have to be both firm and friendly, but most of all you have to be fair. It all sounds so simple until you try to practice on live subjects."

Jacobs gets plenty of opportunities to practice these days. She works with and monitors the performance of 43 applications serving dozens of users at the bank. Using the framework of a performance rating system developed by Darien, Conn.- based Mathews & Co. management consultants, Jacobs helps the users and DPers develop mutually acceptable levels of performance for the DP shop by drafting a written agreement signed by managers from both the user and DP communities.

Once the agreement is reached, it remains unchanged unless changes are again mutually agreed upon. For example, Jacobs used the Mathews system to help users develop performance measurements for Shawmut's demand deposit application, one of the bank's largest applications. She first gathered job control and human resource data from the computer control and scheduling people to determine what reports the application routinely generated and to whom they were sent and when.

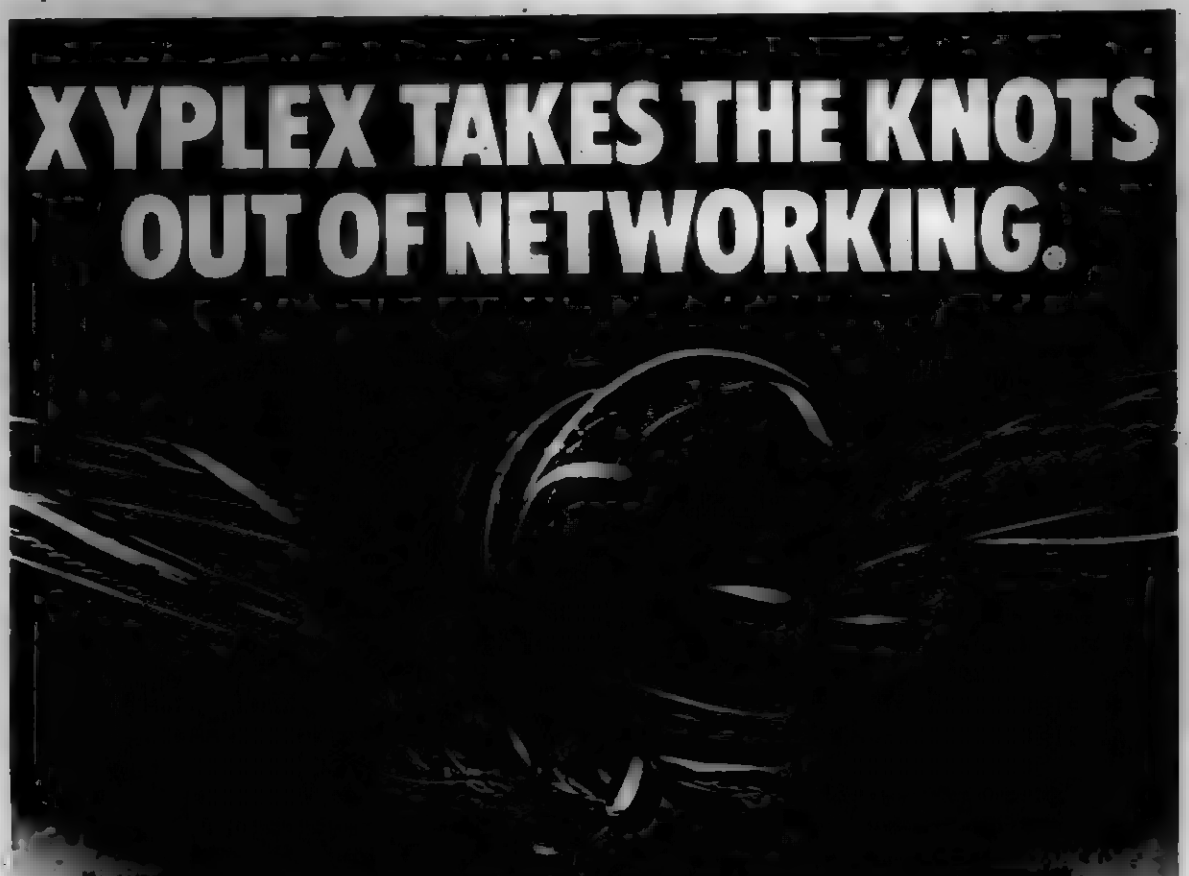
Combining this information with data from the users, Jacobs then arranged a series of meetings with the two groups to work out definitive job schedules. The binding agreement that was finally hammered out dictates what users can expect and what DP should produce. She was also able to alert some users to the availability of reports of which they were not aware.

"Prior to implementing the system, some users needed their reports at 8 a.m.," Jacobs recalled. "Well, maybe they did and maybe they didn't. Using the system with our department in the middle, we have been better able to allow supervisors and middle managers among the users to determine needs vs. wants."

Jacobs said she maintains continuous contact with users, who rate the DP shop according to several criteria, including accuracy of reports, timeliness, on-line availability and response time. Each of the criteria has standards of performance attached to it. For example, to get a "highly satisfactory" rating for timeliness, the DP shop must have zero days of late output in one month, or one day for a "good" rating.

Apart from the enhanced cooperation between users and DP, Jacobs said the performance rating system has also given greater visibility to problems for senior management. In addition, the constant run of meetings Jacobs chairs often stimulates conversation about problems other than those immediately at hand.

"I stayed in the data center, mainly as a clerk, because I truly liked that part of the banking business," Jacobs said. "Now with this job, I feel I have gained back more in the last year in terms of professional development than I have in my lifetime."



If your
– and tog
VAX-11* or PDP-11* user.
Featuring state-of-the-art technology, the XYPLEX System untangles the complexity that bogs down other integrated data communication systems.

A single coaxial cable will never tie you up.
Using XYPLEX locally, a single common cable can extend up to 32,000 feet and connect over 1,500 terminals . . . and personal computers with over 50 computer systems. Because you use less cable, your computer gains more space for more important data processing tasks at a much lower cost.

"Smart" hardware and software connections give your computer more free time.
With an intelligent microprocessor-based terminal cluster controller and a front-end host interface unit handling nearly all terminal and printer processing, your computer has more time to execute your specific business applications. And since character processing is also unloaded from the host, your terminals can run at their top speed.

So if you're a VAX-11 or PDP-11 user and networking isn't working out the way you'd planned, tie-into the XYPLEX System and see how easy and economical distributed data processing can be.

XYPLEX

XYPLEX Inc.
100 Domino Drive
Concord, MA 01742
617 371 1400

*VAX and PDP are trademarks of Digital Equipment Corp.
XYPLEX is a trademark of XYPLEX, Inc.

Coping with AT&T split

Realign tech resource management: report

By James Connolly
CW Staff

BOULDER, Colo. — Budgeting an extra 10% for telephone service, studying bypass technologies and finding new means of managing the electronic office are ways for firms to cope with the AT&T divestiture and technological advances, suggested a report published last week by Cross Information Co., a consulting firm based here.

Corporations should not only plan for additional costs and personnel for telecommunications, but they also should examine how they manage all of their communications, computer and other technical resources, the report advised.

Cross recommended that financial modeling software be used to project changes in telephone rates and calling patterns; that companies appoint staff members to assume the responsibility of the AT&T network account manager; that managers budget a 10% increase in telephone rates and a 30% staff increase; and that companies save repair costs by using their own personnel to find technical problems.

The report called for companies to examine bypass technologies and outlined the strengths and weaknesses of cable television and the microwave, cellular and satellite communications industries as alternatives to AT&T and the regional telephone holding companies.

Another vote for Unix

Cross also suggested that companies convert all of their computer systems to AT&T's Unix multiuser system. "We believe Unix will become the world's computer operating system," the report said.

Corporations should not only plan for additional costs and personnel for telecommunications, but they also should examine how they manage all of their . . . technical resources.

A key to dealing with the rapid changes in technology and communications, according to Cross, is what the report called "virtual management." Under that system, managers use sales and marketing techniques within their own organizations to work with employees to integrate all aspects of the electronic office, including voice and data communications, computers, robots, biotechnology, energy management and ergonomics.

The report predicted government indifference to higher rates after the 1984 elections; delays in getting new products and services because of state and federal regulatory "logjams"; and AT&T and IBM pushing most small suppliers or new products and services from the marketplace.

It also foresaw additional features keeping private branch exchange prices from going down; AT&T continuing a long-range migration strategy of overpricing old equipment to steer customers to new products; poorer and more expensive service in rural areas; and cities raising taxes to fund telephone service for the poor and elderly.

The study recommended that companies prepare for delays in specialized services, with a three- to six-month delay in getting leased lines and repairs — once taking hours — taking weeks.

The 400-page report is available for $500 from Cross, a four-year-old consulting company specializing in telecommunications, located in Suite B, 934 Pearl St., Boulder, Colo. 80302.

Study looks at how AT&T can profit from services

BOULDER, Colo. — AT&T can profit from its long-distance service, new products and joint ventures — but not until it completes its reorganization and develops a marketing strategy, according to a study by Cross Information Co.

In examining the competition among AT&T, the seven former Bell operating companies and alternative communications industries, the consulting firm concluded that AT&T Technologies will continue to market new products, enter joint ventures in the U.S. and abroad and make its Unix multiuser system the "operating standard," thus "positioning itself to compete with IBM."

The report said that the Bell holding companies may see competition in heavily populated local calling areas, but that some lack the proven sales staffs and strategies to compete in markets such as private branch exchanges and long distance. According to Cross, the seven have one thing in common: the buying power of their "enormous resources," even after the parent company's breakup.

Cross noted that AT&T Communications remains viable in the long-distance market despite facing post-divestiture government regulation, such as the Federal Communications Commission allowing a $6 access fee for corporate phone lines while delaying access fees for small businesses and residences.

Long-distance competitors, such as MCI Communications Corp., will benefit when the holding companies later this year begin providing the competitors with the same access to trunk lines that AT&T enjoys, the report noted.

But that does not ensure success, according to Cross, which noted that other common carriers and specialized common carriers do not have the financial backing or technological breakthroughs to defeat AT&T. However, they do have innovative marketing techniques, the report said.

At the local, "last mile" level, the report listed cable television companies, local-area networks and cellular companies as competitors to the holding companies.

The cable firms lack penetration in the business district, understanding of DP and networking capabilities. But they can offer telephone directories, alarm services, electronic mail and other information services, the report noted.

Xpediter users to meet

SAN JOSE, Calif. — The national Xpediter Users Group Conference will be held Feb. 27-29 at the Sheraton-Fisherman's Wharf here.

Featured guest speakers will be Ned Chapin, chief consultant with Infosci, Inc. of Menlo Park, Calif., and Dr. Ed Miller, technical director with Software Research Associates of San Francisco.

Xpediter is an automated testing and debugging tool used by Cobol programmers for applications ranging from program development to program maintenance.

Delegates from the host company, Application Development Systems, Inc. (ADS) here, and from the user community will discuss a variety of topics, including Xpediter testing techniques and future product developments.

The registration cost is $150 for the first registrant and $125 for each additional registrant per company.

More information is available from ADS, 1530 Meridian Ave., San Jose, Calif. 95125.

Local-area net seminar set

ARLINGTON, Va. — A seminar on local-area networks will be held at the Marriott Crystal Gateway Hotel here March 12-13 by Phillips Publishing, Inc. and Century Planning Associates, Inc.

The seminar will be led by Joseph Nocerino, president of Century Planning. Speakers will include Lee Afflerbach of Columbia Telecommunications, William Herald of Planning Research Corp. and Philip Walcoff of RJO Enterprises, Inc.

The fee for the seminar is $595.

Registration information is available from Phillips Publishing, Suite 1200N, 7315 Wisconsin Ave., Bethesda, Md. 20814.

In the words of our users.

"Service has been excellent, and the new operating system is as powerful as they said it would be."

—Larry Jenkins, Director
Jenkins and Associates, San Francisco

FORTUNE SYSTEMS

A leader in UNIX-based commercial, multi-user systems.

101 Twin Dolphin Drive, Redwood City, CA 94065/(415) 595-8444

© 1984 Fortune Systems/UNIX is a trademark of Bell Labs

NEWS

Calif. lawmakers offer bill to stem hacking

By Jeffry Beeler
CW West Coast Bureau

SACRAMENTO, Calif. — A group of California lawmakers has proposed a legislative remedy to the recent rash of information systems break-ins by teenage hackers and other high-tech vandals.

On Jan. 31, a bipartisan coalition of state assemblymen and senators introduced a bill that would refine California's definition of computer crime to give law enforcement officials increased leeway in prosecuting illicit systems users. If Assembly Bill 2551 passes, state law for the first time would explicitly distinguish between unauthorized systems accesses that are deliberately destructive and other such breaches, in which damage is nonexistent or clearly accidental.

Under the state's existing computer crime law, which took effect about four years ago, an unauthorized systems entry qualifies as illegal only if it results in "malicious" destruction or alteration of hardware, programs or data. The statute classifies all such crimes as felonies and makes no provision for system violations in which malice is absent or unproven.

A.B. 2551, by contrast, divides systems penetrations into two categories and treats each differently. One of the classifications is for felonies, which include any illicit access that ends in knowing or malicious systems tampering.

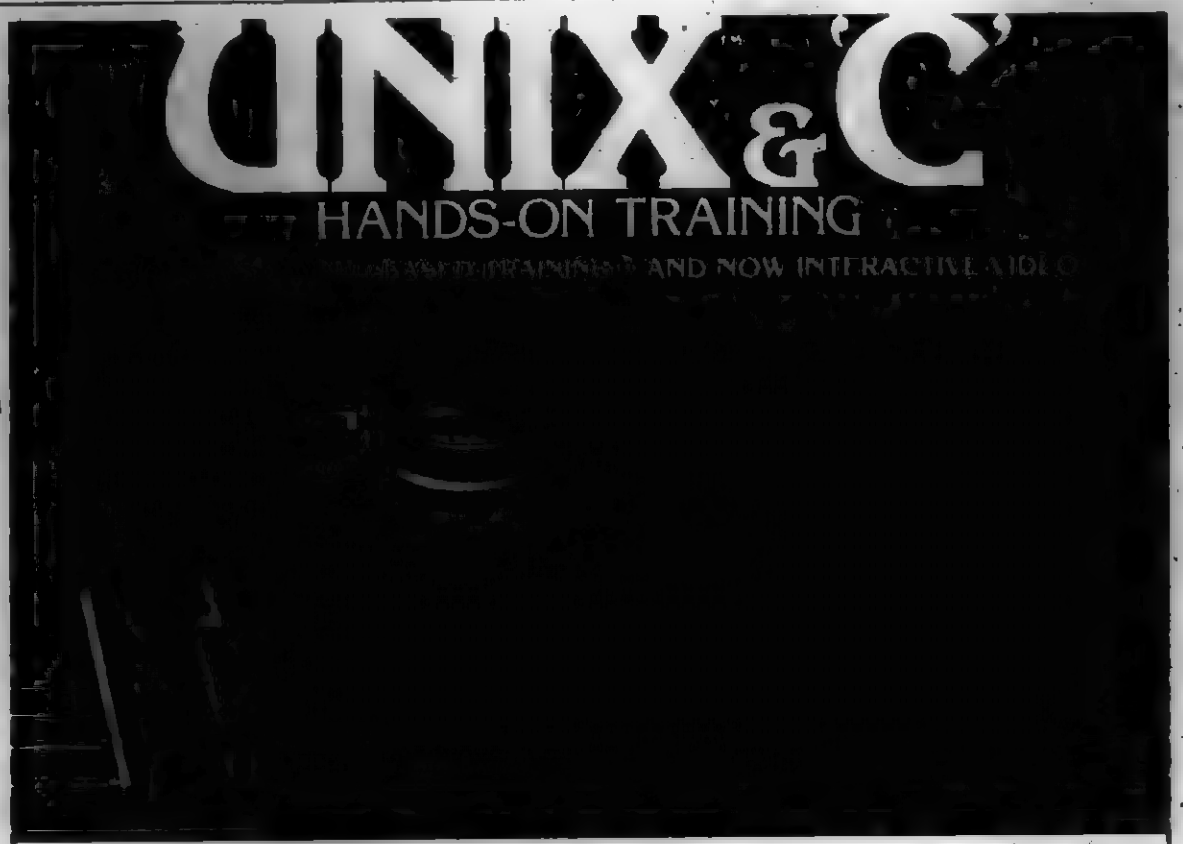
The other covers misdemeanors, which would apply to users who simply gain unauthorized access to a system, but who plainly intend to do no damage.

If it becomes law, A.B. 2551 would give state authorities "additional flexibility" in charging unwanted systems users with computer crimes, according to Barbara Lloyd, a legislative consultant to Assemblyman Sam Farr (D-Santa Cruz), one of the bill's coauthors. "Today, officials have only a limited range of options. They either have to try to convict violators of a felony, prosecute them on some other kind of offense that has absolutely nothing to do with computers or let them go entirely," Lloyd noted.

But in systems break-ins where the injury is slight or nonexistent, "law enforcement officials may not feel the need to seek a felony conviction because the penalties would be inappropriate to the offense," Lloyd said. "On the other hand, authorities don't want to create the impression that [hackers] can enjoy free rein over other people's systems as long as they don't plan on destroying them. So the state needs a law like A.B. 2551, which would give officials a middle ground between charging violators with a felony and not charging them at all."

The bill would also "send a real clear message" to potential snoopers who think certain kinds of unauthorized systems accesses are exempt from criminal prosecution and penalties, she added.

Although the proposed legislation has received broad, bipartisan support from state lawmakers, representatives of certain special interest groups have expressed concern that the bill might unintentionally discourage legitimate use of electronic bulletin boards. Lloyd professes to understand the misgivings, but voices confidence that A.B. 2551 could be easily amended to address the concerns.



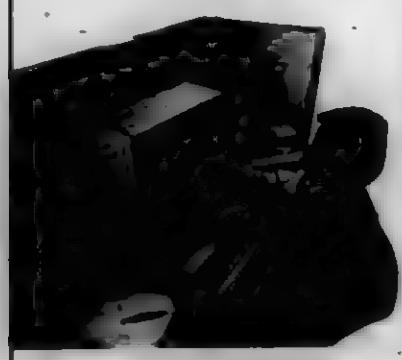
Select your training medium according to the type of training you prefer and the number of people to be trained.

VIDEO-BASED TRAINING. The Computer Technology Group's Video-Based Training integrates professionally developed and produced video and text material, as well as hands-on exercises, into complete training programs.

Our courses are produced with the highest standards of video quality, applying the latest techniques of instructional design including the use of computer graphics and animation techniques to compress learning time. The students' time is not wasted with the "camera at the back of the classroom" or "chalk talk" approach which is so inefficient, and often ineffective, in transferring skills.

Our Video-Based Training courses are completely self-contained, including the hardware-independent hands-on exercises. All you need is a video cassette player.

COURSE	Number of Modules: Video-Based	Interactive
Computers at Work	15	
UNIX—An Executive Perspective	1	
UNIX Overview	6	6
UNIX Fundamentals	15	15
"C" Language Programming	16	16



INTERACTIVE VIDEODISC TRAINING. Our new UNIX Videodisc Training Curriculum combines the benefits of our Video-Based Training with the flexibility of microcomputer access. Designed as a one-on-one tutor, our interactive system assesses the training needs of each student and dynamically tailors the training to his/her specific needs, thus eliminating redundant training. Through engaging exercises and interactive video, we are able to increase student comprehension while reducing training time.

Developed by the Computer Technology Group and Interactive Training Systems, the curriculum uses the latest laser videodisc technology—including IBM PC, color monitor and Interactive Training System Controller.

PUBLIC AND IN-HOUSE SEMINARS. Both public and in-house seminars are offered on a wide variety of UNIX and "C" Language subjects, including:

UNIX Overview • UNIX Fundamentals for Non-Programmers • UNIX Fundamentals for Programmers • Shell as a Command Language • "C" Language Programming • Shell Programming • Using Advanced UNIX Commands • UNIX Internals • UNIX Administration • Advanced "C" Programming Workshop • Advanced "C" Programming Under UNIX • Berkeley UNIX Fundamentals and "csh" Shell.

Call toll-free: (800) 323-UNIX
or in IL (312) 987-4082
310 S. Michigan Ave., Chicago, IL 60604

COMPUTER TECHNOLOGY GROUP
Telemedia, Inc.

TM UNIX is a Trademark of Bell Laboratories

Lotus files copyright suit against Rixon

BOSTON — Lotus Development Corp. filed a $10 million lawsuit in U.S. District Court here last Tuesday charging Rixon, Inc. with illegally copying and disseminating Lotus' 1-2-3 software package. Rixon, the Silver Spring, Md., modem manufacturer, is a subsidiary of Sangamo Weston, Inc.

"The $10 million is an estimate for the number of illegal copies that Rixon made," said Eric Deutsch, associate attorney for the Boston law firm of Testa Hurwitz & Thibeault, which represents Lotus. "A plaintiff can charge $50,000 for each infringement of a copyrighted material." That means Lotus is estimating that 200 copies of 1-2-3 were made.

"We know of at least 10 illegally produced copies of the product," Deutsch said.

Rixon was allegedly reproducing user manuals as well as program diskettes and using them in its branch offices throughout the U.S. "Lotus learned of the practice from a Rixon employee," Deutsch said. There is a possibility that the case will be settled before it reaches trial. "There have been discussions between Rixon's counsel and us," Deutsch admitted.

Rixon officials were not available for comment.

While data base gurus have come and gone, Thomas M. Nies, president of Cincom Systems, Inc., has remained one of the industry's most respected spokesmen. In the early 1970s, he predicted the arrival of the "data base decade." That statement has proved prophetic, as measured by sales of Cincom's Total data base management system (DBMS). With more than 6,000 installations, Total is by far the most popular DBMS from an independent vendor. In 1979, Nies proclaimed that "data base, per se, was passe." The statement surprised the software industry, but it, too, has been borne out by the recent rush of data base vendors to expand into other markets. Cincom has been diversifying as well, expanding first into manufacturing applications and more recently into decision support and financial software. However, DBMS has remained the core of its product strategy. Nies was interviewed recently at Cincom's Cincinnati headquarters by Computerworld Senior Editor/Software Paul Gillin.

Cincom chief forecasts data base directions

Says programming will be automated

In 1979, you said that data base, per se, was passe. How has that statement been realized, and what does that mean to the data base industry today?

Data base management systems [DBMS] technology has become one of the great delimiters of what can be accomplished. The nature of the data structures, the ability to handle complex transactions, the ability to support end users — all of these things have put additional pressures on DBMS since the '60s and the '70s. Old-style DBMS products that were prominent in the '70s are not satisfactory for the completely unstructured end-user systems of the future.

The second part of that comment is, the framework within which that data base management engine fits must be completely changed. In the '60s and '70s, the idea was that the professional programmer would be knowledgeable of data structures, data storage mechanisms, data management commands and so on. This created a demand for knowledge which became the bottleneck for progress. Those old tools are no longer necessary, so we have to supplement the DBMS with other software which, in effect, automatically does large amounts of the work professional programmers would have done before.

What other trends in data base will drive the market for the rest of this decade?

The first trend is this more comprehensive approach, so that everything is done much more easily and to a much higher quality level. I'm talking five to 10 times productivity improvements in using data.

The second major trend is the movement of the data base capability away from only the province of the mainframe. We should supplement the mainframe with a set of superminis and other ancillary computers to serve specialized needs. But all of those computers need data, and that data should be organized in the data base approach.

A major part of Cincom Systems, Inc.'s product line has been tools that complement the data base, including fourth-generation languages and application development systems. Yet these tools are still being used on rather specialized tasks. What is needed for them to catch on?

The failure to catch on has been a result of the weakness of the products themselves. The problem with these languages is that they're not strong enough to encompass the entire gamut of need of Cobol. Therefore, they have to be used in specialized requirements.

The second limitation is that the processing overhead is so great that the response time and throughput is poor. Therefore, they're limited in applications which have large numbers of transactions or which require good response time.

If we can find a way to build a fourth-generation language which has the full capability of doing anything that a Cobol, PL/I, assembly language or Fortran programmer can do, then it can be used for almost all programming. Then if we eliminate the performance overhead, we eliminate the second great obstacle. I think when these languages are introduced that provide this functional richness and throughput and performance, then they will catch on.

If these tools are so much better than Cobol, it would seem obvious that all mainframe installations would be using them within a few years, wouldn't it?

If IBM offered [Cincom's] Mantis [application development system], I doubt anyone would be doing any on-line programming in Cobol. Our problem is we have to promote this concept without the leverage of having IBM in

See NIES page 18

In the words of our users.

"The Fortune System has the power and flexibility to move us into office automation one step at a time."

—Michael Fried, Chief of Administration, Prosecuting County Attorney's office, Wayne County, Michigan

FORTUNE SYSTEMS

A leader in UNIX-based commercial, multi-user systems.

101 Twin Dolphin Drive, Redwood City, CA 94065/(415) 595-8444

© 1984 Fortune Systems/UNIX is a trademark of Bell Labs

NIES from page 17

the market.

Many of the vendors are pointing to the user as being the culprit when, in fact, it's not the user's fault at all. It's the vendors' fault, who are delivering the wrong tools at the wrong quality levels, and the users are then being asked to do the impossible.

And the more they struggle, the more they fail, the more the vendors tell them they have to get their act together. It's an unjust situation.

You emphasize data base portability across a wide range of hardware lines. Why is that important to your strategy?

It's important because the nature of the operating systems on the IBM mainframe is toward a batch environment. The roots of that problem lie almost 20 years ago, when IBM had almost exclusively a batch-oriented customer base that it had to migrate across to a 360 environment, and it built a batch job scheduler, which it called the operating system. It had no on-line support. That was added later in the form of a [teleprocessing] monitor. Eighty percent to 90% of the gross horsepower of an IBM mainframe can be consumed in that mundane work which gets you ready to process an on-line transaction, and there's very little of the CPU left to process the transaction itself.

That environment is absolutely intolerable in any kind of a sophisticated on-line environment. The only way it can succeed is to co-mingle IBM mainframes with distributed, interactive-environment computers out there.

To successfully implement distributed processing, one needs to introduce the concept of an interactive operating system, which is so beautifully supported on computers like [those from] Prime [Computer, Inc.], the [Digital Equipment Corp.] VAX and others and which is woefully inadequate on the IBM mainframe. Now they can then have the IBM mainframe concentrating on batch-type operations and some limited on-line inquiry to the corporate strategic files. But out on those plant floors they would have interactive computers with an interactive operating system.

What are your plans for TES [Cincom's interactive data base and application development product]?

Our goal by Jan. 1, 1990 is to say that it is no longer necessary to write a line of code. You can simply specify requirements in a high-level way, either at the programmer or the end-user function, and all of the software will do all of the program design, development and implementation automatically.

Today we're probably 70% to 75% of the way. It is only necessary for programmers to write 25% of the code in a TES shop. The rest of the programming is automatically done by the software. We still have procedural logic that needs to be done, but today we've eliminated a lot of that with more powerful languages and so on.

Our goal in the next two to four years is to deliver the software that will eliminate what now needs to be done so that programmers, end users and system designers can specify specifications and everything else required will be eliminated.

In doing this, you have chosen not to make that big a splash about your move into relational, which a lot of your competitors have done. Do you not view that move as being that important?

I think simplifying the way you view the data is a necessary prerequisite step. However, the software business has become faddish, marketing hype, sales gimmicks, and the software industry at large is latching onto the current buzzword.

Two years ago the buzzword was "integrated." Everything was integrated, and in some cases it was laughable the way these products were integrated.

Today the buzzword is "relational." Everybody that knows anything about relational looks at most of what's out there and sees that it's laughable.

Cincom has been a relatively quiet company. Can we expect to see more of a marketing push in the coming years?

We are ready to increase our marketing capability because we've spent the last six years building a product line which we believe is preeminent. We now are in the process of substantially increasing our marketing staff, and, in fact, a number of our products are increasing sales at rates greatly ahead of the software industry in general.

We do have to find a way to get a bigger presence. I think that's a weakness of Cincom.

In the last couple of years we've also seen you move into manufacturing and now into decision support applications. Are we going to see Cincom trying to cover the entire market?

Our role is to cover all of the major systems software and office automation functions, including electronic mail, word processing, keyword and context retrieval systems. We're also talking about everything in the area of system design and development, data base, query languages, multicomputer linkups and so forth. We're also talking about a full gamut of end-user software, all the way from electronic spreadsheets, to graphics systems, to query languages. We have now completed 85%, to 90% of all the products we plan to offer in these markets.

You're a $70 million-plus company and still privately held. Software companies one-quarter your size have gone public. Why do you remain private, and do you intend to remain that way?

Our strategy is to have products which are so substantially superior that they will not have any legitimate competition. This represents a massive commitment to research and development, which means large amounts of money over a sustained period of time. If we were a public company, the pressure for profitability increases [would be] so extreme that we fear the pressures in the marketplace would force us to abandon the superiority strategy.

The second reason is because we want to be able to have a reasonable, if not substantial, percentage of the shares of our company owned by the people of the company. . . . This requires a distribution strategy of shares over some time that perhaps an outside, public ownership would not allow. We have to have this distribution before we become a public company.

We have completed much of the development effort that we wanted to do. We've also begun a major distribution of the potential ownership of the company among our people. So we're studying the stage that should Cincom want to become a public company, we can do that. We're not adverse to the public offering idea. It has its attractions.

The Solution.

Dial-Up 3270

LineMaster An intelligent device for dial-in access to your mainframe 3270 Bisync line. **LineMaster** is a communications watchdog which keeps a line in service until a user dials in.

- For any remote 327 1/4/6 line—up to 19.2K baud
- Compatible with any 3270 BiSync emulator including microcomputers
- Connects between modem and mainframe.
- Installs in minutes.

$639.

MF

MicroFrame, Inc.
205 Livingston Avenue
New Brunswick, NJ 08901
(201) 828-4498

SEE IT IN ACTION.

30 day free trial ...
judge the results for yourself.

Quikjob™

Quikjob is a one-step load and go program for one time report writing, fast file creation and dataset quick fixes for use with IBM Mainframes, UNIVAC 90 Series and System 80. • Uses free-format English-like language • Complete and fast, most programmers start using Quikjob after just ½ hour • Generates reports in hours, not days, and updates files faster than you might think possible • Rental or purchase basis • It's quick, complete, and affordable — as low as $125 per month! Try Quikjob FREE for 30 days and see for yourself. Over 1,000 users worldwide.

Call toll free 1-800-551-4466 for complete information.

SSS SYSTEM SUPPORT SOFTWARE
3238 Springboro Pike
Dayton, Ohio 45439
(513) 436-9644

YOUR KEY TO CONTROL!
VSERV for DOS Users

408-730-9714
P.O. Box 2101
Santa Clara,
California 95055

Banks urged to coordinate micro strategy

By Robert Batt
CW West Coast Bureau

SAN FRANCISCO — While personal computers solve many of the integration problems that large organizations face, their presence must be part of a coordinated strategy, attendees at the recent 1984 Insurance and Protection Conference of Financial Institutions were told. The conference was sponsored by the American Bankers Association.

Office automation, including the use of personal computers, is a combination of people, procedures and technology working together to improve productivity, noted Sally Huss, assistant vice-president at Manufacturers Hanover Trust Co. in New York.

"While our short-term goal [at Manufacturers Hanover] is to provide systems to solve specific applications, our long-term goal is to custom design systems for specific business environments — that is, have systems designed to fit the business need instead of the other way around," Huss said.

Professional business people with computing power within arm's reach will find innovative ways to solve their own business problems, Huss added.

Turning to the problem of data security, Huss maintained that the issues relating to personal computers and other end-user technologies are not very different from those associated with larger mainframe data centers.

The difficulties in controlling security with micros, she said, stem largely from the decentralized nature of the technologies involved.

Huss recommended establishing a set of guidelines for the users of personal computers. These guidelines, she suggested, are intended to:

- Prevent misuse and loss of data processing assets.
- Ensure the integrity and auditability of information created within the various departments using microcomputers.
- Minimize duplication of effort.
- Ensure that the organization receives the maximum return on its automation investment.

Becomes data center

"With a personal computer on his desk, the user in effect becomes a data center and must conform to the same requirements as any other computer installation for safe and secure operation.

"The procedures and controls put in place must be commensurate with the value of the data being protected," she contended.

Huss claimed that by educating personal computer users, by giving them hands-on experience and by helping them evaluate their security needs, an organization can make its users active participants in the protection of data and applications.

Also speaking at the conference was Laurance Ochs, a partner in the Washington, D.C., law firm of Compulaw Chartered, who warned of the growing trend toward computer crime.

"Computer fraud, regardless of the term used to describe it — computer crime, computer abuse, computer-related crime — is where the 'big bucks' are today in white-collar crime," Ochs said.

Over the last decade, he said, there has been an unprecedented growth in computer fraud, with one estimate putting the monetary loss at between $3 billion and $5 billion a year.

"The time is fast approaching when one out of every 10 people in the work force will have a direct working relationship with computers. With the number of installed computers proliferating more rapidly as a result of microprocessors, there is no doubt that computer fraud will grow proportionately," Ochs said.

The ability of a would-be perpetrator to penetrate a communications network depends, Ochs said, on several factors, including his technical knowledge of both telecommunications and the system he is attempting to penetrate and his access to or possession of the necessary interception and monitoring equipment.

The lawyer suggested that banks and financial institutions take out insurance indemnity covering employees, independent contractors, software vendors, maintenance personnel and unauthorized individuals.

SPRINT

SPOOL TO 328X
(Also 3262 and ASCII Printers)

VS1 and MVS
JES, JES2, and JES3
Local and Remote Printers
Control Printer Activity from ANY VTAM terminal using SPF-like Panels
Data Formatting Facility
BTAM and VTAM Support
Full FCB and UCS Support
No System Mods Required
Multiple Printers Run in a Single Address Space
Support For SCS Devices
SMF Accounting Records

Shares Printers With Other Applications

Worldwide Support
TONE Software Corp.
Free Trial
1735 S. Brookhurst, Anaheim, CA 92804
(714) 991-9460 Telex 181582

SENIOR EDP AUDITOR

Where will you be recognized for your professional capabilities?

At the folks who do it right!

Currently, we are looking for a professional who can assist management by providing analyses, appraisals and evaluations of company business activities processed by computer systems, applications and data centers of our worldwide operations.

Your primary function will be the evaluation of internal control systems, reviews of safeguards protecting company assets, checks on compliance with corporate policies and procedures, and evaluation of records, reports and other data used by management.

Requirements include a degree in Accounting (or other area of business) and a minimum of 3 years' EDP auditing experience. CISA certificate and financial/operational audit experience are highly desirable. You must be an excellent communicator (both written and oral) and be willing to travel approximately 15% (domestically and internationally). Experience within an MIS function and formal programming training would be a plus.

We offer a competitive salary and comprehensive benefits package. For immediate consideration, please forward your resume, including background and salary requirements, to: Ms. C. Pyock, Manager/Staffing, Kentucky Fried Chicken, P.O. Box 32070, Department 187A, Louisville, KY 40232. We are an equal opportunity employer, M/F.

Kentucky Fried Chicken

In the words of our users.

"The Fortune System does all of the things the minicomputers do, at a fraction of the cost."

–Ted Roberts, certified public accountant, Chicago, Illinois

FORTUNE SYSTEMS

A leader in UNIX-based commercial, multi-user systems.

101 Twin Dolphin Drive, Redwood City, CA 94065/(415) 595-8444

© 1984 Fortune Systems/UNIX is a trademark of Bell Labs

"IBM terminals n says PCI.

Your IBM CRT can communicate with ASCII hosts, like DEC, as if it was a DEC terminal. With a stroke of the key from your IBM CRT on your desk, you become instantly DEC-compatible. Your IBM terminal is now a DEC VT-100 CRT, thanks to the PCI 74D *de*converter from Protocol Computers, Inc.

You don't have to buy new terminals; you already own them.

Your IBM 3278 is a multi-function performer. Talk to DEC hosts, including those running the Unix and VAX/VMS operating systems. Talk to Dow Jones™ News/Retrieval Service for the latest stock information. Dial-up The Source. Connect to your Local Area Networks. The PCI 74D makes previously inaccessible time-sharing and private ASCII networks instantly available.

With the stroke of the key, you're back talking to IBM.

The PCI 74D switches your IBM 3278 terminal into the ASCII mode when it receives a specific keyboard command sequence. Suddenly the asynch ASCII world is at your fingertips. And just as easily, with another stroke of the key, you're back to IBM.

The PCI 74D resides between the IBM controllers (3274s and 3276s) and the hosts (IBM and ASCII). Connections to the controller or host can be either direct or through a modem. The PCI 74D is transparent to the IBM host.

Full capabilities, both worlds.

When your 3278 is in the ASCII mode, it can be a DEC VT-100 or TTY-compatible terminal. When your 3278 switches back to IBM, it regains its IBM screen capabilities, its 3278 identity. It's a split personality terminal, with the PCI 74D.

If you'd like to hear more about how to make your IBM world non-IBM compatible, get a dialog going with PCI today. To start your conversation, here's how to speak the language.

Glossary:

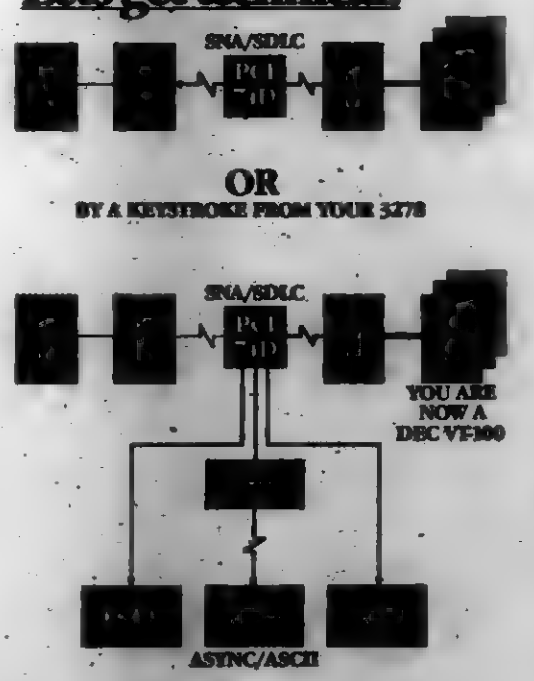
ASCII (American Standard Code for Information Interchange). The language spoken by DEC, not by IBM (without PCI).
ASYNCHRONOUS Start-stop communications technique used by low-cost low speed ASCII terminals and Personal Computers.
CoaxFACE™ Exclusive PCI device provides RS232C interface to coax cables for attachment of ASCII terminals to PCI converters.
DEC Digital Equipment Corpora-

ow speak to DEC,"

tion. Used here as synonym for an ASCII host.
DECONVERTER (74D) Makes the IBM 3270 world ASCII-compatible.
FULL SCREEN The ability to modify an entire CRT screen of data without host interruption.
MODEMS Interface to allow digital devices to communicate over phone lines.
PaperCRT™ ASCII hard copy keyboard terminals have all the versatility of 3278 CRTs with this PCI option.
PCI (Protocol Computers, Inc.) We make the non-IBM world IBM compatible. Now we make the IBM world non-IBM compatible, too.
SDLC (Synchronous Data Link Control). Line protocol for data communications between IBM systems and terminals.
SNA (System Network Architecture). IBM's approach to data communications networking.
SNA/SDLC IBM communications; non-compatible with DEC (ASCII) communications (without PCI).
SYNCHRONOUS High speed, high cost data communications technique.
PCI 74D Deconverter makes the IBM 3270 world ASCII compatible.

3274/76 IBM controllers which support 3278s, 3287s in an SNA/SDLC network.
3278/79 IBM's CRT and color CRT.*
3178 IBM low cost CRT.*
3287 IBM's printer.*
*All non-compatible with DEC (ASCII) without PCI.

Let's get technical.



For more information call today, (800) 423-5904, (213) 716-5500 in California. Or write PCI, 6150 Canoga Avenue, Woodland Hills, California 91367-3773

The Micro Mainframe Link is available from PCI:

PCI 1076: ASCII to SNA/SDLC 3270 emulation.
PCI 1051: ASCII to Sys 34/36/38 5251 emulation.
PCI 74D: Deconverter that makes IBM CRTs ASCII-compatible.
PCI 1067: SNA/SDLC to ASCII 3767 emulation. The NTO alternative.
PCI 71B/SNA: BSC 3271 to SNA/SDLC 3274 emulation.
PCI 75B/SNA: BSC 3275 to SNA/SDLC 3276 emulation.
PCI 1071: ASCII to BSC 3270 emulation.
PCI 3780/SNA: SNA/SDLC to BSC 3780 emulation.
Videotex 67: SNA/SDLC to Videotex protocol conversion.
PCI's X.25 Series: PCI 73SX and PCI R73SX, SNA/SDLC to X.25 protocol converters for host and terminal connections respectively; PCI 1076X, ASCII to 3270 SNA/SDLC through X.25 networks, PAD included.
PCI's Networkers: Keystroke for keystroke 5251/11 and 3278 keyboard compatible ASCII CRTs.
PCI's IBM-PC software packages: For 3270 and System 34/36/38 emulation.

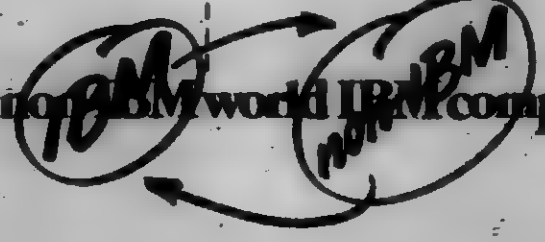
TWX 910-493-1944-PCI WHQ

"Hello DEC, this is IBM calling."

Name/Title
Company Name
Address
City State Zip
Phone CW 2/12/84

PROTOCOL COMPUTERS, INC.
6150 Canoga Avenue Woodland Hills, CA 91367-3773
(800) 423-5904, (213) 716-5500 (In California)

PCI Making the non-IBM world IBM compatible.



NEWS

IBM-Apple competition evidenced at Expo

By Patricia Keefe
CW Staff

HOUSTON — "So often it seems as if IBM is this mysterious presence around us at all times," observed Rod Canion, president of Compaq Computer Corp., while speaking last week here at the PC World Exposition. "This event has to do with [IBM] and [it isn't] even here — or [is it]!" he quipped, looking around.

Vendors, speakers and attendees spent three days talking about IBM, its products, future plans and the compatible marketplace; the other major topic of conversation was Apple Computer, Inc. and its relationship, or lack thereof, with IBM.

CW AT PC WORLD EXPOSITION

Neither IBM nor Apple chose to attend the show, but then they didn't need to. Anyone who wanted to examine the real thing rather than the slew of Personal Computer look-alikes on exhibit needed only to visit Computercraft, Inc.'s booth, where the IBM PCjr and Apple's widely publicized Macintosh were on display.

The Macintosh managed to steal some of the spotlight from IBM. During the Expo, it was typically hidden behind a crowd of curious onlookers, craning on tiptoes to get a closer look at Apple's new baby.

Andrew Fluegelman, editor of both *PC World* (sponsor of the Expo) and *Macworld* and a speaker at the conference, characterized attendees' reactions to the Macintosh as "reserved curiosity" and predicted the new machine will attract visually oriented people, no matter whether they are in the home or business markets. Moreover, he expects the Macintosh to replace the Lisa eventually.

And, despite the use of "standard" and "compatibility" as the two key words of the conference, Fluegelman does not foresee IBM compatibility in the Macintosh's future. In addition to Apple's decision to use non-IBM-compatible 3½-in. disks, "It doesn't need it," he asserted.

Both Fluegelman and micro industry analyst and newsletter publisher Esther Dyson agreed that if anyone can buck IBM, it is Apple. "Everyone I've talked to wants the Macintosh to succeed; 'Go Apple,' they're saying," Dyson said at a seminar called "Survival Strategies for the IBM Personal Computer Marketplace."

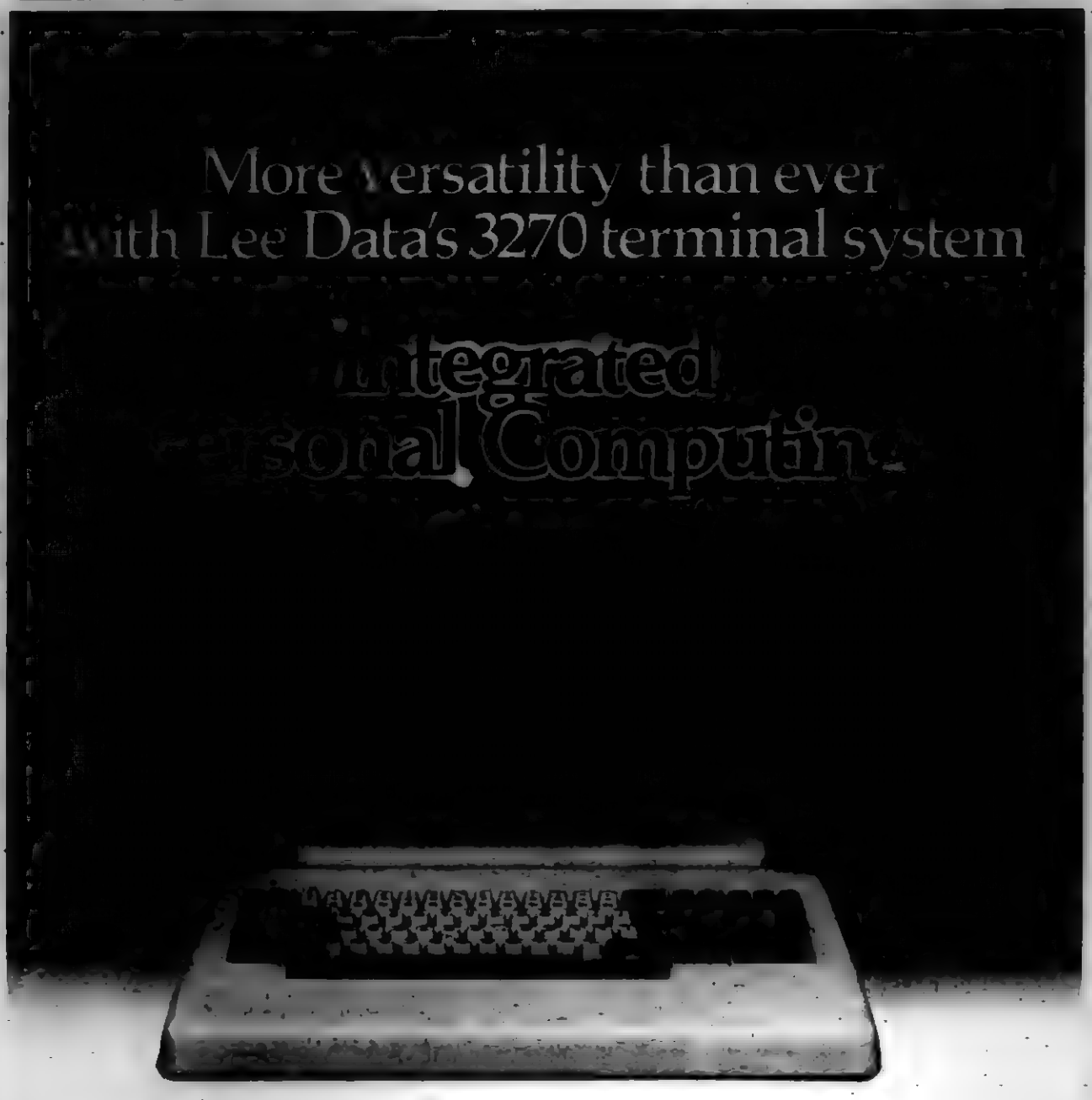
She added that Apple is appealing for two reasons: It's the underdog, and it has a lot of spirit. "I hope Apple succeeds," she said, but warned that Apple's spirit alone will not ensure success.

It is harder to sell against IBM than beside it, according to Dyson. She noted Lisa's poor showing in the corporate personal computer marketplace, adding that Apple walked away "with its tail between its legs."

Dyson expects the Macintosh to attract the next market generation — nonusers who do not want to learn Microsoft, Inc.'s MS-DOS and complicated software. The key to the Macintosh is that it combines user-friendly software with powerful hardware, she said.

Conceding that IBM has most of the third-party software vendors, many of whom are not writing for Apple, Dyson said IBM has no great advantage over the Lisa family, which includes the Macintosh.

What could hamper Apple in its bid to snub the standard is internal executive turmoil, Dyson said. "They are a small company without the stability of IBM. Also, if the Macintosh is to be successful, Apple must capture the retail channel as it did with the Apple II."



Lee Data's new Personal Workstation now lets you enjoy all the advantages of professional business computing plus have both 3270 and asynchronous access to CPU-based applications—all from the same Lee Data workstation!

That's right! Completely-integrated, IBM-compatible personal computing —offering the latest functional capabilities and these value-added features:

Support for a wide variety of popular applications, including all compatible IBM Personal Computer software.

Personal Workstation-to-host file transfer capabilities that allow transfer of data from CPU-based files through existing system communications networks, meaning no new communications networks are ever required.

A single board design that incorporates both display station and printer support, as well as 128K of random access memory standard—with up to 256K of expanded memory on the same board. Plus a dual diskette drive feature that offers two 5¼-inch floppy diskettes, each with 320K of storage capacity!

And four standard system expansion slots for add-on requirements as your needs change.

3270 and asynchronous application access and new personal computing, too—all part of an advanced system design by Lee Data.

Let us show you how easily personal computing can become a part of your company's terminal system.

Call our system specialists toll free:

800/328-3998

Designers of innovative systems for the information worker

LEE DATA CORPORATION

7075 Flying Cloud Drive
Minneapolis, MN 55344

See us at Booth #130 at the 1984 Office Automation Conference.

Micro family, Winnie controller among Expo debuts

By Patricia Keefe
CW Staff

HOUSTON — Although it attracted about 15,000 attendees, the three-day PC World Exposition here early this month did not offer many significant hardware introductions. Many name vendors stayed away from the regional personal computer show, which catered to buyers and sellers of IBM Personal Computer products and featured more than 130 exhibitors (300 booths).

CW AT PC WORLD EXPOSITION

But scattered among the peripheral, accessory and software vendors, as well as software and training services firms, were Digital Equipment Corp.; Sperry Corp.; NEC Information Systems, Inc.; Printronix, Inc.; Compaq Computer Corp.; Televideo Systems, Inc.; Hewlett-Packard Co.; Intel Corp.; Epson America Southwest; Corona Data Systems, Inc.; and Eagle Computer, Inc.

Among the products introduced at PC World Expo, sponsored by *PC World* magazine, was a three-member family of IBM Personal Computer and Personal Computer XT-compatible microcomputer systems from OSM Computer Corp. The series includes the OSM-PC, with 128K bytes and dual, 360K-byte floppy system; the OSM-XPC with 128K bytes, a 360K-byte floppy and a 10M- or 20M-byte hard disk system; and the OSM-VIPC, which offers — in one enclosure — 128K bytes, a 360K-byte floppy, a 10M- or 20M-byte hard disk and a 20M-byte tape system.

The series features a choice of high-resolution monochrome or color monitor; Microsoft, Inc.'s MS-DOS and utilities; and OSM's PC-Link, which allows up to 16 micros (OSM or IBM) to network together. Prices for the three micros start at $24,095 for the OSM-PC; $42,095 for the OSM-XPC; and $67,095 for the OSM-VIPC. OSM is based at 665 Clyde Ave., Mountain View, Calif. 94043.

Winnie with SMD interface

Also at the show, Interphase Corp. introduced what it calls the first Winchester disk controller for the IBM Personal Computer and look-alikes that can support the storage module drive (SMD) interface commonly used in minicomputers. It is said to bring the capacity needed for large accounting and data base management applications to the personal computer level.

The Maverick SMD PC-80 reportedly offers the benefits of the SMD interface (increased capacity and speed) and accommodates 8-in. or larger disks with fixed and/or removable cartridge without software or hardware modifications.

Other features include support for two SMD drives from 16M to 1,600M bytes of on-line storage; networking that supports Xerox Corp.'s Ethernet and IBM's Personal Computer Net and X-Net; compatibility with popular operating systems; storage capacity from 16M to 300M bytes for each disk; fully buffered architecture; support for dual porting and fully programmable sector sizes up to 900 bytes; and high-speed direct memory access.

The Maverick is priced at $1,895. Interphase is located at 2925 Merrell Road, Dallas, Texas 75229.

See EXPO page 24

Have a corporate micro story?

The dust from the corporate microcomputer boom is finally starting to settle. For many firms, the mad dash to buy and install microcomputers is ending and the development of plans for coordinating and controlling micro use is beginning.

Computerworld will publish its second annual "Micros in Big Business" Special Report in the April 30 issue. This special section will focus on the success and failure of micros in large organizations. Included will be articles covering micro-to-mainframe links, microcomputer networks, compatibility issues and the growing concern about security and data protection.

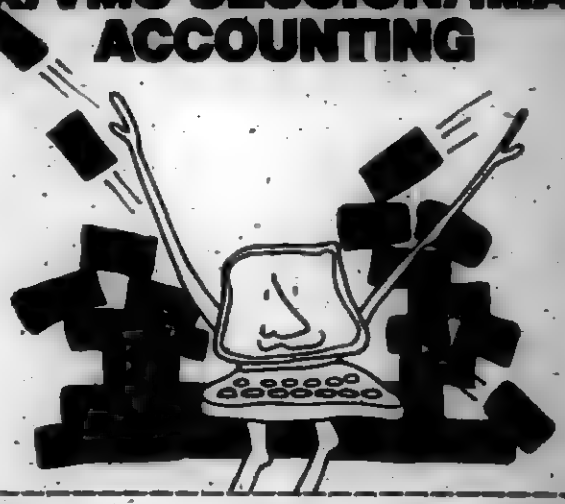
How are microcomputers working out in your organization? If you have a story you would like to share (either bitter or sweet), *Computerworld* would like to hear from you.

Contributions can take one of two forms: a tutorial article discussing an issue or trend in corporate microcomputing; or a story outlining a user's experience with micros.

Articles must be typewritten (double spaced) and no longer than eight pages. Artwork such as charts, graphs or photographs is encouraged. Authors should also include a brief biography and a phone number where they can be reached.

The deadline for submissions is March 5. Articles should be addressed to Donovan White, Special Reports Editor, *Computerworld*, 375 Cochituate Road, Box 880, Framingham, Mass. 01701.

BREAKTHROUGH IN VAX/VMS SESSION/IMAGE ACCOUNTING



Only EZTRACK™ allows examination and tracking of VMS session/image resource data by user, time interval, terminal port and other key fields. EZTRACK offers:

• General query and interactive capabilities • Flexible report writer and graphics
• Full screen forms reporting

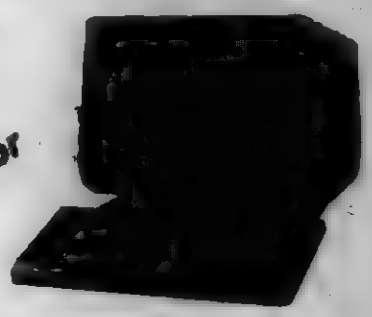
Name _____
Title _____
Company _____
Address _____
City _____ State _____ Zip _____
Phone ( ) _____

SEND COUPON NOW FOR COMPLETE DETAILS!

STi Signal Technology, Inc.
8951 Entrada Road, Goleta, CA 93117 (805) 683-3771 Outside California call toll-free (800) 235-0787
TWX 910-334-3471

VAX/VMS is a trademark of Digital Equipment Corporation

Three Reasons Why... No Other Burroughs Emulator Can Meet Our Standards



1. Features • • • 32 programmable function keys • • • complete keyboard reprogrammability • • • non-volatile RAM can store up to 375 characters • • • with power-on soft key storage can store in excess of 16K bytes of reprogrammed keystrokes.

2. Support • • • multi-million dollar inventory of PC's, CRT's, printers and modems • • • extensive leasing base to meet any budget • • • same day on-site service from nationwide service locations.

3. Price • • • limited time only special leasing price of $75/mo. including on-site service • • • and to totally convince you DASI will give you a two week Free trial so you can see the high standards of this Burroughs emulator for yourself.

The Visual 383 and DASI_
An Industry Leader for 15 Years

Call 800-257-7748 today
or fill out the coupon below for more information.

District Offices:
Atlanta (404) 998-2285 — Los Angeles (213) 532-2230
Boston (617) 769-5430 — Minneapolis (612) 854-4485
Chicago (312) 987-0440 — New Jersey (201) 227-6880
Cleveland (216) 473-2131 — New York City (212) 564-9301
Cincinnati (513) 793-4430 — Philadelphia (609) 228-6880
Denver (303) 337-4168 — Phoenix (602) 264-1927
Detroit (313) 979-7300 — San Francisco (415) 872-1611
Houston (713) 682-0985 — Seattle (206) 575-1448
Washington, DC (301) 490-3977

DATA ACCESS SYSTEMS, INC.
DAS
Coles & Cloverleaf Avenues
P.O. Box 1259
Brick Town, NJ 08723
800/257-7748
In NJ 800/322-1919

Name _____
Company _____
Address _____
City _____ St. _____ Zip _____
Telephone _____

Clip this coupon and mail today.

NEWS

'Bottom-up' design seen as approach for '80s

By Lynn Weiner
CW Staff

WASHINGTON, D.C. — "We have now entered a period, presumably one which is going to last a long time, in which the customer is doing 'bottom-up' design. This means that the customer is going out and buying workstations and assuming that a system exists that will allow him to hook those workstations up and do something meaningful."

Speaking at the recent Communication Networks Conference and Exposition here, Amy D. Wohl, president of Advanced Office Concepts Corp. in Bala Cynwyd, Pa., guided her audience through the changes that made "top-down" system design — buying a system and attaching a workstation — obsolete and bottom-up system design the personal computer networking approach of the 1980s. According to Wohl, this turn in design approach has occurred over the past three years and is based upon assumptions on the part of both the customer and the vendor.

For the customer, the assumption is that a standard environment is available into which the customer can plug devices. "It's similar to the transaction that people make when they go to a department store and buy an electric lamp," Wohl explained. "They take it home, secure in the knowledge that if they use it anywhere in the U.S. they will be able to plug it into any electrical outlet, and it will work. Not only is the customer assuming a standard environment, he's also assuming a standard interface."

For the vendor, Wohl said, bottom-up system design means that it will have to make one of four choices on how to fit into the marketplace:

- It can be the standard (but this position will be open only to the market leader).
- It can provide a compatible environment and sell a product that is almost the same as the standard.
- It can back out of network design, but make its product attachable to the standard.
- It can set a new standard and be outside the existing standard.

Micro personal computers

Wohl predicted that by the end of 1984, business will have more personal computers installed than ever before, with IBM delivering an estimated two million Personal Computers this year. And based on the number of personal computers in place, and particularly the pervasiveness of IBM in that market, the speaker concluded that "you can set standards in committees, but only the market leader gets to set standards in the marketplace — and IBM is very much that leader."

Other changes that have occurred in the approach to workstation design are related to who in the corporation will be active in the decision-making process and who the workstation user will be, according to Wohl. Between 1981 and 1982, the person who most commonly looked at the terminal, word processor or workstation slated to be used in the front office by a noncomputer person was an office service worker, administrator or DP manager.

By the end of 1983, however, the person responsible "for buying [and] implementing ... the workstations was the data processing manager or someone on that person's staff — the [management information systems] director, information services manager and so on," Wohl said. "And rather than look for specific functions that the workstation offers or specific interfaces with which you access that information, what have become the important workstation features are the ability to fit into an existing communications environment, compatibility with workstation standards in the company and [whether it supplies] access to data and data processing."

EXPO from page 23

Printronix unveiled the latest addition to its MVP Printer Series, a compact dot matrix line printer that is plug-compatible with the IBM Personal Computer and other microcomputers. It can be used either as a shared-resource printer for workstation clusters or as a system printer for microcomputer-based local-area networks.

The MVP 150B reportedly supports applications from graphics to word processing, including Lotus Development Corp.'s Lotus 1-2-3 and Metasoft Corp.'s Benchmark. It prints office correspondence at 80 line/min and drafts reports at speeds up to 200 line/min.

The MVP 150B is priced at $3,745 from Printronix, located at 17500 Cartwright Road, P.O. Box 19559, Irvine, Calif. 92713.

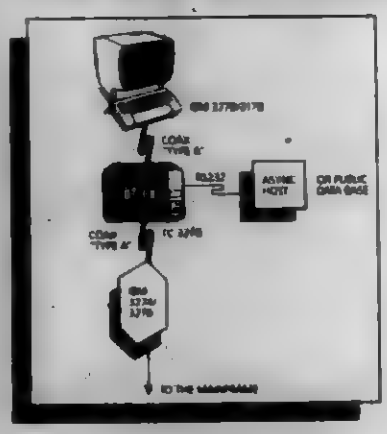
Personal Systems Technology, Inc.'s (PST) Persyst Products went to the PC World Expo to announce a single-board color display adapter for the Personal Computer and Personal Computer XT. The Best-of-Both (BOB) Display Adapter is said to support all the color graphics features offered by IBM's Color Display Adapter software.

The BOB adapter interfaces with advanced high-resolution monitors, its vendor said.

Suggested list prices begin at $425, with shipments scheduled for the end of the first quarter.

PST is located at Suite A, 115801 Rockfield Blvd., Irvine, Calif. 92714.

IBM 3278/3178 Terminal Users... "ADD-ON" PERSONAL COMPUTING CAPABILITY!



AVATAR's TC3278 terminal converter gives local computing power, communications, data storage and file transfer capabilities to your terminals. And switches between standard terminal operation and local computing with the flick of a switch.

- Includes industry standard software
  CP/M and MS-DOS (IBM compatible)
  WordStar, word processor
  Spreadsheet and simple to use utilities
- Allows dual host access
  Converts 3278/3178 to VT 100 for async ASCII host, remote hosts, public database access
- Host file transfer for data sharing and local printing
- Simple to use, easy to install, requires NO modification to terminal
- Cost Effective enhancement to existing equipment

For more information, call
Avatar Technologies Inc.
99 South Street
Hopkinton, MA 01748
(617) 435-6872

AVATAR™

IBM is a registered trademark of International Business Machines Corp.

ELECTRONIC MAIL UNDER CICS

Streamline Communications Reduce WATS, Fax, Telex and Express Mail Charges

Some of the major features of SYSM® include:
- Easy to use
- 327X/328X support
- Dial-up TTY support
- Simple commands
- Menu driven
- In/out baskets
- Broadcast to groups
- Forward with comments
- Full security
- DOS, VS1, MVS, CICS

Here's two good reasons why you should call today:
- 30-day free trial
- Site license
  $12,000 DOS
  $14,000 OS

CALL:
(208) 377-0336

H&W™ COMPUTER SYSTEMS, INC.

H&W Computer Systems, Inc. P.O. Box 4785, Boise, Idaho 83711-4785

CICS Solutions

COMPUTERWORLD READER QUIZ

YES	NO	
☐	☐	1. Is *Computerworld* on your desk <u>every</u> Monday morning?
☐	☐	2. Do you receive *Computerworld On Communications* and *Computerworld Office Automation* every other month?
☐	☐	3. Do you know about the latest job position announcements? (when you've still got time to send your resume)
☐	☐	4. Can you rely on *Computerworld Buyer's Guides** for product information? . . .
☐	☐	5. Do you know the <u>very</u> latest news in the computer field?

If you've answered **NO** to any of the above, you're probably reading someone else's issue of *Computerworld*. Don't you need your own? When you're a subscriber, we'll guarantee that *Computerworld* is on your desk <u>every</u> Monday morning. And, what's more, as part of your subscription, you'll receive <u>all</u> of our special-focus publications.

Now's your chance to say YES! Subscribe today for a full year of Computerworld at our special introductory rate of $39 (save $5 off the $44 annual subscription rate).

Complete Form On Reverse, Then Return In Attached Postage-Paid Envelope. Or Use Your Charge Card and Call TOLL-FREE: 1-800-343-5730.

☐ **Please enter my subscription (details on back).**

☐ **I'm already a subscriber, but I'd like you to change my:**

☐ address ☐ title
☐ industry ☐ other

Put old label or label information here

My current mailing label is attached and I've filled in new information on the other side.

COMPUTERWORLD

*U.S. Only

CW-138

Please send me COMPUTERWORLD for one year. RATES: United States $44; Canada, Central & South America $110; Europe $165; All Other Countries $245 (Airmail Service)

Special Introductory Offer — Only $39.00 Save $5.00

☐ Check Enclosed
☐ Am Ex ☐ BA/Visa ☐ MC (MC Only - List four digits above your name)

If charge we must have cardholder's signature _____ Expiration Date: _____

First Initial		Middle Initial		Surname	
Your Title					
Company Name					
Address					
City			State	Zip Code	

Address shown is:
☐ Business
☐ Home

☐ Check here if you do not wish to receive promotional mail from *Computerworld*

☐ Check here if you're interested in receiving information on *Computerworld's* Index

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

CIRCULATION DEPT. 375 Cochituate Road, Rte. 30, Box 897,
Framingham, MA 01701-9985

Detach here, moisten and seal envelope securely before mailing.

1. BUSINESS/INDUSTRY (Circle One)
End Users
10 Manufacturer (other than computer)
20 Finance/Insurance/Real Estate
30 Medicine/Law/Education
40 Wholesale/Retail Trade
50 Business Service (except DP)
60 Government—State/Federal/Local
65 Public Utility/Communication Systems/Transportation
70 Mining/Construction/Petroleum/Refining
75 Other User
Vendors
80 Manufacturer of Computers, Computer-related Systems or Peripherals
85 Computer Service Bureau/Software/Planning/Consulting
90 Computer/Peripheral Dealer/Distributor/Retailer
95 Other Vendor

2. OCCUPATION/FUNCTION (Circle One)
11 President/Owner/Partner/General Manager
12 VP/Assistant VP
13 Treasurer/Controller/Financial Officer
21 Director/Manager/Supervisor DP/MIS Services
22 Director/Manager of Operations/Planning/Administrative Services
23 Systems Manager/Systems Analyst
31 Manager/Supervisor Programming
32 Programmer/Methods Analyst
35 OA/WP Director/Manager/Supervisor
38 Data Comm Network/Systems Mgmt
41 Engr/Scientific/R&D/Tech Mgmt
51 Mfg Sales Reps/Sales/Marketing Mgmt
60 Consulting Mgmt
70 Medical/Legal/Accounting Mgmt
80 Educator/Journalist/Librarian/Student
90 Other

3. COMPUTER INVOLVEMENT (Circle all that apply)
Types of equipment with which you are personally involved either as user, vendor or consultant
A. Mainframes/Superminis
B. Minicomputers/Small Business Computers
C. Microcomputers/Desktops
D. Communications Systems
E. Office Automation Systems

CW-138

NEWS

INTERNATIONAL REPORT

AUSTRALIA

CARLTON — An IBM 4381 mainframe supplied under IBM's third-party marketing scheme [CW, Nov. 18] is an integral part of the Traffic Authority of Victoria's massive project to automate the issuing of some 2.5 million drivers' licenses. The contract, valued at almost $4 million, was recently awarded to Computer Power here.

BRISBANE — ICL Australia Pty. Ltd. has won the lion's share of the $6 million Queensland Police Department contract. The plan calls for ICL to build a statewide network based on a dual configuration of its yet-to-be-released Estriel processor. Also sharing the contract are Era Computer Corp., which will supply an unspecified number of Era 2007 Data Encryptors, and AWA, which will provide 300 of its 9602 Intelligent Workstations.

FRANCE

PARIS — An application development system that is said to boost productivity for IBM VM/CMS and TSO users has been announced here by CAP Gemini Sogeti. Multipro combines a software package with a number of enhanced IBM Personal Computer XT workstations to create a tool for each level of program and system design, the vendor explained.

Multipro, which features a structured graphics facility and a window management function, is priced from $24,000 and will be on display at Sofcon in New Orleans on Feb. 21.

JAPAN

NAGOYA — While Japan's new domestically developed supercomputers are primarily used in universities, Japanese manufacturers are reportedly considering selling them elsewhere. Hitachi Ltd.'s first supercomputer was installed at Tokyo University, and Fujitsu Ltd.'s first supercomputer has recently been installed here at Nagoya University.

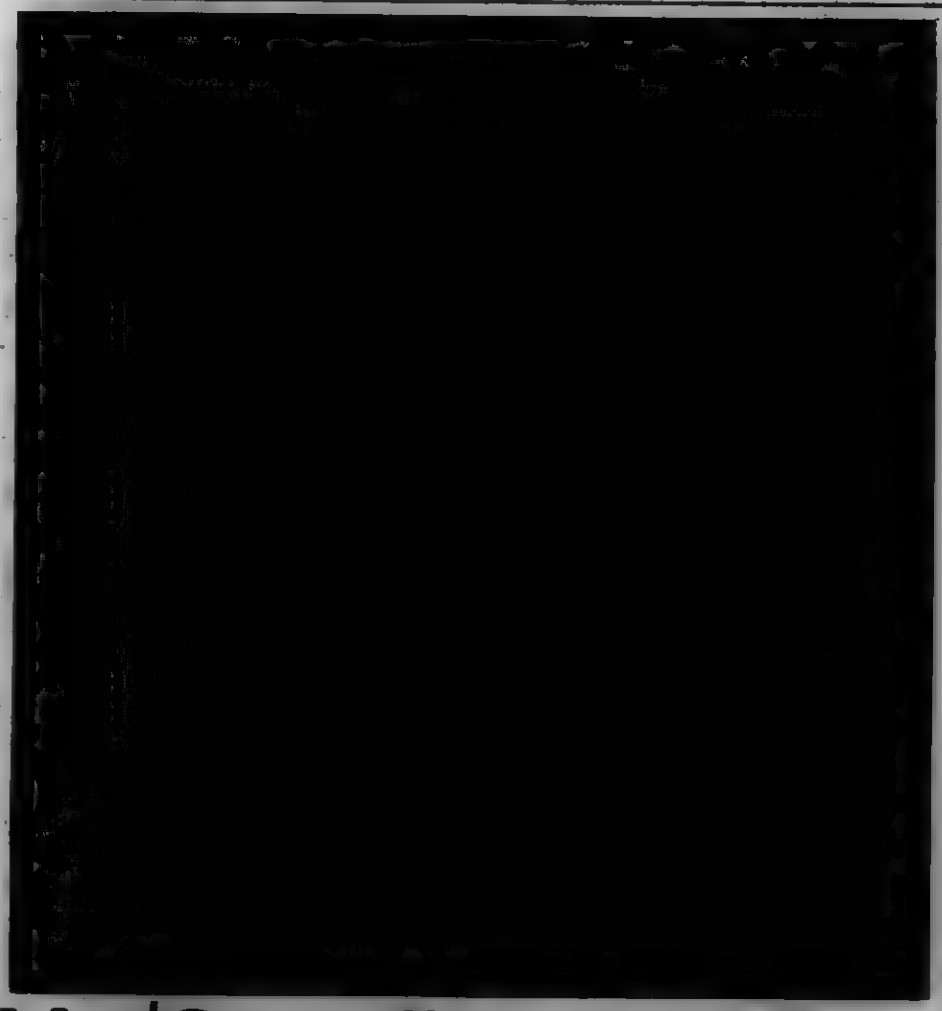
TOKYO — Toshiba Corp. has developed what it believes to be the world's first 256K-bit Cmos static random-access memory (RAM), integrating approximately 1.6 million elements on one chip. The Cmos static RAM chip features high-speed operation, low power consumption and ease of use superior to dynamic RAM, the vendor claimed. The chip was developed with micron precision and other advanced technologies, sources said.

SWEDEN

STOCKHOLM — Sweden's Prince Bertil awarded the Swedish Export Prize to Handic Software during a recent ceremony here for its "remarkable increase in export volume." Handic achieved an eightfold growth in exports in just one year, from $600,000 in 1982 to $5 million in 1983. The company attributed its success largely to the popularity of its Calc Result, a spreadsheet program that runs on microcomputers. Handic has sold over 100,000 copies of the program, 90% of which were exported.

STOCKHOLM — IBM's Swedish subsidiary, IBM Svenska AB, placed fifth in profits among IBM companies in Europe, Africa and the Middle East in 1983. IBM Svenska's volume leaped from $458 million in 1982 to $710 million in 1983; profits rose 84% to $136 million. The gains were attributed in part to a healthier Swedish economy and also to a tax break that prompted companies to purchase products before the end of the year, company sources said.

STOCKHOLM — Swedish hardware exports rose 76% last year, an all-time high valued at $470 million. Most of the exports went to West Germany (25%), France (12%), Great Britain (10%) and the U.S. (5%).



Net/One offers something unique in local area networking. A track record.

In fact, Net/One® offers a number of things unique in local area networking. True vendor independence. Media independence—baseband, broadband, fiber optics, or any combination thereof. Remote bridges and local bridges to interconnect separate Net/One systems—broadband or baseband—between buildings, or between cities, worldwide.

And all this uniqueness becomes even more so when you look at our track record. We not only talk a great network, we've actually been delivering Net/One since July of 1980. Hundreds of our systems are already out there moving information for organizations like Control Data, Caltech, Fairchild, ITT, RCA, Boston University, U.S. Forest Service, and Ford Aerospace.

Let's talk about how to turn the equipment you have now—whatever it is—into the network you want, now, with a network you can have, now. And a network that can take you wherever you want to go from here. Net/One.

Ungermann-Bass, Inc., 2560 Mission College Boulevard, Santa Clara, California 95050. Telephone (408) 496-0111.

Net/One from Ungermann-Bass

©1983 Ungermann-Bass, Inc.
Net/One is a registered trademark of Ungermann-Bass, Inc.

MANAGERS ON THE MOVE

Grzanka

CHESTER T. GRZANKA has been named an assistant vice-president of Hoffmann-La Roche, Inc. in Nutley, N.J. He will continue as director of corporate computer services and assume responsibility for all data processing activities.

Grzanka joined the company in 1968 as a programmer analyst. He was formerly a project manager for ITT and IBM. He has also held adjunct teaching positions at Rutgers University.

Grzanka holds a B.B.A. from Pace University.

■

EDWARD E. WENDT has been appointed senior vice-president of California Federal Savings and Loan Association in Los Angeles. Wendt will direct MIS within the operations group at the bank's new service center in Rosemead, Calif.

Wendt joined California Federal in 1976 as department head in charge of data processing activities related to savings services. He was named assistant vice-president in 1978, vice-president in 1979 and head of the MIS division in June 1981.

Previously a DP consultant serving the financial services industry, Wendt holds a bachelor's degree in accounting from California State University in Los Angeles.

■

EDWARD BAUGH has been promoted to the newly created position of vice-president of management information systems and KEVIN MYERS has been named data processing manager for Jay-Zee, Inc. in Maryland Heights, Mo. Jay-Zee is a manufacturer of mens' clothing.

Baugh has been with Jay-Zee for 16 years. Myers, who will manage the programming operations at Jay-Zee, has been at the company 12 years.

■

Delaney

EDWARD T. DELANEY has been named vice-president for Midlantic National Bank's Information Service Department in Edison, N.J. Delaney serves as manager of Midlantic National's systems and programming area where he is responsible for the development and maintenance of all application systems.

Prior to joining Midlantic, Delaney was with the actuarial department at the Aetna Life and Casualty Company in Hartford, Conn., and programming manager of the U.S. Navy's Atlantic Command Operations Control Center in Norfolk, Va.

He is a graduate of Seton Hall University and New York University where he received a B.S. and an M.S. in mathematics, respectively.

■

MICHAEL C. BANGS has been appointed vice-president of information technology for Prentice-Hall, Inc. in Englewood Cliffs, N.J. He will have overall corporate responsibility for the introduction and utilization of information technology throughout the publishing company.

Bangs is a former vice-president, Computer Center Services, with Informatics General Corp. and has held a number of management positions with Insco Systems Corp., a subsidiary of Continental Insurance.

■

Witco Chemical Corp. in Woodcliff Lake, N.J., has appointed WILLIAM BIERNACKI, GORDON OWENS and JOSEPH TITELIUS as assistant directors of its MIS department. Witco manufactures and markets special purpose chemical and petroleum products and engineered materials.

Biernacki, previously supervisor of electronic data processing audits for Witco, assumes responsibilities for centralized systems development at the company. He has been with Witco since 1978 and has been in the DP field for 23 years. He is a graduate of Fairleigh Dickinson University in Rutherford, N.J.

Owens will be in charge of Witco's distributed systems, telecommunications and manual procedures. He comes to his new position after serving as a regional director of MIS for the company at Melrose Park, Ill. He joined the Richardson Co. at that location in 1977 prior to its acquisition by Witco. A graduate of Dartmouth College and Northwestern University, he began his DP career in the early 1960s.

Titelius will be responsible for operations at Witco's various computer centers in the U.S. Previously manager of the company's corporate data center, he has held various positions in data center operations since joining Witco in 1959.

■

MARTIN B. ROSCH has joined Ipco Corp., a provider of health care products and services, as director of management information systems in White Plains, N.Y., where he will plan and coordinate the information needs of Ipco corporate headquarters. He will provide guidance and assistance in the MIS area to all Ipco divisions in addition to his responsibility for management of the corporate data center.

For the past 11 years, he served as director of MIS for Sony Corp. of America.

He received a B.S. in 1963 from Brooklyn College and an M.S. in 1964 from Penn State University.

NOW CCA'S MODEL 204 DBMS CAN DO SOMETHING EVERY EXECUTIVE CAN APPRECIATE.

NEWS

JESS D. RAY has joined Associates Bancorp in Chicago, an affiliate of Associates Corp. of North America, as vice-president of business systems.

Ray is responsible for business systems at Associates Commercial corporate headquarters in Chicago, which includes information processing services for the Chicago organization plus interfacing with Associates Bancorp's central data processing operations in South Bend, Ind.

He most recently was manager for marketing and sales of Raytheon Computer Services in Chicago. He has also been vice-president of the Midwest region for Information Industries, Inc.; director of marketing for Computer Sciences Corp. in Los Angeles; and regional manager for Docutel Corp. in Chicago.

Ray attended the University of Dayton and has a bachelor's degree in marketing from Elmhurst College, followed by graduate-level courses in marketing strategy at the University of Chicago and Northwestern University.

■

Dunlevy

PAUL B. DUNLEVY has been promoted to corporate manager of systems for Cyclops Corp. in Pittsburgh. He will coordinate the systems and communications activities of Cyclops' various steel, specialty retailing and nonresidential construction divisions nationally and internationally.

Dunlevy, who joined Cyclops in 1961, was most recently director of systems and data processing for the Universal-Cyclops specialty steel division.

Dunlevy is a University of Pittsburgh graduate with a bachelor of science degree.

■

GERARD MAGLIOCCA has been promoted to manager of systems planning and administration for Squibb Corp. of Princeton, N.J. His responsibilities include worldwide MIS planning.

Magliocca has served as a programming analyst and designed the development of real-time automation laboratories for Squibb. Additionally, he has served as project manager of financial systems and internal consultant for Squibb's international operations.

He has a B.S. in mathematics and an MBA in finance from Wagner College.

■

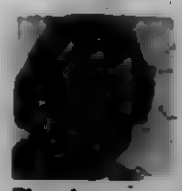
DINEASH MANGALICK has been appointed manager of Varian Associates' Information Systems Services in Palo Alto, Calif. Mangalick will supervise business applications in the Systems Development and Information Center.

He has been with Varian since 1974 and was previously manager of marketing/accounting systems development.

A 15-year veteran of the data processing field, Mangalick has held positions at Control Data Corp. and Essex Wire & Cable.

He received an M.S. degree in industrial engineering from the University of Minnesota in 1967.

■



Plourde

DR. PAUL J. PLOURDE has been appointed the first vice-president for information services at Bentley College located in Waltham, Mass. Plourde, whose background includes teaching and research in data base management systems and analytical models in higher education, has served as interim director of the college's computer center.

He joined Bentley in 1979 as associate professor of computer information systems and coordinator of the master's program in computer information systems.

Before joining Bentley, Plourde served as professor and chairman of the Computer and Information Sciences Department at the State University of New York at Potsdam; director of the Three College Computer Center in Amherst, Mass., serving Amherst, Hampshire and Mount Holyoke Colleges; and a director of the New York Higher Education Assistance Corp.

He was president (1976-1978) and board member of the Concom Users Group and president and board member of Byytebaack, Inc., a software firm owned by 24 institutions of higher education. He is currently president of Cause, the association for the development, use and management of information systems in higher education.

Plourde holds a bachelor of arts from the University of New Hampshire, an M.A. from Northeastern University and a doctorate in education from the University of Massachusetts.

■

LARRY E. TRAVIS, a professor of computer science at the University of Wisconsin-Madison, has accepted an appointment to head the university's academic computing center.

Travis joined the UW-Madison faculty in 1964. He served from 1970-72 as director of UW-Madison's Office of Computing Affairs. From 1979-81, he was chairman of the computer sciences department.

In 1981-82, Travis was at the University of Delaware, where he was professor of computer science and electrical engineering and associate provost for computing.

He received his bachelor's degree from the University of Colorado in 1951 and his doctorate in the philosophy of science from the University of California, Los Angeles in 1966.

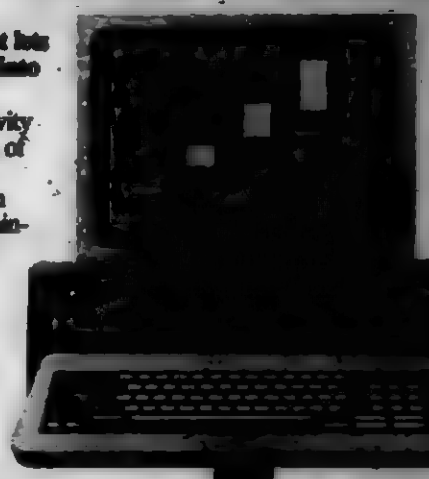
TALK SENSE TO THE IBM PC.

Introducing PC/204, a link that lets PC users turn mainframe data into spreadsheets effortlessly.

PC/204, the newest productivity tool from Computer Corporation of America, is a powerful, efficient, easy-to-use software link between IBM personal computers and mainframes. It effectively answers the pressing problem of how to let corporate managers take full advantage of today's personal computers for making decisions, while also giving them access to the corporate database in a format they can use.

First, PC/204 guides PC users as they browse through the MODEL 204 database. Then it extracts the data they need and converts it into meaningful management information for spreadsheet analysis. Lotus 1-2-3 for example. And PC/204 does all that automatically. Without the PC user having to understand anything about mainframe technology.

If you aren't already using Lotus 1-2-3, we can supply it along with PC/204. Or you can use any current IBM PC business package.



While PC/204 is helping business managers, it's also helping MIS directors.

PC/204 uses the power and intelligence of the personal computer for increasing the overall efficiency of an application.

For one thing, it improves performance of the mainframe by offloading some of the processing to the PC, while reducing PC users' response time. It also makes communication between the PC and the mainframe more efficient.

What about security and control? PC/204 provides individual management views of the corporate database while still allowing PC users access to all the information they need.

PC/204 is the latest reason to get MODEL 204 DBMS which has been so highly rated for performance and programmer productivity.

For more information or to arrange for a demonstration of PC/204's capabilities, simply return the coupon or write to us on your letterhead.

Computer Corporation of America

Yes, please tell me more about: ( ) PC/204 ( ) MODEL 204 DBMS
( ) Send me a brochure.
( ) Send me info on free DBMS seminars, or call our seminar coordinator.

NAME _____ TITLE _____
COMPANY _____
ADDRESS _____
CITY _____
STATE _____ ZIP _____
TELEPHONE _____
Operating System: ( ) MVS ( ) DOS ( ) CMS ( ) Other: _____

Computer Corporation of America
Four Cambridge Center, Cambridge, MA 02142 (617) 492-8860 OW2/13PC

CCA's Executive DBMS Seminar Schedule

February				April	
Boston	Feb. 16	Honolulu	Mar. 22	Albany	Apr. 26
Chicago	Feb. 22	Houston	Mar. 29	Anchorage	Apr. 12
Dallas	Feb. 21	Jacksonville	Mar. 13	Boston	Apr. 12
Denver	Feb. 14	Louisville	Mar. 6	Cleveland	Apr. 19
Ft. Lauderdale	Feb. 14	Minneapolis	Mar. 9	Dayton	Apr. 26
Los Angeles	Feb. 22	New York	Mar. 27	Little Rock	Apr. 5
Madison, WI	Feb. 15	Pittsburgh	Mar. 13	New Orleans	Apr. 5
Philadelphia	Feb. 28	Portland, OR	Mar. 29	Norfolk	Apr. 19
San Francisco	Feb. 23	Richmond	Mar. 20	Philadelphia	Apr. 3
Seattle	Feb. 16	Rochester	Mar. 22	Phoenix	Apr. 19
March		Saddle Brook, NJ	Mar. 6	Princeton	Apr. 10
Columbus, OH	Mar. 1	Salt Lake City	Mar. 7	Raleigh	Apr. 10
Detroit	Mar. 22	Tallahassee	Mar. 14	San Diego	Apr. 12
Hartford	Mar. 15	Tulsa	Mar. 1	St. Louis	Apr. 18
				Washington, D.C.	Apr. 4

NASCP annual conference slated for San Francisco

SAN FRANCISCO — Some 400 strategic planning executives are expected to attend the annual conference hosted by the North American Society for Corporate Planning (NASCP), scheduled at the Sheraton Palace here April 29 to May 2.

"From Steel to Silicon: Planning in a Restructured Economy" is the theme of this year's meeting, which will focus on five key issues addressing the transition to new technology: "How to Manage the Development and Introduction of New Technology"; "The Politics of Change"; "Succeeding in the Global Marketplace"; "Leadership, Entrepreneurship and Culture"; and "CEO Views."

Speakers will include Nolan K. Bushnell, founder of Atari, Inc. and now chairman of Catalyst Technologies; Kenich Ohmae, author of *The Mind of the Strategist*; public opinion researcher Mervin Field; and Nucor Corp. President F. Kenneth Iverson.

The conference fee is $625 for members and $700 for nonmembers; additional information is available from NASCP, 300 Arcade Sq., P.O. Box 1288, Dayton, Ohio 45402.

Strategic Data Planning sets March 26 conference

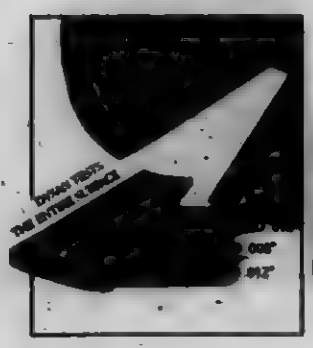
BETHESDA, Md. — The sponsors of the Strategic Data Planning Conference that will be held March 26-28 at the Marriott Hotel here have announced that Dr. Robert H. Holland will deliver the keynote address.

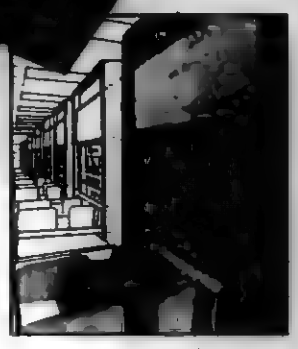
President and chairman of Holland Systems Corp. of Ann Arbor, Mich., Holland will speak on "Strategic Information Planning — the Foundation for Integrated Success." His address will deal with the need for developing an integrated information resource through strategic planning, which encompasses business direction, data and information, hardware, software and communications.

Other speakers scheduled include Henry O. Wintermute of 3M Co., Art Viles of IBM, John Janis of GTE Data Services, Inc., Arvind Shah of Performance Development Corp. and William Baker and James Odell of Database Design, Inc.

The three-day Strategic Data Planning Conference costs $895. More information is available from its sponsor, Barnett Data Systems, at 19 Orchard Way N., Rockville, Md. 20854.

Four Reasons Why The Dysan Difference is Worth Paying For





1. 100% Surface Tested

Only Dysan provides fully usable diskette surfaces that are truly 100% error-free across the entire face of the diskette. An exclusive on-and-between the track testing procedure guarantees error-free performance regardless of temperature and humidity distortions or slight head misalignments.

2. Advanced Burnishing Techniques

Dysan's advanced polishing methods create a smoother, more uniform diskette surface. This results in better signal quality on each track, less wear on drive heads and reliable access to data after millions of head passes.

3. DY10™ Lubricant

Dysan's proprietary DY10 lubricant complements the advanced burnishing process. Both maximize error-free performance while minimizing headwear. Optimal signal presence is maintained between the head and diskette surface during millions of write/read interfaces.

DY10 is a trademark of Dysan Corporation

4. Auto-Load Certification

Dysan's unique quality control methods reflect technological leadership in designing, producing and testing precision magnetic media. Each diskette is unerringly certified by Dysan-built, automated and microprocessor controlled certifiers. Your system and data base will benefit from Dysan's diskette reliability and unsurpassed quality.

Select from a complete line of premium 8" and 5¼" diskettes, in single or double densities, certified on one or both sides.

Dysan Corporation
Corporate Headquarters:
5201 Patrick Henry Drive
Santa Clara, CA 95050
(800) 551-9000

Forum to focus on DSS issues

NEW YORK — A two-day conference dealing with managerial issues in the evaluation and selection of decision support software (DSS) will be held May 21-22 at the New York Hilton at Rockefeller Center.

The conference is titled "Evaluating Decision Support Software: Personal Computer, Mainframe and Distributed Applications — a Managerial Perspective." It is being sponsored jointly by C. Lawrence Meador, executive vice-president of Research & Planning, Inc., the New York chapter of the Planning Executive Institute and the Information Technologies Institute.

The conference will focus on key issues involved in the implementation of DSS with personal computers, mainframes and distributed systems, including managerial user needs assessment, problem diagnosis and networking.

Among the speakers will be Peter G.W. Keen, chairman of the board of Micro Mainframe, Inc.; Michael S. Scott Morton, management professor at MIT's Sloan School of Management; David Ness, associate professor of decision science at the University of Pennsylvania's Wharton School of Business; and Research & Planning's Meador.

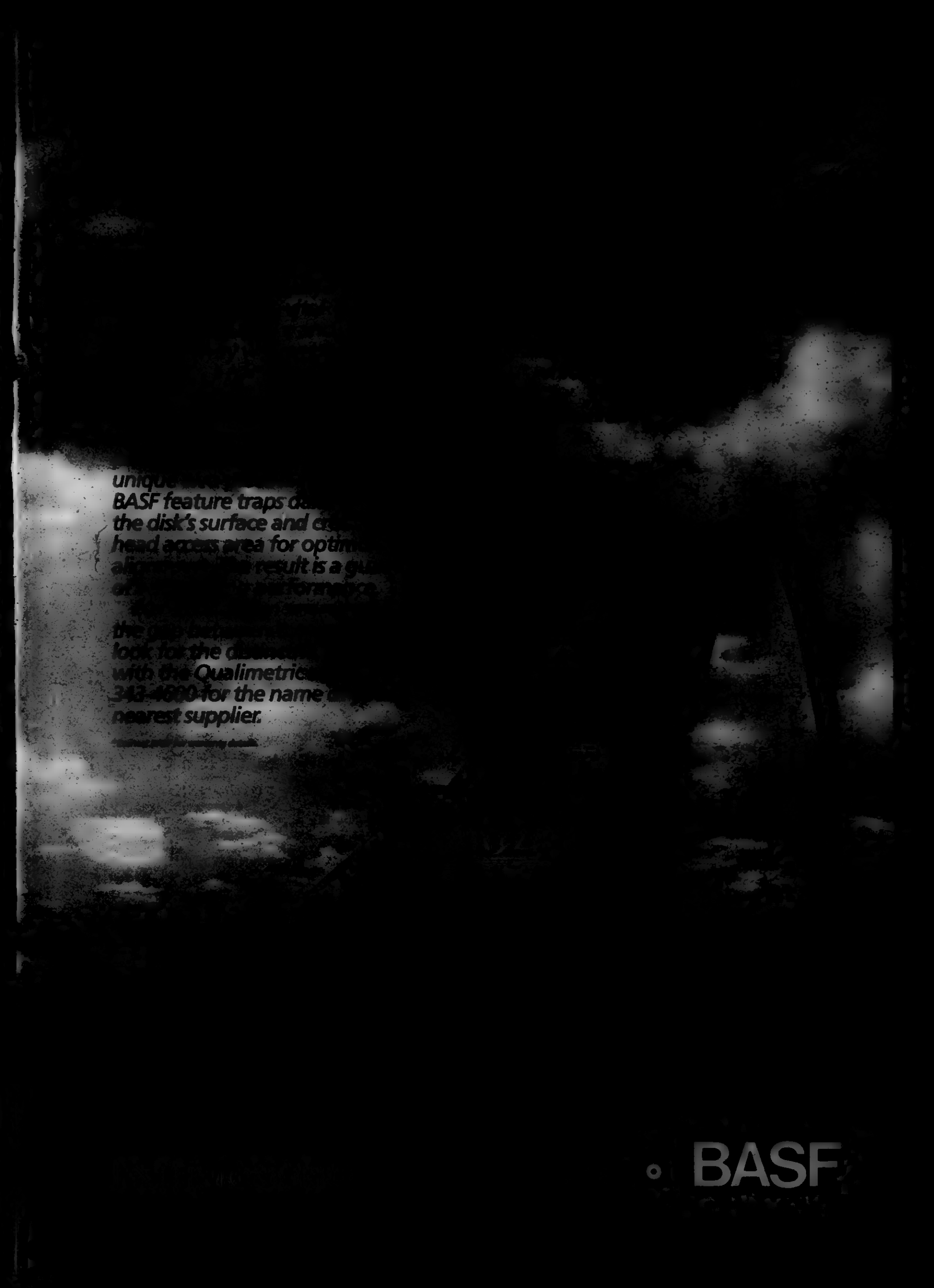
Registration for the conference costs $495. More information is available from DSS Conference, 215 First St., Cambridge, Mass. 02142.

Strategem users to meet in March

BOSTON — Integrated Planning, Inc., the developer of the Strategem decision support system, will hold the first meeting of the Strategem Users Network (SUN) here March 22-23 at the Westin Hotel.

The keynote address will be given by Terry Gallagher, unit director of Mars Group Services, the information processing arm of the Mars Co.'s European operations.

There is no charge for Strategem users to attend the meeting. Integrated Planning is located at 338 Newbury St., Boston, Mass. 02115.


unique
BASF feature traps
the disk's surface and
head access area for optim
result is a
look for the
with the Qualimetric
343-4800 for the name
nearest supplier.
BASF

NEWS

Chips & Changes exhibit to begin national museum tour

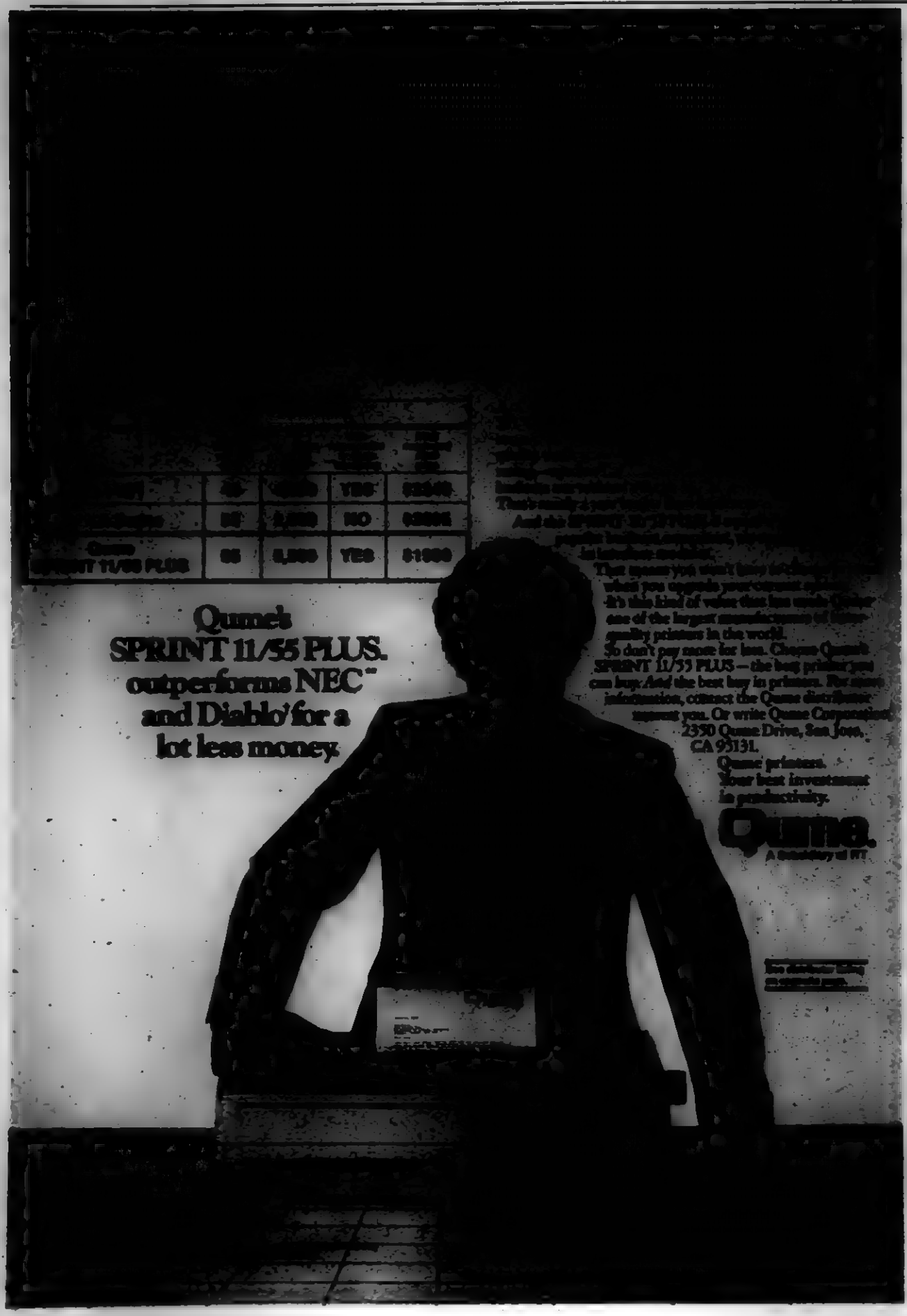
SAN FRANCISCO — The Chips & Changes exhibit will begin a two-year national tour at the San Francisco Exploratorium, where it will run March 14 through May 10.

Billed as the first major computer technology exhibit that also examines social change, Chips & Changes will combine hands-on and computer-based interactive exhibits, live demonstrations and audiovisual presentations exploring computer chip technology and its cultural ramifications.

Organized by the Association of Science and Technology Centers, Chips & Changes will travel to nine major American museums.

In addition to the San Francisco Exploratorium, the Chips & Changes exhibit will visit the Oregon Museum of Science and Industry in Portland June 9 through Aug. 5; The Science Place in Dallas Aug. 25 through Oct. 21; the Science Museum of Minnesota in St. Paul Nov. 10 through Jan. 6, 1985; the Museum of Science and Industry in Chicago Jan. 26 through March 24, 1985; the Science Museum of Virginia in Richmond April 13 through June 9, 1985; the Museum of Science in Boston June 29 through Aug. 25, 1985; the Franklin Institute Science Museum in Philadelphia Sept. 14 through Nov. 10, 1985; and the North Carolina Museum of Life and Science in Durham Nov. 30 through Jan. 26, 1986.

The exhibition is funded by the National Endowment for the Humanities and Intel Corp., with additional funding from Digital Equipment Corp. and the Warner Communications Foundation.



For your best investment in printers.

Call your nearest Qume distributor today.

United States:

American Calculator & Computer
(205) 933-2344—AL
Almac Electronics
(206) 643-9092—WA
Anacomp (206) 881-1113—CA, UT, WA
Anthem Systems (415) 342-9182—CA
Schilg & Associates (612) 922-7011—MN
Butler Associates (617) 964-5270—CT, MA
Byte Industries
(800) 972-5946 (CA Only)
(800) 227-2070 (Outside CA)
David Jamison Carlyle
(213) 410-9250—CA, CO, HI, IL, NJ, TX
Computers & Peripherals Int.
(315) 476-6664—NY
The Datastore (609) 779-0200—NJ
Equipment Resources (404) 955-0313—GA
Future Information Systems
(212) 732-3905—NYC
Gentry Associates
(305) 859-7450—FL, GA, LA, NC, SC, TN
Inland Associates (913) 764-7977—KS
InterACT Computer Systems
(704) 254-1949—FL, GA, NC
Kierulff Electronics
(800) 336-8811—AZ, CA, CO, CT, FL, GA, MA, MD, MN, MO, NC, NJ, OH, OK, TX, UT, WA, WI
MA/COM-Alanthus Data
(301) 770-1150—MD
MicroAmerica Distributing
(800) 431-7660 (MA Only)
(800) 343-4411 (Outside MA)—CA, MA, TX
Midwest Microcomputers (419) 782-1115—OH
National Computers Syndicate
(312) 459-6400—IL, MN
Pacific Mountain States
(800) 272-3222—CA, WA
PAR Associates
(303) 371-4140—CO, UT
PCA Microsystems (512) 854-4711—TX
PCS, Inc. (214) 247-9948—TX
Pioneer Electronics
(301) 921-0660—AL, FL, GA, MO, NC, PA
Polygon Industries
(504) 834-7858—LA
Printer Warehouse (213) 829-5469—(CA Only)
(800) 245-9812—(Outside CA)
R.C. Data (408) 946-3800—CA
Ruder Communications (212) 246-5609—NYC
Schweber
(800) 645-3040—AL, CA, CT, FL, GA, IA, IL, MA, MD, MI, MN, NJ, NY, OH, OK, PA, TX, WI
Southern Microcomputer
(305) 621-4237—FL
Tak-Ada Industries
(312) 870-7400—IL, PA, TX
Terminal Rentals (714) 632-3414—CA
Terminals Unlimited
(800) 336-0423—24 Locations
Tricom (516) 483-9700—NY
Unisa (512) 451-0251—TX
Western New York Computer
(716) 381-4120—NY

Canada:

Abacus Data Services
(416) 677-9555—Ontario
Datamax (416) 781-6135—Ontario, Quebec
DataTech Systems
(604) 479-7117—Alberta, BC, Ontario
Data Terminal Mart
(416) 677-0184—Alberta, BC, Nova Scotia, Ontario, Quebec
Future Electronics
(416) 697-7710—Alberta, BC, Ontario, Quebec
Micro Distributing (604) 941-0822—BC
Printerm Data (416) 977-1711—Ontario

Qume.
A Subsidiary of ITT

NEWS

Robots to be sold to jails for use as guard devices

By Peter Bartelik
CW Staff

WOBURN, Mass. — Robots are ready to move off the factory floor . . . into jails.

At least that is the plan of a two-year-old company here that recently contracted to supply about 200 mobile robots a year for five years beginning in 1985. Denning Mobile Robotics, Inc. announced recently it will provide mobile robots to Southern Steel Co. of San Antonio, Texas, which, in turn, will sell the devices to prisons to be used as guard devices. The robots will not replace guards, but will be used in tasks that are boring and dangerous, such as patrolling hallways at night.

The robots will not replace guards, but will be used in tasks that are boring and dangerous, such as patrolling hallways at night.

The company has not yet produced a fully functioning prototype. "We have a mobile robot, but it doesn't detect [a human presence]," said Benjamin Wellington, vice-president at Denning, who added that a prototype should be completed in early spring or late summer.

The young company was not established with the goal of churning out prison guard robots. The idea, according to Wellington, was to develop security guard robots for general business use. That is still the main target; developing a jailhouse application "is only marginally different," he said.

The robot currently under development will stand four-feet tall, weigh about 200 lb and come equipped with infrared and ultrasonic sensors along with ammonia "sniffers" to detect odors given off by human bodies.

The robot will be programmed to speak as many as 10 different sentences, including warning escaping prisoners, "You have been detected."

Encased in an armored body will be two Motorola, Inc. 68000 microprocessors, "vast amounts" of random-access memory and some erasable programmable read-only memory (Eprom), Wellington said.

Eprom memory will store information that must be non-volatile, such as a map of the prison structure.

Powering the robots will be lead-acid batteries carrying over 2,000A. One of the fundamental problems in designing the product is placing enough on-board power in the units. As designed, the machines will operate for 12 hours and recharge for three hours.

The robots will communicate constantly with a base station via microwave. There are no plans to have the robots communicate with a central computer, Wellington said.

Denning currently employs 14 people and will expand to between 20 and 25 people during development and production of the first six field test units. The company president and founder, R. Warren George, formerly headed his own Washington, D.C.-based management consulting firm, Denning Associates.

According to Wellington, the company has industrial liaisons with robotics centers at MIT and Carnegie-Mellon University and "some superior people working on the artificial intelligence aspects."

NYPD bomb squad using robots in life-threatening situations

NEW YORK — It's become a cliche that the ideal tasks for robots are those that are either too tedious or too dangerous for humans. The New York Police Department (NYPD) now utilizes three strictly mechanical, remote-controlled robots in potentially life-threatening situations.

In early January, one of NYPD's robots was loaned to the Elmira, N.Y., police department during a shoot-out that left one policeman dead and two others injured. Two gunmen were cornered in an apartment, and police eventually used the robot device "to go in and ascertain the suspects were dead," a spokesman for the Elmira police department said. He declined to discuss NYPD's devices.

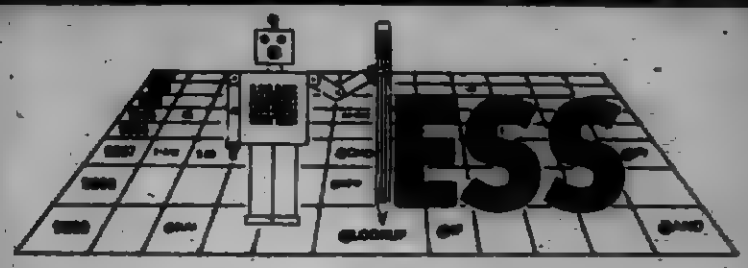
Nor would NYPD discuss the use of the device in Elmira, but it was willing to talk about the general functions of its robots. NYPD obtained its first robot last February and has since acquired two others, one for its bomb squad and one for its emergency squad. The robots were purchased from a Canadian firm, Pesco, which has been producing them for six years.

Detective Frank Guerra, training officer for the bomb squad, said his department uses a robot two to three times a week. Bomb squad technicians operate the robots via a remote panel linked to the device.

The robots weigh 230 lb., measure 40-in. long by 26-in. wide and move on six independent wheels. The robot's carriage is levered so the device can climb over curbs. Power is provided by two 12V wet-cell batteries.

The robot units each contain an X-ray monitor, a spotlight and a camera that can span 360 degrees and send a picture back to the control panel. A mechanical hand can open and close with a "soft touch, to pick up something like an egg or glass of water, and a hard touch, to pick up items like briefcases," Guerra said.

He compared the squad's use of the robot to a golfer's use of a particular club. "In golf, you have several clubs; the bomb squad technician has X-ray devices, dogs and the robot. Whatever the technician feels he needs to do the job, he selects," Guerra said.



Electronic Spread Sheet for VM/CMS & MVS/TSO
- Not Just Another CALC -

Powerful - Spreadsheet size is limited only by available virtual storage. ESS easily handles spreadsheets with thousands of rows and/or columns.

Proven - Already in use at over 100 installations.

Compatible - ESS accepts the same commands as VisiCorp's VisiCalc® program for microcomputers. A person familiar with VisiCalc® can be using ESS productively in minutes. In addition, ESS can load and save files in VisiCalc® format.

High Performance - Assembler language code and sophisticated storage management techniques give you fast response, even with very large spreadsheets.

Easy to Install - Just load the ESS program. No additional program products or languages are required.

Cost Effective - ESS gives all your users access to personal computing capabilities for just $220 per month. Compare that to the cost of buying hundreds of microcomputers.

Questions? - For more information about ESS, or to arrange a 30-day free trial, call or write TRAX.

TRAX

TRAX Software, Inc.
10681 National Blvd., Suite 205
Los Angeles, CA 90064
(213) 475-6720

WHAT TO LOOK FOR IN ON-SITE TRAINING

With all the technical training options around today, it's hard to figure out which company will offer the most professional, reliable on-site training. Here's Sys-Ed's checklist of key benefits that will make your training investment really pay off.

ARE THESE BENEFITS INCLUDED?	SYS-ED	OTHERS
• Qualified training consultant for needs analysis and skills inventory?	YES	NO
• Comprehensive, coordinated curricula of CICS, IMS, VSAM, TSO ISPF or MVS JCL training?	YES	NO
• Complete range of training for the IBM environment, including IDMS, DATACOM, ADABAS and FOCUS?	YES	NO
• Ongoing technical support?	YES	NO
• Satisfaction guarantee?	YES	NO
• Additional charge for customized training?	NO	YES
• Thousands of solid references?	YOU BET	?

If you ask other training companies the answers to these tough questions, you'll probably make the decision thousands of decision-makers like yourself made: to get your training from The Computer Education Professionals at Sys-Ed.

Write Sys-Ed or call 212-889-3386 for more information about the range of on-site course options. By the way, we also offer public, regional and consortium courses.

____ Tell me about your on-site training.
____ I'd like a schedule of your public courses in my area.
✓ Be sure to let me know about the Sys-Ed Multi-Course Discount and your Satisfaction Guarantee!

Name Company
Address City/State/Zip
Phone Number

SYS-ED.
The computer education professionals

One Park Avenue, New York, NY 10016 212-889-3386
New York • Chicago • Dallas • San Francisco • Los Angeles

OFF THE PRESS

GEORGE HARRAR

BOOK REVIEWS

THE UNIX OPERATING SYSTEM BOOK
By Mike Banahan and Andy Rutter

If you have access to a terminal on a system running Unix, then pull up a chair, open this book and delve into the intricacies of this operating system. There's no standards discussion here, no comparisons to Pick & Associates, Inc.'s Pick or Digital Research, Inc.'s CP/M operating systems and little speculation about Unix's place in the 16- or 32-bit worlds.

The book is a hand-holding walk through the shell and down to the kernel of Unix. In Chapter Eight, the hand is let go. Topics fit for a beginner (files and simple commands, the editor, C language, filestore) give way to more complicated matters (the process environment, libraries, maintenance).

Paperback, 318 pages, $16.95, ISBN 0471-89676-4. John Wiley & Sons, Inc., 605 Third Ave., New York, N.Y 10158.

DESIGNING AND IMPLEMENTING LOCAL-AREA NETWORKS
By Dimitris N. Chorafas

The book begins by answering a question few people are asking anymore: "Why should we want to link micros?" But the answer does illustrate the pressure widespread personal computer use is exerting on the creation of local networks. The real question for data processors, as Chorafas says later on, is not whether they should develop a network for their users, but which one they should develop.

Broadband is emphasized in the technical section as the feature most important in a system where a single carrier must combine different services.

"In the 1980s," the author says, "the bandwidth need will exceed other system requirements. The more we have, the more we want. Bandwidth will be a dominant factor in implementing office automation systems."

In the product section, commercial offerings are analyzed to show the various ways the technical features of the first section are utilized. Under scrutiny are Corvus Systems, Inc.'s Omninet, Nestar Systems, Inc.'s Cluster One, Xerox Corp.'s Ethernet and Datapoint Corp.'s Attached Resource Computer, the earliest local network extant.

Hardcover, 354 pages, $32.95, ISBN 0-07-010819-6. McGraw-Hill Book Co., 1221 Ave. of the Americas, New York, N.Y. 10020.

DIGITAL IMAGE PROCESSING
By Gregory A. Baxes

How do you get a clear photograph of the moon? Image processing — the alteration and analysis of pictorial information — was developed by the National Aeronautics and Space Administration to answer that question on the Apollo missions. Today, image processing sees use in medical, factory automation and robotics control applications, among others.

Understanding image processing requires understanding the human eye, which is the starting point for this book. Spatial and brightness resolution, histograms, pixel points and data compression are basic processing concepts covered.

After the concepts comes the hardware that makes the concepts work. Commercial equipment supports the five primary functions of data handling: image digitization, image storage, image display, external host-computer interface and internal image processor interface. The author's rule of thumb: The more a system costs, the faster and more flexible it will be processing image data.

Paperback, 184 pages, $14.95, ISBN 0-13-214056-X. Prentice-Hall, Inc., Englewood Cliffs, N.J. 07632.

BOOKS OF NOTE

RELATIONAL INFORMATION SYSTEMS, by T.H. Merrett: *hardcover, 507 pages, $32.95, ISBN 0-8359-6643-9. Reston Publishing Co., Reston, Va. 22090.*

THE UNIX PROGRAMMING ENVIRONMENT, by Brian W. Kernighan and Rob Pike: *hardcover, 357 pages, $26.95, ISBN 0-13-937699-2. Prentice-Hall, Inc., Englewood Cliffs, N.J. 07632.*

THE KISS PRINCIPLE: APPROACHES TO BUILDING RELIABLE SYSTEMS, by Ronald B. Smith: *hardcover, 207 pages, $19.95, ISBN 089433-198-1. Petrocelli Books, Inc., 1101 State Road, Princeton, N.J. 08540.*

THE SOFTWARE GUIDE: IBM PERSONAL COMPUTER & XT, by Gerald VanDyver: *paperback, 1,035 pages, $24.95, ISBN 0-912003-00-3. Micro-Information Publishing, 15420 Eagle Crest Ave., Prior Lake, Minn. 55372.*

VIRTUAL STORAGE ACCESS METHOD, by Ronald K. Ferguson: *paper (for three-ring binder), 425 pages, $32.50. Software Information Services, P.O. Box 4132, Bellevue, Wash. 98009.*

Publishers wishing to have their books considered for review can direct books, prepublication galleys, press releases, catalogs or other information to George Harrar, Book Review Editor, Computerworld, P.O. Box 880, 375 Cochituate Road, Framingham, Mass. 01701.

Casa/SME names Hall president

DEARBORN, Mich. — John C. Hall, vice-president of North & Donahoe of Santa Ana, Calif., has been elected president of the Computer and Automated Systems Association of the Society of Manufacturing Engineers (Casa/SME).

He succeeds Gordon A. McAlpine, who is associated with Tuma Engineering in Troy, Mich.

The membership of Casa/SME includes more than 7,000 engineers and executives. The organization has 38 chapters worldwide.

How Dave Vipler "dumped the dumb"

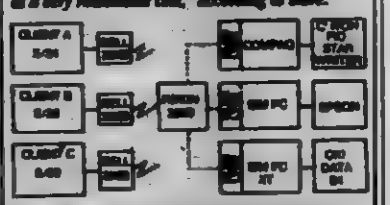
Experienced and consolidated consultants know that customer support is the name of the game. Dave Vipler, new managing director of the New York based *Computer Consulting Center*, in his 14 years with I.B.M. saw too many clients get burned by here today-gone tomorrow consultants. What seemed like a finished program package invariably needed additional work once the consultant left.

Dave recognized that a quality consulting service must provide continuing client support. In 1981 he founded the Center to assist business with their I.B.M. 5/34, 5/36, 5/38, 36xx, 4300 series systems and PCs.

"The Center was organized to provide quality computer consulting to clients that are integrating distributed processing systems into their computer environments," said Dave.

With a staff of 22 professionals, Dave felt that the Center could adequately support its New York City users. Plans to significantly expand their New Jersey operations prompted Dave to find a more convenient method of maintenance, particularly for those programming bugs that only surface after office hours. It was one thing to have a programmer drive an hour each way to spend a full day on site, Dave reasoned, but to make the trip for a half hour of "Troubleshooting" was too costly.

"One client said, 'How do we get you back if we have problems?' BLUE LYNX was the answer for us at a very reasonable cost," according to Dave.



The Center now has 2 PCs, 2 XTs, and 2 Compaqs, each equipped with BLUE LYNX. Their programmers can now sit at their desks and modify programs on I.B.M. host systems downtown, in New Jersey or wherever the accounts are located. Dave's clients were so impressed with BLUE LYNX that some have bought the hardware/software package for their own internal needs.

"The BLUE LYNX™ documentation was excellent, it went up easily and with no support from Technland required. We now use BLUE LYNX to support clients in New York City, as well as those in New Jersey. With BLUE LYNX behind us we can now use our communications ability not only for programming tasks but also as a sales tool."

BLUE LYNX terminal packages include: 3101
3252/12 emulation for 5/34, 5/36 and 5/38.
3276 emulation SNA/SDLC or Bisynch.
Hardware/software package 3626 complete.
Combination of 2 emulators 3230.
VT220/1 - DEC VT220/52 emulation software $160

(212) 684-7788
TECHLAND SYSTEMS Inc.
25 Waterside Plaza
New York, NY 10010
BLUE LYNX 3626 is a joint development of Software Systems, Inc. of Jefferson City, Missouri & Techland

ATTENTION: MANAGERS — ENGINEERS — SITE PLANNERS

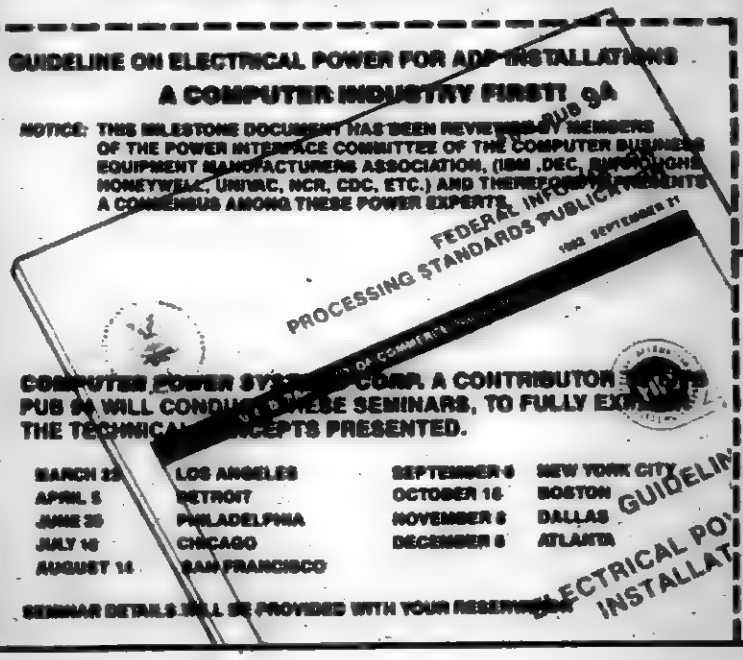
HAVE YOU HEARD ABOUT FIPS PUB 94?

YOU'VE ALL BEEN INVOLVED IN CONTROVERSIES ABOUT

- HOW TO GROUND A COMPUTER?
- HOW MUCH ISOLATION REQUIRED?
- WHAT KIND OF POWER CONDITIONER IS NEEDED?

DON'T MISS THIS UNIQUE OPPORTUNITY!

THIS ONE-DAY SEMINAR COULD BE YOUR BEST INVESTMENT IN 1984!!



COMPUTER POWER SYSTEMS CORP. A CONTRIBUTOR TO FIPS PUB 94 WILL CONDUCT THESE SEMINARS, TO FULLY EXPLAIN THE TECHNICAL CONCEPTS PRESENTED.

MARCH 22	LOS ANGELES	SEPTEMBER 6	NEW YORK CITY
APRIL 5	DETROIT	OCTOBER 16	BOSTON
JUNE 28	PHILADELPHIA	NOVEMBER 8	DALLAS
JULY 10	CHICAGO	DECEMBER 6	ATLANTA
AUGUST 14	SAN FRANCISCO		

SEMINAR DETAILS WILL BE PROVIDED WITH YOUR RESERVATION

☐ ENROLL ME IN _____ (CITY)

☐ ENCLOSED IS MY CHECK FOR $195.00

☐ BILL ME (ENCLOSE BUSINESS CARD)

COMPUTER POWER SYSTEMS CORP.

P.O. BOX 6848, CARSON, CA 90749
213/515-9666 X 237 R. MILLER

NOTICE: PAYMENT IS DUE 10 DAYS PRIOR TO EACH SESSION

CHANGING OUR NAME WAS A STICKY BUSINESS.

After 14 years as Intertel, it wasn't the easiest thing to do. Sure there were the obvious problems; like licking 19,453 labels so we could show off our fancy new logo. But we also found that Intertel was more than just a name to the hundreds of companies that depend on our network command center systems and diagnostic modems for high-availability data communications. It was a constant reminder to them of our commitment to providing the products, support, and services they need to keep pace with the ever increasing size and complexity of their private line networks.

However, we had to face the fact that our old name described only a part of what our current products can do and what the systems we are developing will offer in the future. We decided that changing our name would be an important first step in linking our past accomplishments with future networking needs.

Now, when you think of controlling, managing and measuring the performance of large networks, remember what we did as Intertel. When you need to assure fault-tolerant operation of networks with both analog and digital links, remember Intertel did it first. But when you're ready to find out more about our networking capabilities, please think of them as INFINET.

INFINET
Six Shattuck Road
Andover, MA 01810
(617) 681-0600

NEWS

University users developing own applications

ALBANY, N.Y. — At many large computer installations — even those with 24-hour, seven-day operations — there often is not enough time to develop application programs for individual users or small groups.

But such applications are often vital to middle-line managers and the performance of their departments. Lacking them, those departments have been scurrying to microcomputers to satisfy their processing needs.

The State University of New York here had just that problem. The university had plenty of room on its Sperry Corp. 1100 series mainframe processors. The 10-person DP staff had a "hard time getting mandated things done," noted Pat Panzl, assistant director for Administrative Systems Development, and definitely not enough DP personnel to develop applications for everyone.

The solution, Panzl said, was teaching users to develop their own applications using Sperry's Mapper application development package linked to an 1100/83 mainframe. There are currently 25 to 30 Mapper terminals on campus and 15 Mapper applications in place. While a total of 400 computer terminals are in operation on the campus, most were installed before Mapper came on the scene in 1981. Those terminals cannot be adapted to use the Mapper program, Panzl said.

Of the 15 Mapper applications, only one would have been given any priority by the systems development staff. That program, which links financial aid to draft registration, is a government-mandated application.

The university is using Mapper as an alternative to microcomputers. "Almost any office would be better served with Mapper when accessing institutional data than with any personal computer," said Barbara Wolfe, associate vice-president for Computing Services.

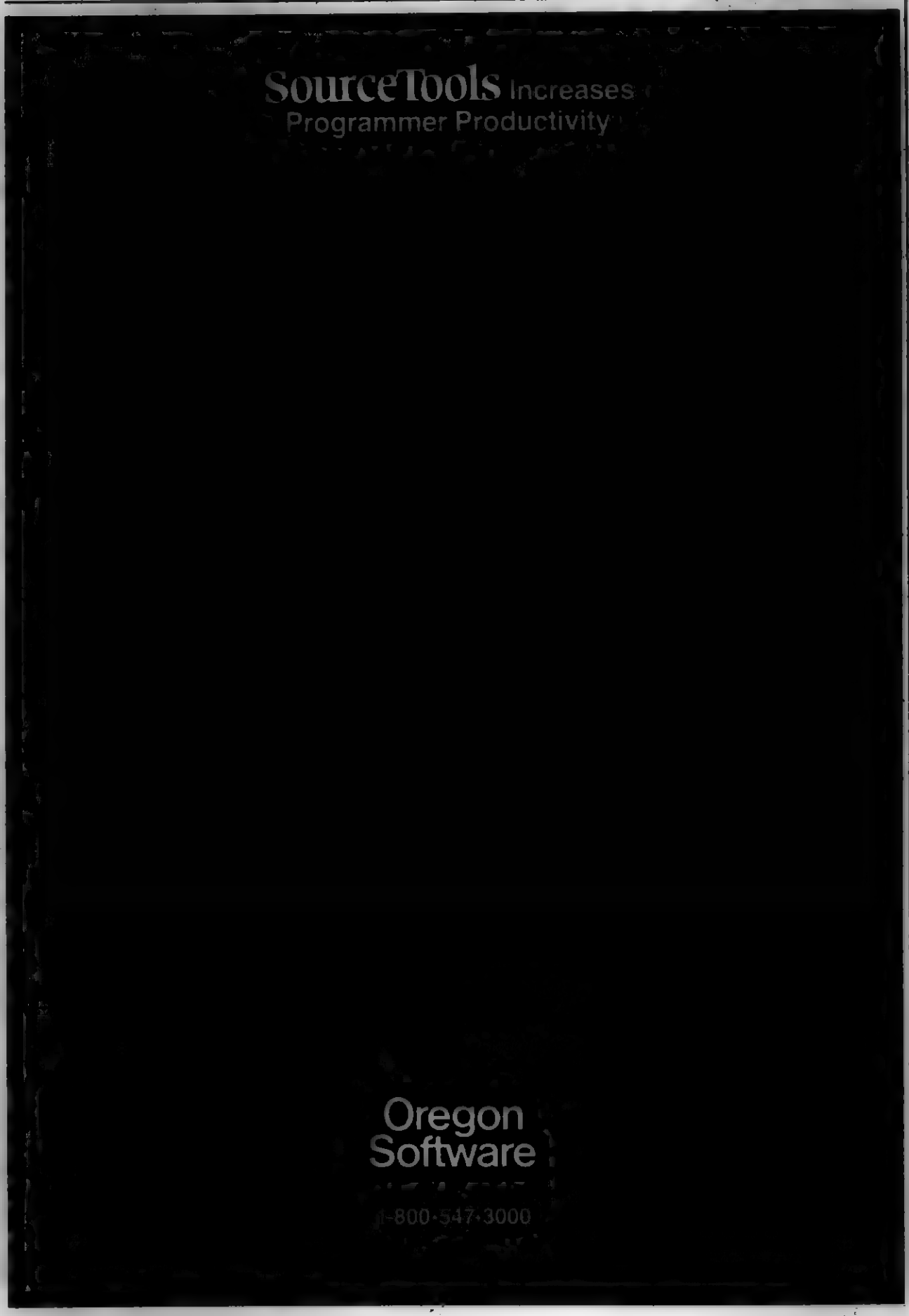
As evidence, she cites an application for scheduling students to counselors. With a microcomputer, the administrator would have to key in information gathered during student registration. The Mapper package, on the other hand, enables the user to access the main computer data base where the student information is stored. The administrator can then manipulate the data to obtain the desired results without duplicate data entry or synchronization problems.

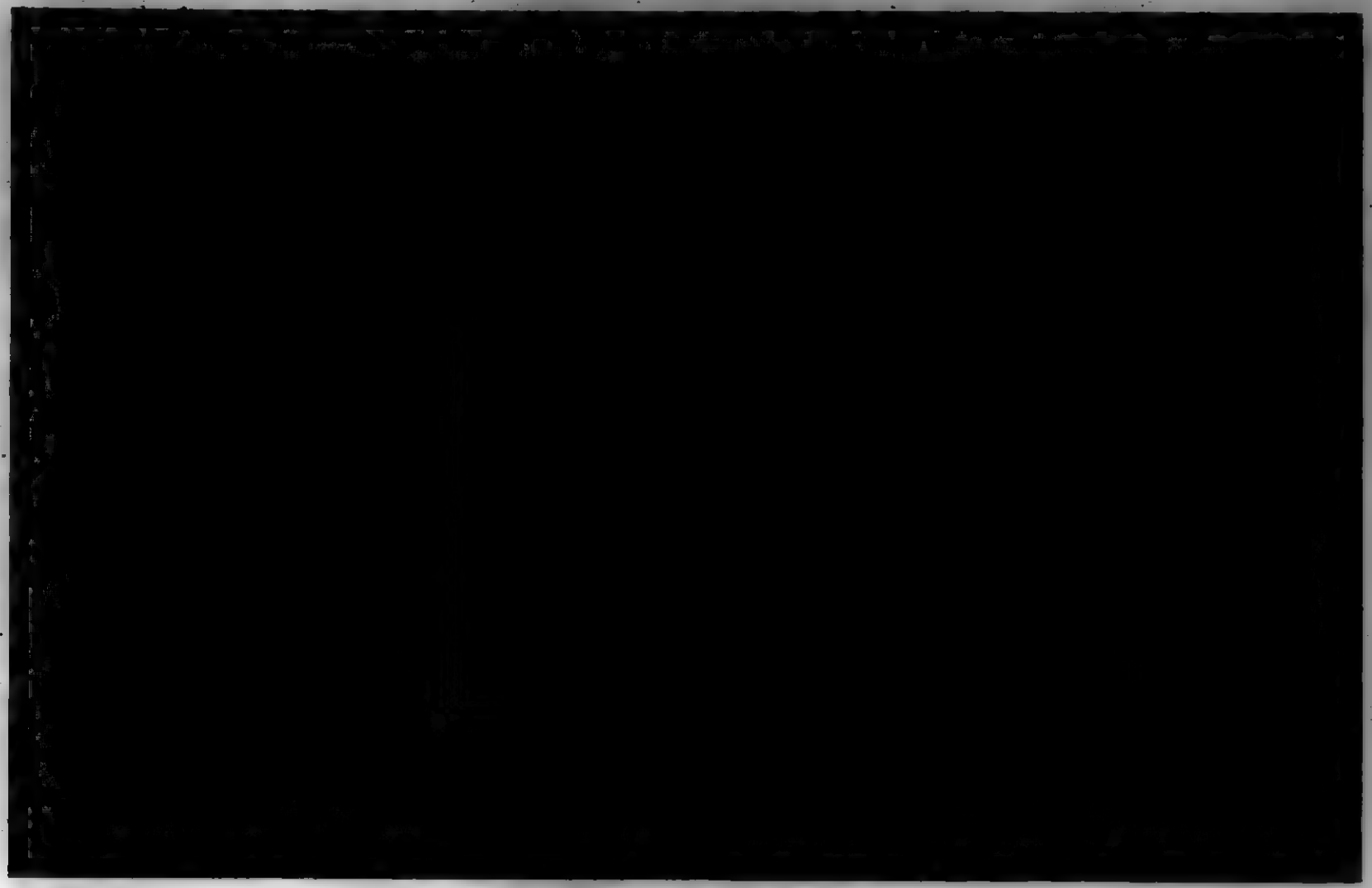
"The user can play with data," noted Stephen Murphy, data base manager and coordinator. Mapper was "designed as a one-way funnel from the data base, allowing the user to extract from the master file only and input to his or her own system." Murphy said that, unless otherwise authorized, a Mapper user cannot enter or delete information from the data base.

To encourage direct computer use by administrators, an orientation program to introduce computer usage was conducted. A demonstration of Mapper was included. This orientation occurred during the summer of 1982.

"Our objective was to build confidence to deal with the computer," recalled Carole Warren, manager of Application Support, whose job is to train users and, with Murphy, help them get their applications up and running. "They teach themselves," Warren said of users.

One such user is Henry Mau. Mau is the associate for University Financial Analysis and is in charge of monitoring a budget of some $70 million, of which 75% is allocated for salaries. "I had a general idea of how much each department spends on salaries, but I wanted to make it more responsive to individual transactions," Mau said.





The personal computer courted the workplace with endless promises.

A new era of problems was delivered instead. As MIS manager, you have observed: too many different brands of computers. Too many types of software. Software that's difficult to learn, limited and inconsistent in quality, and poorly backed up by manufacturers.

More troubling: there has been no way to control the information flow. No way to make these machines communicate with one another, or with the company's mainframe. No way to customize software to meet specific company needs.

Microcomputer chaos is likely to persist unless someone can bring in an effective system for managing them all, and introduce a measure of standardization.

That logical someone is you.

The logical solution is Visi On.™

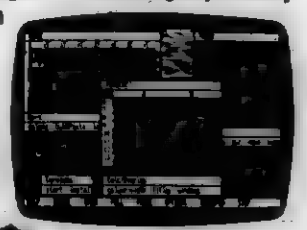
What's good for the user is even better for the MIS Department.

Visi On is not a new computer.

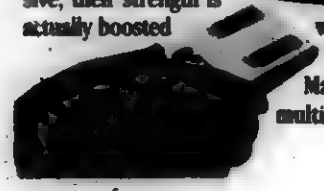
It is not a new computer program.

Visi On is a completely new generation of business software that harnesses the power of the personal computer; a microcomputer applications manager designed to work in tandem with the operating system of the pc, and integrate any number of application programs.

Initially, four applications are available: Visi On Word,™ Visi On Calc,™ Visi On Graph,™ and Visi On Query.™ Totally redefined for the Visi On environment, each application includes features and functions that have dramatically improved performance.



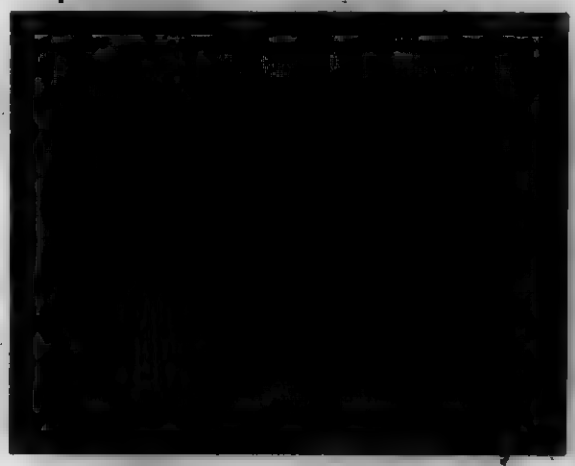
Even more impressive, their strength is actually boosted when these applications are *combined.*



Making maximum use of multiple electronic windows and a mouse, Visi On instantly transfers data between applications, demonstrating depth of integration to an unprecedented degree. Instead of doing just one job at a time, the user may move from project to project, backed up always by the full power of the machine.

And it's all remarkably simple. Visi On provides a single, sensible interface that makes every application easy to learn, and even easier to use.

There. Already it's getting quieter in your department...



ENTER VISI ON. Suddenly, every personal computer in your company becomes everything it ever promised to be.

Indeed, for MIS managers as well as for users, Visi On is a virtually instantaneous remedy for the problems experienced with personal computers.

Instantaneous? Yes. The system will work on most of the computers already in place. (Which also makes Visi On your simple-to-implement solution for standardizing systems and applications.)

On the off-chance a problem should befall a user, no problem. Each Visi On application program comes with the equivalent of 100 pages of Help text users may call on when there is a question. The more help the user gets from Visi On, the fewer the calls for help that come into your department.

The Visi On system also provides the basis for a complete package of communications programs. With applications software soon available, Visi On will allow personal computers to emulate both asynchronous and synchronous terminals.

And, Visi On will allow integration into local networks.

And more. In fact, it's endless.

Visi On is open-ended. New applications, capabilities and peripherals will be added. For developers of custom applications, a Visi On Toolkit™ is available. Want more information? Write Robert Fischer, VisiCorp, 2895 Zanker Road, San Jose, CA 95134.

And with all of the above, Visi On introduces a new generation of software support. It's the most comprehensive program ever executed for microsoftware. Backed up by VisiCorp,™ the number one name in business software.

Sit back. Be pleased with yourself. And if you're far too modest for that, simply rest assured that legions of formerly disgruntled users now have you to thank for an efficient, productive new partnership with their personal computers.

Your management thanks you, too.

You were, after all, the one who recommended Visi On.

VISI ON™

Visi On is now available for the IBM® Personal Computer XT, the Wang® Professional Computer, the Honeywell® Series 7000, the TI® Professional Computer, and the Compaq™ Plus.
Visi On, Visi On Word, Visi On Calc, Visi On Graph, Visi On Query and VisiCorp are all registered trademarks of VisiCorp.
© 1983 VisiCorp.

Data base helps glassmaker peer into future

TOLEDO, Ohio — An online data base of economic and marketing information not only helped a major glassmaker avoid costly system development, it also currently highlights new sales opportunities nationwide.

From its headquarters here, LOF Glass, one of three divisions of the Libbey-Owen-Ford Co., directs five regional marketing operations. One of the keys to success for those marketing teams, according to Nate Condit, director of marketing research and planning, is to identify prime markets for LOF Glass products.

In the late 1970s, Condit said, glass manufacturing companies began to experience higher costs in moving glass from the factory to the market. In addition, escalating interest rates were having a depressing effect on the construction industry, which is a major market for the consumption of glass products.

Today the challenge for glass manufacturers, according to Condit, is to identify and precisely isolate new markets — to avoid the "scatter-gun" approach to marketing.

Condit and his staff first considered developing an extensive data base of national economic and demographic information, as well as models that could forecast patterns of growth and economic concentration. But it soon became clear that the project's costs were prohibitive.

"To develop in-house what we needed would have been quite complicated," he explained. "The staff it takes to establish and maintain such a project represents a heavy budget item. According to our estimates, new wage and benefit costs alone could easily have approached six figures a year.

"We also had to consider the difficulty of building an adequate data base, constructing accurate models and having time to test them. We also would have had to make provisions for keeping the data base up to date."

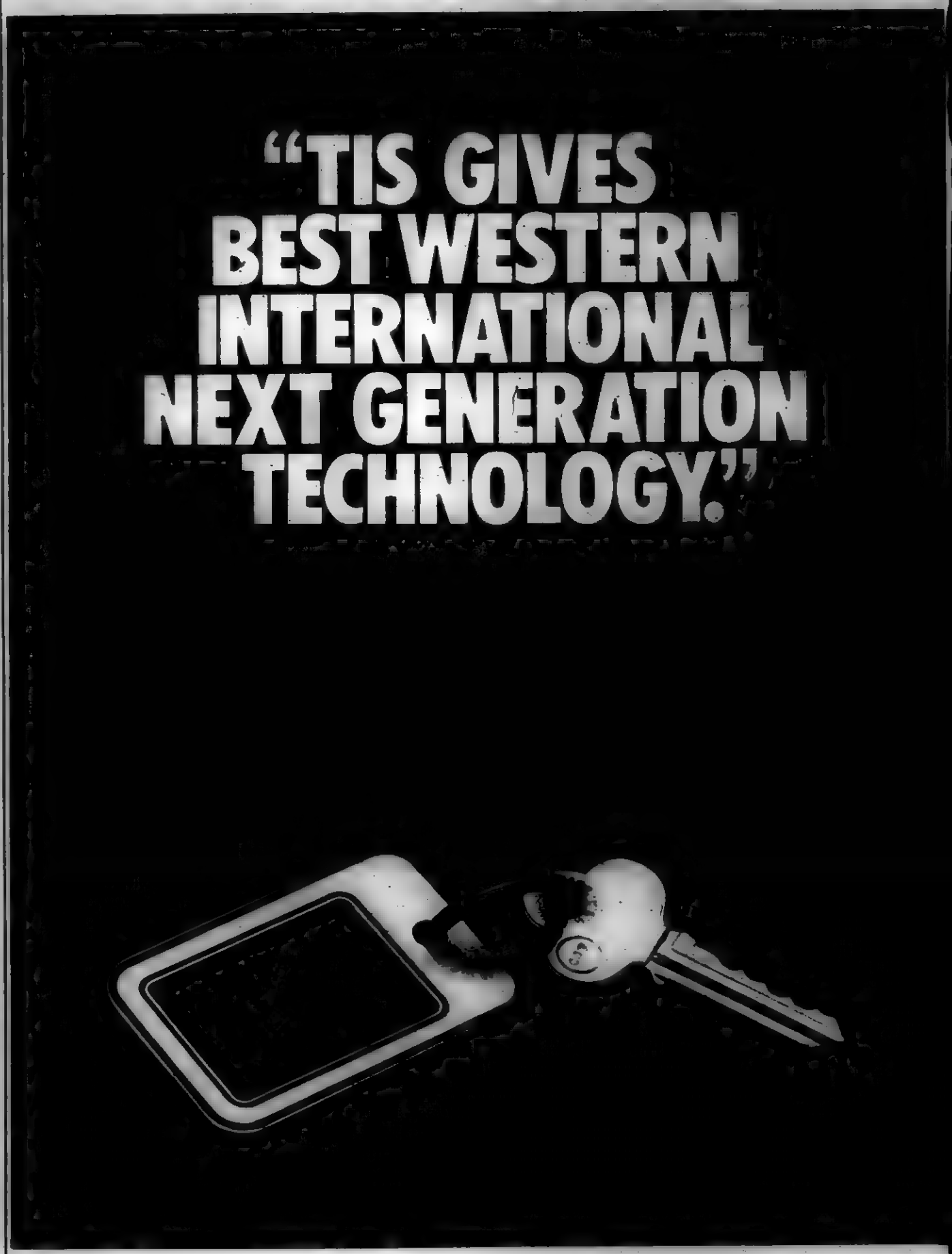
As a result, the marketing team began to look for an outside service that could provide the data and forecasting capabilities LOF Glass needed. What the team found, Condit said, was that most firms offered expensive, overly detailed models that provided more information than the firm needed.

After an extensive search, Condit finally discovered a service that offered the data and modeling techniques he really wanted: Control Data Corp. Business Information Services' X/Region Service.

The X/Region Service, according to Condit, is an online data base that provides economic and demographic data by geographic areas. The service contains data for all 50 states and the District of Columbia, 266 Standard Metropolitan Statistical Areas and 183 Bureaus of Economic Analysis. The data base contains historical data going back to 1970 across eight statistical categories, and the forecasted data extends through 1990.

Utilizing the X/Region Service, LOF Glass is able to track commercial and residential construction in pinpointed areas. The service aids in uncovering pockets of economic concentration in those regions where population shifts could be tipping off a new boom in construction. Accessing the service through a terminal in the marketing department, researchers can spot specific trends that may not be obvious, but which can have a major impact on regional and national sales.

"We needed accurate projections on what the future markets are going to be in given areas," Condit said. "Armed with this information, the company uses analyses and projections to develop new strategic marketing campaigns."



NEWS

Publisher trims costs with move on-line

INDIANAPOLIS — Converting from an IBM-based batch processing system to an on-line system that could utilize specialized software for the publishing industry has reduced personnel and costs for a DP center here that manages various activities for four of the seven companies that comprise a major publishing conglomerate.

Until the new system was installed early in 1983, the central data processing center for ITT Publishing was overwhelmed by a mound of batch processing tasks requiring a library of 200 in-house programs with no standardization.

ITT Publishing's seven companies, located in six major cities, publish material that ranges from computer books to *The Joy of Cooking*. The centralized DP center here manages order processing, inventory, sales and accounting activities for four of the companies: Bobbs-Merrill Co. of Indianapolis and New York; R&R/Newkirk, Indianapolis; Marquis Who's Who, Inc., Chicago; and Howard W. Sams & Co., Inc., Indianapolis.

The DP center here previously employed an IBM 4241 with 40 IBM 3270 terminals. Forty-nine data processing personnel performed tedious daily inputting and batch processing of more than 3,000 pieces of written data from more than 150 users. "Because software applicable to the publishing industry was not available for the IBM equipment, our programmers wrote more than 200 programs for the various operations," DP manager Barbara Shrall recently recalled. "This made standardization impossible and broad modifications difficult."

The IBM system could have been expanded if the company had bought enough 3270 terminals to put all users on-line. But the projected costs for expanding and maintaining the existing system exceeded the industry average, and software availability would still be a problem.

Through a Phoenix software house, Computing Information Systems, Inc. (CIS), ITT Publishing purchased Ultimate Corp.'s packaged Honeywell, Inc. hardware and CIS software.

ITT Publishing has saved $1 million, half of its annual data processing operating costs, during the first year of operation, according to Carl Haynes, vice-president and group comptroller. He said half the savings came in personnel costs and the rest came from annual hardware, software and maintenance fees that totaled $750,000. Purchase of the Ultimate/CIS system, including depreciation benefits, costs about $225,000 to $250,000 a year, he added.

The central DP department was reorganized so that nine people now concentrate on program enhancements and on supervising the system's operation rather than on tedious data entry tasks. Most of the personnel who were employed with the old system were data entry workers, according to Shrall.

With the new system, approximately 115 users are on-line and can input and access data from any department in any of the four companies in the system. The companies outside of Indianapolis communicate with the central data processing center through 1200 bit/sec dedicated and dial-up leased lines.

The Ultimate/CIS system, in operation since January 1983, is built around two Honeywell DPS Level 6 processors and the Ultimate version of Pick and Associates, Inc.'s Pick operating system. Each processor has 1M byte of memory, and each runs three 288M-byte disk drives. Peripherals include 115 Ap-

See IIT page 38

TIS

"TIS™ is truly a remarkable software system. With TIS operating at both the Strategic and Tactical levels of our organization, we now have a sophisticated software system capable of evolving as the needs of the company evolve. As far as I'm concerned, TIS is giving Best Western International the kind of next generation technology we need."

—Keith Barlow

Best Western International is the world's largest lodging chain. In the fast-paced lodging business, total control of accurate and timely information is no luxury. It's a vital necessity. For this reason, Best Western demands advanced software that can grow as its needs grow.

The TIS Solution

After a careful evaluation of several systems, Best Western chose TIS—Cincom's powerfully integrated data base management and application development system and winner of the Associated Information Managers' (AIM) Outstanding Information Technology Award.

TIS was brought up quickly. It was first used in a Strategic capacity to implement corporate payroll and personnel applications. Now, TIS is being used in both Strategic and Tactical operations throughout Best Western International to develop applications for financial, marketing, supply and other functions. And, because the TIS Intelligent Query language provides easy access to corporate information, end-users are discovering that they can meet their own information needs without the aid of trained programmers.

TIS helped solve Best Western's immediate needs. More importantly, with TIS Best Western International now has a migration path to the future —with little concern for obsolescence.

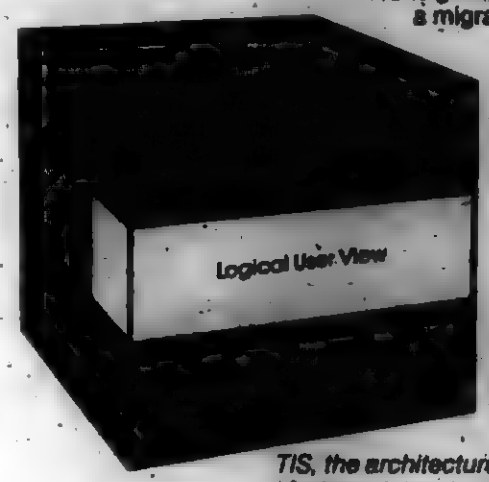
Modern Technology For Modern Needs

TIS is a totally integrated application development and information processing system. Its entirely new architecture is designed to meet a wide range of needs. Designed for complex, high volume data base environments, TIS provides:

- Full in-line integration, so that one system can be used to meet the needs of all users with unprecedented security and control.
- A relational view of data which gives programmers and end-users complete data structure independence.
- A powerful 4th Generation procedural language to serve requirements of both programmers and end-users.
- A new Data Manipulation Language so powerful only four commands are needed to handle even the most complex logical data base processing: GET, INSERT, UPDATE, DELETE.
- An Intelligent Query language to provide instant information to end-users for virtually all ad hoc needs.
- A new DBMS component that provides unique data structuring capabilities with high performance.

Check Into TIS For Your Company's Needs

TIS is giving Best Western International a migration path to the future. Isn't it time to find out what TIS can mean to the future of your company? For more information, or for answers to your specific questions, contact our Marketing Services Department, 2300 Montana Avenue, Cincinnati, Ohio 45211.



800-543-3010

(In Ohio: 513-661-6000)
(In Canada: 416-279-4220)

TIS, the architecture of the next generation of integrated data base technology.

Cincom Systems

Excellence in Software Technology.

TIS is a trademark of Cincom Systems, Inc.

ITT from page 37

plied Digital Data Systems, Inc. Viewpoint terminals and line-quality and matrix printers from Printronix, Inc., Data Products Corp. and Texas Instruments, Inc.

The customized CIS software includes applications for order processing; accounts receivable; inventory management; general ledger; royalties management; sales analysis; prospective customer list management; and subscription management.

"While our old system did provide centralized information, batch processing and data entry were slow and often delayed updating information," Shrall said. One of the major complaints Haynes received from managers concerned the department's very slow response in making program changes.

In June 1982, ITT Publishing signed a $750,000 contract with CIS for two Ultimate computers and customized CIS publishing software.

"We conducted the search on the assumption that reliable, high-quality software would dictate the use of equally reliable hardware," Haynes said.

The system's features include a relational data base manager and a dictionary-driven data retrieval language, Recall, that allows for easy data access. The operating system organizes files relationally so that data can be retrieved quickly and easily through random-access methods and includes other features such as a report writer, Shrall said.

"The major modification involved creating a menu screen that would accommodate the subsidiary companies' various ways of conducting order processing, inventory, sales managing and accounting," Shrall said. Distinct ways of operating similar departments in different companies are inevitable, and the system allows each company a choice by menu. "However, applications are standardized, and if broad modifications are necessary, it is a simple procedure," she said.

Little time was wasted on the conversion process. "Although the book says the two systems must be run in parallel testing and processing for some time, we had enough confidence in the Ultimate/CIS system through our own preliminary testing that we decided to bring up the new system as we turned off the IBM. We were successful, and there have not been any major problems with the system to date," Haynes said.

"The agreement provided the company's programmers with CIS source code so that we could further build on the software as our needs grew," Shrall said. Major enhancements to the CIS software since installation include the development of software for sales analysis; subscription and prospective customer management; accounts payable; cost accounting; and the building of a data base for information on semiconductor parts.

In addition, ITT Publishing purchased Ultimate's new 5X High Performance Processor enhancement to handle instruction execution, reduce the work load of the Honeywell central processors and increase the internal processing speed by a factor of five. Soon ITT users also will receive the Ultimate cache memory board that contains 4K bytes of high-speed memory and reportedly will increase system performance sevenfold.

Fast service, unlimited equipment selection, no red tape.

That's the Telecom Plus Difference.

And one of the reasons why we're one of the largest private telecommunications companies in the country.

Fast Service. Our computer-based service system speeds our response to your call. In an emergency we'll have a local service team at your office in less than an hour...

That's a promise!

Unlimited Equipment Selection. Because we don't manufacture, we're free to select the most suitable equipment for your business needs. With Telecom Plus you're not stuck with one company's products.

See the Telecom Plus Difference. Call us for a free survey of your telecommunications needs. To reach the Telecom Plus office in your area call Toll free 800-TEL-PLUS. Or send us your business card. Telecom Plus, 48-40 34th St. Long Island City, N.Y. 11101. Att: Marketing Dept. A.

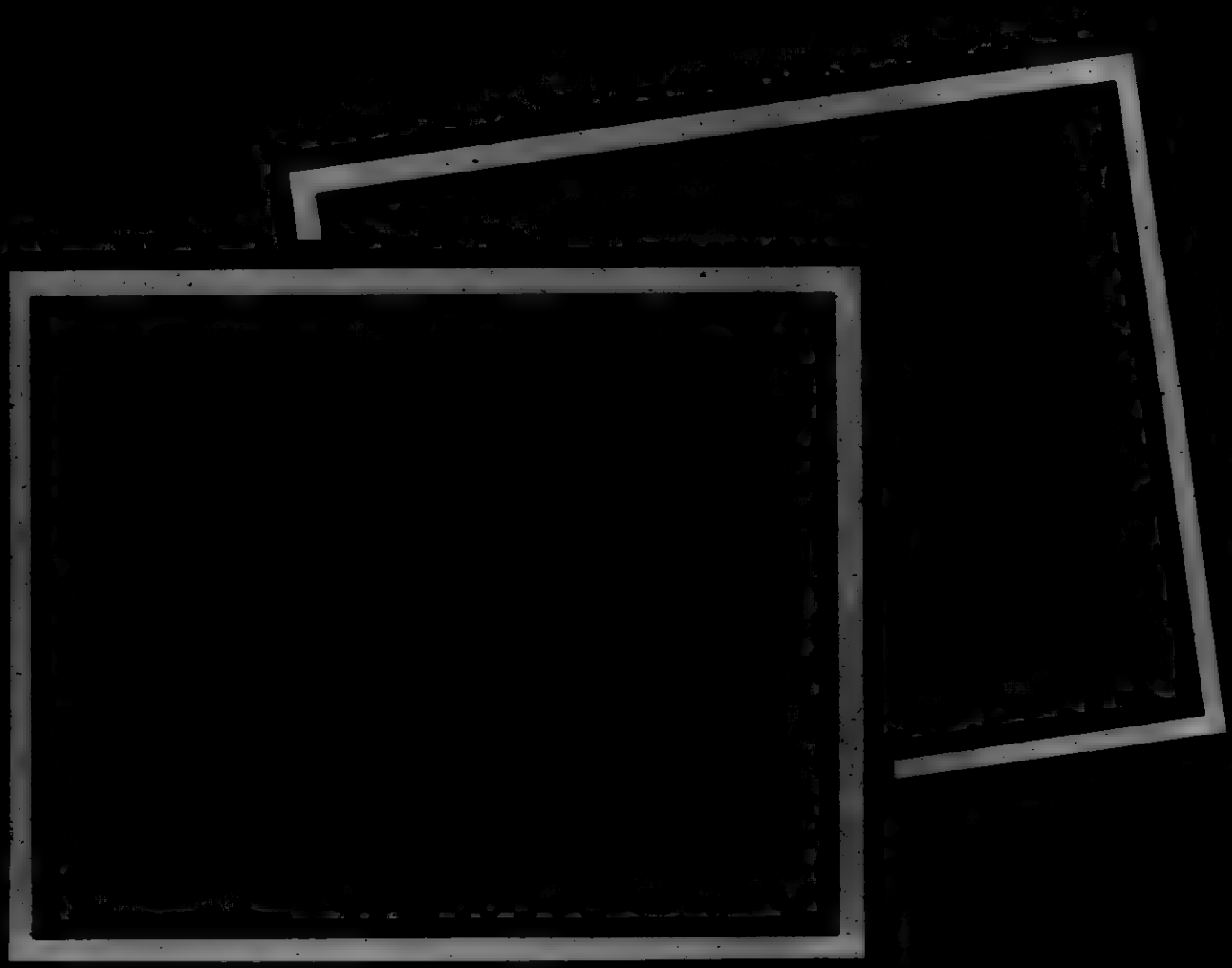
TELECOM PLUS™

Usus to hold conference April 13-15

SAN DIEGO — The UCSD Pascal System User's Society (Usus) semiannual national meeting will be held April 13-15 at the Hyatt Hotel at the Oakland International Airport.

Keynote speaker Susan Nycum, a lawyer specializing in high-technology issues, will discuss the legal issues of software protection. The meeting will also feature two tutorials (free to the public): "The p-System — How to Use it Better" and "Introduction to UCSD Pascal."

Registration prior to March 30 costs $25; registration at the door costs $35. Further information is available from Usus, P.O. Box 1148, La Jolla, Calif. 92038.



NEWS

Utility's DBMS builds modeling data base

ATLANTA — A major public utility here is using a relational data base management system (DBMS) to build a modeling data base that is shared by engineers, systems analysts and planners throughout the company.

Southern Company Services, Inc. is responsible for all major power plant modeling activities at four subsidiary companies: Alabama Power Co., Georgia Power Co., Gulf Power Co. and Mississippi Power Co.

James Dow, manager of information resources strategic planning for Southern Company Services, directed the development of a neutral — application-independent — structural modeling data base on the basis of criteria outlined by an in-house project team. "The initial concept was to identify and implement a relational DBMS which would allow us to approach plant modeling on a corporate basis," Dow explained.

"We wanted to create a data base environment allowing engineers and others to extract subsets from the data base and manipulate those files in a personal data management environment."

Dow's DP organization operates five Amdahl Corp. 470V/7 and 470V/8 mainframes interfaced to a series of IBM Model 4341s running under VM/CMS. In addition, three Honeywell, Inc. DPS 7 processors under Gcos and two Honeywell DPS/8 processors under Multics are linked to the IBM systems through a Honeywell-developed Multics-to-IBM link.

The firm also utilizes Calma Co.'s Dimension III and Applicon, Inc.'s Model 875 computer-aided design (CAD) workstations.

Relational DBMS chosen

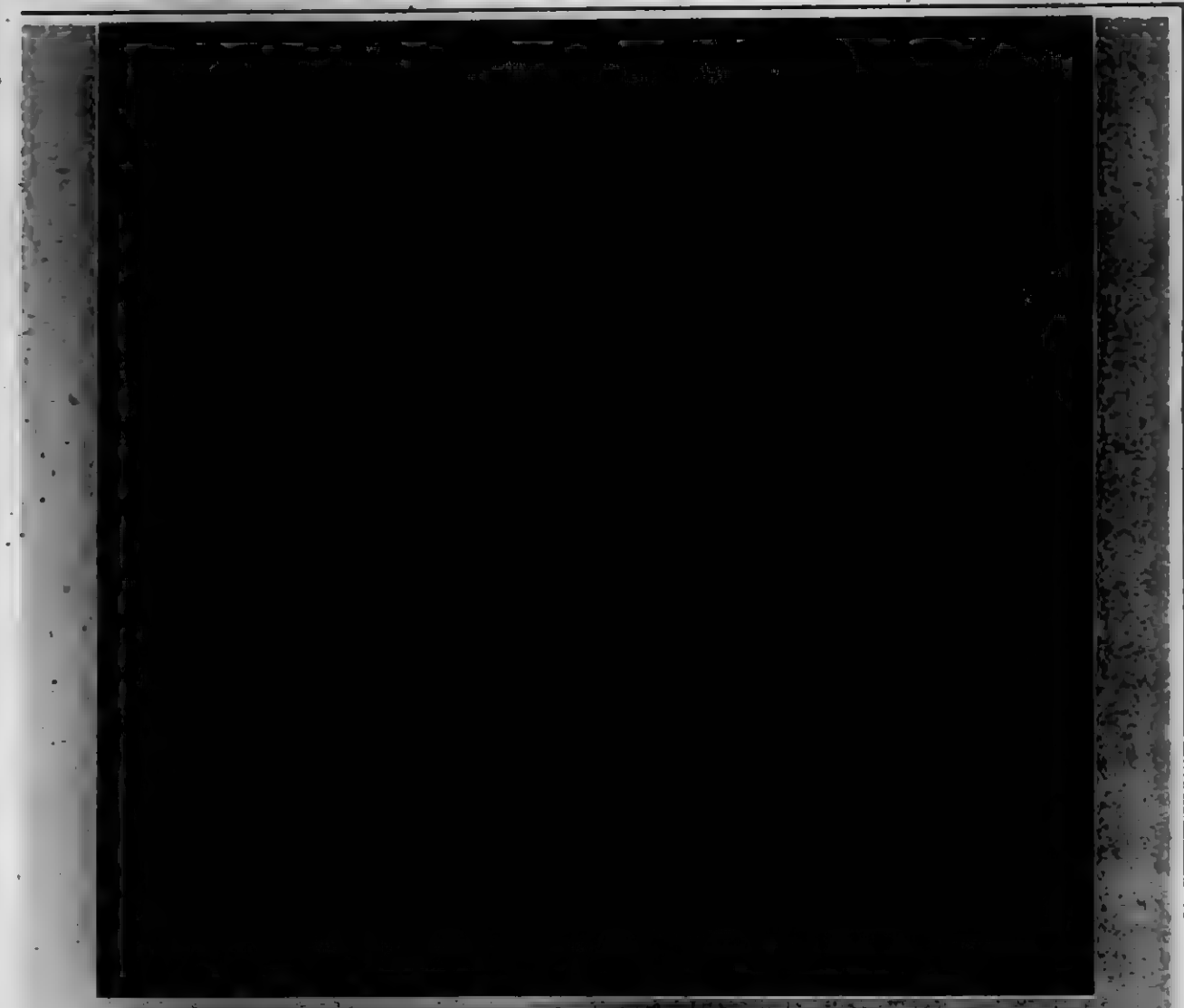
After careful review, Southern Company Services chose Boeing Computer Services Co.'s BCS RIM relational DBMS to maintain its structural modeling data base, which is used for finite element modeling such as the design of steel plates and beams. The BCS RIM system, which resides on the IBM processors, works in conjunction with Calma's graphics DBMS, McDonnell-Douglas Automation Co.'s Structural Design Language (Strudl) system and Sperry Corp.'s Graphics Oriented Finite Element Modeling System (Gifts) software.

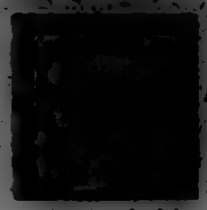
According to Dow, BCS RIM gives engineers the ability to maintain multiple copies of a model subset in a personal data base, on either a microcomputer or a terminal in a Honeywell time-sharing or IBM VM/CMS environment. The model subset copies can support multiple and perhaps conflicting design options under consideration. Once the design alternatives are analyzed, the best design is selected and posted back to the shared plant modeling data base.

"The process involves data capture and maintenance using our Calma automated drafting system," Dow explained. "We accomplish the data capture operation with Calma, and pass the model to Strudl for analysis on our mainframe computers. We bring the output from Strudl and pass it directly to the RIM neutral structural model for storage and post-processing."

Dow said the project goal was to establish a link between Strudl, which operates on the Amdahl processors, and the firm's various applications systems, including the Calma and Applicon CAD systems and Gifts.

In a typical application, he explained, an engineer might generate design geometry using the Multics-based Gifts software, use it to create a RIM data base, transfer the RIM data base to the Amdahl system, run an application to generate a Strudl input deck and perform analysis.





"The integrity of Formica Corporation is very important to me. When we promise rapid delivery, we return it," reports Gordon Sterling, President. "American Software's Sales Forecasting system helps us keep our promises and maintain a high level of customer service by more effectively managing our inventories. Our investment in American Software's Sales Forecasting system has more than paid for itself... and I look forward to even more savings in the future."

American Software can provide you with proprietary software packages for Sales Forecasting, Purchasing, Inventory Management, and Materials Management. Plus extensive consulting help, and the training you need for successful implementation.

American Software: The Power of The Right Decision.

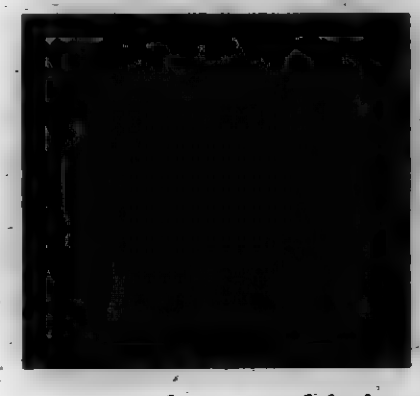
Keeping Formica Corporation On Top

AMERICAN SOFTWARE

443 E. Paces Ferry Rd., Atlanta, GA 30305 (404) 261-4381

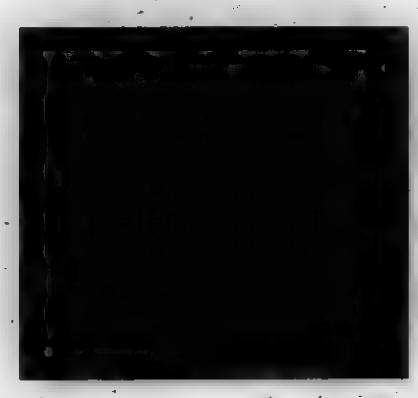
It's just not fair to claim that TEMPLATE® is the best graphics software available. Our competition's already discouraged.

And we like competition. We really do. It's just that it's difficult, if not impossible, to find graphics software as efficient and functional as TEMPLATE. Try as you might. TEMPLATE is the hands-down winner. With true device-independence and intelligence, total graphics functionality for CAD, scientific analysis, seismic work, process control, molecular modelling, and a host of other applications.



In almost any environment, whether it's batch or interactive, 2D or 3D, TEMPLATE wins. Benchmark tests prove it. TEMPLATE, besides being a true 3D graphics package for 32-bit or larger computers, features powerful commands that provide matchless productivity. TEMPLATE makes optimal use of available computer resources, giving you fast, efficient computer graphics program execution. And it supports over 125 graphics devices, from dumb terminals to sophisticated systems.

We also provide on-site installation and training, continuous updates, a regular flow of new device drivers, and ongoing documentation. What's more, we back you up with a telephone hotline so TEMPLATE software specialists can provide help if you need it.



But let's be fair. If you're looking for graphics software, call our competitors first. Find out what they have to say about theirs. Then call us, and find out why TEMPLATE really has no competition.

And why the competition has been so discouraged for so long.

MEGATEK CORPORATION
A UNITED TELECOM COMPANY
Making History out of State-of-the-Art

World Headquarters • 9605 Scranton Road • San Diego, California 92121 • 619/455-5590 • TWX: 910-337-1270
European Headquarters • 34, avenue du Tribunal-Fédéral • CH-1005 Lausanne, Switzerland • Telephone: 41/21/20 70 55 • Telex: 25 037 mega ch

Generator cuts firm's coding time in half

FRESNO, Calif. — Success often creates as many problems as failure. As Paragon Industries, Inc. — a building wholesale and retail firm headquartered here — grew, its automated accounting application became outdated.

The company faced a common dilemma. Designing an accounting package from scratch was expensive, but off-the-shelf packages did not have the features that the company needed.

A program generator solved the dilemma. Paragon could develop its own accounting application but not have to take the time to write all the code from scratch.

Before deciding to buy a program generator, the company looked at a number of packages. "Each package contained bits and pieces of what we needed, but no package met all our needs," according to Sandra Gaines, DP manager.

The reason, she explained, is that most retail outlets measure stock in item quantities; Paragon accounts for its tile by the square foot (or square meter in the case of imports), its grout by the pound and its pipe by the linear foot. Moreover, the accounting system had to calculate three pricing structures — retail, contractor and dealer — as well as discounts for quantity purchases.

In 1982, the company replaced its Alpha Micro, Inc. microcomputer with a microcomputer system from Wicat Systems, Inc., which can support 16 users and has a 474M-byte hard disk. The Alpha microcomputer was unable to handle the growth of Paragon, which had added five stores: four in California and one in Nevada. "Just tracking inventory in six stores would have exhausted our 100M-byte disk capacity," Gaines said.

The company's accounting application was outdated as well. It consisted of several independent modules that required duplicate entries.

Cobol program generator

Paragon's hardware limited its selection of program generators. "We looked at a number of packages, but none ran under Wicat's proprietary MCS operating system," Gaines said. "Bytel Corp. was the only company willing to port its Cobol program generator, Cogen, to that operating system. The vendor worked out the programming specifications and informed us when the migration was finished."

Using Cogen, Paragon coded order entry, accounts receivable and inventory programs in two months. "Without Cogen, coding would have taken at least four months," Gaines claimed. "The program generator did tedious work, such as counting spaces for screen layouts, that no programmer wants to do. Consequently, writing specifications becomes time-consuming, but coding is relatively fast."

Gaines used the generator to produce screen, report and file frameworks, which Paragon customized. "We were using the program generator the morning it arrived," Gaines said. "Applications are menu-driven and easy to use; it takes only 15 minutes to generate a screen module."

Installation problems were minor. "Cogen screens were smaller than our screens," Gaines said. "We had to squeeze our data onto the screen. Bytel personnel told us that a Cogen enhancement should solve this problem. Another problem was function-key syntax. Certain keys have unique uses that were difficult to remember. Templates helped solve this problem," she explained.

While Paragon's accounting needs are not common, they are not unique either, and some of Paragon's customers expressed interest in its package.

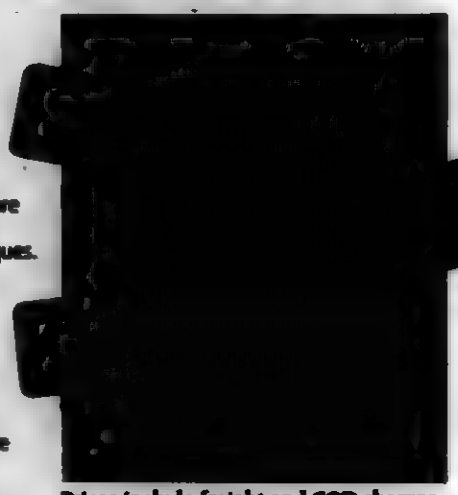
5 Day Delivery!

Paradyne 2,400, 4,800, 9,600 BPS CHALLENGER Modems

Call 1-800-482-3333 and Paradyne will send your modems COD to be delivered at your site, anywhere in the continental U.S., within just 5 days! Paradyne's CHALLENGER Series high performance modems are state-of-the-art technology using advanced signal processing techniques.

Installation is Fast and Easy. You can install these modems yourself! Plug in the modem, follow a push button configuration procedure, attach your DTE connection and the modular jack, connecting the modem to your 4-wire leased phone line. You're ready to go!

High Performance Backed With Paradyne Reliability. All three models operate in either point-to-point or multipoint applications. An optional four-port buffered multiplexer is available for the 4800 and 9600 models. And the Series has a calculated mean time between failure of more than four years.



Prices include freight and COD charges.

State-Of-The-Art VLSI Technology. Front panel soft strapping configuration is easy and each modem has automatic, adaptive equalization at all speeds, including 2,400 bps.

If You Need Modems NOW, Order Direct From The Manufacturer — Call 1-800-482-3333 or mail in your order. In Florida please call 813-530-2516. Delivery time and price discounts for large quantities available on request. Multiplexer option available at additional cost. Dealer inquiries invited. The new CHALLENGER Series...a challenge to the modem industry offering quick delivery at prices below what you normally would expect to pay...only from Paradyne.

1,200 BPS Modem. Also available for 5 day delivery is the DTU 1200D, a 212A compatible full duplex dial modem. This 1,200/300-bps modem features automatic dialing, CRT prompts and automatic test capabilities and sells for $655 including freight and COD charges.

paradyne

Paradyne Corporation P.O. Box 1347 8550 Ulmerton Road, Largo, FL 33540

WHEN IT COMES TO SOLVING BUSINESS PROBLEMS, ONE COMPANY IS A MILLENNIUM AHEAD.

Although we'd all like our business problems to fit into neat little compartments, they never seem to want to go there. Take a simple general ledger variance in your New York office. For some strange reason, it connects to a large office supplies transaction in London, which really turns out to be an erroneous distribution of a capital equipment expenditure to Peoria through your accounts payable system.

A business person can only unravel such mysteries by opening his or her mind and following the trail wherever it leads. Using business software to help.

But is your software giving you the help you really need?

Several years ago, a team of McCormack & Dodge researchers uncovered a remarkable paradox:

Business problems don't fit into compartments. Yet even the most sophisticated software packages operate on the principle of compartmentalization. In the very same vendor product line, you find general ledger packages designed one way, accounts payable another, fixed assets yet another. In actual use, these separate designs become separate walls. Barriers to problem-solving.

Even though your mind wants to move freely from one system to another, roadblocks hold you back.

Because McCormack & Dodge researchers identified this paradox first, we are years ahead of the industry in overcoming it. Our Millennium series is designed and built, from the ground up, as a genuinely borderless product line. A true family of systems in which the whole works as smoothly as any part, making the most efficient use of all your data processing resources.

With Millennium, and only with Millennium, a business person asking a question in one system can instantly enter a correction in another, seek an answer in a third, update a fourth—and move with total freedom through the entire vast information universe.

When it comes to solving business problems, McCormack & Dodge is a Millennium ahead. Shouldn't you be too?

WHEN YOU THINK ABOUT TOMORROW, MILLENNIUM MAKES SENSE TODAY.

McCormack & Dodge

a company of
The Dun & Bradstreet Corporation

McCormack and Dodge Corporation, 1225 Worcester Road, Natick, MA 01760.
Sales and support offices throughout North and South America, Europe, Asia, Australia and Africa. 800-343-0325. Telex: 710-325-0329

NEWS

Conference to focus on bypassing access charges

CRYSTAL CITY, Va. — A conference and exhibition for telecommunications professionals titled "Bypassing Access Charges" will take place Feb. 28-29 at the Hyatt Regency Hotel here.

The conference will focus on "the timing and impact of the bypass options available today as the only challenge to unfair or 'loaded' access charges," according to conference sponsor Telestrategies, Inc.

Mark S. Fowler, chairman of the Federal Communications Commission, will discuss "New Telecommunications Services and Local Telephone Bypass: The FCC Perspective," as the featured speaker at the Feb. 28 luncheon.

Twenty other speakers from private industry and government will address a variety of telecommunications topics.

The exhibition will feature such technology and services as private, high-speed, digital microwave; satellite transmission; two-way CATV; fiber optics; digital termination systems; and cellular, mobile radio telephone.

A day-long, preconference seminar on "Applying Bypass Technologies to Reduce Access Charges" will be conducted Feb. 27 by Dr. Jerome Lucas, president of Telestrategies.

Registration for the preconference seminar is $495. The two-day conference costs $795. Registration for the seminar and conference costs $1,095. Group discounts are available.

More information is available from Telestrategies through P.O. Box 1218, McLean, Va. 22101.

Cincom meet to explore new tech

CINCINNATI — "Keeping Your Organization on the Leading Edge of Software Technology" is the theme of Cincom Systems, Inc.'s Technical User Conference to be held here March 4-8. The conference will feature presentations by Cincom personnel, introduction of new products and more than 35 classes.

Advanced class offerings will focus on the latest developments in major Cincom products including TIS, Ultra, Manufacturing Resource Planning System and Mantis.

The cost of the conference is $825 per person. Cincom is located at 2300 Montana Ave., Cincinnati, Ohio 45211.

IDC slates briefings in six cities

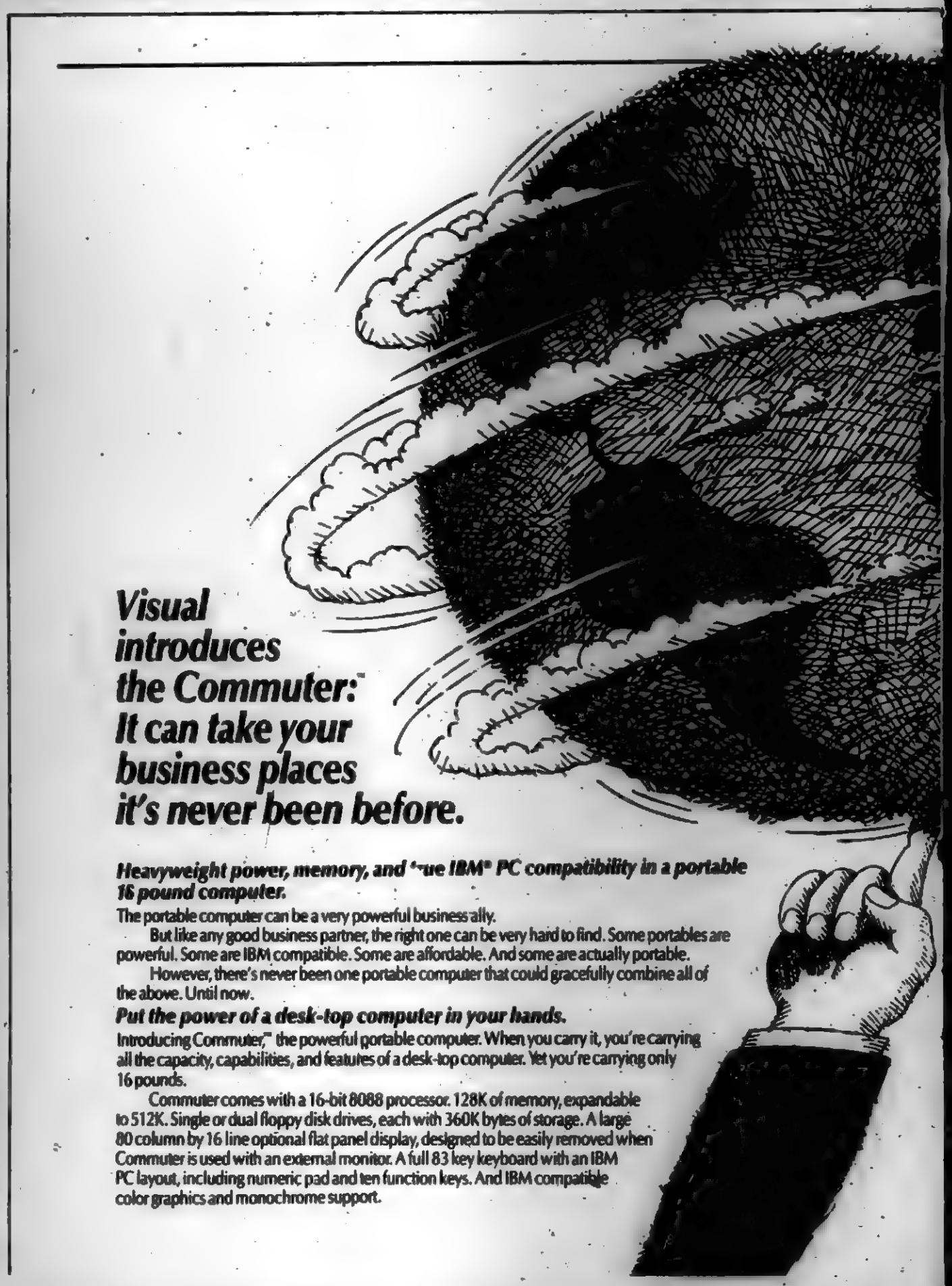
FRAMINGHAM, Mass. — International Data Corp.'s (IDC) 19th annual one-day Information Industry Briefing Session will focus on integrating microcomputers with mainframes when it is held in six cities in early March.

Scheduled topics include a technology update for 1984 and how users perceive micro-to-mainframe connections.

The seminar is scheduled March 2 at Boston's Copley Plaza Hotel; March 5 at the Crystal City Hyatt Regency in Washington, D.C.; March 7 at Chicago's O'Hare Hyatt Regency; March 9 at the Lincoln-Radisson in Dallas; March 12 at the Los Angeles Airport Hyatt; and March 14 at the Red Lion Inn in San Jose, Calif.

The briefing session costs $475 for one person and $395 for each additional attendee from a company.

IDC is located at Five Speen St., Framingham, Mass. 01701.



Visual introduces the Commuter:™ It can take your business places it's never been before.

Heavyweight power, memory, and true IBM® PC compatibility in a portable 16 pound computer.

The portable computer can be a very powerful business ally.

But like any good business partner, the right one can be very hard to find. Some portables are powerful. Some are IBM compatible. Some are affordable. And some are actually portable.

However, there's never been one portable computer that could gracefully combine all of the above. Until now.

Put the power of a desk-top computer in your hands.

Introducing Commuter,™ the powerful portable computer. When you carry it, you're carrying all the capacity, capabilities, and features of a desk-top computer. Yet you're carrying only 16 pounds.

Commuter comes with a 16-bit 8088 processor. 128K of memory, expandable to 512K. Single or dual floppy disk drives, each with 360K bytes of storage. A large 80 column by 16 line optional flat panel display, designed to be easily removed when Commuter is used with an external monitor. A full 83 key keyboard with an IBM PC layout, including numeric pad and ten function keys. And IBM compatible color graphics and monochrome support.

Ross Gear shifts to automatic with CAD

LEBANON, Tenn. — A computer-aided design (CAD) system is helping to slash the time spent in designing tooling for manufacturing trucks at the Ross Gear Division of TRW, Inc. here.

Ross Gear produces steering gears at three locations for such heavy-duty truck customers as Ford Motor Co., General Motors Corp., Mack Trucks, Inc. and International Harvester Co. Prior to 1982, its process planning and tool design work was not automated, although the company said it had been considering doing so for a number of years.

Ross Gear first began to consider automating its tooling design work in 1979 in hopes of increasing productivity and improving the quality of work, according to Michael Russell, manager of manufacturing engineering at the plant here. "We were looking for something that would integrate into the total product design in every area and that would give a common data base that could be accessed simultaneously by the product engineer, the process engineer and the tool designer," he added.

After examining systems from a half-dozen major corporations offering computer graphics systems, Ross Gear chose IBM's Computer Augmented Design and Manufacturing (Cadam) system. The integrated graphics system enables users to draw geometric designs on a display terminal; the drawings can be stored and retrieved and used in manufacture of the product.

[illegible]

Cadam was chosen in part because it was one of two systems at the time that could link up all the plants and the headquarters under one mainframe, according to John Shaw, division chief engineer for technical services at the Lafayette, Ind., headquarters. "Since they both used IBM hardware, we decided to go fully IBM and chose its Cadam," Shaw said.

The system, installed over a six-month period in 1982, includes a 4331 mainframe, three 3258 and six 3256 controllers and 12 Model 3251 monochrome graphics workstations. Because of the system, product quality has improved significantly, Russell said, explaining that engineers can calculate the manufacturing tolerances of moving parts better than they could by hand. Specifically, with the Cadam system, engineers do in minutes, with greater accuracy, detailed design functions that previously took hours to do on a drafting board.

The system here is part of a Cadam network linking three Ross Gear locations. Gears are designed in Lafayette and produced in plants located adjacent to the Lafayette headquarters and in Lebanon and Greeneville, Tenn. The Cadam systems are connected by high-speed telephone lines to the IBM 4331 central computer in Lafayette, which transmits designs to the other locations.

"We can all look at the design displayed on a terminal in each location, make suggestions and know what each other is talking about," Shaw said.

In the year that Ross Gear has used the system, productivity has jumped noticeably. "Engineers can create twice as many new gear designs as before and can redesign three times as many existing gears with the system," Shaw noted.

As an engineering tool, according to designer Jerry Garrett of the Lebanon plant, Cadam is one of the best he's seen. "It's 10 times more accurate than anything you could do by hand," he said. Garrett uses a light pen to draw tool designs directly on the computer's terminal screen.

VISUAL
Visual Computer Incorporated

While Commuter is powerful enough to stand alone, it can really grow on you. Because Commuter also features built-in ports for adding printers, hard disk, communications, external monitors, and your television set. Even a built-in port for adding the IBM expansion chassis.

IBM® PC compatible. And downright sociable.

Many portable computers today call themselves IBM compatible. But before you buy one, ask if it can run IBM PC software. Business programs like Lotus®1-2-3,™ VisiCalc™ or WordPlus-PC.™ Exciting games like Flight Simulator.™ Or educational games from Spinnaker.™ You'd be surprised at the answers. But not with Commuter. In fact, think of it as an IBM PC to go. The IBM PC styled keyboard is only the start. Commuter comes bundled with the MS-DOS™ operating system and GW Basic.™ And at 5¼", Commuter's double-sided double-density diskettes are directly transferable to and from the IBM PC. So you can take advantage of the hundreds of business accounting, word processing, financial planning and other software packages available for the IBM PC. Without having to modify a thing.

At $1,995 and 16 pounds, it's never been easier to pick up a portable computer.

At 15"x18"x3½" with built-in handle and carrying case, the Commuter can go anywhere a briefcase can. It fits easily under an airplane seat. Because it weighs just 16 pounds (about half the weight of other portables in its class), Commuter is very easy to handle. And its $1995 price can save your business a small fortune even before you pick it up.

For more information on Commuter, the portable computer, call us today at 1-800-847-8252 (in Massachusetts, call 1-800-462-5554), or write Visual Computer Incorporated, 135 Maple St., Marlboro, MA 01752. Or visit your local Commuter dealer and weigh the differences for yourself. But hurry. At only 16 pounds and $1995, Commuters are definitely going to be picked up fast.

Commuter. It can take your business places it's never been.

Visual Computer Incorporated is a wholly owned subsidiary of Visual Technology Incorporated. COMMUTER is a trademark of Visual Computer Incorporated. IBM is a registered trademark of International Business Machines Corp. Lotus and 1-2-3 are trademarks of Lotus Development Corp. VisiCalc is a trademark of VisiCorp. WordPlus-PC is a trademark of Professional Software Inc. Spinnaker is a trademark of Spinnaker Software Corp. MS-DOS, GW Basic and Flight Simulator are trademarks of Microsoft Corp.

Interface '84 scheduled for March 12-15 in Las Vegas

LAS VEGAS — Interface '84, the 12th annual conference and exhibition for data communications, data processing and MIS professionals, will be held March 12-15 at the Las Vegas Convention Center here.

More than 200 industry experts are scheduled to speak at Interface '84. Conference sessions and papers will cover such topics as the impact of the AT&T divestiture, information management, network optimization, digital private branch exchange growth, local-area networks and network software, according to a spokesman for the conference.

The exhibition will include more than 1,200 exhibit spaces featuring data processing products and services.

The conference is being produced by The Interface Group, Inc. and co-sponsored by *Business Week* and *Data Communications* magazines.

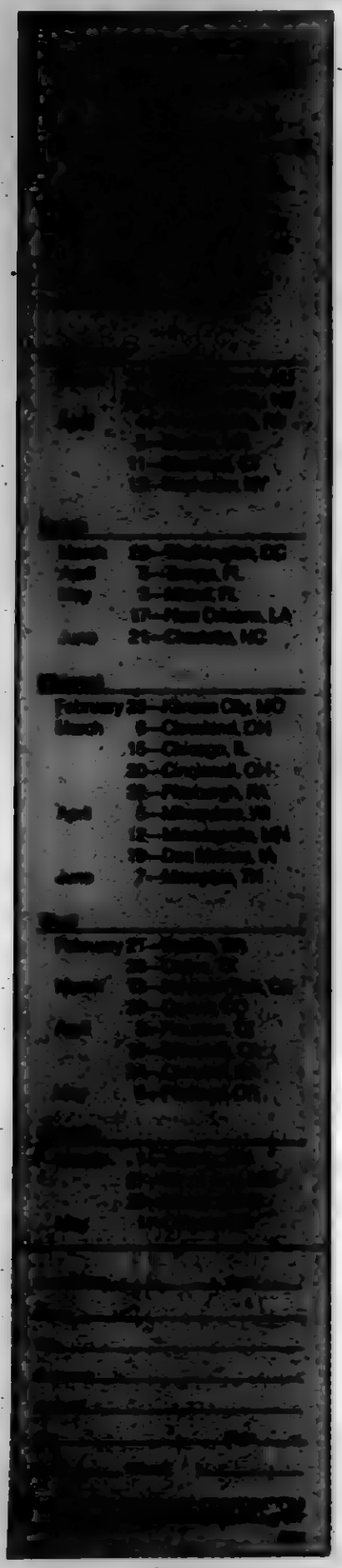
Tickets for the four-day conference are $325. One-day conference tickets cost $125. Tickets to the exhibition only are $25.

Industry awards banquet

For an additional $45 per person, attendees can purchase tickets to an industry awards banquet to be held in conjunction with Interface '84. Limited seating is available. Banquet tickets must be reserved and prepaid by March 5 to guarantee preferred seating.

Special hotel accommodations and airline fares are available.

More information is available from The Interface Group, which is located at 300 First Ave., Needham, Mass. 02194.



THERE'S ONLY ONE UFO.

A lot of software suppliers are trying to fit into UFO's shoes these days. They'll try to tell you that their On-line Application Development Systems are as powerful...as proven...and as accepted as UFO. They'll try to persuade you that they can offer you UFO's dramatic reduction in the time and expense of developing your CICS and IMS/DC applications. That's what they'll try to tell you. But the revealing and indisputable fact that UFO now has more than 1,500 installations ...more than all other independent suppliers combined...is your absolute proof that there's only one UFO.

No other On-line Application Development System can match UFO's speed, performance and cost savings.

UFO helps you melt away your programming and maintenance backlogs by eliminating the prime source of inefficiency in the application development process...repetitive coding. Pre-programmed and pre-tested functions like..."add, update, copy, browse, and display"—are initiated by keying in simple commands. There's no complex new language to learn, no code to write. Even access to your DL/1 database requires no special database training. With UFO, all your programmers can quickly become CICS or IMS/DC application development specialists without extensive and expensive training.

Because UFO is a non-procedural system, the time required to initiate new programs is dramatically reduced. Your programmers are guided through the development process with a free-form screen PAINTing facility, data dictionary, menu assistance and help screens. Simple fill-in-the-blanks techniques focus activity on what's to be done, not how to do it. And applications can be developed interactively with end-users, permitting changes at the prototype stage for guaranteed end-user satisfaction.

If you're concerned about reducing the time and cost of developing, maintaining and securing on-line applications...call in the best. UFO...User Files On-Line...from Oxford.

OXFORD SOFTWARE CORPORATION
174 BOULEVARD/HASBROUCK HEIGHTS, NJ 07604/201 288-4565

☐ I'd like to schedule a UFO demo. Please call to set a date.
☐ Please send me literature on UFO and other Oxford Systems.

Name_____
Title_____
Company_____
Address_____
City_____ State_____
Zip_____ Phone ( )_____
CW

W.S.A. Outside North America, contact one of the following WSA companies: Europe—Austria 0222-3135-1854; Benelux (NL) 03402-61666; Pretoria 1-324-2104; Greece 01-6829-631; Italy 011-617618; United Kingdom 01-950-3578; West Germany 06161-67804; Scandinavia (Sweden) 08-761-7300; Middle East/N. Africa—Greece 01-6829-631. S. Africa—11-37-3040; Israel—4-268196; India—(Madras) 44-88116; Asia—Hong Kong 05-8908511-3. Japan (Nagoya) 052-211-6021, (Osaka) 06-445-7881; (Tokyo) 03-437-6021; Singapore 65-2352795; Australia—New South Wales 02-439-3477; South America—Brazil (Rio de Janeiro) 021-264-4375; (Sao Paulo) 011-853-1953.

NEWS

Bank trims microfilm costs with switch to dry COM

SAN FRANCISCO — By converting much of its computer output operation from a mix of paper printers and wet computer output microfilm (COM) to dry, on-line COM devices, Wells Fargo Bank here reportedly slashed more than $250,000 from its annual tab for generating some one billion lines of microfilm per month.

As a result, the organization is now better positioned to generate reports and information in a timely manner, according to Reuben Barrera, an analyst at Wells Fargo here.

"Management wanted us to develop a plan to use COM effectively during the 1980s," Barrera said. "Three fundamental goals sum up that plan. First, we had to accommodate increased COM usage. Second, we had to cut costs. Third, we wanted to take advantage of the latest technology [in order] to attain goals one and two."

Much of the impetus for increased COM usage stemmed from the fact that, prior to the conversion, the bank generated as much output on six laser nonimpact printers as it did on its four wet COMs. Yet it did this at a substantial premium: The nonimpact printers cost three times as much as the COM equipment, and supplies cost four times as much.

More effective way needed

Growth projections and economics dictated that a more effective way be found. With added use of paper printers ruled out, the basic avenues open to the bank were to continue with the wet COM technology or upgrade to more current dry technology — laser COM devices — available in either on-line or off-line configurations. Dry COM eliminates the chemical handling and processing required with wet COM.

In late 1981, Wells Fargo began to compare the advantages of adopting dry COM technology to that of adding more wet COM units and found that the dry technology would cost at least $20,000 a month less to operate. For the comparison, the bank used an Eastman Kodak Co. Komstar 200 microimage processor — a device that uses a laser-imaging method — and heat-processed microfilm.

In addition to cost, a number of other factors weighed against wet COM:

■ Personnel requirements differed sharply between the two technologies. With wet COM, it was estimated the bank would have to hire up to five more COM operators in 1982 alone. "We had problems keeping a full staff due to high turnover," Barrera said. "Given the special skills needed for wet COM operators, it became a difficult challenge to train staff continually."

■ The costs of wet COM production would grow almost proportionately to the increase in volume. Waste could run as high as 50% some months due to tape problems causing reruns and processing control. "We simply needed to find a way to improve productivity," Barrera said.

■ The bank's tape library was bulging with tapes needed for wet COM processing. Some regular COM jobs created 120 magnetic tapes each time they were run; with the volume of COM jobs rising, so would the number of tapes.

After selecting dry COM technology, the bank had to choose between an on-line and off-line configuration as well as the vendor that could best meet its objectives.

The need to control tape usage favored on-line COM. "Perhaps the biggest factor in favor of on-line COM was the need to integrate COM operations into the mainstream of the DP output operation," Barrera said.

When the bank compared the Komstar 200 with other on-line op-

See BANK page 48

CCA EMACS

The most complete screen editor available for Unix[1] and VAX/VMS[2].

CCA EMACS from Computer Corporation of America has the greatest combination of power, speed, and funtionality of any text editor available for Unix or VAX/VMS. With close to 400 built-in commands, CCA EMACS allows virtually any editing task to be accomplished in just a few keystrokes, including tasks that would be difficult or impossible to do using other editors. In addition, a set of more than 80 predefined variables allows each user to customize CCA EMACS to meet various application needs and user styles. All of these features are supported by a full online documentation package that can assist the user at any point, giving information that ranges from the definition of a single command to manual pages that contain complete explanations of major CCA EMACS features.

Operating Environment

Runs on Berkeley Unix (4.1BSD and 4.2BSD), Bell Unix (System III and System V), and VAX/VMS. Requires 500 K of address space.

Price

Prices for a full source license range from $360 to $2400. Contact CCA for further details.

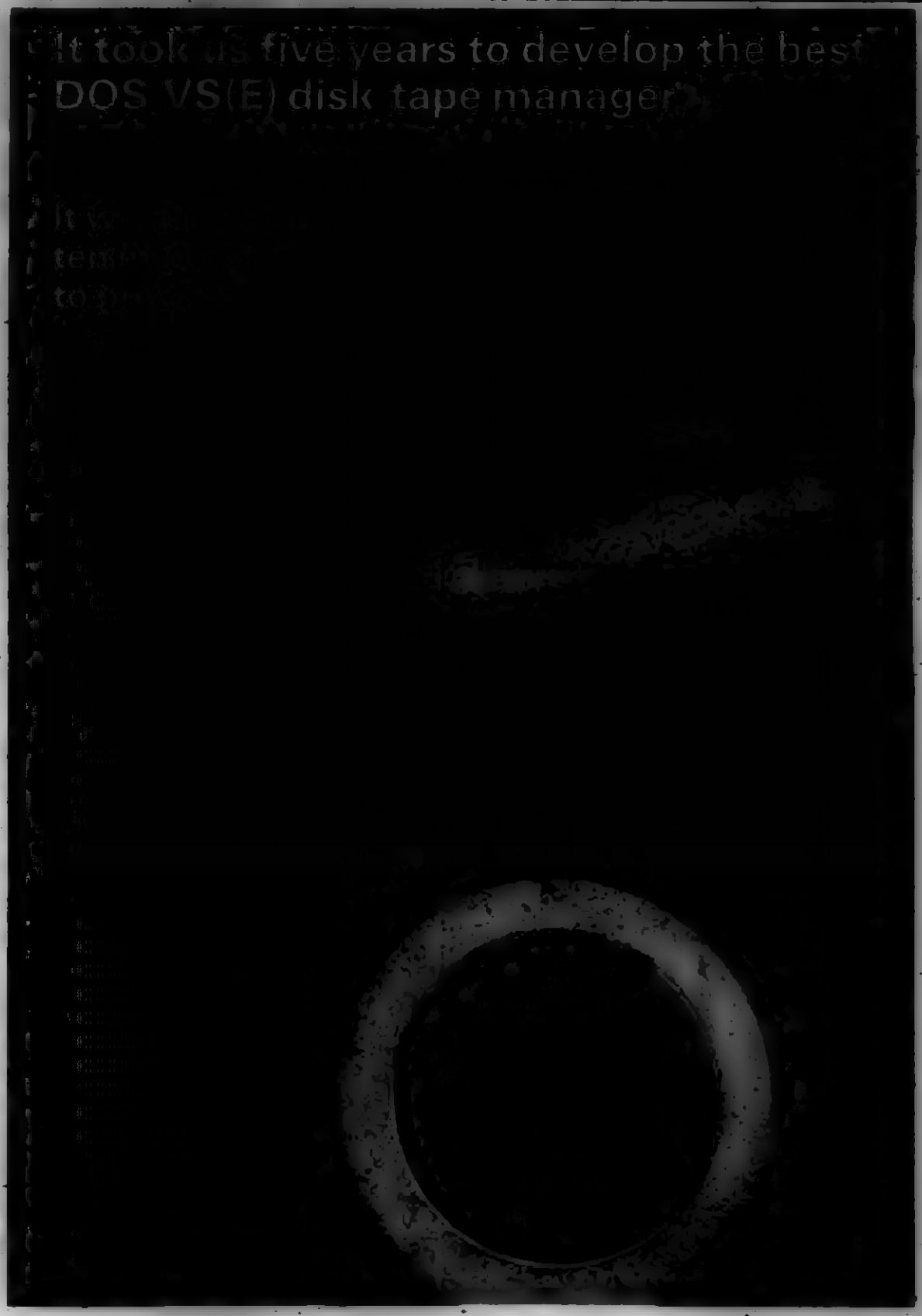
For More Information Contact

Computer Corporation of America, Four Cambridge Center, Cambridge, MA 02142 (617) 492-8860

OEM inquiries are encouraged.

(1) Unix is a trademark of Bell Laboratories.

(2) Vax and VMS are trademarks of Digital Equipment Corporation.



Videotex meet set

ROSSLYN, Va. — "Forum on Unauthorized Access," a 1½-day conference, is scheduled for February 28-29 at the Hyatt Arlington Hotel here.

Sponsored by the Videotex Industry Association (VIA), the forum will look at enforcement, legislation and public awareness of unauthorized access to videotex systems. George M. Minot, senior vice-president of Compuserve, Inc. in Columbus, Ohio, is the forum chairman.

Attendance is limited to 72 people. The cost is $395 for VIA members and $695 for others. VIA is located at Suite 200, 1901 N. Fort Meyer Drive, Rosslyn, Va. 22209.

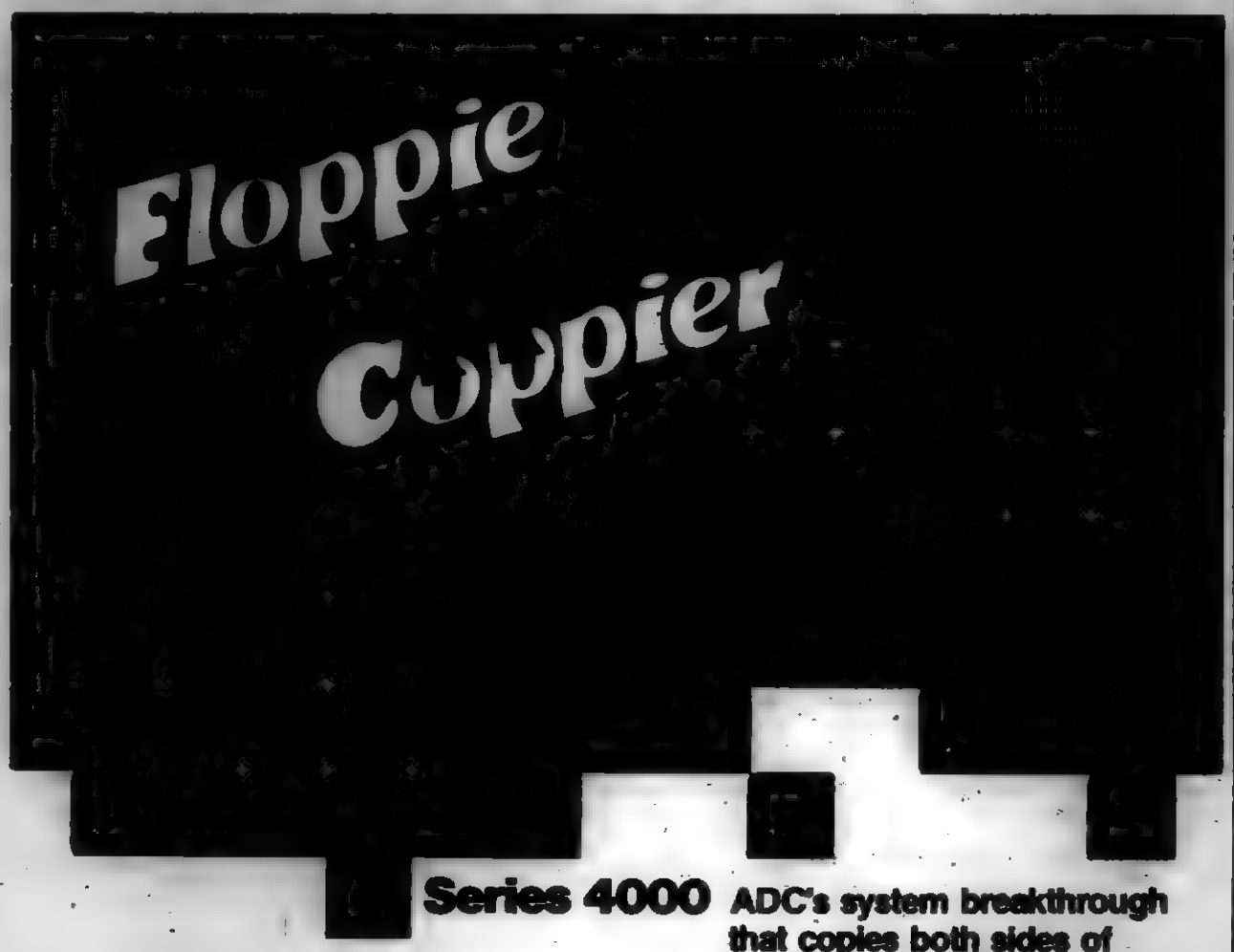
Feb. 23 seminar to cover AI trends

SCOTTSDALE, Ariz. — DM Data, Inc. has announced a one-day Artificial Intelligence Trends '84 Seminar here on Feb. 23.

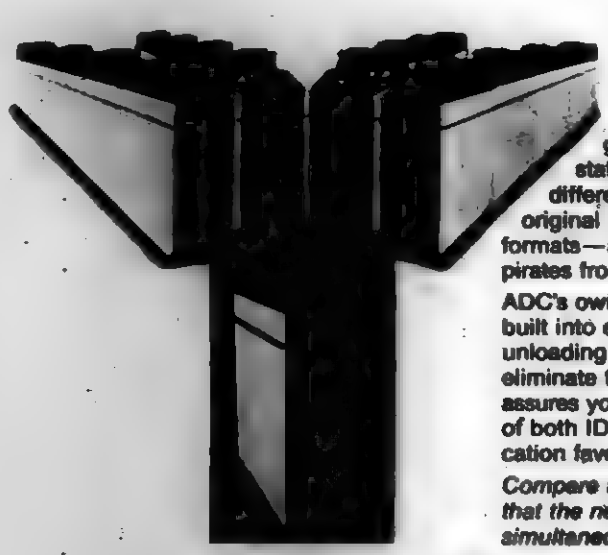
Howard Dicken, president of DM Data, will discuss the present market and the companies actively engaged in the five major categories of AI: expert systems, visual, recognition, computer-aided instruction and natural language software. He will discuss current trends and future markets and products.

Also scheduled is Dr. Nicholas Findler, research professor of computer sciences and director of the Group for Computer Studies at Arizona State University, who will discuss the basic fundamentals of AI and potential applications.

The seminar fee is $325, which includes luncheon and class notes. Further details are available from the seminar secretary, DM Data, Suite 700, 6900 E. Camelback Road, Scottsdale, Ariz. 85251.



Series 4000 ADC's system breakthrough that copies both sides of double-sided diskettes at once!



Just as efficiently and smoothly as your office copier, ADC's new Series 4000 Floppie Coppier™ automatically initializes and copies thousands of duplicate diskettes per hour—and doubles your throughput for double-sided diskettes!

Unlike other blackbox-type duplicators, Series 4000 gives you total single-master control of up to 16 slave stations—each simultaneously working on an entirely different diskette size and format. Since inventing the original Floppie Coppier, ADC's developed over 390 different formats—and dozens of different protection schemes to prevent pirates from copying your Floppie Coppier "coppies."

ADC's own industry-standard-setting Robotic Disk Handler is built into each Series 4000 slave unit, automatically loading and unloading up to 100 diskettes with patented gentle fingers that eliminate the disk destruction of other systems. Floppie Coppier assures you of perfect "coppies" every time with true CRC control of both ID and data fields, instead of the indiscriminate duplication favored by some of our copy-cat imitators.

Compare and you'll come back to the original—especially now that the new Floppie Coppier is even further ahead with simultaneous double-sided duplication—another ADC first!

APPLIED DATA COMMUNICATIONS
14272 Chambers Road, Tustin, CA 92680
(714) 731-6000

First and still foremost in media duplication and test technology

BANK from page 47

tions, it estimated the Kodak unit would cost about $30,000 less and offer greater capacity. The Kodak units were plug-compatible with the bank's computer operation and transparent to the printer spooling system. In addition, both the Komstar hardware and software had established a solid reputation for trouble-free performance, Barrera said.

The bank now has nine Komstar units for production applications, generating two-thirds of the bank's total monthly output. In a normal month, each Komstar produces about 3.5 million pages of output, but at peak times the average can be as high as 4.2 million pages per unit.

"We use the COM equipment for all demand deposit account reports, branch-type output, bank card journals and statements and a number of other production reports," Barrera said. The customer statements mailed to account holders are about the only paper generated in this process.

The move to the on-line COM exceeded management's goals of increasing COM usage and reducing costs. "Staffing for wet COM required six operators on each shift — a minimum of 18 people. Today we have 12 operators, and we produce about 20% more data," Barrera said. He predicts further staff savings this year as the bank implements plans to relocate the duplicators to the printer pool floor and cross-train the COM staff with paper-output personnel.

In addition to reducing personnel and waste, "The compaction capability of the Komstar has enabled us to achieve a 26% savings in supplies," Barrera noted. "The laser technology allows us to average 210 frame/fiche vs. the 156 frame average of the CRT technology." Also, the operation now creates about 500,000 duplicate fiches each month, which compares to 800,000 a month in the past — a 37% reduction in duplicating costs.

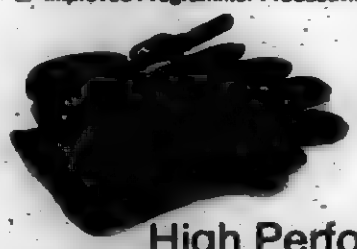
Four Kodak Photomatrix 8955 autoload duplicators are used to produce copies in San Francisco, and one Photomatrix and a Kodak Ektafiche Duplicator are utilized in Los Angeles.

HIGH PERFORMANCE HANDLING

File-AID Puts You in the Driver's Seat to Access Data without Programming.

File-AID gives you high performance handling benefits.

- ☐ Immediate Data Access Without Programming
- ☐ Improved Testing Effectiveness
- ☐ Lower Conversion Costs
- ☐ Better Use of VSAM
- ☐ Reduced Production Delays
- ☐ Increased Security
- ☐ Improved Programmer Productivity



File-AID the Key to High Performance.

File-AID speeds up the utility functions associated with record and file handling.

File-AID is a dependable and reliable tool. And it is supported by a crew of professionals at Compuware, a company with over 2,000 users worldwide.

File-AID is flexible and able to respond in all situations: test and production; regular and special functions.

File-AID is efficient. It combines many utilities into one inexpensive, easy-to-use productivity tool.

File-AID gives the professional greater control over his data environment.

File-AID can put you in the driver's seat fast. It is easy to use and requires virtually no training. The menus, panels, tutorials and control information make it a natural extension of your current environment.

File-AID/SPF

All Access Methods.

File-AID/SPF supports BROWSE, EDIT & UTILITY functions for all standard IBM access methods.

Record/Member Selection.

File-AID/SPF provides expanded IF, AND, and OR logic for record or member selection and processing.

Logical JCL Processing.

File-AID/SPF recognizes JCL as a special format and JCL is treated as logical statements.

Improved Edit.

File-AID/SPF provides a record editor for all access methods with no record or file length restrictions.

New SPF Utility Functions.

File-AID/SPF provides many new utility functions including:

- ☐ Load module CSECT and directory entry mapping
- ☐ Selective COPY functions for records/members.
- ☐ New full function VTOC utility.
- ☐ Full VSAM cluster, alternate index and path support (display, delete, etc.) without the IDCAMS utility.

Ease of Use.

File-AID/SPF requires no training.

File-AID/BATCH

All Access Methods.

File-AID supports all standard IBM OS or VS access methods and device types.

Multi-Function Utility.

File-AID/BATCH is a parameter-driven utility which combines the most often used file and record handling functions.

- ☐ Print, list or dump whole records or portions of records.
- ☐ Copy up to 99 datasets without control cards while mixing any file organization or record format.

File-AID is a comprehensive, easy-to-use data manipulation utility.

- ☐ Selective retrieval or sampling from any file based on record position, or data contents to the bit level.
- ☐ Altering data format or record structure.
- ☐ Access multiple datasets.
- ☐ Accumulate data in any format.

Additional Information.

File-AID/BATCH provides complete audit trail information as well as concise control card error messages.

Flexibility.

The flexibility of File-AID/BATCH is demonstrated by its ability to combine data from different sources or to copy data from or to unlike devices or access methods or record formats.

Test Drive File-AID with a FREE PRODUCT EVALUATION TIME TRIAL

Get behind the wheel. Try File-AID's High Performance Handling with your own drivers and crew. For your FREE 30-day evaluation call 800-521-8363 (in Michigan or Canada: 313-540-0400).

☐ Trial Information ☐ Additional Product Information

Name _____

Title _____

Co. Name _____

Address _____

City _____ State ____ Zip ____

Phone _____ Operating System _____

File-AID

Corporate Headquarters
32100 Telegraph Road
Birmingham, Michigan 48010
(313) 540-0400

COMPUWARE
SYSTEMS SOFTWARE THAT MAKES SENSE

International Offices: New South Wales, AUSTRALIA Phone: (61-2) 816-1177 / Luton, Bedfordshire, ENGLAND Phone: (44-582) 28-483 / Paris, FRANCE Phone: (33-1) 347-1241 / Herzlya, ISRAEL Phone: (972-52) 58912 / Milano, ITALY Phone: (39-2) 345-2211 / Tokyo, JAPAN Phone: (81-3) 479-1800 / Oslo, NORWAY Phone: (47-2) 68-5570 / Bryanston, SOUTH AFRICA Phone (27-11) 706-6800 / Hamburg, W. GERMANY Phone: (49-40) 23-3281

Dairy skims costs by giving managers micros

BARABOO, Wis. — The desire for greater cost efficiencies and improved patron service led a top dairy cooperative, located smack in the middle of the nation's dairyland, to buy microcomputers for its managers.

Wisconsin Dairies, a new member of the Fortune 500 with 1983 revenues of $445 million, chose Honeywell, Inc.'s Microsystem 6/10. The micros not only offer the cooperative's managers personal computing capabilities, but also function as end points in the cooperative's network.

Wisconsin Dairies, which consists of 11 manufacturing plants, handles about 2.5 billion lb of milk from four states every year. The plants have a total daily processing capacity of 7.8 million lb of milk, and the Richland Center, Wis., operation can produce 180,000 lb of cheese a day.

Because of the mammoth operation, plant managers last year became interested in using computer-based management tools. Before they received micros, the plants' data processing needs were served by terminals that were linked via communications lines to a Honeywell Level 6 minicomputer at the cooperative's Baraboo headquarters. The terminals could perform the data entry functions the plant required, but without decision support capabilities.

"Our plant managers were looking for a system that would help them generate information they could use on a day-to-day basis to manage their operations. In many cases, they couldn't afford to wait for reports from headquarters," said Susan Frish, Wisconsin Dairies' data processing manager.

A search by Frish and her staff for a microcomputer to replace the terminals ended with the Microsystem 6/10 with an Intel Corp. 8086 processor option.

"The 6/10 has the same operating system as the minicomputer we have at headquarters, so we knew we could communicate to a host easily. In addition, with compatibility we didn't have to fear upgrades," Frish said.

Initially, the new systems served as a data entry operation that is the basis of the dairy cooperative's complex patron payroll system. The plants receive milk from a network of milk haulers who make pickups at each of more than 5,000 patron farms served by the cooperative. Milk haulers keep track of pickups on tickets that record the date, patron number and weight of the milk.

When the haulers deliver the milk to the plants, the ticket data is entered into the microcomputers, and the systems check the haulers' figures for accuracy. The information then is transferred to the minicomputer in Baraboo, where it is used to help determine each patron's monthly or biweekly milk check and voucher.

Additionally, patron stores at each plant location dispense such supplies as butter and cheese as a service to cooperative members. The haulers deliver the items to the patrons upon request, filling out information on the delivery on supply tickets. The information also is entered in the microcomputers, following which it is electronically transferred to headquarters where it is factored into the payroll calculations.

Plans are under way to transfer part of the patron master file to each of the microcomputers at the plants so that plant management will have vital patron information at its fingertips in dealing with farmer inquiries.

Frish said the microcomputers also will be used for inventory control and product tracking to enable plant management to improve cost control measures.

Normally, you might not trust a product with a new name. But while all of our products have a new name, they also have a proven history of quality and reliability.

That's because Genicom was formerly the Data Communication Products Department of General Electric. Now an independently owned company, Genicom will continue the same product line we established with GE...only the name has changed.

Our Genicom 3000 family, for instance, still offers the same performance features already preferred by users and the design flexibility so important to OEM's, distributors, retailers and dealers. Speeds from 40 to 400 cps. Single or dual mode printing. Type quality from EDP to NLQ. Multi-color printing. Graphics. Selectable type fonts, American craftsmanship and more.

Of course, we'll also offer Genicom 2000 teleprinters and the soon to be introduced 4000 shuttle matrix printers. You'll find we have the same complete product line that we had with GE. We have the same corps of experienced employees, the same facilities, and the same nationwide service network.

But above all, we have a new commitment to excellence. Which means, while we continue to serve existing customers with established products like our 3000 family, we plan to introduce more products to meet growing needs.

At Genicom, we've changed our name and we're planning to change the future with more innovations, and more of the quality you've come to expect from us under any name.

Genicom Corporation, One General Electric Drive, Dept. M321, Waynesboro, VA 22980. In Virginia, call 1-703-949-1170.

GENICOM

For the solution to your printing needs call
TOLL FREE 1-800-437-7468

NEWS

Micro applications top newest book trends

By J. Daniel Couger
Special to CW

Noteworthy among the more than 300 computer books published in 1983 is the improvement in books on system design and advanced programming. However, the 17th edition of the *Annual Bibliography of Computer-Oriented Books*, released this month by the University of Colorado, lists only 265 of those books. Omitted from the bibliography are 52 "inadequate" books published on micro and personal computing; included in the bibliography are 34 very good books on that subject.

Another area of continued improvement, for the second year in a row, is the category of management of data processing. Inmon's book *Management Control of Data Processing* is an example. Ten new books were added to that section.

Programmer Productivity (Arthur) and *Software Testing Techniques* (Beizer) are examples of the high-quality books that are published in the advanced programming category.

Brachett's *Developing Data Structured Information Systems* and Brill's *Building Controls Into Structured Systems* are examples of the improved books in the system design category.

All introductory books published prior to 1980 were deleted from the bibliography. Despite the deletions, the bibliography still contains more than 1,200 books from 173 publishers. The bibliography separates the books into 86 categories and catalogs them according to type (reference, textbook, handbook) and style of presentation (programmed instruction, case study or narrative).

Over half of the new personal computer books were related specifically to the IBM Personal Computer. An example of the excellent new books of this type is Pollack's *Programming the IBM PC in UCSD Pascal*.

In the general microcomputer category, McGlynn's *Simplified Guide to Small Computers in Business* maintained this author's reputation for excellence.

The newest trend in applications-oriented books is not surprising — it is the large number devoted to micro-based applications. Nor is it surprising that the electronic spreadsheet books dominate. Nine of the applications books are devoted to that subject.

Representative of the good books in other application areas is *Forecasting on Your Microcomputer* by Nickell. The nonmicro area was enhanced by books like Bodnar's *Accounting Information Systems* and Jarrett's *Computer Graphics and Reporting Financial Data*.

Because of space limitations, the only application books included in the bibliography concern business uses of the computer. Nevertheless, there are 27 new books in that category.

As would be expected, the office automation category continued to evidence rapid growth. The three Peter McWilliams books are a refreshing addition to that category.

Another quality addition is Forbe's *Word Processing Procedures for Today's Office*.

Ninety-six books are listed in the advanced programming category, including 12 new books. In addition, another 54 books are provided in the categories on operating systems, maintenance programming, microprogramming and structured programming. *The Structured Alternative* (Cassel) illustrates the solid additions to the latter category.

Introductory books on languages continue to proliferate. Books on Basic predominate (51), but Pascal is closing in (37). With six books, Forth now justifies a section of its own.

New language books include *Smalltalk-80* (Goldberg and Robson) and *Icon Programming Language* by Griswold and Griswold. Because of space limitations, most books on DP management published before 1980 were deleted. Despite these deletions, the category on management of data processing contains 65 titles. Valuable additions *The Politics of Projects* (Block) and *Measurement and Tuning of Computer Systems* (Ferrari).

> *The newest trend in applications-oriented books is not surprising — it is the large number devoted to micro-based applications. Nor is it surprising that electronic spreadsheet books dominate.*

The management category is subdivided as follows: computer performance, project management, personnel performance, system security and general management.

In addition to the aforementioned books, the new James Martin book, *Managing the Data Base Environment*, and the Atre book, *DBMS for the Eighties*, strengthen the system design category. The data base section now contains 63 entries; the data communications section contains 34 entries.

One of the better entries to the latter communications category is *Tutorials in Modern Communications* by Lawrence.

Other useful additions to the system design category are *Computer Systems Requirements* (Thurber and Patton) and *The Architecture of Wideotex Systems* (Gecsei).

In the decision support systems/MIS area, *MIS Design Variables and Decision Making* (Jenkins) is the premier addition. That section now contains 35 titles.

The history/future section of the bibliography has 12 additions since 1980. Of the newest, *The Naked Computer* (Rochester and Grantz) is the most interesting, while *The Fifth Generation* (Feigenbaum and McCorduck) is the most informative.

The artificial intelligence section now contains 17 titles, and the robotics section contains seven titles.

A robust section is graphics, with 12 new books. The "oldest" book was published in 1979. The new books in the graphics section range in sophistication from *PC Graphics* (Conklin) to *Formal Specification of Interactive Graphics Programming Language* (Hallgren).

The lack of new books in several important areas may be indicative of the lack of progress of computing in those areas.

The section on computers and society had no 1983 additions. Nor did the sections on marketing and government applications.

One hopes that some creative work is nearing completion in these areas.

Copies of the bibliography are available for $4 from "Computing Newsletter," Box 7345, Colorado Springs, Colo. 80933. The cost is $6 if an invoice is required.

Couger is distinguished professor of computer and management sciences at the University of Colorado.

SEs DEMANDING PERFECTION!

We want you.

We want to hire systems engineers. Ones who demand perfection at every turn. At Storage Technology, we like perfection. We strive for it. We demand it. That's one way we've grown to be a leader in data storage systems and technology. Demands, however, are a two-way street. Here are some things you can demand from us. And, how we'll respond.

Demand creativity.

The kind of creativity that makes your job worthwhile. The kind that puts your mind to work. We think all systems engineers should be creative. And imaginative when solving problems or enhancing systems. We accept creativity as an everyday part of your job.

Demand freedom.

Freedom to be a self starter. To be responsible. The freedom that lets you call your accounts "yours." Storage Technology will give you all the freedom you can handle.

Demand trust.

Trust in your knowledge and experience, your decisions, your dedication. We take great pride in trusting our systems engineers. That's because the difference between a good operating system and a great operating system can be a simple matter of trust. And we like great operating systems.

Demand participation.

Participation in major marketing decisions, customer account decisions and decisions about where the data processing industry should head next. Our systems engineers continually help us make these kinds of decisions. They're involved. Why? Because we need their experience.

Demand listening.

The kind of listening that takes your ideas, suggestions and problems seriously. We're perfect listeners. We'll listen to anything you have to say about our business. We're also good at applying what we've heard.

At Storage Technology, reaching for perfection is reflected in everything we do. We are a Fortune 500 company. The world's leading independent supplier of high performance data storage systems and technology. Storage Technology provides exceptional benefits packages which include health, dental and life insurance, stock purchase, profit sharing and more.

We currently have openings for systems engineers demanding perfection in the following cities:

BOSTON, CHICAGO, CLEVELAND, DETROIT, INDIANAPOLIS, LOS ANGELES, MILWAUKEE, MOUNTAINSIDE, and NEW YORK.

To demand more information about these or future openings send your resume to Fred Moore, MD 3K, Storage Technology Corporation, 2270 South 88th Street, Louisville, Colorado 80028.

Storage Technology is an Equal Opportunity Employer.

Storagetek

BURROUGHS USERS
SOFTWARE CLEARING HOUSE

NEWS

System measures field of vision

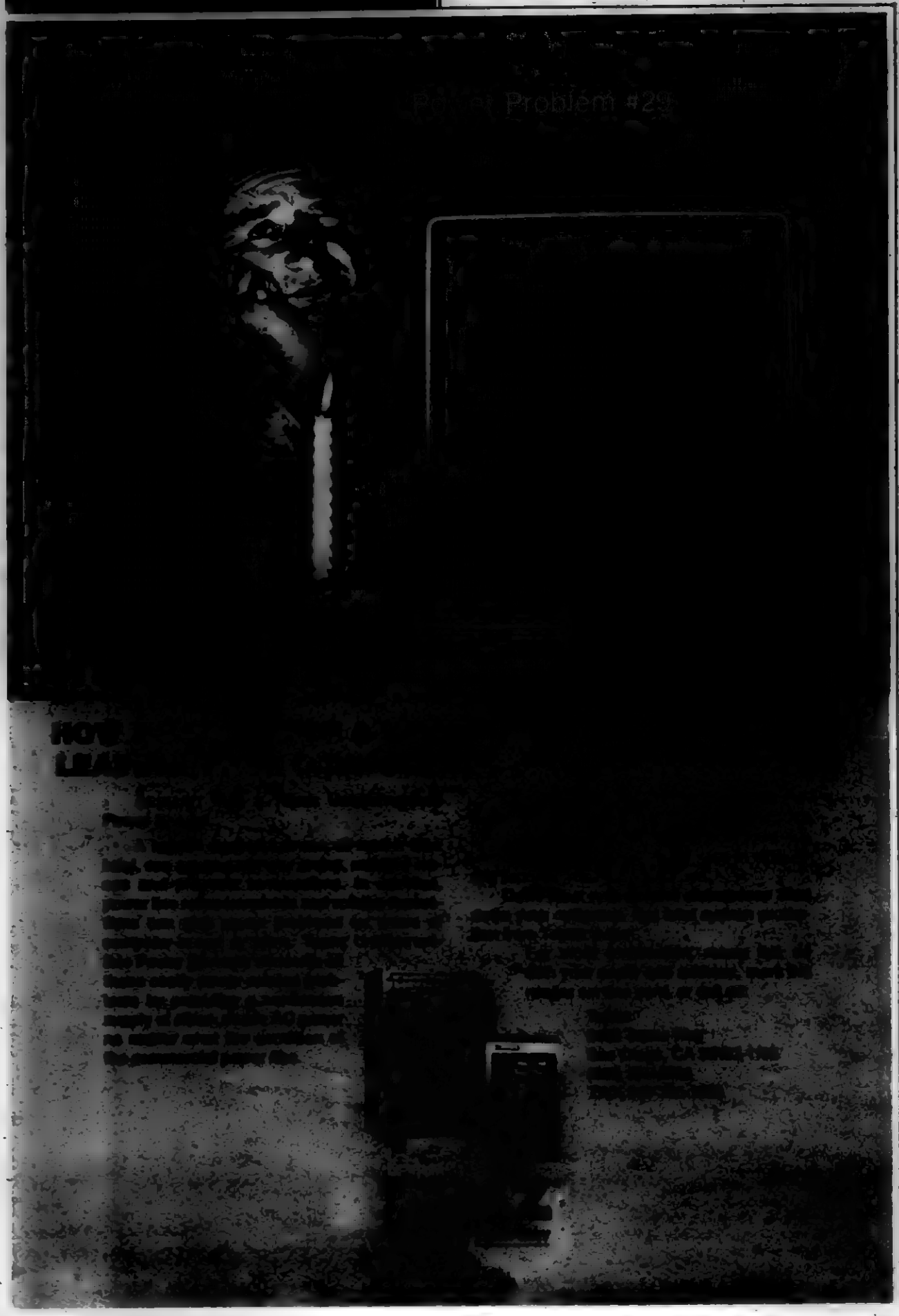
DURHAM, N.C. — Ophthalmologists at Duke University Medical Center here have begun using a computer to measure the field of vision in patients with glaucoma. Installed last summer, the computer is used on approximately 30 patients weekly.

According to a spokesman, the computer system is a vast improvement over previously used methods of measuring peripheral vision, the loss of which is one of the earliest signs of glaucoma. The computerized instrument still requires the response of the patient, but the examiner is partially replaced by the computer.

The Octopus 2000R computer, made by Cilco Corp. of Huntington, W. Va., utilizes Zilog, Inc.'s Z80A microprocessor with 64K bytes of memory and operates on Digital Research, Inc.'s CP/M operating system. The software was developed at the University of Bern, Switzerland.

The patient looks into a bowl while the computer automatically presents tiny spots of light in different parts of the bowl, and the patient is asked to indicate when test spots are seen. The computer can tell whether the patient is staring ahead, and it will double or triple check spots that the patient indicates he cannot see.

At the end of the test, the computer charts the patient's responses, giving the ophthalmologist a precise picture of the patient's range of vision.



Crwth offers training curriculum

SANTA MONICA, Calif. — Crwth Computer Coursewares has introduced a curriculum of interactive, computer-based training for users of Scholar/Teach 3, a computer-based training development and presentation system.

The system runs on IBM and IBM-compatible medium- and large-scale mainframes.

Courses now available are "Introduction to Data Processing," "Introduction to the Information Center," "Introduction to Data Communications," "Developing DP Skills for End Users," "SPF for End Users," "Using Focus" and "Using SAS."

"Using ADRSII" and "Using Answer/DB" will be released soon, the vendor said.

The courses are available for a 30-day free trial and can be leased with a yearly license ranging in cost from $1,200 to $3,700 or purchased with a yearly license ranging from $3,000 to $8,400.

More information is available from Crwth at Suite 200, 613 Wilshire Blvd., Santa Monica, Calif. 90401.

'It's overbearing.'

"The computer is down."

Every day another business goes "on line." Every day the world becomes more dependent on computers. And every day it becomes more important for the world to have a computer that won't go down, or even skip a heartbeat.

Over the past decade there have been computers designed to withstand hardware failures and eliminate downtime. However, all previous approaches depend heavily on software techniques to provide fault tolerance. A comparison of these old systems with the new Stratus/32 Continuous Processing™ System will illustrate how far we have come in one leap, by using advanced hardware technology instead of complex software.

How the Stratus Hardware Solution Supersedes the Software Solutions.

Stratus's hardware design means that fault tolerance is invisible to your application programs and users. You can even move previously developed applications to Stratus with NO CHANGES and NO PERFORMANCE LOSS for fault tolerance. In contrast, the software-based systems require complex, performance-stealing software in order to implement fault tolerance. This means that new programs are more difficult to develop, they run slower, and existing programs can't be run without major changes.

An added benefit of the Stratus fault tolerant design is that you can expand your system with additional processors as your computing needs grow. In fact, you can have up to 32 fault tolerant processors, 2000 communication lines, and 100 billion bytes of storage in a single Stratus system.

Hardware Self-checking Causes a Breakthrough in Service.

Each Stratus/32 tests itself EIGHT MILLION TIMES A SECOND while it executes your programs, so faults are detected BEFORE they corrupt your data. And when there is a failure, there's no need to rush to call your Stratus service technician. For one thing, the failed component, be it a CPU, controller, disk, or power supply, has a partner that continues operations as usual (without slowing down the system), so there's NO DOWNTIME. In addition, repairs can be made WITHOUT STOPPING THE SYSTEM. It is so easy to repair a Stratus/32 that our service is provided at about one-half the average price charged by other computer manufacturers.

$140,000, Software Included.

Our prices are competitive with "normal" systems (i.e. ones that do not provide fault tolerance), and substantially lower than the software-based fault tolerant systems. $140,000 buys you a complete four megabyte 32-bit system with 60 megabytes of disk storage, magnetic tape drive, and system SOFTWARE. If you like our hardware, you will be even more impressed with our software. (A common reaction among our users.) Briefly, our software offering includes VOS (a virtual operating system), transaction processing, networking, IBM communications, data management system, interactive forms builder, symbolic debugger, COBOL, Basic, PL/I, Fortran, Pascal, word processing. . .

To get more information call us at 617-653-1466.

The computer you can count on has arrived.

Stratus

CONTINUOUS PROCESSING™

Now that the world relies on computers it needs a computer it can rely on.

NEWS

CALENDAR

WEEK OF MARCH 4

MARCH 5-9, NEW YORK — **Structured Design and Programming Workshop.** Contact: J. Baldwin, Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

MARCH 5-16, PARSIPPANY, N.J. — **ANS Cobol.** Contact: Chubb Institute, 8 Sylvan Way, Parsippany, N.J. 07054.

MARCH 6, BOSTON — **Computerized Personnel/Payroll Seminar.** Contact: Carol A. Koschak, Insci, 95 Chestnut Ridge Road, Montvale, N.J. 07645. Also being held March 6 in Huntsville, Ala., March 7 in Omaha, March 8 in San Jose, Calif., West Orange, N.J., and Greensboro, N.C., and March 13 in Anaheim, Calif.

MARCH 6-7, PITTSBURGH — **The 1984 Tri-State Telecommunications Exhibition.** Contact: W.C. Hunkele, Telecommunications Management Association, P.O. Box 8839, Pittsburgh, Pa. 15221.

MARCH 6-8, CARY, N.C. — **SAS Exploratory Multivariate Data Analysis Course.** Contact: SAS Institute, Inc., P.O. Box 8000, Cary, N.C. 27511.

MARCH 6-8, WASHINGTON, D.C. — **Getting Ahead With Micros.** Contact: The U.S. Professional Development Institute, Microcomputers in Government, Department AB, 1620 Elton Road, Silver Spring, Md. 20903. Also being held March 13-15 in Denver, March 20-22 in New York and March 27-29 in Seattle.

MARCH 6-9, LOS ANGELES — **The National Data Base and Fourth-Generation Language Symposium.** Contact: Digital Consulting Associates, Inc., 339 Salem St., Wakefield, Mass. 01880.

MARCH 6-9, PALO ALTO, CALIF. — **Data Communications.** Contact: Ruth Dordick, Integrated Computer Systems, 6305 Arizona Place, Los Angeles, Calif. 90045.

MARCH 6-9, LOS ANGELES — **Programming in C: A Hands-On Workshop.** Contact: Ruth Dordick, Integrated Computer Systems, 6305 Arizona Place, Los Angeles, Calif. 90045.

MARCH 6-9, WASHINGTON, D.C. — **Structured Design and Programming.** Contact: Ruth Dordick, Integrated Computer Systems, 6305 Arizona Place, Los Angeles, Calif. 90045. Also being held March 27-30 in San Diego.

MARCH 6-9, BOSTON — **How to Manage Software Projects.** Contact: Ruth Dordick, Integrated Computer Systems, 6305 Arizona Place, Los Angeles, Calif. 90045. Also being held March 20-23 in Palo Alto, Calif.

MARCH 6-9, PALO ALTO — **Defining Software Requirements, Specifications and Tests.** Contact: Ruth Dordick, Integrated Computer Systems, 6305 Arizona Place, Los Angeles, Calif. 90045. Also being held March 27-30 in Boston.

MARCH 7, CHARLOTTE, N.C. — **Planning a Manufacturing Information System.** Contact: Society of Manufacturing Engineers, One SME Drive, P.O. Box 930, Dearborn, Mich. 48121.

MARCH 7-8, CARY, N.C. — **SAS Color Graphics Course.** Contact: SAS Institute, Inc., P.O. Box 8000, Cary, N.C. 27511.

MARCH 7-9, SAN FRANCISCO — **Local-Area Networks.** Contact: The American Institute for Professional Education, Carnegie Building, 100 Kings Road, Madison, N.J. 07940. Also being held March 14-16 in Boston, March 21-23 in Philadelphia and March 28-30 in San Diego.

MARCH 7-9, WASHINGTON, D.C. — **Structured Analysis and Design.** Contact: McCabe and Associates, Inc., Suite 111, 5501 Twin Knolls Road, Twin Knolls Professional Park, Columbia, Md. 21045.

MARCH 7-9, STAMFORD, CONN. — **Layered Network Architecture and ISO Seven Layer Standards.** Contact: Data-Tech Institute, 386 Franklin Ave., P.O. Box 569, Nutley, N.J. 07110. Also being held March 14-16 in Detroit, March 21-23 in Boston and March 28-30 in Orlando, Fla.

MARCH 8-9, STAMFORD, CONN. — **Digital PABX: Architectures, Networks, Systems.** Contact: The American Institute for Professional Education, Carnegie Building, 100 Kings Road, Madison, N.J. 07940. Also being held March 22-23 in Washington, D.C.

MARCH 8-9, SAN DIEGO — **The Spring 1984 Conference for Computers in Construction.** Contact: CIP Information Services, Inc., 1105-F Spring St., Silver Spring, Md. 20910. Also being held March 22-23 in New York.

MARCH 8-9, PHOENIX — **Personal Computer Local Networks.** Contact: Architecture Technology Corp., P.O. Box 24344, Minneapolis, Minn. 55424. Also being held March 15-16 in Atlanta and March 29-30 in Washington, D.C.

MARCH 8-10, ACAPULCO, MEXICO — **The 1984 Computer Dealer and Lessor Association Spring Meeting.** Contact: Computer Dealers and Lessors Association, 1212 Potomac St. N.W., Washington, D.C. 20007.

WEEK OF MARCH 11

MARCH 12, STAMFORD, CONN. — **Planning for XA: An Unbiased Analysis.** Contact: Techtran, 72 Cummings Point Road, P.O. Box 10212, Stamford, Conn. 06904. Also

You're the one of our

We build computers for the way you do business.

Computers matched to your customers' applications.

NEWS

being held March 13 in New York, March 14 in Toronto and March 16 in San Francisco.

MARCH 12-13, HOUSTON — Digital Private Automatic Branch Exchange. Contact: The American Institute for Professional Education, Carnegie Building, 100 Kings Road, Madison, N.J. 07940. Also being held March 15-16 in San Francisco, March 26-27 in Baltimore and March 29-30 in Boston.

MARCH 12-13, CHICAGO — Managing Projects in the Structured Environment. Contact: J. Baldwin, Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

MARCH 12-13, SAN FRANCISCO — IMS/CICS. Contact: Comped Technical Corp., 10 E. 21st St., New York, N.Y. 10010. Also being held March 14-15 in Los Angeles.

MARCH 12-13, RALEIGH, N.C. — Dbase II. Contact: Center for Advanced Professional Education, Suite 110, 1620 E. Garry St., Santa Ana, Calif. 92705.

MARCH 12-13, SAN DIEGO — Introduction to SPSS-X for New Users. Contact: SPSS, Inc., 444 N. Michigan Ave., Chicago, Ill. 60611.

MARCH 12-14, SAN FRANCISCO — Data Communications: An Introduction to Concepts and Systems. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

MARCH 12-14, ORLANDO, FLA. — Data Communications Systems. Contact: Center for Advanced Professional Education, Suite 110, 1620 E. Garry St., Santa Ana, Calif. 92705.

MARCH 12-14, PHILADELPHIA — Managing Application Software Support. Contact: Infosci, Inc., Box 7117, Menlo Park, Calif. 94026.

MARCH 12-14, WASHINGTON, D.C. — Software Quality Assurance and Testing. Contact: U.S. Professional Development Institute, Software Development in Government, Department A, 1620 Elton Road, Silver Spring, Md. 20903.

MARCH 12-14, WASHINGTON, D.C. — Data Communications: Effective Network Design. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

MARCH 12-14, DAYTON, OHIO — Personal Computers and Networking. Contact: Center for Advanced Professional Education, Suite 110, 1620 E. Garry St., Santa Ana, Calif. 92705.

MARCH 12-14, PHOENIX — Structured Analysis for Users. Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

MARCH 12-14, SAN FRANCISCO — Telecommunications Management: Equipment. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

MARCH 12-14, CHICAGO — Microcomputers: A Guide to Selection and Application. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

MARCH 12-14, NEW YORK — Data Base Management Systems: Concepts and Guidelines. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

MARCH 12-14, WASHINGTON, D.C. — Data Dictionaries: Concepts, Contents and Uses. Contact: Barnett Data Systems, 19 Orchard Way N., Rockville, Md. 20854.

MARCH 12-14, WASHINGTON, D.C. — Local-Area Computer Networks. Contact: The George Washington University, Washington, D.C. 20052.

MARCH 12-14, BOULDER, COLO. — Soft Side of Software. Contact: Cross Information Co., Suite B, 934 Pearl, Boulder, Colo. 80302.

MARCH 12-14, LOS ANGELES — Micro and Personal Computers: Techniques and Applications. Contact: Institute for Advanced Technology, 6003 Executive Blvd., Rockville, Md. 20852.

MARCH 12-14, WASHINGTON, D.C. — Computer Awareness: Basic Concepts, Capabilities and Terminology. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

MARCH 12-14, WASHINGTON, D.C. — Distributed Telecommunications Networks. Contact: The George Washington University, School of Engineering and Applied Sciences, Washington, D.C. 20052.

MARCH 12-14, WASHINGTON, D.C. — Decision Support Systems. Contact: Institute for Advanced Technology, 6003 Executive Blvd., Rockville, Md. 20852.

MARCH 12-14, ATLANTA — Purchasing Management and the Computer. Contact: American Management Associations, 135 W. 50th St., New York, N.Y. 10020.

See MARCH page 88

cornerstone business.

Comencé means business. Your business.

Software that speaks your customers' language.

FREE
IBM 34/36 Software

Simply call us at (617) 283-3438 and we will send you a free 30-day timed diskette for word processing or financial modeling.

PARA RESEARCH

Dept. CA, 85 Easkam Avenue
Gloucester, MA 01930

EVERY COMPUTER COMPANY TALKS SERVICE UP FRONT. BUT HOW MANY OF THEM CAN BACK IT UP?

These days, you've got to be real careful that the service a company promises you is more than just lip service.

Because if something goes wrong with your new equipment, and their service isn't right, you've just bought yourself a real headache.

At ITT Courier, we've been around long enough to know you can't sell customers short when it comes to service.

So we back up every ITT product with 150 service centers in North America alone.

We staff every one of those ITT Service Centers with field engineers who get their training at our state-of-the-art service school, not on your equipment.

And we give every ITT customer the security of a 24-hour service hotline, seven days a week.

Of course, no company can promise you a fail-safe product. But at ITT Courier, we're very proud of how quickly we can rise to the occasion should your system ever go down.

ITT Courier Service. It's one important reason we'll be around long after a lot of those other companies are long gone.

Contact your nearest ITT Courier Representative. Or call the ITT Courier Sales Support Department at 1-800-528-1400, toll-free.

ITT COURIER

YOU KNOW WE'LL BE AROUND.

"We're saving $50,000 a year by eliminating SYSOUT printouts and installing JCLWTR."

That's the word from one user of AID's new JCLWTR system.

Instead of printing every production SYSOUT listing, JCLWTR stores them on disk where they're instantly accessible through special SPF screens or hard copy printouts.

The savings in paper, printing, handling, and storage costs add up so quickly that even medium and small shops can recover the system's minimal cost in just months.

JCLWTR installs on medium and large IBM systems operating under MVS and supports on-line interfaces to COM.

Find out how much you can save with AID's JCLWTR system. Send in the coupon, or call Lew Kabza at 312/654-3030.

AID Applied Information Development, Inc.
823 Commerce Drive,
Oak Brook, Illinois 60521

I'd like to know more about the JCLWTR system

Name/Title _____

Company _____

Address _____

City/State/Zip _____

Phone (____) _____

VMSCHEDULE

"VMSCHEDULE has reduced our prime-time workload by 30%."

VMSCHEDULE—A complete scheduling package for end users and management.

- Optimizes machine use by running scheduled resource-intensive events during off-prime hours
- Saves systems personnel time by automatically running repetitive operations without intervention or initiation
- Automatically reschedules events when the machine has been down
- Provides optional load balancing features
- Uses simple English subcommands
- Allows concurrent operations by several users
- Increases security by verifying passwords
- Requires no mods to CP or CMS

703-821-8888

VM Software Inc.

Name _____

Title _____ Company _____

Address _____

City _____ State _____ Zip _____

Phone _____ CPU _____

2070 Chain Bridge Road, Suite 355 Vienna Va 22180 1-CW-0284

MARCH from page 86

MARCH 12-15, SUNNYVALE, CALIF. — **Structured Analysis and Systems Architecture Seminar.** Contact: Janis Halsted, Oberland Associates, 4036 N.E. Sandy Blvd., Portland, Ore. 97212.

MARCH 12-15, MINNEAPOLIS — **Data Base Administration and Control Workshop.** Contact: Institute for Advanced Technology, 6003 Executive Blvd., Rockville, Md. 20852.

MARCH 12-15, CHICAGO — **Dbase II.** Contact: Alexandra Communications, 661 Massachusetts Ave., Arlington, Mass. 02174. Also being held March 14-18 in Atlanta.

MARCH 12-15, TORONTO — **Project Management.** Contact: Brandon Systems Institute, 4720 Montgomery Lane, Bethesda, Md. 20814.

MARCH 12-16, WASHINGTON, D.C. — **Hands-On Pascal Computer Programming.** Contact: The George Washington University, Washington, D.C. 20052.

MARCH 12-16, CONCORD, MASS. — **Unix Workshop.** Contact: Plum Hall Associates, 1 Spruce Ave., Cardiff, N.J. 08232.

MARCH 12-16, FORT WORTH, TEXAS — **The 25th National Computer Security Seminar and Workshop.** Contact: Data Processing Security, Inc., Education Department, 200 E. Loop 820, Fort Worth, Texas 76112.

MARCH 12-16, NEW YORK — **Systems Analysis and Design Workshop.** Contact: Institute for Advanced Technology, 6003 Executive Blvd., Rockville, Md. 20852.

MARCH 12-16, DALLAS — **MVS Systems Management.** Contact: Institute for Software Engineering, 510 Oakmead Pkwy., Sunnyvale, Calif. 94086.

MARCH 12-16, CHICAGO — **MVS JCL.** Contact: Sysed, One Park Ave., New York, N.Y. 10016.

MARCH 12-16, SAN FRANCISCO — **Structured Analysis and Design.** Contact: Institute for Advanced Technology, 6003 Executive Blvd., Rockville, Md. 20852.

MARCH 12-16, ORLANDO, FLA. — **Vsam Programming.** Contact: Harris Education Center, 6220 S. Orange Blossom Trail, Orlando, Fla. 32809.

MARCH 12-16, HARTFORD, CONN. — **Structured Analysis and Design Workshop.** Contact: J. Baldwin, Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

MARCH 12-16, NEW YORK — **Auditing in the Contemporary Computer Environment.** Contact: Marge Umlor, EDP Auditors Foundation, 373 S. Schmale Road, Carol Stream, Ill. 60187.

MARCH 12-16, DETROIT — **Structured Analysis and System Specification Workshop.** Contact: J. Baldwin, Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036. Also being held March 12-16 in Miami, Minneapolis and Phoenix.

MARCH 12-16, HOUSTON — **Project Management and Control Workshop.** Contact: Learmonth and Burchett Management Systems, Inc., Suite 405, 2800 N. Loop W., Houston, Texas 77092.

MARCH 12-16, TRUMBULL, CONN. — **Introduction to Unix.** Contact: Gregory Geiger, Bunker Ramo Information Systems, Trumbull Industrial Park, 35 Nutmeg Drive, Trumbull, Conn. 06609.

MARCH 12-16, ATLANTA — **Structured Analysis for Real-Time Systems.** Contact: J. Baldwin, Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036. Also being held March 12-16 in Chicago.

MARCH 12-16, NEW YORK — **Data Base Development.** Contact: Learmonth and Burchett Management Systems, Inc., Suite 405, 2800 N. Loop W., Houston, Texas 77092.

MARCH 12-16, SEATTLE — **Structured Design Workshop.** Contact: J. Baldwin, Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

MARCH 12-16, TRUMBULL, CONN. — **C Programming.** Contact: Gregory Geiger, Bunker Ramo Information Systems, Trumbull Industrial Park, 35 Nutmeg Drive, Trumbull, Conn. 06609.

MARCH 12-16, ANAHEIM, CALIF. — **Structured Design and Programming Workshop.** Contact: J. Baldwin, Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036. Also being held March 12-16 in Oklahoma City and Washington, D.C.

MARCH 12-16, SAN DIEGO — **Structured Design for Real-Time Systems.** Contact: J. Baldwin, Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

MARCH 12-16, MILWAUKEE — **Information Modeling Workshop.** Contact: J. Baldwin, Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

MARCH 12-16, DENVER — **Project Planning and Control Workshop.** Contact: J. Baldwin, Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

MARCH 13, ORLANDO, FLA. — **SDM/Structured Free Seminar.** Contact: Mary Aliano, AGS Management Systems, 330 Walnut St., Philadelphia, Pa. 19106.

MARCH 13-15, DETROIT — **Micro/Set '84 Microcomputer Expo for Science, Engineering and Technology.** Contact: Micro/Set '84, Engineering Society of Detroit, 100 Farnsworth, Detroit, Mich. 48202.

MARCH 13-15, ARLINGTON, VA. — **SAS Basics Course.** Contact: SAS Institute, Inc., P.O. Box 8000, Cary, N.C. 27511.

MARCH 13-15, ATLANTA — **Focus on Data.** Contact: Du Pont Statistical Seminars, Room X-40236, Wilmington, Del. 19898.

MARCH 13-15, CARY, N.C. — **SAS for New Computer Users (VS/CMS).** Contact: SAS Institute, Inc., P.O. Box 8000, Cary, N.C. 27511.

MARCH 13-15, LOS ANGELES — **The Second Technology Opportunity Conference: Optical Storage of Documents and Images.** Contact: Technology Opportunity Conference, P.O. Box 14817, San Francisco, Calif. 94114.

MARCH 13-15, MELBOURNE, AUSTRALIA — **The First Australian Telecommunications Exhibition and Conference.** Contact: Riddell Exhibition Promotions Pty. Ltd., 137-141 Burnley St., Richmond, Victoria, 3121, Australia.

MARCH 13-16, BOSTON — **Data Base Management Systems: Mini, Micro and Distributed Applications.** Contact: Ruth Dordick, Integrated Computer Systems, 6305 Arizona Place, Los Angeles, Calif. 90045.

MARCH 13-16, LOS ANGELES — **Microprocessor Software, Hardware and Interfacing.** Contact: Ruth Dordick, Integrated Computer Systems, 6305 Arizona Place, Los Angeles, Calif. 90045. Also being held March 27-30 in Baltimore.

Before you buy a printer look at the fine print.

There's a big difference in printers, and the proof is right before your eyes.

This is an actual printout from Digital's Letterprinter 100. As you can see, it's good enough to send out to customers.

But that's not all the Letterprinter 100 can do. Suppose, for instance, you're in a hurry.

JUST PUSH A BUTTON AND YOU CAN PRINT OUT A WHOLE PAGE OF DRAFT COPY IN LESS THAN TEN SECONDS.

There are other fine points. You can see how the Letterprinter 100 can print multiple typefaces. It can also print in **BOLD**, d o u b l e - w i d t h and subscript. And do all these styles automatically, without stopping. And with its wide range of graphics capabilities, you can even draw your own conclusions.

digital

EDITORIAL

Vendor schemes that backfire

Storage Technology Corp.'s recent decision to abandon development of an IBM-compatible mainframe should be studied as a warning of the pitfalls that await vendor and user alike as technology advances evermore rapidly.

Until very recently, STC had boasted, and evidently believed, it could broaden its stake in an increasingly cutthroat business by developing yet another high-performance, IBM-compatible processor. The machine had a planned shipment date of late 1984, which was just recently pushed back from early 1984. Although the company cited technological problems [CW, Feb. 6], it apparently felt that even with just a short delay, the product would no longer be competitive.

The cancellation of the STC project was, unfortunately, not a unique incident for users who make current purchase decisions with one eye focused on forthcoming products. For example, Trilogy Ltd. announced long ago it would ship an IBM-compatible mainframe with new technology in 1985; just last month it announced a brief delay in completing the prototype wafer-scale semiconductor that will be crucial to the new machine.

In this case, vendors are also experiencing what it's like to be on the receiving end. Both Digital Equipment Corp. and Sperry Corp. made substantial investments for rights to Trilogy's still unproven technology that may or may not bring processing to a new plateau.

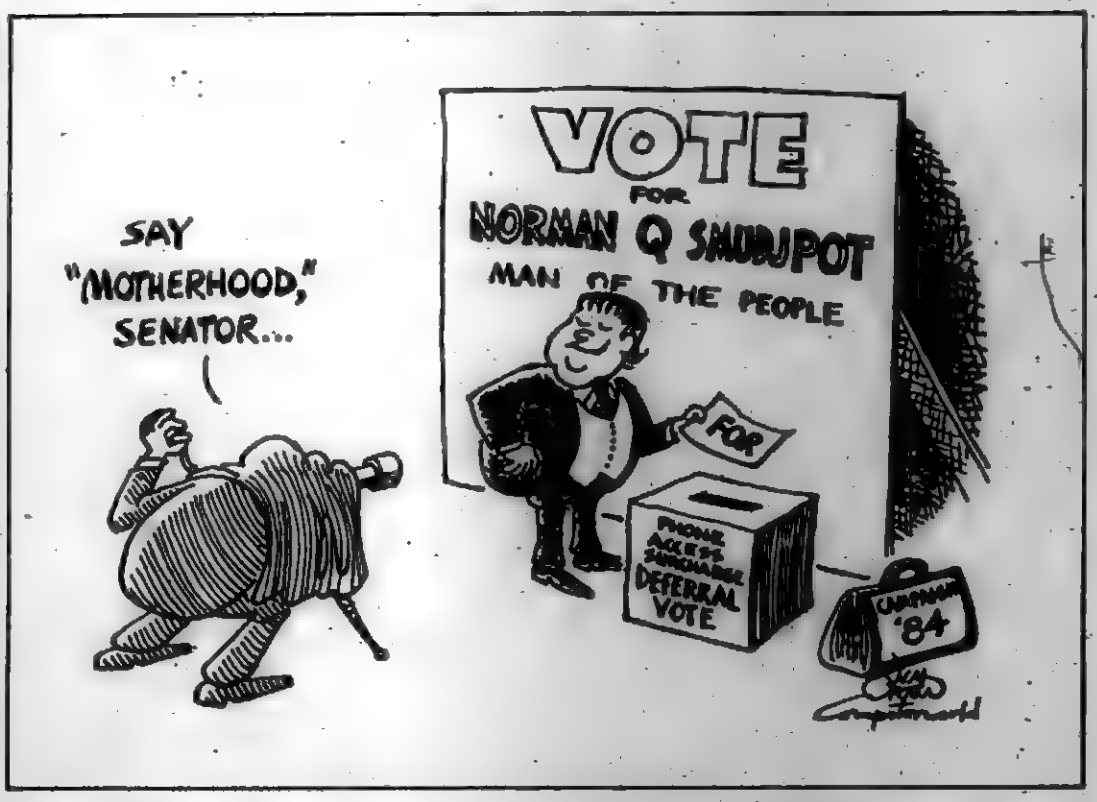
Given the increasingly breathtaking pace of new developments in processing power and applications, it is not surprising that vendors feel compelled to "overpromise" products. The juices of competition are leading to greater dependence on the marketing tactics of Madison Avenue rather than that good old American tradition of proving oneself with actual performance in the marketplace.

You may call it "selective leaking" or you may call it "intrepid reporting," but the fact is that products are being heralded even before a prototype has a chance to power up.

The microcomputer market recently demonstrated dynamics that inevitably will be felt throughout the processing hierarchy. Months of speculation about IBM's PCjr wreaked havoc upon the micro marketplace, then Apple Computer, Inc.'s masterful manipulation of both the trade and the general press served to detract attention from developments by other vendors that might have just as much significance if only given a chance.

When it comes to software, vendor claims seem to be going beyond mere boasting to a possible disregard for ethics. Mainframe-micro linkages are announced weekly, but how many management information systems directors will tell the corporation president he can start manipulating mainframe data from his desktop? Packages that merely contain a new wrinkle to existing technology are heralded as stunning breakthroughs, yet a systems planner for a major corporation told a conference recently that his major gripes are "me-too" packages and "unfinished products" that don't perform as promised.

Users have been indoctrinated to expect breakthroughs, and they certainly must consider what may be coming down the pike when they are planning long-term strategies for their DP shops. But while vendors certainly have every right to scratch to stay in business, they run the risk of disillusioning users to the point that they dare not make a decision revolving around a "forthcoming" product for fear that, at best, it will not work as promised or, at worst, that it will never appear at all.



LETTERS TO THE EDITOR

Your Social Security number: the downfall of individual privacy?

Computerworld's year-end issue included the article "Privacy issues in 1984" [CW, Dec. 26/Jan. 2]. Last fall, *Computerworld* featured the editorial "Silent watchers" [CW, Sept. 12]. And in earlier issues, there were numerous articles included in *Computerworld* that focused on the issue of hacking.

In all the articles written on computer abuse relative to individual privacy, one consideration has been overlooked, that is, that we have given the abuser one very important tool that should be taken away; we have given the abuser a unique identifier.

Today, your social security number is used as an identifier for just about everything.

Your social security number is used for credit applications, medical services, group insurance, a driver's license, nonincome-related employment personnel records, to be a "block home" — the list goes on.

Furthermore, there are no restrictions placed on the use of the social security number by private industry or state government.

What is needed is a law that restricts the use of the social security number to reporting income to a taxing authority or to give a social security benefit.

Michael Stasik
Beaverton, Ore.

Computerworld welcomes letters from its readers. Preference will be given to typed, double-spaced letters of 150 words or less; they may be edited for the purposes of clarity and brevity.

Letters should be addressed to Editor, Computerworld, Box 880, 375 Cochituate Road, Framingham, Mass. 01701.

COMPUTERWORLD

Editor
John C. Wilmouth

Executive Editor
Rita Shaw

Assistant Managing Editor
Cheryl M. Gelb

Design Editor
Marjorie Magowan

Senior Editors:
Software
Paul Gillin
Communications
John Dix
Phil Hirsch
Systems
Tom Henkel
Industry
Bill Laberis
Features
George Hamer

International Editor
Susan Blakeney

Associate Features Editor
Barbara Van Scoyoc

Assistant Features Editor
Elizabeth Morse

Special Reports Editor
Donovan White

Staff Writers:
Peter Bartalik
James Connolly
John Gallant
Lynn Haber
Patricia Keefe
Paul Korzeniowski
David Orrick
Edward Warner

Correspondents:
New York
David Myers
Suite 7G
401 East 80th St.
New York, N.Y. 10021
212/570-2135
Washington, D.C.
Bureau Chief: Jules Kirchner
445 National Press Building
529 14th St., N.W.
Washington, D.C. 20045
202/347-6718

West Coast
Bureau Chief: Jolly Bader
Correspondent: Robert Ball
1060 Marsh Rd.
Menlo Park, Calif. 94025
415/328-6084

Chief Copy Editor
Kathie Gow

Assistant Chief Copy Editor
Charlotte Zimm

Copy Editors:
Becky Batcha
Dave Bouffard
Bruce Crane
Deborah Stadulis-Horn
Thomas Schmidt

Assistant to the Editor
Jura Fettig

Editorial Assistants:
Mary DeCristofaro
Joyce Fuss

Contributing Editors:
Education
J. Daniel Couger
Human Communication
Jack Stone
Technical Time
Larry Long
Telecommunications
Thomas Madden
The Data Center
John P. Murray
Letters on Software
Charles P. Lecht

Special Publications
Computerworld Extra!
George Hamer, Editor
Computerworld on Communications
Bruce Hazard, Editor
Computerworld 64
Ann Dooley, Editor
Computerworld Buyer's Guide
Marcia Stefanchik, Editor

Main Editorial Office: Box 880, 375 Cochituate Road, Framingham, MA 01701 617/879-0700

Computerworld is a member of the CW Communications/inc. group, the world's largest publisher of computer-related information. The group publishes 44 computer publications in 16 major countries. Nine million people read one or more of the group's publications each month. Members of the group include: Argentina's *Computerworld Argentina*; Australia's *Australasian Computerworld* and *Micro Computer Magazine*; Brazil's *DataNews* and *MicroMundo*; Chile's *Chile Computerworld*; Denmark's *Computerworld Denmark* and *MikroData*; France's *Le Monde Informatique*; Germany's *Computerwoche*, *Microcomputerwelt* and *PC Welt*; Italy's *Computerworld Italia*; Japan's *Computerworld Japan* and *PC Japan*; Mexico's *Computerworld Mexico*; Norway's *Computerworld Norge* and *MikroData*; Saudi Arabia's *Saudi Computerworld*; Spain's *Computerworld Espana* and *MicroBusiness*; Sweden's *Computerworld Sweden*, *MikroDatorn* and *Alla Hemdator*; the U.K.'s *Computer Management* and *Computer Business Europe*; the U.S.' *Computerworld*, *Desktop Computing*, *Hot CoCo*, *inCider*, *InfoWorld*, *Micro Marketworld*, *Microcomputing*, *PC World*, *Run* and *80 Micro*.

VIEWPOINT

The phenomenon of MIS 'plateauing'

THE DATA CENTER

JOHN P. MURRAY

Having observed the pattern of development and change within a number of management information systems (MIS) installations over many years, I have come to the conclusion that many, I suspect most, MIS installations operate in concert with a cyclical rhythm. While the tempo is different from organization to organization, it does indeed appear that certain circumstances create an ebb and flow within the typical MIS department.

As an example, the MIS department reaches a given level of performance that is, for whatever reason, viewed as acceptable. There then begins a slow, at first imperceptible, decline in the overall quality of the MIS service to the organization. Once begun, the decline continues, usually at a slow but steady pace. This continues until a certain stage is reached, often caused by some rather dramatic event, a disaster of some magnitude that finds its way to the senior management level. This is the low point in the cycle.

When it becomes apparent that MIS is indeed in trouble, the effort will begin to do whatever is necessary (an often draconian effort) to bring the situation to an improved state. This is usually an expensive, time-consuming and often frustrating experience for all concerned. The outcome here is movement to the high level of the cycle where, usually, the process begins again.

Is this proposition about the phenomenon of MIS plateaus only some imaginary concept? I submit it is not imaginary, but a fact. Think first of the MIS installations with which you are familiar, then consider the amount of management turnover in those installations and, I believe, you have witnessed the effect of the MIS "plateauing" phenomenon.

Cause of MIS plateauing

What is the cause of this rather universal condition of MIS plateauing? There are a number of causes, but I think a primary cause is that of complacency. This complacency can be found in the client areas, in MIS and in the organization's senior management. Often it is a result of, or perhaps a reaction to, the attainment of a certain plateau. Usually, a great deal of money (or what may appear to senior management to be a great deal of money) will have been spent to bring MIS out of the low trough of the cycle; the MIS environment will be viewed as much improved; and senior management support and, perhaps more importantly, attention will be less forthcoming.

In time, MIS management will either simply stop attempting to alert senior management to the requirement to continue to advance with the technology (that is, keep moving to higher plateaus) and become complacent or move on to organizations that recognize they are in the low cycle and that need help. In either event, the down cycle for this MIS function has begun. It may take a long time; I am aware of two organizations in which it took eight and 10 years, respectively, to recognize the low level plateau that had been reached before appropriate action was taken. I suspect there are organizations with longer cycles, but sooner or later, most down cycles do bottom out.

This bottoming out may not be accompanied by the removal of the MIS manager. Senior management may accept the fact that it must share some of the culpability for reaching this low level and may, provided the current MIS management is competent, supply the support required to begin the climb to higher levels. In any event, sooner or later an effort to move ahead will begin and money will be available to get the job done.

Consider facts

Whether you buy this argument or not, it might not hurt to consider the facts in your own organization. Is progress in terms of the technology, in terms of MIS client understanding of MIS and the potential use of information processing being made? Or are there subtle indications that the MIS environment and its perception outside the MIS department is not as good as it was last year? Is your organization attempting at least to examine the potential of new technology and to attempt to use that technology that shows promise for the organization, or is the climate one of "What we have now is good enough"?

This plateauing phenomenon will become more apparent and the cycles less lengthy as the effective uses of technology expand and as the results of the use of that technology become more apparent. Those organizations that become aware of the cycling phenomenon and that take action to keep the organization heading to increasingly higher plateaus will be the future winners.

MIS functions do not stand still; if they are not moving ahead, not growing and evolving with the expanding technology, they are falling behind. Maintaining the status quo is simply hastening the eventual decline of the MIS function.

While we in MIS management may find the effort onerous, and while at times we all feel that indeed "the game is not worth the candle," we do have a responsibility to continue to push for the growth and development of the MIS function, to maintain the struggle to reach the next higher plateau. We have, I suppose, to accept the reality that our management does not want to address this issue, particularly if things are going reasonably well.

The movement to increasingly higher MIS plateaus can be expensive, both to attain and to continue. However, the investment in the continuous recycling of the MIS department is not only expensive, but it also has a deleterious effect on morale throughout the organization.

More time and attention need to be focused on the MIS plateauing phenomenon and to take steps to continue to move organizations ahead through the effective use of the technology, rather than to become caught up in the recycling syndrome. Time, effort and, perhaps most important, money should be invested in the achievement of ever higher MIS plateaus, not in being forced to start the climb over and over again. And this must be a concerted effort of MIS, clients and senior management. MIS cannot do it alone. ‡

Murray is director of management information services for Rayovac Corp., Madison, Wis., and author of Management Information Systems as a Corporate Resource, *published by Dow Jones-Irwin.*

Will publishing technology enter office system arena?

HUMAN CONNECTION

JACK STONE

C'mon now, who cares if a word processing operator can control the type fonts displayed on the monitor? Granted it is a clever demonstration to see an operator strike a few keys and watch the text shift gears into italics, but my view is that such capabilities, along with all the other complex paraphernalia that goes along with automatic typesetting, has always been the proper province of the publishing industry and not the business office — or so I thought until I ran into John Deaner, who is one of the true pioneers of automation in the publishing industry. Deaner set me straight on the matter.

Deaner, president of the newly established Tele Disk Publishing Co. (a subsidiary of LRC, Annandale, Va.), feels that new technologies have radically cut the cost of computer-based processes to the point where conventional offices will soon be able to afford the equipment.

Here is a summary of what he had to say when I interviewed him:

How can the average office fund such expensive equipment?

Right now, those in small firms cannot. They provide a comprehensive range of facilities — editing, proofreading, graphics design, telecommunications, typesetting, printing and photocopying — but make the process easier and more cost-effective than ever before.

In fact, Tele Disk has been organized as a publishing service bureau to help government and commercial firms accelerate their use of automatic publishing processes in everyday work.

I thought the daisywheel technology and its ilk, working with a photocopier, met the printing and copy needs for the vast majority.

They have in the past and will be around for a long time in the future. But the good old daisywheel machinery just cannot handle the surging demand for graphics, and everybody knows the limitations of line printers for quality work.

Furthermore, phototypesetters are too clumsy in terms of all the chemicals and ancillary equipment that are required.

However, there are extra dimensions of printing quality and speed offered by the new equipment that may be more suitable for the larger organizations.

Take the office-size laser printers, for example. Machines of this type are on the market that are no bigger than a copier, yet provide laser-quality originals from instructions, graphics and text in the form of a simple stream provided by the operator.

Typical machines are capable of producing a high-quality typeset page in a matter of seconds. Believe it or not, text for a 600-page book can be created in a couple of hours, including figures, drawings, line art and charts.

Have these machines improved on the paper loading and transport problems of the conventional copiers?

One machine that is available provides cassette loads of plain paper so that the output looks more like printed pages, not photoduplicated printout.

More impressive than this is that substantial savings in paper costs are possible by using compressed text and, thereby, compacting it on the page — a technique long used in the publishing industry to cut paper costs.

And new justification techniques, coupled with textbook-quality type fonts, make the compacted formats very attractive and easier to read as well.

But can these machines be cost-justified for routine office correspondence?

Of course; it depends on the volume requirements of the organizations, but the opportunities for cost, quality and performance improvements are legion.

Imagine storing the company logo in random-access memory instead of hard-copy letterhead or using a microchip instead of a stockroom to produce standard forms.

I'm guessing that many installations may wind up being cost-justified on the basis of cost savings of paper storage alone. ‡

Letters to Stone should be addressed to him at P.O. Box 33699, Washington, D.C. 20033.

Hackers: Hired guns of the high-tech age?

READER'S PLATFORM

R. RAJAGOPAL

Lately, we have been hearing a lot about hackers, mostly high school and college students who get their thrills by hacking away at different computer passwords or identification codes until they gain access to a computer somewhere in the country. By further hacking, it is possible, though not likely, for them to gain access to the computer's files or data bases. What do the parents of these kids do when the telephone bills arrive?

I do not condone professional criminals who, by hacking or other means, attempt to gain access to privileged information; they ought to be put behind bars. Nor am I defending the illegal activities of high school and college hackers who gain entry into other computer systems by trial and error for the sheer fun of it. I am interested in rechanneling the energies of the hackers who are harmless pranksters. Many times I wish I had the services of a hacker to get access to information that is supposedly in the public domain, that has supposedly been created to assist a variety of users.

Not a week goes by without somebody asking me to give information about my family and me: our taxes; our eating, playing and sleeping habits; how we manage our money; where we shop; what we read; when, where and how we got married; where we went on our honeymoon; how we dress; and asking if we'd like a loan, like to win a sweepstakes and how about a free vacation?

These data seekers reach me by simulated long-distance telephone calls, by mail, by telegrams, on the street, at my doorstep and in my office. Some even try to bribe me to fill out their forms by enclosing a dime or, occasionally, a quarter, insisting that I have a cup of coffee at their expense while filling out the form. But I am often gullible and fill out the forms, hoping that one day I will be a surprise winner of a sweepstakes because of the information I provided.

What happens to the data?

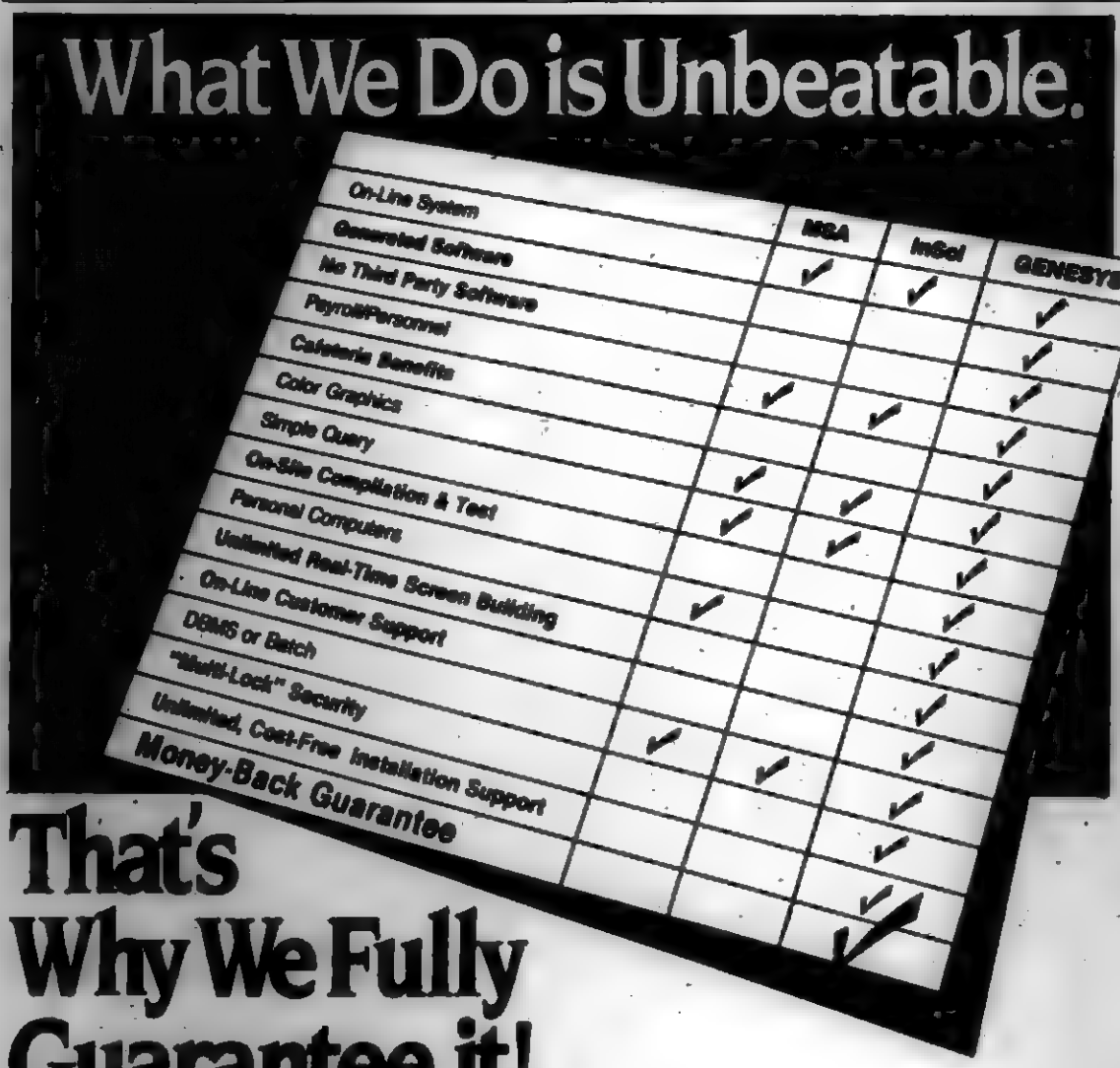
What happens to all the data that is gathered by the various marketing research firms, governmental agencies, associations, political action committees and consumer organizations? In particular, have you ever tried to get information from them? Try it — you will come to admire the skills of our hacking teenagers.

Our government — local, state and federal — gathers all sorts of data on a regular basis. One massive federal effort is the census, which takes place every 10 years. In addition, we spend billions of dollars each year monitoring and measuring our air, water, natural resources, health; social and economic conditions and the productivity of everything and everybody who produces anything. I assume that this data gets stored away in thousands of filing cabinets and computer storage devices. Ours is a highly monitored society.

The problem is that most of this gathered data seems to disappear. Many times I've wished a hacker could come to my rescue when I've sought information. When you request information from an organization, be prepared to hear any of the following responses:

- We only gather and store data, and no money is budgeted for retrieving it.
- Our programmer quit, so why don't you call us back in a few months?
- We had a budget cut, and the system is not maintained anymore.
- We just moved to a new site and haven't unpacked yet.
- Why don't you contact our Washington office?
- You had better ask the boss — and by the way, he's on vacation until next month.
- We lost the data tape.
- The data base is too complicated, and the chances of misuse are quite high, so it's our policy not to release it to outsiders.
- Our people are too busy — we can't free up anybody to comply with your request.
- We haven't put it on the computer yet.
- We haven't decided on the release date yet.
- We are switching to a new system, so why don't you call back in a year?
- We are going to print the data base in the form of a book and make it available through National Technical Information Service. You can buy it from them.
- Contact our central depository.
- If you need it that badly, why didn't you collect the data yourself?
- Make your data request by filling out Forms 5271, 6482 and 7633 in triplicate. You can get these forms by writing to our headquarters' data center. Allow six to eight weeks before contacting us again. No telephone inquiries or in-person visits will be permitted. To avoid any fur-

See GURUS page 68



That's Why We Fully Guarantee it!

Only One Human Resource Management System is good enough to be fully guaranteed. Genesys'. Our own people developed all of our software and systems. Our own people will also install our system, compiling and testing all our programs for you. Then our people will stand behind their work with a no-strings, money-back guarantee.

Genesys is simply unbeatable. Most Human Resource Systems contain the raw data you need for management reports, government compliance and to let you know "Is she promotable?". But you have to do a lot of work preparing data to get the information you want because they've added third party software.

Not so with Genesys. All our software is completely integrated and menu-driven. No matter what you need to know about Payroll, Personnel or Cafeteria Benefits, it's easy to get precisely the information in exactly the format you want. Just one keystroke gives you selective search, decision support, PC integration and color graphics. Real-time, from any office, anywhere in the country. With by far the tightest, most flexible security available.

We're so confident you'll be successful with Genesys we'll give an unconditional guarantee. How can you beat that? If you'd like more information on the Genesys HRMS or would like to attend an Executive Seminar near you, call Norman Bushee at (617) 685-5400.

Genesys, 10 Grafton St., Lawrence, MA 01843
Please send me information on:
☐ Genesys Seminars ☐ Payroll Accounting
☐ Personnel Administration
☐ Benefits Management
Name _____
Title _____
Company _____
Telephone _____
Street _____
City _____ State _____ Zip _____
IBM Hardware _____
AT-22

Genesys
SOFTWARE SYSTEMS INC.

Genesys Software Systems, 10 Grafton St., Lawrence, MA 01843 (617) 685-5400

For The State Of The Art In HRMS
LOOK TO GENESYS FIRST!

VIEWPOINT

We must protect the data others see as threat

READER'S PLATFORM

HARLAN W. CROUSE

Much has been written and spoken about 1984, and with that year now upon us, we can expect even more commentary and predictions. Most of the comments have dealt with George Orwell and his writings. Nearly everything thus far expressed about 1984 has been negative — Big Brother, lack of privacy, world tensions and the problems of technology running rampant.

People have always been suspicious, even afraid, of new ideas and inventions. It seems to be a human characteristic to fear the unknown or that which may change comfortable, accepted circumstances. The negative ideas and threatening scenarios expressed in association with 1984 accentuate the tendency to technology paranoia.

One expression of this fear that we may see is a strong, overt reaction by the ordinary individual to such threats, especially a reaction against what may be perceived as Big Brother and the technologies associated with totalitarian rule. In many minds, computers and data processing fit into this category.

By "ordinary individual" I mean the common man on the street — not hackers, not people with any special knowledge of data processing and not those looking to subvert an automated system for illicit gain. It may be difficult for some to imagine ordinary Americans "rising up" to do anything, but fear and anger can be great motivators.

Increasingly mistrustful

Americans in recent years have become increasingly mistrustful of the government and large corporations. Concern over privacy has never been more intense. Many people still fear that computers and the large amounts of information stored and processed by these machines are primary threats to privacy.

It is quite possible that the near future may bring a rash of attacks on automated information resources — data, hardware, software, storage media and facilities, in fact, anything and everything associated with data processing, not excluding personnel. These attacks could be perpetrated by disgruntled people: those with a reason, real or imagined, for striking back at the perceived invaders of individual privacy and freedom.

These people may attack directly or by proxy. Skilled or enraged persons may attack directly, even physically. Those less skilled or more circumspect may use others to perpetrate their attacks. It is conceivable that a new service industry may be born to procure, alter or destroy information concerning individuals contained in various computer files and data banks. With the dearth of effective computer crime legislation, such activities may not even be illegal.

These attacks may not stop with disaffected persons. Social critics could represent another threat to automated information resources. Incidents similar to the anti-war activities of the late 1960s and the early 1970s may arise as citizens fight a perceived Big Brother. With an ever-increasing amount of government information residing in computerized files, what is the likelihood of an electronic version of *The Pentagon Papers*?

Those of us involved in data processing security walk a fine line. As individuals, we are as much concerned about Big Brother, privacy invasion and the accuracy of information maintained about us as the next person. As professionals, it is

See DATA page 68

More people in your position choose ASK.

After all the sales hype, analyses and benchmarks, the choice of a manufacturing system often comes down to a gesture of faith.

Don't make it blindly.

First consider why ASK inspires the confidence of more MIS professionals. (And why customer referral has made us the biggest in our field.)

Then consider this. Our MANMAN® software integrates manufacturing and financial operations more completely. So you'll never find yourself at a staff meeting accounting for your lack of cost accounting. Or your choice of a system.

Then consider the best part. You can fully implement MANMAN on a VAX or HP 3000 in under a year. So the information burden shifts from your shoulders sooner. And smoother. Because with our comprehensive training and documentation, your users quickly learn to help themselves to all the information they need.

Find out firsthand why more people choose ASK. Contact Carol Singh at (415) 969-4442 or 730 Distel Drive, Los Altos, California 94022. Get a customer referral. Then call and ask someone in your position about MANMAN.

What you hear will answer your every prayer.

ASK

THE PEOPLE WHO KNOW MANUFACTURING.

VAX is a registered trademark of Digital Equipment Corporation.

© 1983 ASK Computer Systems Inc.

VIEWPOINT

Are computer vendors getting a fair shake?

READER'S PLATFORM

JOSEPH P. ZAMMIT

It is fashionable these days to portray computer vendors as callous, overreaching and dishonest. To listen to the hyperbole, one would think that computer vendors are the modern equivalents of snake-oil salesmen: telling the most outrageous lies in order to steal a quick buck, then fleeing town just one step ahead of a crowd brandishing tar and feathers.

But does the image comport with reality? More importantly, does the image do an injustice to legitimate vendors when a judicial forum to resolve the claims asserted by dissatisfied customers is available?

No doubt the industry has seen its share of disreputable characters. And computer salesmen, like all salesmen, are not bashful about praising the qualities of their wares. Yet it strains credulity to believe that vendors are guilty of outright fraud and deceit on anything like the scale that is sometimes suggested. It is simply not in the interest of vendors repeatedly to disappoint false expectations that they themselves have created. Most vendors are in business for the long haul, and they can hardly expect to achieve long-term success if they establish a reputation for habitual lying.

Several reasons

Nevertheless, the image persists. Why? I believe there are several reasons. First, despite the increasing frequency with which they are used in everyday commercial life, computers still retain something of the aura of magical black boxes. This perception is often an intellectual cop-out. For one thing, purchasers often fail to define adequately their own needs — something that the vendor cannot do for them. Moreover, it is easier for a potential purchaser to pretend that "this is just too complicated for an ordinary person to understand" than to assume some responsibility for making a decision. If responsibility is abdicated to the "expert" vendor, it is easier to blame the vendor (who should know better) if anything goes wrong.

A second reason for the poor image of vendors is the nature of computers themselves, particularly software. Computer systems are highly complex, frequently sensitive and never completely debugged. Every sale represents, to some extent, an educated guess that the system will be capable of fulfilling the user's needs — particularly if the sale contemplates any custom programming. Purchasers, failing to appreciate this fact of life, are quick to believe that any failure to live up to expectations reflects misrepresentation on the part of the vendor.

Finally, it is in the interests of certain groups — notably, a growing number of plaintiffs' "computer lawyers" — to promote the rather sleazy image of vendors. Recognizing that contracts frequently limit the vendor's liability, these attorneys have sought theories around such contractual limitations.

"Fraud" is the most obvious route. Not only does a fraud claim offer the promise of circumventing restrictive contractual provisions, but it tantalizes with the hope of unlimited punitive damages. Such possibilities have a lot more "sex appeal" to potential clients than the restricted recoveries available under most contracts. A small number of highly publicized decisions has lent credence to the exhortations of plaintiffs' attorneys.

Air of unreality

There is virtually no lawsuit filed against a vendor today that does not include a claim for fraud. Yet the very frequency with which the claim is asserted suggests an air of unreality.

Can it actually be that every time a computer fails to perform in accordance with the user's expectations, it is because the vendor lied? Can it be that there is even a legitimate question of fact whether fraud was committed in all these cases? I think not.

Nevertheless, the very assertion of so many fraud claims works an unfair hardship on vendors, particularly smaller ones.

While courts will often grant vendors summary judgment on breach of contract claims because of clear contractual provisions, they are extremely reluctant to accord similar relief on fraud claims. That means the vendor must undergo the not unsubstantial expense of extensive discovery and a trial. That trial will usually be before a technologically ignorant jury that itself subscribes to the "snake-oil salesman" view of computer vendors — a view often reinforced by one-sided horror stories appearing in the popular press.

Moreover, the evidence of fraud is likely to consist solely of the purchaser testifying that "the salesman told me," to which the vendor can respond only by denying; the jury then is left to choose whom to believe. It frequently believes the purchaser, no

IS YOUR COMMUNICATIONS NETWORK BREAKING UP?

Don't miss
"MANAGING THE COMMUNICATIONS NETWORK."
Exclusively from
Computerworld Reports.

How many vendors, how many different technologies does it take to make your network work? How many end users, how many decision makers *can* it take before something—or someone—cracks up? And does the telephone company break-up mean telecommunications tie-ups?

These are some of the critical questions posed by host John Gantz in "Managing the Communications Network," third in a lively, provocative series presented on 30-minute videocassettes and produced by DELTAK and CW Communications.

This month, you'll get the views of an industry expert, an MIS director, and a leading communications consultant. And be sure to stay tuned, because next month's Report will address another vital concern: the AT&T divestiture and its impact on information management. Watch for future Reports on subjects such as application development centers, artificial intelligence, end user training, the maturing information center, and more.

To learn all the signs of network break-up before your organization cracks up, order Computerworld Reports: "Managing the Communications Network." Call DELTAK order entry at (312) 369-3000; (416) 678-9222 in Canada.

DELTAK
East/West Technological Center
1751 West Diehl Rd., Naperville, IL 60566
(312) 369-3000 (800) 532-7686

375 Cochituate Road
Box 880, Framingham, MA 01701
(617) 879-0700

© Copyright 1984, DELTAK, Inc.

How to avoid the 'snake-oil' salesman image

matter how farfetched his story, precisely because it does not understand how farfetched the story is.

Argument is unconvincing

Some would argue that fraud claims are a necessary and inevitable response to the "unfair" and "one-sided" contracts proffered by vendors that are far more knowledgeable about their products than their customers. The argument, however, is unconvincing.

The law of contracts was developed to permit parties to agree in advance on the rules that would govern their relationship and to allocate between them the risks of that relationship.

Allowing fraud to be used casually by dissatisfied purchasers to avoid contractual provisions unfairly defeats the legitimate expectations of the vendor. Even if the contract is a "standard form," no one has compelled the purchaser to sign. Moreover, given the highly competitive nature of the computer industry, the bargaining power of purchasers is far greater than some would like to believe. There is always the possibility of going to another vendor or paying more for an enhanced warranty. The fact that a purchaser has failed to explore adequately his alternatives should not be charged against the vendor.

Limit application

All of this is not to suggest that genuine instances of fraud do not exist or that when they occur they should not be actionable. Rather, the point is that fraud should be carefully confined to those situations in which it was meant to apply: intentional misrepresentations of material facts reasonably relied upon by the purchaser to his detriment. Courts should not be loathe to dismiss cases in which it is readily apparent that those standards cannot be met or to impose sanctions upon parties and their attorneys who assert fraud claims without sufficient basis.

Unfortunately, given the moderate degree of success achieved to date by the plaintiffs' bar, the trend is likely to be toward ever-increasing computer fraud litigation. Is there anything a vendor can do to protect itself? The answer is yes, although self-help is not an adequate substitute for a change in public and judicial attitudes.

First, vendors can build a certain amount of protection even against fraud claims into their contracts. For example, there is authority supporting the proposition that very specific disclaimers contained in a written agreement will prevent a plaintiff from relying on supposed contrary oral statements.

A general disclaimer of implied warranties or a merger clause is not enough; the disclaimer must specifically negate the existence of the alleged misrepresentation.

Another possibility is to broaden provisions that reduce the normal statute of limitations to include fraud as well as contract claims. Vendors might also want to consider arbitration clauses as a way of avoiding jury trials and punitive damages.

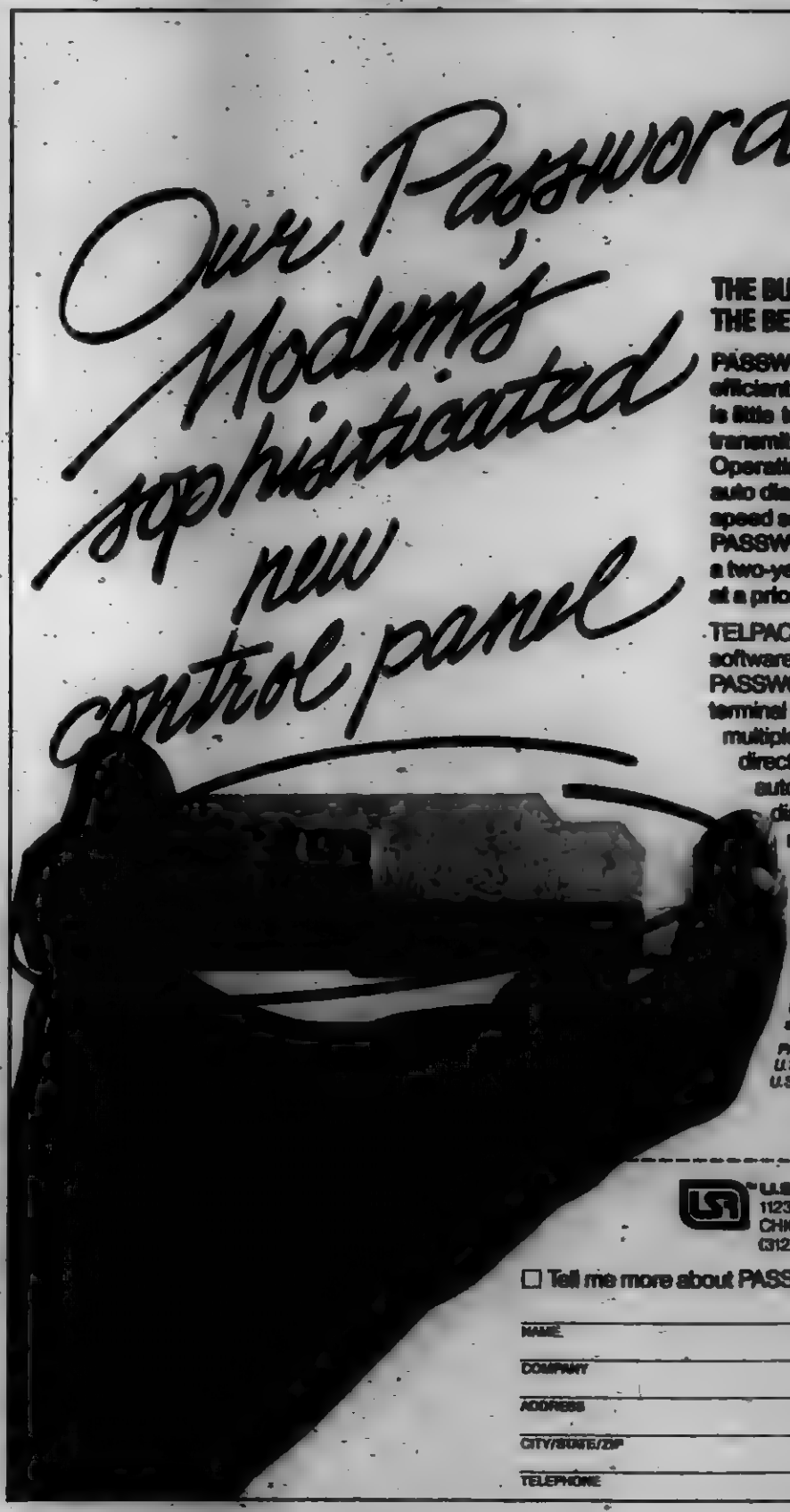
Vendors can also do a better job of policing their literature and sensitizing their sales force. Ambiguous statements in brochures can be avoided. Salesmen can be trained in the art of writing letters and proposals in a fashion that avoids unnecessary embellishment and includes appropriate qualifications. Procedures can be implemented that document what has been stated or promised at meetings with customers.

Finally, vendors can take a tip from the opposition and start choosing counsel who are knowledgeable and experienced in the computer area. For some inexplicable reason, vendors frequently choose attorneys without focusing in at all on the skills necessary to draft procurement contracts properly and to handle complex computer litigation. Firms that are perfectly competent for general corporate work or other types of litigation are not necessarily the appropriate choices for such specialized tasks.

Ultimately, a vendor's best defense is in the quality of its product, the integrity of its personnel and the good faith with which it supports its customers. A little good public relations wouldn't hurt either. But until prevailing attitudes change, vendors will have to factor potential litigation costs into the price of their products. From that perspective, it is ultimately computer users who pay for the poor image of vendors. ‡

Zammit is a New York resident partner, concentrating in DP law, in the New York-Los Angeles-Washington law firm of Reavis & McGrath.

Our Password™ Modem's sophisticated new control panel



THE BUSIER YOU ARE, THE BETTER YOU LIKE IT.

PASSWORD™ is a modem so efficient and convenient there is little to do but turn it on to transmit at 300/1200 baud. Operating features include auto dial/answer, auto mode/speed select, full/half duplex. PASSWORD has all this, plus a two-year limited warranty, at a price of just $449.*

TELPAC™ telecommunications software (optional) programs PASSWORD to transfer files, in terminal or host mode, with multiple error checks. Phone directory gives choice of timed automatic or one-touch dial and logon. Command mode includes file display and update, menus and help, and much more. Write or call for complete specifications.

*Suggested list for PASSWORD complete with power, phone, RS232 interface cables. TELPAC software optional extra, $79.

PASSWORD, TELPAC, USR logo and U.S. Robotics are trademarks of U.S. Robotics Inc.

U.S. ROBOTICS INC.
1123 WEST WASHINGTON
CHICAGO, ILLINOIS 60607
(312) 733-0497

☐ Tell me more about PASSWORD, TELPAC.

NAME
COMPANY
ADDRESS
CITY/STATE/ZIP
TELEPHONE

GUNS from page 62

ther delay, provide all the data requested in these forms. Send your request with a cover letter on your company's stationery with an endorsement by your company's president. This is a recording.

Of course, not all data bases are inaccessible to the same degree. Some are created with users in mind, and there are conscientious people in every organization who will go to great lengths to help you get the information you need as quickly as possible.

We users are thankful for these few concerned individuals. Without them, I suspect hackers would be hired regularly. On the other hand, there are people in many organizations who understand that information is power. They will go out of their way to stifle and limit users' access to information.

I believe that data collection programs should be coupled with the objective of providing those who need to make decisions with information that is timely, relevant and useful. If information is withheld or unused for some reason, then we can make decisions only on the basis of experience or judgment.

Every manager who is being urged to invest large sums of money to gather data should not commit the error of relegating this decision completely to technical professionals. These professionals have many redeeming qualities, but providing data to users in an efficient way is not one of them. It is commonly but erroneously assumed that managers and policymakers should not meddle with the design, development and operation of data collection programs — that such details should be developed by the technical professionals.

But these assumptions have caused American organizations considerable losses in terms of unused information. Managers should find out how the information system is supposed to help users like themselves and then hire a hacker or two to make that information available.

Governor's advisory

A Midwestern governor's advisory commission recently stated that there is a great need today to improve the kinds of decisions, both public and private, being made about resources. The decision makers need to have more ready access to accurate data on water quality and quantity, natural resources, soil, land use and pertinent geological features.

The commission further noted that much of the information is already available in a variety of forms and places, but it is not accessible to the public and its decision makers in a usable way. Perhaps the commissioners should hire a hacker.

Systems that provide useful information do not just come into existence. They must be planned, designed, developed, evaluated and modified with the active participation of users at every stage. Otherwise, hackers will become the hired guns of the high-tech age. ‡

Rajagopal is an associate professor in the geography department at the University of Iowa, Iowa City.

How to get your people on-line. On the double.

One-touch access

The new Scanset 415 HS™ is more than a quick way to get information. It's a quick way to plug computer-shy managers into your information system.

Because Scanset was designed for convenience. Users get single-button dial-up and log-on to your computerized system. You get the ability to program remote Scansets with phone numbers, function keys, even screen brightness and speaker volume. All from your mainframe, without overriding managers' protected entries.

Plus, you can hook Scanset up using normal phone lines.

1200 baud graphics

The Scanset 415 HS will paint an entire screen of line or bar charts almost as fast as you can say, "Personal Information Terminal." And the 300 or 1200 baud rate is selectable right from the keyboard.

Once your people start getting 1200 baud decision-support, you can say goodbye to complaints about slow transfer rates.

Simplicity itself

Scanset has a built-in 36-number autodialer. So instead of the 30 or so keystrokes it takes to reach your data base, users press one button. Scanset does the rest.

And once users are on-line, programmable function keys speed them directly through to frequently-used computer commands. No need to spend time typing—One function key replaces up to 36 keystrokes.

Same goes for international phone calls. Or domestic calls, including connections to lower-cost carriers like SPRINT® or MCI® Multi-number muddles turn into single-button savings.

Answers on tap

If you're planning an information system or looking for a better way to get managers into the system you already have, look into Scanset. The Personal Information Terminal brings a whole new dimension to information management in just under a square foot of space.

Need more information? It's as easy to get as making a phone call. Which gets even easier with the new Scanset 415 HS.

(800) 622-2260

SCANSET

THE PERSONAL INFORMATION TERMINAL FROM TYMSHARE

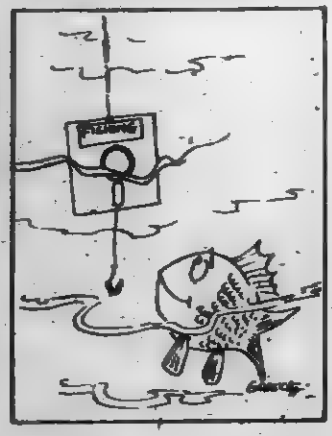
Tymshare, Inc.
20705 Valley Green Dr.
Cupertino, CA 95014

DATA from page 63

our job to protect those same resources that are seen by so many as a leading threat. To be effective, the security professional must recognize the adversities faced, advise employers and devise means of reducing vulnerabilities.

Let us all hope 1984 brings us neither Big Brother nor overreaction to a perception of such. However, data processing managers and security professionals must do more than hope; we must act, and we must act now. ‡

Croucher is systems security officer of automated DP at the Department of the Army, Fort Leavenworth, Kan.



IT is...

the leader in integrated decision support and data processing software.
Ten programs, each separately available, make the IT series the most comprehensive and flexible software system on the market for MS-DOS based personal computers.

Non-computer professionals will find IT easy to use. All programs are menu-driven and make extensive use of help screens. And for the DP professional, ITSoftware programs meet the kinds of operational data processing requirements that are now justified by the low cost of today's microcomputer hardware and software.

Whatever your requirements, you'll discover that ITSoftware meets more of your needs.

KeepIT™ keeps IT together.
At the heart of the ITSoftware series is KeepIT, a menu-driven, relational data base manager that acts as the core module through which all other software is integrated. Only a full data base management program like KeepIT can provide the flexibility of data entry, file transfer, records maintenance, report generation and file management capabilities needed to fully utilize the data calculation and presentation strengths of spreadsheet, graphics and word processing programs.

KeepIT's comprehensive design greatly extends the ability to transfer information from one program to another. Not just for a few numbers, but for entire data files. KeepIT also allows you to specify calculations on the data base and have the results transferred to a spreadsheet or graphics program.

Best of all, you don't have to replace your current software to take advantage of ITSoftware's advanced capabilities. Use them both. KeepIT also comes equipped with interfaces to most other popular micro-based software.

Other members of the ITSoftware series include:
CalcIT™: 3-D spreadsheet program.
LinkIT™: asynchronous communications package.
PassIT™: 3270 file transfer facility.
EditIT™: program editor with mouse management.
SortIT™: sort/merge utility.
StatIT™: MathStat™ program.
WritIT™: our release of MultiMate™ for word processing.
ShowIT™: graphics and drawing program.
SendIT™: for remote presentation of ShowIT slides.

ITSoftware

RAMIS II is a registered trademark of Mathematica Products Group. MathStat is a trademark of Mathematica Policy Research. MultiMate is a trademark of Softword Systems. The IT series product names are trademarks of ITSoftware.

Buy IT.
ITSoftware . . . ask for IT by name. For more information, call toll-free (800) 222-0592. In New Jersey: (609) 799-2600. Or write to ITSoftware, P.O. Box 2392, Princeton, New Jersey 08540. We'll send you a free brochure.

Name _____

Company _____

Title _____

Address _____

City _____ State _____ Zip _____

Phone _____

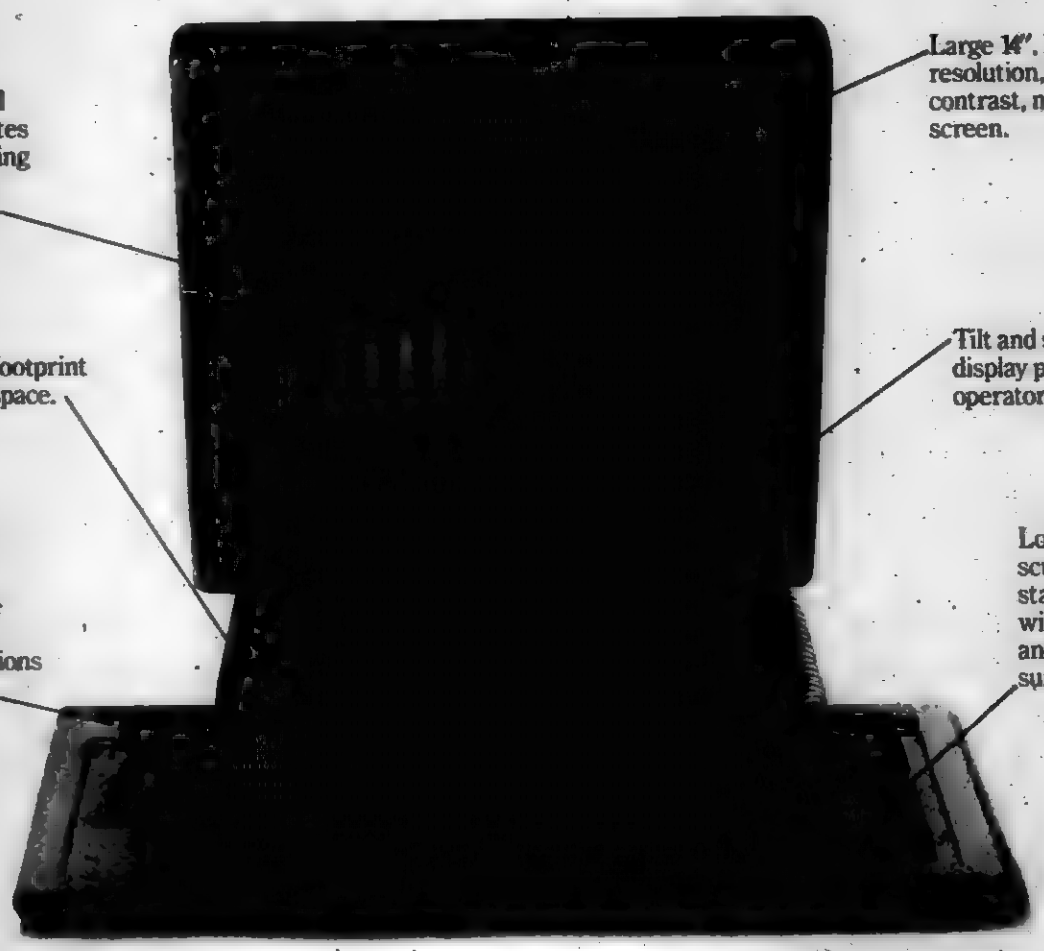
MARTIN MARIETTA

Martin Marietta Data Systems

The company that gives you RAMIS® II.

Introducing the next generation in terminals. The Esprit ESP

Never before have so many high performance features been available in one terminal. And for only $695.



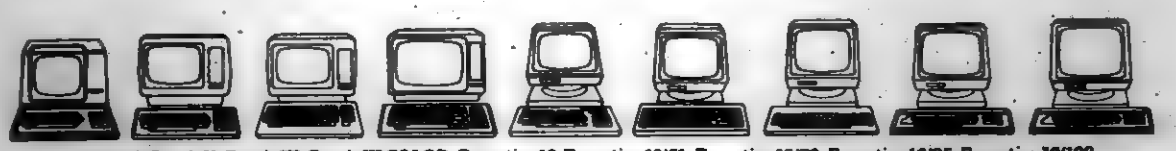
The ESP 6310 is the first of our new family of terminals with a new look and features you won't find in other terminals.

It provides enhanced performance and incorporates emulations of the TeleVideo 925/910 PLUS*®, ADDS Regent 25/Viewpoint*® and Lear Siegler ADM3A*®, as well as the popular Esprit series.

And yet, with all the high performance features, the ESP 6310 is priced below other terminals in its class.

Find out for yourself what makes the ESP truly the next generation in terminals.

Esprit Systems, Inc., 100 Marcus Drive, Melville, NY 11747, 800-645-4508. In N.Y.S. call (516) 293-5600.



Esprit I, Esprit II, Esprit III, Esprit III COLOR, Executive 10, Executive 10/51, Executive 10/78, Executive 10/25, Executive 10/102.

Esprit Systems, Inc.

(TeleVideo 925 is the registered trademark of TeleVideo Systems, Inc. Regent 25/Viewpoint is the registered trademark of Applied Digital Data Systems, Inc. ADM3A is the registered trademark of Lear Siegler, Inc.)

SOFTWARE & SERVICES

Two DBMS types seen emerging

SOFTLINE

WILLIAM INMON

It seems that an evolution is occurring in data bases in the mid-1980s. In the large mainframe environment, the most complete embodiment of the original notion of data base was the "full-function" data base management system (DBMS). This is one that fulfilled the original goals of the data base while interfacing with or containing a teleprocessing monitor and interfacing with a standard operating system. It also handled a wide range of application functions and could handle both small and very large amounts of data. The standard for the full-function DBMS was IBM's IMS.

But there are signs that the DBMS is evolving from a full-function DBMS toward two types of DBMS — a high-performance DBMS and a decision support DBMS (Figure 1). The evolution is shaped by the realization that high-performance DBMS do not make a good foundation for MIS and that decision support systems do not make a good foundation for operational systems.

One trait of a high-performance DBMS is the very high arrival rate of on-line transactions that can be sustained. In a full-function DBMS, a sustained arrival rate of 20 transactions per second is very good. But in looking at future needs, it is not inconceivable to think in terms of 200 transactions per second.

Another trait of high-performance DBMS is the ability to manage very large amounts of data. The data bases kept by credit bureaus, insurance companies and government agencies fit into this category.

A third criterion for high-performance systems is on-line update data integrity. The on-line update of transactions must remain pure, that is, not interfered with by other on-line transactions acting on the same data at the same time. High-performance systems are optimized

See DBMS page 76

DBMS puts rail firm on track

Relieves MIS of application burden

CHICAGO — Besieged by requests for applications, the MIS department at Trailer Train, a major supplier of intermodal cars to the railroad industry, got back on track with fourth-generation information management technology.

Trailer Train has transferred much of the information processing function from MIS to end users. It has closed the loop with Focus, a nonprocedural data base management system and high-level language from Information Builders, Inc.

Trailer Train's information center has trained over 120 users within a year. Focus applications, accessing files ranging from 2,000 to 100,000 records, have been developed for an IBM MVS/TSO environment running on an IBM 3083 mainframe. "Wherever we can use Focus, we use it," Chuck Malone, manager of MIS, said. "It's much easier and a lot faster than writing a Cobol report program. If you've got to change your program, Focus makes it a lot easier to maintain."

Within the MIS department, Focus is used as part of a project management system tracking all information center requests, users and procedures for administrative reporting and resource management. The system is also used for outlining all productivity improvements developed within the company that replaced manual systems.

"It's easier for me to learn DP than it is for MIS to learn railroad distribution," Bob Caldwell, fleet distributor supervisor, said. "Besides, it might have taken months for the MIS department to develop my resource management program. With Focus, I developed a system that allocates 27,000-plus cars equally among the 10 major railroads by average car cost [and that also tracks] surplus and shortages in order to distribute cars where they are needed in the shortest amount of time. And I did it myself in two weeks."

In addition to leasing flatcars, gondolas and boxcars, Trailer Train spends about $100 million annually on shop maintenance for its cars and about $100 million more on repairs performed by railroads on Trailer Train cars while in service. Trailer Train runs three active maintenance facilities along with a regional distribution center for repair parts.

Pointing out that the maintenance expense is the single largest controllable expense Trailer Train has, Larry Greenfield, director of maintenance planning, estimat-

See FOCUS page 72

Denelcor unleashes HEP/UPX

AURORA, Colo. — Denelcor, Inc. has announced a Unix-based operating system called HEP/UPX for its HEP 1000 series of supercomputers.

According to a spokesman, HEP/UPX incorporates the file system from the University of California at Berkeley's Unix Release 4.2.

The file system is said to facilitate file transfers from most Unix-based workstations, minicomputers and superminicomputers. The vendor spokesman also said the operating system's performance in both time-sharing and real-time applications is significantly higher than Denelcor's HEP/OS operating system, which it replaces.

Denelcor also announced C and Fortran 77 language compilers for the HEP/UPX operating system. The compilers share a common code generator and an optional global optimizer for improved runtime performance, the spokesman said.

According to the vendor, extensions to both languages allow them to take advantage of the HEP 1000 architectural features of parallel execution and variable synchronization.

A source code license for HEP/UPX is priced at $15,000, which includes the C compiler.

The source code license for the Fortran 77 compiler is priced at $7,500, the vendor said.

Denelcor can be reached through P.O. Box 31500, Aurora, Colo. 80041.

IBM

IBM mainframes get data set and catalog management system/72

INSIDE

Systems Software/72
Productivity Aids/80
Application Packages/84
DBMS/90
Remote Computing Services/92
On-Line Data Bases/94

Total DP expenses
Dept. A
Dept. B
Dept. C
Dept. D
Dept. E
KOMAND
Name
Title
Company
Address
City
State
Zip
Phone
Operating System

Apollo recognizes the fact that there are two sides to every professional.

There's a part of a professional that involves their profession.

Then there's the part that goes to meetings, makes presentations, does budget, prepares documents.

According to recent reports, people who work with computers spend some 30% of their day working in their chosen profession. And 70% of their day just getting things done.

So we're announcing some ways for making better use of both sides of their day.

For starters, we've set some new standards in high performance workstations. By introducing a new set of Apollo computational nodes so fast you don't have to wait for them to figure out anything. Even when you're working on Solids Modeling, Image Analysis, Finite Element Analysis, and VLSI Design.

The power of a high-end 32-bit supermini at your desk for a fraction of the price.

The Apollo DN 660 and DN 460.

Inside you'll find up to 4 MB of main memory with full 32-bit architecture and an integrated hardware floating point unit. And enough power to handle up to 24 concurrent processes, each with up to 256 MB of virtual address space. Plus high resolution bit map graphics that among other things, can do area fills at up to 320 million bits per second.

In other words, they've got all the power of a high performance supermini like the VAX 11/780*. Except that they sit at a desk. And go for a fourth of the price.

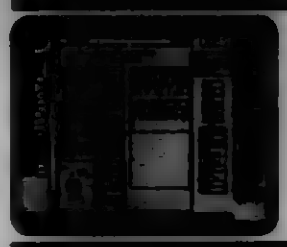
But even more important, each DN 660 and 460 workstation node you add to the Apollo DOMAIN network adds power instead of taking it away. Because each is a 32-bit workstation with network wide virtual memory that lets all Apollo nodes share data, software, programs, and peripherals transparently across the network.

But we've also introduced software that helps professionals work with the other side of their work: DOMAIN Professional Support Services. With Document, Mail, Calc, Calendar and File. All based on the more complex needs of the professional. And fully integrated with your application programs. So you can do all your work on the same system.

All of which should come as a very welcome development to every professional. Because we at Apollo are not simply making computers. We're making workstations that work for professionals.

For more information call or write Marketing Services Director, Dept. J1, Apollo Computer, 15 Elizabeth Drive, Chelmsford, Massachusetts 01824 (617) 256-6600, ext. 6608.

The DN 660 and DN 460 can do state-of-the-art Finite Element Analysis at state-of-the-art speed.



They work on documents the way professionals work.

They do Electronic Mail, Filing and Calendar Management.

apollo

*VAX 11/780 is a trademark of Digital Equipment Corporation.

FOCUS from page 69

ed his department saved $20 million with the help of Focus. "Focus has allowed us to compile 10 years' worth of data covering 100,000 cars, repairs and mileage records. We were able to identify high-cost cars and change our maintenance strategy," he said. "By zeroing in on critical areas, we perform maintenance more frequently, but do less extensive repairs."

Focus programs have been developed that break down by car type and mileage level in order to schedule preventative maintenance; track repetitive repairs to pinpoint which cars to bring in and when; identify which items to fix; and forecast component life. A maintenance plan has been developed that projects mileage 10 years into the future, forecasting the level of maintenance expected as well as the dollars that will be spent. A "most wanted list" has been developed that identifies Trailer Train cars experiencing repetitive repairs and pinpoints the reasons for the defects.

Greenfield pointed out that an ongoing cost of $10 million a year incurred by continually replacing wheels was brought under control by information made available from Focus programs isolating the nature and location of the problem. "Focus opened up a lot of possibilities that we just cringed at before because of the amount of data involved," he said.

"The people in my organization use Focus to extract reports that are not available in a purchasing and materials system in a traditional data base management system such as we have," said Peter Stoyanoff, director of material management. "Normally, it could take months for people to get a report. But now they can get a report the same day."

In the materials area, Focus is used to track the status of defective material returned to suppliers, track the availability of reconditioned material and track scrapped cars and repair histories. In addition, a network has been established between the three major maintenance facilities in California, South Carolina and Florida and corporate headquarters in Chicago for accessing centrally maintained material information. "Key information needed in the shops, such as parts forecasting schedules and inventory reports, is now printed and updated on remote terminals," Stoyanoff said. "It used to run in our corporate Chicago office and had to be mailed to the shops. Now the shops can get it overnight."

"Instead of users requesting numerous changes to the current reports they receive from MIS, they can easily create new reports in Focus with existing data and make ad hoc requests," said Mike Saeger, project leader of the information center. "With Focus you can define multipath structures, enabling the users to request reports in just about any format they want."

The Data Center is under your command.

But is it under your control?

Value Computing's systems management software automates the critical tasks of production forecasting and scheduling, capacity planning, and resource allocation and accounting, and brings those tasks under centralized control. Your control.

The effects on data center operations are immediate: a more stable production environment ... faster turnaround ... fewer manual procedures ... shorter night processing times ... fewer mistakes, mis[illegible] re-runs ... less management dependency on operations personnel.

In short, a smoother running, better performing data center; a center where managers get the most intensive use of all resources. Without making a major capital investment in additional CPUs or peripherals.

We don't believe there's a more cost-effective way to improve the performance of your data center or the value of its position in your company. Call us and find out why more than 1500 users agree.

Value Computing Software Systems:
DCMS—The most powerful and [illegible]ensive production scheduling [illegible]rol system available.
[illegible]-Charge—The industry standard in [illegible]ting and computer billing.
VALU-LIB—An entirely new tape management system designed for today's VS environments.
SMF Express—A unique package for the management of important SMF data.

VALUE COMPUTING
THE OPTIMUM SOFTWARE FOR DATA CENTER MANAGEMENT
Value Computing, Inc., 498 N. Kings Highway, Cherry Hill, NJ 08034 (800) 257-8242. In New Jersey (609) 482-2500

Astute release said to provide data set control

Astco has announced Release 2.2 of Astute, its data set and catalog management system for IBM MVS and OS/VS1 users.

The main element of this release is the Personal Data Set Manager function, which is said to allow users control of their data sets by providing an interactive handle on all other Astute functions.

Individual data sets may be selected and scratched, renamed, cataloged or browsed. An IBM Interactive System Productivity Facility (ISPF) interface is provided that allows execution of ISPF browse and edit functions on any selected data set and also allows any C list or program to be invoked, the company said.

Also included is a C list interface that provides for interaction between Astute and C lists running under ISPF. Commands may be passed to Astute via C list variables; Astute may be directed to store extracted information in C list variables; and any C list may be invoked as an exit.

Astute is priced at $7,000 for the first CPU; multi-CPU and multisite discounts are available. A site license is also available.

Astco, 926 Amarillo Ave., Palo Alto, Calif. 94303.

SYSTEMS SOFTWARE

AMALGAMATED SOFTWARE OF NORTH AMERICA, INC.
Price change for Acceler8

Amalgamated Software of North America, Inc. plans to discontinue discounts to volume purchasers of Acceler8, a utility for the IBM System/34.

After March 31, volume purchasers will pay $3,300 for the utility, which is said to speed random index processing significantly. Users can rent the utility for $150/mo.

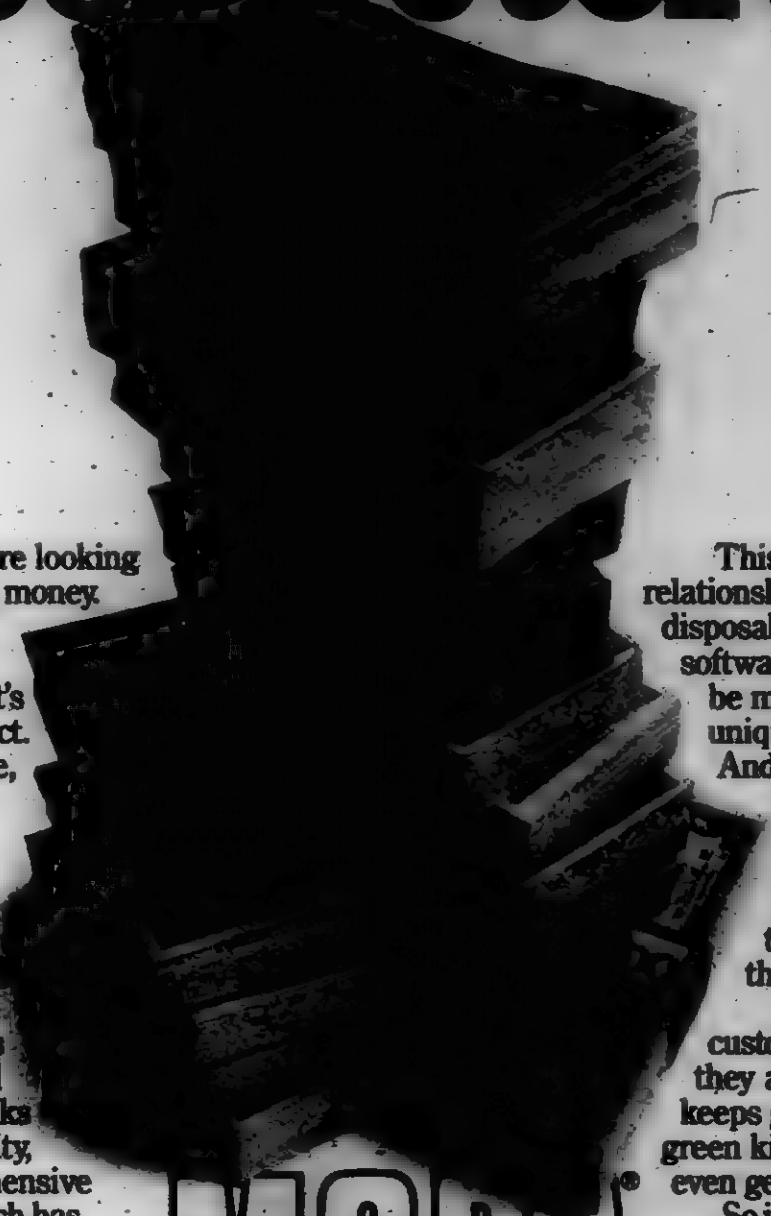
Amalgamated Software of North America, P.O Box 1068, Malibu, Calif. 90265.

DUQUESNE SYSTEMS, INC.
Catalog Performance Optimizer

Duquesne Systems, Inc. has announced its Catalog Performance Optimizer (CPO), designed to improve throughput and response time in IBM MVS systems.

Continued on page 74

MCBA is looking for some professional bill collectors.



More specifically, we're looking for some dealers who like money. Lots of it. Because when you carry our powerful, field-proven software, that's exactly what you can expect.

Why? It's quite simple, really. The quality of MCBA's library of 17 modular manufacturing, distribution, and accounting packages is attested to by over 15,000 users worldwide. In fact, it's really the only serious software of its kind available for mini and micro environments. Thanks its modularity and flexibility, not to mention its comprehensive documentation. All of which has helped us develop and maintain successful relationships with dealers like you for over 10 years now.

This means you can establish a relationship with us and have at your disposal a comprehensive library of software packages. All of which can be mixed or matched to suit the unique needs of your customers. And as your customers grow, they'll come back to you for more business. Because you can expand their systems with totally integrated packages that work with each other like the movement in a Swiss watch.

So no matter what size your customers are now, or what size they are tomorrow, your business keeps growing. And the bills (the green kind) keep pouring in. It might even get embarrassing.

So if you're a dealer who's in it for the money, call MCBA now at (818) 957-2900. You may not end up being famous. But you could end up rich.

MCBA®

Software that grows on you. And with you.™

2441 Honolulu Avenue, Montrose, California 91020

For HP, Wang, DEC, and TI minis and UNIX, and RM/COS-based micros.

MCBA® is a registered trademark of MCBA, Inc.

SOFTWARE & SERVICES

Continued from page 72

CPO intercepts catalog management calls and maintains a list of control-volume entries, the vendor said.

According to the vendor, CPO reduces I/O and CPU overhead required for master catalog searches.

CPO runs on MVS and MVS/XA on IBM 30 series and 370 mainframes, the vendor said.

The product is priced at $7,500, with an introductory price of $5,000 in effect until May 31.

Duquesne Systems, 2 Allegheny Center, Pittsburgh, Pa. 15212.

SPECIALIZED SYSTEMS CONSULTANTS
Unix Command Summary; VI Reference

Specialized Systems Consultants (SSC) has announced two additions to its packet of references for users of the Unix operating system.

The Unix Command Summary includes the commands covered in the Unix Users Manual for Release III and provides examples of common commands and shell references. It costs $6.

The VI Reference, is a reference of commands and options for University of California at Berkeley's Visual Editor. It costs $2.50

SSC, P.O. Box 7, Seattle, Wash. 98125.

NITTANY SYSTEMS, INC.
Westicon

Nittany Systems, Inc. has announced Westicon, a program that converts Westinghouse Electric Corp. Westi terminals into IBM CICS terminals.

The software allows the user to run programs written for Westi under CICS without rewriting the application program or running two monitors concurrently, according to the vendor.

The package costs $15,000 for a perpetual license; an optional annual maintenance fee lists for 10% of the cost.

Nittany Systems, P.O. Box 452, Boalsburg, Pa. 16827.

PROGRAM ACCOUNTABILITY & EVALUATION, INC.
Tuner/38

Program Accountability & Evaluation, Inc. has introduced a performance tuner utility program for the IBM System/38.

Tuner/38 addresses such problems as excessive access paths, large subfiles and unstructured high-level language programs. Features include ability to adjust pool sizes and activity levels gradually and allocate core to the subsystem pools that need it the most.

Tuner/38 is available from the vendor for $650.

Program Accountability & Evaluation, 7 Riverway Road, Salem, Mass. 01970.

BRADMARK COMPUTER SYSTEMS, INC.
Dbcopy II modules

Bradmark Computer Systems, Inc. announced that users can buy individual modules, rather than a complete system, for Dbcopy II, a data base utility for the Hewlett-Packard Co. HP 3000 minicomputer.

Dbcopy II features data set purging, data set rebuilding, detail chain integrity testing and dynamic broken chain restoration. It can reportedly restore a data base or a data base subset from a store or sysdump.

Dbcopy II consists of three utility modules: capacity change, which costs $1,000; complete structural features, priced at $2,500; and standard copying feature, available for $2,000. The complete package is available for $3,500.

Bradmark Computer Systems, 4446 Main St., Buffalo, N.Y. 14226.

ADVANCED SYSTEMS CONCEPTS, INC.
Vaxwatch

Advanced Systems Concepts, Inc. has announced Vaxwatch for Digital Equipment Corp.'s VAX-11 computers.

Vaxwatch is said to allow a user to inspect or modify any terminal session under DEC's VMS operating system. The program will connect into the I/O streams of the "watched" terminal and then log all output into a disk file or another terminal.

Vaxwatch can also be made to observe the terminal from which it was started. If the console is placed in "watch" mode, a listing of all systems events can be captured.

The program can be made to observe a terminal session and dynamically log events to disk on command without interrupting the current process.

Vaxwatch runs under VMS version 3.0 or later and is priced at $495.

Advanced Systems Concepts, 22 Hudson Place, Hoboken, N.J. 07030.

GREENE SOFTWARE
Queue/34

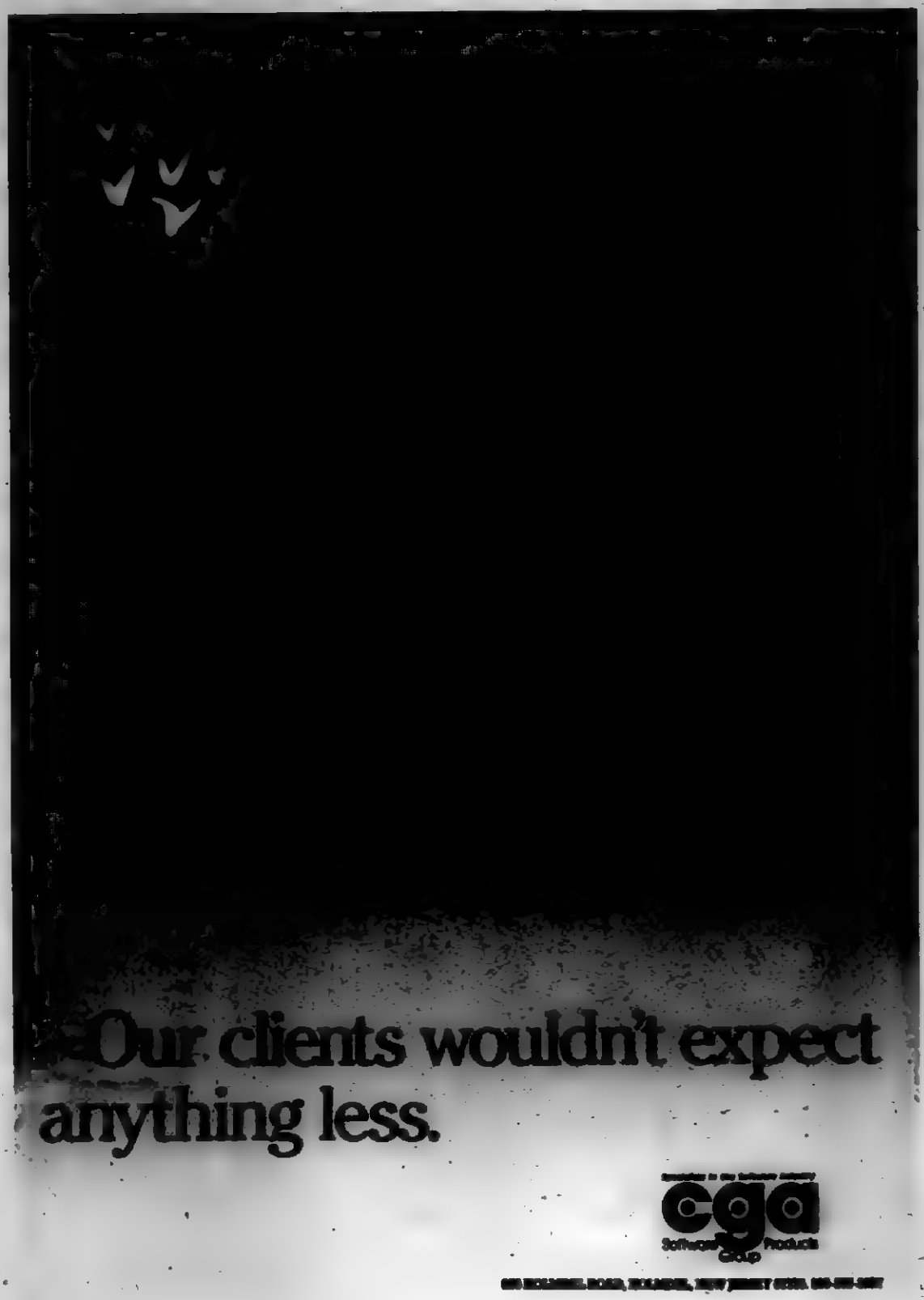
Greene Software has announced Queue/34, which the vendor described as a productivity tool for the IBM System/34.

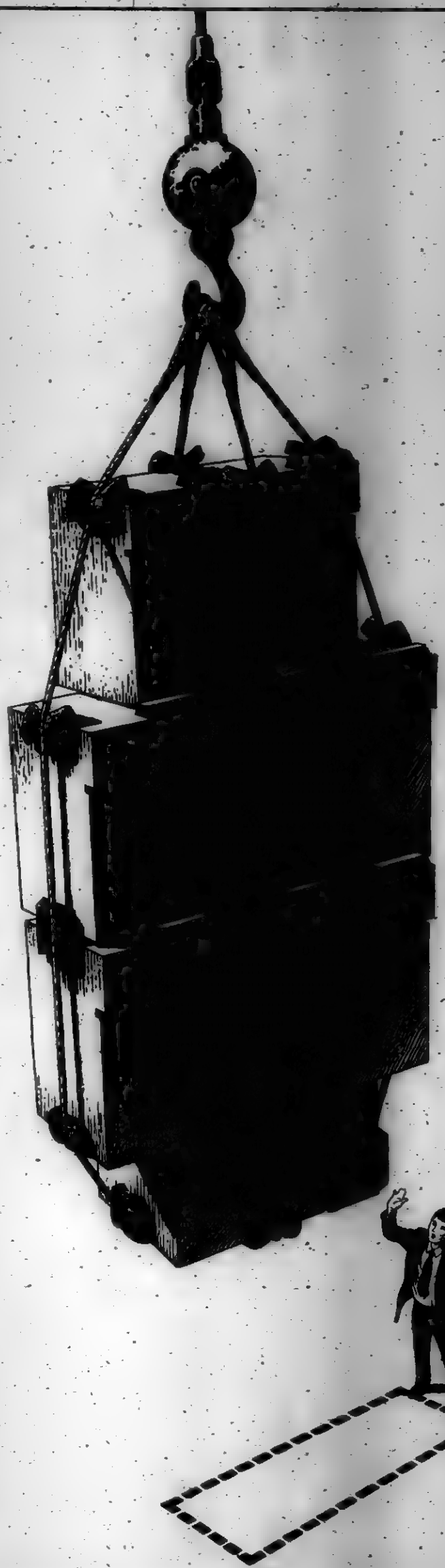
Queue/34 is said to establish an auxiliary batch job queue that allows user jobs to run independently of and concurrently with jobs in the System/34 job queue. The utility reportedly improves utilization of system resources and increases total throughput of the System/34.

The product also includes a set of Help screens. Users reportedly have control of their jobs' positions in the queues, status, start time, execution priority and completion messages through interactive screens. Queue/34 is available for a one-time license fee of $295/CPU.

Greene Software, P.O. Box 23, Victor, N.Y. 14564.

See SOFT page 79





How to put 640 square feet of computer disk storage in a 7′ x 3′ space.

There's no way to store that much data in that little space if you're using disk drives. Even 3380 class. But Masstor Systems' M860 Mass Storage System — a different kind of data storage technology — can solve the problem.

The entry-level M860 stores 55 billion bytes of data on-line and can be expanded to 440 billion bytes. At one-quarter the cost of disk. And less than 4% of the floor space. It also automates tape operations, making processing much faster and more economical.

The M860 is a third storage alternative for your IBM and other plug compatible mainframes. One that offers more on-line storage capacity for your new applications and requires no conversion of your existing programs. Masstor has an M860 solution for Sperry, Honeywell, DEC/VAX and CDC mainframes, too. As well as a way to hook them together in a network: MASSNET.

The M860 and MASSNET are two of a family of Masstor Systems' strategic products that allow you to move, store and share data efficiently and economically.

To find out more, contact Dave Ball at Masstor Systems Corporation, 5200 Great America Parkway, Santa Clara, California 95050. (408) 988-1008. And cut your data storage problems down to size.

MASSTOR SYSTEMS

Strategic solutions to moving, storing and sharing data.

VM/CMS

USERWARE™

A Family of VM Products

SO ADVANCED IT'S SIMPLE

In just 60 days over 100 sites installed the Simple Approach.

BACKUP/CMS
THE SIMPLE APPROACH TO BACKUPS
(VM/CMS Minidisk Backup/Restore Facility)

- Interactive use
- Incremental & full backup capability
- Dynamic password acquisition
- Tape management interface
- Online catalog allows a restoration with only two commands: a FIND and a RESTORE
- No batch processing of any kind

TAPELIB/CMS
THE SIMPLE APPROACH TO TAPE MANAGEMENT
(VM Tape Management Facility)

- Interactive commands
- Full support for SL or NL tapes
- Capability to share tapes
- OS/DOS tape management interface
- Manages tape drive allocation and tape requests
- Active tape catalog
- Full management & audit reports

PPT/CMS
THE SIMPLE APPROACH TO PROGRAMMER PRODUCTIVITY
(VM Programmer Productivity Tools)

- SECURE
- TSCAN
- MODZAP
- TAPECOPY
- SEARCH
- SCRATCH

- All three products can be installed and working for you in the same day, thus saving you valuable time, tape, manpower and computer resources.
- An easy to use online help facility is included with each product.
- No modifications to your VM system are required.
- VM/SP release 3.0 support available.

For under $10,000, you can put all 3 Userware™ products to work in your shop today! Why pay more?

Boole & Babbage, Inc.
510 Oakmead Parkway, Sunnyvale, CA 94086

For more information or a 30-day No Obligation Trial, call (800) 222-8553; in California call (408) 735-9550; or return this coupon.

Name _____ Title _____

Company _____ Phone # ( ) _____

Address _____

City _____ State _____ Zip _____

Boole & Babbage

The single source for harder working software.

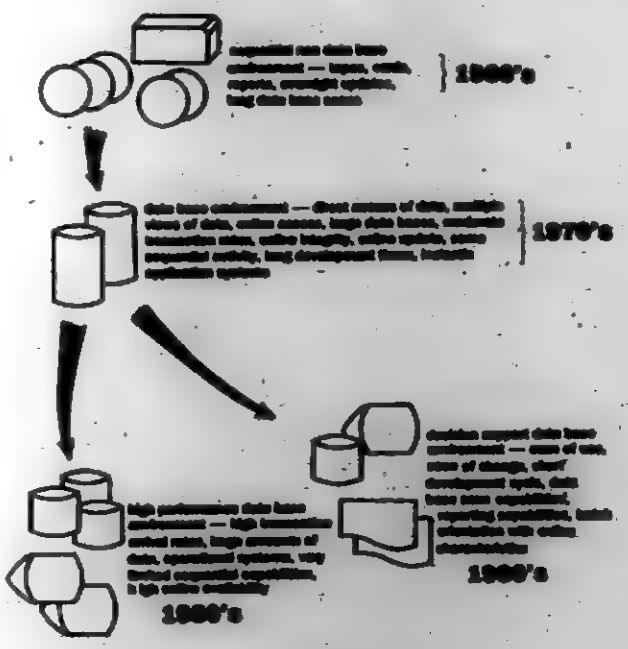


Fig I

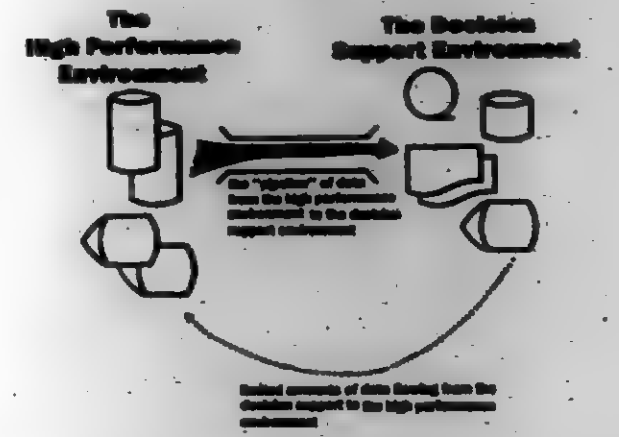


Fig II

DBMS from page 69

to operate on the units of data (segments, records and the like) of a data base rather than on the entire data base. The primary thrust is toward on-line systems, with fast, limited access of data.

Mixing the three criteria is quite challenging. The result is a system that is useful for operational control of a company. Not surprisingly, the high-performance DBMS environment is quite complex.

Reading between the lines of IBM's announcements of IMS Fast Path (for IMS 1.3) would indicate that IBM intends to fill the future needs for high- performance software with Fast Path.

The first-quarter 1984 enhancements of Fast Path extend the capabilities of the previous version significantly. The migration from IMS Full Function to Fast Path is an evolutionary one, not a revolutionary one.

While high-performance DBMS have many operational capabilities, in general they must be used very carefully as they are difficult to change. What is springing up in the void are decision support data base software packages that serve a different audience. Decision support software is easy to change and easy to use in developing new systems.

This software is especially appropriate for unstable environments where the basic form of data is subject to constant and unpredictable change. The difficulties with the long development cycles that are common to high-performance systems are not the same in the decision support environment.

The decision support environment is optimized to manipulate entire data bases in a single request and, to a lesser extent, the units of data within the data base. While there are certain on-line characteristics of decision support software, most of it is designed to operate in a batch or sequential mode.

The decision support environment is optimized to manipulate entire data bases in a single request and, to a lesser extent, the units of data within the data base.

In environments where there is more than a moderate amount of activity and/or where there are large amounts of data, the activities are restricted to limited queries of data. The full range of decision support activities such as updates, large scans of data and other activities requiring many resources are batched and run at night in a sequential mode. Decision support software is typified by IBM's recently announced relational software.

The route from IMS Full Function to relational is made easy by common

See DBMS page 78

AT THE FOREFRONT OF THE REVOLUTION IS THE MULTIFUNCTION WORKSTATION.

THE DATAPOINT 8600.

DATAPOINT

We sparked the re

DBMS from page 76

calls and by extract and load facilities. Like the migration to Fast Path, the path to IBM's relational system is evolutionary.

If the very definition of data base is splitting into two directions, what does that portend for existing IMS Full Function applications? By virtue of the fact that there are literally billions of dollars of full-function applications in existence today, there is a momentum that will not easily change.

Vendor support

What will happen is that as full-function applications reach the end of their life cycle, there will be encouragement by vendors to rebuild the applications in modes other than full function.

High-performance and decision support software will almost certainly not share the same mainframes. If there is a sharing of these resources, it will most likely be on a "duplexed" basis, where the systems run during certain hours of the day in one mode and at other times in another mode. The basic operating characteristics of the systems are such that they are mutually exclusive.

High-performance and decision support systems will share data by means of a "pipeline" connecting them. Entire data bases or large masses of activities will flow from the high-performance environment on a periodic basis.

Reverse data flow

Limited amounts of data will flow in the reverse direction and under stringent conditions. The reverse flow of data will enter the high-performance environment through the sequential capabilities of the high-performance environment as seen in Figure 2 on page 76.

The two types of DBMS operate in essentially different modes, and there will necessarily be wholesale duplication of data between the modes. Within the same mode of operation, there will be an absolute minimum of data duplication.

The direction of other ven-

'Whether the system comes in any other color than beige is not a technical question.'

dors toward the multiple DBMS environment is not as clear as IBM's. The advertisements indicate that the direction is toward both high-performance and decision support at the same time. If that is the case, then Cullinet Software, Inc.'s IDMS appears to be heading for the old idea of a full-function DBMS being all things to all people.

Other DBMS vendors seem to have a more directed pur-

'There is a momentum that will not easily change. . . . What will happen is that as full-function applications reach the end of their life cycle, there will be encouragement by vendors to rebuild the applications in modes other than full function.'

suit of their niches in the marketplace. These include Computer Corp. of America's Model 204, Mathematica Product Group, Inc.'s Ramis, Information Builders, Inc.'s Focus and others.

Those companies with a clear vision of where their role lies in the mainstream of evolution will prosper, whereas those without a clear understanding of the forces of evolution will wither.

Inmon is a director at Coopers & Lybrand in Denver, an author on the subject of data base design and a regular contributor to Softline.

SOFTWARE & SERVICES

SOFT from page 74

VIRTUAL MICROSYSTEMS, INC.
HP Bridge

Virtual Microsystems, Inc. has announced HP Bridge, a board that allows Hewlett-Packard Co. HP 3000 superminicomputers to run Digital Research, Inc.'s CP/M operating system.

The bridge includes a Zilog, Inc. Z80 microprocessor, software utilities for translating data and a license for CP/M, according to a spokesman for the vendor. With the bridge, any HP 3000 terminal acts like a dedicated microcomputer, the spokesman said.

The board and system software to run the board cost $5,000 each.

Virtual Microsystems, Suite 720, 2150 Shattuck Ave., Berkeley, Calif. 94704.

DYLAKOR
Dyl-Security

Dylakor has announced Dyl-Security, said to be a high-speed, re-entrant implementation of the National Bureau of Standards Data Encryption Standard algorithm.

According to the vendor, the system handles most encryption needs with three coding modes and two short block padding modes. It can be invoked with a call verb or its equivalent, and vendor test results indicate that Dyl-Security can encrypt over 90K byte/sec on the IBM Model 3033 processor.

Dyl-Security contains two assembly language modules: encryption and decryption. They can be called in a Cobol or assembler program, or in Dylakor's host languages — DYL-260, DYL-270 and DYL-280.

Dyl-Security is available for IBM's OS, DOS and SSX operating systems on IBM Models 360 and 370, the 30 series, the 4300 series and plug-compatible mainframes. It is priced at $1,000, plus optional maintenance.

Dylakor, 17418 Chatsworth St., P.O. Box 3010, Granada Hills, Calif. 91344.

SIGNAL TECHNOLOGY, INC.
Resource accounting system

Signal Technology, Inc. has announced that its project-based resource accounting system for Digital Equipment Corp. VAX-11 computers can be purchased separately. Previously, the software package could be purchased only in conjunction with the vendor's Process Accounting and Chargeback system software.

The software package reportedly provides three reporting levels for account name, user name and project name. The same user name can be used for multiple projects, and each project name/user name combination can have its own default directory, a spokesman said.

The package ranges in price from $1,000 to $2,200.

Signal Technology, 5951 Encina Road, Goleta, Calif. 93117.

BUSINESS SUPPORT SYSTEMS, INC.
Columnizer

Business Support Systems, Inc. has introduced a software chart program said to simplify the inputting and editing of multicolumn documents on Wang Laboratories, Inc.'s OIS system.

According to the vendor, Columnizer enhances Wang word processing software by eliminating word wrap-around when working with multicolumn applications.

The program features automatic generation of vertical and horizontal lines, the ability to move columns vertically and horizontally, support of up to 15 columns of data, support of columns and row headings and the ability to save specifications for repetitive applications.

Continued on page 80

IBM/38
MAPICs
UNMUZZLED!

Call or write for details on FUSION/4 Media-Independent Retrieval/Query/Report Processor.

NEW! IBM PC program interface supports Lotus 1-2-3, Visicalc, SuperCalc and more.

FUSION
PRODUCTS INTERNATIONAL
(415) 461-4760
900 LARKSPUR L.C. #235
LARKSPUR, CA 94939
TELEX [illegible]

MANUFACTURING MANAGEMENT SOFTWARE FOR HP3000

QED/3000 is a fully integrated system for manufacturing management, comprising: sales order management, materials management, production management, cost management and financial management.

Leading-edge capabilities include bar code data I/O, & AS/RS management. Systems are installed at General Electric, Topaz Electronics, Lear-Siegler and many other small and large companies.

Data Systems for Industry, 3942 Cerritos Ave., Los Alamitos, CA 90720-2475 • (213) 493-4541

FALCON
on-line data entry that's above and beyond the ordinary

For an easy-to-use, completely interactive data entry system that's designed especially for the end user, you need FALCON.

FALCON operates standalone or as a task under CICS and the other major TP monitors giving you total flexibility and performance. It supports both DOS and OS operating systems to provide versatility and upgrading capabilities. And FALCON automatically converts VIDEO/370 formats.

FALCON's high-level security system protects your data against unauthorized access. It lets you decide which operators can use specific functions. And with FALCON you never worry about losing data. If the system fails, all data is recovered. If a terminal breaks down, just go to another terminal, rescue your data, and start working – right where you left off.

FALCON's on-line instructions help you design screen formats, enter and verify data, maintain files, create tables, and submit your own jobs. Just touch a key, tell FALCON what you want to do, and the instructions appear right on the screen.

With FALCON, you can make decisions based on the productivity of your operators without leaving your office.

You can monitor the progress of all active terminals and view job accounting statistics on-line.

FALCON's built-in edits include table lookup, range testing, defaults, balancing, and much more. FALCON goes far beyond other data entry systems to let you use your terminal as an operator's console and view the activity and contents of the input and output queues.

So make sure you're getting the most from your resources. Choose FALCON. Call for a free trial. You'll be glad you made the right choice.

For more information contact
Phoenix Computer Corporation,
11949 Jefferson Boulevard,
Culver City,
California 90230.
Toll free (800) 255-5049 or
(213) 827-4500 in California.

FALCON®

SOFTWARE & SERVICES

Continued from page 79

A permanent license costs $495 for the OIS Master CPU and $1,200 for Wang's Wise Network of four or more CPUs.

Business Support Systems, Suite 102, Executive Place V, 60 Mall Road, Burlington, Mass. 01803.

LOGISTIKOS, INC.
Menu Facility

Logistikos, Inc. has announced Menu Facility, an interactive, menu utility for the IBM System/38 minicomputer.

The menu format allows users to display 96 items in single- or double-col. format, the vendor said. Security features reportedly include password assignment to any menu or menu item, time restriction for certain menu items, tracing of any item and automatic logoff for unused terminals.

Menu Facility costs $495.

Logistikos, Suite 920, One Michigan Ave., Lansing, Mich. 48933.

RD LABS, INC.
RD/Share Release 2.0

RD Labs, Inc. has announced a release of its RD/Share program library management system for the IBM VM/CMS environment.

RD/Share Release 2.0 is said to manage the CMS update facilities allowing for maintenance of multiple levels of change files and effective version control. Enhancements reportedly include improved management reports and an on-line Help facility, support for IBM OS, DOS and CMS targeted compilations, compressed file support and improved documentation.

RD/Share Release 2.0 is priced at $5,475 for a permanent license and $455/mo for lease. It also is available on a rental plan.

RD Labs, P.O. Box 25582, 1779 Tribute Road K-1, Sacramento, Calif. 95865.

SOFTWARE TECHNIQUES, INC.
UTL

Software Techniques, Inc. has announced UTL, a multifunction system utility for processors running under Digital Equipment Corp.'s RSTS/E operating system.

UTL provides on-line control of system operation, replacing seven utilities with one program to save processing time and system memory. UTL incorporates the RSTS/E functions of Utility, Ttyset, Systat, React, ATPK, Umount and Shutup.

The UTL system is priced at $350.

Software Techniques, 5242 Katella Ave., Los Alamitos, Calif. 90720.

SDI
Universal File Portability

SDI has introduced Universal File Portability (UFP), a product which allows interchangeability of storage media with no program changes, recompilation or relink required.

As an introductory offer, UFP is available to SDI software users free of charge and to new customers at a cost of $90/mo on a two-year basis.

SDI, 1700 S. El Camino Real, San Mateo, Calif. 94402.

PRODUCTIVITY AIDS

XXCAL, INC.
XXCalibration

XXCal, Inc. has announced a software testing and evaluation service designed to identify software bugs and suggest improvements before marketing.

With XXCalibration, software authors can test programs for as long as several days and receive a third-party report on technical shortcomings — such as programming and documentation errors — and on nontechnical concerns like ergonomics.

Prices are determined by the complexity of the program, beginning at $30 per man-hour for general-purpose word processing software.

XXCal, Suite 114, 2001 S. Barrington Ave., Los Angeles, Calif. 90025.

See AIDS page 84

What three letters represent the most powerful on-line computer in business today?

TX

The most powerful on-line

Time was, the answer to the previous page was as easy as ABC.

But that was yesterday.

Today, the world of business computing is being introduced to a system featuring over two-and-a-half times the performance and twice the price/performance of its nearest competitor.

A versatile system. Able to compile the information of the largest corporations into a single relational data base. Instantaneously updated and fully available across the entire system.

An expandable and compatible system. Allowing the simple addition of future programs and equipment, without sacrificing past investments.

And most importantly, a system that won't let you down. Because its fault-tolerant design won't let itself down. Even if a major component fails.

This system isn't from IBM.

It's from Tandem.

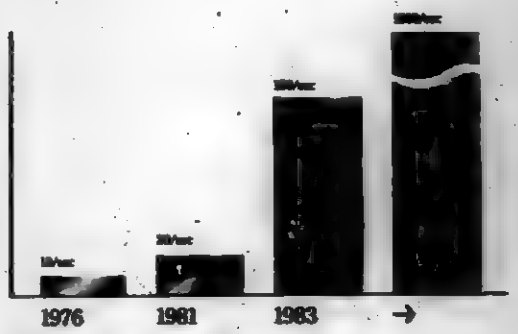
Introducing the NonStop TXP™ system.

TXP: 32-bit transaction processing.

The TXP system processes high volume loads faster and more economically than any other system. Executing over 100 transactions per second now and thousands of transactions in the near future.

It's built around multiple parallel 32-bit processors. Each addressing 16 MB of physical memory and over a gigabyte of virtual memory.

To help memory keep pace with that kind of processing, TXP pulls 64 bits on each memory access.



Our success can be summed up in a second. *Transactions per second. Numbers unsurpassed in the industry. On-line systems that fit your needs today. And tomorrow. With more processing power on the way.*

The TXP system also features parallel data paths. Manipulating 32 bits of information in a single cycle, two 16-bit operations in the same cycle.

And TXP incorporates extensive pipelining, to process multiple instructions simultaneously. Each processor overlaps instructions in three levels: Fetching one, while preprocessing a second, while executing a third.

While helping TXP deliver full 32-bit power, for less.

Cache memory pays off in faster response times.

Cache memory is a high-speed data storage area between the processor and main memory. It lets the processor store more frequently used information closer. So it can get to it faster.

And our tests have shown that the TXP cache memory has a 98% "hit rate." Which means the requested data is virtually always nearby for fast access.

The result? Larger volumes of work can be processed in shorter amounts of time. Helping TXP to be even more productive.

Making cache memory pay big dividends.

A system you'll expand, not disband.

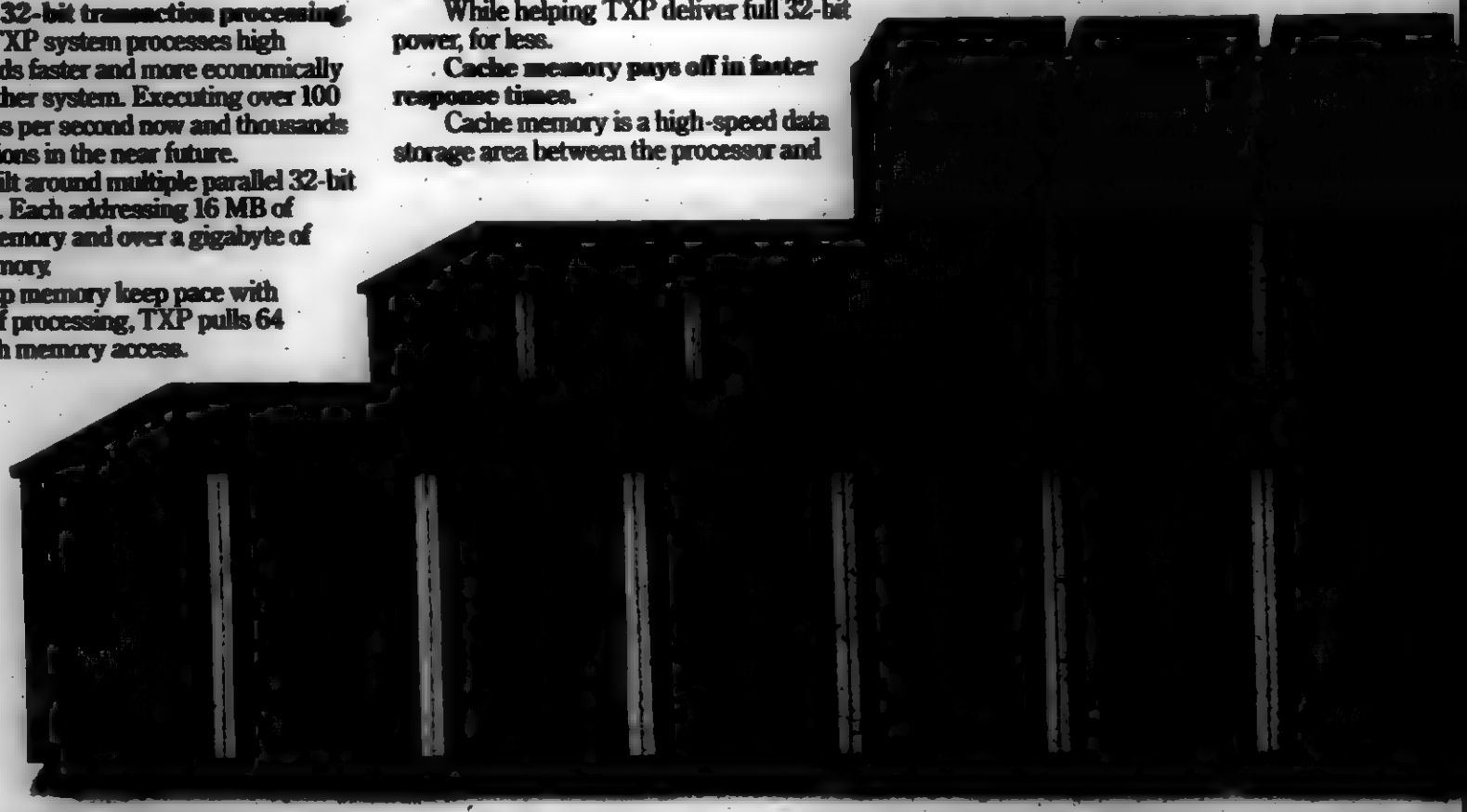
Most computer systems have very limited expandability. So if a company outgrows its computer's capacity, it usually means starting again from scratch.

Selecting and buying a larger and more expensive system.

Then reprogramming.

Then re-training.

Plus all the chaotic disruption and



XP

computer in business today.

massive loss of revenue that's unavoidable during the switch-over.

Not so with the TXP system.

It can expand from two to 16 processors. Increasing its power by a factor of eight.

That's more power than any of the largest mainframes.

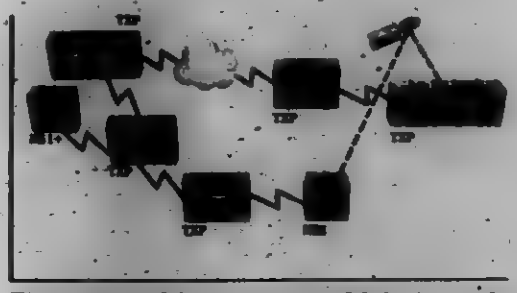
And the additional processors can be installed while TXP is running at full speed. No downtime. No reprogramming.

Still not enough power? Up to 14 TXP systems can be joined together by high-speed fiber optics. Linking the systems together as one computer with 224 processors.

But that still isn't the full potential of the TXP.

TXP systems at up to 255 sites can be joined in a worldwide network. Generating the power of over 4,000 processors.

And that gives TXP the most powerful on-line computer capacity in business.



The most powerful computer network in business today. Users access a single unified global data base from any of thousands of terminals anywhere in the system.

Expandability our competition wishes they could disband.

NonStop™ system compatibility from the people who started it all.

TXP can process more information and support more programs, users and devices than any other computer designed for on-line transaction processing.

Devices you most likely already have.

Even devices made by IBM.

But what if your company isn't quite ready for the TXP system's awesome power?

We suggest the Tandem NonStop II™ system. The second most powerful on-line computer in business today. The cost effective solution for medium to large corporations.

What if your company is somewhere between a Nonstop II and a TXP?

No problem. They can be combined. They can share the same data and programs. In fact, NonStop II and TXP processors can coexist in the same cabinets.

And what if your company needs even a smaller computer? We make a smaller computer. The Tandem NonStop 1+ system. Perfect for those low-volume sites where less processing power is needed.

Tandem literally wrote the book on NonStop™ transaction processing. That's because we introduced the first NonStop system.

Over eight years ago.

And for over eight straight years, despite attempts by others, we've continued to lead the industry.

Learn all about TXP, ASAP.

For complete literature, contact your local Tandem Sales Office.

Or write Tandem Computers Incorporated, 19333 Vallco Parkway, Cupertino, California 95014.

Or call us, toll-free. (800) 482-6336.

TXP is the most powerful on-line computer in business today.

Without question.

TANDEM

NonStop Transaction Processing

©1983 Tandem Computers Incorporated

SOFTWARE & SERVICES

AIDS from page 80

BUSINESS CONTROLS CORP.
SB-5/CDD interface module

Business Controls Corp. has announced a software module that interfaces its SB-5 Automated Cobol Applications Software Development System with the Digital Equipment Corp. Common Data Dictionary (CDD).

The CDD option is included with many of DEC's VAX-11 series of computer installations. The SB-5 is a system of programs that automates design, production, documentation and maintenance of Cobol applications software for DEC's series of VAX-11 systems and for DEC's PDP-11 and Decsystems 10 and 20. The module costs $5,000.

Business Controls, 507 Blvd., Elmwood Park, N.J. 07407.

MICHAELS, ROSS & COLE, LTD.
Maintainer

Michaels, Ross & Cole, Ltd. has announced Maintainer, a program generator for the IBM System/38.

Maintainer features multi-file editing, on-line Help keys, automatic audit trail for any modifications and message file interface. A single CPU license costs $1,140.

Michaels, Ross & Cole, P.O. Box 4533, Oak Brook, Ill. 60521.

PANSOPHIC SYSTEMS, INC.
EZ/Key

Pansophic Systems, Inc. has announced EZ/Key, an integrated prompter and language-sensitive editor for use with its Easytrieve Plus information retrieval and data management system.

According to the vendor, EZ/Key combines a full-function, menu-driven prompter with a full screen editor, allowing flexibility in either mode of operation. A language-sensitive editor checks all statements for errors and is said to eliminate the need for compile runs while building programs.

EZ/Key is designed for use with IBM's TSO, CMS and CICS teleprocessing environments. For CICS, EZ/Key is available in DOS and OS versions priced at $9,000 and $15,000, respectively.

Pansophic Systems, 709 Enterprise Drive, Oak Brook, Ill. 60521.

MCCOSKER CORP.
Program Genie

McCosker Corp. has announced the Program Genie, said to be an on-line application development system for the IBM System/38.

According to a spokesman, Program Genie is designed to assist in the creation of on-line programs for the System/38. The system will create IBM RPG-III on-line programs based on a physical file Data Dictionary System (DDS) member which exists in a defined library and source DDS file.

Program Genie will create both the DDS display specifications and the RPG-III program code to provide on-line update or display capabilities.

Program Genie is licensed for $3,500.

McCosker, 740 Julie Ann Way, Oakland, Calif. 94621.

APPLICATION PACKAGES

COMPUTER ASSOCIATES INTERNATIONAL, INC.
CA-Asset Management

Computer Associates International, Inc. has announced an on-line, interactive accounting system for tracking capital equipment.

CA-Asset Management is designed to run under IBM's DOS and OS operating systems and is the final release in Computer Associates' Financial Management Software Series.

It is intended for use by companies with significant fixed assets. It reportedly tracks a company's assets, updates the general ledger for depreciation calculations, maintains an audit trail and produces reports.

The software is menu-driven with on-line Help screens. It is designed to calculate tax credits for capital equipment and provide "what-if" projections on depreciation. License fees are $27,500 for DOS systems and $30,000 for OS systems.

Computer Associates International, 125 Jericho Tnpk., Jericho, N.Y. 11753.

See PACKAGES page 86

Tear out this coupon before someone rips off your CICS system.

Unauthorized data access and computer crime are problems you can't afford to ignore. And locks, guards and batch protection can't [illegible] CICS system at its most vulnerable [illegible] terminals.

That's why so many companies have turned to GUARDIAN,™ the security software so effective, it's become an industry standard.

GUARDIAN is comprehensive security. You can protect any number of users, terminals, programs, files and data bases in any combination you choose. And GUARDIAN's new techniques make it easy to define protection down to the field level.

[illegible] installation. It also easier than ever to update GUARDIAN for new rules or personnel. Both temporary and permanent changes can now be made on-line. Most importantly, GUARDIAN provides reports in simple English, so it can be administered by non-technical personnel.

To find out more about the CICS security system with a proven track record, just follow the dotted line or call toll-free 800-526-0272. Don't wait.

Inside every RAY-O-VAC Battery there's a NATURAL current.

SOFTWARE & SERVICES

PACKAGES from page 84

LABORATORY TECHNOLOGIES CORP.
Labtech-PC

Laboratory Technologies Corp. has announced Labtech-PC, a material testing package that includes data acquisition, critical instrument control, display and analysis control modules designed for the IBM Personal Computer.

Materials testing is the measurement of mechanical properties of liquids and solids.

The package uses American Society for Testing Materials standards and analyzes and displays test data in graphics and statistical forms, according to the vendor.

Three cards can be placed in IBM Personal Computer expansion slots: Testmate 1 ($3,500), which provides data acquisition software; Testmate 2 ($5,500), said to include data acquisition and instrument control software; and Testmate 3 ($4,000), which runs either data acquisition or instrument control software.

Laboratories Technologies Corp., 328 Broadway, Cambridge, Mass. 02139.

ABC MANAGEMENT SYSTEMS, INC.
ABC/MM for IBM System/36

ABC Management Systems, Inc. has announced an IBM System/36 minicomputer version of its ABC/MM maintenance management package, previously available only on IBM 370, 4300 and 30 series mainframes.

According to a spokesman, the package is designed for use by manufacturing, processing, utility, gas and oil, transport and industrial, public works, school and hospital facilities. ABC/MM is said to be menu-driven and totally on-line. It combines a common data base and eight integrated program modules which are available separately.

The modules are said to accommodate labor records and time cards, work-order scheduling to available capacity, job estimates and backlog planning, time and accounting performance control, budget control, equipment history, parts and inventory and preventive maintenance. The package requires a minimum of 64K bytes of memory.

ABC/MM is priced between $11,000 and $65,000, depending on the number of modules selected. Maintenance is an additional 10% per year option.

ABC Management Systems, Suite 3, 805 Dupont St., Bellingham, Wash. 98225.

REAL DECISIONS CORP.
1984 'Financial Modeling Decisions'

Real Decisions Corp. (RDC) has announced the publication of the 1984 "Financial Modeling Decisions," which contains reviews of 30 major decision support system products.

In its seventh year of publication, "Financial Modeling Decisions" benchmarks 30 financial modeling software packages with real-life business problems, RDC said. The report tests the products' responses to five classic business problems, including new product planning, cash-flow analysis, long-range planning, sales-driven models and short-term models.

The RDC report displays actual code used to solve portions of each benchmark problem, illustrating the capabilities found in each of the software products.

Separate chapters for each product are said to provide detailed information about capabilities in modeling, "what-if" analysis, data handling, reporting and graphics. The full "Financial Modeling Decisions" report is priced at $995, according to RDC.

Real Decisions, 123 High Ridge Road, Stamford, Conn. 06905.

TRANSCOM DATA SYSTEMS, INC.
Tolas-Salestream

Transcom Data Systems, Inc. has announced an enhancement designed to allow users of the Tolas wholesale and distribution package to provide their salesmen and customers with remote access to host computers.

The enhancement, Tolas-Salestream, reportedly allows direct customer order entries with one-button access from terminals in the customer's place of business and other business functions.

Tolas, which operates on Digital Equipment Corp. VAX-11 and PDP-11 systems, was designed to be customized with the Tolas-Salestream for each user.

It reportedly allows salesmen to use portable terminals to verify item availability, enter orders and provide accurate pricing when calling on customers.

Enhanced versions of Tolas will be available in March.

One-time license fees range from $2,000 to $6,000, depending upon the type of CPU and number of modules, the vendor said.

Transcom Data Systems, 1380 Old Freeport Road, Pittsburgh, Pa. 15238.

FUJITSU SYSTEMS OF AMERICA
7880, 7990 enhancements

Fujitsu Systems of America has introduced two enhancements for its 7880 and 7990 point-of-sale terminals: a dial-out credit authorization system for master terminals or terminal support processors and an interactive post void capability.

According to the vendor, the credit authorization function checks credit, replacing telephone inquiries and searches through credit card control books.

The interactive post void feature requires less entry of information, improving the accuracy of daily totals, a company spokesman said.

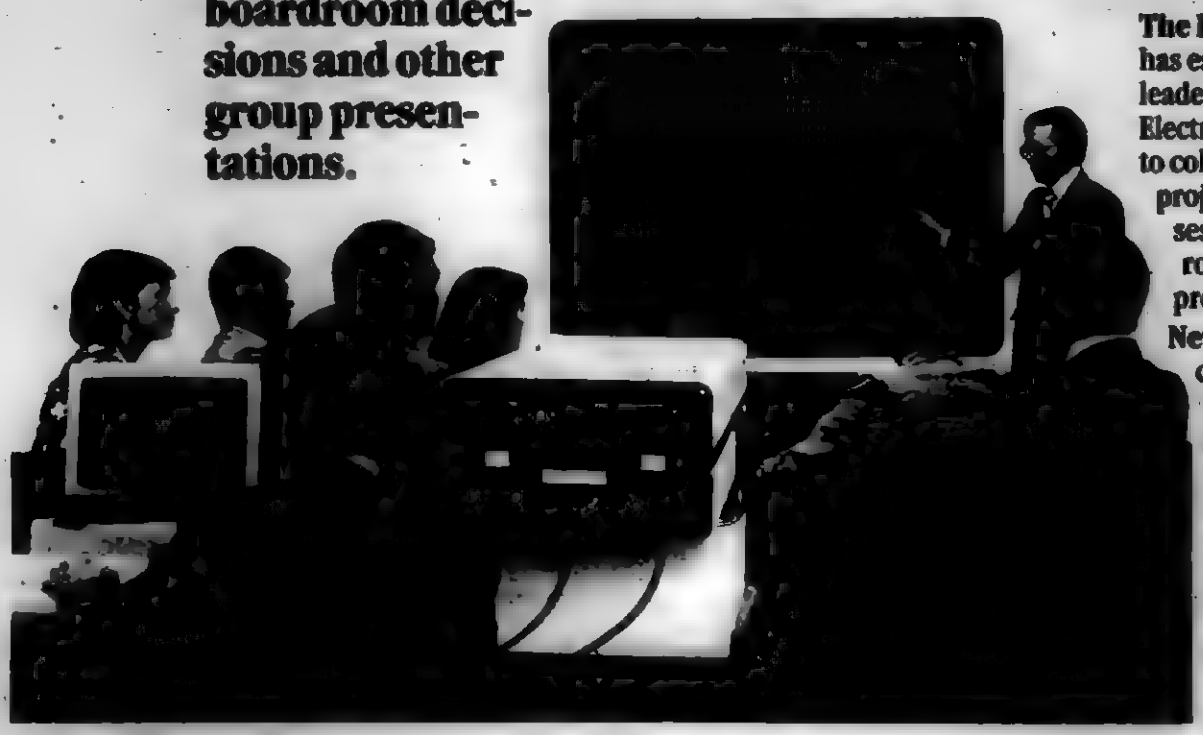
The credit authorization system is priced at $100 per master terminal; the post void is $10 per store-controller.

Fujitsu Systems of America, 3841 Airport Blvd., Los Angeles, Calif. 90045.

NOW ELECTROHOME HAS SIMPLIFIED

Electrohome EDP 57 has achieved worldwide success in monochrome computer projection for training sessions, sales meetings, boardroom decisions and other group presentations.

Now Electrohome ECP 1000 makes it just as easy to project color computer graphics and data or videotapes to big screen size.



The EDP 57 monochrome system has established Electrohome as a leader in computer projection. Now Electrohome is ready for your move to color computers—and your need to project color videotapes in training sessions, sales meetings, boardroom decisions and other group presentations.

New ECP 1000 is so sophisticated, it's simple. You can't imagine how easy it is to set up and operate. Colors are automatically converged in the unit and projected through a single lens—thanks to the Electrohome breakthrough in Laser Aligned Dichroics (LAD).

SOFTWARE & SERVICES

HEWLETT-PACKARD CO.
HP Tex

Hewlett-Packard Co. has announced a document-formatting system for users of its HP 9000 Series 200 16-bit engineering workstations.

Dubbed HP Tex, the package enables users to create and print complex expressions and equations commonly used in scientific and technical fields, according to a spokesman for the vendor. The system utilizes the engineering workstation and the HP 2688A workstation laser printer.

HP Tex accepts text files from the HP 9000 Series 200 computers in stand-alone mode or on HP's Shared Resource Manager, according to a spokesman for the vendor.

Embedded commands can be used to specify formatting features. Page size reportedly can also be specified and printed in a multicolumn format.

The HP Tex formatting system is priced at $4,000. The HP 2688A workstation laser printer is priced at $25,950, and prices for the HP 9000 Series 200 engineering workstation begin at $3,950.

HP, 1820 Embarcadero Road, Palo Alto, Calif. 94303.

MCBA, INC.
Wang M/L

MCBA, Inc. has announced Wang M/L, a mailing-list package written in Cobol for the Wang Laboratories, Inc. Wang VS small business computer.

The Wang M/L interfaces optionally with MCBA's Wang accounts payable, accounts receivable and payroll packages, enabling users to update automatically lists of customers, vendors or employees, according to an MCBA spokeswoman.

The system supports an address list of unlimited size and provides complete letter maintenance, according to the spokeswoman.

In addition, it offers flexible print selection by contact name, company name, Zip Code, date added to the list, date of last change, state, country, source, user-defined codes and status, according to the MCBA spokeswoman.

Source-code licenses for the Wang M/L range in price from $1,500 to $4,000, depending on the Wang VS model.

MCBA, 2441 Honolulu Ave., Montrose, Calif. 91020.

COMPUTER APPLICATION SERVICES
Electronic Mail System

Computer Application Services has introduced the Electronic Mail System (EMS), an application software package which allows users of IBM 3270 series terminals to connect to Telex Corp. Telex and TWX services.

The package adds internal message service to existing IBM 370 and 4300 series mainframe computers running IBM CICS data communications software under IBM OS or DOS operating systems, according to the vendor.

EMS is menu-driven, and the software enables users to reformat and retransmit messages and to retrieve and transmit existing business records without rekeying, according to the vendor.

The software will accommodate up to 100,000 mailboxes and can handle messages as large as 10,000 lines, according to the vendor.

The price is $8,900 for CICS running under OS and $7,500 for CICS running under DOS. The product is marketed by Marc Rubin & Associates.

Marc Rubin & Associates, Suite 210, 12535 Seal Beach Blvd., Seal Beach, Calif. 90740.

HEWLETT-PACKARD CO.
HP Pay

Hewlett-Packard Co. has announced HP Pay, a payroll software package for its HP 3000 line of computers.

The vendor said the system's interactively maintained tables can be tailored to meet user needs, a process that requires no modification of source code or recompilation of code. The system provides menus and interactive screens; real-time updates of data are on-line for review upon data entry.

HP Pay is integrated with HP General Ledger. Data accumulated in HP Pay files can be incorporated in general ledger reports and quarterly and yearly statements, the vendor said.

Provisions are included in the system for all standard U.S. and Canadian government reports.

HP Pay is bundled with implementation assistance and one year of tax information updating. The bundled system is priced at $21,400.

HP, 3000 Hanover St., Palo Alto, Calif. 94304.

GOAL SYSTEMS INTERNATIONAL, INC.
Phoenix Release 4.1

Goal Systems International, Inc. has announced Release 4.1 of the Phoenix System, which the vendor described as a computer-based training system for IBM mainframe and plug-compatible system users.

The new release reportedly features automatic terminal allocation which allows a user to write a sign-on logo, activate automatic registration of terminals, require users to enter account numbers for billing and control display of input fields.

The Phoenix system reportedly provides quick development of courses without programming, immediate delivery of courses to any terminal in a network and updating of course material. Phoenix provides computer-assisted instruction for teaching skills and operating procedures and computer-managed instruction for testing students' skills and for managing employee training time, company training programs and multimedia resources.

Phoenix operates under IBM's VM/CMS, MVS, VS1 and SVS operating systems. A three-year renewable license is priced at $875 per month.

Goal Systems International, 5455 N. High St., Columbus, Ohio 43214.

See PACKAGES page 88

COLOR COMPUTER PROJECTION.

By comparison, other systems have three lenses and dozens of controls that must be adjusted by trial and error to converge colors on the screen. You have easy one-button switching from high resolution data and graphics to brilliant video with lock-in picture size. Ideal for portable or permanent use and for front or rear screen projection. And you can benefit from the last word in color video projection even before you move up to color computers.

ELECTROHOME
ELECTRONICS

Electrohome Limited, 809 Wellington St. N., Kitchener, Ontario, Canada N2G 4J8. Telephone (519) 744-7111. Telex 069-55449.

Please send me more information on the Electrohome
EDP 57 ☐
ECP 1000 ☐
Have a representative call ☐
I would like a demonstration ☐

EDC/C/02-13

Electrohome Limited
Advertising Department
Box 1663
Buffalo, N.Y. 14205

Name _____
Company _____
Position _____
Street _____
City _____ State/Prov. _____
Zip/Postal Code _____ Phone _____

SOFTWARE & SERVICES

PACKAGES from page 87

DATA DECISIONS
Mainframe and minicomputer software survey

Data Decisions has published a survey that describes 87 mainframe and minicomputer business administration and management software packages.

The survey includes dot-chart indexes and written descriptions of key features, according to the vendor. Each entry includes the purpose of the program, installation requirements, unique functions, product interfaces, extra-cost options and source code availability, the vendor said.

The survey costs $29.

Data Decisions, 20 Bruce Road, Cherry Hill, N.J. 08034.

TREE SYSTEMS, INC.
Employee Information System/3000 enhancement

Tree Systems, Inc. has announced an enhanced version of its Employee Information System/3000 software package for IBM and compatible mainframes.

With the new release, on-line, real-time payroll and personnel functions include benefits and compensation administration, Affirmative Action planning, position control, labor distribution and Occupational Safety and Health Administration compliance, according to the vendor.

The enhanced on-line capabilities are said to provide immediate access to the employee master file, optional real-time update and data base inquiry.

The package ranges in price from $75,000 to $175,000.

Tree Systems, 16775 Addison Road, Dallas, Texas 75248.

EPS, INC.
FCS-EPS Version 1.03

EPS, Inc. has announced an enhanced version of its FCS-EPS decision support system for Hewlett-Packard Co.'s HP 3000.

Version 1.03 is said to feature
Continued on page 90

To all reps: Price changes on following items effective immediately: No. 10-11A, 10-114A, 10-A1.

Chris: The latest offer looks better, although it's still not what we were hoping for. Try for another compromise.

Just got the word from Gary. Increased our share by 6%. If trend holds, we'll pass competition by third quarter!

Smartcom II communications software, currently available for IBM PC, DEC Rainbow 100, Xerox 820-II and Kaypro II.

Smartmodem 1200 for all computers with an RS-232C interface; Smartmodem 1200B plug-in board for the IBM PC.

Microcomputer communications? Get control of the situation with

Hayes™

Microcomputer communications can present the DP/MIS staff with a tangle of mis-matched hardware, user-hostile software, and a situation that can quickly get out of hand.

Hayes can help you avert that chaos, with a telecomputing system designed expressly for microcomputers.

A system so advanced, it's downright simple. Economical. And requires no handholding from you.

Hayes. The computer's telephone. Our Smartmodem 300™ and Smartmodem 1200™ connect to any desktop computer with an RS-232C port. They operate with rotary dial, Touch-Tone® and key-set telephone systems. At full or half duplex. And both feature self-test capabilities, as well as indicator lights and built-in speakers for monitoring calls.

The lower-priced Smartmodem 300 is ideal for local data swaps and communicates at 300 bps. A built-in speed selector on Smartmodem 1200 automatically detects transmission speeds (110, 300 or 1200 bps).

Smartmodem 1200B™ is also available as a plug-in board for IBM® Personal Computers. And Hayes manufactures the Micromodem IIe® for Apple® II, III, IIe and Apple Plus computers, as well. It comes packaged with Smartcom I™ communications software.

Speaking of software, more programs are written for Hayes modems than for any other. And that impressive list includes our own incomparable communications software. Smartcom II.™ Complete, menu-driven software for the IBM PC, DEC Rainbow 100,™ Xerox 820-II™ and Kaypro II.™ Even first-time communicators will find success with Smartcom II. Screen prompts guide users in the simple steps it takes to create, send, receive, list, edit, name and re-name files.

Tasks like simultaneously receiving, printing and storing data—completely unattended—are easily managed with Smartcom II, because it takes full advantage of Smartmodem's capabilities.

The program reduces lengthy dial-up and log-on sequences to a single keystroke. It stores communications parameters for 25 remote systems.

Plus, there's an on-line help feature that explains prompts, messages and parameters.

Our reputation speaks for itself. Hayes has five years of solid leadership in the microcomputer industry. Nationwide availability through retail computer stores. Trouble-free factory service and call-in assistance. A limited two-year warranty on all hardware. And the most efficient telecomputing system available. Anywhere.

If you're involved in linking micros or setting standards for configurations, remember this. Everything your people need to know about communications can be summed up in one word: Hayes.

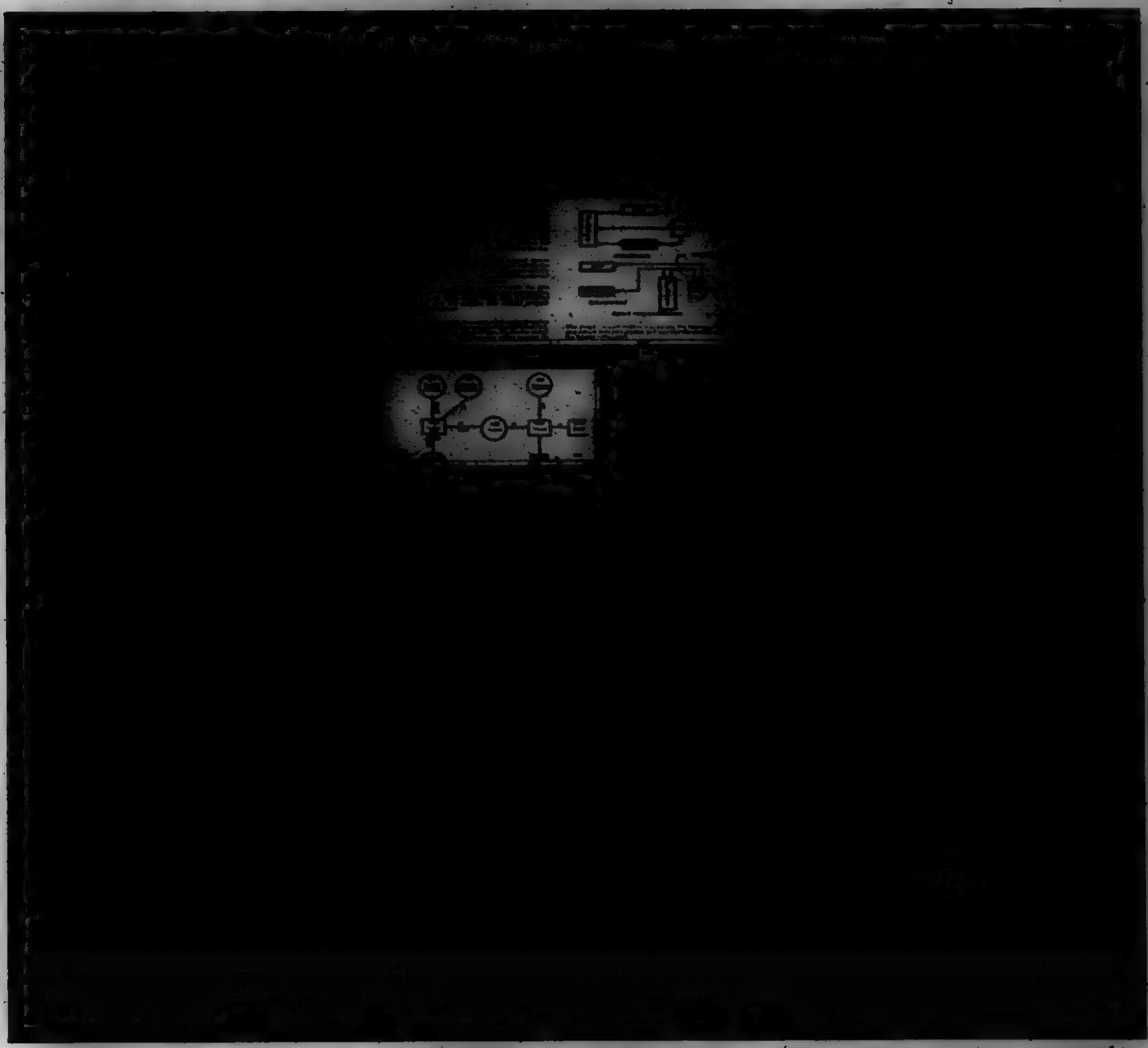
Hayes® Microcomputer Products, Inc., 5923 Peachtree Industrial Blvd., Norcross, GA 30092. 404/441-1617.

Micromodem IIe is a registered trademark of Hayes Microcomputer Products, Inc.
Smartmodem 300, Smartmodem 1200, Smartmodem 1200B, Smartcom I and Smartcom II are trademarks of Hayes Microcomputer Products, Inc.
Touch-Tone is a registered service mark of American Telephone and Telegraph.
IBM is a registered trademark of International Business Machines Corp.
Apple is a registered trademark of Apple Computer, Inc.
DEC Rainbow 100 is a trademark of Digital Equipment Corporation.
Xerox 820-II is a trademark of Xerox Corporation.
Kaypro II is a trademark of Non-Linear Systems.
Z8 is a trademark of Zilog, Inc.
©1983 Hayes Microcomputer Products, Inc.

Smartmodem Specifications:
Low Speed Data Formats (Smartmodem 1200 and Smartmodem 300) Serial, binary, asynchronous: 7 or 8 data bits; 1 or 2 stop bits; odd, even or no parity (0-300 bps).
High Speed Data Formats (Smartmodem 1200) Serial, binary, asynchronous: 7 data bits, 1 or 2 stop bits; odd, even, or fixed parity or 8 data bits, 1 or 2 stop bits; no parity (1200 bps).
Dialing Capability: Touch-Tone® and rotary-dial pulse dialing.
Command Buffer: 40 characters.
Commands (unnecessary with Smartcom II software): A: Immediate answer. A/: Repeat last command. C: Transmitter Carrier. D: Dial command, including simple dialing, waiting for second dial tone, auto-dialing and other features. E: Local echo. F: Full/half duplex. H: Switch hook. M: Audio monitor. O: On-Line. P: Pulse dialing. Q: Quiet mode. R: Reverse originate/answer mode. S: If "Set" commands speed, escape code character, number of rings to answer on, etc. S?: Checks operational parameters above. T: Touch-Tone dialing. V: Verbal result codes.
Result Codes (can be numerical/verbal): 0/OK: Command line ok. 1/Connect: Carrier detected. 2/Ring: Phone is ringing. 3/No Carrier: Carrier lost or never heard. 4/Error: Error in command line. 5/Connect 1200: Carrier detected at 1200 bps. (Smartmodem 1200 only.)
Audio Monitor: Two-inch speaker with volume control.
Rear Panel: On-off switch, power jack, RS-232C connector, modular phone jack connector, volume control.
Operation: Full or half duplex.
Data Rates: 0-300 bps and 1200 bps for Smartmodem 1200; 0-300 bps for Smartmodem 300.
Interface: RS-232C.
Intelligence: Z8™ microprocessor with 4K byte control program for Smartmodem 1200; Z8 microprocessor with 2K byte control program for Smartmodem 300.
Modem Capability: Bell System 103 or 212A compatible originate or answer mode for Smartmodem 1200; Bell System 103 compatible originate or answer mode for Smartmodem 300.
Receive Sensitivity: -9dBm for Smartmodem 1200; -6dBm for Smartmodem 300.
Transmit Levels: -10dBm.
Registration: FCC registered for direct connect to the nationwide phone system. Connects with modular jacks RJ11W, RJ12C, RJ21W, RJ22C, RJ31W, RJ32C.
Power Pack: U.L. listed 120VAC, 60Hz, 13.5VAC output.
Size: 2.5" × 5.5" × 9.0"

The genius of Team Xerox.

XEROX



The 8010 professional workstation has always been known as a computer of dazzling capabilities, especially in its graphics, information processing and document preparation.

Team Xerox

But what some people may not know is that the 8010 is also the key element in Team Xerox, a system of office machines designed to work together like a team.

When part of an Ethernet network, the 8010 can work with a wide array of word processors, mainframes, personal and business computers, printers, electronic mail and file services, facsimile terminals, communicating Memorywriters, other networks and, of course, other 8010's. It also provides 3270 and TTY emulation.

Its full 17" bit-mapped screen lets you view two full pages simultaneously and open up to six documents at a time without covering up a previous document.

It's also the only workstation that can create and print documents in more than a dozen languages, including Russian and, for the first time, Japanese (Katakana, Hiragana and Kanji).

While other workstations may use Xerox innovations like the mouse, icons, windows, property sheets and combined text and graphics, the 8010 simply does more with them.

For example, the 8010's extensive software is fully integrated, to allow you to work with text and graphics simultaneously. You can draw a flowchart right in the middle of a full page of text without having to resort to a separate program and limited buffer "scratchpad" or "clipboard."

In terms of capabilities, ease of use and overall value, the 8010 would have to be considered the stellar workstation in the industry.

For more information, call 800-527-1922 (in Texas, 800-442-0152), or send in the coupon. Or ask anyone who's ever used the 8010.

Xerox Corp., Box 470065, Dallas, Texas 75247.
☐ Please have a sales representative contact me.
☐ Please send me more information.
Name_____ Title_____
Company_____
Address_____ City_____
State_____ Zip_____ Phone_____

SOFTWARE & SERVICES

Continued from page 68

graphics and statistics capabilities and a link to the HP image data base manager.

The graphics module reportedly allows translation of data in a model to a histogram, vertical and horizontal bar charts, pie and star charts and X-Y and bubble plots. The statistical module was designed for basic statistics and test of significance and correlation. The enhanced version is available starting at $25,000.

EPS, One Industrial Drive, Windham, N.H. 03087.

DATA BASE MANAGEMENT SERVICES

SYSTEMS PROGRAMMING LTD.
Adaprep enhancement

Systems Programming Ltd. has announced an enhanced version of Adaprep, a data-dictionary-driven data management language for users of Cobol and PL/1 systems based on Software AG of North America, Inc.'s Adabas data base management system.

The enhancement uses Software AG's Predict data dictionary and integrates it by using the file and field attributes to generate executable code, according to a spokesman for the vendor.

Adaprep is said to cut programming effort by eliminating the need for Direct Call programming or Adamint procedures, as well as automatically integrating and activating the data dictionary, the spokesman for the vendor said.

The product updates the data dictionary with field and file information to produce reports on data base usage by field and program, the spokesman said.

Adaprep is licensed at $17,000 for IBM DOS systems and $21,000 for IBM OS systems, both VS1 and MVS. Maintenance fees are equal to 15% of the license fee, according to the vendor spokesman.

Systems Programming, Suite 220, 131 Stewart St., San Francisco, Calif. 94105.

REMOTE COMPUTING SERVICES

MARTIN MARIETTA DATA SYSTEMS, INC.
Subscription Service

Martin Marietta Data Systems, Inc. has announced the Subscription Service, which the vendor said offers users fixed-price time-sharing on its IBM processors in IBM VM and MVS environments.

A Subscription Service user purchases a block of computer resources at a fixed price rather than paying on a usage basis, a vendor spokesman said.

In addition to the IBM operating systems, users of the Subscription Service have access to a variety of productivity tools and application systems.

Prices for the Subscription Service begin at $15,000/mo, according to the spokesman for the vendor.

Martin Marietta Data Systems, 6303 Ivy Lane, Greenbelt, Md. 20770.

ON-LINE DATA BASES

EUROPEAN LAW CENTRE LTD.; WEST PUBLISHING CO.
Eurolex, Westlaw access

European Law Centre Ltd. and West Publishing Co. have announced a joint agreement to provide mutual access for their subscribers to legal information data bases offered by the companies.

European Law Centre's Eurolex data base is now accessible through West Publishing's Westlaw computer-assisted legal research service, and the Westlaw service is available to Eurolex subscribers.

West Publishing, P.O. Box 43526, 50 W. Kellogg Blvd., St. Paul, Minn. 55164.

SCIENCE/SCOPE

In a step toward faster and more powerful integrated circuits, a Hughes Aircraft Company research team has made submicrometer transistors using focused ion beam lithography. The group made N-channel silicon MOSFETs with self-aligned submicrometer polysilicon gates. The smallest dimension of the gates ranged from 0.35 to 1.2 micrometers. The focused ion beam was used to expose a highly sensitive resist, which provided a mask for reactive ion etching the polysilicon by a combination of chlorine and fluorine-based etch gases. Outstanding electrical performance was obtained for the N-channel FETs, which employed a 100-angstrom-thick gate oxide.

A laser is used to weld certain components of the AMRAAM missile to lower costs and to provide improved performance where low heat distortion is required. The missile's precision RF (radio frequency) seeker antenna is made lightweight and low in cost by laser-welding aluminum foils together. The missile fins are made of laser-welded corrugations and skins to provide strong lightweight surfaces for steering the missile in flight. Hughes designed and developed the Advanced Medium-Range Air-to-Air Missile for the U.S. Air Force and Navy. This laser welding process was developed by Hughes on an Air Force manufacturing technology program. AMRAAM is manufactured in Tucson, Arizona.

The new Telstar 3 communications satellite is providing TV, radio, voice, and high-speed data transmission services within all 50 states, Puerto Rico, and the U.S. Virgin Islands. Telstar 3 is the first in a series of three that Hughes is building for American Telephone and Telegraph Co. The cylindrical satellite measures 7 feet in diameter and stretches more than 22 feet high with its antenna erected and outer solar panel deployed. It operates from a geostationary orbit 22,300 miles above the equator, roughly on line with Houston. The second and third satellites will be launched in 1984 and 1985 aboard the space shuttle.

In a step toward large flat-panel television screens, research scientists at Hughes have developed new mixtures of liquid crystals. A test panel made with the new liquid crystals proved far superior to the kind of displays used in digital watches and calculators. It could be seen clearly at extreme angles without loss of gray scale. The test panel used a mixture of black dye and liquid crystals in a twisted nematic configuration. The transmission-type cells were used with just one polarizer and with diffuse backlighting. The study is part of a program to develop high-performance, flat-panel military displays.

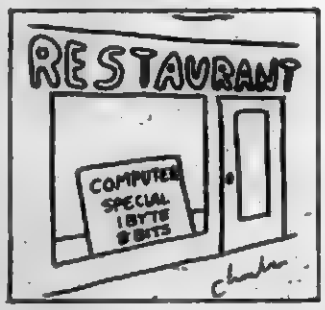
Hughes needs engineers, scientists, and programmers to design and build advanced airborne and spaceborne radar systems, including data links, electronic warfare systems, and display systems. We need systems analysts (communications and control theory, signal processing, applied mathematics), microwave specialists (antenna, receivers, transmitters, data processors), circuit designers (analog, digital, RF/IF), scientific programmers, mechanical designers, systems and test engineers. Send resume to Engineering Employment, Dept. S3, Hughes Radar Systems Group, P.O. Box 92426, Los Angeles, CA 90009. Equal opportunity employer.

Creating a new world with electronics

HUGHES

HUGHES AIRCRAFT COMPANY

For additional information please write to: P.O. Box 92426, Los Angeles, CA 90009



CONTINENTAL RESOURCES.

One company. All the answers.

Whether you're adding high-tech products to your company for the first time or upgrading an existing system, you have a choice: You can deal with multiple vendors, conflicting claims, long lead times and poor service, or you can call Continental Resources.

Whether you're looking for a personal computer, dumb terminal, disk drive, high-speed line printer, data communications equipment, or an advanced graphics system, Continental has the answer. Products of almost every description from virtually every industry leader:

- Anderson Jacobson
- CDC
- Computer Devices
- CIE Terminals
- Digital Equipment
- Diablo
- Data Products
- General Data Comm (or GDC)
- Genicom (G.E.)
- IBM
- Lear Siegler
- Micom
- NEC
- Northern Telecom
- Texas Instruments
- Teletype
- Ventel
- Visual Technology

But Continental doesn't just offer great selection. We provide a total support package unmatched in the industry. Special interface problems? Our Sub-Systems group is expert at solving even the trickiest problems. Complex data communications needs? Our Datacomm group will help you find the best solution. Not sure of what you need? Our specialists will evaluate your needs and recommend the right system for you. **And that means software, too. And supplies like ribbons, printwheels, and paper — even complete work stations.**

In short, you're guaranteed the most informative, professional assistance available — before and after your purchase. And Continental even provides complete on-site service.

Our national network of offices provides sales, technical and service support backed by more than 20 years of experience.

Even if you're not ready to buy, Continental offers a host of rental or leasing options — one is sure to meet your needs. So call us the next time you need high-tech products or services. Continental Resources is the one company with all the answers. **We deliver what you need.**

CONTINENTAL RESOURCES, INC.

175 Middlesex Turnpike, Bedford, MA 01730

Boston Area
(617) 275-0850

Chicago Area
(312) 860-5991

New York, NY
(212) 695-3206

Baltimore-Washington DC
(301) 948-4310

Northern NJ Area
(201) 654-6900

San Francisco Area
(408) 727-9870

Philadelphia Area
(609) 234-5100

Los Angeles Area
(213) 638-0454

Spartacus — the spirit of distributed processing

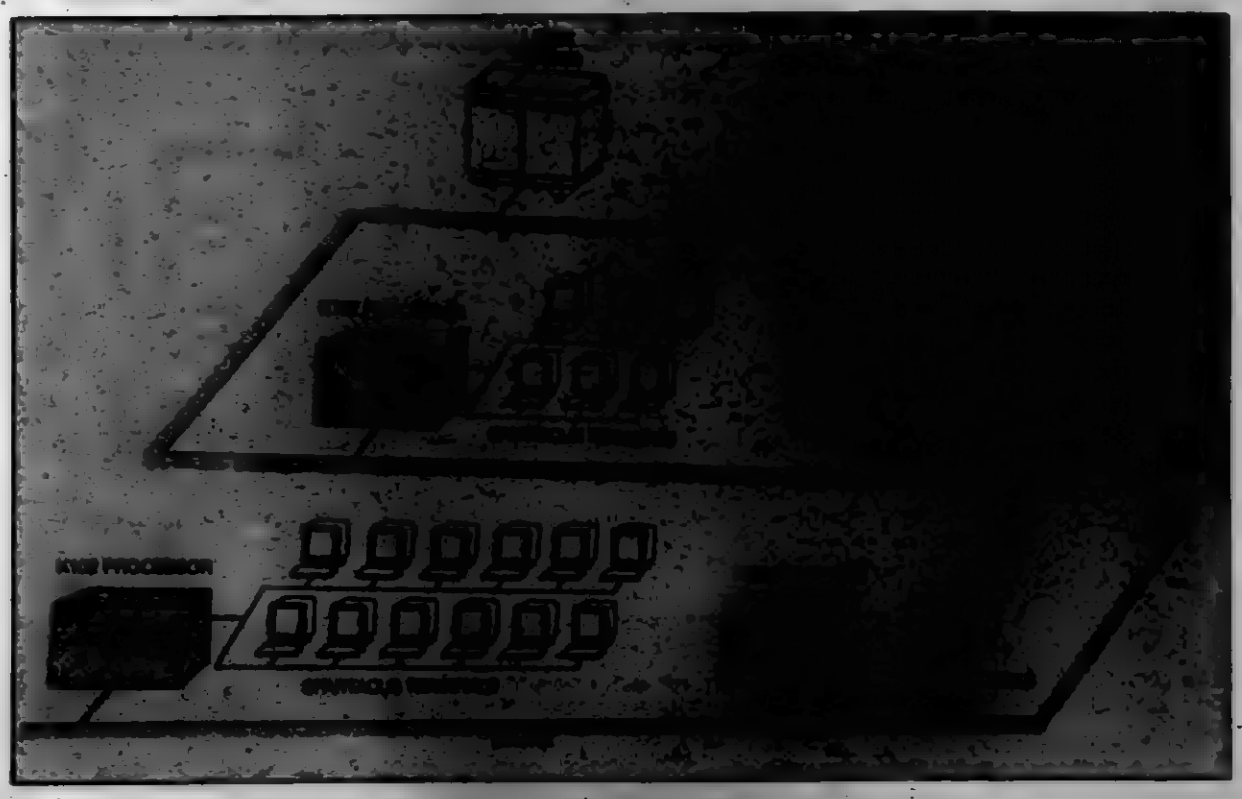
In Spartacus' world of distributed processing, the processor is installed and processing in minutes, the operation requires no skilled operator, the CPU plugs into a standard wall outlet, the "data center" can sit amidst the people who use it and the cost per user falls between $10,000 and $20,000, sometimes less. If that kind of system sounds like a challenge to centralized computing, well, that's what it was designed to be.

George McQuilken — the 41-year-old founder, body and soul of Spartacus Computers, Inc. in Bedford, Mass. — is targeting the mainframe shops that have a heavy investment in IBM systems and software. He conceived the Spartacus System for the office as a distributed processing alternative fully compatible with the IBM 370. The workstation-based system features an Ethernet local-area network control unit.

"We're in rebellion against centralized data processing," McQuilken says. Actually, it is the commitment of so many DP departments to IBM mainframes that gives Spartacus its market opportunity. McQuilken is pitching his system to "the person who wants to preserve the IBM investment but wants to control his or her own destiny."

George Harrar, senior editor of features, interviewed McQuilken in December, a few days after the two-year-old company shipped its first system and hired a new president and chief operating officer. That man is Carl Jansen, the star of Burroughs Corp. television commercials and president of its Business Machines Group. McQuilken, who guided Spartacus' first years in five capacities, by his own choice has cut back to three — chairman of the board, chief executive officer and treasurer.

CW Photo by George Harrar



IN DEPTH

An interview

George McQuilken

You recently installed your first system at Symbolics, Inc. in Cambridge. Was this installation on schedule?

To the day. Unlike most companies, we're pretty conservative. It must be the IBM training. We've run machines here since December of '82. Symbolics was our first real shipment of a manufactured machine, but we have another machine installed at our beta test site, and that ran for three months — the whole test — without failing.

One thing really proving to be important is plant site integration. I can explain that best by contrasting it: Most large computer manufacturers really do the integration of their hardware and software at the customer site. For example, if you buy a computer from IBM, the processor might come from Endicott, the disk might come from San Jose, the tapes might come from Tucson, the terminals might come from Kingston; the software is distributed from Hawthorne, N.Y. This equipment has never run together. Consequently, installing a computer and shooting bugs and so forth can sometimes take several days.

Our machine leaves here with the peripherals integrated. They're all tested with the system, and the operating system and networking software are installed here, too. It's tested here as a complete system. Therefore, it isn't really surprising to us that a machine works when we get it to a customer. It would be more surprising if it didn't.

Your installation at Symbolics took 30 minutes —

Twenty-nine.

Under 30 minutes. That establishes a mark hard for you or any other vendor to match. Were you aiming for that time?

We were aiming for not needing a skilled specialist at the remote site. These are distributed processors. So assume that we sold them to a large insurance company in Boston. They aren't buying them just to use in Boston. They're going to put them all over the U.S. By a trained staff, we mean one to two field engineers and at least one software specialist provided by the customer at a remote site. So the time isn't the thing, it's the fact that we didn't invest three to 10 man-days of effort. Neither we nor the customer put in that type of effort to make the machine go.

How many people from Spartacus were at the site?

Oh, this was our first installation, so there were a few people, but I think only one guy was doing any work. We do believe in the idea that when you send a machine, you do

want to send a man or a woman along to install it. But it's one person, and his skill level needs to be more like a customer support person than an engineer or systems programmer. I'm trying to think how long it takes to set up a personal computer — it's in exactly the same range.

Ours comes in a big crate rather than a cardboard carton, so you have to take your wrench and unbolt the crate, and you have to connect a few cables. That's what takes the 30 minutes. But there is nothing magic about 30 minutes. It doesn't matter if it is 30 minutes or an hour, it's that it can be set up immediately upon receipt and will be running that day.

How involved were you in designing the K102?

The whole preliminary design was done by me. All the major features and capabilities were done by me.

When you set out to develop the system, what features were indispensable in your vision of it?

Operator-less operation — that was the key thing, because if you look at the trends and the economics of computing, it's clear to all of us that hardware is declining rapidly in cost. That's the reason why personal computers and distributed processors are so popular. This has been going on for years. But the cost of supporting the machine — the personnel — is a big factor. When I was still at IBM, they had the largest private network in the world. They have something like 600 processors on five continents and in 90 cities, and you say, "Why aren't there more nodes and more networks like this one." One of the major reasons is that in each and every one of those places, you have a computer room.

Now a computer room, even a small one, can easily cost you a quarter of a million dollars to put in your building. That's a raised floor, extra power and cabling, extra air conditioning. And then almost every system has an operator, trained and skilled. So when you look at the annual operation cost of the computer, what are you going to attack? Well, you can attack the cost of the computer, but you attack these other costs, too.

One of the reasons our machine installs so rapidly is that it runs in a standard office environment off a standard wall outlet. So you see there's little preinstallation work that has to be done. The major thing I wanted to do was build a computer that was IBM-compatible but ran in the office and didn't need a skilled operator. I like the term "midframe." It's 32 bits, and by that I mean it's 32 bits in the processor, in the registers, through the internal buses — none of this fiddling . . . it's a full 32-bit processor. It's fast through the buses, it's fast through the I/O structure. It's much more like a mainframe.

Did you have a target price in mind that you had to come in under?

When I was first starting, I was concerned with cost per user as much as cost per system. It's clear you need a cost per user of under $20,000. I don't know why that's a target. We knew we probably had to target the market under $100,000. There's plenty of room in the $100,000 to $200,000 market also.

One of the reasons our machine installs so rapidly is that it runs in a standard office environment off a standard wall outlet. So you see there's little preinstallation work that has to be done. The major thing I wanted to do was build a computer that was IBM-compatible but ran in the office and didn't need a skilled operator. I like the term "midframe."

Then we looked at features and disk storage. We talked a great deal with possible customers. I had very good contacts in that field, plus I had experience with IBM working and designing distributed processors. Right now the machine can easily come in under $10,000 a user, but again, it depends on the features and processing power. People who are used to using a mainframe use a lot of disk storage in computing. They're not people who can do their work on a personal computer. But we're easily under $20,000 for each user and in most cases we are under $10,000.

With $20,000 per user as an upper limit in your mind, what did you have to leave out of the K102?

You couldn't have made it a single-user workstation, not and maintain the complete IBM compatibility. So there was no choice but to include some of the characteristics of a mainframe and some of a workstation. We focused on the idea that we would appeal to a department of a large company that has a number of users, anywhere from three to 10 people. We felt a department isn't big enough to need 75 users. Then you have a large, time-sharing mainframe.

What kind of system would this department buy from you?

The system is an integrated pack-

RED HOT OFFER.
GET THE NEW ENVISION 215 COLOR GRAPHICS TERMINAL AND GET COLOR ALPHANUMERICS FREE.

You're in for a nice surprise. Because when you buy our new Envision 215 Color Text/Graphics terminal you'll also get color alphanumerics. Free.

WHAT YOU DON'T KNOW

What you might not know is that our new 215 is a low priced terminal with two distinct and very usable talents.

It's an intelligent color graphics terminal which also happens to be a high quality color alphanumerics terminal. But this didn't happen by chance.

We designed both capabilities into the same terminal for one very important reason. You. And quite frankly it makes a great deal of sense because now you don't have to buy two terminals when you want to create color graphics and color alphanumerics. Our new 215 does both exceedingly well.

DID WE GIVE OUR 215 TOO MUCH GRAPHICS CAPABILITY?

Before answering, you should know our 215 is the ideal color graphics terminal for an amazingly large number of applications.

In business, scientific and engineering our new 215 tackles complex color graphics with aplomb.

There's actually a good chance you'll run out of ways to use our 215 in your particular job long before it runs out of color graphics capability.

That's because it's supported by ISSCO, Megatek, Precision Visuals and SAS Institute graphics software.

We also made it compatible with the Tektronix® 4014 which means our 215 is supported by a host of other graphics software packages.

SHARP. PUNCHY. VIVID. COLOR GRAPHICS

You don't have to be an art major to create striking graphics with our 215. You can create vivid 8-color graphics from a palette of 64 colors.

The vivid part comes from the fact that our 215 has a high resolution 640 x 409 display.

It also supports vector drawing in a 16K x 16K virtual address space. All of which means the graphics you create are sharp. Punchy. And vivid.

When you need color graphics in a hurry, our 215 provides complex polygon drawing, vector drawing and fill primitives as standards. And screen copies are easy because our 215 is compatible with our Envision 430 Color VectorPrinter.™

And there's more!

Tektronix is a registered trademark of Tektronix, Inc.
VT-100 is a registered trademark of Digital Equipment Corporation.

age, so when we talk about a system, it has the disk built in and the terminals, of course, attached to it, and it has the operating system software built in. The only things lacking are the user programs and data. Now since we're assuming that this person has a commitment to IBM mainframes, he already has programs and data. They're in the corporate data center on the mainframe. What we have is a networking program to attach to that. That's one of the things we think is a real value-added — we're protecting the investment in programs and data.

IBM software — there's no problem running . . .

No problem. Most IBM software will run with no modification, change or anything on our machine.

You say "most." What would fall in the category of not running?

Things that give you trouble are going from one release to another of IBM software. But I don't like to use the word "most," I like to say "all." But if you look at IBM's recent product announcements, like the XT 370, you notice they say, "This runs most software." IBM has a diversified product line, and it's hard for me to say "all." If IBM won't say that all your software will run on their machines, then I don't think it's fair to ask me to. As much will run on ours as will run on theirs . . . model to model and release to release. For example, the IBM compilers will run on our machine. Some of the decision support software you see around — we've tested things like [Information Builders, Inc.'s] Focus, [Management Decision Systems, Inc.'s] Express and [SAS Institute, Inc.'s] SAS, and that all runs on our machines.

You were targeting a very particular niche in the market.

The broad-scale niche is distributed processing, but the thing we decided is that systems would be easier if the different nodes in the network were compatible. This sounds obvious, but it wasn't obvious when IBM designed the 8100. It isn't obvious to a number of people that in some cases people would get a large IBM mainframe and put a number of DEC [Digital Equipment Corp.] systems or Data General [Corp.] systems around as remote processors. But in most cases, they have run into programming and compatibility problems with these things. So we were trying to build the distributed processor and remove the compatibility problem. That was the niche.

Or to put it another way, there are many people who currently use large mainframes in big organizations and for one reason or another are dissatisfied. They're dissatisfied either because the data center is far away and they can't get their output or the data center distributes charges to them that they think are unreasonable. These people would like to buy a minicomputer, and they may have looked at machines from other people. But the fact is that to do that, they would have to rewrite their programs and they don't want to make that investment. So again, the real niche is the person who wants to preserve the IBM investment but wants to control his or her own destiny. So really, a lot of the people who buy personal computers have some of the characteristics we like.

How about the IBM 4361? That came out after you started Spartacus. Was it a surprise?

No, not at all. There really is nothing new or novel about that processor. It's basically a faster model of the 4331, when you look at it. So they've improved the price/performance in their processors. It would be great for us and for every other competitor of IBM if they never improved their capabilities. But we can't expect that. The 4361 still really is designed to work in a computer room, to have an operator, to have a full complement of disks and peripherals around. I don't know what the average cost of one of those configurations is, but I know the average price of a 4331.

A survey done by International Data Corp. said the average price was $370,000 — that's a complete system, not CPU. So I imagine a 4361 typical configuration comes in at something like $400,000. You can see why I feel that we don't compete directly with a $400,000 machine that needs a computer room and a trained staff.

But if offshoots of the 4361 lead the same way as you are, then they become prime competitors.

That's correct. We do have some features that IBM doesn't have in their machines. I think we're a real technological leader in this business of unattended operation, automatic system start-ups and in terms of built-in diagnostics. But given some lead time and the fact that they might push to learn from our innovative efforts, they could do that.

The one thing we do that they are not likely to do is interface directly to [Xerox Corp.'s] Ethernet. Essential to a distributed processing strategy is good local-area networking. There is a lot of local-area networking, but it varies very much in quality, consistency, types of devices you can attach to it. We know pretty well that IBM will have its own local-area network. We anticipate that they have little motivation to connect to Ethernet and make it easy to attach devices from hundreds of other manufacturers to their machines. We don't have that motivation, so I think our Ethernet strategy alone gives us a market niche which no one

Five different line types are available for vector drawing. Two character fonts are provided. And both fonts can be drawn at four different angles in 16 different sizes.

If all of that's still not enough, don't forget our 215 is also a very versatile color alphanumerics terminal.

INDEPENDENT COLOR ALPHANUMERICS MAKE OUR NEW 215 DOUBLY VALUABLE

We gave our 215 independent memories for graphics and alphanumerics so you can display them separately. Or together.

We also made it VT-100® compatible with programmable soft keys and menu configuration.

You can make characters double width and double height and display 132 column information for maximum viewing.

You can also mix foreground and background colors to highlight different types of data.

A ONE YEAR WARRANTY ON ALL OUR COLOR TERMINALS

When you buy our new 215 we won't forget you. Matter of fact, you'll probably want to know more about our entire family of color graphics terminals. For example, our advanced 230 terminal gives you a local display list for interactive design applications.

Every terminal we make comes with a full one year warranty.

And because they're fully compatible, you can upgrade from one Envision terminal to another as your needs grow. Speaking of needs, you're going to like the human engineering aspects of our terminals almost as much as the capability they give you.

Our 215 for instance is small and ergonomically designed with a detached compact keyboard plus full tilt and swivel convenience. And cursor control can be mouse-driven for optimum operator convenience.

ONE RED HOT OFFER YOU SHOULDN'T PASS UP

We think you'll be impressed with our 215. But don't just take our word for it. Pick up your telephone and call us about a free demo. Or send us the coupon. You'll not only see that our new Envision 215 is a great color graphics terminal. It's also a great color alphanumerics terminal. Best of all, the alphanumerics are yours. Free.

So show a little sporting interest and take us up on our offer. You'll get a red hot demo and a chance to buy two color terminals-in-one. At a price that makes our competitors green with envy. Send us the coupon or call. Envision, 631 River Oaks Parkway, San Jose, CA 95134, (408) 946-9755 or Telex: 176437.

Display samples courtesy of: Megatek and Precision Visuals, Inc.

OK, ENVISION... I CAN'T PASS IT UP. PLEASE CALL ME FOR A DEMO.

NAME

TITLE

COMPANY

ADDRESS

CITY

STATE, ZIP

PHONE

CW 2/13

Envision

else is in right now.

What other strategies do you have or products will you be coming out with, perhaps to counter IBM in one or two years?

I have some pretty good ideas, but I don't want to tell everybody. There's two things I see us as doing probably better than IBM. On the lower end, our virtual machine implementation I believe is superior to theirs. Using the concept of a virtual machine and combining local-area networking with virtual machine concepts are a real value. IBM has pretty much changed its mainframe strategy to its SNA [Systems Network Architecture] strategy to its XA [Extended Architecture] strategy. All those strategies are going to make it hard for them to have a consistent, compatible low-end line of processors. My evidence for that is that they don't have that today. They have at least three lines of processors in the 370 area — they've got the PC XT-370, 4361-class processors with a version of VM and then the XA class processors, without a full VM implementation on them today.

They have three different classes of incompatible machines and slightly different operating systems out there today. So it's hard to see exactly how they are going to do everything we do and be compatible up and down their own product line, which is probably more of a problem for them than we are.

Why did you leave IBM?

To do this — entirely opportunity. I had done a number of relatively successful projects at IBM, and I felt that there were certain barriers there. I like to work on innovative projects that advance the practice of computing. I saw the chance to do that outside as better than inside. I'm not the only one, if you look at all the high-tech start-ups along Rt. 128 here and look at the number of people who felt it was in their best interest to leave DEC or Prime [Computer, Inc.] or Data General and start companies. It's clear I wasn't the only one in the industry feeling this sense of frustration. But it was nothing to do with IBM. IBM is a great company.

Did the opportunity come to you, or did you develop the idea?

I developed the idea myself. I had been working at IBM as editor of the *IBM Systems Journal* and had worked a little bit with the 8100 and SNA people. I then went to IBM's Scientific Center in Cambridge, Mass., and designed the principal distributed processing features that are in the 4300 line today. So I knew I could do this. My project there was ending up. It had been put in the IBM product line — the product division had taken it over. It was time for me to crank up a new project.

So after a great deal of deliberation, I thought if it was time to start cranking up a new project, it was a good time to leave. I didn't want to leave in the middle of a project, and I sure as heck didn't want to design something while I was at IBM and leave and build it, because that would really be unethical. So basically I left with no capital, no job, no anything. In fact, the management there, I think, thought it was rather strange. They had never had anyone resign to take no job before. I was candid. I told them I was going to leave and start a computer company. I don't think they believed me. They may believe me now.

How did you arrange capital?

Over the years, I had paid a lot of attention to things like the MIT Enterprise Forum. I went out and got myself a couple of strong business advisers who were prepared to give me assistance. Their first insistence was that I write a business plan. In a big company, I would have started designing a processor. But, really, I spent the first five or six months out of IBM writing and revising a business plan, recruiting the basic team of people and talking to potential investors. And that was one of the most stressful six months of my life, because my money was running out.

The venture capital community likes a repeater — they like people who have started companies before and who are known to them. I was coming out of IBM; I was unknown to them. So I had to find a couple of investors who weren't professional venture capitalists to put up the first round of seed money, and then I was able to do some pilot studies and licensing of our software to raise some other money. So we were relatively late. We were in business and had machines running before we did our first round of professional venture capital financing. That's actually been good because the early employees and I have maintained much more control of this company than at similar companies, from what I hear.

You have edited the IBM Systems Journal, taught at Boston University and Northeastern University, done design and research at the IBM Scientific Center. Did the venture capitalists look at that background and say, "Well, where is your managerial experience?"

They most certainly did.

How did you answer?

I had never run a big operation, so that was something that was a source of concern to the venture capital community. But from my viewpoint, I knew a fair amount. I reported very high in the IBM organization. My third level manager would have been the president, John Opel. I was certainly one of the youngest manag-

"dBASE II helps keep us on our toes."

Robert Hubert
Marketing Director
The Boston Ballet

"The Boston Ballet was a company in search of a computer when I joined the organization earlier this year. And, after discovering that a large computer system was being considered, I urged a smaller, more sensible first step.

"Since almost no one at The Boston Ballet had any previous computer experience, I strongly recommended the purchase of a microcomputer and dBASE II.

"dBASE II, the relational database management system from Ashton-Tate, would give the people in the Company the time and the opportunity to get used to computing before bringing in a larger, more expensive system later on.

"dBASE II is a command-driven, highly flexible system that can be used for a great variety of applications ranging from very simple to highly complex."

A premier performer from Day One.

"dBASE II manages our extensive season subscriber mailings; keeps track of all our advertising insertions, costs and efficiency; and makes project time management a snap. We are now making plans to use dBASE II in handling the special promotions and manpower analyses critical to our day-to-day management.

"dBASE II made an immediate and sizeable impact on the efficiency of our operation."

The real kicker.

"Recently, we hired a custom systems house to develop a long-range computer program for The Boston Ballet. Without prejudice, they came back and said the new system should be based on dBASE II."

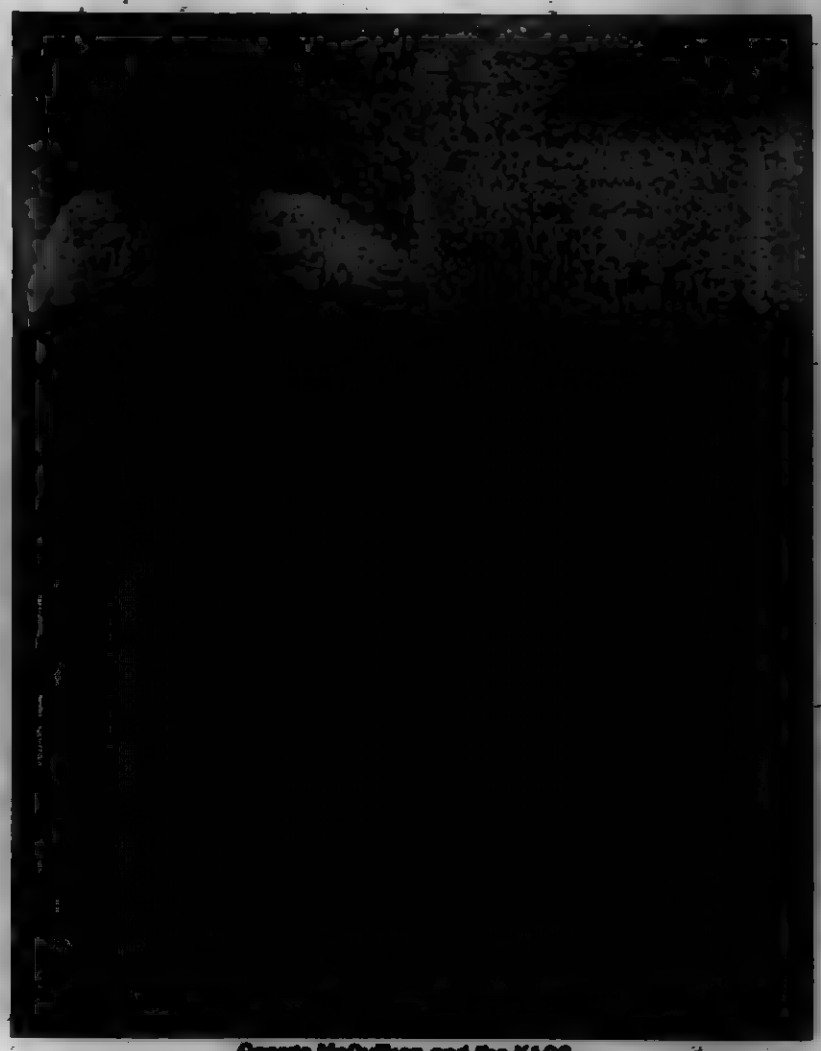
dBASE II can provide you with virtuoso performance, regardless of your application.

For more about dBASE II, contact Ashton-Tate today. 10150 West Jefferson Boulevard, Culver City, CA 90230. (800) 437-4329, ext. 217. In Colorado (303) 799-4900. In the U.K. (0908) 568866.

ASHTON·TATE

dBASE II is a registered trademark of Ashton-Tate.
Suggested retail price for dBASE II is $700.
© Ashton-Tate 1984

IN DEPTH/SPARTACUS



George McQuilkin and the K102

ces at IBM corporate headquarters.

The initial advice the venture capital community gave me was that I should go out and find an experienced executive as a partner, and then the two of us should start a company and they would fund it. I heard this from a number of venture capital firms, so I went on an executive search, and I must have talked with everyone I could find around the Rt. 128 area who had been a high-level executive at one of the other companies.

The problem is that when you have nothing but an idea, you don't have credibility with the venture capitalists and you don't have credibility with other executives either. The type of person who has run a big operation is a little more conservative and isn't impressed by a guy who's working out of his house. To some extent it was fortunate, because I had the pleasure of two years of running the company myself as chairman of the board, chief executive, president, chief operating officer and treasurer. But I'm tired of being all those things. Now we're able to have Carl Jansen join us. Carl has run a $160 million operation at Nixdorf, and he was president of Burroughs Business Machines Group. I think their revenues must be in the $3 billion range. So you see I got a much stronger executive than I could have gotten a year ago.

What will the addition of Carl free you to do?

It has a lot to do with the direction of the company, both the technical direction and the business strategy. In a small company, this is all tied together and there isn't much time to think about the future. It's clear to me that we can't be a one-product company. In fact, we aren't a one-product company. We have a couple of different product lines now. We need to broaden our product line. We have to be prepared for the fact that IBM does introduce new products from time to time, and so I can do all that as well as deal with the financial community.

In order to become a worldwide manufacturing company, we're going to have to raise a substantial amount of money. I also intend to keep the research direction of the company directly under my control. I have no great desire to control a large development organization, I'm concerned about the direction of the company, the direction of research and our external relationships with the technical and academic communities and the business and financial communities.

The other thing is, it was the right time. There's no reason people should think I can run a company with one to 5,000 employees, because I never have. Carl has run bigger operations than that. So I think we have extremely complementary skills.

On a personal level, I will say that I'm coming off close to three years of working 80- to 100-hour weeks, and I'm tired. A good friend of mine called me up. He knew Carl was coming on, and he said, "How does it feel

For $1750 plug into the IBM 3270 with low-cost printers.

InterLynx™/3287 protocol converter features:

- Fully compatible with IBM 3274/3276 controllers.
- Use low-cost ASCII dot matrix and letter quality printers on 3270 controllers.
- 3270 Type A coax-to-async ASCII conversions.
- LU 3 (BSC) and LU1 (SCS SNA/SDLC) modes.
- Full operator panel (including reprint).
- Front panel menu setup.
- RS-232C and Centronics interface standard.
- Pseudo-transparent data feature.

Find out why over 2,000 companies worldwide use Local Data protocol converters to expand their IBM mainframe communication capabilities.

Call today for more information. And ask about our 30-day free trial program.

Local Data

INTERLYNX™/3287

LOCAL DATA • 2701 Toledo Street • Torrance • California • 90503
Telephone 213-320-7126/TLX 182518

"Your Lynx to IBM."

GET A GRIP ON YOUR MAIL MANAGEMENT PROBLEMS.

Benchmark-winning performance nationwide makes COM-MAIL® products the industry standard for speed, accuracy and reliability.

SAVE WITH CARRIER ROUTE SORTING SYSTEM (CRSS). Optimizes postage discounts for greatest bottom line savings. Totally parameter driven. Needs no user coding. No royalty fees. Maintenance optional.

GET ZIP + 4 DISCOUNTS WITH EZ-9. Add the extra 4 digits to your ZIP codes—without programmer intervention—IN ONE PASS of an address file with a ZIP + 4 master file.

MORE HANDS DOWN WINNERS FROM COM-MAIL.

- EZ-5 Zip Code Correction
- List Conversion
- Duplicate Elimination (Merge/Purge)
- Generalized Selection
- Regular Presort
- Label Printing

HAND OVER YOUR MAILING PROBLEMS to the advanced mail management software system with proven performance and savings from day one! COM-MAIL's fully integrated systems, individually or in combination, turn mailing problems into profits.

CALL TOLL FREE
(800) 368-5806
LOCAL (202) 537-7281

COMNET
COMPUTER NETWORK CORPORATION

COM-MAIL® Division, Dept. CW074
5185 MacArthur Boulevard, N.W.
Washington, D.C. 20016-3387

☐ I WANT TO SAVE MONEY IMMEDIATELY. CALL ME TO SET UP A FREE BENCHMARK.
☐ Send more information.

NAME_____
TITLE_____
COMPANY_____
ADDRESS_____
CITY_____
STATE_____ ZIP_____
PHONE_____

Products require IBM/COMPATIBLE or UNIVAC 80/90 MAINFRAME

to be retired?" That's a little extreme because what we're going to do is make the company grow and expand the work load too.

How many employees do you have?

On the payroll, there are 77. Some of those are co-op students and part-timers.

Are you using your connections at Boston University?

We seem to get a lot of people from there. Carl Jansen went there, and he also went to MIT. I'm an MIT grad; they are one of our investors. One of the problems with starting a company is that you have to do everything fast. We were slower at rounding up capital than some of the other companies, but consequently, we got a better deal — we got more capital for less of the company than the other prestige start-ups around here. I was slower to recruit the executive talent, but now I've got probably one of the finest executives we could find to join the company. He knows the IBM world — he was there for 14 or 15 years. He managed their whole sales operation in this region at one time. So you see, we seem to be doing things six months to a year later than conventional wisdom says, but when we do it, it seems to work a little better.

That's measured growth rather than . . .

Oh, we'd like to grow explosively. As an example, the fact that we put a beta test machine out there and it ran for three months without failing, that's very impressive to people. But it didn't surprise me because we didn't ship it until we had machines running for nine months. I hear there are some companies that announce machines that they haven't developed and tested.

You've heard that?

I wouldn't know anything about this myself, of course. Even IBM announced this PC XT-370 and wouldn't even tell you what day they were going to ship it on. They say first customer ship is second quarter, 1984. Because they are IBM, people have confidence in them. But I just mean it's quite common in this industry for people to announce machines they don't have. We've announced machines we do have. We can show them to anybody.

Where would you like to be in terms of size and products in five years?

We're tracking against the real high-growth companies on Rt. 128. You can look at some of the new companies that have gotten off to a successful start, like Stratus Computer, Inc., Apollo Computer, Inc. and Automatix, Inc. It's hard to say we'll do better, but we want to track with the really high-growth companies on 128.

However, there is one thing we want to do a little differently than some of them. A few have been one-product companies that have had meteoric growth and then declined. That's what we don't want to do. We want to have a series of innovative products. I can't tell you specifically what we are going to do, but it will all be in the area of distributed processing and networking. We want to be one of the high-growth companies, but we still want to be around in 10 years. We have a lot of responsibility to our employees, to the widows and orphans who own our stock, to the community at large. I can't think of any decision we've made on a short-term basis.

What kind of pressure do the venture capitalists put on you to show short-term growth, and how involved are they in the direction of the company?

They seem to be more concerned with their companies who aren't making their plans than with companies who are. I find they're great with helpful advice. Very early on, they came in and went over all our budgets, department by department, project to project and never cut a thing. From what I'm hearing now, if anything, they feel our plans are too conservative, that we can really take this company somewhere. At the risk of sounding too rebellious — if I had wanted to have people tell me what to do, I would have stayed at IBM because they had some people who were very effective at doing that. I don't like that very much. But I like to think I take advice very, very well. That's how you build confidence with people.

How much venture capital did you raise?

We've raised over $5 million in capital. The formal fund raising this spring was for $3 million. We've been very frugal. The reason we were frugal is that we didn't have enough money to spend. Carl and I were trained at IBM, so . . .

That brings up the question about a conservative philosophy running a start-up company. Does conservative fiscal philosophy work in a high-growth, start-up atmosphere?

That's a good question; because I've heard people say that a typical California start-up grows twice as fast as an East Coast start-up. So it is true that maybe we are more conservative than we should be. But this is New England.

Did it surprise you that Symbolics is your first user? It doesn't seem to be a typical customer.

HARD FACTS ON SOFTWARE

Israel, a world center for innovative software.

Israel's unique position has created an atmosphere where innovative software development has flourished.

A Meeting of Minds

Join over 3,000 participants from more than 40 countries who will be meeting in Jerusalem from **May 21-25, 1984, at the 4th Jerusalem Conference on Information Technology.**

The conference, together with the concurrent exhibition, will deal with one of the hottest issues of the coming decade: computer technology, applications and software.

The conference will provide a unique forum for experts from all over the world to meet, exchange information and explore new ideas and trends.

A special feature of the conference will be **Executive Track.** This program is oriented towards senior executives and registration is limited.
Participants will include high level executives in both industry and government, from all over the world. Speakers and session moderators are internationally renown leaders in their respective fields
While in Israel you may also choose to attend **Isratech '84,** Israel's showcase of high technology.

On Line to Your Needs

Israel's software houses have specialized in all areas of commercial applications from educational to business; industrial to military and financial to personal.

Information Retrieval

For more information and an invitation to the Jerusalem Conference please write:

The Jerusalem Conference on Information Technology
JCIT-4 Secretariat
P O Box 29313
Tel Aviv, Israel 61292

or

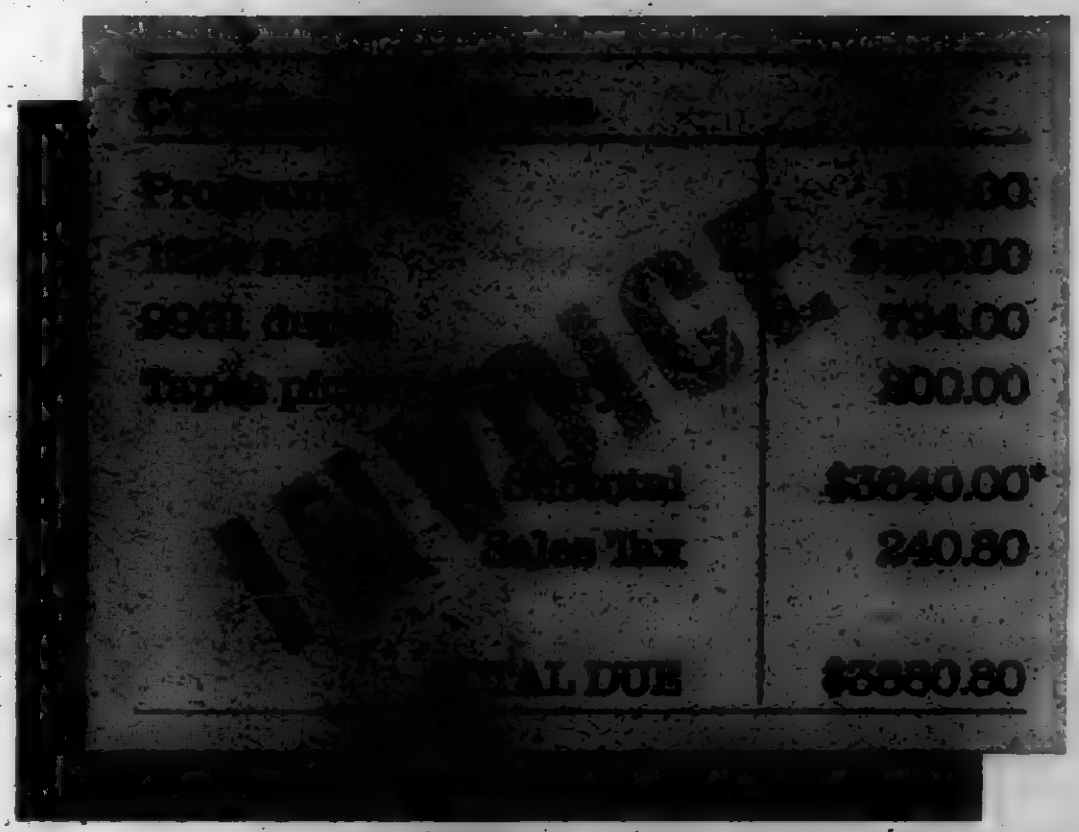
JCIT-4
P.O.Box 639
Silver Springs, MD 20901, USA
Tel: (301)589-8142
Twx: 710 825 0437 IEEECOMPSO

Visit the Israel Software Pavilion in CEBIT-HANOVER, Hall 3, Stand 2105

For an in-depth view of our software capabilities and a catalogue of software houses please contact:

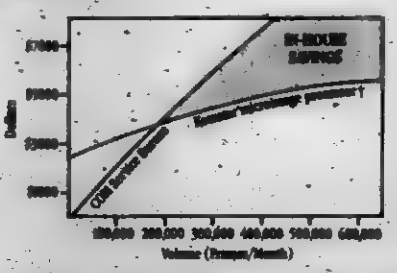
The Israel Export Institute
The Software Center
29 Hamered Street
P.O.Box 50084
Tel Aviv 68125, Israel
Telex: 35613 IL MEMEX

Don't pay this bill.



Run your own in-house COM for less with a Kodak Komstar microimage processor.

The decision is long overdue. Especially if your monthly computer output is close to a quarter-million pages.



That's when a Kodak Komstar microimage processor not only pays great dividends in faster, easier turnaround but can pay for itself in two years or less.

The chart here shows the break-even point based on the above service bureau bill.

But what it doesn't show are all the applications you're probably putting on paper: Internal SYSOUT. Security reports. Or time-sensitive data.

So instead of spending lots of money on a COM Service Bureau, spend it on your own Kodak Komstar 100, 200, or 300 microimage processor.

Send in the coupon today. Or call toll-free 1-800-44KODAK (1-800-445-6325), Ext. 300. And take the smart way out of next month's bills.

Kodak

*Average values based on estimates from available data. †All hardware costs and maintenance contracts are included. © Eastman Kodak Company, 1989

Please have one of your representatives contact me with more information on a Kodak Komstar microimage processor.

NAME _____

COMPANY _____

ADDRESS _____

CITY _____

STATE _____ ZIP _____

TELEPHONE (____) _____

Eastman Kodak Company
Business Systems Markets Division
Dept. DP4512, Rochester, NY 14650

We knew right from the start that Ethernet was a big part of our strategy, so I guess that it wouldn't be surprising that a company that's dedicated to Ethernet wants one of our machines. In fact, we aren't prepared to announce it, but I can say we're running with a couple of million dollars' backlog of some of our products now, and they are all from people who are interested in our Ethernet capability. I might have thought that one of the big IBM-mainframe commercial users around would have been our first ship, but then again, that's [the kind of company] where our beta test machine is running.

Did you realize that Ethernet would be the salient feature in many purchasing decisions?

I felt that it was substantial differentiation. The question is not just the Ethernet, however. If you look around, there are hundreds of companies that have Ethernet now. It's the particular implementation we have that's superior. If anything surprises me, it's that Ethernet isn't more widely adopted than it is today.

What deals can you tell me about right now, including the connection to Nixdorf?

The Nixdorf relationship has been a big boost for us. By working with Nixdorf, we've been able to adopt some of their technologies and components, which has really helped us keep the price of the processor down. In return, we'll be licensing some software to them, which they may or may not choose to introduce into the marketplace. But if they do, that would give us a combined market share.

To a certain extent, it's a pretty complicated relationship, because Nixdorf is a supplier of ours, they are a customer of ours and, of course, to a certain extent, a competitor. That's not that strange a relationship. If you look at Trilogy, for example, it has cooperative deals with Sperry, DEC, Honeywell Bull and so forth. We feel it's probably better to do this than to try to go it alone as a tiny company. But there is nothing restrictive in our agreements with Nixdorf. The principal suppliers are Nixdorf for boards, Visual Technology for displays, Key Tronics for keyboards . . . We must have 50 vendors involved in this.

How is this state for launching a business?

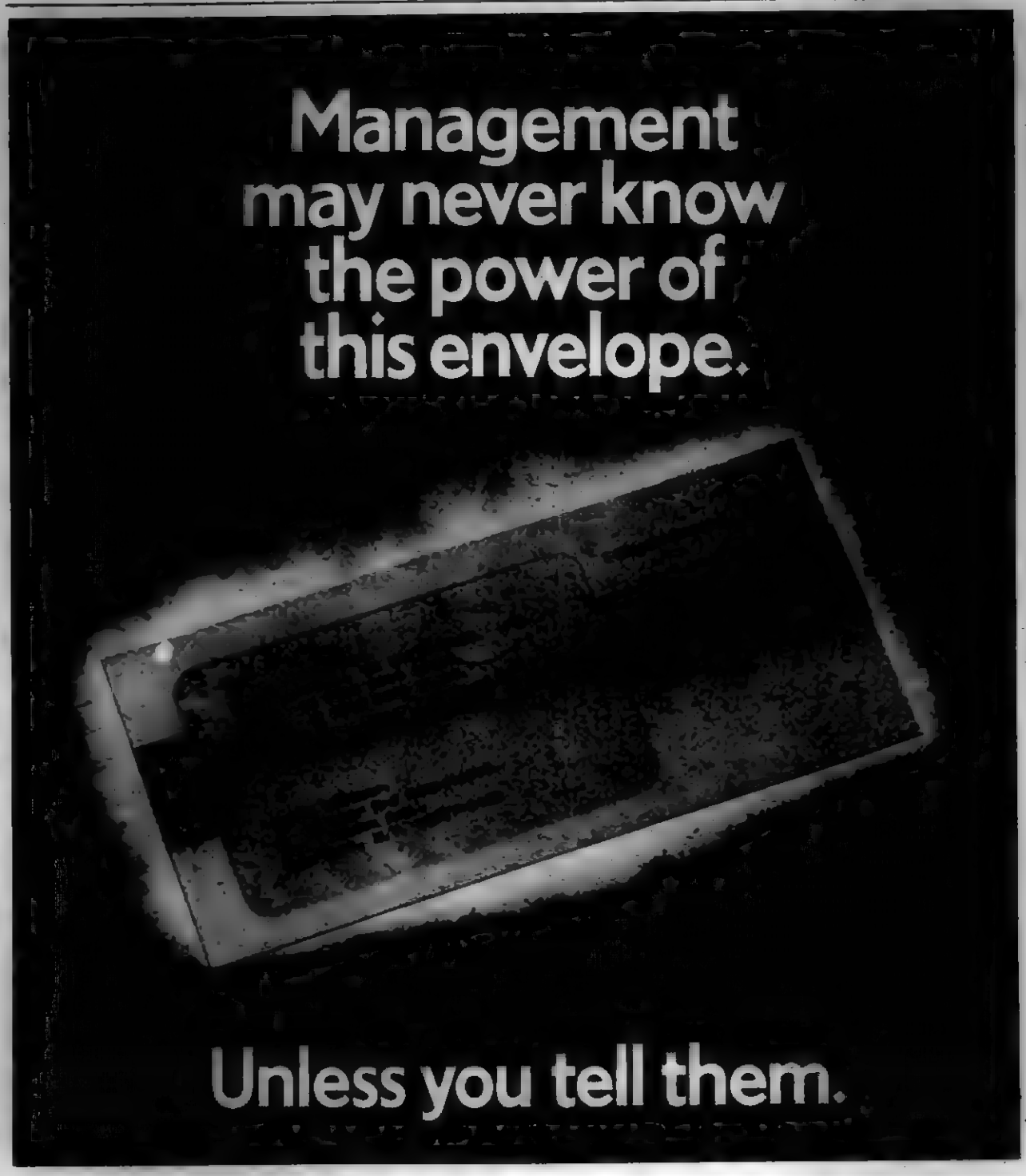
Massachusetts is a great place to start a computer company; that's why so many people do. There is the support infrastructure — the combination of legal, accounting and banking to help start a new company. You have real estate developers who are willing to talk to you. It's pretty risky just for someone to lease us this building. When you are a very early start-up, anyone who does business with you might as well be a venture capitalist. It's just some of the venture capitalists don't get any stock, but they're sure taking a risk.

You also have a highly trained and skilled work force here. Our recruiting has been excellent. We hired IBM's designated area VM specialist. We hired one of the key networking product planners at Wang. There are people around who fabricate computer parts, who make printed circuit boards, who sell cables and connectors and pins.

About everything you need to start and run and operate a computer company exists right here. That's not to say that it doesn't exist other places. I've heard that there's a place in California that has a lot of start-up companies, too. Those are clearly the two areas of the country where you have everything you need to start a company.

This building is getting tight for you in terms of space. Any plans to move or build or lease elsewhere?

We don't want to move too fast. As a start-up company, you never build, because that isn't the most effective use of your capital. At the very best, you lease. What you have to do is find an existing building, because you can't wait. We are already looking for space. This place is full and we don't have enough manufacturing capability, so we're literally borrowing space from people. We're assembling things



You don't have to tell management how easy it is to implement E-COM® service. That can be your secret. Tell them instead about the power of an E-COM service mailing. How letters can be sent right from the company computer. How the Postal Service prints, folds, inserts, seals and delivers these letters for you. How the distinctive blue envelopes of E-COM service lend visibility and impact to your mailing.

Since you're the one who gets E-COM service up and running, you have three options—all of them easy. First, you can write the system interface yourself. It takes about a day, and Postal Service consultants are standing by to give you any help you need. Second, you can buy a dedicated interface from a third-party vendor. Third, you can access E-COM service through an independent communications carrier, without bringing the system in-house at all.

As part of the D.P. department, you're in a unique position to tell your management about the power of E-COM service. So find out more. Call your local Postmaster. You may never again get so much credit for so little work.

E·COM

in other places. We really need a big building, but we aren't prepared to pay for it.

How many systems are you building right now?

Twenty.

They are ordered?

No, unfortunately. Let's put it this way — to handle the anticipated demand, we have one or two still available to qualified purchasers. We're always looking for a few good customers. We can clearly make more machines than we can sell for the time being, unless we come in with a very large contract, which we surely would like to. People don't give large contracts to small companies. Even if they're eventually going to buy 10 of your processors, they take one now. That's the commitment they'll make.

What's a target number to sell in 1984?

I can't really tell you that.

What companies do you want to sell to?

Just get a list of the Fortune 500 or the Fortune 1000. That's obviously the customer base we'd like; the problem is, it's very hard to get in there. There aren't that many computer vendors successfully doing business with them.

What types of companies within that group are most likely to buy from you?

One is the office business functions where they do what you generally classify as decision support. People want to manipulate their own data. The other is probably CAD/CAM (computer-aided design and manufacturing), which is an explosive market for everybody. Those seem to be the two areas that large companies are involved in where the demand for the right product seems almost inexhaustible. How many could be sold? If this was an IBM product, they'd probably sell 25,000 in the next week.

Are you saying that number facetiously?

No, I really believe they'd sell 25,000. They sold 10,000 4331s. They must have sold 25,000 System/34s, or more. But we're a start-up company. We worry about selling 25.

Could this product have been developed at IBM?

It would have taken two years longer. Basically this whole processor was designed and constructed . . . remember, I started by hiring some of my students. So we really started informally. Well, everyone started that way, without an office. I hired my first employee in June 1981; then we started the paperwork to incorporate. The company was officially incorporated in October 1981. We announced a product in October 1983, and then it was a hair longer to first ship. At IBM, the cycle was more like four or five years.

Did you think about suggesting this idea at IBM?

Well, I had left IBM before I had this completely thought out. Suggesting to IBM is kind of a funny thing. I

We were jokingly calling the company Spartacus for the reason that he led the most successful revolt against the centralized Roman empire, and we thought of distributed processing as being a rebellion against centralized computing and centralized mainframes.

mean, there are 360,000 people at IBM. I did approach my management suggesting we attach Ethernet to the 4331s. They were clearly not interested in doing that. They weren't interested then, they don't appear interested now. When I left, it sparked a great deal of interest at IBM about local-area networks, because I was fairly well-known in some areas.

But when I was there, there was no support for a few of the things that we've incorporated into this processor. IBM makes mass-market products, so every product is a compromise. We look at this product and say, "We've got a good product, and we want to sell it." Within IBM, we'd get this far and then someone would say, "I'm not sure if we want to sell it because it would hurt our chances to sell System/34s." There are always competing projects at IBM. You could have a very successful project and not have it come out as a product. That's what takes the extra two years at IBM — the product planning.

The other thing is that if IBM announces it's a product, they'd probably sell 25,000 of them, meaning they'd have to make them. That's a large-scale organizational effort. They also have to train 10,000 sales people.

The problems they have, on the whole, are good problems.

Realistically, they can't act as fast as a small company. On the other side, for a big company, they act pretty fast.

Everything a VAX user could ask for in a storage subsystem.

The Emulex package deal.

Software transparency, low prices, rental/purchase option plans, a trade-in program and a service security blanket. Included are pretested drives and controllers; direct factory installations; fulltime hardware/software applications assistance; and nationwide service through Control Data, General Electric and Tymshare.

Emulex innovation—introducing our Eagle disk/Keystone tape combination.

Where else can you get a unit that optimizes the Fujitsu Eagle's 1.8 MB/sec transfer rate and provides backup, archiving, journaling, and the media interchangeability of ½-inch tape? All in one 42-inch cabinet. Best yet, the FXD-51 is available in six DEC-emulating models for PDP and VAX users on the CMI, SBI or Unibus.

The world's best drives and controllers.

Emulex subsystems let you be very picky. You select proven tape drives and disk drives from 80 to 675 MBytes. Plus you can mix and match fixed and removable disk drives of varying sizes and configurations. At the heart of the subsystem is an Emulex controller designed specifically for your particular DEC CPU.

Emulex has been and continues to be the pioneer in DEC-compatible subsystems. And in each product our objective is clear: to make your DEC system faster, more efficient and capable of processing larger, more complex programs more reliably than any other alternative.

Find out more about the total Emulex package. Phone toll free: (800) 854-7112. In California: (714) 662-5600. Or write: Emulex Corporation, 3545 Harbor Blvd., Costa Mesa, CA 92626.

DEC and Unibus are registered trademarks of Digital Equipment Corp.
Eagle is a trademark of Fujitsu Corp.
Keystone is a trademark of CDC Corp.

EMULEX

The genuine alternative.

GET EVERYBODY ON BOARD.

Now there's a way to let everyone in your company chip in.

AT&T Information Systems, the company whose unparalleled communications heritage has been bringing people together for 100 years, now brings your office together. With state-of-the-art office automation that's designed to get your company moving ahead.

Electronic Document Communications, now available on System 85 and DIMENSION® PBX, is an easy-to-learn software application that's hard to beat. Because it integrates your office by letting everyone prepare, send and store documents and messages with the speed and efficiency of a computer. So you can have better access to the right information in the right form at the right time.

Electronic Document Communications can streamline your office in three ways:

Preparing Information—Reduces the time, effort, cost and wasted paper between drafts by electronically creating, editing and formatting documents and messages. "The Composer," a special software feature, checks spelling, grammar, punctuation and usage. EDC even measures whether documents are readable by technical and nontechnical readers.

Moving Information—Speeds documents to many people in different locations simultaneously so they can act decisively. EDC allows you to determine the timing and cost of delivery, and even check to find out when documents were received. Using a password ensures the privacy of your messages.

Managing and Storing Information—Locates documents, and retrieves and evalu-

ates contents quickly and easily with electronic files—while reducing the possibility of losing documents. An electronic "Mailbox" allows you to quickly determine which documents to read first. EDC reduces storing and filing costs with an electronic "Archives" that allows for either short- or long-term storage, and the "Wastebasket" which enables you to permanently delete items after a determined period of time. There's even an electronic "Calendar" that checks personal schedules and arranges mutually convenient meetings.

Not only will all these features help you further integrate your office, Electronic Document Communications is itself just one part of AT&T's line of completely integrated business systems. For state-of-the-art office automation, you can implement EDC in conjunction with other applications software like Message Center/Directory, a call coverage and message system. These office management applications are now available on System 85 and DIMENSION® 600 and 2000 systems with the Applications Processor.

The result is you'll be able to improve staff productivity at every level and get everybody on board. And as new features are developed in the future, they'll be compatible with your existing equipment.

EDC was developed by Bell Labs systems designers who now work for AT&T Information Systems Laboratories. AT&T Western Electric produces EDC, and AT&T Information Systems will maintain it with comprehensive, conscientious service from the largest service organization in the industry. To find out more, call toll-free 1-800-247-1212, Ext. 879M.

AT&T's Electronic Document Communications: It's part of the integrated office of tomorrow that you can board today.

AT&T Information Systems

Did you pick the name Spartacus?

Yes. It almost came out of a joke. When you have a group of volunteers and you're trying to start a company, if you don't watch it, you find you're spending all your time discussing two things: where the company is going to be — and everyone wants it close to their house — and what the name is. This gets silly, because you don't have any capital, and you don't know if you'll ever get started, and you're discussing these things.

We were jokingly calling it Spartacus for the reason that he led the most successful revolt against the centralized Roman empire, and we thought of distributed processing as being a rebellion against centralized computing and centralized mainframes. So all of a sudden, I started saying, "OK, from now on, it's Spartacus," and it has been Spartacus ever since. If there's anything unfortunate about it, it's that I don't want to give people the idea that we're somehow battling IBM. Our products are really complementary to IBM's. The fact that IBM has a successful product line and people like the company and make major commitments to it is what gives us our business opportunity. So we're in rebellion against centralized data processing — not that we think we're going to destroy it.

For 16 years you worked at IBM, which is known as the safe choice for DP managers making purchasing decisions. Now you are working for a company in which you have to convince people that it, too, is a safe choice.

It's a substantial obstacle. I've only had two jobs in my career, IBM and here. But Carl has been selling against IBM very effectively for quite a while.

How do you go about marketing the company now and developing an image?

Well, it's not an image, it's really an identity. We like to think there's a certain amount of substance behind it. I'm not sure advertising is the right vehicle for us. We know how to identify our customers — they have large buildings — and our staff has been extremely active in users groups and national societies, so we have a strong image in that community.

One thing we have tried to do is to convey as part of our identity a theme of excellence or of attempting to deal with first-class people. People, quite candidly, have been asking me what am I doing with a guy like Carl Jantzen in here, why do we need somebody like that. The answer is that he's a world-class executive and the type of person I want to work with in everything we do. The problem is, to do that we can only do a few things, but the things we do we really want to do well.

You talked about distributed processing vs. centralized. Where is distributed processing heading, and how is Spartacus going to be a part of it?

There's a huge pent-up demand for distributed processing, departmental processing. What it really comes down to is local control. You're seeing the same thing in computing now that you saw 10 or 15 years ago with terminals. People got tired of their keypunches; they wanted terminals. Today they want computers. We can argue cost, cost-effectiveness, technology or anything else. But the main reason distributed processing is a good market is that people want their own computers.

The one thing I never anticipated is the wide acceptance of the personal computer. That's the one thing that changed in the external environment. I didn't know it was going to happen, you didn't know it, IBM didn't know it. If we have a big challenge for the future, it's that we [make sure we] have the right product concept and that we're in the right marketplace. We have to find a long-term niche for ourselves; standing between the mainframe and the vast proliferation of personal computers and other office equipment. The good news is that it's an explosive market; the bad news is it's a tumultuous market and nobody knows exactly what products will be successful.

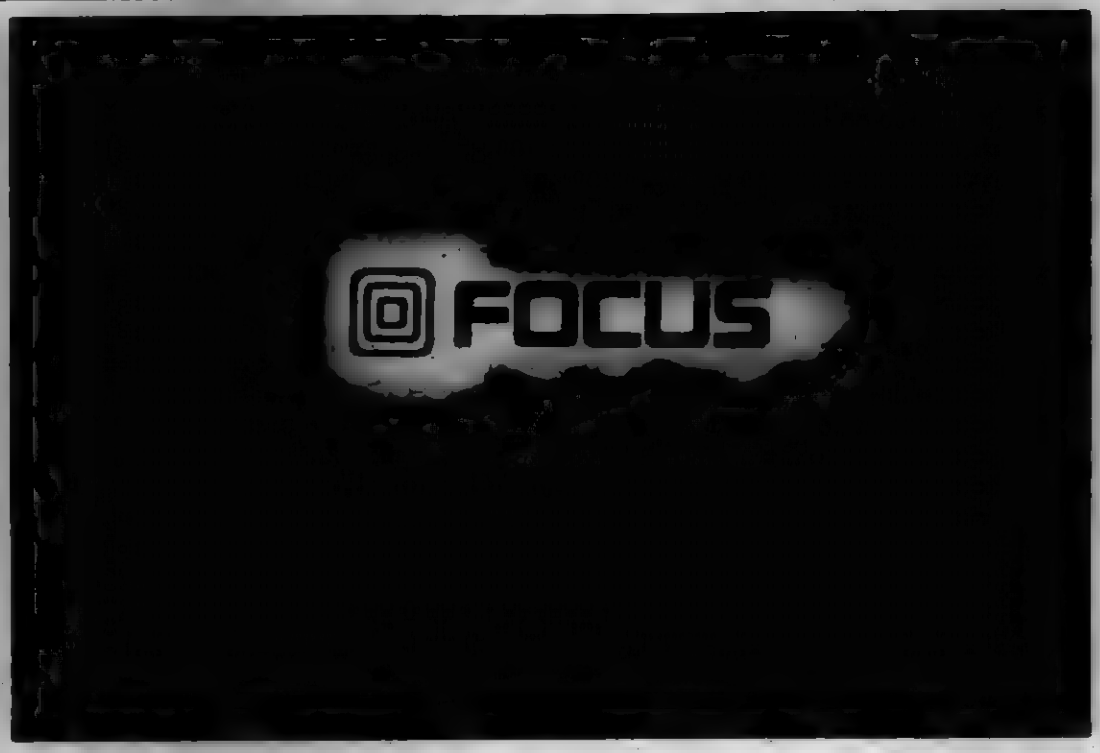
You need to tie in to a personal computer down the line?

Well, we already do. We can connect personal computers to our machine. It's not just connecting them, it's coexistence in that environment. It's clear that personal computers are going to replace terminals. It's clear that local networks are going to come into all of these places. What's not clear is who is going to make the terminal, who's going to make the network, who's going to install them and what people are going to use them for, because they're using these devices for applications we never anticipated.

What exactly is your competition?

IBM, IBM, IBM. We compete with the IBM 4300, the IBM System/38, the IBM Personal Computer, the IBM System/36 and so forth. But the major competitor is conceptual, not really a product. A certain number of people remain committed to centralized data processing. If someone is emotionally and philosophically committed to centralized data processing, then we can't sell them a distributed processor. But if people need IBM-compatible distributed processors, we have a great business.

ONE LANGUAGE. ONE SOLUTION.



THE KEY TO INFORMATION CENTER PRODUCTIVITY.

In today's Information Center environment the #1 application development tool is Information Builders' FOCUS. No other product offers the productivity and full range of functions provided by FOCUS...all within one nonprocedural language!

FOCUS' powerful relational facilities enable you to quickly build new systems. You can create new files within minutes using simple English commands, as well as query and report from existing files (VSAM, QSAM, IMS, IDMS, etc.) in your Information Center.

This increases programmer productivity by hundreds of percent, and allows end users to perform their own ad hoc queries, reports, financial modeling, graphics and statistical analysis after only a few hours familiarization.

And, there's PC/FOCUS too. It expands your PC into an Information Center with the same relational database, screen manager and data analysis facilities found in mainframe FOCUS. Plus, it enables you to download, manipulate and/or upload data extracted from mainframe files and DB's, all with full FOCUS security.

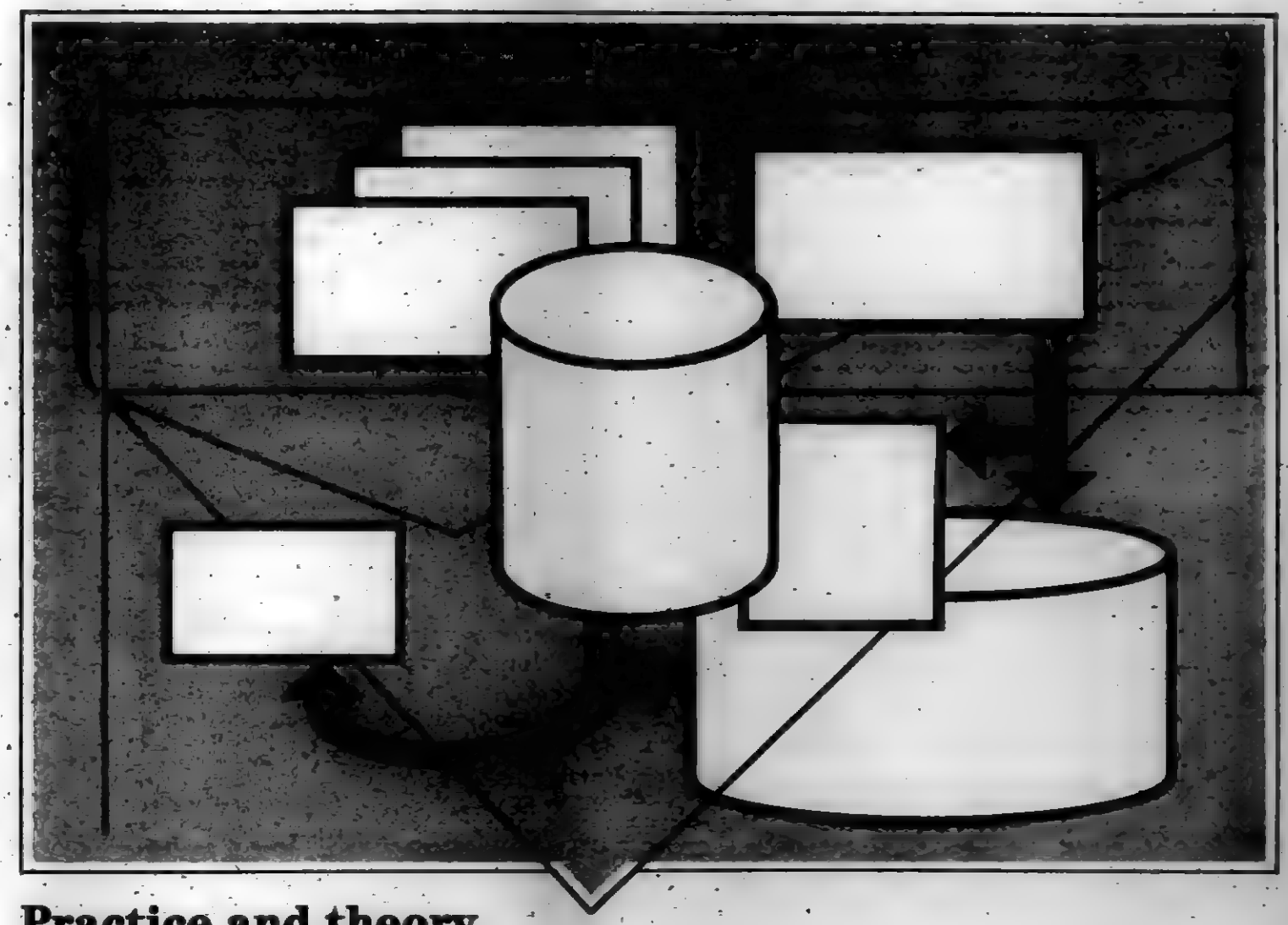
The FOCUS system. The language that unlocks productivity in your Information Center. For details write to: Don Wszolek, Dept. MS, Information Builders, Inc., 1250 Broadway, New York, NY 10001.

INFORMATION BUILDERS, INC.

New York: (212) 736-4433 • Washington, D.C.: (703) 276-9006 • St. Louis: (314) 434-7500 • Chicago: (312) 789-0515
Dallas: (214) 669-9890 • Palo Alto: (415) 324-9014 • Los Angeles: (213) 615-0735 • Houston: (713) 952-0240
Dealer inquiries invited

See us at SOFTCON Booth VL7247.

IN DEPTH



Practice and theory

How relational systems perform

Contrary to popular belief, relational DBMS can perform at least as well as, and quite possibly better than, older hierarchical or network systems. One of the developers of relational theory and practice explains why.

By C.J. Date

Misconceptions have grown up in the DP world these past few years about relational systems, and many of these misconceptions relate to performance. Two commonly heard opinions are:

"Relational systems are all very fine for ad hoc query, but they will never achieve the performance needed for production systems (or transaction processing systems or . . .)"

"Relational systems require a breakthrough in hardware technology such as associative memory before they will be able to achieve acceptable performance."

The contrasting opinion (and mine, needless to say) is:

"There is no intrinsic reason why a relational system should perform any worse than any other kind of system."

Ignoring, for the moment, the interference effects introduced when multiple transactions are run in parallel, we can concentrate on the performance of some given data base transaction considered in isolation. The two principal factors determining the performance of such a transaction are, of course, the number of I/O operations and the pathlength (amount of CPU processing).

Pathlength. The IBM products DB2 and Structured Query Language/Data System (SQL/DS) are *compiling systems*: User-level data base statements are compiled prior to run time into appropriate machine code instructions. Most other systems, relational or otherwise, are interpretive. But the advantages of compilation are widely recognized, and several other relational systems — for example, Oracle Corp.'s Oracle and Relational Technology, Inc.'s Ingres — are moving totally or partially to the compiling approach.

In this discussion, let us concentrate on compiling systems. The purpose of compiling is, precisely, to reduce the runtime pathlength. To be specific, all of the following operations are removed from the runtime path:

- Parsing the original user request.
- Detecting and reporting on syntax errors.
- Mapping logical-level names to physical-level addresses.

■ Choosing an access strategy.
■ Checking authorization.
■ Generating machine code.

Of these operations, easily the most significant from the performance standpoint is choosing an access strategy — in a word, optimization. The runtime pathlength is, thus, considerably shorter than it would be otherwise. What is more, the generated code is tailored to the original request and may be more efficient than more generalized, interpretive code.

Moreover, the performance benefits of compilation can be achieved without any corresponding loss of flexibility in operation. If recompilation becomes necessary (for example, if an index is dropped), the system can perform that recompilation automatically, thanks to an ingenious technique now known as "automatic bind," which was pioneered in the IBM research prototype System R.

The field of data base optimization today may be likened to the field of programming language optimization as it was some 15 or 20 years ago. Researchers are investigating the problem at universities and elsewhere, and the fruits of their work will no doubt eventually find their way into implemented products.

Note, incidentally, that compilation in the above sense (that is, *optimized* compilation) would not even be feasible in a record-level system, because the system would not be able to capture the user's intent in the same way. Thus, it is conceivable a relational system may ultimately involve *shorter* pathlengths than a nonrelational system (if, for example, the nonrelational system always has to parse requests at runtime).

I/O operations. The number of I/O operations required to satisfy a particular request is a function of the physical structure of the data base, not the logical structure; it has nothing to do with how the data base is perceived by its users, that is, as relations or as some other logical structure. (Of course, we are assuming here that the system does make a genuine distinction between the physical and logical levels, as a relational system does.) The question of how much I/O is needed in a relational system can, therefore, be broken down into two subsidiary questions:

1. Are the physical structures supported by the system capable of providing the kind of I/O performance needed?

2. If the answer to the first question is yes, then is the system capable of accepting high-level, relational requests (for example, a SQL SELECT statement or a QUEL RETRIEVE statement) and converting them into operations on those physical structures that are "as good as hand code" — as good as the code that would be produced by a skilled programmer working directly at the physical level?

Regarding the first question, most relational systems today support B-tree indexes. A few systems also support hashes and so on (for example, Ingres does), but B-trees are far and away the structure most often encountered in practice. In fact, there is little doubt that if a single physical structure has to be chosen, B-trees are the obvious choice.

Now, B-trees are certainly capable of providing adequate performance for many applications (this statement must be true, or nobody would use Vsam). On the other hand, some applications simply must use hashing to meet their performance requirements. Thus, the answer to the first question in most current systems is yes if indexes are acceptable for the application in hand; otherwise, no. (In the latter case, of course, the answer may still be yes for some other system.)

Assuming that the answer to the first question is yes, let us now consider the second: Can the system produce code that is as good as hand code? The short answer is yes, it can (in many cases, but not all). The function of the system optimizer is precisely to convert user-level statements into optimized machine code — where "optimized" means, basically, that the generated code employs the best strategy it can for satisfying the original request. In

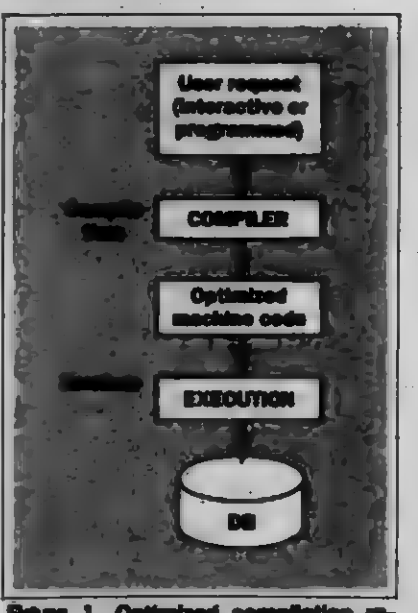


Figure 1. Optimized compilation reduces the runtime pathlength.

Computer Communications?

Whether it's office to office, office to corporate computer or office to data base service, Polygon software delivers reliable data transfer.

We've been developing communications software for micros, minis and mainframes for over five years. Experience that has paid off with comprehensive programs, documentation and effective menus for optimum user performance.

It's simple. Whether you use a modem, direct cabling or local area networks, our software talks directly from computer to computer. One more good reason why Digital Equipment Corporation and Interlan, Inc. sell and support our communications software with their products.

So, if you want to communicate, and you want to do it economically, reliably and easily, communicate with us... we're Polygon Associates.

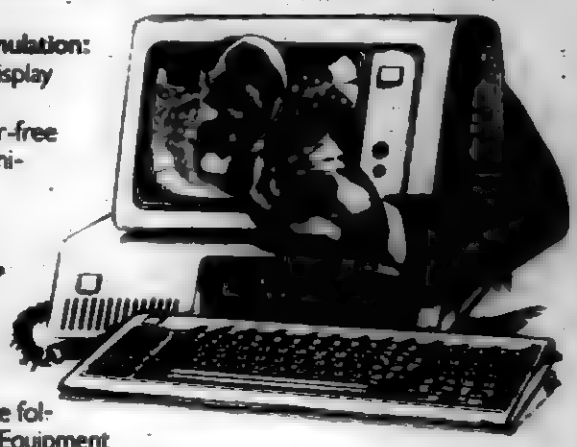
We have the software...

poly-TRM™ Asynchronous Terminal Emulation Software: For communication as a terminal to virtually any computer system including the Source[1], Dow Jones[2] and other commercial information services.

poly-BSC/RJE™ Bisynchronous Terminal Emulation: For Remote Job Entry (IBM 3780/2780) to IBM mainframes and compatible machines.

poly-BSC/3270™ Bisynchronous Terminal Emulation: For emulation of the IBM 3270 family of Information Display Systems, including file transfer.

poly-XFR™ File Transfer Software: For error-free ASCII and Binary file transfers among personal and minicomputers.



For all types of hardware...

Minicomputers using VMS, RSTS/E, RT-11 and RSX-11M Operating Systems[3], Intel and Motorola development systems. Systems using CP/M[4], in a user tailorable version.

Plus we support personal computers from the following manufacturers: Apple Computers, Inc., Digital Equipment Corporation, International Business Machines Corporation, Jonos, Osborne Computer Corporation, Radio Shack/Tandy Corporation, Televideo Systems, Inc., Victor Technologies, Inc. and Xerox Corporation.

1 The Source is a service mark of Source Telecomputing Corporation, a subsidiary of the Reader's Digest Association, Inc.
2 Dow Jones is a trademark of Dow Jones, Inc.
3 VMS, RSTS/E, RT-11 and RSX-11M are trademarks of Digital Equipment Corporation.
4 CP/M is registered to Digital Research, Inc.
© 1983, polygon associates, inc.

polygon associates, inc.
9 American Industrial Drive, St. Louis, Missouri 63043
314/576-7709, TWX 910/764-0876

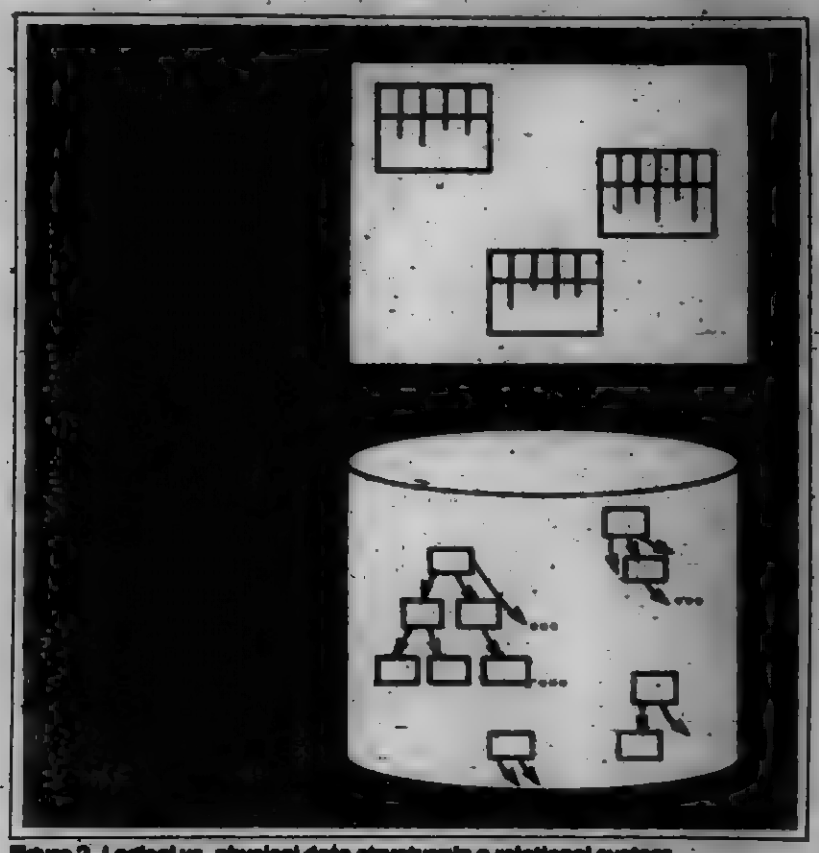


Figure 2. Logical vs. physical data structure in a relational system

DB2, for example, the optimizer will always try to make use of a "clustering index" if one exists that matches the requirements of the user-level statement. Of course, the optimizer does not produce the best possible code for every possible request, but then, neither do most human programmers.

Note, moreover, that we are talking here about products that are, for the most part, only at the stage of a first or second release — products, what is more, that are based on a brand new technology. It is reasonable to expect continuing improvements in the area of optimization throughout the lifetime of those products. Indeed, the field of data base optimization today may be likened to the field of programming language optimization as it was some 15 or 20 years ago. Researchers are investigating the problem at universities and elsewhere, and the fruits of their work will no doubt eventually find their way into implemented products.

Moreover, such enhancements can be made without in any way affecting the form of the external interface (that is what data independence is all about).

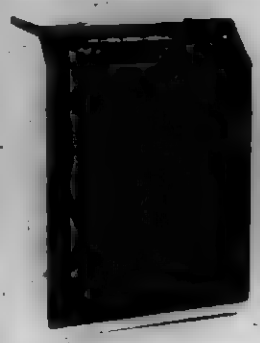
As a matter of fact, it is even conceivable that the optimizer might produce code that is better than hand code. It may well be the case that the optimizer has information available to it (regarding, for example, physical data clustering, table sizes and index selectivities) that a hand coder typically would not have. Moreover, that information may change with time. If it does, reoptimization may become necessary. Such reoptimization is trivial in a relational system; it simply involves a recompile and quite possibly an automatic one at that. It would be very difficult in a hand-coding system, requiring a program rewrite.

One final point regarding optimization: Relational systems may, in some cases, outperform nonrelational systems for another reason. The point is precisely that those relational systems are optimizing systems. High-level relational operations are optimizable precisely because they are high-level — they carry much semantic content, and the optimizer is, therefore, able to recognize what the user is trying to do and can respond in an optimal way.

Figure 3. Departments and employees in IMS (physical structure)

By contrast, in a nonrelational system, in which the user operates at the record level instead of the set level, access strategies are chosen by the user; and if the user makes a wrong choice, there is little chance that the system will be able to optimize that user's code.

As an example, suppose the (nonrelational) user is trying to compute the join of tables A and B. There are two possible strategies: 1) For each record of A in turn, find all matching records in B; 2) for each record of B in turn, find all matching records in A. Depending on such considerations as the relative sizes of A and B and (especially) their physical clustering characteristics, one of these strategies is likely to outperform the other by several orders of magnitude. And, as stated previously, if the user chooses the wrong one, there is really no way that the system can convert it into the other, because the user's choice is expressed as a sequence of low-level operations



Innovator 300 LPM Printer System

Now! Compatible with nearly any micro, mini, and mainframe.

The Innovator printer system can interface with your IBM, Burroughs, DEC, RS-232 Serial and many additional communication protocols. Also, the highly reliable, field proven Teletype™ mechanism provides years of virtually maintenance free performance, significantly lowering your cost of ownership. Starting at..... $4,995

FEATURES:
- Impact printer with fully formed characters
- Ultra quiet acoustically damped cabinet
- BSC/SNA compatibility
- Micro-processor controller/interface board
- 132, 80 column, heavy-duty print mechanism
- Low cost nationwide service

innovative™ network data communications

(305) 624-1044
1-800-327-3068

INNOVATIVE ELECTRONICS, INC., 4714 N.W. 165th Street, Miami, FL 33014

4-5-6™

When you need IBM mainframe applications with the capabilities of popular micro products, your next step should be to join over 150 companies that have already licensed software from Parallax Systems.

ExecuCalc™
Electronic spreadsheets for 3270 terminals

ExecuPlot™
Color business graphics for 3270 terminals

Training
On-site classes in ExecuCalc, ExecuPlot, Lotus 1-2-3, VisiCalc, VisiPlot, and SuperCalc are available.

Distribute your micro and mainframe application easily, and provide training for both, with software and services from Parallax Systems.

Interfaces via CICS, QUASI, VS, and DIF files.
Perpetual licenses $1500 per product. 30-day trial.

Parallax

Parallax Systems, Inc.
[illegible] West 5th Street • New York, New York 10011
212-[illegible]

ExecuCalc, ExecuPlot, and 4-5-6 are trademarks of Parallax Systems Inc.; Lotus is a registered trademark of Lotus Development Corp.; 1-2-3 is a trademark of Lotus Development Corp.; VisiCalc is a registered trademark of VisiCorp; VisiPlot is a trademark of VisiCorp; SuperCalc is a registered trademark of Sorcim Corporation; DIF is a trademark of Software Arts, Inc.

THE NEW 924. THE TELEVIDEO SUCCESS STORY (contd.)

TeleVideo® has combined the best innovations in technology, design and quality of manufacturing to bring you superior terminals. Now with the new 924 we've built in comfort and productivity features that leave the other manufacturers behind.

For user comfort, the 924 has a tilt and swivel non-glare screen and DIN-standard low profile keyboard. 16 programmable, non-volatile function keys (shiftable to 32) turn often used instructions into one key commands. Extra display features include full screen editing, character and block graphics, plus 32 non-embedded visual attributes. The 924's logical attributes define protected and unprotected regions for accurate data entry.

If you don't need the full power of the 924, our 914 has all the design advantages of the 924 at less cost.

Whatever your application, nothing measures up to TeleVideo. And nothing succeeds like the 924!

Call us at (800) 538-8725 for more information. (In California call (408) 745-7760) or contact your nearest TeleVideo office:

California/Santa Ana	(714) 476-0244
California/Sunnyvale	(408) 745-7760
Georgia/Atlanta	(404) 447-1231
Illinois/Chicago	(312) 397-5400
Massachusetts/Boston	(617) 890-3282
New York/New York	(516) 496-4777
Texas/Dallas	(214) 258-6776
Central Europe (The Netherlands)	(31) 2503-35444
Northern Europe (United Kingdom)	(44) 9-905-6464
Southern Europe (France)	(33) 1-686-4412

GET IN ON THE BOOM.™

TeleVideo® Terminals

TeleVideo Systems, Inc.

Service is available nationwide from General Electric Electronic Instrumentation and Computer Service Centers.

instead of as a single high-level operation.

It is sometimes suggested that a relational system must perform poorly as a system regardless of its efficiency with respect to any individual transaction (see, for example, "What Price Relational?" by William H. Inmon, *Computerworld*, Nov. 28, 1983). The argument is that relational systems will be running a mixture of planned transactions and ad hoc queries (short-running activities and long-running activities, to use Inmon's terminology) and that those two kinds of activity are mutually disruptive.

Now, it is true for any system (not just a relational one) that these two kinds of activity tend to interfere with each other somewhat, and there is no harm in drawing attention to that fact. But to suggest that relational systems will, therefore, have significantly worse performance than less flexible (hierarchical or network) systems is completely unwarranted, for at least two reasons:

■ First, the comparison is apples to oranges. It is extremely difficult to perform any kind of ad hoc activity at all on hierarchical and network data bases, with the result that those systems are almost invariably (de facto) devoted to planned activities. This fact does not mean that users would not like to be able to perform ad hoc access to those data bases if they could.

■ Second, there is no *requirement* to mix the two kinds of activity in a relational system. It is ridiculous to suggest, as Inmon did, that controls cannot be imposed in the relational environment. Of course they can, if the installation requires them. The authorization subsystem — which tends to be much more sophisticated in relational than in nonrelational systems, incidentally — provides an obvious example (not the only one) of an appropriate control mechanism. In Ingres, it is perfectly feasible to restrict ad hoc queries to specified hours of the day and/or days of the week.

Moreover, even if such controls do prove necessary in some installations, the user will still enjoy all the other advantages of relational technology (ease of use, speed of application development, resilience to change and so on) and, in addition, will be able to perform ad hoc access at controlled times. Furthermore, at many installations such controls will not be necessary, because the overall performance requirements will be less stringent. Balancing the requirement for ad hoc data availability vs. the control needed to guarantee specific levels of performance is a trade-off like any other.

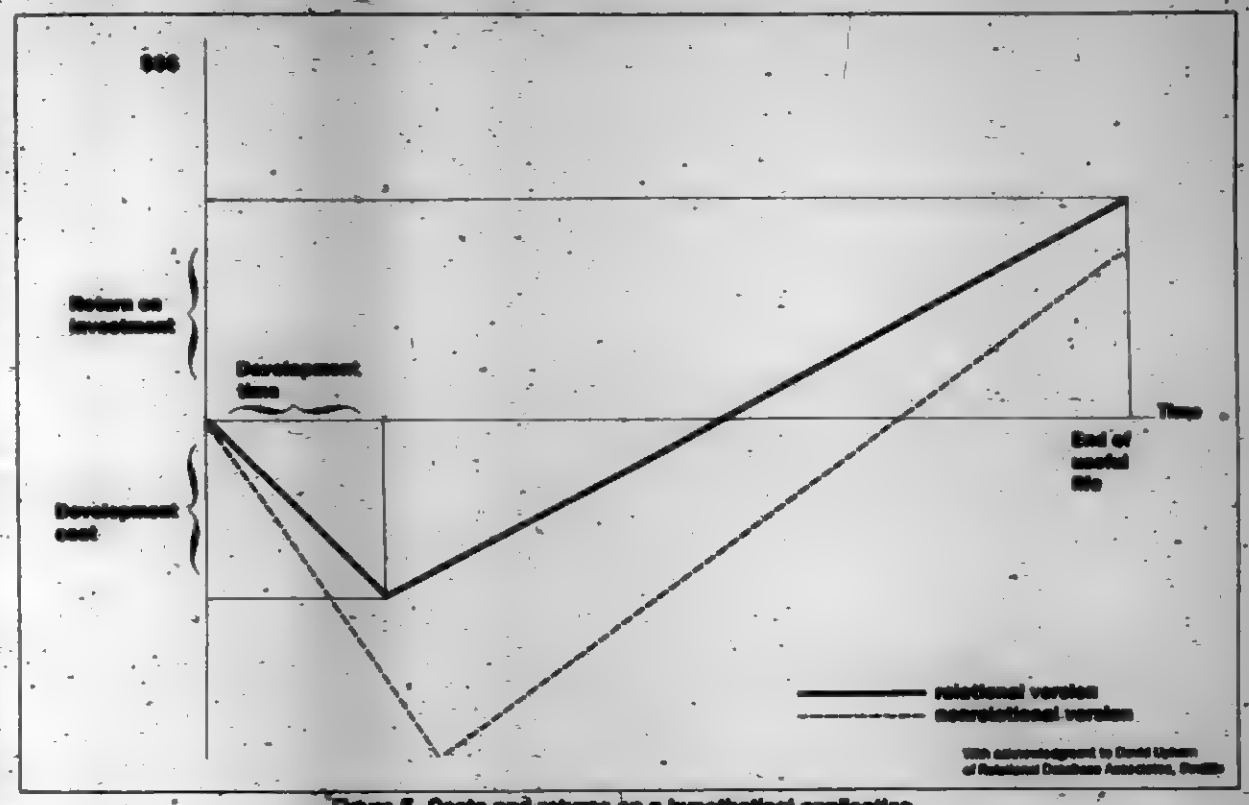


Figure 5. Costs and returns on a hypothetical application

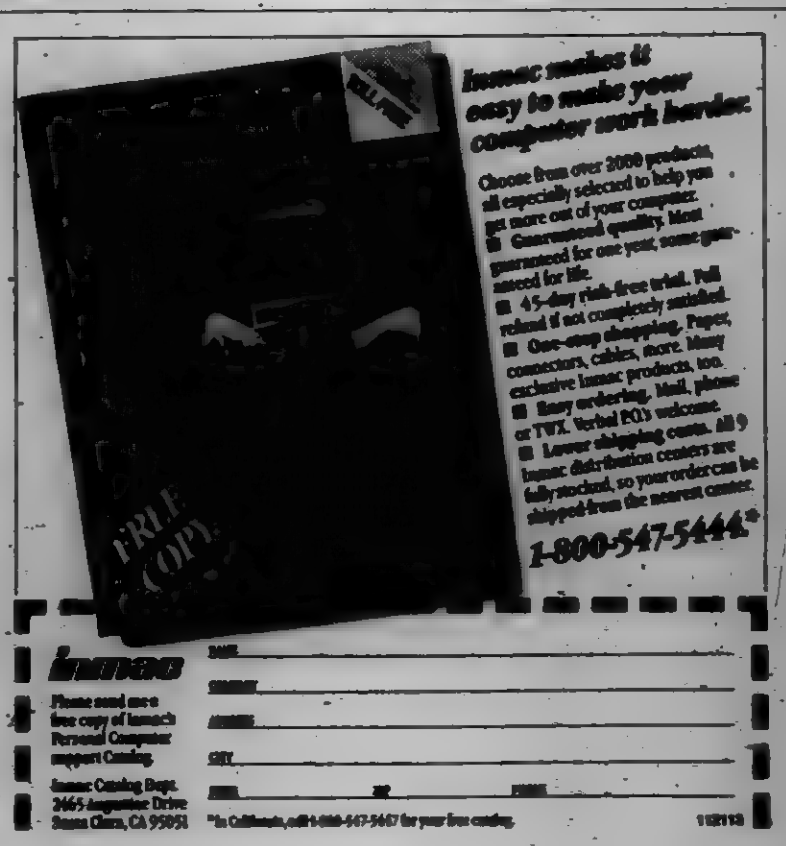
DB2 vs. IMS

I conclude that there is absolutely no reason a relational system that is implemented on perfectly conventional hardware using perfectly conventional software techniques should not perform perfectly well. A hardware breakthrough is not required (though if, for example, cheap large-capacity associative memory ever did become a commercial reality, it would certainly be easier to take advantage of it in a relational system than in a nonrelational one).

Of course, I should emphasize that the foregoing discussions are all very general. I am not saying that a system like DB2 today is able to perform as well as a long-established system such as IMS. In the case of DB2 in particular, it is probably too early even to give any kind of performance figures, though it is a safe bet that any such figures would be substantially less attractive than the corresponding figures for IMS. There is little doubt that *for a given application*, where the data structures and the transaction patterns are very well understood ahead of time, an established system like IMS can be customized and configured to produce more impressive performance than a system like DB2 can — today. On the other hand:

1. That customized system may not look so impressive when other

Figure 4. Departments, employees in a relational system (physical structure)



applications are added to it. Implementing application B on a system that is customized to application A is like cutting wood against the grain — extraneous considerations keep getting in the way. And note that these comments apply not only to system performance but also to the logical structure of the system as perceived by the user (that is, application B will probably be more awkward to write as well).

Logical data structures in a nonrelational system tend to be biased toward some applications and against others, precisely because they closely reflect the physical data structure. Logical data structures in a relational system, by contrast, are more neutral: The application bias shows not in the logical data structure but in the manipulative operations, which by definition are far more flexible than the comparatively static data structure. (The bias will, of course, also show in the physical data structure.)

2. To amplify on the first point: Consider the standard departments-and-employees data base, and consider two typical transactions: (T1) find a specified department and all of its employees; (T2) find all departments. In IMS, the data would typically be organized as a two-level hierarchy, with, for example, index access to departments and pointer access from each department to its employees. This arrangement gives good performance for transaction T1 but bad performance for transaction T2. In a relational system, the data could be physically arranged either as in IMS or, perhaps more usually, as two physically separate sets of records, each with a corresponding index. The first of these arrangements would give essentially the same performance as IMS for both T1 and T2; the second would give somewhat worse performance than IMS for T1 (typically four I/O operations instead of two) but much better performance than IMS for T2 (N times fewer I/O operations, where N is the number of records per page).

3. One reason for the performance advantage of nonrelational systems is simply that those systems have been running for 10 or 15 years and have been constantly improved and tuned throughout that time. Relational systems will improve, too, over the next few years. Moreover, it is not clear that further significant improvements are even possible in a nonrelational system, whereas the field is wide open for such improvements in the relational case.

4. Even if the nonrelational system provides superior runtime performance, the value of that benefit has to be balanced against the amount of time it takes to get the system operational in the first place (not to mention the amount of time spent in subsequent maintenance). The installation's investment will be recovered more quickly with a relational system than with a nonrelational one, because applications will be running sooner. The ultimate return on investment may be higher, too, if the application lifetime is less than the time it takes for the nonrelational version to "catch up," economically speaking, with the relational one.

But let me repeat that all of the above is somewhat theoretical. As stated earlier, a system like DB2 today is extremely unlikely to achieve the performance level of a system like IMS today. The trade-off that must be considered today is performance vs. usability — or, to put it another way, machine productivity vs. people productivity.

Now, it is a truism that people costs are rising fast and machine costs are falling, also fast. As a result, people productivity is very rapidly becoming the dominating factor in many applications; in many cases, it already is. For such applications, relational systems are obviously ideally suited, even at their present level of performance.

However, there are also many applications in which raw machine performance is still the overriding concern. Thus, systems like IMS will have a major role to play for several years to come. And even if relational systems do eventually achieve parity in performance (as I, for one, am convinced they will), the huge investment in nonrelational systems is sufficient to ensure the continued existence of those systems for the foreseeable future.

Human beings are notoriously reluctant to expend the effort needed to learn something new, even when the advantages of doing so are obvious. Witness the fact that, even today, some applications are still written in assembler language instead of in Cobol or some still higher level language. This reluctance is one reason why IBM views DB2 — at least for now — as complementing IMS, not replacing it, and designed the two products to work in harmony as a single cooperating system.

About the author

C.J. Date is an independent author, lecturer and consultant who specializes in relational data base systems. He is based in Saratoga, Calif. In 1967, Date joined IBM in England, where he worked on the integration of data base functions into PL/I. In 1974, he moved to the IBM Development Center in California, where he was responsible for the design of Unified Database Language (UDL). More recently, he was involved in technical planning and externals design for the IBM relational products SQL/DS (announced in 1981 for DOS and in 1983 for VM) and DB2 (announced in 1983 for MVS). He left IBM in May 1983.

This article is based in part on material from Date's book, A Guide to DB2, to be published by Addison-Wesley this year.

How to load your 38 for maximum MRP performance

Not many System/38 users know how. Perhaps you already found that out by using another system. If this is your first time, check out the features that are important to you. Our users enjoy the benefits of a closed-loop MRP II system that allows direct access for anyone to all the information stored. We have a query facility that lets you generate user reports. And we utilize an advanced data base architecture which increases programmer productivity, making changes needed for expansion simple and economical. We even have a PC link which lets you transfer information to your IBM Personal Computer for interaction with popular planning micro products such as 1-2-3® from Lotus.®

Loaded with RMS/38 the potent IBM System/38 can make your business hum with the precision these economic times demand. Loaded with anything else you may have to settle for second best. In the fiercely competitive arena for manufacturing management efficiency, where survival depends on increased productivity—and profits—the software system you use can spell the difference between satisfaction or frustration, maybe even success or failure.

Only RMS/38 has 15 powerful applications to provide you with all the ammunition you'll ever need for total control. Control, not only of manufacturing but all those vital support functions as well, including distribution and finance. Total software...RMS/38!

Reduce inventory; eliminate parts shortages; acquire time for skillful buying; schedule production based on demand, not parts availability; determine whether to buy or build needed components; improve part number, inventory, and routing accuracy; and order in time for delivery on time. You can with RMS/38.

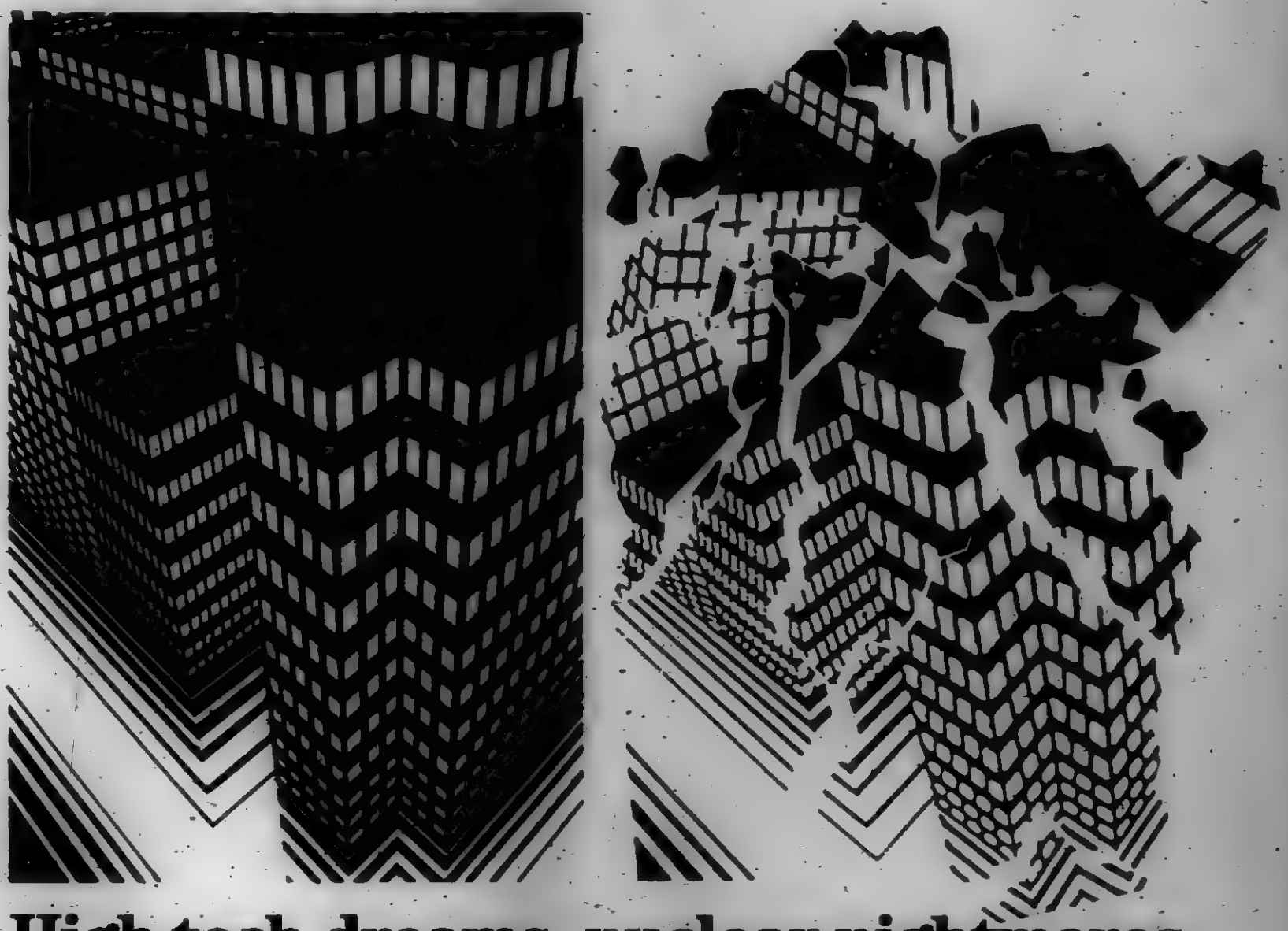
If your present MRP system, whether manual or automated, represents something less than a total integration of business and manufacturing systems; if it doesn't offer the distribution and financial support of closed-loop MRP II; if it doesn't offer you control in an unpredictable environment; then maybe it's time you investigated the building block software of RMS/38.

For a free demonstration or more information, contact PCR, Professional Computer Resources, 2021 Midwest Road, Oak Brook, IL 60521 (near Chicago). Also in New York, San Francisco and Los Angeles.

pcr
ALL THE SOFTWARE YOU'LL EVER NEED.
312/932-2200

1-2-3™ is a trademark of Lotus Development Corporation

IN DEPTH



High-tech dreams, nuclear nightmares

Some in the ranks of data processing are challenging the unrestrained application of high technology to military purposes. Though still an apparent minority, they are organizing and questioning: What is the responsibility of the technical community in the nuclear age?

By Mark Hall

Dave Caulkins left his job with the Pentagon's Minuteman missile program "for moral reasons." With John Larson, a programmer for Xerox Corp., he established a computer conferencing system in Palo Alto, Calif., to foster discussion about arms control and disarmament among programmers, computer scientists and engineers.

Consultant Arthur Fink founded the Center for Appropriate Computing in Wilton, N.H., to encourage debate among "those who use or are touched by computer technology." Typical workshops: "The Computer and Personal Values" and "Computers and Religious Values." Fink says, "We should all affirm that we face ethical questions in our industry."

High Technology Professionals for Peace (HTPFP) opened an employment agency in Boston two years ago dedicated to finding nonmilitary-related jobs for anyone in the computer, engineering or scientific fields.

"The technical community has a particular responsibility to interpret the technical information presented to the general public by government, the weapons laboratories and certain research organizations," says Josie Stein, an HTPFP board member. "For example, the Heritage Foundation did a so-called 'scientific study' claiming we need 400 space-based battlestations to defend against ICBMs. That's technical nonsense. And it is the technical community's responsibility to explain the physics, mathematics and engineering principles that make it nonsense."

Isn't state-of-the-art military technology secret and, therefore, not explainable to the public? Stein replies: "The laws of physics are not classified."

Some of the designers, programmers and builders of the most destructive weapons systems ever conceived are now rebelling against their own designs, looking beyond the cleverness of the technology and considering its repercussions. Does the development and deployment of a computer-reliant defense, in fact, give the superpowers less control over the instruments of peace and war?

"Technologists," says Lucy Suchman,

co-director of the Palo Alto chapter of Computer Professionals for Social Responsibility (CPSR), "have an obligation to be as clear and honest as possible about the capabilities of technology and the choices available."

As Fink points out, "Just because a particular technology works does not mean it should be applied."

Joel Yudken of the Mid-Peninsula Conversion Project, a Silicon Valley organization dedicated to finding nonwar-products work for technologists, states that in the U.S., one-third to one-half of all scientists and engineers are employed in military-related programs. He says the Pentagon's demand for engineers in California alone will outstrip the state's ability to graduate them.

William Cutler, a systems engineer with Lockheed Missiles & Space, Inc. in Sunnyvale, Calif., observes that sometimes military programs "dry up" civilian projects and force technologists within a company a transfer to jobs that "may offend an individual's ethics," raising the basic dichotomy of choosing between one's personal beliefs or familial and economic responsibilities.

Beyond the morality of working on nuclear weapons systems, technologists are beginning to question the validity and capability of the technology itself. Dr. Severo Ornstein, a computer scientist with Xerox's research center in Palo Alto, points out that as defense systems increase in complexity, they require more computer processing. "Larger and larger pieces of the decision-making apparatus get turned over to computer systems. The more one turns over to machines, the more one becomes vulnerable to their fallibility."

The primary concern is the role of technology in the world's nuclear arsenals. Nobel Prize Laureate Owen Chamberlain says of his role in the Manhattan Project, "It seemed like a right thing at the time." Some in the technological community today are realizing that being part of developing powerful weapons means they may forever "be known as those that prepared the world for the great catastrophe."

The fact that those who lead the military even consider nuclear weapons in their war scenarios today appalls Chamberlain. It is equally disturbing to him and others that scientists and engineers persist in designing products that fit the war planners' imaginations. Dr. Oak Knoll, a theoretical chemist formerly with the Los Alamos and Sandia weapons laboratories, believes that scientists delude themselves by proclaiming their research "neutral." "That way they don't have to confront the difficult question of morality," he says. "They believe that they are not responsible for its application."

As one of the founders of CPSR, Ornstein represents increasing discontent among the nation's technologists and scientists. "When I got concerned about my children and my grandchildren, not to mention me, and when I believed genuinely that our lives were in jeopardy, I thought that I should do whatever I possibly could by whatever means were at my disposal."

Although CPSR is a young organization (begun in the summer of 1982 and granted nonprofit status the next spring), it has 400 members in Boston, Seattle, Madison (Wis.), Los Angeles, Berkeley, Palo Alto, San Jose, Santa Cruz (Calif.) and New York chapters. It sponsors forums and provides speakers on the technical issues surrounding nuclear weapons. The group was represented at the International Joint Conference on Artificial Intelligence and has been invited to the Association for Computing Machinery's annual conference. Among the more well-known members are Joseph Weizenbaum of MIT and Terry Winograd of Stanford University and the Xerox Palo Alto Research Center.

CPSR is among a number of growing organizations claiming to represent the social concerns of technologists and scientists. High Technology Professionals for Peace, founded in 1981, recently opened a Boston office for its 200-member organization. Fink's Center for Appropriate Computing and Yudkin's Mid-Penninsula Conversion Project are also less than two years old.

Of course, groups like The Union of Concerned Scientists have been prodding the consciences of scientists for decades. Individuals with no less stature than Albert Einstein have called on their peers to re-evaluate their work from a moral, rather than merely a scientific, perspective. Today, the Pentagon's widening impact on the research and development community has spurred new levels of anxiety among high-tech

To get in touch

Further information on the organizations discussed here is available from:

- Center for Appropriate Computing, Box 614, Prince St., Wilton, N.H. 03086.
- Computer Professionals for Social Responsibility, P.O. Box 717, Palo Alto, Calif. 94301.
- High-Technology Professionals for Peace, Suite 316, 639 Massachusetts Ave., Cambridge, Mass. 02139.
- Mid-Peninsula Conversion Project, 222 View St., Mountain View, Calif. 94041.
- The Technology and Society Committee, P.O. Box 1526, Mountain View, Calif. 94042.
- Union of Concerned Scientists, 1384 Massachusetts Ave., Cambridge, Mass. 02238.

"Your Information, Sir!"

FQS allows end-users to query the computer for every information request, *instantly.*

No more burdening the DP department with programming of ad hoc reports. No more need to learn higher level languages which are still gibberish to an end-user.

FQS is the only CICS or SHADOW-based information retrieval system designed to be on-line from day one. It contains all of the best facilities for sorting, selecting, and printing contained in EASYTRIEVE/on-line, SQL and other batch systems. But FQS is instant, a true on-line query system, menu-driven to allow anyone to get information quickly. Security procedures allow you to control access to valuable corporate information.

Surely, you've outgrown that old batch report writer by now. Isn't it time you moved beyond batch reports and into the simplified world of on-line queries?

Your users will get exactly the information they need because *they* define it. They will have results in mere seconds. And, your programming staff will be freed to spend their time more effectively.

Call today for complete details on FQS, the Friendly Query System. Go on-line. Go Allergo.

"You really must experience FQS. Call Allergo today."
617-938-8811

allergo

Allergo Products Inc.
400 West Cummings Park, Woburn, MA 01801
Telephone 617-938-8811, Telex 951-369
A THORN EMI Company

Introducing MARK V™ for CICS users: a *unique*, 4th generation non-procedural application development system that saves you time and money at every stage of your application life cycle. See it at a free seminar near you!

Informatics just broke the productivity barrier with MARK V, an extraordinary timesaving application development system. But, MARK V is not for everyone. *It may be for you if:*

- ☑ You need help in reducing your backlog of medium to complex CICS applications.
- ☑ You use CICS with IBM-supported data access such as VSAM or DL/I.
- ☑ Your CICS system demands highly efficient application execution.

Then, MARK V can help you produce efficient compiled applications that rival the execution of well-written COBOL—in less than half the development time!

Easy application development and maintenance is just the beginning!

MARK V improves productivity throughout the application development and maintenance cycle—not just in the coding—by providing:

- Interactive application design and simulation
- Easy to use, menu-driven specification language for development and maintenance
- Transparent and complete data access/communications control
- Automatically produced application documentation

That means, with MARK V your programmer need only specify the solution. MARK V generates the *complete* application. This methodology allows you to solve more complex problems more efficiently using less highly trained personnel—*and that saves you money!*

Reserve your place at a *free Seminar* on MARK V—the simple new way to develop and maintain your medium to complex CICS applications.

As a data processing professional, you're also a professional skeptic. But the simplicity, versatility and timesaving capabilities of MARK V are easy to see—and prove. To do so, simply mail the coupon below or call toll free. We'll reserve your place at a free MARK V Seminar in a city near you. But attendance is limited. So mail this coupon or call *today*.

informatics general corporation

THE SOFTWARE ENGINEERS

Register now for a Free MARK V Seminar! Mail this coupon or call toll free

1 800 227-3800, ext. 926

(In Canada, call collect, 0 415 [illegible]-7192)

YES. I want to learn more about how MARK V can make my medium to complex applications development and maintenance both fast and easy.

☐ Please enroll me in the free seminar I have indicated below (check one). Call me with details on specific location and time. I understand that there is no cost or obligation.

☐ Dallas	February 14	☐ Portland	February 15
☐ Boston	February 29	☐ New York	February 14
☐ Chicago	February 16	☐ Philadelphia	February 16
☐ Cleveland	March 1	☐ San Francisco	February 23
☐ Houston	February 15	☐ Toronto	March 14
☐ Los Angeles	February 21	☐ Washington, DC	February 22

☐ I cannot attend a Seminar. But please send me more information on the MARK V Application Development System.

Name _____

Title _____

Company Name _____

Phone Number _____ (include area code)

Address _____

City _____ State _____ Zip _____

Mail this coupon to: Informatics, MARK V Free Seminar, P.O. Box 1452, Canoga Park, CA 91304 CW-AP

Honeywell computers help Trailways move over 20 million people a year at the touch of a button.

Trailways faced a challenge recently. They wanted to improve cash management, the accuracy of pricing and scheduling, and the efficiency of their terminal operations.

So they came to Honeywell, and together we worked out a solution based on our microSystem 6/10. Now, at the touch of a button, ticket agents can see schedules, routes and rates for thousands of Trailways' destinations. The possibility of error is all but eliminated. The system even prints the tickets automatically.

Trailways' managers will benefit by having faster access to data. For example, the system facilitates interline accounting and furnishes feedback on marketing campaigns—a critical edge in a newly deregulated environment.

What's more, the microSystem 6/10 is easy to use, easy to program, and compatible with the Honeywell minicomputer and mainframe host at Trailways' home office. (Only Honeywell has total instructional set compatibility for micros, minis and mainframes.)

The microSystem 6/10 has 512K of memory. More than enough to handle the vast amounts of rate/schedule data Trailways must store, as well as information on daily transactions.

And the system is a snap to install, reliable, and backed up by Honeywell's nationwide service organization.

Information control. That's what keeps Big Red rolling.

For more information on the microSystem 6/10 and the advantages of full-line compatibility, call 800-328-5111, ext. 2708 (In Minnesota, call collect 612-870-2142, ext. 2708) or write Honeywell Inquiry Center, 200 Smith Street (MS 440), Waltham, MA 02154.

Together, we can find the answers.

Honeywell

professionals.

According to Alex Brown, co-founder of HTPFP, "It is all too easy to accept uncritically the traditional arguments about military R&D that conceal its nature: That U.S. military R&D is a direct response to foreign R&D challenges, that military R&D serves the security needs of the American people and that it does, indeed, increase the stability of world order. All [those arguments] are false and must be discarded before a realistic route toward a safe world can be planned."

Dr. Jack Jennings, a senior systems engineer with TRW, says that working on the tools of war is "a waste of time, talent and resources." He believes there exists a "mechanism geared within the system to destroy society and mankind as a species" and that it may be impossible to stop.

Dr. Hugh DeWitt, a Lawrence Livermore Laboratories physicist, sees institutions that provide technological know-how for the military, such as his own employer, as "isolated from the rest of the scientific community, from the rest of American society."

Conspiracy of silence

As Jennings points out, technologists and scientists generally like "to have fun learning something new," which is what attracts them to the well-funded weapons labs and weapons contractors. But there they often become isolated from the political and social questions raised by their work. Prof. Bernard Roth of the Stanford Mechanical Engineering School sees "a conspiracy of silence within the technical community."

Limiting the free exchange of knowledge, Chamberlain believes, contributes to the possibilities of nuclear annihilation. He also worries about the "revival of McCarthyism" in the scientific community. He describes as a devastating move the Reagan administration's executive order forcing the review of writings by individuals who may have worked on classified projects. In the scientific community, publication is the ultimate criterion for recognition and success.

Chamberlain believes that beyond creating a central clearinghouse controlled by bureaucrats and not peers, the policy will have a dramatic impact on scientific and technical achievements in the U.S. Scientists might reconsider the attractiveness of working within an industry that constrains individual rights and possible career advancement.

The primary fear, however, remains that the technological designs scientists dreamed and executed now hold mankind by the throat. Weapons systems now seem to surpass rational man's ability to manipulate them. Trident, Pershing II and MX missile systems are the most flamboyant execution of high technology.

Brian Smith, president of CPSR, says that these weapons "may force the Soviets to implement a 'launch-on-warning' program because the weapons can reach their targets

Technologists employed at the well-funded weapons labs often become isolated from the political and social questions raised by their work.

quickly and with pinpoint accuracy. Computers become the sole interface between the decision to launch a nuclear arsenal or to hold the bombs in check, since only computers could possibly detect an attack and retaliate in time."

Ornstein says it is "not our reliance on computers that scares me nearly as much as the Russians' reliance on computers." Even if U.S. war technology operates as designed with all possible safeguards against accidental launch, those at whom the weapons are directed are compelled to respond — with systems that may be archaic and inadequate.

Doubts about performance

There are also lingering doubts about our dependence on high-tech defense. Skepticism abounds within engineering and scientific journals about the performance of "ultimate defense weapons."

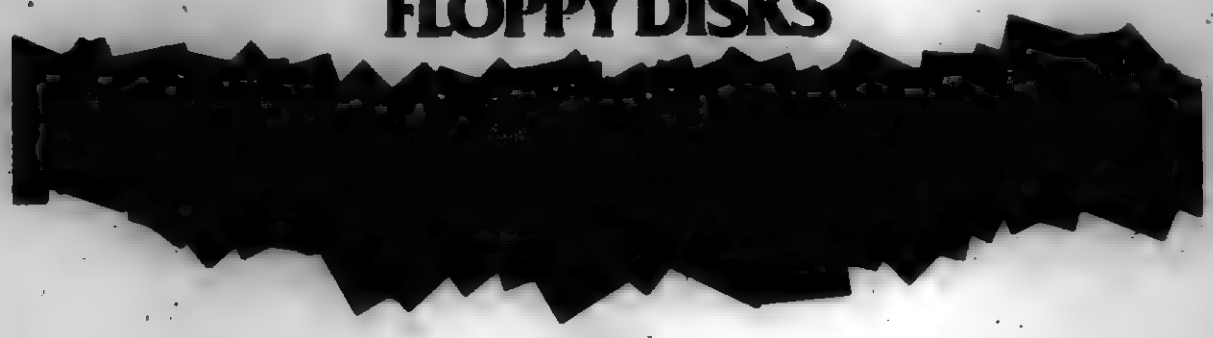
Fred Kaplan wrote in *High Technology* magazine that experts believed the Tomahawk Cruise missile was "a dud, a high-technology application of questionable military value." The Harvard Study Group concluded, "The arms race in recent years has been not in numbers, but in technological improvements." Its report, *Living With Nuclear Weapons*, published by Harvard University Press, exposes the limitations of technology as being more dangerous than the capabilities. And yet arms agreements are predicated upon the capabilities.

As Desmond Ball pointed out in his article for the International Institute of Strategic Studies, the most sophisticated nuclear war-fighting capability may, in fact, "be impossible to realize." Yet publicized capabilities of the U.S. could frighten the Soviets into a pre-emptive strike. High-tech weapons could turn out to be a gossamer Maginot Line made of blueprints and scientific ideas that never could work in the real world.

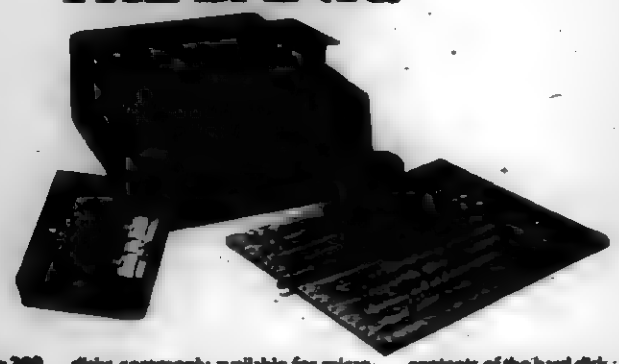
About the author

Mark Hall is the technical editor for Micro Communications, *a monthly magazine based in San Francisco. He has contributed to a number of technical publications as well as historical academic journals.*

1000 FLOPPY DISKS



VS. THE BANK.



Savings you can take to the bank: 200 MB only $2,195. CORVUS is proud to introduce the BANK.

It's the most dramatic breakthrough in low cost, high capacity mass memory systems since CORVUS introduced the Winchester disk for microcomputers in 1979.

The BANK's removable tape cartridges hold up to 200 megabytes of information. That's equal to 1000 double density floppies or 10 times the capacity of the largest hard disks commonly available for microcomputers. You can use the BANK to complement a Winchester disk. It has 19 times the capacity.

And the BANK's cartridges are removable for unlimited capacity and storage.

On-line archival back-up you can bank on. You can use the BANK as a random access archival device. If your Winchester disk fails, you can restore selected volumes without having to restore the entire contents of the hard disk.

The BANK is the perfect solution to your back-up storage problems as a shared storage device on OMNINET™ — the leading Local Area Network for microcomputers.

Call CORVUS for the name of the dealer nearest you. We're sure you'll smile....all the way to the bank.

For more information contact: CORVUS SYSTEMS, 2100 Corvus Drive, San Jose, CA 95124, 1-800-4-CORVUS.

CORVUS

THE NETWORKING COMPANY

The BANK connects up to eight hands of computers using OMNINET Local Area Network TRANSPORTER™ interface cards. The BANK is currently available for the CORVUS CONCEPT™ and the IBM PC™ CORVUS, THE NETWORKING COMPANY, the BANK, OMNINET, CORVUS CONCEPT and TRANSPORTER are trademarks of CORVUS SYSTEMS, INC. IBM and IBM PC are trademarks of International Business Machines.

IN DEPTH

Photo © 1984 Ed Braverman

IEEE Project 802

Setting standards for local-area networks

By William Stallings

Development of the local-area network market depends on the availability of a low-cost interface. The cost to connect equipment to a local network must be much less than the cost of the equipment alone. This requirement as well as the complexity of the local-area network protocols dictate a very large-scale integration (VLSI) solution.

Chip manufacturers will be reluctant to commit the necessary resources without a high-volume market. A local-area network standard would ensure volume and also enable communication among equipment from a variety of manufacturers.

The Institute of Electrical and Electronics Engineers Computer Society established IEEE Project 802 in February 1980 to draft a local-area network standard. The work of the 802 committee has now come to fruition. Several parts of the proposal are now working their way through national and international standards organizations, and the remainder will follow soon.

The task of IEEE 802 was to specify the means by which devices could communicate over a local network. The committee characterized its work as follows:

"A local network is a data communications system that allows a number of independent devices to communicate with each other. This standard defines a set of interfaces and protocols for the local network.

"A local network is distinguished from other types of data networks in that the communication is usually confined to a moderate-size geographic area such as a single office building, a warehouse or a campus. The network can generally depend on a communications channel of moderate to high data rate which has a consistently low error rate. The network is generally owned and used by a single organization, in contrast to long-distance networks which interconnect facilities in different parts of the country or are used as a public utility. The local-area network is also different from networks

The objective of the local-area network standard is to ensure compatibility between equipment made by different manufacturers. The world of local networks will rapidly become an IEEE 802 world. As IEEE 802 products become widely available, nonstandard offerings can be expected to wither away — with two exceptions.

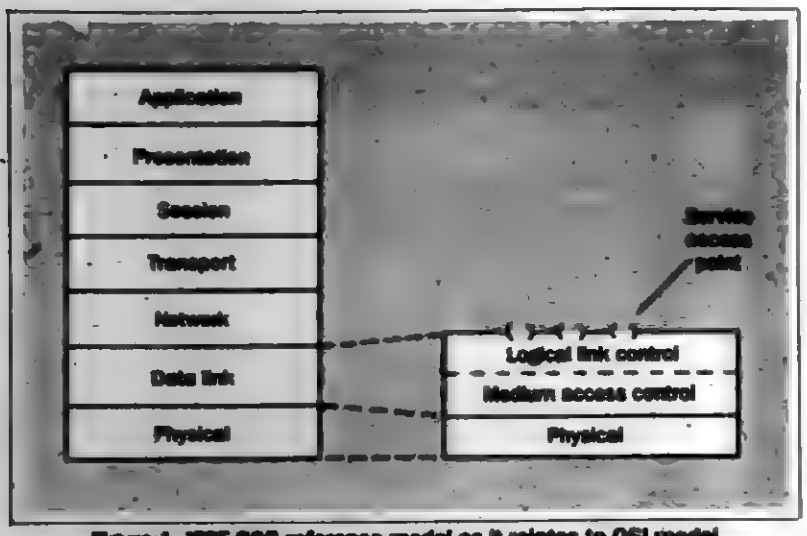


Figure 1. IEEE 802 reference model as it relates to OSI model

that interconnect devices on a desktop or components within a single piece of equipment.

"The objective of the local network standard is to ensure compatibility between equipment made by different manufacturers such that data communications can take place between the devices with a minimum effort on the part of the equipment users or the builders of a system containing the equipment. To accomplish this, the standard will provide specifications that establish common interfaces and protocols for local-area data communications networks."

The committee quickly reached two conclusions. First, the task of communicating across a local network is sufficiently complex that it needs to be broken up into more manageable subtasks. And second, no single technical approach will satisfy all requirements.

The first conclusion is reflected in a "local network reference model," compared in Figure 1 to the better-known open systems interconnection (OSI) model. The local network reference model has three layers:

Physical: This layer is concerned with the nature of the transmission medium and the details of device attachment and electrical signaling.

Medium access control: A local network is characterized by a collection of devices all needing to share a single transmission medium. A means to control access is needed so that only one device attempts to transmit at a time.

Logical link control: This layer is concerned with establishing, maintaining and terminating a logical link between devices.

The committee reluctantly reached the second conclusion when it became apparent that no single standard would satisfy all participants. There was support for both ring and bus topologies. Within the bus topology, there was support for two access methods (carrier-sense multiple access with collision detection [CSMA/CD] and token bus) and two media (baseband and broadband). The response of the committee was to standardize all serious proposals rather than to try to settle on just one. The result is shown in Figure 2.

The work of the IEEE 802 committee is currently organized into the following subcommittees:

- IEEE 802.1 Higher Layer Interface Standard.
- IEEE 802.2 Logical Link Control Standard (LLC).
- IEEE 802.3 CSMA/CD.
- IEEE 802.4 Token Bus.
- IEEE 802.5 Token Ring.
- IEEE 802.6 Metropolitan Area Network (MAN).

The Higher Layer Interface subcommittee is not developing standards, but rather is working on a variety of related issues such as higher layer interfaces, internetworking, addressing and network management.

Work has been completed on LLC, CSMA/CD and token bus for an initial standard. All three are now approved IEEE standards (IEEE Std. 802.2-1983, 802.3-1983 and 802.4-1983 respectively). Work continues on token ring within IEEE 802, with the intention of passing it to the IEEE Standards Board by the middle of this year.

The work on metropolitan area networks has as yet made little progress. The subcommittee is attempting to develop a small number of reasonable alternatives for further study.

The acceptance of the IEEE 802 standards has been remarkably widespread. The National Bureau of Standards, which issues Federal Information Processing Standards (Fips) for U.S. government procurements, has announced the intention of issuing Fips for CSMA/CD and LLC. The others will probably follow. The International Standards Organization (ISO) has decided to adopt the IEEE 802 documents in toto as Draft Proposed Standards. This is the first step in the development of international standards. The influential European Computer Manufacturers Association (Ecma), which had been actively drafting its own local-

Mom files best.

Introducing PC/COM.™ Truly, the fastest, easiest way to manage information today.

When MOM™ says she has a software system that can manage information faster than anything else on the market, believe it.

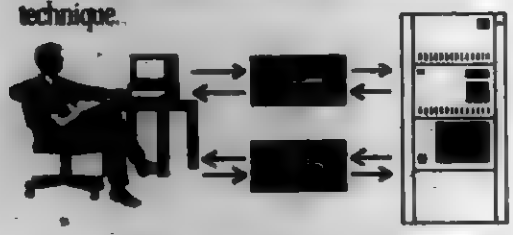
It's called PC/COM. A revolutionary automatic file transfer and management system that opens up a whole new realm of opportunities to PCs and PC-users.

Your mainframe works faster with PC/COM. Your PC gets more file management features.

If you are a mainframe user of TSO, CMS, or CICS, PC/COM will prove invaluable.

MOM says any job worth doing is worth doing fast.

MOM's PC/COM manages information at an incredible speed. And PC/COM will handle just about any file type with its unique binary transfer technique.

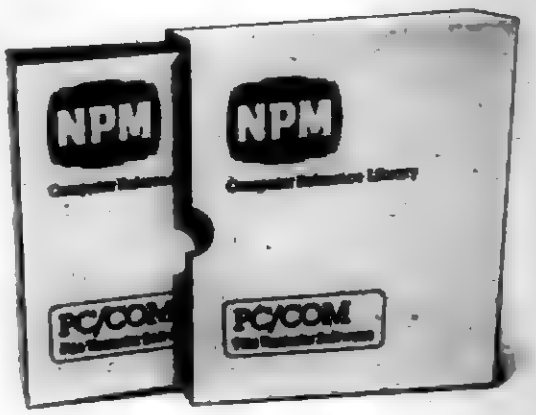


You can even back-up your hard disk on the mainframe. Leave it parked there until you need it. All it takes is the press of a key to get it moving again.

PC/COM is bi-directional, to save time getting information out of the mainframe onto your desk. And vice versa.

Security conscious, private and flexible—that's MOM.

The PC/COM has file access control and security built right in. So only those parts of the mainframe that should be accessed, are.



PC/COM is user-friendly and menu-driven so it's easy to understand. And simple to operate. All the features (and believe you, MOM, there are plenty) are initiated by a single function key.

Call MOM. 1-800-241-1170.

Talk to MOM. Tell her what you have and what you need. Ask her any questions about PC/COM and get good, clear answers.

MOM wants you to understand what you're getting into with PC/COM—and how much you can get out of owning the best, and fastest, file transfer and management system on the market.

The revolutionary PC/COM. Of course, from MOM. Phone 1-800-241-1170 or 404-351-2902.

MOM™

Specialists in Marketing of Micros to Mainframes.
Two Northside 75, Atlanta, Georgia 30318
A division of NPM, Inc.

MOM and PC/COM are trademarks of National Product Marketing, Inc. © 1983, The MOM Corporation

area network standards, has now officially deferred to IEEE 802.

The marketplace

The acceptance of the IEEE 802 standards in the marketplace is assured. As the preceding discussion suggests, the work of the IEEE 802 committee has no competition for standardization. The standards are being adopted within the U.S. and internationally.

Vendors, too, are lining up behind the standard. Fortunately, the CSMA/CD baseband standard is virtually identical to the Ethernet specification. Thus, many Ethernet vendors have announced IEEE 802.3 products and a number of semiconductor houses have announced IEEE 802.3 chips. Token bus broadband is about to follow the same pattern. At least one local-area network vendor (Concord Data Systems) has announced an IEEE 802.4 product. The token ring standard has yet to blossom, but the expected announcement of an IEEE 802.5 product by IBM would change the picture overnight.

What of nonstandard offerings? Many of these can be expected to wither away as the IEEE 802 products become widely available. Two exceptions are likely. The first is the low-cost, twisted-pair local network intended primarily for personal computers. The Corvus Systems, Inc. Omninet is the most prevalent example. Large numbers of these networks are already installed. With the possible exception of the twisted-pair ring, the IEEE 802 standards do not address this marketplace.

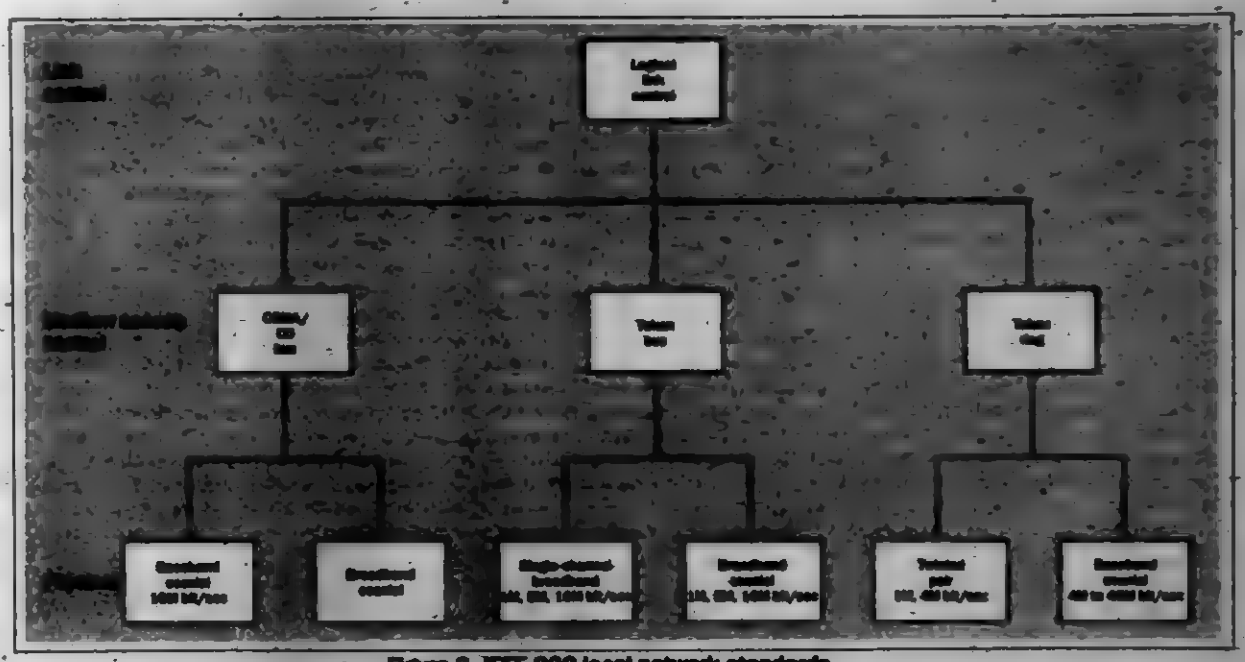


Figure 2. IEEE 802 local network standards

The second exception is from a company called AT&T, which will announce its own local network product shortly. The AT&T offering is totally distinct from all of the various IEEE 802 options and is based on a hybrid circuit and packet-switching technology.

With these exceptions, the world of local networks will rapidly become an IEEE 802 world.

Logical link control

The purpose of any data link control protocol is to provide a reliable communications path between two devices. Typically, data is transmitted in frames, which include control information for error control and flow control.

Because a local network consists of multiple, peer communications stations, the data link control requirement is more complex. The following functions are considered desirable:

Datagram: Some form of connectionless service is needed for efficient support of highly interactive traffic.

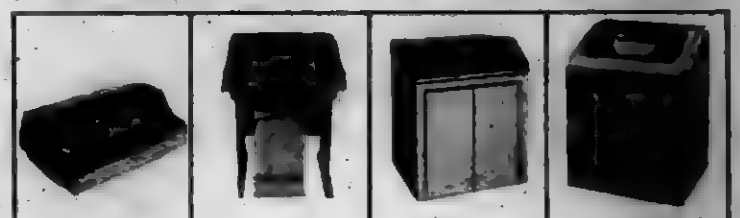
Virtual circuit: A connection-oriented service is also usually needed.

Multiplexing: Generally, a single physical link attaches a station to a local-area network; it should be possible to provide data transfer with multiple end points over that link.

Multicast, broadcast: The link layer should provide a service of sending a message to multiple stations or all stations.

Both the virtual circuit and multiplexing capabilities can be supported with the concept of the service access point (SAP). Figure 3 shows

MTI leases IBM compatible line printers to give you higher performance at lower cost.



B-300	B-600	B-1000	BP-1500
300 LPM	600 LPM	1000 LPM	1500 LPM
1 yr. lease w/service $555 mo.	1 yr. lease w/service $686 mo.	1 yr. lease w/service $1004 mo.	1 yr. lease w/service $1516 mo.

MTI guarantees the compatibility and reliability of Dataproducts printers we interface with your IBM system

Compare MTI's one year lease price which includes manufacturer-approved service. You'll enjoy trouble-free printing with these fine line printers. Dataproducts is the standard of the industry, and this group includes desktop, pedestal-mounted, and soundproofed cabinet models.

MTI is an authorized Dataproducts distributor, so we can have the Dataproducts printer of your choice with the proper interface enhancing your IBM system sooner than you think.

Whether you lease, buy or rent our equipment, you'll find MTI is the one source for all the terminals, peripherals, systems, applications expertise and service you'll ever need. At good prices. Call us.

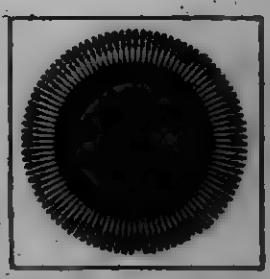
New York: 516/621-6200, 212/767-0677, 518/449-5959
Outside N.Y.S.: 800/645-6630
New Jersey: 201/227-5552
Ohio: 216/464-6688

mti

Applications Specialists & Distributors, New York, New Jersey and Ohio.
DEC, Intel, Texas Instruments, Dataproducts, Lear Siegler, Diablo, Rapid C.Rob, Intecolor, Racal-Vadic, MICOM, Vantel, Develcon, U.S. Design Dig.Eng., Cipher, Protocol Comp., MicroPro, Microsoft, Polygon, Select.

Brighter writer.

Our DP-55 daisywheel is a bit more clever than most. A digital status display tells you what it's doing as it prints, and how you can help when it doesn't. It can save you time and money, and that's just plain smart. Call your printer distributor. Or contact Dataproducts at (213) 887-3924, 6200 Canoga Avenue, Woodland Hills, CA 91365. In Europe, 136-138 High Street, Egham, Surrey, TW 20 9HL England.



Dataproducts Daisywheel Printers

Unacknowledged connectionless service
L-DATA.request
L-DATA.indication
Connection-oriented service
L-DATA-CONNECT.request
L-DATA-CONNECT.indication
L-DATA-CONNECT.confirm
L-CONNECT.request
L-CONNECT.indication
L-CONNECT.confirm
L-DISCONNECT.request
L-DISCONNECT.indication
L-DISCONNECT.confirm
L-RESET.request
L-RESET.indication
L-RESET.confirm
L-CONNECTION-FLOWCONTROL.request
L-CONNECTION-FLOWCONTROL.indication

Table 1. Logical link control primitives

three stations attached to a local network. Each station has an address.

Further, the link layer supports multiple SAPs, each with its own address. The link layer provides communications between SAPs.

Assume that a process or application X in station A wishes to send a message to a process in station C. X may be a report generator program in minicomputer A. C may be a printer and a simple printer driver. X attaches itself to SAP 1 and requests a connection to station C, SAP 1 (station C may have only one SAP if it is a single printer).

Station A's link layer then sends to the local-area network a "connection-request" frame, which includes the source address (A,1), the destination address (C,1) and some control bits indicating that this is a connection request.

The network delivers this frame to C, which, if it is free, returns a "connection-accepted" frame. Henceforth, all data from X will be assembled into a frame by A's LLC, which includes source (A,1) and destination (C,1) addresses.

Incoming frames addressed to (A,1) will be rejected unless they are from (C,1); these might be acknowledgment frames, for example. Similarly, station C's printer is declared busy, and C will only accept frames from (A,1).

Thus a connection-oriented service is provided. At the same time, process Y could attach to (A,2) and exchange data with (B,1). This is an example of multiplexing. In addition, various other processes in A could use (A,3) to send datagrams to various destinations.

IEEE 802 LLC specification

LLC provides two services:

Unacknowledged connectionless service: This is a datagram service that simply allows for sending and receiving frames. It supports point-to-point, multipoint and broadcast.

Connection-oriented service: This provides a virtual-circuit-style connection between service access points. It provides flow control, sequencing and error recovery.

These services are specified in terms of primitives that can be viewed as commands or procedure calls with parameters. Table 1 summarizes the LLC primitives.

The unacknowledged connectionless service provides for only two primitives across the interface between the next highest layer and LLC (not counting management service primitives). L-DATA.request is used to pass a frame to LLC for transmission. L-DATA.indication is used to pass a frame up from LLC upon reception.

The connection-oriented service includes L-DATA-CONNECT.request and L-DATA-CONNECT.indication, with meanings analogous to those above, plus L-DATA-CONNECT.confirm, which conveys the result (acknowledged, failure) of the previous associated L-DATA-CONNECT.request. In addition, a station, through an SAP, must be able to establish and tear down a connection and receive an acknowledgment of this action from the remote SAP. Finally, link resetting and flow control are provided.

The LLC frame consists of four fields, as shown in Figure 4. Unlike most link control formats, LLC requires both source and destination addresses to identify the two peer communicating entities. The source and destination are uniquely identified by a (node, SAP) pair. However, the node address is also used by MAC and is included in the outer MAC frame.

The LLC protocol is very similar to High-Level Data Link Control (HDLC). The format of the control field is identical to that of HDLC and the functioning is the same, with three exceptions:

- LLC makes use only of the asynchronous balanced mode of operation and does not employ HDLC's normal response mode or asynchronous response mode. This mode is used to support connection-oriented service. The set asynchronous balanced mode (SABM) command is used to establish a connection, and disconnect (DISC) is used to terminate the connection.
- LCC supports a connectionless (datagram) service by using the unnumbered information (UI) frame.
- LLC permits multiplexing by the use of SAPs.

CSMA/CD

The simplest form of medium access control adopted for IEEE 802 is CSMA/CD. This technique was popularized by Ethernet, which is a baseband local network developed in its original version by Xerox Corp. and then in its second version jointly by Xerox with Digital Equipment Corp. and Intel Corp. A broadband CSMA/CD was pioneered by Mitre Corp.

We begin by looking at a simpler version known as CSMA (carrier sense multiple access). With this

Imagine,
if you could offer
Distributed Printing
without RJE!

You Can! With VPS the JES/3270 RJE report distribution package. Drive up to 2,000 3270 attached printers while you improve CRT response and reduce local and remote printing costs.

Check these features:

- Total RJE replacement for Batch reports, CICS spooled reports, DS Print, VM
- Operates under JES, standard routing parameters and recovery No system modifications, JES tables or additional hardware
- Shares printers, lines and network resources Reduces hardware and telecommunications costs
- Off-loads all print to JES where it belongs Improves CRT response

270 installations driving over 20,000 printers

LRS Levi, Ray & Shoup, Inc.
PO Box 18538 • Dallas, TX 75218
DALLAS (214) 324-2635 • TELEX 80-4294
L.A. (213) 822-4586 • Chicago (312) 329-0853 • N.Y.C. (212) 288-2522

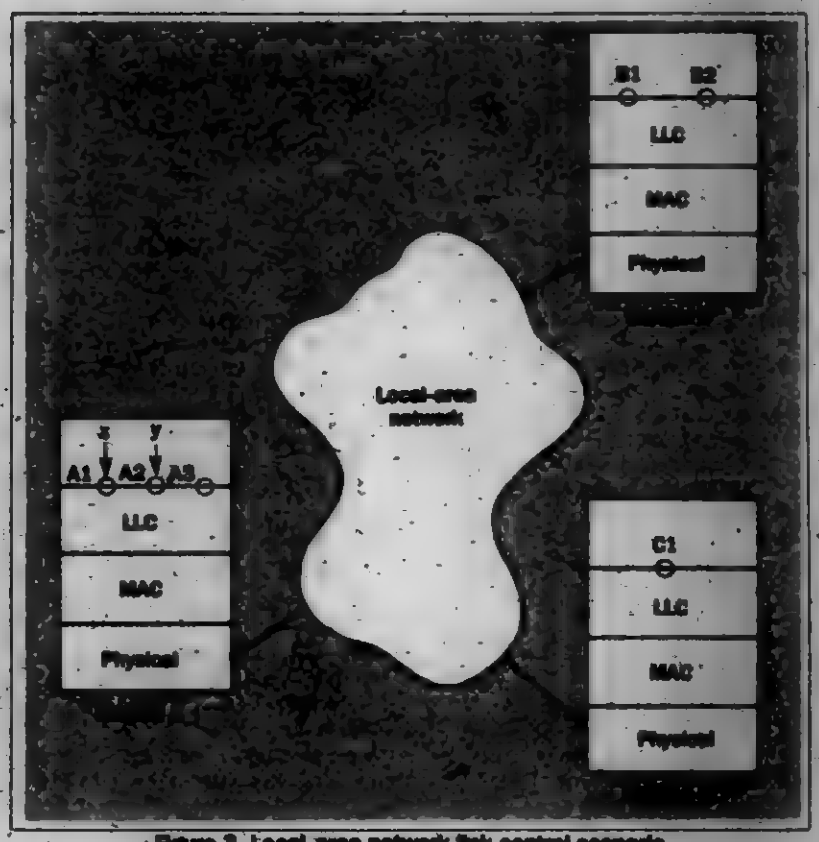


Figure 3. Local-area network link control scenario

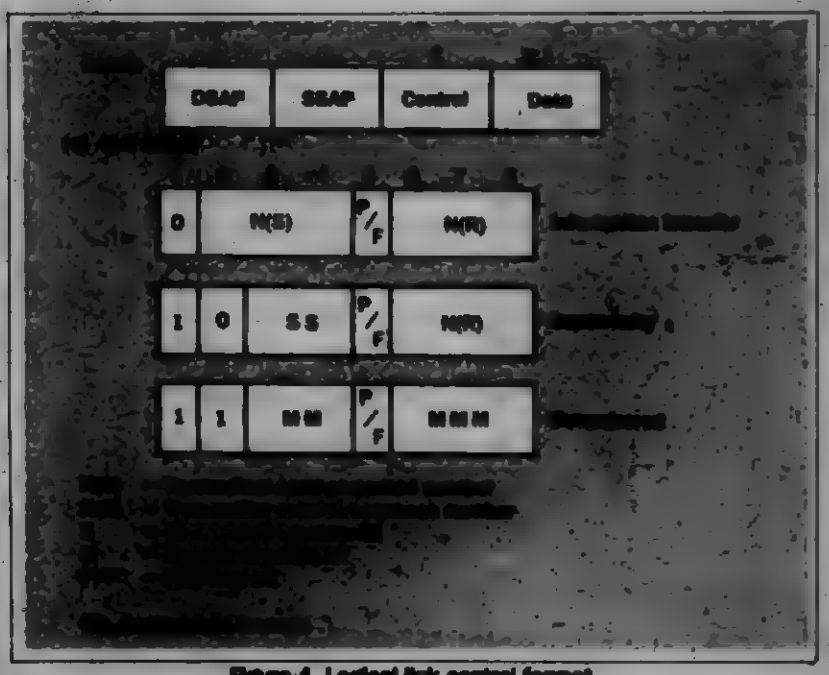


Figure 4. Logical link control format

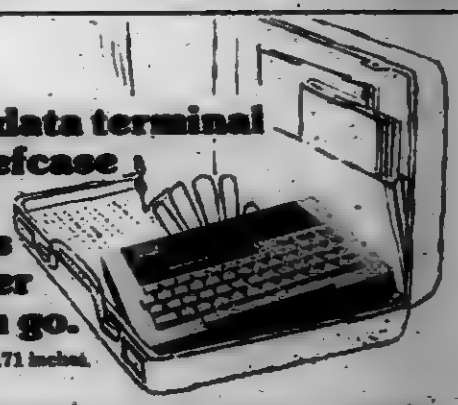
scheme, a station wishing to transmit first listens to the medium to determine if another transmission is in progress. If the medium is idle, the station may transmit. Now, it may happen that two or more stations attempt to transmit at about the same time. If this happens, there will be a collision; the data from both transmissions will be garbled and will not be received successfully. To account for this, a station waits a reasonable amount of time after transmitting for an acknowledgment. If there is no acknowledgment, the station assumes that a collision has occurred and retransmits.

With CSMA, an algorithm is needed to specify what a station should do if the medium is found to be busy. Three approaches are shown in Figure 5. One algorithm is nonpersistent CSMA. A station wishing to transmit listens to the medium and obeys the following rules:

1. If the medium is idle, transmit.
2. If the medium is busy, wait an amount of time drawn from a probability distribution (the retransmission delay) and repeat step 1.

The use of random retransmission times reduces the probability of collisions. The drawback is that even if several stations have a frame to send, there is likely to be some wasted idle time following a prior transmission.

To avoid channel idle time, the 1-persistent protocol can be used. A station wishing to transmit listens to the medium and obeys the following rules:



Slip TI's new data terminal into your briefcase and you'll be able to access your computer wherever you go.

Dimensions: 8.46 x 11.73 x 2.71 inches.
Weight: 5.9 lbs.

Lease the TI707 portable from MTI for $45/month including maintenance.

The Silent 700* Model 707 portable data terminal is ideal for electronic mail applications, data base usage, real estate multiple listing printouts, and much more. The built-in Bell 103 compatible modem lets you access your computer from the nearest telephone jack. With the optional acoustic coupler and battery pack, you can even talk to your computer from a pay phone. The TI 707 features 30 cps matrix printing with true upper and lower case characters.

MTI is an authorized distributor of Texas Instruments' full line of portable terminals, matrix printers and Professional Computers. Whether you buy, lease or rent our equipment, you'll find MTI is the one source for all the terminals, peripherals, systems, applications expertise and service you'll ever need. At great prices. Call us.

New York: 516/621-6200, 212/767-0677, 518/449-5959
Outside N.Y.S.: 800/645-6530
New Jersey: 201/227-5552
Ohio: 216/464-6688

mti systems corp

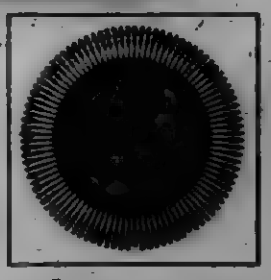
AUTHORIZED DISTRIBUTOR
Texas Instruments
Data Systems Group

Applications Specialists & Distributors, New York, New Jersey and Ohio. DEC, Intel, Texas Instruments, Dataproducts, Lear Siegler, Diablo, Esprit C.Itoh, Intecolor, Racal-Vadic, MICOM, Ventel, Develcon, U.S. Design Dig.Eng., Cipher, Protocol Comp., MicroPro, Microsoft, Polygon, Select.

*Trademark of Texas Instruments.

Heavy duty.

If you can't afford printer downtime, pick the ones designed to take all the punishment you can dish out and still keep printing. Our 35 and 55 character-per-second daisywheels print sheaves of crisp, sharp letters at doubletime, with never a moan or groan. Call your distributor. Or contact Dataproducts at (213) 887-8924. 6200 Canoga Avenue, Woodland Hills, CA 91365. In Europe, 136-138 High Street, Egham, Surrey, TW 20 9HL England.



Dataproducts Daisywheel Printers

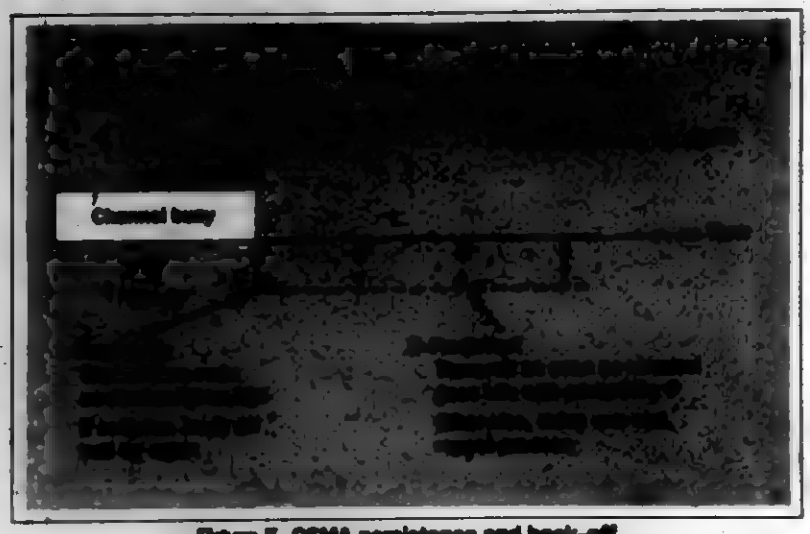


Figure 5. CSMA persistence and back-off

1. If the medium is idle, transmit.
2. If the medium is busy, continue to listen until the channel is sensed idle, then transmit immediately.
3. If there is a collision (determined by a lack of acknowledgment), wait a random amount of time and repeat step 1.

Whereas nonpersistent stations are deferential, 1-persistent stations are selfish. If two or more stations are waiting to transmit, a collision is guaranteed. Things only get sorted out after the collision.

A compromise that attempts to reduce collisions, like nonpersistent, and reduce idle time, like 1-persistent, is p-persistent. The rules are:

1. If the medium is idle, transmit with probability *p*, and delay one time unit with probability (1 - *p*). The time unit is typically equal to the maximum propagation delay.
2. If the medium is busy, continue to listen until the channel is idle and repeat step 1.
3. If transmission is delayed one time unit, repeat step 1.

CSMA has one glaring inefficiency. When two frames collide, the medium remains unusable for the duration of transmission of both damaged frames. For long frames, compared with propagation time, the amount of wasted bandwidth can be considerable. This waste can be reduced if a station continues to listen to the medium while it is transmitting. In that case, these rules can be added to the CSMA rules:

1. If a collision is detected during transmission, immediately cease transmitting the frame and transmit a brief jamming signal to ensure that all stations know there has been a collision.
2. After transmitting the jamming signal, wait a random amount of time, then attempt to transmit again using CSMA.

With this addition, the technique is referred to as CSMA/CD. The technique is illustrated in Figure 6. At time t_0, A begins transmitting a frame addressed to D. At t_1, both B and C are ready to transmit. B senses a transmission and so defers. C, however, is still unaware of A's transmission and begins its own transmission. When A's transmission reaches C(t_2), C detects the collision and ceases transmission. The effect of the collision propagates back to A, where it is detected some time later (t_3), at which time A ceases transmission.

IEEE 802 MAC specification

The IEEE 802 MAC specification follows the general outline described above. One detail worth mentioning is the persistence algorithm. You may be surprised to learn that the IEEE 802 standard specifies the 1-persistent algorithm.

Recall that both nonpersistent and p-persistent have performance problems. In the nonpersistent case, capacity is wasted because the medium will generally remain idle following the end of a transmission, even if there are stations waiting to send. In the p-persistent case, *p* must be set low enough to avoid instability, with the result of sometimes atrocious delays under light load.

The 1-persistent algorithm, which after all means *p* = 1, would seem to be even more unstable than p-persistent because of the greed of the stations. What saves the day is that the wasted time resulting from collisions is mercifully short (if the frames are long relative to propagation delay!); and with random back-off, the two stations involved in a collision are unlikely to collide on their next tries. To ensure that back-off maintains stability, a technique known as binary exponential back-off is used. A station will attempt to transmit repeatedly in the face of repeated collisions, but after each collision, the mean value of the random delay is doubled. After 16 unsuccessful attempts, the station gives up and reports an error.

The beauty of the 1-persistent algorithm with binary exponential back-off is that it is efficient over a wide range of loads. At low loads, 1-persistence guarantees that a station can seize the channel as soon as it

Has your most productive asset been working at half speed?

Look at it this way.

If you had to shade screen glare with one hand, enter data with the other. Hour after hour. Just how efficient would you be?

The fact is, CRT glare takes its toll. On your terminal users. And on department productivity.

But now there's a sensible solution.

Introducing Glare/Guard® anti-glare panels.

Glare/Guard instantly eliminates up to 94 percent of all CRT glare. Resolution is always sharp. And image brightness and clarity are dramatically enhanced—even under bright, fluorescent lighting.

Without anti-glare panel | Etched panel | Glare/Guard

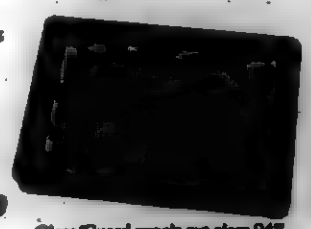
The result? No screen washout.

Glare/Guard's secret is HEA®—a special High-Efficiency Antireflection coating we applied to the windows of NASA's Space Shuttle. And only Glare/Guard has it.

Glare/Guard's durable, laminated-glass design lasts indefinitely. It quickly retrofits to virtually every leading display terminal—no tools required. Its smooth surface is easily cleaned. And Glare/Guard sells for $99, regardless of display size.

Of course, there are less expensive anti-glare products available. But the nylon strands of mesh screens cause fuzzy images. While etched panels merely spread glare around and blur resolution.

Only Glare/Guard does exactly what an anti-glare panel is supposed to do. And that's getting your terminal user's attention out of the glare, and back onto the screen.



Glare/Guard panels cut glare 94%.

Call 800-447-4700 for free brochure.

Glare/Guard anti-glare panels are another quality product manufactured by OCLI. Just call us toll free and we'll send your free brochure, including our helpful sizing guide. Or write Glare/Guard, OCLI, Dept. 109D, 2789 Northpoint Parkway, Santa Rosa, CA 95407-7397.

OCLI

Better yet, place a trial order with your dealer and install Glare/Guard panels on your busiest terminals. You'll see the difference, instantly.

Glare/Guard® and HEA® are registered trademarks of OCLI—Optical Coating Laboratory, Inc. ©1983 OCLI—Optical Coating Laboratory, Inc. All rights reserved.

Glare/Guard®

A difference you can see.

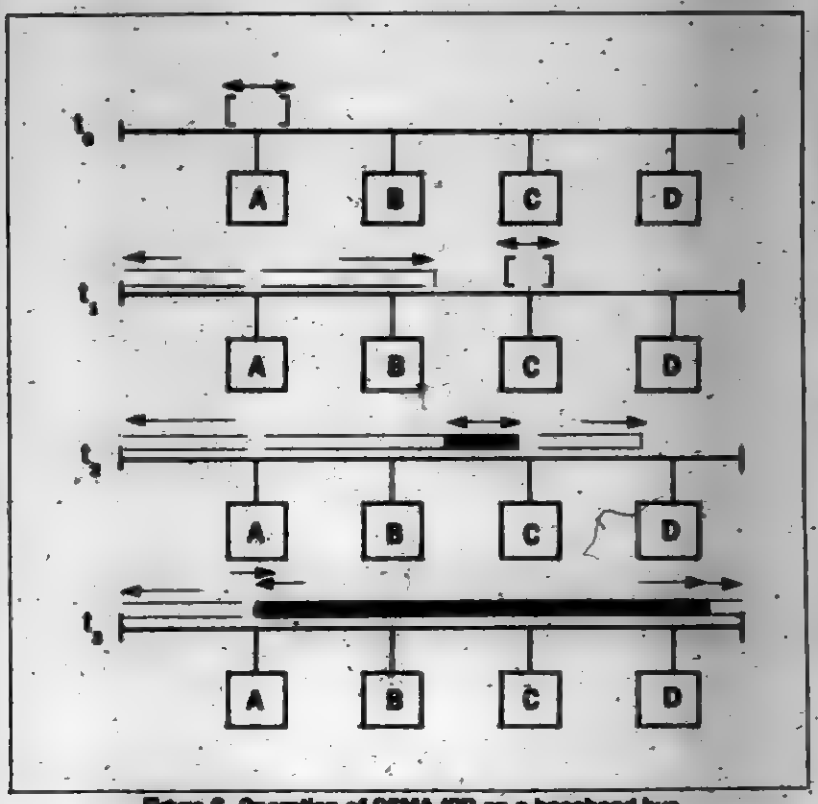


Figure 6. Operation of CSMA/CD on a baseband bus

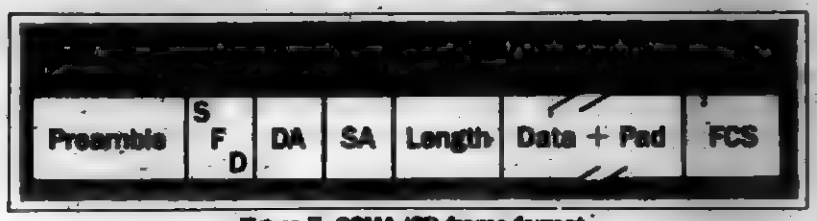


Figure 7. CSMA/CD frame format

goes idle, in contrast to the non- and p-persistent schemes. At high loads, it is at least as stable as the other techniques. However, one unfortunate effect of the back-off algorithm is that it has a last-in, first-out effect; stations with no or few collisions will have a chance to transmit before stations that have waited longer.

Figure 7 shows the MAC CSMA/CD frame structure. The individual fields are as follows:

Preamble: an eight-byte pattern used by the receiver to establish bit synchronization and then locate the first bit of the frame.

Start frame delimiter (SFD): indicates the start of a frame.

Destination address (DA): specifies the station(s) for which the frame is intended. It may be a unique physical address (one destination transceiver), a multicast-group address (a group of stations) or a global address (all stations on the local network).

Source address (SA): specifies the station that sent the frame.

Length: specifies the number of LLC bytes that follow.

LLC data: field prepared at the LLC level.

Pad: a sequence of bytes added to assure that the frame is long enough for proper CD operation.

Frame check sequence (FCS): a 32-bit cyclic redundancy check value. Based on all fields, starting with destination address.

The CSMA/CD physical layer specification calls for a baseband, 50-ohm coaxial cable. In this context, the term baseband refers to the use of digital signaling, as opposed to the use of a modem and analog signaling.

Digital signals are transmitted using Manchester encoding. This is an encoding technique that ensures at least one voltage transmission per bit time. A collision is detected if a larger-than-expected voltage swing is observed.

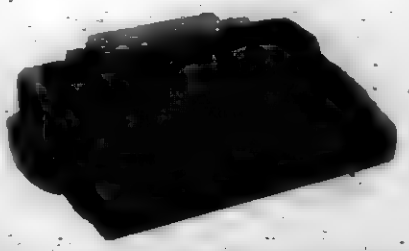
Several broadband schemes for CSMA/CD are under consideration. Broadband implies the use of analog signals and will allow multiple channels to be carried simultaneously.

Token bus

Token bus is a relatively new technique for controlling access to a broadcast medium, inspired by the token ring technique discussed later.

For token bus, the stations on the bus or tree form a logical ring; that is, the stations are assigned logical positions in an ordered sequence, with the last member of the sequence followed by the first. Each station knows the identity of the stations preceding and following it. The physical ordering of the stations on the bus is irrelevant and independent of the logical ordering (see Figure 8 on ID/34).

A control packet known as the token regulates the right of access. The token frame contains a destination address. The station receiving the token is granted control of the medium for a specified time. The station may transmit one or more frames and may poll stations and



Lease the Digital LA12-C plain paper portable from MTI for $83/month including maintenance.

We are authorized distributors of Digital's terminals, printers and personal computers.

Digital's Correspondent is the most versatile portable around. It uses any paper, prints multi-part forms, prints up to 132 columns at 150 cps, full ASCII character set plus bit map graphics via a highly legible 9x9 dot matrix. There are five models of this versatile portable with different data communications capabilities. The C model has an integral 300 baud acoustic coupler.

MTI is one of the few Authorized Digital Terminals Distributors, so we can give you the best of two worlds; terminals, based on advanced technology from the industry leader, and the expertise and service from applications specialists.

Whether you buy, rent or lease our equipment, you'll find MTI is the one source for all the terminals, peripherals, systems, applications expertise and service you'll ever need. At good prices. Call us today.

New York: 516/621-6200, 212/767-0677, 518/449-5959
Outside N.Y.S.: 800/645-6530
New Jersey: 201/227-5552
Ohio: 216/464-6688

mti

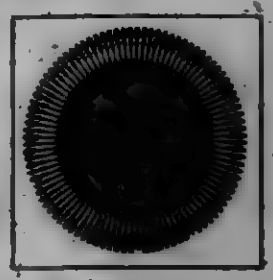
AUTHORIZED digital TERMINALS DISTRIBUTOR

Applications Specialists & Distributors, New York, New Jersey and Ohio. DEC, Intel, Texas Instruments, Dataproducts, Lear Siegler, Diablo, Esprit C.Itoh, Intecolor, Racal-Vadic, MICOM, Ventel, Develcon, U.S. Design Dig.Eng., Cipher, Protocol Comp., MicroPro, Microsoft, Polygon, Select.

Correspondent is a registered trademark of Digital Equipment Corp.

Mighty write.

This is the word processing printer built to survive the rigors of the office. Our heavy duty DP-Series daisywheels whisk out crisp, letter-perfect documents – hour after hour, month after month – without a whimper. Call your printer distributor. Or contact Dataproducts at (213) 887-3924, 6200 Canoga Avenue, Woodland Hills, CA 91365. In Europe, 136-138 High Street, Egham, Surrey, TW 20 9HL England.



Dataproducts Daisywheel Printers

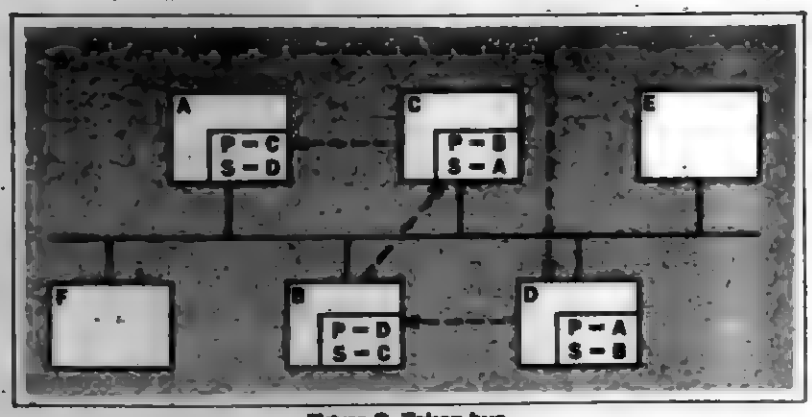


Figure 8. Token bus

receive responses. When the station is done or time has expired, it passes the token on to the next station in logical sequence. This station now has permission to transmit. Hence, steady-state operation consists of alternating data transfer and token transfer phases. In addition, non-token-using stations are allowed on the bus. These stations can only respond to polls or requests for acknowledgment.

This scheme requires considerable maintenance. The following functions, at a minimum, must be performed by one or more stations on the bus:

Ring initialization: When the network is started up, or after the logical ring has broken down, it must be reinitialized. Some cooperative, decentralized algorithm is needed to sort out who goes first, who goes second and so on.

Addition to ring: Periodically, nonparticipating stations must be granted the opportunity to insert themselves in the ring.

Deletion from ring: A station can voluntarily remove itself from the ring by splicing together its predecessor and successor.

Fault management: A number of errors can occur. These include duplicate address (two stations think it is their turn) and broken ring (no station thinks that it is its turn).

Figure 9. Token bus frame format

Token bus specification

The IEEE 802 token bus protocol follows the general principles outlined above. In general, token-passing and data-passing phases alternate.

Figure 9 shows the MAC frame structure for a token bus. The individual fields are as follows:

Preamble: a one-or-more-byte pattern used by receivers to establish bit synchronization and locate the first bit of the frame.

Start delimiter (SD): indicates start of frame.

Frame control (FC): indicates whether this is an LLC data frame. If not, bits in this field control operation of the token bus MAC protocol. An example is a token frame.

Destination address (DA): as with CSMA/CD.

Source address (SA): as with CSMA/CD.

Data unit: field prepared by LLC.

Frame check sequence (FCS): as with CSMA/CD.

End delimiter (ED): indicates end of frame.

The details of the protocol can be grouped into the following categories, which will be considered in turn:

- Addition of a node.
- Deletion of a node.
- Fault management by token holder.
- Ring initialization.

How to contact IEEE 802

The IEEE 802 Project maintained an open-door policy of participation. At any one working group, about 20 to 30 people showed up. Participants came from a variety of backgrounds within communications and marketing. Most worked for a computer vendor or AT&T. The only other major source of participation was the National Bureau of Standards.

Anyone wishing to comment on or question a particular aspect of the proposed standard should write to the chairman of the appropriate working group:

M. Graube, Chairman, IEEE 802
Tektronix
Box 500, MS 50-4473
Beaverton, Ore. 97077

W.T. Lidinsky
Chairman, IEEE 802-1
High-Level Interface Working Group
Bell Laboratories, MS IH6B-309
Naperville-Wheaton Road
Naperville, Ill. 60566

D.E. Carlson
Chairman, IEEE 802-2
Logical Link Control Working Group
AT&T Information Systems
LZ-3E314
307 Middletown-Lincroft Road
Lincroft, N.J. 07738

D.C. Loughry
Chairman, IEEE 802-3
CSMA/CD Working Group
Hewlett-Packard Co.
Building IND-47L
19420 Homestead Road
Cupertino, Calif. 95014

R.H. Douglas
Chairman, IEEE 802-4
Token Bus Working Group
Concord Data Systems
10640 N. 28th Drive
Suite A209
Phoenix, Ariz. 85029

R.A. Donnan
Chairman, IEEE 802-5
Token Ring Working Group
IBM
Department E87/B651
P.O. Box 12195
Research Triangle Park, N.C. 27709

J. Mollenauer
Chairman, IEEE 802-6
Metropolitan Area Network Working Group
Codex
20 Cabot Blvd.
Mansfield, Mass. 02048

M. Stahlman
Chairman, IEEE 802-7
Broadband Technical Advisory Group
General Instruments Corp.
1775 Broadway
New York, N.Y. 10019

W.L. Schumacher
Chairman, IEEE 802-8
Fiber Optics Technical Advisory Group
AMP, Inc.
MS 24-21
P.O. Box 3608
Harrisburg, Pa. 17105

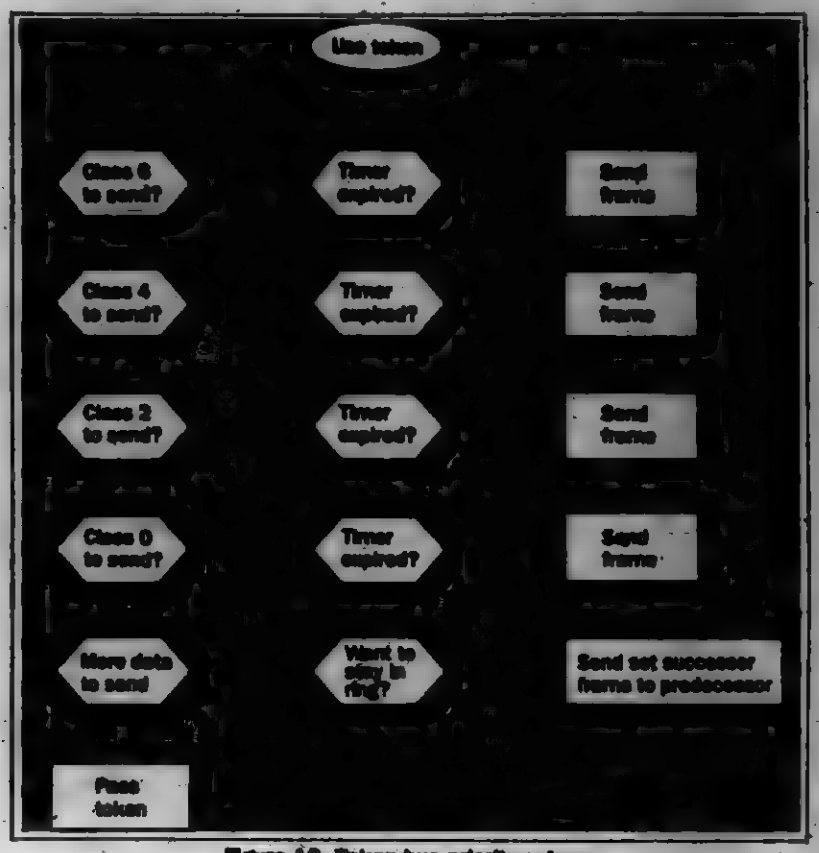


Figure 10. Token bus priority scheme

■ Classes of service.

First, let us consider how a node is added to the ring, using a controlled contention process called *response windows*. Each node in the ring has the responsibility of periodically granting an opportunity for new nodes to enter the ring. While holding the token, the node issues a *solicit-successor* frame, inviting nodes with an address between itself and the next node in logical sequence to demand entrance. The transmitting node then waits for one response window or slot time (equal to twice the end-to-end propagation delay of the medium). Three events can occur:

1. **No response:** Nobody wants in. The token holder transfers the token to its successor as usual.

2. **One response:** One node issues a *set-successor* frame. The token holder sets its successor node to be the requesting node and transmits the token to it. The requester sets its linkages accordingly and proceeds.

3. **Multiple responses:** The token holder will detect a garbled response if more than one node demands entrance. The conflict is resolved by an address-based contention scheme. The token holder transmits a *resolve-contention* frame and waits four demand windows. Each demander can respond in one of these windows based on the first two bits of its address. If a demander hears anything before its window comes up, it refrains from demanding.

If the token holder receives a valid set-successor frame, it is in business. Otherwise, it tries again, and only those nodes that responded the first time are allowed to respond this time, based on the second pair of bits in their address. This process continues until a valid set-successor frame is received, no response is received or a maximum retry count is reached. In the latter two cases, the token holder gives up and passes the token.

Deletion of a node is much simpler. If a node wishes to drop out, it waits until it receives the token, then sends a set-successor frame to its predecessor, instructing it to splice to its successor. If a node fails, it will not pick up the token when the token is passed to it, and this failure will be detected by the token sender, as explained below.

Fault management by the token holder covers a number of contingencies (see Table 2). First, while holding the token, a node may hear a frame indicating that another node has the token. If so, it immediately drops the token by reverting to listener mode. In this way, the number of token holders drops immediately to one or zero, thus overcoming the multiple-token problem (which could be caused by two nodes having the same address). Upon completion of its turn, the token holder will issue a token frame to its successor. The successor should immediately issue a data or token frame. Therefore, after sending a token, the token issuer will listen for one slot time to make sure that its successor is active. This precipitates a sequence of events:

1. If the successor node is active, the token issuer will hear a valid frame and revert to listener mode.

2. If the issuer does not hear a valid frame, it reissues the token to the same successor one more time.

3. After two failures, the issuer assumes that its successor has failed and issues a *who-follows* frame, asking for the identity of the node that follows the failed node. The issuer should get back a set-successor frame from the second node down the line. If so, the issuer adjusts its linkage and issues a token (back to step 1).

4. If the issuing node gets no response to its who-follows frame, it tries again.

5. If the who-follows tactic fails, the node issues a solicit-successor frame with the full address range (that is, every node is invited to respond). If this process works, a two-node ring is established, and life goes on.

6. If two attempts of step 5 fail, the node assumes that a catastrophe has occurred; perhaps the node's receiver has failed. In any case, the node ceases activity and listens to the bus.

Logical ring initialization occurs when one or more stations detect a lack of bus activity of duration longer than a time-out value: The token has been lost. This situation can have a number of causes; perhaps the network has just been powered up or a token-holding station fails. Once its time-out expires, a node will issue a *claim-token* frame. Contending claimants are resolved in a manner similar to the response-window process. Each claimant issues a claim-token frame padded by zero, two, four or six slots based on the first two bits of its address.

After transmission, a claimant listens to the medium and if it hears anything, drops its claim. Otherwise, it tries again, using the second pair of its address bits. The process repeats. With each iteration, only those stations that transmitted the longest on the previous iteration try again, using successive pairs of address bits. When all address bits have been used, a node that succeeds on the last iteration considers itself the token holder. The ring can now be rebuilt by the response window process described previously.

As an option, a token bus system can include classes of service that provide a mechanism of prioritizing access to the bus. Four classes of service are defined, in descending order of priority: 6, 4, 2, 0. Any station may have data in one or more of these classes to send. The object is to allocate network bandwidth to the higher priority frames and only send lower priority frames when there is sufficient bandwidth. To explain, let us define the following variables:

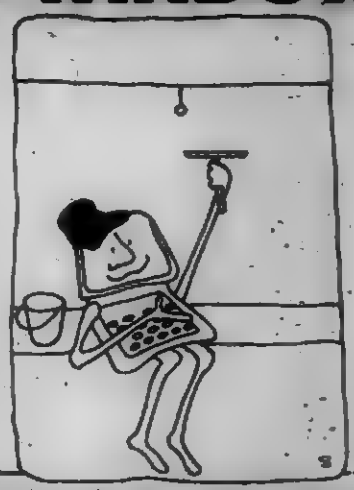
■ THT = token holding time: the maximum time that a station can hold the token to transmit class 6 (synchronous) data.

■ TRT4 = token rotation time for class 4: maximum time that a token can take to circulate and still permit class 4 transmission.

■ TRT2 = token rotation time for class 2: as above.

Table 2. Token bus error handling

MAKE YOUR VAX® DO WINDOWS



SMARTSTAR™ is the first VAX information management tool that creates multiple window applications—and can scroll your screen to 400 lines. The SMARTSTAR family includes:

- SMARTDESIGN™ for designing applications without programming
- SMARTQUERY™ for powerful, easy-to-use application processing
- SMARTCALL™ when VAX host programming is required
- REQUEST for integrated report and query

Name
Title
Company
Address
City State Zip
Phone ( )

SEND COUPON NOW FOR DETAILS AND JOIN THE 4TH GENERATION

STI Signal Technology, Inc.

5951 Encina Road, Goleta, CA 93117 (805) 683-3771 Outside California call toll-free (800) 235-0787
TWX 910-334-3471

VAX is a trademark of Digital Equipment Corporation

Micro-to-mainframe:

Before you settle for solution, ask a few serious

Choosing a micro-to-mainframe communications system is no game.

If you make the wrong choice, the consequences can be very expensive.

So before you toy around with "easy" solutions, do yourself a favor and ask some serious questions.

You might want to start with these:

Will this product support full IBM Terminal Emulation?

Make sure the system you choose offers *full* protocol emulation. It should be able to emulate remote batch and interactive IBM terminals and terminal systems.

Does the company offer a variety of products to solve my problem?

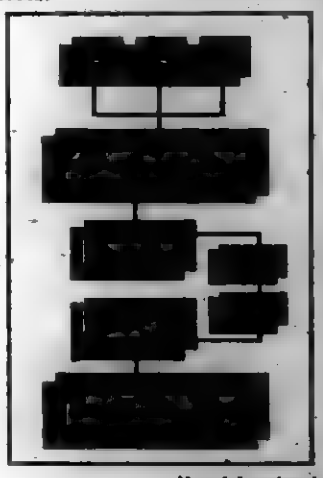
The manufacturer you select should be able to handle *any* operating environment. You should have your choice of stand-alone front-end processors, IBM PC or XT boards, or an OEM board. And make sure the products will run on the most popular operating systems, including CP/M, MS-DOS and UNIX.

Can I get fast answers to my questions?

Insist on toll-free access to qualified service personnel before and *after* the sale. A Product Support Group should be available during your normal business day.

What if I need a quick analysis of a problem?

If you run into a problem, you shouldn't have to sit through a lengthy question-and-answer session over the phone. Ask if the manufacturer has a Communications Test Center that allows for product testing over public phone lines. And find out if the product has internal diagnostics that point out problem areas right on the screen.



Suppose something goes wrong with the unit?

Be sure the company offers a service plan that includes a 30 day money-back guarantee and a 12 month warranty that includes a free replacement unit.

a simplistic questions.

What about future product development?

It's not enough for a company to solve your communications problems today. Ask about their commitment to R&D. Are they working on products you're going to need soon? If not, you might want to consider someone who is.

Who am I dealing with anyway?

In a market as volatile as this one, you need some reassurance that the people you buy from will be around to back up their products. Ask how long they've been in business. The longer, the better.

How much is all this going to cost?

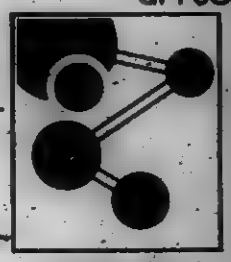
There are lots of micro-to-mainframe solutions with lots of price tags. But here's a point of reference for you:

Our own DataTalker™ product line will give you all the capabilities and services we've just described for as little as $695. Complete.

Granted, this isn't all the information you'll need to choose the right micro-to-mainframe solution. But it's a good start.

If you'd like to know more—and there certainly is more to tell—contact our Marketing Support Group at 1-800-321-7785.

We'll make sure you get the answers you need. And we won't play games.



Providing Data Communications Solutions

Winterhalter, Incorporated
3853 Research Park Drive,
P.O. Box 2180, Ann Arbor,
Michigan 48106, 313/662-2002,
800-321-7785, TELEX 234 216,
TWX 810-223-2423

DataTalker™

By Winterhalter, Incorporated

Winterhalter, Incorporated has been providing data communications solutions to major manufacturers of microcomputers and word processors since 1978. Our Datatalker front-end processors and PC boards are used by companies around the world, from start-up manufacturers to the Fortune 1000.

NASDAQ SYMBOL WNTR

The New WY1000 Microcomputer

BUILDING BLOCKS

Powerful, Affordable, Expandable

The WY1000 stacks up to be a lot of machine from a few simple pieces. By adding the WY1000 microcomputer to the good-looking, ergonomic WY50 display terminal, we created the most exciting concept in desktop workstations on the market today.

We also added sophisticated high resolution graphics, suitable for the most demanding applications.

Plus, we added color capability, when used with our color terminal.

And on top of that, we added a Winchester Disk Drive option providing an additional 10 megabytes of storage.

FEATURES:

- **80186 16 Bit 8 MHz Processor**
- **128KB to 768KB RAM Memory**
- **Two Floppy Disk Drives (725 KB)**
- **Optional 10 MB Winchester Drive**
- **RS232 & RS422 Serial Ports**
- **Optional Graphics/Color Graphics**
- **Networking Capability**
- **CP/M™, MS-DOS™ Compatible**
- **Priced from only $1995**

Best of all, we priced the WY1000 from only $1995. It all adds up to a system builder's dream.

For a complete brochure on the WY1000 contact Wyse Technology toll free at 800/421-1058.

WYSE

Make the Wyse Decision.

WYSE TECHNOLOGY *3040 N. First St., San Jose, CA 95134, 408/946-3075, TLX 910-338-2251; Outside CA call toll-free, 800/421-1058, in So. CA 213/340-2013.*

THT0 = token rotation time for class 0: as above.

When a station receives the token, it can transmit classes of data according to the following rules (see Figure 10 on ID/35):

1. It may transmit class 6 data for a time THT. Hence, for an *n*-station ring, during one circulation of the token, the maximum amount of time available for class 6 transmission is *n* x THT.

2. After transmitting class 6 data, or if there was no class 6 data to transmit, it may transmit class 4 data only if the amount of time for the last circulation of the token (including any class 6 data just sent) is less than TRT4.

3. The station may next send class 2 data only if the amount of time for the last circulation of the token (including any class 6 and 4 data just sent) is less than TRT2.

4. The station may next send class 0 data only if the amount of time for the last circulation of the token (including any class 6, 4 and 2 data just sent) is less than TRT0.

This scheme, within limits, gives preference to frames of higher priority. More definitively, it guarantees that class 6 data may have a certain portion of the bandwidth.

Two cases are possible. If *n* x THT is greater than MAX[TRT4, TRT2, TRT0], the maximum possible token circulation time is *n* x THT, and class 6 data may occupy the entire cycle to the exclusion of other classes. If *n* x THT is less than MAX[TRT4, TRT2, TRT0], the maximum circulation time is MAX[TRT4, TRT2, TRT0], and class 6 data is guaranteed *n* x THT amount of that time.

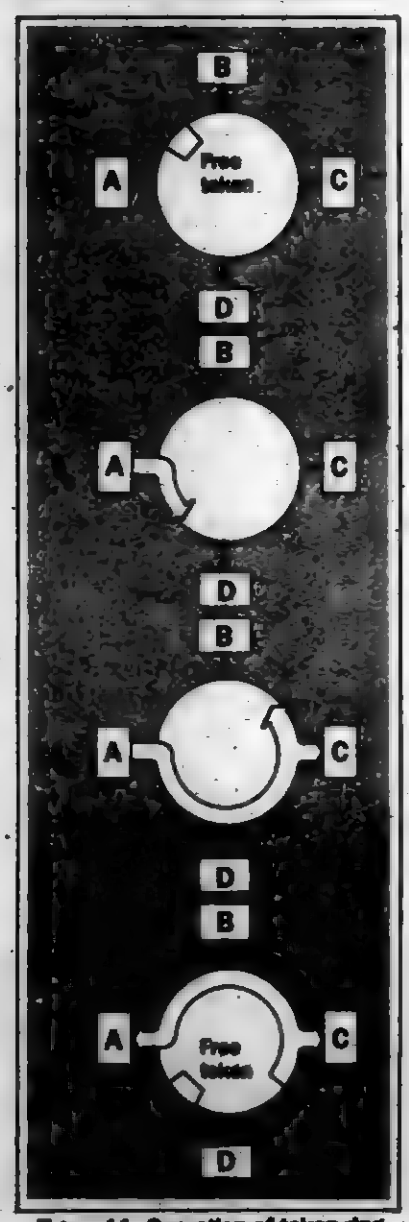


Figure 11. Operation of token ring

Token bus physical layer specification

For token bus, three physical layer specifications are provided as options. All use 75-ohm CATV coaxial cable, and all use modems and analog signaling. This contrasts with the CSMA/CD baseband specification, which uses digital signaling on a special 50-ohm cable.

The simplest and least expensive option uses a form of frequency-shift keying (FSK) and operates at 1M bit/sec. This scheme is known as "single-channel broadband" to indicate that only one channel of signal can be carried; it is not possible to use frequency-division multiplexing. The second option is also single-channel broadband, using FSK at either 5M or 10M bit/sec. In this case, the electronic specifications are such that this option is easily upgradable to the final and most expensive option.

This final option is a full broadband system, which can carry multiple data channels, as well as video channels, simultaneously. Three data rates are provided: 1M bit/sec, which occupies a 1.5-MHz channel; 5M bit/sec, occupying a 6-MHz channel; and 10M bit/sec, occupying a 12-MHz channel.

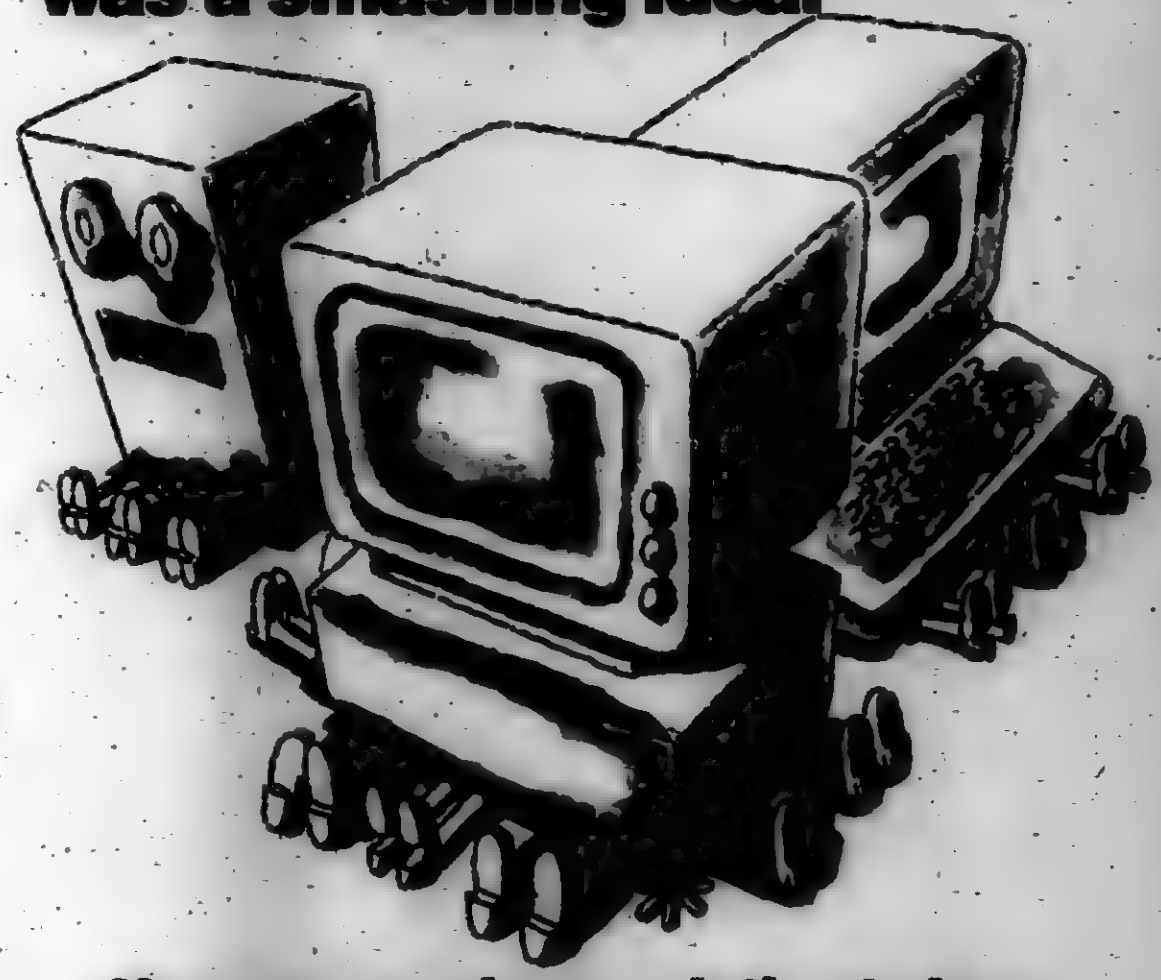
Token ring

The token ring technique is the only medium access control protocol specified for the ring topology. The token ring technique is based on the use of a single token that circulates around the ring when all stations are idle (see Figure 11). A station wishing to transmit must wait until it detects a token passing by. It then changes the token from "free token" to "busy token." The station then transmits a frame immediately following the busy token.

There is now no free token on the ring, so other stations wishing to transmit must wait. The frame on the ring will make a round trip and be purged by the transmitting station. The transmitting station will insert a new free token on the ring when the station has completed transmission of its frame and the busy token has returned to the station.

If the bit length of the ring is less than the frame length, the first condition implies the second. If not, a

Providing your employees with the latest office technology was a smashing idea.



Now you need one solution to keep them on top of it all.

With all the subtlety of a bomb, technology has arrived in your organization. And its effect on productivity can be devastating. Even your most skilled, most motivated employees may be hard-pressed to keep up.

The solution is comprehensive, continuous education and training. And DELTAK, the world leader in training programs and services, can help.

For your DP professionals, there's a wide range of job-specific multimedia and computer-based skills courses. For managers and end users, we offer micro-courseware and video briefings covering critical business issues.

And to complete your expanding training needs, DELTAK now provides comprehensive consulting, professional classroom instruction and major city workshops.

So call today and find out how DELTAK can help your people stay on top of some very pressing problems.

DELTAK
East/West Technological Center
1751 West Diehl Rd., Naperville, IL 60566
(312) 369-3000 (800) 532-7666

© 1984, DELTAK Inc.

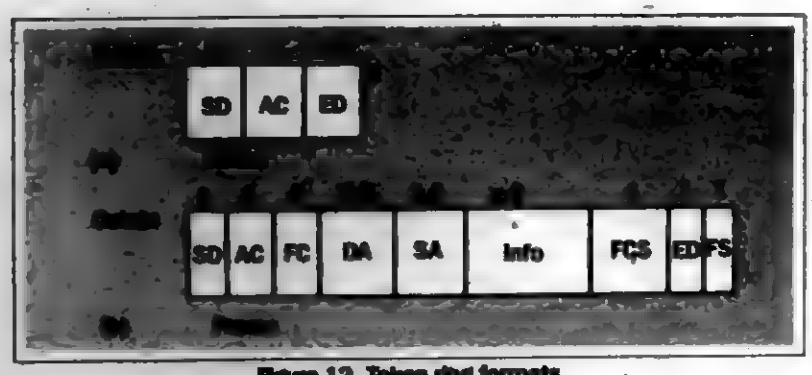


Figure 12. Token ring formats

station could release a free token after it has finished transmitting but before it receives its own busy token; the second condition is not strictly necessary.

In any case, the use of a token guarantees that only one station at a time may transmit.

When a transmitting station releases a new free token, the next station downstream with data to send will be able to seize the token and transmit.

Several implications of the token ring technique can be mentioned. Note that under lightly loaded conditions, there is some inefficiency because a station must wait for the token to come around before transmitting. However, under heavy loads, which is where it matters, the ring functions in a round-robin fashion, which is both efficient and fair. To see how this process works, refer to Figure 11.

Note that after station A transmits, it releases a token. The first station with an opportunity to transmit is D.

If D transmits, it then releases a token, and C has the next opportunity and so on. Finally, the ring must be long enough to hold the token. If stations are temporarily bypassed, their delay may need to be supplied artificially.

Token ring specification

The IEEE 802 token ring specification is a refinement of the scheme just outlined. The key elements are as follows:

1. **Single-token protocol:** A station that has completed transmission will not issue a new token until the busy token returns. This procedure is not as efficient, for small frames, as a multiple-token strategy of issuing a free token at the end of a frame. However, the single-token system simplifies priority and error-recovery functions.

2. **Priority bits:** These indicate the priority of a token and, therefore, which stations are allowed to use the token. In a multiple-priority scheme, priorities may be set by station or by message.

3. **Monitor bit:** It may be used if a central ring monitor is employed.

4. **Reservation indicators:** They may be used to allow stations with high-priority messages to indicate in a frame that the next token be issued at the requested priority.

5. **Token-holding timer:** Started at the beginning of data transfer, it controls the length of time a station may occupy the medium before transmitting a token.

6. **Acknowledgment bits:** There are three: error detected (E), address recognized (A) and frame copied (C). These are reset to 0 by the transmitting station. Any station may set the E bit. Addressed stations may set the A and C bits.

Figure 12 shows the two frame formats for token ring. The individual fields are as follows:

Starting delimiter (SD): a unique eight-bit pattern used to start each frame.

Access control (AC): has the format "PPPTMRRR," where PPP and RRR are three-bit priority and reservation variables, M is the monitor bit and T indicates whether this is a token or data frame. In the case of a token frame, the only additional field is ED.

Frame control (FC): indicates whether this is an LLC data frame. If not, bits in this field control operation of the token ring MAC protocol.

Destination address (DA): as in CSMA/CD and token bus.

Source address (SA): as in CSMA/CD and token bus.

LLC: as in CSMA/CD and token bus.

FCS: as in CSMA/CD and token bus.

Ending delimiter (ED): contains the error detection (E) bit and the intermediate frame (I) bit. The I bit is used to indicate that this is a frame other than the final one of a multiple-frame transmission.

Frame status (FS): contains the address recognized (A) and frame copied (C) bits.

Let us first consider the operation of the ring when only a single priority is used. In this case, the priority and reservation bits are not used. A station wishing to transmit waits until a free token goes by, as indicated by a token bit of 0 in the AC field. The station seizes the token by setting the token bit to 1. It then transmits one or more frames, continuing until either its output is exhausted or its token-holding timer expires. After the busy token returns, the station transmits a free token.

Stations in the receive mode listen

Do you know the only place where you can find...

...all the major developments in office and data technology ? Ways to improve communication and efficiency in office organization ? The latest in word and data processing ? A comprehensive display of microcomputers and personal computers ? All you need to know about information science – from office computers to complete systems ?

You don't ?

Answer: ...

World Centre for Office and Data Technology

CeBIT

Further information from:
Hannover Fairs Information Center
Saken Industrial Park
Route 22 East, Whitehouse NJ 08888
Tel.: (201) 534-9644, (800) 526-5075 (toll free) · Telex: 833493

... at the Fair of Fairs

Wednesday, 4th – Wednesday, 11th April

Hannover Messe'84

to the ring. Each station can check passing frames for errors and set the E bit if an error is detected. If a station detects its own address, it sets the A bit to 1; it may also copy the frame, setting the C bit to 1. This allows the originating station to differentiate three conditions: 1) station nonexistent/nonactive, 2) station exists but frame not copied and 3) frame copied.

The foregoing operation can be supplemented by a multiple-priority scheme. For example, bridges could be given higher priority than ordinary stations. The 802 specification provides three bits for eight levels of priority. For clarity, let us designate three values: P_m = priority of message to be transmitted by station; P_r = received priority; and R_r = received reservation. The scheme works as follows:

1. A station wishing to transmit must wait for a free token with $P_r \leq P_m$.

2. While waiting, a station may reserve a token at its priority level (P_m). If a busy token goes by, it may set the reservation field to its priority ($R_r \leftarrow P_m$) if the reservation field is less than its priority ($R_r < P_m$). If a free token goes by, it may set the reservation field to its priority ($R_r \leftarrow P_m$) if $R_r < P_m$ and $P_m < P_r$. This has the effect of preempting any lower priority reservations.

3. When a station seizes a token, it sets the token bit to 1, the reservation field to 0 and leaves the priority field unchanged.

4. Following transmission, a station issues a new token with the priority set to the maximum of P_r, R_r and P_m and a reservation set to the maximum of R_r and P_m.

The effect of the above steps is to sort out competing claims and allow the waiting transmission of highest priority to seize the token as soon as possible. A moment's reflection reveals that, as is, the algorithm has a ratchet effect on priority, driving it to the highest used level and keeping it there.

To avoid this situation, two stacks are maintained, one for reservations and one for priorities. In essence, each station is responsible for assuring that no token circulates indefinitely because its priority is too high. By remembering the priority of earlier transmissions, a station can detect this condition and downgrade the priority to a previous, lower priority or reservation.

Summarizing the priority algorithm

We are now in a position to summarize the priority algorithm. A station having a higher priority than the current busy token can reserve the next free token for its priority level as the busy token passes by. When the current transmitting station is finished, it issues a free token at that higher priority. Stations of lower priority cannot seize the token, so it passes to the requesting station or an intermediate station of equal or higher priority with data to send.

The station that upgraded the priority level is responsible for downgrading it to its former level when all higher priority stations are finished. When the station sees a free token at the higher priority, it can assume that there is no more higher priority traffic waiting, and it downgrades the token before passing it on.

To overcome various error situations, such as no token circulating and persistent busy token, one station is designated as active token monitor. The monitor detects the lost-token condition by using a timeout greater than the time required for the longest frame to completely traverse the ring. To recover, the monitor purges the ring of any residual data and issues a free token. To detect a circulating busy token, the monitor sets the monitor bit to 1 on any passing busy token. If it sees a busy token with a bit already set, it knows that the transmitting station failed to purge its frame. The monitor changes the busy token to a free token.

Other stations on the ring have the role of passive monitor. Their primary job is to detect failure of the active monitor and assume that role. A contention-resolution algorithm is used to determine which station takes over.

The physical layer specification for the token ring remains to be fully worked out. The following options are expected:

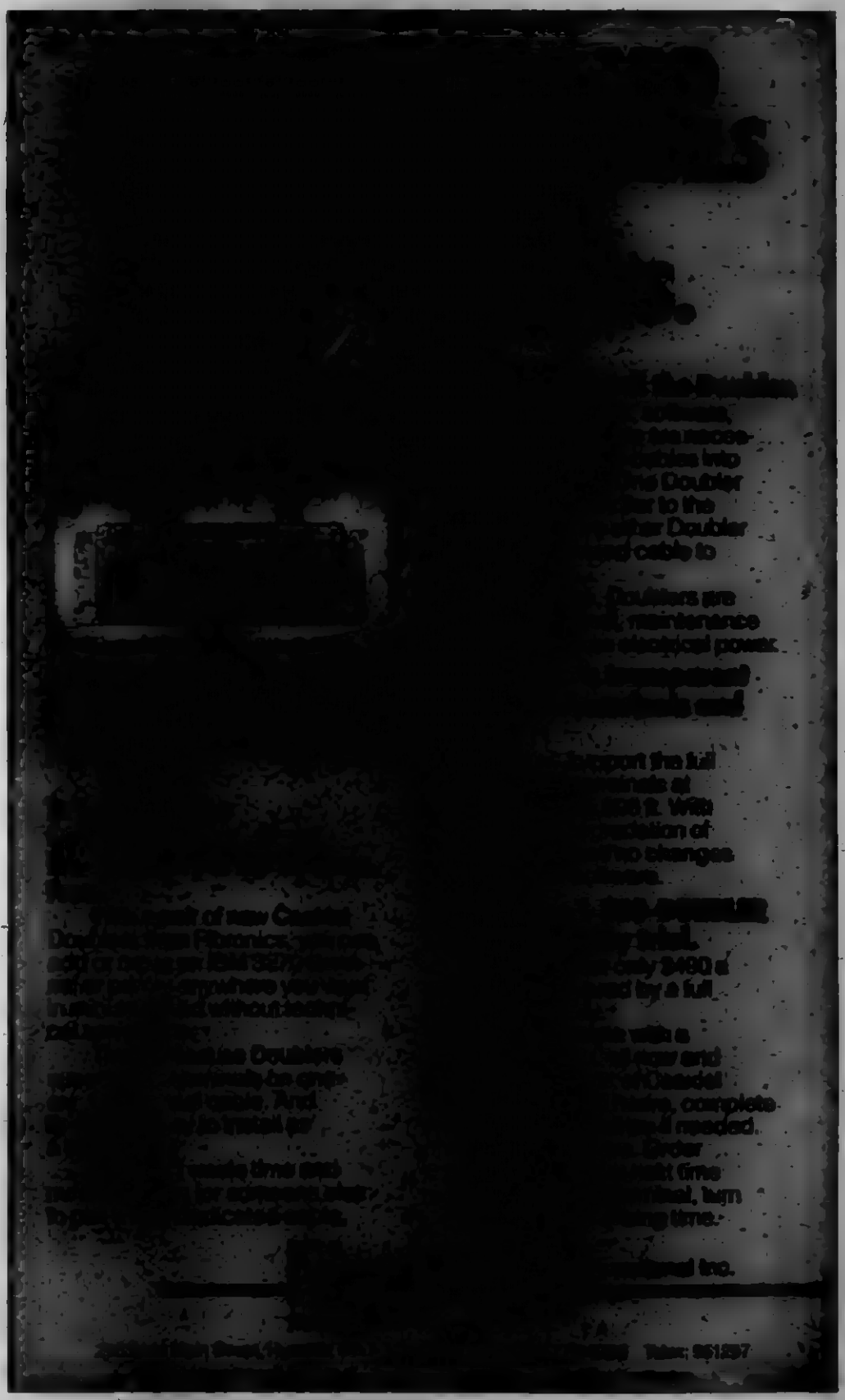
- A lower speed (1M to 4M bit/sec) ring will use a 150-ohm shielded twisted pair.
- Higher speed (4M to 40M bit/sec) may be provided with baseband coaxial cable.
- It is expected that a fiber-optic ring will be defined at some later date.

In many ways, the work of the IEEE 802 committee has been a resounding success. The committee has completed or is close to completing a full set of standards, which has received widespread acceptance. If there has been a failure, it is that the group did not come up with a single standard for local networks. This failure, however, reflects the diversity of the technology rather than any inadequacy within the committee.

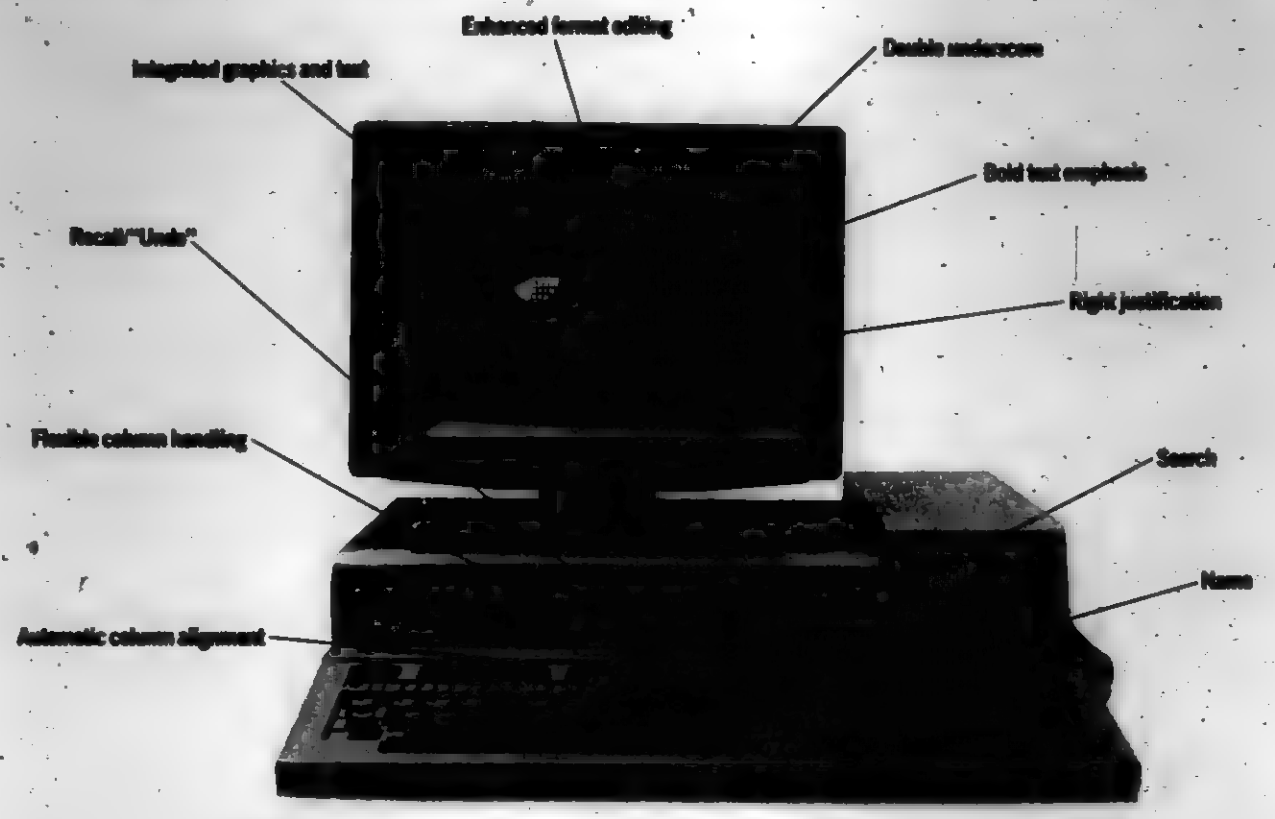
About the author

Dr. William Stallings lectures and writes on data communications subjects. He is the author of Local Networks: An Introduction *(Macmillan, 1984), upon which this article is based.*

Stallings teaches an IEEE 802 course under the auspices of Omnicom, Inc. of Vienna, Va. He is senior communications consultant with Honeywell Information Systems, Inc. in McLean, Va.



Wang Word Processing Plus.



We couldn't leave well enough alone.

For years, word processing from Wang has been the world's standard.

Now it's the only standard.

Because feature for feature, there isn't another word processing software product that even comes close.

Not IBM. Not anyone.

From integrated text and graphics to split-screen editing, Word Processing Plus not only does more, it does it faster and easier.

WP Plus is available on Wang VS, OIS, and Alliance® systems.

And it's easy to convert existing Wang WP documents to WP Plus.

Word Processing Plus.

Once again, the last word in words is Wang.

For a demonstration of Wang WP Plus, call 1-800-225-9264. Or write to: Wang Laboratories, Inc., Business Executive Center, One Industrial Avenue, Lowell, MA 01851.

WANG

The Office Automation Computer People.

© 1985 Wang Laboratories, Inc. Alliance® is a registered trademark of Wang Laboratories, Inc.

IN DEPTH

Technostress

By Craig Brod

It took a thousand years for humanity to incorporate machines in its psyche. It took an era for humanists to call attention to the new psychological problems machines pose. We can no longer wait for hindsight. Technostress is already a reality. We must learn to come to grips with it now.

Jacques Ellul, in *The Technological Society*, pointed out that the impact of new technology on our collective psyche is more forceful now than during the industrial era. Not only has technology become the environment, a ubiquitous part of our lives requiring mastery for survival, but it possesses a power of its own. Machines have become so interconnected that one device necessitates another, which in turn generates the need for more machines and newer applications to keep pace. More computers mean more computer systems and more computerized procedures.

According to Ellul, human character is bound by the computer. We find ourselves confused, overwhelmed and culturally at sea. Our ability to exercise free choice and pursue meaningful lives is made difficult.

Questions of values and free choice are being explored within the technical community itself. Joseph Weizenbaum, professor of computer science at MIT, has written extensively on how the role advocated for the computer by many social scientists and computer professionals intensifies alienation.

Weizenbaum maintains that the espoused benefits of the "information society" are, in fact, questionable. Overreliance on computer systems, in his view, is undercutting people's ability to perceive and evaluate their own lives; the computer reinforces "a kind of pragmatic positivism bordering on scientism."

This approach to the world may

Illustration by Jim Varadka

(Excerpted from Technostress: The Human Cost of the Computer Revolution, *by Craig Brod, copyright © 1984, by permission of Addison-Wesley Publishing Co., Inc., Reading, Mass. 01867. All rights reserved.)*

ultimately reduce people's ability to think creatively by not allowing them to see alternatives to their problems. Weizenbaum fears that as people model themselves on the computer, their self-images as dynamic, feeling beings will be eclipsed by the image of the computer as the universal hero.

Although there is no fixed bundle of characteristics we can refer to as human nature, there is a point beyond which we become nonhuman. At this point, we no longer strive to realize our potential to become feeling, sentient beings. The elegance of being human is reflected in our gift of being able to articulate the finest shades of meaning and feeling. Most of us have an inner desire to blossom, to be creative, to expand our horizons and our bonds with others.

Joann exhibits the classic behavior of the technocentered individual. Her relationship to the computer is determining her relationship to all else, and the computer comes first. She has reordered her priorities, and from her perspective, it probably appears to be a good arrangement.

When we make an all-out effort to adapt to new technology and to become, in effect, high-performance machines ourselves, we frustrate those inner strivings. In so doing, we stunt our most valuable human qualities. In recalling those experiences in life we all most prize — occasions when we express strong emotions, appreciate a beautiful work of art, share a touching moment — the force of those experiences leave us no room to doubt that we are people, not machines.

The central question we must try to face is this: Given our tremendous potential as human beings, how well are we living up to our promise? It is claimed that the computer is the greatest extension of human experience and culture thus far — a tool to do our bidding — but this assessment does not match the experience of how our use of computers is affecting our culture.

Most warnings about technology's effect on human character have been couched in general, societal terms. Social critics have tended not to venture from the speculative to the concrete by examining the individual lives of people for whom the computer is their culture. This broad-brush approach is highly useful, but it is incomplete. As Arthur Koestler once commented, "Facts don't bleed. People do."

The computer has spread so far in so short a time that already evidence of how people's characters are being tansformed is all around us. In some cases, the change is subtle; in others, it is dramatic. The latter cases — instances where people have become technocentered — help illuminate what threatens to become the normal behavior of our time.

Technocentered living

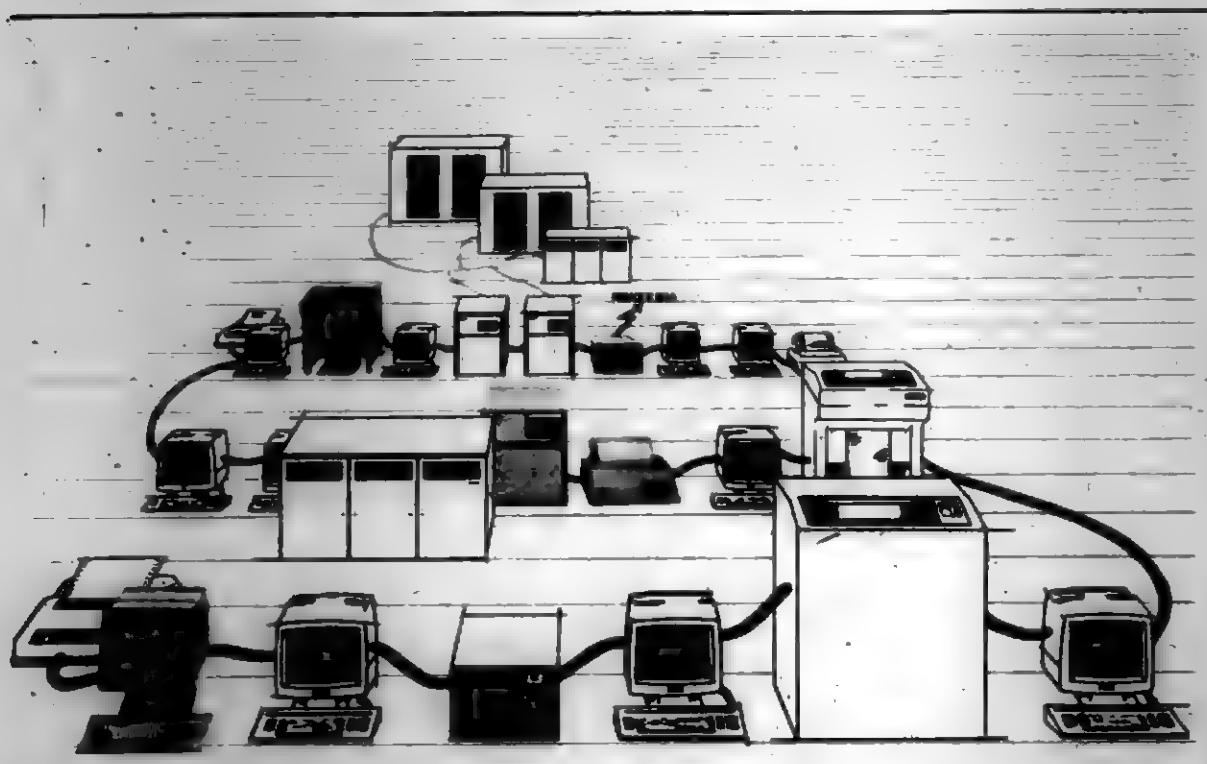
Joann is a systems manager for a large urban bank. She is an expert computer programmer and spends most of her time designing new systems for the bank to use. She feels comfortable in her job and challenged by her work. She hates meetings, wants to be left alone at work and experiences her co-workers as an unnecessary burden. She sometimes neglects her personal appearance. When she returns home at the end of the day, she communicates to her husband in a yes-no fashion and soon retreats to her room where she can have peace and quite.

Joann exhibits the classic behavior of the technocentered individual. Her relationship to the computer is determining her relationship to all else, and the computer comes first. She has reordered her priorities, and from her perspective, it probably appears to be a good arrangement. She thinks of herself as successful and well-adjusted, and only friction with her family may force her to see the harm being technocentered has done to her personality.

Highly motivated computer users, like any other achievement-oriented workers, have a strong desire to excel. They want to master their work, expand their abilities and feel challenged. Most cannot tolerate loose ends, sloppy organization, undefined goals. They see themselves as plowing through a succession of problems and leaving a steady trail of completed tasks behind them. This outlook pushes them in the direction of control, because control engenders task completion.

Maladaptation of this kind is not simply the result of character flaws. Our entire culture is pushing people in the direction of computer compatibility. People do not generally learn to master the computer for the same reasons they master the violin. The majority of computer users are forced to learn the technology, directly or indirectly: directly, through fear of losing one's job, or indirectly, through an awareness that career success and advancement hinge on computer skills. Companies expect high performance from their work force just as they do from their machines, and ambitious people must learn to meet the high standards of electronic space or move aside.

Adaptation to intense computer work is a complex phenomenon.



3270 Networking: No More No Man's LAN.

Imagine. 3270 Processing. IBM-Compatible Personal Computing. Local Area Networking. And SNA Compatibility. In One System.

Imagine a system that successfully settles the uncharted territory of 3270 local networking—that "no man's LAN" of unlinked and unrealized potential.

Imagine a system that delivers the power of 3270 processing, and the flexibility to build two local area networks from a single controller. Imagine being able to attach up to 120 devices to that controller. Or attaching four distinct controllers—and multiple coaxial links of up to 10,000 feet each—to any of those LANs.

Imagine the economies of a system that handles that networking with standard 3270 coax. That requires no commitment to special architectures or non-standard LAN technologies. And that, thanks to a multi-drop, station-to-station design, can eliminate thousands of feet of new coax.

Of course, such a system would have SNA compatibility. But it would also have a set of capabilities to dramatically increase throughput, while reducing hardware and support costs in *any* environment. Capabilities like multi-host and multi-personality support, application and address switching, and system printing.

This system would have multi-user personal computing "built into" the network—allowing you to assign true 16-bit computing power, maintain overall MIS control, and share expensive disks and printers.

Such a system would boast an intelligent display station that displays a mastery of ergonomic and aesthetic design. With multi-screen formats, anti-glare screen, low-profile keyboard, and a tilt-and-swivel pedestal with the smallest footprint in the industry. Such a system would also include a full line of printers.

Imagine. 3270 processing. IBM-compatible personal computing. Versatile, economical, powerful local area networking. In one system.

Braegen *has* imagined just such a system. They have designed it. Built it. And called it the ELAN™ System.

If such a system sparks your imagination, give us a call. We know the feeling. The Braegen Corporation, 525 Los Coches Street, Milpitas, CA 95035, (408) 945-8150; TWX: 910-338-7332.

Braegen. Where Networks Better

BRÆGEN

™ELAN is a trademark of The Braegen Corporation.

Computer literacy, which once referred to an ability to use software and perhaps do a little programming in Basic, has broadened. It now often means familiarity with several computer languages and systems and, by extension, enough ease with the technology to use it to expand one's own abilities. For the achiever, there is continual pressure to stay on top of the technology, since it is constantly evolving as new products appear, change and disappear. There are no niches to slip into and relax.

Pressure on the computer worker can be enormous. When large companies computerize, slipups can be disastrous: The smallest error can disrupt a delivery schedule or misplace millions of dollars.

The smallest glitch can ruin an entire day. Boundaries between the self and the world of the machine become dangerously fuzzy.

Jack is a senior programmer for a large bank. When a new system goes on line, he spends his night in a motel near the bank so that if problems develop, he is nearby to come fix them. Every night for weeks afterwards, even when he sleeps undisturbed, he dreams that he's received the dreaded phone call — "It blew up!" — and must jump out of bed to get the system running again before the entire staff comes in to use it.

Harrowing or not, this pressure is exactly what many computer workers thrive on. Challenge is often the stimulus that motivates them. Attracted by the possibility of doing jobs faster and better, they push themselves from competence to excellence. Completing a predetermined task is no longer the real goal; designing more difficult tasks and mastering them is.

To create the challenges they need, computer workers keep improving on already workable solutions — writing more elegant code, shortening a procedure — so that the tasks at hand keep expanding to fit the available time. As a result, deadlines are always imminent. The computer workers in this case have a high degree of personal involvement in the work they are doing. Their nervous systems are extremely attuned to minute fluctuations in the work system. The smallest glitch can ruin an entire day. Boundaries between the self and the world of the machine become dangerously fuzzy.

With the new mastery of information and problem-solving skills, mental work loads become heavier. The incessant choices that must be made when a complex task is handled as a sequence of subroutines add to the burden.

At 42, James is a systems analyst at a manufacturing company. An ace analyst, he is a worker with few peers and one who, because few others understand what goes into the job, earns little praise. Since at each job only he understands the various programs, he feels constantly badgered to clarify them to co-workers. He explains, "I feel as though more and more information is demanded of me." Large chunks of his time and energy are drained. He has worked for four employers in 10 years. Each time James quits a job, he feels an intense freedom, a tremendous sense of release that lasts until his knowledge catches up with him at another job. He is, ironically, a victim of his own expertise.

Users may begin to feel tired and find they cannot calculate as quickly, plan as well or make decisions as carefully as before. Mental engagement is high-pitched, concentration intensely focused. The person is immersed in processing information, which overshadows normal sensory awareness. Users may start to lose track of time — a morning spent on a problem can seem like no time at all. Meals are skipped and meetings missed as a problem is pursued. Symptoms of an overtaxed mind are not as easily recognized as those of an overtaxed body, so hardworking computer users bend their minds to questionable limits.

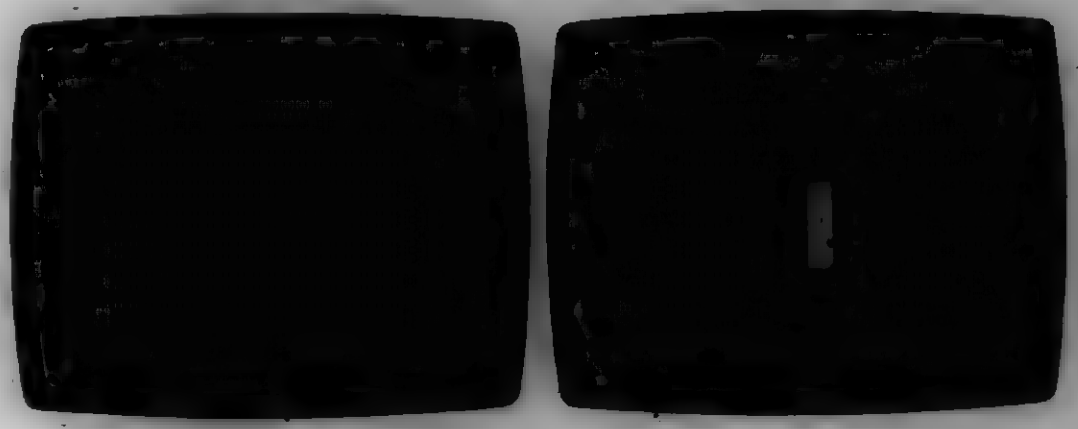
Shelley is a senior systems analyst in her 30s whose design work for a large company includes diagramming responsibilities and calculating work flow. She has to think in a precise and orderly fashion. She is aware that the job is making tremendous mental demands on her, and when she leaves work she needs a long time to disengage from her "work mode" of thinking. To make the transition, she takes a shower, which helps to tell her she is home.

"But that doesn't always work," she says. She cannot always make the break between work life and home life. Shelley has a four-year-old child, and she has begun to worry that her job has affected her abilities as a mother.

"Being a mother is about interruptions," she says, "and being a good mother is being able to handle them. Right now, I just can't tolerate interruptions."

Computer workers like Shelley are not yet technocentered — they are still capable of feelings — but they are on the threshold of becoming emotionally distant, a preliminary symptom of technostress. By contrast, psychologically healthy workers maintain a balanced relationship with whatever technology they use. They are able to be highly involved in their work without losing their own sense of self. When the pressure is on, they can maintain an integrity of personality by paying attention to their own limits, staying in touch with others and looking for ways to

INTELLECT.™
NO SOONER SAID THAN DONE.



To use INTELLECT, the natural language query system, all you have to do is ask—in everyday conversational English—and you'll retrieve. Immediately, in either text or full-color graphics.

INTELLECT, the world's only successful true natural-language query system, is an ideal tool for your information center. INTELLECT's powerful information retrieval capabilities are so advanced that it understands questions and responds with answers as if you were talking to a knowledgeable colleague. Executives access data themselves—more easily than ever before—without learning any technical jargon or "computerese." It's so easy to use, it doesn't even have a training manual!

Whether you use INTELLECT as a retrieval system or as an effective data analysis tool, it transforms raw data in the data base into information and presents it in finished color graphics in a matter of seconds. It's a live dynamic interface that fully integrates your existing database and graphic systems.

Already hard at work in hundreds of organizations, INTELLECT is ideal for marketing, finance, personnel, manufacturing, and banking applications.

INTELLECT is an important technological breakthrough. You can learn more about it by attending one of our nationwide seminars. Or put its amazing power at your fingertips in minutes with one of our demonstration tapes.

Call or send coupon for more details. Look into INTELLECT, and be an eyewitness to the future of computing.

Tell me more about INTELLECT.
Name _____ Title _____
Company _____
Address _____
City _____ State _____ Zip _____
Telephone _____
Hardware Type _____ Info Center? _____
_____ Demo Tape _____ Seminar _____ Sales Presentation
ARTIFICIAL INTELLIGENCE CORPORATION
100 Fifth Avenue, Waltham, MA 02254 C3-13

ARTIFICIAL INTELLIGENCE CORPORATION
100 Fifth Avenue, Waltham, MA 02254 617-890-8400

integrate their work with their personal lives.

They remain sensitive to the world and open to the challenges of new experiences. Newness refreshes and deepens them; it does not simply overwhelm or overstimulate them. Most of all, they maintain the capacity for insight — an emotional and intellectual understanding of themselves. Psychologically healthy workers will try to adapt the environment to their needs, not simply adapt themselves to their environment.

But working with computers is a potent activity. Overidentification with the machine can cause an unhealthy relation to one's work, crippling the psychological bases of insight. People in a pretechnocentered state begin to lose perspective; sometimes a pivotal point is reached when they realize that work is becoming all-encompassing, that they are "not themselves." At this point, they may decide to try to come to grips with the situation, acknowledging their personal problems.

This realization does not come easily. Yet without it, these people continue as before and, driven by the desire to excel, slip ever closer to a machine-like ideal. A human-oriented view of the world disappears, replaced by a technology-oriented view.

Technocentered people push themselves in a constant effort to improve their work performance. They ignore their own limits. Mental fatigue sets in and, with it, increasingly rigid thinking, less creative solutions, an unconscious slowdown in work rate and a higher number of errors. Technocentered workers pattern their behavior after the technology. They don't take breaks, they don't talk about nonwork subjects, they don't think abstractly and, above all, they don't question the reason for doing the job. The greater the fit between them and the technology, the less energy is wasted in struggling to improve performance.

Technocentered people are trapped on a treadmill, although they lack the insight and the self-awareness to understand they are. In the process, they sacrifice a feeling grasp of the real world. All that exists outside logical processes seems fuzzy to them.

Scott is an electrical engineer who does computer programming as part of his job. He must use mathematical equations to calculate the most efficient layouts for detailed electrical circuits. He describes his work as a vortex. At home at night — to his wife's distress — he finds himself lost in the equations fixed in his head, his mind going over and over a certain sequence, tracing the endless connections between numbers. It is a problem he feels compelled to solve but cannot. Night after night, at home, his mind makes its logical loops.

Psychological defense

The desire for technical mastery and the absence of social contact reinforce each other. Like a psychological defense, the technocentered person's relations with the outside world remain within safe bounds because the same behavior patterns are repeated again and again. Nothing new is experienced. Little is unpredictable. These people resemble a broken record played over and over. Freud, in referring to neurotics, called this sort of closed behavior the repetition compulsion: repeating past experiences and continually failing. Similarly, technocentered individuals are condemned to repeat a present with which they overidentify.

Where "technoanxious" people experience a sense of accelerated time, technocentered individuals lose all track of it. Hours and minutes are irrelevant as the task at hand consumes consciousness. Natural limits intrude upon them — their workday ends, they eat dinner, they go to sleep — but these seem only irritating discontinuities.

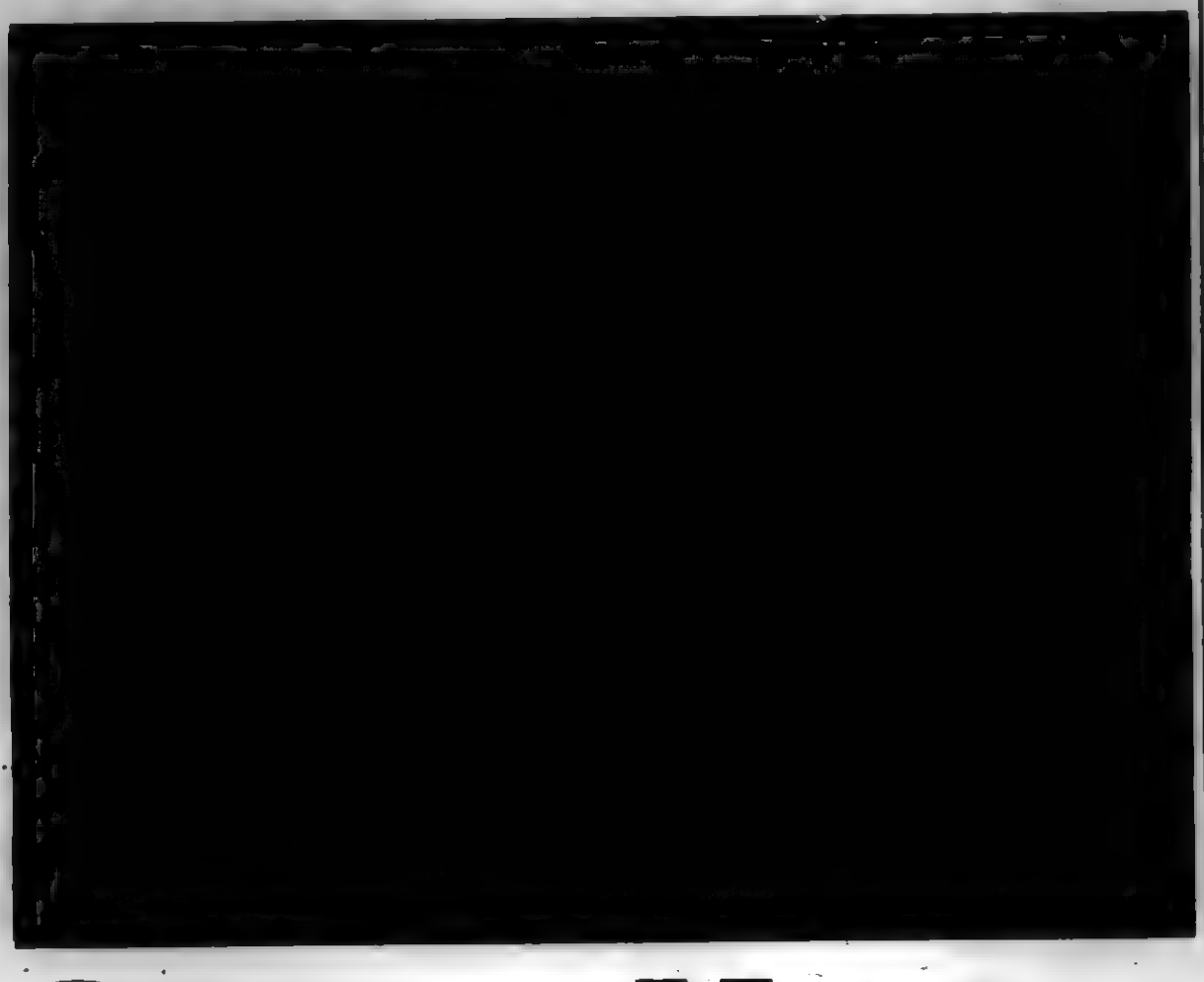
Where staff meetings may be unwelcome interruptions to adapting technical employees, they are intolerable interference to technocentered workers, who feel that meetings detract from their mission to generate code and work intensely with a program.

Jerry is a programmer working on a financial package for a software company. He has always found staff meetings and socializing with coworkers to be an annoyance, but lately he has become angered by any interruption in his work, no matter how trivial. "It's like making love," he says of programming. "If you were making love, you wouldn't want to be interrupted."

Bill, a team leader and lead programmer for IBM, comments, "I hate meetings. I suffocate at meetings. They're a complete waste of time."

Technocentered individuals operate in terms of perfection, sequential thinking, logic. Their entire cognitive structure is geared to the computer. Ambiguity and nuance are concepts the technocentered mind cannot "process." Communication must be efficient. Abbreviated language appeals to them because it accelerates communication. They weave acronyms and technical shorthand into their speech as much as possible. They prefer to communicate with people who are "system literate" so as to transfer information quickly, not interact. People who talk slowly or in general terms are avoided or ignored.

In the early stages of this syndrome, human relationships are a slight irritation. At work, friendships are superficial. Socializing is a vexing intrusion on work at the terminal. At home, excuses start. "One more line of program is all I have." Or, "Sorry for not paying attention, I



was thinking about work." Unfinished tasks dominate their private thoughts. Given a choice, they prefer to be left alone.

In full bloom, the condition leaves no room for excuses. At home, "I'll be through in a minute" becomes "Don't you understand what I'm doing?" At work, tenuous human alliances fade. The most minor interruptions are not merely irritations, they are a major source of stress. For the technocentered person — flat, without affect — it is the friction of social relations, not machine relations, that can provoke outbursts of anger. Such outbursts, however, are not so much manifestations of deep-seated hostility as they are mechanisms to ward off interference. For the technocentered worker, only productivity matters; unstructured, unfocused or irrelevant activity has no redeeming value.

Instead of friendships, technocentered people satisfy what need for social contact they still have by superficial conversations. They have acquaintances, not friends, and the acquaintances are mostly those with whom they can talk shop. Genuine friendships require commitment and energy, and there is little time for either. Talking about nontechnological subjects is an exhausting effort.

Robert is a scientist for a high-tech company. He depends on a computer system daily to sort, analyze and model many of his hunches about chemical processes. He is enthusiastic about his work and often stays after hours. Lately, he has been irritated by things being out of place at home and annoyed by what he perceives to be his wife's slow thinking. He is unsettled when she uses too many words to express herself clearly or when she tells a story. He is angry, generally, because she does not conform to his standards of perfect performance. He takes work home now in the evening so he can be left alone.

For technocentered people, the desire to conquer the system becomes greater than the desire for human relationships and human pleasures. The process of computer operation itself becomes pleasurable. The heightened stimulation of solving problems within a decision tree or making decisions several times a minute is a motivating force all its own. This mental engagement can be as exciting as sexual arousal and makes the habit that much harder to break.

Adding to the stubbornness of the condition is the fact that these people are blind to their own predicament. The push for immediacy, the concentration on present problems only, weakens their ties with past experiences and, thus, their ability to reflect on their lives. Their memories stretch only to the most recent events. For technocentered people, memory becomes "access to past events," an access limited by "search procedures" and "schemes for selected perception."

Increasingly, when pressed for additional or more in-depth information, they will respond, "I haven't got access to that." This answer is not defensiveness, merely a determination that there is insufficient information available to make a reply. Memory, from this perspective, is only recall. The healing power of memory is undermined. Technocentered people forget they once were different.

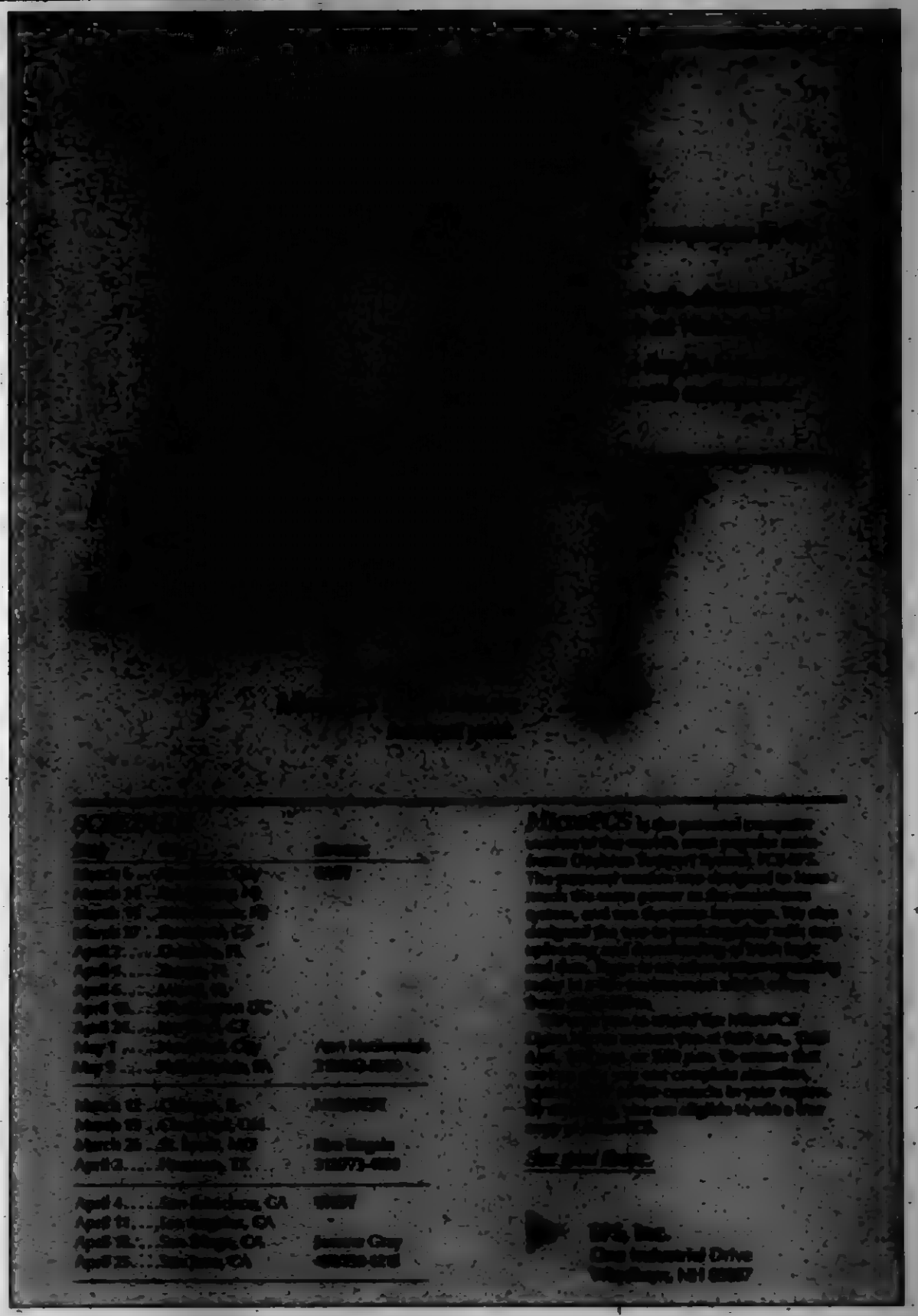
For the technocentered person — flat, without affect — it is the friction of social relations, not machine relations, that can provoke outbursts of anger. Such outbursts, however, are not so much manifestations of deep-seated hostility as they are mechanisms to ward off interference.

To the casual observer, technocentered people may seem to be the computer age's version of the obsessive compulsive, the character type often associated with workaholics. Technocentered people certainly resemble obsessive compulsives, but the differences are significant.

Both groups have trouble managing time and working within normal schedules. They lose themselves in detail and cannot abide disorder or loose ends. Along with their intense powers of concentration, a fear of losing control is evident. Neither type is capable of appreciating and enjoying the nonwork-related experiences of everyday living, although the obsessive-compulsive person can be warm and affectionate.

Obsessive compulsives in general have an overdeveloped sense of volition, a belief that the world is what they make of it, that willpower shapes all. This attitude leads to both intellectual and emotional rigidity; they sometimes seem to be trying to control and redirect all their emotions and desires. The result is a peculiar kind of self-awareness, as though an internal overseer were constantly issuing commands. Obsessive compulsives often fall into role-playing, even going so far as to control the details of their facial expressions and ways of speaking. Compared to other neurotics, they are detached and self-critical; guilty consciences, self-doubt and worry are common. Conflict haunts them.

Technocentered people, by contrast, feel no inner conflict. Where



obsessive compulsives carry out their jobs — whether doctor, lawyer or secretary — "as if" committed to them, technocentered people, whose work is with computers, are their jobs. Where obsessives are preoccupied with self-doubt, technocentered people are not. They have no nagging sense that something psychological is wrong. They feel pressure, but they experience it as a desire to excel, to match the perfection of the machine. This absence of conflict is obvious when they talk about their work. Whereas the "overseer" within obsessives drives them to perform work they "should" do, technocentered people never feel forced to do their work. They are attached to it. Their needs and the demands of the system seem one and the same.

Obsessives harbor a latent hostility. They bristle when criticized. They present an appearance of hardness, of being "uptight." Technocentered people, by contrast, effect a waxen expressionlessness. They accept criticism as data to be processed; hostility is too exhausting and irrelevant. Much of computer work, in fact, requires that workers listen to and accept critical suggestions aimed at improving their end product.

Whereas the "overseer" within obsessives drives them to perform work they "should" do, technocentered people never feel forced to do their work. They are attached to it. Their needs and the demands of the system seem one and the same.

A keen sense of personal guilt drives obsessives, who, whether at work or at home, always feel they are not doing quite as they should, which pushes them into acting out even more assiduously their various roles. Technocentered individuals live without guilt. They lack altogether a feeling for other people that is a precondition of guilt. Without guilt, they can easily dismiss appeals from others to change.

The motivation to change is also quite different for the two personalities. Obsessive compulsives have a high tolerance for suffering, but they nevertheless do not lose their ability to suffer. This factor is crucial, because even an incomplete awareness of suffering can serve as a stimulus for change. Obsessives may be pushed to change by a feeling that their lives lack meaning, that their relationships are less than satisfying or that they are not as creative in their work as they would like to be.

Technocentered people are only dimly aware of suffering, if at all. They may freely concede that work is stressful or that they are not pleasant to be with, but they accept that as the way things are. If adjustments are needed, they assume others can make them. They see themselves as successful, even happy. For a breakthrough to occur, an outside crisis is necessary, such as a spouse threatening to leave.

The obsessive compulsive is a classic neurotic personality type, molded by experiences and relationships from early in life. Obsessives bring their bag of neuroses to any activity and any job — stocking shelves, playing softball, managing a company — and turn it into a pressure-filled experience. The personality shapes the work.

The technocentered person is a creation of technology. Victims may once have been sociable, relaxed and caring, and after leaving their computer jobs, they soon become so again. The problem is not rooted in deep-seated neuroses. The work has determined the personality.

Some of the attributes of the obsessive compulsive are greatly valued in today's society, shaped by the Protestant work ethic. Erich Fromm has observed that the obsessive-compulsive is the norm of industrial culture. We admire people who succeed in high-pressure jobs; the self-motivated, hard-charging young executive-on-the-move is a glamorous and envied model.

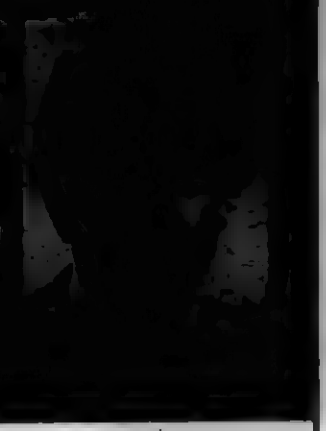
But computer work invites a dangerous transformation of these qualities. Achievers may bring to any job the desire to perform well, but if the nature of that job is not based on a perfect machine-like ideal, any obsessive-type characteristics are softened and the workers retain their basic humanity. The special demands of working with computers exacerbate those obsessive compulsive qualities without allowing for humanizing influences, such as ample social contact with other workers or a relaxed and informal milieu. The overspecialized character that results from high performance in technical work is destined to become the norm of electronic culture.

About the author

Craig Brod, a psychotherapist who has been in private practice for 10 years, is a consultant to government and industry on how to integrate new technologies into the workplace. He lectures at the University of California at Berkeley Extension/Continuing Education for Business and Management and writes on computers and adaptation.

His experience with computers includes creating programs designed to build a more sensitive match between the individual and the machine. He lives in Berkeley, Calif.

8 Good Reasons to Attend the James Martin Seminar



1. James Martin has been writing **THE BOOK** on the Computer Industry for over 3 decades.
2. He is the most sought after consultant in the Computer Industry.
3. His predictions and recognition of major computer developments are unsurpassed.
4. With over 31 top-selling books, Martin is the industry's #1 selling author of all time. His book, *Application Development without Programmers*, is the Computer Industry's #1 selling book of all time.
5. James Martin has the unchallenged reputation as the world's finest lecturer in his field. Over 20,000 individuals worldwide have attended the James Martin Seminars. Many return year after year.
6. James Martin "... can lay fair claim to being the most influential DP guru of all time." — *ICP Interface*
7. A fast-moving, high-density, interactive 5-day program packed with information for all DP designers, management, and staff. Quite honestly, the James Martin Seminar is the industry's best educational value for the money.
   - Attend the seminar designed to dramatically increase your DP capability.
   - A major increase in productivity is attainable through the methods taught in this seminar.
   - 5 days with James Martin will dramatically alter your approach to DP.

Many DP organizations are beginning to break the cycle of low productivity, poor responsiveness, and high application backlog of traditional DP. Now is the time for you to act. Attend the James Martin Seminar this spring. Learn the new technologies and their application to your organization. You'll discover why James Martin is ....

8. ... The Man the DP Experts Listen To!

Check the appropriate box on the coupon for more information on James Martin's 1-Day Seminar, THE END USER REVOLUTION for executives and professionals everywhere who ought to be using computers more effectively. This 1-day seminar will be held on the first day of the 5-day seminar.

Call (213) 394-8305 or
mail the coupon today for a detailed brochure.

Washington, D.C.	April 2-6, 1984
San Francisco	April 9-13, 1984
Chicago	April 23-27, 1984
Boston	April 30-May 4, 1984

Send more information on the following James Martin Seminars

☐ New 1-day End User Revolution Seminar
☐ New 5-day DP Revolution Seminar

NAME
COMPANY NAME
ADDRESS
CITY/STATE/ZIP
TELEPHONE

TECHNOLOGY TRANSFER INSTITUTE
741 10th St., Santa Monica, CA 90402, (213) 394-8305

COMMUNICATIONS

Lingering effects of breakup seen

By Lynn Haber
CW Staff

WASHINGTON, D.C. — The breakup of AT&T more than a month ago has created a crimp in long-range corporate telecommunications planning, according to attendees interviewed recently at Communication Networks Conference & Exposition (Comnet '84).

"We were anticipating some effects from the divestiture, but not to the degree that they've occurred," said Allen N. Boggs, manager for network development and support at Texas Instruments, Inc. "I'd say we've seen reduced service to the point of having a negative effect on day-to-day business dealings. It's difficult to get service on existing circuits."

Boggs works with a substrategy group of the company's electronic communications strategy group, which deals directly with these types of issues. "Like many people, we blame the Federal Communications Commission [for] not deciding what to do; therefore, AT&T doesn't know where to go, and [all] down the line communications managers don't know how to proceed. Presently, I'd say we're suffering from a lot of frustration."

Mary H. Gallagher, supervisor of telecommunications for Ford Aerospace & Communications Corp., Newport Beach, Calif., said her corporation realizes the need for advanced planning and organization but doesn't have any facts to go on. "There seems to be daily changes of rules and regulations, making advanced corporate planning very difficult," she said.

"At a few of our facilities we put in our own systems. But at three other facilities we have Bell systems. We'll be taking a closer look at changing those systems to a private system, but we're waiting to see what the rate increases will look like. For us, cost is what impacts us the most."

> *'I'd say we've seen reduced service to the point of having a negative effect on day-to-day business dealings.'* — Allen N. Boggs, manager for network development at Texas Instruments, Inc.

Tom Fisher, who works for Reliance Communications Technologies, a supplier of telecommunications equipment in Richardson, Texas, said his company has not yet seen any "hard effects" as a result of the divestiture. But "we didn't do too much planning because we didn't know how it was all going to happen."

Attendees said that because they faced a lack of facts and figures regarding the AT&T breakup, many corporate strategies have been reactive rather than active.

"We knew things were coming, but in terms of strategy we operated in a reactive mode," said John Chambers, supervisor of the data communications management section for the Tennessee Valley Authority in Chattanooga, Tenn. "In conversations with the telephone people, there wasn't any definitive information that they could give us. Therefore, we have to guess as to what to tell our users."

Like many of the other people interviewed, Chambers shared problems like not knowing who to call for service and discovering that the regional holding companies were unsure of their own courses.

Michael S. Friedman, director of sales for Access Engineering Corp., Reston, Va., foresees great new market opportunities as a result of the telephone company breakup. "The [former] Bell operating companies will be hungry for new business — and they'll be looking to outside vendors like they've never done before," he said.

In terms of internal company strategy, Friedman believes the divestiture will simplify that strategy. "For the first time, we'll be allowed access to areas that weren't available to us before."

INSIDE

Communications Software/94
Multiplexers/Modems/94
Local-Area Networks/95
Auxiliary Equipment/95

Japan prepares to realize dream in 1990s

Special to CW

TOKYO — The 1990s will be an era during which the integration of computers and communication technology makes great strides in Japan, moving the country closer to becoming an integrated high-information society.

The Japanese government also wants this period to realize connections between corporate computers and implementation of office automation technologies on a wide scale.

To achieve these goals, Japan's Ministry of International Trade and Industry (Miti) initiated a proposal for a "New Media Community."

At the same time, the Ministry of Postal Service established a concept for a Future Communication Model City which it nicknamed "Teletopia."

Also in pursuit of the concept of the information society, Japan's Telegraph and Telephone Public Corp. (JTT) proposed the Information Network System (INS), which calls for building a new network system and providing a wide range of services utilizing digital technology, optical-fiber technology and other advanced technologies.

The Miti report

In September 1983, Miti released its "New Media Community" report along with a study titled "The High-Information Society and New Media." These reports discussed the impact of new media, such as two-direction CATV and videotex, upon various sectors of society. They also detailed problems to be resolved for the development and implementation of new-media technologies as well as proposals for government action.

One report recommendation, for example, was that the government promptly carry out a total review of the country's communication-related system and attempt to standardize the basic components of the industries that are related to the new media.

The reports went on to say that in order

See JAPAN page 92

Net saves school districts more than $500,000

RICHARDSON, Texas — A regional data processing network recently expanded its services to 214 school districts while saving more than $500,000.

The North Texas Multi-Region Processing Center, headquartered here, was established in 1970 and served just two districts. Today, its IBM 3081-D mainframe processes payrolls, grades, accounting work and other tasks for school districts spread over a 44-county area.

The center saved over $500,000 by using a Datastream Communications, Inc. Model 774 remote controller to tie relatively inexpensive Ascii terminals and microcomputers into the network. Those terminals provided the smaller school districts with the on-line access that larger districts enjoyed with IBM 3270 terminals.

"The smaller districts have historically had to rely on manual procedures because of the costs associated with installing interactive terminals. There's the expense of hardware and software, combined with leasing long-distance lines and adding new staff, which districts on a limited budget simply can't afford," Peter Coffey, assistant director of the processing center, explained.

Some of those smaller districts needed on-line access, while larger districts wanted to improve their access by adding less expensive Ascii devices to installed terminals. "We figured there had to be a way to bridge the gap between the 3270 computer terminals and low-cost Ascii terminals in a network environment so that all the districts could enjoy the benefits of streamlined data processing," Coffey said.

Marvin Sanders, director of the center, estimated that converting thousands of programs to allow use of Ascii terminals would have cost more than $500,000 on top of any hardware costs.

The Datastream 774 supports up to 16 directly attached terminals, or a larger community of casual users on a dial-in, port-contention basis. The center has installed four 774 controllers throughout the region where there are currently 400 IBM 3270s and 36 Ascii terminals, primarily Televideo Systems, Inc.'s Model 910s.

Coffey estimated that it would

See NETWORK page 97

The multi-region processing center at work.

VAX USERS!
NOW GET SPREADSHEET
AND GRAPHICS IN ONE PACKAGE.
• Full business graphics • Advanced features • Affordable price
GRAPHIC OUTLOOK™
from STONE MOUNTAIN COMPUTING
1096 Cambridge Dr.
Santa Barbara, CA 93111 (805) 964-9101
VAX is a trademark of Digital Equipment Corporation

JAPAN from page 90

for the new media to make any headway, restrictions on existing systems should be abolished, which would, therefore, spur new activity and freedom. This, the reports argued, will lead to a more competitive market, and the multiplicity of services which utilize the new media will provide users with a wide selection of services.

In tandem with these ideas, a report concurrently prepared by the Investigation and Research Group for the Future Planning of Telecommunication Systems stated that in order to enhance the freedom of the users and to promote an advanced and sophisticated telecommunication system, principles of free competition should be introduced.

The report also encouraged the utilization of satellite communication, standardization of protocols, consolidation of research and development projects, construction of data bases and the consolidation of legal systems.

The Miti reports maintained that consolidation or standardization of the basics of the new media will enhance progress, conserve resources and contribute to the advancement of the industrial structure of the country.

In terms of data base services, Miti recommended that future procedures for preparation, circulation and utilization of information should be streamlined and standardized.

Construction of various data bases should be promoted, and, at the same time, a clearing service should be established. Finally, the development of data base-related technologies should be pushed forward, according to Miti.

The postal report

The postal report is the result of a round table discussion in October 1983 that was conducted to come up with a "Teletopia" plan.

The premise of the group meeting was that the "high-information society is led by telecommunications as the means for transmitting and processing information."

The report called for a combination of systems in the information society, with an emphasis on JTT's INS and the above Miti concepts, resulting in the realization of "model cities."

JTT's INS

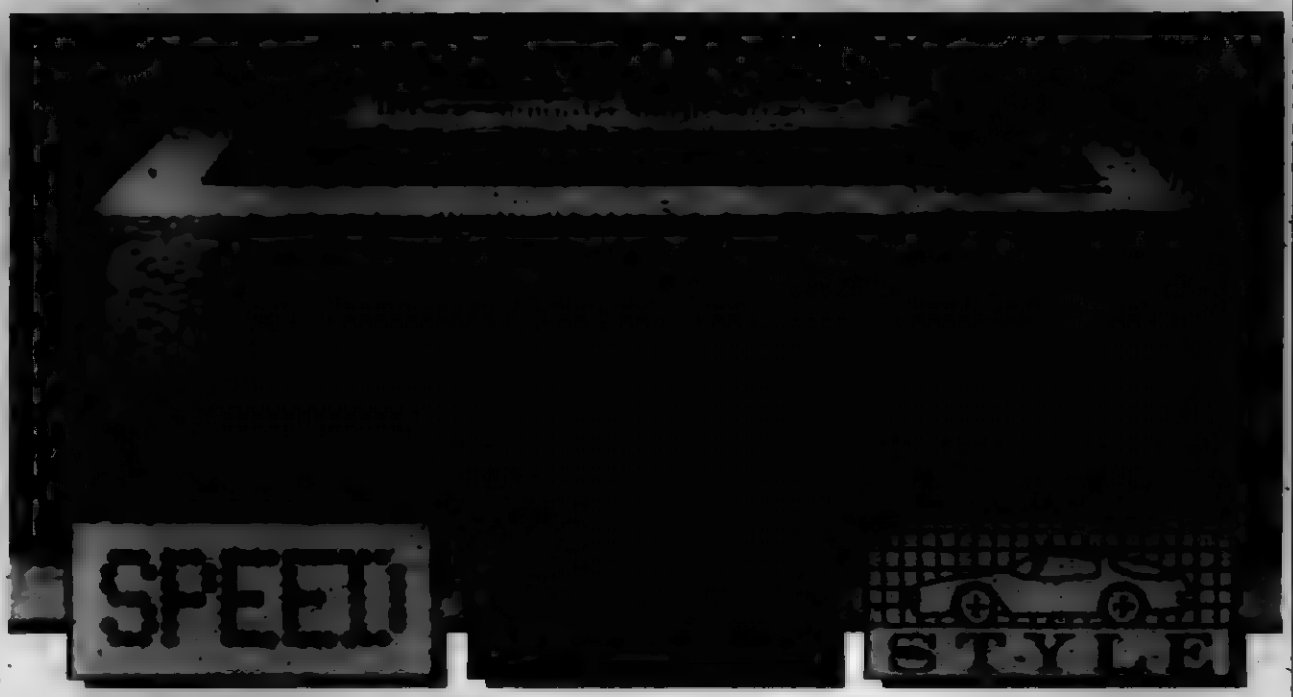
JTT's INS project is budgeted at over $4 billion. The money has been earmarked for the replacement of the existing analog equipment with digital equipment and for the interconnection of Tokyo, Osaka and Nagoya by 1986.

Other major cities will be connected to the digital telephone network in 1987. The system will then be extended to connect cities with populations over 100,000 in 1990, and JTT will eventually extend the digital service to the entire country.

Facsimile communication networks, data networks and videotex communication networks will be connected with the digital telephone network by 1987.

Services utilizing INS will then include advanced telephone services, multifunction facsimile services, image information services, message communication services, data communication services and multimedia communication services.

This article originally appeared in Computerworld's Japanese affiliate, Computerworld Japan, and appears here via the CW International News Network.

HIGH PERFORMANCE
NOW AVAILABLE IN A THREE-SPEED


INTRODUCING THE NEW DS 220 MULTI-MODE MATRIX PRINTER
First there was the Datasouth DS180. The original high-performance printer. The printer that raised the standards of on-the-job performance to new heights. A tough act to follow.
And now, following in the same tradition, is the new Datasouth DS220. State-of-the-art performance, taken to higher levels. In a new 3-speed multimode form. Ready to run data, near letter quality and graphics output—in a single printer.
At data speed, the Datasouth DS220 leaves competitors in the dust. By using high speed tabbing to zip over blank spaces and true logic seeking to print the next available character, the Datasouth DS220 charges through printed copy at speeds rivaling more expensive line printers.
At 40 CPS NLQ speed, the Datasouth DS220 creates near letter quality output with the kind of class that might make you wonder if it was produced by a daisy wheel printer. With its fine tuned 18 x 48 dot matrix, multiple fonts are produced with the precise clarity required for word processing applications.
And for graphics, the Datasouth DS220 adds high performance style to popular microcomputer applications programs through high resolution dot addressable output. Sharp new details emerge from business charts and graphs, and engineering drawings.
And those are just its printing capabilities. Its fully instrumented dashboard allows push button programming of up to fifty features for forms control, communications and print style selection.
Best of all, the Datasouth DS220 costs much less than you might expect for a high performance three speed. Go to your nearest showroom and run a Datasouth DS220 through the gears. See how little it costs to own three high performance printers in one high performance package.
south
HIGH PERFORMANCE MATRIX PRINTERS
Find Datasouth Printers At Participating Computerland® Stores And Other Fine Dealers.
Datasouth Computer Corporation
Box 240947 · Charlotte, NC 28224
704/523-8500 · Telex 6843018 DASOU UW

How To Get A Better Grip On Your 3270 Network.

With More Flexibility Than Ever Before.
Getting a grip on your 3270 applications is a real challenge. You've got to find the best way to bring IBM host applications to non-3270 terminals and personal computers. Without a lot of fuss and bother.

Fortunately, Datastream has a flexible solution. One that won't cost you an arm and a leg.

With our 3270 SNA or BSC Cluster Controllers, you can attach personal computers, ASCII terminals and printers to IBM hosts, giving more people 3270 functionality. And giving you more control of the computing activities in your company.

Our Multi-Path Controller allows personal computers and ASCII terminals to communicate not only with multiple IBM mainframes, but with minicomputers (including DEC®) and time-sharing hosts as well. It even allows personal computers and terminals in the network to talk to each other.

All Datastream controllers feature security, dial-in or direct-connect access, remote dial-in diagnostics and more.

To extend your 3270 investment even more, use our controllers with Datastream's low-cost Display Stations. They offer 3278 functionality keystroke-for-keystroke. Plus features even IBM doesn't have. Like DEC VT100 emulation. Remote dial-in. Additional soft keys. And other 3290-type keyboard features like 24 PF keys.

All this makes for a very tidy, secure, economical way to expand your network.

And put 3270 within everyone's reach.

Call toll free: 800/952-2500
(Outside California)

DATASTREAM

2520 Mission College Blvd.
Santa Clara, CA 95050
408/986-8022

®DEC is a registered trademark of Digital Equipment Corporation.
©1984 Datastream

COMMUNICATIONS

COMMUNICATIONS SOFTWARE

OPTIMATION, INC.
Software package

Optimation, Inc. has introduced a software package that provides a communications link between any Hewlett-Packard Co. 200 series desktop computer and a Digital Equipment Corp. VT100 terminal emulator via RS-232 lines.

The package reportedly includes the emulation of the full screen editor available to DEC users along with up-and-down loading of files.

It features vertical scrolling of up to 1,000 lines and horizontal panning of up to 1,000 characters with the use of a configuration screen, according to the vendor spokesman.

The system is priced at $900.

Optimation Data Center, 200 California Ave., Palo Alto, Calif. 94306.

FLEXCOMM CORP.
Selvax Link

Flexcomm Corp. has announced the Selvax Link, software that connects Gould, Inc.'s Sel Concept 32 series superminicomputers to Digital Equipment Corp. VAX-11 series superminicomputers.

Selvax Link reportedly integrates operating systems without requiring any modifications. A user can transport files from system to system, communicate with remote system operators or take up residence on a remote system, the vendor said.

The product costs $13,500 for each node connected to a CPU, according to the vendor spokesman.

Flexcomm, 15245 Pacific Highway S., Seattle, Wash. 98188.

NETWORK RESEARCH CORP.
Fusion 2.0

Network Research Corp. has announced the Fusion 2.0, an enhancement to the company's Ethernet software, which allows it to support Advanced Research Projects Agency's Internet and Xerox Corp.'s Xerox Network System protocols.

The software links systems using Motorola, Inc.'s 68000 microprocessor, Unix or Microsoft, Inc.'s MS-DOS operating systems, according to the vendor.

Digital Equipment Corp. VAX-11 and PDP-11 minicomputers can be tied into a network, the vendor said.

Prices range from $750 to $7,500, depending on installation, according to the vendor.

Network Research, Suite 200, 1964 Westwood Blvd., Los Angeles, Calif. 90025.

MULTIPLEXERS/ MODEMS

RACAL-MILGO, INC.
Omnimux options

Racal-Milgo, Inc. has announced two options for its Omnimux series of statistical multiplexers. The bisynchronous channel option reduces transmission delays in bisynchronous data communications systems. The dual aggregate option is designed to reduce the number of multiplexers, modems and/or parallel communications lines in asynchronous systems.

The bisynchronous option provides two channels per card, and each channel operates up to 9,600 bit/sec, using Ebcdic and/or Ascii character sets, the vendor said. The price is $900.

The dual-aggregate option allows two or more Omnimux multiplexers to transfer data over one or more links simultaneously. It is designed for three major asynchronous applications: load sharing, split link and channel bypass, according to the vendor. The price is $1,000.

Racal-Milgo, 8600 N.W. 41st St., Miami, Fla. 33166.

PHALO CORP.
Multiplexer series

Phalo Corp. has announced a series of multiplexers that connect IBM 3270 communication controllers to remote devices.

The multiplexers feature multidrop capability, support for extended distance options and proprietary architecture. Diagnostic capability allows the user to test controllers or remote devices without disconnecting the multiplexer, according to the vendor.

A multidrop system for 32

COMMUNICATIONS

devices costs $7,200; a 32-device system with diagnostic capability sells for $5,695; and an eight-device multidrop system costs $1,750.

Phalo, 65 Moreland Road, Simi Valley, Calif. 93065.

KINEX CORP.
9600 Fast-Poll

Kinex Corp. has introduced the 9600 Fast-Poll, a 9,600 bit/sec modem for multipoint applications on unconditioned leased lines.

The modem continuously monitors and displays line quality. Each time the system is polled, the modem retrains the system so variations in the line will not affect others, the vendor said.

The modem features a built-in error rate tester, comprehensive diagnostics and front-panel control signal display, according to the vendor. The price is $3,350.

Kinex, 6950 Bryan Dairy Road, Largo, Fla. 33543.

NATIONAL COMPUTER COMMUNICATIONS CORP.
NCC 12/24

National Computer Communications Corp. has introduced the NCC 12/24 full-duplex modem for direct-dial line use.

The product handles synchronous or asynchronous data at a rate of 2,400 bit/sec or 1,200 bit/sec, which is compatible with the Bell 212A modem. The modem will automatically adapt and respond to Bell 212A-compatible units at 1,200 bit/sec, the vendor said.

Features include manual and automatic answer modes and test and diagnostic capability including V.54 Loop 2 and V.54 Loop 3 capabilities.

Its price is $1,195.

National Computer Communications, 260 West Ave., Stamford, Conn. 06904.

LIGHTWAVE COMMUNICATIONS, INC.
FO-422

Lightwave Communications, Inc. has announced the FO-422, a fiber-optic modem designed to link terminals, printers and other devices requiring an RS-422 interface.

The FO-422 accommodates data rates of 10M byte/sec over distances of up to one kilometer of fiber-optic cable. It is plug-to-plug compatible with existing RS-422-type, 37-pin, D-subminiature connectors, the vendor said. Its price is $300.

Lightwave Communications, 650 Danbury Road, Ridgefield, Conn. 06877.

LOCAL-AREA NETWORKS

COMPLEXX SYSTEMS, INC.
Xlan Kit

Complexx Systems, Inc. has announced the Xlan Kit, a local-area network system which is designed to link a small number of devices, yet is expandable to handle up to 192 devices at distances of up to 10,000 ft.

The system includes two interface devices that contain built-in modems. The modems feature a 300 bit/sec transmission rate and autoanswer/autodial, 100 ft of twisted, shielded pair wire and the hardware necessary to complete a local-area network, according to the vendor.

The system is a baseband, carrier-sense multiple access local-area network that operates at a transmission rate of 1M bit/sec. The interface can connect Ascii asynchronous terminals, personal computers and other peripheral devices. Each interface has three asynchronous RS-232C ports, the vendor said.

The kit costs $2,995 and can be ordered with up to 3,000 ft of additional wire at 12 cents/ft. Additional interface devices are priced at $1,450.

Complexx Systems, 4030 Research Drive, Huntsville, Ala. 35805.

AUXILIARY EQUIPMENT

THE GRASS VALLEY GROUP, INC.
Wavelink Model 3291 option

The Grass Valley Group, Inc. has announced an option for its Wavelink Model 3291 fiber-optic communications system that provides concurrent audio and data transmission with video on a single fiber.

Continued on page 97

Lear Siegler
Quality and Reliability You Trust. High Touch™ Style You'll Prefer.

This new generation of Lear Siegler video display terminals brings elegant High Touch™ style to our American Dream Machine (ADM™) tradition. The family features three new ergonomic terminals designed to meet the needs of OEMs and end users alike: the ADM 11, the ADM 12 and the ADM 24E.

Here is a whole new way for terminals to relate to people. Dozens of little touches add up to the convenience and comfort of High Touch.

For example, we put the power "on/off" switch and contrast control knob in front where they're easy to reach.

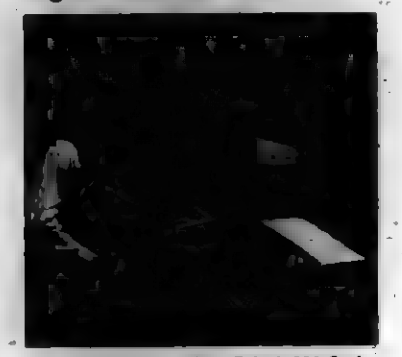
The monitor not only tilts and swivels, it stops positively in almost any position.

The clean, crisp display features a large character matrix on an easy-to-read green or amber non-glare screen – made even easier to read by the hooded bezel. Screens are available in 12" or 14" sizes.

You get the best in style and ergonomics, plus all the outstanding performance features you'd expect from Lear Siegler (see chart).

Lear Siegler High Touch terminals are backed by the broadest network of full service centers anywhere, serving 3000 cities nationwide. And they're made in America – designed, engineered, manufactured and shipped from Anaheim, California to provide you with the best local support.

Place your order today by calling your local Authorized Distributor or, for quantities in excess of 500 units, your Regional OEM Sales Office.



Lear Siegler's new VersaPrint™ 500 Series printers combine with Lear Siegler video display terminals for hard copy output.

Low-profile, tapered, DIN-standard keyboards with Selectric layout feature logical key groupings and adjustable tilt for comfort and efficiency. ADM 11 shown above.

	ADM 11 Conversational	ADM 12 Editing	ADM 24E Host Programmable
Programmable Function Keys	4 (Shiftable to 8)	16 (Shiftable to 32)	16 (Shiftable to 32)
Non-Volatile Function Keys	Optional	Standard	Standard
Function Key Legends on 25th Line	From Host	From Host	Standard Non-Volatile
No. of Pages of Display Memory	1	2	2 or 4
Display Memory Configurations (Plus 25th Message/Status Line)	24 Lines by 80 Characters	(2) 24 x 80 or (1) 48 x 80 or (1) 24 x 158	User Definable up to 96 x 80
Scrolling	Standard Scrolling	Smooth, Jump or Horizontal Scrolling Split Screen	Smooth or Jump Scroll Split Screen
Transmission Mode	Conversation Mode	Conversation or Block Mode	Conversation or Block Mode
Editing	Limited	Full Editing & Protected Fields	Full Editing & Protected Fields
Visual Attributes: Reduced Intensity, Blink, Blank and Reverse Video. Underline also on ADM 12 and ADM 24E	3 Embedded 1 Non-Embedded	4 Embedded, 1 Non-Embedded or All Non-Embedded, plus Full Screen Reverse Video	5 Embedded, 1 Non-Embedded or All Non-Embedded, plus Full Screen Reverse Video and Highlight
OEM Flexibility	Modifiable Set-Up Characteristics	Modifiable Set-Up Characteristics & Personality	Modifiable Set-Up Characteristics. Add to Program in ROM or Down-Line Load in RAM (56K ROM or RAM. Up to 22K Display Available) Room for additional Logic Boards.
Terminal Compatibility	ADM 3A, ADM 5, ADDS Viewpoint & Regent 25, Hazeltine 1400, 1420 & 1500, DEC VT-52	ADM 3A, ADM 5, ADM 31, ADM 22	ADM 3A, ADM 5, ADM 31, ADM 32, ADM 42

Call Lear Siegler at **800/532-7373** for the phone number of an authorized distributor near you: Advanced Technology · Continental Resources · The Datastore · Data Systems Marketing · David Jamieson Carlyle, Inc. · Digital Source · Dytec/South · Gentry Associates · Hall-Mark Electronics · Inland Associates · Kierulff Electronics · M/A Com Alandus, Inc. · Marva Data Services · M.T.I. · National Computer Communications · Pioneer (Standard, Harvey, Gaithersburg) · 2M Corp. · Wyle Electronics

Distributor Sales & Service: Boston *(617) 456-8028* · Chicago *(312) 279-7710* · Houston *(713) 780-9449* · Los Angeles *(714) 774-1010, ext. 219* · Philadelphia *(215) 245-4080* · San Francisco *(415) 828-6941* · England *(04867) 80666* · From the states of CT, DE, MA, MD, NJ, RI, VA and WV *(800) 523-5253*

OEM Sales: Chicago *(312) 279-5250* · Houston *(713) 780-2585* · Los Angeles *(714) 774-1010, ext. 502* · New York *(516) 549-6941* · San Francisco *(415) 828-6941* · England *(04867) 80666*

LEAR SIEGLER, INC.
DATA PRODUCTS DIVISION

901 E. Ball Road, Anaheim, CA 92805 (714) 774-1010

© 1984 Lear Siegler, Inc.
Selectric is a registered Trademark of IBM. Viewpoint and Regent are registered Trademarks of Applied Digital Data Systems, Inc. VT-52 is a registered Trademark of Digital Equipment Corporation.

Bred to think ahead.

SEIKO

The business computer that thinks ahead.

COMMUNICATIONS

Continued from page 96

The option comprises the 3291-11 modulator module and the 3291-12 demodulator module. The Wavelink Model 3291 [CW, Feb. 21] broadband communications system transmits analog signals using an LED source and an FM transmission method over a distance of 10 km in a long-distance version and 2 km in a short-distance version.

The price is $950 each for both modulator and demodulator modules.

The Grass Valley Group, P.O. Box 1114, Grass Valley, Calif. 95945.

TELLABS, INC.
3004X series

Tellabs, Inc. has announced the 3004X series of quad data link interface modules, which provide up to 18 composite data link interfaces for the company's 331 Xplexer data switching system.

The modules include models 3004A and 3004B. The 3004A provides four RS-232C V.24/V.28 interfaces for use with synchronous private-line modems. The 3004B module provides four integral digital line driver/receivers as part of the vendor's Plexerlink interface.

The 3004A costs $450 per interface. The 3004B is priced at $650 per interface.

Tellabs, 4951 Indiana Ave., Lisle, Ill. 60532.

APPLIED SYSTEMS AND PRODUCTS
Universal Modem Adapter

Applied Systems and Products has introduced the Univeral Modem Adapter, which allows a Commodore Business Machines, Inc. Commodore 64 or 20 microcomputer to be used with any type of telephone.

The product supports modular or nonmodular phones, including one-piece electronic phones with built-in dialing, the vendor said.

The Universal Modem Adapter is priced at $14.95.

Applied Systems and Products, 1021-H W. Bishop, Santa Ana, Calif. 92703.

DISTRICTS from page 91

have cost the center $14,000 per site to add 3270s, which some school districts couldn't afford. "We were able to obtain the Ascii terminals for a little over $500 apiece and the four Datastream 774s for $9,950 per system," he noted.

Now, most of the school districts have on-line data processing. Typical uses include grade reports, test scores, student record reports, class scheduling, payroll, warehouse records, vehicle maintenance, tax accounting, fixed assets and personnel-file handling.

"The Datastream equipment has made it possible for the center to automate its information flow, tying together districts that wouldn't even communicate without such a vehicle. Since we installed the 774 units, other manufacturers have come out with similar systems, but as long as the price remains competitive, we plan to stick with what's done the job for us," Sanders said.

The next step for the center will be a printer pass-through upgrade, using Datastream software that Sanders said will turn many of the school district terminals into remote job-entry workstations. That will involve moving up to Televideo 925 terminals.

But one roadblock to that next phase has been finding printers on which users can easily change forms. Sanders said that most users who move into the remote job entry system will need a variety of forms, such as blank checks, that will require continual changes in the feeders.

Earlier networking problems, such as inconsistent power supplies and "normal Ma Bell problems," have been corrected, according to Sanders. He added that Datastream plans to correct another inconvenience — the lack of a local-service technician.

"Overall, we're very satisfied with the project. I would say that the estimate of $500,000 in savings is extremely conservative," he concluded.

#1 FOR TSO or VM/CMS

DYNACALC

The fastest and friendliest spreadsheet system

NEW ★ Color Graphics ★ Database Interface

IMPROVED ★ Worksheet Consolidation ★ VisiCalc® Support™

COMPARE US TO THE COMPETITION!

For a free 30 day trial call (312) 525-6400

ChicagoSoft™ 738 N. LaSalle • Suite 2 • Chicago, IL 60610

*Dynacalc is owned by Dynasoft Corp

**VisiCalc is a registered trademark of VisiCorp. VisiCorp is not associated with Dynacalc.

...ancial
...stem
Doesn't Work.

Now for the Bad News.

The guy who controls many not work any more, either. He just left the software company you bought it from on his never-ending search for greener pastures. Or, the company may have developed it in the first place. You need help, and you're out of luck.

It doesn't have to be that way. All of Data Design's software products are developed by Data Design. We have enjoyed less than a five percent employee turnover rate in over a decade (industry average is 20%). You can be confident that the person who developed the Data Design system you bought is still with the company. Ready to provide the responsive, knowledgeable support—during implementation and beyond—that is consistently rated the highest in the software industry in nationally recognized independent software surveys. Follow-up maintenance (each customer is assigned their own personal Account Manager), telephone consultation and a 24 hour emergency hot-line service are included with the purchase of each system. So are full installation assistance and in-depth training (at Data Design or at your facility).

There are many reasons why we have attained a reputation for supplying the finest financial application software packages and service available. Among them are the shared commitment of our employees to product quality and service (we are 100% employee owned) and their high level of data processing and accounting skills—40% have graduate degrees in business management.

To learn how the following systems work for a broad range of medium to large size companies on most major computer systems, contact us today. Planners and accounting managers at hundreds of major corporations already have.

☐ General Ledger/Financial Control
☐ Accounts Payable/Purchase Control
☐ Fixed Asset Accounting

Our reputation for excellence has been built on years of providing the highest quality products and services to these customers. Call us today at 800-556-5511 (408-730-0800 in California) or complete and return the coupon below.

DATA DESIGN ASSOCIATES

1219 Oakmead Parkway, Sunnyvale, CA 94086

Please send me additional information on your:
☐ General Ledger System
☐ Accounts Payable/ Purchase Control System
☐ Fixed Asset Accounting System
My need is: ☐ Immediate ☐ Short Term ☐ Long Term
☐ I am interested in attending a free seminar on financial application systems.

Name _____
Title _____
Company _____
Address _____
City, State, Zip _____
Telephone ( ) _____
Computer Brand _____ Model _____
CW-2

Large systems hardware is not an impulse buy.

Now there's a guide coming to you that will help with your homework.

The *Computerworld Buyer's Guide to Large System Hardware* is designed to give you a valuable, one-stop information source for large systems hardware and peripherals. Take a look at all the tools it will give you to help you make the right large systems choice:

- Large systems product listings, including mainframes, superminis, minis and small business systems and the terminals and peripherals designed to work with them. You'll get listings of printers, memory products, teleprinters, controllers, magnetic media and supplies, plotters, digitizers and much, much more.

- Vendor profiles that include company name, address, contact information, and primary markets served.

- An industry-specific editorial section that's designed to keep you right up to speed on the trends in large systems hardware. We'll give you news of the latest developments in mainframes, superminis and minis and their changing roles. You'll get information on the latest management techniques used in running data centers; planning for cost effectiveness and the new technologies in fifth generation computing.

- In addition to its comprehensive listings and editorial, the *Computerworld Buyer's Guide* will give you pages of detailed ads for large systems hardware products and peripherals that you can refer to all year long.

Each issue of the *Buyer's Guide* is updated before publication, and contains hundreds of listings that are accurate, complete and easy to use. This *Buyer's Guide to Large System Hardware* is distributed to *Computerworld's* 114,000 subscribers in the U.S. — it's one more of the additional benefits you get as part of your *Computerworld* subscription. Look for it this April 18th.

And if you market your products to buyers of large systems hardware and peripherals, this *Buyer's Guide* will reach them with your product message just when they're researching products and vendors. Reserve space in this *Buyer's Guide* by March 2nd by calling one of the sales offices listed below, or call Ed Marecki, National Sales Director or Kevin McPherson, Product Manager, at (617) 879-0700.

To: *Ed Marecki, National Sales Director*
CW Communications/Inc.
Box 880
Framingham, MA 01701

☐ *Please send me advertising information for Computerworld Buyer's Guides.*
☐ *Please have a sales representative call me.*

Name _____
Title _____
Company _____
Address _____
City _____ *State* _____ *Zip* _____
Telephone _____ 3/2

COMPUTERWORLD
BUYER'S GUIDE

Sales Offices
BOSTON/Chris Lee, Bill Cadigan, Alice Longley *(617) 879-0700*
CHICAGO/Chris Lee, Bill Cadigan, Jean Broderick *(312) 827-4433*
NEW YORK/Mike Masters, Tom Flynn, Gale M. Palermo *(201) 967-1350*
ATLANTA/Mike Masters, Tom Flynn *(404) 394-0758*
SAN FRANCISCO/Bill Healey, Ruth Gordon *(415) 421-7330*
LOS ANGELES/Bill Healey, Beverly Rass *(714) 261-1230*

SYSTEMS & PERIPHERALS

Solving future storage problems

Special to CW

Many DP shops these days are trying to integrate diverse computer systems.

Aside from the problem of developing interfaces for all these systems, there is another problem developing: that is, how DP shops will control information storage and retrieval.

With information storage gaining importance in many information-intensive firms, many businesses have already installed some form of computer-assisted information indexing, storage, retrieval and recall for short-term needs. Desktop microcomputers that interface with a floppy disk drive or mainframe processor regularly accomplish short-term storage and retrieval needs. For longer term applications, both mainframes and microcomputers are often linked to micrographics systems, such as microfilm or microfiche, for information record maintenance.

With the development of the video disk player, a new technology entered the fray. Video disks can play back images through the use of binary code formation and a laser light reader. The challenge was to develop a way for computer users to take advantage of that technology. That challenge appears to have been met in the building optical disk drive industry.

With all this in mind, there appears to be three key interfacing issues that will make up the office information chain of the future.

First is the information processing facility or center itself. This is where data, words and documents are input and output. Professional managers as well as traditional computer operators will use desktop terminal keyboards, video displays and high-speed printers to enter, review or access information in order to make business decisions.

A second important element in data storage is the temporary or short-term

See DAVID page 104

MPP processes satellite data

Supercomputer claims world's fastest I/O rate

By Tom Henshel
CW Staff

AKRON, Ohio — Goodyear appears bent on building big things. Everyone is familiar with the Goodyear Blimp, and now researchers at the Goodyear Aerospace Corp. claim to have developed a computer system with the fastest I/O rate in the world.

Even the name is big. The system is called the Massively Parallel Processor (MPP) and was developed for the National Aeronautics and Space Administration's (Nasa) Goddard Space Flight Center to evaluate satellite data. Installed last May, the system is still being tested and will not be in full production until midsummer, a spokesman for Nasa said.

GOODYEAR

Technically, the MPP is a supercomputer. But it does not use a pipelined architecture like the Cray Research, Inc. Cray 1 and Control Data Corp. Cyber 205. The MPP is a single-instruction, multiple-data processor.

Processors working in parallel

According to Paul Gilmore, program manager on the MPP project, the MPP has 16,384 individual processors working in parallel to perform a single operation. Gilmore said the processor can perform 6.5 billion additions or subtractions in a second. The processor also offers a theoretical I/O rate of 320G byte/sec.

The MPP architecture consists of an array of 128 by 128 custom-designed bit serial processing elements. Each processing element has its own data and memory with associative memory search capabilities, Gilmore explained.

Unlike pipelined supercomputers, which can perform floating-point calculations at extremely high speeds, the MPP garners its speed from thousands of fairly simple processors, all executing instructions simultaneously.

Gilmore said the MPP performs at its best in executing fixed-point calculations. Consequently, the MPP vastly outperforms the Cray-1 and Cyber 205 in applications involving short, fixed-point calculations.

However, for larger, floating-point applications, the pipelined processors show a performance advantage over the MPP, Gilmore noted.

The types of calculations that can be performed by the MPP are particularly useful to scientists doing image processing.

In image processing, such as applications involving satellite data, remote sensing measurements of an object are translated into an array of numbers that represent the object. The numbers can then be analyzed by the processor. In addition to processing satellite data, the image processing technique is used in diagnostic medical imaging, weather forecasting and oil exploration," according to Gilmore.

But in addition to image processing, Gilmore said, the MPP may prove a very useful tool in developing artificial intelligence processors.

Gilmore noted that because the MPP has an extremely high I/O capability, the unit can very quickly scan a large data base for information. Dealing with extremely large lumps of information, such as those required for expert systems, has been one stumbling block to developing artificial intelligence techniques, Gilmore contended.

There is a problem

But even though the MPP has the potential of offering an I/O rate of 320G byte/sec, there is a problem. Gilmore said that currently there are no peripherals, such as disk and tape drives, capable of performing anywhere near the I/O speed of the MPP.

Consequently, the MPP installed at Nasa's Goddard Center has achieved an I/O rate of about 1G byte/sec by using Digital Equipment Corp. peripherals and a DEC VAX-11 series supperminicomputer as a front-end processor. Goodyear, he added, is currently working on a project to develop faster peripherals to support the MPP.

Like the Cray 1 and Cyber 205, the MPP carries a hefty price tag. The base price on the system is about $4 million. So far, aside from the Nasa system, Goodyear has yet to receive an order for an MPP. However, it has sold several of the MPP's predecessor, a unit called the Sartan, which is currently being used in projects sponsored by the U.S. Army, Navy and Air Force and Nasa.

INSIDE

Turnkey Systems/100
Processors/100
Data Storage/100
Terminals/100
Printers/Plotters/100
Graphics Systems/100
Power Supplies/100
Board-Level Devices/100
Ancillary Equipment/104

Kurzweil 4000 scanner debuts

Kurzweil 4000 scanning system

CAMBRIDGE, Mass. — Setting its sights on the low-end office automation market, Kurzweil Computer Products, Inc. has announced the Kurzweil 4000, an intelligent scanning system that can input both typewritten and typeset material.

The 4000 features intelligent character recognition, which enables the system to learn to recognize most type fonts. The system can reportedly accomplish this with little user intervention and can learn unique characteristics of a specific font after a user training session.

An offshoot of the reading machine for the blind, a product that gained Kurzweil recognition in 1976, the Kurzweil 4000 is the first product the firm has produced since its take-

See KURZWEIL page 104

IBM chip touts fast data exchange

YORKTOWN HEIGHTS, N.Y. — Engineers from IBM have developed an experimental amplifier chip that reportedly speeds up the data exchange between processors and I/O devices.

IBM claims the device exchanges data 16 times faster than any amplifier the firm currently uses. The chip is located in a controller that uses a fiber-optic transmission line to send data back and forth to a processor.

Currently, an IBM spokesman said, controllers use copper transmission lines to send data at a rate of 25M bit/sec.

With the newly developed amplifier, data can be sent at up to 400M bit/sec. IBM said that rate translates into better than 17,000 typewritten pages in a second.

The fiber-optics device uses strands of refined glass to send laser or LED light, which pulses to convey computer data signals.

A converter at the sending end of the fiber-optics line changes electronic signals to light pulses and sends the signals through the glass fibers. A converter at the receiving end changes the light back into electronic signals, according to the spokesman for IBM.

The technique was designed by Dennis Rogers and Albert Widmer of IBM's Yorktown Heights research facility and was manufactured under the direction of Joseph Mosley at IBM's East Fishkill, N.Y., facility. IBM did not specify when it would use the device in a commercial product.

SYSTEMS & PERIPHERALS

TURNKEY SYSTEMS

MCDONNELL DOUGLAS AUTOMATION CO.
BDS/GDS

McDonnell Douglas Automation Co. (McAuto) recently announced the availability of the Tektronix, Inc. 4115 color raster terminal with its building design system (BDS)/general drafting system (GDS) for architectural and engineering applications.

The terminal reportedly provides a 60Hz noninterlaced refresh rate, a resolution of 1,280 pixels by 1,024 pixels and 256 displayable colors.

The systems are available in turnkey configuration with Prime Computer, Inc.'s 2350, 250, 750 and 850 computers and Digital Equipment Corp.'s VAX-11 series.

Prices start at $129,000 for a system comprised of either three-dimensional BDS or two-dimensional GDS system software with a 4115 terminal and digitizer, a printer and a Prime 2250 computer.

McAuto, P.O. Box 516, St. Louis, Mo. 63166.

PROCESSORS

THE WOLLONGONG GROUP
Pegasus

The Wollongong Group has introduced a family of products for Digital Equipment Corp. VAX-11s.

The Pegasus line was designed for the 32-bit superminicomputers operating under either Unix or DEC's VMS operating system. According to the vendor, Pegasus offloads interactive editing functions, which involve host system context switching and terminal I/O communications in a keyboard-transparent environment.

The Pegasus 1116 consists of 1M byte of memory, a 5¼-in. floppy disk for initial program load and diagnostics and an interface to the Xerox Corp. Ethernet local-area network. It is priced at $30,000.

The Pegasus 2116 has all the functions of the 1116, plus an additional 1M byte of memory and support for multiple VAX host systems. According to the vendor, it entails the provision of terminal multiplexer, concentrator and local-area network switching functions. The price for the 2116 starts at $35,000.

The Wollongong Group, 1129 San Antonio Road, Palo Alto, Calif. 94303.

DATA STORAGE

TANDEM COMPUTERS, INC.
4114 drive; 4110, 4111 price cuts

Tandem Computers, Inc. recently announced a 264M-byte Winchester fixed-media disk drive, designated the 4114, that it said provides greater flexibility and price/performance to users of the firm's Nonstop transaction processing systems. The company also announced price reductions for its 4110 and 4111 128M-byte disk drives.

The 4114 provides 264M bytes of formatted storage in a sealed module. The unit is the top drive in a two-drive cabinet. The bottom drive, designated the 4115, is identical to the 4114, according to Tandem.

The 4114 is compatible with Tandem's other models. When configured at 240M bytes, it can also be mirrored with the Tandem 4104 removable-head, 240M-byte disk drive.

The 4114, including cabinet, is priced at $20,500, and the 4115 is priced at $19,000. Both are available immediately on Nonstop II and Nonstop TXP systems.

Additionally, Tandem reduced the U.S. price of its 4110 and 4111 modules. The 4110 top drive, including cabinet, has been reduced from $19,500 to $15,850, and the 4111 bottom drive has been reduced from $16,500 to $14,350.

Tandem Computers, 19333 Vallco Pkwy., Cupertino, Calif. 95014.

TERMINALS

ZENTEC CORP.
Zentec 1021

Zentec Corp. has announced a low-end terminal that is said to provide the same features as more expensive terminals.

The Zentec 1021 features a 12-in. diagonal screen, ergonomic design, multiple emulations, 32 graphics characters and editing capabilities.

The 1021 terminal comes in two versions. The first emulates several terminals, including the Hazeltine Corp. 1500, Lear Siegler, Inc. ADM 3, Digital Equipment Corp. VT52 and Applied Digital Data Systems, Inc. Viewpoint. The second version, the 1021A, supports the Ansi X3.64 standard.

The terminal is available for $399 in OEM minimum quantities of 100.

Zentec, 2400 Walsh Ave., Santa Clara, Calif. 95050.

PRINTERS/ PLOTTERS

AMPAK BUSINESS SYSTEMS, INC.
ABS Laser Pro 2700; ABS 200 EPM Thermal Printer; Epson RX-80 Matrix Printer

Ampak Business Systems, Inc. (ABS) has announced add-on printers for IBM minicomputers and microcomputers.

Continued on page 102

Lease a Magnuson PCM for a short term at low, long term rates...

We'll give you long term rates. You give us a short term commitment. With more processing power to the dollar, the Magnuson M80 is the most cost-effective alternative to IBM's 4300 series. Now Phoenix Leasing sweetens the deal by offering low, two-year rates on a lease you can cancel after every 6 months—with no penalties! **Phoenix Leasing means inexpensive flexibility.** Meet your immediate processing needs, without tying yourself to projected long term hardware requirements.

Compare Magnuson with IBM

		MIPS*
Magnuson	M80/42	.77
IBM	4341-1	.72
IBM	4341-10	.58
Magnuson	M80/32	.56
Magnuson	M80/31	.42
IBM	4331-2	.40
IBM	4341-9	.38
Magnuson	M80/30	.24

*COMPUTERWORLD estimates

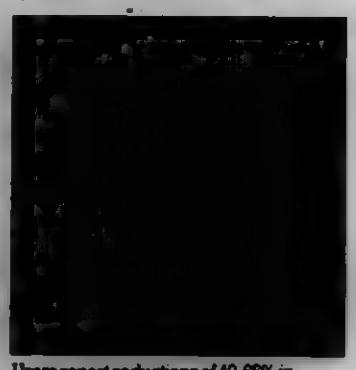
...and get guaranteed support.

We'll give you these bargain rates, and we'll guarantee support. Our Magnuson M80's are supported nationwide by a major national service organization, so you can be sure of receiving prompt service, no matter where you are in the country. **Complete support guaranteed.** If we ever fail to provide you with satisfactory support, you are under no obligation to keep the system. It's as simple as that. **Complete systems, immediate delivery.** Phoenix Leasing has Magnuson systems in inventory ready for immediate delivery. And we can provide a complete system, including peripherals, all in one flexible lease package. **Backed by a company that knows what it's doing.** We've been leasing data processing equipment for more than 11 years, and we have acquired more than $500 million worth of equipment. We currently have over 6000 leases helping companies meet their data processing needs. **Call Kirby Fiegel today.** Don't miss out. Call Kirby at (800) 227-2626. (In California, call (800) 772-4021.) Find out how you can take advantage of this outstanding opportunity.

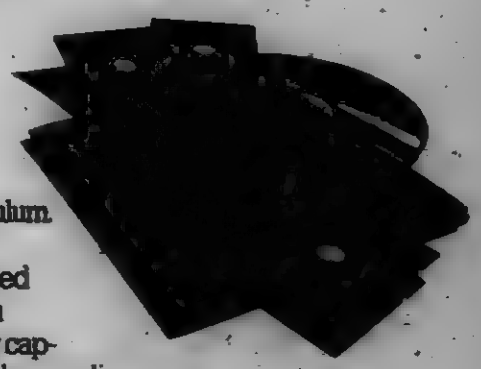
PHOENIX LEASING
495 Miller Avenue, Mill Valley, CA 94941

THE LONG & SHORT OF NEW UNIX™ INTERACTIVE VIDEO TRAINING.

Independent study results show that student recall and retention improve up to 26.3% with interactive video.

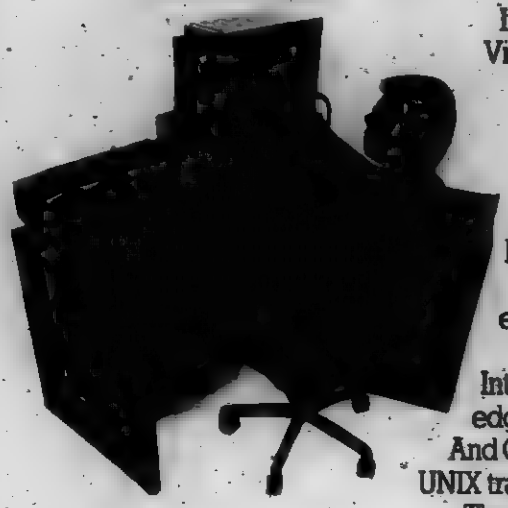


Users report reductions of 40-66% in training time with interactive video.



What way to train UNIX is the best way to train UNIX? Live classroom instruction? Passive video? Or interactive-video?

Studies show there is no faster, more effective, training method than interactive video.



Introducing the first UNIX Videodisc Training Curriculum. Vision.

It combines the power of the computer, the speed of a laser disc and the personality of live classroom instruction. Vision Interactive Videodisc Training captures and holds a student's interest in a way no other medium can.

Students learn by doing. So they learn faster, comprehend better and retain information longer. They spend less time away from the job. And are more productive once they return.

Because Vision training is targeted, you can choose just the Courses you need for your employees. And students learn only what they need to know to do the job. Now.

What's more, Vision was developed by Interactive Training Systems, the acknowledged leader in interactive video training. And Computer Technology Group, a leader in UNIX training.

The result? UNIX training so fast, so effective and so affordable, we back it with a full 30-Day Money-Back Guarantee.

Plus, if you lease all three Vision Curriculum courses for one year, we'll give you the use of an IBM PC, laser videodisc player, color monitor and Interactive Training System Controller. Absolutely Free.

Take advantage of our Free Introductory Offer. Send in the attached coupon. Or call us at 1-800-227-1127. Don't wait too long; you'll get caught short.

AFTER MARCH 31, 1984 OUR FREE INTRODUCTORY OFFER IS NO LONGER FREE!

☐ Please have a representative contact me immediately.

☐ Please send me more information about Vision, the UNIX Interactive Video Training Curriculum.

Name _____

Company _____

Title _____

Address _____

City _____ State _____ Zip _____

Telephone _____

Interactive Training Systems, Inc.
4 Cambridge Center-Cambridge, MA 02142

SYSTEMS & PERIPHERALS

Continued from page 100

The ABS Laser Pro 2700 and the ABS 200 EPM Thermal Printer are based on Xerox Corp. page printers. They were designed to connect with IBM minicomputers through the firm's controller and appear to the IBM system as an IBM 5225 matrix printer.

The ABS Laser Pro 2700 is said to print 12 page/min with 90,000 dot/in., multiple fonts and sizes, graphics capability and dual-input cassettes.

The ABS 200 EPM prints six page/min with 40,000 dot/in., multiple fonts, plain paper printing of text and graphics and auxiliary manual input for envelopes and labels.

ABS is marketing a third printer, the Epson America, Inc. RX-80 Matrix Printer, which incorporates a controller that offers compatibility with IBM's Personal Computer as well as IBM minicomputers, according to a vendor spokesman.

The unit was designed to operate at 100 char./sec, the vendor said.

The ABS Laser Pro 2700 is priced at $23,000, the ABS 200 EPM Thermal Printer at $7,495 and the RX-80 at $2,195.

ABS, 2640 Walnut, Tustin, Calif. 92680.

QUALITY MICRO SYSTEMS, INC.
Lasergrafix 1200 enhancements

Quality Micro Systems, Inc. has enhanced the capabilities of its Lasergrafix 1200 intelligent laser printer.

Enhancements include improved Diablo Systems, Inc. 630 daisywheel printer emulation, Qume Corp. Sprint 9/11 emulation, automatic bar and pie chart generation and improved Tektronix, Inc. 4010 and 4014 plotting, according to the vendor. The printer now supports arc and circle drawing, flood-fill commands and automatic page overlay.

The Lasergrafix 1200 costs $24,995.

Quality Micro Systems, P.O. Box 81250, Mobile, Ala. 36689.

AXIOM CORP.
Axiom TX-1000

Axiom Corp. has introduced a fixed-head thermal printer that provides hardcopy 160 dot/in. resolution with no hardware or software interface.

According to the vendor, the Axiom TX-1000 connects to the raster-scan video output of CRT terminals with a standard coaxial cable. It accepts a variety of video signals, including industry-standard RS-170.

The printer has a 3,000-element print head, which eliminates the need for chemicals or toners, takes 20 seconds to print a complete screen and comes with controls that vary picture positioning and magnification, the Axiom spokesman maintained.

The unit price is $3,395, with quantity discounts available, according to the vendor.

Axiom, 1014 Griswold Ave., San Fernando, Calif. 91340.

GRAPHICS SYSTEMS

GENISCO COMPUTERS CORP.
G-2200

Genisco Computers Corp. has introduced a series of color raster graphics terminals for computer-aided design and manufacturing and engineering (CAD/CAM, CAE) and business and scientific applications.

The basic model, the G-2200, is a terminal with detachable keyboard and a 19-in. color monitor. It features 1,024- by 792-pixel resolution, 60-Hz refresh rate, graphics and built-in support for mouse, tablet and printer.

The G-2200 terminal is software-compatible with the Tektronix, Inc. 4014 and will emulate Digital Equipment Corp.'s VT100 for text editing and data entry.

The RS-232 and RS-422 asynchronous serial links allow the units to receive data at rates as high as 100K bit/sec.

G-2200 costs $12,950.

Genisco Computers, 2545 Cadillac Ave., Costa Mesa, Calif. 92626.

TERAK CORP.
Slash 10; disk drive price cuts

Terak Corp. has an

Continued on page 103

SYSTEMS & PERIPHERALS

nounced the availability of an embedded, 10M-byte, 5¼-in. Winchester fixed disk drive with its 8510 and 8600 computer systems, as well as reduced prices on certain configurations of its older Winchester disk drive.

The new drive, the Slash 10, is the latest in a series of enhancements to the vendor's current product offerings. It is contained within the chassis of the desktop graphics system in place of one floppy disk drive. The unit enhances system performance while reducing its overall size, according to the vendor.

The Slash 10 is based on a Shugart Associates, Inc. 5¼-in., half-height drive with 12.7M bytes of unformatted capacity, a 90-msec average access time and a 5M bit/sec transfer rate. A minimally configured 8510 with the Slash 10 costs $11,730, while a basic, dual-display, color 8600 system with the Slash 10 costs $21,700.

At the same time, the company announced reduced prices on certain systems using its external 10M-byte, 8-in. Winchester disk drives. The University of Minnesota's Minn-Draft Instructional System with the 8-in. drive is now priced at $21,995, while Engineering Systems Corp.'s Design Graphix Commercial Drafting System with the 8-in. drive costs $32,975. All orders currently on backlog will be reduced to reflect the new pricing, a spokesman said.

Tavak, 14151 N. 76th St., Scottsdale, Ariz. 85260.

POWER SUPPLIES

TOPAZ, INC.
Power Conditioner

Topaz, Inc. has announced Power Conditioner, a power fluctuation monitor equipped with a microprocessor.

Power Conditioner monitors voltage fluctuations, detects power surges or sags and determines and supplies power needed to correct a surge, the vendor said. Four circuits reduce power line noise. Peak-limiting circuits reduce high-voltage noise, dynamic clipping circuits suppress low frequency noise, a resistor-capacitor snubber circuit quiets equipment-generated noise and linear filters furnish a 20 decibel attenuation of broadband noise, according to the vendor.

Power Conditioner costs from $7,645 to $14,440, depending on the configuration.

Topaz, 9192 Topaz Way, San Diego, Calif. 92123.

BOARD-LEVEL DEVICES

CONCEPT TECHNOLOGIES, INC.
Graphcard 100

Concept Technologies, Inc. has introduced a graphics controller designed to broaden the uses of the IBM Personal Computer or Personal Computer XT when used as a monochrome system. The product features emulation of Tektronix, Inc. 4010 series terminals.

The graphics controller, called Graphcard 100, implements a Graphic Software Systems, Inc. Ansi GKS Virtual Device Interface Standard. This allows the user to expand the functions of the IBM Personal Computer or XT. It boasts parallel and serial printer ports, as well as a serial port for a mouse, the vendor said. Existing IBM and third-party software programs are run by a circuit board that emulates and replaces IBM's Monochrome and Color/Graphics Adapter Boards, the vendor said.

The Graphcard 100 is said to offer graphics display with a 720-pixel by 352-pixel resolution when the on-board Intel Corp. 80186 coprocessor is used. An intensity level for highlighting provides for high-quality graphics and more interactivity, the vendor said. Graphcard 100 incorporates, through its multitasking system, the Intel 80186 processor to output high-resolution text and graphics to dot matrix printers. Other application functions are executed simultaneously, the vendor said. Low resolution "screen dumps" and the need for a plotter are eliminated by the simultaneous rasterization and application processing.

The Graphcard 100 costs $1,250.

Concept Technologies, P.O. Box 5277, Portland, Ore. 97208.

Connect with success.

IRMA™ is the industry's most successful IBM 3270 Decision Support Interface,™ with more than 25,000 installations.

IRMA, the first coaxial cable link between the IBM PC/PC XT and IBM 3270 networks, delivers the industry's best performance record. She's working successfully right now in more than 25,000 installations worldwide, giving PC users easy, economical mainframe data access, selection, storage and communication back to the mainframe.

And she's more capable than ever, with standard text file transfer software for VM/CMS and MVS/TSO mainframe environments, IBM 3278 Models 2, 3, 4 and 5 and IBM 3279 Models 2A and 3A screen support, plus optional APL Terminal Emulation.

If you want PC/3270 decision support that goes to work literally minutes out of the box, connect with success. With IRMA, the industry's most widely used and most thoroughly proven decision support interface. For information write DCA, 303 Technology Park, Norcross, Georgia 30092. Phone (404) 448-1400, TLX 261333 DCAATL. Or call us toll-free 1-800-241-IRMA. **Connect with success.**

dca
Digital Communications Associates, Inc.

IBM PC and IBM PC XT are trademarks of International Business Machines Corporation.
IRMA and Decision Support Interface are trademarks of Digital Communications Associates, Inc.
©1984 Digital Communications Associates, Inc.

SYSTEMS & PERIPHERALS

AUXILIARY EQUIPMENT

DATA EAST USA, INC.
Datafax 2000

Data East USA, Inc. has announced Datafax 2000, a portable, 10-lb, battery-operated facsimile transceiver.

The transceiver allows a user to communicate over pubic or private telephone lines with any CCITT GII fax machine. The product features a read-and-record mechanism capable of printing graphics output and a magnetic coupler which attaches to any telephone receiver, the vendor said.

The transceiver costs $995.

Data East USA, 470 Gianni St., Santa Clara, Calif. 95050.

COMPUSCAN, INC.
Interfaces

Compuscan, Inc. has introduced interfaces that connect the Alphaword Series 80 Pagereader with Digital Equipment Corp.'s WS78, 82, 103, 200 and Decmate word processing systems.

According to the vendor, the Alphaword Series 80 Pagereader is an optical character reader that can increase productivity of the DEC systems. Compuscan's Series 80, a modular scanner, scans and transmits text typed on standard typewriters directly to the DEC systems for recording on disk.

The Alphaword Series 80 with the DEC interface is priced from $10,390.

Compuscan, Building 2, 81 Two Bridges Road, Fairfield, N.J. 07006.

ELECTRO STANDARDS LABORATORY, INC.
Model 9316

Electro Standards Laboratory, Inc. has introduced a 16-channel switching system for IBM 3278-type information display terminals.

The Model 9316 was designed to accept inputs from up to 16 3278-type display stations and switch them either in bulk from one controller to another or in a programmed mix between two controllers. Model 9316 is available in a standard computer-room, rack-mount configuration, costing $1,050; it is optionally available in a desktop version, which costs $1,100.

Electro Standards Laboratory, P.O. Box 9144, Providence, R.I. 02940.

SIX IBMs ALL IN ONE CIE

It's like getting five IBM terminals free.

In a CIE-7800, you get plug compatibility with the IBM 3178 and all five models of the 3278 series. Yet, a multi-model CIE-7800 costs less than any single one of those IBM terminals.

Both smaller and bigger at the same time

What meets the desktop is a far more compact terminal, too. The CIE-7800 is 40% smaller than any IBM.

But, through the ingenuity of CIE/ACM design, what meets the eye is a screen over one-third larger than IBM's.

The CIE monitor also rotates and has an upward tilt of from 0 to 20 degrees for adjustable viewing. And it weighs less than 20 pounds, so it's easily moved. It's user-friendly to the *nth* degree.

22 keyboards

The detached, low profile keyboard has an 87-key IBM compatible layout. And it can be user-configured into any of nearly two dozen U.S. and international keyboards, all of which give you a continuous adjustment angle of from six to 11 degrees.

Alternate DEC® and HP 2622 personalities

The CIE-7800 is available with *concurrent* alternate personalities. With a single command, you can switch to DEC VT100,® or HP 2622, or IBM 3101-3104, or IBM 3275/3276-2 (bisynch single station), while still retaining IBM 3178/3278 compatibility. No other terminal is as versatile. Not one.

New CIE-7850 "add-in" intelligence

The new CIE-7850 is more than just an add-on. It's an add-in. As shown below on our screen, you simply plug the 7850 into the Coax-A line between the controller and terminal to give you access to both on-line mainframe processing power and local intelligence.

The CIE-7850 conducts concurrent operations in either 3178/3278 or its local intelligence mode, which is *100% IBM PC compatible.*

To learn more, just contact ACM, Inc., Suite 540, 3857 Birch Street, Newport Beach, Ca. 92660. Or call toll free 1-800-854-5959. In California, call 1-800-432-3687.

CITOH ELECTRONICS ACM

® DEC and DEC VT100 are Registered Trademarks of Digital Equipment Corp.
© 1984 C. Itoh Electronics, Inc.

KURZWEIL from page 99

over by Xerox Corp. in 1980. It is also the least expensive device Kurzweil has ever announced, carrying a $35,000 price tag. Early reading machines from the firm cost about $100,000, and the firm's earlier office-oriented scanning machines cost roughly $70,000.

The Kurzweil 4000 is basically an enhanced version of the firm's first stab at the office automation market — a larger, more expensive machine that did not include the artificial intelligence capabilities of the 4000, noted Michael Backler, Kurzweil's vice-president of marketing.

The 4000 is equipped with an autotrain feature that enables the unit to make its own decisions in identifying text. In a demonstration, the unit was able to read through both typewritten and typeset material. When a new type style is introduced into the 4000, the operator must go through a training session in which the 4000 flashes computer-generated enlargements of characters on a screen along with the most likely letter match. The operator then must either respond by indicating whether the 4000's interpretation of the character is correct. If it is not correct, the operator can input the proper interpretation of the character in question. The 4000 will then make that interpretation in future cases.

Backler noted that the 4000 is usually correct in its interpretation of letters. How long a training session is used for a new font depends on the accuracy required in the application.

In addition to identifying letters, the intelligent character recognition software handles other problems such as determining where the text starts and distinguishing between very similar characters.

The Kurzweil 4000 can read approximately 30 to 40 char./sec. The Kurzweil 4000 comes with a scanning unit, CRT terminal and electronic tablet. The unit can be used as a stand-alone system or in an Ethernet local-area network.

It costs approximately $35,000 from Kurzweil, 185 Albany St., Cambridge, Mass. 02139.

DATA from page 99

information storage device. This will include computer-assisted magnetic media, solid-state chips and changeable optical data disks. All three technologies are easily alterable.

The third factor involving memory is permanent or historical storage. This is an area where computer-linked micrographics media will be used heavily. Other forms of long-term storage will include optical disks, permanent solid-state chips and, of course, paper. Paper is an irreplaceable form of permanent storage. It has specific applications that are eternal.

Each day, the business world becomes more dependent upon information. The various means of storing information for recall can only hold so much.

Eventually all stored information will have to be broken into short- and long-term formats. The challenge facing micrographics systems is to bridge the gap between various technologies.

Wolf is manager, national records systems support, for A. B. Dick Co. in Chicago.

Communications.

How to tie things together today without being tied down tomorrow.

This April, *Computerworld Office Automation* will give you a close look at the world of communications products and services. You'll read about what's out there now and what's coming. And how to get started while leaving your architecture open for the technologies of the future. And you'll get it all from the perspective of end users who have to increase productivity *now* while making sure the their company's investment won't be obsolete in two years.

And that's not all. There'll be feature articles on:

- PBX *versus* local area networks and how they'll merge
- voice technology
- videoconferencing technology
- satellite technology
- inter and intra company communications strategies
- product evaluations and comparisons

And after we cover all the developments for you, we'll offer you strategies to link them all together into one integrated system.

Computerworld Office Automation is designed to give you OA information geared to the DP/MIS environment — in a way that no traditional office publication can. As one of *Computerworld's* 114,000 subscribers in the U.S, you'll get six issues of *Computerworld Office Automation* in 1984 — as part of your subscription! And if your users need to increase their communications links, you won't want to miss this issue devoted to Communications in the office.

If you've got office automation and office communication products our readers should know about, then you need to get your ad reservation in by March 2nd.To reserve ad space in this April 11th issue of *Computerworld Office Automation*, call one of the sales offices listed below, or Ed Marecki, National Sales Director at 617-879-0700.

To: Ed Marecki, *National Sales Director*
CW Communications/Inc.
Box 880
Framingham, MA 01701

☐ *Please send me advertising information on Computerworld Office Automation.*

☐ *Please have a sales representative call me.*

Name _____

Title _____

Company _____

Address _____

City _____ State ____ Zip ____

Telephone _____ 4/11

Computerworld
OFFICE AUTOMATION

BOSTON/Chris Lee, Jayne Donovan, Michael Kelleher, Ron Mastro, Jim McClure, Alice Longley, *(617) 879-0700*

CHICAGO/Art Kossack, Chris Lee, Jean Broderick, *(312) 827-4433*

NEW YORK/Mike Masters, Doug Cheney, Ray Corbin, Joan Daly, Fred LoSapio, Gale M. Paterno, *(201) 967-1350*

ATLANTA/Jeffrey Melnick, Mike Masters, *(404) 394-0758*

SAN FRANCISCO/Bill Healey, Ernie Chamberlain, Theodora Franson, Barry Millions, Nicole Boothman (recruitment), *(415) 421-7330*

LOS ANGELES/Bernie Hockswender, Bob Hubbard, Bill Healey *(714) 261-1230*

When Computerworld delivers the goods on manufacturing systems this March 26th, you'll definitely want to be there.

Ad deadline is March 9th.

In response to the increasingly heavy involvement of DP/MIS people in computer-aided manufacturing (CAM) and computer-aided engineering (CAE), *Computerworld* is preparing a Special Report that focuses on CAM/CAE, manufacturing resources planning (MRP), robotics, inventory and shop floor control.

We'll also cover the effect these new technologies are having on traditional manufacturing operations. And on the delicate relationships between traditional DP departments and the factory automation specialists.

If you act before March 9th — your products or services can be represented. To reserve space in this issue, call one of the sales offices listed below or call Ed Marecki, National Sales Director at (617) 879-0700.

To: Ed Marecki, National Sales Director
CW Communications/Inc.
Box 880
Framingham, MA 01701

☐ Please send me advertising information for *Computerworld*.
☐ Please have a sales representative call me.

Name _____
Title _____
Company _____
Address _____
City _____ State _____ Zip _____

CW3/9

COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

BOSTON/Chris Lee, Jayne Donovan, Michael Kelleher, Ron Mastro, Jim McClure, Alice Longley, (617) 879-0700
CHICAGO/Art Kossack, Chris Lee, Jean Broderick, (312) 827-4433
NEW YORK/Mike Masters, Doug Cheney, Ray Corbin, Joan Daly, Fred LoSapio, Gale M. Paterno, (201) 967-1350
ATLANTA/Jeffrey Melnick, Mike Masters, (404) 394-0758
SAN FRANCISCO/Bill Healey, Ernie Chamberlain, Theodora Franson, Barry Milione, Nicole Boothman (classified), (415) 421-7330
LOS ANGELES/Bernie Hockswender, Bob Hubbard, Bill Healey, (714) 261-1230

MICROCOMPUTERS

Apple spurs approval of 3½-in. drives

By Paul Niemiewski
CW Staff

Apple Computer, Inc.'s use of Sony Corp. 3½-in. disk drives in its recently announced Lisa-2 and Macintosh microcomputers will spur acceptance of 3½-in. drives as the micro floppy (sub-5¼-in.) drive standard, according to industry analysts polled by *Computerworld*.

"Apple's decision provides additional momentum for adopting the 3½-in. drive as the predominant standard," said James N. Porter, president of Disk Trend, Inc., which publishes "Disk/Trend Report," an annual market study.

"The Macintosh drive means that practical technology has come to light in the microcomputer world," said Chris Christiansen, senior analyst at The Yankee Group in Boston. "The next generation of microcomputers will use high-capacity, 3½-in. drives rather than 5¼-in. drives."

The smaller disk drives offer users better reliability, faster data retrieval and more storage capacity than their larger, older brothers, according to manufacturers.

However, because different size drives are vying to become the industry standard, hardware manufacturers have been slow to adopt the new standard. The battle began in 1980, when Sony announced its 3½-in. drive and diskettes. Rather than follow Sony, other companies developed different size drives. Last year, four sizes — 3-in., 3¼-in., 3½-in. and 4-in. — were available to manufacturers.

The 3-in. drive is backed primarily by Japanese companies, including Hitachi Ltd. and Matsushita Electric Industrial Co. Tabor Corp. designed the 3¼-in. drive and signed OEM license agreements with Seagate Technology, Inc. and Micro Peripherals, Inc. IBM announced a 4-in. drive, but last summer dropped plans to produce it.

The non-3½-in. formats have had limited market success. Gavilan Computer Corp. planned to use a 3-in. drive from Hitachi Ltd. for its portable computer. However, it recently dropped the 3-in. drives and switched to a Shugart Associates, Inc. 3½-in. drive.

"When we were designing the computer, no standard had emerged," said Vicki Daniel, a Gavilan spokeswoman. "Our portable could use 3-in., 3¼-in. or 3½-in. drives. Hitachi did not meet our shipment request. Since the 3½-in. drive was emerging as a standard, we decided to use the Shugart drive."

The 3½-in. drives have had more success luring major manufacturers. In July, Hewlett-Packard Co. became the first major manufacturer to use a micro floppy drive in a microcomputer. "Hewlett-Packard gave the product the legitimacy which it was lacking," Christiansen said. "Since [HP] is known for superior products, other manufacturers began looking at quality 3½-in. drives rather than marginal 5¼-in. drives."

See DRIVES page 129

MICRO BITS/PAUL GILLIN

IBM micro plans: considering the Pick option

With the incredible amount of activity in the microcomputer software market in just the past month, speculators are having a field day trying to figure out what IBM has planned next for the Personal Computer.

Big Blue can be expected to make about 450 workstation-related announcements in 1984, according to one industry source. And among these announcements there will no doubt be several operating systems.

Certainly a new version of Unix is in the offing, as is an optimized version of VM on the "4301" high-end micro. Sources say a third operating system is in the works based on a mainframe model and taking advantage of multiple parallel processors based on Intel Corp.'s 80286 or 80386 32-bit microprocessor.

One of the more interesting speculations to date comes from Strategic, Inc. President Michael Killen. He believes IBM just might pull the rug out from under the speculators and endorse Pick & Associates, Inc.'s Pick, a quiet operating system that nevertheless has won a large corps of dedicated followers. Microdata Corp. had been the sole remarketer of Pick for many years before its falling out with the system developers in 1980. Pick is now offered by a number of major OEMs and hardware vendors, including Ultimate Corp.; Applied Digital Data Systems, Inc.; Altos Computer Systems, Inc.; Datamedia Corp.; and Cosmos, Inc.

Cosmos has developed a version of Pick for the Personal Computer that runs on top of IBM's PC-DOS yet is still able to run many Pick programs with the proper modifications. IBM's Boca Raton, Fla., laboratory is known to be evaluating a copy of the Cosmos package.

Why should Pick emerge from nowhere to capture IBM's heart? The operating system is often compared to Unix by virtue of the fact that both are portable across a range of hardware, and neither is considered appropriate in a mainframe environment. Pick enthusiasts say

See PICK page 129

Micros for DSS fueling opportunities, problems

By Harry J. Regan
Special to CW

The explosive growth of microcomputer technology over the last few years has left an indelible stamp on the way business analysis is performed. What was once little more than a toy is now becoming the preferred vehicle for decision support systems (DSS).

The introduction of more sophisticated hardware with more processing capability is the fuel firing the rapid acceptance and utilization of micros today. Over two-thirds of the micros installed between now and 1990 will be destined for business use.

Two distinct classes of equipment are emerging in the marketplace: the single-user personal or professional computer and the multiple-user office system. While the latter machine may eventually become the workhorse of the office of the future with respect to word processing, data collection, electronic mail and other applications of a more generalized or routine nature, the personal workstation will become the flagship of the decision maker.

Factors that will determine the success of a business analyst's micro installation include:

- The ability to access data on a host computer.
- The ability to link workstations to each other and to shared resources.
- The ease of use of the equipment and software in its particular application.

- The transportability and repeatability of analyses.

This last point is an important consideration for ensuring consistency in business analyses for organizations that have a variety of micro hardware. The results generated on one workstation must agree with those run on another brand or type of micro.

Until recently, the majority of formal DSS has been implemented on remote computing services. But this situation is changing. In fact, the micro-based DSS has become a major competitor with remote computing services for DSS implementation. A recent trend in decision support software involves linking the personal computer with mainframe-based software, providing a "best of both worlds" capability.

There are decided advantages to using micros for DSS. These include:

- The increased productivity of

See DSS page 120

apple
Apple Imagewriter designed for high-resolution graphics/110

MULTI SOLUTIONS INC.
Portable operating system supports networks, multiprocessing/110

■ Multiuser system features 30M-byte disk/108

■ Small business computer market to skyrocket — survey/108

INSIDE

Systems/112
Storage/112
Board-Level Devices/112
Auxiliary Equipment/113
Micro Software/114

Molecular offers 30M-byte multiprocessor

SAN JOSE, Calif. — Molecular Computer, Inc. has announced a 16-user, 30M-byte multiprocessor system designed for businesses with moderate user and storage requirements.

The Supermicro 16X features 30M bytes of formatted Winchester disk storage and is expandable up to 90M bytes, according to a spokesman. The system reportedly provides each user with a dedicated application processor based on a Zilog, Inc. Z80A microprocessor and 64K bytes of random-access memory (RAM); processors are also available with an optional 16-bit Intel Corp. 8086 processor with up to 1M byte of RAM.

The product reportedly is compatible with Digital Research, Inc.'s CP/M 80, CP/M 86, MP/M 80 and MP/M 86 operating systems and features Molecular's N/Star multiuser network operating system.

All application processors are connected to the system's M/Bus high-speed interprocessor link, which operates with a data transfer rate of 400K byte/sec and can support 18 application processors of either 8-bit or 16-bit configuration, according to the spokesman.

The basic system configuration includes a 30M-byte, 8-in. Winchester disk drive; a 1M-byte dual-sided, double-density, 8-in. floppy disk drive; a Zilog Z80B-based file processor with 256K bytes of RAM; N/Star; and M/Bus. The configuration costs $14,995, and 8-bit application processors are available for $995 each.

Options include a 16-bit application processor for $2,795, a 20M-byte tape backup unit for $2,995 and two additional 30M-byte Winchester disk drives priced at $9,995 for the second drive and $7,995 for the third drive.

Molecular's Application Tools for Office Management integrated word processor, spreadsheet and electronic mail package is available for $1,395 from Molecular Computer, 251 River Oaks Pkwy., San Jose, Calif. 95134.

Small business seen expanding computer use

By James Gosselin
CW Staff

NEW YORK — Computer usage by small businesses will jump by 47% in the 12 months ending June 30, with the sales concentrated in those companies with less than 20 employees, according to a study released by *Time* magazine.

The study, "Small Computers for Small Business," showed that 16%, or 566,000, of America's 3.5 million small businesses were using computers at the time of the telephone survey during the first half of 1983. These figures represented a 25.5% increase in market penetration over a three-year period. A small business was defined as one having 500 or fewer employees or sales of less than $25 million.

The projected growth between mid-1983 and mid-1984 was calculated at 47%, or 246,500 new acquisitions and upgrades.

"Retailing apparently will be the hottest market, with 31% of new installations vs. a current 16% share — growing at almost double the industry rate. New sales will continue to be concentrated in the gigantic marketplace made up of companies with less than 20 employees," said the study, produced for *Time* by Focus Research Systems, Inc. of West Hartford, Conn.

The study, which compared the 1983 market penetration to figures for the end of 1979, found that Apple Computer, Inc. led IBM in sales by 2%, but that IBM led Apple slightly in existing installations.

Small businesses were buying more than half of their systems from Apple, IBM, Radio Shack, Digital Equipment Corp. and Commodore Business Machines, Inc., according to the survey.

The size of a business determined the likelihood of computer use, according to the study, with a 70% market penetration in companies with 100 to 499 employees and only 5% penetration in companies with four or less workers.

Geography also influenced market penetration. Southern cities, Atlanta (18.8%), Houston (18.7%) and Los Angeles (17%) had greater projected penetration than New York (12.6%), Philadelphia (13.4%) and Chicago (15.1%).

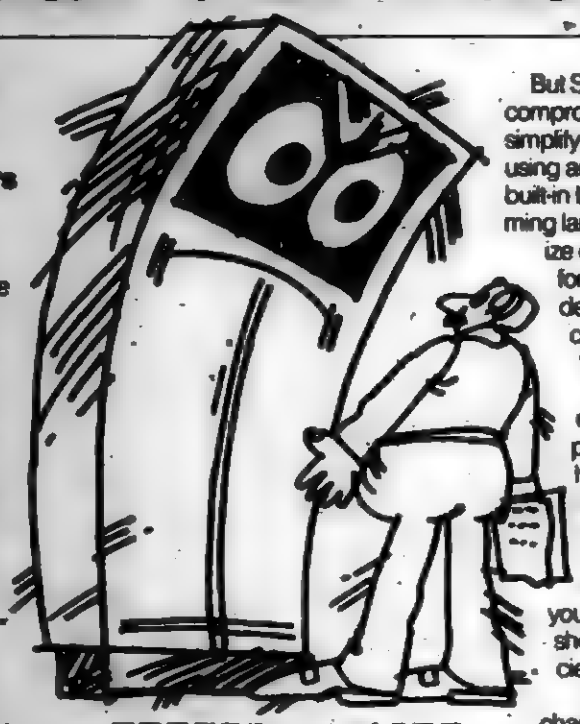
"The pattern seems to indicate that the older markets — Boston (17.4%) being the exception — may be populated with more grass-roots businesses that are resistant to change and innovation, whereas businesses in developing areas — Houston and Atlanta, for example — are quicker to adopt innovative business methods.

"If true, it will mean that more intense selling efforts will be needed in the older cities," the report said.

Boston may be excepted because of its numerous computer and software companies, the researchers said.

The study is available free upon request on company letterhead from Category Sales Supervisor, Time, Inc., Time & Life Building, Rockefeller Center, New York, N.Y. 10020.

Who Really Manages Your VAX Data?



Introducing the DBMS that Users can Use, Programmers can Program, and Managers can Manage.

Most data base users are merely bystanders. Because most data base management systems are so complex that only a few people can squeeze out results.

Now System 1032™ puts the power of the VAX on your side. You get relational data management, without the burden of relational calculus or SQL.

Anyone can use it with less than an hour of training. If you get stuck in the middle of a command, just touch a key. System 1032 prompts for essential information, list choices, or offers a capsule description of any feature.

But System 1032 doesn't compromise on the features that simplify your applications. Design using any host language or our built-in block-structured programming language. You can customize data bases and output formats to satisfy your most demanding users. Yet you can modify any data structures at any time.

Try it out on your own computer. A 60-day trial period costs just $85. See how easily System 1032 manages your own data, on your own system. Test our responsive hot-line support services. Watch your programmer productivity shoot up, and system efficiency accelerate.

Show your VAX who's in charge, with System 1032. Send in the coupon or call today.

© Copyright 1983, Software House. System 1022 and System 1032 are trademarks of Software House. VAX is a trademark of Digital Equipment Corporation.

System 1032 ™

☐ Please call me.
☐ Send me the latest on System 1032.
My VAX environment is:
☐ 11/782 ☐ 11/730
☐ 11/780 ☐ On order
☐ 11/750 ☐ Under consideration
☐ My company is an OEM

Name _____
Title _____
Company _____
Address _____
City _____
State/Prov _____ Zip/PC _____
Tel _____ CW28

Send to:
Shauna Sullivan
Software House
1105 Massachusetts Avenue
Cambridge, Massachusetts 02138

Software House
1105 Massachusetts Avenue
Cambridge, Massachusetts 02138
Tel. (617) 661-9440 TWX: 710-320-1075

Now you don't have to be rich to be powerful.

Riches and power don't always go together. Take Plexus, for instance. The world's most powerful UNIX*-based supermicros.

Powerful because multiple processors share the UNIX load. So processing power is distributed to where it does the most good.

Terminal I/O. Disk I/O. Data communications. And, of course, data processing.

Our unique architecture also lets us bring you the world's first UNIX Network Operating System (NOS). So you can combine Plexus systems in an Ethernet network for even more power.

NOS gives you real time, continuous access to files. From anywhere in the network.

Files are also updated on the same basis. So everyone in the network works with up-to-the-minute data. Automatically.

No waiting for file transfers. And that's a decided improvement over everything else that's out there.

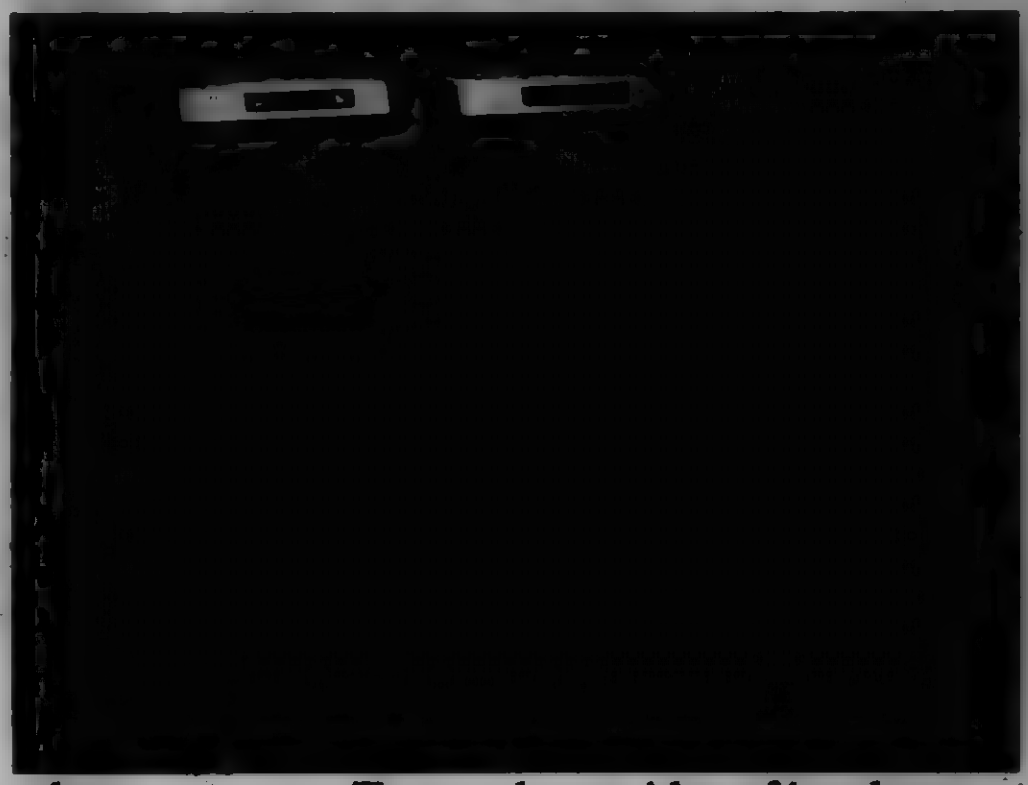
You also get to save money on powerful UNIX-based software, including COBOL, FORTRAN, Pascal, BASIC, and C. Database management and word processing, too. As well as hundreds of third party UNIX packages.

Plus our own software and maintenance support. And even a software referral service for your OEM programs.

Does all this make us expensive?

Absolutely not.

In fact, Plexus systems cost thousands of dollars less than the minicomputers we outperform.



To get a better idea of just how good that performance is, come get a demonstration. Call *800-528-6050*, ext. *1444*. In Arizona, *800-352-0458*, ext. *1444*. Or write Ralph Mele at Plexus Computers, Inc., 2230 Martin Avenue, Santa Clara, CA 95050.

You see? You don't have to be rich to be powerful. Just smart.

PLEXUS

Built for speed.

© Plexus Computers, Inc., 1983
*UNIX is a trademark of Bell Laboratories.

Apple announces high-speed dot matrix printer

CUPERTINO, Calif. — Apple Computer, Inc. has announced a dot matrix printer designed for reproducing high-resolution graphics at fast speeds.

The Imagewriter is compatible with the Lisa and Apple II and III personal computers and prints high-resolution graphics at a rate of up to 180 char./sec and full text up to 120 char./sec. It uses bit-mapped graphics technology to support Lisa's graphics capabilities.

The printer uses a standard RS-232C serial interface to connect directly with the Apple III's or Lisa's built-in serial ports. Apple's Super Serial Interface Card connects the printer to the Apple II+ or IIe.

The Imagewriter prints in a 7- by 9-dot matrix and features eight fonts. Users can design up to 175 additional characters. Various fonts, underscoring and sub- and superscripts can be mixed in the same printed line.

The new printer provides variable resolution from 72 to 160 dot/in., variable pitch from 10 to 17 char./in., variable line spacing from 1/6 to 1/44 in. and proportional fonts and spacing.

The Imagewriter uses either friction-feed or adjustable-width pin-feed tractors and accommodates a range of paper widths from 3 to 10 inches. It uses single sheets of paper, fan-fold continuous forms, roll stock and precut labels. Up to four copies can be printed at a time.

The Imagewriter is priced at $675 with a 90-day warranty from the vendor. Apple is located at 10260 Bandley Drive, Cupertino, Calif. 95014.

S1 supports up to 256 processors

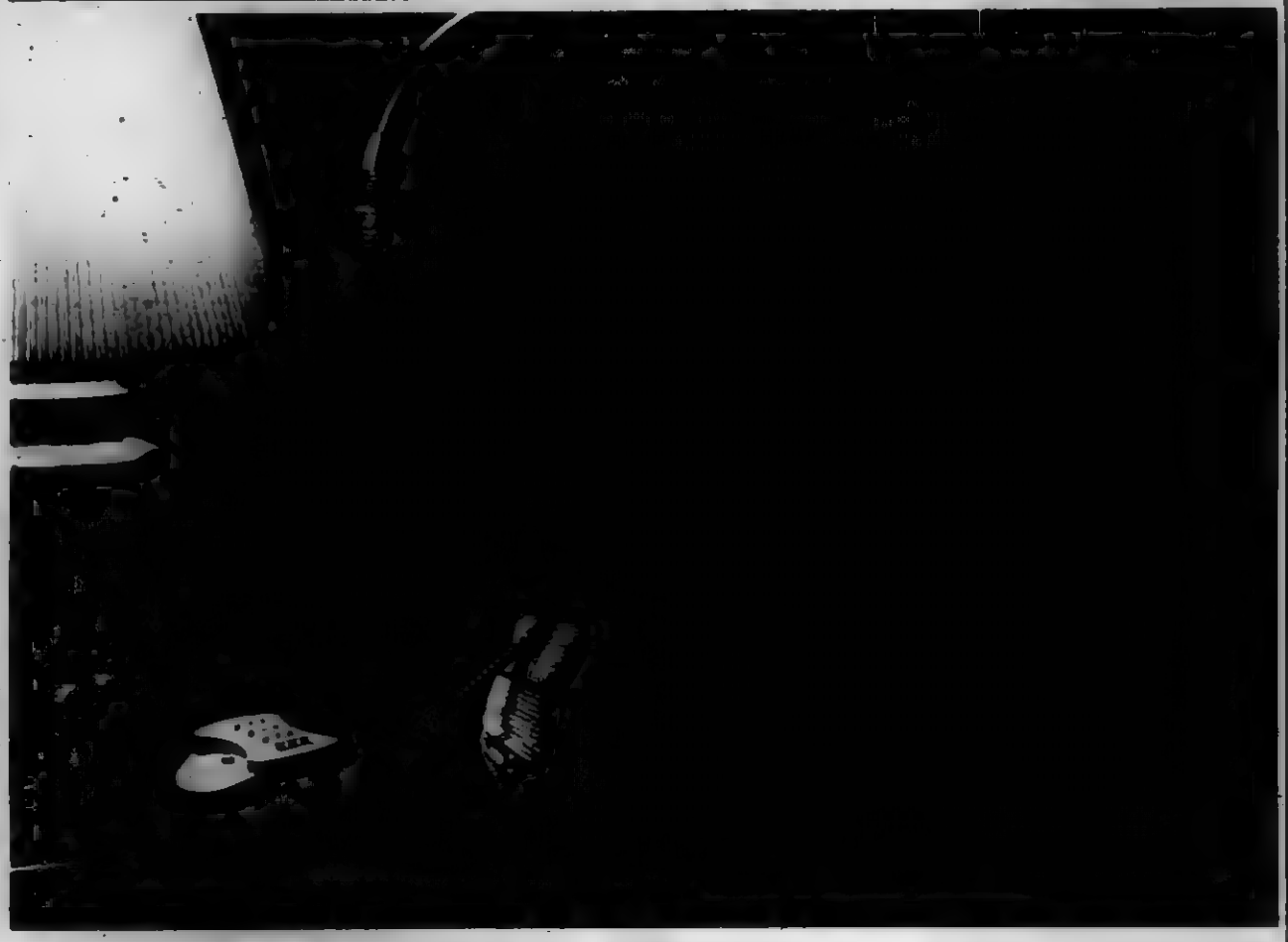
LAWRENCEVILLE, N.J. — Multi Solutions, Inc. recently announced S1, an operating system designed for a variety of microprocessors and said to offer extensive networking support and simultaneous support for up to 256 processors.

Currently available for use on Motorola, Inc.'s 68000, Zilog, Inc.'s Z80 and Intel Corp.'s 8080, 8085, 8086 and 8088 microprocessors, the modular S1 requires 128K bytes of memory, but reportedly may be configured to use as little as 2K bytes of memory by eliminating unneeded facilities.

The operating system reportedly can read and write files to and from Unix, Digital Research, Inc.'s CP/M and MP/M 11; Microsoft, Inc.'s MS-DOS and Xenix, Regents of University of California's P-System, Technical System Consultants, Inc.'s Flex, IBM's 3741 and others.

Features include multiuser and multitasking support, multiprocessing support, networking support, full screen or bit-mapped displays, bit-mapped printers, multiple windows and plotter and terminal support. Compilers for a variety of languages are available.

Prices for a preconfigured system range from $200 to $950 from Multi Solutions at 660 Whitehead Road, Lawrenceville, N.J. 08648.



Computer Interruptus

Midnight. And you wish you would be left in the dark. But miles away in the DP Department, a misplaced DD override, an invalid concatenation, or some other equally obscure JCL error brought production to a standstill.

And when the system breaks down, it's you or your staff they call up. Which usually means getting up and getting down there. And after a night like that, how productive will the morning be?

What a waste. If you had the JCLCHECK™ program, you wouldn't have JCL errors, period. None. Zilch. Zero.

Because the JCLCHECK program can catch any and all JCL errors and give you complete, on-line JCL validation and concise error diagnostics. Plus complete documentation on a job stream or entire production system suitable for insertion in the run book. And it can operate under TSO, TONE, ROSCOE or CMS.

Imagine, with no more JCL errors, your programmers can finally concentrate on what you hired them for: writing programs.

So what are you waiting for? Send the coupon or call us at (408) 554-8121 for details. We'll show you how the JCLCHECK program can bring your error detection out of the dark ages, increase production, and eliminate applications backlog. And that'll put you in the spotlight.

I'm frustrated and tired of JCL errors.
☐ Send me details on the JCLCHECK program.
☐ Have a representative call me.
NAME
TITLE
COMPANY
ADDRESS
CITY, STATE, ZIP
PHONE
OPERATING SYSTEM

Triangle Software Company
4340 Stevens Creek Blvd., Suite 108
San Jose, CA 95129

©Copyright Triangle Software Company. JCLCHECK is a trademark of Triangle Software Company.

"Why does productivity have to start so early in the morning?"

10,000 CICS Users Said There Had To Be A Better Way . . .

We Gave Them GENER/OL™

Feature for unique feature, GENER/OL is the leader in on-line CICS applications development. This 5-star performer channels on-line technology for maximum productivity, efficiency, and flexibility.

Complete with award-winning documentation and responsive support, GENER/OL offers uncommon software productivity in the Pansophic tradition.

Call us today for the performance of a lifetime!

PANSOPHIC®

(800) 323-7335

Pansophic Systems, Inc., 709 Enterprise Drive, Oak Brook, Illinois 60521. In Illinois, call (312) 986-6000.

MICROCOMPUTERS

SYSTEMS

ATV SYSTEMS, INC.
Disk Load Communication Unit

ATV Systems, Inc. has introduced the Disk Load Communication Unit, a turnkey, point-of-sale microcomputer.

The microcomputer uses a Zilog, Inc. Z80 microprocessor, runs Digital Research, Inc.'s CP/M operating system and has 64K bytes of random-access memory. A communications port allows the microcomputer to function as a central processor for a number of cash registers, an emergency backup system to another processor and a distributed processing site, according to the vendor.

The system costs $3,550.

ATV Systems, 2921 S. Dunsier St., Santa Ana, Calif. 92705.

INCOM SYSTEMS, INC.
The Sidekick

Incom Systems, Inc. recently announced The Sidekick, a briefcase-size microcomputer featuring 16K bytes of random-access memory (RAM), 32K bytes of read-only memory (ROM), a data recorder, thermal printer, modem and ac adapter.

The product reportedly provides current information updates in the form of product pricing, inventory control, service support, order entry and electronic mail.

The system reportedly may be expanded with up to two 32K-byte RAM chips, an additional 32K-byte ROM chip and a plug-in 32K-byte RAM disk. Nickel cadmium power packs provide power for up to six hours before a recharge is required, and the ac adapter plugged into an ac source will provide both operation and recharge, according to a company spokesman. It weighs 15 pounds and measures 19.5 in. by 14.5 in. by 5 in.

The basic model is priced at $1,595 and the RAM disk is priced at $395, with add-on RAM and ROM chips priced at approximately $100 per 8K bytes.

Incom Systems, 4801-24th Ave. N.E., Seattle, Wash. 98105.

MICRO STORAGE

INMAC CORP.
New line of diskettes

Inmac Corp. has announced a new line of 5¼-in. Encore floppy diskettes that are compatible with a variety of computers, including those manufactured by Apple Computer, Inc.; IBM; Radio Shack; Digital Equipment Corp.; Control Data Corp; and NCR Corp.

According to the vendor, the diskettes meet Ansi standards, are guaranteed by Inmac for one year and meet or exceed system requirements.

Prices range from $1.59 for 5¼-in. single-sided, single density to $2.99 for double-sided, double-density diskettes in quantities of four 10-disk boxes.

Inmac, 2465 Augustine Drive, Santa Clara, Calif. 95051.

SYSTEMS PERIPHERALS CONSULTANTS
Diskitjr; Winchester subsystems

Systems Peripherals Consultants recently announced a 10M-byte hard disk drive for the IBM PCjr, Sanyo Corp. MBC-550 and other small micros.

The Diskitjr's chassis is 2¼ in. high, 6 in. wide and 12 in. deep. It includes a half-high plated media drive with up to 40M bytes of storage. A second version provides 5- or 10M bytes on a removable cartridge, a spokesman said.

The Diskitjr sells for $1,495.

The vendor also introduced several models of Winchester disk drive subsystems featuring from 10- to 40M bytes of fixed media storage combined with a 5M-byte removable cartridge Winchester disk.

The Diskit Combo is compatible with all systems running Microsoft, Inc.'s MS-DOS 2.0 and some running MS-DOS 1.0, the spokesman said.

Prices start at $1,395 for the 5M-byte removable-only system and $2,795 for the 15M-byte fixed/removable version.

Systems Peripherals Consultants, 9747 Business Park Ave., San Diego, Calif. 92131.

COMPUPRO CORP.
H40 Hard Disk Subsystem

Compupro Corp. has announced a 40M-byte hard disk subsystem, including an 8-in. floppy drive for use with its IEEE 696/S-100 bus-compatible microcomputer systems.

The H40 Hard Disk Subsystem features a Quantum Corp. Q540 5¼-in. hard disk, Compupro's Disk 3 DMA disk controller and the Digital Research, Inc. CP/M 80 and CP/M 86 operating systems. All models of the Compupro System 816 product line support the new system.

A double-sided, double-density Qume Corp. Trak 842 floppy disk drive is standard with the subsystem, with 2.4M bytes of storage and the ability to accept single or double-density, single or double-sided media. The subsystem is priced at $5,495.

Compupro, 3506 Breakwater Court, Hayward, Calif. 94545.

BOARD-LEVEL DEVICES

PHAZE INFORMATION MACHINES CORP.
Brigitte

Phaze Information Machines Corp. has introduced a coaxial interface

MICROCOMPUTERS

board for use with IBM Personal Computers. Called Brigitte, the board enhances the Personal Computer with IBM 3278 terminal capabilities by bridging a Personal Computer to a 3270 network, the vendor said.

A Personal Computer can reportedly connect directly to the IBM 4331 mainframe and IBM 3274 or 3276 controllers to access mainframe data.

Brigitte reportedly plugs into any open Personal Computer option slot, and, in conjunction with the included software, provides for instant 3278 replacement. No additional modems or communications devices are necessary, the vendor said.

Brigitte is priced at $1,255 for single units.

Phase Information Machines, 7850 Redfield, Scottsdale, Ariz. 85260.

LINDGREN ASSOCIATES
RAM Disc Card, package

Lindgren Associates has introduced a line of add-on random-access memory (RAM) cards said to offer from 64K to 256K bytes of additional on-line memory for the Commodore Business Machines, Inc. Commodore 64 microcomputer.

According to the vendor, the RAM Disc Cards can be used for data storage during computation, appending a Basic program from standard disks or executing more than one Basic program directly from the keyboard.

A RAM Disc package is also available. It includes the vendor's RAM Disc memory board with a battery backup, two software packages and a two-slot expansion interface that enables autostart cartridges to use the RAM Disc Card, the vendor said.

A 64K-byte Ram Disc is priced at $370, and each additional 64K bytes of RAM cost $70.

Lindgren Associates, 127 Main St., Brattleboro, Vt. 05301.

TSENG LABORATORIES, INC.
Ultrapak

Tseng Laboratories, Inc. has announced Ultrapak, a graphics and memory expansion board for the IBM Personal Computer.

The board features a parallel port, a serial port and a battery-powered clock and calendar, according to the vendor. Compatible with Lotus Development Corp.'s Lotus 1-2-3, Ultrapak includes 64K bytes of memory, support for 720- by 348-pixel graphics resolution and two pages of bit-mapped graphics, the vendor said.

The board costs $795.

Tseng Laboratories, P.O. Box 588, Newtown, Pa. 18940.

I-BUS SYSTEMS, INC.
I-Bus R188

I-Bus Systems, Inc. has announced a board-level microcomputer system based on the IBM Personal Computer bus structure.

The I-Bus R188 single-board computer is said to allow expansion, with numerous add-on boards available for the Personal Computer. The vendor also offers I-Bus system packaging, including a six-slot chassis enclosure and a nine-slot card cage.

The system uses an Intel Corp. 80188 processor operating at 4.77 MHz and reportedly is upward compatible with software written for the Personal Computer's Intel 8088 processor.

The R188 board includes the processor, 64K bytes of random-access memory, up to 160K bytes of user erasable programmable read-only memory and an RS-232C serial console port.

It is priced at $795 for the computer and $395 to $695 for cages and enclosures.

I-Bus Systems, 9235 Chesapeake Drive, San Diego, Calif. 92123.

AUXILIARY EQUIPMENT

QED INFORMATION SCIENCES, INC.
PC Plus

QED Information Sciences, Inc. has introduced PC Plus, an interactive course designed to run on the IBM Personal Computer, Personal Computer XT and PCjr.

It reportedly teaches users how to operate the Personal Computer, computing fundamentals and the major applications of personal computers, such as word processing, electronic spreadsheets and data base management.

PC Plus modules and hands-on exercises describe and explain system components, storage of records and files, how to operate the keyboard and commonly used computer terms, according to the vendor.

PC Plus, which includes six modules as well as a dictionary, is now available to run on the Personal Computer and Personal Computer XT and costs $59.95.

QED, P.O. Box 181, Wellesley, Mass. 02181.

COMPUTER RESOURCES CORP.
Epson HX-20 parallel port interface

A parallel port interface for the Epson America, Inc. HX-20 notebook-size computer was recently made available from Computer Resources Corp.

The interface unit is said to provide 24 parallel bits of fully buffered input, output or bidirectional data that is user-configurable in 8-bit segments.

In addition, up to 16 parallel port boards can be daisy chained off the expansion connector of one HX-20, according to a spokesman for the company.

The cost of the parallel board is $250, while the connector/LED board is priced at $125 for red LED and at

Continued on page 114

1."How can I be sure I'm getting the latest technology?" At GE, we're a *technology company.* So we have the technical overview to be familiar with major data communications developments. Plus the resources to analyze every piece of equipment we consider leasing to you. So you not only get the *latest.* You get the *best.*

2."How can I be sure I'm getting the right equipment for me?" We will help you analyze your need and likely growth pattern. Then help you decide on the equipment that's right for *you,* from a number of the industry's top manufacturers—like Micom, General DataComm, and IBM, to name a few.

3."How can I be sure I'll get the service I need—when I need it?" General Electric's nationwide service network is just a phone call away. Over 60 locations, with the people *and* parts you need—which usually adds up to *same-day* response.

We even carry the little stuff, like ribbon, paper, cassettes and disks—to save you valuable space.

4."How can I afford it all?" Our leasing alternative helps you conserve capital and credit, eliminate obsolescence, cut overhead, and may give you greater tax advantages than buying.

And with General Electric's service network *behind* the lease, you can minimize downtime—adding up to what may be the best *value* in the business.

GENERAL ELECTRIC.

5."How do I stop worrying?" Call us. We have the answer to practically *any* data communications question—your one-source solution, with the equipment, know-how, service, leasing—and the *security* that comes from dealing with GE.

For the phone number of the sales center nearest you, call 800-528-6050, Extension 406. (In Arizona, 800-352-0458, Extension 406.) Or write General Electric Company, Communication Leasing and Service, Building 4, Room 210, Schenectady, New York 12345.

GENERAL ELECTRIC

MICROCOMPUTERS

Continued from page 113

$145 for two-color LED, the spokesman said.

Computer Resources, P.O. Box 388, Provo, Utah 84601.

SOFTWARE DIGEST, INC.
'Rating Newsletter'

The first issue of 'Rating Newsletter,' published by Software Digest, Inc., evaluates 30 word processing programs that run on IBM's Personal Computer. Each program was tested by 10 reviewers with various levels of computer experience. Evaluation focused on ease of use, performance, versatility and value for money.

Software Digest plans to evaluate nine other types of software packages in future issues of 'Rating Newsletter.' An annual subscription to the newsletter costs $135.

Software Digest, One Wynnewood Road, Wynnewood, Pa. 19096.

MICRO SOFTWARE

LINDBERGH SYSTEMS
Omniterm 2

Lindbergh Systems has introduced Omniterm 2, an intelligent terminal communications package for the IBM Personal Computer and compatible machines.

Omniterm 2 is a revised version of the Omniterm program for Radio Shack's TRS-80. Both products operate through a command-mode menu in which all communications parameters are grouped in logical categories.

According to the vendor, Omniterm 2 was designed for business and professional users. A scroll-back feature allows the user to view text that has been received, but has scrolled off the screen. DOS files can be viewed and edited in a similar manner while remaining connected to the remote system.

Priced at $245, Omniterm 2 comes with documentation, keyboard overlay, an on-line help function and free telephone support.

Lindbergh Systems, 49 Beechmont St., Worcester, Mass. 01609.

CAMBRIDGE COMPUTER CORP.
PC77/78; PC72/73

Cambridge Computer Corp. has introduced software products for the IBM Personal Computer and Personal Computer XT which allow them to emulate Honeywell, Inc. terminals.

Using PC77/78, the Personal Computer emulates the Honeywell VIP 7700 and VIP 7800 series of synchronous terminals; with PC72/73, the Personal Computer emulates the Honeywell VIP 7200 and VIP 7300 series of asynchronous terminals.

The IBM micro reportedly emulates Honeywell terminals without host system or application software modification, regardless of the operating system.

A file transfer utility is also available, allowing the end user to transfer files between the Personal Computer and Honeywell host computers.

The PC77/78 is priced at $795, and the PC72/73 costs $395. The file transfer utility is priced at $150.

Cambridge Computer, 151 Bender Road, Mount Carmel, Conn. 06518.

TARRTEC INTERNATIONAL, INC.
Name directory

Tarrtec International, Inc. has introduced a data base management system (DBMS) capable of storing 2,000 records on a single disk.

The name directory produces mailing labels and record lists according to user-defined catalog codes or geographically by area codes, states, Zip Codes or partial Zip Codes. Each record contains a field for two names, street address, city, state and Zip Code, phone and catalog code.

The DBMS can search record groups for names, catalog codes or record numbers. Utilities allow reading or printing of all current catalog codes, changing access key, selecting minimum and maximum record range and producing multiple mail labels of individual records.

The minimum requirements for running the program are an IBM Personal Computer XT running under DOS with 16K bytes of random-access memory, one disk drive and a printer. The list price is $40.

Tarrtec, P.O. Box 81, Commack, N.Y. 11725.

CLARITY SOFTWARE CORP.
3-2-1 Go

Clarity Software Corp. has introduced 3-2-1 Go, a program that converts Lotus Development Corp.'s Lotus 1-2-3 work sheets into models for an interactive financial planning system.

The program allows Lotus 1-2-3 users on IBM Personal Computers or compatible micros to create models for use as input to Execucom Systems Corp.'s Interactive Financial Planning System (IFPS)/Personal. In addition, models and data files for the mainframe version can also be produced.

The product runs on the Personal Computer under the PC-DOS 1.1 or 2.0 operating system, and requires 96K bytes of memory and two disk drives.

Capabilities include arithmetic expressions, row and column summations and previous and future column references.

Unlimited use within an organization, including copying for multiple in-house personal computer usage, is permitted under a license from Clarity Software. The license fee for 3-2-1 Go is $2,000.

Clarity Software, 11103 Spicewood Pkwy., Austin, Texas 78750.

Announcing

The one-stop, international advertising service for micro marketers.

You'll reach microcomputer buyers all over the world with *Computerworld's* International Marketing Services (CWIMS). Because we have the microcomputer market *covered* with an international network of publications. And what a market!

As the need for computerization in government, industry and educational systems all over the world becomes more acute, countries look to the cost-effective, adaptable microcomputer to bring them into the computer age. This means a very lucrative market for the U.S. micro marketer, since international product demand exceeds product supply.

Now, with the help of *Computerworld's* International Marketing Services, you can advertise in seven magazines devoted exclusively to supplying information to microcomputer users in: Australia *(MicroWorld)*, Brazil *(Micro-Mundo)*, Denmark *(Micro Verden)*, Finland *(Mikro)*, France *(Golden)*, Japan *(PersoCom World)*, Norway *(Mikro Data)*, Sweden *(MickoDatorn, Min Hemdator)*, Spain *(Micro Sistemas)*, The Netherlands *(Micro/Info)*, West Germany *(MicroComputerwelt, PC Welt)*. And, your advertising message can reach buyers of microcomputer products and services around the world through special micro sections in any of our 40 publications in 25 countries.

Act now—and take advantage of this international demand for microcomputer products. Whether you want to test the market—or locate a distributor or representative—our publications will put you in touch with the right people around the microcomputer world.

For more information on getting international micro coverage, call Diana La Muraglia, General Manager, International Marketing Services, toll-free, at 800-343-6474. In Massachusetts, call 617-879-0700 or return the coupon below.

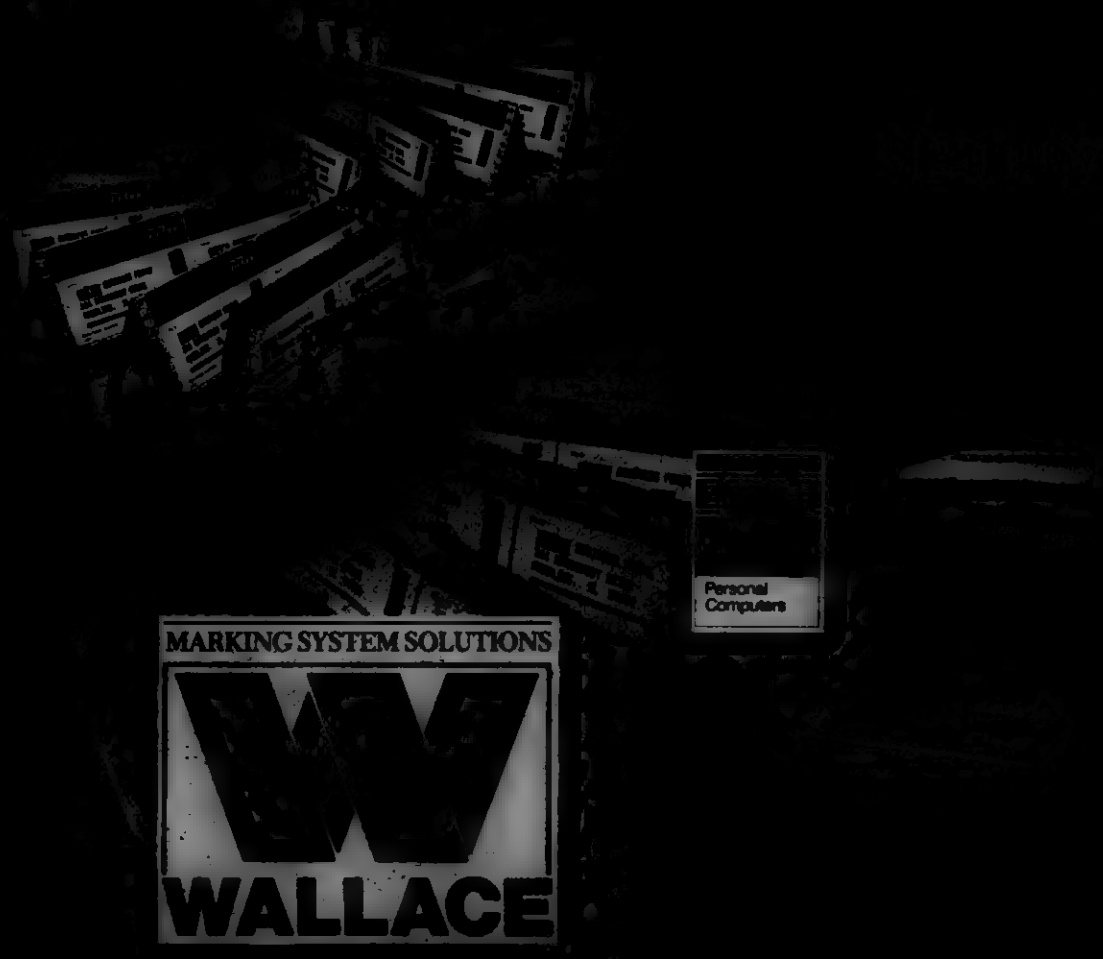
CW COMMUNICATIONS/INC.

Diana La Muraglia, General Manager
International Marketing Services
CW Communications/Inc.
375 Cochituate Road, Box 880
Framingham, MA 01701

Please send me information on:
☐ Your microcomputer publications ☐ Your other foreign publications

Name _____ Title _____
Company _____
Address _____
City _____ State _____ Zip _____

Any label you conceive, Wallace Printware can achieve



MARKING SYSTEM SOLUTIONS

WALLACE

Any label you conceive, Wallace Printware can achieve

MARKING SYSTEM SOLUTIONS
WALLACE

Name_____
Title_____
Company_____
Address_____
City, State, ZIP_____
Phone_____
COMPUTERWORLD 2/13/84

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY CARD

First Class Permit No. 582 Hillside, IL 60162

POSTAGE WILL BE PAID BY ADDRESSEE

WALLACE COMPUTER SERVICES
4600 W. Roosevelt Road
Hillside, IL 60162

Attn: John Apple

YOU BUY ALL YOUR SYSTEMS SOFTWARE FROM ONE COMPANY FOR THE SAME REASON YOU BUY ALL YOUR SUIT FROM ONE TAILOR

There are thousands of software companies. Each of them can sell you a little of this ... and a little of that. And, what have you got? One package that does a little of this ... and another package that does a little of that. And that's all!

But there is one software company that has the software — and the expertise — to help you gain total control of entire operating areas. UCC.

With over 6000 systems installed, UCC is the most experienced software company in the world. Our products have set the standards for dataset management, production workload management, data center management and DOS to OS conversion.

And, more than anything else, with UCC Systems Software: you can handle growth. Plan for it. And manage it.

The UCC-1 Tape Management System

The most widely used tape management system in the world. Now, over 2,400 OS data centers are getting assured protection for their tapes.

UCC-1 eliminates data losses. Improves operating productivity. And solves the problem of tape protection. Completely.

UCC-1 effectively manages all your tapes, preventing accidental loss or destruction of valuable data. And it gets rid of those inefficient handwritten records — along with the costly mistakes they breed.

The UCC-2 DOS Under OS System

All you need to convert to OS ... the easy way! Because, with UCC-2, you can run under OS *without* converting DOS programs.

UCC-2 makes it possible to move the entire DOS workload to an OS environment ... without converting any DOS programs to OS. You get to OS more quickly, easily, and efficiently than ever before ... and hold your conversion costs to the minimum. Over 1,000 data centers have already proven UCC-2 is the best way to get to OS.

The UCC-20 OS JCL Generator

Now, you can create OS JCL ... automatically. And, UCC-20 — together with UCC-2 — makes the transition to OS even easier.

UCC-20 allows you to quickly produce fully functional OS JCL ... without having extensive OS knowledge or training. Plus, your JCL will match *your* predefined standards. Best of all, UCC-20 automatically handles syntax, keyword, and punctuation requirements — both simple and complex.

The UCC-3 Disk Management System

It can increase your usable DASD space by a *third!* And it eliminates DASD problems that cost you time and money.

UCC-3 recovers disk space automatically. It ends space waste ... ends fragmentation, over-allocation, retention of obsolete data sets, inappropriate data set placement.

Data is migrated in minutes ... instead of hours.

What's more, it fully protects your valuable data during use, during back-up, during compression, and during migration. Automatically.

The UCC-6 PDS Space Management System

It eliminates costly PDS compression ... completely. And it helps you avoid most other PDS-related problems.

UCC-6 automatically controls and inventories the members within PDS. This means you get more efficient use of existing disk space. And avoid unnecessary ABENDS. UCC-6 offers security and automatic back-up at the member level. Plus, it prevents processing delay by allowing multiple jobs to update the same PDS simultaneously.

The UCC-7 Automated Production Control System

The ultimate tool for realtime, automated control of your entire production job processing. From automatic scheduling and submission of jobs ... to tracking receipt of data and distribution of output.

UCC-7 is the only system with dynamic feedback ... it's self-adjusting and warns you of potential delays. You get continuous workload balancing for the most efficient use of your hardware resource. Plus, it gives you centralized information for all work areas — Data Preparation, Scheduling, Operations, and Distribution.

The UCC-8 Data Center Management System

It helps you efficiently control all support and service activities ... throughout the data center. With one online, integrated package.

UCC-8 provides management support for your entire company — as well as for your data center. You can instantly monitor the immediate status of every project in your shop ... determine priorities and assign responsibilities for every project ... control equipment and procedural changeovers ... and identify the expense associated with each and every problem.

The UCC-9 Hardware Reliability Management System (RELIABILITY PLUS)

The most authoritative information on hardware reliability that's available. Anywhere. Now, both you and your vendors will know what the score really is.

UCC-9 gives you the facts about hardware failure in your data center ... and in over 700 other participating centers. You have the data you need to make wise hardware decisions. And, every day, UCC-9 pinpoints devices that need attention ... before they bring the system down, before they cost you extensive recovery time. Now, preventative maintenance is a reality.

The UCC-10 Data Dictionary/Manager

The only dictionary package that controls the entire IMS environment. Applications ... databases ... data communications ... and message format services.

UCC-10 is a real workhorse in both a development and production environment. It can significantly improve the productivity of your development staff. And assure the integrity of your production system — while enforcing standards and improving security.

In fact, UCC-10 is much more than just a data dictionary. It is the tool for managing and controlling your investment in people and programs.

The UCC-11 Automated Job Management System

The only system that can automatically re-start or re-run any job. From the proper job step. Without manual effort. Without delay. Without error.

Not only that, UCC-11 eliminates whole categories of reruns outright ... they just can't happen. UCC-11 tracks jobs for you. So you know how many reruns occurred, when, where, why, and at what cost in resources. Now you can analyze the problem. And solve it.

Call 1(800)527-8813 ...

... for more information about UCC Systems Software (in Texas, 214/353-7533; in Canada, 416/424-4171).

UCC

THE MOST COMPLETE SOFTWARE COMPANY IN THE WORLD

University Computing Company Dallas • Toronto • London • Paris • Dusseldorf

SOFTWARE from page 119

INFOWARE, INC.
Info-Samp 2.0

Infoware, Inc. has introduced a sampling tool for auditors and other professionals for testing random samples of a population.

Info-Samp 2.0's features include random generation of numbers for a sample; calculation of a statistically valid sample size and number of errors allowed (based on a precision level and degree of confidence); work sheet printing; and an option that saves numbers to be printed again later.

The software runs on the IBM Personal Computer or Personal Computer XT under IBM's PC-DOS Release 1.1 or 2.0 operating system.

The menu-driven package is priced at $95.

Infoware, 2536 N. Lincoln Ave., Chicago, Ill. 60614.

D A DATA SYSTEMS
The Retriever

D A Data Systems has announced The Retriever, the first in its line of Tools Times Three systems software for the Apple Computer, Inc. Apple III microcomputer.

The Retriever was designed to restore automatically accidentally deleted files, without knowledge of disk formats or any other details of machine operation. The user reportedly enters the name of the deleted file, and the package restores the file automatically.

The Retriever is available for $100 from Apple dealers or directly from D A Data Systems.

D A Data Systems, 229 Rowenwood Ave., Rochester, N.Y. 14619.

MICROLINE, INC.
DMS-III

Microline, Inc. has introduced DMS-III, a menu-driven data base management system (DBMS) designed to run on any system using either Digital Research, Inc.'s CP/M or Microsoft, Inc.'s MS-DOS operating system.

The operating system must have approximately 300K bytes of disk capacity, which can be located on two drives.

According to the vendor, DMS-III is able to perform complex calculations within the files, yielding spreadsheet results. The capability makes it adaptable for time and billing reports. A free-form report function allows the user to design reports, the vendor said.

DMS-III is formatted for more than 30 microcomputers, the vendor said.

The system retails for $295.

Microline, 1701 W. Front St., Tyler, Texas 75702.

MICRO DATA BASE SYSTEMS, INC.
Kpaint

Micro Data Base Systems, Inc. has introduced an interactive forms painter for use with its Knowledgeman package.

Called Kpaint, it is an optional component to go with each of the seven standard Knowledgeman components for use with the spreadsheet, data manager and programming language.

It allows a user to design or revise forms directly on the screen, with immediate full-color feedback as each addition or change is made.

Knowledgeman runs on the IBM Personal Computer, Personal Computer XT and compatible machines using Microsoft, Inc.'s MS-DOS, IBM's PC-DOS or Digital Research, Inc.'s CP/M 86 and MP/M 86 operating systems.

The menu-driven Kpaint supports nearly all standard aspects of Knowledgeman forms design. The forms can be used for screen I/O and for printer output. Each form design can include blocks of color, adding up to 64 foreground/background color combinations.

Kpaint allows a user to define or change the position, colors and size of any color block. A form design can also contain literal and nonliteral form elements.

With Kpaint, a user can define, move, copy, delete and change elements. Nonliteral elements can be directly mapped from data base fields, spreadsheet cells and/or working variables. Pictures for automatic editing and integrity checking can be specified.

All Knowledgeman features and functions are integrated. The standard system includes a relational data manager, third-generation spreadsheet, ad hoc inquiries, screen I/O management, printed forms management, statistics generator and structured programming language.

The standard Knowledgeman package costs $500. The optional Kpaint is an additional $100.

Micro Data Base Systems, P.O. Box 248, Lafayette, Ind. 47902.

APPLIED DATA RESEARCH, INC.
ADR/Data

Applied Data Research, Inc. (ADR) has announced the availability of ADR/Data, the first product in its Genie series software for the Digital Equipment Corp. Professional 300 series microcomputer.

ADR/Data, a relational data management system, is a menu-driven package that provides the capability of joining up to three data files during a session and can be used for entry, updating, retrieval, manipulation and reporting of information, according to a spokesman for the company.

Other packages planned for the Genie series include ADR/Graph, a full-color business graphics package, and ADR/Stats, a statistical analysis

PREV
BAD

IT SPREADS.
CORRUPTS.
ERODES.
DESTROYS INTEGRITY.

Bad data is really bad news. Because it's impossible to get good information from bad data. And once bad data gets into a system, there is no cure. The bad simply gets worse.

There is only one way to guarantee good information: *PREVENT BAD DATA.*

TSI International can do just that. We're the good information specialists. With software designed specifically to make sure your data starts good and stays good. Our products will capture, control and deliver consistently good data to assure nothing but good information. You can depend on it. No one knows more about how to prevent bad data than TSI.

MICROCOMPUTERS

and forecasting product for business applications.

ADR/Data is priced at $600, with quantity discounts available, the spokesman said.

Applied Data Research, CN-8, Route 206 and Orchard Road, Princeton, N.J. 08540.

HYPERGRAPHICS CORP.
Hypergraphics

Hypergraphics Corp. has developed a color graphics software package for the IBM Personal Computer and compatible units that is said to produce animated graphics in 26 colors.

Hypergraphics was designed to store up to 1,000 color graphics screens on a 320K-byte floppy disk and can be used as an authoring language for computer-assisted tutorials, to create stand-up sales presentations and marketing diskettes or as part of other software programs. It can also pick up a screen from another software package that is buffer-stored and convert it to color graphics, the company said.

Hypergraphics requires 128K bytes of random-access memory and runs on any IBM Personal Computer or compatible system. It also can be used on the Apple Computer, Inc. Apple IIe. It works with most color graphics boards and will interface with color graphics printers, the company noted.

The Hypergraphics package costs $395, including user documentation, tutorial disk and two system disks.

Hypergraphics, 1926 Shenandoah Drive, Denton, Texas 76205.

CROMEMCO, INC.
Cromix Version 20.52

Cromemco, Inc. has introduced a new version of the Motorola, Inc. 68000 microprocessor-oriented Cromix operating system that can support more users than previous versions on a Cromemco D series system, with expanded shell buffers and process tables.

The Cromix 20.52, described by the vendor as a Unix-type system, features a device driver that allows random-access memory (RAM) to act as a disk drive.

The Ramdisk device driver, which is implemented in the software, lets users access disk resources significantly faster in multiuser systems. The Ramdisk is an area of system memory that is set aside during system initialization and can then be used as disk storage.

Up to four disk drives in increments of 64K bytes can be allocated in RAM, up to the full 16M-byte RAM capacity allowed by the 68000 microprocessor.

The Cromix 20.52 has 30 shell buffers and 30 process tables; previous versions were allowed a maximum of 10 shell buffers and 10 processor tables. Up to eight users may use the system simultaneously with up to 16 terminals connected to the system, the vendor said.

The product is available on 514- or 8-in. diskettes for $595. Delivery requires 30 days.

Cromemco, P.O. Box 7400, 280 Bernardo Ave., Mountain View, Calif. 94039.

SOFTECH MICROSYSTEMS, INC.
P-system 8087 software upgrade kit

A P-system 8087 software upgrade kit for the IBM Personal Computer, which is said to enable existing P-system application programs to utilize the Intel Corp. 8087 floating point processor, is available from Softech Microsystems, Inc.

The kit allows existing Softech P-system application programs to use the 8087 without any data file conversion or recompilation, the company noted. There are two upgrade configurations available to coincide with the two P-system products available: the Version IV Development System and the Runtime Support System.

Each kit is priced at $20.

Softech Microsystems, 16885 W. Bernardo Drive, San Diego, Calif. 92127.

WESTFORD SYSTEMS, INC.
Micro-Track

Westford Systems, Inc. has introduced Micro-Track, a program for managing and monitoring IBM Personal Computer usage. Micro-Track provides executives with information on how personal computers are being used and who is using them.

Micro-Track runs under IBM's PC-DOS on the IBM Personal Computer and Personal Computer XT. It requires 64K bytes of memory and an 80-char. display; it costs $295.

Westford Systems, 69 Providence Road, Westford, Mass. 01886.

CENTERPOINT COMPUTER APPLICATIONS
Cad from Centerpoint

Centerpoint Computer Applications has introduced Cad From Centerpoint, a picture-drawing program available for the IBM Personal Computer, Apple Computer, Inc. Apple II family and other processors that use the Digital Research, Inc. CP/M 80 operating system.

The product was designed to run

Continued on page 122

DATA

FACETS. Preventing bad data begins with stable database designs. This leading edge design tool assists in all phases of database projects, from information analysis to finished design.

KEY/MASTER. From the moment you capture data, this widely used on-line data entry system helps you screen bad from good — to assure initial and ongoing accuracy.

DATA CATALOG 2. By applying inventory techniques to information, this dictionary system controls your good data — to keep it good.

DATA ANALYZER. As a powerful information center tool for the retrieval and analysis of production data, it will help turn your good data into good information.

DOCU/MASTER. A new way to deliver all your good information — from highly structured data to unstructured text. This on-line information system allows users to query any way they want.

TSI International. The good information specialists. For good data that produces good information, call us at 800-227-3800, Ext. 7005. You can rely on TSI.

TSI International

a company of The Dun & Bradstreet Corporation

157 Danbury Road Wilton, Connecticut 06897

REPORT WRITER
for DEC computers
under RSTS and VMS

- Very powerful and user-friendly
- Better than DEC's Datatrieve
- Costs much less

etc ENTERPRISE TECHNOLOGY CORPORATION

"If you want to do OEM computer business in the U.S., you'd better go to the Invitational Computer Conferences in Boston, Dallas, Minneapolis, Orange County, Washington, D.C., Los Angeles, Ft. Lauderdale, ...We do!"

Experienced marketing management knows that the best way to reach the technical decision maker/buyer is to meet him where he lives and works, demonstrate operating equipment and provide him with the technical information he needs. Over the past 12 years successful marketers have found the Invitational Computer Conferences to be the most cost-efficient, effective method of covering their U.S. computer industry customer base.

The exclusive, one-day, OEM conferences will be held in ten major market areas throughout the United States and are attended by a select, invited audience of OEM's, systems houses and quantity end users. Guests can attend a variety of technical seminars and view operating displays of the newest computer and peripheral equipment. The informal setting makes it easy to meet with potential customers one-on-one and the simple tabletop displays keep exhibit costs at a minimum.

Sept. 13, '83	Newton, MA
Sept. 29, '83	Minneapolis, MN
Oct. 18, '83	Valley Forge/ Philadelphia, PA
Oct. 20, '83	Washington, D.C./ Vienna, VA
Nov. 8, '83	Houston, TX
Nov. 10, '83	Dallas, TX
Jan. 9, '84	Irvine, CA
Feb. 7, '84	Ft. Lauderdale, FL
Feb. 28, '84	Los Angeles, CA
Mar. 1, '84	Palo Alto, CA

For more information:
B.J. Johnson & Associates, Inc.
3151 Airway Ave. #C-2
Costa Mesa, CA 92626
(714) 957-0171

The PC's are coming!

More professionals will attend FOSE '84 than any other office automation conference and expo in America.

FOSE, the largest and most comprehensive program in the nation, has over 3 acres of exhibits on everything pertaining to the total office environment. See the most extensive and in-depth showing of the latest in personal computers and microcomputer systems and software available anywhere.

A day-long PC hands-on session for all conference attendees will feature PC implementation, integration, software, and graphics. In addition, a two-day PC Center will give attendees the opportunity to see and operate dozens of PC systems.

Don't wait. Don't delay. No need to stand in line. New for FOSE '84 is **preregistration.** Send for details on conference sessions plus list of exhibitors or call toll-free

800-638-8510 or 301-459-8383

KEYNOTE SPEAKER

John F. Cunningham, President and Chief Operating Officer, Wang Laboratories, Inc. Leader in office automation.

Mail this to: **FOSE '84,** National Trade Productions, Inc., 9418 Annapolis Road, Suite #206, Lanham, MD 20706.

Please send information for FOSE '84 ☐ conference ☐ exposition

Name _____ Title _____

Organization _____ Div. or Branch _____

Address _____ Mail Stop/Bldg. _____

City _____ State _____ Zip _____

FOSE '84 Washington, D.C. Convention Center March 19-22, 1984

Federal Office Systems Expo

©Copyright 1983, National Trade Productions, Inc.

MICROCOMPUTERS

Continued from page 121

on the Hewlett-Packard Co. 7470 and 7475 plotters, Enter Sweet P and Six Shooter plotters, Mannesmann Tally, Inc.'s Pixy 3 plotter, Amdek Amplot II plotter, Houston Instruments and Apple plotters.

According to the vendor, a user can create, store and plot any shape on the plotter. The documentation explains to the user how to draw the desired shape on the grid.

The program is geared for users who need to create custom shapes, designs, logos, diagrams, layouts or schematics with a plotter.

The program costs $149.

Centerpoint Computer Applications, 500 N. Michigan Ave., Chicago, Ill. 60611.

DATAMATE CO.
Enquery

Datamate Co. has announced an English-language report and query generator for the IBM Personal Computer and compatible systems. Called Enquery, the report writer is said to allow selection and display or printing of data fields from existing application files.

Enquery was designed to allow the user to customize a software system without programming. The program understands standard English words and phrases and automatically formats the report for the user. In addition, Enquery can access existing data files without converting them to a data base, the company said.

Enquery can be used with any computer using Microsoft, Inc.'s MS-DOS or IBM's PC-DOS operating system using RM/Cobol. The Cobol compiler is required for the custom dictionary feature.

The typical price for Enquery, with dictionaries for standard applications, is $950. The customizer option is an additional $500.

Datamate, Department CWB3, Suite 128, 4135 S. 100th East Ave., Tulsa, Okla. 74146.

BMDP STATISTICAL SOFTWARE, INC.
Statcat software package

BMDP Statistical Software, Inc. has announced a 40-program package for data analysis on the firm's Statcat microcomputer.

The 1983 release of BMDP Statistical Software is designed to provide flexible statistical procedures for novices and experienced statisticians and data analysts.

Programs reportedly include data description and screening, linear and nonlinear regression, frequency counts and table analysis, multivariate techniques, nonparametric tests, time-series analysis and additional special techniques.

The software package is now available for lease. There is a one-time, first-year, installation fee of $500 and an annual fee of $50/program with a minimum of 10 programs in a package.

BMDP Statistical Software, 1964 Westwood Blvd., Los Angeles, Calif. 90025.

PRO COMPUTING, INC.
Propel

Pro Computing has introduced Propel, an integrated communications and data and word processing package designed for the Digital Equipment Corp. Professional 350 microcomputer.

The package consists of eight modules: telephone directory with automatic dialing, phone call notebook, answering and message service, word processing, electronic mail, meeting and reading notebooks, spreadsheet and graphics. The package features dedicated function keys, preformatted applications and an on-line Help key for each screen, according to the vendor.

The package runs under DEC's P/OS operating system with 512K bytes of random-access memory.

All eight modules cost $1,195; without the three phone modules, the package costs $950.

Pro Computing, Suite 3314, One Penn Plaza, New York, N.Y. 10119.

ADVANCED SYSTEMS, INC.
Microtutor

Advanced Systems, Inc. has announced a diskette-based computer literacy course for the IBM Personal Computer, the Apple Computer, Inc. Apple II and other microcomputers.

Microtutor reportedly teaches personal computing literacy and applications skills on specific software. It was designed to help management personnel and staff understand and use application software, including financial planning, data base management, word processing, programming, accounting and operating systems.

The company reports that Microtutor is available now for more than 20 popular application software programs.

The price for Microtutor is $80/course.

Advanced Systems, 3340 S. Arlington Heights Road, Arlington Heights, Ill. 60005.

COMPUVIEW PRODUCTS, INC.
Systran

Compuview Products, Inc. has announced a utility program designed to move data between operating systems on the IBM Personal Computer and other microcomputers.

Systran reportedly moves data between Microsoft, Inc. MS-DOS and Digital Research, Inc. CP/M operating systems. It is said to produce readable MS-DOS disk formats from CP/M disk formats. The package is also said to convert data files from CP/M to MS-DOS structures, including MS-DOS 1.1 and 2.0. MS-DOS is not needed on the system, according to the company.

Systran is said to run under Digital's CP/M 86 on the IBM Personal Computer or most other computers using the Intel Corp. 8086 microprocessor.

The Systran disk and manual are available now at a price of $120.

Compuview Products, 1955 Pauline Blvd., Ann Arbor, Mich. 48106.

INTEGRATED SOLUTIONS, INC.
Unix 4.2 BSD

Integrated Solutions, Inc. has announced that its version of the Unix operating system, 4.2 BSD, is available on the company's Motorola, Inc. 68010-based CPU cards.

The vendor said this release of the University of California at Berkeley's 4.2 BSD version of Unix features a fast file system for gains in file system throughput and support for the Defense Advanced Research Projects Agency standard commun-

MICROCOMPUTERS

lication protocols as well as higher level application protocols.

A multiuser license for the Unix 4.2 BSD is priced at $1,395, and a single-user license is priced at $995, according to a spokesman for the vendor.

Integrated Solutions, 1960 Dell Ave., Campbell, Calif. 95008.

REALIA, INC.
Termulator; Spacemaker

Two utility programs for the IBM Personal Computer — a Digital Equipment Corp. VT100 terminal emulator and a file compressor — have been announced by Realia, Inc.

Termulator, a VT100 emulator, interprets all features of the VT100 terminal including the VT52 escape code sequence recognition. In addition, Termulator handles transmission and reception of files, retains the IBM Personal Computer color and graphics capabilities and allows key redefinition. It can be used at transmission speeds up to 9,600 bit/sec, the company said.

Spacemaker is a utility program used to compress executable files on the Personal Computer and run on IBM's PC-DOS operating system Versions 1.1 and 2.0.

Termulator is priced at $95, while Spacemaker costs $75.

Realia, 10 S. Riverside Plaza, Chicago, Ill. 60606.

PERICOMP CORP.
Superfile Backup

Pericomp Corp. has announced the Superfile Backup package designed to back up Digital Research, Inc. CP/M or Microsoft, Inc. MS-DOS operating system files of any size, in hard disk or floppy disk formats.

The menu-oriented package allows user selection of such functions as disk changes, copying, retrieving and purging. Proper file sequence on recovery is enforced by prompts, the company said, and the package will not accept diskettes out of sequence. In addition, backup files are read-only.

A Superfile Backup directory provides listings of files and file segments on each backup diskette.

Superfile Backup is priced at $49.95, with quantity discounts available.

Pericomp, 14 Huron Drive, Natick, Mass. 01760.

RADIO SHACK
Micro Color Compac

Radio Shack has introduced the Micro Color Compac, a program that is said to allow its TRS-80 Micro Color Computer Model MC-10 to communicate by telephone with information services such as Compuserve Information Service or Dow Jones information.

Micro Color Compac is a machine language program on cassette tape that gives the user access to news, weather, sports, electronic mail and personal computing services offered by Compuserve, as well as the current market quotes, financial statistics and transcripts of the Public Broadcasting Service television program *Wall Street Week*, information that is available to the Dow Jones service's subscribers.

Communications protocols are set by the user, but the setting must match those of the computer system with which the MC-10 is communicating. Protocol options include communications rates of 110, 300 or 1,200 bit/sec; half or full duplex; word length of 7 or 8 bits; automatic line feed on or off; and text display of either upper and lowercase or uppercase only.

The program costs $29.95 and is available through Radio Shack computer centers and dealers.

Radio Shack, 1800 One Tandy Center, Fort Worth, Texas 76102.

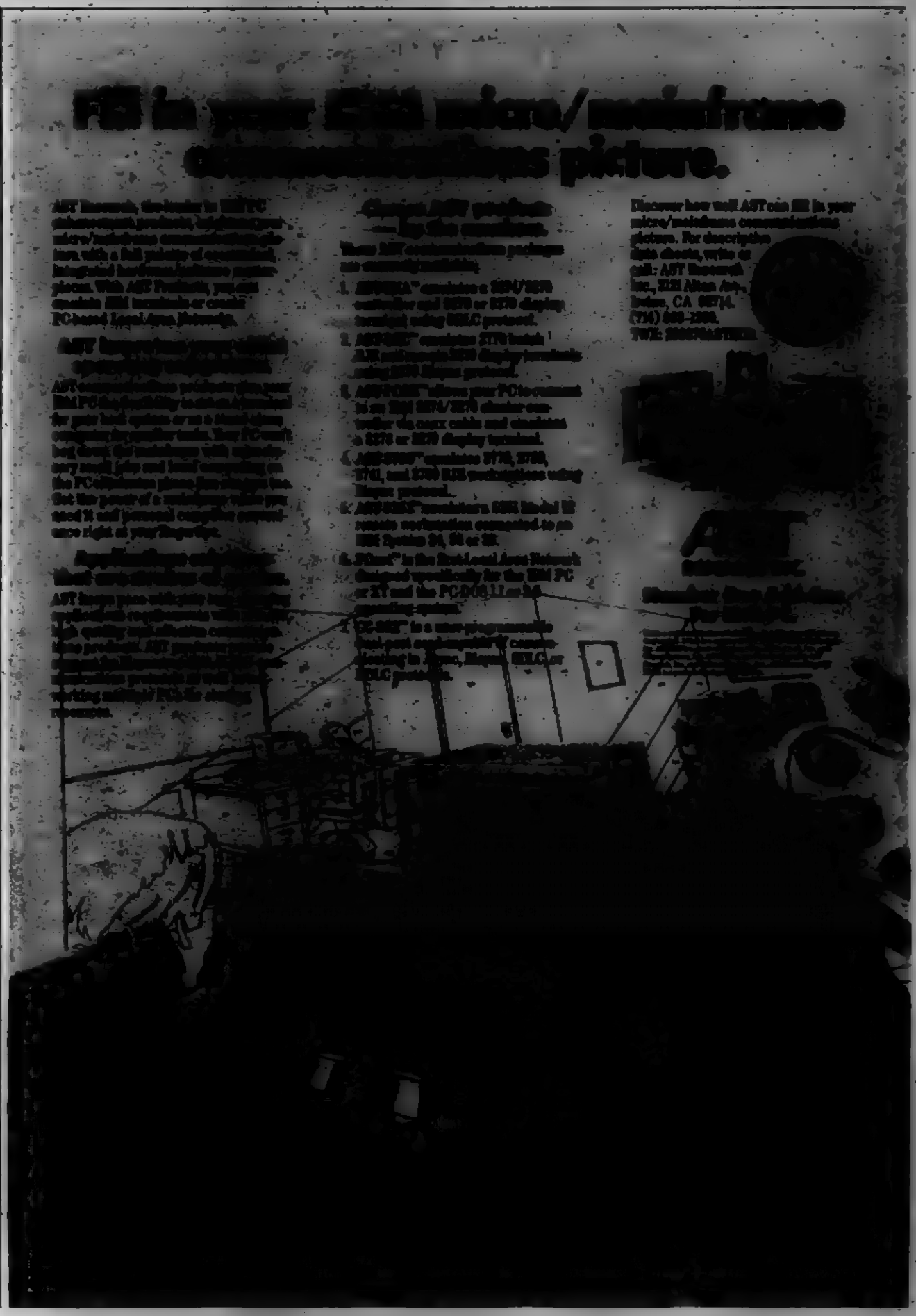
NEW ERA TECHNOLOGIES, INC.
Mist+

New Era Technologies, Inc. (NET) has announced Mist+, an integrated communications package for the IBM Personal Computer.

Designed to work with the Hayes Microcomputer Products, Inc. Smartmodem, Mist+ is also suitable for the IBM Personal Computer XT and compatible systems.

Mist+ includes communications links for most popular on-line services. The program can connect to one of these services on-line or in unattended mode, send and receive files, search on-line

Continued on page 126



MICROCOMPUTERS

Continued from page 122

data bases, disconnect or initiate another session with a different computer, the company explained.

Mist+ can also use interactive routines to gather additional information from the user, such as names of persons to whom the message is to be sent, what data base to search, what keywords to use and the name of the file in which the search results should be recorded. All telecommunications parameters are set, and all host commands are transmitted automatically by Mist+ routines, the company said.

The Mist+ system also allows a Personal Computer to be used as a remotely accessible host that permits the user of any dumb terminal, microcomputer or word processor to retrieve files, compose, send and store messages. A multilevel password system supports up to 900 users.

An optional text-oriented data base management system is also available.

Mist+ is priced at $295 or $495 with the data base option. Along with the release of Mist+, NET has reduced the price of its Digital Research, Inc. CP/M operating system version of Mist to $225 and $375 with the data base option.

NET, Suite 934, 2025 I St. N.W., Washington, D.C. 20006.

MANAGEMENT ANALYTIC SUPPORT, INC.
Cope

Management Analytic Support, Inc. has announced Cope, a system for solving linear and integer programming problems on a microcomputer.

According to the vendor, the Cope microcomputer package is based on the mainframe version previously available on Digital Equipment Corp.'s VAX-11 minicomputers, the DEC 20 and Hewlett-Packard Co.'s HP 3000 series systems.

Cope incorporates features such as optional narratives, prompts and a self-teaching tutor to walk the user through the system's procedures.

The initial implementation is available for the Sage Computer Technology Sage microcomputer, configured with Digital Research, Inc.'s CP/M 86 operating system.

Cope is configured for three ranges of applications: 40 constraints by 80 variables retails for $335; 80 by 200 is $465; and 150 by 300 is $685.

Management Analytic Support, 6836 Dean Drive, McLean, Va. 22101.

ON-LINE BUSINESS SYSTEMS, INC.
Wylbur/PC

On-Line Business Systems, Inc. has introduced Wylbur/PC, a program development package for the IBM Personal Computer.

Wylbur/PC features screen layout control for panel design and menu display, background and foreground color control and the capability to communicate with mainframe software products, the vendor said. The communications capability is programmable and can run automatically.

A full screen editor features four-way scrolling, global search and replace functions and 400 possible function-key definitions, according to the vendor.

Wylbur/PC requires 128K of random-access memory. There is a version that runs on mainframe computers.

A demonstration diskette costs $10, while the complete program sells for $550.

On-line Business Systems, 115 Sansome St., San Francisco, Calif. 94104.

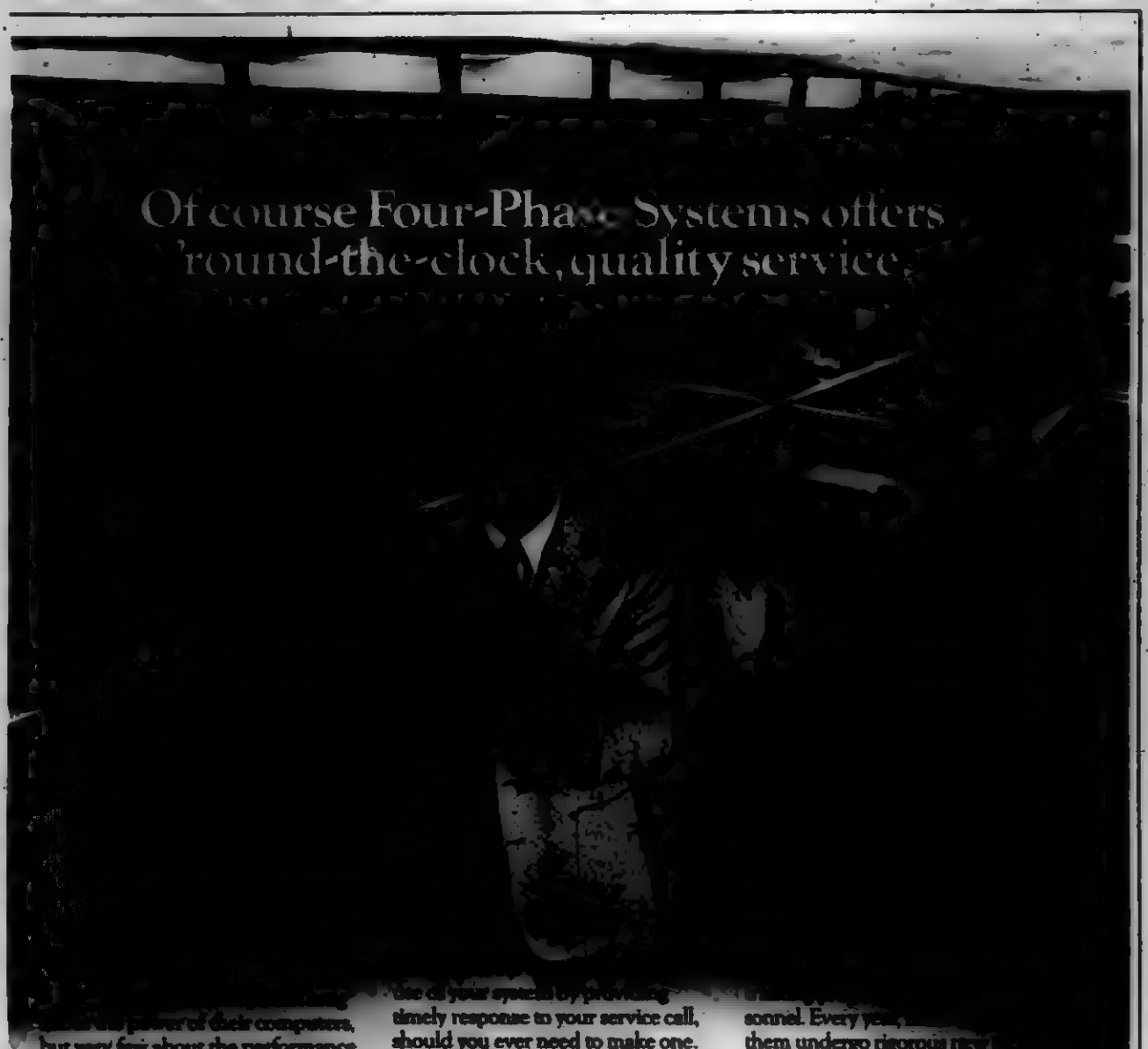
MICRO COURSEWARE CORP.
Computer Tutor 150

Micro Courseware Corp. (MCC) has announced a front-end tutorial package that is being bundled with the Hewlett-Packard Co. HP 150 personal computer.

Computer Tutor 150 reportedly uses interactive learning modules to introduce users to the HP 150 hardware, the system's touch feature and the applications manager that explains the operating system and application software.

The tutorial includes examples of software applications, a glossary of microcomputer buzzwords and educational games to reinforce comprehension, according to a spokesman for the company.

The package was customized by MCC for Hewlett-



...power of their computers, but very few about the performance of their service. They make a lot of noise about their hardware and software, but when it comes to service, they clam up, or promise what they can't deliver. Let's face it, very few companies have the resources to offer both a quality product and quality service.

Four-Phase Systems does.

We recognize and appreciate the trust you place in us when you purchase a Four-Phase computer system. And to preserve that trust we have invested millions of dollars in the development of our Field Engineering Operations Center. Its ...ize on your system by providing timely response to your service call, should you ever need to make one.

Our Field Engineering Operations Center functions as a centralized service, communications and dispatching facility. The Center is staffed by highly trained, qualified personnel and operates 24 hours a day, every day of the year. Its data base includes your entire equipment service history. The Center uses the latest computer and telecommunications technology to help get the right Field Engineer to the right place with the right parts and equipment. We maintain over 175 field service locations throughout North America.

We make further major investments in our level of excellent service ...sonnel. Every ye... them undergo rigorous re... ogy training at our Education Center in Dallas, Texas. More proof that we provide the kind of service you'd expect for a business computer system.

Yes, very few offer this kind of 'round-the-clock, quality service. But fortunately for you, with Motorola and Four-Phase Systems together, you can be sure of two things—quality products and quality service. Together, they make selecting a computer company a lot easier. For more information, just call us at 1-800-528-6050. Or write to 10700 North De Anza Blvd., Cupertino, CA 95014. M/S 52-10A7.

Motorola and (M) are registered trademarks of Motorola, Inc. Four-Phase and the Four-Phase logotype are registered trademarks of Four-Phase Systems, Inc.

MOTOROLA INC. Information Systems Group

Four-Phase Systems The Office Automation Company

SEE US AT THE OFFICE AUTOMATION CONFERENCE, LOS ANGELES, BOOTH 536.

MICROCOMPUTERS

Packard.

The HP 150 is available now with Computer Tutor 150, according to the company spokesman.

Suggested retail price of the HP-150 is $3,995.

Micro Courseware, 4444 Geary Blvd., San Francisco, Calif. 94118.

COMPU-DRAW SOFTWARE HOUSE .Rel/m

Compu-Draw Software House has introduced .Rel/m, a package of programs for maintaining and organizing user-generated, relocatable object code libraries that use the .Rel file format.

The programs, comprised of Library Cross Reference (LX) and Library Sequencer (LS), run under the Digital Research, Inc. CP/M operating system with 32K bytes or more memory and one or more disk drives. LX is priced at $59; LS is $99. Both programs may be purchased for $129.

Compu-Draw Software House, 1227 Goler House, Rochester, N.Y. 14620.

MANAGEMENT INFORMATION SYSTEMS Tempus-Link

Management Information Systems has announced Tempus-Link, a mainframe and personal computer package that allows the user to format IBM's Vsam files onto virtual floppy diskettes.

According to the vendor, the IBM Personal Computer can store up to 15M bytes of data per file and access that data as if it had real diskette drives.

Tempus-Link runs under IBM PC-DOS 1.1 and 2.0 as well as Microsoft, Inc.'s MS-DOS on the IBM Personal Computer and Personal Computer XT. Controlling the software are MVS, VSE and CICS/VS 1.5 and 1.6. Most Personal Computer-to-mainframe communications are supported, the vendor said.

An entry-level system retails for $995.

Management Information Systems, 376 Moody St., Waltham, Mass. 02154.

HAYDEN SOFTWARE CO. Writer; Speller; Producer; Calendar

Hayden Software Co. has introduced its productivity line of professional software, the Writer, the Speller, the Producer and the Calendar.

The Writer, a word processor, and the Producer, a computer slide show producer, are currently available for the Apple Computer, Inc. Apple. The Calendar, an appointment calendar, and the Speller, a spelling checker, are for the IBM Personal Computer.

Prices are as follows: Writer, Apple II, II+, IIe, $59.95; Speller, IBM Personal Computer or compatible, with 64K bytes of memory, $49.95; Calendar, IBM Personal Computer or compatible, with 128K bytes of memory, $49.95; and Producer, Apple II, II+, IIe, $99.95.

Hayden Software, 600 Suffolk St., Lowell, Mass. 01853.

MARK OF THE UNICORN, INC. PC/Intercomm on Z100

Mark of the Unicorn, Inc. has announced that its PC/Intercomm now operates on the Zenith Data Systems Corp. Z100 microcomputer.

PC/Intercomm lets the Z100 emulate Digital Equipment Corp.'s VT100. With PC/Intercomm, Z100 users can talk to DEC host minicomputers and run full screen applications programs.

PC/Intercomm has 30 programmable function keys and operates under 128K bytes of memory with one disk drive and an RS-232 Ascii communications port. The product is priced at $99.

Mark of the Unicorn, 222 Third St., Cambridge, Mass. 02142.

MEGAHAUS CORP. Megawriter version

Megahaus Corp. has released an updated version of Megawriter, a word processor with mail merge, for the Apple Computer, Inc. Apple II and IIe microcomputers.

According to the vendor, the Megawriter comes complete on a single disk. Improvements include a faster boot time, adjustable tabs and the ability to read and write both Apple DOS files and Pascal files. Megawriter costs $99.

Megahaus, 5703 Oberlin Drive, San Diego, Calif. 92121.

See SOFTWARE page 126

It's time the technology of data collection caught up to the technology of data processing.

The speed of your data processing is limited by the speed of your data collection and input. Unfortunately, for a lot of people, data collection technology stopped with the development of the clipboard.

But MSI has changed all that.

Because MSI portable data collection systems are microprocessor-based answers to multipart forms. They actually extend the power of your central computer by allowing data to be keyed in right in the field. And then transmitted over ordinary phone lines to a host computer or data processing center.

MSI systems eliminate paper shuffling, keypunching, and errors by collecting data at its source. At the same time, we return control to the data processing department, eliminate costly time delays, and match the sophistication of your central system with our equally sophisticated remote system.

Our family of hand-held terminals can be used anywhere there's data to be collected. For salesman order entry, inventory control, financial reporting, manufacturing control, and field data collection tasks of all kinds.

Learn how MSI data collection products can bring your system to the peak of its capabilities. Just return the coupon.

You'll find the technology of data collection is right where you want it.

MSI Data Corporation
340 Fischer Avenue
Costa Mesa, CA 92626

I am interested in:
☐ A sales presentation
☐ Product literature

Name/Title_____
Company_____
Address_____
City_____ State_____ Zip_____
Telephone_____
Computer_____

MSI DATA CORPORATION

The world leader in portable data collection systems.

SOFTWARE from page 125

O'HANLON COMPUTER SYSTEMS, INC.
Sensible Solution 2.0

O'Hanlon Computer Systems, Inc. has announced Version 2.0 of the Sensible Solution, a data base management system and procedural programming language.

The vendor said Version 2.0 is 50 times faster than the original version in calculations and string handling. The speed is now comparable to other major languages, such as C, and is faster than Cobol or Pascal.

Sensible Solution 2.0 costs $695.

O'Hanlon Computer Systems, 11053 Main St., Bellevue, Wash. 98004.

NEC INFORMATION SYSTEMS, INC.
Packages for NEC Advanced Personal Computer

NEC Information Systems, Inc. has announced agreements with Microsoft, Inc. to market its Microsoft Pascal Compiler and with Context Management Systems, Inc. to use the Context MBA integrated software package, both for use with the NEC Advanced Personal Computer, according to NEC.

The price for the Context MBA software package is $695.

The Microsoft Pascal Compiler is priced at $495, a NEC spokesman said.

NEC Information Systems, 1414 Massachusetts Ave., Boxborough, Mass. 01719.

NEC INFORMATION SYSTEMS, INC.
Software for Advanced Personal Computer

NEC Information Systems, Inc. has announced an expanded range of software packages that run under Microsoft, Inc.'s MS-DOS operating system for its Advanced Personal Computer.

Applications and their prices include the following: Metasoft Corp.'s Benchmark Word Processor, $495, Benchmark Telecommunicator, $95, and Benchmark Mailing List Manager, $195; Chang Laboratories, Inc.'s Business Planner, $495, Spreadsheet/Planner Upgrade, $350, Consolidator, $295, and Spreadsheet, $195; Ashton-Tate's Dbase II, $695, Binynch-86/3780 and 3270 emulators, $950.

NEC Information Systems, 1414 Massachusetts Ave., Boxborough, Mass. 01719.

"Best seminar I attended on payroll/personnel systems!"

Free seminars. Intel has been giving free seminars to payroll, personnel, and data processing professionals since 1968. Just three years after we developed the first human resource system ever. And we've been getting more sophisticated ever since.

Come to a free seminar and learn how Infinite Payroll/Personnel System can dramatically improve the productivity of your human resource functions.

Run software even on IBM and IBM-compatible mainframes, and operates under the DOS/VS-1, ADABAS, and IDMS database management systems, as well as non-database environments.

To register, call Christine Hanover at (201) 391-1900.

Seminar Schedule					
State	City	Date	State	City	Date
Alabama	Huntsville	March 6	Ohio	Cincinnati	February 29
California	Anaheim	March 13		Columbus	February 16
	San Jose	March 8	Oklahoma	Tulsa	March 13
	Santa Monica	February 22	Pennsylvania	Pittsburgh	February 23
Colorado	Denver	February 28	South Carolina	Greenville	February 22
Dist. of Columbia	Washington	February 16	Texas	Dallas	February 15
Florida	Miami	March 20		Houston	February 23
Illinois	Chicago	February 23		San Antonio	March 8
Indiana	Indianapolis	March 1	Virginia	Richmond	February 28
Kentucky	Louisville	February 16	Wisconsin	Milwaukee	February 29
Louisiana	Baton Rouge	March 22			
Maryland	Baltimore	March 14	Canada	Toronto, Ontario	March 1
Massachusetts	Boston	March 8			
Michigan	Grand Rapids	February 21			
Minnesota	Minneapolis	February 15			
Missouri	St. Louis	March 23			
Nebraska	Omaha	March 7			
New Jersey	West Orange	March 6			
New York	New York	February 24			
North Carolina	Charlotte	March 14			

Intel

AMDEK CORP.
Driver for Amplot II

Amdek Corp. has announced a driver for the Amplot II, a six-color X-Y coordinate plotter.

According to the vendor, the driver is currently available free to users of either Lotus Development Corp.'s Lotus 1-2-3 or Amplot II, a microprocessor-intelligent plotter that accepts Ascii commands. Amplot II has built-in software for arc and circle generation, windowing and other functions. It has RS-232C and 8-bit parallel interfaces.

The Lotus 1-2-3 was developed specifically for Amdek's plotter. The 10-in. by 14-in. plotting range, automatic pen selection and pen speed make it applicable for business graphics or engineering applications, the vendor said.

The suggested retail price of the Amplot II is $1,099.

Amdek, 2201 Lively Blvd., Elk Grove Village, Ill. 60007.

VOICE OPERATED COMPUTER SYSTEMS
Mopi

A software development package that is said to allow each user to define his own set of instructions has been developed by Voice Operated Computer Systems (Voca).

Called Mopi, the assembler/compiler contains the basic elements from which assembly language-type instructions can be defined. Designed as a universal cross-assembler, Mopi is capable of generating the machine code for any 8-bit microprocessor, the company said.

Currently available for use with Digital Research, Inc.'s CP/M 80 operating system, Mopi can be modified for use with other systems as well. The software is supplied under a license agreement for $150.

Voca, P.O. Box 3705, Minneapolis, Minn. 55406.

OMTOOL CORP.
Softbol release

Omtool Corp. has announced a release of its business language, Softbol, that is said to allow users of the IBM Personal Computer, as well as computers that support Microsoft, Inc.'s MS-DOS and IBM's PC-DOS, to run all of the business applications written for Digital Equipment Corp.'s commercial language Dibol.

"Softbol is a business language that includes a compiler, interpretive runtime system, symbolic debugger, indexed key file system and sort utility.

Softbol, priced at $400, is also available for other operating systems, including Unix, Microsoft's Xenix, Digital Research, Inc.'s CP/M 80 and CP/M 86.

Omtool, P.O. Box 477, Tewksbury, Mass. 01876.

COURSEWARE, INC.
PC Master

Courseware, Inc. has announced that its self-learning software package for the IBM Personal Computer and Personal Computer XT has been enhanced to include sections for

Continued on page 128

What full service customers do for their customers. What Zilog do for our

FULL SERVICE

Service from Zilog Systems Division is provided at every level – local, regional and national.

In addition, Zilog offers you a variety of support programs to help you maintain the performance and productivity of your System 8000.

C2-6, Campbell, CA 95008

MICROCOMPUTERS

Continued from page 120

IBM's PCjr home computer.

PC Master includes three dialects of computer instruction, including computer graphics.

The product is available under PC-DOS 2.1 for the IBM PCjr and under PC-DOS 1.1 and/or 2.0 for the Personal Computer and XT.

The enhanced version of the PC Master is priced at $79.50.

Courseware, 10075 Carroll Canyon Road, San Diego, Calif. 92131.

SOFTWARE MANUFACTURERS, INC.
S-Tran; Spectrum

Software Manufacturers, Inc. (SMI) has announced two products designed for software development under the Unix operating system.

S-Tran is a translator that produces source C language statements from popular versions of Basic. Spectrum is a set of application modules available in C.

With S-Tran, Basic programs are transferred into a file on a Unix-based system and then translated as a group by using a single command. S-Tran's runtime package, required to run all translated programs, also reportedly serves as a development tool.

The products are available for 8-, 16- and 32-bit machines from Altos Computer Systems, Inc.; Codata Systems Corp.; Plexus Computers, Inc.; NCR Corp.; and Zilog, Inc.

The S-Tran translator is available for a one-time license fee of $1,500, and the runtime package costs $300 per machine. Spectrum modules are priced at $595 for general ledger; $795 for accounts receivable; $595 for accounts payable; $595 for payroll; $895 for wholesale distribution; and $995 for manufacturing.

SMI, 4009 Pacific Coast Highway, Torrance, Calif. 90505.

SAMNA CORP.
Samna Word II Version 1.1

Samna Corp. has introduced an updated version of Samna Word II, its word processing software package for the IBM Personal Computer, Personal Computer XT and compatible processors.

According to the vendor, Version 1.1 includes mail/merge and free-form line drawing and offers support for more character and matrix printers.

Samna Word II is compatible with software packages such as Lotus Development Corp.'s Lotus 1-2-3 and Ashton-Tate's Dbase II. It runs under Microsoft, Inc.'s MS-DOS Versions 1.1 and 2.0.

Version 1.1 costs $450.

Samna, Suite C-1200, 3700 N.E. Expwy., Atlanta, Ga. 30345.

UNIQ COMPUTER CORP.
Unicalq

Uniq Computer Corp. has announced that its Unicalq virtual memory spreadsheet package is now available for use with AT&T Technologies, Inc.'s 3B20 32-bit microcomputer under the Unix System V operating system.

The Unicalq system was previously available on Digital Equipment Corp.'s VAX-11 and PDP-11 series processors, according to Uniq.

A vendor spokesman said the spreadsheet system offers a user-transparent virtual memory mode in which more than 32,000 rows and columns can be used.

The spokesman said that individual spreadsheets can be linked to share data and that Unicalq includes a file encryption feature employing passwords for access to sensitive files. The Unicalq package is priced at $2,500 for the AT&T Technologies 3B20 micro under Unix System V.

Uniq Computer, 26 S. Water St., Batavia, Ill. 60510.

PERSONAL CAD SYSTEMS, INC.
Cadplan

Personal CAD Systems, Inc. has introduced a software package that gives computer-aided design capabilities to IBM Personal Computers and compatible systems.

Cadplan features menu-driven commands, including zoom, pan, copy, move, rotate, delete and undo. It is suited for two-dimensional design applications, a spokesman said.

Cadplan costs $1,200; an optional data base extraction sells for $350.

Personal CAD Systems, 15425 Los Gatos Blvd., Los Gatos, Calif. 95030.

Our graphics you to your

ISSCO graphics software supports more than 200 output devices from nearly 50 manufacturers.

That's right. Over 200 different terminals, plotters, printers and film recorders. And the number keeps growing as important new ones are introduced.

Only ISSCO lets you choose from such a wide range. You can mix and match computers and output devices for the best fit. And you'll protect your software investment from becoming obsolete when new items appear.

What's more, ISSCO gives you Layout Intelligence that automatically formats your graphics to fit the device used. Plus Device Intelligence that automatically takes advantage of each device's special features.

But device freedom isn't all. ISSCO software also works with many different mainframe and 32-bit minicomputers from Apollo, Burroughs, CDC, Cray, DEC, Honeywell, HP, IBM, Perkin-Elmer, Prime and Sperry.

Once you've seen ISSCO software in action, you won't want to use anything else.

TELL-A-GRAF® MAKES QUALITY GRAPHICS EASY.

ISSCO's TELL-A-GRAF software allows users to quickly make professional-quality charts and graphs themselves. Since it uses conventional English commands, it's easy to learn. In no time you'll be making beautiful line, bar, pie and word charts. Adding CUECHART™ lets completely untrained people generate high-quality TELL-A-GRAF plots.

DRIVES from page 107

Jonos Ltd. plans to use 3½-in. drives in its portable computer. Several Japanese companies, including Mitsubishi Corp., began designing 3-in. drives in Japan and 3½-in. in the U.S., indicating that they don't expect 3-in. drives to be successful in the U.S.

What will happen to the non-3½-in. drives? "There is really no hope for the other formats. The 3½-in. drives will be the standard," Christiansen said.

But other analysts disagree with his assessment. "Non-3½-in. drive manufacturers are stubbornly promoting their drives," Porter said. "There is a possibility that more than one size could be adopted."

Apple's primary microcomputer rival may help provide additional sizes. "While the 3½-in. drive is clearly gaining momentum, the question remains, 'What will IBM do?' " Porter said.

Analysts linked IBM's 4-in. drive to the PCjr. Since that drive was slower, had less capacity and was more expensive than other drives, IBM dropped production plans. "IBM's 4-in. drive was a dinosaur," Christiansen said.

"I think IBM will use a micro floppy drive with its portable computer," Porter said. "I think it will be a 3½-in. drive, but I don't expect to see [it] until next year."

For users, the smaller drives bring the problem of transferring data between 3½-in. and 5¼-in. disks. "The easiest way to transfer data is with communications software," Porter said. This is easy only if one has communications software for both the computer with the 3½-in. drive and the microcomputer using a 5¼-in. drive and the knowledge, desire and time to transfer data.

Gavilan offers a $595 software and cable option that transforms 3½-in. data files to 5¼-in. files. "It is designed for the user who gathers data in the field, but uses it with a desktop computer at home or in the office," Daniel said.

Micro floppy drives will not replace 5¼-in. drives overnight, observers say. It wasn't until 1981 that more 5¼-in. drives were shipped than 8-in. drives.

PICK from page 107

the comparison ends there. Unix has built a dedicated following among programmers who appreciate its multitasking and dictionary facilities. However, Unix is not generally considered to be a "user-friendly" operating system.

Pick, on the other hand, is dictionary-driven with a relational data base manager and a query language that users say is quite appropriately titled "English."

"It's a true user-friendly system," said Dan Rothstein, senior vice-president of Addept Systems Corp., a Santa Clara, Calif.-based vendor of Pick-based applications. "Pick's executable language is mostly Basic. The user has almost no restriction on what he can access in the data base. It's a variable-length record, field and file system, and it has a very good virtual memory system. It places practically no restrictions on the size of the CPU."

Large CPUs

But that doesn't mean Pick isn't appropriate on large CPUs. The Ultimate machine, which is basically a Honeywell, Inc. DPS 6 minicomputer, contains up to 2M bytes of main memory and 1G byte of mass storage. Systems Management, Inc. (SMI) of Rosemont, Ill., also offers Pick on IBM's 4321 and 4331 processors as well as on IBM's CS 9000 multiuser workstation supporting over 21 users and up to 4M bytes of main memory.

Robert Milligan, SMI's vice-president of sales, said Pick enjoys a body of about 15,000 users and is now offered by a dozen vendors. However, he doesn't see IBM releasing its own version of Pick.

"I think they would like to promote a number of operating systems but wouldn't want to do it themselves," he said.

No matter how IBM makes the system available, Milligan believes the endorsement would be a marketing coup. "The beauty of Pick is that it's got an incredible amount of software written for it," he said. "It would be a good weapon against [Apple Computer, Inc.] because so much good software runs on Pick, and Apple doesn't run Pick."

software leaves own devices.

THE DATA CONNECTION™ GETS ALL THE DATA.

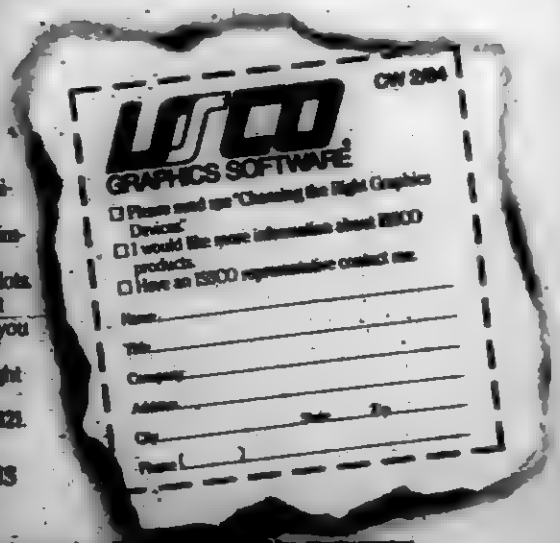
By combining TELL-A-GRAF and THE DATA CONNECTION, users can access data directly from their computers for conversion to graphics. THE DATA CONNECTION can summarize, tabulate, edit and perform mathematical manipulation to put data into the best form for graphing.

DISSPLA® CAN DO IT ALL.

"With DISSPLA software, almost anything is possible. This high-powered product is a library of over 400 subroutines that facilitate data plotting. Business and scientific programmers use DISSPLA to produce everything from simple pie, bar and line charts to sophisticated 3-D diagrams, maps and contour plots.

Shouldn't you be using software that gives you great graphics, but still leaves you to your own devices? For a free copy of our 40-page manual, "Choosing the Right Graphics Devices," write ISSCO, 10505 Sorrento Valley Road, San Diego, CA 92121. Or call (619) 452-0170.

DRAW FASTER CONCLUSIONS WITH ISSCO.



DSS from page 107

the analytical staff, due to automation of time-consuming tasks, such as report and graphics production.

The opportunity for more consistent analyses, because the analyst can exercise models for virtually an infinite variation of conditions without incurring large processing charges.

The opportunity for more efficient use of computer resources by distributing the work load between the organization's main computer and the micro workstation.

The ability to maintain data and models in a more controllable environment.

The last point is important from the standpoints of both operations and security. In the planning and forecasting areas, the ability to duplicate the results of an earlier analysis' results is very desirable, if not vital.

Further, micros can afford an additional level of security for proprietary models and data, especially when maintained in a secure office and when they lack the ability to be accessed via telephone. Sensitive data and programs can be kept on floppy disks, which can be locked up when not in use.

Despite the many capabilities of the micro, there remain several limiting factors to its use. In a decision support environment, there are four major disadvantages to using micros:

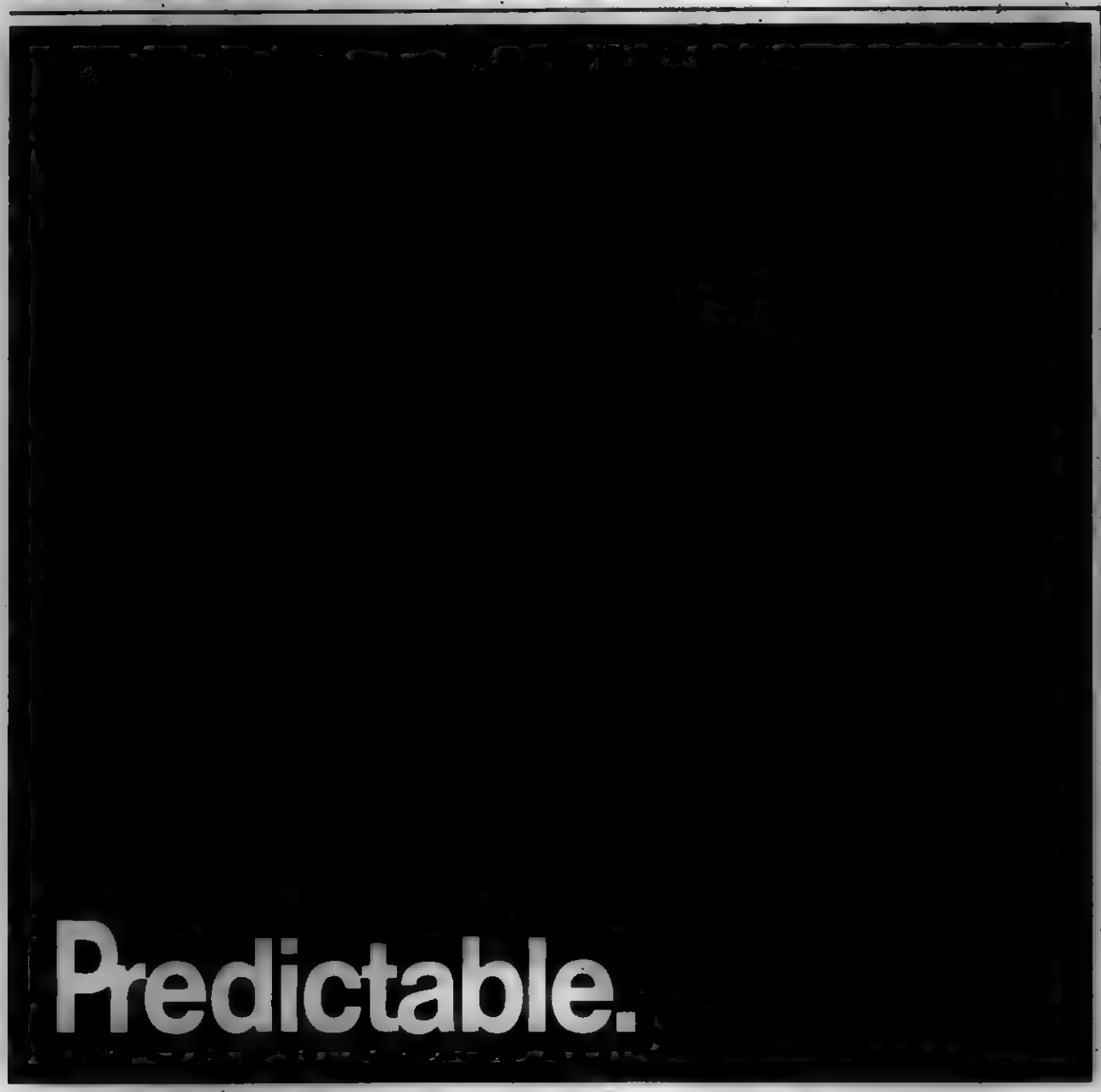
- The availability of DSS software is limited, so more sophisticated analyses must be programmed. Business analysts often develop their models in terms of a system of equations and may have difficulty translating their conceptual models to a spreadsheet program.
- Even in hard disk configurations, micros have limited disk storage capabilities, so manipulation of source data or maintenance of data bases may not be practical.
- Integration of functions is generally lacking in current micro software offerings. It is often difficult, for example, to use a word processing package and a graphics package together, due to differing file formats and/or data representation.
- The perennial problem: Users may fear, dislike or distrust computers. There are additional factors which must be taken into account when developing DSS software for micros. For example, routines that are I/O-intensive are generally slow on micros due to the lack of intelligent I/O channels.

The amount of usable memory, and thus the size of an executable module, is limited and requires the developer of large programs to use partitioning or overlay strategies.

Microcomputers offer the business analyst and decision maker a level of capability and flexibility today that was in the realm of science fiction only a few decades ago. The micro workstation affords its user a viable alternative for DSS over some mainframe processing; however, it does not come without concessions.

The utilization of mainframes for sophisticated processing, data bases, data reduction and analysis is — and will continue to be — an economical DSS solution.

Regan is a technical sales representative at Boeing Computer Services Co.



A flawless future is in sight with 3M diskettes.

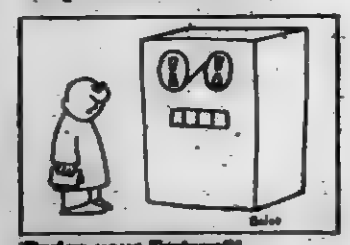
When it comes to keeping track of precious data, predictable means reliable. Being able to count on every diskette, every time. At 3M, reliability is built into every diskette. We've been in the computer media business for over 30 years. And we've never settled in. We're constantly improving and perfecting our product line, from computer tape and data cartridges to floppy disks.

3M diskettes are made at 3M. That way, we have complete control over the entire manufacturing process. And you can have complete confidence in the reliability of every 3M diskette you buy.

Look in the Yellow Pages under Computer Supplies and Parts for the 3M distributor nearest you. In Canada, write 3M Canada, Inc., London, Ontario. If it's worth remembering, it's worth 3M diskettes.

3M hears you...

3M



'Parlez-vous Fortran?'

COMPUTER INDUSTRY

IBM system news may erupt soon

INDUSTRY INSIGHT

BILL LABERIS
CW Senior Editor

Interesting rumblings are emanating from deep within the IBM chasm, all pointing to an unexpected announcement, perhaps in the next few weeks.

Asked about the rumblings, Charles Greco, who keeps his ear close to the ground at International Data Corp. (IDC) in Framingham, Mass., said Feb. 28 or 29 will bring a 3083 announcement, one that will put a bit more distance between the 3083 series and the 4381, announced last September but not shipped in volume yet.

Greco speculated that Big Blue will unveil one to three processors in a so-called "prime" series, namely 3083 E', B' and J', each offering 10%-plus more horsepower than the previous high-end 3083s.

Why the speculation? Greco said IBM had shut down part of its 3080 series production line in the fourth quarter, prompting two things: a slowdown in 3080 shipments and speculation that the Sierra series mainframe — the successor to the 3080 series — would be announced earlier than expected.

However, Greco said, the hounds were thrown off the true scent by this alleged action, as the 3083 enhancements are what IBM really had in mind. Growing that series at the high end would also make it possible for IBM to enlarge its 4381, upgrading to a Model 3 capable of operating in the 4 million instructions per second range, Greco said.

IDC and Greco are also calling for a February announcement of a 3420 tape drive successor, a stackable model with individual units coming in boxes much smaller than the 3420. This will be good news to Storage Technology Corp., which is believed to have its 3420 successor waiting in the wings. It will remain there until an IBM announcement so that STC can ensure that its box will have all the necessary guts to be truly compatible with the IBM version.

See IBM page 144

Recovery challenges vendors

By Robert Batt
CW West Coast Bureau

MENLO PARK, Calif. — The increasingly strong demand for data processing products and peripherals is bringing in its wake a new set of management problems for the leading computer manufacturers and users.

As with all economic recoveries, those problems have been made manifest particularly in the labor area, with companies which only a few months ago were cutting back on recruitment and hiring now facing an acute shortage of people.

"There is a kind of desperation in the marketplace. A short while ago, departments were hiring only one or two people in special categories. Now they are faced with hiring 10 or more people in many areas at the same time," commented Rod Asher, a DP headhunter based in Los Angeles.

A case in point is Santa Clara, Calif.-based National Semiconductor Corp. The company, which two quarters ago was reporting weighty operating losses and laying off workers, is now looking to employ 1,100 new people in its facility.

In Silicon Valley, 8,200 jobs have been added in the electronics and computer field since last April, according to state labor figures. In December alone, 1,300 people were added to the industry's employment total. Santa Clara County, which forms the heart of Silicon Valley, now has almost 175,000 — one out of four employed people — working in computer-related industries.

According to the California State Employment Development Department in San Jose, employment in the electronics area began declining in September 1982 and continued dropping for about six months. However, by the end of 1983, employment in this sector had grown by almost 4% for the year as a whole, and the department said it expects it to grow even more quickly in 1984.

Advertising is another indicator of the upswing that is taking place. The recent "Jubilee Edition" of the *Los Angeles Times*, for example, contained 450 columns of advertisements for software development engineers, IBM Cobol programmers and DP personnel, including computer operators. This was 10 times bigger than any other industry advertisement

See JOBS page 132

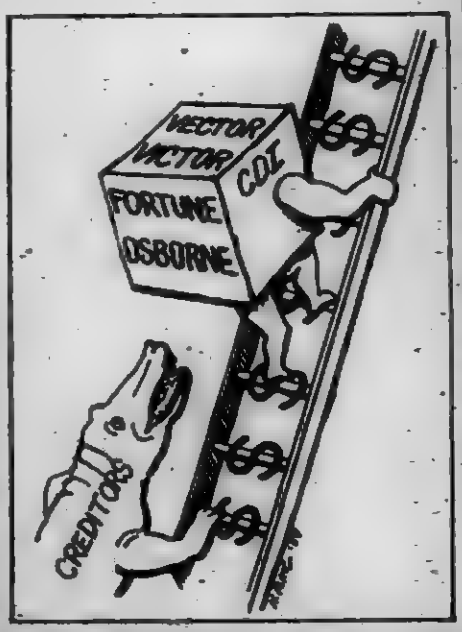
Reorganization seen way of life for micro makers

By Patricia Keefe
CW Staff

A rocky 1983, which saw at least two bankruptcy filings and heavy financial losses among a number of microcomputer vendors, has prompted a series of actions designed to right the corporate ships, including personnel overhauls at the executive level, a refocusing of marketing efforts and a search for the financial aid necessary to sustain the companies until they get back on course.

In several cases, a lack of professional management and financial accounting skills initiated the woes of the founding

See LOSS page 148



apple

Apple followed its recent Macintosh and Lisa introductions with a management and product line reorganization/**140**

amdahl

Amdahl's booming high-end mainframe sales flattened the bottom line in 1983/**142**

INSIDE

■ Facing a hostile takeover bid from a dissident shareholder, MAI fights back with a lawsuit/**139**

■ Electronics industry reps have proposed their own brand of tax legislation for treating overseas sales/**142**

■ A federal court rules against labor in a dispute concerning the application of federal wage laws to computer maintenance contractors/**145**

No-Nonsense Traffic Cop

John Beall & Company, Inc.

JOBS from page 131

section in the newspaper.

"It has become a seller's market once again. There is a keen competitiveness for people, particularly in sectors that are automating quickly, such as the banking industry, and salary increases are once more averaging 10% to 12%. As a result, employees are gung ho and on the lookout for new employment opportunities," Asher said.

"It doesn't appear as though we have yet reached the panic hiring of four to five years ago, but it will not come as a surprise if we reach that same situation in the not-too-distant future," added Don Modie, employment manager at California Computer Products, Inc., an Orange County, Calif.-based subsidiary of Sanders Associates, Inc. and manufacturer of computer plotters, interactive graphics and digitizers.

With job opportunities increasing at a time when companies need to hold onto their people to meet the demand for their products and services, many firms are emphasizing job training and other incentives.

"The task is not only to hire good people, but to keep them here," remarked Susan Peterson, National Semiconductor's employment manager.

In a forward-looking move, the chip manufacturer has set up an employee assistance program, including the use of a resident psychologist to deal with employee relations and handle problems resulting from work stress.

Tandem Computers, Inc., the Cupertino, Calif.-based manufacturer of Nonstop computers, is well versed in the art of managing the employee problems that result from high growth. The firm, which expects to see growth this year in excess of 50%, places high emphasis on its participative management program, designed to involve employees in company decision making.

It has become a seller's market once again. There is a keen competitiveness for people . . . and salary increases are once more averaging 10% to 12%.

"We do a lot of training with our existing work force. If you want to be flexible and put a high rate of change through your organization, you had better make sure you have your act together as far as your employees are concerned," stated Lary Evans, Tandem's vice-president of manufacturing.

Seagate Technology, Inc., a Scotts Valley, Calif.-based manufacturer of Winchester disk drives, is struggling with managing the impact on its work force of high growth. In fiscal year 1982, the company totaled $40 million in sales. In the second quarter of this year alone, it expects to reap sales of $92 million.

In the last 18 months, the number of computer engineers in the company has risen from 75 to over 200. The company did this chiefly by promoting employees who successfully completed a six-month management training course set up by Seagate to improve employee skills.

As Elliott Sopkin, vice-president at Advanced Micro Devices, Inc., put it: "Firms need to provide their people with incentives. Companies have to be extremely careful that in times of high demand they do not work their people so hard that quality suffers. Ultimately, that is a management judgment."

Backlog spurring rethinking of strategy

MENLO PARK, Calif. — The strength of the U.S. economic recovery has forced many computer vendors to rethink strategies for meeting customer needs and responding to exceptionally strong order backlogs.

In several companies, this has resulted in a restructuring of internal procedures and organization to a greater or lesser degree. The companies that are now reaping the best rewards are often those that used the recent recession to make changes that would allow them to take advantage of the upturn when it came.

Advanced Micro Devices, Inc., (AMD) for example, recently entered the top-10 list of semiconductor manufacturers, with sales in the year ended March 31 expected to be around $560 million, compared with $368 million in fiscal '82.

Anticipating annual revenues of $1 billion within the next two years, AMD can attribute its success in no small part to a far-reaching employee relations policy designed to involve its work force more at a time of exceptional growth.

In 1982, AMD carried out a major restructuring of its operations with an emphasis on decentralization. The company was split into five major operating divisions and 13 major production lines, called directorates. "Our concept was to keep the manufacturing groups small so that we could keep the entrepreneurial spirit alive and have each directorate run its own business," explained Elliott Sopkin, AMD vice-president.

A similar approach was followed by Seagate Technology, Inc., a manufacturer of Winchester disks based near Santa Cruz, Calif. The company, which employs around 3,000 people, split itself into different modules with each module having its own plant and production control manager as well as group leaders and supervisors.

Seagate also developed offshore facilities for the labor-intensive part of its operations, such as the testing and repairing of integrated circuit boards. In July 1982, the company opened up a plant in Singapore to be followed one year later by a fa-

See page 136

TERMINALS FROM TRANSNET

PERSONAL COMPUTER SYSTEMS
Visit our computer stores in Union and Ocean, NJ
AUTHORIZED RETAIL DEALER
APPLE® IIe, II+ and USA — DEC RAINBOW — TI PROFESSIONAL
SUPPLIES — FREE CATALOG — CALL

Turn Your VAX into a Total
FINANCIAL
Solution

INTEGRATED FINANCIAL MANAGEMENT SOFTWARE

ROSS INTEGRATES KEY FINANCIAL FUNCTIONS
MAPS is a new generation of software merging decision support tools and financial accounting applications into a powerful, flexible financial management capability. And all Ross products are fully on-line, interactive and bring you multi-user access.

MAPS/MODEL—Powerful financial modeling
MAPS/GRAPH—Quality business graphics
MAPS/DB—Flexible database management
MAPS/Pro—Micro modeling and graphics
MAPS/GL—Comprehensive general ledger
MAPS/AP—Full featured accounts payable

OUR SERVICE AND SUPPORT MAKE THE DIFFERENCE
We bring a commitment to our customers and products that reflects our 12 years of consulting experience. Our staff of experienced professionals can work closely with you to install our products, and to provide the ongoing training and support that make them true financial solutions.

MAPS from Ross Systems. The single source for integrated financial management software.

DEC and VAX are trademarks of Digital Equipment Corporation. MAPS and ROSS/NET are trademarks of Ross Systems, Inc.
MAPS/GL was developed by Price Waterhouse under the name "FMIS" and adapted for the VAX by Ross Systems, Inc.

MAPS
from Ross Systems
Financial Software Solutions

DISTRICT OFFICES: Palo Alto, CA, San Francisco, CA, Los Angeles, CA, Dallas, TX, New York, NY

ROSS SYSTEMS
CORPORATE HEADQUARTERS: 1850 Embarcadero Road, Palo Alto, CA 94303, (415) 856-1850

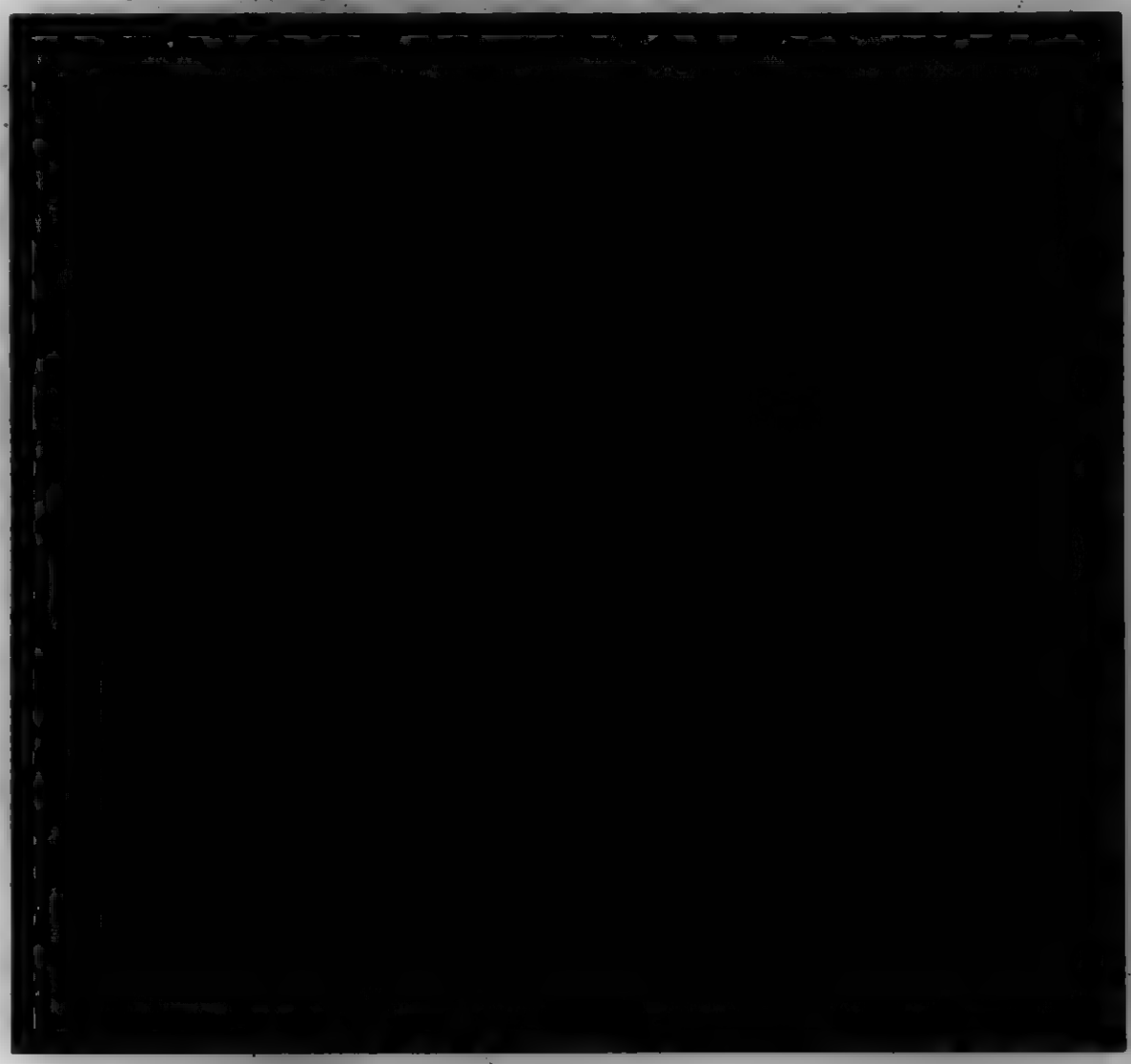
ADVERTISEMENT

PCOX™

YOUR PC-TO-HOST CONNECTION NOW ONLY $1145

FEATURES:

- Connects by coaxial cable to any channel-attached IBM 3274, remote BSC or SNA/SDLC 3274 or 3276, or 4321/4331/4361 Display/Printer Adapter
- Exact emulation of 3278 Models 2, 3 or 4 or 3279 Models 2A or 3A,
- Screen print and screen save to disk
- Screen-control application program interface
- U.S., foreign and RPQ Keyboard support (including Entry Assist)
- Menu-driven installation
- Compatible with IBM PC, PC-XT or any IBM-compatible personal computer
- DMA-attached for high performance
- Proprietary microprocessor architecture
- Menu-selected high-speed file transfers between PC and host
- Binary and compressed text options



PCOX, the Personal Computer Coaxial Interface from CXI, is the best, most economical way to connect your IBM* or IBM-compatible personal computer to your IBM host-based network, and it's available *now*! For $1145, CXI combines the PCOX Personal Computer Coaxial Interface, Control Unit Terminal Program and Professional Workstation Facility. PCOX lets you enjoy many of the functions of the IBM 3270-PC and offers extra features available only from CXI.

*Trademark of IBM Corporation

CXI is not simply another PC-compatible board company. We understand the IBM 3270 and its marketplace, and we are introducing a family of products to allow your PC to grow with your needs.

For immediate delivery and a list of PCOX distributors, call CXI today at toll-free (800) 221-6402. In California call:

cxi

CXI, Inc.
3606 West Bayshore Road
Palo Alto, California 94303
(415) 424-0700

ADVERTISEMENT

CXI Announces Bundled Pricing

For $1145, CXI combines the PCOX Personal Computer Coaxial Interface, Control Unit Terminal Program and Professional Workstation Facility. PCOX supports the operation of IBM or IBM-compatible personal computers as IBM 3278s or 3279s. In addition to the support of 1920-character (Model 2) screens, PCOX offers support of 2560 and 3440-character (Model 3 and 4) screens. PCOX also provides the ability to save screens to disk, to print screen contents and, via the Professional Workstation Facility, to transfer files between the PC and TSO or CMS host. For existing PCOX users, the Professional Workstation Facility is available, as an upgrade, for $195.

CXI, Inc., 3606 West Bayshore Road, Palo Alto, CA 94303.
Toll-free number (800) 221-6402. In California 415/424-0700.

CXI Offers PCOX/m3278/SPF

For $1895, CXI's PCOX/m3278/SPF combines the PCOX Personal Computer Coaxial Interface, the Control Unit Terminal Program and the Professional Workstation Facility with m3278/SPF.* For the programmer, systems analyst or any other user of IBM's TSO/SPF (System Productivity Facility), this package provides SPF functions without the usual host connect time and usage charges. Current PCOX users may buy an upgrade package for $845. The m3278/SPF utility menu accesses a number of utilities, including the file transfer capability of the Professional Workstation Facility. PC files may be treated as members of partitioned data sets.

*Trademark of Pinnacle Systems, Inc.

CXI, Inc., 3606 West Bayshore Road, Palo Alto, CA 94303.
Toll-free number (800) 221-6402. In California 415/424-0700.

FORECASTS AND FINDINGS

Micro software decline

Overall declines in the unit shipment and dollar volume growth rates of the microcomputer software market are likely as vendors integrate existing package functions into more comprehensive functions and develop increasingly user-friendly operating systems, according to a report by International Resource Development, Inc. (IRD).

"Microcomputer Software Packages" predicts that more comprehensive packages, such as the increasing availability of multiple window screens and mouse cursors, will reduce unit shipments and average software expenditures per micro. It also predicts that improved operating systems will allow users to perform a wide range of processing tasks for which they previously would have had to make additional software purchases. Even with a slowdown in growth relative to the expansion of hardware sales, the software market is expected to increase from $1.6 billion in 1983 to $14.7 billion in 1988, an annual growth rate of 25%, IRD claimed.

Other changes predicted by the report include more distinctive usage patterns and distribution structures to serve business, home and educational markets; software increasingly supplied in bulk lots by systems vendors and by distribution organizations; and a shift in the home market away from specialized stores to more general types of retail outlets.

The 272-page report is priced at $1,650 from IRD at 30 High St., Norwalk, Conn. 06851.

Micro graphics strong

The growth rate for microcomputer-based graphics products will grow at a 28% compounded annual rate through the first half of this decade to, a 1985 shipment value in the U.S. of over $6 billion, but the market also faces a number of hindrances in that development, according to a recently released report from Strategic, Inc.

The research study, "Microcomputer Graphics: Impact and Opportunities," predicted that severe price erosion by 1985 will paralyze many micro graphics vendors and that business applications will surpass computer-aided design (CAD) as the leading market segment, with mechanical CAD applications maintaining a 32% annual growth rate, but with electronic CAD applications growth slipping from its 73% rate through 1980 to 25% per year between 1981 and 1985.

Hindering the growth of the market, according to the report, is the lack of software and skilled development programmers, the lack of sophisticated data base management systems and the lack of business user understanding about what computer graphics can do.

The report is available for $950 from Strategic through P.O. Box 9747, San Jose, Calif. 95157.

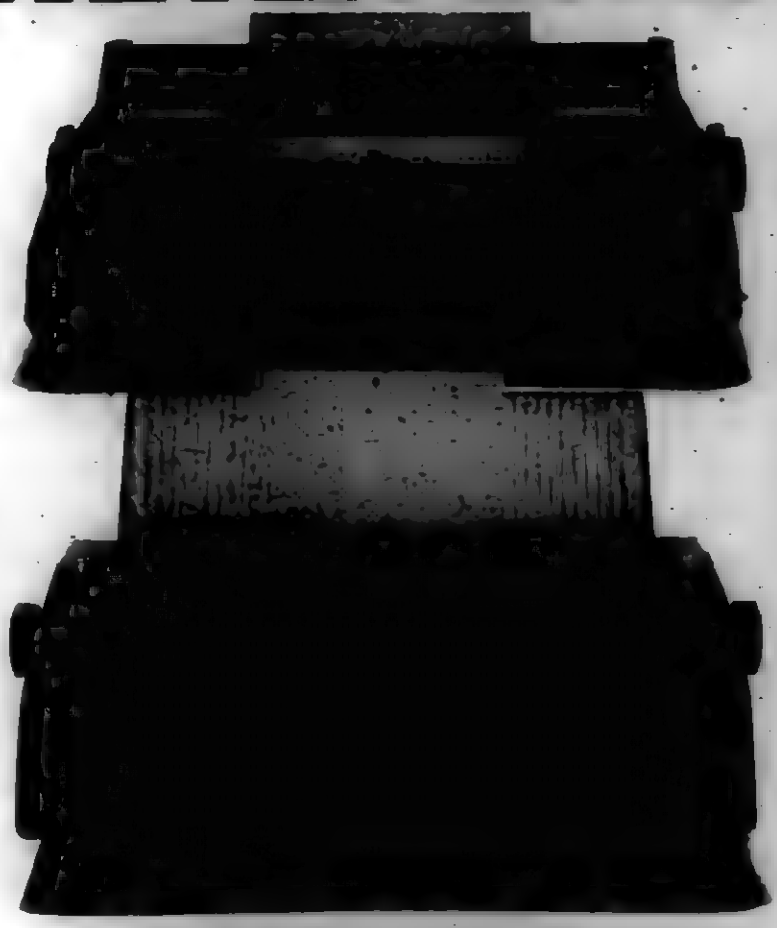
Shipments to perk up

Growth of worldwide computer system shipments by U.S. vendors will increase in dollar value by only 11.5% in 1983, down from 15.1% in 1981-1982 and 19.1% in 1980-1981, but will perk up in 1984 to 13.3% as total shipment values grow from the $30.2 billion posted in 1980 to $52.5 billion in 1984, according to a recent study by Venture Development Corp.

"The U.S. Computer Industry," second edition, forecasts shipments of virtually all major computer products and predicts that general-purpose mainframe shipments, which represented nearly two-thirds of total computer system sales in 1980, will only represent half of total shipments in 1984. Superminicomputer shipments will grow from $857 million in 1980 to $2.9 billion in 1984 with new vendors entering the fray, existing vendors expanding product lines and prices falling dramatically; however, minicomputer shipments, while

SPINWRITER INTR

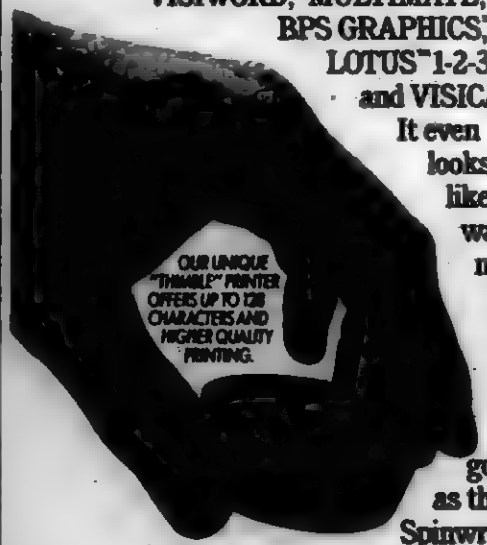
Now you have a choice of fully compatible Spinwriters for your IBM PC and XT.



NEC MODELS OFFER SPEEDS OF 200 AND 350 WORDS PER MINUTE.

First, a few words about the original, the Spinwriter 3550.

It was the first and only totally compatible letter-quality printer for the IBM PC. It plugs directly into the IBM PC and works with every piece of IBM PC software, as well as all popular third-party application packages, such as WORDSTAR,™ WORDPLUS,™ VOLKSWRITER,™ VISIWORD,™ MULTIMATE,™ BPS GRAPHICS,™ LOTUS™ 1-2-3,™ and VISICALC.™

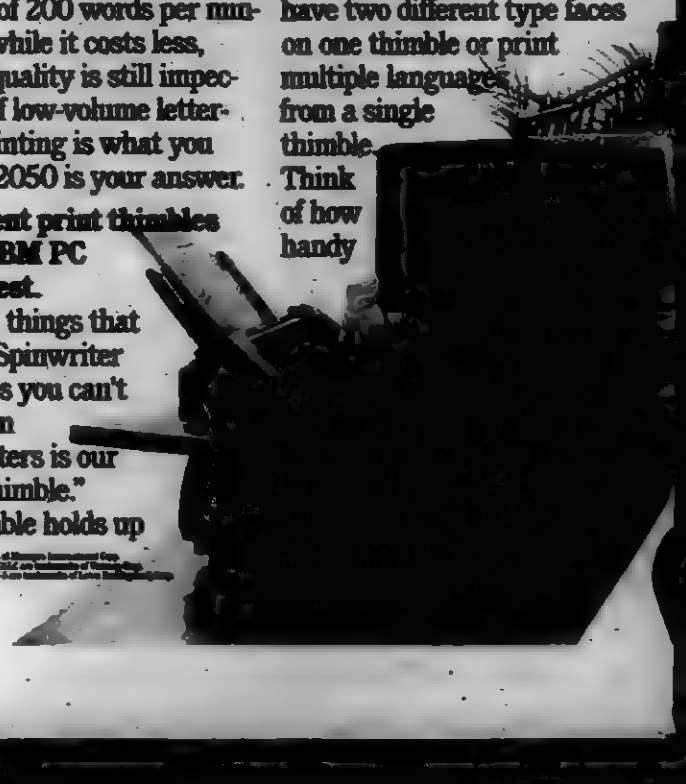


It even looks like it was made for the IBM. Now, as good as the Spinwriter 3550 is, we recognize that a single printer can't take care of every business or professional office need. So we've added another IBM PC compatible Spinwriter: The 2050.

The new 2050 has a printing speed of 200 words per minute. And while it costs less, the print quality is still impeccable. So if low-volume letter-quality printing is what you need, the 2050 is your answer.

60 different print thimbles let your IBM PC look its best.

One of the things that gives our Spinwriter capabilities you can't even get on other printers is our unique "thimble." Each thimble holds up to 128 characters. You can even have two different type faces on one thimble or print multiple languages from a single thimble. Think of how handy



growing at a larger rate in 1983 than 1982, are in a permanent slowdown, according to the report.

Single-user personal computers priced under $10,000 will see business segment shipments grow at an annual rate of 10% to a value of $700 million in 1984, and shipments of portable computers will grow at a "phenomenal" rate to double in 1983 and almost to double again in 1984 to reach nearly $1 billion.

The 200-page study is available for $1,050 from Venture Development at One Washington St., Wellesley, Mass. 02181.

Power balance shift

Distribution strategies spawned by the microcomputer revolution will echo throughout the office products industry in this decade and result in a shift in the balance of marketing power from the manufacturers toward the new distribution establishment, according to a recent study by Frost & Sullivan, Inc.

More intense competition for new markets, created by improving performance/price product ratios, has forced vendors to seek indirect distribution channels to supplement or even to replace their traditional sales forces, the study said. Leading the way have been microcomputers for office use as vendors try to reduce marketing costs while reaching a broader base with cheaper products. OEMs and systems-house sellers are emerging as a major third force, powered by expertise and customer support commitment.

The sales of stand-alone micro sales through dealers should increase from 15% of the total in 1982 to 25% in 1987, and nondirect channels will increase their combined share of workstation micro sales from 20% to 45% over the same time span, the report declared. The report forecast equipment distribution in the areas of word processors, copiers, dictating equipment and communications equipment.

"New Marketing Strategies for Office Equipment" is priced at $1,325 and is available from Frost & Sullivan at 106 Fulton St., New York, N.Y. 10038.

Productivity climbing

Two studies on the computer industry indicate that the number of employees in the industry is growing at an annual rate of 3%, and productivity over a three-year period has increased by 7%, while total corporate operating costs and expenses have grown at a lesser rate than gross income.

"Productivity Trends in the U.S. Computer Industry," based on analyses of 86 companies over a three-year period, and "Computer Industry Comparative Costs Analysis," covering the years 1980 through 1982, are contained in the October 1983 update of "Corporate Strategies for the U.S. Computer Industry."

The studies, completed by Newton-Evans Research Co. (Nerc), in addition to information on productivity, profits and expenses, also analyze cost of goods sold, marketing costs, R&D costs, total working capital, sales revenue and gross income. The second report indicates that total operating costs and expenses rose an average of 7.5%, while gross income grew an average of 9%. Also, growth in investment for R&D remains high and just about matches computer industry sales growth for both 1981 and 1982.

Priced at $850, the 1983-1984 edition of the corporate strategies publication analyzes the 100 leading computer industry firms and is available from Nerc at Suite 204, Bethany Forty Center, 10176 Baltimore National Pike, Ellicott, Md. 21043.

ODUCES A SPINOFF.

that would be if your business is international.

On the other hand if you have special printing needs, you can opt for a full alphabet plus numbers, sub- and superscripting and scientific and arithmetic symbols.

Incidentally, for all their versatility, our inexpensive thimbles last for over 30 million impressions.

So it won't end up costing you a fortune to look like a million.

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
ABCDEFGHIJKLMNOPQRSTUV
АБВГДЕЖЗИЙКЛМНОПРСТУФХ
ABCDEFGHIJKLMNOPQRSTUVWXYZ
ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
ABCDEFGHIJKLMNOPQRSTUVWXYZ

SPINWRITER OFFERS OVER 60 DIFFERENT TYPE FACES.

No matter what form your business takes, Spinwriter can handle it.

A Spinwriter can actually help you put your communications in better shape. It can use any of our nine interchangeable forms handling options. And they can all be easily installed and changed by the operator.

Want to dash off a few hundred original letters to your customers? Our sheet-feeder is just the ticket. It will print on your letterhead and second sheet or envelope.

Standard features include continuous forms handlers that take paper up to 16 inches wide, variable size forms, and multi-part forms.

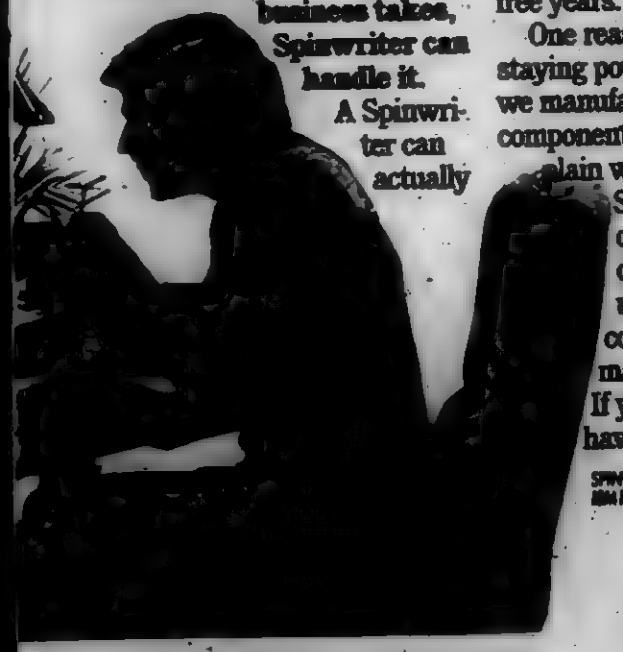
Spinwriters have a hard-earned reputation for reliability.

Spinwriters hold the industry record for mean-time-between-failure. Over 3,000 hours. Which, in terms of average personal computer usage, adds up to more than two trouble-free years.

One reason for Spinwriters' staying power is the fact that we manufacture every major component. It also helps explain why NEC Information Systems is the number one supplier of letter-quality printers to PC users in America. Of course, someday you may need a little service. If you do, it's nearby. We have a large group of NEC-trained professionals all around the country. It's also quick. Because of our modular design, normal repairs take less than 20 minutes.

9 DIFFERENT NEC-BUILT FORMS HANDLERS AUTOMATICALLY FEED ANY OFFICE FORM YOU HAVE.

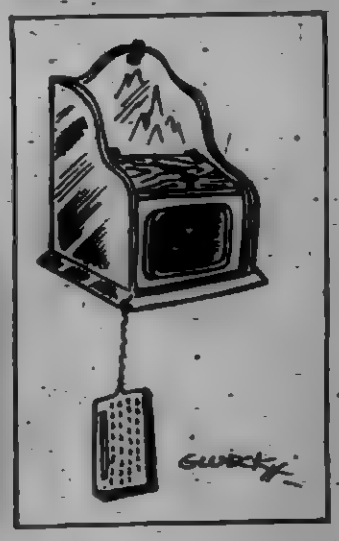
You'll find Spinwriters at participating ComputerLand stores, Sears Business Systems Centers, IBM Product Centers nationwide, Entré Computer Centers and authorized NEC Spinwriter distributors. Or call 800-343-4418 for more information. And find out why more and more IBM PC users are saying, "NEC and me."



SPINWRITER CAN OPTIMIZE YOUR IBM PC CAPABILITIES.

NEC AND ME

NEC Information Systems, Inc.
1414 Massachusetts Avenue
Boxborough, MA 01719



DP boom means overtime, more shifts, facilities

MENLO PARK, Calif. — More overtime, extra shifts and new manufacturing facilities characterize the computer industry enjoying boom times, which it is now.

Intel Corp., Advanced Micro Devices, Inc. (AMD) and California Computer Products, Inc., a subsidiary of Sanders Associates, Inc., are examples of companies that are attempting to meet the demand for their products through expanded production facilities.

Intel, for example, will open up two new plants this year, one in Albuquerque, N.M., and another in Jerusalem. The company is presently operating multiple shifts six and seven days a week.

Intel, which overestimated the semiconductor market in the spring of 1982 and hired many more people than it needed, retained the loyalty of its work force by keeping its people on its employee rolls when the market slowed. It did so by cutting salaries across the board. But when the economy picked up steam, Intel did not have to scramble for new hires, as did virtually all of its competitors, which experienced extensive layoffs during the recession.

Rival chip manufacturer AMD has instituted a "job for life" policy, similar to the Japanese lifetime employment system. With a guaranteed no layoffs system, the rapidly expanding company has been able to win employee approval for a production strategy based on more capital equipment and higher yields.

The company recently brought on-line a new factory in San Antonio, Texas, specializing in the manufacture of bipolar devices and a new Cmos fabrication plant in nearby Austin, Texas.

Among the semiconductor manufacturers in particular, booming demand has resulted in an increasing amount of overtime for company employees.

"Many companies are paying out a lot in overtime payments. During the recession, firms were generally running just two shifts and stretching out deliveries. Now most of them are running three shift patterns, seven days a week," commented Bill Strauss, vice-president of Integrated Circuit Engineering Corp., a Scottsdale, Ariz.-based market research firm.

According to Tom Mitchell, president of Seagate Technology, Inc., such a fast work pace can often lead to problems. "You cannot work people seven days a week for a long period of time. Overtime has to be a short-term phenomenon; otherwise, quality will drop off," he warned.

National Semiconductor Corp. has attempted to get around this problem by changing shift patterns and giving employees more flexible work hours.

NEED from page 132

cility in Bangkok, Thailand.

At Tandem Computers, Inc., the approach was not so much one of organizational restructuring as an attempt to improve already existing procedures.

Emphasis was placed on gaining better control of materials supply, achieving a $15 million reduction in inventories and a $69 million increase in the year-end cash balance in 1983.

At Hewlett-Packard Co., a fundamental change in the firm's business, emphasizing more software development and relatively less manufacturing, has increased the need for high productivity levels.

At its data systems division in Cupertino, Calif., and at its Boise, Idaho, plant, HP has installed automated warehouses to increase productivity and replace jobs HP considered dangerous or dirty for humans.

IBM MAKES WORK STATIONS FOR THE SYSTEMS 34, 36 AND 38. WE MAKE THEM BETTER.

Nobody makes better computers than IBM. But work stations aren't computers. And the simple truth is that the best work stations for your IBM System 34, 36 or 38 don't come from IBM. They come from Decision Data.

Decision Data work stations for the Systems 34, 36 and 38 offer improved productivity, efficiency and operator comfort. The tiltable, non-glare screens provide cursor-position and error-message displays plus automatic dimming for longer screen life. Keyboards are movable and offer built-in palm rests.

Decision Data also produces a cluster controller to enhance the productivity of your system. It includes 4 ports, a single cluster feature, an EIA interface and an expansion feature which doubles the number of ports. All standard from Decision Data, all extra from IBM:

Decision Data is your primary source for work stations, letter-quality printers, matrix and band line printers, serial printers, communications controllers and other computer peripherals which raise the productivity of IBM computers. Decision Data equipment does more work, more quickly, more easily, for less money. And it's reliable—backed by our nationwide and international service.

When people think of computers, they think of IBM. But when they think of the best family of peripherals, they come to Decision Data.

And that's a very smart Decision.

WE MAKE THE RIGHT DECISIONS

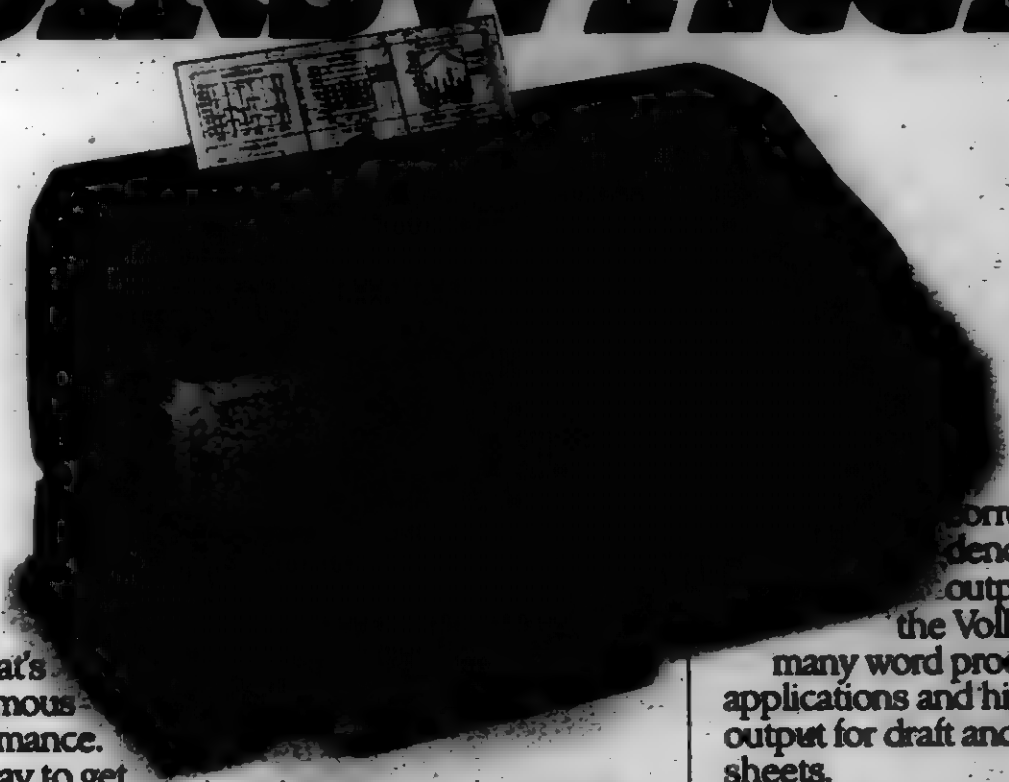
Decision Data Computer Corporation

Box 42023
100 Witmer Road, Horsham, PA. 19044

☐ Please tell me more about the work stations that work harder. ☐ Better yet, I'll phone (800) 523-6529. In PA call: (215) 674-3300.

Your Name
Company Telephone
Address
City State Zip

Soup up your Volkswriter.



Everybody knows Volkswriter, the word processing software package that's become synonymous with high performance. Now, there's a way to get even higher mileage out of your Volkswriter. Hook it up to a Dataproducts P Series dot matrix color printer.

The versatile P Series translates the executive class, word processing capabilities of the Volkswriter into brilliant full color charts, graphs and text. It delivers a full page of text quality print in nothing flat while its sheet feeder automatically prevents loading hassles. And the P Series uses pin feed or plain paper and has the brains to fill every appropriate line with crisp, sharp copy, even if it has to justify to do it. And the P Series color printer has dual speed capability for

correspondence quality output for the Volkswriter's many word processing applications and high speed output for draft and spreadsheets.

The Dataproducts P Series color printer. Think of us as a supercharger for your Volkswriter.

For more information go to your nearest computer store and ask about the Dataproducts P Series color printer, or call Dataproducts, 1-800-258-1386.

Dataproducts computer printers

Nobody puts ideas on paper so many ways.

Volkswriter is a registered trademark of LIFETREE SOFTWARE, INC.

Comshare's Kevin Kalkhoven and Richard Crandall hold graphics showing System W's integration into a typical information center.

Comshare changes strategy
And wins IBM support

By Paul [illegible]
CW Staff

ANN ARBOR, Mich. — For Comshare, Inc., the Big Blue blessing it received last month in the form of a "complementary marketing agreement" with IBM could not have come at a more opportune time.

The agreement provides for IBM salesmen to recommend Comshare's System W as the primary decision support system (DSS) for IBM mainframes [CW, Jan. 9]. The deal is an important lift for Comshare, which has experienced more troubles than most of its peers in the time-sharing industry recently. Its revenues, which reached almost $80 million in 1981, slipped to $76 million in 1983. Between 1981 and 1983 its income per share from continuing operations plunged a precipitous 85%.

However, the company now stands to be counted with the top DSS vendors in the industry, a turnaround which is attributable to a refocusing act Comshare performed in 1979. Prior to that, the firm offered a variety of statistical, data management and modeling packages on time-sharing, but nothing called DSS.

"Toward the end of the 1970s, we found the products we were delivering were not allowing users to keep pace with the productivity benefits they had achieved during the mid-70s," said Richard Crandall, Comshare president. "It turned out that the kinds of requests we were getting were broadening. People were asking more from decision support."

The decision to become a DSS vendor was the result of three primary observations, Crandall said. "We saw that buying software was becoming the accepted thing to do," he said. "We saw Apple [Computer, Inc.] was in the home market and was going to have a significant impact in the corporate area. We also saw that software for decision support and financial management was getting old."

Comshare outlined a two-part strategy to develop a new set of integrated DSS software and a delivery mechanism that emphasized time-sharing as well as packaged sales.

Built from scratch

System W was built from scratch, with an initial investment of $10 million. The company continues to invest about $5 million per year in enhancements and new features like Micro W, a microcomputer version of the mainframe product, released in early 1983.

Comshare also saw a three-tiered delivery strategy as central to System W's success. The product is offered on time-sharing, as a package available on the mainframe and as Micro W. Several of Comshare's largest accounts are using all three delivery methods, Crandall said.

Interestingly, System W's success has marked a rebirth of Comshare's time-sharing business, Crandall said. "Our time-sharing business associated with System W has never been better. Companies are buying the idea of triple delivery."

What has changed is Comshare's image of itself. The company bills itself as a DSS vendor, but has expanded the definition of DSS to include "basically everything that's in the information center," Crandall said.

Comshare also refuses to be pinned down on the future of the time-sharing part of its business, preferring to focus on the product rather than the medium of delivery. In fact, Crandall regards time-sharing as elemental to the three-tiered delivery strategy. More products that are available as a remote service now will be packaged in the future.

"We have set ourselves up so that we are indifferent to whether a customer decides to go with a software sale or time-share. We literally don't care," he said.

THE COLUMBIA IBM-PC COMPATIBLES. THEY REWARD TWO BUSINESS VIRTUES: FORESIGHT AND CUNNING.

Trust your instincts.
While others rushed out to buy an IBM-PC, you waited and watched. You knew prices would come down and software would get better.
Now we have a reward for your patience: the Columbia family of IBM-PC compatible computers. It's a choice of systems and software no one else can match.
The Columbia line includes the VP Portable which lets you work anyplace, any time. There's also the MPC, our desktop model, available in dual floppy disk or 10MB hard disk drive. Compatible with each other and the IBM-PC, as well.

Foresight led you to our IBM-PC compatibility.
We start you with more operating systems than IBM, even more than other IBM-PC compatibles (MS-DOS* and CP/M*-86). Which means you have immediate access to all the latest business and financial software.

Free software that's a steal.
Thousands of dollars worth of free software come with every Columbia computer. Columbia Tutor gives you a fast, comfortable start. Perfect Software* covers your word processing, spreadsheeting, and filing needs. Fast Graphs* turns facts and figures into graphs and charts. And asynchronous communications lets you share information with other computers.
For your sense of self, we give you Home Accountant Plus,* games, and two programming languages so you'll feel like an eleven year old genius.

Responsive service. Above and beyond.
175 local Bell & Howell service centers stand ready to maintain your Columbia computer at a moment's notice.

Prices start at $2995. The phone call is free.
Now, while you're feeling shrewd, call toll free for the Columbia dealer nearest you. Then, see for yourself how the Columbia Compatibles can reward your business virtues.
800-638-7866

COLUMBIA
DATA PRODUCTS, INC.

Columbia Data Products, Inc.
9150 Rumsey Road, Columbia, MD 21045
(301) 992-3400, TWX 710-862-1801.

[illegible]

COMPUTER INDUSTRY

MAI goes to court to prevent stock takeover

By David Myers
CW New York Bureau

NEW YORK — Management Assistance, Inc. (MAI) has struck back against dissident shareholder Asher B. Edelman, suing to keep him from using his 7.5% stake to wrest control of the company.

MAI, maker of the Basic Four line of minicomputers, filed suit against Edelman and six codefendants in U.S. District Court here late last month.

MAI has asked the court to award it an unspecified amount of damages and to prevent Edelman and what the firm called "his group" from adding to their 7.5% stake; voting at the March 14 shareholders' meeting here; selling the stock; using it to attempt to control company management; or "taking any other steps in furtherance of their unlawful scheme to gain control of MAI," according to court papers.

Plans to nominate directors

Edelman has said he will present a slate of nominees for the computer maker's board of directors at the March shareholders' meeting, seeking to get MAI to drop out of manufacturing and to concentrate instead on its more profitable service business.

Named along with Edelman in the complaint were Arbitrage Securities Co., Plaza Securities Co., Minor Associates, R. Raymond French, Charles P. Stevenson Jr. and Clark R. Mandigo.

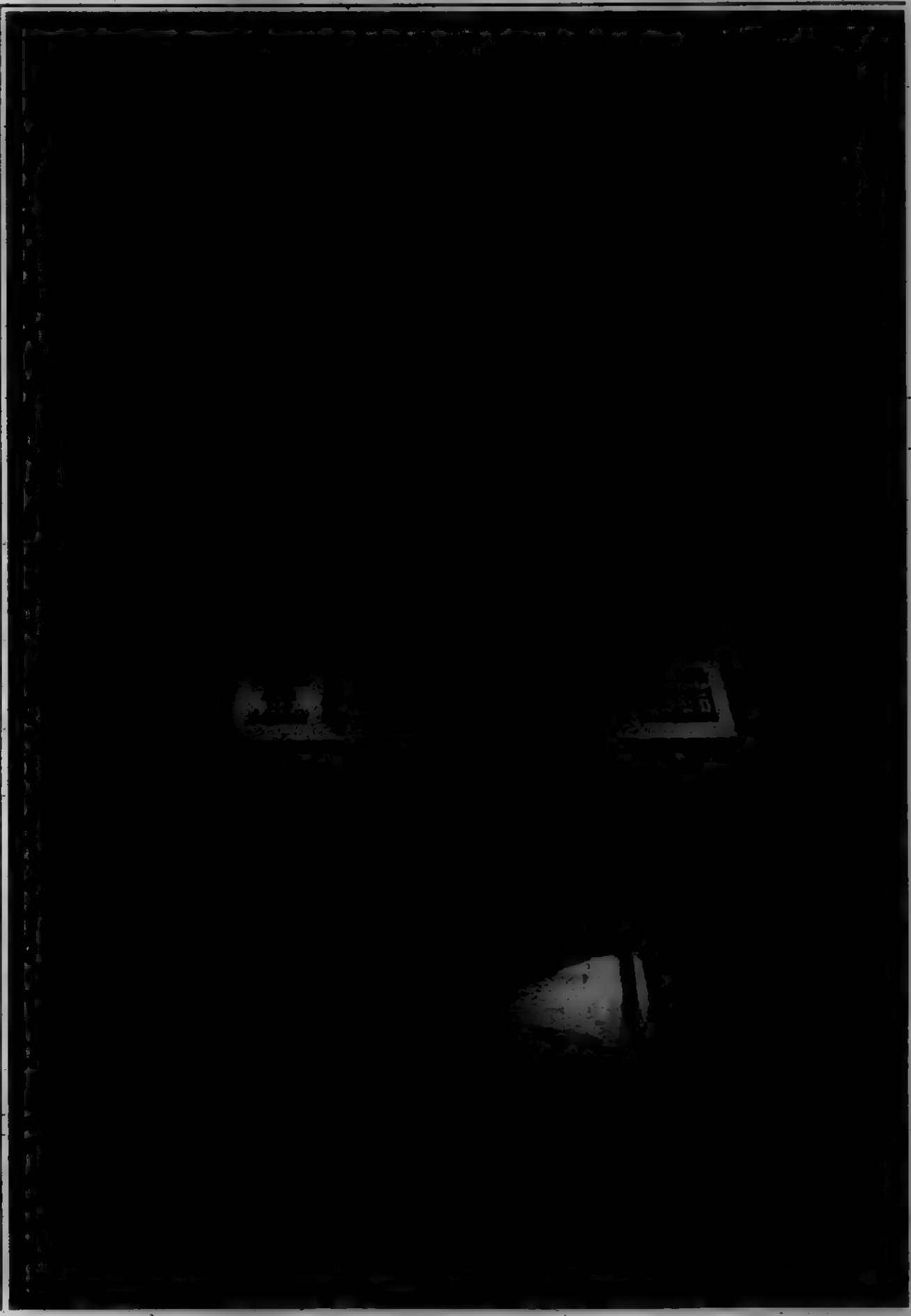
French, Stevenson and Mandigo are on the slate of board nominees put forward by Edelman.

In its complaint, MAI charges Edelman and the six codefendants with stock price manipulation, racketeering and breaking securities laws.

MAI said in a prepared statement that it was accusing Edelman and the six others of obtaining funds for MAI stock purchases by misleading investors into believing that the sale of an Edelman-controlled commercial real estate firm was imminent, driving up the price of that company's stock and providing Edelman with financial leverage to borrow money for his stock purchases.

Reached at his offices here, Edelman said the MAI lawsuit was "totally without merit and totally without truth." He said the case would not tie his hands. "They have to win before they can tie my hands," he noted.

Even if its case were a success, MAI would be unlikely to win an injunction against his buying more stock or selling the stake he has, Edelman added.



Corona, IBM settle on law suit

LOS ANGELES — Corona Data Systems, Inc. announced it has settled a copyright infringement suit brought by IBM by agreeing to a court-entered stipulation order and judgment in which it is enjoined from infringing upon IBM copyrights and ordered to return to IBM or destroy any existing copies of the computer program in question.

Corona Data agreed to the settlement without admitting liability, and IBM agreed not to seek enforcement of the judgment with regard to microcomputers shipped by Corona Data prior to Feb. 18.

Corona officials said they are confident their engineering staff will be able to develop an IBM-compatible program that does not infringe upon IBM copyrights.

Apple reorganization reflects new product strategy

CUPERTINO, Calif. — Apple Computer, Inc. recently announced the reorganization of its product line families and executive sales management to reflect newly implemented product strategies and priorities heralded with the recent announcements of a line of 32-bit microcomputers.

President and Chief Executive Officer John Sculley said Jan. 30 that the reorganization was effective immediately and resulted in three product divisions: the Apple II division, the Apple 32 division and the Accessory Products division.

The Apple 32 division will include product development and marketing for the Macintosh, the Lisa 2 series and all 32-bit systems. Steve Jobs, company chairman, was named executive vice-president responsible for the division, which includes the automated Macintosh manufacturing facility in Fremont, Calif.

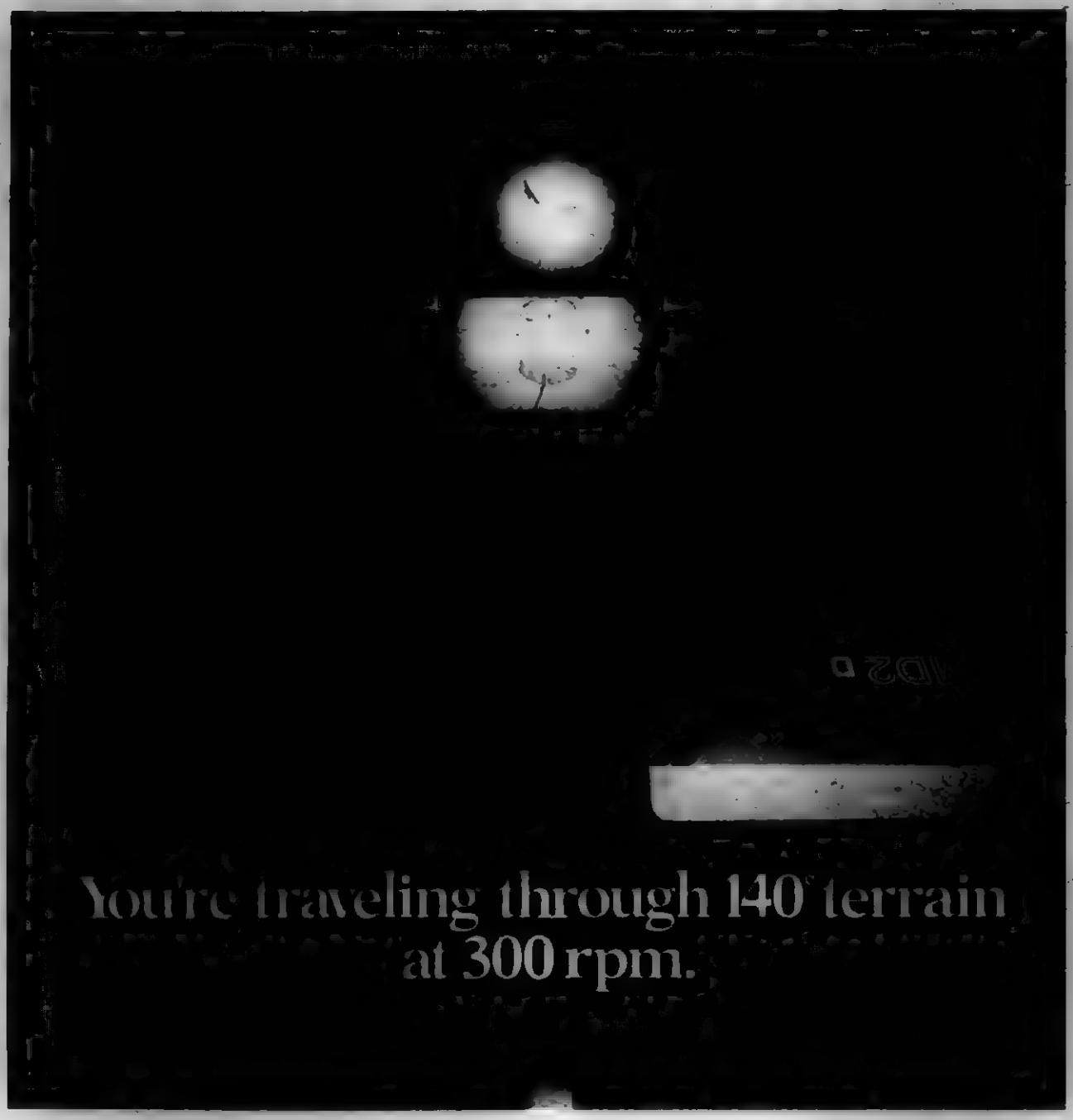
Named to head the Apple II division, with responsibility for all present and future Apple II and Apple III products, was Delbert Yocam, formerly vice-president and general manager of operations.

The Accessory Products division retained Michael Muller as vice-president and general manager of the division, which designs, produces and procures products such as printers, modems and keyboards.

Each product family will include manufacturing operations for that product group, Sculley said.

"Future products will be designed in cooperation with manufacturing, assuring high-quality products that are easily and economically produced," he said.

E. Floyd Kvamme, executive vice-president for worldwide marketing and sales, announced three changes in the company's executive sales management: John Cavalier, formerly head of the personal computer division, was named vice-president of the Americas, Far East and Africa group; Michael Spindler, former European general manager of Apple, was named vice-president of the European group; and William Campbell, formerly vice-president of marketing, was named vice-president of U.S. sales.



Only one disk guarantees safe passage through the torrid zone of drive heat. Maxell.

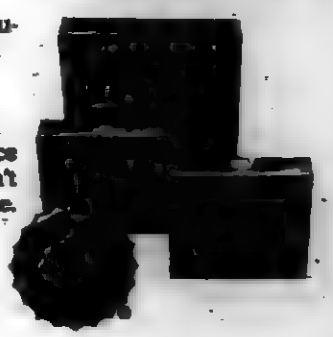
A lifetime warranty. And manufacturing standards that make it almost unnecessary.

Consider this: Every time you take your disk for a little spin, you expose it to drive heat that can sidetrack data. Worse, take it to the point of no return. Maxell's unique jacket construction defies heat of 140°F. And keeps your information on track.

And Maxell runs clean. A unique process impregnates lubricants throughout the oxide layer. Extending media and head life. How good is Gold?

Maxell's the disk that many drive manufacturers trust to put new equipment through its paces. It's that bug-free.

So you can drive a bargain. But in accelerated tests, Maxell floppys lead the industry in error-free performance and durability. Proving that if you can't stand the heat you don't stand a chance.



maxell.

IT'S WORTH IT.

Maxell Corporation of America, 60 Oxford Drive, Moonachie, N.J. 07074 201-440-8020

Interconnect seminar set for March 22

ORLANDO, Fla. — "Interconnect Japan," a seminar for the discussion of successful strategies for penetrating the interconnect market in Japan, has been scheduled here for March 22-23 by Technology Analysis Group, Inc.

The seminar will bring together U.S. telephone equipment manufacturers and top Japanese and U.S. telecommunication and trade experts and will cover topics such as the structure of the market, projected demand for different types of equipment, export financing, legal aspects of exporting to Japan and others.

Speakers will include Clyde Pretowitz, counselor to the U.S. Secretary of Commerce; Hideaki Toda, director general of the New York office of Nippon Telegraph and Telephone Public Corp.; Masaru Kawajiri of the U.S. Embassy, Japan; Kan-Ichiro Aritomi, first secretary, Embassy of Japan; and Robert D. Westfall, vice-president of the Security Pacific National Bank Trade Finance Group.

The registration fee is $900 for the first person from a company and $450 for each additional person. More information is available from Technology Analysis Group, Suite 101, 1424 16th St. N.W., Washington, D.C. 20036.

ADDS STACKS UP BEST

Designed for Operator Enjoyment.

The leader in quality and reliability now offers the Viewpoint family with all the most user-requested features:

- Earth-tone colors and small size to complement any office environment.
- Tilt and swivel display for operator comfort.
- Low profile keyboard with adjustable height for easier data entry.

VIEWPOINT®/Color.
The first truly low-cost color terminal.

VIEWPOINT®/90.
OEM's delight. . .double-high/double-wide, split screen, programmable function keys, down-line loadable, and more.

VIEWPOINT®/78 and VIEWPOINT®/78 Color.
IBM functionality in monochrome and color.

VIEWPOINT®/60.
A fully featured editing terminal.

VIEWPOINT®.
Best price/performance in a conversational terminal.

VIEWPOINT is a registered trademark of Applied Digital Data Systems Inc.

ADDS
Applied Digital Data Systems Inc.
A Subsidiary of NCR Corporation

100 Marcus Boulevard, Hauppauge, NY 11788 (516) 231-5400
Atlanta, GA (404) 469-7120 • Boston, MA (617) 875-2337
Dallas, TX (214) 387-2337 • Palo Alto, CA (415) 856-0560
Philadelphia, PA (215) 564-0135 • Phoenix, AZ (602) 966-0660
Shaumburg, IL (312) 843-7555 • Tustin, CA (714) 730-8760
ADDS, UK 44 01 940 1272

IT ALL ADDS UP.

COMPUTER INDUSTRY

Industry reps back bill for overseas tax treatment

By John Gallant
CW Washington Bureau

WASHINGTON, D.C. — Computer and electronics industry representatives have endorsed legislation to restructure the U.S. program offering favorable tax treatment to American export sales.

The bill would replace the existing Domestic International Sales Corporation (Disc) program, set up to allow tax deferrals on export revenues, with foreign sales corporations (FSC). Members of the General Agreement on Tariffs and Trade have complained that Disc violates that treaty, to which the U.S. is a signatory.

Several spokesmen for various segments of the U.S. high-technology community testified on the bill Feb. 3 before the Senate Finance Committee.

Although they insisted the Disc program has been beneficial to industry and that some sort of tax relief is necessary if American exporters are to remain competitive with foreign firms that receive tax benefits from their governments, the industry representatives offered a number of recommendations for amending the legislation, now under consideration in the U.S. Senate and House of Representatives.

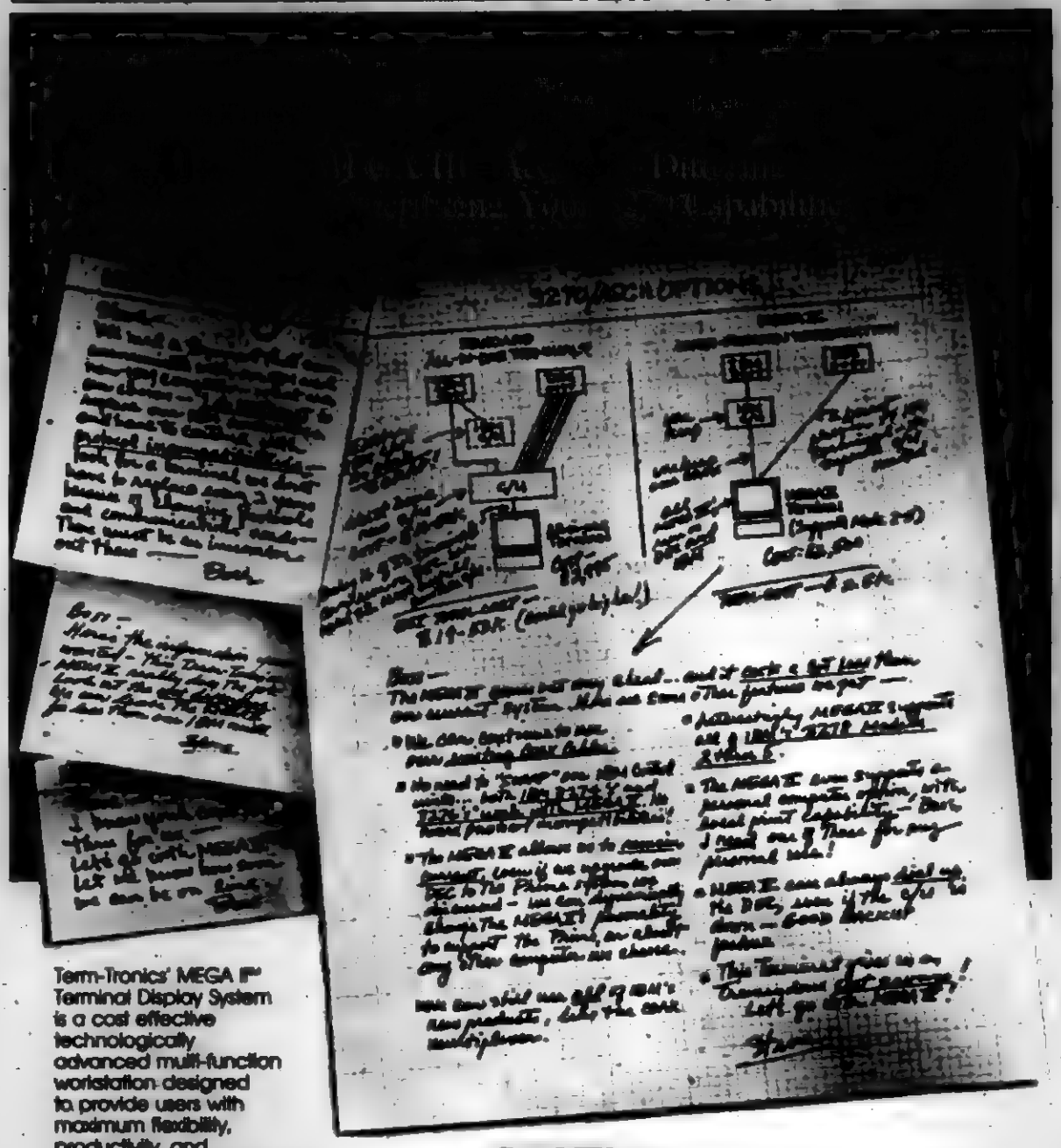
Intel Corp. Vice-President Robert Reed, representing a newly formed High-Technology FSC Coalition, told the Senate committee the FSC act should clarify the current ambiguity regarding eligibility of software sales to receive tax treatment as "export property."

Sperry Corp. Vice-President Gerald K. Howard explained to the committee that under Disc rules software that is bundled with hardware is eligible for the tax benefits, but the eligibility is unclear if the software sold under a separate price is in a separate transaction.

In general, Howard said, "The current Disc provisions have been a most effective incentive for small as well as large electronics companies to begin and expand their export activities."

Appearing for the American Electronics Association, the Computer and Business Equipment Manufacturers Association, the Scientific Apparatus Makers Association and the Semiconductor Industry Association, Howard said the groups support the FSC bill even though it might mean reduced tax benefits for electronics companies on exports.

Howard offered a number of recommendations for the legislation that, he said, would make the overall package attractive to high-technology companies.



Term-Tronics' MEGA II™ Terminal Display System is a cost effective technologically advanced multi-function workstation designed to provide users with maximum flexibility, productivity, and convenience. The MEGA II™ will never become obsolete when your computer is changed or upgraded.

Regional Offices: Washington, D.C., New York, Chicago, Dallas, Houston, San Francisco, San Diego.

MEGA II
The Truly Generic Terminal System

TTI Term-Tronics, Inc.

*IBM 3274, 3276, 3278, and DEC VT 100 are subject to trademark claims.

7408 Trade St., San Diego, CA 92121 (619) 271-1770

Amdahl reports earnings climb to $43.2 million

SUNNYVALE, Calif. — Amdahl Corp. announced recently that earnings for the fiscal year ended Dec. 31 climbed almost tenfold to $43.2 million, or 96 cents per share, from the $4.8 million, or 12 cents per share, reported a year earlier.

The company experienced record fourth-quarter revenues of $225 million, compared with $145.5 million for the corresponding period a year earlier, and net income of $15.6 million, compared with the year-earlier figure of $774,000 before application of a $1.9 million extraordinary credit.

The quarter report reflected continued improvement in product shipment volume and reduction in product costs, despite the impact of foreign currency exchange rates and processor price reductions reported in the third quarter of 1983, according to Amdahl President John C. Lewis.

Total profit for the year, after the credits realized from subsidiaries' prior years' accounting losses and tax credits, was $46.4 million, or $1.03 per share, compared with $6.7 million, or 16 cents per share, for the previous year.

Nippon invites U.S. to forum

TOKYO — Nippon Telegraph & Telephone Public Corp. (NTT) is inviting participants from the U.S. to the International Symposium on Optical Communication Technology to be held here April 12-13.

The symposium is in accordance with a U.S.-Japan trade agreement regarding NTT's procurement procedures.

The symposium costs approximately $190. Simultaneous translation between English and Japanese will be provided.

More information is available from Kanmori Yoneno, NTT, Room 2906, 200 Park Ave., New York, N.Y. 10166.

GET THE WORD ABOUT TRANSACTION PROCESSING. IT'S IN THE BOOK.

In our free 82-page book, "SYNAPSE TRANSACTION PROCESSING: SYSTEM OVERVIEW." And it's a revelation. To non-technical management, technical management, and staff alike.

It spells out how to accelerate development and minimize maintenance of high-performance, fault-tolerant, online transaction-processing systems.

It also discusses miracles: how to get dazzling performance from a Relational DBMS and how to expand a transaction-processing system online under power.

It reveals how to provide fault tolerance without redundant hardware and without programming. How to use a system-wide dictionary to standardize and control all definitions and relationships. How to completely automate database integrity, concurrency and recovery.

It's all there. Chapter and verse. Even a comprehensive index. To get your copy, simply mail the coupon or give us a call at (408) 946-3191. And let there be enlightenment.

Synapse
Computer Corporation

To: Synapse Computer Corporation,
Corporate Communications Department C2,
801 Buckeye Court, Milpitas, CA 95035.

Please send me your free, 82-page bible on transaction processing.

Name _____ Phone _____

Title _____ Company _____

Address _____

City _____ State _____ Zip _____

© 1983 Synapse Computer Corporation.

Study hails 1983 as banner year for buy-outs

But consultant reports more conservative numbers

By David Myers
CW New York Bureau

NEW YORK — Acquisitions involving software and computer services firms topped the $1 billion mark for the first time last year and soared 132% over the 1982 total, according to the year-end index of the Association of Data Processing Service Organizations, Inc. (Adapso).

A record 146 mergers and buy-outs valued at $1.01 billion took place in 1983, according to the index prepared for Adapso by Fort Lee, N.J.-based Broadview Associates, an acquisitions marriage maker.

George Grodahl, a Broadview partner, hailed 1983 as "a banner year" for buy-outs in the software and remote processing segments of the computer industry. The dollar value of the deals rose for the fourth straight year, "a trend we expect to continue in 1984. There may be a 15% increase this year," Grodahl said.

However, more conservative numbers and forecasts were handed in by the Cerberus Group, an independent consultant based in Frenchtown, N.J. The firm's year-end report found that acquisitions and mergers in 1983 added up to $956 million, a gain of 45% from the $660 million total of 1982. A "slight improvement" was predicted by the Cerberus Group for 1984.

The largest single deal of last year was IBM's increase of its stake in Intel Corp. to the tune of $155 million, according to the Cerberus Group. But the Adapso/Broadview index, restricted to the nonhardware marketplaces in the computer industry, located the largest deal in Comdata Network's $91 million purchase of rival electronic funds transfer firm Instacom.

"The most active acquirers were companies that were already in the industry," Grodahl said. "Almost every major computer company has made acquisition a major part of [its] growth strategy."

However, Broadview expected to see an increasing number of noncomputer companies enter the market via acquisition in 1984. Consumer goods makers, insurance firms, publishing houses, distributors and financial institutions were named by Grodahl as likely computer entrants this year.

Software deals outstripped processing company deals in 1983, according to the Adapso/Broadview index. Sixty percent of the companies acquired last year were software developers, compared to "well under" 50% in 1982, Grodahl said.

"This is a clear indication of the importance placed on the software sector and of the shift in emphasis away from the processing sector," Grodahl said, adding that Broadview expected to see software deals dominate computer industry acquisition activity again this year.

> *'The most active acquirers were companies that were already in the industry. Almost every major computer company has made acquisition a major part of [its] growth strategy.'* — George Grodahl, Broadview Associates partner.

Of the software firms acquired by larger companies in 1983, 27% were developers of mainframe programs, up from 8% the year before. Microcomputer software houses accounted for 17% of the deals, a jump from 6% of the acquisitions in 1982.

Grodahl said the smallness of the micro software percentage of deals masked their relative importance last year. "That industry is still quite young and evolving. We expect that trend will become even more important in the future. This is probably one of the fastest growing of all industries," he said.

Buy-outs involving micro software houses will become increasingly common because of what he called "the Lotus syndrome," Grodahl said. "[Lotus Development Corp.] changed the ground rules when [it] entered the market.

"It spent between $3 [million] and $5 million in advertising and almost immediately established brand name identity."

But the Broadview partners do not expect computer hardware manufacturers to be among the bidders for software houses. While hardware makers might be expected to view software development as a way of keeping their machinery from becoming a mere commodity item, they might also fear that acquiring a software house would scare off independent program developers, the Broadview partners suggested.

IBM from page 131

One look at the figures posted last week by Compaq Computer Corp., maker of the most successful IBM Personal Computer lookalike, will erase all doubt that the fully compatible route is a safe one, for the time being. Compaq earned $4.7 million in its first year of operations on $111 million in sales, but sold $52 million and earned $5.2 million in the fourth quarter.

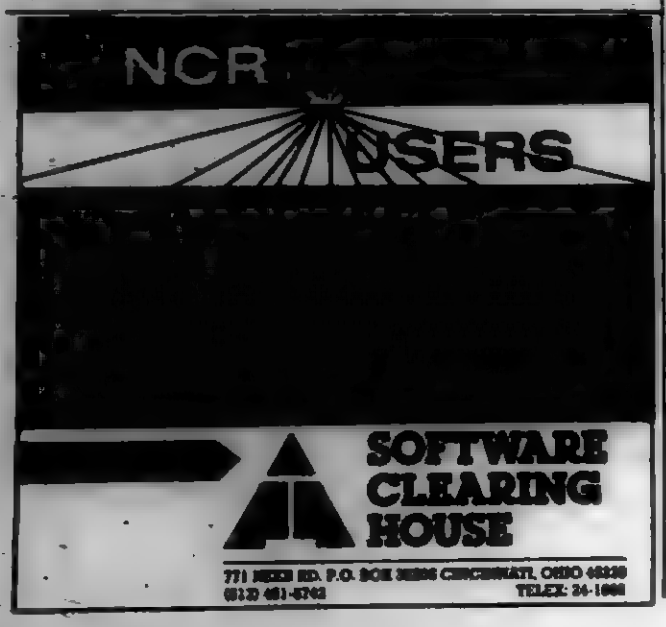
Compaq's Plus computers are about as IBM-compatible as computers can be. From the commencement of shipping its systems, the Houston-based manufacturer has hitched its cart to the insatiable appetite for IBM Personal Computers and IBM's corresponding inability to meet the demand.

But will Compaq's fortunes be short-lived? If they are not to be, the company will have to develop a solid follow-on, because IBM will not sit by idly when there's more business to be had.

The flip side of the microcomputer fortunes coin was shown by Vector Graphic, Inc. this month, when the company posted its fourth consecutive losing quarter.

This time the figures look almost pathetic — $1.9 million in losses on just $3.3 million in sales, compared with sales of almost $12 million for the same period a year ago.

Exactly what the new management group at Vector intends to do to restore the company to financial viability is not clear yet.



This advertisement is not an offer to sell nor a solicitation of an offer to buy these securities. The offering is made only by the Prospectus.

NEW ISSUE

616,000 Shares

Boole & Babbage

COMMON STOCK

Price $10 Per Share

Copies of the Prospectus may be obtained from any of the several Underwriters only in such states in which such Underwriters are qualified to act as dealers in securities and in which the Prospectus may be legally distributed.

Hambrecht & Quist Incorporated — E. F. Hutton & Company Inc.

Blyth Eastman Paine Webber Incorporated — The First Boston Corporation — Alex. Brown & Sons Incorporated

Dillon, Read & Co. Inc. — Donaldson, Lufkin & Jenrette Securities Corporation — Drexel Burnham Lambert Incorporated

Goldman, Sachs & Co. — Kidder, Peabody & Co. Incorporated — Lazard Frères & Co.

Lehman Brothers Kuhn Loeb Incorporated — Prudential-Bache Securities — L. F. Rothschild, Unterberg, Towbin

Salomon Brothers Inc — Shearson/American Express Inc.

Smith Barney, Harris Upham & Co. Incorporated — Wertheim & Co., Inc.

Dean Witter Reynolds Inc. — Robertson, Colman & Stephens

February 8, 1984

COMPUTER INDUSTRY

Wage exemption upheld

By John Gallagher
CW Washington Bureau

WASHINGTON, D.C. — The U.S. District Court here last month ruled against organized labor and supported a U.S. Labor Department decision exempting federal computer and other high-technology equipment maintenance contracts from government-set minimum wage rules.

The AFL-CIO and eight other unions challenged the Labor Department Service Contract Act (SCA) exemption in December. The department had finalized the exemption the month before, saying the act, designed to stop wage busting by government services vendors, should not apply to electronics industry workers, who are relatively well paid and whose skills are in such demand that they can command fair compensation without government protection [CW, Nov. 14, 1983 and Jan. 16].

The electronics industry had sought the exemption, arguing the law would ruin its merit pay scales and force it out of government service work. Federal purchasing and auditing agencies also backed the exemption, saying that bringing this type of work under the SCA could make it hard for federal offices to obtain high-tech maintenance services.

In his decision favoring the Labor Department, Federal District Court Judge Oliver Gasch supported the electronics industry contentions: "A number of facts led to the conclusion that this class of employees did not need the protection of the SCA and were not, in fact, subject to the kinds of difficulties Congress sought to protect against in the SCA."

The order said the industry is "not conducive to wage busting" and noted wages in this sector had not declined during the four years prior to the final Labor Department ruling in November, during which time an interim exemption was in effect.

The judge also pointed out that the final regulations provide that workers on government contracts must receive pay equal to that of workers in private organizations.

To the labor unions' complaint that the exempting regulations were "capricious and arbitrary," the court found that "the scope and content of deliberations preceding the promulgation of the final regulations . . . indicate that the regulations were the product of reasoned consideration of available alternatives."

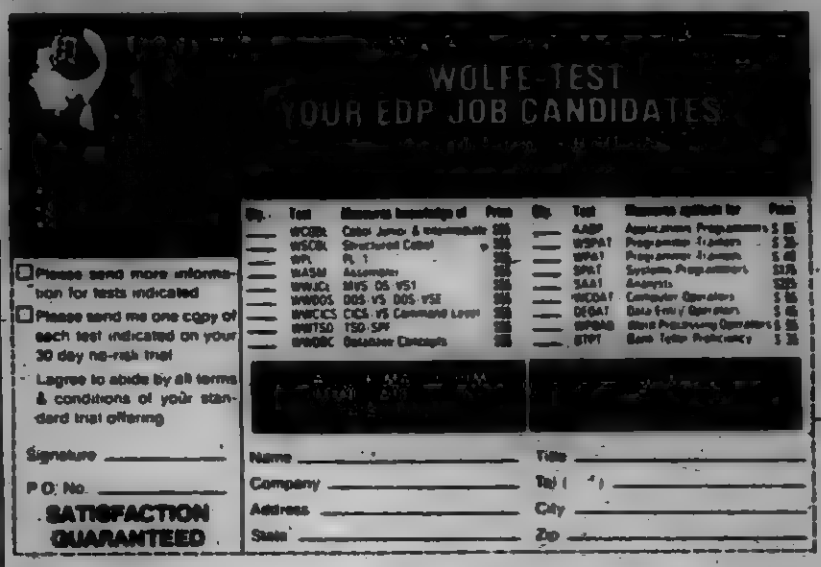
The unions are expected to appeal the court's decision.

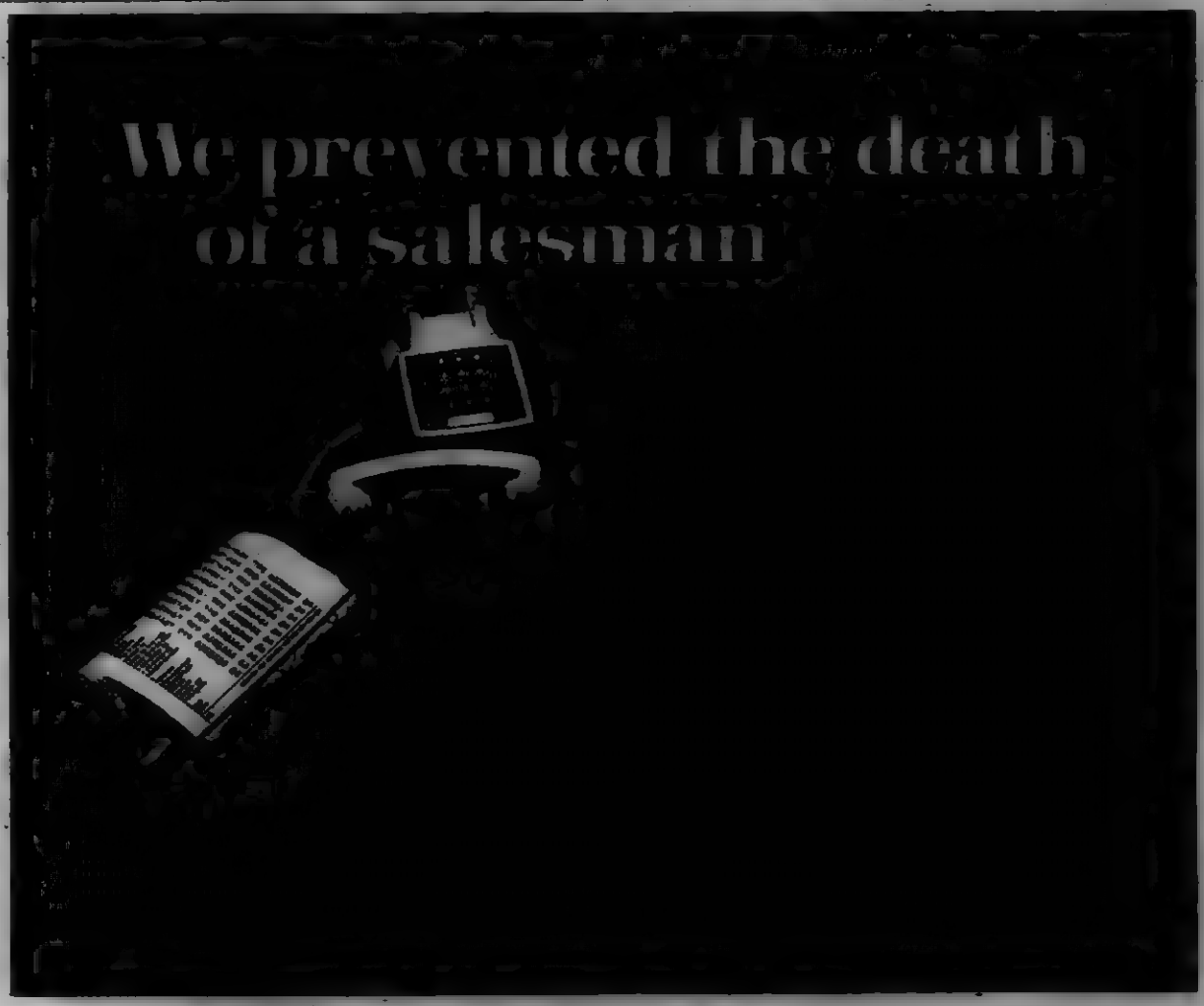
Pactel to offer DG's CEO in Nev., Calif.

WESTBORO, Mass. — Data General Corp.'s integrated office automation system will be marketed in California and Nevada by Pactel Communications Systems, a subsidiary of one of the regional holding companies created with the breakup of the Bell System, it was announced last week.

A subsidiary of the Pacific Telesis Group, Pactel Communications will market DG's Comprehensive Electronic Office (CEO) systems on the Desktop Generation microcomputers and Eclipse MV series of superminicomputers, according to a joint announcement. Pactel currently provides telephone terminal devices and other communications equipment for Pacific Telesis customers and serves an area with more than one million businesses.

The companies said the CEO systems may be linked through Northern Telecom, Inc.'s SL-1 private branch exchange, which is also offered by Pactel, and will provide a means to connect workstations to host computers.





My sale would be shot at sunrise.
My best customer shook his head. "How could a company so on the ball in the past be so off this time?" he growled. I was stunned. The home office and I had worked long and hard on what could be our biggest order. "What's the problem?" I gulped. "Your figures. They're out of whack—way out," he replied. "And so are you—unless you get your proposal in shape by morning."

The main man was 2,000 miles away—but the mainframe was as close as my hotel room.
Because of the time differential my boss was long gone from the office and our work sheets. But with the Execuport 440 Portable Terminal I could work directly with our mainframe and rework what had to be a goof-up that could cost us plenty.

"Let's refigure," said the Execuport. "Anytime," said the mainframe.
So out of its soft case (for added lightness) came my (truly) portable 12 pound Execuport 440 with its internal modem. I jacked in the phone...automatically dialed the mainframe at headquarters... and started the whole process of refiguring. What we had done (wrong) in a week had to be done right by sunup. It took less than that: ten minutes of communicating with the mainframe through my easy-to-use Execuport...and then the mainframe communicating back like all get out.

If the Execuport weren't a plain paper terminal with efficient editing capabilities, I could never have massaged the data the way I should have originally. Or illustrated our product and cost advantages with graphics. Or presented my customer with high-quality multi-copies. The Execuport did everything to get me to that morning meeting but shower and shave me!

The sale got a new lease on life. So did I.
Was my customer impressed? As much by the overnight performance and the look of the presentation as by the revised figures. A happy ending—that began when we first looked into Execuport Portable Terminals. For features, functions and available models...for getting your money's worth...get with the Execuport people. Phone toll free (1-800) 526-9088. In N.J. (201) 261-8800. Or mail the coupon.

PLUS EXECUPORT TERMINAL TERMINALS.
When high speed communication is your high priority, the 4120 series is your answer.

CTS Computer Transceiver Systems, Inc.
East 80 Midland Ave., Paramus, NJ 07652
☐ Send full information on your 400 series.
☐ Please me to set up a hands-on demonstration.
Name
Title
Phone #
Company
Address
City/State/Zip

PORTABLE TERMINALS
Don't leave the office without one.

LOSS from page 131

entrepreneurs, many of whom had sound products to market, but either failed to recognize the impact of IBM announcements on their market or simply mismarketed the products, according to analysts.

■ Osborne Computer Corp. was the first of several micro makers to encounter serious problems, taking refuge under Chapter 11 of the Federal Bankruptcy Act in September 1983. Prior to filing for protection, company founder Adam Osborne attempted to reverse his misfortunes by hiring Robert Jaunich II, former president of Consolidated Foods Corp., as company president and then laying off all but 80 employees.

Under a reorganization plan, Osborne Computer said it will focus on international sales, which reportedly have been consistently high. If the plan is approved, Jaunich would be replaced by Ronald J. Brown as president and chief executive officer (CEO) of the firm. Brown was general manager of Osborne's International Division. Jaunich would remain on the board of directors, as would Osborne. The company lists 27 employees, where it once had 1,000 and reportedly has enough computers to sell through the end of 1984.

■ Computer Devices, Inc. (CDI) was the second portable micro vendor to run for protection under the federal bankruptcy code last year. A major portion of the blame for CDI's problems lay with its decision to equip its non-IBM-compatible micro with non-industry-standard 3½-in. disk drives, analysts have said. Resulting financial troubles forced the company to hire a financial services firm to help locate a merger partner. When that failed, it too filed for bankruptcy.

It introduced an IBM-compatible version of its DOT portable, the DOT II, at Comdex but lacked the funds to manufacture and distribute it. Currently, CDI President Robert Moore is trying to negotiate large orders from dealers, major retail chains and large end users. Moore has said he will consider a private-label deal as well. Also, CDI announced in January that it has sold nonexclusive rights to this version of the DOT to Prime Computer, Inc. for $200,000.

A possible boost to CDI's pioneering efforts with the 3½-in. disk drive may come from Hewlett-Packard Co. and Apple Computer, Inc., which have announced personal computers using the mini-size drives that store twice the density of standard 5¼-in. disks. CDI will submit a business reorganization plan in March.

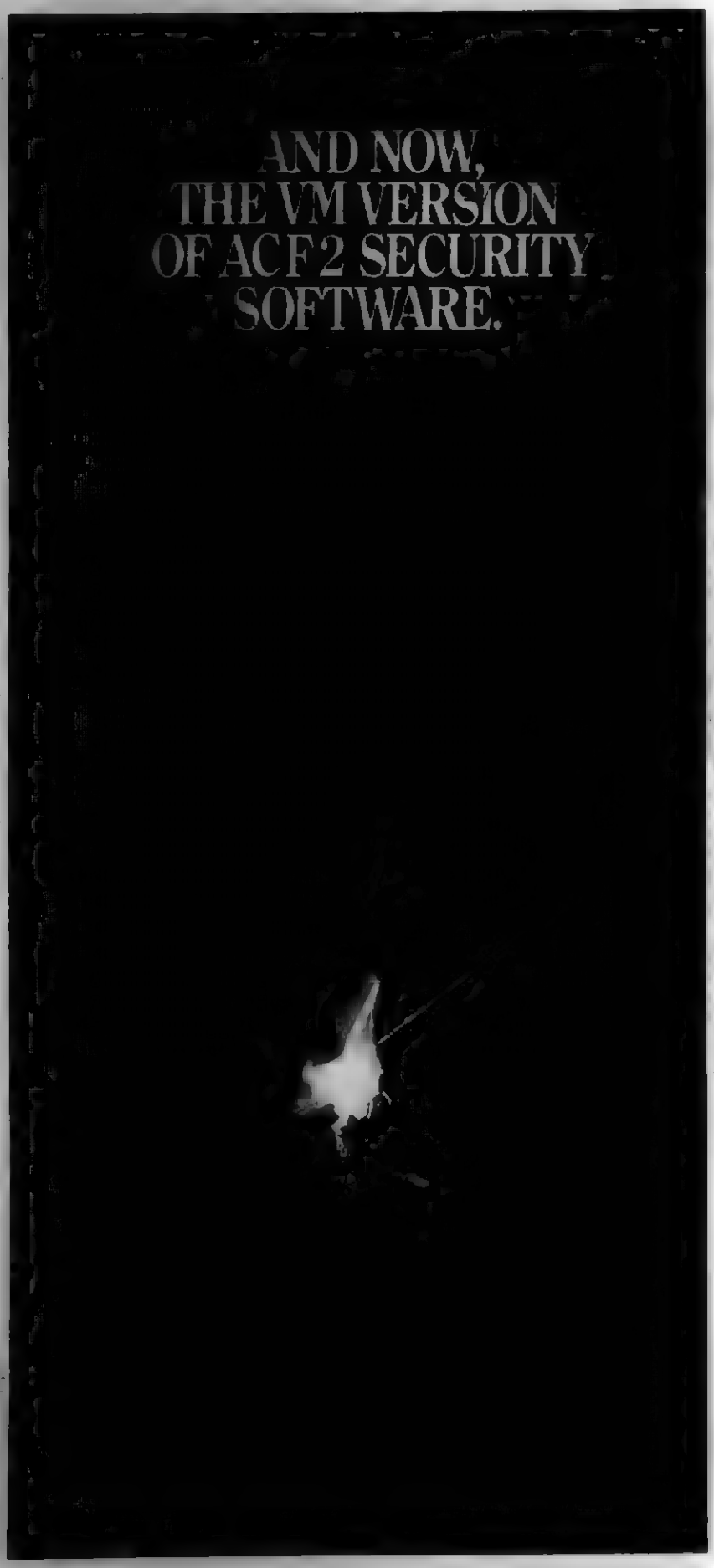
■ Vector Graphic, Inc., vendor of small business computers, has undergone several management changes in the last year, shifting founder Lore Harp in and out of the president's office. Most recently Harp bowed to pressure from a group of investors which insisted on new management in return for $2 million in financial backing.

Recently reported second-quarter losses totaled $1.8 million on sales of $3.3 million — less than one-third of sales during the same period a year ago.

Harp has been replaced by one of the investors, Jean Deleage, who has also become acting chief financial officer. Harp reportedly will concentrate on sales and other operational activities.

■ Victor Technologies, Inc. also saw some some traffic in the president's office, as President and CEO Charles Peddle stepped aside in November and was replaced by Richard Couch, former vice-president. Victor closed down the majority of its U.S. sales offices by November 1983, prompting speculation that the financially troubled micro maker had given up on the U.S. market. Analysts have blamed its troubles on too rapid expansion, poor management and a poor showing of the Victor 9000 in the IBM-dominated U.S. market.

■ Fortune Systems Corp., maker of Unix-based multiuser microcomputers, lost $1.9 million in its third quarter. Its problems have been attributed to delays in development and shipment of revised versions of its software. President Gary Friedman resigned in October, and senior vice-president of operations David Caplan was tapped as acting CEO until James Campbell was appointed president and CEO.



With *innovative* and *non-traditional* Access Control Facility software, ACF2, VM users can sleep a lot better.

Because with ACF2/VM, all data is protected by default. We call this Implicit Security.

Implicit Security means you have unparalleled protection against unauthorized disclosure, modification and destruction of data.

It means you have control of the data residing in your system.

It means you have the ability to control access to other user-defined system resources.

It means you decide exactly what is to be made available and to whom, assuring you that liability and responsibility reside specifically with those in charge of data.

And there's more.

Combining ACF2/VM with ACF2/MVS or ACF2/VS1 provides the unique capability of one common access control discipline across VM, MVS, and VS1 systems.

We knew you'd like that.

You'll also like the initial controls: User Logon to both VM and CMS, user links to mini-disks, CP Attach and OS data set controls, and CMS file security controls over facilities which create, erase, read, write, rename and copy those files.

Naturally enough, there's more to the intelligence of ACF2/VM. So for further information, please write or telephone Mr. Shawn McLaren, direct: (415) 941-4558.

He'll be glad to tell you about a security software system that offers you a very bright future, indeed.

The Cambridge Systems Group

24275 Elise, Los Altos Hills, CA 94022, U.S.A.,
(415) 941-4558 • Telex 357437

POSITION ANNOUNCEMENTS

Systems Analysts and Communications Analysts

New products. New marketing groups support. A new department. Exciting new ISS teams at NCR.

NCR, celebrating its 100th anniversary as a developer of business solutions, is determined to have the best possible MIS organization.

ISS—Information Systems and Services—the internal NCR organization that supports marketing and field service—is expanding to keep pace with an expanding marketing organization driven by new product releases and record profits.

Not only are we further strengthening our EDP staff that is now over 100 strong, but we have a new mission: the development and implementation of a country-wide field engineering dispatching system. The undertaking includes building and installing two computer centers with 6,000 hand held terminals as the input device.

This is in addition to NCR's largest internal hardware installation which now supports a nationwide communications network with over 900 terminals in some 150 NCR field offices.

You'll find a budget exceeding $12 million... and many new openings at various levels for professionals with experience in designing, developing and implementing state-of-the-art MIS systems. Specific areas include:

Applications Programmers

With COBOL, Data Base (TOTAL preferred) and On-line (Transpro) experience.

Systems Programmers

With Network experience and background in teleprocessing software, operating systems software, and database software. Experience in NCR's TOTAL, Transpro, VRX preferred.

Communications Analysts

With experience in network development; voice and data. Will be teamed with Systems Programmers on dispatching project and current network development and upgrades.

This is your opportunity to join an organization that recognizes and rewards outstanding contributions. Investigate salaries, benefits and career prospects in an aggressive $3.7 billion computer company by sending confidential resume and salary history to: Mr. Randy Nelsen, Dept. C56, NCR Corporation, USDPG, USG-1, Dayton, Ohio 45479.

NCR

1884-1984
Celebrating the future

An equal opportunity employer

Engineers & Software Designers

BE A PART OF A LIVING AMERICAN SUCCESS STORY!

Since 1981, we have grown from 11 to over 750 employees. As of third quarter, 1983, sales have grown from market entry to over $87 million and order backlog to over $144 million. The reason? Customer oriented design, marketing and servicing of advanced digital switching systems that meet the needs of today...and tomorrow. If you would like to be part of a group that is writing a new chapter in telecommunications history, consider the following areas:

HELP WRITE A NEW CHAPTER IN TELECOMMUNICATIONS HISTORY

CALL PROCESSING
Design and development of real time telephone, attendant, trunk control and call processing software.

MAINTENANCE/DIAGNOSTICS
Design and development of configuration, control and diagnostic software for distributed processing systems.

OPERATING SYSTEM
Design and development of real time operating systems software for distributed microprocessor based systems.

SWITCH ADMINISTRATION
Design and development of administration, data base and message accounting software.

SYSTEM INTEGRATION AND SUPPORT
Hardware and software test and integration on system level interface with customer and field operations.

HARDWARE DESIGN ENGINEER
Design experience should include microprocessor communication interfaces, peripheral controllers and memory systems. Familiarity with Z80, 68000 or other microprocessors, as well as dynamic Ram components is a must.

All positions require a BS/MS CS, EE, Math or related discipline. Experience with assembly language and/or "C" highly desirable.

We can offer competitive salaries, extensive company-paid benefits, and excellent potential for professional recognition and advancement. For prompt consideration, please send your resume to:

Staffing Manager
Dept. CW 213 R
Digital Switch Corporation
P.O. Box 830911
Richardson, Texas 75083-0911

equal opportunity employer

DSC

The Right Career Choice

Dunhill Means Data Processing Professionals

At Dunhill of Charlotte our only business is finding the right people for the right jobs. We represent many of the largest and most respected corporations across the country. That's why we can offer the busy data processing professional the opportunity to explore the job market without doing any more than simply sending us a resume.

We are not asking you to make any commitment. There is never a fee with Dunhill of Charlotte, and all matters are held in strict confidence. What more could you ask for? We will also keep you up to date on industry trends and current salary ranges in the DP area.

Keep your career running in high-gear by letting Dunhill of Charlotte find the opportunity you have been searching for as a professional. We want to go to work for you today! We specialize in the placement of Programmers, Analysts and Systems Programmers in the Carolinas and throughout the beautiful Southeast and Southwest. Give us a call now, or send your resume to:

Keith Reichle, CPC
Data Processing Consultant
8401 CARMEL ROAD
SUITE 107
CHARLOTTE, N.C. 28226
1-800-438-2012
In North Carolina, call collect (704) 542-0912

Dunhill Of Charlotte, Inc.

An Equal Opportunity Employer M/F

Software Sales Staff Expansion

Join the exciting national expansion of our sales staff which is chartered to double in the coming months creating openings in 20 major metropolitan areas. Our revenue and staff has increased over 70% in recent years and one-third of our sales representatives are earning in the 6 figures.

We have only 2 key requirements:

- You must be one of the top performers in your company.
- A minimum of 2 years' experience selling software to IBM or compatible mainframe environments.

Software AG develops, markets, and supports an integrated line of "off the shelf" systems software packages. Our extremely successful product line includes the following:

- ADABAS—award winning DBMS which manages the storage, retrieval, and manipulation of data contained in computer storage devices.
- NATURAL—a leading 4th generation on-line programming language.
- COM-PLETE—TP software package which manages the flow of data without complexity.

We've developed an unsurpassed line of products which meet today's information center/development center needs—while providing flexible tools to anticipate tomorrow's demands as well.

If you sincerely seek a challenging opportunity which gives unique experience, greater rewards, and satisfaction in selling state-of-the-art software packages, then this is **THE opportunity** to pursue.

We want to speak with achievers who are meeting, or exceeding, quota. **CALL us now at**
(800) 336-3761, ext. 600,
(703) 860-5050, ext. 600
or send resume to
11800 Sunrise Valley Drive,
Dept. 1500
Reston, Virginia, 22091.

software AG
OF NORTH AMERICA, INC

Equal Opportunity Employer M/F

INFORMATION SYSTEMS/ MANUFACTURING SPECIALISTS

- PORTLAND, OREGON
- WICHITA FALLS, TEXAS

PROJECT LEADERS

The successful candidates must have in depth experience in Manufacturing Systems, preferably with System/34 or 38. MAC/PAC or AMAPS a plus. Will lead development team and be responsible for planning through implementation of cost effective systems. Extensive interface with plant personnel. Travel required.

PROGRAMMERS

Minimum 2 years experience in RPG. Part of project team developing and maintaining manufacturing systems. Manufacturing experience a plus.

Please- no trainees. We will contact those candidates we are interested in within two (2) weeks of receipt of resume. Ingersoll-Rand has openings for Programmer/Analysts-IBM mainframe/COBOL- in New Jersey as well.

Ingersoll-Rand offers a comprehensive benefits package, as well as competitive starting salary. Please send resume and salary history to: Personnel Manager

INGERSOLL-RAND
39 Kennedy Blvd.
East Brunswick, NJ 08816
Equal Opportunity Employer M/F

SOFTWARE PLANNING CONSULTANT

Fortune 150 southern Connecticut based corporation seeks a Software Planning Consultant for a highly visible corporate management position. The successful candidate will function as a bridge between long term info system architectures and operational implementation of software related facilities. Responsibilities will include developing a cohesive corporate software plan, providing strategic and tactical recommendations, and evaluating, maintaining and implementing systems software at corporate and worldwide telecommunication networks.

Candidates must be degreed and possess a minimum of 7 years DP/Systems experience. Knowledge of IBM 3081, 3083 and MVS is essential. Familiarity with JES and SNA a plus. Opportunities for advancement are excellent. Compensation is commensurate with background and experience. Please submit resume, including salary history, in strict confidence, to:

Box WC-580, 5th floor
271 Madison Avenue, N.Y., N.Y. 10016

RISING FUTURES.

The goal of every great professional is a future with unlimited growth potential. As you gain the experience necessary, you take stock in your best commodity . . . YOURSELF.

The future is today with FLORIDA POWER CORPORATION. At Florida Power, we look at your experience and track record in order to utilize you to your fullest potential. While you're meeting your goals, we're meeting ours.

Rising futures include:

APPLICATION PROGRAMMER ANALYST
(Several Positions Open)

Bachelor's degree required with 2-7 years of related programming experience. Responsible for development and maintenance of business oriented computer systems and programs.

Environment: IBM OS/JCL, STRUCTURED ANS COBOL, CICS, VSAM, TSO.

Applications: Engineering, Accounting/Financial, Materials Management/Inventory, Purchasing, Customer Accounting, Payroll/Personnel, Employee Benefits, Stock Transfer.

SENIOR SYSTEMS PROGRAMMER ANALYST

Bachelor's degree and 6 years experience preferred. Must have extensive knowledge of MVS/JES II operating systems, computer hardware architecture and peripheral devices, systems software utilities, TSO, JCL, SMP4, RJE, and system generation.

Responsibilities include installation, modification, and maintenance of MVS/JES II operating systems. This person will also assist in conversion to MVS/XA and in the evaluation and selection of operating systems, systems software and computer hardware.

So plan your future with us. You'll not only realize a competitive salary and superlative benefits package, but the opportunity to reach your greatest expectations. Send your resume and salary requirements, in confidence, to: Terry Edwards, Section 243, FLORIDA POWER CORPORATION, 3201 34th Street South, St. Petersburg, Florida 33733.

Florida Power CORPORATION

(BE M/F US Citizenship Required)

S 38 Systems Analyst

ITT Transportation Distribution Services, located in Palm Coast, Florida, seeks a dynamic, well qualified individual for this newly created position. The successful candidate will be responsible for various systems development efforts relating to transportation, cost accounting, accounts payable, accounts receivable, and PC networking.

The qualifications required include:

- Excellent knowledge of S/38 COBOL and CLP
- Proven track record in applications development
- Good communications skills/customer interface
- Bachelor's degree in Computer Science

We offer a salary commensurate with experience as well as an excellent benefits package. Please send resume and salary history in confidence to: J. Loudis, ITT Transportation Distribution Services, P.O. Box TDS, Palm Coast, FL 32037. An Equal Opportunity Employer M/F.

ITT TRANSPORTATION DISTRIBUTION SERVICES

Make the most of your career on the West Coast

To explore new West Coast opportunities, call Dan Cooper at 800-821-7700, extension 6008

If you've ever thought seriously about living on the West Coast, Source Edp now offers you a golden opportunity to explore the possibility.

Hundreds of new positions

As the world's largest recruitment firm that specializes exclusively in the computer field, Source Edp has access to more opportunities in more locations.

On the West Coast, we represent organizations in all parts of California, Oregon and Washington. The firms are diverse in size and industry concentration and offer a broad range of career opportunities. Among them are the most progressive and sophisticated users, manufacturers and service firms in the world.

You may rest assured that our West Coast clients will assume all expenses involved in interviewing and subsequent relocation. Also, you are under no obligation since our fees are assumed by our client organizations.

Call our toll free number

If you want to set your career on a successful course in a cultural, educational and environmental atmosphere many people find more appealing than any other part of the country, call today. Our line, 1-800-821-7700, extension 6008, is open 24 hours every day.

Once we hear from you, one of our professional staff will get back to you with specific information about any of the opportunities that follow, or about others not listed. If you're unable to call, write: Dan Cooper, Source Edp, Dept. C1, P.O. Box 7100, Mountain View, CA 94039. (When writing, please indicate your position title.)

$26,000–$80,000 +

Washington, Alaska

Data Base Analyst — Ground Floor Position. Well-established international software vendor is expanding its staff to include the company's first data base analyst. Successful candidate will possess expertise in a major data base management system such as IMS, TOTAL or IDMS. To $35,000.

IBM Programmer/Analyst — $$$ Training. Leading Seattle-based Fortune 500 financial organization offers the best in-house training in Seattle and a pleasant, modern working environment. Position requires OS COBOL experience. Relocation assistance provided. To $$$,$$$.

Micro Systems Software — Industry Leader. Rapidly growing Seattle-based software development organization has several openings for micro systems software specialists. Position involves design and development of leading edge products such as compilers and operating systems for major microcomputers. To $34,000.

Consultant — Systems. Seattle office of a Big 8 CPA firm seeks a professional capable of directing its systems consulting activities. Exposure to a broad variety of commercial applications desired. Degree required. To $40,000.

Software Engineers — Many Opportunities. Highly-regarded Pacific Northwest organization has several real-time ASSEMBLER and FORTRAN software development projects to staff. Graphics, SCADA, VAX, SEL, CDC and/or microcomputer skills are preferred. Bachelor's degree required. To $40,000.

Programmer/Analyst — Management & CICS Training. Rapidly expanding Western Washington data processing organization seeks a professional having at least two years of IBM OS/COBOL and VSAM experience to work on information systems. Continued expansion provides excellent opportunities for upward mobility. To $30,000.

Systems Programmer — Alaska. Expanding Alaska firm offers state-of-the-art exposure to an experienced IBM OS Systems Programmer. The successful candidate will join the state industry leader while enjoying the unique advantages of our 49th State. CICS, MVS/JES systems, internals desirable. To $45,000.

Data Processing Manager-Ground Floor Opportunity. Join a "Big 8" firm and expand their rapidly growing Pacific Northwest client base. CPA with 10 years experience in Data Processing sought. Professional can become a partner in one to three years. To $75,000.

Mark IV Programmer/Analyst. An outstanding opportunity to work with users. The ideal candidate will know marketing systems, MARK-IV, and COBOL. Two years experience sought to become a part of this exciting environment. To $30,000.

Data Base Analyst. Expanding Seattle firm offers state-of-the-art exposure to an experienced IBM Data Base Analyst. A track record in successful IMS Data Base design is sought. Relocation benefits are excellent. To $40,000.

Address Programmer/Analyst — Rural Environment. Enjoy small town living in a superb recreational area with a low cost-of-living. Solid organization needs ADABASE hands on experience to lead team. Outstanding relocation benefits. To $30,000.

Northern California

Systems Programmer — Superb Location. National company is looking for an experienced OS/MVS Systems Programmer to support their growing IBM 3033 facility. To $30,000.

Telecommunications Specialist. Join a rapidly expanding national computer network using Tandem front end processors and IBM hosts. Experience required with IBM SDLC and Tandem TAL. To $40,000.

Manager of Network Architecture. Nationally-known San Francisco Bay area based firm with extensive TP network. Responsible for network planning, installation, and support from controllers out. Must have large IBM experience. To $50,000.

Systems Programmer. Leading San Francisco based firm seeks a proven OS/MVS Systems Programmer experienced with MVS Internals, Tuning, and Capacity Planning. To $40,000.

Internal Consultant — IDMS. Progressive Bay Area firm located in a highly desirable suburb seeks a proven Systems Analyst with an extensive background in Systems Development using IDMS. To $32,000.

Project Leader — New Development. Major San Francisco financial institution seeks a proven Programmer/Analyst to lead the development of an Electronic Funds Transfer System in an IBM/OS environment using CICS. To $40,000.

Data Base Administrator — Prestigious Firm. Silicon Valley manufacturer offers an excellent opportunity for an experienced IMS Data Base Administrator familiar with the Data Communication facility. To $40,000.

Systems Analyst — Large System Environment. National consumer electronics firm seeks a proven Systems Analyst with strong manufacturing and accounting experience in a large IBM/OS environment. To $30,000.

National Sales Director. International firm located in San Francisco seeks proven Software salesperson to introduce new relational data base package and establish national accounts. Compensation will be structured to the individual. To $60,000.

Software Manager — Major Responsibility. San Francisco area division of Fortune 500 Corporation seeks shirtsleeves leader of real-time interactive Software group. Technical degree and at least 10 years of progressive development responsibility sought. To $60,000.

Project Leader — Southern Peninsula. Senior Level software engineer to lead mini/micro operating systems development team for new 32 bit processor. Requires 5 years software development with specific operating systems experience. Salary to $50,000 and equity potential.

Software Engineer — East Bench. Leading San Jose-area growth company seeks Microprocessor software professional to develop systems for the Communications industry. Experience with Assembler and PASCAL. To $40,000.

Southern California

New Corporate Data Center — Suburban Location. Fortune 500 organization, undergoing a major expansion, is in the process of centralizing all systems planning, programming, software and computer operations into a new corporate data center. The center, which is located in a highly desirable suburban location, will house the latest in computer hardware and software technology. Openings for Programmer/Analysts, Systems Analysts, Project Managers, EDP Auditors, System Programmers and Hardware/Software Planners. To $40,000.

Consultants - Big "8" Prestige. Los Angeles practice of a major Big 8 firm is committed to significant expansion in 1984. Excellent opportunities for senior level professionals with background in manufacturing, financial or administrative systems. To $50,000.

FORTRAN Programmer — Business Systems. Fast-growing Los Angeles suburban financial firm seeks professional with FORTRAN experience. Company is installing dual computers for on-line transaction-driven systems. To $32,000.

Programmer/Analysts — San Fernando Valley. Major institution located in a desirable suburban setting north of Los Angeles needs both mini and large systems Programmer/Analysts. Organization provides excellent benefits including exceptional benefits. To $34,000.

COBOL Programmer — Newport Beach. Well-known, diversified financial services firm seeks professional with a minimum one year COBOL programming experience. Outstanding work environment. CICS, MVS training provided. To $30,000.

Programmer/Analysts — Learn Data Base. Growing Los Angeles financial company seeks OS/COBOL Programmers who want to learn IMS. Presently developing new IMS systems for all financial applications. To $30,000.

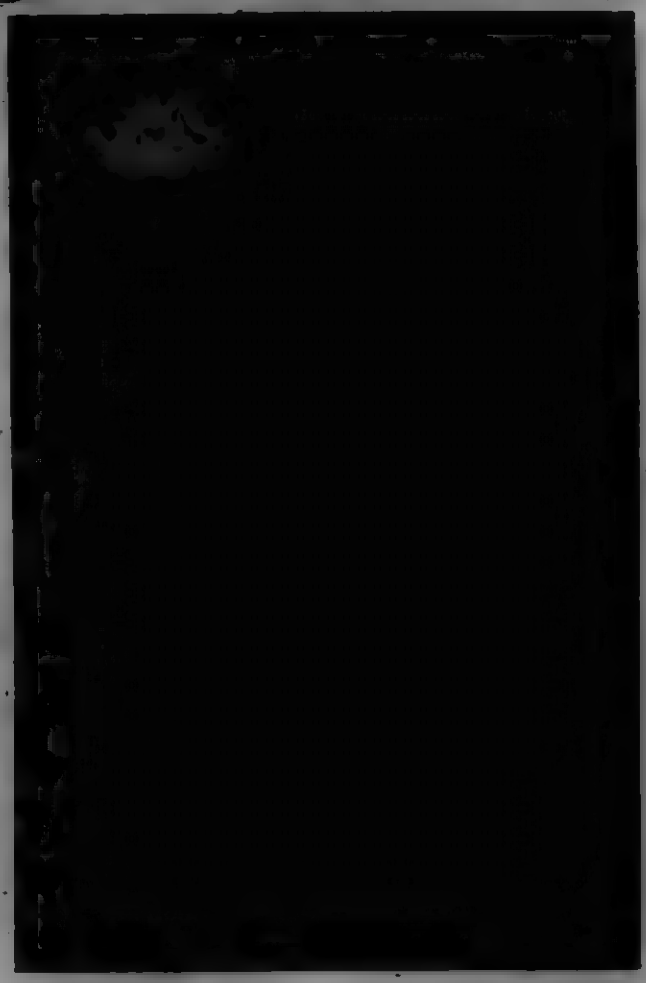
Software Development—Minicomputers. Successful Orange County minicomputer manufacturer seeks professionals with operating system computer data communications, data base or microprogramming experience. Company is committed to developing and marketing a complete line of state-of-the-art systems software products. To $40,000.

Sales Representatives — High Income. Orange County office of a leading computer OEM is seeking a Marketing Representative with a proven track record of selling business systems. Average income of sales force last year was over $60,000.

EDP Audit Specialist — Extensive In-House Training. Fortune 500 organization headquartered in Southern California seeks an EDP Audit Specialist experienced in designing accounting applications in an IBM OS environment. Training in auditing techniques and advanced computing provided. To $40,000.

MI Director — New Data Center. Progressive firm seeks a proven Manager capable of building a data processing organization from ground floor. Will select equipment, hire staff and set direction for successful and growing firm. Suburban Los Angeles community. To $50,000.

Communications Specialist — Multiple Openings. San Diego office of national consulting firm needs experienced software people to work on secure communications systems. To $40,000.



On-Line Programmers — OS Environment. Major San Diego based organization has several openings for On-Line Programmers to participate in a system utilizing a large network of terminals tied to one of IBM's largest computers. Selected candidates will work in an OS/MVS CICS, IMS environment. To $30,000.

Senior Minicomputer Systems Programmer. Manufacturing company headquartered in San Diego has a requirement for an experienced PDP-11 Programmer who has worked on RSX-11M. Will be involved in a major effort to develop a state-of-the-art real-time system. To $32,000.

Graphics Programmer/Analysts. One of San Diego's premier graphics software firms has several positions available for individuals with a background in FORTRAN. To $30,000.

MVS Systems Programmer. Large San Diego based organization seeks a professional to assist in the upgrade to MVS utilizing multi-CPU's and a large network of terminals. The company is one of the most stable organizations in the San Diego area, yet one of the most progressive in keeping up with state-of-the-art technology. To $40,000.

IBM Systems Programmer — Customer Support. A national computer manufacturer is seeking several additional Systems Programmers to staff their growing San Diego facility. Individuals with experience in IBM DOS or OS operating systems preferred. To $30,000.

Product Sales/Marketing. Exciting chance to work for leader. San Diego software firm seeks person with 5 years marketing and strategic planning experience. Prefer exposure to micro and system software industry. To $40,000.

Oregon

Programmer Analyst — Minicomputers. New development group has recently created positions for Programmer Analysts with solid background in BASIC language and the PICK operating system. Will develop new on-line applications for Order Entry, Financial and Inventory on mini-computers and then support field installation. Very creative environment in Portland. To $32,000.

Systems Programmer — Unix. Design and Develop next generation of hardware/software for expanding hi-tech firm in Portland. Will lead design effort using the Unix operating system for a product that supports graphics, databases and multiple peripheral devices. To $35,000.

Programmer/Analyst — New Development. Work on the development of new on-line applications for a solid and well established Portland manufacturing and distribution firm. Two–three years COBOL and one year CICS helpful. To $24,000.

Software Engineers — New Product Development. Newly formed division of a solid, Portland-based, high tech electronics firm engaged in design and development of Engineering Work Stations, has current positions for software engineers. Positions exist in graphics applications, data base applications, I/O interfaces, and diagnostics. Software Engineer with Unix 'C' in particular demand. To $40,000.

Senior Programmer/Analyst — New Development. Portland financial institution has new expansion position for person with four years or more COBOL and one year experience with IMS data base. First project in this very progressive and state-of-the-art environment is as team member to implement a new Deposit System. Any exposure to on-line helpful. To $30,000.

Senior Network Systems Programmer — Management Potential. Growth opportunity in state-of-the-art Portland shop for individual to be integral part of team responsible for total corporate network (includes international). Solid background with IBM SNA Networks, systems software experience with VTAM, NCP, NCCF, NPDA, needed. Exposure to other protocols a plus. Opportunity for management. To $30,000.

Programmer / Analyst — DEC Assembler. Excellent career opportunity for an individual with skills (two or more years) in DEC Assembler language. Will work on development of new business applications as well as support existing applications in a nationwide network. Creative environment in an expanding Portland-based firm. To $30,000.

Marketing Representatives — Systems Sales. Start-up position in Portland to market line of microprocessor and mini-computer systems to OEM's and user accounts. Highly-successful company provides high quality design and technical support. Seek self-starter with track record of successful hardware and/or software sales. First year potential $45,000 - $60,000.

Senior Programmer/Analyst — Learn IMS. Excellent opportunity to work in a team environment on the analysis, design and implementation of a Commercial Checking system for a growing Portland bank. Company will train in IMS. Position provides growth potential to Team Leader. Seek an individual with several years COBOL on large scale IBM, with a background in commercial checking systems. To $30,000.

source edp
Personnel Services

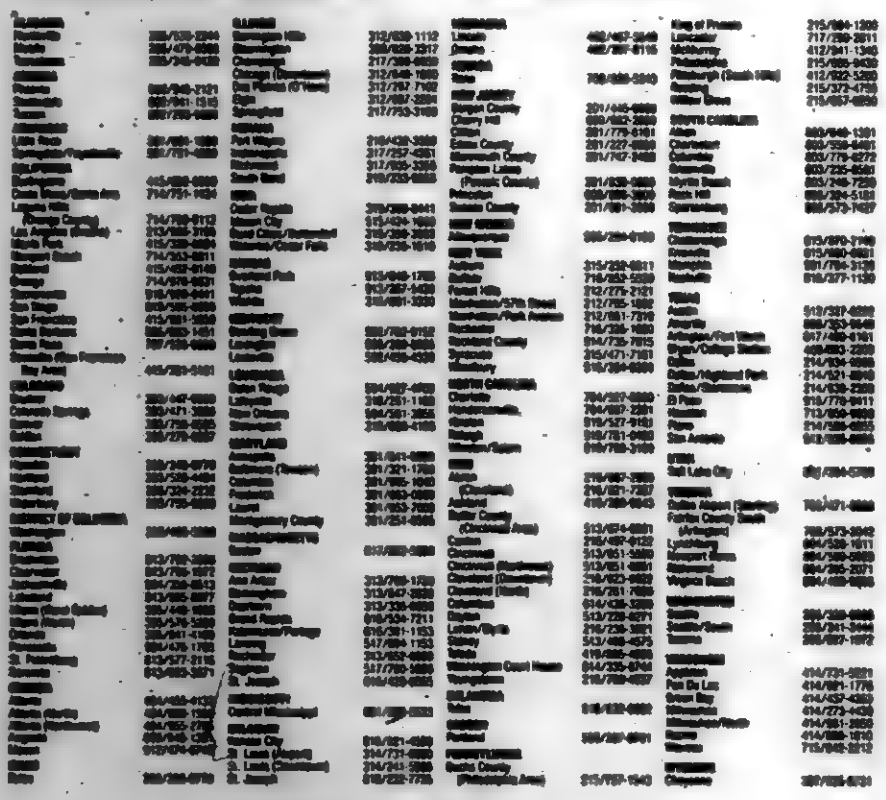
The world's largest recruitment firm that specializes exclusively in the computer profession.

SYSTEM DESIGN BEGINS AND ENDS WITH PEOPLE.

YOU CAN CALL US NOW OR YOU CAN CALL US LATER.

CompuSearch, a division of Management Recruiters, specializes in finding data processing people with the training and experience to step right into your DP staff positions and start producing — right now.

Don't be frustrated by staff vacancies or expansion needs. Call CompuSearch today! We'll find, screen and deliver the qualified people you need.



CompuSearch®

The Best And The Brightest Data Processing Professionals . . .

. . . have always found solid rewards and diverse challenges at CIBER. We're a respected Data Processing Consulting Firm that delivers a variety of applications development services to our customers across the nation.

Currently we have positions for those with a minimum of 3 years experience who enjoy a variety of assignments including analysis, programming, implementation and documentation with emphasis toward IDMS, IMS, CICS and many other state-of-the-art packages.

At CIBER, we respect your talents and efforts and encourage you to advance in your career. Our excellent compensation and attractive benefits package, including a 401K savings plan, paid medical insurance and tuition reimbursement provide the stimulation to achieve your career objectives.

Positions are available in all of our branch offices throughout the United States: Atlanta, Chicago, Dallas, Denver, Detroit, Houston, Phoenix, Sacramento and St. Louis.

Call us collect or send your resume to:

CIBER

Personnel Resources
67 E. Weldon, Suite 121
Phoenix, Arizona 85012
(602) 234-0411

The Data Processor's Choice

Programmers

GESCO'S ON THE MOVE

Programmers
(COBOL/CICS/IBM Assembler)

Systems Analysts
Project Leaders

As a leading growth-oriented software development and computer service organization serving the financial industry, Gesco offers the "competitive edge" to career professionals.

We've enjoyed more than a decade of continued growth by offering our extensive customer base the finest in innovative, reliable data processing services.

Due to expansion within our depository systems, we are seeking:

Programmers (COBOL/CICS/IBM Assembler), Systems Analysts and Project Leaders to add to our staff of professionals.

You should have a minimum of 2 years in the design, development and implementation of deposit systems. Experience with Weiland Software Systems is a strong plus but not required.

As a major servicer to the financial industry, Gesco has experienced a steady growth of approximately 30% a year which has provided increased technical opportunities for our programming and system staff.

Fresno is just three hours from the San Francisco Bay area and offers an outstanding educational system, climate and AFFORDABLE housing and relocation. We offer a competitive salary and benefits package.

For immediate, confidential consideration, please send resume to:
Tony Newborne

gesco corporation

THINK ABOUT IT!

One of the most respected names in our history is also one of the most respected names in the health insurance industry. At the Paul Revere Insurance Companies, you can experience the rewards that come from working with a leader. With more than 1200 people in our home office operation in Worcester, MA, and with over 200 people in our growing Information Systems Division, you'll find the right combination of challenge and career mobility.

PROJECT MANAGER

You will manage a systems development team of analyst programmers, having responsibility for both new development and maintenance production. Proven management experience in an IBM mainframe environment is required. Previous experience in installing software packages is desirable.

ANALYST PROGRAMMERS

Here's a great opportunity to place yourself in this rapidly expanding systems area. We're looking for qualified and dedicated analyst programmers with 2 or more years' COBOL experience in an OS/MVS environment. CICS experience is also a real plus.

We offer excellent salaries and the opportunity for advancement as well as a benefits plan that includes medical and dental insurances, an incentive savings plan and flexible hours.

Qualified applicants should send their resume and salary history, in confidence, to:

Warren Beck
Director - Human Resources
Paul Revere Insurance Companies
18 Chestnut Street
Worcester, MA 01608

An equal opportunity/affirmative action employer. M/F

The Paul Revere Companies

A MEMBER OF THE AVCO CORPORATION FAMILY

LOCKHEED IS PROGRAMMING CAREERS.

With your future in mind, Lockheed Missiles & Space Company is programming special careers in advanced technology. We've got all the right components to make this the opportunity of a lifetime. All we need now is for you to accept the challenge. Look over the descriptions listed below. One of them may be just what you've been waiting for.

ADVANCED COMPUTER/DIGITAL SYSTEM ARCHITECTS

R&D positions at various levels are available for individuals with a PhD and MS in Electrical Engineering/Computer Science with several years of experience, to study and create new systems based on non-von Neumann architecture utilizing highly distributed and parallel multi-processors (supercomputers). Work involves all aspects of computer and digital systems, including system software/firmware design, processor networking, fault tolerance, multi-processor hardware architecture and implementation, and VLSI chip design. Experience with microcomputer and microprocessor systems and architecture is essential.

DIGITAL IMAGE PROCESSING SCIENTISTS

We're seeking PhD or MS level graduates in Electrical Engineering or Computer Science with specialization in digital image processing and familiarity with computer programming. Your experience should also include algorithm development, computer simulation, pattern recognition and digital image enhancement. Positions are available in the following areas:

- Image Correlation
- Artificial Intelligence
- Automated Industrial Inspection
- Target Classification Based on 3-D Imagery

DATA COMMUNICATIONS NETWORK SYSTEMS SPECIALISTS

Specialists are needed to perform network design, planning, coordination, installation and troubleshooting system with knowledge of network configuration, circuit testing, modem strapping. A BS CS/EE and 6 - 8 years of experience desired.

SENIOR SYSTEMS SOFTWARE ANALYST

Strong analytic skills are required for this position which entails the analysis, enhancement, and maintenance of the EXEC 1100 operating system on a large scale Sperry Univac system in a scientific computing environment. Six years experience in programming including at least two years in operating systems, preferably EXEC 1100, is desired. A BS degree in Computer Science or technical field is required.

APL DATA SYSTEMS PROGRAMMERS

We're currently searching for a programmer to create and enhance user friendly APL data systems to status contractor and subcontractor performance. To qualify your background should include experience with IBM systems such as VM/CMS and use of Auxiliary Processors and IBM 3270 series video terminals. A BS in Computer Science, Mathematics or the equivalent is preferred.

MICROCOMPUTER BASED CONTROL SYSTEMS DESIGNERS

Experience with microprocessors and microprocessor based development systems with a BSEE or BSCS desired.

SOFTWARE ENGINEERS

We have openings in all areas for individuals with a minimum of a BS and three years experience in scientific data systems.

SR. DATA SYSTEMS ANALYST

Design and develop programming systems for processing management and central data. BS in Computer Science or Math and 6 - 8 years of experience desired.

COMMUNICATIONS NETWORKS ANALYST

In this position, you will use your knowledge of communications protocols and network configurations to participate in the design, installation, and management of communications networks which link Sperry Univac, DEC and CRAY systems. Familiarity with Sperry TELCOM and CMS 1100, DECnet, Ethernet, and communications hardware is highly desirable. A BS degree in a technical field, preferably Computer Science or Electrical Engineering, and 1 - 3 years experience in the communications or operating systems area is required.

SYSTEMS PROGRAMMERS

We are currently seeking both entry level and experienced systems programmers. The entry-level individuals should have a BSCS and knowledge of FORTRAN and Assembly languages. In this position, you'll design, develop, install and maintain systems software on a large scale Sperry Univac system. The positions available for more experienced individuals require expertise in either operating systems programming using EXEC 1100 internals or Meta-Assembler experience with IBM MVS, OS/MVS internals in software systems design and development activities. A BS in Computer Science and 4-or more years experience desired.

EXPERIENCE WITH SPECIAL ACCESS PROGRAMS AND CURRENT SBI REQUIRED.

For immediate consideration, please forward your resume to Lockheed Missiles & Space Company, Professional Employment, Dept. 653-0213, P.O. Box 504, Sunnyvale, CA 94086. We are an equal opportunity, affirmative action employer. U.S. citizenship is required.

Lockheed Missiles & Space Company

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

The Network of Tomorrow... Today at UNINET

While other companies are anticipating and planning for tomorrow, we are already there.

UNINET, a UNITED TELECOM company, is offering true state-of-the-art opportunities in the further development of our Fourth Generation Public Data Network. This network employs a fully distributed microprocessor architecture based upon 80186 and 80286 processor modules in a four-level bus hierarchy.

We offer the unique opportunity to apply your expertise in support of the design and development of a Public Data Network that achieves sophistication in high-level protocols and data switching rates unattainable under previously available technologies. We see this as a major breakthrough in providing a practical solution to today's business communications problems.

NETWORK SCIENTISTS

Immediate opportunities for applied research exist in the areas of:

- Packet and message switching strategies
- High-level network protocols including routing and congestion
- Incorporation of satellite facilities into backbone services
- Evaluation of theoretical topologies
- Analysis of algorithms
- Network management and control
- Protocol translation schems

UNINET offers an environment which encourages creative applied research and development addressing the most current opportunities in data networking. Candidates possessing advanced degree in Computer Science and Mathematics with significant experience in network architecture and network design are encouraged to apply.

DATA NETWORK SOFTWARE ENGINEERS

Immediate opportunities exist for the development of:

- Network Configuration and Control Systems (VMS)
- Network and Access Control Systems (RMX)

Candidates should have a strong background in the implementation of CCITT packet network protocols or network management and control protocol. Applicants desiring positions in network access engineering should posses detailed knowledge of X.3, X.28, X.29 and X.25 as well as synchronous DTE protocols. SNA experience is considered desirable. Degreed computer scientists with formal software engineering experience are encouraged to apply.

If you feel that your expertise can assist us in the further development of our future network, we invite your inquiry into the positions available. UNINET offers an excellent environment for career advancement and rewards.

For immediate consideration, forward your statement of qualifications in confidence to:

UNINET, INC.
A United Telecom Company
ATTN: Cheri McDougall
Dept. CW-1
10951 Lakeview Avenue
Lenexa, Kansas 66219

An Equal Opportunity Employer

UNINET

VM
Software Inc.

VM Software, Inc. is a profitable and rapidly growing packaged software firm located in the Northern Virginia/Washington, DC area. We are looking for top professionals to join our highly motivated staff. VMSI offers excellent salaries and benefits, and - most importantly - an outstanding work environment.

If you know IBM's VM/SP environment and thrive in an atmosphere of challenge, you won't find a more rewarding place to work than VMSI.

Our current openings include the following:

DEVELOPMENTAL PROGRAMMERS

VMSI's Development Department is looking for talented developmental programmers. Responsibilities include developing new products, as well as, maintaining and enhancing existing products. Applicants must have:

- Strong background in IBM System 370 Assembler
- Excellent debugging skills
- Good knowledge of CP/CMS internals
- Experience developing system level software
- The desire to work with other highly talented professionals

If you believe your talents match our requirements, send your resume and salary requirements to:

VM Software Inc.
2070 Chain Bridge Rd., Suite 355
Vienna, VA 22180
ATTN: Dawn Flannery

An Equal Opportunity Employer M/F

PROGRAMMER/ANALYST

SYSTEM/38

Fast growing company in rural country setting needs experienced programmer/analyst for development of manufacturing & retail distribution systems. The successful candidate will have 1 or more years hands on System/38 and 5 or more years Data Processing application development experience. Principles only please.

Please send resume and salary requirements to:
MIS Director

RENOVATOR'S SUPPLY, INC.
MILLERS FALLS, MA 01349

IMS APPLICATIONS PROGRAMMER/ANALYSTS

Positions available in Phoenix, Arizona

The Business Systems Development group which supports our charge card operations center in Phoenix, is expanding project areas and will require individuals for various programmer/analyst positions.

Requirements include a minimum of 2 years OS COBOL applications programming experience in an IBM compatible environment utilizing JCL, MVS, TSO and IMS batch and/or on-line applications.

Senior and lead positions require 4 to 6 years experience with systems analysis and design in an IMS environment.

American Express has state-of-the-art computer equipment which includes (3) 3081s, (2) 3033s, and (2) 3032s.

Salary commensurate with experience, and an excellent benefits package is available.

Qualified candidates may request an application be mailed to them by calling (602) 954-1741. Resumes and applications may be sent to:

American Express
P.O. Box 13781 Phoenix, Arizona 85002

AMERICAN EXPRESS

Management Information Services

Due to expansion, one of the Southwest's leading medical centers is currently seeking qualified applicants for the following positions:

- Senior Programmer/Analyst
  Minimum 3 years experience
- Programmer/Analyst
  Minimum 2 years experience
- Computer Programmer
  Minimum 1 year experience

Candidates should have knowledge in VAX operating systems, VMS/DCP utilizing, VAX COBOL and CAM file structures.

These positions offer an excellent benefits package. Compensation commensurate with experience. Interested candidates meeting qualifications should send resume to:

Providence Memorial Hospital
Dept. of Human Resources
3001 North Oregon Street
El Paso, Texas 79902
EOE

Supervisor of Systems Department. Supervise development of programs for business, legal, accounting, engineering. Design software for micro, mini, mainframe computers. Assist users. Need M.B.A., three months experience Programmer Analyst, 3.0 GPA for B.S. in Computer Science. Knowledge of Monroe Operating System, CP/M, MS-DOS operating system, Data General, IBM System/34, System 23, Monroe OC8820, 8080/Z80, 8088/8086, 6502 microprocessor, DBASE II software design, assembler. $24,000 per year. Apply at The Texas Employment Commission, San Antonio, Texas or send resume to The Texas Employment Commission, TEC Building, Austin, TX 78778. J.O. # 2511191. Ad paid by An Equal Employment Opportunity Employer.

MANAGER ADVANCED DESIGN

Los Angeles

Our client, a major systems software firm, seeks a SENIOR SYSTEMS ARCHITECT to design relational data base concepts for the 1990's.

You will be responsible for leading a small group of highly technical experts in data base design/systems architecture for large volumes of on-line, real time transaction processing. We seek candidates from a large computer vendor or university research and development department, with expertise in strategic planning of distributed computer networks.

Compensation: $100,000 and executive bonus.

Send resume with salary history or call (213) 277-7421.

Genovese & Co.
Management Consultants, Executive Search
1880 Century Park East
Los Angeles, Ca. 90067

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

Network and Communications Manager
The University of Alaska Computer Network

The UACN provides the statewide University of Alaska system of academic and administrative computing and data communications services. The Network and Communications Manager is responsible for evaluating current facilities and the requirements and forecasting the facilities needed to meet those requirements. Also, this post is responsible for installing, coordinating and supervising the operation, maintenance, enhancement, and planning of the communications network and its facilities. The successful applicant must possess knowledge of communications network architecture, engineering, local area networks, and data communications. In addition, skill in the management and development of large data communications networks are required.

The position is based in Fairbanks, Alaska and will report to the Director of Network and Operations. The salary range begins at $48,756 DOE.

Application letters, together with a resume and at least 3 professional references must be postmarked by March 30, 1984 and sent to:

Statewide Office of Human Resource Development
University of Alaska
368 Tanana Drive
Room 1 Bunnell Building
Fairbanks, Alaska 99701

Your application for employment with the University of Alaska may be subject to public disclosure should you be selected for the position.

The University of Alaska is an Equal Employment/Affirmative Action Employer and Educational Institution.

COMPUTER PROFESSIONALS

CDS is currently recruiting for several Fortune 500 companies in Ohio and Florida.

FLORIDA

PROGRAMMER/ANALYST - MVS, CICS, COBOL to work on financial, credit card applications. ($0-35K). SYSTEMS ANALYST - DOS/VSE to participate in a conversion from IBM 9130 to 4381. ($0-35K). PROGRAMMER - NOR, NEAT 3, and/or COBOL with at least 3 years experience to work on financial applications. ($0-35K). PROGRAMMER/ANALYST - OCCL, CL, COBOL with 3 years experience. ($0-35K). DATA PROCESSING MANAGER - DOS/VSE, 4381, COBOL. Must have management experience. ($0-45K).

OHIO

PROGRAMMER/ANALYST - CB, COBOL, IMS to work on banking purchased packages. ($0-35K). SUPERVISOR OF APPLICATIONS DEVELOPMENT - CB, COBOL, IMS or CICS. Supervise 3-4 project teams. ($0-40K). SENIOR DATA ANALYST - CB, IMS to administer UCC-10 data dictionary from a business viewpoint. ($0-45K). SENIOR PIA - NOR, VAX, COBOL to work on various business applications. ($0-40K). DIRECTOR OF EDP FOR A MAJOR TRANSPORTATION COMPANY - Must have financial background and strong data processing understanding. MBA preferred. ($0-60K).

For full details on these and other openings contact Mary Jo Pfeifer, or Bill at C.D.S., One 121 Northwest Plaza, Suite 1918, Dayton, Ohio 45431. Phone: (513) 253-6355.

or

Pete or Fred at 1035 S. Federal Highway, Atlantic Bank Building, Pompano Beach, Florida 33062. Phone: (305) 942-2662.

CALIF. & CICS
+ Openings in IMS, IDMS, MVS/VM
Sys. Programmers
(714) 891-1244
CPU COMPUTER PROFESSIONALS UNLIMITED, agency
7711 Garden Grove Blvd.
Ste. D, Garden Grove, CA 92641

INFORMATION SERVICES

Software Solutions Through Technology Integration

Today's GE Information Services

Today, General Electric Information Services is pioneering the integration of application software, data processing and communications technology to provide the software solutions that are the heart of today's information services industry. We deliver software solutions and computer power to clients around the world.

Technology Integration
Rockville, MD

We're integrating the personal computer with our remote computing services...continuing to develop our IBM VM MVS 3081/3033/4300 environment for large business users...refining our IBM and Honeywell based telecommunications systems...expanding our library of over 2,000 proven software packages...exploring new applications in the value added private, local and distributed networks and in office communications... developing new international financial and transportation services...and supporting these efforts with state-of-the-art quality assurance, client service and training, and administrative support. Contact: Rockville, MD.

Software Consulting
throughout the U.S.

We're expanding our Professional Services software consulting organization and making significant increases to our permanent staff of programmers, analysts and software engineers. Our Fortune 200 clients afford us the opportunity to consult in a number of commercial, scientific and military environments with a wide variety of equipment, languages, operating systems and database systems (IDMS, IMS DB/DC, ADABAS, and others) with distributed data processing using CICS or ADS/O. If you want to broaden your experience, be involved in interesting assignments, and still enjoy the advantages of working for a recognized leader, contact our San Francisco, CA; Oak Brook, IL; or Paramus, NJ locations.

The Rewards

A highly competitive salary, an opportunity to advance, and a comprehensive employee benefits program, which includes 100% tuition reimbursement and in-house training to keep your skills state-of-the-art, are some of the rewards of being a GE Information Services employee. Send your resume and salary requirements, in confidence, to:

Professional Staffing (C-6291), GENERAL ELECTRIC INFORMATION SERVICES COMPANY, 401 N. Washington Street, Rockville, MD 20850 / Two Embarcadero, Suite 1750, San Francisco, CA 94111 / 614 Commerce Drive, Oak Brook, IL 60521 / 140 East Ridgewood Avenue, MACK Center III, Paramus, NJ 07652.

INFORMATION SERVICES
General Electric Information Services Company
A Division of General Electric Company, U.S.A.

An Equal Opportunity Employer

DATA PROCESSING

PROGRAMMING GROUP LEADER
PROJECT ANALYSTS
SR. SYSTEM PROGRAMMERS
SYSTEM PROGRAMMER
PROGRAMMER ANALYSTS

Experienced D.P. Professionals needed for planned expansion.

CURRENT ENVIRONMENT:
IBM SYSTEM 3083 OS/MVS, CICS, IMS, PL/1, COBOL, MKIV, FOCUS

Must have at least 2-4 years experience in an MVS environment, fourth generation languages a plus. New system development experience is required. Excellent growth potential, salary and benefit package. Submit resume and salary requirement to:

Associated Wholesale Grocers
5000 Kansas Avenue (at I-635)
Kansas City, Ks. 66106

BANKING SYSTEMS MAJOR EXPANSION

The MIS Division of one of BOSTON's leading financial services orgs. has asked Robert Half to identify experienced computer professionals for the following positions. Technology includes IBM OS/MVS COBOL CICS. Applications include: Letter-of-Credit, MICR, Mutual Funds, DDA, Loans, Image Processing.

Positions include:
(2) Project Manager to $45,000
(2) Systems Consultants to $35,000
(4) Programmer Analysts to $30,000

Preference given to candidates with stable and progressive work records utilizing the above technologies in a banking or related industry.

ROBERT HALF
of Boston, Inc.

100 Summer Street
Boston, MA 02110
(617) 423-1500

EDP AUDITOR

Panhandle Eastern, a diversified energy company, seeks an experienced EDP Auditor to join our Kansas City staff. This person will be involved in performing system development, EDP operations, and post-implementation reviews.

The successful candidate will have an accounting degree, 2-3 years' experience with a working knowledge of audit retrieval software packages, and possess a general knowledge of COBOL programming.

This position offers a top compensation and benefits package and personal growth. Submit resume to Karen Downey.

Panhandle Eastern PIPE LINE COMPANY

P.O. Box 1348
Kansas City, Mo. 64141

Equal Opportunity Employer M/F

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

You've Heard The News —
AT&T Is Reaching Out In New Directions.

NOW, YOU CAN HELP TAKE UNIX* SYSTEM V TO NEW HEIGHTS

Unix System V represents the level of quality that AT&T Technologies has produced in the past... will produce in the future.

Unix System V is one of the most talked about software systems in the industry. It's fast becoming the standard and we're taking it even further.

Now, AT&T Technologies' Computer Systems Division invites you to consider joining us as we staff our marketing and product development areas for major projects in 1984.

SOFTWARE DEVELOPMENT ENGINEERS

Extensive development experience with Unix operating systems or related software will be essential. Understanding of C language or other high level languages also required. Familiarity with 32-bit microprocessor technology preferred.

HARDWARE DESIGN ENGINEERS

BSEE coupled with strong 32-bit microprocessor design experience will be essential for these positions involving state-of-the-art processor development. Knowledge of Unix operating or other multi-tasking systems essential.

PRODUCT PLANNERS

We're looking for individuals with at least 3 years of product development and marketing experience in the mini/microcomputer field. Knowledge of product strategies and life cycles essential. Familiarity with Unix operating system or related software required. An MBA is preferred.

THREE LOCATIONS — ONE GREAT CONCLUSION

We have opportunities available at our facilities in suburban Chicago, New Jersey and North Carolina. In addition to a competitive salary and benefits package, these opportunities offer you a historic development environment. This is the future of AT&T and Unix operating systems.

Send your resume with salary history in strictest confidence to:

An Equal Opportunity Employer M/F

AT&T *Trademark of AT&T Bell Laboratories

AT&T TECHNOLOGIES
COMPUTER SYSTEMS
DIVISION

2600 Warrenville Road, Lisle, IL 60532
Attn: Sam Phelps, Dept. 47

Computer Professionals

program your future with

anatec

There's spirit and energy at Anatec. It's generating excitement that's expanding as fast as our data processing business.

We're involved in developing some of the world's most sophisticated computer networks for our Fortune 500 clients. Our success in this area has opened new career opportunities for competent, qualified computer professionals with 2 or more years' experience in the following areas:

Programmer/Analysts — will develop manufacturing software and data base requirements using IMS with COBOL or PL/1.

Mini Computer Engineering Analysts — will design and be responsible for implementing and engineering shop floor system using Fortran. HP-1000 experience a plus.

Systems Analysts — using IBM Series I, will design and implement a shipping system using EDL/EDX.

Programmer/Analysts — using TANDEM, will develop quality control and broadcasting applications with COBOL. Knowledge of SCOBOL is a plus.

Systems Programmers — will technically support TANDEM Network. Knowledge of TANDEM operating system internals a must.

Telecommunications Specialists — will design and implement state-of-the-art networking configuration. Network includes IBM mainframes, minis, micros.

Information Center Specialists — will develop information center concept using high level languages, APL, and ADRS and act as a liaison between the data processing staff and user community. Good communication skills are important.

Some of our positions will allow you to work at our remote Birmingham, MI site with flexible work hour schedules, either on a full or part time basis.

At Anatec, we recognize knowledge and talent, and compensate accordingly. Your salary is coupled with generous fringes such as paid relocation, major medical, dental, optical, life and disability insurance, overtime pay, paid vacation, tuition reimbursement and more.

Find out more by writing us in confidence or calling collect (313) 540-4440. ANATEC, Analytical Technologies, Inc., 30300 Telegraph Rd., Suite 184CW Birmingham, MI 48010.

We are an Equal Opportunity Employer
.No agencies please

anatec
Analytical Technologies, Inc.
Succeeding With Imagination

One of the best...

"We are pleased to announce that AGS was just listed by Forbes magazine as one of the best small publicly held companies in the United States. We plan to maintain this reputation while growing out of the small public company category."

—AGS 3rd Quarter Update

This kind of reputation doesn't come easily. Dedication to client and staff is the basis upon which AGS has developed a 17-year history of quality services and growth.

Experience and expertise enable AGS to assume total responsibility for design through implementation of information processing and communications systems tailored to client specifications. Currently, our development efforts are centering around the IBM mainframe and UNIX/C environments. Strength in systems development, communications, database systems and training affords AGS a 90% repeat business quotient from one year to the next.

For more information about AGS services, subsidiaries or current career opportunities, please contact Mike Dolan at our corporate offices in Mountainside, New Jersey.

Opportunities are available nationwide.

Branch offices in: New York City; Long Island, Connecticut, Massachusetts, Colorado, Illinois, Florida

AGS Computers, Inc.
1139 Spruce Drive
Mountainside,
New Jersey 07092
(201) 654-4321

Equal Opportunity Employer M/F

Academic Coordinator Computing Services

Seeking a person to coordinate academic offerings in Computer Science and assist in the design/implementation of computer literacy program. Coordinator will assist in developing advanced-level courses in Computer Science, and integration of computers into curriculum. Normally, coordinator will teach one course each semester.

M.S. in Computer Science or a graduate degree in another area with broad computer experience. Applicants should qualify for faculty status. Twelve month position. Position is administrative and reports to the Dean of Academic Affairs. Salary negotiable. Position to begin in September, 1984 or Midsummer, 1984.

Apply by March 1st, 1984 to **Dean Richard Oehling, Assumption College, 500 Salisbury Street, Worcester, Mass. 01609.**

Assumption College is an EO/AA Employer.

MAINE

We have specialized in data processing professional placement in Maine for almost a fifth of a century. If you qualify for positions in the $25-40,000 range, please contact us in total confidence. Our clients pay our fees and provide relocation assistance.

Dr. ROMAC.
477 Congress St.
Portland, Maine 04101
(207) 773-4748

PROGRAMMER/ ANALYST

Idaho First National Bank, one of the Northwest's most progressive financial institutions is seeking a career-oriented Professional to assume key responsibility in the development and support of Payroll and Human Resources information systems.

The successful candidate should have at least 3 years experience in a large-scale IBM OS/VS1 or MVS environment with proficiency in COBOL, VSAM, CICS and OS/JCL.

Individual responsibility, ongoing challenge and professional recognition provide a stimulating growth environment at Idaho First. Plus, you will find in Idaho an exceptional quality of good living, outdoor recreational opportunities and excellent schools.

Idaho First offers competitive salaries and benefits, including paid relocation. For immediate consideration, please send resume to Dave Lovell, Placement Manager, Idaho First National Bank, P.O. Box 8247, Boise, ID 83733. An equal opportunity employer. PRINCIPALS ONLY PLEASE.

Idaho first

IDAHO FIRST NATIONAL BANK
AFFILIATE OF NORTHWEST FINANCIAL GROUP

[illegible]
Director,
Administrative Computing Center
Northern Illinois University

Duties and Responsibilities: Manage the design, development, production and maintenance of administrative data processing and management information systems. Supervise a staff of 34 (exempt) professionals. Report to the Associate Director of Computing Facilities.

Qualifications: Minimum of a Bachelor's Degree with a Master's Degree preferred. Knowledge of an administrative computing environment is required. The ability to relate to and work closely with management personnel is essential. Technical computing experience and management experience are essential. Must have demonstrated verbal, written and interpersonal skills. Preferably will have three years management experience including large project implementation on a multi-user system in a business, on-line computing environment. University experience is desirable.

Facilities: NIU is a university of 25,000 students located 65 miles west of downtown Chicago in the city of DeKalb. The university runs an Amdahl 470 V/8 mainframe system with 12 megabytes of main memory running under UTS. On-line systems run under CICS and the ADABAS Software system is used for many administrative applications.

Benefits: This is a 12-month position. Salary Range - high twenties to low forties, depending on experience and qualifications. Position available May 1, 1984. Application deadline March 16, 1984. To apply please send a resume and a list of three references to:

Search Committee
Director Administrative Computing
Executive Director of Computing Facilities
Northern Illinois University
[illegible]
DeKalb, Illinois 60115

equal opportunity/affirmative action employer M/F/H and Section 504

COMPUTER SCIENCES LIBRARIAN/ INFORMATION MANAGER

Major Wall Street law firm has an immediate opening for an experienced Information Manager to plan, implement and promote the services of a computer science center.

The position requires a Master's degree in Library Sciences, Communications or an equivalent degree. Applicants should be familiar with the contents and search strategies of a wide variety of on-line databases, related hardware and software, have working knowledge of word-/data processing and document management. Excellent verbal, written and interpersonal communications skills are required.

Salary commensurate with experience and education. Please send resume and salary requirement to: Box #10PM-04968, 350 E. 42 St., NY, NY 10017.

300 DP Openings

[illegible]

#1 employment agency, #1 DP employment consultant for 1982 in IPA (150 agencies, 500 consultants), now #1 agency in NPC (100 agencies, 400 consultants). Fee paid.

Rick Young, NPC (704) 366-1455

Corporate Personnel Consultants, Inc.
3205 Latrobe Drive, Suite 310
Charlotte, N.C. 28211

Software Design Engineers

If you like technology, you'll love Texas Instruments in Dallas or Lewisville.

Join the Equipment Group of Texas Instruments in the design and production of state-of-the-art electronics systems and subsystems such as radar, missile guidance, electro-optics, communications, navigation and intelligence systems. Our continued innovation in every realm of the government electronics business has made Texas Instruments a leader.

As a result, we're creating new career opportunities for qualified software design engineers. You'll work with a team that works on complete systems — not just components. You'll have the chance to broaden your technological capabilities and be recognized and rewarded for your accomplishments.

Right now, we have immediate openings for experienced software design engineers in the following areas:

- Real-time electro-optics projects (mid-level positions)
- Tool and language development (ADA and Pascal experience preferred; mid-level positions)
- Artificial intelligence software design
- Systems analysts for VAX/VMS operating systems
- CAD/CAM programmers
- Speech recognition applications designers

All positions require U.S. citizenship, a four-year technical degree and at least two years of related experience.

Now is your chance to make your career move to the dynamic Sunbelt and enjoy the Texas environment and lifestyle. Dallas and Lewisville (just outside of Dallas) have year-round recreational activities, lakes, major league sports, museums and theatre. The Dallas area boasts one of the lowest costs of living of any major metropolitan area in the nation and Texas has no state or city income taxes.

For immediate consideration, send your resume in confidence to: Ed Haynes/ Texas Instruments/P.O. Box 226015, M.S. 3186/Dallas, Texas 75266.

U.S. citizenship is a firm requirement for all Equipment Group positions.

An Equal Opportunity Employer M/F

TEXAS INSTRUMENTS

Creating useful products and services for you.

DATA LINK

Give us your resume

We'll Give YOU New England!

Some people come to eat on Cape Cod, some to ski in the White Mountains, and some to walk along the Maine beaches. But the professional climate is the real reason, and it is every bit as exciting.

There's nobody better qualified than Data Link to introduce you to New England. We know everyone in EDP worth knowing, and our list of client companies reads like the Who's Who of the business world.

Send your resume today, or call. All fees, interview, and relocation expenses are paid by our clients.

DATA LINK
National Recruiting Consultants
Exeter Professional Building
Hampton Road, Exeter, NH 03833
(603) 772-5400

The EDP Specialist

Specializing in career placement of EDP personnel of all disciplines. Our nationwide clients offer opportunities spanning the full spectrum of the Data Processing and Software/Hardware Engineering Field.

TRIMBEC GROUP

[illegible]
Assist Director, Data Processing Division, Director of Liverpool N.Y. 13088

481-4600

ROCKY MOUNTAIN OR NATIONAL

Telecommunications/SNA	C, UNIX, LAN, IBM protocols
Data Acquisition	8 and 16 bit MPU's, mainframes
CAD/CAM and Graphics	PASCAL, FORTRAN, PL/1
Data Base Development	IDMS, IMS, DB/DC
Systems Analysis	Business and Mfg. Appl.
Programming	Scientific, High-Tech, Biomed

Margo Kolle/Vic Tuttle
Career Marketing Associates
7100 E. Belleview #208
Englewood, CO 80111
(303) 779-0660

At Howard Systems International, TECHNICAL EXCELLENCE is our single most important commodity. As a growing leader in the data processing and management consulting industry, we have brought this excellence to over 100 of the Fortune 500 Companies. With 80% of our business being repeat business from satisfied customers, our reputation speaks for itself.

Our system can speak for you, too, with unparalleled opportunities in New York, New Jersey, Connecticut and Florida. If you're a talented Programmer or Programmer/Analyst with at least 3 years experience in the following, we'd like to hear from you

OS/DOS	IMS DB/DC	MODEL 204
MSA	IMS PL/1	FOCUS
BAL	CICS	VAX
	UNIX & "C"	

At Howard Systems, we keep our professionals a step ahead of the field with a superior in-house training program and one of the most competitive salary and benefit packages in the industry.

For consideration, please forward your resume to our New York Personnel Director, Barbara Ross, at 708 Third Avenue, 29th Floor, New York, NY 10017 or call collect for local interviews (212) 682-2400.

HOWARD SYSTEMS INTERNATIONAL, INC.

New York New Jersey Connecticut Orlando Chicago

SENIOR SYSTEMS ANALYST

IF YOU WANT MORE INVOLVEMENT, MORE INFLUENCE, AND MORE OPPORTUNITY, TALK TO DIGITAL.

With us, you will play a major role in the design and implementation of on-line interactive warehousing and distribution systems. You will develop project plans, schedules, and design specifications. A degree in Math, Computer Science, or equivalent is desirable. Position requires 2-3 years Materials Manufacturing experience and at least 3-5 years analysis, design and implementation of computer systems. Ideal candidate must have excellent communication skills. Background with Digital hardware/operating systems preferred.

We'll provide a competitive salary, benefits package, relocation assistance, and the chance to play a critical systems support role in one of the world's most advanced PWB facilities.

If you feel you have the background we need, talk to us about the future you can start building now. Send your resume and salary history to Dorothy Mitchiner, Digital Equipment Corporation, Dept. 0205 3804, 500 Fairforest Way, Greenville, SC 29607. Or call, (803) 297-7451.

We are an affirmative action employer.

digital™

PROGRAMMER/ANALYST

Hewlett-Packard in Roseville, California has an excellent opportunity for a Programmer/Analyst experienced in manufacturing applications. Applications programming and analysis responsibilities include interfacing with end users to develop systems specifications, writing and modifying systems, testing, debugging and implementation. Specific applications are in the area of Purchasing, Inventory Control, Production Scheduling and Factory Automation.

A BSCS or BS/MIS degree with 2 years of COBOL related experience is required. This person must have good communications skills and be able to work independently. Knowledge of HP3000 hardware is desirable.

Hewlett-Packard's Roseville Site is located in Northern California close to the Sierra foothills. Skiing and other forms of moutain recreation are nearby as are the cities of San Francisco and Sacramento.

Hewlett-Packard offers a competitive salary and outstanding benefits package including: cash profit sharing, stock purchase plan, basic life and group medical, dental and disability insurance and retirement plan.

Please send resume to:

Employment Office
Programmer/Analyst
Hewlett-Packard Company
8000 Foothills Blvd.
Roseville, CA 95678

We are an equal opportunity employer dedicated to affirmative action.

HEWLETT PACKARD

COMPUTER PROGRAMMER/ANALYST

The City of Dubuque, Iowa (pop. 62,000) invites applications for the position of Programmer/Analyst. The successful applicant must be able to analyze, design, program and document interactive, on-line data base oriented systems. Cobol proficiency is required. The successful applicant should possess a degree in computer science or related field, or any equivalent combination of education and experience. The salary range for this position is $20,020 to $28,392 with a beginning salary commensurate with experience. Resumes should be submitted to the Personnel Manager, City Hall, 13th and Central, Dubuque, IA 52001 by February 29, 1984. Qualified persons with physical and mental impairments are encouraged to apply.

AN EQUAL OPPORTUNITY AND AFFIRMATIVE ACTION EMPLOYER

Software Development

Come see and all beautiful SW Michigan. DIS is an engineering/systems house looking for software talent to staff exciting custom engineering projects. You must have 1-2 years experience in systems design and development on DEC minis/micro systems. Fortran a must, Pascal a plus. Career growth opportunities are unlimited in our growing company. Send resume in confidence to:

Digital Interface Systems, Inc.
Personnel Administrator
P.O. Box 703
St. Joseph, Michigan 49085
An Equal Opportunity Employer

DMS-1100 DATA BASE SPECIALIST

A progressive, multi-division paper manufacturer located in Central Wisconsin has an excellent opportunity available in its Information Systems Department. This person will provide systems programming support in data base and other systems control software and serve as back-up to the Data Base Administrator. This person will be working with a group that has been developing DMS systems for over 10 years.

B.S. degree in Computer Science, Math or Business Administration and 5 years of systems programming experience, including at least 2 years of experience with direct responsibility for installation, maintenance, and operation of the Sperry DMS-1100 and related software.

We offer competitive compensation and excellent employee benefits. Liberal relocation program. Send resume and salary requirements to:

Bert E. Johnson
Professional Employment Manager

CONSOLIDATED PAPERS, INC.
P.O. Box 90
Wisconsin Rapids, WI. 54494

Equal Opportunity Employer M/F
NO THIRD PARTY RESUMES, PLEASE.

Consolidated

BMS SOFTWARE SPECIALIST

RELOCATION TO ATLANTA

STATE OF THE ART IS WHERE WE STAND

PROS, Federal Reserve Communications System, Atlanta District has made a commitment to convert an online Storage/ex System to large IBM 3033 (E) mainframe. In order to orchestrate this challenging conversion we are seeking experienced programmers, software specialists and DBA'S. The analytical problem solvers we seek will also possess expertise in an OS/MVS, OSUCL large mainframe environment with an emphasis on IMS DB/DC, TSO/SPF, COBOL and PANVALET. Any IBM PC experience will be an added plus. In addition excellent communications are required. Along with salary commensurate with experience, benefits are excellent and the environment is truly challenging. For prompt consideration call:

Our Personnel Rep
Collect at (404) 586-1000
or send resume to:
Donna Gaines
P.O. Box 70845
Atlanta, GA 30366

EOE M/F

UNIVAC

Programmers, Systems Analysts, Data Base Analysts, Systems Programmers—let us update you on the rapidly changing UNIVAC market coast-to-coast. To confidentially explore exciting new career opportunities, rush a resume or call Gary Repetto, CPC.

DUNHILL OF ALBUQUERQUE INC

1717 Louisiana NE, Dept. C
Albuquerque, NM 87110
(505) 888-1971
Professionally Employment Solutions

SYSTEMS PROGRAMMERS
$ NOT LIMITED NEVER A FEE

MORE OPENINGS THAN WE CAN FILL for qualified Systems Programmers with experience on large scale IBM computers. Several locations in Florida, Texas, Atlanta, Georgia and the Carolinas. Company clients vary from nationally known firms to rapidly growing local and regional companies. All have state-of-the-art installations and are expanding rapidly. Companies are more than willing to pay fees, relocation and interview costs, etc. Their benefit programs vary but are all considerably better than average. We Need:

PROJECT LEADER - HEAVY MVS/XA	$OPEN
SR. SYSTEMS PROG. - MVS	$OPEN
SOFTWARE SPECIALIST - MVS	$OPEN
IMS DC SYSTEMS PROG	TO $45K
MVS/SP JES2 SYS PROG	TO $39K

SEND YOUR RESUME TODAY TO

Steve Stevenson, Partner

Jim King and Associates

1840 Gulf Life Tower/Jacksonville, Florida 32207
(904) 396-7371

THE LEADER IN ARRAY PROCESSING TECHNOLOGY

FLOATING POINT SYSTEMS, INC. offers opportunities in the leading edge of professional achievement. As the world leader in the design and manufacture of array processors, we are setting the pace for high-speed algorithm execution with the parallel architecture of our products. We are seeking applicants for immediate openings as:

• Design Automation Group Leader

Manage a design automation group providing and supporting CAE tools for logic design and simulation. BSCS or equivalent, and related leadership experience required.

• CAE System Administrator

Administer an APOLLO operating system devoted to CAE design. Some systems software and tools development also involved. Requires BSCS or equivalent, and operating systems experience.

• Applications Software Engineers

Will design and implement scientific and engineering applications software. Requires BSCS in Math or equivalent, and familiarity with assembly language coding and microcomputer architectures; a background in numerical analysis and/or signal processing is desirable.

• Senior Diagnostic Designer

Will coordinate and provide technical leadership for new product diagnostics development. Requires BSCS/BSEE or equivalent, and previous diagnostics design and development from conception to manufacturing integration.

• Diagnostic Designers

Will design, code, and document software diagnostics for new product development. Requires BSCS/BSEE or equivalent; experience in hardware testing and/or Motorola 68000 or 6809 is desirable.

• Computer Scientists

Will perform PDS support. Requires BSCS or equivalent, and experience in PDS development. VAX, APOLLO, or IBM experience preferred.

Will perform operating system support. Requires BSCS or equivalent. APOLLO, VAX/VMS, IBM/CMS, or IBM/MVS experience preferred.

Will design and develop software for new product development. Requires BSCS or equivalent, PASCAL or MODULA-2; compiler construction or graphics experience preferred.

• Senior Software Development Engineers

Will develop and enhance system communications between array processors and host operating systems. Requires BSCS or equivalent; operating systems internals and I/O device driver experience preferred.

• Electrical Design Engineer

Will participate in new product systems design. Requires BSEE or equivalent, and experience in analog and digital design of data processing power distribution and control systems.

• Senior Component Engineer

Qualify and document electrical components for data processing equipment. Requires BSEE or equivalent, and experience with engineering of passive electrical parts.

• Technical Support Software Engineer

Provide software technical support to field engineers and customers. Work with engineering and other customer service groups to enhance and maintain product performance and serviceability. Requires knowledge of computer operations, FORTRAN, and some assembly languages; prior customer service experience or related experience desirable.

• Senior Service Support Planning Engineers (Hardware and Software)

Develop new product service support planning. Requires BSCS/BSEE or equivalent, plus strong computer customer service planning, technical support, or field experience.

• Senior Electronics Design Liaison Engineers

Coordinate test and manufacture of new products. Requires BSEE or equivalent, and familiarity with mainframe computer architectures, manufacturing/engineering concepts, and ATE procedures.

Besides an excellent compensation and benefits package, your opportunity to work within a creative company is further enhanced by our location in metropolitan Portland, Oregon. The clean, green beauty of the Pacific Northwest surrounds us and the Cascade Mountains and the Pacific Ocean are nearby. Outdoor activities are year-round, the climate is always invigorating no matter what the season, and cultural events are plentiful in the Rose City.

If you want to join a company with exciting challenges, we welcome your resume: **FLOATING POINT SYSTEMS, INC., P.O. BOX 23489 RET-28, PORTLAND, OREGON 97223.** If you have questions, call **BOB CLAY at 1-800-547-8627.**

FPS FLOATING POINT SYSTEMS, INC.

We are an equal opportunity employer.

We are a rapidly growing organization which needs the following individuals to compliment and continue the growth at several of our autonomous paper mill subsidiaries located in Northern Wisconsin and SW Ohio.

• PROGRAMMER/ANALYSTS

Beautiful outdoor country in NE and NW Wisconsin. Degree preferred. 2-5 years programming experience required, of which at least one year must be with an IBM Systems 38.

• SUPERVISOR PROGRAMMING/ DATA PROCESSING

SW Ohio, very near Dayton. Degree preferred and 4-7 years programming experience. At least two years IBM Systems 38 programming and one year supervisory experience required.

Qualified candidates will receive a telephone interview. For confidential consideration, qualified candidates are encouraged to submit resumes including significant accomplishments and salary history to:

Ron Lindberg
PENTAIR
Suite 700
1700 W. Highway 36
St. Paul, MN 55113

Equal Opportunity Employer
No Agency Assistance Required.

MANAGER SYSTEM PROGRAMMING

$300 MM NYSE listed organization seeks exp'd manager to head up dept. Ideal candidate will have 3-5+ yrs sys prog exp and ig scale telecommunication systems. Excellent administrative and interpersonal skills a must, as well as 2+ yrs proven DP mgmt ability. Outstanding compensation package; excellent mobility. $41-50K

JAY [illegible]
FEE PAID 513-224-0800

ROBERT HALF OF DAYTON
P.O. Box 338 [illegible]
DAYTON, OH 45401
Lic. EAPC Member

DATAPOINT

- PROGRAMMERS
- ANALYSTS
- OPERATORS
- SALES PEOPLE

JOBS IN 40 US CITIES NATIONWIDE.
NOT AN AGENCY
SEND RESUME TO:

TIM TANNER
1377 K STREET, NW
SUITE 301
WASHINGTON, DC 20005

SYSTEMS ANALYST
Marketing Analyst

Spearhead the development of corporate Sales/Marketing analysis for the leader in the citrus/fruit beverage industry. Advise and influence executive direction of multi-million dollar budget.

Must have experience in syndicated resources (Nielsen, SAMI, Majers) quantitative analysis skills with E.D.P. software such as ADDATA or EXPRESS.

Prefer MBA with minimum 2 years experience or Bachelor's in Marketing/Bus. Econ./quantitative message with 5 years experience.

Accounting Analyst

For the development and maintenance of cost information systems and functions as interdepartmental liaison.

B.S. or equivalent in accounting required with 2 years experience in the design, implementation, and maintenance of accounting systems including report writing, batch processing, on-line processing, and data base systems.

Excellent salary and benefit programs. Send resume and salary history, in confidence, to: J. Burns, Dept. 2299.

Tropicana PRODUCTS, INC.

P.O. Box 338
Bradenton, FL 33506
An Affirmative Action Employer, M/F/H/V

If you're a software professional, you probably would prefer to:

- ☑ Build systems software rather than just use it.
- ☑ Work in a technical environment which offers unlimited professional growth and opportunity.
- ☑ Interact on a regular basis with the industry's recognized leaders in software development.

SYSTEMS PROGRAMMERS

Princeton, NJ & Dallas, TX

SOFTWARE SUPPORT

Software Support positions require a thorough understanding of MVS and/or DOS/VSE and BAL programming skills. Exposure to data bases is preferred.

SOFTWARE DEVELOPMENT

Requirements for these positions include at least 2 years operating systems experience using IBM BAL in any of the following environments: MVS/XA, DOS/VSE and VM. Experience with telecommunications, data base and transaction processing systems would be a significant plus.

"C" LANGUAGE PROGRAMMERS

Software Development & Project Management Positions

Princeton, NJ

These are exceptional opportunities to participate in newly created task groups responsible for the design and implementation of software for the IBM PC. Qualifications include:

- Minimum 2 years "C" language
- IBM PC and/or IBM Assembler Programming a plus
- Project Management positions require 2-3 years prior management experience.

Applied Data Research offers continued opportunities for career development, a comprehensive benefits package and a salary fully commensurate with your experience and potential. For consideration, please forward your resume or call Gary Johnson, (201) 874-9000, APPLIED DATA RESEARCH, INC., Route 206 & Orchard Road, CN-8, Princeton, NJ 08540.

APPLIED DATA RESEARCH

An equal opportunity employer

APPLICATIONS PROGRAMMERS

San Francisco Bay Area

Apply your specialized programming expertise with one of the most progressive major medical facilities on the West Coast—San Jose Hospital.

We are seeking experienced Applications Programmers to join our data processing staff. We're in the process of converting our hospital applications from batch to on-line systems.

If you would like to see what opportunities are available at your experience level, we encourage you to call Mary Mayes at (408) 292-7844 or submit your resume to San Jose Hospital, 675 East Santa Clara Street, San Jose, CA 95112. We are an Equal opportunity employer.

San Jose Hospital

HARDWARE/SOFTWARE SPECIALIST FOR NEW MANUFACTURING APPLIED TECHNOLOGY GROUP

We are a large unit of a Fortune 200 company in an attractive Southeastern location. We shall be developing and modifying the software and utilities to support the automated "factory of the future."

We are seeking several "hands on" individuals who are well-versed in manufacturing applications, systems software, and interfacing with data bases. Knowledge of some of the following is essential: UNIX, C language, RAMIS, ENGLISH, RELATE. Experience with CAD/CAM, robotics, or artificial intelligence would be desirable.

We can offer a competitive salary, superb benefits, an attractive lifestyle, high visibility, and OPPORTUNITY. For a prompt and confidential consideration, please send your resume with salary history to:

C91-84508
Computerworld
Box 880
Framingham, MA 01701

BETTER YET CONNECTICUT

An innovative and dynamic group within a diversified Fortune 100 corporation is centralizing MIS and developing a state-of-the-art information center to support North American operations. Due to promotions and expansion, the additional need for dynamic professionals with strong interpersonal skills, self-motivating aptitude, and management potential are sought for the following opportunities:

MANUFACTURING PROJECT LEADER

Develop and implement an integrated purchasing and material requirements software package supported by CICS. Ability to interface directly with user groups and supervise COBOL programmer/analysts is required. Either PAC II or METHOD 1 experience is a plus.

FINANCIAL PROJECT LEADER

Interface with Controller's group on flexibility through implementation of new on-line accounts receivable and credit system. Background with CICS, IFPS, and either DL/1 or BAS concepts is preferred. COBOL skills are required.

SOFTWARE PROGRAMMER

Ground floor opportunity to assist in technical planning and software support of IBM 4341 DOS/VSE converting to 4381 OS/MVS. Experience with VM/CMS, VTAM/NCP or CICS COMMAND is a plus.

CICS PROGRAMMER ANALYST

Support project leaders on development and implementation of new on-line financial and manufacturing systems. Assist in planning of DDP network and analysis of software packages. COBOL and CICS COMMAND is required.

Excellent salary, comprehensive benefits, and continued EDP education is offered. Qualified candidates may submit their resume and salary history to our personnel consultant.

ROMAC & ASSOCIATES

EDP Placement Specialists since 1968
(203) 255-0145
149 Sherman Street, Fairfield, Connecticut 06430
AN EQUAL OPPORTUNITY EMPLOYER

Programmer Analyst. Design software for micro, mini computers. Develop programs for accountants. Need GPA of 3.00 for M.S. in Computer Science. Proficiency in database systems, application of dBase II language. Knowledge of COBOL, JCL, PASCAL, ALGOL, Assembler. Familiar with operating systems for micro, mini, mainframe, and with computer architectures, compilers. $21,000 per year. Apply at The Texas Employment Commission, San Antonio, Texas, or send resume to The Texas Employment Commission, TEC Building, Austin, TX 78778, J.O. # 2511180. Ad paid by An Equal Employment Opportunity Employer.

PROGRAMMER/ANALYST

Programmer/Analyst to work under the direction of a Project Manager and with other members of a project team to analyze, design, implement and maintain application reporting systems. This includes working with user families to develop and maintain projects, assisting in planning designated projects, presenting progress logs to project team members for discussion with managers, and testing systems. Bachelor's degree in Computer Science/Data Processing with knowledge of CICS, VSAM, COBOL, and one year experience as a Programmer/Analyst or two years experience as a Programmer required. Salary $26,000 per year, 40 hour week. Send resumes to Michigan Employment Security Commission, Room 415, 7310 Woodward Street, Mt. Airmil, Reference Number 6884. This is an employer paid ad.

PROGRAMMER/ANALYST

Excellent opportunity available in the Sunbelt for an experienced Programmer. Our rapidly expanding savings and loan has an immediate opening for an individual with 2-3 years direct programming experience. Familiarity with COBOL, Burroughs B3900 series and Thrift Financial systems preferred. College degree a plus.

We offer an excellent benefits package and salary commensurate with experience. Please send resume with salary history to: Sandi Stuckpoe and Lewis, P.O. Box 888, Slidell, LA 70459, Attn: Gail Simpson.

COMPUTER ANALYST PROGRAMMER

Progressive marketing and distribution leader, Barbasco SYSCO Food Services, seeks a multi talented analyst programmer to join its data processing staff.

Experience with IBM mainframe COBOL, Online and Command Level CICS, DDP is required. Experience in food distribution helpful, but not required. Future opportunity with a nationwide corporation, SYSCO, would also be available. This position offers competitive compensation, great benefits, and growth potential. Please submit resume, salary requirements, and references in confidence to:

Director of Personnel
BARBASCO SYSCO
1201 South Avenue
Baraboo, WI 53913
EOE/AA/M/F

FLORIDA CONNECTION

...ABILITY...

All Expenses Paid

Our clients, in urgent need of your expertise will pay all your expenses in relocating you to an area of Sun & Fun, No State Tax. Average Temperature 75°

TELECOMMUNICATION PROGRAMMERS
PROGRAMMER ANALYSTS
SYSTEMS ANALYSTS
SYSTEMS PROGRAMMERS
DATA BASE ANALYSTS

Burroughs Banking Southern

15 Openings.
Project Leader, S/A, Programmers.
Jobs Available in GA, LA, TX and FL.
Salaries Up To $38K
Need Now
Call or Mail Resume:
Executive Consultants
1600 Fairfield Avenue
Suite 102
Shreveport, LA 71101
(318) 222-1000

SENIOR SYSTEMS ANALYST/ DATA BASE MANAGER

($37,347 - $43,237)

SYSTEMS PROGRAMMER

($30,466 - $44,496)

IBM Experience Preferred

Obtain job descriptions/applications at Personnel, San Jose Community College District, 4750 San Felipe Road, San Jose, CA 95135, (408) 270-6400. Positions to be filled AS SOON AS POSSIBLE. Send applications and resumes to Personnel Office IMMEDIATELY. EOE

RESULTS

Whether you're buying, selling, swapping, hiring or looking, you get results from Computerworld classifieds.

Maybe that's why Computerworld gets more classified advertising than all the other computer publications put together!

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 709 FRAMINGHAM, MA 01701

postage will be paid by

CIRCULATION DEPARTMENT

COMPUTERWORLD

375 Cochituate Road, Rte. 30
Box 897
Framingham, MA 01701-9985

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

ASSISTANT DIRECTOR OF ACADEMIC SERVICES
UNIVERSITY OF NEVADA SYSTEM COMPUTING CENTER
Position located on the University of Nevada Las Vegas campus

This professional position supervises 3-5 data processing employees in daily computer operations, scheduling and operation support functions, and classroom training for the UNSCC's academic site. The successful candidate supervises, plans for and assists in short- and long-range planning for the academic site. The Academic site presently supports a Cyber 170, 2 Honeywell 66/60's, and a DEC VAX 11/780.

The successful candidate will have at least a Master's Degree (with PhD preferred) and significant computer experience in an area of educational delivery. Experience in software support, communication systems, and the exploitation of drivers will also be considered.

Application deadline: March 9, 1984.
Position to be filled on or before July 1, 1984.
Send resume and salary requirements to:

Mark Reed, Acting Director
University of Nevada
System Computing Center
Academic Research Facilities
4505 Maryland Parkway
Las Vegas, NV 89154

Copies of transcripts and three letters of recommendation will also be required for a complete application.

The University of Nevada System is an equal opportunity/affirmative action employer, and does not discriminate on the basis of race, creed, color, sex, age, national origin, handicap, or veteran status in any program or activity it operates.

FREE RESUME KIT
FOR DP PERSONNEL & SOFTWARE ENGINEER

Writing a good resume isn't easy. That's why we have put together our Resume Kit in a simplified but proven format with methods & details to assist you in preparing an effective resume.

Fill In Coupon & Return it to us for your FREE KIT.

Name
Address
City State Zip
Phone Home Office
Degree Year Job Title

Nationwide Personnel Svc., Inc.
P.O. Box 30405
Fayetteville, N.C. 28306

PROGRAMMER/ANALYST
THE RIGHT STUFF

Do you have it? Do you want to make more money in a secure position? Do you want a chance to demonstrate how good you really are to prove that can appreciate your technical expertise? If you have THE RIGHT STUFF, we offer genuine career advancement, full time positions, excellent benefits. Join the professionals, join Rand. Experienced professionals only.

S/36 COBOL
IBM S/36 RPG II
DEC VAX COBOL
DEC DIBOL
DATA GENERAL FORTRAN
IDMS COBOL
BANKING EXP. - MBA PMS
CICS COBOL
CICS PL/I
PDP/11 PASCAL
* MBA SOFTWARE PMS *
TANDEM COBOL

Prior commuting experience not required. Call or write:

Chuck Stark
RAND SYSTEMS CORP.
6400 W. Maple Rd., Suite 2211
West Bloomfield, MI 48033
(313) 855-3377

New York ... New Jersey ... Philadelphia ... Delaware ... Orlando ... Miami ... Tampa ... Jacksonville ... Atlanta ... Houston ... Dallas ...Denver...Tulsa...Chicago...St. Louis...Detroit...Cincinnati...San Francisco...San Jose

Wherever you thrive...from the sunny coast of Florida to the cultural mecca that is New York City ...to the delightful charm of San Francisco... Computer Horizons Corp. offers stimulating and rewarding careers for talented EDP Professionals to move up to consultant status and get involved in some of the most exciting development projects of the decade.

As one of the nation's foremost DP consulting firms, with offices from coast to coast, CHC boasts an impressive list of Fortune 500 clients... in vital industries ranging from banking to communications to health care. For talented DP Professionals, this translates into virtually unlimited opportunities to work in a variety of key industries in the city of your choice.

Our phenomenal record of growth has created outstanding opportunities for success-oriented:

- *PROJECT LEADERS*
- *ANALYSTS*
- *PROGRAMMER/ANALYSTS*
- *DATA BASE ANALYSTS*
- *SYSTEMS PROGRAMMERS*
- *BUSINESS ANALYSTS*

The top talent we seek will have the superior communications skills essential to interface effectively with client management. Additionally, design or implementation experience in one of the following is necessary: • IMS • CICS • MODEL 204 • IDMS/ADSO • ACF or PARS • COBOL • PL/1 • BAL or ALC • POCUS • RAMIS • IBM P/C • DEC TOPS 20 • UNIX 'C' • TANDEM • HONEYWELL LEVEL 6 • Any Internals • System 34 RPG • Data Manager • UCC 7 • CAD/CAM

In addition we seek analysts who have an applications background in Banking (DDA, Florida Software, HOGAN), Brokerage (401K, pensions), or Insurance (Life 70, Universal Life, Halstead Metrics).

At Computer Horizons, you'll choose the lifestyle you want to match your career-style. What's more, you'll be rewarded with an exceptional salary and comprehensive benefits which include major medical, dental and life insurance, tuition reimbursement, relocation assistance, deferred income savings plan (401K), long term disability, and an intensive in-house training program designed to keep you a step ahead in the field.

For consideration, please send your confidential resume to or call: Mr. Bob Palmieri, Vice President of Personnel COMPUTER HORIZONS CORP. 747 Third Avenue, New York, New York 10017 (800) 847-4887

An Equal Opportunity Employer M/F
*1401 is a trademark product of Bell Labs

Computer Horizons Corp.

Have You Considered Teaching?

Growing enrollments have resulted in excellent career opportunities in teaching at nationally recognized suburban Kansas City community college.

To qualify you must be degreed, have data processing work experience, and be able to teach in such areas as COBOL, IBM OS/VS JCL, ALC, RPG II, and Microcomputers.

We offer the right candidate a nine-month, board-level contract; a competitive salary; full insurance options; paid sabbatical; professional development allowances; and an innovative, state-of-the-art environment.

For more information, call or write:

Personnel Office
JOHNSON COUNTY COMMUNITY COLLEGE
12345 College Blvd. at Quivira
Overland Park, KS 66210-1299
(913) 541-3577
An Equal Opportunity Employer

Professional Master's Degree
Computer and Information Science

Advance your career in information systems through Dartmouth's distinctive professional program. Our two-year program is designed to equip you to take a leading role in planning, designing, and developing effective business solutions to business problems.

In the CIS Program, you will study current methodologies for planning, analysis, and design; strategies and issues in the management of information systems; business organization; project management; database systems; networks and distributed processing; professional communication. Learn from guest lectures by practicing managers of information systems, case studies, and professionals-in-residence. An internship is required of each student.

If you have previous experience in the computing field but want to be equipped to assume more responsibility and leadership, consider joining us next year. For more information, write: Program in Computer and Information Science, Dept. C, Nathan Smith Building, Hanover, NH 03755.

Dartmouth College

Software engineers. This is the place.

At Kodak, computers play a vital and ever-increasing role in every step of production. And we need skilled professionals who want to share in the challenges and rewards of technological leadership.

We're looking for talented software and computer engineers with a BS or MS and technical experience in minicomputer and microprocessor systems used in the development of software for real-time equipment control. Assignments may involve design of software systems for products or manufacturing control; programming mini- and/or microcomputers; integrating computer software and hardware into complex electromechanical systems; and quality assurance of computer programs.

Kodak also has opportunities for electrical engineers in the areas of design and development, video, test, systems and optical engineering.

We offer competitive salaries, liberal benefits, and opportunities for individual contribution and growth. Positions are available now. If you have the necessary skills and drive to meet the challenge of working for a corporation in the forefront of technology, send your resume today.

Personnel Resources
Dept. DCPW
Eastman Kodak Company
Rochester, NY 14650

Kodak. The right place. The right time.
An equal opportunity employer

CICS Systems Programmer

Seattle

Blue Cross, a leader in the rapidly changing health insurance field, is seeking an experienced, self-motivated CICS System Programmer to join our technical services group. In addition to CICS systems programming and general systems programming activities, tasks will include supporting our operations and application programming staffs in an MVS/SP JES2 CICS (ALC, COBOL, Macro and Command level) environment.

Qualified candidates will have strong written and verbal communications skills and a working knowledge of assembler programming, CICS systems programming, VSAM, OS JCL and OS utilities. Experience with SMP, COBOL, SAS, DL/I, MVS, IMS DB/DC, NCP, TSO, VTAM, OS systems programming, ROSCOE and LIBRARIAN will be a plus.

Blue Cross offers relocation expenses, fully competitive salary commensurate with skill and experience, and official training. Both junior and senior level applicants will be considered. Please send resume in confidence to: Blue Cross of Washington & Alaska, Manager of Technical Services, c/o Personnel Dept., 15700 Dayton Ave. North, Seattle, WA 98133.

Equal opportunity employer m/f/h/v.

Blue Cross
of Washington and Alaska

Programmer Analyst

Medium sized Chicago based manufacturing firm (headquartered in Niles, Illinois) has an opening for a Programmer Analyst.

Successful candidate will have a manufacturing background. Firm has 4341's and 8140's using state-of-the-art software. COBOL and DL1 are essential. Minimum of 4 years experience required.

Position offers an excellent salary/benefits package. Qualified applicants please submit confidential resume to:

Tempel Steel Company
1640 West Belmont Chicago, Illinois 60640
(312) 252-6400

DATA PROCESSING

上級管理職募集
SENIOR EXECUTIVE WANTED

システム開発および顧客サポート部門の部長としてプログラマー等約20名のグループを統率できる方、チャレンジ精神旺盛な方。
弊社は病院専門のコンピュータ システム サービス会社として、世界のトップを走る会社です。

Candidates must have the ability to manage a group of about 20 people in the fields of both system development and customer support as the director of such department. A person of challenging spirit is welcome.

The Company is an international leader of hospital information systems providers.

勤務地：東京(弊社と三菱銀行との合弁会社)
待　遇：面談

Office: Tokyo (Joint Venture Company with Mitsubishi Bank)
Salary: Negotiable

下記あて英文履歴書をお送り下さい。

Please send resume in English to the following address:

SMS

Shared Medical Systems Corporation

51 Valley Stream Parkway, Malvern, PA 19355
Attention: Mr. F. Mansfield, V.P. International Division
Tel: 215-296-6300

An equal opportunity employer

DATA BASE MANAGEMENT

We are operating for a few Data Base and Software Professionals.

DATA BASE MANAGER - Will develop and supervise an IMS D.B. staff. Must be able to develop a business systems plan and standards & procedures. Salary to $50K.

DATA BASE ANALYST-Must understand Physical & Logical relationships, Structured Analysis and IMS Dictionary. Salary to 40K.

SOFTWARE SYSTEMS - Should have experience with any combination of the following: OS/MVS, DOS/VSE, VM, IMS, CICS, VTAM/NCP, SNA/SDLC. Salary Open.

We are a Data Base experienced recruiting and consulting firm which has contacts nationwide. We accept resumes or will personally discuss "in-depth" these situations.

Merrell, Liguore & O'Brien, Inc.
P.O. Box 636
Allison Park, PA 15101
412/487-5183

PROGRAMMER ANALYSTS

Exciting growth positions available for competent professionals with 3-5 years experience in one or more of the following areas: BAL, IBM PC, Univac 90/XX, Univac System 80, Communications and Financial Systems. Please contact:

Infolibid
388 US Route One
Monmouth Junction, NJ 08852
(201) 329-4627
EOE

(1984) FUTURE WORLD
D P BANKING S & L
$25 000 to $ 00 000

Are you currently investigating a possible career in the banking industry? Our service is totally unique and an opportunity we can provide an in-depth analysis and career evaluation. Become a part of our Future World and we'll help you through every step with a personal confidential approach. Go ahead and SHOUT, we are not.

Andy Fink
516-379-1291
Banking Division
Advice and Associates
P.O. Box 10002
Greensboro, North Carolina 27408
Always fee paid

HIRING?

More than half a million computer people read Computerworld every week. And, among our 529,650 readers at user organizations, about half claim to look at recruitment ads at least every other week (only a small percentage say they never look at recruitment ads). No wonder Computerworld carries more recruitment ads for computer people than any other publication. To place your ad or to get a rate card with complete details on Computerworld Classifieds,

call or write:

Classified Advertising
Computerworld
Box 880
Framingham, MA 01701
1-800-343-6474
617-879-0700

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

IMMEDIATE OPENING FOR PROGRAMMER/DATA PROCESSING MANAGER at progressive 167-bed health facility located in beautiful Cody, Wyoming, a growing community of approximately 7,800. Prefer B.S. in Computer Science or related field, with supervisory experience and familiarity with hospital data entry, accounting and patient billing procedures. Must have 4-5 years programming experience, of which 2 are in a hospital setting. One or more years of RPG II on System/34-36 or RPG III on System/38 essential. Located 50 miles from the East Entrance of Yellowstone Park in Northwestern Wyoming, we offer a diversified lifestyle away from the fast pace, with many recreational opportunities year-round. Excellent salary and benefit package. We welcome inquiries. Send resume/salary history to: Gayle Fisig, Personnel- West Park Hospital, 707 Sheridan Avenue, Cody, WY 82414, (307) 527-7501 Ext. 305 or 272. *EOE M/F.*

Personal computer users:

FOR FREE ACCESS TO A BETTER JOB CALL CLEO.

(213) 618-8888 (408) 294-3888
(415) 482-1530 (714) 476-8888
(619) 234-8888 (818) 999-8888
Standard ASCII code
Access assistance:
(213) 618-1525

CLEO

DP POSITIONS SEATTLE/PORTLAND

MVS, Sr. Systems Programmer $40K
Sr. IMS Systems Prog. $40K
Systems Performance-data base consultant to applications group.
Sr. Programmer/Analyst $30K
Financial app. COBOL/1 on line transaction.
Programmer/Analyst $30K
COBOL/1 or VSAM on-line dev.
Sr. PIA IMS applications dev ..... to $40K
Data Admin. Analyst ..... to $40K
data resources mgmt lead DP design.
Please forward resume immediately to:

HOUSER, MARTIN MORRIS & ASSOC.
(206) 453-2700
[illegible]

VM SPECIALISTS

3+ years' VM/CMS internals experience required by consulting and multi-divisional East Coast clients. Will have senior level tech support, training, long-range planning responsibilities. Salaries $30 - $60,000.

ROBERT HALF
Of Hartford, Inc.
111 Pearl St.
Hartford, CT 01603
(203) 278-7170
Personnel Consultants

PROGRAMMER ANALYSTS / PROJECT LEADERS / SYSTEMS ANALYSTS

Help CGA set the standard in consulting.

Over the last 15 years, CGA has acquired a solid reputation as the number one DP consulting firm in the country. We've built that reputation by insisting on the highest standards of integrity, achievement and technical excellence.

Our people are the best consultants in the business. More than 500 top-notch professionals nationwide. And we need more just like them.

We're looking, specifically, for programmer analysts, project leaders and systems analysts with skills in the following areas:

COBOL, BAL, PL-1, UNIX-C, IMS, CICS, IDMS, FOCUS, RAMIS, TANDEM, ADABASE.

For excellent salaries. Challenging assignments. Complete fringe benefits. For a lifetime career that meets the highest standards, call CGA today. Or send your resume, in complete confidence, to the CGA office nearest you.

CGA CONSULTING OFFICES

Northeast
Stu Grader
25 Commerce Drive
Cranford, NJ 07016
(201) 272-7950

Shirley Herzfeld
369 Lexington Avenue
New York, NY 10017
(212) 883-0900

Central
Joni Kreitzer
212 West National Road
Vandalia, OH 45377
(513) 890-1200

Mid-Atlantic
JoAnn Russo
111 Presidential Boulevard
Bala Cynwyd, PA 19004
(215) 668-4626

Peter McElhinney
1501 Santa Rosa Road
Richmond, VA 23288
(804) 288-1422

Jack McFarland
401 East Pratt Street
World Trade Center
Baltimore, MD 21202
(301) 837-0343

Micki Popp
White Flint Mall
11301 Rockville Pike
North Bethesda, MD 20895
(301) 231-7850

Midwest
Mary Liner
Arbor Terrace II
205 Bishops Way
Suite 206
Brookfield, WI 53005
(414) 784-9337

Steve Gruntmeyer
1011 East Touhy Avenue
Des Plaines, IL 60018
(312) 296-9660

Leah Fischer
7300 France Avenue South
Edina, MN 55435
(612) 835-7779

Southwest
Randy Techman
5757 Alpha Road
Dallas, TX 75240
(214) 385-3290

Mike Jones
1111 North Loop West
Houston, TX 77008
(713) 869-8001

Corporate Headquarters
CGA Computer, Inc.
960 Holmdel Road
Holmdel, NJ 07733
(201) 946-8900

cga

Setting the Standard in Consulting.

MANAGER DATA PROCESSING

Charlottesville, VA subsidiary of ITT Corp. needs a Data Processing Manager. Responsible for maintaining administrative and production systems that meet the changing needs of a dynamic operating environment involved in publishing law books. Full managerial responsibility for D.P. department consisting of 28 employees currently operating IBM 4341 computer under DOS/VSE. Candidate should have bachelor's degree with 6 years D.P. experience. At least 2 years experience managing a D.P. group. EOE M/F. Please send resume with salary requirements to:

LAW PUBLISHERS SINCE 1855

Reginald B. Ryals
Director of Administration
The Michie Company Law Publishers
P.O. Box 7587
Charlottesville, VA 22906

WASHINGTON D.C.

EDP AUDIT MANAGER

Rapidly growing DC financial institution seeks seasoned EDP Auditor. Must have career oriented towards senior management. This position is not a standard it leads to the top! Great Benefits. $30K

ROBERT HALF
OF WASHINGTON, INC.
7316 Wisconsin Ave. Suite 404
Washington, D.C. 20014
(301) 652-1000

HARVEY'S RESORT HOTEL - LAKE TAHOE
SERIES I PROGRAMMER

Minimum 2 years experience at senior level on Series I Program. EDX/EDL language on Series I a must. Establish and meet schedules, user interaction, challenges and responsibilities. College degree or equivalent required.

Send resume and salary requirements to:
Harvey's Resort Hotel - Lake Tahoe
P.O. Box 128
Stateline, NV 89449
Attn: Personnel
EOE

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

SOFTWARE DEVELOPMENT OPPORTUNITIES IN FORT WORTH.

We are a high technology company that performs wireline and other well evaluation services for the oil and gas industry. As we move into an exciting recovery period for our industry we are looking for top individuals who can build on our tradition of excellence.

We have openings for degreed Software Development professionals in two areas of our business.

SOFTWARE ENGINEERING (Scientific/Technical)

Opportunities exist in our Surface Systems Software Development groups with exposure to "state-of-the-art" data acquisition technology. Must have B.S. in Computer Science, E.E. ,Math or Physics, and at least 2 years experience. Will consider MS degree in lieu of work experience.

- Real-time software development for our fleet of truck-mounted Direct Digital Logging (DDL) systems. Assignments will involve the addition of new technology tool functions to these systems. Requires Assembler and FORTRAN experience. Motorola 68000, or well logging experience would be a plus.
- Real-time Software Engineer for our Measurement While Drilling (MWD) project. Requires mini or microprocessor experience.
- Software Engineer for bit graphics programming on an HP 1000. Requires strong Assembler and FORTRAN background.
- Software Engineer for our Dipmeter tool. Will program in FORTRAN, Assembler or C. Experience with HP 1000 is desirable.

BUSINESS DATA PROCESSING

Our system is an IBM 3081 with IMS/DB and CICS.

- Project Leader for our manufacturing systems group. Should have 4-5 years with on-line manufacturing systems in a MVS environment, project management skills and experience in managing Programmer/Analysts. Knowledge of AMAPS is desirable.
- Programmer/Analyst to work with manufacturing systems (AMAPS) or field service administrative systems. Requires 2-3 years experience and proven technical skills in COBOL, TSO/SPF and OS/JCL. Knowledge of IMS/DB and CICS desirable.
- Data Communications Analyst. Requires 3-5 years experience in an SNA/SDLC environment, including the design of moderately complex systems, standards and procedure writing.

We offer an excellent benefits program and competitive salaries.

Send your resume and salary history to:

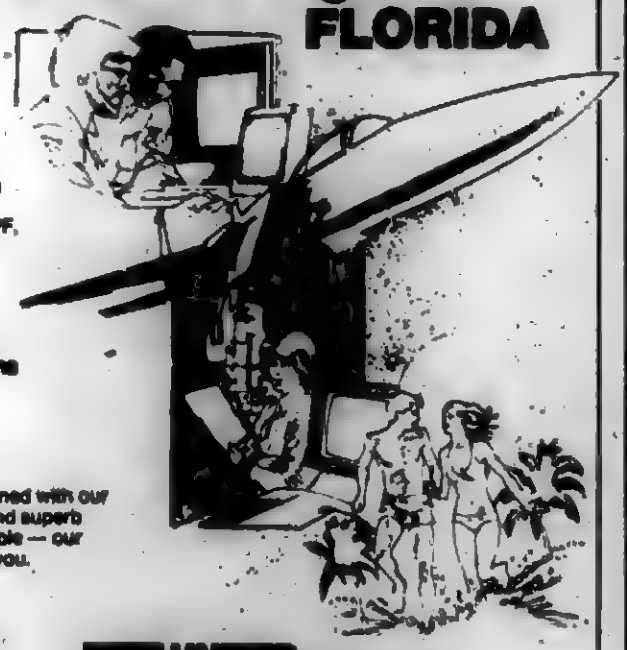
GEARHART THE GO COMPANY

Manager of Corporate Recruiting
GEARHART INDUSTRIES, INC.
P.O. Box 1936
Fort Worth, TX 76101

An Equal Opportunity Employer

PROGRAMMER/ PROGRAMMER ANALYSTS

It's time to migrate to **FLORIDA**



PRATT & WHITNEY is seeking individuals with a Degree in Computer Science or related area and 2-5 years experience with COBOL, IBM JCL, MVS, TSO, SPF, IMS DB/DC on large IBM main frames in the following areas:

- **Business Applications**
- **Data Center Applications**
- **Operations Analysis**
- **IMS Data Base**

The opportunities we offer combined with our excellent South Florida climate and superb recreational facilities are unbeatable — our employees love it here — so will you.

Please send your resume to Professional Placement, P.O. Box 2691, West Palm Beach, FL 33402.

UNITED TECHNOLOGIES PRATT & WHITNEY

An Equal Opportunity Employer M/F

TRADE YOUR BUREAUCRACY FOR OURS!

Tired of the hassles you face to accomplish anything in your present computer science job? Come and light a new one at Winona State University! We are located in southeastern Minnesota in the Mississippi Valley region of the Mississippi River; sports and recreational opportunities abound. The position is full-time, tenure-track in the Mathematics and Computer Science Department. Primary duty is to teach the full range of undergraduate computer science courses in an "ACM guidelines-based curriculum. Master's degree in computer science or an earned doctorate in one of the mathematical sciences with a demonstrated commitment to computer science is required. Dedication to excellence in teaching required. Rank: open. Salary range: 24-34K. Send letter of interest to Joseph Still, for the Mathematics and Computer Science Department, Winona State University, Winona, MN 55987. Open until filled. WSU is an AA/EOE Employer.

DATABASE ANALYST/ PROGRAMMER I

Salary range: $22,851 - $30,165

Applicants must possess a bachelor's degree from an accredited college or university with a major in computer science, data processing or closely related field AND have 1 year of data-base, cobol and/or programming experience. Additional experience may substitute for the bachelor's degree.

For further information or application packages, please contact the Personnel Department.

OAKLAND COUNTY
1200 N. Telegraph
Pontiac, MI 48053
(313) 858-0530

Equal Opportunity Employer

PROGRAMMER CICS

Career position avail. with respected concern involved with software development for financial institutions. IBM under OS or DOS desired. Hands-on exp with CICS required. $40,000 FEE PAID

ROBERT HALF
[illegible]
[illegible]
212-621-0500 (Agency)

PROGRAMMER - In charge of structuring, coding & debugging systems programs for applications relating to financial institutions. 2 yrs exp. req'd. Must have knowledge of COBOL & CICS. $27,500/yr to work 35 hrs/5 days/wk. ACSIS, Inc., 90 John St., NYC, 1038. Send Resume.

UNIVERSITY OF NOTRE DAME

SYSTEMS ANALYST HEWLETT-PACKARD 3000/68

Our Information Systems Department has an immediate opening for an experienced analyst, one that has designed real time applications using IMAGE database. Join a progressive group of professionals dedicated to implementing state of the art systems for our administrative departments. This is an excellent opportunity for personal growth and development while helping us meet our goals.

NETWORK COORDINATOR CAMPUS

The University of Notre Dame seeks a senior professional, beginning July 1, 1984, to lead development of a campus network. Duties will include the organization, selection, implementation and operation of a campus-wide broadband network capable of satisfying both video and data communication needs. Ideal candidate would possess a keen awareness of both analog and digital communications, a Bachelor's degree in Electrical Engineering or equivalent, plus three to five years experience with the design and/or implementation of communication systems.

Please submit your resume stating current job duties and salary by March 2, 1984 to:

Fred E. Freeman
Associate Director of Personnel
University of Notre Dame
Notre Dame, Indiana 46556

PSFS

ASSISTANT VICE PRESIDENT— DIRECTOR OF PLANNING

PSFS, the largest bank headquartered in Philadelphia with assets of $11.9 billion, is seeking an individual to manage, coordinate and facilitate the information systems strategic and long range planning process in its General Operations Division. Qualified candidate will have extensive data processing experience, preferably including consulting or management background. There's no better place to progress than within PSFS' dynamic state of the art professional environment with large-scale IBM systems. In addition to excellent advancement opportunities, PSFS offers competitive salaries and outstanding benefits including prepaid tuition, free lunches and a dental plan to name but a few. Salary commensurate with experience. For immediate consideration, please submit your resume including salary history to: Mrs. Myriene McGorder, Philadelphia Saving Fund Society, 12 S. 12th Street, Philadelphia, PA 19107.

Equal Opportunity Employer M/F

LOOKING?

Find the job you want in Computerworld's classifieds. No other publication carries as many ads for computer professionals as Computerworld, so no other publication can give you as wide a choice of jobs, salary and location as Computerworld.You can even try a "Position Wanted" ad to look for exactly what you want, where you want.

Be sure you look over our recruitment ads every week, so you don't miss the opportunity that's just right for you.

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY
375 Cochituate Road, Box 880, Framingham, MA 01701/(617) 879-0700

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

ADP COORDINATOR
- for 3000-bed health care system in Ohio to serve as Senior Program/Systems Analyst to establish and maintain a new state-of-the-art ADP system. Must have specific knowledge of mini-computers, DEC hardware, operational systems, MUMPS and other application programming languages. 3 yrs. experience in a computer field such as computer specialist or ADP system design. Salary based on experience. Benefits: Medical retirement plan, group health/life insurance, sick leave, vacation leave, 9 paid holidays/year. Contact: Personnel Service, Cleveland VA Medical Center (Brecksville Unit), 10000 Brecksville Road, Brecksville, OH 44141. Telephone (216) 526-3030, ext. 201, 202, 462.

1,000 SUNBELT OPENINGS

D.P. - ROBERT MONTGOMERY

Prog. Anal. (if you H.P. & COBOL)	to $30,000 NC location
Prog. Anal. (if you Mfg. ODS & COBOL)	to $35,000 NC location
Prog. Anal. (if you banking GAS & COBOL)	to 35,000 VA location
Sys. Prog. (if you MVS or VAX)	to $40,000 SC location
Sys. Prog. (if you HP & VTAM)	to $40,000 FL location
Sys. Anal. (if you fin. appl. & COBOL)	to $35,000 TN location

ENGINEERING - MIKE HUNTER

Systems Engineer/CSE	to $75,000
Software Mgr's (Communications)	to $55,000
Software Engrs. (Telephony)	to $50,000
Sr. Software Engr's (Mini-CISC or RISC)	to $50,000
Software Mgr's (Microprocessor)	to $50,000

Penn-Morris is the nation's largest corporate search co. with over 100 offices located throughout the nation. For a clear understanding of our clients needs call 215/275-8000 or send resume to:

PEN-MORRIS ASSOCIATES
3101 Poplarwood Court
Raleigh, NC 27625

DATABASE ANALYST/ PROGRAMMER III

Salary range: $30,075 - $37,287

Oakland County, Michigan, is presently seeking candidates for Database Analyst/Programmer III position within the Computer Services Department. The Computer Center houses two IBM 4341 CPU utilizing VM, CICS, IDMS, VSAM and an on-line network of over 300 terminals. Current applications are primarily related to County governmental operations. Applicants must possess a bachelor's degree from an accredited college or university with a major in computer science, data processing or a directly related field AND have had 3 years of database analysis and/or programming experience. Additional experience may substitute for the bachelor's degree.

For further information or application packet, please contact the Personnel Department.

OAKLAND COUNTY
1200 N. Telegraph
Pontiac, MI 48053
(313) 858-0880

Equal Opportunity Employer

IDEAS: We Make Them Happen.

Software Systems Laboratory...the Software House for Raytheon's Equipment Development Laboratories. We bring life — and intelligence — to a wide range of real-world systems: air traffic control, weapons direction, fire control, communications, missile guidance, tracking and data gathering, space surveillance, range instrumentation, plus an emerging set of laser applications.

We're looking for software engineers who want to explore their full potential developing a wide range of applications in a highly-charged, up-to-date environment. Join our outstanding team of software professionals, and you'll be creating the state of the art, not following it.

Software Systems Engineers

You'll be involved in front-end activities that translate system requirements into software performance specifications in the following areas:

- Requirements Analysis
- Software/Hardware Trade-offs
- Modeling of Critical Performance Characteristics
- Interface Definition
- Data Processing Architecture Definition
- Software Test Selection
- Performance Specification Preparation

These tasks are directly applicable to all of the following application areas listed.

Air Traffic Control Software Engineers

Several Air Traffic Control Program areas include existing and planned enroute and terminal ATC Systems, for both domestic and international applications: aircraft/controller digital communications and dynamic simulation/training.

- Radar Data Processing/Track File Management
- Flight Plan Processing
- Channel Management
- Intercomputer Communications
- Mosaicking

Assignments in the Washington, DC area also available.

Communications Systems Software Engineers

Focus here is on the development of advanced satellite communications terminals employing sophisticated microprocessor technology for processing and system control in the following areas:

- Antenna Pointing Systems
- Ephemeris Data Processing
- Multi-Access Algorithms
- Built-in Test and Diagnostics

Computer Diagnostics Software Engineers

You will design and develop advanced militarized computers employing the latest in technology for fault tolerant techniques and high speed architectural concepts. And also develop several general purpose militarized super minicomputers employing sophisticated built-in test circuitry and high speed parallel pipelined architectures.

- Micro and Macro Diagnostics for fault detection and isolation
- Automatic Test Systems
- Intelligent Control Panel System Development

Graphic Software Engineers

Develop real-time, interactive display software that will comprise the next generation of "user friendly" man/machine interfaces in radar, sonar, communications, air traffic control and image processing.

Radar Systems Software Engineers

Major software challenges exist in these areas:

- Radar Data Processing
- Object Classification and Discrimination
- Real-Time Control Systems
- Embedded Computer Systems
- System and Unit-Level Diagnostics

System Programmers

Major expansion of our System Software Department requires applicants in the following areas:

- Operating Systems, especially VMS, UNIX, and RSX11
- Languages, including "C," PASCAL, FORTRAN, JOVIAL/J73, and Ada
- Performance Measurement and Prediction Tools
- Real-Time Operating Systems Development
- Configuration Management Tools
- Networks and Communication Protocols

Positions require a degree in Engineering or Computer Science and at least 3 years of directly related experience. We are located in the Boston suburbs, an area that many consider to be the finest in the country in which to live and work. U.S. Citizenship not required for all positions.

Please direct your resume, including current salary, in strictest confidence to: Ann Doyle, Dept. CW, Raytheon Equipment Development Laboratories, 528 Boston Post Road, Sudbury, MA 01776.

RAYTHEON COMPANY
EQUIPMENT DIVISION

Air Traffic Control · Shipboard and Ground Radars · Computers and Displays · Missile Guidance · Military Communications · Electro-Optics · Fire Control Systems

An Equal Opportunity Employer

Telecommunications Administrator
$45K

We are a major, privately held consumer products manufacturer, located in the SUBURBAN NEW YORK CITY AREA, seeking an individual with 5-10 years related experience to manage our telecommunications section, providing key input to office of the future technology.

The successful candidate will have hands-on, in-depth experience in voice and data communications including local area networks and network design.
Familiarity with ROLM equipment desirable.

If you have the qualifications for this highly-visible, new position on our Corporate MIS Staff, please send your resume, outlining your background and salary history, in strict confidence, to:

CW-84557, Computerworld
Box 880, Framingham, MA 01701
equal opportunity employer m/f

UNIX*/C

$25,000 to $50,000
APPLICATIONS & SYSTEMS
Over 300 Openings Nationwide
Client co's pay all fees
Call or send resume
in confidence to:
J. ROGERS ASSOC.
(609) 771-0262
2999 Princeton Pike, Dept C-D
Lawrenceville, NJ 08648
*UNIX is a trademark of Bell Labs

PROGRAMMER/MANAGER

Under guidance of Director, administrative information TOPS-20 operating system. Will be responsible for overseeing day-to-day operation of computer facility. Supervise staff of 5. Coordinate future changes, interface with users and oversee vendor negotiations. Prefer data experience with TOPS-20 and PDP-11 assembler language, knowledge of hardware design and debugging techniques. Familiar with VAX computer, Unix networks and network protocols. Position understanding users from 40 departments. Must work well under time pressures. Submit detailed resume to:

Stanford University
Personnel-Ref. 31080
Attn: Art Wilson
Stanford, CA 94305
(415) 497-0117

Engineering Programmer

Sperry's Flight Systems operation is looking for an engineering programmer to debug, document and maintain computer programs to support engineering software development activity. An associates' degree in computer science or computer engineering and two years of scientific programming experience is required. Knowledge of Pascal and Univac Exec Control language is preferred.

With Sperry, you'll work for a strong industry leader while you enjoy a competitive salary and benefits package. To be considered, send your resume and salary information, in confidence, to Charlie Retts, #CW/P-62A, Sperry, P.O. Box 21111 (W2783), Phoenix, AZ 85036.

SPERRY

Equal Employment Opportunity/Affirmative Action Employer

EDP AUDIT PROFESSIONALS

Wang, the computer company leading in office automation with more than $1.5 billion in revenues, today stands #264 on the Fortune 500. And that's still just the beginning. Continued growth and expansion have created new opportunities for experienced EDP Audit Professionals to become part of our EDP Audit Function on a worldwide basis in positions involving approximately 30% domestic and international travel. Primary responsibilities will include the evaluation of controls for systems under development, existing application systems, and computer installations. Additionally, you'll provide technical assistance to the financial/operational staff and evaluate software packages.

Senior EDP Auditor

The successful candidate must possess a minimum of 5-8 years experience, with a computer audit background. Ideally, this experience would be supplemented by a public accounting background and several years in private industry in the EDP Audit Function. CISA preferred.

EDP Auditor

Opportunity to work on audits of application systems, technical systems and computer installations. To qualify, you'll need a minimum of 3-5 years experience in "Big 8" or internal audit, with computer audit assignments. CISA helpful.

Leading the way in benefits.

Wang offers one of the best benefit programs in the industry including profit sharing, stock bonus, long term stock option and stock purchase plans, company paid dental, medical and life insurance, tuition reimbursement, and our employee country club.

Contact us today.

Send your resume with salary history to Robert Dorion, M/S 5320E, Wang Laboratories, Inc., Dept. CW 213, 2 Elizabeth Drive, Chelmsford, MA 01821.

We are an affirmative action employer.

WANG

The Office Automation Computer People

DENVER POSITIONS

Data Processing services organization located in the southeast metropolitan Denver area has openings for:

Systems Programmers - Opportunities for persons with two or more years software internals experience with MVS, CICS, IMS DB/DC or IDMS DC/DB.

Information Systems - COBOL or PL/1 technical background with development experience in on-line, highly interactive data base oriented systems. IDMS or IMS experience desirable. Junior through senior level positions available.

Applications Specialists - MSA financial systems, including general ledger, payables, receivables. Openings at all levels for persons with experience in fully integrated systems, data entry through data management and reporting.

Persons qualified for any of the above positions are invited to send a resume and salary requirements in complete confidence to:

EMPLOYMENT MANAGER
P.O. Box 441171
AURORA, CO 80044

EOE M/F/H/V

We regret that we are not able to accept agency referrals.

PUBLICATION SYSTEMS SUPERVISOR

Callaghan and Company, an established legal publisher offers an excellent and challenging opportunity with substantial growth potential in our MIS Division.

We seek a results oriented individual with a strong background in project management and a sound knowledge of text processing system design and implementation to lead our WANG based development effort. Successful candidates will have minimum 6 years relevant technical experience in systems analysis and design, hardware and software package evaluation, proposal preparation and presentation, and hands-on development activity. We offer an outstanding benefits package including competitive salary. Please send resume and salary history in confidence to:

Personnel Department
Callaghan and Company
3201 Old Glenview Road
Wilmette, IL 60091

An Equal Opportunity Employer M/F/H/V

NEW ENGLAND

Due to an Unprecedented Need by Outstanding N.E. Companies, We are Seeking Additional Skilled D.P. Professionals. Many Individuals Who Replied To Our Previous Ads are Now Enjoying the Benefits of Living and Working in New England while others are Currently Interviewing. Special Needs Include Experienced People on Sys. 38 (We have 20 Openings At Any Given Time), DEC VAX, IBM CMS/VM, and Realtime Software Engineers (Fortune 100 Client Currently Has 11 Openings). According to Leading Trade Journals N.E. is One Of The Fastest Growing Data Processing Regions in the U.S. Today. Start YOUR Year Out Right!

DATA POSITIONS
POSITIONS, INC., 117 Park Avenue,
Suite 201, West Springfield, MA 01089
or Call Collect Bill Mallory (413) 781-3412

DATA PROCESSING

Sohio

San Francisco

SOHIO is combining talented and creative minds with advanced technology to further our continuing oil and gas exploration and production efforts. Our Scientific Systems Division seeks the following scientific computing professionals to provide vital support to our Western Region activities.

CDC Operating System Specialists

The candidates we seek must be knowledgeable on the internals of the CDC NOS 2.1 operating system on Cyber 865 and Cyber 740 computers. A minimum of three years' experience in NOS operating system support is required as is COMPASS assembly language programming. A degree in math or computer science is preferred.

VAX System Specialist

Qualified candidates will have experience with VAX/VMS operating system. You will support existing remote batch and PDP 11 workstations.

Sohio's search for the best technical talent is an integral part of our expansion strategy. Our facilities include a new data center, enabling Sohio to put the most advanced data processing technologies at your disposal. For immediate, confidential consideration for either of these opportunities, forward your resume with salary history TODAY to Judy Alter, Sohio Petroleum Company, S089, 50 Fremont Street, San Francisco, CA 94105. We are an equal opportunity employer M/F/H/V.

Your search leads to Sohio. SOHIO

INFORMATION SERVICES MANAGER

The City of Dubuque, Iowa (pop. 62,000) invites applications for the position of Information Services Manager to direct the data processing and word processing activities. Familiarity with Burroughs B-1000 environment is desired and Cobol proficiency is required. Extensive experience in programming and report design utilizing data base management, data communications and on-line batch and real-time systems is required. The successful applicant must have a graduate from accredited college with a degree in a business administration or related field, or equivalent combination of experience and training. This is a management level position with an annual salary range of $25,332 - $35,448. Send resumes to the Personnel Manager, City Hall, 50 W. 13th and Central, Dubuque, IA 52001 by February 28, 1984. Qualified persons with physical and mental impairments are encouraged to apply. Under Iowa law APPLICANT CONFIDENTIALITY CANNOT BE GUARANTEED.

AN EQUAL OPPORTUNITY AND AFFIRMATIVE ACTION EMPLOYER

NEW ENGLAND

SYS PROG MVS-DOS/VSE-VM/SP	$40,000
DOS COMMANDO	$35,000
CONSULTING	$37,000
BANKING SYSTEMS	$35,000
ME, NH, VT	$35,000
HP-3000/HOSPITALL	$33,000
RI, CONN	$33,000
RPG SYS-SNOBOL4	$32,000
METHODS ANALYST	$28,000
COBOL/FL-1/BASIC/ASM/PS	$30,000

LEAHY & COMPANY

Personnel Consultants
60 Broad Street, Suite 301
Boston, Mass. 02110
Telephone (617) 423-4488

PROGRAMMER ANALYST II - STATISTICS AND METHODS ANALYSIS

Salary range: $23,599 - $27,554

Applicants must possess a bachelor's degree from an accredited college or university with a major in computer science, data processing or a closely related field AND have 2 years of programming and/or systems analysis experience (college/job experience may substitute for the bachelor's degree).

For further information or application package, please contact the Personnel Department.

OAKLAND COUNTY
1200 N. Telegraph
Pontiac, MI 48053
(313) 858-0530

Equal Opportunity Employer

CURIOUS ABOUT CLASSIFIED?

If you are interested in advertising with Computerworld, but don't know how to do it, give us a call! We will be glad to send you our current rate card, which explains sizes, costs, deadlines and requirements. All you have to do is ask! Our toll free number is 800-343-6474, in Massachusetts call (617)879-0700, just ask for the Classified Advertising Department. Or, you can look for our classified order form located in the classified section of Computerworld. Fill it out, attach your ad with a check, and return it to us. Computerworld Classified Advertising, 375 Cochituate Rd., Box 880, Framingham, MA 01701. We're anxious to help!

DIRECTOR OF THE OFFICE OF COMPUTER SERVICES

Rensselaer is seeking a Director of Computer Services who will provide innovative leadership in University computing and enhance the capabilities of our widely respected central computing service organization. Qualifications for this position include an understanding of and a strong commitment to research and academic computing; excellent interpersonal communications skills; extensive background in computer operating systems and hardware; a thorough understanding of data communications networking; demonstrated experience and ability in planning and budgeting; and a record of managerial accomplishments in the full service computing environment.

The director is responsible for strategic planning to insure that Rensselaer continues to provide advanced, high quality computing for research, instruction and computation. Leading the development and implementation of a university data network involving distributed computing, microcomputers and workstations, and coordinating the operations of central computing services are important facets of this challenging opportunity. Candidates should have a minimum of 8 years of relevant experience either in directing a university computing facility or having demonstrated leadership in academic computing or systems development. Applicants must have a Master's degree; a Doctorate is preferred.

The Office of Computer Services is comprised of an experienced and talented staff of 50. They support research, instruction, and a group of administrative and external users on an IBM 3081D with over 500 terminals connected.

Rensselaer is recognized for its strong commitment to computing excellence for faculty and students. RPI offers degree programs in Engineering, Science, Humanities and Social Sciences, Management and Architecture. These five schools enroll 4,700 undergraduates, 1,500 full-time and 500 part-time graduate students. The director will receive highly competitive remuneration and attractive benefits. Applicants are to forward a complete resume and include the names of three references. Confidentiality requirements of applicants will be strictly observed. Applications and supporting materials postmarked by March 15 will receive full consideration.

Candidates should send resumes and supporting materials to Dr. Gary Judd, Vice Provost, Rensselaer Polytechnic Institute, 110 8th St., Troy, NY 12181.

RPI

Rensselaer Polytechnic Institute

RPI is an equal opportunity/affirmative action employer

DATA PROCESSING OPPORTUNITIES

TRW Financial and Data Services Division offers you the opportunity to further your career in pleasant surroundings. We are currently seeking qualified individuals for the following positions:

IBM SYSTEMS PROGRAMMER
To work in the IBM Operating Systems Group. Primary responsibility will be to support the VM Operating System installed on an IBM 3081 processor. Should have working knowledge with both VM and CMS and be familiar with VM SYSGEN. Degree in Computer Science/Math/Engineering and 2 years experience required.

USER SUPPORT ANALYST — SCIENTIFIC
Will be involved in CDC consulting, teaching and authoring classes. Must be experienced in FORTRAN programming on CDC computers, and possess excellent analytic and communication skills. Degree in CS, Math, EE and 3 years experience desired.

PERFORMANCE ANALYST
To do performance measurement on MVS triplex computer configuration with shared DASD, IMS and TSO, and CAD/CAM application performance measurement. Reports design and implementation for performance tracking. Requires minimum BS in Computer Science or Math and 5 years performance/capacity analysis.

USER SUPPORT ANALYST — SCIENTIFIC
Consults with users to solve FORTRAN related programming problems on IBM. Designs and teaches classes. Requires minimum BS in Math, Computer Science or Engineering and 3 years FORTRAN applications in an IBM JCL environment.

LOCAL AREA NETWORK ANALYST
To work with team on interface technology with IBM network. Must be knowledgeable in MVS and network performance, capacity planning. Strong working knowledge of MVS internals and the VTAM interface to SNA Communications network. BSEE or Computer Science and 5 years experience.

USER SUPPORT ANALYST — BUSINESS
Will provide consultation, teaching and technical support to business areas. Will be involved in installation development and maintenance of software products. Experience in IBM Mainframe, VM/CMS, MVS/TSO, JCL. Requires minimum 3 years experience and BS degree in Computer Science.

TRW offers excellent salaries and an outstanding benefits plan that includes medical/dental/vision care and flexible working hours. For immediate consideration, send your resume in confidence to:

Bob Chambers
TRW Financial and Data Services Division
Bldg. E1/Room 4928
One Space Park
Redondo Beach, CA 90278

U.S. Citizenship Required
Equal Opportunity Employer

TRW

Data Processing

Systems Analysts/ Programmers

Key openings in several of NCR's expanding divisions

NCR, a world leader in the information processing industry, seeks strong achievers to complement our teams of marketing and support professionals in both our EFT and Data Services Division and Financial Systems Division—Commercial Bank and Thrift Systems.

Your credentials must include at least 2-5 years experience in commercial banking systems applications. Familiarity with CIF, CLASS, and BANKER 80 is desirable. Ideally, exposure to Assembly language, NEAT/3, and COBOL programming are assets. Up to 20% travel required.

As one of the most respected companies in the field, NCR offers competitive salaries, a comprehensive benefit program and an atmosphere where the challenge, reward and recognition are as great as any opportunity in the business world today.

You should have a technical or business degree with computer science courses. In lieu of a degree we will consider equivalent experience. If you are successful in your present position and want to expand your potential, forward your resume and salary history to: Mr. Randy Nelsen, NCR Corporation, Dept. 058, USDPS, USG-1, Dayton, Ohio 45479.

NCR

Complete Computer Systems

An equal opportunity employer

IBM SERIES/1
REAL TIME PROGRAMMING SYSTEM

We are looking for a few young, bright, ambitious individuals who can substantiate their claim to at least one year's solid systems experience working with RPG II. Plusses would be CM-1, SNA/SDLC or other communications experience. The work is varied and ranges from in-house design/development of new software products to on-site consulting/analysis/programming at customer locations.

Send detailed resume with salary history in confidence to:

Keller Software Systems, Inc.
211 Keller Street, 4th Floor
San Francisco, CA 94102

Position: Senior Sales Representatives
Industry: Resort Timesharing
Product: Computer Services

FN Realty Services is the premier supply of computer services to the rapidly growing resort timesharing industry. Our growth has opened two career sales opportunities leading to sales management. Heavy travel is required in resort/vacation areas such as:

Hawaii/Florida/Colorado
Utah/California/Texas
The Carolinas/Louisiana/Mexico

Expected total compensation $60,000 to $75,000 (first year) consisting of: Salary, draw, commissions and bonus. Excellent benefits package. Please send your resume (including documented sales results) to:

Bob Stevens
Senior Vice President
FN Realty Services
572 East Green Street
Pasadena, CA 91101

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

Data Processing

CAREER OPPORTUNITIES AT DBMS, INC.

DBMS, Inc. is a highly regarded software product and professional services firm. We staff database experts in the areas of consulting, education, application systems, software development and technical support. We currently have openings in our Field Operations, Product Development and Technology groups.

SOFTWARE PRODUCT SALES

The Field Operations group has several openings for Sales Professionals with software or similar high technology product sales experience. These openings will be based in our regional offices.

DATABASE CONSULTANTS

We must also fill several openings in our Field Operations group for professionals with database expertise (IDMS experience preferred but not mandatory with ADS/O a plus). We have an established nationwide network of regional offices and immediate openings in most major North American cities. Some travel is required.

SOFTWARE ENGINEER

The Technology group has an opening for a software engineer to join in the research and development of a major software product. The product will provide an automated, interactive environment for the specification, generation and implementation of information systems. The position requires knowledge of multiple high level languages (FASCAL, PL/1, C, COBOL, etc.) and some Assembler. Other requirements include an exposure to database concepts with IDMS, IMS or a relational product and the ability to work well with peers in a team environment. Experience with formal software design techniques, microcomputers (Intel 8088/IBM-PC preferred), building system software in a product oriented environment and exposure to language translation techniques is highly desirable. MS or BS in Computer Science or a related discipline is also desirable.

Candidates for all positions should have proven ability to meet deadlines and a willingness to work independently in a demanding, dynamic environment. DBMS, Inc. offers an excellent salary and benefit package and will assist in relocation. If you have the ambition, flexibility, and qualifications, please send your resume today in complete confidence to:

Harry J. Pavela
Human Resources Manager

DBMS, Inc.
Corporate Offices
1901 Mill St., Naperville, IL 60540

Equal Opportunity Employer M/F

DBMS INC

FIELD ENGINEER

Dataserv Computer Maintenance is expanding nationwide. We now have immediate openings in major cities and will be adding more in the near future.

DCMI is a $100 million company and growing rapidly. Opportunities for advancement are excellent. We provide competitive salaries plus overtime, liberal benefits and a unique profit sharing plan.

We now have an immediate opening in the San Diego area for an experienced Field Engineer to service and maintain IBM 3600 banking equipment and 3278 terminals.

For immediate consideration and more information, call Toll Free 800-328-6729 or send your resume to: Bev Walters, Dataserv Computer Maintenance, Inc., P.O. Box 3003, Hopkins, MN 55343. We are an equal opportunity employer and all inquiries are considered confidential.

dataserv

OPERATIONS PROFESSIONALS

FINALLY!.... there is a career path offering growth and opportunity for Operations Professionals. CAP GEMINI DASD an internationally established leader in the data processing consulting industry has new ground floor opportunities based on your own abilities in our OPERATIONS SERVICES DIVISION, dedicated to providing professional services in the field of Operations.
We require:

SYSTEMS PROGRAMMERS — JOB SCHEDULERS
OPERATIONS ANALYSTS — JUNIOR & SENIOR OPERATORS
JUNIOR & SENIOR NETWORK CONTROLLERS

Four years of experience and a sound knowledge of either MVS,DOS or VM necessary. Any individual seeking an opportunity—not a job, with a strong background in operations should apply.

Travel, people contacts and job variety make this opportunity even more attractive. We offer highly attractive compensation based on experience and benefits. Respond immediately with resume and SALARY HISTORY in confidence to:

CAP GEMINI DASD
Operations Services Division
100 W. Kennedy Blvd.
Suite 801
Tampa, FL 33602

CAP GEMINI DASD — DASD

Equal opportunity employer m/f

FACULTY POSITION

Towson State faculty position starting August 20, 1984 in business oriented computer program offering BS and AAS degrees. Position will be for holders of a master's or doctorate degree in a computer related area with some professional and teaching experience. Should be able to teach in at least two of the following areas: Systems Analysis, COS, Operating Systems or Programming Languages (COBOL, PL/1, RPG, BASIC, or BAL).

Deadline for applications: March 15, 1984.

Competitive salary and benefits; rank commensurate with qualifications and experience.

Purdue University Calumet is a 7500+ student, urban university located in NW Indiana approximately 25 miles SE of Chicago, in a heavily manufactured industrial area.

Please send resume to: Prof. J.S. Queener, Department Head BCP, Purdue University Calumet, Hammond, IN 46323.

An Equal Opportunity/Affirmative Action Employer

COMPUTER SCIENCE FACULTY POSITIONS

Western Kentucky University invites applications for nine faculty positions in Computer Science. Applicants should hold a Doctorate in the Computer Science field, or a related area with experience in the computer science field. Master's degrees will be considered for some positions. Candidates should be qualified in one or more of the following areas: operating programming, data base theory, computers, programming languages, data management systems, computer architecture and operations research. Available Fall, 1984. Positions are open until filled.

Complete resume, official transcripts, and three letters of recommendation should be forwarded to the Vice-President for Academic Affairs, Computer Science Committee, Western Kentucky University, Bowling Green, Kentucky 42101.

An Affirmative Action/Equal Opportunity Employer

SUPERVISORY UNIVERSITY

SHIPPENSBURG, PENNSYLVANIA

Assistant INFORMATION SYSTEMS SPECIALIST: Tenure-track position available August, 1984. Teach information systems courses and related computer courses at the undergraduate and graduate levels. Minimum requirements: ABD in a Ph.D. or D.B.A. in CIS program, background and interest in several of the following areas: database, systems analysis and design, programming languages, structured methodology, distributed processing. Appointment date: August 20, 1984. Submit letter of application and resume by March 15, 1984. Apply to Search Committee, Business Information Systems/Business Education Department, College of Business, Shippensburg University, Shippensburg, Pennsylvania 17257. Shippensburg University is an Equal Opportunity/Affirmative Action Employer.

ANALYST/PROGRAMMER

Professional position with City of Elgin, Illinois, for design and programming of municipal systems on IBM S/150. Minimum 3 years experience as Analyst/Programmer with working knowledge of RPG required. Compensation: $23,388-$28,680 plus benefits. Send resume by February 27, 1984 to:

Personnel Office
150 Dexter Court
Elgin, IL 60120

An Equal Opportunity Employer

UNIVAC 1100

Enjoy the World's Fair!

PINKERTON, an East coast data processing firm with 17 successful years in ADP design and development, has exciting ground floor opportunities in NEW ORLEANS.

Immediate openings exist for:

DATA BASE DESIGNERS
PROGRAMMER/ANALYSTS

with 2+ years working experience and expertise in 2 or more of the following:

COBOL, DMS 1100, BCL, CLP
TIPS, DMS, MAPPER

for the design, development and installation of large data base systems. Background in a manufacturing environment is desirable.

We offer generous salaries and outstanding company-paid benefits for our employees including per diem on this project. For more information, please call PAIGE GORDON, COLLECT at 703-620-5571 or send resume to:

Pinkerton
Computer Consultants, Inc.

8251 Leesburg Pike, Suite 450, Bailey's Crossroads, Virginia 22041

PRINCIPALS ONLY PLEASE M/F

There's No Time For DOWNTIME!

So while the industry works on your system's problems, let us work on your business problems. Advertise in—

COMPUTERWORLD CLASSIFIEDS!

One insertion will let a potential audience of over a half a million readers know what you are looking for or have to offer. Whether you are looking to recruit computer professionals, want to buy, sell or lease equipment, have computer time or services to offer, or software packages to sell, and more, Computerworld Classifieds will help you get a lot of exposure and get things done faster.

The open line rate is $8.15 per line and there is a minimum size of 1 column by 2" at a cost of $256.20. We can accommodate up to 5 columns and depth measurement increases by half inch increments.

Ads may be mailed in, clearly typewritten, with a letter stating the size desired and the issue in which it is to be run. Our team of advisors will take ads that require no artwork or borders over the phone. We also provide telecopier service.

Any borders, logos, or artwork should be sent in with your ad and must be dark and clear enough to be reproduced.

Computerworld comes out every Monday and our deadline for receiving ads is 10 days (or six working days) prior to the issue date desired.

First time advertisers must send payment along with their first ad.

Our mailing address is:

Classified Advertising
Computerworld
Box 880
375 Cochituate Rd.
Framingham, MA01701

800 343-6474
(617) 879-0700

...Talk directly to our technical managers from the convenience of your own telephone.

PRESENTING THE INSTANT CAREER INTERVIEW!

WEDNESDAY & THURSDAY, FEBRUARY 15 & 16 8:00 pm - 9:00 pm

Call 1-800-327-6343
Within Florida, call Collect, 305-671-6140

We know your time is important. Now, you can learn about career opportunities at Dynamic Control in Orlando, Florida, without leaving your home. Our technical managers will be available after hours to talk with you about your talents and how you might become a part of our organization. We are a division of a Fortune 300 NYSE Company and have become one of the nation's leaders in developing software systems for the healthcare industry. Currently we have the following positions available in our Bethesda, Maryland; Chicago, Illinois and Orlando, Florida locations.

PROGRAMMERS PROGRAMMER/ANALYSTS

Make the most of your experience in RPG II on System/3 or System/34 or RPG III on System/36 in an interactive on-line environment. Two-three years programming experience required.

Positions available in Development, Installations, Pharmacy, and Customer Support.

FINANCIAL INSTALLERS

You will work with hospital financial staffs to assist with the installation of automated financial and accounting systems. Other duties will include training of hospital personnel and systems modifications. Two-three years accounting experience and/or financial implementation of automated systems is required.

Dynamic Control is a people-intensive organization. In accordance, we offer an excellent salary, complete benefits including: medical, dental, profit sharing, the opportunity for national and international travel, liberal vacation time, AND RELOCATION ASSISTANCE. If you are unable to call, write us an informal letter or submit a resume outlining your qualifications and we will contact you. Personnel Department, 1311 S. Semoran Blvd., Winter Park, FL 32792.

Dynamic Control
A division of Travenol Laboratories, Inc.
An Equal Opportunity Employer

VAX/VMS SOFTWARE PROFESSIONALS

JOIN DIGITALS CUSTOMER SUPPORT CENTER IN COLORADO SPRINGS.

At our Customer Support Center in Colorado Springs, you'll work in a team environment where problem solvers like yourself help customers and other Digital's software professionals work more successfully with our computers.

You'll talk over the phone with users all across the country, using computer systems ranging from micro-computers to multiprocessor VAX clusters to multioperating-system wide-area networks.

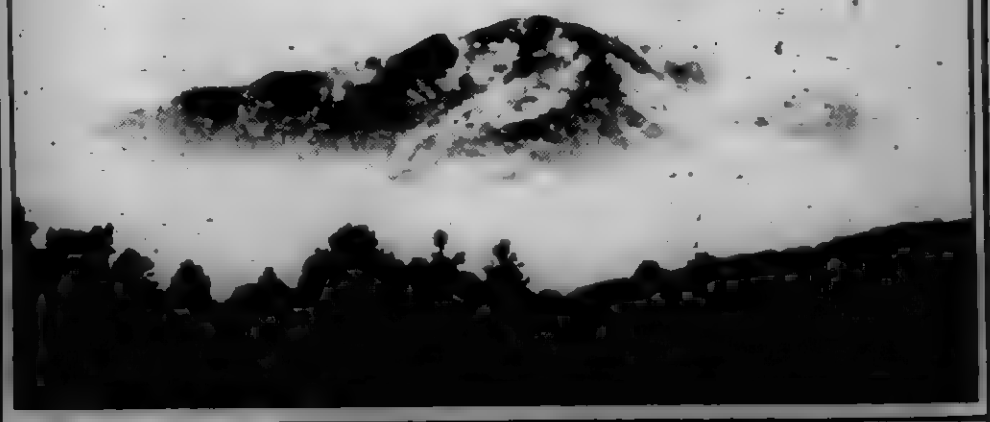
And while you're helping others, you'll be helping yourself as well. Because you'll be expanding your technical expertise in industry leading software like VMS, DECnet, and DBMS and you'll be eligible for the advancement opportunities that Digital, the world's second largest computer company, can provide. And you'll live in Colorado Springs, a beautiful community located at the foot of Pikes Peak, where climate, recreation, and quality of life are at their best.

Right now, we have a wide range of openings at several levels of experience. To qualify, you must have at least 3 years of systems programming or systems support experience. Beyond that, a degree in C.S. or equivalent, VAX/VMS experience, and customer relations exposure are all desirable and will help ensure your success.

Interested? Qualified? If so, please send your resume and salary history to: Susan Chamberlain, Digital Equipment Corporation, Customer Support Center, Dept. 0212 3804, 4405 North Chestnut Street, Colorado Springs, Colorado 80907.

We are an affirmative action employer.

digital™



Product/ Market Manager

Beehive International, a Salt Lake City corporation seeks a dynamic, results-oriented professional to join our marketing team.

The position requires that you have 3-5 years of product or market management experience in micro-computer-based intelligent terminals, small business systems and/or personal computers. BSEE or MBA preferred.

Beehive is a highly successful manufacturer of customized video display terminals, professional work-stations and automated office systems. Salt Lake City offers the best in the arts, recreation, family living and affordable housing. Competitive salaries, an ideal professional environment along with an excellent compensation package accompany this position.

Please send your resume, including salary history in confidence to:

Beehive
Personnel Department
CW-2/13
P.O. Box 25666
Salt Lake City, Utah 84125

BEEHIVE.
Equal opportunity employer M/F/H/V

PROJECT LEADERS

If you're from a large shop with 7 years experience and strong IBM 3031 or larger background, OS/MVS, COBOL, structured methodology, and eager to learn and lead a group of at least 8-12 people, call me in full confidence today. Our client can offer you as much challenge and growth potential as you'll ever want. Salaries will be at or above competitive levels. A great relocation package and benefits beyond the ordinary. Financial or insurance background a real plus. If you prefer please send your resume and salary history. We will call you!

Attn: BETH LORNER

Dunhill
of KEARNEY, INC.
2750 Ave. A Suite B
Kearney, NE 68847
(Call Collect) (308) 234-4555

MANAGER PROGRAM DEVELOPMENT

Our client, a Los Angeles based systems software firm, seeks a Senior Manager to plan, coordinate and direct the development of on-going and future systems projects.

We seek an individual with 10-20 years systems development experience with a major computer or software company. This person should possess skill in long-range strategic/market planning and have a background in managing major development projects, from design and development through test and installation.

Compensation: $100K+ and executive bonus.

Please send resume with salary history or call (213) 277-7421.

Genovese & Co.
Management Consultants, Executive Search
1880 Century Park East
Los Angeles, Ca. 90067

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

Data Processing Consulting

FULFILLMENT! From the Ground Up!

SEI's role and reputation continue to grow as one of the nation's leading builders of high technology applications systems. SEI has five offices across the country and an unsurpassed staff of more than 100 consultants.

SEI is now forming the development team to build a complete online Customer Service and Subscription Fulfillment System for Great American Magazines, Inc., in the Hampton/Newport News, Virginia area. Requirements Analysis is now beginning.

This is your opportunity to work from the ground up alongside senior SEI consultants in the development of this innovative CICS-based system with a multi-billion byte data base. At project end, team members can elect to stay with SEI and move to new locations and other demanding assignments, or to stay with the client as part of the ongoing support team.

SEI is seeking:

- **Design Analysts — $35,000 - $50,000**
  Minimum 5 years of solid application and data base design and construction experience for large-scale online systems, especially using Command Level CICS.
- **Programmer/Analysts — $28,000 - $40,000**
  Minimum 3 years of COBOL application development experience. Online, large-scale system experience a plus.
- **Technical Writer — $28,000 - $40,000**
  Minimum 3 years of solid programming and design experience, plus outstanding writing credentials.

SEI offers top salaries, an imaginative personalized benefits package, and unlimited opportunity for growth. For confidential consideration, send detailed resume to:

SEI Information Technology
Attn: Christopher Vells
450 East Ohio Street
Chicago, Illinois 60611

SEI information technology

THE BUSINESS OF TECHNOLOGY

—An Equal Opportunity Employer M/F—

MANAGER DP Operations

Upgrade procedures to facilitate departmental expansion and grow with it

Pivotal position in dynamic financial environment involves interaction with programmers and other DP professionals to develop improved operating procedures. Your contributions will serve as the cornerstone for an expanding department at Lincoln Federal, New Jersey's 3rd largest savings and loan institution ... and growing.

The problem-solver selected will troubleshoot and analyze rough spots in current procedures as they may arise, and propose responsive solutions. Involvement will also include scheduling workflow and overseeing department supervisors-/computer operators.

4 or more years DP operations experience required with 2 years at the managerial level. Must have hands-on NCR background and knowledge of VRX operating systems. Financial, telecommunications and class experience preferred. Good salary, excellent benefits. For prompt, confidential consideration, forward your resume which MUST INCLUDE salary history and requirement, to: Cathy Pearl

Lincoln Federal Savings
264 Sheffield Street, Mountainside, New Jersey 07092
An Equal Opportunity Employer M/F/H/V

WANTED: HOGAN SYSTEMS EXPERIENCE

Rapidly growing multi-billion dollar bank holding company in Upstate New York seeks a talented DP professional for a position as Senior Programmer/Analyst. Experience with the Hogan System a must. An exciting opportunity for the right person providing excellent benefits, a relocation package and above average compensation.

Send Resume to:

Manager of Administration
Key Services Corporation
225 N. Pearl Street
Albany, NY 12207

An equal opportunity employer M/F

PROGRAMMER

Dvlpmnt/impl. commun. Bi-synchronous Network Protocol, Invlvg. MPX OS. 6 mths exp. or 6 mths in programming. Master's Com. Sci. Knowl. "C", PL/1 & UNIX. $23,000 pa. 40 hrs/5 days/wk. Systems Strategies, Inc., 225 W. 34 St., NYC, NY 10001. Send resumes.

FLORIDA COMPANY EXPANDS

A major Florida company is facing tremendous growth in 1984 calling for heavy expansion in DP. Need top quality PROG/ANAL with 1 year + exp through SENIOR PROG/ANAL. IBM 3083, OS/MVS, COBOL (database, online exp and/or bank or insur applic exp a plus). Only quality PROG/ANAL and SENIOR PROG/ANAL with high energy levels considered. Forward resume in confidence to or call:

Management Recruiters
of St. Petersburg
7901 4th Street North, Suite 307
St. Petersburg, FL 33702
(813) 577-2118

PROGRAMMER ANALYST

Provide programming and system analysis support required to maintain and improve the operating systems and software for mini-computer and micro-processors. Provide technical support for research in optometry applying 3-D Graphics. Analyze, design and direct the development of clinical, administrative and research software. 40 hours/week; $30,000/ year. Bachelor's in Computer Science/Information Systems; must be experienced in HP-1000, VAX-11, PDP-11, IMAGE and QUERY. Apply at Texas Employment Commission, Houston, TX or send resume to Texas Employment Commission, TEC Building, Austin, TX 78778. Job Order Number 2071557. Ad paided for by an equal opportunity employer.

$80,000/YR.—CICS PROGRAMMING

Allegedly one of the most demanded & rewarding programming skills in months instead of years. A complete & practical guide to CICS Command Level Programming. It's based on CICS latest release 1.6, written in COBOL, with special emphasis on VS/AM. Brand-new 2nd edition, contents printed in two colors, handsome mylar-coating cover. 150 examples illustrate use of CICS commands, 15 sample CICS programs address all major applications. Sample programs include Menu, Add, Update, Delete, Browse, Multi-record display/update, Print 24x80, 66x132, any-size report, Message Routing, Screen Refreshing, VS/AM alternate index design, setup and handling, Dynamic table manipulation, Audit Trail initiation and more.

50% time saving—and more

It's hard to believe the learning can be so easy until you try it. In hours you can start creating BMS maps. In days, you can start writing Pseudo Conversational CICS programs. You'll cut your learning curve at least in half, many programmers report even greater saving. Some CICS techniques are especially hard. When you're stuck for the technical problems, you'll be thankful you have this book. All CICS techniques and problem areas are thoroughly covered. You'll find the topics on Production abend handling, Task system debugging, Dump reading, Trace table usage, CEDF monitor, CSMT, CSMT commands, CICS internal tables setup & effects on application programs, Terminal Paging commands, complete procedures to install a CICS transaction and more. Why spend hours searching for the right technique — when this book gives them to you already written.

Tips on moonlighting on CICS projects

Consulting will be the trend of the 80's for CICS due to great shortage of experienced CICS programmers. An average CICS contract programmer makes $30-$45/hr. Some CICS consultants even make $1000/day (1983 Datamation). Moonlighting on CICS projects is very rewarding. A typical 10-screen system can mean $15,000-$25,000 cash. This book contains 11 pages of tips on moonlighting into how to market your service, locate the contracts, write a proposal, make a presentation, quote the right price to beat consulting firms and draw a contract agreement without a lawyer. Written proposal & sample contract agreement are included for your convenience.

Try this book at no risk

How much is this book worth to you? It's hard to say until you try it. That's why we want you to use it for 10 days. If you're not completely satisfied, simply return it at our expense for a prompt full refund. Fair enough? Thousands of copies have been sold. Over 98% of programmers who bought this book are satisfied with it. See how much time it saves you. How it leads you to the gold mine of programming. That's how sure we are that once you use it, nothing could make you part with it. This book will pay for itself over and over, year after year. But act now. Send $34.95 for 1, $29.95 ea. for 2, $27.95 ea. for 3, $25.95 ea. for 4 & over (plus $2.00/copy for P&H) in check or M.O. to: CCD Online Systems, P.O. Box 795796, Dallas, TX 75379. Allow 1 to 2 weeks for delivery.

EMPLOYMENT SERVICE FOR PROGRAMMERS AND ANALYSTS

National Openings With Client Companies
and Through Affiliated Agencies

Scientific and commercial applications • Software development and systems programming • Telecommunications • Control systems • Computer engineering • Computer marketing and support

Call or send resume or rough notes of objectives, salary, location restrictions, education and experience (including computers, models, operating systems and languages) to either one of our locations. Our client companies pay all of our fees. We guide; you decide.

RSVP SERVICES, Dept. C
Suite 700, One Cherry Hill Mall
Cherry Hill, New Jersey 08002
(609) 667-4488

RSVP SERVICES, Dept. C
Suite 211, Dublin Hall
1777 Welton Rd., Blue Bell, PA 19422
(215) 629-0585

From outside New Jersey, call toll-free 800-257-8188

RSVP SERVICES
Employment Agents for Computer Professionals

PROJECT MANAGER SOFTWARE DEVELOPMENT

Santa Barbara based division of Data Resources, Inc. which sell information products to the health care industry needs an experienced technical manager who has worked on significant software development projects.
If you are expert with VM/CMS, IMS, MVS, or UNIX and want to lead a small team of programmers in developing an end-user system linking a supermicro with a large IBM mainframe, send your resume to:

SYSTEMETRICS, INC.
A division of Data Resources, Inc.

Hospital Products Division
Personnel Department
104 West Anapamu St.
Santa Barbara, CA 93101

An Equal Opportunity Employer
A Division of McGraw-Hill, Inc.

SENIOR SYSTEMS ANALYST

Exciting and challenging opportunity now available in premier co's Information Systems Department. Involves all technical phases of systems analysis. Must have 5+ years IBM related exp. Salary to $35,000. Job #4462.

MARK DAVID
JOHN MILLER
ROBERT HALF
3636 IDS Center
Minneapolis, MN 55402
(612) 338-6001

NCR PROGRAMMER

Must have at least one (1) year experience with Neat/3 Level I. Bank experience and Neat/3 Level II desirable. System is V8555M under B3 operating system. Salary is DOE. Send resume to:

Jim Gibson
CITIZENS NATIONAL BANK
P. O. Box 2752
Boise, ID 83701
(208) 336-5700

SEMINARS

SHORT COURSES

- PASCAL
  March 19-23
  & Aug. 20-24
- Discrete Event Digital Computer Simulation with GPSS Programming
  May 14-18
- Principles of Software Engineering
  June 4-6

For Further Information Contact: The Ohio State University Office of Continuing Education, 2400 Olentangy River Road, Columbus, Ohio 43210 (614) 422-6571.

Systems Analyst

Growing $130 million common carrier in Central Wisconsin is seeking an experienced Systems Analyst. This position requires a minimum of 3-4 years experience in designing and implementing large online systems in the trucking industry. Experience with DOS/VSE, CICS, and Assembler is a plus. Selected candidates will determine requirements, develop internal specifications, prepare documentation and recommend systems to management. Excellent salary and benefits package. Call Ron Wiebe at (715) 424-4000 or send resume to:

CW Transport, Inc.
610 High Street
Wisconsin Rapids, WI 54494

JOB DESCRIPTION

Permanent faculty position in Computer Science beginning September 1, 1984. Position involves teaching, advising students, and committee work as related to the Department of Computer and Information Science and Quantitative Methods. Master's degree in computer science or a master's degree in a related area with equivalent industrial or business experience required. Must be technically competent in BASIC, COBOL, FORTRAN, RPG II, and ASSEMBLER programming languages and knowledgeable in JCL, operating systems, database processing and telecommunications. Vita, transcripts and three references should be sent to Dr. Jerry Hatfield, Chairman, Department of Computer Information Science and Quantitative Methods, School of Business and Commerce, Troy State University, Troy, Alabama 36082. Salary based on qualifications. Deadline for applications is March 15. TSU is an AA/EO Employer.

Computer Science:

Tenure-Track position beginning August 1984. Assistant or associate professor to assume chair duties of established program in liberal arts college using DEC 11/44, and PRIME 750. Also Vectrix Graphics Processor. Must be able to teach upper-level courses including Data Structures, Operating Systems, and Compiler Design. Ph.D. desired in CS or related field. Masters in computer science required. Teaching experience preferred. Research contract with summer teaching possible under separate contract. Salary competitive in computer science field. Good fringes. Apply to:

Dr. Kenneth C. Cooney
Academic Dean
Quincy College
Quincy, IL 62301
EOE

DEBUG your search for the "pros" with...
Position Announcements

BUY - SELL - SWAP

PCM

Pioneer Computer Marketing
214/343-2904

BUY - SELL
LEASE
- All IBM Systems
- Peripherals
- Tapes
- Disks

SERIES/1
- Systems
- Features
- Peripherals

SYSTEM 34
- CPU
- Peripherals
- Upgrades

PIONEER COMPUTER MARKETING
11448 Pagemill Road
Dallas, Texas 75243
214/343-2904

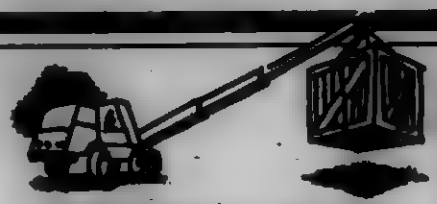
BUY-SELL-LEASE
SERIES/1
SAVE ON NEW OR USED
OVER 2000 CUSTOMERS
S/38
4331
4341
4361
4381
ALL RELATED PERIPHERALS
SHORT/LONG TERM LEASES
S/34
SEE OUR NEW PRICES
S/36
SHORT/LONG TERM LEASES
3083
3081
LEVERAGED LEASES
Call toll-free 800-328-[illegible]
COMPUTER OPTIONS INC.

RANDOLPH'S APPROACH TO COMPUTER LEASING... AND WHY IT WORKS.

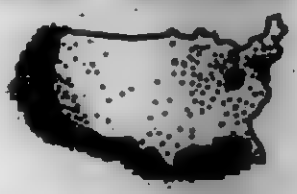
Started in 1964, Randolph has been saving its customers 30% to 70% of their DP hardware dollars . . .

And we *know* leasing is still the most financially attractive method of acquiring computer equipment at low cost without draining working capital.

But we learned early that the dollar-and-cents approach to computer leasing is only part of a company's concern. Equally important are: prompt installation . . . dependable servicing . . . flexible upgrade capabilities. . . and full support services. Our commitment to *this* approach is the key to satisfied customers . . . and our success.



EQUIPMENT ON THE MOVE
We have under management IBM computers with an original cost of over one-half billion dollars. . . . and we're adding to this investment to meet the changing needs of our customers. Whether it's an IBM 3081 or 4300 system, additional tape drives, disk storage, printers or other peripherals, our equipment inventory is available to meet your company's requirements. Even hard-to-get machines are sought out and acquired for Randolph customers.



RANDOLPH . . .
COAST TO COAST
We presently serve customers in over 300 cities and towns from Maine to Hawaii.

BUT . . . SERVICE MAKES THE DIFFERENCE
The real story behind Randolph's success is our approach to customer support services. To keep computer operations running smoothly and efficiently, these support services have proven to be valuable assets to our customers' D.P. operations.

Continuous IBM Maintenance Program
Manufacturer's service is available day or night, seven days a week, to insure optimal use of your system.

On-Going Technical Support
Randolph's technical staff is on call to help you reconfigure your system to meet changing data processing requirements.

Active Remarketing Division
We assure maximum return on your investment in computer equipment which you no longer use.

MEMBER OF THE FIRST NATIONAL BOSTON FAMILY
In 1972, The First National Bank of Boston purchased our S/360 leasing business, and we became a wholly-owned subsidiary.

With the Bank's financial capabilities behind us, Randolph customers benefit even more from the combined efforts of the best computer-leasing and financing people in the United States.

HOW ABOUT YOU?
If your company is not presently leasing computer equipment from Randolph, you'll be interested in our new brochure outlining our special customer support services, and important facts on how we can reduce your computer costs. Call Joseph B. Kelly, Jr., Executive Vice President, 800-243-5307.

537 Steamboat Road
Greenwich, Connecticut 06830
(203) 661-4200 (800) 243-5307

Randolph

A MEMBER OF COMPUTER DEALERS & LESSORS ASSOCIATION RANDOLPH COMPUTER CORPORATION A subsidiary of THE FIRST NATIONAL BANK OF BOSTON BANK OF BOSTON

DATA GENERAL
Hanson Data Systems

FORSYTHE McARTHUR ASSOCIATES, INC.
DEALER / LESSOR OF IBM
Computers and Peripherals
Home Office
Chicago
919 North Michigan Avenue
Chicago, Illinois 60611
312 943-3770
Branch Offices
Atlanta 404 953-0457
Milwaukee 414 786-0644
LDR

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

SYSTEM/34
SYSTEM/36
SYSTEM/38
SERIES/1

FIND IT FAST IN OUR FAMOUS
COMPUTER MARKET ADVISOR
SEND US YOUR BUSINESS CARD
AND WE WILL SEND YOU A FREE COPY.

ECONOCOM

- BUYS
- SELLS
- LEASES

- QUICK DELIVERY
- COMPETITIVE PRICING
- FLEXIBLE FINANCING
- TRADE-INS ACCEPTED
- PROFESSIONAL SERVICE
- SHORT-TERM LEASING
- LONG-TERM LEASING
- PERIPHERAL LEASING
- TAKE-OUTS DONE

901-767-9130

ECONOMIC COMPUTER SALES, INC. • 845 CROSSOVER LANE • P.O. BOX 240207 • MEMPHIS, TENNESSEE 38124

SYSTEMS
4341 4331
38 36 34
32 3
BUY • SELL • LEASE
COMPUTER
BROKERS, INC.
2975 SHELBY ST.
MEMPHIS, TENNESSEE
TOLL-FREE
800-238-6405
901-372-2622
PERIPHERALS
3203 3370
327X 3411
3350 3420

IBM 3178 leasing

Flexible lease terms available
12, 24, 36 or 48 months

Hartford Computer Group

800 323 6355

C.D. SMITH & ASSOCIATES, INC.
DEC computer systems & options
13905 East Freeway, Suite 310
Houston, Texas 77015
(713) 451-3112
TELEX 76-2547

DEC

WE ARE BUYING: VAX 11/780

WE ARE SELLING:

MS780-DC	4,500	DR8-W	1,495
MS780-CA	4,000	RA81-AA	18,000
MS780-DC	5,000	TS11-CA	18,000
FP780-AA	3,700	RP06-AA/PTR	8,000
DW780-AA	10,000	11/780 CPU	CALL

If you want on our Mailing List, call Yolanda (713) 451-3112.

AMDAHL
FOR SALE

V/8-II	8 X 12	MARCH 1
V/8	12 X 16	MARCH 1
V/8	16 X 16	APRIL 1

SUBLEASE

V/7	16 X 16	MARCH 1
V/8	12 X 16	FEBRUARY 1

IBM
WANTED
3033 U8, U12, OR U16
CALL: CHARLIE BERRY
OR TOM STARR
(612) 553-0600
MAJOR COMPUTER INCORPORATED
10227 YELLOW CIRCLE DRIVE
MINNETONKA, MN 55343

Buy/Sell/Lease
SWITCHING
IBM 3914/3814
Locom LCM-500
T-bar 3815/3818
DataSwitch 1000
Bell BCS-3/BCS-5
Digital Ind 3403/4101
Jack McAuliffe
4265 LBJ Freeway #210
Dallas, TX 75234
214-661-3661

Want to Buy
5291, 5251, 5256
Defective Planar Boards
$100 each
For Details Call
(915) 692-9141
Russell Sullivan

DATA GENERAL

8) 6070A 20 MB DISKS	12,000	1) 1078A 1 BAY IND. CABINET	
8) 6070 20 MB SUBSYSTEMS	20,000	WAIR CONDITIONER (NEW)	4,499
8) 6068 12.5 MB DISK W/FLOPPY	21,000	1) 1078B 1 BAY IND. CABINET	
2) 6168 20 MB DISKS (NEW)	6,000	W/HEAT EXCHANGER (NEW)	3,500
2) 6168 20 MB DISKS	4,000	8) 4241 ULM 8 BOARDS	700
1) 6237C 16 MB DISK (NEW)	4,500	2) 6502H 4C 8 SLOT 6/94	1,500
1) 6040 TP1 PRINTER	450	2) 1012H 1/2 BAY CABINETS	350
1) 6073 LP2 PRINTER	550	2) 1144A 1 BAY CABINET (NEW)	550
2) 6169 LP2 PRINTER (NEW)	2,000	12) 6027 20 MB CONTROLLERS	700
1) 6121 LP2 SUBSYSTEM (NEW)	2,500	2) 3264 LP2 CONTROLLERS	550
8) 4027A 4 LINE ASYNC MUX BOARDS	350	2) 5463 AMI-16 20 MA DTR BOARDS	150

1) ECLIPSE S/250 128K 12.5 MB DISK W/FLOPPY & 2 4027 MUX BOARDS 16,500
1) NOVA 4X 8 SLOT 128K 10 MB DISK W/FLOPPY & ULM 8 BOARD 12,100
1) NOVA 4X 8 SLOT 128K 12.5 MB DISK W/FLOPPY & ALM 8 BOARD 12,500

MODEMS & TERMINALS

38) ADM3A LEAR SIEGLER TERMINALS	375	4) ADM3 LEAR SIEGLER TERMINALS	350
11) 201/208A MODEM MODEMS	1,200	10) AJ 212A ACOUSTIC COUPLERS BELL 103-113 300 BAUD	85

CONTACT: ROBERT FULWILER 214-258-0614

MEMORY BOARDS

LSI/11	8MB	$1995
VAX 11/780	2MB	$4300
ECLIPSE	8MB	$5700
NOVA 4	8MB	$4600

Call For Others
Now 100% Compatible

FREE
DEC and DATA GENERAL
Discount Guide
Call or write for your copy TODAY!
NEWMAN ddo DMA
(313) 994-3200 60AJCW

DATAPOINT
FOR SALE
1- 4520 System W/56K Upgrade
3- 3601 Terminals
1- 9461 Comm-Adaptor
1- 9822 Freedom Printer
Cables/Connectors/
15-Disk Packs
Total cost: 7,000.00 plus shipping
Call or write:
Harris Information Systems
700 Highway 18
East Brunswick,
New Jersey 08816
(201) 257-6700

EQUIP YOURSELF IN THE CLASSIFIED PAGES OF COMPUTERWORLD

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

COMDISCO

A Commitment To Excellence

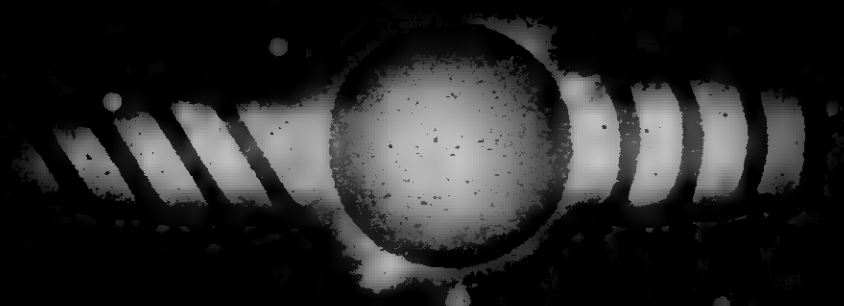
IBM PROCESSORS

- ☐ 3081
- ☐ 3083
- ☐ 3033
- ☐ 4341
- ☐ 4341/4381
- ☐ 4331-2/4361
- ☐ Amdahl V- and V-8 Available January February

IBM PERIPHERALS

- 3350
- 3880-1 2
- 3380 AA4/B4
- 3370/3375
- 3803-2
- 3420-4/6/8
- 3705/3706
- 3725
- 3178/3278
- 3890

The Leader In Full-Service Leasing



A MEMBER OF COLA AND EQUIPMENT LEASING GROUP

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

SERIES I SPECIAL

Control Data
126MB Removable Drives . . $12,900
Diskette Drives . . . . . $ 1,495
Printers & Displays

New or Used
Immediate Delivery

IBM
4956 Processors
4967 200MB Disk Drives
All Peripheral & Features

Buy... Sell... Lease...

- Immediate availability
- 5824 & 5891 • Upgrades
- Short term leases • Trade-ins
- Guaranteed IBM maintenance

COMA

The Datacomp Leasing & Service Group, Inc.

Toll Free 800/323-3888
Chicago 312/323-1200
New Jersey 201/467-8686

WE BUY...SELL...LEASE...

Systems 34/36/38/4300

- Financial Advantage Is Yours Through CPU
- New Or Previous-Owner Processors Available
- Immediate Delivery
- IBM Maintenance
- Create Cash Flow With CPU Purchase/Lease-Back

Call 503/222-2226 Collect

CPU Sales & Leasing, Inc.
3477 Northwest Yeon • Portland, Oregon 97210

CPU

MEMBER AMERICAN SOCIETY OF COMPUTER DEALERS

COMA

The nationwide market - a call away!

DEC/DG

SYSTEMS/PARTS/PERIPHERALS
NEW/USED/SURPLUS • DISCOUNT PRICES
Since 1977! Buy, Sell, Trade and Broker.

PHIL	BRYAN	JENNIFER
DG	11-VAX	8-LSI

CALL TODAY - (305) 392-2005
TELEX 568-670

thomas business systems, inc.
4301 Oak Circle · Unit 11 · Boca Raton, Florida 33431

COMA

DEC

Check out our unbeatable combination:
huge inventory at low, low prices.

Call toll free 800-328-7000
In Minnesota (612) 894-4020

MIDWEST SYSTEMS, INC.
12117 Riverwood Drive, Burnsville, Minnesota 55337

BUY / SELL / LEASE

158	V/8
168	V/8
IBM	AMDAHL
3081	V/7
3032-3033	V/8

INTERESTED IN ALL MODELS AND CONFIGURATIONS ALSO, MODEL-FEATURE-MEMORY UPGRADES

HAVE REQUIREMENT FOR 3033 PROCESSOR MOTOR GENERATORS AVAILABLE

WE WOULD LIKE TO TALK WITH YOU. PLEASE CONTACT: DALE HAUSNER OR CHARLIE BERRY
MAJOR COMPUTER INCORPORATED
10237 Yellow Circle Drive
Minnetonka, MN 55343
(612) 932-0600

COMA

BASIC SYSTEMS HARDWARE, INC. CAN:

- Buy your S/34
- Lease you a S/34
- Sell you a S/34
- Save you $$$$$$$$

- 3 Mos. FREE Maintenance with Purchase
- Plug thru Peripherals
- Software Support
- Upgrades
- Demo Site in Midtown Manhattan

Contact Ken Clarke, Branch Manager, BSH, INC.....460 7th Ave. NY, NY 10123 - 212-279-5107

SELLING?

More than half a million active computer people read COMPUTERWORLD each week. That means:

- **YOU can reach them efficiently in COMPUTERWORLD Classifieds.**
- **YOU can find buyers for discs and DEC's, terminals and timesharing, software, System 370's, and more.**
- **YOU can join the THOUSANDS OF ADVERTISERS who use our classifieds because they get RESULTS.**

To place your ad, or to get a rate card with complete details on COMPUTERWORLD Classifieds, call or write:

Classified Advertising
COMPUTERWORLD
P.O. Box 880
Framingham, MA 01701

IBM UNIT RECORD EQUIPMENT & DISK DRIVES
DISK PACKS, DATA MODULES, MAG TAPE, DISKETTES

SALE OR LEASE

machines
026—029—082— 083— 084
085—087—088— 129— 514
519—548—557

disk packs
2316—3336(1)—3336(11)—3348(70)
5 MEG. TO 300 MEG. PACKS—NEW & USED
Highest Prices Paid for Used Packs & Machines

THOMAS COMPUTER CORPORATION
5833 W. Howard St. Chicago, IL 60648
800-621-3600 312-647-6600
Authorized Distributor – Memorex, CDC, 3M, BASF, Verbatim, Dysan

IBM
Series/1 • S/34 • S/36
S/38 • 4300
5110 - 5120 • S/32
RENT • SELL • LEASE

All models, systems & peripherals AVAILABLE NOW

Ask about our 72 hour upgrades

(408) 425-7333

SOURCE DATA PRODUCTS INC

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

CMI

3033 All models

3081 New or Used

Series 1 New 4955's, 4967 Disk Used 4955F's, 4955E's Immediate Delivery Buy-Sale-Trade Leases Available

3083 New or Used

3081/3082/3084 Lease Financing Available For Your System or Ours 2, 3, 4 or 5 Year Terms

Series 1 I/O New or Used Buy-Sale-Trade Leases Available

Wanted 4381 Delivery Positions

Wanted 4341-M2 Call Now

3380 3350 3370 3375 Buy/Sell/Lease

SYSTEM 36 Monthly Lease Rates Lower Than IBM Credit Corp. 2, 3, 4, or 5 year terms Includes System 34 takeouts

3725 Lease Financing Available For Your System or Ours 2, 3, 4 or 5 Year Terms

3800 LASER PRINTERS Model 1's Available for Immediate Delivery Model 2 Lease Financing Available - Any Term

CMI

8130's Sale or Lease Available Immediately

NEW 4250 PRINTER Greater Discounts Than IBM Leases Available 4224-1 (140 LPM)@ 165/mo. 4224-2 (240 LPM)@ 195/mo. Call For Short Term Rates Immediate Delivery

3705-3704 Available for Immediate Delivery Sale or Lease We Can Supply Models II through K Call Us For Purchase/Lease/Upgrade Of Your NCC Machines And Save 30% Of Your Monthly Cost

DEC

RENT•BUY•UPGRADE•SELL

PDP, 11/03, 11/04, 11/23, 11/24, 11/34, 11/44, 11/70, VAX/730, VAX/750, VAX/780

SYSTEMS•OPTIONS•SUPPLIES

11/04 16KB, Dual RL02, DZ11-A, Dual H9642 (new) $24,995
11/03+ 256KB, Dual RL02, DZV11-C, VT102, Remote (new) $16,500
11/70 512KB MOS, LA36 (used) CALL
VAX/750 1MB, RD53, RL02, VS50 Remote (new) CALL

Customized Configurations–Call With Your Request.

In Stock		Specials		In Stock
11/34-BC (new)	$11,350	M8511-PS (new)		$4,195
DB11-A (serviced)	$ 495	M8728-CA (new)		$4,195
DWF32-AB (new)	$ 3,495	M8728-DC (new)		$3,350
DWP11-DA (used)	$ 995	RH750 (used)		$2,895
DZ11-F (used)	$ 3,100	RX211-EA (used)		$2,895
H9642 (new)	$ 1,350	RL211-AK (new)		$5,450
KT24 (new)	$ 795	RMA81-AA (new)		Call
LP11-WA (serviced)	$ 3,495	VT50-AA (used)		$ 495

BROOKVALE ASSOCIATES
800-645-1167 NY:(516) 273-7777

HP

encore (213) 452-9117

CPR:RESALE Computer Products & Repair

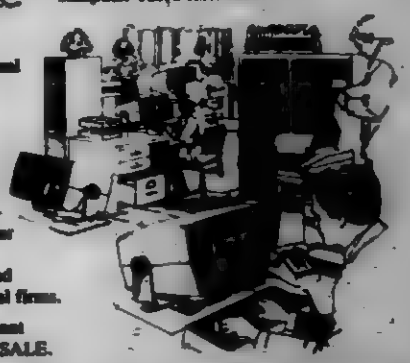
No charge to tell the Data General world.

Call us to list the DG equipment you have to sell or buy. There are no fees. CPR's large, computer-based sales force will find you a MATCH TODAY through national phone sweeps, direct mail, and advertising.

Buy at the price you want. Sell at the price you need.

$2 Million is also available to buy and sell your inventory fast, with aggressive trade-ins, and leasing through national firms.

Expect the price you want TODAY with CPR:RESALE.



CPR gets you results. California: 800-392-2317

800-843-2047

1830 Fourteenth Street, Santa Monica, California 90404 213-450-0010

43XX & PERIPHERALS

Purchased, Sold & Leasing

CORPORATE COMPUTERS, INC.

Contact: Norm Burger

(203) 661-1500

115 Mason St., Greenwich, Conn. 06830

Member Computer Dealers & Lessors Association

WANG WORD PROCESSORS AT THOUSANDS OFF!

Guaranteed, remanufactured WPS 20, WPS 30 and Wangwriters available for immediate delivery. You don't buy a cent till Wang installs and places equipment under service contract. 15-day return privilege. Buy, Lease, Rent

For Free info and fast response call toll-free:

1-800-321-2986

ELECTRONIC OFFICE EXCHANGE, INC. Dept. SCDCWD • Box 7337 • Ann Arbor, MI 48107

SALE LEASE PURCHASE

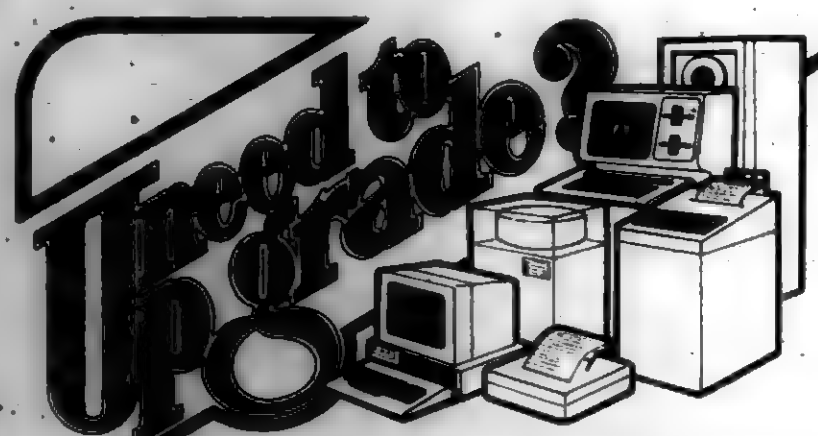
DATA GENERAL

Desk Top Models 10, 20 & 30
MV4000
MV8000
C300, C350
S230
Nova 4/X, 3/12, 1200, 1200
4027 Expansion Chassis
Microprom, 64Kb, I/O
Battery Memories
EP16 C/150 1Mb Memory
ALM-16, ULM-8, SLM-2, DCU/200
AMB-8, AMB-16, MC-8, MC-16
DP16/D211/D416/D460 CRTs
D100/D200/D400/D600 CRTs
Desktop Printers
Letter Quality Printers
6100 7Mb Disk System
6101 14Mb Disk System
6026 30Mb Disk System
6099 12.5/1.2 Mb Disk System
6054 80Mb Disk System
6021/6099/6125 Tape Systems
6064/6099 Diskette Systems

AMES SCIENCES, INC.

301/220-0100

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP



System 34s • 36s • 38s • 4300s
3270s • 370s • all peripherals and I/O
214/258-0541

MCC
Metroplex Computer Company, Inc.
320 Decker Drive, Suite 180 • Irving, Texas 75062 • TWX 910-860-9285

IBM
5110 5120
3741 3742
DATAMASTER
1255 MICR
SYSTEMS
34 36 38 32 73
All Associated Peripherals
BUY SELL LEASE
• Printers, Display Stations
• Upgrades & Exapns/Add-ons
• Tapes/Tapes
• Disk Subsystems/Subsystems
Call Today for Quotation
(615) 269-6505
SOUTHERN DATA SYSTEMS
Nashville, Tennessee

Buy•Sell•Lease
SERIES 1
S/34 S/38
4300 S/370
5110 S/23
XERXES
COMPUTER SALES
1284 Harrison Place, Suite 210
Minneapolis, Minnesota 55403
800-328-3884/612-339-3042

STC
TAPE/DISK
BUY SELL LEASE
(405) 341-0622

MISSISSIPPI CENTRAL DATA PROCESSING AUTHORITY

Sealed proposals will be received by the CDPA, 508 Robert E. Lee Building, Jackson, MS 39201 for the following data processing equipment and services:

Request for Proposal No. 882, due 3:30 p.m., Wednesday, February 15, 1984, for the acquisition of a software package capable of producing maps from descriptive data for Mississippi State University.

Request for Proposal No. 883, due 3:30 p.m., Friday, February 17, 1984, for the acquisition of Univac compatible disk drives and controller for Mississippi Gulf Coast Jr. College.

Request for Proposal No. 884, due 3:30 p.m., Friday, February 17, 1984, for the sale or swap of a Univac 1100/80 computer system and the acquisition of a replacement system including terminals, controller and a DCP/40 upgrade for Mississippi State University.

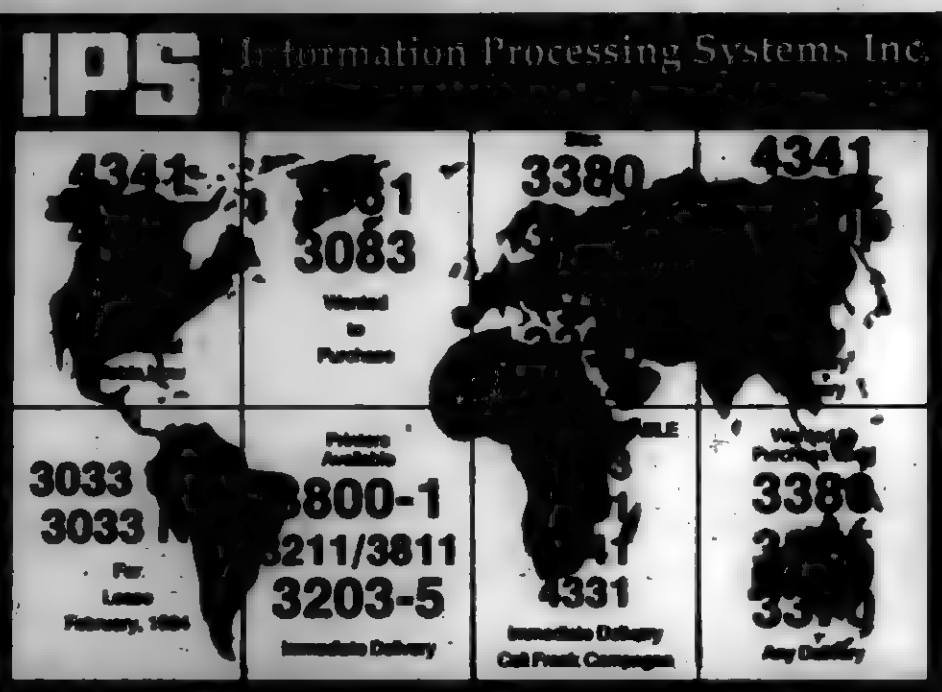
Request for Proposal No. 885, due 3:30 p.m., Tuesday, February 28, 1984, for the acquisition of a software package with the capability of testing and debugging CICS programs for the Mississippi State Computer Center.

Request for Proposal No. 886, due 3:30 p.m., Thursday, February 23, 1984, for the acquisition of a document processing system for the Department of Wildlife Conservation.

Detailed specifications may be obtained from the CDPA office. The CDPA reserves the right to reject any and all bids and proposals and to waive informalities.

Dorothy Hooper or Elaine Knauss,
State Central Data Processing Authority
601/359-1365

IPS Information Processing Systems Inc.



TELEPHONE: (201) 262-9500 Telex: 642-197

4381 - M2 March
3370 A2 & B2 April
Maria Lawrence
(415) 672-6060
Olympus Computer Marketing Inc.

Buy Sell
3270
Courier 2700-03/13, 2780, 2790
Memorex 1377, 2078, 2079
Telex 274, 276, 278, 279, 287
Genesis Systems Corp.
12751 County Road 5
Burnsville, MN 55337
(612) 894-8270
Contact Phil Brandsey

DSI
WE BUY SELL & LEASE!
BURROUGHS
Discover the DSI alternative.
800-641-5215
All equipment available immediately and guaranteed for Burroughs Maintenance
DSI Serving the Burroughs Community Worldwide
2000 W Alameda Ave Denver CO 80223 (303) 922 8331
TWX 910 931 0483

IMMEDIATE DELIVERY

CALL FOR QUANTITY PRICING
TOLL FREE (800)343-0472#

DISK DRIVES	
Shugart 801/800-2 (single sd/density)	$444
Shugart 850 (dble sd/density)	$555
CDC/HPI Hawk 9R8A8	$1990
TERMINALS	
Lear/Siegler ADM3	$660
Lear/Siegler ADM3A	$625
Lear/Siegler ADM31-9	$750
Lear/Siegler ADM31	$995
FANS & BLOWERS	
Rotron MuffinXL MX3A3	$12
Rotron MuffinXL MX2A3	$12
Rotron Whisper WR2A1	$12
Rotron Whisper WR3A1	$12
Kooltronic KP529A	$99
Etri 99XU 110v	$16
POWER SUPPLIES	
Sierracin AC1089	$99
Boschert GL130 3049R	$180

Most items avail 50/60Hz
ONLY FIRST QUALITY MAT'L

EAM DISTRIBUTION
27 MAYER STREET
WAKEFIELD, MASS 01880
*In Mass (617)246-3550
ask for Marc

IN STOCK!
Fujitsu Eagle
with cabinet, cables, slides & terminator:
$13,000
New Fujitsu SP 380
80 character per second, letter quality printer:
Introductory Special - $2,000
MANDERS
303-693-3035
2771 S. Jasper • Aurora, CO 80013

We Buy & Sell
DEC
Systems
Components
Digital Computer Resale
call:713 445-0082
400 Kenrick Ste C22 Houston, Tx 77060

CURIOUS ABOUT CLASSIFIED?

If you are interested in advertising with Computerworld, but don't know how to do it, give us a call! We will be glad to send you our current rate card, which explains sizes, costs, deadlines and requirements. All you have to do is ask! Our toll free number is 800-343-6474, in Massachusetts call (617)879-0700, just ask for the Classified Advertising Department. Or, you can look for our classified order form located in the classified section of Computerworld. Fill it out, attach your ad with a check, and return it to us. Computerworld Classified Advertising, 375 Cochituate Rd., Box 880, Framingham, MA 01701. We're anxious to help!

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

INTERSTATE COMPUTER EXCHANGE

5340-C23-69% off List—$8,500 (64K, dual disk, 27meg)
5340-E35-57.5% off List—$20,000 (128K, magazine, 128meg)
5340-F37-59% off List—$34,000 (256K, magazine, 256meg)

TOP $ PAID FOR S/34's and S/36's

Buy - Sell - Lease
S/32
S/34
S/38
IBM
3741
3742
CPU's CRT's PRINTERS
ALL MODELS
PURCHASE/LEASEBACK
SHORT & LONG TERM LEASES
CMA
Computer Marketing of America, Inc.
P.O. Box 71
698 Bryan Street
Old Hickory, Tennessee 37138
1-800-251-2670
In Tennessee: 615-847-4031

TexCom
Join the more than 200 other major companies that lease IBM equipment from TexCom - the IBM specialists.
WE BUY • SELL • LEASE
SERIES I
• All features and peripherals available
• Buy, sell, trade
• Leases available
4361/4381
• Two, three and four year leases
IBM S/34
IBM S/38
• All models and peripherals available
IBM S/36
• 1, 2, and 3 year leases
• We take S/34 trade-ins
4331/4341
• 1, 2 and 3 year leases
• All models available
TERMINALS
5291 5225 3278
5251 3277 3287
5256 3279
AVAILABLE NOW
DISKS
3370 3380 3340
3375 3350
AVAILABLE NOW
WE WANT TO BUY
• Your IBM systems and peripherals
• Your rental credit equipment
MEMPHIS • SAN ANTONIO • HOUSTON
AEL
(512) 349-9955
BBC

**** DEC ****
BUY—SELL—LEASE—TRADE—CONSIGN
SYSTEMS — PROCESSORS — OPTIONS
PERIPHERAL — MODULES — MEMORY
— SPARES —
NATIONAL COMPUTER EXCHANGE
(800) 624-9299
600 North Lunar Avenue, Brea, CA 92621
TWX: 910-596-1499 (714) 990-5988

BUY • SELL • LEASE
SERIES-1
S/34 • S/36 • S/38
4300
S/23 S/32 5110-20
Tape-Disk-Printers-Tubes
AMCOM
5200 W 73RD ST · MINNEAPOLIS MN 55435
(612)835-4737
CALL TOLL FREE
800-328-7723

data:3
IBM PROCESSORS/PERIPHERALS
GSD
S/38
S/36
S/34
SERIES/1
S/3
• BUY • SELL • LEASE • SUBLEASE •
DPD
4331/43
TAPE
DISK
PRINTERS
TUBES
• All Peripherals
• Special Features
• Upgrades
• Flexible Leases
• On-time Delivery
• Purchase/Leaseback
COLA

DATA GENERAL SPECIALISTS
FOR
Surplus New & Used Equipment & Systems
with full depot repair facilities.
CALL US
WE TAKE THE TIME
- WE CARE -
JM Associates
901 W. Chapel Avenue
Cherry Hill, NJ 08002
609-663-1115

For Sale
DEC 2040
With 256K
32 Ports
2 each TU45's
2 each RPO6
Call Henry
(713) 445-0082

IBM
3270

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

WE'RE NUMBER 1 FOR SERIES/1

Computer Options, Inc. is a major remarketer of both new and used IBM SERIES/1's and related peripherals. We offer your firm the option of purchase or a variety of custom leasing programs for your hardware acquisitions. Call us toll-free for more information.

AVAILABLE NOW FOR IMMEDIATE INSTALLATION

4955-F	4964-001
4955-E	4973-2
4959-A	4974-001
4962-2	4975-2L
4963-64A	1310

ALSO AVAILABLE-SYSTEMS 34 & 38

Call toll-free 800-328-5718

(In Minnesota, 612-544-9660)

COMPUTER OPTIONS, INC.
"the best option"
1660 South Highway 100
Minneapolis, MN 55416

PEARL HAS IBM 3741's

and we have System 34, System 36 and System 38 and a large inventory of CPU's, CRT's and printers. Call us about our flexible lease plans for buying, selling, leasing, renting and purchase/leaseback.

Call Dave Allen or Shirley Shreeve.

Pearl Computer Division
•P.O. Box 24026 •4717 Centennial Blvd.
Nashville, TN 37202 (615) 383-8703

NPA SYSTEMS INC.

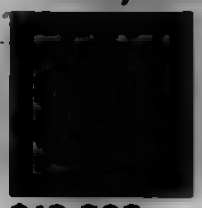
SPECIALIZING IN:
PURCHASE
SALE, TRADE,
LEASE, RENT,
AND SERVICE OF
Data General
EQUIPMENT

(516) 467-2500

DISK DRIVES • CONTROLLERS • PERIPHERALS • MEDIA

WANG • DEC

National authorized CDC OEM-Distributor (for Controllers and Media) offers *New Equipment*, fully warrantied for 90 days:

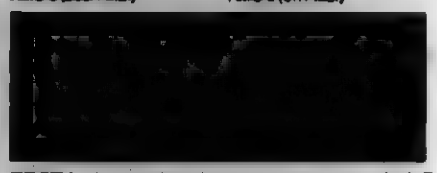


$12,900
CDC Model 9766 (300 Mb.)
WANG Models 2285V–2, and 2280 (288 Mb.) DEC Model RM0 5 (256.1 Mb.)

$7,750
CDC Model 9762 (80 Mb.)
WANG Model 2285V–1 (75 Megabytes). DEC Model RM0 3 (67.1 Mb.)

$8,875
CDC Model 9448 (66 Mb.)
WANG Model 2280–3 (80.4 Mb.)
WANG Models 2280 V–3, 8580 (80 Mb.) DEC Model RM0 7 (83.4 Mb.)

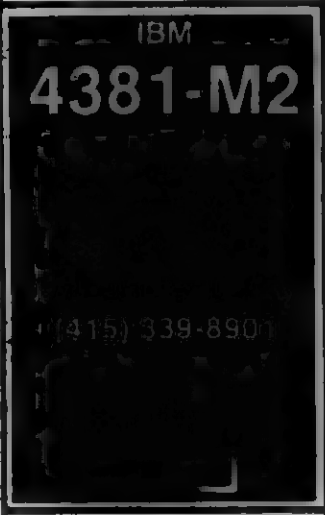
$20,825
CDC Model 9775 (675 Mb.)
WANG Model 2285 V–3 (640 Megabytes). DEC Model 2–RM0 5s (512.2 Mb.)



ERST
INTERNATIONAL CORPORATION
225 Lafayette Street, New York, NY 10012

ERST is the leading dealer in pre-owned WANG equipment—2200, VS, WP (CPUs, Terminals, IOPs, Controllers, Printers, Memory Upgrades).

Next time give us a call . . . Toll Free **1-800-FOR-ERST**. . . *In NY.* **212-431-1100**



IBM Series/1
Special Discount
32%
12 Unit Lot
Factory Shipped
Any Processor and Disk
Full VAR Warranty
Must Accept Delivery By 7/31/84
Equipment Sales, Inc.
(313) 827-8613

MAKE OFFER
"As Is"
Honeywell Level 64/20
Installed: December, 1976
Deactivated: January, 1984
For details, send stamped, self-addressed envelope to:
John C. Bramer, Jr.
Treasurer
General Assembly
Mission Board
341 Ponce de Leon Ave., N.E.
Atlanta, GA 30365

FOR SALE
DEC EQUIPMENT

RM05	(67Mb)	$4,300
RM80-AA	(New, 124Mb)	$12,500
LP11-CA	(600 LPM)	$7,300
VT78	(Tektronix)	$100
RH750	11/780 Controller	$4,000

Massachusetts Enterprises
Essex St. - Middleton, MA 01949
(617) 777-4666

For All Your DEC Requirements . . .

System/34
128K/64MB
Printer 300LPM
$1600. P/Mo.
Sale/Lease

Sale/Lease
4341's
Models K, L, M - GRP 1 & 2
Lease Term -
1 Yr or Longer

Control Units
3880 - B13
3880 - D13
Avail: March 1984
Sale/Lease

Controllers
3880 3803
3274 3276
Immediate Delivery

DASD
3380 3375 3370
3350 3344 3310
Immediate Delivery

Tape Drives
3420 3430
3410 8809
Immediate Delivery

Display Stations
3278 3279
3178 3277
Immediate Delivery

Printers
4245 3262 2980
3211 1403 3262
3289 3287 5256

CDLA
Computer Marketing Inc.
P.O. Box 5265, Philadelphia, PA 19126

EL CAMINO RESOURCES LTD.
offers:
4381-M2
DELIVERY POSITIONS AVAILABLE
early MARCH
APRIL
MAY
JUNE
(213) 986-2411
4827 N. Sepulveda Blvd.
Sherman Oaks, CA 91403

LEASING A LARGE COMPUTER?

Look for the best deal in the classified pages of COMPUTERWORLD.

Call 800-343-6474
(or 617-879-0700) for more information

BUY SELL SWAP | BUY SELL SWAP

We've Got Your Number

S/34 ALL MODELS QUICK DELIVERIES

SERIES 1 CONFIGURED TO YOUR NEEDS

S/36 ATTRACTIVE LEASE RATES

S/38 NEW & USED MACHINES

5110/5120 NEW LOW PRICES

PERIPHERALS

CRT'S...PRINTERS...DISK...TAPE...MODEMS

CARLYN

COMPUTER SYSTEMS

6100-G Backlick Road Annandale, VA 22003

"CALL COLLECT" (703) 642-1950

BIDS & PROPOSALS

Legal Notice - For Sale

Bids will be accepted by the University of California, Santa Barbara until 3-15-84 for the following computer equipment:

(2) IBM 3033 Processing Unit Model UX
IBM 3033 Printer Model A01
IBM 3033 Multi-function card machine
IBM 3033 Reappearance Model B01
IBM 3033 Power Model S without plant with
IBM 3033 Model S Magnetic Tape unit, operation (Parallel-Serial) Model S4 (also
IBM CPU with many features.
(1) serial Multi-Connector Box

All IBM equipment is in good condition and operable for reinstallation. Additional information may be obtained by calling Steve Hansen (805) 961-4551. Bidder has day to all or part bids. Bid price must specify [illegible] from Santa Barbara plus 6% sales tax. UCSB will pay for dismantling. UCSB reserves the right to reject any or all quotations. Send bids to:

UCSB General Stores, Building 527
Attn: Mr. Steve Hansen
Santa Barbara, CA 93106

BUSINESS OPPORTUNITY

ARE YOU REPRESENTED IN ENGLAND?

As a leading IBM Software House with sales of 4 million dollars annually, we have considerable experience in marketing IBM main frame and P.C. softwares.

If you want a share of the U.K. market, contact us without delay. Telephone Paul Ingram on 203-26301, Telex 317165.

SYSTEMS RESOURCES LTD.

The Bulletin Board

Buy • Sell • Lease — Buy • Sell • Lease — Buy • Sell • Lease — Buy • Sell • Lease

WANG

BUY - SELL
MVP/LVP • OIS • VS • PC
SYSTEMS IN INVENTORY
VS/80 • MVP • WPS30
AND PERIPHERALS
2246C • 2246R • 5536-4
[illegible]
(800) 277-4888

Psssst...
WANG USERS.....
HAVE YOU HEARD ABOUT THE GROUP OF FORMER WANG EMPLOYEES IN ATLANTA WHO BUY & SELL USED WANG EQUIPMENT AND PLUG COMPATIBLES?
I.C.A. (404) 977-4388 or
1-800-241-3189

For Sale:
Several VS-80 Systems
Incl. 256-512K, 2 Wk. SW's, 80 Meg "Phoenix", 600 LPM Printers. From $25K Each.
Also Available: OIS 115-4 (80 Meg)
(617) 373-8030
CFR Associates
Broadway, 08869 Specialists Since 1978

HEWLETT PACKARD

HP3000HP3000HP3000

The Bulletin Board

PRIME

PRIME
LARGE SELECTION OF USED PRIME COMPUTER SYSTEMS ...SAVINGS TO 50%
Peripherals also available
Memories•Disk Drives•Controllers
Modems•Terminals•Printers
1st SELFRIDGE
...Your Remote Source
A DATAMATION SERVICES, INC. COMPANY
3001 EAST CAMPBELL AVE.
PHOENIX, ARIZONA 85016
(800) 557-0999
ASK FOR DON OR MATT

DEC

DEC BARGAINS

11/84A CPU Std	$1,595
11/44 KE44-A "CIS"	$2,975
AA-C276D Spares Kit	$9,800
RDV11-AA	$495
DR750-AA	$3,400
DZ11 MUX Bd.	$1,125
DZ32-S	$1,870
FP11A	$1,185
RX11-A	$1,795
RX11-B	$2,875
KW11-P	$330
MS11-MB	$1,275
MS750-DC	$4,850
MS750-PD	$2,995
MSV11-PK	$1,135
MSV11-PL	$1,275
PDP 11/84A-DC	$5,350
RLV11	$975
VAX 1MB MS750-CA	$2,995
VAX 1MB MS760-CA	$2,995

Call Ray at QEI, Inc.
(617) 275-6500

DEC

Now Available in Stock!
More PDP-11 with 16 MSB Winchester, (2) RX50 Floppy Drive, 64K Fab Memory
Inquire Price
PDP 11-03, RLV-11 Controller, 64KB Memory, LA 180 Printer, RT-11 License.
$9,800
PDP 11-23 with RL02 Disk (5), 256 KB Memory, LA 180 Printer, RT-11 License.
$12,500
LA 180 Printer with Controller
$995
Other Configurations Available
Complete Range of DEC Compatible Software, Communication
E.E.C. Systems, Inc.
(617) 443-5186

DEC & PRIME SPECIALS

• MS780-PD Avail Now	Call
• PDP 11/70 Configured to your needs	Call
• RMO5-AA	$6,200
• CDC 9775 600MB	Call
• CDC 9766 300MB	Call
• RP06-AA	Call
• VAX 11/780 1MB, 64K chip Now	Call
• RM05	Call

• Prime Computer Systems Available Upon Request
SEVCO SIC.
(617) 438-6936
(617) 438-6331

DEC NEW & USED
BUY — SELL — EXCHANGE
Systems • Processors • Memory Options • Peripherals • Modules
LAKESIDE COMPUTER CORP.
1600-A Bella St., Sauk Rapids, MN 56379
(800)255-2545

VAX RESOURCE ACCOUNTING
$1200.00 U.S.
ON LINE-MENU DRIVEN
DISK ACCTG-MGMT REPORTS
Virtual Computing
#100, 535-11 Ave. S.W.
Calgary, Alta., Canada T2R0C9
(403)269-7440

DEC

We Buy and Sell DEC Systems and Components.
Alphabyte, Inc.
950 S. State College Blvd.
Fullerton, CA 92631
(714) 680-6511

DEC New & Used

RSTS	$125	MM11DP	$60
H7750A	$695	M8111LD	$1,350
H8600T	$600	RX01AA	$950
LA36DE	$595	RX11D	$2,995
LQP16PA	$695	RM02PK	$950
QJ656E2	$600	VT52AE	$795

Jepco Computer Sales
(516) 369-6566

DEC 11/03 System
With 32KB, RXV11-BA, Cabinet, LA36 Printer, RT11 License
$1,975
Call Ray
(617) 275-6500

11/70 System
½ MEG Core
1 MEG Monolithic
FP11-C, RH70
$39,000
Call ESS
(701) 282-6360

BUY • SELL • TRADE

1170 Sys.	DZ11-E	RH780	
DL11-E	FP11-C	RM03-AA	
DL11-W	LA120-GA	RM05-AA	
DMC11	M7268	RP04/6-C	
DR11-B	MS312	RP06-AA	
DZ11-B	MX11-CE	TE16 Mem.	

NEW YORK COMPUTER EXCHANGE
(516)752-6666 (800)645-6160

RK07
DEC Refurbished RK07-FA Disk Drive and (1) RH811 Controller
For Sale
$10,500 or Best Offer
New Mexico Medical Lab.
(505) 247-2208

DATA GENERAL

NEW DG CRT's

D-210	$795
D-410	$1,395
D-460	$1,295
Desktops	15% to 25% Off List
Analog 300	$695

Any & All DG Cables in Stock.
We Will Not Be Undersold On Any New or Used DG Equipment
Kansas State Systems
(913) 897-4884

MISC. SYSTEMS

KONTRON FUTURE DATA SERIES 2000
Micro processor development systems supporting 8 and 16 bit processors. Single or multi user configurations. Prices discounted 1/3 off list.
Contact Capital
4701 Patrick Henry #1
Santa Clara, CA 95054
(408) 988-6667

DATAPOINT
4650 System
120MB Disk
128K Processor
8020 Processor 128K
General Data Processing
(713) 523-6454

For Sale
DATAPOINT 4630
300 LPM Printer
(216) 464-6620

Nixdorf
For Sale By Owner
Distributed Processing System 600/55
Fully Configured
(215) 293-8369

SPERRY UNIVAC

V-77 600 SYSTEM
(2) 256K CPU with Pagus WCS
(2) 640MB 300 MB Disk Drives
(1) 10 MB Disk Drive
(2) 800 bpi Tape Drives
(2) 6250/1600 bpi Tape Drives
(1) 300 LPM Printer
(1) 600 LPM Printer
Total EXCHANGE (Complete) $950
Ask for Tom Eagle

MISC.

USED COMPUTER FLOOR
Approx 1000 sq ft
Vents and Stands
Contact Ted Christesse
(804) 730-3000 ext 2221

FOR SALE LEE DATA EQUIPMENT
(14) Model 1220 Display Stations
(1) Model 320 Local Controller
Marion Blanchard
(615) 822-5141

Buy • Sell • Lease
• Short Term Rentals •
DATAPOINT
FOR SALE

9400	Rims	$1,195
9407	Multipoints	$600
9600	CRT's	$1,295
1600	Systems	$1,295
1670	20MB Extension	$5,795
9602	150 CPS Printer	$1,295
9640	Arc Proc. 256K	$5,995
9660	Datastations	$1,295
9661	Datastations	$995

24 HOUR DELIVERY
Cougar Computer Corp.
(214) 261-3600

NCR

500 DISK UNITS
NCR Model Avail. Immed.
Mentmore International Corp.
2 Hartsdale Park, Ste. 304
Chattanooga, TN 37415
Tel. (615)870-3000
We supply more NCR Computer Systems to More NCR Users Than Any Other Company. Except NCR!

HONEYWELL

L62, L64
L6000, L6600
PERIPHERALS
TERMINALS
URS
68 Montvale Ave.
Stoneham, MA 02180
(617)438-6300

For Sale
Honeywell Level 6
With 256 KB Of Memory
GCOS 6 Operating System
(2) 80 MB Disk Drives, (1) 600 LPM Printer, (10) 80 MB Disk Packs, Cassette, 3270 Peripheral Module, (2) VIP 7700 CRTs
Call (800) 526-0000 Ext. 150
Also Available: DPS 6/65 & 6/81

LEVEL 6 & DPS 6 EQUIPMENT
Refurbished Like-Printers
FR/B150 300 LPM, 96 Char.... $4,125
FR/B104 300 LPM, 64 Char.... $4,725
FR/B156 600 LPM, 64 Char.... $5,695
New (Never Used) Disk Drives
CDU 91 10 10MB
(SF & SR) CMD ..... $5,200 Ea.
Beadstone Computer Services Ltd.
(617) 568-6660

Your ad can be here for $130

SOFTWARE FOR SALE

Elegant Software
for IBM S/34, 36 and 38

General Accounting	Payroll/Personnel
Financial Reporting	Property & Equipment
Accounts Receivable	Report Writer
Accounts Payable	Oil & Gas
Order Processing	All Systems are:
Inventory Management	RPG II/RPG III
Sales Analysis	Data Base
Job Cost	Interactive

J.B. Edwards & Company
4940 South Syracuse Street/Suite 5500
Denver, CO 80237
303/ 773 3732
Dallas — 214/ 458 0636
Houston — 713/ 960 8276
Northern California — 415/ 697 7754
Southern California — 714/751 5302

More IBM System/38 Users Are Choosing RTC Systems.
For technically superior software in a wide range of Financial, Manufacturing, Distribution and Management Business Systems.
The International Software Developers
RTC Systems, Inc.
49 Plain Street
North Attleboro, MA 02760
(617) 695-5008

ROBOT /38
automatic System/38's read password
For only $00/month, this automated computer operator runs jobs during off-hours and never forgets! Now Version 3 adds 19 Enhancements plus 20 ways to cut overhead, tune-up disk space, and improve response time.
For FREE User Guide
CALL TOLL FREE
1-800-000-0000 Ext. 000
HELP/38
15102 Minnetonka Industrial Rd.
Minnetonka, MN 55343 (USA 612/935-3311
Division of Advanced Circuits

CS SOFTWARE
VAX
PDP-11
Payroll • • Job Cost
General Ledger • • Fixed Assets
Accounts Receivable • • Accounts Payable
Inventory • • Order Entry
Client Writeup
Compu-Share
3824 - 50th St. • Lubbock, TX 79413 (806) 792-3785

Series/1 Performance
Shows the Changes that make Your System Faster
Responsetime/1
Firstsign Computer Company
524 Union St., #208
San Francisco, CA 94133
(415) 398-7228

IBM S/38 PAYROLL
• 99 COMPANYS
• 99 EARNINGS
• 99 DEDUCTIONS
• 401 (k)
• ALL STATE TAXES
• RPG III
• MENU DRIVEN
• ON-LINE
• EMPLOYER TAXES
• G/L DIST
• CHECK HISTORY
• DATA BASE
cic
CONSOLIDATED INFORMATION CO.
177 POST STREET, SUITE 906
SAN FRANCISCO, CA 94108
(415) 433-5333

Sell Your Software in the Classified Pages of Computerworld
Call 800-343-6474 (or 617-879-0700) for more info.

SOFTWARE FOR SALE | SOFTWARE FOR SALE | SOFTWARE FOR SALE | SOFTWARE FOR SALE | SOFTWARE FOR SALE

Tired of changing your payroll system every year? Have problems paying your employees on time? Need better control over where your labor effort is going? Use PLYCOM's Payroll Package for software that is easy to use, yet effective. Includes complete support and excellent documentation. Features:

- Easy to use screens
- Completely interactive
- Excellent audit trail
- Divisional & departmental reporting
- Multi-state tax calculations
- W2A available any type
- Dream driven or exception type
- Extensive on-line error checking
- User defined pay code
- Easily handles manual checks
- Effective control on voids or returns
- On-line employee inquiry
- Productive labor reporting
- For VAX/VMS

Plycom services, inc.
P.O. Box 200485
San Antonio, TX 78220
(512) 734-4366

WANTED
ON LINE-MULTI COMPANY -ACCOUNTING SOFTWARE

Regional Batch Service Bureau processing $4 million annually wants to offer its 2000 clients the on line processing option. We need G/L, A/R, Sales Analysis, A/P & Accountants Time System.

Contact Val Fortier
55 Bloor Street West
Suite 1215
Toronto, Ontario M4W 1A5
(416) 962-7306.

DECISION SUPPORT.

NGS is now an IBM S/38 VAR.

N G S

NEW GENERATION SOFTWARE, INC.
341 Lincoln Street, Roseville, CA 95678 Phone 916 969-9448
Outside California Call Toll Free 800 824-1220.

CONTROL/38

GL/38 GENERAL LEDGER
EXEC/38 FINANCIAL ANALYSIS
AP/38 ACCOUNTS PAYABLE
PPF/38 PROFIT PLANNING AND FORECASTING
ICCS/38 INTEGRATED COST CONTROL
PO/38 PURCHASE ORDER
AR/38 ACCOUNTS RECEIVABLE
FA/38 FIXED ASSETS
SC/38 STANDARD COST

TIME & SERVICES

We'll keep you up to date week, after week,

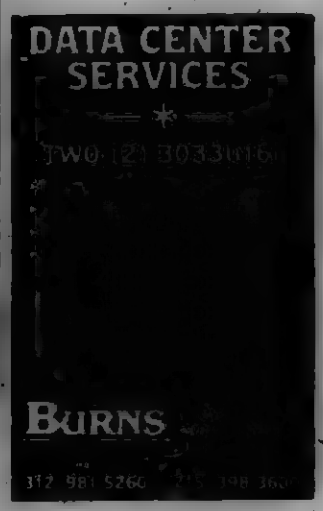
VAX 11/780 AND PDP-11 DEVELOPMENT TIME
NO KILOCORE TICK CHARGES / NO CPU CHARGES
Omnicomputer
$7/$14
RSTS/E VMS
PER HOUR CONNECT TIME
BUDGET BYTES™ 212-944-9230
Omnicomputer, Inc.
1430 Broadway, New York, N.Y. 10018

Computer Time
IBM 4341
- OS/VS1
- VM/CMS
- Negotiable Rates
- Good Environment

Contact Ray Rauth
(212) 777-5040
ICCS
10 East 21st Street
New York, NY

COMMERCIAL DATA PROCESSING
4341-2 370/168-3
OS-DOS-VM/CMS
CICS-ROSCOE
REMOTE JOB ENTRY
CICS DEVELOPMENT
CUSTOMIZED SOFTWARE
XEROX LASER PRINTING
Contact: Greg Gorab
(201) 777-3454
15 MINUTES FROM LINCOLN TUNNEL
ONE PASSAIC STREET
WOOD RIDGE, N.J. 07075

DATA CENTER SERVICES



BURNS

VAX/VMS TIMESHARE
5¢ PER CPU SECOND
$2 PER HOUR CONNECT TIME
ONE MB DISK STORAGE INCLUDED
AVAILABLE NATIONWIDE VIA TELENET
LEASE-A-PORT™ WITH 10 MB DISK & NO CPU OR CONNECT CHARGES FOR $800 PER MONTH
MIDCOM CORPORATION
(714) 99VAX11
(213) 516-0080
(714) 998-0070

THIS SPACE FOR HIRE.
[Inquire at Classified Advertising Dept.]

ICOTECH
Innovative Computer Techniques
COMPUTER SERVICES
IBM 3081 DEC-10
-Remote Job Entry -Online Processing
-Batch Processing -Timesharing
-Optical Mark Reading -Laser Printing
COMPUTER OUTPUT MICROFILM
-Datagraphix MRI Auto-Comp
-Datagraphix Datamaster
-8650 SPI Capability
-Free Testing
Route 202
Raritan, NJ 08869
201-534-6153
Contact: Joyce Bogenrieder

CLASSIFIED ADVERTISING ORDER FORM

Computerworld's Classifieds work.

Issues Dates: Ad closing is every Friday, 10 days prior to issue date.

Sections: Please be sure to specify the section you want: Time and Services, Software for Sale, Position Announcements and Buy/Sell/Swap. (Available upon request: Software Wanted, Business Opportunities and Real Estate).

Copy: We'll typeset your ad at no extra charge. Please attach CLEAN typewritten copy. Figure about 25 words to a column inch, not including headlines.

Costs: Our rates are $128.10 per column inch. (A column is 2" wide.) Minimum size is two column inches (2" wide by 2" deep) and costs $256.20 per insertion. Extra space is available in half-inch increments and costs $64.05. Box numbers are $15.00 extra.

Billing: If you're a first-time advertiser, (or if you have not established an account with us,) WE MUST HAVE YOUR PAYMENT IN ADVANCE.

Ad size desired: _____columns wide by _____inches deep.

Issue Date(s): _____

Section: _____

Signature: _____

Name: _____

Company: _____

Title: _____

Address: _____

Telephone: _____

Send this form to:

COMPUTERWORLD

CLASSIFIED ADVERTISING,

375 Cochituate Road, Box 880,
Framingham, MA 01701

Foreign Editorial/ Sales Offices

England: Terry Cartwright, EEC Publications, 196-200 Bells Pond Rd., London N9 4AQ. Phone: 01-359-3525. Telex: (851) 894085 (Computer Management, Computer Business Europe only).

Euan Rose, Bill Dunlop, Stephen Thomas, Beare Hobson Assoc., 345 Goswell Rd., Islington, London EC1V FHN. Phone: 01278 3415/6 (reps for all CWCI publications except Computer Management and Computer Business Europe).

W. Germany: Eckhard Utpadel, CW Publikationens, Friedrichstrasse 31, 8000 Munich 40. Phone: (089) 38172-0. Telex: 5215350.

France: Axel Leblois, Le Monde Informatique, 185 Avenue Charles De Gaulle, 92200 Neuilly Sur Seine, Paris. Phone: 758.14.14. Telex: 613234 F.

Japan: Mr. Shuji Mizuguchi, Computerworld Japan, 7-4 Shintomi 1-Chome, Chuo-ku, Tokyo 104. Phone: (03) 551-3882, Telex: 252-4217 (Computerworld Japan only).

H. Kajiama, Tokyo Representative Group, Yamaguchi Bldg., 2-12-9 Kanda Jimbo-cho, Chiyoda-ku, Tokyo 101, Phone: (03) 230-4117/8, Telex: J26860 (reps for all CWCI publications except Computerworld Japan).

Australia: Alan Power, Computerworld Pty. Ltd., 37-43 Alexander Street, Crows Nest, NSW 2065. Phone: (02) 4395133, Telex: AA74752 COMWOR.

Brazil: Eric Hippeau, Data News, Computerworld do Brazil, Servicos e Publicacoes Ltda., Rua Alcindo Guanabara, 25/10th Floor 20031 Rio de Janeiro, RJ Brazil. Phone: (021) 240-8225. Telex: 2130838(WORB BR).

Mexico: Richard Small, Computerworld de Mexico, Oaxaca 21-2, Colonia Roma, Mexico City 7 D.F. Phone: (905) 514-4218, (905) 514-6309. Telex: 1771300 ACHAME, 1777809 ACHAME.

Spain: Neil Kelley, Computerworld/Espana, Gravina, 13, Madrid 4. Phone: 231-23-85; 231-23-86; 231-23-88. Telex: 47894(CW E).

Denmark: Preben Engell, Computerworld/Denmark, Gammel Strand 50, 1202 Copenhagen K. Phone: 01-1234-11. Telex: 27586 sveben.

Sweden: Bengt Mannfeldt, Computerworld/Sweden, Nova Media AB, Vartavagen 56, 11536 Stockholm. Telex: 8105099 NOMACW.

The Netherlands: Johannes A. Wihrost, Mgr. Dir., CW Communications B.V., c/o IDC Benelux, Prins Hendriklaan 9, 1075 Ax Amsterdam. Phone: 020-791-692. Telex: (844) 15741.

Italy: Daniele Comboni, Gruppo Editoriale Jackson, s.r.l, Via Rosellini 12, 20124 Milano.

Argentina: Ruben Argento, Gen. Mgr., Computerworld Argentina, Av. Belgrano 406-Piso 9, CP 1092 Buenos Aires. Phone: 34-6583/5684.

Norway: Mr. Per Borresfjord, Editor, CW Norge A/S, Hovinveien 43, P.O. Box 2862, Tonyen, Oslo 6. Phone: 2/647725. Telex: (856) 76476

Singapore: Mr. David Naidu, General Manager, Asia Computerworld, Pte. Ltd., 11-08/11-10 Goldhill Plaza, Newton Road, Singapore. Phone: 250-444. Telex: (786) RS 37003

Saudi Arabia: Mr. Omar Duwaisi, General Manager, Saudi Computerworld, P.O. Box 5455, Jeddah. Phone: 6675916/6650380. Telex: (928) 401205.

ADVERTISERS INDEX

Abacus Products ID/28
American Software, Inc. 46
American Telephone & Telegraph ID/12-ID/13
Apollo Computer 70-71
Applied Computer Research 6
Applied Data Communications 48
Applied Digital Data 141
Applied Information Development 88
Artificial Intelligence ID/45
Ashton-Tate ID/5
ASK 66
A.S.T. Research 123
AVATAR Technologies 24

BASF 20
John Bell Company 121
Beehive International 130
Bein and Belanger, Inc. 76
Brandon Corp. ID/44
BRS 12

Cambridge Systems Group 146
CGA Software 74
Chatsco 26-27
C. Itoh 104
Codex Corp. 10-11
Columbia Data Products 128
Comset ID/7
Computer Corporation of America 56-57,67
Computer Power Systems 82
Computer Technology Group 14
Computer Transceiver Systems 145
Compuware 40
Continental Resources ID/1
Control Data Corp. ID/45
Corvalan 47
Corvus ID/26
Cromemco Inc. 54-55
CubeNet 8
CW Buyer's Guide 96
CW DMS 114
CW Office Automation 106
CW Supplement 108
CXI 132

Data Access 22
Data Design Associates 97
Data Systems for Industry 90
Datapoint 77
Dataproducts ID/29,ID/31,ID/32,137
Datasouth Computer 92
Datastream 98
Decision Data Comp. 126
DEC/TPG 89
Deltak ID/20
Deltak, Inc. 64
Deutsch Messe-U. ID/40
Digital Communications Assoc. 102-103
Dynacomp 97
Dysan 28

Eastman Kodak Co. ID/2
Electrohome 56-57
Elsinor Corp. ID/11

Enterprise Technology 121
Envision ID/4-ID/5
EPS ID/47
Esprit Systems 96

Fortune Systems 15,17,19
Fibronics ID/41
Four Phase Systems 124
Fusion Products 79

General Electric 112-113
Genoyo Software 68
Gentron 90
Group Operations 6

H & W Computer Systems 94
Hambrecht & Quist 144
Hayes Microcomputer 86
Honeywell Information Systems ID/24-ID/25
Hughes Aircraft 98

Infinet 82
Information ID/23
Information Sciences 136
Information Builders ID/14
Innec ID/19
Innovative Data Processing 7
Innovative Electronics ID/17
Interactive Training Systems 101
Invitational Computer 122
Israel Export Institute ID/3
Issco 128-129
ITT Courier 64-67

Kentucky Fried Chicken 10

Lear Siegler 84-85
Lee Data Corp. 32
Levi, Ray & Shoup ID/30
Local Data ID/7

3M 130
Martin Marietta 67
Maxster 75
Maxell Components 140
MCBA 72
McCormack & Dodge 42
Megatek 41
Memorex 78-79
MicroFrame 18
Mike Maresh & Associates, Inc. 9
MSA 102
MSI Data Corp. 126
MTI Systems ID/30,ID/31,ID/32

National Product Marketing ID/26
National Trade Prod. 122
NBC 134-135

OCLI ID/22
On-Line Software 84
Oregon Software 84
Oxford Software 85

Pace Applied Technology 60
Panagraphic Systems 111

Paradyne 48
Parallax ID/17
ParaResearch 52
Phoenix Computer Corp. 30
Phoenix Leasing 100
Pierce Computer 100
Polygon Associates ID/16
Professional Computer Research ID/39
Protocol 26-31

Qume 30

Remex Corp. ID/34
Ross Systems 138

SAS Institute 39
Signal Technology Inc. 52,53
SMC/Intech-Delco 36
Software A G 35
Software Assistance 18
Software House 109
Software Leasing 62,144
Stone Mountain Computing 83
Stratos Computer 80
Storage Technology 61
Synapse Computer 143
Syscomet 3
Sysod 81
Systems Support Software 19

Tandem Computers 81-83
Techland 83
Technology Transfer ID/46
Telecom Plus 88
Televideo Terminals ID/18
Term-Tronics 142
Tese Software 19
Topaz Inc./ Electronic Division 33
TransNet Corp. 133
Trax Software Inc. 31
Triangle Software 110
TRI International 130-131
Tymshare 94

Unger mann-Bass 35
University Computing Company 118-119
US Postal Service ID/10
US Robotics 66

Value Computing 72
Videotex America 12
Vistcorp 38
Visual Computer Inc. 44-45
VM Software 93

Wallace Computer Service 116-117
Wang Laboratories ID/43
Winterhalter Inc. ID/36-ID/37
Wolfe Computer Testing 145
WYSE Technology ID/38

Xerox Corp. 50
Xyplex, Inc. 14

Zilog Inc. 127

This index is provided as an additional service. The publisher does not assume any liability for errors or omissions.

Computerworld Sales Offices

Vice-President/Sales/Donald E. Pagan
Director/National Sales/Edward P. Mansell
Marketing Support Manager/Kathy Doyle
COMPUTERWORLD, 375 Cochituate Road, Box 880,
Framingham, MA 01701
(617) 879-0700

BOSTON SALES OFFICE (617) 879-0700
Northern Regional Director/Chris Lee
District Managers/Jim McClure, Ronald Masiello,
Joyce Donovan, Michael F. Hollaher
Sales Assistant/Alice Langley
COMPUTERWORLD, 375 Cochituate Road, Box 880,
Framingham, MA 01701

CHICAGO SALES OFFICE (312) 827-4433
District Manager/Arthur Kossack
Sales Assistant/Joan F. Broderick
Northern Regional Director/Chris Lee
COMPUTERWORLD, 2000 South River Road, Suite 204,
Des Plaines, IL 60018

NEW YORK SALES OFFICE (201) 967-1380
Eastern Regional Director/Michael J. Masiello
Senior District Manager/Doug Cheney
District Managers/Ray Costin, Joan Daly, Fred La Bate
Sales Assistant/Dale M. Palermo
COMPUTERWORLD, Perkins Place I,
140 Route 17, North, Paramus, NJ 07652

LOS ANGELES SALES OFFICE (714) 261-1230
Senior District Manager/Bob Hubbard
District Manager/Bernie Hockenvender

Western Regional Director/William J. Healey
COMPUTERWORLD, 18005 Sky Park Circle, Suite 260,
Irvine, CA 92714

SAN FRANCISCO SALES OFFICE (415) 421-7200
Western Regional Director/William J. Healey
Senior District Manager/Tony Milone
District Managers/Theodore Ferraro, Ernest Chamberlain
Account Manager, Classified/Wade Boettcher
COMPUTERWORLD, 300 Broadway, Suite 30,
San Francisco, CA 94133

ATLANTA SALES OFFICE (404) 394-0782
District Manager/Kelley Minick
Eastern Regional Director/Michael J. Masiello
COMPUTERWORLD, 2859 Peeler Road, Suite D,
Atlanta, GA 30360

CLASSIFIED ADVERTISING (617) 879-0700
Al DeMilo
COMPUTERWORLD, 375 Cochituate Road, Box 880,
Framingham, MA 01701

CW INTERNATIONAL MARKETING SERVICES
General Manager/Diane Le Munyon
COMPUTERWORLD, 375 Cochituate Road, Box 880,
Framingham, MA 01701
(617) 879-0700
Manager, West Coast/Peter Crockett
COMPUTERWORLD, 1060 March Rd.,
Menlo Park, CA 94025
(415) 328-8084

CW COMMUNICATIONS/INC.

Board Chairman/Publisher
Patrick J. McGovern
President
W. Walter Boyd
Senior Vice-President
Lee Vollmer

Group VP-Communication Services, Jack Edmonston. Group VP-Circulation, Margaret Pinton. VP-Marketing, Donald E. Pagan. VP-Finance, William P. Murphy. VP-Editorial, John Wainwright.

Computerworld Headquarters: 375 Cochituate Road, P.O. Box 880, Framingham, MA 01701
Phone: (617) 879-0700, Telex: 95-1130.

SALES: Vice-President, Donald E. Pagan. National Director, Edward P. Mansell. Corporate Advertising Administrator, Frank Collins. Marketing Support Manager, Kathy Doyle. Display Advertising Supervisor, Arlene Hadley.
Display Advertising, Deborah Bryer, Pam Valentinas, Elaine Costas, Carolyn Medeiros, Cindy Chaban, Mary Waddick. Classified Advertising Manager, William J. Mills.

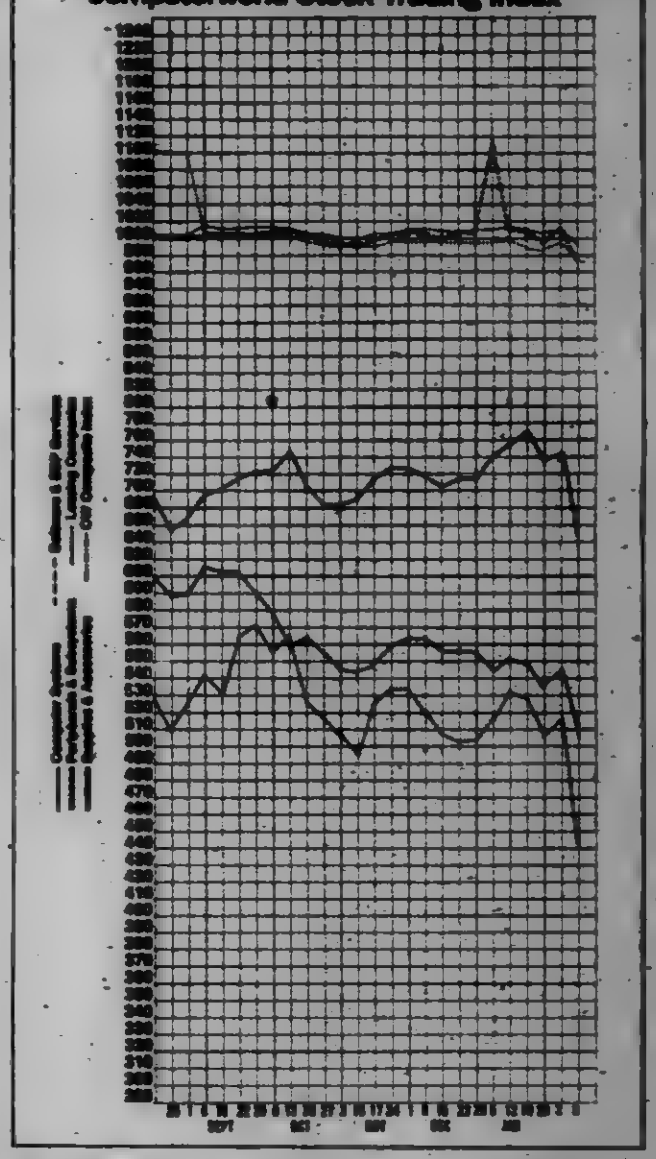
COMMUNICATION SERVICES: Group Vice-President, Jack Edmonston. Director Research, Kathryn Dresser. Sales Promotion Director, Liz Johnson.

PRODUCTION: Production Director, Peter Hahn. Production Manager, Marlene Sokol. Paste-Up Manager, Trish Gaudette. Systems Manager, Tom Pilla. Typesetting Manager, Carol Petzold. Art Director, Tom Monahan. Graphic Designer, Hank Ping.

CIRCULATION: Group Vice-President, Margaret Pinton. Circulation Manager, Jane Dunlevy. Fulfillment Manager, Maureen Burke.

Computerworld can be purchased on 35 mm microfilm through University Microfilms Int., Periodical Entry Dept., 300 Zeeb Rd., Ann Arbor, Mich. 48106. Phone: (313) 761-4700. Computerworld's indexed sold to Circulation Dept. for subscription information.

Computerworld Stock Trading Index



Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, FEBRUARY 8, 1984

All statistics compiled, computed and formatted by TRADE QUOTES, INC., Cambridge, Mass. 02139

		PRICE 1983-84 RANGE (1)	CLOSE FEB 8 1984	NET CHANGE	HIGH CHANGE
COMPUTER SYSTEMS					
N	ALPHA MICROSYSTEMS	11- 34	12 3/4	-1	-7.8
N	ALTOS COMPUTER SYST	9- 28	9	-1 1/2	-16.7
A	AMDAHL CORP	8- 38	18 1/2	-1 1/2	-7.5
N	APPLE COMPUTER INC	55- 83	75 1/4	-1 3/8	-1.8
N	AT&T	59- 78	66 1/8	-1 1/8	-1.6
N	BARRISTER COMP	39- 80	47 3/8	-1 7/8	-3.8
N	COMPUTER AUTOMATION	6- 17	8	- 1/4	-3.0
A	COMPUTER CONSOLES	9- 28	15 3/4	-1 1/8	-11.8
N	CONTROL DATA CORP	21- 60	44	-1 3/4	-3.8
N	CONVERGENT TECHNOL	10- 41	17 3/4	-1 3/4	-10.8
N	CRAY RESEARCH INC	29- 82	44 3/4	-1 3/4	-3.7
N	DATA GENERAL CORP	19- 47	28	-1 1/8	-3.8
N	DATAPOINT CORP	11- 30	21 5/8	- 3/8	-1.7
N	DIGITAL EQUIPMENT	65-132	92 3/8	-2 3/4	-2.9
A	EXCEL INC	3- 15	5 1/2	- 1/2	-7.4
N	ELECTRONIC ASSOC.	3- 8	4 1/2	- 3/8	-7.7
N	FLOATING POINT SYST	19- 41	28 1/2	-2 1/2	-8.0
N	FOXBORO	25- 67	33 3/8	- 3/8	-1.1
N	GENERAL AUTOMATION	9- 18	11 1/4	-1 7/8	-14.2
N	GOULD INC	25- 44	28 7/8	-3	-9.4
N	HARRIS CORP	29- 51	38 1/8	-2 3/8	-5.9
N	HEWLETT-PACKARD CO	69- 93	88 1/2	-1 1/2	-1.7
N	HONEYWELL INC	59- 88	88 1/2	-2 7/8	-3.2
N	IBM	97-134	107 3/4	-2	-2.2
N	IPL SYSTEMS INC	1- 5	3		-7.1
N	M/A-COM INC	17- 31	16	-2 3/8	-2.8
N	MAGNUSON COMP SYSTS	1- 3	3 1/8	0	0.0
N	MANAGEMENT ASSIST.	7- 26	26	+1 3/8	+5.6
N	MATSUSHITA ELEC(ADR)	60- 81	77 1/4	-2	-2.5
N	MODULAR COMPUTER SYS	5- 18	7 7/8	- 1/8	-1.5
N	NBI INC	5- 18	11	- 3/8	-3.3
N	NCR	55- 83	73 1/4	-1 1/4	-1.6
N	NIXDORF COMPUTER	70-146	113 1/2	-4	-3.4
N	NAT'L SEMICONDUCTOR	12- 30	13 1/8	-1	-7.1
N	NBI INC	21- 55	28 1/8	-1	-3.4
N	PRIME COMPUTER INC	11- 30	17 3/8	- 1/4	-1.4
N	SPERRY CORP	31- 69	38 3/4	-1 1/2	-3.7
N	TANDEM COMPUTERS INC	21- 66	30 7/8	-1 1/2	-4.6
N	TANDY CORP	21- 68	38 3/4	-1 1/8	-2.8
N	TELEVIDEO SYSTEMS	11- 41	19 3/4	-2 3/4	-12.2
N	TOLTEX CORP	9- 18	10 1/2	-1	-8.8
N	TEXAS INSTRUMENTS	71-136	103	-1	-0.1
A	ULTIMATE CORP	9- 25	16	-1 1/8	-15.8
N	VECTOR GRAPHICS INC	3- 14	3	- 1/2	-30.0
A	WANG LABS "B"	19- 48	33 1/2	-1 1/2	-4.7
A	WANG LABS "C"	11- 40	27 1/4	-1 3/4	-6.1
N	XEROX CORP	58- 86	68	-1 1/8	-1.6
LEASING COMPANIES					
N	BOOTHE-FINANCIAL CP	11- 27	20	- 1/8	-0.7
N	COMDISCO INC	7- 42	11 1/8	- 1/8	-1.1
N	CONTINENTAL INFO SYS	9- 25	8 3/4	- 1/4	-2.8
N	DPF INC	9- 18	13 1/8	- 1/4	-1.8
N	U.S. LEASING	29- 47	33 3/8	-1 3/8	-4.0
COMPONENTS					
N	ADVANCED MICRO DEV	13- 37	28	-2 3/8	-8.3
N	ADV'D SEMICONDUCTOR	11- 38	25 3/4	-4	-17.3
N	ANALOG DEVICES INC	19- 48	30 3/8	- 3/8	-1.2
N	ANALOGIC CORP	13- 37	18 1/2	- 1/2	-2.6
N	APPLIED MAGNETICS CP	10- 37	17 1/2	-2 1/4	-10.6
N	TERADYNE	19- 38	27 3/8	-2 3/8	-7.8

KEY: N=NEW YORK; A=AMERICAN; P=PACIFIC; O=OVER-THE-COUNTER
L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. ON LAST BID
(1) TO NEAREST DOLLAR

		PRICE 1983-84 RANGE (1)	CLOSE FEB 8 1984	NET CHANGE	HIGH CHANGE
SOFTWARE & EDP SERVICES					
O	ADVANCED COMP SYCS	7- 9	9 1/2	- 1/8	-4.8
O	ADVANCED SYSTEMS INC	7- 22	20 1/2	- 3/4	-4.3
O	ADR COMPUTERS INC	7- 22	20	- 1/4	-4.8
O	AMERICAN SOFTWARE	7- 22	20	-1 1/4	-5.8
A	AMASOFT INC	9- 23	9 3/8	- 7/8	-15.1
O	ANALYTIC INTL CORP	9- 23	9 1/2	- 1/2	-13.6
O	APPLIED DATA RES.	9- 23	13 1/2	- 1/2	-3.6
O	ASK COMPUTER SYSTEMS	9- 21	15 3/4	-1 1/4	-13.3
O	ASTRONYME CORP INC	2- 12	2 3/8	0	0.0
O	AUTOMATIC DATA PROC	21- 47	39 3/8	- 5/8	-1.7
O	CDA COMPUTER ASSOC	2- 12	2 3/8	- 1/8	-5.0
O	COMPUTER ASSOC INT'L	9- 23	9	- 1/8	-13.0
O	COMPUTER HORIZONS	9- 23	15 3/4	-1 1/4	-14.0
O	COMPUTER NETWORK	5- 17	7 1/2	- 1/4	-1.6
O	COMPUTER SCIENCES	9- 23	17 1/2	-1 1/4	-6.6
O	COMPUTER TASK GROUP	9- 23	15	- 1/2	-3.2
O	COMPUTER USAGE	7- 23	8	-	-28.1
O	COMPUTONE SYSTEMS	2- 12	2	-	-5.0
O	CORVEN CORP	7- 23	9 3/8	- 1/8	-1.3
O	CYMBOMIC	7- 23	9 3/8	- 1/8	-7.4
O	DALLNET SOFTWARE	13- 38	21 3/8		-0.2
O	CYRANE SYSTEMS INC	9- 23	15 3/4	-4 1/8	-0.2
O	ELECTRONIC DATA SYST	19- 47	38		-0.1
O	HOGAN SYSTEM INC	13- 38	23 1/2	-1 1/4	-13.1
O	GENERAL ELECTRIC CO	54- 68	63 3/8	-1 3/8	-2.1
O	GTE CORP	29- 48	39 1/2	-1 1/4	-3.1
O	INFORMATICS INC	3- 10	3 3/4		-4.8
O	INFOTRON SYSTEMS COR	23- 54	31 1/4	-1 3/8	-4.2
O	KRONOS ASSOCIATES	9- 23	9 3/8		-0.1
O	LOGICON	9- 23	13 3/8	-1 1/4	-1.8
O	MCI COMMUNICATIONS	9- 23	15 3/8	-1 1/8	-12.3
O	MIDWEST MICRO INC	9- 23	17 3/4	-1 1/4	-1.2
O	MATHEMATICAL APP GRP	9- 23	9 1/8	- 1/2	-4.0
O	MICOM SYSTEMS INC	23- 58	38	- 1/2	-1.2
O	MICROTEK-MICRO CP	9- 23	13	- 1/2	-7.4
O	NATIONAL DATA CORP	19- 58	38 1/8	- 7/8	-4.8
O	ON-LINE SOFTWARE INT	11- 37	21	-1 1/2	-20.1
O	PANSOPHIC SYSTEMS	9- 23	15 1/2	- 3/8	-2.2
O	PLANNING RESEARCH	9- 23	15	- 1/2	-4.1
O	POLICY MGMT SYSTS CP	19- 38	23 1/2	-1 1/2	-4.0
O	PROGRAMMING & SYS	1- 8	4 3/8		-2.8
O	REYNOLDS & REYNOLDS	17- 33	26 3/4	-1 1/4	-0.6
O	SCI CORP	21- 34	28 3/4	-1 1/4	-0.1
O	SHARED MEDICAL SYST	19- 43	38 3/8	-1 1/4	-0.1
O	SCIENTIFIC COMPUTERS	9- 23	15	-1 1/4	-12.1
O	SOFTWARE AG	9- 23	11 3/8	- 1/2	-4.1
O	TYMSHARE INC	23- 58	38 3/8	- 1/2	-1.3
O	WANG CORP	19- 48	33	- 1/2	-1.4
O	APPLY CORP	7- 23	8 7/8	- 1/4	-7.8
PERIPHERALS & ELECTRONICS					
O	3D INTERNATIONAL	3- 7	3 3/8	- 1/8	-4.8
O	ANDERSON JACOBSON	7- 23	8 3/8	- 1/8	-1.8
O	AUTO-TROL TECHNOLOGY	7- 23	10 3/8	-1 1/4	-8.3
O	DANCTEC INC	7- 23	11 1/4	-1 1/4	-10.8
O	DIGITIVE INT'L	3- 13	7	- 1/2	-6.6
O	DOLLY-DIGITAL & ADV	7- 20	11 3/8	- 1/8	-10.1
O	CANNON CORP	1- 4	2	- 1/8	-4.6
O	CONTINENTAL DATA CORP	9- 23	13 1/4	-1 1/4	-13.1
O	CETEC CORP	7- 23	8 3/8	-1 1/4	-10.3
O	CENSITRONICS	7- 23	9 1/4	-1 1/8	-10.8
COMPUTER SERVICES INC					
O	COMPUTER TRANSCEIVER	1- 3	1 1/8	- 1/8	-10.0
O	COMPUTERVISION CORP	19- 38	23 1/8	- 1/8	-4.3
N	CROMAC CORP	19- 38	23 1/8	- 1/8	-4.3
A	DATAPRODUCTS CORP	7- 23	8 1/8	- 1/8	-15.1
O	DATAMAN CORP	11- 23	13 3/8		-4.8
O	DATA SWITCH CORP	11- 23	13 3/8	- 1/8	-4.4
O	DATUM INC	9- 17	9 3/8	- 3/8	-10.0
O	DECISION DATA COMPUT	9- 17	9 3/8	-1 1/4	-10.4
O	DIGITAL-GLOBETYPE	1- 3	1 1/8	- 1/8	-10.7
O	ELECTRONIC M & R	11- 23	13 3/8	- 1/8	-4.8
O	EMDATA, INC	11- 23	13 1/8	- 1/8	-4.1
O	EVANS & SUTHERLAND	3- 13	3	- 1/8	-10.8
O	GAMMA-F TECHNOLOGIES	3- 13	3 1/8	- 1/8	-4.1
O	GEN'L DATA COMM IND	9- 23	15	- 1/8	-10.3
O	GREAT AMERICAN IND	1- 3	3/4	0	0.0
O	HAZELTINE CORP	9- 23	13 7/8	- 1/8	-11.1
O	SCOT CORP	11- 23	13 3/8	- 1/8	-11.1
O	INFORMATION INTL INC	11- 23	13 1/8	- 1/8	-4.1
O	INFORMATION SCIENCE	1- 3	1	- 1/8	-4.2
O	INTEL CORP	11- 38	21 1/2	-1 1/4	-11.2
O	IPL SYSTEMS INC	1- 3	1	- 1/8	-4.8
O	LANEY ELECTRONICS	3- 13	3 1/8	- 1/8	-4.8
O	MEDIDATA CORP	3- 13	3 3/8	- 1/8	-4.4
O	MEI DATA CORP	3- 13	3 3/8	- 1/8	-4.4
O	MANGUM CORP	9- 23	13 3/8	-1 1/8	-4.8
O	NETWORK SYSTEMS CORP	9- 23	15 3/8	-1 1/8	-4.8
O	NO AMERICAN PHILIPS	23- 58	38 1/8	-1 1/2	-1.2
O	NORTHERN TELECOM LTD	19- 38	24 1/8	- 7/8	-4.8
O	OMCH	1- 3	1 1/8	- 1/8	-10.0
O	PARADYNE CORP	7- 23	8 1/8	- 1/8	-4.7
O	PENRIL CORP	7- 23	8 1/8	- 1/8	-4.8
O	PHEDELY AMERICAN INC	9- 17	9 1/8	- 1/8	-4.8
O	PLESSEY CO (ADR)	19- 38	23 1/2	- 1/8	-4.2
O	POLYTRONIX INC	3- 13	3	-1 1/4	-7.4
O	RANTEC CORP	3- 13	3	- 1/4	-4.8
O	RAYTHEON CO	41- 68	61 1/8	- 1/8	-1.8
O	RECOGNITION EQUIP	9- 17	13 1/8	- 1/8	-4.4
O	REMA CORP	19- 38	23 3/8	- 1/8	-4.8
O	RANKING ASSOCIATES	19-130	38	-4 1/8	-10.8
O	SCAN DATA	1- 3	3/8	0	0.0
O	SCAN-TRON CORP	1- 3	1	-1/4	-4.1
O	SCIENTIFIC ATLANTA	11- 23	13 1/8	- 1/8	-4.8
O	STORAGE TECHNOLOGY	11- 23	13 1/8	- 1/8	-10.1
O	SYKES DATATRONICS	1- 3	1 1/8	- 1/8	-4.8
O	SYSTEMS & COMP TECH	19- 38	23 1/8	- 1/8	-4.2
A	T ONE INC	3- 13	3	0	0.0
O	TAB PRODUCTS CO	9- 23	13 3/8	- 1/8	-10.8
O	TANDON CORP	9- 23	13 1/8	- 1/8	-1.8
O	TEC INC	9- 23	13 1/8	- 1/8	-10.8
O	TEKTRONIX INC	9- 23	13 3/8	- 1/8	-4.8
O	TELEX	9- 23	13 3/8	- 1/8	-10.8
O	TERMINAL SYSTEMS CP	3- 17	3 1/8	- 3/8	-4.8
O	TIMEPLEX INC	19- 38	23 1/8	- 3/8	-1.8
O	VISUAL TECHNOLOGY	9- 23	13 1/2	- 1/8	-4.8
SUPPLIES & ACCESSORIES					
O	AMERICAN BUS FORMS	7- 23	10 3/8	- 3/4	-4.8
O	BARRY BRIGHT	3- 13	3 3/8	- 1/8	-4.8
O	DUPLEX PRODUCTS INC	7- 23	11 3/8	- 1/8	-4.8
O	ENNIS BUS. FORMS	9- 23	13 3/8	-1 1/8	-4.8
O	3M COMPANY	41- 68	57 1/8	- 1/8	-1.8
O	MOORE CORP LTD	19- 38	41 3/4	- 1/8	-4.4
O	STANDARD REGISTER	11- 23	25 3/4	- 1/8	-4.8
O	WALLACE BUS FORMS	11- 23	13 3/8	- 1/8	-4.8

15 pointed questions to ask MSA or any software supplier

These questions will help you when you sit down with individual software companies.

They're tough questions. Relevant ones. And any supplier who is worth his salt should be able to answer them without backpedaling.

Ask MSA

We'll answer all these questions to your satisfaction—plus any others you may have.

In fact, we're probably the best equipped to answer them. Because MSA is the software company. We offer the most complete line of totally integrated systems in the software industry, including financial, human resource and manufacturing.

So you avoid the headache of trying to tie together individual systems. (And the even bigger headache of adding to them.)

With MSA's integrated systems, there's no unnecessary duplication of data or effort. Reports faster. All your company's information more timely and accurate—and in the right form.

Our technical edge comes from experience

Staying ahead is easier for a company that's steeped in software technology. MSA has spent years developing, refining, testing and enhancing our systems.

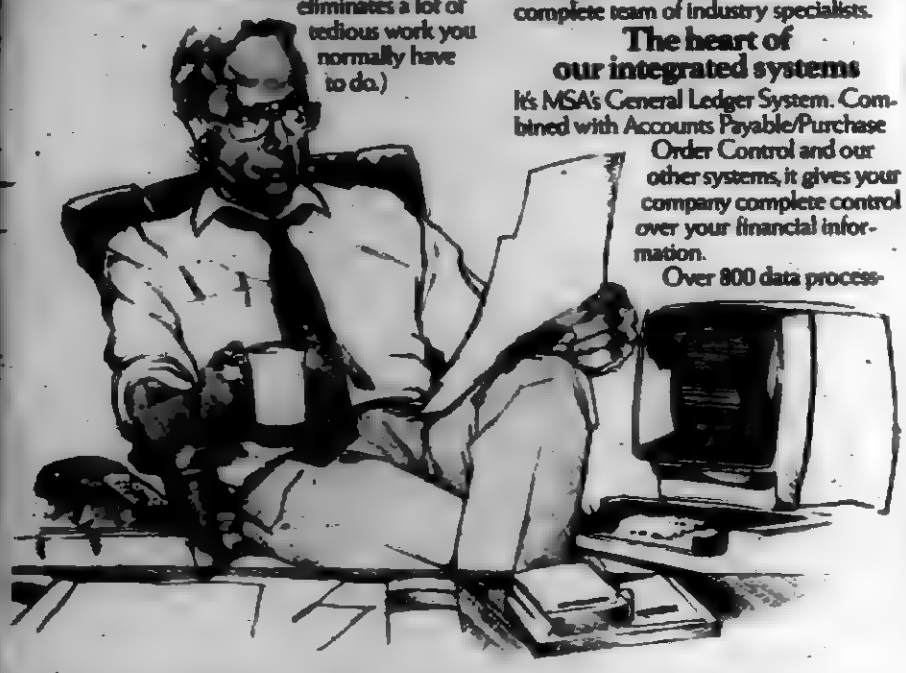
This year alone, we'll invest $25 million to make sure all our systems are technologically razor sharp. That gives us a decided advantage over flash-in-the-pan technology that may not have the bug-free logic of a more experienced system.

It also gives you a decided advantage over "custom" systems you have to update yourself.

MSA relieves you of that time-consuming burden. We update and enhance your software for a full year. Then we continue this service for a surprisingly low annual fee.

Maintenance includes keeping your system up-to-date technologically. Enhancing it with new features that make it work even harder for you.

And making sure it reflects changes in accounting procedures and government regulations, including 401(k), TEFRA, and FAS52. (That eliminates a lot of tedious work you normally have to do.)



Save this box. It can help you make an intelligent software decision.

1. Can you offer us a complete range of software systems designed to work together?
Or will we have to piece together a patchwork of systems?

2. Are your systems just record keepers, or can they really help us make decisions?
Can we pull together information from any of our integrated systems? In exactly the form we want it?

3. Can you provide business software for both mainframe and microcomputers?
Do you develop this software yourself or do you simply market it for another company?

4. Are your systems truly online so all of our information is current?
How many of your systems are online? How secure are they?

5. Will my company have to be the one that discovers the bugs in your brand new system?
Just how long have your systems actually been used, and how have they been tested?

6. Will you update your systems as technology advances and regulations change?
What are some of your most recent updates? Will you keep us current on regulatory changes?

7. Do your systems really do everything you say they will?
Or will we have to change them or add to them to get the features we want?

8. How long have you been in business?
What are your revenues? What is your growth record? Where will your company be five years from now?

9. How many systems has your company installed?
How many of these were installed in the past six months? How many of your earlier customers are still using —and liking—your systems?

10. Do your financial systems handle unlimited foreign currencies?
Do your financial systems use a common set of currency exchange rates?

11. Can you link our executives' computers directly to the mainframe—so they can get their own information?
Is that software available right now?

12. How will you make sure our own people thoroughly understand your system?
Do you have educational centers near us, or will we have to travel all the way across the country to find one? Will you be there to help during installation and after?

13. How many of your people specialize in software for my industry?
How many accountants work for you? Human resource specialists? Manufacturing experts?

14. Do your systems have built-in features that make them easier to use?
What happens if someone needs help figuring out a feature? Do you have online documentation that's easy to understand?

15. As my business changes will your system be flexible enough to change with it?
Or will we have to pay a lot to revamp it? Or even regenerate it?

© Management Science America, 3445 Peachtree Road, N.E., Atlanta, Georgia 30326

35,000 days of training

At MSA, we make sure your people have a firm grasp of our systems. Last year alone, we conducted more than 35,000 student days of customer training for over 1,800 companies. At education centers all over the world, as well as at our headquarters.

From training sessions to cassettes to complete, easy-to-understand documentation, MSA provides the most extensive Customer Education Programs in the industry.

And MSA systems are just as friendly as our people. Our online HELP feature actually guides users through our systems, and EASY-SCREEN™ lets them design their own screens without creating data processing nightmares.

If there's ever a question or problem with our systems, MSA customers are always close to service.

Our Account Managers are knowledgeable, responsive, and backed by a complete team of industry specialists.

The heart of our integrated systems

It's MSA's General Ledger System. Combined with Accounts Payable/Purchase Order Control and our other systems, it gives your company complete control over your financial information.

Over 800 data processing specialists, accountants, and financial experts work together to make MSA's financial systems the most advanced and most highly integrated in the industry.

MSA has the answers

Whatever your size—whatever your business—MSA has a total software solution.

We'll provide the highest quality integrated online software.

We'll tie your business and manufacturing software systems together, using our exclusive Extended Closed Loop™ manufacturing system.

We'll provide business software for your microcomputers, through our Peachtree Software Company.

We'll even link your microcomputers to your company's mainframe—with MSA's Executive Peachpak™ application software. A revolutionary concept that lets executives get the mainframe information they need through their personal computers.

MSA ready-to-install application software

1. General Ledger
2. Accounts Payable/Purchase Order Control
3. Budgetary Control/Encumbrance
4. Fixed Assets Accounting
5. Capital Expenditure Tracking
6. Forecasting & Modeling
7. Accounts Receivable
8. Order Processing
9. Foreign Exchange
10. Inventory & Purchasing
11. Payroll
12. Personnel Management & Reporting
13. Manufacturing Control System (MRP II)
14. Executive Peachpak™ II
15. Peachtree Software™ business systems for microcomputers
16. Peachtree Software™ office productivity systems for microcomputers

EASY-SCREEN, Executive Peachpak II, Peachtree Software, and Extended Closed Loop are trademarks of Management Science America, Inc.

Talk to us

If we've whetted your appetite with our 15 questions, clip the coupon below.

We'll send you a concise booklet that will help you even more in your deliberations. We'd also like to send you more information on how MSA can help you plan for software. And on individual systems.

Just fill in the information below, or contact Robert Carpenter at (404) 239-2000.

Management Science America, Inc.
3445 Peachtree Road, N.E.
Atlanta, Georgia 30326

☐ Please send me a free detailed brochure.
☐ Please send more information on the following systems. (Write numbers from product list.)

Mainframe Computer Type/Model _____

Name _____

Title _____

Company _____

Address _____

City _____

State _____ Zip _____

Business Phone ( ) _____

MSA
The Software Company

VOL 18
ISSUE 7A
FE 15 1984
UMI

FEB. 15, 1984
VOL. 18, NO. 07A

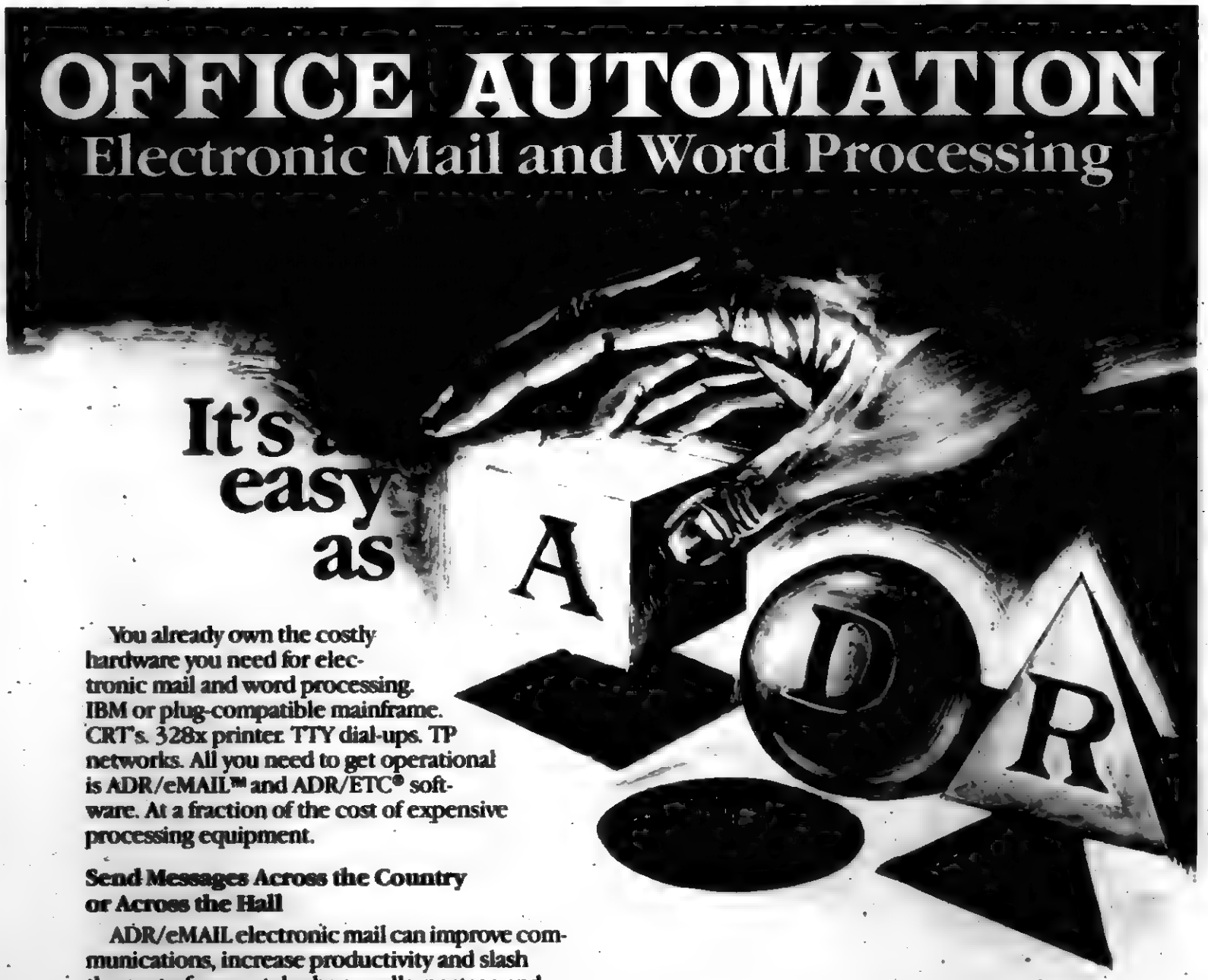
OFFICE AUTOMATION

CW
MI48106UIVYWUIVYMA FCWB C
UNIVERSITY MICROFILMS INTL
SERIAL PUBLICATIONS
300 N ZEEB RD
ANN ARBOR MI 48106

GETTING STARTED

OFFICE AUTOMATION

Electronic Mail and Word Processing



You already own the costly hardware you need for electronic mail and word processing. IBM or plug-compatible mainframe. CRT's. 328x printer. TTY dial-ups. TP networks. All you need to get operational is ADR/eMAIL™ and ADR/ETC® software. At a fraction of the cost of expensive processing equipment.

Send Messages Across the Country or Across the Hall

ADR/eMAIL electronic mail can improve communications, increase productivity and slash the cost of paper, telephone calls, postage and equipment. You can use eMAIL to write letters and memos. Read a message and pass it on with comments. Keep copies permanently. Send a message to a person, group or department. eMAIL can be accessed from any location in its terminal network – not just from your regular office. With eMAIL, you can't misplace, forget about, or spill coffee on, your mail. You can actually handle all your mail in only 15 or 20 minutes a day. Best of all, ADR/eMAIL is simple to learn – anyone can use it.

ADR/eMAIL is Integrated With ADR/ETC Word Processing

eMAIL includes an interface to the ADR/ETC word processor for sending and receiving large or highly-formatted documents. Today's most versatile and powerful word processor, ETC lets you generate simple memos, extensive proposals, catalogs, manuals and one or 100,000 personalized letters. It even allows you to link your word processing activities to your data processing systems. ETC also interfaces with typewriter terminals and hardcopy printers for boardroom quality documents.

ADR® is Ready When You Are

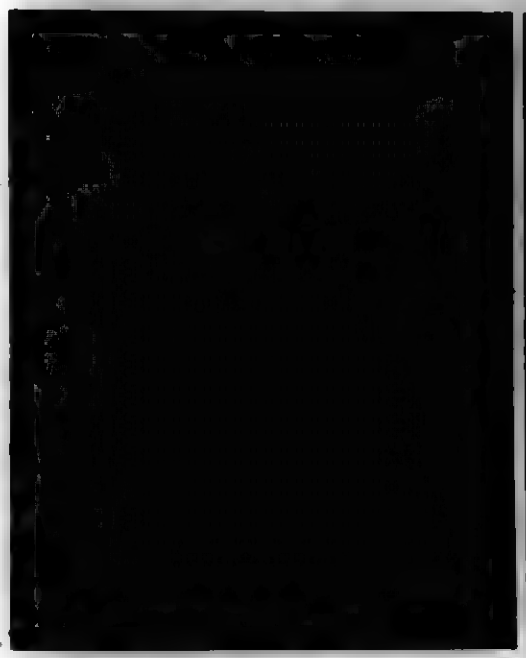
Call or write for more information on how you can increase office productivity, boost employee morale and cut costs substantially. It's as easy as A D R.

APPLIED DATA RESEARCH, Route 206 & Orchard Road, CN-8, Princeton, NJ 08540, (201) 874-9000

APPLIED DATA RESEARCH

The one vendor software solution

CONTENTS



Deciding how to begin in OA can be the hardest step of all. Analyzing, then choosing the approach that's best for you isn't easy, but it's worth it.
(Photo © 1985 Ed Braverman)

COMPUTERWORLD

OA

CW COMMUNICATIONS/INC.
Box 880, 375 Cochituate Road,
Framingham, Mass. 01701

Board Chairman/Publisher Patrick J. McGovern
President W. Walter Boyd
Senior Vice President Lee Wilmer
Group VP-Communication Services Jack Edmonston
Group VP-Circulation Margaret Phelan
VP-Sales Donald E. Pagan
VP-Finance William P. Murphy
VP-Editorial John Wildmacher
Special Focus Publications Administrator Jenny Chamberlain
Editor Ann Dooley
Senior Writer Glenn Rifkin
Associate Editor Nancy Fleming
Art Director Tom Monahan
Production Director Peter Rahn
Production Manager Marlene Stillel
Typesetting Manager Carol Polack
Art Supervisor Henry P. Fling
Art Assistant Marlon Bussard
Production Assistant Laura Saroff
Director/National Sales Edward P. Mayoski
Advertising Traffic Elaine Carlos

Second-class postage paid at Framingham, Mass., and additional mailing offices. Computerworld (ISSN-0010-4841) is published weekly, except: January (5 issues), February (4 issues), March (5 issues), April (7 issues), May (5 issues), June (5 issues), July (5 issues), August (5 issues), September (4 issues), October (5 issues), November (4 issues), and a single combined issue for the last week in December and the first week in January by CW Communications/ Inc., Box 880, 375 Cochituate Road, Framingham, Mass. 01701.

Copyright 1984 by CW Communications/Inc. All rights reserved. Reproduction of material appearing in Computerworld and Computerworld OA is forbidden without written permission. Send all requests to Nancy Shannon.

Computerworld subscription prices: $2.00 a copy; U.S. — $44 a year; Canada, Central & So. America — $110 a year; Europe — $165 a year; all other countries — $245 a year (airmail service). Computerworld OA prices: $5.00 a copy; $12.00 a year. Four weeks notice is required for change of address. Please allow six weeks for new subscription service to begin.

Computerworld can be purchased on 35mm microfilm through University Microfilm Int., Periodical Entry Dept., 300 Zeb Rd., Ann Arbor, Mich. 48106. Phone: (313) 761-4700. Computerworld is indexed; write to Circulation Dept. for subscription information.

PHOTOCOPY RIGHTS: permission to photocopy for internal or personal use or the internal or personal use of specific clients is granted by CW Communications for libraries and other users registered with the Copyright Clearance Center (CCC), provided that the base fee of $3.00 per copy of the article, plus $.50 per page is paid directly to Copyright Clearance Center, 21 Congress Street, Salem, MA 01970.

Permission to photocopy does not extend to contributed articles followed by this symbol.

ABP mcc

POSTMASTER: Send Form 3579 (Change of Address) to Computerworld Circulation Dept., Box 880, 375 Cochituate Road, Framingham, MA 01701.

Computerworld OA is a member of the CW Communications/Inc. group, the world's largest publisher of computer-related information. The group publishes 44 computer publications in 18 major countries. Nine million people read one or more of the group's publications each month. Members of the group include: Argentina's Computerworld/Argentina; Australia's Australasian Computerworld and Micro Computer Magazine; Brazil's DataNews and MicroMundo; China's Ching Computerworld; Denmark's Computerworld/Danmark and MikroData; France's Le Monde Informatique; Germany's Computerwoche, Microcomputerwelt and PC Welt; Italy's Computerworld Italia; Japan's Computerworld Japan and PC Japan; Mexico's Computerworld/Mexico; Norway's Computerworld Norge and MikroData; Saudi Arabia's Saudi Computerworld; Spain's Computerworld/Espana and MicroSistemas; Sweden's ComputerSweden, MikroDatorn and Min Hemdator; the UK's Computer Management and Computer Business Europe; the U.S.' Computerworld, Desktop Computing, Hot CoCo, Inside Cider, InfoWorld, MICRO MARKETWORLD, Microcomputing, PC World, Run and 80-Micro.

9
THE STATE OF OA
By Steven R. Daubow
National survey respondents tell their OA status, thoughts and future plans.

13
DSS & DP: POWERFUL PARTNERS
By Peter G.W. Keen
DP and DSS need to stop battling long enough to discover how much each needs and can learn from the other.

16
JOHN NAISBITT LOOKS AT THE WORLD OF OA
By Glenn Rifkin
Megatrends author comments on how changes in society will affect the office and how OA will change the way we think about the world.

22
IBM FLEXES ITS OFFICE MUSCLE
By Glenn Rifkin
IBM is not yet offering an integrated office strategy, but apparently it doesn't have to. Users are flocking to see what IBM can do for them.

25
SUPERMINI MOVES INTO THE OFFICE
By Charles W. Newton
Superminis are showing up in offices as users search for ways to bring power to their business applications needs.

OAFOCUS

31
HIRING THE RIGHT PEOPLE
By Glenn Rifkin
The right people are critical to making OA successful, but finding them can be difficult. Here are some pointers.

35
MULTIVENDOR SELECTION
By William H. Allen Jr.
Vendors can promise you anything — until the contract is signed. Don't sign until you know what's in store.

41
SELLING THE IDEA
By David Shay
These sure-fire cost-justification and productivity arguments will bring round the most skeptical executives.

47
ORCHESTRATING CHANGE
By Vernell K. Munson
Understanding how OA will change your business is crucial. Business needs must be decided before technology is applied, not vice versa.

49
THE TRAINING PROCESS
By J. Thomas Monk And Kenneth M. Landis
Don't take training lightly. If users don't know how to get the most out of the machines, you won't see any productivity gains.

53
VOICE-DATA PBX DEBUTS
By John Combs
Private branch exchanges are increasingly being viewed as the solution to a lot of user problems. The technology is still developing, but here's what it can do for your organization now.

57
INFORMATION SYSTEMS DELIVER
By Jeri Lynn Edwards
Organizations will move slowly into a fully automated office, going through various stages of usage and technical sophistication. Which stage best describes your company?

DEPARTMENTS

Editorial 2
Hammering It Out 2
News 5
Briefs 6
Q&A 8
Technology 61
Calendar 64

FORUM

HAMMERING IT OUT

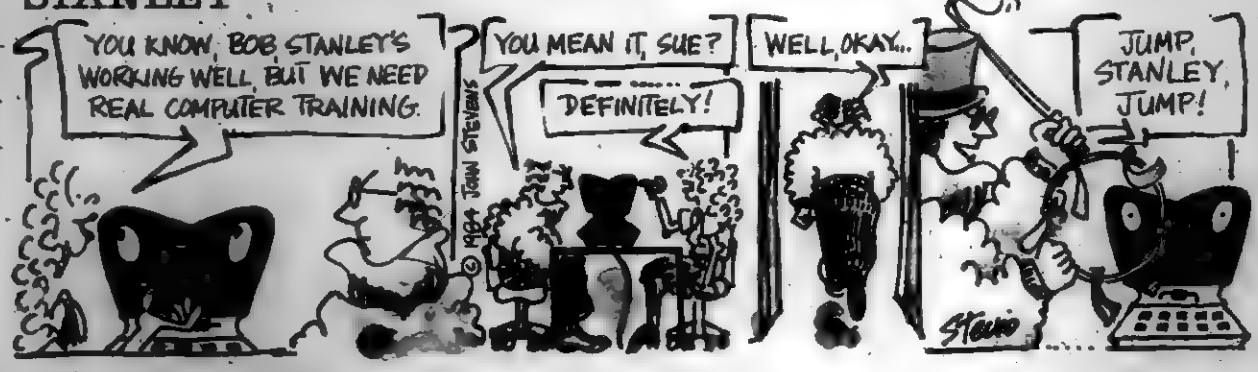
By Michael Hammer

"Hammering It Out" will be a regular feature in Computerworld OA *and will attempt to give readers a look at the lighter side of the developing world of office automation.*

The latest outrage being perpetrated on the English language is the practice of turning nouns into verbs ("finalize," "prioritize" and so on). Regrettably, the office automation field is not immune from this lamentable phenomenon. ("messaging," "windowing" and "interfacing" are three favorites). It is time to counterattack. A good place to begin is with the neologism, "calendaring," and its referent, the electronic calendar.

The electronic calendar is truly a triumph of modern technology. A user can actually enter appointments for specific dates and times, inspect the calendar for a particular date or even have his day's schedule printed out. It is safe to say that an electronic calendar is almost as useful as the *Economist* diary I carry in my jacket. I say "almost" because no electronic calendar fits in my pocket, and when someone stops me in the hall (or on the road) to see if I am free on the 18th of next month, I do not want to start looking for a terminal. Using an electronic calendar for personal scheduling appeals to the same people who balance their checkbooks on a home PC.

But, you say, I am being unfair. The virtue of a calendar is as a group scheduling tool. In theory, everyone in the organization will keep his calendar on-line; then, anyone who needs to schedule a meeting will need only to inspect the attendees' calendars to find a mutually convenient time slot. (Perhaps in the interest of public



Do You Like OA?

If so, write and tell us. If not, tell us about that, too. Send comments to The Editor, *Computerworld OA*, Box 880, 375 Cochituate Road, Framingham, Mass. 01701.

You can also subscribe to OA for $12 a year by calling CW Circulation, 800-343-6474. CW subscribers will continue to receive issues as part of their subscriptions.

decency, censored versions of their schedules will be shown, indicating only what time is free and what is available.)

However, the reality is somewhat different. Although all are invited to put their schedules into the system, the intended users quickly begin to have second thoughts: "You mean my boss will be able to look at my calendar? He's going to see that I don't have anything scheduled for Thursday? Maybe he'll think I'm not doing anything on Thursday. Maybe he's going to find something for me to do." Or, "Harry is going to see I'm available on Friday from 3 to 5? I hate Harry and his idiotic meetings! I want to tell Harry I'll be in Peru on Friday."

Within 30 microseconds of system installation, all calendars are blocked out until the year 2146.

As a result, hardly anyone uses electronic calendars, even the vendors that tout them so highly. One manager I know recently visited a major OA vendor's headquarters, where he was treated to a demonstration of the latest integrated product offering. George, the demonstrator, extolled the virtues of the calendar facility and claimed that his entire organization used it to schedule all their meetings. Just then George's boss stuck his head in to say, "George, I'd like a staff meeting tomorrow. Are you free at 10?"

The sad truth is most electronic calendars provide very little value to their users and the overhead associated with using them dwarfs their putative benefits. Conventional electronic calendars violate the first rule of OA system design: An electronic system must be better than the paper system it is intended to displace. Simply simulating paper with electronics is pointless.

The originator of the electronic calendar ranks up there with the genius who thought it would be clever to employ a large, bit-mapped screen to represent a paper-covered desk — right down to stacks of documents piled on top of each other.

This is not to say that electronic calendar systems are entirely useless. A number of organizations have found on-line calendars very useful for managing the schedules of inanimate objects — conference rooms, corporate aircraft and boards of directors. But for personal calendars, a pocket diary does very well and an electronic mail system can go a long way toward solving group scheduling problems.

A really useful calendar system would allow users to describe the priorities of their existing engagements and the urgency of meetings they are trying to arrange. Individual calendars would remain entirely private; only a scheduling process could inspect them, not other users. The scheduler would exercise intelligence to propose overriding an existing meeting. ("A two-hour meeting with all seven attendees is not possible until July; however, a two-hour meeting with six of them can be scheduled next week and a one-hour meeting with all of them tomorrow.")

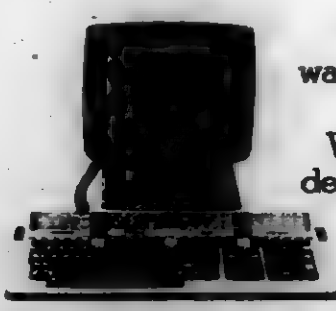
Unfortunately, such capabilities are not yet available. Until they are, we may be better off without electronic calendars; we will certainly be better off without "calendaring"! OA

Hammer is president of Hammer and Co., Inc., a Cambridge, Mass., consulting firm that specializes in the strategic implications of new information technologies.

The promise fulfilled.

NEAX 2400 IMS

WITH DATA GENERAL, YOU WON'T BE A PRISONER OF YOUR IN-BOX.



DATA GENERAL INTEGRATED OFFICE AUTOMATION

Burying information under a ton of mail at the bottom of your in-box is not the best way to get it when it's critical to a decision.

ELECTRONIC MAIL

With Data General's CEO® Comprehensive Electronic Office, information is delivered electronically. Instantly. Unerringly.

But that's only the beginning.

TOTAL OFFICE AUTOMATION

The CEO system automates just about everything in your office. CEO electronic filing files the way you do. Its electronic calendar keeps tabs on trips, appointments, and meetings—even confirming them all.

Of course, CEO includes easy-to-use word processing. And all this is integrated with data processing for total decision support.

DON'T DUMP YOUR EXISTING EQUIPMENT

Best of all, instead of having to dump your existing equipment to automate your office, you can build the CEO system around it.

Because it not only ties in with other Data General computers, but it also ties in with the most widely-used mainframe and word processor.

Instead of just a series of personal computers, each CEO workstation becomes part of a global network, with access to data from IBM mainframes.

AS LITTLE AS $5,000 A WORKSTATION

And with the CEO system, the cost per workstation can be as low as $5,000, depending on application.

CALL NOW

For more information on office automation that's a generation ahead, call: **1-800-554-4343, Operator 05A** or write Data General, M.S. CEO 05A, 4400 Computer Drive, Westboro, MA 01580.

Data General
a Generation ahead.

Copyright 1983 Data General Corporation, Westboro MA CEO is a registered trademark of Data General Corporation

OA NEWS

AT&T Moves In

No sooner had the bell rung on divestiture than AT&T was out of the gates. The newly liberated AT&T Information Systems, with an eye on the lucrative office automation market, has already announced several agreements with computer manufacturers, and many more are expected in 1984.

Within days of the official divestiture date, AT&T bought 25% of Olivetti Co., Europe's second leading information processing company. The deal raised eyebrows in Europe because it positions AT&T and Olivetti to take on IBM on the Continent. AT&T and Olivetti have indicated they will begin exchanging products for sale in their respective markets by mid-1984. AT&T will reportedly import Olivetti workstations for incorporation into its OA strategy.

The ink on that deal had hardly dried when AT&T announced an agreement with Convergent Technologies, Inc. in Santa Clara, Calif. Convergent, the agreement stated, will design and produce new workstations exclusively for AT&T Information Systems. Although neither company would discuss the agreement, analysts predicted that the resulting product would be a state-of-the-art workstation combined with a vast array of telephony features that would allow access to all tools needed in an average office.

Mike Dunmire, an analyst with the Seattle investment banking firm of Cable, Howse & Ragen, said it is quite possible the product will be integrated with Convergent's Megaframe product line. "The options AT&T has with Convergent are limitless," he added.

Dunmire pointed out that AT&T wanted a state-of-the-art product and, though they could have developed it in-house, the question was when? "The management of AT&T deserves a lot of credit for being so enlightened. They saw that Convergent's products were innovative and not 'me-too' technology. It took a lot of guts for AT&T to bite the bullet and look outside." As AT&T broadens its office scope, analysts predicted as many as 30 product announcements this year.

FCC Delays Charges

WASHINGTON, D.C. — The Federal Communications Commission (FCC) bowed to public and congressional pressure and delayed until next year the proposed long-distance access charges that AT&T had hoped to institute in April. The access charges, which were to be imposed on both residential and small-business telephone customers, have been a political football for several months as Congress, the White House and the FCC have gotten into the fray.

The charges, which were slated to be $2 per month, will instead be phased in gradually until 1990 and will go no higher than $4 per month. The FCC did allow $6-per-line charges for big business customers to go into effect as scheduled in April. Both the House of Representatives and the Senate have opposed the access charges. The House bill, H.R. 4102, passed last November blocked the FCC plan by exempting residential and small-business customers from the fees. A similar bill was awaiting approval in the Senate. The Reagan administration had opposed both of those measures, but expressed agreement with the FCC's decision to delay the charges. Analysts felt the White House was happy to have the decision delayed until after the election.

The commission's ruling means that charges that would have been paid to local phone companies could be delayed until spring or summer of 1985. The ruling also means that there will be no reduction in interstate long-distance rates as originally promised by AT&T. The company, after its Jan. 1 divestiture, had planned to reduce its long-distance rates by 10.5% and was counting on the access charges to help defray the costs of that reduction.

If You Knew Unix . . .

The major office vendors had taken a hard line against it, but Unix, Bell Laboratories ever-present operating system, appears to have overcome even its most stubborn opponents. Taking an "If you can't beat 'em, join 'em" approach, IBM, Digital Equipment Corp., and Wang Laboratories, Inc. have all announced Unix-like operating systems for different parts of their respective product lines. AT&T, meanwhile, made it clear through a series of January announcements that it intends to make Unix an industry standard.

Whether Unix becomes the de facto operating system for the office remains to be seen; one thing is clear, however: it is no longer possible for any serious office vendor to ignore Unix altogether.

Among the first to come over was Wang, which in October announced its UVS, an operating system environment integrating Unix System V software with the Wang VS operating system. IBM recently unveiled its Personal Computer Interactive Executive (PC/IX) Unix-like product for its Personal Computer. The IBM offering, developed by Interactive Systems Corp. for IBM and scheduled for April, reportedly will be used for program development, text processing or running a wide variety of existing Unix-system application programs.

Last month, DEC announced Ultrix-32, a new native-mode implementation of Unix for its mid-range and high-end VAX computers. The product is based on the University of California at Berkeley's Fourth Berkeley Software Distribution and is scheduled for delivery in late spring.

Within days of the DEC announcement, AT&T, Unix' creator, unveiled an enhanced version of Unix System V as well as three new software packages designed to run under Unix for a broad range of applications. AT&T also announced a cooperative relationship with Digital Research, Inc., creators of the CP/M operating system, to expand the number of industrywide applications software offerings supported by Unix.

Apple's New Crop

CUPERTINO, Calif. — Whatever the computer industry thinks of Apple Computer, Inc., one thing is certain: it sure is a tough company to ignore. A year ago, the industry was abuzz with the introduction of Lisa, Apple's innovative 32-bit desktop computer. This year, the Macintosh has generated enough ink to start a printing company.

The early reviews on Macintosh, a smaller, less-expensive, scaled-down version of Lisa, have been almost unanimously favorable. But Lisa herself was also the object of lavish praise, and when the final numbers were in for 1983, Lisa had been a major disappointment for Apple.

The Macintosh costs $2,495 and is available now; it should avoid the pitfalls that plagued Lisa. Industry analysts feel it could give IBM a run for the money; one predicted first-year sales of more than 350,000 units.

Apple is reportedly betting the company on the success of Macintosh and spending a reported $50 million on advertising for the product in 1984. John Sculley, Apple's energetic president, has said the Macintosh is "the key to our office products line for the rest of the decade," which brings up the question of just how viable it is as an office product.

The Macintosh, based on a 32-bit 68000 microprocessor, comes with 128K bytes of random-access memory, 64K bytes of read-only memory, a black-and white 9-in. monitor and a single 3½-in. Sony microfloppy-disk drive with 400K-byte storage capacity. Mac features Lisa's user-friendly interface with mouse, so end users can reportedly be up and running in two to three hours. At just 10 inches of desktop space and a weight of just 17 pounds, it is portable in its manufacturer's eyes.

Apple has indicated it is working on AppleBus, an interconnect product that will allow Macs to be hooked to each other as well as to other Apple products. The Macintosh also has two RS-232 serial ports for connecting a modem.

Aaron Goldberg, an analyst with the International Data Corp. (IDC) in Santa Clara, Calif. said, "The office will be the toughest market for the Macintosh because of IBM's presence. At the same time, however, it should do quite well because it's so easy to use and it doesn't take up much room."

Tom Willmott, IDC's director of user research, added that though communications is still a question mark, the Macintosh is positioned for the office better than the Apple IIe or the Lisa. Depending on the amount of application software developed, he foresees the Macintosh as a far better alternative as a low-end workstation than the IBM PCjr. "Apple has blown IBM out of the water on this one," Willmott stated.

Amy Wohl, president of Advanced Office Concepts, pointed out that since Macintosh is not based on the MS-DOS operating system, software availability could become a problem. Large companies that are committed to an MS-DOS environment might shy away from the product.

Apple, even with the Macintosh, does not yet offer a system solution and that could hinder office sales, especially to large corporations. Wohl questioned whether large companies would now be willing to accept Apple. "There are some real doubts about that; they haven't sold well in that environment," she said.

The Apple Macintosh

OA

BRIEFS

MAYNARD, Mass. — It was shaping up to be the winter of its discontent until Digital Equipment Corp., which had announced sharply lower first-quarter earnings, bounced back with stunning quickness. DEC, whose stock plunged more than 30 points after the October announcement, shocked Wall Street analysts in January when it reported a 31% increase in second-quarter earnings to nearly $80.5 million, or $1.41 per share. Revenues for the quarter ended Dec. 31 rose 40% to $1.4 billion compared with $1 billion for the same period a year earlier. Analysts had not expected DEC to recover from its financial woes so fast and had predicted second-quarter earnings of about 65 cents per share. The surprise announcement sent DEC stock soaring nearly as quickly as it had fallen in October. Within three days of the announcement, the stock had risen 17 points to more than $90 per share.

BOSTON — Microcomputer managers in Fortune 1000 corporations now have a place to turn to find out how their contemporaries are confronting the changes that microcomputers are bringing to their respective organizations. Beginning last month, a network of microcomputer managers was made available by the Microcomputer Manager's Association (MMA) of Boston. The network reportedly allows an "exchange of information to the benefit of all subscribers," according to Marty Butler, president of the MMA.

The membership fee for the network is $150. MMA said from 80 Boylston St., Boston, Mass. 02116.

WELLESLEY, Mass. — Workstation shipments to executive and middle management markets are expected to increase from 46,000 in 1983 to more than half a million in 1990, an annual growth rate of more than 40%, according to a survey done by Venture Development Corp. (VDC).

The VDC report, "U.S. Executive Workstation Markets 1983-1990," points out that when first introduced in the late 1970s, executive workstations were unable to generate broad interest, but that the tide has turned. Growth in annual shipments is starting to increase dramatically. The report breaks the market segment into four categories and predicts the most noticeable growth in sales of data-only workstations for middle managers. The study is available for $2,950.

In a separate study, VDC also predicted that worldwide shipments of printers and plotters by U.S.-based manufacturers will reach $8.5 billion in 1984. "The U.S. Computer Industry" forecasts shipments of every major computer product including printers.

It is available for $1,050 from VDC, One Washington St., Wellesley, Mass. 02181.

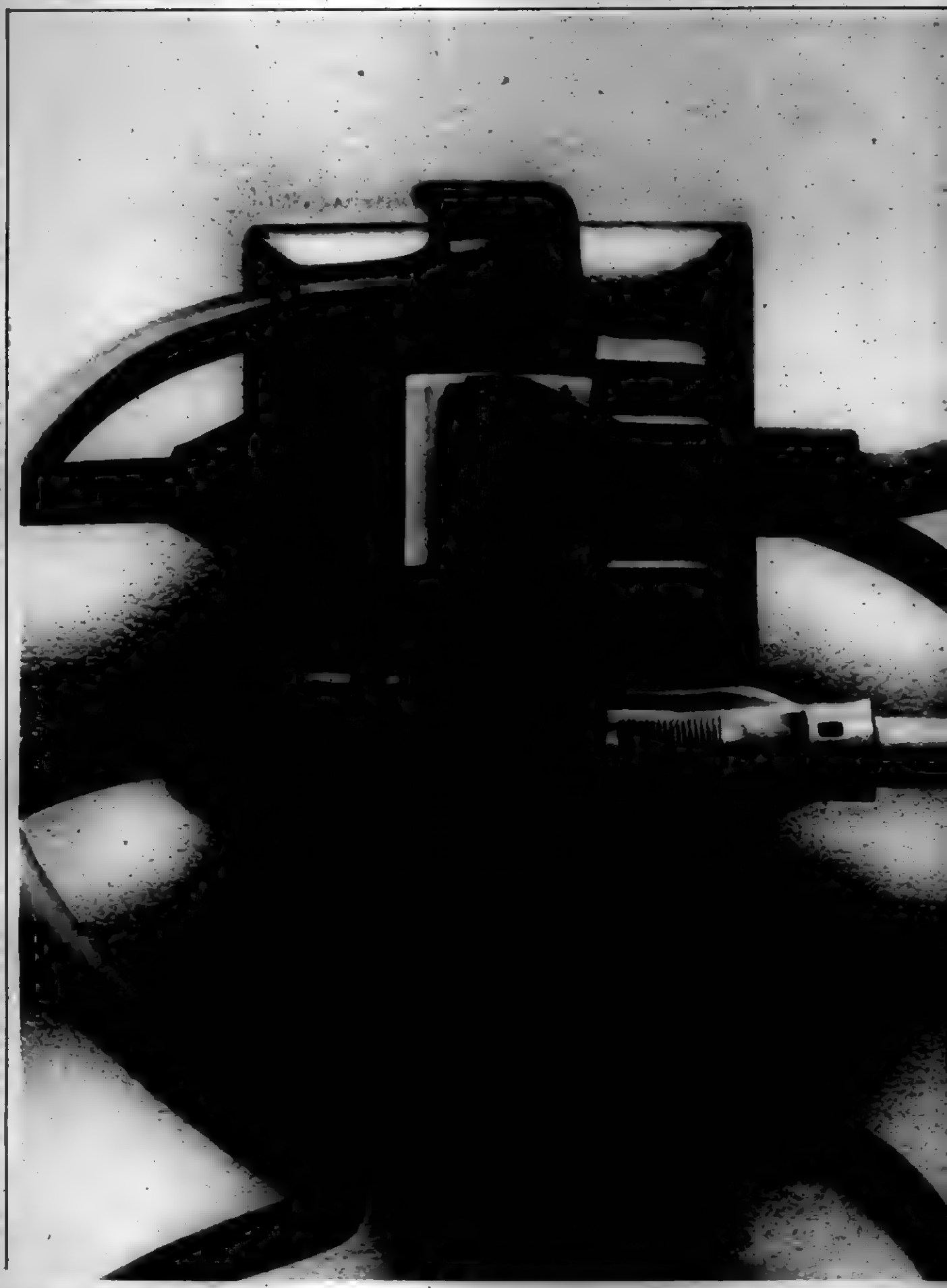
NEW YORK — Franklin Computer Corp., the Cherry Hill, N.J.-based computer manufacturer, agreed to pay Apple Computer, Inc. $2.5 million in lieu of continuing its court battle over the use of Apple's operating systems and computer programs.

In dropping the legal fight, Franklin agreed to accept the validity of Apple's copyright claim on its operating system software and to stop copying Apple programs for its Apple-compatible computers.

As part of the settlement, Franklin was given until April 1 to stop manufacturing computers with software reportedly copied from Apple.

BETHESDA, Md. — "Our economy has entered an era in which information and knowledge have immense value in and of themselves. For managers, this information age will create profound changes in the way they make business decisions. It will also mean new kinds of decisions — on computers, telecommunications, word processing, micrographics, electronic mail and teleconferencing."

With this in mind, the International Information Management Congress (IMC) is



BRIEFS

distributing a new book, entitled *The Executive's Guide to Information Technology: How to Increase Your Competitive Edge*. According to the IMC, the book looks at the "big picture" in information technology. It addresses the question of how today's technology can help managers do their jobs better and increase their company's competitive position. The 314-page book is available for $30 from the vendor, IMC Publication Sales, P.O. Box 34404, Bethesda, Md. 20817.

NORWALK, Conn. — Micro-to-mainframe communications products and services have entered a period of "explosive growth," according to a research report from International Resource Development, Inc. (IRD). The report predicts users will spend more than $500 million on micro-to-mainframe communications in 1984 compared with $220 million in 1983.

The report, "Micro-to-Mainframe Communications — Hardware and Software Markets," is available for $1,850 from IRD, 30 High St., Norwalk, Conn. 06851.

NEW YORK — "VDT News," the first newsletter to report exclusively on video display terminal operator health and safety began publication last month.

The bimonthly newsletter will be available for an annual rate of $18 for individuals and $35 for institutions from VDT News, P.O. Box 1799, Grand Central Station, New York, N.Y. 10163.

WASHINGTON, D.C. — A federal advisory committee for the airline industry has begun studying the potential problems caused by high-technology devices such as portable computers on board airplanes. The report, "Potential Interference to Aircraft Electronics Equipment from Devices Carried on Board," is the result of the first meeting of the Radio Technical Commission for Aeronautics (RTCA) held last November.

The RTCA was approached by Eastern Airlines to investigate the situation and plans to look first into how the passenger-operated devices affect the aircraft antennas.

NEW YORK — Huttonline, an electronic information service that will enable clients to access the firm's computers for personal account data, investment information and electronic mail, was introduced by E.F. Hutton & Co.

Huttonline reportedly gives clients instant access to account information, such as portfolio positions and market values, cash and margin balances and open orders. It also shows the client's transaction activity and makes available research information, market comments, and other investment information.

According to the company, any E.F. Hutton client is eligible to subscribe to Huttonline and the service will initially be available between the hours of 6 a.m. to 12:30 a.m. EST, seven days a week. The service will be available for a sign-up fee of $25 and a monthly service fee of $17.

Hutton also announced that it is getting into the computer business by offering selected personal computer equipment to its clients in conjunction with Huttonline.

ANN ARBOR, Mich. — Comshare, Inc., the Michigan-based software maker, has signed a two-year agreement with IBM which will pair the two in selling decision support system software for use in IBM information centers. It is the first time IBM has signed such an agreement with a DSS vendor.

According to the agreement, IBM and Comshare field representatives will work together in situations where a DSS is needed, and IBM will recommend Comshare's System W and Micro W DSS software. The agreement also called for the two companies to work together on future improvements of System W to support new relevant hardware and operating software releases. OA

LEAVE ROOM FOR MICROGRAPHICS IN YOUR OFFICE AUTOMATION PLANS.

When most companies move into office automation, the first thing they do is plug in a computer and some peripheral equipment.

That's smart. But unfortunately that's also where they stop, leaving some unfilled opportunities for improving their office procedures.

Take filing for instance. While computers are good for storing data, they can't store the documents you must keep for evidentiary purposes.

That's where the 3M micrographic concept of file management can help. Micrographics is the use of microfilm instead of paper to store and retrieve important documents.

With one of our computer-assisted retrieval systems, for example, you can bring your filing system up to speed with the rest of your automated office. By making files easier to retrieve and virtually eliminating lost documents. All while reducing the space you now devote to document storage.

3M even offers a wide range of software programs to link its micrographic equipment to the computer system you may already have.

The result is a system that not only improves the efficiency of workers, but saves your company time, space and money.

Find out how micrographics can fit into your office automation plans and give you more control of your files. Call 1-800-328-1684 (1-800-792-1072 in Minnesota or 1-800-268-9055, Operator 13 in Canada) or return the coupon for a free booklet.

GET CONTROL. GET FILE MANAGEMENT.
Return this coupon for your free booklet.

Name_____
Company_____
Title_____
Phone_____
Address_____
City_____
State_____ Zip_____

Send to G. Collins, File Management Systems, Office Systems Division/3M, 3M Center, Building 216-2N, St. Paul, MN 55144.
GWA1H

3M hears you...

3M

OA

Q&A

Steven M. Abraham, conference chairman for the Office Automation Conference (in Los Angeles, Feb. 20-22) is senior manager for Price Waterhouse & Co.'s Management Advisory Services and responsible for its office systems consulting practice. He discussed some major questions facing the OA community in '84.

What are the key issues in OA as we go into 1984?

We're on the verge of embracing this technology on a very large scale. The PC trend will continue and expand beyond just those stand-alone desktop devices. It will expand because senior management is now touching and feeling the technology and getting direct experience with it. That wasn't true two to three years ago.

What will the key technology trends be?

One of the biggest areas of advancement in 1984 will be in decision support. These packages are becoming more sophisticated, integrating with mainframe-based data base systems and with data base packages, text-processing and graphics.

People are crying to get at the masses of data corporations have built in these odd file structures over the last 20 years. They are eager to get at the information in a format and time frame of their choice and to be able to portray it in the style of their choice.

Who will be the key vendors this year?

AT&T and IBM. What's really clear is that AT&T intends to get into all the businesses IBM is in, except for mainframes. And IBM intends to get into the PBX business. It will be be fascinating to watch over the next two years. Most Fortune 500-type corporations have a major investment in both these companies, and that makes the situation very different from saying, "Who should we pick for our OA vendor?" They already have those two companies as major vendors, so major decisions about OA could involve either one.

How far has OA really come?

It's still in its infancy in most organizations I've seen. I have a client right now, a multibillion-dollar company, with virtually no decentralized OA. It's just now getting around to figuring its strategy and making an investment. Most companies that size have done more, but I don't have a client right now that I'd consider sophisticated or advanced. We're not talking yet about fully integrated systems and strong integration with the mainframe environment. That is still mostly in the talking and planning stages.

Will we see dramatic movement in '84?

Not dramatic; I see a gradual buildup. The ideal environment won't develop for several years. The only ones who've really attacked this thing are vendors and a few leading-edge users. The magnitude of the issue has grown so that most if not all organizations of any size are doing something about it now. That process will lead them to making strong advances over the next few years. But the planning process has been going on only a year, if that long.

Is the resistance coming from the clerical level or from management?

Resistance at the clerical level is a nonissue. And at the upper levels, it's not resistance so much as a lack of awareness, a lack of education, a lack of impetus, a lack of involvement by senior management, a lack of risk-taking on the part of OA managers and a lack of involvement of DP organizations. These are all changing over time, and that's where you'll get the critical mass to make things really happen.

What will come out of all this in five to 10 years? What will the office of the future look like?

I don't pretend to know all the answers. The only thing constant in this industry is dramatic change. Anything I say is going to be wrong; the rate of change is just too great. But from what I know today, by 1990, you'll see the workstation become ubiquitous, not to the extent the telephone is, but tending toward that. We'll see the communications equipment integrated with workstations and that in itself will bring the devices to the desktops of executives and managers. OA

SOME DAY, YOUR COMPUTER WILL STOP.

THAT'S WHY YOU NEED SORBUS NOW.

CALL COLLECT
215-296-5280 314-532-8817 415-472-4770

MAI
UPTIME IN NO TIME.
SORBUS FIXES COMPUTERS. FAST.

THE STATE OF OA

BY STEVEN R. DZUBOW

One way OA planners can come to grips with the ever-elusive office of the future is to find out how other users are approaching OA. Five hundred users of office technology recently participated in a survey designed to profile the state of OA in the U.S. today. These responses, presented in summary form here, are indications of what other managers are doing.

The most visible indication of the integration of office information systems into the work place is the inventory of hardware. Figure 1 on Page 10 gives a brief view of the OA products in use today. At first glance, the data seems to imply a relatively high usage rate of OIS in the companies surveyed; for example, 82% indicated the presence of dictation equipment within their offices. However, the data can be

misleading; it is important to remember that other studies have pointed out that fewer than 10% of office workers use their available dictation equipment on a regular basis.

Again, although 88% of our respondents indicated a presence of word processing stations, most companies with word processors state the equipment is significantly underutilized. Similar patterns of equipment usage also apply to the other categories of office equipment.

With Equipment	Office Equipment Type
88%	Word Processing Stations
83%	Copiers
82%	Dictation Units
53%	DP Computer Terminals (exclusive of WP)
46%	Microfilm/Fiche Readers
39%	Message/Teletype Stations
36%	Facsimile
31%	Small Business Computers (exclusive of WP)
19%	Phototypesetters
16%	OCR Equipment

Figure 1. Office Equipment Integration

This ever-widening gap between equipment and utilization is to some extent a result of business' preoccupation with and enamourment of state-of-the-art technology at the expense of the worker. Although the technology is available today to make significant increases in workers' productivity, the deemphasis of "people problems" has prevented workers from achieving these benefits.

We have been through this before. Initially, computers were placed into glass-walled showplaces and used as expensive calculators. It has taken almost three decades for business to realize the computer's real potential. The evolution from DP, to management information systems and finally to decision support systems has been a slow process.

This problem is much greater in the OA environment than it was with general-purpose computers. A larger number of employees are directly affected. The gap between equipment and utilization also severely hampers firms that want to experience the full extent of benefits associated with the technology.

Most OA systems are maintained independently rather than as part of a distributed network; they are owned, not leased or rented. A strong tendency exists to separate DP from other OIS functions, such as WP. This tendency is apparent in the maintenance of separate personnel — one group supports DP, others support OA functions.

A balance also exists between:

- Customized and off-the-shelf systems.
- Decentralized and centralized systems.
- Single-vendor and multiple-vendor systems.

Most organizations are still in the evaluation stages of OIS; they are experimenting with various prototype configurations to determine the best alternatives for their business environments.

Based upon the survey data, three distinct stages exist:

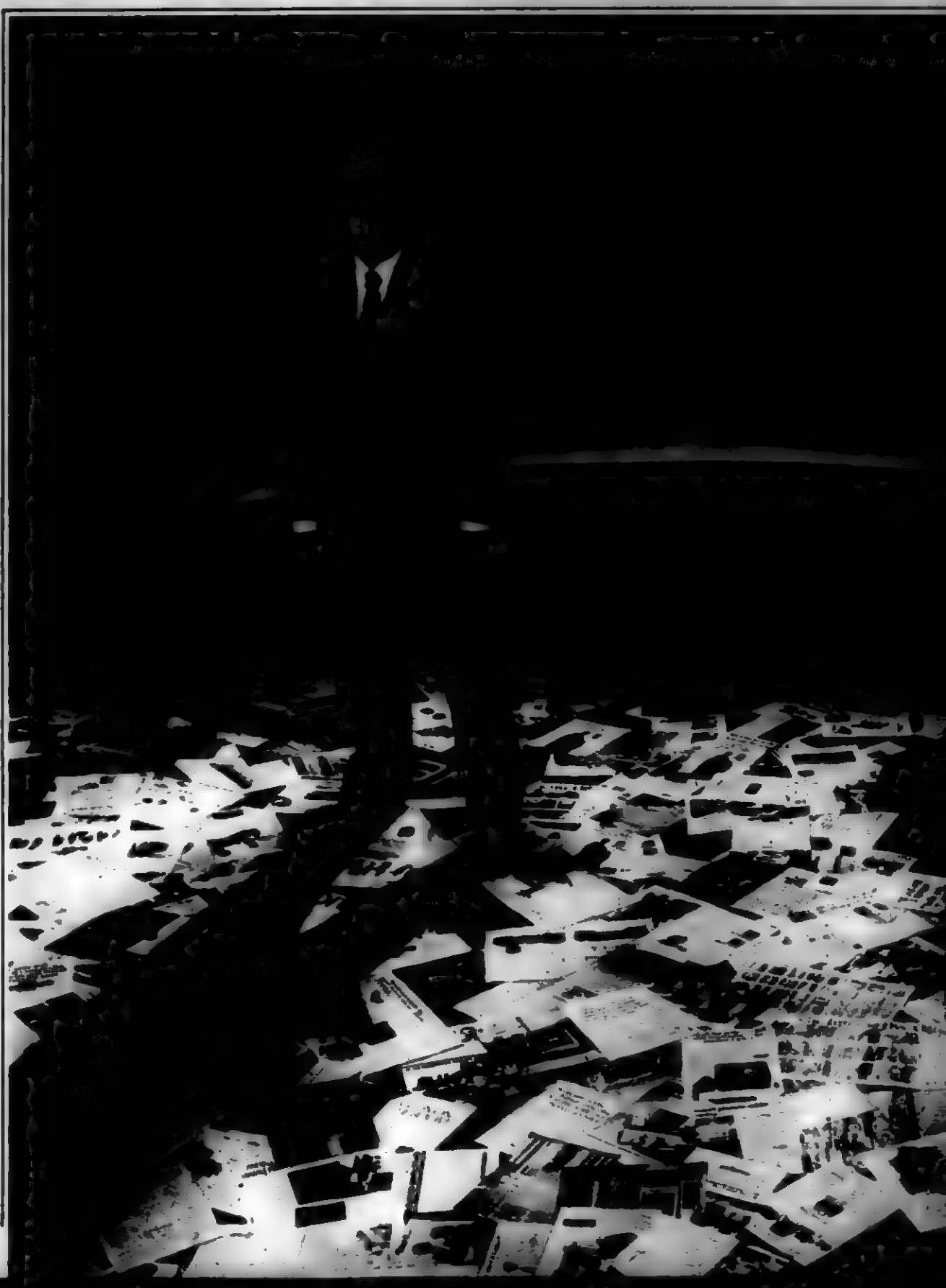
Stage I. This is the earliest stage of OIS development. It encompasses the basic technologies of WP, dictation and microfilm, which are usually the first to be integrated into the automated office.

Stage II. The middle stage of OIS development. Stage II encompasses more sophisticated electronic technologies such as electronic mail, electronic filing and teleconferencing. An organization usually builds upon its Stage I experiences before moving into Stage II.

Stage III. In the advanced stage of OIS development, Stage III technologies are those required for direct augmentation of the manager. Although stages I and II directly support the manager to some degree, most technological interfacing can be accomplished by secretarial and administrative personnel. Stage III requires the integration of DP and OIS as well as the automation of management support functions.

Figure 2 on page 12 indicates the degree to which respondents have progressed into the various stages, and Figure 3 presents the extent of operating experience respondents have achieved in the various stages of development.

More than half the respondents (56%) have actually achieved op-



erating experience with Stage I office technologies. Fewer than 15% have had operating experience with Stage II and Stage III technologies. Of those respondents having operating experience, fewer than 5% have more than three years' experience in the first and second stages. Considering that the technology within these stages has been in existence for more than 15 years, its relatively slow integration into the office is surprising. The delay can be blamed in part on the previously mentioned equipment-utilization gap.

Figure 4 on Page 12 indicates the primary motivators for OIS, as well as the degree to which benefits were achieved using office systems. One interesting response was the last-place ranking of revenue generation, the benefit that would seem to have the greatest potential for the organization.

Respondents at all levels had a moderately positive attitude toward OIS. This attitude held when the accomplishment of OA objectives was compared with organizational expectations. On the average, all levels believed the accomplishments were slightly better than they had expected.

The ranking order is analogous to that associated with the early developmental stages of computers. It was no surprise that increased productivity and improved quality of work were both the primary motivators and the primary benefits of OIS. A further analysis of these two categories by personnel job position shows that the major gains in productivity and quality of work were achieved at the secretarial-clerical level, followed next by professional-staff (nonmanagement), middle and line management and, last, upper and executive management.

A positive correlation existed between degree of benefit achievement for these categories and the existence of quantitative

The Survey

This article is a summary of a study based on a survey sent to 5,000 users of office information systems. From that population, 500 usable returns were obtained.

The largest number of respondents, 41%, represented firms whose revenues totaled $5 million or less. The next largest group, 20%, came from firms with revenues between $5 million and $50 million.

The third largest group, 18%, represented firms with revenues between $50 million and $500 million. The remaining 15% were from firms with revenues in excess of $500 million.

The respondents represented a diverse group of interests and a representative sample of U.S. organizations.

The majority, 27%, were from the financial, legal and insurance industries; the next largest group, 25%, represented education, government and research and development; another 24% were in advertising, engineering, medicine, general business services, transportation and utilities; 17% were in manufacturing; and the remaining 7% represented wholesaling and retailing.

In terms of organizational hierarchy, more than 17% of the respondents were upper or executive management; 36% were middle or line management; 23% were professional and staff, but not management; and fewer than 5% were administrative or secretarial personnel.

Almost 70% of the respondents participated in the establishment of office information systems, guidelines or standards; approximately 63% were involved in the selection process of equipment or equipment upgrades; 59% were able to make decisions or file requests for new equipment.

Most respondents were familiar with the types of equipment being used and given the percentage of users that had equipment in each data-

Table 1 on Page 14 shows the kinds of equipment being used

NOW THAT YOU'VE READ THROUGH THE MAZE OF ALL THESE COMPUTER ADS, READ WHY DIGITAL IS DIFFERENT.

DIFFERENT BECAUSE

DIFFERENT BECAUSE

DIFFERENT BECAUSE

CLIP THIS COUPON TO FIND OUT WHY DIGITAL IS DIFFERENT.

Please send me all the information I need to know about office automation.

SEND TO: Digital Equipment Corporation
Media Response Manager
200 Baker Avenue, Concord, MA 01742

OR CALL: 1-800-332-2220

NAME

TITLE

COMPANY

ADDRESS

CITY STATE ZIP

CW04

digital

Development Stage	Planning/ Evaluation	Implementation/ Prototype Operation	User Experience Achieved
	(Percentage of Respondents)		
I	34%	10%	56%
II	74%	14%	12%
III	65%	22%	13%

Figure 2. OIS Stage Progressions.

Development Stage	No experience	Less than 2 years	1 to 3 years	More than 3 years
I	15%	10%	22%	53%
II	16%	18%	8%	5%
III	64%	21%	10%	5%

Figure 3. Percentage of respondents with OIS stage experience.

measurements for the various job positions. Most organizations (78%) had quantitative measurements related to productivity and quality of work at the secretarial and clerical levels. At the professional and staff level, however, only 50% had developed quantitative measurements. This figure fell to 42% at the middle and line management level and even lower, to 30%, at the upper and executive management levels. This perhaps is because the job position becomes increasingly intangible as one moves into the organizational hierarchy. Nevertheless, it should be possible, even at the upper levels, to measure performance so that progress could also be measured. In fact, some type of quantitative measurement must be developed at all levels of the organization to establish goals and objectives and to reduce the subjectivity that exists at the higher levels.

In terms of benefit achievement, the most successful organizational function was administrative services, followed by accounting, marketing, finance, legal, personnel, R&D, planning, engineering, purchasing and medical. It is not surprising that these functions, which typically have the largest composition of administrative and secretarial staff, ranked highest. Most organizations are in Stage I of OIS development, where most of the technology is targeted toward direct support of administrative and secretarial staff.

Responsibility for overall OA planning and operations resides in a centralized group in 69% of firms responding. Figure 5 breaks down these responses by group.

The distribution of OIS responsibility reflects the predominant OIS stage of development. As organizations move into stages II and III, DP and MIS, followed by autonomous OA groups, will increasingly be responsible for OIS planning and development. Administrative services will probably continue to play a strong role, particularly in operational management. The existence of a centralized coordinating OIS group also seems to increase the likelihood of OA success. This finding seems to be due primarily to better standardization policies and the existence of a corporatewide information clearinghouse to reduce problem duplication.

A second organizational factor related to OIS success is the existence of formalized policies, guidelines and standards. Fewer than half (46%) of the respondents indicated the existence of formalized OIS policies. Only a third indicated the existence of formalized OIS guidelines (34%) and standards (31%). No wonder OIS success has been somewhat limited! Until formalized policies, standards and guidelines are the norm, OIS development and implementation will continue in an ad hoc, uncoordinated fashion. Serious problems, particularly in the area of hardware and software compatibility, could occur in stages II and III when organizations move toward OIS integration.

A third factor related to OIS success is the degree of commitment by upper and executive management. Only 38% of the upper and executive managers and 34% of the middle and line managers participated to any significant degree in the establishment of OIS objectives. In addition, only 18% of executive management and 24% of line management participated to any significant degree in the evaluation and design processes associated with OIS. The limited commitment of management in the early stages of OA planning and development is definitely reflected in the benefit levels respondents attained.

Only 7% of the respondents believed current OA products totally met their organizations' needs. The majority of the respondents (55%) indicated that the office systems mostly met existing needs. The remaining 38% stated that their needs were being only partially satisfied.

Primary reasons cited for this attitude were that the products were beyond present needs (36% of respondents); products were lagging behind present needs (32% of the respondents); equipment costs were too high (33% of the respondents); equipment was not sufficiently reliable (16% of the respondents); and the equipment was too complex (11% of the respondents).

The above statistics again point to the presence of the equipment-utilization gap. Except for the above problems, respondents at all organizational levels had a moderately positive attitude toward OIS. This unanimous positive attitude held when the accomplishment of OA objectives was compared with organizational expectations. On the average, all levels of personnel believed the actual accomplishments were slightly better than the expectations each had for OIS.

Respondents identified five factors as most important in the selection of OIS vendors. In order of importance, they were equipment reliability, equipment quality, quick response to customer needs, field service support and technical support services. All factors involve maintaining the equipment in an operational mode. Of the 20 factors identified, vendor reputation and equipment price ranked respectively 10 and 15 in order of importance. In addition, completeness of office equipment product line ranked 16.

The data seems to indicate that OIS buyers are becoming more sophisticated. They are no longer dependent upon a single vendor for product support, and they are willing to pay additional premiums for equipment so long as such payment can be cost-justified. By far the greatest influence on the equipment purchase decision is exerted by discussions with experienced colleagues. Industry publications and professional magazines rank second; vendor publications, educational institutions and the general media influence the purchase decision only to a limited degree.

In a similar finding, experienced OA users provided the most benefit to respondent organizations in terms of achieving OIS objectives. Vendors and manufacturers ranked second in terms of providing positive assistance, followed by courses and seminars, professional OA associations and independent consulting groups. About 50% of the respondents said independent consultants either were not helpful or actually caused problems for a firm trying to achieve its OA objectives.

More than 85% of the respondents planned either to upgrade or to add new Stage I equipment within the next fiscal year. Over 40% are planning to implement some aspects of the Stage II and Stage III technologies into their organizations over the next two- to three-year time frame. Almost one-third (31%) expected their cumulative investment in OIS to increase significantly over the next three years. Approximately 48% of the companies believed a moderate increase in OIS expenditures would occur, and only 7% anticipated a decrease in their OIS budgets in the near future.

In spite of the limited success experienced by users, respondents were generally optimistic about the future of office systems. The data indicates that most organizations are spending considerably more time today than they did in the past in the planning and requirements phases of OIS development. This initial emphasis upon the critical aspects of OIS will have a positive effect upon the attainment of goals and objectives in the office of the future. OA

Dzubow is professor of administrative sciences at St. Joseph's University in Philadelphia and author of the survey cited in this article.

Motivator Rank	Motivator/Benefit	Benefit Rank
3	Cost Reduction	4
4	Cost Avoidance	6
8	Revenue Generation	8
5	Improved Communication	5
6	Improved Morale	3
1	Increased Productivity	2
2	Improved Quality of Work	1
7	Improved Career Patterns	7

Figure 4. OIS Motivators and Benefits.

Function	Percent of Respondents
Administrative Services	45%
Word Processing	22%
DP/MIS	19%
Autonomous OA Group	13%
Other	1%

Figure 5. OIS Centralized Responsibility.

COMPUTERWORLD READER QUIZ

YES NO

- ☐ ☐ 1. Is *Computerworld* on your desk every Monday morning?
- ☐ ☐ 2. Do you receive *Computerworld On Communications* and *Computerworld Office Automation* every other month?
- ☐ ☐ 3. Do you know about the latest job position announcements? (when you've still got time to send your resume)
- ☐ ☐ 4. Can you rely on *Computerworld Buyer's Guides** for product information? . . .
- ☐ ☐ 5. Do you know the very latest news in the computer field?

If you've answered **NO** to any of the above, you're probably reading someone else's issue of *Computerworld.* Don't you need your own? When you're a subscriber, we'll guarantee that *Computerworld* is on your desk every Monday morning. And, what's more, as part of your subscription, you'll receive all of our special-focus publications.

Now's your chance to say YES! Subscribe today for a full year of Computerworld at our special introductory rate of $39 (save $5 off the $44 annual subscription rate).

Complete Form On Reverse, Then Return In Attached Postage-Paid Envelope. Or Use Your Charge Card and Call TOLL-FREE: 1-800-343-5730.

☐ **Please enter my subscription (details on back)**

☐ **I'm already a subscriber, but I'd like you to change my:**

☐ address ☐ title
☐ industry ☐ other

My current mailing label is attached and I've filled in new information on the other side.

Put old label or label information here

COMPUTERWORLD

*U.S. Only

CW-138

Please send me COMPUTERWORLD for one year. RATES: United States ~~$44~~; Canada, Central & South America $110; Europe $165; All Other Countries $245 (Airmail Service).

Special Introductory Offer — Only $39.00 Save $5.00

☐ Check Enclosed
☐ Am Ex ☐ BA/Visa ☐ MC (MC Only - List four digits above your name)

If charge we must have cardholder's signature: _____ Expiration Date: _____

First Initial	Middle Initial	Surname	
Your Title			
Company Name			
Address			
City		State	Zip Code

Address shown is:
☐ Business
☐ Home

☐ Check here if you do not wish to receive promotional mail from *Computerworld*.

☐ Check here if you're interested in receiving information on *Computerworld's* Index.

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

CIRCULATION DEPT. 375 Cochituate Road, Rte. 30, Box 897, Framingham, MA 01701-9985

Detach here, moisten and seal envelope securely before mailing.

1. BUSINESS/INDUSTRY (Circle One)
End Users
10 Manufacturer (other than computer)
20 Finance/Insurance/Real Estate
30 Medicine/Law/Education
40 Wholesale/Retail Trade
50 Business Service (except DP)
60 Government—State/Federal/Local
65 Public Utility/Communication Systems/Transportation
70 Mining/Construction/Petroleum/Refining
75 Other User _____
Vendors
80 Manufacturer of Computers, Computer-related Systems or Peripherals
85 Computer Service Bureau/Software/Planning/Consulting
90 Computer/Peripheral Dealer/Distributor/Retailer
95 Other Vendor _____

2. OCCUPATION/FUNCTION (Circle One)
11 President/Owner/Partner/General Manager
12 VP/Assistant VP
13 Treasurer/Controller/Financial Officer
21 Director/Manager/Supervisor DP/MIS Services
22 Director/Manager of Operations/Planning/Administrative Services
23 Systems Manager/Systems Analyst
31 Manager/Supervisor Programming
32 Programmer/Methods Analyst
35 OA/WP Director/Manager/Supervisor
38 Data Comm Network/Systems Mgmt
41 Engr/Scientific/R&D/Tech Mgmt
51 Mfg Sales Repa/Sales/Marketing Mgmt
60 Consulting Mgmt
70 Medical/Legal/Accounting Mgmt
80 Educator/Journalist/Librarian/Student
90 Other _____

3. COMPUTER INVOLVEMENT (Circle all that apply)
Types of equipment with which you are personally involved either as user, vendor or consultant
A. Mainframes/Superminis
B. Minicomputers/Small Business Computers
C. Microcomputers/Desktops
D. Communications Systems
E. Office Automation Systems

CW-138

DSS & DP: POWERFUL PARTNERS

BY PETER G.W. KEEN

The central issue for DP is information resource management. At present, information resource management is yet another of the buzz words and cliches that emerge in the management information systems field at random intervals. Cliches are unfortunate — they often disguise the intellectual core behind a phrase. This has happened to decision support systems and may well spell DSS' demise.

The question "What is the definition of DSS?" is asked, but the more important one may well be "Why is the term DSS used in such silly ways without even being defined?"

For information resource management to move beyond cliche, it needs a core of intellectual toughness. To some extent, a clear concept of information resource management constitutes the organizational infrastructure not just for DP, but also for DSS and office technology.

Until recently, information has not been a real resource in most companies. Rather, it has been only a fragmented collection of operational files and special-purpose data bases. For information resource management to be meaningful in both concept and practice, it needs to provide the same level of coordination, planning and methods used to manage the financial resource. In fact, information resource management translates to the creation of an equivalent to the financial planning and control function, headed by a chief information officer comparable to the chief financial officer.

The chief financial officer is responsible for guaranteeing the integrity of the financial accounting system, including planning and reporting. He also supervises the methodologies and frameworks for capital investment. The chief financial officer does not decide how managers should spend money. Rather, this person decides how the processes of financial planning, justification and decision making should be handled. The chief financial officer is responsible, too, for ensuring that the operations are consistent and based on proper assumptions.

Viewed from this perspective, information resource management is not about control of information. It is about certification, justification of procedures, creation of methodologies and data definitions equivalent to those of the financial accounting system. In effect, the chief financial officer has an architecture for handling the financial resource: a systematic blueprint of terms, procedures and structures. Information resource management is a parallel architecture. The chief financial officer does not control how people spend money. Similarly, it would be a dreadful mistake if information resource management were confused with control over the use of information.

The need for DSS to tackle the issue of organizational decision-making processes rather than just individual ones has become increasingly apparent. In addition, it must create the systems that contribute to ongoing planning, control and operations, rather than those that contribute only to specialized or ad hoc needs. DSS has built its identity largely by its deliberate contrast with and independence from DP. For the first time, it needs DP and has every reason to want information resource management to become a reality, not just a buzz word.

DSS offers DP an understanding of how to operate in a user-controlled world. DP offers authority and expertise in defining architectures. It is hard to see how either can really progress without integration of these assets and skills.

Refocusing DP's role really amounts to meshing authority and accountability, a process that has two parts. The first is providing the needed authority to implement the greatly expanded range of applications that information technology has stimulated. The second is to exercise a mandate to spread that technology across departments.

Until recently, DP reported to a staff executive several levels below the key authority figure in the organization. It had a narrow charter, and senior management played a limited role in planning. DP had certain territorial authority as a result of its monopoly over a resource that was not of central interest to the mainstream of the business. Its interpretation of its job focused on preventing disruption rather than on fostering innovation. Applications were handled on a project-by-project basis and largely affected only single departments.

The accountability needed by the information function is broadened by the cross-organizational applications of office technology and the use of terminals by customers, managers, secretaries and professionals to access services and products. DP is too narrow a term for this newer responsibility and set of skills.

Accountability must be backed by adequate authority. There has to be a clearer conception not of what to decide in the use of information technology, but rather of who decides. Planning, coordination and liaison become key, as do formal mechanisms for setting priorities and allocating resources. Pushing electronic mail capabilities, integrated communications or data management across, up and down the organization is impossible without authority.

DP now has the opportunity to use the concepts of information resource management and office technology to clarify the issue of the authority needed to manage such a resource. DP should look to become more of a staff function and should spend much less time being concerned about owning data centers and hardware. It should focus more on getting influence instead of on budgets. The model for this is again the chief financial planning officer, who certainly does not fight to control the tab machines. Too many DP managers are competing to build an empire that largely consists of carbon paper and tape reels. The aim of DP should be to get the kind of staff influence that financial planning officers have.

In essence, information resource management is a set of architectures for data and communications. The applications are a portfolio of opportunities. Because we now have disjunctive technologies, one group sells DSS, another runs office technology and each justifies applications from its technical perspective. With information resource management, one has a corporate resource and a set of business opportunities, defined in terms of investment, competitive impact, internal efficiency and effectiveness. Then and only then can one decide which part of the technology it would be best to use. We should not make the case for DSS in terms of DSS, but in terms of a productivity opportunity or improvement in the operations of the organization and then choose whatever piece of technology makes sense.

The meaning of all this is that the planning process is key. The bottom-up, project-by-project approach of DP needs to be meshed into a process of top-down integration. This again highlights the issue of authority, because doing this needs clear directions from the top. The difficulty is in putting priorities on, for example, electronic mail for increased horizontal communications instead of on financial planning languages for DSS. This is a business issue, not a technical one.

Decisions on applications have been made by DP mostly because they were never very important. If technology becomes a key contributor to effectiveness and efficiency, there have to be mandates from the top.

Top management has to play a more direct role. Does it prefer that information technology mainly be used to leverage the cost side of the business to make it more efficient? Or would it rather see it used to focus on support aspects of business activities more relevant to the revenue side? In some industries — banking and related financial services especially — competitive advantage increasingly depends on information technology, especially on data communications. In that case, the priority is to select applications that contribute to product innovation, service and marketing positioning. This priority may also provide a stimulus for DSS: improving the productivity of people whose productivity matters — senior managers, planners and financial analysts, for example. In a manufacturing company, where margins are squeezed by bad business conditions, the business priority might be very different; there, the answer might be to hold down costs, reduce head count and improve internal efficiency.

The same technical base leads to obviously different uses in these extreme examples. The choice cannot be made on the basis of "Here is one component of information technology; what can we do with it?" In DP, technology has too often pushed applications and not vice versa. DSS, perhaps luckily, has not really had a special technology to push.

Decisions on applications have been made by DP mostly because they were never very important. If technology becomes a key contributor to effectiveness and efficiency, there have to be mandates from the top. One of the biggest challenges for DP is to educate top management to understand how to provide much more precise criteria for selecting a portfolio of applications.

This means that the main question is how to redefine the management structure for DP. This is not something that can be done unilaterally. DP needs an increase in authority, with much more focus — not on being a plant manager, but on building an information company. It will have a corporate planning arm, a technical services and marketing.

The role of the business-oriented systems analyst is clearly much more that of an industrial salesman bringing services and products to a growing range of customers and vice versa. DSS builders are first-rate industrial salesmen. They bring technology to the marketplace and the marketplace to the technology. If we solve the problem of the management structure of DP, then we have integrated office technology, DSS and DP and provided a base for creating real business value from them.

There is no technical fix to evade the issue of a management structure that will lead to that integration. A prime need for research in the MIS field is to address authority and accountability and to help relieve the

The Norwegian computer market wants to hear from you.

The Norwegian computer market is expected to grow at an annual rate of 30%. The Scandinavian countries (Norway, Sweden and Denmark) constitute the fourth largest regional market in Western Europe, and according to International Data Corporation, it is a highly developed market.

Reach your potential buyers in this important marketplace with *Computerworld/Norway*. A tabloid newspaper published twice a month, *Computerworld/Norway* reports on the most timely news concerning new products, new software applications, market trends and opportunities. Editorial coverage includes trade shows, foreign markets, education, government, major industries and the implications of computers. *Computerworld/Norway* is circulated to 7,000 DP professionals in end-user related environments.

CW International Marketing Services gives you one-stop advertising service in countries around the computer world. For more information on *Computerworld/Norway* or any of our other foreign publications, just fill out and return the coupon below.

Bjørn Lo Ranoglin, Manager
International Marketing Services
CW COMMUNICATIONS/INC.
375 Cochituate Road, Box 880
Framingham, MA 01701
(617) 879-0700

CW Communications/inc.
Publishers of *Computerworld* and other leading computer publications around the world.

Please send me more information on:
☐ *Computerworld/Norway* ☐ Your other foreign publications

Name _____ Title _____
Company _____
Address _____
City _____ State _____ Zip _____

strains on an organizational process designed 20 years ago with no expectation that information technology would really matter for the fundamental activities of the business.

Traditional DP must accept a subordinate role. It is one aspect of a meaningful management career path in a broad field. The computing resource has many facets. There will be many career trajectories. DSS is one entry level; it starts toward the marketing side. Many people will still choose to start on the manufacturing side in DP.

DP must also recognize that the DSS intrusion was necessary. When the DSS movement began to build momentum, the main opposition to the very idea of DSS came largely from DP. Only four years ago, if one talked about DSS at a conference of DP managers, the response was disdain or abuse. It is important now to stop the fight. Nothing will be gained in the DSS field by trying anymore to highlight the separation from DP, but much can be gained by trying to blur it.

DSS managers may be the next leaders of DP. Too many old-line DP professionals are temperamentally and intellectually unlikely to accommodate to what is happening around them.

To sum up the contribution of DP to DSS is to provide the necessary infrastructure for leveraging DSS from a small-scale concept to a large-scale one. DP provides the strategic technical base and, in the end, it can provide the organizational base. DSS will have organizational influence via executive support systems, but the organizational strength needed to evolve DSS will rest on information resource management's being embodied in high accountability and high authority.

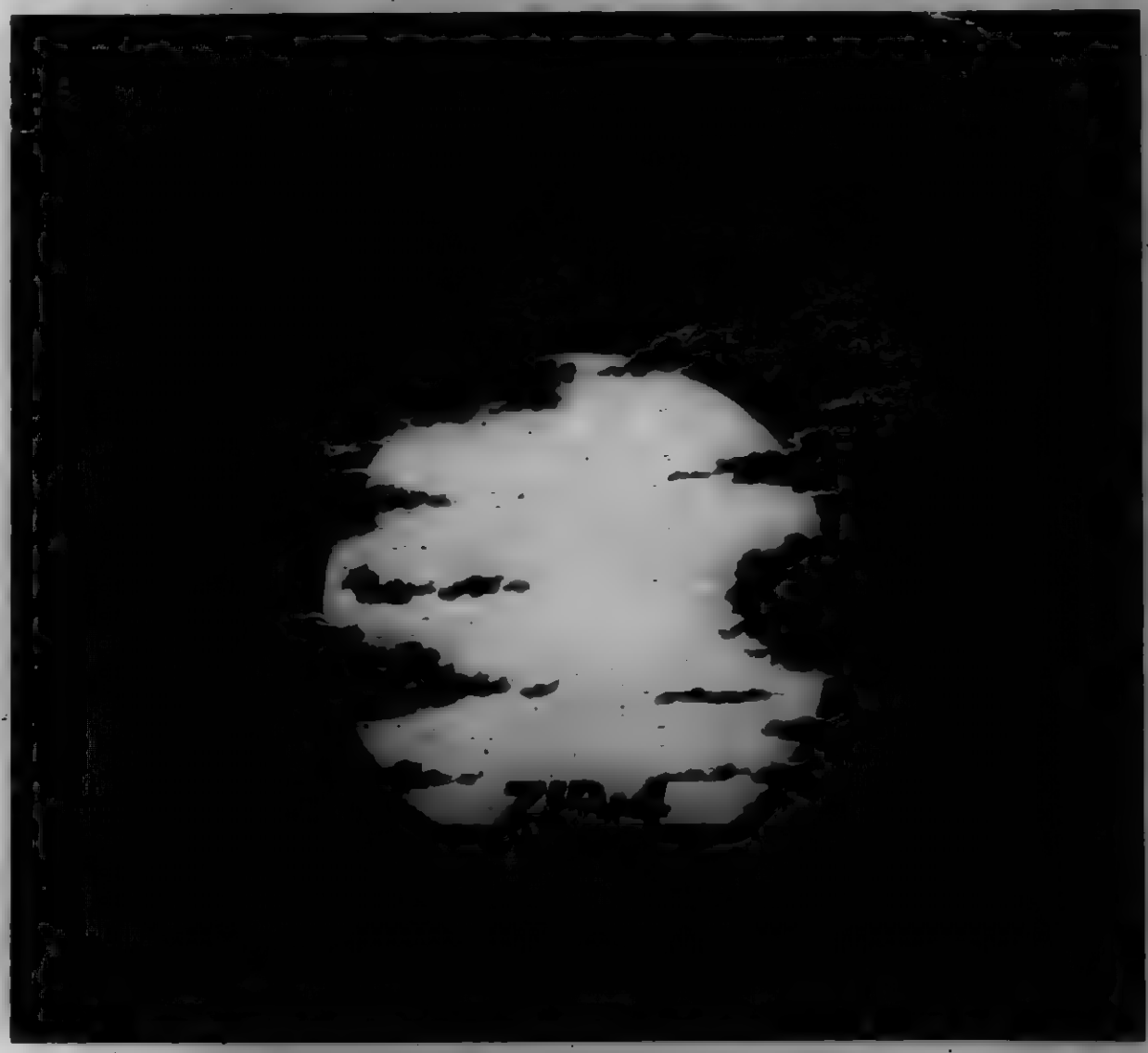
It may be that many DSS managers will be the next leaders of DP. It has become fairly obvious that too many old-line DP professionals are temperamentally and intellectually unlikely to accommodate to what is happening around them. The DSS builder who has worked with complex systems that go beyond dataless models is qualified on both counts to help move DP forward.

DSS people usually understand the business better than DP. One cannot be an isolated DSS designer 20 miles away from the client and take some functional specifications and come back in six months. It is unfortunate that in the 1960s many companies decided one of the safest places to put their money was in buildings. One of the buildings they needed was a new data center. As a result, large numbers of DP organizations have never seen their users because they are 25 traffic jams and 15 miles away. DSS is more embedded in the ongoing activities of the organization. That is why every DP manager really would benefit from an immediate infusion of such people who simply know how the organization works.

DSS people also know the new development technologies. The tools DP is relying on to solve the software productivity bottleneck are the ones DSS grew up with. Any scenario for successful exploitation of information technology over the next five years or more assumes end-user development. We will push applications further into the organizational culture and will rely on highly flexible systems that evolve over time. DSS builders will be key in helping reeducate many programmers and analysts about the craft of information systems development.

The tools DP grew up with — clumsy software languages like Fortran and Cobol — were inadequate in their inception. DP professionals have relied on the notion that systems will always be built from the center out to the users by a technical manufacturing arm now out of date. There are many reasons for infusing the DSS philosophy, even at the bottom level of the organization, to make it easier for DP to fulfill its traditional role. OA

Keen is chairman of Micro Mainframe, Inc. in Cambridge, Mass. He is the conference chairman of the conference, "Microcomputers: High Performance/High Payoff," sponsored by Micro Mainframe and scheduled for March 1 in New York. He is also speaking at the conference, "Software Tools for Distributed Decision Support Systems," Feb. 27-28 in Boston, sponsored by Suffolk University.



ADDRESSING TOMORROW TODAY.

Imagine.

A remarkable new ZIP Code system for business mailers. So precise it can actually pinpoint specific streets, specific buildings. Even specific building floors.

That's the ZIP + 4 code.

Now imagine a computerized sorting system so advanced that it automatically reads the last line of the address off your envelope. Reducing sorting time while increasing sorting efficiency.

That's the Optical Character Reader (OCR).

EFFICIENCY.

Perhaps most amazing is the fact that both the ZIP + 4 program and our OCR's are already in place. Ready to bring technological efficiency to the mountainous task of moving 100 billion pieces of business mail per year.

But to deliver the future, we need your help.

Begin by being sure that the entire address on all your business mail is totally visible, legible and located properly. Your local post office can give you all the information you need.

ECONOMY.

Use of ZIP + 4 codes is voluntary. But by adopting them, you'll be rewarded in the form of more stable postal rates. In fact, when you meet the eligibility requirements, you can start saving postage right away.

If you're a First-Class mailer of 500 pieces or more who already presorts, you can save a half-cent per piece when you use ZIP + 4 codes. And that's on top of the three-cent discount for presorting.

If you're a First-Class mailer who doesn't presort but mails 250 pieces at a time, you can save nine-tenths of a cent per letter.

And no matter how many, or how few, pieces you mail, using ZIP + 4 codes can give you a cleaner, more efficient mailing list. Plus more consistent delivery.

COOPERATION.

Let us show you how you can put more zip in your mail service. Contact your local Postmaster or Customer Service Representative. And send yourself into the future.

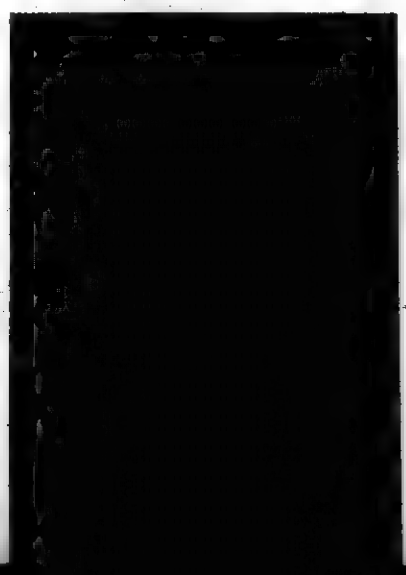
© USPS 1983

PHOTOS © 1984 GWENDOLYN STEWART

JOHN NAISBITT LOOKS AT THE WORLD OF OA

John Naisbitt gained international recognition with his megahit, *Megatrends: Ten New Directions Transforming Our Lives*, which has been at or near the top of the bestseller list for over a year. Naisbitt's staff did more than 12 years of content analysis on 6,000 local newspapers, and the book is a result of that research. This thorough examination of the major news trends around the country led to Naisbitt's identification of "critical restructurings" of our lives. Among his megatrends:

- Although we continue to think we live in an industrial society, we have in fact changed to an economy based on the creation



and distribution of information.

• We are moving in the dual directions of high tech/high touch, matching each new technology with a compensatory human response.

• We are giving up our dependence on hierarchical structures in favor of informal networks. This will be especially important to the business community.

Naisbitt, who also publishes the quarterly *Trend Report*, has served as senior vice-president of the research firm of Yankelovich, Skelly and White and as chairman of the board of the Center for Policy Process in Washington, D.C. He was a special assistant to President Lyndon Johnson and served as special assistant when John W. Gardner was secretary of health, education and welfare.

Glenn Rifkin, *Computerworld OA*'s senior writer, met with Naisbitt in his Washington office to discuss the impact these megatrends will have on office automation.

In *Megatrends* you said, "We're living in a time of parentheses, a time in between." How does the office of the future relate to that?

We're on the edge of rethinking the social institution we call the

corporation. We're going to rethink social contracts, arrangements between people, responsibilities and so on. And we're just beginning that process. The rethinking will influence the technology and vice versa.

Do you see the computer as a liberating rather than a constricting or monitoring device?

On balance, technology is going to liberate rather than harness the worker. What's happened for generations is that in companies with 1,000 workers, people have been treated pretty much the same because that's how you keep track of them. With the computer to keep track, you can have a unique arrangement with each of 200 or 200,000 employees. We have to see the computer as a tool that manages complexity.

"The computer can help us by threading through and selecting what we need for one task or another. The task of the age is to convert that incredible amount of data we're drowning in into knowledge, into intelligence."

Assuming that it will harness the worker is to expect the new technology to do things we did in the old structure of the company. The new structure is going to be very different from that.

If I had to describe that new structure today — and I'm a bit hesitant because it's just unfolding — I'd say we're going to be very decentralized in responsibilities and the way those responsibilities are executed. Anyone who thinks he's going to be competitive using the old structure and the old ways of monitoring employees is mistaken. What's liberating and where you get incredible productivity is when you give people more control over their own lives.

Can that work?

One of the best-kept secrets in America is that people are really dying to make a commitment, but they're not given the space and the freedom to make it. In Japan, one thing that really impressed me was that the employees I dealt with everywhere acted as if they had taken personal responsibility for the success of the company. When you have a company full of people who take personal responsibility for it, you've got a dynamite company.

You said in Megatrends that "we are drowning in information, but starved for knowledge and intelligence." Could you explain that statement?

The information din is incredibly high. It's gone from supply, which we have an overabundance of, to selection. That's how the computer can help us, by threading through and selecting what we need for one task or another. The task of the age is to convert that incredible amount of data we're drowning in into knowledge, into intelligence.

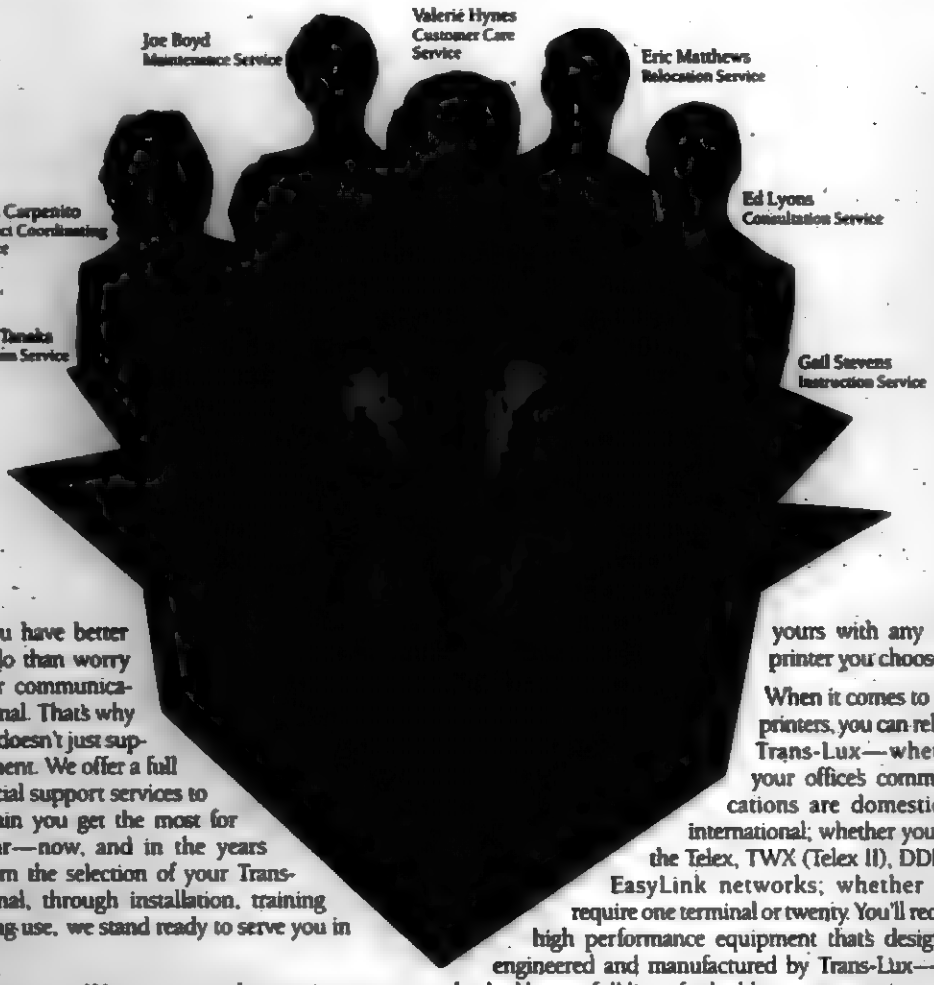
You discuss the information float. With the new technologies, can the information float be conquered or controlled?

What we're doing is foreshortening the float. We're sending information around at the speed of light. If I send a letter to you, it takes four days to get there and a week to answer. Then it takes a few days to get your answer back to me. In a couple of weeks, we've negotiated some transaction.

If I send it to you electronically and in that context you respond within a couple of hours and get your answer back to me instantaneously, we have negotiated the same transaction in a couple of hours rather than a couple of weeks. That's what collapsing the information float is all about. But it must be done with strategic vision. Strategic planning is worthless unless you have strategic vision.

Do you have some sense that what is being done — this rush to hook up the office electronically — is being done without strategic vision?

LOOK AT HOW MUCH MORE YOU GET WHEN THE NAME ON THE BOX IS TRANS-LUX.



Face it. You have better things to do than worry about your communications terminal. That's why Trans-Lux doesn't just supply equipment. We offer a full line of special support services to make certain you get the most for your dollar—now, and in the years ahead. From the selection of your Trans-Lux terminal, through installation, training and ongoing use, we stand ready to serve you in every way.

We pay as much attention to you *after* you lease or buy a Trans-Lux teleprinter as we do before. All of the valuable services shown above are yours with any teleprinter you choose.

When it comes to teleprinters, you can rely on Trans-Lux—whether your offices communications are domestic or international; whether you use the Telex, TWX (Telex II), DDD or EasyLink networks; whether you require one terminal or twenty. You'll receive high performance equipment that's designed, engineered and manufactured by Trans-Lux—and backed by our full line of valuable support services.

FREE CONSULTATION

Without charge or obligation, we'll evaluate your needs to make sure you're getting the most out of your current teleprinter. Call TOLL-FREE now:

1 800 243-5544, EXT. 108

IN CONNECTICUT, CALL 203 853-4321

TRANS-LUX CORPORATION

110 Richards Avenue • Norwalk, Connecticut 06854
Telex 965863 • TWX 710-468-0241

In many regards it's being done for its own sake — because it's the thing to do. In some cases, we're accelerating the rate at which we send dumb messages ricocheting around. We're getting more and more efficient at sending dumb messages and dumb ideas among installations or institutions.

We've got to be more thoughtful about what it is we're accelerating. That's why I say all this strategic planning or accelerated messaging is worthless unless we have a good sense of what it's contributing to and where it's taking us.

You wrote that we're now in the second stage of innovation — improving on old technologies — and that the third stage is new uses and discoveries for the technologies. Wouldn't the office seem to fit better in the third stage?

We're very much in the second stage of the office. We're sort of sticking the technology onto the office, but notice that we're not doing anything any differently. Essentially, an office is a telephone, an in-basket, an out-basket and a waste basket. We're just doing those things more efficiently.

In the third stage are the things that grow out of the invention itself — things suggested by the computer itself. And we're not even on the edge of that yet. We're still very much in the second stage and will be for a long, long time.

Do you have some view of what the office of the future will evolve to be?

The office of the future will be very decentralized. Part of that process is a change in what a manager or leader does — a move from order-giver to facilitator. I think the really successful manager of the '80s and '90s will be the manager who creates a really nourishing environment for personal growth.

In an environment where you're experiencing personal growth, it might not be conducive to have a bunch of little cubbyholes. I think it will be a much more open, decentralized place. Those considerations, in the short term, are probably more important than making everything electronic.

Making everything electronic is not the important thing — it just makes us more efficient at what we're doing. What really is important is to notice what we're doing and to decide whether we're losing ground by becoming more efficient.

It's like productivity. Had Chrysler, a few years ago, used the same workers to produce twice the number of big dinosaur cars, would that have been productivity growth? The meaning of these words really turns on what we're doing. What is the end we are working toward when we attempt all this efficiency?

Do you see any answer to that?

Yes. An institution has to develop a shared strategic vision of where it is going. The Koran says, "If you don't know where you are going, any path will take you there." Most companies don't know where they're going, especially in this time of very basic change.

They do things because they seem like a good idea or are momentum-driven or whatever. But to what end? There are a lot of people who don't know what business they're in. And whatever business they were in, they're not in it anymore and they often don't even know it.

There are certainly examples of that among the computer vendors.

That's right. The U.S. is not in a recovery, and we have not been in a recession. What we're in is much more profound than that. We're changing economies. We haven't changed economies in 150 years.

Now we're going through a long shakeout period. It's been going on for about three decades now, with companies shrinking, companies merging and companies going out of business. The important thing in the new economy is that during the long shakeout period, thousands of companies will go under — thousands of computer companies and thousands of software companies. That's the good news, because we're creating a whole new economy just the way we did when we left the agricultural economy and moved into the industrial economy. And we have a similar incredible entrepreneurial explosion.

The character and the nature of this new electronics information economy is such that we will end up with thousands of companies, but to get there, we will go through thousands and thousands of other companies.

Do you think the electronic office environment will be affected by the concept of high tech/high touch that you mention in the book?

With more and more technology, we're softening the environment to create a balance, and that's beginning to happen in our offices. Our offices are going to have a softer, more compensatory kind of look. At the same time, those environments will have to be more and more conducive to personal growth.

Is there much that can be done in an office setting that is like a rabbit warren?

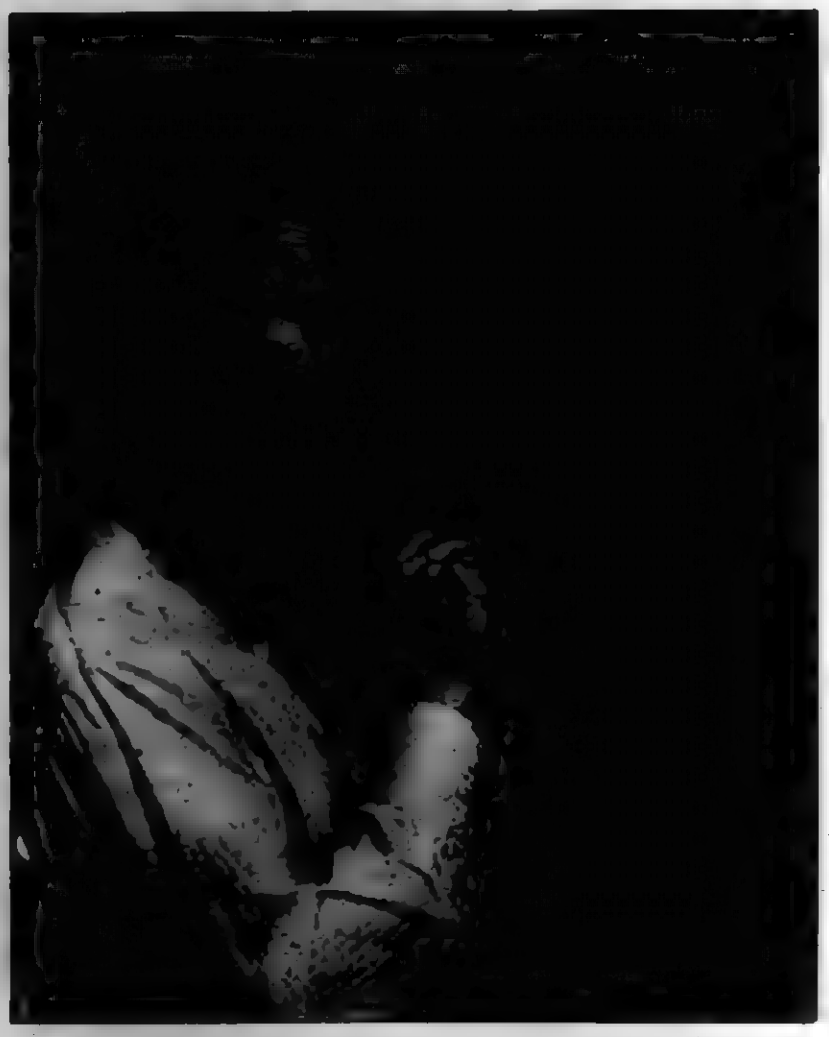
No, and that's why we have to change that image. Those organizations that change that first, understand that first and deal with that first will be way ahead of

Did your computer pull the old "disappearing data" trick again?

Humidity or "dirty" electrical power can cause all kinds of costly, annoying disruptions to your work flow and productivity. Liebert offers low cost solutions to small system environmental and power problems. Stop wasting work and "missing messages." Call 614/888-0246.
We help make your computer investment pay off!

Liebert
World leader in computer support systems.

Liebert Corporation, 1050 Dearborn Drive, P.O. Box 29186, Columbus, Ohio 43229
614/888-0246 Telex: 246520 LIEBERT WOUH



competitors that don't. Because those changes will contribute to people's willingness to make a commitment instead of just putting in their time.

You also said that in an information economy, rigid hierarchical structures slow down the information flow just when greater speed and flexibility are needed. Do you see OA as a means to change that?

The computer is going to smash the pyramid. Hundreds of years ago, we created this hierarchical managerial pyramid. It served us extremely well, but it has also been incredibly antiproductive. We needed it to keep track of people and things they did. But that was mostly just handing information up and handing it back down.

When we reconstitute our organizations along much more horizontal lines — smaller and smaller units, more entrepreneurial units and more participatory units — what occurs is an incredible whittling away of middle management. You really squash the pyramid.

You wrote, "Teleconferencing is so rational, it will never succeed." Would you comment on that?

People say they're going to do teleconferencing to save all this money on traveling and expenses. Teleconferencing works only when it's not important. It works only for one-way communication; we're moving to a period where one-way, top-down communication doesn't work at all. Because if it's of any importance at all, then people have to get together. There's no end to meetings; people really have a need to get together.

That's why I said the electronic cottage is not going to go very far. Very few of us are willing to stay at home and tap out messages. Most people want to go to the office. Most people want to be with people. And the more technology you put into a society, the more people want to be with people.

Alvin Toffler seems to think that, although not everyone will work at home, it is more of a possibility than you give it credit for.

I think it's great for emergencies . . . like Mondays. It's terrific for some things. It's another option. But it won't be for everyone.

We'll increasingly have satellite offices. You will be able to go to the office, but it will be in the same suburb where you live. That satellite can be connected to all the other offices because we have the technology to do that.

The office worker has expressed concern over issues like job displacement and job deskilling, as well as health hazards. What trends do you see developing regarding these allegations?

I don't know very much about it. Some studies say the use of computer terminals is not injurious to health. I myself don't need any studies to tell me it can be incredibly boring. But it's important to remember that the computer terminals we have today are not the computer terminals we will have tomorrow. In people's minds, when they think about 10 years from now, the image continues to be the CRT screen and the keyboard, as if that is the state of the art and it will never change.

That is absurd. It is going to be much more like Ms. Pac Man. It's so primitive now. We're about at the stage where we were when we had steam-driven automobiles. I think those computer stations will be quite different from those we now have.

You mentioned quality circles, which have flourished in Japan. Are they an option for office workers in this country?

It's a very viable option in this country, but it's also a manifestation of something larger. It's a manifestation of people who are more involved in their work and more responsible for what they are doing. It has to do with the idea of participatory democracy, in which people whose lives are affected by a decision are part of the process of arriving at that decision.

It used to be that decisions would be made by someone on the 26th floor who would send the word down and everyone would salute it. It just doesn't work anymore. People are saying, "If my life is involved with something, I've got to be part of the process of arriving at those judgments." That's how to run a company, too.

Quality circles are just a manifestation of that idea of participatory democracy; the people most involved in what's being done are the ones who decide how to do it best. It's very straightforward.

Can an OA system expedite that participation or will it hinder it?

Let's stop on the term "OA system." Often a company will spend $40 million on a new computerized system, but not a penny on the "high-touch" or human side. The installations that work really well are those in which the people who work on the system — who run the system — are part of the process of deciding which system to bring in. Not only are their lives affected, but also they know more about what that system has to do than anyone else. It just makes wonderfully good sense to get people involved.

You pointed out that there possibly won't be enough managers with enough high-tech knowledge to install the systems along with the kind of worker participation you spoke of.

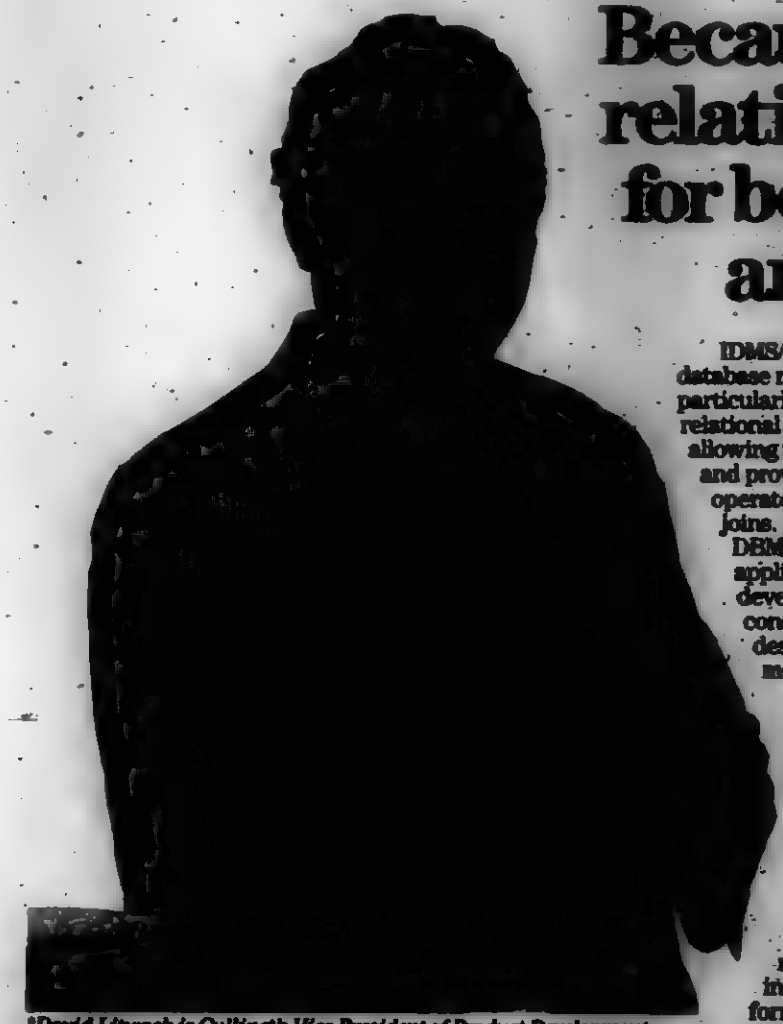
It's the opposite of that. I said that the new manager is not someone who has all the answers. It's someone who knows how to create a process to get the answers. There's no stigma attached to not having the answer. The necessary quality is a willingness to trust people and to utilize human resources.

The real competitive edge, as we move into this new economy, will be our human resources. Those of us who get the most out of our human resources are going to have the competitive edge. This is in a different sense from the old productivity ethic, where you get the people to turn out one more widget.

The goal here is getting more and more creativity and commitment out of people. OA

"IDMS/R represents a major advance in database technology."

Dave Litwack*



Because IDMS/R is the first relational DBMS designed for both the DP professional and the end user.

IDMS/R is not only a relational database management system, but a particularly powerful one. IDMS was made relational by removing all pointers and allowing the user to define data as tables and providing the traditional relational operators such as selects, projects and joins. The major benefit of a relational DBMS is the capacity to develop applications faster because the developer does not have to be concerned with the database design. IDMS/R provides this and much more.

For example, the Automatic System Facility (ASF) of IDMS/R is a major advance over fourth generation languages. The ASF is so comprehensive and easy to use that all a user need do, to develop an application, is define a relational record. The Automatic System Facility dynamically generates all necessary supporting structures including data definitions, screen formats, application processing logic, and documentation. So, the developer can witness the application being produced, literally, in seconds. This capability makes IDMS/R the perfect system for the end user.

Data processing professionals can use the ASF to help develop production applications. The ASF can be used to build a prototype that can be enhanced, using Cullinet's fourth generation language, ADS/OnLine, into a complex production application. But, when they build a complex high volume application using IDMS/R, DP professionals require outstanding performance. Typically, 5% of the data relationships (joins) in any application are accessed 95% of the time. With IDMS/R, they can simply change these relationships to predefined joins and benefit from a dramatic boost in performance. We call it Relational Fastpath. Relational Fastpath makes IDMS/R a unique DBMS and a perfect system for DP professional's system development needs.

In addition, IDMS/R has the most sophisticated back-up and recovery capability of any DBMS, full integration with personal computers and is also integrated with Cullinet's complete line of financial and manufacturing applications.

In summary, IDMS/R was designed to satisfy the requirements of those who want to develop applications faster and those who have the responsibility of processing them.

For further information, attend a Cullinet Seminar. Mail the attached coupon or call the Cullinet Seminar Center at 1-800-225-9930 (in Massachusetts, 617-329-7700).

David Litwack is Cullinet's Vice President of Product Development. Mr. Litwack has contributed significantly to the many technical advances Cullinet has achieved in database software products, including IDMS/R. Mr. Litwack joined Cullinet in 1976. He is a Cum Laude graduate of Brandeis University and holds a Masters in Computer Science from Boston University.

IDMS/R Seminar cities and dates

City & State	Date	City & State	Date	City & State	Date
Albany, NY	Mar 13	Greenville, SC	Mar 6	Orange County, CA	Mar 6
Allentown, PA	Mar 1	Indianapolis, IN	Feb 21	Oshkosh, WI	Feb 28
Atlanta, GA	Mar 28	Indianapolis, IN	Mar 27	Ottawa, ON	Feb 21
Arlington Hts., IL	Feb 23	Jackson, MS	Mar 15	Pittsburgh, PA	Feb 28
Augusta, GA	Mar 14	Kansas City, MO	Feb 22	Portland, ME	Feb 21
Baltimore, MD	Feb 21	Knoxville, TN	Mar 28	Portland, OR	Mar 15
Bloomington, IL	Feb 21	Lexington, KY	Mar 30	Providence, RI	Mar 22
Boston, MA	Mar 8	Little Rock, AR	Mar 13	Quincy, IL	Feb 29
Boston/ Westwood, MA	Feb 28	Los Angeles, CA	Mar 27	Raleigh, NC	Mar 20
Bowling Green, KY	Feb 1	Madison, WI	Mar 15	Rochester, NY	Mar 28
Bridgeport/ New Haven, CT	Mar 6	Meadowlands, NJ	Mar 7	Sacramento, CA	Feb 21
Charleston, WV	Feb 29	Memphis, TN	Feb 23	Salt Lake City, UT	Feb 21
Charlotte, NC	Feb 28	Merrimack, NH	Mar 29	San Antonio, TX	Mar 15
Chicago/ Rosemont, IL	Mar 29	Milwaukee, WI	Mar 7	San Diego, CA	Feb 22
Cincinnati, OH	Mar 21	Minneapolis, MN	Mar 28	San Jose, CA	Feb 14
Cleveland, OH	Mar 29	Montral, PQ (French)	Mar 14	Springfield, IL	Mar 5
Columbus, GA	Feb 28	Montreal, PQ (English)	Mar 21	Springfield, MO	Mar 29
Columbus, OH	Mar 9	New Orleans, LA	Feb 29	Spokane, WA	Mar 29
Davenport, IA	Mar 12	New York, NY	Feb 22	Tallahassee, FL	Mar 1
Detroit, MI	Mar 14	New York, NY	Mar 20	Toledo, OH	Feb 24
Ft. Lauderdale, FL	Mar 22	New York/ Long Island, NY	Mar 27	Toronto, ON	Mar 20
Ft. Wayne, IN	Mar 6	New York/Rye, NY	Mar 13	Tucson, AZ	Mar 20
Ft. Worth, TX	Mar 15	Oakland, CA	Mar 13	Vancouver, BC	Mar 14
Grand Rapids, MI	Mar 27	Omaha, NE	Mar 1	Washington, DC	Mar 6
				Wichita, KS	Mar 8
				Wilmington, DE	Mar 27
				Winnipeg, MB	Mar 6

Visit us at Syscon, Feb 21–23, Booth #A1500.

I'd like to attend your seminar on _____ (date) in _____ (city)

Computer _____

Name/Title _____

Name/Title _____

Company/Department _____

Address _____

City _____ State _____ Zip _____

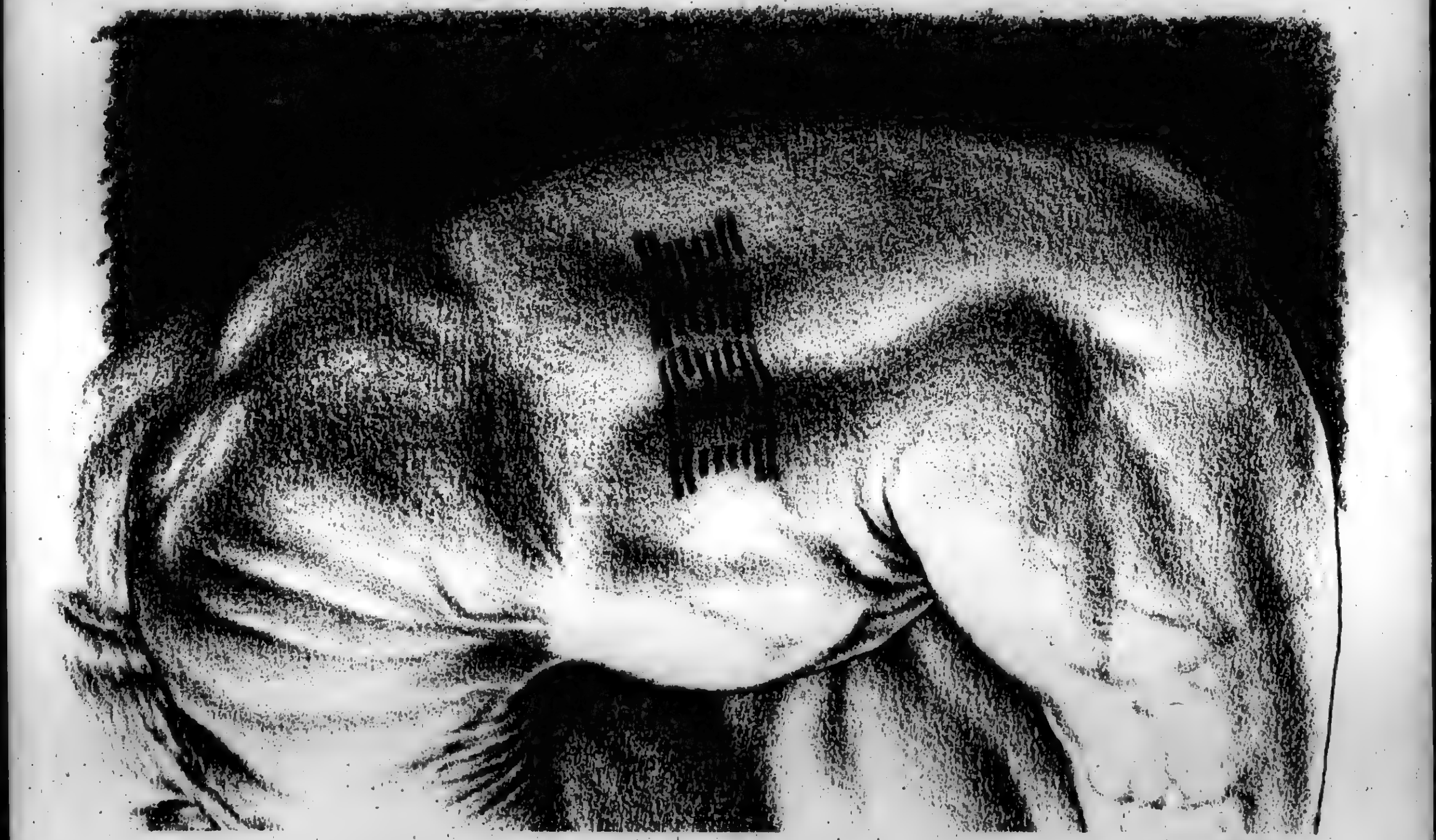
Phone ( ) _____

Mail to: The Cullinet Seminar Center, 400 Blue Hill Drive, Westwood, MA 02090-2198

Cullinet Software products are designed to run on IBM 360/370, 30XX or 43XX or plug-compatible computer systems. 3/1840A

Database: Cullinet

© 1984 Cullinet Software, Inc., 400 Blue Hill Drive, Westwood, MA 02090-2198



IBM FLEXES ITS OFFICE MUSCLE

By Glenn Rifkin

Despite its massive presence in the office, IBM has only recently begun to get its act together in office automation. Even with its Personal Computers, Selectrics, Displaywriters, 3270 terminals and so on, the Big Blue machine has yet to offer a cohesive OA strategy and OA system to its customers.

Whatever the reasons have been for this apparent faux pas, as 1984 unfolds, it will become increasingly apparent that IBM intends to correct the omission. And as the computing universe well knows, when IBM decides to attack, it's time to head for the shelters.

In late 1983, IBM went on the offensive and made it known that it was pulling out all stops to establish control of this explosive market. At a New York OA conference in November, IBM's J.T. Boyle, director of quality and general development in the Communications Products Division, summarized IBM's strategy in the office: "We will provide optimized solutions for the diverse environments and — with architectures and network functions — will integrate those solutions into a single system for all users."

In its office arsenal, IBM has a varied and growing array of weapons. Though industry analysts offer praise for some products and scorn for others, all agree IBM is a formidable figure in the OA market — if for no other reason than it is IBM. Boyle pointed out that by 1989, expenditures on office systems are expected to be $70 billion and IBM will "actively pursue that business." As one consultant put it, "IBM intends to dominate any market it enters."

Although it undoubtedly will get what it wants in the long run, IBM must face a stiff challenge in the office arena. Aside from such staunch competitors as Wang Laboratories, Inc., Data General Corp., Digital Equipment Corp. and Hewlett-Packard Co., IBM's sternest test will come from the recently unleashed AT&T, which has made clear its intent to garner a major share of the office market.

Analysts nevertheless tend to agree that AT&T's challenge is still on the horizon. For IBM, the current mandate is to answer the many internal questions it faces in the office. For example: Does Big Blue have a workable OA strategy? If so, can that strategy incorporate its varied and often incompatible product line into a useful and reasonably priced integrated office system? Are end users now sophisticated enough to look beyond IBM's reputation and ask for more than IBM can currently provide? What will IBM do to solve the communications needs for the office?

Even without an integrated office strategy or a single system offering, IBM had an enviable year in the office in 1983. The phenomenal sales of its PC continued (they owned an estimated 28% of the market) and among the PC, the Displaywriter and earlier word processors, IBM had an installed base of more than half a million desktop workstations, according to International Data Corp., (IDC) a Framingham, Mass.,consulting firm.

Sales of stand-alone products, however impressive, don't answer the OA questions, however. One of IBM's first responses to these questions was the creation of the Entry Systems Division within the Information Systems Group at IBM. The new division, established in August, has responsibility for all low-cost high-volume office workstations.

According to Bob King, director of IBM's Information Systems Group, "It just makes sense to put as much as we can in a common management and common development system." King added that IBM has also expanded its marketing and distribution operations to utilize new and varied channels such as mail order, retail stores, and value-added resellers and dealers.

With the new division in place, IBM began its attempt at a smooth integration of its own diverse product line. Last fall, the company delivered the first in a salvo of major announcements which it believed fulfilled its June 1980 statement of direction of providing full interchange and access capability for office products.

The announcements included the following:

- Systems Network Architecture (SNA)'s newest feature: distribution services. Snads reportedly contains the mechanics for transferring information from one system to another.
- Enhancements to IBM's Distributed Office Support System (Disoss). The new release, when coupled with Snads, reportedly will provide multihost document distribution.
- Enhancements to the 8100/Distributed Office Support Facility (Dosf), to the 5520 Administrative System programming, and to IBM's Professional Office System (Profs). Among the enhancements is the ability of the 8100/Dosf to exchange revisable documents with Displaywriter and 5520 systems. The intent to provide document exchange between Profs and Disoss was also announced.
- Disoss Professional Support Services (Disoss PS), which reportedly provides professional support applications to 3270 terminal users on MVS and VSE systems.

In addition, IBM stepped up support of its Document Interchange Architecture and Document Content Architecture (DIA-DCA), which reportedly will permit the transfer of documents between dissimilar (and even non-IBM) devices. King acknowledged that IBM is extremely interested in standardizing DIA-DCA in the marketplace.

The announcements flowed on. The unveiling of the XT/370 PC and the 3270 PC, along with clear indications that both a local-area network and a Unix-like product were on the way, continued to rock the office world. As 1983 drew to a close, shaken competitors and over-zealous analysts wondered whether there would be any office market left when the blue dust finally settled.

Despite the barrage, however, not everyone was convinced that IBM's dominance of the office market was a fait accompli. As all vendors know

(and users are quickly learning), the bridge between announcement and delivery is a wide one: even IBM can run into trouble traversing it. Although consultants agree the proposed solutions look good on paper, they are adopting a "wait and see" attitude for many of the announcements.

In fact, according to IDC analyst Tom Elliott, IBM's multiple workstation offerings may be more of a burden than a blessing. "As users discover they have real business requirements for interdesk electronic communications, they also discover there is still a long way to go before the diverse range of IBM devices is capable of genuinely unrestricted communications," Elliott stated. "Furthermore, user interfaces differ from machine to machine, so a person cannot necessarily sit down at any workstation and use familiar commands.

"IBM has gone too far along too many different paths to offer a uniform and relatively consistent set of office products," he added.

Christine Hughes, vice-president of the office information systems program for the Gartner Group in Norwalk, Conn., said although the enhancement to Disoss (Version 3.2) might help solve the distribution capabilities, it won't be available until October and will be quite costly.

Even more critical is the analysis offered by Tom Billadeau, president of the Office System Consulting Group, Inc. in Cambridge, Mass. He said the confusion over IBM's office strategy is because "they simply don't have one." Outside of the PC, Billadeau stated, IBM's office products are unimpressive: "If you tie together mediocre products, all you get is a mediocre system."

Such systems as the 8100/Doef or the 5520 are cumbersome and confusing and, according to Billadeau, the reason Profs is not more successful is that people aren't willing to buy a mainframe with the VM operating system just to run Profs. Billadeau said he believes the Displaywriter is outmoded and overpriced and IBM may well stop manufacturing the product in the first quarter of this year. "They may have enough inventory to keep selling it for two years, but I suspect we will see a new Displaywriter based on the PC chip." He noted that when price cuts on a product are announced — as they recently were for the Displaywriter — it is often a signal that IBM intends to phase out that product.

Calling the 5520, IBM's Administrative System, "a real dog," Billadeau offered the opinion that the system was not ergonomically designed and had very poor word processing. The 8100, he added, has not sold well for OA purposes and its strength is in computer-assisted mailing tasks. "It was not really meant to be a desktop solution."

IBM's anticipated local-area network, reportedly a token-passing baseband product, was scheduled for announcement in early 1984, but according to analyst Hughes, it has been delayed for six to nine months. Hughes said that IBM is rumored to be working with both Sytek, Inc. and Ungermann-Bass, Inc. to develop an Ethernet-like local-area network as an interim solution.

Although IBM traditionally remains mum on its plans, King acknowledged that some changes are in the wind. While calling the Displaywriter "a damn good product," he admitted a new version was in the works. He also said IBM is well aware of the PC's potential to undercut sales of the Displaywriter. "I'm not sure a general-purpose word processing package can ever replace a package tailored for a specific task. But nothing prohibits people from putting a super good printer and Wordstar on a PC and using that to displace the Displaywriter." The 8100 will continue "to play a role because the notion of distributed data processing is still very much with us." King said and added that IBM is very interested in improving its hardware and communications in every area. "The technology moves so fast that whether or not we've got our hands full, we've got to move on or we'll get hopelessly outdated."

King admitted IBM has lagged behind in offering its customers an integrated office solution. He would only speculate as to the cause of that dilemma, stating that "it's been very, very difficult to detect any huge, significant trends that leaped out and said 'that's what we'll base our plans on.'"

The introduction and success of the PC helped clarify the situation to IBM because it made possible tremendous price performance improvement. King denied that the shackles of the 13-year federal antitrust suit played a part in the problem. "I think we were just trying to figure out what was going on like many other people."

Because IBM's current offerings are so diverse and new products are still in development, the company's software offerings and open architectures are crucial to tying the workstations together. Though Disoss offers a solution, it is not simple or cheap to implement. It is more likely, consultants agreed, that DIA-DCA will offer a preferable, more elegant solution to the problem.

"The strategic importance of DCA and DIA cannot be overrated," IDC's Elliott stated. "Regardless of whether or not IBM gets into the local-area network market in a major way or develops and markets a voice/data PBX, the transmission medium is secondary to a set of architectural specifications that will allow dissimilar devices to interchange editable documents.

"By publishing its DCA and DIA specifications as it has done with SNA, IBM is once again opening up the IBM world — but on IBM's terms. This is a recognition that even IBM cannot be all things to all offices, and in order to preserve its market leadership it must make its information networks available to suppliers of specialized products," Elliott said.

"By publishing its DCA and DIA specifications as it has done with SNA, IBM is once again opening up the IBM world — but on IBM's terms. This is a recognition that even IBM cannot be all things to all offices."

Hughes pointed out that DIA-DCA has the potential to become the de facto standard in the office, giving IBM a chance to overcome the challenge of a Wang or DEC, both of whom integrated their office products as they were developed.

For IBM, the Scanmaster I image processor was the first product to be developed with the DIA-DCA protocols in mind. It was designed, Elliott pointed out, with multiple data types in mind and for communications within a Disoss network containing different terminal types. Elliott regards it as clear evidence that IBM is planning its newer products in that direction.

IBM also sparked wide interest when it purchased significant blocks of both Rolm Corp. and Intel, Inc., an indication that it will look outside its own environs for needed office technologies. King stated that IBM will leave the building of a PBX to others. Consultants view that as proof positive that Rolm will produce an IBM-endorsed PBX.

IBM has also been forced to look outside for another essential office offering: the Unix operating system. Ironically, Unix was developed by its fiercest rival, AT&T. King acknowledged Unix as a "valid requirement" for its OA push, and IBM last month announced its own version of Unix for the IBM PC. The system, called Personal Computer Interactive Executive (PC/IX), was developed for IBM by Interactive Systems Corp. and will run on both the PC and the PC XT. It will be available in April.

Also available in early 1984 will be the enhanced IBM PCs: the 3270 PC and the XT/370, both of which sent shock waves through the industry when announced. Addressing the micro-to-mainframe link question, both the XT/370 and the 3270 PC have been designated as key office products.

The 3270 with its windowing capabilities offers vast potential for users doing multiple-task-type work. According to Boyle, the combination of document distribution, library services and professional applications found in both Disoss and Profs, together with the PC and 3270 applications give IBM "an offering I believe is unmatched in our industry."

Ironically, though analysts are high on the XT/370's potential as an OA offering, King is not convinced the XT/370 is crucial as an office tool. "The XT/370 will be useful to VM users, but I don't know how many will download Cobol H and run a compiler at the local level. There is a class of users that will find it very useful, but I'm not sure they are general-purpose office employees."

"I really like the XT/370," Billadeau said, "but from an OA perspective, there is little to access from the host level that would be useful for OA applications. It's more of a development tool."

IBM will not designate any single product as its most significant OA offering. "I don't think there is one. For every guy who says the XT/370 is the best thing he ever saw, there is a 3270 advocate who says 'you're nuts.' I don't think the office is a monolithic thing," King said.

As IBM gears up this year, the industry will soon learn whether it will become the monolithic vendor in OA. IBM has traditionally sold to DP managers, and a lot of MIS people "owe their careers to IBM," Billadeau said. That, however, doesn't hold true in the office, where IBM created very few careers, he added.

"You don't hear commitments to IBM in the office as you do in other areas," Billadeau explained. "When you hear about those $40 million OA contracts with E.F. Hutton or the U.S. Forestry Service, you hear about Data General or Wang or Digital. For a systems solution, people aren't looking to IBM."

At IBM, the perception is of very heavy competition from domestic and Japanese vendors. Though acknowledging AT&T as a formidable opponent, IBM denies any specific plan of action to face the communications giant. King said IBM will continue to follow its current course of introducing new products and open architectures.

"I don't know of one of our products that doesn't have heavy competition from one place or another. We are aligning ourselves to be the low-cost producer of information systems and to be competitive, effective and responsive. We're doing it because we perceive it is and will continue to be very, very competitive out there," King stated. OA

Rifkin is Computerworld OA's senior writer.

Supermini Moves Into the Office

By Charles W. Newton

Superminicomputers are increasingly being used for office automation applications. This is especially true when large numbers of terminals or workstations are required, either centrally or in dispersed locations, whether working individually or in clusters.

An informal telephone survey of data processing and management information systems (MIS) executives from 16 U.S. superminicomputer sites illustrates this trend. Eight of these sites reported supermini-based OA applications either in use or on the drawing board.

The vice-president of information systems at one large Wang Laboratories, Inc. VS installation indicated that the organization's supermini is being put to work in two main office-related functions: the preparation of correspondence and the development of an evaluation and planning system. At Dunkin' Donuts, another Wang VS site, R. Thomas Burger, vice-president of information services, indicated extensive use of that system for word processing, including point-to-point document trans-

mission. A federal government agency MIS officer said his agency used its Harris Corp. H-500 supermini as "... an MIS tool for data base management and electronic mail."

The MIS director of one of Prime Computer, Inc.'s largest multisystem installations cited text preparation as a primary application. At another Prime site, Suffolk University, Paul Ladd, director of MIS, said the university's Prime supermini is used for WP and electronic mail applications. Suffolk also provides financial planning applications and is discussing plans for developing an office-oriented spreadsheet graphics capability.

In yet another example, the DP director at a large consulting services organization in the Northeast said its organization used its Digital Equipment Corp. VAX 11/780 in WP and in office-oriented customer support applications.

Seven of the eight organizations that indicated use of superminis for OA applications provided direct support to end users via on-line terminals.

The 32-bit processor segment of the overall OA systems equipment market will continue to grow in terms of total dollar volume. In 1982, U.S. manufacturers shipped an estimated 7,150 32-bit superminicomputers above board level. These units represent a total installed systems value of about $700 million.

Approximately $200 million of that amount has been applied directly to the procurement of superminicomputers for use in commercial office environments. Although these systems are not all performing what we have come to call OA functions, they are nevertheless widely utilized as multifunctional processors. As a result, OA functions are indeed being transferred to these systems (see Figure 1).

In the last three years, the growth rate of superminicomputer shipments has outpaced rates for several other segments of the computer industry. Figure 2 lists the total information processing revenue growth for all superminicomputer manufacturers.

The trend for superminicomputers to move into the office appears warranted for the large office environment because of two architectural design capabilities. First, the strong communications capabilities of these machines allow extensive workstation support. Second, the very fast internal bus structures offers support for graphics — a need in high-tech segments as well as in the office.

Other conditions that point up the supermini's potential in the office environment include favorable price/performance characteristics; increasingly powerful systems are available for lower prices. In addition, the large array of program languages and applications software available to end-user departments means that commercial users are less self-reliant than their high-tech counterparts; as a result, applications software availability is vital.

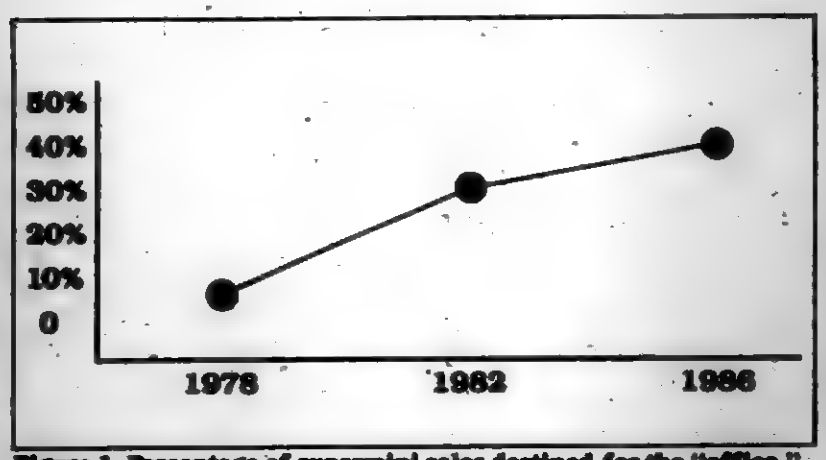


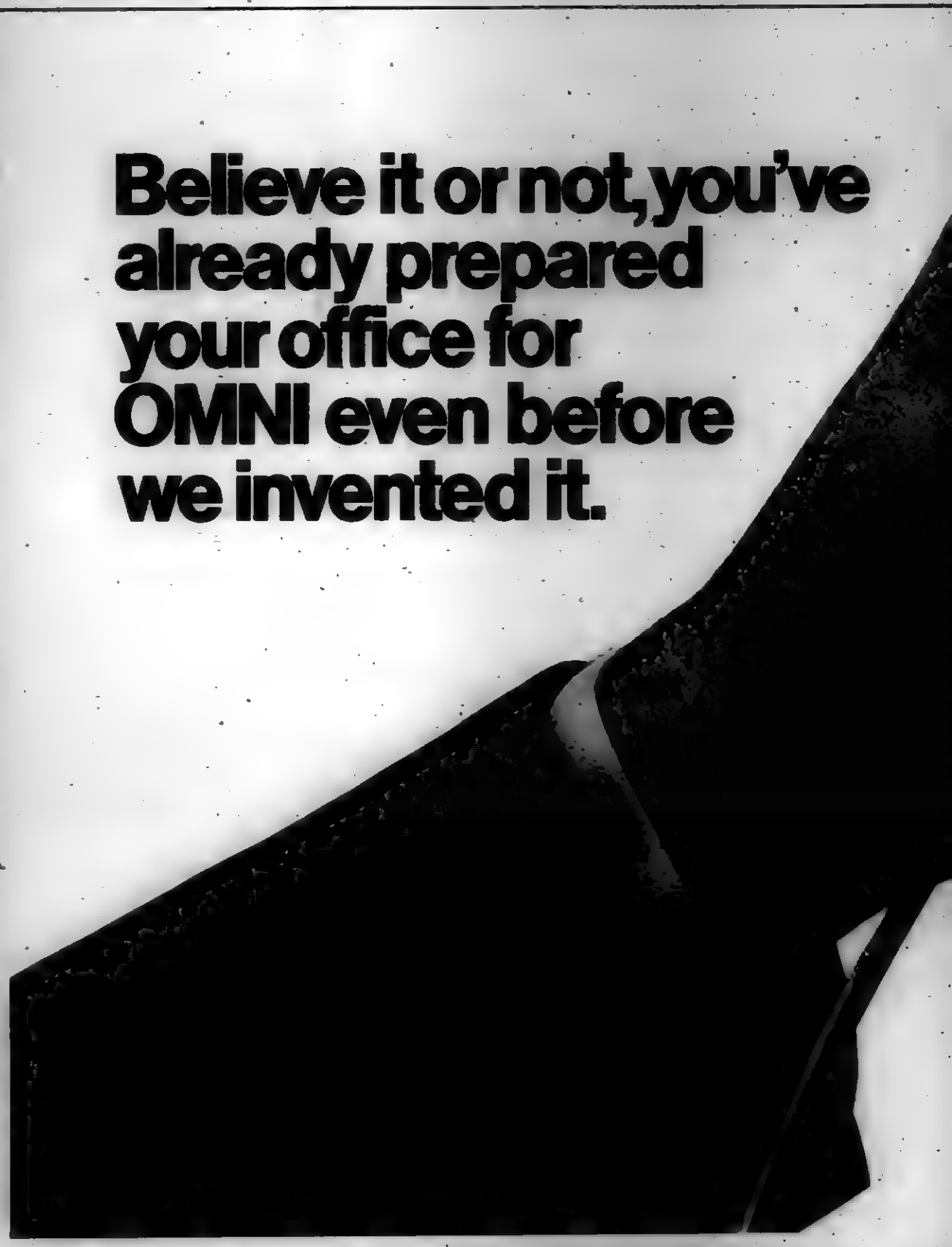
Figure 1. Percentage of supermini sales destined for the "office."

Superminis are typically designed for multiple concurrent users performing multiple activities and doing so interactively or on-line. Superminis, like their smaller mini counterparts, can successfully be installed outside the computer-room environment.

Completely incompatible superminis will be relegated to a specialized dedicated applications environment where the system is independent from the organization's other internal computing resources. Almost every superminicomputer supplier even thinking about participating in the commercial and office markets has already developed at least one IBM-compatible protocol as well as an X.25 interface.

The availability of cost-effective superminicomputers has en-

Believe it or not, you've already prepared your office for OMNI even before we invented it.



Rank by IP Revenue 1982	1981	Company	Total Revenue 1982	1981	Net Income 1982	1981	IP Revenue 1982	1981	IP Growth 81-82	80-81
1	1	Digital Equipment	3,881	3,198	417	343	3,881	3,198	21	28
2	2	Hewlett-Packard	4,264	3,579	303	306	2,186	1,771	23	17
3	3	Wang Laboratories	1,150	866	107	78	1,150	866	33	56
4	4	Data General	806	737	36	61	806	737	9	13
5	5	Prime Computer	436	305	45	28	436	365	19	30
6	6	Harris	1,719	1,582	76	104	535	500	8	20
7	8	Tandem	313	208	20	27	313	208	50	91
8	7	Perkin-Elmer	1,067	1,116	65	88	211	226	(6)	7
9	9	Gould-Sel	1,571	1,569	96	104	184	141	30	66
10	10	General Automation	99	136	(4)	0.1	99	136	(21)	(1)
11	11	Modcomp	93	87	2	1	93	87	7	7
12	13	Floating Point	87	58	12	6	87	58	50	38
13	12	Computer Automation	68	76	2	2	68	76	(11)	(9)
		TOTALS	15,883	13,844	1,261	1,142.1	9,990	8,167	18.4	26.7
		% Change From '81 to '82	15.3%		9.5%		20.6%		Average	

Excerpted from Hare's "Corporate Strategies for the U.S. Computer Industry: 1964-1983 Edition."

Figure 2. Series 4 superminis, high-performance minis revenue growth and profitability ($ millions)

abled suppliers to appeal to a broad new market comprised of users with quite sophisticated computer requirements, but less than mainframe budgets. Price is one area in which the commercial market-oriented supermini suppliers have a comparative advantage over the new and relatively expensive IBM 4361 and IBM 4381.

From 1980 to 1983, the supermini became the vehicle by which a significant amount of DDP activity was accomplished. The use of superminis is becoming prevalent in dedicated, geographically dispersed applications in which data communications — local and remote — is a key element. In fact, it may well be that the superminicomputer, and not the microcomputer, will be responsible for the erosion of some hitherto untouchable remote computing services industry processing revenues.

The impact of the recently announced IBM 4361 and 4381 processors will place additional downward pressure on superminicomputer suppliers, at least on those with an eye to gaining a share of the commercial and office marketplace.

Although not directly compatible with VAX and other superminis, IBM's 4361 and 4381 are indeed competitive with superminis in several characteristics, including memory size, instructional set size, processing speed and workstation support. If we include the 4361 and the 4381 as superminis, we could safely predict that superminis will successfully continue their penetration into additional commercial and office markets. These new IBM processors will cause the growth rates of superminis used in nontechnical environments to abate over the coming year as IBM begins volume production of 4361s and 4381s.

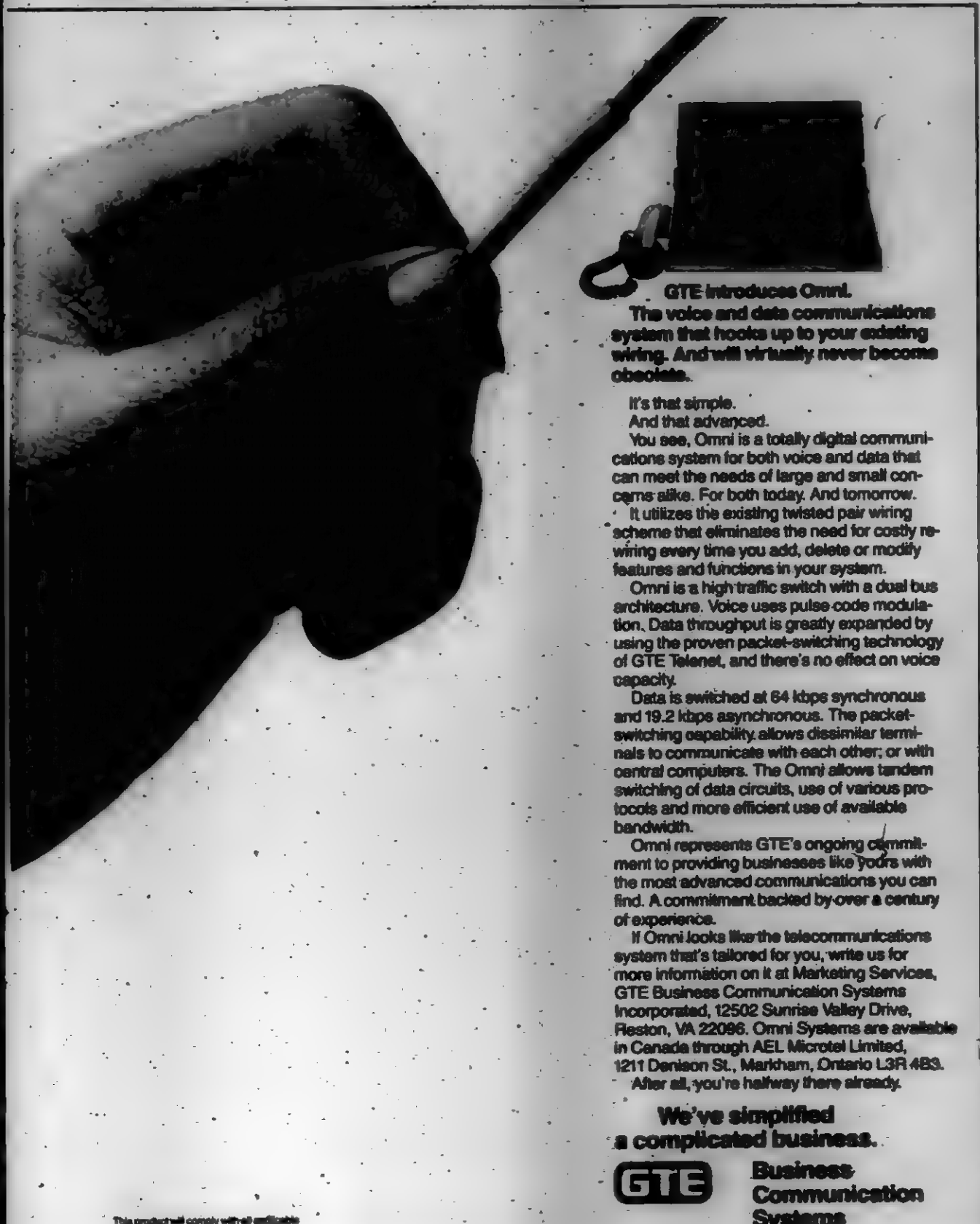
The comparatively high price range of the new 4300 series products may place them at some disadvantage in direct competition with other than top-of-the-line superminicomputers from leading suppliers.

Four of the dozen or so companies manufacturing 32-bit processors specifically positioned as superminicomputers seem especially well-prepared to participate in the office environment. These four are DEC, Data General Corp., Prime and Wang.

Some of the other superminicomputer suppliers with products positioned at medium-tech markets may also eventually become interested in the office market. Hewlett-Packard Co. would be more likely to make such a move than would Gould, Inc. or Perkin-Elmer Corp., if we base our review on the traditional sources of strength for these suppliers.

The following is a closer look at the offerings of the four key suppliers positioning their supermini offerings in the office environment.

Digital Equipment Corp: The VAX family was extended into the commercial market, if not by virtue of the VAX-11/750, then certainly by the introduction of the VAX-11/730.



GTE introduces Omni.
The voice and data communications system that hooks up to your existing wiring. And will virtually never become obsolete.

It's that simple.
And that advanced.

You see, Omni is a totally digital communications system for both voice and data that can meet the needs of large and small concerns alike. For both today. And tomorrow.

It utilizes the existing twisted pair wiring scheme that eliminates the need for costly rewiring every time you add, delete or modify features and functions in your system.

Omni is a high traffic switch with a dual bus architecture. Voice uses pulse code modulation. Data throughput is greatly expanded by using the proven packet-switching technology of GTE Telenet, and there's no effect on voice capacity.

Data is switched at 64 kbps synchronous and 19.2 kbps asynchronous. The packet-switching capability allows dissimilar terminals to communicate with each other; or with central computers. The Omni allows tandem switching of data circuits, use of various protocols and more efficient use of available bandwidth.

Omni represents GTE's ongoing commitment to providing businesses like yours with the most advanced communications you can find. A commitment backed by over a century of experience.

If Omni looks like the telecommunications system that's tailored for you, write us for more information on it at Marketing Services, GTE Business Communication Systems Incorporated, 12502 Sunrise Valley Drive, Reston, VA 22096. Omni Systems are available in Canada through AEL Microtel Limited, 1211 Denison St., Markham, Ontario L3R 4B3.

After all, you're halfway there already.

We've simplified a complicated business.

GTE Business Communication Systems

This product will comply with all applicable FCC rules prior to final delivery.

DEC's VAX-11/730 is a compact and relatively low-cost system geared to businesses (small and medium-size) as well as to the OEM community.

DEC's VAX line is an integral part of their entire OA strategy as well. The company's Office-Plus program, a mid-1980 interpretation of distributed data processing, allows personal computer users in an organization access to different data bases residing on VAX systems dispersed throughout the organization.

According to DEC, one factor inhibiting the growth of officewide or departmentwide computing was the need for small computers with large program capabilities. DEC has positioned the 11/730 as a product response to this market requirement.

Data General Corp.: DG has been an important participant in the superminicomputer marketplace since its introduction of the MV/8000 in 1980. DG's installed base (as of September 1983) of 32-bit Eclipse MV family was estimated at 1,200 units.

The Eclipse MV Series has been responsible in large part for increasing DG's presence in end-user markets. The downward extension of the Eclipse MV family in the form of the Eclipse MV/6000 and Eclipse MV/4000 has brought with it a greater level of interest in the commercial marketplace in using these 32-bit systems in commercial and office applications.

DG has stated that "The demand for 32-bit systems for administrative applications is growing rapidly and Data General has expanded and enhanced its 32-bit Eclipse MV family . . . to meet these growing needs." The company's newest 32-bit system, the Eclipse MV 4000, brings improved performance, larger memory price and cost advantages to customers. Its compact size and style are suited for office environments, according to its vendor.

DG's 1982 and 1983 advertising campaigns have used the Eclipse MV series' broad software program library to its advantage.

Prime Computer, Inc.: Prime has been the industry leader in applying 32-bit superminicomputers to the commercial and office environment since 1979.

The Prime 50 Series systems are used primarily in the business DP and computational processing markets in a wide variety of applications, including time sharing, scientific and engineering calculations, statistical analysis, computer-aided design, financial measurement and control, production and materials control, information retrieval, applications program development, OA and transaction processing.

The company has tended to picture itself as a distributed data processing market leader rather than a superminicomputer supplier. In fact, Prime has adopted a value-added, more meaningful and more directly associated set of descriptions for what it provides.

The 32-bit superminicomputer market has outpaced other industry market segments in recent years. The communications-oriented side of the industry has also done well.

Thus, to gain market advantages by providing superminibased distributed data processing (DDP) has been a strategically appropriate move. Prime, in 1979, was the first vendor to see the merit in marrying powerful minis, data communications know-how and DDP capabilities to meet the requirements of the commercial sectors of the market.

The company remained committed to DDP during 1982 and 1983 and is offering some of the industry's most complete mixed-vendor solutions to provide customers with strong gateways to the IBM world.

Prime made a special effort during 1983 to increase its presence in the office. By introducing its first line of internally developed terminal products, it is clearly on its way to establishing its name in the office environment generally and certain end-user environments specifically.

Wang Laboratories, Inc.: Wang is among the few computer industry companies that developed successful commercial market-oriented computer systems incorporating 32-bit superminicomputer technology at the high end of the range of processor offerings.

Wang's VS100 family of processors is the company's supermini entry. Positioned as the leader (or co-leader, along with IBM) in the OA market, Wang has become more competitive in its large OA systems configurations in those instances where it has proposed using the VS100 as the heart.

For large centralized OA applications, Wang has the capability in its VS100 Series to challenge Prime, DEC, DG and IBM. OA

Newton is president of Newton-Evans Research Co., Inc., Ellicott City, Md.

They offer PROFS under VM.

We offer TOSS under MVS, VS1, DOS/VS and DOS/VSE with CICS support.

Terminal Support
- 327 x CRTs.
- 327 x Printers.
- TTY.
- 3767
- PCs
- Display Writers.
- 8100/DOSF.
- 6670 and System Printer.

•••• YOUR PERSONAL MAIL BOX ••••

System Features
- Short Note Facility.
- Word Processing.
- Electronic Mail.
- Calendering.
- To Do List.
- Document Filing
- User Directory
- User Friendly Interface.

Proven System Performance
Over 5000 Users Spent 15% of a Single 3081-K CPU.

National Business Systems, Inc.

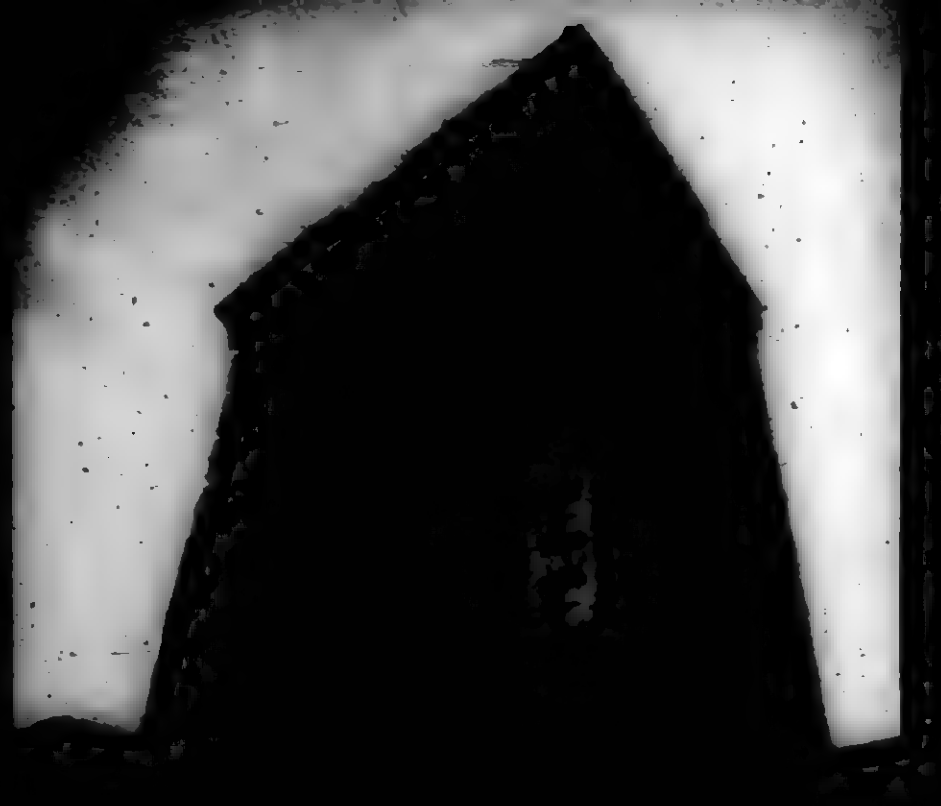
30 Tower Lane, Avon Park South, Avon, CT 06001 Tel: 203-677-8396
• In England, Shubrooks Design, Ltd. Nr. Chertsey, Surrey Tel: 9-328-66812
• In Israel, IBS, Ltd. Herzeliya, Pituoch Tel: 052-70364

GETTING STARTED

Automating the office sounds like it should be, well, automatic. In reality, successfully implementing change is one of the most difficult stumbling blocks to office automation, as many organizations are finding out. This first Focus section of 1984 addresses many of the problems involved in OA implementation — hiring, training, vendor selection and change management.

Hiring the Right People 31
Selling the Idea 35
Multivendor Selection 41
Orchestrating Change 47
The Training Process 49

All photographs in this section © 1984 by Ed Braverman. Computerworld OA expresses its appreciation to the Boston Celtics organization for its cooperation.



1893. Architects discover up is better than out.

The proposition is easy enough to grasp. When space is at a premium, build skyward.

That's why Wright Line designed its PC WorkCenter to take up more vertical space and less horizontal. Let's face it, few offices embracing personal computers today were designed to accommodate an additional piece of substantial furniture.

Designed particularly for IBM Personal Computer Systems, our PC WorkCenter takes as little as 18″ × 24″ of floor space. Believe it or not, that's less space than your average office chair takes.

Our vertical ergonomic design provides for more efficient and convenient access to all computer components. The unit's storage capacity accommodates software manuals, diskettes and supplies, so every thing you need is all in one place. There's virtually no disruption to your normal work habitat.

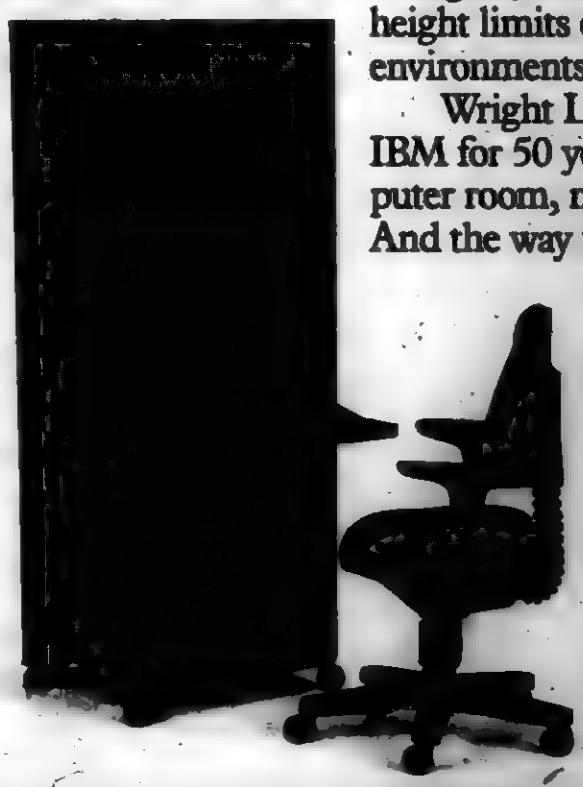
As for security, just roll down the locking tambour door for overnight protection against theft and unauthorized use.

1984. IBM PC users discover up is better than out.

An internal cable management system protects against wire damage while leaving nothing underfoot. The master switch with circuit breaker allows you to activate the whole system with just the flick of a switch. And locking casters are ready to roll in seconds for shared use in other offices.

The PC WorkCenter is available in 50″ and 63″ heights, both well within acceptable height limits of contemporary office environments.

Wright Line has been supporting IBM for 50 years. First in the computer room, now throughout the office. And the way things are going, the sky's the limit.



For more information on our PC WorkCenter or for a complete catalog of PC support products, contact Wright Line, 160 Gold Star Blvd., Worcester, MA 01606.

Wright Line
A UNIT OF BARRY WRIGHT

HIRING THE RIGHT PEOPLE

By Glenn Rifkin

Before an organization can worry about the lightning-quick changes in office technology, it must confront the more pressing need of forming a competent OA team. As consultants, personnel agencies and information systems managers are discovering, that is akin to hunting for unicorns: the species simply doesn't exist.

The reason for the scarcity of polished OA professionals is simple: Office automation, although widely discussed, is a relatively new phenomenon and not enough time has yet elapsed for a large pool of OA specialists to develop. Large organizations in the forefront of automation often train people in-house to manage and staff their OA programs. After training and experience, those professionals become

hot properties with headhunters and rival organizations seeking skills that can be acquired only through hands-on experience.

Because the pool of talent is so small, OA managers have encountered endless frustration while attempting to hire from outside their corporations. In-house searches, often focused in the management information systems (MIS) or DP departments, have not produced much better results. Managers are finding that a DP background for an OA job is often a less-than-perfect match.

"Finding competent people to manage emerging functions such as office automation has been difficult and always will be," stated Tim O'Leary, manager of office systems field operations for ITT Corp. "We've been in a hiring mode, off and on, since February 1982, and it's extremely tough to find competent people."

John Hart, manager of office systems at Avon Products, Inc., agreed. "The resumes I'm getting are long but light, and there's not much broad experience out there. From the resume, they might seem top notch, but when you get them in and ask a few basic questions, you realize there's a lot of overselling going on."

Though each company has specific needs when it comes to office automation personnel, OA managers and consultants tend to agree on the perfect candidate. Technical background with a good working knowledge of a wide variety of office-related technologies is highly desirable.

But, the experts noted, a more important qualification is the ability to communicate and interact with the end user. Interpersonal as well as analytical skills are the keys to a successful career in OA management.

Although a few professionals do fit the description, many of these new-wave specialists have found more lucrative rewards in sales or consulting.

Karen Orton, president of National Training Systems, Inc. of Santa Monica, Calif., pointed out that since the technology is evolving so quickly, each organization will need very specific solutions to its OA needs. That will preclude any standard solutions in hiring. "There are no rules and no courses to take," she said. "It really takes a desire to learn while doing."

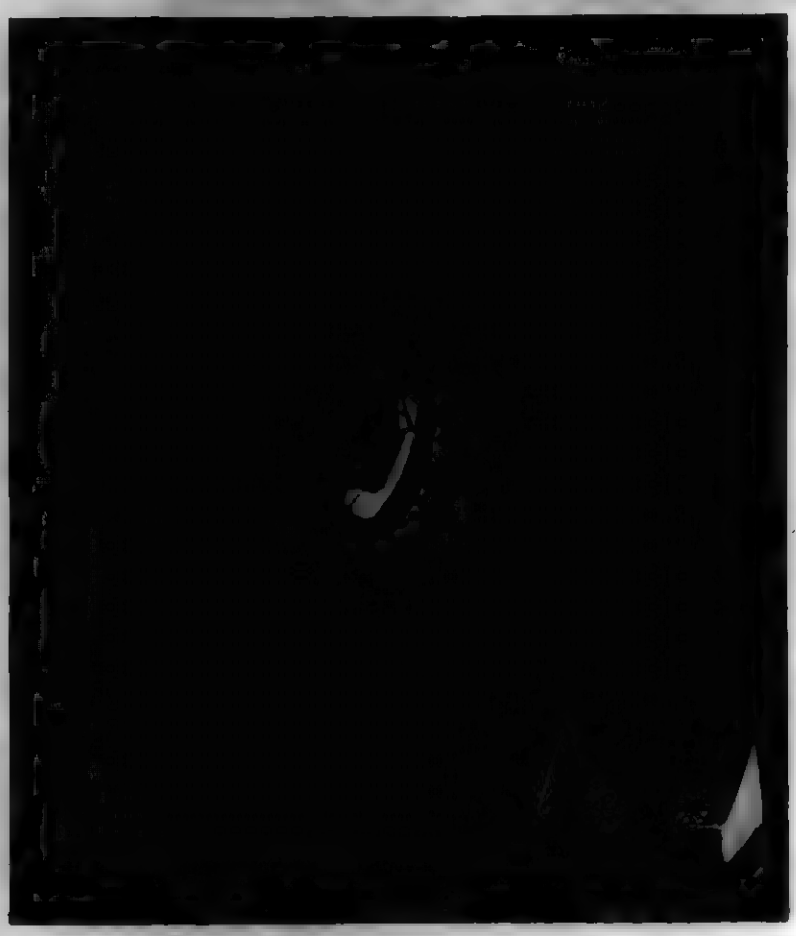
Of course, before a company can worry about an OA staff, it has to find a manager to organize and oversee that staff. Larger corporations, already heavily involved with OA, have solved the problem usually by looking within the MIS department for a senior-level person with an established relationship with top management. For organizations just getting started, the recommended approach is also to look in-house rather than outside. Some consultants believe that a strong manager is enough.

"If you can find the manager, you can solve the other problems," said Anne Mayfield, consultant for Arthur D. Little, Inc.

It is more practical to look within, the consultants said, not only because there are limited resources in the field, but also because a thorough knowledge of the business of the company is essential. David Dell, director of research services for the Diebold Group, Inc., said he does not see many efforts to recruit from outside. "You need good managers with credibility with top management. It would be unlikely to have some hotshot MBA with limited technical training come in and tell management to spend $30 million on office equipment."

The manager overseeing office automation does need greater business skills than technical

A SMART PHONE SYSTEM SHOULDN'T MAKE YOU FEEL DUMB.



With most smart phones, the only way you can access advanced features is through complicated calling codes.

With Focus ET, you just push a button.

Because Focus gives you five fixed buttons and 18 programmable buttons to work with. The five fixed buttons are pre-set for convenience functions like hold, flash, microphone on/off, speaker on/off, and call transfer. The other buttons can be programmed individually. For example, you can push one button and transfer all calls directed to your station over to another station within your network. Push another button to reach a busy station or outside line without redialing. Page hard-to-find people. Dial automatically. And more. Plus, Focus ET gives you one-button access to multiple business and private lines.

To make your calling even easier, all 23 buttons are labeled in plain English. So you don't have to look up instructions or secret operating codes to find the feature you want.

Our smart phone comes in two models: The Focus ET I, with all the advanced features mentioned above, and the Focus ET II with the same features, plus a 40-character LCD display. The display clears the clutter of message slips by recording the names and numbers of callers directly on your phone. The messages can't be misplaced or mistaken for trash. And only you can forget them.

Our Focus ET is the smart phone for smart business people. So next time you're looking for an important message or operating instruction, stop. And look up American Telecom at 3190 Mira Loma Avenue, Anaheim, CA 92806, (714) 630-7721, TX 685571.

American Telecom Inc.

skills, according to Mayfield. The issues tend to be management, not technical. To sell the corporate brass on a system, the OA manager has to be capable of communicating bottom-line benefits, not just bits and bytes. Increasingly, the OA manager's resume shows a liberal arts, not a technical, background.

While agreeing that a strong leader is vital, Randy Goldfield, president of the Omni Group in New York, is wary of entrusting too much power to an individual. The danger is that if the company makes OA a one-man band, it will lose that person to another outfit. The field is "very hot," she said.

Frank Goldschmidt, placement manager with Robert Half Associates, a Boston placement agency in the computer field, agreed, saying that "1984 will be a very strong year for OA in my business." He pointed out, however, that the positions most requested will be analysts, staff consultants and trainers rather than managers. Managers are likely to be in place within the organization already.

There are exceptions. At the Bank of New England in Boston, Stephen Dale, vice-president of productivity services, said he found a manager from outside the organization who had the perfect combination of experience to run the office systems group. She had eight years in a mainframe environment, but also had excellent communication skills. In addition, her knowledge of the OA environment allows her to forecast two to three years down the road.

Of the nine staff members in Bank of New England's OA group, half were hired from outside the company; the others were moved from the bank's DP systems area. "Good leaders tend to clone themselves in the people they hire," Dale said. "But finding that good leader takes a lot of luck."

Though the logical spawning ground for potential OA staffers would seem to be the DP department — to which OA usually reports — there are many pitfalls to recruiting from that traditional mainframe bastion.

"MIS is an obvious source of talent," Goldfield said. "They have the technical expertise and know the systems, but their score with end users is very low."

The profile of a DP person is very different from an that of an OA staffer, according to O'Leary, who said that if there has been crossover from DP into OA, those people were probably "renegades."

"The office systems person has to say, 'How can we make the technology work for the user?' Users are much more computer-literate than before, and you can't give them the old mumbo-jumbo about a task's being too difficult. They are driving the applications, and they know the jargon and what they want. You can't get away with the traditional DP practice of telling people you are protecting them

"Users are much more computer-literate than before, and you can't give them the old mumbo-jumbo. You can't get away with the traditional DP practice of telling them you're protecting them from something. Now they know you're preventing them from access to their data."

from something. Now they know you are preventing them from access to their data," O'Leary said.

Although not all DP staff members will be able to make the transition, some viable candidates will be found within DP, according to Mayfield, from Arthur D. Little. She estimated that about 20% of the DP staff could be molded to fit the OA profile.

Outside DP, organizations have found considerable success within the word processing departments in the search for OA candidates. Because WP was, in many cases, a company's entry into OA, it is a natural progression for WP managers to move into the expanded technologies.

At Kaiser Aluminum and Chemical Corp. in Oakland, Calif., the WP supervisor became the office systems planning manager when centralized word processing was eliminated three years ago. According to David Geary, assistant director of corporate information systems, all four members of Kaiser's OA staff were members of the WP group. Each broadened his role by becoming a trainer of other technologies and by helping others. It wasn't, however, an easy transition.

"Because of their backgrounds, it has been difficult," Geary said. "There are problems in understanding data communications and also in getting the word out to the user community. There is no easy answer."

At ITT, O'Leary has seen several former WP specialists make the move into OA. He said, however, that because that skill represents only one aspect of OA, the WP background runs out of usefulness very quickly, especially when a senior-level person is needed.

Another natural resource, according to Mayfield, is from the secretarial ranks. Secretaries tend to understand the needs of the end user in the office and will usually be among the first to interact with any new technologies brought into an organization. Former secretaries also tend to understand the fear and anxiety end users feel when confronted with new technology.

Unfortunately, secretaries often don't have the technical or systems analysis background, Mayfield pointed out, and it is very difficult in many organizations for secretaries to move out of their slots into management.

It is clear, though, that companies forced to look in-house for OA staff are expanding their horizons far beyond MIS. Administrative departments of all disciplines are becoming resource centers for OA staffers. A liberal arts background rather than computer science training is becoming the preferred profile. Seeking professionals with good communications and writing skills as well as strong interpersonal capabilities has become the priority.

"You can take someone without a technical background and get them up to speed pretty quickly as long as they have the desire," declared Dale of Bank of New England.

At Avon, where the OA implementation is in a more advanced stage, Hart is seeing a change in the type of person interested in OA: a move from the technology-oriented type to more people-oriented applicants. "Technology is not the driving force anymore," he said.

Corporations are generally unwilling to discuss OA salaries, but Goldschmidt of Robert Half Associates pointed out that the salary range "varies all over the lot." Aside from managers, whose salary level would depend on any number of factors, OA staff positions for analysts, consultants and trainers would range from a low of around $20,000 for an entry-level post, to the low to mid-$30,000 level for more senior positions, he said.

Those who, despite the difficulties, seek to hire from outside the corporation are uncovering both expected and unexpected resources. The vendors themselves provide fertile territory, as do distributors and consulting organizations. Former teachers, unable to find work in education, are turning to OA in large numbers and organizations are finding the teaching skills an invaluable asset.

"We just hired a former English teacher with 16 years experience at a private school," related Dale. "He was tired of the education field and he is really motivated and driven. He's a little low on the technical side, but he has the good communication skills of a teacher."

With backgrounds such as teaching, in-house training is a must. Though many organizations have neither the time nor the money to invest in extensive retraining, industry analysts believe training will become a major concentration for OA departments.

At the Continental Bank in Chicago, an acknowledged frontrunner in OA implementation, bank policy prohibits the hiring of experienced personnel for any accounting or systems jobs. Instead, the bank seeks out recent college graduates who immediately enroll in a 15-week training program within the bank. The trainees are not brought in for a specific position; various related departments recruit them after they are in the program.

Ed Wundrum, manager of Continental's OA marketing group, pointed out that because the bank is in the advanced stages of OA, the staffers need to be even more sophisticated. He looks for people who are independent in nature, with a grasp for analytical work. They need, he said, the interpersonal skills to work with everyone from the clerical level up to senior vice-presidents.

In fact, two separate OA groups exist within Continental. The marketing group is responsible for applying technologies to solving business problems for the bank's 12,000 employees. The second group, composed of product managers, is mandated to upgrade the bank's current OA product line with new technologies. Both groups have drawn from the bank's training program and its supply of both computer science and liberal arts graduates.

According to Goldfield of the Omni Group, the OA groups in most organizations will evolve in two directions, in much the same way Continental has. She foresees the need for both strategic planners who know the technology and operations people who will manage implementation and use on a regular basis.

"Both these groups are hard to staff," she stated, "since office automation is just getting started and no one has done all of it as yet."

Dell of Diebold agreed and said the difficulty in finding quality applicants will keep the core OA staff small for quite a while. He predicted that OA will grow into more of a disciplined management function and less of an entrepreneurial activity and that the end users themselves will pick up the slack for the OA department.

"The core group will probably stick with design and implementation and leave the grunt work to the end users," he said.

Ironically, it is the end user who brings optimism to the bleak OA hiring picture. In many organizations, users are ingesting so much knowledge about the technology they need that they are often more well-versed than the office systems staff.

With the end user as the catalyst, solutions to the OA hiring mystery will undoubtedly be found.

"The changes will happen," Mayfield added. "OA is a huge growth industry and there is great opportunity in it." OA

Rifkin is Computerworld OA's senior writer.

"Before Soft-Switch," that is."

"It used to be difficult to share information at our company because our office equipment comes from different vendors. Consequently, when we needed a finished document, all of the information had to be re-keyed for the word processors.

"Not any more. Soft-Switch lets us exchange all of that information intact, with no document clean-up.

"Soft-Switch is a Document Control System from ITI, and it runs on our IBM mainframe. It permits documents created on one type of equipment to be used by other devices, regardless of the vendor (word processors, personal computers, printers, etc.).

"Soft-Switch gives us extensive edit level translation capabilities. It stores documents in libraries on the mainframe—no more hunting for diskettes for last year's reports. And routing is simple and efficient. Whether the document goes to storage at the mainframe, or to a device across the hall, or to 25 branch offices around the country, Soft-Switch requires just one command. Conveniently, the recipient gets the document directly from the mainframe. This is especially useful when you route across time zones.

"It's simple to install and doesn't need much maintenance. The staff likes it because it's easy to use, requires very little training, and just about eliminates document back-up.

"Soft-Switch supports both MVS and VM/CMS operating systems, and it's the first Document Control System that's fully compatible with IBM's DIA/DCA.

"Soft-Switch is available for most major OA equipment. And if you don't have a mainframe, you can still use Soft-Switch by time-sharing through CSPnetwork Corporation.

"For years you've been hearing about 'integrated' offices. Well, now you really can integrate what you want, when you want—with Soft-Switch. Check it out. Call ITI."

iti Integrated Technologies, Inc.
...an Intergraph Technologies

200 North Warner Road
King of Prussia, PA 19406
(215) 768-8330 • TELEX: 466800

MULTIVENDOR SELECTION

By William H. Allen Jr.

Several types of relationships are possible between a user and a vendor. Obviously, different relationships need different management responses. Although generalized, three types of vendors can be readily identified:

- The vendor that tries to become involved in customers' planning activities and to influence the direction to be taken.
- The vendor that prefers to take orders and ship products.
- The vendor that has a monopoly and is slow to respond.

These generalizations offer scenarios from which a plan can be devised.

The involved vendor — Initially, the involved vendor

sounds contemporary, interested and aggressive.

This description suggests a vendor organization with which everyone would like to work, but this may not be the case. All too often, problems are identified in the context of the vendors' products. This situation is automatically contrary to the philosophy of allowing multiple vendors to compete for business.

The criteria for selecting products are performance, price and support. Vendor involvement may be important in some instances, but in actuality the vendor's products are hardware and services, not planning and consultation.

The uninvolved vendor — The uninvolved vendor takes orders, delivers the product and presents an invoice. Although this type of vendor avoids involvement or interference in the customers' direction, this can present problems, too.

At one time, companies could depend on the vendors to recommend how specific products could be used. Recently, especially with respect to some smaller ticket items (for example, modems), members of the vendor's sales staff have appeared limited in their ability to compute costs and take the order. As a result, the office staff must be able to properly evaluate and configure the necessary equipment.

The vendors can transfer to the customers the cost of technical sales review and planning and, in some cases, installation. With an uninvolved vendor, a product without the desired capabilities may be mistakenly ordered because the salesperson is merely an order taker. The salesperson neither takes the time to study the organization's needs nor has the technical background to catch the error. This situation has a hidden cost.

Some smaller vendor companies do have lower prices, but they may also have little expertise available in their company to help their customers arrive at proven technical solutions.

The monopolistic vendor — The monopolistic vendor, a vendor that is the sole provider of a particular service needed by the company, is often the most difficult to manage. The difficulties encountered when dealing with this type of vendor include grappling with a large bureaucracy and sometimes trying in vain to secure an enthusiastic response whenever a problem arises.

Escalation of the problem is usually the only avenue of relief available. In this instance, the business cannot be switched to another vendor; therefore, the threat of that action does little to stimulate vendor activity. The best method of working with this type of vendor organization is to learn how it conducts business and who of its management personnel will help when a problem occurs.

Price, performance and support are important criteria for the office management staff to evaluate during the selection process. In the multivendor environment, operational problems may be reduced significantly if the criteria are expanded to include compatibility with other vendors and products; this refers not only to plug compatibility, but also to support compatibility.

Some vendors with very good products have rigid rules about interfacing with other vendors' products. Some may have problem-identification procedures that do not work well when their products interface with other vendors' products. Office management may have to decide whether to exclude these vendors or to use their products exclusively. Only an astute manager

Paper Processing Magic!

There's a breakthrough in word processing productivity that you should know about.

It's called the Intelligent Paper Processor by Ziyad.

It selects paper (or envelopes) and inserts it into a printer automatically.

Aligns paper, removes it and collates it.

Remembers names and addresses as originally typed, then addresses envelopes automatically, collating them with multi-page letters, in proper sequence ready for signing.

Adjusts margins automatically for different sizes of paper – letterhead, bond or envelopes.

Handles footnotes, page numbers, headers, subscripts and superscripts easily.

It warns the operator when paper runs out so you never have to print on the platen again.

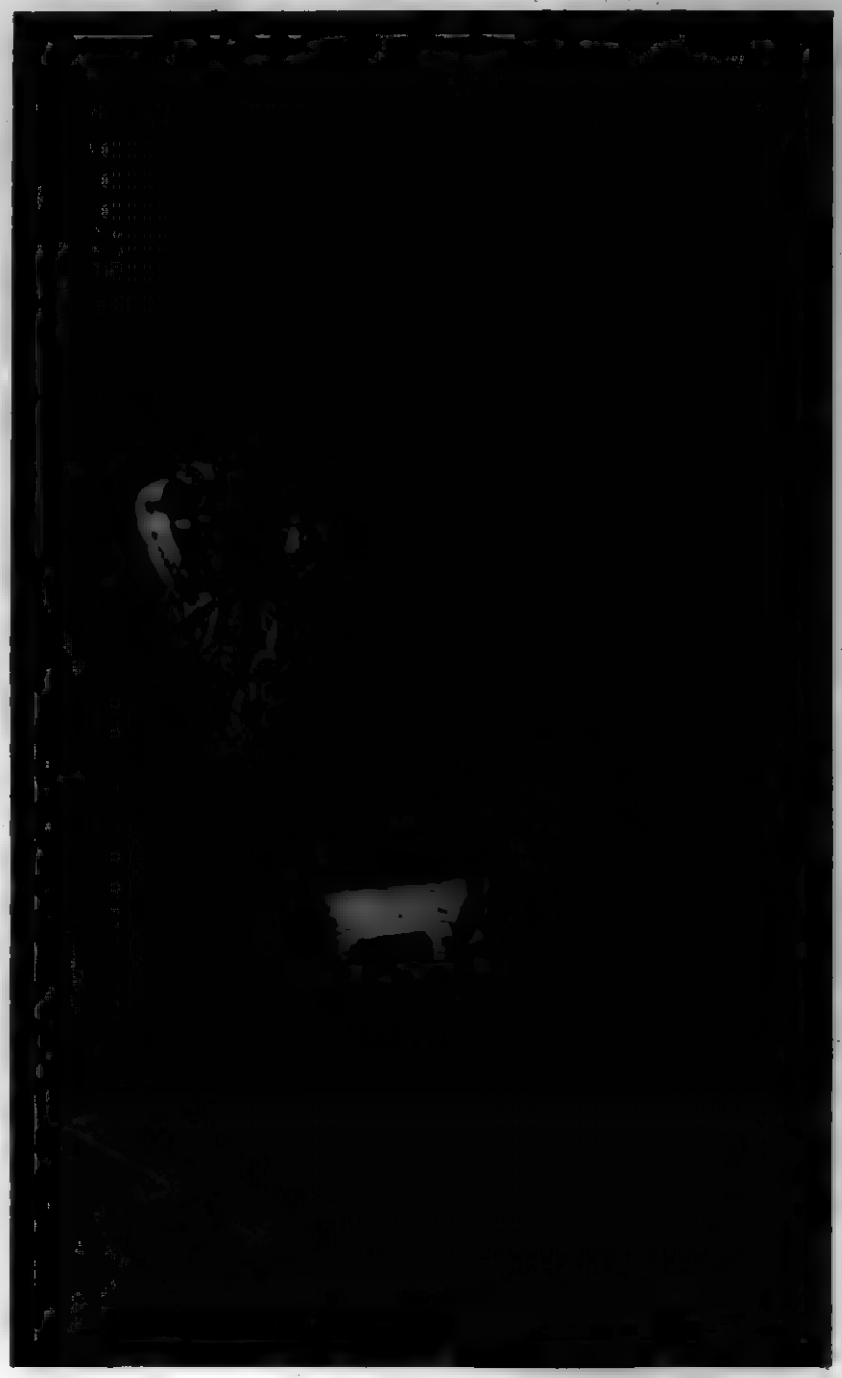
It can save an operator at least an hour a day of tedious, manual paper-handling.

It is so cost effective, it wins management support readily. It can pay for itself in one year.

The world's best word processor companies offer the Intelligent Paper Processor as part of *their* systems, with *their* names on it.

Does a system that can do all this seem like magic? Not at all!

It is the one-of-a-kind, down-to-earth, businesslike, practical step toward increased word processing productivity.



The Intelligent Paper Processor™ by ZIYAD®

For more information and the names of those companies that feature The Intelligent Paper Processor, write or call: Ziyad, Inc., 100 Ford Road, Denville, N.J. 07834 (201) 627-7600. Ask for Kim Turner.

can know which is most advantageous.

Some vendors may not accept nonstandard agreements. Vendors that will not modify their agreements can afford to take such a stand because their business volume is not significantly affected by the loss of a sale or two.

Such vendors are not necessarily small companies that are flexible in order to obtain business, nor does willingness to sign a nonstandard agreement indicate the vendor or its products are inferior. Most companies that accept such agreements have fine products, but simply ventured into the market years ago with this contracting flexibility and have been unable to change their stance.

A nonstandard agreement can be a significant advantage for the customer or can at least counter the vendor's advantage. Therefore, office management should consider this possibility during the evaluation phase.

A new dimension to the already difficult problem of managing the multivendor environment has emerged recently. Because of electronic office networks and distributed processing, office management now faces the task of coordinating multiple vendors in multiple locations. Although purchasing is typically handled in the central location, a great deal of vendor contact occurs at the remote sites, especially with vendor repair and maintenance personnel. Contract enforcement is particularly a problem.

Vendors may do a poor job of communicating with their personnel in cities outside the one in which the sale was made. Sales people stress the size of their maintenance organizations and their organizational structure, which suggest good communications and control of each problem. Almost invariably, however, the first repair person to show up at a new remote location reveals little knowledge about the operation and a lack of even the most cursory briefing.

There are other problems as well. Often, because the remote site is small, repair personnel treat it as though it were less important than headquarters in that city. Repair personnel may be in awe of large installations and may not appreciate that even though a node may have a small hardware configuration, each node in a network is important.

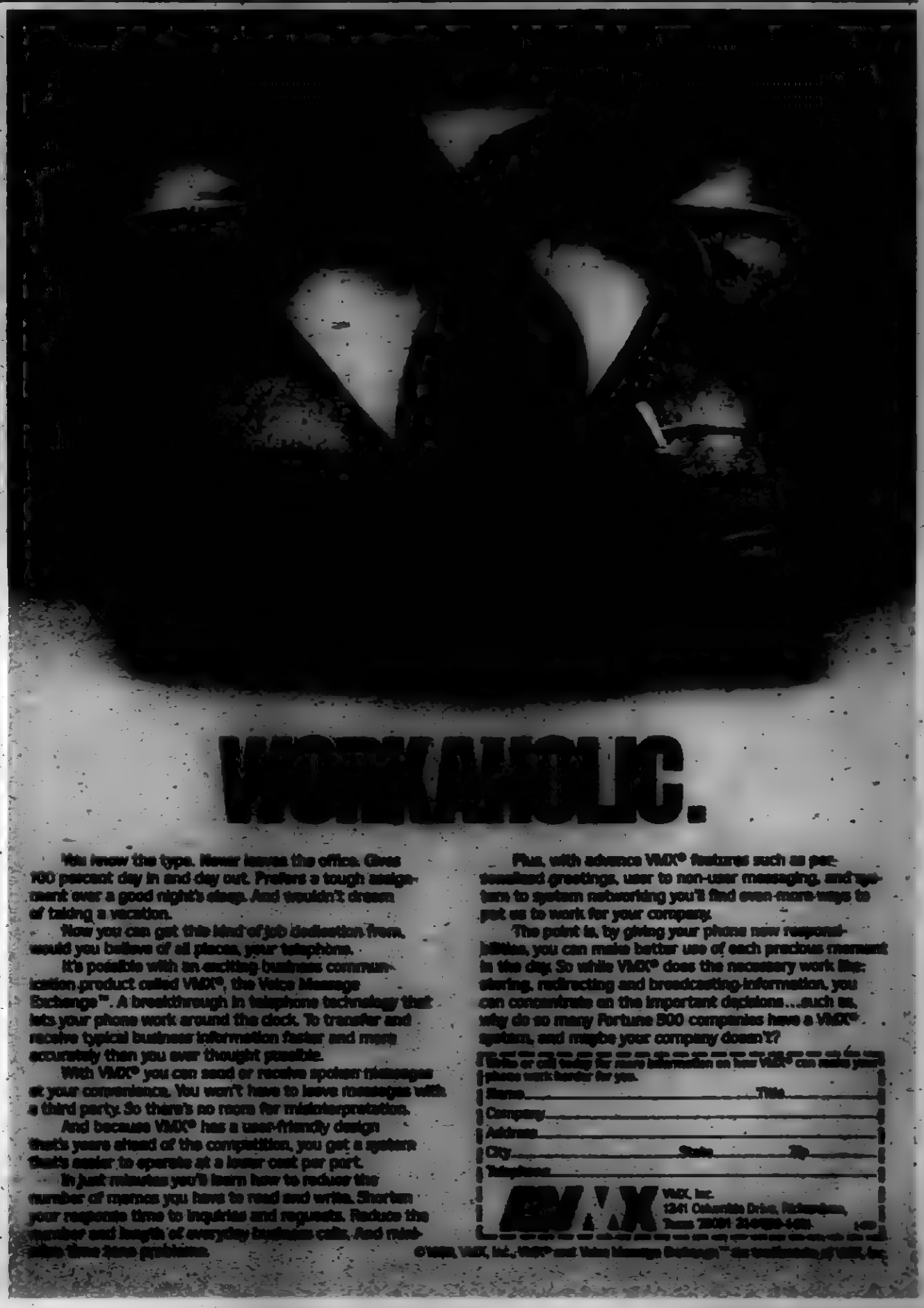
In very small cities within the network, spare parts and repair personnel are not available and must come from the closest large city, thus increasing downtime and maintenance cost.

The manager's efforts in these situations focus on contract enforcement:

A nonstandard agreement can be a significant advantage for the customer or can at least counter the vendor's advantage.

The manager seeks no extra services, but attempts to secure the minimum acceptable service. Two simultaneous avenues can be followed to achieve this result. The first is that the salesperson's responsibilities should not be ignored. As much pressure as possible should be placed on the sales group to communicate a description of the network to every office supporting the network.

The group should also emphasize to its repair and maintenance management that the customer is



Present shock.

The installers have left.

Your fully integrated multi-user word processing system is ready to go.

What's that? A couple of operators called in sick?

Now, what?

Suggestion: Call Manpower Temporary Services.

To provide the word processing operators needed in today's automated offices, we're training people daily. In Manpower offices on popular makes of word processors using our own Skillware® — instructional diskettes developed by and for word processing operators.

We've also introduced a series of machine specific operator support manuals that enable our temporaries to operate your word processors with more ease and confidence.

And we've designed innovative methods for identifying and verifying word processing skills of experienced operators so we can match the right temporary to each assignment.

For these shock absorbing reasons, call us whenever you need effective word processing operators to maintain productivity.

MANPOWER®
TEMPORARY SERVICES

demanding better service. The office manager should emphasize to the sales group that this problem must be escalated within its company and not be confined to the local level and that some evidence of its management's awareness of the problem must be forthcoming.

The second avenue consists of office managers making themselves known in as many remote locations as possible. On business trips to those cities, the manager should take the time to make calls in that location on the vendor personnel who will directly service the account. The manager should also meet vendor management. To improve personal relations, the remote site supervisor or a key network user should also meet occasionally with the vendor in that city. The vendor branch office must not be allowed to regard the remote site as merely another account number.

The best advice available on the subject of contract enforcement is to be prepared to pressure the vendor before an agreement is signed. In this situation, the nonstandard agreement is most beneficial; it can be written to strengthen the office manager's position with respect to contract enforcement.

For the most part, vendors do meet their responsibilities. They will not, of course, give anything away, and they may cut corners occasionally. They tend to provide their most responsive service to their biggest customers or to customers with pending plans for expansion. The agreement therefore becomes vitally important if the office manager is not among these customers. The agreement must state explicitly a level of service that defines the vendor's responsibilities. If the agreement is properly written, the manager must enforce it on every occasion in which the vendor does not comply. Otherwise, permitting the vendor to slip on occasion could become a precedent for future service levels.

Some costs involved in the management of multiple vendors in multiple locations are hidden. For example, vendors sometimes provide less service, which means more downtime. In addition, long-distance telephone and travel expenses are necessary to perform contract enforcement. Another hidden cost is that problems handled over the telephone take more time to solve and consume more staff and management time per problem.

In its long-range plans, office management must anticipate how vendor support will change and how this change will affect plans and budgets. Perhaps the biggest change in computer-based industry will occur in the relationship between vendors and their customers — a change in both roles and attitudes.

In the past, customers relied heavily on their vendors; for the most part, the vendor's support came with the product. One major change — unbundling — has already occurred. In the future, customers are likely to take on more problem-solving responsibilities. This idea is supported by the increased availability and sales of telecommunications and other testing and monitoring equipment and by the increased demand for people with specialized technical skills — equipment and personnel with capabilities once found only in vendors' operations.

When forecasting and planning, office management must anticipate the possibility that vendors will continue to withdraw support and service in order to maximize their profit picture. This action could pose serious problems to small operations.

The standard business practices of tomorrow will possibly resemble current OEM business practices. In the near future, customers may provide all but the most difficult portions of their own preventive maintenance and install a large percentage of their equipment.

The practice of employing multiple vendors will continue to grow despite the difficult managerial, technical and administrative problems. The economics are tempting to both vendor and customer. Because vendors are divesting themselves of providing full support, office management groups need to become correspondingly stronger. This strength will eventually help companies take full advantage of the multivendor environment.

When forecasting and planning, office management must anticipate the possibility that vendors will continue to withdraw support and services in order to maximize their profit picture. This action could pose serious problems to small operations. To some degree, such operations are prevented from taking full advantage of the market because they do not have the strong technical staff required for entering the multivendor environment.

Office management can consider whether implementation of the following steps would better organize their multivendor-environment management effort:

- Reorganize portions of the office management group around the vendors that supply the goods and services. This reorganization should take management, technicians and administration into consideration. For example, appoint a specific group responsible for telecommunications.
- Establish written guidelines for controlling the environment, including guidelines for vendor contact, rules for problem escalation and procedures for administrative authorizations.
- Implement a system support program that will work in the multivendor environment.
- Encourage management, technical and administrative personnel to spend time developing credibility and personal rapport with vendor counterparts.
- Teach executive management about the costs of both personnel and tools needed to achieve possible savings from the multivendor environment. This is a difficult management task.
- Monitor and review procedures and continually make enhancements to guarantee that the desired approach is being followed. Don't assume that a solved problem remains solved.
- Involve the company's internal auditor, who might suggest procedures for dealing with vendors that protect the company and the office manager and ensure fair treatment of all vendors. The office manager must be aware that a staff member possibly could be influenced by something other than a vendor's product.
- Small office management groups that want to take advantage of the multivendor environment, but cannot afford the full-time technical staff might turn to the management information systems (MIS) staff or a large, neighboring data center in another company for help. There, the smaller organization might pay an hourly rate for technical help, as needed. This idea also appeals to the manager of the MIS operation or the other company because it defrays some of the cost of the large staff.

The approach an office manager must follow in managing the multivendor environment — defined by guidelines, procedures and rules — should be written and effectively communicated. A baseline should be developed for each logical segment of the operation. Problems and deviations must be recognized quickly and communicated effectively to the vendors. A deliberate attempt should be made to improve and maintain rapport, which should not be left to chance. No section manager or supervisor should have the option to manage vendor relationships in his own style; the style to be used is the one developed by the office manager.

One must anticipate that problem solving in the multivendor environment will typically take longer than in the single vendor environment. To keep downtime to an acceptable minimum, the office management staff needs to identify problems and responsibilities quickly. After a chain of vendors is contacted and scheduled to work on a problem, downtime lengthens. Because the vendors cannot be made to work more quickly, the office management staff must make up the difference. This is why test and diagnostic equipment is so important.

Cost savings is usually the prime benefit cited for employing multiple vendors, but the ideas that these vendors bring to operations should not be discounted. New approaches to problem solving, the competition and the industry's expansion are contributions that grow out of the multivendor environment. ◊ OA

Allen is vice-president of Jacobs Engineering in Pasadena, Calif.

This article is excerpted from The Electronic Office: Management and Technology, copyright © 1983, *published by Auerbach Publishers, Inc., Pennsauken, N.J.*

Teach your IBM or Wang to read.

Or your CPT, Exxon, Lanier, NBI or Xerox. The compact Dest WordLess Station™ lets you enter typewritten pages of different typestyles into your word processor automatically without using the keyboard.

For immediate information and the name of your nearest dealer call Mary Thorpe at (800) 538-7582. In Calif.

DEST

My word processor is a _____

NAME _____

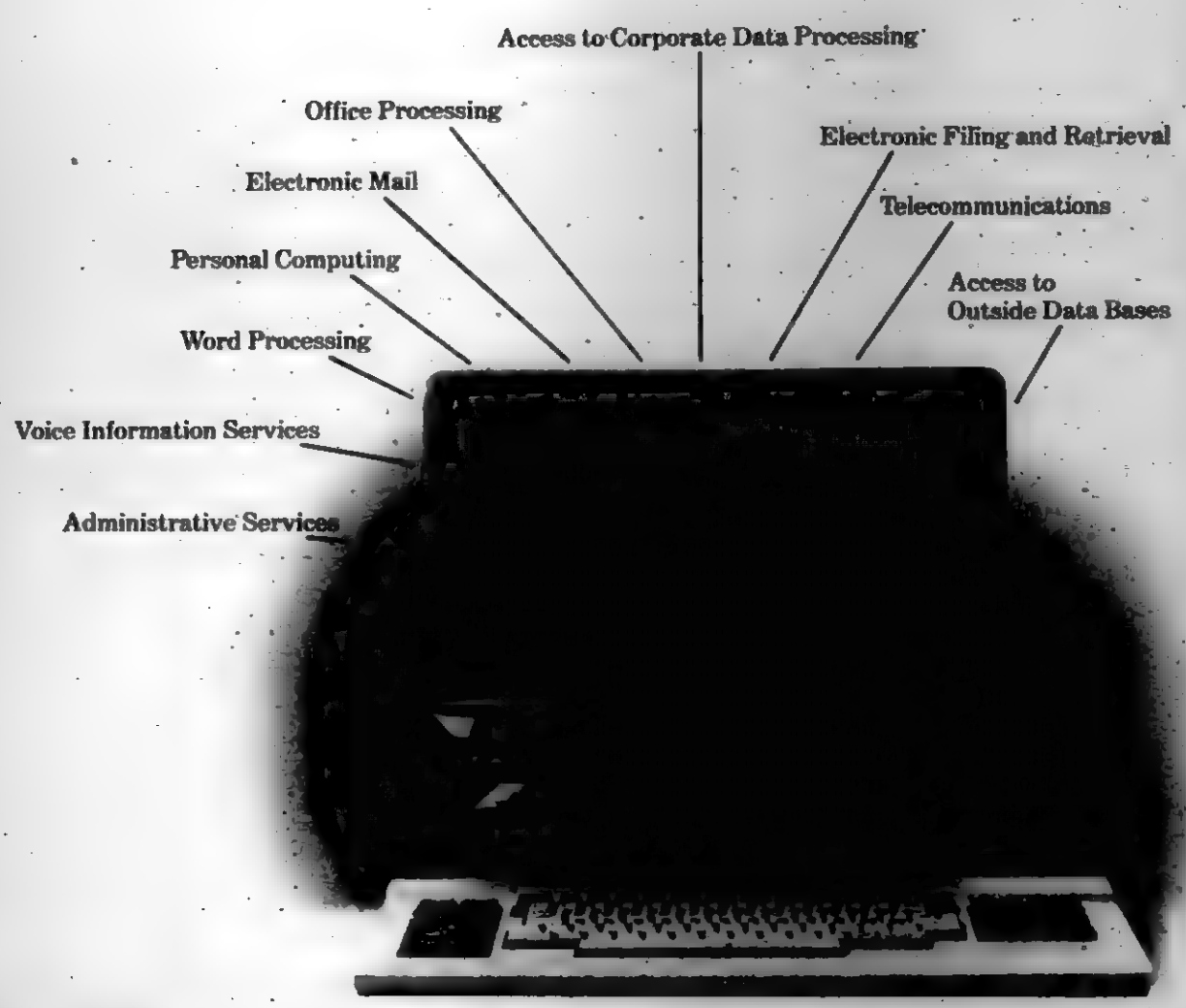
COMPANY _____

ADDRESS _____

CITY _____

OA

SPERRYLINK™
OFFICE SYSTEM



Just about the only thing it won't do is brew your morning coffee.

SPERRYLINK. The one piece of equipment that can handle all your office automation needs.

It ties into the central computer for mainframe information and mainframe support.

It's a data processor when you need to handle data, a word processor when you need to handle words.

It's a personal computer for filing, retrieving, keeping your calendar, your time schedule, your memo board.

And it's a telecommunications terminal with electronic mail and digitized voice capabilities—your link to the outside world.

This is the SPERRYLINK System. A system beyond conventional ideas of office automation. Beyond words and numbers, voice and image.

It's the one system that finally brings it all together.

Sperry Corporation, Computer Systems, Department 100, P.O. Box 500, Blue Bell, PA 19424.

SPERRY

We understand how important it is to listen.

SELLING THE IDEA

By David Shay

It is easy to justify office automation. Many people in OA today, including most vendors and many consultants, are throwing up their hands at the thought of cost-justifying the OA expenditure, whether they want to call OA an expense or an investment.

You can justify your OA expenditure, but first you must understand three key points:

- Different personalities — you and your boss, for example — may require different degrees of proof of justification.
- Traditional ways of cost-justifying factory expenditures do not usually apply in the office.
- People react differently to the dozen or so justification

HERO BREAKS DOWN OFFICE WALLS.

MDS HERO TRANSFORMS ISOLATED WORKSTATIONS INTO NETWORKSTATIONS.

The personal computer is not all pluses. This modern miracle of speed and precision has created a kind of cubbyhole mentality. Isolated, self-protective pockets of valuable information, inaccessible to other computers or the rest of the organization.

How will your company move forward when its best thinking can't even move from office to office? Your company needs HEROS™.

IN THE OFFICE, HERO UNITES AND CONQUERS.

HERO is the intelligent, desktop Networked Personal Computer from MDS. It does everything an ordinary personal computer can do. And lots that it can't. HERO can form interactive alliances with mainframes, trade information with other computers, make peace between departments and convert diversified knowledge into decision-making power.

HEROS LOOK GREAT IN BLUE.

HERO and IBM. Together, they're unbeatable. Mated with MDS SUPER 21™ Communications Processor, HERO slips comfortably into IBM SNA networks. It looks like Big Blue's 3270 SNA and 3776 remote-job-entry systems. And our MDS SUPER SNA™ option gets both on one communications link. Additionally, HERO runs MS-DOS software, as well as a fast-growing library of MDS software programs.

HEROS PLAY "SHOW AND TELL," NOT "HIDE AND SEEK."

HERO and SUPER 21 give you the power to liberate data from personal, departmental and corporate databases that used to play hard-to-get.

With INTELLIGENT 3270™ (an intelligence only MDS offers), your people can write their own programs and integrate them with data in the mainframe. HERO lets you access to the database, extract information, process it, display it, update it and utilize it. Then return it or store it right at the workstation.

MDS HERO WILL MAKE A HERO OUT OF YOU.

With HERO and SUPER 21, what's been out of control will soon be under control. Yours. And your current investments in data processing will pay off even more handsomely. Instead of your system not working, it will be networking. Efficiently, effectively and economically.

Not just in the office, but throughout your entire organization.

Furthermore, MDS systems are planned for non-obsolescence. They're modular in design to accommodate future growth. So, like a hero, every MDS system, is immortal.

TOGETHER, WE'LL MAKE HEROIC STRIDES.

MDS is a multidivisional, multinational corporation. We've grown by helping our customers to grow. We'd like to do the same for you. Not just in IBM country, but beyond.

Wherever you are, or want to be, we are. MDS offers service and support capability around the world. Around the clock.

Ask our customers about us. And give us a call. Dial **800-MDS-HERO.** Together, there's no barrier we can't break through.

MDS MOHAWK DATA SCIENCES

7 Century Drive, Parsippany, New Jersey 07054. And over 430 locations, worldwide.

MDS is a registered trademark and HERO, SUPER 21, INTELLIGENT 3270 and SUPER SNA are trademarks of Mohawk Data Sciences Corp. MS-DOS is a trademark of Microsoft, Inc.

arguments, so you should find the boss' hot button and go with it. There is no right or wrong justification argument.

To understand the first point, we must understand the psychology of the rate at which different people adapt to something new. Almost everything in life follows the normal curve or distribution, and the technology acceptance curve of OA is no exception. The technology acceptance curve is composed of four major groups, three of which can be associated with a dominant personality type. At the beginning of the curve are leading-edge people and early adaptor people. The personality type associated with leading-edge and early adaptor groups is that of the innovator. These people will try almost anything new; they require little or no justification for purchase beyond feeling that the purchase is sound.

Leading-edge people probably had personal computers three years ago; the early-adaptor people are piloting and experimenting with OA now. Together, these two groups represent approximately 15% of the population.

A large percentage of the population is currently interested in and investigating OA; they are called the early majority. They are utilitarian, and the personality type associated with them is that of the activator. The typical activator is the busy production manager or sales type with the cluttered desk.

These people recognise the usefulness of the new technology to one or more facets of their daily tasks, purchase it and quickly compute a pay-off agreement in their minds. They then go on about their business. The activators represent about 35% of the population.

Together, the innovators and the activators represent about half the entire population of U.S. business; they have OA installed. A full 50% of the population is now up the technology acceptance curve, and the stage is set for the entrance of the late majority or the controller type.

The late majority represents 35% of the remaining 50%. After half of the entire population of U.S. business has OA installed, the late majority will decide to start piloting and experimenting with OA. This group is usually very precedent-oriented; it plans the future based upon the lessons of the past. It is characterized by the personalities of the attorney, the controller, the management information systems (MIS) executive and many other executives who have climbed the ladder of corporate success.

These people want a relatively safe bet, which they can defend to their bosses and peers. As they see it, OA is not yet a safe enough bet for them to put their careers on the line. The issues are still too fuzzy.

The final 15% — the last community of skeptics — will come on board only many, many years later, if ever.

We have to use new techniques in the office for justification.

In its major contribution to understanding the knowledge worker, the American Productivity Center concluded in its report, "White-Collar Productivity — A National Challenge," that "the first step to greater white-collar productivity is to recognise that what works in the plant won't necessarily work in the office. Time/motion studies may produce positive results in some clerical areas, but the lessons of industrial engineering are, for the most part, of limited value, because in many situations white-collar work is not patterned or sequenced and does not result in a tangible product."

One of the major recommendations of the panel on the knowledge worker for the recent White House Conference on Productivity was to "reduce the emphasis on case-by-case justification of isolated information technology purchases. Instead, examine the overall effects of investments on business unit productivity and on the quality of services."

The justification arguments of the farm didn't work in the factory, and we can't expect the justification arguments of the factory to work in the office. We are now in an information age, and a variety of justification techniques can be applied.

Hard-dollar savings is the most "factory traditional," the most sought after, frequently the most elusive, the most difficult and perhaps the most dangerous form of justification in the office.

Because the easiest target for automation is a highly repetitive clerical-type function, many people try to automate typing and attrition off a secretary to pay for the equipment. Typing is less than 2% of the cost of running an office. I strongly advise that the time saved by automation in the secretarial ranks be used to support the professionals, managers and executives rather than to lay off secretaries. These higher paid people are distracted from their personal effectiveness by spending close to 20% of their time performing administrative-type tasks that they find tedious but that a secretary might find rewarding.

There are some hard-dollar savings available through OA, however, that you can use in justification arguments. Frequently automation smoothes the peak-load problem in a department, thereby saving the budgeted cost of such items as temporary employees, overtime, overnight couriers and long-distance calling. Some systems speed up the sales or collection cycle fast enough to save the hard-dollar carrying cost of a day of inventories or receivables.

Other hard-dollar savings include having certain items produced in-house. These might include slides, graphics, large proposals and mass mailings. In some instances, teleconferencing technology can save travel cost, and voice or electronic mail can save on lengthy telephone calls. It is possible to juggle enough work among various intelligent workstations that the labor grade for a whole job can be lowered, which is also a hard-dollar savings.

Most OA applications can eliminate forms because you can combine work steps and stations. Remember, the hard-dollar savings associated with the annual purchase of the forms have been estimated by experts to be only 5% of the total cost of the form. The other 95% is a soft-dollar savings associated with the purchasing; recordkeeping; inventorying; and the completion, inspection, data entry, computer processing, distribution, reading, copying, filing, and/or disposal of the form.

Soft-dollar savings is really a very broad category of savings. I like to define these savings more narrowly as improvements in a process which are immediately recognizable as beneficial, but which can probably never be converted into a measurable benefit. The ability to communicate smoothly across town or across time zones is an excellent example of an immediately recognizable benefit of today's telecommunications technology. So is the memo that is better prepared and produced more quickly for the executive supported by word processing.

As time goes on and we learn more about measurement, the soft-dollar category will shrink. A company need only see noticeable increases in salesmen's productivity as a result of the communications gear, and the soft-dollar savings can be moved over to the hard-dollar column as profit margin on incremental sales.

Some other hard-to-quantify benefits often quoted as soft-dollar savings involve the higher quality of correspondence and communication associated with a smoothly produced document on word processing; the decreased need for travel as a result of better communications; faster communications; more time for more complete analysis; better decisions; and fewer problems with time zones.

Cost avoidance is a popular form of justification for OA. Unlike a hard-dollar savings, which is a savings against an actual or budgeted expense, cost avoidance says "I will not have to spend unbudgeted money I know I would have spent." Good examples are avoiding the inevitable new hire next year, absorbing peak work loads or new government regulations that would have forced the company into using outside services or overtime in the past.

Task delegation is one of the most promising forms of cost-justification associated with OA.

Study after study shows that managers, technical and professional knowledge workers spend over 20% of their time (and probably 30% of payroll costs in an average company) on administrative work. That is an hour and a half daily of administrative tasks that could be delegated to lesser paid individuals more qualified and more challenged by these tasks.

If OA frees two hours a day of administrative support personnel time, do not apply the factory mentality of laying off every fourth administrative support worker. Rather, go find those easily transferable tasks and move them from the principal's desk to the support person's workstation. This is job enrichment at its best, as well as bona fide cost-justification. In one organization with support personnel with a fully loaded cost of $7 an hour, it was possible for OA to attribute three hours savings daily per person. No one was laid off, but three hours a day of regular administrative work could be delegated to administrative support people. The company saved $30 by transferring that work to the support person and the support person had a more challenging day. In addition, the senior staff had more time to perform the analytical work they were hired to perform.

Time savings is another form of soft-dollar savings. In the clerical ranks (as with the factory worker) an hour saved will not become dollar savings unless management takes care to schedule another hour of work for the person involved. This factory mentality is one reason why many managers are skeptical of savings from OA.

To be sure, if you roll in a word processor, save someone an hour a day and do not add more work or transfer work, productivity has suffered. You have not changed the output, but you added $12,000 or more to the input.

The majority of the white-collar head count and the lion's share of the payroll, however, goes to professionals, technicians and man-

At last, a system with a head for numbers, an eye for pictures, and a mind of its own.

Introducing the Kodak KAR-4000 information system. Take the processing power of a stand-alone computer. Add a "photographic memory" to access original document images. Top it off with comprehensive, one-source software and service.

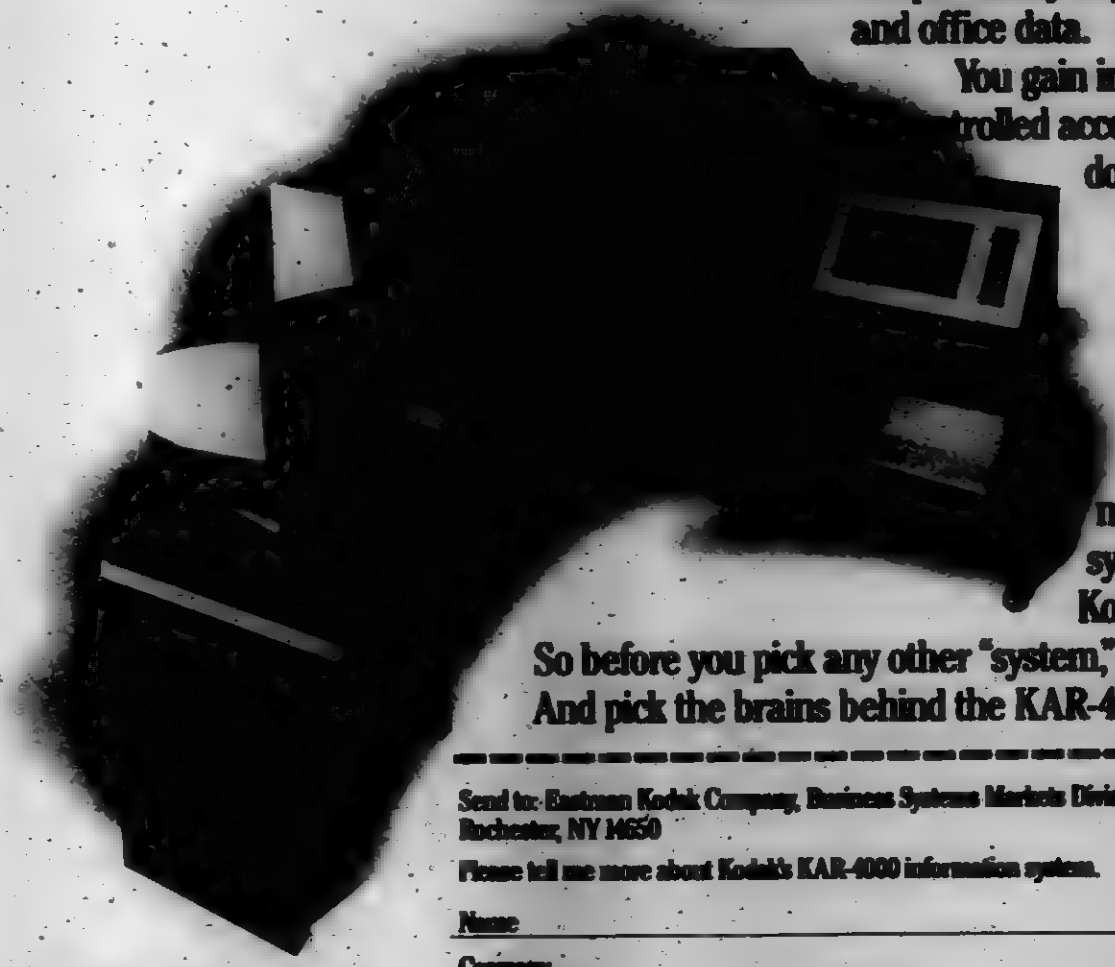
The result: a Kodak KAR-4000 information system.

It outperforms any other computer-assisted retrieval system. But it also functions independently to process both documents and office data.

You gain independent computer-controlled access to on-line data and documents. Without the staggering expense of on-line computer storage.

You even gain independence from service—all components in the KAR-4000 system are serviced by Kodak.

So before you pick any other "system," send in the coupon. And pick the brains behind the KAR-4000 information system.



The Kodak KAR-4000 information system. It gives the computer a photographic memory.

Kodak

© Eastman Kodak Company, 1983

Send to: Eastman Kodak Company, Business Systems Markets Division, Dept. DP4514
Rochester, NY 14650

Please tell me more about Kodak's KAR-4000 information system.

Name _____

Company _____

Address _____

City _____

State _____ ZIP _____

Please answer the following:

1. How many incoming documents per day do you process? ☐ 1000-2000 ☐ 2000-5000 ☐ Over 5000
2. How many documents do you normally retrieve each day? ☐ Less than 10 ☐ 10-25 ☐ Over 25

agement. If you save these people an hour, they will use it (probably as efficiently or effectively as they spend the rest of their day). I recommend that we convert these hour savings into time for cost-containment or revenue-producing idea sessions. Even if OA saves a principal only one hour a week, we can isolate that hour and put it to work.

The second major set of justifications for OA — value justifications — generally has little to do with dollars that might eventually hit the bottom line, but more with the quality and value-added aspects of performance.

Quality of work life and job enrichment studies in the U.S. are demonstrating dramatically that happier employees are more productive employees. This type of performance seems to affect the bottom line, although it is difficult to formally trace the connection between a happier, more cordial receptionist and increased sales.

If you introduce automation to get rid of tedious, boring tasks and then add some spice to the person's life, you use OA to get a happier employee who will be more productive. On the contrary, if you take typing away from all secretaries, send it to a WP pool and increase the number of principals the secretary supports, you will probably have some less happy and less productive folk. A WP pool does have merit in many places, but by and large the typing pool is an obvious example of hold-over thinking from the industrial age the U.S. left when it entered the information age. Companies were probably looking for hard-dollar savings when they invented the typing/WP pool. Worse than that, pools have buried very valuable technology in the corner or the basement.

If the early and late majority people could see that technology working on desks around them, they would start to see valuable applications for the equipment.

In addition to enriching jobs, OA can frequently improve employee morale and, ultimately, productivity. It does this by smoothing down chaotic peak loads; eliminating boring work valleys, where people feel they have to stretch out their work; and by introducing a wider variety of work.

Lower unit cost should be a major accomplishment of OA and is one of the most convincing arguments for the early and late majority decision makers. Even with no layoffs, a good manager can understand that if the old cost was $10 per transaction and the new cost is $8, he can add substantial volume to a department without adding new resources. However, a word of caution: Don't be amateurish in determining unit cost. Do your accounting homework. You do not want to present cost data to management as justification and then have an accounting technician blow a substantially sound argument out the window because you didn't realize a task was fixed or semi-variable or you did not use a full absorption overhead formula.

Because the OA workstation has the inherent capability to do so many different tasks, it invariably lowers the unit cost because there are fewer steps, such as editing, checking, recalculating, forms, stations, time, supervision, error correcting and inspection time per invoice, order, new hire, proposal, benefit claim and customer inquiry.

Streamlining the operation is another of the more promising areas for OA. Probably the biggest contribution to the explosion in the use of personal computers is the ability of the OA workstation to perform so much work that used to be compartmentalized and specialized in the factory mentality.

There should be little doubt in the mind of even the most skeptical manager when OA can bring about a completed transaction by two people in three steps instead of the old 13 steps in three departments by seven people, with considerable delay in everybody's in basket and out basket. Every time a paper has to move, it requires some form of preparation to leave a workstation and then some form of preparation before it can be worked on in the next department. OA can eliminate all these little clearinghouse operations, which added no value, just cost, to the end product.

In addition to enriching jobs, OA can frequently improve employee morale and, ultimately, productivity.

Increased service is another benefit. Whether we are in factory or service jobs, we have customers or clients that reward good service by repeat business. Banks and insurance companies might be obvious examples of firms that will pay handsomely for service-increasing devices, but all firms should recognize their importance. OA can frequently increase the response time to customer inquiries, reduce the errors in processing, produce more concise and accurate responses, capture data for trend analysis, provide faster response on pricing or transaction status and so on.

Time saved for value-added activities offers another area for justification. Under cost-justification, we recommended that some of the time saved for principals might well be isolated for working on cost-containment or revenue-producing activities, brainstorming or task forces. Some of this time saved should also be singled out for value-added activities.

Suppose OA saves a principal one hour a week. Set up a rotating schedule on that individual's calendar to spend every Monday from 11 a.m. to noon on some critical topics and at the end of the year the department will be running substantially better because of that 50-hour block of time. These topics include more time with customers, planning for next year, scheduling work better, desk-checking employee work, counseling employees, training employees, writing policies and procedures, writing job descriptions, setting goals and holding department meetings.

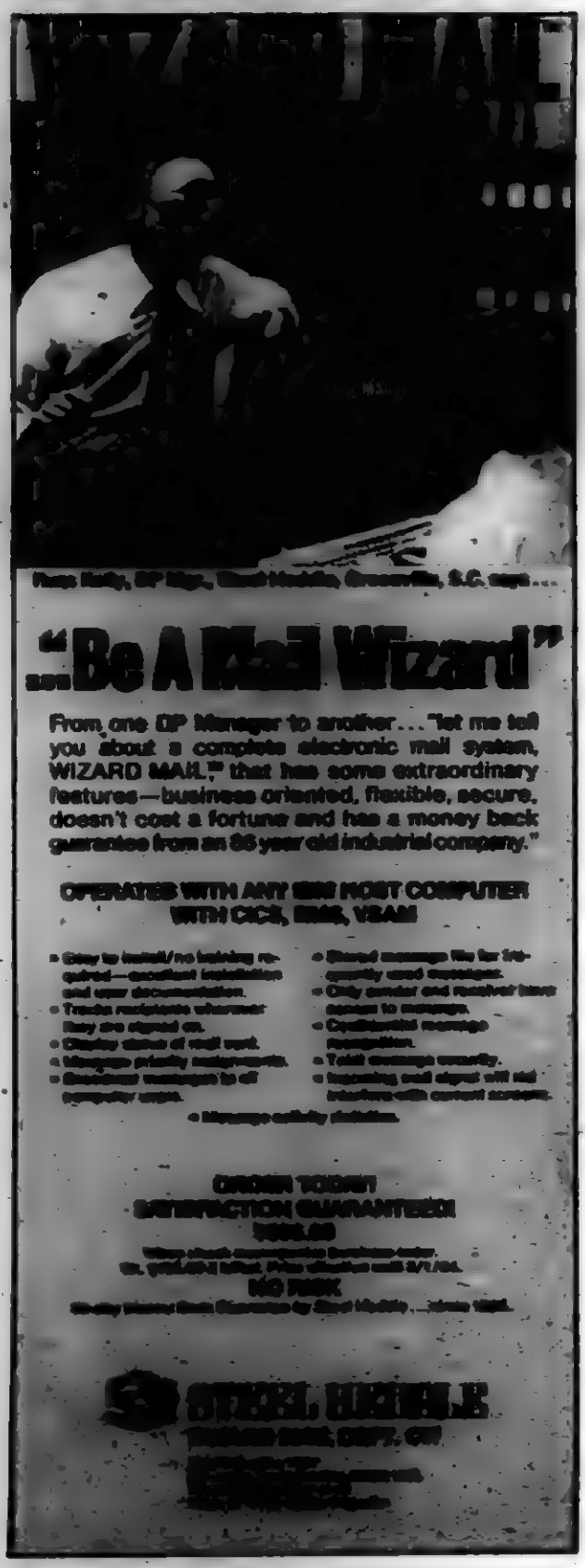
All these tasks add value to an organization and management is always complaining that they have no time for them. OA can fill this gap.

Although the guidelines above can help justify OA, it is ultimately up to the OA committee or department to produce appropriate and valid justification arguments that will satisfy their particular managements and will allow their companies to enter into the office of the future.

One last word of caution: Entrepreneurial, fast-track, high-tech companies are frequently managed by leading edge early adaptors and early majority people that quickly grasp the inherent productivity gains available through OA. Many of these companies are off and running with OA and experiencing the benefits of cost-justification and/or value-justification, whether they cared to stop and measure the results or not. (They usually do not.)

If your company or your company's OA program is managed by late majority personalities who prefer to wait until 50% of the nation is doing something first and not suffering from it, you may have a competitive problem. I recommend you quickly dig up those convincing justification arguments in your company so that it, too, can enter into the office of the future. OA

Shay is a manager in the New York office of Peat, Marwick, Mitchell & Co. and heads up the firm's white-collar productivity practice on a national basis.



ORCHESTRATING CHANGE

By Vernell K. Munson

A major obstacle to implementing office automation today is the traditional "bean counting" approach frequently applied to measuring productivity. That method may have worked well for the application of early computer technology, but it is no longer appropriate for the advanced technologies designed to support the individual consumer of the office environment.

An effective strategy for introducing new technologies in such nontraditional areas as professional, managerial and executive support goes far beyond basic training and end-user involvement in the design and selection of technology. At least in a general sense, users must understand how OA is going to change the way they think about their work and

about their expected roles in the process.

Until recently, computers were seen mainly as a means of handling more efficiently the input-process-output aspects of office work already being done. Office systems analysts found earlier factory work flow models useful in identifying where and how to apply early computer technology to achieve fairly well understood benefits — such as lower transaction costs.

Today, however, technology is moving beyond these infrastructural systems of the office toward support for the professional, the manager, the executive and — in a larger sense — the general business needs of the organization.

We still know little about how, in the long term, the individual knowledge worker will actually use new products and technologies developed to support managerial work. We do know that advanced technology holds great promise for nonquantitative, nontransactional office work. We also know change can be painful.

Success in introducing OA into nontraditional areas depends on the effective management of the process of change. Future users of a new technology need to learn more than how to push function keys — they need to be aware of and accept the need for changes in their own attitudes and behaviors and, ultimately, in the organization itself.

The traditional approach to using an office system to solve a business problem has been to define the problem in terms of the system's capabilities rather than to identify a business opportunity first and then look for an appropriate technological solution.

This focus on technology rather than on business is usually the first (and often the fatal) mistake companies make when developing implementation strategies for OA. Simply automating the artifacts of the office, such as calendars, "to do" lists and telephone directories, does not ensure a more effective and efficient office.

More specifically, if an individual has a time-management problem, putting his manual calendar on a computer does not guarantee that the person will manage his time better. Rather, the systems analyst and the user need jointly to rethink the work process involved. Before deciding on an automated approach, they need to analyze what has to be done when and why, and to identify the objectives and expectations that shaped the existing system.

If we shuck the old methods, how do we develop strategies for introducing advanced technologies into the office? One of the biggest difficulties for an organization is to identify a business opportunity correctly and then to choose technologies that let it take advantage of that opportunity. Taking off the blinders and seeing the forest and the trees requires discipline. The most effective approach is to integrate technology planning and business planning.

When the reason for introducing new technology has been determined, equally careful planning is needed for the next step — deciding what change is to occur and how to make it happen. Most companies tend to see training as the entire solution. They identify what applications will be automated and who will perform them. Then they send these employees off to a training course, where they learn how to push the buttons.

This approach works if the job is fairly routine and has been correctly analyzed, and if the users learn the new way of doing their jobs. Managers and professionals, however, may use a given technology in different ways to do their jobs. Therefore, training professionals to push keys does not guarantee the change will stick.

For example, the office systems group of a major insurance company decided its in-house lawyers would benefit from personal use of management workstations offering automated calendars, "to do" lists, telephone directories and other functions.

The legal department's secretaries were trained on the product and used it mainly for word processing. The lawyers were not given training because it was assumed they would learn from their secretaries how to use the terminals. Some basic applications — such as the department's library check-out system — were transferred to the system.

After six months, the department manager decided to keep the terminals, but only for the clerical staff. The lawyers had seen no benefit in changing their old ways. Many said they didn't understand all the excitement. They saw the terminals as toys, not as tools to help them do their jobs.

The problem, of course, was this implementation strategy lacked many ingredients necessary for the successful establishment of a new way of thinking. The introduction of the new technology should have been part of the senior-level planning process. Members of the management team, however, were treating the department members like guinea pigs. They did not see the terminals as solving a specific problem and did not view the decision to use them personally as essential for the lawyers to meet personal or departmental objectives.

Neither the lawyers nor the secretaries took part in the decision to acquire the terminals. But WP helped the secretaries so much that they overcame any initial resistance to change they may have felt. Otherwise they, too, would have gone back to their old way of doing things. At some point, ownership of the decision to change must transfer from the original decision maker to the person experiencing the change if the changed behavior is to stick.

A new technology may solve the problem that prompted the users to consider change, or it may offer a means of doing something not possible before. For example, the marketing department of a furniture manufacturer implemented a digital voice store-and-forward product. The decision makers correctly believed the system would solve the department's telephone tag problem. But it also opened up opportunities for communicating in ways not possible before. In retrospect, eliminating telephone tag turned out to be less significant than the fact that system users solved other problems — and created new opportunities — through creative application of the technology.

The traditional approach to using an office system to solve a business problem has been to define the problem in terms of the system's capabilities rather than to identify a business opportunity first and then look for an appropriate technological solution.

For an organization to adopt a new way of thinking, each individual must know about the coming change, develop a positive attitude and at some point assume responsibility for making the change. When employees brag about how they now do their work on a terminal instead of the old way, it is clear they own the decision to change and do not feel it was imposed on them. Pinpointing factors that cause people to change is part of successful change management. For example, the desire to maintain a competitive edge led the public relations professionals of a major financial institution to switch from typewriters to word processors. Although they had considered WP to be strictly a clerical tool, seeing one of their peers increase his productivity by using WP convinced them that, in order to get ahead, they would also need to use the new technology.

In addition, the apparent limit on the number of available terminals prompted staffers to ask for a workstation quickly before the supply ran out. After they requested the terminal — thereby owning the decision — they did not complain about change and worked nights and weekends to learn how to use it. The entire department (there really were enough terminals to go around, of course) was using WP within only a few months. The department manager said later that if he had mandated change, the staff would have resisted or possibly refused outright to get involved. He identified the right technology and the right motivating factors and, in a sense, let nature take it course.

Underlying the process of managing change are two assumptions: A desired change will be for the better, and the choice of technology is the right one. The right technology may solve either a perceived problem or a problem not immediately apparent when the process was set in motion, or it may offer an unforeseen opportunity to do something that couldn't have been done before. If the perceived value of the change outweighs the perceived cost — including the pain of personal change — it is likely the change will stick and the technology intervention will be successful.

In evaluating results, managers should not insist on a direct relationship between their expectations and reality. The furniture company, for instance, would be shortsighted if it judged the impact of voice store-and-forward system only against the elimination of telephone tag. This would ignore the unforeseen positive results that were not built into the assessment model. Nor should OA planners focus on the product as the critical variable. The product is a neutral element. It is the change management strategy that determines success or failure.

More and more OA products whose ultimate impact on the office will not be well understood for some time are finding their way to the desks of knowledge workers. As this happens, office systems planners are going to find traditional input-process-output models less and less useful. What they need now are approaches that incorporate the theory of change management.

The diffusion of innovation within a culture — in this case the office — follows a known pattern. After it has been developed and tested, an innovation, along with good reasons to accept it, must be communicated to those who are expected to change. People need time to adopt or reject an innovation. Change occurs if and when the innovation is adopted.

The challenge and opportunity we face in implementing OA technology is to shorten the cycle of innovation diffusion and adoption. We must develop new strategies tailored to the nature of knowledge work if we are to manage the introduction of new technology effectively and to realize the promise of office automation. OA

Munson is manager of the Advanced Systems Laboratory at Wang Laboratories, Inc. in Lowell, Mass.

THE TRAINING PROCESS

By J. Thomas Monk and Kenneth M. Landis

One of the most overlooked issues in work place automation is the training required to support and sustain the new automated environment. Most organizations' approach to training is strictly on the job, through trial and error. This blind-leading-the-blind approach invariably follows little or no formal training.

In cases where the vendor has not bundled training or consulting time with the system, the end users are usually on their own. Rather than accentuating and enhancing the use of office systems, this traditional approach effectively retards the full development of the office information environment. However, work place automation has a profound effect upon the organizational structure (both formal and

informal) and upon information flows and individual jobs. New approaches to training might indicate ways to help the user incorporate these tools in his own work style.

One of the challenges of work place automation management is delivering the necessary training to the appropriate audience. Training, not technology, provides the vehicle for improving organizational effectiveness. The technology is nothing more than an "information engine," and the end users are the engineers. Training in the automated work place should be defined as the vehicle to promote both effective and efficient use of information.

Why make the investment? Because information is an important business resource and must be managed with the same intensity as other business resources, such as personnel, plant and equipment and cash. It is standard practice to have specialists handle important business functions such as compensation, benefits and facilities management programs. Although work place automation does not produce information specialists, training must focus on the use of the available tools and technologies to allow users to do their jobs better.

Even when presented with this unique opportunity, organizations still do not emphasize training; in many cases, they may even relegate it to unassigned or second-tier personnel. For an organization to achieve maximum return on investment from the use of technology in the work place, a directed, viable training program is mandatory.

The decision to employ technology vs. existing operations to support a business strategy is only the first step. The equally important decision must be made to invest in the training necessary to ensure that the technology succeeds. Any organization wants to make optimum use of its information. To ensure this, training and development programs and services must be developed, implemented and coordinated to meet both business and human needs. If either of these two needs is overlooked, the new information automation systems will be viewed as either another edict from management or, even worse, as job threatening.

These programs and services must simultaneously address both technical and professional skills training needs, which will evolve as a result of the new information environment. Because of this critical need to synchronize training, the training strategy must be developed in the same manner and with the same attention to detail as a business strategy developed for the delivery of goods and services in the marketplace.

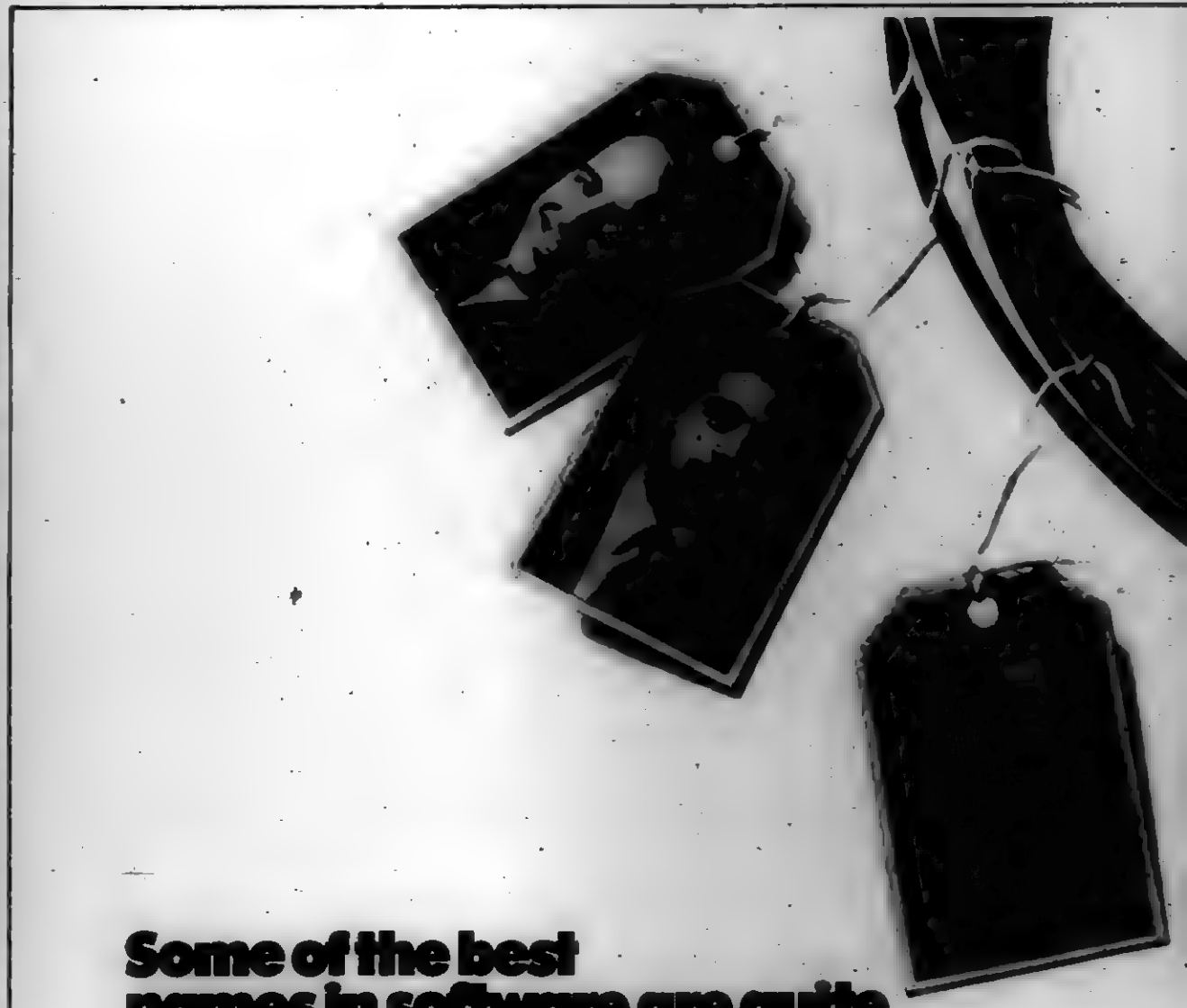
The first task in the development of a training strategy is the identification of the target market or audience. In any organization, whether a Fortune 100 corporation or a private business, the work force can be segmented into discrete groups for which a training product can be developed.

The technology is no more than an information engine and the end users are the engineers. Training in the automated work place should be defined as the vehicle to promote both effective and efficient use of information.

For purposes of illustration, let's look at a company that decided to use technology to solve a business problem. The name and business of the company have been changed.

The Triangle Magnet Co., located in the Midwest, has 500 employees. In early 1983, after pursuing an aggressive two-year growth plan, Triangle's management realized that, because of the business' growth, they now had serious problems processing orders; communicating price changes; and coordinating the activities of the marketing, manufacturing and home office support groups.

The executive vice-president of operations commissioned a study, which resulted in the acquisition of an integrated office information system. The system encompassed all the home office departments and all the regional offices of the firm. A key point of the study was analyzing how the employees of the company used



Some of the best names in software are quite attached to our network.

These people know PCs. They also know a good idea when they see one. That's why they're building future networking software around today's networking standard—Ethernet. And why they chose our PC networking system to help them do it. EtherSeries from 3Com.

What EtherSeries is doing for them.

"3 large, growing, and diverse Ethernets are at the heart of our software development activities. Our 3Com hardware has been very reliable—it has never failed us."
—Bill Gates, Chairman, Microsoft (Bellevue, Washington)

"We want to develop our popular dBase II® to a multiuser networked database environment. To meet the demands of our customers we chose the high-performance 3Com EtherSeries.""
—David Clayton Cole, Chairman, Ashton-Tate (Culver City, California)

"The ease of sharing information and printers led our 1-2-3® advanced development team to choose 3Com's EtherSeries® over all of the alternatives."
—Mitch Kapor, President, Lotus Development (Cambridge, Massachusetts)

"We wanted network software transparency. Our PFS:® software runs without ANY change on 3Com's EtherSeries"—it protects our user's software investment."
—Fred Gibbons, President, Software Publishing (Mountain View, California)

"The Ethernet standard and 3Com's EtherSeries® will be an important part of our in-house networking strategy. It provides the connectivity we require for our growing organization."
—Bob Frankston, President, Software Arts (Wellesley, Massachusetts)

"Our mainframe link software and Peachtree software ran perfectly in the 3Com environment. We dropped

and disseminated information.

Based upon the results of their study, Triangle Magnet segmented its work force into the following categories:

- Decision makers or decision information users: 10%.
- Staff members or information handlers and processors: 60%.
- Manual laborers or questionable users: 30%.

Triangle Magnet's objective and justification for investing in the office system was to use the technology, coupled with a training and education program, to increase the percentage of decision information users in the company. By teaching the information handlers and processors to use information effectively, this group could increase its span of control and, in effect, could become decision makers. This in turn would enhance Triangle's ability to respond to changes in the business environment.

One of the most important issues a training philosophy must address is that of personal fears. This anxiety will take many forms: For some, it is the fear of failing in front of peers or subordinates; for others, the fear of trying at all.

The study also indicated that, from a technological and managerial perspective, Triangle's office operations were years behind its marketed products. The introduction of the new system provided the company with an opportunity to reorganize and streamline its operations at the same time it introduced the new information tools. Triangle also had an opportunity to increase the effectiveness of members of the category called "questionable users." Under the auspices of the training program, TMC's management made a conscious effort to identify and groom high-potential candidates from this group.

To develop a cohesive training program, companies must adopt and standardize on a training philosophy. A successful training philosophy for work place automation reflects management's needs and concerns and is sensitive to the needs of the target audiences.

One of the most important issues a training philosophy for the automated work place must acknowledge and address is the issue of personal fears. The introduction of technology will cause varying degrees of personal anxiety at every level of the organization. This anxiety will take many forms: For some, it will be the fear of failing in front of peers or subordinates; for others, the fear of trying at all. A key element of a successful philosophy is a plan to minimize personal exposure, thereby reducing fears.

An equally important issue is the differentiation between management skills and job-related or task-oriented skills. Each segment of the work force requires different skills to perform its function for the organization. The training philosophy that explicitly acknowledges these differences provides the foundation, direction and scope for developing the training strategy and subsequent programs. The training philosophy defines the training that each segment of the work force should receive to support the business.

Developing the training strategy: The combination of the training philosophy and the composition of the target audiences defines the training strategy. Each segment of the work force requires a basic set of managerial and job-related skills. In the case of Triangle, the strategy was:

- To provide the decision information user segment with management development training, which would represent investment in this segment and would provide the basis for succession management.
- To provide the information handlers and processors with training that would enhance the skills necessary to accomplish their present jobs. The training would be tailored for new personnel. Training for the current staff would be flexible in order to accommodate changing job dynamics caused by the new technologies.
- To provide the questionable segment with specific training that focused on a particular task for a particular reason. This group would be exposed to only those

EtherSeries" right into our IBM Information Center and can now share disks and printers."
— Dennis Vohs, Executive Vice President, MSA (Atlanta, Georgia)

"We wanted the expandability of 3Com's Ethernet as a base for our networked products. VisiSeries" for EtherSeries" is the beginning of a family which will include VisiOn.""
— Dan Fylstra, Chairman, VisiCorp (San Jose, California)

What EtherSeries will do for you.

Tying into 3Com EtherSeries was a smart business move for these PC software experts. And it can be for you too. You'll maximize office efficiency, now. Cut operating costs, now. And you'll realize the full potential of your IBM PCs using software that is readily available off-the-shelf, now. All for the low price of $950 per link.

And until January 31, 1984, we'll give you our award-winning EtherMail — a $750 value — with the purchase of EtherSeries and three PC links.

EtherSeries is available at leading computer stores. Call or write Cory Randall at 3Com for more details.

☐ Please have your 3Com representative call.
☐ Please send me more information.
CW-3/15

Name
Title
Company
Division
Address
City/State/Zip
Phone

3Com Corporation, 1365 Shorebird Way, P.O. Box 7390 Mountain View, CA 94039 Phone (415) 961-9602

3Com is EtherNet.

IBM® is a registered trademark of Action-Tec. Lotus 1-2-3® is a trademark of Lotus Development Corp. PFS® is a registered trademark of Software Publishing Corp. "VisiSeries" and VisiOn" are trademarks of VisiCorp

subjects required to do a specific job because this segment's present work load was, in the classic sense, a textbook example of Taylorism.

Training techniques and systems: The inventory of training techniques and systems available is limited only by the creativeness and skills of the trainer. Technology has advanced to the point where multimedia presentations are no longer prohibitively expensive. As the cost of human resources continues to rise, alternative training techniques become more feasible.

While deciding what form of training systems will be both appropriate and cost-effective, organizations must consider an important relationship: the depth of knowledge required vs. the investment required. A training program that falls one dollar short of what's needed can destroy the potential of a million-dollar system. A well-defined program reflects management's expectations. The actual training techniques will depend upon the investment, the target audience and the depth of knowledge required (the philosophy).

Training techniques can be traditional, technological or innovative.

Traditional training includes the one-to-one relationship as well as lectures, workshops and seminars. This category may be the most expensive to implement because of its high labor intensity. As the size of the target audience increases, the resources must be increased proportionally or the schedule of events must be extended.

The traditional approach is better suited for developmental training; it facilitates the exchange of concepts and ideas by creating an atmosphere for dialogue. In many instances, the traditional approach becomes synergistic as role playing emerges. Nevertheless, the traditional approach is neither cost-effective nor good for specific skill training. The one-to-one relationship is direct and personal, which in many cases causes the training program to appear management-oriented rather than product-oriented.

Triangle believed the traditional approach would be a good investment for its management group. Individuals were selected for training in project management, the general management skills of coaching and counseling, effective speaking and writing and interpersonal skills development. What was interesting, however, was that Triangle also chose to use one-on-one coaching when they had installed the new equipment and were ready to implement the new system and procedures.

Because Triangle considered it important to minimize personal risk, it decided to introduce the new technology through traditional one-on-one and small group seminars. Other companies have

followed this philosophy by teaching basics to peer-level managers in a workshop setting and then allowing each person to use the technology as he desired. Personal consulting should also be available, as the manager requires it, to enhance the benefits derived.

Triangle wanted to use technology to approach its information handlers because specific skill training requires a structured environment of: Input → Practice → Feedback → Motivation. In the past, the company had taught the use of the keyboard in a classroom setting, and the training proceeded at a set pace. This technique worked well for fundamentals, but as the personnel became more knowledgeable, the approach became less and less attractive because of time constraints and costs.

After the staff learned the basics of the new system, Triangle decided to use computer-assisted instruction (CAI) and multimedia tutorials to teach the new office practices. The investment required was a one-time cost to develop the office policies, procedures and tutorial; plus the cost of the vendor-supplied CAI package. The CAI package was a structured tutorial that used reinforcement through testing and self-paced advancement.

New training technologies have provided many other cost-effective alternatives for exchanging information and establishing a knowledge base. Videotape presentations have proven effective for presenting overall concepts or ideas. One technique that works uses a known expert to lend credibility to a program. Videotape is an excellent vehicle for demonstrations or for illustrations of current situations (such as work flows) and how they will change in the future.

When combined with workbooks, videotapes become multimedia. When the desired result is more skill-oriented, a more active medium is required. In this case, you need to integrate hearing and seeing, as well as doing.

The use of television has greatly increased recently for such things as behavior modeling and modification, guided discussions (with a trained group leader), experiential learning, live demonstrations or classroom simulation. When television-based training is carried to its limits, videoconferencing and in-house closed circuit networks are the result.

As work place automation matures, vendors will enhance the usefulness of on-line Help facilities. Nevertheless, the user will need a base knowledge and understanding of equipment operations before on-line facilities will have an appreciable impact.

The strength of on-line Help facilities is that they provide a single automated reference manual for a user when questions arise. A good Help function will provide available alternatives, including an explanation of the alternatives, at the point where the problem occurred. More recent versions also allow data to be entered from the Help screen and then passed back to the point in the program where the trouble occurred. Help is an excellent way to provide initial training as well as continual reinforcement after the process has been implemented.

The innovative training category is really only a combination of traditional and technological methods with the objective of using resources effectively. Triangle wanted to teach very specific job-related skills to its "questionable" segment to improve production efficiency and to decrease the cost of manufacturing its products. Printed job aids had effectively provided quick answers for many day-to-day questions for this group; Triangle therefore developed a series of plastic-encased aids, which were placed at each workstation in the production process. When an employee had a question, he would use the job aid before he called a supervisor; as a result, a majority of problems were solved immediately. Triangle's job aids formed a good way to allow training to be used to address "nonroutine" routine problems. Classroom training was offered on a regular basis to the supervisory personnel.

As a direct result of its philosophy, Triangle adopted another approach to training. Employees throughout the organization's departments had been identified and targeted to play a key role in the training strategy. These employees demonstrated a high potential for advancement at the company through job performance and willingness to accept additional responsibilities. This group was offered a completely different training series that included both technical and subject matter training. Triangle's management called these employees "lead implementors."

A lead implementor was an employee with a functional business background rather than a technical background. These people were able to communicate in nontechnical terms; as a result, they were able to understand fully the business requirement. Triangle found that the offices that had lead implementors quickly started using the new integrated system because the lead implementors could translate the business requirement into an automated solution in language the other office workers understood. The lead implementors became a virtual extension of the training staff, providing a constant, on-site resource.

In the final analysis, work place automation is not just installing new equipment and issuing a new set of policies and procedures. The human resource is often the critical success factor within the new environment. Training, then, becomes paramount and usually represents a greater investment than that usually contemplated. Many vendors offer some training, but this training is either too technical or too skill-related for both information handlers and decision makers.

Successful users of work place automation have developed unique approaches to training by adapting various techniques to their unique needs. These companies have been successful because they took the time to define their objectives and training philosophy and because they implemented strategies that deliver the appropriate amount of knowledge at the appropriate level within the work force. OA

Monk is vice-president of resource management with Citibank in St. Louis and Landis is implementing corporate/office systems at a Fortune 100 manufacturer based in St. Louis.

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 709 FRAMINGHAM, MA 01701

postage will be paid by

CIRCULATION DEPARTMENT

COMPUTERWORLD

375 Cochituate Road, Rte. 30
Box 897
Framingham, MA 01701-9985

VOICE-DATA PBX DEBUTS

BY JOHN COMBS

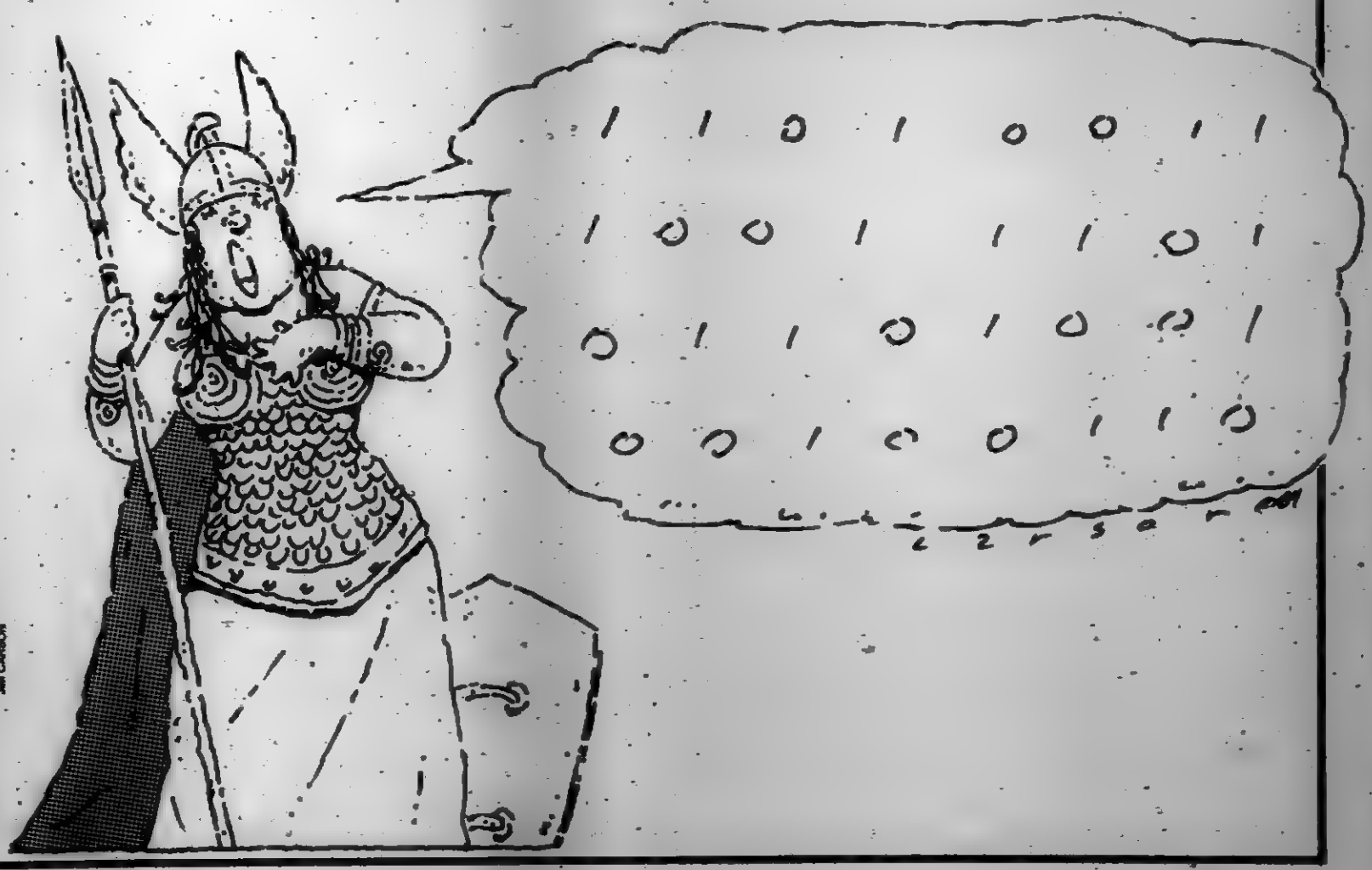
A conflict exists between the term "office automation" and the nuts and bolts procedure of automating today's office environment. As a result, management is often wary of the OA concept, frequently envisioning today's office as a treadmill that is becoming increasingly difficult to control in relation to costs, new equipment and human resources.

Current OA technologies include word processing, communications, accounting and business support systems, electronic mail and messaging systems, as well as public data bases, information services and private centralized computer systems serving remote offices through data communications networks.

Though these units and information sources have individually increased office productivity, a major source of the conflict between the OA concept and reality can be credited to the inability of these individual systems to communicate with each other. Particularly in larger organizations, this lack of equipment integration has led management to resist the OA concept because the full benefit of the technologies involved has not been realized.

The voice-data private branch exchange (PBX) is a solution to this problem. Its value can be traced to the data terminal, which commonly provides access to most office information sources. Approximately 5% of today's office workers use a data terminal in their jobs. This number will increase to 50% in the near future because of the increased need for information and the reduced cost of terminals. Whether the device is a display or dumb terminal, a personal computer, an intelligent workstation or an advanced voice-data workstation, the voice-data PBX can effectively offer the information terminal user access to various OA technologies and information sources.

The voice-data PBX is an office switching system that handles voice communications in addition to data



communications. Modern PBX systems have been switching data in the form of digitized voice for the past seven years.

Consequently, it is highly feasible for the digital PBX to add the capability of switching computer data. The only modification is in the interface to the data distribution system and the data terminal. The actual PBX switching network does not need to know whether the information it is passing is digitally encoded voice or data.

One major advantage the voice-data PBX offers the data user is access to many different resources, such as computer ports for local applications and modems and multiplexers for connecting to remote computers. Formerly, the user was connected directly to a computer. A different terminal was used to access an application stored in another computer. With the voice-data PBX, the user's terminal can become a multipurpose workstation by independently switching to many computers upon request.

Cost-efficiency is another important value of the voice-data PBX. The automated office already utilizing a PBX has an extensive local network, the telephone wiring plant, which can be exploited for data transmission at low cost. When the telephone instrument sitting on every office worker's desk is connected to the voice-data PBX, it can become the outlet for numerous data features.

For obvious reasons, the data terminal is a cornerstone of the OA concept. The voice-data PBX is flexible enough to accommodate a wide variety of terminal types, as well as future terminal installations. At present, the most popular terminal is the low-cost asynchronous Ascii, which is capable of sending and receiving data at rates up to 19.2K bit/sec. They also represent 90% of the market and will continue to proliferate in the office environment.

More sophisticated data users or those who require local computing power for specialized functions may currently be using an intelligent terminal or personal computer. Because of the popularity of these devices, the need for intercommunications increases, as it also does with disk and printer services for resource sharing.

Intelligent terminals and personal computers rely on file transfers from a centralized data base to the local intelligent terminal for processing of information. Fast response time is an important factor in these transfers in order to enhance productivity. The voice-data PBX can handle asynchronous data rates (up to 19.2K bit/sec) and synchronous rates (up to 56K bit/sec) in order to support high-speed file transfers.

Just as a variety of data speeds must be accommodated, a multitude of data formats and protocols also exist. The voice-data PBX is capable of connecting various terminal types with their host computers. To do this, it must be transparent to the data and control signals being switched. Two examples of specialized data formats that require transparent switching are word processing systems and computer graphics terminals.

With the voice-data PBX, the user's terminal can become a multipurpose workstation by independently switching to many computers.

A step forward in PBX technology is the computer-to-PBX interface (CPI) standard, which has been accepted by Digital Equipment Corp., Hewlett-Packard Co. and some other major computer manufacturers. Certain manufacturers have enhanced the technology by designing systems that will support true end-to-end CPI, allowing not only T-I interface to computers, but also terminal-to-computer parameter exchange. Fewer steps in protocol conversion result in a more effective link among terminal, PBX and computer with less costly telephone wire utilized as a shared resource.

An emerging trend in the telecommunications and DP industries is the introduction of combined voice-data workstations. These workstations incorporate a full complement of voice features and data terminal features. These new terminals are an important development in OA because they integrate voice and data at the user's desk and bring a number of information resources to the decision maker. As these terminals become as prevalent

Nearly Nine Million Computer-Involved People Around the World Rely on Our Publications For the News They Need.

We're CW Communications/Inc.: the world's largest publisher of computer-related newspapers and magazines. And wherever you go in the computer world, you'll find computer-involved professionals reading—and relying on—our publications. With highly trained and experienced editorial staffs all over the world, our publications give readers the best and most up-to-date information available in this rapidly changing industry.

Around the world:

We publish, co-publish or provide editorial services to the leading computer publications in the world, including publications in all of the following countries:
Scandinavia—Denmark, Sweden, Finland and Norway.
Western Europe—Germany, United Kingdom, France, Italy, Spain, Greece, the Netherlands.
The Mid-East—Kuwait, Saudi Arabia.
Asia/Africa—People's Republic of China, Korea, Japan, Singapore, Southeast Asia, South Africa.
The Southern Pacific—Australia.
Central and South America—Mexico, Brazil, Argentina, Chile.

In the United States:

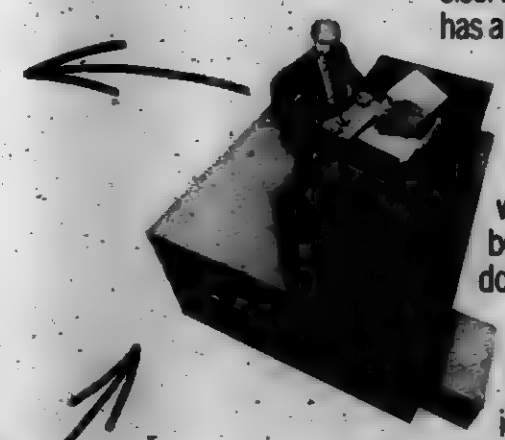
In the world's largest computer market, we publish a whole series of publications that cover different aspects of the industry. Our largest publication, with more than half-a-million readers every week, is *Computerworld*, a weekly newspaper aimed primarily at larger computer users. Its companion publications include *Computerworld Office Automation*, *Computerworld On Communications* (each published semi-monthly) and a series of *Buyer's Guides* covering all major segments of the industry.

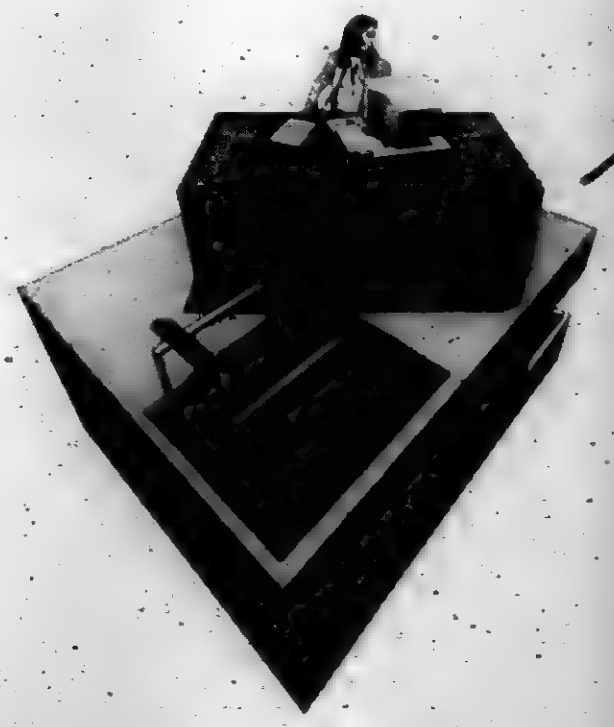
In addition, we publish *MICRO MARKETWORLD* for dealers, distributors, retailers and others involved in the microcomputer marketplace. For microcomputer users, we publish *InfoWorld*, *Microcomputing*, *PC WORLD*, *80 Micro*, *inCider*, *Run*, and *Hot CoCo*.

No one in the world publishes more computer information for more people in more countries than we do. And we'd be happy to give you more information on any of our publications. Just send a telex to our U.S. offices, attention CW International Marketing Services, (telex #95-1153) or write us at the address below.

CW COMMUNICATIONS/INC.
375 Cochituate Road, Box 880, Framingham, MA 01701
(617) 879-0700

We bring everything in your office closer together. That's what puts Wang way ahead.





Let's face it. Making things work together is where most computer companies fall apart.

They talk about compatibility, while they deliver a family of products that relate to each other in name alone.

Quite simply, that's what separates Wang from everyone else. Because unlike everyone else, Wang has a family of products that is truly compatible. From personal computers. To word processors. To office information systems. To large computers.

And it stands to reason that when everything in your office works better together, everyone in your office does too.

As more people manage information and communicate it in more ways than ever before—in words, images, numbers and voice—it just makes sense to choose Wang.

Because Wang offers you total solutions that bring everything, and everyone, in your office closer together.

That's what puts Wang way ahead.

For a presentation on Wang office automation computers, call 1-800-225-9264. Or write to Wang Laboratories, Inc., Business Executive Center, One Industrial Avenue, Lowell, MA 01851.

WANG

The Office Automation Computer People.

CO4

© 1983 Wang Laboratories, Inc.

and useful as the telephone is today, they will become a significant tool for retrieval and manipulation of information in the automated office.

Still another important value of the voice-data PBX is its suitability for networking. Networking capabilities — the ability to efficiently link various information sources together — have become increasingly more critical. This has happened because the information source or service a user requires often exists outside the local facility. In this case, the user wants access to a data communications network to connect to that distant resource. The voice-data PBX is capable of interfacing with data communications networks via analog facilities. The PBX is the hub of the office's voice communications network; it is a small step to adapt that hub to provide data communications over voice-grade lines.

The modem pool is the prime tool for this application. For example, the system can route the data call via the modem pool to a company's private network over leased or private lines. This would be particularly effective if a company relied extensively on networks to communicate with distant computers, such as financial institutions or airline reservation agencies.

Another example might be the case of the user that requires business information services, such as Dow Jones reports. This user could use the modem pool to access information service data networks, such as Compuserve, Inc.'s offering, over central office or other common carrier trunks. Other global communications networks such as GTE Telenet Communications Corp.' Telenet and Tymnet, Inc.'s Tymnet are being used by many companies for corporate data base access, as well as for access to advanced office features such as electronic mail and protocol conversion.

Still another important value of the voice-data PBX is its suitability for networking. Networking capabilities — the ability to efficiently link various information sources together — have become increasingly more critical.

The voice-data PBX system will offer more advanced networking services in the future through direct digital interfaces. More effective data transfer can be realized over the public data networks which offer interfaces at 56K bit/sec and higher synchronous data transmission rates on the customer premises. Networks such as the Advanced Information Service (AIS)/Net 1000, Telenet, Tymnet, Satellite Business Systems and others are now emerging in the marketplace with this capability.

Eliminating the direct connection between the terminal and the information resource through the installation of a voice-data PBX can assuredly provide greater access to different resources for the user. However, these gains can be negated if the PBX imposes another level of procedures to access the desired resource. User acceptance of the voice-data PBX is an important element in providing the maximum utility of the data switching service in the office.

One procedure may require the user to set up the data call similar to dialing a voice call using the traditional telephone. This procedure can be removed using a prearranged connection much like a hot-line voice call.

This can be effective if the user is dedicated to one particular function. However, the intensive user needing switching access to multiple resources requires the PBX to be transparent for establishing data connections. This can be accomplished by allowing the terminal rather than the telephone to be the call-originating device.

The user then keys in the task to be performed (or the name of the source), rather than the directory number (or complex code) of the resource in which it is stored. In this way, the procedure is oriented more toward both the DP professional and the occasional user.

The voice-data PBX has another advantage over a separate data communications or switching network: the centralized maintenance and administration facility. Service orders can be used to specify both voice terminal and data terminal changes. The service order routines may be accessed through the data switching feature via the terminal, allowing an authorized user to input moves and changes on any terminal.

This can offer two benefits to the administrator of a company's communications system: reduced costs of terminal moves or additions, and a common procedure to be used for both telephone and terminal changes.

A centralized facility would also be useful for collecting administrative reports such as call detail recording and traffic reports. Similarly, maintenance and testing of the system are simplified through the common control. Integrity of the data transmission network may be verified through manual and automatic loopback of data at the data interface unit and at the PBX inlet. If the PBX detects a problem affecting service to a number of users, it can generate an alarm and maintenance message so that a serviceman can quickly repair the system.

The OA concept has generated several theoretical tangents during its development. One tangent, the tripod theory, saw OA composed of three basic technologies: DP, WP and telecommunications. Each technology would occupy its own corporate turf with distinct responsibilities. Another saw a tug-of-war between the PBX and the computer.

However, what appears to be occurring is exactly what OA analysts originally predicted some 20 years ago — a merger between two technologies: telecommunications and information processing — and it is drawing mixed reaction.

It is important to underscore that, despite its recent period of rapid growth, telecommunications is not a new industry. Leading edge developments in the industry date back more than 50 years, with the research and development of the semiconductor and transistor paving the way for the computer industry.

Present-generation voice-data PBX and communications-related instruments like electronic telephones and voice-data workstations are unmistakable indications of a merger between technologies. Further signals have been received from Wall Street, where several industry giants are deliberately crossing paths with new business ventures.

The old guard from both industries will undoubtedly voice concerns. The question of departmental control within corporate organizational structures is already beginning to surface. But in an extremely competitive market where the stakes are high, two important questions remain: What does the end-user need, and what is the best solution?

The voice-data PBX offers the advantage of integrating voice and data communications in a single system, thus allowing OA to take a giant step forward, away from the conceptual storybook stage. OA

Combs is vice-president of marketing for American Telecom, Inc., which is located in Anaheim, Calif.

Computerworld/Mexico talks to computer people south of the border.

There are currently 15,000 installed computers on 12,000 sites in Mexico. These include mainframes, medium and small computers as well as personal computers. Experts forecast the sale of small, medium and large computers to grow at an average annual increase of 20% during the 1980s, despite Mexico's current economic problems. Minicomputers will be in great demand since they are small, affordable and efficient. U.S. manufacturers have maintained a 80% market share for the past three years with sales of over $182 million. *Computerworld/Mexico* can bring your message to 10,000 key-decision makers in the Mexican computer community. Published on alternate Mondays, *Computerworld/Mexico* covers all the latest developments in hardware, software and terminals in addition to data processing and computer related subjects. Its goal is to provide useful information to data processing professionals throughout Mexico and Central America.

CW International Marketing Services is your one-stop advertising service in countries around the computer world. For more information on *Computerworld/Mexico* and the people who read it, just fill out and return the coupon below.

Diane La Pierre Manager,
International Marketing Services
CW COMMUNICATIONS/INC.
375 Cochituate Road, Box 880,
Framingham, MA 01701
(617) 879-0700

CW COMMUNICATIONS/INC.
Publishers of Computerworld and other leading computer publications around the world.

Please send me more information on:
☐ *Computerworld/Mexico* ☐ Your other foreign publications

Name _____ Title _____
Company _____
Address _____
City _____ State _____ Zip _____

PHOTO © 1984 ED GRAVEMAN

Information Systems Deliver

By Jeri Lynn Edwards

Data processing technology has promised two things to corporations: increased productivity of operational groups and integrated information management.

It has delivered consistently on the first promise; however, it has not been so successful in integrating information for planning and control.

Most companies find themselves with only a partial automation of their information systems, for several good reasons:

- ***Unproven benefits.*** Corporations want to understand the benefits and risks associated with computerization before they commit vast resources to it.
- ***Resource limitations.*** Most companies cannot afford to automate everything. Instead, they start in areas where consistent high quality is required and the potential return on investment is highest.
- ***Unavailable technologies.*** Computer technology is advancing rapidly. In many cases, however, corporate needs go beyond vendor offerings. For example, the need for good graphics that can be used in conjunction with text-editing equipment has existed for a long time, but only recently have such packages become available.

Constraints such as those listed above have caused most corporations to develop DP systems for various operational areas one at a time; given the state of technology, this has been a prudent strategy. Now, however, such piecemeal approaches make integration very difficult. The applications have been developed separately on various different computer systems, and the "hooks" required for integration with other systems simply do not exist.

Corporations (and individual divisions within corporations) are all different from the standpoint of information management. The following four stages of development summarize the range of conditions that may exist:

- Stage 1. Centralized automation.
- Stage 2. Decentralized automation.
- Stage 3. Rudimentary networks.
- Stage 4. Integrated information networks.

Centralized Automation. In Stage 1, corporations are just beginning to understand computer technology. One or two key functions are automated, usually in a centralized computer system under the direct control of a corporate DP group. Typically, the applications perform highly structured tasks formerly done by production workers or clerks. No provision is made for interactions between applications, even though they run on the same computer.

Stage 1 can be characterized as follows:

- A few business functions in important operational areas are separately automated.
- The automated functions are simple structured business tasks.
- The applications run on batch-oriented stand-alone computer systems under the control of a central DP department.
- Typically, they do not require a

sophisticated data base management system.

• The applications are not integrated, and the data is rarely shared (even though computer resources are centralized).

• Middle and upper management find it hard to use the reports that are generated (because of their bulk, complexity, and single-area focus).

Decentralized automation. As large organizations advance to Stage 2 in their management of information, they begin to automate more and more functions in the operational areas. In addition, minicomputers begin to proliferate. Every manager is struggling to meet deadlines, every manager sees that computers could help get the work done, the hardware is relatively inexpensive and the machines are getting simpler to program. In the quest for immediate solutions to pressing problems, it is not difficult to justify the purchase of minicomputers, small business computers, word processors and so on.

As a result, the corporate computing environment becomes decentralized. In the operational groups, independent systems spring up, geared totally to local concerns and relying on data bases dedicated to and customized around particular applications. These systems and their associated data bases tend to be viewed as private property because they are bought, developed and managed at the operational level. At that level, few managers think about the vague and distant problem of integrated information management and few think to consult the central DP department about the problem of compatibility with existing equipment.

Because of the variety of these systems and their applications (and the absence of central control), several different ways of entering and reporting information will probably develop. Some applications will be batch-oriented, as in Stage 1. Others will be transaction-oriented (designed to process data relevant to individual business transactions as those transactions occur). The transaction-oriented applications will have advanced data base management systems that allow managers to query the data base interactively. Some systems will produce periodic listings or reports that will be rekeyed into the central corporate data base. Occasionally, such reports will be transferred to magnetic tape; in that form, they will be sent to some interested organization.

Developments in Stage 2 can be summarized as follows:

Multiple computer sites emerge, often with equipment from different vendors. Applications move out to user locations, where the data is generated and used.

Specific business tasks are automated. The automated processes use separate data bases customized for the local environment. The end user is accountable for the quality of the data.

In Stage 2, few managers think about the distant problem of integrated information management and few consult central DP about compatibility.

Some applications may be interactive, transaction-based and on-line, although many will still use batch techniques for data entry and retrieval.

Very few automated linkages exist between the computer systems. When there is a need to share or transfer information, data produced on one system has to be transported physically to the other.

As in Stage 1, managers can get only raw operational information from the various computer systems. However, in Stage 2, they may be able to access some of it interactively.

Rudimentary networks. In Stage 3 of the evolution of corporate information systems, additional functions are automated and communications links or rudimentary networking facilities begin to spring up selectively between specific computer systems.

The communications technology remains rudimentary at this stage. Most often, it allows only simple bulk transfers of data between systems. However, data base management systems, which allow data to be accessed interactively by users at terminals and by processes running on the computer, are becoming more advanced. When combined with sophisticated networking software, these advanced systems extend the interactive reach of local terminals and processes across several machines, thus creating a single virtual system composed of geographically distributed computers.

Announcing MinCAR from Minolta.

It's finally here. The computer-assisted microfilm retrieval system so flexible, it not only can be tailored to meet your present needs, it can adapt to your needs as they change.

What's more, you may already own the most expensive component. Because MinCAR is designed to work with practically any DEC computer. From the Micro-II's to the PDP and VAX systems. And soon with many IBM models.

And that's just the beginning of MinCAR's flexibility. It's the only CAR system in the world that can work as a stand-alone system. Or be integrated with your existing mainframe to give you all the benefits of CAR as well as office automation, such as electronic mail or word processing.

MinCAR is so user friendly, operators can be trained in a few hours. Yet so sophisticated, the number of files it can handle is limited only by the amount of available disk space.

You buy only the components you need. From a single source. And trouble can be handled with one telephone call. In many cases, problems can be diagnosed electronically over the phone.

Your authorized Minolta dealer has all the details. Find him in the Yellow Pages or call 800-821-7700, ext. 327.

MinCAR from Minolta. If you already own part of it, you're just a step away from the incredible benefits of owning all of it.

MINOLTA

© 1983 Minolta Corporation. DEC, Micro-II's, PDP and VAX are registered trademarks of Digital Equipment Corporation. IBM is a registered trademark of International Business Machines.

CW-2/15

☐ I'd like to see a demonstration of MinCAR. Please call me.

☐ Send me complete information.

Name_____

Title_____

Company_____

Address_____

City_____

State_____ Zip_____

Telephone_____

Mail to Minolta Corporation, Micrographics Division, 101 Williams Drive, Ramsey, N.J. 07446.

The major new developments in Stage 3 can be summarized as follows:

- Rudimentary, static linkages are formed between various application domains.
- Interdomain information for middle management is derived from these linkages.
- Advanced data base management technologies facilitate interactive queries of the information within some application domains.

Integrated information networks. In Stage 4, information management systems achieve a balance between decentralization (users doing as they please locally) and integration (ready availability throughout the company of various kinds of information from various different systems). Clearly the establishment of such a system is more than a technical achievement. It represents upper management's firm decision and commitment, based on an understanding of the critical importance of information management to the health of the corporation.

An integrated information management system of this kind, providing managers with a dynamic view of the state of the corporation, would almost certainly improve the quality of tactical and strategic decision making.

In Stage 4, information management systems achieve a balance between decentralization (users doing as they please locally) and integration (ready availability throughout the company of various kinds of information from various different systems).

There are at least three competing strategies for bringing such systems into being:

The single-vendor strategy: A corporation might create a Stage 4 information management system by working exclusively through a mature vendor that offers a broad range of vertically integrated computer products: networking, utility processors, advanced peripherals (such as printers or optical character scanners) and user workstations. Such vendors promise an integrated environment to users purchasing equipment and software exclusively from them.

However, the single-vendor solution locks the corporation into the products of a particular vendor and such vendors typically offer only low-level interfaces to other systems. Thus, the single-vendor approach is reasonable under either of two conditions. Under the first, corporations have no applications running on computer systems made by other vendors. Under the second, they are willing to rewrite those applications and live with the constraints imposed by the technology decisions of the chosen vendor in the future.

If applications must be rewritten, Stage 4 becomes more a revolutionary than an evolutionary development in the life cycle of the information management system, and the cost may be prohibitive.

The network-operating-system strategy: Integrated information management systems can be developed from diverse computer systems if the organization is willing to develop a layer of software compatible with each computer, providing a common data base and network architecture. However, most corporations do not have the resources needed to do this, and there is an alternative.

Several groups, such as the International Standards Organization (ISO), the Institute of Electrical and Electronics Engineers (IEEE) and the Consultative Committee for International Telegraph and Telephone (CCITT) are working on standards for a software layer that would provide a network operating system.

Computer system vendors are expected to adopt these standards, which will make possible the development of integrated information management systems through the common interface.

The following factors will probably prevent most corporations from implementing network operating systems as a way of advancing to Stage 4 in their information management:

Most of the new standards will be completed between 1984 and 1986, and it will probably take six or seven years for a substantial percentage of the vendors to modify their hardware and software to accommodate these standards. Thus, corporations interested in integrated information management will have to wait a long time for vendor-supplied solutions.

The only way a corporation can avoid the delay is to implement a network operating system itself, and this would require resources few of them have.

In either case, a network operating system would introduce a substantial amount of processing overhead — the existing systems would end up having to do a great deal of additional processing to maintain the integrated information environment.

The intelligent-network strategy: In the third strategy for developing an integrated information management system, a network of similar processors is established to provide a unified interface through which diverse computer systems could be linked. This single multifunction network would link and manage all information resources, tying people, devices, data and procedures together.

Key features of this concept are the following:

The intelligent network would perform all advanced communications and integration functions for the corporation, such as data base maintenance and report/inquiry capabilities; format-translation services between various data record structures, document images, screen displays and so on; message switching for various forms of information, such as graphics, facsimile images, voicegrams, text and formatted data; and information routing to the appropriate recipients, by content as well as by address.

The corporation's various interactive domains would be connected through the intelligent network. The network also provides access to an external information source (Bell's Advanced Information System (AIS)/Net 1000), which furnishes commodity information, stock prices, news reports and other kinds of information.

Information sent to the intelligent network from the application domains can be forwarded to other domains or stored in the network. The network can automatically translate between the different formats of the attached data bases.

The intelligent network provides the best of two worlds. It is a corporatewide resource under centralized control. Thus, there is centralized access to all resources, but it is physically distributed throughout the company. Such an arrangement reduces the high communications costs associated with an integrated information management system based on a central monolithic computer. It also adds to the fault-tolerance of the system and facilitates the development of customized interfaces or gateways to the network for each of the local environments. Each application domain interfaces to the intelligent network through a gateway designed specifically to meet its needs and capabilities. Thus, each can obtain information with and offer information to other domains without knowing about the particular communications ability of those domains. OA

Edwards is a data communications engineer at Tandem Computers, Inc. in Cupertino, Calif.

"Was your computer operator a "stickup victim" again?

Humidity and static electricity can cause all kinds of costly, annoying disruptions to your work flow and productivity. All of which is unnecessary because Liebert offers low cost, sensible solutions to every small computer environmental and power problem. For details, call **614/888-0246.** We help make your computer investment pay off!

Liebert Corporation, 1050 Dearborn Drive, P.O. Box 29186, Columbus, Ohio 43229, 614/888-0246 Telex: 246555 LIEBERT WOOH

Communications.

How to tie things together today without being tied down tomorrow.

This April, *Computerworld Office Automation* will give you a close look at the world of communications products and services. You'll read about what's out there now and what's coming. And how to get started while leaving your architecture open for the technologies of the future. And you'll get it all from the perspective of end users who have to increase productivity *now* while making sure the their company's investment won't be obsolete in two years.

And that's not all. There'll be feature articles on:

- PBX *versus* local area networks and how they'll merge
- voice technology
- videoconferencing technology
- satellite technology
- inter and intra company communications strategies
- product evaluations and comparisons

And after we cover all the developments for you, we'll offer you strategies to link them all together into one integrated system.

Computerworld Office Automation is designed to give you OA information geared to the DP/MIS environment — in a way that no traditional office publication can. As one of *Computerworld's* 114,000 subscribers in the U.S, you'll get six issues of *Computerworld Office Automation* in 1984 — as part of your subscription! And if your users need to increase their communications links, you won't want to miss this issue devoted to Communications in the office.

If you've got office automation and office communication products our readers should know about, then you need to get your ad reservation in by March 2nd.To reserve ad space in this April 11th issue of *Computerworld Office Automation*, call one of the sales offices listed below, or Ed Marecki, National Sales Director at 617-879-0700.

To: Ed Marecki, *National Sales Director*
CW Communications/Inc.
Box 880
Framingham, MA 01701

☐ *Please send me advertising information on Computerworld Office Automation.*

☐ *Please have a sales representative call me.*

Name _____

Title _____

Company _____

Address _____

City _____ State _____ Zip _____

Telephone _____ 4/11

Computerworld
OFFICE AUTOMATION

BOSTON/Chris Lee, Jayne Donovan, Michael Kelleher, Ron Mastro, Jim McClure, Alice Longley, *(617) 879-0700*

CHICAGO/Art Kossack, Chris Lee, Jean Broderick, *(312) 827-4433*

NEW YORK/Mike Masters, Doug Chaney, Ray Corbin, Joan Daly, Fred LoSapio, Gale M. Paterno, *(201) 967-1580*

ATLANTA/Jeffrey Melnick, Mike Masters, *(404) 394-0758*

SAN FRANCISCO/Bill Healey, Ernie Chamberlain, Theodore Franson, Barry Milione, Nicole Boothman (recruitment), *(415) 421-7550*

LOS ANGELES/Bernie Hockswender, Bob Hubbard, Bill Healey *(714) 261-1230*

TECHNOLOGY

MAYNARD, Mass. — Dectalk, a voice synthesis product that reportedly allows computers to read aloud and that provides unlimited vocabulary was introduced by **Digital Equipment Corp.** Dectalk will be priced at $4,000 and will be available in March.

DEC also announced enhancements to its Decmate II Office Workstation; its All-In-One product; communications links to Wang Laboratories, Inc. and IBM; a Unix-like operating system for its VAX minicomputers; and an agreement with Microsoft Corp. to support Microsoft Windows for DEC's Rainbow personal computers.

Among the enhancements to Decmate II were Decmate/Decspell, Decmate Graphics Option and WPS word processing software version 1.5. For its All-In-One system, DEC unveiled Decpage for high-quality document output and Decdx for transfer of full documents between VAX systems and DEC WP systems. The company introduced Bisynchronous Terminal Support to allow document exchange with IBM 3270-type terminals and VAX systems; and External Document Exchange, which allows full document transfer between VAX and Wang's OIS Office System.

Decspell, WPS word processing version 1.5, Decpage and Decdx will be available this spring and will cost $395, $995, $7,000 including service and $2,850 with service, respectively. Decmate Graphics Option costs $695 and the BTS product is priced at $3,000 with service; both are available now.

More information on all the DEC announcements is available from Digital Equipment Corp., Main St., Maynard, Mass. 01754.

NEW YORK — **AT&T** announced the release of a new, enhanced version of Unix System V and introduced three new software packages designed to serve in a Unix environment.

According to the company, the new version of Unix will run programs about 5% to 10% faster than the current offering and offers greater job control; a new way to handle electronic mail; and a new command, which allows administrators and users to send trouble reports to the Unix software support center.

AT&T also unveiled Unix Documenter's Workbench, Unix System Basic and the Motorola Software Generation System designed for users that are developing software using Motorola's 68000 microprocessor.

The enhanced version of Unix System V is available for $43,000 for an initial source license (those already holding System V licenses can get the upgrade and Workbench for $2,500). Workbench is priced at $4,000 for an initial license; Basic at $5,000; and the Motorola Software for $7,500 for an initial license, the vendor said.

For more information, contact AT&T Technologies Software and Sales Division, Greensboro, N.C.

RYE BROOK, N.Y. — **IBM** unveiled its Personal Computer Interactive Executive (PC/IX) operating system, derived from AT&T's Unix Time Sharing System, for its PC. The system can reportedly be used for program development, text processing or running a variety of existing Unix system application programs.

According to IBM, PC/IX is a recompiled set of Unix system source statements with a redesign of the essential portions of code to improve performance and reliability. It was developed for IBM by Interactive Systems Corp. and runs on both the IBM PC and the PC XT, requiring at least 256K of memory, one dual-sided diskette drive and one 10M-byte fixed-disk drive. The product, available in April, will be priced at $600 for a one-time license charge from IBM, 900 King St., Rye Brook, N.Y. 10573.

SANTA CLARA, Calif. — The British are coming (and they're bringing personal computers). **Applied Computer Techniques (ACT)**, Great Britain's largest microcomputer company, has in-

You can count on 3M diskettes. Day after day.

Just like the sun, you can rely on 3M diskettes every day. At 3M, reliability is built into every diskette. We've been in the computer media business for over 30 years. And we've never settled in. We're constantly improving and perfecting our product line, from computer tape and data cartridges to floppy disks.

3M diskettes are made at 3M. That way, we have complete control over the entire manufacturing process. And you can have complete confidence in the reliability of every 3M diskette you buy.

Look in the Yellow Pages under Computer Supplies and Parts for the 3M distributor nearest you. In Canada, write 3M Canada, Inc., London, Ontario. If it's worth remembering, it's worth 3M diskettes.

3M hears you...

3M

TECHNOLOGY

troduced its Apricot executive microcomputer in the U.S. Apricot, reportedly a fourth-generation, IBM-compatible, 16-bit microcomputer, is 8086-based and includes 256K bytes of main memory, three operating systems (MS-DOS, CP/M-86 and concurrent CP/M-86), 3½-in. Sony Microdrives and bundled executive software. The Apricot weighs 17½ lbs and can be used in a portable mode.

It is available for $2,495 from ACT (North America), Inc., 3375 Scott Blvd., Suite 336, Santa Clara, Calif.

CUPERTINO, Calif. — While most of the attention has been focused on the Macintosh, **Apple Computer, Inc.** introduced a lower priced, enhanced version of its Lisa system.

The Lisa 2 series includes three new versions of Lisa: Lisa 2, Lisa 2/5 and Lisa 2/10. The Lisa 2 reportedly has 512K bytes of memory and a 3½-in. microdisk drive for mass storage. The Lisa 2/5 and 2/10 share these features and offer additional mass storage. Each member of the series can also run programs designed for the Macintosh as well as Lisa software.

Apple is offering owners of the original Lisa a free upgrade to a Lisa 2/5 until June 1 (after which time the upgrade will cost $595) or an upgrade to a 2/10 for $2,495. The series ranges in price from $3,495 to $5,495 from Apple Computer, Inc., 20525 Mariani Ave., Cupertino, Calif. 95014.

LOWELL, Mass. — **Wang Laboratories, Inc.** announced enhancements to its Professional Computer as well as to its DVX Digital Voice Exchange.

For its Professional Computer, Wang introduced the 3278 Emulation Board, a combined hardware and software package that allows the Professional Computer or the Wang Professional Image Computer to access instantly an IBM mainframe data base when attached to a 3270 terminal network. The 3278 Emulation Board is available as a stand-alone product or as an attachment to the Wangnet Cmux-3270 Cable Multiplexer. It costs $1,095 and will be available next month.

Wang and **Microsoft Corp.** of Bellevue, Wash., announced that Microsoft Windows, an extension of the MS-DOS operating system will be available for the Wang Professional Computer. The product will be offered as part of the bundled software for the Professional Computer beginning in the second quarter of 1984.

Wang also unveiled enhancements to its DVX digital voice exchange including the DVX Message Waiting unit (priced at $225 per unit), DVX networking capabilities ($1,000 per node and $10 per month license fee) and DVX Feature Package 3.8 ($14,000 initial charge and $140 license fee).

For more information, contact Wang, One Industrial Ave., Lowell, Mass. 01851.

MORRIS PLAINS, N.J. — The Monroe System 2000, a 16-bit high-speed microcomputer, was introduced by Monroe Systems for Business, Inc. The System 2000 is based on the Intel 80186 microprocessor and comes complete with the CP/M 86 DPX and MS-DOS operating systems, 128K bytes of random-access memory expandable to 896K bytes and a 12-in. amber monochrome video display screen.

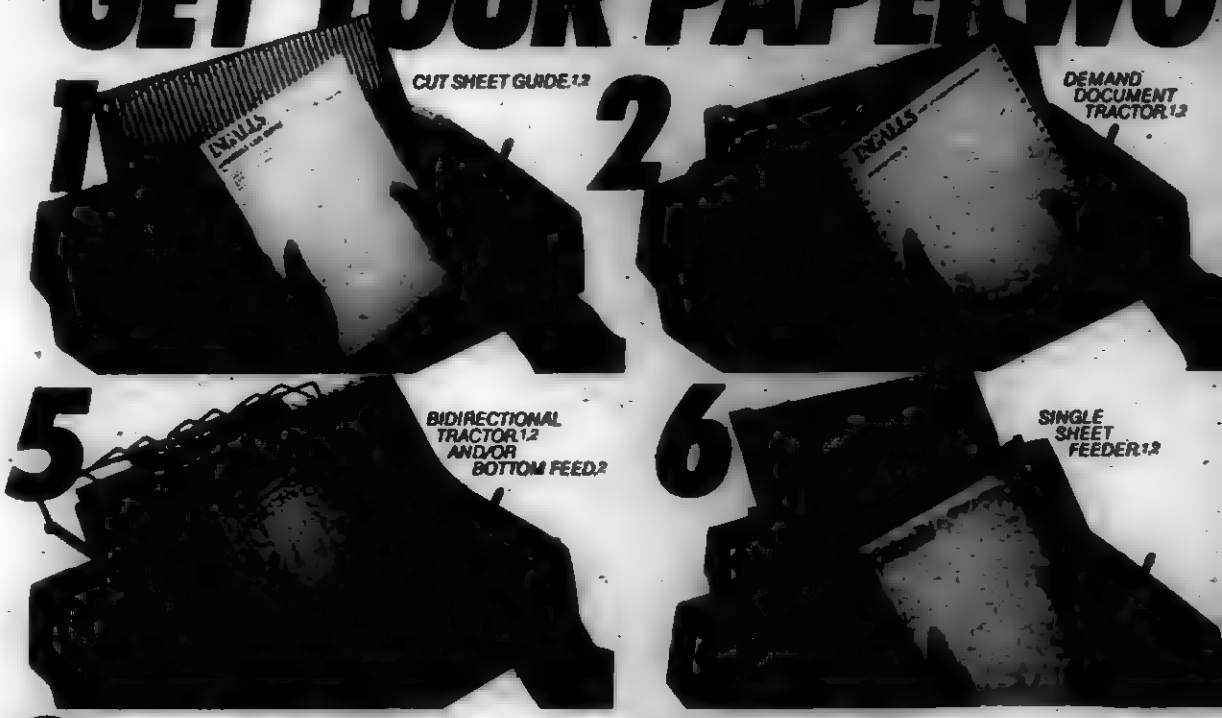
The system is available for $3,675 from Monroe Systems for Business, The American Road, Morris Plains, N.J.

NEW YORK — Pro Computing has unveiled its integrated software package for business professionals.

Propel is reportedly fully integrated and has multiple applications such as phone communications, written communications and number processing. It can be used to send and receive voice messages; prepare letters, memos and reports; and analyze numerical data presented in tables, graphs and spreadsheets, the vendor said.

Propel will initially operate on Digital Equipment Corp.'s Professional 350 microcom-

SPINWRITER INTR
GET YOUR PAPERWO



No other printer gives you so many options for automatic paper handling.

These nine NEC forms handlers can automate most of the printing operations in your office. And to put them to work, you don't have to change the way you work. Because they handle your existing forms, letterheads and envelopes.

With most other printers, you'd be lucky to find even one of these productivity tools.

Why is NEC so committed to forms handlers, while others ignore them? For one thing, we make the world's finest letter quality printers. And we believe that if you buy a computer system in the first place, you ought to be able to take advantage of everything it can do.

YOU CAN GET YOUR CORRESPONDENCE IN THE MAIL 50% FASTER.

Shift from word processing to billing, shipping or inventory control in seconds.

Seconds is all it takes for the average operator to change most of these NEC forms handlers.

Want to dash off a few hundred original letters to your customers? Just snap on our automatic Single Sheet Feeder.

If you add our Dual Bin or Envelope Feeder, you can take care of second sheets or envelopes at the same time. And you'll have the whole package in the mail in about half the time it would take to do it manually.

One of our most popular options is the Bidirectional Tractor. It gives you the precise forward and reverse paper motion you need to print subscripts, superscripts and complex graphics and tables.

OA TECHNOLOGY

puter and will be available in March for $1,195 (minimum orders) from Pro Computing, Suite 3314, One Penn Plaza, New York, N.Y. 10119.

HOUSTON, Texas — Zalsan, Inc. introduced its ES.1 voice/data workstation.

The ES.1 reportedly integrates an advanced executive-feature telephone; a data terminal with a 9-in. high-resolution CRT; an internal 300 bit/sec. full-duplex modem; a detachable keyboard; and personal business support software.

The ES.1 is scheduled for shipping in the first quarter of 1984 and is priced at $650 from Zalsan, Inc., 13910 Champion Forest Drive, Houston, Texas 77069.

SANTA MONICA, Calif. — Compucorp, Inc. announced its OA 3200 minicomputer and Omegamite, a transportable version of the company's word processing equipment. The OA 3200 is a 10 MHz 68000-based CPU, with error-correcting memory ranging from 256K bytes to 2M bytes. It features several I/O processors and four independent buses, including the IEEE 796 Multibus and includes two high throughput front-end communications processors for supporting multiple local-area networks.

Omegamite reportedly combines a WP package and support of a host of CP/M applications in a transportable device that weighs less than 25 lbs. It is targeted at professionals who spend considerable amounts of time away from their offices. It is available with from 64K to 512K bytes of random-access memory, single or dual 655K-byte floppy disks, a 9-in. amber CRT and a communications modem.

Omegamite is priced at $2,995 from Compucorp, 2211 Michigan Ave., Santa Monica, Calif. 90404.

JERICHO, N.Y. — Computer Associates International, Inc. has released CA-Executive, a microcomputer software product for the executive workstation. The product reportedly consists of a full line of integrated business applications, a micro-to-mainframe link and communications facility, as well as a window manager.

CA-Executive was designed to run on IBM and compatible micros including IBM's PC/XT. It runs under the PC DOS 2.0 operating system and uses a full-color graphics monitor. It requires 256K bytes of memory and includes data base management, spreadsheet, WP, editing, graphics and others.

CA-Executive is priced at $1,295 for five to 10 units (with prices descending as order size increases) from Computer Associates International, 125 Jericho Turnpike, Jericho, N.Y. 11753.

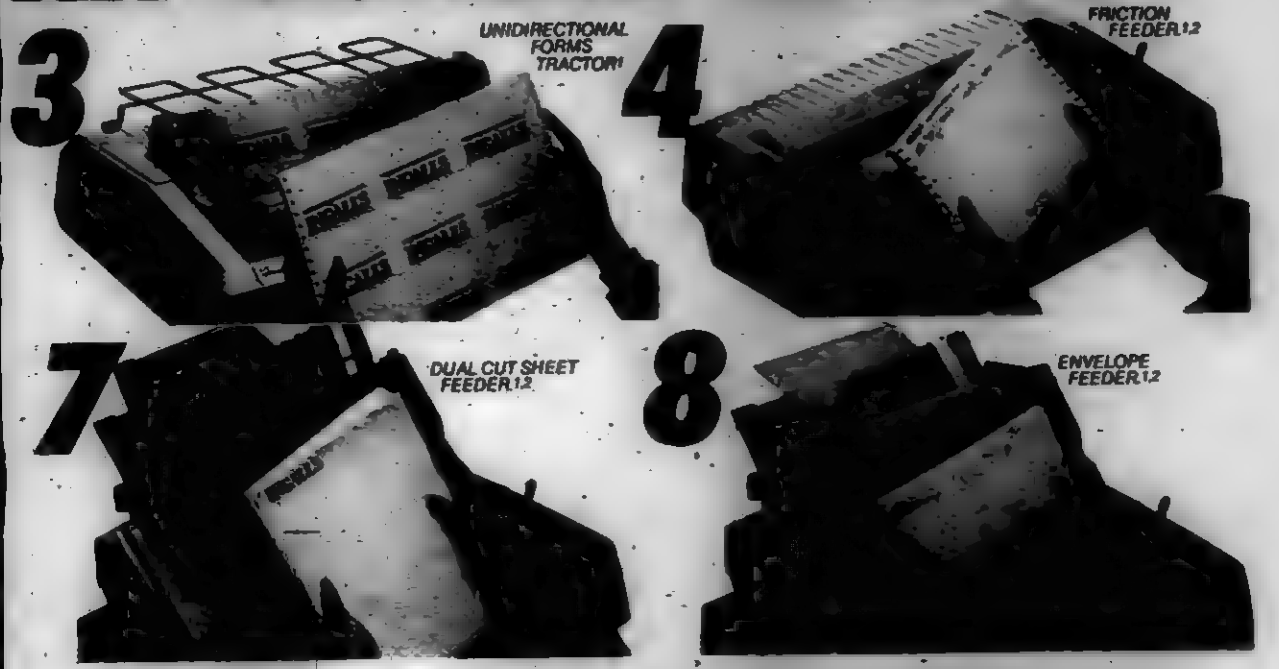
SECAUCUS, N.J. — Panasonic Co. introduced its personal portable computer, the Senior Partner. The portable reportedly utilizes the the MS-DOS 2.0 operating system and can run IBM-compatible software and hardware. It also features a built-in thermal printer, a double-sided, double-density disk drive, 128K bytes of random-access memory and a 9-in. CRT.

The Senior Partner utilizes a 16-bit 8088 microprocessor with an 8087 coprocessor socket. It weighs 28.7 lbs and will be available in March for $2,495 from Panasonic, One Panasonic Way, Secaucus, N.J. 07094.

NORWOOD, Mass. — Raytheon Data Systems Co. made its entry into the office automation market with the introduction of its RDS Signature 8200, a 16-bit business computer featuring DP, WP and communications capabilities.

The system is available with either a 15-in. color or 12-in. monochrome monitor and reportedly features the F8300 Processor module as the core of each workstation. A typical WP configuration, consisting of the monochrome display and keyboard, processor module with dual floppy drives and 512K bytes of random-access memory costs $9,050 from Raytheon Data Systems, 1415 Boston-Providence Turnpike, Norwood, Mass. 02062. OA

ODUCES 9 WAYS TO
RK MOVING FASTER.



NEC forms handlers are designed and built by the same people who make the Spinwriter.

You'll find most competitive forms handlers, when you can find them, are made by third parties. Which means they're compromises.

NEC forms handlers, on the other hand, are anything but. They have all been conceived by the Spinwriter team. So they are perfectly integrated with the Spinwriter. That's why most NEC devices can be used on any Spinwriter model, including our new 2000 series. **Spinwriters have a hard-earned reputation for reliability.**

Spinwriters are known for their dependability. In fact, five years without a failure is not unusual. Which is about twice as good as any other printer.

If you ever do need a little service it's nearby and our modular design makes it fast and easy.

Where can you find Spinwriters and NEC form handlers? At participating ComputerLand stores, Sears Business Systems Centers, IBM Product Centers, Entre Computer Centers and authorized NEC Spinwriter distributors nationwide. Or call 800-343-4418 for product literature. In Massachusetts call (617) 264-8635. And find out why more and more PC users are saying "NEC and me."

1. 2000 SERIES. 2. 3500 SERIES.

NEC AND ME

NEC Information Systems, Inc. 1414 Mass. Ave. Boxborough, MA 01719

CALENDAR

Feb. 18-19, Los Angeles — **Third Annual Office Systems Research Association Conference.** Contact: Joel D. Levy, Conference Chairman, 115 Maywood Drive, Rochester, N.Y. 14618.

Feb. 20-22, Los Angeles — **1984 Office Automation Conference.** Contact: Afips, 1899 Preston White Drive, Reston, Va. 22091.

Feb. 21, 23, New York — **Unix System: Concepts and Facilities.** Contact: Women in Data Processing, Inc., 310 Madison Ave., New York, N.Y. 10017.

Feb. 22, New York — **Introduction to Local-Area Networks.** Contact: Women in Data Processing, Inc., 310 Madison Ave., New York, N.Y. 10017.

Feb. 22-24, Sacramento, Calif. and Indianapolis — **Personal Computers and Networking.** Also, Feb. 27-29, Denver. Contact: Center for Advanced Professional Education (Cape), 1820 E. Garry St., Suite 110, Santa Ana, Calif. 92705.

Feb. 27-28, Boston — **Software Tools for Distributed Decision Support Systems.** Contact: Software Tools Conference, Suffolk University, Boston, Mass. 02108.

Feb. 27-29, Orlando, Fla. — **Local-Area Networks.** Contact: Cape, 1820 E. Garry St., Suite 110 Santa Ana, Calif. 92705.

Feb. 28-29, Washington, D.C. — **Forum on Unauthorized Access.** Contact: The Videotex Industry Association, 1901 N. Fort Myer Drive, Suite 200, Rosslyn, Va. 22209.

Feb. 29-March 1, San Francisco — **Public vs. Private Networks After Divestiture.** Contact: Probe Research, Inc., P.O. Box 590, Morristown, N.J. 07960.

March 1, New York — **Microcomputers: High Performance/High Payoff.** Contact: Micro Conference, 215 First St., Cambridge, Mass. 02142.

March 2, Boston — **The Micro Meets the Mainframe — IDC Briefing Session.** Also, March 5, Washington, D.C.; March 7, Chicago; March 9, Dallas; March 12, Los Angeles; and March 14, San Jose. Contact: International Data Corp., 5 Speen St., Framingham, Mass. 01701.

March 8-9, San Francisco — **IBM Futures (1983-1988).** Contact: Techtran, 72 Cummings Point Road, P.O. Box 10212, Stamford, Conn. 06904.

March 12-15, Las Vegas — **Interface '84.** Contact: Interface '84, 300 First Ave., Needham, Mass. 02194.

March 13-15, Los Angeles — **Optical Storage of Documents and Images.** Contact: Technology Opportunity Conference, P.O. Box 14817, San Francisco, Calif. 94114.

March 19, Washington, D.C. — **Federal Office Systems Expo.** Contact: National Trade Productions, Inc., 9418 Annapolis Road, Lanham, Md. 20706.

March 19-22, Chicago — **Office Automation Society International Annual Conference.** Contact: OASI, 2108-C Gallows Road, Vienna, Va. 22180.

April 11-12, New York — **Executives in the Changing Environment.** Contact: The Conference Board, Inc. P.O. Box 4026, Church St. Station, New York 10249.

Computerworld Sales Offices

Donald E. Pagan, Vice-President/Sales. Edward F. Marecki, Director/National Sales. Frank Collins, Corporate Advertising Administrator, Kathy Doyle, Marketing Support Manager, Elaine Carlos, Special Publications Ad Coordinator. COMPUTERWORLD, 375 Cochituate Road, Box 880, Framingham, Mass. 01701, Phone: (617) 879-0700, Telex: 95-1153.

BOSTON SALES OFFICE: Chris Lee, Northern Regional Director. Jim McClure, Ronald Mastro, Jayne Donovan, Michael F. Kelleher, District Managers. Alice Longley, Sales Assistant. COMPUTERWORLD, 375 Cochituate Road, Box 880, Framingham, Mass. 01701, Phone: (617) 879-0700, Telex: 95-1153.

NEW YORK SALES OFFICE: Michael J. Masters, Eastern Regional Director. Doug Cheney, Senior District Manager. Ray Curtin, Joan Daly, Fred LoSapio, District Managers. Gale M. Paterno, Sales Assistant. COMPUTERWORLD, Paramus Plaza I, 140 Route 17 North, Paramus, N.J. 07652, Phone: (201) 967-1350.

CHICAGO SALES OFFICE: Art Kossack, District Manager. Joan F. Broderick, Sales Assistant. Chris Lee, Northern Regional Director. COMPUTERWORLD, 2600 South River Road, Suite 304, Des Plaines, Ill. 60018, Phone: (312) 827-4433.

LOS ANGELES SALES OFFICE: Bob Hubbard, Senior District Manager. Bernie Hockwender, District Manager. Beverly Raus, Account Coordinator. William J. Healey, Western Regional Director. COMPUTERWORLD, 18006 Skypark Circle, Suite 200, Irvine, Calif. 92714, Phone: (714) 261-1230.

SAN FRANCISCO SALES OFFICE: William J. Healey, Western Regional Director. Barry G. Milione, Senior District Manager. Theodora Franson, Ernest Chamberlain, District Managers. Ruth Gordon, Account Coordinator. Nicole Boothman, Recruitment Account Manager. COMPUTERWORLD, 300 Broadway, Suite 20, San Francisco, Calif. 94133, Phone: (415) 421-7330.

ATLANTA SALES OFFICE: Jeffrey Melnick, District Manager. Michael J. Masters, Eastern Regional Director. COMPUTERWORLD, 1853 Peeler Road, Suite D, Atlanta, GA 30338, Phone: (404) 394-0758.

ADVERTISERS INDEX

American Telecom 32
714-630-7721
Applied Data Research ..... Cover 2
201-874-9000

BASF ..... Cover 3
800-343-4600

Cullinet 21
Seminar Center 800-225-9930, in MA 617-329-7700
CWCI 54
CW International 14,56
CW Office Automation 60

Data General 4
800-554-4343 oper 05A
DEC/Office Information Systems 10-11
800-332-2220
DEST Corp 39
800-538-7582, in CA 408-946-7100

Eastman Kodak Co. 45

GTE Business Communications Sys. 26-27

Insight Software 20
914-682-4910
Integrated Technologies, Inc. 34
215-788-9330

Leading Edge Products ..... Cover 4
800-343-6833, In MA 617-826-5150
Liebert Corporation 19,59
614-888-0246

3M 6-7
800-328-1684, in MN 800-792-1072, in CANADA 800-268-9055 oper 13
3M-Office Products Division 61
Manpower 35
Minolta Corporation 58
800-821-7700 ext 327
Mohawk Data Sciences 42-43
800-MDS-HERO

National Business Systems 28
203-677-8396
NEC 62-63
800-343-4418, in MA 617-264-8636
NEC Telephones 3
800-645-9636, in NY State 516-249-4511

Samsonite Furniture Division 33
800-52-SMART
Sorbus Inc. 8
Collect-east 215-296-5280, central 314-532-8817, west 415-472-4770
Sperry Corp. 40
Steel Heddle 46
803-244-4110

3COM 50-51
415-961-9602
TRANS-LUX Corporation 18
800-243-5544 ext 102, in CT 203-853-4321

US Postal Service 15

VMX, Inc. 37
214-699-1461

Wang Laboratories 55
800-225-9264
Wright Line 30

Ziyad, Inc. 36
201-627-7600

This index is provided as an additional service. The publisher does not assume any liability for errors or omissions.

ISKS.
F
OU NCE.

BASF Qualimetric FlexyDisks fe qua lif
assurance that the vital informat enter on
today will be secure and unchanged tomorrow. Key to th
extraordinary warranted performance is the BASF Qualim
standard...a totally new set of criteria against which
magnetic media will be judged.

You can count on BASF FlexyDisks bec the Qualimetric standard reflects a continuing BASF comm ment to perfection in magnetic media. One exa le is the unique two-piece liner in our FlexyDisk jacket. This BASF feature traps damaging debris away from the disk's surface and creates extra space in the head access area for optimum media-head alignment. The result is a guaranteed lifetime of outstanding performance.

For information security that bridges the gap between today and tomorrow, look for the distinctive BASF package with the Qualimetric seal. Call 800-343-4600 for the name of your nearest supplier.

*Contact BASF for warranty details.

ENTER TOMORROW

BASF

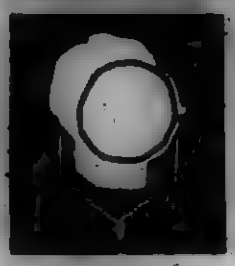
THE DAY THE IBM PC BECAME OBSOLETE.

VOL 18
ISSUE 8
FE 20 1984
UMI

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

COMPUTERWORLD

$2.00 A COPY; $44/YEAR | FEBRUARY 20, 1984 | VOL. XVIII, NO. 8



Spotlight
Bypass:
what's here,
what's ahead/18

In Depth
Roles managers
must play 69/13

Crime and punishment
Bills dealing with
DP crime
languish in
Congress/12

Room
New lease
on life?/14

CW MAR85
MI48116UIVVMOSHJ D 29C 502213
JI MOOSCH
6814 MARGO DR
BRIGHTON MI 48116

NEWSPAPER

TOP OF THE NEWS

All tied up: Three vendors, including Data General Corp., have announced micro-to-mainframe links. Page 2.

■

Trying perhaps to unload older rental and lease agreements, IBM last week raised its convenience agreement rates on most older hardware by 7% to 10%. Page 4.

■

Building up its Tower line of supermicros, NCR Corp. last week added a Cobol-oriented processor. The new I-Tower replaces NCR's aging I-9020 minicomputer series. Page 6.

■

Two more Stars are on the horizon for users. They were introduced last week by Xerox Corp., which lopped almost one-third off the price of its 8010 Star model. Page 6.

■

Half the pregnancies of VDT operators ended "adversely" during a four-year period at United Airlines' telephone reservations office in San Francisco, 9 to 5 reported last week. Page 8.

■

Simpler than Basic, more powerful and elegant than either Pascal or PL/I and offering debugging, portability and modular programming capabilities that outstrip all three. That is how a member of a University of Toronto research team described Turing, a general-purpose programming language the team recently developed. Page 42.

■

The road to the kingdom of on-line, integrated, central data base systems is full of potholes for some application software developers. Page 52.

■

International group forcing U.S. hand on Cobol standard

By Paul [illegible]
CW Staff

VIENNA — The International Standards Organization's working group on Cobol-80 last week bucked tradition and adopted a proposed American National Standards Institute X3J4 Committee standard and modifications before public review or approval by the parent X3 Committee.

The move could signal a breakthrough in the deadlocked attempts to reach a Cobol-80 standard.

In an unusual move, the ISO Technical Committee 97/Standing Committee 5/Working Group 8 approved and sent on to the parent SC5 Committee the most recent Ansi X3J4 proposal — sometimes called the "pink book" — and X3J4's "S" and "D" modification documents. The move came despite the fact that the standard is scheduled to undergo at least one more limited public review — a process that could last into 1985 — before it is submitted to Ansi's X3 Committee.

If the WG8 recommendation is approved, the machinery would be set in motion to adopt an international standard before the Ansi standard is approved, a highly unusual action, sources said.

The Cobol-80 standard has been ex-

See COBOL-80 page 6

Lotus adds two steps to '1-2-3'

NEW YORK — Lotus Development Corp. last week added steps four and five to its fast-selling Lotus 1-2-3 integrated microcomputer software package when it unveiled a single-floppy program that includes word processing, communications, graphics, spreadsheet and data base capabilities.

The $695 program, named Symphony, will be available July 2 for the IBM Personal Computer and Personal Computer XT. The five-function package requires 320K bytes of random-access memory, but its data base function needs 640K bytes of RAM, the stiffest dose of memory available on the Personal Computer, to operate at full strength, a spokesman said.

Symphony includes a window management system that allows a user to create an unlimited number of windows and to enter data simultaneously through each of them, according to Lotus President Mitchell Kapor.

Other features include a word processing-to-communications link, the ability to store 8,000 records in the data base, a spreadsheet of 8,192 rows by 256 columns, a zoom key for enlarging a window to full screen size and a command language for manual programming.

The word processor, which Lotus described as being similar to those offered by Wang Laboratories, Inc., can combine data

See LOTUS page 6

FYI

Making (and putting) their mark on micro software

By John Gallant
CW Staff

When Philip Raymond likens his software testing company to Underwriters Laboratories, Inc. and *Good Housekeeping* magazine, the comparison is not made casually. Nor is that analogy used solely by Raymond.

Raymond's firm, Peripheral Vision Co. of Marlboro, Mass., is one of at least three companies that currently offer to stamp their seals of approval on microcomputer software that has met their testing requirements. For the other two — the International Bureau of Software Test of Sunnyvale, Calif., and Benchmark Computer Systems, Inc. of Edina, Minn. — as well as for Peripheral Vision, comparison with the *Good Housekeeping* and UL seals of approval is an important marketing tool to bolster credibility.

IBST is the only firm among the three that deals solely with software testing and approval. The company has been in business since 1982 and currently employs 26 consultants and full-time software experts who put new software packages through their paces on a variety of micros in IBST's testing labs.

If a package is fully approved by the test team, according to IBST President William Goss, its manufacturer can display IBST's Seal of Approval, which is earned by about 15% of the packages tested.

Like Peripheral Vision and Benchmark Computer Systems, IBST claims to employ rigorous, structured testing methods that involve at least three experts. "We're independent, and we take a systematic, thorough approach," Goss said. "We find problems that the in-house testing team might have overlooked. The software developer is often too involved with the product to be objective, and he might overlook problems we can catch."

Raymond, a former design engineer who left Digital Equipment Corp. in 1982 to found Peripheral Vision, said the Peripheral Vision Software Seal of Approval can be a powerful marketing tool for a software manufacturer. "Buyers can't judge software from its packaging or its documentation. They can't choose between 10 or 15 similar packages simply on what they say on the outside. Our position as an independent software testing firm will help buyers to choose one vendor's package over another's."

Raymond claimed Peripheral Vision's revenues from software testing grow from 20% to 50% of its annual earnings last year alone. Raymond's network of consultants also reviews technical manuscripts for most major publishing companies. Peripheral Vision has targeted the stamp of approval service at the publishing firms, Raymond explained, as they enter the micro software marketplace.

"We sell a comprehensive strategy of software integrity approval to the software publishing industry. We want to help the publishers of printed media use their established market position to sustain a foray into software publishing and distribution," Raymond said.

Benchmark Computer Systems has taken a slightly different approach to soft-

See SEALS page 10

Three tie micros to mainframes

DG board links its small units to IBM CPUs

By Susan Hathaway
CW Staff

WESTBORO, Mass. — Data General Corp. has introduced a communications interface that is said to permit direct communications between IBM mainframes and DG's Desktop Generation, Eclipse S/20 and Eclipse C/30 low-end processors. The product is scheduled to make its debut today at the Office Automation Conference in Los Angeles.

The ISMC/2 is a two-channel, front-end, intelligent synchronous micro controller board that enables its processors to offload high-speed synchronous communications for more efficient file transfer and interactive communications, according to a DG spokesman.

Supported by DG's bisynchronous DG/SNA and X.25-compliant Xodiac communications software products, the ISMC/2 lets the Desktop Generation, S/20 and C/30 systems connect directly to a Systems Network Architecture/Synchronous Data Link Control or public data network, as well as DG's own network, the vendor said.

Direct tie to IBM CPUs

The ISMC/2 gives the Desktop Generation a facility for communicating directly with IBM mainframes via DG's bisynchronous and DG/SNA products.

The product, which runs under DG's AOS and AOS/WS operating systems, is a single 7- by 9-in. printed-circuit board that reportedly fits into any unreserved slot in the CPU chassis or expansion module of a Desktop Generation Model 10SP, Eclipse 20 or Eclipse 30, according to a spokesman for the vendor.

The ISMC/2 is composed of a 16-bit Microeclipse processor with 32K bytes of dynamic random-access memory, a host I/O system and two communications channels. Each channel is capable of full-duplex communications, with modem control and a choice of interface, the vendor noted.

At press time, the price for ISMC/2 was set at $1,650. Additional information is available from DG, located at 440 Computer Drive, Westboro, Mass. 01580.

CORRECTIONS

An announcement of the Cause on-line member data base [CW, Jan. 23] should have stated that the data base includes information from more than 150 different applications divided into 10 areas.

An announcement of Syncsort, Inc.'s Syncsort OS Release 2.5 [CW, Feb. 6] failed to state that the major enhancement to the new release is performance improvements of between 15% and 35%.

Real-time link ties IBM micro to SI software

By John Gallant
CW Staff

ANDOVER, Mass. — Software International Corp. last week entered the micro-to-mainframe communications market by announcing a real-time link between its mainframe general ledger package and a variety of applications that run on the IBM Personal Computer.

Smart Link enables Personal Computer users to extend the data extraction and manipulation resources of Software International's on-line General Ledger and Financial Reporting System at the micro level, a spokesman said.

The product is said to provide for on-line, real-time extraction of live data and does not use any batch processing mechanisms to create a shadow file accessed by the micro.

No modifications

Smart Link reportedly requires no modifications to Software International's General Ledger and Financial Reporting System on the mainframe. It provides users with the ability to perform operations such as data input and report production on the Personal Computer that would otherwise be performed on an IBM 3270 terminal.

In addition, Smart Link reportedly uploads budget information to appropriate mainframe general ledger files under comprehensive security and audit trails.

Restricted upload capabilities are provided to prevent loss of mainframe data integrity, the spokesman said. The security systems are the same as those that govern access to Software International's mainframe applications.

Smart Link also allows users to load data into a variety of current spreadsheet packages and data base management systems, including Lotus Development Corp.'s Lotus 1-2-3, Visicorp's Visicalc and Microsoft, Inc.'s Multiplan. It will also operate with micro applications that incorporate Software Arts, Inc.'s Data Interchange Format.

Smart Link does not require rekeying of commands in order to rerun a download or upload session, the spokesman noted. It automatically recalls a session if it was stored in Smart Link's library; sessions can be modified to give new download or upload specifications.

Data from the General Ledger and Financial Reporting System can be placed into a specific area of the user's spreadsheet for greater flexibility, according to a spokesman for the vendor.

Smart Link will run on the IBM Personal Computer or Personal Computer XT equipped with Technical Analysis Corp.'s Irma board coaxial interface.

The software is priced at $2,995 per micro from Software International, 1 Tech Drive, Andover, Mass. 01810.

Products help micro emulate 3270 terminal

By Jeffry Beeler
CW West Coast Bureau

SANTA CLARA, Calif. — A one-year-old data communications vendor claims to have tightened the integration between IBM Personal Computers and CPUs with the introduction of a micro-to-mainframe link that reportedly enhances a Personal Computer's 3270 emulation features.

Forte Data Systems, Inc.'s micro-to-mainframe link consists of six related hardware and software modules:

- Forte-PJ, an emulation and adapter board that provides IBM Personal Computers and Personal Computer XTs with a coaxial cable interface to 3270-based networks and allows the micros to emulate 3278 and 3279 display terminals.
- Forte-Graph, a "daughter" board that enables Personal Computers to duplicate the IBM 3279 color display station's color graphics capabilities and produce hard-copy output with the same resolution as the micros' display screens.
- Three File-Net packages that permit mainframes to download whole TSO, CICS or CMS files at once rather than in one-page sections.
- Forte-Call, a Personal Computer-resident communications utility that allows remote terminal users to dial into 3270 coaxial cable networks and thus gain access to corporate data bases.

Forte-PJ occupies one Personal Computer or Personal Computer XT chassis slot and — in an effort to simplify future product upgrades — implements all its associated software on diskettes rather than in programmable read-only memory.

When equipped with the board, IBM Personal Computers can double as terminals interacting with host mainframes and as stand-alone processors operating in the PC-DOS operating system mode, according to Forte Product Manager Ron Rawson. Users can reportedly switch back and forth between a mainframe session and stand-alone operation by touching just one button on a Personal Computer's keyboard.

Forte credits its PJ board with supporting up to 32K bytes of buffer memory, eight times as much as the company's existing 3270 emulation product, the PC78-2. This expanded storage capacity, in turn, allows an IBM Personal Computer or Personal Computer XT to emulate a larger set of 3279 color graphics capabilities than was previously possible with the 4K-byte PC78-2, Rawson said.

In addition to its increased buffer memory, Forte-PJ incorporates an interface expansion bus into which users can plug various daughter boards and thus enhance a Personal Computer with additional "personality" or functionality, he said.

One such daughterboard is Forte-Graph, which rides piggyback on the PJ and gives IBM micro users ac-

See FORTE page 4

NEWS SUMMARY

IBM raised by 7% to 10% its convenience agreement rates on most older hardware and the license fees for about half its system and language program products/4

Cortex Corp. unveiled an application generator for the Digital Equipment Corp. VAX-11 that it said virtually eliminates hand-coding/4

A Cobol-oriented version of its Tower 1632 supermicro has replaced NCR Corp's I-9020 minicomputer line/6

Xerox cut the price of its 8010 Star microcomputer by almost one-third and added stand-alone and remote workstations to the Star line/6

The National Association of Working Women, 9 to 5, said 50% of the pregnancies of VDT operators at United Airlines' telephone reservation office in San Francisco ended "adversely" over a four-year period/8

The Association for Computer Operations Managers predicted an average salary increase of 7% for computer operations personnel this year/11

Little action is slated for a variety of federal computer crime bills under consideration by Congress/12

A recommendation from the U.S. Postal Rate Commission, due this Friday, could rejuvenate Ecom/14

Product Spotlight: Bypass/15

The Yankee Group recently offered insights on IBM hardware strategies/17

The former marketing director of Systems Development Co. has been indicted on charges of trying to bribe a Massachusetts official/19

Armed with printouts, Indianapolis police nabbed hundreds of scofflaws at work/23

An IBM consultant has compiled 600 terms that he hopes will become the standard sign language of DP terminology for deaf DP professionals/27

A service bureau doubled in a year the number of tax returns it processed for 400 accountants/28

The Long Island Lighting Co. has broken the 'language barrier' between computers and employees/29

International Report/24
Turnaround Time/28
Calendar/30

IN DEPTH

Fourth-generation software/ID/1
Roles DP managers must play/ID/13

EDITORIAL/34
SOFTWARE & SERVICES/43
COMMUNICATIONS/50
SYSTEMS & PERIPHERALS/57
MICROCOMPUTERS/69
COMPUTER INDUSTRY/93

MIS Directors, DP Managers, Data Administrators, Software Consultants

- Why you should be considering a relational data base system for your company.
- How a relational data base delivers the high performance your company needs.
- Why the relational data base is the only way you can increase productivity across the board.
- How a relational data base management system can effectively handle both production and information centers.
- Why the data processing community agrees data dictionary is not a luxury—it is an absolute requirement.
- Why you should not accept conventional definitions of "active" and "integrated" data dictionaries.
- How you can have all of the benefits of running your current system in a relational data base environment without any reprogramming work.
- How you can develop a "blueprint" or software strategy that can accommodate future technological advancement without becoming obsolete.
- How you can develop an effective corporate strategy that maintains control over personal computers and also complements the mainframe.
- How you can avoid selecting a fourth generation technology that is already outdated.
- Why your company must not only have fourth generation languages, but also high level extensions to COBOL for purchased applications and existing systems.

You are invited to attend an ADR® Seminar on these critical issues.

Because the companies that master the critical software issues of the 80's are the companies that will lead the 90's.

And the people who master these issues will help lead their companies.

DATES AND PLACES '84 SERIES

ALBANY April 24
ALBUQUERQUE June 5
ATLANTA May 31
AUSTIN April 4
BALTIMORE February 14
BIRMINGHAM May 29
BLOOMINGTON, MN February 29
BOISE May 22
BOSTON April 26
BUFFALO March 29
CALGARY June 12
CINCINNATI February 21
CLEVELAND May 8
COLUMBIA, SC May 3
COLUMBUS, OH May 31
DENVER March 15
DES MOINES May 3
DETROIT May 30
EL PASO March 16
FORT WORTH March 13
GARDEN CITY June 7
GRAND RAPIDS, MI February 23
GREEN BAY March 1
GREENVILLE, SC May 1
HARTFORD June 26
HONOLULU March 8
HOUSTON April 24
INDIANAPOLIS May 10
KANSAS CITY May 3
LITTLE ROCK April 3
LOS ANGELES March 13
LOUISVILLE June 19
MADISON, WI May 1
MILWAUKEE March 22, June 7
MONTREAL March 6, June 21
NATICK, MA June 14
NEW ORLEANS April 26
NEW YORK CITY April 12, May 8
OKLAHOMA CITY May 1
OTTAWA March 27
PHILADELPHIA May 15, June 28
PITTSBURGH May 17
PORTLAND, ME May 24
PORTLAND, OR June 12
PROVIDENCE June 28
RICHMOND April 12
ROCHESTER May 22
SALT LAKE CITY May 24
SAN DIEGO March 15
SAN FRANCISCO March 6
SAN JOSE April 12
SEATTLE June 14
SECAUCUS, NJ May 10
SOMERSET, NJ April 3
ST. LOUIS June 21
TARRYTOWN June 5
TORONTO March 8, June 19
VANCOUVER April 13
WASHINGTON, DC February 14

TO REGISTER, SEND IN COUPON OR CALL **800-368-3355**

APPLIED DATA RESEARCH, INC.
Route 206 & Orchard Rd., CN-8
Princeton, NJ 08540

☐ I want to attend. Please reserve _____ seats for the ADR seminar
to be held _____ on _____
CITY DATE

NAME _____ TITLE _____

COMPANY _____

ADDRESS _____

PHONE NO. _____

COMPUTER EQUIPMENT _____

☐ I can't attend, but please send me information on ADR's Blueprint for the 90's.

Application generator ends hand-coding for VAX

By Staff
CW Staff

WELLESLEY, Mass. — Cortex Corp. last week introduced an application generator for Digital Equipment Corp. VAX-11 superminis that it said virtually eliminates the need to write code for standard applications.

Called the Application Factory (Factory), the software allows systems analysts and programmers to develop applications through an interactive terminal dialogue. It constructs applications that include screens, reports, computations and data base management. Programs can be customized and regenerated using the Cortex Application Builder (Builder), a high-level language, a Cortex spokesman said.

Factory can be used to prototype working models and is said to eliminate much of the program design, coding and testing process. It generates modules written in Builder, which can be modified.

Factory provides standard procedures, such as menu screens and the standard mechanisms for using them, such as menu items, which the designer fills in interactively. Program modules can be specified interactively and code generated automatically.

Factory ensures that a generated module is consistent with the data and with other modules, the spokesman said.

Among the activities supported by Factory are data set creation, data dictionary specification, the linking of data sets into logical views, screen layout, report layout, definition of menus, coordination of logical flow, data validation specification and data extraction specification.

An optional facility called Customizer allows screen and report characteristics to be changed. The Application Accelerator, also an optional facility, generates object code from Factory source code, enabling programs to run as efficiently as Cobol programs, the spokesman claimed. Without Accelerator, Factory generates a pseudo-code that executes more slowly.

Still another optional module, Application Targeter, allows applications to be generated in object code to run on other machines within the DEC line, including the VAX-11 series, PDP-11 series and DEC Professional 350.

The Run-Time System, also an option, provides an interface to the file system of the target machine. The End-User Facility is an option that gives end users limited query, sort and report-generation functions.

For the VAX-11/750 and VAX-11/780, the Application Factory costs $25,000. The cost of the options are: Customizer, $10,000; Application Accelerator, $15,000; Application Targeter, $15,000; Run-Time System, $2,500 and End-User Facility, $8,000.

A package made up of the Application Factory, Accelerator or Targeter, Customizer and End-User Facility costs $49,000. All products cost 40% less for the lower end of the VAX-11 line.

Cortex is located at 55 William St., Wellesley, Mass. 02181.

Convenience pact rates, license fees raised by IBM

By Tom Henkel
CW Staff

RYE BROOK, N.Y. — In what appears to be an effort to rid itself of older rental and lease agreements, IBM last week raised its convenience agreement rates on most older hardware by 7% to 10%.

At the same time, the company also raised the license fees on about half its system and language program products by the same 7% to 10%.

Monthly maintenance rates on a handful of older products also underwent changes. Some were increased by as much as 10%, while others were decreased by 10%.

Most users affected by the increases are holders of lease and rental agreements signed before IBM established the IBM Credit Corp.

Convenience lease and rental agreements are those offered directly through IBM rather than the IBM Credit Corp. Most users affected by the increases — effective June 1 — are holders of lease and rental agreements signed before IBM established the IBM Credit Corp.

Processors affected by the increases include the 4321, 4331 and 4341; the 8130 and 8140; the System/34; and the 3060 series. Exempted from the increases were the System/38 and systems announced after the formation of the IBM Credit Corp., which include the 4361, 4381 and 8150, a spokesman said.

As examples of the price increases, IBM said a System/34 Model D23 processor, which formerly carried a convenience lease price of $1,860/mo, will now cost $1,990. The convenience rental fee on the same model is now $2,189 instead of $2,045.

A 3084 Model Q48 processor, which formerly carried a convenience monthly lease rate of $289,920, now costs $310,200. The rental fee for the same processor is now $387,000/mo instead of $362,400.

Initial and monthly license fees on roughly half the systems and language software program products and a small number of applications program products were also increased 7% to 10%. The increases in initial license fees are effective immediately; monthly license fee increases are effective June 1.

The license fee increases affect about 20% of all IBM program products and include the MVS/SP operating system, CICS/OS, VM/High-Performance Option, IMS/Data Base/Data Communications, all software for the System/38 and System/34, the DPPX operating system for IBM's 8100 line of distributed processing systems and OS/Cobol. Monthly software service charges on all IBM software were also increased by 7% to 10%. For example, users formerly paid $1,170 for the monthly license program support charge (MLPSC) for MVS-SP Version 2 Job Entry Subsystem 3. They will now pay $1,250.

DPPX/Distributed Presentation Services (DPPX/DPS) carried a basic license charge of $186, which has been increased to $199. The MLPSC has been increased from $18 to $19.

Finally, IBM announced both price increases and decreases in the monthly maintenance fee of a handful of IBM hardware products. The price changes range from 10% decreases to 10% increases.

The decreases are effective March 1, and the increases are effective June 1, IBM said.

Major systems that received price decreases include the 30 series of mainframes and the smaller System/3 and System/7 processor lines. Systems hit by maintenance price increases include the 3431 and the 4321.

The $6,810/mo maintenance charge on a 3033U Model U16 processor has been dropped to $5,520. But users of 4331 Model J11 processors will now pay $351/mo instead of $325.

Equipment purchase prices were left unchanged, as were IBM Credit Corp. three-, four- and five-year term leases. According to the spokesman for IBM, the price changes were a result of a normal business review.

Cornellian wins ACM award

ITHACA, N.Y. — A postdoctoral associate in the department of computer science at Cornell University has won the 1983 Doctoral Dissertation Award of the Association for Computing Machinery (ACM).

Thomas Repa won the award for "Generating Language-Based Environments," a thesis he wrote while earning his Ph.D. in 1982. The award includes a $1,000 check, publication of his thesis by MIT Press and royalties from sale of the book.

The award was announced at the ACM Computer Science Conference Feb. 14-16 in Philadelphia.

FORTE from page 2

cess to all the 3279 graphics software packages residing in central mainframes. The board thus enables Personal Computers to support as wide a selection of colors as the 3279 and to provide the same display resolution and extended character attributes, Rawson said.

Complementing Forte-Graph are three mainframe-resident file transfer packages — TSO File-Net, CICS File-Net and CMS File-Net. All three are extensions of their respective IBM subsystems' command language and are written in 370 assembler, a feature that maximizes communications efficiency, Rawson said.

The result is that the packages allow complete TSO, CICS or CMS files to be downloaded from a mainframe all in one operation rather than in one small chunk at a time. File-Net therefore overcomes one of the main limitations of usual 3270 emulation, which typically requires files to be transmitted to a Personal Computer in one-page segments, according to Forte President James Ottinger.

After being downloaded from a host CPU to a Personal Computer, data is reportedly displayed in PC-DOS formats to simplify integration of the files with popular microcomputer applications like spreadsheets and word processing.

The last of the six Forte communications is Forte-Call, which is said to allow any remote Ascii device to retrieve data from a central mainframe through a host Personal Computer.

Forte-Call costs $295, compared to $1,195 for the Forte-PJ board and $1,395 for the Forte-Graph board and all its associated software. The TSO File-Net and CMS File-Net packages license for $1,000 each, while the CICS version is available for a one-time license fee of $10,000 per site.

All six of the Forte micro-to-mainframe link products will be available for shipment in April from the company at 1500 Norman Ave., Santa Clara, Calif. 95050.

Second-class postage paid at Framingham, Mass., and additional mailing offices. *Computerworld (ISSN-0010-4841) is published weekly, except: January (6 issues), February (5 issues), March (5 issues), April (7 issues), May (5 issues), June (5 issues), July (5 issues), August (5 issues), September (5 issues), October (5 issues), November (5 issues), and a single combined issue for the last week in December and the first week in January by CW Communications/ Inc., Box 880, 375 Cochituate Road, Framingham, Mass. 01701.*

Copyright 1984 by CW Communications/Inc. All rights reserved.

Computerworld can be purchased on 35 mm microform through University Microfilm Int. Periodical Entry Dept., 300 Zeeb Rd., Ann Arbor, Mich. 48106. Phone (313) 761-4700. *Computerworld* is indexed: write to Circulation Dept. for subscription information.

PHOTOCOPY RIGHTS: permission to photocopy for internal or personal; use or the internal or personal use of specific clients is granted by CW Communications for libraries and other users registered with the Copyright Clearance Center (CCC), provided that the base fee of $3.00 per copy of the article, plus $.50 per page is paid directly to Copyright Clearance Center, 21 Congress Street, Salem, MA 01970.

Permission to photocopy does not extend to contributed articles followed by this symbol. ‡

Special requests should be addressed to Nancy M. Shannon, CW Communications/Inc. Box 880, 375 Cochituate Rd., Framingham, MA 01701. ISSN 0010-4841/82 $3.00 + $.50

$2.00 a copy: U.S. — $44 a year; Canada, Central & So. America — $110 a year; Europe — $165 a year; all other countries — $245 a year (airmail service). Four weeks notice is required for change of address. Please allow six weeks for new subscription service to begin.

ABC ABP mcc

POSTMASTER: Send Form 3579 (Change of Address) to Computerworld, Circulation Dept., Box 880, 375 Cochituate Road, Framingham, Mass. 01701.

Thoroughbred

Meet the newest champion in the world's greatest sorting stable!

(SyncSort OS 2.5)

Call (201) 568-9700.

Find out why it takes a SyncSort to beat a SyncSort.

Here we go again—Improving the Sorting Breed!

That sleek young thoroughbred out in our main paddock is SyncSort OS, Release 2.5. It's by SyncSort 2.4 out of that celebrated brood mare, High Technology. And it's destined to win a lot of prizes on OS/VS and MVS/XA tracks.

IMPROVING THE UNIMPROVABLE: Until now, SyncSort 2.4 was the best OS/VS sort program ever bred. It was far faster than any IBM sort. And it was easier to use, too— thanks to a tack-room full of advanced features.

SyncSort 2.4 probably could have continued to win prizes for years. There was only one catch—it wasn't good enough for us.

PICKING TOMORROW'S WINNERS: We knew that new hardware and software systems would create opportunities for evolution of advanced sort programs. Speed would still be essential. But productivity would continue to skyrocket in importance. So that's the way we bred 2.5.

FASTER SORT PERFORMANCE: We've added new sorting techniques to SyncSort 2.5 to make it the only sort that outperforms 2.4. You can expect savings in critical resources up to those shown at lower left. And that can add up to a big increase in total systems throughput.

NEW PROGRAMMER PRODUCTIVITY FEATURES: As any seasoned sort-watcher knows, there's a lot more to data handling than sorting. SyncSort 2.5 introduces a Data Utility set that applies its proven techniques to a wide range of processing and reporting jobs.

For example, with a single execution, 2.5 can sort, format and present data in virtually any form you want:

- **SortWriter**—a powerful tool that can produce extensive reports as a by-product of your normal sorting—without user exits and the associated programmer investment. Headers, trailers, total and sub-total capabilities provide flexible formatting.
- **Record Formatting**—To existing features like INCLUDE/OMIT, INREC/OUTREC, SUM and others—all of which have been expanded—2.5 adds new and useful capabilities like data conversion, editing, insertion of literals.
- **Multiple Output**—From a single sorted file, you can create multiple files and reports. Each can include the same or different data as determined by INCLUDE, OMIT, OUTFIL or OUTREC parameters.

If you're tired of betting on sort programs that empty your pockets of resources and are tough to handle, give us a call. We'll arrange to have SyncSort OS 2.5 run a few furlongs on your own turf.

SyncSort OS 2.5

Performance Improvements

EXCPs: 35%
TCB CPU Time: 15%
SRB CPU Time: 25%

syncsort INC.

Syncsort Incorporated 560 Sylvan Ave., Englewood Cliffs, N.J. 07632

NEWS

NCR brings out Cobol-oriented supermicro

By Tom Henkel
CW Staff

DAYTON, Ohio — NCR Corp. last week replaced its aging I-9020 line of minicomputers with a Cobol-oriented version of its Tower 1632 supermicro.

Called the I-Tower, the new system offers two to six times the internal performance of the I-9020, NCR said. The I-Tower's hardware is virtually identical to the Unix-based Tower system announced by the firm a year ago, the vendor said, noting that both are based on Motorola, Inc.'s 68000 microprocessor.

The I-Tower supports RM/Cobol, a specialized version of Cobol developed by a long-time supplier of NCR software, Ryan-McFarland Corp. of Rolling Hills Estates, Calif.

The I-Tower system also runs Ryan-McFarland's RM/COS, which optimizes the execution of Cobol programs.

Users of the original Tower 1632 can now run Cobol on their systems. This, according to Jim Krohe, program manager for the Tower line, can be done in two ways. Users can run RM/Cobol directly on the Unix operating system, or they can run both Unix and Ryan-McFarland's RM/COS. He noted, however, that the operating systems cannot run concurrently.

Likewise, users of the I-Tower can, if they wish, purchase the Unix operating system for nonconcurrent use.

Krohe said NCR plans to offer RM/COS, RM/Cobol and Unix packages to Tower 1632 and I-Tower users, but the packages are not yet available.

While NCR representatives seemed unclear on how the firm plans to market the I-Tower, its assistant vice-president of interactive systems, John C. Duritsch, said one group of potential users is microcomputer users who have exhausted the capabilities of their current systems. He noted that from a performance standpoint, the I-Tower offers roughly the same power as IBM's System/36 or Burroughs Corp.'s B93 series of processors.

The I-Tower can run some existing I series applications, including NCR's Interactive Financial Management System (IFMS). It also supports off-the-shelf programs that operate under Ryan-McFarland's RM/Cobol compiler and RM/COS operating system.

While the I-Tower is not directly compatible with larger processors in the NCR line, users of RM/Cobol can migrate to the larger I-9300 line of mainframes by making a software conversion, according to Raymond B. Smith, director of general-purpose systems product marketing. To switch to the I-9300 line, I-Tower users will have to make file modifications and recompile their Cobol programs. Smith claimed the conversion process is a minor task, requiring about two hours per program.

The I-Tower can handle 16 users and is equipped with 512K bytes of standard random-access memory (RAM). It can be expanded with a processor memory control module that offers up to 2M bytes of RAM.

The I-Tower supports up to two 5¼-in. floppy disk drives, each offering 1M byte of storage, and a maximum of two 5¼-in. Winchester disk drives, each offering up to 46M bytes of unformatted storage. Two 8-in. Winchester disk drives, each offering up to 84M bytes of unformatted data storage, can be used in addition to the 5¼-in. Winchester drives for a total disk storage capacity of 260M bytes.

The I-Tower includes a 90 in./sec streaming tape drive, which can store 21.6M bytes of unformatted data, as well as a battery-powered memory support feature designed to protect the system against power fluctuations.

An I-Tower processor with 512K bytes of RAM, 46M bytes of Winchester disk storage, a 1M-byte flexible disk drive, a 20M-byte streaming tape drive, a 125 line/min printer, CRT terminal, eight RS-232C I/O ports, IBM 2780/3780 remote batch communications protocols, RM/COS and RM/Cobol costs $28,880. It will be available next month and distributed through the firm's direct sales force.

NCR's corporate headquarters is located in Dayton, Ohio 45479.

ANALYSIS

NCR becomes first to replace mini with supermicro

By Tom Henkel
CW Staff

NCR Corp. has scored a first with its newly announced I-Tower Cobol-oriented supermicrocomputer: It became the first of the big five computer vendors to replace an existing minicomputer line with a supermicrocomputer.

Whether NCR can parlay the newly announced system into a highly successful product, however, remains to be seen.

NCR stated that the I-9020, the mini line replaced by last week's announcement of the I-Tower, has been its most successful product to date, with more than 20,000 installed systems. However, NCR representatives who presented details of the I-Tower last week did not seem to have a clear focus of who that system's target user would be.

One obvious market for the I-Tower is as a replacement processor for I-9020. NCR said the I-Tower can operate up to six times faster than the I-9020, but users who want to make the switch from an I-9020 must convert from NCR's Imos operating system to Ryan-McFarland, Inc.'s RM/COS.

The other market NCR appears to be eyeing for the I-Tower are microcomputer users who have exhausted the capabilities of their single-user systems. How NCR plans to attack that market remains unclear.

Raymond B. Smith, NCR's director of general-purpose systems product marketing, noted that NCR has approached traditional NCR third-party software developers to adapt existing Cobol programs for the I-Tower. But that raises the question of how that list of Cobol programs compares with the list of Basic programs available for microcomputers. And will NCR be able to convince micro users, who have been weaned on Basic, to switch to Cobol?

Jim Krohe, NCR's program manager for the Tower line, noted that there are currently more than 1,000 off-the-shelf programs that run under RM/COS. Krohe said that it is a fairly simple process to convert other Cobol programs to run under RM/COS.

NCR estimates it will take users 15 minutes to two hours per program to convert to the RM/Cobol compiler. Krohe said the amount of time the conversion takes depends on how much non-Ansi-standard code a given Cobol program uses. Users of strict Ansi-standard Cobol would just have to recompile Cobol programs to use them under RM/Cobol.

Regardless of whether NCR cracks open a new market for small business users, the I-Tower may carve out an alternate, profitable niche for the Tower line, said Dave Moschella, an analyst with the Framingham, Mass., market research firm International Data Corp.

According to Moschella, NCR has basically acted as a systems integrator in developing the Tower line, basing it on the Motorola, Inc. 68000 microprocessor, OEM peripherals and third-party software. The original Tower 1632, announced about a year ago, has shown moderate success as a small business system, Moschella said, noting many Tower sales have gone to systems integrators, not end users.

But NCR's assistant vice-president of interactive systems, John C. Duritsch, disagreed with Moschella. He contended that NCR has also been able to sell the Tower 1632 to end users. In any case, both Moschella and Duritsch agreed that NCR is fairly pleased with sales of the Unix-based version of the Tower.

Moschella said the Cobol-oriented I-Tower is probably guaranteed at least limited success just on the strength of the I-9020 market. Moschella added that since NCR is simply remarketing an existing system to a new audience, the development costs associated with the newly announced I-Tower are very low.

Xerox cuts 8010 Star price; adds stand-alone, remote models

By Tom Henkel
CW Staff

PALO ALTO, Calif. — Xerox Corp. appeared to be trying to rekindle a market for its 8010 Star microcomputer last week when it slashed $5,000 from the micro's $15,065 purchase price and added stand-alone and remote workstations to the Star line.

Announced in 1981 to operate with the Ethernet local-area network, the 8010 Star was greeted with a great amount of interest because it employed such innovative features as multiple windowing, a mouse and icons. However, the network workstation was never very successful because, industry watchers say, it was far too expensive and possibly too sophisticated for what was then a new market. Critics of the system said Xerox simply missed what turned out to be a very fertile market for smaller, stand-alone microcomputers.

Currently, Xerox apparently is trying to reignite the Star. The stand-alone and remote workstation models announced last week are essentially identical to the original network workstation, but they do not require users to buy cabling and pay the service charges for Ethernet.

The stand-alone model, which costs $8,995, is equipped with the same proprietary 16-bit microprocessors used in the network workstation. It comes with 512K bytes of random-access memory; a 10M-byte hard disk drive; a 1.2M-byte, 8-in., double-sided, double-density floppy disk drive; and Xerox's proprietary Mesa operating system.

What is missing from the system are circuit boards that allow it to be connected to Ethernet. However, the stand-alone unit is field upgradable to the remote workstation and the network workstation, Xerox noted.

The remote workstation is offered in the same configuration as the stand-alone workstation, but it is equipped with communications capabilities that allow it to communicate with an Ethernet system via an RS-232C port. To the user, the workstation operates as if it were attached to a local-area network, but the user also has the ability to perform local computing.

Xerox made its announcement through its Office Systems Division, located at 3333 Coyote Hill Road, Palo Alto, Calif. 94304.

Theirs:

STAIRS

Ours:

INQUIRE

COBOL-80 from page 1

broiled in controversy since the first Ansi draft standard was released in 1980. Critics charge that conversion to Cobol-80 would be expensive and time-consuming. Supporters say the standard would add significant features that could make Cobol a viable alternative to many fourth-generation languages.

Action 'closes debate'

The ISO action on the X3J4 standard "effectively closes debate on the American side," said Jerome Garfunkel, president of Jerome Garfunkel Associates, Inc. in Litchfield, Conn., and a member of the Ansi X3J4 and ISO Cobol committees. "I expect [Ansi] will also go along and adopt this as a standard."

Another X3J4 Committee member concurred that the action puts pressure on Ansi to come to an agreement quickly. "The implications are that we are essentially going to lose some control on finalizing a standard," said Lawrence K. Madison, associate director of data processing at the Travelers Insurance Co. in Hartford, Conn.

Lemuel Skidmore, manager of systems development and educational services at New England Data Services in Guilford, Conn., called the ISO action "very important. . . . It says the international community is not pleased with the slowness of our process, and they're going off on their own."

"It's a political game that's being played," Madison said. "The international community is essentially saying, 'Hey, Ansi, let's get going on this.' "

Garfunkel, who has been an outspoken proponent of a new standard, said adoption by the ISO SC5 Committee will force the federal government to adopt the standard as a base for hardware procurement. He noted that hardware vendors will probably follow the government's lead.

Skidmore agreed that hardware vendors may add impetus to the project by standardizing their compilers based upon whichever standard is adopted first. "If I were IBM, I wouldn't want to be married to two different standards. I'd say it's more important that they match up," he said.

However, Madison pointed out that any ISO action is still subject to a six-month international letter ballot, at which time problems could arise. "If the international organization says, 'Let's throw caution to the wind and try to pass something through,' they may find out what X3J4 found — that it's not that easy to convince users who have a substantial investment [in existing programs]," Madison maintained. "Just because [WG5] has made a recommendation, doesn't mean it will be adopted."

The Data Processing Management Association's (DPMA) principal representative to the X3 Committee indicated that the standardization process is too far along to be rushed by international pressures. "We feel that if the progress that's been made on X3J4 continues, we'll see a draft standard that DPMA can approve shortly," Art Dubnow, who is chairman of the DPMA's Standards Committee, said.

ISO changes procedures for making Cobol revisions

VIENNA — At the same time that it approved and sent on for review the latest version of the Ansi X3J4 Committee's proposed Cobol-80 standard and modifications, an International Standards Organization (ISO) working group last week also adopted a resolution to change the current procedures for revising the language.

The resolution approved by the ISO Technical Committee 97/Standing Committee 5/Working Group 8 proposes to add new features to the Cobol standard every two years. It also extends the period between complete overhauls of the standard to 10 years.

Currently the standard is slated to be revised entirely every five years. But controversy over proposed revisions has delayed the adoption of the Cobol-80 standard by more than three years.

According to the resolution's originator, Jerome Garfunkel, a member of the Ansi X3J4 and ISO Cobol committees, the resolution would make it easier to keep Cobol current with state-of-the-art languages. "Very few people ever had complaints about new features," said Garfunkel, president of Jerome Garfunkel Associates, Inc. in Litchfield, Conn. "This proposal is designed to isolate new features and speed up development."

But critics believe adoption of the dual schedule could pose serious compatibility problems. "If you're going to slow down the clarification process, you're dropping the portability issue," said Lemuel Skidmore, manager of systems development and educational services at New England Data Services in Guilford, Conn. "The faster you introduce new features, the less time you have to clarify them."

Skidmore noted that the resolution could result in a proliferation of incompatible compilers that include new features that have not been fully studied. "If we keep changing the standard, we open the door to more incompatibility," he said.

LOTUS from page 1

base functions, communications, spreadsheet and graphics and allows users to preview documents as they will appear when printed.

The communications package combines terminal emulation, automatic dial-up and logon to remote data bases, data capture, point-to-point file transfer and user control of all terminal parameters. Users can instantly suspend a communications session, analyze the captured data using Symphony and return to the communications mode, the spokesman claimed.

The forms-oriented data base lets the user enter a list of items to be included and automatically creates the basic data base structure. It includes report generation employing the spreadsheet and, when combined with the word processor, offers the ability to perform mail-merge functions.

The expanded spreadsheet is compatible with Lotus' 1-2-3 spreadsheets and includes a new ability to manipulate text as well as numeric information in spreadsheet models.

Asked if Symphony would be adapted for the IBM 3270 Personal Computer, Kapor said his company had as yet made "no definite commitment" to adapt the product to micros other than the Personal Computer and Personal Computer XT. However, he added that Lotus has a broad intention of making Symphony available eventually on all boxes that can run 1-2-3.

At present, 1-2-3 also operates on Texas Instruments, Inc.'s Professional Computer; Zenith Data Systems Corp.'s Z100; Wang Laboratories, Inc.'s Professional Computer; Digital Equipment Corp.'s Rainbow 100; Bytec Management Corp.'s Hyperion; Grid Systems Corp.'s Compass; and Compaq Computer Corp.'s Compaq.

"We would like to become preeminent in the software industry. But we have to demonstrate — to ourselves, to the financial community and to users — that Lotus is here to stay," Kapor told the members of the press who gathered for the announcement at the Pierre Hotel here. He went on to say that the company, which turned a $14.3 million profit last year, was threatened not by "a mythical software shakeout," but by the challenge of marketing its own new products.

As an introductory offer, owners or new purchasers of Lotus 1-2-3 can buy Symphony for an additional $200. David McElfresh, vice-president of product development for Lotus, said the offer, due to run for three to six months, was designed to provide "an easy path" for upgrading to the higher priced product and "to protect our user base." Lotus is at 161 First St., Cambridge, Mass. 02142.

'Symphony' gets hesitant bravos

NEW YORK — Users gathered at the Pierre Hotel here last week to hear Lotus Development Corp. announce its Symphony integrated software package were excited about the product, but they suggested that Lotus 1-2-3 devotees may not yet be ready for it.

Frank Tanzillo, business systems analyst at Corning Glass Works, said Symphony is "beyond the leading edge" of most users' technical accomplishments. "It's easily the most powerful thing out there, but it will be a while before people are ready to take full advantage of it," Tanzillo said.

But software specialist Esther Dyson, president of Rosen Research Co., said users would not be dissuaded from buying Symphony even if they have yet to exhaust 1-2-3's capabilities. "You don't have 1-2-3 and then have Symphony for dessert," she said, noting that the five-function tool will appeal to a broader market.

Even so, James I. Magid, an electronic connector industry analyst at L.F. Rothschild, Unterberg, Towbin, said the WP or communications functions alone would convince many users to pay Lotus for the new product.

Dyson said that Symphony's $200 introductory price for 1-2-3 users would allow the new software product to ride the coattails of the hot-selling package. She added that Lotus does not "want to cannibalize" the market for 1-2-3 and so is giving users an incentive to buy both products.

Appeals court calls moonlighting on system criminal

By James Connolly
CW Staff

INDIANAPOLIS — Using an employer's computer for moonlighting is just as much of a crime as the surreptitious tapping of telephone, power or CATV lines, an Indiana appeals court has ruled.

The three-judge Second District Court of Appeals late last month reinstated the theft convictions of a former computer programmer for the Indianapolis Department of Planning and Zoning. The court said that Michael McGraw must face sentencing for using the city's IBM 3031 computer in connection with his second job, selling a franchised diet product called Nature Slim.

McGraw faces a maximum penalty of four years' imprisonment and a $10,000 fine.

The appeals court ruling, which defense attorney Phillip Melangton has asked the court to reconsider, reversed a Marion County Superior Court judge's override of a jury verdict of guilty on two theft counts. That judge said Indiana's theft law wasn't specific enough to cover the theft of computer time.

McGraw's attorney had likened McGraw's actions to a worker "using the office xerox machine to copy a recipe for his wife." He said there were only 35 pages of Nature Slim-related work — such as client lists and form letters — in the 1,100-page printout of McGraw's computer library.

But County Deputy Prosecuting Attorney James Warden appealed to the higher court, which ruled that "computer services, leased or owned, are a part of our market economy in large dollar amounts. Computer time is a service for which money is paid . . . thus it is property."

Now involved in computer sales, McGraw was fired by the city in 1981 for failing to complete his work, apparently because he was working on his second job on city time, according to Warden.

NEWS

VDT operators report 'adverse' pregnancies

By David Meyers
CW New York Bureau

NEW YORK — The National Association of Working Women, 9 to 5, said here last week that it has uncovered a work site where 50% of the pregnancies of VDT operators ended "adversely" over a four-year period.

United Airlines' telephone reservations office in San Francisco was named as the site where the pregnancies of 48 VDT operators ended in 15 miscarriages, one stillbirth, one death of a newborn infant, two children born with birth defects, two premature deliveries and three other undisclosed "problems" between 1979 and this year.

"We're not pointing the finger only at [VDT] manufacturers," Karen Nussbaum, executive director of the Boston-based labor organization, said at a news conference here last Thursday. She admitted 9 to 5 had not identified the cause of the pregnancy problems and was unable to give the name of the manufacturer of the terminals at the United reservations office.

Nussbaum said 9 to 5 has asked the National Institute of Occupational Safety and Health to investigate the United work site.

A spokesman for United Airlines in Chicago cited studies by the Center for Disease Control and the National Academy of Sciences finding "no evidence that radiation emitted [by VDTs] reaches or exceeds any international standard of safety and health." Noting the "vast majority" of VDT operators are women of reproductive age, the spokesman said that "clusters of problem pregnancies will occur by statistical chance alone" and are unrelated to VDT use.

Dr. Jeanne M. Stellman, a Columbia University public health school professor brought to last week's news conference by 9 to 5, agreed there is "no proven link" between VDT radiation and health problems. She went on to note that there is also "no evidence of widespread birth defects" among VDT operators.

Nevertheless, Stellman maintained that the U.S. trails the "rest of the world in providing health protection for VDT workers."

Nussbaum acknowledged that the stress caused by VDT work could be relieved by "painfully simple solutions" undertaken by employers without VDT design or manufacturing changes. However, she said that 9 to 5 is "calling for new standards for manufacturers," including metal shielding for terminals.

The labor group leader said 60% of the terminals manufactured in the U.S. do not meet international safety standards. Bringing the rest "up to snuff" would be "cheap in comparison to the human costs."

The association also released results of a voluntary survey of 871 of the nation's 10 million VDT operators, showing that over half experience eye or muscle strain and 45% reported pregnancies ending in miscarriage, abortion, stillbirth, early death of the infant, premature delivery or major birth defects.

At the same time, 48% of those responding to 9 to 5's questionnaire said their health was "about the same," while 35% described theirs as "slightly worse" and 10.9% as "much worse."

Codex to OEM Ungermann-Bass local network

MANSFIELD, Mass. — Codex Corp., a manufacturer of modems and multiplexers, moved to diversify its product line last week by introducing a local-area network that is being supplied to the company by Ungermann-Bass, Inc. under a five-year agreement.

Under terms of that agreement, Codex will market, install and maintain Ungermann-Bass' Net/One local network under its own name. It will be the first member of a family of new networking products called the Codex 4000 series. Ungermann-Bass will also continue to market Net/One.

Adopting an unusual tactic in the marketing of local-area networks, Codex will offer one- to five-year lease options for network hardware and software components.

Like Ungermann-Bass' Net/One, the Codex local network will be available in either broadband or baseband versions or in a hybrid version, where baseband "feeder" networks can be interconnected with a high-capacity broadband backbone network. Other support options available from Codex for the network include initial site survey and the design and installation of the cable plant.

Codex reported that a typical local net configuration would cost between $450 and $750 per port.

Codex is located at 20 Cabot Blvd., Mansfield, Mass. 02048.

2 Trillion

Last night we backed up two trillion (yes, that's 12 zeroes) characters of data, and checked our work.

VMBACKUP

We bring files back alive, the way they should be—readable, usable—which some "cut-rate" backup systems *don't* do. We verify the data before moving it to tape. That's why 75% of the Fortune 100 companies trust their vital data to VMBACKUP.

How do we do this?

- Start with a solid design.
- Take the best systems people in the VM community.
- Have them build it right.
- Add competent, helpful support people.
- Stay close to our customers.

And we create a winning situation for our users.

VM Software Inc.

(703) 821-6666

London • Frankfurt • Paris • Stockholm • Milan • Tel Aviv • Rio De Janeiro • Sydney • Tokyo

VMBACKUP Sounds Great!
☐ Call me.
☐ Send more information.
I'd also like information on your other products checked:

☐ VMACCOUNT: Complete online collection, costing, & reporting.
☐ VMARCHIVE: End-user initiated archive/restore to intermediate disk or tape.
☐ VMSECURE: Complete security & directory management.
☐ VMTAPE/CMS: Tape management featuring drive management, SL tape support, security, and audit file.
☐ VMLIB: A source library control system offering compression, COPY/INCLUDE cross reference, and management of the development process.
☐ VMSCHEDULE: A complete scheduling and monitoring system for end-users.

Name _____ Title _____
Company _____
Address _____
City, State _____ Zip _____
CPU _____ Phone _____
1-CW-0884

2070 Chain Bridge Road • Suite 355 • Vienna, Virginia 22180 • 703/821-6666

Strict testing the vendors' aim

Many of the companies that submit their microcomputer software products to the International Bureau of Software Test (IBST) are not seeking that company's seal of approval.

Those software manufacturers, according to IBST President William Goss, simply want their products to undergo strict, out-of-house testing that may reveal problems their own quality assurance experts may have missed. In addition to testing, IBST will build test data sets that its clients, which include Digital Research, Inc. and Verbatim Corp., can utilize repeatedly.

"We relieve their designers of test work and allow them to focus on developing new products," Goss said. "Also, our thorough testing can save a software manufacturer quite a lot of money because we catch problems that would otherwise have to be fixed in the field."

IBST charges between $5,000 and $25,000 to test a microcomputer software package. Some tests run as high as $100,000, depending on the number of functions incorporated in the package.

Relatively cheap

In comparison, the certification processes offered by Peripheral Vision Co. and Benchmark Computer Systems, Inc. are relatively cheap. Both firms charge between $400 and $2,000 to test and approve most micro packages.

Peripheral Vision President Philip Raymond guarantees a four-week turnaround time for certification. Benchmark claimed an average three-week turnaround record, and IBST said its seal of approval testing process takes anywhere from four to 10 weeks, depending on the sophistication of the micro package.

"Narrow-scope programs are easy to test," Goss said. "But a micro operating system or a multifunction application takes considerably longer to review because there are many more interrelationships to study."

One of the most common problems IBST encounters with micro packages is poorly written documentation, a flaw that Raymond and Ken Thoreson of Benchmark also highlighted.

"First, we take the package's documentation and grade it, just like in school," Thoreson said. "Then we match the documentation to the operation of the software itself to see how useful the manuals are to the user. Many times the documentation is so poorly written it's useless."

SEALS from page 1

ware testing and approval, according to Vice-President Ken Thoreson. The Minnesota firm, an established retailer of turnkey financial systems, will not only grant its Benchmark Seal of Approval, but will publish and market a package for its developer.

"There are a lot of people out there buying micro software," Thoreson said. "But a lot of that software is developed by loners and entrepreneurs who often don't utilize the most stringent testing methods. That can be very frustrating and costly for the user.

"We can ensure that the package you're buying is a quality product. That's where the UL and *Good Housekeeping* comparison comes in."

Both Peripheral Vision and IBST offer testing for minicomputer software, but Raymond and Goss said demand for that service has not yet developed. All three executives admit that marketing their approval is the biggest obstacle.

Carrier promises reduced telex rates

NEW YORK — Rates "up to 60% below those charged by traditional telex services" were promised earlier this month by International Record Carrier, Inc. when it began marketing its Supertelex service in the U.S.

A telex transmission between the U.S. and the UK, Hong Kong or Israel costs 75 cents per minute, said International Record Carrier President James McKenna. To continental Europe, the per-minute price is 95 cents; to anywhere else, it is $1.85.

All International Record Carrier telex traffic goes directly from the U.S. customer's terminal to a computerized switch in London. It is forwarded to other countries from there if necessary.

The terminal-computer hookup is provided by GTE Telenet Communications Corp.'s packet-switched network at no additional charge to the customer. This arrangement eliminates the delays inherent in competing services, which accumulate outbound international telex traffic at store-and-forward switches in New York, Miami and other U.S. gateways before transmitting it overseas, McKenna explained.

International Record Carrier traffic is transmitted to London at approximately 1,200 bit/sec, considerably faster than traditional telex service, he added.

McKenna reported that his company has developed a software package which "bypasses the complicated accessing procedures of other telex services as well as eliminates the need for a specially trained telex operator."

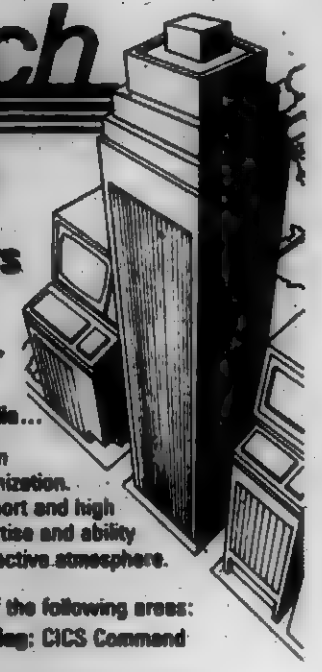
Stored on a floppy diskette, the software is compatible with microprocessors from 28 different manufacturers, including Apple Computer, Inc., IBM and Wang Laboratories, Inc. International Record Carrier will provide compatible micros to customers without them on a free, trial basis, according to McKenna.

International Record Carrier is a subsidiary of Consortium Holdings Ltd., headquartered in Israel, which already markets Supertelex service in that country, throughout Western Europe and in Hong Kong."

TelTech

We're Looking For The BEST CICS Instructors In NYC...

...and Chicago, Los Angeles, San Francisco, Orlando, Washington D.C., Dallas, St. Louis, Atlanta, Minneapolis...



Now's your opportunity to join TelTech, a leading CICS organization. We supply the students, support and high salary—You supply the expertise and ability to share it in a relaxed, interactive atmosphere.

If you are fluent in several of the following areas:

- **Programming and Debugging:** CICS Command Level and Macro
- **Internals:** Recovery/Restart, Architecture, Tuning, Debugging
- **Databases:** IDMS, DL/1, ADABAS
- **Files:** VSAM
- **Telecommunications:** VTAM

TelTech wants to hear from you today!
Contact Mr. Boylan at (212) 514-5400.

TelTech *Our Reputation is On Line*
39 Broadway • New York, NY 10006 • 212-514-5400

IMS VERSUS CICS

DO YOU KNOW THE DIFFERENCES?

Once, it was enough to know only CICS or only IMS. Today, the online world is expanding so that you can no longer afford not to know the capabilities of both.

IMS VERSUS CICS

This one-day seminar provides concise and useful information regarding technical and functional differences between IMS and CICS. Among the topics covered will be:

- Transaction Management/Flow
- Backup/Recovery
- Data Security/Integrity
- File/Database Management
- Migration (Conversion) Considerations
- Application Coding Differences

Attention Managers: Special 2-day seminar, with emphasis on the decision makers perspective, also available.

Attention: Introducing our most recent course offering - Computer Networks and International Standards.

Seminars are presented on-site and publicly offered in French for Canadian clientele.

R.L. Hayer Consultants, Inc.
101 East 52nd Street - Suite 900
New York, NY 10022

Please send me additional information:

☐ IMS vs CICS
☐ Networks and International Standards

Name _____ Title _____
Company _____
Address _____
City _____ State _____ Zip _____
Telephone Number _____
☐ Number of people interested _____
Other course information:

ON-LINE

HP3000 & DEC VAX

BUSINESS MANAGEMENT SYSTEMS

- G/PAYROLL
- G/PERSONNEL
- G/ADVANCED GENERAL LEDGER
- G/ACCOUNTS PAYABLE
- G/ACCOUNTS RECEIVABLE

COLLIER JACKSON, INC

Afcom predicts 7% rise in '84 DP operations salaries

By Patricia Keefe
CW Staff

GARDEN GROVE, Calif. — The salaries of computer operations personnel are expected to rise an average of 7% this year, with a high of 7.8% for data entry managers and a low of 6.2% for key-to-disk operators, the Association for Computer Operations Managers (Afcom) predicted in its annual salary survey.

Undermining this rosy prediction, however, was Afcom's note that the average rise in salaries during 1983 was only 3.8%, considerably less than the anticipated 7.5%. "This is a much smaller increase than was experienced [in 1982], but given the lowest inflation rate in many years, it is not inconsistent with the general economy," the survey said.

The survey, which covered 250 sites, serves as a guide to salaries currently being paid to employees at various levels within the data entry, data control and computer operations departments of the data center. It claims to be one of the few such surveys to make a distinction between the computer operations manager and the DP operations manager.

Afcom defines DP operations managers as "those who are in charge of computer operations, data entry and data control," whereas computer operations managers are responsible only for the computer room. Using Afcom's definition, there are some small shops that call their DP manager computer operations manager. "Surveys that do not make this distinction severely underestimate the highest operations management salaries and, in effect, perform a great disservice to operations," Afcom said.

Anticipated increases for management personnel led the way, as they did last year, with an average of 7.5%. Other departments followed that high with estimated 7.1% increases for both computer and data processing operations, 7% for data control and 6.9% for data entry.

Actual 1983 increases

In 1983, computer operations, by department, led the way in salary gains with an average increase of 3.5%, Afcom said. Data entry salaries rose 3.5%; bringing up the rear was data control, where overall salaries rose a miniscule .8%.

The position that showed the single largest average increase last year was DP operations scheduler, whose salary jumped 12%. Next was computer operations managers, whose salaries rose 11.3%.

On a national basis, DP operations managers earned an average annual salary of $36,150 last year, earning 20% more a year than their counterparts in computer operations.

In large installations (those spending more than $150,000 in equivalent monthly equipment rental costs), the DP operations manager is earning $42,000, and the computer operations manager is earning $34,284. In smaller centers (under $50,000 in equivalent monthly equipment rental costs), the DP operations manager averages $31,320 a year, and the computer operations manager averages $26,556.

The survey also delved into recruitment problems. The heaviest recruitment efforts targeted the computer room, where survey respondents said they encountered the most difficulty in finding qualified and experienced candidates. For example, 59% of the respondents experienced difficulty in locating qualified computer operators, while 60% found it "very difficult, if not impossible," to find qualified DP operations managers.

Conversely, there was no shortage of computer operator trainees.

Copies of the survey are available for $10. Afcom can be reached through Data Center Management Services, Suite 201, 11501 Brookhurst, Garden Grove, Calif. 92640.

Sting nets five alleged smugglers

MARLBORO, N.J. — U.S. Customs Service agents last week charged five people, including a Chinese citizen and an AT&T Information Systems, Inc. engineer, with plotting to smuggle high-tech equipment to China.

The five, arrested after what prosecutors claimed was one of a series of meetings with an undercover customs agent, allegedly tried to buy 100 transverse-wave tube amplifiers from the agent, who was running a "sting" operation.

Held in lieu of bails ranging from $250,000 to $1.5 million, the five were charged with conspiracy to export munitions illegally — specifically, $1 million worth of Watkins-Johnson Co. amplifiers, which allegedly can be used for missile-guidance systems and for jamming radar. Assistant U.S. Attorney Andrew Ruotolo Jr. told a federal magistrate that the suspects gave the agent a "shopping list" of items that they wanted to buy and told the agent they had smuggled other goods to China.

Ruotolo said the lists included various types of computer equipment and military night scopes.

The AT&T Information Systems employee was identified as Kuang-Shin Lin of Lincroft, N.J., a naturalized American citizen. Ruotolo said Lin didn't use his AT&T position in connection with the conspiracy.

MTI leases IBM compatible line printers to give you higher performance at lower cost.

B-300	B-600	B-1000	BP-1500
300 LPM	600 LPM	1000 LPM	1500 LPM
1 yr. lease w/service $555 mo.	1 yr. lease w/service $686 mo.	1 yr. lease w/service $1004 mo.	1 yr. lease w/service $1516 mo.

MTI guarantees the compatibility and reliability of Dataproducts printers we interface with your IBM system

Compare MTI's one year lease price which includes manufacturer-approved service. You'll enjoy trouble-free printing with these fine line printers. Dataproducts is the standard of the industry, and this group includes desktop, pedestal-mounted, and soundproofed cabinet models.

MTI is an authorized Dataproducts distributor, so we can have the Dataproducts printer of your choice with the proper interface enhancing your IBM system sooner than you think.

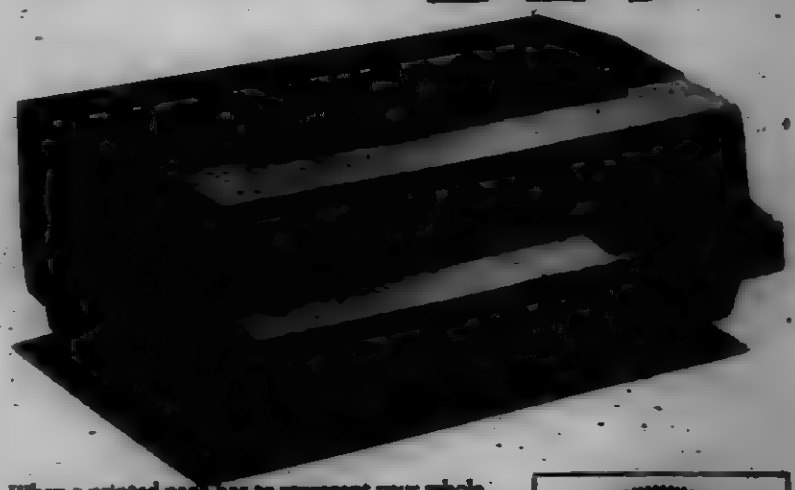
Whether you lease, buy or rent our equipment, you'll find MTI is the one source for all the terminals, peripherals, systems, applications expertise and service you'll ever need. At good prices. Call us.

New York: 516/621-6200, 212/767-0677, 518/449-5969
Outside N.Y.S.: 800/645-6550
New Jersey: 201/227-5552
Ohio: 216/464-6668

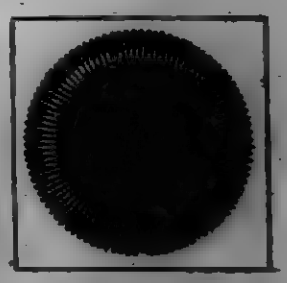
mti

Applications Specialist & Distributors, New York, New Jersey and Ohio. DEC, Intel, Texas Instruments, Dataproducts, Lear Siegler, Diablo, Rapid C.Roh, Intecolor, Racal-Vadic, MICOM, Vumal, Develcom, U.S. Design Dig.Eng., Cipher, Protocol Comp., Microfin, Microsoft, Polygon, Selsel.

Make it snappy.



When a printed page has to represent your whole company, it'd better look sharp. Our DP-35 and DP-55 daisywheels rival the finest office typewriters for crisp clean impressions. And they zip along at just about a page a minute. Call your printer distributor. Or contact Dataproducts at (213) 887-8924, 6200 Canoga Avenue, Woodland Hills, CA 91365. In Europe, 136-138 High Street, Egham, Surrey, TW 20 9HL England.

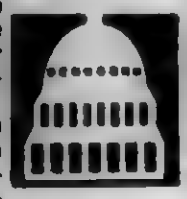


Dataproducts Daisywheel Printers

DP crime bills sitting on congressional back burner

By John Gallant
CW Staff

WASHINGTON, D.C. — Pending federal computer crime legislation is wintering in subcommittee this year, languishing on the congressional back burner while foreign policy and budget issues hold sway.



Four major DP crime bills are still awaiting action in the House of Representatives' Judiciary Subcommittee on Civil and Constitutional Rights, which is chaired by Rep. Don Edwards (D-Calif.). While Edwards said at November hearings that the subcommittee would move promptly to determine if there is a need for a federal computer crime law [CW, Nov. 28], three months later no further hearings or subcommittee action is scheduled.

According to a subcommittee staff member, Edwards is still awaiting the U.S. Justice Department's recommendation on the need for legislation before moving on bills introduced by Reps. Bill Nelson (D-Fla.), Daniel A. Mica (D-Fla.) and Lawrence Coughlin (R-Pa.). The staffer said the Justice Department promised a recommendation at the subcommittee's Nov. 18 hearings, but was delayed by the recent resignation of Attorney General William French Smith.

The fifth DP crime bill, introduced by Rep. William J. Hughes (D-N.J.), is still on hold in the House Judiciary Subcommittee on Crime. A staff member said the subcommittee, chaired by Hughes, anticipates at least one additional day of hearings on the bill, which deals primarily with credit card fraud. Though not yet formally scheduled, those hearings are expected in March.

In the Senate, no action has yet been scheduled on a federal crime bill filed last August by Sen. Paul Trible (R-Va.). That legislation — the Senate version of Rep. Nelson's DP crime bill — is still awaiting initial hearings in the Senate Judiciary Subcommittee on Criminal Law.

Hearings on the Senate version of the Small Business Computer Crime Prevention Act, approved by the House in October [CW, Oct. 31], are slated to begin March 7 before the Committee on Small Business. The bill, introduced by Sen. Paul Tsongas (D-Mass.), would set up a public and private-sector task force to investigate the problem of computer crime in small business and recommend preventative measures.

Earlier this month, the Computer Crime Prevention Act of 1984 was filed by Sen. William S. Cohen (R-Maine) in response to recent Senate hearings on computer hacker activities (see story below).

If no action is taken on the stalled crime bills by Congress' scheduled Oct. 4 adjournment, the bills' sponsors will have to decide whether to reintroduce the bills in the next session.

Nelson's Federal Computer Systems Protection Act of 1983 (H.R. 1092) would make computer crime a federal offense if it involved federal agencies, institutions insured by the U.S. government or computers that operate in interstate commerce. The bill, which currently has 116 co-sponsors, calls for fines of $50,000, or up to twice the monetary gain from such a crime, and prison terms of up to five years.

H.R. 4259 and H.R. 4348, both introduced by Mica, would set up a clearinghouse on federal computer crime (see story on page 13) in addition to making it a federal offense to use a computer without authorization and with the intent to defraud or steal. The bill prescribes a fine of up to $50,000 and five years' imprisonment. H.R. 4259 also faces review by the House Ways and Means Committee because it incorporates an income tax credit for buyers of micros.

Rep. Coughlin's succinct three-paragraph H.R. 4301 would make the use of a computer in a manner not authorized by the owner a federal crime punishable by a fine of up to $100,000 and up to 10 years' imprisonment.

The DP crime portion of Rep. Hughes' H.R. 3570, designed to curb credit card fraud, would make the fraudulent use of a computer a federal offense punishable by a fine of up to $10,000 and a prison term of up to 10 years.

Bill targets unauthorized access

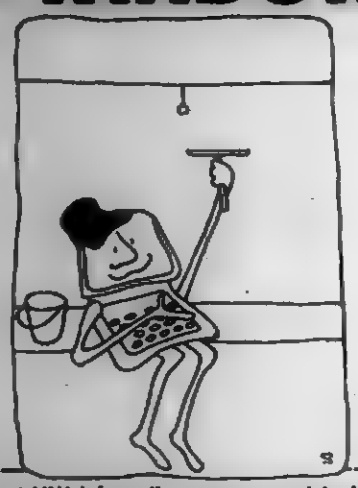
By John Hirshmer
CW Washington Bureau

WASHINGTON, D.C. — A new computer crime bill, introduced recently in the U.S. Senate after hearings on rampant, illegal computer hacker activities, contains special provisions to deter unauthorized access of data bases.

The Computer Crime Prevention Act of 1984, proposed Feb. 8 by Sen. William S. Cohen (R-Maine), contains specific penalties for buying,

See CRIME page 13

MAKE YOUR VAX™ DO WINDOWS



SMARTSTAR™ is the first VAX information management tool that creates multiple window applications—and can scroll your screen to 400 lines. The SMARTSTAR family includes:

- SMARTDESIGN™ for designing applications without programming
- SMARTQUERY™ for powerful, easy-to-use application processing
- SMARTCALL™ when VAX host programming is required
- REQUEST for integrated report and query

Name _____
Title _____
Company _____
Address _____
City _____ State _____ Zip _____
Phone ( ) _____

SEND COUPON NOW FOR DETAILS AND JOIN THE 4TH GENERATION

STI Signal Technology, Inc.
5951 Encina Road, Goleta, CA 93117 (805) 683-3771 Outside California call toll-free (800) 235-6757
TWX 910-334-3471

VAX is a trademark of Digital Equipment Corporation

4-5-6™

When you need IBM mainframe applications with the capabilities of popular micro products, your next step should be to join over 150 companies that have already licensed software from Parallax Systems.

ExecuCalc™
Electronic spreadsheets for 3270 terminals

ExecuPlot™
Color business graphics for 3270 terminals

Training
On-site classes in ExecuCalc, ExecuPlot, Lotus 1-2-3, VisiCalc, VisiPlot, and SuperCalc are available.

Distribute your micro and mainframe application activity, and provide training for both, with software and services from Parallax Systems.

Attendance via CMS, OS/MS, VM, and DAF files.
Purchase licenses $2500 per product. 30-day trial.

Parallax

Parallax Systems, Inc.
[illegible] • New York, New York 10017
212-475-4501

ExecuCalc, ExecuPlot, and 4-5-6 are trademarks of Parallax Systems Inc.; Lotus is a registered trademark of Lotus Development Corp.; 1-2-3 is a trademark of Lotus Development Corp.; VisiCalc is a registered trademark of VisiCorp; VisiPlot is a trademark of VisiCorp; SuperCalc is a registered trademark of Sorcim Corporation; DAF is a trademark of Software Ag, Inc.

CRIME from page 12

procuring or selling the passwords to the computers covered in the legislation in order to obtain money or services illegally. The penalties for this offense would be $50,000 or three times the amount obtained and/or a maximum prison sentence of five years.

To deter computer hackers, penalties for any unauthorized access not involving fraud or damage would be up to $5,000 and one year in jail. These would be levied only against "intentional hackers." It would "not penalize computer enthusiasts who accidentally tap into the computer systems," Cohen said.

Like other computer crime bills now under consideration in Congress, the proposed law covers computers owned or operated by the federal government and federally insured financial institutions and any system used in interstate commerce. Fines for illegally using computers for fraud, damaging computers or altering their content would be $50,000 or three times the amount of any money obtained and up to five years in prison.

Cohen noted that his Subcommittee on Oversight of Government Management held two days of hearings on hacking and computer crime last October. "Those hearings vividly illustrated that computer breaking should not be treated as simply innocent pranks by curious youngsters," he said.

Computer crime clearinghouse proposed

A clearinghouse to identify "vulnerabilities and threats to federal computer systems" has been proposed in legislation filed by Rep. Daniel A. Mica (D-Fla.) to combat what he called the "dangerous mismanagement of federal computer resources."

Dubbed the Interagency Committee on Computer Crime and Abuse, the clearinghouse would compile and disseminate information and statistics on the incidence of computer fraud and abuse.

The clearinghouse idea was incorporated in two DP crime bills introduced by Mica last year. The bills — H.R. 4259 and H.R. 4384 — currently are awaiting action in the House, where they received only limited attention in the previous session of Congress.

The bills call for the clearinghouse to be established within the executive branch of the federal government and to be chaired by the attorney general. The interagency committee would also have as members the secretaries of commerce, defense and the treasury, the chairman of the Federal Communications Commission and the director of the Federal Bureau of Investigation.

Would also coordinate research

Aside from its responsibilities as a computer crime information clearinghouse for federal departments and agencies, the interagency committee would also be charged with coordinating research relating to "the development of more secure computer systems." In that function, it would make recommendations to governmental agencies for improving the security of federal computer systems.

But perhaps its most important role would be that of making recommendations to Congress "for such legislative changes as the committee determines to be desirable in order to protect computer systems from fraud and abuse." In that role, Mica told recent hearings of the House Subcommittee on Civil and Constitutional Rights, the clearinghouse could effectively aid Congress in combating computer crime.

In addition to the proposed clearinghouse, Mica's pending legislation calls for the creation of a Computer Security Research Program. Administered by the secretary of commerce, the program would provide funding to individuals for research and development in new methods of protecting computer systems from unauthorized access and use.

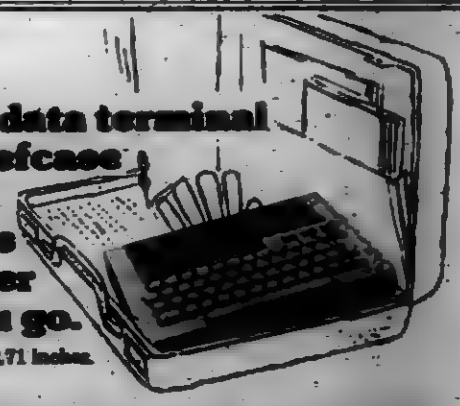
NCR Users Conference set for April 29-May 2

CINCINNATI — The Federation of NCR User Groups will hold the 14th annual NCR Users Conference (Nucon) at the Cincinnati Convention Center here April 29 to May 2.

The conference will include more than 60 educational sessions, including presentations on hardware, operating software, software tools, application software management techniques and communications. Also included will be an address by C.E. Exley Jr., NCR Corp.'s president and chief executive officer.

The conference fee is $365 for participants who register prior to March 16; after that date the fee is $395.

Further information is available from the Federation of NCR User Groups, Mail Station SDC-2, Dayton, Ohio 45479.



Slip TI's new data terminal into your briefcase and you'll be able to access your computer wherever you go.

Dimensions: 8.46 x 11.73 x 2.71 inches.
Weight: 5.9 lbs.

Lease the TI707 portable from MTI for $45/month including maintenance.

The Silent 700* Model 707 portable data terminal is ideal for electronic mail applications, data base usage, real estate multiple listing printouts; and much more. The built-in Bell 103 compatible modem lets you access your computer from the nearest telephone jack. With the optional acoustic coupler and battery pack, you can even talk to your computer from a pay phone. The TI 707 features 30 cps matrix printing with true upper and lower case characters.

MTI is an authorized distributor of Texas Instruments' full line of portable terminals, matrix printers and Professional Computers. Whether you buy, lease or rent our equipment, you'll find MTI is the one source for all the terminals, peripherals, systems, applications expertise and service you'll ever need. At great prices. Call us.

New York: 516/621-6200, 212/767-0677, 518/449-5959
Outside N.Y.S.: 800/645-6530
New Jersey: 201/227-5552
Ohio: 216/464-6688

mti

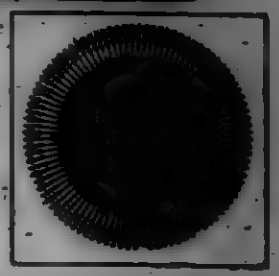
AUTHORIZED DISTRIBUTOR
Texas Instruments
Data Systems Group

Applications Specialists & Distributors, New York, New Jersey and Ohio. DEC, Intel, Texas Instruments, Dataproducts, Lear Siegler, Diablo, Epson, C.Itoh, Intecolor, Racal-Vadic, MICOM, Ventel, Develcon, U.S. Design Dig.Eng., Cipher, Protocol Comp., MicroPro, Microsoft, Polygon, Select.

*Trademark of Texas Instruments.

Better letters.

We can't help your spelling or grammar but we can help your important correspondence look a little brighter than the next guy's. In less than a minute our DP-55 daisywheel dashes out a letter-perfect page. Throw out your white out, call your printer distributor. Or contact Dataproducts at (213) 887-3924. 6200 Canoga Avenue, Woodland Hills, CA 91365. In Europe, 136-138 High Street, Egham, Surrey, TW20 9HL England.



Dataproducts Daisywheel Printers

Decision on higher Ecom rates due Friday

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — The U.S. Postal Service's much-maligned Electronic Computer-Originated Mail (Ecom) service may get a new lease on life this Friday, when the U.S. Postal Rate Commission is scheduled to act on a proposal for higher rates.

The proposal, submitted 10 months ago, would raise the price of a one-page Ecom message from 26 to 31 cents; a two-page message, now priced at 31 cents, would rise to 40 cents. If the new rates are adopted, according to Karen Uemoto, Ecom's director, the service will "begin to break even late next year or early in 1986," and by late 1987 there will be enough of a surplus to repay all of Ecom's accumulated deficit, which currently totals more than $35 million.

However, not everyone agrees with Uemoto's rosy forecast. Critics include the U.S. Department of Justice and Rep. Glenn English (D-Okla.), chairman of a House of Representatives government operations subcommittee, as well as vendors of competing private electronic mail services.

When Ecom began service in January 1982, postal officials predicted it would handle at least 50 million messages during fiscal year 1983, which ended Sept. 30. The actual volume was 15.3 million messages.

Last December, *The Washington Post* reported that one customer, Automotive Incentive Development Co., accounted for 50% to 75% of Ecom's total volume. The company's president, James Young, was quoted as saying that if the proposed rate increase is implemented, he will stop using Ecom service.

In addition, Ecom's managers have been accused of exceeding their authority by unilaterally modifying the service. As originally conceived, Ecom was to be a "generation II" electronic mail offering. Messages would be transmitted on-line from the sender's site to a serving post office (SPO) near the recipient; each message would be printed at the latter point, placed in an envelope and delivered by a letter carrier on his regular rounds. The whole trip, from sender to receiver, was supposed to take a maximum of two days.

But the Postal Service has admitted that a significant percentage of Ecom messages have not been transmitted to the "addressee SPO" for some time. Instead, these messages are transmitted by the sender only to his local post office, where they are printed out, placed in envelopes and forwarded to the recipient as ordinary airmail.

About 50% of Ecom messages are handled in this way, according to a statement published by the Postal Service last April in the *Federal Register*. However, Ecom director Uemoto last week estimated that figure at between 30% and 35% of the total amount of Ecom messages.

Cost advantage

The major advantage of this arrangement for the customer is that it saves the cost of transmission to the addressee's post office, typically amounting to about $1 per message. The local post office transports the message, after printing and enveloping it at the sender's end, and the total charge to the sender for printing, enveloping and transport is 26 cents or 31 cents, depending on the number of pages.

Consultant Mike Cavanagh, who is probably Ecom's most vocal critic, contended that this modification of the original Ecom service demonstrates what is wrong with the whole concept. His basic point is that the only market for Ecom is "junk mailers" needing a cheap, quick distribution system. Since there are not enough such mailers to make the service viable, the Postal Service has simply modified Ecom to make it even cheaper.

"But there just aren't enough customers out there even at the lower price," Cavanagh argued, "so the Postal Service's other patrons have to make up the difference between what Ecom takes in and pays out. In effect, they're paying a steadily mounting subsidy to support a handful of junk mailers."

Although Cavanagh and his fellow critics have attracted a lot of press and public support for the idea that Ecom lacks any redeeming virtue, there is at least one other view.

According to that view, the bulk of the Postal Service's revenue comes from first-class mail; business-related letters supply the bulk of that revenue, and a rapidly growing profusion of online terminals threatens to reduce that revenue stream significantly.

A related argument is that, like the local telephone company, the local post office performs a unique and valuable public service; therefore, if it is desirable to subsidize the local telephone company so it can retain business customers, it is equally desirable to subsidize the post office so it can do likewise.

Critics of that argument, however, point out that unlike the local telephone company, Ecom is not a successful business venture.

The upcoming report of the Postal Rate Commission will significantly impact Ecom's future. Besides the rate increase proposal, the commission will also consider whether to let Ecom users, for an additional four cents, send a business reply envelope along with a message and whether to let users send any number of messages at one time (they must currently send at least 200).

If either of these latter changes is approved, it will mark the first time a major modification of Ecom's original design has been officially endorsed.

MCI announces service to compete with Ecom

WASHINGTON, D.C. — "We're in the same market arena" as the U.S. Postal Service's Electronic Computer-Originated Mail (Ecom), "but we're offering much more," a spokesman for MCI Digital Information Services Corp. said last week after the company unveiled MCI Volume Mail, a second-generation electronic message service that works much like Ecom.

In both services, the user transmits multiple messages to a receiving center, where they are printed, enveloped and then delivered by the Postal Service as ordinary first-class mail.

MCI charges 70 cents to $1 for a one-page letter, depending on volume and job requirements. This is roughly what Ecom costs. But while Ecom requires users to send at least 200 messages at a time, MCI Volume Mail customers can send any number of messages.

In addition, the MCI service allows business reply envelopes or other inserts to be sent along with the message, accepts a wide variety of message formats, reproduces company logos and features a simple sign-up procedure.

The U.S. Postal Service is currently seeking authority to provide a business reply envelope as part of Ecom and to do away with the 200-message minimum.

DEC TO IBM SNA

Now available...full SNA capability for your DEC computer! Comboard/SNA gives your terminals access to IBM interactive applications. Data can be transfered between systems transparently, all in the complete fully supported package, from Software Results.

Comboard/SNA is a proven and reliable, single-board, 256KB communications computer that plugs into your DEC Unibus. Teamed with Comboard software, the system is a cost-effective solution to troublesome SNA communications problems.

Comboard/SNA allows your DEC to emulate an IBM PU Type 2 communications node. You have a full gateway into your SNA without the trouble of passing through a secondary network.

For further information...fill in the coupon below or call Software Results... the leader in DEC to IBM communications.

COMBOARD

SOFTWARE RESULTS CORPORATION
Call Toll-free
1-800-SRC-DATA
In Ohio call collect
1-614-457-8600
2687 Silver Drive, Columbus, Ohio 43211
Telex: 437-405 SRC DATA CI

CICS

IPCP opens and closes CICS files using batch JCL.
✓ many other CSMT/CEMT functions
✓ eliminate PAUSE statements
✓ free 30-day trial period
✓ $1250 one-time or $63 month

sds
A Division of J.W. Lampl, Inc.
8401 University Avenue N.E., Suite 308
Minneapolis, MN 55432
(612) 571-9000

Need general accounting software for IBM System/38?

We've simply solved your problem.

LAWSON ASSOCIATES has solved it with the first general accounting software specifically designed for IBM System/38. Not merely compatible, but state-of-the-art to fully utilize your computer's capabilities. Compare. You won't find a total software solution like it anywhere else.

DESIGN FEATURES: They include: on line systems using data base management; menu driven, user friendly programs written in RPGIII, the System/38 language; and integrated modules. Their benefits: ease of installation and use, plus maximum employee productivity.

INTEGRATED MODULES: Those available include: General Ledger and Report Writer/Accounts Payable/Accounts Receivable/Fixed Assets/Payroll/Personnel/Purchase Order/Order Entry/Inventory Control

SERVICE FEATURES: Fully documented and supported. Onsite training and implementation. One year warranty. Available now for immediate installation.

For more information, please call or write:
Lawson Associates, 2021 East Hennepin Ave., Minneapolis, MN 55413
(612) 379-2633

LAWSON ASSOCIATES
WE SIMPLY SOLVE PROBLEMS

Ways to bypass the phone net on the rise

PRODUCT SPOTLIGHT

By Phil Hirsch
CW Washington Bureau

One of the nation's more extensive bypass networks was put into operation last year by Citicorp, the New York-based banking giant. The network links 10 sites — three on the East Coast, two on the West Coast and most of the others in the Midwest — allowing them to communicate with each other via 56K bit/sec digital circuits.

At the other end of the bypass spectrum is a 1.544M bit/sec digital microwave channel that a company is using to connect two buildings across the street from each other. This system, according to a spokesman for M/A-COM, Inc., a leading manufacturer of private microwave equipment, costs about $20,000.

Citicorp, by comparison, is paying $24 million annually just to lease the satellite channels connecting its 10 earth stations. Each of the stations cost another $1 million.

But in both cases, the motivation is the same — to reduce communication costs below what the wire-line carriers (telephone companies that own transmission facilities) are charging for equivalent transmission capacity and/or to obtain service features not available from the carriers.

How many companies today are using services that bypass the telephone network? Because the figures come from biased sources — bypass vendors and telephone carriers — it is impossible to know accurately. The Federal Communications Commission is expected to issue a detailed analysis within the next month or so, although the commission is not universally considered unbiased.

However, it seems certain that bypassing will increase, both in terms of increasing revenues and in terms of a broadening of the types of users involved. Higher tariffs are a major reason. AT&T's proposed rates for private-line service, filed last October and now scheduled to become effective April 3, call for a 15.7% overall increase in interlocal access and transport area private-line rates. Because of the FCC's recently amended access surcharge plan [CW, Jan. 30], this percentage is expected to increase.

Conflicting definitions

One difficulty of discussing bypass is that conflicting definitions of the term exist. It may mean going around the local-exchange network or going around the long-distance network — or both.

And while some observers talk about bypass in terms of customers and/or traffic, others are concerned about costs and revenue. This semantic confusion creates problems because if a bypass facility is defined as one that provides communications more cost-effectively between and among points normally served by the analog telephone network, then the biggest providers of bypass facilities are the telephone companies themselves.

AT&T is laying fiber-optic cables down the East and West Coasts, as well as elsewhere, which will interconnect several of the nation's largest cities. Meanwhile, many former Bell operating companies are installing local as well as long-distance fiber-optic channels.

The Pacific Telesis Group (Pactel) has laid three fiber-optic loops in downtown San Francisco that can put 90M bit/sec of digital transmission capacity on the doorsteps of nearby companies. In addition, Pactel has just about completed a fiber-optic network in the Los Angeles area that will interconnect the sites of the 1984 Olympics, which are scattered over an area stretching 90 miles north, 30 miles east and 110 miles south of the city. By 1986, the company expects to have all of California's major cities connected by fiber-optic cable.

Meanwhile, it has requested FCC permission to offer digital termination systems in 19 California and Nevada cities and is installing fiber subscriber loop carrier systems in several areas, which would replace much of the existing residential and business customers' analog local loop with a fiber-optic cable that carries 24 digitized voice signals totaling 1.5M bit/sec.

Pacific Bell also has proposed constructing a CATV system to serve Palo Alto, Calif., and several surrounding communities. Part of the system's capacity would be reserved for data transmission at all popular speeds.

Private microwave

A "key alternative" to these telephone company-provided facilities, according to a recent report published by the market research firm International Data Corp. (IDC), is private microwave. "Given the demand in the 1980s for multifaceted data/voice services," IDC said, "we expect to see major growth in . . . microwave-based private communication networks."

Part of this growth will be produced by digital termination systems vendors. A digital termination systems network basically consists of a centrally located microwave transceiver which communicates with users up to about eight miles away through three or four microwave antennas, each serving a different sector of the surrounding area. Users within each sector share a 1.5M bit/sec, digital, full-duplex channel. Because transmission capacity is limited, digital termination systems are generally considered feasible for interactive rather than batch-type data communications and are not suited, at least presently, for voice traffic.

More than 50 companies have requested FCC permission to build and operate digital termination systems, and such systems have been authorized for most of the nation's major cities. Although only a few are actually on the air at the moment, several are scheduled to begin operation this year, so those new bypass facilities should become accessible to a substantial percentage of the nation's corporate communications users by the end of 1984.

See BYPASS page 16

How to Bypass Your Local Telephone Company

Major sources	Types of facilities offered	Comments
AT&T, the former Bell operating companies, independent telephone operating companies and other common carriers	The former Bell operating companies offer long-distance access (local exchange network bypass) using terrestrial analog/digital transmission facilities. Connections link user with AT&T, other common carrier network nodes or with user's private local/long-distance network. AT&T and other common carriers offer Inter-Lata (local access and transport areas) satellite, terrestrial private-line facilities. The former Bell operating companies offer Intra-Lata private-line facilities. Two telephone companies (Rochester Telephone and Southern New England Telephone) are building multistate private-line networks.	All carriers making increased use of fiber-optic cable for local long-distance transmission. Many former Bell operating companies planning to introduce local-area data transport services, circuit-switched digital capabilities, local-area networks this year; they may be authorized to offer digital termination systems (DTS). Some former Bell operating companies are planning to build cable TV networks providing private-line services. The former Bell operating companies are also likely to build office parks offering other tenants teleport and/or shared access to terrestrial networks.
Multitenant services vendors (owners of office buildings and office/industrial parks who provide communications services to their tenants)	Long-distance access using private lines typically leased from phone company. Auxiliary services — electronic mail, private branch exchange and message centers — are also frequently available.	Shared communications services are now offered by 58 office buildings concentrated in New York City, Dallas and Chicago. Telephone companies and other common carriers are investing in real estate-related communications ventures. Video teleconferencing to be offered this year by at least one multitenant services vendor.
DTS/Dama suppliers (DTS provide data-only services within metropolitan areas; digital electronic message services are DTS networks interconnected by satellite/terrestrial facilities leased from others.)	Point-to-point, point-to-multipoint, microwave-based transmission at speeds of 9.6K bit/sec to 1.5M bit/sec.	Only one DTS carrier is operating at the moment. Several plan to be on the air by the end of this year; however, their networking capability will be limited. New technology and the opening of 18-GHz frequency band promise to increase DTS transmission capacity.
Teleports (Some are primarily office/industrial park real estate ventures which include access to on-premises satellite earth stations. Others are "antenna farms" providing only satellite-based communications service.)	Long-distance bypass for voice/data communications. Some teleports also bypass local exchange networks.	New York City teleport, first of its kind, scheduled to begin operation late this year. At least two more (Bay Area Teleport in San Francisco and Las Colinas office park between Dallas and Fort Worth) are likely to be operational in 1985. According to one estimate, within three years teleport-equipped office/industrial parks are likely to be operating in the nation's 30 largest metropolitan areas. "Antenna farm" teleports are now operating in about 25 cities.
Cable TV networks	Coax/fiber-optic-based private-line services connecting user on point-to-multipoint basis with local sites and/or with long-distance network nodes.	Cable TV-based private-line services are now offered in a number of cities — notably, New York, Pittsburgh and Omaha. They are planned in several more, but local telephone companies are insisting that the companies must first be certified by state public utilities commissions. The Federal Communications Commission has been asked to assert federal jurisdiction.
Private network vendors	Primarily microwave (including DTS) providing point-to-point, point-to-multipoint transmission at all popular bit rates.	Business use of microwave to bypass local exchange networks is increasing. Most new systems operate in the 18- or 23-GHz range. Transmission up to 8 miles without regeneration is possible.

NEWS

WASHINGTON UPDATE

JAKE KIRCHNER

Japan will reconsider trade proposals: U.S.

WASHINGTON, D.C. — U.S. government officials said recently they believe Japan will reconsider several controversial high-technology trade proposals that have raised serious concern among American firms.

Chief among the U.S. complaints is a Japanese proposal to create a patent-like protection mechanism for software, allowing for only 15 years of protection and including compulsory licensing to the end user. American industry claims the proposal would allow Japan to raid U.S. software to help it catch up in this important high-technology field.

The other area of concern is a proposal to limit foreign ownership of a certain type of telecommunications network the Japanese government may try to foster in that country.

Both proposals are in the early stages, and U.S. trade officials told U.S. industry leaders recently that Japan has agreed to consider American views as the proposals are developed. U.S. computer and electronics industry representatives who met with U.S. Commerce Secretary Malcolm Baldridge and U.S. Trade Representative William Brock reported the government has assured them of strong support in the controversy.

CAB orders regulations on reservations nets

WASHINGTON, D.C. — The Civil Aeronautics Board (CAB) has directed its staff to prepare regulations to minimize bias in the computerized airline reservations systems provided by airlines to travel agents.

The CAB decision is the latest move in the agency's investigation of complaints that some of the systems, provided by a small number of airlines, are biased in favor of the providers' own flight schedules, to the detriment of carriers who rent time on the systems.

Although there are several systems providers, most travel agents use the systems developed by United Airlines and American Airlines.

Independent studies by the CAB and the Justice Department found a potential for major abuses with anti-competitive consequences in current systems operations.

The CAB rejected suggestions from some airlines that these systems operations be divested.

The regulations being developed by the CAB staff reportedly will include provisions to ensure all airlines' schedules on a system are listed without preference to any carrier and that participation fees charged by the system providers to other airlines are not excessive.

Group plans ad campaign on VDT safety, tech issues

WASHINGTON, D.C. — A newly formed Coalition on Workplace Technology is planning a major advertising campaign on ergonomic and safety issues in support of increased use of office technologies.

The coalition, initially concentrating on VDT safety, was formed in response to concerns that new technology is not put to its best use in the work place, according to the Computer and Business Equipment Manufacturers Association (Cbema), a major force behind the coalition. The coalition will also target what it terms "unnecessary" legislation now appearing at the state level to regulate implementation and use of computer-based office equipment, particularly VDTs, said Cbema spokeswoman Charlotte LeGates.

Besides Cbema, other members of the coalition, representing manufacturers and users of high-technology equipment, include the Air Transport Association of America, the American Bankers Association, the American Electronics Association, the American Insurance Association, the American Newspaper Publishers Association, the American Society of Personnel Administration, the Electronic Industries Association and the Printing Industries of America.

LeGates said the number of prospective members is three times the number of groups that have already joined the coalition. She said the group's funding level "is very much up in the air," but that a "major advertising campaign" now under consideration would cost a minimum of $50,000.

In a statement issued last week, Cbema President Vico Henriques said, "We have a great deal of information about the best installation and use of visual displays, about how to introduce new technology in the work place and about the kinds of questions and problems that users experience."

BYPASS from page 15

According to Telestrategies, Inc., a McLean, Va., consulting firm that devotes most of its time to studying the bypass industry, digital termination systems networks in 45 cities will be operating by the end of this year. At least a few of the cities are also likely to be interconnected by then, so some users should be able to employ the new networks for long-distance as well as local communications.

Another significant source of bypass services is multitenant services vendors. A typical multitenant vendor is the owner of an office building or office park which leases communications circuits from a carrier and resells them to its tenants.

According to Jerry Lucas, president of Telestrategies, Inc., 58 office buildings around the country now provide such services. It is "virtually certain," he added, "that any office building of more than 300,000 square feet built in 1985 will provide shared communications services to its tenants."

Most offices with fewer than 300 employees can save six cents to 20 cents a minute per call by sharing long-distance service instead of dealing directly with the phone company, Lucas contended. And besides this direct saving, he pointed out, the sharer gains access to sophisticated private branch exchange equipment — offering electronic mail boxes, least cost routing and similar features — which the sharer often cannot justify on its own.

Although multitenant service vendors typically lease terrestrial circuits, they may also use satellite facilities. Late last year, for example, Olympia & York, the largest office developer in North America, announced plans to interconnect all of its properties, located in New York and eight other cities, using satellite channels supplied by United Telecommunications, Inc., a major independent telephone company.

Teleport services

A related form of bypass involves "teleports." The best known of these is being built jointly by New York, the regional port authority, Merrill Lynch & Co. and Western Union. Located on Staten Island, the teleport will provide access from a single location to 24 existing or planned domestic and several international satellite networks.

Some of the teleport's users will be located in an adjoining "corporate park"; others will be in neighboring areas of New York and New Jersey. Two similar teleports, consisting of earth stations and an adjacent office area, are also under construction.

One is in the San Francisco Bay area, the other near Dallas. The big advantage of the teleport-cum-office park is that it can largely eliminate the access circuitry — and its related costs — which existing carriers like Satellite Business Systems must add to their charges.

Telestrategies' Lucas expects teleports to be built in the nation's largest 30 cities within the next three years. He also expects "antenna farms" to be built in the largest five cities. Antenna farms, he explained, are satellite earth stations without office parks, connected by leased circuits to users scattered throughout a metropolitan area. Their operators would lease satellite transmission capacity at bulk rates and resell it in smaller pieces at rates less than those charged by other carriers.

Regulatory policies

Although the economics of bypass services will have an important bearing on their viability, regulatory policies will also play an important role.

For example, although a number of CATV companies now offer data transmission services and more plan to do so, they are being stymied by telephone companies' insistence that the CATV operators must first obtain common carrier licenses. According to a survey conducted last year by Time, Inc. and reported to the FCC, eight states — New Jersey, New Mexico, New York, Oregon, California, Colorado, Connecticut and Nebraska — are investigating this.

Meanwhile, legislation is pending in Congress to free cable-based private communication services from regulation, and the FCC is considering whether to preempt state regulatory authority over cable.

BIM-EDIT vs. IBM ICCF:

Higher productivity is the better deal.

When you compare program editor capabilities, there's no comparison between BIM-EDIT and ICCF. BIM-EDIT has more than 25 features that ICCF can't match. Time-saving, productive features like:

- fast, automatic recovery after CICS failure
- library backup without interrupting on-line users
- concurrent library member addition and deletion from batch and on-line
- immediate logoff from any point, including mid-edit session
- logon returns immediately to logoff point and status
- log session maintained per user of commands and responses
- line block group commands — copy, move, delete (cc-cc, mm-mm, dd-dd)
- easy switching between concurrent edit and display sessions
- access to all system commands from any screen or session
- high-speed, highly functional, POWER spool queue access
- spool access, edit, other session types, all use same scrolling commands
- multiple commands for one or multiple session may be entered at any time regardless of session type or position
- may end an edit session without permanently affecting the member
- hierarchical library directory structure
- edit lines up to 256 characters wide
- support for 3270 models 2, 3, 4, and 5
- dynamic adjustment of screen size support
- exit routines
- member name length up to 32 characters
- access control by sub-library, member, or access type
- Help screens
- implied objects of commands (uses last referenced member name)
- library directory always in alphabetical order

Compare the features. Compare the price. You'll agree, the higher productivity of BIM-EDIT is the better deal.

BIM has more than a dozen other DOS/VSE system software products, also performs systems programming consulting, and provides computer time services on a 4331-2 system.

BIM — BI MOYLE ASSOCIATES, INC.
5789 Lincoln Drive
Minneapolis, MN 55436
612-933-2885
Telex 910-576-3137

COMPUTERWORLD READER QUIZ

YES	NO	
☐	☐	1. Is *Computerworld* on your desk <u>every</u> Monday morning?
☐	☐	2. Do you receive *Computerworld On Communications* and *Computerworld Office Automation* every other month?
☐	☐	3. Do you know about the latest job position announcements? (when you've still got time to send your resume)
☐	☐	4. Can you rely on *Computerworld Buyer's Guides** for product information? . . .
☐	☐	5. Do you know the <u>very</u> latest news in the computer field?

If you've answered **NO** to any of the above, you're probably reading someone else's issue of *Computerworld*. Don't you need your own? When you're a subscriber, we'll guarantee that *Computerworld* is on your desk <u>every</u> Monday morning. And, what's more, as part of your subscription, you'll receive <u>all</u> of our special-focus publications.

Now's your chance to say YES! Subscribe today for a full year of Computerworld at our special introductory rate of $39 (save $5 off the $44 annual subscription rate).

Complete Form On Reverse, Then Return In Attached Postage-Paid Envelope. Or Use Your Charge Card and Call TOLL-FREE: 1-800-343-5730.

☐ **Please enter my subscription (details on back)**

☐ **I'm already a subscriber, but I'd like you to change my:**

☐ address ☐ title
☐ industry ☐ other

Put old label or label information here

My current mailing label is attached and I've filled in new information on the other side.

COMPUTERWORLD

*U.S. Only

CW-136

Please send me COMPUTERWORLD for one year. RATES: United States $44; Canada, Central & South America $110; Europe $165; All Other Countries $245 (Airmail Service)

Special Introductory Offer — Only $39.00 Save $5.00

☐ Check Enclosed
☐ Am Ex ☐ BA/Visa ☐ MC (MC Only - List four digits above your name)

If charge we must have cardholder's signature: _____ Expiration Date: _____

First Initial		Middle Initial	Surname	
Your Title				
Company Name				
Address				
City		State	Zip Code	

Address shown is:
☐ Business
☐ Home

☐ Check here if you do not wish to receive promotional mail from *Computerworld*.

☐ Check here if you're interested in receiving information on *Computerworld*'s Index.

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

CIRCULATION DEPT. 375 Cochituate Road, Rte. 30, Box 897,
Framingham, MA 01701-9985

Detach here, moisten and seal envelope securely before mailing.

1. BUSINESS/INDUSTRY (Circle One)
End Users
10 Manufacturer (other than computer)
20 Finance/Insurance/Real Estate
30 Medicine/Law/Education
40 Wholesale/Retail Trade
50 Business Service (except DP)
60 Government—State/Federal/Local
65 Public Utility/Communication Systems/Transportation
70 Mining/Construction/Petroleum/Refining
75 Other User _____
Vendors
80 Manufacturer of Computers, Computer-related Systems or Peripherals
85 Computer Service Bureau/Software/Planning/Consulting
90 Computer/Peripheral Dealer/Distributor/Retailer
95 Other Vendor _____

2. OCCUPATION/FUNCTION (Circle One)
11 President/Owner/Partner/General Manager
12 VP/Assistant VP
13 Treasurer/Controller/Financial Officer
21 Director/Manager/Supervisor DP/MIS Services
22 Director/Manager of Operations/Planning/Administrative Services
23 Systems Manager/Systems Analyst
31 Manager/Supervisor Programming
32 Programmer/Methods Analyst
35 OA/WP Director/Manager/Supervisor
36 Data Comm Network/Systems Mgmt
41 Engr/Scientific/R&D/Tech Mgmt
51 Mfg Sales Reps/Sales/Marketing Mgmt
60 Consulting Mgmt
70 Medical/Legal/Accounting Mgmt
80 Educator/Journalist/Librarian/Student
90 Other _____

3. COMPUTER INVOLVEMENT (Circle all that apply)
Types of equipment with which you are personally involved either as user, vendor or consultant
A. Mainframes/Superminis
B. Minicomputers/Small Business Computers
C. Microcomputers/Desktops
D. Communications Systems
E. Office Automation Systems

CW-136

IBM seen marketing micro with 'Trojan horse' strategy

By David Meyer
CW New York Bureau

NEW YORK — With its antitrust worries safely behind it, IBM has developed a "Trojan horse strategy" for infiltrating American businesses with its Personal Computer and for taking over the entire hardware market through services delivered over its Information Network, The Yankee Group said at seminars held here and in San Francisco earlier this month.

IBM's aim is to "intoxicate end users with [the] limited processing power" of desktop Personal Computers, "creating an explosive demand" for storage media, software and processors, Dale Kutnick, executive director of the Boston-based consulting firm, told about 120 executives from user and vendor firms who attended the seminar here, titled "The IBM Impact."

"IBM has settled into its role as the standard-setter for the industry," Kutnick said. Before the U.S. Justice Department dropped its antitrust case against the company, "IBM was almost paranoid about competition and felt uncomfortable with third-party software developers."

But despite its clear aim to "dominate the industry," IBM is vulnerable in office automation, he contended. It lags behind its minicomputer-making rivals in developing a $35,000 to $40,000 system to act as what he called "a departmental file cabinet."

"There is a desperate need for this machine. Customers are looking for a system in the $20,000 range. They're still looking for that magic box," Kutnick said.

The rapid acceptance of the IBM Personal Computer, with 550,000 units shipped in 1983 and 1.5 million expected to be shipped in 1984, has obscured IBM's lack of a departmental-level office automation minicomputer, according to Kutnick.

Local-area net to debut?

Until IBM is able to design a 4300 family machine "small enough to fit onto the departmental level" — a process expected to take three years — it will pursue its strategy of dominance through networking, Kutnick told the seminar attendees.

Kutnick predicted that the company's local-area network will finally be announced in the second half of the year. A stopgap measure — a network designed for the Personal Computer — is likely to be made available at mid-year, the fruit of a joint development effort by IBM and Soltex, an Israeli firm.

"All the IBM local-area network will be is a local physical implementation" of Systems Network Architecture (SNA), Kutnick maintained. And it is through SNA and the SNA-based Information Network that IBM is plotting to conquer the computer industry, he added.

By year's end, IBM had captured a .9% share of the $4.23 billion computer services market, according to Yankee Group estimates.

Local net, 'Sierra' uniprocessor expected from IBM in '84

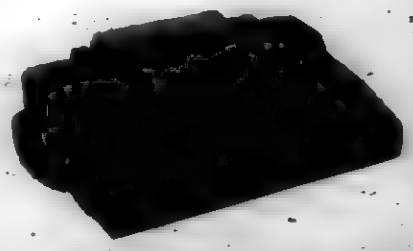
NEW YORK — Nothing as dramatic as the Personal Computer or the PCjr is expected from IBM this year, according to The Yankee Group.

Big Blue's major new product offerings this year will consist of the oft-predicted and oft-delayed local-area network as well as the project code-named Sierra, a high-end uniprocessor-based machine capable of obeying between 14 million instructions per second (Mips) and 19 Mips, Yankee Group researchers said.

The Boston-based consultants told attendees at seminars on "The IBM Impact," held here and in San Francisco earlier this month, to expect midyear, 15% price cuts on the 3081 and 3084 systems, along with higher maintenance costs on the 3033 family.

Other announcements said to be on the way include:

- Introduction late this year of a version of the Personal Computer, able to run subsets of System/36 operations.
- The unveiling of a Personal Computer with a built-in modem late this year or early next year.
- The release sometime this year of an MVS-like operating system to encourage IBM's 20,000 DOS users to sidle over to MVS.
- Availability late this year of a Systems Network Architecture support capability for the VM operating system.
- The marketing throughout the year of various enhancements to the Personal Computer, including a portable version, a different keyboard and a voice-input module.



Lease the Digital LA12-C plain paper portable from MTI for $83/month including maintenance.

We are authorized distributors of Digital's terminals, printers and personal computers.

Digital's Correspondent is the most versatile portable around. It uses any paper, prints multi-part forms, prints up to 132 columns at 150 cps, full ASCII character set plus bit map graphics via a highly legible 9x9 dot matrix. There are five models of this versatile portable with different data communications capabilities. The C model has an integral 300 baud acoustic coupler.

MTI is one of the few Authorized Digital Terminals Distributors, so we can give you the best of two worlds; terminals, based on advanced technology from the industry leader, and the expertise and service from applications specialists.

Whether you buy, rent or lease our equipment, you'll find MTI is the one source for all the terminals, peripherals, systems, applications expertise and service you'll ever need. At good prices. Call us today.

New York: 516/621-6200, 212/767-0677, 518/449-5959
Outside N.Y.S.: 800/645-6530
New Jersey: 201/227-5552
Ohio: 216/464-6688

mti

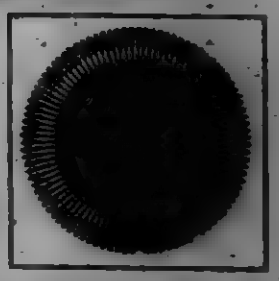
AUTHORIZED digital TERMINALS DISTRIBUTOR

Applications Specialists & Distributors, New York, New Jersey and Ohio. DEC, Intel, Texas Instruments, Dataproducts, Lear Siegler, Diablo, Ikegit C.Itoh, Intecolor, Racal-Vadic, MICOM, Vantel, Develcon, U.S. Design Dig.Eng., Cipher, Protocol Comp., MicroPro, Microsoft, Polygon, Selanar.

Correspondent is a registered trademark of Digital Equipment Corp.

Rough writer.

In the business machine torture chamber most of us call the office, one word processing printer shows true grit. We build our DP-Series daisywheels to keep turning out letter-perfect documents month after month. In the face of adversity, and in the hands of a secretary. Call your printer distributor. Or contact Dataproducts at (213) 887-8924, 6200 Canoga Avenue, Woodland Hills, CA 91365. In Europe, 136-138 High Street, Egham, Surrey, TW 20 9HL, England.



Dataproducts Daisywheel Printers

MCBA is looking for some professional bill collectors.

More specifically, we're looking for some dealers who like money. Lots of it. Because when you carry our powerful, field-proven software, that's exactly what you can expect.

Why? It's quite simple, really. The quality of MCBA's library of 17 modular manufacturing, distribution, and accounting packages is attested to by over 15,000 users worldwide. In fact, it's really the only serious software of its kind available for mini and micro environments. Thanks its modularity and flexibility, not to mention its comprehensive documentation. All of which has helped us develop and maintain successful relationships with dealers like you for over 10 years now.

This means you can establish a relationship with us and have at your disposal a comprehensive library of software packages. All of which can be mixed or matched to suit the unique needs of your customers. And as your customers grow, they'll come back to you for more business. Because you can expand their systems with totally integrated packages that work with each other like the movement in a Swiss watch.

So no matter what size your customers are now, or what size they are tomorrow, your business keeps growing. And the bills (the green kind) keep pouring in. It might even get embarrassing.

So if you're a dealer who's in it for the money, call MCBA now at (818) 957-2900. You may not end up being famous. But you could end up rich.

MCBA®

Software that grows on you. And with you.™

2441 Honolulu Avenue, Montrose, California 91020

For HP, Wang, DEC, and TI minis and UNIX, and RM/COS-based micros.

MCBA® is a registered trademark of MCBA, Inc.

NEWS

SDC employee charged with bribe attempt

By Patricia Keefe
CW Staff

ALEXANDRIA, Va. — A federal grand jury here has indicted a contract employee of Systems Development Corp. (SDC) on charges that he attempted to bribe a consultant to a Massachusetts state agency in return for help in securing an estimated $9.4 million state contract.

The indictment, announced two weeks ago, also charges consultant M. James Errico with interstate travel in aid of racketeering and two counts of wire fraud. If convicted on all four counts, he could receive up to 25 years in jail and a $31,000 fine. Errico has entered a plea of not guilty. The case is scheduled to go to trial March 19.

Errico is under contract with SDC to serve as both consultant and director of marketing, according to Bernard Fried, vice-president, general counsel and secretary at SDC. He said that top management is currently reviewing the case and is expected to decide soon whether to terminate Errico's contract.

"Just because someone is indicted does not mean he is guilty," Fried pointed out.

Errico is accused of promising James R. Camicia, an industrial management consultant hired by the Massachusetts Welfare Department, with future consulting work with SDC in exchange for arranging to have the state contract awarded to the firm. The contract concerned development of a system called the Massachusetts Public Assistance Control System (Mpacs), which will be used to manage several major welfare programs.

The alleged bribery attempt failed, and the contract was awarded to an SDC competitor, Computer Co., last June.

According to a Welfare Department spokeswoman, the bribery attempt was reported immediately to the Massachusetts attorney general, who turned the case over to federal authorities because "it involved facts beyond the jurisdiction of Massachusetts."

Medicaid contract threatened

A subsidiary of Burroughs Corp., SDC was awarded in 1982 an unrelated $49 million contract to automate Massachusetts' $1.2 billion Medicaid program. That contract has been plagued with delays, resulting in at least two warnings from state officials to shape up or lose the contract. Repercussions from Errico's indictment could jeopardize SDC's Medicaid contract, even though that contract is separate from the one involving Mpacs.

According to Welfare Commissioner Charles M. Atkins, if Errico is convicted, the state's contract with SDC has a provision allowing the state to terminate the Medicaid contract — something it has threatened to do twice now.

The first warning was in August in an attempt to get SDC to meet its deadline for getting the system online [CW, Aug. 22]; more recently, SDC was placed on notice that unless it reduces its backlog of processing claims to a 14-day waiting period by March 5, its contract will be canceled.

In response, SDC has filed a 25-page plan to resolve its problems, including an agreement to increase its staff. Nonetheless, Welfare Department officials have estimated the Medicaid management information system has saved the state $28 million since last September.

Groups granted DPMA charters

PARK RIDGE, Ill. — Two new special interest groups in the areas of education and software maintenance have been granted provisional charters by the Data Processing Management Association (DPMA).

The Special Interest Group for Education will seek to enhance communication between industry and education and promote further development of the DPMA model curriculum for computer-based information system education in colleges and universities.

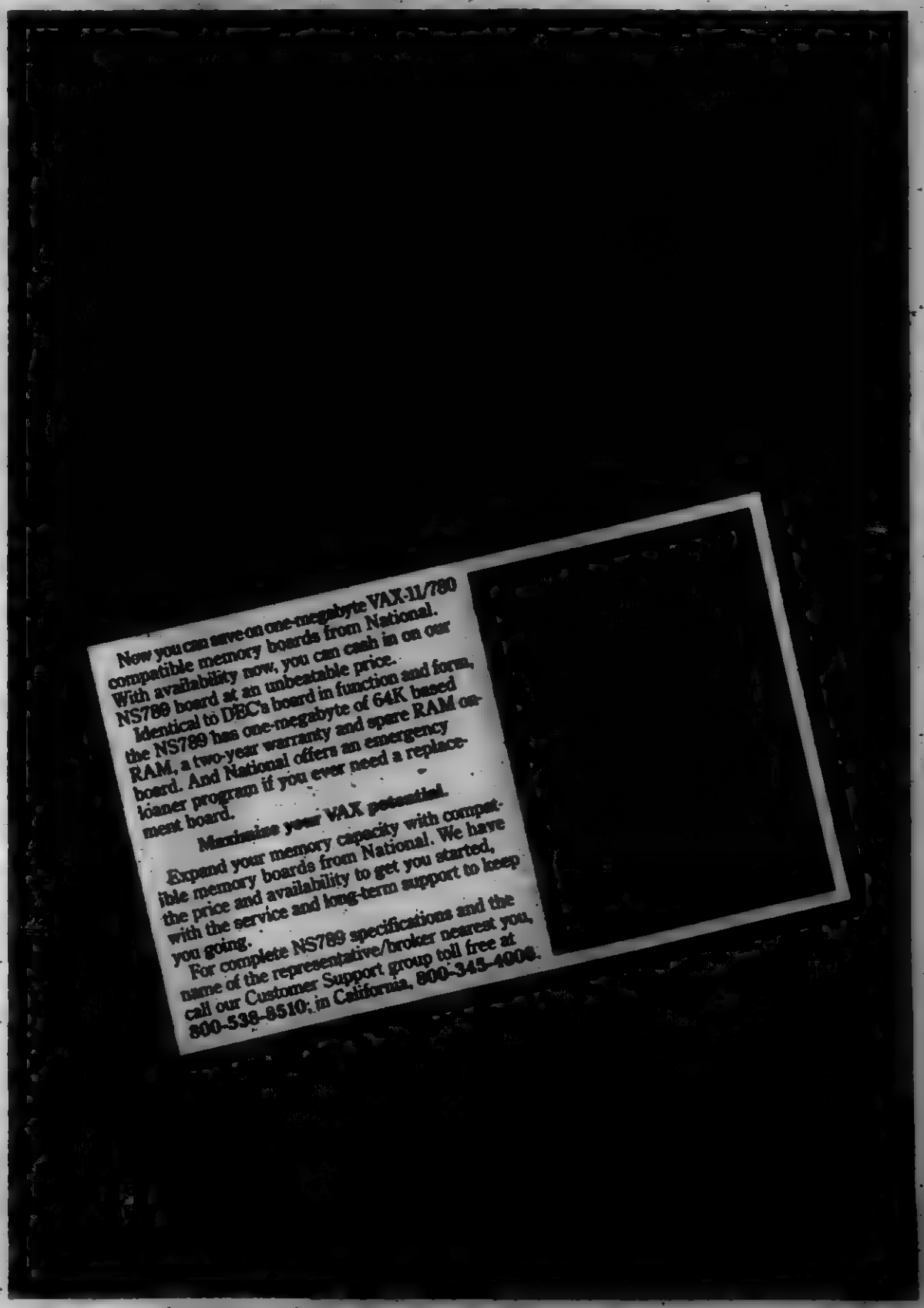
Officers of the group are Dr. Georgia B. Miller, president; Dr. Herbert Rebhun, vice-president; and Kathleen T. O'Neill, treasurer.

Membership information is available from Miller through Indiana University, P.O. Box 647, Indianapolis, Ind. 46223.

The Special Interest Group on Software Maintenance will deal with the problems of enhancement, modification, upgrading, adaptation, tuning and correction of existing software.

Group officers are Dr. Ned Chapin, president; Barbara J. Taute, vice-president; and Nicholas Zvegintzov, secretary/treasurer.

Membership information is available from Zvegintzov, No. 5F, 141 St. Mark's Place, Staten Island, N.Y. 10301.



"Rockwell International eliminates order management paperwork and ships products faster with a ***Tandem NonStop Computer System.***"

Our Tandem NonStop computer has dramatically streamlined order tracking for our broad line of products at the Electronics facilities located in Anaheim. This automated operation is part way to being able to ship products [illegible] sports customers much more quickly and efficiently.

The Tandem system handles data pertaining to each order from the time it is received right on down the line to shipping. And, because the system is on-line, other departments have immediate access to this information as well. Accounting, for example, now generates invoices automatically, resulting in much improved cash flow. Manufacturing is saving $175,000 a year in internal freight charges due to the reorganization of ordering and shipping procedures, and the Group as a whole has been able to eliminate more than 300,000 reproduced documents a year.

Other system benefits contributing to our improved customer service include better control of backorders, more accurate pricing information and the ability to make detailed forecasts of market conditions for planning purposes. The net result is an operation that is helping us achieve some very significant gains in plant productivity.

The NonStop System

Ideally suited to on-line transaction processing where continuous availability of up-to-the-second information is critical to your business,

Tandem. Fully supported by a worldwide sales, training, service and manufacturing organization.

For information on how a Tandem NonStop system can improve your productivity or your P/L statement, call your local sales office or Tandem Computers Incorporated, 19333 Vallco Parkway, Cupertino, California 95014, U.S.A. Toll Free 800-482-6336 or (408) 725-7500 in California.

TANDEM

NonStop Transaction Processing

©Sperry Corporation, 1985

A sure cure for the problem of information bottleneck.

Programming backlog is the source of the problem. Eliminate it, and you eliminate the bottleneck.

Which is precisely what Sperry has done with the MAPPER™ System.

With MAPPER, you work with the computer directly. You ask questions in plain English. And you get immediate answers.

And if the information you get raises other questions, you can ask them right away. With no delay for programming. Or reprogramming.

MAPPER is that powerful. It allows you to manipulate information in almost any way you want. And, interesting to note, it can even help your programmers become more productive.

AN AFFORDABLE SYSTEM.

You don't have to be a large company to have a MAPPER System. MAPPER can be scaled to the real and present needs of just about any size company. The cost of a MAPPER System makes it practical for even a department within a company to own its own system. Or you can time-share through a Sperry service bureau.

What you get for your money is a whole new order of efficiency in your day-to-day management tasks. Because you'll have the information you need right at your fingertips. Literally.

SEEING IS BELIEVING.

We've made some promises here that may sound extravagant. But if anything, our claims are on the conservative side. And to prove it, we offer you the opportunity to see a demonstration of MAPPER at work.

800-547-8362

But first, you might want to look over our MAPPER brochure. A copy is yours for the asking. Call toll-Free: 800-547-8362 (9 a.m. to 5 p.m. E.S.T.). Or send us the coupon.

MAPPER SYSTEM

Sperry Corporation CW1/15-13
Computer Systems
Department 100
P.O. Box 500
Blue Bell, PA 19424

Please send me a brochure on the MAPPER System.

CW12/12-13

Name_____

Title_____

Company_____

Address_____

City_____ State_____ ZIP_____

Telephone_____

We understand how important it is to listen.

SPERRY

NEWS

Scofflaws nabbed at work by printout-wielding police

By James Connolly
CW Staff

INDIANAPOLIS — Armed with computer printouts, local police officers struck at banks, factories and other businesses earlier this month, rounding up hundreds of people wanted on traffic tickets and other misdemeanors.

The dragnet, coordinated through a pair of IBM 3031 mainframes, featured police arresting people at their places of work. The 165 well-publicized arrests in the first day of the program and more arrests in the days that followed inspired 2,500 other people to appear voluntarily in court to clear up outstanding warrants.

The 3031s combined information received from court and police data bases with information collected from another, unidentified source to determine up-to-date home and work addresses for 7,000 people wanted for misdemeanors.

"About nine months ago, we got together with the municipal courts and the prosecutors and found that we were successful in serving only one out of 25 warrants," said Indianapolis Police Department Lt. David Cupello. "Eighty to 90% of the time, the address on the face of the warrant was erroneous, and even where it was accurate, we had little chance of finding the people at home. So we started using various on-line systems to update the addresses."

To ease a backlog, officials offered a 50-day amnesty period under which 27,000 people named in outstanding Marion County misdemeanor and traffic warrants could surrender and pay their fines without risking imprisonment. Only 2,000 accepted the offer.

Meanwhile, the police and the court's 3031s, with software developed in-house, matched the names of wanted persons with places of employment and up-to-date addresses.

The source of that address information remains a secret. "We won't reveal it by agreement with those involved," said Cupello, who is also executive officer of the police department's data processing branch.

During the amnesty program, the police department mailed explanatory letters to 30 major employers to forward to workers who were believed to have outstanding warrants. Those letters warned the workers they were subject to arrest when the amnesty program expired on Feb. 1.

On that date, 25 two-officer teams hit the streets, armed with printouts with names and home and work addresses for 7,000 people. They rounded up 165 people that day.

Employers often let officers use personnel offices and summoned suspects there, rather than having employees handcuffed at their desks, according to Cupello.

With the publicity of the first arrests, 2,500 people voluntarily appeared in court within one week to pay fines or arrange for trials.

But all didn't run smoothly.

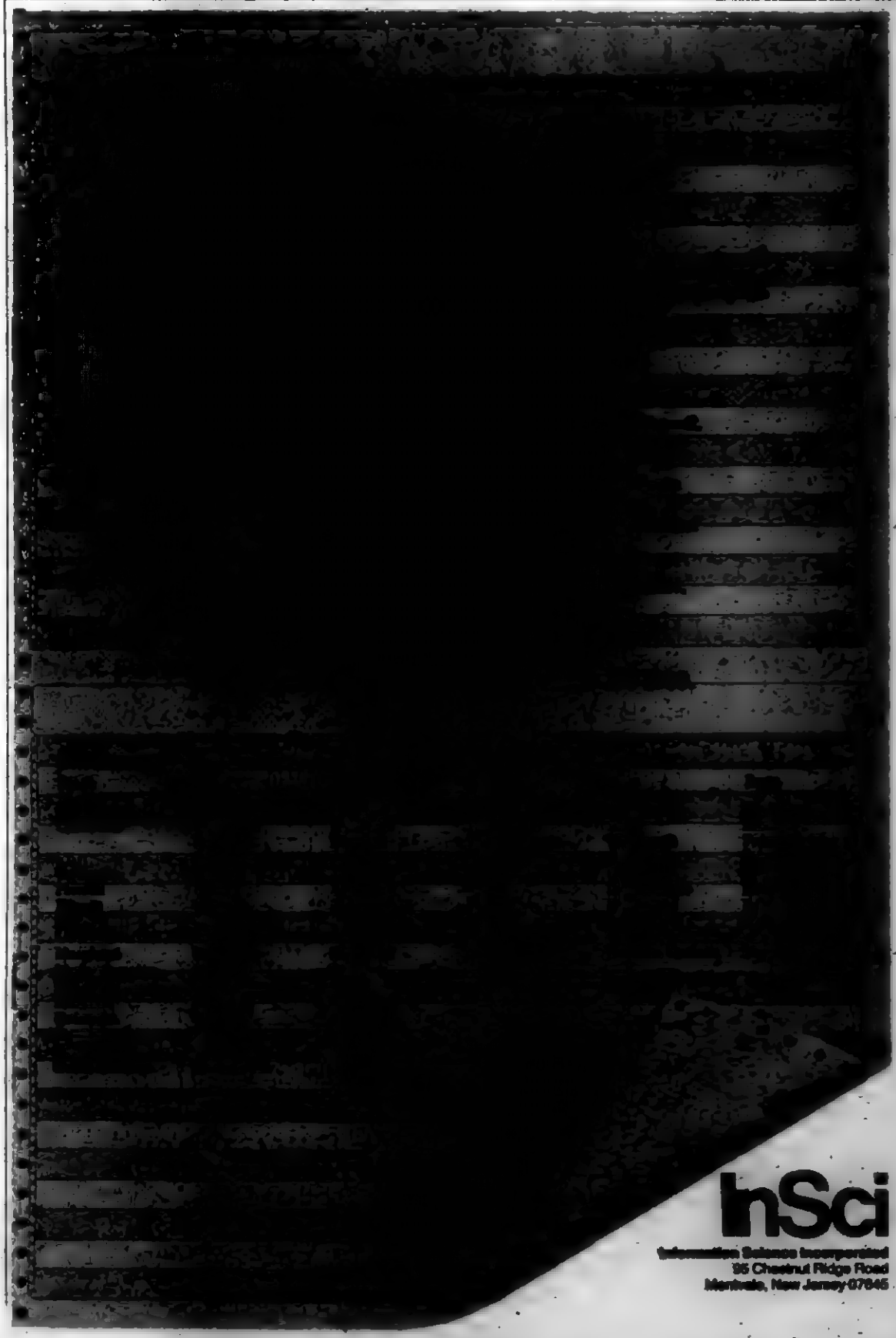
At least one of those arrested and booked under the glare of television news crews' lights was a woman who argued that she had already paid her speeding ticket. The woman is planning a lawsuit.

TSO USERS

Compare these features:

- Up to 50% less overhead than SPF
- Full-Screen Editor (LRECL up to 4096)
- Data Set Manager (Controls TSO files)
- JES Sysout Previewer (Direct from JES Spool)
- File listing facility (LRECL up to 32760)
- Programmable function keys
- Split-Screen facility (Two fully-active screens)
- Customer-defined exit facility (Controls all FSE+ functions)
- FSE+ tuning parameters (Optimize performance)
- Structured menus for new users
- Command oriented for experienced users
- MVS 3.8, SP and XA support
- Free trial period

Call or write for details
Applied Software, Inc. 840 U.S. Highway #1, Suite 250
P.O. Box 13027
North Palm Beach, FL 33408 (305) 626-4818



InSci
Information Science Incorporated
95 Chestnut Ridge Road
Montvale, New Jersey 07645

NEWS

INTERNATIONAL REPORT

CW INTERNATIONAL NEWS NETWORK

AUSTRALIA

MELBOURNE — While Telecom Australia continues to debate whether to support a second standard on its proposed videotex service, Computer Power has unveiled a videotex service that will reportedly support both the UK's Prestel system and AT&T's North American Presentation Level Protocol Syntax on the same terminal.

BRAESIDE — Labtam International Pty. Ltd. has abandoned its plan to incorporate Motorola, Inc.'s 68000 microprocessor in its three-processor system. Instead, Labtam will use National Semiconductor Corp.'s NS16032 chip in the system, which will run Q1 Corp.'s Idris as well as Microsoft, Inc.'s MS-DOS and Digital Research, Inc.'s CP/M operating systems concurrently.

FRANCE

PARIS — OC France, a major copy machine vendor here, has become France's first user of the IBM 4361. OC's system, which replaced a 4331/2, includes 4M bytes of memory, six 3370 disk drives, two tapes, a line printer and two 3274 controllers. It runs under DOS/VSE, but OC is planning a conversion to MVS.

■

PARIS — Thomson-Brandt recently started selling Eagle Computer, Inc.'s microcomputers here under the name Micromega 16. Thomson also markets Micromega 32, a micro developed by Fortune Systems Corp.

JAPAN

TOKYO — Taking aim at IBM's 4361 system, NEC Corp. has introduced the mid-range Acos 430 system. Capable of performing 1 million instructions per second, the 1G-byte NEC machine is targeted for office automation applications as well as computer-aided design. It runs under NEC's Acos-4/AVP operating system. Options include a high-speed scientific calculation processor, an integrated array processor and a three-dimensional display. Although prices were not available, it was learned that the system rents from $7,660/mo, about half the rental fee of a comparable IBM system.

■

OSAKA — Kodensha, Inc., a leading software firm here, has unveiled My Letter Korean, a word processing system for Korean users that combines 2,000 Korean characters with 2,500 Japanese characters. The product was developed for NEC Corp.'s PC-8800; the two products are currently available as a turnkey system for $5,100.

NETHERLANDS

AMSTERDAM — Oscar Data has won an initial $10 million contract from Sweda International, Inc. to supply software for Sweda's point-of-sale cash register systems. The software order is thought to be the largest yet in the Netherlands.

PEOPLE'S REPUBLIC OF CHINA

BEIJING — The Chinese government has ordered $850,000 worth of microcomputers from Japan's NEC Corp. NEC will deliver 155 of its PC-8000 computers and another 150 of its more sophisticated PC-8800, which can display about 3,000 Chinese symbols and characters. The micros will be used for educational and agricultural applications.

UNITED KINGDOM

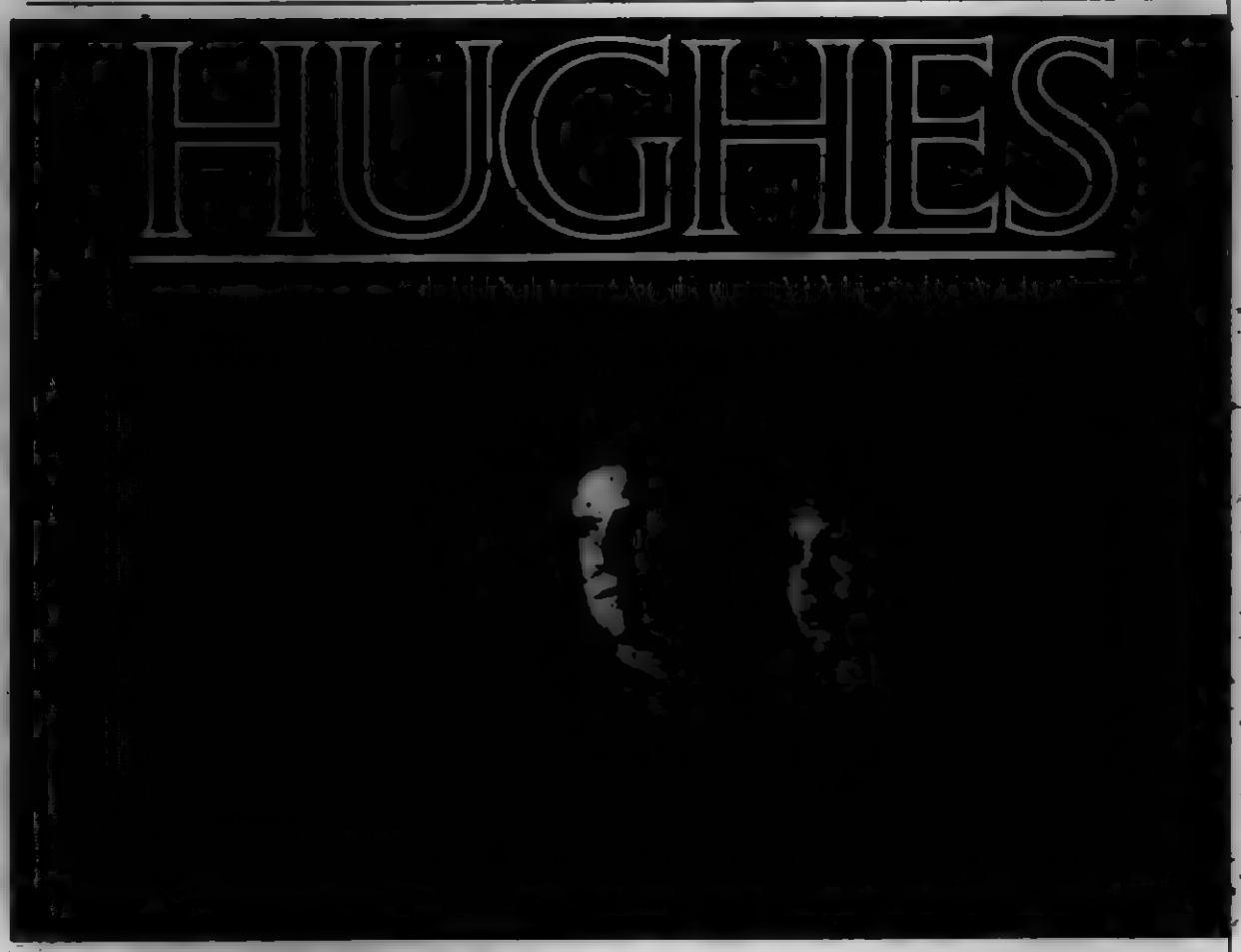
LONDON — Rank Xerox appears to be well positioned to be a leader in the emerging European office automation market, according to a recent study by Frost & Sullivan Ltd. According to the study, the vendor has already distinguished itself as having an "enviable record as an innovator" with products such as Ethernet and Star. But the report also maintained that Rank Xerox must win back the small copier market it lost to the Japanese during the 1970s and hope that IBM endorses Ethernet.

WEST GERMANY

MUNICH — IBM Deutschland GmbH and Siemens AG have signed an agreement to manufacture and market jointly storage peripherals. The contract initially calls for IBM to ship its 3380 mass storage disks to Siemens for its 7800 systems.

■

MUNICH — The German postal, telephone and telegraph (PTT) administration is reportedly trying to push through rate hikes for its Datex-P and Datex-L teleprocessing services. If the PTT is successful, customers will end up paying 50% to 60% more for the X.25-based service. The Ministry of Post and Telecommunications has yet to pass down an official decision.



SOFTWARE SPECIALISTS, COMPUTER SCIENTISTS, DATA PROCESSING SYSTEM ENGINEERS

The people at Hughes Space & Communications Group are proud of their major contributions to space-borne communications.

They are leading the challenge to new technical horizons.

There is a unique team spirit at Hughes Space & Communications Group. A spirit that has created a solid commitment to using advanced technology to develop better and more effective communication.

At Hughes, we know software is *central* to continued success.

Work with some of the most modern and powerful computer equipment and development tools. With top software experts in the field. On projects of vital importance.

It is hard to beat all the advantages that software specialists have at Hughes.

Two-thirds of all commercial communications satellites currently operating were designed and built by the people at Hughes.

Become one of these people with the Space & Communications Defense Systems Division. These are two of our many current openings:

Electrical Engineer
Ability to design, interface, test and integrate digital hardware in data processing systems. Must have capability in application of microprocessor and/or bit slice technology. Strong writing skills essential. Requires BS or MS in EE. 10 years experience preferred.

MTS Programmer
Operating system programmer analyst to maintain and improve large scale computer operating systems in PWB/ENG Computer Center. Must have operating system support experience in DEC VMS or UNIX/PWB. Requires BS in CS.

To respond to these and other openings, send resume to Ray Bevacqua at: Hughes Space & Communications, S41/A300, Dept. WC-826, P.O. Box 92919, Los Angeles, CA 90009.

Creating a new world with electronics

HUGHES
HUGHES AIRCRAFT COMPANY

Proof of U.S. Citizenship Required
Equal Opportunity Employer

SPACE & COMMUNICATIONS GROUP

How 3 famous names got together to

SOLVE YOUR PROBLEMS OF INTELLIGENT MICRO TO MAINFRAME CONNECTION.

Get the answers you're looking for—with the VisiAnswer Software System from Informatics®, the leader in mainframe to micro integration.

Informatics has teamed the best minds in the business to solve the problems of intelligent mainframe data access for microcomputer users. The VisiAnswer™ Software System is the breakthrough result of a unique team involving Informatics Corporate Micro Systems and VisiCorp™ products working with IBM® Personal Computers.

VisiAnswer solves the timely problems plaguing data processing professionals like you.

Available for use right now, the VisiAnswer Software System is the micro to mainframe system specifically designed to help you:

- Manage *and* control the integration of microcomputers with your current mainframe—right in *your* data processing department.
- Provide your company's micro end-users with access to specific mainframe data—without wading through unrelated information for hours.
- Maintain *security*/control of restricted portions of your corporation's data.
- Supply end-users access to *current "live" information*, instead of information that's historical and obsolete.
- Intelligently access *all* mainframe data, whether it's unique application data or part of a data base management system.

VisiAnswer makes your job easier and more efficient than ever.

With more and more managers and analysts in your company using desk-top computers these days, there's a tendency to improvise the way they obtain the data they need. That leaves the door wide open for mistakes and inaccurate information.

Now you can avoid these problems and maintain a high level of data processing efficiency for everyone who needs access to that data with the VisiAnswer Software System. It delivers intelligent solutions that make current mainframe data available to your end-users in an orderly fashion. That makes their jobs *and yours* easier and more accurate—something upper management will appreciate.

VisiAnswer was designed by the best minds in the business to fit your business.

You get Informatics' expertise in data access technology and mainframe system software... plus VisiCorp's expertise in user-friendly micro software. We chose the IBM Personal Computer for its leadership in delivering business solutions, and IBM chose us as a value-added remarketer.

This system works with *all* data bases on IBM mainframe systems. And your end-users will get data that is immediately usable with all Visi Series™ Products and other products utilizing the VisiCalc® file format.

Find out more about Informatics VisiAnswer system. Mail this coupon or call toll free today. See how VisiAnswer products can fit into your Personal Information Center as an integral part of your unique business strategy.

Get the facts on VisiAnswer—
the intelligent micro to mainframe connection.

Mail this coupon today or call toll free

1 800 227-3800 Ext. 911

(In Canada, call collect, 0 416 488-7192)

informatics general corporation

THE SOFTWARE ENGINEERS

VisiCalc is a U.S. Registered Trademark of VisiCorp.
U.S. Registered Trademark applications pending for VisiCorp, VisiAnswer and VisiSeries.

VisiAnswer Information Coupon

Mail to: Informatics, Free VisiAnswer Information,
P.O. Box 1452, Canoga Park, California 91304

I want to know how the VisiAnswer Software System can provide intelligent solutions to my micro to mainframe problems.

☐ I'd like to see the VisiAnswer Software System at work. Please contact me to arrange a free, no-obligation VisiAnswer demonstration.

☐ I'd like more information on your VisiAnswer Product. Please see that I get the full details, without cost or obligation.

Your Name _____ Title _____

Company Name _____ Phone No. (include area code) _____

Address _____

City _____ State _____ Zip _____ CW-AQ

USA

TURNAROUND TIME

LARRY E. LONG

Q Our marketing people have asked us to respond to technical inquiries from three of our large customers who requested directions that would permit them to transmit orders directly from their computers to ours. This seems only logical, since the volume of transactions generated by these three customers is staggering.

Here is the problem. My staff is already overcommitted for the next two years. Preliminary estimates of manpower requirements for the project range from one to three man-years.

While this project would appear to be extremely cost-effective and convenient for both us and our customers, surprisingly I'm not getting much pressure to move on it. Personally, I think that a consumer goods company such as ours should place this project much higher on the priorities list, but those who make these decisions disagree. What are your feelings?

A You did not send a list of your priorities, so I cannot make any relative statements, but I am certainly willing to comment on the importance of intercompany networking: Don't delay.

Before long, your small and medium-size customers will be demanding similar services. The trend is to capture data as close to the source as possible. Why not go directly to the source, that is, your customers' computer systems?

Intercompany networking is no longer a carrot that you offer your customers; it is a marketing necessity in some industries (yours included). I know that several of your competitors already offer this service. Unless you can convince top management to revise its priorities or create funds for additional resources, your company is running the risk of alienating customers and losing a share of the market.

Q For the past five years, I've had responsibility for the DP department (about 20 people). I'll be the first to admit that I've neglected it in favor of my primary responsibilities in accounting and finance.

Being in the public sector, we cannot keep up with DP salaries and, as a result, have lost most of our best people. With our current staff, our DP department is faltering.

Momentum is building to get out of the DP business and bring in a facilities management group. One such group has proposed that they take over the entire DP operation. They said they can move into our present facility and use their software to do everything we are doing now, and do it for less than we are currently spending.

Is this possible?

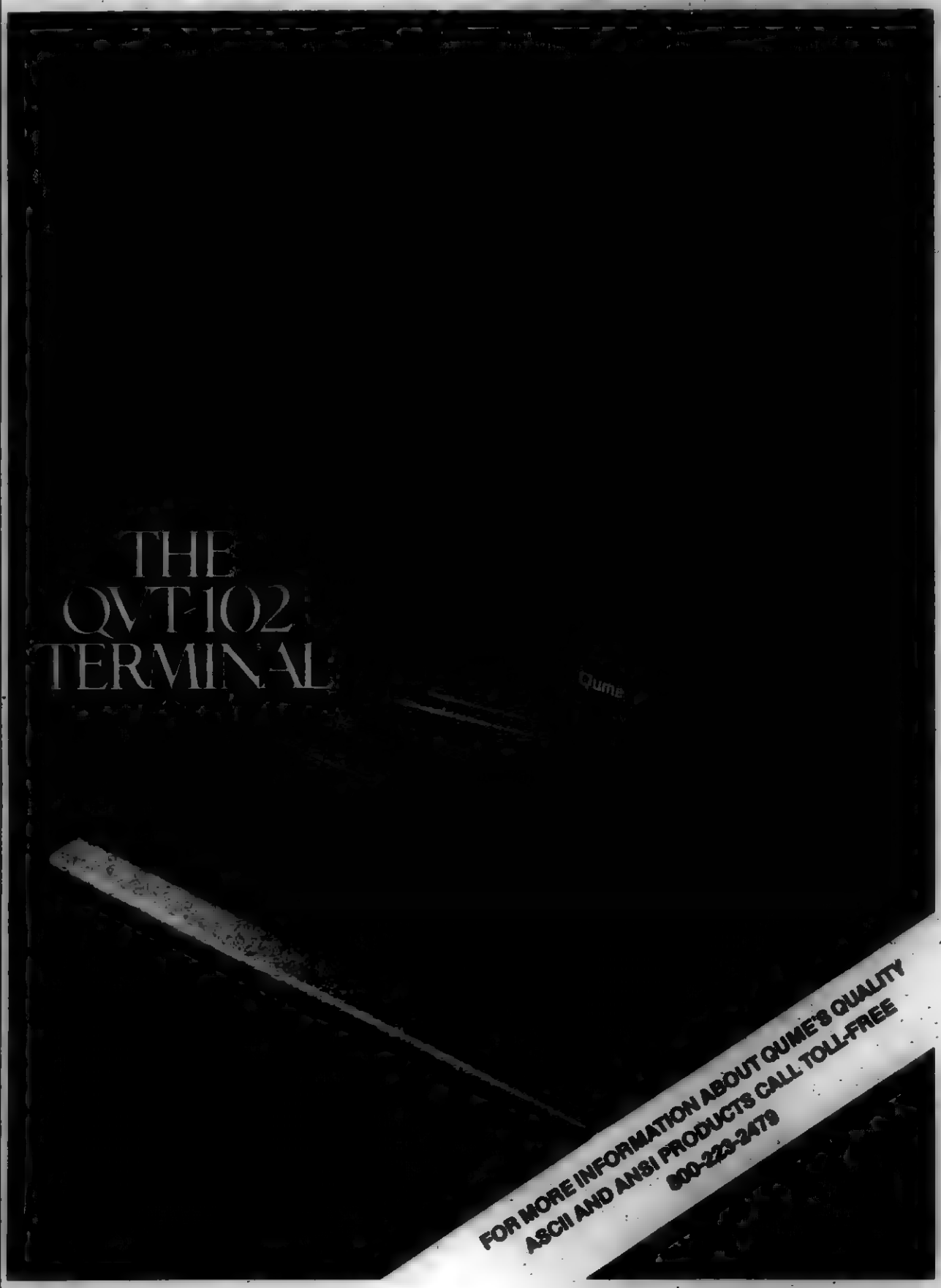
A Do what for less? It may be possible for the facilities management company to reduce DP costs and maintain the status quo over the short term, but is that what you want? You are apparently not satisfied with things the way they are.

Implied in the company's proposal is that services over and above the existing level of service will be billed. Don't overlook this important cost consideration.

External operation of the computer center has proved a smart decision for many organizations, but not for all. You never "get out of the DP business." Top management has an ongoing responsibility to relate information needs and priorities to the DP department. Whether run by an outside company or internally, it is top management's responsibility to provide strategic direction.

I detect from your letter that you expect to be absolved of further DP responsibilities once the facilities management company takes over. It doesn't work that way. If you continue to be aloof from DP, then don't expect any quantum leaps in the quality of the DP services.

Long, president of Long and Associates, is a consultant, lecturer and author in the field of information services. If you have a question you'd like him to address, send it to Larry Long, Editorial Department, Computerworld, *P.O. Box 880, Framingham, Mass. 01701.*



Standard sign language of DP terminology created

Cursor

Scrolling

By David Gleser
CW Staff

SAN JOSE, Calif. — If Steven Jamison has his way, the nation's deaf computer professionals soon will be communicating with their managers and co-workers by using a new standardized sign language of DP terminology.

For the past 10 years, Jamison, a personnel consultant at IBM's Santa Teresa laboratory here, has recruited deaf college students for a summer work program conducted by IBM. In the course of that work, he became aware of the lack of any universal agreement on signs for computer terminology. For example, three or four different signs are used for the word "computer" alone.

Convinced of the need for some standardized terminology, Jamison began in 1981 to compile a comprehensive glossary of DP terms in American Sign Language. IBM agreed to provide the time and money he needed to carry out the two-year project. Jamison's effort culminated last year with the completion of a 600-term glossary.

Those 600 terms have been compiled in an illustrated reference book titled "Signs for Computing Terminology," recently published by The National Association of the Deaf in Silver Spring, Md.

Jamison and the book's publisher expect that the book will be widely used by hearing-impaired students, teachers and computer professionals. They agree, however, that its greatest potential benefit may be for DP managers and others who want to improve their communication with the deaf.

At IBM and other companies within the computer industry, many deaf persons work in technically oriented jobs, such as programming, in which the ability to hear is not as critical as in other fields.

But communicating with a deaf worker can be tedious if someone has to finger spell all technical terms, Jamison said.

Panel of volunteers

To compile the glossary, Jamison recruited 24 associates to serve on an advisory panel for the project. Most of these volunteers were computer professionals; the majority were not only deaf but also skilled signers.

By means of mail surveys and a three-day workshop, the panelists reached agreement on which signs they preferred for all 600 DP terms. Jamison said the primary requirement for choosing a particular sign was the likelihood of its acceptance by the deaf community.

All publishing rights for the book have been turned over to The National Association of the Deaf, which will retain any proceeds from the book. S. Melvin Carter, director of the association's Communicative Skills Program, said the book has sold more than 2,000 copies during its first month of publication.

One company, Integrated Microcomputer Systems, Inc. of Rockville, Md., purchased 500 copies of the book for its employees and associates.

More information about the book is available from The National Association of the Deaf, 814 Thayer Ave., Silver Spring, Md. 20910.

QVT-102

The Price-Performance Leader.

Qume's new QVT 102 VDU terminal has all the features of the Hazeltine 1500* Lear Siegler ADM 3A/5,† and TeleVideo 910,** and emulates any of these terminals by simple menu selection. Features found in higher-priced terminals are standard, including block and conversational modes, local editing, 25th status line, menu set-up mode, and screen content printing.

The QVT 102 takes up minimal workspace and is designed to please the operator. Its non-glare green or amber screen minimizes eye strain with a big 9 x 12 character cell. The screen tilts and swivels for perfect viewing, and the low-profile keyboard is detached to allow placement for ideal reach and hand-rest position.

Sophistication. Comfort. And affordable price. Qume's Model 102 terminal is easily the smartest choice in its class. Features include:

• Line block, Page block, and Unprotected block transfer modes • Four separate function keys (twelve functions) • Line drawing graphics characters • Tilt/swivel, non-glare, green screen (amber optional) • 9 x 12 character cell resolution, 7 x 9 character size • Detachable, low-profile typewriter style keyboard with numeric pad • 24 lines x 80 characters with a 25th status/menu set-up line • Screen-saver time out (an inactive terminal shuts off its screen after fifteen minutes with no screen data loss) • 5 video attributes: blink, blank, reverse video, underline, and half-intensity • 3 emulations: Hazeltine 1500, Lear Siegler ADM 3A/5, and TeleVideo 910 • Self test • Switching power supply (efficient operation and low power consumption).

Display Format
24 lines x 80 Characters
25th status/set-up line (defeatable)

Character Formation
7 x 9 matrix in a 9 x 12 cell

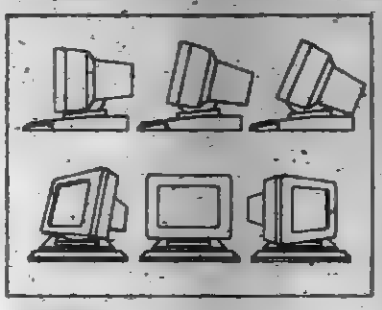
Displayed Character Set
96 ASCII characters, 15 line-drawing symbols, and 32 control character symbols

Editing
Cursor: up, down, left, right, and home.
Character/line insert and delete, erase to end of line/field/page, tab, back tab, field tab, field back tab.

Communications Interface
EIA RS232-C, 20 mA current loop

Communication Protocols
DTR and/or X-ON/X-OFF

Communication Modes
Full or half duplex, block/line, block/page; 7 or 8 data bits



Baud Rates
16 selections from 50 to 19.2k.

Auxiliary Port
Unidirectional EIA RS232-C, partial/full screen copy, transparent

Screen
Tilt/swivel 12-inch diagonal standard non-glare green (optional non-glare amber)

Character Attributes
Blink, blank, underline, reverse video, half intensity

Keyboard
Detachable, low-profile (home row 30mm from work surface), alphanumeric keys, 14-key numeric pad, 4 function keys (12 functions), defeatable auto-repeat and key click. Print, scrap, and no scroll keys.

Fields
Protected and Unprotected fields

Parity
Odd, even, mark, space

Screen-saver
Screen shut off after 15 minutes of inactivity with no data loss (defeatable)

Emulations
Hazeltine 1500, Lear Siegler ADM-3A/5, TeleVideo 910

Set-Up Mode
Menu style, preserved in non-volatile memory

Power Requirements
95-125 VAC
200-264 VAC
50/60 Hz. 30W

Dimensions
Keyboard 1.5"(H) X 18"(W) X 8"(D)
Display 14"(H) X 13"(W) X 12"(D)

Weight
Display 19 lbs. 2 oz., Keyboard 3 lbs.

Options
Amber phosphor screen
14-inch screen
Foreign character sets
20 mA current loop (passive and active)

*Hazeltine 1500 is a registered trademark of Hazeltine Corp.
†Lear Siegler ADM 3A/5 is a registered trademark of Lear Siegler, Inc.
**TeleVideo and TeleVideo 910 are registered trademarks of TeleVideo Systems, Inc.

Command Codes	
Cursor home	Ctrl/^
Cursor right	Ctrl/L
Cursor left	Ctrl/H
Cursor up	Ctrl/K
Cursor down	Ctrl/J
Clear screen	Ctrl/Z
Clear from cursor to end of line	Esc T
Clear from cursor to end of screen with spaces	Esc Y
Clear all foreground	Esc ;
Line insert	Esc E
Line delete	Esc R
Keyboard lock	Esc !
Keyboard unlock	Esc "
Bell ring	Ctrl/G
Column tab	Ctrl/I
Address cursor (row/column)	Esc=(row)(col)
Read cursor (row/column)	Esc ?(row)(col)
Status line display	Esc '
Status line suppress	Esc (
Monitor mode on	Esc U
Monitor mode off	Esc X or Esc u
Print transparent on	Ctrl/R
Print transparent off	Ctrl/T
Write protect on (half intensity)	Esc)
Write protect off (full intensity)	Esc (
Graphic mode on	Esc $
Graphic mode off	Esc %
Auxiliary port on	Esc @
Auxiliary port off	Esc A
New line	Ctrl/_
Back tab	Esc I
Clear screen to nulls	Esc *
Display control character equivalent	Esc F n
Load cursor line	Esc] n
Load cursor column	Esc [n
Print entire screen	Esc P
Print from top to cursor	Esc N
Print from cursor to end	Esc O
Tab set	Esc 1
Tab clear	Esc 2
Tab all clear	Esc 3
Autoscroll on/off	Esc H
Self test	Esc V
Protect mode on	Esc G,
Protect mode off	Esc *
Send line unprotected only	Esc 4
Send page unprotected only	Esc 5
Send line all	Esc 6
Send page all	Esc 7
Clear foreground to nulls	Esc :
Block/page on	Esc B
Conversational mode on	Esc C
Block/line on	Esc D
Character insert	Esc Q
Character delete	Esc W
Termination character select	Esc x N

Call us toll-free:

800-223-2479

Qume.
A Subsidiary of ITT
Qume Corporation, 2350 Qume Drive
San Jose, California 95131

© 1984 Qume Corporation

Contents of this publication may be preliminary and/or may be changed at any time without notice and shall not be regarded as a warranty.

VM/SP Printer Roulette

Round and round it goes, where it prints nobody knows!

The stakes are high: Your corporate information. The game is fixed: You have little control of your print files or small printers.

Stop gambling. Stack the odds in your favor. The ACX-PM™ Printer Manager gives you complete control and management of your 3289, 3287, and ASCII printers.

No risk, 30-day free trial.

For more information, drop us your business card.

ACX

Automotive Computer Extensions, Inc.
5120 Belmont Road, Suite B
Downers Grove, Illinois 60515

©1983 ACX

or for faster access, (312) 971-1505.

NEWS

Bureau doubles output with micro-to-mini link

ATLANTA — By developing a communications package to link varied microcomputers with its minicomputers, a service bureau here doubled in a year the number of tax returns it processed for 400 accountants spread throughout five Southeastern states.

Infoservices, Inc. sought a way to provide the on-line power of its minicomputers to accountants who use more than 30 different types of microcomputers at remote locations. The company developed a software system that it said allows remote users to utilize their micros as intelligent office machines that draw on the resources of Infoservices' Prime Computer, Inc. 550 supermini and Prime 400 mini, which are being replaced by a Prime 750 supermini.

The software, known as Infocomm, is a communications program which will run on the more than 200 microprocessors based on Digital Research, Inc.'s CP/M operating system, as well as microcomputers running under Digital Research's CP/M 86 and Microsoft, Inc.'s PC-DOS and MS-DOS, according to Infoservices Vice-President Bob Westerman.

The program permits the transmission of Ascii and binary files bidirectionally between the microprocessor and the host computer. It also provides a conversational mode whereby the microprocessor becomes a dumb terminal for routine interactive processing on the host system.

With clients in Georgia, Florida, Alabama, Tennessee and North Carolina, Infoservices maintains four divisions: a tax division, a time-sharing service, a division that markets Infocomm and a division that sells accounting packages. A focus of the service bureau operation has been the processing and laser printing of tax forms for professional accountants.

"Users throughout the five-state region who desire to do their own data entry use more than 30 different brands of micros running under more than four different micro operating systems to create tax data files.

"These files are then transferred to our Prime computers in Atlanta using our communications package Infocomm and the complementary program, Infohost, on the Prime. We even recreated on the micros the standard text editor available on the Prime so that our users do not have to contend with entirely different programs in their data processing work," Westerman said.

Users can process their tax returns interactively while on-line with the Prime systems. This reportedly gives them access to the greater processing power of the Prime minis and Infoservices' laser printers and access to current versions of software.

Infoservices support personnel can answer questions on specific returns by accessing the return on the Prime via in-house terminals and can monitor the interactive process while the user is preparing a return. After completing the return, the user can print control sheets and flag the return to be printed and delivered by Infoservices.

"We further capitalize on our customers' in-office computers," Westerman noted, "by providing tutorial programs that run on those microcomputers and that teach the user how to utilize our complementary system of micros and Prime."

He added that clients also use the communications system to produce financial statements and other reports, and that use of remote data entry decreases the time-sharing charges to customers who wish to have large computer power without a costly investment in hardware and software.

The Micro Solution

Finally, there is a total solution for your microfloppy needs . . .

The Dysan 3¼" Flex Diskette.™

It assures a source of high quality duplication services from Dysan's established production facilities.

It includes both alignment and Dysan's exclusive Digital Diagnostic Diskettes (DDD) for trouble-free drive operation and media interchangeability.

It utilizes a high performance, cost-effective and widely available media, selected specifically for minifloppy plug compatibility.

Its flexible jacket bends without damage, and optimizes media lifetime in contaminated environments.

It is from the same company who standardized the minifloppy with Shugart and the 5.25" Winchester drive with Seagate.

Considering supporting services, minifloppy compatibility, product availability and proven performance, it's apparent there is only one complete microfloppy standard.

The Dysan 3¼" Flex Diskette.

3¼" Flex Diskette is a registered trademark of Dysan Corporation.

Dysan CORPORATION

Corporate Headquarters
5201 Patrick Henry Drive
Santa Clara, CA 95050
(800) 551-9000, Department 50
(408) 988-3472

NEWS

Query system allows utility to break 'language barrier'

HICKSVILLE, N.Y. — Computers can be confusing to people who don't use them every day, and part of the problem has to do with the "language barrier" that must be overcome before most computers can be operated.

For employees of the Long Island Lighting Co. (Lilco), the public utility serving the Long Island area, computers are becoming easier to understand — and work with — thanks to an on-line software query system that allows users to interact with computers by using conversational English terms.

Lilco runs the Intellect software system from Artificial Intelligence Corp. of Waltham, Mass., with IBM's CICS teleprocessing monitor on an IBM 3033 in an MVS environment. Using Intellect, employees can access information on the complete listing of all computer equipment owned or leased by Lilco, current employee applications on file and the entire fleet of customer service vehicles.

When users log on to the system, they are greeted by the following message drafted by Donald Weidman, administrator of Lilco's Office of Computer Services here: "Good morning. Welcome to the world of self-service computing. We'll try to answer all the questions you pose. Don't be afraid to try."

Then, instead of relying on a complex series of commands, users draw data through Intellect with English-language commands. The system requires no programming or use of codes and imposes no requirements for structure, syntax, punctuation, definitions or key words, Weidman said.

"It's just like talking to a person," he explained. "Suppose you wanted to know the number of applicants on file for a position in the customer relations department. By gaining access to the applicant's file and typing, 'Tell me how many people have applied for positions in customer relations,' the system responds with information such as names and addresses, education, application test scores, interview dates and the other details you would need to make an initial evaluation of the applications on file."

Before Lilco installed the Intellect package, its data security staff developed a front-end security system which requires comprehensive user identification, according to Weidman. In addition, Intellect's dictionary of data terms is constructed so that only users with approved security codes can gain access to the system. Once the appropriate security codes are fed into a computer terminal at Lilco, however, the user need only type in the questions, and Intellect will do the rest.

"If you aren't sure what information you would like to have," Weidman said, "you only have to ask the computer, 'What information is available?' and Intellect will provide a complete list. You can continue asking questions to obtain even further details about the applicants on file, for example, or you can go on to a new subject by simply asking a different question."

That ability to link a continuing series of questions is the key to the system's functionality, Weidman said. "In the past, users had to depend on preformatted reports, or they had to send their requests for additional information to the information systems department, which would then generate a new report. Often, the answers to a question triggered other questions, which would also have to be answered in the same time-consuming way. With Intellect, the user asks questions directly and gets an answer right away."

User response to the Intellect system has been encouraging, Weidman said. "It provides decision-making information quickly. It's a very flexible system with no rigid ground rules, and the computer dictionary can be expanded to suit the terms used by different departments."

Lilco plans to expand the use of Intellect to other corporate applications. "This type of people-friendly program will allow more people to take advantage of computer technology," Weidman said.

ADDERS/Data Entry BEATS ALL OTHER DATA ENTRY SYSTEMS

...SIMPLICITY... ...FUNCTIONALITY AND...

Simplicity: *ADDERS/Data Entry runs on existing 3270 terminals under CICS or stand-alone in pseudo-conversational mode. End users can set up their own input screens to mirror source documents. No additional hardware needed!*

Functionality: *ADDERS/Data Entry offers all the functions of the best key-to-disk systems plus on-line power and direct data entry.*

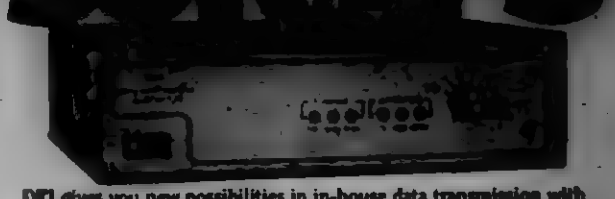
Cost: *ADDERS/Data Entry protects your resources by removing the need for specialized hardware and making optimum use of your mainframe power.*

ADDERS/Data Entry provides the missing link between today's batch systems and tomorrow's on-line applications.

Call: 1 (800) 556-7845 now for a free trial. Your payback can start in just three months.

Rendeck
5 Faneuil Hall Marketplace
Boston, MA 02109 • (617) 367-9100

V.35
MODEM ELIMINATOR WITH
56KBPS



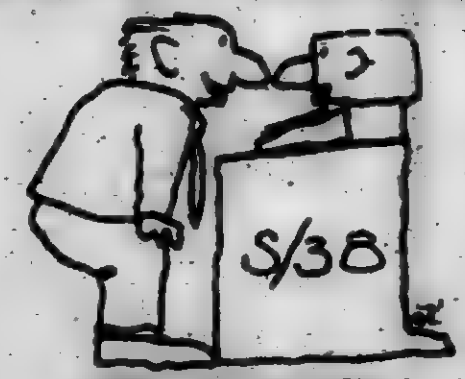
DEI gives you new possibilities in in-house data transmission with our Modem Eliminator (MME). A self-contained, standalone device (rack mount version available), one MME does the job of two synchronous voice grade or wideband modems. Take a look at MME's capabilities:

- **Data Rates** — 1200 BPS to 76.8 KBPS & 56 KBPS upon request
- **Optional Data Rates** — Up to 1 megabit
- **Interface** — RS-232, RS-449, V.35

DEI also offers the ME-1, a Modem Eliminator with 2400, 4800, 9600 and 19.2 BPS. The ME-1 standalone model is completely compatible with RS-232C (CCITT V.24). All DEI products are operator-oriented and backed by the DEI five-star guarantee of quality and service.

DEI
DEI-Telecommunic
230 N. Market Place
Escondido, CA 92025
(619)743-8344

Strike up a Conversation



With your GL

Get the information you need when you need it

Begin a productive relationship. Tell Finance/36's™ general ledger to respond through user-defined structures: on-line report writers; flexible budgeting & S/38 design.

Let us introduce you. Call today:

NGS

NEW GENERATION SOFTWARE, INC.

341 Lincoln Street, Roseville, CA 95678 Phone (916) 969-8466
Outside California Call Toll Free 800 824-1220

PROTOCOL COMPUTERS, INC.
ASCII TO SNA/SDLC EMULATION
MODEL 176-3 (3 PORT)

Price $2900.00 each
Two Year Lease
$145.00 per month

NEWS

CALENDAR

WEEK OF MARCH 11

MARCH 12-16, LAS VEGAS — **Interface '84.** Contact: The Interface Group, Inc., 300 First Ave., Needham, Mass. 02194.

MARCH 13-16, DENVER — **Data Communications: Components, Systems and Networks.** Contact: Institute for Advanced Technology, 6003 Executive Blvd., Rockville, Md. 20852.

MARCH 14, CHICAGO — **Successful Strategies for Acquisition and Control of Microcomputers: The Revolution.** Contact: Datamation Institute, Suite 415, 850 Boylston St., Chestnut Hill, Mass. 02167.

MARCH 14, PITTSFIELD, MASS. — **Beyond 1984: Looking at Life in a High-Tech Society.** Contact: Berkshire Community College, West St., Pittsfield, Mass. 01201.

MARCH 14-16, LOS ANGELES — **Data Communications: An Introduction to Concepts and Systems.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

MARCH 14-16, LANSING, MICH. — **Systems Project Management.** Contact: Association for Systems Management, 24587 Bagley Road, Cleveland, Ohio 44138.

MARCH 14-16, LAS VEGAS — **Data Communications: Networks, Design and Optimization.** Contact: Institute for Advanced Technology, 6003 Executive Blvd., Rockville, Md. 20852.

MARCH 14-16, CHICAGO — **Computer Performance Measurements and Capacity Terminology.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

MARCH 14-16, FORT LAUDERDALE, FLA. — **Bonaventure Intercontinental Telecommunications.** Contact: Gail van Tubergen, Dataquest, Inc., 1290 Ridder Park Drive, San Jose, Calif. 95131.

MARCH 14-16, ARLINGTON, VA. — **SAS Macro Language Course.** Contact: SAS Institute, Inc., P.O. Box 8000, Cary, N.C. 27511.

MARCH 14-16, ANAHEIM, CALIF. — **The International Security Conference and Exposition.** Contact: Michael Berke, Cahners Exposition Group, 12233 W. Olympic Blvd., Los Angeles, Calif. 90064.

MARCH 14-16, ORLANDO, FLA. — **Structured Testing.** Contact: McCabe Associates, Suite 111, 5501 Twin Knolls Road, Twin Knolls Professional Park, Columbia, Md. 21045.

MARCH 14-16, CHICAGO — **Financial Information Systems — Integrating Personal Computers.** Contact: National Institute for Management Research, P.O. Box 3727, Santa Monica, Calif. 90403.

MARCH 14-16, SCOTTSDALE, ARIZ. — **Data Base Management.** Contact: Center for Advanced Professional Education, Suite 110, 1820 E. Garry St., Santa Ana, Calif. 92705.

MARCH 14-16, ST. LOUIS — **Financial Management Reporting.** Contact: Center for Advanced Professional Education, Suite 110, 1820 E. Garry St., Santa Ana, Calif. 92705.

MARCH 14-16, HOUSTON — **IMS.** Contact: Center for Advanced Professional Education, Suite 110, 1820 E. Garry St., Santa Ana, Calif. 92705.

MARCH 14-16, WAKEFIELD, MASS. — **Local-Area Networks.** Contact: Center for Advanced Professional Education, Suite 110, 1820 E. Garry St., Santa Ana, Calif. 92705.

MARCH 14-16, COLUMBUS, OHIO — **Network Communications Protocols.** Contact: Center for Advanced Professional Education, Suite 110, 1820 E. Garry St., Santa Ana, Calif. 92705.

MARCH 15, ATLANTA — **SDM/Structured.** Contact: Mary Aliano, AGS Management Systems, 320 Walnut St., Philadelphia, Pa. 19106.

MARCH 15-16, MADISON, WIS. — **Technology Outlook.** Contact: Engineering Registration, The Wisconsin Center, 702 Langdon St., Madison, Wis. 53706.

MARCH 15-16, LOS ANGELES — **Computer Networks: Protocols, Standards and Compatibility.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

MARCH 15-16, PHILADELPHIA — **Reducing Software Complexity.** Contact: Infosci, Inc., Box 7117, Menlo Park, Calif. 94026.

MARCH 15-16, WASHINGTON, D.C. — **Public and Private Packet-Switched Networks — The X.25 Protocol.** Contact: The George Washington University School of Engineering and Applied Sciences, Washington, D.C. 20052.

MARCH 15-17, HOLLYWOOD, FLA. — **SAS Basic Course, SAS Processing Course, SAS Computer Performance Evaluation and SAS Macro Language Course.** Contact: SAS Institute, Inc., P.O. Box 8000, Cary, N.C. 27511.

MARCH 16, NEW YORK — **Legal Aspects of the Software Acquisition.** Contact: The American Institute for Professional Education, Carnegie Building, 100 Kings Road, Madison, N.J. 07940. Also being held March 23 in Chicago and March 30 in Boston.

MARCH 16, SAN FRANCISCO — **Planning for Extended Architecture: An Unbiased Analysis.** Contact: Techtran, 72 Cummings Point Road, P.O. Box 10212, Stamford, Conn. 06904.

WEEK OF MARCH 18

MARCH 18 and 20, BALTIMORE — **1984 Telecommunications Seminar.** Contact: Alex Brown & Sons, Inc., 135 Baltimore St., Baltimore, Md. 21202.

MARCH 18-22, ORLANDO, FLA. — **The 19th American Institute of Aeronautics and Astronautics (AIAA) Communications Satellite Systems Conference.** Contact: AIAA Communications Satellite Systems Conference, 1633 Broadway, New York, N.Y. 10019.

MARCH 18-22, RIYADH, SAUDI ARABIA — **Saudi Computer 1984 — The Business Computer Show.** Contact: Philip Jenkinson, Saudi Computer 1984, Overseas Exhibition Services Ltd., 11 Manchester Sq., London W1M 5AB, England.

MARCH 19, ORLANDO, FLA. — **Software Configuration Management I.** Contact: Institute of Electrical and Electronics Engineers Computer Society, P.O. Box 639, Silver Spring, Md. 20901.

MARCH 19, ORLANDO, FLA. — **Ada.** Contact: Institute of Electrical and Electronics Engineers Computer Society, P.O. Box 639, Silver Spring, Md. 20901.

MARCH 19-20, SANTA CLARA, CALIF. — **Manufacturing Control for Top Management.** Contact: Management Education Department, American Electronics Association, P.O. Box 10045, Palo Alto, Calif. 94303.

MARCH 19-20, HARTFORD, CONN. — **Computer System Security Management.** Contact: Center for Advanced Professional Education, Suite 110, 1820 E. Garry St., Santa Ana, Calif. 92705. Also being held March 21-22 in Wakefield, Mass.

MARCH 19-20, LOWELL, MASS. — **Integrating the Information Workshop: The Key to Productivity.** Contact: ACM Northeast Regional Conference, P.O. Box 499, Sharon, Mass. 02067.

MARCH 19-20, ORLANDO, FLA. — **Dbase II.** Contact: Center for Advanced Professional Education, Suite 110, 1820 E. Garry St., Santa Ana, Calif. 92705.

MARCH 19-20, SAN FRANCISCO — **Managing Computer Projects.** Contact: Battelle, 4000 N.E. 41st St., P.O. Box C-5395, Seattle, Wash. 98105. Also being held March 22-23 in Detroit.

MARCH 19-21, LOS ANGELES — **Personal Computers in Business: The Micro-Mainframe Connection.** Contact: National Institute for Management Research, P.O. Box 3727, Santa Monica, Calif. 90403.

MARCH 19-21, BOSTON — **American Management Associations (AMA) 65th Annual Human Resources Conference: Innovation in a Changing Environment.** Contact: AMA, 135 W. 50th St., New York, N.Y. 10020.

MARCH 19-21, SAN FRANCISCO — **Power of Personal Computers.** Contact: The Institute for Professional Education, Suite 303, 1515 N. Court House Road, Arlington, Va. 22201.

MARCH 19-21, WASHINGTON, D.C. — **Configuration Management of Software Programs.** Contact: The George Washington University, Washington, D.C. 20052.

MARCH 19-21, NEW YORK — **Project Management: A Practical Approach.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

MARCH 19-22, NEW YORK — **CICS/Design.** Contact: Comped Technical Corp., 10 E. 21st St., New York, N.Y. 10010. Also being held March 26-29 in Dallas.

PROCMAN
THE
TSO CLIST COMPILER

RELEASE 2.0 NOW AVAILABLE

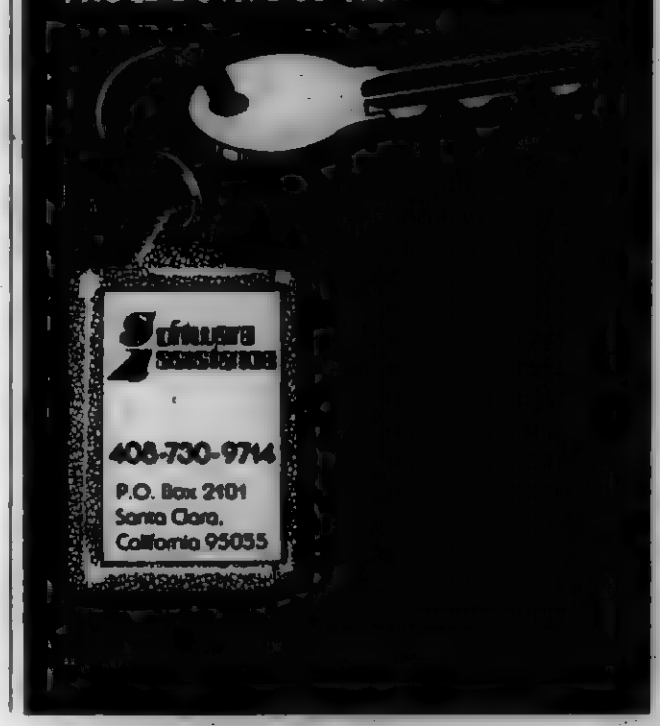
Release 2.0 Includes:

- SORTED CROSS REFERENCE FACILITY
- CLIST MEASUREMENT FACILITY
- COMPILED vs. NON-COMPILED CLIST TRACE FACILITY
- TSO DYNAMIC STEPLIB ALLOCATION
- TSO DYNAMIC COMPILED CLIST LIBRARY ALLOCATION
- 40% FASTER THAN PRIOR RELEASE

PROCMAN
Continuing to Out-Accelerate the Competition . . .
and There's More on the Way!

Contact The CLIST EXPERTS At:
TONE
Software Corp.
1733 S. Bradford, Anaheim, CA 92804 (714) 991-9460 Telex 181562

YOUR KEY TO ORGANIZATION!
PROCDOC for DOS Users



Software Solutions
408-730-9714
P.O. Box 2101
Santa Clara,
California 95055

Info users to meet March 4-8

SAN DIEGO — The Info Users Group, comprised of users of Henco Software, Inc. products, will hold its third annual national meeting at the Hotel del Coronado here March 4-8.

The keynote speaker will be John Kirkley, executive editor of *Datamation* magazine, who will speak on "The Changing Information Environment Within a Corporation."

Other speakers will include Henco President Henry T. Cochran, users of Henco products and representatives from Harris Corp., Prime Computer, Inc., Digital Equipment Corp. and Honeywell, Inc.

The registration fee is $265, which can be paid at the door or sent to R2 Computer Systems, Inc., 5533 Ruffin Road, San Diego, Calif. 92123.

Dates set for Mumps seminars

BOSTON — Seminars for both programmers and nonprogrammers interested in learning more about the Mumps language will be held by the Mumps Users Group at the Sheraton Boston Hotel here March 5-6.

For nonprogrammers, there is "Introductory ANS Mumps Programming" March 5 and "File Manager" the following day. For programmers, there is "Development and Maintenance of Effective Mumps Applications" on March 5 and an advanced version of "File Manager" March 6.

Seminar tuition is $120. Registration information is available from the Mumps Users Group, Suite 306, 4321 Hartwick Road, College Park, Md. 20740.

'I don't get it. This week is almost over and nobody's come out with a new personal computer.'

N.Y. conference to examine micro strategies

NEW YORK — A conference on developing and implementing microcomputer strategy and policy will be held March 1 at the Park Lane Hotel here. Called "Microcomputers: High Performance/High Payoff," it will explore methods for enhancing organizational performance through the use of microcomputers.

Sponsored by Micro Mainframe, Inc. and Morris Decision Systems, Inc., the conference will feature as speakers Peter G.W. Keen, conference chairman and chairman of Micro Mainframe; Anthony P. Morris, president of Morris Decision Systems; and Thomas W. Johnson, vice-president for information systems, State Street Bank.

The conference will feature a panel discussion by microcomputer users as well as a round table discussion on the subject of "Microcomputer Opportunities and Challenges."

Also speaking will be representatives from American Express Co.; Michelin Tire; Hartford Insurance Group; Sun Co., Inc.; Touche Ross & Co.; and the Internal Revenue Service.

The registration fee is $395 per person. More information is available from Micro Mainframe, 215 First St., Cambridge, Mass. 02142.

RAMIS II MAKES YOUR INFORMATION CENTER A GREAT PLACE FOR PEOPLE.

RAMIS II's complete solution is the most effective way to multiply the productivity and satisfaction of your end users and your Information Center staff. Today, RAMIS II means success at hundreds of Information Centers around the world.

POWER AND SIMPLICITY FOR END USERS

RAMIS II provides everything users need for maximum productivity. Its powerful report writer, relational database and language, full-color business graphics, SAS® interface, and many other capabilities meet the most advanced decision support needs. And, with our new RAMLink, IT series, and RAMIS II/PC software, end users have the ideal solution for mainframes and personal computers.

RAMIS II English comprehension extends the power of your Information Center to a multitude of new computer users. Through advanced knowledge-based technology, even people who've never been on speaking terms with a computer can ask questions, obtain answers, and create reports in only a few minutes using everyday English.

EFFICIENCY AND RELIABILITY FOR SUPPORT STAFF

Our complete solution lets your existing staff support many more users by dramatically reducing the number of products you need. And RAMIS II makes your support job easier with built-in computer-based training plus facilities to monitor and control usage.

RAMIS II delivers the performance and reliability needed to tackle even the largest decision support tasks with confidence. In fact, because RAMIS II is also a complete application development system, single-user systems can evolve smoothly into full-fledged applications.

SAS® is a registered trademark of SAS Institute, Inc.

RAMIS II... THE LEADER BY DESIGN

LISTEN TO OUR USERS

Send for our free guide, "Why Information Centers Succeed." It contains practical suggestions for success from RAMIS II Information Center staffs of organizations like yours. Organizations that have found that RAMIS II, the real leader in complete software for business, is the sure way to make an Information Center a great place for everyone.

To get your copy, contact your local Mathematica office, call toll free (800) 257-5171, or return the coupon below.

MATHEMATICA PRODUCTS GROUP

A MARTIN MARIETTA DATA SYSTEMS COMPANY
P.O. Box 2392
Princeton, NJ
08540

MATHEMATICA
PRODUCTS GROUP
P.O. Box 2392 Princeton, NJ 08540

Please send me a free copy of "Why Information Centers Succeed."

Name
Title
Company
Address
Telephone
Computer Operating System

CW3

Managing a Constant Wave of Facts & Figures

Requires a Special Touch.

SOFTWARE INTERFACE

Run With Us.

EDITORIAL

Logic resting in the illogic

The logic rested in the illogic, and the decision of Nissan Motor Manufacturing Corp. U.S.A. to combine its information systems operations with its purchasing department [CW, Feb. 13] is a reminder that businesses may do well to take a second look — in some cases, a first look — at the unorthodox.

Nissan could have followed the well-worn path of other automated manufacturers and buried its computer and communications systems in the finance or production departments. But it didn't, theorizing that computer personnel and equipment in those departments sometimes have been victimized by the whims of noncomputer-oriented department heads who feel, at least in their own minds, that they most need the information systems' resources.

Instead, Nissan paired information systems with purchasing, a department that places minimal demand on those systems. The logic, according to Vice-President for Purchasing and Information Systems Robert A. Frinier, rests in Nissan's belief that information systems should be managed by executives who will not mold them to favor the parent department.

Frinier, who admits that he is learning fast what computers are about, said the move was made to sidestep the "bias" that might occur when someone like a vice-president of finance or vice-president of production shapes information systems to his own department's benefit and to the detriment of others who need the computer resources. Nissan hopes that the setup will provide all departments with fair access to the information systems.

Time will judge whether Nissan's reorganization works. It might indeed "knock the computer industry on its ear," as Frinier suggested with a smile. Or it might not; unfortunately, management decisions don't carry money-back guarantees. However, Nissan's decision carries a noteworthy message: Even the farfetched is worth considering.

The business world, particularly the computer-related aspect of it, will never stop evolving. At the heart of that evolution is the conviction that if something doesn't work right, it's worth trying something new.

'You know how the president feels about fat in the budget'

LETTERS TO THE EDITOR

Clearing up some issues concerning data processing in Nicaragua

I wish to clarify certain editorial comments that were added to the text of my article on Nicaragua "Nicaraguan DP managers face special ills" [CW, Jan. 23]. I spent two weeks in Nicaragua working in data processing. On the basis of my observations, I take issue with the following:

■ There is a reference to "war-torn Nicaragua." Although Central Intelligence Agency-financed "Contras" regularly attack along the sparcely populated border with Honduras, Nicaragua is not at war. Nor is it war-torn.

■ In the article, reference is made to a "Marxist regime." The Sandinista government is certainly socialist, but it also supports and encourages free enterprise. The economy is "mixed," not "upside-down."

■ A "lack of state-of-the-art technology" is mentioned. Developing countries do not need state-of-the-art technology; they need appropriate technology. An example of this is a pest-control system that runs on a microcomputer that was recently developed by American programmers in Nicaragua.

I could go on, but the point of my article is that in Nicaragua, programmers are expected to see themselves not as the technological elite, but as active participants in a revolutionary process. The problem facing DP managers is that many experienced programmers and analysts have left for higher paying jobs abroad.

The professionals who have remained, like Erick Brenes, director of data processing at the Central Bank, are deeply committed to the Sandinista movement. For them, computers are tools for increasing production and services. The problem of political apathy among young programmers is very real for them, for if these programmers are not motivated by a desire to help their fellow countryman they, too, may leave. This is not a case of "government pressure to fight for the country's Marxist regime." Nor is Nicaragua "one of the world's least desirable places for computer professionals," as attested to by the growing number of American programmers and consultants now working there.

Barbara Schaffer
Berkeley, Calif.

DP field in Nicaragua limited by economy, decades of larceny

While Barbara Schaffer's article "Nicaraguan DP managers face special ills" [CW, Jan. 23] conveys a sense of the limitations of data processing employment in Nicaragua, the essential context in which it takes place is missing.

Even under the best of circumstances, professional work in the data processing field in that country would still be limited: The economy is overwhelmingly poor and agricultural, and decades of larceny by Nicaragua's former leaders did nothing to develop the human resources needed for a healthy economy.

Today, data processing in Nicaragua must also contend with a U.S. boycott affecting new and spare computer parts, among other crucial im-

Continued on page 36

COMPUTERWORLD

Editor
John C. Wilkinson

Executive Editor
Rita Shaw

Assistant Managing Editor
Cheryl M. Gallo

Design Editor
Marjorie Magerman

Staff Writers:
Peter Bartok
James Connolly
John Gallant
Lynn Haber
Patricia Keefe
Paul Korzeniowski
David Orrok
Edward Warner

Correspondents:
New York:
David Myers
Suite 7G
421 East 80th St.
New York, N.Y. 10021
212/570-2135
Washington, D.C.
Bureau Chief: John Kirchner
445 National Press Building
529 14th St., N.W.
Washington, D.C. 20045
202/347-4719

West Coast
Bureau Chief: Jeffry Beeler
Correspondent: Robert Bell
1060 Marsh Rd.
Menlo Park, Calif. 94025
415/328-5084

Chief Copy Editor
Kathie Gow

Assistant Chief Copy Editor
Charlotte Ziems

Copy Editors:
Becky Batcha
Dave Bradford
Bruce Crane
Deborah Scanlolo-Horn
Thomas Schmitt

Assistant to the Editor
June Fetig

Editorial Assistants:
Mary DiChristofaro
Joyce Fuss

Contributors
Education
J. Daniel Couger
Human Communication
Jack Stone
Telecommunications
Larry Long
Telecommunications
Thomas Madison
The Data Center
John P. Murray
Legal and Security
Charles P. Lecht

Special Publications
Computerworld Extra!
George Harrar, Editor
Computerworld on Communications
Bruce Hoard, Editor
Computerworld On
Ann Dooley, Editor
Computerworld Buyer's Guides
Marcia Stonesifer, Editor

Main Editorial Office: Box 880, 375 Cochituate Road, Framingham, MA 01701 617/879-0700

Computerworld is a member of the CW Communications group, the world's largest publisher of computer-related information. The group publishes 44 computer publications in 16 major countries. Fifty million people read one or more of the group's publications each month. Members of the group include: Argentina's Computerworld Argentina, Australia's Australasian Computerworld and Micro Computer Magazine; Brazil's DataNews and MicroMundo; Chile's Chile Computerworld; Denmark's Computerworld Danmark and MicroData; France's Le Monde Informatique; Germany's Computerwoche, Microcomputerwelt and PC Welt; Italy's Computerworld Italia; Japan's Computerworld Japan and PC Japan; Mexico's Computerworld Mexico; Norway's Computerworld Norge and MikroData; Saudi Arabia's Saudi Computerworld; Spain's ComputerworldEspana and MicroBusiness; Sweden's ComputerSweden, MikroDator and Att Hantdator; the UK's Computer Management and Computer Business Europe; the U.S.' Computerworld, Desktop Computing, Hot CoCo, InCider, InfoWorld, Micro Marketworld, Microcomputing, PC World, Run and 99'er.

VIEWPOINT

Tweedledum vs. Tweedledee

LECHT ON SCIENCE

CHARLES P. LECHT

My purpose is not to judge the merits of allowing an American computer look-alike industry to function. The fact that it is here and has been for a long time means that our various watchdog and regulatory agencies are comfortable with its efficacy and are reasonably confident that they can handle the unique problems associated with it.

But the increasing number of litigation-bound cases we read about wherein the charge of copying figures as the central issue is rather unsettling. The very existence of such allegations lessens our enthusiasm to consider a look-alike manufacturer's wares for purchase because of our fear that the companies that make them may be in for trouble. Too much success may, paradoxically, guarantee it.

Look-alike lawsuits, as you can imagine, involve a wide variety of copying and/or just plain lifting charges. These include the gross no-no's of blatantly replicating another company's logo and affixing it to a shamelessly manufactured version of its patented products or distributing, without permission, outright duplicates of someone else's proprietary and copyrighted work to augment otherwise original developments.

The battleground between "look-alikers" and "real-thingers" seems hottest, for the moment, in the area of software. The kind of event reported in the article "Taiwan court sentences six for 'bad Apple' [CW, Feb. 6.], in which six Taiwanese computer executives were sent to eight-month prison terms each for copyright and patent infringement of Apple Computer, Inc. software, lets us know how serious world resolve has become to stop pirating in our industry. The previous week's coverage of IBM's victory against two companies who, according to *The Wall Street Journal*, were violating copyright law by offering an IBM Personal Computer look-alike along with IBM software from the real thing confirms this; however we may be inclined to sympathize with little guys trying to make a buck, we cannot condone their doing so with other people's property.

We can, of course, truly sympathize with honest look-alikers, those whose products confirm current legal opinion on how they must behave. Even if they fully adhere to the letter of the law, it is clearly still dangerous to create a truly compatible product. Not only do you have to survive the supreme tests of software and user program transferability between their tweedledee and your tweedledum, but if you do it too well, the likelihood is that a larger test is in store: survival in court against the manufacturer whose system you so admired that you made one in its image.

Thus, as you can imagine, life for the look-alike manufacturer isn't easy. Only the toughest can survive its pitfalls. Each successful product can expect to be subject to the closest scrutiny of a chorus of attack lawyers clamoring to contest that you copied it. To minimize the possibility of a truly unfavorable legal outcome, corporations building look-alikes may be well-advised to build, as well, their judicial pleas for innocence, if charged, and ineptitude, if convicted.

What's going on, what's possible

While each such manufacturer must surely devise a strategy in its own image, it is always prudent to see what others are up to before building anything. So without further ado, I offer the following as a sample of what's going on and a smidgeon of what's possible. Because of the possibility that this sampler may be seen as an attack on the practices of certain specific companies by their ever-alert attack lawyers, I wisely present it under the guise of advice.

First of all, don't make the look-alike system yourself. Assemble it if you must, but for the Lord's sake, don't make anything. Subcontract the entire system so that if by accident your look-alike turns out to be the real thing, your hands are kind of clean. Potential subcontractors should clearly include those already making the real thing for its manufacturer; subcontracting seems to be in vogue these days, so finding them shouldn't be too difficult. I advise the chosen subcontractors to, in turn, subcontract the look-alike manufacturer's work to eligible myopic components companies that know little more than how to deliver their products and that ask no questions.

Now that you've established your manufacturing plans, it's time to bring your look-alike to market. First, boldly take out full-page ads everywhere. The more the better. Show for six months two identical bananas side by side, but provide no text. Next, test the climate for introduction of your product as a hesitant swimmer tests the water temperature with his toe. A trade show, like the Consumer Electronics show, is best for this purpose because you can make a gigantic splash without actually "demoing" anything. A smart giveaway should generate enough excitement to bedazzle booth attendees. I suggest a mirror on which is inscribed in bananas "My look-alike and me," suitable for boardroom or boudoir. Employ the Dallas Cowgirls to pass out banana buttons and do so as near to the real-thing manufacturer's booth as you can get. If the Cowgirls aren't tackled by a team of attack lawyers, you're getting close to a safe introduction of your real thing.

Call a press conference to reveal the bananas mystery. When the press is assembled, have a Cowgirl roll a gigantic banana — a zipper running along its length — out on the conference room floor, then slowly unzip it, letting an apple — preferably a mackintosh — plop to her feet. Check faces for outraged litigious looks while she shoves the apple back in its skin and, with a Cheshire cat grin, rezips the banana.

Your secret is out. Now there's no turning back: Honest look-alike or not, prepare for war. Immediately confuse any lurking enemy by engaging in guerrilla tactics for as long as necessary. Have Chiquita Banana's granddaughter rush out to the press and apologize for all bananas everywhere. Have a kid dressed as a peanut start to squall. Next bring in an Eve to give Adam yet another apple to bite. Have an eagle swoop down to peck at the squalling peanut. Have a midget with a slingshot end the action by killing the eagle with an acorn. You get the idea.

This is the moment of truth: the demo. Quickly and quietly slip Macrosoft-DOS into the computer — preferably a real thing camouflaged to look like the look-alike you're announcing. If everything works out, your product is in the clear, and you're ready to try your hand at real commercial success.

If not, get the hell out as soon as possible. Retain F. Lee Bailey. Make a donation to John Glenn's campaign to establish your astronomical innocence. Disavow any connection with your product. Act like a Silicon Valley millionaire tired of creeping socialism and the mealybugs spreading it in Washington, D.C., and dedicate yourself to fight for America's return to the principle of the freest of enterprises — the liberty to produce anything at anytime by anyone, no matter who owns it. Go on TV and demand this — or death.

All right, all right — you may think these practices I advise to be excessive. But after all, warding off attack lawyers isn't easy. Oh, by the way, any thing, word or idea in my "advice" that suggests an actual firm or product, living or dead, is purely coincidental.

Lecht is chairman of Lecht Sciences, Inc., a New York-based think tank specializing in computer and communications technologies.

LETTERS TO THE EDITOR

Continued from page 24

ports. And then there is the impact of the war being waged on the country by the large U.S.-financed "Contra" army in Honduras.

This, perhaps, is what makes it what the author calls "one of the least desirable places for computer professionals."

Nicaraguan programmers and other DP personnel cannot in the near future live a technology beyond their means, but they can make substantial contributions that can palpably improve economic performance and the standards of living. They can, as essential human resources, also participate in such trends as the "innovators movement."

Employees recognized by their peers as contributing new tools, processes or solutions receive government support in the way of access to shops, research facilities or special education with which to develop their ideas.

Needless to say, computer professionals here can influence policies that will enhance peaceful opportunities for their Nicaraguan counterparts.

Ramon Sueso
Senior programmer
Somerville, Mass.

Some more 'reasonable' ideas for marketing personal computers

I would like to comment on Jack Stone's article "Where are the knowledgeable micro retailers?" [CW, Jan. 30]. For some time now, Stone has recounted his "frustration, anxiety, depression and irritation with personal computer retailers." Apparently, Stone has convinced himself that all of his ideas for interfacing computers are rational and reasonable.

So now Stone wants to dump his random-access memory into a cassette recorder and load the data into his Processor Technology Sol 20 host. Never mind the fact that even *Byte* magazine has not had an ad for a Sol 20 for several years; any self-respecting dealer should stop training his service technicians and salesmen on current computers and focus on the good old Sol 20. Boy, my local dealer would love that. Why, I bet that the closest Sol 20 owner to Iowa is probably in Texas.

And a cassette dump. Wow! Of all of the personal computers that are sold in this area, I bet that there must be one or two with cassette interfaces in this day and age.

Now that Stone has settled on a spiral notebook and three pens, let us focus on his other needs for his trips abroad. First, we'll need a vehicle able to travel in the Sahara under high noon and to roam Antarctica during the winter. It must be able to fold up into a suitcase and fit under an airline seat, but it must be able to pull three tractor trailers filled with clothes, dime novels and back issues of *Computerworld*. Let's see, each ball-point pen should be capable of automatically erasing simply by aiming at the offending errors and rubbing the pen between the fingers. Not state of the art, but it would be quaint enough.

The notebook should be able to make duplicate copies of itself by being placed under a pillow at night. For two copies, use two pillows, four copies, four pillows and so on.

I hope that these ideas will help Stone in his trips around the world. Certainly, my ideas are as reasonable in today's high-tech world as Stone's ideas of how personal computers ought to be marketed and sold.

Richard H. Thompson
Fairfield, Iowa

EQUITABLE LIFE
LEASING CORPORATION

OFFERS

OPERATING & TAX PRICED LEASES

FOR:

Data General

IBM

digital

PRIME

HEWLETT PACKARD

WANG

EQUITABLE LIFE
LEASING CORPORATION

For more information call any of the offices listed below

Atlanta
Boston
Chicago
Cincinnati
Cleveland
Dallas
Denver
Detroit
Houston
Kansas City
Los Angeles
Milwaukee
Minneapolis
New York
Oklahoma
Philadelphia
Phoenix
Pittsburgh
Portland
St. Louis
Salt Lake City
San Francisco
Seattle
Washington D.C.

CORPORATE HEADQUARTERS

Booth #901 | 1984 Office Automation Conference, L.A. Convention Center, February 20-22, 1984

VIEWPOINT

LETTER TO THE EDITOR

Caricature of user needs redrawing

In Jack Stone's article, "User emancipation from Big DP Brother: 1984" [CW, Dec. 26/Jan. 2], Stone is, of course, writing for an audience of DPers. But I feel he is being insensitive to the needs and aims of users.

Stone has caricatured a user as a DP ignoramus whose only objective is to "get control over the data processing establishment." He speaks as if users view DP as an end in itself and as if users "demand . . . support of computing machines, software, documentation, training and supplies" only to frustrate the DP manager. And though users always have a lot to learn about DP, I doubt if they have to be "straightened out."

What I don't think Stone realizes is that users are not trying to use their microcomputers to replace the DP establishment, but to supplement it. Micros are sophisticated tools that can quickly return dividends of increased productivity. There will be problems of data compatibility and a proliferation of data bases, but one must remember that these data bases are out there anyway, manually, though they are called ledgers, indexes, reports or lists — not data bases.

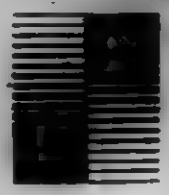
A clerk now using an electronic spreadsheet is doing the same job as he had been doing manually only now he is doing it faster and more accurately. A manager who develops a data base management system application on a microcomputer to handle a few thousand records is doing no more than his staff did before with index cards and file boxes, but is now doing it faster, cheaper and more accurately. In both cases, it would have been inefficient to have the DP department develop applications on the mainframe.

I am sure that the picture painted by Stone in his article is true somewhere, but I think it's the exception. Though there are some users resistant to learning data processing terminology, most try to understand as best they can. Their interests will always be, though, in the ends, not the means. As far as getting "answers to their trivial technical questions in the documentation" and "not . . . pestering the DP department," maybe Stone should offer a course in computerese; it is normally the manual not being aimed properly at its intended uses, not the intelligence or diligence of the user, that is at fault.

It is time that we stop talking about the user vs. the DP establishment and start talking about how users working with the micro hardware and accompanying software can, with the help of the DP department, reach a company's goals. It is the elimination of the waste of human resources doing tedious tasks manually that the use of micros can alleviate that should consume one's efforts.

Donald E. Standiford
Schaumburg, Ill.

MICROCOMPUTERS:
HIGH PERFORMANCE / HIGH PAYOFF
March 1, 1984 The Park Lane Hotel, New York City



A Practical Conference on
Developing and Implementing
Microcomputer Strategy and Policy

PANEL DISCUSSIONS ON:
Micro Opportunities and Challenges
Users with High Payoff Applications

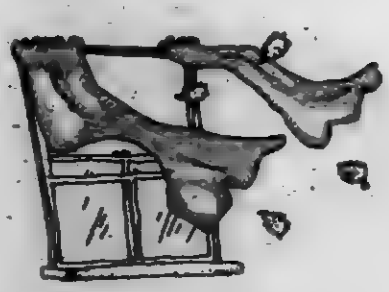
CONFERENCE CHAIRMAN: Peter C.W. Keen
SPONSORING ORGANIZATIONS: Micro Architects, Inc. Morris Decision Systems, Inc.

CONTACT:
Micro Conference 215 First St. Cambridge, MA 02142 (617) 547-8884

A few graphic words from our InterTest™ users:

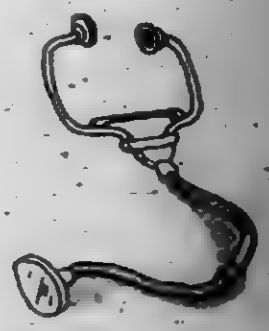
"Testing without InterTest is like climbing a mountain without a rope."

Arthur R. Cossel,
Technical Services,
The Home Insurance Co.



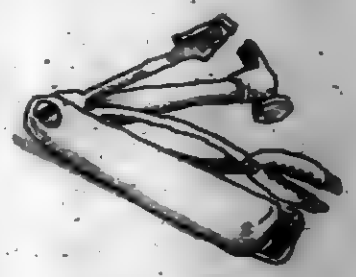
"Makes CICS debugging a breeze."

Neil A. Wale,
Manager Systems & Programming,
Top Value Enterprises.



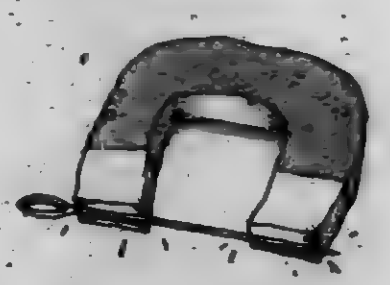
"It provides an invaluable diagnostic capability."

Alan F. Jones,
Systems Analyst/Systems,
First Security Bank Of Utah.



"Best tool on market to help CICS program development."

Joseph C. Chen,
Senior Project Leader,
Briggs-Weaver.



"Unmatched for finding a needle in a haystack."

Charles C. Allen,
Manager, Computer Operations,
Carborundum Co.

"Greatly speeded the debugging process up."

Robert W. Bibbins,
Technical Support Programmer,
R.I. Hospital Trust National Bank.

A survey was recently sent to the users of InterTest software, the industry standard for CICS testing and debugging. As you can see, the comments speak for themselves.

Call today for more information or a copy of the survey results controlled, compiled and tabulated by one of the nation's leading public accounting firms. InterTest works hard for its 1,400 users. And On-Line Software International can prove it.

InterTest from
ON-LINE SOFTWARE INTERNATIONAL
Two Executive Drive, Fort Lee, NJ 07024, (201) 585-1900 Toll Free (800) 631-5272

VIEWPOINT

How new micro users convert to DP faith

HUMAN CONNECTION

JACK STONE

It is almost eerie how consistent the conversion process is by which first-time personal computer users shuck off their numbing ignorance of the technology and fly high the banner of computerism.

I thought it useful to share some empirically derived thoughts about this subject in the hope that an increased awareness of such transitions will help your dealings with the user establishment.

Here are the stages of the process that I have identified:

■ *Stage 1: Wonderment.* Many industry followers suggest that a large number of new users suffer violent mental agonies — cyberphobia — as they begin to approach the subject of automation, with the obvious implication that systems analysts or trainers require near-Freudian capabilities to deal with such users. I believe that the number of new users with deep-rooted psychological problems with computers is very small, in spite of all the media hype to the contrary.

I think the situation is much less complex: The vast majority simply wonder how automation will improve their lot in life and, given the opportunity to become users, whether they will do well and perform well on the job. The psychological situation is not terribly different from that which results from other major changes in one's career, such as obtaining one's first job or becoming a manager for the first time.

However, users are psychologically vulnerable during this period and are unduly influenced by what they experience. Machine breakdowns, boring instruction, abstruse systems documentation and irrelevant applications tend to lessen confidence in users' abilities to cope and interest in moving ahead. It's most important that new users work with soundly designed systems in this stage, otherwise their desires to pursue an automation program will diminish, and their dealings with the DP community will be strained.

■ *Stage 2: Enlightenment.* As a sometime trainer of users, it is no less than a thrilling event when my students succeed at the simplest of DP chores, like printing out their first word processing documents or observing the results on the monitor from their first data base queries. Expressions like "This is fantastic!" and "I can't believe it!" permeate the classroom and give a terrific boost to all the students, giving rise to stronger beliefs in themselves and their expectations of meeting the training challenge.

For this and other reasons, I believe that the early phases of user training, both in the classroom and on the job, should emphasize personal achievement and not notions of fancy advanced technology. In literacy training, the impact on the student of presentations of highfalutin advanced technology — like movies of global command and control systems — is negligible compared with the victory of a first-time paragraph move during a hands-on word processing exercise. For this purpose, the personal computer is ideal, because it provides a total systems environment under complete control of the student.

■ *Stage 3: Achievement.* The conversion process is complete when new users see output that directly relates to their jobs pour out of a machine — power on the premises, as it were. They are exhilarated, if not heady, by the obvious productivity gains inherent in well-designed systems, and many are positively giddy about prospects for the future. Continuing achievements lead to a growing systems "maturity" and independence.

However, for some users, this results in misplaced beliefs that they can do completely without the data processing department. For this reason, at some point during this stage, DPers should step in with a program — seminar, briefing, whatever — to bring users into the arena of production systems, sobering them up with notions that they never considered before and steering the user maturation process toward more realistic goals. ‡

Letters to Stone should be addressed to him at P.O. Box 33699, Washington, D.C. 20033.

"We're not sure of what it does, but it is the newest one out!"

The system that lets you forget to remember.

NCR COM

All you do is tell the NCR 5300 Computer Output Microfiche (COM) recorder how many duplicates you want. Then forget it. The recorder tells the new in-line duplicator what's needed. And that's what you get, completely collated.

All that without operator intervention. And at the fastest speeds you'll find in any COM system.

The system is flexible, too. You can choose between wet or dry-silver recorders. And duplicators that produce vesicular or diazo copies.

However, don't take that string off your finger yet. Wait until you've talked to your local NCR Micrographic representative. For more information call or write NCR Micrographic Systems Division, Box 606, Dayton, Ohio 45401. 1-800-543-8130 (in Ohio, 1-800-762-6517).

NCR Micrographic Systems Division

NCR provides worldwide service and support for the NCR 5300 COM Systems.

BGS: SYSTEMS FOR DP MANAGEMENT

VIEWPOINT

Mid-range computer market here to stay

READER'S PLATFORM

DAVID WALLIS

Regarding Charles P. Lecht's article "U.S. computer industry: 1984" [CW, Jan. 9], I think Lecht's crystal ball needs some Windex. Perhaps the following considerations will help.

Concerning supercomputers, current designs are not "really high-powered stuff," which is why the market for such devices remains relatively small: Most installations are unable to make cost-effective use of array processing architectures. What is needed in most superlarge installations are parallel architectures that are not dependent upon data homogeneity. We will see more solutions to this: The marketplace demands it. However, they may not look very much like supercomputers; they may, in fact, look very distributed data processing-like.

The mid-range computer market is very definitely here to stay. Corporate users want to model all their business activities in their information systems. One particularly effective way of doing that is to provide appropriate information processing power at each corporate level. As long as vendors can provide cost-effective mid-range machines, users will find many places in their organizations where they can be put to profitable use.

It is not that "the advantages of centralized data processing will be rediscovered," since we never lost sight of them. What is true is that we have not yet paid enough attention to the advantages of making form follow function and making capacities match responsibilities.

I sincerely doubt that we will end up with a world in which anything less than a mainframe will eventually "metamorphosize into the dumbest terminals possible." Instead, I see an ever-expanding profusion of novel devices designed to solve various aspects of the problem of getting computers to communicate with people on mutually agreeable terms.

Here to stay

Anyone who says that programming is going to disappear betrays a lack of understanding of what programming is all about. Programming is the art of finding a solution to a problem by effectively applying whatever tools are available. As long as there are problems to be solved and tools to solve them, programming is here to stay.

The question to be asked is: "Who can best program the solution to a particular problem?" The answer is that a solution requires:

- A clear, urgent, experiential understanding of the problem.
- Familiarity with the capabilities of the tools.
- An adequate distribution/implementation/support system.

It may well be that no single organization has the three requisites to solve the problem, in which case a cooperative agreement must be worked out. Since the motivation for solving the problem ultimately rests on the one experiencing the problem, my suggestion is that users become more aggressive in actively creating such agreements with vendors.

I agree that users do not want to reprogram a problem that has already been solved. But they will be forced to as long as they rely upon in-house software development. This appears necessary in the current environment because independent software vendors as a group do not manifest adequate stability. The reason for this is that copyright, patent and trade-secret laws remain ambiguous with respect to software. The software industry's growth will remain stunted and deformed until its product is adequately protected.

The issue of the use of nat-

NEW FROM CINCOM:
THE MANAGE USER SERIES™...
MAINFRAME PERSONAL COMPUTING POWER WITH DP CONTROL.

VIEWPOINT

ural language to communicate with computers is an extremely complex one, because the communication process is one of the most difficult tasks people must perform daily.

We do it so often we take it for granted, but with computers we cannot.

I would characterize communication as a trial-and-error process in which the sender of a message attempts:

- To identify the audience.
- To attract the attention of the audience.
- To instill curiosity in the audience, making it receptive to the message.
- To transmit his message using a syntax and vocabulary understandable to the audience.
- To test if the message was correctly received and is being acted upon.

Since communication problems manifest themselves in decidedly different ways in computers vis-a-vis people, it is not at all obvious that we want to communicate with them in the same casual manner that we communicate with people. In fact, even among people, we often restrict the communication process to minimize ambiguity (for example, printed forms, style and size restrictions on memos, contracts in writing and so on).

I am not saying that we will not continue to make computer interfaces more English-like and to use dialogs where appropriate, including vocal input and response units. What I am saying is that language restrictions are inherent in the communications process and will never go away; not in 1984, not ever.

Any discussion of computer interfaces in 1984 and beyond would be grossly incomplete without mentioning that the use of menus and windows in combination with various pointing devices will continue to prove to be extremely popular and cost-effective in many computer interface designs. Graphics will also increase in popularity as costs diminish and interfaces become more convenient.

Putting things in perspective, I would have to say that there will never be a time when Cobol will go away, to be replaced by apparently unrestricted English. We will continue to want a rich interface environment in which programming languages and natural-looking query and command languages will each have a small but significant part.

Lobbying efforts

I strongly disagree with Lecht that the thrust of lobbying efforts by American electronics companies is or will be "to prevent the sale of Japanese electronics in the U.S." Instead, I see the thrust of lobbying actively as being to arrange appropriate financial and legal support for advanced basic electronics research in this country.

What could we possibly gain from preventing Japanese sales here? The market is a global one, and restrictive U.S. laws cannot hope to do anything but remove the U.S. from participation in it. (If I want to buy Japanese components and U.S. law says I cannot, then I will buy them in Hong Kong, Singapore or Taiwan and move my assembly operation there.)

I think Lecht needs to get out of his think tank a little more often and see what real users' real problems are and what real vendors are really doing to address those problems. As IBM has proven for years, users are not impressed with the latest technology; they want their problems solved. When in doubt, seeing things from a more global perspective practically always enhances clarity. ‡

Wallis is advisory software engineer, software development, at National Advanced Systems in Mountain View, Calif.

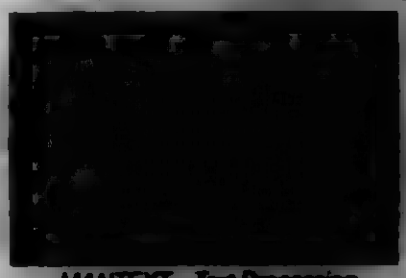
MANAGE USER SERIES

Cincom's new MANAGE USER SERIES™ combines the benefits of personal computing capability, mainframe power and greater data processing control into one comprehensive Decision Support System.

Personal Computing On The Mainframe

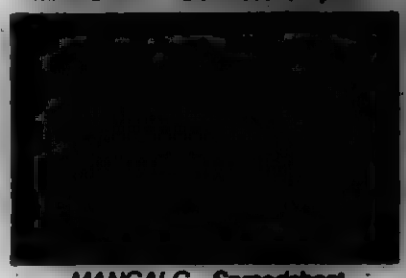
Simply explained, the MANAGE USER SERIES is Cincom's family of integrated mainframe software tools that work together as one powerful Decision Support System. No other software vendor offers such a wide range of Decision Support capabilities at the mainframe level.

Using the power and accessibility of the mainframe, MANAGE enables data processing to provide a wide range of personal computing capabilities while maintaining control over the corporate data resource. And because MANAGE has a conversational, user-friendly personality, it easily wins friends among end-users.



MANTEXT – Text Processing

MANGRAF – Business Graphics



MANCALC – Spreadsheet

Powerful Decision Support Tools

currently integrates four powerful tools that allow end-users to access, store and use production information from the corporate mainframe to aid in key business decision making:

- MANTEXT is a sophisticated free-form text processing system that enables users to access corporate files for the creation of business documents and corporate mailings.
- MANGRAF is an advanced business graphics tool that provides output from on-line applications using centralized production data base information.
- MANCALC is a 3-Dimensional electronic spreadsheet that facilitates "corporate-size" models and can automatically load information stored in corporate files, or build models based on private data as well.
- MANTIS is Cincom's industry acclaimed application development language. As the "integrator" of the MANAGE USER SERIES, MANTIS provides an effective bridge between the Development Center and the Information Center.

End-User Productivity Through Integration

The key to the power and versatility of MANAGE is its elegant integration. MANAGE provides the tools needed for preparation of business reports and day-to-day decision making. And because all components of MANAGE can access central or personal data files, users can merge a multitude of data types, display them graphically, simulate "what-if" futures and document the findings in one business report. The power of MANAGE is limited only by one's own creativity.

Another Major Cincom Technology

Like TIS,™ ULTRA Interactive Data Base System,™ MRPS™ and MANTIS™, MANAGE USER SERIES is a member of the integrated family of new Cincom software technologies. From data base to application software to Decision Support, the name Cincom has come to stand for excellence in software technology the world over.

For more information on MANAGE, or any of our new integrated software technologies, simply contact the Cincom Marketing Services Department, 2300 Montana Avenue, Cincinnati, Ohio 45211.

800-543-3010

(In Ohio: 513-661-6000)
(In Canada: 416-279-4220)

Cincom Systems

Excellence in Software Technology.

Abacus Friendly Report Processor For IBM/38?

Managerial support software that is truly easy to use.

Call or write for more details on FUSION 4/38.

FUSION

PO Box Fusion
Mill Valley, CA 94942
Telex 176000 FUSION

Soup up your Volkswriter.

Everybody knows Volkswriter, the word processing software package that's become synonymous with high performance. Now, there's a way to get even higher mileage out of your Volkswriter. Hook it up to a Dataproducts P Series dot matrix color printer.

The versatile P Series translates the executive class, word processing capabilities of the Volkswriter into brilliant full color charts, graphs and text. It delivers a full page of text quality print in nothing flat while its sheet feeder automatically prevents loading hassles. And the P Series uses pin feed or plain paper and has the brains to fill every appropriate line with crisp, sharp copy, even if it has to justify to do it. And the P Series color printer has dual speed capability for correspondence quality output for the Volkswriter's many word processing applications and high speed output for draft and spreadsheets.

The Dataproducts P Series color printer. Think of us as a supercharger for your Volkswriter.

For more information go to your nearest computer store and ask about the Dataproducts P Series color printer, or call Dataproducts, 1-800-258-1386.

Dataproducts computer printers

Nobody puts ideas on paper so many ways.

Volkswriter is a registered trademark of LIFETREE SOFTWARE, INC.

SOFTWARE & SERVICES

Will Teradata revive a market?

SOFTALK

PAUL GILLIN
CW Senior Editor

Just when many software observers were ready to perform last rites over the data base machine market, Teradata Corp. surprised us last month by announcing a large-scale data base machine capable of handling trillion-byte data bases at speeds of up to 400 million instruction per sec (Mips). In an unusual departure from tradition, the company also announced that it had already installed about a dozen of its DBC/1012 machines in large DP shops.

The announcement will, no doubt, enliven the discussion that has persisted for the last three years about the viability of this intriguing, but so far unpopular technology. Since Britton Lee, Inc. announced the first commercially available dedicated data base processor in 1980, only a few vendors have ventured into the market. With the exception of Intel Corp., none of them are household names.

Vendors are understandably skittish about IBM's unpredictable pricing policies and improvements in hardware price/performance in general. In the large-scale data base machine market, "hardware cost won't be a factor. The important thing will be the performance of the relational model data base," said Vincent Rauzino, manager of new product development at Data Decisions, Inc. in Cherry Hill, N.J.

IBM made that distinction clear last year when it announced DB2, its relational data base management system (DBMS) for IBM MVS installations. DB2 works as an adjunct to IBM's IMS DBMS and requires a copy of the production data. The implicit message was that large shops will be willing to pay the hardware price in order simply to get data to their users in a usable fashion.

However, Teradata appears to have covered many of the criticisms leveled at data base machines. The company has

See DBMS page 48

University launches 'Turing'

Language boasts modular programming techniques

By John Gallant
CW Staff

TORONTO — A member of a University of Toronto research team that recently developed a new general-purpose programming language may one day be a very wealthy man.

"Sure, I might get rich," Richard Holt laughed. "I think we stand to make a great deal of money from this. But we try to think of ourselves like Beethoven enriching the world with his music rather than like Mick Jagger just making money."

Chairman of the university's Computer Systems Research Group, Holt joined forces in 1982 with fellow computer science professors Jim Cordy and J.N.P. Hume to develop the Turing computer language, named in honor of British mathematician and computer theorist Alan Turing. The Turing language, according to Holt, is simpler than Basic, more powerful and elegant than either Pascal or PL/I and offers debugging, portability and modular programming capabilities that outstrip all three.

Turing was born out of an intensive one-year development effort and is currently being used and studied by some 3,000 University of Toronto computer science students. A textbook on the language is being marketed through the Association for Computing Machinery, according to Holt.

The Computer Systems Research Group last month began marketing a Turing compiler for Digital Equipment Corp.'s VAX-11 superminis under Version 4.2 of Unix. Compilers for IBM 370 processors and the IBM Personal Computer are slated for release in the near future.

Not yet for business

As a general-purpose language, Holt said, Turing is useful for basic data processing, microcomputer and scientific applications, as well as for programming that involves data structures and link lists.

In its current form, however, the language is not designed for large, business-oriented DP shops. "It's not as good as Cobol for large file processing applications or for those applications that utilize dollar-type scaled integers," Holt admitted.

"You could use it and it would be better than Basic or Pascal, but whether you could convince people with a large invest-

See TURING page 49

SOFTLINE/THOMAS O'FLAHERTY

Needs of the '80s will alter training

First in a two-part series

In many organizations, a "programmer trainee" is considered at best a necessary evil and at worst a lower form of life. This is in spite of the many desirable traits of trainees. These include few ego problems, willingness to work for low salaries, few technical bad habits, potential for several promotions, high probability of loyalty to the firm and willingness to work hard.

Many "experienced" programmers not only lack these characteristics, but also often overvalue their obsolescent skills. Trainees are traditionally unpopular because they:

- Can't start programming on Monday.
- Require training overhead (the trainee's own time plus the time of experienced staff).
- May have no interest in, or potential for, the work.
- May leave the firm as soon as the training is over.

These are real issues. Dealing effectively with the first two issues requires a planning process that is adhered to. Weeding out those with no interest or aptitude means avoiding taking trainees right off the street and putting them into

See TRAIN page 46

Adesse packages for VM updated/45

ETA

IDMS gets planning and development tool/45

INSIDE

Systems Software/45
Productivity Aids/45
Application Packages/45
DBMS/47
Languages/47
On-Line Data Bases/48

Save up to 50% on VSAM/DASD requirements with the VSAM Space Utilization Monitor, offering:

VSAM file design evaluation
System generated performance recommendations resulting in dramatic improvements
Utilization statistics based on data set interrogation

VSUM... and then some... the ultimate VSAM performance tool!

vsum

Call collect 203 529-7128 or return this coupon to our attention.

☐ Send me VSUM for a 30 day free trial.
☐ I'm interested, please provide more information about VSUM.
☐ Also please provide information about the complete family of software products available from STAR.

Operating System: ☐ DOS ☐ VS1 ☐ MVS

Name Title
Organization Telephone
Address
City State Zip

CW-020284

Software Technologies and Research, Incorporated 41 New Britain Avenue Rocky Hill, CT 06067 203 529-7128

STAR

How To Implement The Best New PC Decision Support Software With A Pair Of Scissors.

YES. Tell me more about The New Context MBA and The Corporate MBA.
☐ Have a Context representative call me.

Name _____

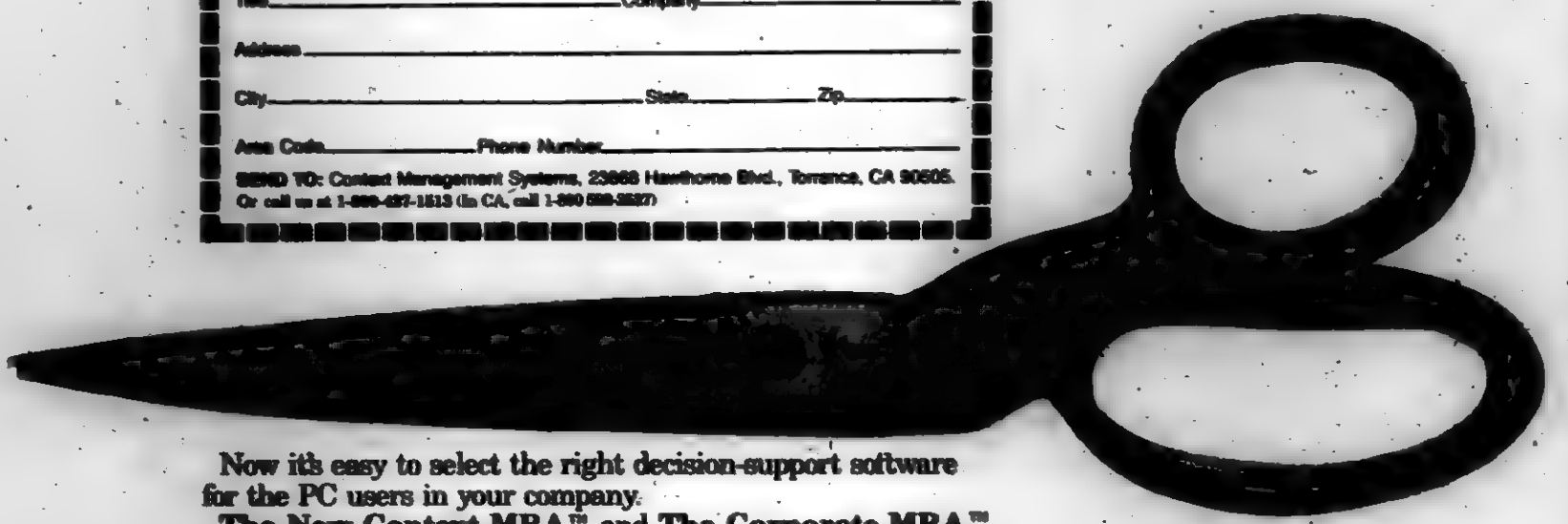
Title _____ Company _____

Address _____

City _____ State _____ Zip _____

Area Code _____ Phone Number _____

SEND TO: Context Management Systems, 23868 Hawthorne Blvd., Torrance, CA 90505.
Or call us at 1-800-437-1513 (In CA, call 1-310 539-5527)



Now it's easy to select the right decision-support software for the PC users in your company.

The New Context MBA™ and **The Corporate MBA™** both have all the functions PC users in your company need: Spreadsheet, Business Graphics, Database, Word Processing, Telecommunications, and Forms Creation.

They're all *integrated* in one software package. With advantages that'll make your life a whole lot easier.

Like full 3270 emulation. So *you* can connect their PCs to your Data Center network. For immediate, yet controlled, access to decision data. No more hand-holding or custom programming.

PC users in your company get the decision-support capability they need from a single, easy-to-learn package. And you get an easy way to plug one PC software package into the entire company.

Our **Context 500™** support team builds a custom training and ongoing support program for your company, so *you* don't have to.

Now *your* job of supporting *our* software is as easy as picking up the phone.

So make it easy on yourself. Cut out, fill in, and send us this coupon. And cut out a lot of heartburn over which of many PC software packages to choose.

Now where did you put those scissors?

Context
MANAGEMENT SYSTEMS
Personal Computer Software For Business Decisions.

The New Context MBA, The Corporate MBA, True Data Integration, Data Exchange Facility and Context 500 are trademarks of Context Management Systems, Inc.
©Context Management Systems, Inc. 1984.

Adesse enhances packages for VM operating system

The Adesse Corp. has announced a series of enhancements and updated releases of its software packages for use with IBM operating systems.

Adesse announced Release 1.3 of its CMS Read/Write OS Dasd (Direct Access Storage Device) Support system, which incorporates support for IBM's CMS/SP Release 3 operating system. The system reportedly permits a CMS application to write files on IBM OS-format disks. It can be used to write on disks that are also used by IBM's OS, VS or DOS operating systems as a means of transferring data.

In addition, Adesse announced that its VM/SP Enhanced Page Migration (EPM) system is now supported in IBM multiprocessing or dyadic processing environments under VM/SP Release 2 and Release 3. EPM also supports Release 3.2 of IBM's VM/SP High-Performance Option.

Adesse also announced its VM/SP Shared File Directory Facility (SFDF), which reportedly eliminates duplicate storage associated with read-only CMS disks by permitting one copy of the File Status Table entries for a disk to be shared by all users who access it. Also, the firm announced the Single System Image (SSI) control program for use with Release 3 of VM/SP.

The system is said to manage the resources of IBM and compatible 370, 4300 and 30 series system complexes to provide multiple users with virtual machine facilities. According to the vendor, SSI is a comprehensive facility that allows several VM processors to appear to the user community as a single CPU.

CMS Read/Write OS Dasd Support is licensed for $150/mo per CPU or can be purchased for $5,000; EPM is licensed for $250/mo and can be purchased for $9,000; SFDF is licensed for $100/mo and can be purchased for $1,900; and SSI is licensed for $4,500/mo and can be purchased for $100,000.

Adesse can be reached through P.O. Box 607, Ridgefield, Conn. 06877.

SYSTEMS SOFTWARE

HOLLAND SYSTEMS CORP.
SSP Version 2.4

Holland Systems Corp. has released an enhanced version of the software portion of its information resource management product.

Version 2.4 of Strategic Systems Planning (SSP) includes an additional 18 reports, automates the development of an information requirement dictionary and enhances the error-checking process during data entry, a spokesman said. It reportedly provides improved user control of the clustering threshold used in defining the information structure.

SSP runs on IBM or IBM-compatible mainframes under IBM's OS/MVS operating system. SSP Version 2.4, including software, method, education and documentation, is priced at $80,000.

Holland Systems, 3131 S. State St., Ann Arbor, Mich. 48104.

NORTH AMERICAN SOFTWARE
Jobqueues

North American Software has announced Jobqueues, a multiple job queue package for the IBM System/34 and System/36.

According to the vendor, Jobqueues boosts IBM's JOBQ function throughput in a mixed job environment, such as IBM's Mapics (Manufacturing, Accounting and Production Information Control System) and DFAS-II (Distributed Financial Accounting System).

Jobqueues was designed to conform to IBM syntax and screen-handling techniques. Suitable for any JOBQ job, the system features job-conflict resolution, four-level security, power-fail restart, performance testing and automatic Operator Control Language conversion. It is priced at $495.

North American Software, P.O. Box 440898, Denver, Colo. 80014.

PRODUCTIVITY AIDS

OXFORD SOFTWARE CORP.
UFO, Mezieak price changes

Oxford Software Corp. has announced price changes for its product line.

User Files On-Line (UFO) is an on-line application development system for IBM CICS and IMS/DC environments. For UFO/CICS, the new prices are $27,000 for IBM's DOS operating system and $38,000 for IBM's OS operating system.

Prices for Mezieak, an electronic spreadsheet for CICS environments, are reduced to $9,000 for DOS and $12,000 for OS.

UFO/Cobol is an on-line CICS application development system that uses standard Ansi Cobol as its development language. The DOS price is $24,000, and the OS price is $33,000. Until April, introductory prices are $18,000 and $24,750.

Oxford Software; 174 Boulevard, Hasbrouck Heights, N.J. 07604.

APPLICATION PACKAGES

DATA DESIGN ASSOCIATES, INC.
Accounts payable enhancement

Data Design Associates, Inc. has announced an enhancement to its accounts payable system for mainframes and large minicomputers.

According to the vendor, the system now helps companies comply with the backup withholding and reporting provisions of the Interest and Dividends Tax Compliance Act of 1983. The system recognizes when withholding should occur and automatically calculates and deducts the proper amount from a vendor's invoice. It is written in Cobol.

An on-line version is available for IBM mainframes and large minicomputers, and a batch version is available for all major mainframes. The system sells for $35,000 to $53,000.

Data Design Associates, 1279 Oakmead Pkwy., Sunnyvale, Calif. 94086.

DISTINCTIVE SOLUTIONS CORP.
Commercial Finance System CFS/3000

Distinctive Solutions Corp. has announced an interactive, modularly designed system for processing and monitoring commercial finance instruments, such as revolving loans, commercial loans and leases.

Commercial Finance System CFS/3000 is designed to operate on the Hewlett-Packard Co. HP 3000 superminicomputer and is available now.

It is said to allow input through menu selections or fill-in-the-blanks forms, with an on-line Help system intended to reduce errors.

The price depends on the number and type of modules ordered, with minimum packages costing $100,000.

Distinctive Solutions, 1305 Marsh St., San Luis Obispo, Calif. 93401.

See Tools page 47

Release 3.0 of DBDM out

ETA International, Inc. has announced Release 3.0 of its Data Based Development Methodology (DBDM), which is described as a systems planning and development methodology for use with Cullinet Software, Inc.'s IDMS, Integrated Data Dictionary and ADS/On-Line software.

DBDM provides detailed standards, procedures, controls and deliverables necessary to implement projects in data base, data communications and data dictionary environments. It reportedly consists of modules that support the planning, analysis, design and implementation of data-based development.

The DBDM modules include business systems planning for business and MIS, business function analysis, logical data base definition, program definition for data-based systems, physical data base design and data base implementation guidelines.

DBDM is licensed for $18,000, including the six primary modules, all supplemental modules and five days of customized on-site workshops.

ETA International, Seven Wells Ave., Newton, Mass. 02159.

ATTENTION: MANAGERS — ENGINEERS — SITE PLANNERS

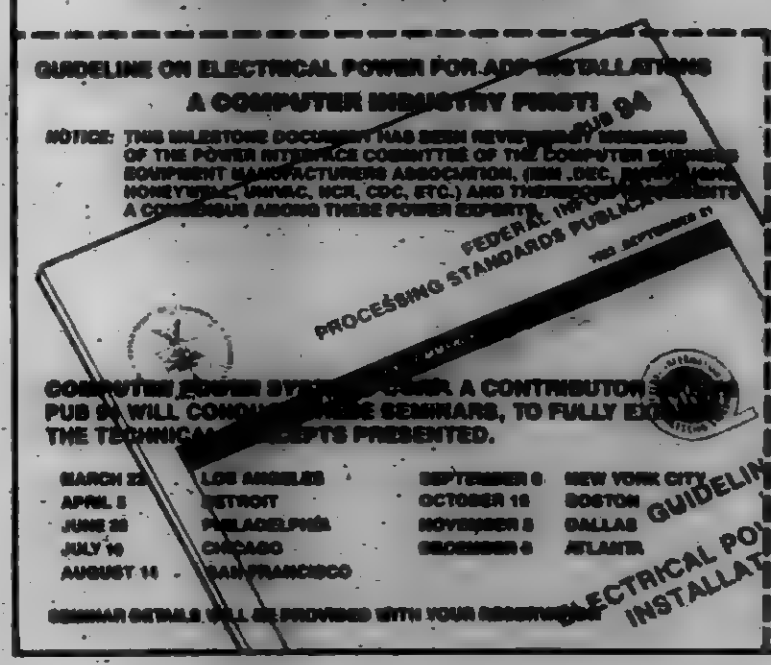
HAVE YOU HEARD ABOUT FIPS PUB 94?

YOU'VE ALL BEEN INVOLVED IN CONTROVERSIES ABOUT

- HOW TO GROUND A COMPUTER?
- HOW MUCH ISOLATION REQUIRED?
- WHAT KIND OF POWER CONDITIONER IS NEEDED?

DON'T MISS THIS UNIQUE OPPORTUNITY!

THIS ONE-DAY SEMINAR COULD BE YOUR BEST INVESTMENT IN 1984!!



COMPUTER POWER SYSTEMS — UNDER A CONTRIBUTION PUB 94 WILL CONDUCT THESE SEMINARS, TO FULLY EXPLAIN THE TECHNICAL CONCEPTS PRESENTED.

MARCH 22	LOS ANGELES	SEPTEMBER 6	NEW YORK CITY
APRIL 5	DETROIT	OCTOBER 18	BOSTON
JUNE 28	PHILADELPHIA	NOVEMBER 8	DALLAS
JULY 10	CHICAGO	DECEMBER 6	ATLANTA
AUGUST 14	SAN FRANCISCO		

SEMINAR DETAILS WILL BE PROVIDED WITH YOUR REGISTRATION

☐ ENROLL ME IN _____ (CITY)

☐ ENCLOSED IS MY CHECK FOR $195.00

☐ BILL ME (ENCLOSE BUSINESS CARD)

P.O. BOX 9240, CARSON, CA 90749
213/518-0606 X 237 R. MILLER

NOTICE: PAYMENT IS DUE 10 DAYS PRIOR TO EACH SESSION

TRAIN from page 43

a programming job.

The problem of "training a programmer for someone else" is the heart of the rational opposition to using trainees. Trainees do leave, but for the same reasons as other employees. Input, Inc.'s research indicates that the primary reasons for turnover in technical positions in the information systems department are:

- Lack of opportunity to learn or to work on challenging projects.
- A nonsupportive management structure.
- Obsolescent technology.
- Nonexistent or unclear career paths.

Unfortunately, all of these problems are often the direct result of training programs. In many trainee programs, it is apparent that management doesn't really know what to do with trainees. Usually there is an initial solid block of training that goes on for weeks. This is far too much to be absorbed at one stretch, especially when much of it is not (and cannot be) put to immediate use. Often, formal education is very hard to come by after the initial period — even when it is desperately needed.

After the block of formal education, trainees are often placed in the most difficult (and usually least rewarding) job in the information system department: maintenance. They are often assigned to a job and/or supervisor that knowledgeable employees successfully avoid.

The consequence of this classroom-maintenance sequence is that after a year, the trainee:

- Does not have a very broad perspective of data processing.
- Has picked up knowledge that is usually obsolescent and often wrong.
- Has done, at best, a mediocre job (the brighter trainees will be aware of this).

With an experience that ranges from unsatisfying to disagreeable, is it any wonder that trainees would look to other organizations for employment?

Why are so many training programs like this? Our research indicates that this is because so many trainees are hired in an unplanned fashion.

Let's take a look at hiring patterns before the recent economic crunch. Looking at a broad sample of corporations, over 40% of hirings were for new positions created by growth. However, companies generally wanted to fill 80% of their openings with experienced people. This is mathematically impossible. Consequently, actual trainee hirings track the numbers of new positions very closely.

This is a game of musical chairs; instead of chairs being subtracted, they are added. New recruits are hurriedly found, but not planned for and not really wanted.

Information systems departments should face mathematical reality and plan to hire trainees regularly. This will be much easier to do if information systems management believes that trainees have the potential for becoming superior employees. Effective training programs are needed to make this potential a reality.

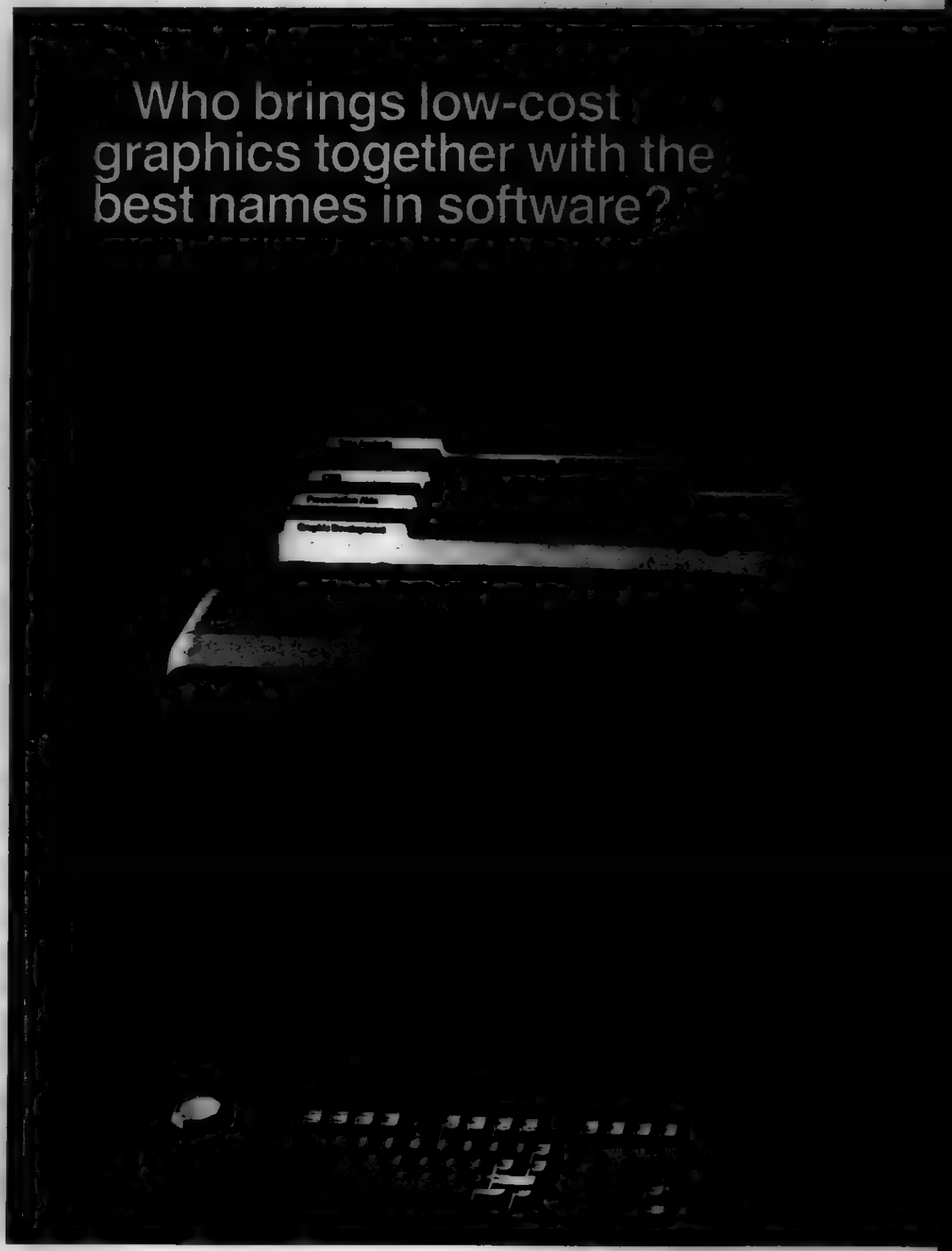
The new system environment will require, besides technical skills, aptitude in systems analysis and interpersonal relations and a knowledge of underlying business issues. This suggests that future trainees will have more diverse backgrounds than trainees now usually have.

Whatever the eventual structure of data processing, it will continue to need skilled people. Effective training will have at least as large a potential payoff in the future as it does now.

A successful training program will have these components:

- Both the organization and the trainee feel that the trainee is making a tangible contribution to the organization very early in the trainee's career.
- The trainee receives textbook knowledge in the amounts required and at an appropriate time.
- Trainees have a positive view toward their job and the organization from the start.
- Trainees stay with the organization.

O'Flaherty is principal consultant and director of software programs at Input, Inc., a research and consulting firm in Saddle Brook, N.J.



SOFTWARE & SERVICES

TOOLS from page 46

CYBORG SYSTEMS, INC.
Payroll; Human Resource Management

Cyborg Systems, Inc. has announced that its Payroll and Human Resource Management packages are now available for use in the IBM IMS DB/DC environment.

According to a company spokesman, standard IMS utilities may be used for backup and recovery.

One feature is said to be the ability to create new on-line screens within the Cyborg program, bypassing the Message Format Services of IMS for immediate use without recompiling programs.

The IMS feature is priced at $50,000.

The base price for the Payroll package is $45,000, while the Human Resources Management package is $35,000.

Cyborg Systems, 2 N. Riverside Plaza, Chicago, Ill. 60606.

DATA BASE MANAGEMENT SERVICES

JCA SOFTWARE, INC.
Sort-On-Line

JCA Software, Inc. has announced a software system said to provide an on-line sorting capability in the Cullinet Software, Inc. IDMS/DC data base management system environment.

Sort-On-Line (SOL) reportedly improves the ability of IDMS users to obtain information from the data base in sequences that are different from the way in which the data was originally stored.

The on-line sorting capability also works for Scratch, Queue and Table records, the vendor said.

SOL enables the end user to specify dynamically the sort sequence desired at the moment without need for program definition by a programmer, according to the vendor.

The product is fully compatible with Cobol, PL/I and Cullinet's Application Development System/On-line programs, the vendor said.

A license fee for SOL costs $10,000.

JCA Software, Suite 224, 2182 Dupont Drive, Irvine, Calif. 92715.

LANGUAGES

WHITESMITHS LTD.
C/370

Whitesmiths Ltd. has announced C/370, said to be a C language compiler for the IBM 370 mainframe architecture.

A vendor spokesman said C/370 permits C program development in the IBM mainframe environment and allows Digital Equipment Corp. VAX-11 users to move existing C and Unix applications to the IBM 370 architecture through recompiling and relinking.

The standard C/370 package includes Whitesmiths' Pascal-to-C translator, which reportedly gives users the ability to run Pascal programs in the 370 environment as well.

The spokesman said C/370 is a full implementation of the standard C language. It runs on all IBM 370, 4300 and 30 series and plug-compatible mainframe systems. It also operates with IBM's VM/CMS, through OS simulation and MVS/TSO, the vendor said.

C/370 is priced at $4,000 until March 30 and $5,000 after that date, according to the vendor.

Whitesmiths, 97 Lowell Road, Concord, Mass. 01742.

Tektronix.

No graphics terminals connect you to better utility or applications software, or with a broader range of computers, than Tek's desktop 4100 Series terminals.

Among the dividends of Tek's long leadership in graphics are the scores of program development tools and powerful applications packages already on-file and immediately compatible with most computers.

From analysis to reporting, cartography to CAD: compatible software helped make Tek's low-cost 4100 Series an immediate success.

Major software vendors like ISSCO, SAS, Precision Visuals and many others offer 4100 users flexibility in data analysis and presentation.

In more technical, engineering and scientific environments, users can take advantage of ANSYS,™ PATRAN-G,™ ANVIL-4000,™ GEOMOD,™ Tek PLOT 10 Computer-Aided Drafting and Easy Graphing II.

Tek PLOT 10 graphics development software library is installed on more computers than any other in the world. It now includes the core standard IGL; the new international standard GKS and TCS, nucleus for scores of specialized packages.

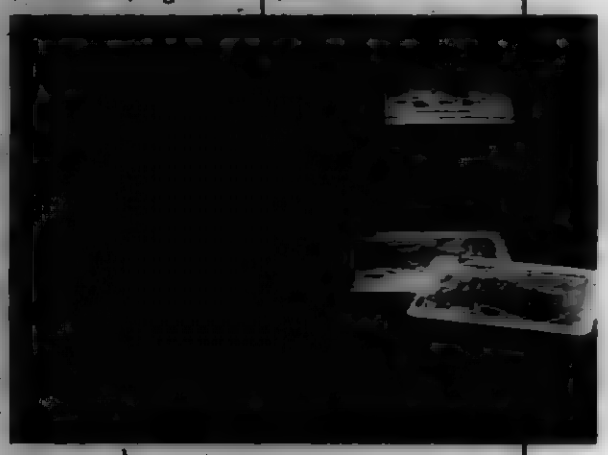
The 4100 Series lets you take full advantage of all these powerful software resources.

Fast, flexible, and priced fully equipped from just $3995, quantity one, the 4100 Series includes VT100 compatibility and ANSI X3.64 text editing right along with its exceptional graphics.

Choose from a range of resolution, segment memory and color capabilities, backed by performance unique to the price range—including a flicker-free 60 Hz non-interlaced display. 38.4K baud communications. And color manipulation by keyboard function keys.

The companion 4695 Color Graphics Copier now makes color copies practical.

It's a very quiet and reliable push-button easy desktop unit that doubles as an alpha-numeric printer. Single quantity cost is just $1595.



Powerful graphics team with Tek 4695 color copies and transparencies for a complete desktop analysis and presentation system.

Presentations come alive with the communications impact of full color transparencies that can be produced in minutes.

Your Tek Sales Engineer can help you find the perfect software for your computer, your needs, and our graphics. For literature or the location of your local Tek sales office, call toll-free: 1-800-547-1512. In Oregon, 1-800-452-1877.

Call Tek

Tektronix
COMMITTED TO EXCELLENCE

NEW LIFE FOR 1401 PROGRAMS

CS-TRAN converts your 1401 object programs to COBOL for the mainframe or mini of your choice.

CS-TRAN is the only translator that accepts your object programs, patches and all, yet allows you to include actual COBOL paragraph names and record definitions.

If you'd like more details about new life for your 1401 programs just call or write Russ Sandberg.

C-S Computer Systems Inc.
299 South Main Street, P.O. Box 298
Manville, NJ 08835 • 201-526-8600

SOFTWARE & SERVICES

DBMS from page 43

provided an IBM SQL look-alike query language that takes dead aim at IBM's decision to use SQL as a front-end language to DB2. Furthermore, Teradata claims to use a "true" relational DBMS combined with a processing architecture "built to support the relational model," according to Michael Ehrensberger, Teradata's eastern regional manager.

Teradata doesn't expect its data base approach to replace IMS or any other product DBMS soon. "Companies have a lot of money invested in their IMS data base, and we'd be foolish to expect they're going to give it up for our model," Ehrensberger said. But the company expects that growing information center requirements and the corresponding demand for relational processing will push companies to seek a more efficient way to process data for end users. In fact, part of the company's documentation offers guidelines for which applications are best offered on DBC/1012 and which are best left to IMS.

DBC/1012 uses Intel 8086 microprocessors, called Access Module Processors (AMP) running in parallel and controlled by Teradata's Ynet network processor, which consists of an array of active logic. Each processor has a dedicated 475M-byte Winchester disk drive with the data distributed evenly among the drives.

Requests are translated and distributed by an interface processor and sent to the AMPs, which access the data in parallel. Responses are transmitted over Ynet and coordinated and translated by the interface processor for return to the mainframe over a block multiplexer pipeline. Each processor can perform 30 access/sec, making a total access rate of over 30,000 access/sec achievable in the largest configuration.

Teradata has also challenged the IBM price umbrella. Storage can be added at the rate of $37 per megabyte, and horsepower can be increased at a cost of $60,000 per Mips.

In designing DBC/1012, Teradata employed the advice of 18 Fortune 500 companies over a 2½-year period to design the system in an agreement it calls the Partner Program. The companies provided input at each step of the design process in exchange for a discount on DBC/1012. Teradata claims to have letters of intent to purchase from nearly every member of the Partner Program.

The company faces an uphill struggle, however. The DP community is clearly skeptical of data base machines in light of their poor market performance to date. Teradata must also face up to the formidable disadvantage of not being IBM. Few companies will be eager to sink one million dollars or more in a complex system from a company that may not be around to support it in the future. It's easier to license DB2 for $30,000 a year and get the peace of mind of knowing it will always be supported.

Teradata expects to be profitable by the end of the year, and it will be worth watching to see if it achieves its objectives. If so, the company may open a door which many in the industry thought was fast closing.

ON-LINE DATA BASES

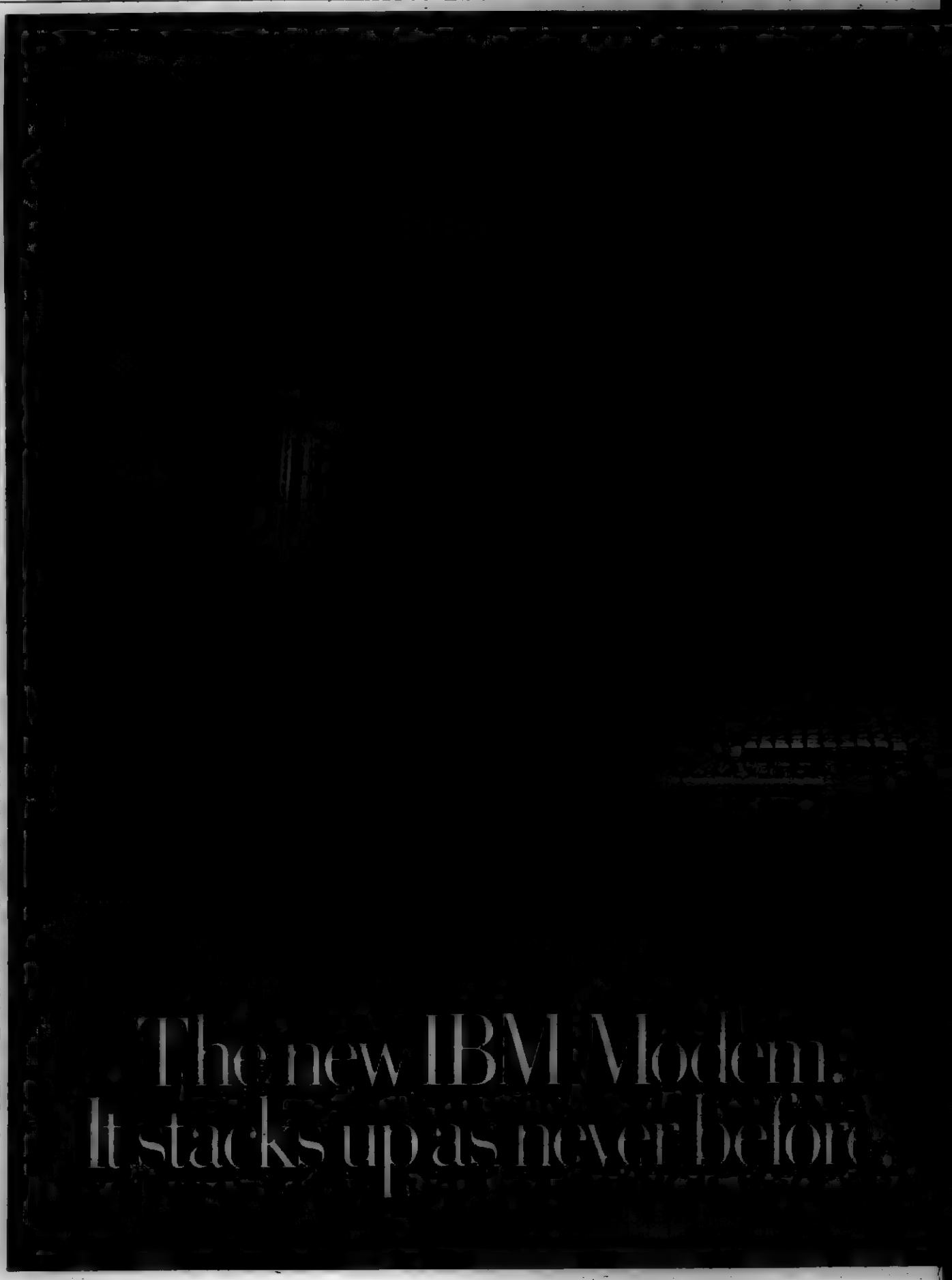
DOW JONES & CO., INC. Dow Jones News/Retrieval via Net 1000

Dow Jones & Co., Inc. has announced that its Dow Jones News/Retrieval business and financial information service is available through AT&T Information Systems, Inc.'s Net 1000 shared network service.

The Dow Jones News/Retrieval service provides users with business and economic news, securities quotes, financial and investment services and general news through its 27 data bases.

The service is offered through two pricing plans, both of which include a $75 sign-up fee. The standard pricing plan prices vary between 60 cents and $1.20 per connect minute. The executive pricing plan prices, which include a $50 monthly fee per user site, range between 40 cents and 80 cents per connect minute.

Dow Jones & Co., P.O. Box 300, Princeton, N.J. 08540.



TURING from page 43

ment in Cobol to switch is another matter entirely."

Holt said that inadequacies in PL/I and Pascal provided the impetus for the development of Turing. "We wanted to be able to use and teach the state of the art in software, which essentially left us the choice of PL/I and Pascal. PL/I had a lot of the power and Pascal had a lot of the elegance we wanted, but those systems don't incorporate many of the things that have been learned in the last decade."

Perhaps the most important advances those languages fail to utilize, he said, are modular programming techniques that allow a programmer to isolate one or more segments — or modules — of a code from the rest of the program.

The modules accommodate a building-block approach to system design and maintenance, an approach that ensures accuracy and flexibility, Holt said.

"We wanted a language that was easier to use than Basic, and I think we accomplished that," Holt said. "It has a very simple, clean syntax. You write down what you want done, and the language does it. That's different from Pascal or PL/I. [Turing] reads much like a simplified version of Pascal, yet it's more powerful, and it leaves behind the syntactic frills of Pascal. You have procedures that appear similar to Pascal procedures, but they are shorter and simpler."

Holt said the structured Turing language incorporates sophisticated debugging techniques, such as consistency checking, that ensure program accuracy. "There are many things that other languages allow that simply don't make sense. But Turing has built in, from an engineering standpoint, many features that minimize the number of errors that show up in your production program," he said.

No 'ruining bugs'

"The result is that when you first get your program running, it's correct. You don't have a whole series of lurking bugs that show up days, weeks or even months later," Holt added.

Turing has been well received by Holt's peers in the academic community, but the development group now faces the task of building a commercial user base. "We are hoping that people will see that this language is on the leading edge in software design.

"Most people who have seen it come away saying that it is. Turing is clearly better, but whether people with a large investment in other languages will convert is the real question. I believe that's a real possibility."

The new rack-mounted IBM 3868 Modem saves you space. And money. And effort.

Space, because IBM's new one-inch-wide vertical package allows you to mount up to 12 modems in one enclosure that fits a standard 19-inch rack.

Money, because each enclosure needs only one power supply and cooling system to support all of its modems.

And you manage your network with less effort because the IBM 3868 Modem has the same high availability and rock-steady reliability as other modems in the 386X Series—plus an enhanced Link Problem Determination Aid (LPDA).

Working with software available for many IBM host systems, the LPDA performs greater end-to-end management. Now line conditions are identified further downstream from the host, and in more detail. For example, conditions in any multi-point circuit can be pinpointed to a particular leg, including tailed configurations off multi-plexed links.

In fact, to help you keep your network humming, the LPDA and host software monitor and provide you with a line quality value, a receive signal level, an error-to-traffic ratio and modem self-test results to help you isolate line problems. Now you can more precisely communicate them to your communications carrier.

And because the 3868 Modem is so reliable, it's backed by a full three-year warranty.

Try them for up to four weeks: just select 2400, 4800 or 9600 bps line speeds. If you purchase in quantity, discounts are available.

To get your copy of a free brochure, or to arrange to have an IBM representative contact you, call toll-free, 1 800 IBM-2468, ext. 90. Call your IBM representative or return the coupon.

IBM

IBM
DRM, Dept. BO/90
400 Parson's Pond Drive
Franklin Lakes, NJ 07417

☐ Please have an IBM representative call me.
☐ Please send me more information on the IBM Modem.

Name_____
Title_____
Company_____
Address_____
City_____ State_____ Zip_____
Phone_____
2-59

On March 5, your micro computer* security problem will be eliminated.

STOPLOCK™

*IBM PC (5150) and IBM XT registered trademarks of IBM, Corp.

STOPLOCK is a trademark of SDI, Inc./P.O. Box 712 Lawrence, KS 66044

Dealer inquiries welcome.

COMMUNICATIONS

Nacha offers paperless trade system

By Patricia Keefe
CW Staff

WASHINGTON, D.C. — A system that electronically replaces the paper checks used in processing debits and credits between participating companies and their trading partners has been unveiled by the National Automated Clearing House Association (Nacha).

Corporate trade payments (CTP) are transmitted via any of 30 automated clearinghouse (ACH) networks, which provide a telecommunications link between banks, savings and loan associations and credit unions. The network reportedly replaces a total of 400 million checks annually.

Most of the regional automated clearinghouses utilize the clearing facilities, delivery methods and settlement services operated by the Federal Reserve System, although some utilize private processing facilities as well. Each clearinghouse is responsible for forming membership policies, pricing structures and the operating policies within its own region. Nacha establishes and maintains rules governing the exchange of automated clearinghouse payments between clearinghouse regions, as well as providing standards and technical support facilitating the same.

Nacha conducted a study in 1981 to determine whether development of electronic CTPs was warranted, and whether it was feasible to send those payments through the ACH. Study results included:

- Each of the corporations indicated interest in sending trade payments through the automated clearinghouse regardless of their level of automation.
- Forty-four percent of the corporations were involved in a net settlement system within their industry.
- The number of financial institutions with which they had accounts ranged from one to 90 on the accounts receivable side, with an average of 22 banks, and one to 50 on the payment disbursement side, with an average of 17. All of the corporations indicated the majority of their trad-

See NACHA page 53

Confusion follows divestiture
Companies report service problems

By John Dix
CW Staff

"Genuine, legitimate and honest confusion" is how one communications manager contacted in a recent informal telephone survey summed up operating conditions in the environment created by the AT&T divestiture.

Each company queried related some dissatisfaction with the quality of service they have been receiving from the regional telephone holding companies and AT&T since they were separated on Jan. 1. The degree of dissatisfaction ranged from simple annoyance at having to work with new contacts within the carrier organizations to disgust with the inability of those companies to complete even modest requests.

In preparation for the divestiture, Bank of America forecast that quality of service would drop and tried to establish . . . tactical plans around that fact.

J. F. Sheedy, manager of network services for International Harvester Co. in Chicago, said there has been a noticeable lag in service and in getting things repaired, but that the company has been able to operate on a relatively even keel. Sheedy credits Harvester's stability to the fact that the company isn't in the midst of any major communications projects and that it uses communications equipment from many vendors.

There have been some problems, however. In the worst case, a disconnect order was issued for four Wats lines at a Harvester facility in Memphis, Tenn. "The order got bungled between AT&T and [Southwestern Bell Corp.]," Sheedy said, "and instead of taking down four lines, all 15 Wats lines at that location were disconnected." Service on all but two of the lines was restored within six hours, and the others were repaired the next day.

Sheedy said that in most other instances Harvester has had little problem getting business and Wats lines installed, but has experienced trouble in getting lines repaired. "There are more steps to go through now," Sheedy said, and "when you call a [regional holding company] with a problem, you often get shuffled around, and sometimes they have trouble finding your records."

The one major equipment delay that Harvester has experienced was in Fort Wayne, Ind. Sheedy said that AT&T Information Systems, Inc. reported that it will not be able to meet a delivery schedule for a Dimension System 85 that was to replace a Centrex-customer premise site, supported by non-AT&T General Telephone, the local telephone company. Sheedy is uncertain if the delay stemmed from divestiture or if AT&T is behind schedule in the construction of this new digital private branch exchange.

At Bank of America in San Francisco, Lloyd Isaacs, vice-president of international information technologies, reported that he has experienced increased lead times for line facilities and equipment. But that has not come as a surprise.

In preparation for the divestiture, Bank of America forecast that quality of service would drop and tried to establish two-, three- and four-year tactical plans around that fact.

In day-to-day operation, Isaacs said, "the placing and processing of orders has become confusing and time-consuming." He believes that one of the primary tasks at hand is to try to establish a working relationship with the splintered pieces of the Bell system. As he pointed out, there are regulated and nonregulated subsidiaries of the regional holding companies to deal with, as well as the similiar delineation at AT&T between AT&T Information Systems

See DIVEST page 53

AT&T

AT&T published an X.25 interface technical reference/83

MCI offers electronic mail access to telex subscribers/81

INSIDE

Communications Controllers/81
Voice/Data Communications/81
Auxiliary Equipment/81

CLIP AND RETURN FOR FAST RESPONSE

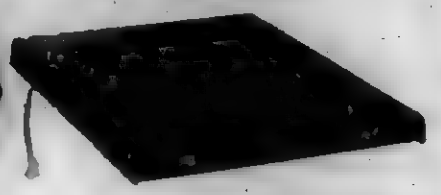
300 BAUD
103A COMPATIBLE

$147

☐ MODEL 305E2-12

MODEMS
WITH ALL THE FEATURES YOU NEED
FULL DUPLEX EIA RS232C INTERFACE
INTEGRAL VOICE DATA SWITCH ALLOWS USE WITH ANY MODULAR TELEPHONE
CAN BE USED ON DIAL NETWORK OR TWO WIRE PRIVATE LINES
212A HAS MANUAL ORIGINATE ANSWER SWITCH; 103A IS ORIGINATE ONLY

1200 BAUD
212 A COMPATIBLE



$377

☐ MODEL 212E2-32

☐ Acoustic Couplers ☐ Modems ☐ Line Drivers ☐ Accessories
☐ Statistical Multiplexers ☐ Protocol Converters

Please check items of interest and return for complete information

ComData
We can get you there from here.
7500 N. Nagle
Morton Grove, IL 60053 312/470-0600
New York 212/490-7727
Los Angeles 213/822-0334

name
company
street
city state zip
telephone ext.

COMMUNICATIONS

COMMUNICATIONS CONTROLLERS

PROTOCOL COMPUTERS, INC.
CPT 8276 SNA controller; Wordplex converter

Protocol Computers, Inc. has announced two products that provide IBM compatibility — the CPT 8276 SNA controller and the Wordplex converter.

The CPT 8276 SNA controller enables CPT Corp.'s word and data processing systems to communicate with IBM host computers. The product allows seven devices to be linked to an IBM network utilizing IBM's System Network Architecture (SNA). The workstations can be linked directly to the IBM network or can utilize dial-in capabilities, such as the ability to store data locally or to word process documents with the CPT terminal and then transfer the data to the IBM host for electronic mail or other processing purposes, the vendor said. The price is $7,000.

The Wordplex converter enables Wordplex Corp.'s workstations to communicate with IBM host computers. The workstations can be linked directly to an IBM network or can utilize dial-in capabilities for low-volume applications, the vendor said.

The converter is available in 1-, 3-, 5- and 7-port configurations. Prices are $2,900, $3,900, $4,900 and $5,600, respectively.

Protocol Computers, 6150 Canoga Ave., Woodland Hills, Calif. 91367.

VOICE/DATA COMMUNICATIONS

TIMEPLEX, INC.
Voice option for Link/1

Timeplex, Inc. has announced a voice digitizing option for the company's Link/1, the T-1 facilities management system.

The option enables up to 48 analog voice channels operating at 32K bit/sec to be digitized and multiplexed over a T-1 line operating at 1.54M bit/sec.

The option is offered in multiples of four voice channels, the vendor said.

Voice modules may be mixed in any proportion with the four-port synchronous data card with the Link/1, according to a company spokesman.

The voice option is priced at $3,550.

Timeplex, 400 Chestnut Ridge Road, Woodcliff Lake, N.J. 07675.

AUXILIARY EQUIPMENT

INTERNATIONAL RECORD CARRIER, INC.
Supertelex

International Record Carrier, Inc. (IRC) has introduced Supertelex, an international telex service available to North American customers.

IRC transmits worldwide via its London-based computer center. Customers link up to this facility through standard microcomputers or electronic typewriters and telephone lines, according to a spokesman for the vendor. The service reportedly allows shorter transmission time and guarantees 5-min delivery. It also permits customers to edit, update and transmit messages, the vendor said.

According to the vendor, the service is compatible with microcomputers from 28 different manufacturers. Customers receive free-of-charge preprogrammed Supertelex software on floppy disk format.

There is no monthly charge for Supertelex service, according to a company spokesman. International rates vary and are obtainable from the vendor.

IRC, 211 E. 43rd St., New York, N.Y. 10017.

MCI service transmits mail to telex users

WASHINGTON, D.C. — MCI Communications Corp. recently announced MCI Mail Telex Dispatch, a service to transmit electronic mail to telex customers and vice versa.

The service reportedly allows MCI Mail subscribers to transmit messages to telex subscribers worldwide and for telex subscribers to send messages to MCI Mail customers.

MCI Mail customers can send dispatches electronically to telex terminals with charges based on an MCI "mini-ounce," which equals 400 characters, MCI said. Rates vary according to the country of destination. Rates are available on-line to MCI customers.

There is no charge to MCI Mail subscribers for receiving telex messages, according to MCI, 1133 19th St. N.W., Washington, D.C. 20036.

The Data Center is under your command.

But is it under your control?

Value Computing's systems management software automates the critical tasks of production forecasting and scheduling, capacity planning, and resource allocation and accounting, and brings those tasks under centralized control. Your control.

The effects on data center operations are immediate: a more stable production environment ... faster turnaround ... fewer manual procedures ... shorter night processing times ... fewer mistakes, mis[illegible] re-runs ... less management dependency on operations personnel.

In short, a smoother running, better performing data center; a center where managers get the most intensive use of all resources. Without making a major capital investment in additional CPUs or peripherals.

We don't believe there's a more cost-effective way to improve the performance of your data center or the value of its position in your company. Call us and find out why more than 1500 users agree.

Value Computing Software Systems:
DCMS—The most powerful and comprehensive production scheduling [illegible] control system available.
[illegible]A-Charge—The industry standard in job accounting and computer billing.
VALU-LIB—An entirely new tape management system designed for today's VS environments.
SMF Express—A unique package for the management of important SMF data.

VALUE COMPUTING
THE OPTIMUM SOFTWARE FOR DATA CENTER MANAGEMENT
Value Computing, Inc., 400 N. Kings Highway, Cherry Hill, NJ 08034 (800) 257-6242. In New Jersey (609) 482-2880

Now Wang gives you office automation on a platter.

Introducing Wang Office.

It's the kind of comprehensive office software and communications package only Wang could put together.

Because only Wang can bring you the most advanced electronic mail. Only Wang can bring you the newest in time and task management. Only Wang can bring you the industry's best word processing.

And only Wang can put all of this together with the world's most advanced communications in one flexible package—easy to put in place and virtually transparent to the user.

With Wang Office you can not only process information, you can send it to, or retrieve it from, any office, anywhere in the world. Instantly. Wang Office.

Thirty years of commitment, innovation and technology.

Yours.

On a platter.

For more information on Wang Office, call 1-800-225-9264. Or write to: Wang Laboratories, Inc., Business Executive Center, One Industrial Avenue, Lowell, MA 01851.

WANG

The Office Automation Computer People.

CW89
© 1989 Wang Laboratories, Inc.

COMMUNICATIONS

X.25 reference describes specs

BROOKLYN, N.Y. — AT&T Communications has announced an updated technical reference describing X.25 packet-switching network interface specifications for data systems users and manufacturers.

"X.25 Interface Specifications and Packet-Switching Capabilities" replaces a 1981 issue and describes X.25 features currently supported by AT&T and those considered for support in 1984 and 1985. It costs $37, plus $1 for shipping, and is published by Literary Data Center, Inc.

Literary Data Center, GPO Box C-9104, Brooklyn, N.Y. 11202.

NACHA from page 59

ing partners did have electronic funds transfer capabilities.

■ Data standards were a concern among most of the corporations. Data specifications had to allow for invoice and payment information to flow through the automated clearinghouse.

Also, benefits cited for using corporate trade payments included better cash management controls, improved business relationships due to knowledge of exact day credit or debit, reduction of paper and paper-related costs, more efficient use of personnel, better investment planning and improved speed of business activity.

The technology developed for corporate trade payments is similar to, although more complex than, the systems instituted several years ago to handle the automatic deposit of payroll, pension and social security payments for consumers, Nacha said. Corporate trade payment rules and regulations differ substantially from that of automated clearinghouse consumer payments. For example, corporate trade payments allow payment of multiple invoices with a single transaction. Also, the system was designed with safeguards, such as maximum dollar limitations that must be specified on individual debit entries.

One of the issues that had to be resolved in the development of a viable trade payment system was that of "float" — the interest earned on funds during the time period from which a check is issued until it is actually debited to the account. However, one method some corporations use to eliminate float impact, according to Nacha, is through renegotiation payment terms with major trading partners. These new terms might offer higher discounts or extended payment due dates in exchange for electronic payment in immediately usable funds.

With the successful completion of the test phase, Nacha claims it can now offer corporate trade payments to companies of all sizes.

A recent announcement by the U.S. Treasury Department indicating that it will begin making corporate trade payments with some of its trading partners in 1984 is expected to boost the volume of trade payments.

More information is available from Nacha, located at 1120 Connecticut Ave. N.W., Washington, D.C. 20036.

DIVEST from page 59

and AT&T Communications.

"We're going to be faced with 12 to 15 more months of this cloud before these things get sorted out," Isaacs said. In the interim, "decisions are going to have to be made under a greater degree of uncertainty."

This is forcing Bank of America to assume greater responsibility in the management of its communications facilities. As an example, Isaacs said that before divestiture, it had on order with AT&T a large Electrical Tandem Network. Now Pacific Bell Telephone Co. will own the switches, and AT&T will provide the interstate lines. "Whereas we had made the decision to go with a single provider of a network, now the responsibility falls in more than one camp. We have to take on the role of coordinator."

The only equipment delays Bank of America has experienced have resulted from order foul-ups. In one notable instance, Isaacs said that an order was noted as complete when it was not, and it had to be reinitialized.

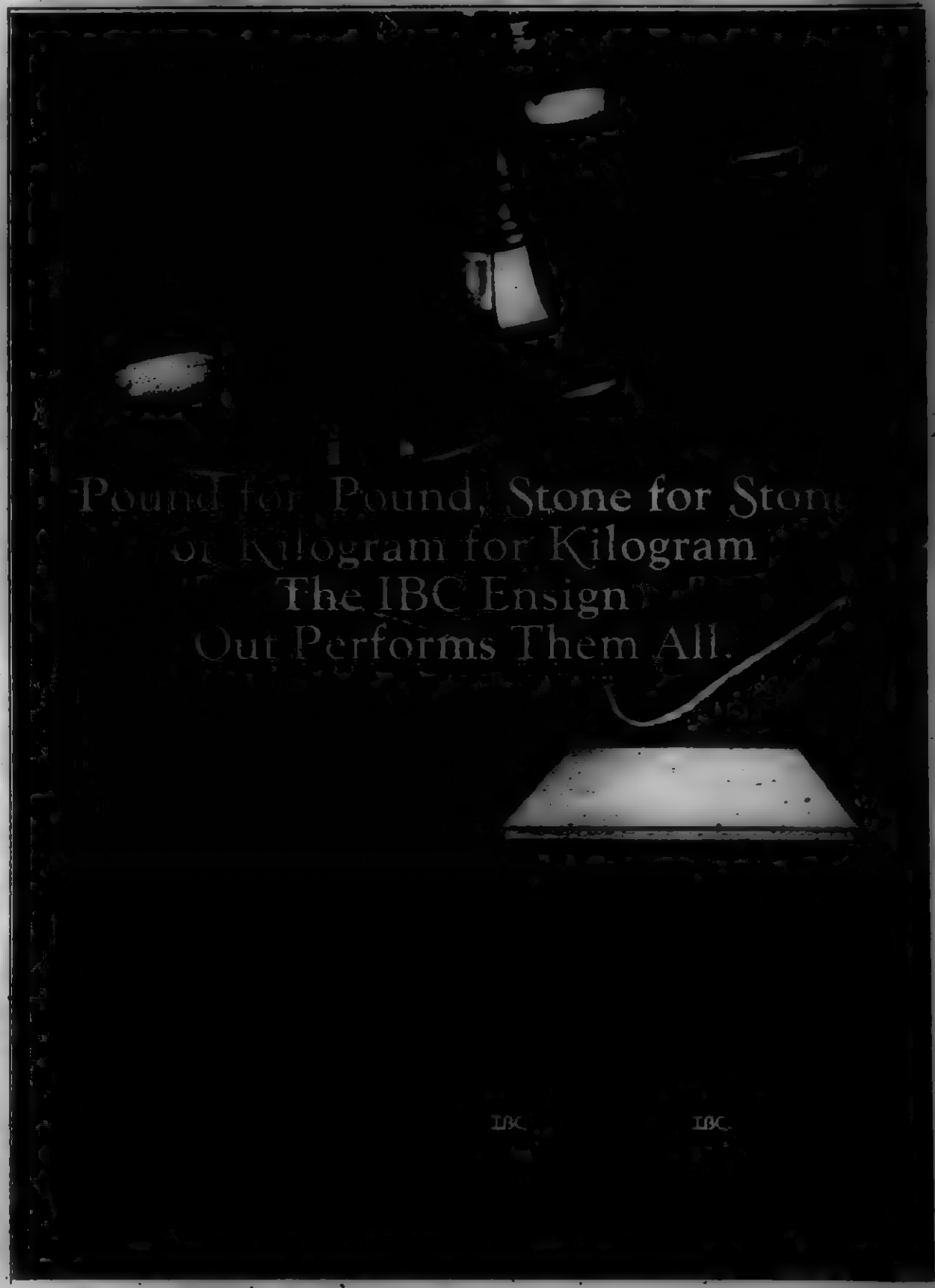
At Colgate-Palmolive Co. in New York City, Manfred Zerbe, director of communications services, said that it will be hard to disappoint his company because it has been anticipating the worst from divestiture.

Colgate's experience in the divested environment has been limited because the company didn't have a backlog of equipment and services. For the few equipment problems the company has experienced, the AT&T Information Systems Customer Service Support Operation provided a single point of contact, relieving Colgate of the responsibility of determining whether the problem was with AT&T Information Systems, AT&T Communications or New York Telephone Co., the communications director reported.

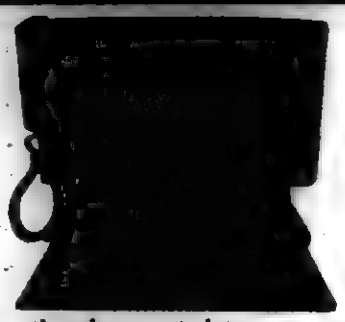
One point of irritation for the company came from the back-ordering of some electronic key systems that AT&T Information Systems said it would deliver in mid-January. More irksome than the actual delay was the fact that this information had to be pried out of the company.

A communications manager at a large Massachusetts company who asked to remain anonymous said that the service his company is receiving is horrendous.

The root of the problem lies in lousy coordination between AT&T and New England Telephone Co., the contact said. "I'm just glad we're not planning any network expansion," he added.



GET EVERYBODY ON BOARD.



Now there's a way to let everyone in your company chip in.

AT&T Information Systems, the company whose unparalleled communications heritage has been bringing people together for 100 years, now brings your office together. With state-of-the-art office automation that's designed to get your company moving ahead.

Electronic Document Communications, now available on System 85 and DIMENSION* PBX, is an easy-to-learn software application that's hard to beat. Because it integrates your office by letting everyone prepare, send and store documents and messages with the speed and efficiency of a computer. So you can have better access to the right information in the right form at the right time.

Electronic Document Communications can streamline your office in three ways:

Preparing Information—Reduces the time, effort, cost and wasted paper between drafts by electronically creating, editing and formatting documents and messages. "The Composer," a special software feature, checks spelling, grammar, punctuation and usage. EDC even measures whether documents are readable by technical and nontechnical readers.

Moving Information—Speeds documents to many people in different locations simultaneously so they can act decisively. EDC allows you to determine the timing and cost of delivery, and even check to find out when documents were received. Using a password ensures the privacy of your messages.

Managing and Storing Information—Locates documents, and retrieves and evalu-

ates contents quickly and easily with electronic files—while reducing the possibility of losing documents. An electronic "Mailbox" allows you to quickly determine which documents to read first. EDC reduces storing and filing costs with an electronic "Archives" that allows for either short- or long-term storage, and the "Wastebasket" which enables you to permanently delete items after a determined period of time. There's even an electronic "Calendar" that checks personal schedules and arranges mutually convenient meetings.

Not only will all these features help you further integrate your office, Electronic Document Communications is itself just one part of AT&T's line of completely integrated business systems. For state-of-the-art office automation, you can implement EDC in conjunction with other applications software like Message Center/Directory, a call coverage and message system. These office management applications are now available on System 85 and DIMENSION® 600 and 2000 systems with the Applications Processor.

The result is you'll be able to improve staff productivity at every level and get everybody on board. And as new features are developed in the future, they'll be compatible with your existing equipment.

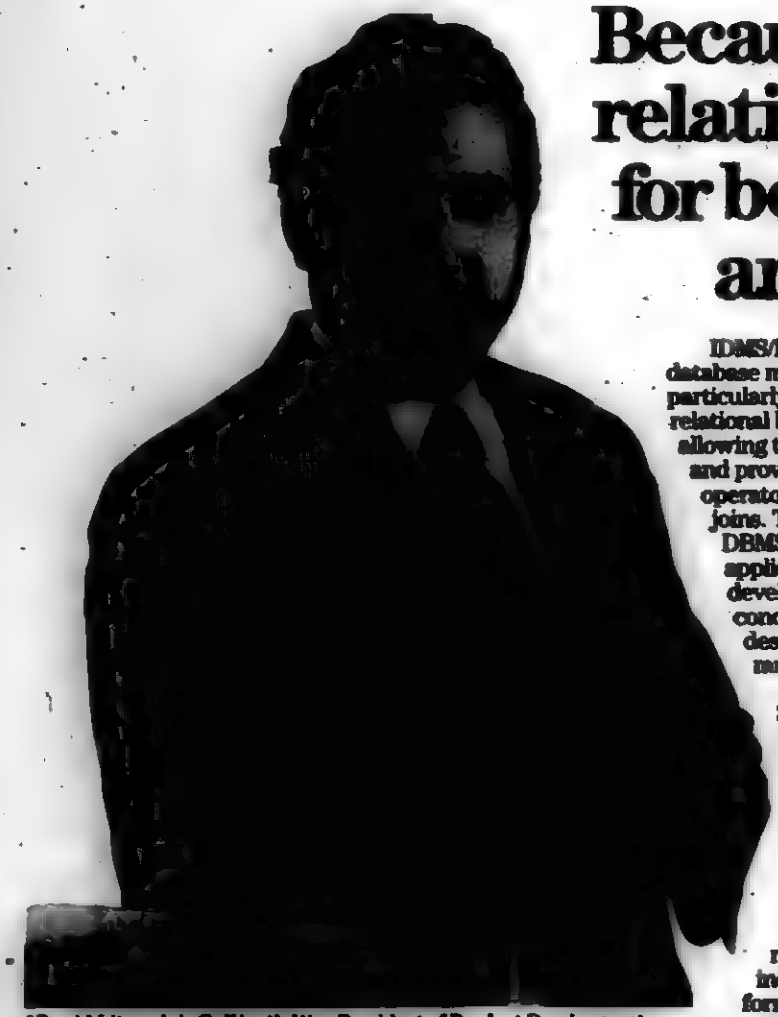
EDC was developed by Bell Labs systems designers who now work for AT&T Information Systems Laboratories. AT&T Western Electric produces EDC, and AT&T Information Systems will maintain it with comprehensive, conscientious service from the largest service organization in the industry. To find out more, call toll-free 1-800-247-1212, Ext. 879M.

AT&T's Electronic Document Communications: It's part of the integrated office of tomorrow that you can board today.

AT&T
Information Systems

"IDMS/R represents a major advance in database technology."

Dave Litwack*



Because IDMS/R is the first relational DBMS designed for both the DP professional and the end user.

IDMS/R is not only a relational database management system, but a particularly powerful one. IDMS was made relational by removing all pointers and allowing the user to define data as tables and providing the traditional relational operators such as selects, projects and joins. The major benefit of a relational DBMS is the capacity to develop applications faster because the developer does not have to be concerned with the database design. IDMS/R provides this and much more.

For example, the Automatic System Facility (ASF) of IDMS/R is a major advance over fourth generation languages. The ASF is so comprehensive and easy to use that all a user need do, to develop an application, is define a relational record. The Automatic System Facility dynamically generates all necessary supporting structures including data definitions, screen formats, application processing logic, and documentation. So, the developer can witness the application being produced, literally, in seconds. This capability makes IDMS/R the perfect system for the end user.

Data processing professionals can use the ASF to help develop production applications. The ASF can be used to build a prototype that can be enhanced, using Cullinet's fourth generation language, ADS/OnLine, into a complex production application. But, when they build a complex high volume application using IDMS/R, DP professionals require outstanding performance. Typically, 5% of the data relationships (joins) in any application are accessed 95% of the time. With IDMS/R, they can simply change these relationships to predefined joins and benefit from a dramatic boost in performance. We call it Relational Fastpath. Relational Fastpath makes IDMS/R a unique DBMS and a perfect system for DP professionals' system development needs.

In addition, IDMS/R has the most sophisticated back-up and recovery capability of any DBMS, full integration with personal computers and is also integrated with Cullinet's complete line of financial and manufacturing applications.

In summary, IDMS/R was designed to satisfy the requirements of those who want to develop applications faster and those who have the responsibility of processing them.

For further information, attend a Cullinet Seminar. Mail the attached coupon or call Cullinet at 1-800-225-9930 (in Massachusetts, 617-329-7700).

**David Litwack is Cullinet's Vice President of Product Development. Mr. Litwack has contributed significantly to the many technical advances Cullinet has achieved in database software products, including IDMS/R. Mr. Litwack joined Cullinet in 1976. He is a Cum Laude graduate of Brandeis University and holds a Masters in Computer Science from Boston University.*

IDMS/R Seminar cities and dates

City & State	Date	City & State	Date	City & State	Date
Albany, NY	Mar 13	Indianapolis, IN	Mar 27	Omaha, NE	Mar 1
Allentown, PA	Mar 1	Jackson, MS	Mar 15	Orange County, CA	Mar 6
Atlanta, GA	Mar 26	Knoxville, TN	Mar 26	Oshkosh, WI	Feb 28
Arlington Hts., IL	Feb 28	Lexington, KY	Mar 30	Pittsburgh, PA	Feb 29
Augusta, GA	Mar 14	Little Rock, AR	Mar 13	Portland, OR	Mar 15
Boston, MA	Mar 8	Los Angeles, CA	Mar 27	Providence, RI	Mar 22
Bridgeport/ New Haven, CT	Mar 6	Madison, WI	Mar 15	Quincy, IL	Feb 29
Charleston, WV	Feb 29	Meadowlands, NJ	Mar 7	Raleigh, NC	Mar 20
Charlotte, NC	Feb 23	Memphis, TN	Feb 23	Rochester, NY	Mar 29
Chicago/ Rosemont, IL	Mar 20	Merrimack, NH	Mar 29	San Antonio, TX	Mar 15
Cincinnati, OH	Mar 21	Milwaukee, WI	Mar 7	San Diego, CA	Feb 23
Cleveland, OH	Mar 22	Minneapolis, MN	Mar 28	Springfield, IL	Mar 5
Columbus, GA	Feb 28	Montreal, PQ (French)	Mar 14	Springfield, MO	Mar 29
Columbus, OH	Mar 9	Montreal, PQ (English)	Mar 21	Spokane, WA	Mar 28
Davenport, IA	Mar 13	Nashville, TN	Feb 16	Tallahassee, FL	Mar 1
Detroit, MI	Mar 14	New Orleans, LA	Feb 23	Toledo, OH	Feb 14
Ft. Lauderdale, FL	Mar 22	New York, NY	Mar 20	Toronto, ON	Mar 20
Ft. Wayne, IN	Mar 6	New York/ Long Island, NY	Mar 27	Tucson, AZ	Mar 20
Ft. Worth, TX	Mar 15	New York/Rye, NY	Mar 13	Vancouver, BC	Mar 14
Grand Rapids, MI	Mar 27	Oakland, CA	Mar 15	Washington, DC Wichita, KS	Mar 8
Greenville, SC	Mar 6			Wilmington, DE	Mar 27
				Winnipeg, MB	Mar 6

Visit us at Softcon, Feb 21–23, Booth #A1500.

I'd like to attend your seminar on _____ (date) in _____ (city)

Computer: _____

Name/Title _____

Name/Title _____

Company/Department _____

Address _____

City _____ State _____ Zip _____

Phone ( ) _____

Mail to: Cullinet Software, Inc., 400 Blue Hill Drive, Westwood, MA 02090-2198 ATTN: Corporate Meetings

Cullinet Software products are designed to run on IBM 360/370, 30XX or 43XX or plug-compatible computers. 330 CW

Database: Cullinet

© 1984 Cullinet Software, Inc., 400 Blue Hill Drive, Westwood, MA 02090-2198

SYSTEMS & PERIPHERALS

What's plaguing big CPU makers

HARD TALK

TOM HENKEL
CW Senior Editor

The big five mainframe makers all have the same problem. With mainframe architectures pushing 20 years old, they are quickly running out of clever ways to boost system performance. All five have tried to update their mainframe systems with newer technology, but all are bound by a morass of software that makes developing an efficient processor difficult. All five are also facing user demands for bigger, faster systems that take up less space, use less power and are more reliable than existing systems.

The problem is a complex one. Each time a mainframe vendor announces a system enhancement that offers 1½ or two times the performance of an older system, it takes one step closer to the technological limitations of its mainframe architectures. And with each doubling of performance, the vendors take even larger steps toward that technological brick wall.

Unlike the entrepreneurial firms developing systems based on microprocessors, mainframe vendors do not have the luxury of developing systems from scratch. Users of mainframe systems are so heavily committed to existing software environments that they are not in a position simply to "make a conversion." Large corporations, whose systems contain millions of lines of code, just cannot make a conversion. IBM learned a painful lesson back in the early 1970s when it pushed 360 users into converting from a DOS- to an OS-oriented operating system. There are still DP executives who hold a grudge against IBM for that conversion. And that was a much simpler time for DP shops. Today, such a conversion would be physically impossible for many shops.

The solution appears to be a transition

See [illegible] page 88

IBM unveils impact line printer
Can operate at 3,600 line/min

RYE BROOK, N.Y. — IBM has unveiled what it claims to be its fastest impact line printer, the 4248.

The unit can operate at 3,600, 3,000 or 2,200 line/min. At 2,200 line/min, the unit can print optical recognition characters, according to IBM.

The printer uses about 40% less power and produces about 26% less heat than the earlier IBM 3211, a 2,000 line/min impact printer. In addition, the 4248 can run all 3211 programs, the IBM spokesman said.

Through program control, an operator can change speeds, select between six or eight vertical line space/in. or adjust hammer-flight timing.

The unit is equipped with microprocessor-controlled self-diagnostics and uses a 12-char. display for diagnostic and test messages, IBM said.

The 4248 can be optionally expanded from 132 to 168 print positions. This option allows side-by-side printing of two 8½-in.-wide sheets of paper, a spokeswoman said.

A basic 4248 Model 1 printer costs $90,000 and will be available in March. Lease plans are available through the IBM Credit Corp. starting at $1,926/mo. The minimum monthly maintenance charge on the 4241 is $975. The option to expand the maximum number of print positions from 132 to 168 costs $10,000 when installed at the factory and $15,000 if installed in the field. Volume discounts of up to 20% are available to users who purchase mixed orders of the 4248 and the 2,000 line/min 4245 printer, according to an IBM spokeswoman.

The printer was announced by IBM's Information Systems Group at 900 King St., Rye Brook, N.Y. 10573.

Apollo DN320 workstation bows

CHELMSFORD, Mass. — Apollo Computer, Inc. has introduced a 32-bit, floating-point workstation said to offer three times the floating-point performance of the firm's DN300.

The floating-point computational performance of the DN320 is equivalent to larger systems, such as Digital Equipment Corp.'s VAX-11/730- or VAX-11/750-class machines, for one-third to one-half the price, the vendor claimed.

In addition, the firm reportedly has more than doubled the storage capacity available for the DN300 and 320 workstations with a 70M-byte Winchester disk drive and two 8-in. Winchester-type disk drives offering 80M and 167M bytes of storage. The drives can be used on the DN460 and DN660 processor nodes and DSP160 server processor.

The DN320 features 1.5M bytes of main memory; the firm's windowing software, which can handle up to 25 concurrent processes; 16M bytes of virtual address space per processor; high-resolution bit-mapped graphics; and connectability to Apollo's Domain local-area network. The unit's 17-in., monochromatic display offers a 1,024-by-800-pixel resolution, detachable keyboard and optional touch pad or mouse.

The DN320 node and disk are said to allow users to mix systems of varying power.

The DN320 is priced at $23,400.

The 70M-byte disk features random-access seek time of 45 msec. A 1.2M-byte floppy disk is optional for backup, software distribution or personal storage. The 70M-byte disk costs $12,800, or $14,300 if integrated with the floppy disk. The 80M-byte disk is priced at $12,800; the 167M-byte disk is $16,800.

Apollo is located at 15 Elizabeth Drive, Chelmsford, Mass. 01824.

Tandem 653X line gets 3270 emulation, voice recognition

By Jeffry Beeler
CW West Coast Bureau

CUPERTINO, Calif. — Tandem Computers, Inc. has enhanced its 653X terminal line with IBM 3270 emulation capability, two additional terminal models and a voice-recognition feature that reportedly provides an alternative means for entering data into Tandem processors.

Tandem also introduced a 55 char./sec. letter-quality printer for the 653X series and trimmed the price of its Model 6530 terminal by $275, a reduction of approximately 11%.

The 653X family had been slated to receive yet another product improvement — word processing capability — but the proposed upgrade reportedly suffers from serious shortcomings and is being withheld from the marketplace indefinitely, according to a Tandem spokesman.

Announcements of the latest enhancements to the 653X terminal line came on Feb. 10 during an annual shareholders' meeting at Tandem's world headquarters here. With the release of Tandem's EM3270 communications access method, all three members of the 653X series, including the two newcomers, can now interact selectively over bisynchronous lines with either IBM or Tandem host mainframes. Users can switch between IBM and Tandem processors by touching just one keyboard button, the spokesman said.

Implemented mainly in software, EM3270 enables the 653X terminals to emulate a wide assortment of 3270 series devices, including:

- The 3277 Model 2.
- 3278 Models 2, 3, 4 and 5.
- 3279 Models 2 and 3.
- Models 3284, 3286, 3287, 3288 and 3289 printers.

Because the 3270's emulation software resides in Tandem's Nonstop and TXP mainframes, none of the firm's terminals can communicate directly with IBM processors. Instead, the display units gain indirect access to IBM applications through Tandem's CPUs, the spokesman said.

EM3270 complements its developer's two existing access methods — TR3271, which allows 3270 series peripherals to treat Tandem hosts as 3271-type cluster controllers, and AM3270, which permits IBM-built 3270s to communicate bisynchronously with Tandem systems.

New terminals

In addition to operating with the existing 6530, the 3270 emulation capability is available with the 6531 and 6532, the two latest extensions to Tandem's terminal family. Unlike its older sister system, with its 15-in. monitor, the 6531 has a 12-in. display screen and is suited primarily for decision-making applications and "what-if" queries, the Tandem spokesman said.

The 6532, by contrast, comes with a 9-in. display and is aimed mainly at jobs in which desk space is at a premium.

Both 653X series additions are packaged with their electronics and monitors in separate boxes, which can be moved up to 6 ft apart from each other, the spokesman noted.

Like the existing 6530, the 6531 and 6532 support Tandem's just-announced Voice Input Option, which uses a microphone and headset to allow users to enter data simply by talking rather than by keying. Intended mainly for production-floor

See [illegible] page 88

PERKIN-ELMER

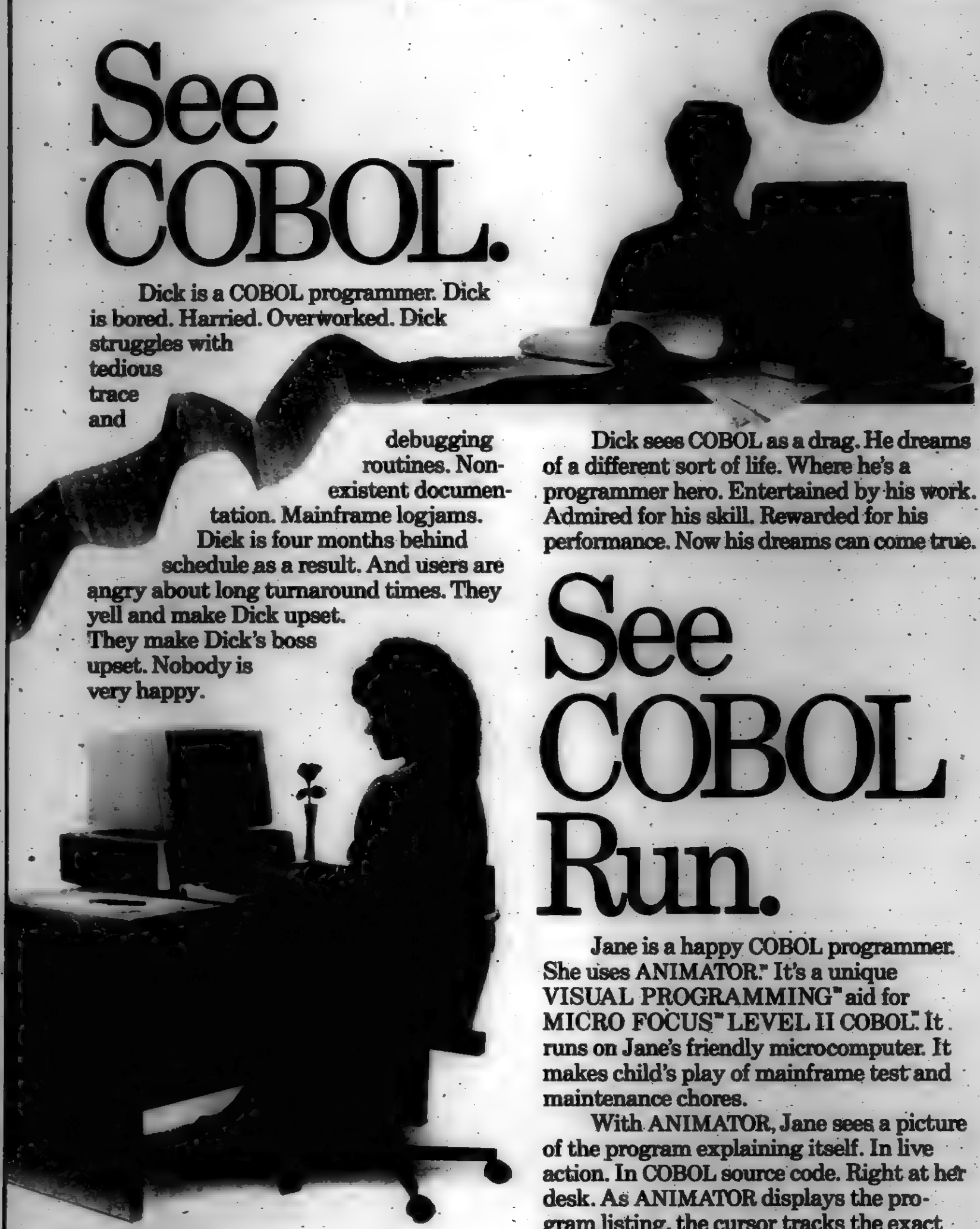
Perkin Elmer Corp. has unveiled a high-speed band printer for its line of superminicomputers/**86**

Array processor out for DEC VAX line/**86**

INSIDE

Turnkey Systems/**86**
Data Storage/**86**
Terminals/**82**
Printers/Plotters/**82**
Graphics Systems/**83**
Power Supplies/**84**
Board-Level Devices/**85**
Auxiliary Equipment/**86**

See COBOL.



Dick is a COBOL programmer. Dick is bored. Harried. Overworked. Dick struggles with tedious trace and debugging routines. Nonexistent documentation. Mainframe logjams. Dick is four months behind schedule as a result. And users are angry about long turnaround times. They yell and make Dick upset. They make Dick's boss upset. Nobody is very happy.

Dick sees COBOL as a drag. He dreams of a different sort of life. Where he's a programmer hero. Entertained by his work. Admired for his skill. Rewarded for his performance. Now his dreams can come true.

See COBOL Run.

Jane is a happy COBOL programmer. She uses ANIMATOR.™ It's a unique VISUAL PROGRAMMING™ aid for MICRO FOCUS™ LEVEL II COBOL.™ It runs on Jane's friendly microcomputer. It makes child's play of mainframe test and maintenance chores.

With ANIMATOR, Jane sees a picture of the program explaining itself. In live action. In COBOL source code. Right at her desk. As ANIMATOR displays the program listing, the cursor tracks the exact execution path. Including subroutine

branches. The view is precise. Compact. Unambiguous. And there's no waiting for computer time.

Jane can have the program run fast. Or slow. Or stop it. All at the touch of a key. This makes it easy to spot problems. Insert fixes. Set breakpoints. Instantly. Because of ANIMATOR's sophisticated debugging commands.

ANIMATOR gives Jane more freedom to innovate too. Her programs sometimes win awards. Yet she always meets schedules. Jane's boss likes this about Jane. Because he doesn't like users to yell at him.

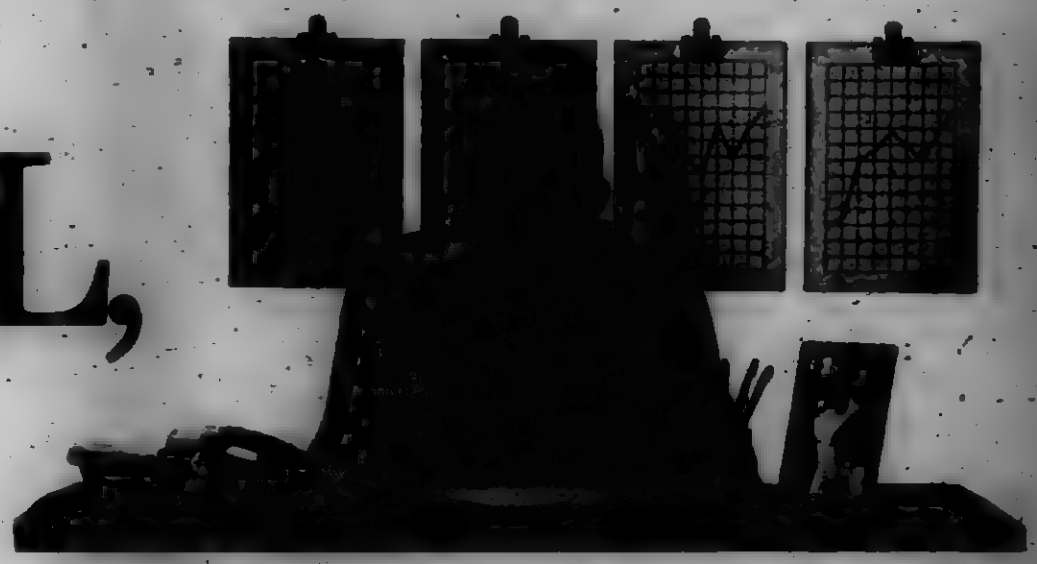
Run, COBOL, Run!

This DP manager just got a big bonus. Because he doubled productivity. He cleared the backlog. Cut costs. Compressed development cycles. Increased programmer efficiency and satisfaction. Produced terrific applications with faster turnaround times. Put control and prestige back into the central DP function. And nobody yells at him anymore. All thanks to ANIMATOR.

See ANIMATOR now.

Let Micro Focus put your DP shop on the fast track. ANIMATOR makes COBOL programs easy to comprehend. Fun to develop. A snap to maintain. Without the drudgery, your programmers will be happier. They'll do better work. In record time. And your users will probably stand up and cheer.

ANIMATOR runs with MICRO FOCUS Level II COBOL for compatibility with



ANSI '74 High Level COBOL implementations. A mainframe-micro communications link is recommended for downloading mainframe programs.

Write or call for a demo. Or detailed information. Right now.

MICRO FOCUS™

2465 East Bayshore Road, Suite 400
Palo Alto, CA 94303
(415) 856-4161

© 1984 Micro Focus, Ltd. All Rights Reserved.

LEVEL II COBOL, ANIMATOR, VISUAL PROGRAMMING, MICRO FOCUS and the MICRO FOCUS Logo are trademarks of Micro Focus Ltd.

CWB-03-84

To: Micro Focus
2465 E. Bayshore Rd., Suite 400
Palo Alto, CA 94303
I'd like more information

Name_____ Title_____

Company_____ Phone_____

Address_____

City_____ State____ Zip_____

Array processor fits VAX

BILLERICA, Mass. — CSP, Inc. has announced the availability of a multiuser, multitasking array processor system for use with Digital Equipment Corp.'s VAX-11/780, 750 and 730 computers.

The Mini-MAP Plus 4 system consists of up to four Mini-MAP 32-bit, floating-point array processors interfaced to one VAX-11. Each array processor can be accessed by a separate user with a different task requirement. Hence, the VAX-11 processor reportedly can accommodate up to four separate computationally intensive tasks simultaneously, each with 7 million floating-point operations per second.

The basic configuration includes the four Mini-MAP array processors, each with 64K bytes of memory and DEC Unibus interface cabling. The unit is packaged in a single 10½-in. chassis suitable for mounting in a DEC cabinet.

Larger configurations, including up to 16M bytes per Mini-MAP, are also available.

Also, the Mini-MAP Plus 4 system provides software development tools comprising the Scientific Subroutine Library of more than 225 algorithms.

The basic configuration is priced at $78,700.

CSP is located at 40 Linnell Circle, Billerica, Mass. 01821.

PE offers LP1200 printer

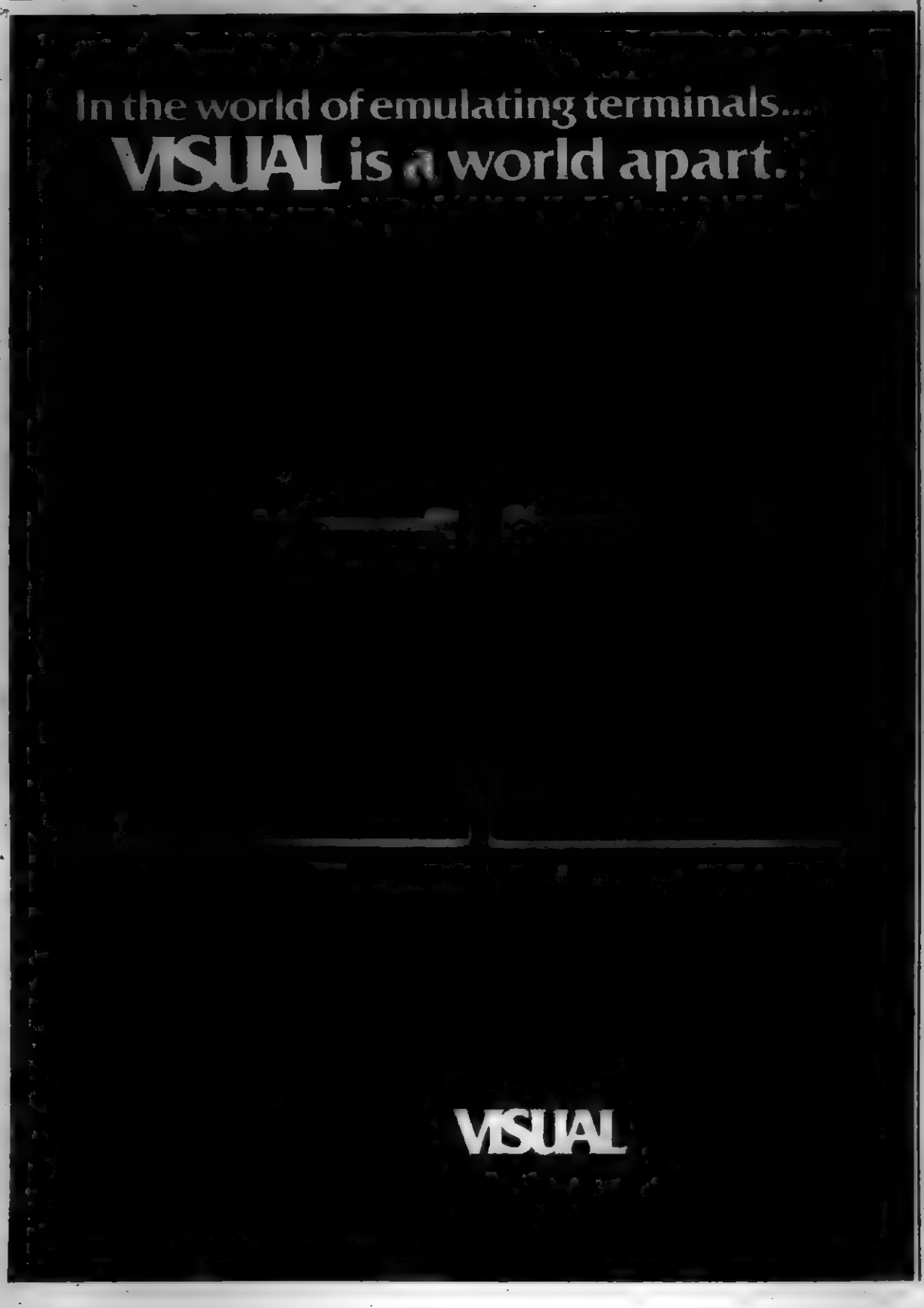
OCEANPORT, N.J. — Perkin-Elmer Corp. has introduced a high-speed band printer for use with its line of 32-bit superminicomputers.

The LP1200 is said to offer 80 or 132 columns of solid character font printing that produces hard-copy output on standard single-page or fan-fold paper.

The unit plugs directly into any PE Series 3200 superminicomputer and reportedly offers features that reduce setup time and maximize printer operation. Other features include a horizontal forms adjustment system, switch-selectable standard vertical spacing for 6 or 8 line/in., an automatic power stacker, touch-sensitive control panel and a typical throughput of 1,200 line/min when using a 64-char. set.

The LP1200 is priced at $20,000 and can be ordered with either a 64- or 90-char. set or both.

PE is located at 2 Crescent Place, Oceanport, N.J. 07757.



TURNKEY SYSTEMS

SKAMP COMPUTER SERVICES, INC.
Skamptrak

Skamp Computer Services, Inc. has introduced an entry-level turnkey system for distributors.

The system is based on a Texas Instruments, Inc. microprocessor and includes two TI Business Systems video display terminals featuring 256K bytes of memory, 17M bytes of disk storage, a 1.2M-byte diskette drive and a desktop printer that prints at a rate of 150 char./sec. It is expandable up to seven terminals.

The software, called Skamptrak, reportedly combines order entry, inventory control, purchase order, sales analysis and sales commissioning with general ledger, accounts payable and accounts receivable.

Skamptrak costs about $20,000, including installation.

Skamp Computer Services, 10261 Yellow Circle Drive, Minneapolis, Minn. 55343.

DATA STORAGE

INNOVATIVE DATA TECHNOLOGY, INC.
Magnetic tape subsystems

Innovative Data Technology, Inc. (IDT) has introduced two ½-in., 9-track, 800 or 1,600 bit/in. magnetic tape systems for the Mostek, Inc. Prolog STD bus line of single-card computer systems. The subsystems meet the requirements of IBM, the American National Standards Institute, the European Computer Manufacturers Association and the International Standards Organization.

The tape subsystems reportedly utilize an intelligent microprocessor-based controller (requiring a single STD bus slot) providing an 8-bit bidirectional parallel interface. Features include asynchronous handshaking, ping-pong buffering, front-end random-access memory buffers to 32K bytes and over 40M bytes of unformatted data storage for archival and/or disk backup.

A software sample application driver is supplied with the IDT magnetic tape subsystems.

The Series TD 1050/STD, a 45 in./sec system, is priced at $9,575; the Series TD 1750/STD, which operates at 75 in./sec, costs $11,950.

IDT, 4060 Morena Blvd., P.O. Box 178160, San Diego, Calif. 92117.

EMULEX CORP.
SC72

Emulex Corp. has announced a controller designed to allow intermixing of disk drive types on Digital

Continued on page 62

IF YOU WANT THE BEST APPLICATIONS DEVELOPMENT TOOL, TALK TO THE PEOPLE WHO DEVELOP THE BEST APPLICATIONS.

Of all the applications development tools ever designed, only one has the proven success of our new Millennium SDT.

Because Millennium SDT was designed by McCormack & Dodge, a company with over a decade of proven success developing applications. Business applications used in over thirty countries. By the world's biggest and most demanding corporate clients.

M & D design teams have developed everything from accounts payable to payroll/personnel software. Recently, they've won industry acclaim for developing the only family of systems on the market with a genuinely borderless environment. The Millennium series.

What made the Millennium series possible was our discovery of Millennium SDT, a remarkable tool based on a remarkable truth: eighty percent of the functions in all applications are, in fact, generic. Which means that 80% are reusable.

This discovery allowed us to vastly simplify and accelerate our entire systems development process. Tasks that once took months suddenly took days. And we were able to bring a breakthrough product line to the marketplace well ahead of our competition.

If Millennium SDT revolutionized our systems development process, think of what it can do for yours. You'll make more efficient use of your data processing resources than you ever thought possible.

And just to give you an idea of how fast our applications development tool works, we've included your first application in this ad. All you do is find the dotted lines, fill in the requested information, mail the completed form, and wait for the postman to bring a packet of important information. And, if you're in a real hurry, call 1-800-343-0325.

Soon your backlog will begin to disappear. You'll be a Millennium ahead.

START WITH THIS APPLICATION.

Name and Title _____

Company _____

Address _____

City _____ State _____ Zip _____

IBM Mainframe Model _____

WHEN YOU THINK ABOUT TOMORROW, MILLENNIUM MAKES SENSE TODAY.

McCormack & Dodge

a company of The Dun & Bradstreet Corporation

McCormack & Dodge Corporation, 1225 Worcester Road, Natick, MA 01760
Sales and support offices throughout North and South America, Europe, Asia, Australia and Africa. 800-343-0325. Telex: 710-325-0329

SYSTEMS & PERIPHERALS

Continued from page 60

Equipment Corp. PDP-11/70 minicomputers.

The SC72 is said to operate on the PDP-11/70 cache bus using standard system software, diagnostics and embedding in place of DEC's RH70 controller.

The SC72 reportedly integrates into a single system any four industry-compatible disk drives operating at data transfer rates up to 2M byte/sec. According to the company, data packs are compatible and interchangeable between DEC RM03 (67M-byte), RM05 (256M-byte) and RP06 (174M-byte) drives and their compatible disk drive subsystems.

The RH70 emulation reportedly allows software-transparent operation under DEC's RSTS-E, RSX11M, RSX11M-Plus and other DEC operating systems.

The SC72 is available now and is priced at $7,950.

Emulex, 3545 Harbor Blvd., P.O. Box 6725, Costa Mesa, Calif. 92626.

TERMINALS

INFORITE CORP.
Inforite intelligent terminal

Inforite Corp. has announced a hand-written character-recognition terminal said to incorporate the functions of dynamic character recognition, mark/sense recognition and graphics capabilities.

The Inforite intelligent data entry terminal is said to input information directly from handwritten business forms while maintaining a hard copy of the original. It features a two-line by 32-char. LCD display, error messages and a programmable calculator function and accommodates three-part forms.

Operating independently of a host computer, it is based on the Zilog, Inc. Z80A microprocessor and contains 64K bytes of random-access memory (RAM), 56K bytes of read-only memory and 48K bytes of battery-backed Cmos RAM. Inforite costs $2,000 in single-unit quantities.

Inforite, Suite 201, 1670 S. Amphlett Blvd., San Mateo, Calif. 94402.

DATA GENERAL CORP.
Dasher D220

Data General Corp. has introduced an addition to its Dasher workstation line, said to be a color, alphanumeric video workstation for data and word processing operations.

The Dasher D220 is compatible with earlier Dasher models and offers programmable color features. It has a palette of eight colors and allows the user to select up to 64 foreground and background color combinations on a character-by-character basis, the vendor said.

The video workstation is supported by a number of operating systems and two operation modes: DG proprietary (7- and 8-bit modes) and Ansi compliant (X3.4, X3.41 and X3.64 modes). All modes are switch- and software-selectable.

The Dasher D220 is available in two packages: a monitor, keyboard and cables configuration for $2,210; or a monitor only for $1,895.

Data General, 4400 Computer Drive, Westboro, Mass. 01581.

MSD SYSTEMS, INC.
PSC-1

MSD Systems, Inc. has announced PSC-1, a retail point-of-sale terminal that uses a Zilog, Inc. Z80 microprocessor.

PSC-1 can function as a stand-alone unit or can be tied into a network, according to the vendor. The PSC-1 features a security program, density studies by the hour and department, inventory polling, product analysis and calculations of profit per square foot, the vendor said.

The unit sells for $3,895. Suggested options include a dual disk drive for $2,500 and a report generator which costs $995.

MSD Systems, Suite 305, 10031 Monroe Drive, Dallas, Texas 75229.

PRINTERS/ PLOTTERS

VERSATEC, INC.
Disk-based plotting systems

Versatec, Inc. unveiled optional 40M- to 140M-byte, 8½-in. Winchester disk drives for its random-ele-

Whether you're looking for Payroll, Personnel, Pension Administration or Claims Processing software, Information Science's "Whole Person" software gives you a comprehensive system that provides superior technical features.

Systems for both Database and Non-Database

InSci's state-of-the-art payroll/personnel database system is integrated into a number of database management environments–including IMS, DL-1, and IDMS. Native mode, the system is designed to take full advantage of each specific database structure, eliminating clumsy, resource-draining interface programs.

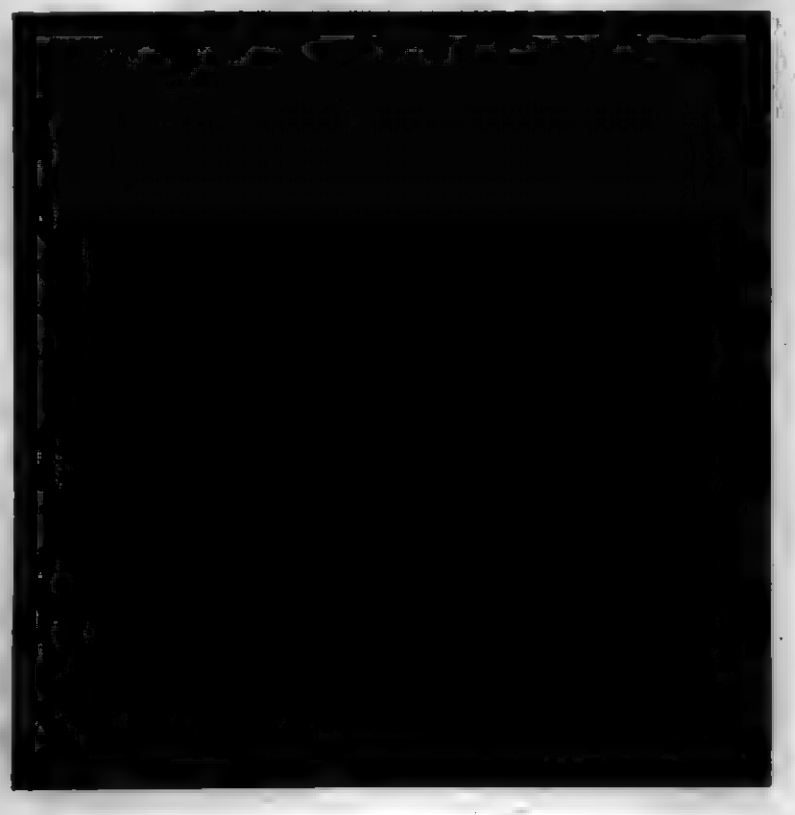
In addition, InSci offers two non-database systems. One using a sequential file structure, the other using a VSAM access method.

INSCI INT

"WHOLE PERSON" SOFTWA

SYSTEM THAT MEETS AL

PROFES



Introducing On-line PAS

PAS–InSci's new Pension Administration System–is available as a complement to our payroll/personnel package or as an independent, stand-alone system. PAS automates most aspects of pension administration from ERISA reporting and compliance to benefits calculation, retirement counseling, vesting schedules and benefits statements.

Software for Health Insurance Claims

Our health insurance claims processing system permits your organization to self-administer group health, dental, and disability claims–providing significant cost savings while eliminating the need to keep duplicate information for insurance purposes.

The Complete Human Resource Package

We call it "Whole Person" software because it is the most comprehensive, technically advanced set of human resource systems avail-

SYSTEMS & PERIPHERALS

ment processor and IBM-compatible on-line plotting controller. The disk options are said to enable Versatec on-line electrostatic plotting systems to handle longer, more complex plots in color or black-and-white with less CPU overhead.

The disk drive is available as an option with new systems or as an upgrade in existing installations. Acting as a raster data buffer, the disk drives spool the raster image for a high-speed transfer to the plotter. On-line electrostatic color plotting requires the disk option and the firm's Versaplot color random software, which provides for eight line colors and 256 predefined area colors. Also supported is black-and-white plotting.

The disk option adds $13,500 to the price of a random-element processor or IBM plotting controller; add $1,500 for in-field upgrades to existing systems.

Versatec, 2710 Walsh Ave., Santa Clara, Calif. 95051.

GRAPHICS SYSTEMS

AUTOGRAPHIX, INC. Autographix 200

Autographix, Inc. has announced an on-site workstation and automated business software package developed to design and produce high-quality presentation graphics for business.

Autographix 200 is said to produce high-resolution 35mm slides, color overhead transparencies, 8- by 10-in. color prints, black-and-white or color hard copy and video, electronic boardroom visuals.

The system is based on IBM's Personal Computer XT microcomputer and can function as an independent graphics system or as the nucleus of a graphics network for IBM Personal Computers and Apple Computer, Inc. microcomputers, according to Autographix.

Standard features reportedly include Autographix Guideline and Polycurve software, a graphics display processor, a graphics tablet and interface for creative work, Epson America, Inc. printers and a Hayes Microcomputer Products, Inc. Smartmodem.

An option is the Matrix Instruments, Inc. QCR film recorder, which produces 2,000 to 4,000 pixel/line slides on-site.

Normal slide needs and slide overlands can be transmitted over telephone lines to Autographix production centers for delivery of finished slides in five to 24 hours, according to the company.

The system is available now. The basic system is priced at $35,500. The optional camera is priced at $32,000.

Autographix, Citicorp Plaza, W. Bryn Mawr Ave., Chicago, Ill. 60631.

CATRONIX CORP. Petcat

Catronix Corp. has introduced a stand-alone, turnkey engineering workstation for mechanical design.

According to the vendor, the Petcat desktop system is the first mechanical design workstation for computer-aided engineering that is not a superminicomputer or a remote terminal to a mainframe computer.

The workstation is built around the IBM System 9000, a laboratory-oriented microcomputer based on the Motorola, Inc. 68000 microprocessor, and three of the vendor's software programs: Catsolid, a three-dimensional solids-modeling system; Catfem, a finite-element modeler; and Catface, an interface to finite-element analysis programs, the vendor said.

The price is $26,500 for a system comprised of a System 9000 with 1M byte of memory, 20M-byte Winchester disk, 8-in. floppy disk, IBM graphics screen, 16-color raster display and Catsolid and Catfem software, a vendor spokesman said.

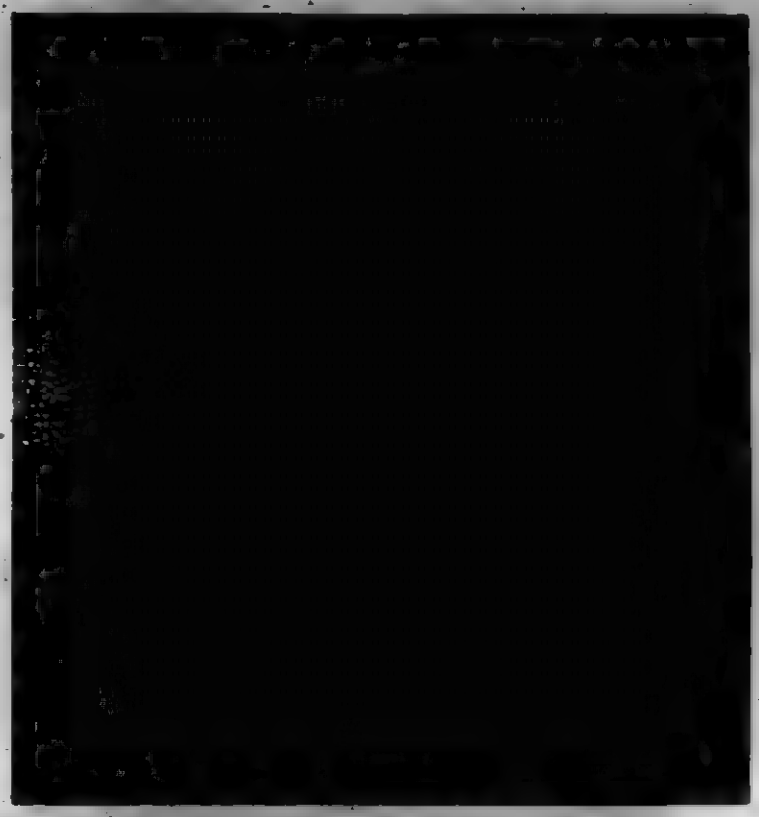
Catronix, 120 Ralph McGill Blvd. N.E., Atlanta, Ga. 30308.

RASTER TECHNOLOGIES, INC. Model One/80; Model One/10

Two enhancements to the Model One line of graphics systems were announced by Raster Technologies, Inc.

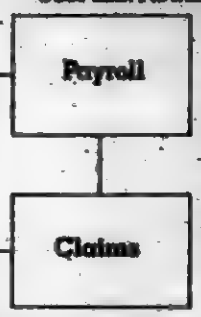
The Model One/80 graphics system features a 1,280- by 1,024-pixel resolution, a 60Hz refresh rate and a pixel

Continued on page 84



able. InSci started the HRS industry back in 1965, and we've led the field ever since. Our technical experts have provided you features unmatched by any other company.

Modularized Design For Easy Maintenance. InSci "Whole Person" software was designed from the top down and is highly modularized, providing maximum flexibility. A single module or subroutine supports each specific function in the system.



User Exit Routines. Strategic areas built into the InSci system allow exits to override the standard system routines. This means you can add your own programs without changing database system codes. InSci also gives you source codes so you can go into the system directly if you desire and still receive maintenance.

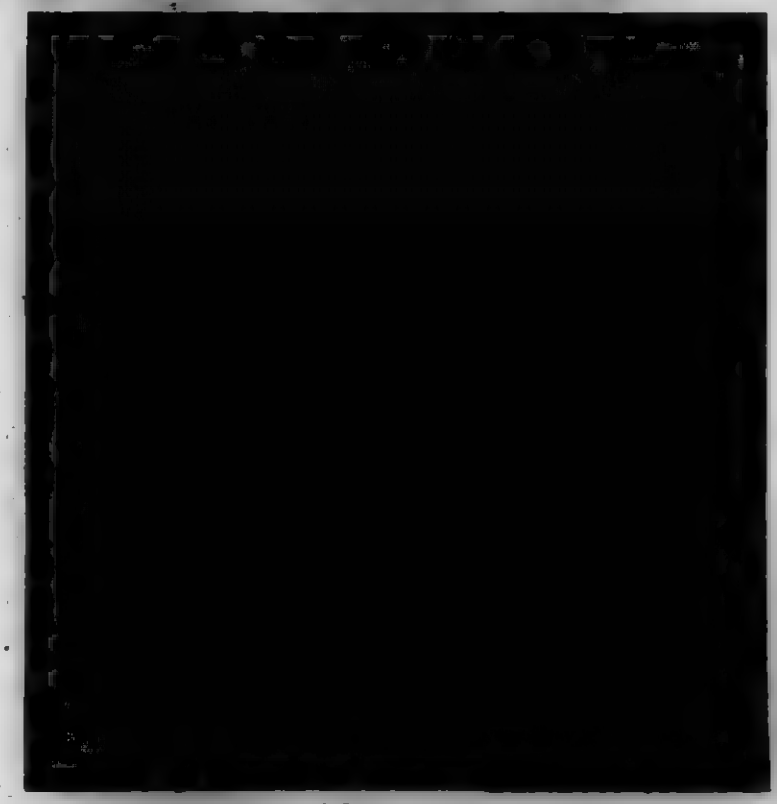
Preliminary or final processing mode. InSci systems let you select the most efficient operating mode for each processing task. All changes can be processed in real-time, so they become effective immediately. Preliminary processing allows for simulating situations such as a payroll run without affecting the database. And, of course, InSci systems provide state-of-the-art security precautions, complete maintenance support and training.

Write us. Or Call.

InSci "Whole Person" software—for more information, write us or call: Information Science Incorporated, 95 Chestnut Ridge Road, Montvale, New Jersey 07645. Attention: Chris Hanavan. 201-391-1600.

InSci
WHOLE PERSON SOFTWARE.

RODUCES
RE. THE FIRST SOFTWARE
L THE NEEDS OF THE DP
SIONAL.



SYSTEMS & PERIPHERALS

Continued from page 62

update rate of up to 8.7 msec per pixel.

The Model One/10 offers a 640- by 480-pixel resolution and a 60Hz refresh rate. Both products use the firm's proprietary very large-scale integration (VLSI) microprocessors, a spokesman said.

The Model One/80 combines a 16-bit microprocessor, a bit-slice processor and proprietary VLSI accelerators. It draws more than 70,000 one centimeter random vectors per second, and a double-buffering feature provides vector drawing rates up to 115M pixel/sec.

The unit was designed to operate with 32-bit workstations and processors. The unit costs $18,950 for a 1,280- by 1,024-pixel resolution system with eight planes of image memory, cabinet, monitor, keyboard and local firmware, the vendor said.

The Model One/10 uses a 16-bit microprocessor and proprietary VLSI processors to achieve a vector writing performance of 1M pixel/sec. VLSI hardware performs image memory refresh and timing, video refesh and hardware vector clipping and picking. The Model One/10 offers local display and Digital Equipment Corp. VT100 terminal capabilities. The unit costs $7,995 for 10 planes of memory, monitor, keyboard, all firmware, local display list and program development software, the vendor said.

The Model One/80 is available immediately, the Model One/10 will be available in April, according to the vendor.

Raster Technologies, Executive Park Drive, North Billerica, Mass. 01862.

ENGINEERING AUTOMATION SYSTEMS
EAS/700 Series enhancements

Engineering Automation Systems has announced enhancements designed to increase the on-line storage capabilities of its EAS/700 Series graphics system.

Enhancements include a 46.3M-byte Winchester disk drive and an increase in central processing memory to 1.5M bytes.

The EAS/700 is an engineering workstation featuring Microsoft, Inc.'s Xenix operating system and Engineering Automation's PCX printed circuit-board design software and OAK documentation software. The enhanced version is available now.

The color system is priced at $48,450, and the monochromatic system costs $40,750. A system with an eight-color plotter, matrix printer and 1,600 bit/in. magnetic tape drive costs about $84,000.

Engineering Automation Systems, 936 Silas Deane Highway, Wethersfield, Conn. 06109.

CASCADE GRAPHICS DEVELOPMENT, INC.
Cascade X

Cascade Graphics Development, Inc. has introduced a high-resolution computer-aided design and drafting (Cadd) system, the Cascade X.

In addition to the standard 12-in. monochrome CRT terminal, the Cascade X features a 19-in. nonglare monitor that reportedly provides 1,024- by 796-pixel resolution, dual monitors and Motorola, Inc.'s 68000 microprocessor. The system includes 756K bytes of random-access memory, which the vendor claims offers nearly instantaneous processing of graphics input. Up to eight workstations can be used in a network with the Cascade X, the vendor said.

The vendor said the Cascade X is compatible with older Cascade products, as the products are totally compatible.

The Cascade X system also includes a CPU, keyboard, tablet, joystick, 5M-byte hard disk storage expandable to 80M bytes and a double-sided, 5¼-in. floppy disk drive for inputting Cascade software and updating or storing drawings. A-size through E-size plotters and a dot matrix printer are optional.

The Cascade X costs $30,000.

Cascade Graphics Development, 1000 S. Grand Ave., Santa Ana, Calif. 92705.

POWER SUPPLIES

DYNAFIVE CORP.
Dynaswitch; system enclosure

Dynafive Corp. has announced a current-controlled switch and a system enclosure for Digital Equipment Corp. and compatible products.

Dynaswitch is designed to minimize interference and current surges, sense the on/off condition of ac power to the master outlet and control the ac power to the switched outlets.

The system enclosure is said to feature a 40A switch-power supply; an eight-slot quad backplane; six communications ports, mounting for a 5¼-in. Winchester disk drive; and dual or single 5¼-in. half-height floppy disk drives or backup tape.

Both products are available now.

Dynaswitch is priced at $133, although quantity discounts are available.

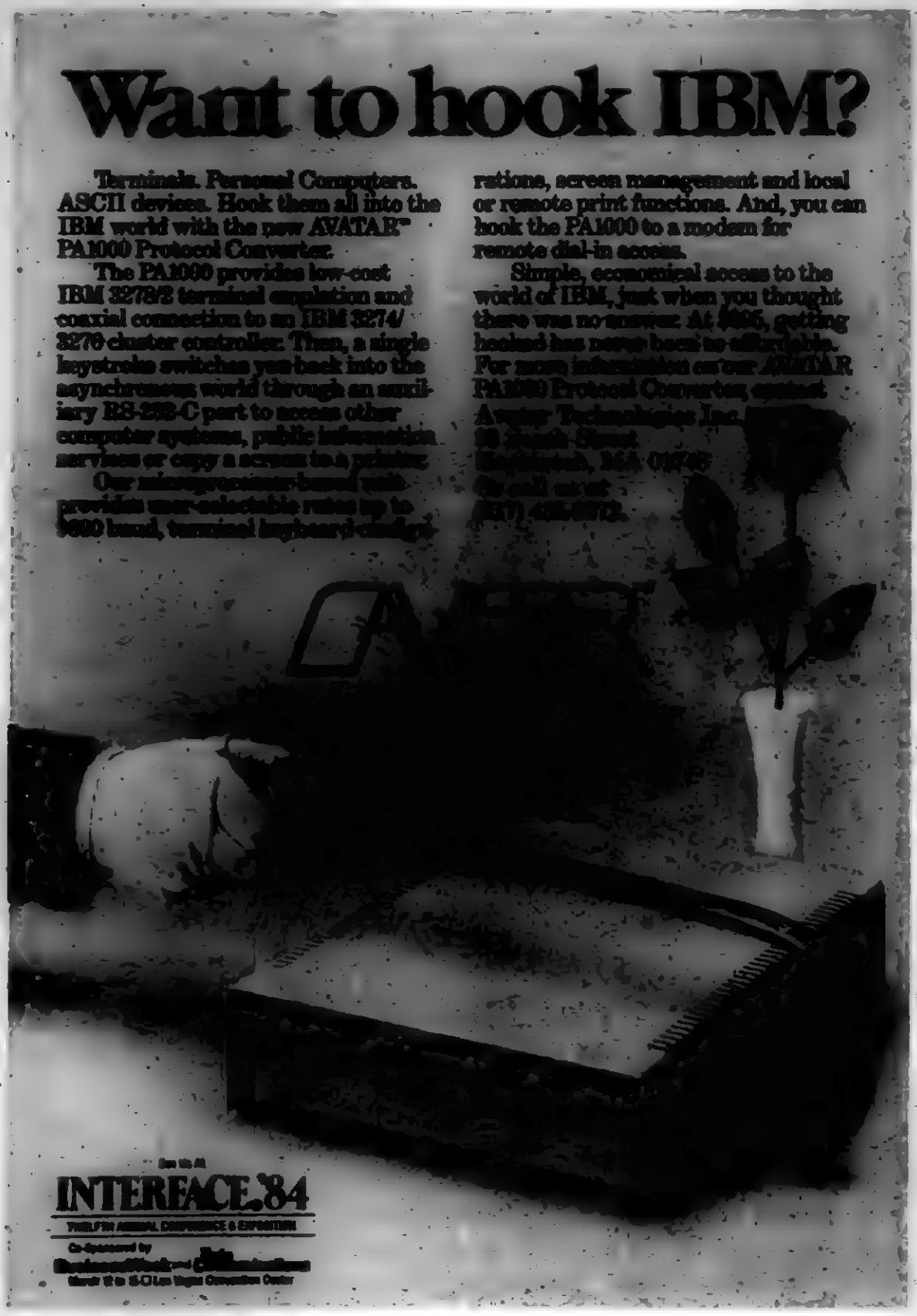
The enclosure is priced at $1,270 for a rack-mount model, $1,520 for a tabletop model and $1,770 for a pedestal model, with quantity discounts available for all three models.

Dynafive Corp., 12040 Western Ave., Garden Grove, Calif. 92641.

TOPAZ, INC.
Maximum Value Powercenter

Topaz, Inc. has announced the availability of its Maximum Value Powercenter (MVP) featuring its single-point grounding.

The MVP reportedly distributes



SYSTEMS & PERIPHERALS

power throughout a computer room while protecting computer circuitry from powerline noise. Features include flexible, watertight, shielded cables; 126 pole positions; digital system-status monitoring; secondary main-circuit breakers; a ground-fault interrupt; and a building-alarm interface package as standard equipment.

The units are reportedly 96% power-efficient and are available in power ratings of 100-, 125- and 150 kVA, the vendor said.

MVP units range in price from $12,635 to $14,770.

Topaz, 9128 Topaz Way, San Diego, Calif. 92123.

BOARD-LEVEL DEVICES

OMNIBYTE CORP.
OB68K/MMU

Omnibyte Corp. recently announced the OB68K/MMU, a large-system CPU board providing hardware memory management for multiuser systems and other applications requiring protected segments of memory.

The board features the Motorola, Inc. 68010 processor with temporary internal register storage and process retry upon receipt of a bus-error signal, delayed bus-error handling for error detection and correction and virtual memory capabilities.

The Omnibyte board provides from one to four Motorola 68451 memory management units partitioning physical address space into 32 to 128 segments.

System-support functions of the product include a real-time calendar/clock with battery backup, two RS-232 serial I/O ports, a software-definable bit/sec rate generator with 18 standard settings and one 240-bit timer.

The board is priced at $1,495 for a 32K-byte version and $1,995 for a 128K-byte version.

Omnibyte, 245 W. Roosevelt Road, West Chicago, Ill. 60185.

AUXILIARY EQUIPMENT

SCIENCE DYNAMICS CORP.
Act II

Science Dynamics Corp. has announced an access-charge measurement device designed for telephone operating companies to use in measuring, originating and terminating traffic on trunks and lines.

The Act II system reportedly features electronic metering of the number of in and out accesses and their duration for each time period, with front-panel controls for local readout and programming and security-code protection.

The company reports that two models are available. The ACT-LTER was designed for medium to large offices, accommodating up to 256 inputs, mixed lines, trunks and expansions in groups of 16. The ACT 16 terminal is offered for small- to medium-size offices and accommodates up to 16 line or trunk inputs.

The device is said to include data collection terminals and a remote data administration system (Rdas), a central processing unit that reportedly polls multiple terminal installations in accordance with the user's billing schedule, computes usage and formats the information to user-defined specifications.

According to Science Dynamic, the Rdas includes self-test, diagnostic and reporting capabilities.

Prices start at $1,940 for ACT 16, $9,150 for ACT-LTER and $22,215 for the Rdas. Delivery, according to the company, is 90 to 120 days after receipt of order.

Science Dynamics, 1919 Springdale Road, Cherry Hill, N.J. 08003.

SUMITOMO ELECTRIC USA, INC.
Personal Scanner Bar-Code

Sumitomo Electric USA, Inc. has introduced the Personal Scanner Bar-Code, a hand-held bar code reader.

The product reportedly reads different styles of bar code fonts, including NW-7, UPC, EAN and JAN fonts. The Personal Scanner Bar-Code interfaces with a number of products, including IBM terminals, the vendor claimed. The bar code reader is available as an integrated or stand-alone product.

The Personal Scanner Bar-Code is priced at $750.

Sumitomo Electric USA, 551 Madison Ave., New York, N.Y. 10022.

SENTEC, INC.
System II

Sentec, Inc. has announced a security system designed to protect computers from 14 environmental, power-line and security threats.

System II reportedly offers monitoring and reaction protection from overheating, transients, power interruptions, humidity, loss of phase, smoke and airborne particles, brownouts, power-line fluctuations, phase out of sequence and water.

The system was designed to cut power to the computer when dangerous conditions exceed manufacturer-specified parameters.

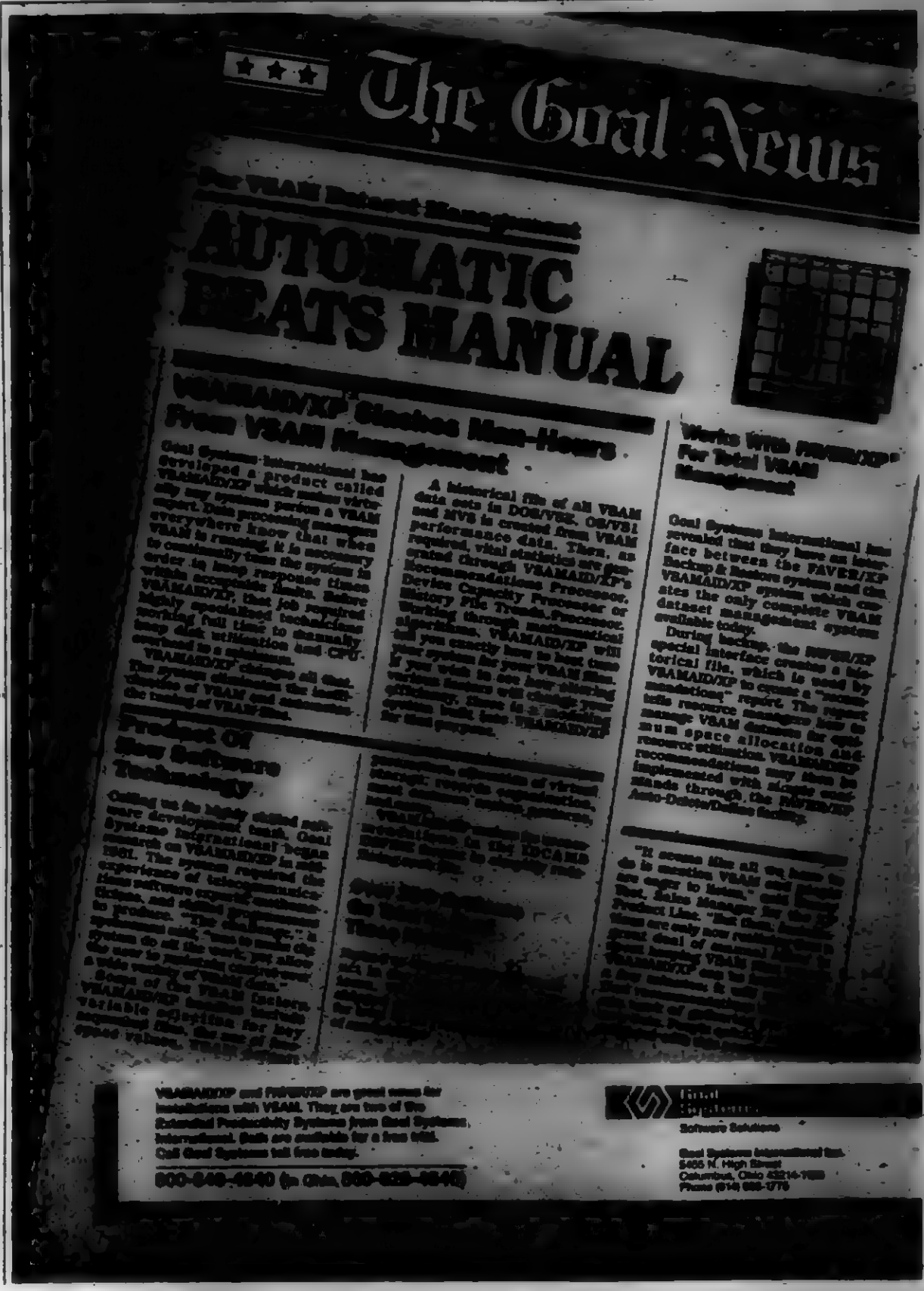
It is said to feature LED status indicators, audible alarms and a remote status-alarm module. That module is designed to allow personnel at a remote station to respond to fault conditions and alert support personnel.

It is said to allow interface with an automatic telephone dialer, which can dial preprogrammed numbers with status messages.

The System II is available now at prices starting at $13,600.

Sentec, 1955 N. Dutton Ave., Santa Rosa, Calif. 95401.

See AUXILIARY page 69



AUXILIARY from page 65

DISCWASHER
Clean Runner

Discwasher has introduced an interactive disk drive cleaner designed to lead the user step-by-step through the cleaning process.

The Clean Runner is said to be a combination program/cleaner that safely cleans disk drive heads, avoiding problems associated with contamination.

It utilizes a lint-free cleaning surface bonded to a polyester diskette and is a dry system.

Suggested retail is $24.95.

Discwasher, P.O. Box 6021, 1407 N. Providence Road, Columbia, Mo. 65205.

RECOGNITION EQUIPMENT, INC.
Bar-code reader

Recognition Equipment, Inc. (REI) has introduced a bar-code reader said to read and convert both human-readable OCR fonts and bar codes into computer-compatible information.

The hand-held input device is used to scan OCR and bar-code information interchangeably without operator intervention, according to the vendor. It reads fonts, such as OCR-A Alphanumeric, Multifont Numeric and bar codes such as UPC/EAN, Code 39 and 2 of 5 Interleave.

Suggested end-user price is $1,800 each, a spokeswoman said.

REI, P.O. Box 660304, Dallas, Texas 75266.

VENDORS from page 57

period. That is what IBM appears to be doing with its MVS/XA operating system. IBM created an environment which, it hopes, will allow users to run existing programs while converting frequently used applications to take advantage of the extended addressing offered by MVS/XA.

Burroughs Corp. also appears to be taking the same approach with its proposed A series of mainframe processors. The first model of the A series, the A 9, allows users to run existing programs developed for the B4900, B5900 or B6900 systems.

But this turtle-like transition period is occurring during a time when technology is whizzing past the older mainframe processors. Microcomputers, for example, started out as 8-bit systems that offered some rudimentary computing capabilities. Within two years, micros have developed into 32-bit systems that are already challenging the performance of low-end mainframes.

Mainframes are not going to die out, but the dramatic advances in microcomputers may erode their importance in corporations. More segments of companies appear to be bypassing the corporate mainframes in favor of smaller systems that better fulfill their specific processing needs. That trend may improve user productivity, but at what price? Many firms are already finding that control of corporate data is slipping away. There may come a day when the micro users come crawling back to the DP shop complaining they have lost all control over how employees are using their micros.

What happens then? Will it be possible to bring everyone back into the more controlled environment of mainframe processing? Will employees want to give up the independence found in microcomputers? Can a DP department handle all the processing needs of a big corporation?

As the world becomes more dependent on computers, the issues involved with managing information appear to be outpacing the technological developments that created them. The solution may be found back at square one, the mainframe processor. But this time, a mainframe is needed that does far more than just process information; it must manage an entire firm and cater to the needs of each individual within that firm. The task sounds impossible for a single machine.

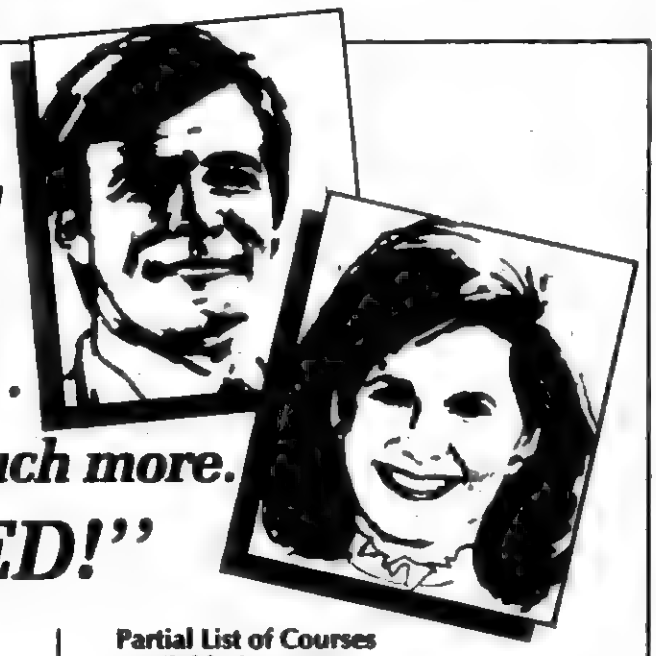
TANDEM from page 57

and similar applications in which constant manual activity hinders conventional data entry, the voice-recognition feature is implemented on a circuit board that contains enough memory to hold a vocabulary of 200 words.

Scheduled for first-customer shipment in April, the voice-recognition feature costs $1,800. The 6531 is priced at $2,100, the 6532 at $1,960 and Tandem's letter-quality printer costs $2,995. Both additions to the 653X terminal family will be available for delivery this month.

EM3270 can be obtained for a one-time, per-processor license fee of $500, plus a $20/mo maintenance charge per system. The capability is available from Tandem at 19333 Vallco Pkwy., Cupertino, Calif. 95014.

'Ms. Nesbit, this guide to tax regulations concerning small business computer rental expenses is well organized, concise and easy to read. You'll have to rewrite it.'



"All we wanted was a basic understanding... We got much, much more. Thanks, QED!"

This is one of the many good things you have said about QED courses. Thank you for your continuing support. We look forward to serving your data processing needs during 1984.

Here are just a few of the courses we will be teaching from February-June at our several regional learning centers, on a consortium basis, and in-house. QED has over 100 courses available in systems development, structured methodologies, data base, data communications, management and interpersonal skills, information resource management, CICS, IMS, VSAM, and other technical, software topics. You will find course descriptions in our new, free 1984 catalog. Call us for details, dates, and registration information...and ask about our IBM technical/software workshops. You, too, will say, "Thanks, QED!"

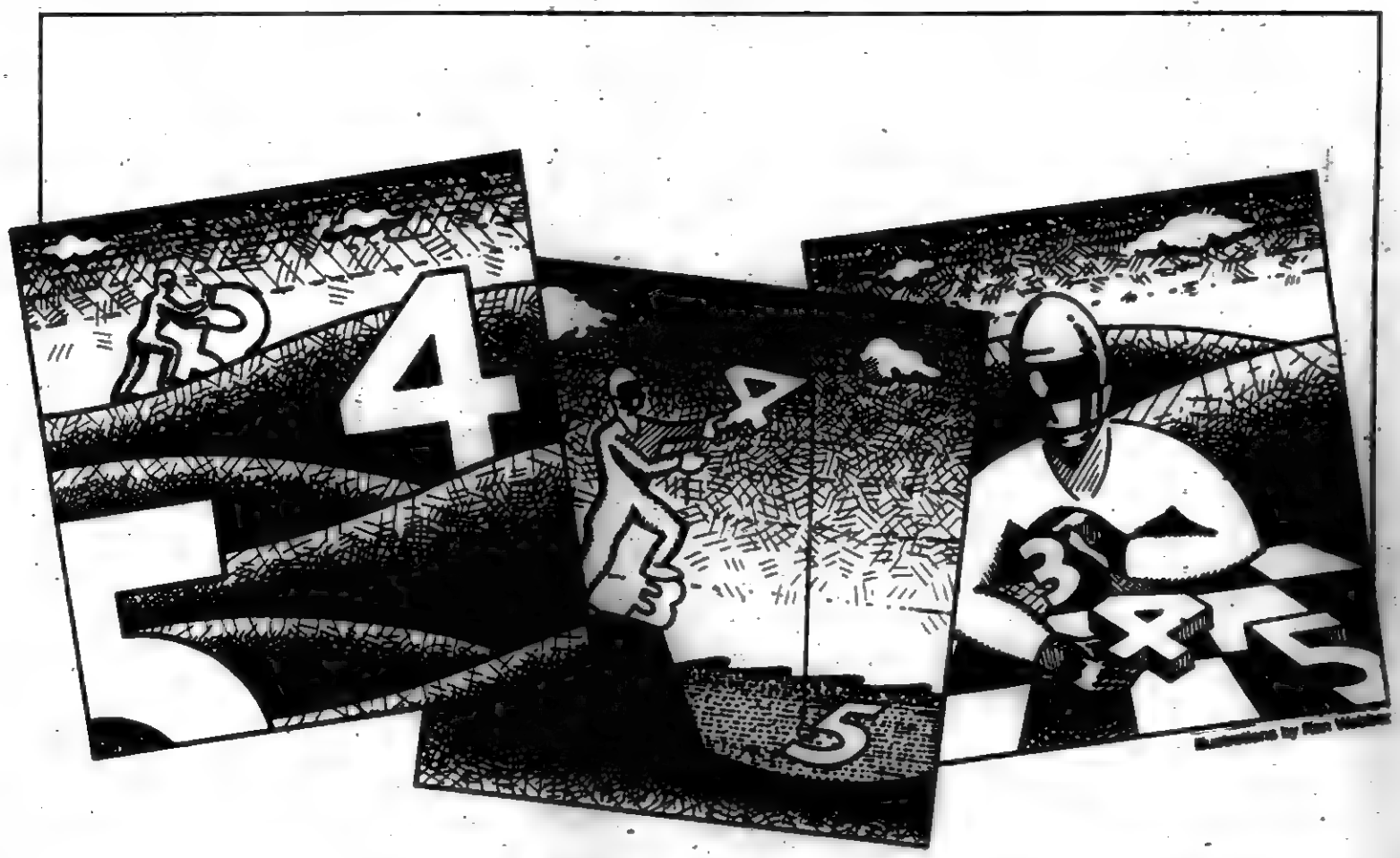
CALL Toll Free 800-343-4848
In Massachusetts 617-237-5656

Partial List of Courses Available from QED

- CICS Command Level Programming
- CICS Testing and Debugging
- Conflict Management in the DP Environment
- Cost-Benefit Analysis
- Data Analysis
- Data Base Concepts and Systems
- Data Base Design
- Data Communications Concepts and Systems
- Decision Support Systems
- DL/1 Application Coding
- DP Concepts for the Non-DP Manager
- DP Documentation
- Effective Presentations
- Ergonomics of Automated Office Systems
- Human Relations: Productive Working Relationships
- IMS Application Coding
- Leadership, Managing, and Influencing People
- Managing Time Effectively
- Programming in the C Language and Unix Environment
- Project Management and Control
- Quality Assurance
- Screen Design
- Structured Programming
- Structured Techniques for System Design
- Structured Testing
- Systems Analysis Workshop
- System Design Workshop
- The Information Resource Environment: Micro vs. Mainframe
- VSAM Application Design
- VSAM for Assembler Programmers
- VSAM for COBOL Programmers
- Writing with Power

QED Education • Publications • Software
QED Information Sciences, Inc. • QED Plaza • P.O. Box 181 • Wellesley, MA 02181

IN DEPTH



Illustrations by Ron Vesely

Strategies for implementing fourth-generation software

By Paul R. Hessinger

The speed and drama of technological innovation often creates confusion for a firm without a business-driven technology strategy. Part of the challenge is to separate marketing hype from technical reality. A specific new facility may be a major innovation. But does it warrant major modifications to a firm's inventory of computing resources, such as a change in an operating system?

Fourth-generation software is one of the most elusive new technologies. The term creates a gray area between major categories, such as systems and applications software. For example: Is Unix an operating system or a fourth-generation language? Die-hard technicians will suggest that even Cobol and RPG-II have a place in fourth-generation discussions. This "technocratic status quo" tendency is evidence of the necessity for a human factor orientation in an information systems technology plan.

People choose tools they are most comfortable with. They do *not* always choose the best tool for a specific task. Even the most competent "handyman" will continue to use a trusted tool rather than experiment. At the other end of the spectrum is the person who is always in search of an easier way, often confused with a new way. These psychological factors should be considered as fourth-generation languages are offered to "third-generation" programmers.

Powerful facilities for automated application development do exist. But even in the third generation, powerful facilities fell by the wayside — the result of indifference by technicians who were not encouraged to understand the new tools; and the result of outright rejection by users (DP and business) unwilling to play a different role in the information systems development process (for example, end users defining their requirements to an on-line dictionary facility).

Those responsible for a technology strategy must, at least for their own corporation, define: a) what a specific tool will involve in terms of processing facilities; b) what user group(s) will utilize the tool(s); and c) necessary and optional interfaces to other components of the overall technology.

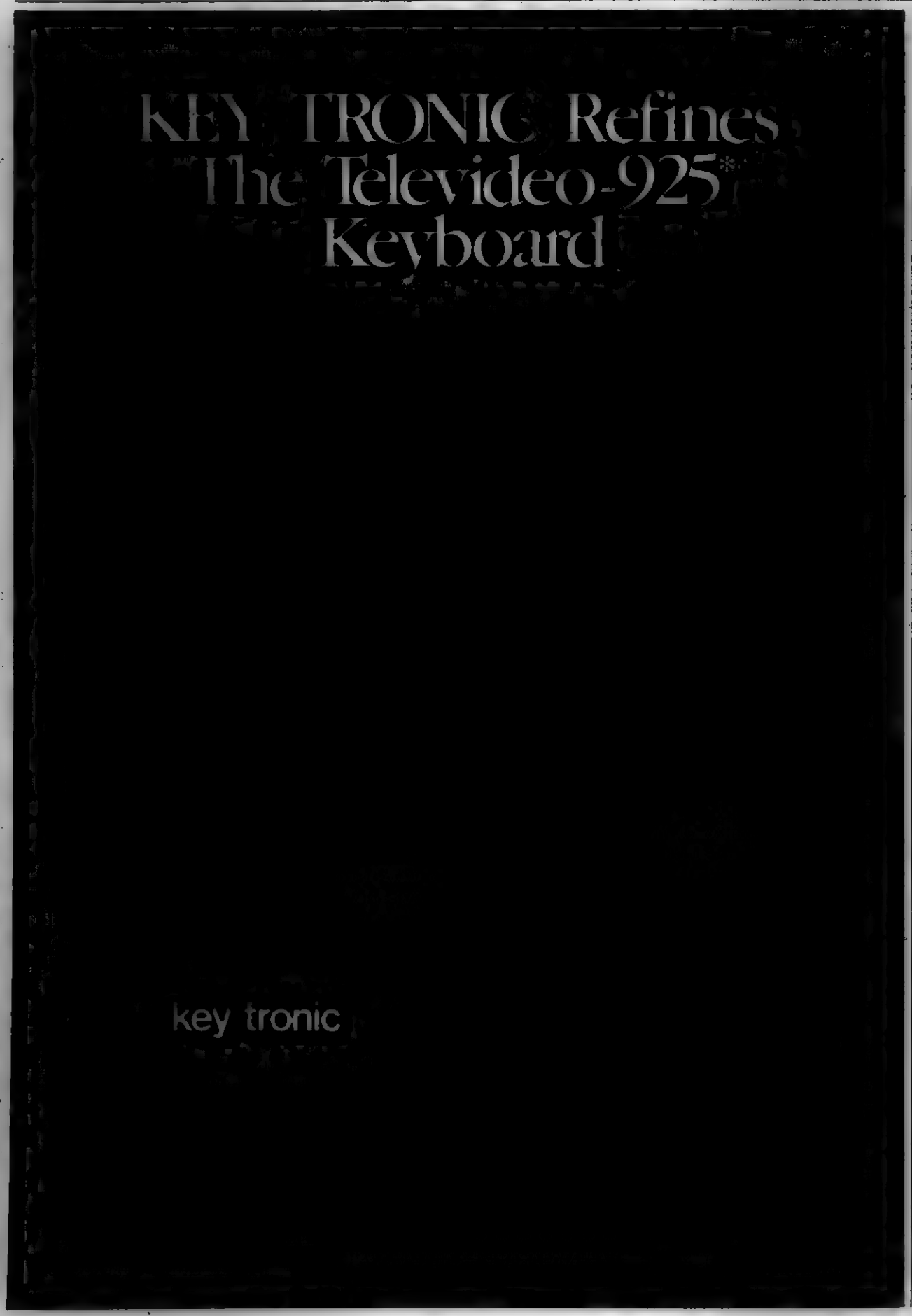
It is acceptable that within a broad

In reality, business objectives, human factors and technological integration are one in the same issue — a management strategy for fourth-generation tools. More accurately, it is a strategy for more productive information processing.

category, such as fourth-generation software, specific products will have overlapping facilities. This overlap must be identified before a firm ends up with several tools that breed confusion and unproductive competition among data processing personnel and users. The rationale that the initial purchase price for a fourth-generation product is relatively low often becomes a convenient escape from the responsibility of carefully selecting and implementing it.

It is unlikely that an industry standard will be adopted in the near future for facilities that qualify a product as a fourth-generation language. Marketing enthusiasts for specific products are already "plotting" the emergence of fifth-generation capabilities. In some cases, these claims are a legitimate extension of product development efforts. Others are attempts to promote tools that may be a little ahead of their time; our third-generation ignorance must be overcome relative to fourth-generation languages before we are ready for fifth-generation artificial intelligence systems.

A management strategy must control the temptation to take a quantum leap forward in applications development technologies. The strategy must involve a *pragmatic* migration to new tools, no matter how powerful they may be. "Revolution" and "cultural change" are alternatives *only* for those corporations hopelessly mired in second-generation "swamps" (for example, running OS/MFT on an IBM 370/158 with 1401 autocoder emulation and mainly RPG and BAL applications). The technologist must develop a management strategy that considers technical issues and human factors related to the technology.



General facilities

The following can be stated as general prerequisite facilities in a fourth-generation applications software product for a large system environment:

a) The primary command language is nonprocedural.

b) An information/data directory/dictionary controls overall use of the tool.

c) The system software environment (for example, the operating system and data base management system) is transparent.

d) The system was designed for interactive use with significant menu-driven, prompted processing.

e) The system can be used by nonprofessional DP personnel (the type of application to be built determines the necessity of this feature; for example, operational transaction — no, ad hoc query — yes).

Clearly, a broad range of products satisfies these requirements: National CSS, Inc.'s Nomad2; Oxford Software Corp.'s UFO; Mathematica Products Group's Ramis II; Applied Data Research, Inc.'s Ideal; Information Builders, Inc.'s Focus; Cullinet Software, Inc.'s ADS/O; Oracle Corp.'s Oracle; IBM's DB2; Software AG's Natural; and Informatics General Corp.'s Mark V. Each qualifies as a fourth-generation language.

Useful subdivision

A further challenge faced by those developing and implementing a fourth-generation strategy is to subdivide the languages into two categories:

1) Application (transaction processing) generators.

2) Information generators.

An application generator is intended primarily for developing structured, data base-oriented, inquiry/update transaction processing application programs.

An information generator is intended primarily for applications that are not fully structured. In addition, the target applications normally involve user-defined information requirements which, in turn, involve dynamic data access paths and reporting formats.

The subdivisions will possess common facilities. The type of applications to be built and the intended user are key factors in selecting a tool from one category or the other. Without this subdivision, the "technologist" will be frustrated by three general types of rejections.

The first is the inability to aim a tool at a specific business target. For instance, the use of an application generator (the tool) is intended to reduce backlog and control programmer head count

(target) through increased productivity.

Trying to build on-line transaction processing IMS capabilities with Focus leads to increased head count for Focus specialists and decreased productivity of other DP personnel (in IMS data base administration, for instance) who attempt to integrate the new tool.

Moral: Powerful tool, wrong utilization with little or no business benefit. Focus is an information generator, not an application generator.

The second major obstacle that occurs if fourth-generation languages are approached as a general class of software is a lack of ergonomic sensitivity.

From a technological perspective, the specific facilities of a given product must take into account the intended user. For example, an information generator (such as Ramis II, with its associated facility Relate) will be more user-friendly if it employs a relational view of the data to be processed in a specific application. An end user requires simple data structures.

If relational capabilities and other facilities are arbitrarily employed as evaluation criteria, it is entirely possible that pertinent human factors will be overlooked and users will resist a tool.

On the other hand, a transaction processing generator may be inhibited by relational-only views unless the generator is integrated with a full-function DBMS that provides for relational and other data structures (for instance, the automatic system facility with IDMS/R from Cullinet). Operational transaction processing applications often require complex data structures that are difficult to implement efficiently with relational structures. This difficulty can seriously impede the progress of data base administration and development personnel as they wrestle with the simplicity of relational structures for complex data base designs to support transaction processing.

If relational capabilities and other facilities are arbitrarily employed as evaluation criteria without the recommended subdivision, it is entirely possible that pertinent human factors will be overlooked and user resistance to a tool will result. Certain classes of end users, with the proper training and support, can be productive with semiprocedural languages, particularly those that are dictionary-driven and prompt-oriented. In other cases, users, for aptitude or business responsibility reasons, may be unable to use any language that requires more than pushing a button (full nonprocedural).

Case study

Suppose a firm's MIS manager dictates that only nonprocedural tools will be considered in an upgrade of application development facilities. Most "new" applications will be enhancements to existing operational systems. An nonprocedural "application generator" is selected, but it does not have a convenient interface to procedural languages, which are better suited to the structured portions of applications being implemented. Programmers become frustrated because they constantly must bypass the "applications generator" as existing Cobol applications require procedural changes. Eventually, programmers completely avoid the tool.

The tool is perfect for end-user information retrieval, but was not included in a search for information center tools because "It didn't have relational or graphics facilities." Although not installed at this site, options for both existed. The tool could be better classified as an "information generator."

The application requirements dictated a fourth-generation language with good procedural facilities. Because one was not chosen, the facility's programmers now reject fourth-generation languages in general.

A second case study

The third obstacle faced by the technologist will be technological disintegration. Consider a second example: An MIS manager focuses on a comprehensive fourth-generation tool with proven end-user capabilities. It has been employed to reduce significantly applications backlogs in other installations. The tool is promoted as a fourth-generation development workstation. However, the "application generator" operates only with that vendor's DBMS. Is it worth the cost of building interfaces to the currently installed DBMS and of retraining the development staff to support the implementation of end-user-oriented applications? Will the methodologies currently in place be modified to reflect the use of a new tool for operational systems?

Situations like this one often result in an investment of more resources in managing rather than applying the technology. A "new way" of developing operational applications may be a more comprehensive change than implementing an information generator primarily for end-user processing.

Obviously, the selection of a new tool must involve careful analysis of its facilities and the potential impact on how other tools operate. In addition, the selection should be driven by the composition of a firm's development backlog. When reporting applications dominate, an information

WHEN AMERICA'S TOP CORPORATIONS WANT TO CONTROL THEIR INFORMATION RESOURCES, THEY CALL HOLLAND.

Not so long ago, most companies believed that any information problem could be solved by adding another computer.

And another.

And another.

Inevitably, the legacy of that approach has been astronomical DP costs. Fragmented, redundant database systems. And untimely, inaccurate reports.

When those problems began to surface at some of the leading Fortune 1000 corporations, key executives all had the same response.

They called Holland Systems Corporation.™

Working with top people in each department, we helped develop a functional business model of the organization. We then created the framework for designing and implementing shared, integrated data and information systems. And we left behind dynamic guidelines for meeting short- and long-term corporate information needs.

While our top-down Strategic Systems Planning™ product (SSP™) may complement BSP™ and similar methodologies, it goes much further. By combining appropriate software, education and method, SSP allows companies to prioritize and control data and information systems development. Often for the first time.

If you're interested in making information more manageable, call us at 313/995-9595 and ask for Marketing Communications.

You'll be in good company.

Holland Systems Corporation
3131 South State Street S-303
Ann Arbor, Michigan 48104

BSP is a trademark of International Business Machines Incorporated.

HOLLAND SYSTEMS CORPORATION

Putting Information to Work.

generator will pay off. Technicians will not have to spend time building interfaces between Cobol programs and nonprocedural facilities.

The information generator should have its own "data base management" facilities. This will minimize the impact on a production DBMS, such as IDMS or IMS. The interfaces the tool might have to full-function DBMS can be used as a channel to pass necessary data from production to end-user applications. Data availability does not become an obstacle.

Reverse the situation and consider the impact if an information generator is selected when transaction processing applications dominate the backlog. Even with careful planning and controlled implementation, technicians will fight the technology. When the tool does not fit the type of information processing task being addressed, development personnel will attempt to build their own interfaces between the fourth-generation language and conventional tools. The "promise" of those languages begins to disintegrate.

Consider the impact if an information generator is selected when transaction processing applications dominate the backlog. Even with careful planning and controlled implementation, technicians will fight the technology.

Target users

Application generators are represented by products such as ADS/0, Ideal, IBM's ADF II (between the third and fourth generation?) and Natural.

Information generators include Focus, Artificial Intelligence Corp.'s Intellect (fifth generation?), Nomad2 and Ramis II.

In the background, the architecture of products such as IDMS/R, IMS/DB2 and Datacom/DB is a key parameter for effective technological integration of fourth-generation languages.

A specific organization considering fourth-generation tools could develop an expanded list of technical prerequisites for each category of these products. Relational views of data, graphics facilities, the ability to merge data with text and so on vary in relevance based upon the category being considered. For example, application generators probably do not need graphics but should have automated documentation, which is facilitated by text processing.

One Fortune 100 MIS organization used the following list of evaluation criteria as it searched for an applications generator:

General environment:

How does the product perform in respect to resource usage?
- Response time.
- Storage overhead.

How many customers are using it? How long has the product been around? What percentage of on-line application development is done with this tool?

Is 24-hour customer/technical support available?

Can this tool "talk" to the installation dictionary? Does it have its own?

How much education is available?

Is there a relational data base available that is integrated with the tool? Can this product be used without a relational data base?

Is user security adequate?

Is system security adequate?

Programming/technical concerns:

Any batch submission necessary?
- For screens.
- For test files.
- For procedural code (precompiler).

Is the end source language Cobol or tool-related? (Is maintenance done in current technology?)

Where is source stored?
- Installation library.
- Secure areas within the tool.

How is DBMS navigation handled? (Other access methods?) Are data base control blocks defined to the tool or to each application developed on the tool?

Are color CRTs supported? 132-character terminals?

Are PL/I or Cobol exits applicable?

How long does installation take? What kind of personnel resources does it take to install and maintain?

How much on-line documentation help is there? Are the manuals on-line? Are reference cards available? How long does it take for a programmer to become productive?

How flexible is the procedural code?

Can it be used for prototyping? Is the prototyping effort transferable to the production version?

How good are the editing facilities?
- Copy previously written code?
- Field/line/program easily modified?
- Copy/rename?
- Sequencing used or available?
- Scanning facilities?
- Temporary versions?
- Full-screen editing support?

System concerns:

How extensive is recovery from hardware failures?

What is the extent of ongoing maintenance and reorganization?

How and where does it run?

How are backup and restores handled?

IS YOUR COMMUNICATIONS NETWORK BREAKING UP?

Don't miss
"MANAGING THE COMMUNICATIONS NETWORK."
Exclusively from
Computerworld Reports.

How many vendors, how many different technologies does it take to make your network work? How many end users, how many decision makers can it take before something—or someone—cracks up? And does the telephone company break-up mean telecommunications tie-ups?

These are some of the critical questions posed by host John Gantz in "Managing the Communications Network," third in a lively, provocative series presented on 30-minute videocassettes and produced by DELTAK and CW Communications.

This month, you'll get the views of an industry expert, an MIS director, and a leading communications consultant. And be sure to stay tuned, because next month's Report will address another vital concern: the AT&T divestiture and its impact on information management. Watch for future Reports on subjects such as application development centers, artificial intelligence, end user training, the maturing information center, and more.

To learn all the signs of network break-up before your organization cracks up, order Computerworld Reports: "Managing the Communications Network." Call DELTAK order entry at (312) 369-3000; (416) 678-9222 in Canada.

DELTAK
East/West Technological Center
1751 West Diehl Rd., Naperville, IL 60566
(312) 369-3000 (800) 532-7686

375 Cochituate Road
Box 880, Framingham, MA 01701
(617) 879-0700

© Copyright 1984, DELTAK, inc.

IN DEPTH/FOURTH-GENERATION STRATEGIES

At the highest level from a human-factor standpoint, the subdivision provides the opportunity to select a tool well suited to the task. If end-user report generation is the task, let the end user evaluate a tool on a trial basis. Imagine an end user being asked to generate an application with ADP. That kind of situation has come up as MIS departments are caught in the fourth-generation language "gold rush."

The recommended subdivision, perhaps somewhat arbitrary, would prevent this situation. Applications generators are DP tools; information generators are end-user-oriented tools. At the very least, the recommended subdivision is a start for an organization trying to develop a fourth-generation language strategy.

While the workstation environment is also applicable to end users, it should be a prerequisite for a fourth-generation language geared to the professional systems developer.

From an ergonomic perspective, when end-user fourth-generation languages are being considered, perhaps defining "end user" in your corporation is a logical starting point.

There are two essential "human factors." First is the nature of the brain. Short-term memory is often used in information processing tasks, and long-term memory is used in analytical, information retrieval-oriented tasks. Consider the question: "Where would I look for a list of current customers?" Long-term memory is scanned as a person tries to remember where the information may be stored.

Preparation of a report is a processing-oriented task. If a fourth-generation language is to be used by an end user, the language must take into account a very limited short-term memory capacity. Psychologists studying human beings as a form of "information processor" have estimated short-term memory capacity as seven plus or minus two "chunks" of data. In a request for a report, an end user would probably need to define in his short-term memory at least the following:

- Name for the report.
- Where the data will come from.
- Basic fourth-generation language command(s) to be used to request the report.

If each item is considered as a chunk, the limits of short-term memory are not exceeded. If a user could enter "Report 'Current Customers' from Customer File," then this fourth-generation language would surely be user-friendly.

It is what happens next that determines if the product is ergonomically sound. If the fourth-generation language prompts the user for other parameters (for example, lines per page) and uses standard information (such as file layout for master files), then short-term memory capacity is efficiently used for processing tasks (defining specific fields of data required). It is not cluttered with items from long-term memory, which remains an analytical tool.

The technical facilities of the product must consider that a user will be involved in other tasks as he employs a fourth-generation language. A limited number of commands, an English-like syntax and short- and long-term memory "assists" (prompts, dictionary) are examples of favorable ergonomic capabilities in an end-user-oriented fourth-generation language.

The second major human factor, of course, is the user's interface to the fourth-generation language. Two extremes are desirable — English language and pushbutton. In the first, a user formulates a request as if he were talking to another human. (Intellect is a leading product on the market in this respect.) In the second, a user selects options from a menu by depressing a key or touching the screen. IBM's dialogue management facility is based upon this concept. An end-user-oriented fourth-generation language will benefit ergonomically from a combination of the two.

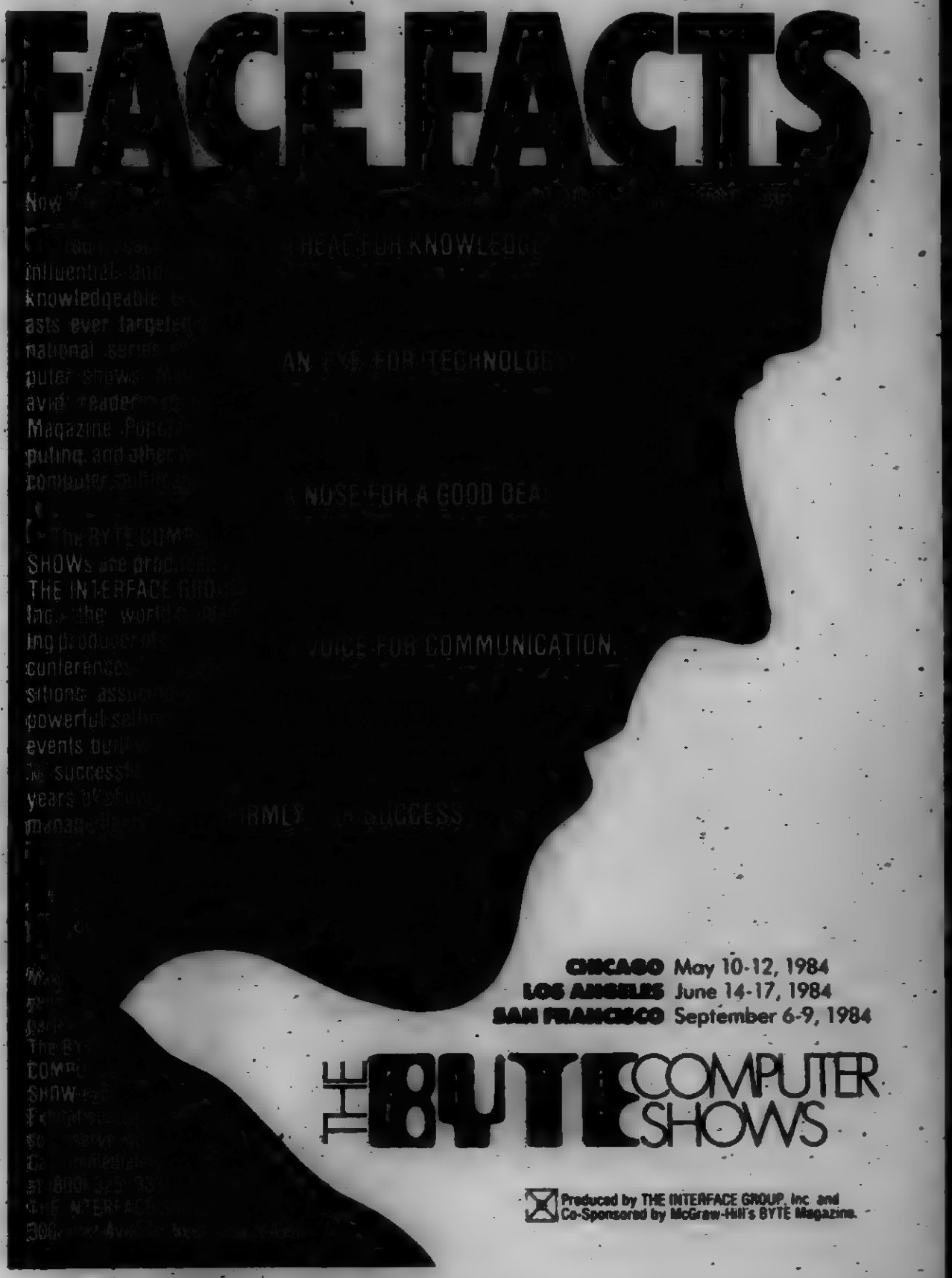
A user should not be expected to learn a new language (nonprocedural or otherwise) for defining the information he requires.

Fourth-generation languages for DP professionals — application generators — will benefit from architectural attention to the same human factors. In addition, the comparison of an application developer to an engineer identifies another key ergonomic factor. The development of an on-line transaction processing application involves a number of distinct tasks:

1) User requirements definition.
2) Initial screen format definition.
3) Data requirements definition.
4) Translation of 1 and 2 into "control blocks."
5) Procedural code generation.
6) Controlled interactive testing.
7) Installation into production environment.
8) Documentation.

The "application engineer" should be able to reference common components such as a data base segment layout from a "parts data base." The application generator should permit the developer to proceed through the various tasks without interruption. Ergonomically, fourth-generation language must provide a workstation environment. Ideal from ADR is a good example of this concept.

While the workstation environment is also applicable to end users,



IN DEPTH/FOURTH-GENERATION STRATEGIES

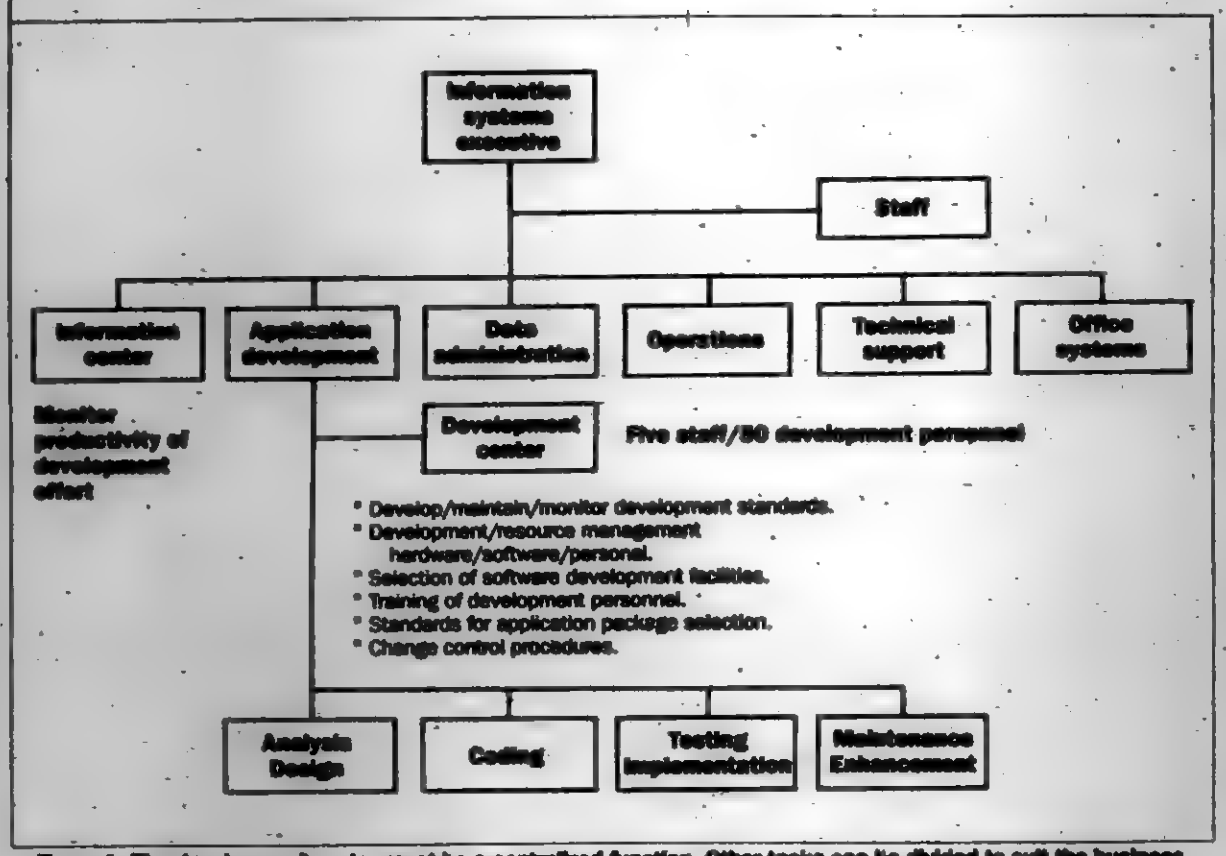


Figure 1. The development center must be a centralized function. Other tasks can be divided to suit the business.

it should be a prerequisite for a fourth-generation language geared to the professional DP developer.

In reality, business objectives, human factors and technological integration are one in the same issue: a management strategy for fourth-generation tools. More accurately, it is a strategy for more productive information processing activities.

A final case study demonstrates the interrelationship of business, ergonomic and technological issues. Senior management of a financial institution commissioned a corporatewide productivity improvement project. MIS was instructed to take the lead in the effort and focus attention on its own operation. A DP staff attitude survey indicated that development personnel felt severely underequipped to do their job. The battle cry was: "We need a fourth-generation language!"

In the background was an overall employee feeling of "occupational claustrophobia." In a corporatewide survey, 89% of all employees indicated the working environment was an inhibitor. It had become a business issue because of very high turnover. Fifty-six percent of management personnel indicated that availability and accuracy of information was a problem.

MIS management was convinced that a programmer productivity system was a necessity. A consultant was retained to perform a productivity audit and recommend a specific application generator.

The consultant reviewed the work habits of development personnel. A common problem surfaced. Design review meetings with end users were held in cramped conference rooms or in the cafeteria. Programmers had to travel long distances to find an unused terminal. In several areas, six to 10 terminals were located in one small room with little or no desk space. In most cases, the room had no windows (at least none were visible through the dense smoke).

The consultant's study concluded that the overall work environment must become more sensitive to human factors. Meeting areas were established specifically for design reviews. The technical staff's work area was redesigned. Gradually, a migration to an application generator and an end-user fourth-generation language was undertaken.

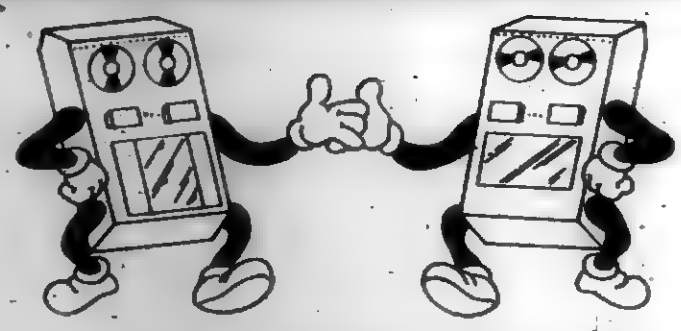
The environment is now ergonomically sound. The application generator selected is terminal-intensive. MIS management recognizes this fact, and in line with the environmental improvement program, the majority of development personnel have a dedicated terminal available.

End users are not particularly self-sufficient. An "end-user computing facility" (information center) has been built and staffed with full-time DP personnel trained in the use of the end-user fourth-generation language. The technicians help the users, being careful not to become a new breed of programmer.

The facility is located next to the data administration group. Data analysts were frequently involved in first-time consultations with users of the fourth-generation language. Data availability is addressed before commitments are made to a user and before a user begins to demand that which is not readily available.

A year after the migration began, the major problems identified in the

OUR SWITCHES MAKE YOUR IBM SYSTEMS WORK LIKE A TEAM!



If you have more than one IBM or plug compatible processor, Digital can help you get the most for your hardware investment. Our switches allow you to achieve backup and peripheral configuration flexibility at a fraction of the cost you're probably thinking.

Whether you have two processors or more, Digital has a switch to suit your requirements.

- Model 4101 The lowest priced matrix switch on the market.
- Model 3421 The only manually operated channel switch in the industry.
- Model 3403 A remote controlled channel switch designed for underfloor installation.

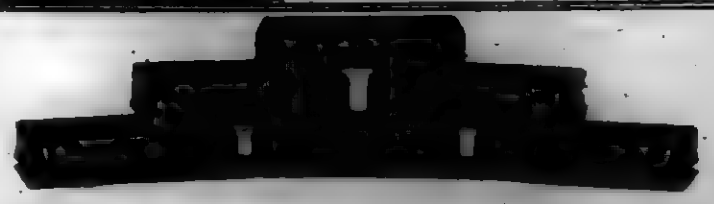
DIGITAL CONTROLS

2779 Orchard Run Road • Dayton, Ohio 45449 U.S.A. • (513) 435-5455
Dallas 214-669-0089 New York 201-585-9416

*Registered Trademark

SWITCHING TERMINALS A PROBLEM?

WTI has a lineup of low cost solutions...RS232 Switching Devices!



A/B Manual Switch $69
End the hassle of plugging and unplugging data cables. Manual Switch lets you manually switch between two RS232 devices and a common device such as a Modem and a Printer sharing a Microcomputer.

T16-41 4 Port Push Button Switch $295
Switch ports electronically from the Terminal by pressing a button instead of flipping switches on a common A/B Switch box. Selectable, operating modes include—equal priority lockout, multiple and single port select.

CAS-41 4 Port ASCII Code Activated Switch $345
Your Computer may select one or any combination of up to 4 RS232 ports by a user selectable code sequence.

CAS-161 16 to 64 Port Code Activated Switch $795
Your Computer may select between any one of 16 ports by a two character ASCII code sequence. The unit is field expandable to 32, 48, or 64 ports.

SMRT-1 8 Port "Smart Switch" $695
This flexible microprocessor controlled 8 port switch allows a user on any port to communicate with an RS232 device on any other port. Up to 4 pairs of users can communicate simultaneously. "User Friendly" commands aid in port selection, port status and sign off. The unit's so smart, it even signals you when the port you wanted is no longer busy! Each port can be configured for DTE or DCE by pressing a button.

PSU-41 Printer Port Sharing Unit $395
Allows up to 4 CRTs to share one Printer automatically without software changes! The PSU-41 scans each CRT and locks on until that output has been sent to the Printer, then rotation resumes.

wti western telematic inc.
5436 E. Anne St., Santa Ana, CA 92704 • (714) 979-6868
Outside California call toll free (800) 854-7226

attitude survey have been overcome, as reflected in a new survey.

Backing up management

In addition to the technology being considered from a human perspective, a management strategy must also include clearly defined organizational responsibilities for fourth-generation tools. If the recommended subdivision of fourth-generation languages is applied, then application development centers and information centers become natural "homes" for each category of fourth-generation language.

Without the subdivision, the application centers may end up "competing" with information centers for new tools. Generally, application generators are best suited to the former environment, information generators to the latter (end-user oriented) environment.

These organizational entities are also essential in a human factor-oriented fourth-generation strategy. Application development center and information center "consultants" must realize that marketing the new tools is as important as, if not more important than, understanding the new tools.

A programmer will accept an application generator much better if the application development center consultant understands the tool and is sensitive to a programmer's uneasiness with the new technology.

As with any new technology in a business environment, an organizational entity must be assigned the responsibility for the ongoing support of new tools. Without this responsibility, a management strategy may be disabled by the very tools on which it is based.

Complementing technologies

It is often difficult to separate human factors from management strategies as fourth-generation languages are investigated. Simply being conscious of one may lead to the other. Another approach, if ergonomics and strategies have been overused in your environment, is to consider implementing techniques along with the new tools that together will define a fourth-generation methodology for information systems development.

Prototyping is perhaps the most publicized fourth-generation methodology. At its most fundamental level, it is a technique for more effective end-user information requirements definition. Successful implementation of the technique, however, requires a balanced emphasis on the three elements that have been the focus of this discussion — business orientation, ergonomic sensitivity, technological integration.

By definition, a prototype is the first thing or being of its kind, an original working model. Prototyping, then, is the development of the original, working model. Clearly, the development of a prototype requires at least three components:

- A statement of requirement — what is the model to do?
- "Manufacturing resources," which facilitate the engineering of the prototype.
- An environment for testing the "first thing or being of its kind" which approximates, if not duplicates, the working environment of the end product.

The development of simulations and prototypes is a design catalyst. The techniques result in tangible entities which translate concept into requirements into general design into detail production specifications. In a past implementation environment, the techniques are valuable control points for maintenance and redesign.

This process is an engineering life cycle. In theory, it is the way in which data processing systems are built. "Third-generation" system development life cycles suffered from too much preaching about and too little practice of:

- User-defined and approved system requirements.
- User participation in design reviews.
- Controlled development, for instance, program walk-throughs.
- Change control procedures to avoid unwarranted "corrective design."

In reality, technological and economic barriers inhibited the generation of simulations and prototypes in conventional operational business system development. The system development life cycle became more and more bureaucratic as organizations attempted to control the process better and assure a higher quality product.

In reality, technological and economic barriers inhibited the generation of simulations and prototypes in conventional operational business system development.

The system development life cycle became more and more bureaucratic as organizations attempted to control the development process better and assure a higher quality end product.

The promise of fourth-generation languages? A cost-effective means of implementing the simulation and prototyping concepts.

For the on-line components of a typical order processing application,

PICK UP WHERE IBM LEAVES OFF.

you pick up CORONA.
Because we give you everything you've ever wanted in an IBM[1]-compatible PC and more. For a great deal less.

COMPATIBLE AND MORE.

Our systems run all software that conforms to IBM PC programming standards. And the most popular software does.

We deliver twice the memory, with room for eight times as much.

We deliver a fast-access 320K floppy drive, a communication port and an improved IBM PC keyboard with indicator lights.

Our systems include high-resolution monitors (12" desktop, 9" portable) for crisper, cleaner displays, and both have built-in high-resolution graphics (640 x 325).

You get a complete system, ready to go to work.

MORE VERSATILITY.

With all the necessary features built into the main unit, the four expansion slots can be used for your special needs. For example, color or our optional 10MB hard disk.

software gives you ... porary disk-type storage that works many times faster than disks.

PLUS SOFTWARE.

Our systems come with the operating system: MS-DOS.[2] A programming language: GW BASIC.[2] A training course: PC Tutor.[3] A professional word processor: MultiMate.[4] Plus DOS utilities and demonstration programs. Or you can get the p-System[5] from N.C.I. and write or run portable Pascal packages.

ALL FOR A GREAT DEAL LESS.

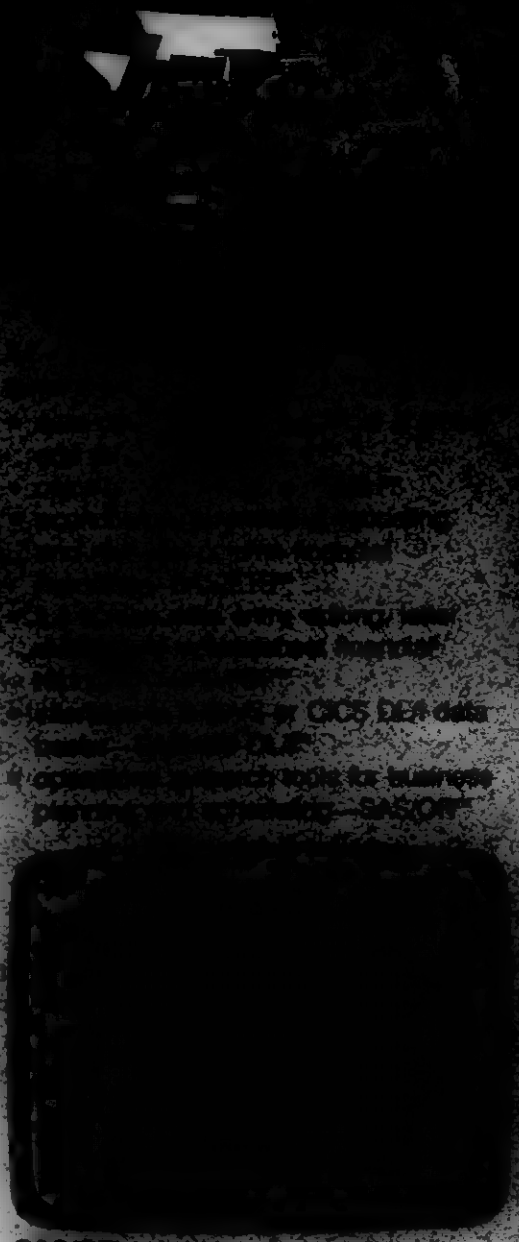
Even with all the extra features and performance, our systems still cost significantly less than the equivalent IBM PC.

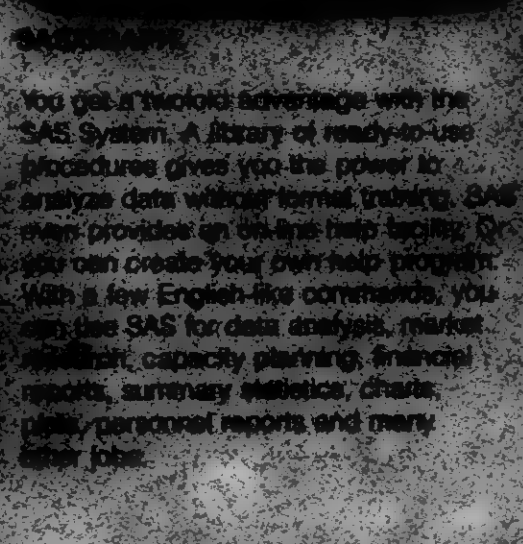
Drop by your nearest CORONA PC dealer for a very convincing demonstration. Or contact us at 31324 Via Colinas, Westlake Village, CA 91361. (213) 991-1144 or (800) 621-6746 toll-free. Telex 658212 WSLK, in Europe 76066 CDS NL.

©Corona Data Systems 1983. 1. TM International Business Machines. 2. TM Microsoft. 3. TM Comprehensive Software Support. 4. TM Softwood Systems. 5. TM University of California.

corona data systems, inc.

SAS...
Power and Flex
to Meet All You





SAS/CPE

You get a tactical advantage with the SAS System. A library of ready-to-use procedures gives you the power to analyze data without formal training. SAS even provides an on-line help facility, or you can create your own help program. With a few English-like commands, you can use SAS for data analysis, market simulation, capacity planning, financial reports, summary statistics, charts, plots, personnel reports and many other jobs.

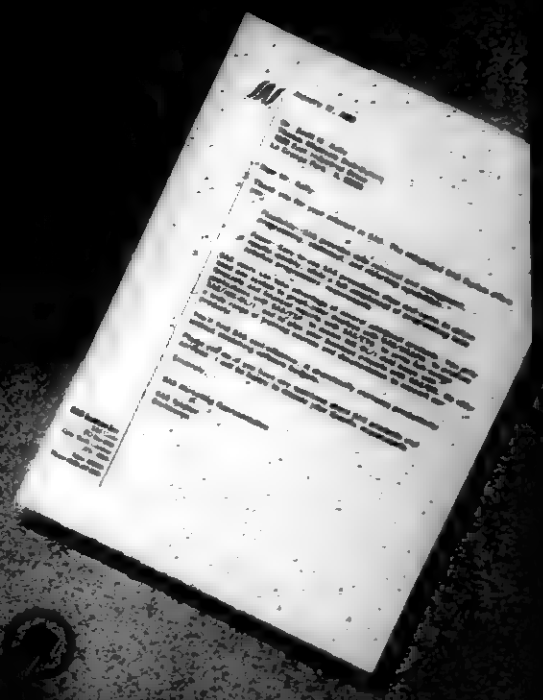
SAS/ETS

SAS/OR

SAS is the registered trademark of SAS Institute Inc., Cary, NC, USA. [illegible] indicates USA registration of SAS Institute Inc. while is a trademark of Digital Equipment Corp., Maynard, MA, USA. Copyright © 1986 by SAS Institute Inc.

Available for IBM, DG ECLIPSE and DEC VAX

ibility
r Needs



Want a report the SAS System can't run on Cullinet Datapacket VAX? It's not easier.

You get the same benefits of the SAS System on Cullinet as on mainframes. To see for yourself, take advantage of our free trial.

[illegible] Group for the past seven years. In its latest survey, SAS was one of the only two software packages to receive this honor.

The best is available and portable. At a price you can afford.

for example, a simulation should be developed to refine user requirement statements and to establish an initial architecture for implementing the application. The simulation is developed interactively, focusing initially on external capabilities and then proceeding to processing flow. User involvement in the simulation process is key.

However, there is a catch-22 to simulation. Users see what they want and they want it delivered quickly. But the simulation isn't a working system. Do you bore or intimidate your users with the necessity for detailed program specifications, data normalization and data base design? No — you move forward with the application engineering effort (see Figure 2).

Prototype development follows the simulation effort. The detail design of the application begins to take shape. But the prototype begins to deliver basic functionality to an end user. Once the prototype has been implemented and perhaps refined, a detail design can be "frozen." Production application development can then begin. This might involve fine tuning the current prototype. In certain cases, it might involve a major effort to produce an application that will operate efficiently in high-volume processing environments. The prototype typically will not involve integration with other major applications.

"Application engineering" is a reorientation of a third-generation development life cycle that incorporates the distinct techniques of simulation and prototyping. The benefits? Applications that can be engineered faster with fourth-generation languages, with a higher degree of end-user satisfaction and business impact as a result of the emphasis on user defined requirements.

Skepticism about the feasibility of these techniques arises from two major misconceptions. The first is that in a typical IBM mainframe environment, there is not a single software product that enables the implementation of the simulation/prototyping techniques. The second is that the techniques are not applicable to large on-line data base systems; the misguided assumption is that prototyping is a euphemism for end-user computing.

Products such as Ideal and IDMS clearly offer the promise of fourth-generation languages to major operational system development projects. Benefits will be attained based upon a carefully directed use of the technology. Prototyping in this context is a strategy for the successful use of fourth-generation products.

If you work in an IMS installation, don't despair. There are products that enable the implementation of these techniques.

The subdivision of "fourth-generation language" into applications generators and information generators is directly related to a successful implementation of simulation/prototyping. When functionality, efficiency and long-term viability are the dominant business design criteria for a major information system, a formal, rigorous approach is mandatory. Application engineering with a heavy dose of simulation and prototyping mixed with conventional techniques is such an approach. A fourth-generation language application generator will be the enabling technology.

When discussion of a new information system centers on "end-user involvement," "throw-away system," "decision support" and "ad hoc specifications," prototyping is not a miracle solution. An information generator will probably be the enabling technology. In this context, a rigorous methodology is not required and, if applied, probably would be an inhibitor.

Prototyping is synonymous with a management strategy for effective requirements definition for major business information systems.

If prototyping is casually embraced as a replacement for third-generation structured techniques and bureaucratic system development life cycles, then it will remain a mystery if not give way to mayhem. To be sure, the fourth-generation tool will be blamed if productivity does not improve: "The tool just wasn't the right one for prototyping — the end user couldn't figure out how to use it." The strategy for fourth-generation language must include a revised approach for requirements definition. Prototyping is a technique for that.

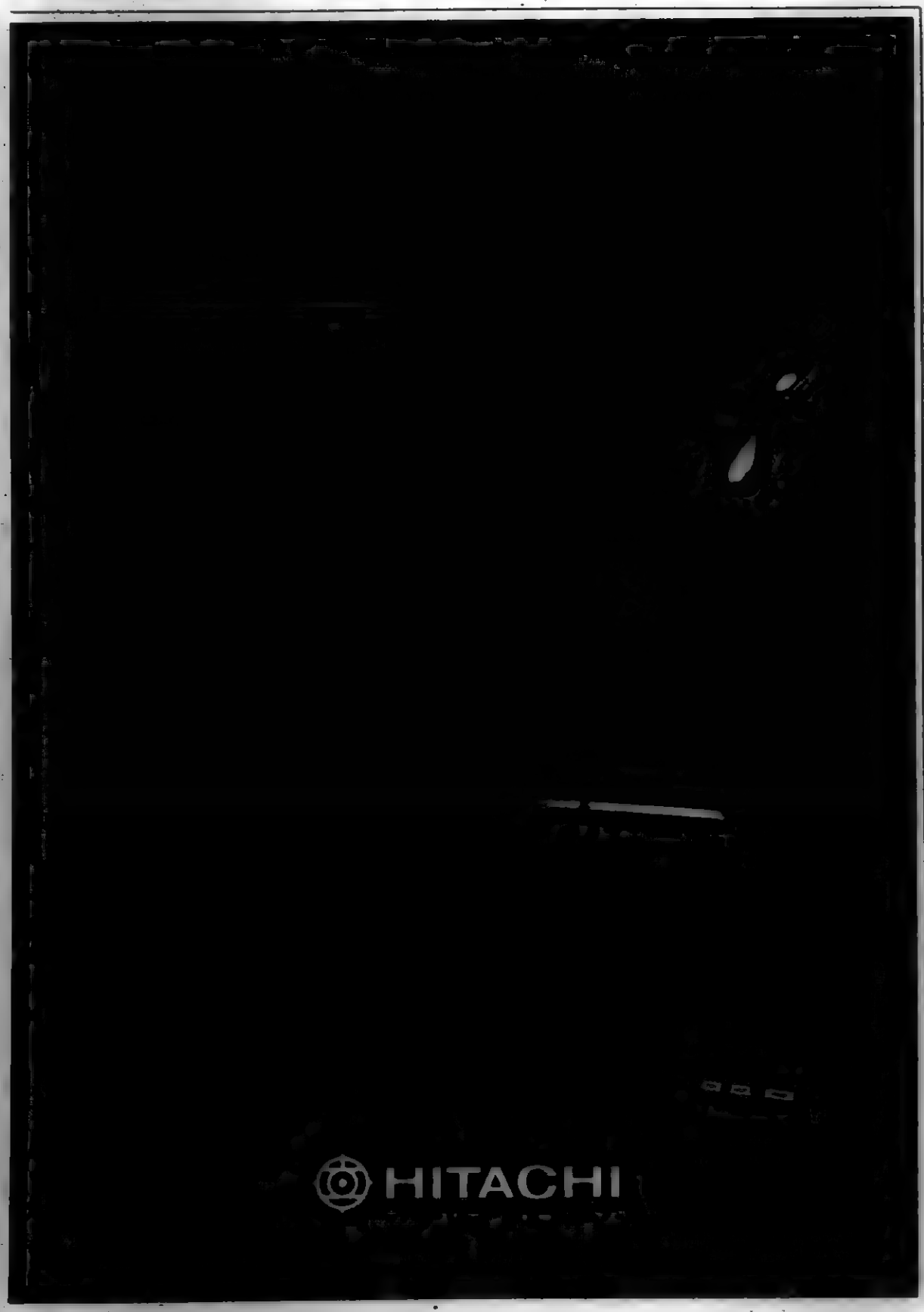
The ability to develop prototypes becomes another evaluation criterion. But prototyping will involve different characteristics in transaction processing vs. information-oriented applications. Seldom will an application generator produce prototypes for end-user-oriented applications. The reverse is also true.

Degrees of development

It must also be realized that prototyping will be used in conjunction with conventional approaches to systems analysis and design. In some cases, a developed prototype may deliver 95% of the required processing. In other cases, it will only scratch the surface. In the latter case, prototyping must be viewed as the tip of an iceberg — a fourth-generation systems development life cycle. In this context, "prototyping" is synonymous with a management strategy for fourth-generation languages.

What then are the keys to the resolution process that will translate fourth-generation tools into business benefits?

First, commit to the development of an information systems technology strategy. Establish at least one full-time resource (call the person



"director of technology assessment") with the ongoing responsibility for the strategy. The person will not be an expert in every area of technology, but through research, will identify technology alternatives and then look to specific areas within the MIS organization to assist in detail evaluations.

Second, classify and understand the technology. The primary technology focus of this discussion was on fourth-generation languages. Subdividing those languages into application generators and information generators permits a more manageable evaluation of the facilities and requirements of specific products.

Third, do not overlook the fact that the new tools may require new techniques to guide the initial and ongoing utilization. Techniques such as prototyping reinforce the subdivision of fourth-generation languages. Prototyping may be another base for end-user computing if the right tool is selected for information generation. In other cases, prototyping will require a transaction processing generator to facilitate requirement definition for production applications.

Fourth, and perhaps most important, consider the people who will use the application and information generators. Involve them in the selection, train them in the implementation and monitor and support their utilization of fourth-generation language. The application development center and information center are the functional areas that will translate the technology strategy into a tactical plan for the effective use of fourth-generation language.

Fifth and finally is an issue that has been transparent to the discussion thus far. In a specific organization, basic business data is relatively stable, while associations between data can be dynamic. New information requirements may involve different levels of summarization and/or different combinations of the basic data. The development of a data architecture for a business implements the data base concept in a very pragmatic way. The data architecture will identify what data is necessary for a business, where it is and how it is used and will assist in establishing controlled access to data from a wide variety of processing tools, including fourth-generation languages.

About the author

Paul R. Hessinger is director of Advanced Technology Research for Computer Task Group, Inc. in Buffalo, N.Y. He conducts approximately 125 professional seminars annually. Among those last year were "Programmer of the Future: Person or Machine," a featured presentation at the International Association for Systems Management Conference in Boston, and "The Fourth Generation Blueprint for a Data Base Environment," for the International Data Processing Management Association conference in Baltimore.

Hessinger lectures for organizations such as the Gartner Group on strategic planning and the future direction of information systems technologies.

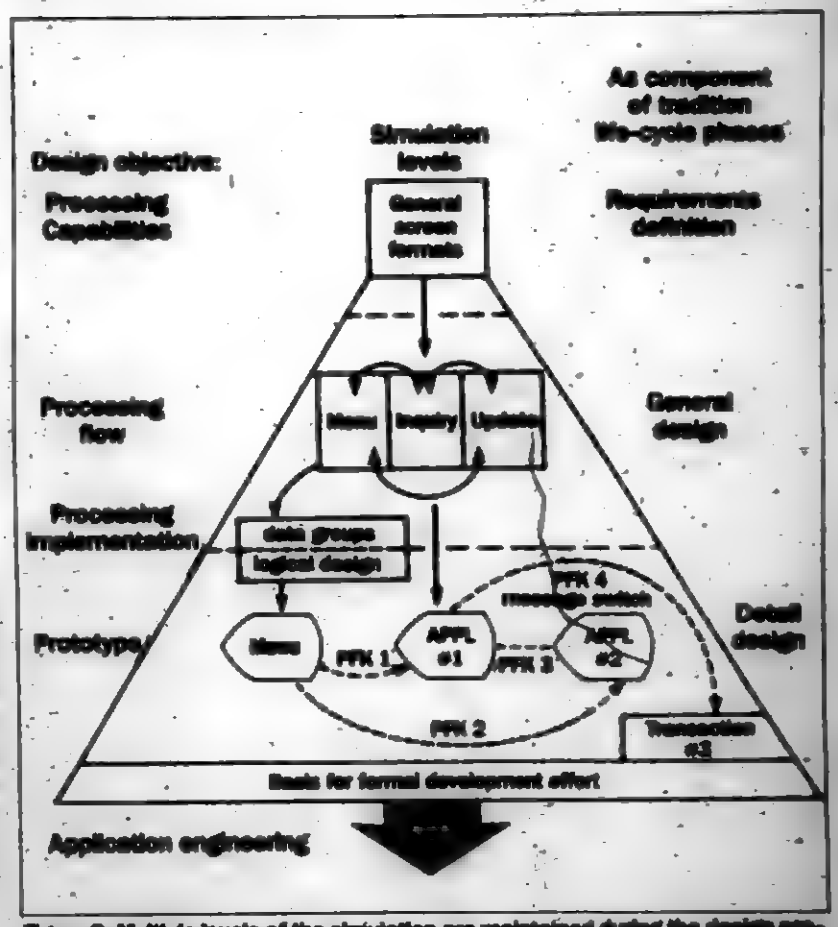


Figure 2. Multiple levels of the simulation are maintained during the design process. Throughout the development life cycle, any requested changes can be evaluated at the highest level to assess impact fully.

"If you want to do OEM computer business in the U.S., you'd better go to the Invitational Computer Conferences in Boston, Dallas, Minneapolis, Orange County, Washington, D.C., Los Angeles, Ft. Lauderdale, ...We do!"

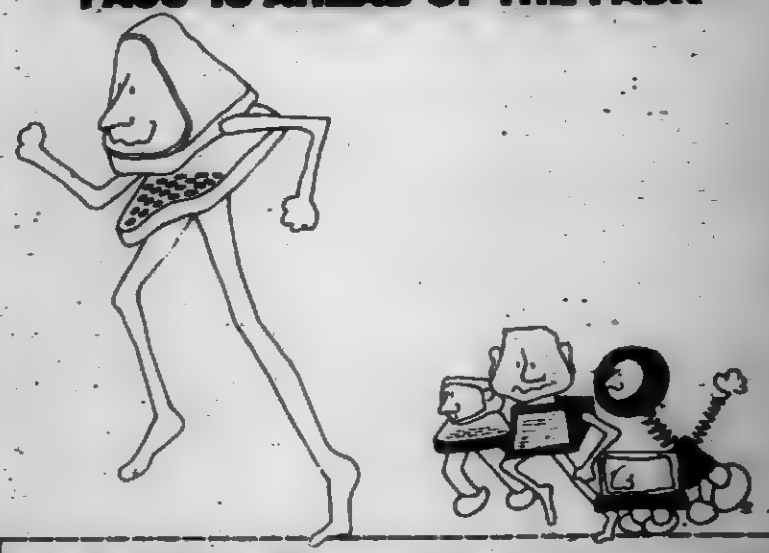
Experienced marketing management knows that the best way to reach the technical decision maker/buyer is to meet him where he lives and works, demonstrate operating equipment and provide him with the technical information he needs. Over the past 12 years successful marketers have found the Invitational Computer Conferences to be the most cost-efficient, effective method of covering their U.S. computer industry customer base.

The exclusive, one-day, OEM conferences will be held in ten major market areas throughout the United States and are attended by a select, invited audience of OEM's, systems houses and quantity end users. Guests can attend a variety of technical seminars and view operating displays of the newest computer and peripheral equipment. The informal setting makes it easy to meet with potential customers one-on-one and the simple tabletop displays keep exhibit costs at a minimum.

Sept. 13, '83	Newton, MA
Sept. 29, '83	Minneapolis, MN
Oct. 18, '83	Valley Forge/Philadelphia, PA
Oct. 20, '83	Washington, D.C./Vienna, VA
Nov. 8, '83	Houston, TX
Nov. 10, '83	Dallas, TX
Jan. 9, '84	Irvine, CA
Feb. 7, '84	Ft. Lauderdale, FL
Feb. 28, '84	Los Angeles, CA
Mar. 1, '84	Palo Alto, CA

For more information:
B.J. Johnson & Associates, Inc.
3151 Airway Ave. #C-2
Costa Mesa, CA 92626
(714) 957-0171

FOR VAX™ RESOURCE ACCOUNTING, PACS™ IS AHEAD OF THE PACK



The competition isn't even close. PACS is so good, it's the only resource accounting package in DEC's™ EAS library. Here's why:

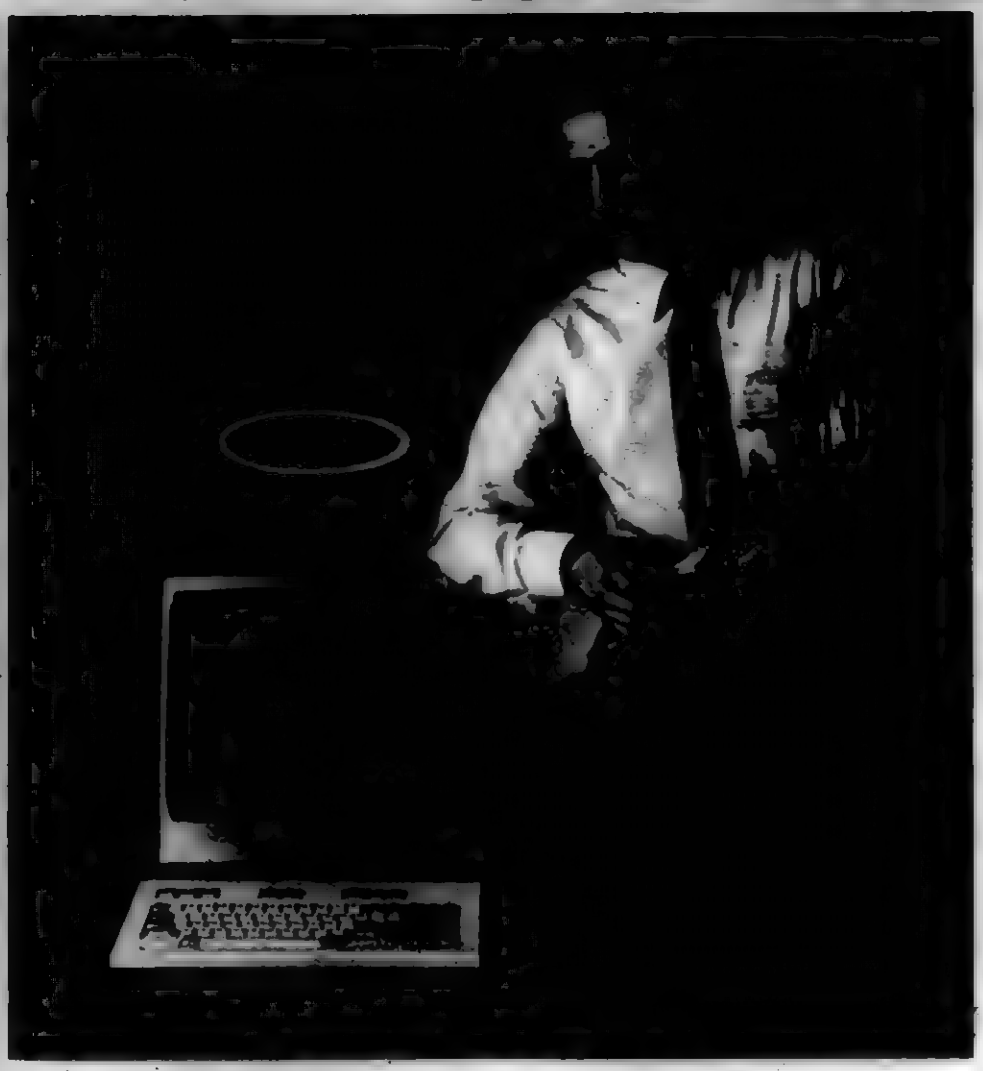
- Flexible billing algorithms
- User budgeting and port speed accounting
- EZLOG™ for true 3-level reporting by account, project and user

Name _____
Title _____
Company _____
Address _____
City _____ State _____ Zip _____
Phone (_____) _____

SEND COUPON NOW FOR COMPLETE DETAILS ON ALL THE PACS BENEFITS.

STI Signal Technology, Inc.
5951 Encina Road, Goleta, CA 93117 (805) 683-3771 Outside California call toll-free (800) 235-0237
TWX 910-334-3471
VAX and DEC are trademarks of Digital Equipment Corporation

HOW THE TERMINALS THAT GIVE YOU SO FEW PROBLEMS CAN WIND UP GIVING YOU NONE AT ALL.



While we at Teletype Corporation like to talk about our terminals' remarkable record for reliability, we have to admit that every once in a while you just might have a problem with one.

But if you contract with Teletype's Product Service Organization, getting good service is no problem at all. That's because no one can service our full line of CRTs and teleprinters as well as our service technicians. Each one of them is a company-trained, job tested professional who must continually meet our expectations—and yours.

Help is never more than a phone call away since our technicians are on-call 24 hours a day, 7 days a week. And with our network of 100 offices nationwide, we're able to provide fast response time, even to remote areas. You can contract with us for response times as low as 2 hours, or less, as your needs dictate.

But at Teletype, we feel there's something more important than fast response time. And that's fast restoral. So when our technicians call on you, they'll have the necessary test equipment and original Teletype® parts to get your terminals up and running in no time flat.

We'll even help solve problems before they occur with scheduled preventative maintenance. You can also choose our installation service option that includes everything from getting your terminals on-line to user orientation. It's all a part of our Full Service Maintenance Agreement.

So to keep your problems from becoming big problems, write Teletype Corporation Product Service Organization, 2330 Eastern Ave., Dept. 2800-A Elk Grove Village, IL 60007. Or call toll free at 800-323-4226, ext. 300. (In Illinois, 1 800 942-4192, ext. 300.)

TELETYPE: VALUE SETS US APART.

©1984, Teletype Corporation.
"Teletype" is a registered trademark and service mark of Teletype Corporation.

AT&T
Teletype Corporation

IN DEPTH

Roles DP managers must play

A manager must wear several masks — adopt roles — to be successful. He needs to improve his communication skills as if he were perfecting a hobby or sport. There are three masks he should learn to assume, as should any entry-level manager and probably senior executives as well.

By Marsha Sinetar

William James, considered by some psychologists a more accurate thinker than Freud in defining human behavior, wrote decades ago that if an individual wants to change his personality, he has to change his actions.

Similarly, a manager who wants a better chance at success will benefit from *acting as if* a given role were natural. Large rewards come from having an adaptable personality.

Successful managers communicate like natural, if not born, actors. However, most people trained in technical fields have not learned the finesse and authority of speaking, listening to or directing a group. Being "at home" with others is not necessarily an inborn trait. The technical professional must learn a new cluster of communication skills, which takes time, patience and a lot of practice.

Management communication, linked to the notion of life-as-performance, is not a new concept. However, as the qualifications for professional managers expand beyond just a financial strategic planning profile to include "people skills," the idea is receiving new attention. Now communication skills and management success are linked more tightly than ever.

Italian psychiatrist Robert Assagioli observed, "One of the most important and illuminating aspects of the analogy between acting and life concerns the relations between the personality of the actor . . . and the characters he sequentially impersonates, his 'mask' in a psychological sense."

Managers must play several roles in order to be successful. If their masks reflect only one side of their personality or falsely portray a warm, caring nature, they are miscast, distrusted; their attempts at communication fall flat. When employees feel the boss is a phony, his behavior is often a sign he is unsure of

IN DEPTH/ROLES MANAGERS PLAY

what role to play.

A manager needs to improve his communication skills as if he were perfecting a hobby or sport. In fact, there are three basic masks he should learn to put on.

Mask 1 — The manager as administrator. How well each department head orchestrates subordinates to achieve scheduled goals makes the difference between mediocre and outstanding performance in this role. Administration is the nuts-and-bolts mask, the technical, organizing, planning and budget management part a manager must play.

Managers must communicate about progress, priorities and schedules. These demands require precise communication, an ability to talk about how each person's job fulfills departmental commitments. This kind of discussion sets the stage for talking about productivity, how the group and/or individuals can accomplish team goals in a systematic and orderly way.

Most managers are pretty good at the technical and organizational aspect of their roles. Retired military officers wear administrative masks particularly well, as do others who are structured, rational and self-disciplined.

A close focus on details helps employees maintain direction — time cards, expense reports, delegation of authority, responsibility and so on. For the manager-as-administrator role, communication is relatively straightforward and objective. These messages can be put on paper, charted and graphed.

Because administrative communiques can be easily measured, the role requires an accurate reporter of facts.

Other key management roles may be more complicated, thus more easily botched. Rarely are administrative managers successful in senior management roles unless they are also adept at playing other parts. If, however, an administrative type owns the company, then everyone else must be a good actor.

Mask 2 — The manager as leader. Managers must not only be good leaders; they must also act like leaders. Few are gifted enough to play this role without training, but not many organizations provide such development opportunities. This lack probably accounts for many of the ills industry has experienced in the past decade — labor-management problems, high employee turnover and apathy, absenteeism, lack of team spirit and others.

To understand the manager-as-leader role requirements, it is helpful to know just what a leader is and does. Oddly, it is the leadership dimension of a manager's performance that industry has most frequently overlooked, underdeveloped and misunderstood. All too many companies promote people into supervisory positions and then into upper management roles without ever considering their leadership talents.

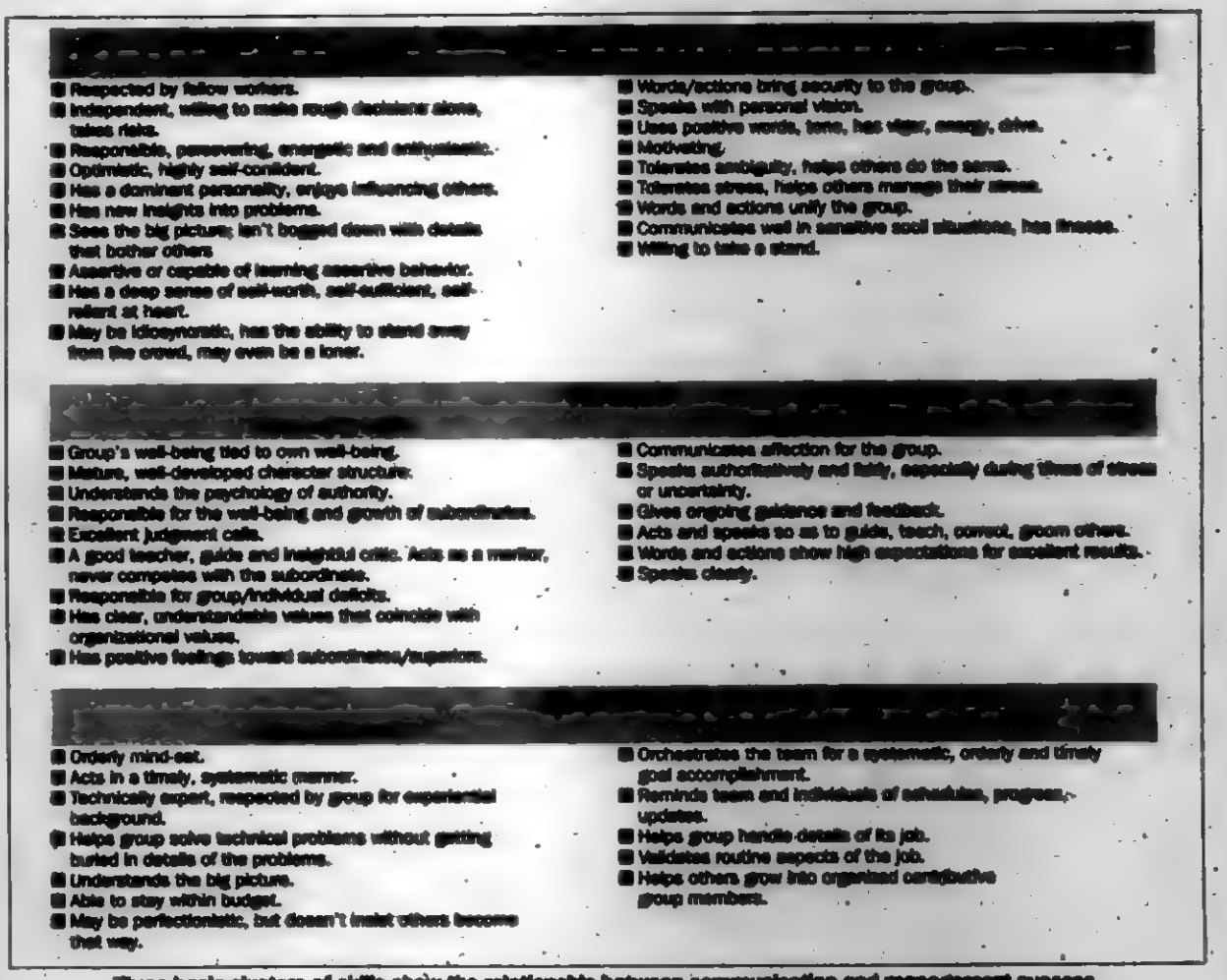
Seniority, technical expertise, politics and other irrelevant criteria are the usual factors in promoting people to "starring roles." I've often heard young enthusiasts from my corporate client organizations say they are "due a promotion" because they've been around a given period of time. Companies that market the "due-a-promotion" policy based on longevity are asking for mediocre managers.

There are at least 20 personality traits that go into a leader's character structure, involving maturity of thinking, interpersonal skills and outward behavior. Two years ago, I was on a select panel of social scientists and educators gathered by the California State Department of Education to see if we could identify the characteristics and behavior of leaders.

Leadership was determined to depend on both character structure and on the leader's situation. Leaders were identified as people whose actions and words brought solidity and cohesion to a group. Leaders were found to be skilled at pulling people together — nonleaders, on the other hand, had a disruptive effect. The nonleader increases the anxiety of the group and divides it. Anyone who has ever heard his superior communicate a new company policy in a lukewarm, apathetic or mechanical fashion understands how easy it is to separate a group from organizational goals or values.

To play the leadership role correctly, it is not enough to have a leader's personality. Because leadership is dependent upon the situation a manager is in, it is necessary to act and speak in leader-like ways in specific work-related arenas. Leading does not necessarily mean being popular (doing or saying the expected, approved-of thing). It does mean that managers who can act like leaders bring long-range unity and cohesion to all elements of their departments.

Executives possess varying degrees of talent when it comes to playing the leadership role. Some



Three basic clusters of skills show the relationship between communication and management success.

Here are a few good reasons why you should make Local Data your protocol converter company.

Local Data's comprehensive line of local and remote protocol converters have been used around the world to make async-to-IBM communications simple and economical.

DATALYNX™/3274.
DataLynx™/3274 remote async ASCII protocol converter supports SNA/SDLC or BSC protocols. 80 types of ASCII async terminals can emulate IBM 3278 display stations. RS-232C ASCII async printers can emulate IBM 328X printers.

DATALYNX™/3780.
DataLynx™/3780 async ASCII-to-IBM 3780, 2780, 2770 and 3741 protocol converter supports EBCDIC BSC protocol on one channel and async ASCII devices on the other two channels. Features include transparency, mini/micro support and free file transfer program.

INTERLYNX™/3278.
InterLynx™/3278 allows the attachment of low-cost ASCII CRT terminals or p.c.'s to 3274/3276/4701 and 43XX integrated adaptor Type "A" coax ports. InterLynx/3278 enables the user to use async CRT's on IBM systems and switch to async applications under terminal control.

FILELYNX™/3278.
For micro-mainframe file transfers.

INTERLYNX™/3287.
InterLynx™/3287 allows attachment of ASCII printers to IBM Type "A" coax ports or 3274/3276/4701 controller and 4321/4331 CPU's.

SNA LUI SCS and LU3 capability are standard with the InterLynx/3287. Features include parallel and serial ports and front panel set-up.

For more information call today.

LOCAL DATA · 2701 Toledo Street · Suite 706 · Torrance · CA · 90503
Telephone (213) 320-7126
Telex # 182518

Local Data

Local Data
"Your Lynx to IBM."

managers have departments beset with problems after the merger is announced. Others continue running a smooth, business-as-usual shop, even helping subordinates cope with uncertainty, ambiguity or the possible loss of a job. These people are, without exception, leaders.

Acting or talking as a leader means a willingness to be visible, authoritative and responsible. These traits are found only in people who have cut the umbilical cord with group opinion and who are able to stand alone when the going gets rough. It takes time to develop the latent leadership characteristics in the average manager's personality, especially if the manager lacks self-confidence.

Only a leader can develop leaders. Only a person who has pulled away from the crowd and has done the personal confrontation work that is a prerequisite to developing leadership skills can inspire these abilities in others.

Only a leader can develop leaders. Only a person who has pulled away from the crowd and has done the personal confrontation work that is a prerequisite to developing leadership skills can inspire these abilities in others.

Although American industry loves short workshops and one-day seminars because they are cost-effective and save time, it is highly doubtful that such sessions can develop leadership behaviors that stem from a strong sense of self. A developmental program conducted within an organization over a period of time is more likely to cultivate leadership talents, depending on who facilitates the program.

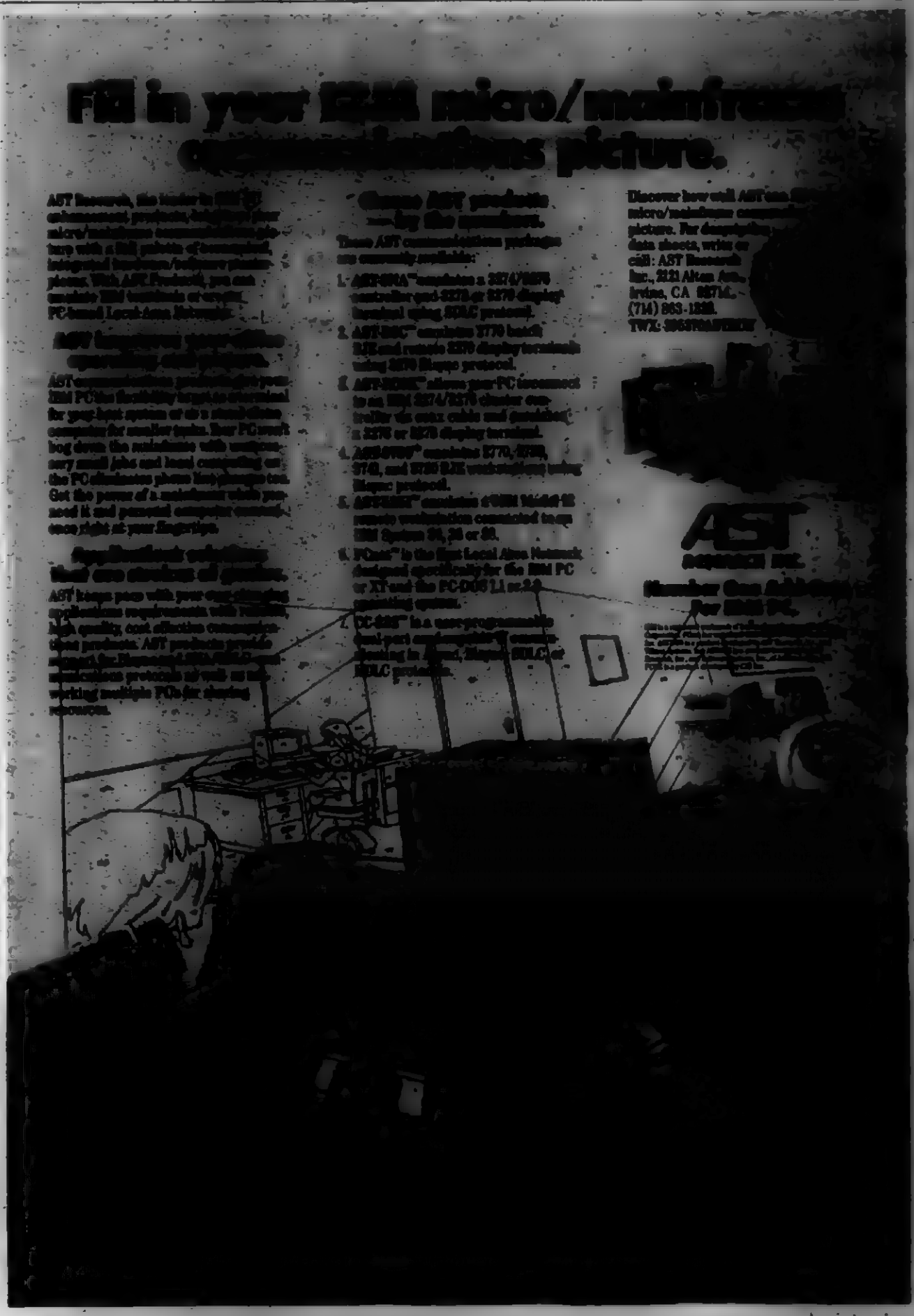
Many executives favor training programs because they are "safe." In a classroom situation — even if involved in team games or simulations — they can often camouflage their tendencies to avoid the rough issues. In the work setting, such camouflages are likely to be revealed over a period of time.

Mask 3 — The manager as parent. One of my more distinguished and intellectual clients said to me in a moment of utter frustration, "I don't want to be a parent to my staff! They're adults. But they're driving me crazy with their time-consuming bids for my attention and approval. They're acting just like my own kids, but I don't want to be their father."

This senior manager reluctantly came to understand that one of his key functions is to act as a parent authority figure on occasion. That management role is one of the masks he must wear if he is to be effective. When he needs to set standards, when he wants to correct or upgrade work or simply say how he wants a matter handled, he is, like it or not, stuck with a parenting role just like every other manager is. Like it or not, communication happens in the perceiver, and employees perceive managers as authority figures when certain types of communications are delivered.

The manager issues parental messages based on a right/wrong or teaching function. This part implies correction, appraisal, judgment, guidance and even nurturing. Reviewing performance, for example, is a routine part of management's job. But little, if anything, is said about the resulting parenting/teaching aspect involved in this procedure. Managers who have clear, understandable positions, who are willing to comment when work is marginal or when it is superior, can function successfully as parent figures.

Some managers, considered old-fashioned or even backward by peers, are successful because they firmly provide what their staff needs in the parenting domain. One of the most effective managers I've ever met is a woman with little or no formal education or management training. She also happens to be the mother of nine children who has realized on her own the connection between her role as a parent



AVOID DOWNTIME!
WATER *ALERT*
. . . FOR COMPUTER AREAS

Warns you of water leakage in sub-floor wiring areas.

- Produces a loud, intermittent alarm when activated by presence of water.
- Completely self-contained . . . no wiring, no connections.
- Early water detection (1/64" water film activates alarm) provides maximum time for corrective action.
- 24 hour per day monitoring.
- Options include remote indicator, remote flashing light, and automatic telephone dialer.

8 Models from $69 - $110
Call or write for complete information.

Dorlen Products

DIMENSION.
THE MOST POWERFUL,
MOST COMPATIBLE
PERSONAL COMPUTER
YOU CAN BUY.

Acting or talking as a leader means a willingness to be visible, authoritative and responsible. These traits are found only in people who have cut the umbilical cord with group opinion and who are able to stand alone when the going gets rough.

and what she does daily on the job with subordinates.

The manager who is unafraid of the parental role and who is adaptable to its communication requirements is the one who will probably avoid being victimized by subordinates. Employees respond to authority in much the same way they did to their parents. Office "complainers," for example, are typically people who received attention as children when they complained about little things. The office "star" learned in childhood that the surest way to get love and attention from adults was to excel.

Then there are the employees who simply detest any and all authority. Some of the most difficult employees to deal with are aggressive types or passive-aggressive types who hide their anger at authority figures but sabotage direction and correction. These employees hide so much anger that they defeat themselves and others, although on the surface they are compliant.

It boils down to this: Managers may not want to be parents on the job, but they are anyway by virtue of employees' response to authority. Managers can only be fully successful when they accept and understand the psychological aspects of the parent role and communicate accordingly.

More managerial roles

There are, of course, other roles to be played — the manager as mediator, for example. The manager with peacemaker abilities can be a star. Most managers, however, are not natural mediators. A growing number of companies retain executive mediators who can objectively help pull diverse perspectives into a whole as they solve problems. In the process, these mediators also act as role models for those who are involved in the mediation process.

Then there's the manager-as-coach role. (Like versatile actors, the manager who fits the leader/parent role would also fit well here.) A coach must be able to motivate his staff. The manager who has coaching ability can add color, vigor and vision to otherwise dull situations. Most companies, aside from sales organizations, are short of coach/manager types. This shortage is especially acute in engineering, high-tech companies and certain legal/health-care businesses where task-orientation is the focus of communication.

Organizations rarely make clear distinctions about the variety of roles and forms of management communication. Business schools have not focused enough attention on the psychological side of management. It has become increasingly difficult to translate the word "manager" into a comprehensive term with behavioral ramifications.

However, it is still possible to enlarge the conceptual framework of the management function. By visualizing the variety of roles and the many communication nuances each mask demands, managers can become more flexible in responding.

About the author

Dr. Marsha Sinetar is president of Sinetar & Associates, Inc. in Santa Rosa and El Segundo, Calif. She is an organizational psychologist, mediator and futurist. Her firm provides management advisory functions to corporate top management in human resource planning and development and mediation.

MICROCOMPUTERS

Software piracy: How serious is it?

MICRO BITS

THOMAS W. MADRON

Over the last two or three years, few issues in microcomputing have received more attention than software piracy. It is difficult to define the meaning of software piracy. A narrow and somewhat legalistic approach would suggest that software piracy is the duplication of copyrighted materials for resale. But a broader interpretation may also be acceptable, namely, the reproduction of copyrighted software for redistribution, regardless of whether it is for resale.

Aside from the ambiguity in its definition, the issue of software piracy is further confused by the software licenses implicitly accepted by those of us who buy microcomputer software. Those licenses typically stipulate that it is a violation of the license agreement to use the software on more than one machine, even if those machines are personally owned by the buyer and used by no one else. This is somewhat akin to the idea of a book publisher attempting to license a book to be read only in the front bathroom and not in the back bathroom.

It is apparent that the current copyright laws are not always relevant to computer software. This is because copyright laws come out of a tradition oriented to printed matter rather than electronic media.

For example, it is allowable under the copyright laws for small parts of copyrighted material to be reproduced for educational purposes. This is fine for printed material, but it is difficult to imagine a situation in which one could take and reproduce a small segment of machine language from a compiled computer program that would serve any meaningful purpose, educational or otherwise.

Clearly an author, or other holder of copyright, should have protection. But we have not yet arrived at a clear-cut answer to what that means in terms

See PIRACY page 92

Windowing seen gaining praise
But pundits question its usefulness

By Paul Hemenway
CW Staff

One of the hottest buzzwords in the microcomputer industry these days is multiple windowing. This feature allows users to monitor up to seven concurrent functions on a single CRT screen, often giving the user the ability to hop from one application to another and to share data among several related programs. But how useful is the feature? Microcomputer vendors will say you cannot live without it. But some industry watchers believe multiple windowing may be a passing fancy.

"Many vendors are designing windowing products, yet its usefulness hasn't been proven," noted Janice Antonellis, research manager for software and services at International Data Corp. in Framingham, Mass. "It may be useful for multitasking applications, but I am not sure it has many other practical applications."

In fact, some industry analysts contend windowing packages, like the environment offered with Apple Computer, Inc.'s Macintosh, are no better than integrated applications, which share data without requiring that a user change diskettes. The advantage is the integrated applications are all visible on one screen, requiring the user to press a function key to move from spreadsheet to word processing functions.

Other windowing software, such as Digital Research, Inc.'s Concurrent CP/M 3.1 and the package that works with Apple's Lisa system, offer multitasking capabilities. "The user can monitor one application's progress while using a different application," noted Gary Gysin, director of product marketing and manager of the Operating Systems Division at Digital Research.

"For example, a user could work on a spreadsheet while a data base sort is completed."

The number of windows offered by various packages typically runs from four to seven. But how many can the user use at one time?

"Most of our users monitor two or three

See WINDOW page 92

DM Data offers management aid

SCOTTSDALE, Ariz. — DM Data, Inc. has announced a management planning aid for scheduling estimated procurement costs for very large-scale integrated circuits.

Called the Computer-Aided Management Planning System (Campa), the planning aid consists of a workstation that utilizes an "expert" software package, which provides artificial-intelligence-like assistance for solving problems on a lap-type portable computer.

Campa follows English prompts and features a program checklist; suggested approaches; standard cost factors for planning, tooling, prototypes and circuits; projected standard time schedules; probability of success factors; and graphic comparisons of approaches.

A Campa package costs $2,850, including expert-system software (Camps I) preprogrammed in a briefcase-size portable computer; a set of instructions and notes; and a half-day seminar covering the system operations and applications.

More information is available from DM Data, located at Suite 700, 6900 E. Camelback Road, Scottsdale, Ariz. 85251.

INSIDE

Systems/T2
Printers/Plotters/T2
Board-Level Devices/T4
Auxiliary Equipment/T4
Micro Software/T6

Quality you expect, at a price you don't.

BECK DOUBLE DENSITY DISKETTES

SINGLE SIDED $2.19 ea. / $2.79 ea. DOUBLE SIDED

Our message to you is simple. If you like the quality of Dysan, Verbatim, 3M, et al, you'll like the quality of Beck soft sector

5¼" flexible diskettes. The only major difference is cost. We're less expensive. In fact, a lot less expensive.

Why does Beck cost less?

Our philosophy is: Excellent quality and reliability, at a cost that beats the jacket off other diskettes. We can do it because we (1) put our money into the product, not mega-marketing schemes and fancy packaging; and (2) sell our money-saving 25-diskette pack to you direct via a toll free order line, so you get fast, door-to-door service efficiently.

What about quality and reliability?

At Beck we take no shortcuts. You get the best because we are committed to excellence. Every diskette is manufactured to very strict quality standards.
• Full 7 Year Warranty • 100% Certified, 100% Error Free • Satisfaction, Money Back Guarantee
• Meets or Exceeds ANSI Standards

Order Now Toll Free (in New Hampshire call 924-3821)

1-800-BECK-MFG

Door to Door in 48 hrs.

Corporate Accounts Welcome • Cash/Cash Only

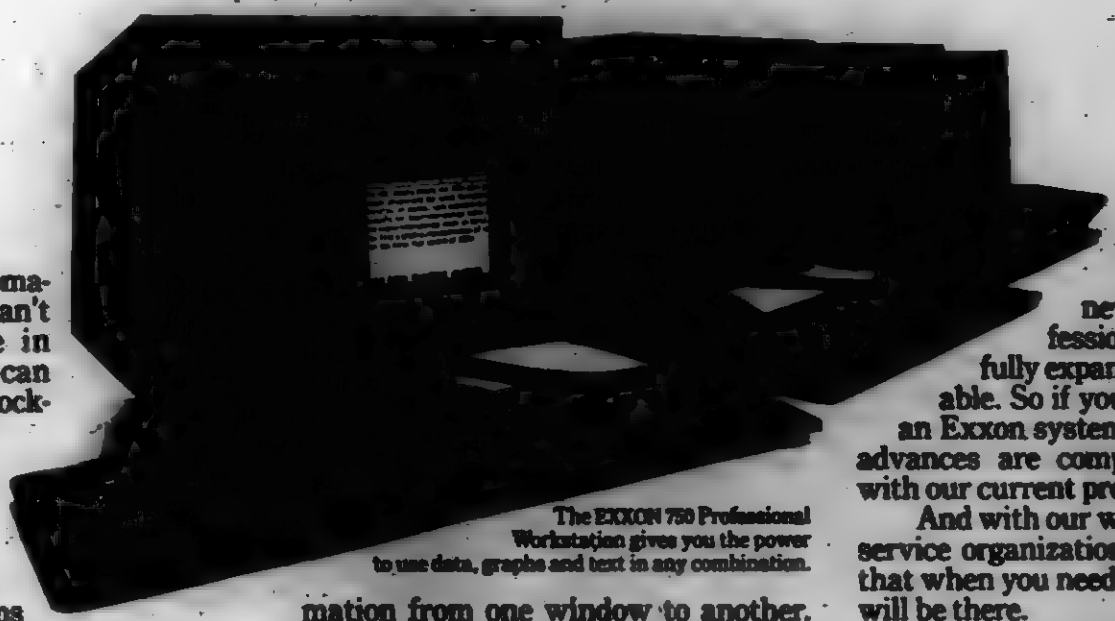
Order Toll Free 1-800-232-5834. Available in 25 pack only, plus freight. Double density, soft sector diskettes complete with hub reinforcing rings, Tyvek envelopes, color coded user labels, and nonmetallic write protect tabs.

P.O. Box 111, Main St., West Peterborough, N.H. 03468

"The office automation I bought for everyone in the corporation doesn't incorporate everyone."

Exxon stops the shock...with fully integrated office automation for everyone in the corporation.

Introducing the Exxon Business Support System.



The EXXON 750 Professional Workstation gives you the power to use data, graphs and text in any combination.

An office automation system that can't support everyone in your corporation can lead to some very shocking experiences.

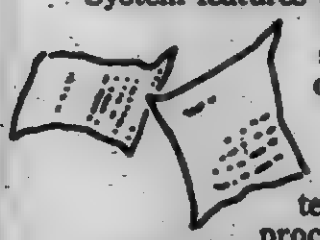
The right power to the right people

That's why Exxon Office Systems now offers more practical office automation solutions that help everyone in the corporation to be more productive. With the Business Support System, Exxon extends its fully integrated line of office automation products to support managers, professionals, and administrators, as well as secretarial staff.

Exxon puts it together for everyone with a fully integrated system — with full communications flexibility that lets you access outside data bases and interact with most mainframe computers. Without the complications. Without the shock.

Office automation for those who shape the corporation

The Exxon Business Support System features the new EXXON 750 Professional Workstation, specifically designed with powerful, integrated software that lets you move instantly from text to graphics to data processing — without changing programs.



You can divide the high resolution bit-map display into several windows and work in a number of functions simultaneously. You can shift information from one window to another. You can preview the page layout, and produce an integrated text/graphics document on our quiet EXXON 965 Ink Jet Printer. Or on a color plotter.

Best of all, the flexible design of our new Professional Workstation is ready for adaptation to the most popular operating systems and network interfaces.

Tying everyone together

At the core of the Business Support System is the EXXON 8400 Series controller. With its UNIX*-based operating system, it can integrate all levels of workstations to share information and programs. Everyone can keep track of schedules and meetings with time management and calendaring functions, whether their workstation is an EXXON 500 Series Information Processor or a new EXXON 750 Professional Workstation. And everyone can send and receive messages easily with transparent electronic mail.

An expandable, shockproof family

Exxon protects your office automation investment by making every workstation—from the EXXON 500 Series to the new EXXON 750 Professional Workstation—fully expandable and upgradeable. So if you've already begun an Exxon system, the latest Exxon advances are completely compatible with our current product line.

And with our worldwide sales and service organization, you can be sure that when you need assistance, Exxon will be there.

That's how Exxon incorporates everyone — in one shockproof family.

For more information

Call 800-327-6666, write Exxon Office Systems, P.O. Box 10184, Stamford, CT 06904-2184, or use the coupon below.

We'll be happy to demonstrate how the Exxon Business Support System can help your corporation move into the future ... without the shock.

*UNIX is a trademark of Bell Labs.

Exxon Office Systems
P.O. Box 10184
Stamford, CT 06904-2184

☐ Please send me more information about the Exxon Business Support System.
☐ Please have your representative call.

Name _____
Title _____
Company _____
Address _____
City _____ State _____ Zip _____
Telephone _____

800-327-6666 (In CT, 800-942-2525)

EXXON OFFICE SYSTEMS

The future...without the shock.

MICROCOMPUTERS

SYSTEMS

ELECTRO DESIGN, INC.
IMP-12

Electro Design, Inc. has announced the IMP-12, a microcomputer that uses IBM's PC-DOS 2.0 operating system and is compatible with the IBM Personal Computer.

According to the vendor, the 12-slot processor can handle up to two half-height drives, either floppy or hard disk.

The floppy disk drives are 5¼-in., double-sided, double-density with 500K bytes of unformatted storage, according to the vendor.

The hard disk drives are available with a 13.24M-, 26.70M- or 40M-byte capacity.

The IMP-12 CPU is Intel Corp. 8088 based and features a read-only memory resident Basic I/O that offers Microsoft, Inc.'s MS-DOS calling conventions, plus extensions for scientific and industrial applications, the vendor said.

The list price of the IMP-12 starts at $3,428.

Electro Design, 680 Rancheros Drive, San Marcos, Calif. 92069.

ET COMPUTER SYSTEMS
ET-2010

ET Computer Systems has introduced ET-2010, a microcomputer that uses a Zilog, Inc. Z80 microprocessor.

The computer features 64K bytes of random-access memory (expandable to 1M byte), a 9-in. monitor, a parallel port and a serial port, according to the vendor.

The system uses ETPM II, an enhanced version of Digital Research, Inc.'s CP/M Release 2.2 operating system. Word processing, spreadsheet, general ledger, accounts receivable, accounts payable and payroll with job costing applications are bundled with the system, the vendor said.

The system costs $1,349.

ET Computer Systems, 8161 Broadway, Lemon Grove, Calif. 92045.

ALSPA COMPUTER, INC.
MC-4010; MC-4020; MC-4035; MC-4050

Alspa Computer, Inc. announced four desktop microcomputers that can be tied into the firm's Alspa-Net local-area network.

The desktop units feature a Zilog, Inc. Z80A microprocessor, 64K bytes of random-access memory, two RS-232 serial ports, two parallel ports and an RS-422 network interface. Bundled software includes a proprietary operating system and an electronic mail package, the vendor said.

The MC-4010, with a 10M-byte hard disk drive, costs $4,495; MC-4020, with a 20M-byte hard disk drive, sells for $5,495; MC-4035, with a 35M-byte hard disk drive, costs $6,495; and MC-4050, with a 50M-byte hard disk drive, costs $7,495.

Alspa Computer, 477 Division St., Campbell, Calif. 95008.

APPLICATION INNOVATIONS
Point-of-sale system

Application Innovations announced a turnkey point-of-sale system based on the IBM PCjr.

The system features a 9-in. monochrome display, 128K bytes of random-access memory, a 40-col. printer, 370K bytes of disk drive, point-of-sale software and a cash drawer with change holder, according to the vendor.

A user can change product descriptions and prices, the vendor said.

The system costs $3,250.

Application Innovations, 1550 Old W. Henderson Road, Columbus, Ohio 43220.

MORROW, INC.
MD11 price increase

Morrow, Inc. has raised the retail price of its MD11 hard disk desktop microcomputer system from $2,745 to $2,995 because of what the firm said are unexpectedly high manufacturing costs.

"Manufacturing costs, particularly those associated with outside vendors, have been higher than anticipated," a spokesman said.

The MD11 is an 8-bit personal/business computer system based on Digital Research, Inc.'s CP/M operating system. Shipments began in November.

Morrow, 600 McCormick St., San Leandro, Calif. 94577.

PRINTERS/PLOTTERS/PERIPHERALS

FUTURENET CORP.
D1-Plot/HP

Futurenet Corp. has announced a pen plotter interface that allows engineers to plot schematics generated on Futurenet's IBM Personal Computer-based Dash-1 schematic designer on the Hewlett-Packard Co. HP 7580, 7585 and 7470 plotters.

According to the vendor, the interface was designed for producing schematics that require hard-copy output in sizes ranging from 8½ by 11 in. to 34 by 44 in.

There is a choice of roller-ball, fiber-tip or liquid drafting pens of various colors and widths, the vendor said.

The package includes the Bausch & Lomb DMP-41 plotter with pedestal and the Dash-1 driver software, according to the vendor.

Available now, the D1-Plot/HP is priced at $600.

Futurenet, 21018 Osborne St., Canoga Park, Calif. 91304.

Get big performance from your small computer for just $2.95!

Take this 5-volume Programming Library (a $76.65 retail value) for $2.95 when you join the Small Computer Book Club.

You simply agree to buy 3 more books—at handsome discounts—within the next 12 months.

1. THE BASIC HANDBOOK: Encyclopedia of the BASIC Computer Language. 2nd Ed.
By David A. Lien. Details virtually every significant BASIC word used by every BASIC-speaking computer in the world. It is the most complete collection of BASIC words ever with strategies programmers can use to convert the many different 'dialects' to their computers.
Publisher's Price: $19.95.

2. BASIC AND THE PERSONAL COMPUTER.
By Thomas A. Dwyer and Margot Critchfield. Learn to program in BASIC within eight hours. Includes: computer graphics, program development, data bases, and more. Also, many step-by-step examples of word processing, computer games, and computer simulations.
Publisher's Price: $16.95.

3. CP/M AND THE PERSONAL COMPUTER.
By Thomas A. Dwyer and Margot Critchfield. Down-to-earth explanations break CP/M into basic components for easy mastery of filing, debugging, editing, information flow, and more. Includes coverage of how to use popular commercial CP/M application programs.
Publisher's Price: $19.95.

4. THE LITTLE BOOK OF BASIC STYLE: How to Write a Program You Can Read.
By John Nevison. Challenges the reader to go beyond computer literacy to *fluency;* teaches how to write programs of less than one page, and encourages thoughtful program organization. Covers everything from algorithms to games.
Publisher's Price: $6.25.

5. DATA FILE PROGRAMMING IN BASIC: A Self-Teaching Guide.
By LeRoy Finkel and Jerald R. Brown. For both hobbyists and professionals who want to add data file programming to their computing capabilities. Includes: maintaining data files, modifying existing programs, and writing your own.
Publisher's Price: $12.95.

We'll keep you up-to-date with the rapidly growing and ever-changing world of computers... from the latest developments in software and improvements in hardware, to the newest innovations in programming techniques, and more.

A division of The Library of Computer and Information Sciences—the oldest, largest, and most respected computer book club in the world—the Small Computer Book Club gives you access to virtually every important computer topic.

MEMBERSHIP BENEFITS • In addition to getting the PROGRAMMING LIBRARY for only $2.95 when you join, you keep saving substantially on the books you buy. • Also, you will immediately become eligible to participate in our Bonus Book Plan, with savings up to 70% off the publishers' prices. • At 3–4 week intervals (16 times per year) you will receive the Book Club News, describing the Main Selection and Alternate Selections, together with a dated reply card. • If you want the Main Selection, do nothing and it will be sent to you automatically. • If you prefer another selection, or no book at all, simply indicate your choice on the card and return it by the date specified. • You will have at least 10 days to decide. If, because of late mail delivery of the News, you should receive a book you do not want, we guarantee return postage.

The Small Computer Book Club Y-AF2
(a division of the Library of Computer and Information Sciences)
Riverside, N.J. 08075

Please accept my application for trial membership and send me the PROGRAMMING LIBRARY (00555), billing me only $2.95. I agree to purchase at least three additional Selections or Alternates over the next 12 months. Savings range up to 30% and occasionally even more. My membership is cancellable any time after I buy these three books. A shipping and handling charge is added to all shipments.

No-Risk Guarantee: If you are not satisfied—for any reason—you may return the PROGRAMMING LIBRARY within 10 days and your membership will be cancelled and you will owe nothing.

Name _____
Address _____ Apt. _____
City _____
State _____ Zip _____
Which make/model small computer do you use? _____ (optional)

(Offer good in Continental U.S. and Canada only. Prices slightly higher in Canada.)

Computerworld 2/20/84

When Computerworld delivers the goods on manufacturing systems this March 26th, you'll definitely want to be there.

Ad deadline is March 9th.

In response to the increasingly heavy involvement of DP/MIS people in computer-aided manufacturing (CAM) and computer-aided engineering (CAE), *Computerworld* is preparing a Special Report that focuses on CAM/CAE, manufacturing resources planning (MRP), robotics, inventory and shop floor control.

We'll also cover the effect these new technologies are having on traditional manufacturing operations. And on the delicate relationships between traditional DP departments and the factory automation specialists.

If you act before March 9th — your products or services can be represented. To reserve space in this issue, call one of the sales offices listed below or call Ed Marecki, National Sales Director at (617) 879-0700.

To: Ed Marecki, National Sales Director
CW Communications/Inc.
Box 880
Framingham, MA 01701

☐ Please send me advertising information for *Computerworld*.
☐ Please have a sales representative call me.

Name _____
Title _____
Company _____
Address _____
City _____ State _____ Zip _____

CW3/9

COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

BOSTON/Chris Lee, Jayne Donovan, Michael Kelleher, Ron Mastro, Jim McClure, Alice Longley, (617) 879-0700
CHICAGO/Art Kossack, Chris Lee, Jean Broderick, (312) 827-4433
NEW YORK/Mike Masters, Doug Cheney, Ray Corbin, Joan Daly, Fred LoSapio, Gale M. Paterno, (201) 967-1350
ATLANTA/Jeffrey Melnick, Mike Masters, (404) 394-0758
SAN FRANCISCO/Bill Healey, Ernie Chamberlain, Theodora Franson, Barry Milione, Nicole Boothman (classified), (415) 421-7330
LOS ANGELES/Bernie Hockswender, Bob Hubbard, Bill Healey, (714) 261-1230

MICROCOMPUTERS

BOARD-LEVEL DEVICES

DY-4 SYSTEMS, INC.
DSTD-187 card

Dy-4 Systems, Inc. has introduced the addition of the DSTD-187 processor card to its line of STD bus products.

The DSTD-187 is an Intel Corp. 8088-based product incorporating the Intel 80130 RMX processor, two RS-232C serial channels and optional Intel 8087 math coprocessor, according to the vendor.

Both Zilog, Inc. Z80 and Intel 8088 bus architectures are supported. According to the vendor, 1M-byte memory addressing is supported.

The product costs $584.

DY-4 Systems, Suite 202, 1475 S. Bascom Ave., Campbell, Calif. 95008.

METRABYTE CORP.
Model PIO-12

Metrabyte Corp. has announced a parallel, digital I/O interface board, Model PIO-12, that plugs into the IBM Personal Computer XT.

According to the vendor, the PIO-12 provides 24 transistor-to-transistor and diode-to-transistor logic-compatible lines.

Other features include an interrupt input and external connections to the microcomputer's bus power, the vendor said.

The price is $89 in single quantities.

Metrabyte, 254 Tosca Drive, Stoughton, Mass. 02072.

NUMBER NINE COMPUTER CORP.
Revolution graphics board

Number Nine Computer Corp. introduced its Revolution graphics board for the IBM Personal Computer.

The board uses a NEC Information Systems, Inc. 7220 16-bit graphics coprocessor, the vendor said.

A display can use two modes: pixel and plane. With pixel mode, the user can modify a single pixel across 8-bit planes of random-access memory in one read or write operation, according to the vendor.

In plane mode, the user can modify eight pixels in a 1-bit plane, the vendor said.

The board costs $945.

Number Nine Computer, 691 Concord Ave., Cambridge, Mass. 02138.

HELIONETICS, INC.
APB-3000PC series

Helionetics, Inc. has announced a series of single-board array processors that is said to increase the computational speed of an IBM Personal Computer or look-alike.

The APB-3000PC series reportedly enables the Personal Computer to perform mathematical calculations up to 10,000 times faster than a Personal Computer not equipped with the device, according to the vendor.

It runs Fortran or Basic under IBM's PC-DOS operating system and is programmable. A high-level assembler and monitor package is also available for custom microcode development, the vendor said.

Prices start at about $2,000 for a 16-bit math integer APB-3000PC board and $4,250 for a 16-bit integer or 24-bit full floating-point board, a spokesman said.

Heliometics, 17312 Eastman St., Irvine, Calif. 92714.

AUXILIARY EQUIPMENT

DATA DECISIONS
Microcomputer service

Data Decisions has announced an information service for microcomputer hardware and software that reportedly was designed for corporate or institutional buyers of multiple systems.

Called Microcomputers, a key feature of the service involves the testing of major software products by the vendor's laboratory staff.

Areas covered by the service include microcomputers, software, expansion/extension cards, communications and peripherals, accessories and support equipment, according to the vendor.

A one-year subscription to the service includes two loose-leaf volumes updated monthly, 12 supplements, 12 newsletters and unlimited free telephone consulting. Charter subscriptions are available for a limited time for $625.

Data Decisions, 20 Bruce Road, Cherry Hill, N.J. 08034.

The Northern Telecom system. A benchmark in batch processing that keeps getting better.

Northern Telecom batch processing systems have proven themselves, in more than a decade of use in a variety of applications, to be among the most reliable, practical, cost-effective systems ever developed. They deliver more throughput per dollar than any competitive system.

Now, as solid evidence of our commitment to batch processing, we're improving these already-successful systems for even more productivity. For instance, we're introducing a new high-speed band printer with changeable type. Operating now with IBM's SNA, we've also added new, low-cost distributed data processing capabilities for more system versatility, and to provide for future growth toward the integrated office.

We're back

MICROCOMPUTERS

MICROPRO INTERNATIONAL CORP.
Startester series

Micropro International Corp. has introduced a line of training tools, the Startester series.

The on-disk interactive computer-aided instruction (CAI) tutorials include lessons for the firm's Wordstar (word processing) and Infostar (data base management system).

Videotape instruction is available for Wordstar and will soon be available for Infostar, Calestar (the firm's electronic spreadsheet) and Starburst (the firm's program that reportedly links the other products). The self-paced tape provides the trainee with interactive training, reinforced with graphics and animation.

Users who have Wordstar Version 3.3 for IBM's PC-DOS operating system can purchase the Wordstar Quick Lesson CAI for a handling charge of $6 each until Feb. 29. The extended lessons feature seven sessions, each approximately 30 minutes long. Each extended lesson CAI product is priced at $79.95.

Micropro's Wordstar Video Training Tape, in ½-in. VHS and ¼-in. Betamax formats, will be available in the spring for a suggested retail price of $89.95. The ¾-in. U-Matic format will be priced at $129.95, the vendor said.

Micropro International, 33 San Pablo Ave., San Rafael, Calif. 94903.

ADVANCED DATA SUPPORT SYSTEMS, INC.
Advanced Data Analyzer

Advanced Data Support Systems, Inc. has announced Advanced Data Analyzer, a hardware and software enhancement that monitors RS-232 asynchronous data communications.

The product taps into any line between two devices. It displays and stores data transmissions and allows the user to examine data, the vendor said. The data analyzer transmits user-defined character strings and can perform a byte/bit error rate test, according to the vendor.

The product costs $1,695.

Advanced Data Support Systems, Suite 1, 217 Mt. Vernon Ave., Bakersfield, Calif. 93307.

MICRO SOFTWARE

COMMODITY TRADING SYSTEMS
Cats

Commodity Trading Systems has announced the Cats computer-aided trading package for the IBM Personal Computer.

A vendor spokesman said Cats was designed as a tool with which commodity traders can collect real-time market data, analyze price and volume and generate a trade signal based on that information and the trader's financial position and objectives.

The spokesman said that, in addition to historical price and volume analysis, Cats also features a "what-if" simulator to determine the optimum trading parameters for each contract, an updated quote page, data base query and report generation and gross profit summary.

Cats is leased for $40,000/year, which does not include hardware.

Commodity Trading Systems, Suite 107, 11301 Richmond, Houston, Texas 77082.

HUMANIC DESIGN CORP.
MSP

Humanic Design Corp. (HDC) has introduced a human resource management package for the IBM Personal Computer XT. The Microcomputer Personnel System (MPS) was designed for organizations with 200 to 2,000 employees.

MPS reportedly supports all major human resource management functions, stores payroll information and can be linked directly to in-house or payroll services. In addition, MPS can provide complete word processing.

Continued on page 77

Your processing may be remote, but Northern Telecom service is on the spot.

With service and maintenance professionals located at 157 cities nationwide, we're able to provide prompt response to your call for service. How fast? Two hours in major metropolitan areas; four hours in most other areas of the country. And our multi-year maintenance agreements guarantee continuing, low-cost operation of your Northern Telecom system.

If your system lease expires within the next six months, *now* is the time to find out more about batch processing from Northern Telecom.

Time-proven performance with long-term savings.

Northern Telecom's aggressive pricing is more proof of our commitment to batch. Our discount structure offers long-term savings on multi-year leases. And at renewal time, you can save even more with discounts up to 30%.

Call our toll-free number: 800-331-3113. Or write Northern Telecom, Mail Station T-240, P.O. Box 1222, Minneapolis, Minnesota 55440. We'll show you how we can tailor a batch system to your specific needs. And save you money, too.

nt northern telecom

ing batch!

FIXED PRICE COMPUTING SERVICE

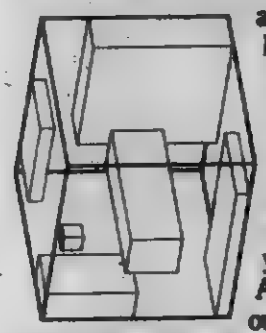
INTRODUCING SUBSCRIPTION SERVICE:

A Cost-Effective Alternative to Traditional Remote Computing Services or In-House Processing.

Now you can couple the benefits of a professionally managed remote computing service with the predictable cost associated with in-house processing. It's called Subscription Service, and it's available today from Martin Marietta Data Systems.

PREDICTABLE COST

Subscription Service is designed to keep your DP operation within budget. It curbs cost overruns by delivering a block of resources at an affordable ***fixed price***—almost like the in-house machine.



But, unlike the in-house machine, your service doesn't degrade at peak-use periods, just when you need it most. And, when you're out of gas, you can upgrade easily. No lease payout. No hardware moves.

NO MYSTERY PRICING

Subscription Service unbundles the remote computing service offering to take the guesswork out of prices. Resource capacity and support levels are clearly defined and easy to understand. You buy what you need. Nothing more—nothing less.

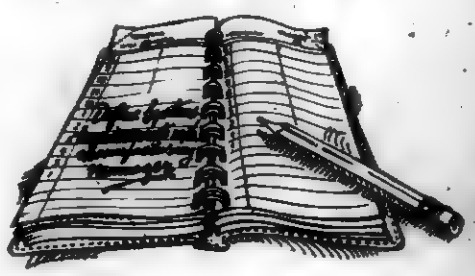
MORE TIME FOR YOUR USERS

It's a fact, a professionally managed computing service offers you ***freedom*** from day-to-day operational problems, giving you more time to focus on solutions to user problems. And, with an inventory of packaged solutions and productivity tools at your fingertips, the time and resource requirements to create a solution are greatly reduced.

COUPLE FREEDOM WITH AFFORDABILITY

Subscription Service is proof that you can get the best for less. All subscribers are linked to Martin Marietta's powerful host computers, providing the most up-to-date computing resources. You can depend on:

- ☐ Solid, stable, thoroughly-tested hardware, software and personnel
- ☐ Response time and throughput associated with IBM's fastest processors
- ☐ Access to hundreds of productivity tools and application systems
- ☐ Responsive technical consultants available around the clock



DISCOVER HOW SUBSCRIPTION SERVICE CAN WORK FOR YOU

If your budget for computer operations exceeds $20,000 per month for either remote computing service or in-house processing, then find out how much Subscription Service can save you. Or how much more service you can get for what you are currently spending. Or both! Simply return the attached coupon or call toll-free (800) 638-7080. In Maryland: (800) 492-7170.

Don't be undersold. Or sold a bundle. Get the precise level of resources you need with Martin Marietta's Subscription Service.

☐ Please send me your Remote Computing Services brochure.
☐ I'd like to have my subscription requirements sized. Have your representative call me.

Name: _____

Title: _____

Company: _____

City: _____

State: _____ Zip: _____

Phone: ( ) _____

Mail To: Martin Marietta Data Systems
Marketing Services Department, CWSS
6303 Ivy Lane
Greenbelt, MD 20770

MARTIN MARIETTA

Martin Marietta Data Systems

Continued from page 76

mail list/merge and electronic spreadsheet capability.

A free-standing, menu-driven system with communications options, MPS requires a Personal Computer XT configuration of a 10M-byte fixed disk, plus 360K-byte capacity diskette drives and 256K bytes of memory.

MPS software is priced at $15,000 with optional rental and/or lease.

HDC, 307 Summit Ave., Mahwah, N.J. 07430.

APPLIED SOFTWARE TECHNOLOGY, INC.
Versaform Release 2.7

Applied Software Technology, Inc. has announced the Versaform Release 2.7 for Texas Instruments, Inc.'s Professional Computer.

Release 2.7, which runs under Microsoft, Inc.'s MS-DOS operating system, is also available for the IBM Personal Computer.

Data entered into the system creates a data base of form records. Data from the data base may be selected, sorted and written to an MS-DOS file for use by word processors, spreadsheets and other programs, the vendor said.

The suggested retail price of Versaform Release 2.7 is $389.

Applied Software Technology, 170 Knowles Drive, Los Gatos, Calif. 95030.

RADIO SHACK
Cobol instruction

Radio Shack has announced an educational software package designed to teach secondary and college students and adults the fundamentals of programming Cobol.

The package contains a comprehensive manual and a diskette with exercises that can be used with any Radio Shack TRS-80 Model II, 12 or 16 disk system with at least 64K bytes of memory.

Volume One is available for $49.95. Class notes are priced at $9.95 and are sold as an aid to instructors for use in the classroom.

Radio Shack, 1800 One Tandy Center, Fort Worth, Texas 76102.

SIGNUM MICROSYSTEMS, INC.
Documax

Signum Microsystems, Inc. has introduced Documax, an information management package for the Apple Computer, Inc. Apple II microcomputer.

Documax is a document-handling package that features word processing, electronic mail and other text files, the vendor said.

Documax runs on the Apple II, II+ or IIe with 48K bytes of memory. It also runs on the Apple III in Apple II emulation mode.

The product sells for $175.

Signum Microsystems, 190 Mountain Ave., Bloomfield, Conn. 06002.

IDEAWARE, INC.
Idea Processor

Ideaware, Inc. has introduced the Idea Processor, a software package for IBM Personal Computer users.

The Idea Processor combines a card-file-style, free-form file manager with word processing software and can incorporate graphics stored as file cards, the vendor said.

Minimum system requirements are an IBM Personal Computer or compatible machine with 192K bytes of memory. A printer is optional, the vendor said.

The Idea Processor sells for $295.

Ideaware, 295 Lafayette St., New York, N.Y. 10012.

ZOOM TELEPHONICS, INC.
Netmaster

Zoom Telephonics, Inc. has introduced Netmaster, a communications program for Apple Computer, Inc.'s Apple II microcomputers.

According to the vendor, Netmaster can be used with 300 bit/sec modems. The package will receive and transmit any file developed under Release 3.3 of Apple's DOS operating system, the vendor said.

Netmaster is priced at $70. It is sold with Zoom's Networker modem (including a free membership to The Source data base) for $179, the vendor said.

Zoom Telephonics, 207 South St., Boston, Mass. 02110.

DATAMEDIA CORP.
Exec

Datamension Corp. has introduced a feature for its Report Manager three-dimensional software, a command language called Exec. The package runs on IBM's Personal Computer.

Exec is a language that uses Basic-like commands or can capture and repeat sequences of keystrokes, the vendor said.

Minimum system requirements are 128K bytes of random-access memory and two disk drives.

The suggested list price of Report Manager is $360.

Datamension, 615 Academy Drive, Northbrook, Ill. 60062.

STONEWARE, INC.
DB Master enhancement

Stoneware, Inc. has enhanced DB Master to include a file converter.

DB Master's file converter reads files created with Software Publishing Corp.'s PFS:File and Visicorp's VisiFile programs into DB Master. It can use alphanumeric, numeric or data fields, the vendor said.

The data base costs $350 and runs on Apple Computer, Inc.'s Apple IIe.

Stoneware, 50 Belvedere St., San Rafael, Calif. 94901.

See MICRO page 78

VIEWCOM

CICS Printer Terminal Spooling & Automatic Batch Report Distribution System

•IBM-PC Connection
•Online Access to Batch Reports
•Full Function Report Routing
•User Exit Facility
•Automatic Restart/Recovery
•Reduce Paper & Delivery Costs

StarTech Software Systems, Inc.
25-39 Borough Place, Woodside, N.Y. 11377
(212) 204-2119

"Innovation Through Technology"

StarTech Software Systems, Inc.
25-39 Borough Place, Woodside, N.Y. 11377 (212) 204-2119
☐ Send more information. ☐ Please call.
Name
Title
Company
Address
City State Zip
Phone ( )
Operating System Release

MICRO from page 77

SOFTWARE SYSTEMS, INC.
Personal Computer Print Utility

Software Systems, Inc. (SSI) has announced a package that allows a report from an IBM System/34 or System/36 minicomputer to be printed on an IBM Personal Computer.

According to the vendor, the Personal Computer Print Utility converts spooled-print files on the host system to Personal Computer-formatted text files.

The utility was designed for users of SSI's 5251 Model 12 emulation and file-transfer utility to allow off-line storage and printing of spooled reports.

The product is available at a price of $75 for the System/34 and $90 for the System/36, including report program generator source code.

Software Systems, P.O. Box 1766, Jefferson City, Mo. 65102.

PROFESSIONAL MICROSYSTEMS, INC.
Bizplan

Professional Microsystems, Inc. has introduced Bizplan, a software template that enables users to create a business plan and analyze alternative sales strategies under changing conditions.

According to the vendor, Bizplan can run on any system running Digital Research, Inc.'s CP/M operating system. Systems must have a minimum of 48K bytes of random-access memory.

The suggested retail price of Bizplan is $195.

Professional Microsystems, Richardson Plaza, Rt. 309 & Richardson Road, Montgomeryville, Pa. 18936.

LIBRA LABORATORIES, INC.
Gantt-Pack Version 3

Libra Laboratories, Inc. has announced Gantt-Pack Version 3, a menu-driven project management software package for Radio Shack TRS-80 Models I/III and I/12 microcomputers.

According to the vendor, the product is a project control and resource management tool that enables users to store data on each project's requirements. Gantt-Pack can be used to automate drawings, create charts and sort data.

Gantt-Pack costs $395.

Gantt Systems, Libra Laboratories, 495 Main St., Metuchen, N.J. 08840.

GENASYS CORP.
Telico Version 2.0

Genasys Corp. has announced the release of Version 2.0 of its asynchronous communications package, Telico, for the IBM Personal Computer, Personal Computer XT and Personal Computer-compatible computers.

Telico operates at speeds ranging from 110 to 9,600 bit/sec through any smart, acoustic or dataphone-type modem hard wired to a machine or via a network. Its internal buffering is said to allow screen scrolling of at least 250 lines of data during communications. Any additional memory can also be used as a screen buffer, allowing scrolling of more than 250 lines.

Telico costs $119.95, including documentation.

Genasys, Microcomputer Products Group, 11820 Parklawn Drive, Rockville, Md. 20852.

ADDISON-WESLEY PUBLISHING CO.
Micro-DSS/Finance

Prices of Micro-DSS/Finance (DSS/F), a microcomputer financial modeling software package from Addison-Wesley Publishing Co., have been reduced by 33%.

DSS/F is an integrated package that combines financial modeling, graphics and reporting. It can be purchased through dealers or Addison-Wesley at the new prices of $795 for Apple Computer, Inc. versions and $995 for the IBM Personal Computer version, a spokesman said.

Addison-Wesley, Reading, Mass. 01867.

HUMAN SYSTEMS DYNAMICS
PC Statistician

Human Systems Dynamics has introduced a general statistics package for the IBM Personal Computer.

According to the vendor, PC Statistician provides a research data base. The prod-

MICRODATA INTRODUCES THE RELATIONAL OFFICE.

IT'S WHERE YOU'VE ALWAYS WANTED TO WORK.

MICROCOMPUTERS

uct also offers the graphics options of data set plots, bar graphs, scatter plots and curve fittings, the vendor said.

System requirements are an IBM Personal Computer with 128K bytes of memory, two double-sided, double-density disk drives and Release 2.0 of IBM's PC-DOS. A printer is optional.

The price of the package is $300.

Human Systems Dynamics, Suite 202, 9010 Reseda Blvd., Northridge, Calif. 91324.

I.P. SHARP ASSOCIATES, LTD.
APL/PC

I.P. Sharp Associates, Ltd. has introduced an implementation of the APL development language for the IBM Personal Computer.

Called APL/PC, the package is compatible with Sharp's mainframe software products. This is accomplished by basing the microcomputer product on a System/370 emulator.

Therefore, all APL constructs available in a mainframe environment are also available in the microcomputer environment. These include all primitive functions and operators and all data types, including packages and enclosed arrays, the vendor said.

The system runs as a user program under the IBM Personal Computer operating system PC-DOS Version 1.1 or 2.0. The package includes the interpreter, the file system, the session manager, several auxiliary processors and the utility software.

The price of APL/PC is $375.

I.P. Sharp Associates, Suite 1900, 2 First Canadian Place, Toronto, Ontario, Canada M5X1E9.

STRATEGIC SOFTWARE SYSTEMS, INC.
Bottomline V

Strategic Software Systems, Inc. has introduced Bottomline V, a financial modeling, planning and forecasting package.

The product operates with spreadsheet programs, such as Lotus Development Corp.'s 1-2-3 and Visicorp's Visicalc. The package runs on the IBM Personal Computer XT, the Xerox Corp. 820, Digital Equipment Corp.'s Rainbow and Apple Computer, Inc.'s processors. The package also runs on Microsoft, Inc.'s MS-DOS and Digital Research, Inc.'s CP/M operating systems.

The suggested retail price is $295.

Strategic Software Systems, Suite 200, 1300 Dove St., Newport Beach, Calif. 92660.

ZYLAB CORP.
Zyindex

Zylab Corp. has introduced Zyindex, an information search and retrieval package that finds information in any Ascii-based text files. The package runs on the IBM Personal Computer, Personal Computer XT and compatible systems.

According to the vendor, Zyindex stores information from documents created with a word processing package or obtained from other public data bases. Users retrieve information from their files by entering search requests on any topic.

Zyindex requires 96K bytes of memory and two disk drives.

The list price of the product is $295.

Zylab, 233 E. Erie, Chicago, Ill. 60611.

PERSOFT, INC.
Smarterm 100

Persoft, Inc. has announced Smarterm 100, a terminal emulation/file transfer package for the IBM Personal Computer and compatible systems.

The product is said to allow the Personal Computer to function as a Digital Equipment Corp. VT100, VT101, VT102 or VT52 CRT terminal and to transfer Ascii or binary files between the Personal Computer and a host computer system.

Smarterm 100 runs under any version of IBM's PC-DOS operating system and can be installed on hard disk, the vendor said.

It requires 128K bytes of memory, one double-sided diskette drive, an asynchronous adapter and either the monochrome display or an 80-col. color monitor, according to the vendor.

It is priced at $149.

Persoft, 2740 Ski Lane, Madison, Wis. 53713.

Continued on page 88

MICRO from page 79

DATA CONSULTING GROUP
PC File; PC Screens and Menus

Data Consulting Group has announced two utility products for the IBM Personal Computer running Microsoft, Inc.'s MS-DOS and compatible operating systems.

PC File Utilities is a series of programs designed to facilitate file management. According to the company, the programs allow the user to print, display or edit random files by entering the file name; print or display sequential files; and display data simultaneously in four formats: character, Ascii, hex and bit flag.

PC Screens and Menus is a menu and screen generator that creates Basic screens for data entry. Once the screen is drawn, it can be saved in a file and accessed by any program.

The utilities cost $50 each, require less than 64K bytes of memory, a monitor and one or two single- or double-sided diskettes.

Data Consulting Group, 12 Skylark Drive, Larkspur, Calif. 94939.

MYCROFT LABS, INC.
Mite/MS

Mycroft Labs, Inc. announced Mite/MS, a menu-driven communications program that runs under Microsoft, Inc.'s MS-DOS operating system.

Mite/MS features user-selectable options to capture text from or send to any asynchronous, Ascii, on-line system, according to the vendor. A user can define 10 programmable macro strings which can be invoked by a function key, the vendor said.

Mite/MS costs $195.

Mycroft Labs, Suite B188, 9639 N. Monroe St., Box 68, Tallahassee, Fla. 32303.

PHASER SYSTEMS, INC.
Vdam

Phaser Systems, Inc. announced Virtual Diskette Access Method (Vdam), a software tool that allows IBM Personal Computers to access and store IBM mainframe data.

With Vdam, the mainframe appears as an infinite set of diskettes to any program running on the Personal Computer, according to the vendor. The user stores and accesses mainframe data in a format identical to that on the Personal Computer.

The system operates under IBM's TSO.

The package costs $600 for mainframe software and $300 for each Personal Computer attached to the mainframe.

Phaser Systems, 24 California St., San Francisco, Calif. 94111.

DATA MANAGEMENT ASSOCIATES, INC.
Magic

Data Management Associates, Inc. has introduced Machine Generated Integrated Code (Magic), a programming language which the company claims increases programmer productivity tenfold. The package runs on microcomputers using Digital Research, Inc.'s CP/M operating system.

The language features internal data areas with variable buffers and dynamic allocation, screen formatting and editing, the ability to mix assembler language anywhere in Magic source code, string manipulation capability and control-conditional compilation of source code, according to the vendor.

Magic for CP/M costs $795. It costs $995 for microcomputers using CP/M 86 or MS-DOS, an operating system from Microsoft, Inc.

Data Management Associates, P.O. Box 4340, Wilmington, Del. 19807.

INFORMATION BUILDERS, INC.
Focus for IBM XT/370

Information Builders, Inc. has announced the availability of its Focus nonprocedural data base and information management package for the IBM Personal Computer XT/370.

Focus, operating under the IBM VM/CMS environment, reportedly combines a relational data base and screen management facilities with an English nonprocedural language for queries, formal reporting, graphics, statistical analysis and financial modeling.

Information Builders reports that users of the desktop XT/370 using IBM's VM operating system on mainframes can access their information centers with Focus. The users reportedly can use English commands to analyze files on their CMS minidisks.

Focus on the XT/370 is licensed as a rider to a user's existing mainframe license. The purchase price for one to eight XT/370 machines is $3,400, and the lease price is $375 per month.

Information Builders, 1250 Broadway, New York, N.Y. 10001.

COLLINS & ASSOCIATES, INC.
Cpert; File-It; Plot-It; LC Data

Collins & Associates, Inc. has introduced four business programs: Cpert, File-It, Plot-It and LC Data.

According to the vendor, all the programs were designed to run on either the Hewlett-Packard Co. HP 86 or HP 87 microcomputers, with memory requirements ranging from 64K bytes to 160K bytes, depending on the program.

Cpert was designed for managers to use in planning a project. It enables the user to focus attention on the plan, measure progress and take corrective action. It requires 160K bytes of memory, according to a spokesman for the vendor.

File-It is a data file management package with a capacity of 65K bytes of memory, according to the vendor spokesman. Records can be sorted on any field for the whole file or selected parts of the file. In displaying or printing records, the fields can be arranged in any order, and the display can be vertical or horizontal. It requires 128K bytes of memory, the spokesman said.

Plot-It is a program for plotting single or multiple line curves and performing linear regression curve fits of curve data. The program is menu-driven. Manipulation of data can be performed, and statistical analysis

"We contracted out. But with a Kodak Komstar 200 we saved $30,000 by doing it ourselves.

When a major do-it-yourself tool company needed to keep up with ever-increasing forms and records, they turned to Kodak.

Our Komstar 200 microimage processor took over the job. And saved over $30,000 in outside costs just six months later.

Find out how Komstar equipment can help you tool up in-house, for less. Send in the coupon today. Or call toll-free: 1-800-44EKODAK (1-800-445-6325), Ext. 303.

© Eastman Kodak Company, 1983

Send me the case history above and more information on the Komstar 200 microimage processor.

Name _____

Company _____

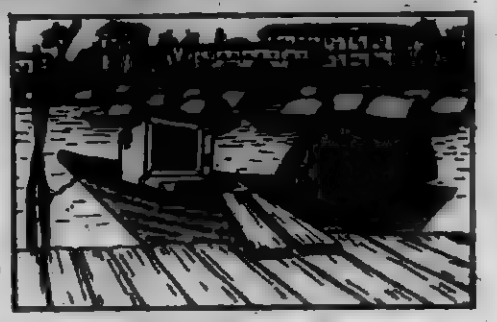
Address _____

City _____ State _____ Zip _____

Telephone ( ) _____

Eastman Kodak Company
Business Systems Markets Division
Dept. DP6523, Rochester, NY 14650

Asian Computerworld reaches the fastest growing computer market in the world.



Introducing *Asian Computerworld.*

Asian Computerworld is *Computerworld's* sister publication covering the Southeast Asian marketplace. The editorial (written in English) keeps company executives, computer users, potential users and people in the computer industry up-to-date.

Southeast Asia is considered the fastest growing computer market in the world with a total value of $1.8 billion and annual growth rates for small business systems and micros over 50%. The average annual growth rate is approximately 30%.

Asian Computerworld is published in Singapore and printed twice a month on Thursdays. The total circulation is 8,000. And the geographical distribution is as follows; Hong Kong, Singapore, Philippines, Malaysia, Indonesia and Thailand.

CW International Marketing Services makes it easy for you to advertise in countries all around the computer world. For more information on *Asian Computerworld*, just fill out and return the coupon below.

CW COMMUNICATIONS/INC.

Diana La Muraglia
General Manager
International Marketing Services
CW COMMUNICATIONS/INC.
375 Cochituate Road
Framingham, MA 01701

Please send me more information on:
☐ *Asian Computerworld.* ☐ Your other publications.

Name _____

Title _____

Company _____

Address _____

City _____ State _____ Zip _____

MICROCOMPUTERS

can be done to give the mean, variance and coefficient of variation. It requires 96K bytes of memory.

LC Data is a learning curve program that provides a tool for production, marketing and general management users to make decisions on manpower, prices and materials. The program can calculate production costs or hours and then forecast future unit- and lot-production hours and costs. It requires 64K bytes of memory.

Programs are supplied on 5¼-in. floppy disks. Prices are $175 for Cpert, $100 for File-It, $150 for Plot-It and $95 for LC Data.

Collins & Associates, 187 Flying Mist Isle, Foster City, Calif. 94404.

BUSINESS SOLUTIONS, INC.
Jack2

Business Solutions, Inc. has introduced Jack2 for the Apple Computer, Inc. Apple IIe. The Jack2 is an integrated software package that does word processing, spreadsheet analysis, charting and data base management tasks on the same screen without windows.

According to the vender, Jack2 was originally designed for the IBM Personal Computer.

Jack2 features commands displayed on a two-line area at the top of the screen, handles multiple columns of text on the same page and can hide confidential information in the middle of the text.

All screen information, including the spreadsheet and the bar chart, is printed out on a single page the same way it appears on the screen, the vendor said.

Jack2 is priced at $395, according to the vendor.

Business Solutions, 60 E. Main St., Kings Park, N.Y. 11754.

STAR ENTERPRISES, INC.
Stardriver-I

Star Enterprises, Inc. has introduced Stardriver-I, a package that enables the Hewlett-Packard Co. HP 9000 Model 20 microcomputer to support multiple users in Basic.

According to the vendor, multiple users may interact via remote terminals for graphics as well as program development and execution.

The software is priced at $1,045, the vendor said.

Star Enterprises, 310 Crestwood Drive, Selma, Ala. 36701.

SOFTLOGIC SOLUTIONS
Doubledos

Softlogic Solutions has introduced Doubledos, an operating system enhancer that lets the IBM Personal Computer and Personal Computer XT microcomputers perform two simultaneous functions. It does not require any software modification.

According to the vendor, Doubledos acts as an extension to the capabilities of IBM's PC-DOS, either Release 1.1 or 2.0.

Doubledos can run on systems with as little as 128K bytes of memory, depending on the application, though 192K bytes of memory are recommended by the vendor. There is no need for the user to buy additional hardware, terminals or cables, the vendor claimed.

According to the vendor, Doubledos works by dividing a system's memory into two areas, one for each program running. The memory can be divided in any way the user chooses.

The price of Doubledos is $299, the vendor said.

Softlogic Solutions, 530 Chestnut St., Manchester, N.H. 03101.

OPUS CORP.
Workstation Emulator

Opus Corp. has introduced the Workstation Emulator, which allows an IBM Personal Computer or Personal Computer XT to act as a Hewlett-Packard Co. HP 250 workstation.

According to the vender, HP 250 software features such as screen-labeled soft keys, forms and video enhancements are emulated. Several additional features extend the emulator's applicability, including an Ascii-Ansi mode for autodial modem control, data logging to disk files and local printer support.

The product costs $600, according to the vendor.

Opus, 20251 Century Blvd., Germantown, Md. 20874.

BAILEY & ROSE LTD.
Compact

Bailey & Rose Ltd. has added a prototyping tool for the IBM Personal Computer to its Act/1 family of productivity software.

Called Compact, the product was designed to facilitate the development of prototypes and allow the user to test design concepts and specifications, as well as demonstrate working models. It includes screen development functions and logic plan facilities.

Compact requires an IBM Personal Computer or compatible system with 256K bytes of memory, two double-sided, double-density diskettes or one hard disk, IBM's PC-DOS operating system, Release 1.1 or 2.0 and a color graphics board or monochrome adapter. It costs $1,500.

Bailey & Rose, 620-1033 Davie St., Vancouver, B.C., Canada V6E 1M7.

NEW MEDIA GRAPHICS CORP.
Graphover Listing

New Media Graphics Corp. has offered a free listing of specific features its Graphover 9500 software driver that runs under IBM's PC-DOS operating system.

The graphics driver allows color graphics to be controlled by the IBM Personal Computer, and the graphics

Continued on page 84

NCR

From the cutting edge of NCR software engineering comes NCR/SNA Systems Network Architecture

If you are a computer manufacturer, or an OEM, there are two ways that you can implement SNA or X.25 on your systems:

- Do it yourself.
- Call NCR.

NCR systems engineers have developed portable communication products which can be easily implemented on a variety of processors and operating systems. These products allow for SNA communications, SNA network management and communication using X.25. Many of the products are immediately available, and could be ported onto most processors with minimum effort. And that's not all. NCR/SNA is backed by the resources and experience of an international company with a long background in data processing, and with the engineering technology that will keep it among the leaders.

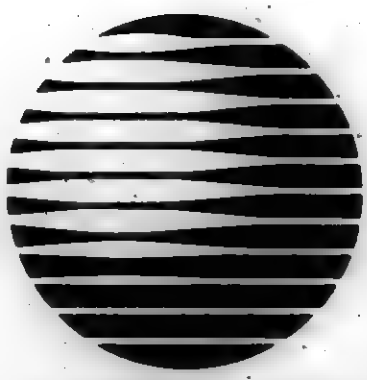
In 1984, NCR is 100 years young. If you are going to make a major investment in a strategic product, you'll want the innovative technology and service for which NCR has long been famous.

If you are a computer manufacturer or an OEM, and would like more information contact:

NCR Corporation
11010 Torreyana Road
San Diego, California 92121
Phone (619) 452-1626

TELETYPE CORPORATION.

WHAT'S NOW IN FRONT OF OUR NAME IS ALSO BEHIND US.



AT&T
Teletype Corporation

At Teletype Corporation, we've changed our logo. But as a part of the AT&T family, our commitment to supplying you with the latest in communications products and services hasn't changed.

With our own sales and marketing force, service organization, manufacturing facilities and distribution network, we're in an ideal position to meet all of your needs. And with the ingenuity of our expanding R&D, we're developing the kinds of terminals and systems the Information Age demands.

Today, our full line of printers and CRTs fit a wide variety of applications—from simple message transmission to sophisticated programming. Each and every terminal boasts user-friendly features that exemplify traditional Teletype Corporation quality.

We're also actively branching out into new areas such as intelligent terminals. Our 5620 intelligent graphics terminal, for example, is indicative of the kind of terminals you'll be working with in the future. It's a UNIX*-based CRT that can perform up to six functions simultaneously.

But while we're exploring new areas, we're also improving the products that have earned Teletype Corporation a strong reputation for value. Take our 5540 line of terminals. It represents our third generation of 3270-compatible devices. And we're continually adding to it, developing new displays, printers, keyboards and controllers to enhance the cost-effectiveness of your system.

Now that you've seen our new logo, it's time you took a closer look at what we can do for you. To find out more about our products and services, write Teletype Corporation, Dept. 3223-F, 5555 Touhy Ave., Skokie, IL 60077. Or call **1-800-323-1229, ext. 932.**

*UNIX is a trademark of Bell Telephone Laboratories, Inc.

©1984, Teletype Corporation.

MICROCOMPUTERS

Continued from page 81

can be overlaid on video coming from videodisk, videotape or TV cameras. The combined pictures can be displayed on any monitor or recorded on videotape, the vendor said.

New Media Graphics, 279 Cambridge St., Burlington, Mass. 01803.

VIKING ASSOCIATES
Firefile; Nativelinx

Viking Associates has introduced Firefile and Nativelinx communications packages for users of Apple Computer, Inc. Apple II+ and IIe microcomputers.

Firefile allows the user to transfer files between micros at speeds up to 38,400 bit/sec, or approximately 90 page/min, the vendor said.

The Nativelinx 3270 system provides an emulation of a remote IBM 3270 display terminal system with the Apple II+ or IIe. The package operates at line speeds of 1,200 to 9,600 bit/sec in a half-duplex mode over full-duplex facilities, the vendor said.

The Firefile package is priced at $250. The Nativelinx package is priced at $845.

Viking Associates, P.O. Box 353, Colorado Springs, Colo. 80901.

ADDISON-WESLEY PUBLISHING CO.
Micro-DSS/Analysis

Addison-Wesley Publishing Co. recently announced an analytical software package for the IBM Personal Computer that is said to bring decision support analysis to managers' desks.

Micro-DSS/Analysis reportedly provides statistics, report writing, graphics, data base management facilities and the ability to perform ad hoc analysis.

The package costs $495.

Addison-Wesley Publishing, Reading, Mass. 01867.

DUNBAR-RIDGE CORP.
Filedriver

Dunbar-Ridge Corp. has introduced Filedriver, an integrated set of utilities for Digital Research, Inc.'s CP/M or MP/M and Musys Corp.'s Turbodos operating systems.

Filedriver operates on any file and accesses files independently of user area or attribute-flag status, according to the vendor. Utilities can be accessed in five ways: file selection, file processing, user interaction, file protection and on-line display.

Filedriver costs $85.

Dunbar-Ridge, 103 Sterling Court, Syosset, N.Y. 11791.

AMERICAN PLANNING CORP.
Megabasic

American Planning Corp. announced Megabasic, a programming language that reportedly can address 1M byte of random-access memory.

Megabasic features an execution speed reportedly six times faster than Mbasic from Microsoft, Inc. Other features include variable names, which can be 255 characters long, and a trace-and-edit capability, according to the vendor.

Megabasic runs under MS-DOS from Microsoft and the CP/M 86 operating system from Digital Research, Inc. The programming language costs $400.

American Planning, Suite 403, 4640 Duke St., Alexandria, Va. 22304.

DCD CO.
Job Shop Control version

DCD Co. announced an IBM Personal Computer XT-compatible version of its Job Shop Control package.

The package includes job costing, payroll, accounts payable, accounts receivable and general ledger applications, the vendor said. The job costing module features job status reports, daily production figures, monthly statistics, efficiency figures, job costs and due dates for jobs.

The job-costing application costs $2,000; the other four packages cost $900 each. Together, the five applications cost $6,000.

DCD, 1601 W. River Road N., Minneapolis, Minn. 55411.

BELLESOFT, INC.
Entry System for Programs

Bellesoft, Inc. has introduced a language-oriented editor for computer-aided programming on IBM's Personal Computer using the Pascal and C languages.

Entry System for Programs is said to check programs for syntax errors and automatically format code for readability, saving compiling and debugging time.

ES/P is priced at $249 for Pascal on a single-machine license and $349 for Pascal and C.

Bellesoft, Suite 150, 2220 Northup Way, Bellevue, Wash. 98004.

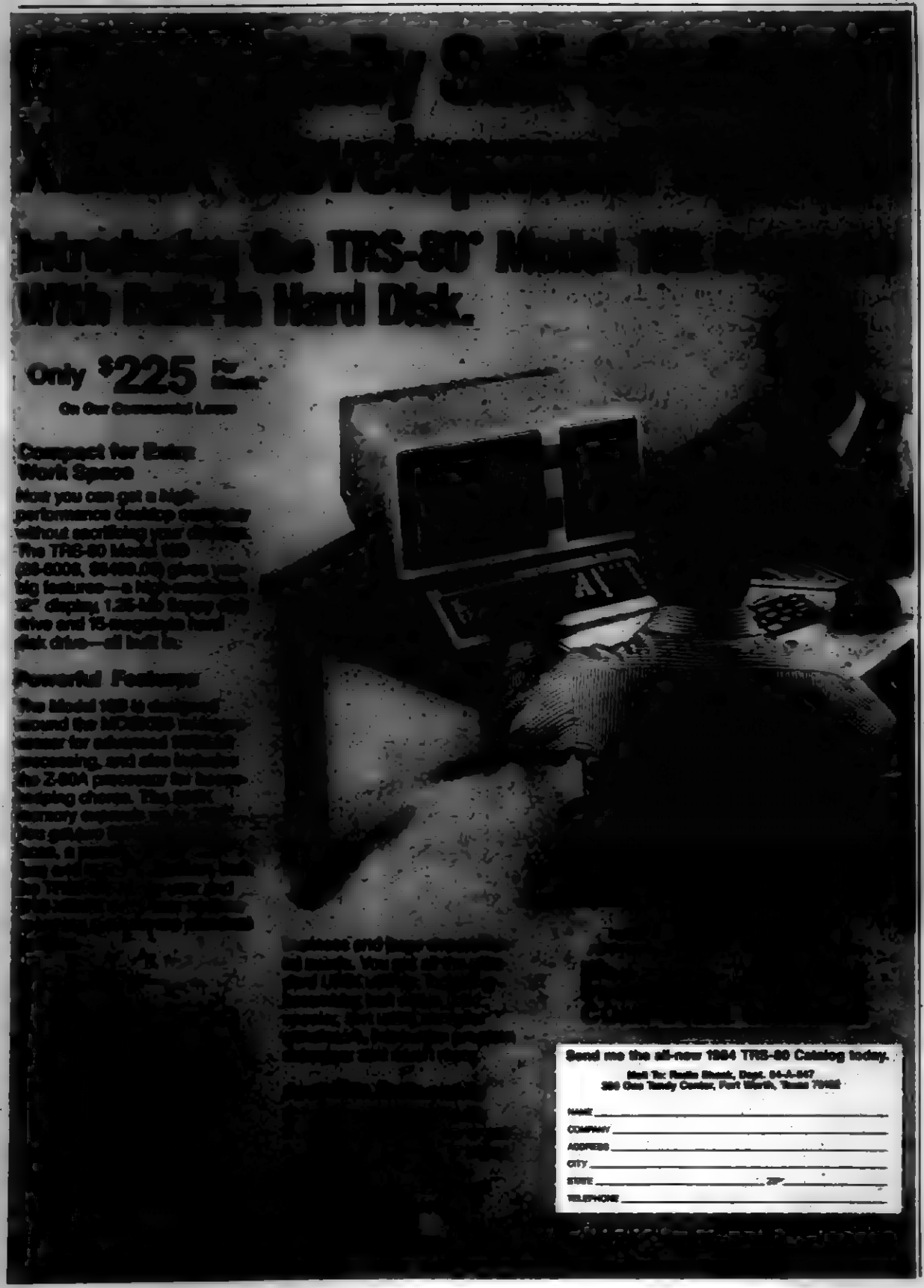
REMROL COMPUTER SERVICES, INC.
Screen.cob Version 2.0

Remrol Computer Services, Inc. has announced Version 2.0 of its Screen.cob Cobol screen code generator for use with Microsoft, Inc.'s IBM Personal Computer Cobol package.

According to the vendor, Screen.cob is a utility program that writes Cobol code for screen set-up in a standard Ascii file text editor.

Screen.cob can also overlay multiple screens and set up a series of screens at one time. The package reportedly will operate on any microcomputer that can run Microsoft's IBM Personal Computer Cobol package. Version 2.0 of Screen.cob is priced at $49.95.

Remrol Computer Services, 215 Brighton Ave., Boston, Mass. 02134.



MICROCOMPUTERS

STOK SOFTWARE, INC.
Backrest enhancements

Stok Software, Inc. has announced enhancements to Backrest, its hard disk backup program.

According to the vendor, Backrest runs on Muxys Corp.'s Turbodos, Microsoft, Inc.'s MS-DOS, IBM's PC-DOS and a variety of local-area networks.

Enhancements include the ability to select predefined backup routines, password-protected file backup and restore, repeated backup to the same hard or floppy disk, improved error handling, optional use of screen color attributes and a German language version with European date format.

Backrest is also available for Digital Research, Inc.'s CP/M, MP/M, CP/Net, CP/M 86, MP/M 86 and concurrent CP/M at a retail price of $180.

Stok Software, 17 W. 17th St., New York, N.Y. 10011.

LOGICAL SYSTEMS, INC.
LS/Host/Term

Logical Systems, Inc. has introduced LS/Host/Term, a host-terminal package developed for use with the Radio Shack TRS/DOS operating system on the TRS-80 Model 4 microcomputer.

The package includes a host system that works in conjunction with the terminal portion of the package. The terminal is designed to emulate an Applied Digital Data Systems, Inc. Adds-5 terminal.

LS/Host/Term is available for $199.

Logical Systems, P.O. Box 23056, 8970 N. 55th St., Milwaukee, Wis. 53223.

COMPUTER TECHNOLOGY GROUP
Unix courses price changes

Computer Technology Group has changed the rental rates for its Unix video tape training courses. Three training courses are available: Unix Overview consists of six modules and costs $2,100, Unix Fundamentals with 15 modules sells for $5,250 and C Language consists of 16 modules and sells for $5,600.

For the first month, the rental prices for any module have been lowered to 20% of purchase price, the vendor said.

In the second month, the rental cost has been lowered to 15% of purchase price. After the second month, rental prices become 10% of the purchase price, according to Computer Technology.

Computer Technology Group, 310 S. Michigan Ave., Chicago, Ill. 60604.

AGS COMPUTERS, INC.
Smart-C

AGS Computers, Inc. has announced Smart-C, a software development tool for any mainframe, mini or microprocessor that supports a C compiler.

According to the vendor, Smart-C is a full screen intelligent editor for constructing C programs. As a structural editor, Smart-C is said to encourage standardization of software layout and style.

The initial version of Smart-C for the IBM Personal Computer will be available in the second quarter of 1984. Pricing will be between $400 and $500.

AGS Computers, 1135 Spruce Drive, Mountainside, N.J. 07092.

ELITE SOFTWARE
Elite-File

Elite Software has introduced a relational data base manager for the Radio Shack Color Computer.

According to the vendor, Elite-File is an all-machine language that allows users to define their own data record structures. It was written by the author of Elite-Calc, Bruce Cook, and uses the same 6809E microprocessor.

The product is compatible with Elite-Calc and Elite-Word.

The program is available on disk and requires 32K bytes of memory and Disk Basic.

The price is $74.50, plus shipping and handling charges.

Elite Software, Box 11234, Pittsburgh, Pa. 15228.

MICROSOFT, INC.
Word merge facility

Microsoft, Inc. has introduced a form letter (merge) facility for its Word word processing software.

According to the vendor, the facility will allow users to produce custom form letters by merging variable information with a standard letter. It is also possible to merge a primary document with data stored in another document or Ascii file, the vendor said.

An expanded printer driver format offers the facility to support all standard printers, including most dot matrix and daisywheel units.

Available the first quarter of this year, the product sells for $25.

Microsoft, 10700 Northup Way, Bellevue, Wash. 98004.

A.B. DICK CO.
Supercalc2

A.B. Dick Co. has announced Supercalc2, a financial spreadsheet software package for use with its Magna III and Magnawriter information processing systems. The systems use Digital Research, Inc.'s CP/M operating system.

According to A.B. Dick, Sorcim Corp.'s Supercalc2 is an enhanced version of Supercalc. New features include a sort facility to rearrange columns and rows, line-item consolidation of spreadsheets, enhanced display and print formatting.

Supercalc2 costs $295. An upgrade to Supercalc2 costs $125.

A.B. Dick Co., 5700 W. Touhy Ave., Chicago, Ill. 60648.

See MICRO page 88

Your Data Center Doesn't Have to Look Like This!

Use Johnson Systems' APEX!

APEX—Automated Production Control System. APEX is the most comprehensive production planning and workload management system available in today's market. APEX eliminates card handling and reruns due to setup errors, assures correct job sequencing, allows viewing of output before it's printed, and provides immediate up-to-date status of all production processing. Some of APEX's powerful features include . . . Flexible Scheduling • Interactive Job Setup • Automatic Job Submission • Automated Restart/Recovery • Online Output Review • Management Reporting • Single Source of Production Information for IBM 370, 303X, 43XX and all PCM's, MVS, VS1 Environments.

If you're looking for ways to avoid the turmoil in production processing, then put APEX to work for you.

Johnson Systems

8300 Greensboro Drive, McLean, VA. 22102 1-800-368-1019 or (703) 821-1700
NATIONAL OFFICES: Chicago (312) 655-3400 San Francisco (415) 982-4616 Dallas (214) 247-3252

MICRO from page 85

HUNTER & READY, INC.
VRTX C Interface Library

Hunter & Ready, Inc. has introduced the Lattice C Compiler for its VRTX Interface Library for IBM's Personal Computer.

The VRTX C Interface Library reportedly enables programmers using the vendor's VRTX/86 real-time operating kernel to use the compiler to write real-time applications code in C language for any Intel Corp. 8086-based system.

The VRTX C Interface Library is available on 5¼-in. floppy diskettes with documentation for $750.

Hunter & Ready, 445 Sherman Ave., Palo Alto, Calif. 94306.

OMNI COMPUTER SYSTEMS, INC.
Flash-Com

Omni Computer Systems, Inc. has introduced an integrated electronic mail package that operates on the IBM Personal Computer and PCjr, Apple Computer, Inc.'s Apple II, Radio Shack and other microcomputers.

Flash-Com is said to enable users to implement the U.S. Postal Service's electronic computer-originated mail (Ecom) service.

Features include a mailing list management capability. It also features an Ecom accounting and billing analysis capability, menu screens, help messages and a glossary of Ecom.

The product can interface with software packages, such as Micropro International Corp.'s Wordstar; Professional Software, Inc.'s Wordplus-PC; Lifetree Software, Inc.'s Volkswriter; Perfect Software, Inc.'s Perfect Writer; Ashton-Tate's Dbase II; and Lotus Development Corp.'s 1-2-3.

The product retails for $200.

Omni Computer Systems, P.O. Box 162, Chestnut Hill, Mass. 02167.

MASTER COMPUTER SYSTEMS, INC.
Fornix

Master Computer Systems, Inc. has announced a software development tool for the IBM Personal Computer and compatible systems.

According to the vendor, Fornix consists of two related components operating under IBM's PC-DOS and Microsoft, Inc.'s MS-DOS operating systems. One is a runtime executive to manage data traffic between the end user and the application program. The other is a set of interactive screen-forms development tools.

Minimum hardware requirements are 64K bytes of main memory and one disk drive.

The product is available now for a single-license price of $495 for the Basic version. Compiler language interfaces are available for a one-time charge of $495.

Master Computer Systems, 9531 W. 78th St., Eden Prairie, Minn. 55344.

MARK OF THE UNICORN, INC.
PCjr compatibility

Mark of the Unicorn, Inc. recently announced that its entire software product line will now operate on the IBM PCjr.

The vendor's products are The Finalword, a word processing package; PC/Intercomm, a communications program; and Mince, a screen-oriented text editor.

The programs for the PCjr require 128K bytes of memory and one disk drive, according to the vendor.

Prices for the PCjr programs are: The Finalword, $300; PC/Intercomm, $99; and Mince, $175, the vendor said.

Mark of the Unicorn, 222 Third St., Cambridge, Mass. 02142.

DATAMENSION CORP.
Exec on Report Manager

Datamension Corp. has announced the addition of a built-in command language to its Report Manager three-dimensional spreadsheet package for the IBM Personal Computer.

Dubbed Exec, according to a vendor spokesman, the command language uses Basic-like commands and can capture and repeat sequences of keystrokes. Thirteen of Report Manager's built-in features are pre-programmed Exec functions. These front-end applications involve loan payments, future and present value, effective interest, amortization and linear regression, the firm said.

In addition to the Exec functions, the package offers more than 40 pre-programmed functions including logarithms, trigonometric functions, inverse trigonometric functions, exponents, square roots and standard deviation, according to the vendor.

The Report Manager package with the Exec command language is priced at $399 for the IBM Personal Computer with 128K-bytes random-access memory and dual disk drives, the firm said.

Datamension, 615 Academy Drive, Northbrook, Ill. 60062.

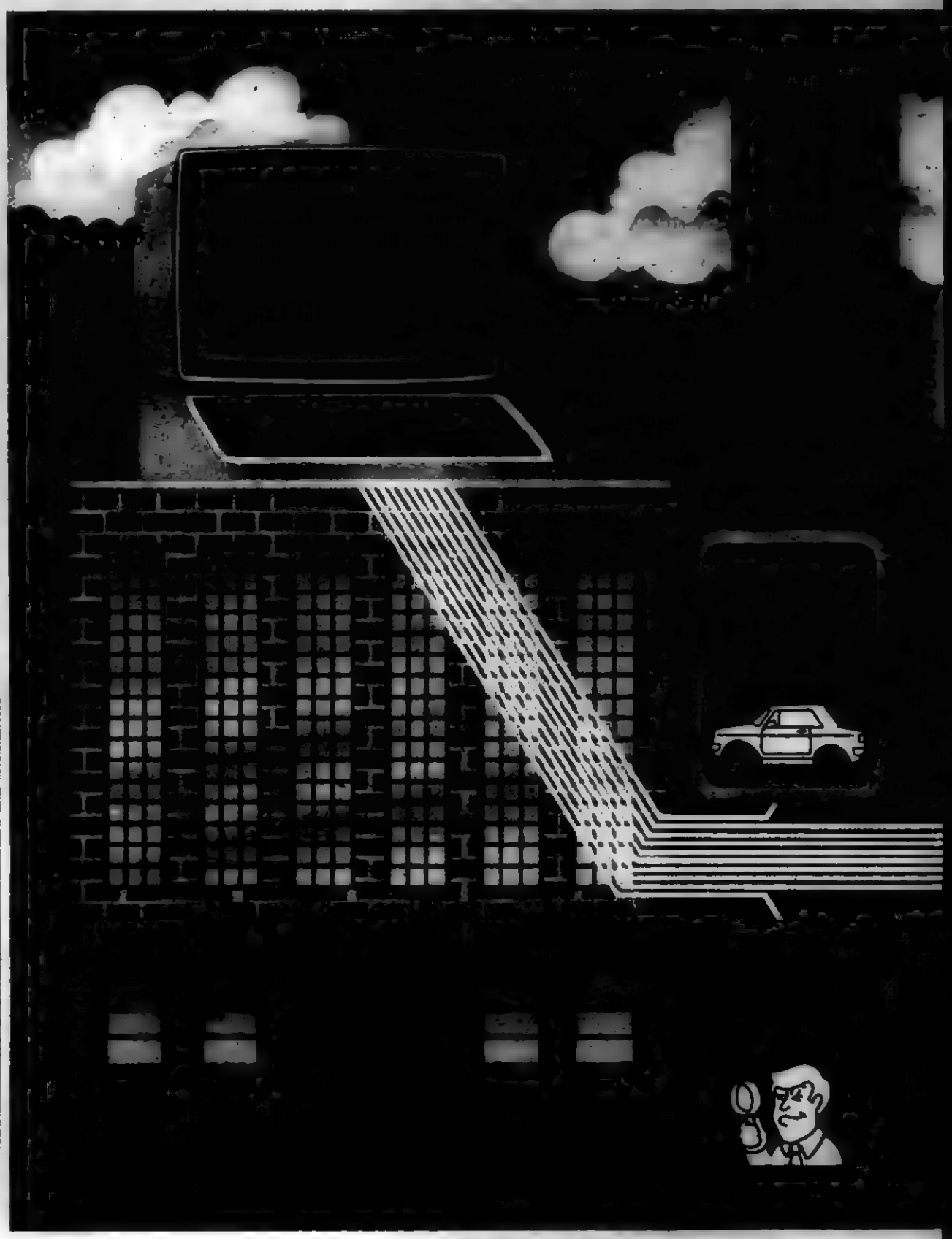
ASSOCIATED TECHNOLOGY CO.
Software Resources

Associated Technology Co. has introduced Software Resources, an artificial intelligence program for the IBM Personal Computer.

The program allows the user to perform "what-if" analysis to determine the effects of various schedules, staffs, programs, documentation, coding techniques and testing conditions, the vendor said.

The program costs $30.

Associated Technology, Rt. 2, Box 448, Estill Springs, Tenn. 37330.



MICROCOMPUTERS

MARTIN MARIETTA DATA SYSTEMS, INC.
Writit

Martin Marietta Data Systems, Inc. has announced a word processing package for IBM microcomputers.

Writit is a private-label version of Softword Systems, Inc.'s Multimate package, Martin Marietta said.

Writit reportedly provides keyboard procedures for insertions, deletions, cursor movement and block manipulation.

The package reportedly allows the user to type Ascii characters into documents for special printer commands and features a 80,000-word spelling checker.

Writit costs $500.

Martin Marietta Data Systems, P.O. Box 8282, Princeton, N.J. 08540.

STRATEGIC SOFTWARE SYSTEMS, INC.
Bottomline-V

Strategic Software Systems, Inc. has announced a corporate financial planning applications system for a variety of microcomputers.

Bottomline-V reportedly allows the user to input basic data variables into a 12-month budget. It then produces five-year pro forma profit and loss, balance sheets, changes in financial position and financial ratio analysis.

The system was designed to run on the IBM Personal Computer and Personal Computer XT, Digital Equipment Corp.'s Rainbow and Kaypro Corp., Apple Computer, Inc. and other microcomputers using Microsoft, Inc.'s MS-DOS and Digital Research, Inc.'s CP/M operating systems.

The suggested retail price is $295.

Strategic Software Systems, Suite 300, 1900 Dove St., Newport Beach, Calif. 92660.

HEWLETT-PACKARD CO.
PFS library; Personal Business Calculator

Hewlett-Packard Co. has announced that the Personal Filing System (PFS) software library from Software Publishing Corp. and HP's Personal Business Calculator package will be added to the software library for the HP 150 touchscreen microcomputer.

The PFS software family includes PFS:File, PFS:Report, PFS:Write and PFS:Graph. PFS:File and PFS:Report will be available for the HP 150 in the first quarter of 1984, while PFS:Write and PFS:Graph will be available in the second quarter.

The Personal Business Calculator is said to provide the functions of an HP-12C calculator on the HP 150. Users can touch the numbers and functions on a screen that resembles the HP-12C to make calculations. The PFS library for the HP 150 is priced at $295. The Personal Business Calculator package is priced at $75 and is available immediately.

HP, 3000 Hanover St., Palo Alto, Calif. 94304.

INSOURCE CORP.
Prestel Terminal Emulation diskettes

Insource Corp. has introduced its videotex family of Prestel Terminal Emulation communication diskettes for the IBM Personal Computer, Apple Computer, Inc. micros and Commodore Business Machines, Inc. Commodore 64.

According to the vendor, the full-color videotex software features an automatic dialing technique and a stored account number and password that allows for simplified login at 300 or 1,200 bit/sec to Insource or any other videotex system operator using Prestel.

The videotex software sells for $199.

Insource, 110 Heritage Sq., 4525 LBJ Freeway, Dallas, Texas 75234.

IDEAWARE, INC.
Grafix Idea

Ideaware, Inc. has introduced the Grafix Idea, a system of three software packages that allows business users to use IBM Personal Computers and compatible microcomputers to act as slide or overhead projectors.

According to the vendor, the slide shows can contain not only graphics images, but also images of text screens such as spreadsheets.

In addition to labeling and titling capabilities, the sketch pad can draw illustrations and flowcharts, with numerous choices of background color, text size and orientation on the screen.

The suggested retail price for the package is $79.95.

Ideaware, Suite 712, 225 Lafayette St., New York, N.Y. 10012.

TERRAPIN, INC.
Logo Version 2.0

Terrapin, Inc. has introduced Version 2.0 of its Logo language for the Apple Computer, Inc. Apple II, II+ and IIe.

Enhancements over the current Version 1.3 include improved "garbage collection" capabilities, support for all four cursor keys on the IIe and the ability to read program files created under Logo.

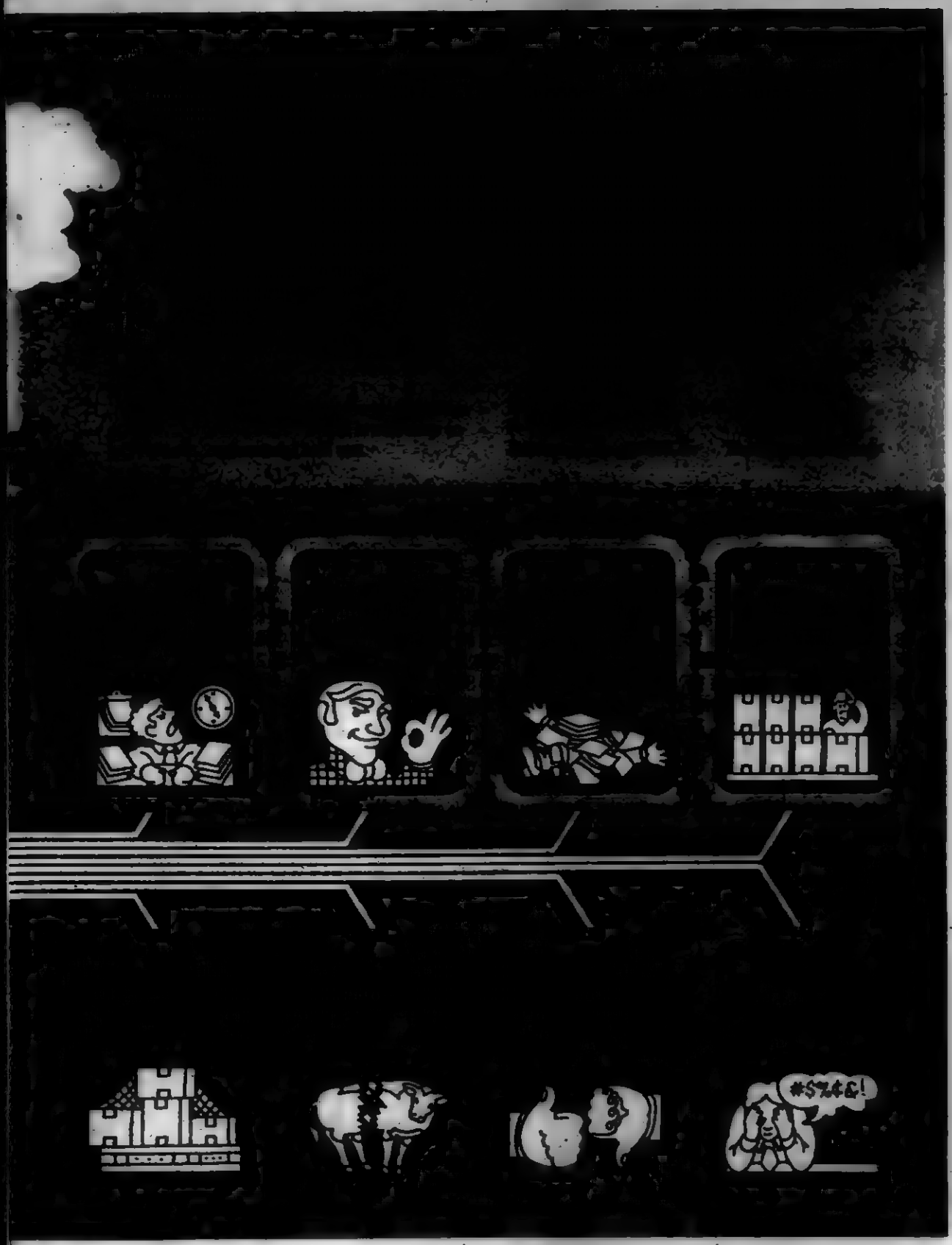
Terrapin has also announced enhanced documentation with a "Words and Lists" chapter in the Logo manual, including recursion, interactive graphics, quizzes, word games and artificial intelligence programming.

The price for the Logo package is $149.95. The "Words and Lists" chapter is priced at $12.50.

Owners of Version 1.3 may update to Version 2.0 for $20 and obtain the "Words and Lists" chapter for $5, the vendor said.

Terrapin, 380 Green St., Cambridge, Mass. 02139.

See MICRO page 38



MICROCOMPUTERS

MICRO from page 87

OPUS CORP.
WS250

Opus Corp. has introduced a workstation emulator that allows an IBM Personal Computer or Personal Computer XT to act as a Hewlett-Packard Co. HP 250.

The WS250 features screen-labeled soft keys and emulation of HP forms and video enhancements. Also included is an Ascii and Ansi mode for autodial modem control, local printer support and logging and sending data to disk files.

The single-quantity price of the WS250 is $500.

Opus, 20251 Century Blvd., Germantown, Md. 20874.

COMPUVIEW PRODUCTS, INC.
Vgraph

Compuview Products, Inc. has introduced Vgraph, a package that is designed for industrial and engineering sites as well as for computer-aided design and manufacturing installations.

According to the vendor, Vgraph emulates a Tektronix, Inc. 4010 graphics display terminal.

It supports the Zenith Data Systems Corp. Z100 and Victor Technologies, Inc. Victor 9000 microcomputers, the vendor said.

The Vgraph disk and manual are priced at $120, according to the vendor.

Compuview Products, Suite 300, 1955 Pauline Blvd., Ann Arbor, Mich. 48103.

ASSOCIATED TECHNOLOGY, INC.
Software Resources

Associated Technology, Inc. has introduced Software Resources, a package that computes optimum resource levels for development projects on IBM Personal Computers or compatible microcomputers.

According to the vendor, the software manager can perform "what-if" studies to determine varying schedule lengths, staff levels, peak staffing, program size, documentation, coding environments, testing environments and 12 other development parameters.

The tool can provide project optimization for software projects requiring 10 to 5,000 man-months of effort, the company said.

The system is described in a user manual that costs $30. The program and manual are available for $175.

Associated Technology, Rt. 2, Box 448, Estill Springs, Tenn. 37330.

MICROTEC RESEARCH, INC.
Paragon enhancement

Microtec Research, Inc. has announced that its line of Paragon cross-assembler systems for microprocessor developers is now available for use on the IBM Personal Computer.

According to the vendor, each assembler includes a library and download utilities. It contains a macro facility, conditional assembly options, list-control operators and cross-reference listing.

Assembler systems are available for most 8-bit and 16-bit microprocessors.

The products require IBM's PC-DOS or Microsoft, Inc.'s MS-DOS Release 1.1 or 2.0 with 128K bytes of random-access memory.

Individual CPU license prices are $600 for 8-bit processors and $900 for 16-bit processors.

Microtec Research, No. 525, 505 W. Olive, Sunnyvale, Calif. 94086.

MONUMENT COMPUTER SERVICE
Report Writer Jr.

Monument Computer Service has introduced Report Writer Jr., a word processing package for the IBM PCjr.

According to the vendor, the program was designed for those who wish to use a PCjr away from the office and later transfer the data directly to an IBM Personal Computer. The program is compatible with many word processor programs and can be used with standard IBM PC-DOS-oriented spelling check programs, the company said.

The Report Writer Jr. requires an IBM PCjr with 128K bytes of memory and a single disk drive. Both IBM graphics and thermal printers can be used with the system, but are not required.

The price of Report Writer Jr. is $80.

Monument Computer Service, P.O. Box 603, Joshua Tree, Calif. 92252.

SOFTWARE SOLUTIONS, INC.
Dataease Version 2

Software Solutions, Inc. has introduced Version 2 of its Dataease relational data base management system for the IBM Personal Computer using IBM's PC-DOS Release 2.0 operating system.

According to the vendor, the product can be menu-driven for novices or worked in the program's expert mode.

It allows the user to obtain information from a large number of files and derive data fields based on information in other fields. It can be used to interpret and manipulate large data bases, the company said.

The product was originally designed for use with Microsoft, Inc.'s MS-DOS Release 2.0 operating system and is also available for Digital Equipment Corp.'s Rainbow, Wang Laboratories, Inc.'s Professional and Texas Instruments, Inc.'s Professional microcomputers. The package costs $595, the vendor said.

Software Solutions, 305 Bic Drive, Milford, Conn. 06460.

See MICRO page 92

SALVO Shatters The Information Barrier!

At last. Create your own applications in a fraction of the time compared to BASIC, COBOL or *any* data base language. You know exactly what you want. Now, let your personal computer generate that information by using SALVO, the fourth generation information manager from Software Automation, Inc. It's Better. Faster. And Easier to use.

Natural Language Interpreter. Unique to SALVO, this allows you to enter the following type command, "List my customers and their orders." Watch as SALVO generates the application. *It truly shatters the information barrier.* In minutes you get what you want, the way you want it. Inventory, Accounting, Mailing Lists, Sales Reports and more.

Fourth Generation Language. SALVO is a powerful nonprogrammer's language combined with a true relational DBMS. This method increases your productivity 10 to 20 times normal! People in all professions can benefit from SALVO. Regardless of their level of expertise.

Applications Development Package. SALVO is a complete tool for information management. Develop your own applications. Maintain your data base. Retrieve information using natural language. All of these functions can be performed *by nonprogrammers.* SALVO is also a complete application generator for advanced users and professional programmers. SALVO's secret is simple. Technological innovations including artificial intelligence (expert systems, natural language processors) combined with relational data structures.

SALVO runs on most personal computers. Compatible with MS-DOS, PC-DOS and CP/M. SALVO requires only 64K memory. SALVO is available at your local computer store or you may contact us for information on how to get your own personal preview copy.

Software Automation Inc

14333 Proton Road, Dallas, Texas 75234
(214) 392-2802

Advertising Created By The Branch Agency, Inc. Dallas, Texas

WINDOW from page 60

while a data base sort is completed."

The number of windows offered by various packages typically runs from four to seven. But how many can the user use at one time?

"Most of our users monitor two or three windows concurrently," Gysin said.

"We found that a person has trouble monitoring more than two or three functions," said Joseph Brophy, senior vice-president of data processing at Travelers Insurance Co. in Hartford, Conn.

Users who try to monitor six or seven windows often find their productivity deteriorating rather than improving. "There has to be a point where too many windows detracts from its usefulness," Gysin said.

While it is fairly easy to share data among windowed microcomputer programs, when mainframe data is incorporated into the windowing process, the task becomes more complicated. Only one of the current windowing software offerings, the one used in IBM's 3270 Personal Computer, offers windows that directly access mainframe data.

"With the 3270 Personal Computer, a user can access mainframe data, but it is not easy to use that data with Lotus Development Corp.'s Lotus 1-2-3 or other microcomputer applications," said Ron Goldfarb, manager for office automation at Pratt & Whitney Aircraft Co., based in Hartford. A complicated cut-and-paste procedure is needed to use mainframe data with a microcomputer application, he added.

"While these products are designed for professional managers, I am not sure they spend enough time with a personal computer to benefit from windowing capabilities," Antonellis said.

Managers may not like other windowing features. Many windowing applications use icons to represent functions. For example, a picture of a notepad might be used to represent a buffer. "Icons are useful for some users," Gysin said. "Other users may find them insulting.

"Windowing will prove to be viable for some applications," he said. "Currently, it is the focus of almost every manufacturer's and independent software vendor's development. As other technologies mature, this trend will taper off, but windowing will not disappear."

PIRACY from page 60

of software for microcomputers. Some questions, such as whether software can be rented or loaned (in the case of libraries) will probably have to be settled in court unless Congress is willing to bite the bullet and come up with a legislative solution.

In order to inhibit unauthorized copying, software houses are using various techniques to copy-protect their programs. This approach to the problem is particularly annoying when attempting to produce an integrated set of software in an organizational environment. It obviously becomes difficult, or impossible, to integrate various programs with menu or windowing systems. This problem is subject to market pressures, however. If consumers, whether individual or corporate, will refrain, as a matter of policy, from buying copy-protected software, software houses will soon see the error of their ways.

After all is said and done, software piracy may not be as significant as some software houses would lead us to believe. It is a problem because of the moral and ethical implications involved (although these are neither neat nor clean). But in attempting to deal with the issue, we should beware of oversimplifying the problem and dealing with it in inappropriate ways.

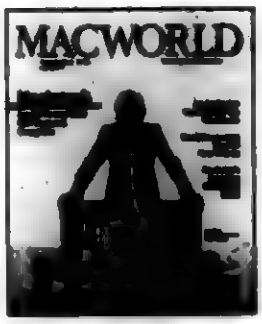
Finally, software houses must meet the challenge of the software needs of large organizations. Such organizations are often willing to pay a substantial fee for a site license if one is available. And quantity or educational discounts probably do not serve the same purpose as site licenses. When dealing with large organizations, software houses must come up with creative marketing techniques. The alternative is for those organizations, as policy, to buy only software from manufacturers which have such policies, or in the worst case, for individuals within such organizations to obtain unauthorized copies of the software in the mistaken belief that they are saving the organization money.

Madron is manager of Computer Services at North Texas State University, Denton, Texas.

Introducing

MACWORLD

The Macintosh Magazine



The Exciting New Magazine for the World's Most Creative Personal Computer—*the Macintosh*

At Special Charter Subscriber Rates
Save Up to 54% Off the Newsstand Price*
(*when you subscribe for 3 years)

Personal computing took a giant leap into the future when Apple introduced the Macintosh. We've created *Macworld* as your passport into this incredible new realm of computing. Each issue we'll bring you everything you need to explore and get the most out of your Macintosh. From the latest product news to innovative business applications, from amazing graphics to personal productivity tools and games, each issue of *Macworld* will be packed with interesting, practical, readable information written by skilled, perceptive writers.

Each month we'll be creating a *Macworld* community, sharing ideas, problems, and creative solutions while we explore the world of Macintosh together.

So why take a chance on missing a single exciting issue? For a limited time only you can subscribe to *Macworld* at special Charter Subscriber rates of only

$24 for 1 year (12 issues)
That's a savings of 20% off the regular $30 subscription rate and 50% off the newsstand price!

And you can save even more by subscribing for 2 or 3 years at Special Charter Rates. Don't Wait...Subscribe Today and Save! Call Toll-Free 800/247-5470 (In Iowa 800/532-1272)

Macworld
Subscription Department
P.O. Box 20380
Hoganfield, New Jersey 07621

I ACCEPT! Please send me Macworld, the Macintosh magazine.
☐ Please Bill Me ☐ Payment Enclosed
☐ Please Charge my ☐ MasterCard ☐ Visa
Card # _____ Exp. Date _____
Interbank # (mc only) _____ Signature _____
Please Send Me:
☐ 12 issues/$24 ☐ 24 issues/$46 ☐ 36 issues/$66
Name _____
Address _____
City, State, Zip _____

Subscriptions begin with the next available issue. Please allow 6–8 weeks for delivery of your first issue. Outside the U.S. subscriptions must be prepaid in U.S. funds. Outside the U.S. and Canada add $12 per year additional postage for surface mail and $60 per year for airmail. Allow an additional 4 weeks for delivery by foreign surface mail. This offer expires July 31, 1984.

mw0004

MICRO from page 86

INTEL CORP.
K286

Intel Corp. has announced a general-purpose operating system kernel for its supermicrocomputer, the IAPX 286.

Dubbed the K286, the kernel reportedly gives operating system designers an interface to all the architectural features of the IAPX 286, such as multitasking capabilities, memory management and protection and 1G byte of virtual memory.

The K286 was reportedly designed for real-time industrial automation systems, communications systems such as automated private branch exchanges and business systems.

The product will be ready for release in July. It costs $27,000 for a one-time license fee, including one year of factory support.

Intel, 3065 Bowers Ave., Santa Clara, Calif. 95051.

COMPUTER INDUSTRY

Lotus: Expected to hit No. 2 spot

OUTSIDE LINES

PETER BARTOLIK

With the scheduled announcement last week of the successor to 1-2-3, Lotus Development Corp. has enhanced its formidable market position and is projected to ride success to No. Two on the ladder of top software companies. That's No. Two among all software companies, not just vendors of micro products.

The investment firm of L.F. Rothschild, Unterberg, Towbin recently predicted that Lotus in 1984 will bring in revenues of $165.7 million, topping Cullinet Software, Inc. and Microsoft, Inc. and coming up just short of Management Science America, Inc.

Without a doubt, Lotus is the prime example of how the marketplace establishes a standard and the potential riches that can come to those who successfully ride the dynamics of the exploding microcomputer market.

The company raised $1 million in financing in early 1982 and introduced its product in October of the same year, actually shipping the product in January of last year. Less than two weeks ago, Lotus released its annual report showing profits of $14.3 million on revenues of $53 million.

Keys to success

The keys to success were: a solid, state-of-the-art package beating anything then in the field, reliability, canny marketing, timely delivery and solid management.

With IBM expected to ship in excess of two million micros in 1984, and IBM-compatibles adding another solid contribution, plus the potential of Apple Computer, Inc.'s Macintosh, Lotus is in fine shape and serves as a mentor to many other would-be overnight success stories.

There will be problems, however, for the new entrepreneurs.

Foremost, where Lotus established a standard by shipping 90,000 packages in

See LOTUS page 98

Bank software firms see red

Data base task too complex?

By Paul Kozaniecki
CW Staff

For some application software developers, the road leading to the kingdom of on-line, integrated, central data base systems is scarred with huge potholes.

One case in point is Anacomp, Inc., the Indianapolis-based company that is developing the Continuous Integrated System (CIS), an on-line, data base system for banks. The month of January represented the company's high and low points; in the space of that month, it delivered both a pilot version of CIS to the Provident National Bank in Philadelphia and defaulted on a $45 million lending agreement with five banks.

The default was attributed to CIS cost overruns and missed deadlines by Anacomp, which expects to report quarterly losses through the first nine months of 1984. Provident National Bank officials refuse to comment on the pilot project.

But Anacomp's problems are hardly unique. Other vendors have also missed delivery dates, raised prices and rewritten specs during the development of their data base systems.

Insurance Service of America, Inc. (ISA), for example, attempted to develop an on-line data base system for commercial insurance policies. After cost overruns and missed deadlines and before the project's completion, the system was sold to Advanced Technology, Inc., a division of Maryland Casualty Co.

A promise of the '70s

The desire for large on-line data base systems emerged in the mid-1970s. The systems promised to make complete, up-to-the-minute customer information instantly available. "The customer wants one statement with checking, Visa and mortgage information," said William Conklin, an independent consultant in Boston.

Major data processing shops, among them those in financial institutions, began looking at these systems. "A company must develop this type of system to keep pace with its competitors," said Ronald G. Ross, editor of "Data Base News," a Marblehead, Mass., publication. "Any com-

See BANK page 100

Six indicted in alleged Apple scam

By Patricia Keefe
CW Staff

PHILADELPHIA — A federal grand jury here recently returned two separate indictments against six individuals and five companies, charging them with criminal conspiracy and smuggling of computer parts into the U.S. from Taiwan. Those parts are alleged to be counterfeit Apple Computer, Inc. Apple II components.

Information from the year-long Philadelphia investigation was funneled through U.S. Customs' Operation Tripwire, resulting in seizures of smuggled, allegedly counterfeit Apple computers in New England, San Francisco and Los Angeles, according to David E. Warren, special agent-in-charge of U.S. Customs Service here.

Operation Tripwire seeks to stop the importation of foreign-manufactured goods that infringe upon U.S. copyrights and trademarks. Warren explained that Customs believes there is a link between these operations, and that it is possible several of the six indicted here may be ring leaders.

The indictments marked "the first time a case has been brought for a customs violation [smuggling] in connection with the importation of computers that are copies of computers manufactured in the U.S.," according to the U.S. District Attorney's office here. (Although U.S. Customs officials raided three California companies last month, netting 1,000 Apple II look-alikes, no charges have been filed as yet.)

Although "there can be no doubt" that the Philadelphia defendants were importing counterfeit Apple II components, the U.S. District Attorney's office here does

See APPLE page 96

MSA
The Software Company
Management Science America, Inc. opens West Coast sales office to provide single source for their own software and products from other vendors./84

IBM
Large systems still count, IBM tells shareholders in annual report stressing conservative management/97

INSIDE

■ Harris Corp. focuses word processing strategy around units from recently acquired Lanier Business Products, Inc./84

■ Longstanding dispute heats up between Software Arts Products Corp. and Visicorp over marketing of Visicalc and next generation/96

Instant Cure for Computer Indigestion

John Beall & Company, Inc.

MSA division to distribute micro software

By Jeffry Beeler
CW West Coast Bureau

LOS ANGELES — Management Science America, Inc. (MSA) has opened an additional sales division in a move designed to aid information systems directors in stemming the spread of incompatible microcomputer programs within large corporations.

MSA's Micro Distribution Division (MDD) will serve as an additional sales arm both for the company's own Peachtree Software, Inc. subsidiary and for many rival publishers of microcomputer applications as well, the company said.

MDD, headquartered here, will evaluate a host of programs representing each of the major generic categories of commercial personal computer applications — spreadsheets, word processing, graphics, communications, accounting, data base management, project scheduling and windowing. The ultimate aim of the exercise is to identify the top three or four big-business-oriented packages in each category, according to the company's senior vice-president, Howard Smith Jr.

Although at least a few of the chosen applications will undoubtedly bear Peachtree's label, the majority will be supplied by other vendors, Smith said. All the packages, however, will be required to run on IBM or IBM-compatible personal computers.

Once a particular product has won MSA's final approval, MDD will buy and warehouse multiple copies of the program. Through its own independent sales staff, the division will then approach large corporations throughout the U.S., offer to analyze their total systems environments and supply the right combination of micro software packages to meet their individual needs.

To take advantage of MDD's services, however, clients will have to commit to buying at least $100,000 worth of personal computer applications per year. "Companies that spend less than that amount for microcomputer software will probably continue to buy through traditional sources like retail stores," Smith said.

In addition to selling a wide variety of personal computer packages, the division will serve as a liaison between its customers and its cooperating publishers' support staffs. MSA is thus striving to offer big business a much needed single source, not only for all its microcomputer software, but also for all its maintenance and user training, Smith said.

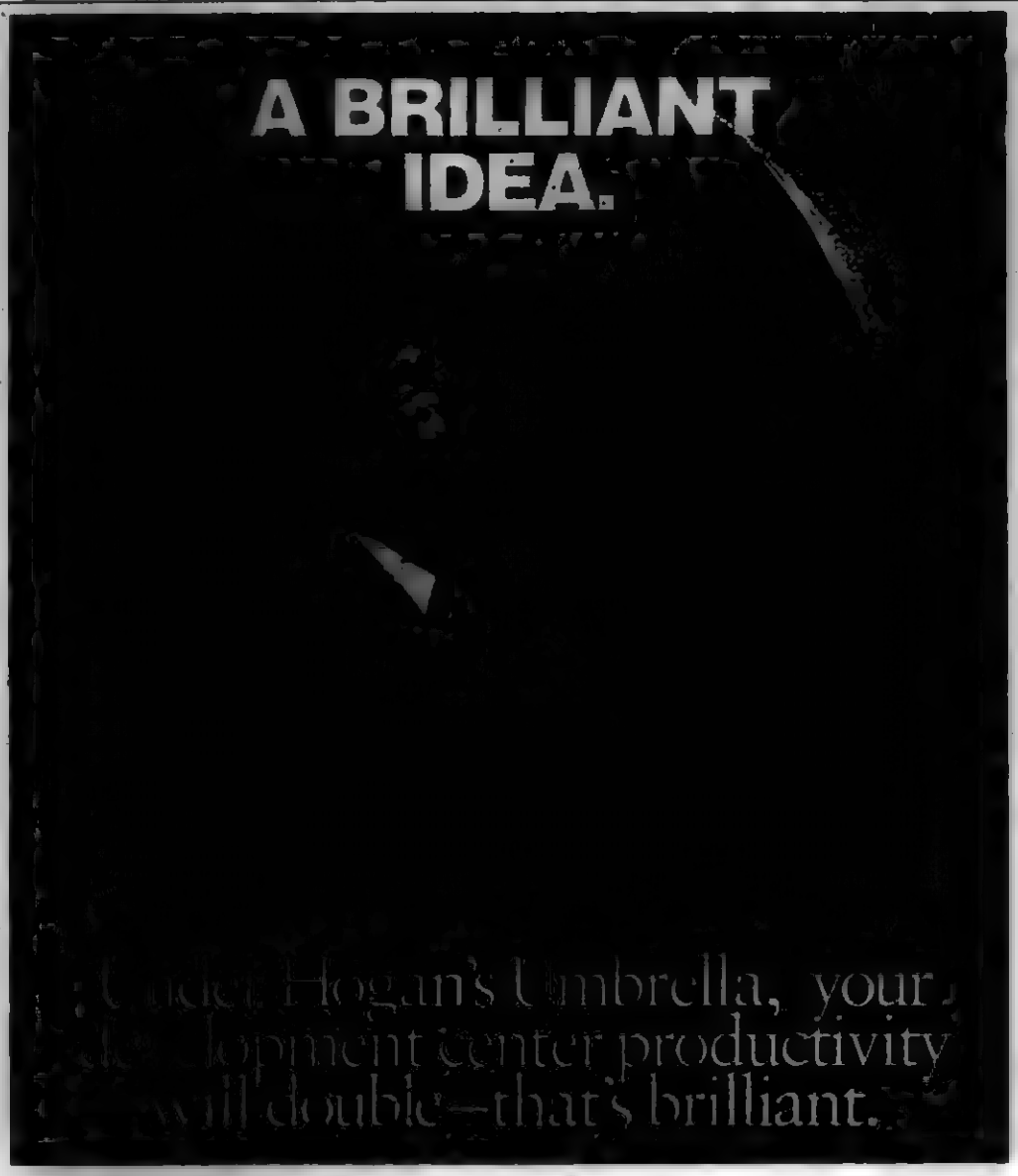
Single sourcing, in turn, will enable MIS managers to control tightly their companies' software purchases, avoid the installation of incompatible systems and, therefore, promote the adoption of effective personal computer standards, he added.

MDD will also provide large corporate accounts with several other software-related services, including:

- Pricing discounts typically ranging from 15% to 30%.
- A series of nationwide, quarterly forums that will give customers an opportunity to discuss their personal computer applications needs with many of the industry's leading program publishers.
- An IBM Personal Computer-compatible add-on board with a prerecorded tutorial and a voice-synthesis unit that together will teach microcomputer operators how to use each MDD-supported application.

Formation of MSA's latest division follows the completion of a recent survey in which MSA sought to analyze the microcomputer installations and needs of the 2,000 largest corporations in the U.S. The study reportedly uncovered a widespread dissatisfaction with traditional methods of acquiring microcomputer software.

"Many big companies still buy most of their microcomputer programs through their local computer stores, but they're not entirely pleased with that arrangement," Smith said. "They dislike having to deal separately with five or six different vendors and would much rather get all their software, service and support from the same source."



Under Hogan's Umbrella, your development center productivity will double—that's brilliant.

Imagine. A fully integrated development center system capable of upgrading and increasing output throughout the life cycle of both major and minor on-line and batch applications.

This completely automated approach to interactive development was critical in the development of our own highly successful line of applications software. That included design, management, programming, implementation, and maintenance of both on-line and batch applications. The Umbrella weathered well.

So well, in fact, users tell us that, "we beat our estimates by 50% on our very first major on-line application and that included our education time on the Umbrella."

There's a lot more the Hogan Umbrella can do. Just ask any Umbrella user...various combinations of DOS, VS, MVS, IMS, VSAM, CICS, IDMS. And ask Ed Lomax, Vice President, at (214) 386-0820. Make a brilliant decision today.

Send me more information on your UMBRELLA System.

Name: _____

Title: _____

Company: _____

Address: _____

City: _____ State: _____ ZIP: _____

Phone: _____

Hogan SYSTEMS

TOMORROW'S SOFTWARE. HERE TODAY.

Corporate Headquarters: 5080 Spectrum Drive, Dallas, TX 75248 ☐ Atlanta, Boston, Chicago, Dallas, Detroit, Los Angeles, New York; London, Australia and New Zealand ☐ TELEX 203927 ☐ (NASDAQ Symbol: HOGN)

Harris strategy to target Lanier

MELBOURNE, Fla. — Harris Corp. announced recently that its strategy in the word processing market will focus on the products of its recently acquired subsidiary, Lanier Business Products, Inc., and that Lanier's One-Step software package will be the companywide word processing standard for all Harris information systems.

Harris will also present its Harrisnet local-area network architecture as the standard networking architecture for all Harris and Lanier information system products. That architecture, according to the company, will be applied first to the Lanier

See HARRIS page 96

Semi bookings for U.S. mart forecast to slip

By Robert Stitt
CW West Coast Bureau

NEWPORT BEACH, Calif. — After reaching record levels in the fourth quarter of 1983, semiconductor bookings for the U.S. market will decline by 12% in the first three months of this year, according to In-Stat, Inc.

In a report presented to the Seventh Annual Information Services Seminar, sponsored by the Semiconductor Equipment and Materials Institute, Inc., In-Stat said bookings for the U.S. market will decline from a total of $8.1 billion in the fourth quarter to $7.7 billion in the current quarter.

Addressing the seminar, Jack Beedle, president of the Scottsdale, Ariz.-based market research firm, said the "splurge" in the last three months of '83 witnessed many manufacturers becoming increasingly gun-shy about product shortages, placing annual purchase orders in an effort to ensure sufficient products to meet rapidly increasing sales forecasts for 1984.

Semi bookings jump

December semiconductor bookings, he claimed, leaped by $1.90 million over November levels to $3.1 billion, while sales moved up to $4680 million.

While there will be a relative downturn in the first quarter of 1984, Beedle predicted that semiconductor bookings will still increase by 20% for the year, after increasing 68% in 1983.

He said a smaller book-to-bill ratio this year will allow both suppliers and end users to schedule products more effectively.

At a press conference following the seminar, Beedle claimed 1984 should be a strong year for U.S. semiconductor manufacturers as compared with their Japanese counterparts.

"The Japanese manufacturers have serious problems at the moment...They are hard pressed to supply their own clients due to the vertically integrated nature of their organizations and because of the tremendous amount of Japanese chip manufacturers that are trying to enter the lucrative computer industry," he claimed.

More good news

Citing more good news for U.S. vendors, Beedle asserted that domestic suppliers are now mounting a viable challenge to Japanese dominance in the 64K-byte dynamic random-access memory (RAM) market. A prime example, according to Beedle, is Mostek Corp., which "came from nowhere to become the world's third-largest manufacturer of 64K dynamic RAMs."

Remarking on the state of the industry, James Webster, director of product program management at IBM's General Technology Division, said the biggest single force in improving price/performance in the computer industry is the march of technology.

That IBM has been able to make price/performance improvements in the region of 20% a year is due almost entirely to the fact that semiconductor technology is growing at an even faster rate than the DP industry itself, he asserted.

But Dan Ross, president of the Los Altos, Calif.-based consulting firm Ross Associates, Inc., told attendees at the post-seminar press conference that a string of recent economic indicators heralds the possibility of a downturn in the economy at a time of record bookings for chip manufacturers.

The expectations of spectacular growth in the industry during the next four years may therefore turn out to be premature, according to Ross.

HARRIS from page 94

5000 series and a new family of Harris distributed data processing systems and later to Harris superminicomputers, interactive and remote job-entry terminals as well as to a new generation of integrated voice and data private branch exchange products.

John T. Hartley, president of Harris, said the company has refined its market focus to take advantage of Lanier's installed base of 55,000 stand-alone word processing units and will concentrate on the recently released Lanier Business Processor 1000 and the Business System 5000 clustered network as its building blocks in the word processing market.

Harris also announced its Distributed Office Systems Division will be separated into its original two components: the Harris Distributed Products Division, to be headquartered in Dallas and managed by J. Whitney Haney, who was previously responsible for the Distributed Office Systems Division; and the Word Processing Division, based here under Lanier Business Products and reporting to William J. Kelly, vice-president of research and development for Lanier.

CUT YOUR COBOL TEST AND DEBUG TIME... AND YOUR COST!

XPF/COBOL is the first full-screen, interactive, SPF-like debugging tool on the market. It delivers a complete window into COBOL programs.

XPF/COBOL enables the user to:
- Watch the programs execute—forward or backward.
- Find and change COBOL data in COBOL format.
- Debug MS programs.

XPF/COBOL:
- Slashes test and debug time.
- Increases programmer productivity.
- Is easy to learn and easy to use.

XPF/COBOL can pay for itself in months.

Call your nearest Boole & Babbage sales office below, or send in the coupon for complete information and user references.

Send me information on XPF/COBOL.
Name
Title
Company
Address

Send to:
Boole & Babbage
510 Oakmead Pkwy.
Sunnyvale, CA
94086

Boole & Babbage
The Information Resource Management Company

Los Angeles, CA (213) 642-7580
Sunnyvale, CA (408) 773-8811
Atlanta, GA (404) 395-1264
Chicago, IL (312) 629-8910
St. Louis, MO (314) 434-5100
Englewood Cliffs, NJ (201) 461-6006
Dallas, TX (214) 385-8078
McLean, VA (703) 448-9184

'Visicalc' lawsuits proliferate

BOSTON — Lawsuits between Software Arts Products Corp. in Wellesley, Mass., and Visicorp in San Jose, Calif., have proliferated in recent weeks, as a long-standing disagreement between the two firms has heated up.

On Feb. 10, Visicorp was denied a temporary restraining order that would have prevented Software Arts from using the trademarks "Visi," "Visicalc" and "Visicalc Advanced Version."

Visicorp's suit was filed in response to an answer and counterclaims filed by Software Arts on Feb. 7. This answer amended a countersuit Software Arts filed here last fall and charged Visicorp with breach of contract, while seeking to terminate an agreement that allows Visicorp to market Visicalc.

The agreement, signed in 1979, allowed Visicorp to market Visicalc, a spreadsheet program developed by Software Arts. In 1979, the program ran only on Apple Computer, Inc.'s Apple II microcomputer. Under the agreement, Software Arts was responsible for enhancing Visicalc and tailoring it to other microcomputers.

Last September, Visicorp filed suit in a California court claiming that Software Arts was late delivering new versions of Visicalc for a number of microcomputers, including the IBM Personal Computer. Visicorp accused Software Arts of using money earmarked for Visicalc enhancements to develop TKSolver, an equation processor.

Software Arts denied the charges and countersued Visicorp for nonpayment of royalties, not promoting Visicalc to the best of its ability and developing Visioncalc, which runs under Visicorp's Visi-On. Software Arts claimed that Visioncalc is an enhanced Visicalc — so Visicorp should have offered Software Arts the opportunity to develop the program — and that Visicorp should pay Software Arts royalties for the product. However, Visicorp claimed that the product was developed from scratch.

Software Arts has indicated that it plans to market Visicalc with its own trademark. "One of the bylaws in the 1979 agreement states that if a breach of contract occurs, the Visicalc trademark reverts to Software Arts," said Thomas Moffei, a lawyer for the Boston firm of Choate, Hall & Stewart, which is representing Software Arts.

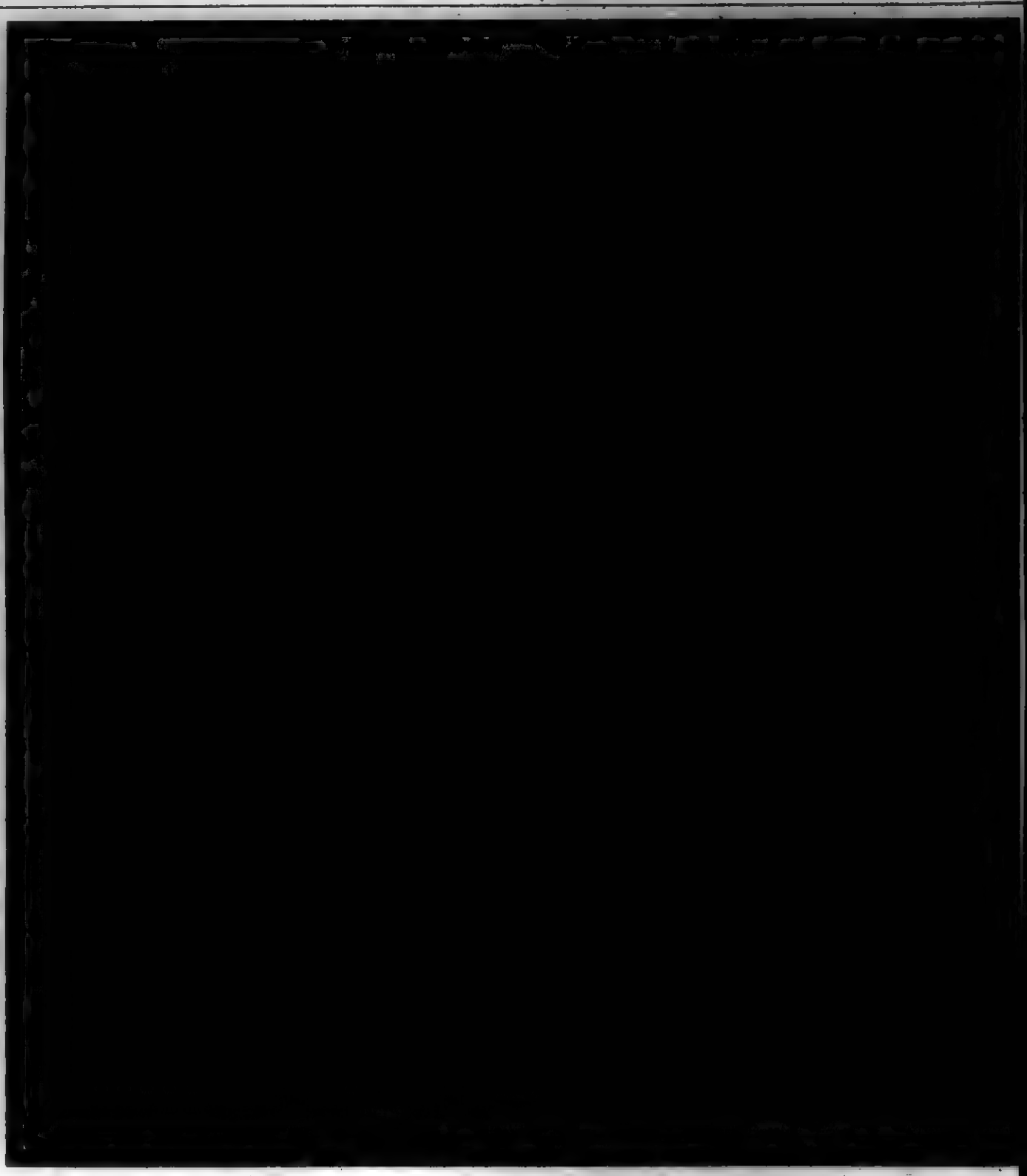
M&D to market Software International's

NATICK, Mass. — In a move intended to skirt an injunction that has frozen international sales of McCormack & Dodge Corp.'s (M&D) G/L Plus general ledger package, M&D last week entered into an agreement with Software International, Inc. of Andover, Mass., for international marketing rights to Software International's The System report writer subsystem.

The System is substantially similar to Fast, a report writer developed by ABC Management Systems, Inc. of Bellingham, Wash., and sold by M&D as part of G/L Plus.

M&D has been enjoined from selling Fast internationally as the result of a suit brought by ABC last year. In November, a superior court judge imposed the injunction and awarded $2.5 million to ABC [CW, Dec. 5]. The judge also awarded $300,000 to Software International for reimbursement of expenses incurred in fighting a countersuit by M&D against ABC and Software International. On Feb. 1, a state appeals court upheld the injunction against M&D.

An M&D spokesman said the agreement with Software International, which is valued at over $1 million, will effectively settle all claims between the two vendors. However, an appeal by M&D



Power. That's the key to CDI/100. It's a new concept in PC operating system environments so powerful, so personal and so remarkably flexible, that it can be tailored to the dimensions of any size operation.

We've integrated the best generic features of the minicomputer world with the convenience of Microsoft's MS-DOS.

The learning process is traversed as quickly and easily as an open door. What it brings to your IBM PC is a new generation of data base management capabilities in a system that becomes as personal as your fingerprint.

For virtually limitless application in a system that will

'The System' in effort to avoid 'Fast' injunction

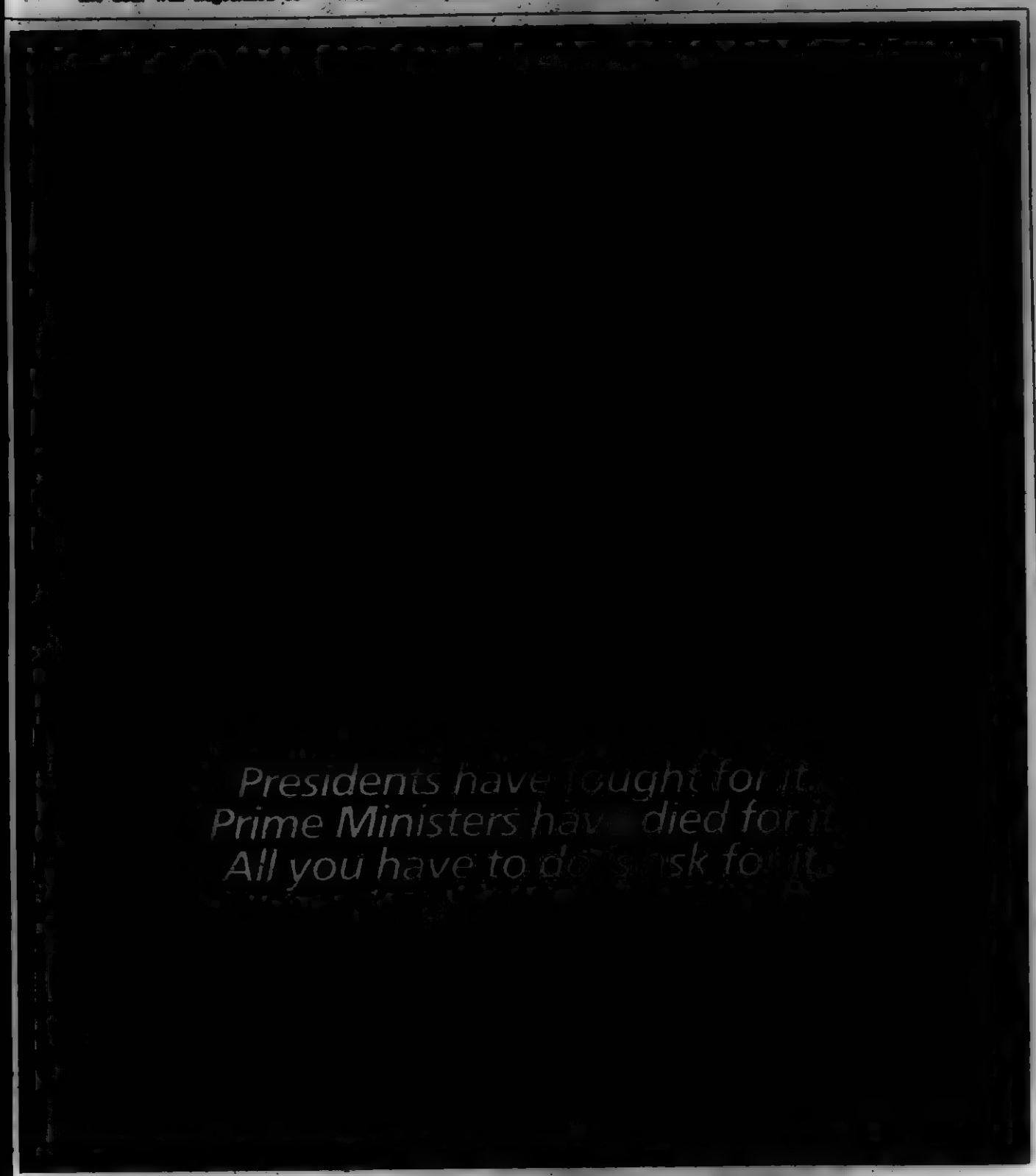
is still pending in its litigation with ABC.

If the agreement is approved by the court, M&D will offer The System as a subset of G/L Plus. However, the software must undergo modifications, a process which could take several months. The spokesman said the deal was negotiated so that M&D international sales representatives could continue to market G/L Plus with the promise that a Fast lookalike would be available soon. M&D has also pledged to replace the Fast subsystem with its own report writer sometime in the third quarter of this year.

M&D Chairman James M. McCormack said the deal was negotiated after attempts to reach an out-of-court settlement with ABC had failed. "It became clear after extensive negotiations that there was no interest from ABC Management Systems in a reasonable settlement of this dispute," he said.

"That's an absolute lie," commented Vernon Ruskin, president of ABC. "We offered them a settlement over a month ago, and we haven't heard from them since. They haven't negotiated seriously." The M&D spokesman would not comment on Ruskin's countercharge.

Ruskin estimated it would take six months for M&D to modify The System, which is based on a later version of the ABC report writer, for use with G/L Plus. "I don't see how they could market [The System] without making those changes," he said. Ruskin added that ABC lawyers believe the agreement between M&D and Software International is "not feasible."



grow just as far and just as fast as you do, ask for CDI/100, coming soon, wherever you buy your software. And look for us at SOFTCON, Booth L4077. Because personal power has never been this simple.

Exceptional New Software Concept
- Everyone's Filing System
- English-like Inquiry Language
- Dynamic Menu System
- Integrated Help Features
- Relational Data Management
- Enhanced Basic Compiler
- Dictionary Supported Data Base
- Work Flow Manager

CDI 100™
CDI, 1309 114th Ave. S.E. Bellevue, WA 98004
INCREASE YOUR PERSONAL POWER.™

IBM aiming to reassure bondholders

ARMONK, N.Y. — Despite its rapid and profitable domination of the microcomputer market, IBM's "large systems still account for a substantial portion of revenue," the company reported in a just-released annual report aimed at reassuring shareholders of a continued conservative management style.

"Management is mindful of the risks inherent in high technology, the growing scope and quality of competition and uncertain economic conditions," IBM's report said. A major consideration of management is conservation of capital. In 1983, according to the report, IBM increased its cash on hand and marketable securities to $5.5 billion, up from $3.3 billion in 1982, and at the end of the year had accumulated total working capital of $7.7 billion, up from $4.8 billion at the end of 1982.

Along with that increase in liquidity, the company continued to decrease its investment in equipment for rentals, "consistent with the changing character of our business," decreasing that portion of its assets before depreciation to $13.4 billion, down from $16.5 billion in 1982. Revenues from rentals declined about 17% to $8.2 billion.

A key management strategy, according to the report, is cost control through maximized productivity, and IBM held increased investment in plant and other property to 6% over the previous year, as general and administrative expenses climbed 14% and research and development expenditures climbed 17%.

A further indication of IBM's strategy of keeping its assets liquid was the disclosure that IBM Credit Corp. increased its purchases of installment payment agreements from the parent company to $848 million in 1983, up from $682 million in 1982, and purchased $334 million of IBM products for term lease customers, up from $67 million in 1982.

Computer counterfeiters gaining in numbers

During fiscal 1983 and the first quarter of fiscal 1984, over $9.2 million of counterfeit computers were seized by U.S. Customs Service officials throughout the U.S., estimated Special Agent-in-Charge David E. Warren of the Philadelphia office of the Customs Service.

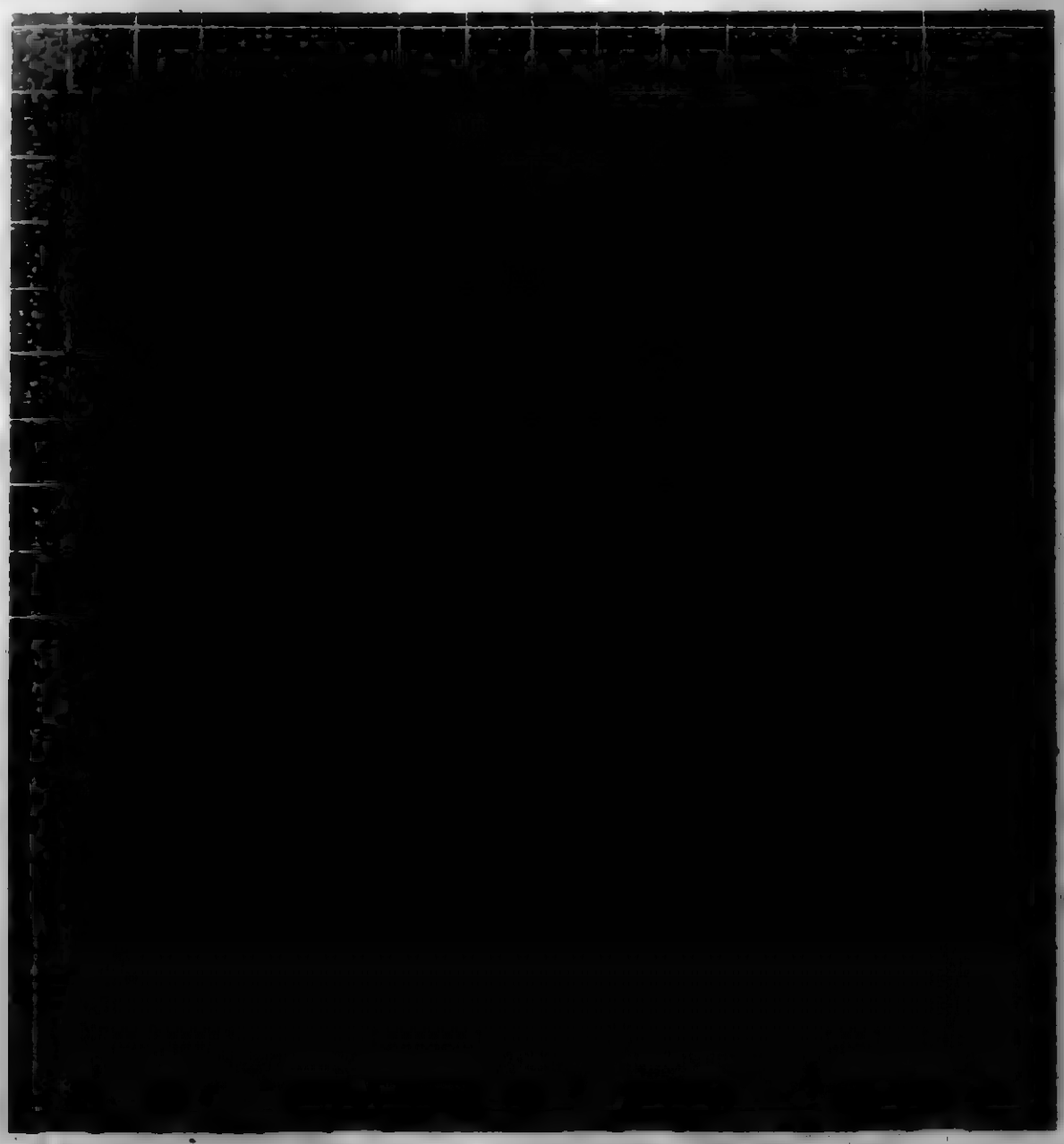
Apple Computer, Inc.'s Apple II and II+ and video games have been among the primary targets of computer counterfeiters. Even industry giant IBM is beginning to experience problems and has recently registered some copyrights with Customs, according to Gary Hecker, a copyright and patent attorney representing Apple.

In Taiwan alone, there are five to 10 major companies manufacturing counterfeit computers and literally hundreds of smaller manufacturing and trading companies as well, Hecker estimates.

Counterfeiters are so numerous that fake Apples actually outsell the real thing 10 to one in Taiwan, the attorney said.

Among the variety of ways counterfeiters are attempting to evade detection by the Customs Service:

- Concealing components in shipments of other goods, like heavy machinery.
- Sending computer components in separate packages, via air mail and air freight, to private residences or separate addresses.
- Falsifying package labeling as to contents and value or falsifying cargo documentation.
- Shipping completed computers minus printed-circuit boards or read-only memories, which are shipped under separate cover.



APPLE from page 98

not intend to pursue the issue of copyright infringement, according to Ewald Zittlau, an assistant U.S. district attorney handling the case. Instead, Apple will have to decide whether to pursue any alleged copyright violations through civil litigation, he said. An Apple spokeswoman said the vendor is considering such action.

However, Zittlau said "there is no question that they [the defendants] had it in mind that they could not get these components into the U.S. unless they concealed them in other shipments or by mislabeling packages and, in some cases, addressing these packages to their homes." Zittlau noted that when "you turn the [assembled computer] on, it says 'Apple.' " And, he added, the parts are so similar, that when placing their orders, the defendants asked for Apple II parts.

An initial tipoff from Apple about illegal sales in the area included one company that was already under investigation for other customs violations, Warren said. Four of the six in Philadelphia were nabbed via a sting operation involving local police, customs officials and some technical assistance from Apple.

The first indictment concerns Alberto K. Chua and Alfonso D. Koh and their three import companies. The two men are each charged with four counts of smuggling and one count of conspiracy. Specifically, they are accused of smuggling counterfeit Apple II parts into the U.S. and selling them to Joel M. Isadore and Daniel Ryan.

Chua and Koh each face a maximum prison sentence of 25 years and a maximum fine of $50,000. Their three companies are each charged with one count of conspiracy; two of the three are also charged with two counts of smuggling and face a maximum fine of $30,000, and the other faces a maximum fine of $10,000.

Isadore is also charged with conspiracy in the second indictment, which concerns the alleged activities of Robert Ellis, his two import companies and his son David. The senior Ellis is charged with four counts of smuggling and one count of conspiracy and faces the same penalties as Chua and Koh.

Ellis is alleged to have asked Taiwanese manufacturers to send fake Apple II parts via air-mail parcel post in mislabeled packages, such as "electric part samples, no commercial value." The indictment further alleges that the three men received counterfeit Apple parts and assembled look-alike computers from February to April 1983.

LOTUS from page 93

the first quarter of 1983 and 160,000 in the second quarter, the newcomers are going to have to ship in the hundreds of thousands, and do it quickly in able to corner the marketplace before new developments overtake them.

Secondly, as the competition heats up it's going to take many more millions of dollars to market a new product successfully.

So there are likely to be few Lotuses in the future and more and more software developers signing up to established muscle, like Microsoft, and maybe even Lotus itself.

COMPUTER INDUSTRY

NICKELS & DIMES

Compaq Computer Corp. posted a yearly profit of $4.7 million, or 24 cents per share on sales of $111 million during 1983, its first year of operation. Profit in the fourth quarter totaled $5.3 million on sales of $52 million.

■

Vector Graphic, Inc. announced its results for the second quarter, posting a $1.9 million loss on sales of just $3.3 million, compared with a profit of $107,000 and sales of $11.9 million posted during the same period a year ago.

■

The Ultimate Corp. has announced third-quarter revenues of $18.5 million and earnings of $2.7 million, or 28 cents per share, up 75% and 116%, respectively, over the same period last year.

■

Computer Task Group, Inc. has reported revenues for 1983 of $54.2 million, up from $40.1 million a year ago. Earnings increased 27% to $1.5 million.

■

Perkin-Elmer Corp. recently reported second-quarter profits of $14 million, or 32 cents per share, up 38% over the same period a year ago, on revenues of $288.7 million, up 6% over the year-earlier figure. Profits for the first six months of fiscal year 1984 were up just $1.5 million over the previous year, reflecting a poor first quarter in 1984 when profits were $8.6 million, down $2.3 million from the year-earlier benchmark, on revenues of $248 million.

■

Computer Consoles, Inc. has reported that revenues for 1983 rose 31% to $103.6 million, up from $79.1 million for 1982. Net income was $10.4 million, or 87 cents per share, up 40% from $7.4 million, or 66 cents per share, in the prior year.

Cray Research, Inc. has reported revenues of $82.8 million and earnings of $19.2 million, or $1.31 per share, for the fourth quarter ended Dec. 31, compared with revenues of $52.6 million and earnings of $12.2 million, or 87 cents per share, for the comparable period last year.

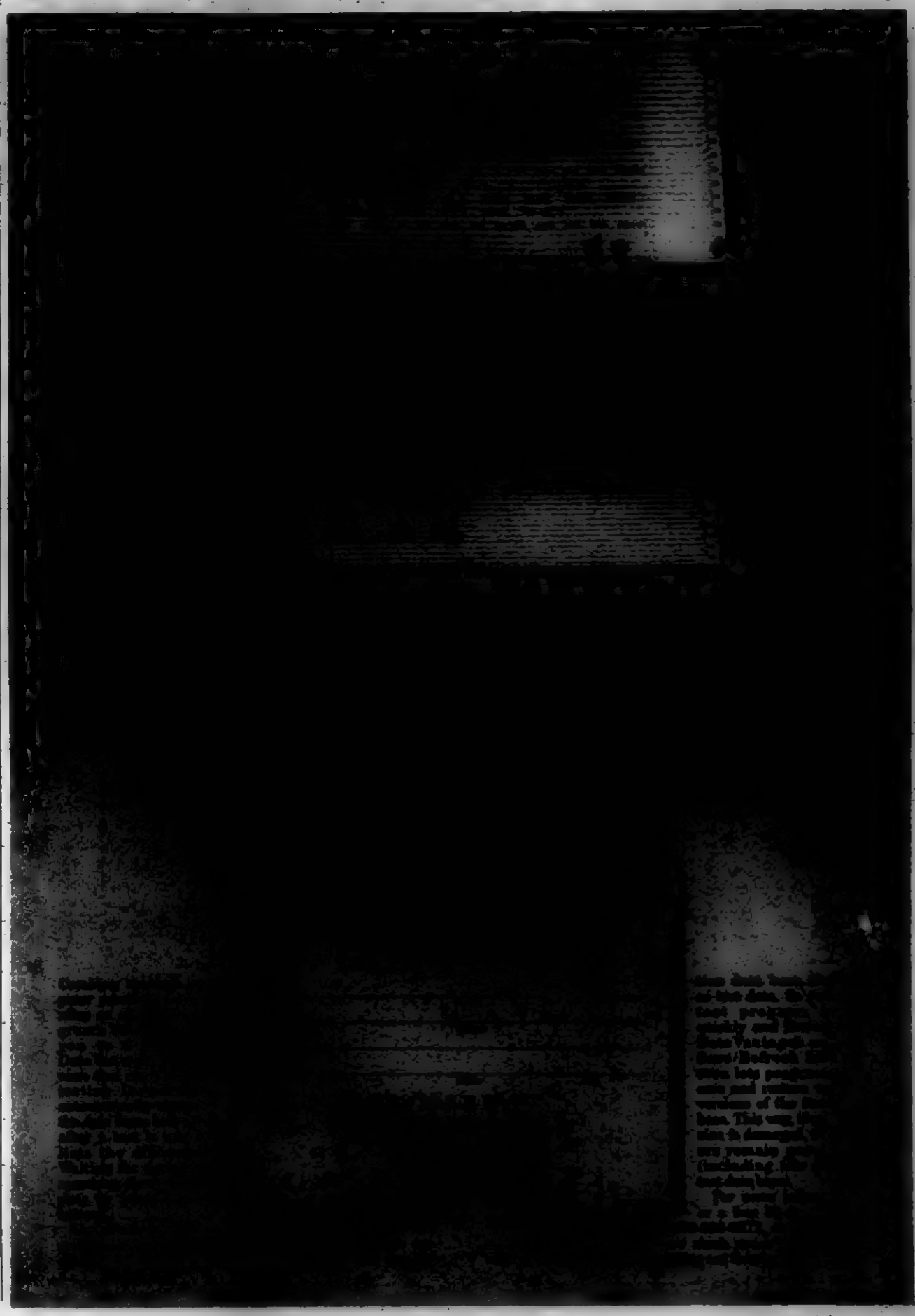
■

Electronic Data Systems Corp.'s earnings per share for the second quarter of fiscal year 1984 were 31 cents per share, up 24% from the same period last year. Quarterly revenues rose 22% to $189.6 million, and profits were up 24% to $17.5 million.

■

Prime Computer, Inc. recently announced it had successfully renegotiated its $100 million line of credit with six major banks, extending the initial agreement through 1991 and reducing borrowing costs and compliance requirements.

VAX® USERS!
NOW GET SPREADSHEET AND GRAPHICS IN ONE PACKAGE.
• Full business graphics • Advanced features • Affordable price
GRAPHIC OUTLOOK™
from STONE MOUNTAIN COMPUTING
1096 Cambridge Dr.
Santa Barbara, CA 93111 (805) 964-6101
VAX is a trademark of Digital Equipment Corporation



ON-LINE from page 98

pany using technology must incorporate the latest technical developments into its operation."

Realizing how complex on-line data base systems are, some companies joined forces with application vendors to design these systems. But few banks, insurance or financial companies had any experience designing and implementing data base systems. They underestimated the cost and complexity of the projects.

"Millions of dollars were thrown away developing elaborate on-line data base systems that were never delivered," said Michael Salzberg, principal at the Plagman Group, Inc., a New York consulting firm specializing in data base technology. "Problems arise when users with diverse needs access the same data."

Design methods, not technical limitations, create problems. "Some vendors and data processing departments undersold the difficulty of designing these systems," Ross said. "Even with technical advances, companies must take a comprehensive analytical look at system needs, set realistic expectations and be totally committed to the system.

"The technology can be improved, but problems surface from the scope and design of the system. Many companies do not have the proper administrative structure in place to design and implement these systems."

In some cases, project control slipped away. "These are huge systems, too large for one person to design," Ross said. "Since this is the nature of the beast, conventional design approaches won't work. Implementation has to be different. Each module has to fit into the system. There has to be division of labor to ensure that the system is well designed."

Conventional programmers often do not have the proper tools to design these systems. "Data processing managers have to retrain their people," said Dan Nolan of Heuristic Development in Annandale, Va.

"Data processing departments must invest in their people. No one works with hexadecimal anymore. They must stop programming in Cobol and other languages and work with the new natural languages," he said.

Another problem is that vendors often build too many features into the system. "There were features in the [Anacomp] CIS system that were not needed," said Conklin. "It had features like simultaneous batch and on-line processing, which a bank doesn't need. Anacomp built the system so that it was easy to sell and maintain."

Hogan Systems, Inc. in Dallas succeeded where Anacomp failed. Its on-line banking system, less ambitious than the Anacomp system, is up and running.

Grandiose design also haunted Insurance Systems of America, Inc.'s system. After purchasing the system, Maryland Casualty changed system specifications and delivery dates. "Since the sale, there has been an improvement in meeting delivery dates," said Lawrence Bacon, second vice-president of data processing at Travelers' Insurance Co. "The quote portion of the general liability system is up and running in 78 Travelers' service offices."

Announcing

The one-stop, international advertising service for micro marketers.

You'll reach microcomputer buyers all over the world with *Computerworld's* International Marketing Services (CWIMS). Because we have the microcomputer market *covered* with an international network of publications. And what a market!

As the need for computerization in government, industry and educational systems all over the world becomes more acute, countries look to the cost-effective, adaptable microcomputer to bring them into the computer age. This means a very lucrative market for the U.S. micro marketer, since international product demand exceeds product supply.

Now, with the help of *Computerworld's* International Marketing Services, you can advertise in seven magazines devoted exclusively to supplying information to microcomputer users in: Australia *(MicroWorld)*, Brazil *(Micro Mundo)*, Denmark *(Micro Verden)*, Finland *(Mikro)*, France *(Golden)*, Japan *(PersoCom World)*, Norway *(Mikro Data)*, Sweden *(MicroDatorn, Min Hemdator)*, Spain *(Micro Sistemas)*, The Netherlands *(Micro/Info)*, West Germany *(MicroComputerwelt, PC Welt)*. And, your advertising message can reach buyers of microcomputer products and services around the world through special micro sections in any of our 40 publications in 25 countries.

Act now—and take advantage of this international demand for microcomputer products. Whether you want to test the market—or locate a distributor or representative—our publications will put you in touch with the right people around the microcomputer world.

For more information on getting international micro coverage, call Diana La Muraglia, General Manager, International Marketing Services, toll-free, at 800-343-6474. In Massachusetts, call 617-879-0700 or return the coupon below.

CW Communications/Inc.

Diana La Muraglia, General Manager
International Marketing Services
CW Communications/Inc.
375 Cochituate Road, Box 880
Framingham, MA 01701

Please send me information on:
☐ Your microcomputer publications ☐ Your other foreign publications

Name _____ Title _____
Company _____
Address _____
City _____ State _____ Zip _____

SUPERSHORTS

Reynolds & Reynolds Co. has announced an agreement with **NCR Corp.** in which NCR will provide advanced computers as new additions to Reynolds' line of VIM/NET Systems. Under the two-year agreement, Reynolds will purchase approximately $20 million in enhanced models of NCR's Tower 1632 data processing units. Reynolds will market the units as part of a configuration for very large vehicle dealers.

■

Dr. John McCarthy, creator of the Lisp programming language, and **Dr. Douglas Lenat**, professor of Computer Science at Stanford University, have been named to the newly formed Scientific Advisory Board at **Inference Corp.**, an artificial intelligence company.

■

Western Union has been awarded a contract by **Eastern Airlines** to provide its Easylink electronic mail service to subscribers to Eastern's automated reservations and ticketing system, the System One Direct Access System, over a three-year period beginning this spring.

■

Warner Software, Inc. has acquired all publishing, marketing and licensing rights to The Desk Organizer, a desk management software product for the IBM Personal Computer, developed by Conceptual Instruments Co.

■

AT&T Information Systems, Inc. and **United Technologies Building Systems Co.** have announced an agreement in principle for forming a joint venture. The new venture will offer information services to the tenants and the owner/managers of multi-tenant commercial buildings.

■

AT&T Information Systems, Inc. and **Hewlett-Packard Co.** have completed joint certification testing of HP 3000 Business Computers, HP 150 Personal Computers and HP data terminals to ensure compatibility with AT&T Information System's Dimension System 85.

POSITION ANNOUNCEMENTS

Salt Lake City
Programmer/Analysts

We are looking for highly qualified professionals to assist us in meeting the challenges of supporting major LDS Church programs. We need computer analysts and programmers with experience in commercial systems development and support. Background in large mainframes (IBM/3081 using MVS, ADF,COBOL and MARK-IV), minis (IBM-Sys/38 using RPG III; ALTOS using OASIS, CONTROL), micros (IBM PC and XT using MS-DOS, DBMS, BASIC) and other high-level languages.

Knowledge of and adherence to the major principles and programs of the Church is necessary. High motivation and desire to contribute to the efforts of the Church is a must.

For an application please fill in this coupon and mail it today to:

William Hansen, 14th floor, The Church of Jesus Christ of Latter-day Saints, 50 E. North Temple St., Salt Lake City, Utah 84150 cw

Name _____
Address _____
City _____
State _____ Zip _____
Phone _____

THE CHURCH OF JESUS CHRIST OF LATTER-DAY SAINTS

MANAGER - ACADEMIC COMPUTING

The Manager of Academic Computing provides leadership and direction to faculty and students in the use of computing facilities. The manager will consult with faculty concerning application of computer technology relating to current and future curriculum. Duties include: develop and maintain public user library of applications software packages, supervise and directs computing staff and develop plans to satisfy future academic computing needs. Qualifications: Bachelor's degree required and advanced degree preferred. Knowledge of instructional uses of computers at college levels. Strong communications skills and leadership potential. Salary commensurate with qualifications and experience. Females and minorities especially encouraged to apply.

The Trinity University computing environment consists of IBM 3/Model 10 with VM/HPO/CICS/ROMULAN, Apple IIs, networked IBM PCs and PDP 11/34.

The position is available June 1, 1984. Deadline for receipt of applications is March 31, 1984. Send nomination for application and inquiries with three references to:

Dr. Jane S. Vinson
Vice President for Academic Affairs
Trinity University
715 Stadium Drive
San Antonio, TX 78284

Trinity University is an Equal Opportunity/Affirmative Action Employer.

TECH SPECIALISTS

Lgs. IBM data comm desktop tr-dir's, rpt'r planning, data security, data comm'n, oper's, telecon reqd's. IBM/MVS biggd preferred. Salaries to $40,000.

ROBERT HALF OF HARTFORD, INC.
111 Pearl St.
Hartford, CT 06103
(203) 278-7170
Personnel Consultants

Software Design Engineers

If you like technology, you'll love Texas Instruments in Dallas or Lewisville.

Join the Equipment Group of Texas Instruments in the design and production of state-of-the-art electronics systems and subsystems such as radar, missile guidance, electro-optics, communications, navigation and intelligence systems. Our continued innovation in every realm of the government electronics business has made Texas Instruments a leader.

As a result, we're creating new career opportunities for qualified software design engineers. You'll work with a team that works on complete systems — not just components. You'll have the chance to broaden your technological capabilities and be recognized and rewarded for your accomplishments.

Right now, we have immediate openings for experienced software design engineers in the following areas:

- Real-time electro-optics projects (mid-level positions)
- Tool and language development (ADA and Pascal experience preferred; mid-level positions)
- Artificial intelligence software design
- Systems analysts for VAX/VMS operating systems
- CAD/CAM programmers
- Speech recognition applications designers

All positions require U.S. citizenship, a four-year technical degree and at least two years of related experience.

Now is your chance to make your career move to the dynamic Sunbelt and enjoy the Texas environment and lifestyle. Dallas and Lewisville (just outside of Dallas) have year-round recreational activities, lakes, major league sports, museums and theatre. The Dallas area boasts one of the lowest costs of living of any major metropolitan area in the nation and Texas has no state or city income taxes.

For immediate consideration, send your resume in confidence to: Ed Haynes/ Texas Instruments/P.O. Box 226015, M.S. 3186/Dallas, Texas 75266.

U.S. citizenship is a firm requirement for all Equipment Group positions.

An Equal Opportunity Employer M/F

TEXAS INSTRUMENTS

Creating useful products and services for you.

DATA PROCESSING PROFESSIONALS

Before you contact someone else about our career opportunities...Contact us directly

Our 3rd party sources for hiring are limited to just a few selected firms. By contacting us directly you will be assured of receiving confidential consideration and quick response back from us.

Career opportunities in one of the country's most advanced data centers

We are state-of-the-art now and going beyond... present equipment consists of an IBM 3081 and two IBM 3033s utilizing MVS and VM for IMS, CICS, TSO and CMS. Under IBM's Systems Network Architecture, we are running 8100s under DPPX and DPCX. Within our Manufacturing Information Network, we are running DEC PDP 11 products under RSX 11M+ with DECNET. As we continue to be innovative and increase our Information Services capabilities, we have created an environment that is charged with challenges and most of all...career opportunities. Immediate opportunities are now available for the following:

SENIOR TECHNICAL ANALYST
TECHNICAL ANALYST

• Solid experience developing/implementing systems software • IBM-MVS environment (XA desirable) • IMS internals • IBM 8100 DPPX (SP1 desirable) including DTMS/HTF experience • DEC RSX-11M+ with DECNET • Minimum 4 years experience

When you join Philip Morris U.S.A. you will be joining a growth company. Our starting salaries and benefits are among the best and our career opportunities are hard to beat.

CONFIDENTIAL CONTACT

Mail to: J. Lamb, Dept. 584, Philip Morris U.S.A., P.O. Box 26603, Richmond, VA 23261.

NAME _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

PHONE: HOME _____ OFFICE _____

PRESENT JOB TITLE _____

DUTIES _____

HARDWARE EXPERIENCE _____

SOFTWARE EXPERIENCE _____

COMPUTER LANGUAGES _____

YEARS OF EXPERIENCE _____

Employing equally today...promoting equally tomorrow.

Philip Morris U.S.A.

DISTRIBUTORS

Rapidly growing international consulting organization is looking for innovative distributors to market its state-of-the-art products in the U.S. and throughout the world. Current locations:

U.S.: New York, Chicago, Dallas, LA, San Francisco, Miami, Fort Lauderdale
CANADA: Montreal, Toronto, Vancouver
EUROPE: France, Italy, Sweden, Germany
MIDDLE EAST: Saudi Arabia
ASIA: Singapore

R.L. Rogar Consultants, Inc.
122 East 42nd Street
Suite 800
New York, NY 10168
(212) 697-1162

IMS TEAM LEADER

An exciting career opptv. awaits you if you're a skilled prof. str. Strong IBM OS/MVS IMS DB/DC COBOL background req'd. for this Fortune 500 org. Key technical/admin. involvement w/ devel. support grps. $38,000.

ROBERT HALF
of [illegible]

100 Summer Street
Boston, MA 02110
(617) 423-1300

Insurance

Positions for Experienced Insurance: Project Managers, Analysts, Programmers, Systems. National Locations. Can Custom Fit Your Employment Needs. Call Collect (318) 222-1088 or send resume (confidential). Life 70, Life Comm, Group, Property & Casualty.

Executive Consultants
Insurance Specialist
1600 Fairfield Avenue
Suite 102
Shreveport, LA 71101

CALIF. & UNIX*

Openings in a variety of areas and disciplines.
(714) 891-UNIX*

CPU COMPUTER PROFESSIONALS UNLIMITED, agency
7411 Garden Grove Blvd.
Ste. D, Garden Grove, CA 92641

*UNIX is a trademark of Bell Laboratories

IDMS ADMINISTRATOR

Southern California

Mellonics Information Center, a major computer service company located in Sunny So. California, is currently seeking an IDMS Data Base Administrator. This individual will assist a rapidly increasing customer community in Systems and Technical Support.

The ideal candidate will have a minimum of 3 years experience with the following family of Cullinet software: IDMS-DC/UCF, Culprit, ADS/Online, ADS/Batch, OLQ, OLM and IDD as well as experience with BAL, PL/1 or COBOL. The administrator will be responsible for establishing data bases, installing system software, data base tuning and establishing standards and procedures for the usage of IDMS. This year's plan also includes the installation of IDMS/R.

Mellonics also offers the advantage of exposure to an even greater array of state-of-the-art software and hardware. MIC is conveniently located in suburban Canoga Park, just 20 miles from metropolitan Los Angeles, yet without the traffic and congestion of the city, and provides competitive salaries, an outstanding benefits package and exceptional career potential. For IMMEDIATE consideration call COLLECT or send resume with SALARY HISTORY to:

Sarah Jackson
(818) 716-2257

Equal Opportunity Employer M/F/H

Litton MELLONICS INFORMATION CENTER

[illegible] CANOGA PARK, CA 91304

DATA CAREERS
PERSONNEL SERVICE, INC

SAN DIEGO COMPUTER CAREERS

If you are an experienced PROGRAMMER, ANALYST, ENGINEER, or COMPUTER RESOURCE MANAGER and plan to EVER relocate to our warm climate I may be able to help you. I am an independent recruiter with all of my 25 years experience in computers in San Diego. I have met decision makers in each of those 25 years. Send your resume to:

Bob Shelton (619) 291-9994
Data Careers Personnel Service
3320 Fourth Ave.
San Diego, CA 92103

— SUNBELT CAREERS —

PIA's, S/P's, SW ENG's

Our clients need your experience in CICS, MES, IDMS, S/38, PC's, HP 1000/3000, ALC, RSX-11M, VAX/VMS, UNIX, C

Hundreds of openings nationally easily searchable on our DEC PDP11/44

Call to inquire or send resume today. Our 15th year as recruiters.

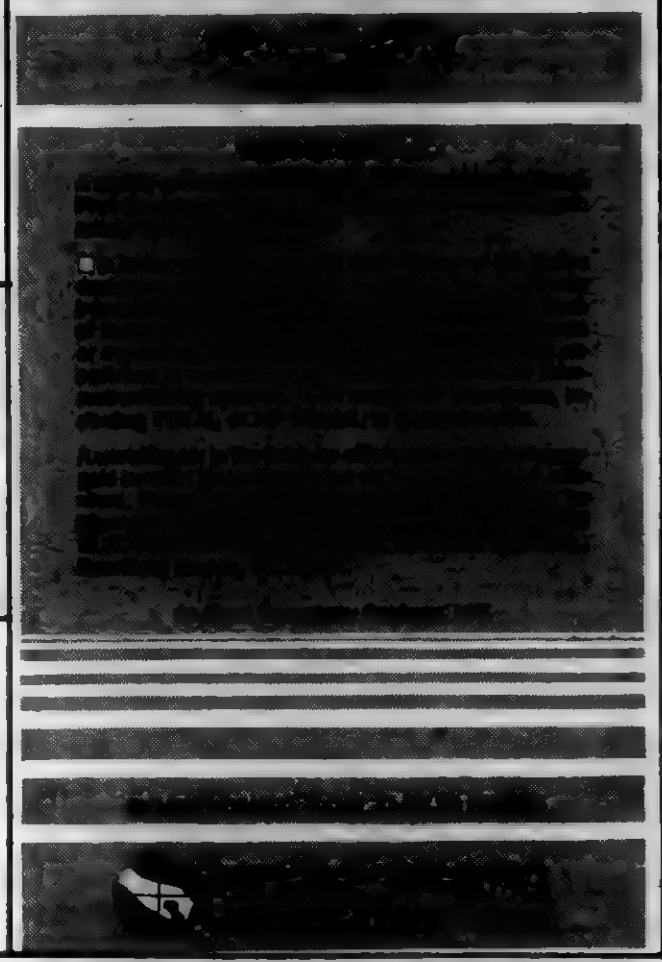
TOLL FREE
800-334-4220
In NC (919)484-4101

Sunbelt Personnel Service, Inc.
P.O. BOX 35025
FAYETTEVILLE, N.C. 28303

PROGRAMMER/ANALYST

Excellent opportunity available in the Sunbelt for an experienced Programmer. Our rapidly expanding savings and loan has an immediate opening for an individual with 2-3 years direct programming experience. Familiarity with COBOL, Burroughs B2000 series and TranX financial systems preferred. College degree a plus.

We offer an excellent benefits package and salary commensurate with experience. Please send resume with salary history to: South Savings and Loan, P.O. Box 999, Slidell, LA 70459, Attn: Gail Simpson.



SAS Institute... setting the pace

At SAS Institute, we are committed to providing the best in software and service. We offer a complete line of Institute Program Products for data management, statistical analysis, report writing, color graphics, forecasting, and data entry. We support these products through ongoing research and development, a complete library of documentation, and a comprehensive training program. Currently, we have openings for:

Software Sales Representative will license software products to new sites and current sites via telemarketing. Applicants must have experience in software sales and knowledge of the applications software industry, specifically in mainframe and minicomputer markets. Telemarketing experience is a plus. A bachelor's degree, preferably in business, statistics, or computer science is required. Travel is minimal.

Technical Support Supervisor will maintain and support the SAS supervisor and related components for the IBM OS/VS and MVS/XA environments, and interface with customers on problems that require an in-depth knowledge in the related areas. The Technical Support Department interfaces with SAS installations, interpreting documentation, explaining error messages, and investigating and documenting reported problems with the SAS System. Applicants must have experience with IBM 370 Assembler and exposure to IBM MVS supervisor and data management services macros. Excellent verbal communication skills and a bachelor's degree, preferably in computer science, are required. Familiarity with operating system concepts, compiler design and implementation, PL/I, and the SAS System are significant assets. Knowledge of the VM/CMS environment, and experience supporting large software systems and using IBM service aids, such as IPCS, are desirable.

Quality Assurance Analyst will work with various Institute departments to test the SAS System. Specific responsibilities include development and maintenance of systems for tracking software through development, testing, and release; development of testing tools; documentation and testing of SAS procedures; and coordination of product testing. Applicants must have knowledge of SAS software, extensive knowledge and experience with an operating system, willingness to work with other operating systems, and good written and verbal communication skills. A quantitative degree is required.

OS/VS Systems Software Developer will develop and maintain the SAS supervisor and related components for the IBM OS/VS and MVS/XA environments. Use of IBM 370 Assembler as a programming language and exposure to OS/VS supervisor and data management service macros are required. Experience with the development and support of large software systems and the use of IBM service aids is desirable. Familiarity with operating system concepts, compiler design and implementation, PL/I, and the SAS System are significant assets. A bachelor's degree, preferably in computer science, or equivalent is required.

Compiler Systems Developer will be responsible for the design and implementation of a PL/I-like compiler. Applicants must have a MS in computer science or mathematics and a strong background in block structured languages, preferably in PL/I. Experience in design and construction of state-of-the-art compilers and familiarity with optimization and code generation issues are required.

Communications Systems Software Developer will develop and maintain the SAS supervisor components for the IBM MVS, VM/CMS, and VSE environments that interface to communications terminals and access methods, such as the 3270, 3287, 3288, and ACF/VTAM. Use of IBM 370 Assembler as a programming language and knowledge of SNA protocols, 3270 data streams, and MVS or CMS supervisor services macros are required. Experience with the development and support of large software systems and the use of VTAM/NCP service aids is desirable. Familiarity with PL/I and the SAS System are significant assets. A bachelor's degree, preferably in computer science, or equivalent experience is required.

Microcomputer Software Developer will design and develop the SAS System for microcomputers. Applicants must have in-depth knowledge of 8086 Assembler language, C language, and IBM PC-DOS BIOS. A bachelor's degree in computer science or equivalent experience is required. Experience with full-screen and graphics drivers is highly desirable. Applicants must provide samples of related work experience.

UNIX Minicomputer Developer will be responsible for helping develop SAS software to run under UNIX. Applicants must have 3 to 4 years of experience with C language and UNIX. A bachelor's degree in computer science or a related field is required. Experience with minicomputers, knowledge of PL/I, and SAS software is highly desirable.

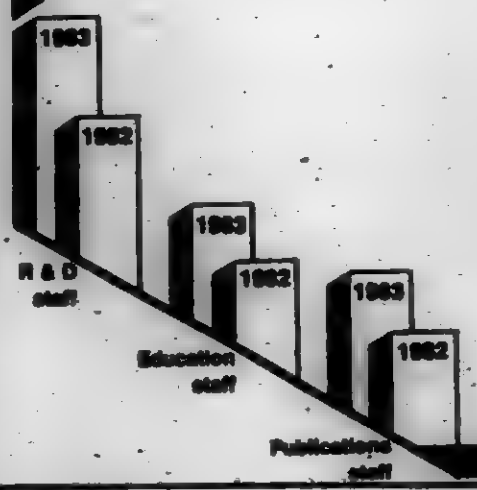
VAX/VMS Systems Programmer will assist in development of host routines and SAS interface routines for Digital VAX systems. Applicants must have at least two years' experience with VMS and Macro-11. PL/I programming experience is a significant asset.

Systems Developer will assist the development of the SAS System on various minicomputer systems. Applicants must have a minimum of two years' PL/I programming experience and working knowledge of SAS software. Experience with one of the following minicomputer systems: Digital VAX under VMS, DG MV under AOS/VS, or Prime under PRIMOS is desirable. A BS in computer science is required. Knowledge of SAS/GRAPH and SAS statistical procedures is desirable.

Testing & Documentation Systems Programmer will perform source code management functions, including documentation of procedures and consultation for SAS system developers working with various minicomputers. Applicants must have 1-2 years' data processing experience, with a working knowledge of PL/I and SAS software. Candidates should have experience with IBM under TSO or VM/CMS, or one of the following systems: Digital VAX under VMS, DG MV under AOS/VS, or Prime under PRIMOS. One to two years' VMS experience is desirable. A BS degree in computer science or equivalent is required.

Minicomputer Programmer will develop the SAS System for various minicomputers. The individual will write and maintain code and documentation, transport code, prepare master tapes, and educate users. A BS degree, preferably in computer science, and PL/I knowledge are required. Minicomputer experience, knowledge of SAS software, and Assembler language experience are preferred.

DG Minicomputer Programmer will be responsible for developing the SAS System for the Data General ECLIPSE. Responsibilities include writing and maintaining machine-dependent code, reviewing documentation, transporting code from the VAX to the ECLIPSE, and assisting in educating users. Applicants must have knowledge of PL/I and a BS degree, preferably in computer science. Experience with Data General minicomputers, knowledge of SAS software, and Assembler language experience is preferred.



SAS Institute offers competitive salaries and excellent benefits. The attractive, 100-acre lakeside campus in Cary, North Carolina—adjacent to the prestigious Research Triangle Park—provides a people-oriented atmosphere, conducive to personal productivity and inventiveness.

If you think you can meet the challenge at SAS Institute, send a detailed letter or resume to Department 0220 by February 29, 1984.

SAS Institute Inc.
Box 8000
Cary, North Carolina 27511

Aircraft Division

The People Behind Our Programs Include Programmers.

Behind the innovative design techniques employed by our Engineers are dedicated software professionals who, working closely with Engineering design teams, develop Northrop's NCAD/NCAM systems. Behind our efficient manufacturing processes are Automated Management Systems Specialists who design programs which integrate the full range of Manufacturing and Materiel functions. And as our business operations continue to grow, our Business Systems Analysts enhance the division's project management and contract systems.

Experienced Programmers and Systems Analysts with expertise in the areas listed below should investigate current opportunities to get behind the programs at Northrop Aircraft Division.

Manufacturing & Materiel Systems
COBOL Programmers with 3-10 years of experience utilizing TSO, preferably with IMS/DC experience will develop, maintain and plan new systems ranging from MRP through work-in-process to configuration documentation systems.

Financial/Contract & Pricing Systems
COBOL Programmers with 3+ years of experience including IMS DB or DC will develop and maintain divisional financial, contract reporting and automated proposal systems. Senior Programmers with IBM 8100/CPU Host integration experience are of special interest.

Graphics & NCAD/NCAM Systems
FORTRAN/IBM Assembly Language Programmers with 3+ years of experience, preferably with a BSCS or BSME will integrate into the scientific computing systems group where they will develop interactive 3-D graphics, structural dynamic analysis and other engineering support systems.

If you're experienced in any of these areas, we welcome your inquiry. Please forward your resume with salary history to:

Mr. Cris Cristina
Engineering &
Administrative Employment
Dept. 1222/80 NDP-CW 018411
P.O. Box 2116
Hawthorne, CA 90250

Equal Opportunity Employer M/F/H
Proof of U.S. Citizenship Required

You can make a difference.

NORTHROP
Making advanced technology work.

now presenting

OVERSEAS

Saudi Arabian Airlines, national flag carrier of the Kingdom of Saudi Arabia, is seeking qualified personnel for the following positions:

SUPERVISOR RELIABILITY PROGRAMS

Monthly Salary $3500 U.S. Dollars

DUTIES

Liaise with users and develop and maintain computer programs for aircraft reliability, fleet statistics and computerized engine testing and maintenance. Collect statistics on component removals, target and alert incidences, implement recommended changes in maintenance programs and monitor improvements as a result of such changes.

REQUIREMENTS

Degree in a computer related field and at least 3 years experience in design and development of real-time software systems for engineering applications using Fortran and Assembler on mini computers. Experience on HP-1000 with RTE-IVB/6 operations systems a definite asset. Airline background preferred.

SENIOR PROGRAMMER

Monthly Salary $3500 U.S. Dollars

DUTIES

To develop and maintain computer programs for aircraft reliability and fleet statistics.

REQUIREMENTS

Degree in computer related field and at least 3 years experience in design and development of real-time software for engineering applications using Fortran and Assembler on mini computers. Experience on HP-1000 with RTE-IVB/6 operations systems would be a definite asset.

The salary shown above in U.S. dollars per month has been converted from Saudi Riyals at the current rates of exchange which are subject to fluctuation.

BENEFITS

Free furnished air-conditioned housing and utilities • Paid medical and group life insurance • 30 day vacation-travel time to and from domicile • Free or reduced rates on Saudia and other airlines • Retirement program (social insurance after 15 years service) • Additional household shipment from domicile to Saudi Arabia and back • K-8 schooling for children — out of Kingdom financial assistance for other grades • Annual service increase and eligibility for yearly merit bonus based on performance.

Position is offered on a two-year (renewable) contract.

Send resume to:
SAUDI ARABIAN AIRLINES
Administrative Recruiter, Dept. RP-S
3420 Pershing Rd., Suite 339
Kansas City, Mo. 64108

saudia

COMPUTER SOFTWARE SPECIALIST III

Northern Arizona University, Flagstaff, Arizona, is currently recruiting for a Computer Software Specialist III. Duties for this position include primary responsibility for implementation of systems software on IBM 3081K and non-IBM/ plug compatible mainframes. Major software environments include MVS, TSO, ISPF/PDF, VM and MUSIC on the 3081K. Additional responsibilities include consulting, planning, installation and technical direction of telecommunication lines, interfaces and devices. The ideal candidate should have 4 years of systems and applications programming experience or a master's degree in computer science or related field and 2 years of systems programming or any equivalent combination of experience and education. IBM MVS systems programming experience desired. Interested candidates should apply to:

Northern Arizona University
Personnel Department
Box 4113
Flagstaff, Arizona 86011

Application deadline is March 9, 1984 at 5:00 p.m.
NAU is An Equal Opportunity/Affirmative Action/ Title IX/Section 504 Employer

MODEL 204
TAB INCORPORATED
The Recognized Leader in MODEL 204 Utilization

Openings for qualified analysts at all levels of experience:

SENIOR ANALYSTS - 4 or more years in EDP with at least 2 years in MODEL 204.

PROGRAMMERS - 3 years of EDP experience with at least 1 year devoted to MODEL 204.

Salary offers will be commensurate with experience. Benefits include fully paid group health package, relocation assistance and 30 days annually in vacation, holidays, and discretionary time off.

Qualified applicants should contact Personnel at (703) 683-6060 or submit a resume in confidence to:

TAB INCORPORATED
901 North Pitt Street
Alexandria, Virginia 22314
EOE M/F

SYSTEMHOUSE, INC. is the nations largest banking software and facilities management company. We are currently searching for talented, aggressive data processing professionals for our corporate headquarters in Little Rock, Arkansas and many of our 45 data centers across the U.S.

Experience preferred includes:
- 3+ years COBOL programming in IBM shop
- CICS
- Banking Applications

We offer competitive salaries, comprehensive benefits package, in-house education, semi-annual salary and performance reviews, and superior working environment.

If you have the above qualifications please submit resume, including salary requirements in confidence to:

Katherine Becker
Regional Recruiting Manager
Systemhouse, Inc.
4901 Rodney Parham Road
Little Rock, AR 72212

M. I. S. PROFESSIONALS

Hekimian Laboratories, a leading manufacturer of telecommunications instrumentation, is seeking Management Information Systems programming and operations professionals to staff a new computer center. Candidates should have experience with integrated manufacturing and accounting applications software. These positions require Bachelor's degrees or equivalent.
We offer an excellent benefits package including medical, dental, and life insurance and a retirement program. Qualified candidates should send confidential resume and salary history to Ed Coward, Personnel Administrator

Hekimian Laboratories, Inc.
9298 Gaither Road
Gaithersburg, Maryland 20877
EOE M/F

"Whatever It Takes."

Brian Bish began working for Cincom Systems in 1977 as a programmer. Initiative and sound thinking have served Brian well. Today he is a Cincom Technical Service Center Manager and an authority on the support and service of leading edge software products. From a recent interview here are Brian's thoughts on support, software and a career with Cincom Systems.

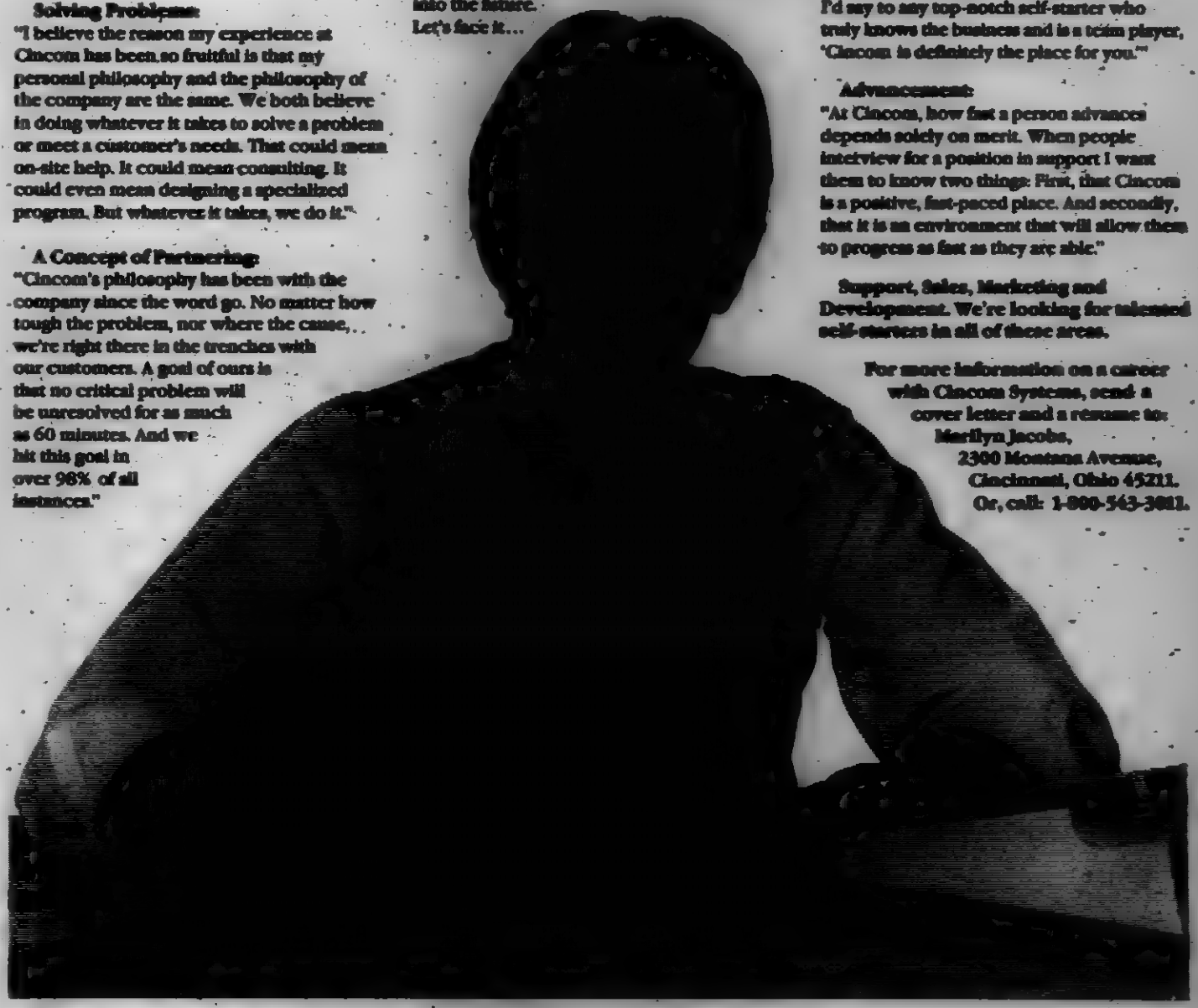
The Role Of Service And Support:
"Bottom line, the role of service and support is to help Cincom's customers become more successful. As our customers become more successful, Cincom becomes more successful."

Solving Problems:
"I believe the reason my experience at Cincom has been so fruitful is that my personal philosophy and the philosophy of the company are the same. We both believe in doing whatever it takes to solve a problem or meet a customer's needs. That could mean on-site help. It could mean consulting. It could even mean designing a specialized program. But whatever it takes, we do it."

A Concept of Partnering:
"Cincom's philosophy has been with the company since the word go. No matter how tough the problem, nor where the cause, we're right there in the trenches with our customers. A goal of ours is that no critical problem will be unresolved for as much as 60 minutes. And we hit this goal in over 98% of all instances."

Leading Edge Technologies:
"Support people are like anyone else in the computer business; they thrive on challenge and they want to work with the leading technology. TIS™, ULTRA™, MANTIS™, MRP5™, MANAGE USER SERIES™, PC CONTACT™...these are some of the newest and most advanced systems in the software industry. And these are the products our people are working with everyday. By working with challenging, leading edge products, people develop a strong personal commitment to leadership and to quality."

Excellence in Software Technology:
"To me, excellence in software means having the sense to look beyond the present and into the future.
Let's face it...the computer business is changing as fast as any business ever has. Anticipating a customer's needs takes vision. In my opinion, no one else comes close to Cincom's vision. That's why we are producing the truly excellent software technologies in our field."



People:
"I don't know about other software vendors, but at Cincom some of the most talented people in the company work in support. They have to. We deal with Fortune 500 companies who are striving to advance the state-of-the-art. Often we work directly with the top DP person within the company. So, our people have to be of the same top-notch caliber to be effective. Leading edge companies need leading edge people. And, I'd say to any top-notch self-starter who truly knows the business and is a team player, 'Cincom is definitely the place for you.'"

Advancement:
"At Cincom, how fast a person advances depends solely on merit. When people interview for a position in support I want them to know two things: First, that Cincom is a positive, fast-paced place. And secondly, that it is an environment that will allow them to progress as fast as they are able."

Support, Sales, Marketing and Development. We're looking for talented self-starters in all of these areas.

For more information on a career with Cincom Systems, send a cover letter and a resume to: Marilyn Jacobs, 2300 Montana Avenue, Cincinnati, Ohio 45211. Or, call: 1-800-543-3011.

An Equal Opportunity Employer

Cincom Systems

Excellence in Software Technology.

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

GENERAL EMPLOYMENT ENTERPRISES, INC.

Data Processing Divisions

A network of Professionals To Service your Local or Relocation Career Desires.

VICE PRESIDENT DATA PROCESSING
$60-65,000
Operate in a data communications network environment. Draw on your assembler and associated languages. EDX, EDL for IBM services is a plus for the individual ready to move up.

TECHNICAL SERVICES MANAGER
$40-$45,000
Strong in supervision knowledgeable in systems. A creative talent that can give directions and advice in software systems! Open and potential!

SOFTWARE DEVELOPMENT DIRECTOR
$55,000-$65,000
An executive opportunity with an international flavor! Be involved with software feasibility and marketing studies. The key term is management and marketing expertise not hardware background! Respond now!

NETWORK MANAGER
$35,000-$45,000
Attention project leaders! A personal challenge to move up! Capitalize on your "on line" and assembler experience! Reward your management skills.

MANAGER CUSTOMER SERVICES
$30,000-$40,000
Specifically for the support specialist with broad IBM equipment background and supervise. Take this step to regional management! It leads to V.P.!

ASSISTANT OS SYSTEMS DEVELOPMENT DIRECTOR
$35,000-$50,000
Be involved in advanced development of software for automated microprocessor business oriented systems. Familiarity with minis and knowledgeable in PASCAL, "C", ALGOL or FORTRAN itself!

PROGRAMMER SYSTEMS TRAINEE
$27,000-$32,000
An entry level system "Plum". You can make your experience on large scale IBM equipment. Your career stepping stone now!

PROGRAMMING CONSULTANTS
$40,000-$45,000
A national firm with country wide opportunities! The keys are systems background and good communications skills! Challenging positions with either, COBOL or OS/MVS exposure.

SYSTEMS SOFTWARE HARDWARE SPECIALISTS
$35,000-$40,000
Career building openings with a wealth of potential! Be involved in corporate networking. Ideal for VTAM background.

SYSTEMS TROUBLESHOOTER
$32,000-$40,000
Be a corporate company ambassador. Follow up with clients! Solve problems! Utilize your basic assembler and "C" languages for coding activity only!

VICE PRESIDENT STAFF ASSISTANT
$30,000-$37,000
A bright future for the individual with technical expertise in CICS and VSAM coupled with COBOL and ASSEMBLER. The systems analyst with a management flair will prosper here!

PROJECT MANAGEMENT INTERNATIONAL
$35,000-$60,000
4 opportunities! Be the #1 on foreign assignment! Supervise a native staff involved in coding and modifying software. Capitalize on your MICROS, PCIM, MS/DOS, Z80 and 8086 Assembly! A rare opportunity!

SOFTWARE DEVELOPMENT "PRO"
$30,000-$50,000
An exciting expanding start-up! Take on the development of production quality compilers! Make for end users of IBM MVS mainframes!

PROGRAMMERS MGR. SECRETARY
$27,000-$30,000
Ideal for the FORTRAN professional. Be a member of the "THINK TANK" Department Teams! Investigate, recommend, implement new enhancements for the software and users! A position for growth and recognition!

FAR WEST

Phoenix, AZ 85012 — 3443 N. Central Ave. — 602/265-7300

Huntington Beach, CA 92648 — 2130 Main Street — 714/969-2431

Los Angeles, CA 90010 — 3699 Wilshire Blvd. — 213/386-4939

Palo Alto, CA 94303 — 2471 E. Bayshore Rd. — 415/494-3441

San Francisco, CA 94111 — 444 Market Street — 415/981-8440

San Francisco, CA 94105 — One Market Plaza — 415/896-0511

San Jose, CA 95128 — 1532 The Alameda — 408/296-8788

Woodland Hills, CA 91367 — 5630 Varel — 213/703-6868

CENTRAL AND MIDDLE WEST

Columbus, OH 43215 — 88 E. Broad St. — 614/228-5192

Indianapolis, IN 46204 — 5 E. Market St. — 317/636-2261

Chicago, IL 60605 — 150 S. Wacker Dr., Ste. 860 — 312/346-7001

St. Louis, MO 63101 — 720 Olive Street — 314/231-7400

Edwardsville, IL 62025 — 350 W. Sherman Blvd. — 312/357-9805

Chicago, IL 60606 — 150 S. Wacker Dr., Ste. 512 — 312/782-1824

Louisville, KY 40207 — Executive Park #616 — 502/897-5347

Detroit, MI 48220 — 1200 Sixth St. — 313/963-5470

Chicago, IL 60606 — 150 S. Wacker Dr., Ste. 775 — 312/782-5662

Independence, OH 44131 — 6100 Rockside Woods Blvd. — 216/524-4444

Arlington Heights, IL 60005 — 85 W. Algonquin Rd. — 312/364-9450

NORTHEAST

Boston, MA 02116 — 545 Boylston St. — 617/267-9119

Philadelphia, PA 19103 — 8 Penn Ctr. Plaza — 215/564-3101

Philadelphia, PA 19102 — 3 Penn Ctr. Plaza — 215/568-3226

SOUTHWEST

Dallas, TX 75229 — 6300 Douglas — 214/353-7300

Dallas, TX 75206 — 8350 N. Central Exp. — 214/987-0762

Dallas, TX 75201 — Plaza of Americas — 214/742-1117

Houston, TX 77060 — 1235 N. Loop West — 713/681-5666

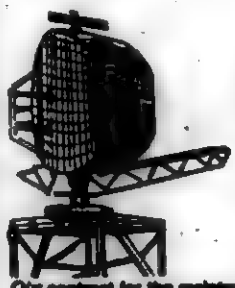
Houston, TX 77074 — 6300 Beconnot — 713/777-6290

CANADA

Hamilton, ONT. L8P-1K2 — 100 King - Stelco-Towers — 416/527-1661

Etobicoke, ONT. M9C-4Z5 — One Eva Road — 416/622-6118

General Employment Enterprises, Inc.
Corporate Offices 150 S. Wacker Dr. Chicago, IL 60606
Listed on American Stock Exchange



COMPUTER ENGINEERING & INSTRUCTION

BENDIX SAUDI ARABIA

Our contract for the maintenance and operation of the Saudi Arabia Airways Facilities could mean a challenging, diverse opportunity for you if you're interested in an overseas assignment and have the credentials for one of the following positions:

DISPLAYS & DATA PROCESSING -

BSEE or equivalent and 6 years Design Engineering experience on equipment utilized in a Surveillance Radar environment.

AUTOMATION (Software) -

BSEE, CS or equivalent and 6 years experience - OR, 8 years progressive experience in Air Traffic Control (commercial or military) or related environments.

DATA PROCESSING EQUIPMENT INSTRUCTOR -

Requires 2 years formal classroom instruction experience on hardware maintenance.

BENDIX offers competitive salaries, overseas allowance and completion bonus. Also offered are free transportation, two leaves per year, subsidized meals, and free family housing. To obtain more details, please forward your resume, or call: 800/638-2888, Mon-Fri., 9AM-4PM (ET), 9017 Red Branch Rd., Columbia, MD 21045. ATTN: BFEC-ATC-NA03A.

Bendix **Field Engineering Corporation**

Subsidiary of the Bendix Corporation

A World Leader in The Service Industry

An equal opportunity employer m/f/h

Data Processing

DIRECTOR INFORMATION SYSTEMS

The University of Kansas Medical Center is seeking a senior information systems generalist with proven managerial and communication skills. Individual will be responsible for the day-to-day management of all aspects of the Office of Information Systems which is responsible for providing computer and information systems support for instruction, research, Hospital and administrative users at the Medical Center. The Director is responsible for 60+ employees and an IBM 3081 AP computer using VM/CMS, VS/1 and BAS/CICS as well as Data General MV8000, 380 and 180 computers which are part of a vendor supplied hospital ADT and Billing System. Over 300 terminals are installed on the campus. The system operates 24 hours, 7 days per week. The director must have strong managerial and planning skills and must relate well to users and senior Medical Center Administrators. The Director must also possess the technical skills necessary to manage a complex multi-faceted computer operation. Required qualifications include B.S. degree in Computer Science or Business or related field and a minimum of 10 years experience in information systems in a hospital/higher education or similar environment to include 5 years senior management experience in an installation of similar size and complexity. Prefer graduate degree and familiarity with IBM hardware and software and Data General equipment. To apply submit letter of application, complete resume of education and experience (including salary history), minimum salary requirements and at least two professional references to: Dr. Richard L. Mann, University Director of Institutional Research/Information Systems/Personnel Services, University of Kansas Medical Center, c/o Personnel Services Department, 39th & Rainbow, Kansas City, Kansas 66103. Application deadline: March 16, 1984.

An Equal Opportunity
Affirmative Action Employer

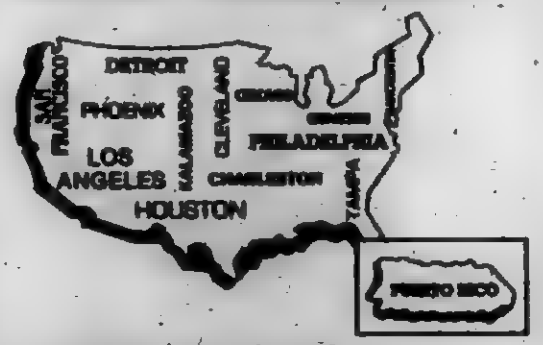
Systems Analyst

Growing $130 million common carrier in Central Wisconsin is seeking an experienced Systems Analyst. This position requires a minimum of 3-4 years experience in designing and implementing large online systems in the trucking industry. Experience with DOS/VSE, CICS, and Assembler is a plus. Selected candidates will determine requirements, develop internal specifications, prepare documentation and recommend systems to management. Excellent salary and benefits package. Call Ron Wolfe at (715) 424-4880 or send resume to:

CRF Transport, Inc.
610 High Street
Wisconsin Rapids, WI 54494

DATA PROCESSING PROFESSIONALS

SCT Offers Superior Career Challenges...



...Nationwide!

(Higher Education & Local Government)

Join Systems & Computer Technology Corp. (SCT), now expanding by 40% per year. We've assumed a paramount leadership position in providing systems/software development services and computer center management expertise to clients in the fields of higher education and local government. You'll become involved in a wide variety of disciplines and functions with total project involvement from concept through implementation.

- **SITE MANAGERS**
- **CONSULTANTS**
  (Financial or Payroll/Personnel Systems)
- **USER LIAISON/PROJECT LEADERS**
- **DATA BASE ADMINISTRATORS**
- **PROGRAMMER ANALYSTS**

These positions are at many of our on-site locations across the U.S. and at our corporate headquarters. Make the choice that challenges! Send your resume, with salary history to: Manager, Corporate Recruiting, Dept. CW-99, SCT, Great Valley Corp. Center, 4 Country View Road, Malvern, PA 19355. An Equal Opportunity Employer, M/F.

SYSTEMS & COMPUTER TECHNOLOGY CORPORATION

...On The Grow!

BANKING SYSTEMS

PROGRAMMERS
SYSTEMS ANALYSTS
QA ANALYSTS • OPS SUPPORT
SR. SYSTEMS PROGRAMMER

Are you ready for a new challenge? Texas American Services offers state-of-the-art systems and applications training for qualified professionals. This spring we are moving to a beautiful new facility. We have openings at all levels in just about all of the main stream commercial banking applications:

CHECK PROCESSING
(MICR Programming, ALC, OS/MVS JCL)

ON-LINE SYSTEMS
(Strong CICS, Banking, CSI)

PAYROLL SYSTEMS
(COBOL, CICS, OS/MVS JCL)

In our operations center we need a

MVS SENIOR SYSTEMS PROGRAMMER
(OS/MVS System Internals, JES 2, CICS, Performance Tuning).

OPERATIONS SUPPORT MANAGER
(Hardware and environment planning, contingency planning, systems training, OS/MVS JES 2 expertise).

We also have openings for:

JCL SPECIALIST
(OS/MVS JCL, ABEND Diagnostics).

Our QA department is searching for a

QUALITY ASSURANCE ANALYST
(EDP Audit, Business Degree, communications skills).

For more information about these and other data processing career opportunities, give us a call at (817) 338-6516 or send your resume to:

Texas American Services Inc.
Attn: Bob Silver
P.O. Box 290
Fort Worth, Texas 76101

principals only
an equal opportunity employer m/f

TEXAS AMERICAN SERVICES INC.

DATA PROCESSING PROFESSIONALS

DATA RESOURCE CORPORATION, headquartered in Atlanta, is a leader in quality Contract Programming and Consulting. Our growth in the Southeast and Southwest has created opportunities for versatile Professionals with state-of-the-art skills in Programming and Systems Design.

We are seeking individuals who desire to work in various stimulating Data Processing environments. IMS and CICS skills are of special interest, as are the abilities to travel or relocate.

We offer you competitive salaries and comprehensive benefits programs, including bonuses and profit sharing, and overtime pay. If you are searching for a growth opportunity with a dynamic and progressive company with a Management team that "puts people first", then DRC is your answer.

For immediate consideration, send resume to 3301 Buckeye Rd., Suite 103, Atlanta, GA 30341, or call BECKY FINLEY or CHARLIE WEXLER at 404-455-7260, or toll free:

1-800-241-8002

DRC

EOE

SYSTEMS ANALYSTS AND PROGRAMMERS FOR SUNBELT LOCATIONS

Job dissatisfaction, complacency, and frustration are the biggest obstacles to overcome to achieve one's career goals. Every day new career opportunities pass us by because we are unaware of their existence. Let us keep you abreast of what your true value is in the market place. Absolutely no obligations, please call or write Keith Ratchie, CPC, Data Processing Specialist.

Dunhill

Of CHARLOTTE, INC.
6401 Carmel Road, Suite 107
Charlotte, North Carolina 28226
800-438-3012
(NC Call)
(704) 542-0912

Join The Team That Created The Elegant NS16000

An elegant approach led to a very elegant solution — National's NS16000 microprocessor and its product family. The revolutionary top-down architecture delivers 32-bit power, and memory management capabilities on par with the latest mainframes. The upward-compatibility will accommodate a shift from 16- to 32-bit hardware. In essence, the NS16000 performs more like a computer than a chip, and we think that's a very elegant package.

A "Software-Intensive" Effort.

The NS16000 microprocessor is the spring-board for an entire family of products currently being developed at National's Microprocessor Systems Division. The key to their success lies in the development of software that enhances the NS16000 family's performance, applicability, and elegance. From development through marketing, our "software-intensive" effort is rapidly gaining momentum as we develop demand-paged UNIX® systems based on Berkeley 4.1bsd and 4.2bsd for National's NS16032 and NS32032 microprocessors. We are also working with Bell Labs to define a version of SYSTEM V, . . . ,etc., for NS16032 and NS32032. These developments are creating opportunities for software professionals with UNIX and IBM PC® experience to join us in the following areas:

Sr. Software Engineers: Compiler Development

You will be involved in developing compiler code optimizers for "C", Pascal, FORTRAN, etc., to take advantage of NS16000 elegant architecture. Your background should include two to five years' experience in compiler development; UNIX experience is desirable.

Sr. Software Engineers: Language Tools Development

You will be involved with developing assembler, linker, or debugger. Requirements include two to five years of language tools development experience, including knowledge of "C", Pascal, FORTRAN, and UNIX.

Sr. Software Engineers: UNIX System Architect

You will be involved in defining the future UNIX system products for NS16032 and NS32032. Two to five years' experience in UNIX kernel and system development is desired.

Sr. Software Engineers: UNIX Kernel Development

You will work on porting Berkeley 4.2bsd to NS16032 and NS32032 based microcomputer systems (including a popular PC configuration with NS16032 and NS32032 add on board). Two to five years' experience in UNIX kernel development is desired.

Sr. Software Engineers: Networking

You will work with developing/porting networking software under Berkeley 4.2bsd on NS16032 and NS32032 based microcomputer systems. Two to five years' experience in networking protocol design and development is desirable.

The Rewards Of Elegance.

The elegance and power of the NS16000 will become evident as more software is developed for it. And those who develop that software will reap the rewards, personally and professionally. That's definitely something to think about if you're ready to take on the challenge of our opportunities.

To learn more about National's Microprocessor Systems Division, send your resume to National Semiconductor, Dept. MS, P.O. Box 62499, Sunnyvale, CA 94088. We are an equal opportunity affirmative action employer. Principals-only please.

NS16000

Elegance is everything.

[redacted] talk about your [redacted]

National Semiconductor

SYSTEMS ANALYSTS

For a handpicked team.

Here's an excellent opportunity to enjoy the invigorating pace of a small, handpicked organization; the benefits and extensive career path of a major corporation; plus the stimulation of diverse assignments such as personal productivity services, documentation distribution, library services, text transformation, education and training. You will work with users tailoring systems development and integrating existing software.

Rapidly expanding Boeing Computer Services has openings for Systems Analysts with 1-2 years' experience in an IBM environment, specifically on IBM 8100 with DPCX/DOSF. A familiarity with TSO would be helpful. Exposure to Wang and Xerox word processing systems is also desirable. Experience with SNA, DIA and DCA is an added plus. BS/BA degree or equivalent experience and training is required.

For immediate consideration, send your resume and salary history to: Walt Sanderson, Boeing Computer Services Company, 7980 Gallows Court, Dept. CW-4, Vienna, VA 22180. An Equal Opportunity Employer.

BOEING COMPUTER SERVICES

A Division of The Boeing Company

Project Manager

One of the foremost names in the management consulting field is offering an outstanding opportunity, in the Dallas area, for a senior level project manager to become a part of one of the world's most prestigious organizations. As a manager with this firm, you will be involved with a multi-year project and will be responsible for the development and installation of a major applications system. This position also involves the use of systems development life cycle methodologies, system documentation standards and state-of-the-art development techniques.

You should possess effective interpersonal skills, excellent verbal and written communications skills along with a technical degree and extensive business and data processing experience. The successful candidate must also have experience in the following:

- **Management of large scale development projects**
- **Large scale IBM (IMS DB/DC environment)**
- **Banking system experience**
- **Planning, development and installation of multi-team/multi-projects**
- **Software configuration management**

For immediate consideration send your resume, in confidence, to:

CW-84888, Computerworld
Box 880, Framingham, MA 01701

Equal Opportunity Employer

THE Martin SCHOOL

Director for Computing and Educational Technology

The Director will implement a strategic computer plan, working closely with computer committees and school administrators. He or she will establish and operate a professional services center to assist students, faculty, researchers and administrators and maintain an information clearing house. He or she will maintain hardware and software inventory and negotiate discounts in purchasing.

The Director will develop fundable proposal packages and oversee the establishment of a central support computer network of mainframe and micro-computers, audio-visual aids, closed circuit TV and other instructional technology.

A masters degree and 8 years relevant experience with knowledge of long-range computer planning and state-of-the-art mainframe/micro-computer technology is required. A doctorate and university experience in systems development, computer facility directing and teaching is desirable.

Send resume and salary requirement to:
Ms. Jacqueline Matthews
Director, Administrative Services
The Wharton School
University of Pennsylvania/CC
Philadelphia, PA 19104

The University of Pennsylvania is an equal opportunity/affirmative action employer.

$100 DPPX PLANNER to $40K

Major southern NJ corp mfgs state of the art IBM data ctr. Has 70 remote locations tied together by a distributed data processing network of 8100's. Qual candidates must know DPCX, TSE & be able to review applications design with eye toward improving performance. Complete rele pkg. Call or send resume to:

SSI
SCIENTIFIC SEARCH, INC.
Plaza Office Center, Suite 209
Rt. 73 & Fellowship Rd.
Mt. Laurel, NJ 08054
(609) 234-0333

SUNBELT

MVS SYSTEMS PROGRAMMING

3 yrs. exp. & knowledge of MVS, JES, by IBM mainframes & related disk sub-systems. Responsible for MVS/SP oper sys & major subsystems. $40,000 Plus.

DIRECTOR OF DP

3+ yrs. proj ldr or mgr in hardware on 4300 series under OS or DOS. $40,000.

ROBERT HALF OF LOUISIANA, INC
P.O. Box 57629
New Orleans, LA 70157
(504) 835-4296

NEW ENGLAND'S *FINEST*

Opportunities are abounding — We can find you the finest positions available in New England or most any place of your choosing. We have the finest client base of High Tech, Manufacturing, Insurance, Banking and Service Companies with state-of-the-art environments. Positions at every level. Minimum one year experience.

Software Development . . . . . to $32K
DBA/Data Analyst . . . . . to $30K
Project Leader . . . . . to $45K
Systems Programmer . . . . . to $42K
Systems Analyst . . . . . to $40K
Programmer Analyst . . . . . to $36K

Send resume in confidence or call Mitch Price or Linda Kalajian toll free (800) 628-3374 or in Massachusetts call (collect) (413) 781-0962.

MEMBER NDC 130 affiliates coast-to-coast

dpSpecialists
DYNAMIC PERSONNEL SYSTEM
P.O. Box 538
West Springfield, MA 01090

The Future Is Here!

Pacific Bell is facing an exciting future, with a new identity and new goals! Now you can be among the first to work in our exciting, new state-of-the-art center in San Diego.

STAFF ANALYST

As an integral part of our time-sharing organization, you will be responsible for systems software maintenance, systems gens and performance. You will also be involved with programming and some assembler utility routines. You will qualify if you have 2-3 years' VM/CMS systems programming experience. A BS or Computer Science degree would make you especially competitive as would strong oral/analytical communication skills. This job may require some overtime and travel. One major highlight of this position is that you will have the professional freedom to work in an unsupervised, unstructured environment. Salaries for this position can range from mid to high thirties (depending on qualifications) and our benefits are outstanding.

If making your imprint on a dynamic, new company appeals to you, send your resume to Pacific Bell, Management Personnel, 1021 Wilshire Blvd., Suite 300, Dept. EG-19, Los Angeles, CA 90017. Relocation not provided. Principals only, please. We are an equal opportunity employer.

PACIFIC BELL

MVS and COMMUNICATIONS SYSTEMS PROGRAMMERS

GIVE YOURSELF A QUIZ! If all your answers are YES, pick up the phone and Call BRENDA CAREY at PERSONNEL PLACEMENT, INC. (919) 884-0991

1. Do you want professional, confidential representation by a Technical Support Specialist-someone who will really LISTEN to your goals? —
2. Can your career be classified in the following words: stagnant, backstopping, dead-end, no room for growth? —
3. Would you like to CHECK OUT THE MARKET in the SOUTHEAST in order to determine your value in the marketplace? —
4. Are all your answers yes? —

Pick up the phone - YOU TALK - I'LL LISTEN

E-SYSTEMS GARLAND DIVISION

FACT 1: E-Systems Garland Division as a pioneer in the field of engineering has been revolutionizing electronics systems technology for decades.

FACT 2: In the most recent Fortune 500 rankings, E-Systems stands Number One in return on investment and 355 in sales.

FACT 3: E-Systems offers a professional working environment with a pacesetting benefits plan, FLEXCOMP, and an employer's stock ownership plan.

FACT 4: E-Systems objective is to become the world's largest producer of high technology, non-consumer electronics. If you are looking for a high-tech company with a strong financial future, you are invited to explore membership in our family by sending your resume.

Project Leaders
BSCS, EE or Math with 5 years experience in software project planning, procedures, Unit Development Folders, proposal writing and cost estimating of government-type programs. Experience with VAX, IBM mainframe, Gould SEL or TANDEM computers preferred. VLSI and VHSIC experience a plus.

Senior Software Engineers
BSCS, EE or Math with 5 plus years experience in definition, design, development and delivery of software systems utilizing DEC (VAX), IBM mainframe, Gould SEL or TANDEM computers. Required fluency in PASCAL, structured Fortran (Fortran-77), Assembly, ADA or TAL languages. Proficiency with VMS, UNIX, MVS or SYSGEN O/S expected.

Software Engineers
BS (MS) CS, EE, Physics, or Math with experience in program development, design and analysis for real-time, hierarchically distributed systems utilizing IBM (mainframes), DEC (PDP/VAX), Gould (SEL), TANDEM or Motorola (6800, 68000) computers. Proficiency in structured Fortran (Fortran-77) PASCAL, PL-1, TAL, MACRO-11 or Assembly languages required.
Electronic Warfare, C³, Reconnaissance, data base applications, operating systems, I/O interfaces and/or communications backgrounds preferred.

Senior MIS Specialist
BSCS with 8 plus years experience on IBM mainframe as MVS-internalist, *ACF II* and *CICS* background highly desirable. Manufacturing environment background a plus.

Software Test Engineers
BSCS, Math, EE with 3 plus years related experience to include the definition of software test requirements, generation of test plans/procedures, test execution and reporting. Related computer system and language background necessary.

Project Analyst
BSCS or related degree with 7 plus years experience (at least 3 as Project Leader) utilizing IBM mainframes. MRP experience required; CICS or database management a plus.

Communication Specialists
BSEE, Math or CS with 5 plus years experience with bit, byte and asynchronous protocols in the design of communications-based systems (computer to computer, device to computer) using Tandem computers with GUARDIAN operatone system. Proficiency in TAL required.

Data Base Administrators
MSCS/Math or EE with 5 plus years experience building and managing large data base systems. Must have working knowledge of structuring, distribution of algorithms and fail safe techniques. Must be capable of supervising total project resources. VAX or TANDEM systems required with PASCAL or TAL fluency.

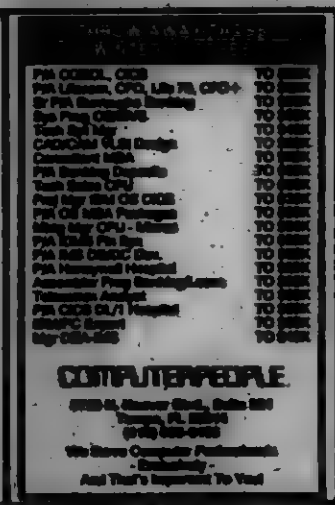
Artificial Intelligence Specialists
Ph.D. or equivalent in Math, EE or CS with 5 plus years related experience applying knowledge-based engineering systems to electronic (turnkey) systems. *LISP* proficiency expected. Researchers will have access to personalized AI workstations operating the *INTERLISP-D* programming environment and *SMALLTALK-80* systems.

Senior VMS Specialist
BSEE (MS) or CS with 10 plus years related experience with VAX systems in PASCAL fluency. Must be VMS internalist within I/O driver systems. Defense environment background a plus.

Ann Olson, E-Systems, Inc., Garland Division, P.O. Box 226118, Dept. 41, Dallas, Texas 75266.

E-SYSTEMS
The problem solvers.

An Equal Opportunity Employer, M/F, V, H.
U.S. Citizenship Required.



FOR ACHIEVERS ONLY

INTERMEDIATE to SENIOR LEVELS

- Software Development Mgr
- Technical Support Specialist
- Data Base Administration
- Voice/Data Communications
- Office Automation
- Microprocessor Software
- Systems & Programming Mgr
- EDP Audit/Security
- Systems Planning
- Manufacturing Systems

DEC, HONEYWELL, IBM, NCR, UNIVAC

BRUCE A. MONTVILLE
Managing Partner

COMPUTER 2100

TOLL-FREE
1-800-258-[illegible]

COMPUTER PARK, P.O. BOX 4970
HAMPTON, [illegible]

UNIX WIZARDS...

We can use your magic!

No other company in management and technology consulting can offer you the degree of challenge, diversity and opportunity we can. We are Booz-Allen & Hamilton, one of the most widely respected firms in the field.

We are looking for a select group of professionals. We are in search of individuals who are skilled in UNIX. These positions offer the opportunity to participate in a major project with national implementation and using a variety of hardware. Combine your technical wizardry with our fast paced data processing environment and enjoy the rewards of professional and personal satisfaction.

As a successful candidate, you must have a college degree, preferably in a technical discipline and excellent communications and interpersonal skills. These opportunities include both mid and senior-level positions. In addition, you should have 2 to 10 years experience with some of the following:

- UNIX and micro-processor development-based systems
- Mini and micro computers
- Structured program design techniques
- Data base design
- Software integration, migration and transportation
- Quality assurance/ configuration management
- Knowlege of "C", PASCAL, or higher order languages
- Systems programming

A more fulfilling professional opportunity will be hard to find . . . work your magic with a leader and realize your complete potential.

For more information and immediate consideration, send your resume, in confidence, to: Ms. Judy Merkel, MISD, Booz-Allen & Hamilton, 4330 East West Highway, Bethesda, Maryland 20814.

BOOZ·ALLEN & HAMILTON INC.

CONSULTANTS TO GOVERNMENT, BUSINESS & INDUSTRY
An Equal Opportunity Employer

Data Processing Professionals...

become part of a growth organization.

AGS. We're more than one of the most respected names in DP consulting. We lead the world in Project Management and Systems Development software package installation. Also, we're the largest independent distributor of microcomputer hardware and software.

If you're one of the best in your field, and you're considering a career move, consider AGS. We're offering some of the most challenging work in the industry to Programmers and Programmer Analysts with at least 3-5 years experience in:

- *UNIX/C*
- *RAMIS/FOCUS*
- *CICS/COBOL*
- *IDMS*
- *IMS: DB/DC, COBOL, PL-1, ASSEMBLER*
- *WX: VMS, FORTRAN, PASCAL*

Our clients? The leaders in financial services, telecommunications, and other high technology and service industries. The assignments? The most exciting that DP can offer. With, of course, compensation and professional development opportunities to match.

If you're ready for "that" career move, send your resume or call the office nearest you.

1600 Wazee Street,
Denver, Colorado 80202 (303) 297-0334

10 Middle Street,
Bridgeport, Connecticut 06604 (203) 366-3341

270 Farmington Avenue,
Farmington, Connecticut 06032 (203) 677-6166

2301 Maitland Parkway, Suite 210,
Maitland, Florida 32751 (305) 660-2900

1301 West 22nd Street,
Oak Brook, Illinois 60521 (312) 887-7440

375 North Broadway,
Jericho, L.I., New York 11753 (516) 822-1630

111 Broadway,
New York, New York 10006 (212) 962-4646

1139 Spruce Drive
Mountainside, New Jersey 07092 (201) 654-4321

PHD Systems, Inc.
12 Lakeside Office Park
Wakefield, Massachusetts 01880 (617) 245-3013

AGS Computers, Inc.
Corporate Headquarters
1139 Spruce Drive, CW
Mountainside, NJ 07092

AGS
AGS Computers, Inc.

Equal Opportunity Employer M/F

Intertech (International American Technologies Corp.) is seeking individuals for a Saudi Arabian assignment. These single status contracts are 84 weeks and renewable. Benefits include housing in 5-star hotels, per diem, 5 weeks vacation with paid transportation, skill pay, free medical insurance, air conditioned company car, and paid overtime. Your earnings, of course are tax free. Must be U.S., U.K., or Canadian citizen.

Systems Analysts and Programmers

- BSCS, math or equivalent with 5 years general DBMS, and 1-2 years with Model 204 DBMS.
- BSCS, math or equivalent and 5 years total experience and 2-3 years experience with FOCUS, TSO/SPF, PL-1, OS/JCL, and CLISTS.
- Degree and 5 years programming and software maintenance on mini/micros associated with Foxboro and/or Honeywell process control instrumentation.
- Degree and 5 years IBM 370 and up, with PL-1, COBOL, IMS DB/DC, TSO/SPF and 1 or more of the following: ADF, SAS, BMP, Mark IV, APL, JES 2/3, OS/JCL.
- BSCS and heavy scientific applications experience preferably oil and gas related with PL-1, FORTRAN, 4331 DOS/VSE, VM/CMS and microcomputers.

Send your resume to Will Barden

Intertech Corporation
2 West Potomac Parkway
Williamsport, MD 21795
Equal Opportunity Employer

CENTRAL FLORIDA SYSTEM PROGRAMMER

Have you dreamed of escaping the snow and moving to Florida? We offer a feeling of vacation time every day of the year! Just one hour or less to any major attraction or beaches. We're enjoying all the pleasures of the good life - Where are you? Minimum of four years exper. in analysis and programming, including two year's exper. in file structure and design, data communications system programming, communications access methods, the current techniques, advanced coding techniques (i.e., COBOL, Assembler, DCB, SMB) operating system programming and current system architecture. Must have IBM background experience in the operating system (OS/ 4300) and software currently utilized. Contact:

Nancy Bennett
Polk County BOCC
P.O. Box 60
Bartow, FL 33830
(813) 533-1161, Ext. 214 or 374

EOE M/F/H

Programmer

Position available in progressive independent bank in major city in San Joaquin Valley California. Requires 2 years experience in NEAT/3 & COBOL. Experience in financial software application systems preferred. Salary commensurate with experience. Excellent benefits. Qualified applicants send resume and salary requirements to:

Union Safe Deposit Bank
P.O. Box 1200
Stockton, CA 95201
Attn: Personnel Dept.
An Equal Opportunity Employer

HP 3000 COMPUTER EXPERIENCE

Hercules Incorporated, a Fortune 500 manufacturer of chemicals, fibers and plastics has an immediate opening in Information Systems at the Terre Haute, Indiana plant.

The successful candidate must have a degree. An Engineering or Computer Science degree is preferred. Must be experienced with the Hewlett Packard HP 3000 equipment and software.

SYSTEMS ADMINISTRATOR: Configuring and maintaining a large, multiple CPU network in a 24 hour/7 day a week manufacturing operation, developing applications using Rapid, and setting up security and control procedures.

We offer a competitive salary and a comprehensive benefits package. Qualified candidates should forward resume and salary history to: Manager of Employee Relations.

HERCULES

Hercules Incorporated
P.O. Box 9036
Terre Haute, Indiana 47808

An Equal Opportunity Employer M/F

PROGRAMMERS AND ANALYSTS

Growing software services company involved in implementing several HOGAN systems at leading California financial organizations is searching for Hogan expertise. You will be assigned to one of our Fortune 500 financial clients and be an integral part of their Hogan implementation process. We offer high salaries, bonuses, fringe benefits and relocation. Send resume or call collect at (213) 380-2691.

cps

SYSTEMS SOFTWARE SUPPORT PROFESSIONALS

New Jersey Opportunities

Internationally known consumer products manufacturer seeks TWO Systems Programming professionals.

SUPPORT YOUR CHOICE of:

MVS, CICS, ACF/VTAM, ACF/NCP, MSNF Network with 3705's, ISMS & IMS, VM/SP-3, TSO/EF7.

Our client offers outstanding professional environment, salaries, and benefits. In a campus-like suburban New Jersey setting. Call or write:

C.J. Stalong

Hallcrest & Co.
675 Third Avenue
NYC, NY 10017
(212) 599-0200

Analysts

WANT REAL SL/VSE +? Try New England.

Enjoy the cozy sophistication of New England, where everything is close by... including some outstanding career opportunities.

Several well established client lines in coastal and interior areas seek Analysts and Systems Analysts with experience on IBM 4341, 3081 or similar equipment with expert knowledge of OS/MVS, JCL, CICS, IMS, VM/CMS or COBOL. Also HP3000, DEC 11/780, IBM S/34, 36, 38 in great demand.

All fees, interview and relocation costs paid by client company. Send confidential letter or resume to: Sheehy Associates, Inc., Suite M, 465 Congress St., Portland, Maine 04101.

SHEEHY ASSOCIATES INC

Recruiting Now!
Opportunity Employers
"Quality of Life/Quality of Work Life."

data processing

computer software specialists

locations throughout U.S.

At Computer Systems, the Technical Services professionals provide customized software solutions for some of the most complex data processing problems facing industry today. Our expertise is extended to a wide range of applications in the scientific, government, military and commercial communities. Currently we are seeking qualified personnel with any of the following backgrounds:

- U1100 OS INTERNALS
- U1100 MASM/COBOL/FORTRAN
- U1100 DMS/TIP
- U1100 MAPPER RUN DESIGN
- DCP 20/40
- AN/UYK-7/CMS-2/ULTRA-32
- AN/UYK-20/CMS-2
- SOFTWARE CM & QA
- NTDS, ASW or EW SOFTWARE EXPERIENCE
- DEC (FOR REAL TIME APPLICATIONS/SYSTEMS)
- ATE SYSTEM ENGINEERS

We have excellent opportunities for Programmers, Application Analysts, Systems Engineers and Technical Leaders. Most positions require a Computer Science degree and hands-on experience or equivalent training and background. At Sperry, we offer one of the finest compensation packages in the industry. To learn more, direct your resume to our Eastern or Western representative. U.S. Citizenship Required. Principals Only. An Equal Opportunity Employer.

For Western U.S. Positions:

Sperry Corporation,
Computer Systems,
Technical Services Division
R. Elmer
P.O. Box 43525
St. Paul, MN 55164-0525

For Eastern U.S. Positions:

Sperry Corporation,
Computer Systems,
Technical Services Division
B. Glover (Dept. CW)
1901 N. Moore Street
Arlington, VA 22209

SPERRY

© Sperry Corporation 1984

DIRECTOR OF DATA PROCESSING

Vanguard Technologies Corporation is a rapidly-paced and proven leader in providing high quality ADP facilities management support for Federal Government clients. We are looking for experienced professional manager with proven leadership ability and 8-10 years of experience in planning, organizing, directing, and controlling large scale, fully integrated ADP facilities operations. Experience must include successful management of operations, systems software, and computer operations with staffs of 50 or more personnel. Experience should also include substantial management responsibility for financial management, project management, and dealing with many different user service requirements.

Preference will be given to individuals possessing an advanced degree who have proven track records of success and clearly possess potential for further growth with Vanguard. An appropriate compensation package is available for qualified individuals. Please send resume, in confidence, to:

Vanguard Technologies Corp.
8280 Leo Madison
Fairfax, VA 22031
Attn: Gordon H. Cain, Vice President
EEO/M/F/H/V
Principals Only

INFORMATION RESOURCE CONSULTANTS

We are a leading international firm specializing in information resource management including strategic planning, information assessment, and user requirements, DBMS package evaluation, data base design, data administration development, fourth generation languages, information centers, and relational technology. We provide consulting and education services to Fortune 1000 companies.

The firm is expanding throughout the country and requires both SR and part time consultants all levels. Minimum requirements are two years experience with data base and information systems experience (graduate studies or MBA or MS in Information Systems or Computer Sciences). Send letter outlining your qualifications and biography to:

Performance Development Corp.
1101 State Road, Bldg. M
Princeton, NJ 08540
(609) 921-5770
or
Infotec Centers Stone Road
Malibu, CA 90265
(213) 456-6391

FLORIDA

Have your choice to work for many exciting companies:

FPA - COBOL/CICS/DB/DC/IMS/PC
TECH SUPP - MVS/VSE/SYSTEM 2000
FPA - COBOL/CICS/DB/DC/IMS/PC
JR DBA - IDMS/ULTIUSER
SYS PROG - MVS/SYSTEM 2000/IMS
FPA - CBS/MVS/IMS/COBOL
FPA - COBOL/CICS/DB/DC/IMS/PC
FPA - MVS/COBOL/CICS/DB/DC/IMS
TECH SUPP - UNIX
PROG SUPP - SAS/CMS - IBM
FPA - SYBASE - MAPICS - RPG II
DBA - IMS and STANDARDS
SYS PROG - VM/SP/CMS/IMS/CICS/VTAM
FPA - FOCUS - PL/1 - IBM
SR FPA - TANDEM/TAL/COBOL
Many others to choose from. All fees and relocation paid. Mail resume to or call us at:

STAN ALLEN
ROBERT HALF
OF TAMPA, INC.
1211 N. Westshore Blvd.
Tampa, FL 33607
(813) 879-4191

Denver Programmer/Analysts

Security Life of Denver, an A+ rated life insurance company, with a firm commitment to data systems, offers:

- Competitive salaries and benefits
- Flexible 4-day work week
- Career paths recognizing individual strengths
- Outstanding year round recreational opportunities

Our current environment includes an IBM 4341-2 and a total 6000 with MVS, CICS, COBOL, ALC, VM/CMS, JES2, Librarian, DYL280, Culprit. Systems efforts are underway using telecommunications and videos. We will begin the replacement of our existing IBM environment ALIS System in the near term.

Openings currently exist in our growing staff for experienced Programmer/Analysts with the following qualifications:

- Minimum 2 years recent experience on IBM mainframe
- Proficient in COBOL and ALC
- Analysis and Design experience
- Life insurance application experience (ALIS a definite plus)

Qualified individuals interested in challenges and rewarding career opportunities are invited to send their resume along with salary requirements to:

Mrs. Sally Morton Sawtell
Assistant Vice President-Systems Development
Security Life of Denver
1616 Glenarm Place
Denver, Colorado 80202
All Replies Strictly Confidential
EOE M/F/H/V

EDP Professionals

Middle South Services has one of the South's largest data processing centers serving one of the nation's largest power systems. Middle South Utilities, our parent company, is a major electric utility. Our hardware environment includes two IBM 3081s, and IBM 4341 and Tandem mini 16s. If you are a career-minded EDP professional, we have the following opportunities available:

PLANNING AND CONTROL ANALYST A current opening exists in our Planning and Control section for an Analyst to work on the implementation and training of a systems development methodology package. The ideal candidate will have a B.A. in Business and 2-3 years experience in a computerized environment monitoring compliance with systems development standards, with an emphasis on planning and control. Experience in development of methodology is a strong plus with experience on methodology software packages.

PROJECT LEADER With strong leadership skills needed to coordinate the enhancement/maintenance and program performance effort of our power plant maintenance information systems. Previous experience as a lead analyst or project leader in power plant or maintenance systems is required. Experience on large IBM mainframe is needed and exposure to IMS DB/DC is a plus.

ANALYST/PROGRAMMER (DATA SECURITY) An experienced computer professional is needed to work with the development and support of data security requirements for on-line systems. The ideal candidate will have previous applications programming experience utilizing IMS DB/DC along with a desire to develop technical and analytical skills pertaining to security issues. Previous data security experience preferred, especially heavy usage of ACF 2.

SR. ANALYST/PROGRAMMERS (APPLICATIONS) Several positions are currently open for experienced IMS DB/DC Analyst Programmers. Experience with COBOL or PL-1 in plant maintenance or business applications is needed.

SYSTEM ANALYST With experience in on-line corporate data base design and/or information systems planning is needed to work in an information resource management section. The ideal candidate will have at least one year experience in logical data base design along with 2 or more years of IMS experience or other data base management systems.

Due to our size and scope of operation, we offer access for advancement, career stability and an excellent salary with major benefits. For more information, call our number below or to apply directly, send your confidential resume to Byron Heath or Richard Jackson, MIDDLE SOUTH SERVICES, INC., P.O. BOX 61000, NEW ORLEANS, LA 70161.

1-800-231-4481
In Louisiana, call collect (504) 586-4646.

MIDDLE SOUTH SERVICES INC.
An Equal Opportunity Employer M/F

Software Systems Engineers
Software Development Engineers

If you want to build a new software division capable of providing total life cycle support...

Harris Can Make It Happen

If you want an aggressive entrepreneurial setting—then the Software Operation of Harris Government Information Systems Division could be the place for you. We are developing and using state-of-the-art methodologies, and have the opportunities for you to achieve the recognition you deserve. Positions are available in our Florida, Colorado Springs, and Washington D.C./Baltimore facilities. Requirements: BS in CS, EE or related technical disciplines. MS or PhD desirable. Experience in the government contracting environment helpful.

SOFTWARE SYSTEMS ENGINEERS
System-level design experience desired in some of the following: CPI Systems, Large Scale Databases, Local and Wide-Area Networks, Real-Time Data Acquisition, Interactive Graphics, Modeling and Simulation, Man-Machine Interface, Advanced Software Methodologies and Software Tool Development. Experience desired with Requirements Analysis Languages, Subsystem Definition, Proposal Preparation and Software Costing Models.

SOFTWARE DEVELOPMENT ENGINEERS
Experience sought in the design and implementation of software using structured languages (and programming techniques) including PASCAL "C," ADA, FORTRAN 77 with DEC, DATA GENERAL, or HARRIS 800/500-Systems. Exposure to modern design methodology (such as PDLs) and structured development (team concept/structured walkthroughs) of medium to large scale software systems desired.

We are part of the Fortune 200 Harris Corporation, Florida's largest industrial employer. We offer an excellent compensation and benefits package, a formal merit review program, and outstanding advancement opportunities.

If you feel that your present position doesn't offer the kind of challenge and recognition you really want, call Julian D. Kaufmann, COLLECT, Monday thru Friday, 8 am-5 pm, EST at (305) 676-6467, for more information. Or send a resume to his attention at Harris GISD— Software Operations, Dept. CW, 160 Wickham Road, Melbourne, Florida 32901-1132. For further information after business hours, call 1-800-327-6552.

U.S. CITIZENSHIP REQUIRED.
SBI MAY BE REQUIRED.
An equal opportunity employer M/F/H/V

HARRIS
IF IT'S HAPPENING IN ELECTRONICS, IT'S HAPPENING AT HARRIS.

SOFTWARE ENGINEERS

UNIX*, C, PDP11, M68000

Opportunities in Rochester, New York and Reston, Virginia

Computer Consoles Inc. designs, develops, manufactures, markets, and services a variety of minicomputer-based fault-tolerant information systems. Headquartered in Rochester, New York, we have all the cultural and educational advantages of a large metropolitan area as well as the ambience and scenic beauty of a small, relaxed town. Our new Office Systems Group is located in lovely northern Virginian Fairfax County just minutes away from our nation's capitol.

CCI currently has immediate opportunities for:

GROUP LEADERS/SOFTWARE ENGINEERS

You'll be responsible for the design and implementation of data base applications and utilities, or fault-tolerant operating system development including development of a multiprocessor UNIX-compatible transaction processing system.

We prefer a technical degree plus a minimum of 2 years' experience. Knowledge of C, UNIX, and data structures plus experience with data bases in a minicomputer Real Time or on-line environment and/or OS internals are also desired. U.S. citizenship or permanent residence is a must.

**UNIX is a trademark of Bell Labs*

We offer opportunities for growth plus attractive compensation and benefits including relocation.

For immediate confidential consideration, please forward your resume including salary history to the location of interest to you.

CCI COMPUTER CONSOLES INCORPORATED

S.C. Hoskins
Computer Consoles, Inc.
97 Humboldt Street
Rochester, New York 14609

G.C. Attimonda
Computer Consoles, Inc.
1760 Reston Avenue
Reston, Virginia 22090

Equal Opportunity Employer M/F/H/V

SYSTEMS PROGRAMMERS

Outstanding career opportunities are now available with the Philadelphia area's most prestigious teaching hospital which enjoys a national reputation for its innovative, trend setting medical research and treatment. These openings are specifically involved with our Radiology Department which has figured prominently in state-of-the-art technological applications.

In one position qualified candidates will work on our development radiology research computer system, including real time systems, programming, networking, image acquisition and display systems. A Bachelor's Degree in Engineering or Computer Science and a minimum of 2 years in systems programming (assembly language) with DEC computer systems is necessary.

The other position requires working on development of new systems and applications and modifying and maintaining the data base system for radiology. A BS in Computer Science, 2 years systems and applications programming on DEC, 1 year VAX, VMS, data base management is required and experience in RATFIE, Basic-Plus and MUMPS is preferred.

In both positions hospital experience is a plus, but not required. If you have the qualifications we seek and want to join a medical leader located in one of the most desirable areas of the eastern United States, receive an extremely competitive salary, and enjoy a benefits package which includes tuition reimbursement, forward your resume without delay to Leonard G. Helm, HUP Recruitment, 3400 Spruce St., Philadelphia, PA 19104.

HUP HOSPITAL OF THE UNIVERSITY OF PENNSYLVANIA

An Equal Opportunity Employer, M/F/H

Experienced Computer Sales & Marketing Representatives

Get off the sales rollercoaster with strong sales support, stability...and opportunity.

The HP Way.

If you're tired of the same old promises, consider Hewlett-Packard. We have outstanding opportunities for career-minded professionals with 2 or more years' specialized sales experience in the minicomputer field. With a degree in engineering, physics, math, computer science, business or the equivalent combination of education and experience, you could qualify for consideration.

1. Bellevue, WA
2. Santa Clara,CA
3. N. Hollywood, CA
4. Los Angeles, CA
5. Englewood, CO
6. St. Paul, MN
7. Rolling Meadows, IL
8. Novi, MI
9. Dallas, TX
10. Houston, TX
11. Atlanta,GA
12. Raleigh, NC
13. Orlando, FL
14. Lexington, MA
15. Paramus, NJ
16. Valley Forge, PA
17. Rockville, MD

and other cities across the U.S.

Careers are yours for the making.

HP offers more than a job. You can reach the top of your field right across the nation. But you'll need to be creative, enthusiastic and have the business maturity and technical know-how to interface effectively with end user decision makers.

Two areas of opportunity for Experienced Field Sales Representatives -

Technical Computer Sales

These positions are responsible for selling HP's technical computer products to scientific, technical and manufacturing customers in your assigned territory. Besides degree or equivalent, 2 years' successful CAE/CAD/CAM or manufacturing minicomputer sales experience is desirable.

Commercial/Business Computer Sales

These positions are responsible for selling large-scale minicomputers, primarily to the manufacturing market. As well as managing the existing customer base in your assigned territory. Besides degree or equivalent, 2 years' successful business computer sales experience is desirable.

Invest in your future... long term.

We rank high among major computer companies in terms of sales growth, earnings, product innovations and employee retention. This means career stability... year in and year out. It starts with in-depth training for up to 10 months, covering every aspect of the business... from learning the HP product line to the most sophisticated sales techniques. You'll quickly gain hands-on experience working with senior HP people.

With HP you'll reap the benefit of rapid production, delivery and installation, plus strong pre-and post-sale technical support. Because our credo is "productivity - not promises."

Consider the HP advantages.

Besides excellent compensation and benefits, you'll find your career progression with us a lot smoother than what you've experienced in the past. For immediate consideration, please send your resume with salary history, indicating your preferred city.

Eastern Region
Murray Kaplan
HP Dept. CW
4 Choke Cherry Rd.
Rockville, MD 20850

Midwest Region
Barbara Moyer
HP Dept. CW
5201 Tollview Drive
Rolling Meadows, IL 60008

Southern Region
Karl Paul
HP Dept. CW
2000 South Park Place
Atlanta, GA 30339

Susan Benson
HP Dept. CW
930 E. Campbell Road
Richardson, TX 75081

Western Region
Blair Farr
HP Dept. CW
3939 Lankershim Blvd.
N. Hollywood, CA 91604

HEWLETT PACKARD

An Equal Opportunity/Affirmative Action Employer
No Agencies Please

Programmers
San Diego

NCR's Rancho Bernardo facility in San Diego, California, has positions available in our Software Development Group for talented programmers to work in these exciting areas:

- Porting UNIX* System V
- C Programming
- Multibus I/O drivers
- VLSI microprocessor experience
- LAN Network

Candidates must have a BS/MS Computer Science degree with 2-8 years of systems programming experience. Working knowledge of UNIX Programs and C programming experience is required. Multibus I/O experience is desirable.

Employees will enjoy excellent salary, top working conditions and benefits which include fully-paid hospital and medical plan for employee dependents. Please send your resume with salary history to: **Professional Placement Office, NCR Corporation, Rancho Bernardo — Engineering and Manufacturing, Dept. 969, San Diego, CA 92127.**

*Trademark of AT&T Bell Laboratories

NCR
Complete Computer Systems

An equal opportunity employer

Bryant Bureau

HAS THE COMPUTER PROGRAM FOR YOU

If you're not accomplishing your career goals, let us put you in the right environment. Our national database of client companies are constantly looking for progressive DP professionals who want to remain state of the art.

IBM mixed MDP design background to $75K	
IBM DASD Developer	to $40K
IBM Systems Specialist	to $40K
IBM CICS/VTP Specialist	to $50K
DEC VAX Communications Pgmr	to $35K
DEC VAX Performance Analyst	to $35K
IBM COBOL/VSA, CICS, DB2	to $40K
IBM Systems Programmer/MVS	to $40K
IBM Network Lead/SNA/NS	to $35K
IBM CICS/DOS Installation Pro	to $35K
IBM IMS Database Analyst	to $35K
IBM CICS/DL1 Specialist	to $35K

To become part of the growth in the 80's, contact the DP Division below.

Bryant Bureau
DP Division
4000 S. Tamiami Trail, S-917
Sarasota, FL 33581
(800) 237-0407

DP MANAGER
IBM 4341

Prominent know within apparel industry offers unique challenge for solid individual. Ideal candidate should possess DOS/VSE & VTAM/VSAM in addition to COBOL programming exp. CICS definitely essential. Project leadership a plus. Don't pass up this outstanding opportunity.

$42,000 FEE PAID

EXCELSIOR EMPLOY
Our Service Is Free, Inc.
555 Fifth Avenue
New York, N.Y. 10017
212-661-4600 (Agency)

Information Processing Manager

Fast-growing international company seeks innovative, dynamic leader for their "Information Factory." Responsibilities include system software, network control center, computer operations, production control, and quality assurance.

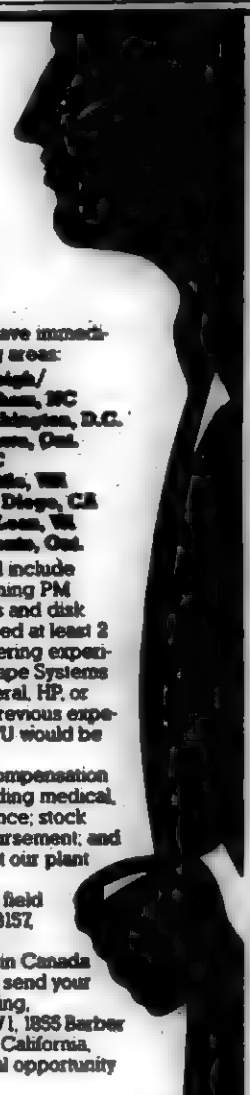
Qualified candidate will have a proven track record in the installation and management of a leading-edge IBM/PCM mainframe environment, as well as a complex distributed processing network. In-depth knowledge of IBM system software, networking, and a major data base management system a must. Experience in hardware evaluation and acquisition important. Emphasis on customer satisfaction and meeting operational service levels is major ingredient to success in the position.

This MIS team serves a premier Fortune 500 company which integrates technology in the day-to-day operation of the company. Environment is challenging and fast-paced. For outstanding personal growth as well as joining an "A Team", send your resume today for immediate consideration to CW-B4562, Computerworld, Box 880, Framingham, MA 01701

An equal opportunity employer.

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

We owe our success to great peripheral vision.



When System Industries first started, the data storage system was viewed as just a peripheral to the computer. Now, 14 years later, the data storage system is the heart of most computer applications. And System Industries has become the world's largest independent supplier of high performance DEC and Data General compatible disk and tape storage systems.

We still have exciting visions of what data storage can become. Our ever-expanding product line ranges from 80 to 675 megabytes. Our SIMACS system, upgradeable from a current controller, can handle eight CPU's on a single database. And we're developing a SINET system that will accommodate multiple vendors and CPU's. It's this ongoing technical vision that has found our products in use everywhere from the FDA to Harvard University.

Our high-performance disk storage products have met with such consistent success that we've grown an average of 50% annually for the last 12 years—installing over 30,000 storage systems worldwide. We're a good company to work with, and a good company to work for.

Field Service Engineer

We place such critical emphasis on field support, that many of our engineers have gone on to management positions with System Industries. We have immediate openings in the following areas:

Pittsburgh, PA	Raleigh/ Durham, NC
Columbus, OH	Washington, D.C.
Kansas City, MO	Ottawa, Ont.
Los Alamos, NM	NYC
Oklahoma City, OK	Seattle, WA
Vancouver, BC	San Diego, CA
New Jersey	McLean, VA
Boston, MA	Toronto, Ont.
Orlando, FL	

Your responsibilities will include troubleshooting and maintaining PM schedules on our CDC disks and disk storage equipment. You'll need at least 2 years' previous field engineering experience involved with Disk or Tape Systems installed on DEC, Data General, HP, or Prime Computer systems. Previous experience in maintenance of CPU would be a plus.

We offer an excellent compensation and benefits package, including medical, dental, vision and life insurance; stock purchase plan; travel reimbursement; and in-house company training at our plant in Milpitas, California.

To join our fast-growing field service group, call 800-538-8157, extension 960 (in California: 800-672-3470 extension 960, in Canada call collect 408-980-7160), or send your résumé to Professional Staffing, System Industries, Dept. CW1, 1855 Barber Lane, P.O. Box 789, Milpitas, California, U.S.A. 95035. We are an equal opportunity employer.

SYSTEM INDUSTRIES
Competent Commitment

A DIRECTION FOR THE 80's

FORWARD MOVING...that's the Greyhound direction. We're moving into some exciting areas that offer far-reaching career options for individuals also on the move. At Greyhound, you'll move further because there are more places to go. Move your career forward.

EDP AUDITOR

Participate in the start-up of a new department. Performs EDP audits within the diversified Greyhound Corporation and supports other auditors in their duties as they relate to data processing operations. If you are appropriately degreed with 2-3 years recent data processing experience and are currently working as an EDP Auditor, find out why Greyhound could be the most exciting career discovery you'll ever make.

Be part of our new directions for the 80's. We offer a very competitive salary and excellent fringe benefits, including medical, dental, and life insurance. To be considered, please send your resume and salary history in confidence to: **Director of Staffing, Greyhound Corporation, Greyhound Tower #982, Phoenix, AZ 85077.**

Equal Opportunity Employer M/F/V/H

Data Processing

Systems Programmer

Southern Company Services, Inc., of Birmingham, Alabama, has an immediate opening for a Systems Programmer. Southern Company Services serves as the engineering, planning, and design organization for the Southern electric system, which is comprised of Alabama, Georgia, Gulf and Mississippi power companies, Southern Electric International, and Southern Company Services.

A BS or MS in Computer Science or Math is desired, and the ideal candidate will have at least 2 years systems programming experience in an IBM VS or VM environment with a working knowledge of Assembler language. Responsibilities will include the development and revision of "access methods" software that couples a realtime system with supporting communications processors.

We offer competitive salary program, a comprehensive benefit package, and excellent career opportunities. Please send resume and salary requirements, in confidence, to:

Personnel Department,
SOUTHERN COMPANY SERVICES, INC.
P.O. Box 2625
Birmingham, AL 35202

An Equal Opportunity Employer M/F

Southern Company Services
the southern electric system

INFORMATION SYSTEMS/ MANUFACTURING SPECIALISTS

- PORTLAND, OREGON
- WICHITA FALLS, TEXAS

PROJECT LEADERS

The successful candidates must have in depth experience in Manufacturing Systems, preferably with System/34 or 38. MACPAC or AMAPS a plus. Will lead development team and be responsible for planning through implementation of cost effective systems. Extensive interface with plant personnel. Travel required.

PROGRAMMERS

Minimum 2 years experience in RPG. Part of project team developing and maintaining manufacturing systems. Manufacturing experience a plus.

Please- no trainees. We will contact those candidates we are interested in within two (2) weeks of receipt of resume. Ingersoll-Rand has openings for Programmer/Analysts-IBM mainframe/COBOL- in New Jersey as well.

Ingersoll-Rand offers a comprehensive benefits package, as well as competitive starting salary. Please send resume and salary history to: Personnel Manager

INGERSOLL-RAND
35 Kennedy Blvd.
East Brunswick, NJ 08816
Equal Opportunity Employer M/F

BUSINESS DATA PROCESSING TEACHING POSITION

Master's Degree in Information Science or a related field. Business & teaching experience desirable. Ability to teach in areas of Systems Analysis & Design, Data Base Management Systems, & Software Program Development. Salary commensurate with educational preparation & experience. Application, resume & references to: Dr. R.M. Pope, Chairman, Division of Business & Economics, Carson-Newman College, Jefferson City, TN 37760. Carson-Newman College is an Equal Opportunity Employer.

VIRGINIA

IMS + COBOL

Move to Virginia! Dynamic regional retailer seeks Programmer/Analyst who can grow with the company. Variety of applications. Experience in COBOL and IMS exposure required. Good benefits. $25K.

ROBERT HALF
OF VIRGINIA, INC.
830 Main Street—Suite 522
Richmond, Virginia 23219
(804) 648-3677

PROGRAMMER ANALYST

Large multi-disciplined consulting engineering and planning firm is seeking individual with minimum of 2 years of concentrated experience in FORTRAN programming for engineering applications in its Fort Worth office. Prefer background in civil engineering and/or surveying. Application programs to be interfaced with Intergraph supplied (DEC VAX 11/780) interactive graphics system. Experience with Intergraph and DEC VAX systems a plus. We provide competitive salary and above average benefits. Send resume in confidence to:

Carter and Burgess, Inc.
1100 Macon Street
P.O. Box 2572
Fort Worth, TX 76113

LOOKING?

Find the job you want in Computerworld's classifieds. No other publication carries as many ads for computer professionals as Computerworld, so no other publication can give you as wide a choice of jobs, salary and location as Computerworld. You can even try a "Position Wanted" ad to look for exactly what you want, where you want.

Be sure you look over our recruitment ads every week, so you don't miss the opportunity that's just right for you.

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY
375 Cochituate Road, Box 880, Framingham, MA 01701/(617) 879-0700

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

It was obvious, when we first met him, that Willard was an intelligent, and energetic achiever. He was, at that time, a young Programmer with limited experience. Nevertheless, being an ambitious person, he had set high goals for himself and a rigid schedule for their achievement. His problem was that he didn't know specifically which companies offered the strongest potentialities for the promotions that would meet his needs.

We worked out a detailed, professional career advancement plan for him... one that would meet the time schedule he had in mind. A few days later we helped him find a position that proved to be a springboard to a bright new future. Now, only five years later, Willard is a Senior Systems Analyst well on his way to his ultimate objective.

Professional computer career planning is only one of the many excellent services offered by National Computer Associates... and no one does it better!

We can do the same thing for you as we have done for Willard Payne and many thousands of others. Come in. Call. Or mail your resume to the NCA firm nearest to you. Confidentiality is assured. Company clients assume our fees.

ATLANTA: EN Limited
339 Peachtree Street, Suite 1001-C
Atlanta, Georgia 30043 (404) 355-5940

BOSTON: Robert Wayne and Co., Inc.
North Shore Park, Suite One, 181 Bedford Street
Lexington, Massachusetts 02173 (617) 861-1620

CHICAGO: Thos. Hohe & Associates
100 N. Wacker Drive, Suite 1709
Chicago, Illinois 60606 (312) 977-9555

CINCINNATI: Michael Thomas, Inc.
66 E. Wilson Bridge Road, Suite 201
Worthington, Ohio 43085 (614) 846-0888

DALLAS: DataPro Personnel Consultants
12720 Hillcrest, Suite 530
Dallas, Texas 75230 (214) 991-9998

DETROIT: Electronic Systems Personnel, Inc.
3000 Town Center, Suite 2580
Southfield, Michigan 48075 (313) 353-6868

FLORIDA: Data Sciences Personnel, Inc.
P.O. Box 6577
Hollywood, Florida 33084 (305) 434-8912

HARTFORD: Compass, Inc.
900 Asylum Avenue
Hartford, Connecticut 06105 (203) 549-4249

HOUSTON: Career Consultants, Inc.
2900 South Post Oak
Houston, Texas 77056 (713) 626-4600

INDIANAPOLIS: Computer Personnel Services, Inc.
107 N. Pennsylvania
Indianapolis, Indiana 46204 (317) 634-4712

KANSAS CITY: D. P. Career Associates
6405 Metcalf, Suite 502
Shawnee Mission, Kansas 66202 (913) 236-4288

LOS ANGELES: Superior Resources, Inc.
Personnel Service
17141 Ventura Boulevard, Suite 200
Encino, California 91316 (213) 986-4488

MINNEAPOLIS: EDP Consultants, Inc.
7302 West State Street, Suite 3
Milwaukee, Wisconsin 53213 (414) 475-0977

MINNEAPOLIS: Boehnen Systems Personnel
633 Twin City Federal Tower, 121 S. 8th St.
Minneapolis, Minnesota 55402 (612) 338-5714

NEW JERSEY: Systems Search
60 Millburn Avenue
Millburn, New Jersey 07041 (201) 761-4499

NEW YORK: Data Associates, Inc.
7 Dey Street, Suite 410
New York, New York 10007 (212) 227-7370

NEW YORK UPSTATE:
CPA Associates Personnel, Inc.
2300 James Street
Syracuse, New York 13206 (315) 463-6335

NORTH CAROLINA: Datafinders,
Div. of TalentForce, Inc., P.O. Box 9669
Greensboro, North Carolina 27408
(919) 373-1481

PHILADELPHIA: Systems Personnel, Inc.
115 West State Street
Media, Pennsylvania 19063 (215) 565-9850

PHOENIX: Professional Career Consultants
4628 North 17th Street, Suite H101
Phoenix, Arizona 85016 (602) 274-6865

SAN FRANCISCO: The Computer Resources Group, Inc. Agency, 303 Sacramento Street
San Francisco, California 94111 (415) 398-3555

SEATTLE: Hosaka, Martin, Morris & Associates
1940 116th Avenue N.E.
Bellevue, Washington 98004 (206) 453-2788

WASHINGTON D.C.: EDP Systems Corporation
914 Lamberton Drive
Silver Spring, Maryland 20902 (301) 649-6571

Call the NCA firm nearest to you for Salary Survey and Relocation Information

National Computer Associates

EDP Placement Firms in Baltimore, Cleveland and St. Louis can learn about the many advantages of being members of National Computer Associates by calling Jack Todd (800) 274-6288

MARIST COLLEGE

The College's Computer Program will be growing by 500% due to a $2.5 million grant of state-of-the-art IBM equipment & software

To meet the challenging opportunities presented by this grant, Marist is upgrading the computer staff resources significantly. Qualified applicants are invited to consider sharing the excitement of being a part of a nationally recognized college computing facility using the latest in technological tools and software. The openings include:

TWO COMMUNICATIONS TECHNICIANS

To help manage a 300 plus terminal network

SR. COMMUNICATIONS TECHNICIAN: Associate's degree in a mathematical, engineering or computer science area and familiarity with at least 1 computer language required. Demonstrated verbal and written communications skills required. Supervisory experience preferred. $15-$19,000 per year.

COMMUNICATIONS TECHNICIAN: Associate's degree in mathematical, engineering or computer science area and familiarity with at least 1 computer language required. Demonstrated verbal and written communications skills required. $14-$18,000 per year.

APPLICATIONS PROGRAMMERS

To assist existing staff in the development and expansion of academic and administrative software system. Associate's degree in computer science required and 3 years of data processing experience preferred. Bachelor's degree in computer science preferred. $18-$26,000 per year.

SYSTEMS PROGRAMMER

To assist existing staff in the installation, development and enhancement of a VM/CMS and MUSIC system including many state-of-the-art applications tools. Bachelor's degree in computer science or mathematics and 1 to 2 years relevant work experience required. Master's degree in computer science or mathematics preferred. $22-$28,000 per year.

INFORMATIONS SYSTEMS SPECIALIST

To assist in the development of an information center to support both academic and administrative users. Bachelor's degree in a mathematical, engineering, computer science or business area required. Familiarity with two computer languages with demonstrated proficiency in at least one required. Demonstrated verbal and written communications skills and at least two years experience in programming or systems analysis required. $19-$26,000 per year.

Marist College is located 75 miles north of N.Y. City in the heart of the scenic mid-Hudson Valley on the banks of the Hudson River. It is in the center of one of the nation's most rapidly expanding high tech geographical areas.

Please submit resume and indicate any or all positions in which you are interested and qualified by Feb. 27, 1984 to Marc Adin, Director of Personnel, MARIST COLLEGE, Poughkeepsie, New York 12601. An equal opportunity/affirmative action employer.

Northern Arizona University is currently recruiting for the position of Information Director of the Arizona Public Network Computer Consortium. The position requires active leadership and working knowledge for the APNCC, including in the development of procedures, guidelines and policies, development of computer systems and operational planning procedures and standards for the APNCC. The qualifications for this position are a bachelor's degree in computer science or data processing. Advanced degree preferred. At least 2 years minimum professional experience and 2 years supervisory/management experience. Salary starts at $25,000 and is negotiable. Interested individuals should apply to:

Northern Arizona University
Personnel Department
Box 4113
Flagstaff, AZ 86011

Application deadline is March 12, 1984. NAU is an Equal Opportunity/Affirmative Action/Title IX/Section 504 Employer

NCR PROGRAMMER/ANALYST

Jefferson Data Services, a multi-bank processing company located in Charlottesville, VA, is seeking experienced Programmer/Analysts. The successful candidate will have a minimum 3 years programming experience on NCR equipment using VRX Operating System, NEAT/3 Level II, VRX COBOL, or NEATVS. Experience in financial applications, TRAN PRO or TOTAL a plus. We offer a full range of company benefits including profit sharing. Qualified candidates should submit their resume, including salary requirements, in confidence to:

GEORGE TROUT-VP SYS & PROD
P.O. BOX 3728
CHARLOTTESVILLE, VA 22903
EOE *NO AGENCIES PLEASE*

Our computer can help you get fees or stay here. Four WATS lines; 13 years' experience; 270 affiliated offices; 350+ current job orders; 3000+ company clients from Virginia to Texas to Florida! Send resume to:

DATA RESOURCES, USA
Division of Landmark Personnel Resources
P.O. Box 13730
Pensacola, Florida 32594-1370
CALL TOLL FREE (800) 874-8497
IN FLORIDA (904) 434-6321 COLLECT

DATA PROCESSING PROFESSIONALS

Marion Laboratories, Inc., is a dynamic company in the rapidly expanding health care industry. Due to recent promotions and our continued growth and expansion, openings are available for experienced data processing professionals at our corporate headquarters in Kansas City, Mo.

All successful candidates should have experience working in a large systems and applications environment with specific analytical and technical skills in the following:

- MVS, VM/CMS and DOS/VSE operating systems
- IBM 370/4300/3080
- CICS, DL/1 or IDMS/DB subsystems
- Good oral and written communication skills

We are currently seeking experienced individuals for positions as:

Systems Development Project Managers
Systems Designer/Analysts
Programmer/Analysts
Programmers

We offer an excellent total compensation and benefits package including bonus, stock options, profit sharing, comprehensive group health, dental and life insurance benefits. Please send a complete resume including salary history, in confidence, to:

Recruiting & Placement
Dept. CJM

MARION LABORATORIES, INC.

10236 Bunker Ridge Road
Kansas City, Missouri 64137

An Equal Opportunity Employer M/F

PROGRAMMERS SYSTEMS ANALYSTS

CIA... where your skills are as vital as we are

The Central Intelligence Agency offers experienced programmers and systems analysts the unique opportunity to contribute to our nation while advancing your career. To us, your skills are as vital as our mission.

The CIA is seeking a select group of highly skilled programmers, systems analysts, and knowledge engineers to participate as team leaders or team members in the development of software systems to support intelligence analysis. Your responsibilities will include:

- Performing overall software requirements definition, analysis, and design
- Analyzing new software requirements and developing system specifications
- Maintaining and expanding existing software
- Developing software documentation
- Serving as consultant in your area of specialization

All positions require extensive experience with large-scale IBM systems using the full facilities of VM/SP and MVS. Background knowledge and experience combining several of the following is highly desired: PL/1, COBOL, Pascal, FORTRAN, INTERLISP, SMALLTALK, fourth generation DBMS (particularly NOMAD2 or RAMIS-II), IBM JCL, and system utilities. Also desired is a degree in Computer Science, Mathematics, Statistics, Economics, Military Science or a related area. Familiarity with intelligence analysis a definite plus.

The CIA offers competitive salaries based on your experience and qualifications. You will enjoy working and living in the Washington, D.C. area, with its choice of athletic, cultural, and historic attractions. You also will appreciate the CIA environment . . . challenging, rewarding, intellectually stimulating.

To apply for a career with the CIA, send your resume to:

Personnel Representative
Dept. S, Rm. 4N20 (SW)
P.O. Box 1925
Washington, D.C. 20013

Central Intelligence Agency

The CIA is an Equal Opportunity Employer. U.S. Citizenship Required

---

IMMEDIATE OPENINGS AVAILABLE IN

Miami, Orlando, Tampa, Melbourne and Jacksonville

- Telecommunications—Voice/Data
- Programmer Analysts
- Data Base Analysts
- Systems Programmers
- Systems Analysts

with experience in: COBOL, ASSEMBLER, BASIC, DS, MVS, MCP, RSX11M, DOS, CICS, (COMMAND or MACRO) IMS DB/DC, IDMS, IDS II, TOTAL, TIS, MODEL 204.

IF you are the best in the business

YOU want to be employed by a quality organization

ARE ready to meet a challenge and prove your worth

GREAT give us a call at 305-922-9901 or send your resume in confidence to: C. Tillinghast

Syspro offers you individual career growth with a good future. Salary is merit-based with premium overtime pay. Our benefits package is extensive and wholly paid by Syspro.

SYSPRO℠

SYSPRO SERVICES CORPORATION
Corporate Headquarters
2450 Hollywood Blvd.
Dept. 10, P.O. Box 1530
Hollywood, Florida 33022

An Equal Opportunity Employer, M/F

VAX SYSTEMS PROGRAMMER

GTE Laboratories, the central research and development facility of the entire Corporation of more than 50 communications, products, research and service subsidiaries in the U.S. and 19 countries around the world, is currently seeking a VAX Systems Programmer.

We seek an experienced individual to help guide our rapidly expanding VAX environment. You will be responsible for networked multiple VAX 11/780 CPUs in a research environment, maintaining systems at high levels of availability, assuring optimal system performance as well as specifying and installing new hardware and software. This position offers strong growth potential for the right individual who possesses supervisory skills.

Minimum requirements include a BS/MS in Computer Science or Electrical Engineering and several years experience with VMS, UNIX© and network communications (DEC NET, LAN) experience are also highly desirable. Strong knowledge of VMS systems internals, VMS Assembler, C and Pascal or Fortran is required.

GTE Laboratories offers an outstanding benefits package including a company-paid medical/life/dental insurance plan, a pension plan, paid holidays and vacation.

To apply, please send your resume to Cynthia Ferrer, GTE Laboratories, Inc., Dept. CW/220, 40 Sylvan Road, Waltham, MA 02254. An equal opportunity employer, M/F.

GTE

GTE Laboratories Incorporated

Applications Engineer needed to design and develop software and hardware for industrial applications of computer vision systems. Applies mathematical morphology to image processing to meet functional specifications and customer requirements and develops algorithms and software. Designs and programs modular interfaces for application to industrial inspection, robotic guidance and material handling equipment and systems. Prepares and develops system documentation through design and customer and field support. MS in computer engineering required. BS or 4 years post-bach experience in computer engineering and hardware design of computer subsystems. At least 1 semester or 6 months practical experience in mathematical morphology and its applications to industrial image processing and in computer graphics and artificial intelligence. Sufficient familiarity with C programming language to develop C programs without guidance. Document and test software data. $40-$50K/yr. Resume: 7310 Woodward, Ste 410, Detroit, MI 48202. Ref. No. 3561. Employer Paid Ad.

ATLANTA POSITIONS
$25,000 to $45,000
NYC INTERVIEWS AVAILABLE

Need several Programmers/Analysts, Senior Analysts, and Team Leaders for IBM Shops. Relocation Expenses Paid.

Send resume to:
Jim Heard
EDP Consultants, Inc.
3067 Bunker Hill Road,
Suite 204
Marietta, Georgia 30062
404-971-7261

ASSISTANT DATA PROCESSING MANAGER FOR PRIME INFORMATION SITE

Knowledge of Prime Information or Pick operating systems a must. Classes in Prime Information, systems administration and Info-Basic programming or equivalent required. Please send resume with salary requirement and availability date to:

The St. Johns County Personnel
P.O. Drawer 349
St. Augustine, FL 32085-0349

HIRING?

More computer people read Computerworld than any other newspaper in the United States - more than half a million computer people every week.

And, among our 529,650 readers at user organizations about half claim to look at recruitment ads at least every other week (only a small percentage say they never look at recruitment ads).

No wonder Computerworld carries more recruitment ads for computer people than any other publication.

To place your ad or to get a rate card with complete details on Computerworld Classifieds, call or write:

Classified Advertising

Box 880
Framingham, MA 01701
617-879-0700

C I C S SUNBELT I M S
(and old country) S

IMS and CICS experience is your ticket to the warmer areas of the U.S. (or to snow country if skiing is your thing). Our national reputation for representing top quality EDP professionals has brought us requests from large scale installations (3031 and up) all over the country for systems programmers, data base administrators, and applications professionals (Programmers through Systems Analysts). Our company clients make it easy...They pay interview costs, relocation, temporary living expenses (and, of course, US$). There is NO COST TO YOU. We select our company clients, too, choosing those with top state-of-the-art installations, good growth potential, liberal benefit programs, and--most important--strong "employee interest". This encompasses support for professional growth and intrinsic job satisfaction. Sample openings include:

Heavy MVS Sys Prog - FL	OPEN
IMS/DC Sys Prog - TX	to $42K
IMS DATABASE ADMIN - TX	to $36K
CICS (Macro Level) P/A - SC	to $33K
CICS/VS (Command) P/A - CA	to $36K

Send your resume in confidence or call collect.

Steve Stevenson, Partner
Jim King and Associates

1640 Gulf Life Tower/Jacksonville, Florida 32207
(904) 399-7371

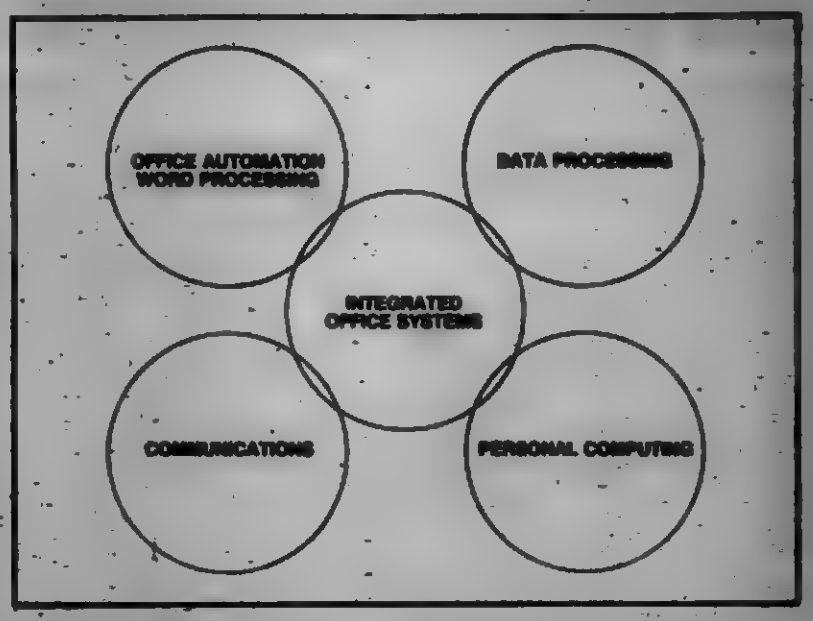
Superintendent of Systems & Data Processing

Northern Petrochemical Company is seeking an experienced manager to direct a staff of professionals in serving our systems and data processing requirements at our Morris complex. Your responsibilities will include managing formulation of proposals and execution of studies taking into account cost and technical feasibility. The successful candidate will have a Bachelor's degree in Computer Science, Engineering or a related field. A minimum of 8 years experience in program development and computer operations related to engineering and business applications is required as well as experience working with users to determine priorities and other key criteria.

Northern Petrochemical Company is a wholly owned subsidiary of Intermark, Inc., a $3 billion corporation concentrating on energy and energy related fields. We offer an excellent salary and complete benefit package. Please send your resume and salary history, in complete confidence, to:

Paul Richfield
Northern Petrochemical Company
P.O. Box 450
Morris, IL 60450
An Equal Opportunity Employer M/F

HP makes a number of office automation products. You can help make them number one.



The trend in office automation is toward fully integrated systems. Hewlett-Packard already produces some of the industry's finest data processing and personal computer equipment. Now you can help develop and manage our programs aimed at the emerging office system market.

Senior Market Managers

This is a rare career opportunity to develop and shape the business strategies of Hewlett-Packard. You'll be building on our well established presence in both office systems and individual components such as personal computers. As an important member of our newly organized Business Development Group for Office Automation, your ideas will help shape the future of HP's market strategy and product development in this area.

Requirements include significant office automation experience, with a thorough marketing background as a computer vendor or office automation specialist for a Fortune company. Personal computer or data processing experience is also required.

Hewlett-Packard offers competitive salaries, a comprehensive benefits package including profit sharing, stock purchase plan, life, medical, dental, and disability insurance and retirement plans in return for your expertise.

Qualified applicants are invited to submit a resume to Staffing Department OA-CW, Hewlett-Packard Company, 11000 Wolfe Road, MS 41Y, Cupertino, CA 95014.

Hewlett-Packard is an affirmative action employer that encourages women, members of minority groups, the disabled and veterans to apply.

Where performance is measured by results.

HEWLETT PACKARD

SECTION MANAGER, LANGUAGES

Will be responsible for technically managing the building of commercial languages for our client. This individual will manage 12 software engineers and ideally should have been responsible for the building of a significant compiler that is now in use.

CAD SOFTWARE - NEW HAMPSHIRE

Salaries: $40's - Mid. $50's

CAD Architect

Will be totally responsible for defining a new micro-based workstation product.

CAD Manager

Will be responsible for managing 35-40 software engineers through 3 section managers and for building a new microbased CAD workstation.

UNIX Software

Will serve as the resident UNIX expert responsible for providing technical direction to the product development team.

Rick Stevens/Mike O'Keefe
Call Immediately or Submit Resume
(603) 472-8844 (Collect)

45 Constitution Drive, Colonial Office Park
Bedford, New Hampshire 03102

Search/Placement Specialists for the Computer Industry
Fees/Relocation Company Paid

MANAGER APPLICATIONS AND DEVELOPMENT

Twin Cities based financial services corporation is seeking a manager with large IBM mainframe and on-line development experience. Responsibilities include development and maintenance of on-line financial systems. SALARY IN MID $40's.

MARK DAVID
JOHN MILLER
ROBERT HALF
3535 IDS Center
Minneapolis, MN 55402
(612) 339-0927

DP OPPORTUNITIES SUNBELT AND NATIONWIDE

Our clients nationwide have special opportunities for experienced SYSTEMS PROGRAMMERS and PROGRAMMER ANALYSTS who are career oriented and looking for professional challenge.

To discuss these opportunities, call or send your resume. Complete confidentiality assured.

All fees and relocation expenses are paid by our clients.

Meredith & Associates, Inc.
4801 N. 32nd St., Phoenix, AZ 85018
(602) 954-7100

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

Senior Software Engineers . . . Advance with the Leader

Booz•Allen & Hamilton is one of the oldest and most respected names in management and technology consulting today. We earned this reputation by supplying solutions to complex technical problems with consistent excellence. We need the best and brightest professionals who are challenged by a diverse environment, and unlimited opportunity for professional growth.

Our Communications, Electronics and Intelligence Division is just such an environment. CEID is involved with the design, development and implementation of DOD Intelligence Data Handling Systems (IDHS). We have a requirement at our Fairview Heights (Scott AFB) location for an experienced individual who wants to apply his talents and expertise along with leadership capability in a key technical role.

The successful candidates must have a technical degree, minimum 5 years experience in an IBM and/or VAX environment. They must also possess excellent interpersonal skills and demonstrated experience in one or several of the following areas:

- Software Design & Implementation
- ADP Security
- Automated Message Handling
- Data Base Management Systems (Model 204)
- Computer Networking

If you want to advance your career with a leader, send your resume, in confidence, to: Mr. Michael D. Star, Booz•Allen & Hamilton, CEID, 4330 East West Highway, Bethesda, Maryland 20814.

BOOZ·ALLEN & HAMILTON INC.

CONSULTANTS TO
GOVERNMENT, BUSINESS & INDUSTRY
An Equal Opportunity Employer
U.S. Citizenship Required
(Background Investigation May Be Required)

Contract Programmers
Rates $35-$45 per hour

1. UNIX Internals
2. 8086-8088 Assembly Language
3. AN-UYK(20, /44 or VAX-OTH Radar
4. Telephony and Telecommunications Programmers

Assignments in Florida, Texas, New York and Others

Call or send resume to:
Computerware, Inc.
Contract Services Division
12801 Nicholson Road, Suite 200
Dallas, Texas 75234
(214) 620-2001

DATAPOINT

- PROGRAMMERS
- ANALYSTS
- OPERATORS
- SALES PEOPLE

JOBS IN 40 US CITIES NATIONWIDE.
NOT AN AGENCY
SEND RESUME TO:

TIM TASSIER
1377 K STREET, NW
SUITE 301
WASHINGTON, DC 20005

MIS MGRS

Mgr of Oper & Tech Support
Rural Penna corp hdqtrs. Converting from DOS/VSE to MVS reqmt to Director MIS. Salary 50K

MIS Mgr
Sys 38 supervise comm. Mfg Env. Top dpst report to VP Finance. Rural Penna. Salary Open.

For details call or submit resume to:
Nixon Allen Agency, 30 W. State St.,
Binghamton, NY 13901
(607) 772-1060

Aircraft Division

COMPUTER SYSTEMS ENGINEERING

At Northrop Aircraft Division, Computer Systems Engineering is a small group of Senior Analysts who are planning the systems architecture that will support the division through the end of this century. This is a select group whose size and influence is such that each individual member's contribution will make a definite impact on the division's operations. We are currently seeking senior specialists in Network Configuration Planning who can address systems that run from multi-mainframe area networks to mini/micro distributed processing.

Aircraft Division Data Processing is one of several information resource management teams that daily support the phenomenal growth of Northrop's Southern California Divisions. Interested candidates should forward resume and salary requirements to:

Mr. Cris Cristina
Engineering & Administrative Employment
Dept. 1222/30 NDP-CW 018412
P.O. Box 2116
Hawthorne, CA 90250

Equal Opportunity Employer M/F/H
Proof of U.S. Citizenship Required

You can make a difference.

NORTHROP
Making advanced technology work.

We'll keep you up to date week, after week, after week after week

---

Data Processing Professionals

Sierra Systems Consultants Inc., an international computer consulting firm, has been providing commercial systems development to a variety of clients for over 16 years.

Our continued business expansion has created the following career opportunities in Los Angeles, San Francisco and San Diego.

We require Senior Analysts and Programmers with at least two years' experience in major systems development using some of the following: IBM/OS, COBOL, BAL, VSAM, IDMS, DB/DC, ADS/O, FOCUS, IMS DB/DC, CICS, TSO, CMS, Model 204, IBM Series 1.

Sierra offers above average salaries and a comprehensive benefit package including continued education and a substantial profit sharing program. If you are interested in sharing our growth in these PROJECT oriented positions, please send your resume in confidence to: Joe Tirado, Sierra Systems Consultants Inc., 649 Mission St., Third Fl., San Francisco, CA 94105; (415) 957-0577. An equal opportunity employer.

SIERRA
SYSTEMS CONSULTANTS INC.

EMPLOYMENT SERVICE FOR PROGRAMMERS AND ANALYSTS

National Openings With Client Companies
and Through Affiliated Agencies

Scientific and commercial applications • Software development and systems programming • Telecommunications • Control systems • Computer engineering • Computer marketing and support

Call or send resume or rough notes of objectives, salary, location restrictions, education and experience (including computers, models, operating systems and languages) to either one of our locations. Our client companies pay all of our fees. We guess, you decide.

RSVP SERVICES, Dept. C
Suite 700, One Cherry Hill Mall
Cherry Hill, New Jersey 08002
(609) 667-4488

RSVP SERVICES, Dept. C
Suite 211, Dublin Hall
1777 Walton Rd., Blue Bell, PA 19422
(215) 628-0585

From outside New Jersey, call toll-free 800-220-8113

RSVP SERVICES
Employment Agents for Computer Professionals

ROCKY MOUNTAIN OR NATIONAL

Telecommunications/SNA.....C, UNIX, LAN, IBM protocols
Data Acquisition.....8 and 16 bit MPU's, mainframes
CAD/CAM and Graphics.....PASCAL, FORTRAN, PL/1

Data Base Development.....IDMS, IMS, DB/DC
Systems Analysis.....Business and Mfg. Appl.
Programming.....Scientific, High-Tech, Stormed

Margo Kolle/Vic Tuttle
Career Marketing Associates
7100 E. Belleview #206
Englewood, CO 80111
(303) 779-0999

DIRECTOR, OFFICE AUTOMATION SUPPORT GROUP

UNIVERSITY OF VIRGINIA

The University of Virginia seeks applications for the position of Director of Office Automation Support Group, reporting to the Assistant Vice President for Administrative Computing Services. The Office Automation Support Group is comprised of Data Center Programmer/Analysts, a Computer Systems Engineer, a Programmer, and an Information Processing Specialist. This work involves monitoring of the operations review and feasibility studies of office systems consulting and training, and providing related hardware and software. The Director plans and coordinates the activities of the Group and works with departmental heads and managers at all levels of University administration on office operations and office information needs. His experience with office systems and office automation is desirable. Candidates must be approved for employment by the Hiring Faculty of the University and must have good interpersonal skills and well-developed analytical and planning capabilities, primarily in the application of computer technology. Letters of application, including a statement of salary requirements should be sent by March 15, 1984 to: DOASG Search Committee, Administrative Computing Services, University of Virginia, Box 8795, Charlottesville, VA 22906-8795. The University of Virginia is an Equal Employment Opportunity/Affirmative Action Employer.

Manager Systems and Programming

The Computer Services Department located at Northern Arizona University is seeking a qualified individual to fill the position of Manager, Systems and Programming. This full time, permanent position involves directing the activities of the administrative systems function, including an operating and programming staff of 10 persons. Qualifications include: A bachelor's degree in computer science or related field, advanced degree desirable. Five years Systems Analyst experience in computing with 3 years in a supervisory/project management capacity. Knowledge of database programming, MIS packages, data base management systems, telecommunications, operating systems, networking and office automation. Salary commensurate with experience and education. Send resume to:

Northern Arizona University
Personnel Department
Box 4113
Flagstaff, AZ 86011

NAU is an Equal Opportunity/Affirmative Action/Title IX/Section 504 Employer.

ST. LOUIS

Come live and grow in America's Gateway to the West!

OPERATIONS MGR. $30K
SR. SYSTEMS PROGRAMMER $30K
SR. TECH SVCS & OPNS $30K
SR. ANALYST/PROG-VAX/VMS $30K
SR. COBOL-MVS-DOS $30K
SENIOR MVS/COBOL/TOTAL $30K
MIS-TOTAL/IMS/DB/DC $30K
STDS ANALYSIS, TRAINER $30K
C PROG-S VMS EXP. $30K
SYS ENGR-DYNAMICS/MVS $30K
COBOL PROG-10 MOS. $30K
PPS II PROG $30K
SOFTWARE PROG-HONEYWELL $30K
TECH SUPT REP-PCC/DATA $30K
PRA-DECVISALTH CARE $30K
PRA 2+ YRS/BS/COBOL/PL $30K

Many others to choose from. All fees paid. Mail resume to or call.

ROBERT HALF of ST. LOUIS
7733 Forsyth Blvd.
St. Louis, MO 63105
(314) 727-1535

COMPUTER PROFESSIONALS ARE ACHIEVING NEW HEIGHTS IN RICHMOND... because VEPCO provides the setting for challenge and progress

For nearly a century, Virginia Electric and Power Company has successfully anticipated and met the changing needs of a dynamic area. Our proud record of achievement would be impossible without the dedication of our employees. We attract and retain the best because we both provide the state-of-the-art environment for progress and challenge, and offer salary, benefit and professional development programs for high-potential, rewarding careers. These added career options could be yours in one of the following areas:

SENIOR SYSTEMS ANALYST

Duties include conducting data security reviews of existing and proposed Vepco computer systems; assisting in the day-to-day administration and maintenance of Data Security policies, procedures and programs, and recommending policies or programs necessary to assure security of corporate computer systems. Candidates must be thoroughly experienced in large-scale IBM systems with both programming and systems analysis experience. Knowledge of CICS, JCL, EASYTRIEVE, Assembler, IMS, Data Security Systems and small computers advantageous.

PROGRAMMER/ ANALYSTS CICS/IMS

CICS and/or IMS proficiency required. Performs systems analyst or programming duties as needed. Interface with user departments and other information systems departments as necessary. To qualify, you will need a 4-year degree or equivalent and 2 years experience. Additional programming experience may be accepted in lieu of degree.

SYSTEMS PROGRAMMERS

A minimum of 2 years programming experience is required in MVS/SP, VTAM, CICS, TSO, NCP for the installation of MVS/XA and maintenance of computer system software, system software problem tracking and resolution, configuration analysis, and the writing of customized operating system user exits. Excellent opportunity to advance existing skills and work with state-of-the-art software and hardware.

MIS TRAINING SPECIALIST

Your responsibilities will include planning and developing curriculum, incorporating advancing techniques and technology changes - and conducting training classes. You will need 7 years related experience as well as teaching experience coupled with extensive knowledge of data processing facilities to conduct training in TSO, BAB, EASYTRIEVE, micro computers and other high level languages.

JOIN THE BEST - the professionals like yourself who are making progress for power - and for themselves. Please send your resume in confidence to:

Vepco

ATTN: Michael W. Brown
Professional Recruiting Dept. 127
VIRGINIA ELECTRIC AND POWER COMPANY
P.O. Box 26666, Richmond, VA 23261

NO THIRD PARTY INQUIRIES ACCEPTED. We are an equal opportunity employer.

PROGRAMMER ANALYST

This position requires a Bachelor's Degree in Business Administration, Mathematics, Engineering, Computer Sciences, or related fields. Experience requirements include two or more years of applicable systems analysis and programming work. Cobol programming experience is a must. Job requirements include the ability to communicate effectively with a wide range of business and engineering people and a solid foundation in structured methods for design and programming.

VAX/VMS (PROGRAMMER/SYSTEMS ANALYST)

We have acquired a state-of-the-art relational data base management system implemented in hardware as a back-end processor interfaced to a VAX/VMS host. We are looking for an individual with in-depth experience in the VAX/VMS operating system to provide technical software support services to Programmers, Systems Analysts, and Operations personnel. The requirements for this position also includes a Bachelor's Degree in Business Administration, Mathematics, Accounting, Computer Sciences, or related fields.

EQUAL OPPORTUNITY EMPLOYER – M/F
Liberal Fringe Benefits
Must be a U.S. citizen
Replies held confidential

Send resumes to:
Trudie L. Rainey
Employment Section Chief
Reynolds Electrical & Engineering Co., Inc.
Post Office Box 14400
Las Vegas, NV 89114-4400

Director of Information Systems

A challenging opportunity awaits the manager who would like to provide direction for a rapidly expanding public sector information systems department. We are seeking a results-oriented manager to be responsible for further development and modification of a computer-assisted library support system which includes fiscal and personnel administrative applications. We require a bachelor's degree in computer science or related field complemented by experience and oral and written communications skills. Qualified applicants should also have at least 3 years of supervisory and managerial experience in a computing facility, hands on experience with a Variable Platform 3000 series computer with a conversational knowledge of COBOL, BASIC languages, and System 34 and/or library operations desirable. We offer a competitive salary in the mid 20's (negotiable). For prompt consideration send resume and salary history in confidence to:

Personnel Department
The Public Library
Columbus and Franklin County
28 South Hamilton Road
Columbus, Ohio 43213

DATABASE ANALYST - OVERSEAS -

SALARY AREA $40,000
tax free + overseas benefits

Do you possess Database 324 background? Join this firm and your benefits will be many – tax free income, bonuses, paid vacation to the States, excellent housing benefits and state-of-the-art equipment. Call Sam Healy for details at (713) 784-8888.

ALL FEES ARRANGED BY CLIENT COMPANIES.

M. DAVID LOWE
PERSONNEL SERVICES
6117 Richmond Avenue
Houston, Texas 77057

PROGRAMMER MSA GENERAL LEDGER

CANDLE CORPORATION, is a multi-national high technology company and developer of OMEGAMON®. We're currently seeking an OS COBOL or PL-1 Programmer with strong OS/JCL to help implement and support internal financial systems.

Minimum qualifications include at least 1 year programming in financial applications as well as a Business degree; accounting majors preferred. Exposure to VSAM and/or CICS a plus. Candidates must have experience in the general ledger area and excellent communications skills. Strong preference will be given to candidates with MSA general ledger experience.

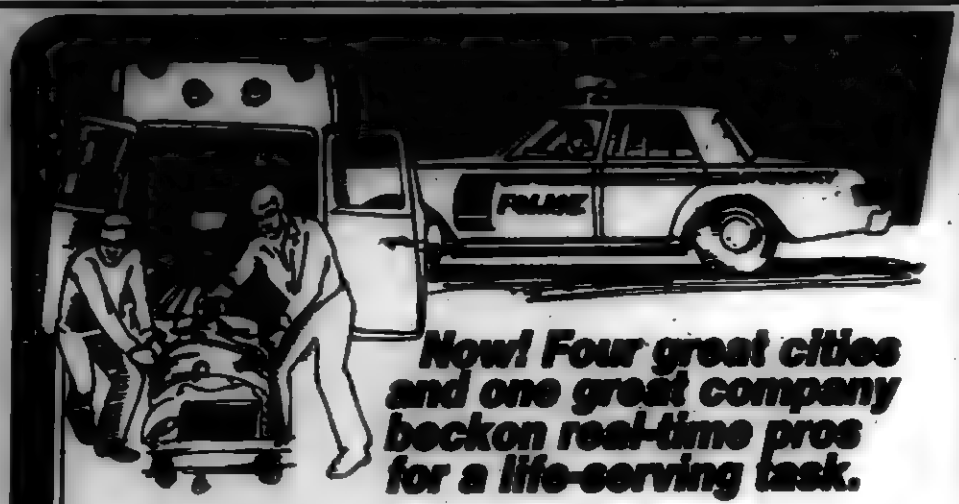
CANDLE offers an excellent compensation and benefits portfolio. For consideration, please send your resume with salary history to:

Joel Presnell
10600 Wilshire Blvd.
Suite 2404
Los Angeles, CA 90024

Equal Opportunity Employer

Candle

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS



Now! Four great cities and one great company beckon real-time pros for a life-serving task.

We're looking for real-time systems development professionals to help us build the next generation of computer-aided emergency vehicle dispatching and message switching systems for public safety agencies, transportation and utility companies.

Excellent openings are available in San Francisco, Chicago, Los Angeles and our Metro Washington, D.C. offices.

If you have solid real-time minicomputer systems development experience and enjoy the pace and freedom of small, informal, high-energy development teams... plus the prestige and growth potential with the world's leading diversified professional services company, let's talk. On-line systems experience, programming know-how (PDP or VAX) a plus.

For immediate consideration, please call Jim Aquino TOLL-FREE at (800) 336-5772, Ext. 2223 (in Virginia, call (703) 556-2223). Or, send your resume to: Planning Research Corporation, 1500 Planning Research Drive, Dept. JA-39, McLean, VA 22102. An Equal Opportunity Employer M/F/H/V.

prc

Planning Research Corporation

Challenging Career Opportunities in ARIZONA for

SOFTWARE ENGINEERS

Motorola's Government Electronics Group, located in sunny Phoenix, Arizona, has several immediate openings for computer software specialists. The work is challenging and varied, and includes the following disciplines:

- Microprocessor Applications
- Ada
- CAD
- FORTRAN, Pascal, Assembly
- Software Technical Writers

Successful applicants will have 3+ years of experience, a degree in Computer Science, Electrical Engineering, Math or a hard science (or equivalent in experience), and a desire to apply their skills to new applications.

Qualified applicants please forward your resume and salary history to: Gary Yoel.

MOTOROLA INC.

Government Electronics Group

8201 E. McDowell Rd., Dept. 8061
Scottsdale, Arizona 85252

"Motorola, a World Leader in Electronics — Quality and Productivity Through Employee Participation in Management"

*The above positions represent only a limited number of positions available at Motorola's Government Electronics Group for a thorough review of your credentials, please forward your resume and salary history.

An Equal Opportunity/Affirmative Action Employer
U.S. Citizenship Required

MVS SYSTEMS PROGRAMMER

The Louisiana Land and Exploration Company, a Fortune 500 energy company with corporate headquarters located in New Orleans, Louisiana, has an opportunity for a MVS Systems Programmer.

The position involves responsibility for a MVS/SP operating system and major subsystems on a large IBM mainframe. The individual selected will provide expert technical advice in the evaluation, coordination, installation and maintenance of software and hardware systems to ensure maximum computer effectiveness and efficiency.

Candidates should have 3-5 years of system programming experience and a working knowledge of MVS, JES, 303X or 308X and related disk sub-systems. Experience in SMP, ISPF, CICS, ACF/VTAM, ACF/NCP or performance tuning is considered beneficial. Also, a Bachelor's degree in computer science or related science or related field is required.

An excellent compensation program and the top-ranked benefit package in the Oil and Gas industry are offered. A comprehensive relocation policy including third-party home purchase program is available.

For confidential consideration, please send your resume, including salary requirements to:

K. L. Nibling
The Louisiana Land and Exploration Company
Human Resource Department
P.O. Box 60350
New Orleans, La. 70160

SAUDI ARABIA

SYSOREX INTERNATIONAL, a California Corporation and a rapidly growing systems management company now developing innovative multi-technology systems in Saudi Arabia has the following challenging position:

RACF SECURITY SPECIALIST

Responsible for the design, acquisition and implementation of state-of-the-art security techniques to protect all electronically stored data.

BS/BA degree required plus min. 6 yrs. experience in large-scale systems, with min. 1 yr. RACF experience required.

We offer an excellent benefit package including: medical, life, accidental death, disability and profit sharing plans. You will additionally receive 25 working days vacation, 15 holidays, free furnished housing, annual return home travel, paid relocation expenses, plus eligibility for present Federal Income Tax exclusions.

Please send resume with present salary to Personnel, SYSOREX INTERNATIONAL, Inc., 10590 N. Tantau Ave., Cupertino, CA 95014. U.S. CITIZENSHIP REQUIRED. INDIVIDUALS ONLY APPLY.

SYSOREX

Sysorex International Inc.

In a bind?

Do you need real professionals? Advertise in Computerworld to find exactly who you're looking for. Because...More computer people read Computerworld than any other newspaper in the United States—more than half a million computer people every week. And, among our 529,650 readers at user organizations, about half claim to look at recruitment ads at least every other week (only a small percentage say they never look at recruitment ads). No wonder Computerworld carries more recruitment ads for computer people than any other publication.

To place your ad or to get a rate

Call or write:

Classified Advertising
Computerworld
Box 880
Framingham, MA 01701
(617) 879-0700
(800) 343-6474

M.I.S. Director

Our company, located in Saudi Arabia, is seeking an M.I.S. Director with the following qualifications:

1. College degree in computer science preferred.
2. At least 4 yrs system design/analysis (COBOL programming) plus 3 yrs management experience preferred.
3. Knowledge of NCR equipment.
4. Wholesale or retail grocery experience preferred.
5. Experience with accounting, order processing, inventory, sales forecasting and purchasing.
6. On-line and remote batch communications experience needed.

Equipment and Systems:

a. NCR I – 9040 IFIX Software with local and remote applications.
b. NCR T-8255 Retail POS system.
c. NCR 2126 Retail POS system.
d. Remote batch communication from T-8255 and 2126 POS to RBC from 8250 to 9040.
e. Mostly on-line applications.

The other terms of services as under:

1. Contract service for 1 yr and renewable with the mutual understanding.
2. Free to and fro air passage, furnished accomodation, medical facility, social and medical insurance for self and family.
3. Salary negotiable and will commensurate with qualifications and experience.

Please mail resumes to:

Julian Berry, Export Manager
SUPER FOOD SERVICES, INC.
P.O. Box 31000
Orlando, FL 32802-1000

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 709 FRAMINGHAM, MA 01701

postage will be paid by

CIRCULATION DEPARTMENT

COMPUTERWORLD

375 Cochituate Road, Rte. 30
Box 897
Framingham, MA 01701-9985

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

SR. SYSTEMS PROGRAMMERS

Southern California

Mellonics Information Center, a major computer service company located in Sunny Southern California is currently seeking Sr. Systems Programmers in the following areas:

COMMUNICATIONS

We require an experienced Systems Programmer (minimum 3 years) to be responsible for installation, maintenance, development and debugging of data communications software products. The current products include: ACF/NCP-PEP with NPA, ACF, VTAM with EMNF, NPDA, NCCF, TAF & RJE.

CAPACITY PLANNING AND TUNING

Required experience includes tuning, performance and capacity planning knowledge, with a minimum of 3 years experience in an MVS/SP environment using a combined knowledge of RMF OMEGAMON, DEXAN and CMF. Prior systems programming experience also required.

ON-LINE SYSTEMS

Requires 2 years experience in tuning and gensing of IMS DB/DC Systems, Assembler language and SMP. CICS knowledge desirable.

SYSTEMS SUPPORT

Requires a minimum of 4 years experience in the following areas: MVS Internals, strong JES2, SMP4, project planning, strong Assembler language and debugging, especially with IPCS. Should also have experience in multi CPU environment, system modification and sysgens. MSX helpful.

These positions require a BS in Computer Science; however applicable work experience may be substituted.

We have the latest IBM CPU's and equipment. Our future plans are to include MVS/XA.

Mellonics also offers the advantage of exposure to an even greater array of state-of-the-art software and hardware. MIC is conveniently located in suburban Canoga Park, just 20 miles from metropolitan Los Angeles, yet without the traffic and congestion of the city, and provides competitive salaries, an outstanding benefits package and exceptional career potential. For IMMEDIATE consideration call COLLECT or send resume with SALARY HISTORY to:

Sarah Jackson
(818) 716-2267

Litton **MELLONICS INFORMATION CENTER**

[illegible] CANOGA PARK, [illegible]

MAINE

We have specialized in data processing professional placement in Maine for almost a fifth of a century. If you qualify for positions in the $20-40,000 range, please contact us in total confidence. Our clients pay our fees and provide relocation assistance.

ROMAC.
477 Congress St.
Portland, Maine 04101
(207) 773-4746

[illegible] of Computer Science, 49 hrs/wk, 9 mos. Teaching some, prt. to students, collaboration in evaluation of exist. systems, comp. communications, data mgt., algorithm analysis, survey of programming & computer applications, programming in BASIC & FORTRAN using Honeywell CP-6 comp. system, digital comm. problem solving & applied programming & automated report writing using COBOL. Min. Reqs.: Masters in Comp. Sci., 3 mos. exp. as Instructor of Comp. Sci. or yr. exp. research or teaching asst. in a Comp. Sci. Dept. Thorough knowledge of & programming exp. in Honeywell CP-6 operating system & in a data communication system. Knowledge of compilers. Apply at the Texas Employment Commission, Texas Employment Commission Building, Austin, Texas, or send resume to the Texas Employment Commission, TEC Building, Austin, Texas 78778, J.O. 2407-4014. An Equal Opportunity Employer.

PROGRAMMER/ANALYST

Current, Inc. (Looart Press), a leading national manufacturer and marketer of greeting cards, crafts, gifts and fine stationery, is seeking a Programmer/Analyst. This position will be responsible for designing and developing applications systems relating to our manufacturing and marketing business functions.

This position requires a degree or equivalent experience, plus a minimum of three years COBOL 74 programming. We prefer Honeywell level 66/DPS, experience with DM IV, IDS II, transaction processing and TSS.

If you are interested in joining the over 900 people who call Current, Inc. their home, please forward your resume, salary history and requirements in confidence to:

CURRENT, INC.
Attn: Andrea McGeorge
P.O. Box 2558, Dept. B-3
Colorado Springs, CO 80901

An Equal Opportunity Employer M/F

DALLAS

Data Base Admin.

Shared floor opportunity to oversee installation of IMS in large dist headquarters. Must have 2 yrs. IMF DB/DC/CICS exper., degree, & ability to adm. to Dallas. Intensive interview & adm. expenses paid. To $40K.

2720 Stemmons Frwy, LB277
Dallas, TX 75207 (214) 637-4388

DATA PROCESSING CAREERS

Colorado Scientific Opportunities

We recruit highly technical professionals for our entrepreneurial and "Fortune 500" Colorado clients in scientific, engineering, defense and energy industries. Data base experts, operating systems specialists, UNIX, C and VAX Software Engineers, Systems Engineers and Programmers are needed.

For a phone interview, send your resume to:

THE FIND FIRM
P.O. Box 624, Station 2
Denver, Colorado 80206
(303) 832-5002

SEMINARS

Data Processing Conferences
for the
Automation of Financial Reports

Designed for service bureaus who prepare for banks or vendors who develop software for banks. Conferences will be held in the following cities:

Atlanta, GA — March 22-23, 1984
Philadelphia, PA — May 21, 22, & 23, 1984
Chicago, IL — August 20-21, 1984
Los Angeles, CA — October 11-12, 1984
Dallas, TX — November 8-9, 1984

For Information Call:
(800) 424-8288
or Write:
FDIC, Call Reports Seminar
Washington, DC 20429

SYSTEMS DEVELOPMENT

Currently challenging positions exist in state-of-the-art MS DOS COBOL and complete system life cycle experience. These opportunities represent the leading edge of sophisticated technologies with companies that encourage growth and reward for performance.

Our clients have the most CHALLENGING and GROWTH ORIENTED career opportunities CALIFORNIA offers.

LOGICAL OPTIONS

One Market Plaza, Spear Tower, Suite 828146
San Francisco, CA 94105 • (415) 777-3999

PHILADELPHIA

SOFTWARE SALES
TO $35,000
COMMUNICATIONS
SOFTWARE

Well-known Phila area comp. staffing new product rollout designed software pro exhibits communications software and Kiosk Networking, system protocols, hardware/software trade-offs, read Graphics or Memory software devel. All new positions paid + top benefits. IM-TYING NOW

ROBERT HALF
OF PHILADELPHIA, INC.
2000 Market St., Suite 700
Philadelphia, PA 19103
(215) 568-6100

BUY - SELL - SWAP

BUY · SELL · LEASE

SERIES-1
S/34 • S/36 • S/38
4300
S/23 S/32 5110-20
Tape•Disk•Printers•Tubes

AMCOM CORPORATION
5200 W 73RD ST · MINNEAPOLIS MN 55435
(612)835-4737

CALL TOLL FREE
800-328-7723

You can get information on buying or leasing
IBM 34-36-38
as fast as you can dial
1/800/LEAS-PAK.
In Texas call 817/268-0023.

Up to 50% Savings

LPI
LEAS PAK INTERNATIONAL

Limited 5/series/36 deliveries, new displays and printers in stock. We want to buy your owned or rental credit equipment.

P.O. Box 759 • Hurst, TX 76053 • 817/268-0023

Send for our free products and services brochure

Name _____
Address _____
City _____ State _____ Zip _____
Phone _____

We've Got Your Number

S/34
ALL MODELS
QUICK DELIVERIES

SERIES 1
CONFIGURED TO YOUR NEEDS

S/36
ATTRACTIVE LEASE RATES

S/38
NEW & USED MACHINES

5110/5120
NEW LOW PRICES

PERIPHERALS
CRT'S, PRINTERS, DISK, TAPE, MODEMS

CARLYN
COMPUTER SYSTEMS
8105-G Rockside Road, Valley View, OH 44125
"CALL COLLECT" (216) 642-1666

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

One-stop computer leasing.

The Total Computer Company...

Hartford Computer Group

800-323-6355

or 312-364-0505

Control Data **SERIES I SPECIAL** **IBM**

126MB Removable Drives . . $12,900
Diskette Drives . . . . . $ 1,495
Printers & Displays

New or Used
Immediate Delivery

4956 Processors
4967 200MB Disk Drives
All Peripheral & Features

IBM

Series/1 • S/34 • S/36
S/38 • 4300
5110 - 5120 • S/32

All models, systems & peripherals AVAILABLE NOW!

Ask about our 72 hour upgrade

(408) 425-7333

SOURCE
DATA PRODUCTS INC

Want to Buy
5291, 5251, 5256
Defective Planar Boards
$100 each
For Details Call
(915) 692-9141
Russell Sullivan

System 38/36 34

- Significant Savings
- Trade-In Allowance
- Guaranteed Full IBM Support
- You pay only after installation and IBM accepts the equipment under maintenance!
- Features 500 references

Can you believe lease terms better than IBM?

- New Tax Leases
- Purchase/Lease Back
- Check IBM's New Plan A & B... then call Datacomp

The Datacomp Leasing & Service Group

Toll Free - 1-800/[illegible]
New Jersey 201/467-8686
Chicago 312/986-1660

DEC
New and Used in Stock

COMPUTERS
Rainbow 100
DECmate I and II
Pro 350
Micro 11
WD 211

CRTS
VT101-AA VT102-AA
VT102-WA

PRINTERS
LA 34
LA 100
LA 50
LA 120

Command Data
PHONE 205/942-3155

Command Data Incorporated
105 West Valley Avenue
Suite 105
Birmingham, Alabama 35209

HARRIS

1 180 MB Disc Drive, controller, #5540
1 300 MB Disc Drive, controller, #5560
1 600 lpm printer (Data Products), #4120
10 Harris (TEC) CRTs, Keyboards (2 with 10 key pads), #5830/5810
2 Harris (Electrive) CRTs, Keyboards (10 key pads), #5860A
2 Harris (Electrive) CRTs, Keyboard (10 key pads), #5865

Under maintenance since installation - Sold as is.

Contact: (404) 640-6336 Ext. 375

Computerworld CLASSIFIEDS:

Our business is to help you improve **yours**—

via programmers, analysts, engineers, terminals, printers, software packages, computer time, computer services, office space, advertising for seminars & conferences, business opportunities, etc...**AND** ...

...**exposure to an audience of over half a million readers nationwide...**

...**every week.**

COMDISCO

A Commitment of Excellence

IBM PROCESSORS	IBM PERIPHERALS
☐ 3081	3350
☐ 3083	3880-1
	3380 AA4, B4
☐ 3033	3370/3375
☐ 4341	3803-2 3420-4/6/8
☐ 4341/4381	3705/3706
☐ 4331-2/4361	3725 3178/3278
☐ Amdahl Available February	3890

The Leader in Full-Service Leasing

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

BUY·SELL·LEASE

SERIES/1

SAVE ON NEW OR USED
OVER 2000 CUSTOMERS

S/38
4331
4341
4361
4381

ALL RELATED PERIPHERALS
SHORT/LONG TERM LEASES

S/34

SEE OUR NEW PRICES

S/36

SHORT/LONG TERM LEASES

3083
3081

LEVERAGED LEASES

3350	3370	3340
3360	3375	3344
3411	3420	3430
3276	3274	3276

Call toll-free 800-328-5718
(in Minnesota, 612-544-8660)

COMPUTER OPTIONS, INC.
"the best option"
1660 South Highway 100
Minneapolis, MN 55416

LEASE • PURCHASE • SELL

IBM SYSTEMS

- *Purchase-Lease Back*
- *Customized Leasing*
- *Upgrade Flexibility*
- *All models and peripherals*

612-941-0510

WINTHROP
FINANCIAL CORPORATION
computer sales & leasing division

6400 Flying Cloud Drive • Eden Prairie, Minnesota 55344 • 612/941-0510

With the money you save with us, you could come to Minnesota for a visit.

If you're buying, selling or leasing IBM equipment, call us about the following: S/23, S/34, S/36, S/38 and Series I. We handle system upgrades and related peripherals. We feature flexible lease options and month-to-month rental agreements. 1-800-328-6999. (In Minnesota, 612-559-7171).

Midland Financial
12800 Industrial Park Blvd., Minneapolis, MN 55441

Inflation Fighters

Quality & Savings

Slightly used. Money Back Guarantee. Full Reels. All External Labels Removed. Guaranteed for use at 800 BPI through 6250 BPI.

2400' Reel $4.85 ea.
1200' Reel $4.25 ea.
600' Reel $3.50 ea.

All Tapes with Hanging Seals

We pay freight on orders over 500 tapes. All orders shipped within 48 hours. Call or Write

Computer Tape Mart
44A Sabre Avenue
N. Amityville, New York 11701
(516) 842-8612

WILL BUY...SELL...LEASE...
Systems 34/36/38/4300

- Financial Advantage Is Yours Through CPU
- New Or Previous-Owner Processors Available
- Immediate Delivery
- IBM Maintenance
- Create Cash Flow With CPU Purchase/Lease-Back

Call 503/222-2226 Collect

CPU Sales & Leasing, Inc.
3477 Northwest Yeon • Portland, Oregon 97210

CPU

AMERICAN SOCIETY OF COMPUTER DEALERS

BUYING?

Whether you're looking for big computers little computers, terminals, printers, software, time sharing or services, you'll find it in Computerworld classifieds.

Pages of ads every week, with everything from Disco to DEC's from time sharing to terminals, and software for every size computer system.

You'll find what you need in Computerworld classifieds.

Call 800-343-6474
(or 617-879-0700)
for more information

DATA GENERAL

8) NOVA 20 MB DISKS $6500
6) 6070 30 MB SUBSYSTEMS 3500
1) 6099 12.5 MB DISK W/FLOPPY 3100
2) 6103 25 MB DISKS (NEW) 5000
3) 6103 25 MB DISKS 4500
1) 6227D 15 MB DISK (NEW) 4500
2) 6040 TP1 PRINTER 400
2) 6073 LP2 PRINTERS 900
1) 6150 LP2 PRINTER (NEW) 1200
1) 6151 LP2 SUBSYSTEM (NEW) 2200
6) 4027S 4 LINE ASYNC MUX BOARDS 300
1) 1078A 1 BAY IND. CABINET W/AIR CONDITIONER (NEW) 4400
1) 1078B 1 BAY IND. CABINET W/HEAT EXCHANGER (NEW) 2900
8) 4341 ULM 5 BOARDS 700
2) 6286H 4C 5 SLOT 64K 1300
3) 1012H 1/2 BAY CABINETS 200
2) 1144A 1 BAY CABINET (NEW) 900
12) 6027 20 MB CONTROLLERS 700
5) 3584 LP2 CONTROLLERS 900
2) 5466 AMS-16 20 MA OTR BOARDS 150

1) ECLIPSE S/50 128K 12.5 MB DISK W/FLOPPY & 2 4027 MUX BOARDS 10,500
1) NOVA 4X 5 SLOT 128K 15 MB DISK W/FLOPPY & ULM 5 BOARD 12,100
1) NOVA 4X 6 SLOT 128K 12.5 MB DISK W/FLOPPY & ALM 6 BOARD 12,800

MODEMS & TERMINALS

36) ADM3A LEAR SIEGLER TERMINALS 375
11) 8612/24 MICOM MODEMS 1200
4) ADM3 LEAR SIEGLER TERMINALS 350
28) AJ 242A ACOUSTIC COUPLERS BELL 103-113 300 BAUD 65

CONTACT: ROBERT FULWILER 214-258-0614

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

PCM
Pioneer Computer Marketing
214/343-2804

BUY - SELL
LEASE
- All IBM Systems
- Peripherals
- Tapes
- Disks

SERIES/1
- Systems
- Features
- Peripherals

SYSTEM 34
- CPU
- Peripherals
- Upgrades

PIONEER COMPUTER MARKETING
11448 Pagemill Road
Dallas, Texas 75243
214/343-2804

What makes Dataserv a world leader in the IBM marketplace?

Customer satisfaction

Over 65% of Dataserv's business comes from previous customers or customer referrals.

dataserv

HP
1000
3000
encore
(213) 452-9117

NPA
SYSTEMS INC.
SPECIALIZING IN:
PURCHASE
SALE, TRADE,
LEASE, RENT,
AND SERVICE OF
Data General
EQUIPMENT
(516) 467-2500

System/34
Printer 300LPM
Sale/Lease

Control Units
3880 - B13
3880 - D13
Sale/Lease

Controllers
3880 3803
3274 3276
Immediate Delivery

Sale/Lease
4341's
Models K, L, M - GRP 1 & 2
Lease Term -
1 Yr or Longer

Tape Drives
3420 3430
3410 3803
Immediate Delivery

DASD
3380 3375 3370
3350 3344 3310
Immediate Delivery

Display Stations
3278 3279
3178 3277
Immediate Delivery

Printers

Computer Marketing Inc.
P.O. Box 5265 Philadelphia, PA 19145

SALE OR LEASE
machines
026—029—082— 083— 084
085—087—088— 129— 514
519—549—557
disk packs
2316—3336(1)—3336(11)—3348(70)
5 MEG. TO 300 MEG. PACKS—NEW & USED
Highest Prices Paid for Used Packs & Machines

THOMAS COMPUTER CORPORATION
5833 W. Howard St. Chicago, IL 60648
800-621-3966 312-647-0966
Authorized Distributor – Memorex, CDC, 3M, BASF, Verbatim, Dysan

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

TexCom

Join the more than 200 other major companies that lease IBM equipment from TexCom – the IBM specialists.

WE BUY • SELL • LEASE

SERIES 1
- All features and peripherals available
- Buy, sell, trade
- Leases available

4361/4381
- Two, three and four year leases

IBM S/34
IBM S/38
- All models and peripherals available

IBM S/36
- 1, 2, and 3 year leases
- We take S/34 trade-ins

4331/4341
- 1, 2 and 3 year leases
- All models available

TERMINALS

5291	5225	3278
5251	3277	3287
5256		3279

AVAILABLE NOW

DISKS

3370	3380	3340
3375		3350

AVAILABLE NOW

WE WANT TO BUY
- Your IBM systems and peripherals
- Your rental credit equipment

MEMPHIS • SAN ANTONIO • HOUSTON

AEL (512) 349-9955 DSCO

INTERSTATE COMPUTER EXCHANGE

5340-C23-65% off List—$8,500 (64K, dual disk, 27meg)
5340-E35-57.5% off List—$20,000 (128K, magazine, 122meg)
5340-F37-55% off List—$34,000 (256K, magazine, 266meg)

TOP $ PAID FOR S/34's and S/38's

CALL COLLEC

MISSISSIPPI CENTRAL DATA PROCESSING AUTHORITY

Sealed proposals will be received by the CDPA, 505 Robert E. Lee Building, Jackson, MS 39201 for the following data processing equipment and services: Request for Proposal No. 697, due 3:30 p.m., Thursday, March 29, 1984. The State of Mississippi seeks to contract with a consulting firm to help the State Department of Public Welfare in the design of the Mississippi Application/Verification Eligibility Reporting and Information Control System (MAVERICS), an integrated eligibility system that includes the four programs cited below. The firm awarded the contract must provide the State with expertise in designing and implementing large scale data base systems using IMS preferably for two or more of the following Welfare programs: AFDC, Food Stamps, Social Services, and Child Support. Services are needed for three phases of the MAVERICS project: Completion of the Detail Design Phase; Development and Testing Phase; and Implementation Phase through certification by the Federal Funding Agencies. A mandatory bidders conference will be held at 515 East Amite Street in Jackson, Mississippi, on Thursday March 8, 1984, at 1:30 p.m.
Request for Proposal No. 696, due 3:30 p.m., Thursday, March 1, 1984, for the acquisition of a multiprogramming minicomputer system for administrative and instructional applications at Itawamba Junior College in Tupelo, MS.
Request for Proposal No. 695, due 3:30 p.m., Thursday, March 1, 1984, for the acquisition of a multiprogramming minicomputer system for administrative and instructional applications at Coahoma Junior College.
Detailed specifications may be obtained from the CDPA office. The CDPA reserves the right to reject any and all bids and proposals and to waive informalities.

Dorothy Hopper or Elaine Kinnard,
State Central Data Processing Authority
601/359-1365

IBM
4381-M2
(415) 339-890

Buy•Sell•Lease
SERIES 1
S/34 S/38
4300 S/36
5110 S/23
XERXES
COMPUTER SALES
800-328-3004/612-339-3042

Your Full Service Computer Dealer

The nationwide market - a call away!

DEC/DG

SYSTEMS/PARTS/PERIPHERALS
NEW/USED/SURPLUS • DISCOUNT PRICES
Since 1977! Buy, Sell, Trade and Broker.

PHIL	BRYAN	JENNIFER
DG	11-VAX	8-LSI

CALL TODAY - (305) 392-2005 TELEX 568-670

thomas business systems, inc.
4301 Oak Circle - Unit 11 Boca Raton, Florida 33431

RESULTS

Whether you're buying, selling, swapping, hiring or looking, you get results from Computerworld classifieds.

Maybe that's why Computerworld gets more classified advertising than all the other computer publications put together!

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

SYSTEMS
4341 4331
38 36 34
32 3
BUY • SELL • LEASE
COMPUTER BROKERS, INC.
2978 SHELBY ST.
MEMPHIS, TENNESSEE
CB
TOLL-FREE
800-238-6405
901-372-2822
PERIPHERALS
3203 3370
327X 3411
3350 3420

IBM
5110 5120
3741 3742
DATAMASTER
1255-MICR
SYSTEMS
34 36 38 32 23
All Associated Peripherals
BUY SELL LEASE
• Printers • Display Stations
• Upgrades & Exchange/Add-ons
• Tape Drives
• IBM Maintenance Contracts
Call Today for Quotation
(615) 352-8585
SOUTHERN DATA SYSTEMS
Knoxville, Tennessee

HOW TO SAVE $30,000 PER MONTH ON A 3083 LEASE.

Lease the same 3083 that IBM leases for over $92,000 per month from Randolph—for less than $62,000 per month. That adds up to savings of $1,440,000 over a four-year lease period. If you're renting an older machine, Randolph may save you even more—and you'll get about four times the throughput in the bargain.

WHEN IS THE BEST TIME TO TALK TO RANDOLPH ABOUT LEASING A 3083?

Now—because Randolph has 3083's available for 4th quarter delivery. But it's never too late, even if you already have a machine installed. Whatever your situation, we can tailor a lease that will fit your exact needs and let you start saving money right away.

TALK TO RANDOLPH NOW.

We can solve problems like these, and more . . .
Stuck with a lease on your old machine?
We'll sublease it, and provide a new lease on a 3083.
Own a 3083 but need cash?
Sell your machine to Randolph, and we'll lease it back to you.
Machine installed on a rental basis?
We'll show you how to end the lease and install a new 3083. Any termination charges can be folded into your new Randolph 3083 lease.

LEASING COMPUTERS IS OUR ONLY BUSINESS.

At Randolph, our people have an average of 18 years in the DP industry . . . from 360's to 3081's. They know all about alternative financing to be sure, but they also know their way around a DP department and the hardware in it.

WE LEASE MORE THAN 3083's.

Whatever your needs, now is the time to talk to Randolph. We provide leases for IBM 303X, 4300 and 3081 systems and peripherals—disks, tapes—as well as 3083's.

UNIQUE FINANCIAL STABILITY.

We're an important part of one of the nation's oldest and leading financial institutions . . . The First National Bank of Boston. 19 years in computer leasing gives added assurance that Randolph will continue as the leader in the computer leasing industry . . . continue to live up to the terms and conditions of our agreements . . . provide upgrades . . . fulfill all of our commitments.

LET RANDOLPH HELP YOU SAVE $30,000 PER MONTH.

We can solve a lot of problems for you, and save you money, too. Talk to Randolph now . . . call Joseph S. Kelly, Jr., Executive Vice President, 800-243-5307.

537 Steamboat Road
Greenwich, Connecticut 06830
203 661-4200 • 800 243-5307

Randolph

A MEMBER OF COMPUTER DEALERS & LEASING ASSOCIATION RANDOLPH COMPUTER CORPORATION A subsidiary of THE FIRST NATIONAL BANK OF BOSTON BANK OF BOSTON

DSI
WE BUY SELL & LEASE!
BURROUGHS
Discover the DSI alternative.
800-641-5215
All equipment available immediately and guaranteed for Burroughs Maintenance.
DSI Serving the Burroughs Community Worldwide
2480 W Alameda Ave Denver CO 80223 (303) 922 8331
TWX 910 931 0483

WANT TO BUY
SYSTEM/34 PERIPHERALS
5251's, 5291's, 5224's, 5225's, and 5256's
Call 214/258-0541
MCC METROPLEX COMPUTER COMPANY, INC.
320 Decker Drive • Suite 180 • Irving TX 75062
TWX 910-860-5885

FORSYTHE McARTHUR ASSOCIATES, INC.
DEALER / LESSOR OF IBM Computers and Peripherals
FOUNDED 1971
Home Office
Chicago
919 North Michigan Avenue
Chicago, Illinois 60611
312 943-3770
Branch Offices
Atlanta 404 953-9557
Milwaukee 414 786-5844
LDA

DATA GENERAL
New & Used Equipment
BUY. SELL. TRADE.
mcintyres
Mini-Computer Sales Group Inc.
(313) 583-4100
TLX: 810-232-4866
Answer Back: MCDATAGEN MANS
32050 Edward Ave.
Madison Heights, MI 48071

DATA GENERAL
Hanson Data Systems

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

SHORT TERM LEASES AVAILABLE

CSI

CMA

Buy - Sell - Lease

S/32
S/34
S/38

IBM 3741 3742

CPU's · CRT's · PRINTERS
ALL MODELS

PURCHASE/LEASEBACK
SHORT & LONG TERM LEASES

Computer Marketing of America, Inc.
P.O. Box 71
610 Bryan Street
Old Hickory, Tennessee 37138

CMA

1-800-251-2670
In Tennessee: 615-847-4831

C.D. SMITH & ASSOCIATES, INC.
DEC computer systems & options
12905 East Freeway, Suite 318
Houston, Texas 77015
(713) 451-3112
TELEX 76-2547

DEC

WE ARE BUYING: VAX 11/780

WE ARE SELLING:

MS780-DC	4,500	DR8-W	1,495
MS780-CA	4,000	RA81-AA	16,000
MS780-DC	5,000	TS11-CA	10,000
FP780-AA	8,700	RP06-AA(FTR)	6,000
DW780-AA	10,000	11/780 CPU	CALL

If you want on our Mailing List, call Valerie (713) 451-3112.

AMDAHL

FOR SALE

V/6-II	8 X 12	MARCH 1
V/6	12 X 16	MARCH 1
V/8	16 X 16	APRIL 1

SUBLEASE

V/7	16 X 16	MARCH 1
V/8	12 X 16	FEBRUARY 1

IBM

WANTED

3033 U8, U12, OR U16

CALL: CHARLIE BERRY
OR TOM STARR
(612) 933-9666

MAJOR COMPUTER INCORPORATED
10237 YELLOW CIRCLE DRIVE
MINNETONKA, MN 55343

FOR SALE
DEC EQUIPMENT

RM03	(67mb)	$4,200
RM80-AA	(Mint, 12mos)	$12,500
LP11-CA	(300 LPM)	$7,300
VT78	(Terminal)	$150
RH780	11/780 Controller	$4,000

Miscellaneous Enterprises
Essex St. • Middleton, MA 01949
(617) 777-4868

For All Your DEC Requirements

Atlas MPC/Powerpod Power Conditioner

Model MPC 60/60, Motor to Brushless Sync
OUTPUT: KW 36, KVA 36, Power Factor .9, Hertz 60, Phases 3, Volts 208/120.
INPUT: HP 51, Phases 3, Speed 1800, Hertz 59, Amp 37.0, Volts 480.
SPECIAL FEATURES: Load Protection Package with OV/RMUF Protection, Maintenance Bypass Switch.
ASKING: $15,000 or Best Offer

TI 820 KSR Printer
Like New, ASKING $1,000

Contact Joel McLaughlin
Kirby Exploration Co.
Houston, Texas
(713) 629-8378

DEC

Our unbeatable combination
inventory at low, low prices

Call toll free 800-328-7000
In Minnesota (612) 894-4020

MIDWEST SYSTEMS, INC.
Boxwood Drive Burnsville, Minnesota 553

PEARL HAS IBM SYSTEMS 34, 36, 38

and we have a large inventory of IBM 3741's, CPU's, CRT's and printers. We buy, sell, lease, rent and purchase/leaseback IBM Systems.

Call John Spight or Ken Warren
Pearl Computer Division
P.O. Box 24026 •4717 Centennial Blvd.
Nashville, TN 37202 **(615) 383-8703**

END USER ONLY

SELL OR LEASE

CSI

BUY ..... SELL SWAP

HARDWARE
SOFTWARE
COMPUTER TIME & SERVICES

Over 500,000 computer people read **COMPUTERWORLD** every week. So, placing an advertisement with us is going to help you take care of your computer-related business...very quickly.

Deal us in on your business needs.

Call the Classified Department at 1-800-343-6474 or (in Massachusetts) (617) 879-0700 to place your ad.

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

CMI

3081-D16 Sale or Lease

3081-K24 Sale or Lease

For Sale/Lease 4361 1st Quarter Delivery

3033 All Models

New Series 1 with Stark Operating System "Unix" † on the Series 1 IBM Master VAR † Trademark of Bell Laboratories

3350's Available Now On a Short Term Lease 3278 3276 3380

3690-A6 Available Now 4700 Banking Equipment Buy/Sell/Lease

3725 Lease Financing Available For your System or Ours 2,3,4 or 5 Year Terms

3800 LASER PRINTERS Model 1's Immediate Delivery Model 3's Lease Financing Available-Any Term 3800-6 3211-1 & 3811-1 3262-6 4245-1

3380 Immediate Delivery 3380-A02 Buy/Sell/Lease

Viewed 4341-M02 4341-L01 Call Now

3278, 3279 3277, 3276 Terminals All Models Immediate Availability

3705-3704 Available for Immediate Delivery Sale or Lease

SYSTEM 38 Model 7 & 9 Available Now New - Used SYSTEM 36 2, 3, 4 or 5 Year Terms Lower rates than IDC 8100's Available Now - Sale or Lease

Series 1 /O All IBM Peripherals Any Used Configuration CDC Peripherals Available Tape Backup 9-track 6250 CRT Systems Buy/Sell/Lease

CPR:RESALE

Computer Products & Repair

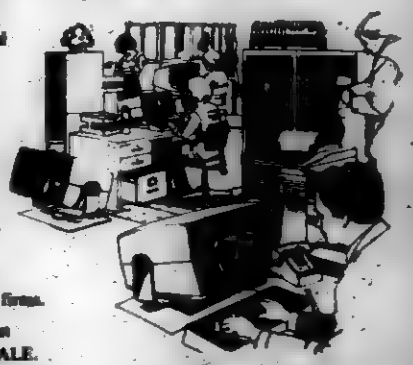
No charge to tell the Data General world.

Call us to list the DG equipment you have to sell or buy. There are no fees. CPR's large, computer-based sales force will find you a MATCH TODAY through national phone swaps, direct mail, and advertising to 300,000 contacts.

Buy at the price you want. Sell at the price you need.

$2 Million is also available to buy and sell your inventory fast, with aggressive trade-ins, and leasing through national firms.

Expect the price you want TODAY with CPR:RESALE.



CPR gets you results. California 800-392-2317

800-843-2047

1830 Fourteenth Street, Santa Monica, California 90404 213-450-0010

IBM SYSTEM/34

S/3 • S/32 • S/38

5291 • 5251

3741 • 3742

BUY • SELL • LEASE

REFURBISHED • RECONFIGURATED

SHORT-TERM LEASES

PURCHASE/LEASEBACK

Tennecom MARKETING INCORPORATED

210 SPACE PARK NORTH
P.O. BOX 246
GOODLETTSVILLE (NASHVILLE)
TENNESSEE 37072

800-422-1004

In TENNESSEE CALL: (615) 859-2672

DEC

RENT • BUY • UPGRADE • SELL

PDP, 11/83, 11/84, 11/23, 11/24, 11/94, 11/44, 11/70, VAX/730, VAX/750, VAX/780

SYSTEMS • OPTIONS • SUPPLIES

11/24	128K, Dual RL02, DZ11-A, Dual H9642 (new)	$24,995
11/23+	256KB, Dual RL02, DZV11-C, V7.1M2, Remove (new)	$16,995
11/70	512KB MOS, LA36 (new)	CALL
VAX/730	1MB, RUA82, RL02, V5.0 System (new)	CALL

Customized Configurations–Call With Your Request.

In Stock		Specials		In Stock	
11/24-BC (new)	$11,395	MS11-PB (new)	$4,195		
DZ11-A (renewed)	$ 495	MS730-CA (new)	$4,795		
DMF32-AB (new)	$ 2,495	MS730-DC (new)	$3,595		
DUP11-DA (used)	$ 695	RH750 (used)	$2,995		
DZ11-F (new)	$ 2,195	RK611-EA (new)	$2,695		
H9642 (new)	$ 1,395	RL211-AK (new)	$5,495		
KT24 (new)	$ 795	RUA81-AA (new)	Call		
LP11-BA (renewed)	$ 2,495	VT50-AA (new)	$ 495		

BROOKVALE

800-645-1167 NY: (516)

IBM SYSTEM 34 Buy Sell UPGRADES Lowest Prices

Call Collect: 404-252-7460

DATAMARC 6065 Roswell Rd Suite 320 Atlanta, GA 30328

S/1 S/38

IN STOCK! Fujitsu Eagle with cabinet, cables, slides & terminator: $13,000

New Fujitsu SP 380 80 character per second, letter quality printer: Introductory Special - $2,695

MANDREL COMPUTER SOLUTIONS INC.

303-693-3035

2771 S. Joppa • Aurora, CO 80013

We Buy & Sell DEC Systems Components

Digital Computer Resale

call:713 445-0082

600 Yorkch Ste C22 Houston, Tx 77060

WANG WANG WORD PROCESSORS AT THOUSANDS OFF!

Guaranteed, remanufactured WPS 35, WPS 55 and Wangwriters available for immediate delivery. You don't pay a cent till Wang installs and places equipment under service contract. 15-day return privilege. Buy. Lease. Rent.

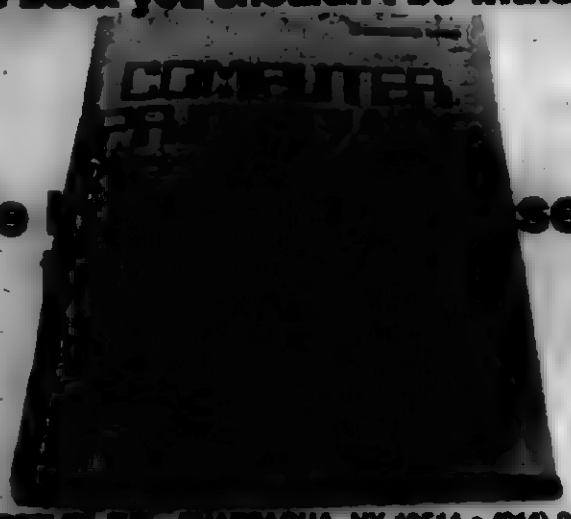
For free info and fast answers call toll-free:

1-800-321-2966

ELECTRONIC OFFICE EXCHANGE, INC.

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

We do a lot more than publish the book you shouldn't be without



75 SO. GREELEY AVE., CHAPPAQUA, NY 10514 • (914) 238-9031

☐ YES! I'm interested; so please enter my subscription to Computer Price Guide at the rate of $32.00 for 4 issues.*

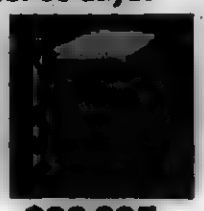
*Published quarterly in January, April, July and October

Name_____
Title_____
Company_____
Street_____
City_____ State_____ Zip_____
Phone_____
Machine Type_____

DISK DRIVES • CONTROLLERS • PERIPHERALS • MEDIA

WANG • DEC

National authorized CDC OEM-Distributor (for Controllers and Media) offers *New Equipment*, fully warranted for 90 days:



$12,900 CDC Model 9766 (300 Mb.) WANG Models 2285V-2 and 6585 (280 Mb.) DEC Model RM05 (256.1 Mb.)

$7,750 CDC Model 9762 (80 Mb.) WANG Model 2285V-1 (75 Megabytes). DEC Model RM03 (67.1 Mb.)

$8,875 CDC Model 9448 (85 Mb.) WANG Model 2280–3 (80.4 Mb.) WANG Models 2280 V–3, 6580 (80 Mb.) DEC Model RM07 (83.4 Mb.)

$20,825 CDC Model 9775 (675 Mb.) WANG Model 2285 V–3 (640 Megabytes). DEC Model 2–RM05s (512.2 Mb.)

ERST
INTERNATIONAL CORPORATION
225 Lafayette Street, New York, NY 10012

ERST is the leading dealer in pre-owned WANG equipment – 2200, VS, WP (CPUs, Terminals, IOPs, Controllers, Printers, Memory Upgrades).

Most times give us a call . . . Toll Free 1-800-FOR-ERST . . . In N.Y. 212-431-1100

* * * * DEC * * * *
BUY—SELL—LEASE—TRADE—CONSIGN
SYSTEMS — PROCESSORS — OPTIONS
PERIPHERAL — MODULES — MEMORY
— SPARES —
NATIONAL COMPUTER EXCHANGE
(800) 624-9299
600 North Lunar Avenue, Brea, CA 92621
TWX: 910-596-1499 (714) 990-5988

DATAPOINT
4630
8600, 20MB (2)
3600 Processors
9601 Letter Quality Printer
1600 128K, 10MB Cartridge
5500 2.5MB Drives (3)
9822 Printer
9214 Printer, 230-340 LPM
9370 25MB Drives (2)
9371 25MB Drives (3)
9584 1600 BPI, 10.5 Inch, Reel to Reel Tape Drive
• BUY • SELL
2600 Clients
(703) 790-9433

BUY / SELL / LEASE
108 V/5
105 V/6
IBM AMDAHL
3031 V/7
3032-3033 V/8
INTERESTED IN ALL MODELS AND CONFIGURATIONS
ALSO, MODEL-FEATURE-MEMORY UPGRADES
HAVE REQUIREMENT FOR 3033 PROCESSOR
MOTOR GENERATORS AVAILABLE
WE WOULD LIKE TO TALK WITH YOU
PLEASE CONTACT: DALE HAUSNER OR CHARLIE BERRY
MAJOR COMPUTER INCORPORATED
11837 Yellow Circle Drive
Minnetonka, MN 55343
(612) 933-6669

STC
TAPE/DISK
BUY • SELL • LEASE

REAL ESTATE

FOR SUBLEASE:
DATA CENTER
Southeast Denver

33,300 S.F. facility with 7,400 S.F. raised floor. 1,100 S.F. tape library. Central Halon System, surveillance cameras, rusco card system, plus 3412 caterpillar emergency generator system.

COLDWELL BANKER

Steve Pearson
COLDWELL BANKER
183 Inverness Drive West, Suite 370
Englewood, Colorado 80112
(303) 799-1800

BIDS & PROPOSALS

Accepting Bids
University of Missouri

Sealed bids will be received by the University of Missouri until 9:00 A.M., Tuesday, March 13, 1984, for the Sale of Used Computer Equipment, located in the Computer Room, Math Science Annex, University of Missouri - Columbia, Columbia, Missouri. For more information contact, Mrs. Kathleen Brumfield, 537 Clark Hall, University of Missouri - Columbia, Columbia, Missouri, Telephone (314) 882-7001.

SHUGART
Floppy Drives
Double Sided Double Density
SA460
In Stock
Quick Delivery
Single Piece Price
Starting at $195
Contact Steve Berber
(401) 769-3233 or
(401) 769-6126

SELLING?

Sell your product or service in Computerworld classifieds. Join the thousands of advertisers who use our classifieds because they get results.

You can find buyers for discs and DEC's, terminals and timesharing, software and System 370's.

More than half a million active computer people read Computerworld each week, and you can reach them efficiently in Computerworld classifieds.

To place your ad, or to get a rate card with complete details on Computerworld Classifieds, call or write:

Classified Advertising
COMPUTERWORLD
P.O. Box 880
Framingham, MA 01701

1-800-343-6474
617-879-0700

The Bulletin Board

PRIME

PRIME
LARGE SELECTION OF USED PRIME COMPUTER SYSTEMS ...SAVINGS TO 50%
Peripherals also available:
Memorex/Dilo Device Corporation
Modems Terminals Printers
1st SERVICE
...Your Absolute Source
A DATAMATION SERVICES, INC., COMPANY
3991 EAST CAMPBELL AVE.
PHOENIX, ARIZONA 85018
(602) 957-0999
ASK FOR DON OR MATT

MISC.

BUY - SELL - LEASE
DATAPOINT
HARDWARE & SOFTWARE
•Turnkey Systems •PAMS Software
On-Line Accounting
(713) 528-6613

Buy • Sell • Lease
• Short Term Rentals •
DATAPOINT
FOR SALE

8400	Plans	$1,150
8420	Multipoint	$800
8430	CRT's	$1,200
1550	Systems	$3,000
8470	20MB Subsystem	$5,700
8450	160 CPS Printer	$1,200
8500	Arm Proc. 256K	$5,995
8550	Diskettes	$1,350
8401	Subsystems	$950

24 HOUR DELIVERY
Cougar Computer Corp.
(216) 261-3660

Call
(800) 343-6474
Or
(617) 879-0700
To
Place
Your
Ad
Today

HEWLETT PACKARD

HP3000HP3000HP3000

SOFTWARE FOR SALE

CONTROL/38

GL/38 GENERAL LEDGER

EXEC/38 FINANCIAL ANALYSIS

AP/38 ACCOUNTS PAYABLE

PPF/38 PROFIT PLANNING AND FORECASTING

ICCS/38 INTEGRATED COST CONTROL

PO/38 PURCHASE ORDER

AR/38 ACCOUNTS RECEIVABLE

FA/38 FIXED ASSETS

SC/38 STANDARD COST

G

VERTICAL MARKET SOFTWARE AUTHORS AND PUBLISHERS WANTED!

by

HARRIS DATA SERVICE, INC.

Why?

Because . . .
We'd like you to consider "packaging" our IBM System/34, 36 & 38 financial application packages (including G/L, A/P, P/R, F/A, A/R) with your specialized vertical market software . . . either as an integrated/interfaced offering or as an "Add-On" product offering.

Why?

Because . . .
Harris software is professionally written and packaged. Standardized programming and documentation development allows for practical package modification and interface to your vertical market software. Attractive product summaries, complete user oriented demos/documentation and an aggressive, nationwide advertising campaign are available as effective sales tools for you.

Because . . .
Harris software is user oriented, table driven and multi-company/facility oriented with all financial modules integrated.

Because . . .
Harris software products are presently installed at several thousand computer sites throughout the U.S. and Canada.

Because . . .
Where there's business . . . there's accounting!

Harris is ready to offer a most attractive financial arrangement and optional install/support services to interested vertical market software vendors/publishers.

CAN WE TALK?

VERTICALS WANTED

HARRIS DATA SERVICE, INC.
11629 W. Dearborn Avenue
Milwaukee, WI 53226
(414) 475-1760

Offices and Distributors Nationally

More IBM System/38 Users Are Choosing RTC Systems.

For technically superior software in a wide range of Financial, Manufacturing, Distribution and Management Business Systems.

The International Software Developers.

RTC Systems, Inc.
49 Plain Street
North Attleboro, MA 02760
(617) 695-8008

• BUY
• SELL
• SWAP

Well-Equipped To Serve You In Buying Or Selling

• HARDWARE
• SOFTWARE
• COMPUTER TIME & SERVICES

Over 500,000 computer people read COMPUTERWORLD every week.

So placing an advertisement with us is going to help you take care of your computer-related business.... very quickly.

Call 1-800-343-6474
(in Mass.) 617-879-0700

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY
375 Cochituate Road, Box 880, Framingham, MA 01701/(617) 879-0700

Elegant Software
for IBM S/34, 36 and 38

General Accounting	Payroll/Personnel
Financial Reporting	Property & Equipment
Accounts Receivable	Report Writer
Accounts Payable	Oil & Gas
Order Processing	All Systems are:
Inventory Management	RPG II/RPG III
Sales Analysis	Data Base
Job Cost	Interactive

J.D. Edwards & Company
4940 South Syracuse Street/Suite 800
Denver, CO 80237
303/ 773-3732

Dallas — 214/ 458 0936
Houston — 713/ 880 8278
Northern California — 415/ 887 7764
Southern California — 714/751 8302

IBM S/38 PAYROLL

- 99 COMPANYS
- 99 EARNINGS
- 99 DEDUCTIONS
- 401 (k)
- ALL STATE TAXES
- RPG II
- MENU DRIVEN
- ON-LINE
- EMPLOYER TAXES
- G/L DIST
- CHECK HISTORY
- DATA BASE

CIC
CONSOLIDATED INFORMATION CO.
177 POST STREET, SUITE 908
SAN FRANCISCO, CA 94108
(415) 433-5333

Specializing in IBM System/38
FRIEDMAN & ASSOCIATES, INC
101 Wilmot Road
Deerfield, Illinois 60015
(312) 948-7660

Totally on-line order entry, complete manufacturing systems, MRP with on-line net change

Fixed price software, including customization, implementation, and 1st year support

We make it work!

Plycom services, Inc.
P.O. Box 300466
San Antonio, TX 78230
(512) 734-4388

SELLING SOFTWARE?

Sell It Here.

Call Computerworld

To Place Your Ad.

1-800-343-6474

SOFTWARE FOR SALE | SOFTWARE FOR SALE | SOFTWARE FOR SALE | SOFTWARE FOR SALE | SOFTWARE FOR SALE

SOFTWARE CONVERSION SOLUTIONS

Datamare provides the software translation system for your complex conversion problems. Over 15 years of conversion experience has resulted in thousands of satisfied customers, worldwide.

- [illegible] to [illegible]
- [illegible]/SPS to [illegible]
- [illegible]/TRAN to [illegible]
- BAL/ALC to [illegible]
- PDS/ALC to OS/ALC
- PL/1 to [illegible]
- SPS/SPS II to [illegible]
- SPS/SPS II to PL/1

Datamare offers services & software to meet your needs. For more information, call or write today.

The Conversion Software People
DATAMARE, INC.
2546 Elmwood Avenue
Buffalo, New York 14217
Phone (716) 876-5722
TELEX: 91519

How to load your 38 for top MRP performance.

Harness the firepower of IMS/38 manufacturing software. IMS/38 for the IBM/38 provides the total control of a closed-loop MRP II system that allows direct user access to all stored information. Its sophisticated query facility lets you generate user reports. And advanced data base architecture makes expansion simple and economical. IMS/38 even offers a PC link that lets you transfer information to your IBM Personal Computer for interaction with popular micro products.

Only IMS/38 has 15 powerful applications to provide you with total management control over manufacturing, distribution and finances. Contact PCR, Professional Computer Resources, 2021 Midwest Road, Oak Brook, IL 60521 (near Chicago). Also in New York, San Francisco and Los Angeles.

pcr
ALL THE SOFTWARE YOU'LL EVER NEED
312-932-2200

The Proven Solution

*SAFE™ Financial Systems for the IBM 8/34, 36, 38
Accounts Payable • General Ledger
Fixed Assets • Payroll • Word Processing
RAPID/S conversion facility
Support • Service • Custom Enhancements
Call or write: Schwartz & Assoc., Inc. P.O. Box 1599 Cambridge, MA 02142 (617) 492-9742

*SAFE trademark of Schwartz & Assoc., Inc. Financial Systems

BUSINESS OPPORTUNITY

ARE YOU REPRESENTED IN ENGLAND?

As a leading IBM Software House with sales of 4 million dollars annually, we have considerable experience in marketing IBM main frame and P.C. software.

If you want a share of the U.K. market, contact us without delay. Telephone Paul Ingram on 203-26301, Telex 317165.

SYSTEMS RESOURCES LTD.

TIME & SERVICES

DATA CENTER SERVICES

TWO [illegible] 3033U16

BURNS [illegible]

[illegible] 198 [illegible]

VAX/VMS TIMESHARE

5¢

$2 PER HOUR CONNECT TIME
ONE MB DISK STORAGE INCLUDED
AVAILABLE NATIONWIDE VIA TELENET
LEASE-A-PORT™ WITH 10 MB DISK & NO CPU OR CONNECT CHARGES FOR $800 PER MONTH

HYCOM CORPORATION (714) 69[illegible]11 (213) 619-9[illegible] (714) 9[illegible]

COMPUTER REPAIRS

DEC-DG-IBM PC
ALL BOARDS
1-2 WEEK TURNAROUND
90 DAY WARRANTY
MEMORIES
POWER SUPPLIES
ANY MANUFACTURER

[illegible] Repair Depot

REAL COST SAVINGS

SUPER FAST TURNAROUND

VAX 750

Complete Repair Services Available for all makes:
Computer Boards
Memories
Peripherals
Cash Register Systems
USED & LIKE NEW DEC EQUIPMENT BOUGHT & SOLD

CDA

VAX 11/780 AND PDP-11 DEVELOPMENT TIME

NO MILLICORE TICK CHARGES / NO CPU CHARGES

Omnicomputer

$7/$14

RSTS/E VMS

PER HOUR CONNECT TIME

BUDGET BYTES™ 212-944-9238

Omnicomputer, Inc.
1430 Broadway, New York, N.Y. 10018

COMMERCIAL DATA PROCESSING

4341-2 370/158-3

OS-DOS-VM/CMS
CICS-ROSCOE
REMOTE JOB ENTRY
CICS DEVELOPMENT
CUSTOMIZED SOFTWARE
XEROX LASER PRINTING

Contact Greg Gorab
(201) 777-3464
15 MINUTES FROM LINCOLN TUNNEL
ONE PASSAIC STREET
WOOD RIDGE, N.J. 07075

ICOTECH

Innovative Computer Techniques

COMPUTER SERVICES
IBM 3081 DEC-10

- Remote Job Entry
- Batch Processing
- Optical Mark Reading
- Online Processing
- Timesharing
- Laser Printing

COMPUTER OUTPUT MICROFILM

- Datagraphix Mini Auto-Cave
- Datagraphix Datamicr
- 3800 SPI Capability
- Free Testing

Route 202
Raritan, NJ 08869
201-685-0100
Contact: Joyce Bogenstein

Tell us about the Time & Services you have to offer... ...here in COMPUTER WORLD's Classified pages.

COMPUTER TIME RENTAL

IBM 4331
DOS/VSE - ICCS
All Shifts Available
3370 Disk, 3420 Tape
Dual/Density
1403-N1,
2540 Reader/Punch
Reasonable Rates
Contact: Al Palmo
Rockmatic Data Services
(212) 867-1411

COMPUTER TIME & TIMESHARING

- We are time brokers.
- IBM timesharing our specialty.
- Also RJE & batch time.

Call John Rudder at
Computer Reserves, Inc.
(201) 666-5700

WANTED NOW

Major corporation wants to lease 1000 square feet of computer room space to be used as a communications node for five years with option on following five years. Must have raised floor, UPS, diesel power backup, backup air conditioning. Do not want basement or ground floor. Prefer downtown location in following cities: Houston, Phoenix, San Francisco, Seattle, Minneapolis, New York, Boston, Chicago, Miami, Cincinnati.

CW-B4681, Computerworld
Box 880, Framingham, MA 01701

CLASSIFIED ADVERTISING ORDER FORM

Computerworld's Classifieds work.

Issue Date: Ad closing is every Friday, 10 days prior to issue date.

Sections: Please be sure to specify the section you want: Time and Services, Software for Sale, Position Announcements and Buy/Sell/Swap. (Available upon request: Software Wanted, Business Opportunities and Real Estate).

Copy: We'll typeset your ad at no extra charge. Please attach CLEAN typewritten copy. Figure about 35 words to a column inch, not including headlines.

Costs: Our rates are $126.10 per column inch. (A column is 2" wide.) Minimum size is two column inches (2" wide by 2" deep) and costs $252.20 per insertion. Extra space is available in half-inch increments and costs $64.05. Box numbers are $15.00 extra.

Billing: If you're a first-time advertiser, (or if you have not established an account with us,) WE MUST HAVE YOUR PAYMENT IN ADVANCE.

Ad size desired: _____ columns wide by _____ inches deep.

Issue Date(s): _____

Section: _____

Signature: _____

Name: _____

Company: _____

Title: _____

Address: _____

Telephone: _____

Send this form to:

COMPUTERWORLD

CLASSIFIED ADVERTISING,

375 Cochituate Road, Box 880,
Framingham, MA 01701

Foreign Editorial/ Sales Offices

England: Terry Cartwright, EEC Publications, 196-200 Balls Pond Rd., London N1 4AQ. Phone: 01-359-3525, Telex: (851) 894085 (Computer Management, Computer Business Europe only).

Euan Rose, Bill Dunlop, Stephen Thomas, Beare Hobson Assoc., 345 Goswell Rd., Islington, London EC1V 7HN. Phone: 01278 3415/6 (reps for all CWCI publications except Computer Management and Computer Business Europe).

W. Germany: Eckhard Upadek, CW Publikationens, Friedrichstrasse 31, 8000 Munich 40. Phone: (089) 38172-0. Telex: 5215350.

France: Axel Leblois, Le Monde Informatique, 185 Avenue Charles De Gaulle, 92200 Neuilly Sur Seine, Paris. Phone: 758.14.14. Telex: 613294 F.

Japan: Mr. Shuji Mizuguchi, Computerworld Japan, 7-4 Shintomi 1-Chome, Chuo-ku, Tokyo 104. Phone: (03) 551-3662, Telex: 252-4217 (Computerworld Japan only).

H. Kajiama, Tokyo Representative Group, Yamaguchi Bldg., 2-12-9 Kanda Jimbo-cho, Chiyoda-ku, Tokyo 101, Phone: (03) 230-4117/8, Telex: J26860 (reps for all CWCI publications except Computerworld Japan).

Australia: Alan Power, Computerworld Pty. Ltd., 37-43 Alexander Street, Crows Nest, NSW 2065. Phone: (02) 4396139, Telex: AA74782 COMWOR.

Brazil: Eric Hippeau, Data News, Computerworld do Brazil, Servicos e Publicacoes Ltda., Rua Alcindo Guanabara, 25/10th Floor 20031 Rio de Janeiro, RJ Brazil. Phone: (021) 240-8225. Telex: 2130838(WORD BR).

Mexico: Richard Smail, Computerworld de Mexico, Oaxaca 21-2, Colonia Roma, Mexico City 7 D.F. Phone: (905) 514-4218, (905) 514-6308. Telex: 1771300 ACHAME, 1777809 ACHAME.

Spain: Neil Kelley, Computerworld/Espana, Gravina, 13, Madrid 4. Phone: 231-23-66; 231-23-66; 231-23-66. Telex: 47894(CW E).

Denmark: Preben Engell, Computerworld/Denmark, Gammel Strand 50, 1202 Copenhagen K. Phone: 01-1234-11. Telex: 27566. ovrdan.

Sweden: Bengt Mamfeldt, Computerworld/Sweden, Nova Media AB, Vertavagen 55, 11538 Stockholm. Telex: 8105089 NOVACW.

The Netherlands: Johannes A. Winnost, Mgr. Dir., CW Communications B.V., c/o IDC Benelux, Prins Hendriklaan II, 1075 AX Amsterdam. Phone: 020-791-692. Telex: (844) 15741.

Italy: Daniele Comboni, Gruppo Editoriale Jackson, s.r.l., Via Rosellini 12, 20124 Milano.

Argentina: Ruben Argento, Gen. Mgr., Computerworld Argentina, Av. Belgrano 406-Piso 9, CP 1092 Buenos Aires. Phone: 34-5883/5884.

Norway: Mr. Per Bjerkjord, Editor, CW Norge A/S, Hovinveien 43, P.O. Box 2862, Tasyen, Oslo 6. Phone: 2/647725. Telex: (856) 76478

Singapore: Mr. David Naidu, General Manager, Asia Computerworld, Pte. Ltd., 11-08/11-10 Goldhill Plaza, Newton Road, Singapore. Phone: 250-444. Telex: (786) RS 37003

Saudi Arabia: Mr. Omer Duaidi, General Manager, Saudi Computerworld, P.O. Box 5455, Jeddah. Phone: 6675916/6650380. Telex: (926) 401205.

ADVERTISERS INDEX

ACS 35
ADR 1
American Telephone & Telegraph 20-21
American Telephone & Telegraph Info Systems 24-25
Applied Software 33
A.R.T. Research ID/14
AVATAR Technologies 44

B I Maple & Associates, Inc. 36
Bake Shell 28
Bank Street/Writing 32
BDS Systems, Inc. 32
Boole & Babbage 48

Chorus 30-31
Cullier Jackson, Inc. 12
Candata 28
Cara/Tektronix, Inc. 28
Computer Specialists 34-35
Computer Power Systems 45
Context MBA 44
Corona Data Systems ID/7
CR Computer Systems 37
Cullinet 38
CW Ads 38
CW Mkts. 188
CW Supplement 25

Datapoint 11,13,17,48
DEC/TPG 26-27
DEC Professionals 28
Delrina, Inc. ID/4
Digital Controls Corp. ID/8
Docken Products ID/14
Dynax 28

Eastman Kodak Co. 46
Executive Life Learning 32
Exxon Office Systems 70-71

Fusion Products 41

Gnat Systems International 46

Hitachi ID/10
Hogan 34
Holland Systems ID/3
Hughes Aircraft 34

IBM 40-42
Infodata 7
Information 28
Information Science, Inc. 28
Information Science 42-43
Integrated Business Computers 32
Intecom ID/5
International Computers ID/11

Johnson Systems 36

Keystroke ID/3

J.W. Lampl, Inc. 34
Lawson Associates 14
Local Data ID/14

MacMillan Book Clubs 15
Macworld 16
Martin Marietta 26
Mathematica 31
MCBA 18
McCormack & Dodge 40
Micro Craft Corp. ID/15
Microdata 72-73
Micro Focus 28-29
Micro Marketware 37
MRA 28-27
MSI Systems Corp. 11,13,17

National Seal Contractor 19
NCR 22
NCR Corp. 23
New Generation Software 28
Northern Telecom 74-75

On-Line Software 57,58

Paradise Systems 10

QED Information Sciences 39
Quasi 54-57

Radio Shack 52
Randeck Corp. 28
R. L. Rager 19

SAS Institute ID/8-ID/9
SDC 60
Signal Technology Inc. 12,ID/11
SMC Software Systems 28
Software Assistance 28
Software Automation 28
Software Express 44
Software International 30-31
Software Results 14
Software Technology 28
Sperry Corp. 28
Sharek 77
Stone Mountain Computing 28
Syncsort 6

Tandem Computers 50-51
Tektronix, Inc. 68-67
Tel Tech 19
Teletype Corp. ID/13,ID-28
Time Software 28

Value Computing 31
Vantel 128
Visual Technology 69
VM Software, Inc. 9

Wang Laboratories 28
Western Telematics ID/6

This index is provided as an additional service. The publisher does not assume any liability for errors or omissions.

Computerworld Sales Offices

Vice-President/Sales/Donald E. Pagan
Director/National Sales/Edward P. Manchill
Marketing Support Manager/Kathy Doyle
COMPUTERWORLD, 375 Cochituate Road, Box 880,
Framingham, MA 01701
(617) 879-0700

BOSTON SALES OFFICE (617) 879-0700
Northern Regional Director/Chris Lee
District Managers/Jim McClure, Randal Masters,
Joyce Donovan, Michael F. Kelleher
Sales Assistant/Allen Langley
COMPUTERWORLD, 375 Cochituate Road, Box 880,
Framingham, MA 01701

CHICAGO SALES OFFICE (312) 827-4433
District Manager/Arthur Kenneth
Sales Assistant/Joan F. Shoboda
Northern Regional Director/Chris Lee
COMPUTERWORLD, 2600 South River Road, Suite 304,
Des Plaines, IL 60018

NEW YORK SALES OFFICE (201) 967-1380
Eastern Regional Director/Michael J. Masterson
Senior District Manager/Doug Chaney
District Managers/Ray Costin, Joan Daly, Fred La Rocca
Sales Assistant/Gale M. Palermo
COMPUTERWORLD, Paramus Plaza I,
140 Route 17, North, Paramus, NJ 07652

LOS ANGELES SALES OFFICE (714) 261-1280
Senior District Manager/Bob Hubbard
District Manager/Bernie Hoekzemizer

Western Regional Director/William J. Healey
COMPUTERWORLD, 18300 Sky Park State, Suite 200,
Irvine, CA 92714

SAN FRANCISCO SALES OFFICE (415) 421-7230
Western Regional Director/William J. Healey
Senior District Manager/Barry Milano
District Managers/Theodore Prevoir, Ernest Chamberlain
Account Manager, Classified/Wanda Boettcher
COMPUTERWORLD, 333 Broadway, Suite 20,
San Francisco, CA 94133

ATLANTA SALES OFFICE (404) 394-0758
District Manager/Jeffrey Mosher
Eastern Regional Director/Richard J. Masterson
COMPUTERWORLD, 1255 Peeler Road, Suite D,
Atlanta, GA 30338

CLASSIFIED ADVERTISING (617) 879-0700
Al DeMilo
COMPUTERWORLD, 375 Cochituate Road, Box 880,
Framingham, MA 01701

CW INTERNATIONAL MARKETING SERVICES
General Manager/Diane La Mungia
COMPUTERWORLD, 375 Cochituate Road, Box 880,
Framingham, MA 01701
(617) 879-0700
Manager, West Coast/Peter Crockett
COMPUTERWORLD, 1020 Menlo Rd.,
Menlo Park, CA 94025
(415) 328-8304

CW COMMUNICATIONS/INC.
Board Chairman/Publisher
Patrick J. McGovern
President
W. Walter Boyd
Senior Vice-President
Lee Vidmar

Group VP-Communication Services, Jack Edmonston. Group VP-Circulation, Margaret Pinder. VP-Marketing, Donald E. Pagan. VP-Finance, William P. Murphy. VP-Editorial, John Wildermuth.

Computerworld Headquarters: 375 Cochituate Road, P.O. Box 880, Framingham, MA 01701
Phone: (617) 879-0700, Telex: 95-1130.

SALES: Vice-President, Donald E. Pagan. National Director, Edward P. Manchill. Corporate Advertising Administrator, Frank Collins. Marketing Support Manager, Kathy Doyle. Display Advertising Supervisor, Anne Hadley. Display Advertising, Deborah Boyer, Pam Valentinetti, Elaine Cadow, Carolyn Medeiros, Cindy Chelsea, Mary Weddon. Classified Advertising Manager, William J. Mills.

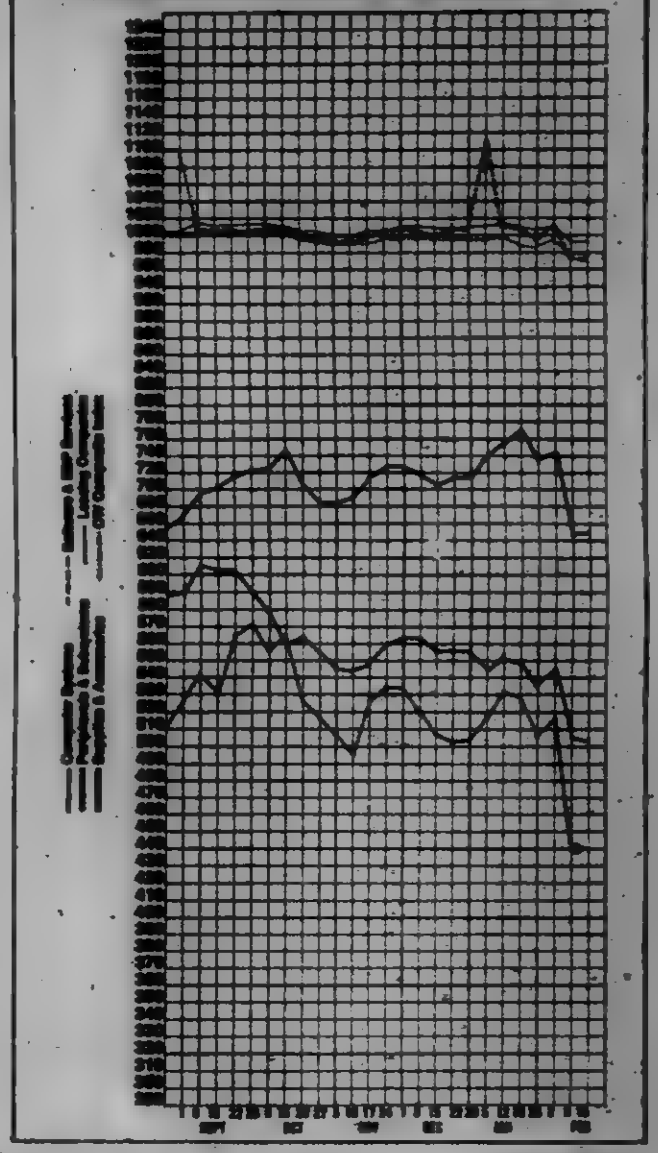
COMMUNICATION SERVICES: Group Vice-President, Jack Edmonston. Director Research, Kathryn Stevens. Sales Promotion Director, Liz Johnson.

PRODUCTION: Production Director, Peter Hahn. Production Manager, Melissa Sabat. Paste-Up Manager, Mark Gaudette. Systems Manager, Tom Flinn. Typesetting Manager, Carol Polack. Art Director, Tom Monahan. Graphic Designer, Hank Pfeg.

CIRCULATION: Group Vice-President, Margaret Pinder. Circulation Manager, Jane Dedberg. Fulfillment Manager, Maureen Buttle.

Computerworld can be purchased on 35 mm microfilm through University Microfilms Inc., Periodical Entry Dept., 300 North Zeeb Road, Ann Arbor, Mich. 48106. Phone: (313) 761-4700. Complimentary reprints sold to Circulation Dept. for subscription information.

Computerworld Stock Trading Index



Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, FEBRUARY 15, 1984

All statistics compiled, computed and formatted by TRADE QUOTES, INC Cambridge Mass 02139

	1983-84 RANGE (1)	CLOSE FEB 15	NET CHANGE	PCT CHANGE
COMPUTER SYSTEMS				
ALPHA MICROSYSTEMS	11- 5	10 1/4	+ 1/8	+0.6
ALTOS COMPUTER SYST	9- 3	5	+1	+25.0
ANSWER CORP	9- 3	8	- 1/2	-5.9
APPLE COMPUTER INC	69- 9	22 1/4	+1 7/8	+9.2
AT&T	69- 9	53	- 5/8	-1.2
BARRISTER CORP	69- 9	47	- 3/8	-0.7
COMPUTER AUTOMATION	11- 3	8 1/4	- 1/4	-2.9
COMPUTER CONSOLES	9- 3	8	- 3/8	-4.5
CONTROL DATA CORP	21- 7	18 3/4	+ 1/4	+1.3
CONVERGENT TECHNOL	19- 6	18	- 1/4	-1.4
CRAY RESEARCH INC	19- 6	17 7/8	+1 7/8	+11.7
DATA GENERAL CORP	19- 6	41 1/2	+2 1/2	+6.4
DATAPOINT CORP	11- 3	20 5/8	+1 1/8	+5.8
DIGITAL EQUIPMENT	69- 9	68 1/4	+3 7/8	+6.0
EDGE INC	9- 3	5 1/8	- 3/8	-6.8
ELECTRONIC ASSOC.	9- 3	5 3/4	- 1/4	-4.2
FLOATING POINT SYST	19- 6	27 3/8	+1 3/8	+5.3
FOXBORO	19- 6	30 3/4	+1 1/8	+3.8
GENERAL AUTOMATION	9- 3	11 3/8	+ 1/8	+1.1
GRID INC	19- 6	31 1/4	+ 3/8	+1.2
HARRIS CORP	39- 21	38 1/2	+ 3/8	+1.0
HEWLETT-PACKARD CO	39- 20	38 1/4	- 1/4	-0.6
HONEYWELL INC	39- 20	34 1/2	+1 1/2	+4.5
IBM	97- 54	80 5/8	+1 1/8	+1.4
IPL SYSTEMS INC	11- 4	4 7/8	- 1/8	-2.5
M/A-COM INC	11- 4	8	- 3/8	-4.7
MANNESMANN CORP SYSTS	1- 1	1	0	0.0
MANAGEMENT ASSIST	17- 8	16 1/2	+ 1/8	+0.8
MATSUSHITA ELECTRONI	69- 9	26 1/2	+ 3/8	+1.4
MODULAR COMPUTER SYS	3- 1	2	- 1/2	-20.0
NORTH DATA SCI	19- 6	16 3/4	- 1/4	-1.5
NOTHERN TEC	11- 4	10 1/2	- 1/2	-4.5
NAT'L SEMICONDUCTOR	19- 6	13	- 1/4	-1.9
NBI INC	21- 11	23 3/8	+ 1/2	+2.1
NCR	39- 19	117 7/8	+2 3/8	+2.0
PERKIN-ELMER	17- 7	27 1/2	+2 1/8	+8.3
PRIME COMPUTER INC	11- 3	17 1/8	+ 3/8	+2.2
SPERRY CORP	21- 10	48	+ 1/4	+0.5
TANDEM COMPUTERS INC	19- 6	32	- 1/2	-1.5
TRIDY CORP	11- 4	32	- 1/2	-1.5
TELEVIDEO SYSTEMS	11- 4	11 1/4	+ 1/2	+4.6
TELXON CORP	9- 3	16 1/2	+ 3/8	+2.3
TEXAS INSTRUMENTS	71- 48	130 1/2	+ 1/2	+0.4
ULTIMATE CORP	9- 3	10 3/8	+ 3/8	+3.8
VECTOR GRAPHICS INC	9- 3	9 1/8	+ 1/8	+1.4
WANG LABS "B"	19- 6	28 1/4	+ 3/4	+2.7
WANG LABS "C"	11- 4	28 3/8	+1 3/8	+5.0
XEROX CORP	39- 19	62 1/8	+1 1/8	+1.7
LEASING COMPANIES				
BOOTHE FINANCIAL CP	11- 37	34 1/2	- 1/2	-1.4
COMDISCO INC	7- 4	11 1/2	+ 3/8	+3.3
CONTINENTAL INFO SYS	19- 6	8 3/4	0	0.0
DPF INC	9- 3	11 3/8	- 1/2	-4.2
SELECTRON INC	11- 21	14	0	0.0
U.S. LEASING	19- 6	37	-3 3/8	-10.7
COMPONENTS				
ADVANCED MICRO DEV	11- 37	27 3/8	+1 3/8	+5.3
ADV'D SEMICONDUCTOR	11- 38	24	+ 1/8	+1.0
ANALOG DEVICES INC	19- 6	32 1/8	- 1/8	-0.3
ANALOGIC CORP	19- 37	29	+ 1/2	+1.8
APPLIED MATERIALS CP	19- 37	18 3/8	+1 1/8	+6.5
TEXASVINE	19- 38	38 1/8	+2 3/8	+6.2

EXCH: N-NEW YORK; A-AMERICAN; P-PACIFIC; O-OVERTHE-COUNTER; I-NATIONAL; R-REGIONAL; B-OVER-THE-COUNTER
B-I-D PRICES ARE BID PRICES AS OF 3 P.M. ON LAST DAY
(1) TO NEAREST DOLLAR

	1983-84 RANGE (1)	CLOSE FEB 15	NET CHANGE	PCT CHANGE
SOFTWARE & COMP SERVICES				
ADVANCED COMP TECH	1- 0	0 1/8	+ 3/8	+33.3
ADVANCED SYSTEMS INC	11- 3	3 1/4	+ 3/4	+23.0
ADR COMPUTERS INC	11- 3	3 1/4	+ 3/4	+23.1
AMERICAN SOFTWARE	11- 3	5 3/4	+ 1/4	+4.5
ANACOMP INC	11- 3	3 3/4	- 1/4	-6.2
ANALYTICS INTL CORP	9- 3	3	+ 1/8	+4.3
APPLIED DATA RES.	11- 3	3	- 1/8	-4.0
ASK COMPUTER SYSTEMS	11- 3	5	+ 1/8	+2.6
AUTOMATIC COMP INC	1- 0	0 1/8	0	0.0
AUTOMATIC DATA INC	21- 7	6 3/4	- 1/4	-3.6
CBA COMPUTER ASSOC	1- 0	0 1/8	+ 1/8	+33.3
COMPUTER ASSOC INTL	9- 3	7	- 1/4	-3.4
COMPUTER HORIZONS	11- 3	5 1/8	- 1/8	-2.4
COMPUTER NETWORK	1- 0	0 1/8	- 1/8	-50.0
COMPUTER SCIENCES	11- 3	5	- 1/8	-2.4
COMPUTER TASK GROUP	3- 1	2 1/8	+ 1/8	+6.2
COMPUTER VISION	9- 3	4	- 1/4	-5.9
COMPUTING SYSTEMS	1- 0	0 1/8	- 1/8	-50.0
CONCORD CORP	9- 3	3 3/4	- 1/4	-6.2
CORVUS	1- 0	0 1/8	- 1/8	-50.0
DALLOUT SOFTWARE	19- 6	10 1/8	+ 3/8	+3.8
DYCAM SYSTEMS INC	11- 3	3 1/4	+ 1/4	+8.0
ELECTRONIC DATA SYST	39- 20	20 3/8	+ 1/8	+0.6
HUMAN SYSTEM INC	11- 3	4 1/8	- 1/8	-2.9
GENERAL ELECTRIC CO	97- 54	80 3/8	+ 1/8	+0.1
GTE CORP	69- 9	63 3/8	- 1/8	-0.1
INFORMATICS INC	11- 3	3 1/8	- 1/8	-3.8
INFOTRON SYSTEMS COR	11- 3	3 1/8	- 1/8	-3.8
INTERNATIONAL ABSORPTION	1- 0	0 1/8	+ 1/8	+33.3
LOGICON	9- 3	7	- 1/4	-3.4
MCI COMMUNICATIONS	11- 3	5 3/8	0	0.0
MDBT SCI AMER INC	11- 3	3 3/8	- 1/8	-3.6
MATHEMATICAL APP GRP	1- 0	0 1/8	- 1/8	-50.0
MICRO SYSTEMS INC	29- 13	27 1/2	- 1/2	-1.8
MICRO-GRAPH CP	9- 3	7 3/4	- 1/4	-3.1
NATIONAL DATA CORP	39- 19	39 1/8	+ 1/8	+0.3
ON-LINE SOFTWARE INT	11- 3	4	- 1/4	-5.9
PANSOPHIC SYSTEMS	11- 3	3 3/8	- 1/8	-3.6
PLANNING RESEARCH	11- 3	3 1/8	- 1/8	-3.8
POLICY MGMT SYSTS CP	19- 6	24 1/2	+ 1/2	+2.0
PROGRAMMING & SYS	11- 3	4 3/4	+ 1/8	+2.7
SCIENCES & DEVELO	11- 3	3 1/4	- 1/8	-3.7
SEI CORP	11- 3	3 1/4	- 1/8	-3.7
SHARED MEDICAL SYST	11- 3	3 3/4	+ 1/8	+3.2
SCIENTIFIC COMPUTERS	1- 0	0 1/8	0	0.0
SOFTWARE AG	11- 3	3 1/8	- 1/4	-7.4
TYMSHARE INC	11- 3	3 3/4	- 3/8	-9.1
UCC CORP	11- 3	3 3/8	- 1/8	-3.6
WYLY CORP	11- 3	3 7/8	0	0.0
PERIPHERALS & INNOVATORS				
AM INTERNATIONAL	19- 7	9 1/2	- 3/8	-3.8
ANACOMP ANCHOR	1- 0	0 1/8	- 1/8	-50.0
AUTO-TRAIL TECHNOLOGY	1- 0	0 3/4	0	0.0
BASTEC INC	1- 0	0 1/8	0	0.0
BERKTEK INT'L	1- 0	0 3/4	- 1/8	-3.2
DALY DESIGNS & MFG	1- 0	0 1/8	0	0.0
CANNER CORP	1- 0	1 3/4	- 1/8	-6.6
CONTROLDYN DATA CORP	9- 3	3 3/4	- 1/4	-6.2
DETEC CORP	1- 0	0 1/2	- 1/8	-20.0
EMERITECH	1- 0	0 1/8	- 1/8	-50.0

	1983-84 RANGE (1)	CLOSE FEB 15	NET CHANGE	PCT CHANGE
COMPUTER DEVICES INC	1- 0	0 3/8	+ 1/8	+33.3
COMPUTER TRANSCEIVER	11- 3	3	- 1/8	-3.9
COMPUTERVISION CORP	19- 6	13 3/8	- 1/8	-0.9
CORVAC CORP	19- 38	13 3/8	- 1/8	-0.9
DATAPRODUCTS CORP	19- 6	8 1/8	+ 1/8	+1.5
DATAVIEW CORP	1- 0	0 1/8	- 1/8	-50.0
DATA UNITED CORP	1- 0	0 1/8	- 1/8	-50.0
DATUM INC	9- 3	6 1/8	- 1/8	-2.0
EDGE TERMINAL DATA CORPORT	9- 3	5 1/8	- 1/8	-2.4
ENCOTEL-OLIVETTI	11- 3	4 1/2	- 1/8	-2.7
ELECTRONIC M A R	1- 0	0 1/2	- 1/8	-20.0
EVANS, INC	11- 3	3 3/4	- 1/8	-3.2
EVANS & SUTHERLAND	11- 3	3 1/2	- 1/8	-3.5
EVERLY TECHNOLOGIES	1- 0	0 1/8	- 1/8	-50.0
GERBER DATA CORP IND	1- 0	0 1/8	- 1/8	-50.0
GERBER SCIENTIFIC IND	11- 3	3 3/8	0	0.0
HARRIS/LANIER CORP	1- 0	0 1/8	- 1/8	-50.0
ICOT CORP	1- 0	0 1/8	- 1/8	-50.0
INFORMATION INTL INC	9- 3	3 1/8	- 1/8	-3.8
INFORMATION DESIGNS	11- 3	3 1/8	- 1/8	-3.8
INTEL CORP	11- 3	3 1/2	+ 1/8	+3.7
IPL SYSTEMS INC	1- 0	0 1/8	+ 1/8	+33.3
LANEY ELECTRONICS	1- 0	0 1/8	- 1/8	-50.0
NEBRASKA CORP	1- 0	0 1/8	- 1/8	-50.0
NEI DATA CORP	1- 0	0 1/8	- 1/8	-50.0
NORMAN CORP	1- 0	0 1/8	- 1/8	-50.0
NETWORK SYSTEMS CORP	9- 3	5 3/8	+ 1/8	+2.3
NO AMERICAN PHILIPS	69- 39	57 3/4	+ 1/8	+0.2
NORTHERN TELECOM LTD	29- 14	28 3/4	+ 1/8	+0.4
OMEN	1- 0	0 1/8	0	0.0
PANASONIC CORP	1- 0	0 1/8	- 1/8	-50.0
PENRIL CORP	1- 0	0 1/8	- 1/8	-50.0
PERKIN AMERICAN INC	1- 0	0 1/8	- 1/8	-50.0
PLESSEY CO ADRS	9- 3	3 1/8	- 1/8	-3.8
PRINTRONIX INC	11- 3	3 1/8	- 1/8	-3.8
RAYTEL CORP	1- 0	0 1/8	- 1/8	-50.0
RAYTHEON CO	11- 3	3 1/8	- 1/8	-3.8
RECOGNITION EQUIP	11- 3	3 1/8	- 1/8	-3.8
RELM CORP	1- 0	0 1/8	- 1/8	-50.0
SCANNERS ASSOCIATES	11- 3	3 1/8	- 1/8	-3.8
SCAN DATA	1- 0	0 1/8	0	0.0
SCAN-TRON CORP	11- 3	3	- 1/8	-3.9
SCIENTIFIC ATLANTA	11- 3	3 1/4	- 1/8	-3.7
STORAGE TECHNOLOGY	11- 3	3 1/8	- 1/8	-3.8
SYKES DATATRONICS	1- 0	0 1/8	- 1/8	-50.0
SYSTEMS & COMP TECH	11- 3	3	- 1/8	-3.9
T BAR INC	1- 0	0 1/8	- 1/8	-50.0
TAB PRODUCTS CO	9- 3	5 1/8	- 1/8	-2.4
TANDON CORP	19- 38	13 1/2	- 1/8	-0.9
TEC INC	1- 0	0 1/8	- 1/8	-50.0
TEKTRONIX INC	19- 6	22 1/8	- 1/8	-0.5
TELEX	11- 3	3 3/4	- 1/8	-3.2
TESDATA SYSTEMS CP	1- 0	0 1/8	- 1/8	-50.0
TRIUMPLEX INC	1- 0	0 1/8	- 1/8	-50.0
VISUAL TECHNOLOGY	1- 0	0 3/4	- 1/8	-14.2
SUPPLIES & ACCESSORIES				
AMERICAN BUS FORMS	7- 3	5 1/2	+1 1/8	+4.0
BARRY WRIGHT	19- 38	17 7/8	+ 1/8	+0.6
DATAPLEX PRODUCTS INC	11- 3	3 1/2	- 1/8	-3.4
DENIS GEN. FORMS	9- 3	3 1/4	- 1/8	-3.7
3M COMPANY	69- 39	58 3/4	- 1/8	-0.2
WANG CORP LTD	29- 14	21	- 1/8	-0.5
STANDARD REGISTER	11- 38	38 1/2	- 1/8	-0.3
WALLACE BUS FORMS	11- 38	38	- 1/8	-0.3

SECURITY

Protect sensitive information with *Ven-Tel's 212 SECURITY PLUS.* Password restrict any terminal to calling only the destinations and applications you authorize. Telephone numbers, passwords, account numbers, and log-in codes are concealed to prevent unauthorized disclosure or use.

Ven-Tel security is not limited to password protection. You are secure in the confidence that your Ven-Tel modem is the most reliable and dependable in the world.

Security is the assurance that Ven-Tel has committed the investment in research, development and production facilities necessary to continued industry leadership and provide off-the-shelf delivery.

Security is knowing that the modem you buy from Ven-Tel is the most modern, technologically advanced product available on the market today. It is knowing that when you need help, a Ven-Tel technical support specialist is as close as a telephone call. It is the confidence that Ven-Tel will be there with service and support for your equipment as long as you own it.

For information call: (800) 538-5121

CUSTOM & OEM CONFIGURATIONS AVAILABLE

Ven-Tel (408) 727-5721

VEN-TEL IS AN OEM SUPPLIER OF INTEGRAL MODEMS TO FALCO DATA PRODUCTS TERMINALS

VOL 18
ISSUE 8A
FE 22 1984
UMI

CU
MI48106UIVYMUIVYM FCSB C
UNIVERSITY MICROFILMS
SERIAL PUBLICATIONS
300 N ZEEB RD
ANN ARBOR MI 48106

COMPUTERWORLD *Communications*

THE COMPLETE NETWORKING COMPANY.

1-800-821-7700 EXT 874

Mom files best.

Introducing PC/COM.™ Truly, the fastest, easiest way to manage information today.

When MOM™ says she has a software system that can manage information faster than anything else on the market, believe it.

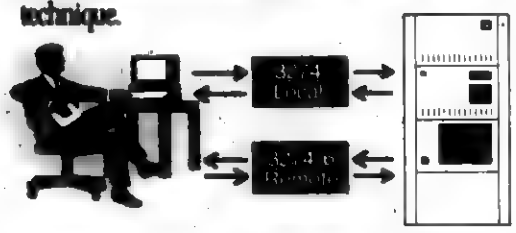
It's called PC/COM. A revolutionary automatic file transfer and management system that opens up a whole new realm of opportunities to PCs and PC-users.

Your mainframe works faster with PC/COM. Your PC gets more file management features.

If you are a mainframe user of TSO, CMS, or CICS, PC/COM will prove invaluable.

MOM says any job worth doing is worth doing fast.

MOM's PC/COM manages information at an incredible speed. And PC/COM will handle just about any file type with its unique binary transfer technique.

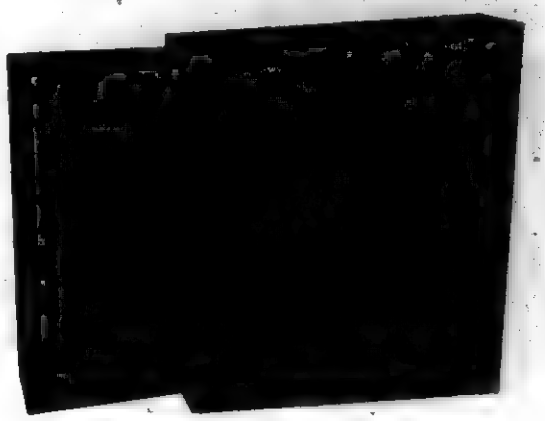


You can even back-up your hard disk on the mainframe. Leave it parked there until you need it. All it takes is the press of a key to get it moving again.

PC/COM is bi-directional, to save time getting information out of the mainframe onto your desk. And vice versa.

Security conscious, private and flexible — that's MOM.

The PC/COM has file access control and security built right in. So only those parts of the mainframe that should be accessed, are.



PC/COM is user-friendly and menu-driven so it's easy to understand. And simple to operate. All the features (and believe you, MOM, there are plenty) are initiated by a single function key.

Call MOM. 1-800-241-1170.

Talk to MOM. Tell her what you have and what you need. Ask her any questions about PC/COM and get good, clear answers.

MOM wants you to understand what you're getting into with PC/COM — and how much you can get out of owning the best, and fastest, file transfer and management system on the market.

The revolutionary PC/COM. Of course, from MOM. Phone 1-800-241-1170 or 404-351-2902.

MOM™

Specialists in Marketing of Micros to Mainframes.
Two Northside 75, Atlanta, Georgia 30318
A division of NPM, Inc.

MOM and PC/COM are trademarks of National Product Marketing, Inc. ©1988 The MOM Corporation

The Great American Telecommunications Puzzle...

Today, there's a telecommunications puzzle facing datacomm users: how to obtain end-to-end network integrity from one source. Divestiture has eliminated AT&T as a single source, but GDC now solves this puzzle with a full range of datacomm products and NETCON-6 network management systems to tie your network together.

GDC has the products to derive the network with a full range of multiplexers and concentrators — FDM, TDM, STDM; to access the network with data sets — analog, digital and local area; and to manage the total network with NETCON-6.

Total system capability — that's what GDC gives you — from network planning, consulting, system engineering and installation to coast-to-coast service.

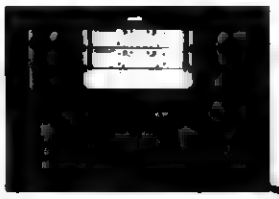
GDC takes the work out of networking.

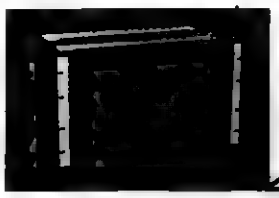
General DataComm Can Tie All the Pieces Back Together For You

MEGAMUX
Super powerful data/voice multiplexer transmits voice and data to 2 Megabits with non-interfering automatic system reconfiguration.

NETCON 6 NMS
The most sophisticated, automated network management system available. NETCON-6 adapts to all networks: analog, digital and local area. It wraps around any datacomm hardware, offering centralized supervision, diagnostics, control, restoral and reporting — insuring true network integrity.

MULTIPLEXERS
Widest range of Frequency Division, Time Division, Statistical and Polling Multiplexers for the simplest to most complex networks.





DATACOMM MODEMS
For analog, digital, local area networks all in common shelf enclosures—DataCommonality.

GEN•NET™
Statistical Network Concentrator, expandable, up to 96 channels, 4 composites to 168 Kbps.

GDC, The Networking Company

General DataComm

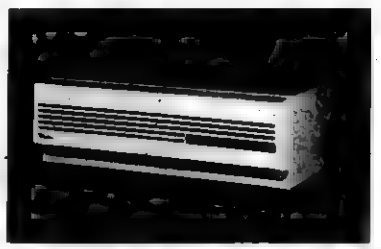
General DataComm Industries, Inc., One Kennedy Avenue, Danbury, CT 06810 (203)797-0711
General DataComm Industries Ltd., Suite 410 West, 2255 Sheppard Avenue East, Willowdale, Ontario M2J4Y3 (416)498-5100
General DataComm (UK) Ltd., Toutley Road, Wokingham, Berkshire, RG11 5QN, England (0734)791 444

U.S. Sales Offices: Atlanta, GA (404)955-0682; Boston, MA (617)229-2740; Chicago, IL (312)298-4181; Dallas, TX (214)980-0803; Detroit, MI (313)540-4110; New York, NY (212)423-5080; San Francisco, CA (415)569-3115; Santa Ana, CA (714)957-0244; Washington, D.C. (301)596-0888.
U.S. Telecomm Sales: Atlanta, GA (404)993-2596; Chicago, IL (312)653-9262; Santa Ana, CA (714)957-0244; St. Louis, MO (314)441-9055; Mt. Laurel, NJ (609)235-5367; New York, NY (914)969-5162; Middletown, NY (914)343-2882; Washington, D.C. (301)428-3311; Dallas, TX (214)241-5383; Seattle, WA (206)355-4800; Puerto Rico (809)792-6855.

What's a 7-letter word for a data switching system that lets you expand your network as far and as fast as you like?

Xplexer. It's Tellabs' modular, expandable, high-performance data switch that's versatile enough to answer your present network needs and flexible enough to face a future filled with change. You can add terminals at any time because the Xplexer's terminal interface capacity is virtually unlimited. Should the need to interface only a few remote terminals arise, the Xplexer's integral line-driver option is your answer. Or, for very affordable communication with larger groups of remote terminals over a single link, pair up your Xplexer with Tellabs Dataplexers, our high-speed statistical multiplexers. If you decide to interconnect several local networks, the Xplexer can handle that, too. It can join as many as 256 switching nodes. And it supports multiple composite links at speeds up to 76,800bps.

Menu-driven configuration and statistics control, switched or permanent virtual circuits, channel-speed conversion, alternate routing, nonvolatile memory: the Xplexer



has all the answers. It's the perfect solution to your port selection, extended network, and distributed network puzzles.

tellabs

4951 Indiana Ave., Lisle, IL 60532 (312) 969-8800

CW COMMUNICATIONS/INC.
Box 880, 375 Cochituate Road
Framingham, Mass. 01701

Board Chairman/ Publisher	Patrick J. McGovern
President	W. Walter Boyd
Senior Vice-President	Lee Vidmer
Group VP Communications Services	Jack Edmonston
Group VP Circulation	Margaret Phelan
VP Sales	Donald E. Pagan
VP Finance	William P. Murphy
VP Editorial	John Whitmarsh
General Manager	Kevin McPherson
Editor	Marcia Blumenthal
Production Editor	Rick LePage
Copy Editor	Kimberly Valloch
Art Director	Tom Monahan
Designer	Kristie VanValkinburgh
Production Director	Peter Holm
Production Manager	Marlene Stibal
Typesetting Manager	Carol Polack
Paste-Up Manager	Patricia Gendette
Print Buyer	Jude Goldman
Display Advertising Supervisor	Anne Hadley
System Manager	Tom Pfau
System Applications	Katrina Lee

INTERNATIONAL DATA CORPORATION
5 Speen Street
Framingham, Mass. 01701

Vice-President/Database	Jerry Todd
Director of MIS	Walter Pitts
Product Manager	Mike Hovagimian
Product Support Reps	John DeSouza Ann Bevilacqua Russell T. Onofrio
Telephone Staff Manager	Dot Lanciloti
Programmers	Daniel Famosi Bob Chiller

Second-class postage paid at Framingham, Mass., and additional mailing offices. *Computerworld* (ISSN-0010-4841) is published weekly, except: January (6 issues), February (6 issues), March (5 issues), April (7 issues), May (5 issues), June (6 issues), July (6 issues), August (5 issues), September (6 issues), October (6 issues), November (6 issues), and a single combined issue for the last week in December and the first week in January by CW Communications/ Inc., Box 880, 375 Cochituate Road, Framingham, Mass. 01701.

Copyright 1984 by CW Communications/Inc. All rights reserved. Reproduction of material appearing in *Computerworld Buyer's Guide* is forbidden without written permission. Send all requests to Nancy Shannon.

Computerworld subscription prices: $2.00 a copy; U.S. — $44 a year; Canada, Central & So. America — $110 a year; Europe — $165 a year; all other countries — $245 a year (air-mail service). Four weeks notice is required for change of address. Please allow six weeks for new subscription service to begin.

Computerworld can be purchased on 35mm microfilm through University Microfilm Inc., Periodical Entry Dept., 300 Zebb Rd., Ann Arbor, Mich. 48106. Phone: (313) 761-4700. *Computerworld* is indexed: write to Circulation Dept. for subscription information.

PHOTOCOPY RIGHTS: permission to photocopy for internal or personal use or the internal or personal use of specific clients is granted by CW Communications for libraries and other users registered with the Copyright Clearance Center (CCC), provided that the base fee of $3.00 per copy of the article, plus $.50 per page is paid directly to Copyright Clearance Center, 21 Congress Street, Salem, MA 01970.

Permission to photocopy does not extend to contributed articles followed by this symbol. ‡

POSTMASTER: Send Form 3579 (Change of Address) to Computerworld Circulation Dept., Box 880, 375 Cochituate Road, Framingham, MA 01701.

COMPUTERWORLD BUYER'S GUIDE *Communications*

CONTENTS

About the Guide	**4**
Editor's Note	**6**
Magazine	**7**
Vendor Profiles	**V-1**

LISTINGS

Modems	**A-1**
Multiplexers	**A-62**
Converters/Emulators	**B-1**
Communications Processors	**B-22**
Switching Equipment	**B-42**
Local-Area Networks	**C-1**
Software	**C-14**
Facsimile Devices	**C-44**
Transmission Services Vendors	**C-49**
Advertiser's Index	**C-56**

DISCLAIMER . . . *CW Communication/Inc. publishes listings and advertising in this* Buyer's Guide *on the condition that its liability shall be limited as follows. In the event of errors or omissions in any listing herein, including without limitation the inclusion of outdated information with respect to an advertiser, the liability of CW Communications/Inc. shall be limited to the cost to the advertiser of the listing in which such error or omission occurs. In no event shall CW Communications/Inc. be liable for any loss of an advertiser's business, revenues or profits, or special or consequential damages of any kind. The foregoing provisions shall apply to the full extent permitted by law and regardless of whether the advertiser's claim is based on contract, tort, strict liability or otherwise, and shall constitute the advertiser's sole remedy against CW Communications/Inc. in the event of an error or omission.*

Computerworld Buyer's Guide is a member of the CW Communications/Inc. group, the world's largest publisher of computer-related information. The group publishes 44 computer publications in 18 major countries. Nine million people read one or more of the group's publications each month. Members of the group include: Argentina's *Computerworld/Argentina*; Australia's *Australasian Computerworld* and *Micro Computer Magazine*; Brazil's *DataNews* and *MicroMundo*; China's *China Computerworld*; Denmark's *Computerworld/Danmark* and *MikroData*; France's *Le Monde Informatique*; Germany's *Computerwoche*, *Microcomputerwelt* and *PC Welt*; Italy's *Computerworld Italia*; Japan's *Computerworld Japan* and *PC Japan*; Mexico's *Computerworld/Mexico*; Norway's *Computerworld Norge* and *MikroData*; Saudi Arabia's *Saudi Computerworld*; Spain's *Computerworld/Espana* and *MicroSistemas*; Sweden's *ComputerSweden*, *MikroDatorn* and *Min Hemdator*; the UK's *Computer Management* and *Computer Business Europe*; the U.S.' *Computerworld*, *Desktop Computing*, *Hot CoCo*, *InCider*, *InfoWorld*, *Micro Marketworld*, *Microcomputing*, *PC World Blue* and *80-Micro*.

About the Guide

The *Computerworld Buyer's Guide to Communications* is a reference manual containing concise descriptions of communications hardware, software and transmission services and short profiles of the vendors offering those products.

The guide contains three major product sections, each preceded by a fold-out tab divider identifying the products listed within that section. The three tab dividers are: Modems and Multiplexers (Section A); Converters/Emulators, Communications Processors and Switching Equipment (Section B); and Local-Area Networks, Communications Software, Facsimile Devices and Transmission Services Vendors (Section C).

In cases where several different types of products are contained within one tab section, a gray-colored page with a product classification identifier is inserted in front of the listings for that particular product grouping.

Preceding the product listings is a vendor profile unit (Section V).

The front of the guide features a special magazine containing articles concerning the state of the industry, technology overviews of specific products and issues pertaining to communications.

Also featured in the guide are separate indices which provide a method for quickly locating the diverse products listed in the guide.

PRODUCT LISTINGS

The product listings contain pertinent technical specifications for the products listed in the guide. Technical data includes information on transmission characteristics, interfaces, protocols and compatability with other vendor's products, among others.

In general the listings are arranged in alphabetical order by vendor, with product descriptions following in alphabetical order by device name and/or model number. In some cases, all listings for one type of product — such as short-haul modems — are listed under the entry for a particular vendor, followed by listings for other classifications — long-haul modems — offered by the same vendor within the same general product classification .

All product listings include information on purchase terms, pricing, installation statistics and monthly maintenance fees when vendors supplied such data.

An example of a typical product listing is shown at right.

Note: Due to problems related to divestiture, AT&T Information Systems, Inc. was unable to provide us with information regarding their modem and multiplexer products. However, they are listed in the vendor section of the guide.

CONCORD DATA SYSTEMS, INC.
CDS 212
Modem Class: Long-Haul
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous/Synchronous - 1,200 bps
Interface: RS-232C
Bell-Compatible: 212
Transmission Medium: Voice-Grade Lines
Diagnostics: No
Features: Autoequalizer, Autoanswer, Diagnostics, Fallback, Switchable Data Rates
Distribution Method: End user, OEM, Third-party
Price: $700
Number Installed to Date: Under 100
Date First Installed: November 1981
(See Vendor Profile Page V-7)

About the Guide

COMPANY PROFILES The company profile section of the *Computerworld Buyer's Guide to Communications* contains each vendor's address and telephone number as well as a listing of key management, marketing and technical personnel within the firm. In addition, the profile includes the company's target markets and revenues, among other details.

An example of a typical entry is shown at right.

NOAKES DATA COMMUNICATIONS, INC.
3330 Stovall
Irving, TX 75061
(214) 988-1151
Major Market: Component, Computer and Communications Equipment Manufacturing; Dealer/Distributor
Target Applications: Data Communications; Network Control; Data Collection
Net Sales: $1 Million - $5 Million (1981)
Contacts:
Head of Marketing: Kenneth Brown
Geographic Coverage: National
Year Established: 1966
Number of Employees: 30

INDEXING SYSTEM Each product category (except transmission services) contains an index, which is located prior to the complete product listings for a particular product type. The introduction to each index provides a definition of the product category. It also explains the method used to sort the products for indexing as well as a description (when necessary) of the order the listings appear in the section.

The indices are designed to provide an overview of the products contained in that section and to make it easier to locate a specific product.

An example of an index is shown below.

Fiber-Optic Multiplexers

VENDOR	MODEL	PRICE	PAGE
Belden Corp.	BIT-DRIVER 222-006	$1,950	A-69
Canoga Data Systems	CMX-320	$2,500	A-70
	CMX-808	$1,200	A-70
	CMX-816	$2,750	A-70

THE ENTERPRISE FILE The Enterprise File is a data base containing information on thousands of companies that produce or provide computer-related products and services. It is the source of listing information in the *Computerworld Buyer's Guide to Communications.*

The project was started in April, 1982 and is a complement to the International Data Corp. (IDC) Data File, a well-known data base of end-user facilities.

Information is gathered and regularly updated by IDC through printed questionnaires and telephone surveys. To date the Enterprise File has records on more than 12,000 companies and 30,000 products.

Note: Vendors were offered the option of placing their company name in a larger typeface than the standard listing size. Vendors were also offered the option of adding a boxed insert at the end of their listing. These options were paid for by the vendor and should in no way be construed as an endorsement of these companies and products by the publisher of the *Computerworld Buyer's Guide to Communications.*

Editor's Note

If you find uncertainty exciting then you'll love today's communications environment.

By now, most information processing managers have experienced the joys of mainframe mips watching, debated distributed processing ad nauseam and defended themselves against the encroachment of micros and their accompanying handmaiden — office automation.

And just when they thought it was safe to come out of the computer room, the communications dilemma lumbered onto the scene. And unfortunately, the dilemma is here to stay for the foreseeable future.

In some ways, the communications environment can be compared to the office automation scene at the time when information processing managers were confronted by administrative managers who wanted a say in automating the office. Generally, the person who was in charge of buying the new electric typewriter — and later the stand-alone word processor — wanted a hand in orchestrating the proliferation of personal computers for professionals. By then, the information processing manager began realizing the personal computer was in fact end-user computing, a much-talked about but rarely implemented concept. But as data and the access to data, rather than clerical work, became issues, the information processing manager became more highly visible in the direction of the personal computer in the organization.

Likewise, the communications function was often left in the hands of the telecommunications manager, a person largely responsible for operating and purchasing the equipment for the voice communications side of the house. But when data transmission was at stake, the information processing manager had to take a more forceful role in determining what the burgeoning network would look like.

In these two instances, there have been organizational problems as information processing managers have had to assert themselves in the office automation and communications disciplines.

In addition to often becoming embroiled in organizational politics, information processing managers have had to begin selecting products for these disciplines, giving form to what once dwelled in the realm of nebulous concepts.

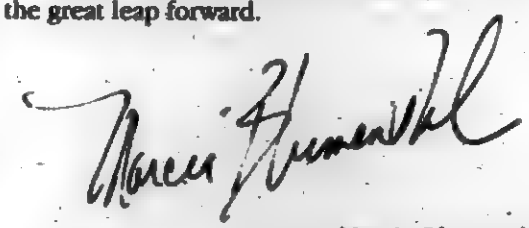
Making decisions on what the communications structure of the organization will look like is difficult because it requires tying together the myriad of automated equipment already in place. The investment is expensive — it is not just a matter of which personal computer to select. With technology changing like New England's weather and many products not yet on the market, the risk of making an inappropriate choice is high.

Moreover, standards — not highly relevant to other forms of information processing — are critical to the communications arena. Yet few standards have been promulgated. Also, there has been little product and market direction yet, as illustrated by the fact that the two industry leaders, AT&T and IBM, have barely dipped their toes in the communications ocean.

Despite this environment, information processing managers are being pressured to come up with a workable networking scheme. In selecting products and systems to create the networks, information processing managers are often approaching the task as they did when other products were in their early life cycle — paying a lot of attention to technology rather than applications.

On the conference circuit, participants eager to find out more about local-area networks are bombarded by information about topologies and access methods. These are certainly important considerations, but they are essentially technological issues and do not take the place of advice on how to proceed with such a network.

From reports circulating around the user community, it appears that some of those who are implementing advanced communications networks are taking what's available and piecing it together into a workable solution — perhaps not ideal, but workable. While this approach may not be ideal, it may be time for more managers to take the great leap forward.



Marcia Blumenthal

Magazine

FEBRUARY

Magazine

CONTENTS

12
The State Of the Net
By Nick Lombardo
The local-area network market is still in its early adolescence and the battle for technological supremacy rages on.

18
A LAN Grows in Manhattan
By Jim Bartimo
Chase Manhattan Bank is moving ahead with its local-area network. In selecting which net to install, Chase did not suffer from "analysis paralysis," opting to be a test site for Wang Laboratories, Inc.'s Wangnet.

23
Plan Your Network
By Sherry Geddes
Users are overly concerned about the technology of local-area networks. Concentrating on the applications the networks will serve is a better way of viewing the network dilemma.

28
On the Road With Bypass
By Walter Ulrich
Technologies that allow users alternatives to telephone line transmission are on the horizon. None are truly proven yet, but the future is rosy.

32
Interview With Leonard Kleinrock
By Marcia Blumenthal
The communications environment is a jungle, with a lot of new animals roaming around. Kleinrock, a leading communications expert, sheds some light upon what to expect for the next few years.

35
Encryption: Securing the Fortress
By Laura Brown Schlafly
Users resist data encryption because they often think these devices are too expensive or difficult to install. But is the loss of data an acceptable alternative?

40
Mixing It Up With Muxes
By James J. Michaels
Multiplexers are quickly becoming a type of front-end processor. Specialized features such as multiple data links and switching are helping expand the range of these devices.

45
Controlling The Network
By Rudolf Strobl
Do you know the value of the network function in your hardware and software installation? In the not-too-distant future the network management component may approach 30% of the cost of your total system.

vices connected by a continuous medium.

- Limited in geographic scope (within a distance not greater than 50 miles), with devices physically separated but not mobile.
- Able, at least potentially, to establish communications among any and all attached devices.
- High-speed, with data rates ranging from 500K to 50M bit/sec.
- Commercially available.

Only the simplest local-area networks are true turnkey products. Most require a great deal of on-site engineering to ensure the efficient location of stations, ease of reconfiguration and expansion, accessibility for testing and repair and compliance with building and fire codes. Some vendors provide "soup-to-nuts" configuration and installation services, while others require that the user purchase and contract for the installation of all but the intelligent components of the network.

When choosing a local-area network, the potential user faces four basic tehnical issues — the network's physical medium and transmission technique; its topology; its access method; and any higher level services it offers. Today's market offers three basic media, three topologies and three access methods. The issue of higher level services is more complex, since a vendor can offer such services above any practical combination of the other three factors. Right now, the availability of high-level services depends heavily on specific applications.

The three transmission media currently practical for local-area networking are twisted copper wire (twisted-pair), coaxial cable and fiber optics. Twisted-pair is the least costly of the three and the easiest to install, but it places severe limitations on the maximum distance spanned by the network and on the maximum data rate the network can support. Coaxial cable is the most versatile medium; it comes in two types that support different transmission techniques.

Baseband coaxial cable supports single-channel digital transmission. Only one signal can travel over baseband cable at a time. Broadband coaxial cable supports multichannel, radio-frequency (RF), analog transmission. Up to 30 different signals, each at a different frequency, can travel over a broadband cable at the same time. Baseband cable is slightly more expensive than broadband cable, and baseband networks are limited in length to a few thousand feet while broadband networks can span a few tens of miles. However, baseband cable is easy to install and requires almost no maintenance, while a broadband network requires physical design, and frequent professional maintenance.

There has been much controversy over the choice between baseband and broadband transmission, but actually the two techniques serve quite different applications. Baseband cable is most useful in small- to medium-size automated offices and in existing buildings where full-scale rewiring would be a problem. Broadband cable is best for large installations, especially campuses and industrial plants, which generate heavy data traffic and require a high level of immunity from electrical noise. A broadband data network can share a single cable with a cable video network or even with another broadband data network.

Optical fiber is the newest and currently the most expensive medium for local-area networking, however, its cost is expected to drop dramatically. Its chief advantages are security from tapping and total immunity to electrical noise. The difficulty of tapping a fiber-optic cable creates a problem in a local-area network environment, because the user requires a medium that is relatively easy to tap into in order to add stations to the network.

A network's topology is the physical and logical arrangement of its stations in relation to one another. There are three topologies in current use for local-area networks: the bus, or tree, in which the stations are arranged in a straight and open-ended path along the main channel; the ring, in which the transmission path forms a closed circle through the stations with each station connecting directly to its two adjacent stations; and the star, in which each station connects directly to a central switching element over a point-to-point link.

Users who shop blindly will find local-area networking an inadequate, even restrictive, solution and will become tomorrow's dissatisfied customers.

The bus is the most popular topology in the United States. The most common bus architectures are the Ethernet, developed by Xerox Corp. and supported by a large number of vendors; the Arcnet, a tree network developed by Datapoint Corp., and used under license by a growing number of vendors; and the broadband tree, used in all broadband cable networks. Ring networks are popular in Europe, since much early ring development occurred at European universities. Star networks, currently out of fashion for high-speed local-area communications, are beginning to make a come back. The hierarchical star, with a number of star-shaped subnetworks connected in a larger star configuration to a central switch, is being discussed in a growing number of research reports, and might become the mainstay of the next generation of local-area networks.

A network's access method is the technique by which the network distributes the right to transmit among its participating stations. On most local-area networks, all signals are broadcast on the main channel; only one signal can occupy the channel at a time, and no two stations can transmit simultaneously. The access

Baseband Local-Area Networks

VENDOR AND MODEL	Datapoint Corp. ARC Local	Digital Equipment Corp. Decnet/Ethernet	Nestar Systems, Inc. Plan Systems
GENERAL CHARACTERISTICS			
Principal Applications supported	General DP; office automation	General DP; office automation	General DP; office automation; lab/classroom instruction
Voice and/or video applications supported	None	None	None
Specific end-user data processing equipment currently supported	Datapoint business computers	Any DEC Unibus, Q-bus or CNS-bus system	Apple II, III and IBM PC families; plug-compatibles
Topology	Bus/star	Tree	Unconstrained tree
Primary network medium	RG-62A/B4	Ethernet coax.	RG-62 coax.
Drop connection medium	RG-62A/B4	4-pair twisted wire	RG-62 coax.
NETWORK DIMENSIONS			
Max dist between farthest net. attach. units	4 miles	4.5 miles	4 miles
Max dist between adjacent net. attach. units	2000 ft.	4.5 miles	4 miles
Max no. of end-user devices addressable	255	1,024	255
TRANSMISSION SPECIFICATIONS			
Maximum throughput on main data channel	2.5M bps	10M bps	2.5M bps
Maximum end-user transmission rate	2.5M bps	10M bps	2.5M bps
Channel access method	Token passing	CSMA/CD	Token passing
HIGH-LEVEL SERVICES SUPPORTED			
Protocol conversion capabilities supported	None	Decnet/SNA; Decnet/X.25	Ascii/BSC; Ascii/SDLC
INSTALLATION/PRICING			
Number of network attach. currently installed	Over 51,000	N/A	Approx 6,000
Avg price per end-user device connected	$7,000	$3,900	$595

method is the network's way of controlling traffic.

In general, access control can be either central or distributed. Most bus, tree and ring local networks use distributed access methods in which each station participates in the control of the network. There are two classes of distributed access methods: random (or contention) and deterministic. In a random-access method, any station can transmit at any time. In a deterministic access method, each station must wait its turn to transmit. Random-access methods work best under sporadic, quick-burst traffic and in situations in which some stations transmit much more data than others. Deterministic access methods work best under a steady, heavy traffic load.

The most common random-access method is carrier-sense multiple access (CSMA), a technique in which each station can sense when the channel is busy, and can refrain from transmitting until the channel is clear. In "pure" CSMA, two stations can sense a clear channel simultaneously and transmit signals that will interfere with one another. This is called a "collision." In a refinement of CSMA, CSMA with collision detection (CSMA/CD), stations can detect such collisions and have a way to arbitrate the use of the channel after a collision has occurred.

The most common deterministic access method is token passing, a form of distributed polling in which the stations circulate a special bit pattern, the "token," which confers permission to transmit on the station that receives it. The stations are arranged in a logical order and each station polls the next station by passing the token to it. Collisions are impossible, but each station, once it has passed the token, must wait to transmit until the token has circulated among all other stations on the network. Token passing is used most frequently in ring topologies, but it also works well in some bus and tree configurations.

Most star networks use either a central polling technique or telephone-style circuit switching. Some of the experimental hierarchical stars use variations of CSMA and token passing, while others use new, traffic-sensitive, hybrid access methods.

Higher level services are only beginning to become available for local-area networks. The service offered most frequently is protocol conversion, especially from asynchronous devices into one of the IBM synchronous protocols, Binary Synchronous Control (BSC) or Synchronous Data Link Control (SDLC). Some networks offer data encryption and many offer network management features such as statistical traffic reporting and error logging. Local-area networks marketed especially for personal computers can often convert disk files among formats for the most popular machines.

Baseband Local-Area Networks

Network Systems Corp. Hyperchannel	Orchid Technology, Inc. PC Net	Ungermann-Bass, Inc. Net/One	Xerox Corp. Xerox 8000 Network
Computer-to-computer data channel extension	General-purpose	General-purpose	Office automation
None	None	None	None
Mainframes, minicomputers and peripheral devices from a number of vendors	IBM PC, XT; PC-compatible peripheral devices	Any RS-232C, IEEE 488, DEC DR11, or IBM PC-compatible devices; 8-, 16- or 32-bit parallel dev.	Xerox 8000-based office automation products
Bus 75 ohm coax. 15 ohm coax.	Linear bus RG-59B/U; RG-11/U; CATV RG-58A/U or RG-11/U coax.	Linear bus Ethernet coax.; fiber-optic Transceiver cable	Bus Ethernet coax. 4-pair twisted wire
1.9 miles 1.9 miles Unlimited	1.3 miles 1.3 miles 65,536	1.5 miles 1.5 miles 24,567	1.5 miles 1.5 miles 1,024
50M bps 40M bps CSMA/CD	1M bps 1M bps CSMA/CD	10M bps 1.3M bps CSMA/CD	10M bps 10M bps CSMA/CD
None	None	None	Xerox/IBM 3270; Xerox/Ascii
Over 2,000 $500-$40,000	N/A $995	Over 2,900 $500	Approx 20,000 Subject to bid pricing/ quantity

Chart Courtesy of Datapro Research Corp.

The number of technologies available, and the number of practical combinations of those technologies create both opportunity and confusion. The opportunity comes to the sophisticated purchaser who can pick carefully from the range of options to create a specific network for specific needs, and to the high-tech entrepreneur who can design and market an unorthodox but demonstrably better way to solve the problems of networking. The confusion comes from the lack of compatibility among different commercial networks, both with one another and with the end-user equipment that must communicate over the network.

The local-area network industry has seen two major efforts to establish standards: one by industry organizations attempting to legislate standards, and one by vendors attempting to establish standards in the marketplace. Committee 802 of the Institute of Electrical and Electronics Engineers (IEEE) has led the legislative effort, while Xerox and the other Ethernet vendors have spearheaded the most successful market effort. Datapoint and its licensed chip manufacturer, Standard Microsystems, Inc., have also succeeded somewhat in establishing a de facto standard. Should IBM announce its much-rumored local-area network, it would likely become another market standard.

Although the IEEE 802 committee has not established a single standard, it has published draft specifications for at least two, a CSMA/CD architecture similar to Ethernet and a token-passing bus. The committee intends to issue at least one more draft standard, for a token-passing ring network, and a number of vendors are petitioning the committee to standardize their architectures for specific applications. Apparently local-area networking is a technology too young for standards.

Right now, the local-area network market contains three major segments: baseband networks, broadband networks and networks especially for personal computers. Among the baseband vendors, the Ethernet community — vendors such as Xerox, Digital Equipment Corp., Ungermann-Bass, Inc. and Interlan, Inc. — still leads the pack. However, Datapoint's installed base of Arcnet token-passing networks is still growing. Other non-Ethernet baseband architectures are beginning to disappear. Zilog, Inc., for example, has dropped its Z-Net II product in favor of Ethernet compatibility.

The broadband market remains a three-way race among Interactive Systems/3M, Sytek, Inc. and Ungermann-Bass, each of which have approximately the same market share. Wang Laboratories, Inc.'s Wangnet is beginning to compete with the market leaders, but potential customers still see it as a network only for Wang systems. Other notable broadband vendors are

Broadband Local-Area Networks

VENDOR AND MODEL	Interactive Systems/3M Videodata LAN/1	Sytek, Inc. LocalNet	Ungermann-Bass Net/One	Wang Laboratories WangNet
GENERAL CHARACTERISTICS				
Principal applications supported	General DP; office automation	General-purpose	General-purpose	General DP; office automation
Voice and/or video applications supported	Analog voice; full-motion video	Voice; video	Can coexist	7 video channels
Specific end-user data processing equipment currently supported	Any async RS-232C device	Any RS-232C device	Any RS-232C, IEEE 488, DEC DR11, or IBM PC-compatible device; 8-, 16- and 32-bit parallel devices	All RS-232C and RS-449 devices; personal computers; mainframes; minicomputers; peripherals
Topology	Tree-like bus	Tree	Rooted tree	Dual-cable tree
Primary network medium	CATV cable	CATV cable	CATV cable	Dual CATV cable
BROADBAND CHARACTERISTICS				
Cable configuration	Single or dual	Single	Single or dual	Dual
Number of channel pairs available	450	120	5	360
NETWORK DIMENSIONS				
Max dist between farthest net. attach. units	14 miles	50 miles	20 miles	8 miles
Max dist between adjacent net. attach. units	7 miles	150 ft.	20 miles	8 miles
Max no. of end-user devices addressable	11,000	24,000	7,200 per channel	Over 20,000
TRANSMISSION SPECIFICATIONS				
Maximum throughput on main data channel	2.5M bps/channel	128K bps or 2M bps	5M bps	10M bps
Maximum end-user transmission rate	100K bps	19.2K bps	1.3M bps	9.5M bps
Channel access method	Token passing; dedicated channel	CSMA/CD	CSMA	CSMA/CD; poll select; dedicated channel
HIGH-LEVEL SERVICES SUPPORTED				
Protocol conversion capabilities supported	None	Ascii/BSC; Ascii/HDLC	None	Ascii/BSC/SDLC/ Wascii
INSTALLATION/PRICING				
Number of networks currently installed	350 (3LAN/1 token systems)	350	Over 20	30
Avg. price per end-user device connected	$350 (with 8 port NIU)	$475-$575	$980	Varies

Chart Courtesy of Dataquest Research Corp.

Contel Information Systems, Inc. and Concord Data Systems, Inc.

The market for personal computer-based local-area networks is the fastest growing segment of the industry. Corvus Systems, Inc.'s Omninet and Nestar Systems, Inc.'s Plan networks lead the field now, although the potential market is so broad that any of a dozen competitors could catch up quickly. In the submarket that specializes in networking for the IBM Personal Computer, Orchid Technologies, Inc.'s PC-Net is an early leader.

With all the current activity in both the technology and the marketplace, some constants remain. The user must decide among a large and often confusing array of products both within the local-area network market and among alternative technologies. Users who examine the market with open eyes and detailed and careful assessments of their needs will acquire a powerful tool for the integration of a wide range of automated functions. Users who shop blindly will find local-area networking an inadequate, even restrictive solution and will become tomorrow's dissatisfied customers.

Alongside the many applications for which local-area networks can provide beneficial, cost-saving solutions are some applications for which local-area networks are either too costly or too unsophisticated technically. In other words, for some applications that might lend themselves to local-area networking, other technologies can do the job better.

For simple port selection or port contention among one or more computers and a network of terminals, a local-area network is simple overkill. Users in such situations usually wish only to gain access to host-resident applications: the host computers handle requests for storage and peripheral services. The terminals are usually unintelligent, asynchronous devices that cannot share software either with the host or with one another and that need to communicate with only one computer at a time.

For port selection among a small number of computers of sim-

No Other Publication Gives You SO MUCH Timely News, Money-Making Ideas & Management Information—

***PLUS** Specials! Bonus Issues!*
All Included In The Basic Low Subscription Price

COMPUTERWORLD

As a weekly newspaper, ***COMPUTERWORLD*** gives you thorough and timely coverage of news and ideas of interest to computer users in industry, business, government and education. Unlike monthlies, ***COMPUTERWORLD*** covers *hundreds* of relevant news items *each week*. *But beyond the "news" you get much more as a CW reader:*

- Weekly "In Depth" articles.
- Monthly "Special Reports" on selected subjects.
- ***COMPUTERWORLD BUYER'S GUIDE SERIES*** . . . a comprehensive series of product-specific lists and up-to-date information on each major product area.
- ***COMPUTERWORLD OA*** with incisive coverage of office automation.
- ***COMPUTERWORLD ON COMMUNICATIONS*** covers product and system developments in the rapidly changing communications field.
- **PLUS** Other Special Issues Throughout The Year!

SUBSCRIBE NOW

Complete Form On Reverse, Then Return In Attached Postage-Paid Envelope. Or Use Your Charge Card and Call TOLL-FREE: 1-800-343-5730.

☐ **Please enter my subscription (details on back)**

☐ **I'm already a subscriber, but I'd like you to change my:**

☐ address ☐ title
☐ industry ☐ other

Put old label or label information here

My current mailing label is attached and I've filled in new information on the other side.

Please send me COMPUTERWORLD for one year. RATES: United States $44; Canada, Central & South America $110; Europe $165; All Other Countries $245 (Airmail Service)

☐ Check Enclosed
☐ Am Ex ☐ BA/Visa ☐ MC (MC Only - List four digits above your name)

If charge we must have cardholder's signature: _____ Expiration Date _____

First Initial		Middle Initial	Surname	
Your Title				
Company Name				
Address				
City		State	Zip Code	

Address shown is
☐ Business
☐ Home

☐ Check here if you do not wish to receive promotional mail from *Computerworld*

☐ Check here if you're interested in receiving information on *Computerworld*'s Index

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

CIRCULATION DEPT. 375 Cochituate Road, Rte. 30, Box 897, Framingham, MA 01701-9985

Detach here, insert in business reply envelope and seal securely before mailing.

1. **BUSINESS/INDUSTRY (Circle One)**
End Users
10 Manufacturer (other than computer)
20 Finance/Insurance/Real Estate
30 Medicine/Law/Education
40 Wholesale/Retail Trade
50 Business Service (except DP)
60 Government – State/Federal/Local
65 Public Utility/Communication Systems/Transportation
70 Mining/Construction/Petroleum/Refining
75 Other User
Vendors
80 Manufacturer of Computers, Computer-related Systems or Peripherals
85 Computer Service Bureau/Software/Planning/Consulting
90 Computer/Peripheral Dealer/Distributor/Retailer
95 Other Vendor

2. **OCCUPATION/FUNCTION (Circle One)**
11 President/Owner/Partner/General Manager
12 VP/Assistant VP
13 Treasurer/Controller/Financial Officer
21 Director/Manager/Supervisor DP/MIS Services
22 Director/Manager of Operations/Planning/Administrative Services
23 Systems Manager/Systems Analyst
31 Manager/Supervisor Programming
32 Programmer/Methods Analyst
35 OA/WP Director/Manager/Supervisor
36 Data Comm Network/Systems Mgmt
41 Engr/Scientific/R&D/Tech Mgmt
51 Mfg Sales Reps/Sales/Marketing Mgmt
60 Consulting Mgmt
70 Medical/Legal/Accounting Mgmt
80 Educator/Journalist/Librarian/Student
90 Other

3. **COMPUTER INVOLVEMENT (Circle all that apply)**
Types of equipment with which you are personally involved either as user, vendor or consultant
A. Mainframes/Superminis
B. Minicomputers/Small Business Computers
C. Microcomputers/Desktops
D. Communications Systems
E. Office Automation Systems

Detach here, moisten and seal envelope securely before mailing.

BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 709 FRAMINGHAM, MA 01701

postage will be paid by

CIRCULATION DEPARTMENT

COMPUTERWORLD

375 Cochituate Road, Rte. 30
Box 897
Framingham, MA 01701-9985

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

ilar make and with similar operating systems, one or more shared front-end processors can do the job more efficiently than a local-area network. For port selection among mutually incompatible computers, a port selection switch (also called a data PBX) is the best choice. Both front-end processors and data switches have been on the scene for years; they offer all the benefits of proven technologies: stable interfaces, time-tested maintenance and control procedures and a history of satisfied customers. Users should not take risks with an infant technology for simple applications when a less risky alternative is available.

At the other end of the spectrum lies the large-scale, fully integrated voice and data network. The local-area network has not been built that can handle a full load of voice telephone traffic along with a full load of data. Local-area networks are a creation of the data processing industry, and their technology has bypassed, not solved, the problems of voice communications that the telephone industry has been handling for decades.

From the telephone industry comes the voice/data PBX, a circuit switch built on a digital matrix and designed to handle both voice and data traffic. For data handling, these switches represent an even younger technology than local-area networking, and their data transmission capabilities are currently quite narrow. They use twisted-pair wiring, usually the same wiring as the building's telephone system, and are limited to a 56K or 64K bit/sec data rate. They are useful only in large installations, with a minimum of a few hundred lines. Their switching algorithms are designed for voice traffic (for a large number of short calls), rather than for the long sessions common with data traffic.

Still, they offer a number of advantages for large offices in which management would like to place a terminal on every desk. Any large office must have a telephone network, and the cost savings from having data applications share the voice network rather than using a separate cable plant can more than make up for the high initial cost of a voice/data PBX. The big switches' present limitations for data handling are not a long-term issue; their makers will probably have ironed the bugs out of data switching long before current local-area network vendors have taught their products to switch voice calls.

Current leaders in the voice/data PBX market are Rolm Corp., now partly owned by IBM; Northern Telecom, Inc., long a supplier to the Canadian telephone system; AT&T Information Systems, Inc., the former American Bell, Inc.; InteCom, Inc., whose IBX systems include an Ethernet interface; and Nippon Electric Corp. New vendors expected to do well are Ztel and CXC, both of whose switches incorporate local-area network technology.□

Lombardo is an associate editor of Datapro Reports On Data Communications *at Datapro Research Corp. in Delran, New Jersey.*

lation of a broadband local-area network.

The network ties together four buildings in midtown New York and a fifth building approximately one mile away. Eventually, the local network will encompass one of the bank's Long Island offices some 15 miles away, probably through microwave transmission. The local-area network itself will connect 60 to 90 floors in nine buildings in the next few years.

With further expansion, the local network will tie into the bank's private packet-switched network for national and international access to the bank's 90-plus data centers. According to Harvey S. Hershkowitz, a vice-president in the operations department, who helped usher the network into existence, "People wanted one terminal that could access any host."

Deciding on what type of network to use is perhaps the biggest deterrent to most companies suffering from "analysis paralysis," but Chase was given a virtually risk-free opportunity to decide on the type of network it would use.

"We were Wang's [Laboratories, Inc.] second largest commercial customer," Hershkowitz explained. So, in late 1981, Chase agreed to become a beta test site for the newly developed Wangnet local-area network. "If it didn't work, we wouldn't buy the equipment," he said.

What is somewhat surprising about Chase's early entrance into local-area networking is the bank's size. It is the third largest commercial bank in the U.S. controlling more than $80 billion in assets. With more than 300 branches, it employs 36,000 people and extends its financial services to 100 locations worldwide. Despite what could have been a bureaucratic maze of committees in smaller organizations, Chase moved decisively into networking.

In fact, Chase was so certain that it needed some type of local network that it began laying broadband cables before Wangnet was selected. The bank knew that no matter what type of network it chose, the cable under the New York streets could be used. "We thought we should get as much bandwidth as possible for expansion, so we went with broadband cable," Hershkowitz said.

Wangnet (renamed Chase Cablenet internally) is a broadband local-area network using carrier-sense multiple access with collision detect (CSMA/CD). Its wide bandwidth ensured Chase easy expansion into voice, image and video, Hershkowitz said, and transmits data at 10M bit/sec.

How did Chase know it was time for a local-area network? To start with, there was a growth rate of 500 terminals per year just for Wang equipment and a total of more than 5,000 terminals already installed throughout the company. There already were multiple overlapping networks in place and Chase was spending approximately two million dollars each year just to install and move terminals within its buildings.

While no feasibility study was performed for Wangnet specifically, studies on networking already had been done which concluded that a single network was needed to replace the existing "spaghetti" network and support high-capacity transmission for a variety of traffic types. Because reducing the amount of cable in use was also a goal, the bank spent a considerable amount of time (as much as 60% to 70% of the total job) preparing space for cable runs.

Because Chase was a beta test site, "there were fewer meetings and fewer people involved than there normally would be in this case," explained Hershkowitz. "It would have taken longer if we had sent out a request for bids. It could have taken six months to a year." While being a test site had its advantages, there were unforeseeable problems with Wang in delivering the equipment throughout much of 1982. "The equipment came in very slowly," Hershkowitz said. "It took Wang longer than it should have."

With a plethora of terminals, networks and cables involved, "this had to be approved by senior management," according to another vice-president in operations and corporate systems, Ronald E. West. "We're due to report back to senior management in six months. Before we can expand to other buildings, we have to show that we're serving the bank's business needs and not our own interests in technology."

After senior management approval for a local network was secured, cable laid and a network selected, Chase began the job of implementation on a limited basis. "People were doing file transfer, inquiry and other applications," Hershkowitz said.

By the time the local network became operational last year, technocrats such as Hershkowitz and West had primed users with what they called "a marketing job."

"We asked people to volunteer to participate in the beta test. We looked for technical people who could handle it. Programmers were used at first and it spread to the end users," according to Hershkowitz. By the end of June, Chase had installed a dual broadband facility into its first four buildings, connecting riser cables to the trunking system in three of the buildings.

Chase Cablenet offers four service categories: private and dial-up line-equivalent services, Wangband, a peripheral band and a utility band.

- The private and dial-up equivalent offers up to 9,600 bit/sec transmission over point-to-point or multipoint, half-duplex or full-duplex, asynchronous or synchronous media through an RS-232, V.24 interface. With an RS-449 or V.25 interface, up to 64K bit/sec transmission speeds are achieved.
- Wangband offers a 10M bit/sec contention service for nine Wang VS, OIS and Alliance minicomputers. Two IBM 4300's and a handful of Wang and IBM personal computers also reside on Wangband.

● The peripheral band offers a multiplexing scheme which allows some 33 Wang products to be coupled to a host instead of hardwired.

● The utility band offers up to seven video channels for teleconferencing or text and news dissemination, but teleconferencing is still in the testing phases with two rooms in use.

While the local area network is up and running, Hershkowitz warns that a network is not the answer to all communications problems. "The . . . [local-area network] does one thing for you," he said, "it allows IBM, DEC [Digital Equipment Corp.] and other equipment to connect but you still have to program the machines to talk to each other. Otherwise, it's like calling France on your telephone — you have a connection but you still can't speak the language."

The networking cost so far is estimated at a reasonable $500,000 by West, who expects several million dollars will be spent for future development. "We have a five-year goal of recovering all money," West said. It will include a charge-back system to all users.

Maintenance costs will also be cut as Chase lessens its reliability on Wang for service by using in-house personnel.

With one of the first local-area networks in place, does Chase feel any buyer's remorse? After all, some industry pundits are touting the next generation of nonblocking private branch exchanges (PBX) as the preferred means of data networking and integrating voice and data.

"We have no regrets because we have a system that's up and running, and that's more than most people can say," Hershkowitz said. "We're looking at a new PBX, but it will coexist with Wangnet. Wangnet traffic is 10 megabits [per second] — no PBX can equal that speed."

West agreed. "We have a hybrid approach — we're not discounting PBX's," he explained. "We have vendors coming in with PBXs now." Chase scruntinizes a vendor's technology, its ability to support Chase Cablenet and voice and data integration. "When a vendor tries to sell only its own hardware, we tell then we want a system solution to our business problems," West said.

Chase is now using a AT&T's Centrex and with the January 1 divestiture of the phone company, "we'll be looking very closely at PBXs with the introduction of the new access charge," Hershkowitz said. Divestiture and voice/data integration have tossed monkey wrenches into many voice departments that were often running smoother than the data processing departments. "The voice people are a little worried about losing their customers to the data people," Hershkowitz said.

As West said, "We're forced to talk to the voice people now. There's always wars between voice and data."

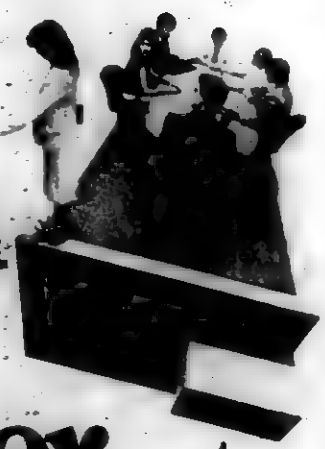
But despite the wars, West anticipates electronic and voice mail capabilities on a PBX by 1985 or 1987. "We will certainly have downtown wired up," he said. "We want to come off the PBX and broadband cable and gateway to packet switching." It will be through advanced gateways that Chase will most likely provide its national and international networks to its 90 plus data centers.

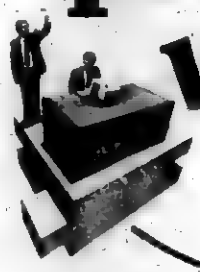
For medium-range voice and data communications, Hershkowitz expressed an interest in microwave links, but West said, "we're looking at other types of bypass technologies also."

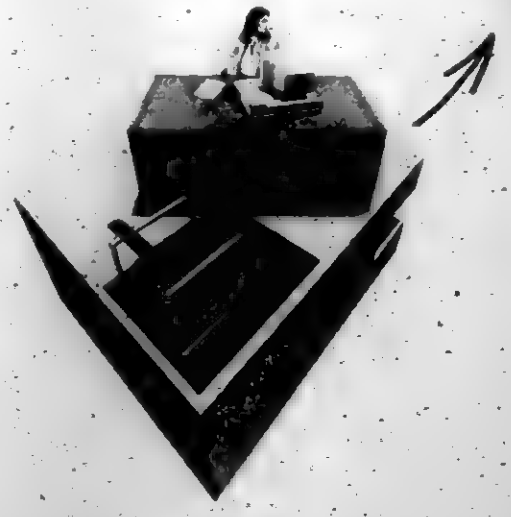
So what actually began as a strategic telecommunications plan for Chase in 1979 has developed into a fully functional local-area network and the start of an integrated voice/data network that most users and vendors only talk about. "We've decided the local-area network works," Hershkowitz said. "We're into the expansion phase now."□

Jim Bartimo is senior writer for Infoworld, *a newsweekly based in Menlo Park, Calif.*

We bring everything in your office closer together. That's what puts Wang way ahead.







Let's face it. Making things work together is where most computer companies fall apart.

They talk about compatibility, while they deliver a family of products that relate to each other in name alone.

Quite simply, that's what separates Wang from everyone else. Because unlike everyone else, Wang has a family of products that is truly compatible. From personal computers. To word processors. To office information systems. To large computers.

And it stands to reason that when everything in your office works better together, everyone in your office does too.

As more people manage information and communicate it in more ways than ever before – in words, images, numbers and voice – it just makes sense to choose Wang.

Because Wang offers you total solutions that bring everything, and everyone, in your office closer together.

That's what puts Wang way ahead.

For a presentation on Wang office automation computers, call 1-800-225-9264. Or write to Wang Laboratories, Inc., Business Executive Center, One Industrial Avenue, Lowell, MA 01851.

WANG

The Office Automation Computer People.

CB4

© 1983 Wang Laboratories, Inc.

Large systems hardware is not an impulse buy.

Now there's a guide coming to you that will help with your homework.

The Computerworld Buyer's Guide to Large System Hardware is designed to give you a valuable, one-stop information source for large systems hardware and peripherals. Take a look at all the tools it will give you to help you make the right large systems choice:

- Large systems product listings, including mainframes, superminis, minis and small business systems and the terminals and peripherals designed to work with them. You'll get listings of printers, memory products, teleprinters, controllers, magnetic media and supplies, plotters, digitizers and much, much more.
- Vendor profiles that include company name, address, contact information, and primary markets served.
- An industry-specific editorial section that's designed to keep you right up to speed on the trends in large systems hardware. We'll give you news of the latest developments in mainframes, superminis and minis and their changing roles. You'll get information on the latest management techniques used in running data centers; planning for cost effectiveness and the new technologies in fifth generation computing.
- In addition to its comprehensive listings and editorial, the *Computerworld Buyer's Guide* will give you pages of detailed ads for large systems hardware products and peripherals that you can refer to all year long.

Each issue of the *Buyer's Guide* is updated before publication, and contains hundreds of listings that are accurate, complete and easy to use. This *Buyer's Guide to Large System Hardware* is distributed to *Computerworld's* 114,000 subscribers in the U.S. — it's one more of the additional benefits you get as part of your *Computerworld* subscription. Look for it this April 18th.

And if you market your products to buyers of large systems hardware and peripherals, this *Buyer's Guide* will reach them with your product message just when they're researching products and vendors. Reserve space in this *Buyer's Guide* by March 2nd by calling one of the sales offices listed below, or call Ed Marecki, National Sales Director or Kevin McPherson, Product Manager, at (617) 879-0700.

To: Ed Marecki, *National Sales Director*
CW Communications/Inc.
Box 880
Framingham, MA 01701

☐ *Please send me advertising information for Computerworld Buyer's Guides.*
☐ *Please have a sales representative call me.*

Name _____
Title _____
Company _____
Address _____
City _____ *State* _____ *Zip* _____
Telephone _____ 3/2

COMPUTERWORLD
BUYER'S GUIDE

Sales Offices
BOSTON/Chris Lee, Bill Cadigan, Alice Longley *(617) 879-0700*
CHICAGO/Chris Lee, Bill Cadigan, Jean Broderick *(312) 827-4433*
NEW YORK/Mike Masters, Tom Flynn, Gale M. Paterno *(201) 967-1390*
ATLANTA/Mike Masters, Tom Flynn *(404) 394-0758*
SAN FRANCISCO/Bill Healey, Ruth Gordon *(415) 421-7330*
LOS ANGELES/Bill Healey, Beverly Raus *(714) 261-1230*

looking for a means of controlling access to data bases and ways to perform file management.

Viewing a local-area network as a tool for connecting diverse communciations equipment, rather than as a separate product, helps to put technological issues into perspective. Taking a top-down, applications-oriented approach can resolve the technological choices required in selecting the appropriate local network. From this stance, the technical choices are driven by the usage objectives. If, for example, the bulk of the usage is high-speed file transfers between two different hosts, then a point-to-point baseband system would be a good choice. Conversely, if the objective is to share expensive resources throughout a widely dispersed geographical area, point-to-point technology plainly will not work because the installation becomes a wiring zoo.

Users should also consider the usage needed when selecting the medium. If video is not necessary, then broadband technology is not necessary, or if geographic scope is necessary, then a baseband system will not be appropriate.

Because of the relative newness of local-area networks, the technological mire is really an issue of more concern to the vendor than it is to the user. Like other products on the market, users must begin to approach vendors of local-area networks with solutions in mind. Most local-area network vendors have different approaches to a network and by taking the solution approach, the user narrows the choices considerably. It is necessary for the vendor to describe what the local-area network will do for the organization.

Organizational considerations play a key role in determining user objectives. The study revealed distinct differences in personality, age, experience and systems-orientation among proponents of different technologies. These differences significantly impacted the network selection process.

Younger managers tend to be systems-oriented. They take a broad view in approaching the local network; therefore broadband-based systems appear to be more popular with these managers. On the other hand, older managers in industrial environments are not comfortable with a systems orientation and tend to select baseband systems. The selection process then seems to be significantly conditioned by managers' attitudes.

For example, several sites with a strong systems orientation did not even consider alternative technologies (thought to be less than state-of-the-art), although there was no immediate requirement for the more sophisticated approach.

Connection philosophies also were found to reflect organizational issues. Three distinct connection approaches were isolated:

- A classic integrated approach to local networks is one in which all devices are interfaced directly to a totally wired building. This would be preferred by users in Fortune 500 companies, high-technology companies, government or education-related endeavors.
- A limited hierarchical approach is one in which the building wiring is used only for connections between a central host and intermediate devices controlling groups of terminals and related equipment. An example is a factory-type setting.
- A piecemeal approach, similar to the classic PBX, consists of a trunk or utility system linking major buildings or concentrations of DP activity with equipment connected primarily through twisted-pair wire. Transaction-oriented systems are found in banking and insurance firms which have not yet integrated the technology into the total organization.

An organization that wants to incorporate a local-area network must further assess the usage the network will receive. In one case, a bank performed a traffic analysis for its proposed network. Once installed the bank experienced considerable degradation in its broadband network because there were 3,000 personal computers in the organization that had not been figured in the usage scheme. This was because the bank allowed micros to be purchased as office rather than computer equipment.

This problem is endemic in the industry. As soon as a local-area network is installed, equipment to hook into it comes out of the woodwork. Any user who does not figure on there being 30% more equipment than originally planned for is making a big mistake.

The decision to consider implementing a local-area network in an organization was often triggered by changes in the organization. Some of these changes included additions (such as an energy-management system or the installation of a new computer), construction of or a move into a new facility or anticipated expansions in programmable controllers or terminals. The initial consideration of the local-area network was emotional and not a product of careful planning and analysis. While the final decision to incorporate the local network is based on economics, the evaluation process tends to be emotional and confusing.

The archetypal decision-maker in this process was a manager confronted with the problems of supporting a large, growing installed base of devices, a number of host computers and frequent movement of devices with a need to avoid using masses of twisted-pair wire. And, if the manager who decides whether the organization will have a local-area network and what it will look like also initiates contact with the vendor, he is not generally a management information systems (MIS) manager. MIS is only starting to become involved with the issue of proliferating computer power. MIS generally figures heavily in the implementation process, but is often not the initiator.

Users found that local-area networks were a good means of alleviating the physical problems brought on by moves or additions to the installation. Recognizing the importance of planning for future

TELEVIDEO'S 970: GET IN ON THE ANSI BOOM.

The TeleVideo 970 Terminal. The computer professionals' most powerful way to utilize the advantages of ANSI X3.64 code structure.

The 970's 16 non-volatile function keys (shiftable to 32) literally automate ANSI code command entry. Other features include VT-100 compatibility, block mode operation, 32 non-embedded visual attributes and a reconfigurable keyboard. An RS232 printer port with built-in buffer is standard.

For operator comfort, the 970 keyboard offers a naturally contoured palm rest and sculpted keys, and non-glare 14-inch tiltable screen. You can utilize either the 80 column format, with 3 pages of memory, or 132 columns with 2 pages.

The 970. A combination of power, ease of use and TeleVideo reliability at a time you need it most. The ANSI boom is here. Get in on it with the TeleVideo 970.

Call us at (800) 538-8725 for more information. (In California call (408) 745-7760), or contact your nearest TeleVideo office:

California/Santa Ana	(714) 476-0244
California/Sunnyvale	(408) 745-7760
Georgia/Atlanta	(404) 447-1231
Illinois/Chicago	(312) 397-5400
Massachusetts/Boston	(617) 890-3282
New York/New York	(516) 496-4777
Texas/Dallas	(214) 258-6776
Central Europe (The Netherlands)	(31) 2503-35444
Northern Europe (United Kingdom)	(44) 9-905-6464
Southern Europe (France)	(33) 1-686-4412

GET IN ON THE BOOM™

TeleVideo Terminals

TeleVideo Systems, Inc.

Service is available nationwide from General Electric Electronic Instrumentation and Computer Service Centers.
VT-100 is a registered trademark of Digital Equipment Corporation.

TYPICAL PER-USER BROADBAND LOCAL-AREA NETWORK COST ANALYSIS[1]

COST	BROADBAND	BASEBAND
I. HARD COSTS		
Wire, cable and taps	$ 233	$525
Computer port contention[2]	0	80
Modems	827	0
Interconnectivity[3]	0	200
TOTALS	$1,050	$805
II. SOFT COSTS		
User relocation[4]	$ 7	$ 25
Interhost message processing[5]	0	625
Additions[6]	86	200
Maintenance[7]	90	0
TOTALS	$183	$850
III. HARD PLUS SOFT COSTS		
Hard costs	$1,050	$ 850
Soft costs	183	850
TOTALS	$1,233	$1,655

Net annual savings using broadband over baseband: $422/user

FOOTNOTES:
[1] Costs based on figures supplied by three broadband and three baseband vendors for a hypothetical local-area network.
[2] 25%-50% reduction in required number of host ports.
[3] No patch panel or switch resources required.
[4] Assumes 25% of employees are relocated each year.
[5] 5% of host processing resources.
[6] 10% growth annually.
[7] Assumes spares kept on site.

Chart Courtesy of Strategic, Inc.

expansion and capabilities, most users surveyed opted for broadband, not baseband networks. Typical connection patterns included asynchronous terminals to asynchronous processors, bisynchronous remote-batch terminals to bisynchronous processors, various IBM 3270 configurations and high-speed host-to-host file transfers.

But the issue of cost justification has been a knotty problem for all users surveyed. Typically, local-area networks cannot be justified solely on the basis of hard-cost savings. Its cost-justification must be based on a combination of hard costs, soft costs (such as frequent movement of devices) and less easily quantified but very real considerations of user access to resources, enhanced productivity and lowered frustration levels. Local networks offer easy relocation of devices, high reliability, reduced media costs, flexibility, easy growth paths and additional services, which will be increasingly important in coming years.

Local-area networks provide for distributed processing, peer-to-peer communications, reduction of "information float" and, when the medium selected is broadband, video capabilities for conferences and training. The accompanying chart illustrates one technique for cost-justification of a broadband local-area network.

This analysis does not include further broadband local-area network savings derived from:

- Fewer expensive resources required.
- Labor savings from increased productivity.
- Savings due to extended computer life (postpones the necessity of upgrading to a larger host).
- Credit for ability to add video, security and alarms and additional applications. Because the payoff period is typically short, no return on investment computations have been included.

Vendor independence has emerged as a crucial concern. As is true with any innovation, the initial applications tend to be replacements for existing products and only after the new approach has been in use for awhile are its unique applications and advantages exploited, such as electronic filing. To commit to a proprietary technology for the local-area network this early in the communications explosion (before IBM and AT&T have even actively entered this market) locks the user into a supplier's network-attachable products. Until IBM and AT&T enter the fray, it is unlikely that any single vendor will be able to provide the optimal solution for cur-

rent and future applications that will be interconnected through a local-area network.

Other concerns expressed by survey respondents included video capability, vendor stability, maturity of the technology (a big plus for broadband, which is essentially cable television technology), ruggedness, ease of expansion and flexibility and capacity.

As mentioned previously, product evaluation was strongly influenced by organizational factors and the far-sighted concern for video capability even when there were no immediate or short-term plans for implementing video. Interestingly enough, among the more than 50 sites surveyed, virtually none included word processing applications in the planning or decision-making phases, frequently resulting in sites with dedicated WP local-area networks not coordinated with nor able to communicate with the DP-based local-area network. Among leading end users, this parochial picture is changing as the emphasis shifts from local-area networks as a product to local-area networks as a protocol for facilitating communications.

Technical considerations among the existing installed base reflected the prevailing technical philosophy at the time the local-area network was installed. Thus in early installations point-to-point systems were the rule since stable, effective multipoint systems did not appear on the scene in quantity until 1980 and 1981. Subsequently, the majority of newer installations surveyed rejected point-to-point product offerings as passe regardless of suitability, based on either preferences for newer technology or understanding of the need to plan for unforeseen future requirements. They tended to want the latest technology whether it was appropriate or not.

For users who adopted local networks early, standards were not an issue. Their needs were sufficiently pressing and they could not afford to wait for standards to be developed. As is now abundantly evident by the multiplicity of IEEE 802.X proposed standards, the industry is still at least a year away from having even viable subsets of a cohesive standard and five years from having real standards. Large users look to IBM to set the standard in the near future.

Security issues, largely a factor only among the government and military sector in the sites surveyed, are rapidly becoming a concern for leading end users as local-area network usage becomes widespread. Hard on the heels of security are the legal implications — such as how to prove that a document which only exists in paperless form has not been tampered with. Large users are now planning or implementing security devices external to the network and are not requiring the network to provide automatic security itself.

Product evaluation is being impacted by the shift in user perception. Now, not only are cost and technical merits major factors, but increasingly the expansionary and interface characteristics of products are examined to ensure present and future compatibility in multivendor environments. Those firms engaged in long-range planning are evaluating local-area network proposals with an eye toward future migration onto optical fiber and development of hierarchical structures. An example of this is a series of inexpensive, dedicated baseband networks serving individual domains tied to a broadband backbone network which is, in turn, connected to fiber-optic links for intercity transmission.

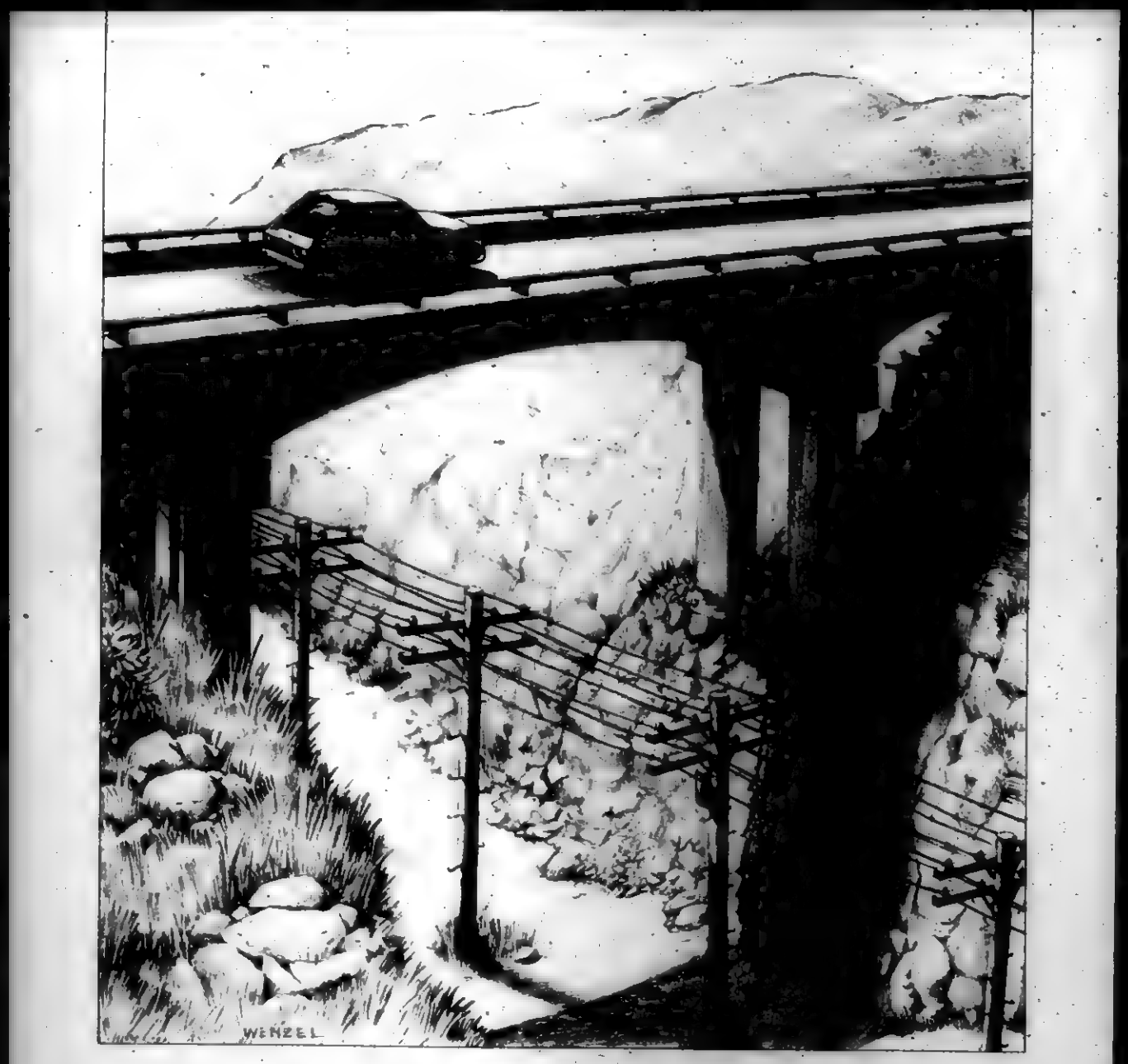
Technical innovations are occurring in the semiconductor field that will soon result in integral local-area network capability in the device itself rather than, as presently, in a stand-alone box between the device and the network. This change, combined with a trend toward totally wired buildings, will soon result in users plugging into the local-area network with any appropriate device in the same way as an appliance is plugged into household electricity when and where needed. The local-area network will be as transparent as electricity is now and network products will be portions of boards resident in the hosts, controllers and other devices.

In terms of trends in the world to come beyond 1990 the communications scenario can be viewed in terms of the size of the business. Small firms will have an inexpensive analog PBX and virtually no data networking, since their requirements are to share time, not resources. The market is sufficiently fragmented and the cost of individual sales calls is prohibitively high so large communications vendors cannot afford to pursue this market. Handing diskettes around is a physically viable and cost-effective alternative to communications networking.

Medium-size firms will have an analog PBX plus an inexpensive baseband local-area network or will have an integrated voice/data PBX to handle their data networking. Large firms will have integrated voice/data PBXs to handle voice requirements and some data applications plus a broadband local-area network for bulk data, video and intracity networking, such as connecting the metropolitan branches of a bank. These local network-PBX systems will coexist and be connected by gateways for maximum communications efficiency. Additionally, they may be augmented by wireless systems such as cellular radio, particularly for campus-type environments.

Local-area networks and PBXs are the "super glue" of today's local communications systems. By providing connectivity virtually without regard for device type, brand or application, local-area networks and PBXs facilitate and enhance effective, timely communications.□

Geddes is director of communication systems for Strategic, Inc., a San Jose, Calif.-based publishing, research and consulting firm specializing in high-technology industries.



On The Road With Bypass

By Walter Ulrich

The communication technologies which permit users to bypass traditional telephone company lines are emerging. Although many of these techniques are not yet commercially available or economical to use, they hold the promise of delivering a great deal of functionality at a reduced cost. Cellular mobile radio, digital termination systems (DTS) and cable television are some of the latest developments in the bypass arena.

This year will undoubtedly witness the most fundamental changes in communications since the telephone was invented in 1876. Activity in the communications marketplace and the regulatory environment and new technology innovations are converging and these changes will tremendously alter the flexibility and cost of communications services.

Fifteen years ago, you could buy communication services from any

ILLUSTRATION BY GREG WENZEL

company — as long as it was part of the Bell system. In 1969, the Federal Communications Commission (FCC) voted that a Texas businessman, named Carter, would be permitted to tap telephone lines using an accoustic coupler. On January 1 of this year AT&T gave up the Bell name and divested itself of its seven operating companies. Today, the FCC's efforts at deregulation are nearly complete.

In addition to marketplace and regulatory change, there have been great advances in communication technologies. The concept of digital termination systems (DTS) was introduced in 1978; today they are becoming a reality. Cable TV has successfully penetrated many households in the U.S., but vendors are only beginning to offer two-way cable to businesses. The first cellular mobile radio system went into full operation last October. As satellites become more powerful, satellite-to-office communications becomes more feasible.

Communication managers have long complained that it is easier to transmit data 3,000 miles across the country than it is to move it from their office to the long-haul facility. Furthermore, the restructuring of the communications industry will mandate an increase in the cost of traditional local-loop services. Alternative local-loop communications, commonly referred to as bypass techniques because they bypass traditional local exchanges, offer solutions to the connection and cost problems.

vices. Alternative local-loop communications, commonly referred to as bypass techniques because they bypass traditional local exchanges, offer solutions to the connection and cost problems.

The traditional telephone plant is just not capable of providing the speed, quantity and quality of communication services needed by today's information-heavy businesses. In some cities higher bandwidth communication services are either unavailable or have unacceptable lead times for installation. The reliability and quality of lines that are suitable for voice communications may be entirely unsatisfactory for handling data. In some cases, the time to repair older equipment and circuits can be a matter of weeks.

In past years almost no one could predict either their unit cost of communications or their total communications bill. Tariff charges from the Bell companies are not subject to negotiation and could not be predicted. The communications director, charged with managing corporate communication costs, could not control the most basic element of that cost — the price of communication services. Bypass ends that worry.

Alternate technologies allow communications managers to negotiate communication costs and establish prices for years to come. Furthermore, the communications department can make capital investments in some forms of communications technologies that will allow them to fix the costs of bypassing certain local exchange services. The ability to control communication costs for the first time may be the strongest single justification for making the move to bypass technology.

Controlling local-loop communication costs is becoming more important. The cost of traditional local-loop services is increasing. Prior to the breakup of AT&T, long-distance services helped support local-loop services. The price of local exchange services was therefore artificially lower. Now, with the divestiture of the operating companies, local and long-distance services must pay for themselves. Charges for local services will increase and charges for some long distance services will decrease. Prudent companies should be exploring alternatives for both local-loop and long-haul communications.

An introduction and description of some of the leading bypass technologies follows:

Microwave and Digital Termination Systems. Private microwave is probably the oldest of the bypass technologies and the forerunner to the current communications revolution. Over the years, private microwave has gone from an exclusively analog format to now over 50% digital transmission. Digital microwave is clearly preferred for distances under 200 miles. Because of crowding in the private microwave spectrum, the FCC has allocated additional slots in the 18-GHz region. Where spectrum space is available, private microwave still makes sense for companies that have a large volume of point-to-point communications.

One new kind of microwave communications that has attracted a lot of attention is called the digital termination system. In the late 1970s, Litton Industries applied to the FCC for allocation of the microwave spectrum in the 10.55- to 10.68-GHz range. Litton wanted this bandwidth assigned for microwave cooking ovens because of its superior qualities for browning meat. Xerox Corp. had a better idea, however — it petitioned the FCC to set aside those frequencies for data communication services.

Xerox called their new communication service Xten. Xerox envisioned an office of the future where large numbers of documents would have to be transmitted between company locations. Communications bandwidth would be necessary to support this view of the office of the future. Fortunately, the FCC agreed that data communications was more important than browned meat.

The full concept of Xten included communicating from the local common carrier directly to a long distance carrier. That full concept has come to be called digital electronic message services (Dems). The part of Xten that bypasses the local loop is called a digital termination system. The DTS carrier for a community would position a multidirectional antenna on the top of a tall building. The carrier would then be able to transmit, as well as receive, high-bandwidth communications between itself

and its subscribers.

In 1980, an experiment was performed to validate the service concept. San Francisco and Manhattan were picked as the local areas. Tymnet, Inc. and LDD (a subsidiary of M/A-COM, Inc.) provided the microwave communications between subscribers and a central facility and San Francisco. From an earth station at Embarcadero Center long-haul transmission via a Satellite Business Systems satellite was accomplished. The information was received in New York City where it was distributed by Manhattan Cable Vision to offices. San Francisco was deemed an ideal place to test DTS because of its hills and its fog.

The experiment was a great success. The error rate was always better than one bit error in every 10^8 bits and was often better than one bit error in every 10^{11} bits.

The FCC has established two kinds of communication carriers for DTS — extended carriers and limited carriers. An extended carrier must provide services in at least 30 cities and must commence offering services within 60 months of its approval. A bandwidth of 10 MHz, 5 MHz in each direction, is assigned in each community for subscriber communications. Spectrum allocation is available for seven extended carriers in any one city. Limited carriers need to provide communication services in only one city and to less than 30 cities. A limited carrier must commence providing services within 30 months of its approval by the FCC. There is sufficient bandwidth available so that six carriers may be offering limited services in any one location. Limited carriers can only offer 5 MHz transmission, 2.5 MHz in each direction, to their subscribers.

The FCC will only authorize carriers to operate in the DTS spectrum. Therefore, a company will not be permitted to use DTS to meet its internal needs exclusively. However, DTS carriers may seek to satisfy their internal communication requirements first, and then they must sell excess capacity to the public.

DTS services are line-of-sight services. To reach some locations in some cities, a single DTS transmitting location may be insufficient. A DTS repeater station or alternate communication technologies, like cable, may be used to reach locations that are otherwise blocked by high buildings or other obstacles.

DTS services are best suited for data communications and will compete with AT&T's Dataphone Digital Service. Even though DTS services are only now being implemented, their economies have been improving. Three years ago, it was universally agreed that the economics for DTS made it suitable only for data transmission. The cost of DTS has been declining and it appears that DTS may soon be suitable for voice communications. The capital cost for a DTS station has fallen by more than 50% in the last 12 months. DTS is an important bypass technology and it will help many companies to reduce the unit cost of their local communication transmissions.

Cable TV. Coaxial cable has broad applicability for communications for both the local-area network (within a facility) and the local loop (from a facility across town).

The typical cable TV franchise operates with the capacity of 56 to 108 full-motion video channels with bandwidths ranging from 330 to 440 MHz. Most of the original cable TV installations provide only one-way transmission from the cable carrier into the home.

Modern cable TV installation provides for two-way communications. Manhattan Cable Vision, in New York, is an example of what can be done using cable TV technology to support business. Its customers include Bankers Trust Co.; Citibank N.A.; Manufacturers Hanover Trust Co.; Shearson/American Express, Inc.; the city of New York; and Wang Laboratories, Inc. The service provides digital data circuits to their customers ranging from 4,800 bit/sec to 1.544M bit/sec (or T-1). Where coaxial cable runs past a building, it can be very economical for communications.

Cellular Mobile Radio. Traditionally, mobile telephone service was provided by a single high-power antenna in the heart of a city. Mobile telephone services have not been without their problems. A vehicle at the outskirts of a city or moving behind tall buildings would often experience interference. Mobile telephone service typically had only 12 or 24 channels and could reasonably support only 500 to 1000 subscribers. During peak times of the day, there would be a fifteen minute wait before the subscriber was able to place a call. To minimize those delays, new subscribers were put on waiting lists, with a several years' wait required in some cities.

Cellular mobile radio promises to correct these deficiencies. Each community is broken up into a number of cells and a low-power antenna is placed in each cell. When a driver goes from one cell to the next, the system automatically senses that the signal is becoming stronger in the adjacent cell. The system then switches the transmission from the first cell to the second one. This switch happens so effectively that a subscriber rarely notices it and gets a relatively uniform signal. There may be many cells within a city, and frequencies can be reused from cell to cell. This frequency reuse makes it possible to service many more subscribers, perhaps as many as 100,000 in some locations.

The cost to subscribe to a cellular mobile radio system is about $200 per month today. That cost includes the amortization of the hardware and the subscription fees. Many analysts expect that cost to be halved by 1985 and perhaps fall to as little as $25 to $50 per month some day. If that occurs, an argument can be made that cellular mobile radio may in fact replace the copper wiring that is go-

ing into homes today.

In the near future, cellular mobile radio will make much more telephone service available as well as at a lower price. This fortunate phenomenon will make it much more feasible to establish data communication services between vehicles and offices. Vehicle data communication schemes, based on the AlohaNet research, make very effective use of mobile radio bandwidth.

More New Communications

FM radio stations have a new, valuable data communication franchise because of changing technology and regulation. The FCC has approved FM radio stations to offer 200 KHz of subcarrier bandwidth for communications resale. These subcarrier communications make sense where companies have to broadcast specific information to a large number of locations. For example, some companies are transmitting stock information in this way to specialized portable terminals, so that businessmen can monitor the performance of their stocks. This is the communication technology that comes closest to making Dick Tracy's wrist radio a reality. A self-contained FM station may be able to install subcarrier equipment for as little as $5,000 to $7,000. That is a very modest investment to make 200 KHz of communications bandwidth available on a broadcast basis.

Satellites have been used to bypass long-haul terrestrial facilities for several years. Thanks to the space shuttle, it has become both easier and cheaper to launch satellites. As satellites become larger and more powerful, the need for large satellite earth stations decreases. As the diameter of a satellite receiver shrinks to approximately two feet, it then becomes feasible to not only bypass long-haul, but also local-loop facilities. The electronics are complicated, but very large-scale integrated circuits promise to bring down their costs. In addition, when earth stations become inexpensive enough, companies will broadcast directly from satellites to the receiving location. Finally, the FCC has recognized direct broadcast satellites (at least for home use) and has allocated the 12.2 to 12.7 GHz region for such satellites.

Infrared and even visible light offer communication alternatives over relatively short distances. For example, the cost to transmit data across a street may be prohibitive in some cities. If a line of sight can be established between two buildings across the street, then infrared or visible light may provide a communications solution.

Fiber optics is another technology that promises to transmit great bandwidth with great accuracy. Electrical interference is not a problem with fiber optics, so the accuracy of the transmission is excellent. Unfortunately, the techniques for splicing and tapping optical fibers have not been refined, which limits their effectiveness over short distances. Over longer distances, fiber optics makes sense and plays an important role in at least one of the new teleports.

Teleports are not a communication technology, but represent the bundling of communication technologies in a useful way. As its name implies, a teleport is a place where communications facilities are concentrated. A teleport might have several earth stations pointing to several different satellites. Then, bypass technologies would be used to distribute the long-haul communications to businesses within nearby communities.

The best known teleport is the joint venture between Merrill Lynch, Pierce, Fenner and Smith, Inc. and the Port Authority of New York and New Jersey. This group is building a satellite earth station complex on Staten Island, with earth stations directed toward many major satellites. From Staten Island, they are stringing fiber-optic cables through the Port Authority Trans Hudson (Path) tubes into the major centers in Manhattan. Selected cities will be served in New Jersey along the Path route as well, including Jersey City and Hoboken. A teleport, then, is a consortium of communication services designed to provide the local region with a variety of voice, data and video communications while bypassing traditional communication facilities. Teleports are springing up in a number of major cities.

Which bypass technology should the buyer select? Probably several of them. Smart companies will be mixing and matching their local and long-distance communication technologies to meet their particular communications profile. The bandwidth, flexibility and economics of various bypass technologies may well mandate that several different technologies will be used in any one city and that all the bypass technologies will be used in one place or another within the overall corporate network. Information is so essential to modern companies that their very survival may depend upon a sound communication strategy.

Communication costs are changing dramatically. If companies fail to take advantage of new communication technologies, their cost per unit of communications will increase — perhaps significantly. On the other hand, the new communication technologies hold out the promise of reducing the cost per unit of communications. Bypass and other new communication technologies will provide more communication power, new services, greater flexibility, and lower costs than every before. Companies must control their communication destiny. For the first time bypass technologies for the local loop are beginning to offer an economical, feasible communications pathways.□

Ulrich is president of Walter E. Ulrich Consulting, located in Houston, Texas. His consulting activities include the convergence of computers and communications. Ulrich is also chairman of Interconnections '84, the national conference of the Independent Computer Consultants Association.

LEONARD Kleinrock

By Marcia Blumenthal

Leonard Kleinrock is a one-man communications network. He is a professor in the computer science department at the University of California at Los Angeles. Almost constantly on the move, Kleinrock traverses the country conducting numerous data communications courses for information processing managers through Technology Transfer Institute, a conference management firm of which he is president. A lively speaker, Kleinrock is a well-known participant at major industry conferences.

His research interests focus on computer networks, packet switching and local-area networks.

INTERVIEW

How would you characterize today's data communications environment?

Right now it's a zoo. Many technological possibilities are being explored by scientists and the outlook for new products is enormous, but nothing has settled down yet.

There are four groups of players in this environment, each pushing its own goals. The scientists are constantly coming up with new ideas, each of which appears to dominate previous ideas. But these ideas are two or three years away from products. Then there are the vendors who want the scientists to make up their minds so they can transfer the idea onto silicon and sell it.

The users are sitting around waiting for delivery on all these lovely new products they've been promised. And the standards organizations are caving in to vendors and users who keep saying they need standards, but have no idea what they should be.

One opportunity is that we are finally seeing the convergence of data processing and communications, but it's taken more than a decade for that to occur.

What is causing this convergence?

Integrated chips. Data communications needs intelligence in its products and information processing needs communications for distributed systems. It's hard to separate them right now. We are becoming a world of interconnected computer networks.

Wide-area networks using packet-switching technology have been around since the early 1970s, but it took the telephone company [AT&T] 13 years before it started offering this service through its ACS/Net 1000.

What's on the horizon for the user?

All the technology is on the horizon — local-area, metropolitan and international networks, fiber optics, cellular radio and so forth, but except for long-haul networks the products are not here yet.

With all this uncertainty, what advice do you have for users wishing to install advanced data communications products, such as local-area networks?

Users who are looking at products such as local-area networks have to recognize that if they opt for a particular product now, in two or three years there will be a new set of standards and products which may not be compatible with what they select now. They may have to rip out what they put in today and replace it — not the wiring but the interfacing.

If I were a corporate executive making the decision today, I would ask whether the system would pay for itself in two or three years. If so, then there is no question about installing a local net, but if it won't pay for itself the decision becomes harder. It's an interesting calculation because corporations that delay adopting advanced communications techniques now may lose far more in lost opportunity than the cost of the investment.

Do you see more users making the move to install local networks?

Some are and some are not. Today, most organizations are not installing local networks on a production basis. They are installing them on a limited, experimental basis. Most are using the classic PBX as a switch because the machine is already in place.

But despite the user's current hesitation in installing local nets, anyone building a new facility should put in the appropriate duct work for whatever cabling comes along in the future — and that includes fiber optics.

Since this switching equipment is in place, does this mean the star configuration will prevail?

People are moving in this direction because they are familiar with it. The star, which transfers data at about 64K byte/sec, is fine for most needs, but not all. It won't handle teleconferencing and it's slow when moving files around. More than likely, terminals will be intelligent workstations with possibly a 10M-byte hard disk. And if the central switch fails, no one can talk to one another.

On the other hand, vendors of these branch exchanges have been very good about building highly reliable devices using modular redundancy. There are high up-front costs with these devices, but it is a competitive technology.

Incidentally, IBM is taking an interesting approach with its ring wiring concentrators. By running wires out to a terminal and back to its cabinet, IBM makes the network look like a star, but it is really a ring. All the maintenance and configuration changes can be done from the cabinet.

What is keeping people from installing local networks on a production basis?

It is the lack of stabilization. Standards are just beginning to be approved. Chip sets are beginning to appear now. People don't want to be guinea pigs, so they are willing to run experiments, but not commit a corporation's basic operation to any particular product.

Another question users have with local networks is whether they are committed to a particular vendor's office automation solution if they opt for that vendor's local net. In a lot of cases the answer is yes and organizations are not pleased with this prospect and are waiting for a universal local net.

What is the outlook for a universal network?

This standards business is going to be around for a long time. We will never get out of it completely or have complete standardization. There is enormous opportunity for conversion products.

A hot product area today is

"bridges and gateways." A gateway is a device that connects two networks which have different protocols while a bridge is a device that connects two networks that have similar characteristics. The user pays more for that device and loses some efficiency, but it's an interim solution and we'll be in this environment for some time to come.

Do you see any one system which is better than most?

The best system depends on the parameters of the applications. Parameters include the bandwidth you need, the length of cable, how many bits will be sent in a block, the number of devices to be attached and so forth.

Some vendors are offering products that will not grow well as bandwith expands and longer cables become available. For example, [Xerox Corp.'s] Ethernet using CSMA/CD [carrier-sense multiple access/collision detect] does not operate well as bandwidth goes up, yet it has its place in the applications spectrum where it works. So with an Ethernet-based system you may eventually need more than one network.

Hiring a consultant is a good way of assisting in the purchase decision. But not all consultants are prepared to carry out a complete performance evaluation which describes where the system will begin to fail or where its limits are. And some consultants are committed to one vendor's approach. Users should hire a consultant who can challenge vendors.

How close to commercial reality is fiber-optics transmission?

As I mentioned before, anyone planning a new facility should install the ducts for fiber optics. This technology is very fast for point-to-point transmission — you can send the entire Webster's unabridged dictionary in a few seconds. Fiber optics carries light better than copper wire carries electricity. It offers the potential for enormous bandwidth, low error rates and it is immune to electromagnetic interference, a feature the military and government find very attractive.

But we don't know how to tap into it without a lot of loss and expense. If 10 taps are put in along the line, the power coming out the end of the line is about 1/1,000 of what went in. The tapping will take about three to four years to solve.

For the user it's clearly an issue of economics. The organization doesn't care how exotic the medium is, but whether it is cost-effective for the bandwith as well as being expandable. It can be a string and a can as long as it does the right job. The question is how much these taps cost — do you need a few gigabytes per second or can you live with 50M byte/sec?

It seems like videoconferencing is not as promising a network feature as was predicted. Are there other features which were being touted in the past that may not be as necessary now as once thought?

Video is not an enormous need right now. It's important for certain applications, but not too many corporate applications.

Clearly textual transmission is needed and facsimile is useful. Voice and data are certainly something that is needed, but whether they should be integrated is another question. When speech understanding technology is perfected there will be a greater need to mix voice and data.

Certainly the user would prefer to use a single terminal to initiate communications, but whether all transmission must go over the same wire is still a question.

The user has to be sensitive to the possibility of overbuilding the communications plant.

What will the organization's communications network look like in the future?

It's my guess at the lowest level there will be a shared logic machine; like a supermicro, that will serve from four to 16 people in a local cluster, perhaps acting as a file server. There will be a collection of these devices on a floor, communicating through a cable to other floors, coming into a computerized branch exchange.

From here the information would move into a metropolitan network, with gateways to value-added networks and satellites. Unfortunately the metropolitan network is confusing and users will have to wait a number of years before vendors provide metropolitan networks. Cellular radio, for example, is in its infancy and it is not yet determined how it will serve communications.

Unfortunately, the communications issue can become a nightmare, much like what has happened with the personal computer.

How do you prevent this?

There have to be changes in the corporate organization which recognize the information resource manager as a high-level executive. This person would be well-versed in information processing and data communications, disciplines which in many instances are separate today. These two specialities must be melded.

Are there any other changes that have to be made?

Issues in communications, particularly local nets, are largely hardware and protocol-oriented, but systems software must be considered. There is an enormous installed base of Cobol-based programs, but building these applications is a slow process. With increased on-line transactions necessary and users connecting into local networks to access corporate data, the organization must embrace the new generation of applications development and data base products.

The most popular personal computer software products are very user friendly. Building user-friendly interfaces is probably the most difficult task necessary for solving this problem. This type of system is more than five years away.

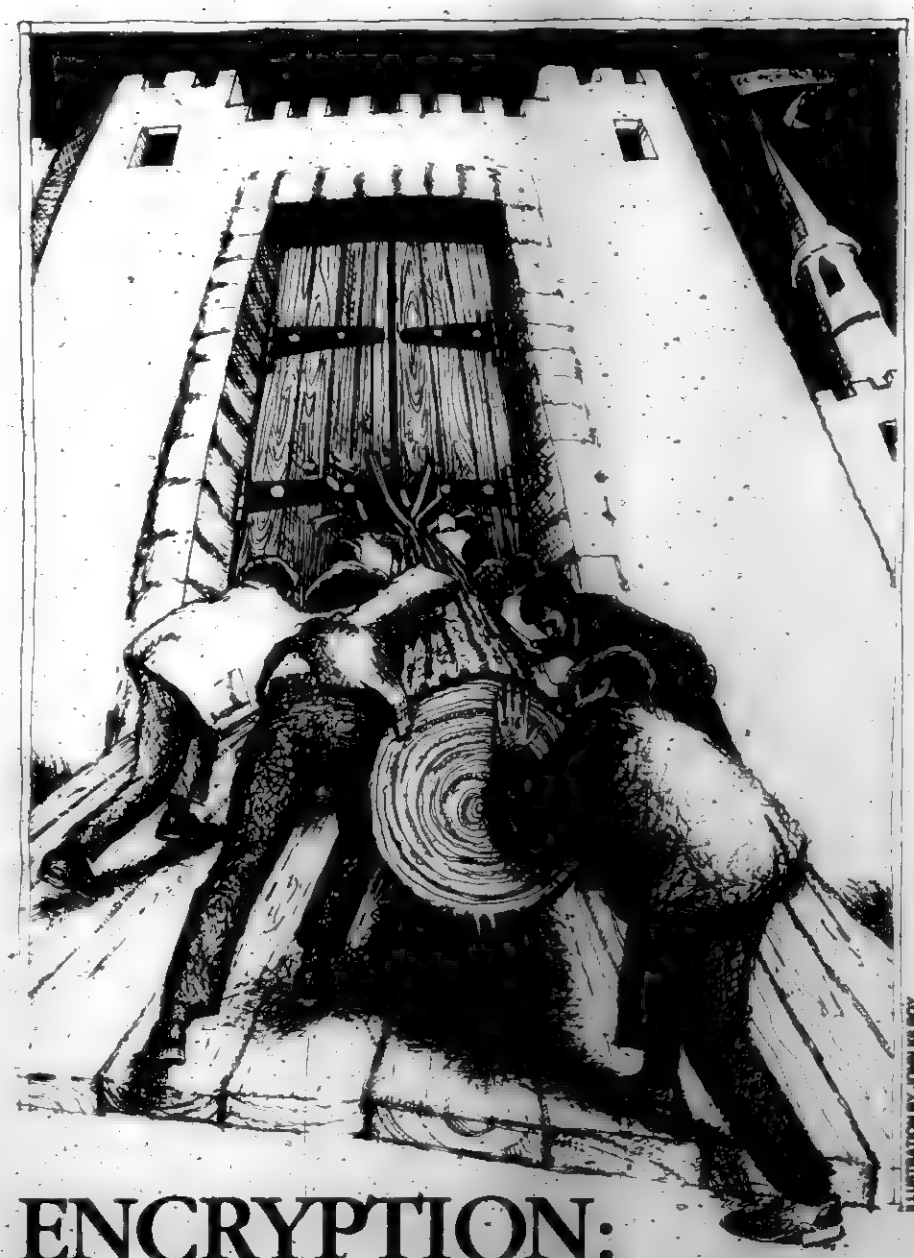


ILLUSTRATION BY JOHN KLIROY

ENCRYPTION: Securing The Fortress

By Laura Brown Schlafly

In 1977, personnel at the U.S. Federal Reserve Bank in Minneapolis verified by secret password an apparently legitimate request to transfer funds to a Georgia bank account, which they later learned belonged to a wire-fraud expert.

In 1982, Japan's Nippon Telephone and Telegraph Co. found its lines being tapped and its data stolen by a credit card forgery ring.

Last year, in Los Angeles, a 19-year-old University of California student used his

home computer to break into a Defense Department communications system.

And a few months ago in Fort Lauderdale, Fla., two computer technicians manipulated a personal computer and a push-button telephone to penetrate the computer files of IBM; Sears, Roebuck and Co.; Gould, Inc.; and *The Miami Herald*.

In these and in many other incidents of unauthorized computer access, information processing experts noted how easily the wrongdoers, especially the novices and hackers, gained entry into various data transfer networks. Speculation continues as never before on the numbers of such incidents both undetected or unreported as well as on the potential capabilities of a truly expert computer thief.

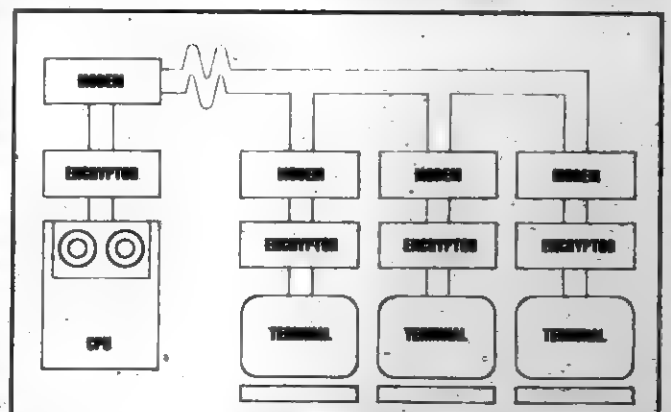


Figure 1

Chart Courtesy of Russell-Hilligs, Inc.

The reality of computer crime and accidental access to any data bank cannot be overstated today, particularly in light of the ever-increasing volumes of computer data gathered and stored not just for government and business purposes, but also for personal reasons. Current industry estimates of such losses range from $100 million to $3 billion annually. More than a few industry observers predict that computer crime will generate catastrophic losses for some financial and corporate organizations by mid-decade, regardless of precautions. To the extent computer security increases, so will the expertise of computer thieves. Although advanced security techniques may reduce the number of perpetrators and the crimes they commit, it may also vastly escalate the losses they create because only the true professional gambling for a high payoff will risk invasion of the system.

The best deterrents to computer crime today include site controls, personnel controls, password controls, file access controls and other controls, not the least of which is securing computer data during transmission. Each deterrent is far too extensive a subject to cover in depth here, and the discussion that follows will be confined to safeguarding computer data during transmission. A problem with computer data, either stored or in transit, is that it cannot be seen. Therefore its loss, intentional or otherwise, can be easily overlooked. Both the programs that perform the processing and the transmission of data are invisible to the human eye. At best they are magnetic spots on tape or disks, or electrical impulses being transmitted through a computer and over its data communications network. Understandably they receive less scrutiny than office paperwork or fixed assets.

In fact, of the five very general computer functions — input, programming, processing, output and data communications — the latter is said to be one of the most vulnerable to penetration and theft. Data communications systems of various magnitudes serve most government, commercial, industrial and financial organizations today.

Computer crime experts claim many data thefts, manipulations and inadvertent losses go unreported each year. The most frequently cited reason is publicity. Widespread knowledge of such incidents would cause great embarrassment in most cases, not to mention possible liabilities. Like cash, property, production techniques, personnel and goodwill, information is considered a major corporate and organizational asset. Its loss or alteration may prove just as serious, or more so, as the loss of any other asset. Personnel data, for example, must be safeguarded under the Privacy Act of 1974. Other confidential data concerning customers and clients, accounting, financial planning, marketing strategies, designs, research and development, production techniques and other operational areas are, in most cases, sufficiently important to be safeguarded; particularly if transmitted over data communications networks.

Most networks transmit a considerable amount of information of a sensitive or proprietary nature. Criminal access can be gained by accessing an organization's own terminals, by attaching foreign terminals or communications devices directly to the data communications phone lines or merely by dialing into a computer site having autoanswer equipment. Virtually any point in the communications links may be vulnerable through a dial-up port at an outside time-sharing house, at a point near the CPU facility or at an unattended communications facility. In addition, communications interception kits for data theft or manipulation can be assembled inexpensively. Powerful minicomputers, which can be leased, can also be programmed and used to dial into a system and masquerade as an authentic terminal, apparently conducting routine business transac-

tions with the computer.

The only adequate safeguard against the theft or inadvertent, unauthorized access of data being transmitted over various media is data encryption. This singular method renders data incomprehensible and useless if lost or intercepted. Some equipment also stores the data in encrypted form. Encryption proves highly effective in maintaining data security when data communications messages are mistakenly misrouted, in the protection of computer-readable ID card passwords and in offering the utility for digitally signing messages.

Unfortunately for many users the acceptance of data encryption has grown slowly. The failure to use encryption during data transmission may well be the result of users not understanding the need. The situation might be analogous to a time when increasing numbers of bank robberies and their attendant publicity created the need for armed guards and armored trucks. Or a time when commercial, industrial and institutional break-ins and burglaries created the need for better site controls and more sophisticated security staffs. The fact is that many organizations do not perceive proprietary data in transit as a high-risk factor.

Banks know better. In fact, the heaviest users of data encryption are banks and other financial institutions. Bank transactions in which depositors' personal identification numbers are transmitted must use encryption. And many members of the banking community agree that unless the integrity of data in other financial and business areas is similarly secured, encryption may one day be required — either by regulation or legislation. The reason being that a company's board of directors, for example, might well be held personally responsible for the loss of assets. Shareholder, customer and other affected interests might well seek legal remedy.

Another possible reason for the slow acceptance of data encryption is the misperceptions by users of its cost and usage. In a recent trade publication article, for example, an industry observer voiced concern over the low price of large-scale integrated chips used in the design of encryptors and the comparatively high price of the encryptors themselves. The same criticism might be made of the price for an automotive starter motor and the price of the automobile on a dealer's showroom floor. A great deal of design and engineering go into the finished product, as does manufacturing — plus personnel time and talents.

Few data encryption vendors, if any, would place themselves in a defensive position over pricing. A low to medium four-figure price for a highly advanced data encryption device can be justified to protect the enormous tangible and intangible value of proprietary and confidential data, just as the price of a computer can be justified to store and provide various uses of the data. That the price of an encryptor sometimes exceeds the price of the terminal device it supports is another invalid criticism.

The functions of the encryptor and the terminal cannot be compared. They are functionally and conceptually unrelated. To pay less in some instances for certain terminals than their encryption devices is perhaps no different than to pay less for the doors of one's home than for the surveillance or alarm systems that guard them. The decision to buy or not to buy must be based upon the value one places on the content of the data.

Figure 1, on page 36, and Figure 2, on the left, show two simplistic network situations that might help many users in considering encryption costs. In the configurations shown, the encryptors are the interface between modems and data terminal equipment. According to industry research data, the average per-unit price of an encryption device is $2,200 without options such as diagnostics or special encryption key management features. Central site, master units typically cost more than remote devices because they are designed to serve many remote units. A reasonable average price to expect in Figure 1 would be $2,500 per central unit and somewhat less for each remote, or just under $5,000 per link. A price of $2,500 for the master and $2,050 for each added remote would, in fact, be very competitive.

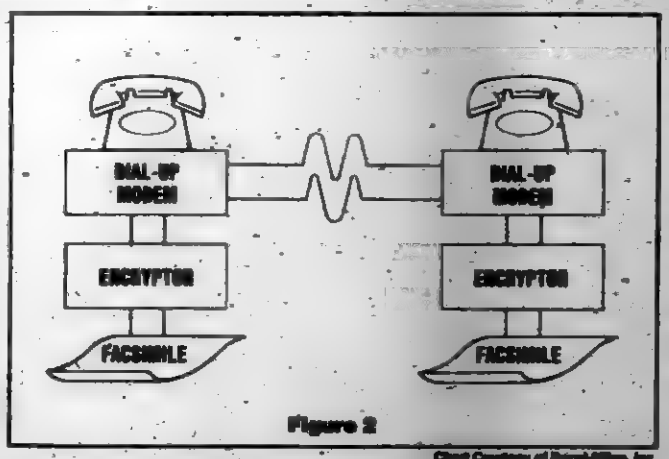


Figure 2

Chart Courtesy of Racal-Milgo, Inc.

Figure 2 shows a dial-up configuration, and while nearly all encryptors can be used on circuit-switched, dial-up networks, some are designed specifically for that purpose, as well as for other special purposes. The dial-ups, for example, may be designed to create and download new transmission session keys for each modem connection and, when the modems disconnect at the session's end, to erase the keys at each end of the link. Special designs will typically

raise the industry-average, per-unit prices — and also significantly increase the security of the data link. Quantity purchases of encryptors will, of course, lower the average per-unit prices cited above.

As to the actual usage of an encryption device, most competitive models are no more complicated to operate than hand-held calculators. User apprehensions about extensive and specialiazed personnel training is unfounded. Most vendors, in fact, provide the necessary operational training, which is minimal. Most also provide field service support.

More germane to usage concerns are considerations of the encryptor's size and operational integrity. Obviously the physical size of encryptors varies from vendor to vendor, as do special requirements for any given application. Because encryptors typically interface at modem locations the size factor must be taken into account during user evaluations. Moreover, encryption devices are yet another insertion in the communications medium and results in a data rate delay. This phenomenon heightens the importance of operational integrity.

While the actual use of encryption devices presents little or no difficulty, the way they operate involves many complexities. In order to make data unintelligible for transmission, encryptors break down data into the simplest possible form, which consists of a bit, that is, either a "1" or a "0." Encryptors then modify single bits or bytes, depending upon their design. The modification process follows the rule of an algorithm, which by definition is a fixed procedure for step-by-step problem solving, or in this case for step-by-step transformations and permutations of bits or bytes. An untried, unproven algorithm may obviously lack operational integrity and fall victim to cryptanalysis, which is the technique used to decipher messages, in this case for illegal or unauthorized purposes. Such algorithms as those found in certain scramblers, for example, are highly predictable in their mathematical transformation procedures and cannot withstand the best efforts of cryptanalysis. Today's most tested and proven algorithm for commercial and industrial use, as well as for nonclassified governmental use, is called the Data Encryption Standard (DES).

In 1977, the National Bureau of Standards agreed upon the DES algorithm for such uses. In the DES algorithm, the encryption of plain text into unintelligible cipher text for transmission is based upon a series of 72 quadrillion transformation combinations. The specific combination chosen for a given encryption process is called the key, which remains secret to the user. Some encryption experts estimate it would take hundreds of years for an eavesdropper to search out all the possible key combinations (72 quadrillion) made possible by the DES algorithm. And should that problem not seem sufficiently difficult, an encryption device user might then use the secret key once or a few times, then change it — or use the DES algorithm to encrypt data twice, which would extend the key possibilities from 72 quadrillion (2^{56}) to what might be called the semi-infinite (2^{112}).

Manufacturers that offer DES algorithm-based devices include Paradyne Corp., IBM, Analytics, Racal-Milgo, Inc. and others. Although the devices made by such companies are based upon different applications, techniques, and equipment arrangements, they display many similarities. Each uses the DES algorithm, as noted. Each requires the placement of encryptors (which encrypt and decrypt in the same sense modems modulate and demodulate) on the data flow between computers and terminals. In the DES algorithm of such devices, a 56-bit key is used to transform data before transmission and after reception. Because the 56-bit key must be in the possession of both sender and receiver, a significant problem is how to safely transmit that key from one to the other — and to change it frequently enough and retransmit it to keep the data secure.

Ordinarily the secret key must be set or loaded into the encryption devices at each end of the data link without anyone gaining knowledge of the key's value. And the key must always lend itself to modification by the user at both ends of the communication link. Therefore the security of data encryption devices depends almost exclusively upon key management, that is, upon the secrecy of the key and upon its physical distribution by courier or mail, which may prove perfectly adequate for some users' needs.

For other users, a more sophisticated key management scheme is desired. This can operate on what may be described as a two-level key hierarchy. In standard operation, the secret "working" key, or data encrypting key, is contained in both a central encryptor at the computer center and in the remote encryptors. This key encrypts and decrypts data using the DES algorithm. A "master" key, or key-encrypting key, is also used at each site, central and remote, to encrypt the working key as it is transmitted over a link. In this way the working keys can be randomly generated or downloaded. And with the master key they can be changed at any time. This brings up a potential problem: if the working key can be encrypted by the master key, what if the user wanted to change the master key itself? At this point, distribution of a new master key would again be necessary by mail or courier.

One way around the key management problem is public-key cryptography. For key management purposes, Racal-Milgo's encryption devices, called Datacryptors, use a cryptographic method called public-key cryptography. The public-key method is used to electronically distribute secure master keys to remote sites, which permits frequents changes of master keys. Very generally, this meth-

od uses two separate keys of its own, a private key and a public key, for the encryption and decryption of data — not main-channel data, but key management data. Only the private key can decrypt messages encrypted by the public key. Public key cryptography had been a theoretical subject confined to academic discussion for many years. The method is based upon the generation of extremely large and random prime numbers for use in the public key encryption and decryption processes. The hardware and other necessities to generate very rapidly such primes was designed and developed by Racal-Milgo in mid-1981.

Another feature for users to consider is whether the encryption device they select is protocol-sensitive or protocol-transparent. Transparency appears to be the more desirable method for flexibility and versatility. Transparent encryptors operate on a method called single-bit cipher feedback, in which single bits of data, as earlier described, rather than characters, are encrypted and decrypted. In this way the encryptor remains free of any hardware and software constraints. It can remain in place as computer networks expand or change, and it will require no retrofitting or reconfiguration. Such devices operate at data rates of up to 112K bit/sec, half- or full-duplex, and on either leased or dial-up telephone lines, or over microwave and satellite links.

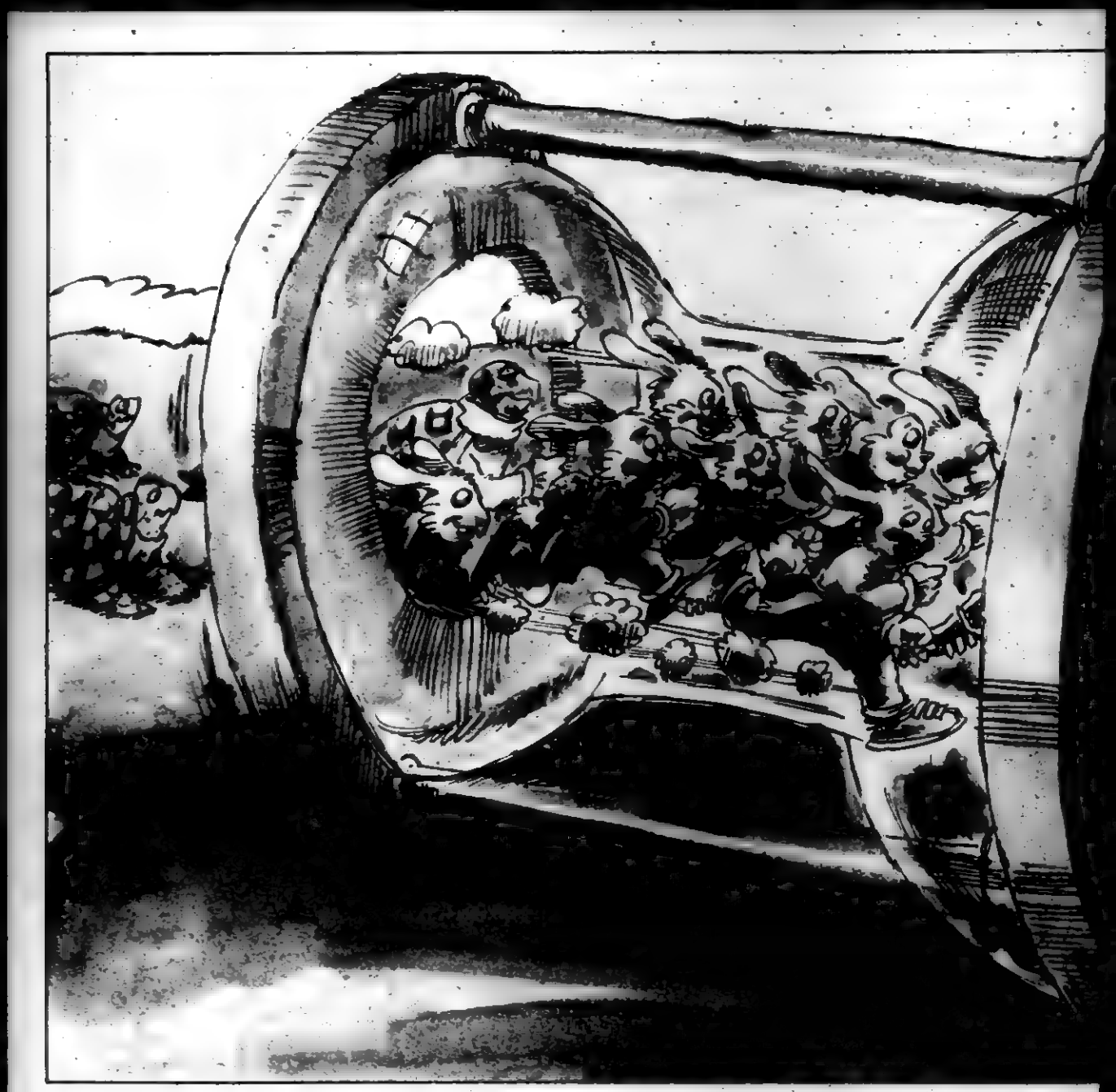
For all their complexity, encryption devices are merely installed in a user's network as a "black box" between sending and receiving ends of each communications link. They can be operated in what might be described as a push-button mode. Most units securely mount on either desktops or racks, and their removal or the opening in their front panels requires the use of dual controls. Their data encrypting key is typically erased automatically if unauthorized access is attempted. In addition to this, in the event of power failures or interruptions, the encrypting key is protected by battery backup and therefore retains its key values.

The need for many business organizations to protect their data by encryption methods is perhaps not as immediately acute as it is for banks or credit reporting organizations, which might obviously violate confidentiality. However, much of the data transferred by businesses are every bit as sensitive. For whatever reason and to what extent such data might be intercepted, and what that might cost the victims, are determinations that can only be made by the individual organizations concerned. Compounding these determinations, of course, is the tremendous growth of computers and data communications in virtually every area of business, as well as in the home.

The alternative to data encryption — even assuming that site controls, personnel controls, password controls, file access controls and similar measures have been evaluated and implemented — is simply accepting a high risk or loss. However, the likelihood of auditors and insurance companies accepting such high risks is minimal. In fact, in the not-too-distant future, auditors and insurance companies may demand senior management to take measures to decrease the probability of such losses. As higher levels of corporate management become more and more involved in protecting information assets, the data processing managers and data communications managers will not remain the decision makers for or against encryption.

The reason is not unlike the reason that banks require its use. As mentioned earlier, a company's board of directors may well be held responsible for the loss of assets, which include proprietary and confidential data. Such losses may be prevented if the data were secured during transmission. For the future, it should become evident that calculating the value of information assets, identifying how vulnerable they are to theft, and then protecting them will cost significantly less than rectifying such losses after the fact.□

Schlafly is marketing manager for digital products at Racal-Milgo in Miami, Fla.



MIXING IT UP WITH MUXES

By James J. Michaels

If transmission over phone lines was free, multiplexing techniques that share a facility or a line among many data or voice conversations would not be very popular. But rising line charges — and the value-added features of multiplexers — have made the multiplexer a cornerstone of communications networks.

Multiplexing techniques have

evolved from the earliest frequency-division multiplexers (FDM), to time-division multiplexers (TDM), to today's STDM, or statistical time-division multiplexers. A new generation of TDMs are, in turn, evolving into a new class of communications network processors.

A time-division multiplexer carries dedicated virtual circuits. The time on the communications line is divided into cycles of equal length and each device attached to the TDM "owns" a fixed interval of time in each cycle. Each device is assigned a constant bandwidth, whether it is transmitting or not. Therefore, the sum of the speeds of all input devices cannot exceed the speed of the composite link.

A statistical multiplexer dynamically allocates bandwidth to a device only when it has data to send. Statistically speaking, devices such as terminals are idle most of the time. So the sum of the inputs to a statistical multiplexer can be many times the speed of the line — four to eight times is typical.

Basically, all these devices — FDM, TDM, STDM — can be networking devices. The key question is how to create an easily man-

ILLUSTRATION BY JIM VENABLE

aged, practical and cost-efficient network using these components.

An ideal network would offer the user a number of advantages. It would provide universal compatibility, handle different types of transmission facilities, provide centralized management and diagnostics and be upwardly compatible. As the network grew, the system operator would be able to add more and varied network devices.

In such an ideal network, the network manager would have very efficient resource utilization. All users would have the ability to access any system resource on the network, such as distributed computers.

Ideal networks would be nice, but they do not exist. Most networking today is driven by computers. The problem with using computers for networking is that they use line bandwidth inefficiently. The computer is designed for crunching numbers and for manipulating data. Most computers get bogged down when they have to perform networking chores. And when they get bogged down, the system does not utilize the bandwidth in a cost-effective manner.

Most large computers drive a network with a fixed protocol, usually one designed for a particular type of data. If the user starts moving different types of data, efficiency can drop. Also, since computer systems are generally single-vendor devices, a mixed environment in which a number of different computers are joined in a network does not always work effectively or may not work at all.

This compatibility problem with computer-based networking demands devices (such as multiplexers) which remove data communications management from the computer.

The key word in designing any network, then, is flexibility. The network must be able to handle any kind of device the user may want to attach. The network should convert protocols, switch connections, change speeds and other tasks necessary to ensure compatibility and flexibility. The network must also anticipate increases in the speeds of transmission, growth in the numbers and kinds of devices that will be attached to it.

There are three basic principles that must be recognized in putting together a network:

- The network will not get smaller. Networks tend to grow. As more users come on-line and each workstation ends up having a terminal attached to it the network will keep growing.
- Networks will never become slower. Speed is addictive in data communications. Once users have had access to a 9,600 bit/sec terminal, they will never willingly go back to 1,200 bit/sec.
- The network will never stay the same. What is new today becomes old hat tomorrow. The system manager needs to purchase products that are upwardly and downwardly compatible so the system can grow.

Some data communications suppliers are responding with a systems approach that offers one-stop sourcing for an entire network. A single source ensures that components are compatible and will continue to be compatible with equipment introduced in the future.

Once a network has been built and hardware devices distributed throughout the system, centralized data network management and maintenance becomes vital. The network operator needs to monitor what is going on with the network at all times — how it is being utilized and what kind of problems users are experiencing.

From one point in the network, the operator requires total network management and diagnostic capabilities. When problems arise these diagnostics permit the operator to delve deeper into the network to determine the exact misfunctions.

Large mainframe computers can be used to manage a communications network directly, but using a very expensive CPU for error checking, protocol handling and diagnostics is an inefficient use of resources. Moreover, the CPU vendor then guides the future direction of the network's development. The trend is to offload communications management functions onto the network.

Front-end processors, specialized computers optimized for and dedicated to communications functions, relieve the mainframe of network management. But front-end processors are themselves expensive and sometimes dedicated to a few protocols or one vendor's products.

Traditional modem makers have incorporated diagnostics and control features into their products. But since modems are the most numerous devices in most networks, the cost of this added functionality can add enormous overhead to the network.

Multiplexer makers have been adding diagnostics and control features into their products as well. The advantage of multiplexers is that fewer are required and they are connected to a larger percentage of the network. Where a modem sees only one input and output line, a multiplexer can see six composite links and more than one hundred user ports.

New features being added to multiplexers — multiple data links, switching, among others — are driven by the need to manage the network. As it takes on more functionality, the multiplexer is evolving into a type of front-end processor.

Network Applications

As the capabilities of multiplexers have increased, they support exceedingly complex network topologies. No longer is each point-to-point line a separate entity, requiring separate attention. Networking multiplexers are tying everything together.

One of the basic methods multiplexers use to tie a network together is to have multiple composite data links. With multiple data links, a single phone line can route to more than one location. Al-

though not all multiplexers have the multiple-link feature, this is the direction products are moving and it is an important new development for networking.

Imagine a network joining Chicago, Atlanta and New York. With single-link multiplexers, there would usually be three phone lines, one between each city pair, and two multiplexers in each city. If the Chicago-Atlanta line was removed it would be necessary for their circuits to be connected between the ports of the two multiplexers in New York in order for those two cities to talk. Note that each Chicago-Atlanta channel requires four multiplexer ports and, in the event of rerouting, a manual patch change.

If one multiplexer supports two data links, then only one multiplexer is needed in each city. It doesn't make sense to have the Atlanta-Chicago circuits come out at one multiplexer port in New York and go back into another port on the same multiplexer.

A bypass feature in the multiplexer, which has been available for a number of years, eliminates the need for back-to-back multiplexers or in-and-out patching at intermediate points. Data is passed from one composite link to another directly. This means that there could be 24 channels between Atlanta and Chicago passing through a four-channel multiplexer in New York.

If three lines were maintained on the triangular network, multiple data link multiplexers can offer alternate routes in case of line or equipment failure. In a trinode setup, for example, stored tables permit the multiplexers to revert to a bypass situation when a link goes down. This means more overall reliability.

If the network requires a considerable amount of bandwidth between two nodes, the multiple lines on a statistical multiplexer can be used in parallel to increase the throughput. Each link carries its rated capacity independently. If there are two 9,600 bit/sec lines between a pair of statistical multiplexers, the connected terminals seem to be sharing a single 19,200 bit/sec line.

Dynamic load sharing, or traffic balancing, on dual data links means that the network operator gets to utilize all the bandwidth.

Information from a specific terminal can go through either data link, automatically going to the link with the lowest load factor. When one data link goes down, it is seen as full since nothing is going into it. All data then goes through the working link.

These automatic fallback and redundancy features are most effective if the two data links are diversely routed, by either coaxial cables or land lines.

Switching

If the network operator wants a terminal to access separate systems resources the most cost-effective solution is switching multiplexers, currently one of the fastest growing segments of the multiplexer market.

With full switching capabilities, essentially all the features of a data private branch exchange (PBX) or the dial-up telephone network are available. The user can access any node or any port in the network. Any terminal can connect to any resource. This gives multifunction capabilities to the terminals.

For example, one terminal can function as a word processor, a spreadsheet analyzer or an engineering design station — simply by connecting to the appropriate computer on the network. A single computer, going out through a switching multiplexer, can select the best printer for a specific job: dot matrix, flatbed plotter, laser and so forth.

To manage all these users and their access to multiple resources, newer switching multiplexers make it possible to define, for any terminal, precise access rights to each of the various resources spread around the network.

Closed user group options, a feature of switching multiplexers, allow the network manager to exercise more complete control over the usage of system resources by excluding any terminal not specifically admitted.

High Speed and T-1

Today's networking applications, which use traditional voice-grade data links, face speed restrictions. The coming generation of multiplexers will provide significantly higher speed capabilities and the network management tools to utilize this increased bandwidth for a variety of office automation applications.

T-1 rate links (1.544M bit/sec) provide an answer to the total speed problem. T-1 rate costs are plummeting, thus creating cheaper bandwidth.

New multiplexers make this ultrawide bandwidth practical by splitting it into more familiar "chunks," such as 9,600 bit/sec. The beauty of the latest T-1 multiplexers is convenience and their flexibility to tailor the "chunks" precisely to fit a user's need. To accomplish this, the data communications industry has taken a new look at TDM techniques.

Recall that TDM was defined previously in terms of dedicated virtual circuits and constant bandwidth. The implication was that TDMs were static, a statement which was true in the past.

Old technology TDMs were very hard to program; they had lots of straps, often physical straps as well as switches. The combinations of port speeds that could be programmed were usually limited, particularly when dealing with the random assortment of speeds and terminal parameters encountered in the average mixed system.

The older TDMs were also limited in diagnostics and offered limited or nonexistent statistics. Almost all were incapable of attaching to a unified network management system.

The new generation of TDMs are a great leap forward, particularly because of automatic reframing. This feature uses microprocessor

control to interpret relatively simple instructions from the operator and programs the "straps" in memory. The time intervals assigned to each port are shifted easily. Not only are these TDMs easier to program, but being designed for data (rather than being derived from voice channel banks), they are flexible enough to combine any type of digital information — data, compressed video, facsimile, digitized voice and so on — over one circuit.

Most large companies today operate multiple networks, running voice, data, facsimile equipment and video in parallel. Unifying these functions into one network not only cuts costs, but puts the entire communications network under a single management system. The T-1 facilities management systems in the new generation of TDMs provide a single system networking solution for all of a user's communications needs.

The argument is made that most users do not have megabit bandwidth requirements. True, not all computers can use the full 1.5M bit/sec capacity. But by combining voice, video and data, there is often more than enough bandwidth to justify T-1.

But aren't they fundamentally different kinds of information? Not at all. While compressing video signals from several megahertz analog to digital bit streams of less than 500K bit/sec is still the province of specialized coder/decoders (codecs), these television devices are available and produce a standard digital output. T-1 multiplexers themselves are adding integral voice digitization through special I/O cards. Using the latest techniques for voice coding, it is possible to convert a normal conversation to 32K bit/sec (half the Bell standard) and below.

What does it mean to a user to have a hotshot T-1 multiplexer with super-sophisticated automatic reframing? Let's look at one short scenario.

You have the T-1 bandwidth and have adapted your present facsimile machines to much higher speeds: a full page now takes two seconds. You have a standard video compression codec that requires less than 500K bit/sec. Both machines are installed in the boardroom, where the president is now holding a videoconference.

The chief engineer in another state comes to a point where he wants to hand the president a drawing. Instead, he puts it in the facsimile transmitter. With advanced bandwidth allocation, a T-1 multiplexer might have to interrupt the video signal for two seconds while the drawing is sent. The video picture would be frozen temporarily, but might not even be noticed by the people participating in the videoconference.

The new TDMs with T-1 rates will provide dynamic bandwidth contention that makes such feats possible. This is not allocation, nor statistical multiplexing, but contention among users attached to the network. Until a device bids for the bandwidth, no bandwidth is allocated to it. This gives the network operator a great deal of flexibility because the aggregate speed of attached devices can be more than the bandwidth of the data link.

If T-1 TDMs can do all that then some would suggest statistically multiplexing at T-1 rates. Unfortunately, for two main reasons, this technique does not work.

The first reason is due to delays. Statistical multiplexers buffer input data to prepare it for sharing the composite link. This takes time, and introduces a variable delay that means nothing to an interactive CRT terminal, but will be unacceptable in a voice conversation.

The second reason is transparency. A TDM is not sensitive to protocols — a statistical multiplexer is. Any form of data can be handled with a TDM.

In addition, the inputs to T-1 are usually high-duty cycle: voice, computer-to-computer links, remote job entry and so forth. Statistical multiplexing simply eliminates idle time — if there is no idle time, then the statistical multiplexer offers no advantage.

Another multiplexer feature becoming more important as networks grow is enhanced diagnostics. Of great importance is systemwide alarm reporting of any fault in the network to a single point. For the sake of the operator, single-point diagnostics are essential and are becoming more widely available.

In the near future the intelligence being brought into the new TDMs will make it possible to transfer this single control point to different locations. In this way control can follow the day shift from time zone to time zone, or be passed to anyone available after a disaster.

Part of this control is due to electronic patch features that provide total port and destination independence for the network. The next logical enhancement in TDMs will be an ability to work with future generation PBXs to deliver more integrated services.

Data multiplexers and the new generation of T-1 rate TDMs, with more advanced features and intelligence, are approaching the former functions of front-end processors. They provide powerful tools for solving networking requirements, and will become even more powerful in the near future.

Multiple T-1 links, with bypass and alternate routing, reduced bandwidth, digital voice and dynamic bandwidth contention are announced features that are being introduced by vendors today. Juggling of bandwidth and tricks with automatic reframing will take more time.□

Michaels is a member of the staff of the product planning department of Timeplex, Inc., located in Woodcliff Lake, N.J.

Keeping Networks Under Control

By Rudolf Strobl

The continuing evolution of multivendor environments, the explosive proliferation of personal computers and end-user computing and the divestiture of AT&T (giving users many more communications options) are catalyzing the growth and increased complexity of data communications networks. These developments have created a need for alternatives to routine functions such as monitoring, fault isolation and equipment restoration as well as automatic network reconfiguration.

At the same time, devices are being connected to networks at a pace that far exceeds the ability of the organization to maintain such devices.

Products that enhance network management will comprise 15% to 30% of total systems cost in the not-too-distant future.

The following article is based upon research done by the Yankee Group and published in a report titled Network Management and Diagnostics.

End users do not have the time or the inclination to worry about what is going on behind the communications port. To them the keyboard represents the net

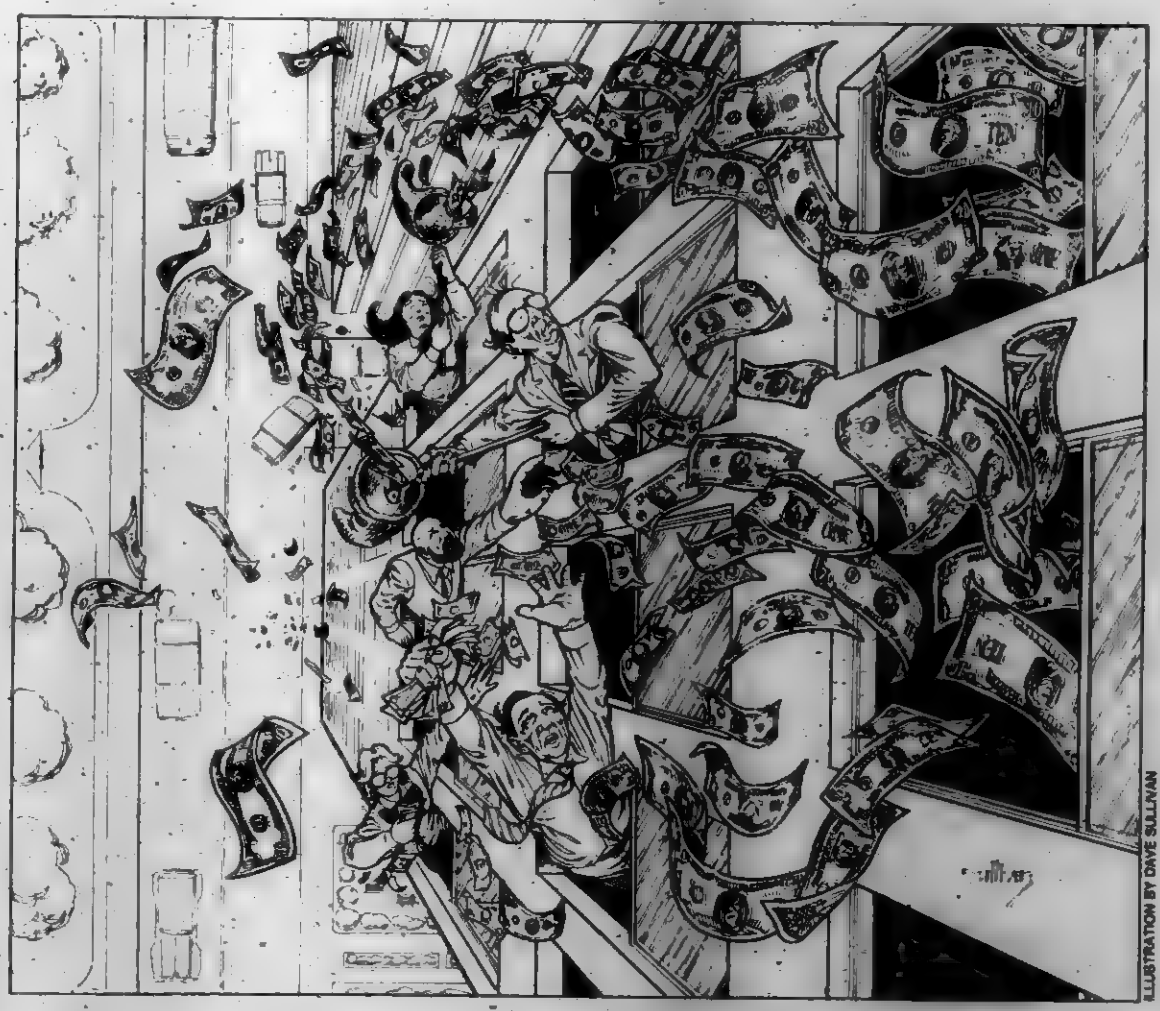


ILLUSTRATION BY DAVE SULLIVAN

work. Their primary concern is the ease of accessing information. The network and its functions must therefore appear completely transparent to users. Networking is becoming the key to information management among the diverse groups of users seeking access to corporate information resources. Thus, network management functions should support both hardware (computers, modems and front-end processors) and software (for applications and network control programs as well as access-method software in host CPUs). In other words, network management facilities should reside in all network components.

Although it is not a technical discipline, network management is a complex and far-encompassing discipline which covers every physical and logical object or component of the network, starting at the keyboard and extending to the applications programs. It encompasses both the communications element of the network and the data processing system (meaning terminals and central processors). It involves facilities that are needed in support of more complex functions such as network information and software management. These functions are necessary due to the fragmentation and dispersion of the "terminal/program/data" elements from single to multiple computer environments.

Some network information management software is available, but it is not available for all the components that have to be integrated in the network. IBM has incorporated all these concepts in its Systems Network Architecture (SNA) as well as some of the software that will control these processes. However, the functionality in terms of supporting certain types of applications such as file transfer are not yet fully developed. For example, SNA lacks an interactive file transfer capability.

Instead of the applications hardware and software controlling the network, the specific network software will control access to the applications and the types of applications. This is based on the presumption that at the moment a device is connected to the network it actually becomes a part of the network. Users should therefore evaluate all network components in terms of their ability to complement control and management functions.

The potential for the network information management market is very large and there are a great deal of opportunities to be exploited by independent data communications equipment systems vendors as well as by IBM. Yet the market has not been fully realized by vendors other than modem manufacturers and a few companies who have been and are currently dominating the opportunities for stand-alone line-diagnostic facilities.

Undoubtedly, the only realistic solution is centralized control supported by decentralized functions resident in every physical and logical network component, enabling a central problem-determination data base to be maintained and used for performance evaluation, capacity planning and other related activities. Characteristic of this approach is network management and control via a network architecture, with SNA coming closest to the optimal solution. The Yankee Group survey found that by the end of 1983, 60% of IBM's large-system users worldwide will have implemented some form of SNA.

Network management, from an architectural perspective, has an objective that goes beyond establishing and managing a communications link between two processors. True communication takes place only when the application process at either end of a connection are making meaningful exchanges of information.

Network and computer systems vendors, therefore, have had to implement their own architectural strategies to satisfy their users' current networking requirements — hence the creations of SNA, Digital Equipment Corp.'s Decnet, Data General Corp.'s Zodiac and Honeywell, Inc.'s Distributed System Architecture.

With the exception of IBM, most of these vendors have attempted to parallel what they perceive will be the direction of the open systems interconnect (OSI) model, but since only three of the seven layers of the OSI model have been fully specified, vendors are essentially flying in the dark, trying to match what they think will be the eventual standards.

Independent data communications equipment vendors of computer terminal and communications equipment need to follow different approaches to provide both solutions that can integrate the components into the SNA strategy, and imaginative products that can improve their capabilities over competitors.

Even if IBM's integrated approach is chosen by user organization — meaning Communications Network Management (CNM) with all its strategic structure of program products such as Network Communications Control Facility (NCCF), Network Problem Determination Application (NPDA), Network Program Analyzer (NPA) and so on — opportunities remain open for other vendors to promote their own network management solutions and products, which can be as or more sophisticated than currently available IBM offerings. In fact, the unique architecture and flavor of each distributed computer operating environment requires tailored, product-oriented network management support for remote maintenance; performance analysis and console management. Consequently, a good market exists for non-IBM vendors with good network management products.

To demonstrate the current value of the total communications network management market, an examination of IBM's line of network management facilities currently available for the various network components should be made. These include:

PERCENTAGE THAT CNM FUNCTIONS ABSORB IN NETWORK COMPONENTS

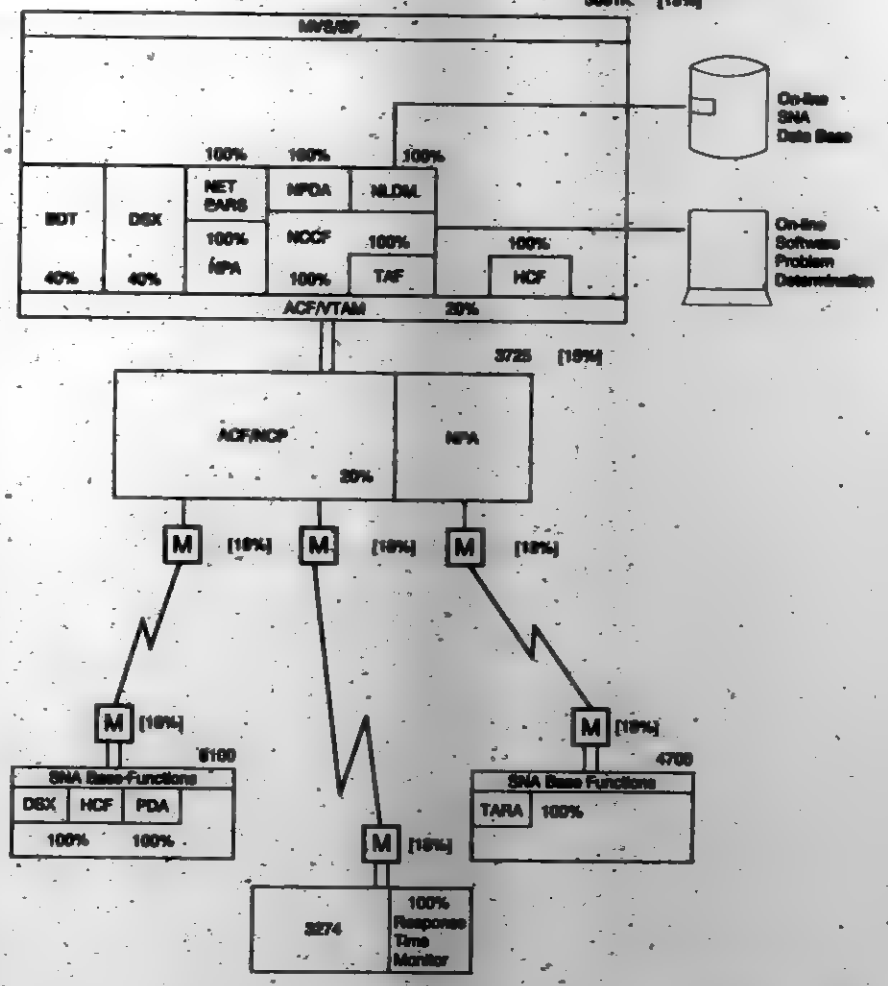


Figure 1

Chart Courtesy of The Yankee Group

- Host-based Communications Network Management products.
- Distributed systems based CNM products.
- Diagnostic facilities in modem equipment.
- Network management functions in the 3705 and 3725 communications controllers and other components.

Since dollar figures for the cost of network management are not officially available from vendors, it is not intended to claim total accuracy but to provide a sense of perspective for the sometimes hidden and often ignored cost of these increasingly critical network functions. Moreover, it includes only the cost of products, not technical support or even the dedicated personnel that are currently required in support of these activities. Users should factor in their own costs to arrive at the total cost of network management. In addition, many one-time charge programs, available to simplify network management functions, are not included in the following figures.

Figure 1, shown above, illustrates the percentages that CNM facilities absorb in network components — computers, program products and modems. For example, 20% of IBM's Virtual Telecommunications Access Method is allocated to network management because of all the support needed for NCCF. The percentage of diagnostic intelligence in modem equipment (18%) has been calculated from prices of equipment with and without diagnostic capabilities. There is a considerable amount of hardware logic in the 3725 controller to perform self-diagnostics and failure isolation, for

Computerworld presents the three most important factors in creating the #1 specialized business publication in the United States:

Factor 1

Great Editorial. When you ask $44 a year for a subscription — the editorial better be worth it. Ours is. Because we hire journalism skills first and computer industry background second. Our writers instinctively recognize the lead in a story. They can smell another story when they haven't even completed the one they're working on. They know how to interview; how to get the source to reveal facts that never were intended to be released.

Factor 2

Great Editorial. Our writers are pros at giving our readers what they need because they go where our readers are. They go to the same seminars, conferences, manufacturers' training programs and trade shows. And they don't just listen with our readers — they listen to them. So our readers get responsive editorial. And they regularly vote *Computerworld* "most useful publication" — both in our own studies and in those done by independent organizations.

Factor 3

Great Editorial. Because *Computerworld's* editorial department is supported by subscription revenue, our writers know who they're working for. They write the stories our readers need to see — independent from our advertising. And our advertisers appreciate our reputation for editorial integrity as much as our readers do.

Editorial. It's the most important factor in developing *Computerworld* as the #1 specialized business publication in the U.S. And you'll find that our sales people know as much about our readers and our marketplace as our writers do. They'll be happy to give you the facts, the numbers and a first-class overview of the marketplace. Just call Don Fagan, Vice President, Sales at 1-617-879-0700.

COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

COMMUNICATIONS NETWORK MANAGEMENT CONFIGURATION — HARDWARE AND SOFTWARE FOR A HYPOTHETICAL BANKING ORGANIZATION

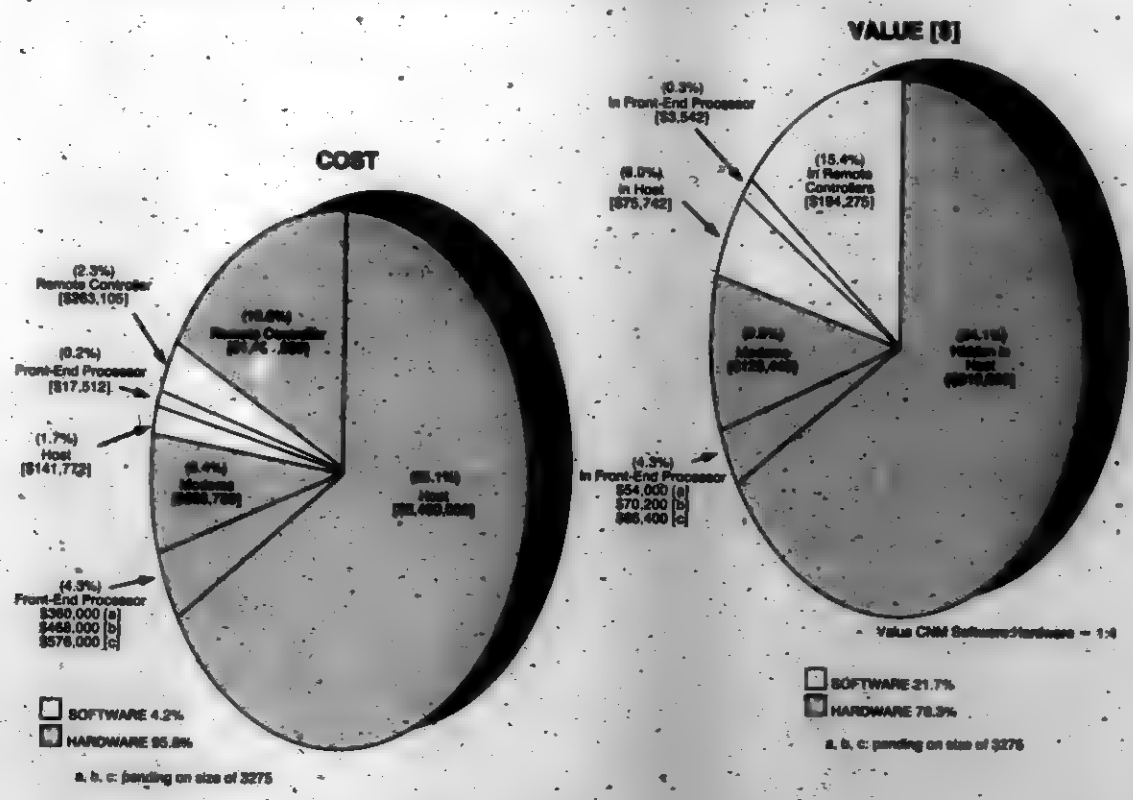


Figure 2

Chart Courtesy of The Yankee Group

both internally and externally attached devices; in addition, the 3725 has a dedicated console for network management functions. Host Command Facility (HCF), which is used in conjunction with Terminal Access Facility (TAF) and allows network operators to control multiple 8100 Distributed Processing Program Executive (DPPX) systems concurrently, as well as Distributed Systems Executive (DSX), which assists users in the managing distributed systems, are both hidden in the operating system of the 8100.

Moreover, in order to have a better grasp of the actual cost of network management facilities, let's create a hypothetical banking organization running one IBM 3081K host computer; two colocated 3725 Communications Controllers (to back up each other), with 70 physical nodes attached consisting of 10 8100 remote controllers, 25 4700 banking controllers, 35 3274 controllers connected through dedicated lines (with 3865 modems transmitting at 9,600 bits/sec).

The 8100 supports some desktop and personal computers, peripherals and so on; the 4700 supports up to 10 terminals and a number of printers; and the 3274 controllers support some display terminals.

Figure 2, shown above, depicts the both the value and the cost of CNM configuration hardware and software for the hypothetical banking organization, and shows that the proportion between the value of CNM software and hardware is 1:4.

The cost pie chart shows the actual cost of CNM configuration hardware and software for the hypothetical banking organization.

Comparison of dollars in the value of CNM configuration hardware and software with dollars in the actual cost of hardware and software configuration yields a percentage of 15.2% — meaning the value of network management hardware and software relative to the actual cost incurred by our banking organization. In other words, CNM facilities represent 15.2% of the actual cost of hardware and network management

program products.

What is the significance of these dollar values and percentages to both users and vendors?

The importance of network management facilities has dramatically increased throughout the last five years. As modem and other line component vendors capitalized on this market with expensive and sophisticated network control centers which only integrate a small percentage of the actual network components, IBM has concentrated and promoted the rather slow but powerful concept of a totally integrated Communications Network Management approach.

During this period of proving their concept, IBM prices remained fairly competitive. The dramatic advantage of a concept that is finally beginning to work will switch the tide toward IBM's integrated approach, but it will also cost users considerably more, even after economies from declining hardware costs have been factored into the total system cost.

While hardware costs will continue to decline relative to software costs, the cost of network management functions will dramatically increase throughout the next three years. In order to continue its annual growth of 15% to 20%, IBM will have to increase the volume of distributed-type hardware sales as well as increase the cost of existing and forthcoming network management systems software.

Projections reveal that total network management systems costs will increase from 15% to 30% or greater as part of total systems costs. This does not include costs of facilities or applications software — such as IMS, Cics, Time-Sharing Option and so forth — which would add an additional 10% to 20% to total system cost. This will bring users increased benefits in terms of network reliability, availability and maintainability and will certainly have an impact in the users' planning of their budgets for network management facilities and services.

For vendors that compete with IBM on a hardware basis, these price developments will provide clues as to how fast IBM can afford to lower its hardware prices. IBM's competitive advantage is partially to offset decreases in hardware prices through both price increases of existing network management software program packages and releases of new network control products. IBM's competitors have no comparative advantage unless they can:

- Provide better products in support of their network components within IBM CNM environments.
- Compete against CNM applications with user-friendly, easy-to-use CNM products, which can make use of existing CNM data generated by IBM products.
- Improve and expand the existing market of line-monitoring equipment.

In recent months, many of the traditional mainframe manufacturers granted SNA a wary approval. Although they continue to shun the notion of direct IBM-compatibility, each of the major mainframe companies, in addition to DEC, Wang Laboratories, Inc. and Hewlett-Packard Co., have formally announced both their intention to support SNA and products that demonstrate each vendor's aggressive program to offer high-level software and communication interconnectability with SNA.

For example, NCR Corp. and Sperry Corp. are developing strategies based on terminal- and cluster-controller-level software interconnection conforming to IBM's Physical Unit 2 (PU2) specification of SNA for peripheral nodes and are planning to adopt higher-level SNA specifications, known as the PU4 and PU5, for their products. These allow communications controllers and host interconnection respectively. The PU4 specification, which represents network control program (NCP) support, has been offered for some time in the NCR Comten product line of IBM-compatible front-end processors.

Similarly, most minicomputer vendors are planning to supply gateways for SNA by the mid-1980s (DEC already does), but the efficiency and ease-of-use of these communications products will depend heavily on cooperation from IBM in supplying interface information at the earliest possible date after the release of new product specifications, systems software and network control software.

Both IBM and other entrepreneurial vendors will also make different alternatives available that will extend the level of connectivity between computer-driven nodes in SNA networks. For this purpose, the major IBM competitors are developing SNA connectors. The primary function of these products is to provide logical connectability to host-based strategic IBM products, in addition to computer-to-computer functionality currently missing from IBM.

Network management is one of the businesses that have a secure, enormous market. The sheer size of communications networks and their indispensability in every business and government enterprise ensures that network management products will enjoy a dramatic and healthy growth throughout the decade.‡

Strobl is a senior analyst at the Yankee Group, a Boston-based strategic market planning service. He directs the company's Data Communications Planning Service.

FEBRUARY 1984

VENDOR PROFILES

A. B. DICK CO.
Office Products
5700 W. Touhy Ave.
Chicago, IL 60648
(312) 647-8600
Major Market: Component, Computer, Terminal, Peripheral and Office Equipment Manufacturing; OEM (Computer Systems); Software House
Target Industries: Education; Government; Legal
Target Applications: OA
Contacts:
Head of Marketing: Clayton Soldey
Geographic Coverage: International
Year Established: 1884

ABLE COMPUTER
1732 Reynolds Ave.
Irvine, CA 92714
(714) 979-7030
Major Market: Peripheral and Communications Equipment Manufacturing
Contacts:
Head of Marketing: Bob Jones
Head of Sales: LaVone Wichman
Geographic Coverage: International
Year Established: 1975
Number of Employees: 160

ABT ASSOCIATES
ABT Microcomputer Software
55 Wheeler St.
Cambridge, MA 02138
(617) 492-7100
Major Market: Software House
Target Industries: Apple II
Target Applications: Communications
Contacts:
Head of Marketing: W. Harrington
Geographic Coverage: National
Year Established: 1982

ACC (ADVANCED COMPUTER COMMUNICATIONS)
720 Santa Barbara St.
Santa Barbara, CA 93101
(805) 963-9431
Major Market: Communications Equipment Manufacturing; OEM (Peripherals-Terminals); Software House; Systems House (Commercial OEM)
Target Industries: Communications
Contacts:
Head of Marketing: Don Lavallee
Head of Engineering: Ed Fash
Year Established: 1976
Number of Employees: 150

ACCESS TELECOMMUNICATIONS CORP.
60 Shore Dr.
Burr Ridge, IL 60521
(312) 920-7920
Major Market: Communications Equipment Manufacturing; Software House
Target Industries: Communications; Telecommunications
Contacts:
Head of Marketing/Sales: Mike Doyle
Geographic Coverage: International
Year Established: 1982
Number of Employees: 15

ACTION/HONEYWELL
4401 Beltwood Pkwy. S.
Dallas, TX 75234
(214) 386-3500
Major Market: Communications Equipment Manufacturing
Target Industries: Telecommunications
Target Applications: Voice Networking; Data Network; Message Switching
Contacts:
Head of Marketing/Sales: N. Michael Ports
Head of Software/Engineering: Fred Gentice
Geographic Coverage: National
Year Established: 1970
Number of Employees: 300

ADVANCED COMPUTER TECHNIQUES
16 E. 32 St.
New York, NY 10016
(212) 696-3600
Major Market: OEM (Computer Systems); Software House; Systems House (Commercial OEM)
Target Industries: Banking; Medical; Manufacturing
Target Applications: Custom Application
Contacts:
Head of Marketing/Sales: Lesley Harsh
Geographic Coverage: International
Year Established: 1962
Number of Employees: 350

ADVANCED INFORMATION MANAGEMENT
20 Kilby St.
Boston, MA 02109
(617) 367-1612
Major Market: Software House
Target Industries: Data Processing; Finance
Target Applications: Data Processing; Financial
Contacts:
Head of Marketing/Sales: Michael Alles
Head of Software: Edward Tighe
Geographic Coverage: National
Year Established: 1978
Number of Employees: 75

ADVANCED MICRO TECHNIQUES
Suite 209
1291 E. Hillsdale Blvd.
Foster City, CA 94404
(415) 349-9336
Major Market: Software House
Net Sales: $100,000 - $500,000 (1981)
Contacts:
Head of Marketing: Jack D. Coplan
Head of Software: Ed L. Bank
Geographic Coverage: International
Year Established: 1977

ADVANCED SOFTWARE PRODUCTS, INC.
100 E. Linton Blvd.
Tower B
Delray Beach, FL 33444
(305) 276-5080
Major Market: Software House; Systems House (Commercial OEM)
Net Sales: $1 Million - $5 Million (1981)
Contacts:
Head of Marketing: A. Oliveri
Geographic Coverage: International
Year Established: 1976
Number of Employees: 12

ADVANCED SYSTEMS CONCEPTS, INC.
22 Hudson Place
Hoboken, NJ 07030
(201) 798-6400
Major Market: Software House
Target Industries: Banking; Commercial; Engineering; Education
Target Applications: DEC-IBM Communications
Contacts:
Head of Marketing: Joseph Affrunti
Head of Sales: Benjamin Rosenberg
Head of Software/Engineering: David Schwartz
Geographic Coverage: International
Year Established: 1981
Number of Employees: 10

AETNA TELECOMM LABS
131 Flanders Road
Westboro, MA 01581
Major Market: Component and Communications Equipment Manufacturing
Target Industries: Telecommunications
Target Applications: Nonspecific
Contacts:
Head of Marketing/Sales: Marjorie Katz
Head of Engineering: Leon Woo
Geographic Coverage: International
Year Established: 1981
Number of Employees: 50

AGILE CORP.
Building E
2290 Ringwood Ave.
Concord, CA 94520
(800) 538-1634
Major Market: Component, Terminal, Peripheral and Communications Equipment Manufacturing
Target Industries: IBM Mainframe Owners; Fortune 1450
Target Applications: 3270 Environment
Net Sales: $1 Million - $5 Million (1981)
Geographic Coverage: International
Year Established: 1977
Number of Employees: 31

AIR LAND SYSTEMS CORP.
2710 Prosperity Ave.
Fairfax, VA 22031
(703) 573-1100
Major Market: Component Manufacturing; Software House
Contacts:
Head of Sales/Marketing: Bill Axe
Geographic Coverage: International
Year Established: 1970
Number of Employees: 30

ALDEN ELECTRONICS, INC.
Washington St.
Westboro, MA 01581
(617) 366-8851
Major Market: Peripheral and Office Equipment Manufacturing
Target Industries: Meteorology; Banking
Contacts:
Head of Marketing/Sales: Lawrence A. Farrington
Head of Engineering: Charles Willingham
Geographic Coverage: National
Year Established: 1948
Number of Employees: 120

ALPHA SYSTEMS LTD.
316 N. Michigan Ave.
Chicago, IL 60601
(312) 346-0707
Major Market: Software House; Systems House (Commercial OEM); Dealer/Distributor
Target Industries: Legal; Accounting Business Services
Target Applications: Accounting; Legal Billing; Communications; Word Processing
Net Sales: $500,000 - $1 Million (1981)
Geographic Coverage: Regional
Year Established: 1979
Number of Employees: 8

ALPHAMATRIX, INC.
1021 Millcreek Dr.
Feasterville, PA 19047
(215) 355-3297
Major Market: Communications Equipment Manufacturing; Software House
Target Industries: Communications; Pharmaceutical; Banking; Insurance
Target Applications: Process Control
Net Sales: $500,000 - $1 Million (1981)
Contacts:
Head of Software: Vince Judith
Geographic Coverage: National
Year Established: 1973
Number of Employees: 14

ALSPA COMPUTER, INC.
477 Division St.
Campbell, CA 95008
(408) 370-3000
Major Market: Computer Manufacturing
Target Industries: System Integrators; OEMS
Target Applications: Medical; Dental Billing; POS
Contacts:
Head of Marketing/Sales: Richard Brooks
Head of Engineering: Bill Streeper
Head of Customer Service: Dennis Henning
Geographic Coverage: International
Year Established: 1980

ALTERGO PRODUCTS, INC.
Suite 6900
400 W. Cummings Park
Woburn, MA 01801
(617) 938-6811
Major Market: Software House

Vendors

Target Industries: IBM users
Geographic Coverage: National
Year Established: 1981
Number of Employees: 12

THE ALTERNATE SOURCE
704 North Penn Ave.
Lansing, MI 48906
(517) 482-6270
Major Market: Software House
Geographic Coverage: National
Year Established: 1980
Number of Employees: 4

AMDAHL CORP.
1250 E. Arques Ave.
P.O. Box 470
Sunnyvale, CA 94086
(408) 746-6000
Major Market: Component, Computer, Peripheral and Communications Equipment Manufacturing; OEM (Computer Systems); Software House; Dealer/Distributor
Target Applications: Project Productivity
Contacts:
Head of Software: Fredrick M. Trapnell, Jr.
Head of Engineering: Bruce O'Beebe
Geographic Coverage: International
Year Established: 1970
Number of Employees: 5,500

AMDAHL CORP.
Amdahl Communications Systems Division
2500 Walnut Ave.
Marina Del Rey, CA 90291
(213) 822-3202
Major Market: Computer and Communications Equipment Manufacturing
Target Industries: Government; Education; Finance; Fortune 500
Contacts:
Head of Sales: Owen Frances
Geographic Coverage: International
Year Established: 1969
Number of Employees: 700

AMERICAN COMPUTER & ELECTRONICS CORP.
Suite 242
2 Professional Dr.
Gaithersburg, MD 20879
(301) 258-9850
Major Market: Peripheral Manufacturing; OEM (Computer Systems); OEM (Peripherals-Terminals); Software House; Systems House (Commercial OEM); Data Services (Service Bureau)
Target Industries: Military; Telecommunications
Target Applications: Special Military Equipment; Office Automation; Telephone Automation
Net Sales: $1 Million - $5 Million (1981)
Contacts:
Head of Marketing: Ron Trowbridge
Head of Sales: Dave Ercole
Head of Software: Kim Richeson
Head of Engineering: Bill Keys
Head of Customer Service: George Smoot
Geographic Coverage: International
Year Established: 1965
Number of Employees: 100

AMERICAN LASER SYSTEMS, INC.
106 James Fowler Road
Goleta, CA 93117
(805) 967-0423
Major Market: Component and Communications Equipment Manufacturing
Target Applications: Data Transmission; Video Transmission
Net Sales: $500,000 - $1 Million (1982)
Contacts:
Head of Marketing/Sales: L. Shallenberger
Head of Engineering: Robert Lewis
Head of Customer Service: Robert Klemovec
Geographic Coverage: International
Year Established: 1968
Number of Employees: 22

AMERICAN PHOTONICS, INC.
71 Commerce Road
Brookfield, CT 06804
(203) 775-8950
Major Market: Communications Equipment Manufacturing
Target Industries: Data Communications; Telecommunications
Contacts:
Head of Marketing: Scott Siderman
Geographic Coverage: International
Year Established: 1981
Number of Employees: 20

AMERICAN TELECOM, INC.
3190 Miraloma Ave.
Anaheim, CA 92806
(714) 630-7721
Major Market: Communications Equipment Manufacturing
Target Industries: Hotel; Motel
Contacts:
Head of Sales: John Combs
Head of Engineering: Allan Thompson
Geographic Coverage: International
Year Established: 1976
Number of Employees: 400

AMNET, INC.
P.O. Box 412
101 Morse St.
Watertown, MA 02172
(617) 923-1850
Major Market: Component and Communications Equipment Manufacturing; Software House; Systems House (Commercial OEM)
Target Industries: Banking; Service Bureaus; Insurance; Government
Target Applications: Private Data Network; Payroll; Pay-By-Phone
Net Sales: $1 Million - $5 Million (1981)
Contacts:
Head of Marketing/Sales: John S. Whelan
Head of Software: Peter Cole
Head of Engineering: Richard Pepe
Geographic Coverage: International
Year Established: 1969
Number of Employees: 75

AMTELCO
6025 Monona Dr.
Madison, WI 53716
(608) 221-3856
Major Market: Communications Equipment Manufacturing; OEM (Computer Systems); Systems House (Commercial OEM)
Target Industries: Answering Service
Target Applications: Operator and Answering Service
Contacts:
Head of Marketing: Bernard Torvik
Geographic Coverage: International
Year Established: 1974
Number of Employees: 130

ANASAZI
2219 E. University Dr.
Phoenix, AZ 85034
(602) 275-0302
Major Market: Communications Equipment Manufacturing; Software House
Target Industries: Lodging; Banking; Cable TV
Contacts:
Head of Marketing: Elaine Ornburg
Head of Engineering: Jan Wlodarkiewicz
Head of Customer Service: Tom Burns
Geographic Coverage: International
Year Established: 1980
Number of Employees: 65

ANCHOR AUTOMATION, INC.
6913 Valjean Ave.
Van Nuys, CA 91406
(213) 997-6493
Major Market: Communications Equipment Manufacturing
Target Industries: Retail
Contacts:
Head of Marketing: Bert Weiss
Head of Sales: Bert Weiss
Head of Software: Brian Ulch
Head of Engineering: Jim Meador
Geographic Coverage: National
Year Established: 1979
Number of Employees: 40

ANDERSON JACOBSON, INC.
521 Charcot Ave.
San Jose, CA 95131
(408) 263-8520
Major Market: Terminal, Peripheral and Communications Equipment Manufacturing; Software House
Target Applications: APL Programs
Contacts:
Head of Marketing: Dick DeLong
Head of Sales: Thomas Zmech
Head of Engineering: Wayne Seppeler
Geographic Coverage: International
Year Established: 1967
Number of Employees: 875

APEX TECHNOLOGY
10965 N. 5900 W.
Highland, UT 84003
(801) 350-8672
Major Market: Communications Equipment Manufacturing
Target Industries: Banking; Insurance
Contacts:
Head of Marketing/Engineering: Mike Stanford
Geographic Coverage: National
Year Established: 1982
Number of Employees: 4

APPLIED CYBERNETICS, INC.
224 Camino Del Cerro
Los Gatos, CA 95030
(415) 651-3000
Major Market: Software House
Target Industries: Manufacturing; Programming
Contacts:
Head of Marketing: Douglas Hulme
Geographic Coverage: International
Year Established: 1977
Number of Employees: 2

APPLIED DATA RESEARCH, INC.
Rte. 206
Orchard Road
Princeton, NJ 08540
(201) 874-9000
Major Market: Software House
Contacts:
Head of Marketing: Donald A. Jordon
Head of Sales: E. Linwood Pearce
Head of Software: Martin A. Goetz
Geographic Coverage: International
Year Established: 1959
Number of Employees: 825

APPLIED INFORMATION SYSTEMS, INC.
500 Eastowne Dr.
Chapel Hill, NC 27514
(919) 942-7801
Major Market: Software House
Target Applications: Compilers (PL/1); Data Entry; Word Processing; Communications
Net Sales: $100,000 - $500,000 (1981)
Contacts:
Head of Marketing: Elizabeth Epermanis
Geographic Coverage: International
Year Established: 1972
Number of Employees: 7

APPLITEK CORP.
107 Audubon Road
Wakefield, MA 01880
(617) 246-4500
Major Market: Communications Equipment Manufacturing; Software House
Target Industries: Government; Scientific; Universities
Target Applications: Communications
Contacts:
Head of Software: Patricia Elliot
Head of Customer Service: Dale Hokanson
Geographic Coverage: National
Year Established: 1982
Number of Employees: 40

ARBAT SYSTEMS LTD.
5 Marine View Plaza
Hoboken, NJ 07030
(212) 269-1300
Major Market: Software House; Systems House (Commercial OEM); Data Services (Service Bureau)

Contacts:
Head of Marketing: Christopher Manderson
Head of Sales: Mark Lobene
Geographic Coverage: International
Year Established: 1975
Number of Employees: 110

ARK ELECTRONIC PRODUCTS, INC.
325 W. Hibiscus Blvd.
Melbourne, FL 32901
(305) 724-5260
Major Market: Communications Equipment Manufacturing
Contacts:
Head of Marketing/Sales: Gayle Lucas
Head of Software/Engineering: P.W. Schirmer
Geographic Coverage: International
Year Established: 1972
Number of Employees: 150

ARTEL COMMUNICATIONS CORP.
P.O. Box 100
W. Side Station
Worcester, MA 01602
(617) 752-5690
Major Market: Communications Equipment Manufacturing
Target Industries: Government; Television Networks; Computer Graphics
Target Applications: CAD/CAM; Transmission of Video/Audio; Digital Data
Contacts:
Head of Marketing: Harry Jain
Head of Sales: John Bielawski
Head of Engineering: Russell Patterson
Geographic Coverage: International
Year Established: 1960
Number of Employees: 40

ASHTON, INC.
209 Tracy Creek Road
Vestal, NY 13850
(607) 748-0800
Major Market: Software House
Geographic Coverage: National
Year Established: 1969
Number of Employees: 9

AST RESEARCH, INC.
2121 Alton Ave.
Irvine, CA 92714
(714) 863-1333
Major Market: Peripheral and Communications Equipment Manufacturing
Target Industries: Banking; Communications; OA; IBM PC users
Contacts:
Head of Marketing: Tom Yuen
Head of Sales: Tom Stickel
Head of Engineering: Albert Wong
Geographic Coverage: International
Year Established: 1980
Number of Employees: 167

ASTROCOM CORP.
120 W. Plato Blvd.
St. Paul, MN 55107
(612) 227-8651
Major Market: Component, Computer and Communications Equipment Manufacturing
Contacts:
Head of Marketing/Sales: Kent Johnson
Head of Software: Michael Anderson
Head of Engineering: Don Kaffein
Geographic Coverage: International
Year Established: 1968
Number of Employees: 150

ATARI, INC.
P.O. Box 427
1265 Borregas Ave.
Sunnyvale, CA 94086
(408) 745-2000
Major Market: Computer Manufacturing; OEM (Computer Systems); Software House
Target Industries: Personal Computer; Education
Target Applications: Educational; General Business; Games
Contacts:
Head of Marketing: Tom McDonough
Head of Engineering: Marcian E. Hoff Jr.
Geographic Coverage: International
Year Established: 1972
Number of Employees: 6,000

ATLANTIC RESEARCH CORP.
5390 Cherokee Ave.
Alexandria, VA 22312
(703) 644-9190
Major Market: Communications Equipment Manufacturing
Target Industries: Fortune 1000; Banking; Manufacturing
Target Applications: Data Communications
Contacts:
Head of Marketing: Keith Britton
Head of Sales: Daniel Ebert
Head of Engineering: J.L. Wallace
Geographic Coverage: International
Year Established: 1949
Number of Employees: 1,800

ATON INTERNATIONAL, INC.
Suite 119
1765 Scott Ave.
Santa Clara, CA 95050
(408) 554-9922
Major Market: Software House
Geographic Coverage: International
Year Established: 1978
Number of Employees: 2

AUSCOM, INC.
2007 Kramer Lane
Austin, TX 78758
(512) 836-8080
Major Market: Communications Equipment Manufacturing
Target Industries: Systems Integrators
Net Sales: $1 Million - $5 Million (1981)
Contacts:
Head of Marketing: Linda Lewis
Head of Engineering: Inaj Vojdani
Geographic Coverage: National
Year Established: 1980
Number of Employees: 15

AT&T INFORMATION SYSTEMS, INC.
100 Southgate
Morristown, NJ 07960
(201) 898-2000
Major Markets: Communication Equipment Manufacturing
Target Industries: Communication
Target Applications: Switching
Contacts:
Head of Marketing/Sales: Robert Casale
Head of Customer Service: Bruce Schwartz
Geographic Coverage: International

AUTOMATED BUSINESS CENTERS
Suite 108
10205 Oasis Dr.
San Antonio, TX 78216
(512) 349-3190
Major Market: Software House; Data Services (Service Bureau); Dealer/Distributor
Net Sales: $500,000 - $1 Million (1982)
Contacts:
Head of Sales/Marketing: Fred Gildart
Geographic Coverage: National
Year Established: 1969
Number of Employees: 15

AUTOMATED PROFESSIONAL SYSTEMS
1450 Broadway
New York, NY 10018
(212) 869-9330
Major Market: Computer Manufacturing; Software House.
Contacts:
Head of Marketing: Doug Sharp
Head of Sales: Don Thompson
Geographic Coverage: International
Year Established: 1978
Number of Employees: 14

AUTOMATION DESIGN, INC.
Suite 1810
500 N. Michigan Ave.
Chicago, IL 60611
(312) 670-2660
Major Market: Software House
Target Industries: Finance; Medical
Contacts:
Head of Customer Service: Peter Boswell
Geographic Coverage: National
Year Established: 1978
Number of Employees: 27

AVANTI COMMUNICATIONS CORP.
Aquidneck Industrial Park
Newport, RI 02840
(401) 849-4600
Major Market: Communications Equipment Manufacturing
Target Applications: Local Data Communications
Net Sales: $1 Million - $5 Million (1981)
Contacts:
Head of Marketing: George Kushin
Head of Sales: William Smith
Head of Engineering: Paul Fredette
Head of Customer Service: Wayne Smith
Geographic Coverage: International
Year Established: 1976
Number of Employees: 68

AVATAR TECHNOLOGIES, INC.
99 South St.
Hopkington, MA 01748
(617) 435-6872
Major Market: Communications Equipment Manufacturing
Target Applications: Communications
Contacts:
Head of Marketing: Daniel Lewis
Geographic Coverage: National
Year Established: 1981
Number of Employees: 70

AVOCOM, INC.
275 Smothers Road
Westerville, OH 43081
(614) 882-6178
Major Market: Communications Equipment Manufacturing;
Year Established: 1970
Number of Employees: 3

A. W. COMPUTER SYSTEMS, INC.
Woods Road
Rt. 38
Cherry Hill, NJ 08002
(609) 779-7200
Major Market: Communications Equipment Manufacturing; OEM (Computer Systems); Systems House (Commercial OEM); Miscellaneous Computer Supplies
Target Industries: Retail
Target Applications: POS; Realtime Inventory
Net Sales: $1 Million - $5 Million (1981)
Contacts:
Head of Marketing: DI Simone
Head of Software: Mike Greenblatt
Head of Engineering: Charles Welch
Head of Customer Service: Andy Nye
Geographic Coverage: International
Year Established: 1973
Number of Employees: 17

BACKUS DATA SYSTEMS
1440 Koll Circle
San Jose, CA 95112
(408) 279-8711
Major Market: Communications Equipment Manufacturing; Dealer/Distributor
Target Applications: Protocol Emulation
Net Sales: $1 Million - $5 Million (1981)
Contacts:
Head of Marketing: A. W. Backus
Head of Software/Engineering: L. Marsala
Geographic Coverage: National
Year Established: 1974
Number of Employees: 20

BAER SYSTEMS, INC.
Suite 315
2500 Blue Ridge Road
Raleigh, NC 27607
(919) 782-4462
Major Market: Software House
Net Sales: Less than $100,000 (1982)
Contacts:
Head of Marketing/Sales: Anthony J. Barr

Vendors

Geographic Coverage: International
Year Established: 1978
Number of Employees: 3

BASIC BUSINESS CONTROL SYSTEMS, INC.
4330 Stafford S.W.
Grand Rapids, MI 49508
(616) 531-2202
Major Market: Software House; Systems House (Commercial OEM); Dealer/Distributor
Target Industries: Retail; Commercial; Government; Education
Target Applications: POS
Contacts:
Head of Sales: Michael Goodyear
Geographic Coverage: Michigan
Year Established: 1961
Number of Employees: 20

BASS SHEED ASSOCIATES, INC.
P.O. Box 646
20 W. Ridgewood
Ridgewood, NJ 07450
(201) 444-3411
Major Market: Software House; Systems House (Commercial OEM)
Target Industries: Military; Industrial; Commercial
Net Sales: $100,000 - $500,000 (1981)
Geographic Coverage: Greater New York
Year Established: 1980
Number of Employees: 5

BAY TECHNICAL ASSOCIATES, INC.
P.O. Box 387
Highway 603
Bay St. Lois, MS 39520
(601) 467-8231
Major Market: Communications Equipment Manufacturing
Target Applications: Data Communications
Contacts:
Head of Marketing: E. Hayden Parker
Head of Sales: C.R. Ramsey
Head of Engineering: M.R. McIver
Year Established: 1974
Number of Employees: 25

BBN COMMUNICATIONS CORP.
Information Management Systems
70 Fawcett St.
Cambridge, MA 02238
(617) 491-1850
Major Market: Communications Equipment Manufacturing; Software House; Consulting
Target Industries: Manufacturing; Insurance
Target Applications: Data Communications
Contacts:
Head of Marketing: Chuck Stein
Head of Sales: Terry Fagin
Head of Software: Robert Harvey
Geographic Coverage: National
Year Established: 1980

BELDEN CORP.
Cooper Industries
2000 S. Batavia Ave.
Geneva, IL 60134
(312) 232-8900
Major Market: Communications Equipment Manufacturing
Contacts:
Head of Marketing: Jim Sopp
Geographic Coverage: National
Year Established: 1902
Number of Employees: 1,000

BENSON C. STONE & ASSOCIATES
P.O. Box 28658
San Diego, CA 92127
(714) 485-7779
Major Market: Software House
Net Sales: $100,000 - $500,000 (1981)
Geographic Coverage: National
Year Established: 1975
Number of Employees: 5

BETACOM CORP.
245 E. Sixth St.
Suite 814
St. Paul, MN 55101
(612) 292-8188
Major Market: Computer and Communications Equipment Manufacturing
Target Industries: Insurance; Legal; Business
Contacts:
Head of Marketing: Bill Presley
Head of Sales: John Zentz
Head of Software: Jerry Thornbeck
Head of Engineering: Al Nuendorf
Geographic Coverage: International
Year Established: 1979
Number of Employees: 24

BICCOMP
532 Waddell Dr.
Sunnyvale, CA 94089
(408) 745-1616
Major Market: Communications Equipment Manufacturing
Contacts:
Head of Marketing: Bruce Miller
Head of Sales: Peter Stokes
Year Established: 1978
Number of Employees: 100

BLACK BOX CATALOG/ EXPANDOR, INC.
Mayview Road
Park Dr.
Pittsburgh, PA 15241
(412) 746-5500
Major Market: Communications Equipment Manufacturing
Contacts:
Head of Marketing: Peter Highberg
Geographic Coverage: International
Year Established: 1976

BO-SHERREL CO., INC.
36133 Niles Blvd.
Fremont, CA 94536
(415) 792-0354
Major Market: Peripheral and Communications Equipment Manufacturing
Net Sales: $1 Million - $5 Million (1982)
Contacts:
Head of Marketing: Carlene L. Rathert
Geographic Coverage: International
Year Established: 1975
Number of Employees: 10

BONNECAZE, MOLEROY & HARRISON
Suite 112
4125 Keller Springs Road
Dallas, TX 75234
(214) 484-0530
Major Market: Software House
Net Sales: $100,000 - $500,000 (1981)
Geographic Coverage: International
Year Established: 1978
Number of Employees: 6

BRABSEN CORP.
MTTS
525 Los Conches St.
Milpitaso, CA 95034
(408) 945-1900
Major Market: Terminal, Peripheral and Communications Equipment Manufacturing; Automatic Tape Library
Target Industries: Financial; Government; Insurance; Manufacturing
Contacts:
Head of Sales: Ray Foster
Head of Software: Peggy Dent
Head of Engineering: Ken McCoy
Geographic Coverage: National
Year Established: 1973
Number of Employees: 800

BROADBAND SYSTEMS, INC.
807 Grundy Ave.
Holbrook, NY 11741
(516) 981-4613
Major Market: Communications Equipment Manufacturing; Systems House (Commercial OEM); Consulting, Communications
Target Industries: Banking; Engineering
Target Applications: Local Area Networks; CAD/CAM; Microwave Communications, Fiber-Optic Communications
Net Sales: $500,000 - $1 Million (1982)
Geographic Coverage: National
Year Established: 1978
Number of Employees: 25

BURROUGHS BANKING SYSTEMS
456 W. State St.
Trenton, NJ 08618
(609) 392-1200
Major Market: Component, Computer and Communications Equipment Manufacturing; Software House
Target Industries: Energy Management; Housing; Large Apartment Complexes
Target Applications: Energy Management; Process Control
Contacts:
Head of Marketing: Hy Gold
Head of Software: Mike Linkebloom
Head of Engineering: Chip Bloodgood
Geographic Coverage: Regional
Year Established: 1981
Number of Employees: 10

BURROUGHS CORP.
Business Machines Groups
Burroughs Place
Detroit, MI 48232
(313) 972-7000
Major Market: Component, Computer, Terminal, Peripheral, Communications Equipment and Office Equipment Manufacturing; OEM (Computer Systems); Software House; Data Services (Service Bureau); Dealer/Distributor
Target Industries: Financial; Distribution; Manufacturing; Education
Geographic Coverage: National
Year Established: 1885

BURROUGHS CORP.
Burroughs Place
Detroit, MI 48232
(313) 972-7000
Major Market: Computer, Communications Equipment and Office Equipment Manufacturing; OEM (Computer Systems); Software House; Dealer/Distributor
Target Industries: Government; OA; Office Supply; Finance
Geographic Coverage: International
Year Established: 1885
Number of Employees: 62,000

BYTCOM, INC.
Suite H
2169 Francisco Blvd.
San Rafael, CA 94901
(800) 227-3254
Major Market: Peripheral, Communications Equipment and Office Equipment Manufacturing; OEM (Peripherals-Terminals); Data Services (Service Bureau)
Target Industries: Banking; Timesharing Services; Dealers and Distributors; PC users
Target Applications: Data Compression; Modem; Multiplexer; Protocol Converting
Contacts:
Head of Marketing: Gary Sorkin
Year Established: 1983
Number of Employees: 150

BYTEX CORP.
2 California Ave.
Framingham, MA 01701
(617) 879-5050
Major Market: Communications Equipment Manufacturing
Target Industries: Transportation; Banking; Network Services
Net Sales: Less than $100,000 (1981)
Contacts:
Head of Sales: Ralph W. Lowry
Head of Software: Bang-Wosi Lu
Head of Engineering: Kenneth Holberger
Head of Customer Service: Glenn Hill
Geographic Coverage: International
Year Established: 1980
Number of Employees: 80

C & W HOSTEL LTD.
48th Floor
110 Penn Plaza
New York, NY 10119
(212) 594-8340
Major Market: Software House;

Systems House (Commercial OEM).
Target Industries: Banking; Airlines; Shipping; Military
Target Applications: Storm Forecasts; Message Switching
Contacts:
Head of Marketing/Sales: John Phillips
Head of Engineering: Larry Reznick
Geographic Coverage: International
Year Established: 1970
Number of Employees: 40

CABLETRON SYSTEMS CORP.
7869 S. W. Nimbus
Beaverton, OR 97005
(503) 643-3329
Major Market: Communications Equipment Manufacturing
Target Industries: Communications; Cable TV
Contacts:
Head of Marketing: David Park
Head of Engineering: Mike Connor
Geographic Coverage: International
Year Established: 1979
Number of Employees: 25

CANOGA DATA SYSTEMS
21218 Van Owen St.
Canoga Park, CA 91303
(213) 888-2003
Major Market: Communications Equipment Manufacturing
Target Industries: Communication
Target Applications: Multiplexing
Contacts:
Head of Sales: Jack Miller
Head of Engineering: Mas NaKamori
Geographic Coverage: International
Year Established: 1978
Number of Employees: 110

CANON U.S.A., INC.
One Canon Plaza
Lake Success, NY 11042
(516) 488-6700
Major Market: Computer, Peripheral and Office Equipment Manufacturing; OEM (Computer Systems); Systems House (Commercial OEM)
Geographic Coverage: International
Year Established: 1966
Number of Employees: 2,500

CAP INFORMATION SYSTEMS
34th Floor
521 Fifth Ave.
New York, NY 10175
(212) 599-7000
Major Market: Software House
Target Industries: Banking; Manufacturing; Retail
Net Sales: $1 Million - $5 Million (1981)
Contacts:
Head of Marketing: Bernard S. Donefer
Head of Sales: Andrew Coleman
Head of Customer Service: Roy Klazka
Geographic Coverage: International
Year Established: 1979
Number of Employees: 60

CARNEY ASSOCIATES, INC.
6000A W. Broad St.
Richmond, VA 23230
(804) 288-8341
Major Market: Software House; Systems House (Commercial OEM)
Target Industries: Retail Fashions and Drugs
Target Applications: Remote Job Entry; Hand-held Data Entry; POS; Communications Networks
Net Sales: $500,000 - $1 Million (1981)
Contacts:
Head of Marketing: Homer C. Carney
Head of Software: R. R. Gingras
Geographic Coverage: Regional
Year Established: 1977
Number of Employees: 10

CATEL
United Scientific Corp.
4800 Patrick Henry Dr.
Santa Clara, CA 95054
(408) 988-7722
Major Market: Communications Equipment Manufacturing
Target Industries: Data Communications; Military; Telephone; Cable TV
Contacts:
Head of Marketing: Jim McLane
Head of Sales: Dick Old
Head of Engineering: Charles Robidart
Head of Customer Service: J. R. Helmer
Geographic Coverage: International
Year Established: 1968
Number of Employees: 200

CENTURY ANALYSIS, INC.
114 Center Ave.
Pacheco, CA 94553
(415) 680-7800
Major Market: OEM (Computer Systems); OEM (Peripherals-Terminals); Software House
Target Industries: General Marketing
Contacts:
Head of Marketing: Clayton L. Parkhill
Head of Customer Service: Frank Zaccari
Geographic Coverage: International
Year Established: 1975
Number of Employees: 60

CERMETEK MICROELECTRONICS
1308 Borregas Ave.
Sunnyvale, CA 94089
(408) 734-8150
Major Market: Component and Communications Equipment Manufacturing
Contacts:
Head of Marketing: Nancy Hess
Head of Sales: Rene Colgate
Year Established: 1963
Number of Employees: 100

CMI CORP.
26055 Emery Road
Cleveland, OH 44128
(216) 831-2622
Major Market: Terminal and Communications Equipment Manufacturing; OEM (Computer Systems); Systems House (Commercial OEM); Data Services (Service Bureau)
Contacts:
Head of Marketing: Maurice Kittle
Geographic Coverage: International
Year Established: 1976
Number of Employees: 24

CNUNG TELECOMMUNICATIONS
Suite 30
450 San Antonio
Palo Alto, CA 94306
(415) 8582456
Major Market: Communications Equipment Manufacturing
Target Industries: Data Communications
Contacts:
Head of Marketing/Sales: May Chung
Year Established: 1982
Number of Employees: 100

CINCOM SYSTEMS, INC.
2300 Montana Ave.
Cincinnati, OH 45211
(513) 662-2300
Major Market: Software House
Target Industries: Cross Industry
Target Applications: Data Base/Data Communications; Manufacturing; Financial
Contacts:
Head of Marketing/Sales: Dennis Yablonsky
Geographic Coverage: International
Year Established: 1968
Number of Employees: 1,000

CISSNETWORK
3401 Science Center
Philadelphia, PA 19104
Major Market: Software House; Data Services (Service Bureau)
Target Industries: Finance; Education; Government
Geographic Coverage: National
Year Established: 1972
Number of Employees: 125

COASTCOM
2312 Stanwell Drive
Concord, CA 94520
(415) 825-7500
Major Market: Component Manufacturing; Communications Equipment Manufacturing
Target Industries: Telephone; Radio; Telecommunications
Target Applications: Voice/Data Communications
Contacts:
Head of Marketing/Sales: William Martin
Head of Engineering: Toney Warren
Head of Customer Service: Paul Rivard
Geographic Coverage: International
Year Established: 1969
Number of Employees: 95

COBE CORP.
Suite 200
2001 W. Beltline Highway
Madison, WI 53713
(608) 274-7416
Major Market: Software House; Systems House (Commercial OEM)
Target Industries: Financial
Target Applications: DBMS
Contacts:
Head of Marketing: Daphne Brayner
Geographic Coverage: National
Year Established: 1976
Number of Employees: 25

COGENSOLL TECHNOLOGY CORP.
1066 N. Broadway
Yonkers, NY 10701
(914) 965-6300
Major Market: Communications Equipment Manufacturing
Target Industries: Telecommunications; Process Control; Communications
Contacts:
Head of Marketing/Sales: Mike Coden
Head of Engineering: Dr. Frederick Scholl
Geographic Coverage: International
Year Established: 1980
Number of Employees: 50

CODEX CORP.

20 Cabot Blvd.
Mansfield, MA 02048
(617) 364-2000
Major Market: Computer, Terminal, Peripheral and Communications Equipment Manufacturing
Target Applications: Data Communications; DP.
Contacts:
Head of Marketing: John Pugh
Head of Sales: Dennis Kinsh
Geographic Coverage: International
Year Established: 1962
Number of Employees: 2,500

COHERENT COMMUNICATIONS SYSTEMS CORP.
60 Commerce Dr.
Hauppauge, NY 11788
(516) 231-1550
Major Market: Communications Equipment Manufacturing
Contacts:
Head of Marketing: Dennis McAlpine
Head of Engineering: Arthur B. Williams
Geographic Coverage: International
Year Established: 1968
Number of Employees: 150

COMI DATA
7900 N. Nagle Ave.
Morton Grove, IL 60053
(312) 470-9800
Major Market: Communications Equipment Manufacturing
Contacts:
Head of Customer Service: Sue Clifford
Geographic Coverage: National
Year Established: 1968
Number of Employees: 40

COMITECH SYSTEMS, INC.
505 Eighth Ave.
New York, NY 10018
(212) 594-5377
Major Market: Communications Equipment Manufacturing
Contacts:
Head of Marketing: Carl M. Mangani

Vendors

Geographic Coverage: International
Year Established: 1969
Number of Employees: 10

COMDESIGN, INC.
751 S. Kellog
Goleta, CA 93117
(805) 964-9852
Major Market: Communications Equipment Manufacturing
Contacts:
Head of Marketing: Arlas Schiff
Geographic Coverage: International
Year Established: 1977
Number of Employees: 100

COMM PRO ASSOCIATES
350 N. Sepulveda Blvd.
Manhattan Beach, CA 90266
(213) 376-1344
Major Market: Software House
Net Sales: $500,000 - $1 Million (1981)
Contacts:
Head of Marketing: Steve Dubow
Geographic Coverage: International
Year Established: 1973
Number of Employees: 3

COMREX, LTD.
141 Central Park Ave. S.
Hartsdale, NY 10530
(703) 821-8766
Major Market: Component and Communications Equipment Manufacturing
Target Applications: Communications
Net Sales: $1 Million - $5 Million (1982)
Contacts:
Head of Engineering: James Southworth
Geographic Coverage: International
Year Established: 1980
Number of Employees: 20

COMMODORE BUSINESS MACHINES, INC.
1200 Wilson Dr.
West Chester, PA 19380
(215) 431-9100
Major Market: Component, Computer, Terminal, Peripheral and Communications Equipment Manufacturing; Software House
Contacts:
Head of Marketing/Sales: Myrdain Jones
Geographic Coverage: International
Year Established: 1976
Number of Employees: 539

COMNETEX, INC.
2411 Crofton Lane
Crofton, MD 21114
(301) 721-3686
Major Market: Communications Equipment Manufacturing
Target Applications: OA
Contacts:
Head of Marketing: George Lockwood
Head of Software: Dorothy C. Naiman
Head of Engineering: Stephen E. Hall
Geographic Coverage: International
Year Established: 1977
Number of Employees: 75

COMMUNICATION DEVICES, INC.
1 Forstman Court
Clifton, NJ 07011
(201) 772-6997
Major Market: Communications Equipment Manufacturing; Dealer/Distributor
Target Industries: Newspaper; Banking
Target Applications: Interfacing and Data; Data Communications
Net Sales: $1 Million - $5 Million (1982)
Contacts:
Head of Marketing: K. Kelly
Head of Software: T. Kelly
Head of Engineering: R. Kelly
Head of Customer Service: Barbara Grembowiec
Geographic Coverage: International
Year Established: 1975
Number of Employees: 15

COMMUNICATION RESEARCH CORP.
1720 130th N.E.
Bellevue, WA 98005
(206) 881-9550
Major Market: Computer and Communications Equipment Manufacturing; OEM (Peripherals-Terminals)
Target Applications: Data Encryption; Data Transmission
Contacts:
Head of Marketing: J.J. Harkins
Geographic Coverage: National
Year Established: 1979
Number of Employees: 22

COMP-U-STAFF, INC.
1 Investment Place P-4
Towson, MD 21204
(301) 828-0788
Major Market: Software House; Systems House (Commercial OEM)
Target Industries: Manufacturing; Engineering; Banking; Insurance
Target Applications: Material Handling; CAD/CAM Manufacturing; Banking
Net Sales: $1 Million - $5 Million (1981)
Contacts:
Head of Marketing: Thomas R. Comet
Head of Software: Douglas Sharp
Geographic Coverage: International
Year Established: 1978
Number of Employees: 100

COMPION CORP.
1101 E. University Ave.
Urbana, IL 61801
(217) 384-8500
Major Market: Software House
Target Industries: Government; Banking
Contacts:
Head of Sales: Gary Tausa
Geographic Coverage: National
Year Established: 1977
Number of Employees: 66

COMPLEX SYSTEMS, INC.
4830 Research Dr.
Huntsville, AL 35805
(205) 830-4130
Major Market: Communications Equipment Manufacturing
Target Applications: Local-Area Networkg
Contacts:
Head of Sales: Bill Thomas
Head of Engineering: Bayron Driver
Year Established: 1982
Number of Employees: 30

COMPRE COMM, INC.
3200 N. Farber Dr.
Champaign, IL 61821
(217) 352-2477
Major Market: Communications Equipment Manufacturing
Net Sales: $1 Million - $5 Million (1982)
Contacts:
Head of Marketing: Ron Sackel
Head of Sales/Engineering: Andrew B. White
Head of Software: Michael Sacre
Geographic Coverage: International
Year Established: 1977
Number of Employees: 40

COMPU-DRAW
1227 Goler Houser
Rochester, NY 14620
(716) 454-3188
Major Market: Software House
Target Industries: Small Business
Target Applications: Time-Sharing; Protocol Conversion; Mail List
Geographic Coverage: National
Year Established: 1982
Number of Employees: 6

COMPUCORP
2211 Michigan Ave.
Santa Monica, CA 90404
(213) 829-7453
Major Market: Computer and Office Equipment Manufacturing; Data Services (Service Bureau)
Target Industries: Legal; Business
Target Applications: WP; Accounting
Contacts:
Head of Marketing: S. Cimbolost
Geographic Coverage: International
Year Established: 1968
Number of Employees: 500

COMPUTAX SYSTEMS, INC.
7471 University Ave.
La Mesa, CA 92041
(714) 462-5420
Major Market: Software House; Systems House (Commercial OEM); Data Services (Service Bureau)
Contacts:
Head of Sales: Don Middleton
Geographic Coverage: National

COMPUTER AUTOMATION, INC.
Commercial Systems Division
1800 Jay Ell Dr.
Richardson, TX 75018
(214) 783-0993
Major Market: Computer and Communications Equipment Manufacturing
Target Industries: Distribution; End Users
Contacts:
Head of Marketing: Steve Konarsk
Geographic Coverage: International
Year Established: 1975
Number of Employees: 200

COMPUTER COMMUNICATIONS, INC.
2610 Columbia St.
Torrance, CA 90503
(213) 320-9101
Major Market: Communications Equipment and Office Equipment Manufacturing; OEM (Computer Systems)
Contacts:
Head of Marketing: Gary Brumfield
Head of Sales: Robert L. Cole
Head of Software: Anthony Fonzo
Head of Engineering: Carl Vanderbeck
Geographic Coverage: International
Year Established: 1966
Number of Employees: 150

COMPUTER COMMUNICATIONS SPECIALISTS, INC.
6683 Jimmy Carter Blvd.
Norcross, GA 30071
(404) 441-3114
Major Market: Component, Peripheral and Communications Equipment Manufacturing; OEM (Computer Systems); Software House; Systems House (Commercial OEM)
Target Industries: Utilities; Manufacturing; Retail; Wholesale
Target Applications: Data Entry; POS Polling; Badge Readers; Bar Code Readers
Net Sales: $1 Million - $5 Million (1982)
Contacts:
Head of Marketing: Steve A. Aufderhar
Head of Software: R. L. Pass
Head of Engineering: Dr. Dwight Jones
Geographic Coverage: International
Year Established: 1977
Number of Employees: 40

COMPUTER CORNER
22 Beechurst Ave.
Morgantown, WV 26505
(304) 292-9700
Major Market: Software House; Dealer/Distributor
Contacts:
Head of Marketing: Mike Matz
Geographic Coverage: Mid-Atlantic
Year Established: 1975
Number of Employees: 15

COMPUTER DEVELOPMENT, INC.
6700 S.W. 105th
Beaverton, OR 97005
(503) 648-1599
Major Market: Communications Equipment Manufacturing
Contacts:
Head of Sales: Penny Estes
Head of Engineering: Gordon Collett
Head of Customer Service: Kathy Ferguson
Geographic Coverage: National
Year Established: 1977
Number of Employees: 70

COMPUTER IDENTICS CORP.
5 Shawmut Road
Canton, MA 02021
(617) 821-0830
Major Market: Peripheral Manufacturing; OEM (Computer Systems); Code Scanning
Target Industries: Materials Handling; Food Distribution
Target Applications: Distribution Management; Production Management; Inventory Control; Data Acquisition
Net Sales: $5 Million - $25 Million (1982)
Contacts:
Head of Marketing: Robert Shallow
Head of Software: Theodore Williams
Head of Engineering: Chris B. Kapsambelis
Head of Customer Service: Richard Mordaunt
Geographic Coverage: International
Year Established: 1969
Number of Employees: 110

COMPUTER INFORMATION ENTERPRISES
13030 Euclid
Garden Grove, CA 92643
(714) 534-0202
Major Market: Software House; Systems House (Commercial OEM); Data Services (Service Bureau); Dealer/Distributor
Target Applications: WP; Network Communications; Business Software; Retail
Net Sales: $1 Million - $5 Million (1981)
Contacts:
Head of Marketing: Gary Irwin
Head of Software: Craig Chandler
Geographic Coverage: National
Year Established: 1975
Number of Employees: 8

COMPUTER INQUIRY SYSTEMS, INC.
160 Hopper Ave.
Waldwick, NJ 07463
(201) 444-8900
Major Market: Communications Equipment Manufacturing; OEM (Computer Systems); OEM (Peripherals-Terminals)
Target Industries: Pharmaceutical Manufacturing
Target Applications: Laboratory Automation; Laboratory Management
Net Sales: $1 Million - $5 Million (1982)
Geographic Coverage: International
Year Established: 1969
Number of Employees: 45

COMPUTER PERIPHERAL SYSTEMS, INC.
P.O. Box 98282
Atlanta, GA 30359
(404) 292-9565
Major Market: Communications Equipment Manufacturing; Systems House (Commercial OEM); Dealer/Distributor
Target Industries: Burroughs; Data Communications Networks
Target Applications: Data Communications Networks
Contacts:
Head of Marketing: Richard Fetsko
Number of Employees: 6

COMPUTER SYSTEMS
28401 Harper Ave.
St. Clair Shores, MI 48081
(313) 779-8709
Major Market: Component, Computer and Communications Equipment Manufacturing; OEM (Computer Systems)
Target Industries: Industrial; Engineering
Target Applications: Graphics; Communications; Control System; Data Acquisition
Contacts:
Head of Marketing: Robert Martin
Geographic Coverage: National
Year Established: 1967
Number of Employees: 20

COMPUTER TOOLBOX, INC.
1325 E. Main St.
Waterbury, CT 06705
(203) 754-4197
Major Market: OEM (Computer Systems); Software House; Dealer/Distributor
Target Industries: Programmers
Target Applications: Development Tools; Communications
Geographic Coverage: International
Year Established: 1979
Number of Employees: 3

COMPUTERWARE SOFTWARE UNLIMITED
Suite 226
2129 Germantown Road S.
Memphis, TN 38138
(901) 754-8332
Major Market: Software House
Net Sales: $100,000 - $500,000 (1981)
Contacts:
Head of Marketing: Michael Pfaff
Geographic Coverage: International
Year Established: 1976
Number of Employees: 5

COMPUTRAC, INC.
401 N. 117th St.
Omaha, NE 68154
(402) 330-1311
Major Market: Software House; Systems House (Commercial OEM); Data Services (Service Bureau); Dealer/Distributor
Target Industries: Manufacturing; Retail
Target Applications: Order Processing; Accounting
Contacts:
Head of Software: Bob Bohac
Geographic Coverage: Regional
Year Established: 1978
Number of Employees: 7

COMPUTROL
15 Eason Allen Highway
Ridgefield, CT
(203) 544-9371
Major Market: Computer and Communications Equipment Manufacturing
Contacts:
Head of Marketing: Charles Brewer
Head of Sales: John Ricketson
Year Established: 1971
Number of Employees: 75

COMPUTRONICS
130 N. Ash
Wood Dale, IL 60191
(312) 860-7707
Major Market: Software House
Net Sales: Less than $100,000 (1981)
Contacts:
Head of Sales: Deborah Styka
Geographic Coverage: International
Year Established: 1977
Number of Employees: 4

COMSPHERE PRODUCTS
1955 Pauline Blvd.
Ann Arbor, MI 48103
(313) 998-1299
Major Market: Software House
Target Applications: Text Editing; Disassembler; Telecommunications; Print Buffer
Net Sales: $100,000 - $500,000 (1982)
Contacts:
Head of Marketing: John Cain
Head of Sales: Brian Howard
Head of Software: Jeff Brown
Geographic Coverage: International
Year Established: 1980
Number of Employees: 12

COMPUWARE CORP.
Systems Software Division
32100 Telegraph Rd.
Birmingham, MI 48010
(313) 540-0400
Major Market: Software House; Systems House (Commercial OEM)
Contacts:
Head of Marketing: Alan B. Cutting
Geographic Coverage: International
Year Established: 1973
Number of Employees: 350

COMREX INTERNATIONAL
Suite 120
3701 Skypark Drive
Torrance, CA 90505
(213) 373-0260
Major Market: Component, Computer, Peripheral and Communications Equipment Manufacturing; OEM (Peripherals-Terminals)
Target Industries: Business; Home
Contacts:
Head of Marketing: Robert Pearce
Head of Sales: Bill Falkenstein
Head of Engineering: Marshall Brown
Head of Customer Service: Judy Fuller
Geographic Coverage: International
Year Established: 1981
Number of Employees: 24

COMSPEC, INC.
Suite 275
10000 Old Katy Road
Houston, TX 77055
(713) 461-4487
Major Market: Software House; Systems House (Commercial OEM); Dealer/Distributor
Contacts:
Head of Marketing/Sales: R. W. Irish
Head of Software/Engineering: Don Kidd
Geographic Coverage: International
Year Established: 1972
Number of Employees: 55

COMTECH DATA CORP.
350 N. Hayden Road
Scottsdale, AZ 85253
(602) 949-1155
Major Market: Communications Equipment Manufacturing; Systems House (Commercial OEM)
Target Applications: High-Speed Data Transmission
Contacts:
Head of Marketing: Jerry Rutever
Head of Engineering: Bob Fitting
Year Established: 1978
Number of Employees: 200

CONCORD DATA SYSTEMS, INC.
303 Bear Hill Road
Waltham, MA 02154
(617) 890-1394
Major Market: Communications Equipment Manufacturing
Contacts:
Head of Sales: Steven Puchkoff
Head of Engineering: Ross Seider
Head of Customer Service: Steven Puchkoff
Geographic Coverage: National
Year Established: 1981
Number of Employees: 70

CONNECTICUT MICROCOMPUTER, INC.
36 Del Mar Dr.
Brookfield, CT 06804
(203) 775-4595
Major Market: Communications Equipment Manufacturing
Target Industries: Engineering Industry; Laboratories; Education
Contacts:
Head of Engineering: Richard Roeser
Geographic Coverage: International
Year Established: 1977
Number of Employees: 9

CONTEL INFORMATION SYSTEMS
130 Steamboat Road
Great Neck, NY 11024
(516) 829-5900
Major Market: Communications Equipment Manufacturing; Software House; Systems House (Commercial OEM)
Target Industries: Manufacturing; Insurance; Securities
Target Applications: Telecommunications; Real-Time Processors
Contacts:
Head of Marketing: G. Thomas Catherines
Geographic Coverage: National
Year Established: 1969
Number of Employees: 300

CONTROL CONCEPTS
12004-B Bals Ford Road
P.O. Box 2367
Manassas, VA 22110

(800) 368-3078
Major Market: Terminal and Peripheral Manufacturing; OEM (Peripherals-Terminals); Dealer/Distributor
Target Industries: Banking; Insurance; Education; Software Houses
Target Applications: Remote Workstations
Net Sales: $25 Million - $100 Million (1983)
Contacts:
Head of Marketing/Sales: Samuel Ginder
Head of Engineering: Roy Peters
Geographic Coverage: National
Year Established: 1968
Number of Employees: 420

CONTROL DATA CORP.
8100 34th Ave. S.
Minneapolis, MN 55440
(612) 853-8100
Major Market: Component, Computer, Terminal, Peripheral and Communications Equipment Manufacturing; Data Services (Service Bureau)
Target Industries: Manufacturing; Electric Utilities; Petroleum/Mining; Education
Target Applications: CAD/CAM; Computer-Based Education; Petroleum Exploration; Electrical Engineering
Contacts:
Head of Marketing: Tom Miller
Head of Customer Service: Gerald W. Gilbert
Geographic Coverage: International
Year Established: 1957
Number of Employees: 57,000

CONVERGENT TECHNOLOGIES, INC.
2500 Augustine Dr.
Santa Clara, CA 95051
(408) 727-8830
Major Market: Computer Manufacturing
Target Industries: OEM
Contacts:
Head of Sales: Richard Merse
Geographic Coverage: International
Year Established: 1979
Number of Employees: 820

CONVERSATIONAL VOICE TERMINAL CORP.
4205 Grove Ave.
Gurnee, IL 60031
(312) 249-6633
Major Market: Terminal and Communications Equipment Manufacturing
Net Sales: $1 Million - $5 Million (1982)
Contacts:
Head of Marketing: Barbara Lounsbery
Head of Sales: Robert Morgan
Geographic Coverage: International
Year Established: 1968
Number of Employees: 25

CORVUS SYSTEMS, INC.
2029 O'Toole Ave.
San Jose, CA 95131
(408) 946-7700
Major Market: Computer and Peripheral Manufacturing; Software House
Target Industries: Fortune 1000
Contacts:
Head of Marketing: Joseph D. Hughes
Head of Engineering: Joseph McMain
Geographic Coverage: International
Year Established: 1979
Number of Employees: 325

CPT CORP.
8100 Mitchell Road
P.O. Box 295
Minneapolis, MN 55440
(612) 937-8000
Major Market: Communications Equipment and Office Equipment Manufacturing; Software House; Systems House (Commercial OEM)
Target Applications: WP
Contacts:
Head of Marketing: Fred Valler
Head of Sales: Bob Gallegher
Head of Engineering: Jim Wienhold
Geographic Coverage: International
Year Established: 1971
Number of Employees: 1,500

CR COMPUTER SYSTEMS
Suite 182
5456 McConell Ave.
Los Angeles, CA 90066
(813) 822-5112
Major Market: Computer Manufacturing
Target Industries: Retail; Fortune 2000
Target Applications: Management
Contacts:
Head of Engineering: Jerry Lohoff
Geographic Coverage: International
Year Established: 1983
Number of Employees: 14

CROMEMCO, INC.
280 Bernardo Ave.
Mountain View, CA 94043
(415) 964-7400
Major Market: Component, Computer, Peripheral and Communications Equipment Manufacturing
Contacts:
Head of Marketing: Andrew Procassini
Head of Engineering: Dr. Roger Melen
Geographic Coverage: National
Year Established: 1975
Number of Employees: 500

CROSSPOINT SYSTEMS, INC.
P.O. Box 5131
81 Centennial Loop
Eugene, OR 97405
(503) 485-4254
Major Market: Communications Equipment Manufacturing
Target Industries: Newspapers; Publishing; Media
Net Sales: $100,000 - $500,000 (1981)
Contacts:
Head of Engineering: Fred Yunker
Geographic Coverage: National
Year Established: 1978
Number of Employees: 6

CULLINET SOFTWARE, INC.
400 Blue Hill Dr.
Westwood, MA 02090
(617) 329-7700
Major Market: Software House; Data Services (Service Bureau)
Target Industries: Banking; Insurance; Manufacturing
Target Applications: DBMS
Contacts:
Head of Marketing: Frank L. Chisholm
Geographic Coverage: International
Year Established: 1968
Number of Employees: 525

CXC CORP.
2652 Alton Ave.
Irvine, CA 92714
(714) 660-1801
Major Market: Communications Equipment Manufacturing
Target Industries: Fortune 500; Communications
Contacts:
Head of Marketing: Bob Hawk
Geographic Coverage: International
Year Established: 1981
Number of Employees: 200

CYB SYSTEMS, INC.
Suite D106
6448 Highway 290 E.
Austin, TX 78723
(512) 458-3224
Major Market: Computer Manufacturing
Target Industries: OEM
Contacts:
Head of Marketing: Mark Ellsworth
Head of Sales: John Osbourne
Head of Software: Brad Benton
Geographic Coverage: International
Year Established: 1982
Number of Employees: 40

CYBNET TECHNOLOGIES, INC.
1296 Lawrence Station Road
Sunnyvale, CA 94089
(408) 734-9846
Major Market: Peripheral, Communications Equipment and Office Equipment Manufacturing; Dealer/Distributor
Target Industries: Finance; Manufacturing; Banking; Services
Target Applications: Networks; Electronic Mail; Communications Management; Productivity
Contacts:
Head of Marketing: Jerry Klein
Head of Sales: Tony Liperino
Head of Software: Eric Ha
Head of Engineering: Lauren Yazolino
Head of Customer Service: Jim Rohde
Year Established: 1981
Number of Employees: 100

CYTROL, INC.
4620 W. 77th St.
Edina, MN 55435
(612) 835-4664
Major Market: Software House
Target Industries: Finance; Travel; Transportation; Manufacturing
Target Applications: Inventory; Securities Trading; Passenger Ticketing
Net Sales: $1 Million - $5 Million (1982)
Contacts:
Head of Marketing: Tom Lobb
Head of Software: Johan Nik Kirberg
Geographic Coverage: International
Year Established: 1969
Number of Employees: 85

D. L. MACHINE ENGINEERING
2208 Landmeier Road
Elk Grove Village, IL 60007
(312) 952-8300
Major Market: OEM (Computer Systems); OEM (Peripherals-Terminals); Software House; Systems House (Commercial OEM); Dealer/Distributor
Target Industries: Medical; Retail Stores
Geographic Coverage: National
Year Established: 1971
Number of Employees: 5

D.G.M.
7871 Central Ave. N.E.
Minneapolis, MN 55432
(612) 784-7489
Major Market: Component Manufacturing; OEM (Computer Systems); Software House
Target Industries: Retail; Hotel; Mass Merchandising; Small Business
Net Sales: $100,000 - $500,000 (1982)
Geographic Coverage: International
Year Established: 1977
Number of Employees: 6

D&N MICRO PRODUCTS, INC.
3702 N. Wells St.
Fort Wayne, IN 46808
(219) 485-6414
Major Market: Component and Computer Manufacturing; OEM (Computer Systems); Software House; Dealer/Distributor
Target Industries: Manufacturing; Professional
Net Sales: $500,000 - $1 Million (1981)
Contacts:
Head of Sales: Jim Kuker
Geographic Coverage: International
Year Established: 1978
Number of Employees: 10

DANFORD CORP.
350 W. 5th St.
San Pedro, CA 90731
(213) 832-6401
Major Market: Software House
Target Industries: Aerospace; Engineering
Target Applications: Graphics; Scientific; Engineering; Custom
Geographic Coverage: International
Year Established: 1982
Number of Employees: 10

DARDEN, INC.
5725 E. River Road
Chicago, IL 60631
(312) 399-1610

Major Market: Communications Equipment Manufacturing
Target Applications: Teleconferencing
Contacts:
Head of Sales: Bob Stewart
Geographic Coverage: International
Year Established: 1968
Number of Employees: 50

DATA CONTROL SYSTEMS
1455 Research Blvd.
Rockville, MD 20850
(301) 279-8796
Major Market: Communications Equipment Manufacturing
Target Industries: Warehouses; Government Security; Aerospace
Net Sales: $1 Million - $5 Million (1981)
Contacts:
Head of Marketing: W. Stewart
Head of Sales: Glen Murphy
Geographic Coverage: International
Year Established: 1957
Number of Employees: 100

DATA GENERAL CORP.
Information Systems Division
4400 Computer Drive
Westboro, MA 01580
(617) 366-8911
Major Market: Component, Computer, Peripheral and Communications Equipment Manufacturing; Software House; Data Services (Service Bureau)
Target Industries: Fortune 1000
Target Applications: OA; Industrial Automation
Contacts:
Head of Marketing: Dave Lyons
Head of Sales: Jim Hertzel
Head of Software: Al Soura
Geographic Coverage: International
Year Established: 1969
Number of Employees: 15,000

DATA INDEX, INC.
4390 Alpha Road
Dallas, TX 75234
(214) 386-3929
Major Market: Software House; Systems House (Commercial OEM)
Target Industries: Cross Industry
Net Sales: $500,000 - $1 Million (1981)
Contacts:
Head of Marketing: Sharon Divley
Head of Sales: R. L. McIntire
Geographic Coverage: International
Year Established: 1973
Number of Employees: 11

DATA PLUS, INC.
7205 E. Lockport Place
Larton, VA 22079
(703) 550-7914
Major Market: Peripheral and Communications Equipment Manufacturing
Target Applications: Data Communications; Telecommunications
Contacts:
Head of Software: Glen Cheyason
Head of Engineering: George Pritz
Year Established: 1977
Number of Employees: 50

DATA SWITCH CORP.
444 Westport Ave.
Norwalk, CT 06851
(203) 847-9800
Major Market: Communications Equipment Manufacturing
Contacts:
Head of Sales: Jack Gaffney
Head of Engineering: Gladstone Young
Geographic Coverage: International
Year Established: 1976
Number of Employees: 250

DATA SYSTEMS OF BATON ROUGE
8939 Jefferson Highway
Baton Rouge, LA 70809
(504) 923-0686
Major Market: OEM (Computer Systems); Software House; Systems House (Commercial OEM); Dealer/Distributor
Target Industries: Distribution; Data Communications; Apartment Management
Target Applications: Data Communications
Net Sales: $500,000 - $1 Million (1981)
Geographic Coverage: International
Year Established: 1973
Number of Employees: 15

DATA TECHNOLOGY INDUSTRIES
701A Whitney St.
San Leandro, CA 94577
(415) 638-1206
Major Market: Computer Manufacturing; Software House; Systems House (Commercial OEM); Dealer/Distributor
Target Industries: Banking; OEM; Government
Target Applications: Accounting; WP; Forecasting
Contacts:
Head of Marketing: Keith Slipper
Head of Sales: Ted Baden
Head of Software: Jeff Clayton
Geographic Coverage: International
Year Established: 1979
Number of Employees: 30

DATA TECHNOLOGY INDUSTRIES
Software Division
701A Whitney St.
San Leandro, CA 94577
(415) 638-1206
Major Market: Computer Manufacturing; OEM (Computer Systems); Software House; Dealer/Distributor
Contacts:
Head of Marketing: Keith Slipper
Head of Sales: Ted Baden
Head of Software: Linda Neverez
Geographic Coverage: International
Year Established: 1976
Number of Employees: 60

DATAINT, INC.
110 Ricefield Lane
Hauppauge, NY 11788
(516) 435-4000
Major Market: Communications Equipment Manufacturing
Contacts:
Head of Marketing: Robert Olsen
Head of Software: Hans Berta
Head of Engineering: Hank Segal
Geographic Coverage: International
Year Established: 1972
Number of Employees: 600

DATAGRAM CORP.
U.S. Division of Canadian Corp.
11 Main St.
E. Greenwich, RI 02818
(401) 885-4840
Target Industries: Data Communications
Contacts:
Head of Marketing: Tom McGovern
Head of Sales: Jean Thibault
Year Established: 1976
Number of Employees: 40

DATALEX CO.
Suite 406
650 5th St.
San Francisco, CA 94107
(415) 541-0780
Major Market: Software House
Target Industries: Fortune 1000
Net Sales: $100,000 - $500,000 (1981)
Contacts:
Head of Marketing: Mark Bernardi
Head of Software: Don Tibbetts
Head of Customer Service: Peter Schwalbyberg
Geographic Coverage: International
Year Established: 1978
Number of Employees: 10

DATAMARK SYSTEMS, INC.
220 N. 1300 W.
Pleasant Grove, UT 84062
(801) 785-5023
Major Market: OEM (Computer Systems); Software House
Contacts:
Head of Engineering: Grant Deardon
Geographic Coverage: International
Year Established: 1976
Number of Employees: 8

DATAPOINT CORP.
9725 Datapoint Dr.
San Antonio, TX 78284
(512) 699-7009
Major Market: Computer, Peripheral, Communications Equipment and Office Equipment Manufacturing
Target Industries: General Business; Scientific; Government
Target Applications: DDP; WP; OA; Electronic Message
Contacts:
Head of Marketing: David Ferrald
Head of Sales: David Holland
Head of Software: David Ruberg
Head of Engineering: Doris Bencalk
Head of Customer Service: John Hale
Geographic Coverage: International
Year Established: 1968
Number of Employees: 8,800

DATAPROBE, INC.
110 W. Palisades Blvd.
Palisades Park, NJ 07650
(201) 947-9500
Major Market: Communications Equipment Manufacturing; Systems House (Commercial OEM); Data Communications
Target Industries: Data Communications
Target Applications: Colorsplating; Modem elimination; Switching Systems
Net Sales: $500,000 - $1 Million (1981)
Contacts:
Head of Engineering: Bob Kill
Geographic Coverage: International
Year Established: 1969
Number of Employees: 15

DATAPRODUCTS CORP.
6200 Canoga Ave.
P.O. Box 748
Woodland Hills, CA 91365
(213) 887-8000
Major Market: Terminal, Peripheral and Communications Equipment Manufacturing; OEM (Peripherals-Terminals)
Contacts:
Head of Marketing: John Harker
Head of Sales: Jim Towell
Head of Engineering: Clifford Jones
Geographic Coverage: International
Year Established: 1962
Number of Employees: 4,600

DATAPRODUCTS NEW ENGLAND, INC.
Data Communications Division
Barnes Park N.
Wallingford, CT 06492
(203) 265-7151
Major Market: Terminal and Communications Equipment Manufacturing; OEM (Computer Systems); Software House
Target Industries: Military; Telephone; Insurance; Oil
Target Applications: Network Management; Encryption
Contacts:
Head of Marketing: J. Flaherty
Head of Engineering: W. Gallagher
Geographic Coverage: International
Year Established: 1951
Number of Employees: 700

DATASOFT, INC.
9421 Winnetka Ave.
Chatsworth, CA 91311
(213) 701-5161
Major Market: Software House
Target Industries: Consumer
Net Sales: $1 Million - $5 Million (1981)
Contacts:
Head of Marketing: Dennis Wallin
Head of Sales: Scott Llewellyn
Head of Software: Steve Bjork
Geographic Coverage: International
Year Established: 1980
Number of Employees: 35

DATASTREAM COMMUNICATIONS, INC.
2520 Mission College Blvd.
Santa Clara, CA 95050
(408) 986-8022
Major Market: Communications Equipment Manufacturing
Target Applications: IBM 3270 Cluster
Net Sales: $1 Million - $5 Million (1981)

Contacts:
Head of Sales: Stanley G. Sartor
Geographic Coverage: International
Year Established: 1978
Number of Employees: 50

BATATEL, INC.
Pin Oak & Springdale
Cherry Hill Industrial Center
Cherry Hill, NJ 08003
(609) 424-4451
Major Market: Communications Equipment Manufacturing
Target Industries: Education
Contacts:
Head of Marketing: Tom Hornsby
Head of Engineering: Herb Baldwin
Year Established: 1979
Number of Employees: 35

BATEC, INC.
Suite 116
200 Eastowne Dr.
Chapel Hill, NC 27514
(919) 929-2135
Major Market: Communications Equipment Manufacturing
Contacts:
Head of Marketing: Albert M. Jenks
Head of Sales: Ted Wiss
Geographic Coverage: National
Year Established: 1976
Number of Employees: 65

BAYCOM SYSTEMS, INC.
217 Homboldt Court Dr.
Sunnyvale, CA 94086
(408) 734-4900
Major Market: Peripheral Manufacturing
Target Industries: Retail
Contacts:
Head of Marketing: Chuck Dapew
Head of Sales: Donna Barry
Head of Software: Tim Lundsen
Head of Engineering: R. Apt
Geographic Coverage: International
Year Established: 1981
Number of Employees: 150

BAYCOM CORP.
2971 Bluefield Ave.
Dayton, OH 45414
(513) 278-7937
Major Market: Communications Equipment Manufacturing; OEM (Computer Systems)
Target Industries: Airlines
Target Applications: Information Display; Communications Systems
Contacts:
Head of Marketing: Jim Kassenberg
Head of Sales: Hans Hoogendoorn
Head of Engineering: Harold Hammelgran
Geographic Coverage: International
Year Established: 1946
Number of Employees: 100

BCA/TAC
Formerly Digital Communications & Technical Analysis
303 Research Dr.
Norcross, GA 30092
(404) 446-1400
Major Market: Communications Equipment Manufacturing
Target Industries: Time-Sharing; Education; OEM
Contacts:
Head of Marketing: James B. Lee III
Head of Engineering: Stan Lamberski
Geographic Coverage: International
Year Established: 1972
Number of Employees: 130

BEFARO SOFTWARE SYSTEMS, INC.
Suite 4
725 Fifth St.
Hermosa Beach, CA 90254
(213) 318-1661
Major Market: Software House; Systems House (Commercial OEM)
Target Industries: IBM Users
Net Sales: $100,000 - $500,000 (1982)
Contacts:
Head of Marketing: Leslie Borg
Head of Software: Julio DeFaro
Head of Engineering: Gary Abbott
Geographic Coverage: National
Year Established: 1977
Number of Employees: 9

BEI-TELEPRODUCTS, INC.
2128 Vineyard Ave.
Escondido, CA 92025
(619) 743-8344
Major Market: Communications Equipment Manufacturing; Data Services (Service Bureau)
Contacts:
Head of Marketing: Art Wallace
Head of Engineering: Greg Graham
Year Established: 1969
Number of Employees: 40

BELTA SYSTEMS, INC.
711 5th Ave. N.
Seattle, WA 98109
(206) 283-5500
Major Market: Component, Peripheral and Communications Equipment Manufacturing; Systems House (Commercial OEM); Data Services (Service Bureau)
Net Sales: $1 Million - $5 Million (1981)
Contacts:
Head of Sales: Scott Carey
Head of Software: Mark Chamberlain
Geographic Coverage: International
Year Established: 1971
Number of Employees: 25

THE BESTEK GROUP
830C E. Evelyn Ave.
Sunnyvale, CA 94086
(408) 737-7211
Major Market: Communications Equipment Manufacturing; Software House
Target Applications: Networking
Contacts:
Head of Marketing: Dennis Reiger
Geographic Coverage: International
Year Established: 1981
Number of Employees: 20

BEVELCON ELECTRONICS, INC.
4037 Swamp Road
Doylestown, PA 18901
(215) 348-1900
Major Market: Communications Equipment Manufacturing; Dealer/Distributor
Target Industries: Fortune 1000; Universities; Manufacturing; Government
Contacts:
Head of Marketing: Anthony Severino
Geographic Coverage: National
Year Established: 1973
Number of Employees: 35

BIBLOS, INC.
Network Control Division
1370 Welsh Road
Montgomeryville, PA 18936
(215) 628-4530
Major Market: Communications Equipment Manufacturing; OEM (Computer Systems)
Contacts:
Head of Marketing: Roy Gamberling
Head of Engineering: Thomas Emory
Head of Customer Service: Robert Armstrong
Geographic Coverage: International
Year Established: 1969
Number of Employees: 175

BIGITAL ASSOCIATES CORP.
1039 E. Main St.
Stamford, CT 06902
(203) 327-9210
Major Market: Communications Equipment Manufacturing; OEM (Peripherals-Terminals); Systems House (Commercial OEM); Remote-Line Printer Systems
Target Industries: Minicomputer; Banking; Education; End Users
Contacts:
Head of Marketing: Ed Thomas
Head of Sales: Simon Harvey
Head of Software: Wallace Ritchie
Geographic Coverage: National
Year Established: 1971
Number of Employees: 40

BIGITAL CONTROLS CORP.
2779 Orchard Run Road
Dayton, OH 45449
(513) 435-5455
Major Market: Communications Equipment Manufacturing; Dealer/Distributor; Peripheral Switching
Net Sales: $1 Million - $5 Million (1981)
Contacts:
Head of Marketing: Greg Collins
Head of Sales: Steven Lachey
Head of Engineering: Jon Lenehan
Geographic Coverage: International
Year Established: 1967
Number of Employees: 43

BIGITAL EQUIPMENT CORP.
146 Main St.
Maynard, MA 01754
(617) 897-5111
Major Market: Component, Computer, Terminal, Peripheral and Communications Equipment Manufacturing; Software House; Dealer/Distributor
Geographic Coverage: International
Year Established: 1957
Number of Employees: 75,000

BIGITAL LABORATORIES, INC.
600 Pleasant St.
Watertown, MA 02172
(617) 924-1680
Major Market: Peripheral and Communications Equipment Manufacturing
Target Applications: Communications
Net Sales: $500,000 - $1 Million (1981)
Contacts:
Head of Marketing: W. Kahn
Head of Sales: L. Call
Head of Software: W. Kahn
Head of Customer Service: P. Krawitz
Geographic Coverage: Regional
Year Established: 1971
Number of Employees: 12

BIGITAL MICROSYSTEMS, INC. (DMS)
1755 Embarcadero
Oakland, CA 94606
(415) 532-3686
Major Market: Computer Manufacturing
Target Industries: ISO; OEM; Fortune 1000
Target Applications: OA; MRP
Contacts:
Head of Marketing: Frank Wishom
Head of Engineering: Joseph Duvivier
Geographic Coverage: International
Number of Employees: 50

DILKS CO., INC.
195 Buckhorn Lane
Reston, VA 22091
(703) 471-4172
Major Market: OEM (Computer Systems); Software House; Systems House (Commercial OEM)
Target Industries: Aviation
Target Applications: Air-Traffic Control; Weather; Radar
Net Sales: $100,000 - $500,000 (1981)
Contacts:
Head of Marketing: Philip Mills
Geographic Coverage: Regional
Year Established: 1974
Number of Employees: 5

DIVELESS CORP.
9776 Mt. Gilead Road
Fredericktown, OH 43019
(614) 694-9015
Major Market: OEM (Computer Systems); Software House; Systems House (Commercial OEM); Manufacturing test equipment
Target Industries: Engineering; Engineering
Target Applications: Testing Control Equipment; Machine Control; Telecommunication
Net Sales: $1 Million - $5 Million (1981)
Contacts:
Head of Marketing: Ralph Williams
Geographic Coverage: National
Year Established: 1974
Number of Employees: 25

DIVERSIFIED DATA RESOURCES, INC.
Suite 7
25 Mitchell Blvd.

San Rafael, CA 94903
(415) 499-8870
Major Market: Communications Equipment Manufacturing; Software House
Target Industries: IBM 360/370 Users
Contacts:
Head of Marketing: David Gortner
Geographic Coverage: National
Year Established: 1981
Number of Employees: 30

BMW GROUP
2020 Hogback Road
Ann Arbor, MI 48104
(313) 971-5234
Major Market: Software House
Target Industries: Telecommunications
Target Applications: Network Design
Contacts:
Head of Marketing: Mark Brown
Geographic Coverage: International
Year Established: 1971
Number of Employees: 100

BOFT ASK COMPUTER SOFTWARE
Suite B150
2265 Westwood Blvd.
Los Angeles, CA 90064
(213) 397-8811
Major Market: Software House
Target Industries: Apple, Atari Users
Target Applications: Recreation
Contacts:
Head of Marketing: Rachel Cohen
Geographic Coverage: International
Year Established: 1981
Number of Employees: 25

BÜRACOM CORP.
7300 N. Crescent Blvd.
Building 5
Pennsauken, NJ 08110
(609) 662-7272
Major Market: Communications Equipment Manufacturing
Target Industries: Manufacturing
Contacts:
Head of Marketing: J. E. Courtney
Geographic Coverage: National
Year Established: 1972
Number of Employees: 6

BUXBURY SYSTEMS, INC.
77 Great Road
Acton, MA 01720
(617) 263-7761
Major Market: OEM (Computer Systems); Software House; Systems House (Commercial OEM); Dealer/Distributor
Net Sales: $100,000 - $500,000 (1981)
Contacts:
Head of Marketing: Dana M. Winkates
Geographic Coverage: International
Year Established: 1975
Number of Employees: 5

BYNAMIC MICROPROCESSOR ASSOCIATES
Suite 602
545 5th Ave.
New York, NY 10017
(212) 687-7115
Major Market: Software House
Target Industries: Utilities; Communications; Systems Houses
Target Applications: DBMS; Applications, Report Generators; Communications
Net Sales: $500,000 - $1 Million (1981)
Contacts:
Head of Software: Lee Rautenberg
Geographic Coverage: International
Year Established: 1979
Number of Employees: 9

BYNAMIC SCIENCES, INC.
7660 Gloria Ave.
Van Nuys, CA 91406
(213) 782-0820
Major Market: Component and Communications Equipment Manufacturing; OEM (Computer Systems); Software House
Target Industries: EM; EMC; TemTest
Target Applications: Department of Defense; Industry
Contacts:
Head of Marketing: Daniel Donovan
Head of Sales: Jim Pyle
Head of Engineering: Jack Birdsall
Geographic Coverage: International
Year Established: 1972
Number of Employees: 180

BYNATECH DATA SYSTEMS
7644 Dynatech Court
Springfield, VA 22153
(703) 569-9000
Major Market: Communications Equipment Manufacturing
Target Industries: Banking; Transportation; Finance
Contacts:
Head of Marketing: V. K. Darnell
Head of Sales: Milton Coleman
Head of Software: Herbert Sharp
Head of Engineering: Nat Kumar
Head of Customer Service: Jack McIlney
Geographic Coverage: International
Year Established: 1952
Number of Employees: 250

BYNATECH PACKET TECHNOLOGY, INC.
6464-G General Green Way
Alexandria, VA 22312
(703) 642-9391
Major Market: Communications Equipment Manufacturing; Data Communications Engineering
Target Industries: Banking; Finance; Transportation
Contacts:
Head of Marketing: K. L. Damanda
Head of Engineering: Jose Prats
Head of Customer Service: Jeff Ogle
Geographic Coverage: International
Year Established: 1980
Number of Employees: 55

EDGE TECHNOLOGY
2735 S.E. Raymond
Portland, OR 97202
(503) 231-1057
Major Market: Peripheral and Communications Equipment Manufacturing
Target Industries: Communications; OA
Target Applications: Credit Reporting
Net Sales: $1 Million - $5 Million (1981)
Geographic Coverage: International
Year Established: 1977
Number of Employees: 15

EFT COMPUTER SYSTEMS, INC.
One Parmley Place
Summit, NJ 07901
(212) 947-7771
Major Market: Software House
Target Industries: Banking
Target Applications: EFT
Net Sales: $500,000 - $1 Million (1981)
Contacts:
Head of Marketing: Garner R. Morgan
Geographic Coverage: Regional
Year Established: 1977
Number of Employees: 15

ELECTRODATA, INC:
23020 Miles Road
Bedford Heights, OH 44139
(216) 663-3333
Major Market: Communications Equipment Manufacturing
Target Industries: Data Communications
Net Sales: $1 Million - $5 Million (1981)
Contacts:
Head of Marketing: Philip Ardire
Head of Engineering: James Spoth
Geographic Coverage: International
Year Established: 1976
Number of Employees: 20

ELECTRONIC SYSTEMS ASSOCIATES
38 E. 29th St.
New York, NY 10016
(212) 683-9100
Major Market: Communications Equipment Manufacturing; OEM (Computer Systems); Software House; Systems House (Commercial OEM); Data Services (Service Bureau); Dealer/Distributor
Target Industries: Banking; Publishing
Target Applications: Data Communications
Contacts:
Head of Sales: Hal Forman
Head of Engineering: Yasha Katz
Geographic Coverage: Regional
Year Established: 1977
Number of Employees: 18

ENTROL SYSTEMS, INC.
123 Locust St.
Lancaster, PA 17602
(717) 291-1116
Major Market: Communications Equipment Manufacturing
Geographic Coverage: National
Year Established: 1978
Number of Employees: 31

ENULEX CORP.
3545 Harbor Blvd.
P.O. Box 6725
Costa Mesa, CA 92626
(714) 662-5600
Major Market: Peripheral Manufacturing; Communications Equipment Manufacturing
Target Industries: End Users; OEM; System House
Contacts:
Head of Marketing: Sol Zachter
Head of Sales: Philip G. Begich
Head of Engineering: Bob Snyder
Geographic Coverage: International
Year Established: 1979
Number of Employees: 525

ENGINEERED SYSTEMS, INC.
Information Systems Division
14775 Grover St.
Omaha, NE 68144
(402) 333-0100
Major Market: Communications Equipment Manufacturing
Target Industries: End User; Banking; Credit Unions
Contacts:
Head of Marketing: W. H. Taylor
Head of Engineering: Gil Fillan
Geographic Coverage: International
Year Established: 1969
Number of Employees: 50

ENVAX SYSTEMS, INC.
3330 Stowil
Irving, TX 75061
(214) 986-1151
Major Market: Communications Equipment Manufacturing
Contacts:
Head of Marketing: Jennifer Hammis
Head of Sales: Harry Rayner
Geographic Coverage: National
Year Established: 1968
Number of Employees: 50

ERICSON PROGMATIC, INC.
11211 Richmond Ave.
Houston, TX 77082
Major Market: Communications Equipment Manufacturing; OEM (Peripherals-Terminals)
Target Applications: Data Communications
Contacts:
Head of Marketing: Peter Welsh
Number of Employees: 65

ESCA CORP.
13010 Northup Way
Bellevue, WA 98005
(206) 885-5077
Major Market: Software House
Contacts:
Head of Marketing: Robin Padwork
Head of Sales: Morris Peterson
Head of Software: Edward Krzyzanowski
Geographic Coverage: International

EVANS, GRIFFITHS AND HART, INC.
55 Waltham St.
Lexington, MA 02173
(617) 861-0670
Major Market: Software House
Target Applications: Data Entry; DBMS
Contacts:
Head of Marketing: Tom Griffiths
Geographic Coverage: International

Vendors

Year Established: 1970
Number of Employees: 15

EVERGREEN CONSULTING, INC.
Suite 520
3407 W. Sixth St.
Los Angeles, CA 90020
(213) 662-3337
Major Market: Software House
Target Applications: IBM Communications Software
Net Sales: $500,000 - $1 Million (1981)
Geographic Coverage: National
Year Established: 1978
Number of Employees: 8

EXCELAN
2180 Fortune Dr.
San Jose, CA 95131
(408) 945-9526
Major Market: Communications Equipment Manufacturing
Target Industries: Systems Integrators
Contacts:
Head of Marketing: Dale Way
Head of Sales: Doug Planchon
Geographic Coverage: International
Year Established: 1982
Number of Employees: 40

EXEC SOFTWARE, INC.
201 Waltham St.
Lexington, MA 02173
(617) 862-3170
Major Market: Software House
Contacts:
Head of Sales: Jean Mayo
Year Established: 1981
Number of Employees: 8

EXXON ENTERPRISES.
Exxon Office Systems Co.
777 Long Ridge Road
Stamford, CT 06902
(203) 329-5000
Major Market: Peripheral and Office Equipment Manufacturing
Target Applications: OA
Contacts:
Head of Marketing: Douglas V. Brunson
Head of Customer Service: Frank J. Bruscato
Geographic Coverage: International
Year Established: 1981
Number of Employees: 3,000

FALLON & ASSOCIATES, INC.
P.O. Box 1850
Upland, CA 91786
(714) 985-5088
Major Market: Software House; Data Services (Service Bureau)
Geographic Coverage: International
Year Established: 1969
Number of Employees: 3

FERGX MICROSYSTEMS, INC.
Suite 611
1701 N. Fort Meyer Dr.
Arlington, VA 22209
(703) 841-0800
Major Market: Software House
Target Applications: Financial Planning; Graphics; Data Communication
Net Sales: $500,000 - $1 Million (1981)
Contacts:
Head of Marketing/Sales: Richard Hykes
Head of Software: David Galland
Geographic Coverage: International
Year Established: 1979
Number of Employees: 25

FIBRONICS INTERNATIONAL, INC.
218 W. Main St.
Hyannis, MA 02601
(617) 778-0700
Major Market: Communications Equipment Manufacturing
Target Industries: Industrial; Financial; Health Care; Military
Target Applications: Data Transmission; Fiber Optics
Net Sales: $1 Million - $5 Million (1983)
Contacts:
Head of Marketing: J. Morris Weinberg
Head of Sales: Kenneth Bowes
Geographic Coverage: International
Year Established: 1977
Number of Employees: 106

FINEGAN COMPUTER CO.
Suite 208
524 Union St.
San Francisco, CA 94133
(415) 398-7228
Major Market: Software House
Target Applications: Data Communications
Net Sales: $100,000 - $500,000 (1981)
Geographic Coverage: National
Year Established: 1975
Number of Employees: 3

FORAGCAM, INC.
Suite 2610
Huntington Quadrangle
Melville, NY 11747
(516) 752-0032
Major Market: Communications Equipment Manufacturing; Software House; Systems House (Commercial OEM); Data Services (Service Bureau)
Target Industries: Oil Companies; Banks; International Organizations; Fortune 500
Target Applications: Networking; Conversion; Coexistence WP
Contacts:
Head of Marketing: Nigel Hall
Head of Customer Service: John Harvey
Year Established: 1981
Number of Employees: 5

FORMULA CONSULTANTS, INC.
P.O. Box 544
Anaheim, CA 92805
(714) 778-1738
Major Market: Software House
Contacts:
Head of Software: Tony J. Sapienza
Head of Engineering: Fritz Lorenz
Geographic Coverage: International
Year Established: 1978
Number of Employees: 22

FRIEDMAN & ASSOCIATES
2424 Morris Ave.
Union, NJ 07083
(201) 964-2600
Major Market: Communications Equipment Manufacturing; Dealer/Distributor
Year Established: 1964
Number of Employees: 8

FUJITSU AMERICA, INC.
2975 Oakmead Village Dr.
Santa Clara, CA 95051
(408) 727-4300
Major Market: Peripheral and Communications Equipment Manufacturing; Office Equipment Manufacturing; Dealer/Distributor
Target Industries: OEM
Contacts:
Head of Marketing: Norm Peterson
Head of Software: Fred Bihler
Head of Engineering: Ken Katashiba
Geographic Coverage: International
Year Established: 1976
Number of Employees: 300

G & G ENGINEERING
1922 Republic Ave.
San Leandro, CA 94577
(415) 895-0798
Major Market: Software House; Systems House (Commercial OEM)
Contacts:
Head of Marketing: Michael Gifford
Head of Software: Dale Giff
Head of Engineering: Gerald Houston
Geographic Coverage: National
Year Established: 1980
Number of Employees: 25

GAMMA TECHNOLOGY, INC.
2452 Embarcadero Way
Palo Alto, CA 94303
(415) 856-7421
Major Market: Software House
Target Applications: Data Communication
Net Sales: $100,000 - $500,000 (1981)
Geographic Coverage: International
Year Established: 1974
Number of Employees: 4

GANDALF DATA, INC.

1019 S. Noel Ave.
Wheeling, IL 60090
(312) 541-6060
Major Market: Communications Equipment Manufacturing
Target Industries: Common Carriers; Government; Industries; Education
Target Applications: DP; Data Entry; OA; Communications Networking
Contacts:
Head of Marketing: Verne Zugenbuhler
Head of Engineering: Jan Bent
Geographic Coverage: International
Year Established: 1973
Number of Employees: 325

GATEWAY COMMUNICATIONS, INC.
16782 Red Hill
Irvine, CA 92714
(714) 261-0762
Major Market: Computer Manufacturing; Communications Equipment Manufacturing; Office Equipment Manufacturing; Software House; Systems House (Commercial OEM)
Target Applications: Resource Sharing; X.25 PADS; SNA/3270 Emulation
Contacts:
Head of Marketing: Larry Stevenson
Year Established: 1981
Number of Employees: 18

GAYLORD BROS., INC.
P.O. Box 4901
Syracuse, NY 13221
(315) 457-5070
Major Market: Software House; Dealer/Distributor
Target Industries: Library; Education
Contacts:
Head of Engineering: Jim Dokoupil
Head of Customer Service: Peggy Trinca
Geographic Coverage: International
Number of Employees: 300

GEJAC, INC.
P.O. Box 188
Riverdale, MD 20737
(301) 864-3700
Major Market: Software House
Net Sales: $100,000 - $500,000 (1981)
Contacts:
Head of Marketing: Susan Kajichstein
Geographic Coverage: International
Year Established: 1977
Number of Employees: 10

GENASYS CORP.
11820 Parklawn Dr.
Rockville, MD 20852
(301) 770-4600
Major Market: Software House
Target Industries: Government
Target Applications: Accounting; Facilities Management
Contacts:
Head of Marketing: Ronald Hussy
Geographic Coverage: National
Year Established: 1968
Number of Employees: 150

GENERAL DATACOMM INDUSTRIES, INC.

One Kennedy Ave.
Danbury, CT 06810
(203) 797-0711
Major Market: Communications Equipment Manufacturing
Target Industries: Fortune 1000; Telephone; International Record Carriers; International Development
Target Applications: Network Diagnostics; Data Communications, Modem and Mux Systems
Contacts:
Head of Marketing: Hugh Trembley
Head of Sales: Robert F. Hendee
Head of Engineering: W. Raymond
Geographic Coverage: International
Year Established: 1969

GENERAL DIGITAL INDUSTRIES, INC.
7702 Governors Dr.
Huntsville, AL 35805
(205) 837-8305
Major Market: Component, Computer and Terminal Manufacturing; OEM (Computer Systems); Software House; Systems House (Commercial OEM)
Target Industries: Manufacturing; System House; Software Development Firms; OEM
Net Sales: $1 Million - $5 Million (1982)
Contacts:
Head of Marketing: Lyle Needham
Head of Software: John D.Reynolds
Geographic Coverage: National
Year Established: 1978
Number of Employees: 40

GENERAL ELECTRIC CO.
One River Road
Schenectady, NY 12345
(518) 385-2211
Major Market: Component, Terminal, Peripheral and Communications Equipment Manufacturing; OEM (Computer Systems); Software House; Data Services (Service Bureau)
Target Applications: Factory Automation; CAD/CAM
Net Sales: $100,000 - $500,000 (1981)
Contacts:
Head of Marketing: Thomas O. Thorsen
Geographic Coverage: International
Year Established: 1892
Number of Employees: 404,000

GENERAL ELECTRIC INFORMATION SERVICES CO.
401 N. Washington St.
Rockville, MD 20850
(301) 340-4000
Major Market: Software House; Data Services (Service Bureau)
Geographic Coverage: International
Year Established: 1964
Number of Employees: 5,000

GENICOMP, INC.
6 Algonquin St.
Canton, MA 02021
(617) 828-2008
Major Market: Communications Equipment Manufacturing
Target Industries: OEM; Dealers
Year Established: 1976

GEORGE W. HALLAHAN & CO., INC.
1660 Soldiers Field Road
Boston, MA 02135
(617) 782-6100
Major Market: Software House; Data Services (Service Bureau)
Target Industries: Distribution; Clubs
Target Applications: Communications
Contacts:
Head of Marketing: Art Greenberg
Geographic Coverage: National
Year Established: 1979
Number of Employees: 12

GLASGAL COMMUNICATIONS, INC.
207 Washington St.
Northvale, NJ 07647
(201) 768-8082
Major Market: Dealer/Distributor
Contacts:
Head of Customer Service: Ken Growney
Year Established: 1973
Number of Employees: 30

GLENAYRE ELECTRONICS
1551 Columbia St.
North Vancouver
(206) 676-1980
Major Market: Communications Equipment Manufacturing
Contacts:
Head of Marketing: John McDermott
Head of Sales: Mike Hodson
Head of Engineering: Roy Smyth
Geographic Coverage: International
Year Established: 1947
Number of Employees: 180

GLENN A. BARBER AND ASSOCIATES
Suite 304
15010 Ventura Blvd.
Sherman Oaks, CA 91403
(213) 997-6622
Major Market: Software House
Target Industries: OEM
Net Sales: $1 Million - $5 Million (1982)
Contacts:
Head of Marketing: Gary Cline
Geographic Coverage: International
Year Established: 1980
Number of Employees: 25

GOULD, INC.
SEL Computer Systems
6901 West Sunrise Blvd.
Fort Lauderdale, FL 33313
(305) 587-2900
Major Market: Computer Manufacturing; OEM (Peripherals-Terminals); Software House
Target Industries: Aerospace; Military; Nuclear; Fossil Fuel
Target Applications: Flight Simulation; Energy Monitoring/Control; Lab Computation; Factory Automation
Contacts:
Head of Marketing: John Mutzko
Head of Sales: Calvin Shoemaker,
Head of Software: Robert Bergman
Head of Engineering: Michael Smith
Head of Customer Service: Edward Shephard
Geographic Coverage: International
Year Established: 1961
Number of Employees: 2,500

GOULD, INC.
Programmable Controller Division
P.O. Box 3083
Andover, MA 01810
(617) 475-4700
Major Market: Peripheral and Communications Equipment Manufacturing; Programable Controllers
Target Industries: Manufacturing
Target Applications: Factory Automation; Process Control
Contacts:
Head of Marketing: Steven Mader
Head of Sales: George Dennaker
Head of Engineering: John J. Joslyn
Head of Customer Service: Richard Balmas
Geographic Coverage: International
Year Established: 1969
Number of Employees: 1,600

GRANADA SYSTEMS DESIGN, INC.
303 Fifth Ave.
New York, NY 10016
(212) 686-6945
Major Market: OEM (Computer Systems); Software House; Systems House (Commercial OEM)
Target Industries: Banking; Distribution; Textile
Target Applications: Billing; Banking; WP; Voice Response
Net Sales: $100,000 - $500,000 (1981)
Contacts:
Head of Marketing: Gulab Bhawnani
Head of Software: Robert Acker
Geographic Coverage: National
Year Established: 1979
Number of Employees: 8

GRAPHIC SOFTWARE SYSTEMS
25117 S.W. Pkwy.
Wilsonville, OR 97070
(503) 682-1606
Major Market: Software House
Target Industries: Business
Contacts:
Head of Sales: Jon Gordon
Head of Engineering: Russ Sprunger
Geographic Coverage: International
Year Established: 1981
Number of Employees: 12

GTE BUSINESS COMMUNICATIONS SYSTEMS, INC.
12502 Sunrise Valley Dr.
Reston, VA 22096
(703) 435-7400
Major Market: Communications Equipment Manufacturing; Dealer/Distributor
Target Industries: Business; Institutions; Goverment
Contacts:
Head of Marketing: Paul Walter
Head of Sales: Bob Smith
Head of Engineering: Tom Monaghan
Geographic Coverage: International
Year Established: 1978
Number of Employees: 5,000

GTE TELENET COMMUNICATIONS CORP.
8229 Boone Blvd.
Vienna, VA 22180
(703) 442-1000
Major Market: Communications Equipment Manufacturing; Communications Networks
Target Industries: Banking; Transportation; Communications
Contacts:
Head of Marketing: W. Comes
Head of Sales: Henry R. Nothstt
Head of Software: Paolo Guld
Geographic Coverage: International
Year Established: 1972
Number of Employees: 600

GTECH CORP.
101 Dyer St.
Providence, RI 02903
(401) 273-7700
Major Market: Terminal and Communications Equipment Manufacturing; OEM (Computer Systems); OEM (Peripherals-Terminals)
Contacts:
Head of Marketing: Peter Morrissey
Head of Sales: George Murray,
Head of Software: Alex Burstein
Head of Engineering: William Metzger
Geographic Coverage: International
Year Established: 1981
Number of Employees: 200

GUILD, INC.
590 Danbury Road
Ridgefield, CT 06877
(203) 431-0411
Major Market: Software House
Target Applications: Prototyping
Net Sales: $100,000 - $500,000 (1982)
Geographic Coverage: National
Year Established: 1979
Number of Employees: 12

GUNN ENTERPRISES, INC.
Suite 150
5815 Richmond
P.O. Box 27474-77227
Houston, TX 77057
(713) 781-6911
Major Market: Software House; Systems House (Commercial OEM); Dealer/Distributor
Target Industries: Professional
Target Applications: WP; Data Base
Net Sales: $100,000 - $500,000 (1982)
Geographic Coverage: International
Year Established: 1979
Number of Employees: 5

H & A COMPUTER SYSTEMS
Suite 204
30 Hotaling Place
San Francisco, CA 94111
(415) 434-3517
Major Market: Software House; Dealer/Distributor
Target Applications: Application Generation; System Software
Net Sales: $1 Million - $5 Million (1982)
Contacts:
Head of Marketing: Kathleen Reilly
Head of Software: Nick Nickerson
Geographic Coverage: National
Year Established: 1978
Number of Employees: 22

HALCYON COMMUNICATIONS
Data Systems Division
2121 Zanker Road
San Jose, CA 95131
(408) 293-9970
Major Market: Communications Equipment Manufacturing
Target Industries: Banking

Vendors

Target Applications: Analog
Contacts:
Head of Marketing: Stan Guzik
Head of Sales: Erv Stein
Head of Engineering: Park Adams
Geographic Coverage: International
Year Established: 1971
Number of Employees: 250

HARRIS CORP.
Information Systems Group
1025 W. Nasa Blvd.
Melbourne, FL 32919
(305) 727-9100
Major Market: Computer, Teminal, and Communications Equipment Manufacturing; Software House; Special Systems Manufacturing
Target Industries: Manufacturing; Scientific; Government; Education
Target Applications: Office Systems; Scientific; Control; Engineering
Geographic Coverage: International
Number of Employees: 5,000

HARRIS CORP.
Computer Systems Division
2101 West Cypress Creek Road
Ft. Lauderdale, FL 33309
(305) 974-1700
Major Market: Computer, Peripheral and Communications Equipment Manufacturing; OEM (Computer Systems); Software House; Systems House (Commercial OEM); Data Services (Service Bureau); Special Systems
Target Industries: Engineering Technology; Aerospace; Scientific Research; OA
Target Applications: Data Aquisition; CAD/CAM; Data Reduction; Design and Simulation
Contacts:
Head of Marketing: James Oyler
Head of Sales: J. Oromaner
Head of Software: Joe Payne
Geographic Coverage: International
Year Established: 1971
Number of Employees: 1,080

HARRIS CORP.
Digital Telephone Systems Division
One Digital Dr.
P.O. Box 1188
Novato, CA 94948
(415) 472-2500
Major Market: Communications Equipment Manufacturing
Target Industries: Business Telephone System; Private Networks
Contacts:
Head of Marketing: Edward Burline
Head of Sales: Vincent Cahill
Head of Engineering: Alan Nagrin
Head of Customer Service: Terry Yelitz
Geographic Coverage: International
Year Established: 1968
Number of Employees: 700

HAYES MICROCOMPUTER PRODUCTS, INC.
5923 Peachtree Industrial Blvd.
Norcross, GA 30092
(404) 449-8791
Major Market: Communications Equipment Manufacturing; OEM (Peripherals-Terminals)
Target Industries: Retail Computer Store
Contacts:
Head of Marketing: Dana S. Perkins
Head of Sales: Don Huizingh
Head of Software: Dan McCutcheon
Head of Engineering: William Hanstine
Geographic Coverage: National
Year Established: 1978
Number of Employees: 200

HEDRICKSEN DATA SYSTEMS
12189 Ralston St.
Arvada, CO 80004
(303) 425-9303
Major Market: Communications Equipment Manufacturing
Target Industries: Modern Office
Target Applications: Communications with TWX and Telex
Contacts:
Head of Marketing/Sales: Jack Freeman
Head of Software: Bill Richard
Year Established: 1980.
Number of Employees: 62

HENSON SYSTEMS, INC.
427 South Olathe Way
Aurora, CA 80013
(303) 690-6279
Major Market: Software House
Contacts:
Head of Marketing: D. Henson
Year Established: 1980
Number of Employees: 3

HERRICON CORP.
3001 Latham Dr.
Madison, WI 53713
(608) 271-8700
Major Market: Component, Computer and Communications Equipment Manufacturing; OEM (Computer Systems); Systems House (Commercial OEM)
Target Industries: Communications; Manufacturing; OEM
Target Applications: Software Developers
Net Sales: $1 Million — $5 Million (1981)
Contacts:
Head of Marketing: Christopher M. Priebe
Head of Engineering: Jaffrey Mattox
Head of Customer Service: Bob May
Geographic Coverage: National
Year Established: 1972
Number of Employees: 55

HITACHI AMERICA, LTD.
2990 Gateway Dr.
Norcross, GA 30071
(404) 458-6921
Major Market: Component, Computer and Communications Equipment Manufacturing
Target Industries: Telephone; Commercial; Lodging
Contacts:
Head of Marketing: E. Kondo
Head of Sales: Charles Kenmore
Head of Software: Rick White
Head of Engineering: Wally Ives
Head of Customer Service: Bill Garraty
Geographic Coverage: International
Year Established: 1973
Number of Employees: 90

HONEYWELL, INC.
Information Systems
Honeywell Plaza
Minneapolis, MN 55408
(612) 870-5200
Major Market: Computer, Terminal, Peripheral, Communications Equipment and Office Equipment Manufacturing; OEM (Computer Systems); OEM (Peripherals-Terminals); Software House; Data Services (Service Bureau); Dealer/Distributor; Special Hardware
Target Industries: Manufacturing/Distribution; Government; Education; Airline
Contacts:
Head of Marketing: George S. Drewett
Geographic Coverage: International
Year Established: 1955
Number of Employees: 25,000

HORNE COMPUTER SERVICES
3822 N. 25th St.
St. Joseph, MI 64505
(816) 233-5418
Major Market: Software House; Systems House (Commercial OEM)
Target Industries: Insurance; Financial
Target Applications: Letter Writing; WP; Data Entry; Insurance
Net Sales: $1 Million — $5 Million (1982)
Geographic Coverage: Regional
Year Established: 1977
Number of Employees: 4

HOUSTON COMPUTER SERVICES, INC.
Suite 101
1221 Richmond
Building C
Houston, TX 77082
(713) 558-8900
Major Market: Software House
Target Applications: Language Processors
Net Sales: $500,000 - $1 Million (1981)
Contacts:
Head of Software: Stephen Starke
Geographic Coverage: National
Year Established: 1979
Number of Employees: 6

HOUSTON ENGINEERING RESEARCH CORP.
P.O. Box 3246
7250 Wynnwood Dr.
Houston, TX 77001
(713) 869-9371
Major Market: Computer Manufacturing; OEM (Computer Systems); OEM (Peripherals-Terminals); Software House; Systems House (Commercial OEM)
Target Industries: Chemical; Paper; Utilities
Target Applications: Scada; Tank Gauging; Auto Production Reporting
Net Sales: $1 Million — $5 Million (1981)
Contacts:
Head of Sales: John A. Chapman
Head of Engineering: Joseph Dryer
Head of Customer Service: John A. Chapman
Geographic Coverage: International
Year Established: 1980
Number of Employees: 50

HOWARD W. SAMS & CO., INC.
4300 W. 62nd St.
Indianapolis, IN 46206
(317) 298-5400
Major Market: Software House
Target Industries: Small Business
Net Sales: $1 Million — $5 Million (1981)
Contacts:
Head of Marketing: Kenneth Jones
Geographic Coverage: International
Year Established: 1980
Number of Employees: 600

HOWE SOFTWARE
14 Lexington Road
New City, NY 10956
(914) 634-1821
Major Market: Software House
Target Applications: TRS-80 Machine Language Utilities
Net Sales: Less than $100,000 (1981)
Geographic Coverage: International
Year Established: 1979
Number of Employees: 2

HUNTER & READY, INC.
445 Sherman Ave.
Palo Alto, CA 94306
(415) 326-2950
Major Market: Software House; Dealer/Distributor
Target Industries: Industrial; Avionics; Hermetics; Military
Contacts:
Head of Marketing: James Ready
Geographic Coverage: International
Year Established: 1981
Number of Employees: 20

I P C TECHNOLOGY, LTD.
7336 Winthrop Road
Chester, CT 06412
(203) 526-9574
Major Market: Communications Equipment Manufacturing
Contacts:
Head of Sales: Jerry Confer
Head of Engineering: Lawrence Timmerman
Year Established: 1974
Number of Employees: 700

IAS CORP.
Mason Road No. 2
West Willington, CT 06279
(203) 429-1691
Major Market: Software House
Contacts:
Head of Marketing: Frank Winchaul
Head of Sales: Rob Sibley
Year Established: 1982
Number of Employees: 4

IBM CORP.
Communications Products
44 S. Broadway
White Plains, NY 10601
(914) 696-1900
Major Market: Terminal,

Communications Equipment and Office Equipment Manufacturing

ICOT CORP.
830 Maude Ave.
Mountain View, CA 94043
(415) 964-4636
Major Market: Peripheral and Communications Equipment Manufacturing
Target Industries: Finance; Airline
Contacts:
Head of Marketing: Joe Becker
Head of Sales: Bill Noonberg
Head of Customer Service: Peter Hepburn
Geographic Coverage: International
Year Established: 1968
Number of Employees: 200

IDS ASSOCIATES, INC.
7 Oak Park Dr.
Bedford, MA 01730
(617) 275-4430
Major Market: Peripheral, Communications Equipment Manufacturing
Contacts:
Head of Marketing: Nora Feldman
Head of Sales: Jim Bender
Head of Software: Nigel Watkins
Head of Engineering: David Hunter
Geographic Coverage: International
Year Established: 1982
Number of Employees: 25

IDEAS, INC.
10759 Tucker St.
Beltsville, MD 20705
(301) 937-3600
Major Market: Component, Computer, Peripheral, Communications Equipment and Office Equipment Manufacturing; OEM (Computer Systems); OEM (Peripherals-Terminals); Software House; Systems House (Commercial OEM); Dealer/Distributor; Training Simulators
Target Industries: Government; Hospitals; Military
Target Applications: LAN; Communications; Remote Sensing
Contacts:
Head of Marketing: Barbara Duffy
Head of Sales: Rod Matheson
Head of Engineering: Dale Barrick
Geographic Coverage: International
Year Established: 1970
Number of Employees: 300

IDEOGRAPHIX, INC.
532 Mercury Dr.
Sunnyvale, CA 94086
(408) 739-1290
Major Market: Computer, Terminal, Peripheral and Communications Equipment Manufacturing; OEM (Computer Systems); OEM (Peripherals-Terminals); Systems House (Commercial OEM); Data Services (Service Bureau)
Target Industries: Chinese DP; Chinese Communication Systems
Target Applications: Chinese Data Entry; Chinese Telex
Net Sales: $1 Million — $5 Million (1981)
Contacts:
Head of Marketing: G. K. Yeh
Head of Sales: Eric Wang
Head of Software: David Chang
Head of Engineering: Chan A. Yeh
Head of Customer Service: George Tsai
Geographic Coverage: Far East
Year Established: 1972
Number of Employees: 55

IE SYSTEMS, INC.
P.O. Box 359
96 Main St.
Newmarket, NH 03857
(603) 659-5891
Major Market: Software House
Target Industries: OEM
Target Applications: Communications
Contacts:
Head of Marketing: Susan Currier
Geographic Coverage: International
Year Established: 1981
Number of Employees: 17

ILEX INDUSTRIES DATA SYSTEMS, INC.
301 Stanley Blvd.
Shelbyville, TN 37160
(615) 684-8731
Major Market: Computer, Communications Equipment Manufacturing
Target Industries: Education
Target Applications: Time-sharing; Real-time
Contacts:
Head of Sales: John C. Smith
Head of Software: Raymond Nix
Head of Engineering: Donald J. Friedman
Head of Customer Service: Rick Chambless
Geographic Coverage: National
Year Established: 1981
Number of Employees: 15

INDUSTRIAL COMPUTER CORP.
Suite 1D
6810 Roswell Road
Atlanta, GA 30328
(404) 396-9395
Major Market: Software House
Contacts:
Head of Marketing: Mike Wells
Head of Sales: Nancy Boyds
Head of Software: Bill Masacre
Geographic Coverage: International
Year Established: 1980
Number of Employees: 10

INFINET, INC.
Formerly Intertel, Inc.
6 Shattuck Road
Andover, MA 01810
(617) 681-0600
Major Market: Communications Equipment Manufacturing
Target Applications: Network Control
Contacts:
Head of Marketing: C. David Hetrick
Head of Sales: Dick Muirland
Head of Engineering: E. Cuddy
Head of Customer Service: Greg Sheerd
Geographic Coverage: International
Year Established: 1969
Number of Employees: 450

INFOLINK
1925 Holste Road
Northbrook, IL 60062
(312) 291-2900
Major Market: Component, Terminal and Communications Equipment Manufacturing; Systems House (Commercial OEM)
Target Industries: Manufacturing; Financial
Target Applications: Factory Data Collection; Computer Voice Response
Contacts:
Head of Marketing: Paul Green
Head of Engineering: Jim Lysaught
Geographic Coverage: International
Year Established: 1976
Number of Employees: 60

INFOMEDIA CORP.
Suite 275
801 Traeger Ave.
San Bruno, CA 94066
(415) 952-4487
Major Market: Software House; Data Services (Service Bureau)
Target Industries: Construction; Engineering; Utilities; Petroleum
Contacts:
Head of Marketing: Frank Mashburn
Head of Sales: Ruth E. Smith
Head of Software: Dr. Mel Pirtle
Geographic Coverage: International
Year Established: 1976
Number of Employees: 25

INFORMATION CONCEPTS, INC.
P.O. Box 19859
Dallas, TX 75219
(214) 324-2635
Major Market: Software House; Dealer/Distributor
Net Sales: $500,000 - $1 Million (1981)
Contacts:
Head of Marketing: Garry Goodwin
Head of Engineering: K. Messina
Geographic Coverage: International
Year Established: 1979
Number of Employees: 3

INFORMATION DEVICES CORP.
3205 Coronado Dr.
Santa Clara, CA 95051
(408) 727-4347
Major Market: Terminal, Peripheral and Communications Equipment Manufacturing; OEM (Peripherals-Terminals); Systems House (Commercial OEM); Dealer/Distributor
Target Industries: Engineering; Electronics Manufacturing; Scientific; Commercial
Target Applications: Structures; CAD/CAM; Earth Sciences
Contacts:
Head of Marketing/Sales: Tom Melby
Head of Software/Engineering: Irv-Marriott
Geographic Coverage: National
Year Established: 1981
Number of Employees: 15

INFORMATION DYNAMICS CORP.
1251 Exchange St.
Richardson, TX 75081
(214) 783-8080
Major Market: Communications Equipment Manufacturing
Contacts:
Head of Marketing: Charles Friedman
Geographic Coverage: National
Number of Employees: 5

INFORMATION MANAGEMENT TECHNOLOGIES
180 N. Michigan Ave.
Chicago, IL 60601
(312) 372-4222
Major Market: Software House; Systems House (Commercial OEM)
Target Industries: Banking; Manufacturing
Target Applications: Financial; DBMS - Manufacturing; Cash Management; Message Store
Contacts:
Head of Marketing: David Kaczmarek
Geographic Coverage: National
Year Established: 1974
Number of Employees: 60

THE INFORMATION ORGANIZATION CORP.
Suite 308
2295 Vallejo St.
San Francisco, CA 94123
(415) 921-3796
Major Market: Software House; Data Services (Service Bureau)
Target Industries: Legal; Banking
Target Applications: WP
Net Sales: $100,000 — $500,000 (1981)
Geographic Coverage: National
Year Established: 1979
Number of Employees: 2

INFOSERVICES, INC.
1728 Montreal Circle
Suite 22
Tucker, GA 30084
(404) 938-9960
Major Market: Software House; Systems House (Commercial OEM); Data Services (Service Bureau)
Target Industries: Finance
Target Applications: Financial; Income Tax Returns
Net Sales: $1 Million — $5 Million (1981)
Contacts:
Head of Marketing: Bob Westerman
Head of Engineering: Craig Engle
Geographic Coverage: Regional
Year Established: 1969
Number of Employees: 17

INFOSOFT SYSTEMS, INC.
P.O. Box 640
80 Washington St.
Norwalk, CT 06856
(203) 866-6833
Major Market: Software House
Net Sales: $500,000 - $1 Million (1982)
Contacts:
Head of Marketing: Holly Lapinski
Head of Sales: Jerrold H. Coret

Vendors

Head of Software: Richard L. Roth
Head of Customer Service: Peggy Herlihy
Geographic Coverage: International
Year Established: 1979
Number of Employees: 10

INFOTRON SYSTEMS CORP.
9 North Olney
Cherry Hill Industrial Center
Cherry Hill, NJ 08003
(609) 424-9400
Major Market: Communications Equipment Manufacturing
Target Applications: Networking Systems (LAN); Data PBX; Network Control Management
Contacts:
Head of Marketing: Jaffrey Kraengel
Head of Sales: Thomas Alexander
Head of Engineering: Joseph O'Neill
Head of Customer Service: Richard T. Mullen
Geographic Coverage: International
Year Established: 1968
Number of Employees: 710

INNOVATEK MICROSYSTEMS, INC.
Smithfield Road
Millerton, NY 12546
(914) 373-9003
Major Market: Componefit and Communications Equipment Manufacturing; Software House; Systems House (Commercial OEM)
Target Industries: Manufacturing; Military
Target Applications: Process Control
Net Sales: $100,000 — $500,000 (1981)
Contacts:
Head of Marketing: David Sherman
Head of Sales: Paul Fitts
Head of Software: Whaden N. Curtis
Geographic Coverage: Regional
Year Established: 1969
Number of Employees: 8

INNOVATIVE ELECTRONICS, INC.
4714 N. W. 165 St.
Miami, FL 33014
(305) 624-1644
Major Market: Peripheral and Communications Equipment Manufacturing
Target Industries: Cross Industry
Net Sales: $1 Million — $5 Million (1983)
Contacts:
Head of Marketing: Shelly Dolen
Head of Sales: Diane Ruggiero
Head of Engineering: Matt Imther
Head of Customer Service: Ken Majersky
Geographic Coverage: National
Year Established: 1977
Number of Employees: 28

INTECOM, INC.
601 InteCom Dr.
Allen, TX 75002
(214) 727-9141
Major Market: Communications Equipment Manufacturing
Target Industries: Corporations; Universities; Hospitals; Resale; Shared Tenant
Target Applications: LAN; Integrated Voice/Data; Voice Messaging; Protocol and Format Conversion
Contacts:
Head of Marketing/Sales: Tom Aschenbrenner
Head of Engineering: Thomas Cannon
Head of Customer Service: Bob Stewart
Geographic Coverage: National
Year Established: 1978
Number of Employees: 1,000

INTEGRATED DESIGN ENGINEERING, INC.
P.O. Box 16307
St. Louis, MO 63125
(314) 343-0005
Major Market: Peripheral and Communications Equipment Manufacturing; OEM (Peripherals-Terminals); Software House
Target Industries: NCR Market
Net Sales: $500,000 - $1 Million (1982)
Contacts:
Head of Marketing/Engineering: Bill Yakstis
Head of Customer Service: Steve Wolfangel
Geographic Coverage: International
Year Established: 1979
Number of Employees: 10

INTELLIGENT BUSINESS SYSTEMS, INC.
1500 Ocean Ave.
Bohemia, NY 11716
(516) 567-1800
Major Market: Computer and Communications Equipment Manufacturing
Target Industries: Record Carriers; Data/Telex
Contacts:
Head of Marketing: Malcolm Nagle
Head of Software: Barry Muirhead
Head of Engineering: Eric Schwartz
Geographic Coverage: International
Year Established: 1981
Number of Employees: 35

INTELLIGENT TECHNOLOGIES INTERNATIONAL CORP.
151 University Ave.
Palo Alto, CA 94301
(415) 328-2411
Major Market: Component and Communications Equipment Manufacturing; Software House; Systems House (Commercial OEM)
Contacts:
Head of Marketing: Verlaine Crawford
Head of Sales: David Vogel
Head of Customer Service: Sharon Keefe
Geographic Coverage: International
Year Established: 1982
Number of Employees: 18

INTERACTIVE SYSTEMS/3M
Business Communication Products
3920 Varsity Dr.
Ann Arbor, MI 48104
(313) 973-1500
Major Market: Communications Equipment Manufacturing
Target Industries: Manufacturing; Education; Financial; Government
Target Applications: LAN
Contacts:
Head of Marketing: Dan Gahlon
Head of Sales: John Huber
Head of Software: Bob Wollers
Head of Engineering: Brian Hackett
Geographic Coverage: International
Year Established: 1969
Number of Employees: 110

INTERBUSINESS CORP.
Incomm
Suite E
115 N. Wolf Road
Wheeling, IL 60090
(312) 459-6866
Major Market: Component Manufacturing; Peripheral Manufacturing; Communications Equipment Manufacturing; Dealer/Distributor
Target Applications: Data Communication
Contacts:
Head of Marketing: Mike Tournayan
Head of Engineering: John Todaro
Head of Customer Service: John Baldin
Geographic Coverage: National
Year Established: 1981
Number of Employees: 41

INTERCOM RESEARCH CORP.
Suite 14
2803 Artie St.
Huntsville, AL 35805
(205) 536-6066
Major Market: Communications Equipment Manufacturing; Dealer/Distributor
Target Industries: Government; Aerospace; Nuclear; Insurance
Contacts:
Head of Marketing/Sales: C. Lyndon Martin
Head of Engineering: Roy Phillips
Geographic Coverage: Regional
Year Established: 1977
Number of Employees: 10

INTERCONNECT PLANNING CORP.
Wall St. Plaza
New York, NY 10005
(212) 825-9060
Major Market: Communications Equipment Manufacturing
Target Industries: Banking; Stock Brokerage; Insurance
Target Applications: Trading
Contacts:
Head of Marketing: Edward F. McGrath
Head of Engineering: Harry Bergen
Head of Customer Service: Acelia Hannson
Geographic Coverage: International
Year Established: 1974
Number of Employees: 450

INTERFACE ELECTRONICS, INC.
21134 Bridge St.
Southfield, MI 48034
(313) 352-8820
Major Market: Communications - Equipment Manufacturing; Software House; Systems House (Commercial OEM); Dealer/Distributor
Net Sales: $500,000 - $1 Million (1981)
Contacts:
Head of Marketing: Kaban Bakshi
Head of Software: Sunil Shah
Head of Engineering: Alan Berman
Geographic Coverage: National
Year Established: 1974
Number of Employees: 20

INTERLAN, INC.
3 Liberty Way
Westford, MA 01886
(617) 692-3900
Major Market: Component, Peripheral and Communications Equipment Manufacturing; Software House; Data Services (Service Bureau)
Target Industries: OEM; Computer Companies
Target Applications: CAD/CAM; Automatic Testing; R&D
Contacts:
Head of Marketing: Jerry Wessel
Head of Sales: George Symuleski
Head of Engineering: Ray Moore
Geographic Coverage: International
Year Established: 1981
Number of Employees: 100

INTER-LINK
Suite 1
580 Weddell Dr.
Sunnyvale, CA 94089
(408) 744-1930
Major Market: Communications Equipment Manufacturing; OEM (Computer Systems); OEM (Peripherals-Terminals); Systems House (Commercial OEM); Dealer/Distributor
Contacts:
Head of Marketing/Sales: Bill Rubin
Head of Engineering: Ken Larsen
Head of Customer Service: Dave Russell
Geographic Coverage: National
Year Established: 1969
Number of Employees: 29

INTERMETRICS
733 Concord Ave.
Cambridge, MA 02138
Major Market: Software House
Geographic Coverage: National
Year Established: 1969
Number of Employees: 400

INTERNATIONAL DATA SCIENCES, INC.
Corporate Headquarters
7 Wellington Road
Lincoln, RI 02865
(401) 333-6200
Major Market: Peripheral and Communications Equipment Manufacturing
Target Industries: Engineering; Banking; Military; Aviation
Net Sales: $1 Million — $5 Million (1981)
Contacts:
Head of Marketing: Jack Simpson
Head of Sales: T. J. Daniels

Head of Engineering: Ed Salzillo
Geographic Coverage: International
Year Established: 1966
Number of Employees: 150

INTERNATIONAL DIGITAL ELECTRONICS ASSOCIATES
6 Westchester Plaza
Elmsford, NY 10523
(914) 347-3700
Major Market: Terminal Manufacturing; Software House; Systems House (Commercial OEM)
Target Industries: Communications
Target Applications: Communications
Contacts:
Head of Marketing: Charles T. Reilly
Geographic Coverage: International
Year Established: 1979
Number of Employees: 25

INTERNATIONAL MODEM EXCHANGE (TRIMCOM)
P.O. Box 8926
Suite 905
4 Longfellow Place
Boston, MA 02114
(617) 720-4060
Major Market: Communications Equipment Manufacturing
Number of Employees: 10

INTERSIL SYSTEMS, INC.
1275 Hammerwood Ave.
Sunnyvale, CA 94089
(408) 743-4300
Major Market: Component, Computer, Terminal, Peripheral, Communications Equipment and Office Equipment Manufacturing; OEM (Peripherals-Terminals); Software House; Systems House (Commercial OEM); Dealer/Distributor
Target Industries: System Integrators; Large Company In-House Communications; Industrial Control; IBM PC
Target Applications: Factory Automation; OA; DP
Contacts:
Head of Marketing: Lee Jansen
Head of Software: Craig Erickson
Geographic Coverage: International
Year Established: 1968
Number of Employees: 209

ITEK COMPOSITION SYSTEMS
34 Sellu Dr.
Nashua, NH 03063
(603) 889-1400
Major Market: Component, Computer, Terminal, Peripheral, Communications Equipment and Office Equipment Manufacturing; Dealer/Distributor
Target Industries: Publishing; Media; Office Systems
Target Applications: Typesetting; Data Conversion
Contacts:
Head of Marketing: William McPherson
Head of Sales: Bill Kelly
Head of Engineering: Edward Neyland
Head of Customer Service: David Sinnott

Geographic Coverage: International
Year Established: 1976
Number of Employees: 600

ITT BUSINESS COMMUNICATIONS CORP.
300 E. Park Dr.
Harrisburg, PA 17111
(717) 564-4349
Major Market: Communications Equipment Manufacturing; Dealer/Distributor
Target Industries: Fortune 1000
Target Applications: Communications
Contacts:
Head of Marketing: Mike Hickey
Head of Sales: Terry Price

ITT TELECOM PRODUCTS, INC.
3100 Highwoods Blvd.
Raleigh, NC 27604
(919) 872-3759
Major Market: Component, Computer, Terminal, Peripheral and Communications Equipment Manufacturing; Software House; Systems House (Commercial OEM); Data Services (Service Bureau); Dealer/Distributor
Target Industries: Telephone; Cellular Radio; Business; Industrial
Target Applications: Switching; Transmission; Data; Instrumentation
Contacts:
Head of Marketing: Ken Ray
Head of Software: W.L. Glomb
Head of Customer Service: George Young Jr.
Geographic Coverage: International
Year Established: 1983
Number of Employees: 6,500

IWATSU AMERICA, INC.
120 Commerce Road
Carlstadt, NJ 07072
(201) 935-8580
Major Market: Communications Equipment Manufacturing; Software House
Contacts:
Head of Marketing: Dan Mahoney
Head of Sales: Charles Rolland
Geographic Coverage: International
Year Established: 1938
Number of Employees: 40

J B M ELECTRONICS
6020 N. Lingbeergh Blvd.
Hagelwood, MS 63042
(314) 731-7781
Major Market: Communications Equipment Manufacturing
Target Industries: Telecommunications
Contacts:
Head of Marketing: Steve Mintz
Head of Software: James Harrisson
Head of Engineering: Irwin Mintz
Year Established: 1975
Number of Employees: 53

JC SYSTEMS
469 Valley Way
Milpitas, CA 95035
(408) 945-0318
Major Market: Component, Computer and Communications Equipment Manufacturing; Software House
Target Industries: Manufacturing; Engineering; Offices; Education
Target Applications: Data Communications; WP; DBMS
Net Sales: $500,000 - $1 Million (1983)
Contacts:
Head of Marketing: Yung Choi
Head of Engineering: Jai Choi
Head of Customer Service: Dave Tom
Geographic Coverage: International
Year Established: 1978
Number of Employees: 10

KAPUR LABORATORIES
2121 S. El Camino Real
San Mateo, CA 94403
(415) 573-5478
Major Market: Communications Equipment Manufacturing
Contacts:
Head of Marketing: John J. Kapur
Geographic Coverage: International
Year Established: 1972
Number of Employees: 10

KAUFMAN RESEARCH MANUFACTURING, INC.
145 E. Dana St.
Mountain View, CA 94041
(415) 962-8811
Major Market: Communications Equipment Manufacturing
Target Applications: Protocol Conversion; Data Communications
Net Sales: $1 Million — $5 Million (1983)
Contacts:
Head of Marketing: Marc T. Kaufman
Geographic Coverage: International
Year Established: 1978
Number of Employees: 17

KEYSTROKE BUSINESS SYSTEMS, INC.
2635 National Ave.
Hayward, CA 94545
(415) 887-8999
Major Market: Computer Manufacturing; Peripheral Manufacturing; OEM (Computer Systems); OEM (Peripherals-Terminals); Software House
Target Industries: Fortune 1000; Government; Education; Small Business
Contacts:
Head of Marketing: Don Gallagher
Head of Software: John Row
Head of Engineering: J. Rogers
Geographic Coverage: International
Year Established: 1979
Number of Employees: 12

KEYSTONE DATA CONSULTANTS, INC.
24 E. Princess St.
P.O. Box 606
York, PA 17405
(717) 848-5606
Major Market: Software House; Systems House (Commercial OEM); Data Services (Service Bureau); Dealer/Distributor
Target Industries: Manufacturing; Engineering
Target Applications: POS; Accounting; Inventory Management; Industry Control
Net Sales: $100,000 — $500,000 (1981)
Geographic Coverage: International
Year Established: 1977
Number of Employees: 6

KINEX CORP.
9950 Bryan Dairy Road
Largo, FL 33543
(813) 541-6404
Major Market: Communications Equipment Manufacturing
Contacts:
Head of Marketing: Bill Huston
Head of Sales: S.F. Ridge
Head of Software: G. Michalec
Head of Engineering: K.I. Nording
Head of Customer Service: T. Porter
Geographic Coverage: National
Year Established: 1977
Number of Employees: 75

KNF SYSTEMS CORP.
8307 Highway 71 W.
Austin, TX 78735
(512) 288-1453
Major Market: Computer, Peripheral, Communications Equipment and Interface Manufacturing
Target Industries: Geophysical; Aerospace
Target Applications: Communication; Graphics; Channel Interfacing
Contacts:
Head of Marketing: Fred Klingensmith
Head of Sales: Steve Stillman
Head of Software: Harry D. Kalms
Head of Engineering: Thomas Allen
Head of Customer Service: Karen Wiley
Geographic Coverage: International
Year Established: 1975
Number of Employees: 60

LEADING EDGE PRODUCTS, INC.
221 Turnpike St.
Canton, MA 02021
(617) 828-8150
Major Market: Peripheral Manufacturing; Dealer/Distributor
Target Industries: System Houses; Computer Retail Stores
Target Applications: Accounting; Games; Education
Contacts:
Head of Marketing: William Sellers
Geographic Coverage: International
Year Established: 1979
Number of Employees: 180

LEARNED-MAHIN
2229 W. State St.
P.O. Box 1488
Boise, ID 83701
(208) 336-2281
Major Market: Software House
Target Industries: Utilities; Nonprofit
Target Applications: Accounting
Net Sales: $100,000 — $500,000 (1981)
Contacts:
Head of Sales: Gary Mahin

Head of Software: Nancy Learned
Head of Customer Service: Gary Mahn
Geographic Coverage: International
Year Established: 1973
Number of Employees: 10

LBD SYSTEMS, INC.
1006 Apache Trail
Mechanicsburg, PA 17055
(717) 697-2607
Major Market: Communications Equipment Manufacturing
Target Industries: Government; Education; Industry; Telephone
Target Applications: Data Communications
Contacts:
Head of Marketing: Ralph Cleveland
Year Established: 1979
Number of Employees: 10

LEGGET AUTOMATION, INC.
1212 Millbrook Dr.
Arlington, TX 76012
(817) 274-0089
Major Market: Software House
Contacts:
Head of Marketing: Judy Carrick
Geographic Coverage: International
Year Established: 1980
Number of Employees: 3

LEXICON SYSTEMS, INC.
2104 W. Peoria Ave.
Phoenix, AZ 85029
(602) 944-1543
Major Market: Communications Equipment Manufacturing
Net Sales: $1 Million — $5 Million (1982)
Contacts:
Head of Marketing: Terry Siegrist
Head of Engineering: Phil Jalowiec
Geographic Coverage: International
Year Established: 1976
Number of Employees: 45

LEXICON CORP. OF MIAMI
1541 N.W. 65th Ave.
Fort Lauderdale, FL 33313
(305) 792-4400
Major Market: Terminal and Communications Equipment Manufacturing
Target Industries: Fortune 1000
Target Applications: Order Entry; Electronic Mail
Net Sales: $1 Million — $5 Million (1981)
Contacts:
Head of Marketing: Chris Washburn
Geographic Coverage: International
Year Established: 1976
Number of Employees: 42

LINDENMAN SYSTEMS
41 Fairhill Road
Holden, MA 01520
(617) 852-0233
Major Market: Software House
Net Sales: $100,000 — $500,000 (1981)
Contacts:
Head of Sales: Alison Wilson
Head of Software: Dave Lindbergh
Geographic Coverage: International
Year Established: 1980
Number of Employees: 3

LINK SYSTEMS
1640 19th St.
Santa Monica, CA 90404
(213) 453-1851
Major Market: Software House
Net Sales: $1 Million — $5 Million (1981)
Contacts:
Head of Sales: Rick Gibson
Head of Engineering: Curt Bianchi
Geographic Coverage: International
Year Established: 1980

LOCAL DATA, INC.
2701 Toledo St.
Torrance, CA 90503
(213) 320-7126
Major Market: Communications Equipment Manufacturing
Net Sales: $1 Million — $5 Million (1982)
Contacts:
Head of Sales: Dave Guthrie
Head of Engineering: Dennis Klein
Head of Customer Service: Kevin Jackson
Geographic Coverage: International
Year Established: 1977
Number of Employees: 50

LOGICA, INC.
666 3rd Ave., 19th Floor
New York, NY 10017
(212) 599-0628
Major Market: Communications Equipment Manufacturing; Software House; Systems House (Commercial OEM)
Target Industries: Banking; Telecommunications; Defense; Space
Target Applications: Message Switching; Communications; System Design
Contacts:
Head of Marketing: William Shrimpton
Head of Sales: Bob Wienewski
Geographic Coverage: International
Year Established: 1968
Number of Employees: 1,500

LYNCH COMMUNICATION SYSTEMS, INC.
Data Division
204 Edison Way
Reno, NV 89520
(702) 785-8680
Major Market: Communications Equipment Manufacturing; Dealer/Distributor
Target Applications: Data Communications
Contacts:
Head of Marketing: Alexander A. Mavronicles
Geographic Coverage: International
Year Established: 1945
Number of Employees: 1,000

M/A-COM DCC, INC.
11717 Exploration Lane
Germantown, MD 20874-2798
(301) 428-5500
Major Market: Communications Equipment Manufacturing
Target Industries: Banking; Law; Universities; Government
Target Applications: Data Communications
Contacts:
Head of Marketing: Cathy Jenkins
Head of Sales: Garland Audlet
Geographic Coverage: International
Year Established: 1971
Number of Employees: 900

M/A-COM, INC.
Linkabit
3033 Science Park Road
San Diego, CA 92121
(619) 457-2340
Major Market: Communications Equipment Manufacturing
Target Industries: Satellite Communications; Government; Cable; Broadcasting; Banking
Contacts:
Head of Marketing: Mike Lubin
Head of Engineering: Tom Seay
Geographic Coverage: International
Year Established: 1968
Number of Employees: 1,300

MACKINNEY SYSTEMS
Rte. 2
Box 270A
Fair Grove, MO 65648
(417) 833-9553
Major Market: Software House
Net Sales: Less than $100,000 (1981)
Geographic Coverage: International
Year Established: 1978
Number of Employees: 3

MADZAR CORP.
37490 Glenmoor Dr.
Fremont, CA 94536
(415) 794-7400
Major Market: Communications Equipment Manufacturing
Contacts:
Head of Marketing: Donald H. Platt
Geographic Coverage: International
Year Established: 1979
Number of Employees: 5

MAGNUM COMMUNICATIONS, LTD.
Suite 415
320 Interstate N.
Atlanta, GA 30339
(404) 952-4940
Major Market: Communications Equipment Manufacturing; Software House; Systems House (Commercial OEM)
Target Industries: Credit Unions; Banking; Retail; Finance
Target Applications: Credit Reports; New Accounts
Net Sales: $100,000 - $500,000 (1981)
Contacts:
Head of Marketing: Sue Knautz
Head of Software: Lindsey Gardener
Geographic Coverage: National
Year Established: 1978
Number of Employees: 13

MANAGE, INC.
P.O. Box 175
Chicopee, MA
(413) 598-8204
Major Market: Communications Equipment Manufacturing
Target Industries: Banking; Retail; Engineering
Contacts:
Head of Marketing: Linda Menard
Head of Sales: David P. Menard
Geographic Coverage: National
Year Established: 1973
Number of Employees: 30

MATH ASSOCIATES, INC.
2200 Shames Dr.
Westbury, NY 11590
(516) 334-6800
Major Market: Component, Peripheral and Communications Equipment Manufacturing; Custom Communications Equipment.
Contacts:
Head of Marketing: Bob DeLia
Head of Sales: Norman Fein
Head of Engineering: Irwin Math
Geographic Coverage: Western Europe
Year Established: 1972
Number of Employees: 30

MATHEMATICA PRODUCTS GROUP, INC.
P.O. Box 2392
Princeton, NJ 08540
(609) 799-2600
Major Market: Software House
Contacts:
Head of Marketing: Paul Grabehald
Head of Sales: Mark Berkowitz
Head of Software: Bernard Finzi
Geographic Coverage: International
Year Established: 1975
Number of Employees: 200

MCCORMACK & DODGE CORP.
580 Hillside Ave.
Needham, MA 02194
(617) 449-4012
Major Market: Software House
Target Applications: Financial; Accounting
Contacts:
Head of Marketing: Robert Weller
Head of Sales: Steven Wanburg
Head of Engineering: John Landry
Geographic Coverage: International
Year Established: 1969
Number of Employees: 400

MCDONNELL DOUGLAS AUTOMATION CO.
P.O. Box 516
St. Louis, MO 63166
(314) 233-4718
Major Market: Software House; Systems House (Commercial OEM); Data Services (Service Bureau)
Target Industries: Medical
Target Applications: Financial Systems; Data Collection; Patient Care Reporting
Contacts:
Head of Marketing: Edward V. Hamilton Jr.
Head of Sales: Arthur M. Randall
Head of Software: Philip Kreted
Head of Engineering: William T. Corvin
Head of Customer Service: Joseph P. Sullivan
Geographic Coverage: International

Year Established: 1970
Number of Employees: 1,000

MDB ENTERPRISES
215 Hamilton Ave
Palo Alto, CA 94301
(415) 327-8080
Major Market: OEM (Computer Systems); Software House
Net Sales: $100,000 - $500,000 (1981)
Geographic Coverage: International
Year Established: 1977
Number of Employees: 5

MEGADATA CORP.
35 Orville Dr.
Bohemia, NY 11716
(516) 589-6800
Major Market: Computer and Office Equipment Manufacturing
Net Sales: $1 Million - $5 Million (1982)
Contacts:
Head of Marketing: Richard Adams
Geographic Coverage: International
Year Established: 1967
Number of Employees: 150

MEGAWEST SYSTEMS, INC.
Suite 224
140 W. 2100 S.
Salt Lake City, UT 84115
(801) 487-0788
Major Market: OEM (Computer Systems); Software House; Systems House (Commercial OEM)
Target Industries: Medical; Retail; Accounting; Trucking
Geographic Coverage: International
Year Established: 1979
Number of Employees: 10

MELCO LABS, INC.
14406 N.E. 20th St.
Bellevue, WA 98007
(206) 643-3400
Major Market: Communications Equipment Manufacturing
Target Industries: Telephone
Contacts:
Head of Customer Service: Kay Barney
Year Established: 1973
Number of Employees: 250

MEMOREX CORP.
Santomas and Central Expressways
Santa Clara, CA 95052
(408) 987-1000
Major Market: Terminal, Peripheral and Communications Equipment Manufacturing; Systems House (Commercial OEM); Dealer/Distributor
Target Industries: Fortune 1000
Contacts:
Head of Marketing: Dennis Flanagan
Head of Sales: Sam Spadafora
Head of Engineering: Lou Debertalo
Head of Customer Service: Robert Berry
Geographic Coverage: International
Year Established: 1961
Number of Employees: 10,000

MERIDIAN TECHNICAL ASSOCIATES, INC.
2 Southboro Lane
Glenrock, NJ 07452
(201) 445-8645
Major Market: Communications Equipment Manufacturing; Software House; Systems House (Commercial OEM); Data Services (Service Bureau); Dealer/Distributor
Target Industries: Data Communications; Business; Micro
Contacts:
Head of Marketing: J. Fitzpatrick
Year Established: 1980
Number of Employees: 3

METAPATH, INC.
737 Lincoln Centre Dr.
Forest City, CA 94404
(415) 345-7700
Target Industries: Data Communications
Target Applications: Terminal Switching to HP and DEC
Contacts:
Head of Marketing: Tom Cramer
Year Established: 1983
Number of Employees: 30

MFJ ENTERPRISES
P.O. Box 494
Starkville, MS 39762
(601) 323-5869
Major Market: Communications Equipment Manufacturing; Software House
Year Established: 1972
Number of Employees: 75

MICOM SYSTEMS
Micro-Baud Systems, Inc.
3393 Delacruz Blvd.
Santa Clara, CA 95050-6283
(408) 727-5275
Major Market: Communications Equipment Manufacturing
Target Industries: OEM Terminal and OEM Computer Manufacturing; End Users (Bell 212); Distributors (Stand-Alone)
Target Applications: Modems
Net Sales: $1 Million - $5 Million (1982)
Contacts:
Head of Marketing: Bob Taylor
Head of Sales: Joseph Gaynor
Head of Software: Stan Fickes
Head of Engineering: Lucian Dang
Geographic Coverage: National
Year Established: 1980
Number of Employees: 30

MICOM SYSTEMS, INC.
20151 Nordhoff St.
Chatsworth, CA 91311
(213) 998-8844
Major Market: Communications Equipment Manufacturing
Contacts:
Head of Marketing: Steve Frankel
Head of Sales: Chris Keeber
Geographic Coverage: International
Year Established: 1973
Number of Employees: 1,200

MICRO-INTEGRATION, INC.
63 Maple St.
P.O. Box 335
Friendsville, MD 21531
(301) 746-5888
Major Market: Software House
Target Applications: Micro Data Communications
Net Sales: $500,000 - $1 Million (1981)
Contacts:
Head of Marketing: Max Eveleth
Head of Sales: Kelly Wiseman
Head of Software: Frank Ross
Head of Engineering: Ernie Nichols
Head of Customer Service: Marsha Shenk
Geographic Coverage: International
Year Established: 1978
Number of Employees: 15

THE MICROPERIPHERAL CORP.
2565 152nd Ave. N.E.
Redmond, WA 98052
(206) 881-7544
Major Market: Communications Equipment Manufacturing; Software House
Target Applications: Data Communications; Telecommunications
Contacts:
Head of Marketing: Noreen Scott
Geographic Coverage: International
Year Established: 1978
Number of Employees: 50

MICRO-SYSTEMS SOFTWARE, INC.
4301-18 Oak Circle
Boca Raton, FL 33431
(305) 391-5033
Major Market: Software House
Net Sales: $500,000 - $1 Million (1981)
Contacts:
Head of Sales: Chris Walczak
Geographic Coverage: International
Year Established: 1979
Number of Employees: 13

MICRO/MAINFRAME SYSTEMS, INC.
10 Columbus Circle
25th Floor
New York, NY 10019
(212) 246-4242
Major Market: Software House; Systems House (Commercial OEM); Dealer/Distributor
Target Industries: Direct Mail; Construction; Financial; Contractors
Target Applications: Accounting; Graphics; Scientific Data Acquisition; Payroll
Net Sales: $1 Million - $5 Million (1981)
Contacts:
Head of Sales: Gerald Greenberg
Geographic Coverage: National
Year Established: 1968
Number of Employees: 30

MICROCOM, INC.
1400-A Providence Highway
Norwood, MA 02062
(617) 762-9310
Major Market: Communications Equipment Manufacturing
Contacts:
Head of Sales: Harry Segal
Geographic Coverage: Regional
Year Established: 1980
Number of Employees: 70

MICRODATA, INC.
Suite 102
6055 Lehman Dr.
Colorado Springs, CO 80907
(303) 594-9241
Major Market: Communications Equipment Manufacturing
Target Industries: Computer
Target Applications: Honeywell Large Systems Communications
Net Sales: $100,000 - $500,000 (1981)
Contacts:
Head of Marketing: Kurt M. Friable
Head of Software: Bruce Trowbridge
Geographic Coverage: National
Year Established: 1975
Number of Employees: 2

MICRODATA CORP.
4000 McArthur
P.O. Box 19501
Irvine, CA 92713
(714) 250-1000
Major Market: Computer, Terminal, Peripheral and Communications Equipment Manufacturing
Contacts:
Head of Marketing: Bob Purdy
Geographic Coverage: International
Year Established: 1969
Number of Employees: 3,000

MICROLOG, INC.
222 Rte. 59
Suffern, NY 10901
(914) 368-0353
Major Market: Component and Communications Equipment Manufacturing
Target Industries: Government; Banking; Insurance
Contacts:
Head of Marketing: Andrew Welsch
Geographic Coverage: National
Year Established: 1981
Number of Employees: 35

MICROL, INC.
10045 Waterford Dr.
Ellicott City, MD 21043
(301) 461-2721
Major Market: Software House
Geographic Coverage: National
Year Established: 1975
Number of Employees: 9

MICROSPARC, INC.
10 Lewis St.
Lincoln, MA 01773
(617) 259-9710
Major Market: Software House
Target Industries: Personal Computers
Net Sales: $1 Million - $5 Million (1982)
Contacts:
Head of Marketing: David P. Szalek
Head of Sales: Tammy J. Arico
Geographic Coverage: International
Year Established: 1980
Number of Employees: 15

MICROSTUF, INC.
Suite 140
1845 The Exchange

Vendors

Atlanta, GA 30339
(404) 952-0267
Major Market: Software House
Target Applications: Data Communications
Geographic Coverage: National
Year Established: 1979
Number of Employees: 12

MIDWEST DATA SOURCE
1010 Nimetz
Cincinnati, OH 45230
(513) 231-2023
Major Market: Communications Equipment Manufacturing
Contacts:
Head of Marketing: James Jepson
Head of Software: Mike Shier
Head of Engineering: William Miller
Head of Customer Service: Barbara Bailey
Geographic Coverage: International
Year Established: 1980
Number of Employees: 7

MINNTRONICS CORP.
2599 White Bear Ave.
St. Paul, MN 55109
(612) 770-5247
Major Market: Peripheral and Communications Equipment Manufacturing
Target Industries: Banking; Military; Education; Commercial
Contacts:
Head of Sales: Jim Cobb
Head of Engineering: Deene Rite
Head of Customer Service: Shona Hillman
Geographic Coverage: International
Year Established: 1975

MITEL, INC.
Mitel Semiconductor Division
5400 Broken Sound Blvd.
Boca Raton, FL 33431
(305) 994-8586
Major Market: Component, Terminal, Peripheral, Communications Equipment and Office Equipment Manufacturing; OEM (Peripherals-Terminals); Dealer/Distributor
Target Industries: Telecommunications
Contacts:
Head of Sales: Gordon Turner
Head of Engineering: Tom Meyer
Geographic Coverage: National
Year Established: 1971

MITSUBISHI ELECTRONICS AMERICA, INC.
Computer Division
991 Knox St.
Torrance, CA 90502
(213) 515-3993
Major Market: Computer, Terminal and Peripheral Manufacturing; OEM (Computer Systems); Software House; Dealer/Distributor
Target Industries: Manufacturing; Contractors
Target Applications: Accounting; Data Entry
Geographic Coverage: National
Year Established: 1976
Number of Employees: 180

MODEMS PLUS, INC.
217 E. Trinity Place
P.O. Box 1727
Decatur, GA 30030
(404) 378-5276
Major Market: Communications Equipment Manufacturing; OEM (Computer Systems); OEM (Peripherals-Terminals); Systems House (Commercial OEM); Dealer/Distributor
Net Sales: $1 Million - $5 Million (1982)
Contacts:
Head of Engineering: Tom Young
Geographic Coverage: International
Year Established: 1971
Number of Employees: 20

MODULAR COMPUTER SYSTEMS, INC. (MODCOMP)
1650 W. McNab Road
Ft. Lauderdale, FL 33310
(305) 974-1380
Major Market: Computer Manufacturing; Communications Equipment Manufacturing; Systems House (Commercial OEM)
Target Industries: Process Control; Communications; Viewdata; Factory Automation
Target Applications: Process Control; Energy Management; Discrete Manufacturing
Contacts:
Head of Marketing: Philippe Courlot
Head of Sales: Howard Kossack
Head of Engineering: Harold Koplow
Head of Customer Service: Ken Estey
Geographic Coverage: International
Year Established: 1970
Number of Employees: 1,500

MODULAR INTEGRATION, INC.
Suite 1
Building C
1145 12th Ave. N.W.
P.O. Box 1079
Issaquah, WA 98027
(206) 392-8086
Major Market: OEM (Computer Systems)
Target Industries: Water/Wastewater
Target Applications: Process Control
Net Sales: $1 Million - $5 Million (1981)
Contacts:
Head of Marketing: Jane Kunkos
Head of Sales: James Wooten
Head of Customer Service: Jane Kunko
Geographic Coverage: International
Year Established: 1977
Number of Employees: 11

MOHAWK DATA SCIENCES CORP.
Seven Century Dr.
Parsippany, NJ 07054
(201) 540-9080
Major Market: Computer, Terminal and Peripheral Manufacturing; Software House
Target Industries: Hospitals; Hospitality; Retail Footwear; Motor Vehicle
Contacts:
Head of Marketing: Brian S. Gaylord
Geographic Coverage: International
Year Established: 1964
Number of Employees: 5,300

MONROE SYSTEMS FOR BUSINESS
Litton Industries, Inc.
The American Road
P.O. Box 9000R
Morris Plains, NJ 07950
(201) 540-7300
Major Market: Computer and Office Equipment Manufacturing; OEM (Computer Systems); Software House
Target Industries: Banking; Accounting
Target Applications: Financial
Contacts:
Head of Marketing: Robert McGrath
Geographic Coverage: International
Year Established: 1912
Number of Employees: 3,300

MORGAN DATA SYSTEMS
233 Racetrack Road
Fort Walton Beach, CA 32548
(904) 863-2124
Major Market: Communications Equipment Manufacturing; OEM (Computer Systems); Manufacturing Special Systems
Target Industries: Communications
Target Applications: Instrumentation; Control; Monitoring; Data Acquisition
Contacts:
Head of Marketing: Constantine Dudek
Head of Customer Service: David Johnson
Geographic Coverage: National
Year Established: 1971
Number of Employees: 8

MOTOROLA, INC.
1301 E. Algonquin Road
Schaumburg, IL 60196
(312) 576-7000
Major Market: Component, Computer, Terminal, Communications Equipment and Office Equipment Manufacturing; OEM (Peripherals-Terminals); Systems House (Commercial OEM); Data Services (Service Bureau); Dealer/Distributor
Target Industries: Public Safety; Industrial; Oil; Mass Transit
Target Applications: Security; Motor Vehicle Efficiency; Hospital Paging; Personnel Communications
Contacts:
Head of Marketing: Bob Cecil
Head of Sales: Art Sundry
Head of Customer Service: Ira Walker
Geographic Coverage: International
Year Established: 1928
Number of Employees: 75,000

MOUNTAIN COMPUTER, INC.
300 El Pueblo Road
Scotts Valley, CA 95066
(408) 438-6650
Major Market: Peripheral, Communications Equipment and Office Equipment Manufacturing; OEM (Peripherals-Terminals); Dealer/Distributor; Storage System
Target Applications: Data Entry; Communications; Storage System
Net Sales: $1 Million - $5 Million (1981)
Contacts:
Head of Marketing: Robert Stroh
Head of Software: George Proper
Head of Engineering: Eric Swartz
Head of Customer Service: Stan Scordino
Geographic Coverage: International
Year Established: 1977
Number of Employees: 120

MTI SYSTEMS CORP.
38 Harbor Park Dr.
P.O. Box 271
Port Washington, NY 11050
(516) 621-6200
Major Market: OEM (Computer Systems); Dealer/Distributor;
Target Industries: Fortune 500; Education; Banking; OEM
Net Sales: $1 Million - $5 Million (1981)
Contacts:
Head of Marketing: Bert Rudofsky
Head of Customer Service: Joe Morreale
Geographic Coverage: Regional
Year Established: 1968
Number of Employees: 55

MUIRHEAD, INC.
1101 Bristol Road
Mountainside, NJ 07092
(201) 233-6010
Major Market: Communications Equipment Manufacturing
Target Industries: Utilities; Common Carriers; Oil Companies; Publishers
Target Applications: Printing; Data Communications
Contacts:
Head of Marketing: Holmes Bailey
Head of Engineering: Jason Eveleth
Geographic Coverage: International
Year Established: 1954
Number of Employees: 80

MULTI — TECH SYSTEMS, INC.
82 2nd Ave. S.E.
New Brighton, MN 55112
(612) 631-3550
Major Market: Computer and Communications Equipment Manufacturing; OEM (Computer Systems)
Target Industries: Retail; End User.
Target Applications: WP; Accounting; MRP; List Management
Contacts:
Head of Marketing: Thomas Heimerman
Head of Engineering: Greg Johnson
Head of Customer Service: Pete Hanlon
Geographic Coverage: National
Year Established: 1970
Number of Employees: 50

MULTITRONICS, INC.
Industrial Products Division
8444 Sierra Court

P.O. Box 2295
Dublin, CA 94568
(415) 829-3300
Major Market: Computer and Communications Equipment Manufacturing; OEM (Computer Systems); OEM (Peripherals-Terminals); Software House; Systems House (Commercial OEM)
Target Industries: System Houses; System Integration; Process Control; Water/Wastewater
Target Applications: Data Acquisition; Water Distribution Control; Process Control
Net Sales: $1 Million - $5 Million (1981)
Contacts:
Head of Marketing: Warren McGuffin
Head of Sales: Bill Cox
Head of Software: James Hays
Head of Engineering: Tom Seabury
Head of Customer Service: Roy Weaver
Geographic Coverage: National
Year Established: 1970
Number of Employees: 200

MUNFORD MICRO SYSTEMS
P.O. Box 400
Summerland, CA 93067
(805) 969-4557
Major Market: Software House
Contacts:
Head of Marketing: Peter Burns
Geographic Coverage: International
Year Established: 1979
Number of Employees: 5

M.P. SYSTEMS, LTD.
P.O. Box 76363
Atlanta, GA 30358
(404) 252-3362
Major Market: Software House
Net Sales: $100,000 - $500,000 (1982)
Geographic Coverage: Canada
Year Established: 1981
Number of Employees: 2

NATIONAL COMPUTER SYSTEMS, INC.
Scanning Products Division
4401 W. 76th St.
P.O. Box 9365
Minneapolis, MN 55440
(612) 830-7800
Major Market: Component, Terminal, Peripheral and Communications Equipment Manufacturing; OEM (Peripherals-Terminals); Software House; Systems House (Commercial OEM); Dealer/Distributor
Target Industries: Education; Human Resources; Government; Clinical
Target Applications: OMR; Data Entry
Contacts:
Head of Marketing: Gene Courtney
Head of Sales: John Kirchner
Head of Software: Laurence Erickson
Head of Engineering: L. Sanderson
Head of Customer Service: J. Lockner
Geographic Coverage: International
Year Established: 1962
Number of Employees: 1,300

NATIONAL E-F-T, INC.
Systems Development
88 Jefferson Blvd.
Warwick, RI 02888
(401) 781-3850
Major Market: Software House; Systems House (Commercial OEM)
Target Industries: Manufacturing; Government; Banking
Net Sales: $1 Million - $5 Million (1981)
Contacts:
Head of Marketing: Donald Kennedy
Head of Software: Donald R. LaChance
Head of Customer Service: Robert Peluso
Geographic Coverage: Regional
Year Established: 1976
Number of Employees: 62

NATIONAL MICRO PRODUCTS, INC.
430 Southlake Blvd.
Richmond, VA 23236
(804) 794-0517
Major Market: Computer and Communications Equipment Manufacturing; OEM (Computer Systems); Systems House (Commercial OEM); Dealer/Distributor
Target Industries: Small Business; Lodging; Security
Target Applications: Office Networks; Process Control
Net Sales: $100,000 - $500,000 (1981)
Contacts:
Head of Marketing: Carol Nugent
Head of Engineering: Stan Demster
Geographic Coverage: National
Year Established: 1980
Number of Employees: 14

NATIONAL PRODUCTS MARKETING, INC.
Suite 234
2 Northside 77
Atlanta, GA 30318
(800) 241-1170
Contacts:
Head of Marketing/Sales: Elizabeth Addison
Head of Engineering/Software: Joe Hale
Geographic Coverage:
Year Established: 1982
Number of Employees: 30

NATIONAL SEMICONDUCTOR CORP.
2900 Semiconductor Dr.
Santa Clara, CA 95051
(408) 721-5000
Major Market: Component, Computer, Terminal, Peripheral and Communications Equipment Manufacturing; Software House; Systems House (Commercial OEM); Dealer/Distributor; Special Systems
Target Industries: Military
Contacts:
Head of Marketing: F. J. Van Poppelen
Geographic Coverage: International
Year Established: 1965
Number of Employees: 35,000

NEC, INC.
3450 Mitchell Lane
P.O. Box 9001
Boulder, CO 80301
(303) 444-5710
Major Market: Communications Equipment and Office Equipment Manufacturing; Software House
Target Industries: Administrative; Finance; Manufacturing; Engineering/Scientific
Target Applications: OA
Contacts:
Head of Marketing: Rob Reid
Head of Sales: Mark Stevenson
Geographic Coverage: International
Year Established: 1973
Number of Employees: 1,300

NOR CONTROL, INC.
2700 Snelling Ave. N.
St. Paul, MN 55113
(612) 638-7777
Major Market: Computer and Communications Equipment Manufacturing; Software House
Target Industries: Finance; Telecommunications; Retail; Oil Industry
Target Applications: Networking; Telecommunications
Contacts:
Head of Marketing: V. W. Yates
Head of Sales: R. E. Oldenberg
Head of Software: R. M. Groenke
Head of Engineering: G. Iverson
Head of Customer Service: L. Ackerman
Geographic Coverage: International
Year Established: 1968
Number of Employees: 2,200

NCR CORP.
World Headquarters
1700 S. Patterson Blvd.
Dayton, OH 45479
(513) 445-5000
Major Market: Component, Computer, Terminal, Peripheral, Communications Equipment and Office Equipment Manufacturing; Software House; Systems House (Commercial OEM); Data Services (Service Bureau)
Target Industries: Retail; Banking; Commercial/Industrial; Medical Education; Government
Target Applications: Transaction Processing
Contacts:
Head of Customer Service: V. F. Bean
Geographic Coverage: International
Year Established: 1884
Number of Employees: 63,000

NEC TELEPHONE, INC.
532 Broad Hollow Road
Melville, NY 11747
(516) 752-9760
Major Market: Communications Equipment Manufacturing
Target Industries: Hotels; Government; Fortune 100
Contacts:
Head of Marketing: Mike Rosen
Head of Sales: Skip Connolly
Head of Engineering: Kenji Suzuki
Head of Customer Service: Ralph Russo
Geographic Coverage: International
Year Established: 1971
Number of Employees: 170

NESCO
167 San Zeno Way
Sunnyvale, CA 94086
(408) 737-2080
Major Market: Communications Equipment Manufacturing; Communications Network
Target Industries: Utilities
Target Applications: Telecommunications
Contacts:
Head of Marketing: Jim Peluso
Head of Customer Service: Nancy Peluso
Geographic Coverage: International
Year Established: 1975
Number of Employees: 30

NESTAR SYSTEMS, INC.
2585 East Bayshore Road
Palo Alto, CA 94303
(415) 493-2223
Major Market: Component, Computer, Peripheral, Communications Equipment and Office Equipment Manufacturing; OEM (Peripherals-Terminals); Software House; Systems House (Commercial OEM); Dealer/Distributor
Target Industries: Financial; Manufacturing
Contacts:
Head of Marketing: Peter Herlan
Head of Sales: William Coleman
Head of Engineering: Leonard J. Shustek
Geographic Coverage: International
Year Established: 1978
Number of Employees: 100

NETWORK PRODUCTS, INC.
Progress Center
P.O. Box 13239
Research Triangle Park, NC 27709
(919) 549-8210
Major Market: Communications Equipment Manufacturing
Target Industries: System Houses
Contacts:
Head of Marketing: John H. Rouse
Head of Software: Stephen I. Schleimer
Geographic Coverage: International
Year Established: 1981
Number of Employees: 25

NETWORK SYSTEMS CORP.
7600 Boone Ave. N.
Brooklyn Park, MN 55428
(612) 425-2202
Major Market: Software House
Target Industries: Finance; Manufacturing; Petro/Chemical; Data Service
Target Applications: Computer-To-Computer Network; Remote Service Network; Local-Area Networks
Contacts:
Head of Marketing: Melvin Moore
Head of Software: Hal Durrett

Head of Engineering: Gerald Olson
Head of Customer Service: Don Lau
Geographic Coverage: International
Year Established: 1974
Number of Employees: 450

NEW GENERATION SYSTEMS, INC.
2153 Golf Course Dr.
Reston, VA 22091
(703) 478-9143
Major Market: Software House
Net Sales: $100,000 - $500,000 (1982)
Geographic Coverage: International
Year Established: 1981
Number of Employees: 2

NIXDORF COMPUTER CORP.
300 Third Ave.
Waltham, MA 02154
(617) 890-3600
Major Market: Component, Computer, Terminal, Peripheral and Communications Equipment Manufacturing; Software House
Target Industries: Banking; Retail; Transportation; Medical
Target Applications: Accounting; General Business
Contacts:
Head of Marketing: Mike Backler
Head of Sales: Robert Davis
Head of Software: James Addleberger
Geographic Coverage: International
Year Established: 1952
Number of Employees: 1,800

NOAKES DATA COMMUNICATIONS, INC.
3330 Stovall
Irving, TX 75061
(214) 986-1151
Major Market: Component, Computer and Communications Equipment Manufacturing; Dealer/Distributor
Target Applications: Data Communications; Network Control; Data Collection
Net Sales: $1 Million - $5 Million (1981)
Contacts:
Head of Marketing: Kenneth Brown
Geographic Coverage: National
Year Established: 1966
Number of Employees: 30

NORTHEAST DATACOM, INC.
4 Tower Dr.
Wallingford, CT 06492
(203) 265-3455
Major Market: Software House; Systems House (Commercial OEM); Data Services (Service Bureau)
Target Industries: Banking; Manufacturing; Thrift
Contacts:
Head of Marketing: James W. Blair Jr.
Head of Customer Service: J. Smith
Geographic Coverage: Regional
Year Established: 1969
Number of Employees: 135

NORTHERN TELECOM, INC.
Cook Electric Division
6201 Oakton St.
Morton Grove, IL 60053
(312) 967-6600
Major Market: Peripheral and Communications Equipment Manufacturing
Target Industries: Communications
Contacts:
Head of Marketing: W. Viviano
Head of Sales: G. Meyer
Head of Software: Frank Brennan
Geographic Coverage: International
Year Established: 1886
Number of Employees: 750

NORTHERN TELECOM, INC.
Electronic Office Systems Division
Data Park
P.O. Box 1222
Minneapolis, MN 55440
(612) 932-8656
Major Market: Computer, Terminal, Peripheral, Communications Equipment and Office Equipment Manufacturing; Software House
Target Industries: Manufacturing; Banking; Government; Education
Target Applications: Inquiry/Response; Data Entry; Distributed Data; RJE
Contacts:
Head of Marketing: R. W. Duthie
Head of Sales: S. T. Oppenheimer
Head of Customer Service: J.Vaughn
Geographic Coverage: International

NORTHERN TELECOM, INC.
Integrated Office Systems Division
1001 E. Arapaho Road
Richardson, TX 75081
(214) 234-5300
Major Market: Computer, Terminal, Peripheral and Communications Equipment Manufacturing; OEM (Computer Systems)
Target Industries: Fortune 1000; Government; Institutions
Target Applications: Lodging; Hospital; Financial
Contacts:
Head of Marketing: Bob Dyer
Head of Sales: Nelson Boyd
Head of Software: Bruce Stevens
Head of Engineering: Bob Davis
Head of Customer Service: Bob Wilder
Geographic Coverage: International
Year Established: 1975
Number of Employees: 7,500

NOVATION, INC.
20409 Prairie St.
Chatsworth, CA 91311
(213) 996-5080
Major Market: Terminal, Peripheral and Communications Equipment Manufacturing; OEM (Peripherals-Terminals); Systems House (Commercial OEM); Dealer/Distributor
Target Applications: Communications
Contacts:
Head of Marketing: Jerry Grimson
Head of Engineering: Alex Nagy
Head of Customer Service: Teddi Cook
Geographic Coverage: International
Year Established: 1967
Number of Employees: 125

NOVELL, INC.
1170 N. Industrial Park Dr.
Orem, UT 84057
(801) 226-8202
Major Market: Communications Equipment Manufacturing
Target Industries: Industry
Target Applications: Airline Reservation
Contacts:
Head of Marketing: Reid Clark
Head of Engineering: David Owen
Geographic Coverage: International
Year Established: 1980
Number of Employees: 35

NU DATA CORP.
32 Fairview Ave.
P.O. Box 125
Little Silver, NJ 07739
(201) 842-5757
Major Market: Communications Equipment Manufacturing
Target Industries: Telecommunications
Contacts:
Head of Engineering: Richard Previte
Geographic Coverage: International
Year Established: 1972
Number of Employees: 24

OFFICE EXPRESS, INC.
Top Down Systems Division
Suite 236
414 Hungerford Dr.
Rockville, MD
(301) 251-9400
Major Market: Software House
Contacts:
Head of Sales: Skip Cashwell
Geographic Coverage: National
Year Established: 1980
Number of Employees: 4

OKI ELECTRONICS OF AMERICA, INC.
5901-B Peach Tree Dunwoody Road
Atlanta, GA 30093
(404) 399-5500
Major Market: Component, Computer, Peripheral, Communications Equipment and Office Equipment Manufacturing; OEM (Peripherals-Terminals); Software House; Systems House (Commercial OEM); Data Services (Service Bureau); Dealer/Distributor
Target Industries: Lodging
Contacts:
Head of Marketing: Steve Fields
Head of Sales: Dick Fisher
Geographic Coverage: International
Year Established: 1969
Number of Employees: 325

OMNIDATA
5717 Corsa Ave.
Westlake Village, CA 91362
(213) 991-5810
Major Market: Computer and Office Equipment Manufacturing
Target Industries: OA
Contacts:
Head of Marketing: George Greenspon
Head of Engineering: Raymond Lee
Geographic Coverage: National
Year Established: 1978
Number of Employees: 100

OPTELECOM
15940 Luanne Dr.
Gaithersburg, MD 20877
(301) 948-4232
Major Market: Communications Equipment Manufacturing
Target Industries: Government; OEM; Industrial
Contacts:
Head of Marketing: Fred Eggleston
Head of Engineering: Jim Colman
Head of Customer Service: Suzie Clark
Geographic Coverage: National
Year Established: 1972
Number of Employees: 35

OPTICAL COMMUNICATIONS CORP.
950 Norwood Road
Silver Spring, MD 20904
(301) 924-2600
Major Market: Peripheral, Communications Equipment and Office Equipment Manufacturing; OEM (Peripherals-Terminals)
Target Industries: Military; Telecommunications
Target Applications: Video; Data/Voice
Contacts:
Head of Marketing: C. Wallash
Year Established: 1975
Number of Employees: 9

ORCHID TECHNOLOGY, INC.
4770 Westinghouse Road
Fremont, CA 94539
(415) 490-8656
Major Market: Peripheral and Communications Equipment Manufacturing
Contacts:
Head of Marketing: Bob Davi
Head of Sales: Bob Gronsky
Head of Software: Hao Nguyen
Head of Engineering: Dr. Le Bui
Head of Customer Service: Chris McGovern
Geographic Coverage: International
Year Established: 1982
Number of Employees: 32

ORION SOFTWARE, INC.
Suite 200
400-2 Totten Pond Road
Waltham, MA 02154
(617) 890-2223
Major Market: Software House
Net Sales: $1 Million - $5 Million (1981)
Contacts:
Head of Marketing: Jim Waite
Head of Software: Wilton Rooks
Geographic Coverage: International
Year Established: 1977
Number of Employees: 39

PACER SOFTWARE
1227 Pearl St.
La Jolla, CA 92037
(619) 454-0565
Major Market: Software House
Net Sales: Less than $100,000 (1982)
Geographic Coverage: International
Year Established: 1981
Number of Employees: 5

PACESETTER SYSTEMS, INC.
Suite 132
4141 Blue Lake Circle
Dallas, TX 75234
(214) 386-0241
Major Market: Software House
Target Industries: Banking
Contacts:
Head of Marketing: J. L. Atchley
Geographic Coverage: National
Year Established: 1976
Number of Employees: 13

PACIFIC SOFTWARE MANUFACTURING CO.
10th and Parker
Berkeley, CA 94710
(415) 540-5000
Major Market: Software House
Target Industries: Micro
Target Applications: DBMS; Communications; WP
Geographic Coverage: International
Year Established: 1981
Number of Employees: 20

PANAFAX CORP.
10 Melville Park Road
Melville, NY 11747
(516) 420-0055
Major Market: Communications Equipment and Office Equipment Manufacturing
Contacts:
Head of Marketing: Dennis Anderson
Head of Engineering: Ted Kekke
Head of Customer Service: Hiroshi Shimen
Year Established: 1977
Number of Employees: 350

PARADYNE CORP.
8550 Ulmerton Road
P.O. Box 2826
Largo, FL 33540
(813) 530-2000
Major Market: Computer, Terminal, Peripheral, Communications Equipment and Office Equipment Manufacturing; OEM (Computer Systems); OEM (Peripherals-Terminals); Software House; Dealer/Distributor
Target Industries: Banking; Engineering; Manufacturing; Retail
Target Applications: WP; OA; Data Entry; DBMS
Contacts:
Head of Marketing: Jerry T. Kendall
Head of Sales: John Mullane
Head of Software: Les Hyde
Head of Engineering: Ken Wall
Head of Customer Service: John Koehler
Geographic Coverage: International
Year Established: 1969
Number of Employees: 3,100

PARTICIPATION SYSTEMS, INC.
50 Cross St.
Winchester, MA 01890
(617) 729-1976
Major Market: Software House
Target Industries: Cross Industry
Target Applications: Electronic Mail; Computer Conferencing; Bulletin Boards
Contacts:
Head of Marketing: Mike Keshen
Head of Software: George Reinhart
Geographic Coverage: National
Year Established: 1970
Number of Employees: 10

PATHWAY DESIGN, INC.
177 Worcester St.
Wellesley, MA 02181
(617) 237-7722
Major Market: Software House
Geographic Coverage: National
Year Established: 1983
Number of Employees: 9

PEACHTREE SOFTWARE, INC.
3445 Peachtree Road N.E.
Atlanta, GA 30326
(404) 239-3000
Major Market: Software House
Target Applications: End User
Contacts:
Head of Marketing: Julian Duckett
Geographic Coverage: International
Year Established: 1977
Number of Employees: 145

PECA, INC.
592 Winks Lane
Bensalem, PA 19020
(215) 245-1560
Major Market: Communications Equipment Manufacturing; OEM (Computer Systems); Dealer/Distributor
Target Industries: Data Communication Systems; Cable
Target Applications: Communications Networking
Net Sales: $500,000 - $1 Million (1982)
Contacts:
Head of Engineering: James Gracie
Head of Customer Service: Joanne Fields
Geographic Coverage: International
Year Established: 1968
Number of Employees: 55

PEDEL CORP.
Data Communications Division
207 Perry Parkway
Gaithersburg, MD 20877
(301) 984-8225
Major Market: Component, Peripheral, Communications Equipment and Office Equipment Manufacturing; OEM (Computer Systems); OEM (Peripherals-Terminals); Software House; Systems House (Commercial OEM)
Target Industries: Data Communications; Computer
Target Applications: Communication
Contacts:
Head of Marketing: Dave Johnson
Head of Engineering: Les Query
Geographic Coverage: International
Year Established: 1968
Number of Employees: 1,000

PEROOM DATA CORP.
11220 Pagemill Road
Dallas, TX 75243
(214) 340-7081
Major Market: Peripheral and Communications Equipment Manufacturing; Software House
Contacts:
Head of Marketing: Bob Gerwer
Geographic Coverage: International
Year Established: 1976
Number of Employees: 180

PERIPHERAL SYSTEMS, INC.
15530 Rockfield Blvd.
Building C
Irvine, CA 92714
(714) 855-3923
Major Market: Computer Manufacturing; Software House; Dealer/Distributor
Target Industries: Fortune 500
Contacts:
Head of Marketing: Rick Diedarich
Head of Software: Chris Cole
Head of Engineering: Gary Story
Head of Customer Service: Pam Ridley
Geographic Coverage: International
Year Established: 1979
Number of Employees: 8

PERIPHERAL TECHNOLOGY, INC.
14784 N.E. 95th St.
Redmond, WA 98052
(206) 881-8891
Major Market: Component, Terminal and Communications Equipment Manufacturing; Software House
Net Sales: $500,000 - $1 Million (1982)
Contacts:
Head of Marketing: Richard Aydelotte
Head of Engineering: Al Williams
Geographic Coverage: International
Year Established: 1979
Number of Employees: 35

PERIPHONICS CORP.
4000 Veterans Memorial Highway
Bohemia, NY 11716
(516) 467-0500
Major Market: Computer, Peripheral and Communications Equipment Manufacturing; OEM (Computer Systems); Software House; Systems House (Commercial OEM)
Target Industries: Banking; Retail; Oil
Target Applications: Voice Entry
Contacts:
Head of Marketing: A. D. Flesner
Head of Engineering: George Cole
Geographic Coverage: International
Year Established: 1969
Number of Employees: 235

PERK SYSTEMS
2800 Liberty St.
P.O. Box 2800
Pittsburgh, PA 15230
(412) 621-6250
Major Market: Computer Manufacturing
Target Industries: OEM
Target Applications: Personal Workstation
Net Sales: $1 Million - $5 Million (1981)
Contacts:
Head of Marketing: Frank Williams
Head of Sales: Kell Hickel
Head of Software: James Marshall
Head of Engineering: Brian Rosen
Head of Customer Service: Frank Sowinski
Geographic Coverage: International
Year Established: 1974
Number of Employees: 320

PERSONAL MICROCOMPUTERS
475 Ellis St.
Mountain View, CA 94043
(415) 962-0220
Major Market: Computer, Terminal, Peripheral and Communications Equipment Manufacturing
Target Industries: Distribution; OEM Systems Integration; Government; End User
Target Applications: Installed Terminals
Contacts:
Head of Sales: Jack Decker
Geographic Coverage: International
Year Established: 1980
Number of Employees: 100

PERSYST, INC.
Suite A
15001 Rockfield Blvd.
Irvine, CA 92714
(714) 859-8871
Major Market: Peripheral and Communications Equipment Manufacturing; Software House
Contacts:
Head of Marketing: Ken Cruickshank
Head of Software: Fred Barry
Head of Customer Service: Don Eiler
Year Established: 1981
Number of Employees: 55

PHALO CORP.
Optical Systems Division
65 Moreland Road
Simi Valley, CA
(805) 522-3333
Major Market: Communications Equipment Manufacturing
Contacts:
Head of Sales: Jim Rodgers
Year Established: 1981

PHILIPS ELECTRONIC INSTRUMENTS, INC.
Division of N. American Philips
85 McKee Dr.
Mahwah, NJ 07430
(201) 529-3800
Major Markets: Communications Equipment Manufacturing
Target Applications: Data Communications
Contacts:
Head of Marketing: B. Robert Feingold
Head of Sales: Robert C. Joseph
Head of Software: Claud Cesard
Geographic Coverage: International
Year Established: 1934
Number of Employees: 280

PHOENIX DENTAL CORP
2315 N. 35th Ave.
Phoenix, AZ 85009
(602) 278-3591
Major Market: Computer, Terminal and Communications Equipment

Manufacturing; OEM (Computer Systems); Process Automation Computers
Target Industries: Automotive; Chemical; Food; Rubber
Target Applications: Data Acquisition; Process Control; Monitoring; Man-Machine Interface
Contacts:
Head of Marketing: Gerald Trussell
Head of Software: Doug Hawkins
Head of Customer Service: J. Williams
Geographic Coverage: International
Year Established: 1977
Number of Employees: 30

PHONE 1, INC.
461 N. Mulford Road
Rockford, IL 61107
(815) 397-6110
Major Market: Communications Equipment Manufacturing; Software House
Target Industries: Fortune 1000; Communications
Target Applications: Data Communications
Net Sales: $1 Million - $5 Million (1983)
Contacts:
Head of Marketing: Roy Lane
Head of Software: Mark Koening
Head of Customer Service: Dan Yucas
Geographic Coverage: National
Year Established: 1977
Number of Employees: 12

PICKLES & TROUT
P.O. Box 1206
Goleta, CA 93116
(805) 685-4641
Major Market: Software House
Geographic Coverage: International
Year Established: 1976
Number of Employees: 15

PITNEY BOWES
Walter Wheeler Dr.
Stanford, CT 069280700
(293) 356-5000
Major Market: Communications Equipment and Office Equipment Manufacturing; Mailing Equipment
Contacts:
Head of Marketing: Robert Lawrence
Head of Sales: George Bradbury
Head of Engineering: Fred Zucker
Head of Customer Service: Rowlin Fairbaugh
Geographic Coverage: International
Year Established: 1920
Number of Employees: 20,000

PLANNING DATA SYSTEMS
Suite 1524
1601 Walnut St.
Philadelphia, PA 19103
(215) 665-1551
Major Market: Software House; Systems House (Commercial OEM)
Target Applications: Mapping
Contacts:
Head of Marketing: Robert Pallone
Geographic Coverage: National
Year Established: 1979
Number of Employees: 4

POLYGON SOFTWARE CORP.
363 7th Ave.
New York, NY 10001
(212) 563-5858
Major Market: Software House
Geographic Coverage: International
Year Established: 1983
Number of Employees: 10

PRAGMATRONICS, INC.
2015 10th St.
Boulder, CO 80302
(303) 444-2600
Major Market: Component and Communications Equipment Manufacturing; Data Services (Service Bureau)
Target Industries: Government; R&D; Laboratories; Warehouse
Contacts:
Head of Marketing: Walter Plywaski
Head of Engineering: Don Boyle
Year Established: 1979
Number of Employees: 7

PRENTICE CORP.
266 Caspian Dr.
Sunnyvale, CA 94086
(408) 734-9810
Major Market: Communications Equipment Manufacturing
Contacts:
Head of Marketing: James Butterworth
Head of Sales: Perry Lindberg
Geographic Coverage: International
Year Established: 1969
Number of Employees: 200

PRIME COMPUTER, INC.
Prime Park
Natick, MA 01760
(617) 655-8000
Major Market: Component, Computer, Terminal, Peripheral and Communications Equipment Manufacturing; OEM (Peripherals-Terminals); Software House
Contacts:
Head of Marketing: H.F. Enright
Head of Sales: W.L. Brubaker
Head of Software: Edward J. Christiansen
Head of Engineering: Roland D. Pamper
Head of Customer Service: Ian Edmonds
Geographic Coverage: International
Year Established: 1972
Number of Employees: 5,900

PROCESSING INNOVATIONS, INC.
10471 S. Brookhurst
Anaheim, CA 92804
(714) 535-8161
Major Market: Communications Equipment Manufacturing
Target Industries: Wholesale
Target Applications: Remote/Direct Data Entry; Voice-Assisted Modem
Net Sales: $100,000 - $500,000 (1981)
Geographic Coverage: International
Year Established: 1975
Number of Employees: 5

PROGRAM RESOURCES, INC.
6001 Montrose Road
Suite 405
Rockville, MD 20852
(301) 984-9020
Major Market: Software House
Target Industries: Government
Geographic Coverage: National
Year Established: 1973
Number of Employees: 19

PROGRESSIVE SYSTEMS, INC.
80 Broad St.
New York, NY 10004
(212) 785-9200
Major Market: Communications Equipment Manufacturing; OEM (Computer Systems); Software House; Systems House (Commercial OEM)
Target Industries: Publishing; Banking; Brokerage
Target Applications: Message Switching; Data Communications
Net Sales: $500,000 - $1 Million (1981)
Contacts:
Head of Marketing: Thomas Flanagan
Head of Software: Vinnie Devita
Head of Engineering: Bill Walker
Geographic Coverage: International
Year Established: 1979
Number of Employees: 25

PROLEIK CORP.
5757 Central Ave.
Boulder, CO 80301
(303) 447-2800
Major Market: Computer and Communications Equipment Manufacturing; OEM (Computer Systems)
Contacts:
Head of Marketing: Lan Julius
Head of Sales: William T. Treadwell
Head of Software: Suresh C. Bazaj
Head of Engineering: Blayne Maring
Head of Customer Service: Carol Snell
Geographic Coverage: International
Year Established: 1980
Number of Employees: 91

PROTEON ASSOCIATES, INC.
24 Crescent St.
Waltham, MA 02154
(617) 894-1980
Major Market: Communications Equipment Manufacturing
Net Sales: $1 Million - $5 Million (1981)
Contacts:
Head of Engineering: Allan Marshall
Geographic Coverage: International
Year Established: 1972
Number of Employees: 35

PROTOCOL COMPUTERS, INC.
Suite 100
6150 Canoga Ave.
Woodland Hills, CA 91367
(818) 716-5500
Major Market: Communications Equipment Manufacturing
Target Industries: IBM Host
Contacts:
Head of Marketing: Addison Woods
Head of Sales: Steve Marks
Head of Engineering: Thomas Jefferson
Geographic Coverage: International
Year Established: 1980
Number of Employees: 91

PULSECOM
2900 Towerview Road
Herdon, VA 22071
(703) 471-2900
Major Market: Communications Equipment Manufacturing; Software House; Systems House (Commercial OEM)
Target Industries: Telecommunications; Railroad
Contacts:
Head of Marketing: Michael Vincour
Head of Engineering: James Britt
Geographic Coverage: National
Year Established: 1983
Number of Employees: 300

QUADSTAR CORP.
Suite 145
12700 Preston Road
Dallas, TX 75230
(214) 980-9601
Major Market: Software House; Systems House (Commercial OEM)
Target Industries: Financial; Retail
Net Sales: $1 Million - $5 Million (1981)
Contacts:
Head of Marketing: Ray Haymes
Head of Software: Tom Streff
Geographic Coverage: International
Year Established: 1976
Number of Employees: 40

QUALITY SOFTWARE, INC.
60 Lewis St.
Newton, MA 02158
(617) 965-2231
Major Market: Software House
Target Industries: Telecommunication
Target Applications: Telecommunication; Typesetting
Net Sales: $100,000 - $500,000 (1981)
Contacts:
Head of Marketing: Diane Seaman
Geographic Coverage: National
Year Established: 1980
Number of Employees: 3

QUASITRONICS, INC.
211 Vandale Dr.
Houston, PA 15342
(412) 745-2663
Major Market: Peripheral and Communications Equipment Manufacturing; OEM (Computer Systems); OEM (Peripherals-Terminals)
Target Industries: Manufacturing
Target Applications: Digital/Analog Acquisition
Contacts:
Head of Marketing: Victor Sulkowski
Head of Engineering: Lucian J. Spalla
Geographic Coverage: International
Year Established: 1971
Number of Employees: 50

RACAL-MILGO, INC.
8250 N.W. 27 Way
Fort Lauderdale, FL 33309

(305) 592-8600
Major Market: Terminal and Communications Equipment Manufacturing
Contacts:
Head of Marketing: Allen Mastandrea
Head of Sales: Mat Kenny
Geographic Coverage: International
Year Established: 1955
Number of Employees: 3,500

RACAL-TELESYSTEMS, INC.
410 N. Michigan Ave.
Chicago, IL 60611
(312) 329-0700
Major Market: Communications Equipment Manufacturing; Data Services (Service Bureau)
Target Industries: Government; Fortune 100
Contacts:
Head of Marketing: Dusn Siebert
Head of Engineering: Dennis Miller
Geographic Coverage: Canada
Year Established: 1976
Number of Employees: 40

RACAL-VADIC
1525 McCarthy Blvd.
Milpitas, CA 95035
(408) 744-0810
Major Market: Data Communications Equipment
Target Industries: End users; OEM Systems Integrators
Contacts:
Head of Marketing: Thomas J. McShane
Head of Sales: David Peters
Geographic Coverage: International
Year Established: 1969
Number of Employees: 600

RACET COMPUTERS, LTD.
Suite 255
1855 W. Katella
Orange, CA 92667
(714) 997-4850
Major Market: Software House
Contacts:
Head of Marketing: Chris Johnston
Geographic Coverage: International
Year Established: 1978
Number of Employees: 15

RADIAN CORP.
P.O. Box 9948
Austin, TX 78766
(512) 454-4797
Major Market: Component and Computer Manufacturing; OEM (Computer Systems); Software House; Dealer/Distributor
Target Industries: Energy
Contacts:
Head of Marketing: F. Scott Laprone
Head of Sales: Ted Hudson
Geographic Coverage: International
Year Established: 1968
Number of Employees: 650

RAHYAN CORP.
15239 Springdale St.
Huntington Beach, CA 92649
(714) 895-5504
Major Market: Peripheral and Communications Equipment Manufacturing
Net Sales: $100,000 - $500,000 (1982)
Contacts:
Head of Marketing: Gardner De Spain
Geographic Coverage: International
Year Established: 1981
Number of Employees: 6

RAPICOM, INC.
7 Kingsbridge Road
Fairfield, NJ 07006
(201) 575-6010
Major Market: Communications Equipment Manufacturing; Dealer/Distributor
Contacts:
Head of Marketing: Gary Winkler
Head of Sales: John Sheehan
Head of Engineering: Paul Brobst
Geographic Coverage: International
Year Established: 1973
Number of Employees: 600

RAYCOM SYSTEMS, INC.
6395 Gunpark Dr.
Boulder, CO 80301
(308) 530-1820
Major Market: Communications Equipment Manufacturing
Target Industries: Medical; Scientific; Robotics
Target Applications: Data Communications
Contacts:
Head of Marketing: Milan Mraz
Head of Engineering: Bill Gibson
Geographic Coverage: International
Year Established: 1981
Number of Employees: 35

RAYTHEON CO.
Raytheon Data Systems
115 Norwood Park S.
Norwood, MA 02062
(617) 762-6700
Major Market: Computer, Terminal, Peripheral, Communications Equipment and Office Equipment Manufacturing; OEM (Peripherals-Terminals); Dealer/Distributor
Target Industries: Transportation; Banking; Manufacturing; Distribution
Target Applications: Data Entry; Inventory; OA
Contacts:
Head of Marketing: Jon Hooper
Head of Software: Joan Jacobs
Geographic Coverage: International
Year Established: 1969
Number of Employees: 5,000

RCS (ROZSA COMPUTER SYSTEMS), INC.
2116 A. Walsh Ave.
Santa Clara, CA 95050
(408) 727-7548
Major Market: Software House; Systems House (Commercial OEM); Dealer/Distributor
Target Applications: WP; Accounting
Net Sales: $100,000 - $500,000 (1981)
Contacts:
Head of Marketing: V. Sripathy
Geographic Coverage: California
Year Established: 1978
Number of Employees: 3

REAL-TIME MANAGEMENT, INC.
10 Middle St.
P.O. Box 1100
Bridgeport, CT 06601
(203) 367-8654
Major Market: Software House; Systems House (Commercial OEM); Data Services (Service Bureau)
Target Industries: Distribution; Manufacturing; Footwear; Medical
Contacts:
Head of Marketing: Warren Sisson
Geographic Coverage: National
Year Established: 1971
Number of Employees: 35

REDDING GROUP, INC.
909 Main St.
Ridgefield, CT 06877
(203) 329-8874
Major Market: Software House
Target Applications: Business Graphics; Communications
Contacts:
Head of Marketing: Lydel Fazio
Head of Customer Service: Phil Campbell
Geographic Coverage: International
Year Established: 1978
Number of Employees: 6

REGIS SYSTEMS, INC.
Suite 222
S. Michigan Ave.
Chicago, IL 60603
(312) 236-7727
Major Market: Software House; Systems House (Commercial OEM); Dealer/Distributor
Target Industries: Medical; Dental; Insurance; Legal
Target Applications: Accounting; Billing; Graphics
Net Sales: Less than $100,000 (1981)
Contacts:
Head of Marketing: Bill Maddocks
Head of Sales: Neil Long
Head of Software: Ronald R. Remst
Head of Customer Service: Ed Becher
Geographic Coverage: National

REMOTE COMPUTING CORP.
Pear Systems Corp.
27 Briarbrae Road
Stamford, CT 06903
(203) 322-5593
Major Market: Software House
Target Industries: Financial
Target Applications: Management; Technical Analysis
Geographic Coverage: International
Year Established: 1966

RENEX CORP.
8901 Old Keene Mill Road
Springfield, VA 22150
(703) 451-2200
Major Market: OEM (Peripherals-Terminals)
Target Industries: IBM End Users
Target Applications: IBM 3270, System/34, System/36 and System/38 Users
Net Sales: $1 Million - $5 Million (1983)
Contacts:
Head of Marketing: O.M. McCall
Head of Engineering: Raymond L. Gwinn
Head of Customer Service: Richard Simpson
Geographic Coverage: International
Year Established: 1975
Number of Employees: 27

RFL INDUSTRIES
Powerville Road
P.O. Box 239
Boonton, NJ 07005
(201) 334-3100
Major Market: Communications Equipment Manufacturing
Target Industries: Power Utilities
Contacts:
Head of Marketing: Bob Figlar
Head of Sales: David Jenkins
Head of Engineering: Barry Kaufman
Geographic Coverage: International
Year Established: 1922
Number of Employees: 435

RITI SYSTEMS SOFTWARE
1 Penn Plaza
New York, NY 10001
(212) 695-5001
Major Market: Software House; Systems House (Commercial OEM)
Target Industries: Manufacturing
Net Sales: $500,000 - $1 Million (1981)
Contacts:
Head of Software: Ross F. Amann
Geographic Coverage: National
Year Established: 1971
Number of Employees: 20

RIVERA ELECTRONICS
2535 Via Palma
Anaheim, CA 92801
(714) 996-6552
Major Market: Computer, Peripheral and Communications Equipment Manufacturing
Target Industries: OG OEM; OEC OEM
Net Sales: $1 Million - $5 Million (1981)
Contacts:
Head of Marketing: Frank Willems
Head of Engineering: Jose Ventura
Head of Customer Service: Bill Cantwell,
Geographic Coverage: International
Year Established: 1977
Number of Employees: 35

RIXON, INC.
2120 Industrial Pkwy.
Silver Spring, MD 20904
(301) 622-2121
Major Market: Communications Equipment Manufacturing
Contacts:
Head of Marketing: Robert Chiaffredo
Head of Sales: Robert Arnold
Geographic Coverage: International
Year Established: 1953
Number of Employees: 640

ROCKWELL INTERNATIONAL CORP.
Semiconductor Products Division
4311 Jamboree Road
P.O. Box C

Vendors

Newport Beach, CA 92660
(800) 854-8099
Major Market: Communications Equipment Manufacturing
Contacts:
Head of Marketing: D.W. Williams
Head of Sales: George Urbani
Head of Engineering: W.F. Krolikowski

ROCKWELL INTERNATIONAL CORP.
Switching Systems Division
1431 Opus Place
P.O. Box 1458
Downers Grove, IL 60515
(312) 960-8000
Major Market: Communications Equipment Manufacturing
Contacts:
Head of Marketing: Charles Young
Geographic Coverage: International
Year Established: 1979
Number of Employees: 1,000

ROLM CORP.
4900 Old Ironside Dr.
Santa Clara, CA 95050
(408) 988-2900
Major Market: Computer and Communications Equipment Manufacturing
Target Applications: Voice/Data Communications Net
Contacts:
Head of Marketing: Richard Moley
Head of Sales: Anthony Carollo
Geographic Coverage: International
Year Established: 1969
Number of Employees: 7,200

ROTELCOM DATA, INC.
930 Fairport Industrial Park
Fairport, NY 14450
(716) 381-3060
Major Market: Software House; Systems House (Commercial OEM)
Contacts:
Head of Software: Joseph Thuroff
Geographic Coverage: International
Year Established: 1979
Number of Employees: 60

RTCS (REAL-TIME COMPUTER SCIENCE) CORP.
P.O. Box 3000-886
Camarillo, CA 93010
(805) 482-0333
Major Market: Software House; Systems House (Commercial OEM); Dealer/Distributor
Target Applications: Real-Time System
Net Sales: $1 Million - $5 Million (1982)
Contacts:
Head of Marketing: Art Baker
Head of Software: Art Baker III
Geographic Coverage: International
Year Established: 1978
Number of Employees: 12

RWF CORP.
1533 E. Spruce
Olathe, KS 66061
(913) 782-5544
Major Market: Software House; Systems House (Commercial OEM); Data Services (Service Bureau); Dealer/Distributor
Net Sales: $1 Million - $5 Million (1982)
Contacts:
Head of Marketing: Forrest E. Weddle
Head of Software: Randy Seeger
Head of Engineering: Keith Constance
Geographic Coverage: International
Year Established: 1976
Number of Employees: 25

SANYO BUSINESS SYSTEMS CORP.
51 Joseph St.
Moonachie, NJ 07074
(201) 440-9300
Major Market: Computer, Terminal, Peripheral and Office Equipment Manufacturing; OEM (Peripherals-Terminals); Software House
Contacts:
Head of Marketing: N.Yamashita
Head of Sales: Arthur Sheber
Head of Customer Service: Mike Zajak
Geographic Coverage: International

SCHNEIDER INSTRUMENT CO.
8115 Camargo Road
Cincinnati, OH 45243
(513) 561-6803
Major Market: Component and Communications Equipment Manufacturing; OEM (Computer Systems)
Net Sales: $100,000 - $500,000 (1981)
Contacts:
Head of Marketing: Mark Schneider
Head of Software: G. L. Schneider
Geographic Coverage: International
Year Established: 1966
Number of Employees: 12

SCIENTIFIC ATLANTA, INC.
One Technology Parkway
P.O. Box 105600
Atlanta, GA 30348
(404) 449-2000
Major Market: Communications Equipment Manufacturing; Software House
Target Industries: Cable; Broadcasting; Business Telecommunications
Contacts:
Head of Marketing: Del Bothof
Head of Engineering: Dr. Guy Beakley
Geographic Coverage: International
Year Established: 1952
Number of Employees: 5,000

SCIENTIFIC DATA SYSTEMS, INC.
344 Main St.
Venice, CA 90291
(213) 390-8673
Major Market: Computer and Communications Equipment Manufacturing; Software House
Target Industries: Legal; Medical; Accounting; Trash Collection
Target Applications: WP; Legal Time and Billing; Temporary Help
Contacts:
Head of Software: William Weldon
Head of Engineering: Jack M. Mitchell
Geographic Coverage: National
Year Established: 1977
Number of Employees: 50

SCIENTIFIC RADIATION CORP.
1201 San Antonio Road
Mountain View, CA 94043
(415) 965-0911
Major Market: Communications Equipment Manufacturing
Contacts:
Head of Sales: James A. Lazzara
Geographic Coverage: National
Year Established: 1975
Number of Employees: 50

SCITEC CORP.
850 Aquidneck Ave.
Middletown, RI 02840
(401) 849-4953
Major Market: Communications Equipment Manufacturing
Target Industries: Manufacturing; Banking; Time-Sharing; Airline
Net Sales: $1 Million - $5 Million (1982)
Contacts:
Head of Marketing: Gerald Olson
Geographic Coverage: International
Year Established: 1978
Number of Employees: 90

SEECOMP, INC.
5311 S. 122 E. Ave.
P.O. Box 1590
Tulsa, OK 74145
(918) 627-3330
Major Market: Communications Equipment Manufacturing
Target Industries: Telephone; Petrochemical; Data Collection
Contacts:
Head of Marketing: Edward Crossland
Geographic Coverage: International
Number of Employees: 350

SENSIBLE SOFTWARE, INC.
6619 Parham Dr.
West Bloomfield, MI 48033
(313) 399-6877
Major Market: Software House
Target Industries: Apple Users
Net Sales: $500,000 - $1 Million (1982)
Contacts:
Head of Marketing: Tracy Shelly
Head of Software: Roger Tuttleman
Head of Engineering: Charles Hartley
Head of Customer Service: Joe Emery
Geographic Coverage: International
Year Established: 1978
Number of Employees: 10

SGS SEMICONDUCTORS, CORP.
1000 E. Bell Road
Phoenix, AZ 85022
(602) 867-6100
Major Market: Component, Computer, Communications Equipment and Office Equipment Manufacturing; OEM (Peripherals-Terminals); Software House; Systems House (Commercial OEM)
Target Industries: Communications; Industrial; Business; OA
Contacts:
Head of Marketing: Dave Hage
Head of Software: Bob Lindstrom
Head of Engineering: Jean Claude Monney
Head of Customer Service: Rubin Sonnino
Geographic Coverage: International
Year Established: 1957
Number of Employees: 600

SHAFFSTALL CORP.
7901 E. 88th St.
Indianapolis, IN 46256
(317) 842-2077
Major Market: Communications Equipment Manufacturing
Target Industries: Data Communications; Printing
Contacts:
Head of Marketing: Tim Shaffstall
Head of Sales: Anthony Shaffstall
Geographic Coverage: International
Year Established: 1973
Number of Employees: 40

SHERWOOD DIGITAL ELECTRONICS
2252 S. 3800 W.
Salt Lake City, UT 84119
(801) 972-3453
Major Market: Terminal, Peripheral and Communications Equipment Manufacturing
Target Industries: IBM System/34, System/38 and Compatibles
Net Sales: $1 Million - $5 Million (1983)
Contacts:
Head of Marketing: John T. Lever Jr.
Geographic Coverage: International
Number of Employees: 11

SIDEREAL CORP.
9600 S.W. Barnes Road
Portland, OR 97225
(503) 297-5531
Major Market: Terminal and Communications Equipment Manufacturing
Contacts:
Head of Marketing: James Miller
Head of Customer Service: Robert Blake
Geographic Coverage: National
Year Established: 1971
Number of Employees: 160

SIEMENS COMMUNICATIONS SYSTEMS
Office Systems Group
240 E. Palais Road
Anaheim, CA 92805
(714) 991-9700
Major Market: Terminal, Peripheral and Office Equipment Manufacturing
Target Industries: Communications
Target Applications: Office Communication
Contacts:
Head of Marketing: Mike Kurz
Geographic Coverage: National
Year Established: 1982
Number of Employees: 750

SIERRA RESEARCH CORP.
455 Cayuga Dr.

P.O. Box 222
Buffalo, NY 14205
(716) 631-6200
Major Market: Terminal, Peripheral and Communications Equipment Manufacturing
Target Industries: Manufacturing
Target Applications: Data Entry
Contacts:
Head of Marketing: Roy H. Hobson
Head of Software: Edwin L. Hill
Head of Engineering: Mike Rupp
Head of Customer Service: Marilyn Euler
Geographic Coverage: International
Year Established: 1968
Number of Employees: 100

SIGCOM, INC.
1945 Gallows Road
Vienna, VA 22180
(703) 448-8600
Major Market: Communications Equipment Manufacturing; OEM (Computer Systems); OEM (Peripherals-Terminals); Software House; Systems House (Commercial OEM); Data Services (Service Bureau); Dealer/Distributor
Target Industries: Law Enforcement; Insurance; Mass Transit; Professional Services
Target Applications: Dispatching
Net Sales: $1 Million - $5 Million (1981)
Contacts:
Head of Marketing: Paul K. Wormell
Head of Sales: Larry Claussen
Head of Software: Lew Hennelo
Head of Customer Service: Thomas Castor
Geographic Coverage: National
Year Established: 1971
Number of Employees: 75

SMART, INC.
28 Cricket Lane
Wilton, CT 06897
(203) 762-3279
Major Market: Software House; Data Services (Service Bureau)
Target Industries: Retail
Target Applications: POS
Net Sales: $1 Million - $5 Million (1981)
Contacts:
Head of Sales: Cletus Smith
Head of Software: Emile Collins
Geographic Coverage: International
Year Established: 1969
Number of Employees: 37

SMITH EDUCATIONAL [illegible] SERVICES, INC.
P.O. Box 244
Arlington Heights, IL 60006
(312) 394-3513
Major Market: Software House
Contacts:
Head of Marketing: George Tucker
Geographic Coverage: National
Year Established: 1979
Number of Employees: 25

SOFTWARE & COMMUNICATIONS CONCEPTS, INC.
Suite 350
11211 Katy Freeway
Houston, TX 77079
(713) 464-9131
Major Market: Communications Equipment Manufacturing; Software House; Systems House (Commercial OEM)
Net Sales: $500,000 - $1 Million (1981)
Contacts:
Head of Engineering: David Dent
Geographic Coverage: National
Year Established: 1974
Number of Employees: 12

SOFTWARE AG OF NORTH AMERICA, INC.
11800 Sunrise Valley Dr.
Reston, VA 22091
(703) 860-5050
Major Market: Software House
Target Industries: DBMS; On-Line Application Development Languages; TP Monitor
Net Sales: $25 Million - $100 Million (1983)
Contacts:
Head of Marketing: Donald M. France
Geographic Coverage: International
Year Established: 1973
Number of Employees: 250

SOFTWARE CLEARING HOUSE
771 Neeb Road
P.O. Box 38206
Cincinnati, OH 45238
(513) 451-8742
Major Market: Software House
Target Industries: NCR users
Net Sales: $1 Million - $5 Million (1981)
Contacts:
Head of Marketing: Tom Ivers
Head of Sales: Jack Ivers
Head of Customer Service: William Ivers
Geographic Coverage: International
Year Established: 1979
Number of Employees: 30

SOFTWARE DEVELOPMENT & MAINTENANCE, INC.
134 Spring Ave.
P.O. Box 668
Fuquay-Varina, NC 27526
(919) 552-5662
Major Market: OEM (Computer Systems); OEM (Peripherals-Terminals); Software House; Systems House (Commercial OEM)
Target Industries: Banking; Manufacturing
Target Applications: ATM; Electronic Mail Transfer; POS; EFT
Net Sales: $1 Million - $5 Million (1981)
Contacts:
Head of Marketing: David W. Lehem
Head of Software: P. E. Truslove
Head of Customer Service: Rick Carpenter
Geographic Coverage: International
Year Established: 1980
Number of Employees: 13

SOFTWARE DEVELOPMENT CORP.
Suite 2H
270 Amity Road
Woodbridge, CT 06525
(203) 397-0500
Major Market: Software House
Target Industries: Retail Pharmacy; Medical; Legal; Financial
Target Applications: Remote Data Access; Loan Accounting
Contacts:
Head of Software: Terry Gilbeau
Geographic Coverage: International
Year Established: 1976
Number of Employees: 9

SOFTWARE DYNAMICS
Suite G
2111 W. Crescent
Anaheim, CA 92801
(714) 635-4760
Major Market: OEM (Peripherals-Terminals); Software House
Contacts:
Head of Engineering: Ira C. Baxter
Geographic Coverage: International
Year Established: 1977
Number of Employees: 5

SOFTWARE MANAGEMENT SYSTEMS, INC.
84 Inverness Circle E.
Englewood, CO 80112
(303) 741-3178
Major Market: Software House; Systems House (Commercial OEM)
Target Industries: Construction; Engineering; General Industry
Target Applications: Accounting; Financial and Project Management
Net Sales: $1 Million - $5 Million (1981)
Contacts:
Head of Marketing: Bill Beck
Head of Sales: Michael Sutkowski
Head of Customer Service: Robert Otten
Geographic Coverage: National
Year Established: 1978
Number of Employees: 30

SOFTWARE RESOURCES CORP.
2867 Silver Dr.
Columbus, OH 43211
(614) 421-2084
Major Market: Communications Equipment Manufacturing; OEM (Computer Systems)
Target Applications: Data Communication
Net Sales: $500,000 - $1 Million (1981)
Contacts:
Head of Marketing: E. J. Sadkowski
Head of Software: S. K. Wilson
Head of Engineering: M. J. Hines

Remember
to mention the
Computerworld
Buyer's Guide
when contacting
vendors.

COMPUTERWORLD
BUYER'S GUIDE

Vendors

Geographic Coverage: International
Year Established: 1975
Number of Employees: 25

THE SOFTWARE STORE
706 Chippewa Square
Marquette, MI 49855
(906) 228-7622
Major Market: Software House
Target Industries: CP/M Computer Market
Target Applications: POS
Contacts:
Head of Marketing: Terry L. Horton
Geographic Coverage: International
Year Established: 1977
Number of Employees: 5

SOFTWARE SYSTEMS, INC.
1907 Wilkam St.
P.O. Box 1795
Jefferson City, MO 65101
(314) 635-5852
Major Market: Software House
Net Sales: $100,000 - $500,000 (1981)
Contacts:
Head of Marketing: Ewin Barnett
Geographic Coverage: International
Year Established: 1980
Number of Employees: 3

SOFTWORKS, INC.
7801 Old Branch Ave.
Clinton, MD 20735
(301) 868-4221
Major Market: Software House
Net Sales: $500,000 - $1 Million (1982)
Contacts:
Head of Marketing: Donald Wood
Head of Software: Robert Fitzgerald
Head of Engineering: Claude Kinsey
Geographic Coverage: International
Year Established: 1977
Number of Employees: 12

SOLID STATE SYSTEMS, INC.
1990 Delk Industrial Blvd.
Marietta, GA 30067
(404) 952-9401
Major Market: Communications Equipment Manufacturing
Target Industries: Hospitals; School Systems; Manufacturing
Target Applications: Energy Management
Contacts:
Head of Marketing: Jason Schloss
Head of Engineering: Joseph Mahoney
Geographic Coverage: National
Year Established: 1974
Number of Employees: 100

SONEX, INC.
931-939 E. Lycoming St.
Philadelphia, PA 19124
(215) 533-4900
Major Market: Communications Equipment Manufacturing
Target Industries: Industrial; Military
Net Sales: $1 Million - $5 Million (1981)
Contacts:
Head of Sales/Marketing: Don Succini
Head of Engineering: James Benson
Geographic Coverage: International
Year Established: 1969
Number of Employees: 38

SOUTHERN COMPUTER SYSTEMS, INC.
2304 12th Ave. N.
P.O. Box 55473
Birmingham, AL 35255
(205) 933-1658
Major Market: Computer Manufacturing; OEM (Computer Systems); Software House; Data Services (Service Bureau); Dealer/Distributor
Target Applications: Data Entry
Net Sales: $500,000 - $1 Million (1981)
Contacts:
Head of Marketing: Paul Scalise
Head of Software: Mark Sumner
Geographic Coverage: International
Year Established: 1979
Number of Employees: 7

SOUTHWESTERN DATA SYSTEMS, INC.
Suite E
10761 Woodside Ave.
Santee, CA 92071
(619) 562-3670
Major Market: Software House
Target Applications: General Business; Educational; Utilities; Communications
Net Sales: $500,000 - $1 Million (1981)
Geographic Coverage: International
Year Established: 1978
Number of Employees: 11

SPARTACUS COMPUTERS, INC.
5 N. Park Dr.
Bedford, MA 01730
(617) 275-4220
Major Market: OEM (Peripherals-Terminals); Software House
Contacts:
Head of Marketing: Paul Inefield
Head of Sales: John Roderick
Head of Software: Michael Casely
Head of Engineering: Michael Oyer
Geographic Coverage: International
Year Established: 1981
Number of Employees: 38

SPERRY CORP.
Township Line & Union Meeting Road
P.O. Box 500
Blue Bell, PA 19424
(215) 542-4011
Major Market: Component, Computer, Terminal, Peripheral and Communications Equipment Manufacturing; OEM (Computer Systems); Software House
Target Industries: Manufacturing; Public Sector; Distribution; Airline
Net Sales: $100,000 - $500,000 (1981)
Contacts:
Head of Marketing: Joseph Claudio
Geographic Coverage: International
Year Established: 1962
Number of Employees: 46,000

STANDARD DATA CORP
1540 Broadway
New York, NY 10036
(212) 586-3100
Major Market: Communications Equipment Manufacturing; Software House; Data Services (Service Bureau)
Target Industries: Pension and Welfare Funds; Associations; Unions
Net Sales: $1 Million - $5 Million (1981)
Geographic Coverage: New York
Year Established: 1959
Number of Employees: 98

STARNET DATA SYSTEMS
1331 W. 7th Ave.
Denver, CO 80223
(303) 935-3566
Major Market: Communications Equipment Manufacturing
Year Established: 1983
Number of Employees: 4

START SYSTEMS
Suite 610
1120 Ave. of the Americas
New York, NY 10036
(212) 398-1717
Major Market: Software House; Systems House (Commercial OEM)
Target Industries: Retail; Nonprofit; Banking; Insurance
Net Sales: $1 Million - $5 Million (1981)
Contacts:
Head of Software: Ira Dodelman
Geographic Coverage: International
Year Established: 1976
Number of Employees: 28

STEARN COMPUTER SYSTEMS
10901 Bren Road E.
P.O. Box 9364
Minneapolis, MN 55440
(612) 936-2000
Major Market: Computer and Communications Equipment Manufacturing
Target Industries: Fortune 1000; Small Business
Target Applications: OA
Contacts:
Head of Marketing: Bob Gallagher
Head of Engineering: John Schinski
Head of Customer Service: Kathy Forde
Geographic Coverage: International
Year Established: 1982
Number of Employees: 110

STRATUS COMPUTER, INC.
17 Strathmore Road
Natick, MA 01760
(617) 653-1466
Major Market: Computer and Communications Equipment Manufacturing; OEM (Peripherals-Terminals); Software House
Target Applications: Transaction Processing; Networking
Contacts:
Head of Marketing: John Morgridge
Head of Sales: Jim Austin
Head of Software: Bob Freiburghouse
Head of Engineering: G. Hendrie
Head of Customer Service: John Walsh
Geographic Coverage: International
Year Established: 1980
Number of Employees: 250

SUMMA FOUR
2456 Brown Ave.
Manchester, NH 03103
(603) 625-4050
Major Market: Communications Equipment Manufacturing
Target Industries: Hospitality; Commercial Business
Target Applications: Telephone Management
Contacts:
Head of Marketing: John A. Belair
Head of Sales: Nathan R. Cyr
Head of Software: Helen Summers
Head of Engineering: John T. Boatwright
Geographic Coverage: International
Year Established: 1976
Number of Employees: 100

SUPERSOFT, INC.
P.O. Box 1628
Champaign, IL 61820
(217) 359-2112
Major Market: Software House
Net Sales: $500,000 - $1 Million (1981)
Contacts:
Head of Marketing: Stephen Hegler
Head of Sales: Rita Ahern
Head of Software: Richard Belloca
Head of Engineering: Mike Pagels
Head of Customer Service: Mike McIntosh
Geographic Coverage: International
Year Established: 1978
Number of Employees: 25

SYNALTA SYSTEMS
3114 Broadway
Astoria, NY 11106
(212) 728-5700
Major Market: Computer and Communications Equipment Manufacturing; Software House
Target Industries: Data Communications; OEM; Single-Card Computer; Customized Manufacturers
Target Applications: Data Communications Conversion
Contacts:
Head of Marketing: Gina Mantoss
Head of Engineering: Frank Colombos
Year Established: 1979
Number of Employees: 17

SYSTREX, INC.
246 Industrial Way W.
Eatontown, NJ 07724
(201) 542-1500
Major Market: Communications Equipment and Office Equipment Manufacturing; Software House
Target Industries: Legal; Manufacturing
Target Applications: Storage; Text Processing; Retrieval
Contacts:
Head of Marketing: Lou Turkely
Head of Sales: Barry Ross
Head of Software: Phil Sheurin
Head of Engineering: Joe Jones
Head of Customer Service: Ed Smith

Geographic Coverage: International
Year Established: 1979
Number of Employees: 450

SYSCON, INC.
470-B Lakeside Dr.
Sunnyvale, CA 94086
(408) 736-7320
Major Market: Communications Equipment Manufacturing
Target Applications: Data Communications
Contacts:
Head of Marketing: Para Suraman
Geographic Coverage: California
Year Established: 1976
Number of Employees: 8

SYSTAR CORP.
Suite 208
1782 Technology Dr.
San Jose, CA 95110
(408) 280-7066
Major Market: Communications Equipment Manufacturing; OEM (Computer Systems); Software House; Systems House (Commercial OEM); Dealer/Distributor
Target Industries: General Business
Target Applications: Protocol Conversion; Electronic Mail; WP
Net Sales: $500,000 - $1 Million (1981)
Contacts:
Head of Marketing: Dorian Filippini
Head of Software: Steven Jackowski
Geographic Coverage: International
Year Established: 1977
Number of Employees: 24

SYSTEM & SOFTWARE, INC.
Suite 500
1319 Butterfield Road
Downers Grove, IL 60515
(312) 960-1161
Major Market: Software House; Systems House (Commercial OEM)
Target Applications: Industrial Control
Net Sales: $500,000 - $1 Million (1981)
Contacts:
Head of Marketing: Jack Pon
Head of Engineering: John Fu
Head of Customer Service: Nancy Cummins
Geographic Coverage: National
Year Established: 1977
Number of Employees: 10

SYSTEMS RESOURCES CORP.
121 W. Elmwood Place
Minneapolis, MN 55419
(612)-831-0125
Major Market: Software House; Systems House (Commercial OEM)
Target Industries: General Business
Target Applications: DBMS
Net Sales: $1 Million - $5 Million (1981)
Contacts:
Head of Marketing: Charles Lantka
Geographic Coverage: International
Year Established: 1975
Number of Employees: 45

THE SYSTEMS CENTER
2986 Campus Dr.
San Mateo, CA 94403
(415) 345-0611
Major Market: Software House; Systems House (Commercial OEM)
Target Applications: IBM SNA Data Communications; DDP
Net Sales: $100,000 - $500,000 (1982)
Contacts:
Head of Marketing: P. G. Schott
Head of Software: R. J. Ordahl
Head of Engineering: W. N. Creech
Head of Customer Service: R. A. Chang
Year Established: 1981
Number of Employees: 45

THE SYSTEMS CENTER, INC.
1320 Greenway Dr.
Irving, TX 75062
(415) 345-0611
Major Market: Software House; Systems House (Commercial OEM)
Contacts:
Head of Marketing: Peter Shott
Head of Software: Norm Creech
Geographic Coverage: National
Year Established: 1981
Number of Employees: 18

SYSTEMS STRATEGIES, INC.
225 W. 34th St.
New York, NY 10001
(212) 279-8400
Major Market: Software House; Systems House (Commercial OEM)
Target Industries: Banking; Brokerage; Terminal Manufacturing
Net Sales: $1 Million - $5 Million (1981)
Contacts:
Head of Sales: Ralph Caffero
Geographic Coverage: National
Year Established: 1976
Number of Employees: 62

SYTEK, INC.
1225 Charleston Road
Mountain View, CA 94043
(415) 966-7300
Major Market: Component, Computer, Communications Equipment and Office Equipment Manufacturing; OEM (Computer Systems); Software House; Dealer/Distributor
Target Industries: Government; Universities; Fortune 100; Hospitals
Target Applications: DDP; Networks
Contacts:
Head of Marketing: George Klaus
Head of Sales: Rhonda St. John
Head of Software: Kennety Bilos
Head of Engineering: Zvi Alon
Geographic Coverage: International
Year Established: 1979
Number of Employees: 250

TAFT CONSULTING, INC.
181 William St.
New York, NY 10038
(212) 964-3636
Major Market: Software House; Systems House (Commercial OEM)
Target Industries: Government; Medical; Wholesale Distributors; Communications
Target Applications: Electronic Mail; Text Retrieval; WP; Message Switching
Net Sales: $1 Million - $5 Million (1981)
Contacts:
Head of Marketing: Russ Laubenheimer
Geographic Coverage: International
Year Established: 1971
Number of Employees: 10

TANDEM COMPUTERS, INC.
19333 Vallco Pkwy.
Cupertino, CA 95014
(408) 725-6000
Major Market: Computer, Terminal and Communications Equipment Manufacturing; Software House
Contacts:
Head of Marketing: David Machle
Head of Sales: Jerry Peterson
Head of Engineering: Larry Lautch
Head of Customer Service: Jerry Everett
Geographic Coverage: International
Year Established: 1974
Number of Employees: 4,400

TANDY CORP.
Radio Shack
1500 One Tandy Center
Fort Worth, TX 76102
(817) 390-3011
Major Market: Computer, Terminal, Peripheral and Communications Equipment Manufacturing; OEM (Computer Systems); Software House; Dealer/Distributor
Target Industries: Legal; Medical; Real Estate; General Business
Contacts:
Head of Marketing: Ron Stagall
Head of Engineering: John Patterson
Geographic Coverage: International
Year Established: 1921
Number of Employees: 30,000

TAU-TRON, INC.
27 Industrial Ave.
Chelmsford, MA 01824
(617) 256-9013
Major Market: Communications Equipment Manufacturing
Target Industries: Fortune 1000; Telecommunications
Contacts:
Head of Marketing: William Rollins
Head of Engineering: Phillip Gendron
Year Established: 1968
Number of Employees: 220

T-BAR, INC.
141 Danbury Road
P.O. Box T
Wilton, CT 06897
(203)-834-8227
Major Market: Component and Communications Equipment Manufacturing
Target Industries: Banking; Insurance; Transportation; Manufacturing
Target Applications: Data Communications; Switching
Contacts:
Head of Marketing: Walter Johnsen
Head of Sales: Thomas J. Interlandi
Head of Software: Ray Mazurek
Head of Engineering: Keith Wells
Head of Customer Service: Joseph Switalski
Geographic Coverage: International
Year Established: 1969
Number of Employees: 900

TECHLAND SYSTEMS, INC.
25 Waterside Plaza
New York, NY 10010
(212) 684-7788
Major Market: Communications Equipment Manufacturing; Software House
Target Applications: Communications
Net Sales: $1 Million - $5 Million (1983)
Contacts:
Head of Marketing: Richard Clowes
Geographic Coverage: International
Year Established: 1982
Number of Employees: 20

TECMEDIC, INC.
2901 Druid Park Dr.
Technology Center
Baltimore, MD 21215
(301) 669-1400
Major Market: Computer Manufacturing; Software House
Target Industries: Education; Small Business; Industrial
Target Applications: Training; Office
Net Sales: $1 Million - $5 Million (1981)
Geographic Coverage: National
Year Established: 1976
Number of Employees: 10

TECNTRAN INDUSTRIES, INC.
200 Commerce Dr.
Rochester, NY 14623
(716) 334-8640
Major Market: Peripheral and Communications Equipment Manufacturing
Target Industries: Banking; Telecommunications; Research; Military
Target Applications: Data Storage; Message Recording
Net Sales: $1 Million - $5 Million (1982)
Contacts:
Head of Marketing: Frank Alff
Head of Sales: Ray Smith
Head of Engineering: Robert Wagner
Geographic Coverage: International
Year Established: 1968
Number of Employees: 120

TECMAR, INC.
6225 Cochran Road
Cleveland, OH 44139
(216) 349-0900
Major Market: Computer, Peripheral and Communications Equipment Manufacturing
Target Industries: Personal Computing; Scientific; Manufacturing
Target Applications: Industrial Control
Contacts:
Head of Marketing: Carolyn Alpert
Head of Sales: John Brandon
Geographic Coverage: International
Year Established: 1974
Number of Employees: 350

TEK-COMP, INC.
Suite C103
1897 O'Toole Ave.
San Jose, CA 95131
(408) 263-7400
Major Market: Communications Equipment Manufacturing
Contacts:
Head of Marketing: Joseph Gaynor
Head of Sales: Susan Stillwell
Head of Customer Service: Becky Herrington
Geographic Coverage: International
Year Established: 1983
Number of Employees: 10

TEKELEC, INC.
2932 Wilshire Blvd.
Santa Monica, CA 90403
(213) 829-7305
Major Market: Communications Equipment Manufacturing; Software House
Target Industries: Data Communication Engineers; Data Network Users
Target Applications: X.25 Packet Switching; SNA/SDLC
Contacts:
Head of Marketing: Michael Lee
Head of Sales: Robert Heap
Head of Software: Adrian Warren
Head of Engineering: Stephen Greppe
Head of Customer Service: Anders Hultin
Geographic Coverage: International
Year Established: 1971
Number of Employees: 19

TEKSERVON INFO SYSTEM
1784 Firman Dr.
Richardson, TX 75081
(214) 644-0570
Contacts:
Head of Sales/Marketing: Bill Sequin
Head of Engineering: Jane Swinston
Year Established: 1983

TEKTRONIX, INC.
P.O. Box 500
Beaverton, OR 97077
(503) 627-7111
Major Market: Component, Computer, Terminal, Peripheral and Communications Equipment Manufacturing; Software House
Target Industries: Engineering; Manufacturing; Television
Target Applications: Test/Measurement; Graphics
Geographic Coverage: International
Year Established: 1946
Number of Employees: 22,000

TELAUTOGRAPH CORP.
5700 Bellanca Ave.
Los Angeles, CA 90045
(213) 641-3900
Major Market: Dealer/Distributor
Target Industries: Medical; Legal; Oil; Manufacturing
Contacts:
Head of Marketing: Frank May
Head of Engineering: Raghu Rai
Geographic Coverage: National
Year Established: 1969
Number of Employees: 1,000

TELCO RESEARCH CORP.
1818 Division St.
Nashville, TN 37203
(615) 383-2251
Major Market: Software House
Target Industries: Banking; Manufacturing; Insurance; Brokerage
Target Applications: Telecommunications; Textbooks; Optimization; Accounting
Contacts:
Head of Marketing: Jacqueline Shrago
Head of Sales: Steve Waterman
Head of Software/Engineering: Ann Caldwell
Head of Customer Service: Harry Williams
Geographic Coverage: National
Year Established: 1975
Number of Employees: 46

TELE/RESOURCES
Northway 10 Executive Park
Ushers Road
Ballston, NY 12019
(518) 877-8571
Major Market: Component and Communications Equipment Manufacturing
Target Industries: Small- to Medium-Size Businesses
Target Applications: Offices; Legal Firms
Contacts:
Head of Marketing/Sales: Gene Daly
Head of Software: Peter Hayes
Head of Engineering: Don Welch
Year Established: 1969
Number of Employees: 100

TELESYTE TECHNOLOGIES, INC.
Remark Datacom Division
4 Sycamore Dr.
Woodbury, NY 11797
(516) 367-3806
Major Market: Communications Equipment Manufacturing
Target Applications: Data Communications
Net Sales: $100,000 - $500,000 (1982)
Contacts:
Head of Sales/Marketing: Blossom Kramer
Geographic Coverage: International
Year Established: 1978
Number of Employees: 10

TELSCOM TECHNOLOGIES
3072 E. G St.
Ontario, CA 91764
(800) 245-6616
Major Market: Communications Equipment Manufacturing
Target Industries: Airline; Banking; Insurance; Telemarketing
Target Applications: Reservations; Catalogue Sales; Ticketing; Customer Service
Contacts:
Head of Marketing: Gwen Blaskan
Head of Sales: Paul Wakefield
Head of Engineering: John Locke
Head of Customer Service: Russ Hagar
Year Established: 1982
Number of Employees: 90

TELEFACE CORP.
11 Rivington St.
New York, NY 10002
(212) 477-6802
Major Market: Communications Equipment Manufacturing
Target Industries: General and International Business
Target Applications: Communications
Contacts:
Head of Marketing: Ron Mullins
Year Established: 1980
Number of Employees: 10

TELEPHONE SOFTWARE CONNECTION, INC.
P.O. Box 6548
Torrance, CA 90504
(213) 516-9430
Major Market: Software House; Data Services (Service Bureau)
Target Applications: Communications
Geographic Coverage: International
Year Established: 1979

TELEPROCESSING PRODUCTS, INC.
4565 E. Industrial St.
Building 7K
Simi Valley, CA 93063
(805) 522-8149
Major Market: Communications Equipment Manufacturing
Contacts:
Head of Marketing: Richard Leich
Geographic Coverage: International
Year Established: 1978
Number of Employees: 100

TELEVIDEO SYSTEMS, INC.
1170 Morse Ave.
Sunnyvale, CA 94086
(408) 745-7760
Major Market: Computer and Terminal Manufacturing
Target Industries: Small Business; Home/Hobby
Contacts:
Head of Marketing: R. DuBridge
Head of Sales: Mark Siegel
Geographic Coverage: International
Year Established: 1977
Number of Employees: 525

TELLABS, INC.
4951 Indiana Ave.
Lisle, IL 60532
(312) 969-8800
Major Market: Communications Equipment Manufacturing
Contacts:
Head of Sales: Chris Cooney
Head of Engineering: Peter Fuss
Geographic Coverage: International
Year Established: 1975
Number of Employees: 1,000

TELMAC, INC.
770 Pivet Court
Sunnyvale, CA 94086
(408) 737-1534
Major Market: Communications Equipment Manufacturing
Target Industries: General Industry; Universities
Target Applications: Data Communications
Contacts:
Head of Marketing: Kenneth Conroy
Head of Engineering: Roy Mason
Year Established: 1981
Number of Employees: 5

TELTONE CORP.
10801-120th N.E.
P.O. Box 657
Kirkland, WA 98033
(206) 827-9626
Major Market: Communications Equipment Manufacturing
Target Applications: Data Communications; Local-Area Networks
Contacts:
Head of Sales: Dale E. Johnson
Head of Software: David Etalbech
Head of Engineering: Floyd Allen
Head of Customer Service: Walt Riebe
Geographic Coverage: International
Year Established: 1966
Number of Employees: 400

TERMINAL DATA CORP.
11878 Coakley Circle
Rockville, MD 20852
(301) 881-7655
Major Market: Peripheral, Communications Equipment and Office Equipment Manufacturing; Dealer/Distributor
Target Industries: Communications; Government; Aerospace
Target Applications: Remote Communication; Applied Analysis
Contacts:
Head of Marketing: Mark Teitelbaum
Geographic Coverage: National
Year Established: 1970
Number of Employees: 10

TEXAS INSTRUMENTS, INC.
Data Systems Group
12501 Research Blvd.
P.O. Box 2909
Austin, TX 78769
(512) 250-7111
Major Market: Component, Computer, Terminal, Peripheral and Communications Equipment Manufacturing
Contacts:
Head of Marketing: Tom Ellis
Head of Engineering: George H. Hollmeier
Geographic Coverage: International
Year Established: 1930
Number of Employees: 80,000

THOMAS ENGINEERING
1040 Oak Grove Road
Concord, CA 94518
(415) 680-8640
Major Market: Computer and Communications Equipment Manufacturing
Contacts:
Head of Marketing: Richard Mondloch
Head of Engineering: Douglas Broadwell
Geographic Coverage: International
Year Established: 1976
Number of Employees: 20

TIGON SYSTEMS, INC.
Suite 207
13470 Washington Blvd.
Marina Del Ray, CA 90291
(213) 827-7118
Major Market: Software House
Target Industries: Professional; Legal; Medical
Target Applications: Office Management; WP
Contacts:
Head of Marketing: David Bakstran
Head of Software: George Simons
Head of Engineering: Michael Hadjidonu
Geographic Coverage: National
Year Established: 1978
Number of Employees: 14

TIE COMMUNICATIONS, INC.
5 Research Dr.
Shelton, CT 06484
(203) 929-7373
Major Market: Communications Equipment Manufacturing
Target Industries: Telephone; Interconnect; Supply Houses
Contacts:
Head of Sales: Gilbert Engels
Head of Engineering: Wilbur Brown
Geographic Coverage: International
Year Established: 1971
Number of Employees: 1,000

TIMEPLEX, INC.
400 Chestnut Ridge Road
Woodcliff Lake, NJ 07675
(201) 391-1111
Major Market: Communications Equipment Manufacturing; OEM (Computer Systems)
Target Industries: Telecommunication; Manufacturing; Financial; Education
Target Applications: Data Communications; Networks
Contacts:
Head of Sales: Victoria Brown
Geographic Coverage: International
Year Established: 1969
Number of Employees: 760

TITN
5501 W. 78th St.
Edina, MN 55437
(612) 944-5440
Major Market: Communications Equipment Manufacturing; OEM (Computer Systems); Software House; Systems House (Commercial OEM)
Target Industries: R&D; Communications
Geographic Coverage: National
Year Established: 1975
Number of Employees: 13

TMW CORP.
3444 Hancock St.
San Diego, CA 92110
(619) 298-2115
Major Market: Peripheral and Communications Equipment Manufacturing; Software House
Net Sales: $100,000 - $500,000 (1981)
Contacts:
Head of Marketing: Douglas Gage
Head of Sales: Pat Doering
Head of Engineering: Gary Huckell
Head of Customer Service: Steve Gage
Geographic Coverage: International
Year Established: 1977
Number of Employees: 7

TOP DOWN SYSTEMS
Suite 235
414 Hungerford Dr.
Rockville, MD 20850
(301) 251-9400
Major Market: Software House
Contacts:
Head of Marketing: Skip Cairnwell
Geographic Coverage: National
Year Established: 1980
Number of Employees: 4

TOSHIBA AMERICA, INC.
Telecommunications Division
2441 Michelle Dr.
Tustin, CA 92680
(714) 730-5000
Major Market: Communications Equipment Manufacturing
Target Industries: Telecommunications
Contacts:
Head of Sales: John Demchuk
Geographic Coverage: International
Year Established: 1975

TRANSACTION DATA SYSTEMS, INC.
5750 Major Blvd.
Orlando, FL 32805
(305) 351-1210
Major Market: Software House; Systems House (Commercial OEM)
Target Industries: Pharmacy; Airline; Banking
Target Applications: Accounting; Message Switching; Package Switching; Virtual Terminal Systems
Net Sales: $1 Million - $5 Million (1981)
Contacts:
Head of Marketing/Sales: Warren Wubker
Head of Software: Richard Jones
Head of Engineering: Charles Hall
Head of Customer Service: Celeste Demetry
Geographic Coverage: National
Year Established: 1977
Number of Employees: 18

TRANSNET CORP.
2190 Paragon Dr.
San Jose, CA 95131
(408) 946-7406
Major Market: Component, Peripheral and Communications Equipment Manufacturing; Software House
Target Applications: Datacommunications
Contacts:
Head of Marketing: David Wertzberger
Head of Software: Malcolm Wright
Geographic Coverage: International
Year Established: 1974
Number of Employees: 60

TRANTOR SYSTEMS, LTD.
Suite I
4432 Enterprise St.
Fremont, CA 94538
(415) 490-3441
Major Market: Peripheral and Communications Equipment Manufacturing
Target Industries: Dealers
Contacts:
Head of Marketing: Ken Betel
Head of Customer Service: Susan Babu
Geographic Coverage: International
Year Established: 1981
Number of Employees: 8

TRENDATA STANDARD MEMORIES CORP.
3400 W. Segerstrom Ave.
Santa Ana, CA 92704
(714) 540-3605
Major Market: Computer, Terminal, Peripheral and Communications Equipment Manufacturing; Systems House (Commercial OEM); Dealer/Distributor
Target Industries: OEM; Government; Education
Contacts:
Head of Marketing/Sales: Mike Elron
Head of Engineering: Ernie Worley
Geographic Coverage: International
Year Established: 1968
Number of Employees: 200

TRI-DATA
505 E. Middlefield Road
Mountain View, CA 94043
(415) 969-3700
Major Market: Component and Communications Equipment Manufacturing
Target Industries: Telephone
Contacts:
Head of Marketing: John Scandalios
Head of Software: Earl Ferguson
Head of Engineering: Ken Krosse
Geographic Coverage: International
Year Established: 1967
Number of Employees: 100

TRI DATA PRODUCTS
Northfield Communications
3 Depot Place
East Norwalk, CT 06855
(203) 853-2777
Major Market: Component and Communications Equipment Manufacturing; OEM (Computer Systems)
Contacts:
Head of Marketing: Arnold Benard
Head of Engineering: Ron Kelley
Head of Customer Service: John Ives
Geographic Coverage: International
Year Established: 1969
Number of Employees: 30

Is your company or product missing from our buyer's guide?

Let us know.

See the business reply card at the end of the book.

COMPUTERWORLD
BUYER'S GUIDE

Vendors

TSCK ELECTRONICS, INC.
330 Second St.
New Cumberland, PA 17070
(717) 761-4354
Major Market: Communications Equipment Manufacturing; Software House
Target Industries: Data Communications; Telephone
Target Applications: Data Communications; Credit Verification
Contacts:
Head of Marketing: Chris Clugston
Geographic Coverage: International
Year Established: 1986

TYMSHARE, INC.
Applied Systems Division
8835 Wisconsin Ave.
Bethesda, MD 20815
(301) 951-0122
Major Market: Component and Communications Equipment Manufacturing; Systems House (Commercial OEM); Data Services (Service Bureau)
Contacts:
Head of Engineering: Alan Monatch
Geographic Coverage: International
Year Established: 1976
Number of Employees: 35

U. S. ROBOTICS, INC.
1123 W. Washington Blvd.
Suite 1718
Chicago, IL 60607
(312) 733-0497
Major Market: Communications Equipment Manufacturing
Target Industries: OEM; Distribution
Contacts:
Head of Marketing: Paul Cowell
Geographic Coverage: National
Year Established: 1976
Number of Employees: 30

UNGERMANN-BASS, INC.
Suite 201
2560 Mission College Blvd.
Santa Clara, CA 95050
(408) 496-0111
Major Market: Communications Equipment Manufacturing
Target Industries: Cross Industry
Contacts:
Head of Marketing: James Jordin
Head of Software: Cary Wyman
Head of Engineering: Robert Ryan
Head of Customer Service: Bruce Jackson
Geographic Coverage: International
Year Established: 1979
Number of Employees: 350

UNISOURCE AUTOMATION PRODUCTS
Suite G
15401 Red Hill
Tustin, CA 92680
(714) 730-10102
Major Market: Software House
Target Applications: Telecommunications; Word Processing
Net Sales: $100,000 - $500,000 (1982)
Geographic Coverage: International
Year Established: 1978
Number of Employees: 5

UNISOFT SYSTEM CORP.
2405 Fourth St.
Berkeley, CA 94710
(415) 644-1230
Major Market: Software House
Net Sales: $1 Million - $5 Million (1982)
Contacts:
Head of Marketing: Bernard Silverman
Head of Sales: Charles Valente
Head of Software: Jeff Schriedmet
Head of Engineering: Asa Romberger
Geographic Coverage: International
Year Established: 1980
Number of Employees: 20

UNITED TECHNOLOGIES/LEXAR CORP.
31829 W. La Tienda Dr.
Westlake Village, CA 91362
(213) 706-1000
Major Market: Communications Equipment Manufacturing; OEM (Computer Systems); Systems House (Commercial OEM)
Target Industries: Manufacturing; Hotels; Professional; Hospitals
Target Applications: Voice/Data Integrated Network; Building Systems Management; Voice Telephone; Hotel Systems
Contacts:
Head of Marketing: Harry Schwedock
Head of Sales: Larry Evans
Head of Engineering: George Oppenheimer
Geographic Coverage: International
Year Established: 1977
Number of Employees: 400

UNIVERSAL DATA SYSTEMS, INC.
5000 Bradford Dr.
Huntsville, AL 35805
(205) 837-8100
Major Market: Communications Equipment Manufacturing
Target Industries: OEM
Contacts:
Head of Marketing: George Grumbles
Head of Sales: John Juranko
Head of Engineering: Lonnie McMillan
Geographic Coverage: International
Year Established: 1970
Number of Employees: 600

UNIVERSITY COMPUTING CO.
Applications Software Division
UCC Tower
Exchange Park
Dallas, TX 75235
(214) 353-7100
Major Market: OEM (Computer Systems); OEM (Peripherals-Terminals); Software House; Data Services (Service Bureau); Dealer/Distributor
Target Industries: Cross Industry
Contacts:
Head of Marketing: J. Allen Hufft
Head of Sales: Allen Hufft
Head of Software: Wally Yost
Head of Engineering: Hugo Biner
Head of Customer Service: Roger Pierpoint
Geographic Coverage: International
Year Established: 1963
Number of Employees: 1,750

UNIVATA, INC.
1551 Glenville Road
Richardson, TX 75081
(214) 680-9700
Major Market: Terminal, Peripheral and Communications Equipment Manufacturing; Systems House (Commercial OEM); Dealer/Distributor
Target Industries: Communication; Process Control; General Business
Target Applications: Communication; Process Control; General Business
Contacts:
Head of Marketing: Gary Kushnerman
Head of Sales: Don Perry
Head of Software: Mitchell Vaugh
Geographic Coverage: International
Year Established: 1974
Number of Employees: 100

UNISA COMPUTER CO.
Suite 622
310 4th Ave. S.
Summit Bank Building
Minneapolis, MN 55415
(612) 339-8047
Major Market: Software House; Data Services (Service Bureau); Dealer/Distributor
Target Industries: Engineering; Manufacturing; Banking; Savings/Loans
Target Applications: Structural Analysis; Financial Modeling; Financial Planning; Budgeting
Net Sales: $100,000 - $500,000 (1982)
Geographic Coverage: International
Year Established: 1977
Number of Employees: 8

VAN ARSDEL & ASSOCIATES, INC.
4837 Old Seward Highway
Anchorage, AK 99503
(907) 276-3553
Major Market: OEM (Computer Systems); Software House; Systems House (Commercial OEM); Data Services (Service Bureau); Dealer/Distributor
Target Industries: Public Safety; Telephone
Net Sales: $1 Million - $5 Million (1982)
Contacts:
Head of Software: Dave Crawford
Head of Engineering: Steve Czarski
Geographic Coverage: Alaska
Year Established: 1979
Number of Employees: 17

VEM-TEL, INC.
2342 Walsh Ave.
Santa Clara, CA 95051
(408) 727-5721
Major Market: Communications Equipment Manufacturing
Contacts:
Head of Marketing: R. Sitt
Head of Engineering: John Johnston
Geographic Coverage: International
Year Established: 1975
Number of Employees: 100

VERSITRON, INC.
6310 Chillum Place N.W.
Washington, DC 20011
(202) 882-8484
Major Market: Communications Equipment Manufacturing
Target Industries: Data Communications; Commercial; Government
Geographic Coverage: International
Year Established: 1958
Number of Employees: 60

VIA WEST, INC.
950 N. Calle Katrina
P.O. Box 2076
Nogales, AZ 85621
(602) 281-0646
Major Market: Communications Equipment Manufacturing
Geographic Coverage: International
Year Established: 1972
Number of Employees: 18

VISICORP
2895 Zanker Road
San Jose, CA 95134
(408) 946-9000
Major Market: Software House
Target Applications: Financial Planning; Scheduling; Cost Analysis; Business Graphics
Contacts:
Head of Marketing: David Spencer
Head of Sales: Ben Cushman
Head of Software: Gene Buechele
Geographic Coverage: International
Year Established: 1978
Number of Employees: 300

VISIONARY ELECTRONICS, INC.
141 Parker Ave
San Francisco, CA 94118
(415) 751-8611
Major Market: Peripheral, Communications Equipment and Office Equipment Manufacturing; OEM (Peripherals-Terminals); Systems House (Commercial OEM)
Target Industries: Telex; Networking
Year Established: 1982
Number of Employees: 4

WANG LABORATORIES, INC.
One Industrial Ave.
Lowell, MA 01851
(617) 459-5000
Major Market: Computer, Terminal, Peripheral, Communications Equipment and Office Equipment Manufacturing
Target Industries: Banking; Insurance; Legal; State/Local Government
Target Applications: Data Entry; Electronic Mail; Human Resource Management; Programmer Utilities
Contacts:
Head of Marketing: Robert Doretti
Head of Software: Frederick Wang

Head of Customer Service: Ray Cullen
Geographic Coverage: International
Year Established: 1951
Number of Employees: 28,000

WESTERN DATACOM
5083 Market St.
Youngtown, OH 44512
(216) 788-6583
Major Market: Communications Equipment Manufacturing
Target Industries: Financial; Manufacturing
Target Applications: Security Systems; Data Communications
Year Established: 1981
Number of Employees: 4

WESTERN TELECOMPUTING CORP.
202 E. Kagy Blvd.
Bozeman, MT 59715
(406) 586-1511
Major Market: Computer and Communications Equipment Manufacturing
Target Industries: Weather
Contacts:
Head of Sales/Marketing: Bob Johnson
Geographic Coverage: International
Year Established: 1969
Number of Employees: 10

WESTERN TELEMATIC, INC.
2435 S. Anne St.
Santa Ana, CA 92704
(800) 854-7226
Major Market: Peripheral and Communications Equipment Manufacturing
Target Industries: Data Communications; PBX
Contacts:
Head of Sales: David Shumway
Geographic Coverage: International
Year Established: 1964
Number of Employees: 20

WILD HARE COMPUTER SYSTEMS, INC.
P.O. Box 3581
Boulder, CO 80307
(303) 442-0324
Major Market: Software House
Net Sales: $500,000 - $1 Million (1981)
Contacts:
Head of Marketing: Wendy Freeman
Head of Software: D. Green
Geographic Coverage: International
Year Established: 1971
Number of Employees: 10

WINBOURGE, INC.
5 Northway Lane N.
Latham, NY 12101
(518) 783-1336
Major Market: Communications Equipment Manufacturing; OEM (Peripherals-Terminals); Software House; Systems House (Commercial OEM); Data Services (Service Bureau); Dealer/Distributor
Target Industries: General
Target Applications: Accounting; Legal-Time Billing; Call-Detail Recording; LAN
Year Established: 1982
Number of Employees: 45

WINTERHALTER, INC.
3853 Research Park Dr.
Ann Arbor, MI 48104
(313) 662-2002
Major Market: Software House
Target Industries: Fortune 1000
Net Sales: $1 Million - $5 Million (1981)
Contacts:
Head of Sales: Bart Castricone
Head of Software: Ray Pacek
Head of Engineering: Tom Ladish
Geographic Coverage: International
Year Established: 1979
Number of Employees: 25

WOLPATA, INC.
187 Billerica Road
Chelmsford, MA 01824
(617) 250-1500
Major Market: Communications Equipment Manufacturing
Contacts:
Head of Marketing: Kevin Want
Geographic Coverage: International
Year Established: 1980
Number of Employees: 30

XEROX CORP.
800 Longridge Road
P.O. Box 1600
Stamford, CT 06904
(203) 329-8700
Major Market: Computer, Terminal, Peripheral and Office Equipment Manufacturing; Software House; Systems House (Commercial OEM)
Target Industries: Government; General Business
Contacts:
Head of Customer Service: John V. Tilsworth
Geographic Coverage: International
Year Established: 1906
Number of Employees: 110,000

XEROX CORP.
Office Products Division
1341 W. Mockingbird Lane
Dallas, TX 75247
(214) 689-6695
Major Market: Computer and Office Equipment Manufacturing
Target Applications: Office Automation
Geographic Coverage: International

XYPLEX, INC.
100 Domino Dr.
Concord, MA 01742
(617) 371-1400
Major Market: Peripheral and Communications Equipment Manufacturing
Target Industries: Banking; Engineering; Retail; Manufacturing
Target Applications: Transaction Processing; Industrial Process Control; LAN; Terminal Switching Equipment
Contacts:
Head of Marketing: Robert Rosenbaum
Head of Engineering: George Comant
Geographic Coverage: National
Year Established: 1981
Number of Employees: 5

XYVISION, INC.
1300 Southampton
St. Louis, MO 63139
(314) 961-5766
Major Market: Communications Equipment Manufacturing
Target Industries: Financial; Airline; Banking
Contacts:
Head of Marketing: S. Landel
Head of Engineering: Fred Stewart
Geographic Coverage: National
Year Established: 1979
Number of Employees: 3

ZAIAZ COMMUNICATIONS, INC.
207 Lakin Dr.
Huntsville, AL 35801
(205) 881-2200
Major Market: Component and Communications Equipment Manufacturing
Target Industries: Lodging; Banks
Target Applications: Voice Mail; Dictation; Electronic Mail; Voice Store/Forward
Contacts:
Head of Marketing: Ray Kesner
Head of Software: Ron Jackson
Head of Engineering: Preston Jett
Geographic Coverage: Regional
Year Established: 1982
Number of Employees: 11

ZEGOS ASSOCIATES, INC.
2334 Bronson Hill Dr.
Los Angeles, CA 90068
(213) 462-4000
Major Market: Software House; Systems House (Commercial OEM); Dealer/Distributor
Target Industries: Telecommunications
Target Applications: Telecommunications
Net Sales: $100,000 - $500,000 (1981)
Contacts:
Head of Marketing: William Bales
Head of Software: Robert Nelson
Head of Customer Service: Royce A. Rabinow
Geographic Coverage: National
Year Established: 1980
Number of Employees: 5

ZOOS TELEPHONICS, INC.
207 South St.
Boston, MA 02111
(617) 423-1239

Need information about advertising in *Computerworld Buyer's Guide*?

Call Kevin McPherson at (617) 879-0700.

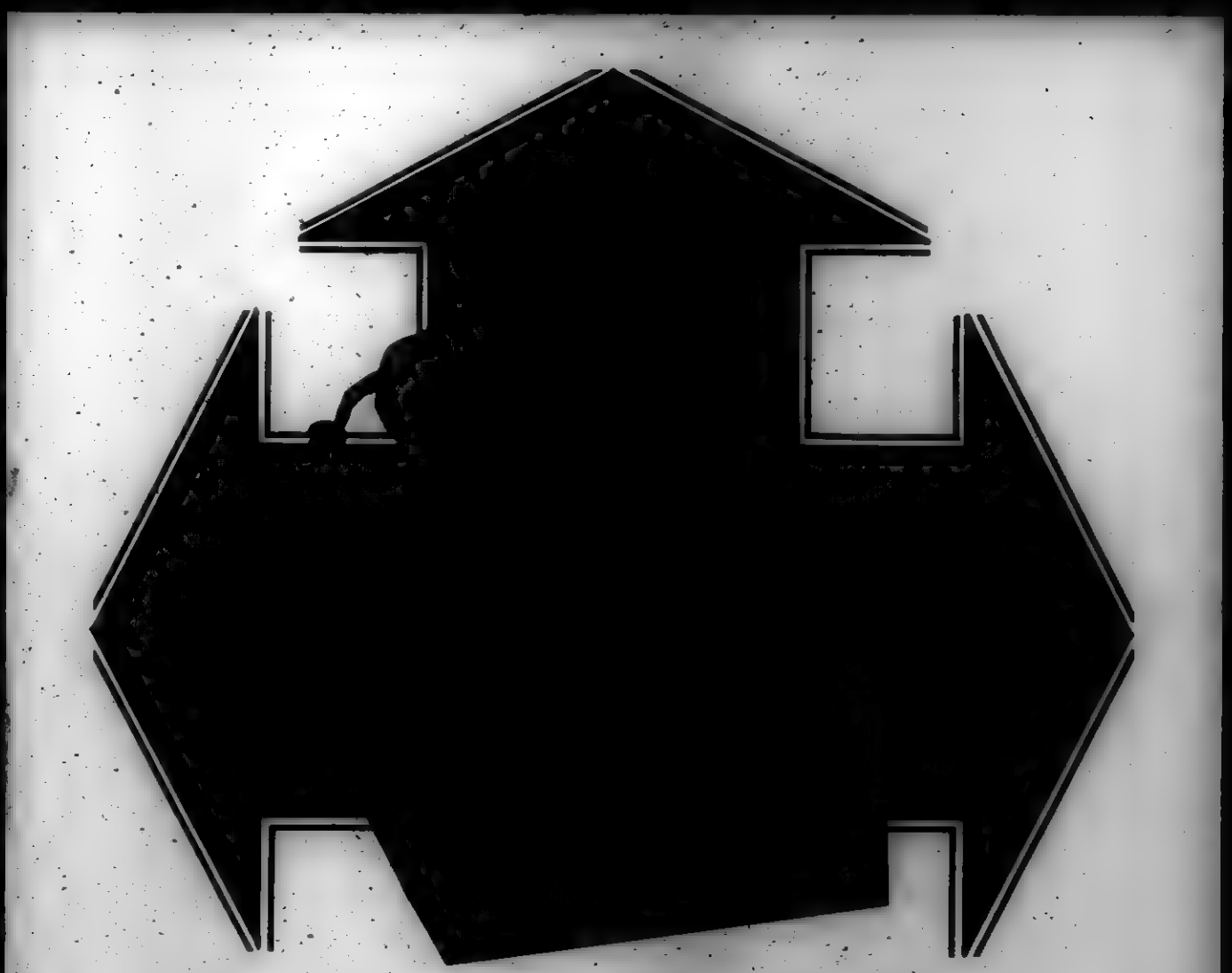
COMPUTERWORLD BUYER'S GUIDE

Major Market: Communications Equipment Manufacturing
Contacts:
Head of Marketing: Ralph Hays
Year Established: 1977
Number of Employees: 50

ZYEL, INC.
181 Bellerdale St.
Wilmington, MA 01887
(617) 657-8730
Target Industries: OEM; End User; Telephone; Interconnect
Target Applications: Voice Communications; Data Communications; Office Automation; Local-Area Networks
Contacts:
Head of Marketing: Philip Kay
Head of Engineering: Henry Vannini
Head of Customer Service: Tom Robinson
Geographic Coverage: International
Year Established: 1981
Number of Employees: 200

3 COM CORP.
1390 Shorebird Way
Mountain View, CA 94043
(415) 961-9602
Major Market: Communications Equipment Manufacturing
Contacts:
Head of Marketing/Sales: John DiLorrio
Geographic Coverage: International
Year Established: 1979
Number of Employees: 50

3M CO.
Static Control Systems
3M Center 225-4S
St. Paul, MN 55144
(612) 733-1110
Target Applications: Static Control
Contacts:
Head of Marketing: Philip Kohlhaas
Head of Sales: Michael E. Martin
Head of Engineering: Dr. James A. Tolzmann
Geographic Coverage: International
Year Established: 1962



UDS gives 212 users three ways to go!

212A—Today's most popular modem. UDS offers a fully Bell-compatible unit with complete local and remote test capability. Select 0–300 or 1200 bps for full-duplex asynchronous communication. The UDS 212A is FCC certified for direct connection to the dial-up telephone network, and available in multi-channel, rack-mounted configuration.

SINGLE UNIT PRICE $595

212 LP — Compatible with 212As at the 1200 bps, full-duplex asynchronous communication rate. No power supply or AC connection required; the 212 LP derives its operating power directly from the telephone line. Ideal for applications requiring 212A capability at 1200 bps only. The 212 LP is direct-connect certified.

SINGLE UNIT PRICE $445

212A/D — Identical to the 212A, with automatic dialing capability added! The unit stores and dials up to five 30-digit numbers. CRT menu prompting, single-stroke commands and automatic test capabilities are provided. The 212A/D is direct-connect certified.

SINGLE UNIT PRICE $645

Universal Data Systems

MOTOROLA INC.
Information Systems Group

5000 Bradford Drive, Huntsville, AL 35805. Telephone 205/837-8100; TWX 810-726-2100

DISTRICT OFFICES:
Old Bridge, NJ, 201/251-9060 • Blue Bell, PA, 215/643-2336 • Atlanta, 404/998-3715 • Glenview, IL, 312/998-9150 • Columbus, OH, 614/885-3935 • Boston, 617/875-8855
Richardson, TX, 214/690-0022 • Englewood, CO, 303/694-6043 • Houston, 713/988-5309 • Tustin, CA, 714/669-8091 • Mountain View, CA, 415/969-3393

Created by Daynard, Inc., Winter Park, Florida

UDS raises the speed limit for dial-up modems

At last there's a 9600 bps modem designed especially for the dial-up telephone network.

Our 9600 A/B is the ideal modem for projected system growth. Realize immediate line-charge savings by moving from 208 A/B to 9600 A/B now! Then, if your system demands dedicated lines, simple strap modifications will convert your modems. Nothing else changes!

A faster turnaround time than 208 A/B's further increases the 9600 A/B's efficiency. Multiple test modes are selectable from the front panel.

Contact Universal Data Systems, 5000 Bradford Drive, Huntsville, AL 35805. Telephone 205/837-8100; TWX 810-726-2100.

Universal Data Systems

MOTOROLA INC.
Information Systems Group

DISTRICT OFFICES:
Old Bridge, NJ, 201/251-9090 • **Blue Bell**, PA, 215/643-2336 • **Atlanta**, 404/998-2715 • **Glenview**, IL, 312/998-8180 • **Columbus**, OH, 614/895-3025 • **Boston**, 617/875-8966
Richardson, TX, 214/680-0002 • **Englewood**, CO, 303/694-6043 • **Houston**, 713/988-5506 • **Tustin**, CA, 714/669-8001 • **Mountain View**, CA, 415/969-3323

Created by Daymon/Holt, Inc., Winter Park, FL

Modem Index by Class

The index to modems has been grouped according to device type — couplers, digital, fiber-optic, line driver, long-haul, modem eliminators, radio frequency and short-haul. The last section of the index includes all other modems which do not fit into any of the above categories. Within each section, products have been listed alphabetically by vendor and contain the unit price and the page number on which the listing can be found.

The modem product listings have been arranged alphabetically by vendor.

Acoustic Couplers

VENDOR	MODEL	PRICE	PAGE
Anderson Jacobson, Inc.	AJ 242A	N/A	A-11
	AJ 247	N/A	A-11
	AJ 1232	$635	A-11
Atari, Inc.	ATARI 1030 DIRECT CONNECT MODEM	N/A	A-14
Racal Data Systems	AC 312 1200B	$495	A-15
	AC 312 300B	$199	A-15
Cermetek	151A2-13	$127	A-26
Develcon Electronics, Inc.	710 ACOUSTIC COUPLER	$195	A-26
Digital Equipment Corp.	DF01-A ACOUSTIC COUPLER	$345	A-26
Envoy Corp.	ACOUSTIC COUPLER, N76	$195 to $225	A-27
International Data Sciences, Inc.	PHONE LINK ACOUSTIC MODEM	$189	A-30
Lexicon Corp. of Miami	LEX-11	$145	A-30
	LEX-11 CCI II	$176	A-30
	LEX-11 CCI IIB	$216	A-30
	LEX-11B	$185	A-30
	LEX-12	$165	A-30
	LEX-12B	$205	A-30
	LEX-15	$325	A-30
	LEX-15B	$385	A-30
Novation Data Communications, Inc.	N76/5-1	$155	A-46
	N76/5-2	$170	A-46
Novation, Inc.	CAT	$189	A-46
	CCITT CAT	$299	A-46
Racal-Vadic	VA3413	$695	A-50
Tandy Corp.	AC- 26-1174	$149	A-55
Tel-Com, Inc.	TC3001	$195 to $265	A-58
	TC3002	$265	A-58
	TC3006	$195	A-58

Digital Modems

VENDOR	MODEL	PRICE	PAGE
Amdahl Corp.	983 DSU	$845 to $745	A-11
General Datacomm Industries, Inc.	GDC 500A/56K	$895	A-30
	GDC GSU-500A	$695	A-30
	GSU-500B	N/A	A-30
Hayes	DSU/CSU 1600R-4	$1,125	A-46
	DSU/CSU 1600R-3	$795	A-46
	DSU/CSU 1600R-5	$700 to $900	A-46
Schneider Instrument Co.	MCT-2	$3,425	A-54
Teleprocessing Products, Inc.	TP-500	$495 to $850	A-58
	TP-501	$865 to $1,025	A-58
	TP-556	$585 to $750	A-58
	TP-557	$860 to $1,095	A-58

Fiber-Optic Modems

VENDOR	MODEL	PRICE	PAGE
Belden Corp.	BIT-DRIVER 22-005	$195	A-16

Modem Index

VENDOR	MODEL	PRICE	PAGE
Boldon Corp.	BIT-DRIVER 222-004	$225	A-16
Broadband Systems, Inc.	BIT DRIVER 222004	$225	A-16
	BIT DRIVER 222005	$195	A-16
Canoga Data Systems	CSA-100	$495	A-17
	CSY-306-A-S	$1,500	A-17
	CSY-306-S	$1,800	A-17
	CSY-3063AX-R	$1,200	A-17
Codenoll Technology Corp.	CODELINK 10	$500	A-17
	CODELINK 20	$500	A-17
	CODELINK 50	$500	A-17
	CODELINK 100	$3,000	A-18
Fibronics International, Inc.	FM 801	N/A	A-27
	FM 802	N/A	A-27
Gandalf Data, Inc.	FA1	$500	A-28
	FS1	$600	A-28
Hayes, Inc.	FOM-232A	$475	A-30
	FOM-1232	$325	A-30
Multi Associates, Inc.	XR-1000	$950	A-30
	XR-1100	$410	A-30
Optilocom	4110	$160	A-47
	4121	$160	A-47
Optical Communications Corp.	FD-10K	$1,200	A-47
	FD-20K	$1,690	A-47
	FD-56K	N/A	A-47
	FD-1200	$1,040	A-47
Photo Corp.	ODS-201	$625	A-48
	ODS-209	$725	A-48
	ODS-306	$1,750	A-48
Raycom Systems, Inc.	2000	$250	A-52
	2200	$350	A-52
	3000	$320	A-52
Verilocal, Inc.	FOM-7	$750	A-66

Line Drivers

VENDOR	MODEL	PRICE	PAGE
Ark Electronic Products, Inc.	LIMITED DISTANCE MODEM MODEL 6 (LDM-6)	$195	A-12
Black Box Catalog/Expander, Inc.	BELL-COMPATIBLE MODEM 212	$595	A-16
Com Data	350/352/354F3-72	$117 to $296	A-20
Computrol	30-0078	$150 to $200	A-22
	30-0080	$150 to $200	A-22
Dataproducts New England, Inc.	DDU-1	$798	A-24
DEI-Teleproducts, Inc.	ADT-3	$225	A-26
Gandalf Data, Inc.	LDS 100C	$225	A-29
	LDS 101	$400	A-29
Infotron Systems Corp.	LD 210/AS	$210	A-34
	LD 210/SA	$350	A-34
Kinex Corp.	SAB-2X4	$545	A-38
Micom Systems, Inc.	M400MP	$220	A-40
	M420MP	$320	A-40
	M430	$85	A-40
Prentice Corp.	ALD/1	$200 to $300	A-49
	HSLD/1	$390 to $490	A-49
Teleboyte Technologies, Inc.	72D, VT-100 COMPATIBLE SHM	$130	A-55
	74A SHORT HAUL MODEM WITH HANDSHAKE	$165	A-55
	79 DUAL SHORT-HAUL MODEM WIRE HANDSHAKE	$225	A-55
Telebe, Inc.	3010	$100	A-56
Telenet Inc.	LDD-1	$150	A-58
	SLD-1	$450	A-58
Van-Tel, Inc.	ALD SERIES	$205 to $320	A-59
	SLD-SERIES	$380 to $450	A-59
Western Telecomputing Corp.	103 MODEM #507	$390	A-61
	103/12 MODEM #506	$825	A-61
	SATELLITE MODEM #508	$275	A-61

Long-Haul Modems

VENDOR	MODEL	PRICE	PAGE
Anchor Automation, Inc.	MARK II SIGNALMAN	$99	A-11
	MARK VI SIGNALMAN	$239	A-11
	MARK VII SIGNALMAN	$159	A-11

Modem Index

VENDOR	MODEL	PRICE	PAGE
Anchor Automation, Inc.	MARK X SIGNALMAN	$189	A-11
	MARK XII SIGNALMAN	$399	A-11
	VOLKSMODEM	$79	A-11
Anderson Jacobson, Inc.	AJ 4048	$2,495 to $2,900	A-11
Binary	MODEL 1012	$649	A-16
	MODEL 1022	$249	A-16
	MODEL 1080	$139	A-16
	MODEL 2120	$499	A-16
Burroughs Corp.	CP 1004	NA	A-16
	CP 1009	NA	A-16
	CP 1009-R/T	NA	A-16
	TA 1201	NA	A-16
	TA 1293	NA	A-16
	TA 1801	NA	A-16
	TA 1802/1804	NA	A-17
Bytecom, Inc.	212 AD	$439	A-17
Catel	DM 2100	$1,695	A-17
Chang Telecommunications	TURBO MUX	$695	A-17
	TURBO 212A	$895	A-17
Codex Corp.	224 DATA MODEM	NA	A-18
	224/V.22 BIS DATA MODEM	NA	A-18
	5016R MULTIPLE MODEM ENCLOSURE	NA	A-18
	5103/5113 DATA MODEMS	NA	A-18
	5201R DATA MODEM	NA	A-18
	5202R V.23	NA	A-18
	5206R DATA MODEM	NA	A-18
	5212/ACU	NA	A-18
	5212R	NA	A-18
	8300 GBM	NA	A-18
	CS 48FP	$4,175	A-18
	CS 96FP	$7,475	A-18
	CS 4800	$4,675	A-18
	CS 9600	$7,975	A-18
	LSI 24/24	$2,650	A-18
	LSI 48FP	$3,500	A-18
	LSI 48i	$3,500	A-18
	LSI 48/V.27 bis/TER	$3,500	A-19
	LSI 96FP	NA	A-19
	LSI 96/V.29	NA	A-19
	LSI 4800	$3,500	A-19
	LSI 9600	$6,800	A-19
	LSI E96/V.29	$6,800	A-19
	LSI E9600	NA	A-19
	LSI E9604	NA	A-19
	MX 2400 DATA MODEM	NA	A-19
	SP 14.4	NA	A-19
Coherent Communications Systems Corp.	SPM-94A	$500	A-19
Com Data	154E2-14	$127	A-20
	208 A/B	$1,697	A-20
	212E2-32	$377	A-20
	302A2-13	$157	A-20
	302A2-33	$187	A-20
	302B2-13	$177	A-20
	302B2-33	$247	A-20
	302C2-13L	$297	A-20
	305E2-12	$117	A-20
	312E2-42	$397	A-20
	312F2-22L	$337	A-20
	330E2-12L	$137	A-20
	330E2-42L	$197	A-20
	332E2-12L	$187	A-20
	332E2-42L	$247	A-20
	332F7/332F8	$591	A-21
	334E2-12L	$537	A-21
	334E2-42L	$587	A-21
	370E2-12 PHONEM	$227	A-21
	370E2-42	$277	A-21
	P 212 A	$495 to $595	A-21
ComDesign, Inc.	TM-1200	$750	A-21
	TM-2400	$750	A-21
	TM-4800	$1,750	A-21
	TM-9600	$2,750	A-21
Commodore Business Machines, Inc.	C-1650 AUTOMATIC MODEM	NA	A-21
Compro Communications, Inc.	LH96	$2,650	A-22
Computer Communications Specialists, Inc.	AUDIO MODEM	$4,895	A-22
Computer Development, Inc.	ET SERIES INTELLIGENT MODEMS	$495 to $895	A-22
	ETC	$1,095 to $1,295	A-22
	ETC (MULTI-USER)	$1,895	A-22

Modem Index

VENDOR	MODEL	PRICE	PAGE
Comspec, Inc.	DATATALKER 9600C	N/A	A-32
Comtech Data Corp.	GB 56	$6,000	A-32
	GB 168	$17,500	A-32
	M700	$4,650	A-32
	SM200A	$14,300	A-32
Comtech Data Corp.	MF 05	$4,650	A-33
Concord Data Systems, Inc.	CDS 212	$700	A-33
	CDS 224	$995 to $1,195	A-33
	CDS 224 TM	$995	A-33
	CDS 224 TM AUTODIAL	$1,195	A-33
	CDS V.22	$950	A-33
	CDS V.22 BIS	$995	A-33
	CDS V.22 BIS AUTODIAL	$1,195	A-33
Datagram Corp.	D 2400	$995	A-34
	D 4800	$1,750	A-34
	D 9600	$2,250	A-34
Datapoint Corp.	9478/9479	$995	A-34
Dataprobe, Inc.	MDR 103	$450	A-34
Datec, Inc.	33	$195 to $599	A-35
	212	$195 to $599	A-35
	PAL 103	$195 to $599	A-35
	PAL 212	$195 to $599	A-35
	PAL PLUS	$195 to $599	A-35
Develcon Electronics, Inc.	2X212 MODEMPLEXER	$965	A-36
	6212 SMART MODEM	$495	A-36
	7212 MODEM	$575	A-36
	8212 SMART MODEM	$850	A-36
	9123 MODEM	$195	A-36
Digital Equipment Corp.	DF02-AA/AC	$450 to $650	A-36
	DF03-AA/AC	$895 to $1,095	A-36
	DF03-RA/RC	$750 to $950	A-36
Racal Systems, Inc.	LYNX 103-0AA	$299	A-37
	LYNX 103-0AA (APPLE LYNX)	$299.000	A-37
Racal-Vadic Corp.	103-1	$175 to $485	A-37
	103-2	$175 to $485	A-37
	103-3	$175 to $485	A-37
	103-5	$175 to $485	A-37
Rixon Pragmatic, Inc.	ZAT 1200	$950	A-37
	ZAT 2400	$925	A-37
	ZAT 4800	$1,895	A-37
	ZAT 9600	$2,195	A-37
Friedman Associates	NEC 201	$620	A-37
	NEC 201 CR	$945	A-37
	NEC 202T	$305	A-38
	NEC 212	$500	A-38
	NEC 212 AR	$500	A-38
	NEC 212 BR	$675	A-38
	NEC DSP 4800-U	$950	A-38
	NEC DSP 9600-U	$1,500	A-68
	NEC VOICE DIGITIZER	$7,000	A-38
Fujitsu America, Inc.	F-1915L	$1,795	A-38
	F-1921L	$2,450	A-38
	F-1925L	$6,000	A-38
	M-1915CM06	$395	A-38
	M-1921CM08	$595	A-38
	M-1925CM02	$1,200	A-38
	M-1925CM03	$1,500	A-38
Gandalf Data, Inc.	SAM 201	N/A	A-29
	SAM 212A	$618	A-29
	SM 9600	$2,800	A-29
General Datacomm Industries, Inc.	DC 103J	N/A	A-30
	DC 106-3M	N/A	A-30
	DC 201-7	$875	A-30
	DC 201C	N/A	A-30
	DC 201C-K	$750	A-30
	DC 202S/T	$405	A-30
	DC 208B/A	$1,595	A-30
	DC 212A	$840	A-31
	DC 2400ASM	$795	A-31
	DC 4800	$1,475	A-31
	DC 4800S	$1,445	A-31
	DC 4827	N/A	A-31
	DC 9600	N/A	A-31
	DC 9600 EP	$2,730	A-31
	DC 9600 QP	$2,995	A-31
	DC 9600 QPS	N/A	A-31
	GDC 103J-M	$240	A-31
	GDC 212 ED	$535	A-31

Modem Index

VENDOR	MODEL	PRICE	PAGE
General Datacomm Industries, Inc.	GDC 21295	$435	A-31
	GDC 2400 ED	N/A	A-32
	GDC 9604 WITH 4-CHANNEL MULTIPLEXER	$3,195	A-32
Gleeh Corp.	CM 7201A	$280	A-32
	GSC 202	N/A	A-32
Hayes Microcomputer Products, Inc.	MICROMODEM IIE	$329	A-32
	MICROMODEM 100	$369	A-32
	SMARTMODEM 300	$289	A-32
	SMARTMODEM 1200	$699	A-33
	SMARTMODEM 1200B	$599	A-33
Honeywell, Inc.	DCD2021	$495	A-33
	DCD2011	$995	A-33
	DCD2012	$895	A-33
	DCD2021	$995	A-33
	DCD2121	$800	A-33
IBM	MODEL 3863-1	$2,695	A-33
	MODEL 3863-2	$2,935	A-33
	MODEL 3864-1	$3,715	A-34
	MODEL 3864-2	$3,925	A-34
	MODEL 3865 MODEL 1&2	$5,895	A-34
	RACK-MOUNTED MODEM 3868 MODEL 1	$2,550 to $5,000	A-34
	RACK-MOUNTED MODEM 3868 MODEL 2	$2,550 to $5,000	A-34
	RACK-MOUNTED MODEM 3868 MODEL 3	$2,550 to $5,000	A-34
	RACK-MOUNTED MODEM 3868-MODEL 4	$2,550 to $5,000	A-34
IDE Associates, Inc.	IDEACOMM 1200	$545	A-34
Infinet, Inc.	NCM 14.4	N/A	A-34
	NCM 1200	$1,200	A-34
	NCM 2400	$1,400	A-34
	NCM 4800	$2,400	A-34
	NCM 9600	$4,300	A-34
Infotron Systems Corp.	DL 96/V.29	$4,500	A-35
	DL 201C	$950	A-35
	DL 9600/V.29 BSM	$5,500	A-35
	DSM 201C	$825	A-35
	DSM 212B	$750	A-35
Integrated Design Engineering, Inc.	IDE-300	$500	A-35
Interbusiness Corp.	212A	$595	A-35
	A1200	$499	A-35
	AC 300	$189	A-35
	AUTO DIAL 212A	$599	A-35
	M1200	$449	A-35
	OEM	N/A	A-36
	S-100	$449	A-36
	STARCOM	$449	A-36
International Data Sciences, Inc.	AUTO LINK 212	$549	A-36
	AUTO LINK 1200	$469	A-36
	AUTODIAL 212	$599	A-36
	MICRO LINK 300	$239	A-36
	MICRO LINK 1200	$449	A-37
International Modem Exchange (Timeco)	PASSWORD AUTODIAL 212A MODEM	$449	A-37
Kinex Corp.	THE OPERATOR	$159	A-37
	2400/FDX	N/A	A-38
	4800/208/AB	$1,725	A-38
	4800/27	$2,225	A-38
	9600/29	$2,750	A-38
	9600/DCM (DATA COMPRESSION MODEM)	$3,650	A-38
	9600/FP	$3,350	A-38
	9600/M	$3,650	A-38
Lexicon Corp. of Miami	LEX-10	$119	A-39
	LEX-10B	$159	A-39
MFJ Enterprises	MFJ 1233	$129	A-39
Micom Systems, Inc.	M4024, M4024/ASYNC	$795 to $825	A-40
	M4048/DB+	$3,295	A-40
	M4048/V.27+	$2,595	A-40
	M4048/V.27-NF	$1,750	A-40
	M4096/4+	$3,695	A-40
	M4096/DB+	$3,795	A-40
	M4096-NF	$2,695	A-40
	M4096/V.29+	$3,095	A-40
Micro-Stuff Systems, Inc.	80512	$550	A-42
	80514	$595	A-42
The Microperipheral Corp.	AUTOPRINT MICROCONNECTION	$149	A-42
	RS232	$159 to $199	A-42
	SUBMINIATURE OEM MODEM	$80	A-42
	TRS 80 MODEL 1	$209 to $259	A-42
Modular Integration, Inc.	MSM-690	N/A	A-42
Multitech, Inc.	H53 GROUP DATA MODEM	N/A	A-42
Multi - Tech Systems, Inc.	MT 103J	$250	A-42

Modem Index

VENDOR	MODEL	PRICE	PAGE
Multi-Tech Systems, Inc.	MT 201B	$695	A-42
	MT 202T	$345	A-43
	MT 212AD	$695	A-43
	MT 212AH	$549	A-43
	MT 212C	$550	A-43
	MT 212PC	$549	A-43
NCR Comten,Inc.	NCR COMTEN 7163 0100	N/A	A-44
	NCR COMTEN 7163 0200	N/A	A-44
	NCR COMTEN 7164 0100	$3,700	A-44
	NCR COMTEN 7164 0200	N/A	A-44
	NCR COMTEN 7165 0100	$5,800	A-44
NEC Telephone, Inc.	B103JR	$460	A-44
	DSP 208	$1,750	A-44
	DSP 224	$1,195	A-44
	DSP 4800-U	$1,695	A-44
	DSP 9600-U	$2,695	A-44
	N113C-DR	$430	A-44
	N201C	$845	A-44
	N201CR	$895	A-44
	N202SR	$495	A-44
	N202T	$400	A-44
	N212AR	$895	A-45
	N212BR	$795	A-45
	SP1440-U	$7,800	A-45
	SP9600-FAST-U	$5,300	A-45
	SPN 4800-U	$3,500	A-45
	SPN 9600-U	$7,000	A-45
Network Products, Inc.	NP-48	$1,800	A-45
	NP-96	$2,750	A-45
Newbee Data Communications, Inc.	N103-3	$385	A-45
	N103-4	N/A	A-45
Northern Telecom, Inc.	2230	$675	A-46
	2240	$850	A-46
	2250	$1,995	A-46
	2260	$2,995	A-46
Novation, Inc.	21 APPLE-CAT II	$399 to $725	A-46
	103 SMART-CAT	$249	A-46
	103/212 SMART-CAT	$595	A-46
	212 AUTO-CAT	$695	A-46
	APPLE-CAT II	$389	A-46
	D-CAT	$199	A-46
	J-CAT	$149	A-46
	PC1200B	$595	A-46
Nu Data Corp.	108	N/A	A-46
Paradyne Corporation	CHALLENGER 2400	$700	A-47
	CHALLENGER 4800	$1,500	A-47
	CHALLENGER 9600	$2,600	A-47
	DTU-1200D	N/A	A-47
	LSI 24C	N/A	A-47
	MP 14.4	N/A	A-47
	MP 14.4 SM	N/A	A-47
	MP 16.0	N/A	A-47
	MP 48/208B	N/A	A-47
	MPX 2400	$950	A-47
	MPX 4800	$2,000	A-47
	MPX 9600	$3,400	A-47
Penril Corp.	300/1200	$525	A-48
	300/1200 AUTO DIAL	$650	A-48
	1800 DED	$375	A-48
	2127	$1,695	A-48
	2129	$2,595	A-48
	8201 A/B	$1,750	A-48
Prentice Corp.	212 TCM	$695 to $795	A-49
	9600A/B	$2,995	A-49
	9629	$2,650 to $2,750	A-49
	P-V.22	$695 to $795	A-49
	P-201C	$695 to $795	A-49
	P-202T	$295 to $395	A-49
	P-208A/B	$1,650 to $1,750	A-49
	P-212	$495 to $595	A-49
	TRIMODEM	$850 to $950	A-49
PulseCom	4011-10 (108C) (RECEIVER)	$351	A-49
	4012-10 (108A) TRANSMITTER	$351	A-49
Racal-Milgo, Inc.	24 LSI MARK II	$1,450 to $2,050	A-49
	CMS 12	$1,900 to $2,050	A-49
	CMS 24	$2,200	A-50
	MODEM 56K	$8,000 to $8,250	A-50
	MODEM 112K	$16,500 to $17,400	A-50

Modem Index

VENDOR	MODEL	PRICE	PAGE
[illegible]	MPS 14.4K	$10,000 to $12,400	A-60
	OMNIMODE CS (CENTRAL SITE)	$2,100 to $3,600	A-60
	OMNIMODE 48	$2,450 to $4,150	A-60
	OMNIMODE 96	$4,150 to $5,650	A-60
[illegible]	VA103 MODEMPHONE	$250 to $360	A-60
	VA212 AUTO DIAL	$695	A-60
	VA212 PAR AUTO DIAL	$695	A-60
	VA212LC	$495	A-60
	VA315	$375	A-60
	VA317	$250	A-60
	VA355	$375	A-60
	VA1205/30 SERIES	NA	A-60
	VA1240	$280	A-61
	VA1250 SERIES DIRECT-CONNECT	NA	A-61
	VA1250 SERIES OF LEASED LINE MODEMS	$425 to $550	A-61
	VA2430 G/K	$500	A-61
	VA2440/45	$575 to $725	A-61
	VA2450 SERIES	$725 to $875	A-61
	VA3451 TRIPLE MODEM	$875	A-61
	VA3455	$775	A-62
	VA3467	NA	A-62
	VA3480 SERIES	$950	A-62
	VA4400 SERIES	$1,745 to $1,945	A-62
	VA4840 SERIES	$1,350	A-62
RFL Industries	6385	$390	A-62
	6860	$3,600	A-62
[illegible]	OEM 212A FOR CUSTOM APPLICATIONS	NA	A-62
	PC 212A MODEM FOR IBM PC AND PC-XT	$499	A-62
	R14.4 MODEM	NA	A-62
	R103J LSI MODEM	NA	A-62
	R212A INTELLIGENT MODEM	NA	A-62
	R212A LSI MODEM	NA	A-62
	R2424 LSI MODEM	NA	A-63
	RV .29/2 MODEM SYSTEM	NA	A-63
	T103J LSI MODEM	NA	A-63
	T108 LSI DATA MODEM	NA	A-63
	T113C LSI DATA MODEM	NA	A-63
	T202S LSI DATA MODEM	NA	A-63
	T202T LSI DATA MODEM	NA	A-63
	T212A LSI DATA MODEM	NA	A-63
	TA 208A/B LSI MODEM	NA	A-63
Rockwell International	R24 THREE MODULE SET	NA	A-63
	R24DC	NA	A-63
	R24LL	NA	A-63
	R48DP	NA	A-63
	R96DP	NA	A-63
	R96FAX	NA	A-63
	R96FT	NA	A-64
	R242M	NA	A-64
	R1212DC	NA	A-64
	R1212M	NA	A-64
	R2424DC	NA	A-64
	V27P/1	NA	A-64
	V96P/1	NA	A-64
Sensar, Inc.	2103	$250	A-64
	2202	$400	A-64
	2407	$500	A-64
Tandy Corp.	76-1005/1009 (ACU)	$699 to $849	A-65
	DC MODEM IB 26-1175	$99	A-65
	DC MODEM II 26-1173	$199	A-65
Tek-Com, Inc.	4700	$365	A-65
	TC5001	NA	A-65
Telkone Corporation	TELEPORT 300	$369	A-66
Timeplex, Inc.	202 C/D	$325	A-66
	AIM SERIES	$1,080 to $2,825	A-66
	R103	$315	A-66
	R103 C/D	$256 to $335	A-67
	R202 C/D	$360	A-67
	V.29 PLUS	$4,100 to $4,600	A-67
TNW Corp.	OPERATOR 103	$189	A-67
	TNW-103	$449	A-67
Transcend Corporation	MODEM CARD AMC-300	$325	A-67
	PC MODEM CARD 300	$349	A-67
	PC MODEM CARD 1200	$549	A-67
	TRANS MODEM 1200	$895	A-67
Tri-Data	OZ 225	$1,375	A-67
	OZ GUARDIAN	$750	A-67
TRT Data Products	202	$175 to $200	A-67

Modem Index

VENDOR	MODEL	PRICE	PAGE
TRT Data Products	212	$250	A-57
Tusk Electronics, Inc.	MODEC 1540	$242	A-57
	MODEL 1653	$275	A-57
Tymshare, Inc.	MODEL 912 MODEM	$995	A-60
Universal Data Systems, Inc.	103 LP O/A	$145	A-58
	103J	$425	A-58
	103JLP	$195	A-58
	108	$295	A-58
	201B	$965	A-58
	201C	$775	A-58
	202LP	$195	A-58
	202S	$475	A-58
	202S/SS	$550	A-58
	202SLP	$245	A-58
	202T	$425	A-58
	208A/B	$1,750	A-58
	212A	$595	A-58
	212A/D	$645	A-58
	212LP	$445	A-58
	9600	$2,650	A-58
	9600A/B	$2,650	A-58
U. S. Robotics, Inc.	IBM PC MODEM	$449	A-59
	IBM PC 64	$599	A-59
	IBM PC MODEM 286	$1,149	A-59
	OEM 4	$300	A-59
	PASSWORD	$449	A-59
	S100 BUS MODEM	$449	A-59
Van-Tel, Inc.	212 SERIES	$425 to $675	A-59
	1200 - PLUS	$499	A-59
	MD 103-1/2E	$245 to $315	A-59
	MD 103J SERIES	$245 to $415	A-59
	MD 113 SERIES	$245 to $315	A-59
	MD 201-1	$730 to $809	A-59
	MD 201-3/4E	$805 to $875	A-59
	MD 202-1/2E	$310 to $380	A-59
	MD 202-5/6E	$280 to $350	A-59
	PCM-H150P	$425	A-59
	PCM-XT	$549	A-59
Visionary Electronics, Inc.	VISIONARY 100	$595	A-59
	VISIONARY 1200	$795	A-59
Wang Laboratories, Inc.	CATV MODEM	N/A	A-59
	WA 3451 MODEM	$1,050	A-59
Western Telecom	212 AUTODIAL	$625	A-61
	WORLDCOM 200	$595	A-61
Weldata Inc.	WD-212A	N/A	A-61
Zoom Telephonics,Inc.	NETWORKER	$129	A-61

Modem Eliminators

VENDOR	MODEL	PRICE	PAGE
Ark Electronic Products, Inc.	MODEM ELIMINATOR MODEL 3 (ME-3)	$295	A-12
Astrocom Corp.	MODEM EMULATOR	$315	A-14
Avanti Communications Corporation	300	$360	A-14
	300H	$795	A-14
Com Data	ME-2D	$510	A-21
Com/Tech Systems, Inc.	MODEMULATOR 402A	$390	A-23
Dynatech Corporation	ME-1	$440	A-26
Gandalf Data Inc.	ME 2D	$400	A-28
	ME 922	$450	A-28
General Datacomm Industries, Inc.	DME-3	N/A	A-32
Inter-Link	CLUSTER MODEM EMULATORS CME-1R	$875	A-36
International Data Sciences, Inc.	MODEL 5110	$370	A-37
Kaufman Research Mfg., Inc.	401 MODEM/PORT CONTENTION UNIT	$995	A-37
Spovy Corp.	DATA COMMUNICATION MODULE (TYPE 5610)	$852	A-54
Teleprocessing Products, Inc.	TP-232	$395	A-56

Radio Frequency Modems

VENDOR	MODEL	PRICE	PAGE
AppRisk Corp.	BROAD BAND MODEM	N/A	A-12
Gandalf Data Inc.	RADIO MODEM	$1,595	A-28

Modem Index

VENDOR	MODEL	PRICE	PAGE
Glenayre Electronics	GL 1102 HF PULSE COMPRESSION	$6,000 to $8,000	A-32
	GL 1142 HFMESSAGE TERMINAL	$6,000 to $8,000	A-32
Interactive Systems/3M	MODEL 520 AUDIO MODEM	$870	A-36
	MODEL 720 DATA & CONTROL MODEM	$1,390 to $1,490	A-36
	MODEL 920 DATA MODEM	$890	A-36
	MODEL 925 DATA MODEM	$590	A-36
	MODEL 960 DATA MODEM	$960	A-36
	MODEL 965 DATA MODEM	$1,190	A-36
Magnavox Govt. & Ind. Elec. Co.	CATV-MODEM	$750 to $950	A-68
	NETWORK MODEM 640	$395	A-68
	NETWORK MODEM 670	$1,980	A-68

Short-Haul Modems

VENDOR	MODEL	PRICE	PAGE
Anadyne Corporation	982 LIMITED DISTANCE DATA SET	$495 to $950	A-11
	984 MULTIPORT LIMITED DISTANCE DATA SET	N/A	A-11
Art Electronic Products, Inc.	LIMITED DISTANCE MODEM MODEL 1B (LDM-1B)	$993	A-12
	LIMITED DISTANCE MODEM MODEL 4 (LDM-4)	$92	A-12
	LIMITED DISTANCE MODEM MODEL 5 (LDM-5)	$395	A-12
	LIMITED DISTANCE MODEM MODEL 7 (LDM-7)	$425	A-14
Astrocom Corp.	MC512	$810	A-14
	SH56S	$825	A-14
	SH96/48	$295	A-14
	SH192S	$395	A-14
Avanti Communications Corporation	1900	$575	A-14
	1985	$895	A-14
	1949	$595	A-14
	2200	$950	A-14
	2300H	$1,975	A-14
	2300M	$1,625	A-14
	2400	$1,100	A-15
	4800	$1,950	A-15
	MODEL 600A	$265	A-15
Belden Corp.	BIT-DRIVER 222-024	$195	A-16
	BIT DRIVER 222-025	$170	A-16
Cablebus Systems Corp.	MOD-1	$1,495	A-17
Codex Corp.	6150 LDSU	N/A	A-19
	6250 LDSU	N/A	A-19
Coherent Communications Systems Corp.	LINEMATE 192	$450	A-19
Commodore Business Machines, Inc.	C-1600	N/A	A-21
Communication Research Corp.	100	$315	A-21
	400	$475	A-21
Complex Systems,Inc.	LS 56K	$650	A-22
	LVS 76.8	$650	A-22
Comtech Data Corp.	M816	$2,000	A-22
Data Control Systems	CCM COAXIAL CABLE MODEM	$165 to $875	A-23
	SR102	$165 to $875	A-23
	SR120	$165 to $875	A-23
	SR202	$165 to $875	A-23
Dataproducts Corporation	DDU-1	$700	A-24
Datotel,Inc.	DCP 3000	$200	A-24
	DCP 3010	$260	A-24
	DCP 3020	$250	A-24
	DCP 3050	$420	A-24
	DCP 3055	$550	A-24
	DCP 3057	$550	A-24
	DCP 3060	$950	A-25
	DCP 3070	$1,400	A-25
	DCP 3150	$420	A-25
	DCP 3155	$550	A-25
Dtl-Telaproducts,Inc.	2000	$889	A-25
	ASR-3	$445	A-25
	ELD-1	$175	A-25
Duracom Corp.	ECS-10	$89 to $104	A-26
Dynatech Corporation	LDM 12	$275	A-26
	LDM 22	$440	A-26
	LDM 32	$590	A-26
Gandalf Data Inc.	LDS 120; RM 3120	$300	A-29
	LDS 121	N/A	A-29
	LDS 140; RM 3140	$450	A-29
	LDS 260	$795 to $899	A-29
	LDS 309; RM 3309	$450	A-29
	LDS 319; RM 3119	$735	A-29

Modem Index

VENDOR	MODEL	PRICE	PAGE
Gandalf Data Inc.	LDS 329; RM 3329	$460	A-29
	SM LDS 349;	$295	A-29
	LINE MISER	$295 to $305	A-29
	MINI LDS 122	N/A	A-30
General Datacomm Industries, Inc.	DC 2020	$850	A-32
	DC 2030	$805	A-32
	GDC LCM 1010/1020	$295 to $325	A-32
	NMS-2020	N/A	A-32
Intel Business Corp.	100 RA	$235	A-36
	200	$495	A-36
Inter-Link	LDM-1R	$245	A-36
	LDM-1V	$600	A-36
International Data Sciences, Inc.	MODEL 6000H	$750	A-37
	MODEL 6000L	$750	A-37
	MODEL 6200	$250	A-37
	MODEL 6220	$300	A-37
	MODEL 6240	$400	A-37
Kappel Laboratories	DT 19.2 DATA TRANCEIVER	$1,190	A-37
Kinex Corp.	4 WIRE BASE BAND	N/A	A-39
	2400/201C	N/A	A-39
Kodiak Corp.	Z9600	$167	A-39
Micom Systems, Inc.	M401	$250	A-40
	M402	$330	A-40
	M421	$370	A-40
	M431	N/A	A-42
Microcom Inc.	ERA 2 FOR APPLE IIE	$429	A-42
	ERA 2 FOR IBM PC	$429	A-42
	ERA 2 FOR IBM PC JR	$429	A-42
	PCS FLASH 2000 NETWORKING MODEM	$995	A-42
	RX FLASH 1000 NETWORKING MODEM	$695	A-42
Multi Tronics	CATV MODEM	$2,000	A-44
PECA, Inc.	EXT-1212	$1,600	A-46
Penril Corp.	8192	$535	A-46
	PSH-96A	$250	A-46
Racal-Milgo, Inc.	COM LINK III	$930 to $945	A-50
Rixon, Inc.	LDM 710 LIMITED DISTANCE DATA MODEM	N/A	A-53
	LDM 720 LIMITED DISTANCE DATA MODEM	N/A	A-53
Scientific Atlanta, Inc.	6402	$4,000	A-54
Scientific Radiation	5010 SERIES OPTICAL DATA LINK	$299 to $338	A-54
Seiscomp, Inc.	IOBC 9600 SERIES	$500	A-54
Telebyte Technologies, Inc.	71	N/A	A-56
	72	$125	A-56
	73 REMOTELY CONTROLLED SHM	N/A	A-56
	75 DUAL SHORT HAUL MODEM	$165	A-56
Timeplex, Inc.	SLDM	$950	A-57

Other Modem Types

VENDOR	MODEL	PRICE	PAGE
Anderson Jacobson, Inc.	AJ 1212-AD1	$595	A-11
	AJ 1212-AD2	$695	A-12
	AJ 1212-2BO1	$425 to $495	A-12
	AJ 1212-4D01	$465	A-12
	AJ 1212-ISO1	$385	A-12
	AJ 1212-RM1	$595	A-12
	AJ 1212-ST	$495	A-12
	AJ 1259	$695	A-12
	AJ 1259-AD	$775	A-12
Bo-Sherrel Co., Inc.	M-1A	$114 to $138	A-16
	M-3	$49	A-16
	M-4	$440	A-16
Gandalf Data Inc.	LDM 404; RM 3404	$875 to $975	A-30
	LDM 409	N/A	A-30
	LDM 414; RM 3414	$975 to $1,050	A-30
	LDM 444; RM 3444	$1,350	A-30
	LDM 454; RM 3454	$1,495	A-30
General Datacomm Industries, Inc.	CSU-550A	N/A	A-32
LSI Systems,Inc.	4D1	$6,950	A-38
	4DT1/7DT1	$8,450 to $12,550	A-38
Penril Corp.	8801C	$875	A-46
	MCU 4B	$440	A-46
Teleprocessing Products, Inc.	TP-550	$415 to $540	A-56
	TP-551	$625 to $830	A-56
Tellabs, Inc.	310 DATAVOICE SYSTEM	$450 to $500	A-56

ANIRAM, CORP.
968 DSU
Modem Class: Digital (DSU)
Transmission Technique: Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Synchronous - 2,400 bps, 4,800 bps, 9,600 bps, 56,000 bps
Interface: RS-232C, CCITT V.24, V.35
Transmission Medium: DDS
Diagnostics: Yes; built-in
Features: Autoequalizer, Diagnostics, Switchable Data Rates
Distribution Method: End user
Price: $645 to $745
Number Installed to Date: 100 - 500
Date First Installed: July 1983
(See Vendor Profile Page V-2)

ANIRAM, CORP.
962 LIMITED-DISTANCE DATA SET
Modem Class: Short-Haul
Transmission Technique: Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Synchronous - 1,200 bps, 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps, 56,000 bps, 64,000 bps; Asynchronous - 64,000 bps
Interface: RS-232C, CCITT V.24, Mil. 188C, V.35, Bell 301/303
Transmission Medium: Metallic 4-Wire
Diagnostics: Yes; Built-in
Features: Autoequalizer, Diagnostics, Switchable Data Rates
Distribution Method: End user
Price: $495 to $850
Number Installed to Date: 1,000 - 5,000
Date First Installed: July 1982

ANIRAM, CORP.
964 MULTIPORT LIMITED-DISTANCE DATA SET
Modem Class: Short-Haul
Transmission Technique: Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 1,800 bps; Synchronous - 2,400 bps, 4,800 bps, 9,600 bps
Interface: RS-232C, CCITT V.24
Transmission Medium: Metallic 4-Wire
Diagnostics: Yes; Built-in
Features: Autoequalizer, Diagnostics, Multiport, Switchable Data Rates
Distribution Method: End user

ARDENDON PHOTONICS
TR2000
Modem Class: Fiber Optic
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps, 19,200 bps, 56,000 bps
Interface: RS-232C
Transmission Medium: Fiber Optics
Distribution Method: OEM
Price: $99
Number Installed to Date: Under 500
(See Vendor Profile Page V-2)

ARGONOR AUTOMATION, INC.
MARK II SIGNALMAN
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 300 bps
Interface: RS-232C
Bell-Compatible: 103
Transmission Medium: Voice-Grade Lines
Diagnostics: No
Features: Alternate Voice/Data, Originate/Answer
Distribution Method: OEM, Third-party
Price: $99
Number Installed to Date: 10,000 - 50,000
Date First Installed: January 1982
(See Vendor Profile Page V-2)

ARGONOR AUTOMATION, INC.
MARK VI SIGNALMAN
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 300 bps
Interface: IBM Bus
Bell-Compatible: 103
Transmission Medium: Voice-Grade Lines
Diagnostics: No
Features: Autodial, Autoanswer, Alternate Voice/Data
Distribution Method: OEM, Third-party
Price: $239
Number Installed to Date: 1,000 - 5,000
Date First Installed: January 1983

ARGONOR AUTOMATION, INC.
MARK VII SIGNALMAN
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 300 bps
Interface: RS-232C
Bell-Compatible: 103
Transmission Medium: Voice-Grade Lines
Features: Autodial, Autoanswer, Alternate Voice/Data
Distribution Method: OEM, Third-party
Price: $159
Number Installed to Date: 10,000 - 50,000
Date First Installed: June 1982

ARGONOR AUTOMATION, INC.
MARK X SIGNALMAN
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 300 bps
Interface: RS-232C
Bell-Compatible: 103
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autodial, Autoanswer, Alternate Voice/Data
Distribution Method: OEM, Third-party
Price: $169
Number Installed to Date: 500 - 1,000
Date First Installed: November 1983

ARGONOR AUTOMATION, INC.
MARK XII SIGNALMAN
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 300 bps, 1,200 bps
Interface: RS-232C
Bell-Compatible: 103, 212
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autodial, Autoanswer, Alternate Voice/Data, Switchable Data Rates
Distribution Method: OEM, Third-party
Price: $389
Date First Installed: September 1983

ARGONOR AUTOMATION, INC.
VOLKSMODEM
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 300 bps
Interface: RS-232C
Bell-Compatible: 103
Transmission Medium: Voice-Grade Lines
Diagnostics: No
Features: Originate/Answer
Distribution Method: OEM, Third-party
Price: $79
Number Installed to Date: 5,000 - 10,000
Date First Installed: September 1983

ARRENDON JAGGERSON, INC.
AJ 242A
Modem Class: Coupler
Transmission Technique: Asychronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps
Interface: RS-232C
Bell-Compatible: 103
Transmission Medium: Voice-Grade Lines
Diagnostics: No
Distribution Method: End user, OEM, Third-party
Number Installed to Date: 10,000 - 50,000
Date First Installed: 1977
(See Vendor Profile Page V-2)

ARRENDON JAGGERSON, INC.
AJ 247
Modem Class: Coupler
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps
Interface: RS-232C
Bell-Compatible: 103
Transmission Medium: Voice-Grade Lines
Distribution Method: End user, Third-party
Number Installed to Date: 5,000 - 10,000
Date First Installed: 1978

ARRENDON JAGGERSON, INC.
AJ 1232
Modem Class: Coupler
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps, 1,200 bps
Interface: RS-232C
Bell-Compatible: 103, 212
Transmission Medium: Voice-Grade Lines
Diagnostics: No
Features: Autoanswer, Switchable Data Rates
Distribution Method: End user, OEM, Third-party
Price: $635
Number Installed to Date: 1,000 - 5,000
Date First Installed: 1981

ARRENDON JAGGERSON, INC.
AJ 4048
Modem Class: Long-Haul
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous/Synchronous - 2,400 bps, 4,800 bps
Interface: RS-232C, MIL 188C
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autoequalizer, Autoanswer, Alternate Voice/Data, Diagnostics, Fallback, Switchable Data Rates, Autoecho Cancel
Distribution Method: End user, Third-party
Price: $2,495 to $2,990
Number Installed to Date: 100 - 500
Date First Installed: May 1983

ARRENDON JAGGERSON, INC.
AJ 1212-AD1
Modem Class: DDD
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps; Asynchronous/Synchronous - 1,200 bps
Interface: RS-232C
Bell-Compatible: 103, 212
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autodial, Autoequalizer, Autoanswer, Alternate Voice/Data, Diagnostics, Switchable Data Rates

Modems

Distribution Method: End user, OEM, Third-party
Price: $595
Date First Installed: December 1983

ANDERSON JACOBSON, INC.
AJ 1212-AD2
Modem Class: DDD
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps; Asynchronous/ Synchronous - 1,200 bps
Interface: RS-232C
Bell-Compatible: 103, 212
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-In
Features: Autodial, Autoequalizer, Autoanswer, Alternate Voice/Data, Diagnostics, Switchable Data Rates
Distribution Method: End user, OEM, Third-party
Price: $695
Date First Installed: December 1983

ANDERSON JACOBSON, INC.
AJ 1212-3D1
Modem Class: DDD
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps; Asynchronous/ Synchronous - 1,200 bps
Interface: RS-232C, IBM/PC BUS
Bell-Compatible: 103, 212
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-In
Features: Autodial, Autoequalizer, Autoanswer, Diagnostics
Distribution Method: End user, OEM, Third-party
Price: $425 to $495

ANDERSON JACOBSON, INC.
AJ 1212-ID01
Modem Class: DDD
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps; Asynchronous/ Synchronous - 1,200 bps
Interface: RS-232C, TTL
Bell-Compatible: 103, 212
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-In
Features: Autodial, Autoequalizer, Autoanswer, Alternate Voice/Data, Diagnostics, Switchable Data Rates
Distribution Method: OEM, Third-party
Price: $495
Date First Installed: December 1983

ANDERSON JACOBSON, INC.
AJ 1212-SD1
Modem Class: DDD
Transmission Technique: Asynchronous, Synchronous -
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps; Asynchronous/ Synchronous - 1,200 bps
Interface: RS-232C, TTL
Bell-Compatible: 103, 212
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-In
Features: Autodial, Autoanswer, Alternate Voice/Data, Diagnostics, Switchable Data Rates, Integral Card
Distribution Method: OEM, Third-party
Price: $385

ANDERSON JACOBSON, INC.
AJ 1212-RM1
Modem Class: DDD
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps; Asynchronous/ Synchronous - 1,200 bps
Interface: RS-232C
Bell-Compatible: 103, 212
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Add-on
Features: Autoanswer, Diagnostics
Distribution Method: End user, OEM, Third-party
Price: $595

ANDERSON JACOBSON, INC.
AJ 1212-ST
Modem Class: DDD
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps; Asynchronous/ Synchronous - 1,200 bps
Interface: RS-232C
Bell-Compatible: 103, 212
Transmission Medium: Voice-Grade Lines
Diagnostics: No -
Features: Autoequalizer, Autoanswer, Alternate Voice/Data, Diagnostics, Switchable Data Rates
Distribution Method: End user, OEM, Third-party
Price: $495
Date First Installed: December 1983

ANDERSON JACOBSON, INC.
AJ 1259
Modem Class: DDD
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps; Asynchronous/ Synchronous - 1,200 bps
Bell-Compatible: 103, 212
Transmission Medium: Voice-Grade Lines
Diagnostics: No
Features: Autoanswer, Diagnostics, Switchable Data Rates, Triple Modem
Distribution Method: End user, OEM, Third-party
Price: $595
Number Installed to Date: 5,000 - 10,000
Date First Installed: 1981

ANDERSON JACOBSON, INC.
AJ 1259-AD
Modem Class: DDD
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps; Asynchronous/ Synchronous - 1,200 bps
Interface: RS-232C
Bell-Compatible: 103, 212
Transmission Medium: Voice-Grade Lines
Diagnostics: No
Features: Autodial, Autoanswer, Alternate Voice/Data, Diagnostics, Switchable Data Rates, Triple Modem
Distribution Method: End user, OEM, Third-party
Price: $775
Number Installed to Date: 1,000 - 5,000
Date First Installed: 1982

APPLITEK CORP.
BROAD BAND MODEM
Modem Class: Radio Frequency (RF)
Transmission Technique: Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous/ Synchronous - 10M bps
Transmission Medium: Wide-Band Lines, Fiber Optics
Diagnostics: No
Features: Frequency Select
Distribution Method: OEM
Number Installed to Date: 0 - 100
Date First Installed: October 1983
(See Vendor Profile Page V-2)

ARK ELECTRONIC PRODUCTS, INC.
LIMITED DISTANCE MODEM MODEL 6 (LDM-6)
Modem Class: Line Driver
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 14,400 bps, 19,200 bps, 56,000 bps; Synchronous 9,600 bps
Interface: RS-232C
Transmission Medium: Wide-Band Lines
Diagnostics: No
Features: Diagnostics, Switchable Data Rates
Distribution Method: End user, OEM
Price: $195
Number Installed to Date: 500 - 1,000
Date First Installed: 1981
(See Vendor Profile Page V-3)

ARK ELECTRONIC PRODUCTS, INC.
MODEM ELIMINATOR MODEL 3 (ME-3)
Modem Class: Modem Eliminator
Transmission Technique: Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Synchronous - 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 19,200 bps, 14,400 bps
Interface: RS-232C
Diagnostics: No
Features: Diagnostics, Switchable Data Rates
Distribution Method: End user
Price: $295
Number Installed to Date: 1,000 - 5,000
Date First Installed: 1979

ARK ELECTRONIC PRODUCTS, INC.
LIMITED DISTANCE MODEM MODEL 1B (LDM-1B)
Modem Class: Short-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Synchronous - 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 19,200 bps, 14,400 bps; Asynchronous/Synchronous - 3,600 bps, 7,200 bps
Interface: RS-232C
Diagnostics: No
Features: Diagnostics, Switchable Data Rates
Distribution Method: End user
Price: $693
Number Installed to Date: 500 - 1,000
Date First Installed: 1978

ARK ELECTRONIC PRODUCTS, INC.
LIMITED DISTANCE MODEM MODEL 4 (LDM-4)
Modem Class: Short-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 19,200 bps, 14,400 bps
Interface: RS-232C
Transmission Medium: Wide-Band Lines
Diagnostics: No
Features: Diagnostics, Switchable Data Rates
Distribution Method: End user, OEM
Price: $92
Number Installed to Date: 500 - 1,000
Date First Installed: 1980

ARK ELECTRONIC PRODUCTS, INC.
LIMITED DISTANCE MODEM - MODEL 5 (LDM-5)
Modem Class: Short-Haul
Transmission Technique: Asynchronous, Syechronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps, 600 bps, 1,800 bps, 14,400 bps, 19,200 bps; Asynchronous/Synchronous - 1,200 bps, 2,400 bps, 4,800 bps, 9,600 bps
Interface: RS-232C
Features: Diagnostics, Switchable Data Rates
Distribution Method: End user, OEM
Price: $395
Number Installed to Date: 500 - 1,000

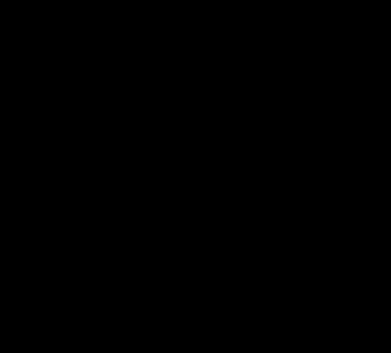
WE HAVE 2400 GOOD WAYS TO UPGRADE YOUR DIAL LINE DATA COMMUNICATIONS

If you're still transmitting data over telephone lines at 1200bps, we'll show you how to save time and money. Our 2400bps full duplex dial modems give you all the performance, versatility *and reliability* that you require, at half the transmission cost, and twice the speed.

All CDS dial line modems operate at 2400bps full duplex with automatic 1200bps fallback *in both* synchronous and asynchronous modes. With our modems you can communicate from or to any terminal, micro, mini, or mainframe computer (even your PC), with support of BSC, HDLC, SDLC, X.25 or *any other* full or half duplex protocol.

Double your data rate and cut transmission costs with complete reliability.

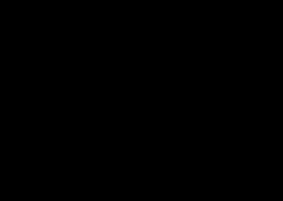
And with CDS 2400bps full duplex dial modems, you won't have to sacrifice one bit of data integrity. Our modems all use advanced signal processing techniques, and feature automatic adaptive equalization. Sophisticated modem diagnostics including analog and digital self-test and an internal test pattern generator rapidly isolate modem faults. With a CDS 2400bps modem, your data will come through smoothly and accurately, even on poor telephone lines.



Communicate with mainframes, minis or micros using any sync or async protocol.

CDS modems combine user-friendly engineering with next-generation technology. Our touch sensitive front panel allows you to select the telephone line configuration, operating mode and diagnostic tests you need. An optional front panel synch/asynch selector lets you switch from synchronous to asynchronous transmission swiftly and easily, without monkeying around with internal modem straps.

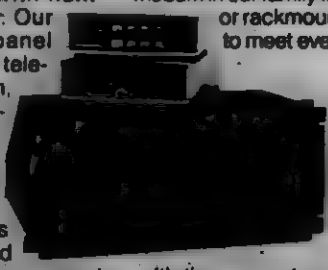
Our new 2400bps autodial modem eliminates extra telephone hardware and lets you leave your modem unattended...ready to communicate when telephone rates are lowest. It supports both touch-tone and rotary dialing systems and operates with "dumb" or intelligent terminals using keyboard or software controlled commands.



Send data at off-hour rates with 2400bps autodial.

We've built our reputation on products that give you advanced engineering at down to earth prices. Our 2400bps full duplex modems range from $995 to $1195 with attractive quantity discounts available.

There's a 2400bps full duplex dial modem in our family in either tabletop or rackmount configuration to meet every need.



Get the functions you want in the configuration you need from our full family of 2400bps modems.

It's time you got more data for your dollar. Call or write, Concord Data Systems, 303 Bear Hill Road, Waltham, Massachusetts 02154 (617) 890-1394, or contact the CDS representative nearest you.

CONCORD DATA SYSTEMS

LINKING COMMUNICATIONS TECHNOLOGY

STOCKING DISTRIBUTORS: NY/CT/AL/DE (800) 348-8088, (203) 269-6224, (201) 768-8092, (908) 779-0500 PA (412) 921-0883, (215) 639-9660 DC/MD (301) 890-5888, (301) 261-6133, (301) 261-4344 NC (919) 832-6780, (919) 373-0400, (704) 523-8695 SC (803) 799-1825, (803) 271-4988 GA (404) 851-0880, (404) 498-2800 FL (800) 282-8120 (inside), (800) 237-8983 (outside), (813) 894-0829, (904) 386-4003, (305) 791-5459, (305) 947-5458 KY (502) 244-0131 OH (800) 543-7836, (419) 389-1111, (216) 582-0700, (614) 885-5562, (513) 294-2770, (513) 961-0778, (604) 885-5562 MI (313) 569-0980 IN (317) 849-5772 IL (312) 289-2440, (312) 583-2280, (217) 352-3207, (217) 544-8825 WI (414) 251-6142 MN (612) 888-4444 MO (816) 252-3700, (314) 721-0401 OK (405)478-5000 TX (915) 542-1782, (214) 620-1551, (713) 353-7728, (512) 327-6800 NM (505) 524-9683, (505) 892-1212 AZ (602) 994-5400, (602) 994-4351, (602) 623-8413 CO (303) 777-8070, (303) 449-3282, (303) 694-0880, (303) 573-5133 NE (800) 523-1613, (402) 895-5850 UT (801) 486-8522 ID/OR/WA/MT (800) 227-8088, CA (800) 824-0872 (inside), (800) 421-4805, (800) 421-4405 or (800) 624-0873 (outside), (213) 908-9004, (213) 599-3822, (415) 340-1515, (714) 535-5501, (714) 851-6142, (714) 937-5435, (916) 366-6255

Modems

ARK ELECTRONIC PRODUCTS, INC.
LIMITED DISTANCE MODEM MODEL 7 (LDM-7)
Modem Class: Short-Haul
Transmission Technique: Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Synchronous - 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 19,200 bps, 14,400 bps; Asynchronous/ Synchronous - 57,600 bps
Interface: RS-232C
Transmission Medium: Wide-Band Lines
Diagnostics: No
Features: Diagnostics, Switchable Data Rates
Distribution Method: End user, OEM
Price: $425
Number Installed to Date: 100 - 500
Date First Installed: 1982

ASTROCOM CORP.
MODEM EMULATOR
Modem Class: Modem Eliminator
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Synchronous - 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps, 19,200 bps, 56,000 bps
Interface: RS-232C
Distribution Method: Third-party
Price: $315
Number Installed to Date: 5,000 - 10,000
Date First Installed: January 1976
(See Vendor Profile Page V-3)

ASTROCOM CORP.
MC612
Modem Class: Short-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Synchronous - 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps, 19,200 bps, 56,000 bps
Interface: RS-232C
Transmission Medium: Unload Twisted-Wire
Diagnostics: Yes; Built-in
Features: Diagnostics, Multiport, Switchable Data Rates
Distribution Method: Third-party
Price: $610
Number Installed to Date: 5,000 - 10,000
Date First Installed: January 1977

ASTROCOM CORP.
SH56S
Modem Class: Short-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Synchronous - 56,000 bps, Asynchronous/ Synchronous - 28,000 bps
Interface: RS-232C, CCITT V.35
Transmission Medium: Unload - Twisted-Wire
Diagnostics: Yes; Built-in
Features: Diagnostics, Multiport, Switchable Data Rates
Distribution Method: Third-party
Price: $825

ASTROCOM CORP.
SH96/48
Modem Class: Short-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps
Interface: RS-232C
Transmission Medium: Unload Twisted-Wire
Diagnostics: Yes; Built-in
Features: Diagnostics, Multiport
Distribution Method: Third-party
Price: $295
Number Installed to Date: 5,000 - 10,000
Date First Installed: January 1977

ASTROCOM CORP.
SH1928
Modem Class: Short-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Synchronous - 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps
Interface: RS-232C
Transmission Medium: Unload Twisted-Wire
Features: Multiport, Switchable Data Rates
Distribution Method: Third-party
Price: $395
Number Installed to Date: 100 - 500
Date First Installed: January 1982

ATARI, INC.
ATARI 1030 DIRECT CONNECT MODEM
Modem Class: Coupler
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 300 bps
Interface: RS-232C
Bell-Compatible: 103, 113
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autodial; Multiport
Distribution Method: Third-party
(See Vendor Profile Page V-3)

AVANTI COMMUNICATIONS CORP.
300
Modem Class: Modem Eliminator
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous/ Synchronous - 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps
Interface: RS-232C, CCITT V.24
Transmission Medium: Voice-Grade Lines
Diagnostics: No
Features: Switchable Data Rates
Distribution Method: End user, OEM, Third-party
Price: $390
Number Installed to Date: 500 - 1,000
Date First Installed: September 1977
(See Vendor Profile Page V-3)

AVANTI COMMUNICATIONS CORP.
300H
Modem Class: Modem Eliminator
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Synchronous - 56,000-bps; Asynchronous/ Synchronous - 224,000 bps
Interface: V.35
Transmission Medium: Voice-Grade Lines
Diagnostics: No
Features: Switchable Data Rates
Distribution Method: End user, OEM, Third-party
Price: $795
Number Installed to Date: 100 - 500
Date First Installed: September 1981

AVANTI COMMUNICATIONS CORP.
1800
Modem Class: Short-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex, Simplex
Transmission Rate: Synchronous - 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps
Interface: RS-232C
Transmission Medium: Voice-Grade Lines
Features: Autoequalizer, Diagnostics, Switchable Data Rates, Loop Timing
Distribution Method: End user, OEM, Third-party
Price: $575
Number Installed to Date: 500 - 1,000
Date First Installed: 1982

AVANTI COMMUNICATIONS CORP.
1835
Modem Class: Short-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex, Simplex
Transmission Rate: Synchronous - 56,000 bps; Asynchronous/ Synchronous - 64,000 bps
Interface: V.35
Transmission Medium: Digital Links
Diagnostics: Yes; Built-in
Features: Autoequalizer, Loop Timing
Distribution Method: End user, OEM, Third-party
Price: $895
Number Installed to Date: 100 - 500
Date First Installed: 1982

AVANTI COMMUNICATIONS CORP.
1848
Modem Class: Short-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex, Simplex
Transmission Rate: Synchronous - 56,000 bps; Asynchronous/ Synchronous - 64,000 bps
Interface: RS-449
Transmission Medium: Digital Links
Features: Autoequalizer, Diagnostics, Loop Timing
Distribution Method: End user, OEM, Third-party
Price: $895
Number Installed to Date: 100 - 500
Date First Installed: 1982

AVANTI COMMUNICATIONS CORP.
2200
Modem Class: Short-Haul
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Half-Duplex, Full-Duplex, Simplex
Transmission Rate: Asynchronous/ Synchronous - 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps, 64,000 bps; Synchronous 19,200 bps, 56,000 bps
Interface: RS-232C, RS-449, CCITT V.24, V.35, MIL188-114
Transmission Medium: Digital Links
Diagnostics: Yes; Built-in
Features: Autoequalizer, Diagnostics, Switchable Data Rates, Multidropping and Extention of DDS Circuit
Distribution Method: End user, OEM, Third-party
Price: $950
Number Installed to Date: 500 - 1,000
Date First Installed: 1977

AVANTI COMMUNICATIONS CORP.
2300H
Modem Class: Short-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex, Simplex
Transmission Rate: Asynchronous/ Synchronous - 2.5M bps
Interface: RS-449, RS-422, V.35, MIL188/114
Transmission Medium: Digital Links
Diagnostics: Yes; Built-in
Features: Autoequalizer, Diagnostics, DSX-1 Compatible
Distribution Method: End user, OEM, Third-party
Price: $1,975
Number Installed to Date: 100 - 500
Date First Installed: 1977

AVANTI COMMUNICATIONS CORP.
2300M
Modem Class: Short-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex,

Full-Duplex, Simplex
Transmission Rate: Synchronous - 56000 bps; Asynchronous/ Synchronous - 480,800 bps
Interface: RS-422, V.35, Bell 301/303
Transmission Medium: Digital Links
Diagnostics: Yes; Built-In
Features: Autoequalizer, Diagnostics, Switchable Data Rates, Loop Timing
Distribution Method: End user, OEM, Third-party
Price: $1,825
Number Installed to Date: 100 - 500
Date First Installed: 1977

AVANTI COMMUNICATIONS CORP.
2400
Modem Class: Short-Haul
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous/ Synchronous - 2,400 bps
Interface: RS-232C
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-In
Features: Diagnostics, Multiport, Dual Channel Format
Distribution Method: End user
Price: $1,100
Number Installed to Date: 100 - 500
Date First Installed: 1982

AVANTI COMMUNICATIONS CORP.
4800
Modem Class: Short-Haul
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous/ Synchronous - 4,800 bps
Interface: RS-232C, CCITT V.24
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-In
Features: Diagnostics, Multiport
Distribution Method: End user
Price: $1,950
Number Installed to Date: 100 - 500
Date First Installed: 1982

AVANTI COMMUNICATIONS CORP.
MODEL 696A
Modem Class: Short-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 9,600 bps
Interface: RS-232C
Transmission Medium: Voice-Grade Lines, Digital Links
Diagnostics: Yes; Built-In
Features: Autoequalizer, Diagnostics, Switchable Data Rates
Distribution Method: End user, OEM, Third-party
Price: $285
Number Installed to Date: 500 - 1,000
Date First Installed: 1979

AVCOM, INC.
CS 30A
Modem Class: Direct Dial
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 300 bps
Interface: TTL
Bell-Compatible: 103
Transmission Medium: Voice-Grade Lines
Diagnostics: No
Features: Autodial, Autoanswer, Switchable Data Rates
Distribution Method: OEM
Price: $109
Number Installed to Date: Under 100
Date First Installed: December 1982
(See Vendor Profile Page V-3)

AVCOM, INC.
PM 300
Modem Class: Direct Dial
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 300 bps
Bell-Compatible: 103
Transmission Medium: Voice-Grade Lines
Diagnostics: No
Features: Autodial, Autoanswer, Fallback, Switchable Data Rates
Distribution Method: End user
Price: $189
Number Installed to Date: Under 100
Date First Installed: August 1983

BACKUS DATA SYSTEMS
AC 312 1200B
Modem Class: Coupler
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 1,200 bps
Interface: RS-232C, 20 MA Current Loop
Bell-Compatible: 202
Transmission Medium: Voice-Grade Lines
Features: Reverse Channel, Diagnostics
Distribution Method: End user, OEM
Price: $495
Number Installed to Date: 5,000 - 10,000
Date First Installed: 1976
(See Vendor Profile Page V-5)

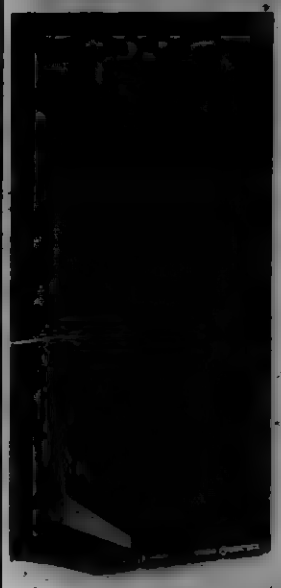
BACKUS DATA SYSTEMS
AC 312 300B
Modem Class: Coupler
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 300 bps
Interface: RS-232C, 20 MA Current Loop
Bell-Compatible: 103
Transmission Medium: Voice-Grade Lines
Diagnostics: No
Features: Reverse Channel, Diagnostics
Distribution Method: End user, OEM
Price: $199
Number Installed to Date: 5,000 - 10,000
Date First Installed: 1976

BELDEN CORP.
BT-DRIVER 23-005
Modem Class: Fiber-Optic
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps, 19,200 bps, 56,000 bps
Interface: RS-232C
Transmission Medium: Fiber Optics
Distribution Method: Third-party
Price: $195
Number Installed to Date: Under 100
Date First Installed: June 1982
(See Vendor Profile Page V-4)

BELDEN CORP.
BT-DRIVER 222-004
Modem Class: Fiber-Optic
Transmission Technique: Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Synchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps, 19,200 bps, 56,000 bps
Interface: RS-232C
Transmission Medium: Fiber Optics
Diagnostics: No
Features: Loopback
Distribution Method: Third-party
Price: $225
Number Installed to Date: 100 - 500
Date First Installed: June 1982

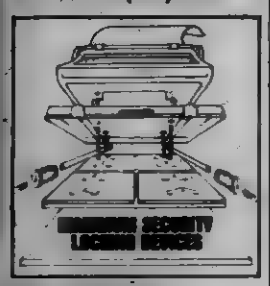
BELDEN CORP.
BT-DRIVER 222-034
Modem Class: Short-Haul
Transmission Technique: Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Synchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps, 19,200 bps, 56,000 bps
Interface: RS-232C
Transmission Medium: BAL 2 Metallic Pairs
Diagnostics: No

Protect Your Business Machines From Unwanted Visitors With Anchor Pad.



ANCHOR PAD provides maximum security without damaging either furniture or equipment. It combines the stopping power of four separate locking and bonding devices to produce a gripping force of over 6,000 lbs. that stops thieves cold.

Find out why major business organizations have put ANCHOR PAD to work for them. Write for our free brochure, or call (800)235-7972



ANCHOR PAD
ANCHOR PAD INTERNATIONAL, INC.
3224 Thatcher Avenue, Marina Del Rey, California 90291

Modems

Features: Diagnostics, Loopback
Distribution Method: Third-party
Price: $195
Number Installed to Date: Under 100
Date First Installed: June 1982

[illegible]
BIT DRIVER 222-025
Modem Class: Short-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps, 19,200 bps, 56,000 bps
Interface: RS-232C
Transmission Medium: BAL 2 Metallic Pairs
Diagnostics: No
Distribution Method: Third-party
Price: $170
Number Installed to Date: 100 - 500
Date First Installed: June 1982

[illegible]
MODEL 1012
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps, 1,200 bps
Interface: RS-232C
Bell-Compatible: 212
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autodial, Autoanswer, Reverse Channel, Diagnostics, Fallback, Switchable Data Rates
Distribution Method: End user, Third-party
Price: $649
Date First Installed: January 1982
(See Vendor Profile Page V-4)

[illegible]
MODEL 1022
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps
Interface: RS-232C
Bell-Compatible: 103
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autodial, Autoanswer, Reverse Channel, Diagnostics, Fallback
Distribution Method: End user, Third-party
Price: $249
Date First Installed: January 1980

[illegible]
MODEL 1069
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps
Interface: RS-232C
Bell-Compatible: 103
Transmission Medium: Voice-Grade Lines
Distribution Method: End user, Third-party
Price: $139
Date First Installed: January 1980

[illegible]
MODEL 2129
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps, 1,200 bps
Interface: RJ11
Bell-Compatible: 212
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autodial, Autoanswer, Alternate Voice/Data, Reverse Channel, Diagnostics, Fallback, Switchable Data Rates
Distribution Method: End user, Third-party
Price: $499
Number Installed to Date: 500 - 1,000
Date First Installed: June 1983

BLACK BOX CATALOG/EXPANDOR, INC.
BELL-COMPATIBLE MODEM 212
Modem Class: Line Driver
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 300 bps, 1,200 bps
Interface: RS-232C
Bell-Compatible: 212
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Add-on
Features: Autodial, Autoanswer, Switchable Data Rates
Distribution Method: End user
Price: $595
Date First Installed: July 1983
(See Vendor Profile Page V-4)

[illegible]
M-1A
Modem Class: LTD Distance
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex, Simplex
Transmission Rate: Asynchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps
Interface: RS-232C, CCITT V.24
Transmission Medium: Narrow-Band Lines
Distribution Method: End user
Price: $114 to $138
Number Installed to Date: 1,000 - 5,000
Date First Installed: 1982
(See Vendor Profile Page V-4)

[illegible]
M-3
Modem Class: LTD Distance
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex, Simplex
Transmission Rate: Asynchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps
Interface: RS-232C
Transmission Medium: Narrow-Band Lines
Diagnostics: No
Distribution Method: End user
Price: $49
Number Installed to Date: 500 - 1,000
Date First Installed: 1979

[illegible]
M-4
Modem Class: Limited Distance
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex, Simplex
Transmission Rate: Synchronous - 1,200 bps, 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps
Interface: RS-232C, CCITT V.24, CCITT V.26
Transmission Medium: Narrow-Band Lines
Diagnostics: No
Features: Switchable Data Rates
Distribution Method: End user
Price: $440
Number Installed to Date: 1,000 - 5,000
Date First Installed: 1982

BROADBAND SYSTEMS, INC.
BT DRIVER 222004
Modem Class: Fiber-Optic
Transmission Technique: Synchronous
Transmission Rate: Synchronous - 110 bps, 56,000 bps
Interface: RS-232C
Transmission Medium: Fiber Optics
Diagnostics: No
Features: Clock-Calendar
Distribution Method: Third-party
Price: $225
Number Installed to Date: 500 - 1,000
Date First Installed: April 1981
(See Vendor Profile Page V-4)

BROADBAND SYSTEMS, INC.
BT DRIVER 222005
Modem Class: Fiber-Optic
Transmission Technique: Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 56,000 bps
Interface: RS-232C
Transmission Medium: Fiber Optics
Features: Diagnostics, Clock Calendar, Loopback
Distribution Method: Third-party
Price: $195
Number Installed to Date: 500 - 1,000
Date First Installed: April 1981

BURROUGHS CORP.
CP 1004
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Synchronous - 2,400 bps, 4,800 bps
Interface: RS-232C, CCITT V.24
Features: Autoequalizer, Diagnostics, Fallback
Date First Installed: 1982
(See Vendor Profile Page V-4)

BURROUGHS CORP.
CP 1008
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Synchronous - 4,800 bps, 9,600 bps; Asynchronous/Synchronous - 7,200 bps
Interface: RS-232C, CCITT V.24
Features: Autoequalizer, Diagnostics, Fallback
Date First Installed: 1982

BURROUGHS CORP.
CP 1008-R/T
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Synchronous - 4,800 bps, 9,600 bps, Asynchronous/Synchronous - 7,200 bps
Interface: RS-232C, CCITT V.24
Features: Autoequalizer, Diagnostics, Fallback
Date First Installed: 1982

BURROUGHS CORP.
TA 1201
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps
Interface: RS-232C, CCITT V.24
Bell-Compatible: 202
Features: Autoequalizer, Diagnostics
Date First Installed: 1977

BURROUGHS CORP.
TA 1203
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps
Interface: RS-232C, CCITT V.24
Bell-Compatible: 202
Features: Autoequalizer, Autoanswer, Diagnostics
Date First Installed: 1977

BURROUGHS CORP.
TA 1801
Modem Class: Long-Haul
Transmission Technique: Asynchronous

Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 1,200 bps, 1,800 bps
Interface: RS-232C, CCITT V.24
Bell-Compatible: 202
Transmission Medium: Voice-Grade Lines
Features: Autoequalizer, Diagnostics
Date First Installed: 1977

SYNCOM, INC.
212 AD
Modem Class: Long-Haul
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous/ Synchronous - 300 bps, 1,200 bps
Interface: RS-232C
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autodial, Autoequalizer, Autoanswer, Alternate Voice/Data, Reverse Channel, Diagnostics, Switchable Data Rates
Distribution Method: Third-party
Price: $439
Number Installed to Date: 500 - 1,000
Date First Installed: March 1983
(See Vendor Profile Page V-4)

CABLEMAX SYSTEMS CORP.
MOD-1
Modem Class: Short-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 300 bps, 2,400 bps
Interface: RS-232C
Bell-Compatible: 212
Transmission Medium: Voice-Grade Lines
Diagnostics: No
Features: Autoanswer, Reverse Channel, Switchable Data Rates
Distribution Method: End user
Price: $1,495
Number Installed to Date: Under 100
Date First Installed: 1981
(See Vendor Profile Page V-5)

CANOGA DATA SYSTEMS
CSA-100
Modem Class: Fiber-Optic
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous/ Synchronous - 1,200 bps, 14,400 bps, 115K bps
Interface: RS-232C, RS-422, V.35
Transmission Medium: Fiber Optics
Diagnostics: Yes; Built-in
Features: Reverse Channel, Diagnostics, Clock Calender, Switchable Data Rates, Continual Monitoring
Distribution Method: End user
Price: $495
Number Installed to Date: Under 100
Date First Installed: October 1983
(See Vendor Profile Page V-5)

CANOGA DATA SYSTEMS
CSY-306-A-S
Modem Class: Fiber-Optic
Transmission Technique: Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Synchronous 2,400 bps; Asynchronous/ Synchronous 4,000 bps
Interface: RS-449, RS-422, V.35, TC
Transmission Medium: Fiber Optics
Diagnostics: Yes; Built-in
Features: Diagnostics, Continual Monitoring
Distribution Method: End user
Price: $1,500
Number Installed to Date: Under 100
Date First Installed: May 1983

CANOGA DATA SYSTEMS
CSY-306-S
Modem Class: Fiber-Optic
Transmission Technique: Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Synchronous 2,400 bps; Asynchronous/ Synchronous 4,000 bps
Interface: RS-449, RS-422, V.35
Bell-Compatible: 306
Transmission Medium: Fiber Optics
Diagnostics: Yes; Built-in
Features: Reverse Channel, Diagnostics, Switchable Data Rates, Continual Monitoring
Distribution Method: End user
Price: $1,800
Number Installed to Date: 100 - 500
Date First Installed: May 1981

CANOGA DATA SYSTEMS
CSY-3063AX-R
Modem Class: Fiber-Optic
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous/ Synchronous - 2,400 bps, Synchronous - 4,000 bps
Interface: RS-422, RS-423, V.35, T-1, TTL
Bell-Compatible: 306A
Transmission Medium: Fiber Optics
Diagnostics: Yes; Built-in
Features: Clock Calender, Continual Monitoring
Distribution Method: End user
Price: $1,200
Number Installed to Date: 100 - 500
Date First Installed: May 1983

GATEL
DM 2100
Modem Class: Long-Haul
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 9,600 bps, 14,400 bps
Interface: RS-232C, CCITT V.24
Transmission Medium: Coaxial Cable
Features: Reverse Channel, Diagnostics, Switchable Data Rates, Loopback
Distribution Method: Third-party
Price: $1,895
Number Installed to Date: Under 100
Date First Installed: June 1981
(See Vendor Profile Page V-5)

GENESYS MICROELECTRONICS
CH1760E/1760
Modem Class: Long-Haul
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps, 1,200 bps
Interface: RS-232C
Bell-Compatible: 103, 113, 212
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autodial, Autoequalizer, Autoanswer, Alternate Voice/Data, Diagnostics, Switchable Data Rates, Tone Detection
Distribution Method: OEM
Price: $495
(See Vendor Profile Page V-5)

GENESYS MICROELECTRONICS
INFO-MATE 212A
Modem Class: Long-Haul
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps; Asynchronous/ Synchronous - 1,200 bps
Interface: RS-232C
Bell-Compatible: 103, 113, 212A
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autodial, Autoequalizer, Autoanswer, Alternate Voice/Data, Diagnostics, Switchable Data Rates
Distribution Method: End user, Third-party
Price: $595
Number Installed to Date: 100 - 500
Date First Installed: July 1983

GRUNER TELECOMMUNICATIONS
TURBO MUX
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 2,400 bps
Interface: RS-232C
Transmission Medium: Voice-Grade Lines
Diagnostics: No
Features: Autoanswer, Reverse Channel, Diagnostics
Distribution Method: Third-party
Price: $695
Date First Installed: July 1983
(See Vendor Profile Page V-5)

GRUNER TELECOMMUNICATIONS
TURBO 212A
Modem Class: Long-Haul
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous/ Synchronous - 2,400 bps
Interface: RS-232C
Bell-Compatible: 212
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autodial, Autoequalizer, Autoanswer, Alternate Voice/Data, Reverse Channel, Diagnostics, Multiport, Switchable Data Rates
Distribution Method: Third-party
Price: $695

CODENOLL TECHNOLOGY CORP.
CODELINK 10
Modem Class: Fiber-Optic
Transmission Technique: Asynchronous, Synchronous
Transmission Rate: Synchronous - 10M bps
Interface: RS-232C, RS-449, RS-422, TTL
Transmission Medium: Fiber Optics
Diagnostics: No
Features: Autoanswer, Switchable Data Rates
Distribution Method: End user, OEM, Third-party
Price: $500
Number Installed to Date: Under 100
Date First Installed: January 1983
(See Vendor Profile Page V-5)

CODENOLL TECHNOLOGY CORP.
CODELINK 20
Modem Class: Fiber-Optic
Transmission Technique: Asynchronous, Synchronous
Transmission Rate: Asynchronous - 20,000 bps
Interface: RS-232C, RS-449, RS-422, TTL
Transmission Medium: Fiber Optics
Features: Autoanswer, Switchable Data Rates
Distribution Method: End user, OEM, Third-party
Price: $500
Number Installed to Date: Under 100
Date First Installed: January 1983

CODENOLL TECHNOLOGY CORP.
CODELINK 30
Modem Class: Fiber-Optic
Transmission Technique: Asynchronous, Synchronous
Transmission Rate: Synchronous - 50M bps

Interface: RS-232C, RS-449, RS-422, TTL
Transmission Medium: Fiber Optics
Diagnostics: No
Distribution Method: End user, OEM, Third-party
Price: $500
Number Installed to Date: Under 100
Date First Installed: January 1983

CODENOLL TECHNOLOGY CORP.
CODELINK 100
Modem Class: Fiber-Optic
Transmission Technique: Asynchronous, Synchronous
Transmission Rate: Synchronous - 150M bps
Interface: RS-232C, RS-449, RS-422, TTL
Transmission Medium: Fiber Optics
Diagnostics: No
Features: Autorenewer, Switchable Data Rates
Distribution Method: End user, OEM, Third-party
Price: $3,000
Number Installed to Date: Under 100
Date First Installed: January 1983

CODEX CORP.
224 DATA MODEM
Modem Class: Long-Haul
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous/ Synchronous - 1,200 bps, 2,400 bps
Interface: RS-232C, CCITT V.24, CCITT V.28, 2-Wire
Bell-Compatible: 212
Transmission Medium: Voice-Grade Lines
Features: Autoequalizer, Autorenewer, Fallback
Distribution Method: End user
Number Installed to Date: 5,000 - 10,000
(See Vendor Profile Page V-9)

CODEX CORP.
224/V.22 BIS DATA MODEM
Modem Class: Long-Haul
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous/ Synchronous - 1,200 bps, 2,400 bps
Interface: RS-232C, CCITT V.22, CCITT V.24, CCITT V.28
Bell-Compatible: 212
Transmission Medium: Voice-Grade Lines
Features: Autoequalizer, Autorenewer, Diagnostics, Switchable Data Rates
Distribution Method: End user
Date First Installed: March 1983

CODEX CORP.
5010R MULTIPLE MODEM ENCLOSURE
Modem Class: Long-Haul
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous/ Synchronous - 300 bps, 1,200 bps; Synchronous 2,400 bps
Interface: RS-232C, RS-366
Bell-Compatible: 103, 201, 202
Transmission Medium: Voice-Grade Lines
Features: Autodial
Distribution Method: End user

CODEX CORP.
5103/5113 DATA MODEMS
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps
Interface: RS-232C, CCITT V.24, CCITT V.28
Bell-Compatible: 103, 113
Transmission Medium: Voice-Grade Lines
Features: Autodial, Autorenewer, Alternate Voice/Data, Local Loopback
Distribution Method: End user

CODEX CORP.
5201R DATA MODEM
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Synchronous 1,200 bps, 2,400 bps
Interface: RS-232C, CCITT V.24, CCITT V.28
Bell-Compatible: 201
Features: Autodial, Autorenewer, Alternate Voice/Data, Diagnostics, Clock Calendar
Distribution Method: End user

CODEX CORP.
5202R V.23
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps, 600 bps, 1,200 bps
Interface: RS-232C, CCITT V.24, CCITT V.28, 2 or 4-Wire
Bell-Compatible: 202
Transmission Medium: Voice-Grade Lines
Features: Autodial, Local/Remote Loopback
Distribution Method: End user

CODEX CORP.
5208R DATA MODEM
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Synchronous 4,800 bps
Interface: RS-232C, CCITT V.24, CCITT V.28
Bell-Compatible: 208
Transmission Medium: Voice-Grade Lines
Features: Autoequalizer, Autorenewer, Diagnostics, Clock Calendar
Distribution Method: End user
Number Installed to Date: 5,000 - 10,000

CODEX CORP.
5312/ACU
Modem Class: Long-Haul
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous 300 bps, Asynchronous/ Synchronous 1,200 bps
Interface: RS-232C, CCITT V.24
Bell-Compatible: 103, 212
Transmission Medium: Voice-Grade Lines
Features: Autodial, Built-in Abort Timer

CODEX CORP.
5212R
Modem Class: Long-Haul
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 300 bps; Asynchronous/ Synchronous 1,200 bps
Interface: RS-232C, CCITT V.24, CCITT V.28, 2-Wire
Bell-Compatible: 103, 113, 212
Transmission Medium: Voice-Grade Lines
Features: Autodial, Alternate Voice/Data, Switchable Data Rates, Automatic Speed Sensing
Distribution Method: End user

CODEX CORP.
5300 GSM
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Synchronous - 56,000 bps, Asynchronous/ Synchronous - 48,000 bps, 50,000 bps, 64,000 bps
Interface: V.35
Bell-Compatible: 303
Transmission Medium: Wide-Band Lines
Features: Diagnostics, Clock Calendar
Distribution Method: End user

CODEX CORP.
CS 48FP
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Synchronous - 2,400 bps, 4,800 bps
Interface: RS-232C, CCITT V.24, RS-423
Transmission Medium: Voice-Grade Lines
Features: Diagnostics
Distribution Method: End user
Price: $4,175
Number Installed to Date: 5,000 - 10,000

CODEX CORP.
CS 96FP
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Synchronous - 4,800 bps, 9,600 bps
Interface: RS-232C, CCITT V.24, CCITT V.28, RS-423
Transmission Medium: Voice-Grade Lines
Features: Autoequalizer, Diagnostics
Distribution Method: End user
Price: $7,475

CODEX CORP.
CS 4800
Modem Class: Long-Haul
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Synchronous - 2,400 bps, 4,800 bps, 9,600 bps; Asynchronous/Synchronous 7,200 bps
Interface: RS-232C, CCITT V.24, CCITT V.28, CCITT V.29, RS-423
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-In
Features: Autoequalizer, Alternate Voice/Data, Diagnostics, Clock Calendar, Fallback, Switchable Data Rates, Integral Four-Channel Mux
Distribution Method: End user
Price: $4,675
Number Installed to Date: 5,000 - 10,000

CODEX CORP.
CS 9600
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Synchronous - 2,400 bps, 4,800 bps, 9,600 bps; Asynchronous/Synchronous 7,200 bps
Interface: RS-232C, CCITT V.24, CCITT V.28, CCITT V.29
Transmission Medium: Voice-Grade Lines
Features: Autoequalizer, Alternate Voice/Data, Diagnostics, Clock Calendar, Fallback, Switchable Data Rates, Integral Four-Channel Mux
Distribution Method: End user
Price: $7,975
Number Installed to Date: 5,000 - 10,000

CODEX CORP.
LSI 24/24
Modem Class: Long-Haul
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous/ Synchronous 2,400 bps
Interface: RS-232C, CCITT V.24, CCITT V.28
Transmission Medium: Voice-Grade Lines
Features: Autodial, Autoequalizer, Autorenewer, Alternate Voice/Data,

Clock Calender, Local Loopback
Distribution Method: End user
Price: $2,850

CODEX CORP.
LSI 48FP
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Synchronous - 2,400 bps, 4,800 bps
Interface: RS-232C, CCITT V.24, CCITT V.28, MIL 188C
Transmission Medium: Voice-Grade Lines
Features: Autoequalizer, Diagnostics, Clock Calender, Fallback
Distribution Method: End user
Price: $3,500
Number Installed to Date: 10,000 - 50,000

CODEX CORP.
LSI 48I
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Synchronous - 4,800 bps
Interface: RS-232C, CCITT V.24, MIL 188C
Transmission Medium: Voice-Grade Lines
Features: Autoequalizer, Clock Calender, Fallback, Local/Remote Loopback
Distribution Method: End user
Price: $3,500

CODEX CORP.
LSI 48/V.27 SR/TSR
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 2,400 bps, 4,800 bps
Interface: RS-232C, CCITT V.24, CCITT V.27, CCITT V.28
Transmission Medium: Voice-Grade Lines
Features: Autoequalizer, Autoanswer, Alternate Voice/Data, Reverse Channel, Diagnostics, Clock Calender, Fallback, Local/Remote Loopback
Distribution Method: End user
Price: $3,500
Number Installed to Date: 5,000 - 10,000

CODEX CORP.
LSI 96FP
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Synchronous - 9,600 bps, Asynchronous/ Synchronous - 7,200 bps
Interface: RS-232C, CCITT V.24, CCITT V.28, MIL 188C
Transmission Medium: Voice-Grade Lines
Features: Autoequalizer, Alternate Voice/Data, Diagnostics, Clock Calender, Fallback
Distribution Method: End user
Number Installed to Date: 10,000 - 50,000

CODEX CORP.
LSI 4800
Modem Class: Long-Haul
Transmission Technique: Synchrorious
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Synchronous - 2,400 bps, 4,800 bps
Interface: RS-232C, CCITT V.24, CCITT V.28, MIL 188C
Transmission Medium: Voice-Grade Lines
Features: Autoequalizer, Alternate Voice/Data, Reverse Channel, Clock Calender, Fallback, Switchable Data Rates
Distribution Method: End user
Price: $3,500
Number Installed to Date: 10,000 - 50,000

CODEX CORP.
LSI 9600
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Synchronous 4,800 bps, 9,600 bps; Asynchronous/Synchronous - 7,200 bps
Interface: RS-232C, CCITT V.24, CCITT V.28, MIL 188C
Transmission Medium: Voice-Grade Lines
Features: Autoequalizer, Alternate Voice/Data, Reverse Channel, Diagnostics, Clock Calender, Fallback, Switchable Data Rates
Distribution Method: End user
Price: $6,800
Number Installed to Date: 10,000 - 50,000

CODEX CORP.
LSI E96/V.29
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Synchronous - 4,800 bps, 9,600 bps
Interface: RS-232C, CCITT V.24, CCITT V.28
Transmission Medium: Voice-Grade Lines
Features: Autoequalizer, Diagnostics, Clock Calender, Fallback
Distribution Method: End user
Price: $6,800
Number Installed to Date: 10,000 - 50,000

CODEX CORP.
LSI E9600
Modem Class: Long-Haul
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Synchronous - 4,800 bps, 9,600 bps; Asynchronous/Synchronous 7,200 bps
Interface: RS-232C, CCITT V.24, CCITT V.28, 4-Wire
Bell-Compatible: None
Transmission Medium: Voice-Grade Lines
Features: Autoequalizer, Diagnostics, Clock Calender, Fallback
Distribution Method: End user

CODEX CORP.
LSI E9604
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Synchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps
Interface: RS-232C, CCITT V.24, CCITT V.28
Transmission Medium: Voice-Grade Lines
Features: Autoequalizer, Diagnostics, Clock Calender, Fallback
Distribution Method: End user
Number Installed to Date: 10,000 - 50,000

CODEX CORP.
MX 2400 DATA MODEM
Modem Class: Long-Haul
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Synchronous - 1,200 bps; Asynchronous/ Synchronous - 2,400 bps
Interface: RS-232C, CCITT V.24, CCITT V.28, CCITT V.28, MIL 188C
Bell-Compatible: 201
Transmission Medium: Voice-Grade Lines
Features: Autodial, Autoequalizer, Autoanswer, Diagnostics, Fallback
Distribution Method: End user
Number Installed to Date: 5,000 - 10,000

CODEX CORP.
SP 14.4
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Synchronous - 1,200 bps, 9,600 bps, 19,200 bps
Interface: RS-232C, CCITT V.24, CCITT V.29
Transmission Medium: Voice-Grade Lines
Features: Autoequalizer, Diagnostics, Fallback
Number Installed to Date: 500 - 1,000

CODEX CORP.
9150 LD8U
Modem Class: Short-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 19,200 bps
Interface: RS-232C, CCITT V.24
Bell-Compatible: 43401
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-In
Features: Autoequalizer
Number Installed to Date: 500 - 1,000
Date First Installed: December 1992

CODEX CORP.
9250 LD8U
Modem Class: Short-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Synchronous - 2,400 bps, 4,800 bps, 9,600 bps
Interface: RS-232C, CCITT V.24
Transmission Medium: Twisted Pair
Features: Autoequalizer
Number Installed to Date: 5,000 - 10,000
Date First Installed: March 1992

COMSTAT COMMUNICATIONS SYSTEMS CORP.
SPM-84A
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex
Transmission Rate: Asynchronous - 300 bps
Interface: RS-232C
Transmission Medium: Voice-Grade Lines
Features: Diagnostics, Simulated - Voice/Data
Distribution Method: End user, OEM
Price: $500
Number Installed to Date: Under 100
Date First Installed: August 1983
(See Vendor Profile Page V-5)

COMSTAT COMMUNICATIONS SYSTEMS CORP.
LINEMATE 192
Modem Class: Short-Haul

Modems

Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous/Synchronous - 14,400 bps
Interface: RS-232C
Transmission Medium: 2-Wire Nonloaded
Diagnostics: No
Features: Diagnostics, Switchable Data Rates, Simulated Voice/Data
Distribution Method: End user, Third-party
Price: $450
Number Installed to Date: Under 100
Date First Installed: September 1983

COMI DATA
151A2-13
Modem Class: Coupler
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps
Interface: RS-232C
Bell-Compatible: 103
Transmission Medium: Voice-Grade Lines
Features: Carrier Light
Distribution Method: End user
Price: $127
Date First Installed: January 1983
(See Vendor Profile Page V-5)

COMI DATA
360/362/364F3-72
Modem Class: Line Driver
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps
Interface: RS-232C
Transmission Medium: Metallic Circuit
Features: Diagnostics
Distribution Method: End user
Price: $117 to $296
Date First Installed: January 1981

COMI DATA
154E2-14
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 300 bps
Interface: RS-232C
Bell-Compatible: 103
Transmission Medium: Voice-Grade Lines
Diagnostics: No
Distribution Method: End user
Price: $127
Date First Installed: January 1978

COMI DATA
208 A/B
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Synchronous - 4,800 bps
Interface: RS-232C
Bell-Compatible: 208
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autoequalizer, Autoanswer, Alternate Voice/Data, Diagnostics
Distribution Method: End user
Price: $1,697
Date First Installed: January 1981

COMI DATA
212E2-32
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 1,200 bps
Interface: RS-232C
Bell-Compatible: 212
Transmission Medium: Voice-Grade Lines
Diagnostics: No
Distribution Method: End user
Price: $377
Date First Installed: March 1983

COMI DATA
302A2-13
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 300 bps
Interface: RS-232C
Bell-Compatible: 103
Transmission Medium: Voice-Grade Lines
Diagnostics: No
Features: Originate Mode Only
Distribution Method: End user
Price: $157
Date First Installed: January 1970

COMI DATA
302A2-33
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous 300 bps
Interface: RS-232C
Bell-Compatible: 103
Transmission Medium: Voice-Grade Lines
Features: Originate/Answer
Distribution Method: End user
Price: $187
Date First Installed: January 1970

COMI DATA
302B2-13
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 300 bps
Interface: RS-232C
Transmission Medium: Voice-Grade Lines
Distribution Method: End user
Price: $177
Date First Installed: January 1970

COMI DATA
302B2-33
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 300 bps
Interface: RS-232C
Bell-Compatible: 103
Transmission Medium: Voice-Grade Lines
Diagnostics: No
Features: Originate/Answer
Distribution Method: End user
Price: $247
Date First Installed: January 1970

COMI DATA
302C2-13L
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 300 bps
Interface: RS-232C
Bell-Compatible: 103
Transmission Medium: Voice-Grade Lines
Diagnostics: No
Distribution Method: End user
Price: $297
Date First Installed: January 1977

COMI DATA
306E2-12
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps
Interface: RS-232C
Bell-Compatible: 103
Transmission Medium: Voice-Grade Lines
Diagnostics: No
Features: Originate Only
Distribution Method: End user
Price: $117
Date First Installed: January 1981

COMI DATA
312E2-42
Modem Class: Long-Haul
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous/Synchronous - 1,200 bps
Interface: RS-232C
Bell-Compatible: 212
Transmission Medium: Voice-Grade Lines
Diagnostics: No
Features: Autoanswer, Digital/Analog Loopback
Distribution Method: End user
Price: $397
Date First Installed: January 1982

COMI DATA
312F2-22L
Modem Class: Long-Haul
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous/Synchronous - 1,200 bps
Interface: RS-232C
Bell-Compatible: 212
Features: Digital/Analog Loopback
Distribution Method: End user
Price: $337
Date First Installed: January 1982

COMI DATA
330E2-12L
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 300 bps
Interface: RS-232C
Bell-Compatible: 103
Transmission Medium: Voice-Grade Lines
Diagnostics: No
Features: Manual Answer
Distribution Method: End user
Price: $137
Date First Installed: January 1978

COMI DATA
330E2-42L
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 300 bps
Interface: RS-232C
Bell-Compatible: 103
Transmission Medium: Voice-Grade Lines
Diagnostics: No
Features: Autoanswer
Distribution Method: End user
Price: $197
Date First Installed: January 1978

COMI DATA
332E2-12L
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps, 600 bps, 1,200 bps
Interface: RS-232C
Bell-Compatible: 202
Transmission Medium: Voice-Grade Lines
Diagnostics: No
Distribution Method: End user
Price: $187
Date First Installed: January 1978

COMI DATA
332E2-42L
Modem Class: Long-Haul
Transmission Technique: Asynchronous

Transmission Mode: Half-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps, 600 bps, 1,200 bps
Interface: RS-232C
Bell-Compatible: 202
Transmission Medium: Voice-Grade Lines
Diagnostics: No
Features: Autoanswer
Distribution Method: End user
Price: $247
Date First Installed: January 1978

COM DATA
332F7/332F8
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Synchronous - 300 bps, 1,200 bps
Interface: RS-232C
Bell-Compatible: 103
Transmission Medium: Voice-Grade Lines
Diagnostics: No
Features: Alternate Voice/Data, Switchable Data Rates, Point to Point
Distribution Method: End user
Price: $561
Date First Installed: January 1981

COM DATA
334E2-12L
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex
Transmission Rate: Synchronous - 2,400 bps
Interface: RS-232C
Bell-Compatible: 201
Transmission Medium: Voice-Grade Lines
Diagnostics: No
Features: Autoequalizer, Autoanswer, Busy Out
Distribution Method: End user
Price: $537
Date First Installed: January 1981

COM DATA
334E2-42L
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex
Transmission Rate: Synchronous - 2,400 bps
Interface: RS-232C
Bell-Compatible: 201
Transmission Medium: Voice-Grade Lines
Diagnostics: No
Features: Autoequalizer, Busy Out
Distribution Method: End user
Price: $567
Date First Installed: January 1981

COM DATA
370E2-12 PHONE
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 300 bps
Interface: RS-232C
Bell-Compatible: 103
Transmission Medium: Voice-Grade Lines
Diagnostics: No
Features: Alternate Voice/Data, Manual Answering
Distribution Method: End user
Price: $227
Date First Installed: January 1981

COM DATA
370E2-42
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 300 bps
Interface: RS-232C
Bell-Compatible: 103
Transmission Medium: Voice-Grade Lines
Features: Autoanswer, Alternate Voice/Data, One Number Dialer
Distribution Method: End user
Price: $277
Date First Installed: January 1981

COM DATA
P 212 A
Modem Class: Long-Haul
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps; Asynchronous/ Synchronous - 1,200 bps
Interface: RS-232C
Bell-Compatible: 212
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-In
Features: Diagnostics
Distribution Method: End user
Price: $495 to $595
Date First Installed: January 1981

COM DATA
ME-2D
Modem Class: Modem Eliminator
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous/ Synchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps
Interface: RS-232C
Transmission Medium: Cables
Distribution Method: End user
Price: $510
Date First Installed: January 1982

COMSTREAM, INC.
TM-1200
Modem Class: Long-Haul
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 300 bps; Asynchronous/ Synchronous - 1,200 bps
Interface: RS-232C, CCITT V.24
Bell-Compatible: 103, 113, 212A
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-In
Features: Autodial, Autoequalizer, Autoanswer, Switchable Data Rates, Abort Timer
Distribution Method: End user, Third-party
Price: $750
Number Installed to Date: Under 100
Date First Installed: April 1983
(See Vendor Profile Page V-6)

COMSTREAM, INC.
TM-2400
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Synchronous - 2,400 bps
Interface: RS-232C, CCITT V.24
Bell-Compatible: 201B
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-In
Features: Diagnostics, Clock Calendar
Distribution Method: Third-party
Price: $750
Number Installed to Date: Under 100
Date First Installed: January 1983

COMSTREAM, INC.
TM-4800
Modem Class: Long-Haul
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous/ Synchronous - 4,800 bps
Interface: RS-232C, CCITT V.24
Bell-Compatible: 208, 208B
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-In
Features: Autoequalizer, Autoanswer, Diagnostics, Clock Calendar
Distribution Method: End user, Third-party
Price: $1,750
Number Installed to Date: Under 100
Date First Installed: February 1983

COMSTREAM, INC.
TM-9600
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Synchronous - 4,800 bps, 9,600 bps; Asynchronous/Synchronous - 7,200 bps
Interface: RS-232C, CCITT V.24, CCITT V.29
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-In
Features: Autoequalizer, Clock Calendar, Fallback
Distribution Method: End user, Third-party
Price: $2,750
Number Installed to Date: Under 100
Date First Installed: February 1983

COMTECH DATA MACHINES, INC.
C-1600 AUTOMATIC MODEM
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 300 bps
Interface: RS-232C
Transmission Medium: Voice-Grade Lines
Diagnostics: No
Features: Autodial, Autoanswer, Alternate Voice/Data, Reverse Channel
Distribution Method: End user, Third-party
Number Installed to Date: 500 - 1,000
Date First Installed: August 1983
(See Vendor Profile Page V-6)

COMTECH DATA MACHINES, INC.
C-1800
Modem Class: Short-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 300 bps
Interface: RS-232C
Transmission Medium: Voice-Grade Lines
Features: Reverse Channel, Switchable Data Rates
Date First Installed: May 1983

COMMUNICATION RESEARCH CORP.
100
Modem Class: Short-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps
Interface: RS-232C, AC Power Line
Transmission Medium: AC Power Line
Features: Multiport
Distribution Method: Third-party
Price: $315
Number Installed to Date: 500 - 1,000
Date First Installed: July 1982
(See Vendor Profile Page V-6)

COMMUNICATION RESEARCH CORP.
400
Modem Class: Short-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps
Interface: RS-232C, AC Power Line
Transmission Medium: AC Power Line
Features: Multiport

Modems

Distribution Method: Third-party
Price: $475
Number Installed to Date: 100 - 500
Date First Installed: February 1983

COMPLEX SYSTEMS, INC.
LS 56K
Modem Class: Short-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Synchronous - 56,000 bps
Interface: CCITT V.35
Transmission Medium: Voice-Grade Lines, Digital Links
Diagnostics: Yes; Built-in
Features: Diagnostics
Distribution Method: Third-party
Price: $650
Number Installed to Date: Under 100
Date First Installed: December 1983
(See Vendor Profile Page V-6)

COMPLEX SYSTEMS, INC.
LVS 76.8
Modem Class: Short-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Synchronous - 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps, 19,200 bps
Interface: RS-232C, CCITT V.35
Transmission Medium: Voice-Grade Lines, Digital Links
Diagnostics: Yes; Built-in
Features: Diagnostics, Switchable Data Rates
Distribution Method: Third-party
Price: $650
Number Installed to Date: Under 100
Date First Installed: November 1983

COMPRE COMMUNICATIONS, INC.
LH56
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Synchronous - 600 bps; Asynchronous/ Synchronous - 7,200 bps
Interface: RS-232C
Bell-Compatible: 208
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Add-on
Features: Autoequalizer, Reverse Channel, Diagnostics, Fallback, Switchable Data Rates
Distribution Method: End user, Third-party
Price: $2,650
Number Installed to Date: Under 100
Date First Installed: May 1981
(See Vendor Profile Page V-6)

COMPUTER COMMUNICATIONS SPECIALISTS, INC.
AUDIO MODEM
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex
Transmission Rate: Asynchronous - 1,200 bps
Bell-Compatible: 202
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Add-on
Features: Autodial, Autoanswer, Alternate Voice/Data, Diagnostics, Clock Calendar, Switchable Data Rates
Distribution Method: End user
Price: $4,895
Number Installed to Date: Under 100
Date First Installed: 1982
(See Vendor Profile Page V-6)

COMPUTER DEVELOPMENT, INC.
ET SERIES INTELLIGENT MODEMS
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex, Simplex
Transmission Rate: Asynchronous - 300 bps, 1,200 bps
Interface: RS-232C, CCITT V.23
Bell-Compatible: 103, 212
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autodial, Autoanswer, Alternate Voice/Data, Reverse Channel, Diagnostics, Switchable Data Rates
Distribution Method: OEM, Third-party
Price: $495 to $695
Number Installed to Date: Under 100
Date First Installed: November 1983
(See Vendor Profile Page V-6)

COMPUTER DEVELOPMENT, INC.
ETC-EXECUTIVE TELECOMMUNICATIONS COMPUTER
Modem Class: Long-Haul
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 300 bps; Asynchronous/ Synchronous 1,200 bps
Interface: RS-232C, CCITT V.23
Bell-Compatible: 212
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autodial, Autoanswer, Alternate Voice/Data, Reverse Channel, Diagnostics, Clock Calendar, Switchable Data Rates
Distribution Method: OEM, Third-party
Price: $1,095 to $1,295
Date First Installed: August 1983

COMPUTER DEVELOPMENT, INC.
EXECUTIVE TELECOM COMPUTER (MULTI-USER)
Modem Class: Long-Haul
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Half-Duplex, Full-Duplex, Simplex
Transmission Rate: Asynchronous - 300 bps; Asynchronous/ Synchronous - 1,200 bps
Interface: RS-232C
Bell-Compatible: 103, 212
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autodial, Autoanswer, Alternate Voice/Data, Reverse Channel, Diagnostics, Multiport, Clock Calendar, Switchable Data Rates
Distribution Method: OEM, Third-party
Price: $1,595

COMPUTROL
30-0078
Modem Class: Line Driver
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 2,000 bps
Interface: TTL
Transmission Medium: Coaxial Cable
Distribution Method: End user, OEM
Price: $150 to $200
Number Installed to Date: 5,000 - 10,000
Date First Installed: January 1979
(See Vendor Profile Page V-7)

COMPUTROL
30-0080
Modem Class: Line Driver
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous/ Synchronous
Interface: TTL
Distribution Method: End user, OEM
Price: $150 to $200

COMREX INTERNATIONAL
CR-103 COMMUNICATOR
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 300 bps
Bell-Compatible: 103
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autodial
Price: $159
Date First Installed: November 1983
(See Vendor Profile Page V-7)

COMSPEC, INC.
DATATALKER 9,600C
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Synchronous - 9,600 bps
Interface: RS-232C
Transmission Medium: Voice-Grade Lines, Radio Links
Diagnostics: Yes; Built-in
Features: Autodial, Autoequalizer, Autoanswer, Alternate Voice/Data, Diagnostics, Fallback, Switchable Data Rates, Autocall Forward
Distribution Method: End user
Number Installed to Date: Under 100
Date First Installed: September 1983
(See Vendor Profile Page V-7)

COMTECH DATA CORP.
CB 56
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Synchronous - 56,000 bps
Interface: CCITT V.35, V.28
Bell-Compatible: 309C
Transmission Medium: Group Spectrums
Features: Diagnostics
Distribution Method: End user
Price: $8,000
Number Installed to Date: 100 - 500
Date First Installed: 1979
(See Vendor Profile Page V-7)

COMTECH DATA CORP.
CB 168
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous/ Synchronous - 168,000 bps
Interface: RS-449, CCITT V.35
Bell-Compatible: 309C
Transmission Medium: Group Spectrums
Features: Autoequalizer, Diagnostics, Multiport, Fallback, Switchable Data Rates
Distribution Method: End user
Price: $17,500
Number Installed to Date: Under 100
Date First Installed: December 1983

COMTECH DATA CORP.
M700
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous/ Synchronous - 56,000 bps
Interface: RS-449, CCITT V.35, TTL
Transmission Medium: Microwave Systems
Diagnostics: Yes; Built-in
Features: Diagnostics
Distribution Method: End user, OEM
Price: $4,650
Number Installed to Date: Under 100
Date First Installed: March 1981

COMTECH DATA CORP.
SM200A
Modem Class: Long-Haul
Transmission Technique: Synchronous

Transmission Mode: Full-Duplex
Transmission Rate: Synchronous - 56,000 bps
Interface: RS-449, CCITT V.35, TTL
Transmission Medium: Satellite
Diagnostics: Yes; Add-on
Features: Autoequalizer, Fallback
Distribution Method: End user
Price: $14,300
Number Installed to Date: 500 - 1,000
Date First Installed: January 1980

COMTECH DATA CORP.
MR16
Modem Class: Short-Haul
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous/ Synchronous - 2M bps
Interface: RS-449, CCITT V.35
Transmission Medium: Twisted-Pair
Diagnostics: No
Features: Switchable Data Rates
Distribution Method: End user
Price: $2,000
Number Installed to Date: Under 100
Date First Installed: March 1983

COMTECH DATA CORP.
MF 96
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Synchronous - 56,000 bps
Interface: RS-449, CCITT V.35, V.36
Transmission Medium: Coaxial Cables
Diagnostics: No
Features: Autoequalizer, Diagnostics
Distribution Method: End user, OEM
Price: $4,650
Number Installed to Date: 100 - 500
Date First Installed: January 1981

COM/TECH SYSTEMS, INC.
MODEMULATOR 402A
Modem Class: Modem Eliminator
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous/ Synchronous - 14,400 bps
Interface: RS-232C
Transmission Medium: RS-232 Cable
Diagnostics: No
Features: Diagnostics, Switchable Data Rates, Loopback
Distribution Method: End user
Price: $390
Number Installed to Date: Under 100
Date First Installed: February 1983

CONCORD DATA SYSTEMS, INC.
CDS 212
Modem Class: Long-Haul
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous/ Synchronous - 1,200 bps
Interface: RS-232C
Bell-Compatible: 212
Transmission Medium: Voice-Grade Lines
Diagnostics: No
Features: Autoequalizer, Autoanswer, Diagnostics, Fallback, Switchable Data Rates
Distribution Method: End user, OEM, Third-party
Price: $700
Number Installed to Date: Under 100
Date First Installed: November 1981
(See Vendor Profile Page V-7)

CONCORD DATA SYSTEMS, INC.
CDS 224
Modem Class: Long-Haul
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous/ Synchronous - 2,400 bps
Interface: RS-232C
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autodial, Autoequalizer, Autoanswer, Diagnostics, Fallback, Switchable Data Rates
Distribution Method: Third-party
Price: $995 to $1,195
Number Installed to Date: 500 - 1,000
Date First Installed: November 1982

CONCORD DATA SYSTEMS, INC.
CDS 224 TM
Modem Class: Long-Haul
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous/ Synchronous - 1,200 bps, 2,400 bps
Interface: RS-232C
Transmission Medium: Voice-Grade Lines
Diagnostics: No
Features: Autoequalizer, Autoanswer, Diagnostics, Fallback, Switchable Data Rates
Distribution Method: End user, OEM, Third-party
Price: $995
Number Installed to Date: 500 - 1,000
Date First Installed: March 1983

CONCORD DATA SYSTEMS, INC.
CDS 224 TM AUTODIAL
Modem Class: Long-Haul
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous/ Synchronous - 1,200 bps, 2,400 bps
Interface: RS-232C
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autodial, Autoequalizer, Autoanswer, Diagnostics, Fallback, Switchable Data Rates
Distribution Method: End user, OEM, Third-party
Price: $1,195
Number Installed to Date: Under 100
Date First Installed: January 1983

CONCORD DATA SYSTEMS, INC.
CDS V.22
Modem Class: Long-Haul
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous/ Synchronous - 300 bps, 600 bps, 1,200 bps
Interface: CCITT V.24, CCITT V.28
Bell-Compatible: 212
Transmission Medium: Voice-Grade Lines
Diagnostics: No
Features: Autoequalizer, Autoanswer, Diagnostics, Fallback, Switchable Data Rates
Distribution Method: OEM, Third-party
Price: $950
Number Installed to Date: 5,000 - 10,000
Date First Installed: November 1981

CONCORD DATA SYSTEMS, INC.
CDS V.22 BIS
Modem Class: Long-Haul
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous/ Synchronous - 1,200 bps, 2,400 bps
Interface: CCITT V.24, CCITT V.28
Transmission Medium: Voice-Grade Lines
Diagnostics: No
Features: Autoequalizer, Autoanswer, Diagnostics, Fallback, Switchable Data Rates
Distribution Method: End user, OEM, Third-party
Price: $995
Number Installed to Date: 500 - 1,000
Date First Installed: April 1983

CONCORD DATA SYSTEMS, INC.
CDS V.22 BIS AUTODIAL
Modem Class: Long-Haul
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous/ Synchronous - 1,200 bps, 2,400 bps
Interface: CCITT V.24, V.28
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autodial, Autoequalizer, Autoanswer, Diagnostics, Fallback, Switchable Data Rates
Distribution Method: OEM, Third-party
Price: $1,195
Number Installed to Date: Under 100
Date First Installed: August 1983

CONCORDCO, INC.
MDM-12000
Modem Class: Long-Haul
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous/ Synchronous - 300 bps, 1,200 bps
Interface: RS-232C
Bell-Compatible: 212
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autodial, Autoanswer, Reverse Channel, Diagnostics
Distribution Method: OEM, Third-party
Price: $1,495
Date First Installed: 1983
(See Vendor Profile Page V-8)

DATA CONTROL SYSTEMS
CCM COAXIAL CABLE MODEM
Modem Class: Short-Haul
Transmission Technique: Asynchronous, Synchronous
Transmission Rate: Asynchronous/ Synchronous - 1,200 bps, 1,800 bps, 4,800 bps, 9,600 bps, 14,400 bps; Synchronous - 2,400 bps
Interface: RS-232C, RS-422
Transmission Medium: Coaxial, Triaxial Cables
Diagnostics: Yes; Built-in
Features: Reverse Channel, Diagnostics, Switchable Data Rates
Distribution Method: End user, Third-party
Price: $165 to $875
Number Installed to Date: 500 - 1,000
Date First Installed: 1978
(See Vendor Profile Page V-9)

DATA CONTROL SYSTEMS
SR102
Modem Class: Short-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex, Simplex
Transmission Rate: Asynchronous - 1,200 bps, 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps
Interface: RS-232C, RS-422
Transmission Medium: Metallic Circuit
Diagnostics: Yes; Built-in
Features: Reverse Channel, Diagnostics, Switchable Data Rates
Distribution Method: End user, Third-party
Price: $165 to $875
Number Installed to Date: 500 - 1,000
Date First Installed: 1978

DATA CONTROL SYSTEMS
SR120
Modem Class: Short-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex, Simplex
Transmission Rate: Synchronous 1,200 bps, 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps
Interface: RS-232C, RS-422
Transmission Medium: Metallic Circuit
Diagnostics: Yes; Built-in
Features: Reverse Channel,

Modems

Diagnostics, Switchable Data Rates
Distribution Method: End user, Third-party
Price: $165 to $975
Number Installed to Date: Under 100
Date First Installed: 1983

DATA CONTROL SYSTEMS SR202
Modem Class: Short-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex, Simplex
Transmission Rate: Synchronous - 1,200 bps, 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps
Interface: RS-232C, RS-422
Transmission Medium: Metallic Circuit
Diagnostics: Yes; Built-In
Features: Reverse Channel, Diagnostics, Switchable Data Rates
Distribution Method: End user, Third-party
Price: $165 to $975
Number Installed to Date: 500 - 1,000
Date First Installed: 1978

DATA CONTROL SYSTEMS SR208
Modem Class: Power Line Carrier
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Half-Duplex, Full-Duplex, Simplex
Transmission Rate: Asynchronous/ Synchronous - 1,200 bps
Interface: RS-232C, RS-422
Transmission Medium: Power Line Carrier
Diagnostics: Yes; Built-In
Features: Reverse Channel, Diagnostics, Switchable Data Rates
Distribution Method: End user, Third-party
Price: $165 to $975
Number Installed to Date: 500 - 1,000
Date First Installed: 1978

DATASCAN CORP. D 2400
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 4,800 bps
Interface: RS-232C, CCITT V.24
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-In
Features: Autoequalizer, Diagnostics, Fallback, Switchable Data Rates
Distribution Method: End user
Price: $995
(See Vendor Profile Page V-9)

DATASCAN CORP. D 4800
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Synchronous - 4,800 bps
Interface: RS-232C, CCITT V.24, V.27
Transmission Medium: Voice-Grade Lines
Diagnostics: No
Features: Autoequalizer, Fallback, Switchable Data Rates
Distribution Method: End user, Third Party
Price: $1,695
Date First Installed: March 1984

DATASCAN CORP. D 9600
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Synchronous - 2,400 bps, 4,800 bps, 9,600 bps
Interface: RS-232C, CCITT V.24
Transmission Medium: Voice-Grade Lines
Features: Autoequalizer, Diagnostics, Fallback, Switchable Data Rates
Distribution Method: End user
Price: $2,250

DATAPOINT CORP. 9478/9479
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 1,200 bps
Interface: RS-232C
Transmission Medium: Voice-Grade Lines
Diagnostics: No
Distribution Method: End user
Price: $995
Date First Installed: January 1978
(See Vendor Profile Page V-9)

DATAPROBE, INC. MDR 103
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 300 bps
Interface: RS-232C, 20 MA Current Loop, 60 MA Current Loop
Transmission Medium: Voice-Grade Lines, Wide-Band Lines
Diagnostics: No
Features: Switchable Data Rates
Distribution Method: End user
Price: $450
Number Installed to Date: Under 100
Date First Installed: November 1983
(See Vendor Profile Page V-9)

DATAPRODUCTS CORP. DDU-1
Modem Class: Short-Haul
Transmission Technique: Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Synchronous - 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps; Asynchronous/ Synchronous - 7,200 bps
Interface: RS-232C, MIL 188C, MIL 188/114
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-In
Features: Autoequalizer, Diagnostics, Switchable Data Rates, Polling/Multipoint
Distribution Method: End user
Price: $700
Number Installed to Date: 100 - 500
Date First Installed: June 1980
(See Vendor Profile Page V-9)

DATAPRODUCTS NEW ENGLAND, INC. DDU-1
Modem Class: Line Driver
Transmission Technique: Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous/ Synchronous - 300 bps, 600 bps, 1,200 bps, 2,400 bps, 7,200 bps; Synchronous - 1,800 bps, 4,800 bps, 9,600 bps, 14,400 bps
Transmission Medium: Unconditioned Cable
Diagnostics: Yes; Built-In
Features: Diagnostics, Switchable Data Rates
Distribution Method: End user
Price: $795
Number Installed to Date: 500 - 1,000
Date First Installed: 1987
(See Vendor Profile Page V-9)

DATATEL, INC. DCP 3000
Modem Class: Short-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex, Simplex
Transmission Rate: Asynchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps, 19,200 bps
Interface: RS-232C
Bell-Compatible: 43401
Transmission Medium: Twisted-Pair
Diagnostics: Yes; Built-In
Features: Diagnostics
Distribution Method: End user
Price: $200
Number Installed to Date: 500 - 1,000
Date First Installed: 1980
(See Vendor Profile Page V-10)

DATATEL, INC. DCP 3010
Modem Class: Short-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex, Simplex
Transmission Rate: Asynchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps, 19,200 bps
Interface: Burroughs
Bell-Compatible: 43401
Transmission Medium: Twisted-Pair
Diagnostics: Yes; Built-In
Features: Diagnostics
Distribution Method: End user
Price: $260
Number Installed to Date: Under 100
Date First Installed: June 1990

DATATEL, INC. DCP 3020
Modem Class: Short-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex, Simplex
Transmission Rate: Asynchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps
Interface: RS-232C
Bell-Compatible: 43401
Transmission Medium: Twisted-Pair
Diagnostics: Yes; Built-In
Features: Diagnostics, Simulated Dial Control Sign
Distribution Method: End user
Price: $250
Number Installed to Date: Under 100
Date First Installed: January 1991

DATATEL, INC. DCP 3030
Modem Class: Short-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex, Simplex
Transmission Rate: Synchronous - 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps, 19,200 bps; Asynchronous/ Synchronous - 3,600 bps
Interface: RS-232C
Bell-Compatible: 43401
Transmission Medium: Twisted-Pair
Diagnostics: Yes; Built-In
Features: Diagnostics
Distribution Method: End user
Price: $420
Number Installed to Date: 500 - 1,000
Date First Installed: January 1991

DATATEL, INC. DCP 3055
Modem Class: Short-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex, Simplex
Transmission Rate: Synchronous - 1,200 bps, 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps
Interface: RS-232C
Bell-Compatible: 43401
Transmission Medium: Twisted-Pair
Diagnostics: Yes; Built-In
Features: Diagnostics, Switchable Data Rates, Auto Speed Detection
Distribution Method: End user
Price: $550
Number Installed to Date: Under 100
Date First Installed: October 1992

DATATEL, INC. DCP 3057
Modem Class: Short-Haul
Transmission Technique: Synchronous

Transmission Mode: Half-Duplex, Full-Duplex, Simplex
Transmission Rate: Synchronous - 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps, 56,000 bps
Interface: RS-232C
Bell-Compatible: 43401
Transmission Medium: Twisted-Pair
Diagnostics: Yes; Built-In
Features: Diagnostics
Distribution Method: End user
Price: $550
Number Installed to Date: Under 100
Date First Installed: January 1983

DATATEL, INC.
DCP 3060
Modem Class: Short-Haul
Transmission Technique: Synchronous
Transmission Rate: Synchronous - 56,000 bps, Asynchronous/ Synchronous - 48,000 bps, 72,000 bps
Interface: RS-232C, RS-422, V.35
Transmission Medium: Twisted-Pair
Diagnostics: Yes; Built-In
Features: Diagnostics, Automatic Speed Detection
Distribution Method: End user
Price: $950
Number Installed to Date: Under 100
Date First Installed: December 1983

DATATEL, INC.
DCP 3070
Modem Class: Short-Haul
Transmission Technique: Synchronous
Transmission Rate: Synchronous - 56,000 bps, Asynchronous/ Synchronous - 48,000 bps, 2M bps
Interface: RS-232C, RS-422, V.35
Transmission Medium: Twisted-Pair
Diagnostics: Yes; Built-In
Features: Diagnostics, Automatic Speed Detection
Distribution Method: End user
Price: $1,400
Date First Installed: January 1984

DATATEL, INC.
DCP 3180
Modem Class: Short-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex, Simplex
Transmission Rate: Synchronous - 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps, 19,200 bps; Asynchronous/ Synchronous - 3,600 bps
Interface: RS-232C
Bell-Compatible: 43401
Transmission Medium: Twisted-Pair
Diagnostics: Yes; Built-In
Features: Diagnostics
Distribution Method: End user
Price: $420
Number Installed to Date: 500 - 1,000
Date First Installed: January 1981

DATATEL, INC.
DCP 3155
Modem Class: Short-Haul
Transmission Technique: Synchronous
Transmission Mode: Full-Duplex, Simplex
Transmission Rate: Synchronous - 1,200 bps, 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps
Interface: RS-232C
Bell-Compatible: 43401
Transmission Medium: Twisted-Pair
Features: Diagnostics, Switchable Data Rates, Automatic Speed Detection
Distribution Method: End user
Price: $550
Number Installed to Date: Under 100
Date First Installed: October 1982

DATEC, INC.
33
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 300 bps
Interface: RS-232C
Bell-Compatible: 108, 113
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-In
Features: Autodial, Autoequalizer, Autoanswer, Alternate Voice/Data, Diagnostics, Switchable Data Rates
Distribution Method: Third-party
Price: $195 to $599
Number Installed to Date: 500 - 1,000
Date First Installed: 1981
(See Vendor Profile Page V-10)

DATEC, INC.
212
Modem Class: Long-Haul
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous/ Synchronous - 300 bps, 1,200 bps
Interface: RS-232C
Bell-Compatible: 103, 113, 212
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-In
Features: Autodial, Autoequalizer, Autoanswer, Alternate Voice/Data, Diagnostics, Switchable Data Rates
Distribution Method: Third-party
Price: $195 to $599
Number Installed to Date: 5,000 - 10,000
Date First Installed: 1980

DATEC, INC.
PAL 103
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 300 bps
Interface: RS-232C
Bell-Compatible: 103, 113
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-In
Features: Autodial, Autoequalizer, Autoanswer, Alternate Voice/Data, Diagnostics, Switchable Data Rates
Distribution Method: Third-party
Price: $195 to $599
Date First Installed: 1984

DATEC, INC.
PAL 212
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 300 bps, 1,200 bps
Interface: RS-232C
Bell-Compatible: 103, 113, 212
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-In
Features: Autodial, Autoequalizer, Autoanswer, Alternate Voice/Data, Diagnostics, Switchable Data Rates
Distribution Method: Third-party
Price: $195 to $599
Date First Installed: 1983

DATEC, INC.
PAL PLUS
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 300 bps, 1,200 bps
Interface: RS-232C
Bell-Compatible: 103, 113, 212
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-In
Features: Autodial, Autoequalizer, Autoanswer, Alternate Voice/Data, Diagnostics, Multiport, Switchable Data Rates
Distribution Method: Third-party
Price: $195 to $599
Date First Installed: 1983

DCI-TELEPRODUCTS, INC.
ADT-3
Modem Class: Line Driver
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps, 19,200 bps
Interface: RS-232C
Transmission Medium: Voice-Grade Lines, Unload Metallic Pairs
Diagnostics: No
Features: Diagnostics, Switchable Data Rates, Extended Ring Option
Distribution Method: End user
Price: $225
Number Installed to Date: 10,000
Date First Installed: July 1978
(See Vendor Profile Page V-10)

DCI-TELEPRODUCTS, INC.
2000
Modem Class: Short-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Synchronous - 56,000 bps; Asynchronous/ Synchronous - 64K bps
Interface: CCITT V.35
Transmission Medium: Voice-Grade Lines, Unload Metallic Pairs
Diagnostics: No
Features: Diagnostics, Switchable Data Rates
Distribution Method: End user
Price: $689
Number Installed to Date: 200
Date First Installed: August 1983

DCI-TELEPRODUCTS, INC.
ASR-3
Modem Class: Short-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Synchronous - 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps
Interface: RS-232C
Transmission Medium: Voice-Grade Lines, Unload Metallic Pairs
Diagnostics: No
Features: Diagnostics, Switchable Data Rates, Extended Ring Option
Distribution Method: End user
Price: $445
Number Installed to Date: 5,000
Date First Installed: 1979

DCI-TELEPRODUCTS, INC.
SLD-1
Modem Class: Short-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps, 19,200 bps
Interface: RS-232C
Transmission Medium: Voice-Grade Lines, Unload Metallic Pairs
Diagnostics: No
Features: Diagnostics
Distribution Method: End user, Third-party
Price: $175
Number Installed to Date: 500 - 1,000
Date First Installed: January 1981

DEVELCON ELECTRONICS, INC.
710 ACOUSTIC COUPLER
Modem Class: Coupler
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps
Interface: RS-232C, 20 MA Current Loop
Bell-Compatible: 103
Transmission Medium: Voice-Grade Lines
Diagnostics: No
Features: Alternate Voice/Data
Distribution Method: End user, OEM, Third-party

Modems

Price: $195
Number Installed to Date: 5,000 - 10,000
Date First Installed: September 1978
(See Vendor Profile Page V-10)

DEVELCON ELECTRONICS, INC.
2X212 MODEMPLEXER
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps, 1,200 bps
Interface: RS-232C
Bell-Compatible: 103, 113, 212
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autodial, Autoequalizer, Autoanswer, Diagnostics, Multiport, Switchable Data Rates, Stored Directory
Distribution Method: End user, OEM, Third-party
Price: $995
Number Installed to Date: Under 100
Date First Installed: August 1983

DEVELCON ELECTRONICS, INC.
5212 SMART MODEM
Modem Class: Long-Haul
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous/ Synchronous - 1,200 bps
Interface: RS-232C
Bell-Compatible: 212
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autodial, Autoequalizer, Autoanswer, Diagnostics, Switchable Data Rates, Stored Directory
Distribution Method: End user, OEM, Third-party
Price: $495
Number Installed to Date: Under 100
Date First Installed: January 1984

DEVELCON ELECTRONICS, INC.
7212 MODEM
Modem Class: Long-Haul
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps; Asynchronous/ Synchronous - 1,200 bps
Interface: RS-232C
Bell-Compatible: 103, 113, 212
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autoequalizer, Autoanswer, Alternate Voice/Data, Diagnostics, Switchable Data Rates
Distribution Method: End user, Third-party
Price: $575
Number Installed to Date: 100 - 500
Date First Installed: July 1982

DEVELCON ELECTRONICS, INC.
9212 SMART MODEM
Modem Class: Long-Haul
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps; Asynchronous/ Synchronous - 1,200 bps
Interface: RS-232C
Bell-Compatible: 103, 113, 212
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autodial, Autoequalizer, Autoanswer, Diagnostics, Switchable Data Rates, Stored Directory
Distribution Method: End user, OEM, Third-party
Price: $650
Number Installed to Date: 500 - 1,000
Date First Installed: November 1982

DEVELCON ELECTRONICS, INC.
9123 MODEM
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps
Interface: RS-232C
Bell-Compatible: 103
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autoanswer, Alternate Voice/Data, Diagnostics
Distribution Method: End user, OEM, Third-party
Price: $195
Number Installed to Date: 100 - 500
Date First Installed: 1982

DEVELCON ELECTRONICS, INC.
9202 MODEM
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 1,200 bps
Interface: RS-232C
Bell-Compatible: 202
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autodial, Autoanswer, Reverse Channel, Diagnostics
Distribution Method: End user, OEM, Third-party
Price: $671
Number Installed to Date: 1,000 - 5,000
Date First Installed: September 1978

DIGITAL EQUIPMENT CORP.
DF01-A ACOUSTIC COUPLER
Modem Class: Coupler
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 300 bps
Interface: RS-232C, 20 MA Current Loop
Transmission Medium: Voice-Grade Lines
Price: $345
Date First Installed: 1978
(See Vendor Profile Page V-10)

DIGITAL EQUIPMENT CORP.
DF03-AA/AC
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps
Interface: RS-232C, CCITT V.24, CCITT V.28
Bell-Compatible: 103
Transmission Medium: Voice-Grade Lines
Features: Autoanswer, Alternate Voice/Data, Diagnostics
Price: $450 to $650
Date First Installed: 1980

DIGITAL EQUIPMENT CORP.
DF03-AA/AC
Modem Class: Long-Haul
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps; Asynchronous/ Synchronous - 1,200 bps
Interface: RS-232C, CCITT V.24, CCITT V.28
Bell-Compatible: 103, 212
Transmission Medium: Voice-Grade Lines
Features: Autodial, Autoanswer, Alternate Voice/Data, Diagnostics, Switchable Data Rates
Price: $895 to $1,095
Date First Installed: 1980

DIGITAL EQUIPMENT CORP.
DF03-RA/RC
Modem Class: Long-Haul
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps; Asynchronous/ Synchronous - 1,200 bps
Interface: RS-232C, CCITT V.24, CCITT V.28, RS432-A
Bell-Compatible: 103, 212
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autodial, Autoanswer, Diagnostics
Price: $750 to $950
Date First Installed: 1983

DURACOM CORP.
ECS-10
Modem Class: Short-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 9,600 bps
Interface: RS-232C
Transmission Medium: Solid Copper Wire Pair
Diagnostics: No
Features: High Noise Immunity
Distribution Method: End user
Price: $99 to $104
Number Installed to Date: 3,000
Date First Installed: 1977
(See Vendor Profile Page V-11)

DYNATECH DATA SYSTEMS
ME-1
Modem Class: Modem Eliminator
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous/ Synchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps
Interface: RS-232C, CCITT V.24
Transmission Medium: Digital Links
Diagnostics: No
Features: Switchable Data Rates
Distribution Method: End user
Price: $440
Number Installed to Date: 500 - 1,000
(See Vendor Profile Page V-11)

DYNATECH DATA SYSTEMS
LDM 12
Modem Class: Short-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps
Interface: RS-232C, CCITT V.24
Transmission Medium: Metallic Twisted Pairs
Diagnostics: No
Features: Switchable Data Rates
Distribution Method: End user, Third-party
Price: $275
Number Installed to Date: 500 - 1,000
Date First Installed: 1980

DYNATECH DATA SYSTEMS
LDM 22
Modem Class: Short-Haul
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous/ Synchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps
Interface: RS-232C
Transmission Medium: Metallic Twisted Pair
Features: Switchable Data Rates
Distribution Method: End user, Third-party
Price: $440
Number Installed to Date: 1,000 - 5,000
Date First Installed: 1982

DYNATECH DATA SYSTEMS
LDM 32
Modem Class: Short-Haul
Transmission Technique: Synchronous
Transmission Mode: Full-Duplex

Transmission Rate: Synchronous - 2,400 bps, 4,800 bps, 9,600 bps
Interface: RS-232C, CCITT V.24
Transmission Medium: Two Untoad Twisted-Pair
Diagnostics: No
Features: Switchable Data Rates, Remote Digital Loopback
Distribution Method: End user, Third-party
Price: $590
Number Installed to Date: Under 100
Date First Installed: 1982

CONTROL SYSTEMS, INC.
LYNX 103-0AA
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 300 bps
Bell-Compatible: 103
Transmission Medium: Voice-Grade Lines
Diagnostics: No
Features: Autodial, Autoanswer
Distribution Method: Third-party
Price: $299
(See Vendor Profile Page V-11)

CONTROL SYSTEMS, INC.
LYNX 103-0AA (APPLE LYNX)
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 300 bps
Bell-Compatible: 103
Transmission Medium: Voice-Grade Lines
Diagnostics: No
Features: Autodial, Autoanswer
Distribution Method: Third-party
Price: $299

DIVAX CORP.
ACOUSTIC COUPLER N78
Modem Class: Coupler
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 300 bps
Interface: RS-232C
Bell-Compatible: 103
Transmission Medium: Voice-Grade Lines
Distribution Method: Third-party
Price: $195 to $225
Number Installed to Date: 10,000 - 50,000
Date First Installed: 1979
(See Vendor Profile Page V-11)

DIVAX CORP.
103-1
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 300 bps
Interface: RS-232C
Bell-Compatible: 103
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Add-on
Features: Autoanswer, Alternate Voice/Data, Diagnostics
Distribution Method: OEM
Price: $175 to $485
Date First Installed: 1979

DIVAX CORP.
103-2
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 300 bps
Interface: RS-232C
Bell-Compatible: 103
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Add-on
Features: Autoanswer, Alternate Voice/Data, Diagnostics
Distribution Method: OEM
Price: $175 to $485
Date First Installed: 1979

DIVAX CORP.
103-3
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 300 bps
Interface: RS-232C
Bell-Compatible: 103
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Add-on
Features: Autoanswer, Alternate Voice/Data, Diagnostics
Distribution Method: OEM
Price: $175 to $485
Date First Installed: 1979

DIVAX CORP.
103-5
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 300 bps
Interface: RS-232C
Bell-Compatible: 103
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Add-on
Features: Autoanswer, Alternate Voice/Data, Diagnostics
Distribution Method: OEM
Price: $175 to $485
Date First Installed: 1979

ERICSON PRODMATIC, INC.
ZAT 1200
Modem Class: Long-Haul
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps; Asynchronous/ Synchronous - 600 bps, 1,200 bps
Interface: CCITT V.22
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autoequalizer, Autoanswer, Alternate Voice/Data, Diagnostics, Fallback, Switchable Data Rates
Distribution Method: End user
Price: $950
Number Installed to Date: Under 100
Date First Installed: January 1980
(See Vendor Profile Page V-11)

ERICSON PRODMATIC, INC.
ZAT 2400
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Synchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps
Interface: CCITT V.22
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autoequalizer, Autoanswer, Alternate Voice/Data, Reverse Channel, Fallback, Switchable Data Rates, Point to Point and Multidropping
Distribution Method: End user
Price: $925
Number Installed to Date: Under 100
Date First Installed: January 1980

ERICSON PRODMATIC, INC.
ZAT 4800
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Synchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps
Interface: CCITT V.27
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autoequalizer, Autoanswer, Alternate Voice/Data, Reverse Channel, Diagnostics, Fallback, Switchable Data Rates, Dial Backup
Distribution Method: End user
Price: $1,895
Number Installed to Date: Under 100
Date First Installed: January 1980

ERICSON PRODMATIC, INC.
ZAT 9600
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Synchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps
Interface: CCITT V.29
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autoequalizer, Autoanswer, Reverse Channel, Diagnostics, Fallback, Switchable Data Rates, Multiplexer Option
Distribution Method: End user
Price: $2,195
Number Installed to Date: Under 100
Date First Installed: January 1980

FIBRONICS INTERNATIONAL, INC.
FM 001
Modem Class: Fiber-Optic
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 4,800 bps; Synchronous - 14,400 bps
Interface: RS-232C
Transmission Medium: Fiber Optics
Diagnostics: Yes; Built-in
Features: Autoequalizer, Autoanswer, Reverse Channel, Diagnostics, Clock Calendar, Switchable Data Rates
Distribution Method: End user
(See Vendor Profile Page V-12)

FIBRONICS INTERNATIONAL, INC.
FM 002
Modem Class: Fiber-Optic
Transmission Technique: Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous/ Synchronous - 256K bps
Interface: RS-232C
Transmission Medium: Fiber Optics
Diagnostics: Yes; Built-in
Features: Autoequalizer, Autoanswer, Reverse Channel, Diagnostics, Clock Calendar, Switchable Data Rates
Distribution Method: End user

FRIEDMAN ASSOCIATES
MEC 201
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Synchronous - 2,400 bps
Interface: RS-232C
Bell-Compatible: 201
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Distribution Method: End user
Price: $620
Date First Installed: January 1981
(See Vendor Profile Page V-12)

FRIEDMAN ASSOCIATES
MEC 201 CR
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Synchronous - 2,400 bps

Modems

Interface: RS-232C
Bell-Compatible: 201
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-In
Features: Autodial
Distribution Method: End user
Price: $845
Date First Installed: June 1981

FRIEDMAN ASSOCIATES
NEC 202T
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex, Simplex
Transmission Rate: Synchronous - 1,800 bps
Interface: RS-232C
Bell-Compatible: 202
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-In
Features: Reverse Channel, Diagnostics
Distribution Method: End user
Price: $305
Date First Installed: June 1981

FRIEDMAN ASSOCIATES
NEC 212
Modem Class: Long-Haul
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Synchronous - 300 bps, 1,200 bps
Interface: RS-232C
Bell-Compatible: 212
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-In
Features: Autodial
Distribution Method: End user
Price: $500
Date First Installed: January 1981

FRIEDMAN ASSOCIATES
NEC 212 AR
Modem Class: Long-Haul
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 300 bps; Synchronous - 1,200 bps
Interface: RS-232C
Bell-Compatible: 212
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-In
Features: Autodial, Autoanswer
Distribution Method: End user
Price: $500
Date First Installed: June 1982

FRIEDMAN ASSOCIATES
NEC 212 BR
Modem Class: Long-Haul
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 300 bps; Synchronous - 1,200 bps
Interface: RS-232C
Bell-Compatible: 212
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-In
Features: Autodial
Distribution Method: End user
Price: $675
Date First Installed: January 1982

FRIEDMAN ASSOCIATES
NEC DSP 4800-U
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Synchronous - 2,400 bps, 4,800 bps
Interface: RS-232C, CCITT V.24
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-In
Features: Autoequalizer, Diagnostics, Multiport, Fallback
Distribution Method: End user
Price: $950
Date First Installed: January 1982

FRIEDMAN ASSOCIATES
NEC DSP 9600-U
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 4,800 bps, 7,200 bps, 9,600 bps
Interface: RS-232C
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-In
Features: Autodial, Autoanswer
Distribution Method: End user
Price: $1,500
Date First Installed: January 1982

FRIEDMAN ASSOCIATES
NEC VOICE DIGITIZER
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Synchronous - 2,400 bps, 4,800 bps
Interface: RS-232C
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-In
Price: $7,000
Date First Installed: January 1984

FUJITSU AMERICA, INC.
F-1916L
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Synchronous - 4,800 bps
Interface: RS-232C
Transmission Medium: Voice-Grade Lines, Unconditional Voice-Grade
Diagnostics: Yes; Built-In
Features: Autoequalizer, Autoanswer, Diagnostics, Multiport, Fallback, Switchable Data Rates, Software Strapping
Distribution Method: OEM
Price: $1,795
Number Installed to Date: 100 - 500
Date First Installed: November 1983
(See Vendor Profile Page V-12)

FUJITSU AMERICA, INC.
F-1921L
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Synchronous - 9,600 bps
Interface: RS-232C
Transmission Medium: Unconditional Voice-Grade
Diagnostics: Yes; Built-In
Features: Autoequalizer, Autoanswer, Diagnostics, Multiport, Fallback, Switchable Data Rates, Software Strapping
Distribution Method: OEM
Price: $2,450
Number Installed to Date: 100 - 500
Date First Installed: November 1983

FUJITSU AMERICA, INC.
F-1925L
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Synchronous - 19,200 bps
Interface: RS-232C
Transmission Medium: Unconditional Voice-Grade
Diagnostics: Yes; Built-In
Features: Autoequalizer, Autoanswer, Diagnostics, Multiport, Fallback, Switchable Data Rates, Software Strapping
Distribution Method: OEM
Price: $6,000
Number Installed to Date: 100 - 500
Date First Installed: November 1983

FUJITSU AMERICA, INC.
M-1915CM06
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Synchronous - 4,800 bps
Interface: TTL
Transmission Medium: Unconditional Voice-Grade
Diagnostics: Yes; Add-on
Features: Autoequalizer, Autoanswer, Diagnostics, Multiport, Fallback, Switchable Data Rates, Software Strapping
Distribution Method: OEM
Price: $395
Number Installed to Date: 5,000
Date First Installed: November 1983

FUJITSU AMERICA, INC.
M-1921CM06
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Synchronous - 9,600 bps
Interface: TTL
Transmission Medium: Unconditional Voice-Grade
Diagnostics: Yes; Add-on
Features: Autoequalizer, Autoanswer, Diagnostics, Multiport, Fallback, Switchable Data Rates, Software Strapping
Distribution Method: OEM
Price: $595
Number Installed to Date: 100 - 500
Date First Installed: November 1983

FUJITSU AMERICA, INC.
M-1925CM02
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Synchronous - 19,200 bps
Interface: TTL
Transmission Medium: Unconditional Voice-Grade
Diagnostics: Yes; Add-on
Features: Autoequalizer, Autoanswer, Diagnostics, Multiport, Fallback, Switchable Data Rates, Software Strapping
Distribution Method: OEM
Price: $1,200
Number Installed to Date: 100 - 500
Date First Installed: November 1983

FUJITSU AMERICA, INC.
M-1925CM03
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Synchronous - 19,200 bps
Interface: TTL
Transmission Medium: Unconditional Voice-Grade
Diagnostics: Yes; Add-on
Features: Autoequalizer, Autoanswer, Diagnostics, Multiport, Fallback, Switchable Data Rates, Software Strapping
Distribution Method: OEM
Price: $1,500
Number Installed to Date: 100 - 500
Date First Installed: November 1983

GAMBALF DATA, INC.
FA1
Modem Class: Fiber-Optic
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 100K bps
Interface: RS-232C, CCITT V.24, CCITT V.28
Transmission Medium: Fiber Optics
Diagnostics: No
Features: Switchable Data Rates
Distribution Method: End user
Price: $500
(See Vendor Profile Page V-12)

GAMBALF DATA, INC.
FS1
Modem Class: Fiber-Optic
Transmission Technique: Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Synchronous - 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps, 19,200 bps, 56,000 bps; Asynchronous/Synchronous - Up to 252,000 bps
Interface: RS-232C, CCITT V.24, V.28
Transmission Medium: Fiber Optics

Diagnostics: No
Features: Switchable Data Rates
Distribution Method: End user
Price: $600
Number Installed to Date: Under 100

GANDALF DATA, INC.
LDS 160C
Modem Class: Line Driver
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 14,400 bps
Interface: RS-232C, CCITT V.24, CCITT V.28
Transmission Medium: Narrow-Band Lines
Diagnostics: No
Distribution Method: End user
Price: $225
Number Installed to Date: 5,000 - 10,000
Date First Installed: 1974

GANDALF DATA, INC.
LDS 161
Modem Class: Line Driver
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 14,400 bps
Interface: RS-232C, CCITT V.24, CCITT V.28
Transmission Medium: Narrow-Band Lines
Diagnostics: No
Distribution Method: End user
Price: $400
Number Installed to Date: 5,000 - 10,000
Date First Installed: 1974

GANDALF DATA, INC.
SAM 201
Modem Class: Long-Haul
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous/ Synchronous - 1,200 bps, 2,400 bps
Interface: RS-232C
Bell-Compatible: 201
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Date First Installed: 1982

GANDALF DATA, INC.
SAM 212A
Modem Class: Long-Haul
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 300 bps; Asynchronous/ Synchronous - 1,200 bps
Interface: RS-232C
Bell-Compatible: 103, 113, 212
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autodial, Autoequalizer, Autoanswer, Alternate Voice/Data, Diagnostics
Distribution Method: End user
Price: $618

GANDALF DATA, INC.
SM 3600
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Synchronous - 9,600 bps
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Multiport, Manual Dial Backup
Distribution Method/End user
Price: $2,800
Date First Installed: 1981

GANDALF DATA, INC.
ME 2D
Modem Class: Modem Eliminator
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous/ Synchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps, 19,200 bps, 56,000 bps; Synchronous - 316,800 bps
Interface: RS-232C, CCITT V.24, CCITT V.28
Transmission Medium: Narrow-Band Lines
Distribution Method: End user
Price: $400
Date First Installed: 1978

GANDALF DATA, INC.
ME 922
Modem Class: Modem Eliminator
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Synchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps, 19,200 bps; Asynchronous/Synchronous - 38.4K bps
Interface: RS-232C, CCITT V.24, CCITT V.28
Transmission Medium: Narrow-Band Lines
Diagnostics: No
Distribution Method: End user
Price: $450
Date First Installed: 1978

GANDALF DATA, INC.
RADIO MODEM
Modem Class: Radio Frequency (RF)
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous/ Synchronous - 300 bps, 1,200 bps, 2,400 bps
Interface: RS-232C, CCITT V.24, CCITT V.28
Transmission Medium: Radio Links
Diagnostics: No
Price: $1,595
Date First Installed: 1983

GANDALF DATA, INC.
LDS 120; RM 3120
Modem Class: Short-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 9,600 bps
Interface: RS-232C, CCITT V.24, CCITT V.28
Transmission Medium: Narrow-Band Lines
Diagnostics: No
Features: Digital Loopback
Distribution Method: End user
Price: $300
Number Installed to Date: 10,000 - 50,000
Date First Installed: 1973

GANDALF DATA, INC.
LDS 121
Modem Class: Short-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 9,600 bps
Interface: RS-232C, CCITT V.24, CCITT V.28
Transmission Medium: Narrow-Band Lines
Diagnostics: No
Distribution Method: End user

GANDALF DATA, INC.
LDS 140; RM 3140
Modem Class: Short-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 4,800 bps, 9,600 bps
Interface: RS-232C, CCITT V.24, CCITT V.28
Transmission Medium: Narrow-Band Lines
Distribution Method: End user
Price: $450
Number Installed to Date: 500 - 1,000
Date First Installed: 1977

GANDALF DATA, INC.
LDS 200
Modem Class: Short-Haul
Transmission Technique: Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Synchronous - 56,000 bps; Asynchronous/ Synchronous - 50K bps
Interface: RS-232C, RS-422, CCITT V.24, CCITT V.28, MIL 188C, V.35
Transmission Medium: Narrow-Band Lines
Price: $786 to $985
Date First Installed: 1982

GANDALF DATA, INC.
LDS 300; RM 3300
Modem Class: Short-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Synchronous - 14,400 bps
Interface: RS-232C, CCITT V.24, CCITT V.28
Transmission Medium: Narrow-Band Lines
Diagnostics: No
Features: Multiport, Analog Loopback
Distribution Method: End user
Price: $450
Number Installed to Date: 5,000 - 10,000
Date First Installed: 1974

GANDALF DATA, INC.
LDS 319; RM 3119
Modem Class: Short-Haul
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous/ Synchronous - 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps
Interface: RS-232C, CCITT V.24, CCITT V.28
Transmission Medium: Narrow-Band Lines
Diagnostics: No
Features: Switchable Data Rates
Distribution Method: End user
Price: $735
Number Installed to Date: 500 - 1,000
Date First Installed: 1978

GANDALF DATA, INC.
LDS 329; RM 3329
Modem Class: Short-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Synchronous - 2,400 bps, 4,800 bps, 9,600 bps
Interface: RS-232C, CCITT V.24, CCITT V.28
Transmission Medium: Narrow-Band Lines
Diagnostics: No
Distribution Method: End user
Price: $450
Number Installed to Date: 500 - 1,000
Date First Installed: 1979

GANDALF DATA, INC.
SM LDS 349
Modem Class: Short-Haul
Transmission Technique: Synchronous
Transmission Mode: Full-Duplex
Interface: RS-232C, CCITT V.24
Transmission Medium: Twisted-pair
Features: Autoequalizer
Distribution Method: End user
Price: $295
Number Installed to Date: Under 500
Date First Installed: January 1984

GANDALF DATA, INC.
LINE MIXER
Modem Class: Short-Haul

Modems

Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous/Synchronous - 9,600 bps
Interface: RS-232C
Transmission Medium: Voice-Grade Lines, Narrow-Band Lines
Diagnostics: No
Distribution Method: End user
Price: $295 to $305
Date First Installed: 1982

GANDALF DATA, INC.
LDM 122
Modem Class: Short-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 9,600 bps
Interface: RS-232C, CCITT V.24, CCITT V.28
Transmission Medium: Narrow-Band Lines
Diagnostics: No
Features: Autoequalizer
Distribution Method: End user

GANDALF DATA, INC.
LDM 404; RM 3404
Modem Class: Medium Distance
Transmission Technique: Syhchronous
Transmission Mode: Full-Duplex
Transmission Rate: Synchronous - 2,400 bps, 4,800 bps
Interface: RS-232C, CCITT V.24, CCITT V.28
Transmission Medium: Voice-Grade Lines
Features: Multiport, Split Channel
Distribution Method: End user
Price: $875 to $975
Number Installed to Date: 500 - 1,000
Date First Installed: 1977

GANDALF DATA, INC.
LDM 409
Modem Class: Medium Distance
Transmission Technique: Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Synchronous - 9,600 bps
Interface: RS-232C, CCITT V.24
Transmission Medium: Voice-Grade Lines, Narrow-Band Lines
Diagnostics: Yes; Built-in
Features: Autoequalizer, Diagnostics
Distribution Method: End user
Date First Installed: 1983

GANDALF DATA, INC.
LDM 414; RM 3414
Modem Class: Medium Distance
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 2,400 bps, 4,800 bps
Interface: RS-232C, CCITT V.24, CCITT V.28
Transmission Medium: Voice-Grade Lines
Features: Multiport
Price: $975 to $1,050
Number Installed to Date: 500 - 1,000

GANDALF DATA, INC.
LDM 444; RM 3444
Modem Class: Medium Distance
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Synchronous - 4,800 bps
Interface: RS-232C, CCITT V.24, CCITT V.28
Transmission Medium: Narrow-Band Lines
Diagnostics: Yes; Built-in
Features: 8.5 msec Fast Pull
Distribution Method: End user
Price: $1,350
Date First Installed: 1982

GANDALF DATA, INC.
LDM 464; RM 3464
Modem Class: Medium Distance
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 4,800 bps
Interface: RS-232C, CCITT V.24, CCITT V.28
Transmission Medium: Narrow-Band Lines
Diagnostics: Yes; Built-in
Distribution Method: End user
Price: $1,495
Date First Installed: 1982

GENERAL DATACOMM INDUSTRIES, INC.
GDC 56DA/56K
Modem Class: Digital (DSU)
Transmission Technique: Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Synchronous - 56,000 bps
Interface: CCITT V.35
Transmission Medium: Digital Links
Diagnostics: Yes; Add-on
Features: Autoequalizer, Diagnostics
Distribution Method: End user, Third-party
Price: $995
Number Installed to Date: 200
Date First Installed: 1983
(See Vendor Profile Page V-12)

GENERAL DATACOMM INDUSTRIES, INC.
GDC GSU-56DA
Modem Class: Digital (DSU)
Transmission Technique: Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Synchronous - 2,400 bps, 4,800 bps, 9,600 bps
Interface: RS-232C
Transmission Medium: Digital Links
Diagnostics: Yes; Built-in
Features: Autoequalizer, Diagnostics, Switchable Data Rates
Distribution Method: End user, Third-party
Price: $695
Number Installed to Date: 200
Date First Installed: 1983

GENERAL DATACOMM INDUSTRIES, INC.
GSU-56DB
Modem Class: Digital (DSU)
Transmission Technique: Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Synchronous - 2,400 bps, 4,800 bps, 9,600 bps
Interface: RS-232C
Transmission Medium: Digital Links
Diagnostics: Yes; Built-in
Features: Diagnostics, Switchable Data Rates
Distribution Method: End user, Third-party

GENERAL DATACOMM INDUSTRIES, INC.
DC 103J
Modem Class: Long-Haul
Transmission Technique: Asyrichronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps
Interface: RS-232C, CCITT V.24, CCITT V.28
Bell-Compatible: 103
Transmission Medium: Voice-Grade Lines
Diagnostics: No
Features: Autoanswer, Alternate Voice/Data, Diagnostics
Distribution Method: End user
Date First Installed: 1981

GENERAL DATACOMM INDUSTRIES, INC.
DC 108-3M
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps
Interface: RS-232C, CCITT V.24, CCITT V.28
Bell-Compatible: 108
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Add-on
Features: Diagnostics
Distribution Method: End user
Date First Installed: 1981

GENERAL DATACOMM INDUSTRIES, INC.
DC 201-7
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Synchronous - 1,200 bps, 2,400 bps
Interface: RS-232C, CCITT V.24, CCITT V.26, CCITT V.28
Bell-Compatible: 201
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Add-on
Features: Diagnostics, Fallback, Switchable Data Rates, Remote Diagnostics
Distribution Method: End user
Price: $675
Number Installed to Date: 5,000
Date First Installed: 1981

GENERAL DATACOMM INDUSTRIES, INC.
DC 201C
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Synchronous - 2,400 bps
Interface: RS-232C, CCITT-V.24, CCITT V.26, CCITT V.28
Bell-Compatible: 201
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Add-on
Features: Autodial, Autoanswer, Alternate Voice/Data, Diagnostics
Distribution Method: End user
Date First Installed: 1980

GENERAL DATACOMM INDUSTRIES, INC.
DC 201C-K
Modem Class: Long-Haul
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Half-Duplex
Transmission Rate: Asynchronous - 300 bps, 600 bps, 1,800 bps; Asynchronous/Synchronous - 1,200 bps, 2,400 bps
Interface: RS-232C, CCITT V.24, CCITT V.26, CCITT V.28
Bell-Compatible: 201
Transmission Medium: Voice-Grade Lines
Diagnostics: No
Features: Autodial, Autoanswer, Alternate Voice/Data, Diagnostics, Fallback, Switchable Data Rates, Serial Autodial
Distribution Method: End user
Price: $750
Date First Installed: 1982

GENERAL DATACOMM INDUSTRIES, INC.
DC 2028/T
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 1,200 bps, 1,800 bps
Interface: RS-232C
Bell-Compatible: 202
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Reverse Channel, Diagnostics, Switchable Data Rates
Distribution Method: End user, Third-party
Price: $405
Number Installed to Date: 2,500
Date First Installed: 1980

GENERAL DATACOMM INDUSTRIES, INC.
DC 208B/A
Modem Class: Long-Haul
Transmission Technique: Synchronous

Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Synchronous - 4,800 bps
Interface: RS-232C, CCITT V.24, CCITT V.28
Bell-Compatible: 208
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Add-on
Features: Autodial, Autoequalizer, Autoanswer, Alternate Voice/Data, Diagnostics
Distribution Method: End user
Price: $1,595
Number Installed to Date: 4,000
Date First Installed: 1981

GENERAL DATACOMM INDUSTRIES, INC.
DC 212A
Modem Class: Long-Haul
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps; Asynchronous/ Synchronous - 1,200 bps
Interface: RS-232C, CCITT V.24, CCITT V.28
Bell-Compatible: 103, 212
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Add-on
Features: Autodial, Autoequalizer, Autoanswer, Alternate Voice/Data, Diagnostics, Switchable Data Rates
Distribution Method: End user
Price: $940
Number Installed to Date: 980
Date First Installed: 1982

GENERAL DATACOMM INDUSTRIES, INC.
DC 2400ASM
Modem Class: Long-Haul
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps; Asynchronous/ Synchronous - 2,400 bps
Interface: RS-232C, CCITT V.24, CCITT V.28, CCITT V.28
Bell-Compatible: 201
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Add-on
Features: Diagnostics, Fallback, Switchable Data Rates, Point to Point
Distribution Method: End user, Third-party
Price: $795
Number Installed to Date: 3,000
Date First Installed: 1981

GENERAL DATACOMM INDUSTRIES, INC.
DC 4800
Modem Class: Long-Haul
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 1,200 bps, 1,800 bps, 2,400 bps; Asynchronous/Synchronous - 4,800 bps
Interface: RS-232C, CCITT V.24, CCITT V.28
Bell-Compatible: 208
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Add-on
Features: Autodial, Autoequalizer, Autoanswer, Alternate Voice/Data, Diagnostics, Remote Diagnostics
Distribution Method: End user, Third-party
Price: $1,475
Number Installed to Date: 2,000
Date First Installed: 1982

GENERAL DATACOMM INDUSTRIES, INC.
DC 4800B
Modem Class: Long-Haul
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Half-Duplex
Transmission Rate: Asynchronous - 1,200 bps, 1,800 bps, 2,400 bps; Asynchronous/Synchronous - 4,800 bps
Interface: RS-232C, CCITT V.24, CCITT V.28
Bell-Compatible: 208
Transmission Medium: Voice-Grade Lines
Diagnostics: No
Features: Autodial, Autoequalizer, Autoanswer, Alternate Voice/Data, Diagnostics, Serial Autodial
Distribution Method: End user, Third-party
Price: $1,445
Number Installed to Date: 500
Date First Installed: 1983

GENERAL DATACOMM INDUSTRIES, INC.
DC 4827
Modem Class: Long-Haul
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 600 bps, 1,200 bps, 1,800 bps; Asynchronous/Synchronous - 2,400 bps, 4,800 bps
Interface: RS-232C, CCITT V.24, CCITT V.27, CCITT V.28
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Add-on
Features: Autoequalizer, Diagnostics, Fallback, Switchable Data Rates, Remote Diagnostics
Date First Installed: 1982

GENERAL DATACOMM INDUSTRIES, INC.
DC 9600
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Synchronous - 4,800 bps, 9,600 bps; Asynchronous/Synchronous - 7,200 bps
Interface: RS-232C, CCITT V.24, CCITT V.29
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Add-on
Features: Autoequalizer, Diagnostics, Fallback, Switchable Data Rates, Point to Point
Date First Installed: 1980

GENERAL DATACOMM INDUSTRIES, INC.
DC 9600 EP
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Synchronous - 4,800 bps, 9,600 bps; Asynchronous/Synchronous - 7,200 bps
Interface: RS-232C, CCITT V.24, CCITT V.28, CCITT V.29
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Add-on
Features: Autoequalizer, Diagnostics, Fallback, Switchable Data Rates, Point to Point
Distribution Method: End user, Third-party
Price: $2,730
Number Installed to Date: 500
Date First Installed: 1983

GENERAL DATACOMM INDUSTRIES, INC.
DC 9600 OP
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Synchronous - 4,800 bps, 9,600 bps; Asynchronous/Synchronous - 7,200 bps
Interface: CCITT V.29
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autoequalizer, Diagnostics, Fallback
Distribution Method: End user, Third-party
Price: $2,995
Number Installed to Date: 1,500
Date First Installed: 1982

GENERAL DATACOMM INDUSTRIES, INC.
DC 9600 OPB
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Synchronous - 4,800 bps, 9,600 bps; Asynchronous/Synchronous - 7,200 bps
Interface: RS-232C, CCITT V.24, CCITT V.28, CCITT V.29
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Add-on
Features: Autoequalizer, Diagnostics, Fallback, Switchable Data Rates, Multipoint
Date First Installed: 1983

GENERAL DATACOMM INDUSTRIES, INC.
GDC 103J-M
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps
Interface: RS-232C, CCITT V.24, CCITT V.28
Bell-Compatible: 103
Transmission Medium: Voice-Grade Lines
Diagnostics: No
Features: Autoanswer, Alternate Voice/Data, Diagnostics
Distribution Method: End user
Price: $240
Date First Installed: 1981

GENERAL DATACOMM INDUSTRIES, INC.
GDC 212 ED
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 300 bps, 1,200 bps
Interface: RS-232C
Bell-Compatible: 103, 113, 212
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autodial, Autoequalizer, Diagnostics
Distribution Method: End user, Third-party
Price: $535
Number Installed to Date: 200
Date First Installed: 1983

GENERAL DATACOMM INDUSTRIES, INC.
GDC 21288
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps, 1,200 bps
Interface: RS-232C
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autodial, Autoequalizer, Autoanswer, Diagnostics
Distribution Method: Third-party
Price: $435
Number Installed to Date: 200
Date First Installed: 1983

GENERAL DATACOMM INDUSTRIES, INC.
GDC 21288
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps, 1,200 bps
Interface: RS-232C, CCITT V.24, CCITT V.28
Bell-Compatible: 103, 212
Transmission Medium: Voice-Grade Lines
Diagnostics: No
Features: Autoequalizer, Autoanswer, Alternate Voice/Data, Diagnostics, Switchable Data Rates
Distribution Method: End user
Date First Installed: 1984

Modems

GENERAL DATACOMM INDUSTRIES, INC.
GDC 2400 ED
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps, 1,200 bps
Interface: RS-232C, CCITT V.24, CCITT V.28
Bell-Compatible: 103, 212
Transmission Medium: Voice-Grade Lines
Features: Autoequalizer, Autoanswer, Alternate Voice/Data, Diagnostics, Switchable Data Rates, Serial Autodial
Distribution Method: End user
Date First Installed: 1984

GENERAL DATACOMM INDUSTRIES, INC.
GDC 9604 WITH 4 CHANNEL MULTIPLEXER
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Synchronous - 4,800 bps, 9,600 bps; Asynchronous/Synchronous - 7,200 bps
Interface: RS-232C, CCITT V.24, CCITT V.28, CCITT V.29
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Add-on
Features: Autoequalizer, Diagnostics, Multiport, Fallback, Switchable Data Rates, Tail-End Controls
Distribution Method: End user, Third-party
Price: $3,195
Number Installed to Date: 2,500
Date First Installed: 1982

GENERAL DATACOMM INDUSTRIES, INC.
DME-3
Modem Class: Modem Eliminator
Transmission Technique: Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Synchronous - 1,200 bps, 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps
Interface: RS-232C
Transmission Medium: 232 Cable
Features: Switchable Data Rates, Master Timing Source

GENERAL DATACOMM INDUSTRIES, INC.
DC 2030
Modem Class: Short-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Synchronous - 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps, 19,200 bps; Asynchronous/Synchronous - 7,200 bps
Transmission Medium: Nonload Twisted Wire
Diagnostics: Yes; Built-in
Features: Autoequalizer, Diagnostics, Switchable Data Rates, Multidrop, Point to Point
Distribution Method: End user, Third-party
Price: $660
Number Installed to Date: 1,000
Date First Installed: 1982

GENERAL DATACOMM INDUSTRIES, INC.
DC 2030
Modem Class: Short-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Synchronous - 56,000 bps; Asynchronous/Synchronous - 64,000 bps
Interface: CCITT V.35
Transmission Medium: Nonload Twisted Wire
Diagnostics: Yes; Built-in
Features: Autoequalizer, Diagnostics, Multidrop and Point to Point
Distribution Method: End user, Third-party
Price: $805
Number Installed to Date: 1,000
Date First Installed: 1983

GENERAL DATACOMM INDUSTRIES, INC.
GDC LCM 1010/1020
Modem Class: Short-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300, 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps
Transmission Medium: Nonload Wire Line
Features: Autoequalizer, Diagnostics, Multidrop and Point to Point
Distribution Method: End user, Third-party
Price: $295 to $325
Number Installed to Date: 1,500
Date First Installed: 1982

GENERAL DATACOMM INDUSTRIES, INC.
NMS-2020
Modem Class: Short-Haul
Transmission Technique: Synchronous
Transmission Rate: Synchronous - 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps, 19,200 bps; Asynchronous/Synchronous - 7,200 bps
Interface: RS-232C
Transmission Medium: Twisted-Pair Wire Line
Diagnostics: Yes; Built-in
Features: Autoequalizer, Diagnostics, Switchable Data Rates, Supports Netcon
Distribution Method: End user

GENERAL DATACOMM INDUSTRIES, INC.
CSU-550A
Modem Class: Channel Service Unit
Transmission Technique: Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Synchronous - 2,400 bps, 4,800 bps, 9,600 bps, 56,000 bps
Interface: DSU/CSU
Transmission Medium: Digital Links
Diagnostics: No
Features: Switchable Data Rates, Terminated DDS Service
Distribution Method: End user, Third-party

GLENAYRE ELECTRONICS
GL 1102 HF PULSE COMPRESSION
Modem Class: Radio Frequency (RF)
Transmission Technique: Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Synchronous - 300 bps
Interface: RS-232C
Transmission Medium: Radio Links
Diagnostics: Yes; Built-in
Features: Autodial, Alternate Voice/Data, Diagnostics, Fallback
Distribution Method: End user, OEM, Third-party
Price: $6,000 to $8,000
Number Installed to Date: Under 100
Date First Installed: October 1983
(See Vendor Profile Page V-13)

GLENAYRE ELECTRONICS
GL 1142 HF MESSAGE TERMINAL
Modem Class: Radio Frequency
Transmission Technique: Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous/Synchronous - 100 bps
Interface: RS-232C
Transmission Medium: Radio Links
Diagnostics: Yes; Built-in
Features: Autodial, Alternate Voice/Data, Diagnostics, Fallback, Switchable Data Rates, Message Format
Distribution Method: End user, OEM, Third-party
Price: $6,000 to $8,000
Number Installed to Date: 500 - 1,000
Date First Installed: September 1983

GTECH CORP.
CM 7201A
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 1,800 bps
Interface: RS-232C
Bell-Compatible: 202
Transmission Medium: Standard Lease Lines
Diagnostics: No
Distribution Method: End user
Price: $280
Number Installed to Date: Under 100
Date First Installed: September 1983
(See Vendor Profile Page V-13)

GTECH CORP.
GSC 202
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 1,800 bps
Interface: TTL
Bell-Compatible: 202
Transmission Medium: Standard Lease Lines
Diagnostics: Yes; Built-in
Distribution Method: End user
Number Installed to Date: 500 - 1,000
Date First Installed: May 1982

HAYES MICROCOMPUTER PRODUCTS, INC.
MICROMODEM IIE
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps
Interface: Internal Apple Bus
Bell-Compatible: 103
Transmission Medium: Voice-Grade Lines
Diagnostics: No
Features: Autodial, Autoanswer, Switchable Data Rates
Distribution Method: Third-party
Price: $329
Date First Installed: October 1983
(See Vendor Profile Page V-14)

HAYES MICROCOMPUTER PRODUCTS, INC.
MICROMODEM 100
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchrynous - 110 bps, 300 bps
Interface: S100 Bus
Bell-Compatible: 103
Transmission Medium: Voice-Grade Lines
Diagnostics: No
Features: Autodial, Autoanswer, Switchable Data Rates, Pulse/Line Dial Only
Distribution Method: Third-party
Price: $399
Date First Installed: 1977

HAYES MICROCOMPUTER PRODUCTS, INC.
SMARTMODEM 300
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps
Interface: RS-232C
Bell-Compatible: 103
Transmission Medium: Voice-Grade Lines
Diagnostics: No
Feature: Autodial, Switchable Data Rates

Distribution Method: Third-party
Price: $269
Date First Installed: July 1981

HAYES MICROCOMPUTER PRODUCTS, INC.
SMARTMODEM 1200
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps, 1,200 bps
Interface: RS-232C
Bell-Compatible: 103
Transmission Medium: Voice-Grade Lines
Diagnostics: No
Features: Autodial, Switchable Data Rates
Distribution Method: Third-party
Price: $599
Date First Installed: September 1982

HAYES MICROCOMPUTER PRODUCTS, INC.
SMARTMODEM 1200B
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps, 1,200 bps
Interface: IBM PC Bus
Bell-Compatible: 103, 212
Transmission Medium: Voice-Grade Lines
Diagnostics: No
Features: Autodial
Distribution Method: Third-party
Price: $599
Date First Installed: May 1983

HONEYWELL, INC.
DCD6710
Modem Class: Line Driver
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 9,600 bps
Interface: RS-232C, CCITT V.24, 20 MA Current Loop
Transmission Medium: Nonload Metallic Pairs
Diagnostics: Yes; Built-in
Features: Autoequalizer, Diagnostics
Distribution Method: End user, Third-party
Price: $295
(See Vendor Profile Page V-14)

HONEYWELL, INC.
DCD6720
Modem Class: Line Driver
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Synchronous - 19,200 bps
Transmission Medium: Nonload Metallic Pairs
Diagnostics: Yes; Built-in
Features: Autoequalizer, Diagnostics
Distribution Method: End user, Third-party
Price: $595

HONEYWELL, INC.
DCD2021
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 1,200 bps, 1,800 bps
Interface: RS-232C
Bell-Compatible: 202
Transmission Medium: Voice-grade Lines
Diagnostics: Yes; Built-in
Features: Alternate Voice/Data, Autoequalizer, Diagnostics
Distribution Method: End user, Third-party
Price: $495

HONEYWELL, INC.
DCD2011
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Synchronous - 2,400 bps
Interface: RS-232C
Bell-Compatible: 201
Transmission Medium: Voice-grade Lines
Diagnostics: Yes; built-in
Features: Alternate Voice/Data, Automatic Answering, Diagnostics
Distribution Method: End user, Third-party
Price: $995

HONEYWELL, INC.
DCD2012
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Synchronous - 2,400 bps
Interface: RS-232C
Bell-Compatible: 201
Transmission Medium: Voice-grade Lines
Diagnostics: Yes; built-in
Features: Alternate Voice/Data, Automatic Answering, Diagnostics
Distribution Method: End user, Third-party
Price: $995

HONEYWELL, INC.
DCD2021
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Rate: Asynchronous - 1,800 bps
Bell-Compatible: 202
Transmission Medium: Voice-grade Lines
Diagnostics: Yes; built-in
Features: Automatic Answering, Diagnostics
Distribution Method: End user, Third-party
Price: $495

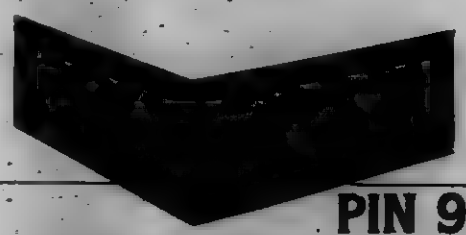
HONEYWELL, INC.
DCD2021
Modem Class: Long-Haul
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 300 bps; Asynchronous/ Synchronous - 1,200 bps
Bell-Compatible: 103, 212
Transmission Medium: Voice-grade Lines
Diagnostics: Yes; built-in
Features: Diagnostics
Distribution Method: End user, Third-party
Price: $995

HONEYWELL, INC.
DCD2121
Modem Class: Long-Haul
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 300 bps; Asynchronous/ Synchronous - 1,200 bps
Bell-Compatible: 103, 113, 212
Transmission Medium: Voice-grade Lines
Diagnostics: Yes; built-in
Features: Alternate Voice/Data, Autoanswer, Diagnostics
Distribution Method: End user, Third-party
Price: $800

IBM
MODEL 3863-1
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Synchronous - 1,200 bps, 2,400 bps
Interface: RS-232C, CCITT V.24, CCITT V.28
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autoequalizer, Autoanswer, Diagnostics, Multiport, Switchable Data Rates
Distribution Method: End user
Price: $2,685
Date First Installed: March 1980
(See Vendor Profile Page V-14)

IBM
MODEL 3863-2
Modem Class: Long-Haul
Transmission Technique: Synchronous

New error correcting Stat Mux for the asynchronous world



PIN 9106

- ☐ Provides error correction and line savings for distributed async minicomputer networks
- ☐ Two async channels up to 9600 bps or four at up to 4800 bps
- ☐ Sync or async composite runs up to 9600 bps
- ☐ Answer control compatible with 212 modems
- ☐ Menu driven parameter selection
- ☐ Hardware and software flow control
- ☐ Down-line loading of parameters and echoplex
- ☐ ALL AT TREMENDOUS SAVINGS

Call 312-541-6060 for details today.

gandalf™

Gandalf Data, Inc./1019 S. Noel Ave./Wheeling, IL 60090/TWX: 910-651-4951

Modems

Transmission Technique: Synchronous
Transmission Mode: Half-Duplex
Transmission Rate: Synchronous - 1,200 bps, 2,400 bps
Interface: RS-232C, CCITT V.24, CCITT V.28
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-In
Features: Autoequalizer, Autoanswer, Diagnostics, Switchable Data Rates, Antistreaming
Distribution Method: End user
Price: $2,935
Date First Installed: March 1980

IBM
MODEL 3864-1
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Synchronous - 2,400 bps, 4,800 bps
Interface: RS-232C, CCITT V.24, CCITT V.27, CCITT V.28
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-In
Features: Autoequalizer, Autoanswer, Diagnostics, Multiport, Antistreaming
Distribution Method: End user
Price: $3,715
Date First Installed: March 1980

IBM
MODEL 3864-2
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex
Transmission Rate: Synchronous - 2,400 bps, 4,800 bps
Interface: RS-232C, CCITT V.24, CCITT V.28
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-In
Features: Autoequalizer, Autoanswer, Diagnostics, Switchable Data Rates, Antistreaming
Distribution Method: End user
Price: $3,925
Date First Installed: March 1980

IBM
MODEL 3865 MODEL 1&2
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Synchronous - 4,800 bps, 9,600 bps
Interface: RS-232C, CCITT V.24, CCITT V.28
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-In
Features: Autoequalizer, Autoanswer, Diagnostics, Multiport, Switchable Data Rates, Antistreaming
Distribution Method: End user
Price: $5,885
Date First Installed: June 1980

IBM
RACK-MOUNTED MODEM 3865 MODEL 1
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Synchronous - 1,200 bps, 2,400 bps
Interface: RS-232C, CCITT V.24
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-In
Features: Autoequalizer, Diagnostics, Multiport, Switchable Data Rates, Antistreaming
Distribution Method: End user
Price: $2,550 to $5,000

IBM
RACK-MOUNTED MODEM 3865 MODEL 2
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Synchronous - 2,400 bps, 4,800 bps
Interface: RS-232C, CCITT V.24, CCITT V.28
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-In
Features: Autoequalizer, Diagnostics, Multiport, Switchable Data Rates, Antistreaming
Distribution Method: End user
Price: $2,550 to $5,000

IBM
RACK-MOUNTED MODEM 3865 MODEL 3
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Synchronous - 4,800 bps, 9,600 bps
Interface: RS-232C, CCITT V.24
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-In
Features: Autoequalizer, Diagnostics, Multiport, Switchable Data Rates, Antistreaming
Distribution Method: End user
Price: $2,550 to $5,000

IBM
RACK-MOUNTED MODEM 3865-MODEL 4
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Synchronous - 4,800 bps, 9,600 bps
Interface: RS-232C, CCITT V.24, CCITT V.28
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-In
Features: Autoequalizer, Diagnostics, Multiport, Switchable Data Rates, Antistreaming
Distribution Method: End user
Price: $2,550 to $5,000

Distribution Method: End user
Price: $2,550 to $5,000

IDE ASSOCIATES, INC.
IDEACOMM 1,200
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 300 bps, 1,200 bps
Interface: RS-232C
Bell-Compatible: 103, 212A
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-In
Features: Autodial, Autoanswer, Alternate Voice/Data, Diagnostics, Switchable Data Rates
Distribution Method: Third-party
Price: $545
Number Installed to Date: 100 - 500
Date First Installed: September 1983
(See Vendor Profile Page V-69)

INFINET, INC.
NCM 14.4
Modem Class: Long-Haul
Transmission Mode: Full-Duplex
Transmission Rate: Synchronous - 9,600 bps, 19,200 bps; Asynchronous/Synchronous - 1,200 bps
Interface: RS-232C
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-In
Features: Autoequalizer, Diagnostics, Multiport, Fallback, Switchable Data Rates, Dial Backup
Distribution Method: End user
(See Vendor Profile Page V-17)

INFINET, INC.
NCM 1200
Modem Class: Long-Haul
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous/ Synchronous - 1,200 bps
Interface: RS-232C
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-In
Features: Reverse Channel, Diagnostics
Distribution Method: End user
Price: $1,200
Number Installed to Date: 1,000 - 5,000

INFINET, INC.
NCM 2400
Modem Class: Long-Haul
Transmission Mode: Full-Duplex
Transmission Rate: Synchronous - 1,200 bps; Asynchronous/ Synchronous - 2,400 bps
Interface: CCITT V.26
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-In
Features: Reverse Channel, Diagnostics, Fallback, Switchable Data Rates
Distribution Method: End user
Price: $1,400
Number Installed to Date: 5,000 - 10,000

INFINET, INC.
NCM 4800
Modem Class: Long-Haul
Transmission Mode: Full-Duplex
Transmission Rate: Synchronous - 2,400 bps; Asynchronous/ Synchronous - 4,800 bps
Interface: CCITT V.27
Transmission Medium: Voice-Grade Lines
Features: Autoequalizer, Reverse Channel, Diagnostics, Fallback, Switchable Data Rates
Distribution Method: End user
Price: $2,400
Number Installed to Date: 1,000 - 5,000

INTERTEL, INC.
NCM 9600
Modem Class: Long-Haul
Transmission Mode: Full-Duplex
Transmission Rate: Synchronous - 4,800 bps, 9,600 bps; Asynchronous/Synchronous - 7200
Interface: CCITT V.29
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-In
Features: Autoequalizer, Reverse Channel, Diagnostics, Multiport, Fallback, Switchable Data Rates
Distribution Method: End user
Price: $4,300
Number Installed to Date: 1,000 - 5,000

INTRONIX SYSTEMS CORP.
LD 210/AS
Modem Class: Line Driver
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 14,400 bps
Interface: RS-232C, CCITT V.24
Bell-Compatible: 43401
Transmission Medium: Unload Metallic Pairs
Features: A/D Loopback
Price: $210
Date First Installed: September 1981
(See Vendor Profile Page V-18)

INTRONIX SYSTEMS CORP.
LD 210/SA
Modem Class: Line Driver
Transmission Technique: Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Synchronous - 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps
Interface: RS-232C, CCITT V.24, CCITT V.28
Bell-Compatible: 43401
Transmission Medium: Unload Metallic Pairs
Price: $350
Date First Installed: September 1981

INTRONIX SYSTEMS CORP.
DL 96/V.29
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Full-Duplex

Transmission Rate: Synchronous - 4,800 bps, 9,600 bps; Asynchronous/Synchronous - 7,200 bps
Interface: CCITT V.28
Transmission Medium: Voice-Grade Lines
Features: Autoequalizer, Alternate Voice/Data
Price: $4,500
Date First Installed: 1981

SPOTRON SYSTEMS CORP.
DL 201C
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Synchronous - 2,400 bps
Interface: RS-232C, CCITT V.24
Bell-Compatible: 201
Transmission Medium: Voice-Grade Lines
Features: Loopback
Price: $950
Date First Installed: 1982

SPOTRON SYSTEMS CORP.
DL 9600/V.29 DSM
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Synchronous - 4,800 bps, 9,600 bps; Asychronous/Synchronous - 7,200 bps
Interface: RS-232C, CCITT V.24, CCITT V.29
Transmission Medium: Voice-Grade Lines
Price: $5,500

SPOTRON SYSTEMS CORP.
DSM 201C
Modem Class: Long-Haul
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous/Synchronous - 2,400 bps
Bell-Compatible: 201
Transmission Medium: Voice-Grade Lines
Price: $925

SPOTRON SYSTEMS CORP.
DSM 212B
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 1,200 bps
Bell-Compatible: 212
Transmission Medium: Voice-Grade Lines
Price: $750

INTEGRATED DESIGN ENGINEERING, INC.
IDE-300
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 300 bps, 1,200 bps
Interface: NCR DM5 Bus
Bell-Compatible: 212
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autodial, Autoanswer, Diagnostics, Switchable Data Rates
Distribution Method: End user
Price: $500
Number Installed to Date: Under 500
Date First Installed: September 1983
(See Vendor Profile Page V-16)

INTERACTIVE SYSTEMS/3M
MODEL 520 AUDIO MODEM
Modem Class: Radio Frequency
Transmission Mode: Full-Duplex
Interface: BELL 3002
Transmission Medium: CATV 75 OHM Cable
Diagnostics: No
Distribution Method: End user
Price: $870
Number Installed to Date: Under 100
Date First Installed: 1977
(See Vendor Profile Page V-16)

INTERACTIVE SYSTEMS/3M
MODEL 720 DATA & CONTROL MODEM
Modem Class: Radio Frequency
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 9,600 bps
Interface: 10 Bit Analog Data
Transmission Medium: CATV 75 Ohm Cable
Diagnostics: Yes; Built-in
Features: Analog Loopback
Distribution Method: End user
Price: $1,390 to $1,490
Number Installed to Date: 100 - 500
Date First Installed: 1982

INTERACTIVE SYSTEMS/3M
MODEL 920 DATA MODEM
Modem Class: Radio Frequency (RF)
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps, 1,800 bps, 10,000 bps; Asynchronous/Synchronous - 600 bps, 1,200 bps, 2,400 bps, 4,800 bps, 9,600 bps
Interface: RS-232C, F Connector
Transmission Medium: CATV 75 Ohm Cable
Features: Analog Loopback
Distribution Method: End user
Price: $890
Number Installed to Date: 500 - 1,000
Date First Installed: 1979

INTERACTIVE SYSTEMS/3M
MODEL 925 DATA MODEM
Modem Class: Radio Frequency
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 2,400 bps, 4,800 bps, 9,600 bps
Interface: RS-232C, F Connector
Transmission Medium: CATV 75 Ohm Cable
Diagnostics: Yes; Built-in
Features: Analog Loopback
Distribution Method: End user
Price: $590
Number Installed to Date: 1,000 - 5,000
Date First Installed: 1982

INTERACTIVE SYSTEMS/3M
MODEL 960 DATA MODEM
Modem Class: Radio Frequency
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps, 600 bps, 1,800 bps, 19,200 bps, 56,000 bps; Asynchronous/Synchronous - 1,200 bps, 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps, 76,800 bps
Interface: RS-232C
Transmission Medium: CATV 75 Ohm Cable
Diagnostics: Yes; Built-in
Features: Analog Loopback
Distribution Method: End user
Price: $980
Number Installed to Date: 100 - 500
Date First Installed: 1978

INTERACTIVE SYSTEMS/3M
MODEL 966 DATA MODEM
Modem Class: Radio Frequency (RF)
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps, 600 bps, 1,800 bps, 19,200 bps, 56,000 bps; Asynchronous/Synchronous - 1,200 bps, 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps, 76,800 bps
Interface: CCITT V.35
Transmission Medium: CATV 75 Ohm Cable
Diagnostics: Yes; Built-in
Features: Analog Loopback
Distribution Method: End user
Price: $1,190
Number Installed to Date: 100 - 500
Date First Installed: 1982

INTERBUSINESS CORP.
212A
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps, 1,200 bps
Interface: RS-232C
Bell-Compatible: 103, 212
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autodial
Distribution Method: Third-party
Price: $585
Number Installed to Date: 1,000 - 5,000
Date First Installed: December 1980
(See Vendor Profile Page V-16)

INTERBUSINESS CORP.
A1200
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps, 1,200 bps
Interface: RS-232C
Bell-Compatible: 103, 212
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autoequalizer, Autoanswer, Diagnostics
Distribution Method: Third-party
Price: $499
Number Installed to Date: 500 - 1,000
Date First Installed: August 1981

INTERBUSINESS CORP.
AC 300
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps
Interface: RS-232C
Bell-Compatible: 103, 113
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autoequalizer, Autoanswer, Diagnostics
Distribution Method: Third-party
Price: $169
Number Installed to Date: 1,000 - 5,000
Date First Installed: October 1980

INTERBUSINESS CORP.
AUTO DIAL 212A
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps, 1,200 bps
Interface: RS-232C
Bell-Compatible: 103, 113, 212
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autodial, Autoanswer, Diagnostics, Fallback, Switchable Data Rates
Distribution Method: Third-party
Price: $599
Number Installed to Date: 1,000 - 5,000
Date First Installed: October 1981

INTERBUSINESS CORP.
M1200
Modem Class: Long-Haul
Transmission Technique: Asynchronous

Modems

Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps, 1,200 bps
Interface: RS-232C
Bell-Compatible: 103, 212
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-In
Features: Autoequalizer, Switchable Data Rates
Distribution Method: Third-party
Price: $449
Number Installed to Date: 1,000 - 5,000
Date First Installed: August 1981

INTERBUSINESS CORP.
OEM
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps, 1,200 bps
Interface: RS-232C
Bell-Compatible: 103, 113, 212
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-In
Features: Autodial, Autoanswer, Fallback
Distribution Method: Third-party
Number Installed to Date: 1,000 - 5,000
Date First Installed: May 1983

INTERBUSINESS CORP.
S-100
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps, 1,200 bps
Interface: RS-232C
Bell-Compatible: 103, 212
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-In
Features: Autodial, Autoanswer, Fallback
Distribution Method: Third-party
Price: $449
Number Installed to Date: 100 - 500
Date First Installed: May 1983

INTERBUSINESS CORP.
STARCOM
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps, 1,200 bps
Interface: RS-232C
Bell-Compatible: 103, 113, 212
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-In
Features: Autodial, Autoanswer, Fallback
Distribution Method: Third-party
Price: $449
Number Installed to Date: 5,000 - 10,000
Date First Installed: October 1981

INTERBUSINESS CORP.
100 RA
Modem Class: Short-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps, 19,200 bps, 56,000 bps
Interface: RS-232C
Bell-Compatible: 43401
Transmission Medium: Voice-Grade Lines
Diagnostics: No
Features: Multiport
Distribution Method: Third-party
Price: $235
Number Installed to Date: 500 - 1,000
Date First Installed: January 1982

INTERBUSINESS CORP.
200
Modem Class: Short-Haul
Transmission Technique: Synchronous
Transmission Rate: Synchronous - 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps, 19,200 bps, 56,000 bps
Interface: RS-232C
Bell-Compatible: 43401
Features: Multiport
Distribution Method: Third-party
Price: $495
Number Installed to Date: 100 - 500
Date First Installed: December 1983

INTER-LINK
CLUSTER MODEM EMULATORS
CME-1R
Modem Class: Modem Eliminator
Transmission Technique: Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Synchronous - 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps
Interface: RS-232C, CCITT V.24, CCITT V.28
Diagnostics: No
Features: Switchable Data Rates,
Distribution Method: Third-party
Price: $875
Number Installed to Date: Under 100
Date First Installed: February 1983
(See Vendor Profile Page V-16)

INTER-LINK
ME-1R
Modem Class: Modem Eliminator
Transmission Technique: Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Synchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps
Interface: RS-232C, CCITT V.24, CCITT V.28
Diagnostics: Yes; Built-In
Features: Diagnostics, Switchable Data Rates, RTS to CTS Delays
Distribution Method: Third-party
Price: $250
Number Installed to Date: 100 - 500
Date First Installed: 1982

INTER-LINK
LDM-1R
Modem Class: Short-Haul
Transmission Technique: Asynchronous, Synchronous, Isochronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous/ Synchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps
Interface: RS-232C, CCITT V.24, CCITT V.28
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-In
Features: Diagnostics, Switchable Data Rates, RTS and CTS Delays
Distribution Method: Third-party
Price: $245
Number Installed to Date: 100 - 500
Date First Installed: 1982

INTER-LINK
LDM-1V
Modem Class: Short-Haul
Transmission Technique: Asynchronous, Synchronous, Isochronous
Transmission Mode: Full-Duplex
Transmission Rate: Synchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 19,200 bps, 14,400 bps, 56,000 bps; Asynchronous/ Synchronous - Up to 250K bps
Interface: CCITT V.35
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-In
Features: Diagnostics, Switchable Data Rates, RTS and CTS Delays
Distribution Method: Third-party
Price: $600
Number Installed to Date: Under 100
Date First Installed: November 1983

INTERNATIONAL DATA SCIENCES, INC.
PHONE LINK ACOUSTIC MODEM
Modem Class: Coupler
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps
Interface: RS-232C
Bell-Compatible: 113
Transmission Medium: Voice-Grade Lines
Diagnostics: No
Features: Self-Test Function
Distribution Method: End user
Price: $189
Number Installed to Date: Under 100
Date First Installed: 1983
(See Vendor Profile Page V-16)

INTERNATIONAL DATA SCIENCES, INC.
AUTO LINK 212
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 300 bps, 1,200 bps
Interface: RS-232C
Bell-Compatible: 212
Transmission Medium: Voice-Grade Lines
Features: Autoanswer, Alternate Voice/Data, Switchable Data Rates, Analog Loopback
Distribution Method: End user
Price: $549
Number Installed to Date: Under 100
Date First Installed: 1983

INTERNATIONAL DATA SCIENCES, INC.
AUTO LINK 1200
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 1,200 bps
Interface: RS-232C
Bell-Compatible: 212
Transmission Medium: Voice-Grade Lines
Features: Autoanswer, Alternate Voice/Data, Analog Loopback
Distribution Method: End user
Price: $499
Number Installed to Date: Under 100
Date First Installed: 1983

INTERNATIONAL DATA SCIENCES, INC.
AUTODIAL 212
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 300 bps, 1,200 bps
Interface: RS-232C
Bell-Compatible: 103, 212
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-In
Features: Autodial, Autoanswer, Switchable Data Rates, Analog Loopback
Distribution Method: End user
Price: $599
Number Installed to Date: Under 100
Date First Installed: 1983

INTERNATIONAL DATA SCIENCES, INC.
MICRO LINK 300
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps
Interface: RS-232C
Bell-Compatible: 103, 113
Transmission Medium: Voice-Grade Lines

Diagnostics: No
Features: Autoanswer, Alternate Voice/Data, Analog Loopback
Distribution Method: End user
Price: $239
Date First Installed: 1983

INTERNATIONAL DATA SCIENCES, INC.
MICRO LINK 1200
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 1,200 bps
Interface: RS-232C
Bell-Compatible: 212
Transmission Medium: Voice-Grade Lines
Diagnostics: No
Features: Alternate Voice/Data, Analog Loopback
Distribution Method: End user
Price: $449
Number Installed to Date: Under 100
Date First Installed: 1983

INTERNATIONAL DATA SCIENCES, INC.
PASSWORD AUTODIAL 212A MODEM
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 300 bps, 1,200 bps
Interface: RS-232C
Bell-Compatible: 103, 212
Transmission Medium: Voice-Grade Lines
Features: Autodial, Autoanswer, Switchable Data Rates
Distribution Method: End user
Price: $449
Number Installed to Date: Under 100
Date First Installed: 1983

INTERNATIONAL DATA SCIENCES, INC.
MODEL 6110
Modem Class: Modem Eliminator
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps, 600 bps; Asynchronous/Synchronous - 1,200 bps, 1,800 bps, 2,400 bps, 7,200 bps; Synchronous - 4,800 bps, 9,600 bps, 14,400 bps, 19,200 bps
Interface: RS-232C
Transmission Medium: Low-Capacity Cable
Distribution Method: End user
Price: $370
Number Installed to Date: 100 - 500
Date First Installed: 1980

INTERNATIONAL DATA SCIENCES, INC.
MODEL 6000H
Modem Class: Short-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Synchronous - 9,600 bps, 14,400 bps
Interface: RS-232C
Bell-Compatible: 43401
Transmission Medium: Twisted-Pair Conductor
Diagnostics: Yes; Built-in
Features: Diagnostics, Switchable Data Rates, Analog Loopback
Distribution Method: End user
Price: $750
Number Installed to Date: 100 - 500
Date First Installed: 1980

INTERNATIONAL DATA SCIENCES, INC.
MODEL 6000L
Modem Class: Short-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Synchronous - 2,400 bps, 4,800 bps, 9,600 bps
Interface: RS-232C
Bell-Compatible: 43401
Transmission Medium: Twisted Pair
Diagnostics: Yes; Built-in
Features: Diagnostics, Switchable Data Rates, Analog Loopback
Distribution Method: End user
Price: $750
Number Installed to Date: 100 - 500
Date First Installed: 1980

INTERNATIONAL DATA SCIENCES, INC.
MODEL 6200
Modem Class: Short-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps
Interface: RS-232C, TTY Current Loop
Transmission Medium: Metallic Twisted Pair
Features: Analog Loopback
Distribution Method: End user
Price: $250
Number Installed to Date: 100 - 500
Date First Installed: 1980

INTERNATIONAL DATA SCIENCES, INC.
MODEL 6220
Modem Class: Short-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps
Interface: RS-232C, TTY Current Loop
Bell-Compatible: 43401
Transmission Medium: Metallic Twisted Pair
Diagnostics: Yes; Built-in
Features: Analog Loopback
Distribution Method: End user
Price: $300
Number Installed to Date: 100 - 500
Date First Installed: 1980

INTERNATIONAL DATA SCIENCES, INC.
MODEL 6240
Modem Class: Short-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps
Interface: RS-232C, TTY Current Loop
Bell-Compatible: 43401
Transmission Medium: Twisted Pair Conductor
Diagnostics: Yes; Built-in
Features: Diagnostics, Analog Loopback
Distribution Method: End user
Price: $400

INTERNATIONAL MODEM EXCHANGE (TIMEDOR)
THE OPERATOR
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps
Bell-Compatible: 103
Transmission Medium: Voice-Grade Lines
Diagnostics: No
Features: Autoanswer, Switchable Data Rates, Autodisconnect
Distribution Method: End user
Price: $159
Date First Installed: May 1983
(See Vendor Profile Page V-17)

ITT TELECOMM PRODUCTS, INC.
828-646-666-66X
Modem Class: Digital
Transmission Technique: Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous/Synchronous - 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps, 19,200 bps, 56K bps
Interface: RS-232C, RS-449, CCITT V.35
Transmission Medium: Four-Wire Circuit
Diagnostics: Yes; Built-in
Features: Switchable Data Rates, Autoequalizer, Diagnostics
Distribution Method: End user
Price: $775 - $1,200
Number Installed to Date: 1,000 - 5,000
(See Vendor Profile Page V-17)

J B I ELECTRONICS
MODEM SAVER
Modem Class: Modem Eliminator
Transmission Technique: Synchronous
Transmission Rate: Synchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps, 19,200 bps, 56,000 bps
Interface: RS-232C
Transmission Medium: Digital Links
Diagnostics: No
Distribution Method: Third party
Price: $265
Number Installed to Date: 1,000 - 5,000
Date First Installed: September 1978
(See Vendor Profile Page V-00)

J B I ELECTRONICS
ASYNCHRONOUS/SYNCHRONOUS LINE DRIVER
Modem Class: Line Driver
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Half-Duplex
Transmission Rate: Asynchronous/Synchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps, 19,200 bps, 56,000 bps
Interface: RS-232C
Transmission Medium: Voice-Grade Lines
Diagnostics: No
Distribution Method: Third-Party
Price: $135 - $225
Number Installed to Date: 1,000 - 5,000
Date First Installed: September 1980

KAPUR LABORATORIES
DT 19.2 DATA TRANSCEIVER
Modem Class: Short-Haul
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous/Synchronous - 14,400 bps
Interface: RS-232C
Bell-Compatible: 43401
Transmission Medium: Metallic Circuit
Diagnostics: No
Distribution Method: End user
Price: $1,190
Number Installed to Date: 500 - 1,000
(See Vendor Profile Page V-17)

KANFMAN RESEARCH MANUFACTURING, INC.
401 MODEM/PORT CONTENTION UNIT
Modem Class: Modem Eliminator
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex
Transmission Rate: Synchronous - 14,400 bps
Interface: RS-232C
Transmission Medium: Voice-Grade Lines
Diagnostics: No
Features: Switchable Data Rates, Enable/Disable Switch
Distribution Method: End user, Third-party
Price: $985
Number Installed to Date: 100 - 500

Modems

Date First Installed: 1979
(See Vendor Profile Page V-17)

KINEX CORP.
SAB-2X4
Modem Class: Line Driver
Transmission Technique: Asynchronous, Synchronous, Isochronous
Transmission Mode: Half-Duplex, Full-Duplex, Simplex
Transmission Rate: Asynchronous/Synchronous - 600 bps, 1,200 bps, 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps
Interface: RS-232C, CCITT V.24, CCITT V.28
Transmission Medium: Metallic Conductor
Features: Diagnostics, Fallback, Switchable Data Rates, Strappable Equalizer
Distribution Method: Third-party
Price: $545
Number Installed to Date: 500 - 1,000
Date First Installed: 1981
(See Vendor Profile Page V-17)

KINEX CORP.
2400/FDX
Modem Class: Long-Haul
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous/Synchronous - 1,200 bps, 2,400 bps
Interface: RS-232C, CCITT V.24, CCITT V.28
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autoequalizer, Autoanswer, Alternate Voice/Data, Diagnostics, Fallback, Switchable Data Rates, Echo Canceling
Distribution Method: Third-party

KINEX CORP.
4800/208/AB
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Synchronous - 4,800 bps
Interface: RS-232C, CCITT V.24, CCITT V.28
Bell-Compatible: 208A/B
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autoequalizer, Autoanswer, Alternate Voice/Data, Reverse Channel, Diagnostics, Fallback, Switchable Data Rates
Distribution Method: Third-party
Price: $1,725
Number Installed to Date: 500 - 1,000
Date First Installed: May 1981

KINEX CORP.
4800/27
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Synchronous - 2,400 bps, Synchronous - 4,800 bps
Interface: RS-232C, CCITT V.24, CCITT V.28
Bell-Compatible: V.27 BIS
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autoequalizer, Autoanswer, Alternate Voice/Data, Reverse Channel, Diagnostics, Multiport, Fallback, Switchable Data Rates
Distribution Method: Third-party
Price: $2,225
Date First Installed: 1981

KINEX CORP.
9600/29
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Synchronous - 4,800 bps, 9,600 bps; Asynchronous/Synchronous - 7,200 bps
Interface: RS-232C, CCITT V.24, CCITT V.28
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autoequalizer, Alternate Voice/Data, Diagnostics, Fallback, Switchable Data Rates
Distribution Method: Third-party
Price: $2,750
Number Installed to Date: 100 - 500
Date First Installed: 1982

KINEX CORP.
9600/DCM
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Synchronous - 4,800 bps, 9,600 bps, 19,200 bps; Asynchronous/Synchronous - 7,200 bps
Interface: RS-232C, CCITT V.24, CCITT V.28
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autoequalizer, Autoanswer, Diagnostics, Switchable Data Rates, Data Compression Capabilities
Distribution Method: Third-party
Price: $3,650
Number Installed to Date: Under 100
Date First Installed: 1983

KINEX CORP.
9600/FP
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex
Transmission Rate: Synchronous - 4,800 bps, 9,600 bps; Asynchronous/Synchronous - 7,200 bps
Interface: RS-232C, CCITT V.24, CCITT V.28
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autoequalizer, Diagnostics, Fallback, Switchable Data Rates, Simulated Control Carrier
Distribution Method: Third-party
Price: $3,650
Number Installed to Date: Under 100
Date First Installed: 1983

KINEX CORP.
4-WIRE BASEBAND
Modem Class: Short-Haul
Transmission Technique: Asynchronous, Synchronous, Isochronous
Transmission Mode: Half-Duplex, Full-Duplex, Simplex
Transmission Rate: Asynchronous/Synchronous - 600 bps, 1,200 bps, 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps
Interface: RS-232C, CCITT V.24, CCITT V.28
Transmission Medium: Metallic Conductor
Diagnostics: Yes; Built-in
Features: Diagnostics, Fallback, Switchable Data Rates, Strappable Equalizer
Distribution Method: Third-party

KINEX CORP.
2400/201C
Modem Class: Short-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Synchronous - 1,200 bps, 2,400 bps
Interface: RS-232C, CCITT V.24, CCITT V.28
Bell-Compatible: 201C
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autoanswer, Reverse Channel, Diagnostics, Fallback, Switchable Data Rates
Distribution Method: Third-party

LEE SYSTEMS, INC.
401
Modem Class: Infrared
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 14,400 bps; Asynchronous/Synchronous - 100,000 bps
Interface: RS-232C, RS-449, RS-422, CCITT V.22, CCITT V.24, CCITT V.26, CCITT V.27, CCITT V.28, CCITT V.29, 20 MA Current Loop, 60 MA Current Loop, Mil. 188C
Transmission Medium: Infrared Light
Features: Diagnostics, Fallback, Switchable Data Rates
Distribution Method: Third-party
Price: $8,950
Number Installed to Date: Under 100
Date First Installed: September 1980
(See Vendor Profile Page V-16)

LEE SYSTEMS, INC.
4DT1/7DT1
Modem Class: Infrared
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - T-1
Interface: RS-449, V.35
Bell-Compatible: 551A
Transmission Medium: Infrared Light
Features: Alternate Voice/Data, Diagnostics
Distribution Method: Third-party
Price: $8,450 to $12,550
Number Installed to Date: Under 100
Date First Installed: September 1982

LEXICON CORP. OF MIAMI
LEX-11
Modem Class: Coupler
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 300 bps
Interface: RS-232C
Bell-Compatible: 103
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Diagnostics
Distribution Method: Third-party
Price: $145
Number Installed to Date: 5,000 - 10,000
Date First Installed: 1983
(See Vendor Profile Page V-16)

LEXICON CORP. OF MIAMI
LEX-11 CCI II
Modem Class: Coupler
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 300 bps
Interface: RS-232C

Bell-Compatible: 103
Transmission Medium: Voice-Grade Lines
Diagnostics: No
Distribution Method: Third-party
Price: $176
Number Installed to Date: 10,000 - 50,000
Date First Installed: 1983

LEXICON CORP. OF MIAMI
LEX-11 CCI 88
Modem Class: Coupler
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 300 bps
Interface: RS-232C
Transmission Medium: Voice-Grade Lines
Diagnostics: No
Distribution Method: Third-party
Price: $215
Number Installed to Date: 10,000 - 50,000
Date First Installed: 1983

LEXICON CORP. OF MIAMI
LEX-11B
Modem Class: Coupler
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 300 bps
Interface: RS-232C
Bell-Compatible: 103
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-In
Features: Diagnostics
Distribution Method: Third-party
Price: $185
Number Installed to Date: 10,000 - 50,000
Date First Installed: 1983

LEXICON CORP. OF MIAMI
LEX-12
Modem Class: Coupler
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 300 bps
Interface: RS-232C
Bell-Compatible: 103
Transmission Medium: Voice-Grade Lines
Features: Switch to Handset
Distribution Method: Third-party
Price: $165
Number Installed to Date: 10,000 - 50,000
Date First Installed: 1981

LEXICON CORP. OF MIAMI
LEX-12B
Modem Class: Coupler
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 300 bps
Interface: RS-232C
Bell-Compatible: 103
Transmission Medium: Voice-Grade Lines
Diagnostics: No
Features: Switch to Handset
Distribution Method: Third-party
Price: $205
Number Installed to Date: 10,000 - 50,000
Date First Installed: 1981

LEXICON CORP. OF MIAMI
LEX-15
Modem Class: Coupler
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex
Transmission Rate: Asynchronous - 1,200 bps
Interface: RS-232C
Bell-Compatible: 202
Transmission Medium: Voice-Grade Lines
Diagnostics: No
Features: Switchable Data Rates, Switch to Handset
Distribution Method: Third-party
Price: $325
Number Installed to Date: 10,000 - 50,000
Date First Installed: 1982

LEXICON CORP. OF MIAMI
LEX-15B
Modem Class: Coupler
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex
Transmission Rate: Asynchronous - 1,200 bps
Interface: RS-232C
Bell-Compatible: 202
Transmission Medium: Voice-Grade Lines
Diagnostics: No
Features: Switchable Data Rates, Switch to Handset
Distribution Method: Third-party
Price: $395
Number Installed to Date: 10,000 - 50,000
Date First Installed: 1982

LEXICON CORP. OF MIAMI
LEX-10
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 300 bps
Interface: RS-232C
Bell-Compatible: 103
Transmission Medium: Voice-Grade Lines
Diagnostics: No
Features: Autoanswer
Distribution Method: Third-party
Price: $119
Number Installed to Date: 10,000 - 50,000
Date First Installed: 1980

LEXICON CORP. OF MIAMI
LEX-10B
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 300 bps
Interface: RS-232C
Bell-Compatible: 103
Transmission Medium: Voice-Grade Lines
Diagnostics: No
Features: Autoanswer
Distribution Method: Third-party
Price: $159
Number Installed to Date: 10,000 - 50,000
Date First Installed: 1980

SIVA-GNB LINKABIT, INC.
LM 48
Modem Class: Satellite
Transmission Technique: Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Synchronous - 6,000 bps
Interface: CCITT V.35, T-1, DSI, TTL
Transmission Medium: Digital Links
Diagnostics: Yes, Built-In
Features: Diagnostics
Distribution Method: End user
Price: $223 - $256
Number Installed to Date: Under 500
Date First Installed: 1979
(See Vendor Profile Page V-16)

MARZAR CORP.
Z9600
Modem Class: Short-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps
Interface: RS-232C, CCITT V.24
Transmission Medium: Voice-Grade Lines
Features: Reverse Channel, Diagnostics, Fallback, Automatic Data Rates
Distribution Method: End user
Price: $167
Number Installed to Date: 500 - 1,000
Date First Installed: March 1980
(See Vendor Profile Page V-16)

MANAGE, INC.
FOM-232A
Modem Class: Fiber-Optic
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous/Synchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps, 19,200 bps, 56,000 bps
Interface: RS-232C
Transmission Medium: Fiber Optics
Diagnostics: No
Distribution Method: End user, OEM
Price: $475
Number Installed to Date: Under 100
Date First Installed: September 1980
(See Vendor Profile Page V-16)

MANAGE, INC.
FOM-1232
Modem Class: Fiber-Optic
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps, 19,200 bps, 56,000 bps
Interface: RS-232C
Transmission Medium: Fiber Optics
Diagnostics: No
Distribution Method: End user, OEM
Price: $325
Number Installed to Date: Under 100

MATH ASSOCIATES, INC.
XR-1000
Modem Class: Fiber-Optic
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - Up to 100K bps
Interface: RS-232C
Transmission Medium: Fiber Optics
Diagnostics: No
Features: Diagnostics
Distribution Method: End user, OEM, Third-party
Price: $950
Number Installed to Date: Under 100
Date First Installed: October 1981
(See Vendor Profile Page V-16)

MATH ASSOCIATES, INC.
XR-1100
Modem Class: Fiber-Optic
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - Up to 100K bps
Interface: RS-232C
Transmission Medium: Fiber Optics
Diagnostics: No
Distribution Method: End user, OEM
Price: $410
Number Installed to Date: 100 - 500
Date First Installed: August 1979

MATH ASSOCIATES, INC.
XR-1100/55
Modem Class: Fiber-Optic
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - Up to 100K bps
Interface: RS-232C, RS-422
Transmission Medium: Fiber Optics
Diagnostics: No
Features: Direct Plug-In Module
Distribution Method: End user, OEM, Third-party
Price: $349
Number Installed to Date: 100 - 500
Date First Installed: February 1983

MFJ ENTERPRISES
MFJ 1233
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex

Transmission Rate: Asynchronous - 300 bps
Interface: RS-232C, TTL
Bell-Compatible: 103
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-In
Features: Alternate Voice/Data, Diagnostics
Distribution Method: End user, Third-party
Price: $129
Date First Installed: January 1982
(See Vendor Profile Page V-19)

MICOM SYSTEMS, INC.
M4000P
Modem Class: Line Driver
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 14,400 bps
Interface: RS-232C, CCITT V.24, CCITT V.28
Transmission Medium: Customer Owned Cable
Diagnostics: No
Features: Diagnostics
Distribution Method: Third-party
Price: $220
Number Installed to Date: 1,000 - 5,000
Date First Installed: January 1983
(See Vendor Profile Page V-19)

MICOM SYSTEMS, INC.
M4000SP
Modem Class: Line Driver
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Synchronous - 14,400 bps
Interface: RS-232C, CCITT V.28
Transmission Medium: Customer Owned Cable
Diagnostics: No
Features: Diagnostics, Switchable Data Rates
Distribution Method: Third-party
Price: $320
Number Installed to Date: 500 - 1,000
Date First Installed: September 1982

MICOM SYSTEMS, INC.
M430
Modem Class: Line Driver
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 14,400 bps
Interface: RS-232C, CCITT V.24, CCITT V.28
Transmission Medium: Voice-Grade Lines, Customer-Owned Cable
Diagnostics: No
Features: Powered by Interface
Distribution Method: Third-party
Price: $85
Number Installed to Date: 500 - 1,000
Date First Installed: September 1983

MICOM SYSTEMS, INC.
M4024, M4024/ASYNC
Modem Class: Long-Haul
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous/ Synchronous - 2,400 bps
Interface: RS-232C, CCITT V.24, CCITT V.26, CCITT V.28
Bell-Compatible: 201
Transmission Medium: Voice-Grade Lines
Diagnostics: No
Features: Diagnostics, Fallback
Distribution Method: Third-party
Price: $795 to $825
Number Installed to Date: 500 - 1,000
Date First Installed: June 1981

MICOM SYSTEMS, INC.
M4048/DB+
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Synchronous - 4,800 bps
Interface: RS-232C, CCITT V.24, CCITT V.27, CCITT V.28
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-In
Features: Autoequalizer, Autoanswer, Diagnostics, Fallback, Switchable Data Rates
Distribution Method: Third-party
Price: $3,295
Number Installed to Date: Under 100
Date First Installed: December 1983

MICOM SYSTEMS, INC.
M4048/V.27+
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Synchronous - 4,800 bps
Interface: RS-232C, CCITT V.24, CCITT V.26, CCITT V.27, CCITT V.28
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-In
Features: Autoequalizer, Diagnostics, Fallback, Switchable Data Rates
Distribution Method: Third-party
Price: $2,595
Number Installed to Date: 100 - 500
Date First Installed: February 1983

MICOM SYSTEMS, INC.
M4048/V.27-NF
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Synchronous - 4,800 bps
Interface: RS-232C, CCITT V.24, CCITT V.26, CCITT V.27, CCITT V.28
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-In
Features: Autoequalizer, Diagnostics, Fallback, Switchable Data Rates
Distribution Method: Third-party
Price: $1,750
Number Installed to Date: 100 - 500
Date First Installed: February 1983

MICOM SYSTEMS, INC.
M4096/4+
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Synchronous - 9,600 bps
Interface: RS-232C, CCITT V.24, CCITT V.28, CCITT V.29
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-In
Features: Autoequalizer, Diagnostics, Multiport, Fallback, Switchable Data Rates
Distribution Method: Third-party
Price: $3,695
Number Installed to Date: Under 100

MICOM SYSTEMS, INC.
M4096/DB+
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Synchronous - 9,600 bps
Interface: RS-232C, CCITT V.24, CCITT V.27, CCITT V.28, CCITT V.29
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-In
Features: Autoequalizer, Autoanswer, Diagnostics, Fallback, Switchable Data Rates
Distribution Method: Third-party
Price: $3,795
Number Installed to Date: Under 100
Date First Installed: December 1983

MICOM SYSTEMS, INC.
M4096-NF
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Synchronous - 9,600 bps
Interface: RS-232C, CCITT V.24, CCITT V.28, CCITT V.29
Transmission Medium: Voice-Grade Lines
Features: Autoequalizer, Diagnostics, Fallback
Distribution Method: Third-party
Price: $2,695
Number Installed to Date: 500 - 1,000
Date First Installed: June 1982

MICOM SYSTEMS, INC.
M4096/V.29+
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Synchronous - 9,600 bps
Interface: RS-232C, CCITT V.24, CCITT V.27, CCITT V.28, CCITT V.29
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-In
Features: Autoequalizer, Diagnostics, Fallback, Switchable Data Rates
Distribution Method: Third-party
Price: $3,095
Number Installed to Date: 100 - 500
Date First Installed: February 1983

MICOM SYSTEMS, INC.
M401
Modem Class: Short-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 9,600 bps
Interface: RS-232C, CCITT V.24, CCITT V.28
Transmission Medium: Voice-Grade Lines
Diagnostics: No
Features: Diagnostics
Distribution Method: Third-party
Price: $250
Number Installed to Date: 500 - 1,000
Date First Installed: January 1982

MICOM SYSTEMS, INC.
M402
Modem Class: Short-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 14,400 bps
Interface: RS-232C, CCITT V.24, CCITT V.28
Transmission Medium: Voice-Grade Lines
Diagnostics: No
Features: Diagnostics
Distribution Method: Third-party
Price: $330
Number Installed to Date: 500 - 1,000
Date First Installed: September 1981

MICOM SYSTEMS, INC.
M421
Modem Class: Short-Haul
Transmission Technique: Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Synchronous - 14,400 bps
Interface: RS-232C, CCITT V.24, CCITT V.28
Transmission Medium: Voice-Grade Lines
Features: Diagnostics, Switchable Data Rates
Distribution Method: Third-party
Price: $370
Number Installed to Date: 500 - 1,000

Microcomputers for Managements
We don't want to get involved with more than a
protocol and more incompatibilities
Fiber optic cable endorsed by experts as
necessary to install
We are not ready to pull down networks that
we already own, good detail of data processing
Division Group DP Managers want control over
their own local datacomm
Leased Gateways
Packet switched phone network
Packet Data Networks
Digital local networks
WE NEED IT FAST
We don't want to spend a cent and

Modems

Date First Installed: November 1981

MICOM SYSTEMS, INC.
8431
Modem Class: Short-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 14,400 bps
Interface: RS-232C, CCITT V.24, CCITT V.28
Transmission Medium: Voice-Grade Lines
Diagnostics: No
Features: Powered By Interface
Distribution Method: Third-party
Number Installed to Date: 500 - 1,000
Date First Installed: September 1983

MICRO-BAUD SYSTEMS, INC.
96612
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex
Transmission Rate: Asynchronous - 300 bps, Asynchronous - 1,200 bps
Interface: RS-232C, RS-449
Bell-Compatible: 212A
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-In
Features: Autodial, Diagnostics, Switchable Data Rates
Distribution Method: Third-party
Price: $550
Number Installed to Date: 1,000 - 5,000
Date First Installed: January 1982
(See Vendor Profile Page V-19)

MICRO-BAUD SYSTEMS, INC.
96614
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 300 bps, 1,200 bps
Interface: RS-232C
Bell-Compatible: 212A
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-In
Features: Autodial, Diagnostics, Switchable Data Rates, Stores 5 Phone Numbers
Distribution Method: Third-party
Price: $595
Number Installed to Date: 500 - 1,000
Date First Installed: February 1983

MICROCOM, INC.
ERA 2 FOR APPLE IIE
Modem Class: Short-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps, 1,200 bps
Interface: RS-232C
Bell-Compatible: 103, 212
Transmission Medium: Voice-Grade Lines
Diagnostics: No
Features: Autodial, Autoequalizer, Autoanswer, Fallback, Switchable Data Rates
Distribution Method: Third-party
Price: $429
Date First Installed: January 1984
(See Vendor Profile Page V-19)

MICROCOM, INC.
ERA 2 FOR IBM PC
Modem Class: Short-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps, 1,200 bps
Interface: RS-232C
Bell-Compatible: 103, 212
Transmission Medium: Voice-Grade Lines
Diagnostics: No
Features: Autoequalizer, Autoanswer, Fallback, Switchable Data Rates
Distribution Method: Third-party
Price: $429
Date First Installed: January 1984

MICROCOM, INC.
ERA 2 FOR IBM PC JR
Modem Class: Short-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps, 1,200 bps
Interface: RS-232C
Bell-Compatible: 103
Transmission Medium: Voice-Grade Lines
Diagnostics: No
Features: Autodial, Autoequalizer, Autoanswer, Fallback, Switchable Data Rates
Distribution Method: Third-party
Price: $429
Date First Installed: January 1984

MICROCOM, INC.
PCS FLASH 2000 NETWORKING MODEM
Modem Class: Short-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps, 1,200 bps
Interface: RS-232C
Bell-Compatible: 103, 212
Transmission Medium: Voice-Grade Lines
Diagnostics: No
Features: Autodial, Autoequalizer, Autoanswer, Clock Calendar, Fallback, Switchable Data Rates
Distribution Method: Third-party
Price: $995
Date First Installed: November 1983

MICROCOM, INC.
RX FLASH 1000 NETWORKING MODEM
Modem Class: Short-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps, 1,200 bps
Interface: RS-232C
Bell-Compatible: 103, 212
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-In
Features: Autodial, Autoequalizer, Autoanswer, Diagnostics, Multiport, Fallback, Switchable Data Rates
Distribution Method: Third-party
Price: $895
Date First Installed: November 1983

THE MICROPERIPHERAL CORP.
AUTOPRINT MICROCONNECTION
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 300 bps
Interface: RS-232C
Bell-Compatible: 103
Transmission Medium: Voice-Grade Lines
Features: Autodial, Autoanswer, Alternate Voice/Data
Distribution Method: Third-party
Price: $149
Number Installed to Date: 1,000 - 5,000
Date First Installed: January 1979
(See Vendor Profile Page V-18)

THE MICROPERIPHERAL CORP.
RS232
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 300 bps
Interface: RS-232C
Bell-Compatible: 103
Transmission Medium: Voice-Grade Lines
Features: Autodial, Autoanswer, Alternate Voice/Data
Distribution Method: Third-party
Price: $159 to $199
Number Installed to Date: 1,000 - 5,000

THE MICROPERIPHERAL CORP.
SUBMINATURE OEM MODEM
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps
Interface: RS-232C
Bell-Compatible: 103
Transmission Medium: Voice-Grade Lines
Diagnostics: No
Features: Autodial, Autoanswer
Distribution Method: OEM
Price: $80
Number Installed to Date: 1,000 - 5,000

THE MICROPERIPHERAL CORP.
TRS 80 MODEL 1
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 300 bps
Interface: RS-232C
Bell-Compatible: 103
Transmission Medium: Voice-Grade Lines
Features: Autodial, Autoanswer, Alternate Voice/Data
Distribution Method: Third-party
Price: $209 to $259
Number Installed to Date: 1,000 - 5,000

MODULAR INTEGRATION, INC.
MIM-600
Modem Class: Long-Haul
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous/Synchronous - 1,200 bps, 2,400 bps
Interface: RS-232C
Bell-Compatible: 201
Transmission Medium: Voice-Grade Lines
Date First Installed: September 1980
(See Vendor Profile Page V-20)

MUNRHEAD, INC.
H63 GROUP DATA MODEM
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Full-Duplex, Simplex
Transmission Rate: Asynchronous/Synchronous - 48,000 to 172,000 bps
Interface: RS-422, CCITT V.35
Transmission Medium: Group Band Circuits
Diagnostics: Yes; Built-In
Features: Autoequalizer, Diagnostics, Multiport, Simultaneous Voice/Data
Distribution Method: End user
Number Installed to Date: 100 - 500
Date First Installed: 1973
(See Vendor Profile Page V-20)

MULTI — TECH SYSTEMS, INC.
MT 103J
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps
Interface: RS-232C
Bell-Compatible: 103, 113
Transmission Medium: Voice-Grade Lines
Features: Autoanswer, Alternate Voice/Data, Diagnostics
Distribution Method: End user
Price: $250
Date First Installed: July 1979
(See Vendor Profile Page V-20)

MULTI — TECH SYSTEMS, INC.
MT 2018
Modem Class: Long-Haul

Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Synchronous - 2,400 bps
Interface: RS-232C
Bell-Compatible: 201
Transmission Medium: Voice-Grade Lines
Diagnostics: No
Features: Diagnostics
Distribution Method: End user
Price: $685
Date First Installed: September 1982

MULTI — TECH SYSTEMS, INC.
MT 202T
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps, 600 bps, 1,200 bps
Interface: RS-232C
Bell-Compatible: 202
Transmission Medium: Voice-Grade Lines
Diagnostics: No
Features: Diagnostics
Distribution Method: End user
Price: $345
Date First Installed: March 1978

MULTI — TECH SYSTEMS, INC.
MT 212AD
Modem Class: Long-Haul
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps; Asynchronous/ Synchronous - 1,200 bps
Interface: RS-232C
Bell-Compatible: 103, 212
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autodial, Autoanswer, Alternate Voice/Data, Diagnostics, Switchable Data Rates
Distribution Method: End user
Price: $695
Date First Installed: May 1983

MULTI — TECH SYSTEMS, INC.
MT 212AH
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps, 1,200 bps
Interface: RS-232C
Bell-Compatible: 103, 212
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autodial, Autoanswer, Alternate Voice/Data, Diagnostics, Switchable Data Rates
Distribution Method: End user
Price: $549
Date First Installed: September 1983

MULTI — TECH SYSTEMS, INC.
MT 212C
Modem Class: Long-Haul
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous/ Synchronous - 1,200 bps
Interface: RS-232C
Bell-Compatible: 212
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autodial, Autoanswer, Alternate Voice/Data, Diagnostics
Distribution Method: End user
Price: $550
Date First Installed: February 1983

MULTI — TECH SYSTEMS, INC.
MT 212PC
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps, 1,200 bps
Interface: IBM Expansion Slot
Bell-Compatible: 103, 212
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autodial, Autoanswer, Alternate Voice/Data, Diagnostics, Switchable Data Rates, Software
Distribution Method: End user

For a choice instead of a line,

Call GLASGAL

Manufacturer's reps or salesmen usually push only one product line. When Glasgal sales engineers or subdistributors speak, they have over 55 sources of data communication equipment to choose from to make sure that what they recommend is the best technically, at the lowest possible cost, with prompt delivery and hassle free service.

The Glasgal catalog and winter '84 supplement have over 175 pages of system diagrams, charts, brand name product listings and prices. Call for your free copy today.

212's - *from AJ, Cermetek, Concord Data, Datec, GDC, Microcom, Penril, Prentice, Racal Vadic, Rixon (Hayes Compatible), UDS, Ven-Tel.*

Multiplexers - *from Ark, Astrocom, Cermetek, Complexx, Datec, Develcon, GDC, Micom, Network Products, Prentice, Racal Vadic, Rixon, Tellabs, Western Datacom.*

LAN's/Port Selectors - *from Complexx, Develcon, Micom, Network Products, Tellabs.*

Short-Haul Data Sets - *from Ark, Avanti, CRC, Develcon, GDC, Micom, Prentice, RAD, Remark, Rixon, Ven-Tel.*

Protocol Converters - *from Halcyon, Icot, Micom, Microcom, Western Datacom, 3R Computers.*

Full Selection - *switches, cables, cabinets, tools, cable parts, test equipment, transient protectors, patch panels, tie wraps, bridges, dial back-up units, ACU's, DSU's, DAA's, CSU's, error correctors, interface converters, encryption and security devices, network control systems, V.35 equipment, and much more from Amdahl, CD Communications, Com/Tech, Dataprobe, Digilog, Electrodata, Electronic Enclosures, ESL, ITS, Hadax, IMM, Lion, Microframe, Switchcraft, Transtector and VIR, etc.*

Free monthly seminars, 5:30 to 8:00 P.M., middle Wednesday of each month at our building in Northvale. Video tapes of seminars are available. **"Techniques in Data Communications"** by Ralph Glasgal, 209 pages, 2nd edition 9/83, Artech House, now in stock.

GLASGAL COMMUNICATIONS, INC.
307 Washington Street • Northvale, NJ 07647
(201) 768-8082 TWX 710-991-9585

Modems

Price: $549
Date First Installed: November 1983

MULTITRONICS
CATV MODEM
Modem Class: Short-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps
Interface: RS-232C
Transmission Medium: Coaxial
Features: Reverse Channel, Switchable Data Rates
Distribution Method: End user
Price: $2,000
(See Vendor Profile Page V-20)

NCR COMTEN, INC.
NCR COMTEN 7163 0100
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Synchronous - 1,200 bps, 2,400 bps
Interface: RS-232C, CCITT V.24, CCITT V.28
Transmission Medium: Voice-Grade
Diagnostics: Yes; Built-in
Features: Autoequalizer, Autoanswer, Diagnostics, Fallback, Switchable Data Rates, NCCF/NPDA Compatible
Distribution Method: End user
(See Vendor Profile Page V-21)

NCR COMTEN, INC.
NCR COMTEN 7163 0200
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Synchronous - 1,200 bps, 2,400 bps
Interface: RS-232C, CCITT V.24
Transmission Medium: Voice-Grade
Diagnostics: Yes; Built-in
Features: Autoequalizer, Autoanswer, Diagnostics, Fallback, Switchable Data Rates, NCCF/NPDA Compatible
Distribution Method: End user

NCR COMTEN, INC.
NCR COMTEN 7164 0100
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Synchronous - 4,800 bps
Interface: RS-232C, CCITT V.24, CCITT V.28
Transmission Medium: Voice-Grade
Diagnostics: Yes; Built-in
Features: Autoequalizer, Autoanswer, Diagnostics, Fallback, Switchable Data Rates, NCCF/NPDA Compatible
Distribution Method: End user
Price: $3,700
Number Installed to Date: 200
Date First Installed: 1983

NCR COMTEN, INC.
NCR COMTEN 7165 0100
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Synchronous - 9,600 bps
Interface: RS-232C, CCITT V.24, CCITT V.28
Transmission Medium: Voice-Grade
Diagnostics: Yes; Built-in
Features: Autoequalizer, Autoanswer, Diagnostics, Fallback, Switchable Data Rates, NCCF/NPDA Compatible
Distribution Method: End user
Price: $5,800
Number Installed to Date: Under 100
Date First Installed: September 1983

NEC TELEPHONE, INC.
B103JR
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Synchronous - 110 bps, 300 bps
Interface: RS-232C
Bell-Compatible: 103
Transmission Medium: Voice-Grade Lines
Features: Autoequalizer, Autoanswer, Standard Diagnostics
Distribution Method: Third-party
Price: $460
Number Installed to Date: 750
Date First Installed: October 1982
(See Vendor Profile Page V-21)

NEC TELEPHONE, INC.
DSP 208
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex
Transmission Rate: Synchronous - 4,800 bps
Interface: RS-232C
Bell-Compatible: 208
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autoequalizer, Autoanswer, Diagnostics, Fallback
Distribution Method: Third-party
Price: $1,750
Number Installed to Date: 50
Date First Installed: December 1983

NEC TELEPHONE, INC.
DSP 224
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Synchronous - 2,400 bps
Interface: RS-232C
Bell-Compatible: 103, 212
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autoequalizer, Autoanswer, Diagnostics, Clock Calendar, Fallback, Switchable Data Rates
Distribution Method: Third-party
Price: $1,195
Number Installed to Date: 45
Date First Installed: December 1983

NEC TELEPHONE, INC.
DSP 4800-U
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Synchronous - 4,800 bps
Interface: RS-232C
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autoequalizer, Autoanswer, Diagnostics, Clock Calendar, Fallback
Distribution Method: Third-party
Price: $1,695
Number Installed to Date: 800
Date First Installed: December 1982

NEC TELEPHONE, INC.
DSP 9600-U
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Synchronous - 9,600 bps
Interface: RS-232C
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autoequalizer, Autoanswer, Diagnostics, Clock Calendar, Fallback, Switchable Data Rates
Distribution Method: Third-party
Price: $2,695
Number Installed to Date: 400
Date First Installed: December 1982

NEC TELEPHONE, INC.
N113C-DR
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 300 bps
Interface: RS-232C
Bell-Compatible: 113
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autoequalizer, Autoanswer, Standard Diagnostics
Distribution Method: Third-party
Price: $430
Number Installed to Date: 350
Date First Installed: October 1982

NEC TELEPHONE, INC.
N201C
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Synchronous - 2,400 bps
Interface: RS-232C
Bell-Compatible: 201
Transmission Medium: Voice-Grade Lines
Features: Autoequalizer, Autoanswer, Clock Calendar, Fallback, Switchable Data Rates, Standard Diagnostics
Distribution Method: Third-party
Price: $845
Number Installed to Date: 1,200
Date First Installed: January 1983

NEC TELEPHONE, INC.
N201CR
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Synchronous - 2,400 bps
Interface: RS-232C
Bell-Compatible: 201
Transmission Medium: Voice-Grade Lines
Features: Autoequalizer, Autoanswer, Clock Calendar, Fallback, Switchable Data Rates, Standard Diagnostics
Distribution Method: Third-party
Price: $895
Number Installed to Date: 1,500
Date First Installed: July 1982

NEC TELEPHONE, INC.
N2023R
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 1,200 bps
Interface: RS-232C
Bell-Compatible: 202
Transmission Medium: Voice-Grade Lines
Features: Autoequalizer, Autoanswer, Reverse Channel, Standard Diagnostics
Distribution Method: Third-party
Price: $495
Date First Installed: December 1982

NEC TELEPHONE, INC.
N202T
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 1,800 bps

Interface: RS-232C
Bell-Compatible: 202
Transmission Medium: Voice-Grade Lines
Features: Autoequalizer, Autoanswer, Reverse Channel, Standard Diagnostics
Distribution Method: Third-party
Price: $400
Number Installed to Date: 300
Date First Installed: December 1983

NEC TELEPHONE, INC.
N212AR
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 1,200 bps
Interface: RS-232C
Bell-Compatible: 103, 113, 212
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-In
Features: Autoequalizer, Autoanswer, Switchable Data Rates, Standard Diagnostics
Distribution Method: Third-party
Price: $695
Number Installed to Date: 3,000
Date First Installed: July 1982

NEC TELEPHONE, INC.
N212BR
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 1,200 bps
Interface: RS-232C
Bell-Compatible: 103, 113, 212A
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-In
Features: Autodial, Autoequalizer, Autoanswer, Alternate Voice/Data, Fallback, Switchable Data Rates, Standard Diagnostics
Distribution Method: Third-party
Price: $795
Number Installed to Date: 1,200
Date First Installed: October 1982

NEC TELEPHONE, INC.
SP1440-U
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Synchronous - 19,200 bps
Interface: RS-232C
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-In
Features: Autoequalizer, Autoanswer, Diagnostics, Multiport, Clock Calendar, Fallback, Switchable Data Rates
Distribution Method: Third-party
Price: $7,800
Number Installed to Date: 200
Date First Installed: October 1983

NEC TELEPHONE, INC.
SP9600-FAST-U
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Synchronous - 9,600 bps
Interface: RS-232C
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-In
Features: Autoequalizer, Autoanswer, Diagnostics, Clock Calendar, Fallback, Switchable Data Rates
Distribution Method: Third-party
Price: $2,000
Date First Installed: April 1984

NEC TELEPHONE, INC.
SPN 4800-U
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Synchronous - 4,800 bps
Interface: RS-232C
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-In
Features: Autoequalizer, Autoanswer, Diagnostics, Multiport, Clock Calendar, Fallback, Switchable Data Rates
Distribution Method: Third-party
Price: $3,500

NEC TELEPHONE, INC.
SPN 9600-U
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Synchronous - 9,600 bps
Interface: RS-232C
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-In
Features: Autoequalizer, Autoanswer, Diagnostics, Multiport, Clock Calendar, Fallback, Switchable Data Rates
Distribution Method: Third-party
Price: $7,000
Date First Installed: April 1984

NESCO
DSU/CSU 1600 R-4
Modem Class: Digital
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 56,000 bps
Interface: V.35
Bell-Compatible: 501
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-In
Features: Autoequalizer, Alternate Voice/Data, Reverse Channel, Diagnostics, Multiport
Distribution Method: End user
Price: $1,125
(See Vendor Profile Page V-21)

NESCO
DSU/CSU 1600R-3
Modem Class: Digital
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 2,400 bps, 4,800 bps, 9,600 bps
Interface: RS-232C
Bell-Compatible: 5008
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-In
Features: Autoequalizer, Autoanswer, Alternate Voice/Data, Reverse Channel, Diagnostics, Switchable Data Rates
Distribution Method: End user
Price: $795
Number Installed to Date: Under 100
Date First Installed: 1982

NESCO
DSU/CSU 1600R-6
Modem Class: Digital (DSU)
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 2,400 bps, Asynchronous - 4,800 bps, Asynchronous - 9,600 bps
Interface: RS-232C
Bell-Compatible: 500, 501
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-In
Features: Alternate Voice/Data, Diagnostics, Switchable Data Rates
Distribution Method: End user
Price: $700 to $900
Number Installed to Date: 500 - 1,000

NETWORK PRODUCTS, INC.
NP-48
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Synchronous - 4,800 bps
Interface: RS-232C, CCITT V.24
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-In
Features: Autoequalizer, Diagnostics
Distribution Method: End user, Third-party
Price: $1,800
Number Installed to Date: 500 - 1,000
Date First Installed: January 1978
(See Vendor Profile Page V-21)

NETWORK PRODUCTS, INC.
NP-96
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Synchronous - 4,800 bps, 9,600 bps, Asynchronous/Synchronous - 7,200 bps
Interface: RS-232C, CCITT V.24, CCITT V.29
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-In
Features: Autoequalizer, Diagnostics, Fallback, Switchable Data Rates
Distribution Method: End user, Third-party
Price: $2,750
Number Installed to Date: 1,000 - 5,000
Date First Installed: January 1978

NOAKES DATA COMMUNICATIONS, INC.
N76/5-1
Modem Class: Coupler
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 300 bps
Interface: RS-232C, 20 MA Current Loop
Bell-Compatible: 103, 113
Transmission Medium: Switch Network
Distribution Method: End user
Price: $155
Number Installed to Date: 1,000 - 5,000
(See Vendor Profile Page V-22)

NOAKES DATA COMMUNICATIONS, INC.
N76/5-2
Modem Class: Coupler
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 300 bps
Interface: RS-232C, 20 MA Current Loop
Bell-Compatible: 103, 113
Transmission Medium: Switch Network
Distribution Method: End user
Price: $170
Number Installed to Date: 1,000 - 5,000

NOAKES DATA COMMUNICATIONS, INC.
N103-3
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 300 bps
Interface: RS-232C, 20 MA Loop
Bell-Compatible: 103, 113
Transmission Medium: Voice-Grade Lines
Features: Autoanswer
Distribution Method: End user
Price: $365
Number Installed to Date: 1,000 - 5,000

NOAKES DATA COMMUNICATIONS, INC.
N103-4
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 300 bps
Interface: RS-232C, 20 MA Current Loop
Bell-Compatible: 103, 113

Transmission Medium: Voice-Grade Lines
Features: Autodial, Autoanswer, TWX Option
Distribution Method: Third-party
Number Installed to Date: 1,000 - 5,000

NORTHERN TELECOM, INC.
2230
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 300 bps, 600 bps, 1,200 bps
Interface: RS-232C, CCITT V.24
Bell-Compatible: 103, 113
Transmission Medium: Voice-Grade Lines
Features: Autoequalizer, Autoanswer, Alternate Voice/Data, Reverse Channel, Diagnostics, Multiport, Switchable Data Rates
Distribution Method: End user
Price: $675
Number Installed to Date: 500 - 1,000
Date First Installed: June 1982
(See Vendor Profile Page V-22)

NORTHERN TELECOM, INC.
2240
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Synchronous - 2,400 bps
Interface: RS-232C, CCITT V.24
Bell-Compatible: 201
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autoequalizer, Autoanswer, Alternate Voice/Data, Reverse Channel, Diagnostics
Distribution Method: End user
Price: $850
Number Installed to Date: 100 - 500
Date First Installed: April 1981

NORTHERN TELECOM, INC.
2250
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Synchronous - 4,800 bps
Interface: RS-232C, CCITT V.24
Bell-Compatible: 208
Transmission Medium: Voice-Grade Lines
Features: Autoequalizer, Autoanswer, Alternate Voice/Data, Reverse Channel, Diagnostics
Distribution Method: End user
Price: $1,995
Number Installed to Date: 100 - 500
Date First Installed: 1982

NORTHERN TELECOM, INC.
2260
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Synchronous - 9,600 bps
Interface: RS-232C, CCITT V.24
Bell-Compatible: 209
Transmission Medium: Voice-Grade Lines
Features: Autoequalizer, Autoanswer, Alternate Voice/Data, Reverse Channel, Diagnostics
Distribution Method: End user
Price: $2,995
Number Installed to Date: Under 100
Date First Installed: 1982

NOVATION, INC.
CAT
Modem Class: Coupler
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps
Interface: RS-232C
Bell-Compatible: 103, 113
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Diagnostics, Originate/Answer
Distribution Method: OEM, Third-party
Price: $189
(See Vendor Profile Page V-22)

NOVATION, INC.
CCITT CAT
Modem Class: Coupler
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps
Interface: CCITT V.24, CCITT V.28
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Originate/Answer
Distribution Method: OEM, Third-party
Price: $299
Date First Installed: 1980

NOVATION, INC.
21 APPLE-CAT II
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps, 600 bps, 1,200 bps
Interface: Apple Parallel Bus
Bell-Compatible: 103, 113, 202, 212
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autodial, Autoanswer, Alternate Voice/Data, Diagnostics, Switchable Data Rates
Distribution Method: OEM, Third-party
Price: $369 to $725
Date First Installed: September 1982

NOVATION, INC.
103 SMART-CAT
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps
Interface: RS-232C
Bell-Compatible: 103, 113
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autodial, Autoanswer, Alternate Voice/Data, Diagnostics, Switchable Data Rates
Distribution Method: OEM, Third-party
Price: $249
Date First Installed: 1982

NOVATION, INC.
103/212 SMART-CAT
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 300 bps, 1,200 bps
Interface: RS-232C
Bell-Compatible: 103, 113, 212
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autodial, Autoanswer, Alternate Voice/Data, Diagnostics, Switchable Data Rates
Distribution Method: OEM, Third-party
Price: $595
Date First Installed: 1982

NOVATION, INC.
212 AUTO-CAT
Modem Class: Long-Haul
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps: Asynchronous/ Synchronous - 1,200 bps
Interface: RS-232C
Bell-Compatible: 103, 113, 212
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autodial, Autoanswer, Alternate Voice/Data, Diagnostics, Switchable Data Rates
Distribution Method: OEM, Third-party
Price: $695
Date First Installed: 1982

NOVATION, INC.
APPLE-CAT II
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps, 1,200 bps
Interface: Apple Parallel Bus
Bell-Compatible: 103, 113, 202
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autodial, Autoanswer, Alternate Voice/Data, Diagnostics, Switchable Data Rates
Distribution Method: OEM, Third-party
Price: $369

NOVATION, INC.
D-CAT
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps
Interface: RS-232C
Bell-Compatible: 103, 113
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Alternate Voice/Data, Diagnostics
Distribution Method: OEM, Third-party
Price: $199
Date First Installed: 1980

NOVATION, INC.
J-CAT
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps
Interface: RS-232C, TTL
Bell-Compatible: 103, 113
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autodial, Autoanswer, Alternate Voice/Data, Diagnostics
Distribution Method: OEM, Third-party
Price: $149
Date First Installed: 1982

NOVATION, INC.
PC1200B
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchrdnous - 300 bps, 1,200 bps
Interface: IBM PC Parallel Bus
Bell-Compatible: 103, 113, 212
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autodial, Autoanswer, Alternate Voice/Data, Diagnostics, Switchable Data Rates
Distribution Method: OEM, Third-party
Price: $595

NU DATA CORP.
108
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 300 bps
Interface: RS-232C, CCITT V.24
Bell-Compatible: 103, 208
Transmission Medium: Voice-Grade Lines

Features: Autoequalizer, Autoanswer, Switchable Data Rates
Distribution Method: End user, Third-party
(See Vendor Profile Page V-22)

OPTELECOM
4116
Modem Class: Fiber-Optic
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 100M bps
Interface: RS-232C, MIL 188C
Transmission Medium: Fiber Optics
Features: Diagnostics, Multiport
Distribution Method: End user, OEM
Price: $160
Number Installed to Date: 100 - 500
(See Vendor Profile Page V-22)

OPTELECOM
4121
Modem Class: Fiber-Optic
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 100M bps
Interface: RS-232C
Transmission Medium: Fiber Optics
Features: Multiport, Status Lights
Price: $160
Number Installed to Date: 100
Date First Installed: April 1982

OPTICAL COMMUNICATIONS CORP.
FD-10K
Modem Class: Fiber-Optic
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 10,000 bps
Interface: RS-232C
Transmission Medium: Fiber Optics
Diagnostics: Yes; Add-on
Features: Reverse Channel, Diagnostics, Switchable Data Rates
Price: $1,200
(See Vendor Profile Page V-22)

OPTICAL COMMUNICATIONS CORP.
FD-20K
Modem Class: Fiber-Optic
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps, 19,200 bps, 20,000 bps
Interface: RS-232C
Transmission Medium: Fiber Optics
Diagnostics: Yes; Add-on
Features: Reverse Channel, Diagnostics, Switchable Data Rates
Price: $1,600

OPTICAL COMMUNICATIONS CORP.
FD-56K
Modem Class: Fiber-Optic
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps, 19,200 bps, 20,000 bps, 56,000 bps
Interface: RS-232C
Transmission Medium: Fiber Optics
Diagnostics: Yes; Add-on
Features: Reverse Channel, Diagnostics, Switchable Data Rates
Distribution Method: End user

OPTICAL COMMUNICATIONS CORP.
FD-1200
Modem Class: Fiber-Optic
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps, 600 bps, 1,200 bps
Interface: RS-232C
Transmission Medium: Fiber Optics
Diagnostics: Yes; Add-on
Features: Reverse Channel, Diagnostics, Switchable Data Rates
Distribution Method: End user
Price: $1,040
Date First Installed: 1980

PARADYNE CORP.
CHALLENGER 2400
Modem Class: Long-Haul
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous/Synchronous - 1,200 bps, 2,400 bps
Interface: CCITT V.28, CCITT V.27, CCITT V.29
Transmission Medium: Voice-Grade Lines
Features: Diagnostics, Fallback
Price: $700
(See Vendor Profile Page V-23)

PARADYNE CORP.
CHALLENGER 4800
Modem Class: Long-Haul
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous/Synchronous - 2,400 bps, 4,800 bps
Interface: CCITT V.28, CCITT V.27, CCITT V.29
Transmission Medium: Voice-Grade Lines
Features: Diagnostics, Fallback
Price: $1,500

PARADYNE CORP.
CHALLENGER 9600
Modem Class: Long-Haul
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous/Synchronous - 4,800 bps, 9,600 bps; 7,200 bps
Interface: CCITT V.24, CCITT V.28, CCITT V.27, CCITT V.29
Transmission Medium: Voice-Grade Lines
Features: Diagnostics, Fallback
Price: $2,600

PARADYNE CORP.
DTU-1200
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex
Transmission Rate: Asynchronous - 300 bps, 1,200 bps
Bell-Compatible: 212
Transmission Medium: Voice-Grade Lines
Features: Autodial

PARADYNE CORP.
LSI 24C
Modem Class: Long-Haul
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Half-Duplex
Transmission Rate: Asynchronous/Synchronous - 1,200 bps, Asynchronous/Synchronous - 2,400 bps
Interface: RS-232C
Bell-Compatible: 201
Transmission Medium: Voice-Grade Lines
Date First Installed: 1981

PARADYNE CORP.
MP 14.4
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Synchronous - 9,600 bps, 19,200 bps; Asynchronous/Synchronous - 12K bps
Interface: RS-232C, CCITT V.24, CCITT V.28, MIL 188C
Transmission Medium: Voice-Grade Lines
Features: Autodial, Diagnostics, Fallback, 6 Port Mux
Date First Installed: 1980

PARADYNE CORP.
MP 14.4 SB
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Synchronous - 9,600 bps, 19,200 bps; Asynchronous/Synchronous - 12K bps
Interface: RS-232C, CCITT V.28, CCITT V.28, MIL 188C
Transmission Medium: Voice-Grade Lines
Features: 16 Port Statistical Multiplexer

PARADYNE CORP.
MP 16.8
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Synchronous - 9,600 bps; Asynchronous/Synchronous - 16,000 bps
Interface: RS-232C, CCITT V.24, MIL 188C
Transmission Medium: Voice-Grade Lines
Features: Autodial, Diagnostics, Fallback
Date First Installed: 1981

PARADYNE CORP.
MP 48/2088
Modem Class: Long-Haul
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Half-Duplex
Transmission Rate: Asynchronous/Synchronous - 4,800 bps
Interface: CCITT V.27
Bell-Compatible: 208
Transmission Medium: Voice-Grade Lines
Features: Autoanswer
Date First Installed: 1986

PARADYNE CORP.
MPX 2400
Modem Class: Long-Haul
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous/Synchronous - 1,200 bps, 2,400 bps
Interface: CCITT V.28, CCITT V.27, CCITT V.29
Transmission Medium: Voice-Grade Lines
Features: Autoequalizer, Diagnostics, Fallback
Price: $950
Date First Installed: 1988

PARADYNE CORP.
MPX 4800
Modem Class: Long-Haul
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous/Synchronous - 2,400 bps, 4,800 bps
Interface: CCITT V.28, CCITT V.27, CCITT V.29
Transmission Medium: Voice-Grade Lines
Features: Autoequalizer, Diagnostics, Fallback, Multiplexer Option
Price: $2,000
Date First Installed: 1988

PARADYNE CORP.
MPX 9600
Modem Class: Long-Haul
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous/Synchronous - 4,800 bps, 9,600 bps; Synchronous - 7,200 bps
Interface: CCITT V.28, CCITT V.27, CCITT V.29
Transmission Medium: Voice-Grade Lines
Features: Autoequalizer, Multiplexer Option
Price: $3,400
Date First Installed: 1988

Modems

PEDA, INC.
EXT-1212
Modem Class: Short-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex
Transmission Rate: Synchronous - 56,000 bps
Interface: CCITT V.24
Transmission Medium: Cable
Diagnostics: No
Features: Reverse Channel, Multiport, Fallback, Switchable Data Rates
Distribution Method: End user
Price: $1,800
(See Vendor Profile Page V-53)

PEIREL CORP.
300/1200
Modem Class: Long-Haul
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps; Asynchronous/ Synchronous - 1,200 bps
Interface: RS-232C, CCITT V.24, CCITT V.28
Bell-Compatible: 212
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Alternate Voice/Data, Diagnostics, Switchable Data Rates
Distribution Method: Third-party
Price: $525
Number Installed to Date: 5,000 - 10,000
Date First Installed: February 1979
(See Vendor Profile Page V-23)

PEIREL CORP.
300/1200 AUTO DIAL
Modem Class: Long-Haul
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps; Asynchronous/ Synchronous - 1,200 bps
Interface: RS-232C, CCITT V.24, CCITT V.28
Bell-Compatible: 212
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autodial, Autoanswer, Alternate Voice/Data, Diagnostics, Switchable Data Rates
Distribution Method: Third-party
Price: $650
Number Installed to Date: 5,000 - 10,000
Date First Installed: January 1982

PEIREL CORP.
1800 DED
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex, Simplex
Transmission Rate: Asynchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps
Interface: RS-232C, CCITT V.24, CCITT V.28
Bell-Compatible: 202
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Distribution Method: Third-party
Price: $1,695
Number Installed to Date: Under 100
Date First Installed: September 1983

PEIREL CORP.
2129
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex, Simplex
Transmission Rate: Synchronous - 4,800 bps, 9,600 bps
Interface: RS-232C, CCITT V.24, CCITT V.28, CCITT V.29
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autoequalizer, Autoanswer, Alternate Voice/Data; Diagnostics, Fallback, Switchable Data Rates
Distribution Method: Third-party
Price: $2,595

PEIREL CORP.
9201 A/B
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex, Simplex
Transmission Rate: Synchronous - 4,800 bps
Interface: RS-232C, CCITT V.24, CCITT V.28
Bell-Compatible: 208
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autoanswer
Distribution Method: Third-party
Price: $1,750
Number Installed to Date: 500 - 1,000
Date First Installed: January 1982

PEIREL CORP.
9201 DN/PL
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex, Simplex
Transmission Rate: Synchronous - 1,200 bps, 2,400 bps
Interface: RS-232C, CCITT V.24; CCITT V.26, CCITT V.28
Bell-Compatible: 201
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autoanswer, Alternate Voice/Data, Switchable Data Rates
Distribution Method: Third-party
Price: $785 to $795
Number Installed to Date: 1,000 - 5,000
Date First Installed: February 1981

PEIREL CORP.
9202
Modem Class: Short-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex, Simplex
Transmission Rate: Synchronous - 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps
Interface: RS-232C, CCITT V.24, CCITT V.28
Transmission Medium: Nonloaded Cable
Features: Autoequalizer, Diagnostics
Distribution Method: Third-party
Price: $535
Number Installed to Date: 500 - 1,000
Date First Installed: October 1981

PEIREL CORP.
PEH-66A
Modem Class: Short-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex, Simplex
Transmission Rate: Asynchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps, 19,200 bps
Interface: RS-232C, CCITT V.24, CCITT V.28, 20 mA Current Loop
Transmission Medium: Nonloaded Cable
Diagnostics: No
Distribution Method: Third-party
Price: $250
Number Installed to Date: 5,000 - 10,000
Date First Installed: September 1978

PEIREL CORP.
9801C
Modem Class: Autocall Unit
Interface: RS 366
Bell-Compatible: 801C
Transmission Medium: Voice-Grade Lines
Features: Autodial
Distribution Method: Third-party
Price: $675
Number Installed to Date: Under 100
Date First Installed: June 1980

PEIREL CORP.
MCU 48
Modem Class: Port-Sharing
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Interface: RS-232C, CCITT V.24
Diagnostics: No
Distribution Method: OEM
Price: $440
Number Installed to Date: Under 100
Date First Installed: June 1974

PHALO CORP.
ODS-201
Modem Class: Fiber-Optic
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - Up to 100K bps
Interface: RS-232C
Transmission Medium: Fiber Optics
Features: Diagnostics, Remote/Local Loopback
Distribution Method: End user
Price: $625
Date First Installed: 1981
(See Vendor Profile Page V-23)

PHALO CORP.
ODS-209
Modem Class: Fiber-Optic
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous/ Synchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps, 19,200 bps; Synchronous - 56,000 bps
Interface: RS-232C, RS-449, V.35
Transmission Medium: Fiber Optics
Diagnostics: No
Features: Remote/Local Loopback
Distribution Method: End user
Price: $725
Date First Installed: 1981

PHALO CORP.
ODS-308
Modem Class: Fiber-Optic
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Synchronous - 2,000 to 40K bps
Interface: RS-449, V.35
Transmission Medium: Fiber Optics
Diagnostics: No
Features: Remote/Local Loopback
Distribution Method: End user, OEM
Price: $1,750
Date First Installed: 1982

PRENTICE CORP.
ALD/1
Modem Class: Line Driver
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps; 4,800 bps, 9,600 bps

Interface: RS-232C, CCITT V.24, 20 MA Current Loop
Transmission Medium: Twisted-Pair
Features: Diagnostics, Switchable Data Rates
Distribution Method: Third-party
Price: $200 to $300
Number Installed to Date: 10,000 - 50,000
Date First Installed: June 1977
(See Vendor Profile Page V-34)

PRENTICE CORP.
H8LD/1
Modem Class: Line Driver
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Synchronous - 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps
Interface: RS-232C, CCITT V.24
Transmission Medium: Twisted-Pair
Diagnostics: Yes; Built-In
Features: Diagnostics, Fallback, Switchable Data Rates
Distribution Method: Third-party
Price: $390 to $490
Number Installed to Date: 5,000 - 10,000
Date First Installed: January 1977

PRENTICE CORP.
212 TCM
Modem Class: Long-Haul
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps, 1,200 bps
Interface: RS-232C, CCITT V.24
Bell-Compatible: 103, 212
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-In
Features: Autodial, Autoanswer, Alternate Voice/Data, Diagnostics, Switchable Data Rates, Stored Autodial Directory
Distribution Method: Third-party
Price: $695 to $795
Number Installed to Date: 500 - 1,000
Date First Installed: 1982

PRENTICE CORP.
9600A/B
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Synchronous - 2,400 bps, 4,800 bps, 9,600 bps
Interface: RS-232C, CCITT V.24
Transmission Medium: Voice-Grade Lines
Features: Autoequalizer, Autoanswer, Alternate Voice/Data, Diagnostics, Fallback, Switchable Data Rates
Distribution Method: Third-party
Price: $2,995
Date First Installed: January 1984

PRENTICE CORP.
9629
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Synchronous - 2,400 bps, 4,800 bps, 9,600 bps
Interface: RS-232C, CCITT V.24
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-In
Features: Autoequalizer, Diagnostics, Fallback, Switchable Data Rates
Distribution Method: Third-party
Price: $2,650 to $2,750
Number Installed to Date: Under 100
Date First Installed: November 1983

PRENTICE CORP.
P-V.22
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps; Asynchronous/ Synchronous - 600 bps, 1,200 bps
Interface: RS-232C, CCITT V.22, CCITT V.24, CCITT V.28
Bell-Compatible: 212
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-In
Features: Autoanswer, Alternate Voice/Data, Diagnostics, Fallback, Switchable Data Rates
Distribution Method: OEM
Price: $695 to $795
Number Installed to Date: 1,000 - 5,000
Date First Installed: March 1981

PRENTICE CORP.
P-201C
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex, Simplex
Transmission Rate: Synchronous - 2,400 bps
Interface: RS-232C, CCITT V.24
Bell-Compatible: 201
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-In
Features: Autoanswer, Alternate Voice/Data, Diagnostics
Distribution Method: Third-party
Price: $695 to $795
Number Installed to Date: 1,000 - 5,000
Date First Installed: April 1981

PRENTICE CORP.
P-202T
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex, Simplex
Transmission Rate: Asynchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps
Interface: RS-232C, CCITT V.24
Bell-Compatible: 202
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-In
Features: Diagnostics, Switchable Data Rates
Distribution Method: Third-party
Price: $295 to $395
Number Installed to Date: 1,000 - 5,000
Date First Installed: September 1980

PRENTICE CORP.
P-208A/B
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Synchronous - 4,800 bps
Interface: RS-232C, CCITT V.24
Bell-Compatible: 208
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-In
Features: Autoequalizer, Autoanswer, Alternate Voice/Data, Diagnostics
Distribution Method: Third-party
Price: $1,650 to $1,750
Number Installed to Date: Under 100
Date First Installed: September 1983

PRENTICE CORP.
P-212
Modem Class: Long-Haul
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps; Asynchronous/ Synchronous - 1,200 bps
Interface: RS-232C, CCITT V.24
Bell-Compatible: 103, 208
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-In
Features: Autoanswer, Alternate Voice/Data, Diagnostics, Switchable Data Rates
Distribution Method: Third-party
Price: $495 to $595
Number Installed to Date: 5,000 - 10,000
Date First Installed: June 1980

PRENTICE CORP.
TRIMODEM
Modem Class: Long-Haul
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps; Asynchronous/ Synchronous - 1,200 bps
Interface: RS-232C, CCITT V.24
Bell-Compatible: 103, 212, VA 3400
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-In
Features: Autoanswer, Alternate Voice/Data, Diagnostics, Switchable Data Rates
Distribution Method: Third-party
Price: $850 to $950
Number Installed to Date: 500 - 1,000
Date First Installed: February 1982

PULSECOM
4011-10 (108C) RECEIVER
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - Up to 300 bps
Interface: RS-232C, MIL 188-100
Bell-Compatible: 108C
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-In
Features: Diagnostics, Line Impedance Match
Distribution Method: End user, OEM, Third-party
Price: $351
Number Installed to Date: 1,000 - 5,000
Date First Installed: 1979
(See Vendor Profile Page V-34)

PULSECOM
4012-10 (108A) TRANSMITTER
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - Up to 300 bps
Interface: RS-232C, MIL 188-100
Bell-Compatible: 108A
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-In
Features: Switchable Data Rates, Line Impedance Match
Distribution Method: End user, OEM, Third-party
Price: $351
Number Installed to Date: 1,000 - 5,000
Date First Installed: 1979

RACAL-MILGO, INC.
24 LSI MARK II
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Synchronous - 2,400 bps
Interface: RS-232C, CCITT V.24, CCITT V.28
Bell-Compatible: 201B, 201
Transmission Medium: Voice-Grade Lines
Features: Autoequalizer, Autoanswer, Diagnostics
Distribution Method: End user
Price: $1,450 to $2,050
(See Vendor Profile Page V-34)

RACAL-MILGO, INC.
CMS 12
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 1,200 bps
Interface: RS-232C, CCITT V.24
Transmission Medium: Voice-Grade Lines

Modems

Diagnostics: Yes; Built-in
Features: Diagnostics, Dial Back-up
Distribution Method: End user
Price: $1,900 to $2,050

RACAL-MILGO, INC.
CMS 24
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Synchronous - 2,400 bps
Interface: RS-232C, CCITT V.24, CCITT V.28
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Diagnostics, Dial Back-up
Distribution Method: End user
Price: $2,200

RACAL-MILGO, INC.
MODEM 96K
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Synchronous - 56,000 bps
Interface: CCITT V.35
Transmission Medium: Wide-Band Lines
Diagnostics: Yes; Built-in
Features: Statistical Equalizer
Distribution Method: End user
Price: $8,000 to $8,250

RACAL-MILGO, INC.
MODEM 112K
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous/ Synchronous - 112K bps
Interface: CCITT V.35
Transmission Medium: Wide-Band Lines
Diagnostics: Yes; Built-in
Features: Diagnostics, Fallback, Statistical Equalizer
Distribution Method: End user
Price: $16,500 to $17,400

RACAL-MILGO, INC.
MPS 14.4K
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Synchronous - 19,200 bps
Interface: RS-232C, CCITT V.24
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autoequalizer, Diagnostics, Multiport, Fallback, Switchable Data Rates, Individual Port Carrier Center
Distribution Method: End user
Price: $10,000 to $12,400

RACAL-MILGO, INC.
OMNIMODE CS (CENTRAL SITE)
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Synchronous - 4,800 bps, 9,600 bps
Interface: RS-232C, CCITT V.24, CCITT V.27, CCITT V.28
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autoequalizer, Diagnostics, Fallback, Switchable Data Rates
Distribution Method: End user
Price: $2,100 to $3,600
Date First Installed: 1983

RACAL-MILGO, INC.
OMNIMODE 48
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Synchronous - 4,800 bps
Interface: RS-232C, CCITT V.24, CCITT V.28
Transmission Medium: Voice-Grade Lines
Features: Autoequalizer, Diagnostics, Multiport, Fallback, Switchable Data Rates, Front Panel Information
Distribution Method: End user
Price: $2,450 to $4,150
Number Installed to Date: 500 - 1,000
Date First Installed: 1982

RACAL-MILGO, INC.
OMNIMODE 96
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Synchronous - 9,600 bps
Interface: RS-232C, CCITT V.24, CCITT V.28
Transmission Medium: Voice-Grade Lines
Features: Autoequalizer, Diagnostics, Multiport, Fallback, Switchable Data Rates, Front Panel Information
Distribution Method: End user
Price: $4,150 to $5,850
Number Installed to Date: 500 - 1,000
Date First Installed: 1983

RACAL-MILGO, INC.
COM LINK III
Modem Class: Short-Haul
Transmission Technique: Synchronous
Transmission Rate: Synchronous - 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps; Asynchronous/Synchronous - 1,200 bps, 19,200 bps
Interface: RS-232C, CCITT V.24
Transmission Medium: 4-Wire Twisted-Pair
Diagnostics: Yes; Built-in
Features: Diagnostics
Distribution Method: End user
Price: $920 to $945

RACAL-VADIC
VA3413
Modem Class: Coupler
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps; Asynchronous/ Synchronous - 1,200 bps
Interface: RS-232C
Bell-Compatible: 103, 113
Transmission Medium: Voice-Grade Lines
Features: Diagnostics
Distribution Method: Third-party
Price: $695
(See Vendor Profile Page V-25)

RACAL-VADIC
VA103 MODEMPHONE
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps
Interface: RS-232C
Bell-Compatible: 103, 113
Transmission Medium: Voice-Grade Lines
Features: Autodial, Autoanswer, Alternate Voice/Data, Diagnostics
Distribution Method: Third-party
Price: $250 to $380
Date First Installed: 1980

RACAL-VADIC
VA212 AUTO DIAL
Modem Class: Long-Haul
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps; Asynchronous/ Synchronous - 1,200 bps
Interface: RS-232C
Bell-Compatible: 103, 212
Transmission Medium: Voice-Grade Lines
Features: Autodial, Autoanswer, Diagnostics
Distribution Method: Third-party
Price: $695
Date First Installed: 1983

RACAL-VADIC
VA212 PAR AUTO DIAL
Modem Class: Long-Haul
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps; Asynchronous/ Synchronous - 1,200 bps
Interface: RS-232C
Bell-Compatible: 103, 212
Transmission Medium: Voice-Grade Lines
Features: Autodial, Diagnostics, Switchable Data Rates
Distribution Method: Third-party
Price: $695
Date First Installed: 1983

RACAL-VADIC
VA212LC
Modem Class: Long-Haul
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps; Asynchronous/ Synchronous - 1,200 bps
Interface: RS-232C
Bell-Compatible: 103, 212
Transmission Medium: Voice-Grade Lines
Features: Autodial, Autoanswer, Diagnostics, Handshaking
Distribution Method: Third-party
Price: $495
Date First Installed: September 1983

RACAL-VADIC
VA318
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps
Interface: RS-232C
Bell-Compatible: 103, 113
Transmission Medium: Voice-Grade Lines
Features: Autodial, Autoanswer, Diagnostics
Distribution Method: End user
Price: $375
Date First Installed: 1981

RACAL-VADIC
VA317
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps
Interface: RS-232C
Bell-Compatible: 113
Transmission Medium: Voice-Grade Lines
Features: Autoanswer, Diagnostics, Switchable Data Rates
Distribution Method: Third-party
Price: $250
Date First Installed: 1976

RACAL-VADIC
VA355
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps
Interface: RS-232C, 20 mA Current Loop
Bell-Compatible: 103, 113
Transmission Medium: Voice-Grade Lines
Features: Alternate Voice/Data, Diagnostics
Distribution Method: Third-party
Price: $375
Date First Installed: 1977

RACAL-VADIC
VA1205/30 SERIES
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex

Transmission Rate: Asynchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps
Interface: RS-232C
Bell-Compatible: 202
Transmission Medium: Voice-Grade
Features: Reverse Channel, Diagnostics
Distribution Method: Third-party
Date First Installed: 1971

RACAL-VADIC
VA1240
Modem Class: Long-Haul
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous/Synchronous - 600 bps, 1,200 bps
Interface: RS-232C, CCITT V.24
Bell-Compatible: 202
Transmission Medium: Voice-Grade Lines
Features: Diagnostics
Distribution Method: Third-party
Price: $290

RACAL-VADIC
VA1250 SERIES DIRECT-CONNECT
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps, 600 bps, 1,200 bps
Interface: RS-232C
Bell-Compatible: 202
Transmission Medium: Voice-Grade Lines
Features: Alternate Voice/Data, Reverse Channel, Diagnostics
Distribution Method: Third-party
Date First Installed: 1978

RACAL-VADIC
VA1250 SERIES OF LEASED-LINE MODEMS
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps
Interface: RS-232C
Bell-Compatible: 202
Transmission Medium: Voice-Grade Lines
Features: Autoanswer, Reverse Channel, Diagnostics
Distribution Method: Third-party
Price: $425 to $550
Date First Installed: 1978

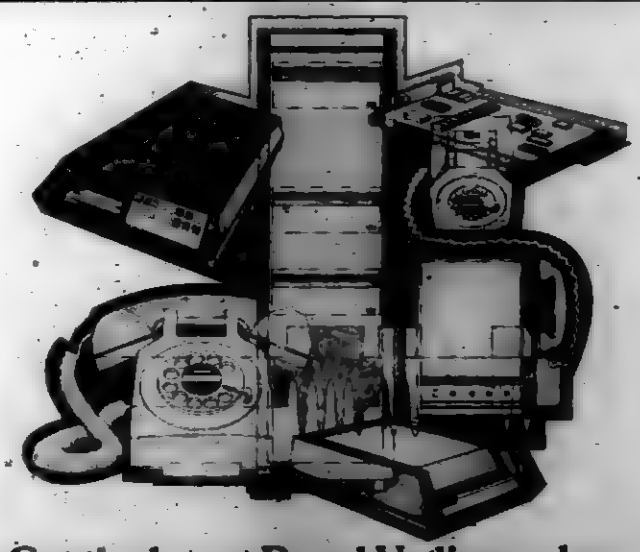
RACAL-VADIC
VA2430 G/K
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Synchronous - 2,400 bps
Interface: RS-232C, CCITT V.28
Bell-Compatible: 201

Features: Autoequalizer, Reverse Channel, Diagnostics
Distribution Method: Third-party
Price: $500
Date First Installed: 1976

RACAL-VADIC
VA2440/45
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex
Transmission Rate: Asynchronous - 1,200 bps, 2,400 bps
Interface: RS-232C, CCITT V.24, CCITT V.26
Bell-Compatible: 201
Transmission Medium: Voice-Grade Lines
Features: Reverse Channel, Diagnostics, Fallback, Switchable Data Rates
Distribution Method: Third-party
Price: $575 to $725

RACAL-VADIC
VA2480 SERIES
Modem Class: Long-Haul
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous/Synchronous - 2,400 bps
Bell-Compatible: 201
Transmission Medium: Voice-Grade
Features: Alternate Voice/Data, Reverse Channel, Diagnostics
Distribution Method: Third-party
Price: $725 to $875

RACAL-VADIC
VA3451 TRIPLE MODEM
Modem Class: Long-Haul
Transmission Technique: Asynchronous



Get the latest Racal-Vadic modems and couplers from MTI Systems Corp.

We are authorized distributors for Racal-Vadic, so we get their latest equipment first. We sell, rent and lease modems, acoustic couplers, line drivers, multiplexors, data switchers, protocol converters, everything you could need for data communications. We supply cables, switches, and all the rest.

MTI has the expertise to answer your questions and help you configure your network. In the New York, New Jersey and Ohio areas, our field sales engineers will provide on-site consultation, and our service engineers will install the equipment and maintain it with expert service.

What about price? We want your business and we intend to be very competitive. Call us today for all your data communications needs.

New York: 516/621-6200, 212/767-0677, 518/449-5959
Outside N.Y.S.: 800/645-6530
New Jersey: 201/227-5552
Ohio: 216/464-6688

mti
systems corp

Applications Specialists & Distributors, New York, New Jersey and Ohio.
DEC, Intel, Texas Instruments, Dataproducts, Lear Siegler, Diablo, Esprit Intecolor, Racal-Vadic, MICOM, Ventel, Develcon, Dig. Eng., U.S.Design Cipher, Protocol Computers, MicroPro, Microsoft, Polygon and Select.

Modems

Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps, 1,200 bps
Bell-Compatible: 103, 212-
Features: Autodial, Autoanswer, Alternate Voice/Data, Diagnostics
Distribution Method: Third-party
Price: $675

RACAL-VADIC
VA3455
Modem Class: Long-Haul
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous/ Synchronous - 1,200 bps
Interface: RS-232C
Transmission Medium: Voice-Grade Lines
Features: Autoanswer, Alternate Voice/Data, Diagnostics
Distribution Method: Third-party
Price: $775
Number Installed to Date: 5,000 - 10,000
Date First Installed: 1977

RACAL-VADIC
VA3467
Modem Class: Long-Haul
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 300 bps; Asynchronous/ Synchronous - 1,200 bps
Interface: RS-232C
Bell-Compatible: 103, 212
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-In
Features: Autoanswer, Diagnostics, Switchable Data Rates
Distribution Method: Third-party
Date First Installed: 1977

RACAL-VADIC
VA3400 SERIES
Modem Class: Long-Haul
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 300 bps; Asynchronous/ Synchronous - 1,200 bps
Interface: RS-232C
Bell-Compatible: 103, 113, 212
Transmission Medium: Voice-Grade Lines
Features: Autoanswer, Diagnostics
Distribution Method: Third-party
Price: $950
Date First Installed: 1981

RACAL-VADIC
VA4400 SERIES
Modem Class: Long-Haul
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps; Synchronous - 1,200 bps, 2,400 bps
Interface: RS-232C
Bell-Compatible: 103, 212
Transmission Medium: Voice-Grade Lines
Features: Autodial, Autoequalizer, Autoanswer, Diagnostics, Switchable Data Rates
Distribution Method: Third-party
Price: $1,745 to $1,945
Date First Installed: 1982

RACAL-VADIC
VA4840 SERIES
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Synchronous - 4,800 bps
Interface: RS-232C, CCITT V.24, CCITT V.28
Bell-Compatible: 208
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-In
Features: Autodial, Autoequalizer, Autoanswer, Diagnostics
Distribution Method: Third-party
Price: $1,350
Date First Installed: 1982

RAYCOM SYSTEMS, INC.
2000
Modem Class: Fiber-Optic
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps, 19,200 bps, 56,000 bps, 100K bps
Interface: RS-232C
Transmission Medium: Fiber Optics
Diagnostics: Yes; Built-In
Features: Diagnostics
Distribution Method: OEM
Price: $250
Number Installed to Date: Under 100
Date First Installed: October 1983
(See Vendor Profile Page V-00)

RAYCOM SYSTEMS, INC.
2200
Modem Class: Fiber-Optic
Transmission Technique: Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Synchronous - 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps, 19,200 bps, 56,000 bps; Asynchronous/Synchronous - 2,500 bps
Interface: Coaxial Connector RG-62
Transmission Medium: Fiber Optics
Diagnostics: Yes; Built-In
Features: Diagnostics
Distribution Method: OEM
Price: $350
Number Installed to Date: Under 100
Date First Installed: March 1984

RAYCOM SYSTEMS, INC.
3000
Modem Class: Fiber-Optic
Transmission Technique: Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Synchronous - 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps, 19,200 bps, 56,000 bps; Asynchronous/Synchronous - 2,500 bps
Interface: RS-232C, RS-422
Transmission Medium: Fiber Optics
Features: Diagnostics, Clock Calendar, Switchable Data Rates
Distribution Method: OEM
Price: $320
Number Installed to Date: Under 100

RFL INDUSTRIES
6365
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 1,200 bps
Interface: RS-232C
Bell-Compatible: 212
Transmission Medium: Voice-Grade Lines
Diagnostics: No
Distribution Method: OEM
Price: $390
Number Installed to Date: 1,000 - 5,000
Date First Installed: January 1977
(See Vendor Profile Page V-25)

RFL INDUSTRIES
6960
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 1,200 bps
Interface: RS-232C
Transmission Medium: Voice-Grade Lines
Diagnostics: No
Features: Alternate Voice/Data
Distribution Method: OEM
Price: $3,600
Number Installed to Date: Under 100
Date First Installed: January 1981

RIXON, INC.
OEM 212A FOR CUSTOM APPLICATIONS
Modem Class: Long-Haul
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 300; Synchronous - 1,200 bps
Interface: RS-232C, TTL
Bell-Compatible: 103, 113, 212
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-In
Features: Autodial, Alternate Voice/Data, Diagnostics
Distribution Method: End user, Third-party
(See Vendor Profile Page V-25)

RIXON, INC.
PC 212A MODEM FOR IBM PC AND PC-XT
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 300 bps, 1,200 bps
Bell-Compatible: 103, 113, 212
Transmission Medium: Voice-Grade Lines
Diagnostics: No
Features: Autodial, Autoanswer, Alternate Voice/Data, Switchable Data Rates
Distribution Method: End user, Third-party
Price: $499
Date First Installed: March 1983

RIXON, INC.
R14.4 MODEM
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Synchronous - 9,600 bps, 19,200 bps
Interface: RS-232C
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-In
Features: Autoequalizer, Diagnostics, Multiport, Fallback
Distribution Method: End user, Third-party

RIXON, INC.
R103J LSI MODEM
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 300 bps
Interface: RS-232C
Bell-Compatible: 103, 113, 212
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-In
Features: Autoanswer, Alternate Voice/Data, Diagnostics
Distribution Method: End user, Third-party

RIXON, INC.
R212A INTELLIGENT MODEM
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 300 bps, 1,200 bps
Interface: RS-232C
Bell-Compatible: 103, 113, 212
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-In
Features: Autodial, Autoanswer, Alternate Voice/Data, Diagnostics
Distribution Method: End user, Third-party

RIXON, INC.
R212A LSI MODEM
Modem Class: Long-Haul
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 300 bps; Synchronous - 1,200 bps
Interface: RS-232C
Bell-Compatible: 103, 212
Transmission Medium: Voice-Grade

Diagnostics: Yes; Built-in
Features: Autodial, Autoanswer, Alternate Voice/Data, Diagnostics
Distribution Method: Third-party

RIXON, INC.
R9434 LSI MODEM
Modem Class: Long-Haul
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous/Synchronous - 1,200 bps, 2,400 bps
Interface: RS-232C, CCITT V.24, CCITT V.28
Bell-Compatible: 212
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autoanswer, Alternate Voice/Data, Diagnostics
Distribution Method: End user, Third-party

RIXON, INC.
RV .29/2 MODEM SYSTEM
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Synchronous - 4,800 bps, 9,600 bps
Interface: RS-232C
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autoequalizer, Diagnostics, Multiport, Fallback
Distribution Method: End user, Third-party

RIXON, INC.
T103J LSI MODEM
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 300 bps
Interface: RS-232C
Bell-Compatible: 103, 113, 212
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autoanswer, Reverse Channel, Diagnostics
Distribution Method: End user, Third-party

RIXON, INC.
T106 LSI DATA MODEM
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 300 bps
Interface: RS-232C
Bell-Compatible: 100
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Alternate Voice/Data, Diagnostics
Distribution Method: End user, Third-party

RIXON, INC.
T113C LSI DATA MODEM
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 300 bps
Interface: RS-232C
Bell-Compatible: 103, 113, 212
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Alternate Voice/Data, Diagnostics
Distribution Method: End user, Third-party

RIXON, INC.
T202S LSI DATA MODEM
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex
Transmission Rate: Asynchronous - 1,200 bps
Interface: RS-232C
Bell-Compatible: 202
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autodial, Autoanswer, Alternate Voice/Data, Reverse Channel, Diagnostics
Distribution Method: End user, Third-party

RIXON, INC.
T202T LSI DATA MODEM
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 1,800 bps
Interface: RS-232C
Bell-Compatible: 202
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autoequalizer, Reverse Channel, Diagnostics
Distribution Method: End user, Third-party

RIXON, INC.
T212A LSI DATA MODEM
Modem Class: Long-Haul
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 300 bps; Synchronous - 1,200 bps
Interface: RS-232C
Bell-Compatible: 103, 113, 212
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autodial, Autoanswer, Alternate Voice/Data, Fallback
Distribution Method: End user, Third-party

RIXON, INC.
TA 208A/B LSI MODEM
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Synchronous - 4,800 bps
Interface: RS-232C
Bell-Compatible: 208, 208B
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autodial, Autoequalizer, Autoanswer, Alternate Voice/Data, Diagnostics
Distribution Method: End user, Third-party

RIXON, INC.
LDM 710 LIMITED-DISTANCE DATA MODEM
Modem Class: Short-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 9,600 bps
Interface: RS-232C
Transmission Medium: Nonload Metallic Cable Pair
Diagnostics: Yes; Built-in
Features: Diagnostics
Distribution Method: End user, Third-party

RIXON, INC.
LDM 720 LIMITED-DISTANCE DATA MODEM
Modem Class: Short-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Synchronous - 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps, 19,200 bps; Asynchronous/Synchronous - 3,600 bps
Interface: RS-232C
Transmission Medium: Nonload Metallic Cable Pair
Diagnostics: Yes; Built-in
Features: Autoequalizer
Distribution Method: End user, Third-party

ROCKWELL INTERNATIONAL
R24 THREE MODULE SET
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Synchronous - 1,200 bps, 2,400 bps
Interface: RS-232C, CCITT V.28
Bell-Compatible: 201
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Add-on
Features: Switchable Data Rates
Distribution Method: OEM, Third-party
Date First Installed: 1980
(See Vendor Profile Page V-25)

ROCKWELL INTERNATIONAL
R24DC
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex
Transmission Rate: Synchronous - 1,200 bps, 2,400 bps
Interface: RS-232C, CCITT V.28
Bell-Compatible: 201, 201 B/C
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Add-on
Features: Switchable Data Rates
Distribution Method: OEM, Third-party
Date First Installed: 1982

ROCKWELL INTERNATIONAL
R48DP
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Synchronous - 2,400 bps, 4,800 bps
Interface: RS-232C, CCITT V.24, CCITT V.27
Bell-Compatible: 208
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autoequalizer, Diagnostics, Switchable Data Rates
Distribution Method: OEM, Third-party

ROCKWELL INTERNATIONAL
R96DP
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Synchronous - 2,400 bps, 4,800 bps, 9,600 bps
Interface: RS-232C, CCITT V.24, CCITT V.27, CCITT V.29
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autoequalizer, Diagnostics, Switchable Data Rates
Distribution Method: OEM, Third-party

ROCKWELL INTERNATIONAL
R96FAX
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex
Transmission Rate: Synchronous - 1,200 bps, 2,400 bps
Interface: RS-232C, CCITT V.28
Bell-Compatible: 201
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Add-on
Features: Switchable Data Rates
Distribution Method: OEM, Third-party
Date First Installed: 1981

ROCKWELL INTERNATIONAL
R24LL
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Synchronous - 1,200 bps, 2,400 bps
Interface: RS-232C, CCITT V.28
Bell-Compatible: 201, 201 B/C
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Add-on
Features: Switchable Data Rates
Distribution Method: OEM, Third-party
Date First Installed: 1982

ROCKWELL INTERNATIONAL
R48DP
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Synchronous - 2,400 bps, 4,800 bps
Interface: RS-232C, CCITT V.24, CCITT V.27
Bell-Compatible: 208
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autoequalizer, Diagnostics, Switchable Data Rates
Distribution Method: OEM, Third-party

ROCKWELL INTERNATIONAL
R96DP
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Synchronous - 2,400 bps, 4,800 bps, 9,600 bps
Interface: RS-232C, CCITT V.24, CCITT V.27, CCITT V.29
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autoequalizer, Diagnostics, Switchable Data Rates
Distribution Method: OEM, Third-party

ROCKWELL INTERNATIONAL
R96FAX
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex
Transmission Rate: Synchronous -

Modems

300 bps, 2,400 bps, 9,600 bps
Interface: RS-232C, CCITT V.24, CCITT V.27, CCITT V.29
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autoequalizer, Diagnostics, Switchable Data Rates
Distribution Method: Third-party
Date First Installed: 1983

ROCKWELL INTERNATIONAL R96FT
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Synchronous - 110 bps, 2,400 bps, 4,800 bps, 9,600 bps
Interface: RS-232C, CCITT V.24, CCITT V.27, CCITT V.29
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autoequalizer, Diagnostics, Switchable Data Rates
Distribution Method: OEM

ROCKWELL INTERNATIONAL R24M
Modem Class: Long-Haul
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous/ Synchronous - 300 bps, 600 bps, 1,200 bps, 2,400 bps
Interface: RS-232C, CCITT V.22, CCITT V.24, CCITTV.22bis
Bell-Compatible: 103, 212, 212A
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autodial, Autoequalizer, Autoanswer, Alternate Voice/Data, Diagnostics, Switchable Data Rates
Distribution Method: OEM, Third-party

ROCKWELL INTERNATIONAL R1212DC
Modem Class: Long-Haul
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous/ Synchronous - 300 bps, 600 bps, 1,200 bps
Interface: RS-232C, CCITT V.22, CCITT V.24
Bell-Compatible: 103, 212, 212A
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autodial, Autoequalizer, Autoanswer, Alternate Voice/Data, Diagnostics, Switchable Data Rates
Distribution Method: OEM, Third-party

ROCKWELL INTERNATIONAL R1212M
Modem Class: Long-Haul
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous/ Synchronous - 300 bps, 600 bps, 1,200 bps
Interface: RS-232C, CCITT V.22, CCITT V.24
Bell-Compatible: 103, 212, 212A
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autodial, Autoequalizer, Autoanswer, Alternate Voice/Data, Diagnostics, Switchable Data Rates
Distribution Method: OEM, Third-party
Date First Installed: 1981

ROCKWELL INTERNATIONAL R2424DC
Modem Class: Long-Haul
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous/ Synchronous - 300 bps, 600 bps, 1,200 bps, 2,400 bps
Interface: RS-232C, CCITT V.22, CCITT V.24, CCITT V.22bis
Bell-Compatible: 103, 212, 212A
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autodial, Autoequalizer, Autoanswer, Alternate Voice/Data, Diagnostics, Switchable Data Rates
Distribution Method: OEM, Third-party

ROCKWELL INTERNATIONAL V27P/1
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Synchronous - 300 bps, 2,400 bps, 4,800 bps
Interface: RS-232C, T.30
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Add-on
Features: Autoequalizer, Switchable Data Rates
Distribution Method: OEM
Date First Installed: 1981

ROCKWELL INTERNATIONAL V96P/1
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Synchronous - 300 bps, 2,400 bps, 4,800 bps, 9,600 bps
Interface: RS-232C, CCITT V.27, CCITT V.29
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Add-on
Features: Autoequalizer, Switchable Data Rates
Distribution Method: OEM
Date First Installed: September 1981

SCHNEIDER INSTRUMENT CO. SICT-2
Modem Class: Digital
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps
Interface: RS-232C
Transmission Medium: Voice-Grade Lines
Diagnostics: No
Features: Autodial, Autoanswer, Clock Calendar, Switchable Data Rates
Distribution Method: End user
Price: $3,425
Number Installed to Date: Under 100
Date First Installed: January 1980
(See Vendor Profile Page V-28)

SCIENTIFIC ATLANTA, INC. 9402
Modem Class: Short-Haul
Transmission Technique: Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous/ Synchronous - T-1
Interface: RS-449, RS-422, DS1
Transmission Medium: Coaxial Lines
Diagnostics: Yes; Built-in
Features: Diagnostics
Distribution Method: End user, OEM
Price: $4,000
Number Installed to Date: Under 100
Date First Installed: December 1982
(See Vendor Profile Page V-28)

SCIENTIFIC RADIATION CORP. 5010 SERIES OPTICAL DATA LINK
Modem Class: Short-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 2,400 bps
Interface: RS-232C
Transmission Medium: Free Air
Diagnostics: No
Distribution Method: End user, Third-party
Price: $269 to $338
Number Installed to Date: Under 100
Date First Installed: 1980
(See Vendor Profile Page V-28)

SEIKOSHA, INC. IDSC 9000 SERIES
Modem Class: Short-Haul
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous/ Synchronous - 9,600 bps
Interface: RS-232C
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autodial, Autoequalizer, Autoanswer, Alternate Voice/Data, Diagnostics, Multiport, Fallback, Switchable Data Rates, Simultaneous Voice/Data
Distribution Method: End user
Price: $500
Number Installed to Date: 100 - 500
Date First Installed: January 1983
(See Vendor Profile Page V-28)

SOREX, INC. 2103
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 300 bps
Interface: RS-232C
Bell-Compatible: 103
Transmission Medium: Voice-Grade Lines
Diagnostics: No
Features: Autoanswer, Reverse Channel
Distribution Method: OEM
Price: $250
Number Installed to Date: Under 100
Date First Installed: January 1972
(See Vendor Profile Page V-28)

SOREX, INC. 2202
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 1,200 bps, 1,800 bps
Interface: RS-232C
Bell-Compatible: 202
Transmission Medium: Voice-Grade Lines
Diagnostics: No
Features: Autoanswer
Distribution Method: OEM
Price: $400
Number Installed to Date: Under 100
Date First Installed: January 1972

SOREX, INC. 2407
Modem Class: Long-Haul
Interface: RS-232C
Bell-Compatible: 407E
Transmission Medium: Voice-Grade Lines
Diagnostics: No
Features: Autoanswer
Distribution Method: OEM
Price: $500
Number Installed to Date: 500 - 1,000

SPERRY CORP. DATA COMMUNICATION MODULE (TYPE 5610)
Modem Class: Modem Eliminator
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps; Asynchronous/ Synchronous - 2,400 bps, 4,800 bps, 9,600 bps; Synchronous - 7,200 bps, 14,400 bps
Interface: RS-232C
Transmission Medium: Voice-Grade Lines
Diagnostics: No
Features: Diagnostics, Switchable Data Rates
Distribution Method: End user
Price: $952

Number Installed to Date: 1,000 - 5,000
Date First Installed: 1981
(See Vendor Profile Page V-28)

TANDY CORP.
AC- 26-1174
Modem Class: Coupler
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 300 bps
Interface: RS-232C
Bell-Compatible: 103
Transmission Medium: Voice-Grade Lines
Diagnostics: No
Distribution Method: End user
Price: $149
(See Vendor Profile Page V-28)

TANDY CORP.
26-1006/1009 (ACU)
Modem Class: Long-Haul
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 300 bps; Asynchronous/ Synchronous - 1,200 bps
Interface: RS-232C
Bell-Compatible: 103, 212
Transmission Medium: Voice-Grade Lines
Diagnostics: No
Features: Autodial, Autoanswer, Switchable Data Rates
Distribution Method: End user
Price: $699 to $849

TANDY CORP.
DC MODEM III 26-1176
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps
Interface: RS-232C
Bell-Compatible: 103
Transmission Medium: Voice-Grade Lines
Features: Direct Connect
Distribution Method: End user
Price: $99

TANDY CORP.
DC MODEM II 26-1173
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps
Interface: RS-232C
Bell-Compatible: 103
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Add-on
Features: Autodial, Autoanswer, Remote/Local Loopback
Distribution Method: End user
Price: $199

TEK-COM, INC.
TC3001
Modem Class: Coupler
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 300 bps
Interface: RS-232C, 20 MA Current Loop
Bell-Compatible: 103
Transmission Medium: Voice-Grade Lines
Distribution Method: End user
Price: $195 to $265
Date First Installed: 1979
(See Vendor Profile Page V-32)

TEK-COM, INC.
TC3002
Modem Class: Coupler
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 300 bps
Interface: RS-232C, 20 MA Current Loop
Bell-Compatible: 103, 113
Transmission Medium: Voice-Grade Lines
Features: Autodial
Distribution Method: OEM
Price: $265
Date First Installed: 1979

TEK-COM, INC.
TC3008
Modem Class: Coupler
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 300 bps
Interface: RS-232C
Bell-Compatible: 103, 113
Transmission Medium: Voice-Grade Lines
Features: Autoanswer
Price: $195
Date First Installed: September 1979

TEK-COM, INC.
4700
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps
Interface: RS-232C
Bell-Compatible: 103
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autoanswer, Alternate Voice/Data, Diagnostics, Fallback
Distribution Method: OEM, Third-party
Price: $365
Number Installed to Date: 500 - 1,000
Date First Installed: May 1982

TEK-COM, INC.
TC3001
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps
Interface: RS-232C, CCITT V.24, CCITT V.28
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Diagnostics

TELEBYTE TECHNOLOGIES, INC.
720, VT-100 COMPATIBLE SMM
Modem Class: Line Driver
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 14,400 bps
Interface: RS-232C
Bell-Compatible: 43401
Transmission Medium: Metallic Pairs
Diagnostics: No
Features: Reverse Channel, Switchable Data Rates, DEC VT-100 Compatible
Distribution Method: Third-party
Price: $130
Number Installed to Date: Under 100
Date First Installed: June 1983
(See Vendor Profile Page V-30)

TELEBYTE TECHNOLOGIES, INC.
74A SHORT-HAUL MODEM WITH HANDSHAKE
Modem Class: Line Driver
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 14,400 bps
Interface: RS-232C
Bell-Compatible: 43401
Transmission Medium: Metallic Pairs
Diagnostics: No
Features: Reverse Channel, Switchable Data Rates, Bidirectional Control
Distribution Method: OEM
Price: $165
Number Installed to Date: 100 - 500
Date First Installed: January 1983

TELEBYTE TECHNOLOGIES, INC.
79 DUAL SHORT-HAUL MODEM WITH HANDSHAKE
Modem Class: Line Driver
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 14,400 bps
Bell-Compatible: 43401
Transmission Medium: Metallic Pairs
Diagnostics: Yes; Built-in
Features: Reverse Channel, Diagnostics, Fallback, Switchable Data Rates, Bidirectional Control
Distribution Method: End user
Price: $225
Number Installed to Date: Under 100
Date First Installed: January 1984

TELEBYTE TECHNOLOGIES, INC.
71
Modem Class: Short-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 14,400 bps
Interface: RS-232C
Bell-Compatible: 41403
Transmission Medium: Metallic Pairs
Diagnostics: No
Features: Reverse Channel, Switchable Data Rates
Distribution Method: End user
Number Installed to Date: 1,000 - 5,000
Date First Installed: February 1982

TELEBYTE TECHNOLOGIES, INC.
72
Modem Class: Short-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 14,400 bps
Interface: RS-232C
Bell-Compatible: 43401
Transmission Medium: Metallic Pairs
Diagnostics: No
Features: Reverse Channel, Switchable Data Rates, DTE/DCE Selectable
Distribution Method: Third-party
Price: $125
Number Installed to Date: 1,000 - 5,000
Date First Installed: February 1982

TELEBYTE TECHNOLOGIES, INC.
73 REMOTELY CONTROLLED SMM
Modem Class: Short-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 14,400 bps
Interface: RS-232C
Bell-Compatible: 43401
Transmission Medium: Metallic Pairs
Features: Reverse Channel, Switchable Data Rates, Host Powered
Distribution Method: End user
Number Installed to Date: Under 100
Date First Installed: November 1982

TELEBYTE TECHNOLOGIES, INC.
75 DUAL SHORT-HAUL MODEM
Modem Class: Short-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 14,400 bps

Modems

Bell-Compatible: 43401
Transmission Medium: Metallic Pairs
Diagnostics: Yes; Built-in
Features: Reverse Channel, Diagnostics, Fallback, Switchable Data Rates
Distribution Method: End user
Price: $185
Number Installed to Date: 100 - 500
Date First Installed: October 1982

TELEPROCESSING PRODUCTS, INC.
TP-560
Modem Class: Digital (DSU)
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex, Simplex
Transmission Rate: Synchronous - 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps
Interface: RS-232C
Transmission Medium: Digital Termination
Diagnostics: Yes; Built-in
Features: Diagnostics, Multiport, Fallback, Switchable Data Rates
Distribution Method: End user
Price: $495 to $650
Number Installed to Date: 500 - 1,000
Date First Installed: June 1983
(See Vendor Profile Page V-30)

TELEPROCESSING PRODUCTS, INC.
TP-561
Modem Class: Digital
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex, Simplex
Transmission Rate: Synchronous - 2,400 bps, 4,800 bps, 9,600 bps
Interface: RS-232C
Transmission Medium: Digital Termination
Diagnostics: Yes; Built-in
Features: Autoequalizer, Diagnostics, Multiport, Fallback, Switchable Data Rates
Distribution Method: End user
Price: $695 to $1,025
Number Installed to Date: Under 100
Date First Installed: January 1984

TELEPROCESSING PRODUCTS, INC.
TP-566
Modem Class: Digital
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex, Simplex
Transmission Rate: Synchronous - 14,400 bps, 56,000 bps
Interface: V.35
Transmission Medium: Digital Termination
Diagnostics: Yes; Built-in
Features: Diagnostics, Multiport, Fallback, Switchable Data Rates
Distribution Method: End user
Price: $595 to $750
Number Installed to Date: 100 - 500
Date First Installed: August 1983

TELEPROCESSING PRODUCTS, INC.
TP-567
Modem Class: Digital
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex, Simplex
Transmission Rate: Synchronous - 14,400 bps, 56,000 bps
Interface: V.35
Transmission Medium: Digital Termination
Diagnostics: Yes; Built-in
Features: Autoequalizer, Diagnostics, Fallback, Switchable Data Rates
Distribution Method: End user
Price: $890 to $1,095
Number Installed to Date: Under 100
Date First Installed: January 1984

TELEPROCESSING PRODUCTS, INC.
TP-232
Modem Class: Modem Eliminator
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Half-Duplex, Full-Duplex, Simplex
Transmission Rate: Asynchronous/ Synchronous - 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps
Interface: RS-232C
Transmission Medium: Twisted-Pair
Diagnostics: Yes; Built-in
Features: Autodial, Autoanswer, Diagnostics, Switchable Data Rates
Distribution Method: End user
Price: $395
Number Installed to Date: 500 - 1,000
Date First Installed: September 1978

TELEPROCESSING PRODUCTS, INC.
TP-550
Modem Class: Channel Service Unit
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex, Simplex
Transmission Rate: Synchronous - 2,400 bps, 4,800 bps, 9,600 bps
Transmission Medium: Digital Termination
Diagnostics: Yes; Built-in
Features: Autoequalizer, Diagnostics, Switchable Data Rates
Distribution Method: End user
Price: $415 to $540
Number Installed to Date: Under 100
Date First Installed: November 1983

TELEPROCESSING PRODUCTS, INC.
TP-561
Modem Class: Channel Service Unit
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex, Simplex
Transmission Rate: Synchronous - 14,400 bps, 56,000 bps
Transmission Medium: Digital Termination
Diagnostics: Yes; Built-in
Features: Autoequalizer, Diagnostics, Switchable Data Rates
Distribution Method: End user
Price: $625 to $630
Number Installed to Date: Under 100
Date First Installed: December 1983

TELLABS, INC.
3010
Modem Class: Line Driver
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 600 bps, 1,200 bps, 2,400 bps, 4,800 bps, 9,600 bps
Interface: RS-232C, RJ11
Transmission Medium: Voice-grade Lines
Diagnostics: No
Distribution Method: End user
Price: $100
Number Installed to Date: Under 100
Date First Installed: March 1983
(See Vendor Profile Page V-30)

TELLABS, INC.
319 DATAVOICE SYSTEM
Modem Class: Simultaneous Data/ Voice
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps
Interface: RS-232C, RJ11
Transmission Medium: Voice-grade Lines
Diagnostics: No
Features: Simultaneous Data/Voice
Distribution Method: End user, Third-party
Price: $450 - $500
Number Installed to Date: Under 500
Date First Installed: 1982

TELMAG, INC.
LDD-1
Modem Class: Line Driver
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps
Interface: RS-232C
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Diagnostics
Distribution Method: End user
Price: $150
Number Installed to Date: Under 100
Date First Installed: June 1981
(See Vendor Profile Page V-30)

TELMAG, INC.
SLD-1
Modem Class: Line Driver
Transmission Technique: Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Synchronous - 1,200 bps, 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps
Interface: RS-232C
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Diagnostics
Distribution Method: End user
Price: $450
Number Installed to Date: Under 100
Date First Installed: 1983

TELTONE CORP.
TELEPORT 300
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 2,400 bps, 4,800 bps, 9,600 bps
Interface: RS-232C, CCITT V.24
Bell-Compatible: 103
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autodial, Autoequalizer, Autoanswer, Diagnostics, Clock Calendar, Switchable Data Rates, Touch-Tone to Ascii
Distribution Method: OEM
Price: $399
Date First Installed: December 1983
(See Vendor Profile Page V-30)

TIMEPLEX, INC.
202 C/D
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 1,800 bps
Interface: RS-232C
Bell-Compatible: 202
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Distribution Method: End user
Price: $325
(See Vendor Profile Page V-31)

TIMEPLEX, INC.
AIM SERIES
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Synchronous - 2,400 bps, 4,800 bps, 9,600 bps
Interface: RS-232C, RS-449, CCITT V.26, CCITT V.27, CCITT V.29
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autoequalizer, Diagnostics, Fallback, Switchable Data Rates
Distribution Method: End user
Price: $1,080 to $2,625

TIMEPLEX, INC.
R103
Modem Class: Long-Haul

Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 300 bps
Interface: RS-232C, MIL 188C
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autodial, Autoanswer, Diagnostics
Distribution Method: End user
Price: $315

TIMEPLEX, INC.
R103 C/D
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 300 bps
Interface: RS-232C, MIL 188C
Bell-Compatible: 103, 113, 108
Transmission Medium: Voice-Grade
Diagnostics: Yes; Built-in
Features: Diagnostics
Distribution Method: End user
Price: $255 to $335

TIMEPLEX, INC.
R202 C/D
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 1,200 bps
Interface: RS-232C, MIL 188C
Bell-Compatible: 202
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Reverse Channel, Diagnostics
Distribution Method: End user
Price: $360

TIMEPLEX, INC.
V.29 PLUS
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Synchronous - 9,600 bps
Interface: RS-232C, CCITT V.29
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Add-on
Features: Autoequalizer, Diagnostics, Multiport, Fallback, Switchable Data Rates
Distribution Method: End user
Price: $4,100 to $4,600
Date First Installed: January 1982

TIMEPLEX, INC.
SLDM
Modem Class: Short-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Synchronous - 14,400 bps
Interface: RS-232C
Bell-Compatible: 43401
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Diagnostics, Switchable Data Rates
Distribution Method: End user
Price: $850

TRW CORP.
OPERATOR 103
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 300 bps
Interface: RS-232C
Bell-Compatible: 103
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autodial, Autoanswer, Reverse Channel
Distribution Method: End user, OEM, Third-party
Price: $169
Date First Installed: June 1983
(See Vendor Profile Page V-31)

TRW CORP.
TRW-103
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 300 bps
Interface: IEEE-488
Bell-Compatible: 103
Diagnostics: No
Features: Autodial, Autoanswer, Reverse Channel
Distribution Method: End user, OEM, Third-party
Price: $449
Date First Installed: January 1978

TRANSEND CORP.
MODEM CARD AMC-300
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 300 bps
Bell-Compatible: 103
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autodial, Autoanswer, Alternate Voice/Data, Diagnostics
Distribution Method: Third-party
Price: $325
Number Installed to Date: 100 - 500
Date First Installed: January 1983
(See Vendor Profile Page V-31)

TRANSEND CORP.
PC MODEM CARD 300
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 300 bps
Bell-Compatible: 103
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autodial, Autoanswer, Alternate Voice/Data, Diagnostics
Distribution Method: Third-party
Price: $349
Number Installed to Date: 100 - 500

TRANSEND CORP.
PC MODEM CARD 1200
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 300 bps
Bell-Compatible: 212
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autodial, Autoanswer, Alternate Voice/Data, Diagnostics, Switchable Data Rates
Distribution Method: Third-party
Price: $549
Number Installed to Date: 100 - 500
Date First Installed: October 1983

TRANSEND CORP.
TRANS MODEM 1200
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 300 bps, 1,200 bps
Interface: RS-232C
Bell-Compatible: 212
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autodial, Autoanswer, Alternate Voice/Data, Diagnostics, Switchable Data Rates
Distribution Method: Third-party
Price: $695
Number Installed to Date: 100 - 500
Date First Installed: February 1983

TRI-DATA
OZ 225
Modem Class: Long Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 300 bps, 1,200 bps
Interface: RS-232C
Bell-Compatible: 212
Transmission Medium: Voice-Grade Lines
Features: Autodial, Autoanswer
Price: $1,375
Date First Installed: September 1982
(See Vendor Profile Page V-31)

TRI-DATA
OZ GUARDIAN
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps, 1,200 bps
Interface: RS-232C
Bell-Compatible: 212
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autodial, Autoanswer, Alternate Voice/Data, Diagnostics, Fallback, Switchable Data Rates, Security Coding
Distribution Method: Third-party
Price: $750
Number Installed to Date: 100 - 500
Date First Installed: September 1983

TST DATA PRODUCTS
202
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 1,200 bps
Interface: RS-232C
Bell-Compatible: 201
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autodial, Autoequalizer, Autoanswer, Diagnostics, Fallback, Switchable Data Rates, Security Coding
Distribution Method: Third-party
Price: $750
Number Installed to Date: 100 - 500
Date First Installed: September 1983

TST DATA PRODUCTS
202
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 1,200 bps
Interface: RS-232C
Bell-Compatible: 201
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autoequalizer, Autoanswer, Alternate Voice/Data, Diagnostics
Distribution Method: End user, OEM
Price: $175 to $200
Number Installed to Date: 100 - 500
(See Vendor Profile Page V-31)

TST DATA PRODUCTS
212
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 300 bps, 1,200 bps
Interface: RS-232C
Bell-Compatible: 212
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autoequalizer, Autoanswer, Alternate Voice/Data, Reverse Channel, Diagnostics, Switchable Data Rates
Distribution Method: End user, OEM
Price: $250
Number Installed to Date: Under 100
Date First Installed: June 1983

TUCK ELECTRONICS, INC.
MODEC 1649
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 300 bps
Interface: RS-232C
Bell-Compatible: 103
Transmission Medium: Voice-Grade Lines
Distribution Method: End user
Price: $242
Date First Installed: August 1974
(See Vendor Profile Page V-32)

TUCK ELECTRONICS, INC.
MODEL 1663
Modem Class: Long-Haul

Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 1,200 bps
Interface: RS-232C
Bell-Compatible: 202
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Diagnostics
Distribution Method: End user
Price: $275
Date First Installed: March 1981

TYMSHARE, INC.
MODEL 912 MODEM
Modem Class: Long-Haul
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous/Synchronous - 300 bps, 1,200 bps
Interface: RS-232C
Bell-Compatible: 212
Transmission Medium: Voice-Grade Lines
Features: Autoanswer, Diagnostics
Price: $995
Date First Installed: 1980
(See Vendor Profile Page V-32)

GRIESEMANN-SASS, INC.
CATV-MODEM
Modem Class: Radio Frequency
Transmission Technique: Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Synchronous - 14,400 bps
Interface: 1510 D-Type Connect
Transmission Medium: Wide-Band Lines
Diagnostics: No
Distribution Method: End user
Price: $750 to $950
Number Installed to Date: Under 100
Date First Installed: April 1982
(See Vendor Profile Page V-32)

GRIESEMANN-SASS, INC.
NETWORK MODEM 640
Modem Class: Radio Frequency
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Full-Duplex, Simplex
Transmission Rate: Asynchronous/Synchronous - 19,200 bps
Interface: RS-232C, CCITT V.35
Transmission Medium: Wide-Band Lines
Diagnostics: No
Features: Diagnostics, Switchable Data Rates
Distribution Method: End user
Price: $995
Number Installed to Date: 5,000 - 10,000
Date First Installed: February 1980

GRIESEMANN-SASS, INC.
NETWORK MODEM 670
Modem Class: Radio Frequency (RF)
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Full-Duplex, Simplex
Transmission Rate: Asynchronous/Synchronous - 14,400 bps
Interface: RS-232C
Transmission Medium: Wide-Band Lines
Diagnostics: No
Features: Diagnostics, Switchable Data Rates
Distribution Method: End user
Price: $1,990
Number Installed to Date: 5,000 - 10,000
Date First Installed: June 1978

UNIVERSAL DATA SYSTEMS, INC.
103 LP O/A
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps
Interface: RS-232C, CCITT V.24
Bell-Compatible: 103, 113
Transmission Medium: Voice-Grade Lines
Features: Alternate Voice/Data, Telco Line Powered
Distribution Method: Third-party
Price: $145
Date First Installed: 1978
(See Vendor Profile Page V-32)

UNIVERSAL DATA SYSTEMS, INC.
103J
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps
Interface: RS-232C, CCITT V.24
Bell-Compatible: 103, 113
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autoanswer, Alternate Voice/Data, Diagnostics
Distribution Method: Third-party
Price: $425
Date First Installed: 1982

UNIVERSAL DATA SYSTEMS, INC.
103JLP
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps
Interface: RS-232C, CCITT V.24
Bell-Compatible: 103, 113
Transmission Medium: Voice-Grade Lines
Features: Autoanswer, Alternate Voice/Data, Telco Line Powered
Distribution Method: Third-party
Price: $195
Date First Installed: 1978

UNIVERSAL DATA SYSTEMS, INC.
108
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps
Interface: RS-232C, CCITT V.24
Bell-Compatible: 103
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Alternate Voice/Data, Diagnostics, Multidrop
Distribution Method: Third-party
Price: $295
Date First Installed: 1982

UNIVERSAL DATA SYSTEMS, INC.
201B
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Synchronous - 2,400 bps
Interface: RS-232C, CCITT V.24
Bell-Compatible: 201
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Diagnostics, Antistreaming
Distribution Method: Third-party
Price: $965
Date First Installed: 1981

UNIVERSAL DATA SYSTEMS, INC.
201C
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Synchronous - 2,400 bps
Interface: RS-232C, CCITT V.24
Bell-Compatible: 201
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autoanswer, Alternate Voice/Data, Diagnostics, Test Pattern Generator
Distribution Method: Third-party
Price: $775
Date First Installed: September 1981

UNIVERSAL DATA SYSTEMS, INC.
202LP
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps, 600 bps, 1,200 bps
Interface: RS-232C, CCITT V.24
Bell-Compatible: 202
Transmission Medium: Voice-Grade Lines
Features: Alternate Voice/Data, Telco Line Powered
Distribution Method: Third-party
Price: $195
Date First Installed: September 1981

UNIVERSAL DATA SYSTEMS, INC.
202S
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps, 600 bps, 1,200 bps
Interface: RS-232C, CCITT V.24
Bell-Compatible: 202
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autoanswer, Alternate Voice/Data, Diagnostics
Distribution Method: Third-party
Price: $475
Date First Installed: 1981

UNIVERSAL DATA SYSTEMS, INC.
202S/99
Modem Class: Long-Haul
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps, 600 bps; Asynchronous/Synchronous - 1,200 bps
Interface: RS-232C, CCITT V.24
Bell-Compatible: 202
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autoanswer, Alternate Voice/Data, Diagnostics, Test Pattern Generator
Distribution Method: Third-party
Price: $550
Date First Installed: 1981

UNIVERSAL DATA SYSTEMS, INC.
202SLP
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps, 600 bps
Interface: RS-232C, CCITT V.24
Bell-Compatible: 202
Transmission Medium: Voice-Grade Lines
Features: Autoanswer, Alternate Voice/Data
Distribution Method: Third-party
Price: $245
Date First Installed: 1982

UNIVERSAL DATA SYSTEMS, INC.
202T
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps, 600 bps; 1,200 bps, 1,800 bps
Interface: RS-232C, CCITT V.24
Bell-Compatible: 202
Transmission Medium: Voice-Grade

Diagnostics: Yes; Built-in
Features: Alternate Voice/Data, Diagnostics, Antistreaming
Distribution Method: Third-party
Price: $425
Date First Installed: 1982

UNIVERSAL DATA SYSTEMS, INC.
208A/B
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Synchronous - 4,800 bps
Interface: RS-232C, CCITT V.24
Bell-Compatible: 208
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autoanswer, Alternate Voice/Data, Diagnostics, Antistreaming
Distribution Method: Third-party
Price: $1,750
Date First Installed: 1981

UNIVERSAL DATA SYSTEMS, INC.
212A
Modem Class: Long-Haul
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps, 600 bps; Asynchronous/Synchronous - 1,200 bps
Interface: RS-232C, CCITT V.24
Bell-Compatible: 103, 113, 212
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autoanswer, Alternate Voice/Data, Diagnostics, Switchable Data Rates
Distribution Method: Third-party
Price: $595
Date First Installed: 1982

UNIVERSAL DATA SYSTEMS, INC.
212A/D
Modem Class: Long-Haul
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps, 600 bps; Asynchronous/Synchronous - 1,200 bps
Interface: RS-232C, CCITT V.24
Bell-Compatible: 103, 113, 212
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autodial, Autoanswer, Alternate Voice/Data, Switchable Data Rates, Phone Number Memory
Distribution Method: Third-party
Price: $845
Date First Installed: 1983

UNIVERSAL DATA SYSTEMS, INC.
212LP
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 1,200 bps
Interface: RS-232C, CCITT V.24
Bell-Compatible: 212
Transmission Medium: Voice-Grade Lines
Diagnostics: No
Features: Alternate Voice/Data, Telco Line Powered
Distribution Method: Third-party
Price: $445
Date First Installed: 1982

UNIVERSAL DATA SYSTEMS, INC.
9600
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Synchronous - 4,800 bps, 9,600 bps; Asynchronous/Synchronous - 7,200 bps
Interface: RS-232C, CCITT V.24
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autoequalizer, Diagnostics, 100 msec Train Time
Distribution Method: Third-party
Price: $2,650
Date First Installed: 1983

UNIVERSAL DATA SYSTEMS, INC.
9600A/B
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Synchronous - 4,800 bps, 9,600 bps; Asynchronous/Synchronous - 7,200 bps
Interface: RS-232C, CCITT V.24
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autoequalizer, Autoanswer, Alternate Voice/Data, Diagnostics, Fallback, Switchable Data Rates, Antistreaming
Distribution Method: Third-party
Price: $2,850
Date First Installed: 1983

U. S. ROBOTICS, INC.
IBM PC MODEM
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 300 bps, 1,200 bps
Interface: Plug-in Board to IBM PC
Bell-Compatible: 212
Transmission Medium: Voice-Grade Lines
Features: Autodial, Autoequalizer, Autoanswer, Alternate Voice/Data, Diagnostics
Distribution Method: End user, OEM
Price: $449
(See Vendor Profile Page V-32)

U. S. ROBOTICS, INC.
IBM PC 96
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 300 bps, 1,200 bps
Interface: Plug-in Board to IBM PC
Bell-Compatible: 212
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autodial, Autoequalizer, Autoanswer, Alternate Voice/Data, Diagnostics, Clock Calendar, Fallback, Parallel Port
Distribution Method: End user, OEM
Price: $599

U. S. ROBOTICS, INC.
IBM PC MODEM 288
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 300 bps, 1,200 bps
Interface: RS-232C, Plug-in Board to IBM PC
Bell-Compatible: 212
Transmission Medium: Voice-Grade Lines
Diagnostics: No
Features: Autodial, Autoequalizer, Autoanswer, Alternate Voice/Data, Diagnostics, Clock Calendar, Fallback, Switchable Data Rates, Parallel Port
Distribution Method: End user, OEM
Price: $1,149

U. S. ROBOTICS, INC.
OEM 4
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 300 bps, 1,200 bps
Interface: PPI
Bell-Compatible: 212
Transmission Medium: Voice-Grade Lines
Diagnostics: No
Features: Autodial, Autoequalizer, Autoanswer, Alternate Voice/Data, Fallback
Distribution Method: OEM
Price: $300

U. S. ROBOTICS, INC.
PASSWORD
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 300 bps, 1,200 bps
Interface: RS-232C
Bell-Compatible: 212
Transmission Medium: Voice-Grade Lines
Diagnostics: No
Features: Autodial, Autoequalizer, Autoanswer, Alternate Voice/Data, Diagnostics, Fallback, Switchable Data Rates
Distribution Method: End user, OEM
Price: $449
Number Installed to Date: 5,000 - 10,000
Date First Installed: May 1988

U. S. ROBOTICS, INC.
S100 BUS MODEM
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 300 bps, 1,200 bps
Interface: RS-232C
Bell-Compatible: 212
Transmission Medium: Voice-Grade Lines
Diagnostics: No
Features: Autodial, Autoequalizer, Autoanswer, Alternate Voice/Data, Fallback, Switchable Data Rates
Distribution Method: End user, OEM
Price: $449

VEN-TEL, INC.
ALD SERIES
Modem Class: Line Driver
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps
Interface: RS-232C
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Diagnostics, Switchable Data Rates
Distribution Method: Third-party
Price: $205 to $320
Date First Installed: June 1977
(See Vendor Profile Page V-32)

VEN-TEL, INC.
SLD-SERIES
Modem Class: Line Driver
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Synchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps
Interface: RS-232C
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Diagnostics, Switchable Data Rates
Distribution Method: Third-party
Price: $360 to $450
Date First Installed: January 1978

VEN-TEL, INC.
212 SERIES
Modem Class: Long-Haul
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous/Synchronous - 300 bps, 1,200 bps
Interface: RS-232C
Bell-Compatible: 212
Transmission Medium: Voice-Grade Lines

Modems

Diagnostics: Yes; Built-in
Features: Autodial, Autoanswer, Diagnostics, Switchable Data Rates
Distribution Method: Third-party
Price: $425 to $675
Number Installed to Date: 5,000 - 10,000
Date First Installed: 1979

VEN-TEL, INC.
1200 - PLUS
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 300 bps, 1,200 bps
Bell-Compatible: 212
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autodial, Autoanswer, Diagnostics, Switchable Data Rates
Distribution Method: Third-party
Price: $499
Date First Installed: December 1983

VEN-TEL, INC.
MD 103-1/2E
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps
Interface: RS-232C
Bell-Compatible: 103
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Diagnostics, Switchable Data Rates
Distribution Method: Third-party
Price: $245 to $315
Date First Installed: 1982

VEN-TEL, INC.
MD 103-I SERIES
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps
Interface: RS-232C
Bell-Compatible: 103
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autodial, Autoanswer, Diagnostics, Switchable Data Rates
Distribution Method: Third-party
Price: $345 to $415
Date First Installed: September 1982

VEN-TEL, INC.
MD 113 SERIES
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps
Interface: RS-232C
Bell-Compatible: 103
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autoanswer, Diagnostics, Switchable Data Rates
Distribution Method: Third-party
Price: $245 to $315
Date First Installed: 1982

VEN-TEL, INC.
MD 201-1
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex
Transmission Rate: Synchronous - 2,400 bps
Interface: RS-232C
Bell-Compatible: 201
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autoanswer, Diagnostics
Distribution Method: Third-party
Price: $730 to $800
Date First Installed: January 1979

VEN-TEL, INC.
MD 201-3/4E
Modem Class: Long-Haul
Transmission Technique: Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Synchronous - 2,400 bps
Interface: RS-232C
Bell-Compatible: 201
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Diagnostics
Distribution Method: Third-party
Price: $605 to $675
Date First Installed: January 1979

VEN-TEL, INC.
MD 202-1/2E
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps, 600 bps, 1,200 bps
Interface: RS-232C
Bell-Compatible: 202
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autoanswer, Diagnostics, Switchable Data Rates
Distribution Method: Third-party
Price: $310 to $360

VEN-TEL, INC.
MD 202-5/6E
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps
Interface: RS-232C
Bell-Compatible: 202
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Diagnostics, Switchable Data Rates
Distribution Method: Third-party
Price: $280 to $350
Date First Installed: January 1979

VEN-TEL, INC.
PCM-H150P
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 300 bps, 1,200 bps
Interface: HP150
Bell-Compatible: 212
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autodial, Autoanswer, Diagnostics, Switchable Data Rates
Distribution Method: Third-party
Price: $425
Date First Installed: December 1983

VEN-TEL, INC.
PCM-XT
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 300 bps, 1,200 bps
Interface: IBM PC
Bell-Compatible: 212
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autodial, Autoanswer, Diagnostics, Switchable Data Rates
Distribution Method: Third-party
Price: $549
Date First Installed: December 1983

VEN-TEL, INC.
PCM-1202
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 300 bps, 1,200 bps
Interface: IBM PC
Bell-Compatible: 212
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autodial, Autoanswer, Diagnostics, Switchable Data Rates
Distribution Method: Third-party
Price: $499
Date First Installed: December 1983

VERSITRON, INC.
FOM-7
Modem Class: Fiber-Optic
Transmission Technique: Asynchronous, Synchronous, Isochronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous/Synchronous - 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps; Synchronous - 38.4K bps
Interface: RS-232C, MIL 188C
Transmission Medium: Fiber Optics
Price: $750
Date First Installed: 1982
(See Vendor Profile Page V-32)

VISIONARY ELECTRONICS, INC.
VISIONARY 199
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 300 bps
Interface: RS-232C
Bell-Compatible: 103
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autodial, Autoanswer, Reverse Channel, Multiport, Clock Calendar
Distribution Method: End user, OEM, Third-party
Price: $595
Number Installed to Date: Under 100
Date First Installed: November 1982
(See Vendor Profile Page V-32)

VISIONARY ELECTRONICS, INC.
VISIONARY 1200
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 300 bps, 1,200 bps
Interface: RS-232C
Bell-Compatible: 212
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autodial, Autoanswer, Reverse Channel, Diagnostics, Multiport, Clock Calendar, Switchable Data Rates
Distribution Method: End user, OEM, Third-party
Price: $795
Date First Installed: November 1983

WAMB LABORATORIES, INC.
CATV MODEM
Modem Class: Long-Haul
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous/Synchronous - 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps
Interface: RS-232C
Transmission Medium: Voice-Grade Lines
Diagnostics: No
Distribution Method: End user
Number Installed to Date: Under 100
Date First Installed: April 1983
(See Vendor Profile Page V-32)

WAMB LABORATORIES, INC.
WA 3451 MODEM
Modem Class: Long-Haul
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps; Asynchronous/Synchronous - 1,200 bps

Interface: RS-232C, CCITT V.24
Bell-Compatible: 103, 212
Transmission Medium: Voice-Grade Lines
Diagnostics: No
Features: Autodial, Autoanswer, Diagnostics, Switchable Data Rates
Distribution Method: End user
Price: $1,050
Number Installed to Date: 100 - 500
Date First Installed: June 1981

WESTERN DATACOM
212 AUTODIAL
Modem Class: Long-Haul
Transmission Technique: Asynchronous, Synchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous/Synchronous - 1,200 bps; Asynchronous - Up to 300 bps
Interface: RS-232C
Bell-Compatible: 212
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autodial, Autoanswer, Alternate Voice/Data, Reverse Channel, Diagnostics, Fallback, Switchable Data Rates
Distribution Method: End user, Third-party
Price: $825
Number Installed to Date: 200
Date First Installed: March 1984
(See Vendor Profile Page V-33)

WESTERN DATACOM
WORLDCOM 208
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 300 bps, 1,200 bps
Interface: RS-232C
Bell-Compatible: 103, 202
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autodial, Autoanswer, Alternate Voice/Data, Reverse Channel, Diagnostics, Fallback, Switchable Data Rates
Distribution Method: Third-party
Price: $595
Number Installed to Date: 10
Date First Installed: September 1983

WESTERN TELECOMPUTING CORP.
103 MODEM #667
Modem Class: Line Driver
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 300 bps
Interface: RS-232C
Bell-Compatible: 103
Transmission Medium: Voice-Grade Lines, Narrow-Band Lines, Radio Links
Diagnostics: Yes; Add-on
Features: Autodial
Distribution Method: End user
Price: $390
Number Installed to Date: Under 100
Date First Installed: September 1982
(See Vendor Profile Page V-33)

WESTERN TELECOMPUTING CORP.
103/12 MODEM #666
Modem Class: Line Driver
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 300 bps
Interface: RS-232C
Bell-Compatible: 103
Transmission Medium: Voice-Grade Lines, Narrow-Band Lines, Radio
Diagnostics: Yes; Add-on
Features: Autodial
Distribution Method: End user
Price: $825
Number Installed to Date: Under 100
Date First Installed: January 1982

WESTERN TELECOMPUTING CORP.
SATELLITE MODEM #668
Modem Class: Line Driver
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 300 bps
Interface: RS-232C
Bell-Compatible: 103
Transmission Medium: Voice-Grade Lines, Narrow-Band Lines, Radio Links
Diagnostics: Yes; Add-on
Features: Autodial
Distribution Method: End user
Price: $275
Number Installed to Date: Under 100
Date First Installed: January 1982

WOLPERTA, INC.
WD-212A
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Full-Duplex
Transmission Rate: Asynchronous - 300 bps, 1,200 bps
Interface: RS-232C
Bell-Compatible: 212
Transmission Medium: Voice-Grade Lines
Diagnostics: Yes; Built-in
Features: Autodial, Autoequalizer, Autoanswer, Diagnostics, Switchable Data Rates
Distribution Method: OEM
Number Installed to Date: 1,000 - 5,000
Date First Installed: March 1982
(See Vendor Profile Page V-33)

ZOOM TELEPHONICS, INC.
NETWORKER
Modem Class: Long-Haul
Transmission Technique: Asynchronous
Transmission Mode: Half-Duplex, Full-Duplex
Transmission Rate: Asynchronous - 110 bps, 300 bps
Interface: Apple II
Bell-Compatible: 103
Transmission Medium: Voice-Grade Lines
Diagnostics: No
Features: Alternate Voice/Data
Distribution Method: End user
Price: $129
Date First Installed: August 1983
(See Vendor Profile Page V-33)

MULTIPLEXERS

Multiplexer Index by Class

The index to multiplexers has been grouped according to device type — concentrators, frequency-division, fiber-optic, network concentrators, statistical, time-division and wideband. The last section of the index includes all multiplexers which do not fit into any of the above categories. Within each section, products have been arranged alphabetically by vendor and include price information and the page number on which the complete product listing may be found. The actual product listings have been grouped alphabetically by vendor.

Concentrators

VENDOR	MODEL	PRICE	PAGE
Computer Systems	CS/88	$1,500 to $3,000	A-74
Integrated Design Engineering, Inc.	IDE-250BA, -250CA	$1,600 to $6,850	A-83
Multitronics	RDS-1600	$5,000	A-87
	SBR-700	$1,000	A-88
Northern Telecom	COMM-MULTIPLEXER	$2,000	A-89
Philips Electronics Instruments	FLEXPAC PAD	N/A	A-89
Tandy Corp.	COMMUNICATIONS MULTIPLEXER (71-3080)	$6,000 to $8,000	A-94

Fiber-Optic Multiplexers

VENDOR	MODEL	PRICE	PAGE
Belden Corp.	BIT-DRIVER 222-006	$1,950	A-69
Comgal Data Systems	CMX-320	$2,500	A-70
	CMX-808	$1,200	A-70
	CMX-816	$2,750	A-70
Fibronics International, Inc.	FM 814	$2,000 to $2,800	A-70
	FM 818	$3,300 to $4,900	A-70
	FM 832	$5,400 to $15,000	A-70
	FM 1608	$1,300 to $2,200	A-70
	FM 1632	$1,825 to $4,900	A-70
Micom, Inc.	MUX-S	N/A	A-86

Frequency-Division Multiplexers

VENDOR	MODEL	PRICE	PAGE
Black Box Catalog/Expander, Inc.	SYNCHRONOUS CHANNEL SPLITTER (SCS-2)	$355	A-69
Codequent Communications Systems Corp.	FSM-76	$7,200 to $11,400	A-72
	LINEMATE 192	$500	A-72
	SPM-94A	$475	A-72
Micom Systems, Inc.	INSTALINK480 MODEL M461	$560 to $575	A-86

Network Concentrators

VENDOR	MODEL	PRICE	PAGE
Datagram Corp.	DM900	$1,550 to $2,750	A-74
	DM1600	$2,200 to $4,600	A-74
	DM4800	$3,650 to $13,250	A-74
General Datacomm Industries, Inc.	GENNET 1201	$1,400 to $2,200	A-81
	GENNET 1202	N/A	A-81
Infotron Systems Corp.	792 NETWORK CONCENTRATOR	$4,500 to $7,900	A-82
	SM480 WITH 790NC OR 792NC	$1,200	A-82
	SM680 WITH 790NC OR 792NC	$1,200	A-82
	SUPERMUX 790	$4,600 to $7,100	A-82
Magnalink Corp.	SM5/X INTERFACE-A	$1,500	A-85
	SM5/X INTERFACE-S	$1,500	A-85
Racal-Vadic	SCOTSMAN III	N/A	A-92

Multiplexer Index

VENDOR	MODEL	PRICE	PAGE
Bisco, Inc.	DCX840 NETWORK MUX	N/A	A-62
	DCX850 SWITCHING MUX	$80,000	A-62
Modelm, Inc.	PEX-1 INTELLIGENT DATA MULTIPLEXER	$3,500	A-66

Statistical Multiplexers

VENDOR	MODEL	PRICE	PAGE
Racine Data Systems	SWITCHABLE/STATISTICAL MULTIPLEXER	$1,995	A-68
Black Box Catalog/Expander, Inc.	DATA CONCENTRATOR 2	$1,050	A-69
	DATA CONCENTRATOR 2HP	$1,050	A-69
	DATA CONCENTRATOR 4	$1,400	A-69
	DATA CONCENTRATOR 4HP	$1,400	A-69
	DATA CONCENTRATOR 8	$2,200	A-69
	DATA CONCENTRATOR 8HP	$2,200	A-69
	GENERAL PURPOSE DATA CONCENTRATOR	$1,050 to $2,200	A-70
Cermetek Microelectronics	MUX-MATE 840	$695	A-70
Chariq Telecommunications	TURBO MUX 2	$995	A-71
Codex Corp.	670 MULTIDROP STATISTICAL	$1,350 to $5,400	A-71
	6001 INTELLIGENT NETWORK PROCESSOR	$1,500 to $4,925	A-71
	6005 INTELLIGENT NETWORK PROCESSOR	$2,600 to $7,000	A-71
	6010 INTELLIGENT NETWORK PROCESSOR	$4,500	A-71
	6030 INTELLIGENT NETWORK PROCESSOR	$8,500	A-71
	6040 INTELLIGENT NETWORK PROCESSOR	$17,000	A-71
	6050 DISTRIBUTED COMMUNICATIONS PROCESSOR	$45,000	A-71
CompDesign, Inc.	TC-500	$1,700 to $7,800	A-72
Communication Devices, Inc.	01-09-0075	$2,000	A-72
Compiex Systems, Inc.	AMUX 4/8	$1,350 to $1,950	A-73
Compro Communications, Inc.	BILINK 2AA24	$675	A-73
	BILINK 2AS192	$675	A-73
	DATA XCHANGE	$2,550 to $9,600	A-73
	ECONO SERIES 4	$1,095	A-73
	ECONO SERIES 8	$1,695	A-73
	Q-LINK 4AA24	$1,195	A-73
	Q-LINK 4AS192	$1,195	A-73
Computer Modules Corp.	RAMM-16	$4,000	A-73
	TAMM-16A	$5,000	A-73
Computer Peripheral Systems, Inc.	MARS SYSTEM MUX/CONCENTRATOR	$1,500 to $5,000	A-74
Computrol	MEGA PLEX	$5,000 to $10,180	A-74
Datagram Corp.	DM 900	$1,550 to $2,750	A-74
	DM 1600	$2,200 to $4,600	A-74
	DM 4800	$3,650 to $13,250	A-74
Datagroup-data New England, Inc.	DP MUX-256	$4,842 to $9,550	A-75
	MC 3	$8,715 to $10,800	A-75
Datalink, Inc.	DCP 5000	$1,300	A-76
Datec, Inc.	DATEC DATAMUX	$835	A-76
DCA/TAC	AYARWM 205	$4,250 to $6,000	A-76
	SYSTEM 105	$1,295 to $2,650	A-76
	SYSTEM 110	$1,495 to $2,850	A-76
	SYSTEM 120	$2,450 to $8,595	A-76
	SYSTEM 125	$3,250 to $9,395	A-76
	SYSTEM 325 NETSWITCH	$12,560	A-76
	SYSTEM 335	$6,795 to $7,195	A-76
	SYSTEM 355	$9,995 to $11,295	A-76
Develcon Electronics, Inc.	DS1600	$2,600 to $5,000	A-76
	DS1800	$1,550 to $2,750	A-76
	DS4800	$3,650 to $13,250	A-77
Digital Equipment Corp.	DFM04	$2,675	A-77
	DFM08	$3,350	A-77
	DFM12	$4,075	A-77
	DFM16	$4,800	A-77
Dynatech Packet Technology, Inc.	DP 1000	$1,000 to $2,000	A-77
	MULTIPAD 25	$3,000 to $60,000	A-77
	MULTIPLEX 25	$1,500 to $50,000	A-77
Emulex Corp.	CS01-H	N/A	A-77
	CS11-F	N/A	A-77
	CS11-H	N/A	A-77
	CS11-U	N/A	A-77
	CS11-V	N/A	A-78
	CS21-F	N/A	A-78
	CS21-H	N/A	A-78
	CS21-U	N/A	A-78
	CS21-Z	N/A	A-78
	CSM11-MH	N/A	A-78
	CSM11-MU	N/A	A-78

Multiplexer Index

VENDOR	MODEL	PRICE	PAGE
Emidex Corp.	CSM21-MU	N/A	A-79
	CSM21-MZ	N/A	A-79
	CSM21-NH	N/A	A-79
Ericsson Pragmatic, Inc.	1111	$990	A-79
	1112	$1,140	A-79
	1114	$1,510	A-79
	1118	$2,150	A-79
Friedman Associates	DATAGRAM DM900	$1,550 to $2,750	A-79
	DATAGRAM DM1600	$2,900 to $5,000	A-79
	DATAGRAM DM4800	$3,600 to $13,200	A-79
Fujitsu America, Inc.	NEC STAT MUX	$35,000	A-80
Gandalf Data, Inc.	F 1951A	N/A	A-80
	PIN 9101 E	$2,650 to $5,750	A-80
	PIN 9103	$1,650 to $7,150	A-80
	PIN 9106	$825 to $1,085	A-80
GTE Network Systems, Inc.	9004 A/B	$15,000	A-81
Halcyon Communications	4001	$1,700 to $4,100	A-81
	4220	$3,800 to $6,500	A-81
Infotron Systems Corp.	SUPERMUX 380 STAT MUX	$1,375 to $1,750	A-82
	SUPERMUX 480 STAT MUX	$1,900 to $6,000	A-82
	SUPERMUX 616	$5,500	A-82
	SUPERMUX 632	$9,000	A-82
	SUPERMUX 680 STAT MUX	$3,000 to $5,200	A-83
	SUPERMUX 780 STAT MUX	$1,700	A-83
Interactive Systems/3M	MODEL 6330 STAT MUX	$3,640 to $8,150	A-83
Interbusiness Corp.	DUAL MUX A	$695	A-84
	DUAL MUX S	$695	A-84
	QUAD MUX S	$1,150	A-84
	QUAD MUX (4 CHANNEL STAT MUX)	$1,150	A-84
Interlan, Inc.	NTS-10 TERMINAL SAVER	$400	A-84
Inter-Link	LN-1000	$995 to $1,635	A-84
	LN-2000	$1,695 to $2,695	A-84
	LN-4000	$2,995 to $3,995	A-85
Micom Systems, Inc.	MICRO 200 PORT CONCENTRATOR	$2,559 to $3,250	A-85
	MICRO 500 ERROR CONTROLLER	$795	A-85
	MICRO 800/2 DATA CONCENTRATOR	$1,080 to $4,800	A-86
	MICRO 800/X25	$2,050 to $4,800	A-86
	MICRO 900/2 MULTIDROP CONCENTRATOR	$900 to $4,800	A-86
	MICRO 5000 INTELLIGENT MODEM	$1,500 to $3,400	A-86
	MICRO 8000 CONCENTRATOR MODEM	$1,950 to $7,200	A-86
Multi-Tech Systems, Inc.	MULTI-MUX	$1,295	A-87
Network Products, Inc.	BABY MUX	$1,350 to $2,300	A-88
	BABY NET	$1,450 to $2,400	A-88
Paradyne Corp.	DCX-815	$1,880 to $2,180	A-88
	DCX-825	$3,200 to $7,200	A-88
	DCX-840	$10,000 to $85,000	A-88
	DCX-850	$15,000 to $100,000	A-88
	DCX-861	$2,900 to $3,300	A-88
	DCX-871	$4,500 to $8,800	A-88
	MP-14.4 SM	$14,975	A-88
Phoenix Digital Corp	BABY KNET	$1,460 to $2,400	A-89
Prentice Corp.	SNP 1101	$695	A-89
	SNP 1102	$985	A-91
	SNP 1104	$1,295	A-91
	SNP 1208	$1,495 to $2,295	A-91
	SNP 1209	$2,095 to $2,795	A-91
Rapid-Ridge, Inc.	OMNIMUX 80	N/A	A-91
	OMNIMUX 30	$1,800 to $2,600	A-91
	OMNIMUX 40	$1,800 to $2,600	A-91
	OMNIMUX 160	N/A	A-91
	OMNIMUX 320	N/A	A-91
Rand-Vadic	SCOTSMAN I	$1,850	A-92
	SCOTSMAN II	$2,950 to $4,900	A-92
Rixon, Inc.	COMMUX STATISTICAL MULTIPLEXER PLUS	N/A	A-92
	DCX815 STATISTICAL MULTIPLEXER	N/A	A-92
	DCX825 STATISTICAL MULTIPLEXER	N/A	A-92
	DCX836 STATISTICAL MULTIPLEXER	N/A	A-92
Sattre Corp.	CPX 25	$1,850 to $10,000	A-93
	ILX	$4,500 to $10,000	A-93
	MUX 25	$1,200	A-93
	NPX	$4,500 to $10,000	A-93
Teleprocessing Products, Inc.	TP-212	$850	A-94
	TP-214	$1,350	A-94
	TP-400 MULTI-DROP STAT MUX	$4,000 to $2,500	A-94
Telebit, Inc.	330A-F DATAPLEXERS	$2,400 to $11,900	A-94
Telenet Corp.	M-860	N/A	A-94
Timeplex, Inc.	NETWORKING MICROPLEXER NM96	$17,000	A-95
	NETWORKING MICROPLEXER NM144	$17,000	A-95

Multiplexer Index

VENDOR	MODEL	PRICE	PAGE
Timeplex, Inc.	QUAD SWITCHING MICROPLEXER	$7,525	A-85
	SERIES II MICROPLEXER M8	$1,625 to $2,650	A-85
	SERIES II MICROPLEXER M24	$2,655 to $3,420	A-85
	SERIES II MICROPLEXER M48	$4,890 to $5,150	A-85
	SWITCHING MICROPLEXER SM8	$1,800 to $2,625	A-85
	SWITCHING MICROPLEXER SM24	$2,630 to $3,855	A-85
	SWITCHING MICROPLEXER SM48	$4,125 to $5,150	A-85
	WIDEBAND MICROPLEXER WM48	$6,025	A-85
Western Datacom	PRISM 1003	$875	A-86
Xyplex, Inc.	XYPLEX SYSTEM	$700	A-86

Time-Division Multiplexers

VENDOR	MODEL	PRICE	PAGE
Able Computer	DH/DM	$3,750 to $4,500	A-68
	DV/16	$8,000 to $11,000	A-68
	DZ16	$3,200 to $3,950	A-68
	VMZ/32N	$3,750 to $4,500	A-68
Anadat Corp.	2211 TDM MULTIPLEXER	$7,500 to $50,000	A-68
Bay Technical Associates, Inc.	524 AC 11	$279 to $849	A-69
	524E	$279 to $849	A-69
	528 AC 11	$279 to $849	A-69
	528E	$279 to $849	A-69
Black Box Catalog/Expander, Inc.	ASYNCHRONOUS CHANNEL SPLITTER	$635	A-70
	SYNCHRONOUS CHANNEL SPLITTER (SCS-4)	$1,150	A-70
Bo-Eberral Co., Inc.	MX-1	$495	A-70
Codex Corp.	60/ 605 SYNCHRONOUS MULTIPLEXORS	$1,660 to $2,250	A-72
	960 SYNCHRONOUS MULTIPLEXOR	$4,500	A-72
	8000 GROUP BAND MULTIPLEXOR	$5,000	A-72
Computer Communications Specialists, Inc.	CHANNEL COMMUNICATIONS CONCENTRATOR	$3,695	A-73
Computer Inquiry Systems, Inc.	CIS BMUX	$300	A-74
Datakit, Inc.	MODEL 925 TELEX & DATA TDM	N/A	A-74
Datatel, Inc.	DCP 9100	$3,850	A-75
DCA/TAC	T-1 SPEED TIME DIVISION MULTIPLEXOR	$3,800 to $4,950	A-76
Gandalf Data, Inc.	GLM 504	$1,550	A-80
	LINE MISER-MUX4/MUX8	$850 to $850	A-80
GenComp, Inc.	ASYNCHRONOUS MULTIPLEXER MODEL 2033	$1,000 to $3,000	A-81
	ASYNCHRONOUS MULTIPLEXER MODEL 2035	$2,000 to $3,000	A-81
	ASYNCHRONOUS MULTIPLEXER MODEL 2133	$900	A-81
	ASYNCHRONOUS MULTIPLEXER MODEL 2135	$2,000 to $3,000	A-81
General Datacomm Industries, Inc.	MEGAMUX (TDM 1257/1258)	$6,000 to $35,000	A-81
	TDM 1209 SERIES	$995 to $1,295	A-81
Infinet, Inc.	MX400	$300	A-82
	MX496	$800	A-82
	MX600	$1,000	A-82
Infotron Systems Corp.	T1 MULTIPLEXER	$4,800	A-83
	TIMELINE 180 MULTIPLEXER	$1,700	A-83
	TIMELINE 280 MULTIPLEXER	$1,800	A-83
	TIMELINE 290 MULTIPLEXER	$1,950	A-83
Interactive Systems/3M	MODEL 6600	$1,600 to $3,090	A-84
Interall Systems, Inc.	5300	$1,500 to $2,250	A-85
ITT	D424	$5,000 to $50,000	A-85
LED Systems, Inc.	4D7 SYSTEM	$13,550	A-86
M/A-COM Linkabit, Inc.	MX 24	$2,700 to $5,000	A-86
	MX 48	$5,600	A-86
Micom Systems, Inc.	INSTAMUX470 MDL M474 OR 476	$695 to $1,050	A-86
	INSTATRUNK480 MODEL M481	$3,200 to $12,600	A-86
	M4096/4 +	$3,695	A-87
	MICRO100 LINE MULTIPLEXER	$4,300 to $6,400	A-87
	MICRO700 MODEL M700	N/A	A-87
	MICRO750 MODEL 1 OR 2	$2,500 to $10,000	A-87
Microtronics Corp.	MZV-11/8 OCTOMUX	$1,300	A-87
Modular Computer Systems, Inc.	1907	$75,000	A-87
Network Products, Inc.	LOCAL MUX	$850	A-88
Optelecom, Inc.	MODEL 51-008	$6,000	A-88
Paradyne Corp.	DCX-T1	$8,000 to $27,000	A-88
	DCX-725	$4,000	A-88
Pluto Corp.	MD-3200	$2,740 to $4,750	A-89
	MD-3208	$875	A-89
	OMX-1908	$1,295	A-90
	OMX-1916	$2,395	A-90
	OMX-5600	$6,000 to $18,800	A-90
	OMX-9600	$3,300 to $16,000	A-90
Phoenix Digital Corp	DPAC/PTX-1	$7,000 to $12,000	A-90

Multiplexer Index

VENDOR	MODEL	PRICE	PAGE
Phoenix Digital Corp	OPAC-30	$5,000 to $8,000	A-69
Natalin Electronics	MODEL 1600	$360 to $1,900	A-62
	MODEL 2600	$800 to $1,440	A-62
Rixon, Inc.	DCX725 SYNCHRONOUS MULTIPLEXER	N/A	A-63
Soltec Corp.	ESPT1	$3,900 to $35,000	A-63
Tau-Tron, Inc.	INTRAPLEX TDM 150	$3,500 to $8,000	A-64
Telmax, Inc.	AMUX(-1	$800	A-64
Timeplex, Inc.	LNK1-T1 FACILITIES MANAGEMENT SYSTEM	N/A	A-65
	TIMEPLEXER TIG TDM	$1,725	A-66
	TIMEPLEXER T-20 TDM	$2,050	A-66
	TIMEPLEXER T-66 TDM	$3,270	A-66
Wang Laboratories, Inc.	CMUX-2570 CABLE MULTIPLEXOR	$3,375	A-66

Wideband (T-1) Multiplexers

VENDOR	MODEL	PRICE	PAGE
Avanti Communications Corp.	ULTRAMUX	$15,750	A-60
Datacom	D/I MUX	$5,000	A-71
Gandalf Data, Inc.	LINE MISER-T1 MUX	$3,200	A-60

Other Multiplexer Types

VENDOR	MODEL	PRICE	PAGE
Astrocom Corp.	SQUEEZIPLEXER-RACK MOUNT	$2,880	A-60
	SQUEEZIPLEXER-STAND ALONE	$1,022	A-60
Canoga Data Systems	CMX-832	$2,700 to $6,700	A-70
Interface Electronics, Inc.	SLAM	$1,900	A-61
Micom Systems, Inc.	MICRO 800 CONCENTRATOR SWITCH	$1,400	A-67
Mitel, Inc.	MITEL DATA DEMULTIPLEXER	$850	A-67
Optelecom	4481	$1,100	A-68
	5100-8	$6,200	A-68
Periphonics Corp.	T-COMM	$35,000	A-68
	VOICE STAR	$35,000	A-68
	VOICEPACK	$20,000	A-68
Micro Research Corp.	TC-2/32	$10,000	A-62
Sperry Corp.	SIXTEEN CHANNEL TERMINAL MULTIPLEXER	$2,138	A-64
Telebe, Inc.	331 XPLEXER	$2,900 to $12,900	A-64
Timeplex, Inc.	MICROPLEXER X.25 PAD	$1,750	A-66

Multiplexers

ABLE COMPUTER
DI/DM
Multiplexer Class: TDM
Input Interface: RS-232C, CCITT V.24, CCITT V.28
Transmission Mode: Full-Duplex
Input Transmission Rates:
Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 19,200 bps
Maximum Output Lines:
Synchronous: 16
Output Transmission Mode: Full-Duplex
Features: Flow Control, Programmable
Diagnostic Features: Local
Price: $3,750 to $4,500
Date First Installed: 1981
(See Vendor Profile Page V-1)

ABLE COMPUTER
DV/16
Multiplexer Class: TDM
Maximum Input Channels:
Synchronous: 32
Asynchronous: 32
Input Transmission Rates:
Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,800 bps, 7,200 bps, 19,200 bps; Asynchronous/Synchronous - 1,200 bps; 2,400 bps, 3,600 bps, 4,800 bps, 9,600 bps
Aggregate Transmission Rate: 300 bps
Maximum Output Lines:
Synchronous: 4
Asynchronous: 4
Output Transmission Mode: Half-Duplex, Full-Duplex
Diagnostic Features: Local
Distribution Method: Third-party
Price: $8,000 to $11,000
Date First Installed: 1980

ABLE COMPUTER
DZ16
Multiplexer Class: TDM
Input Interface: RS-232C, CCITT V.24/V.28
Maximum Input Channels:
Synchronous: 16
Transmission Mode: Full-Duplex
Input Transmission Rates:
Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps
Maximum Output Lines:
Synchronous: 16
Output Transmission Mode: Full-Duplex
Features: Programmable
Diagnostic Features: Local
Distribution Method: Third-party
Price: $3,200 to $3,950
Date First Installed: 1980
Number Installed to Date: 100 - 500

ABLE COMPUTER
VMZ/32N
Multiplexer Class: TDM
Input Interface: RS-232C, CCITT V.24/V.28
Maximum Input Channels:
Synchronous: 16
Transmission Mode: Full-Duplex
Input Transmission Rates:
Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps, 19,200 bps
Maximum Output Lines:
Synchronous: 16
Output Transmission Mode: Full-Duplex
Features: Flow Control, Programmable
Diagnostic Features: Local
Distribution Method: Third-party
Price: $3,750 to $4,500
Date First Installed: 1982

ARDAKL CORP.
3211 TDM MULTIPLEXER
Multiplexer Class: TDM
Input Interface: RS-232C, CCITT V.24/V.28, V.35, MIL 188C, Bell 301/303
Maximum Input Channels:
Synchronous: 48
Asynchronous: 96
Transmission Mode: Full-Duplex
Input Transmission Rates:
Asynchronous - 110 bps, 1,800 bps; Asynchronous/Synchronous - 300 bps; 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps, 14,400 bps, 19,200 bps, 460.8K bps
Aggregate Transmission Rate: 13,440 bps
Maximum Output Lines:
Asynchronous: 1
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates:
Synchronous - 9,600 bps, 14,400 bps, 56,000 bps; Asynchronous - T-1; Asynchronous/Synchronous - 40,860 bps, 2,048K bps
Communications Protocols: Ascii, Protocol Transparent
Features: Automatic Speed Detection (Autobaud), Downline Loading (On-Line Reconfiguration), Operational and Statistical Reports, Programmable, Network Monitor, Soft Configurability
Diagnostic Features: Remote, Local
Distribution Method: End user
Price: $7,500 to $50,000
Date First Installed: May 1983
Number Installed to Date: Under 100
(See Vendor Profile Page V-2)

ASTROCOM CORP.
SQUEEZPLEXER-STAND ALONE
Multiplexer Class: IBM 3274 Coaxial Cable Eliminator
Input Interface: Coaxial Cable, RG-62A/U
Maximum Input Channels:
Synchronous: 8
Transmission Mode: Half-Duplex
Input Transmission Rates:
Asynchronous - 2M bps
Aggregate Transmission Rate: 28K bps
Maximum Output Lines:
Synchronous: 1
Output Transmission Mode: Half-Duplex
Output Line Transmission Rates:
Asynchronous - 2M bps
Features: Polling, Operational and Statistical Reports, Network Monitor
Diagnostic Features: Local
Distribution Method: Third-party
Price: $1,022
Date First Installed: January 1983
Number Installed to Date: 500 - 1,000
(See Vendor Profile Page V-3)

ASTROCOM CORP.
SQUEEZPLEXER-RACK MOUNT
Multiplexer Class: IBM 3274 Coaxial Cable Eliminator
Maximum Input Channels:
Synchronous: 32
Transmission Mode: Half-Duplex
Maximum Output Lines:
Synchronous: 4
Features: Polling, Operational and Statistical Reports, Network Monitor
Diagnostic Features: Local
Distribution Method: Third-party
Price: $2,860
Date First Installed: January 1983
Number Installed to Date: 500 - 1,000

AVANTI COMMUNICATIONS CORP.
ULTRAMUX
Multiplexer Class: Wideband (T-1)
Input Interface: RS-232C, MIL 188C, V.35, RS-449, Bell 303
Maximum Input Channels:
Synchronous: 128
Asynchronous: 64
Transmission Mode: Half-Duplex, Full-Duplex
Input Transmission Rates:
Asynchronous/Synchronous - 2.5M bps
Aggregate Transmission Rate: 1M bps
Maximum Output Lines:
Asynchronous: 4
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates:
Synchronous - 56,000 bps; Asynchronous/Synchronous - 16M bps
Communications Protocols: Transparent
Features: Automatic Speed Detection (Autobaud), Data Compression, Downline Loading (On-Line Reconfiguration), Automatic Repeat Request, Port Contention; Switching, Operational and Statistical Reports, Flow Control, Programmable, Network Monitor, T-1 Capability, Dynamic Band Width
Diagnostic Features: Remote, Local
Distribution Method: End user, OEM, Third-party
Price: $15,750
Date First Installed: March 1983
Number Installed to Date: Under 100
(See Vendor Profile Page V-3)

BACKUS DATA SYSTEMS
SWITCHABLE/STATISTICAL MULTIPLEXER
Multiplexer Class: Statistical
Input Interface: RS-232C
Maximum Input Channels:
Asynchronous: 5
Transmission Mode: Full-Duplex
Input Transmission Rates:
Synchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps
Aggregate Transmission Rate: 96 bps
Maximum Output Lines:
Synchronous: 1
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates:
Asynchronous - 9,600 bps
Communications Protocols: SDLC
Features: Switching, Operational and Statistical Reports, Programmable
Diagnostic Features: No
Distribution Method: End user
Price: $1,995
Date First Installed: September 1983
Number Installed to Date: Under 100
(See Vendor Profile Page V-3)

BAY TECHNICAL ASSOCIATES, INC.
524 AC 11
Multiplexer Class: TDM
Input Interface: RS-232C
Maximum Input Channels:
Synchronous: 4
Transmission Mode: Full-Duplex
Input Transmission Rates:
Asynchronous - 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps, 19,200 bps
Maximum Output Lines:
Synchronous: 1
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates:
Asynchronous - 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps
Communications Protocols: Ascii
Features: Flyback Buffering Delay, Polling, Programmable
Diagnostic Features: Local
Distribution Method: End user
Price: $279 to $649
Date First Installed: September 1982
Number Installed to Date: 5,000 - 10,000
(See Vendor Profile Page V-4)

BAY TECHNICAL ASSOCIATES, INC.
524E
Multiplexer Class: TDM
Input Interface: RS-232C
Maximum Input Channels:
Synchronous: 4
Transmission Mode: Full-Duplex
Input Transmission Rates:
Asynchronous - 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps, 19,200 bps
Maximum Output Lines:
Synchronous: 1
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates:

Asynchronous - 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps
Communications Protocols: Ascii
Features: Polling, Programmable
Diagnostic Features: Local
Distribution Method: End user
Price: $279 to $649
Date First Installed: September 1982
Number Installed to Date: 5,000 - 10,000

BAY TECHNICAL ASSOCIATES, INC.
828 AC 11
Multiplexer Class: TDM
Input Interface: RS-232C
Maximum Input Channels:
Synchronous: 8
Transmission Mode: Full-Duplex
Input Transmission Rates:
Asynchronous - 600 bps, - 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps, 19,200 bps
Maximum Output Lines:
Synchronous: 1
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates:
Asynchronous - 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps
Communications Protocols: Ascii
Features: Flyback Buffering Delay, Polling, Programmable
Diagnostic Features: Local
Distribution Method: End user
Price: $279 to $649
Date First Installed: September 1982
Number Installed to Date: 5,000 - 10,000

BAY TECHNICAL ASSOCIATES, INC.
828E
Multiplexer Class: TDM
Input Interface: RS-232C
Maximum Input Channels:
Synchronous: 8
Transmission Mode: Full-Duplex
Input Transmission Rates:
Asynchronous - 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps, 19,200 bps
Maximum Output Lines:
Synchronous: 1
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates:
Asynchronous - 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps
Communications Protocols: Ascii
Features: Polling, Programmable
Diagnostic Features: Local
Distribution Method: End user
Price: $279 to $649
Date First Installed: September 1982
Number Installed to Date: 5,000 - 10,000

BELDEN CORP.
BT-DRIVER 222-006
Multiplexer Class: Fiber-Optic
Input Interface: RS-232C
Maximum Input Channels:
Synchronous: 8
Asynchronous: 8
Transmission Mode: Full-Duplex
Input Transmission Rates:
Asynchronous/Synchronous - 1,200 bps, 2,400 bps, 4,800 bps, 9,600 bps, 19,200 bps
Aggregate Transmission Rate: 1,600 bps
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates:
Asynchronous/Synchronous - 1,200 bps, 4,800 bps
Communications Protocols: Transparent
Features: Independent Channel Loopback
Diagnostic Features: Local
Distribution Method: Third-party
Price: $1,950
Date First Installed: June 1983
Number Installed to Date: Under 100
(See Vendor Profile Page V-4)

BLACK BOX CATALOG/EXPANDOR, INC.
SYNCHRONOUS CHANNEL SPLITTER (SCS-2)
Multiplexer Class: FDM
Input Interface: RS-232C
Maximum Input Channels:
Asynchronous: 2
Transmission Mode: Full-Duplex
Input Transmission Rates:
Asynchronous/Synchronous - Up to 9,600 bps
Maximum Output Lines:
Asynchronous: 1
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates:
Asynchronous/Synchronous - Up to 9,600 bps
Features: Automatic Speed Detection (Autobaud), Data Compression, Automatic Repeat Request, Port Contention, Operational and Statistical Reports, Flow Control
Diagnostic Features: Remote, Local
Distribution Method: End user
Price: $355
Date First Installed: August 1982
Number Installed to Date: 100 - 500
(See Vendor Profile Page V-4)

BLACK BOX CATALOG/EXPANDOR, INC.
DATA CONCENTRATOR 2
Multiplexer Class: Statistical
Input Interface: RS-232C, DCE
Maximum Input Channels:
Synchronous: 2
Transmission Mode: Full-Duplex
Input Transmission Rates:
Asynchronous - 110 bps, 9,600 bps
Aggregate Transmission Rate: 192 bps
Maximum Output Lines:
Synchronous: 1
Asynchronous: 1
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates:
Asynchronous - 1,200 bps, 1,800 bps, 9,600 bps, Asynchronous/Synchronous - As Per Modem Speed
Communications Protocols: BSC
Features: Data Compression, Downline Loading (On-Line Reconfiguration), Automatic Repeat Request, Flow Control
Diagnostic Features: Remote, Local
Price: $1,050
Date First Installed: 1978
Number Installed to Date: 10,000-50,000

BLACK BOX CATALOG/EXPANDOR, INC.
DATA CONCENTRATOR 2HP
Multiplexer Class: Statistical
Input Interface: RS-232C, DCE
Maximum Input Channels:
Synchronous: 2
Transmission Mode: Full-Duplex
Input Transmission Rates:
Asynchronous - 110 bps, 9,600 bps
Aggregate Transmission Rate: 192 bps
Maximum Output Lines:
Synchronous: 1
Asynchronous: 1
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates:
Asynchronous - 1,200 bps, 1,800 bps, 9,600 bps;
Asynchronous/Synchronous - As per Modem Speed
Communications Protocols: BSC-Type
Features: Data Compression, Downline Loading (On-Line Reconfiguration), Automatic Repeat Request, Flow Control
Diagnostic Features: Remote, Local
Price: $1,050
Date First Installed: 1978
Number Installed to Date: 10,000 - 50,000

BLACK BOX CATALOG/EXPANDOR, INC.
DATA CONCENTRATOR 4
Multiplexer Class: Statistical
Input Interface: RS-232C, DCE
Maximum Input Channels:
Synchronous: 4
Transmission Mode: Full-Duplex
Input Transmission Rates:
Asynchronous - 110 bps, 9,600 bps
Aggregate Transmission Rate: 384 bps
Maximum Output Lines:
Synchronous: 1
Asynchronous: 1
Output Line Transmission Rates:
Asynchronous -1,200 bps, 1,800 bps, 9,600 bps;
Asynchronous/Synchronous - As per Modem Speed
Communications Protocols: BSC-Type
Features: Data Compression, Downline Loading (On-Line Reconfiguration), Automatic Repeat Request, Flow Control, Tact
Diagnostic Features: Remote, Local
Distribution Method: End user
Price: $1,400
Number Installed to Date: 10,000 - 50,000

BLACK BOX CATALOG/EXPANDOR, INC.
DATA CONCENTRATOR 4HP
Multiplexer Class: Statistical
Input Interface: RS-232C, DCE
Maximum Input Channels:
Synchronous: 4
Transmission Mode: Full-Duplex
Input Transmission Rates:
Asynchronous - 110 bps to 9,600 bps
Aggregate Transmission Rate: 384 bps
Maximum Output Lines:
Synchronous: 1
Asynchronous: 1
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates:
Asynchronous - 1,200 bps, 1,800 bps, 9,600 bps;
Asynchronous/Synchronous - As per Modem Speed
Communications Protocols: BSC-Type
Features: Data Compression, Downline Loading (On-Line Reconfiguration), Automatic Repeat Request, Flow Control, Terminal-Activated Communications Test
Diagnostic Features: Remote, Local
Distribution Method: End user
Price: $1,400
Date First Installed: 1978
Number Installed to Date: 10,000 - 50,000

BLACK BOX CATALOG/EXPANDOR, INC.
DATA CONCENTRATOR 8
Multiplexer Class: Statistical
Input Interface: RS-232C, DSC
Maximum Input Channels:
Synchronous: 8
Transmission Mode: Full-Duplex
Input Transmission Rates:
Asynchronous - 110 bps, 3,600 bps
Aggregate Transmission Rate: 768 bps
Maximum Output Lines:
Synchronous: 1
Asynchronous: 1
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates:
Asynchronous - 1,200 bps, 1,800 bps, 9,600 bps;
Asynchronous/Synchronous - As per Modem Speed
Communications Protocols: BSC-Type
Features: Data Compression, Downline Loading (On-Line Reconfiguration), Automatic Repeat Request, Flow Control, Terminal-Activated Communications Test
Diagnostic Features: Remote, Local
Price: $2,200
Date First Installed: 1978
Number Installed to Date: 10,000 - 50,000

BLACK BOX CATALOG/EXPANDOR, INC.
DATA CONCENTRATOR 8HP
Multiplexer Class: Statistical

Input Interface: RS-232C, DSC
Maximum Input Channels:
Synchronous: 8
Transmission Mode: Full-Duplex
Input Transmission Rates:
Asynchronous - 110 bps to 9,600 bps
Aggregate Transmission Rate: 768 bps
Maximum Output Lines:
Synchronous: 1
Asynchronous: 1
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates:
Asynchronous - 1,200 bps, 1,800 bps, 9,600 bps;
Asynchronous/Synchronous - As per Modem Speed
Communications Protocols: BSC-Type
Features: Data Compression, Downline Loading (On-Line Reconfiguration), Automatic Repeat Request, Flow Control and Terminal Activated Communications Test
Diagnostic Features: Remote, Local
Distribution Method: End user
Price: $2,200
Date First Installed: 1978
Number Installed to Date: 10,000 - 50,000

BLACK BOX CATALOG/EXPANDOR, INC.
GENERAL PURPOSE DATA CONCENTRATOR
Multiplexer Class: Statistical
Input Interface: RS-232C
Maximum Input Channels:
Synchronous: 8
Transmission Mode: Half-Duplex, Full-Duplex
Input Transmission Rates:
Asynchronous - 300 bps, 600 bps, 1,200 bps, 4,800 bps, 9,600 bps
Aggregate Transmission Rate: 384 bps
Maximum Output Lines:
Synchronous: 1
Asynchronous: 1
Output Transmission Mode: Half-Duplex, Full-Duplex
Output Line Transmission Rates:
Asynchronous/Synchronous - 1,200 bps, 1,800 bps, 9,600 bps; Synchronous - 2,400 bps, 4,800 bps
Communications Protocols: Ascii, EWK/ACK (HP), XON-XOFF
Features: Automatic Speed Detection (Autobaud), Data Compression, Automatic Repeat Request, Port Contention, Operational and Statistical Reports, Flow Control, Statistical Convention Multiplexer
Diagnostic Features: Remote, Local
Distribution Method: End user
Price: $1,050 to $2,200
Date First Installed: August 1982
Number Installed to Date: 100 - 500

BLACK BOX CATALOG/EXPANDOR, INC.
ASYNCHRONOUS CHANNEL SPLITTER
Multiplexer Class: TDM
Input Interface: RS-232C
Maximum Input Channels:
Synchronous: 2
Asynchronous: 2
Transmission Mode: Full-Duplex
Input Transmission Rates:
Asynchronous - 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps, 19,200 bps
Maximum Output Lines:
Synchronous: 1
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates:
Asynchronous - Up to 38,400 bps
Features: Automatic Speed Detection (Autobaud), Data Compression, Automatic Repeat Request, Port Contention, Operational and Statistical Reports, Flow Control
Diagnostic Features: Remote, Local
Distribution Method: End user
Price: $835
Date First Installed: August 1982
Number Installed to Date: 100 - 500

BLACK BOX CATALOG/EXPANDOR, INC.
SYNCHRONOUS CHANNEL SPLITTER (SCS-4)
Multiplexer Class: TDM
Input Interface: RS-232C, CCITT V.24/V.28
Maximum Input Channels:
Asynchronous: 4
Transmission Mode: Full-Duplex
Input Transmission Rates:
Synchronous - 4,800 bps
Aggregate Transmission Rate: 300 bps
Maximum Output Lines:
Asynchronous: 1
Output Transmission Mode: Half-Duplex, Full-Duplex
Output Line Transmission Rates:
Asynchronous/Synchronous - Up to 19,200 bps
Features: Automatic Speed Detection (Autobaud), Data Compression, Automatic Repeat Request, Port Contention, Operational and Statistical Reports, Flow Control
Diagnostic Features: Remote, Local
Distribution Method: End user
Price: $1,150
Date First Installed: August 1982
Number Installed to Date: Under 100

BO-GENERAL CO., INC.
MX-1
Multiplexer Class: TDM
Input Interface: RS-232C
Maximum Input Channels:
Synchronous: 8
Transmission Mode: Full-Duplex
Input Transmission Rates:
Asynchronous - 9,600 bps
Aggregate Transmission Rate: 768 bps
Maximum Output Lines:
Synchronous: 8
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates:
Asynchronous - 9,600 bps
Communications Protocols: All (Transparent)
Diagnostic Features: Local
Distribution Method: End user
Price: $495
Date First Installed: December 1983
Number Installed to Date: Under 100
(See Vendor Profile Page V-4)

CANOGA DATA SYSTEMS
CMX-320
Multiplexer Class: Fiber-Optic
Input Interface: RS-232C
Maximum Input Channels:
Synchronous: 32
Transmission Mode: Half-Duplex, Full-Duplex
Input Transmission Rates:
Asynchronous - 19,200 bps
Aggregate Transmission Rate: 6,144 bps
Maximum Output Lines:
Synchronous: 32
Asynchronous: 32
Output Transmission Mode: Half-Duplex, Full-Duplex
Output Line Transmission Rates:
Asynchronous - 14,400 bps
Communications Protocols: Bit TDM
Features: Automatic Speed Detection (Autobaud), Continual Monitoring
Diagnostic Features: Local
Distribution Method: End user
Price: $2,500
Date First Installed: November 1981
Number Installed to Date: 100 - 500
(See Vendor Profile Page V-5)

CANOGA DATA SYSTEMS
CMX-808
Multiplexer Class: Fiber-Optic
Input Interface: RS-232C
Maximum Input Channels:
Synchronous: 16
Asynchronous: 8
Transmission Mode: Full-Duplex
Input Transmission Rates:
Synchronous - 9,600 bps;
Asynchronous - 19,200 bps
Aggregate Transmission Rate: 1,536 bps
Maximum Output Lines:
Synchronous: 8
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates:
Asynchronous - 14,400 bps
Communications Protocols: Bit TDM
Features: Automatic Speed Detection (Autobaud), Continual Monitoring
Diagnostic Features: Local
Distribution Method: End user
Price: $1,200
Date First Installed: November 1982
Number Installed to Date: 100 - 500

CANOGA DATA SYSTEMS
CMX-816
Multiplexer Class: Fiber-Optic
Input Interface: RS-232C, RS-422, V.35
Maximum Input Channels:
Synchronous: 16
Asynchronous: 16
Transmission Mode: Full-Duplex
Input Transmission Rates:
Asynchronous - 19,200 bps;
Asynchronous/Synchronous - 76.8K bps
Aggregate Transmission Rate: 10 bps
Maximum Output Lines:
Synchronous: 16
Asynchronous: 16
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates:
Asynchronous - 14,400 bps;
Asynchronous/Synchronous - 64K bps
Communications Protocols: Bit TDM
Features: Automatic Speed Detection (Autobaud), Programmable, Continual Monitoring
Diagnostic Features: Local
Distribution Method: End user
Price: $2,750
Date First Installed: September 1983
Number Installed to Date: Under 100

CANOGA DATA SYSTEMS
CMX-832
Multiplexer Class: Fiber-Optic TDM
Input Interface: RS-232C
Maximum Input Channels:
Synchronous: 32
Asynchronous: 32
Transmission Mode: Full-Duplex
Input Transmission Rates:
Asynchronous/Synchronous - 19,200 bps
Aggregate Transmission Rate: 61 bps
Maximum Output Lines:
Synchronous: 32
Asynchronous: 32
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates:
Asynchronous/Synchronous - 14,400 bps
Communications Protocols: Bit TDM
Features: Automatic Speed Detection (Autobaud), Continual Monitoring
Diagnostic Features: Local
Distribution Method: End user
Price: $2,700 to $8,700
Date First Installed: November 1980
Number Installed to Date: 500 - 1,000

CERMETEK MICROELECTRONICS
MUX-MATE 840
Multiplexer Class: Statistical
Input Interface: RS-232C
Maximum Input Channels:
Synchronous: 2
Transmission Mode: Full-Duplex
Input Transmission Rates:
Asynchronous - 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps
Aggregate Transmission Rate: 24 bps
Maximum Output Lines:
Synchronous: 1
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates:
Asynchronous - 2,400 bps

Communications Protocols: HDLC (CCITT X.205 Level 2)
Features: Automatic Repeat Request, Port Contention, Flow Control, Programmable
Diagnostic Features: Local
Distribution Method: End user, Third-party
Price: $695
(See Vendor Profile Page V-5)

CRUMB TELECOMMUNICATIONS TURBO MUX 2
Multiplexer Class: Statistical
Input Interface: RS-232C
Transmission Mode: Full-Duplex
Input Transmission Rates: Asynchronous - 2,400 bps
Aggregate Transmission Rate: 48 bps
Maximum Output Lines:
Synchronous: 1
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Asynchronous - 1,200 bps
Communications Protocols: Asynchronous - Protocol
Features: Data Compression, Automatic Repeat Request, Flow Control
Diagnostic Features: Remote, Local
Distribution Method: Third-party
Price: $995
Date First Installed: April 1983
(See Vendor Profile Page V-5)

COASTCOM D/I MUX
Multiplexer Class: Wideband (T-1)
Input Interface: RS-232C, RS-422, RS-449, CCITT V.35
Maximum Input Channels:
Synchronous: 16,800 bps
Transmission Mode: Full-Duplex
Input Transmission Rates: Asynchronous - 800 bps
Aggregate Transmission Rate: 154 bps
Maximum Output Lines:
Synchronous: 168
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Asynchronous - 800 bps
Communications Protocols: DS1
Features: Protocol Conversion, Programmable, Network Monitor
Diagnostic Features: No
Distribution Method: End user, OEM, Third-party
Price: $6,000
Date First Installed: May 1982
Number Installed to Date: 100 - 500
(See Vendor Profile Page V-5)

CODEX CORP. 670 MULTIDROP STATISTICAL MULTIPLEXORS
Multiplexer Class: Statistical
Input Interface: RS-232C, CCITT V.24/V.28
Maximum Input Channels:
Synchronous: 16
Transmission Mode: Half-Duplex, Full-Duplex
Input Transmission Rates: Asynchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps
Aggregate Transmission Rate: 384 bps
Maximum Output Lines:
Other: Multidrop Line
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Asynchronous/Synchronous - 1,200 bps, 2,400 bps; Synchronous - 1,800 bps, 4,800 bps, 9,600 bps; Asynchronous - 1,800
Communications Protocols: Ascii, Asynchronous Protocols
Features: Downline Loading (On-Line Reconfiguration), Automatic Repeat Request, Flyback Buffering Delay, Flow Control, Programmable
Diagnostic Features: Remote, Local
Distribution Method: End user
Price: $1,350 to $5,400
(See Vendor Profile Page V-5)

CODEX CORP. 6001 INTELLIGENT NETWORK PROCESSOR
Multiplexer Class: Statistical
Input Interface: RS-232C, CCITT V.24/V.28
Maximum Input Channels:
Synchronous: 8
Transmission Mode: Half-Duplex, Full-Duplex, Echoplex
Input Transmission Rates: Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 134.5K bps, 150K bps, 200K bps
Aggregate Transmission Rate: 786 bps
Maximum Output Lines:
Asynchronous: 1
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Synchronous - 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 19,200 bps
Communications Protocols: Ascii, Most Asynchronous Protocols
Features: Automatic Speed Detection (Autobaud), Downline Loading (On-Line Reconfiguration), Automatic Repeat Request, Flyback Buffering Delay, Flow Control, Programmable, Satellite Link Support
Diagnostic Features: Remote, Local
Distribution Method: End user
Price: $1,500 to $4,925
Date First Installed: 1981

CODEX CORP. 6005 INTELLIGENT NETWORK PROCESSOR
Multiplexer Class: Statistical
Input Interface: RS-232C, CCITT V.24/V.28
Maximum Input Channels:
Synchronous: 16
Asynchronous: 16
Transmission Mode: Half-Duplex, Full-Duplex, Echoplex
Input Transmission Rates: Asynchronous/Synchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps, 14,400 bps, 19,200 bps, 134.5K bps, 150K bps, 200K bps
Aggregate Transmission Rate: 1.536 bps
Maximum Output Lines:
Asynchronous: 1
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Synchronous - 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 19,200 bps
Communications Protocols: HDLC (CCITT X.205 Level 2), SDLC, BSC, Ascii, Many Synchronous Protocol
Features: Automatic Speed Detection (Autobaud), Downline Loading (On-Line Reconfiguration), Automatic Repeat Request, Flyback Buffering Delay, Operational and Statistical Reports, Flow Control, Programmable, Satellite Capabilities Standard
Diagnostic Features: Remote, Local
Distribution Method: End user
Price: $2,600 to $7,000
Date First Installed: 1982

CODEX CORP. 6010 INTELLIGENT NETWORK PROCESSOR
Multiplexer Class: Statistical
Input Interface: RS-232C
Maximum Input Channels:
Synchronous: 30
Transmission Mode: Half-Duplex, Full-Duplex, Echoplex
Input Transmission Rates: Asynchronous - 75 bps, 600 bps, 1,200 bps, 2,400 bps, 4,800 bps
Aggregate Transmission Rate: 192 bps
Maximum Output Lines:
Asynchronous: 1
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Synchronous - 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps
Communications Protocols: CCITT X.25 (Level 2)
Features: Automatic Speed Detection (Autobaud), Downline Loading (On-Line Reconfiguration), Automatic Repeat Request, Flyback Buffering Delay, Operational and Statistical Reports, Flow Control, Network Monitor, Configurable
Diagnostic Features: Remote, Local
Distribution Method: End user
Price: $4,500
Date First Installed: 1979

CODEX CORP. 6030 INTELLIGENT NETWORK PROCESSOR
Multiplexer Class: Statistical
Input Interface: RS-232C, CCITT V.24/V.28, MIL 188C, Current Loop
Maximum Input Channels:
Synchronous: 128
Asynchronous: 129
Transmission Mode: Half-Duplex, Full-Duplex, Echoplex
Input Transmission Rates: Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps; Asynchronous/Synchronous - 2,400 bps, 3,600 bps, 7,200 bps, 9,600 bps
Aggregate Transmission Rate: 576 bps
Maximum Output Lines:
Asynchronous: 1
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Synchronous - 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps, 19,200 bps, 56,000 bps
Communications Protocols: HDLC (CCITT X.205 Level 2), SDLC, BSC, Ascii, Many Synchronous Protocols
Features: Automatic Speed Detection (Autobaud), Data Compression, Downline Loading (On-Line Reconfiguration), Automatic Repeat Request, Flyback Buffering Delay, Operational and Statistical Reports, Flow Control, Network Monitor
Diagnostic Features: Remote, Local
Distribution Method: End user
Price: $8,500
Date First Installed: 1977

CODEX CORP. 6040 INTELLIGENT NETWORK PROCESSOR
Multiplexer Class: Statistical
Input Interface: RS-232C, CCITT V.24/V.28, MIL 188C, Current Loop
Maximum Input Channels:
Synchronous: 140
Asynchronous: 140
Transmission Mode: Half-Duplex, Full-Duplex, Echoplex
Input Transmission Rates: Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps; Asynchronous/Synchronous - 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps
Aggregate Transmission Rate: 576 bps
Maximum Output Lines:
Asynchronous: 16
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Synchronous - 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps, 19,200 bps
Communications Protocols: HDLC (CCITT X.205 Level 2), SDLC, BSC, Ascii, Many Synchronous Protocols
Features: Automatic Speed Detection (Autobaud), Data Compression, Downline Loading (On-Line Reconfiguration), Automatic Repeat Request, Flyback Buffering Delay, Operational and Statistical Reports, Flow Control, Network Monitor, Multiple Protocols Configurable
Diagnostic Features: Remote, Local
Distribution Method: End user
Price: $17,000
Date First Installed: 1977

CODEX CORP. 6060 DISTRIBUTED COMMUNICATIONS PROCESSOR
Multiplexer Class: Statistical

Multiplexers

Input Interface: RS-232C
Asynchronous: 120
Transmission Mode: Half-Duplex, Full-Duplex, Echoplex
Input Transmission Rates: Asynchronous/Synchronous - 50 bps, 75 bps, 110 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps, 19,200 bps; Asynchronous - 300 bps, 600 bps, 1,200 bps
Aggregate Transmission Rate: 5,760 bps
Maximum Output Lines:
Asynchronous: 89
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Synchronous - 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps, 19,200 bps, 56,000 bps; Asynchronous/Synchronous - 7, 200 bps, 64,000 bps, 48,000 bps
Communications Protocols: HDLC (CCITT X.205 Level 2), SDLC, BSC, Ascii, Many Synchronous Protocols
Features: Automatic Speed Detection, Data Compression, Downline Loading (On-Line Reconfiguration), Automatic Repeat Request, Flyback Buffering Delay, Port Contention, Switching, Operational and Statistical Reports, Flow Control, Network Monitor, Configurable
Diagnostic Features: Remote, Local
Price: $45,000
Date First Installed: 1981

CODEX CORP.
604-605 SYNCHRONOUS MULTIPLEXORS
Multiplexer Class: TDM
Input Interface: RS-232C, CCITT V.24/V.28
Maximum Input Channels:
Asynchronous: 4
Transmission Mode: Half-Duplex, Full-Duplex
Input Transmission Rates: Synchronous - 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps, 19,200 bps
Aggregate Transmission Rate: 192 bps
Maximum Output Lines:
Asynchronous: 1
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Synchronous - 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps, 19,200 bps
Communications Protocols: HDLC (CCITT X.205 Level 2), SDLC, CCITT X.25 (Level 3), BSC, All Synchronous Protocols
Features: Downline Loading (On-Line Reconfiguration)
Diagnostic Features: Remote, Local
Distribution Method: End user
Price: $1,850 to $2,250
Date First Installed: 1979

CODEX CORP.
900 SYNCHRONOUS MULTIPLEXOR
Multiplexer Class: TDM
Input Interface: MIL 188C
Maximum Input Channels:
Asynchronous: 4
Transmission Mode: Full-Duplex
Input Transmission Rates: Synchronous - 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 7,200 bps, 9,600 bps; Asynchronous/Synchronous - 150 bps, 7,200 bps
Aggregate Transmission Rate: 960 bps
Maximum Output Lines:
Asynchronous: 1
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Synchronous - 1,200 bps, 2,400 bps, 4,800 bps, 9,600 bps; Asynchronous/Synchronous - 600 bps, 7,200 bps
Communications Protocols: HDLC (CCITT X.205 Level 2), SDLC, CCITT X.25 (Level 3), BSC, All Synchronous Protocols
Features: Downline Loading (On-Line Reconfiguration), LED Indications, Configurable
Diagnostic Features: Remote, Local
Distribution Method: End user
Price: $4,500
Date First Installed: 1980

CODEX CORP.
8000 GROUP BAND MULTIPLEXOR
Multiplexer Class: TDM
Input Interface: RS-232C, CCITT V.24/V.28
Maximum Input Channels:
Asynchronous - 20
Transmission Mode: Half-Duplex, Full-Duplex
Input Transmission Rates: Synchronous - 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps, 19,200 bps
Aggregate Transmission Rate: 640 bps
Maximum Output Lines:
Asynchronous: 1
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Synchronous - 4,800 bps, 56,000 bps; Asynchronous/Synchronous - 50,000 bps, 64,000 bps
Communications Protocols: HDLC (CCITT X.205 Level 2), SDLC, CCITT X.25 (Level 3), BSC, All Synchronous Protocols
Features: Configurable, LED Indicators
Diagnostic Features: Remote, Local
Distribution Method: End user
Price: $5,000
Date First Installed: 1974

COHERENT COMMUNICATIONS SYSTEMS CORP.
FSM-76
Multiplexer Class: FDM
Input Interface: CCITT V.24/V.28, Optional Office Telex
Maximum Input Channels:
Synchronous: 36
Transmission Mode: Full-Duplex
Input Transmission Rates: Asynchronous - 50 bps, 75 bps, 110 bps, 150 bps, 200 bps, 225 bps, 300 bps, 600 bps
Aggregate Transmission Rate: 228 bps
Maximum Output Lines:
Synchronous: 36
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Asynchronous - 50 bps, 75 bps, 110 bps, 150 bps, 200 bps, 2,400 bps
Communications Protocols: Ascii
Features: Programmable, Voice-grade Circuit Use
Diagnostic Features: Local
Distribution Method: End user
Price: $7,200 to $11,400
Date First Installed: 1978
Number Installed to Date: 10,000 - 50,000
(See Vendor Profile Page V-5)

COHERENT COMMUNICATIONS SYSTEMS CORP.
LINEMATE 102
Multiplexer Class: FDM
Input Interface: RS-232C
Transmission Mode: Full-Duplex
Input Transmission Rates: Synchronous - 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps, 19,200 bps; Asynchronous/Synchronous - 19,200 bps
Aggregate Transmission Rate: 192 bps
Maximum Output Lines:
Synchronous: 1
Asynchronous: 1
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Asynchronous/Synchronous - 14,400 bps
Features: Simultaneous Voice/Data, 0/2 Wire Twisted Pair
Diagnostic Features: Local
Distribution Method: End user, OEM
Price: $500
Date First Installed: April 1982
Number Installed to Date: 100 - 500

COHERENT COMMUNICATIONS SYSTEMS CORP.
SPM-94A
Multiplexer Class: FDM
Input Interface: RS-232C
Maximum Input Channels:
Synchronous: 1
Transmission Mode: Half-Duplex, Full-Duplex
Input Transmission Rates: Asynchronous - 300 bps
Aggregate Transmission Rate: 3 bps
Maximum Output Lines:
Synchronous: 2
Output Transmission Mode: Half-Duplex, Full-Duplex
Output Line Transmission Rates: Asynchronous - 300 bps
Communications Protocols: Any
Features: Simultaneous Voice/Data, Dial-up Network
Diagnostic Features: Local
Distribution Method: End user, OEM, Third-party
Price: $475
Date First Installed: July 1983
Number Installed to Date: Under 100

COMDESIGN, INC.
TC-500
Multiplexer Class: Statistical
Input Interface: RS-232C, CCITT V.24/V.28
Maximum Input Channels:
Synchronous: 32
Asynchronous: 32
Transmission Mode: Full-Duplex, Echoplex
Input Transmission Rates: Asynchronous/Synchronous - 9,600 bps
Aggregate Transmission Rate: 3,072 bps
Maximum Output Lines:
Synchronous: 1
Asynchronous: 1
Output Transmission Mode: Full-Duplex, Echoplex
Output Line Transmission Rates: Asynchronous/Synchronous - 14,400 bps
Communications Protocols: User Selectable
Features: Automatic Speed Detection, Data Compression, Protocol Conversion, Downline Loading (On-Line Reconfiguration), Automatic Repeat Request, Flyback Buffering Delay, Operational and Statistical Reports, Flow Control, Programmable, Network Monitor, Front Panel Security
Diagnostic Features: Remote
Distribution Method: End user, Third-party
Price: $1,700 to $7,800
Date First Installed: February 1982
Number Installed to Date: 100 - 500
(See Vendor Profile Page V-6)

COMMUNICATION DEVICES, INC.
01-08-0076
Multiplexer Class: Statistical
Input Interface: RS-232C
Maximum Input Channels:
Asynchronous: 8
Transmission Mode: Full-Duplex
Input Transmission Rates: Synchronous - 1,200 bps
Aggregate Transmission Rate: 96 bps
Maximum Output Lines:
Asynchronous: 8
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Synchronous - 9,600 bps
Communications Protocols: HDLC (CCITT X.205 Level 2),
Features: Protocol Conversion, Downline Loading (On-Line Reconfiguration), Automatic Repeat Request, Polling, Port Contention, Flow Control
Diagnostic Features: No
Distribution Method: End user
Price: $2,000
Date First Installed: 1976
Number Installed to Date: Under 100
(See Vendor Profile Page V-6)

COMPLEX SYSTEMS, INC.
ARIUX 4/8
Multiplexer Class: Statistical
Input Interface: RS-232C
Maximum Input Channels:
Synchronous: 9
Transmission Mode: Half-Duplex, Full-Duplex
Input Transmission Rates:
Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps, 19,200 bps
Aggregate Transmission Rate: 384 bps
Output Transmission Mode: Half-Duplex, Full-Duplex
Output Line Transmission Rates:
Synchronous - 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps
Communications Protocols:
Complex X.25 (DERT X.25)
Features: Data Compression, Downline Loading (On-Line Reconfiguration), Automatic Repeat Request, Flyback Buffering Delay, Port Contention, Switching, Flow Control, Programmable, Menu-Driven Setup
Diagnostic Features: Remote, Local
Distribution Method: Third-party
Price: $1,350 to $1,950
Number Installed to Date: Under 100.
(See Vendor Profile Page V-6)

COMPRE COMMUNICATIONS, INC.
8LINK 2AA24
Multiplexer Class: Statistical
Input Interface: RS-232C
Transmission Mode: Full-Duplex
Input Transmission Rates:
Asynchronous - 2,400 bps
Aggregate Transmission Rate: 192 bps
Maximum Output Lines:
Synchronous: 1
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates:
Asynchronous - 2,400 bps
Communications Protocols:
Proprietary
Features: Protocol Conversion, Automatic Repeat Request, Flow Control, Programmable, Network Monitor, Automatic Passthrough
Diagnostic Features: Remote, Local
Distribution Method: End user, OEM, Third-party
Price: $675
Date First Installed: October 1982
Number Installed to Date: 500 - 1,000
(See Vendor Profile Page V-6)

COMPRE COMMUNICATIONS, INC.
8LINK 2AB192
Multiplexer Class: Statistical
Input Interface: RS-232C
Transmission Mode: Full-Duplex
Input Transmission Rates:
Synchronous - 9,600 bps
Aggregate Transmission Rate: 192 bps
Maximum Output Lines:
Asynchronous: 1
Output Line Transmission Rates:
Synchronous - 2,400 bps
Communications Protocols:
Proprietary
Features: Protocol Conversion, Automatic Repeat Request, Flow Control, Programmable, Network Monitor, Automatic Passthrough
Diagnostic Features: Remote, Local
Distribution Method: End user, OEM, Third-party
Price: $675
Date First Installed: October 1982
Number Installed to Date: 500 - 1,000

COMPRE COMMUNICATIONS, INC.
DATA XCHANGE
Multiplexer Class: Statistical
Input Interface: RS-232C
Maximum Input Channels:
Synchronous: 32
Transmission Mode: Full-Duplex
Input Transmission Rates:
Asynchronous - 110 bps, 9,600 bps
Aggregate Transmission Rate: 3,072 bps
Maximum Output Lines:
Synchronous: 1
Asynchronous: 1
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates:
Asynchronous/Synchronous - 14,400 bps
Features: Automatic Speed Detection (Autobaud), Data Compression, Downline Loading (On-Line Reconfiguration), Automatic Repeat Request, Operational and Statistical Reports, Flow Control, Programmable, Network Monitor, Field Expandable, Upgradable
Diagnostic Features: Remote, Local
Distribution Method: End user, OEM, Third-party
Price: $2,550 to $9,800
Date First Installed: June 1981
Number Installed to Date: 500 - 1,000

COMPRE COMMUNICATIONS, INC.
ECONO SERIES 4
Multiplexer Class: Statistical
Input Interface: RS-232C
Transmission Mode: Full-Duplex
Input Transmission Rates:
Asynchronous - 300 bps, 1,200 bps, 2,400 bps, 4,800 bps
Aggregate Transmission Rate: 192 bps
Maximum Output Lines:
Synchronous: 1
Asynchronous: 1
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates:
Asynchronous - 4,800 bps; Synchronous - 9,600 bps
Features: Automatic Repeat Request, Flow Control, Programmable
Diagnostic Features: Local
Distribution Method: End user, OEM, Third-party
Price: $1,095
Date First Installed: January 1981
Number Installed to Date: 100 - 500

COMPRE COMMUNICATIONS, INC.
ECONO SERIES 8
Multiplexer Class: Statistical
Input Interface: RS-232C
Transmission Mode: Full-Duplex
Input Transmission Rates:
Asynchronous - 300 bps, 1,200 bps, 2,400 bps, 4,800 bps
Aggregate Transmission Rate: 384 bps
Maximum Output Lines:
Asynchronous: 1
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates:
Asynchronous - 9,600 bps
Features: Automatic Repeat Request, Operational and Statistical Reports, Flow Control, Programmable, Network Monitor
Diagnostic Features: Local
Distribution Method: End user, OEM, Third-party
Price: $1,695
Date First Installed: January 1981
Number Installed to Date: 100 - 500

COMPRE COMMUNICATIONS, INC.
Q-LINK 4AA24
Multiplexer Class: Statistical
Input Interface: RS-232C
Transmission Mode: Full-Duplex
Input Transmission Rates:
Asynchronous - 2,400 bps
Aggregate Transmission Rate: 96 bps
Maximum Output Lines:
Synchronous: 1
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates:
Asynchronous - 9,600 bps
Features: Downline Loading (On-Line Reconfiguration), Automatic Repeat Request, Operational and Statistical Reports, Flow Control, Programmable, Network Monitor, Automatic Passthrough
Diagnostic Features: Remote, Local
Distribution Method: End user, OEM, Third-party
Price: $1,195
Date First Installed: February 1983
Number Installed to Date: 100 - 500

COMPRE COMMUNICATIONS, INC.
Q-LINK 4AB192
Multiplexer Class: Statistical
Input Interface: RS-232C
Input Transmission Rates:
Synchronous - 4,800 bps; Synchronous - 9,600 bps
Aggregate Transmission Rate: 24 bps
Maximum Output Lines:
Asynchronous: 1
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates:
Asynchronous - 9,600 bps
Features: Downline Loading (On-Line Reconfiguration), Automatic Repeat Request, Operational and Statistical Reports, Flow Control, Programmable, Network Monitor, Automatic Passthrough
Diagnostic Features: Remote, Local
Distribution Method: End user, OEM, Third-party
Price: $1,195
Date First Installed: February 1983
Number Installed to Date: 100 - 500

COMPUTER COMMUNICATIONS SPECIALISTS, INC.
CHANNEL COMMUNICATIONS CONCENTRATOR (CCC)
Multiplexer Class: TDM
Input Interface: Proprietary
Maximum Input Channels:
Synchronous: 64
Transmission Mode: Half-Duplex
Input Transmission Rates:
Asynchronous - 9,600 bps
Maximum Output Lines:
Synchronous: 3
Output Transmission Mode: Half-Duplex
Output Line Transmission Rates:
Asynchronous - 9,600 bps
Features: Downline Loading (On-Line Reconfiguration), Automatic Repeat Request, Port Contention, Switching, Flow Control, Network Monitor
Diagnostic Features: Local
Distribution Method: End user
Price: $3,695
Date First Installed: February 1982
Number Installed to Date: Under 100
(See Vendor Profile Page V-6)

COMPUTER SIGNTICS CORP.
RAMM-16
Multiplexer Class: Statistical
Input Interface: RS-232C, 20 MA Current Loop
Maximum Input Channels:
Synchronous: 16
Input Transmission Rates:
Asynchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 2,400 bps, 4,800 bps, 9,600 bps
Aggregate Transmission Rate: 96 bps
Maximum Output Lines:
Synchronous: 1
Output Transmission Mode: Half-Duplex
Output Line Transmission Rates:
Asynchronous - 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps, 56,000 bps
Communications Protocols: SDLC, BSC, Ascii
Features: Protocol Conversion, Polling, Port Contention
Diagnostic Features: Local
Distribution Method: Third-party
Price: $4,000
Date First Installed: June 1978
Number Installed to Date: Under 100
(See Vendor Profile Page V-7)

COMPUTER SIGNTICS CORP.
TAMM-16A
Multiplexer Class: Statistical
Input Interface: RS-232C, 20MA Current Loop

Multiplexers

Maximum Input Channels:
Synchronous: 16
Transmission Mode: Half-Duplex
Transmission Rate : Asynchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 4,800 bps, 9,600 bps
Aggregate Transmission Rate: 96 bps
Maximum Output Lines:
Synchronous: 1
Output Transmission Mode: Half-Duplex
Output Line Transmission Rates: Asynchronous - 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps, 56,000 bps
Communications Protocols: SDLC, BSC, Ascii
Features: Protocol Conversion, Polling, Port Contention
Diagnostic Features: Local
Distribution Method: Third-party
Price: $5,000
Date First Installed: February 1978
Number Installed to Date: Under 100

COMPUTER HORIZONS SYSTEMS, INC.
CHS 8MUX
Multiplexer Class: TDM
Input Interface: RS-232C
Maximum Input Channels:
Synchronous: 48
Transmission Mode: Full-Duplex
Input Transmission Rates: Asynchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps
Maximum Output Lines:
Asynchronous: 1
Output Transmission Mode: Full-Duplex
Communications Protocols: Ascii
Features: Protocol Conversion, (On-Line Reconfiguration), Flyback Buffering Delay, Polling, Port Contention, Flow Control
Diagnostic Features: Remote, Local
Distribution Method: End user
Price: $300
Date First Installed: 1980
Number Installed to Date: 100 - 500
(See Vendor Profile Page V-7)

COMPUTER PERIPHERAL SYSTEMS, INC.
MARS SYSTEM
MUX/CONCENTRATOR
Multiplexer Class: Statistical
Input Interface: RS-232C
Maximum Input Channels:
Synchronous: 8
Asynchronous: 8
Transmission Mode: Half-Duplex
Input Transmission Rates: Asynchronous/Synchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps, 19,200 bps
Aggregate Transmission Rate: 192 bps
Maximum Output Lines:
Synchronous: 8
Asynchronous: 4
Output Transmission Mode: Half-Duplex
Output Line Transmission Rates: Asynchronous/Synchronous - 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps, 19,200 bps
Features: Data Compression, Protocol Conversion, Downline Loading (On-Line Reconfiguration), Automatic Repeat Request, Flyback Buffering Delay, Polling, Port Contention, Switching, Flow Control, Programmable, Burroughs-Oriented
Diagnostic Features: Remote, Local
Distribution Method: End user
Price: $1,500 to $5,000
Date First Installed: July 1982
Number Installed to Date: Under 100
(See Vendor Profile Page V-7)

COMPUTER SYSTEMS CS/90
Multiplexer Class: Concentrator
Input Interface: RS-232C, RS-422, CCITT V.24/V.28
Maximum Input Channels:
Synchronous: 16
Asynchronous: 8
Transmission Mode: Half-Duplex, Full-Duplex
Input Transmission Rates: Asynchronous - 110 bps, 300 bps, 1,200 bps; Asynchronous/Synchronous - 2,400 bps; Synchronous - 4,800 bps, 9,600 bps, 19,200 bps
Aggregate Transmission Rate: 1 bps
Maximum Output Lines:
Synchronous: 2
Asynchronous: 2
Output Transmission Mode: Half-Duplex, Full-Duplex
Output Line Transmission Rates: Asynchronous/Synchronous - 2,400 bps, 4,800 bps, 9,600 bps; Synchronous - 14,400 bps, 56,000 bps
Communications Protocols: SDLC, BSC, Ascii, Custom Protocols
Features: Automatic Speed Detection (Autobaud), Data Compression, Protocol Conversion, Downline Loading (On-Line Reconfiguration), Automatic Repeat Request, Polling, Port Contention, Switching, Programmable
Diagnostic Features: Local
Distribution Method: End user, OEM
Price: $1,500 to $3,000
Date First Installed: 1983
(See Vendor Profile Page V-7)

COMPUTROL
MEGA PLEX
Multiplexer Class: Statistical
Input Interface: RS-232C, RS-422, Custom
Maximum Input Channels:
Synchronous: 64
Asynchronous: 64
Transmission Mode: Half-Duplex, Full-Duplex
Input Transmission Rates: Asynchronous - 2,400 bps, 9,600 bps
Aggregate Transmission Rate: 3,072 bps
Maximum Output Lines:
Asynchronous: 1
Output Transmission Mode: Half-Duplex, Full-Duplex
Output Line Transmission Rates: Asynchronous/Synchronous - 1M bps
Communications Protocols: HDLC (CCITT X.205 Level 2)
Features: Downline Loading (On-Line Reconfiguration), Automatic Repeat Request, Polling, Port Contention, Flow Control, Programmable, Network Monitor
Diagnostic Features: Local
Distribution Method: End user, OEM
Price: $5,000 to $10,160
Date First Installed: June 1981
(See Vendor Profile Page V-7)

DATABIT, INC.
MODEL 926 TELEX & DATA TDM
Multiplexer Class: TDM
Input Interface: CCITT R.101
Maximum Input Channels:
Synchronous: 92
Asynchronous: 92
Input Transmission Rates: Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps; Asynchronous/Synchronous - 1,200 bps, 1,800 bps, 2,400 bps; Synchronous - 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps
Aggregate Transmission Rate: 980 bps
Features: Programmable
Diagnostic Features: Local
Distribution Method: End user
(See Vendor Profile Page V-9)

DATAGRAM CORP.
DM 900
Multiplexer Class: Statistical
Input Interface: RS-232C, 20 mA Current Loop, CCITT V.24/V.28
Maximum Input Channels:
Synchronous: 9
Asynchronous: 1
Transmission Mode: Half-Duplex, Full-Duplex, Echoplex
Input Transmission Rates: Asynchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps; Asynchronous/Synchronous - 2,400 bps, 3600 bps, 4,800 bps, 7200 bps, 9,600 bps
Aggregate Transmission Rate: 864 bps
Maximum Output Lines:
Synchronous: 1
Asynchronous: 1
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Asynchronous/Synchronous - 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 19,200 bps, 14,400 bps
Communications Protocols: HDLC (CCITT X.205 Level 2), Ascii
Features: Automatic Speed Detection (Autobaud), Data Compression, Downline Loading (On-Line Reconfiguration), Automatic Repeat Request, Flyback Buffering Delay, Port Contention, Switching, Flow Control, Operational and Statistical Reports, Programmable, Network Monitor
Diagnostic Features: Remote, Local
Distribution Method: End user, Third-party
Price: $1,550 to $2,750
Date First Installed: June 1982
Number Installed to Date: 500 - 1,000
(See Vendor Profile Page V-8)

DATAGRAM CORP.
DM 1600
Multiplexer Class: Statistical
Input Interface: RS-232C
Maximum Input Channels:
Synchronous: 16
Asynchronous: 4
Transmission Mode: Half-Duplex, Echoplex
Input Transmission Rates: Asynchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 7,200 bps, 9,600 bps
Aggregate Transmission Rate: 9,600 bps
Maximum Output Lines:
Synchronous: 1
Asynchronous: 1
Output Line Transmission Rates: Asynchronous/Synchronous - 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps, 19,200 bps
Communications Protocols: HDLC (CCITT X.205 Level 2), Ascii
Features: Automatic Speed Detection (Autobaud), Data Compression, Downline Loading (On-Line Reconfiguration), Automatic Repeat Request, Flyback Buffering Delay, Port Contention, Switching, Flow Control, Programmable, Network Monitor
Diagnostic Features: Remote, Local
Distribution Method: End user, Third-party
Price: $2,200 to $4,600
Date First Installed: June 1979
Number Installed to Date: 500 - 1,000

DATAGRAM CORP.
DM 4800
Multiplexer Class: Statistical
Input Interface: RS-232C, CCITT V.24/V.28, 20 mA Current Loop
Maximum Input Channels:
Synchronous: 52
Asynchronous: 4
Transmission Mode: Half-Duplex, Full-Duplex, Echoplex
Input Transmission Rates: Asynchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, Asynchronous/Synchronous - 2,400 bps, 7,200 bps, 9,600 bps
Aggregate Transmission Rate: 9,600 bps
Maximum Output Lines:
Synchronous: 1
Asynchronous: 1
Output Line Transmission Rates: Synchronous/Asynchronous - 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps, 19,200 bps
Communications Protocols: HDLC (CCITT X.205 Level 2), Ascii
Features: Automatic Speed Detection (Autobaud), Data

Compression, Downline Loading (On-Line Reconfiguration), Automatic Repeat Request, Flyback Buffering Delay, Port Contention, Switching, Flow Control, Programmable, Network Monitor, Operational and Statistical Reports
Diagnostic Features: Remote, Local
Distribution Method: End user, Third-party
Price: $3,650 to $13,250
Date First Installed: June 1980
Number Installed to Date: 500 - 1,000

DATAPRODUCTS NEW ENGLAND, INC.
DP MUX-256
Multiplexer Class: Statistical
Input Interface: EIA
Maximum Input Channels:
Synchronous: 32
Asynchronous - 32
Transmission Mode: Full-Duplex
Input Transmission Rates:
Asynchronous - 50 bps, 110 bps, 1,800 bps, 3,600 bps, Asynchronous/Synchronous - 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 2,400 bps, 4,800 bps, 7,200 bps, 9,600 bps, 19,200 bps, Synchronous 150 bps, 8,000 bps, 16,000 bps, 32,000 bps
Aggregate Transmission Rate: 2,560 bps
Maximum Output Lines:
Synchronous: 1
Asynchronous: 1
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Asynchronous/Synchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps
Communications Protocols: HDLC (CCITT X.205 Level 2), SDLC, CCITT X.25 (Level 3), BSC, Ascii
Features: Downline Loading (On-Line Reconfiguration), Operational and Statistical Reports, Programmable
Diagnostic Features: Local
Distribution Method: End user
Price: $4,842 to $9,550
Date First Installed: 1983
Number Installed to Date: Under 100
(See Vendor Profile Page V-9)

DATAPRODUCTS NEW ENGLAND, INC.
MC 3
Multiplexer Class: Statistical
Input Interface: EIA
Maximum Input Channels:
Synchronous: 32
Asynchronous: 32
Transmission Mode: Full-Duplex
Input Transmission Rates: Asynchronous - 75 bps, 110 bps; Asynchronous/Synchronous - 300 bps, 1,200 bps, 2,400 bps, 4,800 bps; Synchronous - 600 bps; 9,600 bps, 19,200 bps
Maximum Output Lines:
Asynchronous: 1
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Asynchronous/Synchronous - 1,200 bps, 4,800 bps; Synchronous - 9,600 bps, 14,400 bps, 56,000 bps
Communications Protocols: HDLC (CCITT X.205 Level 2), SDLC, CCITT X.25 (Level 3), BSC, Ascii
Features: Downline Loading (On-Line Reconfiguration), Operational and Statistical Reports, Programmable
Diagnostic Features: No
Distribution Method: End user
Price: $6,715 to $10,800
Date First Installed: 1980

DATATEL, INC.
DCP 5000
Multiplexer Class: Statistical
Input Interface: RS-232C
Maximum Input Channels:
Synchronous: 4
Transmission Mode: Half-Duplex, Full-Duplex
Input Transmission Rates: Asynchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps
Aggregate Transmission Rate: 192 bps
Maximum Output Lines:
Asynchronous: 1
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Synchronous - 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps, 19,200 bps
Features: Automatic Speed Detection (Autobaud), Downline Loading (On-Line Reconfiguration), Automatic Repeat Request, Flyback Buffering Delay, Operational and Statistical Reports, Flow Control, Programmable, Network Monitor
Diagnostic Features: Remote, Local
Distribution Method: End user, Third-party
Price: $1,300
Date First Installed: 1982
Number Installed to Date: Under 100
(See Vendor Profile Page V-10)

DATATEL, INC.
DCP 9100
Multiplexer Class: TDM
Input Interface: RS-232C, V.35
Maximum Input Channels:
Asynchronous: 96
Transmission Mode: Half-Duplex, Full-Duplex
Input Transmission Rates: Asynchronous/Synchronous - 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps, 19,200 bps
Aggregate Transmission Rate: 15,400 bps
Maximum Output Lines:
Asynchronous: 1
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Asynchronous/Synchronous - 1.5M bps
Communications Protocols: DY/FE
Features: Downline Loading (On-Line Reconfiguration), Operational and Statistical Reports, Programmable, Network Monitor
Diagnostic Features: Remote, Local
Price: $3,850
Date First Installed: February 1983
Number Installed to Date: Under 100

DATEC, INC.
DATEC DATAMUX
Multiplexer Class: Statistical
Input Interface: RS-232C.
Maximum Input Channels:
Synchronous: 2
Transmission Mode: Full-Duplex
Input Transmission Rates: Asynchronous - 110 bps, 300 bps, 1,200 bps, 2,400 bps, 4,800 bps, 9,600 bps
Aggregate Transmission Rate: 192 bps
Maximum Output Lines:
Asynchronous: 1
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Asynchronous - Up to 9,600
Communications Protocols: SDLC Subset
Features: Automatic Speed Detection (Autobaud), Data Compression, Automatic Repeat Request, Polling; Flow Control, Programmable, End to End Speed Conversion
Diagnostic Features: Remote, Local
Distribution Method: Third-party
Price: $835
Date First Installed: 1983
Number Installed to Date: Under 100
(See Vendor Profile Page V-10)

DCA/TAC
AYARWIN 208
Multiplexer Class: Statistical
Input Interface: RS-232C, CCITT V.24/V.28
Maximum Input Channels:
Synchronous: 128
Transmission Mode: Full-Duplex, Echoplex
Input Transmission Rates: Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps
Aggregate Transmission Rate: 12 bps
Maximum Output Lines:
Asynchronous: 1
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Synchronous - 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps
Communications Protocols: Ascii, DDCMP
Features: Automatic Speed Detection (Autobaud), Data Compression, Automatic Repeat Request, Flyback Buffering Delay, Polling, Flow Control, Programmable, Network Monitor
Diagnostic Features: Remote, Local
Distribution Method: End user
Price: $4,250 to $6,000
Date First Installed: 1979
Number Installed to Date: Under 100
(See Vendor Profile Page V-10)

DCA/TAC
SYSTEM 106
Multiplexer Class: Statistical
Input Interface: RS-232C, CCITT V.24/V.28
Maximum Input Channels:
Synchronous: 8
Transmission Mode: Half-Duplex, Full-Duplex, Echoplex
Input Transmission Rates: Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps
Aggregate Transmission Rate: 96 bps
Maximum Output Lines:
Asynchronous: 1
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Synchronous - 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps
Communications Protocols: DDCMP
Features: Automatic Speed Detection (Autobaud), Data Compression, Downline Loading (On-Line Reconfiguration), Automatic Repeat Request, Flyback Buffering Delay, Operational and Statistical Reports, Flow Control, Programmable, Network Monitor
Diagnostic Features: Remote, Local
Distribution Method: End user, OEM
Price: $1,295 to $2,650
Date First Installed: 1980
Number Installed to Date: Under 100

DCA/TAC
SYSTEM 116
Multiplexer Class: Statistical
Input Interface: RS-232C, CCITT V.24/V.28
Maximum Input Channels:
Synchronous: 8
Transmission Mode: Half-Duplex, Full-Duplex, Echoplex
Input Transmission Rates: Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps
Aggregate Transmission Rate: 576 bps
Maximum Output Lines:
Asynchronous: 1
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Synchronous - 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps, 19,200 bps
Communications Protocols: DDCMP
Features: Automatic Speed Detection (Autobaud), Data Compression, Downline Loading (On-Line Reconfiguration), Automatic Repeat Request, Flyback Buffering Delay, Operational and Statistical Reports, Flow Control, Programmable, Network Monitor
Diagnostic Features: Remote, Local

Distribution Method: End user, OEM
Price: $1,495 to $2,850
Date First Installed: 1982
Number Installed to Date: Under 100

BCA/TAC
SYSTEM 128
Multiplexer Class: Statistical
Input Interface: RS-232C, CCITT V.24/V.28
Maximum Input Channels:
Synchronous: 32
Transmission Mode: Half-Duplex, Full-Duplex, Echoplex
Input Transmission Rates: Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps
Aggregate Transmission Rate: 576 bps
Maximum Output Lines:
Asynchronous: 1
Output Transmission Mode: Half-Duplex, Full-Duplex, Echoplex
Output Line Transmission Rates: Synchronous - 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps, 19,200 bps
Communications Protocols: Ascii, DDCMP
Features: Automatic Speed Detection (Autobaud), Data Compression, Downline Loading (On-Line Reconfiguration), Flyback Buffering Delay, Operational and Statistical Reports, Flow Control, Programmable, Network Monitor
Diagnostic Features: Remote, Local
Distribution Method: End user, Third-party
Price: $2,450 to $8,595
Date First Installed: 1982
Number Installed to Date: Under 100

BCA/TAC
SYSTEM 128
Multiplexer Class: Statistical
Input Interface: RS-232C, CCITT V.24/V.28
Maximum Input Channels:
Synchronous: 32
Transmission Mode: Half-Duplex, Full-Duplex, Echoplex
Input Transmission Rates: Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps
Aggregate Transmission Rate: 576 bps
Maximum Output Lines:
Asynchronous: 1
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Synchronous - 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps, 19,200 bps
Communications Protocols: Ascii, DDCMP
Features: Automatic Speed Detection (Autobaud), Data Compression, Downline Loading (On-Line Reconfiguration), Automatic Repeat Request, Flyback Buffering Delay, Polling, Operational and Statistical Reports, Flow Control, Programmable, Network Monitor
Diagnostic Features: Remote, Local
Distribution Method: End user
Price: $3,250 to $9,395
Date First Installed: 1982
Number Installed to Date: Under 100

BCA/TAC
SYSTEM 325 NETSWITCH
Multiplexer Class: Statistical
Input Interface: RS-232C, CCITT V.24/V.28
Maximum Input Channels:
Synchronous: 1,472
Transmission Mode: Half-Duplex, Full-Duplex, Echoplex
Input Transmission Rates: Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps
Maximum Output Lines:
Asynchronous: 11
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Synchronous - 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps, 19,200 bps
Communications Protocols: Ascii, DDCMP
Features: Automatic Speed Detection (Autobaud), Data Compression, Downline Loading (On-Line Reconfiguration), Automatic Repeat Request, Flyback Buffering Delay, Port Contention, Switching, Operational and Statistical Reports, Flow Control, Programmable, Network Monitor
Diagnostic Features: Remote, Local
Distribution Method: End user
Price: $12,560
Date First Installed: January 1982
Number Installed to Date: Under 100

BCA/TAC
SYSTEM 336
Multiplexer Class: Statistical
Input Interface: RS-232C, CCITT V.24/V.28
Maximum Input Channels:
Synchronous: 42
Transmission Mode: Half-Duplex, Full-Duplex, Echoplex
Input Transmission Rates: Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps
Maximum Output Lines:
Asynchronous: 4
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Synchronous - 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps, 19,200 bps
Communications Protocols: CCITT X.25 (Level 3), BSC, Ascii, DDCMP
Features: Automatic Speed Detection (Autobaud), Data Compression, Protocol Conversion, Downline Loading (On-Line Reconfiguration), Automatic Repeat Request, Flyback Buffering Delay, Polling, Port Contention, Switching, Operational and Statistical Reports, Flow Control, Programmable, Network Monitor
Diagnostic Features: Remote, Local
Distribution Method: End user, OEM
Price: $6,795 to $7,195
Date First Installed: 1983
Number Installed to Date: Under 100

BCA/TAC
SYSTEM 365
Multiplexer Class: Statistical
Input Interface: RS-232C, CCITT V.24/V.28
Maximum Input Channels:
Synchronous: 1,400
Transmission Mode: Half-Duplex, Full-Duplex, Echoplex
Input Transmission Rates: 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps
Maximum Output Lines:
Asynchronous: 44
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Synchronous - 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps, 19,200 bps
Communications Protocols: CCITT X.25 (Level 3), BSC, Ascii, DDCMP
Features: Automatic Speed Detection (Autobaud), Data Compression, Protocol Conversion, Downline Loading (On-Line Reconfiguration), Automatic Repeat Request, Flyback Buffering Delay, Polling, Port Contention, Switching, Operational and Statistical Reports, Flow Control, Programmable, Network Monitor
Diagnostic Features: Remote, Local
Distribution Method: End user, OEM
Price: $9,995 to $11,295
Date First Installed: 1980

BCA/TAC
T-1 SPEED TIME DIVISION MULTIPLEXOR
Multiplexer Class: TDM
Input Interface: RS-232C, RS-422, CCITT V.24/V.28, RS-423, V.35, Bell 303
Maximum Input Channels:
Synchronous: 128
Asynchronous: 128
Transmission Mode: Full-Duplex
Input Transmission Rates: Asynchronous/Synchronous - 50 bps, 100 bps, 102 bps, 300 bps, 400 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps, 19,200 bps
Aggregate Transmission Rate: 20,480 bps
Maximum Output Lines:
Asynchronous: 1
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Synchronous - 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps, 19,200 bps, 56,000 bps; Asynchronous - T-1; Asynchronous/Synchronous - 100 bps, 102 bps, 400 bps
Communications Protocols: HDLC (CCITT X.205 Level 2), SDLC, CCITT X.25 (Level 3), BSC, Ascii, Transparent
Features: Downline Loading (On-Line Reconfiguration), Operational, Statistical Reports, Programmable, Bandwidth Contention
Diagnostic Features: Remote, Local
Distribution Method: End user
Price: $3,800 to $4,950
Date First Installed: December 1983
Number Installed to Date: Under 100

BEVELCOM ELECTRONICS, INC.
DS1000
Multiplexer Class: Statistical
Input Interface: RS-232C, 20 mA Current Loop
Maximum Input Channels:
Synchronous: 16
Transmission Mode: Half-Duplex, Full-Duplex, Echoplex
Input Transmission Rates: Asynchronous - 9,600 bps
Aggregate Transmission Rate: 192 bps
Maximum Output Lines:
Asynchronous: 1
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Synchronous - 14,400 bps
Communications Protocols: HDLC (CCITT X.205 Level 2)
Features: Automatic Speed Detection (Autobaud), Data Compression, Downline Loading (On-Line Reconfiguration), Port Contention, Programmable, Burst Aggregate - 76,800 bps
Diagnostic Features: Remote, Local
Distribution Method: Third-party
Price: $2,600 to $5,000
(See Vendor Profile Page V-10)

BEVELCOM ELECTRONICS, INC.
DS1000
Multiplexer Class: Statistical
Input Interface: RS-232C, 20 mA Current Loop
Maximum Input Channels:
Synchronous: 9
Transmission Mode: Half-Duplex, Full-Duplex, Echoplex
Input Transmission Rates: Asynchronous - 9,600 bps
Aggregate Transmission Rate: 192 bps
Maximum Output Lines:
Asynchronous: 1
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Asynchronous - 14,400 bps
Communications Protocols: HDLC (CCITT X.205 Level 2)
Features: Automatic Speed Detection (Autobaud), Data Compression, Downline Loading (On-Line Reconfiguration), Port Contention, Programmable, Burst Aggregate - 76,800 bps
Diagnostic Features: Remote, Local
Distribution Method: Third-party
Price: $1,560 to $2,750

DEVELCON ELECTRONICS, INC.
DS4000
Multiplexer Class: Statistical
Input Interface: RS-232C
Maximum Input Channels:
Synchronous: 52
Transmission Mode: Half-Duplex, Full-Duplex, Echoplex
Input Transmission Rates:
Asynchronous - 9,600 bps
Aggregate Transmission Rate: 192 bps
Maximum Output Lines:
Asynchronous: 1
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates:
Synchronous - 14,400 bps
Communications Protocols: HDLC (CCITT X.205 Level 2)
Features: Automatic Speed Detection (Autobaud), Data Compression, Downline Loading (On-Line Reconfiguration), Port Contention, Programmable, Burst Aggregate - 76,800 bps
Diagnostic Features: Remote, Local
Distribution Method: Third-party
Price: $3,650 to $13,250

DIGITAL EQUIPMENT CORP.
DFM04
Multiplexer Class: Statistical
Input Interface: RS-232C, RS-423
Maximum Input Channels:
Synchronous: 4
Asynchronous: 4
Input Transmission Rates:
Synchronous - Up to 9,600 bps
Aggregate Transmission Rate: 1,536 bps
Features: Automatic Speed Detection (Autobaud), Downline Loading (On-Line Reconfiguration)
Diagnostic Features: Remote, Local
Price: $2,675
Date First Installed: 1983
(See Vendor Profile Page V-10)

DIGITAL EQUIPMENT CORP.
DFM08
Multiplexer Class: Statistical
Input Interface: RS-232C, RS-423
Maximum Input Channels:
Synchronous: 8
Asynchronous: 8
Input Transmission Rates:
Synchronous - Up to 9,600 bps
Aggregate Transmission Rate: 1,536 bps
Features: Automatic Speed Detection (Autobaud), Downline Loading (On-Line Reconfiguration)
Diagnostic Features: Remote, Local
Price: $3,350
Date First Installed: 1983

DIGITAL EQUIPMENT CORP.
DFM12
Multiplexer Class: Statistical
Input Interface: RS-232C, RS-423
Maximum Input Channels:
Synchronous: 12
Asynchronous: 12
Input Transmission Rates:
Synchronous - Up to 9,600 bps
Aggregate Transmission Rate: 1,536 bps
Features: Automatic Speed Detection (Autobaud), Downline Loading (On-Line Reconfiguration)
Diagnostic Features: Remote, Local
Price: $4,075
Date First Installed: 1983

DIGITAL EQUIPMENT CORP.
DFM16
Multiplexer Class: Statistical
Input Interface: RS-232C, RS-423
Maximum Input Channels:
Synchronous: 16
Asynchronous: 16
Input Transmission Rates:
Synchronous - Up to 9,600 bps
Aggregate Transmission Rate: 1,536 bps
Features: Automatic Speed Detection (Autobaud), Downline Loading (On-Line Reconfiguration)
Diagnostic Features: Remote, Local
Price: $4,800

DYNATECH PACKET TECHNOLOGY, INC.
DP 1000
Multiplexer Class: Statistical
Input Interface: RS-232C
Maximum Input Channels:
Synchronous: 8
Transmission Mode: Full-Duplex
Input Transmission Rates:
Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps
Aggregate Transmission Rate: 760 bps
Maximum Output Lines:
Asynchronous: 1
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates:
Synchronous - 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps, 19,200 bps
Communications Protocols: SDLC
Features: Automatic Speed Detection (Autobaud), Data Compression, Protocol Conversion, Downline Loading (On-Line Reconfiguration), Polling, Port Contention, Switching, Flow Control
Diagnostic Features: Remote, Local
Distribution Method: End user
Price: $1,000 to $2,000
Date First Installed: 1981
(See Vendor Profile Page V-11)

DYNATECH PACKET TECHNOLOGY, INC.
MULTIPAD 25
Multiplexer Class: Statistical
Input Interface: RS-232C
Maximum Input Channels:
Synchronous: 64
Transmission Mode: Full-Duplex
Input Transmission Rates:
Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps
Maximum Output Lines:
Asynchronous: 2
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates:
Synchronous - 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps, 19,200 bps, 56,000 bps; Asynchronous/Synchronous - Up to 64,000 bps
Communications Protocols: HDLC (CCITT X.205 Level 2), CCITT X.25 (Level 3)
Features: Automatic Speed Detection (Autobaud), Data Compression, Protocol Conversion, Downline Loading (On-Line Reconfiguration), Automatic Repeat Request, Polling, Port Contention, Switching, Operational and Statistical Reports, Flow Control, Programmable
Diagnostic Features: Remote, Local
Distribution Method: End user
Price: $3,000 to $60,000
Date First Installed: 1981

DYNATECH PACKET TECHNOLOGY, INC.
MULTIPLEX 25
Multiplexer Class: Statistical
Input Interface: RS-232C
Maximum Input Channels:
Synchronous: 64
Transmission Mode: Full-Duplex
Input Transmission Rates:
Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps
Maximum Output Lines:
Asynchronous: 2
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates:
Synchronous - 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps, 19,200 bps, 56,000 bps; Asynchronous/Synchronous - Up to 64,000 bps
Communications Protocols: HDLC (CCITT X.205 Level 2), CCITT X.25 (Level 3)
Features: Automatic Speed Detection (Autobaud), Data Compression, Protocol Conversion, Downline Loading (On-Line Reconfiguration), Polling, Port Contention, Switching, Operational and Statistical Reports, Flow Control, Programmable, Network Monitor
Diagnostic Features: Remote, Local
Distribution Method: End user
Price: $1,500 to $50,000
Date First Installed: 1981

EMULEX CORP.
CS01-H
Multiplexer Class: Statistical
Input Interface: RS-232C, Current Loop
Maximum Input Channels:
Synchronous: 64
Input Transmission Rates:
Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 19,200 bps, External Clock
Maximum Output Lines:
Synchronous: 64
Output Transmission Mode: Half-Duplex, Full-Duplex, Echoplex
Output Line Transmission Rates:
Asynchronous - 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps, External Clock
Communications Protocols: Ascii
Distribution Method: End user, OEM, Third-party
(See Vendor Profile Page V-11)

EMULEX CORP.
CS11-F
Multiplexer Class: Statistical
Input Interface: RS-232C, Current Loop
Maximum Input Channels:
Synchronous: 48
Input Transmission Rates:
Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 19,200 bps, External Clock
Maximum Output Lines:
Synchronous: 48
Output Transmission Mode: Half-Duplex, Full-Duplex
Output Line Transmission Rates:
Asynchronous - 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps, External Clock
Communications Protocols: Ascii
Diagnostic Features: Local
Distribution Method: End user, OEM, Third-party

EMULEX CORP.
CS11-H
Multiplexer Class: Statistical
Input Interface: RS-232C, Current Loop
Maximum Input Channels:
Synchronous: 64
Transmission Mode: Half-Duplex, Full-Duplex, Echoplex
Input Transmission Rates:
Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 19,200 bps, External Clock
Maximum Output Lines:
Synchronous: 64
Output Transmission Mode: Half-Duplex, Full-Duplex, Echoplex
Output Line Transmission Rates:
Asynchronous - 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps, External Clock
Communications Protocols: Ascii
Diagnostic Features: Local
Distribution Method: End user, OEM, Third-party

EMULEX CORP.
CS11-U
Multiplexer Class: Statistical
Input Interface: RS-232C, Current Loop
Maximum Input Channels:
Synchronous: 64
Transmission Mode: Half-Duplex, Full-Duplex, Echoplex
Input Transmission Rates:
Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 19,200 bps, External Clock
Maximum Output Lines:
Synchronous: 64

Multiplexers

Output Transmission Mode: Half-Duplex, Full-Duplex, Echoplex
Output Line Transmission Rates: Asynchronous - 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps, External Clock
Communications Protocols: Ascii
Diagnostic Features: Local
Distribution Method: End user, OEM, Third-party

EMULEX CORP.
CS11-V
Multiplexer Class: Statistical
Input Interface: RS-232C
Maximum Input Channels:
Synchronous: 32
Asynchronous: 32
Transmission Mode: Half-Duplex, Full-Duplex
Input Transmission Rates: Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps; Asynchronous/Synchronous - 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 19,200 bps; Synchronous - External Clock
Maximum Output Lines:
Synchronous: 32
Asynchronous: 32
Output Transmission Mode: Half-Duplex, Full-Duplex
Output Line Transmission Rates: Asynchronous/Synchronous - 1,200 bps, 2,400 bps, 4,800 bps, 9,600 bps, Asynchronous - 1,800 bps, 14,400 bps, External Clock
Communications Protocols: BSC, Ascii
Diagnostic Features: Local
Distribution Method: End user, OEM, Third-party

EMULEX CORP.
CS21-F
Multiplexer Class: Statistical
Input Interface: RS-232C, Current Loop
Maximum Input Channels:
Synchronous: 16
Transmission Mode: Full-Duplex
Input Transmission Rates: Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 19,200 bps
Maximum Output Lines:
Synchronous: 16
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Asynchronous - 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps
Communications Protocols: Ascii
Diagnostic Features: Local
Distribution Method: End user, OEM, Third-party

EMULEX CORP.
CS21-H
Multiplexer Class: Statistical
Input Interface: RS-232C, Current Loop
Maximum Input Channels:
Synchronous: 16
Transmission Mode: Full-Duplex
Input Transmission Rates: Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 19,200 bps
Maximum Output Lines:
Synchronous: 16
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Asynchronous - 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps
Communications Protocols: Ascii
Diagnostic Features: Local
Distribution Method: End user, OEM, Third-party

EMULEX CORP.
CS21-U
Multiplexer Class: Statistical
Input Interface: RS-232C, Current Loop
Maximum Input Channels:
Synchronous: 16
Transmission Mode: Full-Duplex
Input Transmission Rates: Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 19,200 bps
Maximum Output Lines:
Synchronous: 16
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Asynchronous - 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps
Communications Protocols: Ascii
Diagnostic Features: Local
Distribution Method: End user, OEM, Third-party

EMULEX CORP.
CS21-Z
Multiplexer Class: Statistical
Input Interface: RS-232C, Current Loop
Maximum Input Channels:
Synchronous: 16
Transmission Mode: Full-Duplex
Input Transmission Rates: Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 19,200 bps
Maximum Output Lines:
Synchronous: 16
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Asynchronous - 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps
Communications Protocols: Ascii
Diagnostic Features: Local
Distribution Method: End user, OEM, Third-party

EMULEX CORP.
CSM11-MH
Multiplexer Class: Statistical
Input Interface: RS-232C, Current Loop
Maximum Input Channels:
Synchronous: 64
Transmission Mode: Half-Duplex, Full-Duplex
Input Transmission Rates: Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 19,200 bps
Maximum Output Lines:
Asynchronous: 16
Output Transmission Mode: Half-Duplex, Full-Duplex
Output Line Transmission Rates: Synchronous - 2,400 bps, 4,800 bps, 9,600 bps
Features: Automatic Speed Detection (Autobaud), Downline Loading (On-Line Reconfiguration), Automatic Repeat Request
Diagnostic Features: Remote, Local
Distribution Method: End user, OEM, Third-party

EMULEX CORP.
CSM11-MU
Multiplexer Class: Statistical
Input Interface: RS-232C, Current Loop
Maximum Input Channels:
Synchronous: 64
Transmission Mode: Half-Duplex, Full-Duplex
Input Transmission Rates: Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 19,200 bps
Maximum Output Lines:
Asynchronous: 16
Output Transmission Mode: Half-Duplex, Full-Duplex
Output Line Transmission Rates: Synchronous - 2,400 bps, 4,800 bps, 9,600 bps
Features: Automatic Speed Detection (Autobaud), Downline Loading (On-Line Reconfiguration), Automatic Repeat Request
Diagnostic Features: Remote, Local
Distribution Method: End user, OEM, Third-party

EMULEX CORP.
CSM21-MZ
Multiplexer Class: Statistical
Input Interface: RS-232C, Current Loop
Maximum Input Channels:
Synchronous: 32
Transmission Mode: Full-Duplex
Input Transmission Rates: Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 19,200 bps
Maximum Output Lines:
Asynchronous: 16
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Synchronous - 2,400 bps, 4,800 bps, 9,600 bps
Features: Automatic Speed Detection (Autobaud), Downline Loading (On-Line Reconfiguration), Automatic Repeat Request
Diagnostic Features: Remote, Local
Distribution Method: End user, OEM, Third-party

EMULEX CORP.
CSM21-NH
Multiplexer Class: Statistical
Input Interface: RS-232C, Current Loop
Maximum Input Channels:
Synchronous: 32
Transmission Mode: Half-Duplex, Full-Duplex
Input Transmission Rates: Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 19,200 bps
Maximum Output Lines:
Asynchronous: 16
Output Transmission Mode: Half-Duplex, Full-Duplex
Output Line Transmission Rates: Synchronous - 2,400 bps, 4,800 bps, 9,600 bps
Features: Automatic Speed Detection (Autobaud), Downline Loading (On-Line Reconfiguration), Automatic Repeat Request
Diagnostic Features: Remote, Local
Distribution Method: End user, OEM, Third-party

EMULEX CORP.
CSM21-NU
Multiplexer Class: Statistical
Input Interface: RS-232C, Current Loop
Maximum Input Channels:
Synchronous: 32
Transmission Mode: Half-Duplex, Full-Duplex
Input Transmission Rates: Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 19,200 bps
Maximum Output Lines:
Asynchronous: 16
Output Transmission Mode: Half-Duplex, Full-Duplex
Output Line Transmission Rates: Synchronous - 2,400 bps, 4,800 bps, 9,600 bps
Features: Automatic Speed Detection (Autobaud), Downline Loading (On-Line Reconfiguration), Automatic Repeat Request
Diagnostic Features: Remote, Local
Distribution Method: End user, OEM, Third-party

ERICSSON PROMATIC, INC.
1111
Multiplexer Class: Statistical
Input Interface: RS-232C
Maximum Input Channels:
Synchronous: 1
Transmission Mode: Full-Duplex, Echoplex
Input Transmission Rates: Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps
Aggregate Transmission Rate: 96 bps
Maximum Output Lines:
Asynchronous: 1
Output Transmission Mode: Full-Duplex, Echoplex
Output Line Transmission Rates: Synchronous - 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps
Communications Protocols: HDLC (CCITT X.205 Level 2)
Features: Automatic Speed

Detection (Autobaud), Protocol Conversion, Downline Loading (On-Line Reconfiguration), Automatic Repeat Request
Diagnostic Features: Local
Distribution Method: End user
Price: $990
Number Installed to Date: Under 100
(See Vendor Profile Page V-11)

ERICSSON PROGRAMTIC, INC. 1112
Multiplexer Class: Statistical
Input Interface: RS-232C
Maximum Input Channels:
Synchronous: 2
Transmission Mode: Full-Duplex, Echoplex
Input Transmission Rates:
Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps
Aggregate Transmission Rate: 96 bps
Maximum Output Lines:
Asynchronous: 1
Output Transmission Mode: Full-Duplex, Echoplex
Output Line Transmission Rates:
Synchronous - 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps
Communications Protocols: HDLC (CCITT X.205 Level 2)
Features: Automatic Speed Detection (Autobaud), Protocol Conversion, Downline Loading (On-Line Reconfiguration), Automatic Repeat Request
Diagnostic Features: Local
Distribution Method: End user
Price: $1,140
Number Installed to Date: Under 100

ERICSSON PROGRAMTIC, INC. 1114
Multiplexer Class: Statistical
Input Interface: RS-232C
Maximum Input Channels:
Synchronous: 4
Asynchronous: 1
Transmission Mode: Full-Duplex, Echoplex
Input Transmission Rates:
Asynchronous/Synchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps;2,400 bps, 3,600 bps, 4,800 bps;
Asynchronous - 7,200 bps, 9,600 bps
Aggregate Transmission Rate: 96 bps
Maximum Output Lines:
Asynchronous: 1
Output Transmission Mode: Full-Duplex, Echoplex
Output Line Transmission Rates:
Synchronous - 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps
Communications Protocols: HDLC (CCITT X.205 Level 2)
Features: Automatic Speed Detection (Autobaud), Protocol Conversion, Downline Loading (On-Line Reconfiguration), Automatic Repeat Request
Diagnostic Features: Local
Distribution Method: End user
Price: $1,510
Number Installed to Date: Under 100

ERICSSON PROGRAMTIC, INC. 1116
Multiplexer Class: Statistical
Input Interface: RS-232C
Maximum Input Channels:
Synchronous: 8
Asynchronous: 1
Transmission Mode: Full-Duplex, Echoplex
Input Transmission Rates:
Asynchronous/Synchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps;
Asynchronous - 7,200 bps, 9,600 bps
Aggregate Transmission Rate: 96 bps
Maximum Output Lines:
Asynchronous: 1
Output Transmission Mode: Full-Duplex, Echoplex
Output Line Transmission Rates:
Synchronous - 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps
Communications Protocols: HDLC (CCITT X.205 Level 2)
Features: Automatic Speed Detection (Autobaud), Protocol Conversion, Downline Loading (On-Line Reconfiguration), Automatic Repeat Request
Distribution Method: End user
Price: $2,150
Number Installed to Date: Under 100

FIBRONICS INTERNATIONAL, INC. FM 614
Multiplexer Class: Fiber-Optic
Input Interface: RS-232C
Maximum Input Channels:
Synchronous: 16
Asynchronous: 4
Transmission Mode: Full-Duplex
Input Transmission Rates:
Asynchronous - 19,200 bps;
Asynchronous/Synchronous - Up to 64,000 bps
Output Transmission Mode: Full-Duplex
Communications Protocols: Transparent to User
Features: Automatic Speed Detection (Autobaud), Polling
Diagnostic Features: Remote, Local
Price: $2,000 to $2,800
Date First Installed: 1981
Number Installed to Date: Under 100
(See Vendor Profile Page V-12)

FIBRONICS INTERNATIONAL, INC. FM 618
Multiplexer Class: Fiber-Optic
Input Interface: RS-232C, CCITT V.24/V.28
Maximum Input Channels:
Synchronous: 16
Asynchronous: 8
Transmission Mode: Full-Duplex
Input Transmission Rates:
Asynchronous - 19,200 bps;
Asynchronous/Synchronous - Up to 64,000 bps
Output Transmission Mode: Full-Duplex
Communications Protocols: Transparent to User
Features: Automatic Speed Detection (Autobaud), Polling
Diagnostic Features: Remote, Local
Distribution Method: End user
Price: $3,300 to $4,900
Date First Installed: 1981
Number Installed to Date: Under 100

FIBRONICS INTERNATIONAL, INC. FM 632
Multiplexer Class: Fiber-Optic
Input Interface: RS-232C, RS-422, CCITT V.24/V.28, V.35,T-1,RS-449
Maximum Input Channels:
Synchronous: 128
Asynchronous: 32
Transmission Mode: Full-Duplex
Input Transmission Rates:
Asynchronous - 19,200 bps;
Synchronous - Up to 64,000 bps
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates:
Asynchronous - T-1
Communications Protocols: Transparent to User
Features: Polling
Diagnostic Features: Remote, Local
Distribution Method: End user
Price: $5,400 to $15,000
Date First Installed: 1983
Number Installed to Date: Under 100

FIBRONICS INTERNATIONAL, INC. FM 1608
Multiplexer Class: Fiber-Optic
Input Interface: IBM 3270, ITT
Maximum Input Channels:
Synchronous: 8
Transmission Mode: Full-Duplex
Input Transmission Rates:
Asynchronous - 23,580 bps
Output Transmission Mode: Full-Duplex
Communications Protocols: IBM 3270, ITT, Raytheon
Features: Polling
Diagnostic Features: Remote, Local
Distribution Method: End user
Price: $1,300 to $2,200
Date First Installed: 1983
Number Installed to Date: Under 100

FIBRONICS INTERNATIONAL, INC. FM 1632
Multiplexer Class: Fiber-Optic
Maximum Input Channels:
Synchronous: 32
Transmission Mode: Full-Duplex
Input Transmission Rates:
Asynchronous - 23,580 bps
Output Transmission Mode: Half-Duplex
Communications Protocols: IBM 3270, ITT, Raytheon
Features: Polling, Fiber Optic or Coaxial Link
Diagnostic Features: Remote, Local
Distribution Method: End user
Price: $1,825 to $4,900
Date First Installed: 1982
Number Installed to Date: 100 - 500

FRIEDMAN ASSOCIATES DATAGRAM DM600
Multiplexer Class: Statistical
Input Interface: RS-232C
Maximum Input Channels:
Synchronous: 9
Transmission Mode: Full-Duplex
Input Transmission Rates:
Asynchronous - 110 bps, 300 bps, 2,400 bps, 4,800 bps, 9,600 bps
Aggregate Transmission Rate: 768 bps
Maximum Output Lines:
Synchronous: 1
Asynchronous: 1
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates:
Asynchronous - 14,400 bps
Communications Protocols: HDLC (CCITT X.25 Level 2)
Features: Automatic Speed Detection (Autobaud), Data Compression, Downline Loading (On-Line Reconfiguration), Polling, Port Contention, Flow Control
Diagnostic Features: Local
Distribution Method: End user
Price: $1,550 to $2,750
Date First Installed: January 1982
(See Vendor Profile Page V-12)

FRIEDMAN ASSOCIATES DATAGRAM DM1600
Multiplexer Class: Statistical
Input Interface: RS-232C
Maximum Input Channels:
Synchronous: 16
Transmission Mode: Full-Duplex
Input Transmission Rates:
Asynchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 2,400 bps, 4,800 bps, 9,600 bps
Aggregate Transmission Rate: 540 bps
Maximum Output Lines:
Synchronous: 16
Asynchronous: 1
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates:
Synchronous - 2,400 bps, 4,800 bps, 9,600 bps
Communications Protocols: HDLC (CCITT X.205 Level 2)
Features: Automatic Speed Detection (Autobaud), Downline Loading (On-Line Reconfiguration), Port Contention, Operational and Statistical Reports, Flow Control
Diagnostic Features: Local
Distribution Method: End user
Price: $2,900 to $5,000
Date First Installed: January 1981

FRIEDMAN ASSOCIATES DATAGRAM DM4800
Multiplexer Class: Statistical
Input Interface: RS-232C
Maximum Input Channels:
Synchronous: 52
Transmission Mode: Full-Duplex

Multiplexers

Input Transmission Rates: Asynchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 2,400 bps, 4,800 bps, 9,600 bps
Aggregate Transmission Rate: 540 bps
Maximum Output Lines:
Synchronous: 56
Asynchronous: 1
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Synchronous - 2,400 bps, 4,800 bps
Communications Protocols: HDLC (CCITT X.205 Level 2)
Features: Automatic Speed Detection (Autobaud), Downline Loading (On-Line Reconfiguration), Port Contention, Flow Control
Diagnostic Features: Local
Distribution Method: End user
Price: $3,600 to $13,200
Date First Installed: June 1981

FREEMAN ASSOCIATES
NEC STAT MUX
Multiplexer Class: Statistical
Input Interface: RS-232C
Maximum Input Channels:
Synchronous: 8
Transmission Mode: Full-Duplex
Input Transmission Rates: Synchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps, 19,200 bps
Maximum Output Lines:
Asynchronous: 2
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Synchronous - 9,600 bps
Communications Protocols: HDLC (CCITT X.205 Level 2)
Features: Automatic Speed Detection (Autobaud), Data Compression, Downline Loading (On-Line Reconfiguration), Automatic Repeat Request, Polling, Port Contention, Switching, Flow Control
Diagnostic Features: Local
Distribution Method: End user
Price: $35,000
Date First Installed: April 1982

FUJITSU AMERICA, INC.
F 1961A
Multiplexer Class: Statistical
Input Interface: RS-232C
Maximum Input Channels:
Synchronous: 16
Asynchronous: 16
Transmission Mode: Echoplex
Input Transmission Rates: Asynchronous/Synchronous - 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps
Aggregate Transmission Rate: 1,530 bps
Maximum Output Lines:
Asynchronous: 2
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Synchronous - 19,200 bps
Communications Protocols: SDLC
Features: Automatic Speed Detection (Autobaud), Data Compression, Downline Loading (On-Line Reconfiguration), Automatic Repeat Request, Flyback Buffering Delay, Operational and Statistical Reports, Flow Control, Programmable, Network Monitor, LCD Display; Prompting Protocol Configuration
Diagnostic Features: Remote, Local
Distribution Method: OEM
Date First Installed: October 1983
Number Installed to Date: 10
Number Installed to Date: Under 100
(See Vendor Profile Page V-12)

GANDALF DATA, INC.
PIN 9101 E
Multiplexer Class: Statistical
Input Interface: RS-232C, CCITT V.24/V.28
Maximum Input Channels:
Synchronous: 16
Transmission Mode: Half-Duplex, Full-Duplex, Echoplex
Input Transmission Rates: Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps
Aggregate Transmission Rate: 576 bps
Maximum Output Lines:
Asynchronous: 1
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Synchronous - 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps
Communications Protocols: HDLC (CCITT X.205 Level 2), CCITT X.25 (Level 3), Ascii
Features: Automatic Speed Detection (Autobaud), Downline Loading (On-Line Reconfiguration), Automatic Repeat Request, Flyback Buffering Delay, Port Contention, Switching, Operational and Statistical Reports, Flow Control, Programmable, Supports HP ENQ/ACK Protocol
Diagnostic Features: Local
Distribution Method: End user
Price: $2,650 to $5,750
Date First Installed: 1981
Number Installed to Date: Under 100
(See Vendor Profile Page V-12)

GANDALF DATA, INC.
PIN 9103
Multiplexer Class: Statistical
Input Interface: RS-232C, CCITT V.24/V.28
Maximum Input Channels:
Synchronous: 32
Transmission Mode: Half-Duplex, Full-Duplex, Echoplex
Input Transmission Rates: Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps
Aggregate Transmission Rate: 768 bps
Maximum Output Lines:
Asynchronous: 1
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Synchronous - 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps
Communications Protocols: HDLC (CCITT X.205 Level 2)
Features: Automatic Speed Detection (Autobaud), Downline Loading (On-Line Reconfiguration), Automatic Repeat Request, Operational and Statistical Reports, Flow Control, Programmable, Priority Channel Assign
Diagnostic Features: Local
Distribution Method: End user
Price: $1,650 to $7,150
Date First Installed: 1979
Number Installed to Date: 500 - 1,000

GANDALF DATA, INC.
PIN 9106
Multiplexer Class: Statistical
Input Interface: RS-232C, CCITT V.24/V.28
Maximum Input Channels:
Synchronous: 4
Transmission Mode: Half-Duplex, Full-Duplex
Input Transmission Rates: Asynchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 2,400 bps, 4,800 bps, 9,600 bps
Aggregate Transmission Rate: 192 bps
Maximum Output Lines:
Asynchronous: 1
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Synchronous - 9,600 bps
Communications Protocols: SDLC
Features: Automatic Speed Detection (Autobaud), Data Compression, Downline Loading (On-Line Reconfiguration), Automatic Repeat Request, Flow Control, Built-in for Test Pattern Generation
Diagnostic Features: Remote, Local
Distribution Method: End user
Price: $825 to $1,095
Date First Installed: 1983
Number Installed to Date: Under 100

GANDALF DATA, INC.
GLM 504
Multiplexer Class: TDM
Input Interface: RS-232C, CCITT V.24/V.28
Maximum Input Channels:
Asynchronous: 4
Transmission Mode: Half-Duplex, Full-Duplex
Aggregate Transmission Rate: bps
Maximum Output Lines:
Asynchronous: 1
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Synchronous - 56,000 bps; Asynchronous/Synchronous - Up to 64K bps
Features: EIA Signal Throughput
Diagnostic Features: Remote, Local
Distribution Method: End user
Price: $1,550
Date First Installed: 1981
Number Installed to Date: Under 100

GANDALF DATA, INC.
LINE MISER-MUX4/MUX8
Multiplexer Class: TDM
Input Interface: RS-232C
Maximum Input Channels:
Synchronous: 8
Transmission Mode: Half-Duplex, Full-Duplex
Input Transmission Rates: Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps
Aggregate Transmission Rate: 384 bps
Maximum Output Lines:
Asynchronous: 1
Output Transmission Mode: Full-Duplex
Features: Port Contention, Switching
Diagnostic Features: Remote, Local
Distribution Method: End user
Price: $850 to $850
Date First Installed: January 1984
Number Installed to Date: Under 100

GANDALF DATA, INC.
LINE MISER-T1 MUX
Multiplexer Class: Wideband (T-1)
Input Interface: RS-232C
Maximum Input Channels:
Synchronous: 128
Transmission Mode: Half-Duplex, Full-Duplex
Input Transmission Rates: Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps, 19,200 bps
Aggregate Transmission Rate: 3,072 bps
Maximum Output Lines:
Asynchronous: T-1
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Asynchronous - T-1
Communications Protocols: Bipolar RTZ
Features: Flow Control, Synchronous to PBX, Transparent
Diagnostic Features: Remote, Local
Distribution Method: End user
Price: $3,200
Number Installed to Date: Under 100

GANDALF DATA, INC.
LINE MISER-T1 MUX
Multiplexer Class: Wideband (T-1)
Input Interface: RS-232C
Maximum Input Channels:
Synchronous: 128
Transmission Mode: Half-Duplex, Full-Duplex
Input Transmission Rates: Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps, 19,200 bps

Aggregate Transmission Rate: 3,072 bps
Maximum Output Lines:
Asynchronous: T-1
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Asynchronous - T-1
Communications Protocols: Bipolar RTZ
Features: Flow Control, Synchronous to PABX, Transparent
Diagnostic Features: Remote, Local
Distribution Method: End user
Price: $3,200
Number Installed to Date: Under 100

GENCOMP, INC.
ASYNCHRONOUS MULTIPLEXER MODEL 2033
Multiplexer Class: TDM
Input Interface: RS-232C, Current Loop
Maximum Input Channels:
Synchronous: 128
Transmission Mode: Full-Duplex
Input Transmission Rates: Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps, 19,200 bps
Aggregate Transmission Rate: 1,536 bps
Output Line Transmission Rates: Asynchronous - Direct Connect to PDP-11
Communications Protocols: Ascii
Diagnostic Features: No
Distribution Method: OEM
Price: $1,000 to $3,000
Date First Installed: 1979
Number Installed to Date: 500 - 1,000
(See Vendor Profile Page V-13)

GENCOMP, INC.
ASYNCHRONOUS MULTIPLEXER MODEL 2035
Multiplexer Class: TDM
Input Interface: RS-232C, Current Loop
Maximum Input Channels:
Synchronous: 128
Transmission Mode: Full-Duplex, Echoplex
Input Transmission Rates: Asynchronous - 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 19,200 bps, 134.5M bps, 150M bps
Aggregate Transmission Rate: 1,500 bps
Output Line Transmission Rates: Asynchronous - Direct Connect to PDP-11
Communications Protocols: Ascii
Diagnostic Features: Local
Distribution Method: End user
Price: $2,000 to $3,000
Number Installed to Date: Under 100

GENCOMP, INC.
ASYNCHRONOUS MULTIPLEXER MODEL 2133
Multiplexer Class: TDM
Input Interface: RS-232C
Maximum Input Channels:
Synchronous: 128
Transmission Mode: Full-Duplex
Input Transmission Rates: Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps, 19,200 bps, 134.5M bps, 150M bps
Aggregate Transmission Rate: 500 bps
Output Line Transmission Rates: Asynchronous - Direct Connect to LSI
Communications Protocols: Ascii
Diagnostic Features: Local
Distribution Method: OEM
Price: $900
Date First Installed: March 1983
Number Installed to Date: Under 100

GENCOMP, INC.
ASYNCHRONOUS MULTIPLEXER MODEL 2136
Multiplexer Class: TDM
Input Interface: RS-232C, Current Loop
Maximum Input Channels:
Synchronous: 128
Transmission Mode: Full-Duplex, Echoplex
Input Transmission Rates: Asynchronous - 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 19,200 bps, 134.5M bps, 150M bps, 38.4K bps
Aggregate Transmission Rate: 1,500 bps
Output Line Transmission Rates: Asynchronous - Direct Connect to LSI-11
Communications Protocols: Ascii
Diagnostic Features: Local
Distribution Method: OEM
Price: $2,000 to $3,000
Number Installed to Date: Under 100

GENERAL DATACOMM INDUSTRIES, INC.
GENNET 1261
Multiplexer Class: Network Concentrator
Input Interface: RS-232C, CCITT V.24/V.28
Maximum Input Channels:
Synchronous: 8
Transmission Mode: Half-Duplex, Echoplex
Input Transmission Rates: Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps
Aggregate Transmission Rate: 96 bps
Maximum Output Lines:
Asynchronous: 1
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Asynchronous/Synchronous - Up to 19,200 bps
Communications Protocols: HDLC (CCITT X.205 Level 2)
Features: Automatic Speed Detection (Autobaud), Downline Loading (On-Line Reconfiguration), Automatic Repeat Request, Flow Control
Diagnostic Features: Remote, Local
Distribution Method: Third-party
Price: $1,400 to $2,200
Date First Installed: December 1983
Number Installed to Date: Under 100
(See Vendor Profile Page V-12)

GENERAL DATACOMM INDUSTRIES, INC.
GENNET 1262
Multiplexer Class: Network Concentrator
Input Interface: RS-232C, RS-422, RS-423, CCITT V.24/V.28, V.10, V.11
Maximum Input Channels:
Synchronous: 96
Asynchronous: 96
Transmission Mode: Full-Duplex, Echoplex
Input Transmission Rates: Asynchronous - 50 bps to 19,200 bps
Aggregate Transmission Rate: 760 bps
Maximum Output Lines:
Asynchronous: 4
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Asynchronous/Synchronous - 256,000 bps
Communications Protocols: HDLC (CCITT X.205 Level 2)
Features: Automatic Speed Detection (Autobaud), Downline Loading (On-Line Reconfiguration), Automatic Repeat Request, Operational and Statistical Reports, Flow Control, Programmable, Network Monitor, Split Rates, Intelligent Front Panel
Diagnostic Features: Remote, Local
Distribution Method: End user
Date First Installed: June 1983
Number Installed to Date: Under 100

GENERAL DATACOMM INDUSTRIES, INC.
MEGAMUX (TDM 1287/1288)
Multiplexer Class: TDM
Input Interface: RS-232C, RS-422, RS-423, CCITT V.24/V.28, MIL 188C, CCITT V.703
Maximum Input Channels:
Synchronous: 54
Asynchronous: 54
Transmission Mode: Full-Duplex
Input Transmission Rates: Asynchronous - 50 bps, 75 bps, 110 bps; Asynchronous/Synchronous - 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps; Synchronous - 19,200 bps
Aggregate Transmission Rate: 20,400 bps
Maximum Output Lines:
Synchronous: 1
Asynchronous: 1
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Asynchronous - 256,000 bps
Features: Automatic Speed Detection (Autobaud), Network Monitor, Fiber-Optic Aggregate Interface
Diagnostic Features: Remote, Local
Distribution Method: End user
Price: $6,000 to $35,000
Date First Installed: June 1981
Number Installed to Date: 500 - 1,000

GENERAL DATACOMM INDUSTRIES, INC.
TDM 1200 SERIES
Multiplexer Class: TDM
Input Interface: RS-232C, CCITT V.24/V.28
Maximum Input Channels:
Synchronous: 4
Transmission Mode: Full-Duplex
Input Transmission Rates: Asynchronous - 150 bps, 300 bps, 1,200 bps, 2,400 bps, 4,800 bps, 9,600 bps
Aggregate Transmission Rate: 38 bps
Maximum Output Lines:
Asynchronous: 1
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Synchronous - 1,200 bps, 2,400 bps, 4,800 bps, 9,600 bps
Communications Protocols: Ascii
Diagnostic Features: Local
Distribution Method: End user
Price: $995 to $1,295
Date First Installed: April 1981
Number Installed to Date: 1,000 - 5,000

GTE NETWORK SYSTEMS
9604 A/B
Multiplexer Class: Statistical Multiplexer
Maximum Input Channels:
Synchronous: 24
Transmission Mode: Full-Duplex
Input Transmission Rates: Synchronous - 4,800 bps, 56,000 bps
Aggregate Transmission Rate: 1.3K bps
Maximum Output Lines: 1
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: 1.5K bps
Features: Network Monitor
Diagnostic Features: Remote, Local
Distribution Method: End user
Price: $15,000
Date First Installed: June 1983
Number Installed to Date: Under 500
(See Vendor Profile Page V-13)

HALCYON COMMUNICATIONS
4001
Multiplexer Class: Statistical
Input Interface: RS-232C
Maximum Input Channels:
Synchronous: 32
Transmission Mode: Echoplex
Input Transmission Rates: Synchronous - 50 bps, 9,600 bps
Aggregate Transmission Rate: 48 bps

Multiplexers

Maximum Output Lines:
Asynchronous: 1
Other: Split Link
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Synchronous - 9,600 bps
Communications Protocols: HDLC (CCITT X.205 Level 2)
Features: Automatic Speed Detection (Autobaud), Downline Loading (On-Line Reconfiguration), Automatic Repeat Request, Flyback Buffering Delay, Operational and Statistical Reports, Programmable, Network Monitor, Remote Term Control
Diagnostic Features: Remote, Local
Distribution Method: End user
Price: $1,700 to $4,100
Date First Installed: 1982
Number Installed to Date: Under 100
(See Vendor Profile Page V-13)

MALGTON COMMUNICATIONS
4226
Multiplexer Class: Statistical
Input Interface: RS-232C
Maximum Input Channels:
Synchronous: 60
Asynchronous: 60
Transmission Mode: Echoplex
Input Transmission Rates: Asynchronous/Synchronous - 50 bps, 9,600 bps
Aggregate Transmission Rate: 48 bps
Maximum Output Lines:
Synchronous: 2
Asynchronous: 1
Other: Split Link
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Synchronous - 9,600 bps
Communications Protocols: HDLC (CCITT X.205 Level 2)
Features: Automatic Speed Detection (Autobaud), Data Compression, Downline Loading (On-Line Reconfiguration), Automatic Repeat Request, Flyback Buffering Delay, Polling, Operational and Statistical Reports, Programmable, Network Monitor, Executive Port Option, Port Monitor
Diagnostic Features: Remote, Local
Distribution Method: End user
Price: $3,800 to $6,500
Date First Installed: 1982
Number Installed to Date: Under 100

MDI
3200
Multiplexer Class: Terminal Multiplexer
Maximum Input Channels:
Synchronous: 8
Maximum Output Lines:
Synchronous: 1
(See Vendor Profile Page V-14)

INFINET, INC.
MX400
Multiplexer Class: TDM
Input Interface: RS-232C
Maximum Input Channels:
Asynchronous: 4
Transmission Mode: Full-Duplex
Input Transmission Rates: Synchronous - 1,200 bps, 2,400 bps, 4,800 bps
Aggregate Transmission Rate: 48 bps
Maximum Output Lines:
Asynchronous: 1
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Synchronous - 4,800 bps
Features: Programmable
Diagnostic Features: No
Distribution Method: End user
Price: $300
Number Installed to Date: 1,000 - 5,000
(See Vendor Profile Page V-15)

INFINET, INC.
MX496
Multiplexer Class: TDM
Input Interface: RS-232C
Maximum Input Channels:
Asynchronous: 4
Transmission Mode: Full-Duplex
Input Transmission Rates: Synchronous - 2,400 bps, 4,800 bps, 7,200 bps, 9,600 bps
Aggregate Transmission Rate: 96 bps
Maximum Output Lines:
Asynchronous: 1
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Synchronous - 9,600 bps
Features: Programmable, Tracks Fallback Rate of Modem
Diagnostic Features: No
Distribution Method: End user
Price: $800
Number Installed to Date: 100 - 500

INFINET, INC.
MX600
Multiplexer Class: TDM
Input Interface: RS-232C
Maximum Input Channels:
Asynchronous: 6
Transmission Mode: Full-Duplex
Input Transmission Rates: Synchronous - 2,400 bps, 4,800 bps, 7,200 bps, 9,600 bps; Asynchronous/Synchronous - 14,400 bps, 120,000 bps
Aggregate Transmission Rate: 144 bps
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Synchronous - 19,200 bps
Communications Protocols: HDLC (CCITT X.205 Level 2), SDLC, BSC
Features: Programmable
Diagnostic Features: No
Distribution Method: End user
Price: $1,000
Number Installed to Date: Under 100

INFOTRON SYSTEMS CORP.
782 NETWORK CONCENTRATOR
Multiplexer Class: Network Concentrator
Input Interface: RS-232C, CCITT V.24/V.28
Input Transmission Rates: Asynchronous/Synchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps
Aggregate Transmission Rate: 768 bps
Maximum Output Lines:
Asynchronous: 3
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Asynchronous/Synchronous - Up to 9,600 bps
Communications Protocols: SDLC, Ascii, Baudot
Features: Automatic Repeat Request, Port Contention, Switching, Flow Control
Price: $1,200

INFOTRON SYSTEMS CORP.
SM680 WITH 780NC OR 782NC
Multiplexer Class: Network Concentrator
Maximum Input Channels:
Asynchronous: 16
Input Transmission Rates: Asynchronous/Synchronous - 9,600 bps
Aggregate Transmission Rate: 384 bps
Features: Port Contention, Switching, Flow Control
Price: $1,200

INFOTRON SYSTEMS CORP.
SUPERMUX 780
Multiplexer Class: Network Concentrator
Input Interface: RS-232C, CCITT V.24/V.28
Maximum Input Channels:
Synchronous: 640
Asynchronous: 640
Transmission Mode: Half-Duplex, Full-Duplex
Input Transmission Rates: Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps; Asynchronous/Synchronous - 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps
Aggregate Transmission Rate: 384 bps

Input Transmission Rates: Asynchronous/Synchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps
Aggregate Transmission Rate: 3,072 bps
Communications Protocols: BSC, Ascii
Features: Automatic Speed Detection (Autobaud), Switching, Flow Control
Diagnostic Features: Remote, Local
Price: $4,500 to $7,900
(See Vendor Profile Page V-16)

INFOTRON SYSTEMS CORP.
SM480 WITH 780NC OR 782NC
Multiplexer Class: Network Concentrator
Maximum Input Channels:
Asynchronous: 8
Transmission Mode: Full-Duplex
Input Transmission Rates: Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 134.5M bps, 200M bps
Aggregate Transmission Rate: 768 bps
Maximum Output Lines:
Asynchronous: 3
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Asynchronous/Synchronous - Up to 9,600 bps
Communications Protocols: SDLC, Ascii, Baudot
Features: Automatic Repeat Request, Port Contention, Switching, Flow Control
Price: $1,200

INFOTRON SYSTEMS CORP.
SM680 WITH 780NC OR 782NC
Multiplexer Class: Network Concentrator
Maximum Input Channels:
Asynchronous: 16
Input Transmission Rates: Asynchronous/Synchronous - 9,600 bps
Aggregate Transmission Rate: 384 bps
Features: Port Contention, Switching, Flow Control
Price: $1,200

INFOTRON SYSTEMS CORP.
SUPERMUX 780
Multiplexer Class: Network Concentrator
Input Interface: RS-232C, CCITT V.24/V.28
Maximum Input Channels:
Synchronous: 640
Asynchronous: 640
Transmission Mode: Half-Duplex, Full-Duplex
Input Transmission Rates: Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps; Asynchronous/Synchronous - 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps
Aggregate Transmission Rate: 384 bps

Maximum Output Lines:
Asynchronous: 15
Output Transmission Mode: Half-Duplex, Full-Duplex
Output Line Transmission Rates: Asynchronous/Synchronous - 72,000 bps
Features: Downline Loading (On-Line Reconfiguration), Port Contention, Switching, Flow Control, Network Monitor, Optional ANM 800 Network Monitor
Diagnostic Features: Local
Price: $4,600 to $7,100

INFOTRON SYSTEMS CORP.
SUPERMUX 380 STAT MUX
Multiplexer Class: Statistical
Input Interface: RS-232C, CCITT V.24/V.28, DB-25-P
Maximum Input Channels:
Synchronous: 8
Transmission Mode: Half-Duplex, Full-Duplex
Input Transmission Rates: Synchronous - Up to 9,600 bps
Aggregate Transmission Rate: 768 bps
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Synchronous - 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps
Communications Protocols: SDLC
Features: Automatic Speed Detection (Autobaud), Downline Loading (On-Line Reconfiguration), Flow Control, Programmable
Diagnostic Features: Remote, Local
Price: $1,375 to $1,750

INFOTRON SYSTEMS CORP.
SUPERMUX 480 STAT MUX
Multiplexer Class: Statistical
Input Interface: RS-232C, 20 mA or 60 mA Current Loop
Maximum Input Channels:
Synchronous: 8
Input Transmission Rates: Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps
Aggregate Transmission Rate: 768 bps
Output Line Transmission Rates: Synchronous - 2,400 bps, 4,800 bps; Asynchronous/Synchronous - Up to 9,600 bps
Communications Protocols: HDLC (CCITT X.205 Level 2), SDLC
Features: Automatic Speed Detection, Downline Loading (On-Line Reconfiguration), Automatic Repeat Request, Flow Control
Diagnostic Features: Local
Price: $1,900 to $6,000

INFOTRON SYSTEMS CORP.
SUPERMUX 816
Multiplexer Class: Statistical
Input Interface: RS-232C, CCITT V.24/V.28
Maximum Input Channels:
Synchronous: 16
Asynchronous: 16
Input Transmission Rates: Asynchronous/Synchronous - 50

bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps; Synchronous - 50 bps to 9,600 bps
Aggregate Transmission Rate: 192 bps
Maximum Output Lines:
Asynchronous: 1
Features: Automatic Speed Detection (Autobaud), Downline Loading (On-Line Reconfiguration), Port Contention, Switching
Diagnostic Features: Remote, Local
Price: $5,500
Date First Installed: 1982

INFOTRON SYSTEMS CORP. SUPERMUX 632
Multiplexer Class: Statistical
Input Interface: RS-232C, CCITT V.24/V.28
Maximum Input Channels:
Synchronous: 32
Asynchronous: 32
Input Transmission Rates:
Asynchronous/Synchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps
Aggregate Transmission Rate: 192 bps
Features: Automatic Speed Detection (Autobaud), Downline Loading (On-Line Reconfiguration), Port Contention, Switching
Diagnostic Features: Remote, Local
Price: $9,000
Date First Installed: 1982

INFOTRON SYSTEMS CORP. SUPERMUX 680 STAT MUX
Multiplexer Class: Statistical
Input Interface: RS-232C, CCITT V.24/V.28
Maximum Input Channels:
Synchronous: 32
Asynchronous: 32
Transmission Mode: Half-Duplex
Input Transmission Rates:
Asynchronous - 50 bps, 75 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 134.5M bps, 150M bps; Asynchronous/Synchronous - 110 bps, 300 bps, 600 bps, 1,200 bps
Aggregate Transmission Rate: 384 bps
Maximum Output Lines:
Asynchronous: 3
Output Transmission Mode: Half-Duplex
Output Line Transmission Rates:
Synchronous - 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps; Asynchronous/Synchronous - Up to 9,600 bps
Communications Protocols: HDLC (CCITT X.205 Level 2), SDLC
Features: Automatic Speed Detection (Autobaud), Downline Loading (On-Line Reconfiguration), Automatic Repeat Request, Flow Control
Diagnostic Features: Remote, Local
Price: $3,000 to $5,200

INFOTRON SYSTEMS CORP. SUPERMUX 780 STAT MUX
Multiplexer Class: Statistical
Input Interface: RS-232C, CCITT V.24/V.28, DB-25-P
Maximum Input Channels:
Synchronous: 128
Asynchronous: 128
Input Transmission Rates:
Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 134.5M bps, 150M bps;
Asynchronous/Synchronous - 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps
Aggregate Transmission Rate: 384 bps
Output Line Transmission Rates:
Asynchronous/Synchronous - Up to 19,200 bps
Communications Protocols: HDLC (CCITT X.205 Level 2), SDLC
Features: Automatic Speed Detection (Autobaud), Data Compression
Diagnostic Features: Remote, Local
Price: $1,700

INFOTRON SYSTEMS CORP. T1 MULTIPLEXER
Multiplexer Class: TDM
Input Interface: RS-232C
Maximum Input Channels:
Asynchronous: 48
Input Transmission Rates:
Asynchronous/Synchronous - 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps, 19,200 bps
Output Line Transmission Rates:
Asynchronous - T-1
Communications Protocols: HDLC (CCITT X.205 Level 2)
Diagnostic Features: Remote, Local
Distribution Method: End user
Price: $4,800

INFOTRON SYSTEMS CORP. TIMELINE 180 MULTIPLEXER
Multiplexer Class: TDM
Input Interface: RS-232C, CCITT V.24/V.28, MIL 188C
Maximum Input Channels:
Synchronous: 16
Input Transmission Rates:
Synchronous - 37.5 bps to 9,600 bps
Aggregate Transmission Rate: 192 bps
Output Line Transmission Rates:
Synchronous - 2,400 bps, 4,800 bps, 9,600 bps
Features: Automatic Speed Detection (Autobaud)
Diagnostic Features: Remote, Local
Price: $1,700
Date First Installed: 1975

INFOTRON SYSTEMS CORP. TIMELINE 280 MULTIPLEXER
Multiplexer Class: TDM
Input Interface: RS-232C, CCITT V.24/V.28
Maximum Input Channels:
Asynchronous: 24
Input Transmission Rates:
Asynchronous/Synchronous - Up to 19,200 bps
Aggregate Transmission Rate: 640 bps
Diagnostic Features: Local
Price: $1,800
Date First Installed: 1978

INFOTRON SYSTEMS CORP. TIMELINE 290 MULTIPLEXER
Multiplexer Class: TDM
Input Interface: RS-232C, CCITT V.24/V.28
Maximum Input Channels:
Asynchronous: 4
Input Transmission Rates:
Asynchronous/Synchronous - Up to 7,200 bps
Aggregate Transmission Rate: 96 bps
Diagnostic Features: Local
Price: $1,950
Date First Installed: 1976

INTEGRATED DESIGN ENGINEERING, INC. IDE-250SA, -250CA
Multiplexer Class: Concentrator
Input Interface: RS-232C
Maximum Input Channels:
Synchronous: 16
Transmission Mode: Half-Duplex, Echoplex
Input Transmission Rates:
Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps, 19,200 bps
Aggregate Transmission Rate: 192 bps
Maximum Output Lines:
Synchronous: 1
Output Transmission Mode: Half-Duplex, Full-Duplex
Output Line Transmission Rates:
Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps
Communications Protocols: Asci, IDE Protocol
Features: Data Compression, Protocol Conversion, Flyback Buffering Delay, Port Contention, Switching, Programmable
Diagnostic Features: Local
Distribution Method: End user
Price: $1,600 to $6,850
Date First Installed: 1979
Number Installed to Date: 100 - 500
(See Vendor Profile Page V-16)

INTERACTIVE SYSTEMS/3M MODEL 6330 STAT MUX
Multiplexer Class: Statistical
Input Interface: RS-232C
Maximum Input Channels:
Synchronous: 32

Meet The Cordless Wonder

New mLDS 122
ASYNC SHORT-HAUL

- Requires no desk space
- Requires no power cord or EIA cable
- Powered by EIA signals
- Range to four miles on LADS at 50 to 9600 bps
- Auto-equalized short-haul modem
- **ALL FOR ONLY $95!**

Phone 312-541-6060 today.

gandalf™

Gandalf Data, Inc. 1019 S. Noel Ave. Wheeling, IL 60090 TWX: 910-651-4951

Transmission Mode: Full-Duplex
Input Transmission Rates: Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps; Asynchronous/Synchronous - 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps to 76,800 bps; Synchronous - 3,600 bps, 7,200 bps, 19,200 bps
Aggregate Transmission Rate: 3,072 bps
Maximum Output Lines:
Asynchronous: 1
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Asynchronous/Synchronous - 76,000 bps
Communications Protocols: HDLC (CCITT X.205 Level 2), SDLC, Ascii
Features: Automatic Speed Detection (Autobaud), Downline Loading (On-Line Reconfiguration), Automatic Repeat Request, Operational and Statistical Reports, Flow Control, Programmable
Diagnostic Features: Remote
Distribution Method: End user
Price: $3,640 to $8,150
Date First Installed: 1983
Number Installed to Date: Under 100
(See Vendor Profile Page V-16)

INTERACTIVE SYSTEMS/3M MODEL 6600
Multiplexer Class: TDM
Input Interface: IBM 3274 CRTS
Maximum Input Channels:
Asynchronous: 32
Transmission Mode: Half-Duplex
Input Transmission Rates: Asynchronous/Synchronous - 4.7K bps
Maximum Output Lines:
Asynchronous: 1
Output Transmission Mode: Half-Duplex
Output Line Transmission Rates: Asynchronous/Synchronous - 4.7K bps
Communications Protocols: IBM, 3274 Type "A" CRT
Diagnostic Features: Local
Distribution Method: End user
Price: $1,600 to $3,090
Date First Installed: 1981
Number Installed to Date: 500 - 1,000

INTERBUSINESS CORP.
DUAL MUX A
Multiplexer Class: Statistical
Input Interface: RS-232C
Maximum Input Channels:
Synchronous: 2
Transmission Mode: Full-Duplex
Input Transmission Rates: Asynchronous - 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 7,200 bps, 9,600 bps
Aggregate Transmission Rate: 192 bps
Output Transmission Mode: Full-Duplex
Features: Automatic Speed Detection (Autobaud), Data Compression, Protocol Conversion, Downline Loading (On-Line Reconfiguration), Automatic Repeat Request, Flyback Buffering Delay, Flow Control, Network Monitor
Diagnostic Features: Remote, Local
Distribution Method: End user, OEM
Price: $695
Date First Installed: June 1983
Number Installed to Date: Under 100
(See Vendor Profile Page V-16)

INTERBUSINESS CORP.
DUAL MUX S
Multiplexer Class: Statistical
Input Interface: RS-232C
Maximum Input Channels:
Asynchronous: 2
Transmission Mode: Full-Duplex
Input Transmission Rates: Synchronous - 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 7,200 bps, 9,600 bps
Aggregate Transmission Rate: 192 bps
Output Transmission Mode: Full-Duplex
Features: Automatic Speed Detection (Autobaud), Data Compression, Protocol Conversion, Downline Loading (On-Line Reconfiguration), Automatic Repeat Request, Flyback Buffering Delay, Flow Control, Network Monitor
Diagnostic Features: Remote, Local
Distribution Method: End user, OEM
Price: $695
Date First Installed: June 1983
Number Installed to Date: Under 100
(See Vendor Profile Page V-16)

INTERBUSINESS CORP.
QUAD MUX S
Multiplexer Class: Statistical
Input Interface: RS-232C
Maximum Input Channels:
Asynchronous: 4
Transmission Mode: Full-Duplex
Input Transmission Rates: Synchronous - 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 7,200 bps, 9,600 bps
Aggregate Transmission Rate: 384 bps
Maximum Output Lines:
Asynchronous: 1
Output Transmission Mode: Full-Duplex
Features: Automatic Speed Detection (Autobaud), Data Compression, Protocol Conversion, Downline Loading (On-Line Reconfiguration), Automatic Repeat Request, Flyback Buffering Delay, Flow Control, Network Monitor
Diagnostic Features: Remote, Local
Distribution Method: End user, OEM
Price: $1,150
Date First Installed: June 1983
Number Installed to Date: Under 100

INTERBUSINESS CORP.
QUAD MUX 4 CHANNEL STAT MUX
Multiplexer Class: Statistical
Input Interface: RS-232C
Maximum Input Channels:
Synchronous: 4
Transmission Mode: Full-Duplex
Input Transmission Rates: Asynchronous - 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 7,200 bps, 9,600 bps
Aggregate Transmission Rate: 384 bps
Maximum Output Lines:
Synchronous: 1
Output Transmission Mode: Full-Duplex
Features: Automatic Speed Detection (Autobaud), Data Compression, Protocol Conversion, Downline Loading (On-Line Reconfiguration), Automatic Repeat Request, Flyback Buffering Delay, Flow Control, Network Monitor
Diagnostic Features: Remote, Local
Distribution Method: End user, OEM
Price: $1,150
Date First Installed: June 1983
Number Installed to Date: Under 100

INTERFACE ELECTRONICS, INC.
SLAM
Multiplexer Class: Interface Board
Input Interface: RS-232C
Maximum Input Channels:
Synchronous: 16
Transmission Mode: Full-Duplex
Input Transmission Rates: Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps, 19,200 bps
Maximum Output Lines:
Synchronous: 16
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Asynchronous - 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps
Communications Protocols: Ascii
Features: Loopback
Diagnostic Features: Local
Distribution Method: OEM
Price: $1,900
Date First Installed: 1979
Number Installed to Date: Under 100
(See Vendor Profile Page V-16)

INTERLAN, INC.
NTS-10 TERMINAL SAVER
Multiplexer Class: Statistical
Input Interface: RS-232C
Transmission Mode: Half-Duplex, Full-Duplex
Input Transmission Rates: Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps, 19,200 bps
Aggregate Transmission Rate: 384 bps
Output Transmission Mode: Half-Duplex, Full-Duplex
Output Line Transmission Rates: Asynchronous - 10K bps
Communications Protocols: XNS
Features: Automatic Speed Detection (Autobaud), Downline Loading (On-Line Reconfiguration), Automatic Repeat Request, Flyback Buffering Delay, Polling, Port Contention, Switching, Flow Control, Network Monitor
Diagnostic Features: Remote, Local
Distribution Method: End user
Price: $400
Date First Installed: September 1983
Number Installed to Date: Under 100
(See Vendor Profile Page V-16)

INTER-LINK
LN-1000
Multiplexer Class: Statistical
Input Interface: RS-232C, CCITT V.24/V.28
Maximum Input Channels:
Synchronous: 8
Transmission Mode: Half-Duplex, Full-Duplex, Echoplex
Input Transmission Rates: Asynchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps
Aggregate Transmission Rate: 80 bps
Maximum Output Lines:
Asynchronous: 1
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Asynchronous - 2,400 bps, 4,800 bps, 9,600 bps
Communications Protocols: HDLC Proprietary
Features: Automatic Speed Detection (Autobaud), Data Compression, Protocol Conversion, Automatic Repeat Request, Port Contention, Flow Control
Diagnostic Features: Remote, Local
Distribution Method: Third-party
Price: $995 to $1,535
Date First Installed: 1982
Number Installed to Date: Under 100
(See Vendor Profile Page V-16)

INTER-LINK
LN-2000
Multiplexer Class: Statistical
Input Interface: RS-232C, CCITT V.24/V.28
Maximum Input Channels:
Synchronous: 8
Transmission Mode: Half-Duplex, Full-Duplex, Echoplex
Input Transmission Rates: Asynchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps
Aggregate Transmission Rate: 80 bps
Maximum Output Lines:
Asynchronous: 1
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Synchronous - 2,400 bps, 4,800 bps, 9,600 bps
Communications Protocols: CCITT X.25 (Level 3)
Features: Automatic Speed Detection (Autobaud), Data Compression, Protocol Conversion, Automatic Repeat Request, Port Contention, Flow Control

Diagnostic Features: Remote, Local
Distribution Method: Third-party
Price: $1,895 to $2,695
Date First Installed: September 1982
Number Installed to Date: Under 100

INTER-LINK
LN-4000
Multiplexer Class: Statistical
Input Interface: RS-232C, CCITT V.24/V.28
Maximum Input Channels:
Synchronous: 8
Transmission Mode: Half-Duplex, Full-Duplex, Echoplex
Input Transmission Rates: Asynchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps
Aggregate Transmission Rate: 80 bps
Maximum Output Lines:
Asynchronous: 1
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Synchronous - 2,400 bps, 4,800 bps, 9,600 bps
Communications Protocols: CCITT X.25 (Level 3)
Features: Automatic Speed Detection (Autobaud), Data Compression, Protocol Conversion, Downline Loading (On-Line Reconfiguration), Automatic Repeat Request, Port Contention, Operational and Statistical Reports, Flow Control
Diagnostic Features: Remote, Local
Distribution Method: Third-party
Price: $2,995 to $3,995
Date First Installed: September 1982
Number Installed to Date: Under 100

INTERSIL SYSTEMS, INC.
5300
Multiplexer Class: TDM
Input Interface: RS-232C
Maximum Input Channels:
Synchronous: 16
Transmission Mode: Full-Duplex
Aggregate Transmission Rate: 368 bps
Maximum Output Lines:
Asynchronous: 2
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Synchronous - 9,600 bps
Communications Protocols: Ascii
Features: Automatic Speed Detection (Autobaud), Data Compression, Automatic Repeat Request, Flyback Buffering Delay, Port Contention, Operational and Statistical Reports, Flow Control, Programmable
Diagnostic Features: Remote, Local
Distribution Method: Third-party
Price: $1,500 to $2,250
Date First Installed: January 1982
Number Installed to Date: Under 100
(See Vendor Profile Page V-17)

ITT TELECOM PRODUCTS, INC.
D424
Multiplexer Class: TDM
Input Interface: RS-232C, RS-449
Maximum Input Channels:
Synchronous: 24
Asynchronous: 24
Transmission Mode: Full-Duplex
Input Transmission Rates: Asynchronous/Synchronous - 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps, 19,200 bps, 56K bps
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Asynchronous/Synchronous - 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps, 19,200 bps, 56K bps, T-1
Communications Protocols: HDLC (CCITT X.25 Level 2), SDLC, CCITT X.25 (Level 3), BSC, Ascii, Transparent
Diagnostic Features: No
Distribution Method: End user
Price: $5,000 - $50,000
Date First Installed: 1982
Number Installed to Date: 500 - 1,000
(See Vendor Profile Page V-17)

LEE SYSTEMS, INC.
407 SYSTEM
Multiplexer Class: TDM
Input Interface: RS-232C
Maximum Input Channels:
Synchronous: 7
Asynchronous: 7
Transmission Mode: Full-Duplex
Input Transmission Rates: Asynchronous - 2,400 bps; Synchronous - 9,600 bps
Aggregate Transmission Rate: 672 bps
Maximum Output Lines:
Asynchronous: 1
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Asynchronous/Synchronous - 76,800 bps
Communications Protocols: Transparent, Infra Red
Features: Switching, Network Monitor
Diagnostic Features: Local
Distribution Method: Third-party
Price: $13,550
Number Installed to Date: Under 100
(See Vendor Profile Page V-18)

M/A-COM LINKABIT, INC.
MX 24
Multiplexer Class: TDM
Input Interface: RS-232C
Maximum Input Channels:
Synchronous: 24
Transmission Mode: Full-Duplex
Input Transmission Rates: Asynchronous - 19,200 bps
Aggregate Transmission Rate: 15,400 bps
Maximum Output Lines:
Synchronous: 1
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Asynchronous - T-1
Communications Protocols: Asynchronous
Features: Automatic Speed Detection (Autobaud)
Distribution Method: End user
Price: $2,700 to $5,000
Date First Installed: May 1982
Number Installed to Date: 100 - 500
(See Vendor Profile Page V-18)

M/A-COM LINKABIT, INC.
MX 48
Multiplexer Class: TDM
Input Interface: RS-232C
Maximum Input Channels:
Synchronous: 48
Transmission Mode: Full-Duplex
Input Transmission Rates: Asynchronous - 19,200 bps
Maximum Output Lines:
Synchronous: 2
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Asynchronous - 2 T-1 Lines
Communications Protocols: Asynchronous
Features: Automatic Speed Detection (Autobaud)
Diagnostic Features: No
Distribution Method: End user
Price: $5,600
Date First Installed: May 1982

MANAGE, INC.
MUX-8
Multiplexer Class: Fiber-Optic
Input Interface: RS-232C
Maximum Input Channels:
Synchronous: 8
Transmission Mode: Full-Duplex
Input Transmission Rates: Asynchronous - to 19,200 bps
Aggregate Transmission Rate: 1,536 bps
Maximum Output Lines:
Synchronous: 8
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Asynchronous - 625,000 bps
Communications Protocols: HDLC (CCITT X.205 Level 2), SDLC, CCITT X.25 (Level 3), BSC, Ascii
Diagnostic Features: No
Distribution Method: End user
Date First Installed: November 1983
Number Installed to Date: Under 100
(See Vendor Profile Page V-18)

MEGADATA CORP.
SM5/X INTERFACE-A
Multiplexer Class: Network Concentrator
Input Interface: RS-232C
Maximum Input Channels:
Synchronous: 4
Transmission Mode: Full-Duplex
Input Transmission Rates: Asynchronous - 50 bps, 19,200 bps
Maximum Output Lines:
Synchronous: 4
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Asynchronous - 14,400 bps
Communications Protocols: Ascii
Features: Data Compression, Protocol Conversion, Downline Loading (On-Line Reconfiguration), Polling, Port Contention, Programmable, Network Monitor
Diagnostic Features: Remote, Local
Distribution Method: End user
Price: $1,500
Date First Installed: September 1983
Number Installed to Date: Under 100
(See Vendor Profile Page V-18)

MEGADATA CORP.
SM5/X INTERFACE-S
Multiplexer Class: Network Concentrator
Input Interface: RS-232C
Maximum Input Channels:
Asynchronous: 4
Transmission Mode: Full-Duplex
Input Transmission Rates: Synchronous - 50 bps, 19,200 bps
Maximum Output Lines:
Asynchronous: 4
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Synchronous - 14,400 bps
Communications Protocols: BSC
Features: Data Compression, Protocol Conversion, Downline Loading (On-Line Reconfiguration), Polling, Port Contention, Programmable, Network Monitor
Diagnostic Features: Remote, Local
Distribution Method: End user
Price: $1,500
Date First Installed: 1982
Number Installed to Date: Under 100

MICOM SYSTEMS, INC.
INSTALINK400 MODEL M401
Multiplexer Class: FDM
Input Interface: RS-232C, CCITT V.24/V.28
Maximum Input Channels:
Synchronous: 1
Transmission Mode: Half-Duplex, Full-Duplex
Input Transmission Rates: Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps, 19,200 bps
Aggregate Transmission Rate: 192 bps
Maximum Output Lines:
Other: Modulated Signal
Output Transmission Mode: Full-Duplex
Features: Automatic Speed Detection (Autobaud)
Diagnostic Features: Local
Distribution Method: Third-party
Price: $550 to $575
Date First Installed: March 1983
Number Installed to Date: 500 - 1,000
(See Vendor Profile Page V-18)

MICOM SYSTEMS, INC.
MICRO 200 PORT CONCENTRATOR
Multiplexer Class: Statistical
Input Interface: RS-232C, CCITT V.24/V.28

Multiplexers

Maximum Input Channels:
Asynchronous: 1
Transmission Mode: Full-Duplex
Input Transmission Rates: Synchronous - 2,400 bps, 4,800 bps, 9,600 bps, 19,200 bps
Aggregate Transmission Rate: 576 bps
Maximum Output Lines:
Asynchronous: 8
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Synchronous - 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps
Features: Automatic Speed Detection (Autobaud), Data Compression, Downline Loading (On-Line Reconfiguration), Automatic Repeat Request, Flyback Buffering Delay, Port Contention, Switching, Operational and Statistical Reports, Flow Control, Network Monitor, Local Switching
Diagnostic Features: Remote, Local
Distribution Method: Third-party
Price: $2,550 to $3,250
Date First Installed: April 1983
Number Installed to Date: Under 100

MICOM SYSTEMS, INC.
MICRO 500 ERROR CONTROLLER
Multiplexer Class: Statistical
Input Interface: RS-232C, CCITT V.24/V.28
Maximum Input Channels:
Synchronous: 1
Transmission Mode: Half-Duplex, Full-Duplex
Input Transmission Rates: Asynchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 1,200/75 Asymmetrical
Aggregate Transmission Rate: 96 bps
Maximum Output Lines:
Synchronous: 1
Asynchronous: 1
Output Transmission Mode: Half-Duplex, Full-Duplex
Output Line Transmission Rates: Asynchronous - Up to 9,600 bps
Features: Data Compression, Protocol Conversion, Automatic Repeat Request, Flyback Buffering Delay, Flow Control, Asynchronous/Synchronous and Full- and Half Duplex Conversion
Diagnostic Features: Remote, Local
Price: $795
Date First Installed: April 1978
Number Installed to Date: 500 - 1,000

MICOM SYSTEMS, INC.
MICRO 900/2 DATA CONCENTRATOR
Multiplexer Class: Statistical
Input Interface: RS-232C, CCITT V.24/V.28
Maximum Input Channels:
Synchronous: 16
Asynchronous: 4
Transmission Mode: Half-Duplex, Full-Duplex
Input Transmission Rates: Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,800 bps, 134.5M bps, 150M bps, 200M bps; Asynchronous/Synchronous - 1,200 bps, 2,400 bps, 4,800 bps, 9,600 bps
Aggregate Transmission Rate: 768 bps
Maximum Output Lines:
Synchronous: 1
Asynchronous: 1
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Asynchronous - 1,200 bps, 1,800 bps, 9,600 bps; Asynchronous/Synchronous - Up to 19,200 bps
Features: Automatic Speed Detection (Autobaud), Data Compression, Downline Loading (On-Line Reconfiguration), Automatic Repeat Request, Flyback Buffering Delay, Operational and Statistical Reports, Flow Control, Command Port
Diagnostic Features: Remote, Local
Distribution Method: Third-party
Price: $1,050 to $4,600
Date First Installed: January 1978
Number Installed to Date: 10,000 - 50,000

MICOM SYSTEMS, INC.
MICRO 900/X25
Multiplexer Class: Statistical
Input Interface: RS-232C, CCITT V.24/V.28
Maximum Input Channels:
Synchronous: 24
Asynchronous: 8
Transmission Mode: Half-Duplex, Full-Duplex, Echoplex
Input Transmission Rates: Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,800 bps; Asynchronous/Synchronous - 1,200 bps, 2,400 bps, 4,800 bps
Aggregate Transmission Rate: 768 bps
Maximum Output Lines:
Asynchronous: 1
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Synchronous - 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps
Communications Protocols: CCITT X.25 (Level-3)
Features: Automatic Speed Detection (Autobaud), Protocol Conversion, Downline Loading (On-Line Reconfiguration), Automatic Repeat Request, Port Contention, Switching, Operational and Statistical Reports, Flow Control, Programmable, Network Monitor
Diagnostic Features: Remote, Local
Distribution Method: End user, OEM, Third-party
Price: $2,050 to $4,600
Date First Installed: November 1982

MICOM SYSTEMS, INC.
MICRO 900/2 MULTIDROP CONCENTRATOR
Multiplexer Class: Statistical
Input Interface: RS-232C, CCITT V.24/V.28
Transmission Mode: Half-Duplex, Full-Duplex
Input Transmission Rates: Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps; Asynchronous/Synchronous - 134.5M bps, 150M bps, 200M bps
Aggregate Transmission Rate: 768 bps
Maximum Output Lines:
Synchronous: 1
Asynchronous: 1
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Asynchronous/Synchronous - Up to 9,600 bps
Features: Automatic Speed Detection (Autobaud), Data Compression, Downline Loading (On-Line Reconfiguration), Automatic Repeat Request, Flyback Buffering Delay, Polling, Operational and Statistical Reports, Flow Control, Network Monitor, Command Port, Battery Backup
Diagnostic Features: Remote, Local
Price: $900 to $4,600
Number Installed to Date: 500 - 1,000

MICOM SYSTEMS, INC.
MICRO 5000 INTELLIGENT MODEM
Multiplexer Class: Statistical
Input Interface: RS-232C, CCITT V.24/V.28
Transmission Mode: Half-Duplex, Full-Duplex
Input Transmission Rates: Asynchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps
Aggregate Transmission Rate: 96 bps
Maximum Output Lines:
Synchronous: 1
Asynchronous: 1
Output Transmission Mode: Half-Duplex, Full-Duplex
Output Line Transmission Rates: Asynchronous - 1,200 bps, 1,800 bps, 2,400 bps; Synchronous - 110 bps, 300 bps, 600 bps
Features: Data Compression, Protocol Conversion, Automatic Repeat Request, Flyback Buffering Delay, Flow Control, Asynchronous/Synchronous and Full- and Half-Duplex Conversion
Diagnostic Features: Remote, Local
Price: $1,500 to $3,400
Date First Installed: April 1978
Number Installed to Date: 500 - 1,000

MICOM SYSTEMS, INC.
MICRO 9000 CONCENTRATOR MODEM
Multiplexer Class: Statistical
Input Interface: RS-232C, CCITT V.24/V.28
Transmission Mode: Half-Duplex, Echoplex
Input Transmission Rates: Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,800 bps, 134.5M bps, 150M bps, 200M bps; Asynchronous/Synchronous - 1,200 bps, 2,400 bps, 4,800 bps, 9,600 bps
Aggregate Transmission Rate: 768 bps
Maximum Output Lines:
Synchronous: 1
Asynchronous: 1
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Asynchronous - 1,200 bps, 1,800 bps, 9,600 bps; Asynchronous/Synchronous - Up to 19,200 bps
Features: Automatic Speed Detection (Autobaud), Data Compression, Downline Loading (On-Line Reconfiguration), Automatic Repeat Request, Flyback Buffering delay, Operational and Statistical Reports, Flow Control
Diagnostic Features: Local
Distribution Method: Third-party
Price: $1,650 to $7,200
Date First Installed: January 1978
Number Installed to Date: 10,000 - 50,000

MICOM SYSTEMS, INC.
INSTAMUX470 MDL M474 OR 478
Multiplexer Class: TDM
Input Interface: RS-232C, CCITT V.24/V.28
Maximum Input Channels:
Synchronous: 8
Transmission Mode: Half-Duplex, Full-Duplex
Input Transmission Rates: Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps, 19,200 bps
Aggregate Transmission Rate: 1,536 bps
Maximum Output Lines:
Asynchronous: 1
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Asynchronous - 820M bps
Communications Protocols: Bit Sampled
Features: Automatic Speed Detection (Autobaud)
Diagnostic Features: Local
Distribution Method: Third-party
Price: $695 to $1,050
Date First Installed: October 1982
Number Installed to Date: 500 - 1,000

MICOM SYSTEMS, INC.
INSTATRUNK480 MODEL M481
Multiplexer Class: TDM
Input Interface: RS-232C, CCITT V.24/V.28
Maximum Input Channels:
Synchronous: 128
Transmission Mode: Full-Duplex
Input Transmission Rates: Asynchronous - 50 bps, 75 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps, 19,200 bps
Aggregate Transmission Rate: 12,288 bps

Maximum Output Lines:
Asynchronous: 1
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Asynchronous - T-1
Communications Protocols: Bit Interleaved
Features: Automatic Speed Detection (Autobaud), Downline Loading (On-Line Reconfiguration)
Diagnostic Features: Remote, Local
Distribution Method: Third-party
Price: $3,200 to $12,600
Date First Installed: November 1983
Number Installed to Date: Under 100

MICOM SYSTEMS, INC.
M4096/4+
Multiplexer Class: TDM
Input Interface: RS-232C, CCITT V.24/V.28
Maximum Input Channels:
Asynchronous: 4
Transmission Mode: Half-Duplex, Full-Duplex
Input Transmission Rates: Synchronous - 2,400 bps, 4,800 bps, 7,200 bps, 9,600 bps
Maximum Output Lines:
Asynchronous: 1
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Synchronous - 4,800 bps, 9,600 bps
Communications Protocols: All Synchronous Protocols
Features: Downline Loading (On-Line Reconfiguration), Switched Carrier Simulation
Diagnostic Features: Remote, Local
Distribution Method: Third-party
Price: $3,695
Date First Installed: September 1983
Number Installed to Date: Under 100

MICOM SYSTEMS, INC.
MICRO100 LINE MULTIPLEXER
Multiplexer Class: TDM
Input Interface: RS-232C, CCITT V.35
Maximum Input Channels:
Asynchronous: 1
Transmission Mode: Full-Duplex
Input Transmission Rates: Synchronous - 19,200 bps; Asynchronous/Synchronous - Up to 57,600 bps
Aggregate Transmission Rate: 640 bps
Maximum Output Lines:
Asynchronous: 4
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Synchronous - 4,800 bps, 9,600 bps
Communications Protocols: Bit Interleaved
Features: Automatic Downspeed or Line Delete
Diagnostic Features: Remote, Local
Distribution Method: Third-party
Price: $4,300 to $6,400
Date First Installed: September 1979
Number Installed to Date: 100 - 500

MICOM SYSTEMS, INC.
MICRO700 MODEL M700
Multiplexer Class: TDM
Input Interface: RS-232C, CCITT V.24/V.28
Maximum Input Channels:
Asynchronous: 4
Transmission Mode: Full-Duplex
Input Transmission Rates: Synchronous - 1,200 bps, 2,400 bps, 4,800 bps
Aggregate Transmission Rate: 96 bps
Maximum Output Lines:
Asynchronous: 1
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Synchronous - 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps
Communications Protocols: Bit Interleaved
Features: Downline Loading (On-Line Reconfiguration)
Diagnostic Features: Remote, Local
Distribution Method: Third-party
Date First Installed: 1979
Number Installed to Date: 500 - 1,000

MICOM SYSTEMS, INC.
MICRO750 MODEL 1 OR 2
Multiplexer Class: TDM
Input Interface: RS-232C
Maximum Input Channels:
Asynchronous: 36
Transmission Mode: Full-Duplex
Input Transmission Rates: Synchronous - 1,200 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps, 19,200 bps; Asynchronous/Synchronous - Up to 259,600 bps
Output Line Transmission Rates: Synchronous - 9,600 bps, 14,400 bps, 19,200 bps, 56,000 bps; Asynchronous/Synchronous - Up to 300,000 bps
Communications Protocols: Bit Interleaved
Features: Downline Loading (On-Line Reconfiguration), Instantaneous Configuation Selection
Diagnostic Features: Remote, Local
Distribution Method: Third-party
Price: $2,500 to $10,000
Date First Installed: 1974
Number Installed to Date: 500 - 1,000

MICOM SYSTEMS, INC.
MICRO 800 CONCENTRATOR SWITCH
Multiplexer Class: Data Concentrator Switch
Input Interface: RS-232C, CCITT V.24/V.28
Maximum Input Channels:
Asynchronous: 8
Transmission Mode: Full-Duplex
Input Transmission Rates: Asynchronous - 1,200 bps, 1,800 bps, 9,600 bps; Asynchronous/Synchronous - Up to 19,200 bps
Maximum Output Lines:
Synchronous: 1
Asynchronous: 1
Output Transmission Mode: Half-Duplex, Full-Duplex
Output Line Transmission Rates: Asynchronous/Synchronous - 1,200 bps, 2,400 bps, 4,800 bps, 9,600 bps; Synchronous - 14,400 bps
Features: Automatic Speed Detection (Autobaud), Data Compression, Downline Loading (On-Line Reconfiguration), Automatic Repeat Request, Flyback Buffering Delay, Operational and Statistical Reports, Flow Control
Diagnostic Features: Remote, Local
Distribution Method: Third-party
Price: $1,400
Date First Installed: September 1979
Number Installed to Date: Under 100

MINNITRONICS CORP.
MZV-11/8 OCTOMUX
Multiplexer Class: TDM
Input Interface: RS-232C
Maximum Input Channels:
Synchronous: 8
Transmission Mode: Full-Duplex
Input Transmission Rates: Asynchronous - Up to 38.4K bps
Aggregate Transmission Rate: 3,072 bps
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Asynchronous - Up to 38.K bps
Features: Switching, Programmable
Diagnostic Features: Local
Distribution Method: End user, OEM, Third-party
Price: $1,300
Date First Installed: 1983
(See Vendor Profile Page V-20)

MITEL, INC.
MITEL DATA DEMULTIPLEXER
Multiplexer Class: Demultiplexer
Input Interface: RS-232C
Transmission Mode: Half-Duplex, Full-Duplex, Echoplex
Input Transmission Rates: Asynchronous - 300 bps, 1,200 bps
Maximum Output Lines:
Synchronous: 4
Output Transmission Mode: Half-Duplex, Full-Duplex, Echoplex
Output Line Transmission Rates: Asynchronous - 300 bps, 1,200 bps
Communications Protocols: Serial Data Link
Features: Switching, Programmable
Diagnostic Features: Local
Distribution Method: Third-party
Price: $850
Date First Installed: June 1982
Number Installed to Date: Under 100
(See Vendor Profile Page V-20)

MODULAR COMPUTER SYSTEMS, INC. (MODCOMP)
1807
Multiplexer Class: TDM
Input Interface: RS-232C, Current Loop V.35, WE301/303
Maximum Input Channels:
Synchronous: 256
Asynchronous: 256
Transmission Mode: Half-Duplex, Full-Duplex
Input Transmission Rates: Asynchronous/Synchronous - 50 bps to 250,000 bps
Aggregate Transmission Rate: 350 bps
Maximum Output Lines:
Synchronous: 256
Asynchronous: 256
Output Transmission Mode: Half-Duplex, Full-Duplex, Echoplex
Output Line Transmission Rates: Asynchronous/Synchronous - 50 bps to 250,000 bps
Communications Protocols: HDLC (CCITT X.205 Level 2), SDLC, CCITT X.25 (Level 3), BSC, Ascii, Mesnet
Features: Protocol Conversion, Downline Loading (On-Line Reconfiguration), Polling, Operational and Statistical Reports, Flow Control, Programmable, IBM 2/3780, IBM 3271
Diagnostic Features: Local
Distribution Method: End user
Price: $75,000
Date First Installed: April 1978
Number Installed to Date: 500 - 1,000
(See Vendor Profile Page V-20)

MULTI - TECH SYSTEMS, INC.
MULTI-MUX
Multiplexer Class: Statistical
Input Interface: RS-232C
Maximum Input Channels:
Synchronous: 8
Asynchronous: 1
Transmission Mode: Half-Duplex, Full-Duplex, Echoplex
Input Transmission Rates: Asynchronous/Synchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps
Aggregate Transmission Rate: 192 bps
Maximum Output Lines:
Asynchronous: 1
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Synchronous - 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps
Communications Protocols: HDLC (CCITT X.205 Level 2)
Features: Automatic Speed Detection (Autobaud), Data Compression, Downline Loading (On-Line Reconfiguration), Automatic Repeat Request, Polling, Flow Control, Programmable, Point to Point, Multipoint
Diagnostic Features: Remote, Local
Distribution Method: End user
Price: $1,295
Date First Installed: March 1983
(See Vendor Profile Page V-20)

MULTI TECHNOLOGY
RDS-1600
Multiplexer Class: Concentrator
Input Interface: RS-232C
Maximum Input Channels:
Synchronous: 16
Transmission Mode: Half-Duplex, Full-Duplex, Echoplex
Input Transmission Rates: Asynchronous - 300 bps, 600 bps,

1,200 bps, 4,800 bps, 9,600 bps
Aggregate Transmission Rate: 96 bps
Maximum Output Lines:
Synchronous: 19
Output Transmission Mode: Half-Duplex, Full-Duplex, Echoplex
Output Line Transmission Rates: Asynchronous - 300 bps, 600 bps, 1,200 bps, 4,800 bps, 9,600 bps
Communications Protocols: Variable Link CRC16
Features: Downline Loading (On-Line Reconfiguration), Automatic Repeat Request, Polling, Port Contention, Switching, Flow Control, Programmable
Diagnostic Features: Remote, Local
Distribution Method: OEM
Price: $5,000
Date First Installed: June 1978
Number Installed to Date: 100 - 500
(See Vendor Profile Page V-20)

MULTI TRONICS
SBR-700
Multiplexer Class: Concentrator
Input Interface: FSK Modem
Maximum Input Channels:
Synchronous: 1
Transmission Mode: Half-Duplex, Full-Duplex, Echoplex
Input Transmission Rates: Asynchronous - 1,200 bps
Aggregate Transmission Rate: 12 bps
Maximum Output Lines:
Synchronous: 1
Output Transmission Mode: Half-Duplex, Full-Duplex, Echoplex
Output Line Transmission Rates: Asynchronous - 1,200 bps
Communications Protocols: Variable Link CRC16
Features: Downline Loading (On-Line Reconfiguration), Automatic Repeat Request, Polling, Flow Control, Programmable
Distribution Method: End user
Price: $1,000
Date First Installed: June 1982
Number Installed to Date: 100 - 500

NETWORK PRODUCTS, INC.
BABY MUX
Multiplexer Class: Statistical
Input Interface: RS-232C, CCITT V.24/V.28
Maximum Input Channels:
Synchronous: 19,200
Transmission Mode: Full-Duplex
Input Transmission Rates: Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps, 19,200 bps, 134.5M bps
Aggregate Transmission Rate: 384 bps
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Asynchronous/Synchronous - 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps
Communications Protocols: HDLC (CCITT X.205 Level-2)
Features: Data Compression, Downline Loading (On-Line Reconfiguration), Automatic Repeat Request, Flow Control, Programmable
Diagnostic Features: Remote, Local
Distribution Method: Third-party
Price: $1,350 to $2,300
Date First Installed: April 1982
Number Installed to Date: 500 - 1,000
(See Vendor Profile Page V-21)

NETWORK PRODUCTS, INC.
BABY NET
Multiplexer Class: Statistical
Input Interface: RS-232C, CCITT V.24/V.28
Transmission Mode: Full-Duplex
Input Transmission Rates: Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps
Aggregate Transmission Rate: 384 bps
Maximum Output Lines:
Asynchronous: 1
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Synchronous - 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps
Communications Protocols: HDLC (CCITT X.205 Level 2)
Features: Automatic Speed Detection (Autobaud), Data Compression, Downline Loading (On-Line Reconfiguration), Automatic Repeat Request, Polling, Port Contention, Switching, Operational, Statistical Reports, Flow Control, Programmable, Network Monitor
Diagnostic Features: Remote, Local
Distribution Method: Third-party
Price: $1,450 to $2,400
Date First Installed: December 1982
Number Installed to Date: 100 - 500

NETWORK PRODUCTS, INC.
LOCAL MUX
Multiplexer Class: TDM
Input Interface: RS-232C
Maximum Input Channels:
Synchronous: 8
Asynchronous: 8
Transmission Mode: Full-Duplex
Input Transmission Rates: Asynchronous/Synchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps, 19,200 bps, 38,400 bps
Aggregate Transmission Rate: 3,072 bps
Maximum Output Lines:
Other: 1
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Asynchronous/Synchronous - 937,500 bps
Features: Automatic Speed Detection (Autobaud), Transparent
Diagnostic Features: Remote, Local
Distribution Method: Third-party
Price: $850
Date First Installed: April 1983
Number Installed to Date: 500 - 1,000

NORTHERN TELECOM
COMM-MULTIPLEXER
Multiplexer Class: Concentrator
Input Interface: RS-232C
Maximum Input Channels:
Synchronous: 8
Asynchronous: 8
Transmission Mode: Full-Duplex
Input Transmission Rates: Asynchronous/Synchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps; Synchronous - 19,200 bps
Aggregate Transmission Rate: 96 bps
Maximum Output Lines:
Synchronous: 1
Asynchronous: 1
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Asynchronous/Synchronous - 1,200 bps, 2,400 bps, 4,800 bps, 9,600 bps; Synchronous - 14,400 bps
Communications Protocols: HDLC (CCITT X.205 Level 2), SDLC, CCITT X.25 (Level 3), BSC
Features: Automatic Speed Detection (Autobaud), Protocol Conversion, Downline Loading (On-Line Reconfiguration), Automatic Repeat Request, Polling, Programmable, Network Monitor, Auto Dialup
Diagnostic Features: Remote, Local
Distribution Method: End user
Price: $2,000
(See Vendor Profile Page V-22)

OPTELECOM, INC.
4481
Multiplexer Class: Fiber-Optic TDM
Input Interface: RS-232C
Maximum Input Channels:
Synchronous: 4
Asynchronous: 4
Transmission Mode: Full-Duplex
Input Transmission Rates: Synchronous - Up to 153, 000 bps; Asynchronous - 100,000 bps
Aggregate Transmission Rate: 98,000 bps
Maximum Output Lines:
Other: 1 Aggregate Output Line
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Asynchronous - 9.8K bps
Communications Protocols: Optical Intensity Modular Signal
Diagnostic Features: Remote
Distribution Method: End user, OEM
Price: $1,100
Date First Installed: March 1983
Number Installed to Date: 50
(See Vendor Profile Page V-22)

OPTELECOM, INC.
5100-8
Multiplexer Class: TDM
Input Interface: RS-232C
Maximum Input Channels:
Synchronous: 4
Asynchronous: 8
Transmission Mode: Full-Duplex
Input Transmission Rates: Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,800 bps, 3,600 bps, 7,200 bps; Asynchronous/Synchronous - 38.4K bps, 1,200 bps, 2,400 bps, 4,800 bps, 9,600 bps, 19,200 bps
Aggregate Transmission Rate: 1.2K bps
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Optical - 9,000 bps
Communications Protocols: All RS-232
Diagnostic Features: Remote
Distribution Method: End user, OEM
Price: $6,000
Date First Installed: February 1982
Number Installed to Date: 100

PARADYNE CORP.
DCX-615
Multiplexer Class: Statistical
Input Interface: RS-232C, CCITT V.24/V.28
Maximum Input Channels:
Synchronous: 8
Asynchronous: 8
Transmission Mode: Full-Duplex
Input Transmission Rates: Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps
Output Line Transmission Rates: Synchronous - 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps, 19,200 bps
Communications Protocols: HDLC (CCITT X.205 Level [illegible]
Features: Automatic Speed Detection (Autobaud), Downline Loading (On-Line Reconfiguration)
Diagnostic Features: Remote, Local
Price: $1,690 to $2,180
Date First Installed: 1982
Number Installed to Date: 500 - 1,000
(See Vendor Profile Page V-23)

PARADYNE CORP.
DCX-625
Multiplexer Class: Statistical
Input Interface: RS-232C, CCITT V.24/V.28, CCITT V23 V28
Maximum Input Channels:
Synchronous: 32
Input Transmission Rates: Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps
Output Line Transmission Rates: Synchronous - 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps, 19,200 bps
Communications Protocols: HDLC (CCITT X.205 Level 2)
Features: Automatic Speed Detection (Autobaud), Downline Loading (On-Line Reconfiguration)
Diagnostic Features: Remote, Local
Price: $3,200 to $7,200
Date First Installed: September 1982
Number Installed to Date: 1,000

PARADYNE CORP.
DCX-648
Multiplexer Class: Statistical
Input Interface: V.35

Input Transmission Rates:
Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps
Output Line Transmission Rates:
Synchronous - 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps, 19,200 bps, 56,000 bps; Asynchronous/Synchronous - 72,000 bps
Communications Protocols: HDLC (CCITT X.205 Level 2)
Features: Automatic Speed Detection (Autobaud), Downline Loading (On-Line Reconfiguration)
Diagnostic Features: Remote, Local
Price: $10,000 to $85,000
Date First Installed: 1982
Number Installed to Date: Under 100

PARADYNE CORP.
DCX-850
Multiplexer Class: Statistical
Input Interface: CCITT V.24/V.28, V.35
Maximum Input Channels:
Synchronous: 240
Input Transmission Rates:
Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps
Output Line Transmission Rates:
Synchronous - 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps, 19,200 bps, 56,000 bps; Asynchronous/Synchronous - 72,000 bps
Communications Protocols: HDLC (CCITT X.205 Level 2)
Features: Automatic Speed Detection (Autobaud), Downline Loading (On-Line Reconfiguration)
Diagnostic Features: Remote, Local
Price: $15,000 to $100,000
Date First Installed: 1982
Number Installed to Date: Under 100

PARADYNE CORP.
DCX-851
Multiplexer Class: Statistical
Input Interface: CCITT V.24/V.28
Maximum Input Channels:
Synchronous: 8
Input Transmission Rates:
Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps
Output Line Transmission Rates:
Synchronous - 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps
Communications Protocols: HDLC
Features: Automatic Speed Detection (Autobaud), Downline Loading (On-Line Reconfiguration)
Diagnostic Features: Remote, Local
Price: $2,900 to $3,300
Date First Installed: 1982

PARADYNE CORP.
DCX-871
Multiplexer Class: Statistical
Input Interface: CCITT V.24/V.28
Maximum Input Channels:
Synchronous: 32
Input Transmission Rates:
Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps
Output Line Transmission Rates:
Synchronous - 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps
Communications Protocols: HDLC (CCITT X.205 Level [illegible])
Features: Automatic Speed Detection (Autobaud), Downline Loading (On-Line Reconfiguration)
Diagnostic Features: Remote, Local
Price: $4,500 to $8,800
Number Installed to Date: 100 - 500

PARADYNE CORP.
MP-14.4 SM
Multiplexer Class: Statistical
Input Interface: RS-232C, CCITT V.24/V.28
Maximum Input Channels:
Synchronous: 16
Input Transmission Rates:
Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps; Asynchronous/Synchronous - 1,200 to 12,000 bps
Output Line Transmission Rates:
Synchronous - 19,200 bps
Features: Automatic Speed Detection (Autobaud)
Price: $14,975
Date First Installed: 1983

PARADYNE CORP.
DCX-T1
Multiplexer Class: TDM
Input Interface: CCITT V.35, 551A, 6-Wire
Maximum Input Channels:
Synchronous: 48
Input Transmission Rates:
Asynchronous - 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps, 19,200 bps, 44,800 bps
Output Line Transmission Rates:
Synchronous - 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps, 19,200 bps, 56,000 bps, T-1; Asynchronous/Synchronous - 1.5M bps
Features: Downline Loading (On-Line Reconfiguration)
Price: $8,000 to $27,000
Date First Installed: 1983

PARADYNE CORP.
DCX-725
Multiplexer Class: TDM
Input Interface: RS-232C, CCITT V.24/V.28
Maximum Input Channels:
Asynchronous: 4
Transmission Mode: Full-Duplex
Input Transmission Rates:
Synchronous - 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps
Aggregate Transmission Rate: 192 bps
Maximum Output Lines:
Asynchronous: 1
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates:
Synchronous - 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps, 19,200 bps
Communications Protocols: HDLC (CCITT X.205 Level 2), SDLC, CCITT X.25 (Level 3)
Features: Automatic Speed Detection (Autobaud), Downline Loading (On-Line Reconfiguration), Automatic Repeat Request, Flyback Buffering Delay, Flow Control
Diagnostic Features: Remote, Local
Distribution Method: End user
Price: $4,000
Date First Installed: 1982
Number Installed to Date: Under 100

PERIPHONICS CORP.
VOICEPACK
Multiplexer Class: Voice Multiplexer and Front End Processor
Input Interface: RS-232C, CCITT V.24/V.28, MIL 188C, Custom Protocols
Maximum Input Channels:
Synchronous: 100
Asynchronous: 100
Transmission Mode: Half-Duplex, Full-Duplex
Input Transmission Rates:
Asynchronous - 300 bps, 1,200 bps
Maximum Output Lines:
Other: Configuration Dependent
Output Transmission Mode: Half-Duplex, Full-Duplex
Features: Data Compression, Protocol Conversion, Downline Loading (On-Line Reconfiguration), Automatic Repeat Request, Flyback Buffering Delay, Polling, Port Contention, Switching, Operational and Statistical Reports, Flow Control, Network Monitor, Voice/Data Front End Peripherals
Diagnostic Features: Remote
Distribution Method: End user, OEM
Price: $20,000
Date First Installed: January 1974
Number Installed to Date: Under 100
(See Vendor Profile Page V-23)

PERIPHONICS CORP.
T-COMM
Multiplexer Class: Voice Multiplexer
Input Interface: RS-232C, CCITT V.24/V.28, MIL 188C, Custom Protocols
Maximum Input Channels:
Synchronous: 416
Asynchronous: 416
Transmission Mode: Full-Duplex
Input Transmission Rates:
Asynchronous/Synchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps; Asynchronous - 19,200 bps
Maximum Output Lines:
Other: Dependent
Output Transmission Mode: Half-Duplex, Full-Duplex
Communications Protocols: Vendor Dependent
Features: Data Compression, Protocol Conversion, Downline Loading (On-Line Reconfiguration), Automatic Repeat Request, Polling, Port Contention, Switching, Operational and Statistical Reports, Flow Control, Programmable, Network Monitor
Diagnostic Features: Remote
Distribution Method: End user, OEM
Price: $35,000
Date First Installed: January 1970
Number Installed to Date: 100 - 500

PERIPHONICS CORP.
VOICE STAR
Multiplexer Class: Voice Multiplexer and Front End Processor
Input Interface: RS-232C, CCITT V.24/V.28, MIL 188C, Custom Protocols
Maximum Input Channels:
Synchronous: 416
Asynchronous: 416
Transmission Mode: Full-Duplex
Input Transmission Rates:
Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 3,600 bps, 7,200 bps, 19,200 bps; Asynchronous/Synchronous - 2,400 bps, 4,800 bps, 9,600 bps
Maximum Output Lines:
Other: Dependent
Output Transmission Mode: Half-Duplex, Full-Duplex
Communications Protocols: Vendor Dependent
Features: Data Compression, Protocol Conversion, Downline Loading (On-Line Reconfiguration), Automatic Repeat Request, Polling, Port Contention, Switching, Operational and Statistical Reports, Flow Control, Programmable, Network Monitor
Diagnostic Features: Remote
Distribution Method: End user, OEM
Price: $35,000
Date First Installed: January 1970
Number Installed to Date: 100 - 500

PHALO CORP.
MD-3200
Multiplexer Class: TDM
Input Interface: IBM 3274 Control Terminal
Transmission Mode: Half-Duplex
Input Transmission Rates:
Asynchronous/Synchronous - 2.36M bps
Maximum Output Lines:
Synchronous: 1
Features: 3274 Terminal to Controller
Diagnostic Features: Remote, Local
Distribution Method: End user, OEM
Price: $2,740 to $4,750
Date First Installed: April 1983
(See Vendor Profile Page V-23)

PHALO CORP.
MD-3208
Multiplexer Class: TDM
Input Interface: IBM 3274 Control Terminal
Transmission Mode: Half-Duplex
Input Transmission Rates:
Asynchronous/Synchronous - 2.36M bps
Maximum Output Lines:

Multiplexers

Other: 1 Optical or Coaxial
Output Transmission Mode: Half-Duplex
Output Line Transmission Rates: Asynchronous/Synchronous - Proprietary
Communications Protocols: IBM
Features: 3274 Terminal to Controller
Diagnostic Features: No
Distribution Method: End user, OEM
Price: $875
Date First Installed: September 1983

PHALO CORP.
OMX-1900
Multiplexer Class: TDM
Input Interface: RS-232C
Maximum Input Channels:
Synchronous: 24
Asynchronous: 8
Transmission Mode: Full-Duplex
Input Transmission Rates: Asynchronous/Synchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps, 19,200 bps
Aggregate Transmission Rate: 4,600 bps
Maximum Output Lines:
Other: Optical Link
Output Transmission Mode: Full-Duplex
Output Transmission Rate: 6.9M bps
Features: Speed and Protocol Transparent
Diagnostic Features: No
Distribution Method: End user
Price: $1,295
Date First Installed: July 1983

PHALO CORP.
OMX-1916
Multiplexer Class: TDM
Input Interface: RS-232C
Maximum Input Channels:
Synchronous: 48
Asynchronous: 16
Transmission Mode: Full-Duplex
Input Transmission Rates: Asynchronous/Synchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps, 19,200 bps
Aggregate Transmission Rate: 9,210 bps
Output Transmission Mode: Full-Duplex
Output Transmission Rate: 6.9M bps
Features: Speed and Protocol Transparent
Diagnostic Features: No
Distribution Method: End user
Price: $2,395
Date First Installed: July 1983

PHALO CORP.
OMX-5800
Multiplexer Class: TDM
Input Interface: RS-232C, MIL 188C, RS-449, V.35
Maximum Input Channels:
Synchronous: 64
Asynchronous: 64
Transmission Mode: Full-Duplex
Input Transmission Rates: Asynchronous/Synchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps, 19,200 bps
Aggregate Transmission Rate: 9,210 bps
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Asynchronous/Synchronous - 6M bps
Features: Protocol and Speed Transparent
Diagnostic Features: Local
Distribution Method: End user, OEM
Price: $6,000 to $18,800
Date First Installed: September 1982

PHALO CORP.
OMX-6600
Multiplexer Class: TDM
Input Interface: RS-232C, MIL 188C, RS-449, V.35
Maximum Input Channels:
Synchronous: 64
Asynchronous: 64
Transmission Mode: Full-Duplex
Input Transmission Rates: Asynchronous/Synchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps, 19,200 bps
Aggregate Transmission Rate: 5,000 bps
Maximum Output Lines:
Other: 2 Optical
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Asynchronous - 8M bps
Features: Protocol and Speed Transparent
Diagnostic Features: Remote, Local
Distribution Method: End user, OEM
Price: $3,300 to $16,000
Date First Installed: September 1982

PHILIPS ELECTRONIC INSTRUMENTS
FLEXPAC PAD
Input Interface: RS-232C, CCITT V.24/V.28
Maximum Input Channels:
Asynchronous: 15
Transmission Mode: Full-Duplex
Input Transmission Rates: Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 2,400 bps, 4,800 bps, 9,600 bps
Maximum Output Lines:
Synchronous: 1
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Synchronous - 1,200 bps, 2,400 bps, 4,800 bps, 9,600 bps, 19,200 bps
Communications Protocols: HDLC (CCITT X.25 Level 2), CCITT X.25 (Level 3)
Features: Automatic Speed Detection, Downline Loading (On-Line Reconfiguration), Port Contention, Switching, Operational and Statistical Reports, Flow Control, Programmable, Network Monitor
Diagnostic Features: Remote, Local
Distribution Method: End user, Third-party
Number Installed to Date: 500 - 1,000
(See Vendor Profile Page V-33)

PHOENIX DIGITAL CORP.
BABY KNET
Multiplexer Class: Statistical
Input Interface: RS-232C, CCITT V.24/V.28
Transmission Mode: Full-Duplex
Input Transmission Rates: Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps
Aggregate Transmission Rate: 1,152 bps
Maximum Output Lines:
Asynchronous: 1
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Synchronous - 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps
Communications Protocols: HDLC (CCITT X.205 Level-2)
Features: Automatic Speed Detection (Autobaud), Data Compression, Downline Loading (On-Line Reconfiguration), Automatic Repeat Request, Polling, Port Contention, Switching, Operational and Statistical Reports, Flow Control, Programmable, Network Monitor
Diagnostic Features: Remote, Local
Distribution Method: Third-party
Price: $1,450 to $2,400
Date First Installed: December 1982
Number Installed to Date: 100 - 500
(See Vendor Profile Page V-23)

PHOENIX DIGITAL CORP.
DPAC/PTX-1
Multiplexer Class: TDM
Input Interface: RS-232C, RS-422, CCITT V.24/V.28, 20 mA and 60 mA Current Loop, HDLC
Maximum Input Channels:
Synchronous: 16
Asynchronous: 16
Transmission Mode: Half-Duplex, Full-Duplex, Echoplex
Input Transmission Rates: Synchronous - 50 bps, 75 bps; Asynchronous/Synchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps, 19,200 bps
Aggregate Transmission Rate: 10,000 bps
Maximum Output Lines:
Synchronous: 16
Asynchronous: 16
Output Transmission Mode: Half-Duplex, Full-Duplex, Echoplex
Output Line Transmission Rates: Synchronous - 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps, 19,200 bps, 56,000 bps
Communications Protocols: HDLC (CCITT X.205 Level 2), SDLC, CCITT X.25 (Level 3), Ascii, Optonet
Features: Data Compression, Protocol Conversion, Downline Loading (On-Line Reconfiguration), Automatic Repeat Request, Flyback Buffering Delay, Polling, Port Contention, Switching, Operational and Statistical Reports, Flow Control, Programmable, Network Monitor
Diagnostic Features: Remote, Local
Distribution Method: OEM
Price: $5,000 to $9,000
Date First Installed: June 1980
Number Installed to Date: Under 100

PHOENIX DIGITAL CORP.
DPAC-30
Multiplexer Class: TDM
Input Interface: RS-232C, RS-422, CCITT V.24/V.28, 20 mA and 60 mA Current Loop
Maximum Input Channels:
Synchronous: 16
Asynchronous: 16
Transmission Mode: Half-Duplex, Full-Duplex, Echoplex
Input Transmission Rates: Synchronous - 50 bps, 75 bps; Asynchronous/Synchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps, 19,200 bps
Aggregate Transmission Rate: 10,000 bps
Maximum Output Lines:
Synchronous: 16
Asynchronous: 16
Output Transmission Mode: Half-Duplex, Full-Duplex, Echoplex
Output Line Transmission Rates: Synchronous - 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps, 19,200 bps, 56,000 bps
Communications Protocols: HDLC (CCITT X.205 Level 2), SDLC, CCITT X.25 (Level 3), Ascii, Optonet
Features: Data Compression, Protocol Conversion, Downline Loading (On-Line Reconfiguration), Automatic Repeat Request, Flyback Buffering Delay, Port Contention, Switching, Operational and Statistical Reports, Flow Control, Programmable, Network Monitor
Diagnostic Features: Remote, Local
Distribution Method: OEM
Price: $7,000 to $12,000
Date First Installed: July 1982
Number Installed to Date: Under 100

PHOENIX DIGITAL CORP.
DPAC-30
Multiplexer Class: TDM
Input Interface: RS-232C, RS-422, CCITT V.24/V.28, 20 mA and 60 mA Current Loop
Maximum Input Channels:
Synchronous: 16
Asynchronous: 16
Transmission Mode: Half-Duplex, Full-Duplex, Echoplex
Input Transmission Rates: Synchronous - 50 bps, 75 bps; Asynchronous/Synchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps, 19,200 bps
Aggregate Transmission Rate: 10,000 bps
Maximum Output Lines:
Synchronous: 16
Asynchronous: 16
Output Transmission Mode: Half-Duplex, Full-Duplex, Echoplex
Output Line Transmission Rates: Synchronous - 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps, 19,200 bps, 56,000 bps
Communications Protocols: HDLC (CCITT X.205 Level 2), SDLC, CCITT X.25 (Level 3), Ascii, Optonet
Features: Data Compression, Protocol Conversion, Downline Loading (On-Line Reconfiguration), Automatic Repeat Request, Flyback Buffering Delay, Port Contention, Switching, Operational and Statistical Reports, Flow Control, Programmable, Network Monitor
Diagnostic Features: Remote, Local
Distribution Method: OEM
Price: $7,000 to $12,000
Date First Installed: July 1982
Number Installed to Date: Under 100

PRENTICE CORP.
SNP 1101
Multiplexer Class: Statistical
Input Interface: RS-232C
Maximum Input Channels:
Synchronous: 1
Transmission Mode: Full-Duplex
Input Transmission Rates: Asynchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 2,400 bps, 4,800 bps, 9,600 bps,
Aggregate Transmission Rate: 192 bps
Maximum Output Lines:
Asynchronous: 1

Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Synchronous - 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps
Communications Protocols: HDLC Modified
Features: Downline Loading (On-Line Reconfiguration), Automatic Repeat Request, Polling, Flow Control
Diagnostic Features: Remote
Distribution Method: Third-party
Price: $695
Date First Installed: April 1981
Number Installed to Date: 100 - 500
(See Vendor Profile Page V-24)

PRENTICE CORP.
SNP 1102
Multiplexer Class: Statistical
Input Interface: RS-232C, CCITT V.24/V.28
Maximum Input Channels:
Synchronous: 2
Transmission Mode: Full-Duplex
Input Transmission Rates: Asynchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 2,400 bps, 4,800 bps, 9,600 bps
Aggregate Transmission Rate: 192 bps
Maximum Output Lines:
Asynchronous: 1
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Synchronous - 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps; Asynchronous/Synchronous - 1,200 bps to 9,600 bps
Communications Protocols: Modified HDLC
Features: Downline Loading (On-Line Reconfiguration), Automatic Repeat Request, Polling, Flow Control
Diagnostic Features: Remote
Distribution Method: Third-party
Price: $695
Date First Installed: April 1981
Number Installed to Date: 100 - 500

PRENTICE CORP.
SNP 1104
Multiplexer Class: Statistical
Input Interface: RS-232C, CCITT V.24/V.28
Maximum Input Channels:
Synchronous: 4
Transmission Mode: Full-Duplex
Input Transmission Rates: Asynchronous - 110 bps, 150 bps, 300 bps, 600 bps, 1,200 bps, 2,400 bps, 4,800 bps, 9,600 bps
Aggregate Transmission Rate: 192 bps
Maximum Output Lines:
Asynchronous: 1
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Synchronous - 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps; Asynchronous/Synchronous - 1,200 bps to 9,600 bps
Communications Protocols: Modified HDLC
Features: Downline Loading (On-Line Reconfiguration), Automatic Repeat Request, Polling, Flow Control
Diagnostic Features: Remote, Local
Distribution Method: Third-party
Price: $1,295
Date First Installed: October 1981
Number Installed to Date: 500 - 1,000

PRENTICE CORP.
SNP 1208
Multiplexer Class: Statistical
Input Interface: RS-232C, CCITT V.24/V.28
Maximum Input Channels:
Synchronous: 8
Transmission Mode: Full-Duplex
Input Transmission Rates: Asynchronous - 110 bps, 150 bps, 300 bps, 600 bps, 1,200 bps, 2,400 bps, 4,800 bps, 9,600 bps
Maximum Output Lines:
Asynchronous: 1
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Synchronous - 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps; Asynchronous/Synchronous - 1,200 bps to 9,600 bps
Communications Protocols: Modified HDLC
Features: Automatic Speed Detection (Autobaud), Downline Loading (On-Line Reconfiguration), Automatic Repeat Request, Polling, Flow Control
Diagnostic Features: Remote, Local
Distribution Method: Third-party
Price: $1,495 to $2,295
Date First Installed: August 1982
Number Installed to Date: 100 - 500

PRENTICE CORP.
SNP 1209
Multiplexer Class: Statistical
Input Interface: RS-232C, CCITT V.24/V.28
Maximum Input Channels:
Synchronous: 8
Asynchronous: 1
Transmission Mode: Full-Duplex
Input Transmission Rates: Asynchronous - 110 bps, 150 bps, 300 bps; Asynchronous/Synchronous - 600 bps, 1,200 bps, 2,400 bps, 4,800 bps, 9,600 bps; Synchronous - 1,800 bps, 3,600 bps, 7,200 bps
Aggregate Transmission Rate: 192 bps
Maximum Output Lines:
Asynchronous: 1
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Synchronous - 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps; Asynchronous/Synchronous - 1,200 to 9,600 bps
Communications Protocols: Modified HDLC
Features: Automatic Speed Detection (Autobaud), Downline Loading (On-Line Reconfiguration), Automatic Repeat Request, Flow Control
Diagnostic Features: Remote, Local
Distribution Method: Third-party
Price: $2,095 to $2,795
Date First Installed: November 1983
Number Installed to Date: Under 100

RACAL-MILGO, INC.
OMNIMUX 80
Multiplexer Class: Statistical
Input Interface: RS-232C, CCITT V.24/V.28
Maximum Input Channels:
Synchronous: 8
Asynchronous: 4
Transmission Mode: Half-Duplex, Full-Duplex, Echoplex
Input Transmission Rates: Asynchronous/Synchronous - 50 bps to 9,600 bps
Aggregate Transmission Rate: 192 bps
Maximum Output Lines:
Asynchronous: 2
Output Transmission Mode: Half-Duplex, Full-Duplex, Echoplex
Output Line Transmission Rates: Asynchronous/Synchronous - Up to 19,200 bps
Communications Protocols: HDLC (CCITT X.205 Level 2), Modified Synchronous Input Protocol
Features: Downline Loading (On-Line Reconfiguration), Programmable, Network Monitor, Speed Conversion
Diagnostic Features: Remote, Local
Distribution Method: End user
(See Vendor Profile Page V-24)

RACAL-MILGO, INC.
OMNIMUX 36
Multiplexer Class: Statistical
Input Interface: RS-232C, CCITT V.24/V.28
Maximum Input Channels:
Synchronous: 8
Transmission Mode: Half-Duplex
Input Transmission Rates: Asynchronous - 50 bps, 75 bps, 110 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps
Aggregate Transmission Rate: 96 bps
Maximum Output Lines:
Synchronous: 8
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Asynchronous - 4,800 bps, 9,600 bps
Communications Protocols: HDLC (CCITT X.205 Level 2), Modified Half-Duplex
Features: Downline Loading (On-Line Reconfiguration), Network Monitor, Aggregate and Channel Loopback
Distribution Method: End user
Price: $1,800 to $2,600

RACAL-MILGO, INC.
OMNIMUX 40
Multiplexer Class: Statistical
Input Interface: RS-232C, CCITT V.24/V.28
Maximum Input Channels:
Synchronous: 8
Transmission Mode: Half-Duplex, Full-Duplex
Input Transmission Rates: Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 7,200 bps, 9,600 bps; 19,200 bps
Aggregate Transmission Rate: 96 bps
Maximum Output Lines:
Synchronous: 8
Output Transmission Mode: Half-Duplex, Full-Duplex, Echoplex
Output Line Transmission Rates: Asynchronous/Synchronous - Up to 9,600 bps
Communications Protocols: Modified HDLC (CCITT X.205 Level 2)
Features: Automatic Speed Detection (Autobaud), Flyback Buffering Delay, Programmable, Network Monitor, Autobaud and Flow Control Optional
Diagnostic Features: Remote, Local
Distribution Method: End user
Price: $1,800 to $2,600

RACAL-MILGO, INC.
OMNIMUX 160
Multiplexer Class: Statistical
Input Interface: RS-232C, CCITT V.24/V.28
Maximum Input Channels:
Synchronous: 8
Asynchronous: 16
Transmission Mode: Half-Duplex, Full-Duplex, Echoplex
Input Transmission Rates: Synchronous - 50 bps to 9,600 bps
Maximum Output Lines:
Asynchronous: 2
Output Transmission Mode: Half-Duplex, Full-Duplex, Echoplex
Output Line Transmission Rates: Asynchronous/Synchronous - Up to 19,200 bps
Communications Protocols: Modified HDLC (CCITT X.205 Level 2)
Features: Downline Loading (On-Line Reconfiguration), Flow Control, Programmable, Network Monitor
Diagnostic Features: Remote, Local
Distribution Method: End user

RACAL-MILGO, INC.
OMNIMUX 320
Multiplexer Class: Statistical
Input Interface: RS-232C, CCITT V.24/V.28
Maximum Input Channels:
Synchronous: 32
Asynchronous: 8
Transmission Mode: Half-Duplex, Full-Duplex, Echoplex
Input Transmission Rates: Synchronous - 50 to 9,600 bps
Aggregate Transmission Rate: 192 bps
Maximum Output Lines:
Asynchronous: 2
Output Line Transmission Rates: Asynchronous/Synchronous - Up to 19,200 bps
Communications Protocols: Modified HDLC (CCITT X.205 Level 2)
Features: Downline Loading (On-Line Reconfiguration), Flow Control, Programmable, Network Monitor

Diagnostic Features: Remote, Local

RACAL-VADIC
SCOTSMAN III
Multiplexer Class: Network Concentrator
Input Interface: RS-232C, CCITT V.24/V.28
Maximum Input Channels:
Synchronous: 4
Asynchronous: 4
Transmission Mode: Full-Duplex
Input Transmission Rates: Asynchronous - 75 bps, 110 bps, 300 bps, 600 bps, 9,600 bps; Asynchronous/Synchronous - 1,200 bps, 2,400 bps, 4,800 bps, 7,200 bps; Synchronous - 19,200 bps
Aggregate Transmission Rate: 192 bps
Output Line Transmission Rates: Asynchronous - 9,600 bps
Communications Protocols: HDLC (CCITT X.205 Level 2), SDLC, CCITT X.25 (Level 3), BSC, Ascii
Features: Data Compression, Protocol Conversion, Automatic Repeat Request, Flyback Buffering Delay, Operational and Statistical Reports, Network Monitor
Diagnostic Features: Remote, Local
Date First Installed: December 1983
Number Installed to Date: Under 100
(See Vendor Profile Page V-25)

RACAL-VADIC
SCOTSMAN I
Multiplexer Class: Statistical
Input Interface: RS-232C, CCITT V.24/V.28
Maximum Input Channels:
Synchronous: 8
Asynchronous: 8
Transmission Mode: Half-Duplex, Full-Duplex
Input Transmission Rates: Asynchronous - 50 bps, 75 bps, 110 bps, 150 bps, 300 bps, 600 bps; Asynchronous/Synchronous - 1,200 bps, 1,800 bps, 2,400 bps; 4,800 bps, 9,600 bps; Synchronous - 3,600 bps, 7,200 bps
Aggregate Transmission Rate: 96 bps
Output Transmission Mode: Echoplex
Features: Automatic Speed Detection (Autobaud), Downline Loading (On-Line Reconfiguration), Automatic Repeat Request, Flow Control
Distribution Method: End user
Price: $1,850
Date First Installed: July 1983
Number Installed to Date: Under 100

RACAL-VADIC
SCOTSMAN II
Multiplexer Class: Statistical
Input Interface: RS-232C, CCITT V.24/V.28
Maximum Input Channels:
Synchronous: 8
Asynchronous: 8
Transmission Mode: Half-Duplex, Full-Duplex
Input Transmission Rates: Asynchronous - 50 bps, 75 bps, 110 bps, 134 bps, 150 bps, 200 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps
Aggregate Transmission Rate: 768 bps
Maximum Output Lines:
Asynchronous: 1
Output Line Transmission Rates: Synchronous - 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps
Communications Protocols: Modified HDLC
Features: Automatic Speed Detection (Autobaud), Downline Loading (On-Line Reconfiguration), Automatic Repeat Request, Switching, Operational and Statistical Reports, Flow Control, Network Monitor
Diagnostic Features: Remote, Local
Distribution Method: End user
Price: $2,950 to $4,900
Number Installed to Date: Under 100

RAMSA ELECTRONICS
MODEL 1600
Multiplexer Class: TDM
Input Interface: RS-232C
Maximum Input Channels:
Synchronous: 16
Transmission Mode: Full-Duplex
Input Transmission Rates: Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps, 19,200 bps
Aggregate Transmission Rate: 3,072 bps
Maximum Output Lines:
Synchronous: 16
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Asynchronous - 14,400 bps
Communications Protocols: CCITT V.24
Features: Polling, Port Contention
Diagnostic Features: Local
Distribution Method: OEM
Price: $360 to $1,900
Date First Installed: January 1979
Number Installed to Date: Under 100
(See Vendor Profile Page V-25)

RAMSA ELECTRONICS
MODEL 2600
Multiplexer Class: TDM
Input Interface: RS-232C
Maximum Input Channels:
Synchronous: 16
Transmission Mode: Full-Duplex
Input Transmission Rates: Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps, 19,200 bps
Aggregate Transmission Rate: 3,072 bps
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Asynchronous - 14,400 bps
Communications Protocols: 20 mA Current Loop
Features: Polling, Port Contention, Parallel Print Port, Masterfly
Diagnostic Features: Local
Distribution Method: OEM
Price: $900 to $1,440
Date First Installed: January 1977
Number Installed to Date: 100 - 500

RIXON, INC.
DCX840 NETWORK MUX
Multiplexer Class: Network Concentrator
Input Interface: RS-232C, CCITT V.24/V.28
Maximum Input Channels:
Synchronous: 240
Input Transmission Rates: Asynchronous - 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps
Aggregate Transmission Rate: 384 bps
Maximum Output Lines:
Asynchronous: 15
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Synchronous - 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps, 19,200 bps, 56,000 bps; Asynchronous/Synchronous - 72,000 bps
Communications Protocols: HDLC (CCITT X.205 Level 2)
Features: Automatic Speed Detection (Autobaud), Downline Loading (On-Line Reconfiguration), Flyback Buffering Delay, Flow Control
Diagnostic Features: Local
(See Vendor Profile Page V-25)

RIXON, INC.
DCX850 SWITCHING MUX
Multiplexer Class: Network Concentrator
Input Interface: RS-232C, CCITT V.24/V.28
Maximum Input Channels:
Synchronous: 240
Transmission Mode: Half-Duplex, Full-Duplex, Echoplex
Input Transmission Rates: Asynchronous - 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps
Aggregate Transmission Rate: 384 bps
Maximum Output Lines:
Asynchronous: 14
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Synchronous - 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps, 19,200 bps, 56,000 bps; Asynchronous/Synchronous - 72,000 bps
Communications Protocols: HDLC (CCITT X.205 Level 2)
Features: Data Compression, Downline Loading (On-Line Reconfiguration), Flyback Buffering Delay, Port Contention, Switching, Flow Control
Diagnostic Features: Local
Price: $80,000

RIXON, INC.
COMMUX STATISTICAL MULTIPLEXER PLUS
Multiplexer Class: Statistical
Input Interface: RS-232C, CCITT V.24/V.28
Maximum Input Channels:
Synchronous: 8
Transmission Mode: Full-Duplex, Echoplex
Input Transmission Rates: Asynchronous - 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps
Aggregate Transmission Rate: 384 bps
Maximum Output Lines:
Asynchronous: 1
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Synchronous - 4,800 bps
Communications Protocols: HDLC (CCITT X.205 Level 2)
Features: Automatic Speed Detection (Autobaud), Flyback Buffering Delay
Diagnostic Features: Local
Distribution Method: End user

RIXON, INC.
DCX815 STATISTICAL MULTIPLEXER
Multiplexer Class: Statistical
Input Interface: RS-232C, CCITT V.24/V.28
Maximum Input Channels:
Synchronous: 8
Transmission Mode: Full-Duplex, Echoplex
Input Transmission Rates: Asynchronous - 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps
Aggregate Transmission Rate: 384 bps
Maximum Output Lines:
Asynchronous: 1
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Synchronous - 1,200 bps, 14,400 bps
Communications Protocols: HDLC (CCITT X.205 Level 2)
Features: Automatic Speed Detection (Autobaud), Data Compression, Flyback Buffering Delay, Buffer Overload Protection
Diagnostic Features: Local

RIXON, INC.
DCX825 STATISTICAL MULTIPLEXER
Multiplexer Class: Statistical
Input Interface: RS-232C
Maximum Input Channels:
Synchronous: 32
Asynchronous: 4
Transmission Mode: Full-Duplex
Input Transmission Rates: Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,800 bps, 3,600 bps; Asynchronous/Synchronous - 1,200

bps, 2,400 bps, 4,800 bps, 7,200 bps, 9,600 bps
Aggregate Transmission Rate: 768 bps
Maximum Output Lines:
Asynchronous: 1
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Synchronous - 1,200 bps, 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps; Asynchronous/Synchronous - 3,600 bps
Communications Protocols: HDLC (CCITT X.205 Level 2)
Features: Automatic Speed Detection (Autobaud), Flyback Buffering Delay
Diagnostic Features: Local

NIXON, INC.
DCX726 SYNCHRONOUS MULTIPLEXER
Multiplexer Class: TDM
Input Interface: RS-232C, CCITT V.24/V.28
Maximum Input Channels:
Synchronous: 4
Transmission Mode: Full-Duplex, Echoplex
Input Transmission Rates: Synchronous - 1,200 bps, 2,400 bps, 4,800 bps, 7,200 bps, 9,600 bps
Aggregate Transmission Rate: 192 bps
Maximum Output Lines:
Asynchronous: 1
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Synchronous - 4,800 bps, 9,600 bps, 14,400 bps, 19,200 bps; Asynchronous/Synchronous - 7,200 bps
Communications Protocols: HDLC

NIXON, INC.
DCX824 STATISTICAL MULTIPLEXER
Multiplexer Class: Statistical
Input Interface: RS-232C, CCITT V.24/V.28
Maximum Input Channels:
Synchronous: 60
Transmission Mode: Half-Duplex, Full-Duplex, Echoplex
Input Transmission Rates: Asynchronous - 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps
Aggregate Transmission Rate: 384 bps
Maximum Output Lines:
Asynchronous: 1
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Synchronous - 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps, 19,200 bps, 56,000 bps; Asynchronous/Synchronous - 72,000 bps
Communications Protocols: HDLC
Features: Automatic Speed Detection, Downline Loading (On-Line Reconfiguration), Flyback Buffering Delay, Flow Control
Diagnostic Features: Local

NIXON, INC.
DCX725 SYNCHRONOUS MULTIPLEXER
Multiplexer Class: TDM
Input Interface: RS-232C, CCITT V.24/V.28
Maximum Input Channels:
Asynchronous: 4
Transmission Mode: Full-Duplex, Echoplex
Input Transmission Rates: Synchronous - 1,200 bps, 2,400 bps, 4,800 bps, 7,200 bps, 9,600 bps
Aggregate Transmission Rate: 192 bps
Maximum Output Lines:
Asynchronous: 1
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Synchronous - 4,800 bps, 9,600 bps, 14,400 bps, 19,200 bps; Asynchronous/Synchronous - 7,200 bps
Communications Protocols: HDLC
Features: Data Compression, Switching
Diagnostic Features: Local

ROCKWELL INTERNATIONAL
DXM-2003
Multiplexer Class: TDM
Input Interface: DS1
Maximum Input Channels:
Asynchronous: 28
Transmission Mode: Full-Duplex
Input Transmission Rates: T-1
Aggregate Transmission Rate: 44.7M bps
Maximum Output Lines:
Asynchronous: 1
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: 44.7M bps
Communications Protocols: B3ZS
Features: Automatic Speed Detection (Autobaud), Programmable, 75 Watts of Power
Distribution Method: End user
Price: $18,000
Date First Installed: November 1983
Number Installed to Date: Under 500
(See Vendor Profile Page V-25)

SCITEC CORP.
CPX 25
Multiplexer Class: Statistical
Input Interface: RS-232C
Maximum Input Channels:
Synchronous: 32
Asynchronous: 32
Transmission Mode: Half-Duplex, Full-Duplex, Echoplex
Input Transmission Rates: Asynchronous/Synchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps; Asynchronous - 19,200 bps
Aggregate Transmission Rate: 768 bps
Maximum Output Lines:
Asynchronous: 2
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Synchronous - 2,400 bps, 56,000 bps
Communications Protocols: HDLC (CCITT X.205 Level 2)
Features: Automatic Speed Detection (Autobaud), Data Compression, Downline Loading (On-Line Reconfiguration), Automatic Repeat Request, Flyback Buffering Delay, Flow Control, Programmable
Diagnostic Features: Local
Distribution Method: End user, OEM
Price: $1,850 to $10,000
(See Vendor Profile Page V-26)

SCITEC CORP.
ILX
Multiplexer Class: Statistical
Input Interface: RS-232C
Maximum Input Channels:
Synchronous: 32
Asynchronous: 32
Transmission Mode: Half-Duplex, Full-Duplex, Echoplex
Input Transmission Rates: Asynchronous/Synchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps; Asynchronous - 19,200 bps
Aggregate Transmission Rate: 384 bps
Maximum Output Lines:
Asynchronous: 1
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Synchronous - 1,200 bps, 9,600 bps
Communications Protocols: HDLC (CCITT X.205 Level 2)
Features: Automatic Speed Detection (Autobaud), Data Compression, Downline Loading (On-Line Reconfiguration), Flyback Buffering Delay, Flow Control, Programmable
Diagnostic Features: Local
Distribution Method: End user, Third-party
Price: $1,200
Date First Installed: January 1978
Number Installed to Date: 100 - 500

SCITEC CORP.
MPX
Multiplexer Class: Statistical
Input Interface: RS-232C
Maximum Input Channels:
Synchronous: 32
Asynchronous: 32
Transmission Mode: Half-Duplex, Full-Duplex, Echoplex
Input Transmission Rates: Asynchronous/Synchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7200 bps, 9,600 bps; Asynchronous - 19,200 bps
Aggregate Transmission Rate: 768 bps
Maximum Output Lines:
Asynchronous: 2
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Synchronous - 2,400 bps, 56,000 bps
Communications Protocols: HDLC (CCITT X.205 Level 2)
Features: Automatic Speed Detection (Autobaud), Data Compression, Downline Loading (On-Line Reconfiguration), Automatic Repeat Request, Flyback Buffering Delay, Flow Control, Programmable
Diagnostic Features: Local
Distribution Method: End user, OEM
Price: $4,500 to $10,000
Number Installed to Date: Under 100

SCITEC CORP.
ESPT1
Multiplexer Class: TDM
Input Interface: RS-232C, RS-449
Maximum Input Channels:
Asynchronous: 128
Transmission Mode: Full-Duplex
Input Transmission Rates: Synchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 14,400 bps, 19,200 bps; Asynchronous/Synchronous - 256K bps
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Synchronous - T-1
Communications Protocols: T-1
Features: Downline Loading (On-Line Reconfiguration), Programmable, Voice
Diagnostic Features: Local
Distribution Method: End user, OEM
Price: $3,900 to $35,000
Date First Installed: March 1983
Number Installed to Date: Under 100

SIERRA RESEARCH CORP.
TC-2/32
Multiplexer Class: Cable
Input Interface: RS-232C
Maximum Input Channels:
Synchronous: 60
Transmission Mode: Full-Duplex
Input Transmission Rates: Asynchronous - 9,600 bps
Maximum Output Lines:
Synchronous: 1
Asynchronous: 1
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Asynchronous/Synchronous - 9,600 bps
Communications Protocols: Custom
Features: Protocol Conversion, Downline Loading (On-Line Reconfiguration), Polling, Flow Control
Diagnostic Features: Local
Distribution Method: End user, OEM, Third-party
Price: $10,000

Date First Installed: January 1982
Number Installed to Date: Under 100
(See Vendor Profile Page V-26)

SPERRY CORP.
SIXTEEN CHANNEL TERMINAL MULTIPLEXER
Multiplexer Class: Scan for Channel Request
Input Interface: RS-232C, CCITT V.24/V.28
Transmission Mode: Half-Duplex, Full-Duplex
Input Transmission Rates: Synchronous - 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps, 19,200 bps
Aggregate Transmission Rate: 192 bps
Maximum Output Lines:
Asynchronous: 16
Output Transmission Mode: Half-Duplex, Full-Duplex
Output Line Transmission Rates: Synchronous - 2,400 bps, 4,800 bps, 9,600 bps, 14,400 bps
Communications Protocols: Transparent
Features: Polling
Diagnostic Features: Remote, Local
Distribution Method: End user
Price: $2,136
Date First Installed: April 1981
Number Installed to Date: 1,000 - 5,000
(See Vendor Profile Page V-26)

TANDY CORP.
COMMUNICATIONS MULTIPLEXER (71-3600)
Multiplexer Class: Concentrator
Input Interface: RS-232C
Transmission Mode: Full-Duplex
Input Transmission Rates: Asynchronous - 9,600 bps
Maximum Output Lines:
Synchronous: 16
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Asynchronous - 300 bps
Communications Protocols: Ascii
Features: Downline Loading (On-Line Reconfiguration), Polling, Port Contention, Programmable, Network Monitor
Diagnostic Features: Local
Distribution Method: End user
Price: $6,000 to $8,000
Date First Installed: February 1980
Number Installed to Date: Under 100
(See Vendor Profile Page V-29)

TAU-TRON, INC.
INTRAPLEX T.D.M. 189
Multiplexer Class: TDM
Input Interface: RS-232C, RS-449
Maximum Input Channels:
Synchronous: 240
Asynchronous: 240
Transmission Mode: Full-Duplex
Input Transmission Rates: Asynchronous/Synchronous - 110 bps
Aggregate Transmission Rate: 1.3M bps
Maximum Output Lines:
Asynchronous: 1
Output Transmission Rate: 1.5M bps
Communications Protocols: Transparent to Protocol
Features: Polling, Switching, Programmable
Diagnostic Features: Local
Distribution Method: End user
Price: $3,500 to $8,000
Date First Installed: July 1983
(See Vendor Profile Page V-29)

TELEPROCESSING PRODUCTS, INC.
TP-212
Multiplexer Class: Statistical
Input Interface: RS-232C
Maximum Input Channels:
Synchronous: 2
Asynchronous: 2
Transmission Mode: Half-Duplex, Full-Duplex, Echoplex
Input Transmission Rates: Asynchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps
Aggregate Transmission Rate: 192 bps
Maximum Output Lines:
Asynchronous: 1
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Synchronous - 9,600 bps
Communications Protocols: Ascii
Features: Automatic Repeat Request, Flyback Buffering Delay
Diagnostic Features: No
Distribution Method: End user, Third-party
Price: $850
Date First Installed: June 1981
Number Installed to Date: 100 - 500
(See Vendor Profile Page V-30)

TELEPROCESSING PRODUCTS, INC.
TP-214
Multiplexer Class: Statistical
Input Interface: RS-232C
Maximum Input Channels:
Asynchronous: 4
Transmission Mode: Half-Duplex, Full-Duplex, Echoplex
Input Transmission Rates: Asynchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps
Aggregate Transmission Rate: 192 bps
Maximum Output Lines:
Asynchronous: 1
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Synchronous - 9,600 bps
Communications Protocols: Ascii
Features: Programmable, Automatic Repeat Request, Flyback Buffering Delay
Distribution Method: End user, Third-party
Price: $1,350
Date First Installed: January 1984
Number Installed to Date: Under 100

TELEPROCESSING PRODUCTS, INC.
TP-400 MULTI-DROP STAT MUX
Multiplexer Class: Statistical
Input Interface: RS-232C
Maximum Input Channels:
Synchronous: 32
Transmission Mode: Half-Duplex, Full-Duplex, Echoplex
Input Transmission Rates: Asynchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps
Aggregate Transmission Rate: 3,072 bps
Maximum Output Lines:
Asynchronous: 1
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Synchronous - 9,600 bps
Communications Protocols: Ascii
Features: Data Compression, Downline Loading (On-Line Reconfiguration), Automatic Repeat Request, Flyback Buffering Delay, Polling, Port Contention, Operational and Statistical Reports, Flow Control, Network Monitor
Diagnostic Features: Local
Distribution Method: End user, Third-party
Price: $4,000 to $2,500
Date First Installed: June 1981
Number Installed to Date: 100 - 500

TELLABS, INC.
330A-F DATAPLEXERS
Multiplexer Class: Statistical
Input Interface: RS-232C, CCITT V.24/V.28
Maximum Input Channels:
Synchronous: 32
Asynchronous: 8
Transmission Mode: Full-Duplex
Input Transmission Rates: Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps
Aggregate Transmission Rate: 3,072 bps
Maximum Output Lines:
Asynchronous: 2
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Synchronous - 1,200 bps
Asynchronous/Synchronous - 76.8K bps
Communications Protocols: CCITT X.25 Level 2
Features: Automatic Speed Detection, Downline Loading (On-Line Reconfiguration), Automatic Repeat Request, Operational and Statistical Reports, Flow Control, Programmable, Network Monitor
Diagnostic Features: Remote, Local
Price: $2,400 to $11,900
Date First Installed: 1982
Number Installed to Date: Under 100
(See Vendor Profile Page V-30)

TELLABS, INC.
331 XPLEXER
Multiplexer Class: Concentrator, Data Switching
Input Interface: RS-232C, CCITT V.24/V.28
Maximum Input Channels:
Synchronous: 32
Asynchronous: 8
Transmission Mode: Full-Duplex
Input Transmission Rates: Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps
Aggregate Transmission Rate: 3,072 bps
Maximum Output Lines:
Asynchronous: 16
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Synchronous - 1,200 bps; Asynchronous/Synchronous - Up to 76.8K bps
Communications Protocols: Subset of CCITT X.25 Level 2
Features: Automatic Speed Detection (Autobaud), Automatic Repeat Request, Port Contention, Switching, Operational and Statistical Reports, Flow Control, Programmable, Network Monitor, Flexible Network Topology
Diagnostic Features: Remote, Local
Distribution Method: End user, Third-party
Price: $2,900 to $12,900
Date First Installed: 1983

TELMAG, INC.
AMUX-1
Multiplexer Class: TDM
Input Interface: RS-232C
Maximum Input Channels:
Synchronous: 4
Transmission Mode: Full-Duplex
Input Transmission Rates: Asynchronous - 300 bps, 600 bps, 1,200 bps, 2,400 bps, 4,800 bps
Aggregate Transmission Rate: 192 bps
Maximum Output Lines:
Synchronous: 4
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Asynchronous - 1,200 bps, 2,400 bps, 4,800 bps
Communications Protocols: Ascii
Diagnostic Features: Local
Distribution Method: End user
Price: $800
Date First Installed: January 1981
Number Installed to Date: Under 100
(See Vendor Profile Page V-30)

TELTONE CORP.
M-960
Multiplexer Class: Statistical
Input Interface: RS-232C, CCITT V.24/V.28
Maximum Input Channels:
Synchronous: 32
Transmission Mode: Full-Duplex, Echoplex
Input Transmission Rates: Asynchronous - 300 bps, 600 bps; Synchronous - 9,600 bps
Aggregate Transmission Rate: 3,072 bps

Maximum Output Lines:
Asynchronous: 2
Output Line Transmission Rates: Asynchronous/Synchronous - 76,800 bps
Communications Protocols: HDLC, SDLC, Subset of CCITT X.25 Level 2
Features: Automatic Speed Detection (Autobaud), Protocol Conversion, Downline Loading (On-Line Reconfiguration), Automatic Repeat Request, Flyback Buffering Delay, Polling, Operational and Statistical Reports, Programmable
Diagnostic Features: Remote, Local
Distribution Method: End user
Date First Installed: July 1983
Number Installed to Date: Under 100
(See Vendor Profile Page V-30)

TIMEPLEX, INC.
NETWORKING MICROPLEXER NM84
Multiplexer Class: Statistical
Input Interface: RS-232C, RS-422, CCITT V.24/V.28, MIL 188C
Maximum Input Channels:
Synchronous: 96
Asynchronous: 96
Transmission Mode: Half-Duplex, Full-Duplex
Input Transmission Rates: Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps
Aggregate Transmission Rate: 9,216 bps
Maximum Output Lines:
Asynchronous: 6
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Synchronous - 14,400 bps
Communications Protocols: HDLC
Features: Downline Loading (On-Line Reconfiguration), Automatic Repeat Request, Flyback Buffering Delay, Port Contention, Switching, Operational and Statistical Reports, Flow Control, Programmable, Network Monitor
Diagnostic Features: Remote, Local
Distribution Method: End user
Price: $17,000
Date First Installed: 1983
(See Vendor Profile Page V-31)

TIMEPLEX, INC.
NETWORKING MICROPLEXER NM144
Multiplexer Class: Statistical
Input Interface: RS-232C, RS-422, CCITT V.24/V.28, MIL 188C
Maximum Input Channels:
Synchronous: 144
Asynchronous: 144
Transmission Mode: Half-Duplex, Full-Duplex
Input Transmission Rates: Asynchronous - Up to 9,600 bps
Aggregate Transmission Rate: 13,900 bps
Maximum Output Lines:
Asynchronous: 6
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Synchronous - 14,400 bps
Communications Protocols: HDLC
Features: Downline Loading (On-Line Reconfiguration), Automatic Repeat Request, Flyback Buffering Delay, Port Contention, Switching, Operational and Statistical Reports, Flow Control, Programmable, Network Monitor
Diagnostic Features: Remote, Local
Distribution Method: End user
Price: $17,000
Date First Installed: 1983

TIMEPLEX, INC.
QUAD SWITCHING MICROPLEXER QSM
Multiplexer Class: Statistical
Input Interface: RS-232C, RS-422, CCITT V.24/V.28, MIL 188C
Maximum Input Channels:
Synchronous: 48
Asynchronous: 48
Transmission Mode: Half-Duplex, Full-Duplex
Input Transmission Rates: Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps
Aggregate Transmission Rate: 4,608 bps
Maximum Output Lines:
Asynchronous: 4
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Synchronous - 14,400 bps
Communications Protocols: HDLC
Features: Downline Loading (On-Line Reconfiguration), Automatic Repeat Request, Flyback Buffering Delay, Port Contention, Switching, Operational and Statistical Reports, Flow Control, Programmable, Network Monitor
Diagnostic Features: Remote, Local
Distribution Method: End user
Price: $7,525
Date First Installed: 1983

TIMEPLEX, INC.
SERIES II MICROPLEXER M8
Multiplexer Class: Statistical
Input Interface: RS-232C, RS-422, CCITT V.24/V.28, MIL 188C
Maximum Input Channels:
Synchronous: 8
Asynchronous: 8
Transmission Mode: Half-Duplex, Full-Duplex
Input Transmission Rates: Asynchronous/Synchronous - 50 bps, 75 bps, 300 bps, 600 bps, 1,200 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps
Aggregate Transmission Rate: 768 bps
Maximum Output Lines:
Asynchronous: 2
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Synchronous - 9,600 bps, 14,400 bps, 19,200 bps
Communications Protocols: HDLC
Features: Downline Loading (On-Line Reconfiguration), Automatic Repeat Request, Operational and Statistical Reports, Flow Control, Programmable, Network Monitor
Diagnostic Features: Remote, Local
Distribution Method: End user
Price: $1,625 to $2,650
Date First Installed: 1979

TIMEPLEX, INC.
SERIES II MICROPLEXER M24
Multiplexer Class: Statistical
Input Interface: RS-232C, RS-422, CCITT V.24/V.28, MIL 188C
Maximum Input Channels:
Synchronous: 24
Asynchronous: 24
Transmission Mode: Half-Duplex, Full-Duplex
Input Transmission Rates: Asynchronous/Synchronous - 50 bps; Asynchronous - 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps; 7,200 bps, 9,600 bps
Aggregate Transmission Rate: 2,304 bps
Maximum Output Lines:
Asynchronous: 2
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Synchronous - 9,600 bps, 14,400 bps, 19,200 bps; Asynchronous - 14,400 bps
Communications Protocols: HDLC
Features: Downline Loading (On-Line Reconfiguration), Automatic Repeat Request, Flyback Buffering Delay, Operational and Statistical Reports, Flow Control, Programmable, Network Monitor
Diagnostic Features: Remote, Local
Distribution Method: End user
Price: $2,655 to $3,420
Date First Installed: 1980

TIMEPLEX, INC.
SERIES II MICROPLEXER M48
Multiplexer Class: Statistical
Input Interface: RS-232C, RS-422, CCITT V.24/V.28, MIL 188C
Maximum Input Channels:
Synchronous: 48
Asynchronous: 48
Transmission Mode: Half-Duplex, Full-Duplex
Input Transmission Rates: Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps
Aggregate Transmission Rate: 4,608 bps
Maximum Output Lines:
Asynchronous: 2
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Synchronous - 9,600 bps, 14,400 bps, 19,200 bps
Communications Protocols: HDLC
Features: Downline Loading (On-Line Reconfiguration), Automatic Repeat Request, Flyback Buffering Delay, Port Contention, Switching, Operational and Statistical Reports, Flow Control, Programmable
Diagnostic Features: Remote, Local
Distribution Method: End user
Price: $4,690 to $5,150
Date First Installed: 1981

TIMEPLEX, INC.
SWITCHING MICROPLEXER SM8
Multiplexer Class: Statistical
Input Interface: RS-232C, RS-422, CCITT V.24/V.28, MIL 188C
Maximum Input Channels:
Synchronous: 8
Asynchronous: 8
Transmission Mode: Half-Duplex, Full-Duplex
Input Transmission Rates: Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps
Aggregate Transmission Rate: 768 bps
Maximum Output Lines:
Asynchronous: 2
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Synchronous - 9,600 bps, 14,400 bps
Communications Protocols: HDLC
Features: Downline Loading (On-Line Reconfiguration), Automatic Repeat Request, Flyback Buffering Delay, Port Contention, Switching, Operational and Statistical Reports, Flow Control, Programmable, Network Monitor
Diagnostic Features: Remote, Local
Distribution Method: End user
Price: $1,800 to $2,825
Date First Installed: 1981

TIMEPLEX, INC.
SWITCHING MICROPLEXER SM48
Multiplexer Class: Statistical
Input Interface: RS-232C, RS-422, CCITT V.24/V.28, MIL 188C
Maximum Input Channels:
Synchronous: 24
Asynchronous: 24
Transmission Mode: Half-Duplex, Full-Duplex
Input Transmission Rates: Asynchronous - Up to 9,600 bps
Aggregate Transmission Rate: 2,304 bps
Maximum Output Lines:
Asynchronous: 2
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Synchronous - 9,600 bps, 14,400 bps
Communications Protocols: HDLC
Features: Downline Loading, Automatic Repeat Request, Flyback Buffering Delay, Port Contention, Switching, Operational and Statistical Reports, Flow Control, Programmable, Network Monitor
Diagnostic Features: Remote, Local
Distribution Method: End user
Price: $2,830 to $3,855
Date First Installed: 1981

TIMEPLEX, INC.
SWITCHING MICROPLEXER SM48
Multiplexer Class: Statistical
Input Interface: RS-232C, RS-422, CCITT V.24/V.28, MIL 188C
Maximum Input Channels:

Synchronous: 48
Asynchronous: 48
Transmission Mode: Half-Duplex, Full-Duplex
Input Transmission Rates: Asynchronous - Up to 9,600 bps
Aggregate Transmission Rate: 4,608 bps
Maximum Output Lines:
Asynchronous: 2
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Synchronous - 9,600 bps, 14,400 bps
Communications Protocols: HDLC
Features: Downline Loading (On-Line Reconfiguration), Automatic Repeat Request, Flyback Buffering Delay, Port Contention, Switching, Statistical Reports, Flow Control, Programmable, Network Monitor
Diagnostic Features: Remote, Local
Distribution Method: End user
Price: $4,125 to $5,150
Date First Installed: 1991

TIMEPLEX, INC.
WIDEBAND MICROPLEXER WB48
Multiplexer Class: Statistical
Input Interface: RS-232C, RS-422, CCITT V.24/V.28, MIL 188C
Maximum Input Channels:
Synchronous: 48
Asynchronous: 48
Transmission Mode: Half-Duplex, Full-Duplex
Input Transmission Rates: Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps
Aggregate Transmission Rate: 4,608 bps
Maximum Output Lines:
Asynchronous: 1
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Asynchronous/Synchronous - 72,000 bps
Communications Protocols: HDLC
Features: Downline Loading (On-Line Reconfiguration), Automatic Repeat Request, Flyback Buffering Delay, Operational and Statistical Reports, Flow Control, Programmable, Network Monitor
Diagnostic Features: Remote, Local
Distribution Method: End user
Price: $8,025
Date First Installed: 1992

TIMEPLEX, INC.
LINK1-T1 FACILITIES MANAGEMENT SYSTEM
Multiplexer Class: TDM
Input Interface: RS-232C, RS-422, MIL 188C
Maximum Input Channels:
Synchronous: 44
Asynchronous: 44
Transmission Mode: Full-Duplex
Input Transmission Rates: Asynchronous/Synchronous - Up to 51,000 bps
Maximum Output Lines:
Asynchronous: 1
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Asynchronous - T-1
Features: Operational and Statistical Reports, Flow Control, Programmable, Network Monitor
Diagnostic Features: Remote, Local
Distribution Method: End user
Date First Installed: 1983

TIMEPLEX, INC.
TIMEPLEXER TIG TDM
Multiplexer Class: TDM
Input Interface: RS-232C, RS-422, CCITT V.24/V.28, MIL 188C
Maximum Input Channels:
Synchronous: 16
Asynchronous: 16
Transmission Mode: Half-Duplex, Full-Duplex
Input Transmission Rates: Asynchronous - 2,400 bps; Synchronous - 9,600 bps
Maximum Output Lines:
Asynchronous: 1
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Synchronous - 14,400 bps
Features: Operational and Statistical Reports, Flow Control, Programmable
Diagnostic Features: Remote, Local
Distribution Method: End user
Price: $1,725
Date First Installed: 1971

TIMEPLEX, INC.
TIMEPLEXER T-39 TDM
Multiplexer Class: TDM
Input Interface: RS-232C, RS-422, CCITT V.24/V.28, MIL 188C
Transmission Mode: Half-Duplex, Full-Duplex
Input Transmission Rates: Asynchronous - 2,400 bps; Synchronous - 9,600 bps
Maximum Output Lines:
Asynchronous: 1
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Synchronous - 14,400 bps
Features: Operational and Statistical Reports, Flow Control, Programmable
Diagnostic Features: Remote, Local
Distribution Method: End user
Price: $2,050

TIMEPLEX, INC.
TIMEPLEXER T-96 TDM
Multiplexer Class: TDM
Input Interface: RS-232C, RS-422, CCITT V.24/V.28, MIL 188C
Maximum Input Channels:
Synchronous: 96
Asynchronous: 96
Transmission Mode: Half-Duplex, Full-Duplex
Input Transmission Rates: Asynchronous - 19,200 bps; Asynchronous/Synchronous - 64,000 bps
Maximum Output Lines:
Asynchronous: 3
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Asynchronous/Synchronous - Up to 256,000 bps
Features: Operational and Statistical Reports, Flow Control, Programmable
Diagnostic Features: Remote, Local
Distribution Method: End user
Price: $3,270
Date First Installed: 1974

TIMEPLEX, INC.
MICROPLEXER X.25 PAD
Multiplexer Class: Statistical
Multiplexer Class: Packet Assembler/Disassembler
Input Interface: RS-232C, RS-422, CCITT V.24/V.28
Maximum Input Channels:
Synchronous: 48
Transmission Mode: Half-Duplex, Full-Duplex
Input Transmission Rates: Asynchronous - Up tp 9,600 bps Asynchronous/Synchronous - 600 bps, 3,600 bps
Aggregate Transmission Rate: 4,608 bps
Maximum Output Lines:
Asynchronous: 2
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Synchronous - 9,600 bps, 14,400 bps
Communications Protocols: HDLC
Features: Automatic Speed Detection (Autobaud), Protocol Conversion, Automatic Repeat Request, Operational and Statistical Reports, Flow Control, Programmable, Network Monitor
Diagnostic Features: Remote, Local
Distribution Method: End user
Price: $1,750
Date First Installed: 1988

USDATA, INC.
PEX-1 INTELLIGENT DATA MULTIPLEXER
Multiplexer Class: Network Concentrator
Input Interface: RS-232C, RS-422
Maximum Input Channels:
Synchronous: 14
Input Transmission Rates: Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps, 19,200 bps
Communications Protocols: Ascii
Diagnostic Features: Remote, Local
Price: $3,500
(See Vendor Profile Page V-32)

WANG LABORATORIES, INC.
CMUX-2370 CABLE MULTIPLEXOR
Multiplexer Class: TDM
Input Interface: IBM Type "A" Coaxial
Maximum Input Channels:
Asynchronous: 32
Transmission Mode: Half-Duplex
Input Transmission Rates: Asynchronous/Synchronous - 23,500 bps
Aggregate Transmission Rate: 23,500 bps
Maximum Output Lines:
Asynchronous: 1
Output Transmission Mode: Half-Duplex
Output Line Transmission Rates: Asynchronous/Synchronous - 23,500 bps
Communications Protocols: SDLC
Diagnostic Features: Remote, Local
Distribution Method: End user
Price: $3,375
Date First Installed: November 1993
Number Installed to Date: Under 100
(See Vendor Profile Page V-32)

WESTERN DATACOM
PRISM 1003
Multiplexer Class: Statistical
Input Interface: RS-232C, 20 mA Current Loop
Maximum Input Channels:
Synchronous: 3
Transmission Mode: Full-Duplex
Input Transmission Rates: Asynchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps
Aggregate Transmission Rate: 96 bps
Maximum Output Lines:
Synchronous: 1
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Asynchronous - 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 9,600 bps
Communications Protocols: High Protocol Streaming
Features: Data Compression, Automatic Repeat Request, Flyback Buffering Delay, Port Contention, Flow Control, Automatic Speed Detection, Autodial Throughput
Diagnostic Features: Remote, Local
Distribution Method: Third-party
Price: $675
Date First Installed: August 1992
Number Installed to Date: 150
(See Vendor Profile Page V-33)

XYPLEX, INC.
XYPLEX SYSTEM
Multiplexer Class: Statistical
Input Interface: RS-232C
Transmission Mode: Full-Duplex
Input Transmission Rates: Asynchronous - 9,600 bps
Maximum Output Lines:
Synchronous: 1
Output Transmission Mode: Full-Duplex
Output Line Transmission Rates: Asynchronous/Synchronous - 1M bps
Features: Automatic Speed Detection, Downline Loading, Automatic Repeat Request, Flyback Buffering Delay, Port Contention, Switching, Flow Control, Programmable, Network Monitor
Diagnostic Features: Remote, Local
Distribution Method: End user
Price: $700
Date First Installed: October 1992
Number Installed to Date: Under 100
(See Vendor Profile Page V-33)

The CPT Solution that talks with mainframes in an important new way:

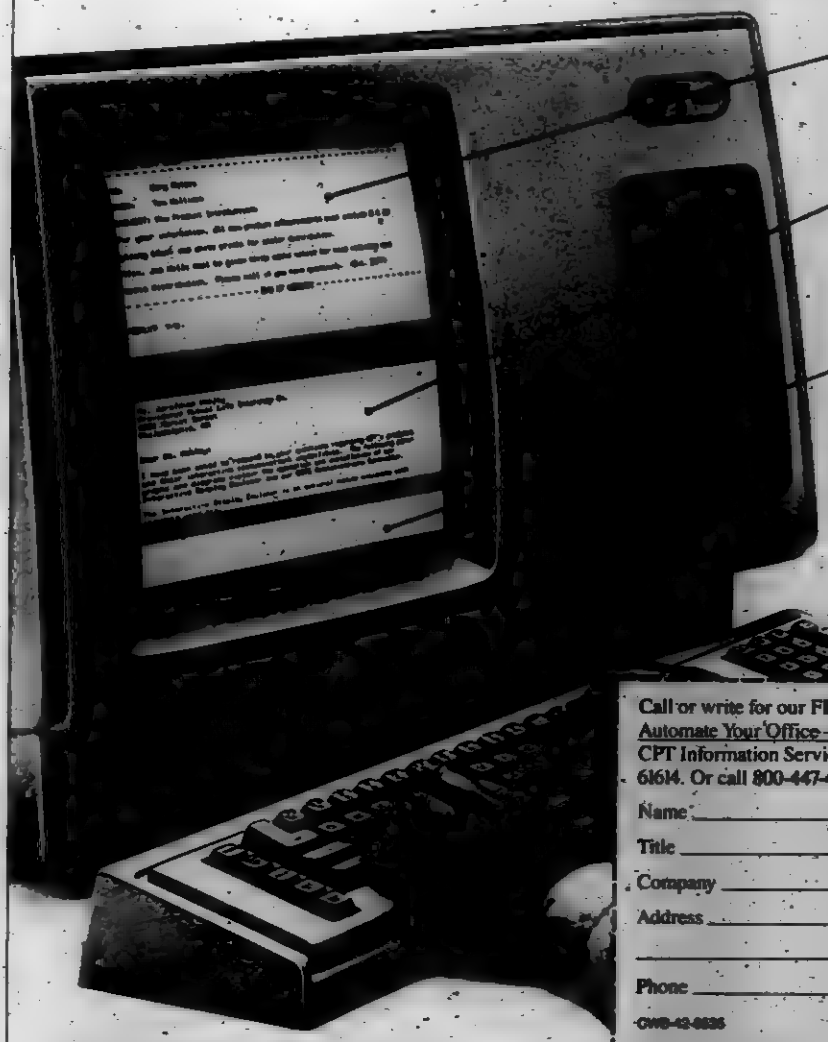
CPT solves the costly, cumbersome problem of separate data terminals and word processors at individual workstations.

An exclusive software breakthrough enables one CPT system to perform both functions. On the same screen. At the same time. We call it the CPT Interactive Display Emulator (IDE).

With this new CPT solution, an operator can transfer data processing information from a host computer (top window) directly to a word processing document-in-progress (middle window). Or vice versa. With just two keystrokes.

In addition, an optional CPT SNA communications controller can link up to 7 CPT systems together as part of an IBM 3270 network.

A few toll-free keystrokes on your telephone will bring you more information. And open some important new windows on the future.



Interactive Communications Window
A full 24-line by 80-column screen that displays information direct from a host computer.

Independent CPT Word Processing Window
A half-page display of the same CPT word processing that's earned a place on the Datapro Honor Roll for the last three years.

Word Processing Preview
Another standard CPT word processing feature. It lets you preview other pages in a document, or scan an entirely different document, without interrupting work in progress.

Specifications are subject to change at the discretion of CPT Corporation.

Call or write for our FREE 28-page booklet, How to Automate Your Office – One Step at a Time.™ Mail to CPT Information Service, P.O. Box 3900, Peoria, Illinois 61614. Or call 800-447-4700.

Name _____

Title _____

Company _____

Address _____

_____

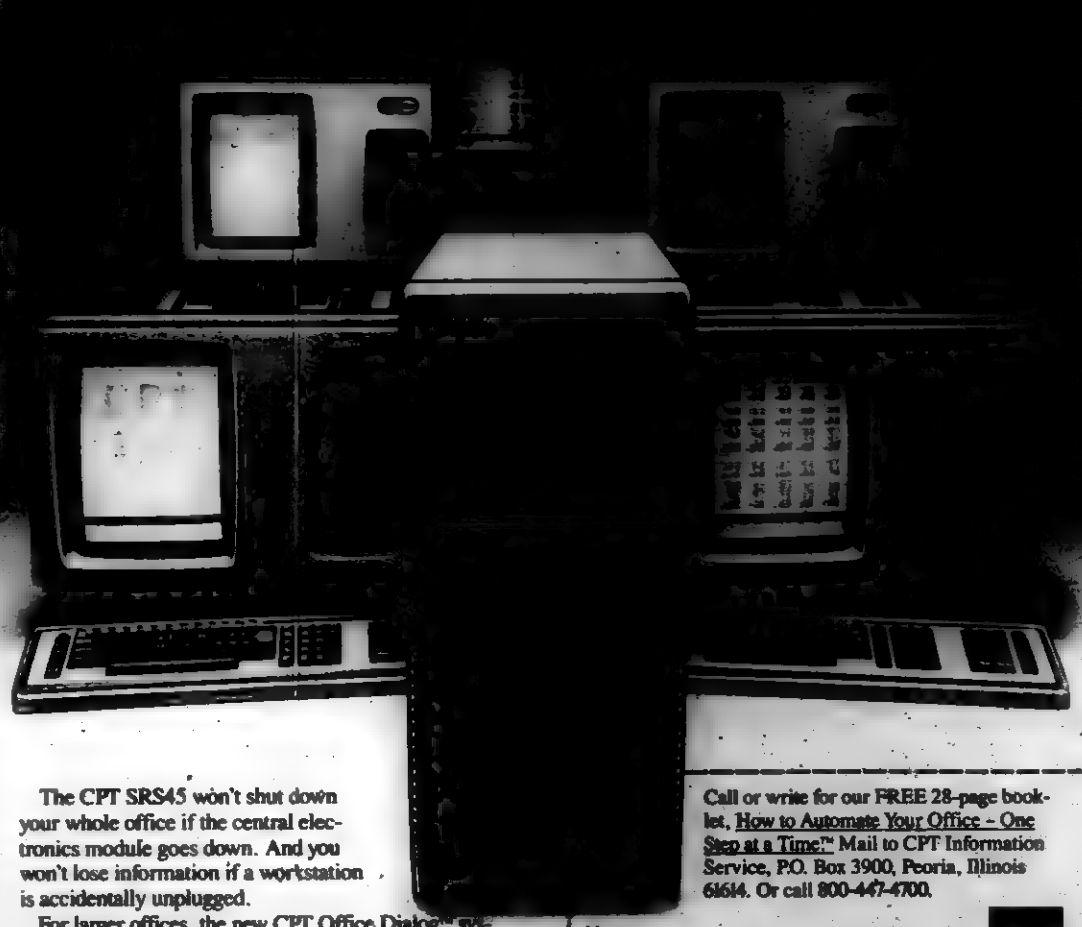
Phone _____

CWB-42-8826

Office automation you can't outgrow

CPT.

New CPT Solutions that work together.



The CPT SRS45 won't shut down your whole office if the central electronics module goes down. And you won't lose information if a workstation is accidentally unplugged.

For larger offices, the new CPT Office Dialog™ system (not shown) supports from 8 to 128 workstations, depending on the application. It provides additional speed and capabilities, and can tie into existing IBM host computer systems with all their workstations.

Before you buy, find out why other multi-workstation systems can't promise many of these features. And why CPT can.

Specifications are subject to change at the discretion of CPT Corporation.

Call or write for our FREE 28-page booklet, How to Automate Your Office - One Step at a Time!™ Mail to CPT Information Service, P.O. Box 3900, Peoria, Illinois 61614. Or call 800-447-4700.

Name _____

Title _____

Company _____

Address _____

_____

Phone _____

CWB-43-SRS45

Office automation you can't outgrow.

CPT.

Index to Converters/Emulators

Converters are devices (or software) that convert the transmission characteristics of one data stream to different transmission characteristics. Included in this category are interface, protocol, speed and code conversion products.

Emulators permit one computer system to execute programming written for another computer system.

The index to converters/emulators is arranged alphabetically by vendor and contains the unit price as well as the page number on which the complete listing can be found.

VENDOR	MODEL	PRICE	PAGE
Agile Comp.	MODEL 3851 TWINAX PROTOCOL CONVERTER	$2,495	B-4
	MODEL 5287 PROTOCOL CONVENTOR	$2,500	B-4
	MODEL 6287 PROTOCOL CONVERTER	$2,500	B-4
	PROGRAMMABLE COMMUNICATIONS INTERFACE LC-300	$2,995	B-4
	PROGRAMMABLE COMMUNICATIONS INTERFACE LC-36	$995	B-4
Air Land Systems Corp.	PRINTER INTERFACES MPC-SERIES	$1,200 to $1,850	B-4
	PROTOCOL CONVERTERS PCU-SERIES	$1,400 to $5,000	B-4
Alphametrix, Inc.	BAE-800	$1,495	B-4
Amdahl Corp.	4440 NETWORK CONCENTRATOR	$8,700 to $14,000	B-4
	4450 NETWORK CONCENTRATOR	$10,700	B-4
	4470 NETWORK CONCENTRATOR	$12,500	B-4
Anacomp	KACHINA 2	$4,000 to $25,000	B-4
Apex Technology	B-10	$1,150	B-5
	T-10	$3,500	B-5
AST Research, Inc.	AST-BSC	$995	B-5
	AST-PCOX	$1,195	B-5
	AST-SNA	$995	B-5
	AST-3780	$945	B-5
	AST-5251	$995	B-5
Atlantic Research Corp.	IFA-SERIES	$220 to $1,150	B-5
Avatar Technologies, Inc.	PA 1000	$995	B-5
A. W. Computer Systems, Inc.	A.W. P.C. TYPE 1	$2,000 to $2,200	B-5
	A.W. P.C. TYPE 3	$7,000 to $8,000	B-5
Boston Data Systems, Inc.	DIGILINK II	N/A	B-5
Botacom Corp.	PROFESSIONAL COMMUNICATION MANAGER-2000	$1,300 to $2,500	B-5
Black Box Catalog/Expander Inc.	AS/26	$1,695	B-5
Cbi Corp.	IBM/UNIVAC COMPATABILITY CARD	$1,500	B-5
	RAINBOW 100 UNIVAC ADAPTER KIT	$2,000	B-5
Comsoft, Inc.	TERMINAL CONCENTRATOR; MDS-8070	$4,000 to $20,000	B-6
Computer Communications Specialists, Inc.	TASK 200	$450	B-6
Computer Peripheral Systems, Inc.	MARS	$1,100 to $4,200	B-6
Computer Systems	CS/88	$1,500 to $3,900	B-6
Com/Tech Systems, Inc.	A-302 RTS EMULATOR	$400	B-6
Connecticut Microcomputer, Inc.	BUSSTER GR	$495	B-6
	BUSSTER RG	$395	B-6
	SADI	$295	B-6
Control Concepts	PROTOCOL CONVERTER/CC-3274	$4,995 to $18,995	B-6
Data General Corp.	DG/RJE	N/A	B-6
	DG/3270	N/A	B-6
	RASP	N/A	B-6
	RCX70	N/A	B-6
	RJE80	N/A	B-6
Datagram Corp.	DM 1600 B	$6,000 to $30,000	B-6
Data Flex, Inc.	PCT PLUS	$3,100	B-6
Datagrebe, Inc.	DR-10	$750	B-6
Datastream Communication, Inc.	774	$4,000 to $10,000	B-6
	776	$4,000 to $6,000	B-6
	874	$16,000	B-6
	MPC	$6,000 to $12,000	B-6
Data Technologies Industries	MIDDLEMAN	$550	B-6
DCA/TAC	INA/ATC	$8,950 to $14,950	B-6
Digital Acquisitions Corp.	COMMUNICATION PRINTER INTERFACE 7141	$1,650	B-6
	RLPS 901000	$6,750	B-6
Diversified Data Resources, Inc.	HYDRA II	$6,950 to $9,900	B-10
Dynatech Data Systems	DYNA-TEST 1600	$8,000	B-10
	DYNA-TEST 2000 C	$13,000	B-10
Dynatech Packet Technology, Inc.	MULTI-PAD X.25	$2,695 to $3,400	B-10

Converter/Emulator Index

VENDOR	MODEL	PRICE	PAGE
Dynatech Packet Technology, Inc.	MULTI-PLEX X.25	$1,695 to $2,695	B-10
Edge Technology	MESSAGE HANDLER	$495 to $1,995	B-10
Fortecom, Inc.	FS-100 CODEM	$13,000	B-10
Gandalf Data, Inc.	IFC 200 SERIES	$400 to $850	B-10
	PIN 3270E-7	$7,900 to $13,000	B-10
Gateway Communications, Inc.	GATEWAY PROCESSOR	$1,500	B-10
Hamilton Data Systems	COMMCENTER 2	$995	B-11
IBM Corp.	7426	N/A	B-11
Inet Corp.	VTS 352	$6,600 to $8,200	B-11
IRE Associates, Inc.	IDECOMM 3278/NPR-001 SPR-IN	$1,195	B-11
Innovation Microsystems, Inc.	IMI SERIES 570	$800 to $2,000	B-11
Innovative Electronics, Inc.	MC-80/100	$1,445 to $1,645	B-11
	MC-80/200	$1,445 to $1,645	B-11
	MC-80/300	$2,095 to $2,245	B-11
	MC-80/400	$2,095 to $2,245	B-11
	MC-80/600	$1,495 to $1,695	B-11
	MC-80/602	$1,650	B-11
InfoGram, Inc.	3270 IPC	$15,000	B-11
	X.25 IPC	$15,000	B-11
Integrated Design Engineering, Inc.	IDE-3011	$500	B-12
	IDE-3013	$500	B-12
	IDE-3014	$1,800	B-12
	IDE-3015	$450	B-12
	IDE-3016	$1,850	B-12
	IDE-3018	$1,850	B-12
Intelligent Business Systems, Inc.	CSX 1024	$60,000	B-12
	CSX-1024	$60,000	B-12
Inter-Link	2101/2501	$995 to $1,900	B-12
Interall Systems, Inc.	8276-1	$3,500	B-12
	8276-12	$3,500	B-12
Itek Competitive Systems	MULTIDISK READER	$12,900 to $15,900	B-13
J B M Electronics	ASYNCHRONOUS PROTOCOL CONVERTERS	$995	B-13
Kaufman Research Manufacturing, Inc.	MODEL 870	$3,395 to $8,295	B-13
	MODEL 871	$3,395 to $8,295	B-13
	MODEL 872	$3,395 to $8,295	B-13
KMW Systems Corp.	2780/3780	$1,995	B-14
	3770	$4,550	B-14
	3777 SERIES II	$4,550	B-14
	HASP	$4,550	B-14
Local Data, Inc.	DATALYNX 3274	$6,000	B-14
	DATALYNX 3780	$1,750	B-14
	INTERLYNX 3278	$1,395	B-14
	INTERLYNX 3287	$1,750	B-14
Micom Systems, Inc.	MICRO800/X.25 CONCENTRATOR PAD	$2,050 to $4,600	B-14
	MICRO7400 PROTOCOL CONVERTER	$1,650 to $4,750	B-14
Microlog, Inc.	BABYTALK	$995	B-15
Midwest Data Source	APPLE II	$695 to $1,500	B-15
	APPLE III	$695 to $1,500	B-15
	IBM	$140 to $1,200	B-15
Modacom Plus, Inc.	BRITE ONE	$1,280	B-15
	SMRTE ONE	$3,900	B-15
National Computer Systems, Inc.	PROTOCOL CONVERTER	$1,500	B-15
Nestar Systems, Inc.	3270 BSC	$3,000	B-15
	3270 SNA	$4,000	B-15
Northern Telecom, Inc.	PC	$4,200	B-15
	SL-1	N/A	B-15
Nu Data Corp.	720 PROTOCOL CONVERTER	$2,000	B-15
Peripheral Technology, Inc.	SCAT	$995	B-15
	SCAT 1	$795	B-15
	SCAT 2 2101	$995	B-16
	SCAT 2 2303	$2,995	B-16
	SCAT 2 2501	$2,995	B-16
Peripherals Corp.	T-COMM	N/A	B-16
Personal Microcomputers	MICRO-MET	$995	B-16
Phoenix Digital Corp.	DPAC-30	$8,000	B-16
Pinnacle 1, Inc.	CLEO 3270	$3,995	B-16
	CLEO 3270 HF	$3,995	B-16
Progressive Systems, Inc.	CLC MODELS 2/4	$3,500 to $15,000	B-16
	CLC MODEL 5	$4,000 to $16,000	B-17
Protocol Computers, Inc.	71B/SNA	$3,100 to $7,000	B-17
	73SX	N/A	B-17
	74D	$5,200	B-17
	75B/SNA	$3,100 to $7,000	B-17
	1051 CONVERTER	$3,100 to $7,000	B-17
	1057 CONVERTER	$3,100 to $7,000	B-16
	1071 CONVERTER	$3,100 to $7,000	B-16
	1076 CONVERTER	$3,100 to $7,000	B-16
	1076X CONVERTER	$4,800 to $8,500	B-16

Converter/Emulator Index

VENDOR	MODEL	PRICE	PAGE
Protocol Computers, Inc.	3780/SNA	$3,100 to $7,000	B-18
	PCI SERIES	$1,850 to $8,500	B-18
	R73SX CONVERTER	$5,500	B-18
	VIDROTEX 67	$3,100 to $7,000	B-18
Quadritronics, Inc.	SQ1	N/A	B-18
	STI	$300 to $400	B-18
Reed-Telesystems, Inc.	202 NETWORKING TRANSLATOR	$2,695	B-18
	404 CENTRAL SITE TRANSLATOR	$3,995	B-18
Radian Corp.	MP-III	$4,100 to $20,000	B-18
Remex Corp.	TRANSLATOR-3270	$3,600 to $15,000	B-18
Sheffield Corp.	MEDIACOM	$5,500	B-18
Sherwood Digital Electronics	A/S-2, A/S-3	$1,495 to $2,495	B-19
	PQ4, PQ5	$1,495 to $2,495	B-19
Starnet Data Systems	STARNET II	$14,710	B-19
Stratus Computer, Inc.	STRATUS/32 CONTINUOUS PROCESSING SYSTEM	$140,000	B-19
Synoptic Systems	DCIC2	$495	B-19
	STD SER 2	$495	B-19
Tandy Corp.	T 76	$7,000	B-19
Techland Systems, Inc.	BLUE LINX 3275/6 BISYNCH	$990	B-19
	BLUE LINX 3276/SDLC	$990	B-19
	BLUE LINX 5251/12	$990	B-19
	VTERM	$180	B-20
Tektronix, Inc.	334	$175 to $3,990	B-20
Telebyte Technology, Inc.	60	$115	B-20
	64	$80	B-20
	65	$100	B-20
	78	$198	B-20
	SERIES 63	$99 to $126	B-20
Telefonx Corp.	TELEX PLUG	$1,385 to $1,670	B-20
Teleprocessing Products, Inc.	TP-200/201	$295 to $395	B-20
	TP-200M	$735	B-20
	TP-300	$450	B-20
	TP-350	$450	B-20
Telenex Corp.	M-871 ACCESS CONTROLLER	N/A	B-20
Thomas Engineering	MZ80	$6,000 to $12,000	B-21
TRW Corp.	TNW 232D	$369	B-21
	TNW 1000	$129	B-21
	TRW 2000	$229	B-21
Trendata Standard Memories Corp.	TCA/2	$5,000	B-21
TriData	NETWAY COMMUNICATIONS PROCESSOR	$11,000	B-21
Vio West, Inc.	CST 100	$150	B-21
	PSI 100	$200	B-21
	VST 2000	$195	B-21
Western Datacom	DATACOM 1000	$2,000	B-21
Xyquad, Inc.	X-100	$1,150	B-21

Converters/Emulators

AGILE CORP.
MODEL 3661 TWINAX PROTOCOL CONVERTER
Conversion Function: Protocol Conversion
Number of Ports Supported: 2
Transmission Mode: Full-Duplex
Standard Transmission Rate: Asynchronous - 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps, 19,200 bps
Protocol Conversion: IBM System/34, System/36 to RS-232C, IBM Series/1 to RS-232C
Features: Diagnostics, Polling
Price: $2,495
Distribution Method: End user
(See Vendor Profile Page V-1)

AGILE CORP.
MODEL 5367 PROTOCOL CONVERTER
Conversion Function: Protocol Conversion
Number of Ports Supported: 1
Transmission Mode: Full-Duplex
Standard Transmission Rate: Asynchronous - 1,200 bps, 2,400 bps, 4,800 bps, 9,600 bps, 19,200 bps
Protocol Conversion: IBM 3270 BSC to Ascii RS-232C, 3270 SNA/SDLC to Ascii RS-232C, Local 3270 DCA to Ascii RS-232C
Features: Diagnostics, Polling
Price: $2,500
Distribution Method: End user
Number Installed to Date: 500 - 1,000
Date First Installed: September 1981

AGILE CORP.
MODEL 6367 PROTOCOL CONVERTER
Conversion Function: Protocol Conversion
Number of Ports Supported: 1
Transmission Mode: Full-Duplex
Standard Transmission Rate: Asynchronous - 300 bps, 600 bps, 1,200 bps, 2,400 bps, 4,800 bps, 9,600 bps, 19,200 bps
Protocol Conversion: IBM 3270 BSC to Ascii RS-232C, 3270 SNA/SDLC to Ascii RS-232C, 3270 Local DCA to Ascii RS-232C
Features: Diagnostics, Polling
Price: $2,500
Distribution Method: End user

AGILE CORP.
PROGRAMMABLE COMMUNICATIONS INTERFACE LC-396
Conversion Function: Protocol Conversion
Number of Ports Supported: 3
Transmission Mode: Half-Duplex, Full-Duplex
Standard Transmission Rate: Synchronous - 50 bps, 75 bps, 110 bps, 1,800 bps, 3,600 bps, 7,200 bps, 9,600 bps; Asynchronous/Synchronous - 300 bps, 600 bps, 1,200 bps, 2,400 bps, 4,800 bps; Asynchronous - 19,200 bps
Protocol Conversion: HP MTS 3000 to RS-232C
Features: Polling
Price: $2,995
Distribution Method: End user
Number Installed to Date: 500 - 1,000
Date First Installed: March 1981

AGILE CORP.
PROGRAMMABLE COMMUNICATION INTERFACE MODEL LC-36
Conversion Function: Protocol Conversion
Number of Ports Supported: 1
Transmission Mode: Half-Duplex, Full-Duplex
Standard Transmission Rate: Asynchronous - 9,600 bps, 19,200 bps
Protocol Conversion: Burroughs Poll Select to Asynchronous Ascii
Features: Diagnostics, Polling
Price: $995
Distribution Method: End user
Number Installed to Date: 500 - 1,000
Date First Installed: November 1977

AIR LAND SYSTEMS CORP.
PRINTER INTERFACES MPC-SERIES
Conversion Function: Interface Conversion, Code Conversion, Protocol Conversion, Speed Conversion, Emulator
Number of Ports Supported: 1
Transmission Mode: Half-Duplex, Full-Duplex
Standard Transmission Rate: Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, Asynchronous/Synchronous - 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps, 19,200 bps
Code Conversion: Ebcdic to Ascii, Baudot to Ascii, XS 3 to Ascii
Interface Conversion: Serial RS-232 to Parallel Centronics
Mode Conversion: Half-Duplex to Full-Duplex, Full-Duplex to Half-Duplex
Protocol Conversion: IBM BSC 2780 to Ascii Unblocked, Honeywell VIP to Ascii Unblocked, Sperry U100 to Ascii Unblocked
Features: Data Compression, Diagnostics, Polling, Autoanswer
Price: $1,200 to $1,850
Distribution Method: End user, OEM, Third-party
Number Installed to Date: 5,000 - 10,000
Date First Installed: 1972
(See Vendor Profile Page V-1)

AIR LAND SYSTEMS CORP.
PROTOCOL CONVERTERS PCU-SERIES
Conversion Function: Interface Conversion, Code Conversion, Protocol Conversion, Speed Conversion, Emulator
Number of Ports Supported: 16
Transmission Mode: Half-Duplex, Full-Duplex
Standard Transmission Rate: Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps; Asynchronous/Synchronous - 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps, 19,200 bps
Code Conversion: Ebcdic to Ascii, XS 3 to Ascii, Baudot to Ascii
Interface Conversion: Serial RS-232 to Serial RS-232
Mode Conversion: Half-Duplex to Full-Duplex, Full-Duplex to Half-Duplex
Protocol Conversion: IBM PC 2780 to Ascii Asynchronous, Honeywell GRTS to Ascii Asynchronous, Sperry U100 to Ascii Asynchronous
Features: Concentration, Data Compression, Diagnostics, Polling, Autoanswer
Price: $1,400 to $5,000
Distribution Method: End user, OEM, Third-party
Number Installed to Date: 5,000 - 10,000
Date First Installed: 1972

ALPHAMATRIX, INC.
BAE-800
Conversion Function: Interface Conversion, Code Conversion, Protocol Conversion, Speed Conversion
Transmission Mode: Half-Duplex, Full-Duplex
Standard Transmission Rate: Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps, 19,200 bps
Code Conversion: Ascii to Ebcdic, Baudot to Ascii, Ebcdic to Ascii
Interface Conversion: RS-232C to 20 mA Current Loop, RS-232C to 60 mA Current Loop
Mode Conversion: Half-Duplex to Full-Duplex, Full-Duplex to Half-Duplex
Protocol Conversion: BSC to Ascii, AXDX to Ascii, BLC to Ascii
Features: Concentration, Data Compression, Diagnostics, Polling, Autoanswer
Price: $1,495
Monthly Maintenance Fee: $25
Distribution Method: End user
Number Installed to Date: Under 100
Date First Installed: 1978
(See Vendor Profile Page V-1)

AMDAHL CORP.
4440 NETWORK CONCENTRATOR
Conversion Function: Protocol Conversion
Number of Ports Supported: 40
Transmission Mode: Full-Duplex
Standard Transmission Rate: Asynchronous - 110 bps, 300 bps, 600 bps; Asynchronous/Synchronous - 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 7,200 bps, 9,600 bps, 19,200 bps
Protocol Conversion: Asynchronous to X.25, X.25 to Asynchronous
Features: Concentration, Diagnostics, Automatic Data Rate Detection, Automatic Parity Recognition, Autoanswer
Price: $6,700 to $14,000
Monthly Maintenance Fee: $80
Distribution Method: End user
Number Installed to Date: Under 100
Date First Installed: December 1982
(See Vendor Profile Page V-2)

AMDAHL CORP.
4460 NETWORK CONCENTRATOR
Conversion Function: Protocol Conversion
Number of Ports Supported: 8
Transmission Mode: Full-Duplex
Standard Transmission Rate: Synchronous - 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 7,200 bps, 9,600 bps, 19,200 bps
Code Conversion: Ascii to Ebcdic, Ebcdic to Ascii
Protocol Conversion: Bisynchronous 3270 to X.25, X.25 to Bisynchronous 3270
Features: Concentration, Diagnostics, Polling
Price: $10,700
Monthly Maintenance Fee: $70
Distribution Method: End user
Number Installed to Date: Under 100
Date First Installed: January 1983

AMDAHL CORP.
4470 NETWORK CONCENTRATOR
Conversion Function: Protocol Conversion
Number of Ports Supported: 8
Transmission Mode: Full-Duplex
Standard Transmission Rate: Synchronous - 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps
Protocol Conversion: SDLC/SNA 3270 to X.25, X.25 to SDLC/SNA 3270
Features: Concentration, Diagnostics, Polling
Price: $12,500
Distribution Method: End user
Number Installed to Date: Under 100
Date First Installed: February 1984

ASAHAZI
KACHINA 2
Conversion Function: Interface Conversion, Code Conversion, Protocol Conversion, Speed Conversion, Emulator
Number of Ports Supported: 5
Transmission Mode: Half-Duplex, Full-Duplex
Standard Transmission Rate: Synchronous - 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps, 19,200 bps, 56,000 bps
Code Conversion: Ascii to Ebcdic
Interface Conversion: RS-232C to CCITT V.27
Mode Conversion: Half-Duplex to Full-Duplex, Full-Duplex to Half-Duplex
Protocol Conversion: BLC to HDLC
Features: Concentration, Data Compression, Diagnostics, Polling,

Automatic Data Rate Detection, Automatic Parity Recognition, Autoanswer, Integrated Modem
Price: $4,000 to $25,000
Distribution Method: End user
Number Installed to Date: 500 - 1,000
Date First Installed: 1981
(See Vendor Profile Page V-2)

APEX TECHNOLOGY
S-10
Conversion Function: Interface Conversion, Code Conversion, Protocol Conversion, Speed Conversion, Emulator
Number of Ports Supported: 1
Transmission Mode: Full-Duplex
Standard Transmission Rate: Asynchronous/Synchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps, 19,200 bps
Code Conversion: Burroughs to RS-232C
Interface Conversion: Burroughs to RS-232C
Protocol Conversion: Burroughs to RS-232C
Features: Data Compression, Diagnostics
Price: $1,150
Distribution Method: Third-party
Number Installed to Date: Under 100
Date First Installed: 1982
(See Vendor Profile Page V-2)

APEX TECHNOLOGY
T-10
Conversion Function: Interface Conversion, Code Conversion, Protocol Conversion, Speed Conversion, Emulator
Number of Ports Supported: 1
Transmission Mode: Full-Duplex
Standard Transmission Rate: Asynchronous/Synchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps, 19,200 bps
Code Conversion: Data Products Parallel to Synchronous RS-232C
Interface Conversion: Data Products Parallel to Synchronous RS-232C
Protocol Conversion: Data Products Parallel to Synchronous RS-232C
Features: Data Compression, Diagnostics
Price: $3,500
Distribution Method: Third-party
Number Installed to Date: Under 100
Date First Installed: September 1982

AST RESEARCH, INC.
AST-BSC
Conversion Function: Emulator
Transmission Mode: Half-Duplex
Price: $895
Distribution Method: OEM
Number Installed to Date: Under 100
Date First Installed: 1983
(See Vendor Profile Page V-2)

AST RESEARCH, INC.
AST-PCOX
Conversion Function: Emulator
Number of Ports Supported: 1
Standard Transmission Rate: 2.35M bps
Price: $1,195
Distribution Method: OEM
Number Installed to Date: Under 100
Date First Installed: 1983

AST RESEARCH, INC.
AST-SNA
Conversion Function: Emulator
Transmission Mode: Half-Duplex
Price: $895
Distribution Method: OEM
Number Installed to Date: Under 100
Date First Installed: 1983

AST RESEARCH, INC.
AST-3780
Conversion Function: Emulator
Transmission Mode: Half-Duplex
Standard Transmission Rate: Synchronous - 19,200 bps
Price: $945
Distribution Method: OEM
Number Installed to Date: Under 100
Date First Installed: 1983

AST RESEARCH, INC.
AST-6251
Conversion Function: Emulator
Transmission Mode: Half-Duplex
Standard Transmission Rate: Synchronous - 9,600 bps
Price: $895
Distribution Method: OEM
Number Installed to Date: Under 100
Date First Installed: 1983

ATLANTIC RESEARCH CORP.
IFA-SERIES
Conversion Function: Interface Conversion
Transmission Mode: Half-Duplex, Full-Duplex
Standard Transmission Rate: All
Interface Conversion: RS-232 to V.35, RS-232 to RS-422, RS-232 to X.21, V.10, V.11
Mode Conversion: Half-Duplex to Full-Duplex, Full-Duplex to Half-Duplex
Price: $220 to $1,150
Distribution Method: End user
Number Installed to Date: 100 - 500
Date First Installed: February 1981
(See Vendor Profile Page V-3)

AVATAR TECHNOLOGIES, INC.
PA 1000
Conversion Function: Interface Conversion, Code Conversion, Protocol Conversion, Speed Conversion, Emulator, PC to 3278, VT-100
Number of Ports Supported: 2
Transmission Mode: Full-Duplex
Standard Transmission Rate: Asynchronous - 300 bps, 9,600 bps, 2.3M bps
Code Conversion: Asynchronous Ascii to IBM 3278/2
Interface Conversion: RS-232 to Coaxial
Mode Conversion: Full-Duplex to Half-Duplex
Protocol Conversion: Asynchronous Ascii to IBM Coaxial
Features: Diagnostics, Polling, Automatic Data Rate Detection, Automatic Parity Recognition, Autoanswer, Protocol Conversion
Price: $995
Distribution Method: Third-party
Number Installed to Date: 500 - 1,000
Date First Installed: 1983
(See Vendor Profile Page V-3)

A. W. COMPUTER SYSTEMS, INC.
A.W. P.C. TYPE 1
Conversion Function: Protocol Conversion
Number of Ports Supported: 2
Standard Transmission Rate: Asynchronous - 600 bps, 1,200 bps; Synchronous - 4,800 bps
Code Conversion: IBM Ebcdic BSC to NCR Ascii BSC, NCR Ascii BSC to Ascii Asynchronous, IBM Ebcdic BSC to Ascii Synchronous
Features: Diagnostics, Polling
Price: $2,000 to $2,200
Distribution Method: End user
Number Installed to Date: Under 100
Date First Installed: July 1983
(See Vendor Profile Page V-3)

A. W. COMPUTER SYSTEMS, INC.
A.W. P.C. TYPE 3
Conversion Function: Protocol Conversion
Number of Ports Supported: 2
Standard Transmission Rate: Asynchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 2,400 bps; Synchronous - 3,600 bps, 9,600 bps
Code Conversion: IBM Ebcdic BSC to NCR Ascii BSC, NCR Ascii BSC to Ascii Asynchronous, IBM Ebcdic BSC to Ascii Synchronous
Features: Diagnostics, Polling
Price: $7,000 to $8,000
Distribution Method: End user
Number Installed to Date: Under 100
Date First Installed: July 1983

BACKUS DATA SYSTEMS, INC.
DIGILINK II
Conversion Function: Code Conversion, Speed Conversion
Number of Ports Supported: 6
Transmission Mode: Full-Duplex
Standard Transmission Rate: Asynchronous/Synchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps, 19,200 bps
Code Conversion: Ascii to Binary, Binary to Ascii
Distribution Method: End user
Number Installed to Date: Under 100
(See Vendor Profile Page V-3)

BETACOM CORP.
PROFESSIONAL COMMUNICATION MANAGER-3000
Conversion Function: Protocol Conversion, Emulator
Number of Ports Supported: 1
Transmission Mode: Half-Duplex, Full-Duplex
Standard Transmission Rate: Synchronous - 110 bps; Asynchronous/Synchronous - 300 bps, 1,200 bps
Code Conversion: Ebcdic to Ascii, Baudot to Ascii
Interface Conversion: IBM PC to Televideo 910, Televideo 800/802 to TTY, IBM Compatible to TTY
Features: Diagnostics, Polling, Autoanswer, Autodial, Sign-on
Price: $1,300 to $2,500
Monthly Maintenance Fee: $13
Distribution Method: End user
Number Installed to Date: Under 100
(See Vendor Profile Page V-4)

BLACK BOX CATALOG/EXPANDER, INC.
AA/2S
Conversion Function: Protocol Conversion
Number of Ports Supported: 1
Transmission Mode: Half-Duplex On Bisynchronous
Standard Transmission Rate: Asynchronous/Synchronous - 9,600 bps
Code Conversion: Ebcdic to Ascii
Mode Conversion: Bisynchronous to Asynchronous
Protocol Conversion: 2780 to Ascii to 3741 to Ascii, 3780 to Ascii to Transparent Asynchronous, 2770 to Ascii
Features: Built-in Modem Emulator
Price: $1,695
Distribution Method: End user
Number Installed to Date: 500 - 1,000
Date First Installed: January 1982
(See Vendor Profile Page V-4)

CMI CORP.
IBM/SPERRY COMPATABILITY CARD
Conversion Function: Emulator
Number of Ports Supported: 1
Standard Transmission Rate: Synchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps, 19,200 bps
Features: Data Compression, Diagnostics, Polling, Automatic Parity Recognition
Price: $1,500
Distribution Method: Third-party
Number Installed to Date: Under 100
Date First Installed: March 1982
(See Vendor Profile Page V-5)

CMI CORP.
RAINBOW 100 SPERRY ADAPTER KIT
Conversion Function: Emulator
Number of Ports Supported: 1
Standard Transmission Rate: Synchronous - 110 bps, 300 bps,

Converters/Emulators

600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps, 19,200 bps
Features: Data Compression, Diagnostics, Polling, Automatic Parity Recognition, UTS Emulation
Price: $2,000
Distribution Method: Third-party
Number Installed to Date: Under 100
Date First Installed: March 1982

CODRITEX, INC.
TERMINAL CONCENTRATOR, MDS-8070
Conversion Function: Interface Conversion, Code Conversion, Protocol Conversion, Speed Conversion, Emulator
Number of Ports Supported: 25
Transmission Mode: Half-Duplex, Full-Duplex
Standard Transmission Rate: Asynchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps, 19,200 bps
Code Conversion: Ascii to Ebcdic, Ebcdic to Ascii
Interface Conversion: RS-422A to RS-232C, 20 mA Current Loop to RS-232C, MIL 188C to RS-232C
Mode Conversion: Half-Duplex to Full-Duplex, Full-Duplex to Half-Duplex
Protocol Conversion: 3270 SNA/SDLC to Ascii Asynchronous, IBM 3270 BSC to Ascii Asynchronous
Features: Concentration, Data Compression, Diagnostics, Polling, Automatic Data Rate Detection, Automatic Parity Recognition, Autoanswer, Switching
Price: $4,000 to $20,000
Distribution Method: Third-party
Number Installed to Date: 500 - 1,000
Date First Installed: February 1981
(See Vendor Profile Page V-6)

COMPUTER COMMUNICATIONS SPECIALISTS, INC.
TASK 200
Number of Ports Supported: 2
Transmission Mode: Half-Duplex
Standard Transmission Rate: Asynchronous - 9,600 bps
Code Conversion: Component Driven
Interface Conversion: Component Driven
Protocol Conversion: Component Driven
Features: Diagnostics, Automatic Parity Recognition
Price: $450
Monthly Maintenance Fee: $6
Distribution Method: End user
Number Installed to Date: Under 100
Date First Installed: April 1983
(See Vendor Profile Page V-6)

COMPUTER PERIPHERAL SYSTEMS, INC.
MARS
Conversion Function: Code Conversion, Speed Conversion
Number of Ports Supported: 7
Transmission Mode: Half-Duplex
Standard Transmission Rate: Asynchronous/Synchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps, 19,200 bps
Code Conversion: Poll/Select to TTY
Interface Conversion: RS-232C to RS-232C, RS-232C to TDI, RS-232C to Parallel
Mode Conversion: Half-Duplex to Half-Duplex
Protocol Conversion: Poll/Select to TTY
Features: Concentration, Data Compression, Diagnostics, Polling
Price: $1,100 to $4,200
Monthly Maintenance Fee: $18
Distribution Method: End user
Number Installed to Date: Under 100
Date First Installed: January 1982
(See Vendor Profile Page V-7)

COMPUTER SYSTEMS CS/86
Conversion Function: Interface Conversion, Code Conversion, Protocol Conversion, Speed Conversion, Data Buffer/Converter
Number of Ports Supported: 8
Transmission Mode: Half-Duplex, Full-Duplex
Standard Transmission Rate: Asynchronous - 110 bps, 300 bps, 1,200 bps, 1,800 bps; Asynchronous/Synchronous - 2,400 bps, 4,800 bps, 9,600 bps, 19,200 bps
Code Conversion: Ascii to Ebcdic, Binary to Ebcdic
Interface Conversion: RS-232 to RS-422, RS-232 to Current Loop, EIA to TTY Parallel
Mode Conversion: Half-Duplex to Full-Duplex, Full-Duplex to Half-Duplex
Protocol Conversion: TTY Asynchronous to Bysynchronous, SDLC to TTY
Features: Concentration, Data Compression, Diagnostics, Automatic Data Rate Detection
Price: $1,500 to $3,900
Distribution Method: End User
Number Installed to Date: Under 100
Date First Installed: 1982
(See Vendor Profile Page V-7)

CORE/TECH SYSTEMS, INC.
A-302 RTS EMULATOR
Conversion Function: Asynchronous to Synchronous Conversion
Number of Ports Supported: 1
Transmission Mode: Half-Duplex, Full-Duplex
Standard Transmission Rate: Asynchronous - 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps
Mode Conversion: Full-Duplex to Half-Duplex, Asynchronous to Synchronous
Features: Automatic Data Rate Detection, Automatic Modem Handshaking
Price: $400
Distribution Method: End user
Number Installed to Date: 100 - 500
Date First Installed: 1978
(See Vendor Profile Page V-8)

CONNECTICUT MICROCOMPUTER, INC.
BUSSTER GR
Conversion Function: Interface Conversion
Number of Ports Supported: 2
Transmission Mode: Full-Duplex
Standard Transmission Rate: Asynchronous - 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps
Interface Conversion: IEEE-488 to RS-232
Features: Polling, Automatic Parity Recognition
Price: $495
Distribution Method: End user
(See Vendor Profile Page V-7)

CONNECTICUT MICROCOMPUTER, INC.
BUSSTER RG
Conversion Function: Interface Conversion
Number of Ports Supported: 2
Transmission Mode: Full-Duplex
Standard Transmission Rate: Asynchronous - 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps
Interface Conversion: RS-232 to IEEE-488
Features: Polling, Automatic Parity Recognition
Price: $595

CONNECTICUT MICROCOMPUTER, INC.
SADI
Conversion Function: Code Conversion
Number of Ports Supported: 2
Transmission Mode: Full-Duplex
Standard Transmission Rate: Asynchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps
Code Conversion: PET Ascii to True Ascii
Interface Conversion: RS-232 to IEEE
Features: Automatic Parity Recognition
Price: $295
Distribution Method: End user

CONTROL CONCEPTS
PROTOCOL CONVERTER/CC-3274
Conversion Function: Protocol Conversion
Number of Ports Supported: 32
Transmission Mode: Both Half- and Full-Duplex
Standard Transmission Rate: Asynchronous/Synchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps
Protocol Conversion: Asynchronous to Bisynchronous, Asynchronous to SNA/SDLC
Features: Concentration, Polling, Automatic Data Rate Detection, Automatic Parity Recognition, Autoanswer, Graphics Passthrough
Price: $4,995 to $18,995
Monthly Maintenance Fee: $67
Distribution Method: End user
Number Installed to Date: 100 - 500
Date First Installed: June 1982
(See Vendor Profile Page V-7)

DATA GENERAL CORP.
DG/RJE
Conversion Function: Emulator
Number of Ports Supported: 4
Transmission Mode: Half-Duplex, Full-Duplex
Standard Transmission Rate: Synchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps, 19,200 bps
Features: Data Compression, Polling, Autoanswer
Number Installed to Date: Under 100
(See Vendor Profile Page V-6)

DATA GENERAL CORP.
DG/3270
Conversion Function: Emulator, SNA/3270 Terminals and Ports
Number of Ports Supported: 4
Transmission Mode: Half-Duplex, Full-Duplex
Standard Transmission Rate: Synchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps, 19,200 bps
Features: Polling
Distribution Method: End user
Number Installed to Date: Under 100

DATA GENERAL CORP.
HASP
Conversion Function: Emulator
Number of Ports Supported: 16
Transmission Mode: Half-Duplex, Full-Duplex
Standard Transmission Rate: Synchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps, 19,200 bps
Distribution Method: End user
Number Installed to Date: Under 100

DATA GENERAL CORP.
RCX70
Conversion Function: Emulator
Number of Ports Supported: 1
Transmission Mode: Half-Duplex, Full-Duplex
Standard Transmission Rate: Synchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps

If you're looking for an easy, flexible cost-effective way to make the personal computer to mainframe connection, look no further.

ICOT's Virtual Terminal System™ provides you with a convenient and flexible way to connect personal computers to your IBM or IBM-compatible mainframe. It does so by performing line concentration, cluster control and terminal emulation simultaneously. You'll be able to connect a multitude of personal computers into a single front-end port, conserving your mainframe resources. And you won't have to make any hardware modifications to either the personal computers themselves or to your network controllers.

Put ICOT's VTS protocol converter in your existing 3270 network and virtually any personal computer will be compatible with your BISYNC or SNA/SDLC applications software. ICOT's PC connection also gives you the flexibility of dial-up and leased line communications, plus access security.

ICOT Delivers a Turnkey Solution.
And ICOT won't leave you with a stack of black boxes and a screwdriver. We deliver a turnkey solution, installing every VTS ourselves. Then we back each installation with on-site training and a nationwide field service organization that delivers full engineering and maintenance support.

Whatever your current network configuration and protocols, ICOT's Virtual Terminal System can help you make the PC connection. Pure and simple.

For more information about the ICOT Virtual Terminal System call or write:

ICOT ...the data communications company

ICOT Corporation, 830 Maude Avenue, P.O. Box 7248, Mountain View, CA 94039; (415) 964-4635 TWX 910-379-6479

Converters/Emulators

Features: Polling
Distribution Method: End user
Number Installed to Date: Under 100

DATA GENERAL CORP.
MJ230
Conversion Function: Emulator
Number of Ports Supported: 16
Transmission Mode: Half-Duplex, Full-Duplex
Standard Transmission Rate: Synchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps, 19,200 bps
Features: Polling
Distribution Method: End user

DATAGRAM CORP.
DM 1000 B
Conversion Function: Interface Conversion, Code Conversion, Protocol Conversion, Speed Conversion
Number of Ports Supported: 16
Transmission Mode: Half-Duplex, Full-Duplex
Standard Transmission Rate: Asynchronous/Synchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps
Code Conversion: Burroughs Poll Select to Ascii, Ascii to Burroughs Poll Select
Interface Conversion: RS-232C to TDI, RS-232C to 20 mA, 20 mA to TDI
Mode Conversion: Half-Duplex to Full-Duplex, Full-Duplex to Half-Duplex
Protocol Conversion: Asynchronous - to Burroughs Poll Select
Features: Concentration, Diagnostics, Polling, Automatic Data Rate Detection, Autoanswer
Price: $6,000 to $30,000
Distribution Method: End user
Number Installed to Date: 100 - 500
Date First Installed: February 1979
(See Vendor Profile Page V-9)

DATA PLUS, INC.
PCT PLUS
Conversion Function: Code Conversion, Protocol Conversion, Speed Conversion
Number of Ports Supported: 5
Transmission Mode: Half-Duplex, Full-Duplex
Standard Transmission Rate: Asynchronous/Synchronous - 9,600 bps
Code Conversion: Baudot to Ascii, Ascii to Baudot, Ebcdic to Ascii
Mode Conversion: Half-Duplex to Full-Duplex, Full-Duplex to Half-Duplex
Protocol Conversion: SDLC to BDLC, HDLC to BLC, BLC to HDLC
Features: Concentration, Diagnostics, Polling, Automatic Parity Recognition, Autoanswer
Price: $3,100
Distribution Method: End user
Number Installed to Date: Under 100
Date First Installed: January 1983
(See Vendor Profile Page V-9)

DATAPRISE, INC.
DR-10
Conversion Function: Protocol Conversion, Speed Conversion
Transmission Mode: Half-Duplex, Full-Duplex
Standard Transmission Rate: Asynchronous/Synchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps, 19,200 bps
Code Conversion: Ascii to Baudot, Ebcdic to Ascii, Ebcdic to Baudot
Interface Conversion: Current Loop to EIA, Current Loop to RS-422, Current Loop to RS-423
Mode Conversion: Half-Duplex to Full-Duplex, Full-Duplex to Half-Duplex
Features: Concentration, Diagnostics, Polling, Automatic Data Rate Detection, Automatic Parity Recognition, Made to Specific Needs
Price: $750
Distribution Method: End user
Number Installed to Date: Under 100
Date First Installed: 1982
(See Vendor Profile Page V-9)

DATASTREAM COMMUNICATION, INC.
774
Conversion Function: Code Conversion
Number of Ports Supported: 24
Transmission Mode: Full-Duplex
Standard Transmission Rate: Asynchronous/Synchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps
Code Conversion: Ascii to Ebcdic, Ebcdic to Ascii
Interface Conversion: RS-232 to RG-59
Features: Data Compression, Diagnostics, Automatic Data Rate Detection, Automatic Parity Recognition
Price: $4,000 to $10,000
Monthly Maintenance Fee: $40
Distribution Method: End user
Number Installed to Date: Under 100
Date First Installed: 1980
(See Vendor Profile Page V-9)

DATASTREAM COMMUNICATION, INC.
776
Conversion Function: Code Conversion
Number of Ports Supported: 8
Transmission Mode: Full-Duplex
Standard Transmission Rate: Asynchronous/Synchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps
Code Conversion: Ascii to Ebcdic, Ebcdic to Ascii
Interface Conversion: RS-232 to RG-59
Features: Data Compression, Diagnostics, Automatic Data Rate Detection, Automatic Parity Recognition
Price: $6,000 to $9,008
Monthly Maintenance Fee: $40
Distribution Method: End user
Number Installed to Date: Under 100
Date First Installed: 1980

DATASTREAM COMMUNICATION, INC.
874
Conversion Function: Code Conversion
Number of Ports Supported: 16
Transmission Mode: Full-Duplex
Standard Transmission Rate: Asynchronous/Synchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps
Code Conversion: Ebcdic to Ascii, Ascii to Ebcdic
Interface Conversion: RS-232 to RG-59
Features: Data Compression, Diagnostics, Automatic Data Rate Detection, Automatic Parity Recognition
Price: $16,000
Monthly Maintenance Fee: $55
Distribution Method: End user
Number Installed to Date: Under 100
Date First Installed: 1981

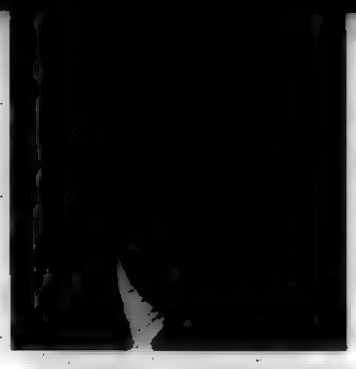
DATASTREAM COMMUNICATION, INC.
MPC
Conversion Function: Code Conversion
Number of Ports Supported: 24
Standard Transmission Rate: Asynchronous/Synchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps
Code Conversion: Ascii to Ebcdic, Ebcdic to Ascii
Interface Conversion: RS-232
Features: Data Compression, Diagnostics, Automatic Data Rate Detection, Automatic Parity Recognition
Price: $6,000 to $12,000
Monthly Maintenance Fee: $150
Distribution Method: End user
Number Installed to Date: Under 100
Date First Installed: January 1984

DATA TECHNOLOGY INDUSTRIES
MIDDLEMAN
Conversion Function: Code Conversion, Emulator
Number of Ports Supported: 1
Transmission Mode: Half-Duplex, Full-Duplex
Standard Transmission Rate: Asynchronous - 150 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 9,600 bps
Code Conversion: Ascii to 12-13 Bit Parallel
Features: Memory Test Initialization
Price: $550
Distribution Method: Third-party
Number Installed to Date: 100 - 500
Date First Installed: 1980
(See Vendor Profile Page V-9)

DCA/ITAC
INA/ATC
Conversion Function: Code Conversion, Protocol Conversion
Number of Ports Supported: 24
Transmission Mode: Half-Duplex, Full-Duplex
Standard Transmission Rate: Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps:
Asynchronous/Synchronous - 2,400 bps, 4,800 bps, 9,600 bps
Code Conversion: Ascii to Ebcdic
Protocol Conversion: Ascii to 3270/BSC, Ascii to SDLC/SNA
Features: Concentration, Automatic Data Rate Detection, Dial-up Modem Support
Price: $8,950 to $14,950
Distribution Method: End user, Third-party
Number Installed to Date: Under 100
(See Vendor Profile Page V-10)

DIGITAL ASSOCIATES CORP.
COMMUNICATION PRINTER INTERFACE 7141
Conversion Function: Interface Conversion
Number of Ports Supported: 1
Transmission Mode: Half-Duplex, Full-Duplex
Standard Transmission Rate: Synchronous - 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps
Code Conversion: Ebcdic to Ascii
Interface Conversion: IBM 2780, 3780 to Parallel
Features: Data Compression, Diagnostics, Polling, Automatic Parity Recognition, Autoanswer
Price: $1,650
Monthly Maintenance Fee: $40
Distribution Method: End user
Number Installed to Date: Under 100
Date First Installed: 1979
(See Vendor Profile Page V-10)

DIGITAL ASSOCIATES CORP.
RLPS 901080
Conversion Function: Interface Conversion
Number of Ports Supported: 2
Transmission Mode: Half-Duplex, Full-Duplex
Standard Transmission Rate: Synchronous - 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps, 19,200 bps
Code Conversion: Any Code to Standard
Interface Conversion: Parallel to RS-232C
Protocol Conversion: Parallel to Synchronous X.25
Features: Data Compression, Diagnostics, Polling, Automatic Parity Recognition, Autoanswer, Autodial
Price: $6,790



"GET IBM 3270, 3780 AND HASP COMMUNICATIONS—ADDING A ONE-BOARD PROCESSOR TO MY PC?"

"YOU CAN WITH PERSYST."

The Persyst DCP/88. The only compatible front end communications processor that can support a range of IBM communications.

It's a Persyst exclusive.

The DCP/88 distributed communications processor. A one-board computer that can be configured by software to handle communications between a PC and another computer system.

In fact, the DCP/88 enables the IBM or TI PC to support a range of sophisticated IBM communications—all with just one processor.

So it gives corporate users unprecedented, low-cost flexibility to incorporate the PC into virtually any environment.

Convert any PC into an IBM 3270 terminal. An IBM 2780/3780 RJE workstation. Or a HASP/RJE workstation—instantly.

Just combine the DCP/88 with Persyst software—and you can connect your PC to any compatible host mainframe or minicomputer.

PC/3270 enables your PC to emulate an IBM 3274 Cluster control unit and 3278 terminal, supporting up to four additional devices. Including a printer and three other PCs functioning as 3278 terminals.

PC/3780 converts your PC into a 2780/3780 remote job entry terminal that can send and receive batch files to and from the host.

And with PC/HASP, your PC instantly becomes a full-function HASP/RJE workstation that can support up to seven input and seven output multi-leaved job streams concurrently.

Capability to support your communications needs now. And in the future.

Because the DCP/88 supports bisync, SDLC, HDLC and async protocols, it is the only communications processor you'll ever have to buy.

Use it to connect your PC to an expanding network of IBM communications. Configure your system to meet virtually any communications need—without adding another piece of hardware. Or expense.

All of which makes the DCP/88 as practical as it is powerful.

The Persyst Coax/3278. Still another way to expand your IBM communications.

Here's another fast way to incorporate the PC into existing SNA or bisync data processing installations.

The Coax/3278. A single-slot expansion board that converts your PC into an IBM 3278 display terminal. And with its high-speed coaxial port, you can connect the PC directly to IBM 3274 or 3276 cluster controllers.

Sophisticated communications products for the corporate user. Insist on Persyst.

Persyst communications products are designed to make corporate information systems more powerful. And more efficient.

Write or call Persyst today for complete information.

PERSYST

Persyst Products, Personal Systems Technology, Inc., 15801 Rockfield Blvd., Suite A, Irvine, CA 92714. Telephone (714) 859-8871. Telex: 467864.

THE DCP/88™ BY PERSYST.

Converters/Emulators

Monthly Maintenance Fee: $40
Distribution Method: End user
Number Installed to Date: Under 100
Date First Installed: 1981

SIVERSPEED DATA RESOURCES, INC.
HYDRA II
Conversion Function: Code Conversion
Number of Ports Supported: 16
Transmission Mode: Full-Duplex
Standard Transmission Rate: Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps
Code Conversion: Ascii to Ebcdic, Ebcdic to Ascii
Features: Diagnostics, Automatic Data Rate Detection, Automatic Parity Recognition, Redundant Data Suppression
Price: $6,900 to $9,900
Distribution Method: End user
Number Installed to Date: Under 100
Date First Installed: January 1983
(See Vendor Profile Page V-10)

SYNATECH DATA SYSTEMS
DYNA-TEST 1000
Conversion Function: Interface Conversion, Code Conversion
Transmission Mode: Half-Duplex, Full-Duplex
Standard Transmission Rate: Asynchronous/Synchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps, 19,200 bps, 56,000 bps
Code Conversion: Ascii to Ebcdic, Ebcdic to Ascii
Interface Conversion: RS-449 to RS-232, V.35 to RS-232, Bell 303 to RS-232
Mode Conversion: Half-Duplex to Full-Duplex, Full-Duplex to Half-Duplex
Features: Diagnostics, Polling, Automatic Data Rate Detection, Automatic Parity Recognition, Autoanswer, High-Speed Integral Tape
Price: $8,000
Monthly Maintenance Fee: $35
Distribution Method: End user, Third-party
Number Installed to Date: 500 - 1,000
Date First Installed: 1980
(See Vendor Profile Page V-11)

SYNATECH DATA SYSTEMS
DYNA-TEST 2000 C
Conversion Function: Interface Conversion, Code Conversion
Transmission Mode: Half-Duplex, Full-Duplex
Standard Transmission Rate: Asynchronous/Synchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps, 19,200 bps
Code Conversion: Ascii to Ebcdic, Ebcdic to Ascii
Interface Conversion: RS-449 to RS-232, V.35 to RS-232, Bell 303 to RS-232
Mode Conversion: Half-Duplex to Full-Duplex, Full-Duplex to Half-Duplex
Protocol Conversion: SDLC/SNA to Synchronous
Features: Diagnostics, Polling, Automatic Data Rate Detection, Automatic Parity Recognition, Switch Selectable Emulator
Price: $13,000
Monthly Maintenance Fee: $45
Distribution Method: End user, Third-party
Number Installed to Date: 500 - 1,000

SYNATECH PACKET TECHNOLOGY, INC.
MULTI-PAD X.25
Conversion Function: Code Conversion, Protocol Conversion, Speed Conversion
Number of Ports Supported: 16
Transmission Mode: Full-Duplex
Standard Transmission Rate: Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps
Code Conversion: Ascii to Asynchronous X.25, Baudot to Synchronous X.25
Interface Conversion: RS-232 to RS-232
Mode Conversion: Half-Duplex to Full-Duplex, Full-Duplex to Half-Duplex
Protocol Conversion: Asynchronous Ascii to X.25, Asynchronous Baudot to X.25
Features: Concentration, Data Compression, Diagnostics, Automatic Data Rate Detection, Automatic Parity Recognition, Autoanswer, Autospeed, Autoparity
Price: $2,695 to $3,400
Distribution Method: End user
Number Installed to Date: 100 - 500
Date First Installed: December 1982
(See Vendor Profile Page V-11)

SYNATECH PACKET TECHNOLOGY, INC.
MULTI-PLEX X.25
Conversion Function: Code Conversion, Protocol Conversion, Speed Conversion
Number of Ports Supported: 8
Transmission Mode: Full-Duplex
Standard Transmission Rate: Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps
Code Conversion: Ascii to X.25
Interface Conversion: RS-232 to RS-232
Mode Conversion: Half-Duplex to Full-Duplex
Protocol Conversion: Asynchronous Ascii to X.25
Features: Concentration, Data Compression, Diagnostics, Automatic Data Rate Detection, Automatic Parity Recognition, Autoanswer, Autospeed, Autoparity
Price: $1,695 to $2,695
Distribution Method: End user
Number Installed to Date: 500 - 1,000
Date First Installed: December 1980

SYSTECH TECHNOLOGY MESSAGE HANDLER
Conversion Function: Interface Conversion, Code Conversion, Protocol Conversion, Speed Conversion
Number of Ports Supported: 3
Transmission Mode: Half-Duplex, Full-Duplex
Standard Transmission Rate: Asynchronous - 9,600 bps
Code Conversion: Baudot to Ascii, Ascii to Baudot
Interface Conversion: RS-232C to CCITT V.27
Mode Conversion: Half-Duplex to Full-Duplex, Full-Duplex to Half-Duplex
Features: Diagnostics, Polling, Automatic Data Rate Detection, Autoanswer
Price: $495 to $1,995
Distribution Method: OEM
Number Installed to Date: 500 - 1,000
Date First Installed: 1978
(See Vendor Profile Page V-11)

TORRICAN, INC.
FS-100 CODEM
Conversion Function: Interface Conversion, Code Conversion, Protocol Conversion, Speed Conversion, Full Document Conversion
Number of Ports Supported: 2
Transmission Mode: Half-Duplex, Full-Duplex
Standard Transmission Rate: Synchronous - 2,400 bps, Asynchronous - 9,600 bps
Code Conversion: Ascii to Configured, Ebcdic to Configured, Typesetting to Configured
Interface Conversion: Asynchronous to BSC, BSC to BSC, Asynchronous to Asynchronous
Mode Conversion: Half-Duplex to Full-Duplex, Full-Duplex to Half-Duplex
Protocol Conversion: Teletype to Configured, 2770 to Configured, 3780 to Configured
Features: Diagnostics, Polling, Automatic Data Rate Detection, Automatic Parity Recognition, Autoanswer
Price: $13,000
Distribution Method: End user
Number Installed to Date: Under 100
Date First Installed: September 1982
(See Vendor Profile Page V-12)

TRANDALF DATA, INC.
IFC 200 SERIES
Conversion Function: Interface Conversion
Number of Ports Supported: 1
Code Conversion: RS-232C to RS-422 or RS-423, CCITT V.35 to RS-232C, Bell 301 or RS-422, RS-423 to RS-232C
Price: $400 to $650
Distribution Method: End user
Number Installed to Date: 1,000 - 5,000
(See Vendor Profile Page V-12)

TRANDALF DATA, INC.
PIN 3270E-7
Conversion Function: 3270-Type Controller
Number of Ports Supported: 16
Transmission Mode: Full-Duplex
Standard Transmission Rate: Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps
Protocol Conversion: TTY II to 3270 BSC
Features: Diagnostics, User Programmable
Price: $7,900 to $13,000
Distribution Method: End user
Number Installed to Date: Under 100
Date First Installed: 1983

GATEWAY COMMUNICATIONS, INC.
GATEWAY PROCESSOR
Conversion Function: Interface Conversion, Code Conversion, Protocol Conversion, Speed Conversion, Emulator
Number of Ports Supported: 16
Transmission Mode: Half-Duplex, Full-Duplex
Standard Transmission Rate: Asynchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 9,600 bps; Asynchronous/Synchronous - 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 19,200 bps
Code Conversion: Ascii to Ebcdic, Ebcdic to Ascii
Interface Conversion: SNA to Ascii, SNA to BSC, BSC to SNA
Mode Conversion: Half-Duplex to Full-Duplex, Full-Duplex to Half-Duplex
Protocol Conversion: 3270 SNA to Ascii, BSC 3270 to Ascii
Features: Concentration, Diagnostics, Polling, Automatic Data Rate Detection, Automatic Parity Recognition, Autoanswer
Price: $1,560
Distribution Method: Third-party
(See Vendor Profile Page V-12)

GATEWAY COMMUNICATIONS, INC.
GATEWAY PROCESSOR
Conversion Function: Interface Conversion, Code Conversion, Protocol Conversion, Speed Conversion, Emulator
Number of Ports Supported: 16
Transmission Mode: Half-Duplex, Full-Duplex
Standard Transmission Rate: Asynchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps; Asynchronous/Synchronous - 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 19,200 bps

Code Conversion: Ascii to Ebcdic, Ebcdic to Ascii
Interface Conversion: SNA to Ascii, SNA to BSC, BSC to SNA
Mode Conversion: Half-Duplex to Full-Duplex, Full-Duplex to Half-Duplex
Protocol Conversion: 3270 SNA to Ascii, BSC 3270 to Ascii
Features: Concentration, Diagnostics, Polling, Automatic Data Rate Detection, Automatic Parity Recognition, Autoanswer
Price: $1,560
Distribution Method: Third-party

HERMSDEN DATA SYSTEMS
COMMCENTER 2
Conversion Function: Interface Conversion, Code Conversion, Speed Conversion
Number of Ports Supported: 2
Transmission Mode: Half-Duplex, Full-Duplex
Code Conversion: Ascii to Ebcdic, Ascii to Baudot
Interface Conversion: RS-232 to RG-11
Features: Polling, Automatic Data Rate Detection, Automatic Parity Recognition, Autoanswer
Price: $995
Distribution Method: Third-party
Number Installed to Date: 5,000 - 10,000
Date First Installed: April 1980
(See Vendor Profile Page V-14)

IBM CORP.
7426
Conversion Function: Protocol Conversion
Transmission Mode: Half-Duplex, Full-Duplex
Standard Transmission Rate: Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps
Protocol Conversion: Ascii to SDLC
Features: Diagnostics, Autoanswer
(See Vendor Profile Page V-14)

ICOT CORP.
VTS 252
Conversion Function: Code Conversion, Protocol Conversion, Speed Conversion
Number of Ports Supported: 16
Transmission Mode: Full-Duplex
Standard Transmission Rate: Asynchronous/Synchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps, 19,200 bps
Code Conversion: Ascii to 3270 Ebcdic
Mode Conversion: Half-Duplex to Full-Duplex, Full-Duplex to Half-Duplex
Protocol Conversion: Ascii to Bisynchronous, Ascii to SDLC
Features: Concentration, Data Compression, Diagnostics, Polling, Automatic Data Rate Detection, Automatic Parity Recognition, Autoanswer, Multiple Host, Automatic Log-on
Price: $5,800 to $8,200
Distribution Method: Third-party
Number Installed to Date: Under 100
Date First Installed: 1982
(See Vendor Profile Page V-15)

IDE ASSOCIATES, INC.
IDECOMM 3278/NPR-001 SPR-01
Conversion Function: Emulator
Number of Ports Supported: 1
Transmission Mode: Half-Duplex
Standard Transmission Rate: 25000 bps
Code Conversion: IBM PC to IBM 3278/3274
Interface Conversion: IBM PC to IBM 3278/3274
Protocol Conversion: IBM PC to IBM 3278/3274
Features: Diagnostics, 3278/3274 to IBM PC Conversion
Price: $1,195
Distribution Method: Third-party
Number Installed to Date: Under 100
Date First Installed: December 1983
(See Vendor Profile Page V-15)

INNOVATIVE MICROSYSTEMS, INC.
IMI SERIES 570
Conversion Function: Interface Conversion, Code Conversion, Protocol Conversion, Speed Conversion
Number of Ports Supported: 5
Transmission Mode: Half-Duplex, Full-Duplex
Standard Transmission Rate: Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps, 19,200 bps
Code Conversion: Ascii to Ebcdic, Ebcdic to Ascii, Serial to Parallel
Interface Conversion: Ascii to Ebcdic, Ebcdic to Ascii, Serial to Parallel
Mode Conversion: Half-Duplex to Full-Duplex, Full-Duplex to Half-Duplex
Protocol Conversion: Asynchronous to Printer
Features: Diagnostics, Polling, Automatic Data Rate Detection, Automatic Parity Recognition, Autoanswer
Price: $600 to $2,000
Distribution Method: OEM
Number Installed to Date: Under 100
Date First Installed: 1981
(See Vendor Profile Page V-16)

INNOVATIVE ELECTRONICS, INC.
MC-80/188
Conversion Function: Protocol Conversion, Emulator
Number of Ports Supported: 2
Transmission Mode: Half-Duplex, Full-Duplex
Standard Transmission Rate: Asynchronous - 9,600 bps; Synchronous - 19,200 bps
Protocol Conversion: 2780/3780 BSC to Asynchronous Ascii
Features: Diagnostics, Polling, Autoanswer
Price: $1,445 to $1,845
Distribution Method: End user
Number Installed to Date: 100 - 500
Date First Installed: January 1980
(See Vendor Profile Page V-16)

INNOVATIVE ELECTRONICS, INC.
MC-80/288
Conversion Function: Protocol Conversion
Number of Ports Supported: 2
Transmission Mode: Half-Duplex, Full-Duplex
Standard Transmission Rate: Asynchronous - 9,600 bps; Synchronous - 19,200 bps
Protocol Conversion: Burroughs Poll/Select to Asynchronous Ascii
Features: Diagnostics, Polling, Autoanswer
Price: $1,445 to $1,845
Distribution Method: End user
Number Installed to Date: 500 - 1,000
Date First Installed: January 1980

INNOVATIVE ELECTRONICS, INC.
MC-80/388
Conversion Function: Protocol Conversion
Number of Ports Supported: 2
Transmission Mode: Half-Duplex, Full-Duplex
Standard Transmission Rate: Synchronous - 9,600 bps; Asynchronous - 19,200 bps
Protocol Conversion: IBM 3270 BSC to Burroughs Poll/Select
Features: Diagnostics, Polling, Autoanswer
Price: $2,095 to $2,245
Distribution Method: End user
Number Installed to Date: 100 - 500
Date First Installed: January 1980

INNOVATIVE ELECTRONICS, INC.
MC-80/488
Conversion Function: Protocol Conversion
Number of Ports Supported: 2
Transmission Mode: Half-Duplex, Full-Duplex
Standard Transmission Rate: Asynchronous - 9,600 bps, Synchronous - 19,200 bps
Protocol Conversion: IBM 3270 BSC to NCR Poll/Select
Features: Diagnostics, Polling, Autoanswer
Price: $2,095 to $2,245
Distribution Method: End user
Number Installed to Date: 100 - 500
Date First Installed: January 1980

INNOVATIVE ELECTRONICS, INC.
MC-80/588
Conversion Function: Protocol Conversion, Emulator
Number of Ports Supported: 2
Transmission Mode: Half-Duplex, Full-Duplex
Standard Transmission Rate: Asynchronous - 9,600 bps; Synchronous - 19,200 bps
Code Conversion: Ebcdic to Ascii
Mode Conversion: Synchronous to Asynchronous
Protocol Conversion: 3270 BSC to Asynchronous Ascii
Features: Diagnostics, Polling, Autoanswer
Price: $1,495 to $1,695
Distribution Method: End user
Number Installed to Date: 100 - 500
Date First Installed: October 1980

INNOVATIVE ELECTRONICS, INC.
MC-80/682
Conversion Function: Protocol Conversion
Number of Ports Supported: 1
Transmission Mode: Half-Duplex, Full-Duplex
Standard Transmission Rate: Asynchronous - 9,600 bps; Synchronous - 19,200 bps
Protocol Conversion: 3270 BSC to Asynchronous Ascii
Features: Diagnostics, Polling, Autoanswer
Price: $1,650
Distribution Method: End user
Number Installed to Date: Under 100
Date First Installed: December 1982

INTECOM, INC.
3270 IPC
Conversion Function: Code Conversion, Protocol Conversion, Speed Conversion, Emulator
Number of Ports Supported: 16
Transmission Mode: Half-Duplex
Standard Transmission Rate: Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps, 19,200 bps
Code Conversion: Ascii to IBM 3270 Bisynchronous
Protocol Conversion: Ascii to 3270 Bisynchronous
Features: Diagnostics, Automatic Data Rate Detection, Automatic Parity Recognition, Autoanswer, Multiplexing
Price: $15,000
Distribution Method: End user
Number Installed to Date: Under 100
Date First Installed: 1983
(See Vendor Profile Page V-16)

INTECOM, INC.
X.25 IPC
Conversion Function: Code Conversion, Protocol Conversion, Speed Conversion, Emulator
Number of Ports Supported: 16
Transmission Mode: Half-Duplex, Full-Duplex
Standard Transmission Rate: Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 19,200 bps; Asynchronous/Synchronous - 9,600 bps
Code Conversion: Ascii to X.25 Packet

Converters/Emulators

Mode Conversion: Half-Duplex to Full-Duplex, Full-Duplex to Half-Duplex
Protocol Conversion: Ascii to X.25
Features: Diagnostics, Automatic Data Rate Detection, Automatic Parity Recognition, Autoanswer, Multiplexer
Price: $15,000
Distribution Method: End user
Number Installed to Date: Under 100
Date First Installed: 1983

INTEGRATED DESIGN ENGINEERING, INC.
IDE-3011
Conversion Function: Protocol Conversion, Speed Conversion
Number of Ports Supported: 1
Transmission Mode: Half-Duplex, Full-Duplex
Standard Transmission Rate: Asynchronous - 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps, 19,200 bps
Mode Conversion: Half-Duplex to Full-Duplex, Full-Duplex to Half-Duplex
Protocol Conversion: NCR 301 to Serial TTY
Features: Diagnostics, Polling, Automatic Parity Recognition
Price: $500
Distribution Method: End user
Number Installed to Date: Under 100
Date First Installed: 1982
(See Vendor Profile Page V-16)

INTEGRATED DESIGN ENGINEERING, INC.
IDE-3013
Conversion Function: Protocol Conversion, Speed Conversion, Emulator
Number of Ports Supported: 1
Transmission Mode: Half-Duplex, Full-Duplex
Standard Transmission Rate: Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps, 19,200 bps
Mode Conversion: Half-Duplex to Full-Duplex, Full-Duplex to Half-Duplex
Protocol Conversion: NCR 301 to Serial TTY
Features: Diagnostics, Polling, Automatic Parity Recognition
Price: $500
Distribution Method: End user
Number Installed to Date: Under 100
Date First Installed: September 1982

INTEGRATED DESIGN ENGINEERING, INC.
IDE-3014
Conversion Function: Protocol Conversion, Speed Conversion
Number of Ports Supported: 4
Transmission Mode: Half-Duplex, Full-Duplex
Standard Transmission Rate: Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps, 19,200 bps
Mode Conversion: Half-Duplex to Full-Duplex, Full-Duplex to Half-Duplex
Protocol Conversion: NCR 301 to Serial TTY
Features: Diagnostics, Polling, Automatic Parity Recognition
Price: $500
Distribution Method: End user
Number Installed to Date: Under 100
Date First Installed: 1982

INTEGRATED DESIGN ENGINEERING, INC.
IDE-3015
Conversion Function: Protocol Conversion, Speed Conversion, Emulator
Number of Ports Supported: 1
Transmission Mode: Half-Duplex, Full-Duplex
Standard Transmission Rate: Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps, 19,200 bps
Interface Conversion: NCR PC BUS to RS-232
Mode Conversion: Half-Duplex to Full-Duplex, Full-Duplex to Half-Duplex
Protocol Conversion: NCR 301 to Serial TTY
Features: Diagnostics, Polling, Automatic Parity Recognition
Price: $450
Distribution Method: End user
Number Installed to Date: Under 100
Date First Installed: 1983

INTEGRATED DESIGN ENGINEERING, INC.
IDE-3016
Conversion Function: Protocol Conversion, Speed Conversion, Emulator
Number of Ports Supported: 4
Transmission Mode: Half-Duplex, Full-Duplex
Standard Transmission Rate: Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps, 19,200 bps
Mode Conversion: Half-Duplex to Full-Duplex, Full-Duplex to Half-Duplex
Protocol Conversion: NCR 301 to Serial TTY
Features: Concentration, Diagnostics, Polling, Automatic Parity Recognition
Price: $1,850
Distribution Method: End user
Number Installed to Date: Under 100
Date First Installed: September 1982

INTEGRATED DESIGN ENGINEERING, INC.
IDE-3018
Conversion Function: Protocol Conversion, Speed Conversion, Emulator
Number of Ports Supported: 4
Transmission Mode: Half-Duplex, Full-Duplex
Standard Transmission Rate: Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps, 19,200 bps
Mode Conversion: Half-Duplex to Full-Duplex, Full-Duplex to Half-Duplex
Protocol Conversion: NCR 301 to Serial TTY
Features: Concentration, Diagnostics, Polling, Automatic Parity Recognition
Price: $1,850
Distribution Method: End user
Number Installed to Date: Under 100
Date First Installed: 1982

INTELLIGENT BUSINESS SYSTEMS, INC.
CSX 1024
Conversion Function: Code Conversion, Protocol Conversion
Number of Ports Supported: 2,048
Transmission Mode: Full-Duplex
Standard Transmission Rate: Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 9,600; Asynchronous/Synchronous - 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps
Code Conversion: Baudot to Ascii, CCITT X.62 to Telex
Protocol Conversion: PSTN DDD to Telex, Teletex to Telex, X.71 to X.75
Features: Concentration, Data Compression, Diagnostics, Polling, Automatic Data Rate Detection, Automatic Parity Recognition, Autoanswer
Price: $60,000
Distribution Method: End user
Number Installed to Date: Under 100
Date First Installed: January 1984
(See Vendor Profile Page V-16)

INTELLIGENT BUSINESS SYSTEMS, INC.
CSX-1024
Conversion Function: Code Conversion, Speed Conversion
Number of Ports Supported: 2,048
Transmission Mode: Full-Duplex
Standard Transmission Rate: Asynchronous/Synchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps; Synchronous - 19,200 bps, 64,000 bps
Code Conversion: Ascii to Baudot, X.61 to Telex
Protocol Conversion: X.71 to X.75, Telex to Teletex, PSTN (DDD) to Telex
Features: Concentration, Data Compression, Diagnostics, Polling, Automatic Data Rate Detection, Automatic Parity Recognition, Autoanswer, Full Redundancy
Price: $60,000
Distribution Method: End user
Number Installed to Date: Under 100
Date First Installed: February 1982

INTER-LINK
2101/2501
Conversion Function: Code Conversion, Protocol Conversion
Number of Ports Supported: 5
Transmission Mode: Half-Duplex, Full-Duplex
Standard Transmission Rate: Asynchronous/Synchronous - 9,600 bps
Code Conversion: Ascii to Ebcdic, Ebcdic to Ascii
Protocol Conversion: IBM BSC to Asynchronous Ascii, IBM SDLC/SNA to Asynchronous Ascii
Features: Concentration, Diagnostics, Polling, Automatic Data Rate Detection, Automatic Parity Recognition, Autoanswer
Price: $995 to $1,900
Monthly Maintenance Fee: $20
Distribution Method: Third-party
Number Installed to Date: Under 100
Date First Installed: September 1982
(See Vendor Profile Page V-16)

INTERGE. SYSTEMS, INC.
3276-1
Conversion Function: Interface Conversion, Code Conversion, Protocol Conversion, Speed Conversion, Emulator
Number of Ports Supported: 8
Transmission Mode: Full-Duplex
Standard Transmission Rate: Asynchronous/Synchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps
Code Conversion: Ascii to BSC
Interface Conversion: Ascii to BSC
Mode Conversion: Half-Duplex to Full-Duplex, Full-Duplex to Half-Duplex
Protocol Conversion: Ascii to BSC
Features: Diagnostics, Polling, Automatic Data Rate Detection, Automatic Parity Recognition, Autoanswer
Price: $3,500
Monthly Maintenance Fee: $35
Distribution Method: End user
Number Installed to Date: Under 100
Date First Installed: February 1981
(See Vendor Profile Page V-17)

INTERGE. SYSTEMS, INC.
3276-12
Conversion Function: Interface Conversion, Code Conversion, Protocol Conversion, Speed Conversion, Emulator
Number of Ports Supported: 8
Transmission Mode: Full-Duplex
Standard Transmission Rate:

Asynchronous/Synchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps
Code Conversion: Ascii to SDLC
Interface Conversion: Ascii to SNA
Mode Conversion: Half-Duplex to Full-Duplex, Full-Duplex to Half-Duplex
Protocol Conversion: Ascii to BSC
Features: Diagnostics, Polling, Automatic Data Rate Detection, Automatic Parity Recognition
Price: $3,500
Monthly Maintenance Fee: $35
Distribution Method: End user
Number Installed to Date: Under 100
Date First Installed: February 1981

TYMS CORPORATION SYSTEMS
MULTIDISK READER
Conversion Function: Floppy Disk Conversion
Number of Ports Supported: 1
Transmission Mode: Half-Duplex, Full-Duplex
Standard Transmission Rate: Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps, 19,200 bps
Code Conversion: Ascii to Ascii
Features: Reads Floppy Disk, WP, PC
Price: $12,900 to $15,900
Distribution Method: OEM
Number Installed to Date: 100 - 200
Date First Installed: 1982
(See Vendor Profile Page V-17)

J B M ELECTRONICS
ASYNCHRONOUS PROTOCOL CONVERTERS
Conversion Function: Code Conversion, Protocol Conversion, Speed Conversion
Number of Ports Supported: 16
Transmission Mode: Full-Duplex
Standard Transmission Rate: Synchronous - 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps, 19,200 bps
Code Conversion: Ascii to Ebcdic, Ebcdic to Ascii
Mode Conversion: Half-Duplex to Full-Duplex, Full-Duplex to Half-Duplex
Protocol Conversion: 3275 Synchronous to Asynchronous, 3270 SNA to Asynchronous
Features: Concentration, Diagnostics, Polling, Automatic Data Rate Detection, Autoanswer
Price: $995
Distribution Method: Third-party
Number Installed to Date: 500 - 1,000
Date First Installed: September 1979
(See Vendor Profile Page V-17)

KAMPMAN RESEARCH MANUFACTURING, INC.
MODEL 870
Conversion Function: Code Conversion, Protocol Conversion, Speed Conversion, Emulator
Number of Ports Supported: 8
Transmission Mode: Full-Duplex, Block Mode Operation
Standard Transmission Rate: Asynchronous - 75 bps, 110 bps, 300 bps, 600 bps, 9,600 bps; Asynchronous/Synchronous - 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 19,200 bps
Code Conversion: Ascii to Ebcdic
Protocol Conversion: Ascii to IBM 3270 BSC
Features: Concentration, Polling, Automatic Data Rate Detection, Autoanswer
Price: $3,395 to $8,295
Monthly Maintenance Fee: $65
Distribution Method: End user, OEM, Third-party
Number Installed to Date: 100 - 500
Date First Installed: January 1980
(See Vendor Profile Page V-17)

KAMPMAN RESEARCH MANUFACTURING, INC.
MODEL 871
Conversion Function: Code Conversion, Protocol Conversion, Speed Conversion, Emulator
Number of Ports Supported: 8
Transmission Mode: Full-Duplex, Block Mode Operation
Standard Transmission Rate: Asynchronous - 75 bps, 110 bps, 300 bps, 600 bps, 9,600 bps; Asynchronous/Synchronous - 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 19,200 bps
Code Conversion: Ascii to Ebcdic
Protocol Conversion: Ascii to Sperry Univac
Features: Concentration, Polling, Automatic Data Rate Detection, Autoanswer
Price: $3,395 to $8,295
Monthly Maintenance Fee: $65
Distribution Method: End user, OEM, Third-party
Number Installed to Date: 100 - 500
Date First Installed: January 1980

KAMPMAN RESEARCH MANUFACTURING, INC.
MODEL 872
Conversion Function: Code Conversion, Protocol Conversion, Speed Conversion, Emulator

Here are a few good reasons why you should make Local Data your protocol converter company.

Local Data's comprehensive line of local and remote protocol converters have been used around the world to make async-to-IBM communications simple and economical.

DATALYNX™/3274.
DataLynx™/3274 remote async ASCII protocol converter supports SNA/SDLC or BSC protocols. 80 types of ASCII async terminals can emulate IBM 3278 display stations. RS-232C ASCII async printers can emulate IBM 328X printers.

DATALYNX™/3780.
DataLynx™/3780 async ASCII-to-IBM 3780, 2780, 2770 and 3741 protocol converter supports EBCDIC BSC protocol on one channel and async ASCII devices on the other two channels. Features include transparency, mini/micro support and free file transfer program.

INTERLYNX™/3278.
InterLynx™/3278 allows the attachment of low-cost ASCII CRT terminals or p.c.'s to 3274/3276/4701 and 43XX integrated adaptor Type "A" coax ports. InterLynx/3278 enables the user to use async CRT's on IBM systems and switch to async applications under terminal control.

FILELYNX™/3278.
For micro-mainframe file transfers.

INTERLYNX™/3287.
InterLynx™/3287 allows attachment of ASCII printers to IBM Type "A" coax ports or 3274/3276/4701 controller and 4321/4331 CPU's.

SNA LU1 SCS and LU3 capability are standard with the InterLynx/3287. Features include parallel and serial ports and front panel set-up.

For more information call today.

LOCAL DATA · 2701 Toledo Street · Suite 706 · Torrance · CA · 90503
Telephone (213) 320-7126
Telex # 182518

Local Data

Local Data
"Your Lynx to IBM."

Converters/Emulators

Number of Ports Supported: 8
Transmission Mode: Full-Duplex, Block Mode Operation
Standard Transmission Rate: Asynchronous - 75 bps, 110 bps, 300 bps, 600 bps, 9,600 bps; Asynchronous/Synchronous - 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 19,200 bps
Code Conversion: Ascii to Ebcdic
Protocol Conversion: Ascii to 3270 SNA/SDLC
Features: Concentration, Polling, Automatic Data Rate Detection, Autoanswer
Price: $3,395 to $8,295
Monthly Maintenance Fee: $85
Distribution Method: End user, OEM, Third-party
Number Installed to Date: 100 - 500
Date First Installed: January 1980

KMW SYSTEMS CORP.
2780/3780
Conversion Function: Interface Conversion, Code Conversion, Protocol Conversion, Speed Conversion, Emulator
Number of Ports Supported: 3
Transmission Mode: Full-Duplex
Standard Transmission Rate: Asynchronous/Synchronous - 110 bps, 300 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps, 19,200 bps
Code Conversion: Ebcdic to Ascii, Ebcdic to Binary, Ebcdic to Card Punch
Interface Conversion: RS-232 Synchronous to Async, RS-232 Synchronous to Printer, RS-232 Synchronous to Card Reader
Mode Conversion: From Full-Duplex to Half-Duplex, Full to Full
Protocol Conversion: BSC to Asynchronous Ascii
Features: Concentration, Data Compression, Diagnostics, Polling, Automatic Data Rate Detection, Automatic Parity Recognition, Autoanswer
Price: $1,995
Monthly Maintenance Fee: $1
Distribution Method: Third-party
Number Installed to Date: 100 - 500
Date First Installed: 1978
(See Vendor Profile Page V-17)

KMW SYSTEMS CORP.
3770
Conversion Function: Interface Conversion, Code Conversion, Protocol Conversion, Speed Conversion, Emulator
Number of Ports Supported: 8
Transmission Mode: Half-Duplex, Full-Duplex
Standard Transmission Rate: Asynchronous/Synchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps, 19,200 bps
Code Conversion: Ebcdic SNA/SDLC to Asynchronous Ascii, Ebcdic to Binary, Ebcdic to 2780/3780
Interface Conversion: RS-232 Synchronous to RS-232 Asynchronous, RS-232 Synchronous to Binary, RS-232 Synchronous to 2780/3780
Mode Conversion: Half-Duplex to Full-Duplex, Full-Duplex to Half-Duplex
Protocol Conversion: Ebcdic SNA/SDLC to Asynchronous RS-232, Ebcdic SNA/SDLC to Synchronous Parallel, Synchronous RS-232 to Synchronous RS-232
Features: Concentration, Data Compression, Diagnostics, Polling, Automatic Data Rate Detection, Automatic Parity Recognition, Autoanswer
Price: $4,550
Distribution Method: Third-party
Number Installed to Date: Under 100
Date First Installed: 1981

KMW SYSTEMS CORP.
3777 SERIES II
Conversion Function: Interface Conversion, Code Conversion, Protocol Conversion, Speed Conversion, Emulator
Number of Ports Supported: 8
Transmission Mode: Half-Duplex, Full-Duplex
Standard Transmission Rate: Synchronous - 110 bps, 300 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps, 19,200 bps
Code Conversion: Ebcdic to Ascii, Ascii to Ebcdic
Mode Conversion: Half-Duplex to Full-Duplex, Full-Duplex to Half-Duplex
Protocol Conversion: SNA/SDLC Ebcdic to Asynchronous Ascii
Features: Data Compression, Diagnostics, Polling, Automatic Data Rate Detection, Automatic Parity Recognition, Autoanswer
Price: $4,550
Distribution Method: End user
Number Installed to Date: 100 - 500
Date First Installed: 1979

KMW SYSTEMS CORP.
HASP
Conversion Function: Interface Conversion, Code Conversion, Protocol Conversion, Speed Conversion, Emulator
Number of Ports Supported: 8
Standard Transmission Rate: Asynchronous/Synchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps, 19,200 bps
Code Conversion: Ebcdic to Ascii, Ebcdic to Binary
Interface Conversion: RS-232 to Synchronous, RS-232 to Ascii, RS-232 Synchronous to Parallel Async
Mode Conversion: Half-Duplex to Full-Duplex, Full-Duplex to Half-Duplex
Protocol Conversion: Synchronous Ebcdic to Asynchronous Ascii, Synchronous Ebcdic to Asynchronous Printer, Synchronous Ebcdic to Binary
Features: Concentration, Data Compression, Diagnostics, Polling, Automatic Data Rate Detection, Automatic Parity Recognition, Autoanswer
Price: $4,550
Monthly Maintenance Fee: $1
Distribution Method: Third-party
Number Installed to Date: 100 - 500
Date First Installed: 1977

LOCAL DATA, INC.
DATALYNX 3274
Conversion Function: Protocol Conversion
Number of Ports Supported: 10
Transmission Mode: Half-Duplex, Full-Duplex
Standard Transmission Rate: Asynchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps, 19,200 bps
Code Conversion: Ascii to Ebcdic, Ebcdic to Ascii
Protocol Conversion: BSC to Asynchronous, SNA/SDLC to Asynchronous
Features: Concentration, Data Compression, Diagnostics, Polling, Automatic Data Rate Detection, Autoanswer, Auxiliary Printer
Price: $6,000
Distribution Method: End user
Number Installed to Date: 100 - 500
Date First Installed: 1900
(See Vendor Profile Page V-16)

LOCAL DATA, INC.
DATALYNX 3780
Conversion Function: Protocol Conversion
Number of Ports Supported: 3
Transmission Mode: Half-Duplex, Full-Duplex
Standard Transmission Rate: Asynchronous/Synchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps
Code Conversion: Ascii to Ebcdic, Ebcdic to Ascii
Mode Conversion: Half-Duplex to Full-Duplex, Full-Duplex to Half-Duplex
Protocol Conversion: Asynchronous to BSC
Features: Diagnostics, Polling, Autoanswer, Transparency, Prompt Mode
Price: $1,750
Distribution Method: End user
Number Installed to Date: 500 - 1,000
Date First Installed: September 1980

LOCAL DATA, INC.
INTERLYNX 3278
Conversion Function: Protocol Conversion
Number of Ports Supported: 3
Transmission Mode: Full-Duplex
Standard Transmission Rate: Asynchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps
Code Conversion: Ascii to Ebcdic
Interface Conversion: RS-232C to IBM Type-A Coax
Mode Conversion: Half-Duplex to Full-Duplex
Protocol Conversion: IBM Type-A to Asynchronous
Features: Diagnostics, Automatic Data Rate Detection, Autoanswer, 50 Terminal Types
Price: $1,395
Distribution Method: End user
Number Installed to Date: 100 - 500
Date First Installed: April 1983

LOCAL DATA, INC.
INTERLYNX 3287
Conversion Function: Interface Conversion, Protocol Conversion
Number of Ports Supported: 3
Transmission Mode: Half-Duplex, Full-Duplex
Standard Transmission Rate: Asynchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps, 19,200 bps
Code Conversion: Ascii to Ebcdic
Interface Conversion: Asynchronous to IBM Type-A
Mode Conversion: From Half-Duplex to Full-Duplex
Protocol Conversion: BSC/SNA to Asynchronous
Features: Diagnostics, Supports RS-232C Centronics
Price: $1,750
Distribution Method: End user
Number Installed to Date: Under 100

MICOM SYSTEMS, INC.
MICRO600/X.25 CONCENTRATOR PAD
Conversion Function: Code Conversion, Protocol Conversion, Speed Conversion
Number of Ports Supported: 24
Transmission Mode: Half-Duplex, Full-Duplex
Standard Transmission Rate: Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps; Asynchronous/Synchronous - 1,200 bps, 1,800 bps, 2,400 bps, 4,800 bps, 19,200 bps; 9,600 bps
Code Conversion: 5-, 6-, 7-, 8-Bit to X.25 8-Bit Character
Mode Conversion: Full-Duplex to Full-Duplex
Protocol Conversion: Asynchronous to X.25, HDLC to X.25
Features: Concentration, Diagnostics, Automatic Data Rate Detection, Automatic Parity Recognition, Autoanswer, Full Support of DCITT X.3, X.28, X.29 Interfaces
Price: $2,050 to $4,600
Distribution Method: Third-party
Number Installed to Date: 500 - 1,000
Date First Installed: September 1982
(See Vendor Profile Page V-15)

MICOM SYSTEMS, INC.
MICRO7400 PROTOCOL CONVERTER
Number of Ports Supported: 12
Transmission Mode: Half-Duplex, Full-Duplex

Standard Transmission Rate: Asynchronous/Synchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps, 19,200 bps
Code Conversion: Ascii to Ebcdic
Protocol Conversion: Ascii to 3270 BSC, Ascii to 3270 SNA
Features: Data Compression, Diagnostics, Polling, Automatic Data Rate Detection, Autoanswer, 3270 Terminal Simulation
Price: $1,650 to $4,750
Distribution Method: Third-party
Number Installed to Date: Under 100
Date First Installed: January 1984

MICROLOGIC, INC.
BABYTALK
Conversion Function: Code Conversion, Emulator
Number of Ports Supported: 2
Transmission Mode: Half-Duplex, Full-Duplex
Standard Transmission Rate: Asynchronous/Synchronous - 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps
Code Conversion: Ascii to Ebcdic, Ebcdic to Ascii
Interface Conversion: RS-232 to CCITT V.21, RS-232 to CCITT V.23
Features: Diagnostics, Polling, Automatic Data Rate Detection, Automatic Parity Recognition, Autoanswer
Price: $595
Distribution Method: End user, OEM, Third-party
Number Installed to Date: 500 - 1,000
(See Vendor Profile Page V-19)

MIDWEST DATA SOURCE
APPLE II
Conversion Function: Interface Conversion, Protocol Conversion, Emulator
Number of Ports Supported: 3
Transmission Mode: Half-Duplex, Full-Duplex
Standard Transmission Rate: Synchronous - 75 bps, 3,600 bps
Code Conversion: Burroughs to Teletype
Protocol Conversion: Burroughs to Teletype
Features: Diagnostics, Polling, Automatic Parity Recognition
Price: $695 to $1,500
(See Vendor Profile Page V-20)

MIDWEST DATA SOURCE
APPLE III
Conversion Function: Interface Conversion, Protocol Conversion, Emulator
Number of Ports Supported: 3
Transmission Mode: Half-Duplex, Full-Duplex
Standard Transmission Rate: Synchronous - 75 bps, 3,600 bps
Interface Conversion: Burroughs to Teletype
Protocol Conversion: Burroughs to Teletype
Features: Diagnostics, Polling, Automatic Parity Recognition
Price: $695 to $1,595

MIDWEST DATA SOURCE
IBM
Conversion Function: Interface Conversion, Protocol Conversion, Emulator
Number of Ports Supported: 3
Transmission Mode: Half-Duplex, Full-Duplex
Standard Transmission Rate: Synchronous - 75 bps, 3,600 bps
Interface Conversion: Burroughs to Teletype
Protocol Conversion: Burroughs to Teletype
Features: Diagnostics, Polling, Automatic Parity Recognition
Price: $140 to $1,200
Distribution Method: End user

MODEMS PLUS, INC.
SMITE ONE
Conversion Function: Interface Conversion, Code Conversion, Protocol Conversion, Speed Conversion, Emulator
Number of Ports Supported: 3
Transmission Mode: Half-Duplex, Full-Duplex
Standard Transmission Rate: Asynchronous/Synchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps, 19,200 bps
Code Conversion: Ascii to Ebcdic, Ebcdic to Ascii
Interface Conversion: RS-232C to Parallel, RS-232C to RS-232C
Mode Conversion: Half-Duplex to Full-Duplex, Full-Duplex to Half-Duplex
Protocol Conversion: Burroughs to Ascii
Features: Data Compression, Diagnostics, Polling, Autoanswer
Price: $1,260
Monthly Maintenance Fee: $10
Distribution Method: Third-party
Number Installed to Date: 500 - 1,000
Date First Installed: June 1981
(See Vendor Profile Page V-20)

MODEMS PLUS, INC.
SMITE ONE
Conversion Function: Interface Conversion, Code Conversion, Protocol Conversion, Speed Conversion, Emulator
Number of Ports Supported: 5
Transmission Mode: Half-Duplex, Full-Duplex
Standard Transmission Rate: Asynchronous/Synchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps, 19,200 bps
Code Conversion: Ascii to BSC, Ascii to SDLC, BSC to SDLC
Interface Conversion: RS-232C to NRZI, RS-232C to Parallel
Mode Conversion: Half-Duplex to Full-Duplex, Full-Duplex to Half-Duplex
Protocol Conversion: IBM BSC to IBM SDLC, Ascii to SDLC
Features: Concentration, Data Compression, Diagnostics, Polling, Autoanswer
Price: $3,900
Monthly Maintenance Fee: $25
Distribution Method: Third-party
Number Installed to Date: Under 100
Date First Installed: June 1983

NATIONAL COMPUTER SYSTEMS, INC.
PROTOCOL CONVERTER
Conversion Function: Interface Conversion, Code Conversion, Speed Conversion, Emulator
Number of Ports Supported: 4
Transmission Mode: Full-Duplex
Standard Transmission Rate: Asynchronous - 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps
Code Conversion: Asynchronous to Poll/Select
Interface Conversion: Asynchronous to Poll/Select
Mode Conversion: Half-Duplex to Full-Duplex, Duplex to Half-Duplex
Protocol Conversion: Asynchronous to Poll/Select
Features: Data Compression, Diagnostics, Polling, Automatic Data Rate Detection, Automatic Parity Recognition
Price: $1,500
Distribution Method: End user
Date First Installed: June 1984
(See Vendor Profile Page V-21)

NESTAR SYSTEMS, INC.
3270 BSC
Conversion Function: Emulator
Number of Ports Supported: 16
Transmission Mode: Half-Duplex
Standard Transmission Rate: Synchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps
Code Conversion: Ebcdic to Ascii
Features: Concentration, Data Compression, Diagnostics, Polling
Price: $3,000
Distribution Method: End user
Date First Installed: August 1985
(See Vendor Profile Page V-21)

NESTAR SYSTEMS, INC.
3270 SNA
Conversion Function: Emulator
Number of Ports Supported: 32
Transmission Mode: Full-Duplex
Standard Transmission Rate: Synchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps
Code Conversion: Ebcdic to Ascii
Features: Concentration, Data Compression, Diagnostics, Polling
Price: $4,000
Distribution Method: End user

NORTHERN TELECOM, INC.
PC
Conversion Function: Interface Conversion, Code Conversion, Protocol Conversion, Speed Conversion
Number of Ports Supported: 2
Transmission Mode: Full-Duplex
Standard Transmission Rate: Asynchronous/Synchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps; Synchronous - 19,200 bps
Code Conversion: Ebcdic to Ascii, Ascii to Ebcdic
Protocol Conversion: HDLC/X.25/BSC to HDLC/X.25/BSC
Features: Data Compression, Diagnostics, Polling, Automatic Data Rate Detection, Automatic Parity Recognition
Price: $4,200
Distribution Method: End user, OEM
Number Installed to Date: Under 100
Date First Installed: November 1983
(See Vendor Profile Page V-22)

NORTHERN TELECOM, INC.
SL-1
Number of Ports Supported: 64
Transmission Mode: Half-Duplex, Full-Duplex
Standard Transmission Rate: Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps; Asynchronous/Synchronous - 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps, 19,200 bps, 56,000
Interface Conversion: IBM PC; IBM PC-XT to NT SL-1
Protocol Conversion: Ascii to IBM 3270
Date First Installed: 1980

OSI DATA CORP.
720 PROTOCOL CONVERTER
Conversion Function: Interface Conversion, Code Conversion, Protocol Conversion, Speed Conversion, Emulator
Number of Ports Supported: 4
Transmission Mode: Full-Duplex
Standard Transmission Rate: Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps, 19,200 bps
Code Conversion: Baudot to Ascii, Ascii to Baudot
Interface Conversion: Baudot to ASCII, Ascii to Baudot
Features: Diagnostics
Price: $2,000
Distribution Method: End user
Number Installed to Date: Under 100
Date First Installed: 1983
(See Vendor Profile Page V-22)

PERIPHERAL TECHNOLOGY, INC.
SCAT
Conversion Function: Interface Conversion, Code Conversion, Protocol Conversion, Speed Conversion, Emulator
Number of Ports Supported: 25
Transmission Mode: Half-Duplex, Full-Duplex

Converters/Emulators

Standard Transmission Rate: Asynchronous/Synchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps
Code Conversion: Ascii to Ebcdic
Interface Conversion: RS-232C to RS-422
Mode Conversion: Half-Duplex to Full-Duplex, Full-Duplex to Half-Duplex
Protocol Conversion: Ascii to BSC, Ascii to SNA
Features: Concentration, Data Compression, Diagnostics, Polling, Automatic Data Rate Detection, Automatic Parity Recognition, Autoanswer, Password Protection
Price: $995
Distribution Method: OEM
Number Installed to Date: 100 - 500
Date First Installed: 1982
(See Vendor Profile Page V-22)

PERIPHERAL TECHNOLOGY, INC.
SCAT 1
Conversion Function: Protocol Conversion
Number of Ports Supported: 1
Transmission Mode: Half-Duplex, Full-Duplex
Standard Transmission Rate: Asynchronous/Synchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps
Code Conversion: Ascii to Ebcdic, Ebcdic to Ascii
Protocol Conversion: Ascii to Bisynchronous, Ascii to SNA
Features: Data Compression, Diagnostics, Automatic Data Rate Detection, Automatic Parity Recognition
Price: $795
Distribution Method: Third-party
Number Installed to Date: Under 100
Date First Installed: September 1981

PERIPHERAL TECHNOLOGY, INC.
SCAT 2 2101
Conversion Function: Protocol Conversion
Number of Ports Supported: 1
Transmission Mode: Half-Duplex, Full-Duplex
Standard Transmission Rate: Asynchronous/Synchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps
Code Conversion: Ascii to Ebcdic, Ebcdic to Ascii
Protocol Conversion: Ascii to Bisynchronous, Ascii to SNA
Features: Data Compression, Diagnostics, Automatic Data Rate Detection, Automatic Parity Recognition
Price: $995
Distribution Method: Third-party
Number Installed to Date: Under 100
Date First Installed: January 1982

PERIPHERAL TECHNOLOGY, INC.
SCAT 2 2201
Conversion Function: Protocol Conversion
Number of Ports Supported: 5
Transmission Mode: Half-Duplex, Full-Duplex
Standard Transmission Rate: Asynchronous/Synchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps
Code Conversion: Ascii to Ebcdic, Ebcdic to Ascii
Protocol Conversion: Ascii to Bisynchronous, Ascii to SNA
Features: Concentration, Data Compression, Diagnostics, Automatic Data Rate Detection, Automatic Parity Recognition
Price: $2,995
Distribution Method: Third-party
Number Installed to Date: 100 - 500
Date First Installed: January 1982

PERIPHERALS CORP.
T-COMM
Conversion Function: Interface Conversion, Code Conversion, Protocol Conversion, Speed Conversion, Emulator
Number of Ports Supported: 416
Transmission Mode: Half-Duplex
Standard Transmission Rate: Asynchronous/Synchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps, 19,200 bps
Code Conversion: Ebcdic to Ascii, Ascii to Ebcdic
Interface Conversion: User Selectble
Mode Conversion: From Half-Duplex to Full-Duplex
Protocol Conversion: User Selectable
Features: Concentration, Data Compression, Diagnostics, Polling, Automatic Parity Recognition, Autoanswer, Autodial
Distribution Method: End user
Number Installed to Date: Under 100
Date First Installed: January 1974
(See Vendor Profile Page V-23)

PERSONAL MICROCOMPUTERS
MICRO-MET
Conversion Function: CP/M Conversion
Number of Ports Supported: 2
Transmission Mode: Full-Duplex
Standard Transmission Rate: Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps, 19,200 bps
Price: $995
Distribution Method: End user, OEM
Number Installed to Date: 500 - 1,000
Date First Installed: April 1983
(See Vendor Profile Page V-23)

PHOENIX DIGITAL CORP.
DPAC-30
Conversion Function: Interface Conversion, Protocol Conversion, Speed Conversion, Emulator, Protocol to Protocol
Number of Ports Supported: 16
Transmission Mode: Half-Duplex, Full-Duplex
Standard Transmission Rate: Asynchronous/Synchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps, 19,200 bps
Code Conversion: Asynchronous/Bisynchronous to Modicon, GE to Modicon, GE to Asynchronous/Bisynchronous
Mode Conversion: Half-Duplex to Full-Duplex, Full-Duplex to Half-Duplex
Features: Concentration, Data Compression, Diagnostics, Polling, Automatic Data Rate Detection, Automatic Parity Recognition, Autoanswer
Price: $8,000
Monthly Maintenance Fee: $35
Distribution Method: OEM
Number Installed to Date: Under 100
Date First Installed: February 1980
(See Vendor Profile Page V-23)

PHOENIX 1, INC.
CLEO 3270
Conversion Function: Code Conversion, Protocol Conversion, Speed Conversion, Emulator
Number of Ports Supported: 9
Transmission Mode: Half-Duplex
Standard Transmission Rate: Asynchronous/Synchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps, 19,200 bps
Code Conversion: Ebcdic to Ascii
Interface Conversion: RS-232C to RS-232C
Mode Conversion: Half-Duplex to Full-Duplex
Protocol Conversion: 3276/2 to Full-Duplex Ascii
Features: Diagnostics, Autoanswer
Price: $3,995
Distribution Method: End user
Number Installed to Date: 100 - 500
Date First Installed: 1981
(See Vendor Profile Page V-24)

PHOENIX 1, INC.
CLEO 3270 H
Conversion Function: Protocol Conversion
Number of Ports Supported: 8
Transmission Mode: Half-Duplex
Standard Transmission Rate: Synchronous - 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps
Code Conversion: Ebcdic to Ascii
Interface Conversion: RS-232 to RS-232
Mode Conversion: Straight Half-Duplex
Protocol Conversion: 3270/2 to Ascii
Price: $3,995
Distribution Method: End user, OEM
Number Installed to Date: Under 100
Date First Installed: December 1981

PHOENIX 1, INC.
CLEO 3276 HF
Conversion Function: Protocol Conversion
Number of Ports Supported: 8
Transmission Mode: Half-Duplex
Standard Transmission Rate: Synchronous - 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps
Code Conversion: Ebcdic to Ascii
Interface Conversion: RS-232 to RS-232
Mode Conversion: Straight Half-Duplex
Protocol Conversion: 3271/12 to Ascii
Price: $3,995
Distribution Method: End user, OEM
Number Installed to Date: Under 100
Date First Installed: January 1983

PROGRESSIVE SYSTEMS, INC.
CLC MODELS 2/4
Conversion Function: Protocol Conversion
Number of Ports Supported: 14
Standard Transmission Rate: Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps, 19,200 bps
Code Conversion: Baudot to Ascii, Ascii to Baudot, Ebcdic to Ascii
Protocol Conversion: Telex to Ascii, TWX to Ascii, DDP to Ascii
Features: Data Compression, Diagnostics, Automatic Parity Recognition, Autoanswer, for Tandem and IBM Computer

Price: $3,500 to $15,000
Distribution Method: End user
Number Installed to Date: Under 100
Date First Installed: January 1978
(See Vendor Profile Page V-24)

PROGRESSIVE SYSTEMS, INC.
CLC MODEL 5
Conversion Function: Protocol Conversion
Number of Ports Supported: 20
Transmission Mode: Half-Duplex
Standard Transmission Rate: Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps, 19,200 bps
Code Conversion: Baudot to Ascii, Ascii to Baudot, Ebcdic to Ascii
Protocol Conversion: Telex to Ascii, TWX to Ascii, DDP to Ascii
Features: Concentration, Data Compression, Diagnostics, Automatic Parity Recognition, Autoanswer for Tandem Computers
Price: $4,000 to $18,000
Distribution Method: End user
Number Installed to Date: Under 100
Date First Installed: January 1984

PROTOCOL COMPUTERS, INC.
7188/SNA
Conversion Function: Protocol Conversion
Number of Ports Supported: 8
Transmission Mode: Full-Duplex
Standard Transmission Rate: Synchronous - 300 bps, 1,200 bps, 2,400 bps, 4,800 bps, 9,600 bps
Protocol Conversion: BSC 3271 to SNA/SDLC 3274
Features: Polling
Price: $3,100 to $7,000
Monthly Maintenance Fee: $35
Distribution Method: End user, OEM, Third-party
Number Installed to Date: Under 100
Date First Installed: January 1983
(See Vendor Profile Page V-24)

PROTOCOL COMPUTERS, INC.
736X
Conversion Function: Protocol Conversion
Number of Ports Supported: 3
Transmission Mode: Full-Duplex
Standard Transmission Rate: Asynchronous - 300 bps; Asynchronous/Synchronous - 1,200 bps; 2,400 bps, 4,800 bps, 9,600 bps
Protocol Conversion: X.25 to SDLC
Features: Diagnostics, Polling
Monthly Maintenance Fee: $55
Distribution Method: End user, OEM, Third-party
Number Installed to Date: Under 100
Date First Installed: April 1983

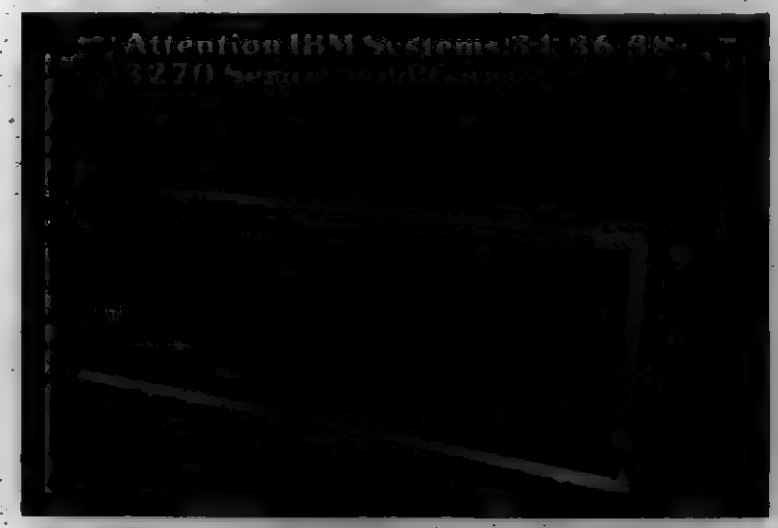
PROTOCOL COMPUTERS, INC.
740
Conversion Function: Protocol Conversion
Number of Ports Supported: 8
Transmission Mode: Full-Duplex
Standard Transmission Rate: Asynchronous - 300 bps; Asynchronous/Synchronous - 1,200 bps, 2,400 bps, 4,800 bps, 9,600 bps
Code Conversion: Ebcdic to Ascii
Protocol Conversion: SNA/SDLC to Ascii
Features: Polling, Autoanswer
Price: $5,200
Monthly Maintenance Fee: $35
Distribution Method: End user, OEM, Third-party

Number Installed to Date: Under 100
Date First Installed: October 1983

PROTOCOL COMPUTERS, INC.
7SS/SNA
Conversion Function: Protocol Conversion
Number of Ports Supported: 8
Transmission Mode: Full-Duplex
Standard Transmission Rate: Synchronous - 1,200 bps, 2,400 bps, 4,800 bps, 9,600 bps
Protocol Conversion: 3270 BSC to 3276 SNA/SDLC

Features: Polling
Price: $3,100 to $7,000
Monthly Maintenance Fee: $35
Distribution Method: End user, OEM, Third-party
Number Installed to Date: Under 100
Date First Installed: December 1983

PROTOCOL COMPUTERS, INC.
1951 CONVERTER
Conversion Function: Protocol Conversion
Number of Ports Supported: 7
Transmission Mode: Full-Duplex



Let MTI connect you to the low-cost ASCII world with protocol converters from PCI (and let your PC talk with your mainframe, too).

PCI protocol converters allow IBM users to expand their networks using ASCII terminals and printers with complete compatibility, high performance and at lower cost than with expensive SNA/SDLC equipment. The PCI 1076 lets any PC talk to an IBM mainframe.

MTI is an authorized distributor of PCI protocol converters as well as the most desirable ASCII terminals and printers. And MTI field sales engineers provide on-site consultation to show you how to design the most cost-effective terminal system.

Whether you buy, rent or lease, you'll find MTI is the one source for all the terminals, peripherals, systems, applications expertise and service you'll ever need. At good prices. Call MTI today and save.

New York: 516/621-6200, 212/767-0677, 518/449-5959
Outside N.Y.S.: 800/645-6530
New Jersey: 201/227-5552
Ohio: 216/464-6688

mti
systems corp

Applications Specialists & Distributors, New York, New Jersey and Ohio.
DEC, Intel, Texas Instruments, Dataproducts, Lear Siegler, Diablo, Esprit Intecolor, Racal-Vadic, MICOM, Ventel, Develcon, Dig. Eng., U.S.Design Cipher, Protocol Computers, MicroPro, Microsoft, Polygon and Select.

Converters/Emulators

Standard Transmission Rate: Asynchronous - 300 bps; Asynchronous/Synchronous - 1,200 bps, 2,400 bps, 4,800 bps, 9,600 bps
Protocol Conversion: SNA/SDLC to Ascii
Features: Diagnostics, Polling, Automatic Data Rate Detection, Automatic Parity Recognition
Price: $3,100 to $7,000
Monthly Maintenance Fee: $30
Distribution Method: End user, OEM, Third-party
Number Installed to Date: 100 - 500
Date First Installed: November 1982

PROTOCOL COMPUTERS, INC.
1667 CONVERTER
Conversion Function: Protocol Conversion
Number of Ports Supported: 7
Transmission Mode: Full-Duplex
Standard Transmission Rate: Asynchronous - 300 bps; Asynchronous/Synchronous - 1,200 bps, 2,400 bps, 4,800 bps, 9,600 bps
Protocol Conversion: Ascii to SNA/SDLC (FU1)
Features: Polling, Automatic Data Rate Detection
Price: $3,100 to $7,000
Monthly Maintenance Fee: $30
Distribution Method: End user, OEM, Third-party
Number Installed to Date: 100 - 500
Date First Installed: September 1979

PROTOCOL COMPUTERS, INC.
1671 CONVERTER
Conversion Function: Protocol Conversion
Number of Ports Supported: 7
Transmission Mode: Full-Duplex
Standard Transmission Rate: Asynchronous - 300 bps; Asynchronous/Synchronous - 1,200 bps, 2,400 bps, 4,800 bps, 9,600 bps
Protocol Conversion: Ascii to 3270 BSC
Features: Polling, Automatic Data Rate Detection
Price: $3,100 to $7,000
Monthly Maintenance Fee: $30
Distribution Method: End user, OEM, Third-party
Number Installed to Date: 100 - 500
Date First Installed: August 1982

PROTOCOL COMPUTERS, INC.
1676 CONVERTER
Conversion Function: Protocol Conversion, Emulator
Number of Ports Supported: 8
Transmission Mode: Full-Duplex
Standard Transmission Rate: Asynchronous - 300 bps; Asynchronous/Synchronous - 1,200 bps, 2,400 bps, 4,800 bps, 9,600 bps
Code Conversion: Ebcdic to Ascii
Protocol Conversion: Ascii to SNA/SDLC 3274-6
Features: Diagnostics, Polling, Automatic Data Rate Detection, Autoanswer
Price: $3,100 to $7,000
Monthly Maintenance Fee: $30
Distribution Method: End user, OEM, Third-party
Number Installed to Date: 500 - 1,000
Date First Installed: September 1980

PROTOCOL COMPUTERS, INC.
1676X CONVERTER
Conversion Function: Protocol Conversion, Emulator
Number of Ports Supported: 7
Standard Transmission Rate: Asynchronous - 300 bps; Asynchronous/Synchronous - 1,200 bps, 2,400 bps, 4,800 bps, 9,600 bps
Protocol Conversion: Ascii to 3270 SNA/SDLC
Features: Diagnostics, Polling, Automatic Data Rate Detection
Price: $4,600 to $8,500
Monthly Maintenance Fee: $30
Distribution Method: End user, OEM, Third-party
Number Installed to Date: Under 100
Date First Installed: April 1982

PROTOCOL COMPUTERS, INC.
3780/SNA
Conversion Function: Protocol Conversion
Number of Ports Supported: 1
Transmission Mode: Full-Duplex
Standard Transmission Rate: Asynchronous - 300 bps; Asynchronous/Synchronous - 1,200 bps, 2,400 bps, 4,800 bps, 9,600 bps
Protocol Conversion: 3780 BSC to 3776/2 SNA/SDLC
Features: Polling
Price: $3,100 to $7,000
Monthly Maintenance Fee: $50
Distribution Method: End user, OEM, Third-party
Number Installed to Date: Under 100
Date First Installed: September 1983

PROTOCOL COMPUTERS, INC.
PCI SERIES
Conversion Function: Code Conversion, Protocol Conversion, Emulator
Number of Ports Supported: 8
Transmission Mode: Full-Duplex
Standard Transmission Rate: Asynchronous - 300 bps; Asynchronous/Synchronous - 1,200 bps; 2,400 bps, 4,800 bps, 9,600 bps
Code Conversion: Ascii/BSC 3270 to Ascii/SNA 3767, Ascii/SNA 3270 to 3780/SNA 3770, Ascii/SNA 5251 to 3270 BSC/SNA
Protocol Conversion: Ascii/BNS 3270 to Ascii/SNA 3767, Ascii/SNA 3270 to 3780, Ascii/SNA 5251 to 3270 BSC/SNA
Features: Concentration, Diagnostics, Polling, Automatic Data Rate Detection, Autorenewer, Dynamic Printer Assignment
Price: $1,850 to $8,500
Monthly Maintenance Fee: $40
Distribution Method: End user, OEM, Third-party
Number Installed to Date: 500 - 1,000
Date First Installed: August 1980

PROTOCOL COMPUTERS, INC.
R738X CONVERTER
Conversion Function: Protocol Conversion
Number of Ports Supported: 8
Standard Transmission Rate: Asynchronous - 300 bps; Asynchronous/Synchronous - 1,200 bps, 2,400 bps, 4,800 bps, 9,600 bps
Protocol Conversion: SDLC to X.25
Features: Diagnostics, Polling
Price: $5,500
Monthly Maintenance Fee: $55
Distribution Method: End user, OEM, Third-party
Number Installed to Date: Under 100
Date First Installed: December 1983

PROTOCOL COMPUTERS, INC.
VIDROTEX 67
Conversion Function: Protocol Conversion
Number of Ports Supported: 7
Transmission Mode: Full-Duplex
Standard Transmission Rate: Asynchronous - 75 bps, 300 bps, Asynchronous/Synchronous - 1,200 bps, 2,400 bps, 4,800 bps, 9,600 bps
Protocol Conversion: Ascii to SNA/SDLC
Features: Polling
Price: $3,100 to $7,000
Monthly Maintenance Fee: $35
Distribution Method: End user, OEM, Third-party
Number Installed to Date: Under 100

QUADTECHNICS, INC.
SQ1
Conversion Function: Protocol Conversion
Number of Ports Supported: 1
Transmission Mode: Full-Duplex
Standard Transmission Rate: Asynchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps
Code Conversion: Ascii to Digital Command
Protocol Conversion: Serial to Qume
Features: Diagnostics, Automatic Parity Recognition, Autorenewer
Distribution Method: End user
Number Installed to Date: Under 100
Date First Installed: January 1984
(See Vendor Profile Page V-24)

QUADTECHNICS, INC.
ST1
Conversion Function: Protocol Conversion
Number of Ports Supported: 1
Standard Transmission Rate: Asynchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps
Code Conversion: Ascii to Digital Command
Protocol Conversion: Serial to Parallel
Features: Diagnostics, Automatic Parity Recognition, Autoanswer
Price: $300 to $400
Distribution Method: End user
Number Installed to Date: 500 - 1,000
Date First Installed: June 1981

RACAL-TELESYSTEMS, INC.
292 NETWORKING TRANSLATOR
Conversion Function: Protocol Conversion
Number of Ports Supported: 2
Transmission Mode: Half-Duplex, Full-Duplex
Standard Transmission Rate: Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps
Protocol Conversion: Word Processor to Word Processor
Features: Diagnostics, Automatic Data Rate Detection, Automatic Parity Recognition
Price: $2,695
Monthly Maintenance Fee: $59
Distribution Method: End user
Number Installed to Date: 100 - 500
Date First Installed: February 1983
(See Vendor Profile Page V-25)

RACAL-TELESYSTEMS, INC.
404 CENTRAL SITE TRANSLATOR
Conversion Function: Protocol Conversion
Number of Ports Supported: 2
Transmission Mode: Half-Duplex, Full-Duplex
Standard Transmission Rate: Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps
Protocol Conversion: Word Processor to Word Processor
Features: Diagnostics, Automatic Data Rate Detection, Automatic Parity Recognition
Price: $3,995
Monthly Maintenance Fee: $33
Distribution Method: End user
Number Installed to Date: 100 - 500
Date First Installed: February 1983

RAIMAN CORP.
RP-III
Conversion Function: Protocol Conversion
Transmission Mode: Half-Duplex, Full-Duplex
Features: Remote Batch
Price: $4,100 to $20,000
Monthly Maintenance Fee: $200
Distribution Method: End user
Number Installed to Date: Under 100
(See Vendor Profile Page V-26)

RENEX CORP.
TRANSLATOR-3270
Conversion Function: Protocol Conversion

Number of Ports Supported: 32
Transmission Mode: Half-Duplex, Full-Duplex
Standard Transmission Rate: Asynchronous - 50 bps, 75 bps, 110 bps, 600 bps, 1,800 bps, 3,600 bps, 7,200 bps; Asynchronous/Synchronous - 300 bps, 1,200 bps, 2,400 bps, 4,800 bps, 9,600 bps
Protocol Conversion: Ascii to 3270 SNA/SDLC, Ascii to 3270 BSC, Ascii to System/34, System/36, System/38
Features: Diagnostics, Automatic Data Rate Detection
Price: $3,600 to $15,000
Monthly Maintenance Fee: $67
Distribution Method: Third-party
Number Installed to Date: 500 - 1,000
Date First Installed: September 1980
(See Vendor Profile Page V-26)

SNAPPSTALL CORP.
MEDIACOM
Conversion Function: Protocol Conversion
Number of Ports Supported: 1
Transmission Mode: Half-Duplex, Full-Duplex
Standard Transmission Rate: Asynchronous/Synchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps
Code Conversion: Ascii to Ebcdic
Protocol Conversion: Asynchronous to Bisynchronous, Bisynchronous to Asynchronous
Features: Diagnostics, Autoanswer
Price: $5,500
Distribution Method: End user
Number Installed to Date: 100 - 500
Date First Installed: June 1980
(See Vendor Profile Page V-26)

SHERWOOD DIGITAL ELECTRONICS
A/S-2, A/S-3
Conversion Function: Interface Conversion, Code Conversion, Protocol Conversion, Speed Conversion, Emulator
Number of Ports Supported: 1
Transmission Mode: Half-Duplex, Full-Duplex
Standard Transmission Rate: Asynchronous/Synchronous - 2,400 bps, 9,600 bps
Code Conversion: Ebcdic to Ascii, Ebcdic to Baudot, Ascii to Baudot
Interface Conversion: RS-232 to RS-232
Mode Conversion: Half-Duplex to Full-Duplex, Full-Duplex to Half-Duplex
Protocol Conversion: Bisynchronous Ebcdic to Ascii Asynchronous, Ebcdic Bisynchronous to Baudot-Telex
Features: Data Compression, Diagnostics, Polling, Autoanswer
Price: $1,495 to $2,495
Distribution Method: Third-party
Number Installed to Date: 1,000 - 5,000
Date First Installed: March 1978
(See Vendor Profile Page V-26)

SHERWOOD DIGITAL ELECTRONICS
PQ4, PQ5
Conversion Function: Protocol Conversion
Number of Ports Supported: 2
Transmission Mode: Half-Duplex, Full-Duplex
Standard Transmission Rate: Asynchronous - 110 bps, 300 bps, 600 bps, 1,800 bps; Asynchronous/Synchronous - 1,200 bps; 2,400 bps, 4,800 bps, 9,600 bps
Code Conversion: Ebcdic to Baudot, Ascii to Ebcdic, Ascii to Baudot
Interface Conversion: IBM TWX-AX to RS-232
Protocol Conversion: SNA/SDLC TWX to Ascii-Asynchronous
Features: Diagnostics, Polling, Autoanswer
Price: $1,495 to $2,495
Distribution Method: Third-party
Number Installed to Date: 500 - 1,000
Date First Installed: March 1978

STARNET DATA SYSTEMS
STARNET II
Conversion Function: Interface Conversion, Code Conversion, Protocol Conversion, Speed Conversion, Dissimilar Protocols
Number of Ports Supported: 16
Transmission Mode: Half-Duplex, Full-Duplex
Standard Transmission Rate: Asynchronous/Synchronous - 19,200 bps
Code Conversion: Ascii to Binary, Ascii to Hex, Ascii to Ascii II
Interface Conversion: RS-232 to V.35
Mode Conversion: Half-Duplex to Full-Duplex, Full-Duplex to Half-Duplex
Protocol Conversion: INQ AK to DCI DC2, CTS RTS to DCII DC3, XON XOF to ENQ ANK
Features: Diagnostics, Autoanswer, Modem Facility, Autodial, Autoanswer
Price: $14,710
Distribution Method: End user
Number Installed to Date: Under 100
Date First Installed: 1981
(See Vendor Profile Page V-26)

STRATUS COMPUTER, INC.
STRATUS/32 CONTINUOUS PROCESSING SYSTEM
Conversion Function: Protocol Conversion, Speed Conversion
Number of Ports Supported: 32
Transmission Mode: Half-Duplex, Full-Duplex
Standard Transmission Rate: Asynchronous/Synchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps, 19,200 bps
Code Conversion: Ebcdic to Ascii, Ascii to Ebcdic
Interface Conversion: RS-232 to RS-422, RS-422 to RS-232
Features: Concentration, Data Compression, Diagnostics, Polling, Automatic Parity Recognition, Autoanswer
Price: $140,000
Distribution Method: End user
Number Installed to Date: Under 100
Date First Installed: February 1982
(See Vendor Profile Page V-26)

SYNALTA SYSTEMS
DCIC 2
Conversion Function: Interface Conversion, Code Conversion, Protocol Conversion, Speed Conversion, Emulator
Number of Ports Supported: 3
Transmission Mode: Half-Duplex, Full-Duplex
Standard Transmission Rate: Asynchronous/Synchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps, 19,200 bps
Code Conversion: Ascii to Ebcdic, Ebcdic to Ascii
Interface Conversion: Serial to Parallel, Parallel to Serial
Mode Conversion: Half-Duplex to Full-Duplex, Full-Duplex to Half-Duplex
Protocol Conversion: SLC to HDLC, SDLC to BDLC
Features: Data Compression, Diagnostics, Polling, Automatic Data Rate Detection, Automatic Parity Recognition, Autoanswer
Price: $495
Monthly Maintenance Fee: $25
Distribution Method: End user, OEM
Number Installed to Date: 100 - 500
Date First Installed: January 1983
(See Vendor Profile Page V-26)

SYNALTA SYSTEMS
STD SER 2
Conversion Function: Interface Conversion, Code Conversion, Protocol Conversion, Speed Conversion, Emulator
Number of Ports Supported: 3
Transmission Mode: Half-Duplex, Full-Duplex
Standard Transmission Rate: Asynchronous/Synchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps, 19,200 bps
Code Conversion: Ascii to Ebcdic, Ebcdic to Ascii
Interface Conversion: Serial to Parallel, Parallel to Serial
Mode Conversion: Half-Duplex to Full-Duplex, Full-Duplex to Half-Duplex
Protocol Conversion: SLC to HDLC, SDLC to BDLC
Features: Data Compression, Diagnostics, Polling, Automatic Data Rate Detection, Automatic Parity Recognition, Autoanswer
Price: $495
Monthly Maintenance Fee: $25
Distribution Method: End user, OEM
Number Installed to Date: 100 - 500
Date First Installed: January 1983

TANDY CORP.
T 76
Conversion Function: Protocol Conversion
Number of Ports Supported: 7
Standard Transmission Rate: Synchronous - 9,600 bps
Code Conversion: Ebcdic to Ascii
Interface Conversion: RS-232C to RS-232C
Protocol Conversion: SNA/SDLC to Ascii 2
Features: Diagnostics, Automatic Data Rate Detection, Automatic Parity Recognition
Price: $7,000
Distribution Method: End user
Date First Installed: December 1981
(See Vendor Profile Page V-26)

TECHLAND SYSTEMS, INC.
BLUE LINX 3275/6 BISYNCH
Conversion Function: Emulator
Number of Ports Supported: 1
Transmission Mode: Half-Duplex, Full-Duplex
Standard Transmission Rate: Asynchronous/Synchronous - 1,200 bps, 1,800 bps, 2,400 bps; Synchronous - 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps
Code Conversion: Ascii to Ebcdic, Ebcdic to Ascii
Features: Data Compression, Diagnostics, Polling, Automatic Data Rate Detection, Automatic Parity Recognition, Autoanswer
Price: $690
Distribution Method: End user, OEM, Third-party
Number Installed to Date: 100 - 500
(See Vendor Profile Page V-26)

TECHLAND SYSTEMS, INC.
BLUE LINX 3276/SDLC
Conversion Function: Emulator
Number of Ports Supported: 1
Transmission Mode: Half-Duplex, Full-Duplex
Standard Transmission Rate: Asynchronous/Synchronous - 1,200 bps, 1,800 bps, 2,400 bps; 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps
Code Conversion: Ascii to Ebcdic, Ebcdic to Ascii
Features: Data Compression, Diagnostics, Polling, Automatic Data Rate Detection, Automatic Parity Recognition, Autoanswer
Price: $690
Distribution Method: End user, OEM, Third-party
Number Installed to Date: 500 - 1,000
Date First Installed: November 1982

TECHLAND SYSTEMS, INC.
BLUE LINX 5251/12
Conversion Function: Emulator
Number of Ports Supported: 1
Standard Transmission Rate: Asynchronous/Synchronous - 1,200 bps, 1,800 bps, 2,400 bps; Synchronous - 3,600 bps, 4,800 bps,

Converters/Emulators

7,200 bps, 9,600 bps
Code Conversion: Ascii to Ebcdic, Ebcdic to Ascii
Features: Data Compression, Diagnostics, Polling, Automatic Data Rate Detection, Automatic Parity Recognition, Autoanswer
Price: $690
Distribution Method: End user, OEM, Third-party
Number Installed to Date: 500 - 1,000
Date First Installed: November 1982

TECHLARD SYSTEMS, INC.
VTERM
Conversion Function: Emulator
Number of Ports Supported: 1
Transmission Mode: Half-Duplex, Full-Duplex
Standard Transmission Rate: Asynchronous/Synchronous - 1,200 bps, 1,800 bps, 2,400 bps; Synchronous - 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps
Code Conversion: Ascii to Ebcdic, Ebcdic to Ascii
Features: Data Compression, Diagnostics, Polling, Automatic Data Rate Detection, Automatic Parity Recognition, Autoanswer
Price: $160
Distribution Method: End user, OEM, Third-party
Number Installed to Date: 1,000 - 5,000
Date First Installed: October 1981

TEKTRONIX, INC.
834
Conversion Function: Emulator
Number of Ports Supported: 1
Transmission Mode: Half-Duplex, Full-Duplex
Standard Transmission Rate: Asynchronous/Synchronous - 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps
Mode Conversion: Half-Duplex to Full-Duplex, Full-Duplex to Half-Duplex
Protocol Conversion: BSC to X.25, SDLC, SNA
Features: Diagnostics, Polling, Protocol Simulation
Price: $175 to $3,990
Distribution Method: End user
Number Installed to Date: 500 - 1,000
Date First Installed: 1981
(See Vendor Profile Page V-30)

TELEBYTE TECHNOLOGIES, INC.
60
Conversion Function: Interface Conversion
Number of Ports Supported: 1
Transmission Mode: Full-Duplex
Standard Transmission Rate: Asynchronous/Synchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps, 19,200 bps, 20,000 bps
Interface Conversion: RS-232C to

RS-449, RS-449 to RS-232C
Features: Automatic Data Rate Detection
Price: $115
Distribution Method: End user
Number Installed to Date: Under 100
Date First Installed: September 1981
(See Vendor Profile Page V-30)

TELEBYTE TECHNOLOGIES, INC.
64
Conversion Function: Interface Conversion
Number of Ports Supported: 1
Transmission Mode: Half-Duplex, Full-Duplex
Standard Transmission Rate: Asynchronous/Synchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps, 19,200 bps
Interface Conversion: RS-232C to Current Loop, Current Loop to RS-232C
Features: Automatic Data Rate Detection
Price: $80
Distribution Method: End user
Number Installed to Date: 100 - 500
Date First Installed: September 1982

TELEBYTE TECHNOLOGIES, INC.
66
Conversion Function: Interface Conversion
Number of Ports Supported: 1
Transmission Mode: Half-Duplex, Full-Duplex
Standard Transmission Rate: Asynchronous/Synchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps
Interface Conversion: RS-232C to Current Loop, Current Loop to RS-232C
Features: Automatic Data Rate Detection
Price: $100
Distribution Method: End user
Number Installed to Date: 500 - 1,000
Date First Installed: June 1983

TELEBYTE TECHNOLOGIES, INC.
78
Conversion Function: Interface Conversion
Number of Ports Supported: 2
Transmission Mode: Half-Duplex, Full-Duplex
Standard Transmission Rate: Asynchronous/Synchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps, 19,200 bps
Interface Conversion: RS-232C to Current Loop, Current Loop to RS-232C
Features: Diagnostics
Price: $195
Distribution Method: End user
Number Installed to Date: Under 100
Date First Installed: June 1983

TELEBYTE TECHNOLOGIES, INC.
SERIES 83
Conversion Function: Interface Conversion
Number of Ports Supported: 1
Transmission Mode: Full-Duplex, Control Signals
Standard Transmission Rate: Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps, 19,200 bps, 100,000 bps
Interface Conversion: RS-232C to RS422, RS422 to RS-232C
Features: Automatic Data Rate Detection
Price: $99 to $126
Distribution Method: End user
Number Installed to Date: Under 100
Date First Installed: March 1983

TELERACE CORP.
TELEX PLUG
Conversion Function: Code Conversion, Protocol Conversion, Speed Conversion
Number of Ports Supported: 2
Transmission Mode: Full-Duplex
Standard Transmission Rate: Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps
Code Conversion: Ascii to Baudot, Baudot to Ascii
Features: Diagnostics, Autoanswer, Fail Back
Price: $1,395 to $1,670
Monthly Maintenance Fee: $24
Distribution Method: End user, OEM, Third-party
Number Installed to Date: Under 100
Date First Installed: September 1980
(See Vendor Profile Page V-30)

TELEPROCESSING PRODUCTS, INC.
TP-200/201
Number of Ports Supported: 1
Transmission Mode: Half-Duplex, Simplex
Standard Transmission Rate: Asynchronous/Synchronous - 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps, 19,200 bps
Protocol Conversion: Asynchronous to Synchronous, Synchronous to Asynchronous
Features: Diagnostics
Price: $295 to $395
Distribution Method: End user, Third-party
Number Installed to Date: 1,000 - 5,000
Date First Installed: January 1979
(See Vendor Profile Page V-30)

TELEPROCESSING PRODUCTS, INC.
TP-300
Conversion Function: Interface Conversion
Number of Ports Supported: 1
Transmission Mode: Half-Duplex, Full-Duplex
Standard Transmission Rate: Asynchronous/Synchronous - 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps, 19,200 bps
Protocol Conversion: Asynchronous to Synchronous, Synchronous to Asynchronous
Features: Diagnostics, Automatic Parity Recognition, Autoanswer, Error Control
Price: $735
Distribution Method: End user, Third-party
Number Installed to Date: 100 - 500
Date First Installed: May 1981

TELEPROCESSING PRODUCTS, INC.
TP-300I
Number of Ports Supported: 1
Transmission Mode: Half-Duplex, Simplex
Standard Transmission Rate: Asynchronous/Synchronous - 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps, 19,200 bps
Protocol Conversion: Asynchronous to Synchronous, Synchronous to Asynchronous
Features: Diagnostics, Automatic Parity Recognition, Autoanswer, Error Control
Price: $735
Distribution Method: End user, Third-party
Number Installed to Date: 100 - 500
Date First Installed: May 1981

TELEPROCESSING PRODUCTS, INC.
TP-350
Conversion Function: Interface Conversion
Number of Ports Supported: 1
Transmission Mode: Half-Duplex, Full-Duplex
Standard Transmission Rate: Asynchronous/Synchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps, 19,200 bps, 56,000 bps
Interface Conversion: RS-232 to V.35, V.35 to RS-232
Price: $450
Distribution Method: End user, Third-party
Number Installed to Date: 500 - 1,000

TELTONE CORP.
M-871 ACCESS CONTROLLER
Conversion Function: Protocol Conversion
Number of Ports Supported: 25
Transmission Mode: Half-Duplex
Standard Transmission Rate: Asynchronous/Synchronous - 300

bps, 1,200 bps, 2,400 bps; Synchronous - 600 bps, 4,800 bps, 9,600 bps
Code Conversion: Ascii to Ebcdic, Ebcdic to Ascii
Interface Conversion: RS-232C
Protocol Conversion: Ascii to SNA/SDLC, Ascii to BSC
Features: Diagnostics, Polling, Automatic Data Rate Detection, Automatic Parity Recognition
Distribution Method: End user
Number Installed to Date: Under 100
Date First Installed: October 1983
(See Vendor Profile Page V-30)

TYMNAS [illegible]
8220
Conversion Function: Protocol Conversion
Number of Ports Supported: 32
Transmission Mode: Full-Duplex
Standard Transmission Rate: Asynchronous - 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps, 19,200 bps
Code Conversion: Ascii to Ebcdic, Ebcdic to Ascii
Protocol Conversion: Ascii to BSC, Ascii to SDLC, Ascii to VIP
Features: Concentration, Diagnostics, Polling, Automatic Data Rate Detection, Automatic Parity Recognition
Price: $5,000 to $12,000
Distribution Method: End user
Number Installed to Date: Under 100
Date First Installed: December 1981
(See Vendor Profile Page V-30)

TRW COMP.
TRW 232D
Conversion Function: Interface Conversion, Code Conversion
Number of Ports Supported: 2
Transmission Mode: Full-Duplex
Standard Transmission Rate: Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps
Code Conversion: Commodore Ascii to Ascii
Interface Conversion: IEEE/488 to RS-232, RS-232 to IEEE/488
Price: $369
Distribution Method: Third-party
Number Installed to Date: 100 - 500
Date First Installed: 1979
(See Vendor Profile Page V-31)

TRW COMP.
TRW 1000
Conversion Function: Interface Conversion, Code Conversion
Number of Ports Supported: 1
Transmission Mode: Full-Duplex
Standard Transmission Rate: Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps
Code Conversion: Commodore Ascii to Ascii
Interface Conversion: IEEE/488 to RS-232
Price: $129
Distribution Method: Third-party
Number Installed to Date: 500 - 1,000
Date First Installed: 1980

TRW COMP.
TRW 2000
Conversion Function: Interface Conversion, Code Conversion
Number of Ports Supported: 1
Transmission Mode: Full-Duplex
Standard Transmission Rate: Asynchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps
Code Conversion: Commodore Ascii to Ascii
Interface Conversion: IEEE/488 to RS-232, RS-232 to IEEE/488
Price: $229
Distribution Method: Third-party
Number Installed to Date: 500 - 1,000
Date First Installed: 1981

TRENDATA STANDARD MEMORIES CORP.
TCA/2
Conversion Function: Protocol Conversion
Number of Ports Supported: 8
Transmission Mode: Half-Duplex, Full-Duplex
Standard Transmission Rate: Asynchronous/Synchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps
Code Conversion: Ascii to BSE
Protocol Conversion: RS-232 to IBM
Price: $5,000
Distribution Method: End user
Number Installed to Date: 500 - 1,000
(See Vendor Profile Page V-31)

TRI-DATA
NETWAY COMMUNICATIONS PROCESSOR
Conversion Function: Interface Conversion, Code Conversion, Protocol Conversion, Speed Conversion, Emulator
Number of Ports Supported: 32
Transmission Mode: Half-Duplex, Full-Duplex
Standard Transmission Rate: Asynchronous/Synchronous - 50 bps, 75 bps, 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps, 19,200 bps, 56,000 bps
Protocol Conversion: 3270 SNA to Asynchronous Ascii, SDLC to Asynchronous Ascii, 3270 Bisynchronous to Asynchronous Ascii
Features: Concentration, Data Compression, Diagnostics, Polling, Automatic Data Rate Detection, Automatic Parity Recognition, Autoanswer
Price: $11,000
Distribution Method: End user, OEM, Third-party
Number Installed to Date: Under 100
Date First Installed: March 1983
(See Vendor Profile Page V-31)

VIA WEST, INC.
CST 100
Conversion Function: Interface Conversion
Number of Ports Supported: 1
Standard Transmission Rate: Asynchronous - 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps, 19,200 bps
Interface Conversion: RS-232 to Centronics Parallel
Price: $150
Distribution Method: OEM
Number Installed to Date: 500 - 1,000
(See Vendor Profile Page V-32)

VIA WEST, INC.
PSI 100
Conversion Function: Interface Conversion
Number of Ports Supported: 1
Standard Transmission Rate: Asynchronous - 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps, 19,200 bps
Interface Conversion: Centronics Parallel to RS-232
Price: $200
Distribution Method: OEM
Number Installed to Date: Under 100

VIA WEST, INC.
VST 2000
Conversion Function: Interface Conversion
Number of Ports Supported: 1
Standard Transmission Rate: Asynchronous - 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps, 19,200 bps
Interface Conversion: RS-232 to Centronics Parallel
Features: Diagnostics
Price: $195
Distribution Method: OEM
Number Installed to Date: 5,000 - 10,000

WESTERN DATACOM
DATACOM 1660
Conversion Function: Interface Conversion, Code Conversion, Protocol Conversion, Speed Conversion, Emulator
Number of Ports Supported: 4
Transmission Mode: Full-Duplex
Standard Transmission Rate: Asynchronous - 110 bps, 300 bps, 600 bps, 1,200 bps, 1,800 bps, 2,400 bps, 3,600 bps, 4,800 bps, 7,200 bps, 9,600 bps, 19,200 bps
Code Conversion: Ascii to Ebcdic, Ebcdic to Ascii
Interface Conversion: Software Flow Center to Hardware Flow Center
Protocol Conversion: Any Asynchronous to Other Asynchronous
Features: Diagnostics, Autoanswer, Dual-Speed Modems
Price: $2,000
Monthly Maintenance Fee: $10
Distribution Method: Third-party
Number Installed to Date: Under 100
Date First Installed: November 1982
(See Vendor Profile Page V-33)

XYGMAR, INC.
X-100
Conversion Function: Protocol Conversion
Number of Ports Supported: 5
Transmission Mode: Half-Duplex, Full-Duplex
Standard Transmission Rate: Synchronous - 2,400 bps
Code Conversion: Ascii to Ebcdic, Ebcdic to Ascii
Mode Conversion: Usually Half-Duplex, No Conversion
Protocol Conversion: Ascii to SNA/SDLC
Features: Diagnostics, Automatic Parity Recognition
Price: $1,150
Monthly Maintenance Fee: $13
Distribution Method: End user
Number Installed to Date: Under 100
(See Vendor Profile Page V-33)

COMMUNICATIONS PROCESSORS

Index to Communications Processors

Often referred to as front-end processors, these systems perform the communications management function between peripheral devices and the host computer. These tasks include line control of the communications circuits, interface control, message formatting and error checking, as well as other functions. The index has been arranged alphabetically by vendor and contains the unit price as well as the page number on which the complete listing can be found.

VENDOR	MODEL	PRICE	PAGE
AGS	IF-11/3780	$8,000	B-25
	IF-11/HDLC	$7,500 to $10,000	B-25
	IF-11Q/X.25	$9,500	B-25
	IF-11/X.25	$10,000	B-25
	IF-11/X.25 PLUS	$9,000 to $24,000	B-25
	UMC PROCESSOR BOARD	$3,600 to $12,000	B-25
Ascom Telecommunications	ACCESS 34-I	$6,000 to $25,000	B-25
	ACCESS 36-II	$6,000 to $25,000	B-25
	ACCESS 38	$6,000 to $25,000	B-25
Ascotel Corp.	4705	$60,000	B-25
	4705 E	$120,000	B-25
Asmet, Inc.	NUCLEUS 6000-PACKET SWITCH	$100,000	B-26
Asnaam, Inc.	MODEL 8911A CHANNEL INTERFACE	$20,000	B-26
A. W. Computer Systems, Inc.	A.W. BRIDGE TECH	N/A	B-26
Behavior Corp.	PROFESSIONAL COMM MANAGER-3000	$1,300 to $2,500	B-26
Broadband Systems, Inc.	PS-1100	$3,300	B-26
Burroughs Corp.	B874	N/A	B-26
	CP3880	$94,050 to $124,950	B-26
	CP9582	$27,000 to $44,000	B-27
	NSP/LSP	N/A	B-27
Century Analysis, Inc.	OSI	$11,000	B-27
Chi Corp.	CCP/3205	$32,000 to $250,000	B-27
Codex Corp.	CODEX 6520 FEP	$45,000	B-27
Comsaar, Ltd.	CMC-4	$13,005 to $190,050	B-27
	CMC-32	$35,000 to $65,000	B-27
	DNP-4I	$30,000 to $80,000	B-27
	DNP-8I	$50,000 to $107,000	B-28
	DNP-16I	$75,000 to $250,000	B-28
Connetics, Inc.	TERMINAL-CONCENTRATOR: MDS-8070	$4,000 to $20,000	B-28
Computer Communications, Inc.	CC-6	$28,000 to $50,000	B-28
	CC-8	$50,000 to $100,000	B-28
	CC-80	$200,000 to $500,000	B-28
	CC-85	$200,000 to $500,000	B-28
Computer Ideation Corp.	LDP-5	$30,000	B-28
Computer Systems	CP/86	$2,500 to $10,000	B-29
Control Data Corp.	2551-3	$38,170	B-29
	2551-4	$47,883	B-29
Datagram Corp.	DM 1600B	$6,000 to $30,000	B-29
Datapraba, Inc.	DR-10	$750	B-29
Datastream Communications, Inc.	774	$4,000 to $10,000	B-29
	778	$4,000 to $6,000	B-30
	874	$18,000	B-30
	MPC	$6,000 to $12,000	B-30
Daycom Corp.	DAYCOM	N/A	B-30
DGA/TAC	SYSTEM 335	N/A	B-30
	SYSTEM 355	N/A	B-30
Digital Equipment Corp.	ETHERNET COMMUNICATIONS SERVERS	N/A	B-30
Engineered Systems, Inc.	TCS/500	$15,000	B-30
Envox Systems, Inc.	ENVAX 600	$1,000 to $3,000	B-30
	TRANSACTION PROCESSOR	$4,000 to $20,000	B-31
Excelan	EXOS 101	$1,700	B-31
Gandalf Data, Inc.	PACX IV	N/A	B-31
Gateway Communications, Inc.	GATEWAY PROCESSOR	$1,595 to $4,500	B-31
GTE Telenet Communications Corp.	TP-3005 NETWORK INTERFACE PROCESSOR	$2,350	B-31
	TP3010-II NETWORK INTERFACE PROCESSOR	$7,500	B-31
Harris Corp.	HARRIS 1600	N/A	B-31
	HARRIS 8470	$3,500	B-31
	HARRIS 9240	N/A	B-31
Hewlett-Packard Data Systems	Z-80	$1,000	B-32
Hewlett Corp.	HK-68A	$3,285	B-32

Communications Processor Index

VENDOR	MODEL	PRICE	PAGE
Honeywell, Inc.	DATANET 8	$38,085	B-32
	DATANET 6661	$36,805	B-32
IBM Corp.	3704	$36,150	B-32
	3705-80 M81-M83	$39,300 to $55,940	B-32
	3705-II E1-L4	$49,270 to $300,610	B-33
	3725-1	$132,490 to $299,940	B-33
	3725-2	$72,240 to $95,240	B-33
Ipsat Corp.	25X SERIES	$3,000 to $25,000	B-33
Ikona Industries Data Systems, Inc.	COMMUNICATIONS PROCESSOR 1	$3,000	B-33
Information Devices Corp.	SMART SYNC MODEM	$6,500	B-33
Integrated Design Engineering, Inc.	PORT-SAVER	$1,600	B-33
Intelligent Business Systems, Inc.	CSX 1024	$80,000	B-33
Intercon Research Corp.	INTERCON 100A	$1,280 to $4,995	B-33
Interlan, Inc.	NI1010 UNIBUS ETHERNET CTLR	$3,000	B-34
Itek Composition Systems	QUADRITEK SERIES IDC	$995 to $2,495	B-34
ITT Telecom Products, Inc.	N640	N/A	B-34
JC Systems	LINK III	N/A	B-34
Lanacom Systems, Inc.	CMC-4/8/32	$14,000 to $60,000	B-34
	DNP	$30,000 to $300,000	B-34
M/A-COM DCC, Inc.	CP9000 SERIES II	$20,000 to $200,000	B-34
Masstrax Corp.	1270 TCU	N/A	B-34
Micom Systems, Inc.	MICRO 800/X.25 CONCENTRATOR PAD	$2,050 to $4,600	B-35
Microcosym, Inc.	MCS-30	$25,000	B-35
Microdata Corp.	5750	$5,100	B-35
	NETWORK SYSTEM	$15,000 to $20,000	B-35
Modcomp Plus, Inc.	BRITE ONE	$1,280	B-35
	SMRTE ONE	$3,900	B-35
Modular Computer Systems, Inc.	CL II/45	$80,000	B-35
	CL II/75	$150,000	B-35
Multinetics, Inc.	RDS 1600	$1,500	B-35
	SVR 700	$1,500	B-35
NCR Comten, Inc.	3650	N/A	B-36
	3670 MBS	N/A	B-36
	3690	N/A	B-36
Nestar Data Communications, Inc.	TRANSACTION CONCENTRATOR	$4,500	B-36
Northern Telecom, Inc.	BMC	$17,000 to $125,000	B-36
	29X SERIES	N/A	B-36
	503	$10,000 to $30,000	B-37
	585	$15,000 to $30,000	B-37
	585	$50,000 to $200,000	B-37
Nu Data Corp.	720 COMMUNICATIONS PROCESSOR	$1,700	B-37
Paradyne Corp.	PIXNET	$25,000	B-37
	SYSTEM 8400	$30,000	B-37
Peripheral Corp.	T-COMM	$60,000 to $120,000	B-37
Perkyst, Inc.	DCP/88	$2,000	B-38
	PC/3270	$995	B-38
Philips Electronics Instruments, Inc.	FLEXPAC PAD	N/A	B-38
Phoenix Digital Corp.	DPAC-80/PC	$8,000 to $15,000	B-38
Processing Innovations, Inc.	SAM (SPEECH AIDED MODEM)	$1,595 to $10,000	B-38
Radian Corp.	UT-1 & UT-4	$39,500 to $100,000	B-38
	UT-2 & UT-3	$24,000 to $50,000	B-38
Raycom Corp.	ATTACHED PROCESSOR AP61	$9,500 to $28,000	B-38
Raytheon Co.	RAYNET I, II, III	$200,000 to $600,000	B-38
S&S Semiconductors Corp.	SAMSON	$24,900	B-38
Sidereal Corp.	MICRONET 6	$18,000 to $23,000	B-39
	MICRONET 8	$21,000 to $26,000	B-39
	MICRONET 12	$2,500	B-39
	MICRONET 20	$4,200	B-39
	MICRONET 25	$5,600	B-39
	MICRONET 404	$8,750 to $12,100	B-39
	THE MICRONET SWITCH (STORE/FORWARD MSG)	$65,000 to $95,000	B-39
Software Results Corp.	COMBOARD/HASP	$13,900 to $26,900	B-40
	COMBOARD/SNA	$18,000 to $32,800	B-40
	COMBOARD/3780	$9,800 to $21,900	B-40
Sperry Corp.	DISTRIBUTED COMMUNICATIONS PROCESSOR/10	$28,000 to $50,000	B-40
	DISTRIBUTED COMMUNICATIONS PROCESSOR/20	$47,000 to $100,000	B-40
	DISTRIBUTED COMM PROCESSOR/40	$103,000 to $999,999	B-40
Summa Four	MCX & PCX SERIES	N/A	B-40
Syscom, Inc.	STORE & FORWARD MESSAGE SWITCH	$50,000	B-40
Tandem Computers, Inc.	6100 COMMUNICATION SUBSYSTEM	$24,000 to $300,000	B-40
	INFOSAT	$53,000	B-41
Thames Engineering	MZ-80	$6,000 to $12,000	B-41
TTTI	68K30	$3,750	B-41
Tusk Electronics, Inc.	PEOPLE TO COMPUTER INTERFACE	N/A	B-41
Wintechnifier, Inc.	DATATALKER	$995	B-41
	DATATALKER 2	$995 to $995	B-41
Xyplex, Inc.	XP-UN64	$8,500	B-41
	XYPLEX SYSTEM	N/A	B-41

ADC
IF-11/3780
Processor Function: Front-End Processor
Compatibility Classification: 2780/3780
Word Length: 8 bit
Host Compatibility: DEC PDP-11
Maximum Number Input Lines: 2
Input Transmission Mode: Full-Duplex, Half-Duplex
Input Transmission Speeds:
Synchronous: 1,200 bps to 19,200 bps
Input Port Code Supported: Ebcdic
Protocols Supported: BSC
Maximum Output Lines: 1
Aggregate Transmission Rate: 1
Features: Protocol and Code Conversion
Price: $8,000
Distribution Method: End user
Number Installed to Date: 100 to 1,000
Date First Installed: March 1981
(See Vendor Profile Page V-1)

ADC
IF-11/HDLC
Processor Function: Front-End Processor
Word Length: 8 bit
Host Compatibility: DEC VAX, DEC PDP-11, DEC LSI-11
Maximum Number Input Lines: 1
Input Transmission Mode: Full-Duplex
Input Transmission Speeds:
Synchronous: 2,400 bps to 500,000 bps
Input Port Code Supported: Ascii
Protocols Supported: HDLC
Maximum Output Lines: 1
Aggregate Transmission Rate: 1
Features: Protocol and Code Conversion, Error Control, User Programmable
Price: $7,500 to $10,000
Distribution Method: OEM

ADC
IF-11Q/X.25
Processor Function: Front-End Processor
Compatibility Classification: X.25
Word Length: 8 bit
Host Compatibility: DEC LSI-11
Maximum Number Input Lines: 32
Input Transmission Mode: Full-Duplex
Input Transmission Speeds:
Synchronous: 56,000 bps
Input Port Code Supported: X.25
Protocols Supported: X.25
Maximum Output Lines: 1
Aggregate Transmission Rate: 1
Features: Protocol and Code Conversion, Error Control, Automatic Disconnect, Multiplexer/Demultiplexer
Price: $9,500
Distribution Method: End user

ADC
IF-11/X.25
Processor Function: Front-End Processor
Compatibility Classification: X.25
Word Length: 8 bit
Host Compatibility: DEC PDP-11, DEC VAX-11
Maximum Number Input Lines: 32
Input Transmission Mode: Full-Duplex
Input Transmission Speeds:
Synchronous: 56,000 bps
Input Port Code Supported: X.25
Protocols Supported: X.25
Maximum Output Lines: 1
Aggregate Transmission Rate: 1
Features: Protocol and Code Conversion, Error Control, Automatic Disconnect, Multiplexer/Demultiplexer
Price: $10,000
Distribution Method: End user
Number Installed to Date: 50 to 100

ADC
IF-11/X.25 PLUS
Processor Function: Front-End Processor
Compatibility Classification: X.25 PAD
Word Length: 8 bit
Host Compatibility: DEC PDP-11, DEC VAX-11
Maximum Number Input Lines: 32
Input Transmission Mode: Full-Duplex
Input Transmission Speeds:
Synchronous: 56,000 bps
Input Port Code Supported: X.25
Protocols Supported: X.25, Asynchronous (Start/Stop)
Maximum Output Lines: 1
Aggregate Transmission Rate: 1
Features: Protocol and Code Conversion, Error Control, Terminal-Initiated Applications Switching, Automatic Disconnect, Multiplexer/Demultiplexer, Processor-Initiated Dynamic Line Reconfiguration, Terminal Controller, Local Console (System Control Functions), User Programmable
Price: $9,000 to $24,000
Distribution Method: End user
Number Installed to Date: 1 to 10

ADC
UMC PROCESSOR BOARD
Processor Function: Front-End Processor
Compatibility Classification: Processor Board
Word Length: 8 bit
Host Compatibility: DEC VAX, DEC PDP
Maximum Number Input Lines: 64
Input Transmission Mode: Full-Duplex, Half-Duplex
Input Transmission Speeds:
Synchronous: 300 bps to 700 bps
Input Port Code Supported: Ebcdic, Ascii, X.25
Protocols Supported: BSC, ADCCP, HDLC, UDLC, X.25, Asynchronous (Start/Stop)
Maximum Output Lines: 1
Aggregate Transmission Rate: 1
Features: User Programmable
Price: $3,600 to $12,000
Distribution Method: End user
Number Installed to Date: 1,000 to 10,000
Date First Installed: September 1978

ACCESS TELECOMMUNICATIONS
ACCESS 34-I
Processor Function: Front-End Processor
Compatibility Classification: Non-IBM (Specialty)
Word Length: 8 bit
Host Compatibility: IBM System/34
Peripherals Supported: CRT, Printer, Tape Drive, Disk Drive, Diagnostic/Test
Maximum Number Input Lines: 8
Input Transmission Mode: Half-Duplex
Input Transmission Speeds:
Asynchronous: 55 bps to 19,200 bps
Input Port Code Supported: Ascii
Protocols Supported: X.25, Asynchronous (Start/Stop)
Maximum Output Lines: 8
Aggregate Transmission Rate: 8
Aggregate Transmission Rate: 192 bps
Features: Protocol and Code Conversion, Error Control, Terminal-Initiated Applications Switching, Automatic Disconnect, Processor-Initiated Dynamic Line Reconfiguration, Terminal Controller, Local Console (System Control Functions), Automatic Polling, Autodial/Autoanswer Capabilities, Downline Loading of Remote Node
Price: $6,000 to $25,000
Monthly Maintenance Fee: $115
Distribution Method: End user
Number Installed to Date: 100 to 1,000
Date First Installed: January 1981
(See Vendor Profile Page V-1)

ACCESS TELECOMMUNICATIONS
ACCESS 36-II
Processor Function: Front-End Processor
Compatibility Classification: Non-IBM (Specialty)
Word Length: 8 bit
Host Compatibility: IBM System/36
Peripherals Supported: CRT, Printer, Tape Drive, Disk Drive, Diagnostic/Test
Maximum Number Input Lines: 8
Input Transmission Mode: Half-Duplex
Input Transmission Speeds:
Asynchronous: 55 bps to 19,200 bps
Input Port Code Supported: Ascii
Protocols Supported: X.25, Asynchronous (Start/Stop)
Aggregate Transmission Rate: 8
Aggregate Transmission Rate: 192 bps
Features: Protocol and Code Conversion, Error Control, Terminal-Initiated Applications Switching, Automatic Disconnect, Processor-Initiated Dynamic Line Reconfiguration, Terminal Controller, Local Console (System Control Functions), Automatic Polling, Autodial/Autoanswer Capabilities, Downline Loading of Remote Node
Price: $6,000 to $25,000
Monthly Maintenance Fee: $115
Distribution Method: End user
Number Installed to Date: 100 to 1,000
Date First Installed: January 1981

ACCESS TELECOMMUNICATIONS
ACCESS 38
Processor Function: Front-End Processor
Compatibility Classification: Non-IBM (Specialty)
Word Length: 8 bit
Host Compatibility: IBM System/38
Peripherals Supported: CRT, Printer, Tape Drive, Disk Drive, Diagnostic/Test
Maximum Number Input Lines: 8
Input Transmission Mode: Half-Duplex
Input Transmission Speeds:
Asynchronous: 55 bps to 19,200 bps
Input Port Code Supported: Ascii
Protocols Supported: X.25, Asynchronous (Start/Stop)
Aggregate Transmission Rate: 8
Aggregate Transmission Rate: 192 bps
Features: Protocol and Code Conversion, Error Control, Terminal-Initiated Applications Switching, Automatic Disconnect, Processor-Initiated Dynamic Line Reconfiguration, Terminal Controller, Local Console (System Control Functions), Automatic Polling, Autodial/Autoanswer Capabilities, Downline Loading of Remote Node
Price: $6,000 to $25,000
Monthly Maintenance Fee: $115
Distribution Method: End user
Number Installed to Date: 100 to 1,000
Date First Installed: January 1981

ARRAKIS, CORP.
4785
Processor Function: Front-End Processor
Compatibility Classification: IBM 37XX
Word Length: 16 bit
Host Compatibility: Amdahl 470, Amdahl 580, IBM 370
Input Transmission Mode: Full-Duplex, Half-Duplex
Input Transmission Speeds:
Synchronous: 64,000 bps
Asynchronous: 9,600 bps
Input Port Code Supported: Ebcdic, Ascii, X.25, Baudot
Protocols Supported: BSC, SDLC, HDLC, X.25, Asynchronous (Start/Stop)
Maximum Output Lines: 4
Aggregate Transmission Rate: 4
Features: Protocol and Code Conversion, Error Control, Automatic Transmission Speed (Baud Rate) Detection, Terminal-Initiated Applications Switching, Automatic Disconnect, Multiplexer/Demultiplexer, Terminal Controller, Local Console (System Control Functions), Automatic Polling, User Programmable, On-Line Maintenance, Statistics Collection, Autodial/Autoanswer Capabilities,

Downline Loading of Remote Node
Price: $60,000
Monthly Maintenance Fee: $320
Distribution Method: End user
Number Installed to Date: 100 to 1,000
Date First Installed: September 1980
(See Vendor Profile Page V-2)

AMDAHL CORP.
4705 E
Processor Function: Front-End Processor
Compatibility Classification: IBM 37XX
Word Length: 16 bit
Host Compatibility: Amdahl 470, Amdahl 580, IBM 370
Maximum Number Input Lines: 352
Input Transmission Mode: Full-Duplex, Half-Duplex
Input Transmission Speeds:
Synchronous: 64,000 bps
Asynchronous: 9,600 bps
Input Port Code Supported: Ebcdic, Ascii, X.25, Baudot
Protocols Supported: BSC, SDLC, HDLC, X.25, Asynchronous (Start/Stop)
Maximum Output Lines: 4
Aggregate Transmission Rate: 4
Features: Protocol and Code Conversion, Error Control, Automatic Transmission Speed (Baud Rate) Detection, Automatic Disconnect, Multiplexer/Demultiplexer, Processor-Initiated Dynamic Line Reconfiguration, Terminal Controller, Automatic Polling, User Programmable, On-Line Maintenance, Statistics Collection, Autodial/Autoanswer Capabilities, Downline Loading of Remote Node
Price: $120,000
Monthly Maintenance Fee: $320
Distribution Method: End user
Number Installed to Date: 100 to 1,000
Date First Installed: September 1980

ARNET, INC.
NUCLEUS 8000-PACKET SWITCH
Processor Function: Front-End Processor, Message Switch, Remote-Line Concentrator, Host Independent, Distributed Processing Nodes
Compatibility Classification: X.25
Word Length: 16 bit
Peripherals Supported: CRT, Printer, Tape Drive, Disk Drive
Maximum Number Input Lines: 1,024
Input Transmission Mode: Full-Duplex
Input Transmission Speeds:
Synchronous: 150 bps to 64,000 bps
Input Port Code Supported: Ebcdic, Ascii, X.25, Baudot
Protocols Supported: X.25
Maximum Output Lines: 1,024
Aggregate Transmission Rate: 1,024
Aggregate Transmission Rate: 10,000 bps
Features: Protocol and Code Conversion, Error Control, Terminal Emulation, Automatic Transmission Speed (Baud Rate) Detection, Terminal-Initiated Applications Switching, Automatic Disconnect, Multiplexer/Demultiplexer, Processor-Initiated Dynamic Line Reconfiguration, Terminal Controller, Local Console (System Control Functions), Automatic Polling, On-Line Maintenance, Statistics Collection, Autodial/Autoanswer Capabilities, Downline Loading of Remote Node
Price: $100,000
Distribution Method: OEM
Date First Installed: 1980
(See Vendor Profile Page V-2)

ASSOCOM, INC.
MODEL 9811A CHANNEL INTERFACE
Processor Function: Front-End Processor, Message Switch, Remote-Line Concentrator, Distributed Processing Nodes
Compatibility Classification: IBM, Mainframes, PCM
Word Length: 16 bit
Host Compatibility: IBM Mainframes
Peripherals Supported: CRT, Printer, Disk Drive, Diagnostic/Test, Graphics
Input Transmission Mode: Full-Duplex, Half-Duplex
Input Transmission Speeds:
Synchronous: 2,400 bps to 1,000,000 bps
Asynchronous: 50 bps to 38,400 bps
Input Port Code Supported: Ebcdic, Ascii, X.25, Parallel Binary Data, Baudot
Protocols Supported: BSC, SDLC, HDLC, BDLC, X.25, Asynchronous (Start/Stop)
Maximum Output Lines: 1
Aggregate Transmission Rate: 1
Features: Protocol and Code Conversion, Error Control, Terminal Emulation, Terminal Controller, Automatic Polling, User Programmable
Price: $20,000
Distribution Method: End user, OEM
Number Installed to Date: 100 to 1,000
Date First Installed: November 1980
(See Vendor Profile Page V-3)

A. W. COMPUTER SYSTEMS, INC.
A.W. BRIDGE TECH
Processor Function: Message Switch, Distributed Processing Nodes
Compatibility Classification: IBM Series/1
Word Length: 16 bit
Host Compatibility: IBM Series/1, DEC PDP-11
Peripherals Supported: CRT, Printer, Disk Drive, Diagnostic/Test
Input Transmission Mode: Full-Duplex
Input Transmission Speeds:
Synchronous: 1,200 bps to 9,600 bps
Input Port Code Supported: Ebcdic, Ascii, X.25, Parallel Binary Data
Protocols Supported: BSC, SDLC, HDLC, X.25, Asynchronous (Start/Stop)
Features: Protocol and Code Conversion, Error Control, Terminal Emulation, Automatic Transmission Speed (Baud Rate) Detection, Terminal-Initiated Applications Switching, Automatic Disconnect, Multiplexer/Demultiplexer, Processor-Initiated Dynamic Line Reconfiguration, Terminal Controller, Local Console (System Control Functions), Automatic Polling, On-Line Maintenance, Statistics Collection, Autodial/Autoanswer Capabilities, Downline Loading of Remote Node
Distribution Method: End user
Number Installed to Date: 10 to 50
Date First Installed: 1973
(See Vendor Profile Page V-3)

BETACOM CORP.
PROFESSIONAL COMM MANAGER-2000
Processor Function: Front-End Processor
Compatibility Classification: Micro Processor
Word Length: 16 bit
Host Compatibility: IBM PC-XT, Televideo 910, 802, 800
Peripherals Supported: CRT, Printer
Maximum Number Input Lines: 2
Input Transmission Mode: Full-Duplex, Half-Duplex
Input Transmission Speeds:
Synchronous: 300 bps to 1,200 bps
Asynchronous: 1,200 bps
Input Port Code Supported: Ebcdic, Ascii
Protocols Supported: BSC, SDLC, Asynchronous (Start/Stop), TWX
Features: Protocol and Code Conversion, Error Control, Terminal Emulation, Automatic Disconnect, Processor-Initiated Dynamic Line Reconfiguration, Automatic Polling, User Programmable, Statistics Collection, Autodial/Autoanswer Capabilities, Downline Loading of Remote Node
Price: $1,300 to $2,500
Monthly Maintenance Fee: $13
Distribution Method: End user
Number Installed to Date: 100 to 1,000
(See Vendor Profile Page V-4)

BROADBAND SYSTEMS, INC.
PS-1100
Processor Function: Remote-Line Concentrator
Compatibility Classification: IBM 3250
Word Length: 32 bit
Host Compatibility: IBM 308X, IBM 430X
Peripherals Supported: Graphics Terminals
Maximum Number Input Lines: 1
Input Transmission Mode: Half-Duplex
Input Transmission Speeds:
Synchronous: 2,400 bps to 2,000,000 bps
Input Port Code Supported: Ascii
Protocols Supported: SDLC
Aggregate Transmission Rate: 20,000 bps
Features: Error Control, Automatic Transmission Speed (Baud Rate) Detection, Automatic Disconnect, Multiplexer/Demultiplexer, Terminal Controller, Automatic Polling, User Programmable
Price: $3,300
Distribution Method: End user
Date First Installed: August 1981
(See Vendor Profile Page V-4)

BURROUGHS CORP.
B674
Processor Function: Front-End Processor
Compatibility Classification: Non-IBM (General Purpose)
Host Compatibility: Burroughs B2/3/4000
Maximum Number Input Lines: 32
Input Transmission Mode: Half-Duplex
Input Transmission Speeds:
Synchronous: 9,600 bps
Asynchronous: 19,200 bps
Input Port Code Supported: Ebcdic, Ascii
Aggregate Transmission Rate: 1
Features: Protocol and Code Conversion, Error Control, Terminal-Initiated Applications Switching, Automatic Disconnect, Terminal Controller, Automatic Polling, Statistics Collection, Autodial/Autoanswer Capabilities
Distribution Method: End user
Date First Installed: 1974
(See Vendor Profile Page V-4)

BURROUGHS CORP.
CP3680
Processor Function: Front-End Processor
Compatibility Classification: Non-IBM (General Purpose)
Host Compatibility: Burroughs B2/3/4000
Peripherals Supported: CRT, Disk Drive
Maximum Number Input Lines: 256
Input Transmission Mode: Full-Duplex, Half-Duplex
Input Transmission Speeds:
Synchronous: 9,600 bps
Asynchronous: 19,200 bps
Input Port Code Supported: Ebcdic, Ascii
Protocols Supported: BSC, SDLC, Asynchronous (Start/Stop)
Features: Protocol and Code Conversion, Error Control, Terminal Emulation, Terminal-Initiated Applications Switching, Automatic Disconnect, Processor-Initiated Dynamic Line Reconfiguration, Terminal Controller, Local Console (System Control Functions), Automatic Polling, On-Line Maintenance, Statistics Collection, Autodial/Autoanswer Capabilities, Downline Loading of Remote Node
Price: $84,050 to $124,950
Monthly Maintenance Fee: $535
Distribution Method: End user
Date First Installed: September 1981

BURROUGHS CORP.
CP9552
Processor Function: Front-End Processor, Message Switch, Remote-Line Concentrator, Host Independent, Distributed Processing Nodes
Compatibility Classification: Non-IBM (General Purpose)
Word Length: 8 bit
Host Compatibility: Burroughs
Peripherals Supported: CRT, Printer, Tape Drive, Disk Drive, Diagnostic/Test, Card Reader
Maximum Number Input Lines: 96
Input Transmission Mode: Full-Duplex, Half-Duplex
Input Transmission Speeds:
Synchronous: 9,600 bps
Asynchronous: 19,200 bps
Input Port Code Supported: Ebcdic, Ascii, X.25
Protocols Supported: BSC, SDLC, SDLC, X.25, Asynchronous (Start/Stop)
Features: Protocol and Code Conversion, Error Control, Terminal Emulation, Terminal-Initiated Applications Switching, Automatic Disconnect, Processor-Initiated Dynamic Line Reconfiguration, Terminal Controller, Local Console (System Control Functions), Automatic Polling, User Programmable, On-Line Maintenance, Statistics Collection, Autodial/Autoanswer Capabilities, Downline Loading of Remote Node
Price: $27,000 to $44,000
Distribution Method: End user
Date First Installed: June 1982

BURROUGHS CORP.
NSP/LSP
Processor Function: Front-End Processor
Compatibility Classification: Non-IBM (General Purpose)
Word Length: 48 bit
Host Compatibility: Burroughs B7900, B6900, B5900
Maximum Number Input Lines: 128
Input Transmission Mode: Full-Duplex, Half-Duplex
Input Transmission Speeds:
Synchronous: 2,000 bps to 56,000 bps
Asynchronous: 50 bps to 19,200 bps
Input Port Code Supported: Ebcdic, Ascii, X.25, Baudot
Protocols Supported: BSC, SDLC, HDLC, BDLC, X.25, Asynchronous (Start/Stop)
Aggregate Transmission Rate: 1
Features: Protocol and Code Conversion, Error Control, Terminal Emulation, Automatic Disconnect, Multiplexer/Demultiplexer, Processor-Initiated Dynamic Line Reconfiguration, Terminal Controller, Local Console (System Control Functions), Automatic Polling, User Programmable, Statistics Collection, Autodial/Autoanswer Capabilities
Monthly Maintenance Fee: $300
Distribution Method: End user
Number Installed to Date: 100 to 1,000
Date First Installed: January 1980

CENTURY ANALYSIS, INC.
CAI
Processor Function: Line Multiplexing
Compatibility Classification: NCR Criterion Series
Word Length: 16 bit
Host Compatibility: NCR Criterion
Peripherals Supported: CRT, Printer
Maximum Number Input Lines: 21
Input Transmission Mode: Full-Duplex
Input Transmission Speeds:
Asynchronous: 300 bps to 19,200 bps
Input Port Code Supported: Ascii
Protocols Supported: Asynchronous (Start/Stop)
Maximum Output Lines: 21
Aggregate Transmission Rate: 96 bps
Features: Protocol and Code Conversion, Error Control, Automatic Transmission Speed (Baud Rate) Detection, Terminal-Initiated Applications Switching, Automatic Disconnect, Terminal Controller, On-Line Maintenance, Statistics Collection, Autodial/Autoanswer Capabilities, Downline Loading of Remote Node
Price: $11,000
Distribution Method: End user
Number Installed to Date: 100 to 1,000
Date First Installed: June 1982
(See Vendor Profile Page V-5)

CMI CORP.
CCP/3305
Processor Function: Front-End Processor, Remote-Line Concentrator, Host Independent
Compatibility Classification: Sperry
Word Length: 32 bit
Host Compatibility: Sperry 1100
Peripherals Supported: CRT, Printer, Tape Drive, Disk Drive, Diagnostic/Test
Maximum Number Input Lines: 400
Input Transmission Mode: Full-Duplex, Half-Duplex
Input Transmission Speeds:
Synchronous: 1,200 bps to 50,000 bps
Asynchronous: 75 bps to 19,200 bps
Input Port Code Supported: Ebcdic, Ascii, X.25, Parallel Binary Data
Protocols Supported: BSC, SDLC, ADCCP, HDLC, UDLC, X.25, Asynchronous (Start/Stop), Uniscope
Maximum Output Lines: 400
Aggregate Transmission Rate: 2,000 bps
Features: Protocol and Code Conversion, Error Control, Terminal Emulation, Automatic Transmission Speed (Baud Rate) Detection, Terminal-Initiated Applications Switching, Automatic Disconnect, Multiplexer/Demultiplexer, Processor-Initiated Dynamic Line Reconfiguration, Local Console (System Control Functions), Automatic Polling, On-Line Maintenance, Statistics Collection, Autodial/Autoanswer Capabilities, Downline Loading of Remote Node
Price: $32,000 to $250,000
Distribution Method: Third-party
Number Installed to Date: 100 to 1,000
(See Vendor Profile Page V-6)

CODEX CORP.
CODEX 6020 FEP
Processor Function: Front-End Processor
Compatibility Classification: IBM 270X
Word Length: 16 bit
Host Compatibility: IBM Mainframes
Peripherals Supported: CRT, Printer, Tape Drive, Disk Drive
Maximum Number Input Lines: 240
Input Transmission Mode: Full-Duplex, Half-Duplex
Input Transmission Speeds:
Synchronous: 1,200 bps to 230,400 bps
Asynchronous: 50 bps to 9,600 bps
Input Port Code Supported: Ebcdic, Ascii, Baudot
Protocols Supported: BSC, Asynchronous (Start/Stop)
Maximum Output Lines: 4
Aggregate Transmission Rate: 16,000 bps
Features: Protocol and Code Conversion, Automatic Transmission Speed (Baud Rate) Detection, Terminal-Initiated Applications Switching, Processor-Initiated Dynamic Line Reconfiguration, Local Console (System Control Functions), Automatic Polling, Statistics Collection, Autodial/Autoanswer Capabilities, Multipoint Dynamic
Price: $45,000
Monthly Maintenance Fee: $450
Distribution Method: End user
Date First Installed: 1980
(See Vendor Profile Page V-5)

COMMEX, LTD.
CMC-4
Processor Function: Front-End Processor
Compatibility Classification: IBM 37XX
Word Length: 8 bit
Host Compatibility: IBM
Peripherals Supported: CRT, Printer
Maximum Number Input Lines: 4
Input Transmission Mode: Full-Duplex, Half-Duplex, Isochrono
Input Transmission Speeds:
Synchronous: 1,200 bps to 57,600 bps
Asynchronous: 75 bps to 9,600 bps
Input Port Code Supported: Ebcdic, Ascii, Baudot, PTTC
Protocols Supported: BSC, Asynchronous (Start/Stop), SDA2, TTY2, IBM Series/1
Maximum Output Lines: 1
Aggregate Transmission Rate: 576 bps
Features: Error Control, Automatic Transmission Speed (Baud Rate) Detection, Automatic Disconnect, Local Console (System Control Functions), Automatic Polling, On-Line Maintenance, Autodial/Autoanswer Capabilities, Hardware Configurable
Price: $13,005 to $190,080
Monthly Maintenance Fee: $80
Distribution Method: End user
Number Installed to Date: 100 to 1,000
Date First Installed: 1976
(See Vendor Profile Page V-6)

COMMEX, LTD.
CMC-32
Processor Function: Front-End Processor
Compatibility Classification: IBM 37XX
Word Length: 8 bit
Host Compatibility: IBM
Peripherals Supported: CRT, Printer
Maximum Number Input Lines: 32
Input Transmission Mode: Full-Duplex, Half-Duplex, Isochronou
Input Transmission Speeds:
Synchronous: 1,200 bps to 57,600 bps
Asynchronous: 75 bps to 9,600 bps
Input Port Code Supported: Ebcdic, Ascii, Baudot, PTTC
Protocols Supported: BSC, Asynchronous (Start/Stop), SDA2, TTY2, IBM Series/1
Maximum Output Lines: 1
Aggregate Transmission Rate: 576 bps
Features: Error Control, Automatic Transmission Speed (Baud Rate) Detection, Automatic Disconnect, Local Console (System Control Functions), Automatic Polling, On-Line Maintenance, Autodial/Autoanswer Capabilities, Hardware Configurable
Price: $35,000 to $65,000
Monthly Maintenance Fee: $120
Distribution Method: End user
Number Installed to Date: 100 to 1,000
Date First Installed: September 1976

COMMEX, LTD.
DNP-4I
Processor Function: Front-End Processor, Remote-Line Concentrator, Host Independent, Distributed Processing Nodes
Compatibility Classification: IBM 37XX
Word Length: 8 bit
Host Compatibility: IBM, DEC
Peripherals Supported: CRT, Printer
Maximum Number Input Lines: 18
Input Transmission Mode: Full-Duplex, Half-Duplex, Isochronous
Input Transmission Speeds:
Synchronous: 600 bps to 56,000 bps
Input Transmission Speeds:
Asynchronous: 75 bps to 19,200 bps
Input Port Code Supported: Ebcdic,

Communications Processors

Ascii, Baudot, PTTC
Protocols Supported: BSC, ADCCP, X.25, Asynchronous (Start/Stop), SDA2, TTY2, IBM Series/1
Maximum Output Lines: 1
Aggregate Transmission Rate: 1 - 750 bps
Features: Error Control, Terminal Emulation, Automatic Transmission Speed (Baud Rate) Detection, Terminal-Initiated Applications Switching, Automatic Disconnect, Multiplexer/Demultiplexer, Processor-Initiated Dynamic Line Reconfiguration, Local Console (System Control Functions), Automatic Polling, On-Line Maintenance, Statistics Collection, Autodial/Autoanswer Capabilities, Downline Loading of Remote Node, User Configurable
Price: $30,000 to $80,000
Monthly Maintenance Fee: $140
Distribution Method: End user
Number Installed to Date: 50 to 100
Date First Installed: 1982

COMMTEX, LTD.
DNP-4I
Processor Function: Front-End Processor, Remote-Line Concentrator, Host Independent, Distributed Processing Nodes
Compatibility Classification: IBM 37XX
Word Length: 8 bit
Host Compatibility: IBM, DEC
Peripherals Supported: CRT, Printer
Maximum Number Input Lines: 23
Input Transmission Mode: Full-Duplex, Half-Duplex, Isochronous
Input Transmission Speeds:
Synchronous: 600 bps to 56,000 bps
Asynchronous: 75 bps to 19,200 bps
Input Port Code Supported: Ebcdic, Ascii, Baudot, PTTC
Protocols Supported: BSC, ADCCP, X.25, Asynchronous (Start/Stop), SDA2, TTY2, IBM Series/1
Maximum Output Lines: 1
Aggregate Transmission Rate: 750 bps
Features: Error Control, Terminal Emulation, Automatic Transmission Speed (Baud Rate) Detection, Terminal-Initiated Applications Switching, Automatic Disconnect, Multiplexer/Demultiplexer, Processor-Initiated Dynamic Line Reconfiguration, Local Console (System Control Functions), Automatic Polling, On-Line Maintenance, Statistics Collection, Autodial/Autoanswer Capabilities, Downline Loading of Remote Node, User Configurable
Price: $50,000 to $107,000
Monthly Maintenance Fee: $165
Distribution Method: End user
Number Installed to Date: 50 to 100
Date First Installed: 1982

COMMTEX, LTD.
DNP-16I
Processor Function: Front-End Processor, Remote-Line Concentrator, Host Independent, Distributed Processing Nodes
Compatibility Classification: IBM 37XX
Word Length: 8 bit
Host Compatibility: IBM, DEC
Peripherals Supported: CRT, Printer
Maximum Number Input Lines: 83
Input Transmission Mode: Full-Duplex, Half-Duplex, Isochronous
Input Transmission Speeds:
Synchronous: 600 bps to 56,000 bps
Asynchronous: 75 bps to 19,200 bps
Input Port Code Supported: Ebcdic, Ascii, Baudot, PTTC
Protocols Supported: BSC, ADCCP, X.25, Asynchronous (Start/Stop), SDA2, TTY2, IBM Series/1
Maximum Output Lines: 4
Aggregate Transmission Rate: 750 bps
Features: Error Control, Terminal Emulation, Automatic Transmission Speed (Baud Rate) Detection, Terminal-Initiated Applications Switching, Automatic Disconnect, Multiplexer/Demultiplexer, Processor-Initiated Dynamic Line Reconfiguration, Local Console (System Control Functions), Automatic Polling, On-Line Maintenance, Statistics Collection, Autodial/Autoanswer Capabilities, Downline Loading of Remote Node, User Configurable
Price: $75,000 to $250,000
Monthly Maintenance Fee: $195
Distribution Method: End user
Number Installed to Date: 50 to 100
Date First Installed: 1982

COMMTEX, INC.
TERMINAL CONCENTRATOR; MDS-3070
Processor Function: Message Switch, Remote-Line Concentrator, Distributed Processing Nodes
Compatibility Classification: IBM 3274/6 Compatible
Word Length: 8 bit, 16 bit
Host Compatibility: IBM 360/370, IBM 30XX, 43XX, TTY
Peripherals Supported: CRT, Printer, Tape Drive, Disk Drive
Maximum Number Input Lines: 128
Input Transmission Mode: Full-Duplex
Input Transmission Speeds:
Synchronous: 19,200 bps
Asynchronous: 110 bps to 19,200 bps
Input Port Code Supported: Ascii
Protocols Supported: BSC, SDLC, X.25, Asynchronous (Start/Stop)
Maximum Output Lines: 4
Aggregate Transmission Rate: 4
Features: Protocol and Code Conversion, Error Control, Terminal Emulation, Automatic Transmission Speed (Baud Rate) Detection, Terminal-Initiated Applications Switching, Automatic Disconnect, Terminal Controller, Local Console (System Control Functions), Automatic Polling, User Programmable, Statistics Collection, Autodial/Autoanswer Capabilities, Downline Loading of Remote Node, Switching
Price: $4,000 to $80,000
Distribution Method: Third-party
Number Installed to Date: 1,000 to 10,000
Date First Installed: February 1981

COMPUTER COMMUNICATIONS, INC.
CC-8
Processor Function: Front-End Processor
Compatibility Classification: IBM 37XX
Word Length: 16 bit
Host Compatibility: IBM 370, IBM 30XX, IBM 43XX
Peripherals Supported: CRT, Printer, Disk Drive
Maximum Number Input Lines: 32
Input Transmission Mode: Full-Duplex, Half-Duplex
Input Transmission Speeds:
Synchronous: 2,000 bps to 56,000 bps
Input Transmission Speeds:
Asynchronous: 75 bps to 9,600 bps
Input Port Code Supported: Ascii
Protocols Supported: BSC, Asynchronous (Start/Stop)
Maximum Output Lines: 2
Aggregate Transmission Rate: 8,000 bps
Features: Protocol and Code Conversion, Error Control, Automatic Transmission Speed (Baud Rate) Detection, Processor-Initiated Dynamic Line Reconfiguration, Terminal Controller, Local Console (System Control Functions), Automatic Polling, User Programmable, Autodial/Autoanswer Capabilities
Price: $28,000 to $60,000
Distribution Method: End user
Date First Installed: 1981
(See Vendor Profile Page V-6)

COMPUTER COMMUNICATIONS, INC.
CC-6
Processor Function: Front-End Processor
Compatibility Classification: IBM 37XX
Word Length: 16 bit
Host Compatibility: IBM 370, IBM 30XX, IBM 43XX
Peripherals Supported: CRT, Printer, Disk Drive
Maximum Number Input Lines: 240
Input Transmission Mode: Full-Duplex, Half-Duplex
Input Transmission Speeds:
Synchronous: 2,000 bps to 230,400 bps
Input Transmission Speeds:
Asynchronous: 75 bps to 9,600 bps
Input Port Code Supported: Ascii
Protocols Supported: BSC, Asynchronous (Start/Stop), TTY
Maximum Output Lines: 4
Aggregate Transmission Rate: 16,000 bps
Features: Protocol and Code Conversion, Error Control, Automatic Transmission Speed (Baud Rate) Detection, Terminal Controller, Local Console (System Control Functions), Automatic Polling, User Programmable, Statistics Collection, Autodial/Autoanswer Capabilities, X.25 Support
Price: $50,000 to $100,000
Distribution Method: End user
Number Installed to Date: 300
Date First Installed: 1978

COMPUTER COMMUNICATIONS, INC.
CC-80
Processor Function: Message Switch, Electronic Mail
Compatibility Classification: Custom Design Communications Processor
Word Length: 16 bit
Host Compatibility: IBM 370, IBM 30XX, IBM 43XX
Peripherals Supported: CRT, Printer, Tape Drive, Disk Drive
Maximum Number Input Lines: 1,000
Input Transmission Mode: Full-Duplex, Half-Duplex
Input Transmission Speeds:
Synchronous: 2,000 bps to 230,400 bps
Asynchronous: 75 bps to 9,600 bps
Input Port Code Supported: Ebcdic, Ascii, X.25
Protocols Supported: BSC, HDLC, Asynchronous (Start/Stop), Sabre X.25
Maximum Output Lines: 7
Aggregate Transmission Rate: 12,000 bps
Features: Protocol and Code Conversion, Error Control, Terminal Emulation, Automatic Transmission Speed (Baud Rate) Detection, Terminal-Initiated Applications Switching, Automatic Disconnect, Processor-Initiated Dynamic Line Reconfiguration, Terminal Controller, Local Console (System Control Functions), Automatic Polling, User Programmable, On-Line Maintenance, Statistics Collection, Autodial/Autoanswer Capabilities
Price: $200,000 to $500,000
Distribution Method: End user
Number Installed to Date: 50 to 100
Date First Installed: 1978

COMPUTER COMMUNICATIONS, INC.
CC-85
Processor Function: Message Switch, Electronic Mail
Compatibility Classification: Custom Design Communications Processor
Word Length: 16 bit
Host Compatibility: IBM 370, IBM 30XX, IBM 43XX
Peripherals Supported: CRT, Printer, Tape Drive, Disk Drive
Maximum Number Input Lines: 1,000
Input Transmission Mode: Full-Duplex, Half-Duplex

Input Transmission Speeds:
Synchronous: 2,000 bps to 230,400 bps
Input Transmission Speeds:
Asynchronous: 75 bps to 9,600 bps
Input Port Code Supported: Ebcdic, Ascii, X.25
Protocols Supported: BSC, HDLC, Asynchronous (Start/Stop), Sabre X.25
Maximum Output Lines: 7
Aggregate Transmission Rate: 24,000 bps
Features: Protocol and Code Conversion, Error Control, Terminal Emulation, Automatic Transmission Speed (Baud Rate) Detection, Terminal-Initiated Applications Switching, Automatic Disconnect, Processor-Initiated Dynamic Line Reconfiguration, Terminal Controller, Local Console (System Control Functions), Automatic Polling, User Programmable, On-Line Maintenance, Statistics Collection, Autodial/Autoanswer Capabilities
Price: $200,000 to $500,000
Distribution Method: End user
Number Installed to Date: 50 to 100
Date First Installed: 1979

COMPUTER MEDICS CORP.
LDP-5
Processor Function: Front-End Processor
Compatibility Classification: IBM 37XX
Word Length: 8 bit
Peripherals Supported: CRT, Printer, Bar Code Scanner
Maximum Number Input Lines: 32
Input Transmission Mode: Full-Duplex
Input Transmission Speeds:
Asynchronous: 110 bps to 9,600 bps
Input Port Code Supported: Ascii
Protocols Supported: Asynchronous (Start/Stop)
Maximum Output Lines: 5
Aggregate Transmission Rate: 96 bps
Features: Protocol and Code Conversion, Terminal Emulation, Multiplexer/Demultiplexer, Local Console (System Control Functions), Automatic Polling, Statistics Collection, Downline Loading of Remote Node
Price: $30,000
Distribution Method: Third-party
Number Installed to Date: 50 to 100
Date First Installed: 1979
(See Vendor Profile Page V-7)

COMPUTER SYSTEMS CP/86
Processor Function: Front-End Processor, Remote-Line Concentrator
Compatibility Classification: IBM 270X
Word Length: 16 bit
Host Compatibility: IBM-PC-XT,4300, DEC PDP-11, DEC VAX-780
Peripherals Supported: CRT, Printer, Tape Drive, Disk Drive, Diagnostic/Test
Maximum Number Input Lines: 32
Input Transmission Mode: Full-Duplex, Half-Duplex
Input Transmission Speeds:
Synchronous: 2,400 bps to 8,000 bps
Asynchronous: 300 bps to 19,200 bps
Input Port Code Supported: Ebcdic, Ascii, Parallel Binary Data
Protocols Supported: BSC, SDLC, Asynchronous (Start/Stop)
Maximum Output Lines: 2
Aggregate Transmission Rate: 1,000 bps
Features: Protocol and Code Conversion, Error Control, Terminal Emulation, Automatic Transmission Speed (Baud Rate) Detection, Terminal-Initiated Applications Switching, Multiplexer/Demultiplexer, Terminal Controller, User Programmable, Autodial/Autoanswer Capabilities
Price: $2,900 to $10,000
Distribution Method: End user
Date First Installed: 1982
(See Vendor Profile Page V-7)

CONTROL DATA CORP.
2551-3
Processor Function: Front-End Processor
Compatibility Classification: Non-IBM (General Purpose)
Word Length: 16 bit
Host Compatibility: CDC Cyber 700, CDC Cyber 800
Peripherals Supported: Tape Drive
Maximum Number Input Lines: 256
Input Transmission Mode: Full-Duplex, Half-Duplex
Input Transmission Speeds:
Synchronous: 56,000 bps
Asynchronous: 9,600 bps
Input Port Code Supported: Ebcdic, Ascii, X.25
Protocols Supported: BSC, SDLC, HDLC, X.25, HASP, CDCCP
Maximum Output Lines: 256
Aggregate Transmission Rate: 256
Features: Protocol and Code Conversion, Error Control, Terminal Emulation, Automatic Transmission Speed (Baud Rate) Detection, Automatic Disconnect, Multiplexer/Demultiplexer, Terminal Controller, Local Console (System Control Functions), Automatic Polling, User Programmable, On-Line Maintenance, Statistics Collection, Autodial/Autoanswer Capabilities, Downline Loading of Remote Node
Price: $36,170
Monthly Maintenance Fee: $425
Distribution Method: End user
Date First Installed: 1974
(See Vendor Profile Page V-8)

CONTROL DATA CORP.
2561-4
Processor Function: Front-End Processor
Compatibility Classification: Non-IBM (General Purpose)
Word Length: 16 bit
Host Compatibility: CDC Cyber 700, CDC Cyber 800
Maximum Number Input Lines: 256
Input Transmission Mode: Full-Duplex, Half-Duplex
Input Transmission Speeds:
Synchronous: 56,000 bps
Input Transmission Speeds:
Asynchronous: 9,600 bps
Input Port Code Supported: Ebcdic, Ascii, X.25
Protocols Supported: BSC, SDLC, HDLC, X.25, HASP, CDCCP
Maximum Output Lines: 256
Aggregate Transmission Rate: 256
Features: Protocol and Code Conversion, Error Control, Terminal Emulation, Automatic Transmission Speed (Baud Rate) Detection, Automatic Disconnect, Multiplexer/Demultiplexer, Terminal Controller, Local Console (System Control Functions), Automatic Polling, User Programmable, On-Line Maintenance, Statistics Collection, Autodial/Autoanswer Capabilities, Downline Loading of Remote Node
Price: $47,863
Monthly Maintenance Fee: $475
Distribution Method: End user
Date First Installed: 1974

DATAGRAM CORP.
DM 19000
Processor Function: Front-End Processor
Compatibility Classification: Non-IBM (General Purpose)
Word Length: 8 bit
Host Compatibility: Burroughs Mainframes
Peripherals Supported: CRT, Printer, Diagnostic/Test
Maximum Number Input Lines: 40
Input Transmission Mode: Full-Duplex, Half-Duplex
Input Transmission Speeds:
Synchronous: 110 bps to 9,600 bps
Asynchronous: 110 bps to 9,600 bps
Input Port Code Supported: Ebcdic, Ascii, Baudot
Protocols Supported: Asynchronous (Start/Stop), Burroughs Poll Select
Maximum Output Lines: 2
Aggregate Transmission Rate: 192 bps
Features: Protocol and Code Conversion, Error Control, Automatic Transmission Speed (Baud Rate) Detection, Terminal-Initiated Applications Switching, Automatic Disconnect, Processor-Initiated Dynamic Line Reconfiguration, Local Console (System Control Functions), Automatic Polling, User Programmable, On-Line Maintenance, Autodial/Autoanswer Capabilities, Downline Loading of Remote Node
Price: $6,000 to $30,000
Distribution Method: End user
Number Installed to Date: 100 to 1,000
Date First Installed: January 1979
(See Vendor Profile Page V-9)

DATAPOINT, INC.
DR-10
Processor Function: Distributed Processing Nodes
Compatibility Classification: Non-IBM (General Purpose)
Word Length: 8 bit
Peripherals Supported: CRT, Printer, Disk Drive, Diagnostic/Test
Input Transmission Mode: Full-Duplex, Half-Duplex
Input Transmission Speeds:
Synchronous: 50 bps to 19,200 bps
Asynchronous: 50 bps to 19,200 bps
Input Port Code Supported: Ebcdic, Ascii, X.25, Parallel Binary Data
Protocols Supported: BSC, SDLC, HDLC, X.25, Asynchronous (Start/Stop)
Maximum Output Lines: 2
Features: Protocol and Code Conversion, Error Control, Terminal Emulation, Automatic Transmission Speed (Baud Rate) Detection, Terminal-Initiated Applications Switching, Automatic Disconnect, Multiplexer/Demultiplexer, Processor-Initiated Dynamic Line Reconfiguration, Terminal Controller, Local Console (System Control Functions), Automatic Polling, Statistics Collection
Price: $750
Distribution Method: End user
Number Installed to Date: 100 to 1,000
Date First Installed: September 1982
(See Vendor Profile Page V-9)

DATASTREAM COMMUNICATIONS, INC.
774
Processor Function: Remote-Line Concentrator
Compatibility Classification: IBM 3270
Host Compatibility: IBM
Peripherals Supported: CRT, Printer, Diagnostic/Test
Maximum Number Input Lines: 16
Input Transmission Mode: Half-Duplex
Input Transmission Speeds:
Synchronous: 110 bps to 9,600 bps
Asynchronous: 110 bps to 9,600 bps
Input Port Code Supported: Ebcdic, Ascii, Asynchronous Serial
Protocols Supported: BSC
Maximum Output Lines: 2
Aggregate Transmission Rate: 2
Features: Protocol and Code Conversion, Terminal Emulation, Automatic Transmission Speed (Baud Rate) Detection, Terminal-Initiated Applications Switching, Automatic Disconnect, Terminal Controller, Local Console (System Control Functions), User Programmable
Price: $4,000 to $10,000
Monthly Maintenance Fee: $125
Distribution Method: End user
Number Installed to Date: 100 to 1,000
Date First Installed: September 1980
(See Vendor Profile Page V-9)

Communications Processors

DATASTREAM COMMUNICATION, INC.
778
Processor Function: Remote-Line Concentrator
Compatibility Classification: IBM 3270
Host Compatibility: IBM
Peripherals Supported: CRT, Printer, Diagnostic/Test
Maximum Number Input Lines: 15
Input Transmission Mode: Half-Duplex
Input Transmission Speeds:
Synchronous: 110 bps to 9,600 bps
Asynchronous: 110 bps to 9,600 bps
Input Port Code Supported: Ebcdic, Ascii, Asynchronous Serial
Protocols Supported: BSC
Maximum Output Lines: 2
Aggregate Transmission Rate: 2
Features: Protocol and Code Conversion, Terminal Emulation, Automatic Transmission Speed (Baud Rate) Detection, Terminal-Initiated Applications Switching, Automatic Disconnect, Terminal Controller, Local Console (System Control Functions), User Programmable
Price: $4,000 to $6,000
Monthly Maintenance Fee: $100
Distribution Method: End user
Number Installed to Date: 100 to 1,000
Date First Installed: September 1980

DATASTREAM COMMUNICATION, INC.
674
Processor Function: Remote-Line Concentrator
Compatibility Classification: IBM 3270
Host Compatibility: IBM
Peripherals Supported: CRT, Printer, Diagnostic/Test
Maximum Number Input Lines: 15
Input Transmission Mode: Half-Duplex
Input Transmission Speeds:
Synchronous: 110 bps to 9,600 bps
Asynchronous: 110 bps to 9,600 bps
Input Port Code Supported: Ebcdic, Ascii, Asynchronous Serial
Protocols Supported: BSC
Maximum Output Lines: 2
Aggregate Transmission Rate: 2
Features: Protocol and Code Conversion, Terminal Emulation, Automatic Transmission Speed (Baud Rate) Detection, Terminal-Initiated Applications Switching, Automatic Disconnect, Terminal Controller, Local Console (System Control Functions), User Programmable
Price: $16,000
Monthly Maintenance Fee: $115
Distribution Method: End user
Number Installed to Date: 100 to 1,000
Date First Installed: September 1981

DATASTREAM COMMUNICATION, INC.
MPC
Processor Function: Remote-Line Concentrator
Compatibility Classification: IBM 3270
Host Compatibility: IBM
Peripherals Supported: CRT, Printer, Diagnostic/Test
Maximum Number Input Lines: 15
Input Transmission Mode: Half-Duplex
Input Transmission Speeds:
Synchronous: 110 bps to 9,600 bps
Asynchronous: 110 bps to 9,600 bps
Input Port Code Supported: Ebcdic, Ascii, Asynchronous Serial
Maximum Output Lines: 2
Aggregate Transmission Rate: 2
Features: Protocol and Code Conversion, Terminal Emulation, Automatic Transmission Speed (Baud Rate) Detection, Terminal-Initiated Applications Switching, Automatic Disconnect, Terminal Controller, Local Console (System Control Functions), User Programmable
Price: $6,000 to $12,000
Monthly Maintenance Fee: $150
Distribution Method: End user
Number Installed to Date: 1 to 10
Date First Installed: January 1984

DAYCOM CORP.
DAYCOM
Processor Function: Front-End Processor, Message Switch, Remote-Line Concentrator, Host Independent, Distributed Processing Nodes
Compatibility Classification: Non-IBM (General Purpose)
Word Length: 16 bit, 32 bit
Peripherals Supported: CRT, Printer, Tape Drive, Disk Drive, Diagnostic/Test
Input Transmission Mode: Full-Duplex, Half-Duplex
Input Port Code Supported: Ebcdic, Ascii
Protocols Supported: BSC, SDLC, HDLC, BDLC
Features: Error Control, Automatic Transmission Speed (Baud Rate) Detection, Automatic Disconnect, Automatic Polling, User Programmable, On-Line Maintenance, Statistics Collection
Number Installed to Date: 100 to 1,000
(See Vendor Profile Page V-10)

DCA/TAC
SYSTEM 326
Processor Function: Host Independent
Compatibility Classification: Network Processor
Word Length: 8 bit
Host Compatibility: DEC, DG, IBM
Peripherals Supported: CRT, Printer, Tape Drive, Disk Drive
Maximum Number Input Lines: 42
Input Transmission Mode: Full-Duplex
Input Transmission Speeds:
Synchronous: 2,400 bps to 9,600 bps
Asynchronous: 50 bps to 9,600 bps
Input Port Code Supported: Ebcdic, Ascii, X.25, Baudot
Protocols Supported: BSC, X.25, Asynchronous (Start/Stop)
Maximum Output Lines: 42
Aggregate Transmission Rate: 4,000 bps
Features: Protocol and Code Conversion, Error Control, Automatic Transmission Speed (Baud Rate) Detection, Terminal-Initiated Applications Switching, Automatic Disconnect, Multiplexer/Demultiplexer, Processor-Initiated Dynamic Line Reconfiguration, Terminal Controller, Local Console (System Control Functions), Automatic Polling, User Programmable, On-Line Maintenance
Distribution Method: End user, OEM, Third-party
Date First Installed: 1984
(See Vendor Profile Page V-10)

DCA/TAC
SYSTEM 365
Processor Function: Host Independent
Compatibility Classification: Network Processor
Word Length: 8 bit
Host Compatibility: DEC, DG, IBM
Peripherals Supported: CRT, Printer, Tape Drive, Disk Drive
Maximum Number Input Lines: 126
Input Transmission Mode: Full-Duplex
Input Transmission Speeds:
Synchronous: 2,400 bps to 9,600 bps
Asynchronous: 50 bps to 9,600 bps
Input Port Code Supported: Ebcdic, Ascii, X.25, Baudot
Protocols Supported: BSC, X.25, Asynchronous (Start/Stop)
Maximum Output Lines: 126
Aggregate Transmission Rate: 4,000 bps
Features: Protocol and Code Conversion, Error Control, Automatic Transmission Speed (Baud Rate) Detection, Terminal-Initiated Applications Switching, Automatic Disconnect, Multiplexer/Demultiplexer, Processor-Initiated Dynamic Line Reconfiguration, Terminal Controller, Local Console (System Control Functions), Automatic Polling, User Programmable, On-Line Maintenance
Distribution Method: End user, OEM, Third-party
Number Installed to Date: 100 to 1,000
Date First Installed: 1980

DIGITAL EQUIPMENT CORP.
ETHERNET COMMUNICATIONS SERVERS
Processor Function: Front-End Processor, Remote-Line Concentrator, Host Independent
Compatibility Classification: DEC Communication Service for Ethernet
Word Length: 16 bit
Host Compatibility: DEC
Maximum Number Input Lines: 32
Input Transmission Mode: Full-Duplex
Input Transmission Speeds:
Asynchronous: 19,200 bps
Input Port Code Supported: Ascii
Protocols Supported: Asynchronous (Start/Stop)
Maximum Output Lines: 32
Aggregate Transmission Rate: 32
Distribution Method: End user, OEM, Third-party
Date First Installed: March 1984
(See Vendor Profile Page V-10)

[illegible] SYSTEMS, INC.
TCS/500
Processor Function: Front-End Processor
Compatibility Classification: IBM 3270
Word Length: 16 bit
Host Compatibility: IBM 3270
Peripherals Supported: CRT, Printer, Tape Drive, Disk Drive, Diagnostic/Test
Maximum Number Input Lines: 144
Input Transmission Mode: Full-Duplex
Input Transmission Speeds:
Asynchronous: 600 bps
Input Port Code Supported: Ebcdic, Ascii, X.25, Parallel Binary Data, Baudot
Protocols Supported: BSC, SDLC, HDLC, X.25, Asynchronous (Start/Stop)
Maximum Output Lines: 144
Aggregate Transmission Rate: 192 bps
Features: Protocol and Code Conversion, Error Control, Terminal Emulation, Automatic Transmission Speed (Baud Rate) Detection, Terminal-Initiated Applications Switching, Automatic Disconnect, Multiplexer/Demultiplexer, Processor-Initiated Dynamic Line Reconfiguration, Terminal Controller, Local Console (System Control Functions), Automatic Polling, User Programmable, On-Line Maintenance, Statistics Collection, Autodial and Autoanswer Capabilities, Downline Loading of Remote Node
Price: $15,000
Distribution Method: End user
Number Installed to Date: 1 to 10
Date First Installed: October 1981
(See Vendor Profile Page V-11)

ENVAX SYSTEMS, INC.
ENVAX 600
Processor Function: Front-End Processor, Host Independent
Compatibility Classification: Non-IBM (General Purpose)
Word Length: 8 bit
Peripherals Supported: CRT, Printer, Diagnostic/Test
Maximum Number Input Lines: 8
Input Transmission Mode: Full-Duplex, Half-Duplex
Input Transmission Speeds:
Asynchronous: 2,400 bps

Input Port Code Supported: Ebcdic, Ascii, Baudot
Protocols Supported: Asynchronous (Start/Stop)
Maximum Output Lines: 1
Aggregate Transmission Rate: 96 bps
Features: Protocol and Code Conversion, Automatic Disconnect, On-Line Maintenance, Autodial/Autoanswer Capabilities
Price: $1,000 to $3,000
Distribution Method: Third-party
Number Installed to Date: 1,000 to 10,000
Date First Installed: October 1978
(See Vendor Profile Page V-11)

RAYMAX SYSTEMS, INC.
TRANSACTION PROCESSOR
Processor Function: Front-End Processor
Compatibility Classification: IBM 37XX
Word Length: 8 bit
Host Compatibility: IBM 370, 360, DG, Datapoint ARC
Peripherals Supported: CRT, Printer, Tape Drive, Disk Drive, Diagnostic/Test
Maximum Number Input Lines: 32
Input Transmission Mode: Full-Duplex, Half-Duplex
Input Transmission Speeds:
Asynchronous: 9,600 bps
Input Port Code Supported: Ebcdic, Ascii, X.25, Parallel Binary Data, Baudot
Protocols Supported: BSC, SDLC, HDLC, BDLC, X.25, Asynchronous (Start/Stop)
Maximum Output Lines: 4
Aggregate Transmission Rate: 2 Mb bps
Features: Protocol and Code Conversion, Error Control, Automatic Transmission Speed (Baud Rate) Detection, Automatic Disconnect, Multiplexer/Demultiplexer, Processor-Initiated Dynamic Line Reconfiguration, Local Console (System Control Functions), On-Line Maintenance, Autodial/Autoanswer Capabilities, Downline Loading of Remote Node
Price: $4,000 to $20,000
Distribution Method: Third-party
Number Installed to Date: 50 to 100
Date First Installed: February 1981

EXCELAN
EXOS 101
Processor Function: Front-End Processor
Compatibility Classification: IBM 270X
Word Length: 16 bit
Maximum Memory Supported: 16.0M bytes
Peripherals Supported: Ethernet LAN
Input Transmission Mode: Half-Duplex
Protocols Supported: Ethernet CCP IP
Features: Protocol and Code Conversion, Error Control, Terminal Emulation, Multiplexer/Demultiplexer, User Programmable, Statistics Collection, Downline Loading of Remote Node
Price: $1,700
Distribution Method: OEM
Number Installed to Date: 1 to 10
Date First Installed: January 1983
(See Vendor Profile Page V-12)

GANDALF DATA, INC.
PACX IV
Processor Function: Front-End Processor, Message Switch, Remote-Line Concentrator, Host Independent, Distributed Processing Nodes
Compatibility Classification: Non-IBM (General Purpose)
Word Length: 8 bit, 16 bit
Peripherals Supported: CRT, Printer, Diagnostic/Test
Maximum Number Input Lines: 1,024
Input Transmission Mode: Full-Duplex
Input Transmission Speeds:
Synchronous: 2,400 bps to 19,200 bps
Asynchronous: 9,600 bps
Input Port Code Supported: Ebcdic, Ascii, X.25, Baudot
Protocols Supported: BSC, SDLC, HDLC, X.25, Asynchronous (Start/Stop)
Maximum Output Lines: 128
Aggregate Transmission Rate: 190,000 bps
Features: Protocol and Code Conversion, Error Control, Automatic Transmission Speed (Baud Rate) Detection, Terminal-Initiated Applications Switching, Automatic Disconnect, Multiplexer/Demultiplexer, Processor-Initiated Dynamic Line Reconfiguration, Terminal Controller, Local Console (System Control Functions), User Programmable, On-Line Maintenance, Statistics Collection, Autodial/Autoanswer Capabilities, Downline Loading of Remote Node
Distribution Method: End user
Number Installed to Date: 1,000 to 10,000
(See Vendor Profile Page V-12)

GATEWAY COMMUNICATIONS, INC.
GATEWAY PROCESSOR
Processor Function: Message Switch, Remote-Line Concentrator, Host Independent
Compatibility Classification: Non-IBM (General Purpose)
Word Length: 8 bit
Host Compatibility: IBM
Peripherals Supported: CRT, Printer, Disk Drive, Diagnostic/Test
Maximum Number Input Lines: 16
Input Transmission Mode: Full-Duplex, Half-Duplex
Input Transmission Speeds:
Synchronous: 2,400 bps to 56,000 bps
Asynchronous: 110 bps to 19,200 bps
Input Port Code Supported: Ebcdic, Ascii, X.25, Parallel Binary Data, Baudot
Protocols Supported: BSC, SDLC, ADCCP, HDLC, X.25, Asynchronous (Start/Stop)
Maximum Output Lines: 16
Aggregate Transmission Rate: 5,000 bps
Features: Protocol and Code Conversion, Error Control, Terminal Emulation, Automatic Transmission Speed (Baud Rate) Detection, Terminal-Initiated Applications Switching, Automatic Disconnect, Local Console (System Control Functions), Automatic Polling, User Programmable, On-Line Maintenance, Statistics Collection, Autodial/Autoanswer Capabilities, Downline Loading of Remote Node
Price: $1,500 to $4,500
Distribution Method: Third-party
Number Installed to Date: 1 to 10
Date First Installed: January 1983
(See Vendor Profile Page V-12)

GTE TELENET COMMUNICATIONS CORP.
TP-3005 NETWORK INTERFACE PROCESSOR
Processor Function: Remote-Line Concentrator, Host Independent, Distributed Processing Nodes
Compatibility Classification: Non-IBM (General Purpose)
Word Length: 8 bit
Maximum Number Input Lines: 8
Input Transmission Mode: Half-Duplex
Input Transmission Speeds:
Asynchronous: 110 bps to 9,600 bps
Input Port Code Supported: Ascii
Protocols Supported: X.25, Asynchronous (Start/Stop), X.28, X.29, X.3
Maximum Output Lines: 1
Aggregate Transmission Rate: 1
Features: Protocol and Code Conversion, Error Control, Automatic Transmission Speed (Baud Rate) Detection, Terminal-Initiated Applications Switching, Automatic Disconnect, Multiplexer/Demultiplexer, Local Console (System Control Functions), On-Line Maintenance, Statistics Collection, Autodial/Autoanswer Capabilities, Downline Loading of Remote Node
Price: $2,350
Monthly Maintenance Fee: $30
Distribution Method: End user
Number Installed to Date: 100 to 1,000
Date First Installed: January 1983
(See Vendor Profile Page V-13)

GTE TELENET COMMUNICATIONS CORP.
TP3010-II NETWORK INTERFACE PROCESSOR
Processor Function: Remote-Line Concentrator, Host Independent, Distributed Processing Nodes
Compatibility Classification: Network Interface Process
Word Length: 8 bit
Peripherals Supported: Tape Drive
Maximum Number Input Lines: 28
Input Transmission Mode: Full-Duplex, Half-Duplex
Input Transmission Speeds:
Synchronous: 1,200 bps to 9,600 bps
Asynchronous: 50 bps to 9,600 bps
Input Port Code Supported: Ebcdic, Ascii, Baudot
Protocols Supported: BSC, SDLC, X.25, Asynchronous (Start/Stop), 3270 DSP BPAD
Maximum Output Lines: 1
Aggregate Transmission Rate: 1
Features: Protocol and Code Conversion, Error Control, Terminal Emulation, Automatic Transmission Speed (Baud Rate) Detection, Terminal-Initiated Applications Switching, Automatic Disconnect, Multiplexer/Demultiplexer, Local Console (System Control Functions), Automatic Polling, On-Line Maintenance, Statistics Collection, Autodial/Autoanswer Capabilities, Downline Loading of Remote Node
Price: $7,500
Monthly Maintenance Fee: $65
Distribution Method: End user
Number Installed to Date: 1,000 to 10,000
Date First Installed: December 1978

HARRIS CORP.
HARRIS 1000
Processor Function: Distributed Processing Nodes
Compatibility Classification: IBM 37XX
Word Length: 16 bit
Host Compatibility: IBM Mainframes, Sperry 1004, CDC 200 UT
Peripherals Supported: CRT, Printer, Tape Drive, Disk Drive, Diagnostic/Test, Card Reader
Maximum Number Input Lines: 4
Input Transmission Mode: Full-Duplex, Half-Duplex
Input Transmission Speeds:
Synchronous: 1,200 bps to 56,000 bps
Asynchronous: 110 bps to 9,600 bps
Input Port Code Supported: Ebcdic, Ascii
Protocols Supported: BSC, SDLC, HDLC, Asynchronous (Start/Stop)
Maximum Output Lines: 4
Aggregate Transmission Rate: 4
Features: Protocol and Code Conversion, Error Control, Terminal Emulation, Terminal-Initiated Applications Switching, Terminal Controller, Local Console (System Control Functions), Automatic Polling, User Programmable, Statistics Collection, Autodial/Autoanswer Capabilities
Distribution Method: End user
Number Installed to Date: 1,000 to 10,000
Date First Installed: September 1974
(See Vendor Profile Page V-14)

HARRIS CORP.
HARRIS 8470
Processor Function: Front-End Processor

Communications Processors

Compatibility Classification: Non-IBM (General Purpose)
Word Length: 48 BIT
Host Compatibility: Harris 800, 700, 500, 1000
Peripherals Supported: CRT, Printer, Tape Drive, IEEE 488 Device
Maximum Number Input Lines: 16
Input Transmission Mode: Full-Duplex, Half-Duplex
Input Transmission Speeds:
Synchronous: 1,200 bps to 56,000 bps
Asynchronous: 50 bps to 19,200 bps
Input Port Code Supported: Ebcdic, Ascii, X.25, Parallel Binary Data
Protocols Supported: BSC, X.25, Asynchronous (Start/Stop), Isochronous
Maximum Output Lines: 1
Aggregate Transmission Rate: 15,000 bps
Features: Protocol and Code Conversion, Error Control, Automatic Transmission Speed (Baud Rate) Detection, Multiplexer/Demultiplexer, Processor-Initiated Dynamic Line Reconfiguration, Terminal Controller, Automatic Polling, User Programmable, On-Line Maintenance, Statistics Collection, Downline Loading of Remote Node
Price: $3,500
Monthly Maintenance Fee: $20
Distribution Method: End user
Date First Installed: September 1982

HARRIS CORP.
HARRIS 8240
Processor Function: Distributed Processing Nodes
Compatibility Classification: IBM 37XX
Word Length: 16 bit
Host Compatibility: IBM Mainframes, Sperry 1004, CDC 200 UT
Peripherals Supported: CRT, Printer, Tape Drive, Disk Drive, Diagnostic/Test, Card Reader
Maximum Number Input Lines: 4
Input Transmission Mode: Full-Duplex, Half-Duplex
Input Transmission Speeds:
Synchronous: 1,200 bps to 56,000 bps
Asynchronous: 110 bps to 9,600 bps
Input Port Code Supported: Ebcdic, Ascii
Protocols Supported: BSC, SDLC, HDLC, Asynchronous (Start/Stop)
Maximum Output Lines: 4
Aggregate Transmission Rate: 4
Features: Protocol and Code Conversion, Error Control, Terminal Emulation, Terminal-Initiated Applications Switching, Terminal Controller, Local Console (System Control Functions), Automatic Polling, User Programmable, Statistics Collection, Autodial/Autoanswer Capabilities
Distribution Method: End user
Number Installed to Date: 100 to 1,000
Date First Installed: March 1982

HEINEKEN DATA SYSTEMS
Z-80
Processor Function: Front-End Processor, Host Independent, Distributed Processing Nodes
Compatibility Classification: Non-IBM (General Purpose)
Word Length: 8 bit
Host Compatibility: IBM 370, IBM 4300
Peripherals Supported: CRT, Printer, Diagnostic/Test
Maximum Number Input Lines: 1
Input Transmission Mode: Full-Duplex, Half-Duplex
Input Transmission Speeds:
Asynchronous: 9,600 bps
Input Port Code Supported: Ascii
Protocols Supported: Asynchronous (Start/Stop)
Maximum Output Lines: 3
Aggregate Transmission Rate: 96 bps
Features: Protocol and Code Conversion, Terminal Emulation, Automatic Transmission Speed (Baud Rate) Detection, Terminal-Initiated Applications Switching, Automatic Disconnect, Terminal Controller, Automatic Polling, User Programmable, On-Line Maintenance, Autodial/Autoanswer Capabilities, Downline Loading of Remote Node
Price: $1,000
Monthly Maintenance Fee: $30
Distribution Method: Third-party
Number Installed to Date: 10,000 to 50,000
Date First Installed: April 1980
(See Vendor Profile Page V-14)

HERMES CORP.
HK-68A
Processor Function: Front-End Processor
Compatibility Classification: Non-IBM (General Purpose)
Word Length: 16 bit
Peripherals Supported: CRT, Printer, Tape Drive, Disk Drive, Diagnostic/Test
Maximum Number Input Lines: 48
Input Transmission Mode: Full-Duplex
Input Transmission Speeds:
Synchronous: 50 bps to 1,000,000 bps
Asynchronous: 50 bps to 38,400 bps
Input Port Code Supported: Ascii, X.25
Protocols Supported: BSC, SDLC, ADCCP, HDLC, X.25, Asynchronous (Start/Stop)
Maximum Output Lines: 16
Aggregate Transmission Rate: 16
Features: Protocol and Code Conversion, Error Control, Terminal Emulation, Automatic Transmission Speed (Baud Rate) Detection, Terminal-Initiated Applications Switching, Automatic Disconnect, Multiplexer/Demultiplexer, Terminal Controller, Local Console (System Control Functions), Automatic Polling, User Programmable, On-Line Maintenance, Statistics Collection, Autodial/Autoanswer Capabilities, Downline Loading of Remote Node
Price: $3,265
Distribution Method: End user, OEM
Number Installed to Date: 100 to 1,000
Date First Installed: October 1983
(See Vendor Profile Page V-14)

HONEYWELL, INC.
DATANET 8
Processor Function: Front-End Processor, Remote-Line Concentrator, Host Independent, Distributed Processing Nodes
Compatibility Classification: Network Processor
Word Length: 16 bit
Host Compatibility: Honeywell DPS 8, DPS 66, DPS 64
Peripherals Supported: Disk Drive
Maximum Number Input Lines: 128
Input Transmission Mode: Full-Duplex, Half-Duplex
Input Transmission Speeds:
Synchronous: 1,200 bps to 56,000 bps
Asynchronous: 75 bps to 19,200 bps
Input Port Code Supported: Ebcdic, Ascii, X.25
Protocols Supported: BSC, ADCCP, HDLC
Maximum Output Lines: 4
Aggregate Transmission Rate: 4
Features: Protocol and Code Conversion, Error Control, Automatic Transmission Speed (Baud Rate) Detection, Terminal-Initiated Applications Switching, Automatic Disconnect, Multiplexer/Demultiplexer, Processor-Initiated Dynamic Line Reconfiguration, Local Console (System Control Functions), Automatic Polling, On-Line Maintenance, Statistics Collection, Downline Loading of Remote Node, Autoanswer Capabilities
Price: $39,065
Monthly Maintenance Fee: $240
Distribution Method: End user
Date First Installed: September 1980
(See Vendor Profile Page V-14)

HONEYWELL, INC.
DATANET 6661
Processor Function: Front-End Processor
Compatibility Classification: Network Processor
Word Length: 16 bit
Host Compatibility: Honeywell Series 60
Peripherals Supported: CRT
Maximum Number Input Lines: 96
Input Transmission Mode: Full-Duplex, Half-Duplex
Input Transmission Speeds:
Synchronous: 1,200 bps to 56,000 bps
Asynchronous: 75 bps to 19,200 bps
Input Port Code Supported: Ebcdic, Ascii
Protocols Supported: BSC, ADCCP, HDLC
Maximum Output Lines: 1
Aggregate Transmission Rate: 1
Features: Protocol and Code Conversion, Error Control, Automatic Transmission Speed (Baud Rate) Detection, Terminal-Initiated Applications Switching, Automatic Disconnect, Multiplexer/Demultiplexer, Terminal Controller, Local Console (System Control Functions), Automatic Polling, User Programmable, On-Line Maintenance, Statistics Collection, Autodial/Autoanswer Capabilities, Downline Loading of Remote Node
Price: $36,605
Monthly Maintenance Fee: $362
Distribution Method: End user
Date First Installed: 1980

IBM CORP.
3704
Processor Function: Front-End Processor
Compatibility Classification: IBM 37XX
Host Compatibility: IBM S/370, IBM 4300, IBM 303X, 308X
Maximum Number Input Lines: 32
Input Transmission Mode: Full-Duplex, Half-Duplex
Input Transmission Speeds:
Synchronous: 1,200 bps
Asynchronous: 110 bps to 1,200 bps
Input Port Code Supported: Ebcdic, Ascii
Protocols Supported: BSC, SDLC, Asynchronous (Start/Stop)
Maximum Output Lines: 2
Aggregate Transmission Rate: 1
Features: Error Control, Terminal-Initiated Applications Switching, Automatic Polling, User Programmable, Autodial/Autoanswer Capabilities
Price: $38,150
Distribution Method: End user
Date First Installed: February 1973
(See Vendor Profile Page V-14)

IBM CORP.
3705-80 0851-0854
Processor Function: Front-End Processor, Remote-Line Concentrator
Compatibility Classification: IBM 37XX
Host Compatibility: IBM S/370, IBM 303X, 308X, IBM 43XX
Maximum Number Input Lines: 16
Input Transmission Mode: Full-Duplex, Half-Duplex
Input Port Code Supported: Ebcdic, Ascii, X.25
Protocols Supported: BSC, SDLC, X.25, Asynchronous (Start/Stop)
Maximum Output Lines: 2
Aggregate Transmission Rate: 2
Features: Protocol and Code Conversion, Error Control, Automatic Transmission Speed (Baud Rate) Detection, Terminal-Initiated Applications Switching, Multiplexer/Demultiplexer, Automatic Polling, User Programmable, Statistics Collection, Downline Loading of Remote Node
Price: $39,300 to $55,940
Distribution Method: End user
Date First Installed: June 1981

IBM CORP.
3705-II E1-L4
Processor Function: Front-End Processor, Remote-Line Concentrator
Compatibility Classification: IBM 37XX
Host Compatibility: IBM 370, IBM 303X, 308X, IBM 43XX
Maximum Number Input Lines: 352
Input Transmission Mode: Full-Duplex, Half-Duplex
Input Transmission Speeds:
Synchronous: 1,200 bps to 230,400 bps
Asynchronous: 455 bps to 9,600 bps
Input Port Code Supported: Ebcdic, Ascii, X.25, Baudot
Protocols Supported: BSC, SDLC, X.25, Asynchronous (Start/Stop), Line Control
Maximum Output Lines: 4
Aggregate Transmission Rate: 4
Features: Protocol and Code Conversion, Error Control, Automatic Transmission Speed (Baud Rate) Detection, Terminal-Initiated Applications Switching, Automatic Polling, User Programmable, Downline Loading of Remote Node
Price: $49,270 to $300,610
Distribution Method: End user
Date First Installed: August 1976

IBM CORP.
3725-1
Processor Function: Front-End Processor, Remote-Line Concentrator
Compatibility Classification: IBM 37XX
Host Compatibility: IBM 3/370, IBM 303X, 308X, IBM 43XX
Peripherals Supported: CRT
Maximum Number Input Lines: 256
Input Transmission Mode: Full-Duplex, Half-Duplex
Input Transmission Speeds:
Synchronous: 1,200 bps to 256,000 bps
Asynchronous: 50 bps to 9,600 bps
Input Port Code Supported: Ebcdic, Ascii, X.25
Protocols Supported: BSC, SDLC, X.25, Asynchronous (Start/Stop)
Maximum Output Lines: 8
Aggregate Transmission Rate: 6
Features: Protocol and Code Conversion, Error Control, Terminal Emulation, Terminal-Initiated Applications Switching, Multiplexer/Demultiplexer, Processor-Initiated Dynamic Line Reconfiguration, Local Console (System Control Functions), Automatic Polling, User Programmable, Statistics Collection, Downline Loading of Remote Node
Price: $132,480 to $299,940
Distribution Method: End user
Date First Installed: April 1983

IBM CORP.
3725-2
Processor Function: Front-End Processor, Remote-Line Concentrator
Compatibility Classification: IBM 37XX
Host Compatibility: IBM 3/370, IBM 303X, 308X, IBM 43XX
Peripherals Supported: CRT
Maximum Number Input Lines: 24
Input Transmission Mode: Full-Duplex, Half-Duplex
Input Transmission Speeds:
Synchronous: 1,200 bps to 256,000 bps
Asynchronous: 50 bps to 9,600 bps
Input Port Code Supported: Ebcdic, Ascii, X.25
Protocols Supported: BSC, SDLC, X.25, Asynchronous (Start/Stop)
Maximum Output Lines: 2
Aggregate Transmission Rate: 2
Features: Protocol and Code Conversion, Error Control, Terminal Emulation, Terminal-Initiated Applications Switching, Multiplexer/Demultiplexer, Processor-Initiated Dynamic Line Reconfiguration, Local Console (System Control Functions), Automatic Polling, User Programmable, Statistics Collection, Downline Loading of Remote Node
Price: $72,240 to $85,240
Monthly Maintenance Fee: $227
Distribution Method: End user, Third-party
Date First Installed: January 1984

IDET CORP.
3X SERIES
Processor Function: Remote-Line Concentrator
Compatibility Classification: Non-IBM (General Purpose)
Word Length: 16 bit
Host Compatibility: IBM 370X, IBM 3725, NCR 8325 6655
Peripherals Supported: CRT, Printer
Maximum Number Input Lines: 32
Input Transmission Mode: Full-Duplex, Half-Duplex
Input Transmission Speeds:
Synchronous: 1,200 bps to 19,200 bps
Asynchronous: 300 bps to 9,600 bps
Input Port Code Supported: Ebcdic, Ascii, X.25
Protocols Supported: BSC, SDLC, HDLC, X.25, Asynchronous (Start/Stop), Para, NCR
Maximum Output Lines: 25
Aggregate Transmission Rate: 192 bps
Features: Protocol and Code Conversion, Error Control, Terminal Emulation, Automatic Transmission Speed (Baud Rate) Detection, Terminal-Initiated Applications Switching, Automatic Disconnect, Multiplexer/Demultiplexer, Processor-Initiated Dynamic Line Reconfiguration, Terminal Controller, Automatic Polling, On-Line Maintenance, Statistics Collection, Autodial/Autoanswer Capabilities, Downline Loading of Remote Node
Price: $3,000 to $25,000
Number Installed to Date: 100 to 1,000
Date First Installed: 1979
(See Vendor Profile Page V-16)

ILEX SYSTEMS DATA SYSTEMS, INC.
COMMUNICATIONS PROCESSOR 1
Processor Function: Front-End Processor
Compatibility Classification: Non-IBM (General Purpose)
Word Length: 8 bit
Host Compatibility: Sigma 9000
Peripherals Supported: CRT, Diagnostic/Test
Maximum Number Input Lines: 256
Input Transmission Mode: Full-Duplex, Half-Duplex
Input Transmission Speeds:
Synchronous: 1,000,000 bps
Asynchronous: 19,200 bps
Input Port Code Supported: Ebcdic, Ascii, X.25, Parallel Binary Data, Baudot
Protocols Supported: SDLC, Synchronous
Maximum Output Lines: 256
Features: Protocol and Code Conversion, Error Control, Terminal Emulation, Automatic Transmission Speed (Baud Rate) Detection, Automatic Disconnect, Processor-Initiated Dynamic Line Reconfiguration, Terminal Controller, Local Console (System Control Functions), Automatic Polling, User Programmable, Autodial/Autoanswer Capabilities, Downline Loading of Remote Node
Price: $3,000
Distribution Method: End-user
(See Vendor Profile Page V-15)

INFORMATION SERVICES CORP.
SMART SYNC MODEM
Processor Function: Remote-Line Concentrator
Compatibility Classification: IBM 37XX
Word Length: 8 bit
Host Compatibility: IBM, DEC VAX, Sperry
Peripherals Supported: CRT, Printer
Input Transmission Mode: Half-Duplex
Input Transmission Speeds:
Asynchronous: 9,600 bps
Input Port Code Supported: Ascii
Protocols Supported: BSC
Features: Automatic Transmission Speed (Baud Rate) Detection, Automatic Polling, User Programmable, Autodial/Autoanswer Capabilities
Price: $6,500
Distribution Method: End user
Number Installed to Date: 1 to 10
(See Vendor Profile Page V-15)

INTEGRATED SERVER ENGINEERING, INC.
PORT-SAVER
Processor Function: Remote-Line Concentrator
Compatibility Classification: Non-IBM (General Purpose)
Word Length: 8 bit
Host Compatibility: NCR
Peripherals Supported: CRT, Printer, Diagnostic/Test
Maximum Number Input Lines: 16
Input Transmission Mode: Full-Duplex, Half-Duplex
Input Transmission Speeds:
Asynchronous: 50 bps to 19,200 bps
Input Port Code Supported: Ascii
Protocols Supported: IDE Proprietary
Maximum Output Lines: 4
Aggregate Transmission Rate: 192 bps
Features: Terminal Emulation, Terminal-Initiated Applications Switching, Multiplexer/Demultiplexer, Terminal Controller, Automatic Polling, User Programmable, Downline Loading of Remote Node
Price: $1,600
Distribution Method: End user
Number Installed to Date: 100 to 1,000
Date First Installed: 1979
(See Vendor Profile Page V-16)

INTELLIGENT SOFTWARE SYSTEMS, INC.
CSX 1024
Processor Function: Front-End Processor, Message Switch, Remote-Line Concentrator
Compatibility Classification: Non-IBM (General Purpose)
Word Length: 8 bit
Peripherals Supported: CRT, Printer, Tape Drive, Disk Drive, PC
Maximum Number Input Lines: 2,048
Input Transmission Mode: Full-Duplex
Input Port Code Supported: Ebcdic, Ascii, X.25, Baudot, Telex
Protocols Supported: BSC, SDLC, HDLC, X.25, Telex
Aggregate Transmission Rate: 9,600 bps
Features: Protocol and Code Conversion, Error Control, Automatic Transmission Speed (Baud Rate) Detection, Terminal-Initiated Applications Switching, Automatic Disconnect, Multiplexer/Demultiplexer, Terminal Controller, Local Console (System Control Functions), Automatic Polling, On-Line Maintenance, Statistics Collection, Autodial and Autoanswer Capabilities, Downline Loading of Remote Node
Price: $60,000
Distribution Method: End user
Number Installed to Date: 1 to 10
Date First Installed: January 1984
(See Vendor Profile Page V-16)

INTERCON RESEARCH CORP.
INTERCON 100A
Processor Function: Front-End Processor
Compatibility Classification: IBM 3270
Word Length: 8 bit
Host Compatibility: DEC VAX, IBM
Peripherals Supported: Printer, Disk Drive, Diagnostic/Test
Maximum Number Input Lines: 1

Communications Processors

Input Transmission Mode: Full-Duplex
Input Transmission Speeds:
Synchronous: 56,000 bps
Asynchronous: 19,200 bps
Input Port Code Supported: Ebcdic, Ascii, BCD
Protocols Supported: BSC, SDLC, X.25, Hasp, Seops 200
Maximum Output Lines: 1
Aggregate Transmission Rate: 1
Aggregate Transmission Rate: 980 bps
Features: Protocol and Code Conversion, Error Control, Terminal Emulation, Automatic Disconnect, Local Console (System Control Functions), Automatic Polling, Downline Loading of Remote Node
Price: $1,250 to $4,995
Distribution Method: OEM
Number Installed to Date: 10 to 50
Date First Installed: 1983
(See Vendor Profile Page V-16)

SYTEK,INC.
IN1610 UNIBUS ETHERNET CTLR
Processor Function: Front-End Processor, Message Switch, Distributed Processing Nodes
Compatibility Classification: Ethernet
Word Length: 16 bit
Host Compatibility: DEC VAX, DEC PDP-11
Peripherals Supported: Diagnostic/Test
Input Transmission Mode: Full-Duplex
Input Transmission Speeds:
Synchronous: Up to 2,560,000 bps
Asynchronous: UP to 2,560,000 bps
Input Port Code Supported: Ascii
Protocols Supported: CSMA/CD
Maximum Output Lines: 1
Aggregate Transmission Rate: 1
Aggregate Transmission Rate: 25,000 bps
Features: Protocol and Code Conversion, Error Control, Automatic Disconnect, Multiplexer/Demultiplexer, Terminal Controller, Local Console (System Control Functions), On-Line Maintenance, Statistics Collection, Downline Loading of Remote Node
Price: $3,000
Distribution Method: OEM
Number Installed to Date: 1,000 to 10,000
Date First Installed: January 1982
(See Vendor Profile Page V-16)

TYMNET CORPORATION SYSTEMS
QUADRITEX SERIES IDC
Processor Function: Front-End Processor
Compatibility Classification: Non-IBM (General Purpose)
Word Length: 8 bit
Peripherals Supported: Printer.
Maximum Number Input Lines: 1
Input Transmission Mode: Full-Duplex, Half-Duplex
Input Transmission Speeds:
Asynchronous: 50 bps to 9,600 bps
Input Port Code Supported: Ascii
Protocols Supported: Asynchronous (Start/Stop)
Maximum Output Lines: 1
Aggregate Transmission Rate: 1
Features: Protocol and Code Conversion, Terminal Controller, User Programmable, Operation Control String Translation
Price: $695 to $2,495
Distribution Method: End user
Number Installed to Date: 100 to 1,000
Date First Installed: 1979
(See Vendor Profile Page V-17)

ITT TELECOM PRODUCTS, INC.
N940
Processor Function: Host Independent
Compatibility Classification: Non-IBM (General Purpose)
Word Length: 8 bit
Peripherals Supported: CRT, Printer, Tape Drive, Disk Drive, Diagnostic/Test
Input Transmission Mode: Full-Duplex
Input Transmission Speeds:
Synchronous: 64,000 bps
Input Port Code Supported: Ascii, X.25, Parallel Binary Data
Protocols Supported: BSC, UDLC
Aggregate Transmission Rate: 15,000 bps
Features: Protocol and Code Conversion, Error Control, Automatic Transmission Speed (Baud Rate) Detection, Automatic Disconnect, Multiplexer/Demultiplexer, Processor-Initiated Dynamic Line Reconfiguration, Terminal Controller, Local Console (System Control Functions), Automatic Polling, On-Line Maintenance, Statistics Collection
Distribution Method: End user
Number Installed to Date: 100 to 1,000
Date First Installed: 1976
(See Vendor Profile Page V-17)

JC SYSTEMS
LINK 81
Processor Function: Front-End Processor, Remote-Line Concentrator
Compatibility Classification: Non-IBM (General Purpose)
Word Length: 8 bit
Host Compatibility: JC Systems
Peripherals Supported: CRT, Printer, Diagnostic/Test
Maximum Number Input Lines: 4
Input Transmission Mode: Full-Duplex, Half-Duplex
Input Transmission Speeds:
Synchronous: 1,200 bps to 110,000 bps
Asynchronous: 50 bps to 110,000 bps
Input Port Code Supported: Ebcdic, Ascii, X.25, Parallel Binary Data
Protocols Supported: BSC, SDLC, ADCCP, HDLC, BDLC, X.25, X.27, Asynchronous (Start/Stop)
Maximum Output Lines: 1
Aggregate Transmission Rate: 20,000 bps
Features: Protocol and Code Conversion, Error Control, Terminal Emulation, Automatic Transmission Speed (Baud Rate) Detection, Automatic Disconnect, Processor-Initiated Dynamic Line Reconfiguration, Terminal Controller, Local Console (System Control Functions), Automatic Polling, User Programmable, On-Line Maintenance, Statistics Collection, Autodial/Autoanswer Capabilities, Downline Loading of Remote Node
Monthly Maintenance Fee: $20
Distribution Method: Third-party
Date First Installed: January 1984
(See Vendor Profile Page V-17)

LEXICON SYSTEMS, INC.
CMC-4/8/32
Processor Function: Front-End Processor
Compatibility Classification: IBM 270X
Word Length: 8 bit
Host Compatibility: IBM 360, IBM 370, IBM 303X
Peripherals Supported: CRT, Printer, Diagnostic/Test
Maximum Number Input Lines: 32
Input Transmission Mode: Half-Duplex
Input Port Code Supported: Ebcdic, Ascii
Protocols Supported: BSC, Asynchronous (Start/Stop)
Maximum Output Lines: 1
Aggregate Transmission Rate: 4,000 bps
Features: Error Control, Terminal Emulation, Automatic Transmission Speed (Baud Rate) Detection, Automatic Disconnect, Automatic Polling, On-Line Maintenance, Autodial/Autoanswer Capabilities
Price: $14,000 to $60,000
Distribution Method: End user
Number Installed to Date: 100 to 1,000
(See Vendor Profile Page V-16)

LEXICON SYSTEMS, INC.
DSP
Processor Function: Front-End Processor, Message Switch, Remote-Line Concentrator, Host Independent, Distributed Processing Nodes
Compatibility Classification: IBM 370X
Word Length: 8 bit, 16 bit
Host Compatibility: IBM
Peripherals Supported: CRT
Input Transmission Mode: Full-Duplex, Half-Duplex
Input Transmission Speeds:
Synchronous: 56,000 bps
Input Port Code Supported: Ebcdic, Ascii, X.25
Protocols Supported: BSC, SDLC, ADCCP, HDLC, BDLC, UDLC, X.25
Maximum Output Lines: 32
Aggregate Transmission Rate: 240,000 bps
Features: Protocol and Code Conversion, Error Control, Terminal Emulation, Automatic Transmission Speed (Baud Rate) Detection, Terminal-Initiated Applications Switching, Automatic Disconnect, Multiplexer/Demultiplexer, Processor-Initiated Dynamic Line Reconfiguration, Local Console (System Control Functions), Automatic Polling, On-Line Maintenance, Statistics Collection, Autodial/Autoanswer Capabilities, Downline Loading of Remote Node
Price: $30,000 to $300,000
Distribution Method: End user
Number Installed to Date: 100 to 1,000
Date First Installed: 1981

M/A-COM DCC, INC.
CP6000 SERIES II
Processor Function: Distributed Processing Nodes
Compatibility Classification: Packet Switching
Word Length: 16 bit
Peripherals Supported: CRT, Disk Drive, Diagnostic/Test
Input Transmission Mode: Full-Duplex
Input Transmission Speeds:
Synchronous: 64,000 bps
Asynchronous: 384,000 bps
Input Port Code Supported: Ebcdic, Ascii, X.25
Protocols Supported: X.25, X.75
Maximum Output Lines: 2,000
Aggregate Transmission Rate: 2,000
Features: Protocol and Code Conversion, Processor-Initiated Dynamic Line Reconfiguration, Local Console (System Control Functions), User Programmable, On-Line Maintenance, Statistics Collection, Autodial/Autoanswer Capabilities, Downline Loading of Remote Node
Price: $20,000 to $200,000
(See Vendor Profile Page V-16)

MICOM-INTERLAN CORP.
1270 TCU
Processor Function: Front-End Processor
Compatibility Classification: IBM 270X
Word Length: 8 bit
Host Compatibility: IBM 370, IBM 303X, IBM 36
Peripherals Supported: CRT, Printer, Diagnostic/Test
Maximum Number Input Lines: 2
Input Transmission Mode: Full-Duplex, Half-Duplex
Input Transmission Speeds:
Synchronous: 56,000 bps
Asynchronous: 56,000 bps
Input Port Code Supported: Ebcdic, Ascii, Baudot, PTTC, TWX, BCD
Protocols Supported: BSC, Asynchronous (Start/Stop)
Maximum Output Lines: 96
Aggregate Transmission Rate: 96
Aggregate Transmission Rate: 1,800 bps
Features: Protocol and Code Conversion, Automatic Transmission Speed (Baud Rate) Detection, Terminal-Initiated Applications Switching, Automatic Disconnect, Multiplexer/Demultiplexer, Terminal Controller, Automatic Polling, On-

Line Maintenance,
Autodial/Autoanswer Capabilities
Distribution Method: End user
Date First Installed: 1970
(See Vendor Profile Page V-18)

BROOM SYSTEMS, INC.
MICRO 800/X.25 CONCENTRATOR PAD
Processor Function: Remote-Line Concentrator, Host Independent
Compatibility Classification: X.25 PAD
Word Length: 8 bit
Host Compatibility: IBM, Prime Primenet, CDC 2501-NOS
Peripherals Supported: CRT, Printer
Maximum Number Input Lines: 24
Input Transmission Mode: Half-Duplex, Echoplex
Input Transmission Speeds:
Synchronous: 1,200 bps to 9,600 bps
Asynchronous: 50 bps to 9,600 bps
Input Port Code Supported: Ebcdic, Baudot
Maximum Output Lines: 1
Aggregate Transmission Rate: 1
Aggregate Transmission Rate: 768 bps
Features: Protocol and Code Conversion, Error Control, Terminal Emulation, Automatic Transmission Speed (Baud Rate) Detection, Terminal-Initiated Applications Switching, Automatic Disconnect, Multiplexer/Demultiplexer, Terminal Controller, Local Console (System Control Functions), Statistics Collection, Autodial/Autoanswer Capabilities, Downline Loading of Remote Node
Price: $2,050 to $4,800
Distribution Method: Third-party
Number Installed to Date: 1,000 to 10,000
Date First Installed: November 1982
(See Vendor Profile Page V-18)

HONEYWELL, INC.
MCS-30
Processor Function: Front-End Processor
Compatibility Classification: Honeywell Datanet
Word Length: 8 bit
Host Compatibility: Honeywell DIA, DTS8
Peripherals Supported: Ascii
Maximum Number Input Lines: 32
Input Transmission Mode: Half-Duplex
Input Transmission Speeds:
Asynchronous: 1,200 bps to 38,400 bps
Input Port Code Supported: Ascii
Protocols Supported: Ascii
Maximum Output Lines: 32
Aggregate Transmission Rate: 384 bps
Features: Error Control, Automatic Transmission Speed (Baud Rate) Detection, Automatic Disconnect, Multiplexer/Demultiplexer, On-Line Maintenance; Downline Loading of Remote Node
Price: $25,000
Monthly Maintenance Fee: $200
Distribution Method: End user
Number Installed to Date: 10 to 50
Date First Installed: November 1977
(See Vendor Profile Page V-18)

INFORMATA CORP.
5780
Processor Function: Front-End Processor
Compatibility Classification: IBM 37XX
Word Length: 8 bit
Host Compatibility: IBM 3780, IBM 3780
Peripherals Supported: CRT, Printer
Maximum Number Input Lines: 1
Input Transmission Mode: Half-Duplex
Input Transmission Speeds:
Asynchronous: 19,200 bps
Protocols Supported: BSC
Maximum Output Lines: 1
Aggregate Transmission Rate: 192 bps
Features: Protocol and Code Conversion, Error Control, Terminal Emulation, Automatic Disconnect, Local Console (System Control Functions), On-Line Maintenance, Autodial/Autoanswer Capabilities
Price: $5,100
Distribution Method: End user
Number Installed to Date: 100 to 1,000
Date First Installed: June 1981
(See Vendor Profile Page V-18)

INFORMATA CORP.
NETWORK SYSTEM
Processor Function: Host Independent
Compatibility Classification: Non-IBM (General Purpose)
Word Length: 16 bit
Host Compatibility: Microdata, IBM.
Peripherals Supported: CRT, Printer
Maximum Number Input Lines: 1,000
Input Transmission Mode: Half-Duplex
Input Transmission Speeds:
Asynchronous: 9,600 bps
Input Port Code Supported: Ebcdic, Ascii, X.25, Parallel Binary Data, Baudot, Transparent
Protocols Supported: BSC, SDLC, X.25, Asynchronous (Start/Stop)
Maximum Output Lines: 44
Aggregate Transmission Rate: 44
Features: Protocol and Code Conversion, Error Control, Automatic Transmission Speed (Baud Rate) Detection, Terminal-Initiated Applications Switching, Automatic Disconnect, Multiplexer/Demultiplexer, Local Console (System Control Functions), User Programmable, Statistics Collection, Downline Loading of Remote Node
Price: $15,000 to $80,000

MODCOMP PLUS, INC.
WRITE ONE
Processor Function: Distributed Processing Nodes
Compatibility Classification: Burroughs
Word Length: 8 bit
Host Compatibility: Burroughs 6900
Peripherals Supported: CRT, Printer, Diagnostic/Test
Maximum Number Input Lines: 1
Input Transmission Mode: Full-Duplex, Half-Duplex
Input Transmission Speeds:
Synchronous: 19,200 bps
Asynchronous: 19,200 bps
Input Port Code Supported: Ascii
Protocols Supported: Asynchronous (Start/Stop), Synchronous Poll Sheet
Maximum Output Lines: 2
Aggregate Transmission Rate: 192 bps
Features: Protocol and Code Conversion, Error Control, Terminal Emulation, Terminal-Initiated Applications Switching, Terminal Controller, Automatic Polling, Autodial/Autoanswer Capabilities
Price: $1,280
Monthly Maintenance Fee: $10
Distribution Method: Third-party
Number Installed to Date: 1,000 to 10,000
Date First Installed: June 1981
(See Vendor Profile Page V-20)

MODCOMP PLUS, INC.
WRITE ONE
Processor Function: Distributed Processing Nodes
Compatibility Classification: IBM 270X
Word Length: 8 bit
Host Compatibility: IBM 9100, IBM 4300, IBM 3300
Peripherals Supported: CRT, Printer, Diagnostic/Test
Maximum Number Input Lines: 2
Input Transmission Mode: Full-Duplex, Half-Duplex
Input Transmission Speeds:
Synchronous: 19,200 bps
Asynchronous: 192,000 bps
Input Port Code Supported: Ebcdic, Ascii, Parallel Binary Data
Protocols Supported: BSC, SDLC, HDLC, Asynchronous (Start/Stop)
Maximum Output Lines: 3
Aggregate Transmission Rate: 3
Aggregate Transmission Rate: 192 bps
Features: Protocol and Code Conversion, Error Control, Terminal Emulation, Terminal-Initiated Applications Switching, Automatic Disconnect, Terminal Controller, Local Console (System Control Functions), Automatic Polling, User Programmable, On-Line Maintenance, Autodial/Autoanswer Capabilities, Downline Loading of Remote Node
Price: $3,900
Monthly Maintenance Fee: $25
Distribution Method: Third-party
Number Installed to Date: 10 to 50
Date First Installed: June 1983

MODULAR COMPUTER SYSTEMS, INC. (MODCOMP)
CL II/45
Processor Function: Front-End Processor, Message Switch, Remote-Line Concentrator, Host Independent, Distributed Processing Nodes
Compatibility Classification: Non-IBM (General Purpose)
Word Length: 16 bit
Host Compatibility: IBM 360, 370, CDC Cyber, IBM 3033X
Peripherals Supported: CRT, Printer, Tape Drive, Disk Drive, Diagnostic/Test, IBM Select
Maximum Number Input Lines: 255
Input Transmission Mode: Full-Duplex
Input Transmission Speeds:
Synchronous: 1,200 bps to 250,000 bps
Asynchronous: 50 bps to 19,200 bps
Input Port Code Supported: Ebcdic, Ascii, X.25, Baudot, Marnet
Protocols Supported: BSC, SDLC, ADCCP, HDLC, X.25, Asynchronous (Start/Stop)
Maximum Output Lines: 256
Aggregate Transmission Rate: 14,500 bps
Features: Protocol and Code Conversion, Error Control, Terminal Emulation, Terminal-Initiated Applications Switching, Automatic Disconnect, Multiplexer/Demultiplexer, Processor-Initiated Dynamic Line Reconfiguration, Local Console (System Control Functions), Automatic Polling, User Programmable, On-Line Maintenance, Statistics Collection, Autodial/Autoanswer Capabilities, Downline Loading of Remote Node
Price: $60,000
Monthly Maintenance Fee: $600
Distribution Method: OEM
Number Installed to Date: 100 to 1,000
Date First Installed: 1982
(See Vendor Profile Page V-20)

MODULAR COMPUTER SYSTEMS, INC. (MODCOMP)
CL II/75
Processor Function: Front-End Processor, Message Switch, Remote-Line Concentrator, Host Independent, Distributed Processing Nodes
Compatibility Classification: Non-IBM (General Purpose)
Word Length: 16 bit
Host Compatibility: IBM 360,370, CDC Cyber, IBM 3033X
Peripherals Supported: CRT, Printer, Tape Drive, Disk Drive, Diagnostic/Test, IBM Select
Maximum Number Input Lines: 256
Input Transmission Mode: Full-Duplex
Input Transmission Speeds:
Synchronous: 1,200 bps to 35,000 bps
Asynchronous: 50 bps to 19,200 bps
Input Port Code Supported: Ebcdic, Ascii, X.25, Baudot, Marnet
Protocols Supported: BSC, SDLC, ADCCP, HDLC, X.25, Asynchronous (Start/Stop)

Communications Processors

Maximum Output Lines: 256
Aggregate Transmission Rate: 19,000 bps
Features: Protocol and Code Conversion, Error Control, Terminal Emulation, Terminal-Initiated Applications Switching, Automatic Disconnect, Multiplexer/Demultiplexer, Processor-Initiated Dynamic Line Reconfiguration, Local Console (System Control Functions), Automatic Polling, User Programmable, On-Line Maintenance, Statistics Collection, Autodial/Autoanswer Capabilities, Downline Loading of Remote Node
Price: $150,000
Monthly Maintenance Fee: $700
Distribution Method: OEM
Number Installed to Date: 100 to 1,000
Date First Installed: 1982

BBN COMMUNICATIONS, INC.
BBN 1000
Processor Function: Message Switch, Remote-Line Concentrator, Host Independent, Distributed Processing Nodes
Compatibility Classification: Non-IBM (General Purpose)
Host Compatibility: IBM PC-XT, Apple, DEC PDP-11
Peripherals Supported: CRT, Printer, Tape Drive, Disk Drive, Diagnostic/Test
Input Transmission Mode: Full-Duplex, Half-Duplex
Input Transmission Speeds:
Synchronous: 1,200 bps
Asynchronous: 4,800 bps
Input Port Code Supported: Ascii, X.25
Protocols Supported: BSC, SDLC, ADCCP, HDLC, BDLC, LDLC, X.25, Bold, X.27, Asynchronous (Start/Stop), ICP
Maximum Output Lines: 128
Features: Protocol and Code Conversion, Error Control, Terminal Emulation, Terminal-Initiated Applications Switching, Automatic Disconnect, Multiplexer/Demultiplexer, Processor-Initiated Dynamic Line Reconfiguration, Terminal Controller, User Programmable, On-Line Maintenance, Statistics Collection, Autodial/Autoanswer Capabilities, Downline Loading of Remote Node
Price: $1,500
Distribution Method: End user
Number Installed to Date: 100 to 1,000
Date First Installed: 1980
(See Vendor Profile Page V-20)

BBN COMMUNICATIONS, INC.
BBN 700
Processor Function: Message Switch, Remote-Line Concentrator, Host Independent, Distributed Processing Nodes
Compatibility Classification: Non-IBM (General Purpose)
Host Compatibility: IBM PC-XT, Apple, DEC PDP-11
Peripherals Supported: CRT, Printer, Tape Drive, Disk Drive, Diagnostic/Test
Input Transmission Mode: Full-Duplex, Half-Duplex
Input Transmission Speeds:
Synchronous: 1,200 bps
Asynchronous: 4,800 bps
Input Port Code Supported: Ascii, X.25
Protocols Supported: BSC, SDLC, ADCCP, HDLC, BDLC, UDLC, X.25, Bold, X.27, Asynchronous (Start/Stop), ICP
Maximum Output Lines: 10
Features: Protocol and Code Conversion, Error Control, Terminal Emulation, Terminal-Initiated Applications Switching, Automatic Disconnect, Multiplexer/Demultiplexer, Processor-Initiated Dynamic Line Reconfiguration, Terminal Controller, Automatic Polling, User Programmable, On-Line Maintenance, Statistics Collection, Autodial/Autoanswer Capabilities, Downline Loading of Remote Node
Price: $1,500
Distribution Method: End user
Number Installed to Date: 100 to 1,000
Date First Installed: 1980

BOR COMTEN, INC.
3660
Processor Function: Front-End Processor, Message Switch, Remote-Line Concentrator, Distributed Processing Nodes
Compatibility Classification: IBM 37XX
Word Length: 32 bit
Host Compatibility: IBM 360/370, IBM 303X, 43XX, IBM 308X
Input Transmission Mode: Full-Duplex, Half-Duplex
Input Port Code Supported: Ebcdic, Ascii, X.25
Protocols Supported: BSC, SDLC, HDLC, X.25, Asynchronous (Start/Stop)
Maximum Output Lines: 2
Aggregate Transmission Rate: 2
Features: Protocol and Code Conversion, Error Control, Automatic Transmission Speed (Baud Rate) Detection, Terminal-Initiated Applications Switching, Automatic Disconnect, Processor-Initiated Dynamic Line Reconfiguration, Local Console (System Control Functions), Automatic Polling, User Programmable, Statistics Collection, Autodial/Autoanswer Capabilities, Downline Loading of Remote Node
Distribution Method: End user
Number Installed to Date: 1,000 to 10,000
Date First Installed: 1975
(See Vendor Profile Page V-21)

BOR COMTEN, INC.
3670 MSS
Processor Function: Front-End Processor, Message Switch, Remote-Line Concentrator, Distributed Processing Nodes
Compatibility Classification: IBM 370X
Word Length: 32 bit
Host Compatibility: IBM 360/370, IBM 303X, 43XX, IBM 308X
Input Transmission Mode: Full-Duplex, Half-Duplex
Input Port Code Supported: Ebcdic, Ascii, X.25
Protocols Supported: BSC, SDLC, HDLC, X.25, Asynchronous (Start/Stop)
Maximum Output Lines: 4
Aggregate Transmission Rate: 4
Features: Protocol and Code Conversion, Error Control, Automatic Transmission Speed (Baud Rate) Detection, Terminal-Initiated Applications Switching, Automatic Disconnect, Processor-Initiated Dynamic Line Reconfiguration, Local Console (System Control Functions), Automatic Polling, User Programmable, Statistics Collection, Autodial/Autoanswer Capabilities, Downline Loading of Remote Node
Distribution Method: End user
Number Installed to Date: 1,000 to 10,000
Date First Installed: 1972

BOR COMTEN, INC.
3680
Processor Function: Front-End Processor, Message Switch, Remote-Line Concentrator, Distributed Processing Nodes
Compatibility Classification: IBM 37XX
Word Length: 64 bit
Host Compatibility: IBM 360/370, IBM 303X 43XX, IBM 308X
Input Transmission Mode: Full-Duplex, Half-Duplex
Input Port Code Supported: Ebcdic, Ascii, X.25
Protocols Supported: BSC, SDLC, HDLC, X.25, Asynchronous (Start/Stop)
Maximum Output Lines: 8
Aggregate Transmission Rate: 8
Features: Protocol and Code Conversion, Error Control, Automatic Transmission Speed (Baud Rate) Detection, Terminal-Initiated Applications Switching, Automatic Disconnect, Processor-Initiated Dynamic Line Reconfiguration, Local Console (System Control Functions), Automatic Polling, Statistics Collection, Autodial/Autoanswer Capabilities, Downlined Loading of Remote Node
Distribution Method: End user
Number Installed to Date: 1,000 to 10,000
Date First Installed: 1978

BOWKER DATA COMMUNICATIONS, INC.
TRANSACTION CONCENTRATOR
Processor Function: Front-End Processor
Compatibility Classification: IBM 270X
Word Length: 8 bit
Host Compatibility: Datapoint, TI 990
Peripherals Supported: CRT, Printer, Disk Drive
Maximum Number Input Lines: 32
Input Transmission Mode: Full-Duplex, Half-Duplex
Input Transmission Speeds:
Synchronous: 19,200 bps
Asynchronous: 19,200 bps
Input Port Code Supported: Ebcdic, Ascii
Protocols Supported: SDLC, Asynchronous (Start/Stop)
Maximum Output Lines: 32
Aggregate Transmission Rate: 32
Features: Protocol and Code Conversion, Error Control, Automatic Transmission Speed (Baud Rate) Detection
Price: $4,500
Distribution Method: End user
Number Installed to Date: 10 to 99
Date First Installed: 1982
(See Vendor Profile Page V-22)

BOWTHERN TELECOM, INC.
SBC
Processor Function: Front-End Processor, Message Switch, Remote-Line Concentrator, Host Independent, Distributed Processing Nodes
Compatibility Classification: Model-Independent
Word Length: 8 bit
Peripherals Supported: CRT, Printer, Tape Drive, Disk Drive, Diagnostic/Test, Data Capture
Maximum Number Input Lines: 40
Input Transmission Mode: Full-Duplex
Input Transmission Speeds:
Synchronous: 110 bps to 19,200 bps
Asynchronous: 110 bps to 9,600 bps
Input Port Code Supported: Ebcdic, Ascii, X.25, Parallel Binary Data
Protocols Supported: BSC, SDLC, HDLC, X.25, Asynchronous (Start/Stop)
Maximum Output Lines: 16
Aggregate Transmission Rate: 16
Features: Protocol and Code Conversion, Error Control, Automatic Transmission Speed (Baud Rate) Detection, Terminal-Initiated Applications Switching, Automatic Disconnect, Multiplexer/Demultiplexer, Processor-Initiated Dynamic Line Reconfiguration, Terminal Controller, Local Console (System Control Functions), Automatic Polling, On-Line Maintenance, Statistics Collection, Autodial/Autoanswer Capabilities, Downline Loading of Remote Node, Internal Storage
Price: $17,000 to $125,000
Distribution Method: End user, OEM
Number Installed to Date: 10 to 50
Date First Installed: November 1982
(See Vendor Profile Page V-22)

BOWTHERN TELECOM, INC.
28X SERIES
Processor Function: Remote-Line Concentrator
Compatibility Classification: IBM 270X
Word Length: 8 bit
Host Compatibility: IBM
Peripherals Supported: CRT,

Printer, Diagnostic/Test, Asynchronous/Bisynchronous Devices
Maximum Number Input Lines: 1
Input Transmission Mode: Full-Duplex
Input Transmission Speeds:
Synchronous: 9,600 bps
Input Port Code Supported: Ebcdic, Ascii
Protocols Supported: BSC, SDLC, IBM SNA
Maximum Output Lines: 1
Aggregate Transmission Rate: 96 bps
Features: Protocol and Code Conversion, Error Control, Terminal Emulation, Automatic Transmission Speed (Baud Rate) Detection, Terminal Controller, Local Console (System Control Functions), Automatic Polling, User Programmable, On-Line Maintenance, Statistics Collection
Distribution Method: End user
Number Installed to Date: 1,000 to 10,000
Date First Installed: 1980

NORTHERN TELECOM, INC. 585
Processor Function: Host Independent, Distributed Processing Nodes
Compatibility Classification: Non-IBM (General Purpose)
Word Length: 8 bit
Host Compatibility: IBM Mainframes, CDC Mainframes, Burroughs Mainframes
Peripherals Supported: CRT, Printer, Tape Drive, Disk Drive, Diagnostic/Test, Cardpunches
Maximum Number Input Lines: 2
Input Transmission Mode: Full-Duplex, Half-Duplex
Input Transmission Speeds:
Synchronous: 9,600 bps
Asynchronous: 9,600 bps
Input Port Code Supported: Ascii, Parallel Binary Data, Baudot
Protocols Supported: BSC, SDLC, Asynchronous (Start/Stop)
Maximum Output Lines: 2
Aggregate Transmission Rate: 96 bps
Features: Protocol and Code Conversion, Error Control, Terminal Emulation, Automatic Transmission Speed (Baud Rate) Detection, Terminal-Initiated Applications Switching, Automatic Disconnect, Multiplexer/Demultiplexer, Terminal Controller, Local Console (System Control Functions), Automatic Polling, User Programmable, On-Line Maintenance, Statistics Collection, Autodial/Autoanswer Capabilities
Price: $10,000 to $30,000
Distribution Method: End user
Number Installed to Date: 1,000 to 10,000
Date First Installed: June 1981

NORTHERN TELECOM, INC. 586
Processor Function: Host Independent, Distributed Processing Nodes
Compatibility Classification: Non-IBM (General Purpose)
Word Length: 8 bit
Host Compatibility: IBM Mainframes, CDC Mainframes, Burroughs Mainframes
Peripherals Supported: CRT, Printer, Tape Drive, Disk Drive, Diagnostic/Test, Cardpunches
Maximum Number Input Lines: 8
Input Transmission Mode: Full-Duplex, Half-Duplex
Input Transmission Speeds:
Synchronous: 9,600 bps
Asynchronous: 9,600 bps
Input Port Code Supported: Ascii, Parallel Binary Data, Baudot
Protocols Supported: BSC, SDLC, Asynchronous (Start/Stop)
Maximum Output Lines: 8
Aggregate Transmission Rate: 96 bps
Features: Protocol and Code Conversion, Error Control, Terminal Emulation, Automatic Transmission Speed (Baud Rate) Detection, Terminal-Initiated Applications Switching, Automatic Disconnect, Multiplexer/Demultiplexer, Terminal Controller, Local Console (System Control Functions), Automatic Polling, User Programmable, On-Line Maintenance, Statistics Collection, Autodial and Autoanswer Capabilities
Price: $15,000 to $60,000
Distribution Method: End user
Number Installed to Date: 100 to 1,000
Date First Installed: April 1983

NORTHERN TELECOM, INC. 586
Processor Function: Host Independent, Distributed Processing Nodes
Compatibility Classification: Non-IBM (General Purpose)
Word Length: 8 bit
Host Compatibility: IBM 370, CDC Mainframes, Burroughs Mainframes
Peripherals Supported: CRT, Printer, Tape Drive, Disk Drive, Diagnostic/Test, Cardpunches
Maximum Number Input Lines: 14
Input Transmission Mode: Full-Duplex, Half-Duplex
Input Transmission Speeds:
Synchronous: 9,600 bps
Asynchronous: 9,600 bps
Input Port Code Supported: Ascii, Parallel Binary Data, Baudot
Protocols Supported: BSC, SDLC, Asynchronous (Start/Stop)
Maximum Output Lines: 14
Aggregate Transmission Rate: 96 bps
Features: Protocol and Code Conversion, Error Control, Terminal Emulation, Automatic Transmission Speed (Baud Rate) Detection, Terminal-Initiated Applications Switching, Automatic Disconnect, Multiplexer/Demultiplexer, Terminal Controller, Local Console (System Control Functions), Automatic Polling, User Programmable, On-Line Maintenance, Statistics Collection, Autodial and Autoanswer Capabilities
Price: $50,000 to $200,000
Distribution Method: End user
Date First Installed: June 1980

NRI DATA CORP. 730 COMMUNICATIONS PROCESSOR
Processor Function: Front-End Processor, Message Switch, Host Independent
Compatibility Classification: Non-IBM (General Purpose)
Word Length: 8 bit
Peripherals Supported: CRT
Maximum Number Input Lines: 4
Input Transmission Mode: Full-Duplex
Input Transmission Speeds:
Synchronous: 56,000 bps
Asynchronous: 50 bps to 19,200 bps
Input Port Code Supported: Ascii, Baudot
Protocols Supported: SDLC
Maximum Output Lines: 4
Aggregate Transmission Rate: 4
Features: Protocol Conversion, Code Conversion, Error Control, Terminal Emulation and Terminal Controller
Price: $1,700
Distribution Method: Third-party
Date First Installed: 1982
(See Vendor Profile Page V-22)

PARADYNE CORP. PODET
Processor Function: Message Switch, Remote-Line Concentrator, Host Independent, Distributed Processing Nodes
Compatibility Classification: Non-IBM (General Purpose)
Word Length: 16 bit
Host Compatibility: IBM 360/370, IBM 303X, IBM 308X, 430X
Peripherals Supported: CRT, Printer, Tape Drive, Diagnostic/Test
Maximum Number Input Lines: 10
Input Transmission Mode: Full-Duplex
Input Transmission Speeds:
Synchronous: 56,000 bps
Asynchronous: 19,200 bps
Input Port Code Supported: Ebcdic, Ascii, X.25, Parallel Binary Data
Protocols Supported: SDLC, X.25, Asynchronous (Start/Stop)
Maximum Output Lines: 10
Aggregate Transmission Rate: 3,000 bps
Features: Protocol and Code Conversion, Error Control, Terminal Emulation, Automatic Transmission Speed (Baud Rate) Detection, Terminal-Initiated Applications Switching, Automatic Disconnect, Multiplexer/Demultiplexer, Terminal Controller, Local Console (System Control Functions), Automatic Polling, On-Line Maintenance, Statistics Collection, Autodial/Autoanswer Capabilities, Downline Loading of Remote Node, Self Configuring
Price: $25,000
Distribution Method: End user
Number Installed to Date: 1,000 to 10,000
Date First Installed: 1978

PARADYNE CORP. SYSTEM 9400
Processor Function: Distributed Processing Nodes
Compatibility Classification: Non-IBM (General Purpose)
Word Length: 16 bit
Host Compatibility: IBM 370, Paradyne 9200
Peripherals Supported: CRT, Printer, Tape Drive, Disk Drive, Diagnostic/Test
Maximum Number Input Lines: 28
Input Transmission Mode: Full-Duplex
Input Transmission Speeds:
Synchronous: 19,200 bps
Asynchronous: 9,600 bps
Input Port Code Supported: Ebcdic, Ascii
Protocols Supported: BSC, SDLC, HDLC, Asynchronous (Start/Stop), Paradyne Planet
Maximum Output Lines: 8
Features: Protocol and Code Conversion, Error Control, Terminal Emulation, Terminal-Initiated Applications Switching, Automatic Disconnect, Multiplexer/Demultiplexer, Terminal Controller, Local Console (System Control Functions), Automatic Polling, User Programmable, On-Line Maintenance, Statistics Collection, Autodial/Autoanswer Capabilities, Downline Loading of Remote Node
Price: $30,000
Monthly Maintenance Fee: $185
Distribution Method: End user
Number Installed to Date: 1,000 to 10,000
Date First Installed: 1981

PERIPHERONICS CORP. T-CONN
Processor Function: Front-End Processor, Message Switch, Remote-Line Concentrator, Host Independent, Distributed Processing Nodes
Compatibility Classification: Per Choice and Multiple
Word Length: 16 bit
Peripherals Supported: CRT, Printer, Tape Drive, Disk Drive, Diagnostic/Test, Acoustic Coupler
Maximum Number Input Lines: 416
Input Transmission Mode: Half-Duplex
Input Transmission Speeds:
Synchronous: 9,600 bps
Asynchronous: 19,200 bps
Input Port Code Supported: Ebcdic, Ascii, X.25, Baudot
Protocols Supported: BSC, SDLC, ADCCP, BDLC, X.27, Asynchronous (Start/Stop)
Maximum Output Lines: 416
Features: Protocol and Code Conversion, Error Control, Terminal Emulation, Terminal-Initiated Applications Switching, Automatic Disconnect, Multiplexer/Demultiplexer, Processor-Initiated Dynamic Line Reconfiguration, Terminal Controller, Local Console (System Control

Functions), Automatic Polling, User Programmable, On-Line Maintenance, Statistics Collection, Autodial/Autoanswer Capabilities, Downline Loading of Remote Node
Price: $50,000 to $120,000
Distribution Method: End user
Number Installed to Date: 100 to 1,000
Date First Installed: 1972
(See Vendor Profile Page V-33)

FERRANTI, INC.
DCP/88
Processor Function: Front-End Processor, Distributed Processing Nodes
Compatibility Classification: IBM General Purpose
Word Length: 16 bit
Host Compatibility: IBM
Peripherals Supported: Printer
Maximum Number Input Lines: 4
Input Transmission Mode: Full-Duplex, Half-Duplex
Input Transmission Speeds:
Synchronous: 38,400 bps
Asynchronous: 38,400 bps
Input Port Code Supported: Ebcdic, Ascii
Protocols Supported: BSC, SDLC, HDLC, Asynchronous (Start/Stop)
Maximum Output Lines: 4
Features: Protocol and Code Conversion, Error Control, Automatic Transmission Speed (Baud Rate) Detection, Automatic Disconnect, Processor-Initiated Dynamic Line Reconfiguration, Terminal Controller, Local Console (System Control Functions), Automatic Polling, User Programmable, Autodial/Autoanswer Capabilities, Downline Loading of Remote Node
Price: $2,000
Distribution Method: End user, OEM, Third-party
(See Vendor Profile Page V-33)

FERRANTI, INC.
PC/3270
Processor Function: Front-End Processor
Compatibility Classification: IBM 3270
Word Length: 8 bit
Host Compatibility: IBM PC, TI Professional
Peripherals Supported: Printer, Disk Drive
Maximum Number Input Lines: 1
Input Transmission Mode: Half-Duplex
Input Port Code Supported: Ebcdic
Maximum Output Lines: 1
Features: Error Control, Terminal Emulation, Terminal Controller, Local Console (System Control Functions), Automatic Polling, User Programmable, On-Line Maintenance
Price: $995
Distribution Method: End user, OEM, Third-party

FIELDS ELECTRONIC INSTRUMENTS, INC.
FLEXPAC PAD
Processor Function: Front-End Processor, Host Independent
Compatibility Classification: Non-IBM (General Purpose)
Word Length: 8 bit
Peripherals Supported: Tape Drive, Diagnostic/Test
Input Transmission Mode: Full-Duplex
Input Transmission Speeds:
Asynchronous: 50 bps to 9,600 bps
Input Port Code Supported: Ascii
Protocols Supported: X.25, Asynchronous (Start/Stop)
Aggregate Transmission Rate: 15
Features: Error Control, Automatic Transmission Speed (Baud Rate) Detection, Multiplexer/Demultiplexer, User Programmable, On-Line Maintenance, Statistics Collection, Downline Loading of Remote Node
Distribution Method: End user, OEM
(See Vendor Profile Page V-33)

FOXBORO DATA COMM.
DPAC-80/PC
Processor Function: Front-End Processor, Message Switch, Remote-Line Concentrator, Host Independent, Distributed Processing Nodes
Compatibility Classification: IBM 370X
Word Length: 8 bit, 16 bit
Host Compatibility: DEC PDP-11/44, IBM Series/1, HP 1000
Peripherals Supported: CRT, Printer, Tape Drive, Disk Drive, Diagnostic/Test
Maximum Number Input Lines: 16
Input Transmission Mode: Full-Duplex, Half-Duplex
Input Transmission Speeds:
Synchronous: 50 bps to 1,000,000 bps
Asynchronous: 50 bps to 19,200 bps
Input Port Code Supported: Ebcdic, Ascii, X.25, Parallel Binary Data
Protocols Supported: BSC, SDLC, ADCCP, HDLC, UDLC, X.25, Asynchronous (Start/Stop), ICP, DDCMP
Maximum Output Lines: 16
Aggregate Transmission Rate: 100,000 bps
Features: Protocol and Code Conversion, Error Control, Terminal Emulation, Automatic Disconnect, Multiplexer/Demultiplexer, Processor-Initiated Dynamic Line Reconfiguration, Terminal Controller, Local Console (System Control Functions), Automatic Polling, User Programmable, On-Line Maintenance, Autodial/Autoanswer Capabilities, Downline Loading of Remote Node
Price: $8,000 to $15,000
Number Installed to Date: 100 to 1,000
(See Vendor Profile Page V-33)

FRONTIER TECHNOLOGIES, INC.
SAM (SPEECH AIDED MODEM)
Processor Function: Front-End Processor
Compatibility Classification: IBM 370X
Word Length: 8 bit
Host Compatibility: HP 3000, DEC VAX, Burroughs
Peripherals Supported: CRT, Printer, Disk Drive
Maximum Number Input Lines: 16
Input Transmission Mode: Full-Duplex, Half-Duplex
Input Transmission Speeds:
Asynchronous: 1,200 bps
Input Port Code Supported: Ebcdic, Ascii
Protocols Supported: BSC, Asynchronous (Start/Stop)
Maximum Output Lines: 1
Aggregate Transmission Rate: 192 bps
Features: Protocol and Code Conversion, Error Control, Terminal Emulation, Terminal-Initiated Applications Switching, Multiplexer/Demultiplexer, Local Console (System Control Functions), Automatic Polling, Statistics Collection, Autodial/Autoanswer Capabilities
Price: $1,595 to $10,000
Distribution Method: End user
Number Installed to Date: 100 to 1,000
Date First Installed: October 1978
(See Vendor Profile Page V-34)

RADIAN CORP.
UT-1 & UT-4
Processor Function: Remote Batch Only
Compatibility Classification: CDC, Sperry, Honeywell, IBM
Word Length: 16 bit
Host Compatibility: IBM, CDC, Sperry
Peripherals Supported: CRT, Printer, Tape Drive, Disk Drive, Diagnostic/Test, Plotter, Digitizer
Maximum Number Input Lines: 2
Input Transmission Mode: Full-Duplex, Half-Duplex
Input Transmission Speeds:
Synchronous: 19,200 bps
Protocols Supported: BSC, Asynchronous (Start/Stop)
Maximum Output Lines: 7
Aggregate Transmission Rate: 2
Features: Terminal Emulation
Price: $39,500 to $100,000
Monthly Maintenance Fee: $500
Distribution Method: End user
Number Installed to Date: 100 to 1,000
Date First Installed: 1971
(See Vendor Profile Page V-35)

RADIAN CORP.
UT-2 & UT-3
Processor Function: Remote Batch
Compatibility Classification: Sperry, CDC, IBM
Host Compatibility: IBM, Sperry, CDC
Peripherals Supported: CRT, Printer, Disk Drive, Diagnostic/Test, Card Punch
Maximum Number Input Lines: 1
Input Transmission Mode: Full-Duplex, Half-Duplex
Input Transmission Speeds:
Synchronous: 9,600 bps
Protocols Supported: BSC
Maximum Output Lines: 1
Aggregate Transmission Rate: 96 bps
Features: Terminal Emulation
Price: $24,000 to $50,000
Monthly Maintenance Fee: $375
Distribution Method: End user
Number Installed to Date: 50 to 100

RAMTAM CORP.
ATTACHED PROCESSOR APS1
Processor Function: Front-End Processor
Compatibility Classification: Non-IBM (General Purpose)
Word Length: 16 bit, 32 bit
Host Compatibility: DEC VAX, DEC PDP-11, DEC LSI-11
Peripherals Supported: CRT, Printer, Tape Drive, Disk Drive
Maximum Number Input Lines: 64
Input Transmission Mode: Full-Duplex, Half-Duplex
Input Transmission Speeds:
Synchronous: 1,000,000 bps
Input Transmission Speeds:
Asynchronous: 110 bps to 56,000 bps
Input Port Code Supported: Ascii, X.25
Protocols Supported: X.25, Asynchronous (Start/Stop)
Maximum Output Lines: 64
Aggregate Transmission Rate: 8,144 bps
Features: Protocol and Code Conversion, Error Control, Terminal Emulation, Terminal-Initiated Applications Switching, Automatic Disconnect, Multiplexer/Demultiplexer, Local Console (System Control Functions), Automatic Polling, User Programmable, On-Line Maintenance, Statistics Collection, Autodial and Autoanswer Capabilities, Downline Loading of Remote Node
Price: $9,500 to $28,000
Distribution Method: End user
Date First Installed: April 1983
(See Vendor Profile Page V-35)

RAYTHEON CO.
RAYNET I, II, III
Processor Function: Remote-Line Concentrator
Compatibility Classification: Non-IBM (General Purpose)
Word Length: 16 bit
Host Compatibility: IBM, Amdahl
Peripherals Supported: CRT, Printer, Disk Drive
Maximum Number Input Lines: 128
Input Transmission Mode: Full-Duplex, Half-Duplex
Input Transmission Speeds:
Synchronous: 2,400 bps to 9,600 bps
Input Port Code Supported: Ebcdic, Ascii, ALC
Protocols Supported: BSC, ALC,
Maximum Output Lines: 25
Aggregate Transmission Rate: 25
Aggregate Transmission Rate: 1,000 bps
Features: Protocol and Code Conversion, Error Control, Terminal Emulation, Automatic Transmission

Speed (Baud Rate) Detection, Terminal-Initiated Applications Switching, Local Console (System Control Functions), Automatic Polling, User Programmable, On-Line Maintenance, Statistics Collection, Downline Loading of Remote Node
Price: $200,000 to $600,000
Monthly Maintenance Fee: $2,000
Distribution Method: End user, Third-party
Number Installed to Date: 50 to 100
(See Vendor Profile Page V-20)

GEC SEMICONDUCTORS
GDRP.
SAMSON
Processor Function: Front-End Processor, Host Independent
Compatibility Classification: IBM 370X
Word Length: 16 bit, 32 bit
Host Compatibility: IBM 3780, HP 300 Series, DEC VAX
Peripherals Supported: CRT, Printer, Tape Drive, Disk Drive
Maximum Number Input Lines: 34
Input Transmission Mode: Half-Duplex
Input Transmission Speeds:
Asynchronous: 9,600 bps
Input Port Code Supported: Ebcdic, Ascii, X.25, Baudot
Protocols Supported: BSC, SDLC, X.25, X.27, Asynchronous (Start/Stop)
Maximum Output Lines: 1
Aggregate Transmission Rate: 66 bps
Features: Protocol and Code Conversion, Error Control, Terminal Emulation, Automatic Transmission Speed (Baud Rate) Detection, Terminal-Initiated Applications Switching, Automatic Disconnect, Terminal Controller, Local Console (System Control Functions), Automatic Polling, User Programmable, On-Line Maintenance, Statistics Collection, Autodial/Autoanswer Capabilities, Downline Loading of Remote Node
Price: $24,900
Distribution Method: OEM
Number Installed to Date: 100 to 1,000
Date First Installed: January 1981
(See Vendor Profile Page V-29)

GENERAL GDRP.
MICRONET 6
Processor Function: Host Independent, Message Processor
Compatibility Classification: Telex, TWX, DDD, Private Line
Word Length: 16 bit
Peripherals Supported: CRT, Printer, Disk Drive
Maximum Number Input Lines: 6
Input Transmission Mode: Full-Duplex, Half-Duplex
Input Transmission Speeds:
Asynchronous: 50 bps to 1,200 bps
Input Port Code Supported: Ascii, Baudot
Protocols Supported: Asynchronous (Start/Stop), Telex, TWX, IRC
Maximum Output Lines: 6
Aggregate Transmission Rate: 48 bps
Features: Protocol and Code Conversion, Error Control, Automatic Transmission Speed (Baud Rate) Detection, Terminal-Initiated Applications Switching, Automatic Disconnect, Local Console (System Control Functions), Programmable, Autodial/Autoanswer Capabilities
Price: $18,000 to $23,000
Monthly Maintenance Fee: $125
Distribution Method: End user, OEM
Number Installed to Date: 1,000 to 10,000
Date First Installed: 1981
(See Vendor Profile Page V-38)

GENERAL GDRP.
MICRONET 8
Processor Function: Message Switch, Host Independent, Message Processor
Compatibility Classification: Telex, TWX, DDD, Private Line
Word Length: 16 bit
Peripherals Supported: CRT, Printer, Disk Drive
Maximum Number Input Lines: 8
Input Transmission Mode: Full-Duplex, Half-Duplex
Input Transmission Speeds:
Synchronous: 4,800 bps
Asynchronous: 50 bps to 1,200 bps
Input Port Code Supported: Ebcdic, Ascii, Baudot
Protocols Supported: BSC, Asynchronous (Start/Stop), Telex, TWX, IRC
Maximum Output Lines: 8
Aggregate Transmission Rate: 96 bps
Features: Protocol and Code Conversion, Error Control, Automatic Transmission Speed (Baud Rate) Detection, Terminal-Initiated Applications Switching, Automatic Disconnect, Local Console (System Control Functions), User Programmable, Statistics Collection, Autodial/Autoanswer Capabilities
Price: $21,000 to $26,000
Monthly Maintenance Fee: $150
Distribution Method: End user, OEM
Number Installed to Date: 100 to 1,000
Date First Installed: February 1983

GENERAL GDRP.
MICRONET 12
Processor Function: Host Independent, Message Processor
Compatibility Classification: Telex, TWX, DDD, Private Line
Word Length: 8 bit
Peripherals Supported: CRT, Printer
Maximum Number Input Lines: 1
Input Transmission Mode: Full-Duplex, Half-Duplex
Input Transmission Speeds:
Asynchronous: 110 bps to 300 bps
Input Port Code Supported: Ascii, Baudot
Protocols Supported: Asynchronous (Start/Stop), Telex, TWX, DDD
Maximum Output Lines: 1
Features: Terminal Emulation, Automatic Transmission Speed (Baud Rate) Detection, Automatic Disconnect, User Programmable, Autodial/Autoanswer Capabilities
Price: $2,500
Monthly Maintenance Fee: $35
Distribution Method: End user, OEM, Third-party
Number Installed to Date: 1,000 to 10,000
Date First Installed: February 1984

GENERAL GDRP.
MICRONET 20
Processor Function: Host Independent, Message Processor
Compatibility Classification: Telex, TWX, DDD, Private Line
Word Length: 8 bit
Peripherals Supported: CRT, Printer, OCR Interface
Maximum Number Input Lines: 4
Input Transmission Mode: Full-Duplex, Half-Duplex
Input Transmission Speeds:
Asynchronous: 50 bps to 1,200 bps
Input Port Code Supported: Ascii, Baudot
Protocols Supported: Asynchronous (Start/Stop), Telex, TWX, IRC
Maximum Output Lines: 4
Aggregate Transmission Rate: 4
Features: Protocol and Code Conversion, Automatic Transmission Speed (Baud Rate) Detection, Automatic Disconnect, User Programmable, Autodial/Autoanswer Capabilities
Price: $4,200
Monthly Maintenance Fee: $40
Distribution Method: End user, OEM, Third-party
Number Installed to Date: 1,000 to 10,000
Date First Installed: 1982

GENERAL GDRP.
MICRONET 25
Processor Function: Host Independent, Message Processor
Compatibility Classification: Telex, TWX, DDD, Private Line
Word Length: 8 bit
Peripherals Supported: CRT, Printer, Disk Drive, CRC Interface
Maximum Number Input Lines: 4
Input Transmission Mode: Full-Duplex, Half-Duplex
Input Transmission Speeds:
Asynchronous: 50 bps to 1,200 bps
Input Port Code Supported: Ascii, Baudot
Protocols Supported: Asynchronous (Start/Stop), Telex, TWX
Maximum Output Lines: 4
Aggregate Transmission Rate: 4
Features: Protocol and Code Conversion, Automatic Transmission Speed (Baud Rate) Detection, Automatic Disconnect, User Programmable, Autodial/Autoanswer Capabilities
Price: $5,600
Monthly Maintenance Fee: $60
Distribution Method: End user, OEM, Third-party
Number Installed to Date: 1,000 to 10,000
Date First Installed: 1982

GENERAL GDRP.
MICRONET 404
Processor Function: Host Independent, Message Processor
Compatibility Classification: Telex, TWX, DDD, Private Line
Word Length: 16 bit
Peripherals Supported: CRT, Printer, Disk Drive
Maximum Number Input Lines: 4
Input Transmission Mode: Full-Duplex, Half-Duplex
Input Transmission Speeds:
Asynchronous: 50 bps to 1,200 bps
Input Port Code Supported: Ascii, Baudot
Protocols Supported: Asynchronous (Start/Stop), Telex, TWX
Maximum Output Lines: 4
Aggregate Transmission Rate: 4
Features: Protocol and Code Conversion, Error Control, Automatic Transmission Speed (Baud Rate) Detection, Terminal-Initiated Applications Switching, Automatic Disconnect, Local Console (System Control Functions), User Programmable, Autodial/Autoanswer Capabilities
Price: $8,750 to $12,100
Monthly Maintenance Fee: $100
Distribution Method: End user, OEM
Date First Installed: September 1983

GENERAL GDRP.
THE MICRONET SWITCH (STORE/FORWARD MSG)
Processor Function: Message Switch, Host Independent
Compatibility Classification: Telex, TWX, DDD, Private Line
Word Length: 16 bit
Peripherals Supported: CRT, Printer, Disk Drive
Maximum Number Input Lines: 24
Input Transmission Mode: Full-Duplex, Half-Duplex
Input Transmission Speeds:
Synchronous: 2,400 bps to 19,200 bps
Input Transmission Speeds:
Asynchronous: 50 bps to 2,400 bps
Input Port Code Supported: Ebcdic, Ascii, X.25, Baudot
Protocols Supported: BSC, HDLC, X.25, Asynchronous (Start/Stop), Telex, TWX, IRC
Maximum Output Lines: 24
Aggregate Transmission Rate: 768 bps
Features: Protocol and Code Conversion, Error Control, Automatic Transmission Speed (Baud Rate) Detection, Terminal-Initiated Applications Switching, Automatic Disconnect, Local Console (System Control Functions), Automatic Polling, User Programmable, Statistics Collection, Autodial and Autoanswer Capabilities
Price: $65,000 to $85,000

Communications Processors

Distribution Method: End user, OEM
Number Installed to Date: 1 to 10
Date First Installed: January 1984

SOFTWARE RESULTS CORP.
COMBOARD/HASP
Processor Function: Front-End Processor
Compatibility Classification: IBM 37XX
Word Length: 16 bit
Host Compatibility: IBM, CDC, DEC PDP-11, DEC VAX
Peripherals Supported: Printer
Maximum Number Input Lines: 1
Input Transmission Speeds:
Synchronous: 2,400 bps to 56,000 bps
Input Port Code Supported: Ebcdic, Ascii, Parallel Binary Data
Protocols Supported: BSC
Maximum Output Lines: 1
Aggregate Transmission Rate: 1
Features: Protocol and Code Conversion, Error Control, Automatic Transmission Speed (Baud Rate) Detection, Automatic Disconnect, Local Console (System Control Functions), Statistics Collection, Autodial/Autoanswer Capabilities, Downline Loading of Remote Node
Price: $13,900 to $26,900
Distribution Method: End user
Date First Installed: December 1983
(See Vendor Profile Page V-27)

SOFTWARE RESULTS CORP.
COMBOARD/SNA
Processor Function: Front-End Processor
Compatibility Classification: IBM 37XX
Word Length: 16 bit
Host Compatibility: IBM 3780, DEC VAX
Peripherals Supported: Printer
Maximum Number Input Lines: 1
Input Transmission Speeds:
Synchronous: 9,600 bps to 56,000 bps
Protocols Supported: SDLC
Maximum Output Lines: 1
Features: Protocol and Code Conversion, Error Control, Terminal Emulation, Automatic Transmission Speed (Baud Rate) Detection, Statistics Collection, Autodial/Autoanswer Capabilities, Downline Loading of Remote Node
Price: $18,000 to $32,800
Distribution Method: End user

SOFTWARE RESULTS CORP.
COMBOARD/3780
Processor Function: Front-End Processor
Compatibility Classification: IBM 37XX
Word Length: 16 bit
Host Compatibility: IBM 3780, CDC 3780, DEC PDP-11, DEC VAX
Peripherals Supported: Printer
Maximum Number Input Lines: 1
Input Transmission Mode: Half-Duplex
Input Transmission Speeds:
Synchronous: 9,600 bps to 56,000 bps
Input Port Code Supported: Ebcdic, Ascii, Parallel Binary Data
Protocols Supported: BSC
Maximum Output Lines: 1
Features: Protocol and Code Conversion, Error Control, Automatic Transmission Speed (Baud Rate) Detection, Automatic Disconnect, Statistics Collection, Autodial/Autoanswer Capabilities, Downline Loading of Remote Node
Price: $9,800 to $21,900
Distribution Method: End user
Number Installed to Date: 10 to 50
Date First Installed: November 1983

SPERRY CORP.
DISTRIBUTED COMM PROCESSOR/10
Processor Function: Front-End Processor, Remote-Line Concentrator
Compatibility Classification: Sperry
Word Length: 16 bit
Host Compatibility: Sperry 1100/60/70, Sperry System 11, Sperry 1100/80/90
Peripherals Supported: CRT, Printer, Tape Drive, Disk Drive
Maximum Number Input Lines: 8
Input Transmission Mode: Full-Duplex, Half-Duplex
Input Transmission Speeds:
Synchronous: 2,400 bps to 64,000 bps
Asynchronous: 455 bps to 19,200 bps
Input Port Code Supported: Ebcdic, Ascii, X.25, Parallel Binary Data, Baudot
Protocols Supported: BSC, SDLC, ADCCP, HDLC, UDLC, X.25, Asynchronous (Start/Stop), Unicopa, NTR
Maximum Output Lines: 1
Aggregate Transmission Rate: 1
Features: Protocol and Code Conversion, Error Control, Terminal Emulation, Automatic Transmission Speed (Baud Rate) Detection, Terminal-Initiated Applications Switching, Automatic Disconnect, Processor-Initiated Dynamic Line Reconfiguration, Local Console (System Control Functions), Automatic Polling, User Programmable, On-Line Maintenance, Statistics Collection, Autodial/Autoanswer Capabilities, Downline Loading of Remote Node
Price: $28,000 to $50,000
Distribution Method: End user
Number Installed to Date: 10 to 50
(See Vendor Profile Page V-28)

SPERRY CORP.
DISTRIBUTED COMM PROCESSOR/20
Processor Function: Front-End Processor, Remote-Line Concentrator
Compatibility Classification: Sperry
Word Length: 8 bit, 32 bit
Host Compatibility: Sperry Series 1100, Sperry System 11, Sperry Series 90/60
Peripherals Supported: CRT, Printer, Tape Drive, Disk Drive
Maximum Number Input Lines: 48
Input Transmission Mode: Full-Duplex, Half-Duplex
Input Transmission Speeds:
Synchronous: 2,400 bps to 64,000 bps
Asynchronous: 455 bps to 19,200 bps
Input Port Code Supported: Ebcdic, Ascii, X.25, Parallel Binary Data, Baudot
Protocols Supported: BSC, SDLC, ADCCP, HDLC, UDLC, X.25, Asynchronous (Start/Stop), Unicopa, NTR
Maximum Output Lines: 1
Aggregate Transmission Rate: 1
Features: Protocol and Code Conversion, Error Control, Terminal Emulation, Automatic Transmission Speed (Baud Rate) Detection, Terminal-Initiated Applications Switching, Automatic Disconnect, Processor-Initiated Dynamic Line Reconfiguration, Local Console (System Control Functions), Automatic Polling, User Programmable, On-Line Maintenance, Statistics Collection, Autodial/Autoanswer Capabilities, Downline Loading of Remote Node
Price: $47,000 to $100,000
Distribution Method: End user
Number Installed to Date: 100 to 1,000

SPERRY CORP.
DISTRIBUTED COMM PROCESSOR/40
Processor Function: Front-End Processor, Remote-Line Concentrator
Compatibility Classification: Sperry
Word Length: 16 bit, 32 bit
Host Compatibility: Sperry Series 1100, Sperry Series 90/80, Sperry System 11
Peripherals Supported: CRT, Printer, Tape Drive, Disk Drive
Maximum Number Input Lines: 253
Input Transmission Mode: Full-Duplex, Half-Duplex
Input Transmission Speeds:
Synchronous: 2,400 bps to 64,000 bps
Asynchronous: 455 bps to 19,200 bps
Input Port Code Supported: Ebcdic, Ascii, X.25, Parallel Binary Data, Baudot
Protocols Supported: BSC, SDLC, ADCCP, HDLC, UDLC, X.25, Asynchronous (Start/Stop), Unicopa, NTR
Maximum Output Lines: 8
Aggregate Transmission Rate: 8
Features: Protocol and Code Conversion, Error Control, Terminal Emulation, Automatic Transmission Speed (Baud Rate) Detection, Terminal-Initiated Applications Switching, Automatic Disconnect, Processor-Initiated Dynamic Line Reconfiguration, Local Console (System Control Functions), Automatic Polling, User Programmable, On-Line Maintenance, Statistics Collection, Autodial/Autoanswer Capabilities, Downline Loading of Remote Node
Price: $103,000 to $999,999
Monthly Maintenance Fee: $1,200
Distribution Method: End user

SYSTEM FOUR
MCX & PCX SERIES
Processor Function: Distributed Processing Nodes
Compatibility Classification: Non-IBM (General Purpose)
Word Length: 8 bit
Peripherals Supported: CRT, Printer
Maximum Number Input Lines: 2
Input Transmission Speeds:
Asynchronous: 300 bps to 9,600 bps
Input Port Code Supported: Ascii
Protocols Supported: Asynchronous (Start/Stop)
Maximum Output Lines: 2
Aggregate Transmission Rate: 2
Features: Error Control, Terminal-Initiated Applications Switching, Automatic Disconnect, Automatic Polling, User Programmable, Downline Loading of Remote Node
Distribution Method: Third-party
Number Installed to Date: 1,000 to 10,000
(See Vendor Profile Page V-29)

SYSCOM, INC.
STORE & FORWARD MESSAGE SWITCH
Processor Function: Message Switch
Compatibility Classification: Non-IBM (General Purpose)
Word Length: 16 bit
Peripherals Supported: CRT, Printer, Tape Drive, Disk Drive
Maximum Number Input Lines: 32
Input Transmission Mode: Full-Duplex, Half-Duplex
Input Transmission Speeds:
Synchronous: 9,600 bps
Asynchronous: 9,600 bps
Input Port Code Supported: Ascii
Maximum Output Lines: 32
Features: Protocol and Code Conversion, Error Control, Terminal Emulation, Automatic Disconnect, Multiplexer/Demultiplexer, Local Console (System Control Functions), Automatic Polling, On-Line Maintenance, Statistics Collection, Autodial/Autoanswer Capabilities
Price: $50,000
Distribution Method: End user
Number Installed to Date: 10 to 50
(See Vendor Profile Page V-29)

TANDEM COMPUTERS, INC.
6100 COMMUNICATION SUBSYSTEM
Processor Function: Front-End Processor
Compatibility Classification: Non-IBM (General Purpose)
Word Length: 16 bit, 32 bit
Peripherals Supported: CRT, Printer, Tape Drive, Disk Drive, Diagnostic/Test Systems
Maximum Number Input Lines: 300
Input Transmission Mode: Full-Duplex, Half-Duplex
Input Transmission Speeds:
Synchronous: 50 bps to 56,000 bps

Asynchronous: 50 bps to 56,000 bps
Input Port Code Supported: Ebcdic, Ascii, X.25, Baudot
Protocols Supported: ADCCP, HDLC, Asynchronous (Start/Stop), Exchange 3780
Maximum Output Lines: 300
Aggregate Transmission Rate: 16
Features: Protocol and Code Conversion, Error Control, Automatic Disconnect, Multiplexer/Demultiplexer, Terminal Controller, Automatic Polling, User Programmable, On-Line Maintenance, Statistics Collection, Autodial/Autoanswer Capabilities, Downline Loading of Remote Node
Price: $24,000 to $300,000
Monthly Maintenance Fee: $119
Distribution Method: End user
Number Installed to Date: 10 to 50
Date First Installed: April 1983
(See Vendor Profile Page V-29)

TARRIER COMPUTERS, INC.
INFOBAT
Processor Function: Earth Station
Word Length: 16 bit, 32 bit
Maximum Number Input Lines: 8
Input Transmission Mode: Full-Duplex
Input Transmission Speeds:
Synchronous: 56 bps to 56,000 bps
Asynchronous: 56 bps to 56,000 bps
Input Port Code Supported: Expand
Maximum Output Lines: 2
Aggregate Transmission Rate: 2
Price: $53,000
Monthly Maintenance Fee: $1,100
Distribution Method: End user

TECHLAS ENGINEERING
MZ-80
Processor Function: Front-End Processor
Compatibility Classification: IBM 370X
Word Length: 8 bit
Host Compatibility: Honeywell Series 60, DPS Series
Peripherals Supported: CRT, Printer, Disk Drive, Diagnostic/Test
Maximum Number Input Lines: 32
Input Transmission Mode: Half-Duplex
Input Transmission Speeds:
Asynchronous: 110 bps to 19,200 bps
Input Port Code Supported: Ebcdic, Ascii
Protocols Supported: BSC, SDCC, VIP
Maximum Output Lines: 32
Aggregate Transmission Rate: 3,072 bps
Features: Protocol and Code Conversion, Error Control, Terminal Emulation, Automatic Transmission Speed (Baud Rate) Detection, Terminal-Initiated Applications Switching, Automatic Disconnect, Multiplexer/Demultiplexer, Terminal Controller, Local Console (System Control Functions), Automatic Polling, User Programmable, On-Line Maintenance
Price: $5,000 to $12,000
Distribution Method: End user
Number Installed to Date: 100 to 1,000
Date First Installed: December 1981
(See Vendor Profile Page V-30)

TTTM
68K30
Processor Function: Host Independent
Compatibility Classification: Non-IBM (General Purpose)
Word Length: 8 bit, 16 bit, 32 bit
Peripherals Supported: CRT, Printer, Diagnostic/Test
Maximum Number Input Lines: 2
Input Transmission Mode: Full-Duplex, Half-Duplex
Input Transmission Speeds:
Synchronous: 600 bps to 307,200 bps
Asynchronous: 50 bps to 19,200 bps
Input Port Code Supported: Ebcdic, Ascii, X.25, Parallel Binary Data
Protocols Supported: BSC, SDLC, HDLC, X.25, Asynchronous (Start/Stop)
Maximum Output Lines: 2
Aggregate Transmission Rate: 8,144 bps
Features: Error Control, Automatic Transmission Speed (Baud Rate) Detection, Processor-Initiated Dynamic Line Reconfiguration, Terminal Controller, User Programmable
Price: $3,750
Distribution Method: End user
Number Installed to Date: 50 to 100
Date First Installed: January 1982
(See Vendor Profile Page V-31)

TUCK ELECTRONICS, INC.
PEOPLE TO COMPUTER INTERFACE
Processor Function: Front-End Processor, Message Switch, Remote-Line Concentrator, Host Independent
Compatibility Classification: Non-IBM (General Purpose)
Word Length: 8 bit
Host Compatibility: IBM Series/1, Tandem
Peripherals Supported: CRT, Touch-Tone Phones
Maximum Number Input Lines: 64
Input Transmission Mode: Full-Duplex
Input Transmission Speeds:
Asynchronous: 300 bps to 1,200 bps
Input Port Code Supported: Ascii
Protocols Supported: BSC, SDLC, X.25
Maximum Output Lines: 1
Aggregate Transmission Rate: 96 bps
Features: Protocol and Code Conversion, Error Control, Multiplexer/Demultiplexer, Automatic Polling, User Programmable, Autodial/Autoanswer Capabilities, Download-Loading of Remote Node
Distribution Method: End user
Date First Installed: January 1983
(See Vendor Profile Page V-32)

WINTERMALTER, INC.
DATATALKER
Processor Function: Front-End Processor
Compatibility Classification: IBM 370X
Word Length: 8 bit
Host Compatibility: IBM
Peripherals Supported: CRT, Printer, Diagnostic/Test
Maximum Number Input Lines: 1
Input Transmission Mode: Half-Duplex
Input Transmission Speeds:
Synchronous: 1,200 bps to 19,200 bps
Input Port Code Supported: Ebcdic, Ascii
Protocols Supported: BSC
Maximum Output Lines: 1
Aggregate Transmission Rate: 192 bps
Features: Protocol and Code Conversion, Error Control, Terminal Emulation, Automatic Transmission Speed (Baud Rate) Detection, Automatic Disconnect, Terminal-Controller, Automatic Polling, User Programmable
Price: $995
Distribution Method: End user, OEM, Third-party
Number Installed to Date: 100 to 1,000
Date First Installed: January 1983
(See Vendor Profile Page V-33)

WINTERMALTER, INC.
DATATALKER 2
Processor Function: Front-End Processor
Compatibility Classification: IBM 270X
Word Length: 8 bit
Host Compatibility: IBM Mainframes
Maximum Number Input Lines: 4
Input Transmission Mode: Half-Duplex
Input Transmission Speeds:
Asynchronous: 9,600 bps
Input Port Code Supported: Ebcdic, Ascii
Protocols Supported: BSC
Maximum Output Lines: 1
Aggregate Transmission Rate: 192 bps
Features: Protocol and Code Conversion, Error Control, Terminal Emulation, Terminal-Initiated Applications Switching, Automatic Disconnect, Multiplexer/Demultiplexer, Processor-Initiated Dynamic Line Reconfiguration, Automatic Polling, User Programmable, Autodial/Autoanswer Capabilities, Downlined Loading of Remote Node
Price: $895 to $995
Distribution Method: End user
Date First Installed: January 1984

XYPLEX, INC.
XP-UNIX
Processor Function: Front-End Processor, Message Switch, Remote-Line Concentrator, Host Independent, Distributed Processing Nodes
Compatibility Classification: Non-IBM (General Purpose)
Word Length: 16 bit
Host Compatibility: DEC PDP-11, DEC VAX
Peripherals Supported: CRT, Printer
Maximum Number Input Lines: 64
Input Transmission Mode: Full-Duplex
Input Transmission Speeds:
Asynchronous: 9,600 bps
Input Port Code Supported: Ebcdic, Ascii
Protocols Supported: Asynchronous (Start/Stop)
Maximum Output Lines: 64
Aggregate Transmission Rate: 999,999 bps
Features: Protocol and Code Conversion, Error Control, Terminal Emulation, Automatic Transmission Speed (Baud Rate) Detection, Terminal-Initiated Applications Switching, Automatic Disconnect, Multiplexer/Demultiplexer, Terminal Controller, On-Line Maintenance, Statistics Collection, Autodial/Autoanswer Capabilities
Price: $9,500
Monthly Maintenance Fee: $100
Distribution Method: End user
Date First Installed: September 1982
(See Vendor Profile Page V-33)

XYPLEX, INC.
XYPLEX SYSTEM
Processor Function: Front-End Processor, Message Switch, Remote-Line Concentrator, Host Independent, Distributed Processing Nodes
Compatibility Classification: Non-IBM (General Purpose)
Word Length: 16 bit
Host Compatibility: DEC VAX, DEC PDP-11
Peripherals Supported: CRT, Printer, Diagnostic/Test
Maximum Number Input Lines: 2,000
Input Transmission Mode: Full-Duplex
Input Transmission Speeds:
Asynchronous: 9,600 bps
Input Port Code Supported: Ascii, Parallel Binary Data
Protocols Supported: HDLC, Asynchronous (Start/Stop)
Maximum Output Lines: 2,000
Aggregate Transmission Rate: 10,000 bps
Features: Protocol and Code Conversion, Error Control, Terminal Emulation, Automatic Transmission Speed (Baud Rate) Detection, Terminal-Initiated Applications Switching, Automatic Disconnect, Multiplexer/Demultiplexer, Terminal Controller, Automatic Polling, User Programmable, On-Line Maintenance, Statistics Collection, Autodial/Autoanswer Capabilities, Downline Loading of Remote Node
Distribution Method: Third-party
Number Installed to Date: 50 to 100
Date First Installed: October 1982

SWITCHING EQUIPMENT

Index to Switching Equipment By Transmission Type

The index to switching systems has been broken down according to the transmission type — voice, data, nonintegrated voice/data or integrated voice/data — of the different products. Within each section of the index products are grouped alphabetically by vendor and contain the unit price as well as the page number on which the complete product listing can be found.

Voice Transmission Devices

VENDOR	MODEL	PRICE	PAGE
Action/Honeywell	ROADRUNNER DIGITAL EDITION	$1,000 to $1,500	B-46
Amteico	MCF	N/A	B-46
Conversational Voice Terminal Corp.	CON MODE VOICE TERMINAL	$4,000 to $6,000	B-46
Data Switch Corp.	ANA-MAX	N/A	B-46
Dynatech Data Systems	CTM 1000 MATRIX	N/A	B-46
GTE Business Communications Systems, Inc.	DPD 4800	$500	B-51
Information Dynamics Corp.	IDX 230	N/A	B-51
	IDX 2120	N/A	B-52
Intecom America, Inc.	OMEGA II MODEL 412	N/A	B-52
Mitel, Inc.	SX-100	N/A	B-55
	SX-200	N/A	B-55
Motorola, Inc.	EMX SERIES SWITCHING EXCHANGES	N/A	B-55
Siemens Communications Systems	SD-192	N/A	B-55
	SD-192MX	N/A	B-55
T-Bar, Inc.	5000 SERIES	$350 to $500	B-55
Telecom Technologies	ECD 1000	N/A	B-55
	ECD 2000	$300 to $400	B-55
Tie Communications	MERCURY PBX	$300 to $400	B-55
Toshiba America, Inc.	PERCEPTION	N/A	B-55

Data Switching Devices

VENDOR	MODEL	PRICE	PAGE
Atlantic Research Corp.	DPS-4	$100 to $1,000	B-46
	FBS-1	$100 to $1,000	B-46
	RCS-100	$100 to $1,000	B-46
Racine Data Systems, Inc.	TRI CHANNEL SECURITY SYSTEMS	N/A	B-46
RSN Communications Corp.	C 30 PSN	N/A	B-46
Sytex Corp.	AUTOSWITCH 240	$100 to $200	B-46
Codex Corp.	IMS 7700	N/A	B-46
	IMS 7800	N/A	B-46
Gammex, Ltd.	DNP-4R, -8R, -16E	N/A	B-46
Gammex, Inc.	TERMINAL CONCENTRATOR; MDS-8070	$600 to $620	B-46
Crosspoint Systems, Inc.	SD 450	N/A	B-46
Datapraks, Inc.	3274 CONTROLLER BACKUP SWITCH	N/A	B-46
Data Switch Corp.	MODEL 800	N/A	B-50
	MODEL 1000	N/A	B-50
	MODEL 1200	N/A	B-50
	XY-MAX-2840	N/A	B-50
DCA/TAC	SYSTEM 3LS NETSWITCH	N/A	B-50
Develcon Electronics, Inc.	9002 DATA SWITCH	N/A	B-50
	9006 DATA SWITCH	N/A	B-50
Digilog, Inc.	NETWORK ACCESS SWITCH (NAS)	$600 to $700	B-50
Digital Controls Corp.	DIGITAL CONTROLS 3403	$995 to $19,500	B-50
	DIGITAL CONTROLS 3421	$995 to $19,500	B-50
	DIGITAL CONTROLS 4101	$995 to $19,500	B-50
Digital Laboratories, Inc.	3R	$395	B-50
	MICRO MATRIX	$245	B-50
	MICRO MATRIX II	$995	B-50
	TLC	$245	B-50
	WAP	$395	B-50
Dynacom Corp.	SELECT 8	$400 to $6,000	B-51
Dynatech Data Systems	CHANNEL ACCESS SWITCH	$400 to $6,000	B-51

Switching Equipment Index

VENDOR	MODEL	PRICE	PAGE
Dynatech Data Systems	CTM 1000	$400 to $6,000	B-61
	DYNASWITCH	$400 to $6,000	B-61
	DYNASWITCH MARK II	$4,000	B-61
	VS CHANNEL ACCESS SWITCH	$4,000	B-61
Dynatech Packet Technology, Inc.	MULTI SWITCH X.2	$4000	B-61
Electrodata, Inc.	CLS 2	$125	B-61
Electronic Interface Association	S 8	$1,600 to $1,800	B-61
	S 24	$100 to $250	B-61
Ericsson Pragmatic, Inc.	ERIPAX	$1,600 to $1,800	B-61
Gandalf Data, Inc.	PACX TM	$135 to $300	B-61
Ideographix, Inc.	IPX 5410	N/A	B-62
Infotron Systems Corp.	IS 4000/4002 INTELLIGENT SWITCHING SYSTEM	$140 to $240	B-64
Intelligent Business Systems, Inc.	CSX 1024	N/A	B-64
ITT Telecom Products, Inc.	DPS 1500	N/A	B-64
M/A-Com, Inc.	IDX 3000	$1,450	B-65
Micom Systems, Inc.	MICRO 600	$160 to $250	B-66
Network Products, Inc.	BABYNET	$1,450	B-56
Paradyne Corp.	PDN 5200	$800 to $2,000	B-67
Philips Electronics Instruments, Inc.	FLEXPAC	$800 to $1,100	B-67
Syscom, Inc.	STORE AND FORWARD MESSAGE SWITCH	N/A	B-69
T-Bar, Inc.	3090/3800 SERIES COMPUTER SWITCH MATRIX	$800 to $1,100	B-69
	VIRTUAL SWITCH MATRIX	$585	B-69
Telebit, Inc.	331 XPLEXER	$875	B-69
Terminal Data Corp.	DATA SWITCH	$125 to $300	B-69
Western Datacom	UNISWITCH 1020	$650	B-69
Western Telematic, Inc.	ABS	$99	B-69
	CAS 41	$395	B-69
	CAS 164	$795	B-69
	PSU 41	$395	B-69
	TM 41	$295	B-69
Xyplex, Inc.	XYPLEX SYSTEM	N/A	B-69

Nonintegrated Voice/Data Switching Devices

VENDOR	MODEL	PRICE	PAGE
American Telecom, Inc.	FOCUS ELITE	N/A	B-46
AT&T Information Systems, Inc.	DIMENSION	N/A	B-46
Codex Corp.	IMS 7760	N/A	B-46
Computer Systems	TS/88	$320 to $500	B-46
Data Switch Corp.	ANA-MAX	N/A	B-50
Daycom Corp.	DAYCOM	N/A	B-50
GTE Business Communications Systems, Inc.	OMNI PBX	N/A	B-51
Harris Corp.	400-L (400L-2 AC OR DC)	$320 to $500	B-52
	400-M (400M-2 AC OR DC)	$350 to $500	B-52
	1201 (1201-3 AC OR DC)	$400 to $550	B-52
	1202 (1202-6 AC OR DC)	$290 to $500	B-52
	1204/1204-6 DC	$400 to $550	B-52
	1205/1205-3 DC	$450 to $600	B-53
	HARRIS 110S & 110M	N/A	B-53
Hitachi America, Ltd.	DX 30/40	N/A	B-53
IPC Technology, Ltd.	DPX III, 100,160,1000	N/A	B-53
ITT Business Communications Corp.	SYSTEM 3100	$600 to $850	B-54
Iwatsu America, Inc.	OMEGA III MODEL 816	N/A	B-55
Maico Labs, Inc.	MAX-128P	$120	B-55
	MAX-212	$75	B-55
	MAX-424	$120	B-55
	MAX-824	$140	B-55
Morgan Data Systems	ANSWERNET	N/A	B-56
Solid State Systems, Inc.	CEO	$300 to $750	B-56
T-Bar, Inc.	MASS	$350 to $500	B-56
	5900 SERIES PATCH	$95 to $150	B-56
Tekmarken Info Switch	INFO SWITCH ACD	N/A	B-56
Tele/Resources	T R 150 SERIES	$300	B-56

Integrated Voice/Data Switching Devices

VENDOR	MODEL	PRICE	PAGE
Amtelco	EVE	N/A	B-46
	LEPRECHAUN	N/A	B-46
	MINI MESSAGE CENTER	N/A	B-46
Andersen Anaheim, Inc.	100-1000 INTEGRATED OFFICE EXCHANGE	$600 to $800	B-46

Switching Equipment Index

VENDOR	MODEL	PRICE	PAGE
AT&T Information Systems, Inc.	SYSTEM 85	$670 to $1,000	B-46
GXC Corp.	ROSE	N/A	B-46
Intecom, Inc.	IBX TM	$1000	B-54
Interconnect Planning Corp.	DPX 1000	$900 to $1200	B-54
	DPX 100	$600 to $900	B-54
	DPX 160	$600 to $900	B-54
ITT Telecom Products, Inc.	1210 SYSTEM	N/A	B-54
	1240	$500 to $300	B-54
Inviso America, Inc.	OMEGA IV ID8-128	N/A	B-54
	OMEGA IV ES-824/1048	N/A	B-55
Mitel, Inc.	SX-5	N/A	B-55
	SX-10	$3,000	B-55
	SX-20	$8,300	B-55
Motorola, Inc.	EMX SERIES RADIO TELEPHONE	N/A	B-56
Northern Telecom, Inc.	DMS 10	$250 to $500	B-56
	DMS 100	$300 to $500	B-56
	DMS 200	N/A	B-56
	SL 1	N/A	B-56
	SL 100	N/A	B-56
	CSV 248	N/A	B-56
OKI Electronics of America, Inc.	SPECTRUM 4000	N/A	B-57
	SPECTRUM 100	N/A	B-57
	SPECTRUM 700	N/A	B-57
Peripherales Corp.	T-COMM	N/A	B-57
ProLink Corp.	PROLINK	$500 to $800	B-57
Rockwell International Corp.	GALAXY ACD	N/A	B-57
Rolm Corp.	VSCBX	N/A	B-57
	CBX II 8000 CPU	N/A	B-57
	CBX II 9000 CPU	N/A	B-57
Siemens Communications Systems	SATURN II	N/A	B-58
	SATURN III	N/A	B-58
Toshiba Industries, Inc.	MC 56 56T	N/A	B-58
United Technologies/Lexar Corp.	UTX 5000	$650	B-58
	UTX 1001	N/A	B-58
	UTX 1200	$650	B-58
Xtel, Inc.	PNX	$800 to $1000	B-58

Switching Equipment

ACTION/HONEYWELL
ROADRUNNER DIGITAL EDITION
Equipment Type: Tandem
Transmission: Voice, Data, Integrated Voice/Data, Video
Switch Technology: Digital
Switching Matrix: Time/Space/Time
Modulation Method: PCM
Maximum Trunks Supported: 4,096
Attendant Consoles (Maximum): 7
Matrix Architecture: Nonblocking, 100%
Maximum Transmission Speeds:
Voice: 64,000 bit/sec
Data: 1,544,000 bit/sec
Advanced Features: T-1 Carrier Interface, X.25 Interface, Security, Diagnostics, Data Security, Common Channel Switch
Price:
Purchase: $1,000 to $1,500
Distribution Method: End user
Number Installed to Date: 10 to 25
Date First Installed: September 1982
(See Vendor Profile Page V-1)

AMERICAN TELECOMM, INC.
FOCUS ELITE
Equipment Type: PBX
Transmission: Nonintegrated Voice/Data
Switch Technology: Digital
Switching Matrix: Time Division
Modulation Method: DM
Maximum Trunks Supported: 56
Maximum Stations Supported: 280
Attendant Consoles (Maximum): 4
Matrix Architecture: Nonblocking
Maximum Simultaneous Transmissions: 128
Advanced Features: User Programmable, Security, Diagnostics, Data Security
Distribution Method: Third-party
Number Installed to Date: More than 100
Date First Installed: September 1976
(See Vendor Profile Page V-2)

AMTELCO
5VE
Equipment Type: PBX
Transmission: Integrated Voice/Data
Switch Technology: Digital
Switching Matrix: PCM
Modulation Method: PCM
Maximum Trunks Supported: 24
Maximum Stations Supported: 2,000
Attendant Consoles (Maximum): 12
Matrix Architecture: Nonblocking, 100%
Maximum Simultaneous Transmissions: 12
Maximum Transmission Speeds:
Voice: 64,000 bit/sec
Advanced Features: T-1 Carrier Interface, OA, Security, Data Security
Advanced Attendant Features: Paperless Phone
Distribution Method: End user
Number Installed to Date: 1 to 10
Date First Installed: May 1983
(See Vendor Profile Page V-3)

AMTELCO
LEPRECHAUN
Equipment Type: PBX
Transmission: Integrated Voice/Data
Switch Technology: Analog
Switching Matrix: Relay
Maximum Trunks Supported: 1
Maximum Stations Supported: 14
Attendant Consoles (Maximum): 1
Matrix Architecture: Nonblocking, 100%
Maximum Simultaneous Transmissions: 1
Advanced Features: OA, Diagnostics
Distribution Method: End user
Number Installed to Date: 25 to 50
Date First Installed: September 1981

AMTELCO
LITTLE GUY
Equipment Type: PBX
Switch Technology: Analog
Switching Matrix: Relay
Maximum Trunks Supported: 4
Attendant Consoles (Maximum): 1
Matrix Architecture: Nonblocking, 100%
Maximum Simultaneous Transmissions: 1
Advanced Features: OA, Diagnostics
Distribution Method: End user
Number Installed to Date: 25 to 50
Date First Installed: September 1982

AMTELCO
MCF
Equipment Type: PBX
Transmission: Voice
Switch Technology: Analog
Switching Matrix: Relay
Maximum Trunks Supported: 36
Maximum Stations Supported: 900
Attendant Consoles (Maximum): 12
Matrix Architecture: Blocking
Maximum Simultaneous Transmissions: 36
Advanced Features: OA, Diagnostics
Advanced Attendant Features: Electronic Mail, Corporate Message Center, Information Retrieval
Distribution Method: End user
Number Installed to Date: 10 to 25
Date First Installed: March 1982

AMTELCO
MINI MESSAGE CENTER
Equipment Type: PBX
Transmission: Integrated Voice/Data
Switch Technology: Analog
Switching Matrix: Relay
Maximum Trunks Supported: 1
Maximum Stations Supported: 14
Attendant Consoles (Maximum): 100
Matrix Architecture: Nonblocking, 100%
Maximum Simultaneous Transmissions: 1
Advanced Features: OA, Diagnostics
Distribution Method: End user
Date First Installed: March 1984

ANDERSON JACOBSON, INC.
10X-1000 (INTEGRATED OFFICE EXCHANGE)
Equipment Type: PABX
Transmission: Integrated Voice/Data
Switch Technology: Digital
Modulation Method: PCM
Maximum Trunks Supported: 1,536
Maximum Stations Supported: 16,000
Matrix Architecture: Nonblocking, 100%
Advanced Features: User Programmable, Digitizes at Handset (End-to-End Digital), T-1 Carrier Interface, X.25 Interface, LAN Capability (Micro/Mini/Mainframe), Voice Store and Forward, OA, Security, Diagnostics, Data Security, Energy Control/Management, RJE to Host Interface, Protocol Conversion
Price:
Lease: $40 to $60
Price:
Purchase: $500 to $800
Average Monthly Maintenance: $6
Distribution Method: OEM, Third-party
(See Vendor Profile Page V-2)

ATLANTIC RESEARCH CORP.
DPS-4
Equipment Type: Data Switch
Transmission: Data
Switch Technology: Digital
Matrix Architecture: Nonblocking
Maximum Transmission Speeds:
Data: 2,000,000 bit/sec
Price:
Purchase: $100 to $1,000
Distribution Method: End user
Number Installed to Date: 10 to 25
Date First Installed: January 1978
(See Vendor Profile Page V-3)

ATLANTIC RESEARCH CORP.
PBS 1
Equipment Type: Data Switch
Transmission: Data
Switch Technology: Digital
Matrix Architecture: Nonblocking
Maximum Transmission Speeds:
Data: 2,000,000 bit/sec
Price:
Purchase: $100 to $1,000
Distribution Method: End user
Number Installed to Date: 10 to 25
Date First Installed: January 1978

ATLANTIC RESEARCH CORP.
RCS-100
Equipment Type: Data Switch
Transmission: Data
Switch Technology: Digital
Matrix Architecture: Nonblocking
Maximum Transmission Speeds:
Data: 2,000,000 bit/sec
Price:
Purchase: $100 to $1,000
Distribution Method: End user
Number Installed to Date: 10 to 25

AT&T INFORMATION SYSTEMS, INC.
DIMENSION
Equipment Type: ICBX
Transmission: Nonintegrated Voice/Data
Switch Technology: Analog
Switching Matrix: Time Division
Modulation Method: PAM
Maximum Trunks Supported: 1,100
Maximum Stations Supported: 7,000
Attendant Consoles (Maximum): 480
Matrix Architecture: Blocking
Maximum Transmission Speeds:
Data: 9,600 bit/sec
Advanced Features: User Programmable, T-1 Carrier Interface, X.25 Interface, Voice Store and Forward, OA, Security, Diagnostics, Data Security, Energy Control/Management, RJE to Host Interface
Advanced Attendant Features: Electronic Mail, Text Message, Uniform Wiring
Distribution Method: End user
Number Installed to Date: More than 100
Date First Installed: March 1975
(See Vendor Profile Page V-3)

AT&T INFORMATION SYSTEMS, INC.
SYSTEM 85
Equipment Type: ICBX
Transmission: Integrated Voice/Data
Switch Technology: Digital
Switching Matrix: Time Division
Modulation Method: PCM
Maximum Trunks Supported: 2,250
Maximum Stations Supported: 7,000
Attendant Consoles (Maximum): 480
Matrix Architecture: Nonblocking, 100%
Maximum Transmission Speeds:
Voice: 64,000 bit/sec
Data: 64,000 bit/sec
Advanced Features: User Programmable, Digitizes at Handset (End-to-End Digital), T-1 Carrier Interface, X.25 Interface, LAN Capability (Micro/Mini/Mainframe), OA, Security, Diagnostics, Data Security, Energy Control/Management, RJE to Host Interface
Advanced Attendant Features: Electronic Mail, Text Message Uniform, Wiring
Price:
Purchase: $870 to $1,850
Distribution Method: End user
Number Installed to Date: More than 100
Date First Installed: April 1983

BACKUS DATA SYSTEMS, INC.
TRI CHANNEL SECURITY SYSTEMS
Equipment Type: Data Switch
Transmission: Data
Switch Technology: Digital
Switching Matrix: Time Division
Maximum Simultaneous Transmissions: 3
Maximum Transmission Speeds:
Data: 9,600 bit/sec
Advanced Features: LAN Capability (Micro/Mini), Security, Data Security

FIRST WE MADE IT SMART.

THEN WE MADE IT SIMPLE.

Switching Equipment

Number Installed to Date: 50 to 100
(See Vendor Profile Page V-5)

BBN COMMUNICATIONS CORP.
C 30 PSN (PACKET SWITCH NODE)
Equipment Type: Packet Processor
Transmission: Data
Switch Technology: Digital
Switching Matrix: Statistical
Maximum Trunks Supported: 14
Attendant Consoles (Maximum): 1
Maximum Simultaneous Transmissions: 500
Maximum Transmission Speeds:
Data: 64,000 bit/sec
Advanced Features: X.25 Interface, Security, Diagnostics, Data Security, Protocol Conversion
Distribution Method: End user, OEM
Number Installed to Date: More than 100
Date First Installed: 1981
(See Vendor Profile Page V-4)

Additional information provided for by vendor

BBNCC markets private packet-switching networks. The company's fully integrated line of products and services provides a total solution approach to managing network growth and controlling data communications cost. BBNCC designs, installs and maintains wide area X.25 networks for clients located worldwide.

BYTEX CORP.
AUTOSWITCH 240
Equipment Type: Matrix Switch
Transmission: Data
Switch Technology: Digital
Switching Matrix: Time Division
Modulation Method: PAM
Maximum Trunks Supported: 240
Attendant Consoles (Maximum): 16
Matrix Architecture: Blocking
Maximum Simultaneous Transmissions: 120
Maximum Transmission Speeds:
Data: 306,000 bit/sec
Advanced Features: User Programmable, LAN Capability (Micro/Mini/Mainframe), OA, Security, Diagnostics, User Expandable
Price:
Purchase: $100 to $200
Distribution Method: Third-party
Number Installed to Date: More than 100
Date First Installed: September 1981
(See Vendor Profile Page V-6)

CODEX CORP.
MS 7700
Equipment Type: Data Switch
Transmission: Data
Switch Technology: Digital
Switching Matrix: Time Division
Modulation Method: PCM
Maximum Stations Supported: 512
Attendant Consoles (Maximum): 1
Matrix Architecture: Nonblocking
Maximum Simultaneous Transmissions: 256
Maximum Transmission Speeds:
Data: 19,200 bit/sec
Advanced Features: Diagnostics, Data Security
Distribution Method: End user
Number Installed to Date: More than 100
Date First Installed: 1980
(See Vendor Profile Page V-6)

CODEX CORP.
MS 7750
Equipment Type: Data Switch
Transmission: Nonintegrated Voice/Data
Switch Technology: Digital
Switching Matrix: Space Division
Modulation Method: PCM
Maximum Stations Supported: 1,440
Attendant Consoles (Maximum): 6
Matrix Architecture: Nonblocking
Maximum Simultaneous Transmissions: 720
Maximum Transmission Speeds:
Data: 64,000 bit/sec
Advanced Features: User Programmable, Security, Diagnostics
Distribution Method: End user
Number Installed to Date: 50 to 100
Date First Installed: 1983

CODEX CORP.
MS 7800
Equipment Type: PABX
Transmission: Data
Switch Technology: Digital
Switching Matrix: Time Division
Modulation Method: PCM
Maximum Stations Supported: 508
Attendant Consoles (Maximum): 1
Matrix Architecture: Nonblocking
Maximum Simultaneous Transmissions: 254
Maximum Transmission Speeds:
Data: 19,200 bit/sec
Advanced Features: Security, Diagnostics
Distribution Method: End user
Number Installed to Date: More than 100
Date First Installed: September 1980

COMNEX, LTD.
DNP-4R, -8R, -16E
Equipment Type: Data Switch
Transmission: Data
Switch Technology: Digital
Switching Matrix: Statistical
Maximum Transmission Speeds:
Data: 56,000 bit/sec
Advanced Features: RJE to Host Interface
Average Monthly Maintenance: $120
Distribution Method: End user
Number Installed to Date: 25 to 50
Date First Installed: 1982
(See Vendor Profile Page V-6)

COMNITEX, INC.
TERMINAL CONCENTRATOR; MDS-8078
Equipment Type: Data Switch
Transmission: Data
Switch Technology: Digital
Switching Matrix: Time Division
Modulation Method: External
Maximum Trunks Supported: 20
Maximum Stations Supported: 128
Maximum Simultaneous Transmissions: 125
Maximum Transmission Speeds:
Data: 19,200 bit/sec
Advanced Features: User Programmable, T-1 Carrier Interface, X.25 Interface, LAN Capability (Micro/Mini), OA, Security, Diagnostics, RJE to Host Interface, Protocol Conversion
Price:
Purchase: $800 to $820
Distribution Method: Third-party
Number Installed to Date: More than 100
Date First Installed: February 1981

COMPUTER SYSTEMS TS/88
Equipment Type: PABX
Transmission: Nonintegrated Voice/Data
Switch Technology: Digital
Switching Matrix: Space Division
Modulation Method: DM
Maximum Trunks Supported: 50
Maximum Stations Supported: 400
Attendant Consoles (Maximum): 100
Matrix Architecture: Blocking
Maximum Transmission Speeds:
Data: 19,200 bit/sec
Advanced Features: User Programmable, T-1 Carrier Interface, LAN Capability (Micro/Mini), Voice Store and Forward, OA, Diagnostics, Data Security, RJE to Host Interface, Protocol Conversion
Advanced Attendant Features: Integrated Communications, Data Switching
Price:
Purchase: $200 to $600
Distribution Method: End user, Third-party
Date First Installed: 1983
(See Vendor Profile Page V-7)

CONVERSATIONAL VOICE TERMINAL CORP.
CON MODE VOICE TERMINAL
Equipment Type: ACD
Transmission: Voice
Switch Technology: Analog/Digital
Advanced Features: User Programmable, Voice Store and Forward, OA
Price:
Lease: $200 to $300
Purchase: $4,000 to $6,000
Distribution Method: End user
Date First Installed: March 1984
(See Vendor Profile Page V-8)

CROSSPOINT SYSTEMS, INC.
SD480
Equipment Type: Data Switch
Transmission: Data
Switch Technology: Analog
Maximum Trunks Supported: 256
Maximum Stations Supported: 256
Attendant Consoles (Maximum): 1
Matrix Architecture: Nonblocking, 100%
Maximum Simultaneous Transmissions: 256
Maximum Transmission Speeds:
Data: 19,200 bit/sec
Advanced Features: User Programmable, Diagnostics
Distribution Method: End user
Number Installed to Date: 50 to 100
Date First Installed: September 1982
(See Vendor Profile Page V-8)

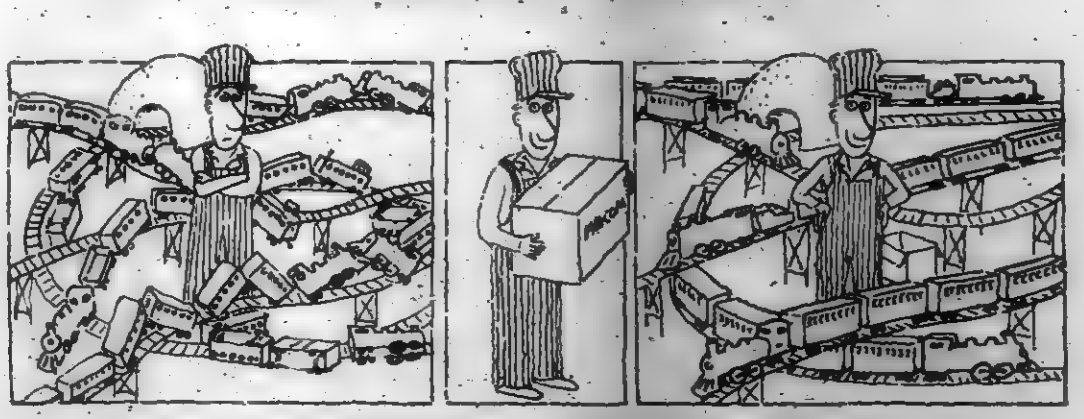
DEC CORP.
ROSE
Equipment Type: PBX
Transmission: Integrated Voice/Data
Switch Technology: Digital
Switching Matrix: Time/Space/Time
Modulation Method: PCM
Maximum Stations Supported: 12,288
Attendant Consoles (Maximum): 192
Matrix Architecture: Nonblocking
Maximum Simultaneous Transmissions: 12,000
Maximum Transmission Speeds:
Voice: 512,000 bit/sec
Data: 512,000 bit/sec
Advanced Features: User Programmable, Digitizes at Handset (End-to-End Digital), T-1 Carrier Interface, X.25 Interface, LAN Capability (Micro/Mini/Mainframe), Voice Store and Forward, OA, Security, Diagnostics, Data Security, RJE to Host Interface, Protocol Conversion
Distribution Method: OEM
Date First Installed: December 1983
(See Vendor Profile Page V-8)

DATAPROBE, INC.
3274 CONTROLLER BACKUP SWITCH
Equipment Type: Coaxial Switch
Transmission: Data
Switch Technology: Analog/Digital
Switching Matrix: Magnetic Latching
Maximum Stations Supported: 128
Matrix Architecture: Blocking
Advanced Features: X.25 Interface, Diagnostics, Data Security
Distribution Method: End user
Number Installed to Date: 1 to 19
Date First Installed: October 1982
(See Vendor Profile Page V-9)

DATA SWITCH CORP.
ANA-MAX
Equipment Type: Analog Switch
Transmission: Voice, Data
Switch Technology: Digital
Maximum Trunks Supported: 72
Maximum Stations Supported: 1,024
Attendant Consoles (Maximum): 7
Matrix Architecture: Blocking
Maximum Simultaneous Transmissions: 1,024
Maximum Transmission Speeds:
Data: 19,200 bit/sec
Advanced Features: User Programmable, Security, Diagnostics
Advanced Attendant Features: CMS Control Console, Controls 16 ANA-MAX, XY-MAX Switches
Distribution Method: End user
Date First Installed: April 1983
(See Vendor Profile Page V-9)

WHEN IT COMES TO CONTROLLING YOUR DATA NETWORK,

THE IDX-3000™ PUTS YOU ON THE RIGHT TRACK.



Control can be a major problem with a large network. That's why our IDX-3000 Local Communication System features the IDX-Net™ network controller. With IDX-Net, you handle configuration management on-line. You can manage major network topology changes, such as disaster recovery, with only a few keystrokes.

IDX-Net lets you access network control commands and diagnostics from any terminal in the network, including dial-up. This means that you, or M/A-COM Linkabit's Hotline Service, can diagnose your problem in seconds without having to be in your computer room.

Programmability
IDX-Net's 68000-based network controller software provides you with the capability to interface host-resident application programs to the network. You can build-in your own custom-tailored network management features.

User convenience
In addition to traditional data PABX port contention and resource selection, IDX-Net provides your authorized users with many of the features offered by modern telephone systems. They can connect, disconnect and hold lines to multiple computer resources and execute third-party connects.

For the office of now
With the IDX-3000, you can start with a small system that fits your current needs and budget, then grow to obtain non-blocking, full-duplex asynchronous communication for as many as 3072 lines, all at data rates of up to 19.2 Kbps. The IDX-3000's proven TI-based technology is fault-tolerant, with optional redundancy features throughout its distributed architecture, and automatic, continuous self-testing. The IDX-3000 isn't one of those products of the future. It's here now—proven, in use, and backed by M/A-COM, one of the nation's largest communication companies.

If you want to get control of your network, contact Ruth Stoffel at M/A-COM Linkabit, 3033 Science Park Road, San Diego, CA 92121, toll-free (800) 626-6640 or (619) 457-2340. We'll put you in control.

©1983 M/A-COM Linkabit, Inc.
IDX-3000 and IDX-Net are registered trademarks of M/A-COM Linkabit, Inc.

THE NETWORK YOU CAN CONTROL

M/A-COM

DATA SWITCH CORP.
MODEL 600
Equipment Type: Computer/Peripheral Switch
Transmission: Data
Switch Technology: Digital
Maximum Trunks Supported: 4
Maximum Stations Supported: 12
Maximum Simultaneous Transmissions: 4
Maximum Transmission Speeds: Data: 8,000,000 bit/sec
Advanced Features: User Programmable
Advanced Attendant Features: Can be Upgraded to Model 1200, Larger Matrix Size and CMS Controlled
Distribution Method: End user
Date First Installed: December 1983

DATA SWITCH CORP.
MODEL 1000
Equipment Type: Computer/Peripheral Switch
Transmission: Data
Switch Technology: Digital
Maximum Trunks Supported: 16
Maximum Stations Supported: 48
Attendant Consoles (Maximum): 7
Maximum Simultaneous Transmissions: 16
Maximum Transmission Speeds: Data: 8,000,000 bit/sec
Advanced Features: User Programmable, Security, Diagnostics
Advanced Attendant Features: CMS Controlled Console Operates 56 Model 1000 Units, Switches at Remote and Local Sites
Distribution Method: End user
Date First Installed: 1978

DATA SWITCH CORP.
MODEL 1200
Equipment Type: Computer/Peripheral Switch
Transmission: Data
Switch Technology: Digital
Maximum Trunks Supported: 16
Maximum Stations Supported: 24
Attendant Consoles (Maximum): 7
Maximum Simultaneous Transmissions: 16
Maximum Transmission Speeds: Data: 8,000,000 bit/sec
Advanced Features: User Programmable, Security, Diagnostics
Advanced Attendant Features: CMS Controlled Console, Operates 56 Model 1200 Units, Switches at Remote and Local Sites
Distribution Method: End user
Date First Installed: 1978

DATA SWITCH CORP.
XY-MAX-2040
Equipment Type: Data Switch
Transmission: Data
Switch Technology: Digital
Maximum Trunks Supported: 512
Maximum Stations Supported: 512
Attendant Consoles (Maximum): 7
Matrix Architecture: Nonblocking, 100%
Maximum Transmission Speeds: Data: 72,000 bit/sec
Advanced Features: User Programmable
Advanced Attendant Features: CMS Control Console, Controls 16 XY-MAX, ANA-MAX Switches
Average Monthly Maintenance: $75
Distribution Method: End user
Date First Installed: April 1983

DAYCOM CORP.
DAYCOM
Equipment Type: PBX
Transmission: Nonintegrated Voice/Data, Integrated Voice/Data
Switch Technology: Digital
Switching Matrix: Time Division, Data
Modulation Method: PCM
Attendant Consoles (Maximum): 10
Matrix Architecture: Nonblocking, 100%
Maximum Transmission Speeds: Voice: 256,000 bit/sec
Distribution Method: End user
Number Installed to Date: More than 100
(See Vendor Profile Page V-10)

DCA/TAC
SYSTEM 2LS NETSWITCH
Equipment Type: Data Switch
Transmission: Data
Switch Technology: Digital
Switching Matrix: STDM
Maximum Trunks Supported: 11
Maximum Stations Supported: 1,472
Attendant Consoles (Maximum): 1
Matrix Architecture: Nonblocking
Maximum Transmission Speeds: Data: 9,600 bit/sec
Advanced Features: User Programmable, OA, Security, Diagnostics, Energy Control/Management
Distribution Method: End user, OEM, Third-party
Number Installed to Date: 10 to 25
Date First Installed: January 1982
(See Vendor Profile Page V-10)

DEVELCON ELECTRONICS, INC.
9002 DATA SWITCH
Equipment Type: Data Switch
Transmission: Data
Switch Technology: Digital
Switching Matrix: Time/Space/Time
Maximum Stations Supported: 284
Matrix Architecture: Nonblocking
Maximum Simultaneous Transmissions: 141
Maximum Transmission Speeds: Data: 19,200 bit/sec
Advanced Features: User Programmable, Digitizes at Handset (End-to-End Digital), T-1 Carrier Interface, X.25 Interface, LAN Capability (Micro/Mini/Mainframe), Security, Diagnostics, Data Security, RJE to Host Interface, Protocol Conversion
Distribution Method: End user
Number Installed to Date: More than 100
Date First Installed: 1978
(See Vendor Profile Page V-10)

DEVELCON ELECTRONICS, INC.
9006 DATA SWITCH
Equipment Type: Data Switch
Transmission: Data
Switch Technology: Analog/Digital
Switching Matrix: Time Division
Maximum Stations Supported: 2,012
Matrix Architecture: Nonblocking, 100%
Maximum Simultaneous Transmissions: 2,012
Maximum Transmission Speeds: Data: 19,200 bit/sec
Advanced Features: User Programmable, Digitizes at Handset (End-to-End Digital), T-1 Carrier Interface, LAN Capability (Micro/Mini/Mainframe), Security, Diagnostics, Data Security, RJE to Host Interface
Advanced Attendant Features: X.25 Interface, Protocol Converter
Distribution Method: End user
Number Installed to Date: More than 100
Date First Installed: September 1978

DIALOG, INC.
NETWORK ACCESS SWITCH (NAS)
Equipment Type: Data Switch
Transmission: Data, Four-Wire Leased Lines
Switch Technology: Analog/Digital
Switching Matrix: Time Division
Maximum Stations Supported: 240
Attendant Consoles (Maximum): 2
Matrix Architecture: Nonblocking, 100%
Maximum Transmission Speeds: Voice: 9,600 bit/sec Data: 192 bit/sec
Price: Purchase: $600 to $700
Average Monthly Maintenance: $500
Distribution Method: End user
Date First Installed: February 1984
(See Vendor Profile Page V-10)

DIGITAL CONTROLS CORP.
DIGITAL CONTROLS 3403
Equipment Type: Data Switch
Transmission: Data
Switch Technology: Digital
Maximum Trunks Supported: 16
Maximum Stations Supported: 8
Price: Purchase: $995 to $19,500
Distribution Method: End user
Number Installed to Date: More than 100
Date First Installed: September 1982
(See Vendor Profile Page V-10)

DIGITAL CONTROLS CORP.
DIGITAL CONTROL 3421
Equipment Type: Data Switch
Transmission: Data
Switch Technology: Digital
Maximum Trunks Supported: 16
Maximum Stations Supported: 8
Price: Purchase: $995 to $19,500
Distribution Method: End user
Number Installed to Date: 50 to 100
Date First Installed: 1982

DIGITAL CONTROLS CORP.
DIGITAL CONTROLS 4101
Equipment Type: Data Switch
Transmission: Data
Switch Technology: Digital
Maximum Trunks Supported: 16
Maximum Stations Supported: 8
Price: Purchase: $695 to $19,500
Distribution Method: End user
Number Installed to Date: 10 to 35
Date First Installed: 1983

DIGITAL LABORATORIES, INC.
3R
Equipment Type: Data Switch
Transmission: Data
Switch Technology: Digital
Modulation Method: Operational Amplifiers
Maximum Trunks Supported: 3
Maximum Stations Supported: 3
Attendant Consoles (Maximum): 3
Price: Purchase: $395
Distribution Method: End user
Number Installed to Date: More than 100
Date First Installed: 1977
(See Vendor Profile Page V-10)

DIGITAL LABORATORIES, INC.
MICRO MATRIX
Equipment Type: Data Switch
Transmission: Data
Switch Technology: Digital
Modulation Method: Operational Amplifiers
Maximum Trunks Supported: 8
Maximum Stations Supported: 8
Attendant Consoles (Maximum): 8
Maximum Simultaneous Transmissions: 8
Price: Purchase: $995
Number Installed to Date: More than 100
Date First Installed: 1980

DIGITAL LABORATORIES, INC.
MICRO MATRIX II
Equipment Type: Data Switch
Transmission: Data
Switch Technology: Digital
Modulation Method: Operational Amplifiers
Maximum Trunks Supported: 8
Maximum Stations Supported: 8
Attendant Consoles (Maximum): 8
Price: Purchase: $995
Distribution Method: End user
Number Installed to Date: More than 100
Date First Installed: 1981

DIGITAL LABORATORIES, INC.
TLC
Equipment Type: Data Switch
Transmission: Data
Switch Technology: Digital
Modulation Method: Operational Amplifiers
Maximum Trunks Supported: 3
Maximum Stations Supported: 3
Attendant Consoles (Maximum): 3
Price: Purchase: $245
Distribution Method: End user
Number Installed to Date: More than 100
Date First Installed: 1982

DIGITAL LABORATORIES, INC.
WAP
Equipment Type: Data Switch
Transmission: Data
Switch Technology: Digital
Modulation Method: Operational Amplifiers
Maximum Trunks Supported: 5
Maximum Stations Supported: 5
Attendant Consoles (Maximum): 5
Price:
Purchase: $395
Distribution Method: End user
Number Installed to Date: 50 to 100
Date First Installed: 1983

DIRACOM CORP.
SELECT 8
Equipment Type: Data Switch
Transmission: Data
Switch Technology: Analog
Maximum Stations Supported: 8
Price:
Purchase: $335 to $420
Distribution Method: End user, OEM, Third-party
Number Installed to Date: More than 100
Date First Installed: September 1982
(See Vendor Profile Page V-11)

DYNATECH DATA SYSTEMS
CHANNEL ACCESS SWITCH
Equipment Type: Data Switch
Transmission: Data
Switch Technology: Digital
Maximum Stations Supported: 16
Price:
Purchase: $400 to $6,000
Number Installed to Date: 50 to 100
(See Vendor Profile Page V-11)

DYNATECH DATA SYSTEMS
CTM 1000
Equipment Type: Data Switch
Transmission: Data
Switch Technology: Digital
Switching Matrix: Time/Space/Time
Maximum Stations Supported: 16
Price:
Purchase: $400 to $6,000
Distribution Method: End user
Number Installed to Date: 10 to 25

DYNATECH DATA SYSTEMS
CTM 1000 MATRIX
Equipment Type: Data Switch
Transmission: Voice, Data, Integrated Voice/Data
Switch Technology: Digital
Switching Matrix: Time Division, Space Division
Modulation Method: Analog
Maximum Stations Supported: 2,000
Attendant Consoles (Maximum): 16
Matrix Architecture: Nonblocking, 100%
Maximum Transmission Speeds:
Voice: 1,000,000 bit/sec
Data: 64,000 bit/sec
Advanced Features: User Programmable, Digitizes at Handset (End-to-End Digital), LAN Capability (Micro/Mini/Mainframe), Security, Diagnostics, Data Security
Advanced Attendant Features: Storage Capability, Loading Reconfiguration, LED Alarm
Price:
Purchase: $800
Distribution Method: End user, Third-party
Number Installed to Date: 10 to 25
Date First Installed: 1983

DYNATECH DATA SYSTEMS
DYNASWITCH
Equipment Type: Data Switch
Transmission: Data
Switch Technology: Digital
Maximum Stations Supported: 16
Price:
Purchase: $400 to $6,000
Distribution Method: End user
Number Installed to Date: More than 100

DYNATECH DATA SYSTEMS
DYNASWITCH MARK II
Equipment Type: Data Switch
Transmission: Data
Switch Technology: Digital
Maximum Stations Supported: 16
Price:
Purchase: $400 to $6,000
Distribution Method: End user
Number Installed to Date: More than 100

DYNATECH DATA SYSTEMS
VS CHANNEL ACCESS SWITCH
Equipment Type: Data Switch
Transmission: Data
Switch Technology: Analog
Maximum Stations Supported: 16
Price:
Purchase: $400 to $6,000
Distribution Method: End user
Number Installed to Date: 25 to 50

DYNATECH PACKET TECHNOLOGY, INC.
MULTI SWITCH X.2
Equipment Type: Packet Processor
Transmission: Data
Switch Technology: Digital
Switching Matrix: Time Division
Maximum Trunks Supported: 8
Maximum Stations Supported: 127
Matrix Architecture: Nonblocking, 100%
Maximum Simultaneous Transmissions: 127
Maximum Transmission Speeds:
Data: 14,400 bit/sec
Advanced Features: User Programmable, X.25 Interface, LAN Capability (Micro/Mini/Mainframe), Security, Diagnostics, Data Security, Protocol Conversion
Price:
Purchase: $4,000
Distribution Method: End user
Number Installed to Date: More than 100
Date First Installed: June 1982
(See Vendor Profile Page V-11)

ELECTROGATA, INC.
CLS 2
Equipment Type: Data Switch
Transmission: Data
Switch Technology: Digital
Maximum Stations Supported: 2
Price:
Purchase: $125
Distribution Method: Third-party
Number Installed to Date: More than 100
Date First Installed: December 1978
(See Vendor Profile Page V-11)

ELECTRONIC INTERFACE ASSOCIATES
8 8
Equipment Type: Data Switch
Transmission: Data
Switch Technology: Digital
Maximum Stations Supported: 8
Price:
Purchase: $100 to $200
Distribution Method: End user
Number Installed to Date: More than 100
Date First Installed: 1980
(See Vendor Profile Page V-11)

ELECTRONIC INTERFACE ASSOCIATES
8 24
Equipment Type: Data Switch
Transmission: Data
Switch Technology: Digital
Maximum Stations Supported: 8
Price:
Purchase: $100 to $200
Distribution Method: End user
Number Installed to Date: More than 100

EMERSON PRODUCTIC, INC.
ENPAX
Equipment Type: Packet Processor
Transmission: Data
Switch Technology: Digital
Maximum Trunks Supported: 1,500
Maximum Stations Supported: 1,500
Matrix Architecture: Nonblocking, 100%
Maximum Simultaneous Transmissions: 1,500
Maximum Transmission Speeds:
Data: 16,000 bit/sec
Advanced Features: X.25 Interface, LAN Capability (Micro/Mini/Mainframe), OA, Diagnostics, Data Security, Energy Control/Management, Protocol Conversion
Price:
Lease: $30 to $40
Purchase: $1,600 to $1,800
Distribution Method: End user
Number Installed to Date: 10 to 25
Date First Installed: January 1983
(See Vendor Profile Page V-11)

GANDALF DATA, INC.
PACX TM
Equipment Type: PACX
Transmission: Data
Switch Technology: Digital
Switching Matrix: Time Division, Space Division
Maximum Trunks Supported: 1,024
Maximum Stations Supported: 2,048
Attendant Consoles (Maximum): 1
Matrix Architecture: Nonblocking, 100%
Maximum Simultaneous Transmissions: 1,024
Maximum Transmission Speeds:
Data: 19,200 bit/sec
Advanced Features: User Programmable, T-1 Carrier Interface, X.25 Interface, OA, Security, Diagnostics, Data Security, RJE to Host Interface, Protocol Conversion
Price:
Purchase: $135 to $600
Average Monthly Maintenance: $300
Distribution Method: End user
Number Installed to Date: More than 100
(See Vendor Profile Page V-12)

GTE [illegible]
COMMUNICATIONS SYSTEMS, INC.
GPD 4000
Equipment Type: PBX
Transmission: Voice, Data, Integrated Voice/Data
Switch Technology: Digital
Switching Matrix: Time Division, Space Division
Modulation Method: PCM
Maximum Trunks Supported: 4,000
Maximum Stations Supported: 12,288
Attendant Consoles (Maximum): 32
Matrix Architecture: Blocking
Maximum Simultaneous Transmissions: 4,000
Maximum Transmission Speeds:
Data: 64,000 bit/sec
Advanced Features: User Programmable, Digitizes at Handset (End-to-End Digital), T-1 Carrier Interface, X.25 Interface, LAN Capability (Micro/Mini/Mainframe), Voice Store and Forward, OA, Security, Diagnostics, Data Security, RJE to Host Interface, Protocol Conversion
Advanced Attendant Features: Dual Bus Architecture
Price:
Purchase: $300 to $600
Distribution Method: End user
Number Installed to Date: 50 to 100
Date First Installed: September 1976
(See Vendor Profile Page V-12)

GTE [illegible]
COMMUNICATIONS SYSTEMS, INC.
GSM PBX
Equipment Type: PBX
Transmission: Voice, Data, Integrated Voice/Data
Switch Technology: Digital
Switching Matrix: Time Division, Space Division
Modulation Method: PCM
Maximum Trunks Supported: 1,024
Maximum Stations Supported: 2,000
Attendant Consoles (Maximum): 8
Matrix Architecture: Blocking
Maximum Simultaneous Transmissions: 384
Maximum Transmission Speeds:
Data: 64,000 bit/sec
Advanced Features: User Programmable, Digitizes at Handset (End-to-End Digital), T-1 Carrier Interface, X.25 Interface, LAN Capability (Micro/Mini/Mainframe), Voice Store and Forward, OA,

Security, Diagnostics, Data Security, RJE to Host Interface, Protocol Conversion
Advanced Attendant Features: Dual Bus Architecture
Distribution Method: End user
Number Installed to Date: More than 100
Date First Installed: September 1978

HARRIS CORP.
480-L (480L-2 AC OR DC)
Equipment Type: PABX
Transmission: Nonintegrated Voice/Data
Switch Technology: Digital
Switching Matrix: Time Division
Modulation Method: DM
Maximum Trunks Supported: 56
Maximum Stations Supported: 440
Attendant Consoles (Maximum): 2
Matrix Architecture: Blocking
Maximum Simultaneous Transmissions: 145
Maximum Transmission Speeds: Data: 9,600 bit/sec
Advanced Features: User Programmable, LAN Capability (Micro/Mini/Mainframe), Data Security
Price: Purchase: $320 to $500
Distribution Method: Third-party
Number Installed to Date: 1 to 10
Date First Installed: January 1984
(See Vendor Profile Page V-14)

HARRIS CORP.
480-M (480M-2 AC OR DC)
Equipment Type: PABX
Transmission: Nonintegrated Voice/Data
Switch Technology: Digital
Switching Matrix: Time Division
Modulation Method: DM
Maximum Trunks Supported: 32
Maximum Stations Supported: 216
Attendant Consoles (Maximum): 2
Matrix Architecture: Nonblocking, 100%
Maximum Simultaneous Transmissions: 145
Maximum Transmission Speeds: Data: 9,600 bit/sec
Advanced Features: User Programmable, LAN Capability (Micro/Mini/Mainframe), Data Security
Price: Purchase: $350 to $500
Distribution Method: Third-party
Number Installed to Date: 1 to 10
Date First Installed: January 1984

HARRIS CORP.
1201 (1201-3 AC OR DC)
Equipment Type: PABX
Transmission: Nonintegrated Voice/Data
Switch Technology: Digital
Switching Matrix: Time Division
Modulation Method: DM
Maximum Trunks Supported: 48
Maximum Stations Supported: 448
Attendant Consoles (Maximum): 4
Matrix Architecture: Blocking
Maximum Simultaneous Transmissions: 145
Maximum Transmission Speeds: Data: 9,600 bit/sec
Advanced Features: User Programmable, LAN Capability (Micro/Mini/Mainframe), Data Security
Price: Purchase: $350 to $500
Distribution Method: End user
Number Installed to Date: 8,000
Date First Installed: January 1975

HARRIS CORP.
1202 (1202-6 AC OR DC)
Equipment Type: PABX
Transmission: Nonintegrated Voice/Data
Switch Technology: Digital
Switching Matrix: Time Division
Modulation Method: DM
Maximum Trunks Supported: 128
Maximum Stations Supported: 928
Matrix Architecture: Blocking
Maximum Simultaneous Transmissions: 145
Maximum Transmission Speeds: Data: 9,600 bit/sec
Advanced Features: User Programmable, LAN Capability (Micro/Mini/Mainframe), Data Security
Price: Purchase: $280 to $500
Distribution Method: End user
Number Installed to Date: 8,000
Number Installed to Date: More than 100
Date First Installed: June 1977

HARRIS CORP.
1204/1204-6 DC
Equipment Type: PACX
Transmission: Nonintegrated Voice/Data
Switch Technology: Digital
Switching Matrix: Time Division
Modulation Method: DM
Maximum Trunks Supported: 120
Maximum Stations Supported: 840
Matrix Architecture: Nonblocking, 100%
Maximum Simultaneous Transmissions: 145
Maximum Transmission Speeds: Data: 9,600 bit/sec
Advanced Features: User Programmable, LAN Capability (Micro/Mini/Mainframe), Data Security
Price: Purchase: $400 to $500
Distribution Method: Third-party
Number Installed to Date: More than 100
Date First Installed: October 1979

HARRIS CORP.
1205/1205-3 DC
Equipment Type: PABX
Transmission: Nonintegrated Voice/Data
Switch Technology: Digital
Switching Matrix: Time Division
Modulation Method: DM
Maximum Trunks Supported: 56
Maximum Stations Supported: 320
Matrix Architecture: Nonblocking, 100%
Maximum Simultaneous Transmissions: 145
Maximum Transmission Speeds: Data: 9,600 bit/sec
Advanced Features: User Programmable, LAN Capability (Micro/Mini/Mainframe), Data Security
Price: Purchase: $450 to $600
Distribution Method: Third-party
Number Installed to Date: More than 100
Date First Installed: May 1979

HARRIS CORP.
HARRIS 1186 & 1188
Equipment Type: PBX
Transmission: Nonintegrated Voice/Data
Switch Technology: Analog
Switching Matrix: Time Division
Modulation Method: PAM
Maximum Trunks Supported: 20
Maximum Stations Supported: 111
Attendant Consoles (Maximum): 1
Matrix Architecture: Blocking
Maximum Simultaneous Transmissions: 30
Maximum Transmission Speeds: Data: 9,600 bit/sec
Advanced Features: Data Security
Price: Purchase: $650
Distribution Method: OEM, Third-party
Number Installed to Date: More than 100
Date First Installed: April 1982

HITACHI AMERICA, LTD.
DX 30/40
Equipment Type: PBX
Transmission: Nonintegrated Voice/Data
Switch Technology: Digital
Switching Matrix: Time Division
Modulation Method: PCM
Maximum Trunks Supported: 256
Maximum Stations Supported: 1,272
Attendant Consoles (Maximum): 8
Maximum Simultaneous Transmissions: 128
Maximum Transmission Speeds: Voice: 19,200 bit/sec Data: 19,200 bit/sec
Advanced Features: User Programmable, Voice Store and Forward, OA, Diagnostics
Distribution Method: Third-party
Number Installed to Date: 50 to 100
Date First Installed: 1982
(See Vendor Profile Page V-14)

I P C TECHNOLOGY, LTD.
DPX III (100, 160, 1600)
Equipment Type: PABX
Transmission: Nonintegrated Voice/Data
Switch Technology: Digital
Switching Matrix: Time Division
Modulation Method: PWM
Maximum Trunks Supported: 1,000
Maximum Stations Supported: 1,000
Attendant Consoles (Maximum): 4
Matrix Architecture: Nonblocking, 100%
Maximum Simultaneous Transmissions: 500
Maximum Transmission Speeds: Voice: 9,600 bit/sec Data: 9,600 bit/sec
Advanced Features: User Programmable, Voice Store and Forward, OA, Security, Diagnostics, Data Security, RJE to Host Interface
Advanced Attendant Features: 40-Key Programmable Console
Advanced Attendant Features: Electronic Key Set
Average Monthly Maintenance: $4
Distribution Method: End user, Third-party
Number Installed to Date: More than 100
Date First Installed: 1979
(See Vendor Profile Page V-14)

IMAGEGRAPHIX, INC.
IPX 5410
Equipment Type: Message Switch
Transmission: Data
Switch Technology: Digital
Switching Matrix: Interrupt
Modulation Method: Multiplexer
Maximum Trunks Supported: 128
Maximum Stations Supported: 256
Attendant Consoles (Maximum): 256
Matrix Architecture: Blocking
Maximum Simultaneous Transmissions: 1
Maximum Transmission Speeds: Data: 9,600 bit/sec
Advanced Features: X.25 Interface, Security, Diagnostics, Protocol Conversion
Distribution Method: Third-party
Number Installed to Date: 1 to 10
Date First Installed: 1972
(See Vendor Profile Page V-15)

INFORMATION DYNAMICS CORP.
IDX 220
Equipment Type: PBX
Transmission: Voice, Transparent to Data
Switching Matrix: Space Division
Maximum Trunks Supported: 10
Maximum Stations Supported: 30
Attendant Consoles (Maximum): 2
Matrix Architecture: Nonblocking, 100%
Maximum Simultaneous Transmissions: 14
Distribution Method: Third-party
Number Installed to Date: More than 100
Date First Installed: 1973
(See Vendor Profile Page V-15)

INFORMATION DYNAMICS CORP.
IDX 2120
Equipment Type: PBX
Transmission: Voice, Transparent to Data
Switching Matrix: Space Division
Maximum Trunks Supported: 120
Maximum Stations Supported: 30
Attendant Consoles (Maximum): 2
Matrix Architecture: Nonblocking, 100%
Maximum Simultaneous Transmissions: 14
Advanced Features: Diagnostics

Nearly Nine Million Computer-Involved People Around the World Rely on Our Publications For the News They Need.

We're CW Communications/Inc.; the world's largest publisher of computer-related newspapers and magazines. And wherever you go in the computer world, you'll find computer-involved professionals reading—and relying on—our publications. With highly trained and experienced editorial staffs all over the world, our publications give readers the best and most up-to-date information available in this rapidly changing industry.

Around the world:

We publish, co-publish or provide editorial services to the leading computer publications in the world, including publications in all of the following countries:
Scandinavia—Denmark, Sweden, Finland and Norway.
Western Europe—Germany, United Kingdom, France, Italy, Spain, Greece, the Netherlands.
The Mid-East—Kuwait, Saudi Arabia.
Asia/Africa—People's Republic of China, Korea, Japan, Singapore, Southeast Asia, South Africa.
The Southern Pacific—Australia.
Central and South America—Mexico, Brazil, Argentina, Chile.

In the United States:

In the world's largest computer market, we publish a whole series of publications that cover different aspects of the industry. Our largest publication, with more than half-a-million readers every week, is *Computerworld*, a weekly newspaper aimed primarily at larger computer users. Its companion publications include *Computerworld Office Automation*; *Computerworld On Communications* (each published semi-monthly) and a series of *Buyer's Guides* covering all major segments of the industry.

In addition, we publish *MICRO MARKETWORLD* for dealers, distributors, retailers and others involved in the microcomputer marketplace. For microcomputer users, we publish *InfoWorld*, *Microcomputing*, *PC WORLD*, *80 Micro*, *inCider*, *Run*, and *Hot CoCo*.

No one in the world publishes more computer information for more people in more countries than we do. And we'd be happy to give you more information on any of our publications. Just send a telex to our U.S. offices, attention CW International Marketing Services, (telex #95-1153) or write us at the address below.

CW COMMUNICATIONS/INC.

Distribution Method: Third-party
Number Installed to Date: More than 100
Date First Installed: 1978

SPOTRON SYSTEMS CORP.
IS 4000/4002 INTELLIGENT SWITCHING SYSTEM
Equipment Type: Data Switch
Transmission: Data
Switch Technology: Digital
Switching Matrix: Space/Time/Space
Maximum Stations Supported: 4,000
Attendant Consoles (Maximum): 2
Matrix Architecture: Nonblocking, 100%
Maximum Simultaneous Transmissions: 2,000
Maximum Transmission Speeds:
Data: 64,000 bit/sec
Advanced Features: User Programmable, LAN Capability (Micro/Mini/Mainframe), OA, Security, Diagnostics, Data Security, RJE to Host Interface
Price:
Lease: $9 to $15
Purchase: $140 to $240
Distribution Method: End user
Number Installed to Date: More than 100
Date First Installed: November 1981
(See Vendor Profile Page V-16)

SYTEK, INC.
IBX TM
Equipment Type: IBX
Transmission: Integrated Voice/Data
Switch Technology: Digital
Switching Matrix: Time Division
Modulation Method: PCM
Maximum Trunks Supported: 8,192
Maximum Stations Supported: 8,192
Attendant Consoles (Maximum): 16
Matrix Architecture: Nonblocking, 100%
Maximum Simultaneous Transmissions: 8,192
Maximum Transmission Speeds:
Voice: 64,000 bit/sec
Data: 10,000,000 bit/sec
Advanced Features: User Programmable, Digitizes at Handset (End-to-End Digital), T-1 Carrier Interface, X.25 Interface, Voice Store and Forward, OA, Diagnostics, RJE to Host Interface, Integrated
Price:
Purchase: $1,000
Distribution Method: End user
Number Installed to Date: 25 to 50
Date First Installed: September 1981
(See Vendor Profile Page V-16)

INTELLIGENT BUSINESS SYSTEMS, INC.
CBX 1024
Equipment Type: Data Switch
Transmission: Data
Switch Technology: Digital
Switching Matrix: Time Division
Maximum Trunks Supported: 2,048
Maximum Stations Supported: 2,048
Attendant Consoles (Maximum): 10
Matrix Architecture: Nonblocking, 100%
Maximum Simultaneous Transmissions: 512
Maximum Transmission Speeds:
Data: 64,000 bit/sec
Advanced Features: User Programmable, Digitizes at Handset (End-to-End Digital), X.25 Interface, LAN Capability (Micro/Mini/Mainframe), Diagnostics, Data Security, Protocol Conversion
Distribution Method: End user
Number Installed to Date: 1 to 10
Date First Installed: January 1984
(See Vendor Profile Page V-16)

INTERCONNECT PLANNING CORP.
DPX 100
Equipment Type: PABX
Transmission: Integrated Voice/Data
Switch Technology: Digital
Switching Matrix: Time Division
Modulation Method: PWM
Maximum Trunks Supported: 88
Maximum Stations Supported: 88
Attendant Consoles (Maximum): 2
Matrix Architecture: Nonblocking, 100%
Maximum Simultaneous Transmissions: 44
Maximum Transmission Speeds:
Voice: 9,600 bit/sec
Data: 9,600 bit/sec
Advanced Features: User Programmable, Digitizes at Handset (End-to-End Digital), T-1 Carrier Interface, LAN Capability (Mainframe), Security, Diagnostics
Price:
Purchase: $600 to $800
Distribution Method: End user
Number Installed to Date: 50 to 100
Date First Installed: September 1977
(See Vendor Profile Page V-16)

INTERCONNECT PLANNING CORP.
DPX 160
Equipment Type: PABX
Transmission: Integrated Voice/Data
Switch Technology: Digital
Switching Matrix: Time Division
Modulation Method: PWM
Maximum Trunks Supported: 152
Maximum Stations Supported: 152
Attendant Consoles (Maximum): 2
Matrix Architecture: Nonblocking, 100%
Maximum Simultaneous Transmissions: 76
Maximum Transmission Speeds:
Data: 9,600 bit/sec
Advanced Features: User Programmable, Digitizes at Handset (End-to-End Digital), T-1 Carrier Interface, Voice Store and Forward, Security, Diagnostics
Price:
Purchase: $600 to $800
Distribution Method: End user
Number Installed to Date: More than 100
Date First Installed: January 1977

INTERCONNECT PLANNING CORP.
DPX 1000
Equipment Type: PABX
Transmission: Integrated Voice/Data
Switch Technology: Digital
Switching Matrix: Time Division
Modulation Method: PWM
Maximum Trunks Supported: 1,016
Maximum Stations Supported: 1,016
Attendant Consoles (Maximum): 4
Matrix Architecture: Nonblocking, 100%
Maximum Simultaneous Transmissions: 508
Maximum Transmission Speeds:
Voice: 9,600 bit/sec
Data: 9,600 bit/sec
Advanced Features: User Programmable, Digitizes at Handset (End-to-End Digital), T-1 Carrier Interface, Voice Store and Forward, Security, Diagnostics, Data Security
Price:
Purchase: $600 to $1,200
Distribution Method: End user
Number Installed to Date: More than 100
Date First Installed: January 1977

ITT BUSINESS COMMUNICATIONS CORP.
SYSTEM 3100
Equipment Type: PBX
Transmission: Nonintegrated Voice/Data
Switch Technology: Digital
Switching Matrix: Time Division
Modulation Method: PCM
Maximum Trunks Supported: 256
Maximum Stations Supported: 256
Attendant Consoles (Maximum): 4
Matrix Architecture: Nonblocking
Maximum Simultaneous Transmissions: 190
Maximum Transmission Speeds:
Voice: 9,600 bit/sec
Data: 56,000 bit/sec
Advanced Features: User Programmable, Diagnostics, Protocol Conversion
Price:
Purchase: $600 to $650
Average Monthly Maintenance: $4
Distribution Method: End user
Number Installed to Date: More than 100
Date First Installed: January 1981
(See Vendor Profile Page V-17)

ITT TELECOM PRODUCTS, INC.
1210 SYSTEM
Equipment Type: Data Switch
Transmission: Integrated Voice/Data
Switch Technology: Digital
Switching Matrix: Time/Space/Time
Modulation Method: PCM
Maximum Trunks Supported: 15
Maximum Stations Supported: 50,000
Attendant Consoles (Maximum): 120
Matrix Architecture: Nonblocking
Maximum Simultaneous Transmissions: 7,500
Maximum Transmission Speeds:
Voice: 64,000 bit/sec
Data: 64,000 bit/sec
Advanced Features: User Programmable, Digitizes at Handset (End-to-End Digital), T-1 Carrier Interface, X.25 Interface, Voice Store and Forward, Diagnostics, Data Security
Distribution Method: End user
Number Installed to Date: More than 100
Date First Installed: 1978
(See Vendor Profile Page V-17)

ITT TELECOM PRODUCTS, INC.
1240
Equipment Type: DCU
Transmission: Integrated Voice/Data
Switch Technology: Digital
Switching Matrix: Time Division, Space Division
Modulation Method: PCM
Maximum Trunks Supported: 60,000
Maximum Stations Supported: 100,000
Attendant Consoles (Maximum): 300
Matrix Architecture: Nonblocking
Maximum Simultaneous Transmissions: 12,000
Maximum Transmission Speeds:
Voice: 64,000 bit/sec
Data: 4,000,000 bit/sec
Advanced Features: User Programmable, Digitizes at Handset (End-to-End Digital), T-1 Carrier Interface, X.25 Interface, LAN Capability (Micro/Mini/Mainframe), Voice Store and Forward, OA, Security, Diagnostics, Data Security, Energy Control/Management, Protocol Conversion
Price:
Purchase: $200 to $300
Distribution Method: End user
Number Installed to Date: 10 to 25
Date First Installed: 1981

ITT TELECOM PRODUCTS, INC.
DPS 1000
Equipment Type: Packet Processor
Transmission: Data
Switch Technology: Digital
Maximum Trunks Supported: 1,000
Maximum Simultaneous Transmissions: 2,000
Maximum Transmission Speeds:
Data: 25,600 bit/sec
Advanced Features: User Programmable, X.25 Interface, Security, Diagnostics, Protocol Conversion, IBM 3270, 2780, X.27 Interface
Distribution Method: End user
Number Installed to Date: 10 to 25
Date First Installed: 1981

HITACHI AMERICA, INC.
OMEGA IV IDS-120
Equipment Type: Hybrid
Transmission: Integrated Voice/Data
Switch Technology: Digital
Switching Matrix: Time Division

Modulation Method: PCM
Maximum Trunks Supported: 36
Maximum Stations Supported: 128
Attendant Consoles (Maximum): 2
Matrix Architecture: Nonblocking, 100%
Maximum Simultaneous Transmissions: 128
Advanced Features: User Programmable, Digitizes at Handset (End-to-End Digital), Voice Store and Forward, OA, Diagnostics, Data Security
Advanced Attendant Features: Voice Synthesis, Station to Station, Facsimile
Distribution Method: Third-party
Number Installed to Date: More than 100
Date First Installed: February 1983
(See Vendor Profile Page V-17)

MATSU AMERICA, INC.
OMEGA III MODEL 412
Equipment Type: Key System
Transmission: Voice, Data
Switch Technology: Analog/Digital
Switching Matrix: Space Divsion
Modulation Method: PAM
Maximum Trunks Supported: 4
Maximum Stations Supported: 12
Attendant Consoles (Maximum): 1
Matrix Architecture: Nonblocking, 100%
Maximum Simultaneous Transmissions: 4
Advanced Features: User Programmable, LAN Capability (Micro/Mini)
Advanced Attendant Features: Message Connect/Override
Distribution Method: Third-party
Number Installed to Date: More than 100
Date First Installed: 1979

MATSU AMERICA, INC.
OMEGA III MODEL 816
Equipment Type: Key System
Transmission: Voice, Data
Switch Technology: Analog/Digital
Switching Matrix: Space Divsion
Modulation Method: PAM
Maximum Trunks Supported: 8
Maximum Stations Supported: 16
Attendant Consoles (Maximum): 1
Matrix Architecture: Nonblocking, 100%
Maximum Simultaneous Transmissions: 8
Advanced Features: LAN Capability (Micro/Mini)
Advanced Attendant Features: Message Connect/Override
Distribution Method: Third-party
Number Installed to Date: More than 100
Date First Installed: 1979

MATSU AMERICA, INC.
OMEGA IV ES-624/1648
Equipment Type: Hybrid
Transmission: Integrated Voice/Data
Switch Technology: Analog
Switching Matrix: Space Divsion
Maximum Trunks Supported: 16
Maximum Stations Supported: 48
Attendant Consoles (Maximum): 2
Matrix Architecture: Nonblocking, 100%
Maximum Simultaneous Transmissions: 24
Advanced Features: User Programmable, Voice Store and Forward, OA, Diagnostics
Advanced Attendant Features: Voice Synthesis, Hand-Free Reply
Distribution Method: Third-party
Date First Installed: January 1984

MATSU AMERICA, INC.
OMEGA III MODEL 2460
Equipment Type: Key System
Transmission: Voice, Data
Switch Technology: Analog/Digital
Switching Matrix: Space Divsion
Modulation Method: PAM
Maximum Trunks Supported: 20
Maximum Stations Supported: 60
Attendant Consoles (Maximum): 2
Matrix Architecture: Nonblocking, 100%
Maximum Simultaneous Transmissions: 20
Advanced Features: LAN Capability (Micro/Mini)
Advanced Attendant Features: Call-Waiting, Message Connect/Override
Distribution Method: Third-party
Number Installed to Date: More than 100
Date First Installed: 1979

M/A-COM, INC.
IDX 3000
Equipment Type: CBX
Transmission: Data
Switch Technology: Digital
Switching Matrix: Time Division
Modulation Method: Bipolar
Maximum Trunks Supported: 128
Maximum Stations Supported: 3,072
Matrix Architecture: Nonblocking, 100%
Maximum Simultaneous Transmissions: 3,072
Maximum Transmission Speeds:
Data: 19,200 bit/sec
Advanced Features: User Programmable, Digitizes at Handset (End-to-End Digital), T-1 Carrier Interface, LAN Capability (Micro/Mini/Mainframe), Security, Diagnostics, Data Security, Energy Control/Management, RJE to Host Interface, Protocol Conversion
Advanced Attendant Features: Optional, Autobaud Terminals, On-Line Reconfiguration
Price:
Purchase: $200
Distribution Method: OEM, Third-party
Number Installed to Date: 25 to 50
Date First Installed: October 1982
(See Vendor Profile Page V-18)

MELCO LABS, INC.
MAX-128P
Equipment Type: PBX
Transmission: Nonintegrated Voice/Data
Switch Technology: Analog
Switching Matrix: Space Divsion
Maximum Trunks Supported: 40
Maximum Stations Supported: 128
Attendant Consoles (Maximum): 2
Matrix Architecture: Nonblocking
Maximum Simultaneous Transmissions: 48
Maximum Transmission Speeds:
Data: 4,800 bit/sec
Advanced Features: User Programmable, Security, Diagnostics
Price:
Purchase: $189
Distribution Method: Third-party
(See Vendor Profile Page V-19)

MELCO LABS, INC.
MAX-212
Equipment Type: PBX
Transmission: Nonintegrated Voice/Data
Switch Technology: Analog
Switching Matrix: Space Divsion
Maximum Trunks Supported: 2
Maximum Stations Supported: 12
Matrix Architecture: Nonblocking
Maximum Simultaneous Transmissions: 3
Maximum Transmission Speeds:
Data: 4,800 bit/sec
Advanced Features: User-Programmable
Price:
Purchase: $75
Distribution Method: Third-party
Number Installed to Date: More than 100
Date First Installed: September 1982

MELCO LABS, INC.
MAX-424
Equipment Type: PBX
Transmission: Nonintegrated Voice/Data
Switch Technology: Analog
Switching Matrix: Space Divsion
Maximum Trunks Supported: 4
Maximum Stations Supported: 24
Attendant Consoles (Maximum): 1
Matrix Architecture: Nonblocking
Maximum Simultaneous Transmissions: 6
Maximum Transmission Speeds:
Data: 4,800 bit/sec
Advanced Features: User Programmable, Diagnostics
Price:
Purchase: $120
Distribution Method: Third-party
Number Installed to Date: More than 100
Date First Installed: July 1980

MELCO LABS, INC.
MAX-624
Equipment Type: PBX
Transmission: Nonintegrated Voice/Data
Switch Technology: Analog
Switching Matrix: Space Divsion
Maximum Trunks Supported: 12
Maximum Stations Supported: 24
Attendant Consoles (Maximum): 1
Matrix Architecture: Nonblocking
Maximum Simultaneous Transmissions: 16
Maximum Transmission Speeds:
Data: 4,800 bit/sec
Advanced Features: User Programmable, Diagnostics
Price:
Purchase: $140
Distribution Method: Third-party
Number Installed to Date: More than 100
Date First Installed: 1981

MICRO SYSTEMS, INC.
MICRO 800
Equipment Type: Data Switch
Transmission: Data
Switch Technology: Digital
Switching Matrix: Time Division
Maximum Stations Supported: 1,504
Matrix Architecture: Blocking
Maximum Simultaneous Transmissions: 400
Maximum Transmission Speeds:
Data: 9,600 bit/sec
Advanced Features: T-1 Carrier Interface, X.25 Interface, LAN Capability (Micro/Mini/Mainframe), OA, Security, Diagnostics, Data Security, Protocol Conversion
Price:
Purchase: $100 to $250
Distribution Method: End user
Number Installed to Date: More than 100
Date First Installed: November 1979
(See Vendor Profile Page V-19)

MITEL, INC.
SX-5
Equipment Type: PABX
Transmission: Integrated Voice/Data
Switch Technology: Digital
Switching Matrix: Space Divsion
Modulation Method: PAM
Maximum Trunks Supported: 2
Maximum Stations Supported: 6
Matrix Architecture: Blocking
Advanced Features: User Programmable, Diagnostics, Data Security, Protocol Conversion, Ring Group
(See Vendor Profile Page V-20)

MITEL, INC.
SX-10
Equipment Type: PABX
Transmission: Integrated Voice/Data
Switch Technology: Digital
Switching Matrix: Space Divsion
Modulation Method: PAM
Maximum Trunks Supported: 8
Maximum Stations Supported: 16
Attendant Consoles (Maximum): 1
Matrix Architecture: Blocking
Maximum Simultaneous Transmissions: 8
Advanced Features: User Programmable, OA, Security, Diagnostics, Data Security, Protocol Conversion, External Call Forwarding
Price:
Purchase: $3,000
Distribution Method: Third-party
Date First Installed: 1981

MITEL, INC.
SX-20
Equipment Type: PABX
Transmission: Integrated Voice/Data
Switch Technology: Analog

Switching Equipment

Switching Matrix: Space Division
Modulation Method: PAM
Maximum Trunks Supported: 112
Maximum Stations Supported: 72
Attendant Consoles (Maximum): 2
Matrix Architecture: Blocking
Advanced Features: User Programmable, OA, Security, Diagnostics, Data Security, Protocol Conversion, External Call Forwarding
Price:
Purchase: $6,300
Distribution Method: Third-party
Date First Installed: January 1980

BYTEL, INC.
SX-100
Equipment Type: PABX
Transmission: Voice
Switch Technology: Analog
Switching Matrix: Space Division
Maximum Trunks Supported: 112
Maximum Stations Supported: 112
Attendant Consoles (Maximum): 2
Matrix Architecture: Blocking
Maximum Simultaneous Transmissions: 31
Maximum Transmission Speeds:
Data: 4,800 bit/sec
Advanced Features: User Programmable, Security, Diagnostics, Data Security
Distribution Method: Third-party
Number Installed to Date: 5,000
Date First Installed: 1979

BYTEL, INC.
SX-300
Equipment Type: PABX
Transmission: Voice
Switch Technology: Analog
Switching Matrix: Space Division
Maximum Trunks Supported: 208
Maximum Stations Supported: 208
Attendant Consoles (Maximum): 2
Matrix Architecture: Blocking
Maximum Simultaneous Transmissions: 31
Maximum Transmission Speeds:
Data: 4,800 bit/sec
Advanced Features: User Programmable, Security, Diagnostics, Data Security
Distribution Method: Third-party
Number Installed to Date: 8,000
Date First Installed: September 1978

CORDAN DATA SYSTEMS
ANSWERNET
Equipment Type: PCM Switch
Transmission: Nonintegrated Voice/Data
Switch Technology: Digital
Switching Matrix: Time Division, Space Division
Modulation Method: PCM
Maximum Trunks Supported: 200
Maximum Stations Supported: 20
Attendant Consoles (Maximum): 30
Maximum Simultaneous Transmissions: 24
Maximum Transmission Speeds:
Voice: 1,536,000 bit/sec
Advanced Features: User Programmable, Digitizes at Handset (End-to-End Digital), LAN Capability (Micro/Mini), Voice Store and Forward, OA, Diagnostics
Advanced Attendant Features: Call Distribution
Price:
Purchase: $275
Distribution Method: End user, Third-party
Number Installed to Date: 1 to 10
Date First Installed: August 1983
(See Vendor Profile Page V-20)

MOTOROLA, INC.
EMX SERIES SWITCHING EXCHANGES
Equipment Type: Cellular Telephone Switch
Transmission: Voice, Nonintegrated Voice/Data
Switch Technology: Digital
Switching Matrix: Time Division
Modulation Method: PCM
Matrix Architecture: Nonblocking
Advanced Features: T-1 Carrier Interface, Voice Store and Forward, Security, Diagnostics
Distribution Method: End user
Number Installed to Date: 10 to 25
Date First Installed: September 1980
(See Vendor Profile Page V-20)

MOTOROLA, INC.
EMX SERIES (RADIO TELEPHONE)
Equipment Type: PCM
Transmission: Integrated Voice/Data
Switch Technology: Digital
Switching Matrix: Time Division
Modulation Method: PCM
Maximum Trunks Supported: 15,000
Maximum Stations Supported: 200,000
Matrix Architecture: Nonblocking
Maximum Simultaneous Transmissions: 7,500
Advanced Features: User Programmable, T-1 Carrier Interface, Diagnostics, Digital Radio Telephone Extension
Distribution Method: End user
Number Installed to Date: 25 to 50

NETWORK PRODUCTS, INC.
BABYNET
Equipment Type: Data Switch
Transmission: Data
Switch Technology: Digital
Switching Matrix: Packet
Maximum Trunks Supported: 1
Maximum Stations Supported: 56
Attendant Consoles (Maximum): 64
Matrix Architecture: Nonblocking
Maximum Simultaneous Transmissions: 22
Maximum Transmission Speeds:
Data: 9,600 bit/sec
Advanced Features: User Programmable, X.25 Interface, LAN Capability (Micro/Mini/Mainframe), OA, Security, Diagnostics, Data Security, RJE to Host Interface, Protocol Conversion
Price:
Purchase: $1,450
Distribution Method: End user
Number Installed to Date: More than 100
Date First Installed: 1982
(See Vendor Profile Page V-21)

NORTHERN TELECOM, INC.
CSV 248
Equipment Type: PABX
Transmission: Digital
Switch Technology: Analog/Digital
Switching Matrix: Time Division
Matrix Architecture: Nonblocking, 100%
Maximum Simultaneous Transmissions: 1
Maximum Transmission Speeds:
Data: 56,000 bit/sec
Advanced Features: X.25 Interface, OA, Security, Diagnostics, Data Security, RJE to Host Interface, Protocol Conversion
Distribution Method: End user
Number Installed to Date: More than 100
Date First Installed: 1973
(See Vendor Profile Page V-22)

NORTHERN TELECOM, INC.
DMS 10
Equipment Type: C.O. Switch
Transmission: Integrated Voice/Data
Switch Technology: Digital
Switching Matrix: Time Division, Space Division
Modulation Method: PCM
Maximum Trunks Supported: 1,120
Maximum Stations Supported: 10,000
Matrix Architecture: Nonblocking, 100%
Maximum Simultaneous Transmissions: 3,360
Maximum Transmission Speeds:
Voice: 64,000 bit/sec
Data: 56,000 bit/sec
Advanced Features: T-1 Carrier Interface, X.25 Interface, Security, Diagnostics, RJE to Host Interface, Protocol Conversion
Price:
Purchase: $250 to $600
Distribution Method: End user
Number Installed to Date: 1,000
Date First Installed: September 1977

NORTHERN TELECOM, INC.
DMS 100
Equipment Type: C.O. Switch
Transmission: Integrated Voice/Data
Switch Technology: Digital
Switching Matrix: Time Division
Modulation Method: PCM
Maximum Trunks Supported: 60,000
Maximum Stations Supported: 100,000
Matrix Architecture: Nonblocking, 100%
Maximum Simultaneous Transmissions: 61,440
Maximum Transmission Speeds:
Voice: 64,000 bit/sec
Data: 64,000 bit/sec
Advanced Features: T-1 Carrier Interface, X.25 Interface, Voice Store and Forward, Security, Diagnostics, RJE to Host Interface, Protocol Conversion
Price:
Purchase: $300 to $500
Distribution Method: End user
Number Installed to Date: 600
Date First Installed: December 1979

NORTHERN TELECOM, INC.
DMS 200
Equipment Type: Toll Tandem Switch
Transmission: Integrated Voice/Data
Switch Technology: Digital
Switching Matrix: Time Division
Modulation Method: PCM
Maximum Trunks Supported: 60,000
Matrix Architecture: Nonblocking, 100%
Maximum Simultaneous Transmissions: 30,000
Maximum Transmission Speeds:
Voice: 64,000 bit/sec
Data: 64,000 bit/sec
Advanced Features: T-1 Carrier Interface, X.25 Interface, Security, Diagnostics, Data Security, Protocol Conversion
Distribution Method: End user
Number Installed to Date: More than 100
Date First Installed: April 1979

NORTHERN TELECOM, INC.
SL-1
Equipment Type: PABX
Transmission: Integrated Voice/Data
Switch Technology: Digital
Switching Matrix: Time Division
Modulation Method: PCM
Maximum Trunks Supported: 600
Maximum Stations Supported: 5,000
Attendant Consoles (Maximum): 15
Matrix Architecture: Blocking
Maximum Simultaneous Transmissions: 1,000
Maximum Transmission Speeds:
Data: 56,000 bit/sec
Advanced Features: Voice Store and Forward, OA, Diagnostics, Data Security, RJE to Host Interface, Protocol Conversion
Price:
Purchase: $1,000 to $2,000
Distribution Method: End user, Third-party
Number Installed to Date: 6,000
Date First Installed: 1976

NORTHERN TELECOM, INC.
SL-100
Equipment Type: PABX
Transmission: Integrated Voice/Data
Switch Technology: Digital
Switching Matrix: Time Division
Modulation Method: PCM
Maximum Trunks Supported: 5,000
Maximum Stations Supported: 30,000
Attendant Consoles (Maximum): 255
Matrix Architecture: Nonblocking
Maximum Transmission Speeds:
Data: 64,000 bit/sec
Advanced Features: User Programmable, Digitizes at Handset (End-to-End Digital), Voice Store and Forward, OA, Security, Diagnostics, Data Security, RJE to Host Interface,

Protocol Conversion
Distribution Method: End user, Third-party
Number Installed to Date: 18
Date First Installed: 1978

OKI ELECTRONICS OF AMERICA, INC.
SPECTRUM 160
Equipment Type: PABX Hybrid Key
Transmission: Integrated Voice/Data
Switch Technology: Digital
Switching Matrix: Time Division, PCM
Modulation Method: PCM
Maximum Trunks Supported: 48
Maximum Stations Supported: 256
Attendant Consoles (Maximum): 2
Matrix Architecture: Nonblocking
Maximum Simultaneous Transmissions: 256
Maximum Transmission Speeds:
Voice: 8,000 bit/sec
Advanced Features: User Programmable, Digitizes at Handset (End-to-End Digital), LAN Capability (Micro/Mini), OA, Diagnostics, Data Security, Protocol Conversion
Advanced Attendant Features: Voice Digital Station, 18 Programmable Function Line Keys, DDS, BLF Line Appearance
Distribution Method: Third-party
Number Installed to Date: 50 to 100
Date First Installed: January 1983
(See Vendor Profile Page V-22)

OKI ELECTRONICS OF AMERICA, INC.
SPECTRUM 700
Equipment Type: PABX
Transmission: Integrated Voice/Data
Switch Technology: Digital
Switching Matrix: Time Division
Modulation Method: PCM
Maximum Trunks Supported: 176
Maximum Stations Supported: 768
Attendant Consoles (Maximum): 8
Matrix Architecture: Nonblocking
Maximum Simultaneous Transmissions: 256
Maximum Transmission Speeds:
Voice: 8,000 bit/sec
Data: 192,000 bit/sec
Advanced Features: User Programmable, T-1 Carrier Interface, Voice Store and Forward, OA, Diagnostics
Distribution Method: Third-party
Number Installed to Date: 50 to 100
Date First Installed: January 1983

OKI ELECTRONICS OF AMERICA, INC.
SPECTRUM 4000
Equipment Type: PABX
Transmission: Integrated Voice/Data
Switch Technology: Digital
Switching Matrix: Time Division
Modulation Method: PCM
Maximum Trunks Supported: 960
Maximum Stations Supported: 4,096
Attendant Consoles (Maximum): 24
Matrix Architecture: Blocking
Maximum Simultaneous Transmissions: 960
Maximum Transmission Speeds:
Voice: 8,000 bit/sec
Data: 19,200 bit/sec
Advanced Features: User Programmable, T-1 Carrier Interface, Voice Store and Forward, OA, Diagnostics
Distribution Method: Third-party

PARADYNE CORP.
PDN 8300
Equipment Type: Packet Processor
Transmission: Data
Switch Technology: Digital
Switching Matrix: Packet
Maximum Trunks Supported: 16
Maximum Stations Supported: 10,000
Attendant Consoles (Maximum): 14
Matrix Architecture: Nonblocking
Maximum Simultaneous Transmissions: 13,000
Maximum Transmission Speeds:
Data: 72,000 bit/sec
Advanced Features: User Programmable, X.25 Interface, LAN Capability (Micro/Mini/Mainframe), OA, Security, Diagnostics, Data Security, RJE to Host Interface, Protocol Conversion
Prices:
Purchase: $600 to $2,000
Distribution Method: End user
Number Installed to Date: More than 100
Date First Installed: January 1982
(See Vendor Profile Page V-23)

PERIPHONICS CORP.
T-COMM
Equipment Type: PBX
Transmission: Integrated Voice/Data
Switch Technology: Analog/Digital
Switching Matrix: Space Division
Modulation Method: FM
Maximum Simultaneous Transmissions: 416
Advanced Features: User Programmable, T-1 Carrier Interface, LAN Capability (Micro/Mini/Mainframe), Security, Diagnostics, Data Security, Energy Control/Management, RJE to Host Interface, Protocol Conversion
Distribution Method: End user
Number Installed to Date: More than 100
Date First Installed: January 1973
(See Vendor Profile Page V-23)

PHILIPS ELECTRONICS INSTRUMENTS, INC.
FLEXPAC
Equipment Type: Data Switch
Transmission: Data
Switch Technology: Digital
Maximum Trunks Supported: 18
Maximum Simultaneous Transmissions: 70
Advanced Features: User Programmable, X.25 Interface, Security, Diagnostics
Advanced Attendant Features: X.25 Monitoring
Advanced Station Features: Software Downline Loading, Billing
Distribution Method: End user, Third-party
Number Installed to Date: More than 100
(See Vendor Profile Page V-23)

PROLINX CORP.
PROLINX
Equipment Type: PBX
Transmission: Integrated Voice/Data
Switch Technology: Analog/Digital
Switching Matrix: Space Division
Modulation Method: PCM
Maximum Trunks Supported: 48
Maximum Stations Supported: 128
Attendant Consoles (Maximum): 8
Matrix Architecture: Blocking
Maximum Transmission Speeds:
Voice: 1,000,000 bit/sec
Data: 1,000,000 bit/sec
Advanced Features: User Programmable, T-1 Carrier Interface, LAN Capability (Micro/Mini/Mainframe), OA, Diagnostics, Data Security, Protocol Conversion
Advanced Attendant Features: Busy Lamp Field, Internal Directory
Advanced Station Features: Personal Speed Code No., Call-Waiting Voice Button, Speaker
Prices:
Purchase: $600 to $900
Distribution Method: OEM
Number Installed to Date: 25 to 50
Date First Installed: 1982
(See Vendor Profile Page V-23)

ROCKWELL INTERNATIONAL CORP.
GALAXY ACD
Equipment Type: ACD
Transmission: Integrated Voice/Data
Switch Technology: Digital
Switching Matrix: Time/Space/Time
Modulation Method: PCM
Maximum Trunks Supported: 1,536
Maximum Stations Supported: 1,536
Attendant Consoles (Maximum): 512
Matrix Architecture: Nonblocking: 100%
Maximum Simultaneous Transmissions: 768
Maximum Transmission Speeds:
Voice: 9,600 bit/sec
Data: 9,600 bit/sec
Advanced Features: T-1 Carrier Interface, X.25 Interface, OA, Diagnostics, Protocol Conversion
Distribution Method: End user
Number Installed to Date: More than 100
Date First Installed: April 1974
(See Vendor Profile Page V-25)

ROLM CORP.
CBX II (8000 CPU)
Equipment Type: CBX
Transmission: Integrated Voice/Data
Switch Technology: Digital
Switching Matrix: Time Division
Modulation Method: PCM
Maximum Trunks Supported: 4,000
Maximum Stations Supported: 10,000
Attendant Consoles (Maximum): 6
Matrix Architecture: Nonblocking
Maximum Simultaneous Transmissions: 11,520
Maximum Transmission Speeds:
Voice: 64,000 bit/sec
Data: 64,000 bit/sec
Advanced Features: User Programmable, Digitizes at Handset (End-to-End Digital), T-1 Carrier Interface, X.25 Interface, LAN Capability (Micro/Mini/Mainframe), Voice Store and Forward, OA, Security, Diagnostics, Data Security, RJE to Host Interface, Protocol Conversion
Advanced Attendant Features: Attendant Directory, Telephone Message Management System, Mail
Distribution Method: End user, Third-party
Number Installed to Date: More than 100
Date First Installed: October 1986
(See Vendor Profile Page V-26)

ROLM CORP.
CBX II (8000 CPU)
Equipment Type: CBX
Transmission: Integrated Voice/Data
Switch Technology: Digital
Switching Matrix: Time Division
Modulation Method: PCM
Maximum Trunks Supported: 4,000
Maximum Stations Supported: 10,000
Matrix Architecture: Nonblocking
Maximum Simultaneous Transmissions: 11,520
Maximum Transmission Speeds:
Voice: 64,000 bit/sec
Data: 64,000 bit/sec
Advanced Features: User Programmable, Digitizes at Handset (End-to-End Digital), T-1 Carrier Interface, X.25 Interface, LAN Capability (Micro/Mini/Mainframe), Voice Store and Forward, OA, Security, Diagnostics, Data Security, RJE to Host Interface, Protocol Conversion
Advanced Attendant Features: Attendant Directory, Telephone Message Management System
Distribution Method: End user, Third-party
Number Installed to Date: More than 100
Date First Installed: October 1983

ROLM CORP.
VSCBX
Equipment Type: CBX
Transmission: Integrated Voice/Data
Switch Technology: Digital
Switching Matrix: Time Division
Modulation Method: PCM
Maximum Trunks Supported: 40
Maximum Stations Supported: 144
Attendant Consoles (Maximum): 2
Maximum Simultaneous Transmissions: 67
Maximum Transmission Speeds:
Voice: 64,000 bit/sec
Data: 64,000 bit/sec
Advanced Features: User Programmable, Digitizes at Handset (End-to-End Digital), T-1 Carrier

Interface, X.25 Interface, LAN Capability (Micro/Mini/Mainframe), Voice Store and Forward, OA, Security, Diagnostics, Data Security, RJE to Host Interface, Protocol Conversion
Advanced Attendant Features: Attendant Directory, Telephone Message Management System
Advanced Station Features: Data Sheet Listing
Distribution Method: End user
Number Installed to Date: More than 100
Date First Installed: September 1979

SIEMENS COMMUNICATIONS SYSTEMS
SATURN II
Equipment Type: PABX
Transmission: Integrated Voice/Data
Switch Technology: Digital
Switching Matrix: Time Division
Modulation Method: PCM
Maximum Trunks Supported: 72
Maximum Stations Supported: 224
Attendant Consoles (Maximum): 4
Matrix Architecture: Nonblocking, 100%
Maximum Simultaneous Transmissions: 224
Advanced Features: User Programmable, Digitizes at Handset (End-to-End Digital), OA, Diagnostics, Message Waiting Privacy
Advanced Station Features: Hold, Transfer, Conference Call, Queuing, Call Pick-up, Speed Calling, Station Hunting
Distribution Method: OEM, Third-party
Number Installed to Date: More than 100
Date First Installed: September 1982
(See Vendor Profile Page V-68)

SIEMENS COMMUNICATIONS SYSTEMS
SATURN III
Equipment Type: PABX
Transmission: Integrated Voice/Data
Switching Matrix: Time Division
Modulation Method: PCM
Maximum Trunks Supported: 224
Maximum Stations Supported: 864
Attendant Consoles (Maximum): 8
Matrix Architecture: Nonblocking, 100%
Maximum Simultaneous Transmissions: 864
Advanced Features: User Programmable, Digitizes at Handset (End-to-End Digital), OA, Diagnostics, Message Waiting Privacy
Advanced Station Features: Hold, Transfer, Conference Call, Queuing, Call Pick-up, Speed Calling, Station Hunting
Distribution Method: OEM, Third-party
Number Installed to Date: More than 100
Date First Installed: 1988

SIEMENS COMMUNICATIONS SYSTEMS
SD-192
Equipment Type: PABX
Transmission: Voice
Switch Technology: Analog
Switching Matrix: Space Division
Modulation Method: Analog AD
Maximum Trunks Supported: 48
Maximum Stations Supported: 192
Attendant Consoles (Maximum): 2
Matrix Architecture: Full Availability
Maximum Simultaneous Transmissions: 48
Maximum Transmission Speeds: Data: 4,800 bit/sec
Advanced Features: User Programmable, Diagnostics, Data Security
Number Installed to Date: 8,000
Date First Installed: September 1978

SIEMENS COMMUNICATIONS SYSTEMS
SD-192EX
Equipment Type: PABX
Transmission: Voice
Switch Technology: Analog
Switching Matrix: Space Division
Maximum Trunks Supported: 48
Maximum Stations Supported: 192
Attendant Consoles (Maximum): 2
Matrix Architecture: Full Availability
Maximum Simultaneous Transmissions: 48
Maximum Transmission Speeds: Data: 4,800 bit/sec
Advanced Features: User Programmable, Diagnostics, Data Security
Advanced Attendant Features: Call Parking, Trunk-to-Trunk Station Callback
Distribution Method: Third-party
Number Installed to Date: 8,000
Date First Installed: June 1980

SOLID STATE SYSTEMS, INC.
CEO
Equipment Type: CBX
Transmission: Nonintegrated Voice/Data
Switch Technology: Analog
Switching Matrix: Space Division
Maximum Trunks Supported: 384
Maximum Stations Supported: 1,792
Attendant Consoles (Maximum): 16
Matrix Architecture: Nonblocking, 90%
Maximum Simultaneous Transmissions: 512
Maximum Transmission Speeds: Voice: 9,600 bit/sec Data: 9,600 bit/sec
Advanced Features: User Programmable, T-1 Carrier Interface, LAN Capability (Micro/Mini/Mainframe), OA, Security, Diagnostics, Data Security, Energy Control/Management, RJE to Host Interface, Protocol Conversion
Price: Purchase: $300 to $750
Distribution Method: Third-party
Number Installed to Date: 25 to 99
Date First Installed: June 1981
(See Vendor Profile Page V-28)

SYSCOM, INC.
STORE & FORWARD MESSAGE SWITCH
Equipment Type: Data Switch
Transmission: Data
Switch Technology: Digital
Maximum Trunks Supported: 32
Maximum Simultaneous Transmissions: 32
Maximum Transmission Speeds: Data: 9,600 bit/sec
Advanced Features: User Programmable, LAN Capability (Mainframe), Security, Diagnostics, Data Security
Average Monthly Maintenance: $1
Distribution Method: End user
Number Installed to Date: 25 to 99
Date First Installed: 1980
(See Vendor Profile Page V-29)

T-BAR, INC.
3000/3000 SERIES COMPUTER SWITCH MATRIX
Equipment Type: Data Switch
Transmission: Data
Switch Technology: Analog
Switching Matrix: Space Division
Attendant Consoles (Maximum): 7
Matrix Architecture: Nonblocking, 100%
Maximum Transmission Speeds: Data: 8,000,000 bit/sec
Advanced Features: User Programmable, Security, Diagnostics
Advanced Attendant Features: Real-Time Configuration, Display User Data Base Switching
Advanced Attendant Features: Channel Interface, Diagnostic Module, Connectivity, Insensitivity to Power Loss
Price: Purchase: $900 to $1,100
Distribution Method: End user
Number Installed to Date: 1,700
Date First Installed: February 1975
(See Vendor Profile Page V-29)

T-BAR, INC.
5000 SERIES
Equipment Type: Data Switch
Transmission: Voice, Data, Nonintegrated Voice/Data, Integrated Voice/Data
Switch Technology: Analog
Switching Matrix: Space Division
Maximum Trunks Supported: 96
Attendant Consoles (Maximum): 1
Matrix Architecture: Nonblocking, 100%
Maximum Simultaneous Transmissions: 96
Maximum Transmission Speeds: Voice: 64,000 bit/sec Data: 2,040,000 bit/sec
Advanced Features: T-1 Carrier Interface, X.25 Interface, LAN Capability (Micro/Mini/Mainframe), Security, Diagnostics
Advanced Attendant Features: Individual Line and Bulk Line Switch
Advanced Station Features: Speed and Protocols, Transparency, Insensitivity to Power Loss
Price: Purchase: $100 to $150
Distribution Method: End user, OEM, Third-party
Number Installed to Date: 100,000
Date First Installed: 1972

T-BAR, INC.
5600 SERIES PATCH
Equipment Type: Analog Switch
Transmission: Voice, Data, Nonintegrated Voice/Data, Integrated Voice/Data
Switch Technology: Analog
Switching Matrix: Space Division
Maximum Trunks Supported: 96
Attendant Consoles (Maximum): 1
Matrix Architecture: Nonblocking, 100%
Maximum Simultaneous Transmissions: 96
Maximum Transmission Speeds: Voice: 64,000 bit/sec Data: 2,040,000 bit/sec
Advanced Features: T-1 Carrier Interface, X.25 Interface, Diagnostics
Advanced Attendant Features: Circuit Reconfiguration, Modem Subset and Sparing, Monitor and Break
Advanced Station Features: Line Activity Display, Connectivity, Insensitivity to Power Loss
Price: Purchase: $85 to $150
Distribution Method: End user, OEM, Third-party
Number Installed to Date: 100,000

T-BAR, INC.
MASS
Equipment Type: Data Switch
Transmission: Voice, Data, Nonintegrated Voice/Data, Integrated Voice/Data
Switch Technology: Analog
Switching Matrix: Direct
Maximum Trunks Supported: 8,192
Attendant Consoles (Maximum): 8
Matrix Architecture: Nonblocking, 100%
Maximum Simultaneous Transmissions: 8,192
Maximum Transmission Speeds: Data: 2,040,000 bit/sec
Advanced Features: User Programmable, T-1 Carrier Interface, X.25 Interface, Security, Diagnostics
Advanced Attendant Features: Central Distribution, Control Preprogrammed Configuration, Automatic Alarms
Advanced Station Features: Transparency to Protocol and Data Rate
Price: Purchase: $350 to $600
Distribution Method: End user, OEM
Number Installed to Date: More than 100
Date First Installed: March 1980

T-BAR, INC.
VIRTUAL SWITCH MATRIX
Equipment Type: Data Switch
Transmission: Data
Switch Technology: Digital
Switching Matrix: Space Division
Maximum Trunks Supported: 4,096
Matrix Architecture: Nonblocking, 100%
Maximum Simultaneous Transmissions: 4,096

Maximum Transmission Speeds:
Data: 230,000 bit/sec
Advanced Features: User Programmable, Security, Diagnostics, RJE to Host Interface, Protocol Transparency
Advanced Attendant Features: Central Distribution, Control Preprogrammed Configuration, Automatic Alarms, Network Management, Data Base
Price:
Purchase: $585
Distribution Method: End user, OEM
Number Installed to Date: More than 100
Date First Installed: January 1982

TECHTRAN INDUSTRIES, INC.
SC 96 96T
Equipment Type: PBX
Transmission: Integrated Voice/Data
Switch Technology: Analog
Matrix Architecture: Nonblocking, 100%
Maximum Transmission Speeds:
Data: 5,000,000 bit/sec
Advanced Features: User Programmable
Distribution Method: End user
Date First Installed: September 1982
(See Vendor Profile Page V-29)

TEKNEKRON INFO SWITCH
INFO SWITCH ACD
Equipment Type: ACD
Transmission: Nonintegrated Voice/Data
Switch Technology: Analog
Switching Matrix: Space Division
Maximum Trunks Supported: 500
Maximum Stations Supported: 700
Matrix Architecture: Nonblocking, 100%
Maximum Simultaneous Transmissions: 500
Maximum Transmission Speeds:
Voice: 9,600 bit/sec
Advanced Features: User Programmable, X.25 Interface, LAN Capability (Micro/Mini/Mainframe), OA, Diagnostics
Distribution Method: End user
Number Installed to Date: More than 100
(See Vendor Profile Page V-30)

TELECOM TECHNOLOGIES
ECD 1000
Equipment Type: ACD
Transmission: Voice
Switch Technology: Analog
Switching Matrix: Space Division
Maximum Trunks Supported: 20
Maximum Stations Supported: 20
Matrix Architecture: Nonblocking, 100%
Maximum Simultaneous Transmissions: 20
Advanced Features: User Programmable, RJE to Host Interface, 8 Agent Groups
Distribution Method: Third-party
Number Installed to Date: 10 to 25
Date First Installed: September 1983
(See Vendor Profile Page V-30)

TELECOM TECHNOLOGIES
ECD 2000
Equipment Type: ACD
Transmission: Voice
Switch Technology: Analog
Switching Matrix: Space Division
Maximum Trunks Supported: 48
Maximum Stations Supported: 48
Matrix Architecture: Nonblocking, 100%
Maximum Simultaneous Transmissions: 48
Advanced Features: User Programmable, Diagnostics, RJE to Host Interface
Distribution Method: Third-party
Number Installed to Date: More than 100
Date First Installed: November 1982

TELE/RESOURCES
T R 180 SERIES
Equipment Type: PBX
Transmission: Voice, Data
Switch Technology: Analog
Switching Matrix: Time Division
Modulation Method: PAM
Maximum Trunks Supported: 64
Maximum Stations Supported: 256
Attendant Consoles (Maximum): 2
Matrix Architecture: Blocking
Maximum Simultaneous Transmissions: 64
Maximum Transmission Speeds:
Voice: 4,800 bit/sec
Data: 4,800 bit/sec
Advanced Features: User Programmable, Diagnostics, Data Security, Four-Wire Transmission
Price:
Purchase: $390
Distribution Method: Third-party
Number Installed to Date: More than 100
Date First Installed: 1979
(See Vendor Profile Page V-30)

TELLABS, INC.
331 XPLEXER
Equipment Type: Packet Processor
Transmission: Data
Switch Technology: Digital
Switching Matrix: STDM
Maximum Trunks Supported: 18
Maximum Stations Supported: 32
Maximum Transmission Speeds:
Data: 76,800 bit/sec
Advanced Features: Security, Diagnostics, Data Security, Speed and Parity Conversion
Advanced Attendant Features: Configuration Status, TICS Messages
Advanced Station Features: Autobaud, Echoplex, Host Select Message, Broadcast, Port Contention, Queuing Option
Price:
Purchase: $2,900 to $12,900
Distribution Method: End user, OEM, Third-party
Number Installed to Date: 25 to 50
Date First Installed: 1983
(See Vendor Profile Page V-30)

TERMINAL DATA CORP.
DATA SWITCH
Equipment Type: Data Switch
Transmission: Data
Switch Technology: Digital
Maximum Trunks Supported: 1
Maximum Stations Supported: 4
Attendant Consoles (Maximum): 1
Matrix Architecture: Blocking
Maximum Transmission Speeds:
Data: 19,200 bit/sec
Price:
Purchase: $129 to $300
Average Monthly Maintenance: $10
Distribution Method: End user
Number Installed to Date: More than 100
Date First Installed: May 1982
(See Vendor Profile Page V-30)

TIE COMMUNICATIONS, INC.
MERCURY PBX
Equipment Type: PABX
Transmission: Voice
Switch Technology: Digital
Switching Matrix: Time Division
Modulation Method: PCM
Maximum Trunks Supported: 480
Maximum Stations Supported: 1,920
Attendant Consoles (Maximum): 8
Matrix Architecture: Blocking
Maximum Simultaneous Transmissions: 255
Advanced Features: Diagnostics, Data Security
Price:
Purchase: $300 to $400
Distribution Method: Third-party
Number Installed to Date: 50 to 100
(See Vendor Profile Page V-31)

TOSHIBA AMERICA, INC.
PERCEPTION
Equipment Type: PABX
Transmission: Voice
Switch Technology: Digital
Switching Matrix: Time Division
Modulation Method: PCM
Maximum Trunks Supported: 32
Maximum Stations Supported: 120
Attendant Consoles (Maximum): 2
Matrix Architecture: Nonblocking, 100%
Maximum Simultaneous Transmissions: 120
Maximum Transmission Speeds:
Voice: 20,000 bit/sec
Advanced Features: User Programmable, LAN Capability (Micro/Mini/Mainframe), Diagnostics
Distribution Method: Third-party
Date First Installed: March 1983
(See Vendor Profile Page V-31)

UNITED TECHNOLOGIES/LEXAR CORP.
UTX 1681
Equipment Type: PBX
Transmission: Integrated Voice/Data
Switch Technology: Digital
Switching Matrix: Time Division
Modulation Method: ADM
Maximum Trunks Supported: 3,069
Maximum Stations Supported: 3,000
Attendant Consoles (Maximum): 16
Matrix Architecture: Nonblocking, 100%
Maximum Simultaneous Transmissions: 512
Maximum Transmission Speeds:
Voice: 56,000 bit/sec
Data: 64,000 bit/sec
Advanced Features: Digitone at Handset (End-to-End Digital), LAN Capability (Micro/Mini/Mainframe), Voice Store and Forward, OA, Diagnostics, Energy Control/Management, Protocol Conversion
Distribution Method: End user
Number Installed to Date: 50 to 100
Date First Installed: January 1981
(See Vendor Profile Page V-32)

UNITED TECHNOLOGIES/LEXAR CORP.
UTX 1200
Equipment Type: PBX
Transmission: Integrated Voice/Data
Switch Technology: Digital
Switching Matrix: Time Division
Modulation Method: PCM
Maximum Trunks Supported: 1,200
Maximum Stations Supported: 1,344
Attendant Consoles (Maximum): 12
Matrix Architecture: Nonblocking
Maximum Simultaneous Transmissions: 672
Maximum Transmission Speeds:
Voice: 64,000 bit/sec
Data: 9,600 bit/sec
Advanced Features: T-1 Carrier Interface, X.25 Interface, Security, Diagnostics, Data Security
Price:
Purchase: $650
Distribution Method: End user
Number Installed to Date: More than 100

UNITED TECHNOLOGIES/LEXAR CORP.
UTX 5000
Equipment Type: PBX
Transmission: Integrated Voice/Data
Switch Technology: Digital
Switching Matrix: Time Division
Modulation Method: PCM
Maximum Trunks Supported: 5,376
Maximum Stations Supported: 5,376
Attendant Consoles (Maximum): 48
Matrix Architecture: Nonblocking
Maximum Simultaneous Transmissions: 2,688
Maximum Transmission Speeds:
Voice: 64,000 bit/sec
Data: 9,600 bit/sec
Advanced Features: T-1 Carrier Interface, X.25 Interface, Security Access Control, Diagnostics, Data Security
Price:
Purchase: $650
Distribution Method: End user
Number Installed to Date: More than 100

WESTERN DATACOM
UNISWITCH 1020
Equipment Type: Data Switch
Transmission: Data
Switch Technology: Digital

Switching Matrix: Physical Switch
Maximum Trunks Supported: 8
Maximum Stations Supported: 8
Matrix Architecture: Nonblocking, 100%
Maximum Simultaneous Transmissions: 4
Maximum Transmission Speeds:
Data: 19,200 bit/sec
Advanced Features: User Programmable, LAN Capability (Micro/Mini), OA, Security, Diagnostics, Data Security, RJE to Host Interface
Price:
Purchase: $575
Average Monthly Maintenance: $6
Distribution Method: Third-party
Number Installed to Date: 50 to 100
Date First Installed: September 1982
(See Vendor Profile Page V-33)

WESTERN TELEMATIC, INC.
ABS
Equipment Type: Data Switch
Transmission: Data
Switch Technology: Digital
Maximum Stations Supported: 2
Price:
Purchase: $89
Distribution Method: End user, OEM, Third-party
Number Installed to Date: More than 100
Date First Installed: 1982
(See Vendor Profile Page V-33)

WESTERN TELEMATIC, INC.
CAS 41
Equipment Type: Data Switch
Transmission: Data
Switch Technology: Digital
Maximum Stations Supported: 4
Distribution Method: End user, OEM, Third-party
Number Installed to Date: More than 100
Date First Installed: 1982

WESTERN TELEMATIC, INC.
CAS 164
Equipment Type: Data Switch
Transmission: Data
Switch Technology: Digital
Maximum Stations Supported: 64
Price:
Purchase: $795
Distribution Method: End user, OEM, Third-party
Number Installed to Date: More than 100
Date First Installed: 1982

WESTERN TELEMATIC, INC.
PSU 41
Equipment Type: Data Switch
Transmission: Data
Switch Technology: Digital
Maximum Stations Supported: 4
Price:
Purchase: $395
Distribution Method: End user, OEM, Third-party
Number Installed to Date: More than 100
Date First Installed: 1982

WESTERN TELEMATIC, INC.
TM 41
Equipment Type: Data Switch
Transmission: Data
Switch Technology: Digital
Maximum Stations Supported: 4
Price:
Purchase: $295
Distribution Method: End user, OEM, Third-party
Number Installed to Date: More than 100

XYPLEX, INC.
XYPLEX SYSTEM
Equipment Type: Packet Processor
Transmission: Data
Switch Technology: Digital
Switching Matrix: STDM
Modulation Method: FM
Maximum Stations Supported: 2,000
Matrix Architecture: Nonblocking, 100%
Maximum Simultaneous Transmissions: 2,000
Maximum Transmission Speeds:
Data: 9,600 bit/sec
Advanced Features: User Programmable, LAN Capability (Micro/Mini/Mainframe), OA, Security, Diagnostics, Protocol Conversion
Price:
Purchase: $950
Distribution Method: OEM, Third-party
Date First Installed: October 1982
(See Vendor Profile Page V-33)

ZTEL, INC.
PNX
Equipment Type: PABX
Transmission: Integrated Voice/Data
Switch Technology: Digital
Switching Matrix: Time Division
Modulation Method: PCM
Maximum Stations Supported: 30,000
Matrix Architecture: Nonblocking
Maximum Transmission Speeds:
Voice: 64,000 bit/sec
Data: 56,000 bit/sec
Advanced Features: User Programmable, Digitizes at Handset (End-to-End Digital), T-1 Carrier Interface, X.25 Interface, LAN Capability (Micro/Mini/Mainframe), Voice Store and Forward, OA, Security, Diagnostics, Data Security, RJE to Host Interface, Protocol Conversion, IEEE 802.5 Interface
Price:
Purchase: $800 to $1,000
Distribution Method: Third-party
Date First Installed: June 1984
(See Vendor Profile Page V-34)

Network Designers—Introducing the simplicity of a Remote Procedure Call ...ACCES XNS.

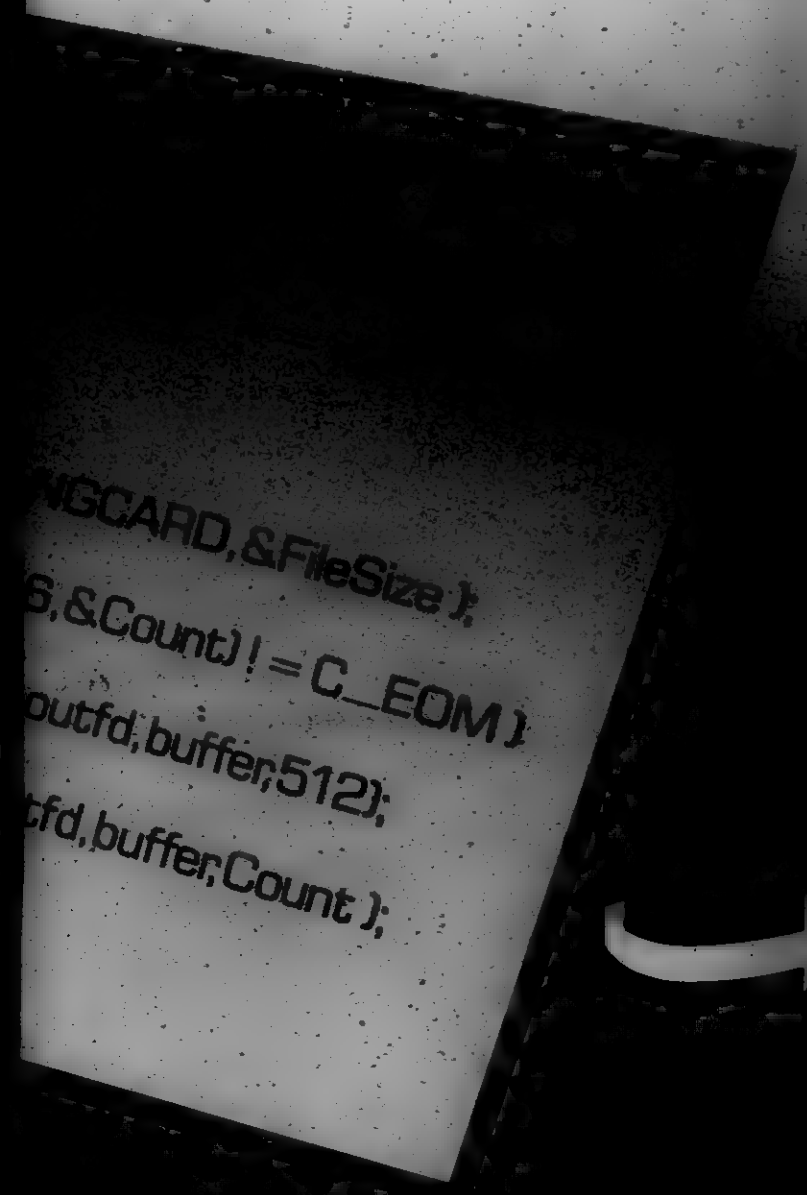
ACCES XNS is ACC's networking protocol package ready for use on popular minicomputers and work stations. It links applications and system level programs to data files and processing services in your distributed computer environment...through simple Remote Procedure Calls.

The ACCES XNS Protocol Package adheres to Xerox protocol standards: Courier, SPP, and IDP—making it compatible with other standard products, present and future.

Whether you are responsible for designing a communication environment around your company's product line, or interconnecting your company's computer resources, ACCES XNS meets your network design requirements.

To learn more about ACCES XNS, Courier, and Remote Procedure Calls, phone ACC at (805) 963-9431 and we'll gladly send you the ACCES XNS Brochure.

We Make Advanced Computer Communication.



ACC

Network Designers—Introducing the simplicity of a Remote Procedure Call ...ACCES XNS.

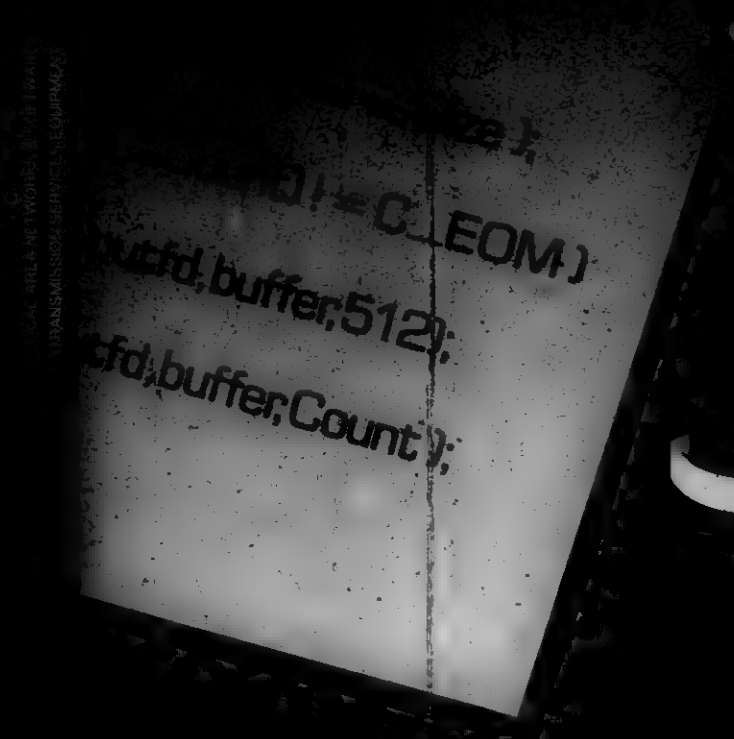
ACCES XNS is ACC's networking protocol package ready for use on popular minicomputers and work stations. It links applications and system level programs to data files and processing services in your distributed computer environment...through simple Remote Procedure Calls.

The ACCES XNS Protocol Package adheres to Xerox protocol standards: Courier, SPP, and IDP—making it compatible with other standard products, present and future.

Whether you are responsible for designing a communication environment around your company's product line, or interconnecting your company's computer resources, ACCES XNS meets your network design requirements.

To learn more about ACCES XNS, Courier, and Remote Procedure Calls, phone ACC at (805) 963-9431 and we'll gladly send you the ACCES XNS Brochure.

We Make Advanced Computer Communication



ACC

Index to Local-Area Networks by Topology

A local-area network is a communications network that permits the interconnection of data communications devices within a limited distance. The local network shares a common medium, has high-speed broadcasting ability and is generally shared by all users. In addition, the network must support distributed processing, file transfer, data base management and access to long-haul networks. The index has been sorted by network topology — bus (linear or tree), star or ring. The final section of the index includes all networks which utilize other topologies or have unspecified topologies. Within each section, products are listed alphabetically by vendor and contain information on transmission technique, price and the page on which the complete listing can be found.

Bus (Linear) Networks

VENDOR	MODEL	TECHNIQUE	PRICE	PAGE
Alspa Computer, Inc.	ALSPA NET	Baseband	$1,500	C-4
AST Research, Inc.	AST PCNET	Baseband	$695	C-4
Bridgar	8500 LOCAL CONTROLLER (ELAN SYSTEM)	Broadband	$18,495 to $29,495	C-5
Bumblebee Energy Systems	BUMBLEBEE NETWORK	Baseband	$100 to $150	C-5
Cadax Corp.	4000 SERIES LAN	Baseband	N/A	C-5
Commtex, Inc.	MDS 8070 NETWORKING OPTION	Baseband	N/A	C-5
Complex Systems,Inc.	X LAN	Baseband	$282	C-6
Compsocorp	OMEGANET	Baseband	N/A	C-6
Computer Automation, Inc.	SYFANET	Broadband	N/A	C-6
Computrol	MEGA LINK	Baseband	$100 to $3,000	C-6
Convergent Technologies, Inc.	CT-CLUSTER	Baseband	N/A	C-6
Corvus Systems, Inc.	OMNINET	Baseband	$495 to $1,500	C-6
CYB Systems, Inc.	UNITE	Baseband	N/A	C-6
Data General Corp.	XODIAC/NETWORK BUS SYSTEM/4480	Baseband	N/A	C-6
DCA/TAC	DCA INA/NETWORK	Broadband/Baseband	N/A	C-7
Delta Systems, Inc.	WHITE BOX I	Broadband	$1,500	C-7
The Destek Group	DESNET	Fiber Optics	$600 to $700	C-7
Digital Equipment Corp.	DECNET	Broadband/Baseband	N/A	C-7
Gateway Communications, Inc.	G/NET	Baseband	$595	C-7
Harris Corp.	HARRIS 9070 (BASEBAND)	Baseband	$1,250	C-8
	HARRIS 9070 (BROADBAND)	Broadband	$1,250	C-8
IMI Associates, Inc.	IDEANET/NPR-001 SPR-1N	Baseband	N/A	C-8
Interlan, Inc.	INTERLAN NET/PLUS	Baseband	$400	C-8
Inter-Link	STATIONMATE	Baseband	$1,450	C-8
Interoll Systems, Inc.	GE NET	Broadband	$800 to $1,000	C-9
JC Systems	JCS A-10	Broadband	$495	C-9
Metapath, Inc.	ROBIN DESKTOP DATA SWITCH	Baseband	$400	C-9
NBI, Inc.	NBI NET	Baseband	$900	C-9
NCR Corp.	NCR DECISION NET	Baseband	$500	C-9
Network Systems Corp.	HYPER CHANNEL	Baseband	$40,000	C-10
Novell Inc.	NETWARE-X	Baseband	$995	C-10
Omnidata	OMNINET	Baseband	$500 to $1,000	C-10
Programdrive, Inc.	TIENET	Baseband	$600 to $900	C-10
Raytheon Co.	RAYNET IV	Broadband	N/A	C-11
Standard Data Corp.	STANDARD NET	Baseband	$995	C-11
Toomer, Inc.	ELAN	Baseband	$1,495 to $3,395	C-12
Ungermann-Bass, Inc.	NET/ONE BASEBAND NETWORK INTERFACE UNIT	Baseband	N/A	C-12
Xerox Corp.	ETHERNET	Baseband	$600 to $20,000	C-12
Xyplex Inc.	XYPLEX SYSTEM	Broadband	$300	C-12

Bus (Tree) Networks

VENDOR	MODEL	TECHNIQUE	PRICE	PAGE
Able Computer	EASYWAY/E ETHERNET CONTROLLER	Baseband	$7,200	C-4
Applitek Corp.	UNILAN FIBER OPTIC	Fiber Optics	N/A	C-4
	UNILAN I	Baseband	N/A	C-4
	UNILAN II	Broadband	N/A	C-4
BBN Communications Corp.	BBNCC X.25 PACKET SWITCHING NET	Packet	N/A	C-4
Concord Data Systems, Inc.	TOKENNET	Broadband	$600 to $1,000	C-5

Local-Area Network Index

VENDOR	MODEL	TECHNIQUE	PRICE	PAGE
Contel Information Systems	CONTEL NET	Baseband/Broadband	$300 to $500	C-8
CR Computer Systems	X-NET	Baseband	$1,000	C-8
Datapoint Corp.	ARC	Baseband	$6,950 to $8,950	C-8
Gould, Inc.	MODWAY	Baseband/Broadband	$1,500	C-8
Ideas, Inc.	INET	Broadband	$500	C-8
Interactive Systems/3M	VIDEODATA LAN/1	Broadband	$400 to $800	C-8
Modular Computer Systems, Inc.	MAX NET	Baseband	$3,500 to $30,000	C-9
NCR Corp.	MIRLAN (MID RANGE LAN)	Baseband	N/A	C-9
Network System Corp.	HYPER BUS	Baseband	$8,000	C-10
PERQ Systems	ETHERNET	Broadband	N/A	C-10
Systron, Inc.	SYNNET	Baseband	$650	C-11
Sytek, Inc.	LOCAL NET	Broadband	$345 to $545	C-11
Ungermann-Bass, Inc.	NET/ONE BROADBAND NETWORK INTERFACE UNIT	Broadband	N/A	C-12
	SERIES 600 PRODUCTS	Broadband	N/A	C-12
Western Telematic, Inc.	SS-8	Baseband	$995	C-12
3 Com Corp.	ETHERSERIES	Baseband	$950	C-13

Star Networks

VENDOR	MODEL	TECHNIQUE	PRICE	PAGE
Active Telecomm Labs	ATL NET	Baseband	N/A	C-4
American Photonics, Inc.	64 NET	Fiber Optics	N/A	C-4
Datacom Corp.	PROF COMMUNICATIONS MANAGER 2000	Baseband	$1,300 to $2,500	C-5
Codenoll Technology Corp.	CODENET	Baseband	$150 to $900	C-5
Computer Comm. Specialists, Inc.	TASK 1000	Baseband	N/A	C-5
CPT Corp.	OFFICE DIALOGUE	Baseband	$30,000 to $42,000	C-6
Cygnet Technologies, Inc.	COSYSTEM	Broadband	$1,495 to $1,845	C-6
Digital Microsystems, Inc.	HINET	Baseband	$950	C-7
Gandalf Data Inc.	PACXNET	Baseband	$600 to $135	C-7
IBE Associates, Inc.	IDEASHARE/SPR-IS	RS232	N/A	C-8
InfoCom Inc	LANMARK	Baseband	$600 to $800	C-8
Illocom Systems, Inc.	INSTANET	TDM	$100 to $250	C-9
Master Systems, Inc.	PLAN SERIES	Baseband	$2,000 to $100,000	C-9
Novell Inc.	NETWARE-S	Baseband	$250	C-10
Peripheral Technology, Inc.	SNC	Baseband	$800	C-10
Protean Associates, Inc.	PRONET	Baseband/Broadband	$600 to $2,800	C-11
Storm Computer Systems Corp.	MICRONETWORK	Baseband	$4,000 to $6,000	C-11
Tellene Corp.	DCS-2	Broadband	$450	C-12
Transfer Systems Ltd.	WEB	Broadband	N/A	C-12
Ungermann-Bass, Inc.	NET/ONE Fiber Optics INTERFACE	Baseband	N/A	C-12

Ring Networks

VENDOR	MODEL	TECHNIQUE	PRICE	PAGE
Beamax, Inc.	CONVENER-NETWORK CONFERENCING UNIT	Baseband	$550 to $1,700	C-6
	CONVENER-PHONE CONFERENCING UNIT	Baseband	$550 to $1,700	C-6
	DAROME 2020 COCONVENER	Baseband	N/A	C-6
Burroughs Systems, Inc.	DS200-015	Baseband	$645	C-7
Fujitsu America, Inc.	OPTICAL DATA HIGHWAY	Fiber Optics	N/A	C-7
Logica, Inc.	POLYNET	Baseband	$1,400 to $4,900	C-9
Northern Telecom, Inc.	NORTHERN TELECOM, INC	Baseband	$1,600 to $1,600	C-10
Percom Data Corp.	PERCOM NET	Baseband	$595 to $1,700	C-10
Phoenix Digital Corp.	OPTONET	Baseband	$100,000	C-10
Prime Computer, Inc.	RINGNET	Baseband	$5,000	C-11
Prolink Corp.	PROLOOP NETWORK	Baseband	N/A	C-11
Rexel-Elliger, Inc.	PLANET	Baseband	$600 to $900	C-11
Stratos Computer, Inc.	STRATALINK	Baseband	N/A	C-11
Wheatnet, Inc.	WINNET	Broadband	$100	C-12
Ztel, Inc.	ZTEL LAN	Baseband	N/A	C-13

Networks Using Other Topologies

VENDOR	MODEL	TECHNIQUE	PRICE	PAGE
American Laser Systems, Inc.	738/NOVA-SR OPTICAL DATA/VOICE	Digital	$7,000 to $13,000	C-4
	MODEL 761 VIDEO TRANSMISSION	Baseband	$7,750	C-4
	MODEL 829 WIDEBAND DIGITAL INFRARED	Baseband	$14,000	C-4
Artel Communications Corp.	CV100 CAD/CAM SYSTEM	Baseband	N/A	C-4

Local-Area Network Index

VENDOR	MODEL	TECHNIQUE	PRICE	PAGE
Artel Communications Corp.	LS100 INTERFACE MODEM	*Baseband*	*N/A*	*C-4*
	T2010/K2010 HIGH-SPEED DATA TRANS.	*Baseband*	*N/A*	*C-4*
	TR2016/TR2017 RGB VIDEO/DATA	*Baseband*	*N/A*	*C-4*
Avocom, Inc.	8911A CHANNEL INTERFACE	*IBM TO LAN*	*N/A*	*C-4*
Bachus Data Systems, Inc.	SIX PORT SWITCHING SYSTEMS	*N/A*	*N/A*	*C-4*
Botelbit, Inc.	ANP 2520 (ADVANCED NETWORK PROCESSOR)	*Packet*	*N/A*	*C-5*
	EDX-P	*Packet*	*N/A*	*C-5*
Datastream Communication, Inc.	774	*Baseband*	*$4,000 to $10,000*	*C-7*
	776	*Baseband*	*$4,000 to $6,000*	*C-7*
	874	*Baseband*	*$16,000*	*C-7*
	MPC	*Baseband*	*$8,000 to $12,000*	*C-7*
General Electric Co.	GEMLINK LDS-072A	*Microwave*	*N/A*	*C-8*
	GEMLINK LSD-112A/122A	*Microwave*	*N/A*	*C-8*
	LSD-092A	*Microwave*	*N/A*	*C-8*
	GEMLINK LDS-082A	*Microwave*	*N/A*	*C-8*
Infolink	SYSTEM 5000	*Baseband*	*$2,000 to $4,000*	*C-8*
ITT Telecom Products, Inc.	MULTITENENT	*Baseband*	*N/A*	*C-9*
Lynch Communication Systems	VOICE PLUS DATA SUBSCRIBER CARRIER	*FSK*	*$200 to $256*	*C-9*
Network Products, Inc.	LOCAL MUX	*Baseband*	*$108*	*C-9*
Orchid Technology, Inc.	PC NET	*Baseband*	*$695*	*C-10*
Scientific Data Systems, Inc.	SDS NETWORK	*Broadband*	*$5,000 to $6,000*	*C-11*
Tandem Computers, Inc.	NONSTOP II	*Fiber Optic*	*N/A*	*C-11*
	NONSTOP TXP	*Fiber Optic*	*N/A*	*C-12*
	NONSTOP 1	*Fiber Optic*	*N/A*	*C-12*

ABLE COMPUTER
EASYWAY/E ETHERNET CONTROLLER
Topology: Bus (tree)
Network Type: Baseband
Maximum Physical Connections: 1,024
Maximum Distance: 9,240 Feet
Transmission Media: Terrestrial Coaxial Cable
Access Method: Distributed CSMA/CD (Contention Type)
Protocols Supported: IEEE 802.3 Ethernet
Network Compatibility: DEC DNA/Decnet, IEEE 802.3, NBS4 Intel
Advanced Functions: Diagnostics, Usage/Traffic Reporting
Price:
Purchase: $7,200
Distribution Method: End user
Date First Installed: September 1983
(See Vendor Profile Page V-1)

AETNA TELECOMM LABS
ATL NET
Topology: Star
Network Type: Baseband
Maximum Physical Connections: 19
Transmission Media: Terrestrial Fiber Optics
Access Method: Round Robin
Protocols Supported: Asynchronous, Synchronous, X.25, Bisynchronous, T-1, SDLC, HDLC, Ascii
Network Compatibility: DEC DNA/Decnet, IBM BSC, Telenet, DDS, Tymnet
Interfaces Supported: RS 232C, RS 422/423, RS 449, CCITT
(See Vendor Profile Page V-1)

ALSPA COMPUTER, INC.
ALSPA NET
Topology: Bus (Linear)
Network Type: Baseband
Maximum Physical Connections: 255
Maximum Distance: 2,000 Feet
Transmission Media: Terrestrial Twisted Wire
Access Method: CSMA/CD (Contention Type)
Protocols Supported: Asynchronous, SDLC, HDLC, Ascii
Network Compatibility: Telenet
Interfaces Supported: RS 232C, RS 422/423
Advanced Functions: Diagnostics, Usage/Traffic Reporting
Price:
Purchase: $1,560
Distribution Method: Third-party
Number Installed to Date: Over 100
Date First Installed: April 1983
(See Vendor Profile Page V-1)

AMERICAN LASER SYSTEMS, INC.
720 & ROVA-SR INFRARED OPTICAL DATA/VOICE SYSTEM
Topology: Point to Point
Network Type: Digital
Maximum Distance: 10 Miles
Transmission Media: Free Space Infrared Light, Laser
Protocols Supported: Asynchronous, Synchronous, Bisynchronous
Interfaces Supported: RS 232C, TTL Input
Price:
Lease: $1,300
Purchase: $7,000 to $13,000
Distribution Method: End user
Number Installed to Date: 231
Date First Installed: 1974
(See Vendor Profile Page V-2)

AMERICAN LASER SYSTEMS, INC.
MODEL 761 VIDEO TRANSMISSION SYSTEM
Network Type: Baseband
Maximum Physical Connections: 4
Transmission Media: Free Space Infrared Light
Price:
Lease: $775
Purchase: $7,750
Average Monthly Maintenance: $60
Distribution Method: End user
Number Installed to Date: 210
Date First Installed: 1975

AMERICAN LASER SYSTEMS, INC.
MODEL 920 WIDEBAND DIGITAL INFRARED TRANSMISSION SYSTEM
Topology: Point to Point
Network Type: Baseband
Maximum Physical Connections: 1
Maximum Distance: 7,500 Feet
Transmission Media: Free Space Infrared Light, Laser
Protocols Supported: T-1
Interfaces Supported: TI OR TTL
Advanced Functions: Security/Encryption
Price:
Lease: $700
Purchase: $14,000
Distribution Method: End user
Number Installed to Date: 1 to 10
Date First Installed: 1983

AMERICAN PHOTONICS, INC.
64 NET
Topology: Star
Network Type: Fiber Optic
Maximum Physical Connections: 1
Maximum Distance: 1,000 Feet
Transmission Media: Terrestrial Fiber Optics, Free Space Laser
Protocols Supported: Asynchronous
Interfaces Supported: RS-232C, IEEE 488
Distribution Method: End user
Number Installed to Date: 1 to 10
Date First Installed: November 1983
(See Vendor Profile Page V-2)

APPLITEK CORP.
UNILAN FIBER OPTIC
Topology: Bus (tree)
Network Type: Fiber Optic
Maximum Physical Connections: 1,000
Maximum Distance: 30 Miles
Transmission Media: Terrestrial Coaxial Cable, Fiber Optics
Access Method: Distributed CSMA/CD (Contention Type), Token Passing (Polling Types)
Protocols Supported: Asynchronous, Synchronous, X.25, Bisynchronous, HDLC, Ascii
Interfaces Supported: RS-232C, IEEE 488, RS-449, V.35
Advanced Functions: Security/Encryption
Distribution Method: End user
(See Vendor Profile Page V-2)

APPLITEK CORP.
UNILAN I
Topology: Bus (tree)
Network Type: Baseband
Maximum Physical Connections: 1,000
Maximum Distance: 2 Miles
Transmission Media: Terrestrial Coaxial Cable, Fiber Optics
Access Method: Distributed CSMA/CD (Contention Type), Token Passing (Polling Types)
Protocols Supported: Asynchronous, Synchronous, X.25, Bisynchronous, HDLC, Ascii
Interfaces Supported: RS-232C, IEEE 488, RS-449, V.3.5
Advanced Functions: Security/Encryption, Diagnostics
Distribution Method: End user

APPLITEK CORP.
UNILAN II
Topology: Bus (tree)
Network Type: Broadband
Maximum Physical Connections: 40,000
Maximum Distance: 30 Miles
Transmission Media: Terrestrial Coaxial Cable, Fiber Optics
Access Method: Distributed CSMA/CD (Contention Type), Token Passing (Polling Types)
Protocols Supported: Asynchronous, Synchronous, X.25, Bisynchronous, HDLC, Ascii
Interfaces Supported: RS-232C, IEEE 488, RS-449, V.35
Distribution Method: End user

ARTEL COMMUNICATIONS CORP.
CV100 CAD/CAM SYSTEM
Topology: End to End
Network Type: Baseband
Maximum Distance: 2 Miles
Protocols Supported: Asynchronous, Synchronous
Network Compatibility: Computervision
Distribution Method: End user
(See Vendor Profile Page V-3)

ARTEL COMMUNICATIONS CORP.
LS100 INTERFACE MODEM
Topology: End to End
Network Type: Baseband
Maximum Distance: 16,400 Feet
Transmission Media: Terrestrial Fiber Optics
Network Compatibility: IBM 3299 Compatible
Distribution Method: End user

ARTEL COMMUNICATIONS CORP.
T2010/K2010 HIGH SPEED DATA TRANSMISSION
Topology: End to End
Network Type: Baseband
Maximum Distance: 2 Miles
Transmission Media: Terrestrial Fiber Optics
Protocols Supported: Asynchronous
Interfaces Supported: RS-232C, TTL/ECL
Distribution Method: End user

ARTEL COMMUNICATIONS CORP.
TR2016/TR2017 RGB VIDEO & DATA MODULES
Topology: End to End
Network Type: Baseband
Maximum Distance: 10,000 Feet
Protocols Supported: Asynchronous
Interfaces Supported: RS-232C, TTL
Distribution Method: End user

AST RESEARCH, INC.
AST PCNET
Topology: Bus (Linear)
Network Type: Baseband
Maximum Physical Connections: 256
Maximum Distance: 7,000 Feet
Transmission Media: Terrestrial Coaxial Cable
Access Method: Distributed CSMA/CD (Contention Type)
Protocols Supported: Asynchronous, Bisynchronous
Network Compatibility: IBM BSC
Advanced Functions: Diagnostics, Performance Analysis, Usage/Traffic Reporting
Price:
Purchase: $695
Date First Installed: May 1983
(See Vendor Profile Page V-3)

AXIOOMS, INC.
6911A PROGRAMMABLE CHANNEL INTERFACE
Network Type: IBM to LAN
(See Vendor Profile Page V-3)

BACKUS DATA SYSTEMS, INC.
SIX PORT SWITCHING SYSTEMS
Protocols Supported: Asynchronous, Synchronous, Ascii
Interfaces Supported: RS-232C
Advanced Functions: Security/Encryption, Usage/Traffic Reporting
Distribution Method: End user
Number Installed to Date: 50 to 100
(See Vendor Profile Page V-3)

BBN COMMUNICATIONS CORP.
BBNCC X.25 PACKET SWITCHING NETWORK
Topology: Bus (tree), Star, Ring, Arbitrary Mesh
Network Type: Packet-Switched
Maximum Physical Connections: 255
Transmission Media: Terrestrial Twisted Wire, Free Space Microwaves and Satellite
Access Method: X.25, X.28
Protocols Supported: Asynchronous, Synchronous, X.25, Bisynchronous, SDLC, HDLC, Ascii,

X.3, X.28, X.29
Network Compatibility: IBM SNA, DEC DNA/Decnet, IBM BSC, Honeywell DSE/DSA, Burroughs BNA, Primenet, HP DSN, Telenet, DDS, Tymnet, X.25 Packet SVS
Interfaces Supported: RS-232C, RS-422/423, MIL 188C, RS-449, CCITT, V.28, V.24
Advanced Functions: Security/Encryption, Diagnostics, Performance Analysis, Accounting and Billing, Downline Loading
Average Monthly Maintenance: $1
Distribution Method: End user, OEM
Number Installed to Date: 10 to 25
Date First Installed: January 1988
(See Vendor Profile Page V-4)

BETACOM CORP.
PROF COMMUNICATIONS MANAGER 2000
Topology: Star
Network Type: Baseband
Transmission Media: Free Space Laser, PBX to Satellite
Access Method: Centralized PBX (Switching Type)
Protocols Supported: Asynchronous, Synchronous, Bisynchronous, SDLC, Ascii, Bausot, TWX, Telex
Network Compatibility: IBM SNA, IBM BSC, Telenet, Tymnet, TWX
Interfaces Supported: RS-232C
Advanced Functions: Diagnostics, Usage/Traffic Reporting
Price:
Purchase: $1,300 to $2,500
Average Monthly Maintenance: $13
Distribution Method: End user
Number Installed to Date: Over 100
(See Vendor Profile Page V-4)

BRANDEN CORP.
6800 LOCAL CONTROLLER (BLAN SYSTEM)
Topology: Bus (Linear)
Network Type: Broadband
Maximum Physical Connections: 120
Transmission Media: Terrestrial Coaxial Cable
Access Method: Distributed CSMA/CD (Contention Type)
Protocols Supported: Bisynchronous, SDLC, SNA SDLC
Network Compatibility: IBM SNA, IBM BSC
Interfaces Supported: RS-232C
Advanced Functions: Security/Encryption, Diagnostics, Screen Format Selectable
Price:
Lease: $525 to $725
Purchase: $19,495 to $29,495
Average Monthly Maintenance: $85
Distribution Method: End user
Number Installed to Date: 10 to 25
Date First Installed: 1983
(See Vendor Profile Page V-4)

BURROUGHS ENERGY SYSTEMS
BURRLESS NETWORK
Topology: Bus (Linear)
Network Type: Baseband
Maximum Physical Connections: 255
Maximum Distance: 4 Miles
Transmission Media: Terrestrial Twisted Wire
Access Method: Centralized Master/Slave Polling
Protocols Supported: Asynchronous
Interfaces Supported: RS-232C
Advanced Functions: Diagnostics
Price:
Purchase: $100 to $150
Average Monthly Maintenance: $10
Distribution Method: End user
Number Installed to Date: 10 to 25
Date First Installed: June 1981
(See Vendor Profile Page V-4)

CODENOLL TECHNOLOGY CORP.
CODENET
Topology: Star
Network Type: Baseband
Maximum Physical Connections: 1,024
Maximum Distance: 4 Miles
Transmission Media: Fiber Optics
Access Method: Distributed CSMA/CD (Contention Type)
Protocols Supported: Transparent
Network Compatibility: IBM SNA, DEC DNA/Decnet, Primenet, Omninet, Tymnet
Interfaces Supported: IEEE 488, Ethernet
Advanced Functions: Security/Encryption, Performance Analysis
Price:
Purchase: $150 to $600
Distribution Method: End user
Number Installed to Date: 25 to 50
Date First Installed: June 1981
(See Vendor Profile Page V-5)

COMBEX CORP.
4000 SERIES LAN
Topology: Bus (Linear)
Network Type: Baseband
Transmission Media: Terrestrial Coaxial Cable , Fiber Optics
Access Method: Distributed CSMA/CD (Contention Type)
Protocols Supported: Asynchronous, Synchronous, X.25, Bisynchronous, HDLC, Ascii
Network Compatibility: IBM SNA, IBM BSC, Honeywell DSE/DSA, Burroughs BNA, Sperry DCA, XNS (Xerox), HP DSN
Interfaces Supported: RS-232C, IEEE 488, RS-422/423, RS-449
Advanced Functions: Diagnostics, Usage/Traffic Reporting
Distribution Method: End user
Date First Installed: January 1984
(See Vendor Profile Page V-5)

COMMTEX, INC.
MDS 9070 NETWORKING OPTION
Topology: Bus (Linear and Tree), Star
Network Type: Baseband
Maximum Physical Connections: 255
Maximum Distance: 20,000 Feet
Transmission Media: Terrestrial Coaxial Cable
Access Method: Distributed Token Passing (Polling Types)
Protocols Supported: Asynchronous, Bisynchronous, SDLC, Ascii, 3270
Network Compatibility: IBM SNA, IBM BSC
Interfaces Supported: RS-232C, RS-422/423, MIL 188C, 20 mA Current Loop
Advanced Functions: Security/Encryption, Diagnostics
Distribution Method: Third-party
(See Vendor Profile Page V-5)

COMPLEX SYSTEMS, INC.
X LAN
Topology: Bus (Linear)
Network Type: Baseband
Maximum Physical Connections: 64
Maximum Distance: 10,000 Feet
Transmission Media: Terrestrial Twisted Wire
Access Method: Distributed CSMA/CD (Contention Type)
Protocols Supported: Asynchronous, Ascii
Interfaces Supported: RS-232C
Advanced Functions: Diagnostics, Performance Analysis, Usage/Traffic Reporting
Price:
Purchase: $292
Distribution Method: Third-party
Date First Installed: November 1983
(See Vendor Profile Page V-5)

COMPUCORP
OMEGANET
Topology: Bus (Linear)
Network Type: Baseband
Maximum Physical Connections: 33
Maximum Distance: 5,000 Feet
Transmission Media: Terrestrial Coaxial Cable
Access Method: CSMA/CA
Protocols Supported: Asynchronous
Network Compatibility: Proprietary
Interfaces Supported: RS-232C, RS-422/423
Advanced Functions: Security/Encryption, Diagnostics, Performance Analysis, Usage/Traffic Reporting
Distribution Method: Third-party
Number Installed to Date: Over 100
Date First Installed: February 1982
(See Vendor Profile Page V-5)

COMPUTER AUTOMATION, INC.
SYFANET
Topology: Bus (Linear)
Network Type: Broadband
Maximum Physical Connections: 64
Maximum Distance: 5,000 Feet
Transmission Media: Terrestrial Coaxial Cable
Access Method: Broadcast
Protocols Supported: X.25, Bisynchronous, SNA
Network Compatibility: IBM SNA, IBM BSC
Interfaces Supported: RS-232C
Advanced Functions: Security/Encryption, Diagnostics, Usage/Traffic Reporting
Distribution Method: End user, Third-party
Number Installed to Date: 1 to 10
Date First Installed: 1983
(See Vendor Profile Page V-6)

COMPUTER COMMUNICATIONS SPECIALISTS, INC.
TASK 1000
Topology: Star
Network Type: Baseband
Maximum Physical Connections: 64
Maximum Distance: 8,000 Feet
Transmission Media: Terrestrial Twisted Wire
Access Method: Interrupt
Protocols Supported: Ansi
Interfaces Supported: RS-232C, Parallel
Advanced Functions: Diagnostics, Performance Analysis, Usage/Traffic Reporting
Distribution Method: End user
Number Installed to Date: 1 to 10
Date First Installed: 1982
(See Vendor Profile Page V-6)

COMPUTROL
MEGA LINK
Topology: Bus (Linear)
Network Type: Baseband
Maximum Physical Connections: 100
Maximum Distance: 50,000 Feet
Transmission Media: Terrestrial Coaxial Cable
Access Method: Centralized Master/Slave Polling, Distributed CSMA/CD (Contention Type)
Protocols Supported: Asynchronous, SDLC, HDLC
Network Compatibility: DEC DNA/Decnet
Interfaces Supported: RS-232C, IEEE 488, High-Speed Bus
Advanced Functions: Diagnostics
Price:
Purchase: $100 to $3,000
Distribution Method: End user, OEM, Third-party
Number Installed to Date: Over 100
Date First Installed: May 1980
(See Vendor Profile Page V-7)

CONCORD DATA SYSTEMS INC.
TOKENNET
Topology: Bus (tree)
Network Type: Broadband
Maximum Physical Connections: 2,000
Maximum Distance: 25 Miles
Transmission Media: Terrestrial Coaxial Cable
Access Method: Distributed Token Passing (Polling Types)
Protocols Supported: Asynchronous, Hasp, Synchronous, X.25, Bisynchronous, T-1, SDLC, HDLC, Ascii
Network Compatibility: IEEE 802.4
Interfaces Supported: RS-232C, IEEE 488, RS-449, V.24
Advanced Functions: Security/Encryption, Diagnostics, Performance Analysis, Usage/Traffic Reporting
Price:
Purchase: $699 to $1,000

Distribution Method: End user, OEM
Number Installed to Date: 1 to 10
Date First Installed: October 1983
(See Vendor Profile Page V-7)

CONTEL INFORMATION SYSTEMS
CONTEL NET
Topology: Bus (tree)
Network Type: Both
Maximum Physical Connections: 5,000
Maximum Distance: 5 Miles
Transmission Media: Terrestrial Coaxial Cable
Access Method: Distributed CSMA/CD (Contention Type)
Protocols Supported: Asynchronous, X.25, Bisynchronous, 3270
Interfaces Supported: RS-232C
Advanced Functions: Security/Encryption, Diagnostics, Performance Analysis, Usage/Traffic Reporting
Price:
Purchase: $300 to $500
Distribution Method: End user
Number Installed to Date: 25 to 50
Date First Installed: 1981
(See Vendor Profile Page V-7)

CONVERGENT TECHNOLOGIES, INC.
CT-CLUSTER
Topology: Bus (Linear)
Network Type: Baseband
Maximum Physical Connections: 255
Maximum Distance: 2,500 Feet
Transmission Media: Terrestrial Twisted Wire
Access Method: Centralized Master/Slave Polling
Protocols Supported: Synchronous, X.25, Bisynchronous, SDLC, HDLC, Ascii, SNA
Network Compatibility: IBM SNA, IBM BSC, Telenet, Tymnet
Interfaces Supported: RS-232C
Distribution Method: OEM
Number Installed to Date: Over 100
Date First Installed: November 1980
(See Vendor Profile Page V-8).

CORVUS SYSTEMS, INC.
OMNINET
Topology: Bus (Linear)
Network Type: Baseband
Maximum Physical Connections: 64
Maximum Distance: 4,000 Feet
Transmission Media: Terrestrial Twisted Wire
Access Method: Distributed CSMA/CD (Contention Type)
Protocols Supported: Asynchronous, X.25, Ascii
Network Compatibility: IBM SNA
Interfaces Supported: RS-232C, IEEE 488, RS-422/423
Advanced Functions: Diagnostics
Price:
Purchase: $495 to $1,500
Distribution Method: Third-party
Number Installed to Date: Over 100
Date First Installed: September 1979
(See Vendor Profile Page V-8)

CPT CORP.
OFFICE DIALOGUE
Topology: Star
Network Type: Baseband
Maximum Physical Connections: 16
Transmission Media: Terrestrial Twisted Wire
Access Method: Master/Slave Polling (Centralized)
Protocols Supported: Bisynchronous, SDLC, Ascii, X.25 HDLC
Network Compatibility: IBM SNA, X.25
Interfaces Supported: RS-232C, RS-422/423
Advanced Functions: Security/Encryption, Diagnostics
Price:
Purchase: $30,000 to $42,000
Distribution Method: Third-party
(See Vendor Profile Page V-8)

CR COMPUTER SYSTEMS
X-NET
Topology: Bus (tree)
Network Type: Baseband
Maximum Physical Connections: 2,032
Maximum Distance: 3 Miles
Transmission Media: Twin-Ax
Access Method: Centralized Master/Slave Polling
Protocols Supported: Asynchronous, Synchronous, X.25, Bisynchronous, SDLC, HDLC, Ascii
Network Compatibility: IBM SNA, DEC DNA/Decnet, IBM BSC, Honeywell DSE/DSA, Burroughs BNA, Sperry DCA, HP DSN
Interfaces Supported: RS-232C
Advanced Functions: Security/Encryption, Diagnostics, Performance Analysis, Usage/Traffic Reporting
Price:
Purchase: $1,000
Distribution Method: End user
Number Installed to Date: 50 to 100
Date First Installed: February 1972
(See Vendor Profile Page V-8)

CYB SYSTEMS, INC.
UNITE
Topology: Bus (Linear)
Network Type: Baseband
Maximum Physical Connections: 32
Maximum Distance: 1,000 Feet
Transmission Media: Terrestrial Coaxial Cable
Interfaces Supported: RS-232C
Advanced Functions: MOD, DOS, Unix, Passwording
Distribution Method: End user
Number Installed to Date: 1 to 10
(See Vendor Profile Page V-8)

CYGNET TECHNOLOGIES,INC.
COSYSTEM
Topology: Star
Network Type: Broadband
Maximum Distance: 3,000 Miles
Transmission Media: Terrestrial Twisted Wire
Protocols Supported: Hasp, Synchronous, X.25, Bisynchronous, T-1, SDLC, HDLC
Network Compatibility: IBM BSC, HP DSN
Interfaces Supported: Ascii Asynchronous
Advanced Functions: Security/Encryption, Diagnostics, Usage/Traffic Reporting
Price:
Purchase: $1,495 to $1,845
Distribution Method: Third-party
Date First Installed: September 1983
(See Vendor Profile Page V-8)

DAROMEL, INC.
CONVENER-NETWORK CONFERENCING UNIT
Topology: Ring
Network Type: Baseband
Maximum Physical Connections: 20
Transmission Media: Terrestrial Twisted Wire
Access Method: Dial-up
Price:
Purchase: $550 to $1,700
Distribution Method: End user
Number Installed to Date: Over 100
Date First Installed: 1972
(See Vendor Profile Page V-8)

DAROMEL, INC.
CONVENER-PHONE CONFERENCING UNIT
Topology: Ring
Network Type: Baseband
Maximum Physical Connections: 20
Transmission Media: Terrestrial Twisted Wire
Access Method: Dial-up
Price:
Purchase: $550 to $1,700
Distribution Method: End user
Number Installed to Date: Over 100
Date First Installed: 1972

DAROMEL, INC.
DAROME 2020 COCONVENER
Topology: Ring
Network Type: Baseband
Maximum Physical Connections: 20
Access Method: Dial-up
Distribution Method: End user
Number Installed to Date: 50 to 100
Date First Installed: 1978

DATAMET, INC.
ANP 2020 (ADVANCED NETWORK PROCESSOR)
Topology: Wide Area Packet-Switching
Network Type: Packet-Switching
Protocols Supported: Asynchronous, X.25, Bisynchronous, Ascii, 3270 BSC
Network Compatibility: IBM BSC, Telenet, Tymnet, X.25, X.75, Gateway
Interfaces Supported: RS-232C, RS-422/423, V.35
Advanced Functions: Performance Analysis, Alarms, On-line Configuration
Number Installed to Date: 10 to 25
Date First Installed: September 1983
(See Vendor Profile Page V-8)

DATAMET, INC.
EDX-P
Network Type: Packet-Switching
Transmission Media: Terrestrial Twisted Wire, Coaxial Cable; Free-Space Fiber Optics, Infrared Light, Microwaves; Satellite
Access Method: Centralized PBX (Switching Type), Master/Slave Polling, X.25, X.75
Protocols Supported: Asynchronous, Synchronous, X.25, Bisynchronous, HDLC, Ascii
Network Compatibility: IBM BSC, Telenet, DDS, Tymnet, Packet
Interfaces Supported: RS-232C, CCITT
Advanced Functions: Diagnostics, Performance Analysis, Usage/Traffic Reporting, Error Checking, Congestion Control
Distribution Method: End user
Number Installed to Date: 50 to 100
Date First Installed: 1981

DATA GENERAL CORP.
XODIAC/NETWORK BUS SYSTEM/4400
Topology: Bus (Linear)
Network Type: Baseband
Maximum Physical Connections: 32
Maximum Distance: 1 Mile
Transmission Media: Terrestrial Coaxial Cable
Access Method: Distributed Token Passing (Polling Types)
Protocols Supported: Xodiac
Network Compatibility: IBM SNA, IBM BSC, Telenet, Tymnet
Interfaces Supported: RS-232C, RS-422/423, Mil. 188C, RS-449, CCITT
Distribution Method: End user
Date First Installed: February 1982
(See Vendor Profile Page V-9)

DATAPOINT CORP.
ARC
Topology: Bus (tree)
Network Type: Baseband
Maximum Physical Connections: 255
Maximum Distance: 4 Miles
Transmission Media: Terrestrial Coaxial Cable
Access Method: Distributed Token Passing (Polling Types)
Protocols Supported: Asynchronous, Synchronous, X.25, Bisynchronous, T-1, SDLC, HDLC, Ascii
Network Compatibility: IBM SNA, IBM BSC, Honeywell DSE/DSA, Burroughs BNA, Sperry DCA, Arc Link, Telenet, Tymnet
Interfaces Supported: RS-232C
Advanced Functions: Security/Encryption, Diagnostics, Performance Analysis, Usage/Traffic Reporting
Price:
Lease: $280 to $5
Purchase: $5,950 to $8,950
Average Monthly Maintenance: $70
Distribution Method: End user
Number Installed to Date: Over 100
Date First Installed: October 1977
(See Vendor Profile Page V-9)

DATASTREAM COMMUNICATIONS, INC.
774
Network Type: Baseband
Maximum Physical Connections: 64
Transmission Media: Terrestrial Coaxial Cable
Access Method: Dial-up
Protocols Supported: Bisynchronous, Ascii, Ebcdic
Network Compatibility: IBM SNA
Interfaces Supported: RS-232C
Advanced Functions: Security/Encryption, Diagnostics, Usage/Traffic Reporting
Price:
Purchase: $4,000 to $10,000
Average Monthly Maintenance: $125
Distribution Method: End user
Number Installed to Date: Over 100
Date First Installed: 1980
(See Vendor Profile Page V-9)

DATASTREAM COMMUNICATIONS, INC.
776
Network Type: Baseband
Maximum Physical Connections: 64
Transmission Media: Terrestrial Coaxial Cable
Access Method: Dial-up
Protocols Supported: Bisynchronous, Ascii, Ebcdic
Network Compatibility: IBM SNA
Interfaces Supported: RS-232C
Advanced Functions: Security/Encryption, Diagnostics, Usage/Traffic Reporting
Price:
Purchase: $4,000 to $8,000
Average Monthly Maintenance: $100
Distribution Method: End user
Number Installed to Date: Over 100
Date First Installed: 1980

DATASTREAM COMMUNICATION, INC.
874
Network Type: Baseband
Maximum Physical Connections: 64
Transmission Media: Terrestrial Coaxial Cable
Access Method: Dial-up
Protocols Supported: Ascii, Ebcdic
Network Compatibility: IBM SNA
Interfaces Supported: RS-232C
Advanced Functions: Security/Encryption, Diagnostics, Usage/Traffic Reporting
Price:
Purchase: $16,000
Average Monthly Maintenance: $115
Distribution Method: End user
Number Installed to Date: Over 100
Date First Installed: 1981

DATASTREAM COMMUNICATIONS, INC.
MPC
Network Type: Baseband
Maximum Physical Connections: 64
Transmission Media: Terrestrial Coaxial Cable
Access Method: Dial-up
Protocols Supported: Ascii, Ebcdic
Network Compatibility: IBM SNA
Interfaces Supported: RS-232C
Advanced Functions: Security/Encryption, Diagnostics, Usage/Traffic Reporting
Price:
Purchase: $6,000 to $12,000
Average Monthly Maintenance: $150
Distribution Method: End user
Number Installed to Date: 1 to 10
Date First Installed: January 1984

DAVONG SYSTEMS, INC.
D6300-015
Topology: Ring
Network Type: Baseband
Maximum Physical Connections: 255
Transmission Media: Terrestrial Coaxial Cable
Access Method: Distributed Token Passing (Polling Types)
Network Compatibility: IBM SNA, XNS (Xerox)
Advanced Functions: Diagnostics
Price:
Purchase: $645
Distribution Method: Third-party
Number Installed to Date: 50 to 100
Date First Installed: April 1983
(See Vendor Profile Page V-10)

DCA/TAC
DCA INA/NETWORK
Topology: Bus (Linear and Tree), Ring
Network Type: Both
Maximum Physical Connections: 32,767
Transmission Media: Terrestrial Twisted Wire, Coaxial Cable, Fiber Optics; Free Space Infrared Light, Microwaves, Laser, Satellite
Protocols Supported: Asynchronous, HASP, Synchronous, X.25, Bisynchronous, T-1, SDLC, HDLC, Ascii
Network Compatibility: IBM SNA, DEC DNA/Decnet, IBM BSC, Honeywell DSE/DSA, Burroughs BNA, Primenet, Sperry DCA, XNS (Xerox), HP DSN, Arc Link, Gminet, Telenet, DDS, Tymnet
Interfaces Supported: RS-232C, RS-422/423, CCITT
Advanced Functions: Security/Encryption, Diagnostics, Performance Analysis, Usage/Traffic Reporting
Distribution Method: End user, OEM, Third-party
(See Vendor Profile Page V-10)

DELTA SYSTEMS, INC.
WHITE BOX I
Topology: Bus (Linear)
Network Type: Broadband
Maximum Physical Connections: 2
Maximum Distance: 13,000 Miles
Transmission Media: Leased Lines
Access Method: Centralized Master/Slave Polling
Protocols Supported: Asynchronous, Synchronous, Ascii
Network Compatibility: ICL System
Interfaces Supported: RS-232C
Advanced Functions: Security/Encryption, Diagnostics, Performance Analysis
Price:
Purchase: $1,500
Average Monthly Maintenance: $75
Distribution Method: End user
Number Installed to Date: Over 100
Date First Installed: December 1980
(See Vendor Profile Page V-10)

THE DESTEK GROUP
DESNET
Topology: Bus (Linear)
Network Type: Fiberoptics
Maximum Physical Connections: 350
Maximum Distance: 6,500 Feet
Transmission Media: Terrestrial Coaxial Cable, Fiber Optics
Access Method: Distributed CSMA/CD (Contention Type)
Protocols Supported: HDLC
Network Compatibility: IBM SNA
Interfaces Supported: RS-232C, IEEE 488, IBM PC
Advanced Functions: Diagnostics, Usage/Traffic Reporting
Price:
Purchase: $600 to $700
Distribution Method: End user
Number Installed to Date: Over 100
Date First Installed: November 1982
(See Vendor Profile Page V-10)

DIGITAL EQUIPMENT CORP.
DECNET
Topology: Bus (Linear), Star
Network Type: Both
Maximum Physical Connections: 1,023
Transmission Media: Terrestrial Coaxial Cable
Access Method: Controlled Master/Slave Polling, Distributed CSMA/CD (Contention Type)
Protocols Supported: Asynchronous, Hasp, Synchronous, X.25, Bisynchronous, SDLC, Ascii
Network Compatibility: IBM SNA, DEC DNA/Decnet, IBM BSC, Telenet, Tymnet
Interfaces Supported: RS-232C, RS-422/423, RS-449, CCITT
Advanced Functions: Diagnostics, Performance Analysis, Usage/Traffic Reporting
Distribution Method: End user
Date First Installed: 1976
(See Vendor Profile Page V-10)

DIGITAL MICROSYSTEMS, INC. (DMSI)
HINET
Topology: Star, Ring
Network Type: Baseband
Maximum Physical Connections: 32
Transmission Media: Terrestrial Fiber Optics
Access Method: Master/Slave Polling (Centralized)
Protocols Supported: Uniscope
Network Compatibility: IBM BSC, Sperry DCA
Interfaces Supported: RS-232C, RS-444
Advanced Functions: Diagnostics, Performance Analysis, Usage/Traffic Reporting
Price:
Purchase: $600
Distribution Method: End user
Date First Installed: January 1984
(See Vendor Profile Page V-12)

GANDALF DATA, INC.
PACXNET
Topology: Star
Network Type: Baseband
Maximum Physical Connections: 8
Transmission Media: Terrestrial Twisted Wire, Coaxial Cable, Fiber Optics
Access Method: Centralized PBX (Switching Type)
Protocols Supported: Asynchronous, Synchronous, X.25, Bisynchronous, T-1, SDLC, HDLC, Ascii
Network Compatibility: IBM SNA, IBM BSC, Telenet, DDS, Tymnet
Interfaces Supported: RS-232C, RS-422/423, MIL 188C, RS-449, CCITT, 20 mA
Advanced Functions: Diagnostics, Usage/Traffic Reporting
Price:
Purchase: $600 to $135
Average Monthly Maintenance: $300
Distribution Method: End user
Number Installed to Date: 25 to 50
Date First Installed: October 1982
(See Vendor Profile Page V-12)

GATEWAY COMMUNICATIONS, INC.
G/NET
Topology: Bus (Linear)
Network Type: Baseband
Maximum Physical Connections: 255
Maximum Distance: 7,000 Feet
Transmission Media: Terrestrial Coaxial Cable
Access Method: Distributed CSMA/CD (Contention Type)
Protocols Supported: Asynchronous, Hasp, Synchronous, X.25, Bisynchronous, SDLC, HDLC, Ascii
Network Compatibility: IBM SNA, IBM BSC, Primenet, Tymnet
Interfaces Supported: RS-232C, RS-422/423, V35

Advanced Functions: Diagnostics, Performance Analysis
Price:
Purchase: $585
Distribution Method: OEM
Number Installed to Date: Over 100
Date First Installed: September 1983
(See Vendor Profile Page V-15)

GENERAL ELECTRIC CO.
GESLINK LDS-072A
Topology: Point to Point
Network Type: Microwave
Maximum Distance: 10 Miles
Transmission Media: Free Space Microwaves
Protocols Supported: Asynchronous
Interfaces Supported: RS-232C
Distribution Method: Third-party
Number Installed to Date: 1,000
Date First Installed: March 1982
(See Vendor Profile Page V-13)

GENERAL ELECTRIC CO.
GESLINK LDS-063A
Network Type: Microwave
Maximum Distance: 10 Miles
Transmission Media: Free Space Microwaves
Protocols Supported: Synchronous
Network Compatibility: All Synchronous
Interfaces Supported: RS-232C, RS-422/423, RS-449
Distribution Method: Third-party
Number Installed to Date: 1,000
Date First Installed: March 1982

GENERAL ELECTRIC CO.
GESLINK LSD-112A/122A
Topology: Point to Point
Network Type: Microwave
Maximum Distance: 7 Miles
Transmission Media: Free Space Microwaves
Protocols Supported: Synchronous, T-1
Network Compatibility: All Synchronous
Interfaces Supported: RS-422/423, DSX-1,1C
Distribution Method: Third-party
Number Installed to Date: 1,000
Date First Installed: March 1982

GENERAL ELECTRIC CO.
LSD-062A
Topology: Point to Point
Network Type: Microwave
Maximum Distance: 7 Miles
Transmission Media: Free Space Microwaves
Protocols Supported: Synchronous
Interfaces Supported: RS-232C, RS-422/423, RS-449, V.35
Distribution Method: Third-party
Number Installed to Date: 1,000
Date First Installed: March 1982

GOULD, INC.
NODWAY
Topology: Bus (tree)
Network Type: Both
Maximum Physical Connections: 250
Maximum Distance: 3 Miles
Transmission Media: Terrestrial Coaxial Cable
Access Method: Distributed Token Passing (Polling Types)
Protocols Supported: Asynchronous, Synchronous, X.25, Bisynchronous, T-1, SDLC, HDLC, Ascii, Modbus
Interfaces Supported: RS-232C, RS-449, DMA
Advanced Functions: Diagnostics, Performance Analysis, Usage/Traffic Reporting, Network Reconfiguration
Price:
Purchase: $1,500
Distribution Method: End user
Date First Installed: January 1983
(See Vendor Profile Page V-13)

HARRIS CORP.
HARRIS 9070 (BASEBAND)
Topology: Bus (Linear)
Network Type: Baseband
Maximum Physical Connections: 32
Maximum Distance: 5,000 Feet
Transmission Media: Terrestrial Coaxial Cable
Access Method: Distributed Token Passing (Polling Types)
Protocols Supported: Asynchronous, Synchronous, Bisynchronous, SDLC
Network Compatibility: IBM SNA
Interfaces Supported: RS-232C, RS-422/423, RS-449
Advanced Functions: Diagnostics, Performance Analysis
Price:
Purchase: $1,200
Distribution Method: End user
(See Vendor Profile Page V-14)

HARRIS CORP.
HARRIS 9070 (BROADBAND)
Topology: Bus (Linear)
Network Type: Broadband
Maximum Physical Connections: 1,000
Maximum Distance: 3 Miles
Transmission Media: Terrestrial Coaxial Cable
Access Method: Distributed Token Passing (Polling Types)
Protocols Supported: Asynchronous, Synchronous, Bisynchronous, SDLC
Network Compatibility: IBM SNA
Interfaces Supported: RS-232C, RS-422/423, RS-449
Advanced Functions: Diagnostics, Usage/Traffic Reporting
Price:
Purchase: $1,250
Distribution Method: End user

IDEAS, INC.
INET
Topology: Bus (tree)
Network Type: Broadband
Maximum Physical Connections: 1,000
Maximum Distance: 5 Miles
Transmission Media: Terrestrial Coaxial Cable
Access Method: Distributed CSMA/CD (Contention Type)
Protocols Supported: Asynchronous, Synchronous, X.25, Bisynchronous, SDLC, HDLC, Ascii
Network Compatibility: DEC DNA/Decnet, Honeywell DSE/DSA, Burroughs BNA, Sperry, DCA, HP DSN, Telenet, Tymnet
Interfaces Supported: RS-232C
Advanced Functions: Diagnostics, Performance Analysis, Usage/Traffic Reporting
Price:
Purchase: $500
Average Monthly Maintenance: $20
Distribution Method: End user
Date First Installed: July 1981
(See Vendor Profile Page V-15)

IDE ASSOCIATES, INC.
IDEANET/NPR-001 SPR-1N
Topology: Bus (Linear)
Network Type: Baseband
Maximum Physical Connections: 64,000
Maximum Distance: 2,000 Feet
Transmission Media: Terrestrial Coaxial Cable
Access Method: Distributed CSMA/CD (Contention Type)
Protocols Supported: SDLC, HDLC
Network Compatibility: PC-Net
Interfaces Supported: Coaxial Connections
Advanced Functions: Diagnostics
Distribution Method: Third-party
(See Vendor Profile Page V-15)

IDE ASSOCIATES, INC.
IDEASHARE/SPB-III
Topology: Star
Network Type: RS-232
Maximum Physical Connections: 4
Maximum Distance: 200 Feet
Transmission Media: RS-232
Network Compatibility: None
Interfaces Supported: RS-232C
Advanced Functions: Diagnostics
Distribution Method: Third-party
Date First Installed: December 1983

INFOLINK
SYSTEM 5000
Topology: Multidrop
Network Type: Baseband
Maximum Distance: 15,000 Feet
Transmission Media: Terrestrial Twisted Wire
Access Method: Distributed Token Passing (Polling Types)
Protocols Supported: Asynchronous, Synchronous, SDLC
Network Compatibility: IBM SNA, DEC DNA/Decnet, IBM BSC, Honeywell DSE/DSA, Burroughs BNA, Primenet, Sperry DCA, DDS
Interfaces Supported: RS-232C, Teletype
Advanced Functions: Diagnostics, Performance Analysis, Usage/Traffic Reporting
Price:
Lease: $60 to $180
Purchase: $2,000 to $4,000
Average Monthly Maintenance: $30
Distribution Method: End user
(See Vendor Profile Page V-15)

INTECOM, INC.
LANMARK
Topology: Star
Network Type: Baseband
Maximum Physical Connections: 32
Maximum Distance: 54,000 Feet
Transmission Media: Terrestrial Twisted Wire, Fiber Optics
Access Method: Controlled PBX (Switching Type)
Network Compatibility: IBM SNA, Ethernet
Interfaces Supported: IEEE 802
Advanced Functions: Diagnostics, Performance Analysis, Usage/Traffic Reporting
Price:
Purchase: $500 to $600
Distribution Method: End user
(See Vendor Profile Page V-16)

INTERACTIVE SYSTEMS/3M
VIDEODATA LAN/1
Topology: Bus (tree)
Network Type: Broadband
Maximum Physical Connections: 256
Maximum Distance: 14 Miles
Transmission Media: Terrestrial Coaxial Cable
Access Method: Distributed Token Passing (Polling Types)
Protocols Supported: Asynchronous, Hasp, Ascii
Network Compatibility: IBM SNA, IBM BSC, Sperry DCA
Interfaces Supported: RS-232C
Advanced Functions: Diagnostics, Performance Analysis
Price:
Lease: $15 to $25
Purchase: $400 to $600
Distribution Method: End user
Number Installed to Date: 1 to 10
Date First Installed: August 1983
(See Vendor Profile Page V-16)

INTERLAN, INC.
INTERLAN NET/PLUS
Topology: Bus (Linear)
Network Type: Baseband
Maximum Physical Connections: 1,024
Maximum Distance: 2 Miles
Transmission Media: Terrestrial Coaxial Cable
Access Method: Distributed CSMA/CD (Contention Type)
Protocols Supported: Asynchronous, Ascii
Network Compatibility: DEC DNA/Decnet, XNS (Xerox), Telenet, Tymnet
Interfaces Supported: RS-232C
Advanced Functions: Diagnostics, Performance Analysis, Usage/Traffic Reporting
Price:
Purchase: $400
Distribution Method: End user
Number Installed to Date: Over 100
Date First Installed: September 1983
(See Vendor Profile Page V-16)

INTER-LINK
STATIONMATE
Topology: Bus (Linear)
Network Type: Baseband
Maximum Physical Connections: 64
Maximum Distance: 10,000 Feet
Transmission Media: Terrestrial Twisted Wire

Access Method: Distributed CSMA/CD (Contention Type)
Protocols Supported: Asynchronous, Ascii
Network Compatibility: Telenet, Tymnet, Uninet Compuserve
Interfaces Supported: RS-232C, CCITT.
Advanced Functions: Diagnostics, Usage/Traffic Reporting, Password Protection
Price:
Purchase: $1,450
Average Monthly Maintenance: $15
Distribution Method: Third-party
Number Installed to Date: 1 to 10
Date First Installed: November 1983
(See Vendor Profile Page V-16)

INTERGIL SYSTEMS, INC.
GE NET
Topology: Bus (Linear)
Network Type: Broadband
Maximum Physical Connections: 1,000
Maximum Distance: 3 Miles
Transmission Media: Terrestrial Coaxial Cable
Access Method: Distributed CSMA/CD (Contention Type)
Protocols Supported: Asynchronous, HDLC, Ascii, CCM
Network Compatibility: DEC DNA/Decnet, DDS
Interfaces Supported: RS-232C
Advanced Functions: Diagnostics, Performance Analysis, Usage/Traffic Reporting
Price:
Purchase: $800 to $1,000
Distribution Method: End user
Number Installed to Date: 25 to 50
Date First Installed: December 1982
(See Vendor Profile Page V-17)

ITT TELECOM PRODUCTS, INC.
MULTITENENT
Network Type: Baseband
Access Method: Centralized PBX (Switching Type)
Protocols Supported: Asynchronous, Synchronous, T-1, Ascii
Network Compatibility: DEC DNA/Decnet
Interfaces Supported: RS-232C
Advanced Functions: Diagnostics, Usage/Traffic Reporting
Distribution Method: End user
Number Installed to Date: Over 100
Date First Installed: 1980
(See Vendor Profile Page V-17)

JG SYSTEMS
JCS A-10
Topology: Bus (Linear)
Network Type: Broadband
Maximum Distance: 600 Feet
Access Method: Centralized Master/Slave Polling
Protocols Supported: Synchronous
Network Compatibility: IBM SNA, IBM BSC
Interfaces Supported: RS-232C, Centronics
Advanced Functions: Security/Encryption, Diagnostics, Usage/Traffic Reporting
Price:
Purchase: $495
Average Monthly Maintenance: $150
Distribution Method: OEM, Third-party
Number Installed to Date: 2,000
Date First Installed: May 1982
(See Vendor Profile Page V-17)

LOGICA, INC.
POLYNET
Topology: Ring
Network Type: Baseband
Maximum Distance: 2 Miles
Transmission Media: Terrestrial Twisted Wire, Fiber Optics
Access Method: DMA
Protocols Supported: Asynchronous, Ascii
Interfaces Supported: RS-232C, DEC Unibus
Advanced Functions: Built-in Error Correction
Price:
Purchase: $1,400 to $4,900
Distribution Method: Third-party
Number Installed to Date: 1 to 10
Date First Installed: January 1984
(See Vendor Profile Page V-18)

LYNCH COMMUNICATION SYSTEMS, INC.
VOICE PLUS DATA SUBSCRIBER CARRIER
Topology: Point to Point
Network Type: FSK
Maximum Physical Connections: 1
Transmission Media: Terrestrial Twisted Wire
Protocols Supported: Asynchronous, Hasp, Synchronous, X.25, Bisynchronous, T-1, SDLC, HDLC, Ascii
Interfaces Supported: 4 Wire
Advanced Functions: Diagnostics
Price:
Purchase: $203 to $256
Distribution Method: End user
Number Installed to Date: 25 to 50
(See Vendor Profile Page V-18)

METAPATH, INC.
ROBIN DESKTOP DATA SWITCH
Topology: Bus (Linear)
Network Type: Baseband
Maximum Physical Connections: 225
Maximum Distance: 5,000 Feet
Transmission Media: Terrestrial Coaxial Cable
Access Method: Absent Token
Protocols Supported: Asynchronous, Ascii
Network Compatibility: IBM SNA, IBM BSC, XNS (Xerox), Tplanet, DDS, Tymnet
Interfaces Supported: RS-232C, Centronics
Advanced Functions: Security/Encryption, Diagnostics, Performance Analysis, Usage/Traffic Reporting
Price:
Purchase: $400
Distribution Method: OEM, Third-party
Number Installed to Date: 50 to 100
(See Vendor Profile Page V-18)

MICOM SYSTEMS, INC.
INSTANET
Topology: Star
Network Type: TDM
Transmission Media: Terrestrial Twisted Wire; Free Space Microwaves, Laser
Access Method: Centralized PBX (Switching Type)
Protocols Supported: Asynchronous, X.25, T-1, Ascii
Network Compatibility: Telenet, Tymnet
Interfaces Supported: RS-232C, RS-422/423
Advanced Functions: Diagnostics, Usage/Traffic Reporting
Price:
Purchase: $100 to $250
Average Monthly Maintenance: $400
Distribution Method: End user
Number Installed to Date: More Than 100
Date First Installed: September 1979
(See Vendor Profile Page V-19)

MODULAR COMPUTER SYSTEMS, INC. (MODCOMP)
MAXNET
Topology: Bus (Inear)
Network Type: Baseband
Maximum Physical Connections: 255
Maximum Distance: 600 Miles
Transmission Media: Terrestrial Twisted Wire, Coaxial Cable, Ribbon/Parallel Wire, Fiber Optics; 4 Wire
Access Method: Maxnet
Protocols Supported: Maxnet Proprietary
Interfaces Supported: RS-232C, V.25, WE301
Advanced Functions: Diagnostics, Usage/Traffic Reporting
Price:
Purchase: $3,500 to $30,000
Distribution Method: OEM
Number Installed to Date: Over 100
Date First Installed: September 1974
(See Vendor Profile Page V-20)

NBS, INC.
NBI NET
Topology: Bus (Linear)
Network Type: Baseband
Maximum Physical Connections: 500
Maximum Distance: 6,000 Feet
Transmission Media: Terrestrial Coaxial Cable
Access Method: Distributed CSMA/CD (Contention Type)
Protocols Supported: Asynchronous, Bisynchronous
Network Compatibility: IBM SNA, IBM BSC
Interfaces Supported: RS-232C, IEEE 802.3
Advanced Functions: Diagnostics, Usage/Traffic Reporting
Price:
Purchase: $900
Distribution Method: Third-party
Date First Installed: June 1984
(See Vendor Profile Page V-21)

NCR CORP.
MIRLAN (MID RANGE LAN)
Topology: Bus (tree)
Network Type: Baseband
Maximum Distance: 12,000 Feet
Access Method: Distributed CSMA/CD (Contention Type)
Distribution Method: End user
(See Vendor Profile Page V-21)

NCR CORP.
NCR DECISION NET
Topology: Bus (Linear)
Network Type: Baseband
Maximum Physical Connections: 64
Maximum Distance: 4,000 Feet
Transmission Media: Terrestrial Twisted Wire
Access Method: Distributed CSMA/CD (Contention Type)
Protocols Supported: Omninet
Network Compatibility: Omninet
Advanced Functions: Diagnostics, Usage/Traffic Reporting, File Sharing
Price:
Purchase: $500
Distribution Method: End user
Date First Installed: October 1983

NESTAR SYSTEMS, INC.
PLAN SERIES
Topology: Star
Network Type: Baseband
Maximum Physical Connections: 255
Maximum Distance: 4 Miles
Transmission Media: Terrestrial Coaxial Cable
Access Method: Distributed Token Passing (Polling Types)
Protocols Supported: Asynchronous, Hasp, Synchronous, Bisynchronous, T-1, SDLC, HDLC, Ascii, Spreadsheets
Network Compatibility: IBM SNA, IBM BSC, XNS (Xerox), Arc Link, Telenet, Tymnet
Interfaces Supported: RS-232C, CCITT
Advanced Functions: Security/Encryption, Diagnostics, Usage/Traffic Reporting
Price:
Purchase: $2,000 to $100,000
Distribution Method: End user
Number Installed to Date: Over 100
Date First Installed: January 1982
(See Vendor Profile Page V-21)

NETWORK PRODUCTS, INC.
LOCAL MUX
Topology: Point to Point
Network Type: Baseband
Maximum Physical Connections: 1
Maximum Distance: 10,000 Feet
Transmission Media: Terrestrial Twisted Wire
Access Method: Direct
Protocols Supported: Asynchronous, Hasp, Synchronous, X.25, Bisynchronous, SDLC, HDLC, Ascii
Interfaces Supported: RS-232C
Advanced Functions: Diagnostics
Price:
Purchase: $106
Average Monthly Maintenance: $13
Distribution Method: End user

Number Installed to Date: Over 100
Date First Installed: April 1983
(See Vendor Profile Page V-21)

NETWORK SYSTEMS CORP.
HYPER BUS
Topology: Bus (tree)
Network Type: Baseband
Maximum Physical Connections: 200
Maximum Distance: 4,000 Feet
Transmission Media: Terrestrial Coaxial Cable; Free Space Infrared Light, Microwaves, Laser; Satellite
Access Method: Virtual Time-sharing
Protocols Supported: Asynchronous, Synchronous, Bisynchronous, T-1, SDLC, Ascii
Network Compatibility: IBM SNA, IBM BSC, DDS
Interfaces Supported: RS-232C, IEEE 488, RS-422/423, MIL 188C, RS-449, CCITT, 306
Advanced Functions: Diagnostics, Usage/Traffic Reporting
Price:
Purchase: $8,000
Distribution Method: End user
Number Installed to Date: Over 100
Date First Installed: 1982
(See Vendor Profile Page V-21)

NETWORK SYSTEMS CORP.
HYPER CHANNEL
Topology: Bus (Linear)
Network Type: Baseband
Maximum Physical Connections: 64
Maximum Distance: 1,200 Feet
Transmission Media: Terrestrial Coaxial Cable; Free Space Infrared Light, Microwaves, Laser; Satellite
Access Method: Distributed CSMA/CD (Contention Type)
Protocols Supported: Heap, Synchronous, Bisynchronous, T-1, SDLC, HDLC, Ascii, T-2, T-3
Network Compatibility: IBM SNA, IBM BSC, Burroughs BNA, DDS
Interfaces Supported: RS-232C, IEEE 488, RS-422/423, MIL 188C, RS-449, CCITT, 306
Advanced Functions: Security/Encryption, Diagnostics, Usage/Traffic Reporting
Price:
Purchase: $40,000
Distribution Method: End user
Number Installed to Date: Over 100
Date First Installed: 1974

NORTHERN TELECOM, INC.
Topology: Ring
Network Type: Baseband
Maximum Physical Connections: 20
Maximum Distance: 5,000 Feet
Transmission Media: Terrestrial Coaxial Cable
Access Method: Distributed Token Passing (Polling Types)
Protocols Supported: Asynchronous, Heap, Synchronous, Bisynchronous, SDLC, Ascii
Network Compatibility: IBM SNA, IBM BSC, Burroughs BNA, Sperry DCA, Telenet, Tymnet
Interfaces Supported: RS-232C
Advanced Functions: Diagnostics
Price:
Purchase: $1,600 to $1,800
Distribution Method: End user
Date First Installed: 1977
(See Vendor Profile Page V-22)

NOVELL, INC.
NETWARE-S
Topology: Star
Network Type: Baseband
Maximum Physical Connections: 24
Maximum Distance: 3,000 Feet
Transmission Media: Terrestrial Twisted Wire
Access Method: Proprietary
Protocols Supported: Asynchronous, X.25, Ascii
Network Compatibility: Arc Lnk, DDS
Interfaces Supported: RS-232C, RS-422/423, MIL 188C
Advanced Functions: Security/Encryption, Diagnostics, Performance Analysis, Usage/Traffic Reporting
Price:
Purchase: $250
Distribution Method: OEM, Third-party
Number Installed to Date: 600
Date First Installed: December 1981
(See Vendor Profile Page V-22)

NOVELL, INC.
NETWARE-X
Topology: Bus (Linear)
Network Type: Baseband
Maximum Physical Connections: 250
Maximum Distance: 4,000 Feet
Transmission Media: Terrestrial Coaxial Cable
Access Method: Novel Proprietary
Protocols Supported: Asynchronous, X.25, Ascii
Network Compatibility: Arc Lnk, Omninet
Interfaces Supported: RS-232C, RS-422/423, MIL 188C
Advanced Functions: Security/Encryption, Diagnostics, Performance Analysis, Usage/Traffic Reporting
Price:
Purchase: $695
Average Monthly Maintenance: $35
Distribution Method: Third-party
Date First Installed: April 1983

OMNIDATA
OMNINET
Topology: Bus (Linear and Tree
Network Type: Baseband
Maximum Physical Connections: 64
Maximum Distance: 4,000 Feet
Transmission Media: Terrestrial Twisted Wire
Access Method: Distributed CSMA/CD (Contention Type)
Network Compatibility: SDLC
Interfaces Supported: RS-422/423
Advanced Functions: Security/Encryption, Diagnostics, Usage/Traffic Reporting
Price:
Purchase: $600 to $1,000
Distribution Method: OEM, Third-party
Number Installed to Date: 50 to 100
Date First Installed: October 1982
(See Vendor Profile Page V-22)

ORCHID TECHNOLOGY, INC.
PC NET
Topology: Distributed Bus
Network Type: Baseband
Maximum Physical Connections: 256
Maximum Distance: 7,000 Feet
Transmission Media: Terrestrial Coaxial Cable
Access Method: Distributed CSMA/CD (Contention Type)
Protocols Supported: SDLC
Network Compatibility: IBM SNA
Interfaces Supported: RS-232C
Advanced Functions: Performance Analysis, Usage/Traffic Reporting, Execution
Price:
Purchase: $695
Distribution Method: End user
Number Installed to Date: Over 100
Date First Installed: October 1982
(See Vendor Profile Page V-22)

PERCOM DATA CORP.
PERCOM NET
Topology: Ring
Network Type: Baseband
Maximum Physical Connections: 255
Maximum Distance: 25 Miles
Transmission Media: Terrestrial Twisted Wire
Access Method: Distributed Token Passing (Polling Types)
Protocols Supported: Western Digital
Network Compatibility: Western Digital 2840
Interfaces Supported: RS-422/423
Advanced Functions: Security/Encryption
Price:
Purchase: $695 to $1,700
Distribution Method: Third-party
Number Installed to Date: 1 to 10
Date First Installed: November 1983
(See Vendor Profile Page V-23)

PERIPHERAL TECHNOLOGY, INC.
SNC
Topology: Star
Network Type: Baseband
Maximum Physical Connections: 5
Maximum Distance: 8,000 Feet
Transmission Media: Twisted Wire
Access Method: Centralized Master/Slave Polling
Protocols Supported: Asynchronous, Synchronous, Bisynchronous, Ascii
Network Compatibility: IBM BSC
Interfaces Supported: RS-232C, RS-422
Advanced Functions: Security/Encryption, Diagnostics
Price:
Purchase: $800
Distribution Method: End user
Number Installed to Date: 10 to 25
Date First Installed: November 1983
(See Vendor Profile Page V-23)

PERQ SYSTEMS
ETHERNET
Topology: Bus (tree)
Network Type: Broadband
Maximum Physical Connections: 1,024
Maximum Distance: 2 Miles
Transmission Media: Terrestrial Coaxial Cable
Access Method: Distributed CSMA/CD (Contention Type)
Protocols Supported: Asynchronous, Synchronous, X.25
Network Compatibility: DEC DNA/Decnet
Interfaces Supported: RS-232C, IEEE 488, GPIB-1
Advanced Functions: Security/Encryption, Diagnostics
Price:
Lease: $1,800
Distribution Method: OEM
Number Installed to Date: Over 100
Date First Installed: 1982
(See Vendor Profile Page V-23)

PROTEON DIGITAL CORP.
OPTONET
Topology: Ring, Single/Multiple Ring
Network Type: Baseband
Maximum Physical Connections: 256
Maximum Distance: 2 Miles
Transmission Media: Terrestrial Twisted Wire, Fiber Optics; Free Space Infrared Light, Laser
Access Method: Centralized Master/Slave Polling; Distributed Token Passing (Polling Types)
Protocols Supported: Asynchronous, Heap, Synchronous, X.25, Bisynchronous, SDLC, HDLC, Ascii, DDCMP
Network Compatibility: IBM SNA, DEC DNA/Decnet, Honeywell DSE/DSA, Modbus, Asynchronous/Bisynchronous Data Highway
Interfaces Supported: RS-232C, IEEE 488, RS-422/423, RS-449, CCITT
Advanced Functions: Security/Encryption, Diagnostics, Performance Analysis, Usage/Traffic Reporting, Network Monitor
Price:
Purchase: $100,000
Distribution Method: End user
Number Installed to Date: 50 to 100
Date First Installed: August 1980
(See Vendor Profile Page V-23)

PRAGMATRONICS, INC.
TBNET
Topology: Bus (Linear)
Network Type: Baseband
Maximum Physical Connections: 2,000
Maximum Distance: 5 Miles
Transmission Media: Terrestrial Coaxial Cable; Free Space Infrared Light
Access Method: Distributed CSMA/CD (Contention Type)
Protocols Supported: Asynchronous, Synchronous, HDLC, Ascii
Network Compatibility: Transport
Interfaces Supported: RS-232C, RS-422/423

Advanced Functions: Diagnostics, Performance Analysis, Usage/Traffic Reporting
Price:
Lease: $25 to $33
Purchase: $600 to $800
Distribution Method: End user
Number Installed to Date: 1 to 10
Date First Installed: 1979
(See Vendor Profile Page V-34)

PRIME COMPUTER, INC.
RINGNET
Topology: Ring
Network Type: Baseband
Access Method: Distributed Token Passing (Polling Types)
Protocols Supported: Asynchronous, HASP, Synchronous, X.25, Bisynchronous, SDLC, HDLC, Ascii
Network Compatibility: IBM BSC, Honeywell DSE/DSA, Primenet, Sperry DCA, Telenet, Tymnet
Interfaces Supported: RS-232C, CCITT
Price:
Purchase: $5,000
Average Monthly Maintenance: $30
Distribution Method: End user
(See Vendor Profile Page V-34)

PROLINK CORP.
PROLOOP NETWORK
Topology: Ring
Network Type: Baseband
Maximum Physical Connections: 62
Maximum Distance: 62,000 Feet
Transmission Media: Terrestrial Coaxial Cable
Access Method: Slotted Bus
Protocols Supported: Synchronous, Bisynchronous, SDLC, Ascii, ISO Equivalent
Network Compatibility: IBM SNA, IBM BSC, IBM 3101, ST 100
Interfaces Supported: RS-232C
Advanced Functions: Security/Encryption, Diagnostics, Performance Analysis, Usage/Traffic Reporting, System Customization
Distribution Method: End user
Number Installed to Date: 10 to 25
Date First Installed: October 1983
(See Vendor Profile Page V-34)

PROTEON ASSOCIATES, INC.
PRONET
Topology: Star
Network Type: Baseband, Broadband and Fiber Optic
Maximum Physical Connections: 255
Maximum Distance: 620 Miles
Transmission Media: Terrestrial Twisted Wire, Coaxial Cable, Fiber Optics; Free Space Infrared Light
Access Method: Distributed Token Passing (Polling Types)
Protocols Supported: Asynchronous, Hasp, Synchronous, X.25, Bisynchronous, HDLC
Network Compatibility: IBM SNA, DEC DNA/Decnet, HP
Interfaces Supported: RS-232C, IEEE 488
Advanced Functions: Security/Encryption, Diagnostics, Performance Analysis, Usage/Traffic Reporting
Price:
Purchase: $600 to $2,800
Distribution Method: End user
Number Installed to Date: 50 to 100
Date First Installed: June 1981
(See Vendor Profile Page V-34)

RACAL-MILGO, INC.
PLANET
Topology: Ring
Network Type: Baseband
Maximum Physical Connections: 250
Maximum Distance: 7 Miles
Transmission Media: Terrestrial Coaxial Cable
Access Method: Distributed Token Passing (Polling Types)
Protocols Supported: Asynchronous, Hasp, Synchronous, X.25, Bisynchronous, T-1, SDLC, HDLC, Ascii
Interfaces Supported: RS-232C
Advanced Functions: Security/Encryption, Diagnostics, Performance Analysis, Usage/Traffic Reporting, On-line Inventory
Price:
Lease: $25 to $60
Price:
Purchase: $600 to $800
Distribution Method: End user
Number Installed to Date: 50 to 100
Date First Installed: March 1983
(See Vendor Profile Page V-34)

RAYTHEON CO.
RAYNET IV
Topology: Bus (Linear)
Network Type: Broadband
Maximum Physical Connections: 31
Transmission Media: Terrestrial Coaxial Cable, Ribbon/Parallel Wire; Satellite
Access Method: Controlled Master/Slave Polling
Protocols Supported: Bisynchronous, ALC
Network Compatibility: IBM BSC, Sperry DCA, Telenet, Tymnet
Interfaces Supported: RS-232C, MIL 188C
Advanced Functions: Security/Encryption, Diagnostics, Performance Analysis, Usage/Traffic Reporting, Message Switching
Price:
Lease: $5,000
Average Monthly Maintenance: $2,500
Distribution Method: End user
Number Installed to Date: 1 to 10
Date First Installed: 1982
(See Vendor Profile Page V-35)

SCIENTIFIC DATA SYSTEMS, INC.
SDS NETWORK
Topology: Ethernet Bus
Network Type: Broadband
Maximum Physical Connections: 254
Transmission Media: Terrestrial Coaxial Cable
Access Method: Distributed CSMA/CD (Contention Type)
Protocols Supported: Asynchronous, Synchronous, HDLC, Ascii
Interfaces Supported: RS-232C
Price:
Purchase: $5,000 to $6,000
Average Monthly Maintenance: $95
Distribution Method: Third-party
Number Installed to Date: 25 to 50
Date First Installed: November 1982
(See Vendor Profile Page V-35)

STANDARD DATA CORP.
STANDARD NET
Topology: Bus (Linear)
Network Type: Baseband
Maximum Physical Connections: 255
Maximum Distance: 4,000 Feet
Transmission Media: Terrestrial Coaxial Cable, Fiber Optics; Free Space Microwaves, Laser
Access Method: Distributed CSMA/CD (Contention Type) , CSMA/CA
Network Compatibility: IBM SNA, DEC DNA/Decnet, IBM BSC, Honeywell DSE/DSA, Burroughs BNA, Primenet, Sperry DCA, XNS (Xerox), HP DSN, Arc Link, Omninet, Telenet, DDS, Tymnet
Interfaces Supported: RS-232C, IEEE 488, IEEE 696
Advanced Functions: Security/Encryption, Diagnostics, Usage/Traffic Reporting
Price:
Purchase: $995
Distribution Method: Third-party
Number Installed to Date: 10 to 25
Date First Installed: October 1983
(See Vendor Profile Page V-35)

STRAND COMPUTER SYSTEMS
MICRONETWORK
Topology: Star
Network Type: Baseband
Maximum Physical Connections: 32
Maximum Distance: 6,000 Feet
Transmission Media: Terrestrial Fiber Optics
Protocols Supported: SDLC
Interfaces Supported: RS-422/423
Advanced Functions: Diagnostics, Usage/Traffic Reporting
Price:
Purchase: $4,000 to $6,000
Distribution Method: Third-party
(See Vendor Profile Page V-35)

STRATUS COMPUTER, INC.
STRATALINK
Topology: Ring
Network Type: Baseband
Maximum Physical Connections: 32
Maximum Distance: 2,500 Miles
Transmission Media: Terrestrial Coaxial Cable
Access Method: Proprietary X.25-Based
Protocols Supported: Asynchronous, Synchronous, X.25, Bisynchronous, SDLC, HDLC, Ascii, X.29 FTPS
Network Compatibility: IBM SNA, IBM BSC
Interfaces Supported: RS-232C, RS-422/423, Bus Interface
Advanced Functions: Security/Encryption, Diagnostics, Performance Analysis, Usage/Traffic Reporting
Distribution Method: End user
Number Installed to Date: 25 to 50
Date First Installed: November 1981
(See Vendor Profile Page V-35)

SYNTREX, INC.
SYNNET
Topology: Bus (tree)
Network Type: Baseband
Maximum Physical Connections: 420
Maximum Distance: 1,700 Feet
Transmission Media: Terrestrial Coaxial Cable
Access Method: Distributed CSMA/CD (Contention Type)
Protocols Supported: Asynchronous, Synchronous, Bisynchronous, SDLC, Ascii, Syntrex Proprietary
Network Compatibility: Syntrex Proprietary
Interfaces Supported: RS-232C, Syntrex Proprietary
Advanced Functions: Diagnostics, Usage/Traffic Reporting
Price:
Purchase: $650
Average Monthly Maintenance: $60
Distribution Method: End user, Third-party
Number Installed to Date: 10 to 25
Date First Installed: 1983
(See Vendor Profile Page V-35)

SYTEK, INC.
LOCAL NET
Topology: Bus (tree)
Network Type: Broadband
Maximum Physical Connections: 24,000
Maximum Distance: 70 Miles
Transmission Media: Terrestrial Coaxial Cable
Access Method: Distributed CSMA/CD (Contention Type)
Protocols Supported: Asynchronous, Synchronous, X.25, Bisynchronous, Ascii
Network Compatibility: IBM BSC, XNS (Xerox), HP DSN, Telenet, Tymnet, X.25
Interfaces Supported: RS-232C
Advanced Functions: Security/Encryption, Diagnostics, Performance Analysis, Usage/Traffic Reporting, Name-Serving, Access Control
Price:
Purchase: $345 to $545
Average Monthly Maintenance: $6
Distribution Method: End user
Number Installed to Date: Over 100
Date First Installed: January 1981
(See Vendor Profile Page V-35)

TANDEM COMPUTERS, INC.
NONSTOP II
Topology: Double Ring
Network Type: Fiber Optics
Maximum Physical Connections: 255
Transmission Media: Fiber Optics

Access Method: EXP (Proprietary) Fox
Protocols Supported: Asynchronous, X.25, HDLC
Average Monthly Maintenance: $500
Distribution Method: End user
Number Installed to Date: 25 to 50
(See Vendor Profile Page V-29)

TANDEM COMPUTERS, INC.
NONSTOP TXP
Topology: Double Ring
Network Type: Fiber Optics
Maximum Physical Connections: 255
Maximum Distance: 3,000 Feet
Transmission Media: Terrestrial Fiber Optics
Access Method: Expand (TM), Fox
Protocols Supported: Asynchronous, X.25, HDLC
Average Monthly Maintenance: $500
Distribution Method: End user
Number Installed to Date: 25 to 50

TANDEM COMPUTERS, INC.
NONSTOP 1
Topology: Double Ring
Network Type: Fiber Optics
Maximum Physical Connections: 255
Transmission Media: Fiber Optics
Access Method: Expand (TM), Fox
Protocols Supported: Asynchronous, X.25, HDLC
Average Monthly Maintenance: $500
Distribution Method: End user
Number Installed to Date: 25 to 50

TECMAR, INC.
SLAN
Topology: Bus (Linear)
Network Type: Baseband
Maximum Physical Connections: 1,024
Maximum Distance: 6,000 Feet
Transmission Media: Terrestrial Coaxial Cable
Access Method: Distributed CSMA/CD (Contention Type)
Protocols Supported: Asynchronous, Ascii
Network Compatibility: Telenet, Tymnet
Interfaces Supported: RS-232C, CCITT
Advanced Functions: Security/Encryption, Diagnostics, Performance Analysis, Usage/Traffic Reporting
Price:
Purchase: $1,695 to $3,395
Average Monthly Maintenance: $10
Distribution Method: Third-party
Number Installed to Date: 1 to 10
Date First Installed: July 1983
(See Vendor Profile Page V-29)

TELTONE CORP.
DCS-2
Topology: Star
Network Type: Broadband
Maximum Distance: 18,000 Feet
Transmission Media: Terrestrial Twisted Wire; Free Space, Microwaves; T-1
Access Method: Centralized PBX (Switching Type)
Protocols Supported: Asynchronous, X.25, Bisynchronous, T-1, SDLC, HDLC, Ascii
Interfaces Supported: RS-232C
Advanced Functions: Diagnostics
Price:
Purchase: $490
Distribution Method: End user
Number Installed to Date: Over 100
Date First Installed: 1979
(See Vendor Profile Page V-30)

TRANTOR SYSTEMS LTD.
WEB
Topology: Star
Network Type: Broadband
Maximum Physical Connections: 4
Maximum Distance: 100 Feet
Transmission Media: Terrestrial Twisted Wire, Ribbon/Parallel Wire
Access Method: Centralized PBX (Switching Type)
Protocols Supported: Asynchronous
Network Compatibility: IBM SNA, Burroughs BNA, XNS (Xerox)
Interfaces Supported: RS-232C, IEEE 488
Advanced Functions: Security/Encryption, Diagnostics, Usage/Traffic Reporting
Average Monthly Maintenance: $10
Distribution Method: Third-party
Number Installed to Date: 50 to 100
Date First Installed: June 1983
(See Vendor Profile Page V-31)

UNGERMANN-BASS, INC.
NET/ONE BASEBAND NETWORK INTERFACE UNIT
Topology: Bus (Linear)
Network Type: Baseband
Maximum Physical Connections: 1,024
Maximum Distance: 9,184 Feet
Transmission Media: Terrestrial Coaxial Cable, Free Space Infrared Light
Access Method: Distributed CSMA/CD (Contention Type)
Protocols Supported: Asynchronous, Synchronous, Bisynchronous, SDLC, HDLC, Ascii
Network Compatibility: IBM SNA, DEC DNA/Decnet, IBM BSC, Honeywell DSE/DSA, Burroughs BNA, Sperry DCA, XNS (Xerox), Telenet
Interfaces Supported: RS-232C, IEEE 488, CCITT
Advanced Functions: Performance Analysis, Usage/Traffic Reporting, Configuration Control
Price:
Lease: $500
Distribution Method: End user, OEM, Third-party
Number Installed to Date: 3,300
Date First Installed: July 1980
(See Vendor Profile Page V-32)

UNGERMANN-BASS, INC.
NET/ONE BROADBAND NETWORK INTERFACE UNIT
Topology: Bus (tree)
Network Type: Broadband
Maximum Physical Connections: 1,500
Maximum Distance: 10 Miles
Transmission Media: Terrestrial Coaxial Cable
Access Method: CSMA
Protocols Supported: Asynchronous, Synchronous, Bisynchronous, SDLC, HDLC, Ascii
Network Compatibility: IBM SNA, DEC DNA/Decnet, IBM BSC, Honeywell DSE/DSA, Burroughs BNA, Sperry DCA, XNS (Xerox), Telenet
Interfaces Supported: RS-232C, IEEE 488, CCITT, Dril W-8
Advanced Functions: Performance Analysis, Configuration Control
Price:
Lease: $525
Distribution Method: End user, OEM, Third-party
Number Installed to Date: Over 100
Date First Installed: July 1982

UNGERMANN-BASS, INC.
NET/ONE FIBER OPTICS NETWORK INTERFACE UNIT
Topology: Star
Network Type: Baseband
Maximum Physical Connections: 1,024
Maximum Distance: 9,184 Feet
Transmission Media: Fiber Optics
Access Method: Distributed CSMA/CD (Contention Type)
Protocols Supported: Asynchronous, Synchronous, Bisynchronous, SDLC, HDLC, Ascii, DDCMP
Network Compatibility: IBM SNA, DEC DNA/Decnet, IBM BSC, Honeywell DSE/DSA, Burroughs BNA, Sperry DCA, XNS (Xerox), Telenet
Interfaces Supported: RS-232C, IEEE 488, CCITT, Dril W-8
Advanced Functions: Performance Analysis, Usage/Traffic Reporting, Configuration Control
Price:
Lease: $620
Distribution Method: End user, OEM, Third-party

UNGERMANN-BASS, INC.
SERIES 600 PRODUCTS
Topology: Bus (tree)
Network Type: Broadband
Transmission Media: Terrestrial Coaxial Cable
Access Method: Modems
Protocols Supported: Asynchronous, Synchronous
Interfaces Supported: RS-232C, CCITT
Distribution Method: End user, OEM, Third-party
Number Installed to Date: 8,100
Date First Installed: August 1977

WESTERN TELEMATIC, INC.
SS-6
Topology: Bus (tree)
Network Type: Baseband
Maximum Physical Connections: 8
Maximum Distance: 1,000 Feet
Transmission Media: Terrestrial Twisted Wire, Ribbon/Parallel Wire
Access Method: Distributed Token Passing (Polling Types)
Protocols Supported: Asynchronous
Interfaces Supported: RS-232C
Advanced Functions: Status Indicator
Price:
Purchase: $995
Distribution Method: End user, OEM, Third-party
Number Installed to Date: Over 100
Date First Installed: January 1983
(See Vendor Profile Page V-33)

WINDROCK, INC.
WINNET
Topology: Ring
Network Type: Broadband
Maximum Physical Connections: 432
Maximum Distance: 2,000 Feet
Transmission Media: Terrestrial Twisted Wire
Access Method: Distributed CSMA/CD (Contention Type)
Protocols Supported: Asynchronous, Synchronous, Bisynchronous, Ascii
Network Compatibility: IBM SNA
Interfaces Supported: RS-232C, RS-449
Advanced Functions: Security/Encryption, Diagnostics, Usage/Traffic Reporting
Price:
Purchase: $100
Average Monthly Maintenance: $1
Distribution Method: End user
Number Installed to Date: Over 100
Date First Installed: November 1982
(See Vendor Profile Page V-33)

XEROX CORP.
ETHERNET
Topology: Bus (Linear and Tree)
Network Type: Baseband
Maximum Physical Connections: 1,024
Maximum Distance: 2 Miles
Transmission Media: Terrestrial Coaxial Cable
Access Method: Distributed CSMA/CD (Contention Type)
Protocols Supported: Asynchronous, Synchronous, Bisynchronous
Network Compatibility: IBM BSC, XNS (Xerox)
Interfaces Supported: RS-232C, X.25
Advanced Functions: Diagnostics, Performance Analysis, Usage/Traffic Reporting
Price:
Purchase: $500 to $20,000
Distribution Method: Third-party
Number Installed to Date: Over 100
Date First Installed: 1981
(See Vendor Profile Page V-33)

XYPLEX, INC.
XYPLEX SYSTEM
Topology: Bus (Linear)
Network Type: Broadband
Maximum Physical Connections: 255
Maximum Distance: 8 Miles
Transmission Media: Terrestrial Coaxial Cable
Access Method: Distributed CSMA/CD (Contention Type)

Protocols Supported: Asynchronous
Interfaces Supported: RS-232C, RS-422/423, RS-449, CCITT
Advanced Functions: Diagnostics, Performance Analysis, Usage/Traffic Reporting
Price:
Purchase: $300
Distribution Method: End user
(See Vendor Profile Page V-33)

ZYTEL, INC.
ZTEL LAN
Topology: Ring
Network Type: Baseband
Transmission Media: Terrestrial Twisted Wire, Coaxial Cable, Fiber Optics
Access Method: Distributed Token Passing (Polling Types)
Protocols Supported: Asynchronous, Hasp, Synchronous, X.25, Bisynchronous, T-1, SDLC, HDLC, Ascii
Network Compatibility: IBM SNA, DEC DNA/Decnet, IBM BSC, Honeywell DSE/DSA, Burroughs BNA, Primenet, Sperry DCA, XNS (Xerox), HP DSN, Arc Unit, Omninet, Telenet, DDS, Tymnet
Interfaces Supported: RS-232C, RS-449, IEEE 802.5
Advanced Functions: Diagnostics, Performance Analysis, Usage/Traffic Reporting
Distribution Method: Third-party
(See Vendor Profile Page V-34)

3 COM CORP.
ETHERSERIES
Topology: Bus (tree)
Network Type: Baseband
Maximum Physical Connections: 1,024
Maximum Distance: 7,000 Feet
Transmission Media: Terrestrial Coaxial Cable, Fiber Optics
Access Method: Distributed CSMA/CD (Contention Type)
Protocols Supported: XNS
Network Compatibility: IBM SNA, XNS (Xerox)
Interfaces Supported: RS-232C, SNA, X.25
Advanced Functions: Diagnostics, Usage/Traffic Reporting
Price:
Purchase: $950
Distribution Method: Third-party
(See Vendor Profile Page V-34)

SOFTWARE

Index to Communications Software

This product category includes software products that are specifically designed to perform communications functions, including teleprocessing monitoring and terminal and network management. The index has been arranged alphabetically by vendor and contains information on the memory required to run the product, the price and the page on which the complete product listing can be found.

VENDOR	MODEL	MEMORY REQUIRED	PRICE	PAGE
A. B. Dick Co.	A B DICK COMPANY HASP	64.0K bytes	$418	C-21
	A B DICK COMPANY MAGNA SOFTWARE	64.0K bytes	$300	C-21
	A B DICK COMPANY BIS 3270TM	64.0K bytes	$400	C-21
	A B DICK COMPANY BIS 3780TM	64.0K bytes	$400	C-21
AMT Associates	DATA TRANS	48.0K bytes	$100	C-21
Access Telecommunications	ACCESS 34/36/38	N/A	N/A	C-21
Alden/Honeywell	6H	256.0K bytes	N/A	C-21
	6I	256.0K bytes	N/A	C-21
Advanced Computer Techniques	ACT NETWORK PROCESSOR	N/A	N/A	C-21
Advanced Information Management	AIM/FILE CONVERSION SYSTEM	N/A	N/A	C-21
Advanced Micro Techniques	INTELLIGENT TERMINAL - VERSION 1	48.0K bytes	$150	C-21
	MICROTLX - VERSION 1.02	48.0K bytes	$150	C-21
Advanced Software Products, Inc.	3101 EMULATOR	128.0K bytes	$300	C-21
Advanced Systems Concepts, Inc.	PRISM PROFESSIONAL INTER SYSTEM	512.0K bytes	$595	C-21
	REMOTE PRINTER SUPPORT	1.0M bytes	$1,500	C-21
Alphamicrix, Inc.	BATCH EMULATOR 2780/3780/3741	16.0K bytes	N/A	C-21
Alpha Systems Ltd.	ALPHACOMM	64.0K bytes	$200	C-21
	NUCOMM	64.0K bytes	$100	C-21
Altergo Products Inc.	ALTERGO PRODUCTS SHADOW II	100.0K bytes	$36,000	C-21
The Alternate Source	TCOM	N/A	$29	C-22
	TRAKCESS	N/A	$29	C-22
	TRS-80 COMMUNICATION	32.0K bytes	$39	C-22
American Comp. & Elec. Corp.	HASP 990	25.0K bytes	$6,000	C-22
Applied Cybernetics, Inc.	FREEFORM/3000	N/A	N/A	C-22
	TERMINAL/3000	N/A	$2,500	C-22
Applied Data Research, Inc.	ADR/DATACOM/DC - RELEASE 4	N/A	$13,600 to $51,500	C-22
Applied Information Systems, Inc.	COMMUNICATION SYSTEM-VERSION 2.9	3.0K bytes	$4,400	C-22
Arbat Systems Ltd.	ARBAT SERIES 700 INTELEX SYSTEM	512.0K bytes	N/A	C-22
Ashton, Inc.	ELECTRONIC MESSAGE SYSTEM	64.0K bytes	$495	C-22
Atlas International, Inc.	MICRO/REMOTE 2780/3780 EMULATOR	24.0K bytes	$25,000	C-22
	MICRO/REMOTE 3270 EMULATOR	24.0K bytes	$25,000	C-22
Automated Business Centers	COMM-HANDLER	128.0K bytes	$295	C-22
Automated Professional Systems	APSTRAN	64.0K bytes	N/A	C-22
Automation Design, Inc.	THINKER-PC	N/A	N/A	C-22
Barr Systems, Inc.	BARR/HASP	128.0K bytes	$750	C-22
Basic Business Control Sys., Inc.	ELECTRONIC SCALE POLLING SYSTEM	128.0K bytes	N/A	C-22
	ELECTRONIC TIME CLOCK POLLING SYSTEM	128.0K bytes	N/A	C-22
Bass Based Associates, Inc.	VMOS	N/A	$15,000	C-22
Benson C. Stone & Associates	TRIMS	64.0K bytes	$20,000 to $35,000	C-23
Bonnenberg, McLeroy & Harrison	VIRTEX	1.0M bytes	$9,500	C-23
CAP Information Systems	LINEAR AND MATHEMATICAL PROGRAMMING SYSTEM	5.1M bytes	$12,000	C-23
	TRANSIT INFORMATION TRANSFER SERVICES	50.0K bytes	N/A	C-23
Carney Associates, Inc.	MSI/TELXON RECEIVE	64.0K bytes	$3,000	C-23
Century Analysis, Inc.	BOSS-3	256.0K bytes	$12,000	C-23
Cincom Systems, Inc.	ENVIRON/1	N/A	$58,400	C-23
Cleinetwork	C-N-COMM MICRO/MAINFRAME COMMUNICATIONS	128.0K bytes	$400	C-23
Cobe Corp.	TELECOMMUNICATIONS	32.0K bytes	$2,500	C-23
Comm Pro Associates	NAS (NETWORK ACCESS SYSTEM)	64.0K bytes	N/A	C-23
	PP01	48.0K bytes	N/A	C-23
	PP02	48.0K bytes	N/A	C-23
	PP03	48.0K bytes	N/A	C-23
	PP04	48.0K bytes	N/A	C-23
	VLSW (VIRTUAL LINE SWITCH)	256.0K bytes	N/A	C-23
Compton Corp.	ACCESS	N/A	$15,000	C-23
Compu-Share	COMCOM	12.0K bytes	$95	C-23
	CPMCPM	8.0K bytes	$95	C-23
Comp-U-Staff, Inc.	BSWIP	512.0K bytes	$40,000	C-23
Computax Systems, Inc.	BETA DATA COMM HANDLER	256.0K bytes	$1,500	C-24
Computer Comm. Specialists	ACCA I	128.0K bytes	N/A	C-24
	ACCA II	128.0K bytes	N/A	C-24
Computer Connex	CCS COMMUNICATIONS CONTROL SYSTEM	N/A	$75	C-24

Software Index

VENDOR	MODEL	MEMORY REQUIRED	PRICE	PAGE
Computer Information Enterprises	C-F-NETWORK	22.0K bytes	N/A	C-34
	CREDIT AUTORIZATION INTERFACE	22.0K bytes	N/A	C-34
	SWITCH NETWORK SUPPORT	22.0K bytes	$20,000	C-34
	TELEPHONE PBX SYSTEM	22.0K bytes	N/A	C-34
Computer Toolbox, Inc.	INTELLICOM	56.0K bytes	$50 to $250	C-34
	INTELLICOM VER 1.5 INTELLIGENT COMMUNICATIONS	56.0K bytes	$49	C-34
Computerware Software Unlimited	HAROLD TP MONITOR	100.0K bytes	$3,000	C-34
Computhink, Inc.	POINT OF SALES COMMUNICATIONS MANAGEMENT	256.0K bytes	$30,000	C-34
Computronics	AUTOBAND (AUTOMATIC BAND RATE)	8.0K bytes	$600	C-34
	NETWORK	100.0K bytes	$1,200	C-34
Computview Products	MODEM-86 TELECOMMUNICATIONS UTILITY	24.0K bytes	$89	C-34
Comsoware Corp.	CICS-AID	40.0K bytes	$6,000 to $8,000	C-34
Contel Information Systems	STAR -ELEVEN	N/A	$4,000	C-34
Cullinet Software Inc.	INTEGRATED DATABASE MANAGEMENT SYSTEM-DATA	N/A	$50,000	C-34
	UNIVERSAL COMMUNICATIONS FACILITY	N/A	$40,000	C-34
C & W Inscotel Ltd.	IMX 200	128.0K bytes	$35,000	C-34
	IMX 300	128.0K bytes	$50,000	C-34
	IMX 700	128.0K bytes	$150,000	C-34
Cybrel, Inc.	CYX-DC DATA COMMUNICATIONS MONITOR	N/A	$20,000 to $30,000	C-34
	CYX-RT/DECNET REACH THROUGH	N/A	$5,000	C-34
	CYX-RT/IBM REACH THROUGH		$4,600 to $7,000	C-34
	CYX-TRANSACTION PROCESSING SYSTEM	144.0K bytes	$30,000 to $45,000	C-34
Dasdyne Corp.	TECTRONICS TERMINAL EMULATOR	512.0K bytes	$1,500	C-34
Data Index, Inc.	ZIX - TERMINAL CONTROL SYSTEM	128.0K bytes	$6,000	C-34
Datalex Co.	PASSPORT-MICRO-TO HOST COMPUTER	128.0K bytes	N/A	C-34
Datamark Systems, Inc.	IBM CHANNEL CONTROL UNIT EMULATOR	64.0K bytes	$5,000	C-35
	LOCAL HIGH SPEED DATA LINK	64.0K bytes	$2,000 to $5,000	C-35
Datapoint Corp.	ARC	128.0K bytes	$1,500	C-35
	CHANNEL PRODUCTS DC10, CHOUR, MLCI	128.0K bytes	$1,500	C-35
Datasoft, Inc.	TELE-TALK	N/A	$49	C-35
Data Systems of Baton Rouge	BLAST	48.0K bytes	$250 to $1,395	C-35
Data Technology Industries	CONTE	N/A	$175	C-35
The Datalex Co., Inc.	PASSPORTS SYSTEM	128.0K bytes	$500	C-35
DCA/TAC	E-78	128.0K bytes	N/A	C-35
	FT78	128.0K bytes	$1,195	C-35
	IRMA INTERFACE SOFTWARE	64.0K bytes	$1,195	C-35
DeFiore Software Systems, Inc.	AUTOMATIC NETWORKING OPTION	96.0K bytes	$5,000	C-35
Delta Systems, Inc.	WHITE BOX DOWNLOADER	N/A	N/A	C-35
The Destek Group	CENTRAL RESOURCE SERVER CRS VERSION 1	25.0K bytes	$500	C-35
	LOCAL AREA NETWORK OPERATING SERVER	8.0K bytes	$100	C-35
D.S.M.	SOFTWARE HANDLER	64.0K bytes	$99	C-35
Dilks Co., Inc.	DEC DV11 SYNCHRONOUS COMMUNICATIONS HANDLER	12.0K bytes	N/A	C-35
Dinolikes Corp.	SINGLE BIT HEXADECIMAL SYSTEM	2.0K bytes	$250	C-35
D. L. MacNeil Engineering	REMOTT	16.0K bytes	$450	C-35
DMW Group	ANDMS ADVANCED NETWORK DESIGN	400.0K bytes	$12,000	C-35
	NDMS NETWORK DESIGN AND MANAGEMENT SYSTEM	160.0K bytes	$6,500	C-35
	NETWORKER	300.0K bytes	$10,000 to $50,000	C-35
	TELECOST	200.0K bytes	$22,000	C-35
	TOP TELETRAFFIC OPTIMIZER PROGRAM	300.0K bytes	$20,000 to $40,000	C-35
D&N Micro Products, Inc.	DISK TRANSFER	48.0K bytes	$100	C-35
Don't Ask Computer Software	TELETARI	32.0K bytes	$40	C-35
Duxbury Systems, Inc.	METERED UTILITY MONITORING SYSTEM	36.0K bytes	$175	C-36
Dynamic Microprocessor Assoc.	ASCOM	32.0K bytes	$175	C-35
Dynamic Solutions	COSMO	32.0K bytes	N/A	C-35
EFT Computer Systems, Inc.	MESSAGE-SWITCHING AND CONTROL SYSTEM	128.0K bytes	N/A	C-35
	PAYMENT AND CONTROL SYSTEM PACS	256.0K bytes	$60,000	C-35
Esco Corp.	FAIL OVER PACKAGE	N/A	$50,000	C-35
Evans Griffiths and Hart, Inc.	BSC/DV	96.0K bytes	$5,000	C-35
	COLINK	96.0K bytes	$1,250	C-35
	DEALUP	96.0K bytes	$1,700	C-35
	TAM	96.0K bytes	$6,000	C-35
Evergreen Consulting, Inc.	QUICK-TUBE	N/A	$650	C-35
Exos Software, Inc.	TERMEXEC	48.0K bytes	$80	C-35
Fallon & Associates, Inc.	STANDARD & CUSTOM MICROBASED COMPUTER SUPPLY	N/A	N/A	C-37
Feral Microsystems, Inc.	LOGON	128.0K bytes	$150	C-37
Firedigs Computer Co.	COM/1	22.0K bytes	$2,395	C-37
Formula Consultants Inc.	MESSAGE MANAGEMENT SYSTEM MMS-110	N/A	$30,000	C-37
	SUPER-SYNCHRONOUS UTS PROTOCOL	48.0K bytes	$900	C-37
Gamma Technology, Inc.	GAMMA TECHNOLOGY WORKSTATIONS	32.0K bytes	$3,000 to $4,000	C-37
	GT70 CENTRAL SITE GT70	32.0K bytes	$4,000 to $8,500	C-37
Gayland Bros., Inc.	DIAL-UP INQUIRY	48.0K bytes	$5,000	C-37
	GS-500 MICRO COMPUTER NETWORK SYSTEM	48.0K bytes	N/A	C-37
	OCLC INTERFACE	48.0K bytes	$6,000	C-37
	VISI TERM	48.0K bytes	$100	C-37
GELMAC, Inc.	HASP VERSION 3	16.0K bytes	$3,500 to $5,500	C-37
Genesys Corp.	TELIOS	96.0K bytes	N/A	C-37
General Digital Industries, Inc.	COMPAT/200	256.0K bytes	$3,000	C-37
General Electric Information	TS12.0	100.0K bytes	$250	C-38

Software Index

VENDOR	MODEL	MEMORY REQUIRED	PRICE	PAGE
George W. Hollahan & Co., Inc.	XCHANGE-11	N/A	$99,500	C-29
G & G Engineering	MODEM 8-16	128.0K bytes	$295	C-29
Glenn A. Barber and Associates	TSX-NET	64.0K bytes	N/A	C-29
Gould, Inc.	HASP REMOTE WORKSTATION	400.0K bytes	$3,000	C-29
Granada Systems Design, Inc.	INTERFACE	96.0K bytes	$12,000 to $25,000	C-29
	TELDEAR	96.0K bytes	$12,500	C-29
Graphic Software Systems	GSS-TERMINAL	128.0K bytes	N/A	C-29
Guild, Inc.	THE GUILD CATALYST	64.0K bytes	$250,000	C-29
Gunn Enterprises, Inc.	CUSTOM CDOS I/O DRIVERS	64.0K bytes	$195	C-29
	MODEM COMMUNICATIONS FOR CROMEMCO	128.0K bytes	$595	C-29
H & A Computer Systems	RSS-REMOTE SERIES 1 SERVICES	8.0K bytes	$3,500	C-29
Harris Corp.	RJE HOST	N/A	$2,600	C-29
	RJE TERMINAL EMULATION	N/A	N/A	C-29
Hausen Systems, Inc.	CRTX	42.0K bytes	$100	C-29
	CRTXE	42.0K bytes	$250	C-29
	REMOTE	N/A	$90	C-29
Horne Computer Services	RPSS-REMOTE PRINTER SPOOLING	N/A	N/A	C-29
Houston Computer Services, Inc.	OCTACOMM/940	N/A	$2,750	C-29
Houston Engineering Research	TDC 2000 DRIVER	128.0K bytes	$4,500	C-29
Howard W. Sams & Co., Inc.	HELLO CENTRAL!	48.0K bytes	$99	C-29
Hoyo Software	SMART TERMINAL	N/A	$75	C-29
Hunter & Ready, Inc.	C INTERFACE LIBRARY (HP)	N/A	$450	C-29
	C INTERFACE LIBRARY (MIT)	N/A	$450	C-29
	C INTERFACE LIBRARY (WHITE SMITHS)	N/A	$450	C-29
	PASCAL INTERFACE LIBRARY (HP)	N/A	$450	C-29
	PL/M INTERFACE LIBRARY	N/A	$450	C-29
IAS Corp.	GENTERM	64.0K bytes	$79	C-29
IDE Associates, Inc.	IDEACOMM 1200	128.0K bytes	$545	C-29
	IDEACOMM 3278	128.0K bytes	$1,195	C-29
	IDEANET	128.0K bytes	$795	C-29
	IDEASHARE	128.0K bytes	$595	C-29
IE Systems, Inc.	ACCULINK	128.0K bytes	$245	C-30
	BIS-3270	128.0K bytes	$695	C-30
	BIS-3780	128.0K bytes	$695	C-30
	BIS-HASP	128.0K bytes	$695	C-30
	BIS-3270 VERSION 4.0	64.6K bytes	$695	C-30
Industrial Computer Corp.	CDCMP 1000	64.0K bytes	$2,500	C-30
Infomedia Corp.	JENNY	N/A	N/A	C-30
Information Concepts, Inc.	CICS APPLICATION FILE CONTROL	N/A	$2,500	C-30
Information Management Technologies	DEDICOM	256.0K bytes	$20,000 to $40,000	C-30
The Information Organization Corp.	OCR (OPTICAL CHARACTER READER) INTERFACE	256.0K bytes	$1,000	C-30
	WANG VS TO HIGH-SPEED PRINTER	256.0K bytes	$4,000	C-30
	WANG VS TO IBM DISPLAYWRITER	256.0K bytes	$4,000	C-30
	WANG VS TO OCR INTERFACE	256.0K bytes	$1,000	C-31
Infoservices, Inc.	INFOCOMM/INFOHOST ANSWER-DB	32.0K bytes	$3,500	C-31
InfoSoft Systems, Inc.	INFOSOFT NETWORK SYSTEM - MULTINET	32.0K bytes	N/A	C-31
	INTELLIGENT TERMINAL (COMMUNICATION SYSTEM)	3.2M bytes	N/A	C-31
Innovatek Microsystems, Inc.	COMMUNICATION LINK	12.0K bytes	$775	C-31
Integrated Design Engineering, Inc.	NCR COMM	64.0K bytes	$400	C-31
Intelligent Technologies Intl. Corp.	CLUSTER NET 3270	256.0K bytes	$8,303	C-31
	PC EXPRESS 1	256.0K bytes	$695	C-31
	PC EXPRESS 2	256.0K bytes	$1,295	C-31
Intercon Research Corp.	INTERCON 100A	15.0K bytes	$1,250 to $4,995	C-31
Interoptics	TALK	N/A	$500	C-31
International Digital Electronics Assoc.	COMMUNICATION	N/A	$1,500	C-31
Keybrook Business Systems, Inc.	KEYBROOK FILESERVER	N/A	$2,700	C-31
Keystone Data Consultants, Inc.	FILE TRANSMISSION PACKAGE	128.0K bytes	$1,200	C-31
Learned-Sisko	ASTALK	64.0K bytes	$295	C-31
Leglat Automation, Inc.	UT 200	N/A	$10,000	C-31
Lindbergh Systems	OMNITERM	N/A	$95 to $175	C-31
Link Systems	DATALINK	64.0K bytes	N/A	C-31
Logitek, Inc.	FASTRAN	1.0M bytes	$100,000	C-31
	FASTRX	1.0M bytes	$75,000	C-32
	FASTWIRE	1.0M bytes	$100,000	C-32
MacKinney Systems	CICS/SPOOLER	32.0K bytes	$995	C-32
Magnum Communications, Ltd.	CREDICHECK	30.0K bytes	$8,500 to $35,500	C-32
Mathematics Products Group	ATLAS	N/A	$28,000	C-32
McCormack & Dodge Corp.	PC:M	100.0K bytes	$10,000	C-32
McDonnell Douglas Automation Co.	MCAUTO SYSTEM 1	1.0K bytes	N/A	C-32
MCM Enterprises	PROCALL	64.0K bytes	$350	C-32
Megawest Systems, Inc.	MEGA NET	64.0K bytes	$2,000	C-32
Meridian Technical Associates, Inc.	INTELLIGENT MODEM PROGRAM IMP	32.0K bytes	$30	C-32
Micro-Integration, Inc.	BIS 3270 VERSION 4.0	64.0K bytes	$695	C-32
	BIS 3780 VERSION 5.0	64.0K bytes	$695	C-32
	BIS HASP VERSION 1.1	64.0K bytes	$695	C-32
	COAXSYS TM	64.0K bytes	$1,195	C-32
	MICRO-SNA/3270 VERSION 1.0	64.0K bytes	$695	C-32
	MICRO-SNA/3770	64.0K bytes	$695	C-32

Software Index

VENDOR	MODEL	MEMORY REQUIRED	PRICE	PAGE
Micro/Micro Systems, Inc.	BI-SYNC	128.0K bytes	$495	C-33
Micron, Inc.	COMM LINE	64.0K bytes	$300	C-33
	SMART TERM I	32.0K bytes	N/A	C-33
The Microperipheral Corp.	TSMART	32.0K bytes	$50	C-33
MicroSpare, Inc.	TELETEXT	48.0K bytes	$80	C-33
Microstuf, Inc.	CROSSTALK XVI	96.0K bytes	$195	C-33
	REMOTE	N/A	$150	C-33
	TRANSPORTER	96.0K bytes	$295	C-33
Micro-Systems Software, Inc.	BBS-80	N/A	$80	C-33
	MICROTERM	N/A	$80	C-33
	QUADROMACK	N/A	$600 to $1,000	C-33
Modular Integration, Inc.	COMPAK	256.0K bytes	$500	C-33
	SDLC/HDLC	256.0K bytes	$1,000	C-33
Mohawk Data Sciences Corp.	BSC 3741	N/A	N/A	C-33
	EM 3275	N/A	N/A	C-33
	MASP/WS	9.6M bytes	N/A	C-33
	REMOTE COPY	N/A	N/A	C-33
Monroe Systems For Business	ASCOM +	128.0K bytes	$175	C-33
	MONROE BIS-3780	128.0K bytes	$750	C-33
	MONROE BIS-3270	128.0K bytes	$750	C-33
	MONROE TTY EMULATOR	128.0K bytes	$95	C-33
	MONROE BIS-HASP	128.0K bytes	$795	C-33
	MONROE 3270 SNA/SDLC	128.0K bytes	$995	C-33
Mountain Computer, Inc.	SUPER TALKER	N/A	N/A	C-34
Mumford Micro Systems	DEMON	32.0K bytes	$29	C-34
	TELCOM II	32.0K bytes	$69	C-34
	TELECOM I	32.0K bytes	$39	C-34
National S-F-T, Inc.	LINK/1	64.0K bytes	$20,000	C-34
National Micro Products, Inc.	MODEM	64.0K bytes	$40,000	C-34
	SMODEM	64.0K bytes	$40,000	C-34
	XMODEM	64.0K bytes	$40,000	C-34
National Semiconductor Corp.	ANS-TRAN	256.0K bytes	N/A	C-34
	BHCS	256.0K bytes	N/A	C-34
NCR Comten, Inc.	ACF/NCP 3	N/A	N/A	C-34
	CNS 2-COMMUNICATIONS NETWORKING SYSTEM	N/A	N/A	C-34
	EP 4-EMULATION PROCESSING	N/A	N/A	C-34
	MAF 3-3270 MULTIPLE ACCESS FACILITY	N/A	N/A	C-34
	NTO-NETWORK TERMINAL OPTION	N/A	N/A	C-34
	SRM 1-SUB AREA ROUTING MANAGER	N/A	N/A	C-34
	X.25 PUBLIC DATA NETWORK	N/A	N/A	C-34
NCR Corp.	NCR-DMS/TRAN-PRO EL	1.0K bytes	N/A	C-34
Nestar Systems, Inc.	MESSENGER ELECTRONIC MAIL	64.0K bytes	N/A	C-34
	3270 CLUSTER EMULATOR SERVER	64.0K bytes	$2,000	C-34
	3278 EMULATOR	64.0K bytes	$200	C-35
	3770 EMULATOR SERVER	64.0K bytes	$1,000	C-35
	FILE TRANSFER SERVER	64.0K bytes	$2,000	C-35
New Generation Systems, Inc.	AMCALL	64.0K bytes	$150	C-35
N. F. Systems, Ltd.	HOST COMM	128.0K bytes	$120	C-35
Nixdorf Computer Corp.	3270 BISYNC EMULATOR	512.0K bytes	N/A	C-35
	3270 SNA EMULATOR	512.0K bytes	N/A	C-35
	3770 SNA EMULATOR	512.0K bytes	N/A	C-35
Northeast Datascan, Inc.	TELECOMMUNICATIONS	28.0K bytes	N/A	C-35
Office Express, Inc.	INTF 3270	N/A	N/A	C-35
Orion Software, Inc.	NETWORK ORION	96.0K bytes	$3,200 to $10,000	C-35
Pacer Software	GNET	128.0K bytes	$1,000	C-35
Pacesetter Systems, Inc.	PACER/HPS-HOST PROCESSING SYSTEM	N/A	N/A	C-35
Pacific Software Manufacturing Co.	X.DOT:PAD	64.0K bytes	$40,000	C-35
	X.DOT:X.25	64.0K bytes	$30,000	C-35
	X.DOT FOR UNIX	64.0K bytes	$40,000	C-35
Participation Systems, Inc.	PARTICIPATE	160.0K bytes	$30,000 to $60,000	C-35
Pathway Design, Inc.	PATHWAY/BSC	128.0K bytes	$595	C-35
	PATHWAY/SNA	128.0K bytes	$595	C-35
Peachtree Software	TELECOMMUNICATIONS	N/A	$150	C-36
Peregrine Systems, Inc.	PNMS	64.0K bytes	$250,000	C-36
Pickles & Trout	LYNC 3.0 COMMUNICATIONS SOFTWARE	32.0K bytes	$95	C-36
Planning Data Systems	TERM	48.0K bytes	N/A	C-36
Polygon Software Corp.	INTERCOMM	N/A	$75,000	C-36
Prime Computer, Inc.	DPTX - INTERCONNECT FACILITY FOR IBM 3270	N/A	$7,500	C-36
	IEM 200 UT - EMULATION FOR CONTROL DATA UT 200	N/A	$3,750	C-36
	IEM 1004 - EMULATION FOR UNIVAC 1004	N/A	$3,750	C-36
	IEM 7020 - EMULATION FOR ICL 7020	N/A	$3,750	C-36
	IEM GRTS - EMULATION FOR HONEYWELL GRTS	N/A	$4,500	C-36
	IEM XBM - EMULATION FOR ICL XBM	N/A	$3,750	C-36
	IEM HASP - EMULATION FOR IBM HASP II	N/A	$5,250	C-36
	IEM X80 - EMULATION FOR IBM 2780/3780	N/A	$4,500	C-36
	FILE TRANSFER SERVICE	N/A	$2,000	C-36
	PACKET NETWORK INTERFACE	N/A	$2,500	C-36
	PRIMENET - NETWORKING FACILITY	N/A	$7,500	C-36

Software Index

VENDOR	MODEL	MEMORY REQUIRED	PRICE	PAGE
Program Resources, Inc.	WANG DEC LINK	N/A	$995	C-36
Protocol Computer, Inc.	PCITERM 51 (UPGRADED VERSION OF 5156 PLUS)	128.0K bytes	$295	C-36
	PCITERM 78(UPGRADED VERSION OF 7887 PLUS)	128.0K bytes	$295	C-36
Quadralay Corp.	AUDIO RESPONSE SYSTEM	512.0K bytes	$75,000	C-36
	AUTOMATED COLLECTION SYSTEM	512.0K bytes	$75,000	C-37
	HOME BANKING SYSTEM	512.0K bytes	$50,000	C-37
	MINIHOST	512.0K bytes	$200,000	C-37
Quality Software, Inc.	OS CALL	64.0K bytes	$195	C-37
	OS SAM	48.0K bytes	$795	C-37
Racet Computers, Ltd.	MAGIC MAIL	32.0K bytes	$150	C-37
RCS (Rezac Computer Systems), Inc.	SUPER COM	48.0K bytes	$19,500	C-37
Real-Time Management Inc.	REMOTE 990	192.0K bytes	$12,500	C-37
Redding Group, Inc.	ALPACA PLUS	48.0K bytes	$500	C-37
	ALPACA-PLUS - VERSION 2.56	48.0K bytes	$500	C-37
	ASYNCH	48.0K bytes	$100	C-37
	ASYNCH - VERSION 3.01	48.0K bytes	$100	C-37
	LYNX	48.0K bytes	$250 to $150	C-37
	MICRO E COM	48.0K bytes	N/A	C-37
	MICRO X.25	48.0K bytes	N/A	C-37
	SYNCH 2780/3780	48.0K bytes	$500	C-38
	SYNCH 2780/3780 - VERSION 2.52	48.0K bytes	$500	C-38
	SYNCH 3270	48.0K bytes	$750	C-38
	SYNCH 3270 - VERSION 1.3	48.0K bytes	$750	C-38
Remex Systems, Inc.	TELESTAR	64.0K bytes	$195	C-38
Remote Computing Corp.	DIAL DATA	64.0K bytes	$100	C-38
RETI Systems Software	3271/DD DEVICE DRIVER	N/A	$2,700	C-38
	RFX-11 VERSION II (FILE TRANSFER UTILITY)	5.0K bytes	$875	C-38
	SCREENSHARE-11 TERMINAL MONITOR FACILITY	N/A	$1,250	C-38
Rotolone Bain, Inc.	SATURN-SPECIAL SERVICES AND TRUNK UTILIZATION	2.0M bytes	N/A	C-38
RTCS	PC/ENET VERSION 1.0	128.0K bytes	$1,700	C-38
RUF Corp.	IMPRS COMMUNICATIONS SOFTWARE	28.0K bytes	$2,000	C-38
Satellite Software, Inc.	TELE-PORTER	48.0K bytes	$80	C-38
SGS Semiconductors, Corp.	DEC VAX COMMUNICATIONS	512.0K bytes	N/A	C-38
	HP 3000 COMMUNICATIONS	512.0K bytes	N/A	C-38
	IBM 3780 PROTOCOL	512.0K bytes	N/A	C-38
	TELEX PLUX	512.0K bytes	N/A	C-38
	X.25	512.0K bytes	N/A	C-38
Simcet, Inc.	TELECOMM	256.0K bytes	N/A	C-38
	TELECOMMUNICATIONS INTERFACE	256.0K bytes	$14,000 to $20,000	C-38
Smart, Inc.	SERIES 1 POLLER & CREDIT AUTHORIZATION SYSTEM	64.0K bytes	$20,000 to $80,000	C-38
Smith Educational Engineering Svcs.	ICOMM	48.0K bytes	$150	C-38
Software AG of North America, Inc.	COM-PLETE	512.0K bytes	N/A	C-38
Software Clearing House	VIMOS	41.0K bytes	$8,500	C-38
	VIRTEX	N/A	$7,000 to $17,000	C-38
Software & Communication Concepts	SOFTWARE & COMMUNICATIONS CONCEPT	N/A	$100,000	C-38
Software Development & Maintenance	SDM/RPO ELECTRONIC REMOTE PURCHASE	64.0K bytes	$5,000	C-38
Software Development Corp.	DAGAR DTS-3	48.0K bytes	$250	C-38
Software Dynamics	MODEM	32.0K bytes	$250	C-38
	SDNET	64.0K bytes	$200	C-38
Software Management Systems, Inc.	MICROTALK	128.0K bytes	$300	C-38
The Software Store	SOFTCOM - TELECOMMUNICATIONS UTILITY	32.0K bytes	$150	C-38
Software Systems, Inc.	5251 MODEL 12 WORK STATION EMULATOR	64.0K bytes	$500	C-38
	SYSTEM 34, 36, 38 EMULATOR TRANSFER	N/A	$360 to $750	C-38
Softworks, Inc.	VIRTUAL TERMINAL FACILITY	512.0K bytes	$7,500	C-38
Southern Computer Systems, Inc.	ISIS-CP/M	16.0K bytes	$250	C-38
Southwestern Data Systems, Inc.	ASCII EXPRESS II	48.0K bytes	$35	C-38
	ASCII EXPRESS THE PROFESSIONAL	48.0K bytes	$130	C-38
	ONLINE	48.0K bytes	$90	C-40
	P-TERM THE PROFESSIONAL	48.0K bytes	$130	C-40
	Z-TERM	48.0K bytes	$100	C-40
	Z-TERM THE PROFESSIONAL	48.0K bytes	$150	C-40
Sperkenos Computers, Inc.	KNET	N/A	$15,000	C-40
Start Systems	AUTOPASS 3270TM	256.0K bytes	$15,000 to $80,000	C-40
Stratus Computer, Inc.	3270 EMULATOR FACILITY	N/A	$5,000	C-40
	3270 TERMINAL SUPPORT	N/A	$4,000	C-40
	RJE-REMOTE JOB ENTRY	N/A	$3,000	C-40
SuperSoft, Inc.	TERM II	32.0K bytes	$200	C-40
Syntar Corp.	GATEWAY 34/36	256.0K bytes	$22,000 to $34,000	C-40
	GATEWAY/370	192.0K bytes	$16,000	C-40
	LODESTAR 34/36	384.0K bytes	$40,000	C-40
The Systems Center	NETWORK ACCESS SERVICES CORVUS	512.0K bytes	N/A	C-40
	NETWORK ACCESS SERVICES-SERIES/1	N/A	N/A	C-40
The Systems Center, Inc.	NETWORK DATAMOVER	N/A	N/A	C-40
	SNA ON MICRO COMPUTERS	100.0K bytes	N/A	C-40
System & Software, Inc.	NEXUS	N/A	$420	C-40
Systems Resources Corp.	SIM 3278	N/A	$6,500	C-40
Systems Strategies, Inc.	2780/3780 EMULATOR	N/A	$47,000	C-41
	3270 BSC EMULATOR	N/A	$85,000	C-41

Software Index

VENDOR	MODEL	MEMORY REQUIRED	PRICE	PAGE
Systems Strategies, Inc.	3270 SNA EMULATOR	N/A	$13,000	C-41
	X.25 INTERFACE	N/A	$90,000	C-41
Taft Consulting, Inc.	TERRALINK	N/A	$5,000	C-41
Tecmire, Inc.	SERIAL FILE TRANSFER PROGRAM	4.0K bytes	$100	C-41
Telesino, Inc.	CHAMELEON ASYNC	64.0K bytes	$1,000	C-41
	CHAMELEON BASIC	64.0K bytes	$1,000	C-41
	CHAMELEON BISYNC	N/A	$1,000	C-41
	FRAMEM (FRAME LEVEL EMULATOR)	N/A	$1,000	C-41
	FRANEM	64.0K bytes	$1,000	C-41
	SIMP/L	64.0K bytes	$1,000	C-41
	SIMP/L (SIMULATOR INTERACTIVE MULTI-PROTOCOL)	N/A	$1,000	C-41
	SITREX	64.0K bytes	$2,000	C-41
	SITREX-PLUS	N/A	$1,000	C-41
Telos Research Corp.	GENERAL COST ALLOCATION (GCA)	100.0K bytes	$28,500	C-41
	MULTI-NODE TANDEM OPTYMIZER (MTO)	100.0K bytes	N/A	C-41
	THE ACD OPTYMIZER	N/A	$27,500	C-41
	THE OPTYMIZER PLUS	N/A	$28,600	C-41
	TRU DATA RECORDER/POLLER	256.0K bytes	$12,800 to $14,500	C-42
Telephone Software Connection, Inc.	ANSWERING MACHINE	48.0K bytes	$40	C-42
	PHONE SECRETARY II	48.0K bytes	$45	C-42
	PICTURE TRANSFER PROGRAM	48.0K bytes	$40	C-42
	TELEPHONE TRANSFER II	48.0K bytes	$80	C-42
	TERMINAL PROGRAM	48.0K bytes	$40	C-42
Texas Instruments, Inc.	TERMINAL EMULATOR II	N/A	$50	C-42
Tiecom Systems, Inc.	REMCOM	64.0K bytes	$95	C-42
TITN	TITN X.25 VERSION 1.0	64.0K bytes	N/A	C-42
TRW Corp.	PTWX	8.0K bytes	$98	C-42
	XPTERM	32.0K bytes	$49 to $59	C-42
Top Down Systems	INTF 3270	256.0K bytes	$8,125	C-42
	TERMINAL MONITOR	256.0K bytes	$39,375	C-42
	VTAM 3270	256.0K bytes	$8,125	C-42
Transaction Data Systems, Inc.	PACKET NETWORK FACILITY	500.0K bytes	$5,000	C-42
	STAT-MUX SUPPORT FACILITY	500.0K bytes	$5,000	C-42
Transend Corp.	TRANSEND I	N/A	$89	C-42
	TRANSEND II	N/A	$149	C-42
	TRANSEND III	N/A	$275	C-42
	TRANSEND PC	N/A	$189	C-43
Unigon Automation Products	RJE REMOTE JOB ENTRY SOFTWARE	N/A	$1,850 to $2,250	C-43
	UAP-LINK	N/A	$250 to $1,500	C-43
	UAP-LINK FILE TRANSFER SOFTWARE	N/A	$250	C-43
Unisoft System Corp.	B-NET	156.0K bytes	$400	C-43
University Computing Co.	UCC MBA-MICROCOMPUTER SOFTWARE	256.0K bytes	N/A	C-43
USSA Computer Co.	COMMUNICATIONS PACKAGE	64.0K bytes	$200	C-43
	IBM PC COM	64.0K bytes	$200	C-43
Van Amburg & Associates, Inc.	TAC SOFT	780.0K bytes	N/A	C-43
VisiCorp	VISIANSWER	N/A	N/A	C-43
	VISITERM	N/A	$100	C-43
Wild Hare Computer Systems, Inc.	HARE/NET	N/A	$2,000	C-43
Wintek Corp.	NS3270 AND NS3780	56.0K bytes	N/A	C-43
Zalan Communications, Inc.	TRANSLATION EXPRESS	N/A	$500	C-43
Zimem Associates, Inc.	TAP	56.0K bytes	$1,000	C-43

A. B. DICK CO.
A. B. DICK HASP
Additional Product Classification: Communications/TP Monitors
Specific Application: Data Communications
System Requirements: AB Dick Magna Writer, CP/M; AB Dick Magna III, CP/M; Magna SL, CP/M
Memory Required: 64.0K bytes
Source Language: Assembler
Source Code Available: No
Purchase Terms: Purchase (license) - $418
Date First Installed: March 1983
(See Vendor Profile Page V-1)

A. B. DICK CO.
A B DICK MAGNA SOFTWARE
Additional Product Classification: Communications/TP Monitors
Specific Application: Data Communication
System Requirements: AB Dick Magna Writer, CP/M; AB Dick Magna III, CP/M; AB Dick Magna SL, CP/M
Memory Required: 64.0K bytes
Source Language: Assembler
Source Code Available: No
Purchase Terms: Purchase (license) - $300
Date First Installed: March 1983

A. B. DICK CO.
A. B. DICK BIS 3270TM
Additional Product Classification: Communications/TP Monitors
Specific Application: Data Communications
System Requirements: AB Dick Magna Writer, CP/M; AB Dick Magna III, CP/M; AB Dick Magna SL, CP/M
Memory Required: 64.0K bytes
Source Language: Assembler
Source Code Available: No
Purchase Terms: Purchase (license) - $400
Date First Installed: March 1983

A. B. DICK CO.
A B DICK BIS 3780TM
Additional Product Classification: Communications/TP Monitors
Specific Application: Data Communications 2780/3780
System Requirements: AB Dick Magna Writer, CP/M; AB Dick Magna III, CP/M; AB Dick Magna SL, CP/M
Memory Required: 64.0K bytes
Source Language: Assembler
Source Code Available: No
Purchase Terms: Purchase (license) - $400
Date First Installed: March 1983

ABT ASSOCIATES
DATA TRANS
Additional Product Classification: Communications/TP Monitors
Specific Application: Automatic Telecommunication and Data Transfer; Will Run at 300 or 1200 Baud
System Requirements: Apple II+, Apple DOS
Memory Required: 48.0K bytes
Source Language: Basic
Source Code Available: No
Purchase Terms: Purchase (license) - $100
Number Installed to Date: 1,000
Date First Installed: September 1982
(See Vendor Profile Page V-1)

ACCESS TELECOMMUNICATIONS
ACCESS 34/36/38
Additional Product Classification: Communications/TP Monitors
Specific Application: Provides Asynchronous Communication for IBM System/34, 36, 38
System Requirements: IBM System/34, 36, 38: DOS
Source Language: RPG-II, Assembler
Source Code Available: No
Purchase Terms: Purchase (license)
Number Installed to Date: 100
Date First Installed: November 1981
(See Vendor Profile Page V-1)

ADTECH/HONEYWELL
6I
Additional Product Classification: Communications/TP Monitors
Specific Application: Analog Communications Package
Specific Industry: Telecommunications
System Requirements: DG: RTOS
Memory Required: 256.0K bytes
Source Language: Assembler
Source Code Available: No
Purchase Terms: Purchase (license)
Number Installed to Date: 94
Date First Installed: 1978
(See Vendor Profile Page V-1)

ADTECH/HONEYWELL
6I
Additional Product Classification: Communications/TP Monitors
Specific Application: Digital Communication Package
Specific Industry: Telecommunications
System Requirements: DG: RTOS
Memory Required: 256.0K bytes
Source Language: Assembler
Source Code Available: No
Purchase Terms: Purchase (license)
Number Installed to Date: 94

ADVANCED COMPUTER TECHNIQUES
ACT NETWORK PROCESSOR
Additional Product Classification: Communications/TP Monitors
Specific Application: Comprehensive Communications Controller
Specific Industry: Communication
System Requirements: Honeywell DPS 6, Honeywell Level 6
Source Language: Assembler
Purchase Terms: Purchase (license)
Number Installed to Date: 10
Date First Installed: 1981
(See Vendor Profile Page V-1)

ADVANCED INFORMATION MANAGEMENT
ABI/FILE CONVERSION SYSTEM
Additional Product Classification: Communications/TP Monitors
Specific Application: Menu-Driven Aid for Converting from One Machine to Another
System Requirements: IBM 370; IBM 30XX; IBM 43XX
Source Language: Cobol
Purchase Terms: Purchase (license); Rental; Lease
Date First Installed: 1982

ADVANCED MICRO TECHNIQUES
INTELLIGENT TERMINAL - VERSION 1
Additional Product Classification: Communications/TP Monitors
Specific Application: Asynchronous Communication Package
System Requirements: CP/M, MP/M
Memory Required: 48.0K bytes
Source Language: Assembler
Source Code Available: No
Purchase Terms: Purchase (license) - $150
Number Installed to Date: 500
Date First Installed: June 1981
(See Vendor Profile Page V-1)

ADVANCED MICRO TECHNIQUES
MICROTLX - VERSION 1.02
Additional Product Classification: Communications/TP Monitors
Specific Application: Converts CP/M Into Telex/TWX Machine
System Requirements: MP/M, CP/M
Memory Required: 48.0K bytes
Source Language: Assembler
Source Code Available: No
Purchase Terms: Purchase (license) - $150
Number Installed to Date: 7,000
Date First Installed: 1982

ADVANCED SOFTWARE PRODUCTS, INC.
3101 EMULATOR
Additional Product Classification: Communications/TP Monitors
Specific Application: Emulates 3101 Terminal
System Requirements: IBM PC
Memory Required: 128.0K bytes
Source Language: Assembler
Source Code Available: No
Purchase Terms: Purchase (license) - $300
Number Installed to Date: 100
Date First Installed: 1982
(See Vendor Profile Page V-1)

ADVANCED SYSTEMS CONCEPTS, INC.
PRISM PROFESSIONAL INTER SYSTEM
Additional Product Classification: Communications/TP Monitors
Specific Application: Emulates IBM 3278 With 3278 Model 2 Display Station Intersystem Communications Via Tasks
System Requirements: DEC Professional 300, P/OS
Memory Required: 512.0K bytes
Source Language: Basic
Source Code Available: No
Purchase Terms: Purchase (license) - $585
Number Installed to Date: 120
Date First Installed: June 1983

ADVANCED SYSTEMS CONCEPTS, INC.
REMOTE PRINTER SUPPORT
Additional Product Classification: Communications/TP Monitors
Specific Application: Transports, Queues and Spools Report to Other Remote Systems Via Decnet
System Requirements: DEC VAX, VMS
Memory Required: 1.0M bytes
Source Language: Macro
Source Code Available: No
Purchase Terms: Purchase (license) - $1,500
Number Installed to Date: 1
Date First Installed: June 1983

ALPHAMASTRIX, INC.
BATCH EMULATOR 2780/3780/3741
Additional Product Classification: Communications/TP Monitors
Specific Application: Batch File Transfer from Micro to Mainframe
System Requirements: IBM, MTX-80; Burroughs; Sperry
Memory Required: 16.0K bytes
Source Language: Assembler
Number Installed to Date: 600
Date First Installed: 1978
(See Vendor Profile Page V-1)

ALPHA SYSTEMS LTD.
ALPHACOMM
Additional Product Classification: Communications/TP Monitors
Specific Application: Communications Package
System Requirements: Compucorp 600, 700 Series; Zebra
Memory Required: 64.0K bytes
Source Language: Compiled Basic
Purchase Terms: Purchase (license) - $200
Number Installed to Date: 7
Date First Installed: 1980
(See Vendor Profile Page V-1)

ALPHA SYSTEMS LTD.
MICOMM
Additional Product Classification: Communications/TP Monitors
Specific Application: TTY Terminal Simulator
System Requirements: Jeequard 100, 200, 300, 500
Memory Required: 64.0K bytes
Source Language: Compiled Basic
Purchase Terms: Purchase (license) - $100
Number Installed to Date: 5
Date First Installed: 1978

ALTERGO PRODUCTS, INC.
ALTERGO PRODUCTS SHADOW II
Additional Product Classification: Communications/TP Monitors
Specific Application: Full Function Teleprompter Monitor
System Requirements: IBM 30XX, 4300: DOS/VSE, OS, VS
Memory Required: 100.0K bytes
Source Language: Assembler
Source Code Available: No
Purchase Terms: Purchase (license;

Rental - $26,000
Number Installed to Date: 7,400
Date First Installed: 1975
(See Vendor Profile Page V-1)

THE ALTERNATE SOURCE
TCOM
Additional Product Classification: Communications/TP Monitors
Specific Application: Tape-Based Communication; Full Uploading and Downloading
System Requirements: TRS-80/3: DOS/80; TRS-80/4: TRS-DOS, DOS/Plus, MultI-DOS
Purchase Terms: Purchase (license) - $29
Number Installed to Date: 50
Date First Installed: October 1982
(See Vendor Profile Page V-2)

THE ALTERNATE SOURCE
TRAKCESS
Additional Product Classification: Communications/TP Monitors
Specific Application: Access Floppy Disk Controller, Perform Track I/O
System Requirements: TRS-80/t: MultI-DOS; TRS-80/3: DOS/80; TRS-80/4: TRS-DOS, DOS/Plus
Source Language: Basic
Purchase Terms: Purchase (license) - $29
Number Installed to Date: 500
Date First Installed: November 1982

THE ALTERNATE SOURCE
TRS-80 COMMUNICATION
Additional Product Classification: Communications/TP Monitors
Specific Application: Allows TRS-80 to Talk to Micros and Mainframes
System Requirements: TRS-80/t: MultI-DOS; TRS-80/3: DOS/80; TRS-80/4: TRS-DOS, DOS/Plus
Memory Required: 32.0K bytes
Source Language: Z80
Purchase Terms: Purchase (license) — $39
Number Installed to Date: 1,000
Date First Installed: February 1980

AMERICAN COMPUTER & ELECTRONICS CORP.
HASP 950
Additional Product Classification: Communications/TP Monitors
Specific Application: Communications Link Between TI and IBM
Memory Required: 25.0K bytes
Source Language: Assembler
Source Code Available: No
Purchase Terms: Purchase (license) - $5,000
Date First Installed: 1981
(See Vendor Profile Page V-2)

APPLIED SYNERGETICS, INC.
FREEFORM/3000
Additional Product Classification: Communications/TP Monitors
Specific Application: Communications Interface for HP Terminals Only
System Requirements: HP 3000, MPE
Source Language: SPL
Source Code Available: No
Number Installed to Date: 34
Date First Installed: 1977
(See Vendor Profile Page V-2)

APPLIED SYNERGETICS, INC.
TERMINAL/3000
Additional Product Classification: Communications/TP Monitors
Specific Application: Communications Interface Between HP 3000 and Non-HP Terminals
System Requirements: HP 3000, MPE
Source Language: SPL
Source Code Available: No
Purchase Terms: Purchase (license); Lease - $2,500
Number Installed to Date: 34
Date First Installed: 1977

APPLIED DATA RESEARCH, INC.
ADR/DATACOM/DC - RELEASE 4
Additional Product Classification: Communications/TP Monitors
Specific Application: TP Monitor
System Requirements: IBM Series 370, 30XX: OS, DOS
Source Language: Assembler
Source Code Available: No
Purchase Terms: Purchase (license); Rental; Lease - $13,600 to $51,500
(See Vendor Profile Page V-2)

APPLIED INFORMATION SYSTEMS, INC.
COMMUNICATION SYSTEM-VERSION 2.0
Additional Product Classification: Communications/TP Monitors
Specific Application: Communications
System Requirements: DEC PDP-11 Series, VAX-11 Series, Professional 300
Memory Required: 3.0K bytes
Source Language: Assembler
Purchase Terms: Purchase (license) - $4,400
Number Installed to Date: 75
Date First Installed: 1974
(See Vendor Profile Page V-2)

ARBAT SYSTEMS LTD.
ARBAT SERIES 700 INTELEX SYSTEM
Additional Product Classification: Communications/TP Monitors
Specific Application: Automatic Telex System
Specific Industry: Banking/Financial
System Requirements: DEC PDP-11; DEC VAX, VMS
Memory Required: 512.0K bytes
Source Language: Aims Basic
Purchase Terms: Purchase (license); Source Code Available: No
Number Installed to Date: 25
Date First Installed: 1980
(See Vendor Profile Page V-2)

ASHTON, INC.
ELECTRONIC MESSAGE SYSTEM
Additional Product Classification: Communications/TP Monitors
Specific Application: Simulates Electronic Mail Center and Remote Data Base
System Requirements: IBM PC; MS-DOS; Apple III: DOS
Memory Required: 64.0K bytes
Source Language: Basic
Purchase Terms: Purchase (license) - $495
Number Installed to Date: 10
Date First Installed: February 1983
(See Vendor Profile Page V-3)

ATOM INTERNATIONAL, INC.
MICRO/REMOTE 2780/3780 EMULATOR
Additional Product Classification: Communications/TP Monitors
Specific Application: Allows Micro or Minicomputer to Emulate IBM 2780 or 3780 Remote Batch Terminals
System Requirements: CP/M
Memory Required: 24.0K bytes
Source Language: C
Purchase Terms: Purchase (license) - $25,000
Date First Installed: November 1982
(See Vendor Profile Page V-3)

ATOM INTERNATIONAL, INC.
MICRO/REMOTE 3270 EMULATOR
Additional Product Classification: Communications/TP Monitors
Specific Application: Emulates IBM 3275 Interactive Data Terminal Using Bisynchronous Protocol
System Requirements: Unix, CP/M
Memory Required: 24.0K bytes
Source Language: C
Purchase Terms: Purchase (license) - $25,000
Date First Installed: November 1982

AUTOMATED BUSINESS CENTERS
COMM-HANDLER
Additional Product Classification: Communications/TP Monitors
Specific Application: Remote Communication With Other Computers
System Requirements: SWT, Unilex
Memory Required: 128.0K bytes
Source Language: Assembler
Purchase Terms: Purchase (license) - $295
Number Installed to Date: 25
Date First Installed: 1982
(See Vendor Profile Page V-3)

AUTOMATED PROFESSIONAL SYSTEMS
APSTRAN
Additional Product Classification: Communications/TP Monitors
Specific Application: Transfers Data Between Various Incompatible File Formats
System Requirements: CP/M 80, CP/M 86, MS-DOS, PC-DOS
Memory Required: 64.0K bytes
Source Language: Pascal
Source Code Available: No
Purchase Terms: Purchase (license)
Date First Installed: September 1983
(See Vendor Profile Page V-3)

AUTOMATION SCIENCE, INC.
THINKER-PC
Additional Product Classification: Communications/TP Monitors
Specific Application: Uses IBM PC to Interface With Online Systems
System Requirements: IBM PC
Purchase Terms: Lease
(See Vendor Profile Page V-3)

BARR SYSTEMS, INC.
BARR/HASP
Additional Product Classification: Communications/TP Monitors
Specific Application: HASP Multileaving Work Station Package for The IBM PC
System Requirements: IBM PC, PC-DOS
Memory Required: 128.0K bytes
Source Language: Macro Assembler
Source Code Available: No
Purchase Terms: Purchase (license) - $750
Number Installed to Date: 20
Date First Installed: August 1983
(See Vendor Profile Page V-3)

BASIC BUSINESS CONTROL SYSTEMS, INC.
ELECTRONIC SCALE POLLING SYSTEM
Additional Product Classification: Communications/TP Monitors
Specific Application: Sends and Retrieves Data to and from Multiple Electronic Scales
Specific Industry: Retail
System Requirements: IBM Series 1, EDX; IBM, DOS
Memory Required: 128.0K bytes
Source Language: EDL, Assembler
Source Code Available: No
Purchase Terms: Purchase (license)
Number Installed to Date: 1
Date First Installed: May 1983
(See Vendor Profile Page V-4)

BASIC BUSINESS CONTROL SYSTEMS, INC.
ELECTRONIC TIME CLOCK POLLING SYSTEM
Additional Product Classification: Communications/TP Monitors
Specific Application: Sends and Retrieves Data to and from Intelligent Stand-Alone Electronic Time Clock
System Requirements: IBM Series/1, EDX
Memory Required: 128.0K bytes
Source Language: EDL
Source Code Available: No
Purchase Terms: Purchase (license)
Number Installed to Date: 1
Date First Installed: May 1983

BASS SPEED ASSOCIATES, INC.
VMDS
Additional Product Classification: Communications/TP Monitors
Specific Application: Connecting Intel Development Stations to Minicomputers for Shared Use
System Requirements: HP 1000: RTE; DEC PDP: RSX-11M
Source Language: Fortran
Source Code Available: No
Purchase Terms: Purchase (license) - $15,000
Number Installed to Date: 1

Date First Installed: October 1982
(See Vendor Profile Page V-4)

BENSON G. STONE & ASSOCIATES
TRSIS
Additional Product Classification: Communications/TP Monitors
Specific Application: Telecommunication Resources Improvement System
System Requirements: IBM, OS-DOS; Sperry; DEC PDP-11; TRS-80
Memory Required: 64.0K bytes
Source Language: Fortran
Purchase Terms: Purchase (license); Lease - $20,000 to $35,000
Number Installed to Date: 20
Date First Installed: June 1979

BORNEGAIN, HOLLERBY & HARRISON
VIRTEX
Additional Product Classification: Communications/TP Monitors
Specific Application: Communications
System Requirements: NCR 8500; NCR 8600
Memory Required: 1.0M bytes
Source Language: Cobol 74
Purchase Terms: Purchase (license); Rental - $9,500
Number Installed to Date: 145
Date First Installed: May 1979
(See Vendor Profile Page V-4)

GAP INFORMATION SYSTEMS
LINEAR AND MATHEMATICAL PROGRAMMING SYSTEM
Additional Product Classification: Communications/TP Monitors
Specific Application: X.25 Software for Equipment Attached to Packet Switching Networks
System Requirements: IBM; DEC 20, VAX, Tops 20, VMS; Prime 650: Primos; Perkin-Elmer 3200: OS/32
Memory Required: 5.1M bytes
Source Language: PL/M-86, Assembler
Source Code Available: No
Purchase Terms: Purchase (license); Rental - $12,000
Number Installed to Date: 20
Date First Installed: June 1980
(See Vendor Profile Page V-5)

GAP INFORMATION SYSTEMS
TRANSIT INFORMATION TRANSFER SERVICES
Additional Product Classification: Communications/TP Monitors
Specific Application: Communication Betwen Computers Connected By Racal-Milgo's Planet
System Requirements: DEC PDP-11: RSX-11M; DEC VAX: VMS
Memory Required: 50.0K bytes
Source Language: C, Assembler
Purchase Terms: Purchase (license)

GARNEY ASSOCIATES, INC.
IMI/TELXON RECEIVE
Additional Product Classification: Communications/TP Monitors
Specific Application: Receive Data from Hand-Held Entry Devices to Computer
System Requirements: IBM Series/1, EDX
Memory Required: 64.0K bytes
Source Language: EDX - Series/1
Source Code Available: No
Purchase Terms: Purchase (license) - $3,000
Number Installed to Date: 4
(See Vendor Profile Page V-5)

GENTURY ANALYSIS, INC.
BOSS-3
Additional Product Classification: Communications/TP Monitors
Specific Application: Transaction Processor, Data-Entry Monitor and On-Line Program Development System for NCR Mainframe
System Requirements: NCR, VRX
Memory Required: 256.0K bytes
Source Language: Cobol, Next 3
Source Code Available: No
Purchase Terms: Purchase (license) - $12,000
Number Installed to Date: 500
Date First Installed: September 1977
(See Vendor Profile Page V-5)

GENCOM SYSTEMS, INC.
ENVIRON/1
Additional Product Classification: Communications/TP Monitors
Specific Application: On-Line Teleprocessing Communication Monitor
System Requirements: IBM: DOS, EDOS, OS, MVS
Source Language: Cobol
Source Code Available: No
Purchase Terms: Purchase (license) - $59,400
(See Vendor Profile Page V-5)

GENNETWORK
C-N-COMM MICRO/MAINFRAME COMMUNICATIONS
Additional Product Classification: Communications/TP Monitors
Specific Application: Permits The IBM PC to Upload and Download from An IBM Mainframe, Special Error Checking Protocol Insures Data Integrity
System Requirements: IBM PC, MS-DOS
Memory Required: 128.0K bytes
Source Language: Compiled Basic
Purchase Terms: Purchase (license) - $400
Date First Installed: June 1983
(See Vendor Profile Page V-5)

GENSI CORP.
TELECOMMUNICATIONS
Additional Product Classification: Communications/TP Monitors
Specific Application: Communicates With Service Bureau for Inquiry and Input
Specific Industry: Banking/Financial
System Requirements: Wang 2200
Memory Required: 32.0K bytes
Source Language: Basic
Source Code Available: No
Purchase Terms: Purchase (license) - $2,500
Number Installed to Date: 18
(See Vendor Profile Page V-5)

GESEN PRO ASSOCIATES
NAS (NETWORK ACCESS SYSTEM)
Additional Product Classification: Communications/TP Monitors
Specific Application: X.25 Support 3705
System Requirements: IBM 3705, VS; IBM 4705, MVS, VM, MVT
Memory Required: 64.0K bytes
Source Language: Assembler
Purchase Terms: Lease
Number Installed to Date: 200
Date First Installed: 1977
(See Vendor Profile Page V-5)

GESEN PRO ASSOCIATES
PP01
Additional Product Classification: Communications/TP Monitors
Specific Application: Automatic Speed Select
System Requirements: IBM 3705: VM; IBM 4705: MVS, VS, MVT
Memory Required: 48.0K bytes
Source Language: Assembler
Source Code Available: Yes
Purchase Terms: Lease
Number Installed to Date: 25
Date First Installed: 1973

GESEN PRO ASSOCIATES
PP02
Additional Product Classification: Communications/TP Monitors
Specific Application: Code Conversion (ASCII to 2741)
System Requirements: IBM 3705: VM; IBM 4705: MVS, VS, MVT
Memory Required: 48.0K bytes
Source Language: Assembler
Purchase Terms: Lease
Number Installed to Date: 25
Date First Installed: 1973

GESEN PRO ASSOCIATES
PP03
Additional Product Classification: Communications/TP Monitors
Specific Application: PP01 and PP02 Combined
System Requirements: IBM 3705: VS; IBM 4705: MVS, VM, MVT
Memory Required: 48.0K bytes
Source Language: Assembler
Purchase Terms: Lease
Number Installed to Date: 25
Date First Installed: September 1973

GESEN PRO ASSOCIATES
PP04
Additional Product Classification: Communications/TP Monitors
Specific Application: Terminal Switching Plus PP03 Features
System Requirements: IBM 3705: VS; IBM 4705: MVS, VM, MVT
Memory Required: 48.0K bytes
Source Language: Assembler
Purchase Terms: Lease
Number Installed to Date: 75
Date First Installed: 1983

GESEN PRO ASSOCIATES
VLSW (VIRTUAL LINE SWITCH)
Additional Product Classification: Communications/TP Monitors
Specific Application: Switch Between EP and NPP (PP01-PP04 Integrated)
System Requirements: IBM 3705, VS; IBM 4705, MVS, VM, MVT
Memory Required: 256.0K bytes
Source Language: Assembler
Source Code Available: No
Purchase Terms: Lease
Number Installed to Date: 27
Date First Installed: 1977

GOSEPCOM GOSEP.
ACCESS
Additional Product Classification: Communications/TP Monitors
Specific Application: Network Communications Package That Provides Network Protocol for Interconnecting Computers
System Requirements: DEC VAX, VMS
Source Language: C
Purchase Terms: Purchase (license) - $15,000
Number Installed to Date: 25
Date First Installed: 1982
(See Vendor Profile Page V-6)

GOSEPH-GRANT
COSCOM
Additional Product Classification: Communications/TP Monitors
Specific Application: Computer Communication and Terminal Emulator
System Requirements: Osborne: CP/M; Kaypro-II: CP/M; Xerox 820: CP/M
Memory Required: 12.0K bytes
Source Language: Assembly
Source Code Available: No
Purchase Terms: Purchase (license) - $95
Date First Installed: February 1982
(See Vendor Profile Page V-6)

GOSEPH-GRANT
CPMCPM
Additional Product Classification: Communications/TP Monitors
Specific Application: File Transfer Between Computers
System Requirements: Osborne: CP/M; Xerox 820: CP/M; Kaypro-II: CP/M
Memory Required: 8.0K bytes
Source Language: Assembly
Purchase Terms: Purchase (license) - $95
Date First Installed: March 1982

GOSEPH-STAFF, INC.
BSWP
Additional Product Classification: Communications/TP Monitors
Specific Application: Bank Switch Interface, Processor Interface, IBM Based Machine With NCR Electronic Funds Transfer Switch
Specific Industry: Banking/Financial
System Requirements: IBM 4300: DOS; IBM 3030: OS; IBM 3080: MVS
Memory Required: 512.0K bytes
Source Language: Assembler, Macro
Source Code Available: No
Purchase Terms: Purchase (license) - $40,000

Number Installed to Date: 4
Date First Installed: 1982
(See Vendor Profile Page V-6)

COMPUTAX SYSTEMS, INC.
BETA DATA COMM HANDLER
Additional Product Classification: Communications/TP Monitors
Specific Application: Data Communications Package
System Requirements: Burroughs B90: CMS; Burroughs B900, B1900
Memory Required: 256.0K bytes
Source Language: Cobol
Source Code Available: No
Purchase Terms: Purchase (license) - $1,500
Date First Installed: 1979
(See Vendor Profile Page V-6)

COMPUTER COMMUNICATIONS SPECIALISTS, INC.
ACCA I
Additional Product Classification: Communications/TP Monitors
Specific Application: Allows Communication With Hand-Held Asynchronous Terminals
System Requirements: IBM Series/1: EDX; IBM PC
Memory Required: 128.0K bytes
Source Language: Assembly
Source Code Available: No
Purchase Terms: Purchase (license)
Number Installed to Date: 90
Date First Installed: 1979
(See Vendor Profile Page V-6)

COMPUTER COMMUNICATIONS SPECIALISTS, INC.
ACCA II
Additional Product Classification: Communications/TP Monitors
Specific Application: Allows Communication With Hand-Held Asynchronous Terminals, POS Devices and CPUs
System Requirements: IBM Series/1: EDX; IBM PC
Memory Required: 128.0K bytes
Source Language: Assembly
Source Code Available: No
Purchase Terms: Purchase (license)
Number Installed to Date: 5
Date First Installed: 1983

COMPUTER COMEN
DCS COMMUNICATIONS CONTROL SYSTEM
Additional Product Classification: Communications/TP Monitors
Specific Application: Asynchronous Data Communications, File Transfer, TErminal Simulaton
System Requirements: Osborne 1: CP/M 2.2
Source Language: 8080 Assembly
Source Code Available: No
Purchase Terms: Purchase (license) - $79
Date First Installed: July 1983
(See Vendor Profile Page V-6)

COMPUTER INFORMATION ENTERPRISES
C-F-NETWORK
Additional Product Classification: Communications/TP Monitors
Specific Application: Install Series/1 Using Communication Facilities
System Requirements: IBM: EDX
Memory Required: 22.0K bytes
Source Language: EDL
Purchase Terms: Purchase (license)
Date First Installed: 1983
(See Vendor Profile Page V-7)

COMPUTER INFORMATION ENTERPRISES
CREDIT AUTHORIZATION INTERFACE
Additional Product Classification: Communications/TP Monitors
Specific Application: Protocol Conversion to Interface With Non-IBM Sales Control into IBM CICS Credit Host Package
System Requirements: IBM: EDX
Memory Required: 22.0K bytes
Source Language: EDL
Purchase Terms: Purchase (license)
Date First Installed: November 1982

COMPUTER INFORMATION ENTERPRISES
SWITCH NETWORK SUPPORT
Additional Product Classification: Communications/TP Monitors
Specific Application: Central Support for Series/1 and PC Dial-Up Networks
System Requirements: IBM: EDX
Memory Required: 22.0K bytes
Source Language: EDL
Purchase Terms: Purchase (license) - $20,000
Date First Installed: 1981

COMPUTER INFORMATION ENTERPRISES
TELEPHONE PBX SYSTEM
Additional Product Classification: Communications/TP Monitors
Specific Application: Directive PBX Department Costing and Usage
System Requirements: IBM, EDX
Memory Required: 22.0K bytes
Source Language: EDL
Purchase Terms: Purchase (license)
Date First Installed: 1982

COMPUTER TOOLBOX, INC.
INTELLICOM
Additional Product Classification: Communications/TP Monitors
Specific Application: Terminal Emulator Communication Program
System Requirements: DEC VT180: CP/M; IBM PC-XT: PC-DOS; Northstar Advantage: CP/M
Memory Required: 56.0K bytes
Source Language: C
Purchase Terms: Purchase (license) - $50 to $250
Date First Installed: September 1982
(See Vendor Profile Page V-7)

COMPUTER TOOLBOX, INC.
INTELLICOM VER 1.5
INTELLIGENT COMMUNICATIONS
Additional Product Classification: Communications/TP Monitors
Specific Application: Communications and Terminal Emulation With Data Capture and Transmission Capabilities
System Requirements: DEC VT180: CP/M; Northstar Advantage: CP/M; IBM PC: PC-DOS
Memory Required: 56.0K bytes
Source Language: C
Purchase Terms: Purchase (license) - $49
Number Installed to Date: 200
Date First Installed: September 1982

COMPUTERWARE SOFTWARE UNLIMITED
HAROLD TP MONITOR
Additional Product Classification: Communications/TP Monitors
Specific Application: Generalized TP Monitor
System Requirements: IBM 370 Series: DOS; IBM 4300 Series: DOS/VS, DOS/VSE
Memory Required: 100.0K bytes
Source Language: Assembler
Purchase Terms: Purchase (license); Rental; Lease - $3,000
Number Installed to Date: 40
Date First Installed: June 1980
(See Vendor Profile Page V-7)

COMPUTRISE, INC.
POINT OF SALES COMMUNICATIONS MANAGEMENT
Additional Product Classification: Communications/TP Monitors
Specific Application: Performs Two-Way Communications Operations Between POS Devices and IBM Mainframes
Specific Industry: Retail
System Requirements: IBM: DOS
Memory Required: 256.0K bytes
Source Language: Assembler
Purchase Terms: Purchase (license) - $30,000
Number Installed to Date: 1
Date First Installed: August 1981
(See Vendor Profile Page V-7)

COMPUTRONICS
AUTOBAND (AUTOMATIC BAND RATE)
Additional Product Classification: Communications/TP Monitors
Specific Application: Communications
System Requirements: Prime, Primos
Memory Required: 8.0K bytes
Source Language: Fortran, PMA
Purchase Terms: Purchase (license) - $600
Number Installed to Date: 40
Date First Installed: August 1977
(See Vendor Profile Page V-7)

COMPUTRONICS
NETWORK
Additional Product Classification: Communications/TP Monitors
Specific Application: Communications Utility Allowing the Communication Between Prime Systems With Other Systems
System Requirements: Prime, Primos
Memory Required: 100.0K bytes
Source Language: Fortran
Source Code Available: No
Purchase Terms: Purchase (license) - $1,200
Number Installed to Date: 75
Date First Installed: December 1978

COMPUVIEW PRODUCTS
MODEM-86
TELECOMMUNICATIONS UTILITY
Additional Product Classification: Communications/TP Monitors
Specific Application: Networking OF Microcomputer Mainframe Access
System Requirements: IBM PC, CP/M-86, MS-DOS
Memory Required: 24.0K bytes
Source Language: Assembly
Source Code Available: No
Purchase Terms: Purchase (license) - $89
Number Installed to Date: 60
Date First Installed: October 1982
(See Vendor Profile Page V-7)

COMPUVIEW CORP.
CICS-AID
Additional Product Classification: Communications/TP Monitors
Specific Application: Provide English Language Diagnostics for CICS
System Requirements: IBM 370, 4300, 3000: MVS, DOS/VS, DOS, VSI
Memory Required: 40.0K bytes
Source Language: Assembler
Source Code Available: No
Purchase Terms: Purchase (license); Lease - $6,000 to $8,000
Number Installed to Date: 10
Date First Installed: May 1983
(See Vendor Profile Page V-7)

CONTEL INFORMATION SYSTEMS
STAR -ELEVEN
Additional Product Classification: Operating Systems, Performance Measurement, Sysytem Resource Management, Communications/TP Monitors
Specific Application: Local-Area Network
System Requirements: DEC PDP-11: RSTS/E, RT-11; DEC VAX: VMS
Source Language: Fortran, Macro 11
Purchase Terms: Purchase (license) — $4,000
Number Installed to Date: 150
Date First Installed: 1980
(See Vendor Profile Page V-7)

CULLINET SOFTWARE, INC.
INTEGRATED DATABASE MANAGEMENT SYSTEM-DATA
Additional Product Classification: Communications/TP Monitors
Specific Application: Integrated System of Teleprocessing Functions
System Requirements: IBM 360, 370, 30XX
Source Language: Assembler
Source Code Available: No
Purchase Terms: Purchase (license); Rental - $50,000
Number Installed to Date: 325
Date First Installed: June 1978
(See Vendor Profile Page V-8)

GULLIVET SOFTWARE, INC.
UNIVERSAL COMMUNICATIONS FACILITY
Additional Product Classification: Communications/TP Monitors
Specific Application: Communications
System Requirements: IBM 360, 370, 30XX
Source Language: Assembler
Source Code Available: No
Purchase Terms: Purchase (license); Rental - $40,000
Number Installed to Date: 301
Date First Installed: January 1981

G & W SIGGITEL LTD.
MX 200
Additional Product Classification: Communications/TP Monitors
Specific Application: Store and Forward Message Switching (Conversion)
System Requirements: DEC PDP-11/23; Scams
Memory Required: 128.0K bytes
Source Language: Assembler
Purchase Terms: Purchase (license) - $35,000
Number Installed to Date: 12
(See Vendor Profile Page V-4)

G & W SIGGITEL LTD.
MX 300
Additional Product Classification: Communications/TP Monitors
Specific Application: Store & Forward Message Switching (Conversion)
System Requirements: DEC PDP-11/34, Scams
Memory Required: 128.0K bytes
Source Language: Assembler
Purchase Terms: Purchase (license) - $50,000
Number Installed to Date: 48

G & W SIGGITEL LTD.
MX 700
Additional Product Classification: Communications/TP Monitors
Specific Application: Store & Forward Message Switching (Conversion)
System Requirements: DEC VAX Series, VMS
Memory Required: 128.0K bytes
Source Language: Assembler, Bliss
Purchase Terms: Purchase (license) - $150,000
Number Installed to Date: 10
Date First Installed: 1980

GYTROL, INC.
CYX-DC DATA COMMUNICATIONS MONITOR
Additional Product Classification: Communications/TP Monitors
Specific Application: Data Communications Management
System Requirements: DEC PDP-11/24: RSX-11M; DEC VAX: VMS
Source Language: Assembler, Cobol
Purchase Terms: Purchase (license); Lease - $20,000 to $30,000
Number Installed to Date: 30
Date First Installed: August 1976
(See Vendor Profile Page V-4)

GYTROL, INC.
CYX-RT/DECNET REACH THROUGH
Additional Product Classification: Communications/TP Monitors
Specific Application: Connect DEC-CYX Systems Via Decnet
System Requirements: DEC VAX, VMS
Source Language: Cobol
Source Code Available: No
Purchase Terms: Purchase (license) - $5,000
Number Installed to Date: 10
Date First Installed: May 1983

GYTROL, INC.
CYX-RT/IBM REACH THROUGH
Additional Product Classification: Communications/TP Monitors
Specific Application: Connect DEC/CYX Systems and IBM Systems
System Requirements: DEC PDP: RSX-11M; DEC VAX: VMS
Source Language: Cobol
Source Code Available: No
Purchase Terms: Purchase (license) - $4,600 to $7,000
Number Installed to Date: 20

GYTROL, INC.
CYX-RT/IBM REACH THROUGH
Additional Product Classification: Communications/TP Monitors
Specific Application: Connect DEC/CYX Systems and IBM Systems
System Requirements: DEC PDP: RSX-11M; DEC VAX: VMS
Source Language: Cobol
Source Code Available: No
Purchase Terms: Purchase (license) - $4,600 to $7,000
Number Installed to Date: 20

GYTROL, INC.
CYX-TRANSACTION PROCESSING SYSTEM
Additional Product Classification: DBMS, Communications/TP Monitors
Specific Application: Provides Data Communications Management and Data Base Management for DEC PDP-11 and VAX-Based Systems
System Requirements: DEC PDP-11: RSX-11M; DEC VAX: VMS
Memory Required: 144.0K bytes
Source Language: Assembler, Cobol
Source Code Available: No
Purchase Terms: Purchase (license); Lease - $30,000 to $45,000
Number Installed to Date: 30
Date First Installed: August 1976

RAMFORD CORP.
TECTRONICS TERMINAL EMULATOR
Additional Product Classification: Communications/TP Monitors
Specific Application: Terminal Emulator
Specific Industry: Engineering
System Requirements: Apollo, Aegis
Memory Required: 512.0K bytes
Source Language: Fortran
Source Code Available: No
Purchase Terms: Purchase (license) - $1,500
Number Installed to Date: 2
Date First Installed: 1983
(See Vendor Profile Page V-6)

SATA WEEK, INC.
ZIX - TERMINAL CONTROL SYSTEM
Additional Product Classification: Communications/TP Monitors
Specific Application: Managed Terminal and Memory Space
System Requirements: IBM Series/1: EDX
Memory Required: 128.0K bytes
Source Language: EDL, Assembly
Source Code Available: No
Purchase Terms: Purchase (license) - $5,000
Number Installed to Date: 3
Date First Installed: April 1983
(See Vendor Profile Page V-6)

DATALEX CO.
PASSPORT-MICRO-TO HOST COMPUTER
Additional Product Classification: Communications/TP Monitors
Specific Application: Communications Package Micro to Host
System Requirements: IBM; HP 200, UCSD-p System; TI Professional: PC-DOS, CP/M 86
Memory Required: 128.0K bytes
Source Language: Pascal
Purchase Terms: Purchase (license)
Number Installed to Date: 100
Date First Installed: May 1983
(See Vendor Profile Page V-6)

DATAMARK SYSTEMS, INC.
IBM CHANNEL CONTROL UNIT EMULATOR
Additional Product Classification: Data/File Management, Program Generators/Aids/Application Development Tools, Communications/TP Monitors
Specific Application: Front End, Networking, Satellite Communications
Memory Required: 64.0K bytes
Source Language: Assembler
Purchase Terms: Purchase (license); Rental; Lease - $5,000
Number Installed to Date: 50
Date First Installed: 1977
(See Vendor Profile Page V-6)

DATAMARK SYSTEMS, INC.
LOCAL HIGH-SPEED DATA LINK
Additional Product Classification: Communications/TP Monitors
Specific Application: Local-Area Network High-Speed Data Link
Memory Required: 64.0K bytes
Source Language: Assembler
Purchase Terms: Purchase (license); Rental; Lease - $2,000 to $5,000
Number Installed to Date: 28
Date First Installed: February 1981

DATAPOINT CORP.
ARC
Additional Product Classification: Communications/TP Monitors
Specific Application: Local-Area Network Sector Server Software
System Requirements: Datapoint 5500, 6600, 3600: DOS
Memory Required: 128.0K bytes
Source Language: Assembler
Purchase Terms: Purchase (license) - $1,500
Number Installed to Date: 5,000
(See Vendor Profile Page V-6)

DATAPOINT CORP.
CHANNEL PRODUCTS BC10, CHOUR, MLCI
Additional Product Classification: Communications/TP Monitors
Specific Application: Direct Attachment to IBM Compatible-Byte Multiplexer Channel for Information Transfer to and from IBM to PCM Host
System Requirements: Datapoint 6600: DOS
Memory Required: 128.0K bytes
Source Language: Assembler
Source Code Available: No
Purchase Terms: Purchase (license) —$1,500

DATASOFT, INC.
TELE-TALK
Additional Product Classification: Communications/TP Monitors
Specific Application: Home Communications
Specific Industry: Home
System Requirements: Atari
Source Code Available: No
Purchase Terms: Purchase (license) - $49
Number Installed to Date: 9,000
Date First Installed: 1982
(See Vendor Profile Page V-6)

DATA SYSTEMS OF BATON ROUGE
BLAST
Additional Product Classification: Communications/TP Monitors
Specific Application: Computer to Computer Communication Software Package
System Requirements: DG; Apple II, CP/M; IBM PC, MS-DOS; DEC VAX, VMS
Memory Required: 48.0K bytes
Source Language: Assembly
Source Code Available: No
Purchase Terms: Purchase (license) - $250 to $1,395
Number Installed to Date: 200
Date First Installed: 1980
(See Vendor Profile Page V-6)

DATA TECHNOLOGY INDUSTRIES
CDNTE
Additional Product Classification: Communications/TP Monitors
Specific Application: Communications
Purchase Terms: Purchase (license); Lease - $175
(See Vendor Profile Page V-6)

THE DATELEX CO., INC.
PASSPORTS SYSTEM
Additional Product Classification: Communications/TP Monitors

Specific Application:
Communication System Between Micros and Mainframes
Specific Industry: Fortune 1000
System Requirements: IBM PC, UCSD; HP 125; DEC Rainbow
Memory Required: 128.0K bytes
Source Language: Pascal
Purchase Terms: Purchase (license) - $500
Number Installed to Date: 1,000
Date First Installed: 1981
(See Vendor Profile Page V-9)

BGA/TAC
E-78
Additional Product Classification:
Communications/TP Monitors
Specific Application: File Transfer Package
System Requirements: IBM PC: DOS 1.1/2.0, MDS TSO; IBM: VM
Memory Required: 128.0K bytes
Source Language: Assembler, C
Source Code Available: Yes
Purchase Terms: Purchase (license)
Number Installed to Date: 20,000
Date First Installed: December 1982
(See Vendor Profile Page V-10)

BGA/TAC
FT78
Additional Product Classification:
Communications/TP Monitors
Specific Application: Allows Text File Transfer
System Requirements: IBM PC, MS-DOS; IBM 4300, VM, MVS
Memory Required: 128.0K bytes
Source Language: C
Purchase Terms: Purchase (license) - $1,195
Number Installed to Date: 10,000
Date First Installed: September 1983

BGA/TAC
IRMA INTERFACE SOFTWARE
Additional Product Classification:
Communications/TP Monitors
Specific Application: Allows You to Talk from One Host Through IBM 3274/76 Control to IBM PC
System Requirements: IBM PC: PC-DOS
Memory Required: 64.0K bytes
Source Language: Assembler
Purchase Terms: Purchase (license) - $1,195
Number Installed to Date: 1,000
Date First Installed: 1982

BIFARO SOFTWARE SYSTEMS, INC.
AUTOMATIC NETWORKING OPTION
Additional Product Classification:
Communications/TP Monitors
Specific Application: Automatic Networking
Specific Industry: Retail
System Requirements: IBM System/34, System/36
Memory Required: 96.0K bytes
Source Language: RPG-II
Purchase Terms: Purchase (license) - $5,000
Date First Installed: August 1982
(See Vendor Profile Page V-10)

DELTA SYSTEMS, INC.
WHITE BOX DOWNLOADER
Additional Product Classification:
Communications/TP Monitors
Specific Application: Allows 2 Computers to Send/Receive Data from Disk to Disk
System Requirements: ICL System 10: DMS 2; ICL System 25: DMS 3
Source Language: Assembler
Source Code Available: No
Purchase Terms: Lease
Number Installed to Date: 100
Date First Installed: March 1983
(See Vendor Profile Page V-10)

THE DESTEK GROUP
CENTRAL RESOURCE SERVER CRS VERSION 1
Additional Product Classification:
Communications/TP Monitors
Specific Application: Resource Sharing Software for,Unix Local-Area Network Applications
System Requirements: CP/M, PC-DOS, MS-DOS, Unix
Memory Required: 25.0K bytes
Source Language: C
Purchase Terms: Purchase (license) - $500
Number Installed to Date: 15
Date First Installed: May 1983
(See Vendor Profile Page V-10)

THE DESTEK GROUP
LOCAL-AREA NETWORK OPERATING SERVER
Additional Product Classification:
Communications/TP Monitors
Specific Application: Local-Area Network Software for CP/M, PC-DOS, MS-DOS, Unix
System Requirements: CP/M, PC-DOS, MS-DOS, Unix
Memory Required: 8.0K bytes
Source Language: C, Assembler
Purchase Terms: Purchase (license) - $100
Number Installed to Date: 30
Date First Installed: May 1983

E.S.M.
SOFTWARE HANDLER
Additional Product Classification:
Communications/TP Monitors
Specific Application: Reads Data Out Of Cash Register, Creates File on IBM
Specific Industry: Retail
System Requirements: IBM PC, PC-DOS
Memory Required: 64.0K bytes
Source Language: Basic
Purchase Terms: Purchase (license) - $99
Number Installed to Date: 50
Date First Installed: March 1983
(See Vendor Profile Page V-9)

GILES CO., INC.
DEC DV11 SYNCHRONOUS COMMUNICATIONS HANDLER
Additional Product Classification:
Communications/TP Monitors
Specific Application: Full Polling Capability With A Priority Output Schema
System Requirements: DEC PDP-11: DEC VAX, VMS
Memory Required: 12.0K bytes
Source Language: Fortran 77, Assembly
Purchase Terms: Purchase (license); Rental; Lease
Number Installed to Date: 1
Date First Installed: September 1982
(See Vendor Profile Page V-10)

INVERNESS CORP.
SINGLE BIT HEXADECIMAL SYSTEM
Additional Product Classification:
Communications/TP Monitors
Specific Application: Programmable Controller System Software
System Requirements: Diversitec
Memory Required: 2.0K bytes
Source Code Available: No
Purchase Terms: Purchase (license); Rental - $250
Number Installed to Date: 1,000
Date First Installed: June 1982
(See Vendor Profile Page V-10)

D. L. MACHIEL [illegible]
REMOTT
Additional Product Classification:
Communications/TP Monitors
Specific Application: Send Or Receive Source Or Save File from One Computer to Another
System Requirements: DEC, RT-11; DEC, RSX-11
Memory Required: 16.0K bytes
Source Language: Macro
Source Code Available: No
Purchase Terms: Purchase (license) - $450
Number Installed to Date: 20
Date First Installed: 1976
(See Vendor Profile Page V-08)

MRM GROUP
AMDMS ADVANCED NETWORK DESIGN
Additional Product Classification:
Communications/TP Monitors
Specific Application: Design of Banking (ATM) and Retail (POS) Networks
Specific Industry: Retail, Banking/Financial
System Requirements: IBM 370, 30XX, 43XX, MVS, TSO, CMS; DEC VAX; Amdahl 470, 5880
Memory Required: 400.0K bytes
Source Language: Fortran
Purchase Terms: Lease; Time-Sharing - $12,000
Number Installed to Date: 2
Date First Installed: January 1978
(See Vendor Profile Page V-11)

MRM GROUP
NDMS NETWORK DESIGN AND MANAGEMENT SYSTEM
Additional Product Classification:
Communications/TP Monitors
Specific Application: Design Management Reporting and Optimization OF Multistage, Multipoint Data Communications Networks
System Requirements: IBM 360, 370, 30XX, MVS, TSO, CMS; DEC VAX, VMS; Amdahl 470, 5880
Memory Required: 160.0K bytes
Source Language: Fortran
Purchase Terms: Lease; Time-sharing - $6,500
Date First Installed: January 1977

MRM GROUP
RETWORKER
Additional Product Classification:
Communications/TP Monitors
Specific Application: Design of Data Communications Networks
System Requirements: IBM 370, 30XX, 43XX, MVS, TSO, CMS; DEC VAX, VMS; Amdahl
Memory Required: 300.0K bytes
Source Language: Fortran, Cobol
Source Code Available: No
Purchase Terms: Lease; Time-sharing - $10,000 to $50,000
Number Installed to Date: 3
Date First Installed: November 1983

MRM GROUP
TELECOST
Additional Product Classification:
Communications/TP Monitors
Specific Application: Telecommunications Chargebkk and Allocation
System Requirements: IBM 360, 370, 30XX, 43X; TSO, CMS, MVS; DEC VAX: VMS; Amdahl 470, 5880
Memory Required: 200.0K bytes
Source Language: Cobol
Purchase Terms: Lease; Time-sharing - $22,000
Number Installed to Date: 25
Date First Installed: January 1980

MRM GROUP
TOP TELETRAFFIC OPTIMIZER PROGRAM
Additional Product Classification:
Communications/TP Monitors
Specific Application: Reduces Long Distance Usage Costs by Reconfiguration of The Facilities and Services
System Requirements: IBM 360, 370, 30XX, 43X; MVS, TSO, CMS; DEC VAX: VMS; Amdahl 470, 5880
Memory Required: 300.0K bytes
Source Language: Cobol, Fortran
Purchase Terms: Lease; Time-sharing - $20,000 to $40,000
Number Installed to Date: 18
Date First Installed: January 1979

MSM MICRO PRODUCTS, INC.
DISK TRANSFER
Additional Product Classification:
Communications/TP Monitors
Specific Application: Utility Program to Transfer OSI CP/M Format Disk to Standard CP/M IBM 3740 Format
System Requirements: Ohio Scientific: CP/M 2.2
Memory Required: 48.0K bytes
Source Language: Assembler
Source Code Available: No
Purchase Terms: Purchase (license) - $100
Date First Installed: January 1983

SOFT ASK COMPUTER SOFTWARE
TELETAM
Additional Product Classification:
Communications/TP Monitors

Specific Application:
Telecommunications Package
System Requirements: Atari: DOS
Memory Required: 32.0K bytes
Source Language: Machine
Source Code Available: No
Purchase Terms: Purchase (license) - $40
Date First Installed: January 1983
(See Vendor Profile Page V-11)

DUXBURY SYSTEMS, INC.
METERED UTILITY MONITORING SYSTEM
Additional Product Classification:
Communications/TP Monitors
Specific Application:
Communications
System Requirements: Northstar Horizon: DOS; Northstar Advantage: DOS
Memory Required: 36.0K bytes
Source Language: Northstar Basic
Source Code Available: No
Purchase Terms: Purchase (license) - $175
Number Installed to Date: 5
Date First Installed: January 1982
(See Vendor Profile Page V-11)

DYNAMIC MICROPROCESSOR ASSOCIATES
ASCOM
Additional Product Classification:
Communications/TP Monitors
Specific Application: Asynchronous Communication Package
System Requirements: CP/M, CP/M 86, MS-DOS, PC-DOS
Memory Required: 32.0K bytes
Source Language: Assembly
Source Code Available: No
Purchase Terms: Purchase (license) - $175
Number Installed to Date: 5,000
Date First Installed: January 1979
(See Vendor Profile Page V-11)

DYNAMIC SCIENCES
COSMO
Additional Product Classification:
Communications/TP Monitors
Specific Application: Complete Monitoring and Control System
System Requirements: DEC PDP-11, RSX-11M; HP, RTE; DEC PDP-11, RSTS/E
Memory Required: 32.0K bytes
Source Language: Fortran
Purchase Terms: Purchase (license)
Number Installed to Date: 5
Date First Installed: 1979
(See Vendor Profile Page V-11)

EFT COMPUTER SYSTEMS, INC.
MESSAGE-SWITCHING AND CONTROL SYSTEM
Additional Product Classification:
Communications/TP Monitors
Specific Application: Message Switching and Control System
Specific Industry: Banking/Financial
System Requirements: NCR 9040, 9050, 9300; IBM System/34; IBM System/36; IBM System/38
Memory Required: 128.0K bytes
Source Language: Cobol
Purchase Terms: Purchase (license)
Date First Installed: 1983
(See Vendor Profile Page V-11)

EFT COMPUTER SYSTEMS, INC.
PAYMENT AND CONTROL SYSTEM PACS
Additional Product Classification:
Banking, Data/File Management, Communications/TP Monitors
Specific Application: Paying and Receiving Money Transfers
Specific Industry: Banking/Financial
System Requirements: NCR 9040, 9050, 9300; IBM System/36
Memory Required: 256.0K bytes
Source Language: Cobol
Purchase Terms: Purchase (license) - $60,000
Number Installed to Date: 4
Date First Installed: 1977

EDGA CORP.
FAIL OVER PACKAGE
Additional Product Classification:
Communications/TP Monitors, Redundant CPUs
Specific Application: Redundant CPUs Networking Package
Specific Industry: Engineering, Scientific
System Requirements: DEC VAX-11/780, VMS; DEC VAX-11/750, VMS; DEC VAX-11/782, VMS
Source Language: Fortran, Macro
Purchase Terms: Purchase (license) - $50,000
Number Installed to Date: 5
Date First Installed: 1983
(See Vendor Profile Page V-11)

EVANS GRIFFITHS AND HART, INC.
BSC/DV
Additional Product Classification:
Communications/TP Monitors
Specific Application: Driver for DEC PDP-11 Handles Most BSC-Based Protocols
System Requirements: DEC PDP, RSTS/E
Memory Required: 96.0K bytes
Source Language: Macro-11
Purchase Terms: Purchase (license) - $5,000
Number Installed to Date: 9
Date First Installed: 1978
(See Vendor Profile Page V-11)

EVANS GRIFFITHS AND HART, INC.
COLINK
Additional Product Classification:
Communications/TP Monitors
Specific Application: Links Two RSTS/E Systems
System Requirements: DEC PDP-11, RSTS/E
Memory Required: 96.0K bytes
Source Language: Basic
Purchase Terms: Purchase (license) - $1,250
Date First Installed: 1979

EVANS GRIFFITHS AND HART, INC.
DIALUP
Additional Product Classification:
Communications/TP Monitors
Specific Application: Link for RSTS/E System to A Remote Computer Using Asynchronous Terminal Line
System Requirements: DEC PDP, RSTS/E
Memory Required: 96.0K bytes
Source Language: Basic
Number Installed to Date: 59
Date First Installed: 1979

EVANS GRIFFITHS AND HART, INC.
TAM
Additional Product Classification:
Communications/TP Monitors
Specific Application: Transaction-Processing Front End for the PDP-11
System Requirements: DEC PDP-11: RSTS/E, RSX-11M; DEC VAX, VMS
Memory Required: 96.0K bytes
Source Language: Basic, Macro-11
Purchase Terms: Purchase (license) - $6,000
Number Installed to Date: 88
Date First Installed: 1975

EVERGREEN CONSULTING, INC.
QUICK-TUBE
Additional Product Classification:
Communications/TP Monitors
Specific Application: TSO
System Requirements: IBM: OS/MVS
Source Language: Assembler
Purchase Terms: Rental; Lease - $650
Number Installed to Date: 120
Date First Installed: May 1978
(See Vendor Profile Page V-12)

EXEC SOFTWARE, INC.
TERMEXEC
Additional Product Classification:
Communications/TP Monitors
Specific Application: Allows An Apple II+ or Apple IIe to Operate As An Intelligent Terminal on A Variety Of Host Systems
System Requirements: Apple II+: Apple-DOS; Apple IIE: Pro-DOS, DOS 3.3
Memory Required: 48.0K bytes
Source Language: Assembly
Purchase Terms: Purchase (license) - $80
Number Installed to Date: 200
Date First Installed: January 1983
(See Vendor Profile Page V-12)

FALLON & ASSOCIATES, INC.
STANDARD & CUSTOM MICROBASED COMPUTER SUPPLY
Additional Product Classification:
Communications/TP Monitors
Specific Application: SNA, X.25 DCE, X.25 DTE, IBM 3270, 3780 BSC, Asynchronous, X-3, Asynchronous VIP 7700, IBM 3270 Emulation Protocols
Specific Industry:
Telecommunications
Source Language: Pascal, Assembler
Purchase Terms: Purchase (license)
Number Installed to Date: 200
Date First Installed: May 1981
(See Vendor Profile Page V-12)

FERROX MICROSYSTEMS, INC.
LOGON
Additional Product Classification:
Communications/TP Monitors
Specific Application:
Communication Package Allows Storage Of Configurations and Phone Numbers
Specific Industry: Banking/Financial
System Requirements: IBM PC, UCSD-P System: MS-DOS; Apple II: Apple-DOS
Memory Required: 128.0K bytes
Source Language: Pascal
Source Code Available: No
Purchase Terms: Purchase (license) - $150
Number Installed to Date: 500
(See Vendor Profile Page V-12)

FERRANTI COMPUTER CO.
COM/1
Additional Product Classification:
Communications/TP Monitors
Specific Application: File Transfer With IBM 2780 OR 3780 Compatible Devices
System Requirements: IBM Series/1, EDX
Memory Required: 22.0K bytes
Source Language: EDL
Purchase Terms: Purchase (license) - $2,395
Number Installed to Date: 12
Date First Installed: 1976
(See Vendor Profile Page V-12)

FORMULA CONSULTANTS, INC.
MESSAGE MANAGEMENT SYSTEM MMS-110
Additional Product Classification:
Communications/TP Monitors
Specific Application: Sends Messages from Terminal to Terminal
System Requirements: Sperry 1100, S 1100
Source Language: Cobol, Assembler
Purchase Terms: Purchase (license); Rental; Lease - $30,000
Date First Installed: July 1980
(See Vendor Profile Page V-12)

FORMULA CONSULTANTS, INC.
SUPER-SYNCHRONOUS UTS PROTOCOL
Additional Product Classification:
Communications/TP Monitors
Specific Application: Sperry Terminal Emulation
System Requirements: Xerox 560: CP/M
Memory Required: 48.0K bytes
Source Language: Assembler
Purchase Terms: Purchase (license) - $900
Number Installed to Date: 10
Date First Installed: June 1982

GAMMA TECHNOLOGY, INC.
GAMMA TECHNOLOGY WORKSTATIONS
Additional Product Classification:
Communications/TP Monitors

Specific Application: Protocol Emulation
System Requirements: DG: AOS/VS; DG MV Series: RTOS; DG Nova: RDOS
Memory Required: 32.0K bytes
Source Language: Assembly for TV
Source Code Available: Yes
Purchase Terms: Purchase (license) - $3,000 to $4,000
Number Installed to Date: 428
Date First Installed: 1976
(See Vendor Profile Page V-12)

GAMMA TECHNOLOGY, INC.
GT770 CENTRAL SITE GT770
Additional Product Classification: Communications/TP Monitors
Specific Application: 3270 Communication
System Requirements: DG Eclipse: AOS; DG Nova, R-DOS; RTOS
Memory Required: 32.0K bytes
Source Language: Assembly for TV
Purchase Terms: Purchase (license) - $4,000 to $8,500
Number Installed to Date: 5
Date First Installed: 1976

GAYLORD BROS., INC.
DIAL-UP INQUIRY
Additional Product Classification: Communications/TP Monitors
Specific Application: One or More Dial-up Ports to Exist On the GS-1000, 2000
Specific Industry: Library
System Requirements: Apple II+
Memory Required: 48.0K bytes
Source Language: Basic
Purchase Terms: Purchase (license) - $5,000
(See Vendor Profile Page V-12)

GAYLORD BROS., INC.
GS-500 MICRO COMPUTER NETWORK SYSTEM
Additional Product Classification: Communications/TP Monitors
Specific Application: Has All Features OF GS-1000, Combines On-Line and Stand-Alone Processing
System Requirements: Apple II+
Memory Required: 48.0K bytes
Source Language: Basic
Purchase Terms: Purchase (license)

GAYLORD BROS., INC.
OCLC INTERFACE
Additional Product Classification: Communications/TP Monitors
Specific Application: Direct Transfer of an Edited Marc II Record On The OCLC
Specific Industry: Library
System Requirements: Apple II+
Memory Required: 48.0K bytes
Source Language: Basic
Purchase Terms: Purchase (license) - $6,000

GAYLORD BROS., INC.
VIM TERM
Additional Product Classification: Communications/TP Monitors
Specific Application: Enables Apple II to Communicate With Larger Computers or Other PCs
System Requirements: Apple II+
Memory Required: 48.0K bytes
Source Language: Basic
Purchase Terms: Purchase (license) - $100
Date First Installed: 1980

GEJAC, INC.
HASP VERSION 3
Additional Product Classification: Communications/TP Monitors
Specific Application: Communications
System Requirements: DEC VAX-11: VMS; DEC PDP-11: RSX, IAS, RT-11
Memory Required: 16.0K bytes
Source Language: Assembler, Fortran
Source Code Available: Yes
Purchase Terms: Purchase (license); Rental; Lease - $3,500 to $5,500
Number Installed to Date: 500
Date First Installed: January 1978
(See Vendor Profile Page V-12)

GENASYS CORP.
TELIOS
Additional Product Classification: Communications/TP Monitors
Specific Application: Asynchronous Telecommunications Handler for IBM PC
System Requirements: IBM PC: DOS 2.0
Memory Required: 96.0K bytes
Source Language: Assembler
Purchase Terms: Purchase (license)
Number Installed to Date: 50
Date First Installed: January 1985
(See Vendor Profile Page V-12)

GENERAL DIGITAL INDUSTRIES, INC.
COMPAT/200
Additional Product Classification: Communications/TP Monitors
Specific Application: User 200 Workstation Emulator for Communication With CDC Cyber Systems
System Requirements: DEC: Unix
Memory Required: 256.0K bytes
Source Language: C
Purchase Terms: Purchase (license) - $3,000
Number Installed to Date: 10
Date First Installed: January 1982
(See Vendor Profile Page V-13)

GENERAL ELECTRIC INFORMATION
TS2.0
Additional Product Classification: Communications/TP Monitors
Specific Application: Communication Software
System Requirements: IBM PC: MS-DOS
Memory Required: 100.0K bytes
Source Language: Fortran
Purchase Terms: Purchase (license) - $250
Date First Installed: October 1982
(See Vendor Profile Page V-13)

GEORGE W. HALLAHAN & CO., INC.
XCHANGE-11
Additional Product Classification: Communications/TP Monitors
Specific Application: Micro Computer Communication and Networking
System Requirements: DEC PDP-11: RSTS/E; DEC VAX: RSX-11M
Source Language: Basic
Source Code Available: Yes
Purchase Terms: Purchase (license) - $99,500
Number Installed to Date: 28
Date First Installed: May 1982
(See Vendor Profile Page V-13)

G & G ENGINEERING
MODEM 9-16
Additional Product Classification: Communications/TP Monitors
Specific Application: Telecommunication Language for MP/M 86 System and for Concurrent CP/M 86
System Requirements: Compupro S100: CP/M, MP/M
Memory Required: 128.0K bytes
Source Language: C
Source Code Available: No
Purchase Terms: Purchase (license) - $295
Number Installed to Date: 85
Date First Installed: January 1983
(See Vendor Profile Page V-12)

GLENN A. BARBER AND ASSOCIATES
TSX-NET
Additional Product Classification: Communications/TP Monitors
Specific Application: Networking Package
System Requirements: DEC: RT11, TSX Plus, RSX 11; DEC VAX: VMS
Memory Required: 64.0K bytes
Purchase Terms: Purchase (license)
(See Vendor Profile Page V-13)

GOULD, INC.
HASP REMOTE WORKSTATION
Additional Product Classification: Communications/TP Monitors
Specific Application: Remote Job-Entry
System Requirements: Concept/32, MPX-32
Memory Required: 400.0K bytes
Purchase Terms: Purchase (license) - $3,000
(See Vendor Profile Page V-13)

GRANADA SYSTEMS DESIGN, INC.
INTERFACE
Additional Product Classification: Communications/TP Monitors
Specific Application: Allows Host to Communicate With Multiple Hosts
Specific Industry: Banking/Financial
System Requirements: IBM Series/1, EDX
Memory Required: 96.0K bytes
Source Language: EDL
Number Installed to Date: 6
Date First Installed: July 1982
(See Vendor Profile Page V-13)

GRANADA SYSTEMS DESIGN, INC.
TELDEAR
Additional Product Classification: Communications/TP Monitors
Specific Application: Telephone Data Entry and Audio Response, Touch-Tone, Order Entry, Pay-By-Phone Sales Order Entry
Specific Industry: Wholesale/Distribution, Banking/Financial
System Requirements: IBM Series/1: EDX; IBM System/36, System/38: SSP
Memory Required: 96.0K bytes
Source Language: EDL
Purchase Terms: Purchase (license) - $12,500
Number Installed to Date: 6
Date First Installed: June 1981

GRAPHIC SOFTWARE SYSTEMS
GSS-TERMINAL
Additional Product Classification: Communications/TP Monitors
Specific Application: Terminal Emulation (Graphics Terminal from Micro)
System Requirements: IBM PC: MS-DOS, Unix
Memory Required: 128.0K bytes
Source Language: C
Purchase Terms: Purchase (license)
Number Installed to Date: 2,500
Date First Installed: August 1983
(See Vendor Profile Page V-13)

GUILD, INC.
THE GUILD CATALYST
Additional Product Classification: Communications/TP Monitors
Specific Application: Totally Portable Across Hardware, Enables Networking Between Micros, Minis and Mainframes
System Requirements: Motorola 68000: Catalyst; Zilog 8000: Catalyst; DEC: Catalyst; Sperry 1100: Catalyst
Memory Required: 64.0K bytes
Source Language: Extended Pascal
Purchase Terms: Purchase (license) - $250,000
Number Installed to Date: 5
Date First Installed: March 1982
(See Vendor Profile Page V-13)

GUNN ENTERPRISES, INC.
CUSTOM CDOS I/O DRIVERS
Additional Product Classification: Communications/TP Monitors
Specific Application: Terminal Interface
System Requirements: Cromemco: C-DOS
Memory Required: 64.0K bytes
Source Language: Assembly
Purchase Terms: Purchase (license) - $195
Number Installed to Date: 300
Date First Installed: 1977
(See Vendor Profile Page V-13)

GUNN ENTERPRISES, INC.
MODEM COMMUNICATIONS FOR CROMEMCO
Additional Product Classification: Communications/TP Monitors
Specific Application: Allows Transfer of Programs to and from Cromix

System Requirements: Cromemco Cromix
Memory Required: 128.0K bytes
Source Language: Assembly
Source Code Available: No
Purchase Terms: Purchase (license) - $595
Number Installed to Date: 40
Date First Installed: 1982

M & A COMPUTER SYSTEMS
RBS-REMOTE SERIES 1 SERVICES
Additional Product Classification: Communications/TP Monitors
Specific Application: Remote Operation and Service
System Requirements: IBM Series/1, EDX
Memory Required: 8.0K bytes
Source Language: EDL
Source Code Available: No
Purchase Terms: Purchase (license) - $3,500
Number Installed to Date: 10
Date First Installed: 1982
(See Vendor Profile Page V-13)

HARRIS CORP.
RJE HOST
Additional Product Classification: Communications/TP Monitors
Specific Application: Remote Job Entry
System Requirements: Harris 600, 700, 800: VOS
Purchase Terms: Purchase (license) - $2,600
(See Vendor Profile Page V-14)

HARRIS CORP.
RJE TERMINAL EMULATION
Additional Product Classification: Communications/TP Monitors
Specific Application: Terminal Emulation
System Requirements: Harris 600, 700, 800: VOS

HERCOM SYSTEMS, INC.
CRTX
Additional Product Classification: Communications/TP Monitors
Specific Application: Communications
System Requirements: IBM PC: MS-DOS; Columbia: MPC
Memory Required: 42.0K bytes
Source Language: Assembly
Source Code Available: No
Purchase Terms: Purchase (license) - $100
Number Installed to Date: 400
Date First Installed: 1981
(See Vendor Profile Page V-14)

HERCOM SYSTEMS, INC.
CRTXE
Additional Product Classification: Communications/TP Monitors
Specific Application: Communications With Terminal Emulation
System Requirements: IBM PC: MS-DOS; Columbia: MPC
Memory Required: 42.0K bytes
Source Language: Assembly
Source Code Available: No
Purchase Terms: Purchase (license) - $250
Number Installed to Date: 200
Date First Installed: 1981

HERCOM SYSTEMS, INC.
REMOTE
Additional Product Classification: Communications/TP Monitors
Specific Application: Allows the User to Remotely Execute A CP/M System
System Requirements: CP/M
Source Language: Assembly
Source Code Available: No
Purchase Terms: Purchase (license) - $60
Number Installed to Date: 80
Date First Installed: 1981

HORNE COMPUTER SERVICES
RPSS-REMOTE PRINTER SPOOLING
Additional Product Classification: Communications/TP Monitors
Specific Application: Remote Printer Spooling System
System Requirements: IBM 4300: DOS; IBM 370: CICS
Source Language: Assembler
Source Code Available: No
Purchase Terms: Lease
Number Installed to Date: 12
Date First Installed: 1981
(See Vendor Profile Page V-14)

HOUSTON COMPUTER SERVICES, INC.
OCTACOMM/940
Additional Product Classification: Communications/TP Monitors
Specific Application: Intelligent I/O Processor Interfaces with RS-232 Terminals Asyncronously
System Requirements: TI 990: DX-10, D-NOS; TI Professional: MS-DOS
Source Language: Assembler, Pascal
Purchase Terms: Purchase (license) - $2,750
Number Installed to Date: 180
Date First Installed: October 1982
(See Vendor Profile Page V-14)

HOUSTON INSTRUMENTS RESEARCH CORP.
TDC 2000 DRIVER
Additional Product Classification: Communications/TP Monitors
Specific Application: Communication Driver Between PDP-11 and Honeywell 2000
System Requirements: DEC PDP-11: RSX
Memory Required: 128.0K bytes
Source Language: Fortran
Purchase Terms: Purchase (license) - $4,500
Number Installed to Date: 3
Date First Installed: 1978
(See Vendor Profile Page V-14)

HOWARD W. SAMS & CO., INC.
HELLO CENTRAL!
Additional Product Classification: Communications/TP Monitors
Specific Application: A Terminal Control Program That Allows the User Computer to Talk to Other Computers Over Telephone Lines
System Requirements: Apple IIE; Apple II+; Apple II: DOS
Memory Required: 48.0K bytes
Source Language: Assembly
Purchase Terms: Purchase (license) - $99
(See Vendor Profile Page V-14)

HOWE SOFTWARE
SMART TERMINAL
Additional Product Classification: Communications/TP Monitors
Specific Application: Data Communications VIA RS-231C
System Requirements: TRS-80: TRS-DOS, CP/M
Source Language: Assembler, Delivered Machine
Purchase Terms: Purchase (license) - $75
Number Installed to Date: 400
Date First Installed: January 1980
(See Vendor Profile Page V-14)

HUNTER & READY, INC.
C INTERFACE LIBRARY (HEWLETT PACKARD)
Additional Product Classification: Communications/TP Monitors
Specific Application: Interfaces Programs Written in HPC to VRTX/68000
System Requirements: Motorola 68000
Source Language: Assembly
Purchase Terms: Purchase (license) - $450
Number Installed to Date: 100
Date First Installed: 1982
(See Vendor Profile Page V-14)

HUNTER & READY, INC.
C INTERFACE LIBRARY (HEWLETT PACKARD)
Additional Product Classification: Communications/TP Monitors
Specific Application: Interfaces Programs Written in HPC to VRTX/86
System Requirements: Intel 8086
Source Language: Assembly
Purchase Terms: Purchase (license) - $450
Number Installed to Date: 100
Date First Installed: 1982

HUNTER & READY, INC.
C INTERFACE LIBRARY (HEWLETT PACKARD)
Additional Product Classification: Communications/TP Monitors
Specific Application: Interfaces Programs Written IN HPC to VRTX/6002
System Requirements: Zilog Z8002
Source Language: Assembly
Purchase Terms: Purchase (license) - $450
Number Installed to Date: 100
Date First Installed: 1982

HUNTER & READY, INC.
C INTERFACE LIBRARY (IMT)
Additional Product Classification: Communications/TP Monitors
Specific Application: Interfaces Programs Written IN IMTC to VRTX/68000
System Requirements: Motorola 68000
Source Language: Assembly
Purchase Terms: Purchase (license) - $450
Number Installed to Date: 100
Date First Installed: 1982

HUNTER & READY, INC.
C INTERFACE LIBRARY (WHITE SMITHS)
Additional Product Classification: Communications/TP Monitors
Specific Application: Interfaces Programs Written IN White Smiths C to VRTX/68000
System Requirements: Motorola 68000
Source Language: Assembly
Purchase Terms: Purchase (license) - $450
Number Installed to Date: 100
Date First Installed: 1982

HUNTER & READY, INC.
C INTERFACE LIBRARY (WHITE SMITHS)
Additional Product Classification: Communications/TP Monitors
Specific Application: Interfaces Programs Written In White Smiths C to VRTX/6002
System Requirements: Zilog Z8002
Source Language: Assembly
Purchase Terms: Purchase (license) - $450
Number Installed to Date: 100
Date First Installed: 1982

HUNTER & READY, INC.
PASCAL INTERFACE LIBRARY (HEWLETT PACKARD)
Additional Product Classification: Communications/TP Monitors
Specific Application: Interfaces Programs Written in HP Pascal to VRTX/68000
System Requirements: Motorola 68000
Source Language: Assembly
Purchase Terms: Purchase (license) - $450
Number Installed to Date: 100
Date First Installed: 1982

HUNTER & READY, INC.
PASCAL INTERFACE LIBRARY (HEWLETT PACKARD)
Additional Product Classification: Communications/TP Monitors
Specific Application: Interfaces Programs Written IN HP Pascal to VRTX/86
System Requirements: Intel 8086
Source Language: Assembly
Purchase Terms: Purchase (license) - $450

Number Installed to Date: 100
Date First Installed: 1982

HUNTER & READY, INC.
PASCAL INTERFACE LIBRARY (HEWLETT PACKARD)
Additional Product Classification: Communications/TP Monitors
Specific Application: Interfaces Programs Written In HP Pascal to VRTX/8002
System Requirements: Zilog Z8002
Source Language: Assembly
Purchase Terms: Purchase (license) - $450
Number Installed to Date: 100
Date First Installed: 1982

HUNTER & READY, INC.
PL/M INTERFACE LIBRARY
Additional Product Classification: Communications/TP Monitors
Specific Application: Interfaces Programs Written In PL/M to VRTX/86
System Requirements: Intel 8086
Source Language: Assembly
Purchase Terms: Purchase (license) - $450
Number Installed to Date: 100
Date First Installed: 1982

MS CORP.
GENTEN8
Additional Product Classification: Communications/TP Monitors
Specific Application: Comprehensive Asynchronous Communications Package
System Requirements: Apple II: Apple-DOS, CP/M; IBM PC, MS-DOS
Memory Required: 64.0K bytes
Source Language: CP/M Fortran, MS-DOS Assembler
Source Code Available: No
Purchase Terms: Purchase (license) - $79
Number Installed to Date: 1,000
Date First Installed: June 1983
(See Vendor Profile Page V-14)

IDE ASSOCIATES, INC.
IDEACOMM 1200
Additional Product Classification: Communications/TP Monitors
Specific Application: Asynchronous Communications Package
System Requirements: IBM PC, PC-DOS 2.0
Memory Required: 128.0K bytes
Source Language: Assembly, C
Number Installed to Date: 250
Date First Installed: October 1983
(See Vendor Profile Page V-15)

IDE ASSOCIATES, INC.
IDEACOMM 3278
Additional Product Classification: Communications/TP Monitors
Specific Application: Allows An IBM PC to Emulate A 3278
System Requirements: IBM PC, PC-DOS 2.0
Memory Required: 128.0K bytes
Source Language: Assembly, C
Purchase Terms: Purchase (license) - $1,195
Number Installed to Date: 2
Date First Installed: 1983

IDE ASSOCIATES, INC.
IDEANET
Additional Product Classification: Communications/TP Monitors
Specific Application: Allows An IBM PC to Communicate Over Coaxial Cable
System Requirements: IBM PC, PC-DOS 2.0
Memory Required: 128.0K bytes
Source Language: Assembly, C
Purchase Terms: Purchase (license) - $795
Date First Installed: January 1984

IDE ASSOCIATES, INC.
IDEASHARE
Additional Product Classification: Communications/TP Monitors
Specific Application: Allows An IBM PC to Communicate Via An Asynchronous RS-232 Cable
System Requirements: IBM PC, PC-DOS 2.0
Memory Required: 128.0K bytes
Source Language: Assembly, C
Purchase Terms: Purchase (license) - $595
Number Installed to Date: 1
Date First Installed: December 1983

IE SYSTEMS, INC.
ACCULINK
Additional Product Classification: Communications/TP Monitors
Specific Application: Protocol Emulation
System Requirements: IBM: CP/M; Zorox 820: MS-DOS; NEC: PC-DOS; Tandy
Memory Required: 128.0K bytes
Source Language: Assembler
Source Code Available: No
Purchase Terms: Purchase (license) - $245
Number Installed to Date: 1,000
Date First Installed: August 1979
(See Vendor Profile Page V-15)

IE SYSTEMS, INC.
IBS - 3270
Additional Product Classification: Communications/TP Monitors
Specific Application: Protocol Emulation
System Requirements: IBM: CP/M; Zorox 820: MS-DOS; NEC: PC-DOS; Tandy
Memory Required: 128.0K bytes
Source Language: Assembler
Source Code Available: No
Purchase Terms: Purchase (license) - $695
Number Installed to Date: 1,000
Date First Installed: November 1980

IE SYSTEMS, INC.
IBS - 3780
Additional Product Classification: Communications/TP Monitors
Specific Application: Protocol Emulation
System Requirements: IBM: CP/M; Zorox: MS-DOS; NEC: PC-DOS; Tandy
Memory Required: 128.0K bytes
Source Language: Assembler
Source Code Available: No
Purchase Terms: Purchase (license) - $695
Number Installed to Date: 1,000
Date First Installed: January 1979

IE SYSTEMS, INC.
IMS-HASP
Additional Product Classification: Communications/TP Monitors
Specific Application: Protocol Emulation
System Requirements: IBM: CP/M; Zorox 820: MS-DOS; NEC: PC-DOS; Tandy
Memory Required: 128.0K bytes
Source Language: Assembler
Source Code Available: No
Purchase Terms: Purchase (license) - $695
Number Installed to Date: 1,000
Date First Installed: May 1982

IE SYSTEMS, INC.
IBS-3270 VERSION 4.0
Additional Product Classification: Communications/TP Monitors
Specific Application: 3270 Emulation Software for Microcomputers
System Requirements: CP/M, CP/M 86, MS-DOS
Memory Required: 64.0K bytes
Source Language: Assembler
Source Code Available: No
Purchase Terms: Purchase (license) - $695
Number Installed to Date: 600
Date First Installed: November 1980

INDUSTRIAL COMPUTER CORP.
DDCMP 1000
Additional Product Classification: Communications/TP Monitors
Specific Application: Provides DEC to HP 1000 Communication
System Requirements: HP 1000
Memory Required: 64.0K bytes
Source Language: Fortran, Assembler
Source Code Available: No
Purchase Terms: Purchase (license) - $2,500
Number Installed to Date: 5
Date First Installed: January 1983
(See Vendor Profile Page V-15)

INFOMEDIA CORP.
JENNY
Additional Product Classification: Communications/TP Monitors
Specific Application: Electronic Mail Package
System Requirements: HP 3000: MPE
Source Language: SPL
Source Code Available: No
Purchase Terms: Lease
Number Installed to Date: 10
Date First Installed: 1981
(See Vendor Profile Page V-15)

INFORMATION CONCEPTS, INC.
CICS APPLICATION FILE CONTROL
Additional Product Classification: Communications/TP Monitors
Specific Application: Batch-TO-CICS Communications, Streamlines Restart Activity
System Requirements: IBM 4300; MVS; IBM 30XX; IBM 360; IBM 370
Source Language: Assembler
Purchase Terms: Purchase (license) - $2,500
Number Installed to Date: 75
Date First Installed: 1980
(See Vendor Profile Page V-15)

INFORMATION MANAGEMENT TECHNOLOGIES
DEDICOM
Additional Product Classification: Communications/TP Monitors
Specific Application: Communications Switching Program
System Requirements: DG: Unix; TI; Perkin Elmer
Memory Required: 256.0K bytes
Source Language: C
Purchase Terms: Purchase (license) - $20,000 to $40,000
Number Installed to Date: 20
Date First Installed: September 1982
(See Vendor Profile Page V-15)

THE INFORMATION ORGANIZATION CORP.
OCR (OPTICAL CHARACTER READER) INTERFACE
Additional Product Classification: WP/Text Editing, Communications/TP Monitors
Specific Application: OCR Interface
Specific Industry: Legal
System Requirements: Wang VS
Memory Required: 256.0K bytes
Source Language: Cobol
Source Code Available: No
Purchase Terms: Purchase (license) - $1,000
Number Installed to Date: 20
Date First Installed: May 1980
(See Vendor Profile Page V-15)

THE INFORMATION ORGANIZATION CORP.
WANG VS TO HIGH SPEED PRINTER
Additional Product Classification: Communications/TP Monitors, Speed Printer
Specific Application: Sends Wang WP to High-Speed Printer
System Requirements: Wang VS
Memory Required: 256.0K bytes
Source Language: Cobol
Source Code Available: No
Purchase Terms: Purchase (license) - $4,000
Number Installed to Date: 2
Date First Installed: August 1982

THE INFORMATION ORGANIZATION CORP.
WANG VS TO IBM DISPLAY WRITER
Additional Product Classification: Communications/TP Monitors, Display Writer
Specific Application: Telecommunications Interface Package Translates Wang WP to IBM Display Writer and IBM to Wang
System Requirements: Wang VS

Memory Required: 256.0K bytes
Source Language: Cobol
Source Code Available: No
Purchase Terms: Purchase (license) - $4,000
Number Installed to Date: 2
Date First Installed: May 1982

THE INFORMATION ORGANIZATION CORP.
WANG VS TO OCR INTERFACE
Additional Product Classification: Communications/TP Monitors
Specific Application: Wang VS to OCR Interface
System Requirements: Wang VS
Memory Required: 256.0K bytes
Source Language: Cobol
Source Code Available: No
Purchase Terms: Purchase (license) - $1,000
Number Installed to Date: 23
Date First Installed: May 1980

INFOSERVICES, INC.
INFOCOMM/INFOHOST ANSWER-DB
Additional Product Classification: Communications/TP Monitors, Library Management, Report Generator
Specific Application: Communications from Micros to Prime and Micro to Micro
System Requirements: CP/M, MS/D
Memory Required: 32.0K bytes
Source Code Available: No
Purchase Terms: Purchase (license) - $3,500
Date First Installed: 1981
(See Vendor Profile Page V-15)

INFOSOFT SYSTEMS, INC.
INFOSOFT NETWORK SYSTEM - MULTI/NET
Additional Product Classification: Communications/TP Monitors, Networking
Specific Application: Networking
Memory Required: 32.0K bytes
Source Language: 8080 Assembler, Infosoft C
Purchase Terms: Purchase (license)
Date First Installed: September 1982
(See Vendor Profile Page V-15)

INFOSOFT SYSTEMS, INC.
INTELLIGENT TERMINAL (COMMUNICATION SYSTEM)
Additional Product Classification: Communications/TP Monitors
Specific Application: Communications
Memory Required: 3.2M bytes
Source Language: 8080 Assembler
Purchase Terms: Purchase (license)
Date First Installed: August 1976

INFOTRON MICROSYSTEMS, INC.
COMMUNICATION LINK
Additional Product Classification: Communications/TP Monitors
Specific Application: High-Speed Communications to Remote Systems
System Requirements: DEC PDP-11: RT-11; DEC LSI-11: RT-11
Memory Required: 12.0K bytes
Source Language: Macro
Purchase Terms: Purchase (license) - $775
Date First Installed: 1978
(See Vendor Profile Page V-16)

INTEGRATED DESIGN ENGINEERING, INC.
NCR COMM
Additional Product Classification: Communications/TP Monitors
Specific Application: Data Communications
System Requirements: NCR Decision Mate V: CP/M, MS-DOS
Memory Required: 64.0K bytes
Source Language: Assembly
Source Code Available: No
Purchase Terms: Purchase (license) - $400
Date First Installed: August 1983
(See Vendor Profile Page V-16)

INTELLIGENT TECHNOLOGIES INTERNATIONAL CORP.
CLUSTER NET 3278
Additional Product Classification: Communications/TP Monitors
Specific Application: Multiple 3278 Cluster Emulation - PC to PC
System Requirements: IBM PC, MS-DOS
Memory Required: 256.0K bytes
Source Language: Compiled Basic, C, Assembler
Purchase Terms: Purchase (license) - $8,303
(See Vendor Profile Page V-16)

INTELLIGENT TECHNOLOGIES INTERNATIONAL CORP.
PC EXPRESS 1
Additional Product Classification: Communications/TP Monitors
Specific Application: Electronic Mail, PC to PC Link, DEC VT100/VT52 Emulator
System Requirements: IBM PC, MS-DOS
Memory Required: 256.0K bytes
Source Language: Compiled Basic, C, Assembler
Source Code Available: No
Purchase Terms: Purchase (license) - $695
Date First Installed: March 1983

INTELLIGENT TECHNOLOGIES INTERNATIONAL CORP.
PC EXPRESS 2
Additional Product Classification: Communications/TP Monitors
Specific Application: Electronic Mail, PC to PC Link, DEC VT100/VT52 Emulator
System Requirements: IBM PC, MS-DOS
Memory Required: 256.0K bytes
Source Language: Compiled Basic, C, Assembler
Source Code Available: No
Purchase Terms: Purchase (license) - $1,295
Date First Installed: March 1983

INTERCOM RESEARCH CORP.
INTERCOM 100A
Additional Product Classification: Communications/TP Monitors
Specific Application: Communications Software for Front End Processing
System Requirements: DEC VAX: VMS; DEC PDP-11: CP/M, Unix
Memory Required: 15.0K bytes
Source Language: Assembly
Source Code Available: No
Purchase Terms: Purchase (license); Lease - $1,250 to $4,995
Date First Installed: January 1985
(See Vendor Profile Page V-16)

INTERSTAGE
TALK
Additional Product Classification: Communications/TP Monitors
Specific Application: Communications Link Between Micro and Mainframes
System Requirements: Intel
Source Language: C
Purchase Terms: Purchase (license) - $500
(See Vendor Profile Page V-16)

INTERNATIONAL DIGITAL ELECTRONICS ASSOCIATES
COMMUNICATION
Additional Product Classification: Communications/TP Monitors
Specific Application: Telex, TWX, Special Protocols
Specific Industry: Communications
System Requirements: Intel: BTX; Bitgix
Source Language: Assembler
Purchase Terms: Purchase (license) - $1,500
Number Installed to Date: 100
Date First Installed: 1982
(See Vendor Profile Page V-17)

KEYBROOK BUSINESS SYSTEMS, INC.
KEYBROOK FILESERVER
Additional Product Classification: Communications/TP Monitors
Specific Application: Networking System for CP/M Micro Computers
System Requirements: Xerox 820; Sanyo: CP/M; Altos
Source Language: Z-80 Assembly
Purchase Terms: Purchase (license) - $2,700
Number Installed to Date: 50
Date First Installed: 1982
(See Vendor Profile Page V-17)

KEYSTONE DATA CONSULTANTS, INC.
FILE TRANSMISSION PACKAGE
Additional Product Classification: Communications/TP Monitors
Specific Application: Transmits Information from One Machine to Another
System Requirements: DEC PDP-11: RSX
Memory Required: 128.0K bytes
Source Language: Macro Jl
Purchase Terms: Purchase (license) - $1,200
Number Installed to Date: 6
Date First Installed: 1982

LEARNED-SMITH
ASTALK
Additional Product Classification: Data/File Management, Communications/TP Monitors
Specific Application: Communications and File Building
System Requirements: IBM PC; GE Time-sharing System
Memory Required: 64.0K bytes
Source Language: Basic
Purchase Terms: Purchase (license) - $295
Number Installed to Date: 100
Date First Installed: August 1982
(See Vendor Profile Page V-17)

LIGHT INFORMATION, INC.
UT 200
Additional Product Classification: Communications/TP Monitors
Specific Application: Terminal Emulator
System Requirements: Four Phase 4: MFE
Source Language: Cobol
Source Code Available: No
Purchase Terms: Purchase (license) - $10,000
Number Installed to Date: 3
Date First Installed: 1982
(See Vendor Profile Page V-16)

LIEBERMAN SYSTEMS
ORBITERM
Additional Product Classification: Communications/TP Monitors
Specific Application: Smart Terminal Software With File Transfer
System Requirements: TRS-80 Models I, II, III, 12
Source Code Available: Yes
Purchase Terms: Purchase (license) - $95 to $175
Number Installed to Date: 1,000
Date First Installed: January 1980
(See Vendor Profile Page V-16)

LINK SYSTEMS
DATALINK
Additional Product Classification: Communications/TP Monitors.
Specific Application: Communicates to Other Data Bases
System Requirements: Apple II, IIE, III: UCSD-P System; IBM PC-XT, UCSD-P System
Memory Required: 64.0K bytes
Source Language: Pascal
Source Code Available: No
Purchase Terms: Purchase (license)
Date First Installed: August 1983
(See Vendor Profile Page V-16)

LOGICA, INC.
FASTRAN
Additional Product Classification: Communications/TP Monitors
Specific Application: Bank Cable Room and Funds Transfer Automation Software
Specific Industry: Banking/Financial, International
System Requirements: DEC PDP-11: RSX; Tandem
Memory Required: 1.0M bytes
Source Language: Macro, C
Purchase Terms: Purchase (license); Rental; Lease - $100,000
Number Installed to Date: 20
Date First Installed: 1979
(See Vendor Profile Page V-16)

Software

LOGICA, INC.
FASTRX
Additional Product Classification: Communications/TP Monitors
Specific Application: Transaction Processing and Message Switching Applications
Specific Industry: Banking/Financial, International
System Requirements: DEC PDP-11: RSX; Tandem
Memory Required: 1.0M bytes
Source Language: Macro, C
Purchase Terms: Purchase (license); Rental; Lease - $75,000
Number Installed to Date: 25
Date First Installed: 1979

LOGICA, INC.
FASTWIRE
Additional Product Classification: Communications/TP Monitors
Specific Application: Bank Cable Room and Funds Transfer Automation Software
Specific Industry: Banking/Financial, International
System Requirements: DEC PDP-11: RSX
Memory Required: 1.0M bytes
Source Language: Macro, C
Purchase Terms: Purchase (license); Rental; Lease - $100,000
Number Installed to Date: 3
Date First Installed: 1982

MACKINNEY SYSTEMS
CICS/SPOOLER
Additional Product Classification: Communications/TP Monitors
Specific Application: Print Spooler System
System Requirements: IBM 370, 4300, 30XX
Memory Required: 32.0K bytes
Source Language: Cobol, Assembler
Purchase Terms: Purchase (license); Lease - $995
Date First Installed: October 1983
(See Vendor Profile Page V-18)

MAGNUM COMMUNICATIONS, LTD.
CREDICHECK
Additional Product Classification: Communications/TP Monitors
Specific Application: System to System Credit Bureau Access System
Specific Industry: Retail, Banking/Financial
System Requirements: IBM Mainframe: CICS
Memory Required: 30.0K bytes
Source Language: Cobol, Assembler, EDL
Purchase Terms: Purchase (license) - $9,500 to $35,500
Number Installed to Date: 7
Date First Installed: 1977
(See Vendor Profile Page V-18)

MATHEMATICA PRODUCTS GROUP
ATLAS
Additional Product Classification: Communications/TP Monitors
Specific Application: Data Communications Monitor
System Requirements: IBM: DOS/VSE
Source Language: Assembler
Source Code Available: No
Purchase Terms: Purchase (license); Rental; Lease - $28,000
Number Installed to Date: 40
Date First Installed: 1982
(See Vendor Profile Page V-18)

MCCORMACK & DODGE CORP.
PC:M
Additional Product Classification: Communications/TP Monitors
Specific Application: Personal Computer Link from Micro to Mainframe
System Requirements: IBM: OS, DOS
Memory Required: 100.0K bytes
Source Language: Cobol
Purchase Terms: Purchase (license) - $10,000
Date First Installed: 1983
(See Vendor Profile Page V-18)

MCDONNELL DOUGLAS AUTOMATION CO.
MCAUTO SYSTEM 1
Additional Product Classification: Communications/TP Monitors
Specific Application: Manage A Distributed Environment Between A Local Minicomputer Dedicated to An Engineering Project and A Backup Mainframe
Specific Industry: Manufacturing, Engineering, Construction, Government, Transportation
System Requirements: DEC: VMS
Memory Required: 1.0K bytes
Source Code Available: No
Purchase Terms: Purchase (license); Lease
Date First Installed: February 1983
(See Vendor Profile Page V-18)

MCGS ENTERPRISES
PROCALL
Additional Product Classification: Communications/TP Monitors
Specific Application: Communicates With Bulletin Boards Large Computers Between Cromemco Systems Multi- and Single-User Environments, Christianson Protocol Or Program Transfers
System Requirements: Cromemco C10: C-DOS; Cromemco S100: Cromix
Memory Required: 64.0K bytes
Source Language: Assembler
Source Code Available: No
Purchase Terms: Purchase (license) - $360
Number Installed to Date: 150
Date First Installed: December 1982
(See Vendor Profile Page V-18)

MEDAREST SYSTEMS, INC.
MEGA NET
Additional Product Classification: Communications/TP Monitors
Specific Application: Communications Package
System Requirements: IBM PC; Mentor: Pick; Micro Data
Memory Required: 64.0K bytes
Source Language: Data Basic
Purchase Terms: Purchase (license) - $2,000
Number Installed to Date: 45
Date First Installed: 1980
(See Vendor Profile Page V-18)

MERIDIAN TECHNICAL ASSOCIATES, INC.
INTELLIGENT MODEM PROGRAM IMP
Additional Product Classification: Communications/TP Monitors
Specific Application: Terminal Emulation
System Requirements: Zenith/Heath H8: H-DOS; Zenith/Heath H/Z89: CP/M; Zenith/Heath H/Z90: CP/M-86; Zenith/Heath H/Z100: Z-DOS
Memory Required: 32.0K bytes
Source Language: Assembler
Source Code Available: No
Purchase Terms: Purchase (license) - $30
Number Installed to Date: 12
Date First Installed: November 1983
(See Vendor Profile Page V-18)

MICRO-INTEGRATION, INC.
IMS 3270 VERSION 4.0
Additional Product Classification: Communications/TP Monitors
Specific Application: IBM 3270 Terminal Emulator
System Requirements: CP/M, CP/M 86, MS-DOS, PC-DOS
Memory Required: 64.0K bytes
Source Language: Assembler
Source Code Available: No
Purchase Terms: Purchase (license) - $695
Number Installed to Date: 2,000
Date First Installed: November 1980
(See Vendor Profile Page V-18)

MICRO-INTEGRATION, INC.
IMS 3780 VERSION 5.0
Additional Product Classification: Communications/TP Monitors
Specific Application: IBM 2780, 3780 Emulator Communications Remote Job Entry
System Requirements: CP/M, CP/M 86, MS-DOS, PC-DOS
Memory Required: 64.0K bytes
Source Language: Assembler
Source Code Available: No
Purchase Terms: Purchase (license) - $695
Number Installed to Date: 2,000
Date First Installed: September 1979

MICRO-INTEGRATION, INC.
IMS HASP VERSION 1.1
Additional Product Classification: Communications/TP Monitors
Specific Application: Hasp Multi-Leaving Workstation Communications; Remote Job Entry
System Requirements: CP/M, CP/M 86, MS-DOS, PC-DOS
Memory Required: 64.0K bytes
Source Language: Assembler
Purchase Terms: Purchase (license) - $695
Number Installed to Date: 50
Date First Installed: September 1981

MICRO-INTEGRATION, INC.
COAXSYS TM
Additional Product Classification: Communications/TP Monitors
Specific Application: IBM 3270 Coaxial Interface Hardware and Software
System Requirements: CP/M, CP/M 86, MS-DOS, PC-DOS
Memory Required: 64.0K bytes
Source Language: Pascal, Assembler
Source Code Available: No
Purchase Terms: Purchase (license) - $1,195

MICRO-INTEGRATION, INC.
MICRO-SNA/3270 VERSION 1.0
Additional Product Classification: Communications/TP Monitors
Specific Application: IBM 3270 Terminal Emulator, Communications
System Requirements: CP/M, CP/M 86, MS-DOS, PC-DOS
Memory Required: 64.0K bytes
Source Language: Assembler, Pascal
Source Code Available: No
Purchase Terms: Purchase (license) - $695

MICRO-INTEGRATION, INC.
MICRO-SNA3770
Additional Product Classification: Communications/TP Monitors
Specific Application: IBM 3770 Terminal Emulator, Communications, Remote Job Entry
System Requirements: CP/M, CP/M 86, MS-DOS, PC-DOS
Memory Required: 64.0K bytes
Source Language: Assembler, Pascal
Source Code Available: No
Purchase Terms: Purchase (license) - $695

MICRO/MAGIC SYSTEMS, INC.
M-SYNC
Additional Product Classification: Communications/TP Monitors
Specific Application: Remote Job Entry
System Requirements: Victor 9000
Memory Required: 128.0K bytes
Source Code Available: No
Purchase Terms: Purchase (license) - $495
Date First Installed: September 1983
(See Vendor Profile Page V-18)

MICRON, INC.
COMM LINE
Additional Product Classification: Communications/TP Monitors
Specific Application: Monitors Communication Between Computers
System Requirements: TRS-80, TRS-DOS
Memory Required: 64.0K bytes
Source Language: Assembly
Purchase Terms: Purchase (license) - $300

Date First Installed: 1983
(See Vendor Profile Page V-19)

MICRON, INC.
SMART TERM I
Additional Product Classification: Communications/TP Monitors
Specific Application: Makes Mini Look Like Intelligent Terminal
System Requirements: TRS-80, TRS-DOS
Memory Required: 32.0K bytes
Source Language: Assembly
Purchase Terms: Purchase (license)
Number Installed to Date: 200
Date First Installed: 1979

THE MICROPERIPHERAL CORP.
TSMART
Additional Product Classification: Communications/TP Monitors
Specific Application: Allows Up/Down Loading, Allows Transferable On/Off Selectable Communications Parameters
System Requirements: Atari
Memory Required: 32.0K bytes
Source Language: Basic, Assembly
Purchase Terms: Purchase (license) - $50
Date First Installed: January 1981
(See Vendor Profile Page V-19)

MICROSPARC, INC.
TELETEXT
Additional Product Classification: Communications/TP Monitors
Specific Application: A General Purpose Data Communications Package
System Requirements: Apple II+, IIE, DOS
Memory Required: 48.0K bytes
Source Language: Applesoft, 6502 Machine Language
Purchase Terms: Purchase (license) - $80
Number Installed to Date: 100
Date First Installed: June 1982
(See Vendor Profile Page V-19)

MICROSTUF, INC.
CROSSTALK XVI
Additional Product Classification: Communications/TP Monitors
Specific Application: Integrated Help System Emulates Several Terminals, Supports Most Autodial Modems Capable Of Totally Automated File Transmission
System Requirements: IBM PC; MS-DOS; Victor 9000; Eagle 1600; Corona
Memory Required: 96.0K bytes
Source Language: Assembly
Purchase Terms: Purchase (license) - $195
(See Vendor Profile Page V-19)

MICROSTUF, INC.
REMOTE
Additional Product Classification: Communications/TP Monitors
Specific Application: Remote Console Program Allows You to Call Into Your Microcomputer
System Requirements: IBM PC; MS-DOS; Televideo; CP/M; Eagle; North Star
Source Language: Assembly

MICROSTUF, INC.
TRANSPORTER
Additional Product Classification: Communications/TP Monitors
Specific Application: Automated Data Communications Program Designed for Unattended Information Exchange
System Requirements: IBM PC; MS-DOS
Memory Required: 96.0K bytes
Source Language: Assembly
Source Code Available: No
Purchase Terms: Purchase (license) - $295

MICRO-SYSTEMS SOFTWARE, INC.
BBS-80
Additional Product Classification: Communications/TP Monitors
Specific Application: Bulletin Board System That Hooks Into Microcomputers via Telephone
System Requirements: TRS-80/I; TRS-80/III
Source Language: Basic
Source Code Available: No
Purchase Terms: Purchase (license) - $80
Date First Installed: 1981
(See Vendor Profile Page V-19)

MICRO-SYSTEMS SOFTWARE, INC.
MICROTERM
Additional Product Classification: Communications/TP Monitors
Specific Application: Turns Microcomputer Into A Terminal to Hook Up Into Mainframes
System Requirements: TRS-80; IBM PC; Apple II, IIE
Source Language: Basic
Source Code Available: No
Purchase Terms: Purchase (license) - $80
Date First Installed: 1982

MICRO-SYSTEMS SOFTWARE, INC.
QUADROBACK
Additional Product Classification: Communications/TP Monitors
Specific Application: Communication System That Ties 4 TRS-80 Model I, III, IV to 1 Hard Disk
System Requirements: TRS-80/I; TRS-80/III; TRS-80/IV
Source Language: Basic
Source Code Available: No
Purchase Terms: Purchase (license) - $900 to $1,000
Date First Installed: August 1983

MODULAR INTEGRATION, INC.
COMPAK
Additional Product Classification: Communications/TP Monitors
Specific Application: Protocol Converter Package, Synchronous to Asynchronous Converter
Specific Industry: Weather Power
System Requirements: IBM PC; CP/M 86, MS-DOS
Memory Required: 256.0K bytes
Purchase Terms: Purchase (license); Lease - $500
Number Installed to Date: 500
Date First Installed: 1978
(See Vendor Profile Page V-20)

MODULAR INTEGRATION, INC.
SDLC/HDLC
Additional Product Classification: Communications/TP Monitors
Specific Application: SDLC/HDLC Communications Package
Specific Industry: Weather Power
System Requirements: CP/M 86, MS-DOS
Memory Required: 256.0K bytes
Purchase Terms: Purchase (license); Lease - $1,000
Number Installed to Date: 500
Date First Installed: 1978

MOHAWK DATA SCIENCES CORP.
IBC 3761
Additional Product Classification: Communications/TP Monitors
Specific Application: Communications
System Requirements: MDS Series 21; OS/2
Source Language: Mobol/Z80
Source Code Available: No
(See Vendor Profile Page V-20)

MOHAWK DATA SCIENCES CORP.
IBM 3275
Additional Product Classification: Communications/TP Monitors
Specific Application: Communications
System Requirements: MDS Series 21, SO/2
Source Language: Mobol/Z80
Source Code Available: No

MOHAWK DATA SCIENCES CORP.
MASP/MS
Additional Product Classification: Communications/TP Monitors
Specific Application: Communications
System Requirements: MDS Series 21, OS/2
Memory Required: 9.6M bytes
Source Language: Mobol/Z80
Source Code Available: No
Purchase Terms: Purchase (license)

MOHAWK DATA SCIENCES CORP.
REMOTE COPY
Additional Product Classification: Communications/TP Monitors
Specific Application: Communications
System Requirements: MSD Series 21, OS/2
Source Language: Mobol/Z80
Source Code Available: No

MONROE SYSTEMS FOR BUSINESS
ASCOM +
Additional Product Classification: Communications/TP Monitors
Specific Application: Asynchronous Communications Utility
System Requirements: Monroe OC 8800: CP/M-80
Memory Required: 128.0K bytes
Source Language: Assembler
Source Code Available: No
Purchase Terms: Purchase (license); Lease - $175
Date First Installed: 1981
(See Vendor Profile Page V-20)

MONROE SYSTEMS FOR BUSINESS
MONROE BIS - 3780
Additional Product Classification: Communications/TP Monitors
Specific Application: Synchronous 2780/3780 Emulation
System Requirements: Monroe OC 8800: CP/M 80
Memory Required: 128.0K bytes
Source Language: Assembler
Source Code Available: No
Purchase Terms: Purchase (license); Lease - $750
Date First Installed: 1981

MONROE SYSTEMS FOR BUSINESS
MONROE BIS- 3270
Additional Product Classification: Communications/TP Monitors
Specific Application: Synchronous Communications
System Requirements: Monroe OC 8800: CP/M 80
Memory Required: 128.0K bytes
Source Language: Assembler
Source Code Available: No
Purchase Terms: Purchase (license); Lease - $750
Date First Installed: 1981

MONROE SYSTEMS FOR BUSINESS
MONROE TTY EMULATOR
Additional Product Classification: Communications/TP Monitors
Specific Application: Asynchronous Communications Utility
System Requirements: Monroe OC 8800: MS-10; Monroe EC 8800: MS-10
Memory Required: 128.0K bytes
Source Language: Assembler
Source Code Available: No
Purchase Terms: Purchase (license); Lease - $95
Date First Installed: 1981

MONROE SYSTEMS FOR BUSINESS
MONROE BIS -HASP
Additional Product Classification: Communications/TP Monitors
Specific Application: Multileaving Workstation Emulation
System Requirements: Monroe OC 8800: CP/M 80
Memory Required: 128.0K bytes
Source Language: Assembler
Purchase Terms: Purchase (license); Lease - $795
Date First Installed: 1981

MONROE SYSTEMS FOR BUSINESS
MONROE 3270 SNA/SDLC
Additional Product Classification: Communications/TP Monitors

Specific Application: SNA 3270 Display Emulation
System Requirements: Monroe OC 9600: MS-10
Memory Required: 128.0K bytes
Source Language: Assembler
Source Code Available: No
Purchase Terms: Purchase (license); Lease - $995
Date First Installed: 1981

MOUNTAIN COMPUTER, INC.
SUPER TALKER
Additional Product Classification: Communications/TP Monitors
Specific Application: Speech Digitizer
System Requirements: Apple; IBM
Purchase Terms: Purchase (license)
(See Vendor Profile Page V-20)

MUSIQUEST MICRO SYSTEMS
DEMON
Additional Product Classification: Communications/TP Monitors
Specific Application: Monitor and Debugger
System Requirements: TRS-80: DOS
Memory Required: 32.0K bytes
Source Language: Assembler
Source Code Available: No
Purchase Terms: Purchase (license) - $29
Date First Installed: 1983
(See Vendor Profile Page V-21)

MUSIQUEST MICRO SYSTEMS
TELCOM II
Additional Product Classification: Communications/TP Monitors
Specific Application: Advanced Telecommunications
System Requirements: TRS-80: DOS
Memory Required: 32.0K bytes
Source Language: Assembler
Source Code Available: No
Purchase Terms: Purchase (license) - $69
Date First Installed: 1982

MUSIQUEST MICRO SYSTEMS
TELECOM I
Additional Product Classification: Communications/TP Monitors
Specific Application: Telecommunications
System Requirements: TRS-80: DOS
Memory Required: 32.0K bytes
Source Language: Assembler
Source Code Available: No
Purchase Terms: Purchase (license) - $39
Date First Installed: 1980

NATIONAL E-P-T, INC.
LINK/1
Additional Product Classification: Communications/TP Monitors
Specific Application: Communications Support Package
Specific Industry: Manufacturing, Banking/Financial
System Requirements: IBM Series/1
Memory Required: 64.0K bytes
Source Language: Cobol
Purchase Terms: Purchase (license) - $20,000
Number Installed to Date: 2
Date First Installed: 1982
(See Vendor Profile Page V-21)

NATIONAL MICRO PRODUCTS, INC.
MODEM
Additional Product Classification: Communications/TP Monitors
Specific Application: Order Entry
System Requirements: Intertec Computer: CP/M
Memory Required: 64.0K bytes
Source Language: Basic, Pascal, Assembler
Purchase Terms: Purchase (license) - $40,000
Date First Installed: December 1983
(See Vendor Profile Page V-21)

NATIONAL MICRO PRODUCTS, INC.
SMODEM
Additional Product Classification: Communications/TP Monitors
Specific Application: Order Entry
System Requirements: Intertec Computer, CP/M
Memory Required: 64.0K bytes
Source Language: Basic, Pascal, Assembler
Purchase Terms: Purchase (license) - $40,000
Date First Installed: December 1983

NATIONAL MICRO PRODUCTS, INC.
XMODEM
Additional Product Classification: Communications/TP Monitors
Specific Application: Order Entry
System Requirements: Intertec Computer, CP/M
Memory Required: 64.0K bytes
Source Language: Basic, Pascal, Assembler
Purchase Terms: Purchase (license) - $40,000
Date First Installed: December 1983

NATIONAL SEMICONDUCTOR CORP.
ANS-TRAN
Additional Product Classification: Communications/TP Monitors
Specific Application: Enables POS Systems to Communicate With Host Computers
Specific Industry: Food
System Requirements: DEC PDP-11
Memory Required: 256.0K bytes
Source Language: IMP, Macro-11
(See Vendor Profile Page V-21)

NATIONAL SEMICONDUCTOR CORP.
ENCS
Additional Product Classification: Communications/TP Monitors
Specific Application: Enables POS Systems to Communicate With Host Computers
Specific Industry: Food
System Requirements: DEC PDP-11: RSX-11
Memory Required: 256.0K bytes.
Source Language: IMP, Macro-11
Source Code Available: No

NCR COMTEN, INC.
ACF/NCP 3
Additional Product Classification: Communications/TP Monitors
Specific Application: Compatible With IBM ACF/NCR. Enables Increase of Data Access Within The Network By Supporting Various Systems
System Requirements: NCR: SCS 63/Cross 2
Source Language: Cobol
Purchase Terms: Purchase (license)
Date First Installed: 1982
(See Vendor Profile Page V-21)

NCR COMTEN, INC.
CNS 2-COMMUNICATIONS NETWORKING SYSTEM
Additional Product Classification: Communications/TP Monitors
Specific Application: Network Trunking Facility to Interconnect NCR Comten 3600 Systems
System Requirements: NCR
Source Language: Cobol
Purchase Terms: Purchase (license)
Date First Installed: 1981

NCR COMTEN, INC.
EP 4-EMULATION PROCESSING
Additional Product Classification: Communications/TP Monitors
Specific Application: Permits Compatible Comten 3600 Communication Processors to Function As Or Emulate IBM 270X/IBM 370X Program Controllers
System Requirements: NCR Comten 3600: SCS 63/Cross 2
Source Language: Cobol
Purchase Terms: Purchase (license)
Date First Installed: 1981

NCR COMTEN, INC.
MAF 3-3270 MULTIPLE ACCESS FACILITY
Additional Product Classification: Communications/TP Monitors
Specific Application: Allows 3270 Devices to Select Any Emulation Host Application Defined In The Network
System Requirements: NCR
Source Language: Cobol
Purchase Terms: Purchase (license)
Date First Installed: 1981

NCR COMTEN, INC.
NTO-NETWORK TERMINAL OPTION
Additional Product Classification: Communications/TP Monitors
Specific Application: Allows ACF/NCP 3 Product to Select SNA Start/Stop Devices Which Communicate
System Requirements: NCR
Source Language: Cobol
Purchase Terms: Purchase (license)
Date First Installed: 1981

NCR COMTEN, INC.
SRM 1-SUB AREA ROUTING MANAGER
Additional Product Classification: Communications/TP Monitors
Specific Application: Allows Bysynchronous and SNA 3270 Devices to be Dynamically Routed to Emulator or SNA Host Access Methods
System Requirements: NCR
Source Language: Cobol
Purchase Terms: Purchase (license)
Date First Installed: 1981

NCR COMTEN, INC.
X.25 PUBLIC DATA NETWORK
Additional Product Classification: Communications/TP Monitors
Specific Application: Supports The Public Data Network
System Requirements: NCR
Source Language: Cobol
Purchase Terms: Purchase (license)
Date First Installed: 1980

NCR CORP.
NCR-DMS/TRAN-PRO EL
Additional Product Classification: Communications/TP Monitors
Specific Application: Entry Level Transaction Processing Monitor
Specific Industry: Manufacturing, Engineering, Wholesale/Distribution, Retail, Banking/Financial, Medical, Legal, Insurance, Real Estate, Education, Construction, Government, Transportation, Non-Profit Organizations, Scientific
System Requirements: NCR V-8500, VRX; NCR V-8000 Series, VRX
Memory Required: 1.0K bytes
Source Language: Cobol, NEAT/VS
Source Code Available: No
Purchase Terms: Purchase (license); Rental
Number Installed to Date: 6
Date First Installed: October 1982
(See Vendor Profile Page V-21)

NESTAR SYSTEMS, INC.
'MESSENGER' ELECTRONIC MAIL
Additional Product Classification: Communications/TP Monitors, Insurance, Mail System
Specific Application: Memos/Letters Sent Between Users Connected by Same Local Network
System Requirements: Apple II: Pascal; Apple III: SOS; IBM PC: DOS, CP/M
Memory Required: 64.0K bytes
Source Language: Pascal
Purchase Terms: Purchase (license)
Number Installed to Date: 500
Date First Installed: 1981
(See Vendor Profile Page V-21)

NESTAR SYSTEMS, INC.
3270 CLUSTER EMULATOR SERVER
Additional Product Classification: Communications/TP Monitors
Specific Application: 3270 Emulation
System Requirements: Apple II: Pascal; IBM PC: PC-DOS
Memory Required: 64.0K bytes
Source Language: Pascal
Source Code Available: No
Purchase Terms: Purchase (license) - $2,000

Purchase Terms: Purchase (license) - $2,000
Number Installed to Date: 1,000
Date First Installed: 1982

NESTAR SYSTEMS, INC.
3278 EMULATOR
Additional Product Classification: Communications/TP Monitors
Specific Application: Emulates IBM 3278 Model II for PC On the Same Local Network AS IBM 3274 Emulator
System Requirements: Apple II: Pascal; Apple III: SOS; IBM PC: DOS, CP/M
Memory Required: 64.0K bytes
Source Language: Pascal
Source Code Available: No
Purchase Terms: Purchase (license) - $200
Date First Installed: July 1983

NESTAR SYSTEMS, INC.
3770 EMULATOR SERVER
Additional Product Classification: Communications/TP Monitors
Specific Application: 3770 Emulation
System Requirements: IBM PC: PC-DOS; Apple II: Pascal; Apple III: SOS
Memory Required: 64.0K bytes
Source Language: Pascal
Source Code Available: No
Purchase Terms: Purchase (license) - $1,000
Number Installed to Date: 1,000
Date First Installed: 1982

NESTAR SYSTEMS, INC.
FILE TRANSFER SERVER
Additional Product Classification: Communications/TP Monitors
Specific Application: Provides Batch Transfer of Files
System Requirements: Apple II, Pascal; Apple III, SOS; IBM PC, PC-DOS, CP/M
Memory Required: 64.0K bytes
Source Language: Pascal
Source Code Available: No
Purchase Terms: Purchase (license) - $2,000
Number Installed to Date: 1,000
Date First Installed: 1981

NEW GENERATION SYSTEMS, INC.
AMCALL
Additional Product Classification: Communications/TP Monitors
Specific Application: Communications Package
System Requirements: Compupro, CP/M
Memory Required: 64.0K bytes
Source Language: C, Assembly
Source Code Available: No
Purchase Terms: Purchase (license) - $150
Date First Installed: January 1982
(See Vendor Profile Page V-22)

N. F. SYSTEMS, LTD.
HOST COMM
Additional Product Classification: Communications/TP Monitors
Specific Application: Host Communications Package
System Requirements: IBM PC: MS-DOS; Compaq
Memory Required: 128.0K bytes
Source Language: Basic
Source Code Available: No
Purchase Terms: Purchase (license) - $120
Number Installed to Date: 200
Date First Installed: September 1982
(See Vendor Profile Page V-21)

NIXDORF COMPUTER CORP.
3270 BISYNC EMULATOR
Additional Product Classification: Communications/TP Monitors
Specific Application: Interactive Communication Between 8860 and Host
System Requirements: Nixdorf 8860: Dipos
Memory Required: 512.0K bytes
Source Language: Assembler
Purchase Terms: Rental
Number Installed to Date: 5,000
(See Vendor Profile Page V-22)

NIXDORF COMPUTER CORP.
3270 SNA EMULATOR
Additional Product Classification: Communications/TP Monitors
Specific Application: Interactive Communication Between 8860 and Host
System Requirements: Nixdorf 8860: Dipos
Memory Required: 512.0K bytes
Source Language: Assembler
Purchase Terms: Rental
Number Installed to Date: 5,000

NIXDORF COMPUTER CORP.
3770 SNA EMULATOR
Additional Product Classification: Communications/TP Monitors
Specific Application: Batch Communications Between 8860 and Host
System Requirements: Nixdorf 8860: Dipos
Memory Required: 512.0K bytes
Source Language: Assembler
Purchase Terms: Rental
Number Installed to Date: 2,000

NORTHEAST DATACOM, INC.
TELECOMMUNICATIONS
Additional Product Classification: Communications/TP Monitors
Specific Application: Telecommunications
System Requirements: Wang 2200 MVP: Speed
Memory Required: 28.0K bytes
Source Language: Basic II
Purchase Terms: Purchase (license)
(See Vendor Profile Page V-22)

OFFICE EXPRESS, INC.
INTF 3270
Additional Product Classification: Communications/TP Monitors
Specific Application: Software Interface for Terminal Monitor to CICS Or Other Monitors
System Requirements: OS/VS1, DOS/VS
Source Language: Assembler
Source Code Available: No
Purchase Terms: Purchase (license); Rental
Number Installed to Date: 25
Date First Installed: 1982
(See Vendor Profile Page V-22)

ONION SOFTWARE, INC.
NETWORK ONION
Additional Product Classification: Communications/TP Monitors
Specific Application: Connects IBM System/34, 36, 38 With Telex
System Requirements: IBM System/34: SSP; IBM System/36; IBM System/38: CPF
Memory Required: 96.0K bytes
Source Language: RPG-II, Assembler
Source Code Available: No
Purchase Terms: Purchase (license); Rental; Lease - $3,200 to $10,000
Number Installed to Date: 120
Date First Installed: January 1982
(See Vendor Profile Page V-22)

PACER SOFTWARE
GNET
Additional Product Classification: Communications/TP Monitors
Specific Application: Asynchronous (RS-232) Communications Between Local Prime Computer and Remote System
System Requirements: Prime: Primos
Memory Required: 128.0K bytes
Source Language: Fortran, PL/1
Source Code Available: Yes
Purchase Terms: Purchase (license) - $1,000
Date First Installed: September 1981
(See Vendor Profile Page V-22)

PACESETTER SYSTEMS, INC.
PACER/HP8-HOST PROCESSING SYSTEM
Additional Product Classification: Communications/TP Monitors
Specific Application: Allows Bank to Communicate With IBM 370
Specific Industry: Banking/Financial
System Requirements: IBM 370; IBM 4300: OS; IBM 308X: DOS; IBM 308X
Source Language: Cobol, Assembler
Purchase Terms: Purchase (license); Lease
Number Installed to Date: 1
Date First Installed: 1982
(See Vendor Profile Page V-23)

PACIFIC SOFTWARE MANUFACTURING CO.
X.DOT:PAD
Additional Product Classification: Communications/TP Monitors
Specific Application: Interface from Asynchronous Terminals to A Packet- Switching Network
System Requirements: DEC VAX; Motorola 68000; Zilog Z8000
Memory Required: 64.0K bytes
Source Language: C
Purchase Terms: Purchase (license) - $40,000
Date First Installed: 1983
(See Vendor Profile Page V-23)

PACIFIC SOFTWARE MANUFACTURING CO.
X.DOT:X.25
Additional Product Classification: Program Generators/Aids, Application Development Tools, Communications/TP Monitors
Specific Application: C Language Source Code Technology Transfer Product
System Requirements: DEC VAX, VMS; Motorola 68000; Zilog Z8000
Memory Required: 64.0K bytes
Source Language: C
Purchase Terms: Purchase (license) - $30,000
Number Installed to Date: 10
Date First Installed: 1981

PACIFIC SOFTWARE MANUFACTURING CO.
X.DOT FOR UNIX
Additional Product Classification: Program Generators/Aids, Application Development Tools, Communications/TP Monitors
Specific Application: Interface from Unix to Packet Switching, Supports Remote Log-in, Call Out, File Transfer, Mail
System Requirements: DEC VAX; Motorola 68000; Zilog Z8000
Memory Required: 64.0K bytes
Source Language: C
Purchase Terms: Purchase (license) - $40,000
Date First Installed: 1986

PARTICIPATION SYSTEMS, INC.
PARTICIPATE
Additional Product Classification: Communications/TP Monitors, DBMS
Specific Application: Computer Conferencing Package Including Electronic Mail and A Bulletin Board
System Requirements: DEC VAX: VMS; Prime Series 50: Primos; Honeywell DPS8: GCOS; IBM: VM/CMS, MVS/TSO
Memory Required: 160.0K bytes
Source Language: Pascal
Purchase Terms: Purchase (license); Time-sharing - $30,000 to $60,000
Number Installed to Date: 10
Date First Installed: May 1982
(See Vendor Profile Page V-23)

PATHWAY DESIGN, INC.
PATHWAY/SNC
Additional Product Classification: Communications/TP Monitors
Specific Application: Communication 3270/3770 Emulator
System Requirements: IBM PC, MS-DOS, PC-DOS
Memory Required: 128.0K bytes
Source Language: C
Purchase Terms: Purchase (license) - $595
Date First Installed: September 1983
(See Vendor Profile Page V-23)

PATHWAY DESIGN, INC.
PATHWAY/SNA
Additional Product Classification: Communications/TP Monitors

Specific Application: 3770/3270 Emulator
System Requirements: IBM PC, PC-DOS, MS-DOS
Memory Required: 128.0K bytes
Source Language: C
Source Code Available: No
Purchase Terms: Purchase (license) - $595
Date First Installed: September 1983

PEACHTREE SOFTWARE TELECOMMUNICATIONS
Additional Product Classification: Communications/TP Monitors
Specific Application: Program (Data Communication)
Source Language: Assembler
Purchase Terms: Purchase (license) - $150
(See Vendor Profile Page V-23)

PERIPHERAL SYSTEMS, INC. PSMS
Additional Product Classification: Communications/TP Monitors
Specific Application: Network Management
System Requirements: IBM PC: CPM; IBM 3000: Unix, MS-DOS
Memory Required: 64.0K bytes
Source Language: C4, Unix, PL/1
Source Code Available:
Purchase Terms: Purchase (license); Rental; Lease - $250,000
Number Installed to Date: 2
Date First Installed: January 1980
(See Vendor Profile Page V-23)

PICKLES & TROUT LYNC 3.0 COMMUNICATIONS SOFTWARE
Additional Product Classification: Communications/TP Monitors, System Resource Management
Specific Application: Communications Software
System Requirements: CP/M
Memory Required: 32.0K bytes
Source Language: Assembly
Source Code Available: No
Purchase Terms: Purchase (license) - $95
Date First Installed: January 1983
(See Vendor Profile Page V-24)

PLAINWIRE DATA SYSTEMS TERM
Additional Product Classification: Communications/TP Monitors
Specific Application: Communications Between Micros and Mainframs
System Requirements: Televideo: CP/M; Vector Graphics: CP/M
Memory Required: 48.0K bytes
Source Language: Fortran
Source Code Available: No
Purchase Terms: Purchase (license)
Date First Installed: 1982
(See Vendor Profile Page V-24)

POLYGON SOFTWARE CORP. INTERCOMM
Additional Product Classification: Communications/TP Monitors
Specific Application: Communications
System Requirements: IBM 360/370: OS, VS, MVS
Source Language: Assembler
Purchase Terms: Purchase (license) - $75,000
Number Installed to Date: 500
Date First Installed: September 1969
(See Vendor Profile Page V-24)

PRIME COMPUTER, INC. DPTX - INTERCONNECT FACILITY FOR IBM 3270
Additional Product Classification: Communications/TP Monitors
Specific Application: Communications Control and Facilitation
System Requirements: Prime, Primos
Source Code Available: No
Purchase Terms: Purchase (license); Monthly License - $7,500
Number Installed to Date: 1,000
Date First Installed: 1979
(See Vendor Profile Page V-24)

PRIME COMPUTER, INC. EM 200 UT-EMULATION FOR CONTROL DATA UT 200
Additional Product Classification: Communications/TP Monitors
Specific Application: Emulation - Communication
System Requirements: Prime: Primos
Source Code Available: No
Purchase Terms: Purchase (license); Monthly License - $3,750
Date First Installed: 1979

PRIME COMPUTER, INC. EM 1004 - EMULATION FOR UNIVAC 1004
Additional Product Classification: Communications/TP Monitors
Specific Application: Emulation - Communication
System Requirements: Prime: Primos
Source Code Available: No
Purchase Terms: Purchase (license); Monthly License - $3,750
Date First Installed: 1979

PRIME COMPUTER, INC. EM 7020 - EMULATION FOR ICL 7020
Additional Product Classification: Communications/TP Monitors
Specific Application: Emulation - Communication
System Requirements: Prime: Primos
Source Code Available: No
Purchase Terms: Purchase (license); Monthly License - $3,750
Date First Installed: 1980

PRIME COMPUTER, INC. EM GRTS - EMULATION FOR HONEYWELL GRTS
Additional Product Classification: Communications/TP Monitors
Specific Application: Emulation - Communication
System Requirements: Prime: Primos
Source Code Available: No
Purchase Terms: Purchase (license); Monthly License - $4,500
Date First Installed: 1979

PRIME COMPUTER, INC. EMHASP - EMULATION FOR IBM HASP II
Additional Product Classification: Communications/TP Monitors
Specific Application: Emulation - Communication
System Requirements: Prime: Primos
Source Code Available: No
Purchase Terms: Purchase (license); Monthly License - $5,250
Date First Installed: 1979

PRIME COMPUTER, INC. EMX80 - EMULATION FOR IBM 2780/3780
Additional Product Classification: Communications/TP Monitors
Specific Application: Communications - Emulation
System Requirements: Prime: Primos
Source Code Available: No
Purchase Terms: Purchase (license); Monthly License - $4,500
Date First Installed: 1979

PRIME COMPUTER, INC. FILE TRANSFER SERVICE
Additional Product Classification: Communications/TP Monitors, System Resource Management
Specific Application: Network File Transfer Facility
System Requirements: Prime: Primos
Source Code Available: No
Purchase Terms: Purchase (license); Monthly License - $2,000
Date First Installed: 1982

PRIME COMPUTER, INC. PACKET NETWORK INTERFACE
Additional Product Classification: Communications/TP Monitors
Specific Application: Communications Control and Facilitation
System Requirements: Prime: Primos
Source Code Available: No
Purchase Terms: Purchase (license); Monthly License - $2,500
Date First Installed: 1979

PRIME COMPUTER, INC. PRIMENET - NETWORKING FACILITY
Additional Product Classification: Communications/TP Monitors
Specific Application: Communications Control and Facilitation - DDP Environment
System Requirements: Prime 50 Series: Primos
Source Code Available: No
Purchase Terms: Purchase (license); Monthly License - $7,500
Number Installed to Date: 1,000
Date First Installed: 1979

PROGRAM RESOURCES, INC. WANG DEC LINK
Additional Product Classification: Communications/TP Monitors
Specific Application: VT100 Emulation Package
Source Language: Assembler
Source Code Available: No
Purchase Terms: Purchase (license) - $995
Number Installed to Date: 3
Date First Installed: 1983
(See Vendor Profile Page V-24)

PROTOCOL COMPUTER, INC. PCITERM 51 (UPGRADED VERSION OF 5155 PLUS)
Additional Product Classification: Communications/TP Monitors
Specific Application: Terminal Emulation in Conjunction With Protocol Conversion
System Requirements: MS-DOS
Memory Required: 128.0K bytes
Source Language: Assembly
Source Code Available: No
Purchase Terms: Purchase (license) - $295
Number Installed to Date: 5,000
Date First Installed: January 1983
(See Vendor Profile Page V-24)

PROTOCOL COMPUTER, INC. PCITERM 78 (UPGRADED VERSION OF 7887 PLUS)
Additional Product Classification: Communications/TP Monitors
Specific Application: Terminal Emulation in Conjunction With Protocol Conversion
System Requirements: MS-DOS
Memory Required: 128.0K bytes
Source Language: Assembly
Source Code Available: No
Purchase Terms: Purchase (license) - $295
Number Installed to Date: 5,000
Date First Installed: January 1983

QUADSTAR CORP. AUDIO RESPONSE SYSTEM
Additional Product Classification: Communications/TP Monitors
Specific Application: Home Bill Payment, Teller Assist Functions Via Telephone
Specific Industry: Retail, Banking/Financial
System Requirements: IBM Series/1, EDX
Memory Required: 512.0K bytes
Source Language: Cobol
Source Code Available: No
Purchase Terms: Purchase (license) - $75,000
Number Installed to Date: 2
Date First Installed: 1981
(See Vendor Profile Page V-24)

QUADSTAR CORP.
AUTOMATED COLLECTION SYSTEM
Additional Product Classification: Communications/TP Monitors
Specific Application: Automated Credit Card System and Installment Loan Collection Activities
Specific Industry: Retail, Banking/Financial
System Requirements: IBM Series/1: EDX
Memory Required: 512.0K bytes
Source Language: Cobol
Purchase Terms: Purchase (license); Rental; Lease - $75,000
Number Installed to Date: 3
Date First Installed: 1981

QUADSTAR CORP.
HOME BANKING SYSTEM
Additional Product Classification: Communications/TP Monitors
Specific Application: Personal Home Banking
Specific Industry: Retail, Banking/Financial
System Requirements: IBM Series/1: EDX
Memory Required: 512.0K bytes
Source Language: Cobol
Purchase Terms: Purchase (license); Rental; Lease - $50,000
Number Installed to Date: 1
Date First Installed: 1983

QUADSTAR CORP.
MINIHOST
Additional Product Classification: Communications/TP Monitors
Specific Application: Terminal Network Management System
Specific Industry: Retail, Banking/Financial
System Requirements: IBM Series/1: EDX
Memory Required: 512.0K bytes
Source Language: Cobol
Purchase Terms: Purchase (license); Rental - $200,000
Number Installed to Date: 20
Date First Installed: 1979

QUALITY SOFTWARE, INC.
QS CALL
Additional Product Classification: Communications/TP Monitors
Specific Application: Data Transfer Via Telecommunications
System Requirements: IBM PC-XT: MS-DOS; Altos 8000-2: CP/M; IBM PC: MS-DOS 2.0
Memory Required: 64.0K bytes
Source Language: C
Source Code Available: No
Purchase Terms: Purchase (license) - $195
Date First Installed: January 1982
(See Vendor Profile Page V-24)

QUALITY SOFTWARE, INC.
QS SAM
Additional Product Classification: Communications/TP Monitors
Specific Application: Utility for Transferring Text from Microcomputers to AM Typesetter
System Requirements: IBM PC-XT: MS-DOS 2.0; Altos 8000: CP/M; IBM PC: MS-DOS 2.0
Memory Required: 48.0K bytes
Source Language: C
Source Code Available: No
Purchase Terms: Purchase (license) - $795
Date First Installed: January 1982

RACET COMPUTERS, LTD.
MAGIC MAIL
Additional Product Classification: Communications/TP Monitors
Specific Application: Electronic Mail
System Requirements: MEC PC-8001, 8801: Racet NEC-DOS
Memory Required: 32.0K bytes
Source Language: Assembly
Source Code Available: No
Purchase Terms: Purchase (license) - $150
Number Installed to Date: 25
Date First Installed: 1983
(See Vendor Profile Page V-25)

RCG (ROZSA COMPUTER SYSTEMS), INC.
SUPER COM
Additional Product Classification: Communications/TP Monitors
Specific Application: Communications Package
System Requirements: IBM PC: CP/M
Memory Required: 48.0K bytes
Source Language: C
Source Code Available: No
Purchase Terms: Purchase (license) - $19,500
Number Installed to Date: 2
Date First Installed: 1982
(See Vendor Profile Page V-25)

REAL-TIME MANAGEMENT, INC.
REMOTE 990
Additional Product Classification: Communications/TP Monitors
Specific Application: Allows TI 990S and Business Systems to Participate in Burroughs Poll Network
System Requirements: TI 308; TI 990
Memory Required: 192.0K bytes
Source Language: TI Assembly, Cobol, Tiform
Purchase Terms: Purchase (license) - $12,500
Date First Installed: 1979
(See Vendor Profile Page V-25)

REDDING GROUP, INC.
ALPACA PLUS
Additional Product Classification: Communications/TP Monitors
Specific Application: Micro to Micro Network Communications System
System Requirements: IBM PC: CP/M
Memory Required: 48.0K bytes
Source Language: Fortran
Purchase Terms: Purchase (license) - $500
(See Vendor Profile Page V-25)

REDDING GROUP, INC.
ALPACA-PLUS - VERSION 2.55
Additional Product Classification: Communications/TP Monitors
Specific Application: Micro-to-Micro Communications Link
System Requirements: CP/M 80
Memory Required: 48.0K bytes
Source Code Available: No
Purchase Terms: Purchase (license) - $500
Date First Installed: 1980

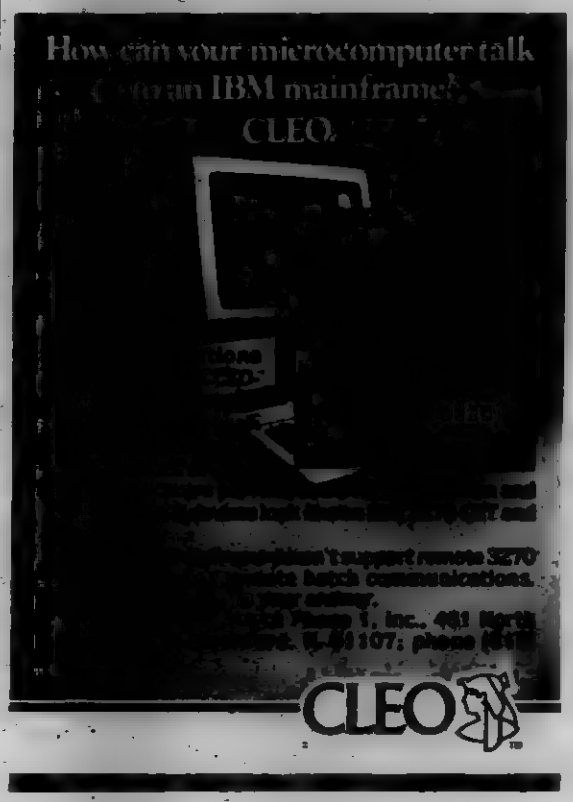
REDDING GROUP, INC.
ASYNCH
Additional Product Classification: Communications/TP Monitors
Specific Application: Asynchronous Communicator
System Requirements: IBM PC: CP/M
Memory Required: 48.0K bytes
Source Language: Fortran
Purchase Terms: Purchase (license) - $100

REDDING GROUP, INC.
ASYNC - VERSION 3.01
Additional Product Classification: Communications/TP Monitors
Specific Application: Asynchronous Communications
System Requirements: CP/M
Memory Required: 48.0K bytes
Purchase Terms: Purchase (license) - $100
Date First Installed: 1979

REDDING GROUP, INC.
LYNX
Additional Product Classification: Communications/TP Monitors
Specific Application: Overlay Linker
System Requirements: IBM PC: CP/M
Memory Required: 48.0K bytes
Source Language: Fortran
Purchase Terms: Purchase (license) - $250 to $150

REDDING GROUP, INC.
MICRO E COM
Additional Product Classification: Communications/TP Monitors
Specific Application: Asynchronous Electronic Mail
System Requirements: IBM PC: CP/M
Memory Required: 48.0K bytes
Source Language: Fortran
Purchase Terms: Purchase (license)

REDDING GROUP, INC.
MICRO X.25
Additional Product Classification: Communications/TP Monitors
Specific Application: Protocol for Communication



System Requirements: IBM PC: CP/M
Memory Required: 48.0K bytes
Source Language: Fortran
Purchase Terms: Purchase (license) - $750

[redacted], INC.
SYNCH 2780/3780
Additional Product Classification: Communications/TP Monitors
Specific Application: Emulates Protocol for IBM Bisynchronous Micro to Mainframe
System Requirements: IBM PC: CP/M
Memory Required: 48.0K bytes
Source Language: Fortran
Purchase Terms: Purchase (license) - $500

[redacted], INC.
SYNCH 2780/3780 - VERSION 2.02
Additional Product Classification: Communications/TP Monitors
Specific Application: Bisynchronous Communications Package
System Requirements: CP/M
Memory Required: 48.0K bytes
Source Code Available: No
Purchase Terms: Purchase (license) - $500
Date First Installed: April 1979

[redacted], Inc.
SYNCH 3270
Additional Product Classification: Communications/TP Monitors
Specific Application: Emulates IBM 3270 Protocol
System Requirements: IBM PC: CP/M
Memory Required: 48.0K bytes
Source Language: Fortran
Purchase Terms: Purchase (license) - $750

[redacted], INC.
SYNCH 3270 - VERSION 1.3
Additional Product Classification: Communications/TP Monitors
Specific Application: Bisynchronous Communications
System Requirements: CP/M
Memory Required: 48.0K bytes
Source Code Available: No
Purchase Terms: Purchase (license) - $750

[redacted], INC.
TELESTAR
Additional Product Classification: Communications/TP Monitors
Specific Application: Asynchronous Telecommunications Software for CP/M 80
System Requirements: CP/M 80
Memory Required: 64.0K bytes
Source Language: Assembler
Purchase Terms: Purchase (license) - $195
Number Installed to Date: 30
Date First Installed: April 1982
(See Vendor Profile Page V-25)

[redacted] COMPUTING CORP.
DIAL DATA
Additional Product Classification: Communications/TP Monitors, Interface
Specific Application: Interfaces Micro With Mainframe
Specific Industry: Banking/Financial
System Requirements: IBM PC: PC-DOS; Apple
Memory Required: 64.0K bytes
Source Language: Basic
Purchase Terms: Purchase (license) - $100
Number Installed to Date: 1,000
Date First Installed: 1981
(See Vendor Profile Page V-25)

[redacted] SOFTWARE
3271/DD DEVICE DRIVER
Additional Product Classification: Program Generators/Aids, Application Development Tools, Communications/TP Monitors
Specific Application: IBM/RSX Communications Package
System Requirements: DEC PDP-11, RSX
Source Language: Macro
Purchase Terms: Purchase (license) - $2,700
Number Installed to Date: 2
Date First Installed: 1982
(See Vendor Profile Page V-25)

[redacted] SOFTWARE
RFX-11 VERSION II (FILE TRANSFER UTILITY)
Additional Product Classification: Program Generators/Aids, Application Development Tools, Communications/TP Monitors
Specific Application: File Transfer and Virtual Terminal Utility
System Requirements: DEC PDP-11, RSX; DEC VAX, VMS
Memory Required: 5.0K bytes
Source Language: Macro
Purchase Terms: Purchase (license) - $675
Number Installed to Date: 300
Date First Installed: 1980

[redacted] SOFTWARE
SCREENSHARE-11 TERMINAL MONITOR FACILITY
Additional Product Classification: Communications/TP Monitors
Specific Application: Terminal Monitoring for Remote Support, Troubleshooting, Supervision and Security
System Requirements: DEC PDP-11: RSX; DEC VAX: VMS
Source Language: Macro
Purchase Terms: Purchase (license) - $1,250
Number Installed to Date: 20
Date First Installed: 1981

[redacted], INC.
SATURN-SPECIAL SERVICES AND TRUNK UTILIZATION
Additional Product Classification: Communications/TP Monitors
Specific Application: Tracks Circuits and Trunk Utilization
Specific Industry: Telephone Industry
System Requirements: DEC VAX-11/780, VMS
Memory Required: 2.0M bytes
Source Language: Fortran
Purchase Terms: Purchase (license)
Date First Installed: 1983
(See Vendor Profile Page V-28)

[redacted] COMPUTER SCIENCE CORP.
PC/ENET VERSION 1.0
Additional Product Classification: Communications/TP Monitors
Specific Application: Ethernet Application
System Requirements: IBM PC
Memory Required: 128.0K bytes
Source Language: Object, PL/M
Purchase Terms: Purchase (license) - $1,700
Number Installed to Date: 3
Date First Installed: March 1983
(See Vendor Profile Page V-28)

[redacted] CORP.
INFRS COMMUNICATIONS SOFTWARE
Additional Product Classification: Communications/TP Monitors
Specific Application: Communications
System Requirements: DEC: RSTS/E; DEC: RT-11, RSX-11, VMS, IAS
Memory Required: 28.0K bytes
Source Language: Macro-11
Purchase Terms: Purchase (license) - $2,000
Number Installed to Date: 7
Date First Installed: 1981
(See Vendor Profile Page V-28)

[redacted] SOFTWARE, INC.
TELE-PORTER
Additional Product Classification: Communications/TP Monitors
Specific Application: Communication Package for Transfering Files and Diskettes Between Apples
System Requirements: Apple: Apple-DOS
Memory Required: 48.0K bytes
Source Language: Assembly
Source Code Available: No
Purchase Terms: Purchase (license) - $80
Number Installed to Date: 100
Date First Installed: July 1983
(See Vendor Profile Page V-28)

[redacted] SEMICONDUCTORS CORP.
DEC VAX COMMUNICATIONS
Additional Product Classification: Communications/TP Monitors
Specific Application: Electronic Mail for A DEC-VAX Based System
System Requirements: DEC VAX: Unix, Sunix
Memory Required: 512.0K bytes
Source Language: Basic, Cobol, Fortran , C
Purchase Terms: Purchase (license)
Number Installed to Date: 350
Date First Installed: January 1981
(See Vendor Profile Page V-28)

[redacted] SEMICONDUCTORS CORP.
HP 3000 COMMUNICATIONS
Additional Product Classification: Communications/TP Monitors
Specific Application: Electronic Mail for a HP 3000-Based System
System Requirements: HP 3000, Unix, Sunix
Memory Required: 512.0K bytes
Source Language: Basic, Cobol, Fortran , C
Purchase Terms: Purchase (license)
Number Installed to Date: 350
Date First Installed: January 1981

[redacted] SEMICONDUCTORS CORP.
IBM 3780 PROTOCOL
Additional Product Classification: Communications/TP Monitors
Specific Application: Electronic Mail
System Requirements: IBM 3780, Unix, Sunix
Memory Required: 512.0K bytes
Source Language: Assembler, Cobol, Fortran , C
Purchase Terms: Purchase (license)
Number Installed to Date: 350
Date First Installed: January 1981

[redacted] SEMICONDUCTORS CORP.
TELEX PLUX
Additional Product Classification: Communications/TP Monitors
Specific Application: Electronic Mail, Telex, D
System Requirements: Unix, Sunix
Memory Required: 512.0K bytes
Source Language: Cobol, Fortran , C, Assembler
Purchase Terms: Purchase (license)
Number Installed to Date: 350
Date First Installed: March 1983

[redacted] SEMICONDUCTORS CORP.
TELEX PLUX
Additional Product Classification: Communications/TP Monitors
Specific Application: Electronic Mail, Telex
System Requirements: Unix, Sunix
Memory Required: 512.0K bytes
Source Language: Cobol, Fortran, C, Assembler
Purchase Terms: Purchase (license)
Number Installed to Date: 350
Date First Installed: March 1983

[redacted], INC.
TELECOMM
Additional Product Classification: Communications/TP Monitors
Specific Application: Allows Mobile Terminals to Interface With State Or National Computer
System Requirements: DG; HP; Durango
Memory Required: 256.0K bytes
Source Language: Assembler, Fortran
Purchase Terms: Purchase (license)
Number Installed to Date: 1
Date First Installed: 1982
(See Vendor Profile Page V-27)

[redacted], INC.
TELECOMMUNICATIONS INTERFACE
Additional Product Classification: Communications/TP Monitors
Specific Application: Allows Police Departments to Talk to National Data

Base Networks
Specific Industry: Police Departments
System Requirements: HP 3000: MPE; DG CS 100: R-DOS; Burroughs 1800/1900; DEC PDP-11
Memory Required: 256.0K bytes
Source Language: Basic, Cobol
Purchase Terms: Purchase (license); Lease - $14,000 to $20,000
Number Installed to Date: 15
Date First Installed: May 1982

SMART, INC.
SERIES 1 POLLER & CREDIT AUTHORIZATION SYSTEM
Additional Product Classification: Communications/TP Monitors
Specific Application: Communication Between POS and Mainframe, Performs Credit Authorization Functions
Specific Industry: Retail
System Requirements: IBM Series/1
Memory Required: 64.0K bytes
Source Language: Assembler
Purchase Terms: Purchase (license) - $20,000 to $80,000
Date First Installed: October 1983
(See Vendor Profile Page V-27)

SMITH EDUCATIONAL ENGINEERING SERVICES, INC.
ICOMM
Additional Product Classification: Communications/TP Monitors
Specific Application: Emulates Over 12 Terminals to Allow Access to Various Mainframes, Minis, and Other PCs
System Requirements: IBM PC: PC-DOS
Memory Required: 48.0K bytes
Source Language: Basic, Assembler
Source Code Available: No
Purchase Terms: Purchase (license) - $150
Number Installed to Date: 1,000
Date First Installed: February 1982
(See Vendor Profile Page V-27)

SOFTWARE AG OF NORTH AMERICA, INC.
COM-PLETE
Additional Product Classification: Communications/TP Monitors
Specific Application: Teleprocessing System
System Requirements: IBM System 370, MVS; IBM 43XX Series, OS-VS1; IBM 30XX Series, DOS/VSE
Memory Required: 512.0K bytes
Source Language: Assembler
(See Vendor Profile Page V-27)

SOFTWARE CLEARING HOUSE VMOS
Additional Product Classification: Communications/TP Monitors
Specific Application: Allows I Applications to Run Under V
System Requirements: NCR V-Series, VRX
Memory Required: 41.0K bytes
Source Language: VRX Cobol 74
Source Code Available: No
Purchase Terms: Purchase (license); Rental - $9,500
Number Installed to Date: 147
(See Vendor Profile Page V-27)

SOFTWARE CLEARING HOUSE VIRTEX
Additional Product Classification: Communications/TP Monitors
Specific Application: Utility VRX Teleprocessing Monitor Includes Features Required to Develop New Systems from Scratch Under VRX
System Requirements: NCR V Series, VRX
Source Code Available: No
Purchase Terms: Purchase (license); Rental - $7,000 to $17,000
Number Installed to Date: 147

SOFTWARE & COMMUNICATION CONCEPTS, INC.
SOFTWARE & COMMUNICATIONS CONCEPT
Additional Product Classification: Communications/TP Monitors
Specific Application: Complete Front End Software
System Requirements: CDC, NOS
Source Language: Modcom
Purchase Terms: Purchase (license) - $100,000
Number Installed to Date: 12
Date First Installed: 1976
(See Vendor Profile Page V-27)

SOFTWARE DEVELOPMENT & MAINTENANCE, INC.
SDM/RPO ELECTRONIC REMOTE PURCHASE
Additional Product Classification: Communications/TP Monitors
Specific Application: Provides Electronic Purchase Order Interface Between Manufacturers and Retailers
Specific Industry: Manufacturing
System Requirements: Formation 4000: DOS/OS
Memory Required: 64.0K bytes
Source Language: Assembler
Purchase Terms: Purchase (license) - $5,000
Number Installed to Date: 2
Date First Installed: 1980
(See Vendor Profile Page V-27)

SOFTWARE DEVELOPMENT CORP.
DAGAR DTS-9
Additional Product Classification: Communications/TP Monitors
Specific Application: Transfer Files from One CP/M Based System to Another
System Requirements: CP/M
Memory Required: 48.0K bytes
Source Language: Cobol-80
Purchase Terms: Purchase (license) - $250
Date First Installed: February 1982
(See Vendor Profile Page V-27)

SOFTWARE DYNAMICS MODEM
Additional Product Classification: Communications/TP Monitors
Specific Application: Remote Telephone Transmitter Through Telephone Lines
System Requirements: Motorola: S-DOS, CP/M
Memory Required: 32.0K bytes
Source Code Available: No
Purchase Terms: Purchase (license) - $250
Number Installed to Date: 10
Date First Installed: January 1984
(See Vendor Profile Page V-27)

SOFTWARE DYNAMICS SDNET
Additional Product Classification: Communications/TP Monitors
Specific Application: Shared Resources Microcomputer Network Software
System Requirements: Pollech ST Series: S-DOS; TRS-80: CP/M; Motorola
Memory Required: 64.0K bytes
Source Language: Assembly
Purchase Terms: Purchase (license) - $200
Number Installed to Date: 150
Date First Installed: March 1983

SOFTWARE MANAGEMENT SYSTEMS, INC.
MICROTALK
Additional Product Classification: Communications/TP Monitors
Specific Application: Interface IBM PC OR Victor 9000 to Prime Computers
System Requirements: IBM PC: MS-DOS, PC-DOS; Victor 9000: MS-DOS, PC-DOS; Prime Computers: Primos
Memory Required: 128.0K bytes
Source Language: Info Basic V
Source Code Available: No
Purchase Terms: Purchase (license) - $300
Number Installed to Date: 2
Date First Installed: July 1983
(See Vendor Profile Page V-27)

THE SOFTWARE STORE
SOFTCOM - TELECOMMUNICATIONS UTILITY
Additional Product Classification: Communications/TP Monitors
Specific Application: Telecommunications Utility for Smart Terminal and File Transfer
System Requirements: CP/M
Memory Required: 32.0K bytes
Source Language: Machine
Source Code Available: No
Purchase Terms: Purchase (license) - $150
Number Installed to Date: 2,000
Date First Installed: 1980
(See Vendor Profile Page V-28)

SOFTWARE SYSTEMS, INC.
5251 MODEL 12 WORK STATION EMULATOR
Additional Product Classification: Communications/TP Monitors
Specific Application: Enables IBM 5280 System to Operate On-Line to IBM System/34, System/36, System/38
System Requirements: IBM 5280: SCP
Memory Required: 64.0K bytes
Source Language: 5280 Assembler
Source Code Available: No
Purchase Terms: Purchase (license) - $500
Number Installed to Date: 150
Date First Installed: February 1982
(See Vendor Profile Page V-28)

SOFTWARE SYSTEMS, INC.
SYSTEM 34, 36, 38 EMULATOR TRANSFER
Additional Product Classification: Communications/TP Monitors
Specific Application: File Transfer Station from System/34, System/36, System/38 to IBM 5280
System Requirements: IBM System/34, System/36, System/38
Source Language: Assembler, RPG-II
Purchase Terms: Purchase (license) - $350 to $750
Number Installed to Date: 60
Date First Installed: February 1982

SOFTWORKS, INC.
VIRTUAL TERMINAL FACILITY
Additional Product Classification: Communications/TP Monitors
Specific Application: Accesses Any Local 3270 Terminal Multiple Teleprocessing Programs
System Requirements: IBM: OS
Memory Required: 512.0K bytes
Source Language: Assembler
Purchase Terms: Purchase (license); Lease - $7,500
Number Installed to Date: 85
Date First Installed: 1977
(See Vendor Profile Page V-28)

SOUTHERN COMPUTER SYSTEMS, INC.
IBM-CP/M
Additional Product Classification: Communications/TP Monitors
Specific Application: Data Transfer from One Operating System to Another
System Requirements: CP/M
Memory Required: 16.0K bytes
Source Language: Assembly
Purchase Terms: Purchase (license) - $250
Number Installed to Date: 1,000
Date First Installed: 1979
(See Vendor Profile Page V-28)

SOUTHWESTERN DATA SYSTEMS, INC.
ASCII EXPRESS II
Additional Product Classification: Communications/TP Monitors
Specific Application: Apple Communications Package
System Requirements: Apple II, II+, IIE, DOS
Memory Required: 48.0K bytes
Source Language: Assembly
Purchase Terms: Purchase (license) - $35
(See Vendor Profile Page V-28)

SOUTHWESTERN DATA SYSTEMS, INC.
ASCII EXPRESS THE PROFESSIONAL
Additional Product Classification: Communications/TP Monitors

Specific Application: Apple-DOS Communication Package File Transfer, Supports Modems
System Requirements: Apple II, II+, IIE: DOS
Memory Required: 48.0K bytes
Source Language: Assembly
Source Code Available: No
Purchase Terms: Purchase (license) - $130

SOUTHWESTERN DATA SYSTEMS, INC.
ONLINE
Additional Product Classification: Communications/TP Monitors
Specific Application: Private Access Dial-up System - Apples Equipped With a Hayes Micromodem II
System Requirements: Apple II, II+, IIE: DOS
Memory Required: 48.0K bytes
Source Language: Assembly
Source Code Available: No
Purchase Terms: Purchase (license) - $90

SOUTHWESTERN DATA SYSTEMS, INC.
P-TERM THE PROFESSIONAL
Additional Product Classification: Communications/TP Monitors
Specific Application: Communications Package for Pascal
System Requirements: Apple II, II+, IIE, USCD-P System
Memory Required: 48.0K bytes
Source Language: Assembly, Pascal
Source Code Available: No
Purchase Terms: Purchase (license) - $130

SOUTHWESTERN DATA SYSTEMS, INC.
Z-TERM
Additional Product Classification: Communications/TP Monitors
Specific Application: Economical Terminal Package for CP/M Apple II With Microsoft Z-80 Soft Card
System Requirements: Apple II, II+, IIE: CP/M
Memory Required: 48.0K bytes
Source Language: Assembly
Source Code Available: No
Purchase Terms: Purchase (license) - $100

SOUTHWESTERN DATA SYSTEMS, INC.
Z-TERM THE PROFESSIONAL
Additional Product Classification: Communications/TP Monitors
Specific Application: Apple CP/M Communications Package, Apples With Microsoft Z-80 Soft Card
System Requirements: Apple II, IIE: Apple CP/M; Apple II+
Memory Required: 48.0K bytes
Source Language: Assembly
Purchase Terms: Purchase (license) - $150

SPARTACUS COMPUTERS, INC.
IDNET
Additional Product Classification: Communications/TP Monitors
Specific Application: Networking System Based on TCP IP ARPA Protocol
System Requirements: IBM 4331: VM
Source Language: Assembly
Source Code Available: No
Purchase Terms: Purchase (license) - $15,000
Number Installed to Date: 1
Date First Installed: 1983
(See Vendor Profile Page V-28)

START SYSTEMS
AUTOPASS 3270TM
Additional Product Classification: Communications/TP Monitors
Specific Application: Communications Interface Between Wang VS and 3270, Host Processor Interfaces With CMS, TSO, CICS, IMS
System Requirements: Wang VS
Memory Required: 256.0K bytes
Source Language: Object, Procedure
Source Code Available: No
Purchase Terms: Purchase (license) - $15,000 to $80,000
Number Installed to Date: 2
Date First Installed: January 1982
(See Vendor Profile Page V-28)

STRATUS COMPUTER, INC.
3270 EMULATOR FACILITY
Additional Product Classification: Communications/TP Monitors
Specific Application: Facilities to Connect Stratus Computer to IBM Mainframe Using A Bisynchronous Protocol
System Requirements: Stratus/32, Stratus VOS
Source Language: PL/1
Source Code Available: No
Purchase Terms: Purchase (license) - $5,000
Date First Installed: September 1982
(See Vendor Profile Page V-28)

STRATUS COMPUTER, INC.
3270 TERMINAL SUPPORT
Additional Product Classification: Communications/TP Monitors
Specific Application: Connects 3270 Terminal to A Stratus Computer
System Requirements: Stratus/32, Stratus VOS
Source Language: PL/1
Source Code Available: No
Purchase Terms: Purchase (license) - $4,000
Date First Installed: June 1982

STRATUS COMPUTER, INC.
RJE-REMOTE JOB ENTRY
Additional Product Classification: Communications/TP Monitors
Specific Application: 2780/3780 Hasp Communications to Host Computers
System Requirements: Stratus/32, Stratus VOS
Source Language: PL/1
Source Code Available: No
Purchase Terms: Purchase (license) - $3,000
Date First Installed: March 1982

SUPERSOFT, INC.
TERM II
Additional Product Classification: Communications/TP Monitors
Specific Application: Allows CP/M Computer to Communicate With Other Terminal Users and Other Computers
System Requirements: CP/M
Memory Required: 32.0K bytes
Source Language: C
Source Code Available: No
Purchase Terms: Purchase (license) - $200
(See Vendor Profile Page V-28)

SYSTAR CORP.
GATEWAY 34/36
Additional Product Classification: Communications/TP Monitors
Specific Application: Communications Front-End Protocol Converter; X.25 Interface
System Requirements: IBM Series/1 - 4955, CMX; IBM 4954; IBM 4956
Memory Required: 256.0K bytes
Source Code Available: No
Purchase Terms: Purchase (license) - $22,000 to $34,000
Number Installed to Date: 15
Date First Installed: 1981
(See Vendor Profile Page V-28)

SYSTAR CORP.
GATEWAY/370
Additional Product Classification: Communications/TP Monitors
Specific Application: Communications Front-End Protocol Converter; X.25 Interface
System Requirements: IBM Series/1
Memory Required: 192.0K bytes
Source Language: Assembler
Source Code Available: No
Purchase Terms: Purchase (license) - $16,000

SYSTAR CORP.
LODESTAR 34/36
Additional Product Classification: Communications/TP Monitors
Specific Application: Communications Front End System
System Requirements: IBM Series/1
Memory Required: 384.0K bytes
Source Language: Assembler
Source Code Available: No
Purchase Terms: Purchase (license) - $40,000
Date First Installed: June 1982

THE SYSTEMS CENTER
NETWORK ACCESS SERVICES CORVUS
Additional Product Classification: Communications/TP Monitors
Specific Application: Allows Microprocessor Program to Attach to Corvus, Omninet to Communicate to SNA Processors
System Requirements: Corvus Concept, CCOS; IBM PC, MS-DOS; Apple Lisa: Lisa
Memory Required: 512.0K bytes
Source Language: Pascal
Source Code Available: No
Purchase Terms: Purchase (license)
Date First Installed: October 1983
(See Vendor Profile Page V-28)

THE SYSTEMS CENTER
NETWORK ACCESS SERVICES-SERIES/1
Additional Product Classification: Communications/TP Monitors
Specific Application: Allows Series/1 EDX Programs to Communicate Upstream With SNA Host Processor
System Requirements: IBM Series/1: EDX
Source Language: Assembler
Source Code Available: No
Purchase Terms: Purchase (license)
Date First Installed: October 1983

THE SYSTEMS CENTER, INC.
NETWORK DATAMOVER
Additional Product Classification: Communications/TP Monitors
Specific Application: Manages The Transfer Of Information Between Controllers, Mainframe to Mainframe, Mainframe to Series/1; Mainframe to Micro
System Requirements: IBM PC, MS-DOS; Apple Lisa, Apple-DOS; IBM System 370: MVS; IBM Series/1
Source Language: Assembly
Purchase Terms: Purchase (license)
Number Installed to Date: 10
Date First Installed: August 1983
(See Vendor Profile Page V-28)

THE SYSTEMS CENTER, INC.
SNA ON MICRO COMPUTERS
Additional Product Classification: Communications/TP Monitors
Specific Application: Supports Full IBM SNA Data Communications
Memory Required: 100.0K bytes
Source Language: Pascal
Purchase Terms: Purchase (license)
Date First Installed: May 1983

SYSTEMS & SOFTWARE, INC.
NEXUS
Additional Product Classification: Communications/TP Monitors
Specific Application: Ties DEC PDP-11 or DEC VAX Together With Either an Intel MDS or MDS Under CP/M
System Requirements: DEC PDP-11, Iois II; DEC VAX: VMS, CP/M
Source Language: Assembler
Purchase Terms: Purchase (license) - $420
Number Installed to Date: 100
Date First Installed: September 1979
(See Vendor Profile Page V-28)

SYSTEMS RESOURCES CORP.
SRI 3278
Additional Product Classification: Communications/TP Monitors
Specific Application: Protocol Converter for The IBM 3278
System Requirements: IBM 4300: VM MVS; IBM 308X; IBM 370
Source Language: Assembler
Source Code Available: No
Purchase Terms: Purchase (license) - $6,500

Date First Installed: 1982
(See Vendor Profile Page V-28)

SYSTEMS STRATEGIES, INC.
2780/3780 EMULATOR
Additional Product Classification: Communications/TP Monitors
Specific Application: Provides 2780/3780 Batch to IBM Mainframe
Source Language: C Code
Purchase Terms: Purchase (license) - $47,000
Number Installed to Date: 5
(See Vendor Profile Page V-28)

SYSTEMS STRATEGIES, INC.
3270 BSC EMULATOR
Additional Product Classification: Communications/TP Monitors
Specific Application: Emulator 3270 BSC Device to IBM Mainframe
Source Language: C Code
Purchase Terms: Purchase (license) - $85,000
Number Installed to Date: 1

SYSTEMS STRATEGIES, INC.
3270 SNA EMULATOR
Additional Product Classification: Communications/TP Monitors
Specific Application: Emulator 3270 Cluster Controller to IBM Mainframe
Source Language: C Code
Purchase Terms: Purchase (license) - $13,000
Number Installed to Date: 5
Date First Installed: 1978

SYSTEMS STRATEGIES, INC.
X.25 INTERFACE
Additional Product Classification: Communications/TP Monitors
Specific Application: CCITT X.25 Standard Communications Interface
Source Language: C Code
Purchase Terms: Purchase (license) - $90,000
Number Installed to Date: 2

TAFT CONSULTING, INC.
TERRALINK
Additional Product Classification: Communications/TP Monitors
Specific Application: Interface Between Tandem and The Western Unich Easy Link
System Requirements: Tandem Guardian
Source Language: TAL
Source Code Available: No
Purchase Terms: Purchase (license) - $5,000
Date First Installed: 1983
(See Vendor Profile Page V-29)

TECHNICO, INC.
SERIAL FILE TRANSFER PROGRAM
Additional Product Classification: Communications/TP Monitors
Specific Application: Allows the User to Upload and Download from A Host Computer
Specific Industry: Education, Scientific, Industrial Control
System Requirements: TI 9900
Memory Required: 4.0K bytes
Source Language: 9900 Assembler
Source Code Available: Yes
Purchase Terms: Purchase (license) - $100
Number Installed to Date: 30
Date First Installed: 1982
(See Vendor Profile Page V-29)

TEKELEC, INC.
CHAMELEON ASYNC
Additional Product Classification: Communications/TP Monitors
Specific Application: Stop-Start Protocol Simulator
System Requirements: Chameleon Data Communication
Memory Required: 64.0K bytes
Source Language: Assembly
Purchase Terms: Purchase (license) - $1,000
Number Installed to Date: 30
Date First Installed: 1983
(See Vendor Profile Page V-30)

TEKELEC, INC.
CHAMELEON BASIC
Additional Product Classification: Communications/TP Monitors
Specific Application: Simulator of Byte Protocol
System Requirements: Chameleon Data Communication
Memory Required: 64.0K bytes
Source Language: Assembly
Purchase Terms: Purchase (license) - $1,000
Number Installed to Date: 30
Date First Installed: 1983

TEKELEC, INC.
CHAMELEON SYNC
Additional Product Classification: Communications/TP Monitors, Performance Measurement
Specific Application: Protocol Modeling
Specific Industry: Manufacturing, Engineering, Banking/Financial, Government
System Requirements: Chameleon
Source Language: Proprietary
Source Code Available: No
Purchase Terms: Purchase (license) - $1,000
Number Installed to Date: 55
Date First Installed: December 1982

TEKELEC, INC.
FRAMEM (FRAME LEVEL EMULATOR)
Additional Product Classification: Communications/TP Monitors, Performance Measurement
Specific Application: Protocol Modeling for Development and Test Purposes
Specific Industry: Manufacturing, Engineering, Banking/Financial, Government, Network Support
System Requirements: Chameleon
Source Language: Proprietary
Source Code Available: No
Purchase Terms: Purchase (license); Rental; Lease - $1,000
Number Installed to Date: 55
Date First Installed: April 1982

TEKELEC, INC.
FRANEM
Additional Product Classification: Communications/TP Monitors
Specific Application: HDLC/SDLC Protocol Simulator
Memory Required: 64.0K bytes
Source Language: Assembler
Purchase Terms: Purchase (license) - $1,000
Number Installed to Date: 42
Date First Installed: 1982

TEKELEC, INC.
SNP/L
Additional Product Classification: Communications/TP Monitors
Specific Application: SNA Protocol Simulator
Memory Required: 64.0K bytes
Source Language: Assembly
Purchase Terms: Purchase (license) - $1,000
Number Installed to Date: 35
Date First Installed: 1983

TEKELEC, INC.
SNP/L (SIMULATOR INTERACTIVE MULTI-PROTOCOL
Additional Product Classification: Communications/TP Monitors
Specific Application: Protocol Modeling for Development and List
Specific Industry: Manufacturing, Engineering, Banking/Financial, Government, Network Support/Development
Source Language: Proprietary
Source Code Available: No
Purchase Terms: Purchase (license) - $1,000
Number Installed to Date: 55
Date First Installed: December 1982

TEKELEC, INC.
SITREX
Additional Product Classification: Communications/TP Monitors
Specific Application: X.25 Network and Subscriber Simulator
Memory Required: 64.0K bytes
Source Language: Assembler
Purchase Terms: Purchase (license) - $2,000
Number Installed to Date: 225
Date First Installed: 1981

TEKELEC, INC.
SITREX-PLUS
Additional Product Classification: Communications/TP Monitors
Specific Application: X.25 Protocol Modeling
Specific Industry: Manufacturing, Engineering, Banking/Financial, Government, X.25 Network Support
Source Language: Proprietary
Purchase Terms: Purchase (license) - $1,000
Number Installed to Date: 300
Date First Installed: March 1988

TELCO RESEARCH CORP.
GENERAL COST ALLOCATION (GCA)
Additional Product Classification: System Resource Management, Communications/TP Monitors
Specific Application: Allocates Telecommunications Costs to Users
Specific Industry: Manufacturing, Engineering, Wholesale/Distribution, Retail, Banking/Financial, Medical, Legal, Insurance, Real Estate, Education, Construction, Government, Transportation
System Requirements: IBM; Honeywell; DEC PDP: RSX-11M
Memory Required: 100.0K bytes
Source Language: Cobol
Purchase Terms: Purchase (license) - $28,500
Date First Installed: April 1981
(See Vendor Profile Page V-30)

TELCO RESEARCH CORP.
MULTI-NODE TANDEM OPTYMIZER (MTO)
Additional Product Classification: Communications/TP Monitors
Specific Application: Design and Optimize Multiple Location Switched Networks
Specific Industry: Manufacturing, Engineering, Wholesale/Distribution, Retail, Banking/Financial, Medical, Legal, Insurance, Real Estate, Education, Construction, Government, Transportation
System Requirements: IBM; DEC 10, DEC 20; DEC VAX: VMS; DG MV8000
Memory Required: 100.0K bytes
Source Language: Fortran
Purchase Terms: Purchase (license)
Number Installed to Date: 35
Date First Installed: 1978

TELCO RESEARCH CORP.
THE ACD OPTYMIZER
Additional Product Classification: Communications/TP Monitors
Specific Application: Communications Package
Specific Industry: Manufacturing, Engineering, Wholesale/Distribution, Retail, Banking/Financial, Medical, Legal, Insurance, Real Estate, Education, Construction, Government, Transportation
System Requirements: IBM: OS/MVS; DEC 10: VM/CMS; DEC PDP-11
Source Language: Fortran, Assembly
Purchase Terms: Purchase (license) - $27,500
Date First Installed: 1979

TELCO RESEARCH CORP.
THE OPTYMIZER PLUS
Additional Product Classification: Communications/TP Monitors
Specific Application: Network Optimization
Specific Industry: Manufacturing, Engineering, Wholesale/Distribution, Retail, Banking/Financial, Medical, Legal, Insurance, Real Estate, Education, Construction, Government, Transportation
System Requirements: IBM; DEC VAX: VMS; Honeywell; Amdahl
Source Language: Fortran
Purchase Terms: Purchase (license) - $28,600
Date First Installed: 1979

TELCO RESEARCH CORP.
THE OPTYMIZER PLUS
Additional Product Classification: Communications/TP Monitors

Specific Application: Network Optimization
Specific Industry: Manufacturing, Engineering, Wholesale/Distribution, Retail, Banking/Financial, Medical, Legal, Insurance, Real Estate, Education, Construction, Government, Transportation
System Requirements: IBM; DEC VAX: VMS; Honeywell; Amdahl
Source Language: Fortran
Purchase Terms: Purchase (license) - $28,800
Date First Installed: 1978

TELOS RESEARCH CORP.
TRU DATA RECORDER/POLLER
Additional Product Classification: Communications/TP Monitors
Specific Application: Data Capture for Call Detail
Specific Industry: Manufacturing, Engineering, Wholesale/Distribution, Retail, Banking/Financial, Medical, Legal, Insurance, Education, Construction, Government, Transportation
System Requirements: IBM PC; IBM PC-XT
Memory Required: 256.0K bytes
Purchase Terms: Purchase (license) - $12,500 to $14,500

TELEPHONE SOFTWARE CONNECTION, INC.
ANSWERING MACHINE
Additional Product Classification: Communications/TP Monitors
Specific Application: Answers Modem Calls, Handles Incoming Outgoing Messages
System Requirements: Apple II, II+, IIE: DOS 3.3
Memory Required: 48.0K bytes
Source Language: Applesoft
Source Code Available: No
Purchase Terms: Purchase (license) - $40
(See Vendor Profile Page V-30)

TELEPHONE SOFTWARE CONNECTION, INC.
PHONE SECRETARY II
Additional Product Classification: Communications/TP Monitors
Specific Application: Places Calls and Keeps A Log of Activity
System Requirements: Apple II, II+, IIE: DOS 3.3
Memory Required: 48.0K bytes
Source Language: Applesoft W6502
Source Code Available: No
Purchase Terms: Purchase (license) - $45

TELEPHONE SOFTWARE CONNECTION, INC.
PICTURE TRANSFER PROGRAM
Additional Product Classification: Communications/TP Monitors
Specific Application: Sends Graphics Picture Over Phone
System Requirements: Apple II, II+, IIE: DOS 3.3
Memory Required: 48.0K bytes
Source Language: Applesoft
Purchase Terms: Purchase (license) - $40

TELEPHONE SOFTWARE CONNECTION, INC.
TELEPHONE TRANSFER II
Additional Product Classification: Communications/TP Monitors
Specific Application: Sends All DOS 3.3 File Types Over the Phone to Another Apple
System Requirements: Apple II, II+, IIE: DOS 3.3
Memory Required: 48.0K bytes
Source Language: Applesoft W6502
Source Code Available: No
Purchase Terms: Purchase (license) - $60

TELEPHONE SOFTWARE CONNECTION, INC.
TERMINAL PROGRAM
Additional Product Classification: Communications/TP Monitors
Specific Application: Intelligent Terminal Program With Automatic Log On and 16K Capture Buffer
System Requirements: Apple II, II+,IIE: DOS 3.3
Memory Required: 48.0K bytes
Source Language: Applesoft W6502
Source Code Available: No
Purchase Terms: Purchase (license) - $40

TEXAS INSTRUMENTS, INC.
TERMINAL EMULATOR II
Additional Product Classification: Communications/TP Monitors
Specific Application: Terminal Emulation
System Requirements: TI 99/4
Source Code Available: No
Purchase Terms: Purchase (license) - $50
(See Vendor Profile Page V-30)

TICOM SYSTEMS, INC.
REMCOM
Additional Product Classification: Communications/TP Monitors
Specific Application: Comprehensive Asynchronous Communications Package
System Requirements: IBM PC; DEC Rainbow: UCSD-P; NEC APC; TI
Memory Required: 64.0K bytes
Source Language: Pascal
Source Code Available: No
Purchase Terms: Purchase (license) - $95
Date First Installed: 1981
(See Vendor Profile Page V-31)

TITN
TITN X.25 VERSION 1.0
Additional Product Classification: Communications/TP Monitors
Specific Application: Provides Minicomputer Access for Long-Haul Data Network
System Requirements: Intel; Fortune; Alice; Apollo
Memory Required: 64.0K bytes
Source Language: C
Purchase Terms: Purchase (license)
Number Installed to Date: 30,000
Date First Installed: August 1983
(See Vendor Profile Page V-31)

TMW CORP.
PTWX
Additional Product Classification: Communications/TP Monitors
Specific Application: Telex II (TWX) Terminal Software
System Requirements: Commodore Pet
Memory Required: 8.0K bytes
Source Language: Basic
Purchase Terms: Purchase (license) - $69
Date First Installed: 1980
(See Vendor Profile Page V-31)

TMW CORP.
XPTERM
Additional Product Classification: Communications/TP Monitors
Specific Application: Smart Terminal Software
System Requirements: Commodore Pet
Memory Required: 32.0K bytes
Source Language: Basic
Purchase Terms: Purchase (license) - $49 to $59
Date First Installed: 1980

TOP DOWN SYSTEMS
INTF 3270
Additional Product Classification: Communications/TP Monitors
Specific Application: Software Interface for Terminal Monitor to Another Systems Monitor
System Requirements: IBM: CP/M, DOS, VS, MVS
Memory Required: 256.0K bytes
Source Language: Assembly
Purchase Terms: Purchase (license); Rental; Lease - $8,125
Number Installed to Date: 25
Date First Installed: 1982
(See Vendor Profile Page V-31)

TOP DOWN SYSTEMS
TERMINAL MONITOR
Additional Product Classification: Communications/TP Monitors
Specific Application: Management Facility for Application Programs
System Requirements: IBM: CP/M, DOS, VS, MVS
Memory Required: 256.0K bytes
Source Language: Assembly
Purchase Terms: Purchase (license); Rental; Lease - $39,375
Date First Installed: 1972

TOP DOWN SYSTEMS
VTAM 3270
Additional Product Classification: Communications/TP Monitors
Specific Application: Interface for Terminal Monitor to VTAM
System Requirements: IBM Mainframes: CP/M, DOS, VS, MVS
Memory Required: 256.0K bytes
Source Language: Assembly
Purchase Terms: Purchase (license); Rental; Lease - $8,125
Number Installed to Date: 25
Date First Installed: 1980

TRANSACTION DATA SYSTEMS, INC.
PACKET NETWORK FACILITY
Additional Product Classification: Communications/TP Monitors
Specific Application: Provides Interface Between Multiple Processors
System Requirements: PE 3200, Ohio Scientific 32
Memory Required: 500.0K bytes
Source Language: Assembly
Purchase Terms: Purchase (license) - $5,000
Number Installed to Date: 3
Date First Installed: 1979
(See Vendor Profile Page V-31)

TRANSACTION DATA SYSTEMS, INC.
STAT-MUX SUPPORT FACILITY
Additional Product Classification: Communications/TP Monitors
Specific Application: Provides A Software Statistical Interface to Remote Multiplexers
System Requirements: PE 3200, Ohio Scientific 32
Memory Required: 500.0K bytes
Source Language: Assembly
Purchase Terms: Purchase (license) - $5,000
Number Installed to Date: 2
Date First Installed: 1981

TRANSEND CORP.
TRANSEND I
Additional Product Classification: Communications/TP Monitors
Specific Application: Communication, Send and Receive Messages
System Requirements: Apple II: DOS; Apple IIE: DOS
Source Language: Assembly, Basic
Purchase Terms: Purchase (license) - $89
Number Installed to Date: 1,000
Date First Installed: 1981
(See Vendor Profile Page V-31)

TRANSEND CORP.
TRANSEND II
Additional Product Classification: Communications/TP Monitors
Specific Application: Send and Receive Messages, Verify File Transfer
System Requirements: Apple II: DOS; Apple IIE: DOS
Source Language: Assembly, Basic
Purchase Terms: Purchase (license) - $149
Number Installed to Date: 1,000
Date First Installed: 1981

TRANSEND CORP.
TRANSEND III
Additional Product Classification: Communications/TP Monitors
Specific Application: Electronic Mail
System Requirements: Apple II: DOS; Apple IIE: DOS
Source Language: Assembly, Basic
Purchase Terms: Purchase (license) - $149
Number Installed to Date: 1,000
Date First Installed: 1981

TRANSEND CORP.
TRANSEND III
Additional Product Classification: Communications/TP Monitors

Specific Application: Electronic Mail
System Requirements: Apple II: DOS; Apple IIE: DOS
Source Language: Assembly, Basic
Source Code Available: No
Purchase Terms: Purchase (license) - $275
Number Installed to Date: 1,000
Date First Installed: 1983

TRANSEND CORP.
TRANSEND PC
Additional Product Classification: Communications/TP Monitors
Specific Application: Electronic Mail
System Requirements: IBM PC; MS-DOS
Source Language: Assembly
Source Code Available: No
Purchase Terms: Purchase (license) - $150
Date First Installed: August 1983

UNISOURCE AUTOMATION PRODUCTS
RJE REMOTE JOB ENTRY SOFTWARE
Additional Product Classification: Communications/TP Monitors
Specific Application: Telecommunications
System Requirements: DEC PDP-11, RSX, RT-11
Source Code Available: No
Purchase Terms: Purchase (license) - $1,850 to $2,250
Number Installed to Date: 100
Date First Installed: January 1978
(See Vendor Profile Page V-32)

UNISOURCE AUTOMATION PRODUCTS
UAP-LINK
Additional Product Classification: Communications/TP Monitors
Specific Application: Telecommunications File Transfer
System Requirements: DEC PDP-11; IBM PC: PC-DOS; IBM 370, TSO
Source Code Available: No
Purchase Terms: Purchase (license) - $250 to $1,500
Number Installed to Date: 50
Date First Installed: July 1982

UNISOURCE AUTOMATION PRODUCTS
UAP-LINK FILE TRANSFER SOFTWARE
Additional Product Classification: Communications/TP Monitors
Specific Application: Telecommunications File Transfer
System Requirements: DEC PDP-11: RT-11; DEC VAX: VMS; IBM PC, MS-DOS; IBM Mainframes: TSO
Source Code Available: No
Purchase Terms: Purchase (license) - $250
Number Installed to Date: 40
Date First Installed: June 1982

UNISOFT SYSTEM CORP.
B-NET
Additional Product Classification: Communications/TP Monitors
Specific Application: Networking
System Requirements: Unix
Memory Required: 156.0K bytes
Source Language: C
Purchase Terms: Purchase (license) - $400
Number Installed to Date: 10
Date First Installed: March 1983
(See Vendor Profile Page V-32)

UNIVERSITY COMPUTING CO.
UCC MBA-MICROCOMPUTER SOFTWARE
Additional Product Classification: Financial Modeling Languages/DSS, WP/Text Editing, DBMS, Graphics, Communications/TP Monitors
Specific Application: Spreadsheet Modeling, Graphics, WP, Data Base Forms Generation
Specific Industry: Manufacturing
System Requirements: IBM PC; MP 9816
Memory Required: 256.0K bytes
Source Code Available: No
Purchase Terms: Purchase (license)
Number Installed to Date: 2,000
(See Vendor Profile Page V-32)

USMA COMPUTER CO.
COMMUNICATIONS PACKAGE
Additional Product Classification: Communications/TP Monitors
Specific Application: Asynchronous Communications With an IBM PC and Hayes Smart Modem, Supports 132 Column Reports
System Requirements: IBM PC, PC-DOS
Memory Required: 64.0K bytes
Source Language: Basic
Purchase Terms: Purchase (license) - $200
Number Installed to Date: 3
Date First Installed: January 1983
(See Vendor Profile Page V-32)

USMA COMPUTER CO.
IBM PC COM
Additional Product Classification: Communications/TP Monitors
Specific Application: Communication With Time-sharing Firms and Data Bases
System Requirements: IBM PC; PC-DOS
Memory Required: 64.0K bytes
Source Language: Basic
Source Code Available: Yes
Purchase Terms: Purchase (license) - $200
Number Installed to Date: 5
Date First Installed: January 1983

VAN ARSDALE & ASSOCIATES, INC.
TAC SOFT
Additional Product Classification: Communications/TP Monitors
Specific Application: User-Defined Technical Assistance Center Support Package Supports Maintenance of Company and PBX Switching Equipment
Specific Industry: Telephone
System Requirements: DG Eclipse: AOS
Memory Required: 760.0K bytes
Source Language: SP/Pascal, Assembler
Purchase Terms: Purchase (license)
Number Installed to Date: 1
Date First Installed: 1983
(See Vendor Profile Page V-32)

VISICORP
VISIANSWER
Additional Product Classification: Communications/TP Monitors
Specific Application: Communications Package
System Requirements: IBM PC; PC-DOS
Purchase Terms: Purchase (license)
(See Vendor Profile Page V-32)

VISICORP
VISITERM
Additional Product Classification: System Resource Management, Communications/TP Monitors
Specific Application: Terminal Emulation, Product Turns PC Into Dumb Terminal
System Requirements: Apple II; III: Apple-DOS; IBM PC: PC-DOS; Commodore; Atari 800
Purchase Terms: Purchase (license) - $100

WILD HARE COMPUTER SYSTEMS, INC.
HARE/NET
Additional Product Classification: Communications/TP Monitors
Specific Application: Local-Area Network Software
System Requirements: Hare Brain Work Station: MCS
Source Code Available: No
Purchase Terms: Purchase (license) - $2,000
Number Installed to Date: 4
Date First Installed: June 1983
(See Vendor Profile Page V-33)

WINTERHALTER, INC.
NS3270 AND NS3780
Additional Product Classification: Communications/TP Monitors
Specific Application: Micro to Mainframe Communications Programs (Emulation)
System Requirements: CP/M
Memory Required: 56.0K bytes
Source Language: C
Source Code Available: $8,000
Purchase Terms: Purchase (license)
(See Vendor Profile Page V-33)

ZAIAZ COMMUNICATIONS, INC.
TRANSLATION EXPRESS
Additional Product Classification: Communications/TP Monitors
Specific Application: Intercomputer File Transfer
System Requirements: Televideo: CP/M; DEC VAX: VMS; DEC PDP-11/23: Unix; TI 990: DSX
Source Language: C
Purchase Terms: Purchase (license) - $500
Number Installed to Date: 23
Date First Installed: March 1982
(See Vendor Profile Page V-33)

ZEIGER ASSOCIATES, INC.
TAP
Additional Product Classification: Communications/TP Monitors
Specific Application: Traffic Analysis Program, Communication Network Design
Specific Industry: Telecommunications
System Requirements: CP/M
Memory Required: 56.0K bytes
Source Language: Cobol, Basic, Assembler
Purchase Terms: Purchase (license); Rental; Lease - $1,000
Number Installed to Date: 12
Date First Installed: 1979
(See Vendor Profile Page V-33)

FACSIMILE DEVICES

Index to Facsimile Devices

Facsimile devices are systems which are used for the transmission of images. There are three basic types of facsimile devices — transmitters, receivers and transceivers, which can both send and receive images. The index listings are arranged alphabetically by vendor and include the price, device type and the page number on which the complete product listing can be found.

VENDOR	MODEL	TRANSMISSION TECHNIQUE	PRICE	PAGE
Alden Electronics, Inc.	18 X 22 FACSIMILE SYSTEM	Stand-alone Transmitter	$11,750	C-46
	SIGMA FAX	Stand-alone Transmitter	$5,600	C-46
Burroughs Corp.	DEX 1103	Transceiver	$1,500	C-46
	DEX 1402	Transceiver	$2,000	C-46
	DEX 2100	Transceiver	$2,995	C-46
	DEX 3200	Transceiver	$3,995	C-46
	DEX 3500	Transceiver	$3,500	C-46
	DEX 3600	Transceiver	$3,995	C-46
Canon U.S.A., Inc.	FAX 31	Transceiver	$1,995	C-46
	FAX 320E	Transceiver	$5,995	C-46
	FAX 330	Transceiver	$4,495	C-46
	FAX 401	Transceiver	$3,795	C-46
Exxon Enterprises	1200	Transceiver	$1,495	C-46
	1300 QWIP	Transceiver	$1,495	C-46
	2000/2150	Transceiver	$2,375 to $3,375	C-46
	2210 QWIP	Transceiver	$2,995	C-46
	2310 QWIP	Transceiver	$5,845 to $6,745	C-46
Infotek	DIAL ACCESS RECEIVER	Receiver	$500	C-46
	DIAL ACCESS TRANSMITTER	Stand-alone Transmitter	$500	C-46
	PRIVATE LINE RECEIVER	Receiver	$500	C-46
	PRIVATE LINE TRANSMITTER	Transceiver	$500	C-46
Mitsubishi Electronics America, Inc.	FA-585G	Transceiver	$8,500	C-46
NEC Telephone, Inc.	NEFAX 3C	Transceiver	$11,500	C-46
	NEFAX 3S	Transceiver	$4,400	C-46
	NEFAX 3SE	Transceiver	$4,600	C-46
	NEFAX 3SH	Transceiver	$4,600	C-46
	NEFAX 3T	Transceiver	$6,200	C-46
	NEFAX 8	Transceiver	$2,100	C-46
Panafax Corp.	MV-1200	Transceiver	$1,975	C-46
	MV-3000	Transceiver	$6,250	C-46
	MV-3000WL	Transceiver	$7,000	C-46
	PX-100	Transceiver	$4,495	C-46
Pitney Bowes	8300	Transceiver	$2,995	C-46
	8400	Transceiver	$4,995	C-46
	8500	Transceiver	$4,695	C-46
	8600	Transceiver	$5,995	C-46
	8600	Transceiver	$8,995	C-46
Raytheon, Inc.	3100	Transceiver	$3,795	C-46
	3300	Transceiver	$5,000	C-46
	5000	Transceiver	$9,950	C-46
	6100	Transceiver	$5,000	C-46
	6300	Transceiver	$7,940	C-46
	6300R	Receiver	$4,450	C-46
	6350	Stand-alone Transmitter	$4,420	C-46
Sanyo Business Sys. Corp.	SF 615	Transceiver	N/A	C-46
	SF 625	Transceiver	N/A	C-46
	SF 935	Transceiver	$4,700	C-46
Telautograph Corp.	G21	Transceiver	$2,100	C-46
	G32	Transceiver	$3,500	C-46
	G38	Transceiver	$4,500	C-46
	G96	Transceiver	$6,000	C-46
	G99	Transceiver	N/A	C-46
Xerox Corp.	TC 295	Transceiver	$4,600	C-46
	TC 400	Transceiver	$1,695	C-46
	TC 455	Transceiver	$2,195	C-46
	TC 485	Transceiver	$4,195	C-46
	TC 495-1	Transceiver	$6,700	C-46
3M Co.	606	Transceiver	$1,995	C-46
	611	Transceiver	$4,450	C-46
	1000	Transceiver	$2,550	C-46
	2700	Transceiver	$4,450	C-46
	9140	Transceiver	$2,600	C-46
	9145	Transceiver	$3,700	C-46
	9165	Transceiver	$6,509	C-46

Facsimile Devices

ALDEN ELECTRONICS, INC.
18 X 22 FACSIMILE SYSTEM
Device Type: Stand-alone Transmitter, Receiver
Transmission Signal: Analog
Graphics Capability: Yes
Price: $11,750
Date First Installed: September 1978
(See Vendor Profile Page V-1)

ALDEN ELECTRONICS, INC.
SIGMA FAX
Device Type: Stand-alone Transmitter, Receiver
Transmission Signal: Analog
Graphics Capability: No
Price: $5,600

BURROUGHS CORP.
DEX 1103
Device Type: Transceiver
Transmission Signal: Analog
Graphics Capability: Yes
Price: $1,500
Date First Installed: June 1978
(See Vendor Profile Page V-4)

BURROUGHS CORP.
DEX 1402
Device Type: Transceiver
Transmission Signal: Analog
Graphics Capability: Yes
Price: $2,000
Date First Installed: June 1979

BURROUGHS CORP.
DEX 2100
Device Type: Transceiver
Transmission Signal: Analog
Graphics Capability: Yes
Price: $2,995
Date First Installed: September 1981

BURROUGHS CORP.
DEX 3200
Device Type: Transceiver
Transmission Signal: Digital
Graphics Capability: Yes
Price: $3,995
Date First Installed: November 1983

BURROUGHS CORP.
DEX 3600
Device Type: Transceiver
Transmission Signal: Digital
Graphics Capability: Yes
Price: $3,500
Date First Installed: September 1982

BURROUGHS CORP.
DEX 3800
Device Type: Transceiver
Transmission Signal: Digital
Graphics Capability: Yes
Price: $3,995
Date First Installed: September 1981

CANON U.S.A., INC.
FAX 31
Device Type: Transceiver
Transmission Signal: Analog
Graphics Capability: No
Price: $1,995
Date First Installed: June 1983
(See Vendor Profile Page V-5)

CANON U.S.A., INC.
FAX 320E
Device Type: Transceiver
Transmission Signal: Analog, Digital
Graphics Capability: Yes
Price: $5,995
Date First Installed: January 1984

CANON U.S.A., INC.
FAX 330
Device Type: Transceiver
Transmission Signal: Analog, Digital
Graphics Capability: Yes
Price: $4,495
Date First Installed: September 1983

CANON U.S.A., INC.
FAX 401
Device Type: Transceiver
Transmission Signal: Analog, Digital
Graphics Capability: Yes
Price: $3,795
Date First Installed: January 1981

EXXON ENTERPRISES
1200
Device Type: Transceiver
Transmission Signal: Analog
Graphics Capability: Yes
Price: $1,495
Date First Installed: December 1978
(See Vendor Profile Page V-12)

EXXON ENTERPRISES
1300 QWP
Device Type: Transceiver
Transmission Signal: Analog
Graphics Capability: Yes
Price: $1,495
Date First Installed: July 1978

EXXON ENTERPRISES
2000/2150
Device Type: Transceiver
Transmission Signal: Analog
Graphics Capability: Yes
Price: $2,375 to $3,375
Date First Installed: February 1980

EXXON ENTERPRISES
2210 QWP
Device Type: Transceiver
Transmission Signal: Digital
Graphics Capability: Yes
Price: $2,995
Date First Installed: 1983

EXXON ENTERPRISES
2310 QWP
Device Type: Transceiver
Transmission Signal: Digital
Graphics Capability: Yes
Price: $5,845 to $6,745
Date First Installed: June 1982

INFOLINK
DIAL ACCESS RECEIVER
Device Type: Receiver
Transmission Signal: Analog, Digital
Graphics Capability: Yes
Price: $500
Date First Installed: January 1970
(See Vendor Profile Page V-15)

INFOLINK
DIAL ACCESS TRANSMITTER
Device Type: Stand-alone Transmitter
Transmission Signal: Analog, Digital
Graphics Capability: Yes
Price: $500
Date First Installed: January 1970

INFOLINK
PRIVATE LINE RECEIVER
Device Type: Receiver
Transmission Signal: Analog, Digital
Graphics Capability: Yes
Price: $500
Date First Installed: January 1970

INFOLINK
PRIVATE LINE TRANSMITTER
Device Type: Transceiver
Transmission Signal: Analog, Digital
Graphics Capability: Yes
Price: $500
Date First Installed: January 1970

MITSUBISHI ELECTRONICS AMERICA, INC.
FA-85SG
Device Type: Transceiver
Transmission Signal: Digital
Graphics Capability: Yes
Price: $8,500
Date First Installed: January 1982
(See Vendor Profile Page V-20)

NEC TELEPHONE, INC.
NEFAX 3C
Device Type: Transceiver
Transmission Signal: Digital
Graphics Capability: Yes
Price: $11,500
Date First Installed: January 1981
(See Vendor Profile Page V-21)

NEC TELEPHONE, INC.
NEFAX 3S
Device Type: Transceiver
Transmission Signal: Digital
Graphics Capability: Yes
Price: $4,400
Date First Installed: June 1983

NEC TELEPHONE, INC.
NEFAX 3SE
Device Type: Transceiver
Transmission Signal: Digital
Graphics Capability: Yes
Price: $4,600
Date First Installed: June 1983

NEC TELEPHONE, INC.
NEFAX 3SH
Device Type: Transceiver
Transmission Signal: Digital
Graphics Capability: Yes
Price: $4,600
Date First Installed: June 1983

NEC TELEPHONE, INC.
NEFAX 3T
Device Type: Transceiver
Transmission Signal: Digital
Graphics Capability: Yes
Price: $8,200
Date First Installed: June 1981

NEC TELEPHONE, INC.
NEFAX 8
Device Type: Transceiver
Transmission Signal: Digital
Graphics Capability: Yes
Price: $2,100
Date First Installed: October 1983

PANAFAX CORP.
MV-60
Device Type: Transceiver
Transmission Signal: Analog
Graphics Capability: Yes
Price: $1,975
Date First Installed: September 1978
(See Vendor Profile Page V-22)

PANAFAX CORP.
MV-3000
Device Type: Transceiver
Transmission Signal: Digital
Graphics Capability: Yes
Price: $6,250
Date First Installed: May 1982

PANAFAX CORP.
MV-3000WL
Device Type: Transceiver
Transmission Signal: Digital
Graphics Capability: Yes
Price: $7,000
Date First Installed: May 1982

PANAFAX CORP.
FX-100
Device Type: Transceiver
Transmission Signal: Digital
Graphics Capability: Yes
Price: $4,495
Date First Installed: June 1983

PITNEY BOWES
8300
Device Type: Transceiver
Transmission Signal: Analog
Graphics Capability: Yes
Price: $2,995
Date First Installed: September 1982
(See Vendor Profile Page V-24)

PITNEY BOWES
8400
Device Type: Transceiver
Transmission Signal: Analog
Graphics Capability: Yes
Price: $4,995
Date First Installed: September 1982

PITNEY BOWES
8600
Device Type: Transceiver
Transmission Signal: Analog, Digital
Graphics Capability: Yes
Price: $4,695
Date First Installed: September 1983

PITNEY BOWES
8800
Device Type: Transceiver
Transmission Signal: Analog, Digital
Graphics Capability: Yes
Price: $6,995
Date First Installed: September 1982

PITNEY BOWES
8900
Device Type: Transceiver
Transmission Signal: Analog, Digital
Price: $8,995
Date First Installed: September 1982

Learn more about Personal Computing, Office Automation or Communications in these video journals from CW Communications and Deltak.

Personal Computing:
A Business Perspective
Taped on location during CW Communications' COMPUTERWEEK conference, these six video sessions feature many of the biggest names in the microcomputer industry as they share their insights into the application of personal computers in the business environment. Each of the six tapes is 20-30 minutes long, and focuses on a specific issue. Available through Deltak singly or as a group.

- *Thinking Small for Big Business*
- *The Purchase Decision*
- *Finding a Vendor*
- *Sales Trends and IBM*
- *New Languages and Networking*
- *A Look Toward the Future*

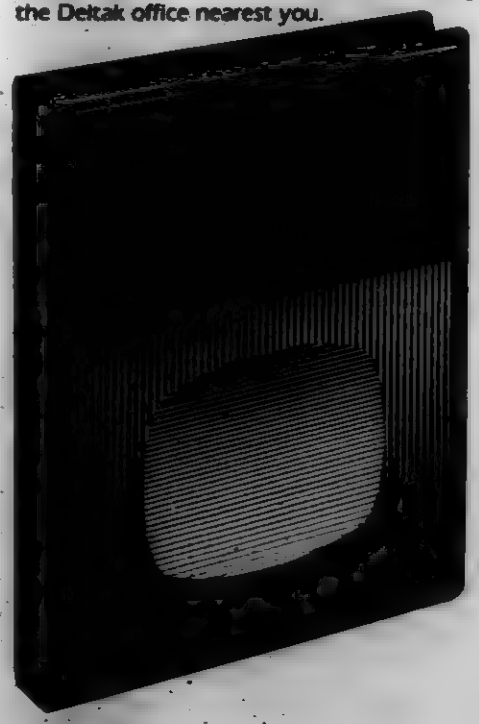
Office Automation: The Essential Issues
Last Fall, executives from around the country attended the OA Forum, a national conference conducted by CW Communications on the introduction, integration and implementation of office automation in today's business environment. Leading industry experts and top corporate managers discussed key office automation planning issues. These discussions are now available to you in seven carefully edited conference journals. Each journal is in full color, and 20-30 minutes long. They are available from Deltak singly or in a group.

- *The DP Role in Office Automation*
- *Planning for Office Automation*
- *The Fundamentals of Integration*
- *Some Specifics of Integration*
- *The Executive Workstation*
- *One Company's Experience*
- *Introducing Office Automation to Your Organization*

Communications
Leading experts in all areas of communications were taped at the 1983 Communication Networks Conference in New Orleans. The result was two brand new video conference journals of key interest to all levels of corporate and technical understanding:

- Communication Networks: Alternatives for the 80's
- Local Area Networks: The major considerations

All of these useful journals are available through Deltak, inc., 1751 Diehl Road, Naperville, IL 60566. To get more information, or to find out about rentals, just call Deltak Order-Entry at (312) 369-3000 (in Canada, (416) 678-9222), or check the white pages of your telephone directory for the Deltak office nearest you.



CW COMMUNICATIONS/INC.
Publishes of Computerworld, InfoWorld, PC World, MICRO MARKETWORLD, and other leading computer publications around the world.

Facsimile Devices

RAPICOM, INC.
3100
Device Type: Transceiver
Transmission Signal: Digital
Graphics Capability: Yes
Price: $3,795
Date First Installed: January 1982
(See Vendor Profile Page V-25)

RAPICOM, INC.
3200
Device Type: Transceiver
Transmission Signal: Digital
Graphics Capability: Yes
Price: $5,000
Date First Installed: January 1982

RAPICOM, INC.
3300
Device Type: Transceiver
Transmission Signal: Digital
Graphics Capability: Yes
Price: $9,950

RAPICOM, INC.
6100
Device Type: Transceiver
Transmission Signal: Digital
Graphics Capability: Yes
Price: $5,000
Date First Installed: October 1981

RAPICOM, INC.
6300
Device Type: Transceiver
Transmission Signal: Digital
Graphics Capability: Yes
Price: $7,840
Date First Installed: January 1981

RAPICOM, INC.
6300R
Device Type: Receiver
Transmission Signal: Digital
Graphics Capability: Yes
Price: $4,450
Date First Installed: January 1981

RAPICOM, INC.
6360
Device Type: Stand-alone Transmitter
Transmission Signal: Digital
Graphics Capability: Yes
Price: $4,420
Date First Installed: January 1981

SANYO BUSINESS SYSTEMS CORP.
SF 615
Device Type: Transceiver
Transmission Signal: Analog, Digital
Graphics Capability: Yes
Date First Installed: March 1984
(See Vendor Profile Page V-26)

SANYO BUSINESS SYSTEMS CORP.
SF 635
Device Type: Transceiver
Transmission Signal: Analog, Digital
Graphics Capability: Yes
Date First Installed: March 1984

SANYO BUSINESS SYSTEMS CORP.
SF 935
Device Type: Transceiver
Transmission Signal: Analog, Digital
Graphics Capability: Yes
Price: $4,700
Date First Installed: 1983

TELAUTOGRAPH CORP.
G21
Device Type: Transceiver
Transmission Signal: Analog
Graphics Capability: Yes
Price: $2,100
(See Vendor Profile Page V-30)

TELAUTOGRAPH CORP.
G32
Device Type: Transceiver
Transmission Signal: Digital
Graphics Capability: Yes
Price: $3,500
Date First Installed: January 1981

TELAUTOGRAPH CORP.
G38
Device Type: Transceiver
Transmission Signal: Digital
Graphics Capability: Yes
Price: $4,500
Date First Installed: January 1983

TELAUTOGRAPH CORP.
G96
Device Type: Transceiver
Transmission Signal: Digital
Graphics Capability: Yes
Price: $6,000
Date First Installed: January 1982

TELAUTOGRAPH CORP.
G99
Device Type: Transceiver
Transmission Signal: Digital
Date First Installed: March 1984

XEROX CORP.
TC 295
Device Type: Transceiver
Transmission Signal: Digital
Graphics Capability: Yes
Price: $4,600
Date First Installed: October 1983
(See Vendor Profile Page V-33)

XEROX CORP.
TC 400
Device Type: Transceiver
Transmission Signal: Analog
Graphics Capability: Yes
Price: $1,695
Date First Installed: January 1971

XEROX CORP.
TC 455
Device Type: Transceiver
Transmission Signal: Analog
Graphics Capability: Yes
Price: $2,195
Date First Installed: June 1981

XEROX CORP.
TC 495
Device Type: Transceiver
Transmission Signal: Analog
Graphics Capability: Yes
Price: $4,195
Date First Installed: August 1979

XEROX CORP.
TC 495-1
Device Type: Transceiver
Transmission Signal: Digital
Graphics Capability: Yes
Price: $6,700
Date First Installed: June 1981

3M CO.
906
Device Type: Transceiver
Transmission Signal: Analog, Digital
Graphics Capability: Yes
Price: $1,995
Date First Installed: June 1979
(See Vendor Profile Page V-34)

3M CO.
911
Device Type: Transceiver
Transmission Signal: Analog, Digital
Graphics Capability: Yes
Price: $4,450
Date First Installed: June 1981

3M CO.
1000
Device Type: Transceiver
Transmission Signal: Analog
Graphics Capability: Yes
Price: $2,550
Date First Installed: June 1981

3M CO.
2709
Device Type: Transceiver
Transmission Signal: Analog, Digital
Graphics Capability: Yes
Price: $4,450
Date First Installed: June 1981

3M CO.
9140
Device Type: Transceiver
Transmission Signal: Analog, Digital
Graphics Capability: Yes
Price: $2,600
Date First Installed: June 1982

3M CO.
9145
Device Type: Transceiver
Transmission Signal: Analog, Digital
Graphics Capability: Yes
Price: $3,700
Date First Installed: December 1983

3M CO.
9185
Device Type: Transceiver
Transmission Signal: Analog, Digital
Graphics Capability: Yes
Price: $6,500
Date First Installed: May 1983

TRANSMISSION SERVICES VENDORS

Transmission Services Vendors

A. W. COMPUTER SYSTEMS, INC.
Woods Rd.
Rt. #38
Cherry Hill, NJ 08002
(609) 779-7200
Major Market: Communications Equipment Manufacturing; OEM (Computer Systems); Systems House (Commercial OEM); Retail Store
Product Lines: Microwave Services; Satellite Services; Long Lines (MCI, Sprint, Bell); Microwave Equipment; Laser
Net Sales: $1 Million - $5 Million (1981)
Contacts:
Head of Marketing: Di Simone
Head of Software: Mike Greenblatt
Head of Engineering: Charles Welch
Head of Customer Service: Andy Nye
Geographic Coverage: International
Year Established: 1973
Number of Employees: 17

ADBA CORP.
130 Knowles Drive
Los Gatos, CA 95030
(408) 379-1500
Major Market: Communications Equipment Manufacturing
Product Lines: Digital Termination Services; Cellular Radio
Contacts:
Head of Marketing/Sales: Ron Fried
Head of Engineering: Dan Maase
Geographic Coverage: International
Year Established: 1977
Number of Employees: 189

AETNA TELECOMM LABS
131 Flanders Road
Westboro, MA 01581
Major Market: Component and Communications Equipment Manufacturing
Product Lines: Fiber Optic
Contacts:
Head of Marketing/Sales: Marjorie Katz
Head of Engineering: Leon Woo
Geographic Coverage: International
Year Established: 1981
Number of Employees: 50

AMERICOM PHOTONICS, Inc.
71 Commerce Road
Brookfield, CT 06804
(203) 775-8950
Major Market: Communications Equipment Manufacturing
Product Lines: Fiber Optic
Contacts:
Head of Marketing: Scott Sideman
Geographic Coverage: International
Year Established: 1981
Number of Employees: 20

AMERICOM SUN MOON STAR, INC.
10440 Tantau Ave.
Cupertino, CA 95014
(408) 255-9281
Major Market: Communications Equipment Manufacturing
Product Lines: Microwave Services; Satellite Services; Long Lines (MCI, Sprint, Bell); Digital Termination Services; Satellite Equipment
Contacts:
Head of Engineering: Jim Balchtal
Geographic Coverage: International
Year Established: 1981
Number of Employees: 20

ANTEL COMMUNICATIONS CORP.
W. Side Station
P.O. Box 100
Worcester, MA 01602
(617) 752-5660
Major Market: Communications Equipment Manufacturing
Product Lines: Fiber Optic
Contacts:
Head of Marketing: Harry Jain
Head of Sales: John Blalewald
Head of Engineering: Russell Patterson
Geographic Coverage: International
Year Established: 1980
Number of Employees: 40

ARCH & BARBOT TECHNICAL SERVICES
11300 Hartland St.
N. Hollywood, CA 91605
(213) 769-6772
Major Market: OEM (Peripherals-Terminals); Maintenance/Other Services
Product Lines: Fiber Optic; Laser
Year Established: 1983
Number of Employees: 10

BELNEL, INC.
4824 N.E. 42nd.
Portland, OR 97218
(503) 281-8153
Major Market: Communications Equipment Manufacturing
Product Lines: Digital Termination Services
Contacts:
Head of Marketing/Sales: Richard C. Chamberlin
Head of Engineering: Bill Johnson
Geographic Coverage: International
Year Established: 1972
Number of Employees: 9

CANOGA DATA SYSTEMS
21218 Van Owen St.
Canoga Park, CA 91303
(213) 888-2003
Major Market: Communications Equipment Manufacturing
Product Lines: Fiber Optic
Contacts:
Head of Sales: Jack Miller
Head of Engineering: Mas NaKamori
Geographic Coverage: International
Year Established: 1978
Number of Employees: 110

CHRISTOMETTICS
9155 Brookville Rd.
Silver Springs, MD 20910
(301) 587-3507
Major Market: Communications Equipment Manufacturing; System Manufacturing
Contacts:
Head of Marketing: Homev Guerra
Geographic Coverage: National
Year Established: 1977
Number of Employees: 10

COASTCOM
2312 Stanwell Drive
Concord, CA 94520
(415) 825-7500
Major Market: Component and Communications Equipment Manufacturing
Product Lines: Satellite Equipment
Contacts:
Head of Marketing/Sales: William Martin
Head of Sales: William Martin
Head of Engineering: Toney Warren
Head of Customer Service: Paul Rivard
Geographic Coverage: International
Year Established: 1980
Number of Employees: 85

COGENCILL TECHNOLOGY CORP.
1066 N. Broadway
Yonkers, NY 10701
(914) 965-6300
Major Market: Communications Equipment Manufacturing; Maintenance/Other Services
Product Lines: Fiber Optic; Laser
Contacts:
Head of Marketing/Sales: Mike Coden
Head of Sales: Mike Coden
Head of Engineering: Dr. Frederick Scholl
Geographic Coverage: International
Year Established: 1980
Number of Employees: 60

COMPTEL COMM, INC.
3200 N Farber Dr.
Champaign, IL 61821
(217) 352-2477
Major Market: Communications Equipment Manufacturing
Product Lines: Satellite Equipment
Net Sales: $1 Million - $5 Million (1982)
Contacts:
Head of Marketing: Ron Socket
Head of Sales/Engineering: Andrew B. White
Head of Software: Michael Sams
Geographic Coverage: International
Year Established: 1977
Number of Employees: 40

CONTROL MODELS, INC.
360 Enfield St.
Enfield, CT 06082
(203) 745-2438
Major Market: Peripheral and Communications Equipment Manufacturing; Systems House (Commercial OEM); Maintenance/Other Services
Product Lines: Laser
Net Sales: $5 Million - $25 Million (1981)
Contacts:
Head of Sales: Peter DiMaria
Head of Engineering: Martin Seelig
Head of Customer Service: Marlene Erhardt
Geographic Coverage: International
Year Established: 1969
Number of Employees: 180

CORNING GLASS WORKS
Telecomm Products
Baron Steuben Place
Corning, NY 14831
(607) 974-4411
Major Market: Communications Equipment Manufacturing
Product Lines: Fiber Optic
Contacts:
Head of Marketing: David Duke
Head of Sales: Peter Redding
Geographic Coverage: International
Year Established: 1975
Number of Employees: 30,000

CPT CORP.
8100 Mitchell Road
P.O. Box 295
Minneapolis, MN 55440
(612) 937-8000
Major Market: Communications Equipment and Office Equipment Manufacturing; Software House; Systems House (Commercial OEM)
Product Lines: Microwave and Satellite Equipment
Contacts:
Head of Marketing: Fred Vetter
Head of Sales: Bob Gallagher
Head of Engineering: Jim Wenhold
Geographic Coverage: International
Year Established: 1971
Number of Employees: 1,500

DACOMM, INC.
5725 E. River Road
Chicago, IL 60631
(312) 399-1610
Major Market: Communications Equipment Manufacturing; Maintenance/Other Services
Product Lines: Satellite Services; Satellite Equipment
Net Sales: $5 Million - $25 Million (1981)
Contacts:
Head of Sales: Bob Stewart
Geographic Coverage: International
Year Established: 1969
Number of Employees: 80

DATA GENERAL CORP.
Information Systems Division
4400 Computer Drive
Westboro, MA 01580
(617) 366-8911
Major Market: Component, Computer, Peripheral and Communications Equipment Manufacturing; Software House; Data Services (Service Bureau); Maintenance/Other Services
Product Lines: Microwave Services; Satellite Services; Digital Termination Services; Microwave Equipment
Contacts:
Head of Marketing: Dave Lyons
Head of Sales: Jim Hertzel
Head of Software: Al Soura
Geographic Coverage: International
Year Established: 1969
Number of Employees: 15,000

DEVELCOM ELECTRONICS, INC.
4037 Swamp Road
Doylestown, PA 18901
(800) 526-8423
Major Market: Communications Equipment Manufacturing; Dealer/Distributor;

Maintenance/Other Services
Product Lines: Long Lines (MCI, Sprint, Bell); Cellular Radio
Contacts:
Head of Marketing: Tony Severino
Head of Sales: John Roberts
Head of Engineering: Tom Tarchuk
Head of Customer Service: Fred Reid
Geographic Coverage: International
Year Established: 1978
Number of Employees: 275,000

BIDDLE, INC.
818 Mulberry S.E.
P.O. Box 8230
Canton, OH 44711
(216) 488-4000
Major Market: Component, Computer, Terminal and Communications Equipment Manufacturing; OEM (Computer Systems); Software House; Systems House (Commercial OEM); Maintenance/Other Services
Product Lines: Microwave Equipment
Net Sales: More than $100 Million (1982)
Contacts:
Head of Marketing: Robert Mahoney
Head of Sales: Robert Berone
Head of Software: Frank D'Angelo
Head of Engineering: Al Werf
Geographic Coverage: International
Year Established: 1868
Number of Employees: 6,000

BYTEMASTER SCIENCES, INC.
7660 Gloria Ave.
Van Nuys, CA 91406
(213) 782-0820
Major Market: Component Manufacturing; Communications Equipment Manufacturing; OEM (Computer Systems); Software House
Product Lines: Microwave Services; Satellite Services; Long Lines (MCI, Sprint, Bell); Digital Termination Services; Cellular Radio; Microwave Equipment; Satellite Equipment; Fiber Optic
Net Sales: $5 Million - $25 Million (1981)
Contacts:
Head of Marketing: Daniel Donovan
Head of Sales: Jim Pyle
Head of Engineering: Jack Birdsall
Geographic Coverage: International
Year Established: 1972
Number of Employees: 160

DYNAMICS SCIENCES, INC.
Suite 525I
2341 Jefferson Davis Highway
Sentry Blvd.
Arlington, VA 22202
(203) 979-1945
Major Market: Component, Computer, Terminal and Communications Equipment Manufacturing; OEM (Peripherals-Terminals); Software House; Systems House (Commercial OEM); Dealer/Distributor; Maintenance/Other Services; Miscellaneous Computer Supplies; Digital Panel Reader
Product Lines: Satellite Services; Digital Termination Services; Cellular Radio; Microwave Equipment; Satellite Equipment; Fiber Optic
Contacts:
Head of Marketing: Daniel Donovan
Head of Sales: Donald Utt
Head of Customer Service: G. Altmus
Number of Employees: 140

EMI COMPUTER SYSTEMS, INC.
6701 Seybold Road
P.O. Box 4272
Madison, WI 53719
(608) 274-4180
Major Market: Software House; Distributor; Dealer
Product Lines: Fiber Optic
Net Sales: Less than $100,000 (1982)
Geographic Coverage: National
Year Established: 1980
Number of Employees: 2

ERICSSON PROGRAMTIC, INC.
11211 Richmond Ave.
Houston, TX 77082
Major Market: Communications Equipment Manufacturing; OEM (Peripherals-Terminals)
Product Lines: Cellular Radio
Contacts:
Head of Marketing: Peter Walsh
Number of Employees: 65

FERRANTI DIGITAL SYSTEMS, INC.
33 Toppler Dr.
Sterling, NJ 07980
(201) 647-8601
Major Market: Communications Equipment Manufacturing
Product Lines: Fiber Optic
Contacts:
Head of Marketing: W. G. Sozatti
Geographic Coverage: U.S.
Year Established: 1978
Number of Employees: 8

FERRANTI INTERNATIONAL, INC.
218 W. Main St.
Hyannis, MA 02601
(617) 778-0700
Major Market: Communications Equipment Manufacturing; Dealer; Maintenance/Other Services
Product Lines: Fiber Optic
Net Sales: $1 Million - $5 Million (1983)
Contacts:
Head of Marketing: J. Morris Weinberg
Head of Sales: Kenneth Bowes
Geographic Coverage: International
Year Established: 1977
Number of Employees: 108

FORD AEROSPACE & COMMUNICATIONS CORP. WDL
3939 Fabian Way
Palo Alto, CA 94303
(415) 852-4000
Major Market: Communications Equipment Manufacturing; OEM (Computer Systems)
Product Lines: Microwave Services
Contacts:
Head of Marketing: Charles Stiles
Head of Software: Kenneth L. Ross
Head of Engineering: Jack Thornell
Head of Customer Service: Robert Berry
Geographic Coverage: International
Year Established: 1957
Number of Employees: 5,000

FULTON ASSOCIATES, INC.
2075 Oakmead Village Dr.
Santa Clara, CA 95051
(408) 727-4300
Major Market: Peripheral, Communications Equipment and Office Equipment Manufacturing; Dealer/Distributor
Product Lines: Satellite Services; Long Lines (MCI, Sprint, Bell); Microwave Equipment; Satellite Equipment; Fiber Optic; Laser
Net Sales: More than $100 Million (1981)
Contacts:
Head of Marketing/Sales: Norm Peterson
Head of Software: Fred Ehler
Head of Engineering: Ken Kataehba
Geographic Coverage: International
Year Established: 1976
Number of Employees: 300

GANDALF DATA, INC.
1019 S. Noel Ave.
Wheeling, IL 60090
(312) 541-6060
Major Market: Communications Equipment Manufacturing
Product Lines: Fiber Optic
Contacts:
Head of Marketing: Vefre Zugenbuhler
Head of Engineering: Jan Bartlett
Geographic Coverage: International
Year Established: 1973
Number of Employees: 325

GENCOM, INC.
Suite 800
12221 Merit Dr.
Dallas, TX 75251
(214) 960-1977
Major Market: Dealer/Distributor; Maintenance/Other Services
Net Sales: $25 Million - $100 Million (1981)
Contacts:
Head of Sales/Customer Service: Bill Robinson
Head of Software: Tony Hoffman
Head of Engineering: Kenneth Wilson
Geographic Coverage: National
Year Established: 1951
Number of Employees: 30

GTE NETWORK SYSTEMS
400 N. Wolf Road
Northlake, IL 60164
(312) 681-7100
Major Market: Communications Equipment Manufacturing
Product Lines: Microwave Services; Microwave Equipment
Contacts:
Head of Marketing: George Bradley
Year Established: 1983
Number of Employees: 10,000

HARRIS CORP.
Government Systems Sector
1025 W. Nasa Blvd.
P.O. Box 37
Melbourne, FL 32902
(305) 727-4000
Major Market: Custom Systems
Product Lines: Microwave Services; Satellite Services
Net Sales: More than $100 Million (1981)
Contacts:
Head of Marketing: Lee Woods
Geographic Coverage: International

HARRIS CORP.
Satellite Communications Division
1301 Woddy Burke Road
P.O. Box 1700
Melbourne, FL 32902
(305) 724-3000
Major Market: Communications Equipment Manufacturing
Product Lines: Satellite Equipment
Contacts:
Head of Marketing: Raymond Pawley

HARRIS CORP.
Farinon Lightwave Division
643 Bair Island Road
Redwood City, CA 94063
(415) 364-5441
Major Market: Communications Equipment Manufacturing
Product Lines: Fiber Optic
Contacts:
Head of Marketing: Elliot Gilbert
Geographic Coverage: International
Year Established: 1952

HARRIS CORP.
Farinon Division
1691 Bayport Ave.
San Carlos, CA 94070
(415) 594-3000
Major Market: Communications Equipment Manufacturing
Product Lines: Microwave Equipment
Contacts:
Head of Marketing: Colin Palmenaers

HBR-SYSTEMS, INC.
8404 Indian Hills Dr.
Omaha, NE 68114
(402) 399-1400
Major Market: Component and Communications Equipment Manufacturing; OEM (Computer Systems); OEM (Peripherals-Terminals); Software Houses; Systems House (Commercial OEM); Data Services (Service Bureau)
Product Lines: Long Lines (MCI, Sprint, Bell)
Net Sales: $1 Million - $5 Million (1981)
Contacts:
Head of Marketing: Terry Pirzaller
Head of Sales: Ron Gillespie
Head of Software: Chung Le
Head of Customer Service: Tom Provost
Geographic Coverage: National
Year Established: 1969
Number of Employees: 45

HEWLETT PACKARD CO.
Corporate Headquarters

Transmission Services Vendors

3000 Hanover St.
P.O. Box 10301
Palo Alto, CA 94304
(408) 986-8600
Major Market: Component, Computer, Terminal, Peripheral and Office Equipment Manufacturing; OEM (Peripherals-Terminals); Software House; Systems House (Commercial OEM); Data Services (Service Bureau); Dealer/Distributor; Maintenance/Other Services; Miscellaneous Computer Supplies
Product Lines: Fiber Optic
Net Sales: More than $100 Million (1982)
Contacts:
Head of Marketing: Al Oliverio
Head of Sales: Jim Arthur
Head of Software: Andre Schwegar
Geographic Coverage: International
Year Established: 1939
Number of Employees: 72,000

INTERNATIONAL DATA SCIENCES, INC.
Corporate Headquarters
7 Wellington Rd.
Lincoln, RI 02865
(401) 333-6200
Major Market: Peripheral and Communications Equipment Manufacturing
Product Lines: Satellite Equipment
Net Sales: $1 Million - $5 Million (1981)
Contacts:
Head of Marketing: Jack Simpson
Head of Sales: T. J. Daniels
Head of Engineering: Ed Sabilo
Geographic Coverage: International
Year Established: 1966
Number of Employees: 150

ITT TELECOM PRODUCTS, INC.
3100 Highwoods Blvd.
Raleigh, NC 27604
(919) 872-3758
Major Market: Component, Computer, Terminal, Peripheral and Communications Equipment Manufacturing; Software House; Systems House (Commercial OEM); Data Services (Service Bureau); Dealer/Distributor; Maintenance/Other Services; Miscellaneous Computer Supplies
Product Lines: Cellular Radio; Fiber Optic
Contacts:
Head of Marketing: Ken Ray
Head of Software/Engineering: W.L. Glomb
Head of Customer Service: George Young Jr.
Geographic Coverage: International
Year Established: 1983
Number of Employees: 8,000

KNOX SYSTEMS CORP.
8307 Highway 71 W.
Austin, TX 78735
(512) 266-1453
Major Market: Computer, Peripheral, Communications Equipment and Interface Manufacturing
Product Lines: Microwave Equipment; Satellite Equipment; Fiber Optic; Laser
Net Sales: $5 Million - $25 Million (1982)
Contacts:
Head of Marketing: Fred Klingensmith
Head of Sales: Steve Stillman
Head of Software: Harry D. Kelms
Head of Engineering: Thomas Allen
Head of Customer Service: Karen Wiley
Geographic Coverage: International
Year Established: 1975
Number of Employees: 60

L.M. ERICSSON TELECOMMUNICATIONS, INC.
370 Crossways Park
Woodbury, NY 11797
(516)
Major Market: Communications Equipment Manufacturing
Product Lines: Microwave Services; Satellite Services; Microwave Equipment; Satellite Equipment; Fiber Optic; Laser

LIGHTWAVE COMMUNICATIONS
650 Danbury Road
Ridgefield, CT 06877
(203) 438-9625
Product Lines: Fiber Optic

LINCOLN TELEPHONE SERVICES & SUPPLY, INC.
4900 Superior St.
Lincoln, NE 68504
(402) 466-8337
Major Market: Communications Equipment Manufacturing; Dealer/Distributor
Product Lines: Microwave Equipment; Satellite Equipment; Fiber Optic
Contacts:
Head of Marketing/Engineering: Dean Petty
Head of Sales/Customer Service: Deb Nelson
Year Established: 1979
Number of Employees: 25

LOCUS, INC.
P.O. Box 740
State College, PA 16801
(814) 466-6275
Major Market: Component and Communications Equipment Manufacturing
Product Lines: Satellite Equipment
Net Sales: $5 Million - $25 Million (1981)
Contacts:
Head of Marketing: Walter Coyle
Head of Engineering: Daniel Larchuck
Geographic Coverage: National
Year Established: 1967
Number of Employees: 280

LORAL-TERRACOM
Loral Corp.
9020 Balboa Ave.
San Diego, CA 92123
(619) 278-4100
Major Market: Communications Equipment Manufacturing; Maintenance/Other Services
Product Lines: Microwave Equipment
Net Sales: $1 Million - $5 Million (1982)
Contacts:
Head of Marketing: C. G. Imakeep
Head of Engineering: Brian Martes
Geographic Coverage: International
Year Established: 1970
Number of Employees: 170

M/A-COM, INC.
M/A-COM Cable Home Group
Rt. 1
P.O. Box 198A
Catawba, NC 28609
(704) 241-3142
Major Market: Component and Communications Equipment Manufacturing
Product Lines: Microwave Equipment; Satellite Equipment
Net Sales: $25 Million - $100 Million (1981)
Contacts:
Head of Marketing: Frank Logan
Head of Sales: Gene Switchenbank
Geographic Coverage: International
Year Established: 1950
Number of Employees: 1,800

MATH ASSOCIATES, INC.
2200 Shames Drive
Westbury, NY 11590
(516) 334-6800
Major Market: Component, Peripheral and Communications Equipment Manufacturing; Miscellaneous Computer Supplies; Custom Communications Equipment
Product Lines: Fiber Optic; Laser
Contacts:
Head of Marketing: Bob DeLia
Head of Sales: Norman Fein
Head of Engineering: Irwin Math
Geographic Coverage: Western Europe
Year Established: 1972
Number of Employees: 30

MCI INTERNATIONAL, INC.
One WUI Plaza
New York, NY 10004
(212) 363-6400
Major Market: Communications Equipment Manufacturing; Maintenance/Other Services
Product Lines: Long Lines (MCI, Sprint, Bell)
Net Sales: More than $100 Million (1981)
Geographic Coverage: International
Year Established: 1963
Number of Employees: 1,400

MITEL, INC.
Mitel Semiconductor
5400 Broken Sound Blvd.
Boca Raton, FL 33431
(305) 994-8588
Major Market: Component, Terminal, Peripheral, Communications Equipment and Office Equipment Manufacturing; OEM (Peripherals-Terminals); Dealer/Distributor
Product Lines: Long Lines (MCI, Sprint, Bell); Digital Termination Services
Contacts:
Head of Sales: Gordon Turner
Head of Engineering: Tom Mayer
Geographic Coverage: National
Year Established: 1971

MOSELEY ASSOCIATES, INC.
Santa Barbara Research Park
111 Castilian Dr.
Goleta, CA 93117
(805) 968-9621
Major Market: Component, Communications Equipment Manufacturing
Product Lines: Microwave Equipment
Contacts:
Head of Marketing: Charles Rockhill
Head of Sales: Kin Jones
Head of Engineering: Donald Sharpe
Head of Customer Service: Jim Jones
Geographic Coverage: International
Year Established: 1960
Number of Employees: 150

MOTOROLA, INC.
1301 E. Algonquin Road
Schaumburg, IL 60196
(312) 576-7000
Major Market: Component, Computer, Terminal, Communications Equipment and Office Equipment Manufacturing; OEM (Peripherals-Terminals); Systems House (Commercial OEM); Data Services (Service Bureau); Dealer/Distributor; Maintenance/Other Services; Miscellaneous Computer Supplies
Product Lines: Satellite Services; Cellular Radio
Contacts:
Head of Marketing: Bob Cecil
Head of Sales: Art Sundry
Head of Customer Service: Ira Weiner
Geographic Coverage: International
Year Established: 1928
Number of Employees: 75,000

MOUNTAIN COMPUTER, INC.
300 El Pueblo Road
Scotts Valley, CA 95066
(408) 438-6650
Major Market: Peripheral, Communications Equipment and Office Equipment Manufacturing; OEM (Peripherals-Terminals); Dealer/Distributor; Miscellaneous Computer Supplies; Storage System
Product Lines: Cellular Radio
Net Sales: $1 Million - $5 Million (1981)
Contacts:
Head of Marketing: Robert Stroh
Head of Software: George Proper
Head of Engineering: Eric Swartz
Head of Customer Service: Stan Scardino
Geographic Coverage: International
Year Established: 1977
Number of Employees: 120

NEC
107 San Zeno Way
Sunnyvale, CA 94086
(408) 737-2080
Major Market: Communications

Equipment Manufacturing; Maintenance/Other Services; Communications Network
Product Lines: Satellite Services; Long Lines (MCI, Sprint, Bell); Digital Termination Services
Contacts:
Head of Marketing: Jim Peluso
Head of Customer Service: Nancy Peluso
Geographic Coverage: International
Year Established: 1975
Number of Employees: 30

NEVADA BELL
645 E. Plumb Lane
Reno, NV 89520
(702) 789-6000
Major Market: Telecommunications
Product Lines: Microwave Services; Digital Termination Services
Contacts:
Head of Marketing/Sales: Don Van Epps
Year Established: 1913
Number of Employees: 1,460

NORTHERN TELECOM, INC.
1001 E. Arapaho Road
Nelson Highway 54
P.O. Box 13010
Richardson, TX 75081
(214) 238-4790
Major Market: Computer, Terminal, Peripheral and Communications Equipment Manufacturing; OEM (Computer Systems); OEM (Peripherals-Terminals); Data Services (Service Bureau); Dealer/Distributor; Maintenance/Other Services; Miscellaneous Computer Supplies
Product Lines: Microwave Services; Satellite Services; Microwave Equipment; Satellite Equipment; Fiber Optic
Contacts:
Head of Sales: Nelson Boyd
Geographic Coverage: International
Year Established: 1971
Number of Employees: 15,000

NORTHERN TELECOM, INC.
Integrated Office Systems
1001 East Arapaho Road
Richardson, TX 75081
(214) 234-5300
Major Market: Computer, Terminal, Peripheral and Communications Equipment Manufacturing; OEM (Computer Systems); Maintenance/Other Services
Product Lines: Microwave Equipment; Fiber Optic
Net Sales: Over $100 Million (1982)
Contacts:
Head of Marketing: Bob Dyer
Head of Sales: Nelson Boyd
Head of Software: Bruce Stevens
Head of Engineering: Bob Davis
Head of Customer Service: Bob Wider
Geographic Coverage: International
Year Established: 1975
Number of Employees: 7,500

NOVATEL COMMUNICATIONS, INC.
2020 Peterson Place
Norcross, GA 30071
(404) 449-6666
Major Market: Communications Equipment Manufacturing; Maintenance/Other Services
Contacts:
Head of Marketing: John MacLeod
Head of Sales: Peter Zugus
Head of Engineering: Dr. Arunas Slekys
Head of Customer Service: Bill Wight
Geographic Coverage: International
Year Established: 1982
Number of Employees: 500

OKI ELECTRONICS OF AMERICA, INC.
5901-B Peach Tree Dunwoody Road
Atlanta, GA 30063
(404) 399-5500
Major Market: Computer, Computer, Peripheral, Communications Equipment and Office Equipment Manufacturing; OEM (Peripherals-Terminals); Software Houses; Systems House (Commercial OEM); Data Services (Service Bureau); Dealer/Distributor; Maintenance/Other Services
Product Lines: Cellular Radio
Contacts:
Head of Marketing/Customer Service: Steve Fields
Head of Sales: Dick Fisher
Geographic Coverage: International
Year Established: 1969
Number of Employees: 325

P.R. HUBBES & CO., INC.
17 Howell Road
Sudbury, MA 01776
(617) 443-2453
Major Market: Communications Equipment Manufacturing; OEM (Computer Systems); Electronic Equipment
Product Lines: Satellite Equipment
Geographic Coverage: International
Year Established: 1975
Number of Employees: 8

PACIFIC TELECOM, INC.
805 Broadway
Vancouver, WA 98668
(206) 696-0983
Major Market: Communications Equipment Manufacturing; OEM (Computer Systems); Maintenance/Other Services
Product Lines: Microwave Equipment; Satellite Equipment; Fiber Optic; Laser
Contacts:
Head of Marketing: Chuck Russell
Head of Engineering: Jim Warwick
Head of Customer Service: Greg Bogus
Geographic Coverage: Regional
Year Established: 1975
Number of Employees: 2,200

PACNET CORP.
8321 Lemmon Ave.
Dallas, TX 75209
(214) 353-0396
Major Market: Communications Equipment Manufacturing; Maintenance/Other Services
Product Lines: Satellite Services; Long Lines (MCI, Sprint, Bell); Digital Termination Services; Satellite Equipment
Contacts:
Head of Marketing: Gilbert Williams
Head of Sales: George Kelly
Head of Engineering: Doug Littlewood
Geographic Coverage: National
Year Established: 1972
Number of Employees: 32

PANASONIC INDUSTRIAL CO.
Matsushita Electronic Corp. of America
One Panasonic Way
Secaucus, NJ 07094
(201) 348-7000
Major Market: Component, Computer, Peripheral, Communications Equipment and Office Equipment Manufacturing; OEM (Computer Systems); OEM (Peripherals-Terminals); Dealer/Distributor; Maintenance/Other Services
Product Lines: Cellular Radio
Contacts:
Head of Marketing: Scott Minakami
Head of Sales: Joe Shohtoku
Geographic Coverage: International
Year Established: 1982
Number of Employees: 600

PHALO CORP.
Optical Systems
66 Moreland Road
Simi Valley, CA
(805) 522-3333
Major Market: Communications Equipment Manufacturing; Maintenance/Other Services
Product Lines: Fiber Optic
Contacts:
Head of Sales: Jim Rodgers
Year Established: 1981

PHILCOM
2900 Towerview Road
Herdon, VA 22071
(703) 471-2900
Major Market: Communications Equipment Manufacturing; Software House; Systems House (Commercial OEM)
Product Lines: Microwave Equipment; Satellite Equipment
Contacts:
Head of Marketing: Michael Vincour
Head of Engineering: James Britt
Geographic Coverage: National
Year Established: 1963
Number of Employees: 300

RACOM, INC.
12828 Interurban Ave. S.
Seattle, WA 98168
(206) 241-1110
Major Market: Communications Equipment Manufacturing
Product Lines: Microwave Equipment
Net Sales: $500,00 - $1 Million (1981)
Contacts:
Head of Marketing: Sugan Furushiro
Head of Sales: James Dooley
Geographic Coverage: International
Year Established: 1969
Number of Employees: 55

RCA AMERICAN COMMUNICATIONS, INC.
400 College Road E.
Princeton, NJ 08540
(609) 734-4000
Major Market: Communications Equipment Manufacturing
Product Lines: Satellite Services
Contacts:
Head of Marketing: John Williamson
Head of Sales: Murray Fruchter
Head of Customer Service: J. F. Underwood
Geographic Coverage: National
Year Established: 1976
Number of Employees: 500

ROCKWELL INTERNATIONAL
Collins Transmission Systems
1200 N. Alma Road
P.O. Box 10462
Richardson, TX 75207
(214) 996-5000
Major Market: Communications Equipment Manufacturing
Product Lines: Microwave Equipment; Satellite Equipment; Fiber Optic
Contacts:
Head of Marketing: Wroman Riley
Head of Sales: Lee Fisher
Geographic Coverage: International
Year Established: 1928
Number of Employees: 5,000

ROTELCOM
106 Central Ave.
Cortland, NY 13045
(607) 756-7511
Major Market: Communications Equipment Manufacturing; Dealer/Distributor
Product Lines: Fiber Optic
Contacts:
Head of Marketing: Loraine Heath
Head of Sales: Greg Martt
Head of Customer Service: Paula Barber
Number of Employees: 150

SCIENTIFIC ATLANTA, INC.
Corporate Headquarters
One Technology Parkway
P.O. Box 105600
Atlanta, GA 30348
(404) 449-2000
Major Market: Communications Equipment Manufacturing; Software House
Product Lines: Satellite Equipment
Net Sales: More than $100 Million (1982)
Contacts:
Head of Marketing: Dal Bothof
Head of Engineering: Dr. Guy Beakley
Geographic Coverage: International
Year Established: 1952
Number of Employees: 5,000

SEDCOR FEDERAL
P.O. Box 12726
Research Triangle Park, NC 27709
(919) 544-3791
Major Market: Communications Equipment Manufacturing; OEM (Computer Systems); Systems

Transmission Services Vendors

House (Commercial OEM); Maintenance/Other Services
Contacts:
Head of Marketing: Glenn R. Constable
Head of Sales: Russell Stanley
Head of Engineering: Richard Jones
Year Established: 1982
Number of Employees: 17

SOUTHERN BELL TELEPHONE AND TELEGRAPH CO.
675 W. Peachtree St. N.E.
Atlanta, GA 30375
(404) 529-8611
Major Market: Telecommunications
Product Lines: Microwave Services; Digital Termination Services; Cellular Radio
Contacts:
Head of Marketing: Donald B. Dawes
Year Established: 1879
Number of Employees: 72,000

TELEPHONE COMPUTER CO., INC.
1930 Isaac Newton Square
Reston, VA 22090
(703) 435-5100
Major Market: Computer Manufacturing; Communications Equipment Manufacturing; OEM (Peripherals-Terminals); Software House
Product Lines: Long Lines (MCI, Sprint, Bell)
Net Sales: $1 Million - $5 Million (1982)
Contacts:
Head of Marketing: Ron Elsak
Year Established: 1979
Number of Employees: 15

TERRACOM
9020 Balboa Ave.
San Diego, CA 92123
(619) 278-4100
Major Market: Communications Equipment Manufacturing
Product Lines: Microwave Equipment
Contacts:
Head of Marketing: Mike Labadula
Geographic Coverage: International
Year Established: 1970
Number of Employees: 185

THE OHIO BELL TELEPHONE CO.
Headquarters
100 Erieview Plaza
Cleveland, OH 44144
(216) 822-9700
Major Market: Dealer/Distributor; Telecommunications
Product Lines: Microwave Services; Digital Termination Services
Contacts:
Head of Marketing: Leo Richard
Year Established: 1921
Number of Employees: 16,300

UNGERMANN-BASS, INC.
Suite 201
2560 Mission College Blvd.
Santa Clara, CA 95050
(408) 496-0111
Major Market: Communications Equipment Manufacturing
Product Lines: Digital Termination Services; Fiber Optic
Net Sales: $5 Million - $25 Million (1982)
Contacts:
Head of Marketing: James Jordan
Head of Software: Cary Wyman
Head of Engineering: Robert Ryan
Head of Customer Service: Bruce Jackson
Geographic Coverage: International
Year Established: 1979
Number of Employees: 350

VALTEC
99 Hartwell St.
West Boylston, MA 01583
(617) 835-6082
Major Market: Communications Equipment Manufacturing; Maintenance/Other Services
Product Lines: Fiber Optic
Contacts:
Head of Marketing: Marguerite Shapla
Head of Sales: George Golebiowski
Geographic Coverage: International
Year Established: 1967
Number of Employees: 200

VERSITRON, INC.
8310 Chilum Place N.W.
Washington, DC 20011
(202) 882-8464
Major Market: Communications Equipment Manufacturing
Product Lines: Fiber Optic
Geographic Coverage: International
Year Established: 1958
Number of Employees: 50

WESTERN MULTIPLEX CORP.
1045 Howard Ave.
San Carlos, CA 94070
(415) 592-8832
Major Market: Communications Equipment Manufacturing
Contacts:
Head of Marketing: John P. Bartaina
Geographic Coverage: International
Year Established: 1980
Number of Employees: 11

WISCONSIN TELEPHONE CO.
722 N. Broad St.
Milwaukee, WI 53201
(414) 466-3000
Major Market: Dealer/Distributor; Telecommunications
Product Lines: Digital Termination Services
Contacts:
Head of Marketing: Gary Van Otte
Head of Customer Service: Chuck Dickson
Year Established: 1883
Number of Employees: 9,000

XYPLEX, INC.
100 Domino Dr.
Concord, MA 01742
(617) 371-1400
Major Market: Peripheral and Communications Equipment Manufacturing
Product Lines: Long Lines (MCI, Sprint, Bell); Digital Termination Services; Fiber Optic
Contacts:
Head of Marketing: Robert Rosenbaum
Head of Engineering: George Comant
Geographic Coverage: National
Year Established: 1981
Number of Employees: 5

ZOOM TELEPHONICS, INC.
207 South St.
Boston, MA 02111
(617) 423-1239
Major Market: Communications Equipment Manufacturing
Product Lines: Long Lines (MCI, Sprint, Bell)
Contacts:
Head of Marketing: Ralph Hays
Year Established: 1977
Number of Employees: 50

ADVERTISER'S INDEX

Advertiser's Index

Advanced Computer Communications (ACC)	Tab Divider C
Archer Pad International, Inc.	A-15
BBN Communications Corp.	B-48
Codex Corp.	Cover 1
Concord Data Systems, Inc.	A-13
CPT Corp.	Tab Divider B
CW Communications/Inc.	22, 45, V-27, V-31, V-33, B-53, C-47, Cover 3
Gandalf Data, Inc.	A-33, A-53
General Datacomm Industries, Inc.	1
Glenayre Communications, Inc.	A-43
ICOT Corp.	B-7
Leading Edge Products, Inc.	Cover 4
Local Data, Inc.	B-13
M/A-COM Linkabit, Inc.	B-49
Micom Systems, Inc.	A-41
MTI Systems Corp.	A-51, B-17
National Products Marketing, Inc.	Cover 2
Paradyne, Inc.	B-9
Philips Electronic Instruments, Inc.	B-47
Phone 1, Inc.	C-37
Televideo Systems, Inc.	25
Tellabs, Inc.	2
Universal Data Systems, Inc.	Tab Divider A
Wang Laboratories, Inc.	21

The Advertiser's Index is provided as an additional service. The publisher does not assume any liability for errors or omissions.

Computerworld Sales Offices

CORPORATE HEADQUARTERS: Donald E. Fagan, Vice-President/Sales. Edward P. Marecki, Director/National Sales. Frank Collins, Corporate Advertising Administrator, Kathy Doyle, Marketing Support Manager, Pam Valentinas, Special Publications Ad Coordinator. COMPUTERWORLD, 375 Cochituate Road, Box 880, Framingham, Mass. 01701, Phone: (617) 879-0700, Telex: 95-1153.

BOSTON SALES OFFICE: Chris Lee, Regional Director. Bill Cadigan, Account Manager. Alice Longley, Sales Assistant. COMPUTERWORLD, 375 Cochituate Road, Box 880, Framingham, Mass. 01701, Phone: (617) 879-0700, Telex: 95-1153.

CHICAGO SALES OFFICE: Chris Lee, Regional Director. Bill Cadigan, Account Manager. Jean Fowler Broderick, Sales Assistant. COMPUTERWORLD, 2600 South River Road, Suite 304, Des Plaines, Ill. 60018, Phone: (312) 827-4433.

NEW YORK SALES OFFICE: Michael J. Masters, Regional Director. Tom Flynn, Account Manager. Gale M. Paterno, Sales Assistant. COMPUTERWORLD, Paramus Plaza I, 140 Route 17 North, Paramus, N.J. 07652, Phone: (201) 967-1350.

ATLANTA SALES OFFICE: Michael J. Masters, Regional Director. Tom Flynn, Account Manager. COMPUTERWORLD, 1853 Peeler Road, Suite D, Atlanta, Ga. 30338, Phone: (404) 394-0758.

SAN FRANCISCO SALES OFFICE: William Healey, Regional Director. Ruth Gordon, Account Coordinator. COMPUTERWORLD, 300 Broadway, Suite 20, San Francisco, Calif. 94133, Phone: (415) 421-7330.

LOS ANGELES SALES OFFICE: William Healey, Regional Director. Beverly Raus, Account Coordinator. COMPUTERWORLD, 18008 Skypark Circle, Suite 260, Irvine, Calif. 92714, Phone: (714) 261-1230.

COMPUTERWORLD BUYER'S GUIDE

WHAT'S NEW?

Is your company new? Have a new product? Moved?

Make sure your listing appears in the next *Computerworld Buyer's Guide to Communications*. Simply fill out this card and return it to us and we'll include your free listing in our next issue.

Company _____

Address _____

City _____ State _____ Zip _____

Your Name/Title _____ Telephone _____

Product _____

Brief Description _____

Please check appropriate box: ☐ new address ☐ new company or listing ☐ new product

☐ Please call me for more information

COMPUTERWORLD BUYER'S GUIDE

Put your directory advertising in front of *Computerworld* readers.

The *Computerworld Buyer's Guides* are distributed exclusively to the more than 114,000 *Computerworld* subscribers in the United States. When a buyer sees your listing in one of the *Computerworld Buyer's Guides*, make sure your ad is there to tell your story.

Yes! Please send me the following information on advertising in the *Computerworld Buyer's Guides*:

☐ Complete 1984 Ratecard ☐ Expanded Listings & Bold Headings

☐ Inserts & Postcards ☐ Please have a sales representative call me.

Name/Title _____

Company _____

Address _____

City _____ State _____ Zip _____

Telephone _____

COMPUTERWORLD BUYER'S GUIDE

We Welcome Your Comments

It is our aim to fill the information needs of our subscribers and readers. We want to make sure you find what you need in the *Computerworld Buyer's Guide*. With your help, we hope to make our guides the best in the industry. Please take a moment to tell us what you think.

Please rank the following categories:

	Excellent	Good	Satisfactory	Fair	Poor
LISTINGS	☐	☐	☐	☐	☐
MAGAZINE SECTION	☐	☐	☐	☐	☐
OVERALL FORMAT	☐	☐	☐	☐	☐

Your comments or suggestions: _____

Name/Title: _____ Telephone: _____
(optional)

Thank you!

NO POSTAGE NECESSARY IF MAILED IN THE UNITED STATES

BUSINESS REPLY CARD
FIRST CLASS PERMIT NO. 709 FRAMINGHAM, MA 01701

POSTAGE WILL BE PAID BY ADDRESSEE

CW COMMUNICATIONS/INC.
Attn: Kevin McPherson
375 Cochituate Road
Box 880
Framingham, MA 01701

COMPUTERWORLD
BUYER'S GUIDE

NO POSTAGE NECESSARY IF MAILED IN THE UNITED STATES

BUSINESS REPLY CARD
FIRST CLASS PERMIT NO. 709 FRAMINGHAM, MA 01701

POSTAGE WILL BE PAID BY ADDRESSEE

CW COMMUNICATIONS/INC.
Attn: Kevin McPherson
375 Cochituate Road
Box 880
Framingham, MA 01701

COMPUTERWORLD
BUYER'S GUIDE

NO POSTAGE NECESSARY IF MAILED IN THE UNITED STATES

BUSINESS REPLY CARD
FIRST CLASS PERMIT NO. 709 FRAMINGHAM, MA 01701

POSTAGE WILL BE PAID BY ADDRESSEE

CW COMMUNICATIONS/INC.
Attn: Kevin McPherson
375 Cochituate Road
Box 880
Framingham, MA 01701

COMPUTERWORLD
BUYER'S GUIDE

To: Circulation Dept., CW Communications/Inc., Box 880, Framingham, MA 01701

☐ Please enter my one-year subscription to the publication(s) I have checked. (If you wish only to get further information on a publication, just circle the name).

☐ Computerworld — $44* ☐ InfoWorld — $31*
☐ PC World — $24* ☐ Micro Marketworld*
☐ My check is enclosed ☐ Charge to my credit card ☐ MC ☐ Visa
☐ Amex Exp. date _____ (MC only)

☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐ ☐☐☐☐

Name _____
Title _____
Company Name _____
Signature _____ (cardholder's signature)

Address _____
City _____
State _____
Zip _____

Address Shown: ☐ Business ☐ Home ☐ Send foreign rates
☐ Check here if you do not wish to receive relevant promotional mail.

129 *US ONLY

CW COMMUNICATIONS/INC.

THE DAY THE IBM PC BECAME OBSOLETE.

VOL 18
ISSUE 9
FE 27 1984
UMI

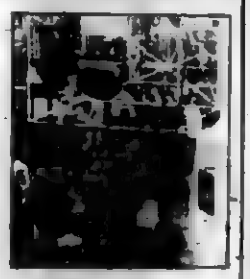
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

COMPUTERWORLD

$2.00 A COPY; $44/YEAR | FEBRUARY 27, 1984 | VOL. XVIII, NO. 9

SPECIAL REPORT
Data communications networks/ Follows 71

Living Laboratory
How IBM tests its products/4



Sofitces
On the floor of the show/5-7

Disappearing act?
Whatever happened to FBA?/73

CW
NI48106UIVYNUIVYHA FCWB C
UNIVERSITY MICROFILMS INTL
SERIAL PUBLICATIONS
300 N ZEEB RD
ANN ARBOR MI 48106

NEWSPAPER

New CPUs replace IBM 3080 series

By Tom Henkel
CW Staff

RYE BROOK, N.Y. — IBM last week replaced its 3080 line of mainframes with six new CPUs that incorporate design and circuit-packaging enhancements said to increase internal performance 5% to 14% over current models. The new models are being offered at the same price as the older systems, but current users cannot field-upgrade to the new machines.

The new mainframes — the 3083 Models EX, BX and JX, the 3081 Models GX and KX and the 3084 Model QX — are direct replacements for the 3083 Model E, Model B and Model J, the 3081 Models G and K and the 3084 Model Q, respectively, which have been taken out of new production. Shipments of the X models will begin immediately; users with 3080 series systems on order will automatically receive the new models, IBM said.

Aside from the performance enhancements to the CPUs, the X model systems offer virtually the same memory and channel characteristics as the older 3080 series machines, an IBM spokesman said. The exceptions are the 3081 Model KX, on which the maximum main memory was expanded from 48M to 64M bytes, and the 3084 Model QX, whose maximum main memory jumped from 64M to 128M bytes.

According to IBM, the X models incorporate improved circuit packaging, which has resulted in a consolidation of some internal components. The consolidation allows the elimination of one Thermal Conduction Module. It is this consolidation of internal components that makes it impossible for current users of 3080 series machines to field-upgrade to the X models, the spokesman explained.

The X models of the 3083 line reportedly deliver 5% to 8% greater internal throughput than the older models when used in IBM MVS/XA, MVS/370 or VM/SP High-Performance Option operating environments.

The 3081 X models offer 8% to 10% greater internal performance under MVS/XA and MVS/370 and up to 14% greater throughput when operating under VM/SP HPO. The 3084 Model QX offers 8% greater throughput running under MVS/XA, IBM said.

Maintenance fees cut

At the same time that it introduced the X processor models, IBM cut the monthly maintenance fee on old versions of the 3080 series by up to 15% to equal the monthly maintenance fees on the X models. It also announced 7% to 10% price reductions on processor upgrades for users of the older 3080 system configurations. Both changes are effective immediately.

As examples of the lower monthly maintenance fees on older 3080 series processors, IBM said the former $5,150 monthly maintenance fee for a 3081 Model G system with 32M bytes of main memory has been cut to $4,475. A 3081 Model K with 48M bytes of main memory now carries a monthly maintenance fee of $5,995 instead of $6,435.

As examples of the price reductions on model-to-model upgrade charges on older

See IBM page 8

TOP OF THE NEWS

Elbowing its way into the crowded IBM-compatible microcomputer marketplace, Zenith Data Systems Corp. last week announced two machines. Page 2. Earlier, IBM had announced its Portable Personal Computer (Page 69), but Compaq Computer Corp. isn't too worried about it (Page 99).

■

The list of lawsuits against Burroughs Corp. grew even longer as a nursing home management firm, a B920 user, filed a $1 million suit. Page 2.

■

In a hard-hitting keynote address at the Office Automation Conference last week, the president and chief executive officer of Xerox Corp. said there is neither a clear mission nor a clear sense of urgency in automating office functions. Page 11.

■

Health-related problems are widespread among VDT operators, a survey by 9 to 5 found. Page 12. Meanwhile, opposition to the regulation of VDT use is growing. Page 13.

■

The Federal Communications Commission said no to the charges for accessing long-distance, private-line and dial-up services that were proposed by most of the nation's local telephone companies last October. Page 15.

■

Groundwork for a national consortium to meet telecommunications needs was laid last week. Page 43.

■

Security getting lip service only

By John Gallant
CW Staff

PARK RIDGE, Ill. — Upper level management is aware of the importance of data security, a recent survey indicated, but that awareness does not always translate into money and support for DP managers who must provide the security.

In a survey conducted by the Data Processing Management Association, 70% of the 200 DPMA members responding said they believe upper management in their organizations is "aware of the importance of data security." But only 65% of those companies allocate a portion of their annual budgets to data security programs.

The survey found that among the firms that provide such funding, only 2.7% of the corporate budget is slated for data security purposes. Also, fewer than half the DPMA members within those organizations said their data security budgets are scheduled for increases in the upcoming year.

The budget findings were highlighted by the fact that DPMA members said their companies would lose an average of more than $142,000 per day in the event of a systems failure brought on by a computer break-in or some other security breach. Further, 82% of the DP and MIS professionals responding said they want to win "solid commitment and support" from upper level management in addressing security issues.

See SECURITY page 6

FYI

Tomorrow's primary may go slowly

By James Connolly
CW Staff

CONCORD, N.H. — New Hampshire voters will participate tomorrow in their first-in-the-nation presidential primary, becoming, as they have for three decades, the first Americans to vote for candidates who have wooed them for a year.

CAMPAIGN '84

Technologies such as computers and television have brought states scientifically tailored candidates, continuous polling and instant declarations of winners — as Iowa discovered when TV network news anchors awarded Walter Mondale a win before the Democratic caucuses were fully under way last week.

But most of the Granite State's 451,000 voters will not see evidence of those technologies at the two crucial times: when they cast their votes and when they count their votes. Most of the state still relies on manually counted paper ballots. Only seven of the 259 New Hampshire cities, towns and unincorporated communities use either mechanical voting machines or punched-card computer voting, according to Deputy Secretary of State Robert Ambrose. When polls close at 8 p.m. EST tomorrow, the networks are likely to project a winner within an hour, based on key precincts and past voter trends.

But the official vote count will take about two days, as town officials tabulate paper ballots and hand the ballots to state troopers for transport to the state capitol here.

"We have a Wang [Laboratories, Inc.] VS80

See VOTE page 12

Zenith offers IBM compatibles

By David Myers
CW New York Bureau

NEW YORK — Zenith Data Systems Corp. last week elbowed its way into the crowded bazaar for IBM-compatible personal computers with the announcement here of two machines, a desktop unit and a portable.

In all, the Glenview, Ill.-based subsidiary of Zenith Radio Corp. announced five configurations — three desktop systems and two portables. Based on Intel Corp.'s 8088 microprocessors, all five are essentially the same, offering from 128K to 640K bytes of random-access memory; two RS-232C serial ports; one Centronics Data Computer Corp.-compatible parallel port; red, green and blue color output; an IBM expansion bus; and a detached keyboard. The models differ in the number and type of disk drives used.

The desktop unit, the Z-150, is available with single or dual, 5¼-in., soft-sector floppy disk drives. It is also available in a dual-drive configuration employing one floppy and one 10.6M-byte Winchester disk drive.

Available in volume

The Z-150 has a base price of $2,699, which is $430 more than IBM's 128K-byte Personal Computer. Zenith said at the time of its introduction last week that the Z-150 is available in volume.

The portable unit, the Z-160, comes with either single or dual floppy disk drives. Weighing 30 lb, it incorporates a built-in, 9-in., brown-tone monitor and retails for $2,799, $4 more than the recently announced IBM Portable Personal Computer (see story page 83) and about $200 less than a rival machine from Compaq Computer Corp., the Houston-based leader of the portable sweepstakes.

The Zenith portable is scheduled to appear May 1, two months after initial shipments of the IBM Portable Personal Computer. A Winchester version is slated for the future.

"We agree with those who say that by the end of the decade, 74% of the [personal] computers in business offices will be IBM or IBM-compatible machines," Donald P. Moffat, president of Zenith Data Systems, told the press conference here last week at which the Zenith micros were unveiled.

The new computers join two Digital Research, Inc. CP/M-based systems in Zenith's product line. Both desktop and portable are equipped with a detachable keyboard manufactured for Zenith by Alps Electric, a Tokyo-based components maker.

IBM compatibility

John Frank, Zenith's vice-president of marketing, said the two new computers will run virtually any software program developed for the IBM Personal Computer and accept virtually any plug-in expansion board for the Big Blue machine.

Zenith marketers claimed the company has tested 175 programs and dozens of plug-in boards. The company promised to publish a bimonthly list of successfully tested IBM-compatible software products.

The Zenith personal computers will support Basic, assembler, Fortran and Pascal, as well as Microsoft, Inc.'s Word and Multi-Plan 1.1 and Lotus Development Corp.'s Lotus 1-2-3 financial spreadsheet, according to company spokesmen. In July, Microsoft's Windows and the Lotus Symphony products will also be available on the Zenith machines.

Tom Dornback, vice-president of software development for Zenith, said the new computers run under a "standard implementation" of Microsoft's MS-DOS 2.0 operating system. Most makers of IBM-compatible equipment opt for an operating system modeled upon PC-DOS, the altered version of MS-DOS developed by IBM for its machines. By contrast, the Zenith systems' compatibility resides in a proprietary I/O statement lodged in read-only memory code, according to Dornback.

Vulnerable to change?

A consultant here who asked not to be named said that chip-level compatibility was "easier for [Zenith]. They didn't have to meddle with the software. But it leaves them vulnerable to changes in the IBM architecture. If IBM ever decides to change its chips, Zenith will be in the position of having to copy [those changes] to remain compatible."

With IBM now quoting a delivery time of four months on large-volume orders of its Personal Computer, the initial success of the Zenith boxes appears to depend on the company's ability to keep its delivery schedule ahead of Big Blue's. But as IBM's lead times shrink, Zenith will have to sell its personal computers on less dependable factors, such as ease of use, a consultant here told *Computerworld*.

Zenith Data Systems is located at 1000 Milwaukee Ave., Glenview, Ill. 60025.

B920 user sues Burroughs for $1 million

By Patricia Keefe
CW Staff

BLOOMINGTON, Ill. — Burroughs Corp. is the target of a $1 million lawsuit brought this month by the user of a B920 turnkey system.

Filed in U.S. District Court in Springfield, Ill., by Care Management, Inc. (CMI), a nursing home management firm, the suit alleges that Burroughs' sales personnel "engaged in deception, fraud, false promises and misrepresentations" and that the vendor was aware that other buyers had experienced problems with the B920 system. CMI's attorney, Gerri Papushkewych, declined to identify the other buyers.

Story of lawsuits

It has been estimated that at least 150 lawsuits have been filed against Burroughs over the last three or four years, typically charging the vendor with fraud or misrepresentation or breach of contract or some combination of the three. Marvin Benn, an attorney for Chicago law firm Hamman, Benn and Miller, handling over 60 of these cases, said his firm has not "lost" a case to date, settling all "to the mutual satisfaction of the parties involved." Hamman, Benn and Miller has represented users of Burroughs' B700, B80, B900, B1700 and B1800 machines.

The suit filed by CMI accuses Burroughs of having caused that user to suffer "severe financial losses" after it bought the B920 which, it claimed, never operated as promised. The financial losses include damage to business services and reputation and loss of internal control of cost and customers, according to Papushkewych.

CMI paid $100,000 for the system in December 1980. The suit alleges the system could not perform functions the company needed, in particular, multicompany processing; was not completely compatible with CMI's Burroughs B700 minicomputer; and was not fully operable by the end of August 1981 as promised. When the hardware was installed, Papushkewych said, the software "was not there."

The B920 "is alleged to be deceptive in that significant parts of the computer system were not operable and could not be made operable," she said. Also, "some components of the system do not work together."

Attempts to reach a Burroughs spokesman for comment were unsuccessful.

However, John Felzan, an attorney for the Chicago-based law firm of Kirkland and Ellis, which has represented the vendor in the past, said he is unaware of any other suits involving the B900 series. Stressing that he has not seen the complaint and does not know whether his firm will be retained in this case, Felzan said, "It is my understanding that the general industry perception and studies of the B900 series have been and are quite favorable."

CORRECTIONS

The announcement of the Fiber Optic Net/One local-area network [CW, Feb. 6] incorrectly referred to Siecor Fiberian as a fiber-optic transmission subsystem. Siecor Fiberian is a division of Siecor Corp. It sells the Net 10 transmission subsystem to Ungermann-Bass, Inc. under an OEM agreement. When Net 10 is combined with Ungermann-Bass equipment and software, the result is Fiber Optic Net/One.

"High-tech Robin Hood pays piper" [CW, Feb. 6] incorrectly stated that Washington state's Cedar Creek Corrections Center is in Little Rock, Ark. It is actually located near Littlerock, Wash.

NEWS SUMMARY

IBM "usability laboratories" employ cameras and one-way glass as end users test new software/6

Software '84: Micro-mainframe links top product debuts . . . Attendance low, but Softcon shows potential . . . Host state Louisiana unwraps a bill enforcing software copyrights . . . micro software producers begin a membership drive for the fledgling Software Protection Fund/5-7

Besides a series of mainframes, IBM announced a new MVS/XA release/8

OAC '84: Roundup of product introductions . . . Xerox chief delivers hard-hitting keynote/10-11

A survey done by 9 to 5 finds adverse effects from working with VDTs/12

As more states work to adopt laws regulating the use of video display terminals, the opposition is organizing/13

The International Communications Association called for the deferral of pending increases in AT&T's CPE rates/14

The FCC has rejected local access tariffs filed by former Bell operating companies and other local telephone companies/15

AT&T will offer office building tenants shared access to long-distance circuits and sophisticated PBXs/16

Banks in Massachusetts and Virginia tell how mergers have affected their data processing departments/18

A DP consultant received probation for accumulating copies of a tire company's computer programs that cost more than $100,000 to develop/22

Smart cards in Blois, France, will enable people to tote their entire medical histories in their pockets/24

Scientists at the University of Wisconsin are using a supermini to "read" the language of DNA/26

Employees at Adesso Corp. dial up — rather than drive to — work every morning/28

A Tennessee county is entering a crucial election year with a retrofitted voting and registration system that costs one-third the price of a new system/29

The microcomputer revolution is encountering a backlash/30

International Report/25
Managers on the Move/32
Calendar/34

IN DEPTH

The One-Minute DP Manager/38

EDITORIAL/36
SOFTWARE & SERVICES/45
COMMUNICATIONS/63
SYSTEMS & PERIPHERALS/73
MICROCOMPUTERS/83
COMPUTER INDUSTRY/99

ENCOUNTER

How new SyncSort outperformed IBM's Release 6 by 36% in their very first meeting!

Call (201) 568-9700.

Try our hot new OS Sort.

Ironically, some of SyncSort's most glowing recommendations come from the mouths of IBM systems engineers. Here's the latest example.

One of our systems engineers recently visited the computer center of a well-known worldwide manufacturer. His mission was to install and demonstrate SyncSort 2.5, the latest and most advanced release of our OS sort program.

As our man sat down at the console, an IBM "MVS Specialist" joined the group. "Can I help with the installation?" he asked. Of course, Our Man replied, thanks for the offer.

After SyncSort 2.5 had been installed, the IBMer came up with another helpful suggestion. "Would you mind if we benchmarked your sort against our 5740-SM1, Release 6? I just happen to have a copy here."

Not in the least, Our Man replied. It was the first duel between SyncSort 2.5 and Release 6 (also known as DFSORT). But our systems engineer was confident that 2.5 could outperform Release 6 anywhere, anytime.

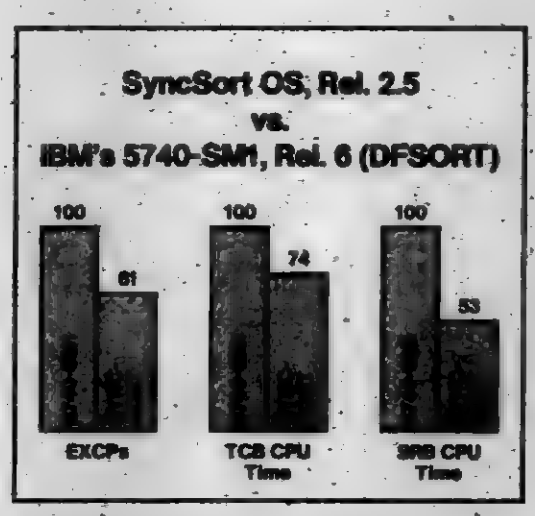
The benchmark was run, and the results bore out Our Man's confidence. SyncSort 2.5 had outperformed Release 6 by a wide margin.

The IBMer was clearly disappointed. But he wasn't ready to concede yet. "Let's take a look at the results on the monitor I've installed," he said.

He explained that the monitor had an "awesome capability" for measuring total resource consumption. It produced an overall "resource utilization" index that reflected the aggregate impact of such vital items as SRB CPU Time, TCB CPU Time, and EXCPs.

Suppressing a grin, Our Man agreed. And this time the IBMer shot himself in the foot with his own monitor.

SyncSort 2.5 had outperformed Release 6 by a whopping 36%—as the charts below indicate:



Resource Utilization Index

How did the IBMer react? Like a gentleman and a scientist. "Well," he said affably, "I've always known a lot of specialized software houses can produce better products than we can in certain areas. Obviously, you've got the best sort."

Then he deleted his sort program from the system and went on to other duties.

Who said chivalry is dead?

syncsort INC.

Syncsort Incorporated 560 Sylvan Ave., Englewood Cliffs, N.J. 07632

Behind the looking glass, users test IBM software

CW Illustration by H. Fling

By John Gallant
CW Staff

ATLANTA — A young woman sits working at a computer terminal in a smartly furnished office. Though she is alone, she is speaking aloud.

In the next room, a middle-aged businessman also talks to himself as he operates a microcomputer on his desk. Similarly, workers in adjacent offices chatter away to no one in particular while they tap the keyboards of other terminals or micros.

Has office automation come to Bedlam? Hardly. The talkative workers are actually product evaluators in a high-technology IBM software "usability laboratory" where their facial expressions, body movements and keystrokes are recorded on videotape along with the continuous stream of their comments.

Monitoring responses

In addition to the cameras mounted throughout the four simulated offices — or testing modules, as they are called here — panes of one-way glass allow designers and usability experts to monitor the responses of the test subjects as they attempt to use newly developed software products.

The evaluators are selected according to their ages, backgrounds and experience levels from temporary employment agencies in the city.

They are placed alone in the modules to read the product manuals and operate the software on the equipment for which it was designed — anything from the IBM Personal Computer to a mainframe terminal. Their physical responses and verbal feedback help designers pinpoint and resolve usability problems before a software package ever hits the marketplace.

The Atlanta Usability Lab is the first of three such evaluation centers developed by IBM since 1980, according to Mike Mehal, manager of product usability for IBM's Information Programming Services Group. IBM also maintains similar, though less sophisticated, usability labs in Dallas and Poughkeepsie, N.Y. Research here focuses primarily on application packages, while the other labs deal with system software.

Developed for usability

The idea for the labs grew from concepts developed at IBM's hardware-oriented human factors research centers across the country. "We recognized that the software environment is changing," according to Mehal.

"There is more emphasis today on the end user and the ease of use of each product. These centers were developed as an approach to making our software easier to use, building in usability, so to speak."

The usability labs were designed to make software developers aware of problems that would otherwise surface only when the package was used in a production environment. Mehal's staff of usability specialists aids developers in preparing and implementing the test situations and in collecting and analyzing the evaluation results.

The usability lab is laid out in a semicircle that permits developers and test experts to monitor all evaluators simultaneously. In the first phase of testing, subjects are encouraged to "think out loud" so their comments can be recorded and analyzed.

Second phase

In a second phase, a usability expert plays the role of the evaluator's supervisor whom the evaluator is prompted to telephone when he encounters difficulties with the package that he can't resolve on his own.

Each of the test modules is equipped as a working office environment complete with plants, paintings, desks and telephones. When the tests involve minicomputer or mainframe software, the processing equipment is located outside the module.

Videotape cameras are situated so that developers behind the glass can mix images of the evaluator, the keyboard and the terminal screen.

Common information base

The audiovisual test results and written evaluations are later made available to other development teams to promote what Mehal termed a "common base of usability information."

Mehal would not say whether all new IBM software is required to undergo usability evaluation, but he did point out that testing on one application may produce results that apply to a variety of other packages. In addition to testing a fully coded package and its documentation, evaluators are often asked simply to choose between several different screens or menus that a designer hopes to use in a future system.

The goal, according to Mehal, is to capture problems early, before any major coding changes are necessary. But that task isn't always easy. "If you fix one problem, chances are that three smaller ones will arise. If you go beyond those, you encounter five or six others," he said. "We have to determine just how far to keep fixing. You reach a point where the usability of a product adversely affects its performance. It's a real trade-off."

What it takes to become an IBM software evaluator

Some people are just too competitive to be good candidates for software evaluation.

"We sometimes have to coach the evaluators. We really have to work to convince some people that it's not a test of their knowledge or their computer literacy," said Mike Mehal, manager of product usability at IBM's Atlanta software evaluation laboratory.

Experts at the Atlanta usability lab try to overcome individual personality problems among evaluators by testing each package with as many as 15 subjects. Shorter tests, involving, for example, screen or menu preference, are conducted with as many as 25 evaluators.

Different age groups

Evaluators are employed for software product tests that can last as little as an hour or as long as two weeks. The evaluators are selected from different age groups and on the basis of their education, employment background and computer experience.

To evaluate a financial application properly, Mehal explained, subjects from 20 to 60 years of age with accounting backgrounds would be selected. Their collective computer literacy would vary, depending on the sophistication of the software to be tested.

The evaluators are given the product manuals and some test data and are asked to input the data on their own. During the evaluation, a usability specialist will often interrupt the evaluator with telephone calls to simulate actual work conditions and to analyze how easily a user can resume working with a package after his attention has been diverted.

Checking reactions

On occasion, usability experts will assemble users of existing IBM software to gauge their reactions to new products for the same application. All the subjects are outsiders, with the exception of IBM employees who, Mehal said, undergo "dry runs" to aid designers in developing test situations and data.

While most evaluators enjoy themselves during the testing, Mehal said, some find the process emotionally demanding as they attempt to solve problems they are only supposed to discover.

"We try to make them realize that they are helping us. We're not testing them. If there is something wrong with the software, that's our problem, not theirs. They may not all enjoy it, but they usually give 110%; they're great."

Software developers can also find the evaluation process trying as users candidly highlight flaws and inconsistencies in their creations. Like writers, Mehal pointed out, the developers have an emotional stake in their products, and criticism is not always easy to swallow.

"In the beginning, we encountered some resistance on the part of the developers," according to Mehal.

"Some of them are afraid of the exposure when problems come to light. But that hesitancy is waning over time as the developers become more open to the concept of usability."

Second-class postage paid at Framingham, Mass., and additional mailing offices. *Computerworld (ISSN-0010-4841) is published weekly, except: January (6 issues), February (5 issues), March (5 issues), April (7 issues), May (5 issues), June (6 issues), July (5 issues), August (5 issues), September (6 issues), October (5 issues), November (5 issues), and a single combined issue for the last week in December and the first week in January by CW Communications/ Inc., Box 880, 375 Cochituate Road, Framingham, Mass. 01701.*

Copyright 1984 by CW Communications/Inc. All rights reserved.
Computerworld can be purchased on 35 mm microform through University Microfilm Int. Periodical Entry Dept., 300 Zeeb Rd., Ann Arbor, Mich. 48106. Phone (313) 761-4700. *Computerworld* is indexed: write to Circulation Dept. for subscription information.
PHOTOCOPY RIGHTS: permission to photocopy for internal or personal use or the internal or personal use of specific clients is granted by CW Communications for libraries and other users registered with the Copyright Clearance Center (CCC), provided that the base fee of $3.00 per copy of the article, plus $.50 per page is paid directly to Copyright Clearance Center, 21 Congress Street, Salem, MA 01970.
Permission to photocopy does not extend to contributed articles followed by this symbol. ‡
Special requests should be addressed to Nancy M. Shannon, CW Communications/Inc. Box 880, 375 Cochituate Rd., Framingham, MA 01701. ISSN 0010-4841/82 $3.00 + $.50
$2.00 a copy: U.S. — $44 a year; Canada, Central & So. America — $110 a year; Europe — $165 a year; all other countries — $245 a year (airmail service). Four weeks notice is required for change of address. Please allow six weeks for new subscription service to begin.

POSTMASTER: Send Form 3579 (Change of Address) to Computerworld, Circulation Dept., Box 880, 375 Cochituate Road, Framingham, Mass. 01701.

Micro-mainframe links debut in New Orleans

By Paul Gillin
CW Staff

NEW ORLEANS — Amid dozens of enhancements, marketing agreements and ports to other hardware announced at the Softcon International Conference and Trade Fair for the Software Industry here last week were two products of particular interest to DP installations looking to tie their microcomputers to mainframes.

CW AT OAC '84

Artificial Intelligence Corp. (AIC) announced the Intellect Micro-to-Mainframe Link, based on its Intellect English-language query product. The package allows IBM Personal Computer users to access, retrieve and display information resident on their IBM mainframes in conversational English. In addition, Intellect now acts as a front-end supervisor to a variety of popular IBM Personal Computer-based software packages.

The link offers access to mainframe data stored in Intellect-supported data base management systems, including IBM's SQL/DS and Vsam files; Cullinet Software, Inc.'s IDMS; Software AG of North America, Inc.'s Adabas; and AIC's Dfam access method and sequential files. Intellect manages data selection, analysis, output and transfer into the micro software.

Expandable dictionary

The product also includes an expandable lexicon dictionary, micro graphics capability, terminal emulation to the IBM host via IBM's VM/CMS or TSO and "visible" support of multitasking through windows and security.

The software requires Intellect under VM/CMS or TSO, the mainframe-to-micro software option and an asynchronous RS-232 connection or coaxial connection to an IBM 3274 controller. The IBM Personal Computer must be equipped with 256K bytes of random-access memory, Digital Research, Inc.'s Concurrent CP/M 86 or IBM's PC-DOS. The link also requires AIC's micro-to-mainframe software option and specific micro software.

Deliveries are scheduled for the third quarter. The host software costs $17,500, including the mainframe communications module and software packages to link 10 Personal Computers to the mainframe. Additional micro packages are priced at $250 per copy.

AIC is located at 100 Fifth Ave., Waltham, Mass. 02254.

CAP Gemini introduction

CAP Gemini Software Products, Inc. announced a product that allows enhanced IBM Personal Computer XTs to be used as dedicated programmer workstations in an IBM VM/CMS or TSO environment. The Multipro Application Development Workstation includes facilities to download mainframe programs to the workstation and provides a variety of tools that automate systems design and programming.

Flow charts, user documentation, design specifications and record layouts are all stored in libraries along with the source code, a spokesman noted. A windowing function allows different components of the application project to be displayed simultaneously and offers data transfer between the windows. Windowing allows the user to execute a CMS job on the mainframe, move to another window to perform local editing and return to CMS to retrieve the results of the job execution.

An editing facility similar to IBM's Structured Programming Facility is provided along with a project library containing interfaces to popular library systems. Also included is a document generating facility, calculator functions and a project management facility.

The product uses a proprietary graphics system to produce graphics symbols that can be stored as ordinary text. Graphics can be interspersed with text to create flowcharts and design documents which reside in the Multipro library.

Emulation capability

Multipro can let the Personal Computer XT emulate an IBM 3270 or Digital Equipment Corp. VT100 terminal in one of the windows and transfer data between the windows. It is also possible to process mainframe-resident files from the workstation without downloading using a buffer.

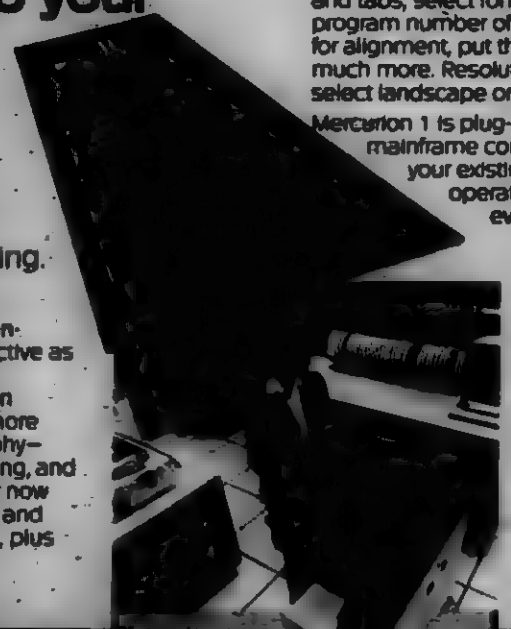
The capability restricts access to mainframe programs that data processing does not want loaded onto floppy disks.

The mainframe package is priced at $24,000, and the software for each workstation costs $1,900. The Personal Computer XT also requires a standard communications interface to the mainframe, which costs about $1,000.

CAP Gemini is headquartered at 2350 Valley View Lane, Dallas, Texas 75234.

Mercurion 1

The page-per-second non-impact printer matched to your computer



...and priced to change all your thinking.

Now Mercurion 1 makes non-impact printing as cost-effective as it is performance-effective. Revolutionary ion deposition imaging—far simpler and more reliable than laser xerography—gives you letter quality printing, and on standard 8½ x 11 paper now demanded by government and most businesses. All of this, plus 5,280 lines-per-minute.

At an initial cost less than 50% that of conventional non-impact printer systems, Mercurion 1 also substantially reduces maintenance costs, downtime, and per-page operating costs. And does it quietly (55dBA).

A simple, user-friendly control panel lets you set margins and tabs, select fonts (up to 8 styles and sizes), program number of copies (1 to 255), feed a single sheet for alignment, put the system through self-test, and much more. Resolution is 240 x 240 pixels, and you can select landscape or portrait orientation.

Mercurion 1 is plug-compatible with all popular mini- and mainframe computers. It's designed to replace your existing impact line printer directly—no operating system software changes. We even supply the cable.

And you can count on SSI quality and service support. Thousands of our printer systems are in use worldwide.

Call us or mail the coupon below for a fully-detailed brochure on this great new printer system.

SSI Southern Systems, Inc.

2841 Cypress Creek Road
Ft. Lauderdale, FL 33309
(305) 979-1000 (800) 327-5602
Telex-522135

Southern Systems Canada:
(416) 229-2589

Turnout low, but show seen worth the effort

By John Gallant and Paul Gillin
CW Staff

NEW ORLEANS — Whether last week's Softcon International Conference and Trade Fair for the Software Industry lived up to expectations depends on how lofty your expectations were. While the show apparently succeeded in getting vendors in touch with a sophisticated audience, the turnout was relatively low. And the notable absence of a large-user audience indicated that the question of whether the software industry can support an end-user trade show is still unresolved.

CW AT SOFTCON

That was the consensus of nearly 20 vendors and attendees interviewed here last week by *Computerworld*. In contrast to what some vendors expected, the Softcon audience was composed almost entirely of dealers and software developers. While this was a sore point with some attendees, most agreed that Softcon had been worth the effort and could develop into a major trade show.

Throughout the interviews, comparisons of Softcon to last year's mammoth Computer Dealers Exposition (Comdex) show were unavoidable. Most vendors agreed that the atmosphere was more productive.

"The crowds are quieter and less frazzled," said Michael Mango, national marketing manager for Accountants Micro Systems, Inc. "The traffic flow is a little lighter than I would have expected, but the type of people who come here are serious buyers."

However, those buyers generally did not include representatives from large corporations. While most vendors shrugged off the absence of Fortune 1,000 accounts, others felt the show's voluminous promotional campaign had been misleading. "We decided to come here at the last minute because we didn't want another Comdex," said Sol Chooljian, vice-president of marketing at Context Management Systems of Torrance, Calif. "We wanted more to deal with the volume buyers from corporations. I haven't seen any of those people."

Although attendees from large corporations were hard to come by, one DP professional called the show "terrific, especially compared to Comdex. In three days at Comdex, I couldn't see it all," said Jack Sprague, a senior systems engineer at Frito-Lay, Inc. in Dallas. "I came here to evaluate Lotus [Development Corp.] and to see a lot of their competitors. It's been a good show."

Attendance totaled over 19,000 after two days, but that figure included exhibitors. Most vendors indicated that totals fell short of their expectations. "It's kind of disappointing once you get used to the chaos of the Consumer Electronics Show," said Jeff Schwamberger, manager of product acquisitions for the Brisbane, Calif.-based Human Engineered Software, Inc. "I'm not saying I'm disappointed in the quality of the people attending, but there is a lot of dead air in here. We're doing a lot of sitting around and waiting between customers."

"It's not as large as I expected," agreed Edward Behn, vice-president of Gregg Corp. in Waltham, Mass.

"Attendance could be better, a lot better," Tim Fuller of Atlanta-based Peachtree Software, Inc. said.

However, Fuller and others added that they were generally impressed with the sophistication of the visitors. "I'm impressed with the quality of the people who have stopped to see us," said Michael Pearce, vice-president of sales for Accountants Micro Systems, Inc. of Bellevue, Wash. "There aren't as many people here as we'd like to see, but they are informed. All in all, it's not bad for a first attempt."

Attendees were divided on the issue of whether Softcon proved that the software industry is capable of supporting its own trade show. Mango pointed out that some of the largest exhibits were still hosted by vendors like IBM, Digital Equipment Corp. and NCR Corp. "It's billed as software only, but if you look around, you see a lot of hardware vendors," he said.

Others pointed out that Softcon had apparently failed to attract a national audience. "We're seeing mostly local dealers and absolutely none from the West Coast," said Phillip Kessler, president of Carlsbad, Calif.-based Allenbach Industries, Inc. "I think that's a real weakness with this show. Perhaps in the future they may want to have smaller, regional shows."

He was seeking software that could take a beating

By Paul Gillin
CW Staff

NEW ORLEANS — Capt. Jim Caudle came to the Softcon International Conference and Trade Fair for the Software Industry here last week looking for software that was fast, dependable and able to take a beating. That last quality is especially important in Caudle's line of work. He was one of two technicians sent to Grenada on short notice to install a network to automate the command and control procedures used on the island during the U.S. invasion last October.

CW AT SOFTCON

Caudle is an automatic data processing systems officer in the 18th Airborne Corps of the U.S. Army at Fort Bragg, N.C. When he is not parachuting out of airplanes, he is responsible for designing and implementing micro-based systems in the controller's office at Fort Bragg.

The call to fly to Grenada came just two days after U.S. troops stormed the island on Oct. 25. Within a week, Caudle and another technician packed Fort Bragg's Apple Computer, Inc. Apple II+-based system into ruggedized containers, obtained and customized a backup system based on Grid Systems, Inc. portable computers, trained the operations staff and transported and installed the computers and communications gear on the occupied island.

The system was designed by Caudle to track supplies and send messages electronically using a modem and satellite telecommunications. It also performs battlefield analysis using a graphics system that superimposes symbols over images generated by an optical disk.

The system is based on a local-area network comprised of two Apple II+ micros with two terminals, a 20Mbyte Corvus Systems, Inc. optical disk and an Apple printer. While Caudle would not specify the communications gear used, he said the data is encrypted during transmission via satellite.

He arrived with the system while sporadic fighting was still going on in Grenada. "There was a lot of destruction and some sniper fire still going on when I got off the transport plane," he said.

The systems were transferred from the airport to a hotel annexed by the Army as temporary headquarters and installed within hours. The installers confronted some problems in reconfiguring the hotel's power supply to run the Apple system and in training the command personnel to use the software. As a result, they worked 12- to 18-hour shifts for most of the 33 days they were on the island.

Caudle said the process of implementing a command system during a battle was particularly exciting. "At least it was doing something that was critical under pressure," he said.

Fortunately, the equipment performed flawlessly. "We didn't even need the backup systems," he noted. The result was a dramatic improvement in communications between military command on the island and Fort Bragg. "Some of the critical information would have taken hours instead of minutes to communicate," he said. "Normally they would use a Teletype terminal and paper tape and transmit at 110 bit/sec. We were able to operate at 1,200 bit/sec."

Info centers gaining

PARK RIDGE, Ill. — Nearly 60% of the Data Processing Management Association (DPMA) members that responded to a recent survey said their companies will have information centers by year-end.

More than 40% of the 200 DPMA members answering the survey said their companies already have information centers; another 19% said their firms will have one in place by the end of 1984.

In addition, according to Austin Weber, assistant publications editor for the DPMA, nearly 80% of the membership responded that upper management in their companies is aware of the information center concept. "The survey shows the growing importance of the information center," Weber said. "They are really beginning to take hold in the corporate world."

The DPMA members split almost down the middle on the question of which department should be responsible for the design and implementation of the information center. Forty-eight percent said the tasks should fall to the data processing and end-user departments, while a slightly higher number — 49% — said those groups should work in conjunction with top management and outside consultants.

A majority of the DP managers surveyed said they wanted upper level management to exhibit support for the information center concept by providing necessary funding and personnel allocations. But a third of the respondents cautioned management to remember that the information center is only another information resource, not a replacement for traditional application development.

The DPMA survey did not include information on the size of the information center budgets or staff.

SECURITY from page 1

"I think it points out quite clearly to top-level people that the data processing manager is very concerned with the issue of security. The DP professional wants to maintain security, but he needs management support in budgeting for security and developing a security policy," Austin Weber, assistant publications editor for the DPMA, said.

When asked what suggestions they would offer to upper management on the issue of data security, the DPMA members' most common responses were:

- Do not overreact to everything you read, but avoid taking computer security for granted.
- Become more aware of the costs involved in data security and budget accordingly.
- Urge computer security as a major goal throughout the project development cycle.
- Take the positive attitude that security is everyone's business.
- Continue to take an active role in the organization's data security on a regular basis.

The leading threat to data security, according to members, is misuse of data by their own DP or MIS staffs, including programmers and systems analysts. Clerical users, outside intruders and management users were also seen as potential threats.

The survey findings are available from the DPMA's newsletter "Compufax," DPMA, 505 Bussey Highway, Park Ridge, Ill. 60068.

Fund forms to combat piracy

By John Gallant
CW Staff

NEW ORLEANS — Calling it a first shot in the war against piracy, the founders of the fledgling Software Protection Fund (SPF) began a quest for membership and funding among the microcomputer software publishers attending the Softcon International Conference and Trade Fair for the Software Industry here last week.

Organized in November by high-level executives from four leading micro software companies, SPF is intended to be a nonprofit, industry-wide organization geared to frustrating illegal copying of microprocessor software. Its initial members — Ashton-Tate, Lotus Development Corp., Sorcim Corp. and Microsoft, Inc. — formally unveiled SPF at a press conference here and began seeking funding for the group's $500,000 first-year budget.

SPF has initially targeted corporate rather than individual abusers of software copyright laws and license agreements, according to David Cole, Ashton-Tate's president and chief executive officer. Cole, who was appointed chairman of the SPF steering committee, said the group will attack these violators on four fronts: increased technical protection of software, attempts to initiate governmental protection, education of users and visible enforcement of license agreements.

"Elegant execution of just one or two of these areas won't produce the results we all desire in this industry," Cole said. "We must have a long-term effort on all four fronts. Only in that way can we protect our creative work."

SPF will work in conjunction with the Microcomputer Software Association (MCSA) arm of the Association of Data Processing Service Organizations, Inc. SPF will be responsible for coordinating the educational and enforcement efforts, while MCSA will focus on the remaining fronts.

SPF plans a joint advertising and direct-mail campaign for the spring and has earmarked at least half the proposed budget for those efforts. On the enforcement front, Cole said the group will promote the investigation of corporate abuse and will urge members to make clear their intent to prosecute abusers. The enforcement effort may also include the filing of joint *amicus curiae* briefs in support of SPF member companies involved in litigation.

"In an industry composed of stubborn entrepreneurs, this collective action is absolutely necessary," according to Lotus Development President Mitchell Kapor. "It will create a climate of opinion that will help resolve the piracy problem."

Cole said the group will present preliminary advertising proposals at its next meeting, the date of which has yet to be announced. SPF's founders also laid out the group's membership fee scale, which ranges from $5,000 to $50,000, depending on the annual net revenues of the member company.

La. unwraps bill to enforce copyrights

By John Gallant
CW Staff

NEW ORLEANS — State officials last week introduced legislation that they said would "strengthen significantly" the ability of software publishers to enforce their rights under existing trade-secret and copyright laws.

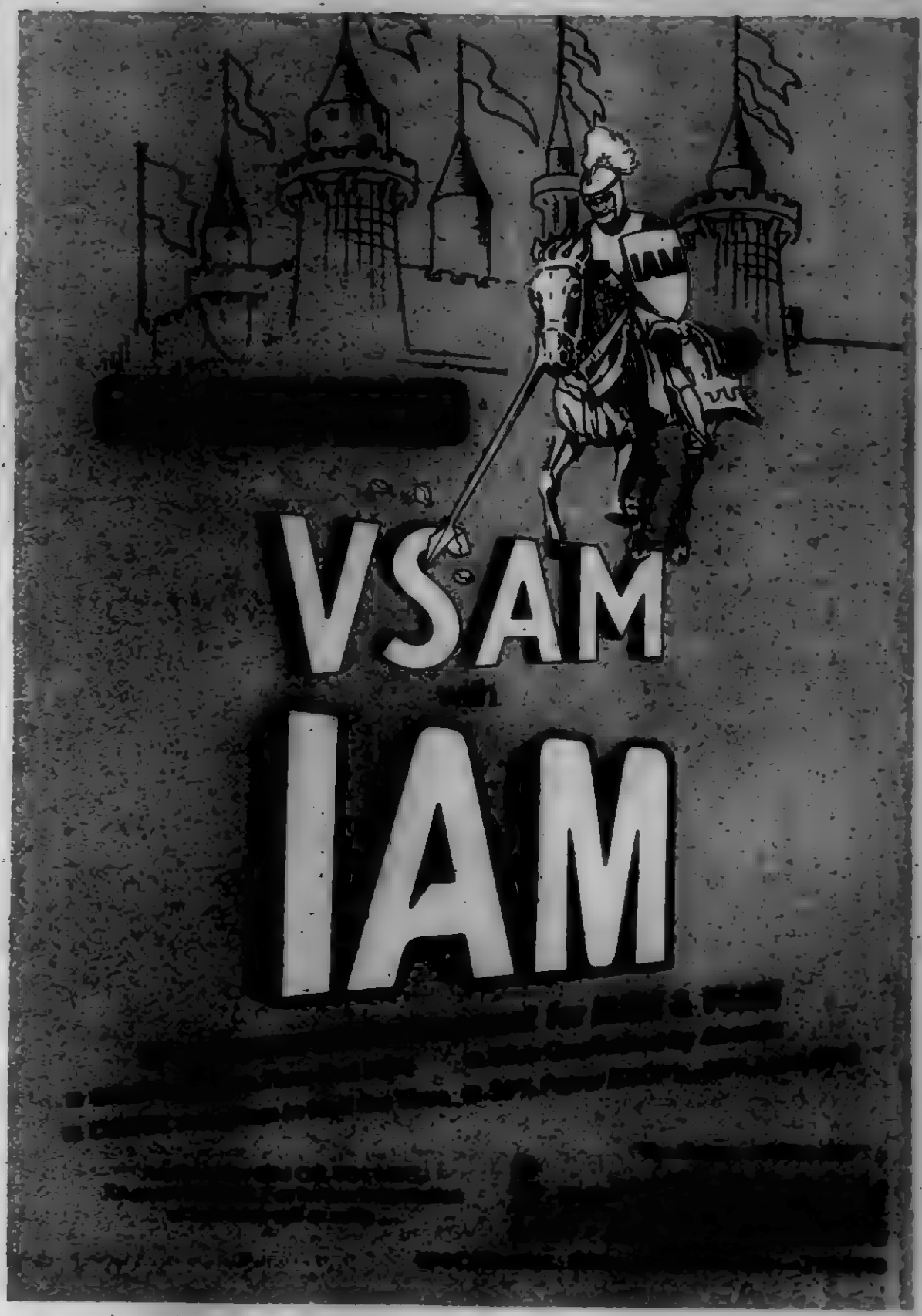
Taking advantage of a formidable media presence at the Softcon International Conference and Trade Fair for the Software Industry, the state attorney general's office unveiled the Software License Enforcement Act, which will be introduced into the Louisiana Senate and House of Representatives in April.

Described as the first of its kind in the nation, the proposed legislation would make it clear to consumers that license agreements appearing on software packaging will be enforced by the state. In the past, according to Louisiana Assistant Secretary of State J. Robert Wooley, state and federal courts have split on the issue of whether the packaged license statements constitute a binding contractual agreement with purchasers.

The bill, which deals primarily with microcomputer software, states that a consumer will be bound by the specific terms of the license agreement if the software package is opened or used. According to Wooley, the legislation would make the consumer a licensee of the software firm rather than the owner of the package.

Although it provides no penalties, the proposed legislation would aid software publishers by giving them a civil, contractual claim against users who illegally copy or modify a package.

Both the bill's cosponsors — state Sen. William Atkins and state Rep. Al Alter — and its supporters made it clear that the bill is aimed at attracting high-tech firms to Louisiana. Wooley joked that measures such as this are intended to transform the state into a "Silicon Bayou."



NEWS

IBM releases enhanced version of MVS/XA

By John Gantz
CW Staff

RYE BROOK, N.Y. — IBM last week unveiled an enhanced version of its MVS/XA operating system. At the same time, the company also unveiled:

■ A Cobol product that allows programmers to write application programs for the 31-bit XA architecture as well as for the previous 24-bit architecture.

■ An option that allows users to purchase either MVS or MVS/XA and up to 70 application programs in a single package.

The latest release of MVS/XA, Data Facility Product Release 1.2, runs on IBM 4381 and larger processors. It provides expanded support for attached devices, including printers and communications devices, along with improved communications to system operators, including additional information on system requests and error tracking, according to an IBM spokesman.

The MVS/XA update also includes enhancements to IBM's Global Resource Serialization, such as facilities for improved handling of system message traffic. It supports IBM's 3290 and 3278 Model 5 terminals as operator counsel terminals, and it is said to provide additional IBM Vsam control block support above the 16M-byte virtual storage line.

IBM said MVS/XA now provides additional support for the operating system's data facility/data set functions, including the integration of Vsam data set catalog facilities. The enhanced version will be available in April.

MVS/XA Data Set Facility Product Release 1.2 has an initial license fee of $1,350 and a monthly license fee of $450. The spokesman said the system's price will increase June 1 to an initial fee of $1,484 and a monthly fee of $495.

In conjunction with the MVS/XA update, IBM unveiled VS Cobol II, described as a Cobol language product that allows programmers to write application programs for the 31-bit XA architecture as well as for the previous Cobol 24-bit architecture.

VS Cobol II provides 31-bit support for generated object programs and includes productivity and usability features that have been structured into the programming language, IBM said. The software also includes interactive debugging facilities, and performance features include reentrant object code, improved object code optimization and execution of most compiler and library functions.

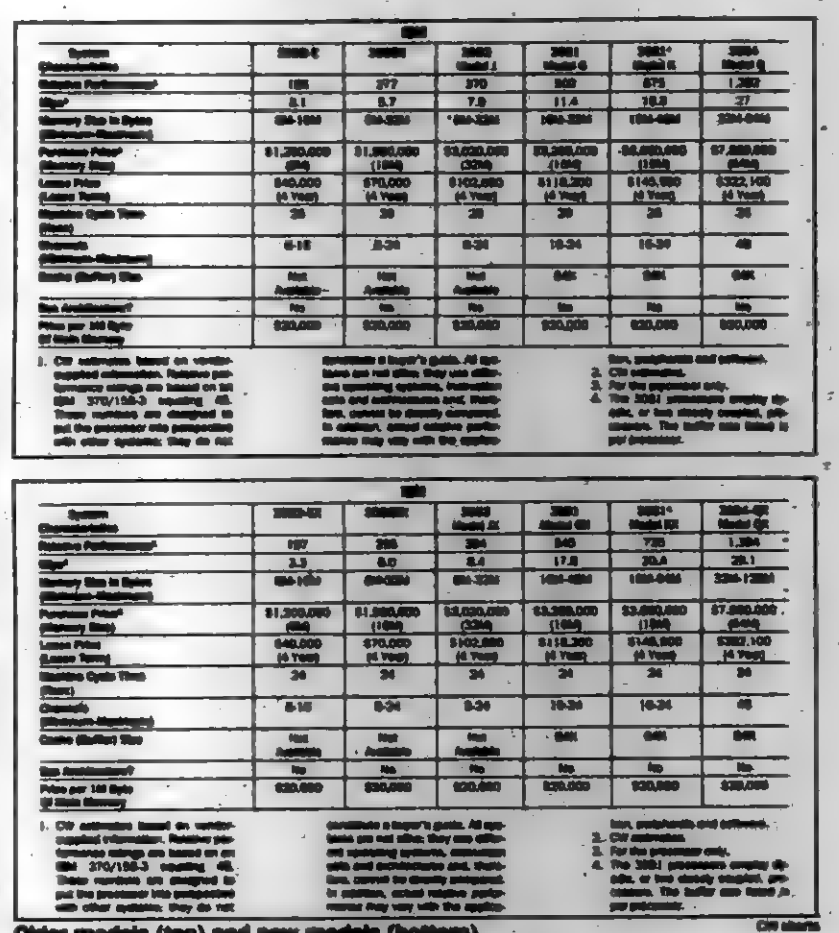
With VS Cobol II, the spokesman said, virtual storage takes place above the 16M-byte virtual storage line. The system was designed for use with IBM's MVS/370 operating system and any version of MVS/XA.

Available in the fourth quarter, VS Cobol II will carry an initial license fee of $6,000 and a monthly license fee of $1,000. The VS Cobol II pricing includes the compiler and the library.

IBM also announced a new packaging arrangement for software called the MVS Custom-Built Installation Productivity Option (Cbipo). Cbipo will allow customers to purchase either MVS or MVS/XA and up to 70 application programs in a single package, reducing the complexity of installing operating systems.

Cbipo's pricing is dependent on the operating system and applications chosen. It will be available to customers in the second quarter.

IBM's Information Systems Group is located at 900 King St., Rye Brook, N.Y. 10573.



Older models (top) and new models (bottom)

CW charts

ANALYSIS

Did IBM anticipate problems with current 3080 line?

Why IBM replaced its well-selling 3080 product line and what will happen to users of those older systems were the issues that industry analysts pondered last week.

Available in volume for slightly more than a year, the 3080 line faced little competition either from manufacturers of IBM-compatible machines or other mainframe vendors. IBM traditionally does not make major changes to a product line until it is absolutely necessary. Why, then, did it make abrupt, sweeping changes to a very successful product line this time?

One theory is that IBM detected major problems with the older versions of the 3080 line which could become evident in the future.

Charles Greco, an analyst with International Data Corp. (IDC) based in Framingham, Mass., said the migration to IBM's MVS/XA operating system is not proving to be as smooth a process as many originally felt it would be. He speculated that IBM may have realized that to run MVS/XA efficiently, users require processors offering more performance than the older 3080 models can muster.

Designed for upgrade?

Another possibility offered by Greco is that the new X models of the 3080 line may have been designed to be field-upgradable to IBM's next level of large processors, which the company is expected to announce later this year.

In either case, current users of 3080 series processors appear to be out of luck, noted William Easterbrook, an analyst with Kidder-Peabody & Co., Inc. in New York.

The resale values of the older 3080 machines will probably suffer from the introduction of the X models, especially if their successors are field-upgradable to a new line of IBM mainframes, he pointed out.

Further, Easterbrook said, users of those system will probably face a processor swap in order to migrate up IBM's product line.

IBM from page 1

3080 systems, a user who wants to upgrade from a 3081 Model K with 32M bytes of main memory to a 3084 Model Q with 64M bytes of main memory will now pay $2,896,000 instead of the previous $3,145,000 price tag.

Upgrading from a 3083 Model B to a 3083 Model J used to cost $525,000; it now costs $475,000, according to IBM.

More information is available from IBM, which announced the new line of mainframe systems through its Information Systems Division, located at 900 King St., Rye Brook, N.Y. 10573.

Agee to head new micro software venture

NEW YORK — William M. Agee, the controversial leader of Bendix Corp. before he lost the company to Allied Corp., has joined the founder of Interactive Systems Corp., developer of a Unix-based operating system for IBM's Personal Computer, in a new software venture.

Dr. Peter G. Weiner, founder of Interactive and the first commercial licensee on Unix in 1973, announced here last week the formation of Uniform Software Systems, Inc., which will be based in Santa Monica, Calif., and sell Unix-based microcomputer programs. Agee was named as chairman and Peter C. Wensberg, former president of Atari, Inc.'s telecommunications unit and longtime Polaroid Corp. marketer, was appointed president and chief executive.

"I'm not window dressing. They don't have me on the board just to raise money," Agee tald reporters here last week after revealing the firm had raised but $750,000 after three initial rounds of financing. "My principal task will be to put together a more sensible financial plan and to provide top management direction."

Agee quit as president of Allied in February 1983 and has been heading Semper Enterprises, a Mass.-based venture capital firm since then.

Weiner, who gave himself the title of chairman of the executive committee, said Uniform Software's first product would be a conversion program allowing all IBM DOS software to run under a Unix-based system. The product will be offered in the third quarter of this year, he added.

"In your development center, ADS/OnLine will increase productivity and reduce your company's applications backlog." —Don Heitzmann*

Using ADS/OnLine Cullinet created the best applications software ever built.

The Application Development System, Cullinet's fourth generation language, became available in 1981. ADS/OnLine was the key element in our database software system needed to address the application software business in a whole new way.

We set out to develop advanced financial and manufacturing applications; applications designed in the 1980's all built using this fourth generation language. Today, Cullinet offers the finest financial and manufacturing applications available, featuring both horizontal and vertical integration. Horizontal integration means that all applications share a common database so redundancies and inconsistencies are eliminated. Vertical integration means all applications are built using ADS/OnLine and advanced database technology so they are easier to install, tailor and maintain.

Using ADS/OnLine, we developed advanced applications much faster than if we used traditional methods. In your development center, ADS/OnLine can increase productivity and reduce your company's backlog.

ADS/OnLine eliminates up to 70% of the lines of code in a typical COBOL program. This can result in a dramatic increase in programmer productivity. In addition, ADS/OnLine is easily learned by COBOL programmers, so your programming staff can become more productive in less time.

Applications can be built more efficiently with ADS/OnLine because it is a non-procedural language. The developer simply paints the screens on a terminal and fills in the blanks to define the applications program. Plus, automatic editing and automatic error handling detect input errors with no code written at all. And the complete integration of ADS/OnLine, with all Cullinet Database facilities, not only ensures control over the application development function, but also guarantees the performance necessary to run these applications in day-to-day operations.

ADS/OnLine has been a key to our success in applications software. It could do the same for you in establishing new information systems and eliminating your applications backlog in the 1980's and 1990's.

Attend a comprehensive seminar explaining this advanced fourth generation language and Cullinet's other database software products. To participate in one of the 700 Cullinet seminars scheduled internationally, send in the coupon or call 1-800-225-9930. In MA, 617-329-7700.

Computer_____

Name/Title_____

Company/Department_____

Address_____

City_____

State_____ Zip_____

Phone ( )_____

Mail to: Cullinet Software, Inc., 400 Blue Hill Drive, Westwood, MA 02090-2198 Attn: Corporate Meetings

Cullinet Software products are designed to run on IBM 360/370, 30XX or 43XX or plug-compatible computers.

CW 3/27

**Don Heitzmann is Cullinet's Director of System Software Development. Don joined Cullinet seven years ago. His early efforts were in design and development of IDMS-DC and he is now responsible for the complete IDMS database product line. Don is a graduate of Princeton University with a B.S. in Electrical Engineering and a Masters in Architecture.*

IDMS/R Seminar cities and dates

City & State	Date	City & State	Date	City & State	Date
Albany, NY	Mar 15	Indianapolis, IN	Mar 27	New York/Rye, NY	Mar 13
Atlanta, GA	Mar 20	Jackson, MS	Mar 15	Oakland, CA	Mar 13
Augusta, GA	Mar 14	Knoxville, TN	Mar 28	Orange County, CA	Mar 6
Boston, MA	Mar 8	Lexington, KY	Mar 30	Portland, OR	Mar 15
Bridgeport/ New Haven, CT	Mar 6	Little Rock, AR	Mar 13	Providence, RI	Mar 22
		Los Angeles, CA	Mar 27	Raleigh, NC	Mar 20
Chicago/ Rosemont, IL	Mar 20	Madison, WI	Mar 15	Rochester, NY	Mar 28
		Meadowlands, NJ	Mar 7	San Antonio, TX	Mar 16
Cincinnati, OH	Mar 21	Merrimack, NH	Mar 29	Springfield, IL	Mar 5
Cleveland, OH	Mar 28	Milwaukee, WI	Mar 7	Springfield, MO	Mar 29
Columbus, OH	Mar 9	Minneapolis, MN	Mar 28	Spokane, WA	Mar 28
Davenport, IA	Mar 13	Montreal, PQ (French)	Mar 14	Toronto, ON	Mar 20
Detroit, MI	Mar 14			Tucson, AZ	Mar 20
Ft. Lauderdale, FL	Mar 22	Montreal, PQ (English)	Mar 21	Vancouver, BC	Mar 14
Ft. Wayne, IN	Mar 6			Washington, DC	Mar 8
Ft. Worth, TX	Mar 15	New York, NY	Mar 20	Wichita, KS	Mar 8
Grand Rapids, MI	Mar 27	New York/ Long Island, NY	Mar 27	Wilmington, DE	Mar 27
Greenville, SC	Mar 6			Winnipeg, MB	Mar 6

Database: Cullinet

© 1984 Cullinet Software, Inc., 400 Blue Hill Drive, Westwood, MA 02090-2198

NEWS

OAC ushers in host of workstations, software

By Robert Holt
CW West Coast Bureau

LOS ANGELES — Professional workstations, enhanced software packages, information retrieval systems and communications interfaces dominated a host of product announcements at last week's Office Automation Conference (OAC '84), held here by the American Federation of Information Processing Societies, Inc.

Taking advantage of an estimated 25,000 visitors to the conference, Exxon Office Systems Co. announced its 750 Professional Workstation for executives and managers. The workstation offers text editing, business graphics and electronic spreadsheets that can be displayed and edited in multiple windows, together with a communications facility that allows the user to access outside data bases and interact with most mainframe computers.

CW AT OAC '84

Pricing for the Exxon 750 begins at $7,750; volume shipments are scheduled for the second quarter. Further information is available from the vendor at 777 Long Ridge Road, Stamford, Conn. 06902.

Also introducing a workstation at OAC '84 was Syntrex, Inc., which showed off Pisces, a stand-alone workstation featuring multiple windows, concurrent tasking and local mass storage.

The user can perform several tasks at the same time, moving information between windows while also communicating to a host mainframe, Syntrex noted. Pisces consists of screen and keyboard, designed with the Intel Corp. 80186 microprocessor and containing 384K bytes of internal memory. The standard storage module is reputed to be a 10M-byte mini Winchester drive that provides the user with on-line access to over 3,000 pages of information and a floppy disk drive with 300 pages of capacity.

Pisces is priced at $7,590 with a removable keyboard and at $9,190 with an electronic typewriter. Deliveries are scheduled for April from Syntrex, 246 Industrial Way W., Eatontown, N.J. 07724.

Datapoint software

Heralding a bunch of new office automation software packages at the conference was Datapoint Corp. Datapoint's Pro-Vista consists of a new hierarchical user interface, Vista-Guide; an electronic mail system, Vista-Mail; and an enhanced word processing package, Vista-Word.

Priced at $1,500 per component, the package is available immediately. More details are available from the vendor at 9725 Datapoint Drive, San Antonio, Texas 78284.

Four-Phase Systems, Inc. went to OAC '84 to announce the second release of its menu-driven office management software package, Coms/IV. The enhanced product reportedly provides administrative support, document filing, sophisticated electronic mail and word processing document exchange in a networked Four-Phase Series 4000/5000 and IBM host environment.

On-line application services allow the user access to other 3270 applications on the IBM system concurrent with Coms/IV, the vendor claimed.

The new product is available immediately and is priced at $32,000 for a permanent license. Coms/IV is also available on 12-, 24-, 36- and 45-month lease terms at $1,200/mo.

Four-Phase Systems can be reached at 10700 N. DeAnza Blvd., Cupertino, Calif. 95014.

With integration a key consideration for OA specialists, Integrated Office Systems, Inc. introduced its Unity System for sales and marketing organizations. The system is said to provide voice mail, electronic text mail, data entry, data inquiry and electronic telephone capabilities in one system.

The Unity package consists of two components, a portable workstation that can reportedly support both voice and data communications and a control message switch and file storage system.

Volume shipments are scheduled to begin in the second quarter. The system is priced at approximately $6,000 to $7,000 per salesman, depending on configuration.

Integrated Office Systems is home-based at 20740 Valley Green Drive, Cupertino, Calif. 95014.

In the area of information access, Northern Telecom, Inc. announced its Datascan information retrieval and reporting system for use with its Models 445, 503, 565 and 585 distributed data processing systems. The package reportedly gives users the ability to produce reports, bar graphs or histograms from information stored in data bases. Data may be retrieved using inverted, indexed-sequential, direct or sequential access methods.

Suggested software licensing fees for the Datascan package vary from

See OAC page 11

Our Password™ sophisticated new control panel

THE BUSIER YOU ARE, THE BETTER YOU LIKE IT.

PASSWORD™ is a modem so efficient and convenient there is little to do but turn it on to transmit at 300/1200 baud. Operating features include auto dial/answer, auto mode/speed select, full/half duplex. PASSWORD has all this, plus a two-year limited warranty, at a price of just $449.*

TELPAC™ telecommunications software (optional) programs PASSWORD to transfer files, in terminal or host mode, with multiple error checks. Phone directory gives choice of timed automatic or one-touch dial and logon. Command mode includes file display and update, menus and help, and much more. Write or call for complete specifications.

*Suggested list for PASSWORD complete with power, phone, RS232 interface cables. TELPAC software optional extra, $79.

PASSWORD, TELPAC, USR logo and U.S. Robotics are trademarks of U.S. Robotics Inc.

U.S. ROBOTICS INC.
1123 WEST WASHINGTON
CHICAGO, ILLINOIS 60607
(312) 733-0497

☐ Tell me more about PASSWORD, TELPAC.

NAME
COMPANY
ADDRESS
CITY/STATE/ZIP
TELEPHONE

OA efforts lack focus, Xerox chief charges

By Robert Batt
CW West Coast Bureau

LOS ANGELES — There is no clear sense of mission in automating office functions and no clear sense of urgency about the need for it, the president and chief executive officer of Xerox Corp. said in a hard-hitting keynote address to the 1984 Office Automation Conference (OAC '84) here last week.

CW AT OAC '84

David Kearns said the office of the future — "when it finally gets here," — has to be managed with clear-cut goals, operating plans, business strategies and performance plans that can be measured. "All of that has to come before an equipment strategy," he declared. "What we have to do in all our companies is figure out how to tie our white-collar workers to the bottom line."

However, given the lack of good performance measures in the office, it is no wonder that the equipment in it gets short shrift, he told conference attendees.

Pointing to personal computers as an example of this lack of goal orientation, Kearns said that micros have gotten better, cheaper and easier to justify. "But the fact that for the most part they are incompatible, that they are isolated from information stored on other machines, that many of them can't communicate, that buying them probably puts off any intelligent equipment strategy — all that gets forgotten in the compulsion to go out and buy a good little machine at a good price," he told his audience.

The focus in measuring office productivity needs to be on quality, not quantity, Kearns maintained. The role of the information manager is to invest capital in a combination of people, machines, facilities and support services. "A good information manager is constantly fine-tuning that combination. The objective is not to substitute machines for people or to cut out support services. The objective is to come up with the best mix to meet the business objectives," he declared.

Kearns

Kearns recommended a list of priorities in determining such a mix:

- First, information managers should insist on a system plan with equipment specifications and technical objectives that support the needs of the business. For example, if the business is growing, install a system that can grow with it, he said.
- Secondly, remember that communication is the one essential goal of office automation. "Remember how people think. Their ideas come in random, unpredictable patterns. Your system should help people generate those ideas easily and share them with others," he said.
- Finally, make sure the office system chosen allows people to expand the scope of their work. Doing better work should be the goal.

Kearns also warned that management itself needs to be scrutinized. American business, he maintained, tries to solve all its problems by throwing more managers at them.

OAC from page 10

$995 to $2,495 per distributed system. The package is scheduled for availability in the second quarter.

Northern Telecom can be reached through Data Park, P.O. Box 1222, Minneapolis, Minn. 55440.

Also at OAC '84, Data General Corp. announced a series of additions to its Comprehensive Electronic Office (CEO) system. Among the additions is a telex interface, the CEO Document Exchange II system, priced at $2,500 and reportedly allowing users to send messages anywhere in the world from their CEO workstations.

DG also introduced a new word processing document interface, the CEO Document Exchange III, which lets CEO users send and receive word processing documents from other vendors' equipment. It is also priced at $2,500.

Availability for both products is within 90 days. DG is located at 4400 Computer Drive, Westboro, Mass. 01581.

The open systems philosophy was also espoused at the conference by Hewlett-Packard Co., which announced a second-generation communications network. Advancenet will provide links between HP computers and other vendors' equipment, the vendor said.

HP Advancenet includes an IBM 3278 emulator, priced at $1,200, and a network remote job entry product for communication with IBM's Systems Network Architecture costing $12,000. Both products will be available March 1.

Further information is available from HP at 3000 Hanover St., Palo Alto, Calif. 94304.

Survey by 9 to 5 links VDTs, health problems

By Lynn Haber
CW Staff

NEW YORK — A recent study of VDT operators found that stress, eyestrain, muscle pain and other adverse side effects have resulted from working with the terminals.

The survey results, outlined in "Analysis of VDT Operator Questionnaires of VDT Hot Line Callers," a report released here earlier this month by 9 to 5, the National Association of Working Women [CW, Feb. 20], indicated that health-related problems are widespread among VDT operators.

Respondents to the health history/job history questionnaire were individuals who had called a 9 to 5 hot line, part of the organization's campaign on VDT risks. Six thousand questionnaires were distributed to VDT workers from May to December 1983; 873, or 15%, of the surveys were returned and analyzed. The typical respondent was a female, 25 to 30 years of age, who worked six to eight hours daily on a plastic-cased VDT with her eyes 10 to 20 inches from the VDT screen and took the same rest breaks as other workers. Over half the respondents were clerical workers in a variety of industries; a majority had been working on VDTs for three years or less.

Severe health effects

Some of the more severe health effects reported "often or daily" by VDT operators in the survey were eyestrain, 53.5%; exhaustion, 51.6%; muscle pain, 56.2%; tension or anxiety, 43.8%; instability or anger, 25.1%; and depression, 23.6%.

In addition, 48.6% of all respondents reported diagnosis or treatment by a physician for vision problems or changes in eyesight since working with VDTs. Approximately half (49%) reported their health was slightly worse or much worse since working on a VDT.

Among the VDT users who had been pregnant since working on a VDT, 31.6% reported normal full-term delivery; 30.6% reported miscarriage; 11.7% said they had given birth by caesarean section; 7.3% had undergone therapeutic or elective abortions; 6.8% had delivered children with major birth defects (treatment required); 4.4% reported premature delivery; 3.4% reported neonatal death; 2.4% of respondents said their pregnancies ended in stillbirths; and 1.9% reported minor birth defects (no treatment required).

Of those women who were pregnant while working on VDTs, 83.3% rated their health during pregnancy as "excellent or good" and 16.7% rated their health "fair or poor."

In response to the study, Karen Nussbaum, executive director of 9 to 5 and president of District 925, Service Employees International Union, AFL-CIO, announced a second phase of the organization's national campaign on VDT risks, which calls on employers, manufacturers and government agencies to take action to protect the safety and health of VDT workers.

Nussbaum recommended that the National Institute for Occupational Safety and Health (Niosh) investigate a work site where a cluster pregnancy problem was recently discovered; that Niosh follow through on a feasibility study of pregnancies among women workers, including VDT users, as soon as possible; and that Niosh set up a national tracking system to study patterns of VDT-related health problems across the U.S. and suggest solutions.

VOTE from page 1

minicomputer that does the tabulating once we get the ballots from the state police. We'll have a final count about two days after the primary," Ambrose said.

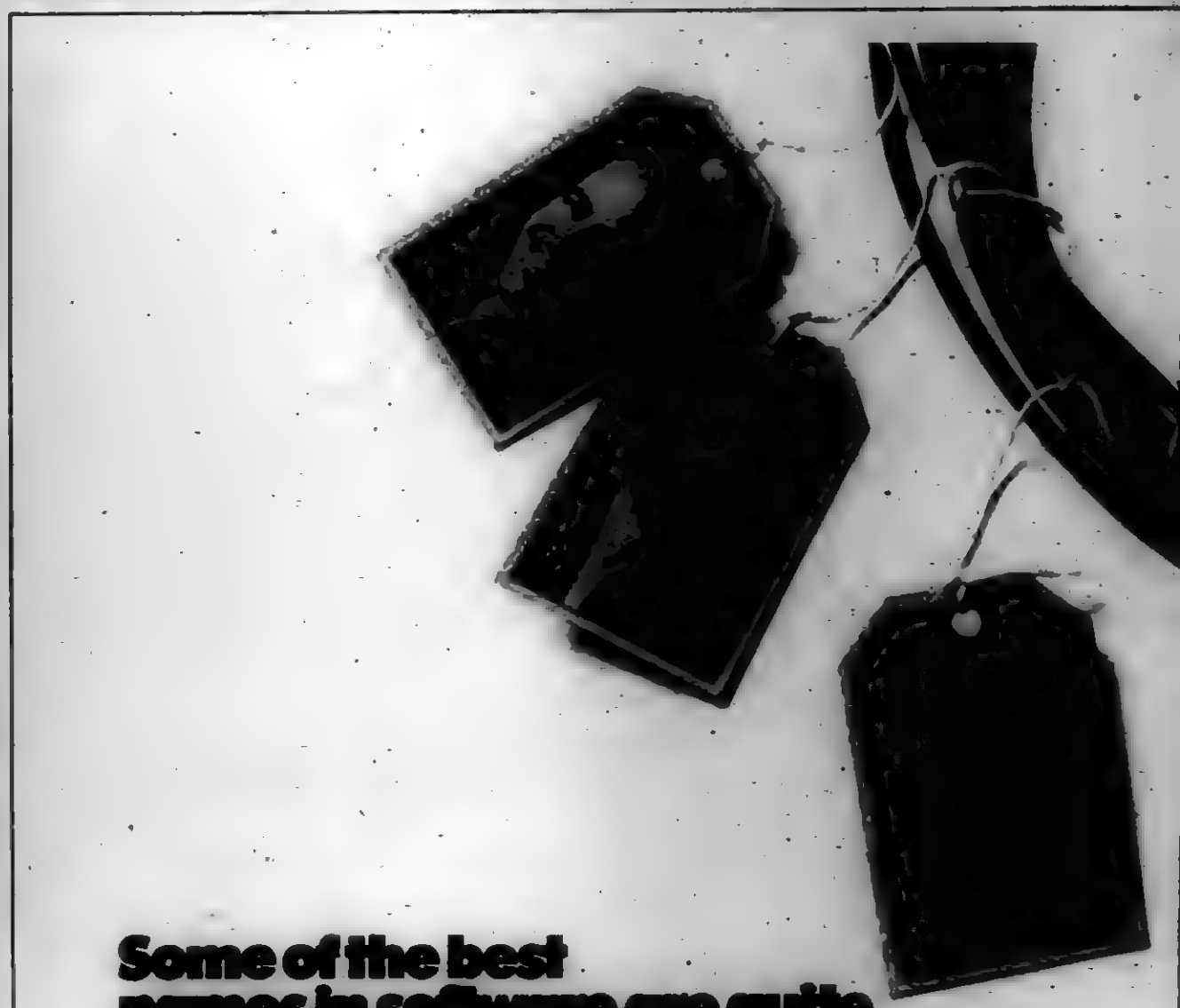
Automated voting is confined to the larger cities and towns, such as Manchester, Concord, Salem and Portsmouth.

These communities rely on equipment that ranges from mechanical lever-action voting machines to punched-card booths and card readers.

It is not scheduled for use tomorrow, but a new system eventually may speed the vote count in Salem. The town plans to try as a pilot a precinct ballot counter produced by Computer Election Systems, Inc. of California.

That counter, scheduled for use in a municipal election next month, would count the votes at the precinct level as voters feed it punch cards throughout the day. When the polls close, workers would then unlock the machines at each of six polling places and read the results in seconds, according to Town Clerk Eleanor Barrett.

Comparing even the current card system, which involves several hours of vote counting, with the paper system she used when she started counting votes in 1955, Barrett noted, "It's sure a lot better than what we used to do, when we would be here until four in the morning."



Some of the best names in software are quite attached to our network.

These people know PCs. They also know a good idea when they see one. That's why they're building future networking software around today's networking standard — Ethernet. And why they chose our PC networking system to help them do it. EtherSeries from 3Com.

What EtherSeries is doing for them.

"3 large, growing, and diverse Ethernets are at the heart of our software development activities. Our 3Com hardware has been very reliable — it has never failed us."
— Bill Gates, Chairman, Microsoft (Bellevue, Washington)

"We want to develop our popular dBase II® to a multiuser networked database environment. To meet the demands of our customers we chose the high-performance 3Com EtherSeries."
— David Clayton Cole, Chairman, Ashton-Tate (Culver City, California)

"The ease of sharing information and printers led our 1-2-3® advanced development team to choose 3Com's EtherSeries® over all of the alternatives."
— Mitch Kapor, President, Lotus Development (Cambridge, Massachusetts)

"We wanted network software transparency. Our PFS:® software runs without ANY change on 3Com's EtherSeries® — it protects our user's software investment."
— Fred Gibbons, President, Software Publishing (Mountain View, California)

"The Ethernet standard and 3Com's EtherSeries® will be an important part of our in-house networking strategy. It provides the connectivity we require for our growing organization."
— Bob Frankston, President, Software Arts (Wellesley, Massachusetts)

"Our mainframe link software and Peachtree software ran perfectly in the 3Com environment. We dropped

Opponents of proposed VDT laws organize

By Lynn Reiser
CW Staff

WASHINGTON, D.C. — As legislative attempts to regulate the use of video display terminals in the work place have grown, opposition to such regulation has also mounted.

Among those opposing the legislation are trade groups and associations such as the Computer Business and Equipment Manufacturers Association (Cbema), the American Banking Association, the American Electronics Association, the Air Transport Association and the American Insurance Association.

"We have opposed all the bills that we've seen so far — other than study bills — not because we don't believe that there aren't any problems connected with the work place or with video display terminals, but [because] the so-called solutions that we've seen mandated in the bills . . . would do more harm than good," said a spokeswoman for Cbema. A national group, Cbema has 40 members, including such computer companies as IBM, Digital Equipment Corp., Honeywell, Inc., Sperry Corp., Texas Instruments, Inc. and Apple Computer, Inc.

At the Air Transport Association, representing the major airlines, which currently use more than 75,000 VDTs nationwide, "Our position is that we don't believe we should be burdened with legislation requirements unless there's a demonstrated need," a spokesman said. "As far as we know, there has been no such demonstrated need for such legislation."

Legislative efforts to regulate VDT use have surfaced in Massachusetts, Connecticut, Illinois, Maine, Oregon, New York, Ohio and Rhode Island. Both Connecticut and Maine have passed legislative study bills, but no state has yet adopted regulatory legislation.

Other attempts to regulate the use of VDTs in the work place have included adding VDT-specific language to union contracts [CW, Sept. 26].

The U.S. trails Europe on the VDT issue. In countries like Sweden, Switzerland and West Germany, federal regulation has mandated the use of adjustable chairs, terminals with detachable keyboards and rest breaks for operators.

Typical bill

The recently drafted Ohio House Bill 552 is typical of many VDT regulation bills.

Its stated purpose is to require minimum occupational and health and safety standards for VDT operation; it would require that VDT operators be provided with adjustable chairs and tables, tilt screens, detachable keyboards, individual brightness and contrast controls, noise-reduction covers and metal shielding on the transformer of the VDT to block radiation.

The bill would also mandate rest breaks for workers, maximum exposure limits and free yearly eye exams provided to users by their employers. A pregnancy consideration clause requires employers to offer work alternatives at the same work site to pregnant VDT operators.

Cbema objects to proposed legislation like the Ohio bill because it "aids the notion that there's something unsafe about these machines, when there isn't," the Cbema spokeswoman said.

"We've looked at the radiation question, and we looked at the radiation literature that deals with pregnancy-related hazards, and as a responsible organization we just can't condone legislation that asks for alternate work for women during their pregnancy.

"It doesn't seem any more valid to us to say that terminals could be a possible cause of birth defects than it does to say light bulbs could be a possible cause of defects," the Cbema spokeswoman said.

Studies on the effects of VDT usage, such as those made by the National Institute for Occupational Safety and Health (Niosh) in 1981 and the Newspaper Guild in 1983, have acknowledged VDT-related health risks such as eye strain and muscle fatigue.

Studies examining radiation emissions and the effects of VDTs on pregnant operators are being done, but presently there is no conclusive scientific evidence linking VDTs to pregnancy problems.

A spokeswoman from the Printing Industry of America (PIA), which is part of a coalition of VDT users groups organized by Cbema to act against regulatory legislation, said PIA is opposed to legislation, not to the recommendations of Niosh, which include better ergonomically designed work areas.

"We're concerned that employees are encouraged to become more fearful of the equipment by the scare stories being told. The unions are using it as an organizing tool, so one has to keep it in mind that there's politics going on and not just a concern for the employees on the part of the promoters of that legislation," the PIA spokeswoman said.

EtherSeries" right into our IBM Information Center and can now share disks and printers."
— Dennis Vohs, Executive Vice President, MSA (Atlanta, Georgia)

"We wanted the expandability of 3Com's Ethernet as a base for our networked products. VisiSeries" for EtherSeries" is the beginning of a family which will include VisiOn.""
— Dan Fylstra, Chairman, VisiCorp (San Jose, California)

What EtherSeries will do for you.

Tying into 3Com EtherSeries was a smart business move for these PC software experts. And it can be for you too. You'll maximize office efficiency, now. Cut operating costs, now. And you'll realize the full potential of your IBM PCs using software that is readily available off-the-shelf, now. All for the low price of $950 per link.

And until January 31, 1984, we'll give you our award-winning EtherMail — a $750 value — with the purchase of EtherSeries and three PC links.

EtherSeries is available at leading computer stores. Call or write Cory Randell at 3Com for more details.

☐ Please have your 3Com representative call.
☐ Please send me more information.
CW 2/27/84

Name
Title
Company
Division
Address
City/State/Zip
Phone

3Com Corporation, 1365 Shorebird Way, P.O. Box 7390, Mountain View, CA 94039. Phone (415) 961-9602.

3Com is EtherNet.

"Ethernet" is a registered trademark of Xerox Corp. "3Com" is a registered trademark of 3Com Corporation. "EtherSeries" and "VisiOn" are trademarks of VisiCorp.

Voice/data problems seen growing

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — Incompatibility and downtime, familiar problems to computer users, are posing an increasing threat to voice/data telecommunications users, consultant Howard Frank said here last week. And he indicated that the problems arising in the wake of AT&T's recent divestiture are going to get worse, possibly much worse.

Frank, who is president of Contel Information Systems, Inc. and an authority on the design and implementation of communications networks, told a conference sponsored by the Institute of Electrical and Electronics Engineers (IEEE) that the growing difficulty of obtaining reliable telecommunications service is due partly to vendors. Because of the growing integration of data processing and communications, vendors expert in one of these fields are now trying to sell functions from the other, but in many cases haven't yet "built up sufficient skills or reliable product lines.

"Office automation vendors add further uncertainty and instability as they extend their product lines to contain both DP and communications features," he said.

Another reason telecommunication services are becoming less reliable and more expensive, Frank said, is that user companies have underpaid and "under-resourced" their communications departments. This is ironic in a way, he indicated, because of "the competitive opportunities arising from enhanced communications. For example, a recent advertisement by a major bank emphasized its worldwide communications network as its major point of superiority over competitors."

The trend toward common data processing and communications technology will "inevitably" require the merger of the related departments, Frank added. Although this merger is beginning to take place, it is frequently "accompanied by destructive corporate power struggles."

Keeping telecommunications operations from becoming gridlocked will require better-trained systems managers and administrators, Frank said. Universities are not providing such people, he maintained, and the short courses offered by private organizations to those already on the job are —with some exceptions — "abominable."

Better education

Frank's answer to all of these problems starts with better education. Network users and component suppliers must fund university-based courses tailored to the current need, he said.

These are long-term remedies, Frank said, adding that the immediate problem is to "survive the next few years," especially the uncertainties created by AT&T's divestiture and the related tariff changes.

To reduce that problem, Frank advised Congress to adopt a hands-off approach toward "the post-divestiture environment."

ICA seeks deferral of AT&T CPE rate hike

WASHINGTON, D.C. — The pending increases in AT&T lease prices for installed terminals should be deferred, the International Communications Association (ICA) told the Federal Communications Commission last week.

The reason: AT&T has failed to comply with an FCC order issued last December that requires AT&T Information Systems, Inc., AT&T's terminal marketing subsidiary, to lease installed (embedded) terminals known as customer premises equipment (CPE) at specified rates for two years after offering them for sale [CW, Dec. 5]. The ICA, whose members include most of the nation's largest companies, told the FCC that:

■ AT&T has announced that the "lease price predictability program" will begin, with an increase in present rates, on March 1 this year and run until Jan. 1, 1986. The FCC order called for a 24-month program.

■ The FCC order specified that during the 24-month program, AT&T would be allowed to raise its lease rates in three steps spaced eight months apart. AT&T's notice to customers said the "maximum lease price will be achieved on July 1, 1985, a full six months before the end of the two-year transition period," according to ICA.

■ A survey of ICA members showed AT&T Information Systems has failed to give its embedded CPE customers "firm sales quotes in writing." Under the FCC's December order, this information must be available before the 24-month price predictability program can begin.

Commenting on the ICA action, an AT&T spokesman said the FCC ruling allows the price predictability program to begin "when the company has notified all affected customers in writing that we have initiated a sales program." AT&T Information Systems sent out those notifications in December, so it believes that establishing Jan. 1, 1984 as the starting date complies with the FCC order.

SAVE MONEY ON TALK FASTER.

THE CODEX 224 DIAL MODEM.

FCC rejects tariffs filed by local carriers

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — The Federal Communications Commission has rejected the charges for accessing long-distance, private-line and dial-up services that were proposed by most of the nation's local telephone companies last October. The FCC action raised the possibility that the current, generally lower rates for all long-distance, inter-Lata (Local Access and Transport Area) communications services will continue beyond April 3, the date they are scheduled to end.

The tariffs rejected by the FCC on Feb. 16 specified the carriers' proposed charges for circuits connecting subscribers to inter-Lata MTS, Wats and private-line circuits.

The rates reflected the FCC's previously adopted access charge plan, under which the costs of local telephone service were redistributed.

Raised prices

As a result of this redistribution, the former Bell operating companies and other local telephone companies, according to the commission, have raised their prices for some services by 800%.

"The magnitude of the increases makes it clear that the telephone companies are proposing to change radically the manner in which local private lines are priced and provided," the FCC said in its rejection order.

The commission added that "the present filing provides virtually no information on these matters."

The carriers must resubmit their tariffs, together with adequate justification, by March 15. However, this deadline may not allow them enough time.

A related problem is that the commission staff will have only about two weeks after March 15 to review the submitted material — which is bound to be voluminous — and make recommendations to the commission.

A further complication involves AT&T, which also submitted a tariff to the commission last October embodying the new access charge plan. Like the local carriers' proposed rates, those filed by AT&T are presently scheduled to become effective April 3.

AT&T's pending tariff includes a "total service" option, under which the company combines its own facilities with connections obtained from local carriers and charges the end user a consolidated price.

Since the price for each total-service option cannot be determined until the local carriers' charges for their facilities are in place, AT&T probably will be unable to submit its final rates to the commission until after March 15.

AT&T's Brown attacks order issued by FCC

The same day the Federal Communications Commission rejected the tariffs filed by local telephone companies, AT&T attacked the changes recently incorporated into the commission's access charge plan.

The FCC order "will drive our interstate earnings to levels which are about half of those authorized for the nationwide interstate long-distance business," AT&T's Chairman Charles L. Brown said.

Brown's statement is believed to presage a substantial cutback of the savings AT&T promised early last month [CW, Jan. 16].

The specific charges probably will be disclosed next month, when AT&T is likely to file revised rates for long-distance, inter-Lata (Local Access and Transport Area) MTS, Wats and private-line services that embody the latest version of the commission's access charge plan.

October filing: 15.3% increase

In its October filing, AT&T proposed a 15.3% increase overall in private-line rates and a 10.5% decrease in MTS and Wats.

Last month, the company said the increase could be less and the decreases greater if the FCC stuck with the original version of its access charge plan, in particular, a $2/mo surcharge on residential users beginning April 3.

However, a short time later, the commission, responding to pressure from the U.S. Congress, deferred that surcharge until next year, along with a similar fee imposed on single-line business users.

In his recent attack on the FCC decision, Brown said that as a result of the residential surcharge deferral, "two billion dollars in additional expenses has been loaded on AT&T Communications. . . . It is important to understand that AT&T is no longer a huge monopoly which can offset such blows as this with earnings from other jurisdictions."

YOUR PHONE BILL.

If you're running 212 modems in a dial-up network, Codex has a new product that can significantly reduce your phone bills.

It's the Codex 224 modem.

At 1200 bits per second, the Codex 224 is fully compatible with Bell's 212 modem. But because the Codex 224 also runs at 2400 bits per second you can transfer more data faster and therein lies the economy.

You can run at 2400 bps full duplex asynchronous or synchronous over public telephone lines, even unattended. And because the Codex 224 incorporates advanced equalizers you're assured of high performance at higher speeds even over marginal lines. In addition, the Codex 224 automatically recognizes 1200 or 2400 bps transmissions and adjusts automatically.

And with faster file transfer and screen fills, people in the network will be able to get more done in the same time.

What all this means is that you can get better productivity and significant savings in your 212 network simply by installing Codex 224 modems.

The Codex 224, which meets the CCITT international standard, can be leased directly from Codex or purchased outright.

In short, you don't have to make a massive investment to run a better, faster, more economical network.

All you have to do is call Codex.

Call 1-800-821-7700 Ext. 895. Or write: Codex Corporation, Dept. 707-95, 20 Cabot Blvd., Mansfield, MA 02048.

codex

MOTOROLA INC.

© 1983 Codex Corporation.

SEE US AT INTERFACE, LAS VEGAS, MARCH 12-15, BOOTH #736.

NEWS

AT&T to offer shared multitenant services

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — AT&T's unregulated subsidiary announced plans early this month to offer "intelligent building services" that would provide tenants of office buildings with access to long-distance private-line services and sophisticated private branch exchange services.

Landlords of office buildings in major cities have begun offering such services in recent years at prices considerably below what the tenants could obtain on their own. AT&T Information Systems, Inc., the unregulated AT&T subsidiary, wants to contract with the landlords to provide the supporting facilities.

With communication rates spiraling upward, these "shared, multitenant communication services" are likely to become considerably more popular, since they offer a way of canceling or at least sharply reducing the higher charges.

AT&T Information Systems has agreed in principle with United Technologies Corp. to form a joint-venture company that would provide shared, multitenant services. If the proposed marriage between AT&T and United Technologies is consummated, it will almost certainly make the whole idea of these services more credible to office building landlords and their tenants, besides creating a supplier with the resources needed to launch a major marketing effort.

However, because of the Federal Communications Commission's Second Computer Inquiry decision, AT&T Information Systems cannot offer most private-line services. They are classified as "basic" services and thus have to be provided under tariff by regulated common carriers such as AT&T Communications.

AT&T Information Systems recently asked the FCC to waive this provision of Computer Decision II, indicating that, otherwise, the proposed joint venture would come unstuck, and "several near-term venture projects" would have to be abandoned.

However, the proposal to amend Computer Decision II has evoked opposition from several parties, and they are believed likely to feel the same about the waiver.

One opponent is the Independent Data Communications Manufacturers Association which, in a recent comment that it made to the FCC, said that allowing AT&T Information Systems to resell services would enable AT&T to turn over to its subsidiary "the most advanced and lucrative portions of the transmission business."

ANNOUNCING

FLASHER

★ ENHANCES OUTPUT RETRIEVAL USING SPF/ISPF
★ MENU SELECTION TO VIEW, DELETE, AND REQUEUE JOBS ON JES SPOOL
★ USES SPF/ISPF BROWSE DIRECTLY AGAINST JOBS IN JES SPOOL
★ 10 – 20 TIMES FASTER RETRIEVAL THAN SPF 3.8
★ WORKS WITH HELD OR NON – HELD DATASETS
★ ALLOWS DISPLAY OF SYSLOG
★ IBM MVS OR MVS/XA WITH JES2 OR JES3
★ FULLY SUPPORTED

SPECIAL PRICES IN EFFECT
FREE 30 DAY TRIAL
JES 2 FPL $2500.
12 MONTH LEASE $99/MO
JES 3 FPL $5500.
12 MONTH LEASE $199/MO

TONE
SoftwareCorp.

1735 S. Brookhurst
Anaheim, CA 92804
(714) 991-9460
Telex 181592

Suit accuses MCI of billing unfinished calls

By John Dix
CW Staff

CHICAGO — Users of long-distance telephone services provided by MCI Communications Corp. should be on the lookout for phantom phone charges.

In a class-action suit recently filed here against MCI, Certified Collateral Corp. alleged that MCI sometimes charges its customers for calls which are not completed. This is done "deliberately, knowingly and with the intention to deceitfully and fraudulently obtain moneys" to which it is not entitled, Certified Collateral claims in its suit. According to Certified Collateral, this fact is not disclosed in MCI's filings with the Federal Communications Commission nor in the company's residential and commercial rate schedules.

Additionally, Certified Collateral alleges that "these improper charges were reversed by the defendant only if discovered by the customer and reported to the defendant."

An MCI spokesman said that a booklet for new installations provides a number to call for questions regarding bills and that any inappropriate charges are reversed. While the company agrees that the overbillings can occur, the spokesman said that the regional telephone holding companies do not provide MCI with the "answer supervision" function that AT&T Communications enjoys.

Without this feature, which enables a carrier to know when a call is completed, MCI has had to adopt a billing system whereby its computers monitor the noise on a line to distinguish between ringing sounds, busy signals and conversation. "This system isn't perfect," the MCI spokesman said, and can result in some calls being billed that are not completed.

This system is also at fault, he added, for Certified Collateral's allegation that calls which ring six or more times before they are answered may incur a charge of a "minute or more in addition to any actual communications."

How To Implement The Best New PC Decision Support Software With A Pair Of Scissors.

YES. Tell me more about The New Context MBA and The Corporate MBA.
☐ Have a Context representative call me.

Name _____

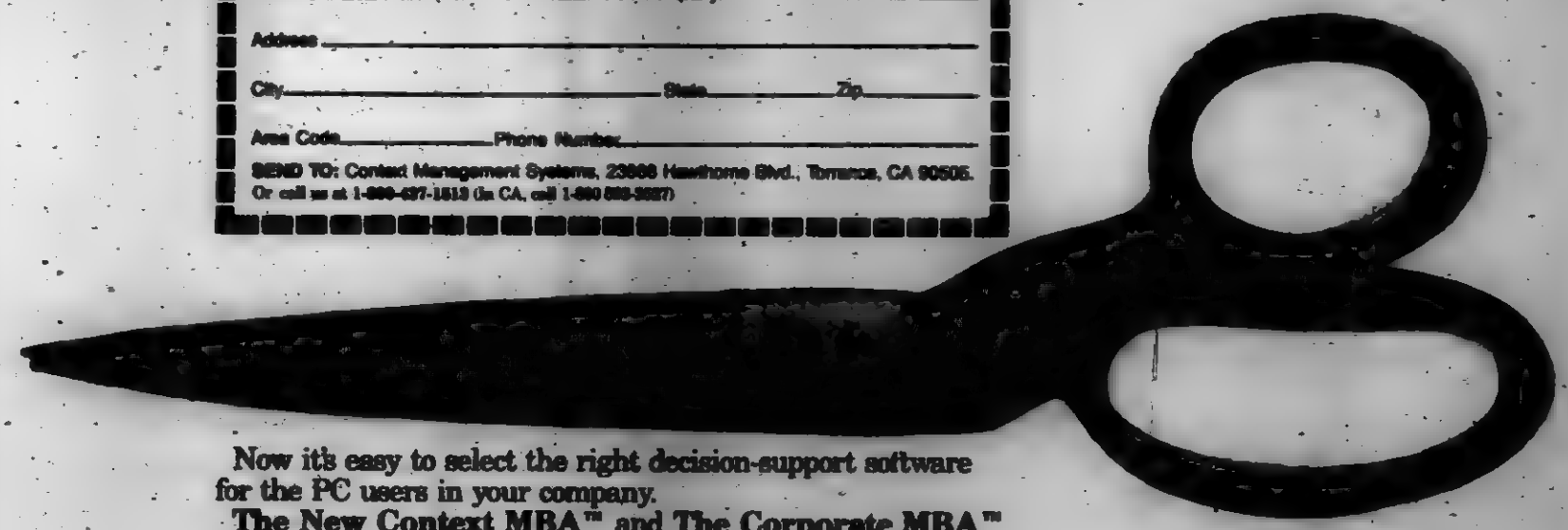
Title _____ Company _____

Address _____

City _____ State _____ Zip _____

Area Code _____ Phone Number _____

SEND TO: Context Management Systems, 23868 Hawthorne Blvd., Torrance, CA 90505.
Or call us at 1-800-637-1512 (In CA, call 1-800 [illegible])



Now it's easy to select the right decision-support software for the PC users in your company.

The New Context MBA™ and **The Corporate MBA™** both have all the functions PC users in your company need: Spreadsheet, Business Graphics, Database, Word Processing, Telecommunications, and Forms Creation.

They're all *integrated* in one software package. With advantages that'll make your life a whole lot easier.

Like full 3270 emulation. So *you* can connect their PCs to your Data Center network. For immediate, yet controlled, access to decision data. No more hand-holding or custom programming.

PC users in your company get the decision-support capability they need from a single, easy-to-learn package. And you get an easy way to plug one PC software package into the entire company.

Our **Context 500™** support team builds a custom training and ongoing support program for your company, so *you* don't have to.

Now *your* job of supporting *our* software is as easy as picking up the phone.

So make it easy on yourself. Cut out, fill in, and send us this coupon. And cut out a lot of heartburn over which of many PC software packages to choose.

Now where did you put those scissors?

Context
MANAGEMENT SYSTEMS
Personal Computer Software For Business Decisions.

The New Context MBA, The Corporate MBA, True Data Integration, Data Exchange Facility and Context 500 are trademarks of Context Management Systems, Inc.
©Context Management Systems, Inc. 1984.

HOTSITE, the dedicated IBM 4300 facility, gives you a disaster recovery back-up option that's five ways better.

It doesn't take much to put your computer out of business. But when it's backed up by HOTSITE, you'll be back in business - fast. Dedicated to disaster recovery, HOTSITE provides a far better option than an "empty shell," a reciprocal agreement or a duplicate site. It even has advantages over other dedicated facilities.

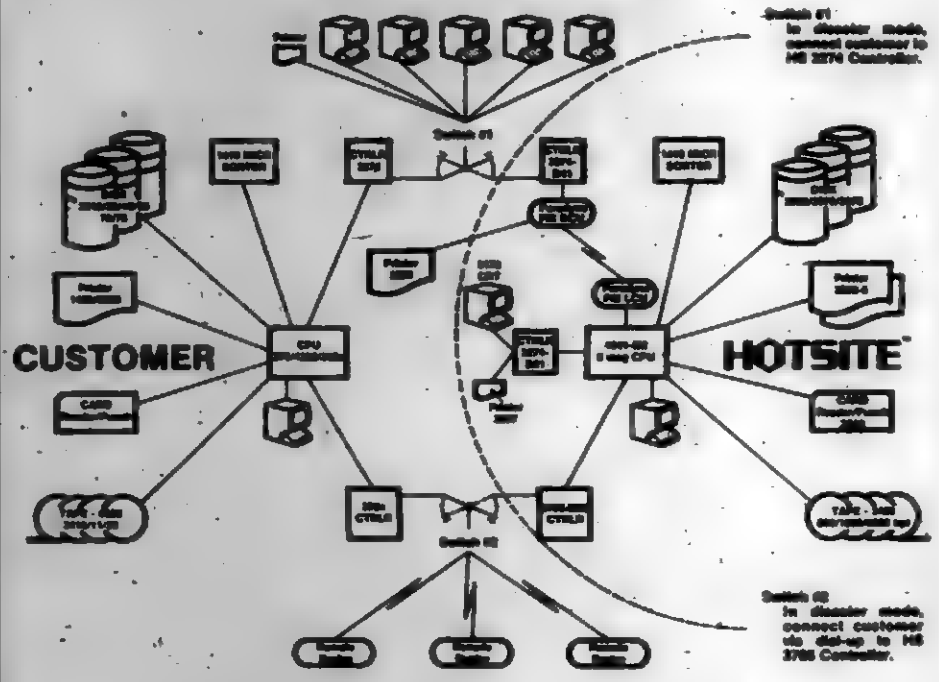
HOTSITE

- supports you with an IBM 4341-2 system and total communication equipment.
- insists that you test the system on a regular basis according to your needs.
- protects you with a state-of-the-art security system.
- assists you with comprehensive technical support.
- saves you money with flexible pricing.

You haven't explored your disaster recovery options until you've talked to our representative. Please use the attached coupon to contact us, or call (216) 652-9624.

HOTSITE
A DIVISION OF FMA COMPANY
1999 Warren Avenue
Niles, OH 44446

THE HOTSITE BACK-UP SCHEME



Complete and mail to: HOTSITE, 1999 Warren Avenue, Niles, OH 44446.

Yes, tell me more about HOTSITE, the fully-equipped IBM 4300 facility dedicated to disaster recovery!

☐ Please have a representative call. ☐ Please send a HOTSITE brochure.

Name _____ Title _____

Company _____

Address _____

City _____ State _____ Zip _____

Phone _____

Bank MIS chiefs talk about merger planning

By Paul Kerstenbaum
CW Staff

When companies merge, "the key to integrating data processing departments is to make the transition transparent to customers and employees," said Arthur Johnson, vice-president of the Automated Systems Development department at the Shawmut Bank of Boston. "Terminal operators and customers should be able to access data without having to stipulate which bank produced it."

Johnson speaks from experience. His bank last year bought Worcester (Mass.) County National Bank. Both Johnson and Truman Hester, another veteran of a bank merger, estimated that it will take two or three years before data processing activities are fully integrated.

Hester is senior vice-president of Sovereign National Bank, created last year by the merger of Virginia National Bank in Norfolk, Va., and First National Bank in Richmond. "The two banks' operations and data processing departments began working together eight months before the merger took place," Hester noted. "We wanted the departments to be familiar with one another, and we had to integrate the two personnel systems.

"On the day the merger was signed, one personnel and human resource system was used at both banks." After the personnel system was implemented, "we prioritized our applications and began integrating the most important applications first."

In both the Massachusetts and Virginia mergers, automated teller machines (ATM) were the first application to be integrated. "At first, each bank's ATM application ran independently," Hester said. "Communication hardware allowed us to tie the two systems together so a customer could complete a transaction at either bank. Today, a central data base holds customer information for the ATM system. We plan to use the data base when we integrate other applications."

Currently, most Sovereign applications run independently at both data processing centers. "We would like to design a system so that one mainframe processes applications and the other could be used for batch and emergency processing," he said.

Shawmut took a different approach. "We are evaluating each bank's version of an application," Johnson said. "When we determine which version meets our needs, we will use that version and continue to run it at its present location. When we have completed this process, both mainframes will probably process the same number of applications."

IBM mainframes

The conversion process in both mergers has been aided by the fact that all the banks use IBM mainframes. "Since both data processing departments used IBM's [Systems Network Architecture], we were able to develop communication capabilities quickly," Hester said.

Data conversion required more effort. "No two data file formats were the same," Johnson said. "We didn't encounter many major conversion problems, but it did require a great deal of work."

While a chief benefit of a merger should be reduced operating costs, "Since the merger, we haven't eliminated any positions," Hester said. "We expect that our staffing level will remain constant throughout the integration process." But, he added, "As we fully integrate applications, staff may be reduced. We don't plan on laying any employees off; any staff cuts will come through attrition."

Software AG slates April users conference

ANAHEIM, Calif. — Software AG of North America, Inc. will hold its 13th Annual International Users Conference here at the Disneyland Hotel and Convention Center April 29-May 3.

John Naisbitt, chairman of the Naisbitt Group, author of *Megatrends: Ten New Directions Transforming Our Lives* and publisher of "The Trend Report," will deliver the keynote address.

The conference will feature guest speakers, user presentations, workshops and education classes for all levels of the company's users.

Some of the classes being planned include "Adabas Physical File Design" and "Natural Security."

Registration is $595. Further information is available from Software AG, 11800 Sunrise Valley Drive, Reston, Va. 22091.

How 3 famous names got together to

SOLVE YOUR PROBLEMS OF INTELLIGENT MICRO TO MAINFRAME CONNECTION.

Get the answers you're looking for—with the VisiAnswer Software System from Informatics, the leader in mainframe to micro integration.

Informatics has teamed the best minds in the business to solve the problems of intelligent mainframe data access for microcomputer users. The VisiAnswer™ Software System is the breakthrough result of a unique team involving Informatics Corporate Micro Systems and VisiCorp™ products working with IBM® Personal Computers.

VisiAnswer solves the timely problems plaguing data processing professionals like you.

Available for use right now, the VisiAnswer Software System is the micro to mainframe system specifically designed to help you:

- Manage *and* control the integration of microcomputers with your current mainframe—right in *your* data processing department.
- Provide your company's micro end-users with access to specific mainframe data—without wading through unrelated information for hours.
- Maintain *security*/control of restricted portions of your corporation's data.
- Supply end-users access to *current "live" information*, instead of information that's historical and obsolete.
- Intelligently access *all* mainframe data, whether it's unique application data or part of a data base management system.

VisiAnswer makes your job easier and more efficient than ever.

With more and more managers and analysts in your company using desk-top computers these days, there's a tendency to improvise the way they obtain the data they need. That leaves the door wide open for mistakes and inaccurate information.

Now you can avoid these problems and maintain a high level of data processing efficiency for everyone who needs access to that data with the VisiAnswer Software System. It delivers intelligent solutions that make current mainframe data available to your end-users in an orderly fashion. That makes their jobs *and yours* easier and more accurate—something upper management will appreciate.

VisiAnswer was designed by the best minds in the business to fit your business.

You get Informatics' expertise in data access technology and mainframe system software...plus VisiCorp's expertise in user-friendly micro software. We chose the IBM Personal Computer for its leadership in delivering business solutions, and IBM chose us as a value-added remarketer.

This system works with *all* data bases on IBM mainframe systems. And your end-users will get data that is immediately usable with all Visi Series™ Products and other products utilizing the VisiCalc® file format.

Find out more about Informatics VisiAnswer system. Mail this coupon or call toll free today. See how VisiAnswer products can fit into your Personal Information Center as an integral part of your unique business strategy.

Get the facts on VisiAnswer—
the intelligent micro to mainframe connection.

Mail this coupon today or call toll free

1 800 227-3800 Ext. 911

(In Canada, call collect, 0 416 488-7192)

Informatics general corporation

THE SOFTWARE ENGINEERS

VisiCalc is a U.S. Registered Trademark of VisiCorp.
U.S. Registered Trademark applications pending for VisiCorp, VisiPlanner and VisiAnswer.

VisiAnswer Information Coupon

Mail to: Informatics, Free VisiAnswer Information,
P.O. Box 1452, Canoga Park, California 91304

I want to know how the VisiAnswer Software System can provide intelligent solutions to my micro to mainframe problems.

☐ I'd like to see the VisiAnswer Software System at work. Please contact me to arrange a free, no-obligation VisiAnswer demonstration.

☐ I'd like more information on your VisiAnswer Product. Please see that I get the full details, without cost or obligation.

Your Name _____ Title _____

Company Name _____ Phone No. (include area code) _____

Address _____

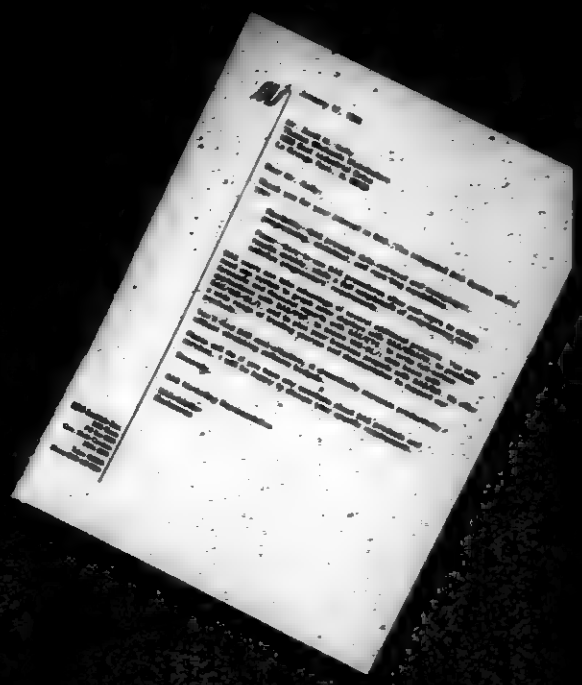
City _____ State _____ Zip _____ CW-46

BA

SAS...
Power and Flex
to Meet All You

Available
for
IBM, DG ECLIPSE
and DEC VAX

ibility
r Needs



'Collector' of DP programs gets probation

AKRON, Ohio — Apparently "just a collector," a DP consultant reportedly accumulated copies of tire company computer programs that cost more than $100,000 to develop.

It was only by chance that officials found the manufacturing and utility programs that Alfred C. Buxton Jr. of Akron had stored in his desk at General Tires, Inc. and in an apartment where he kept a minicomputer, according to a prosecutor.

Buxton was placed on probation after he pleaded guilty to a conversion of trade secrets charge relating to his copying printouts as he translated a program for The Goodyear Tire and Rubber Co., where he worked as a consultant in the late 1970s.

That program, according to Summit County Assistant Prosecutor Richard Dobbins, was a tire curing process program that cost Goodyear more than $30,000 to develop and was worth as much as $1.5 million to Goodyear's competitors.

Buxton allegedly left that program in a loose-leaf binder in his desk at General Tires when he quit a programming job there last year. A coworker found it by accident and reported it to General Tires' legal department. "We never would have known otherwise," Dobbins noted.

A police search uncovered three General Tires programs in one of two Akron apartments that Buxton kept. According to Dobbins, Buxton fed at least one of those programs to his Lobo Drives International small business computer's disks via telephone hookups at General Tires. Two of those reportedly were program development systems, while a third was a program designed to run industrial equipment manufactured by Akron Standard Mold Co., the company where Buxton worked when finally charged with conversion of trade secrets, possession of stolen goods and possessing criminal tools (the computer) last November. The remaining charges were dropped when he pleaded guilty to the conversion of trade secrets charge.

"It originally looked like he was selling them. But we became convinced that he didn't. He was just a collector keeping this stuff around for his own use," Dobbins said.

Buxton, who passed a polygraph examination, maintained he was only a collector and had what turned out to be improper permission from tire company officials to take programs home to work on at night, Dobbins noted.

CONDOR
on-line programming that reaches new heights in productivity

To get the most from your IBM mainframe, you need CONDOR – a reliable, easy-to-use, high-performance system that soars above the rest through improved programmer productivity and low resource consumption. CONDOR's highly efficient processing methods and I/O facility improve system response time and can substantially expand the capacity of your CPU while minimizing personnel requirements.

You can write and edit programs with CONDOR and submit them for compile or execution. You can view and modify data from input and output queues, release or cancel jobs, and spool output to local and remote printers.

CONDOR's built-in library management system automatically reorganizes as you process for optimum conservation of disk space. In addition to offering stringent security against unauthorized access and supporting multiple versions, it provides detailed audit reports and program cross-referencing – both batch and on-line.

Boosting productivity even more, CONDOR's own high-level interactive programming language lets you create programs and JCL in a fraction of the time required with other languages. And a powerful set of interactive utilities makes system maintenance a breeze.

CONDOR operates standalone or as a task under CICS and the other major TP monitors to give you total flexibility, and it supports DOS/VS(E) and MVS operating systems for versatility and upgrading capabilities.

No wonder respondents to a recent Datapro survey rated CONDOR tops in reliability, efficiency, ease of use, ease of installation, support, and realized financial savings.

So for a system that out-performs the others and gives you complete control of all your data processing, choose CONDOR. Call for a free trial. You'll be glad you made the right choice.

For more information contact Phoenix Computer Corporation, 11949 Jefferson Boulevard, Culver City, California 90230. Toll-free (800) 255-5049 or (213) 827-4500 in California.

CONDOR

Data erasure at weapons firm investigated

By Patricia Keefe
CW Staff

OAK RIDGE, Tenn. — A seemingly minor incident in the eyes of DP employees at the Y-12 nuclear weapons parts plant here has come under the spotlight as a result of a federal government investigation into allegations of missing uranium at the facility.

The discovery last June of what plant officials said is the accidental erasure of data — for which backup reportedly exists — from 27 computer tapes was revealed during a hearing held Feb. 6 by the U.S. House of Representatives' Armed Services Committee's Subcommittee on Investigation. Also investigating at the request of Joe LaGronde, the manager of operations at the plant, is the U.S. Department of Energy (DOE), which contracts with Y-12.

The investigations were initiated after a series of stories appeared in the *Knoxville News-Sentinel* of Tennessee, concerning alleged uranium inventory discrepancies at the plant. The stories focused specifically on the whereabouts of 1,710 pounds of uranium.

A reporter for the *News-Sentinel* said plant officials told DOE about the tapes only after his inquiry about them the day before. Since the tapes contained uranium accountability inventories, there was some speculation that the tapes might have been deliberately erased as part of a cover-up concerning the missing uranium.

George Jansy, vice-president of engineering and computer science at Union Carbide Corp., which operates the Y-12 plant, dismissed those allegations, saying that backup in the form of printouts, microfiche and files exists for the data that was erased.

"You have to understand that [the tape erasures] were uncovered last June during a routine housekeeping process, and the people involved considered it a purely internal matter," Jansy said.

A spokesman for the Subcommittee on Investigations said the subcommittee was satisfied with Y-12 officials' responses to the charges.

Introducing APS/IMS

40% Improvement in Productivity Without the "Black Box."

Introducing APS/IMS—the only application productivity system designed specifically to meet the complex needs of the IMS Development Center.

Looking For Productivity Tools?

If you're an IMS user and looking at productivity improving tools, be careful. Most products on the market today have taken a "black box" generator approach to productivity improvement. You may be looking at one right now. While these tools can be fine for putting up simple things fast in a low-volume environment, they fall apart when subjected to the complex application, performance and maintenance issues of the IMS world.

Introducing APS/IMS— The Source-Based, Layered Solution

APS/IMS is the application productivity system that, for the first time, offers a strategic solution for the IMS Development Center. Unlike "black box" productivity tools, APS/IMS offers a source-based, layered solution for IMS users.

Source-based means that APS is engineered to be compatible with your existing source-level interfaces and requires no run-time overhead. With APS, you don't have to adopt a new language or a new design methodology.

The five APS components are housed in a layered architecture. The APS layered approach uniquely addresses the different technical skill levels within your organization as well as the broad range of application development and maintenance requirements you face:

- **Screen Painter**—engineered for end-users, designers and programmers. Using the painter, designers can interactively define screens at their 3270 or PC workstations. After screens are painted, APS will generate MFS, BMS, working storage and hard copy documentation.
- **Command Level Support System**—designed for COBOL programmers and requires no IMS knowledge. Through the use of powerful DB and DC Command Sets in a Structured COBOL programming environment, this facility allows programmers with no IMS experience to write comprehensive batch, DB and online applications.
- **Macro Level Interface**—leverages the skills of senior programmers and analysts who know IMS. This subsystem provides a macro language that enables senior technicians to extend, modify and control the Command Level environment. This additional productivity layer allows senior technicians to control systems performance and integrity without being forced to "exit" to the native IMS level.
- **Data Description Interface**—reads your existing IMS data base descriptions (whether or not you use a dictionary) and automatically provides information about the data base structure to APS/IMS.
- **APS Precompiler**—combines the outputs of the other APS components and generates native COBOL, IMS source. The APS Precompiler traps coding errors, validates IMS calls and adds no run-time overhead.

Increases Productivity By 40%

The productivity gains of these five components benefit every phase of the application life cycle—from initial design through maintenance programming.

Because of the APS layered architecture, you choose the productivity and performance ratios you need based on the specific application requirements at hand. No other product offers you this degree of control.

To date, APS users are reporting design, coding and test savings of 25% to 40% over traditional methods—with savings of 50% during the maintenance phase.

Call Today For More Information

APS/IMS can begin immediately to address your IMS Development Center requirements without forcing you to sacrifice the control and flexibility you need. With APS/IMS, there is no "black box" and there are no traps.

If you think the other productivity systems you've looked at compare to APS/IMS, look again. Before it's too late.

Call now for more information. If timing is critical, ask about the *FAST TRACK* evaluation process. We'll be happy to show you how APS/IMS can address your IMS productivity needs.

YES, I am interested in APS/IMS.
☐ Tell me about the *FAST TRACK* evaluation.
☐ Contact me for a product presentation.
☐ Please send me more information.

Name _____

Title _____

Organization _____

Address _____

City _____ *State* _____

Phone _____ *Zip* _____

SAGE SYSTEMS INC.

3200 Monroe Street • Rockville, MD 20852 • 301/231-8686

Call 800/638-8703 Today

APS is available for users of IMS DB/DC; CICS, DL/I;CICS/IDMS; and CICS/VSAM. APS operates under TSO, CMS and CICS, or on the IBM PC in a programmer workstation mode.

NEWS

French town to try out medical smart card

By Susan Shirmacy
CW Staff

BLOIS, France — Imagine walking around with your entire medical history — records of every doctor visit, prescription and treatment you ever had — in your back pocket.

This is exactly what people here will be doing, thanks to smart card technology. Smart cards resemble credit cards, but in addition to a magnetic signature band, they contain an embedded programmable microprocessor equipped with logic and memory. Originally developed by Honeywell Bull SA for retail and banking applications, they are now breaking new ground with the medical application.

That $3 million government-funded project was devised by Intelmatique, a coalition of 40 independent information companies (including Honeywell Bull) and the French government. According to Roy Bright, managing director and chief executive officer of Intelmatique, it will encompass three separate pilot programs using the chip-on-a-card technology.

Distributed to school children

The first program in the project will be launched early this year with the school children of Blois, a small city southwest of Paris. Minister for Social Affairs Pierre Beregovy said the smart cards will be distributed in the school system to maintain individual vaccination records.

To support the program, card readers will be issued to all schools and physicians in the region. A card reader can display and update a card holder's entire permanent file.

"Ultimately, we hope that an individual health card could be created for every member of the population," Beregovy said. "This would lead to improved health care by reducing delays in treatment, eliminating duplicate medical tests and ensuring correct emergency care."

The two other medical applications slated for implementation later this year involve patients requiring frequent hospital treatment — both the chronically ill and outpatient cases, such as people undergoing dialysis, Beregovy said.

"These applications will greatly facilitate the appointment and treatment process," Beregovy maintained. "At the same time, these patients, if they move, will not have to face repetitious and expensive medical examinations" each time they relocate. The automated procedures will also simplify and streamline the clerical and recording processes in hospital administration routines, Beregovy added.

To ensure that privacy is maintained in the use of the smart cards, all medical applications will be supervised by the National Commission for Computer Technologies and Civil Liberties, Beregovy noted. Furthermore, the cards feature built-in security devices that make them especially well suited to medical applications.

"Individual privacy is assured by the powerful but flexible security mechanism designed in the card," Intelmatique's Bright said. "It has three levels of security for data protection, ranging from 'open' to 'secret,' " he added. (Many retail and banking smart cards operate with identification codes; when a code is entered improperly or used fraudulently, the microprocessor in the card self-destructs.)

Bright predicted that the growing number and scope of applications for smart card implementations in France will create a wide interest and acceptance of the technology in a wide array of industries abroad.

So far, smart cards have been adopted by French university students as portable school records; they're being used to make direct-billing phone calls from special French phone booths; and to make direct-billing purchases at many of France's retail stores. Smart cards are also scheduled to become a part of the French pay-TV network.

FREE
IBM 34/36
Software

Simply call us
at (617) 283-3438
and we will send you
a free 30-day timed
diskette for word
processing or
financial modeling.

PARA RESEARCH
Dept. CB, 85 Eastern Avenue
Gloucester, MA 01930

NOW CCA'S
MODEL 204 DBMS
CAN DO SOMETHING
EVERY EXECUTIVE
CAN APPRECIATE.

NEWS

INTERNATIONAL REPORT

CW INTERNATIONAL NEWS NETWORK

AUSTRALIA

SYDNEY — Less than six months after signing an agreement to distribute its accounting software through Wang Computer Pty. Ltd., Attache Software has struck distribution deals with Wang's parent company in the U.S. and completed negotiations with three other major microcomputer vendors in Australia. The most significant of the local deals is a $1 million pact with IBM Australia Ltd.

■

CANBERRA — Agridata Resources, Inc.'s Agridata Network has been chosen as Australia's national agricultural information network. Slated to be introduced this summer, Agridata Network is said to be the first U.S. on-line electronic information system adopted for widespread use in Australia, where the British Prestel system is dominant.

■

HAWTHORN — IBM Australia Ltd. has donated an IBM 4341 mainframe and associated peripherals, valued at approximately $1 million, to the Swinburne Institute of Technology here. Swinburne will establish a computer-aided design and manufacturing center for teaching and research applications.

BRAZIL

RIO DE JANEIRO — Brazil's Special Department of Informatics has initially qualified eight Brazilian companies to produce superminis. Three of the companies (Cobra, Sid and Labo) will rely on domestically produced technology. The remaining five (Bradesco, Sisco, Itautec, Edisa and ABC-Sistemas) will import technology: Bradesco will buy from Digital Equipment Corp.; Sisco will import from IPL Systems, Inc.; Itautec will purchase Formation, Inc. equipment; Edisa will use Fujitsu Ltd. technology; and ABC-Sistemas, whose proposal for a joint venture with Hewlett-Packard Co. was rejected by the government, will import technology from CII-Honeywell Bull.

CHINA

BEIJING — In conjunction with China's Ministry of Machine Building, IBM sponsored an advanced computer course to familiarize some 30 Chinese government ministers with computer applications and also to establish a friendly IBM image in the People's Republic, a ministry spokesman said.

■

BEIJING — A software development center called the China Software Technical Corp. has been established here by China's Computer Industry Administration under the nation's Ministry of Electronic Industries (MEI). The center, one of several newly formed software groups, will coordinate the developmental efforts of all MEI's subordinate organizations.

■

BEIJING — In an attempt to modernize and increase economic efficiency, China is expected to import $1 billion worth of advanced technology in 1984. Last year, China's computer imports totaled $300 million, said Yuan Baohua, vice-minister of the State Economic Commission.

FRANCE

PARIS — After dissolving its joint-venture agreement with Datapoint Corp., Matra Informatique appears to be re-entering the minicomputer marketplace — this time with the Norwegian vendor Norsk Data A.S., which offers a range of minis for scientific, industrial and transactional applications. In order to establish a joint venture with Norsk, Matra must first get permission from the French Ministry of Industry.

JAPAN

TOKYO — Fujitsu Ltd. has announced plans to build a factory in the U.S. It is rumored that the proposed factory will be built in California to produce computer-related devices such as magnetic disks.

■

TOKYO — NEC Corp. claims to have created the world's first single-chip processor that is not a von Neumann-type system. The system was designed for image processing. First shipments of the NEC processor are slated for June.

WEST GERMANY

MUNICH — Industry watchers here predict IBM Germany GMBH will cut prices by up to 20% on its 3080 processors on March 1. The speculation comes in the wake of IBM's unofficial announcement of a new pricing strategy made to customers interested in buying new data processing equipment.

■

MUNICH — Siemens AG has unveiled its three-model 7.590 series of mid-range computers. The 7.590 processor is based on emitter-coupled logic technology with large-scale integrated circuits. A basic configuration with 300M bytes of disk storage and four display stations (plus the vendor's BS 2000 operating system) starts at approximately $107,000. First shipments are slated for early 1985.

TALK SENSE TO THE IBM PC.

Introducing PC/204, a link that lets PC users turn mainframe data into spreadsheets effortlessly.

PC/204, the newest productivity tool from Computer Corporation of America, is a powerful, efficient, easy-to-use software link between IBM personal computers and mainframes. It effectively answers the pressing problem of how to let corporate managers take full advantage of today's personal computers for making decisions, while also giving them access to the corporate database in a format they can use.

First, PC/204 guides PC users as they browse through the MODEL 204 database. Then it extracts the data they need and converts it into meaningful management information for spreadsheet analysis. Lotus 1-2-3 for example. And PC/204 does all that automatically. Without the PC user having to understand anything about mainframe technology.

If you aren't already using Lotus 1-2-3, we can supply it along with PC/204. Or you can use any current IBM PC business package.

While PC/204 is helping business managers, it's also helping MIS directors.

PC/204 uses the power and intelligence of the personal computer for increasing the overall efficiency of an application.

For one thing, it improves performance of the mainframe by offloading some of the processing to the PC, while reducing PC users' response time. It also makes communication between the PC and the mainframe more efficient.

What about security and control? PC/204 provides individual management views of the corporate database while still allowing PC users access to all the information they need.

PC/204 is the latest reason to get MODEL 204 DBMS which has been so highly rated for performance and programmer productivity.

For more information or to arrange for a demonstration of PC/204's capabilities, simply return the coupon or write to us on your letterhead.

Computer Corporation of America

CCA's Executive DBMS Seminar Schedule

February				April	
Boston	Feb. 16	Honolulu	Mar. 22	Albany	Apr. 26
Chicago	Feb. 23	Houston	Mar. 29	Anchorage	Apr. 12
Dallas	Feb. 21	Jacksonville	Mar. 13	Boston	Apr. 12
Denver	Feb. 14	Louisville	Mar. 6	Cleveland	Apr. 19
Ft. Lauderdale	Feb. 14	Minneapolis	Mar. 9	Dayton	Apr. 26
Los Angeles	Feb. 22	New York	Mar. 27	Little Rock	Apr. 5
Madison, WI	Feb. 15	Pittsburgh	Mar. 13	New Orleans	Apr. 5
Philadelphia	Feb. 28	Portland, OR	Mar. 29	Norfolk	Apr. 19
San Francisco	Feb. 23	Richmond	Mar. 20	Philadelphia	Apr. 3
Seattle	Feb. 86	Rochester	Mar. 22	Phoenix	Apr. 19
March		Saddle Brook, NJ	Mar. 6	Princeton	Apr. 10
Columbus, OH	Mar. 1	Salt Lake City	Mar. 7	Raleigh	Apr. 19
Detroit	Mar. 22	Tallahassee	Mar. 88	San Diego	Apr. 12
Hartford	Mar. 15	Tulsa	Mar. 1	St. Louis	Apr. 26
				Washington, D.C.	Apr. 4

Yes, please tell me more about: ( ) PC/204 ( ) MODEL 204 DBMS
( ) Send me a brochure.
( ) Send me info on free DBMS seminars, or call our seminar coordinator.

NAME _____ TITLE _____
COMPANY _____
ADDRESS _____
CITY _____
STATE _____ ZIP _____
TELEPHONE _____
Operating System: ( ) MVS ( ) DOS ( ) CMS ( ) Other: _____

Computer Corporation of America
Four Cambridge Center, Cambridge, MA 02142 (617) 492-8860

CW02/PC

NEWS

Supermini helps scientists 'read' language of DNA

By Peter Bartells
CW Staff

MADISON, Wis. — In science fiction writer Frank Herbert's latest novel, *White Plague*, an embittered scientist uses a computer to map human deoxyribonucleic acid (DNA) — the molecular building block of genes — and develop an almost unstoppable virus that kills all infected women.

A project at the University of Wisconsin at Madison's University-Industry Research Program here makes no claims to the potential for evil, or good, that could be wrought with the genetic engineering abilities foreseen by Herbert. But it is using a computer to enable scientists to "read" more easily the language of DNA.

"DNA sequences are the coding stuff for the software of life," explained John R. Devereux. With partner Paul Haberli, Devereux developed a program that runs on a Digital Equipment Corp. VAX-11/780 supermini under VMS and enables engineers to compare a DNA sequence against about 3,000 sequences stored in the computer's memory. "We are developing ways to look at that [DNA] so we can know what it is."

Fully understanding the codes contained in DNA and being able to manipulate those codes would open "overwhelming" possibilities, Devereux said in a recent interview with *Computerworld*. Scientists could determine if a DNA sequence in a particular strain of corn contains a particular amino acid that increases corn's feedstock value. Similarly, he said, a clinician trying to treat people with genetic diseases might be able to take a DNA sequence from a person, alter it slightly to conform to a normal pattern and reintroduce it into that person's body where, theoretically, it would "spread and correct the deficiency."

While the medical example is the alter ego of Herbert's doomsday disease, Devereux said the ethical considerations of such power will be determined by society. "Like any powerful technology, it opens up avenues for abuse," he said, adding that it's his belief "the levels of diabolicalness already established are so good" that there is little need for using genetic engineering to create new monsters.

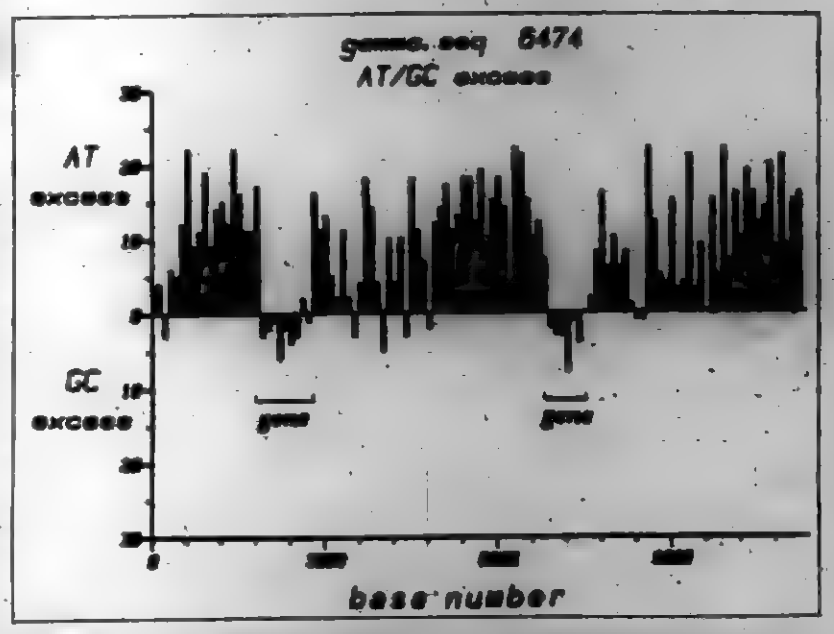
Devereux uses his program to compare new DNA sequences against those already stored in the computer memory. The computer sorts through its base of sequences to determine if the new sequence has any similarities or patterns to existing sequences. That may enable scientists to determine if the new sequence has similar functions to a known sequence or if it is unusual.

There are probably more than three million DNA sequences that have been identified and published, according to Devereux. His project has stored 3,000 sequences ranging from those in bacterial viruses to those of human blood genes.

DNA is found in the form of a helix-shaped staircase containing millions of steps. Each step is a pair of nucleotides, named a base, which may occur in either of two combinations: an adenine-thymine (A-T) pair or a cytosine-guanine (C-G) pair. A grouping of three pairs, called a codon, provides a code for one of 20 amino acids that form proteins. Identifying a sequence is a matter of reading those As, Ts, Gs and Cs.

An actual gene may be tucked away within a long strand of DNA, and Devereux's computer can pinpoint areas that are likely to contain genes. The computer can also indicate what areas on the DNA strand are vulnerable to the cutting action of specialized enzymes used by genetic engineers to pry out genes.

The sequences are read from patterns of dark bands exposed on X-ray film and are then input by keyboard.



On this bar graph of the AT and GC content of a human fetal DNA sequence, the genes for two different blood pigments are indicated by excesses of GC bases. The molecule is the most flexible where there is an excess of AT bases since this region is not transcribed into a protein.

Poll surveys large companies on their OA equipment requirements

By Lynn Haber
CW Staff

WELLESLEY, Mass. — Compatibility of office automation equipment becomes increasingly important to users as company size increases, according to a report recently published here.

Less than 10% of very large companies (those with annual revenues of $250 million or more) would forego compatibility to get the best equipment from the best individual vendors, they recently told Venture Development Corp. (VDC), which mass-mailed a survey to approximately 10,000 companies.

In contrast, 40% of those companies with $5 million to $20 million in annual revenues would be willing to sacrifice compatibility to get the best equipment from the best individual vendors.

Acquisition analysis

The results of the survey were published in a report titled "Office Automation Survey: Analysis of Acquisition and Use of Office and Communications Equipment."

The survey's response rate was approximately 7%; respondents included company presidents, communications managers, managers of systems and data processing, senior systems engineers, vice-presidents in marketing and finance, engineering and system applications engineers and systems analysts.

Large companies are also more concerned than smaller companies that future purchases mesh effectively with currently owned office equipment. According to the researchers, products are evaluated with an eye to compatibility specifications as well as functionality. This contrasts with small firms that often buy equipment to suit an immediate need, with less thought to a systems-oriented approach.

Interest in compatibility

According to Leone Nancy Pease, VDC market research analyst, the stronger interest in compatibility is attributable to the fact that larger companies are usually more automated and have a greater diversity of location and type of equipment that need to communicate with both external locations and international locations.

Cost of equipment and acceptance by users were also cited as vital concerns by more than 20% of the companies questioned. Proper planning of equipment purchases and management cooperation each concerned about one company in eight.

According to the VDC survey report, the overriding theme today among office automation equipment buyers is caution. Many companies are underautomated, yet reluctant to get in over their heads with an expensive automation structure that may become obsolete in the near future.

VDC believes many companies are waiting for communications and software standards to be set and for vendors to sort themselves into product and service categories clearer to the potential buyer of equipment. But, the researchers warn, this "wait-and-see" attitude does not help the user to solve immediate problems.

Concern about shakeouts

According to the study, some buyers even expressed reluctance to buy from anyone but IBM because so many vendors are in financial trouble. Continued concern about shakeouts in such categories as personal computers and electronic typewriters has led purchasers to be wary of parts and service problems with unstable vendors.

VDC noted that the successful office equipment vendor, in addition to providing effective products, will also give some degree of assurance of being in the business for the long term.

The report costs $1,850 and is available from VDC, One Washington St., Wellesley, Mass. 02181.

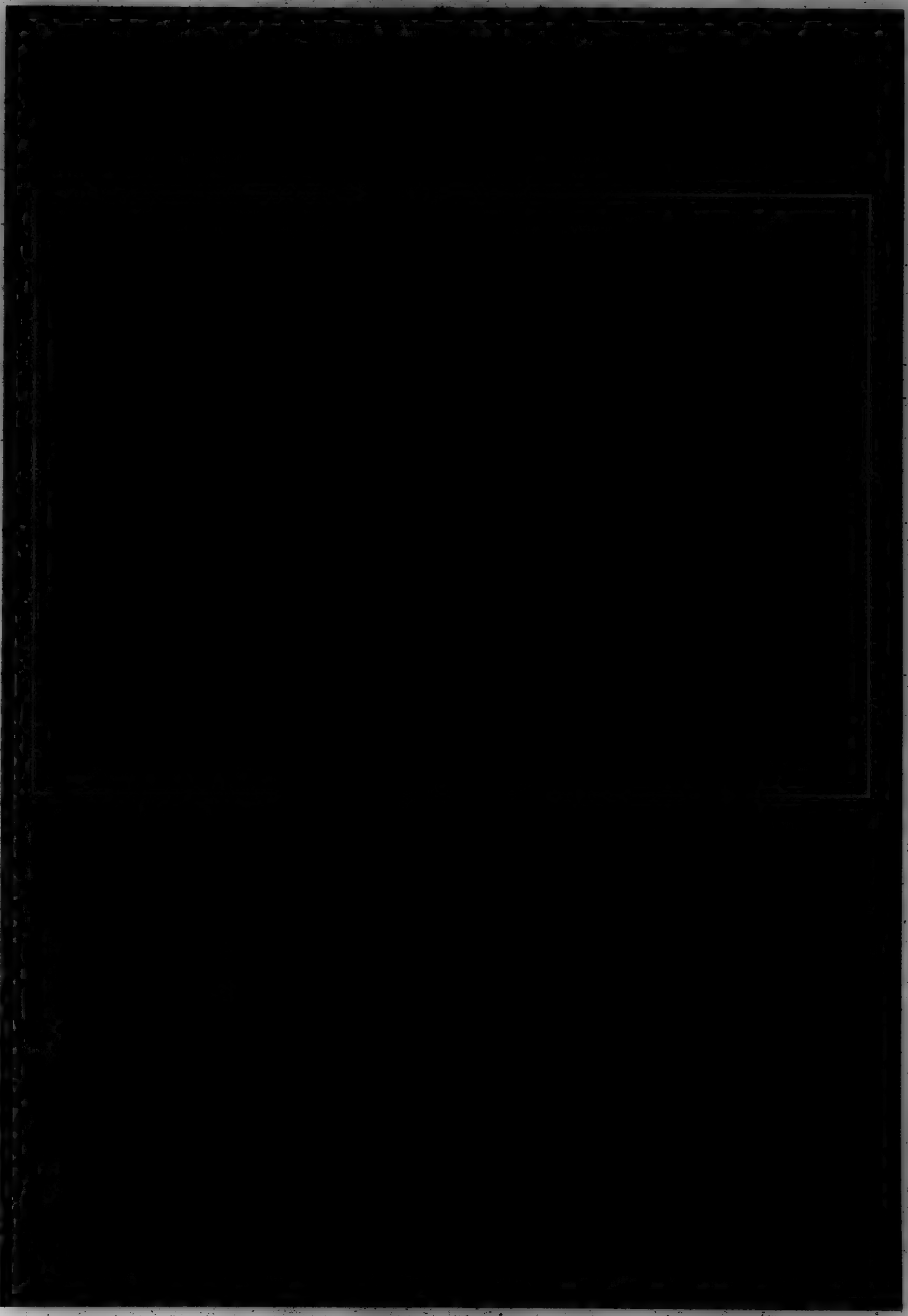
LOWER
PROGRAMMING MAINTENANCE
AND DEVELOPMENT COSTS

{SET:SCIL}

The Source Code Interactive Librarian
for microcomputers.

- SCIL keeps a historical record of all changes made to the library.
- SCIL maintains any source code regardless of language, including user documentation and text material.
- SCIL allows software engineers to work with source code as they do now, *using any ASCII text editor.*
- SCIL saves disk space by storing only the changes made to the program.
- SCIL provides a labeling capability for ease of maintaining multiple versions and multiple releases.
- SCIL offers unlimited description in the program library directory.
- *High visibility displays* with varied intensity for ease of viewing insertions and deletions.
- SCIL is available on CP/M, MP/M II, MS-DOS, PC-DOS and TurboDOS.

{SET} Get {SET} for Success
{SET:SCIL™} is a product of System Engineering Tools, Inc.
648 Arroyo Drive, San Diego, CA 92103



Teleconferencing net keeps workers home

By Paul Somerson
CW Staff

Like most people, Charles Aronovici wakes up every morning, dresses, eats breakfast and goes to work. But unlike most workers who battle traffic or subway crowds, Aronovici only has to walk from the dining room to a computer terminal to reach the office. He and five co-workers for The Adesse Corp. in Ridgefield, Conn., are tied together by a teleconferencing network that Adesse manufactures.

"We designed the system so we could attract quality personnel without requiring that they move to Connecticut," said Jerry DePass, president of Adesse, which makes software utilities for companies with IBM VM/CMS operating environments. Its employees are located in Pennsylvania, Massachusetts, Connecticut and Canada. Telephone lines, multiplexers and modems connect the company's programming and marketing personnel.

"A message facility allows employees to talk to one another," Aronovici said. "Since we have access to each other's files, employees can electronically discuss any plan. Whenever an employee completes a task, he assigns it a file name. Other employees can look through the file, insert notes and highlight benefits. An electronic mail feature notifies the author of any changes. The author can incorporate or amend them," he added.

The system has its limitations. "Since there is no face-to-face communication, there is the risk of misunderstandings," Aronovici said. "Since our employees have experience with the system, we have few misunderstandings. At first, some people may take notes or corrections personally — even though they are not meant that way. Whenever there is a serious problem, someone can pick up the telephone and talk to the person."

Teleconferencing provides benefits. "Working with this type of system is different from a normal office," DePass said.

"Since there is no body language, employees have to develop skills to utilize the system fully. I think that they concentrate and put more thought into an item before sending it. They do not want to waste words, so when they use the system, their message is usually clear and concise. At a meeting, people often talk just for the sake of talking. A lot of time is wasted."

DePass thinks that the time needed to complete a project is saved. "Since employees do not have to schedule a meeting to discuss an issue, the system increases productivity," DePass said. "If someone has a question at 3 a.m., he asks it then, rather than waiting for a weekly staff meeting."

Adesse does not hold staff meetings or planning conferences. "The workers only meet on social occasions," DePass said. "We have one meeting a year. It is purely social; there really is no need for other meetings."

Since employees work at home rather than at the office, the temptation exists to play rather than work. "Employees work more, rather than less," Aronovici said. "Since the system is always available, if one wants to work at night or during the weekend, one can. The terminal acts as my conscience."

Adesse's small size is tailor-made for teleconferencing. "If a company had more than 50 employees, there may be a problem using this type of system," DePass said. "There is nothing inherent in teleconferencing that prevents larger companies from using it. But larger companies lack the support mechanisms necessary for this type of system."

NEW
FROM CINCOM:
THE MANAGE
USER SERIES™...
MAINFRAME PERSONAL
COMPUTING POWER
WITH DP CONTROL.

NEWS

Rebuilt vote counter saves county $144,000

By James Connolly
CW Staff

CHATTANOOGA, Tenn. — A decision to retrofit its 10-year-old vote counting equipment gave a local election commission a faster and more versatile system for a third the price of new equipment.

When it was time for the Hamilton County Election Commission to upgrade its punch-card vote tabulating system last year, Registrar Rick Wilson looked for ways to speed up not only the vote count, but to computerize voter registration lists. With automated voter lists, the county hoped to save some of the $40,000 per year that service bureaus charged to process them.

The company that installed the county's vote counting system in 1974, Computer Election Systems, Inc. (CES), quoted a price of "roughly $200,000" for a new package that would replace the 4K-byte, 600 card/min ballot tabulator with a 128K-byte, 1,000 card/min system with disk drives and monitors. Instead of paying $200,000 for that new system, however, Wilson found a company that would recondition and retrofit the old equipment to produce a system comparable to the CES system for only $56,000.

"We wanted to increase the card reader speed from 600 up to 1,000 [cards] per minute, but the most interesting things were the disk, the disk-tape backup and the screens. We wanted some type of computer system that could be used to computerize registration. We've always had to send that out to a job shop," he added, noting that voting lists in the county of 300,000 are in constant flux with new voters and address changes. The county, which includes Chattanooga and vicinity, has an average of 150,000 registered voters.

Wilson contacted Don Baumer, a former CES employee and now president of Diverse Integrated Systems, Inc. (DIS) of Concord, Calif. He asked Baumer what could be done to upgrade the county's system.

Retrofit equipment

"We completely rebuilt the card counter. We tore the guts out and brought it up to 1,000 cards a minute," Baumer said of the Documation, Inc. 3008 vote counter.

To the Data General Corp. Nova 1210 processor, Baumer added a board utilizing a chip based on the Fairchild Camera and Instrument Corp. 944516 microprocessor, which increased the CES Ballot Tab's memory from 4K to 128K bytes. He also added five Liberty Electronics Co. USA Freedom 100 terminals and a 160M-byte Priam Corp. 15450 disk drive. In addition, as election night protection, DIS upgraded a backup processor from 4K to 16K bytes.

The system is already handling voter registration tasks as clerks transfer data from paper registration cards into the system via the terminals.

On election days, beginning with the May 1 presidential primary, poll workers at 87 voting sites are expected to have up-to-date registration lists. Voters, as they have for a decade, will use CES Votomatic ballot stands and punch cards to vote. The votes will be stored at the polling places and shipped in steel boxes to election commission headquarters in Chattanooga, where they will be processed on the two card readers.

The system, now undergoing final conversion, will receive its final test in the May 1 primary.

"It's not absolutely new computer technology, but for us it is a dramatic new application. I do think that it has been very much worth pursuing. The fact that it all cost only $56,000 still seems unbelievable," Wilson concluded.

MANAGE USER SERIES

Cincom's new MANAGE USER SERIES™ combines the benefits of personal computing capability, mainframe power and greater data processing control into one comprehensive Decision Support System.

Personal Computing On The Mainframe

Simply explained, the MANAGE USER SERIES is Cincom's family of integrated mainframe software tools that work together as one powerful Decision Support System. No other software vendor offers such a wide range of Decision Support capabilities at the mainframe level.

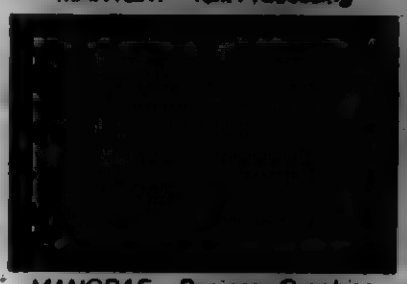
Using the power and accessibility of the mainframe, MANAGE enables data processing to provide a wide range of personal computing capabilities while maintaining control over the corporate data resource. And because MANAGE has a conversational, user-friendly personality, it easily wins friends among end-users.

Powerful Decision Support Tools

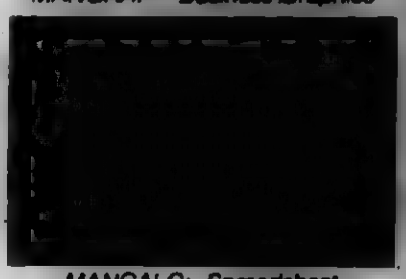
currently integrates four powerful tools that allow end-users to access, store and use production information from the corporate mainframe to aid in key business decision making:

- MANTEXT is a sophisticated free-form text processing system that enables users to access corporate files for the creation of business documents and corporate mailings.
- MANGRAF is an advanced business graphics tool that provides output from on-line applications using centralized production data base information.
- MANCALC is a 3-Dimensional electronic spreadsheet that facilitates "corporate-size" models and can automatically load information stored in corporate files, or build models based on private data as well.
- MANTIS is Cincom's industry acclaimed application development language. As the "integrator" of the MANAGE USER SERIES, MANTIS provides an effective bridge between the Development Center and the Information Center.

MANTEXT – Text Processing



MANGRAF – Business Graphics



MANCALC – Spreadsheet

End-User Productivity Through Integration

The key to the power and versatility of MANAGE is its elegant integration. MANAGE provides the tools needed for preparation of business reports and day-to-day decision making. And because all components of MANAGE can access central or personal data files, users can merge a multitude of data types, display them graphically, simulate "what-if" futures and document the findings in one business report. The power of MANAGE is limited only by one's own creativity.

Another Major Cincom Technology

Like TIS,™ ULTRA Interactive Data Base System,™ MRPS™ and MANTIS™; MANAGE USER SERIES is a member of the integrated family of new Cincom software technologies. From data base to application software to Decision Support, the name Cincom has come to stand for excellence in software technology the world over.

For more information on MANAGE, or any of our new integrated software technologies, simply contact the Cincom Marketing Services Department, 2300 Montana Avenue, Cincinnati, Ohio 45211.

800-543-3010

(In Ohio: 513-661-6000)
(In Canada: 416-279-4220)

Cincom Systems

Excellence in Software Technology.

Confused buyers unite against micromania

By Lynn Weber
CW Staff

As the computer evolution moves full speed ahead, some people feel as though they're sinking in its wake — and they have something to say about it.

The Crabapple Anti-Computer Club was founded last month as an outlet for consumers who don't believe that home computers are for everyone, despite the sales pitches. The Society for the Prevention of Cruelty to Users (SPCU) was established for users of IBM Personal Computers who are feeling battered by their software.

Steven M. Stroum, 35, is the founder of the Crabapples. A technical publicist with his own company and claiming over 1,900 accounts, Stroum is familiar with the technology and a believer in the advantages of computers, but vehemently objects to the marketing strategies used by the home computer industry, some of which "hit below the belt on an emotional level."

"I believe that computers aren't a fad, that they are in fact a part of our society and that they have a role and a place; that I have no problem with," Stroum said. "What I'm opposed to is the promotion that implies: 'Average parent, unless you buy your child a computer, you're going to be neglecting that child. You're going to be an inferior parent, and you're going to be responsible for your kid failing.'

"That heavy-handed approach needs to stay with cosmetics and deodorant. I don't think it has a place with high technology and computers."

The Crabapple club, which presently has only about a half-dozen members, will publish six newsletters a year. Its objective will be to provide people with a real idea of what's involved with computers and to help them determine whether they really need a computer.

"If the companies that have been involved in the home computer market could do as fine a job with determining the needs of that market as IBM has done in determining the needs of the small business market," Stroum said, "I think we'd have a different ball game. It's that type of responsibility that I'd like to see."

Annual membership in the Crabapples is $19. Further information is available from Crabapple, P.O. Box 3236, Framingham, Mass. 01701.

SPCU for IBM users

The SPCU was founded to help IBM Personal Computer users better understand available software programs.

"Most people complain that what they learned from advertising was what features a particular software program offered, but rarely did they get a straightforward assessment of how well each of the features worked," said founder Charles J. Speranno, a psychologist. "They found it difficult to assess from all the glowing ads what it was that they needed."

The society, which Speranno said resulted from his own frustrations with his Personal Computer, currently has 200 members. For $36 a year, society members receive a monthly newsletter and four special reports.

Personal Computer users are not discontented with their micros, Speranno noted. Instead, "it seems that the main problem that people have is in shopping." He thinks Personal Computer users are looking for a *Consumer Reports* type of magazine on software.

Further information on the SPCU is available from Speranno at 6716B E. Cedar Ave., Denver, Colo. 80224.

What to look for in a word processing printer.
And what to look out for.

First of all, look for a daisywheel printer. Daisywheels produce crisp, sharp characters that readers can't tell from the finest office typewriter.

They're the best choice for printing letters, proposals, contracts and other important documents that call for a professional look.

We make the DP-55 and DP-35 daisywheels, which print at 55 and 35 characters per second (CPS).

Rule of thumb: Faster is better.

Our DP-55 will print a one-page letter in about a minute. A 12 CPS machine takes five.

You may be happy to wait five minutes for your letter. But remember, while the computer is tied up running the printer, it may not be available for other jobs.

Bad design can make a smart operator look dumb.

People with otherwise normal dexterity sometimes become all thumbs around a computer printer. The fault is usually the machine's.

Our DP-Series printers were designed with the operator in mind. A status display is standard on the DP-55. The printhead mechanism tilts a full 90° to make printwheel changes a snap.

Industry standard ribbons and plastic or metal printwheels are available from Dataproducts or local office supply stores. More than a hundred type styles are available, so you can match most any office typewriter.

A printer's no better than the technology behind it.

Some companies are pushing the limits of their technical knowhow and offer little more than souped up typewriters. Dataproducts has decades of experience in the design and manufacture of sophisticated, high-speed computer printers.

Our daisywheel printers are serious business machines, engineered to perform reliably for years and years. And to provide their users the greatest productivity at the lowest cost of ownership.

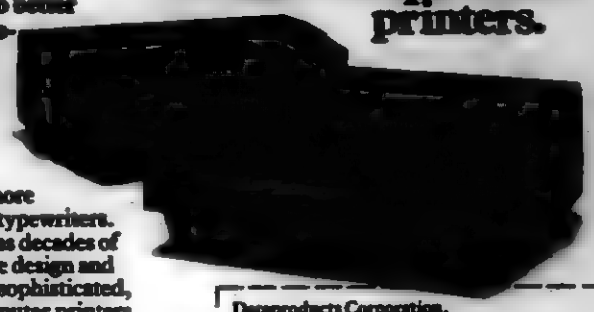
Depend on the world leader.

Virtually every major computer manufacturer buys printers from Dataproducts, then resells them with their name on them. For them, Dataproducts is synonymous with quality and reliability.

It's that reputation that made us the largest independent manufacturer of computer printers in the world.

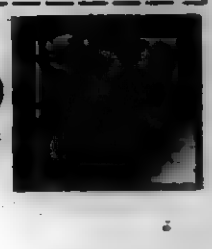
To learn more about Dataproducts DP-55 and DP-35, or for the name of our distributor in your area, call (213) 887-3924. Or send the coupon below.

Look for Dataproducts printers.



Dataproducts Corporation,
6200 Canoga Ave., Woodland Hills, CA 91365
☐ Send details on Dataproducts' daisywheels.
☐ I'm shopping for printers now. Send a rep.
Name
Title
Company
Type of business
No. of printers needed
Address
City State Zip
Telephone Ext.
Send information on: ☐ 120-200 LPM matrix printers ☐ 300-1100 LPM band printers ☐ 1500-2000 LPM high performance printers ☐ Dot matrix graphics and label printers ☐ Printer supplies
Dataproducts is a registered trademark. DP-55 and DP-35 are trademarks of Dataproducts Corporation. 227-CW

DATAPRODUCTS
The Printer Company



On March 5, your micro computer* security problem will be eliminated.

STOPLOCK™

*IBM PC (640) and IBM XT registered trademarks of IBM Corp.

STOPLOCK is a trademark of SDI, Inc./P.O. Box 712 Lawrence, KS 66044

Dealer inquiries welcome.

For the first time ever, you can get the most advanced Xerox manufacturing software, plus an IBM mainframe computer, in one complete, affordable system.

It's a new concept in computing. The Xerox Turnkey Manufacturing System includes everything you need for dependable, comprehensive information management. It's the very first system to bundle an IBM mainframe with efficient, industry-tested manufacturing, financial, and distribution software.

And because it's an off-the-shelf system, it can be acquired and fully installed at a price you never thought possible.

But price isn't the only thing that's remarkable. You get everything you need to run the system. You don't have to buy various components from different vendors and then build interfaces yourself. It's all been done for you. So there's no data processing staff to hire.

The Xerox Computer Services turnkey system has an advanced architecture that completely integrates business applications software, personal computing, information center software, decision support systems, a database manager, and fourth-generation languages. Each with user-friendly screens and "help" functions. Your current personnel can develop their own applications and handle their own information needs without assistance.

That means you get fast, economical installation, plus immediate payback in improved productivity and management control. All with minimum overhead.

And what about support? Xerox technical experts understand the manufacturing business and will help you with your system, from initial site planning to telephone hotline support after you're up and running. Of course, full documentation, training, and software maintenance are part of the package.

Best of all, this may be the last software decision you'll ever have to make. As your business expands and it's time to move to a larger computer, you can run the same software on any IBM mainframe, starting with the smallest 4300 series system up through the powerful 3084 model.

Have the best of both worlds in your world. If you need better control over your operations, but are concerned about finding a system that really fits your requirements and budget, let us tell you about our simple solution... the Xerox Turnkey Manufacturing System. Just fill in the coupon and we'll send you complete information and pricing by return mail. Or call Ron Rich at (213) 306-4000.

XEROX COMPUTER SERVICES CW05227/84
c/o Ron Rich, 5310 Beethoven Street
Los Angeles, California 90066

Your ad was very timely. We're planning on buying a new system within ☐ 30 days ☐ 90 days ☐ 6 months ☐ 1 year.

☐ Have a sales rep call me immediately.

☐ Send me more detailed information.

Name/Title _____

Company _____

Street _____

City _____ State _____

Zip _____ Phone _____

Xerox® is a trademark of XEROX CORPORATION.
IBM® is a trademark of International Business Machines Corporation.

NEWS

MANAGERS ON THE MOVE

Harris

LINDA HALL HARRIS has been named director of information services for Honeywell, Inc.'s Residential Division. In her new capacity, she will be responsible for providing business information and communication services to the information services division and for implementing office automation.

Harris joined Honeywell in 1980 as strategic planning manager for the Energy Products Center. Most recently she was manager of international and interdivisional marketing for Energy Products.

Prior to joining Honeywell, Harris had 10 years of experience as a psychologist.

She received a B.S. degree in special education and an M.A. degree in psychology from the University of Michigan. She also holds a doctorate in educational administration from the University of Minnesota.

■

WILLIAM D. STOWBRIDGE has been appointed vice-president of management information systems for Dataproducts Corp. in Woodland Hills, Calif.

Stowbridge most recently was a managing principal with JIA Management Group, Inc., a Los Angeles computer consulting firm. Prior to that, he served four years as corporate director of management information systems at Denny's, Inc. and a similar period at Rockwell International Corp. as director of computing services in the Eastern Region as well as corporate director of systems planning and control.

Earlier in his career, Stowbridge was associated with IBM's Data Processing Division as well as with the Bell system.

He attended Elgin Community College and the University of Illinois at Champaign.

■

DAVID J. HERSH has been appointed manager of engineering systems/management information services for Air Products and Chemicals, Inc. in Allentown, Pa.

In this position, he will be responsible for developing and implementing engineering computing systems for Air Products and Chemicals, an international supplier of industrial gases and equipment, chemicals and engineering services.

Hersh joined Air Products in 1968 as a participant in the company's career development program. He has held positions of increasing responsibility within the company's Process Systems Group and has served as manager of engineering information systems prior to his recent appointment.

He holds a B.S. in chemical engineering from Lehigh University in Bethlehem, Pa.

IEEE society fire called disaster story with happy ending

SILVER SPRING, Md. — An electrician dropped his wrench on a 480V wire during the course of some maintenance work at the Institute of Electrical and Electronics Engineers (IEEE) Computer Society's East Coast office here three weeks ago, starting a fire that DP manager Jim Barrett said caused the disk drives to "flash like pinball machines" as the building's transformers blew up.

But even though electricity went on and off for more than a minute, there was no damage to the Digital Equipment Corp. PDP-11/44 and two DEC Professional 350s or to the back-up data files. "I guess you could call this a disaster story with a happy ending," Barrett said.

When, on Feb. 8, smoke filled the eight-story building housing the IEEE Computer Society's administrative office, book publishing and conference and tutorials division, IEEE employees grabbed disk packs and hurried down six flights of stairs to safety.

Staff members Nancy Heinbaugh and Margaret Brown were hit with polyvinyl dichloride dust when power boxes exploded in their faces. They were treated at a local hospital and released the same day.

IEEE Computer Society staff members worked at home for about a week, waiting for electricity in the building to be turned on again. "We set up five or six cottage offices," said Chip Stockton, director of the IEEE press.

"We were able to do a lot with typewriters as well as take advantage of a networking system we set up in September called Compmail. Through Compmail, we can take advantage of several personal computers we have out in the field," he said.

For the week while the East Coast office was closed, administrative operation of the society was handled by the society's Los Alamitos, Calif. office.

Two to share award from IEEE

SAN FRANCISCO — Two vice-presidents of Valid Logic Systems, Inc. of Mountain View, Calif., have been chosen to share the Institute of Electrical and Electronics Engineers Computer Society's W. Wallace McDowell Award.

Dr. Thomas M. McWilliams and Dr. L. Curtis Widdoes will receive the honor for "creating the Structured Computer-Aided Logic Design [Scald] methodology, which is the basis for many of the successful computer-aided engineering systems used in the industry," according to a society spokesman. The Scald methodology is a three-part approach to the design of computer logic, which uses interactive graphics entry of designs, a high-level language and automatic verification tools.

Widdoes, who is Valid Logic Systems' chief scientist, and McWilliams began work on the Scald methodology while designing supercomputers at the Lawrence Livermore Laboratory in California in 1975. By 1978, they had produced a first-generation methodology.

"I'm quite honored," Widdoes said. "Frankly, the people who've gotten the award in the past — Gene Amdahl, Seymour Cray — are people I've looked up to all my life."

IBM exec to keynote ACM meet

CHICAGO — An IBM marketing support consultant for workstations will deliver the keynote address at the Association for Computing Machinery's (ACM) two-day North Central Regional conference, "Making the Micro-to-Mainframe Connection," to be held here March 22-23.

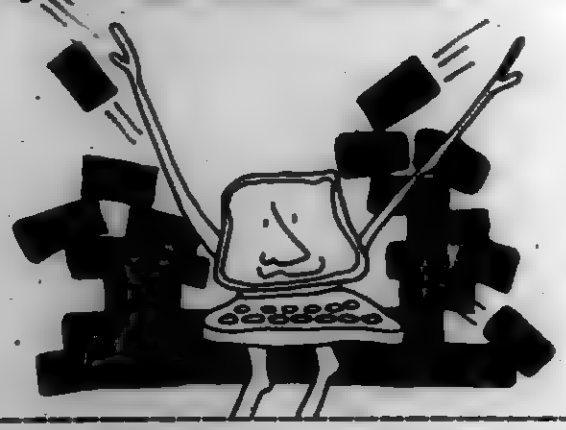
The conference will investigate solutions to microcomputer integration problems in a mainframe-based data environment. IBM's Morton Sinkoff will examine the emerging trends and future directions of microcomputers, integrated workstations and personal computing in the work place from technological and marketing viewpoints. He will also discuss the implications of these trends for business, scientific and academic users.

A 24-year veteran of IBM, Sinkoff is responsible for establishing the strategic directions of IBM workstations. He previously served as the company's manager of academic and scientific programs for the IBM Personal Computer.

Full conference registration is $95 for ACM members and $105 for nonmembers before March 1. After March 1, registration is $120 for ACM members and $130 for nonmembers.

Further information is available from North Central ACM '84 through P.O. Box 2281, Chicago, Ill. 60690.

BREAKTHROUGH IN VAX/VMS SESSION/IMAGE ACCOUNTING



Only EZTRACK™ allows examination and tracking of VMS session/image resource data by user, time interval, terminal port and other key fields. EZTRACK offers:

• General query and interactive capabilities • Flexible report writer and graphics
• Full screen forms reporting

Name _____
Title _____
Company _____
Address _____
City _____ State _____ Zip _____
Phone ( ) _____

SEND COUPON NOW FOR COMPLETE DETAILS!

Sti Signal Technology, Inc.
5951 Encina Road, Goleta, CA 93117 (805) 685-3771 Outside California call toll-free (800) 235-0789
TWX 910-334-3471

VAX/VMS is a trademark of Digital Equipment Corporation

WITH DATA GENERAL YOU WON'T BE A PRISONER OF YOUR IN-BOX

DATA GENERAL INTEGRATED OFFICE AUTOMATION

Burying information under a ton of mail at the bottom of your in-box is not the best way to get it when it's critical to a decision.

ELECTRONIC MAIL

With Data General's CEO® Comprehensive Electronic Office, information is delivered electronically. Instantly. Unerringly.

But that's only the beginning.

TOTAL OFFICE AUTOMATION

The CEO system automates just about everything in your office. CEO electronic filing files the way you do. Its electronic calendar keeps tabs on trips, appointments, and meetings—even confirming them all.

Of course, CEO includes easy-to-use word processing. And all this is integrated with data processing for total decision support.

DON'T DUMP YOUR EXISTING EQUIPMENT

Best of all, instead of having to dump your existing equipment to automate your office, you can build the CEO system around it.

Because it not only ties in with other Data General computers, but it also ties in with the most widely-used mainframe and word processor.

Instead of just a series of personal computers, each CEO workstation becomes part of a global network, with access to data from IBM mainframes.

AS LITTLE AS $5,000 A WORKSTATION

And with the CEO system, the cost per workstation can be as low as $5,000, depending on application.

CALL NOW

For more information on office automation that's a generation ahead, call: **1-800-554-4343, Operator 05A** or write Data General, M.S. CEO 05A, 4400 Computer Drive, Westboro, MA 01580.

Data General
a Generation ahead.

Copyright 1983 Data General Corporation, Westboro MA CEO is a registered trademark of Data General Corporation

NEWS

CALENDAR

WEEK OF MARCH 11

MARCH 16-17, HOLLYWOOD, FLA. — **Balancing** SAS Technical Support Skills (OS). Contact: SAS Institute, Inc., P.O. Box 8000, Cary, N.C. 27511.

WEEK OF MARCH 18

MARCH 19, CLEVELAND — **Micro-PCS.** Contact: Evaluation and Planning Systems, Inc., Suite 1540, 110 Plaza, New York, N.Y. 10119.

MARCH 19, NEW YORK — **Introduction to the IBM Personal Computer.** Contact: Center for Advanced Data Processing, Inc., Suite 402, 450 Seventh Ave., New York, N.Y. 10123.

MARCH 19, NEW YORK — **Word Processing with Wordstar.** Contact: Center for Advanced Data Processing, Inc., Suite 402, 450 Seventh Ave., New York, N.Y. 10123.

MARCH 19, INDIANAPOLIS — **Structured Systems Development.** Contact: J. Baldwin, Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

MARCH 19-21, LOS ANGELES — **Microcomputers: A Guide to Selection and Application.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

MARCH 19-21, CHICAGO — **Computer Awareness: Basic Concepts, Capabilities and Terminology.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

MARCH 19-21, NEW YORK — **IBM Teleprocessing Systems Software: An Introduction to Concepts, Systems and Applications.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

MARCH 19-21, DALLAS — **Computer Operations Management: Effective Techniques.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

MARCH 19-21, SAN FRANCISCO — **Introduction to Office Automation: Concepts Technology and Applications.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

MARCH 19-21, DALLAS — **Structured Quality Assessment Workshop.** Contact: J. Baldwin, Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

MARCH 19-22, WASHINGTON, D.C. — **Federal Office Systems Expo 1984.** Contact: National Trade Production, Inc., 9418 Annapolis Road, Lanham, Md. 20706.

MARCH 19-22, GREENVILLE, S.C. — **Automated Manufacturing (AM) 1984.** Contact: AM '84, P.O. Box 5823, Greenville, S.C. 29606.

MARCH 19-22, NEW YORK — **Microcomputer Systems in Government.** Contact: U.S. Professional Development Institute, Microcomputers in Government, Department AB, 1620 Elton Road, Silver Spring, Md. 20903. Also being held March 26-29 in Seattle.

MARCH 19-22, WASHINGTON, D.C. — **Computer Graphics Systems: Hardware, Software and Applications.** Contact: George Washington University, Continuing Engineering Education, School of Engineering and Applied Science, Washington, D.C. 20052.

MARCH 19-23, NEW YORK — **Auditing in the Contemporary Computer Environment.** Contact: Marge Umlor, EDP Auditors Foundation, 373 S. Schmale Road, Carol Stream, Ill. 60187. Also being held March 26-30 in Orlando, Fla.

MARCH 19-23, NEW YORK — **Advanced Structured Analysis.** Contact: J. Baldwin, Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

MARCH 19-23, SAN FRANCISCO — **The Data Structured Systems Development Methodology.** Contact: Georganna Carson, Ken Orr and Associates, Inc., 1725 Gage Blvd., Topeka, Kan. 66604.

MARCH 20-21, NEW YORK — **New Marketing Strategies.** Contact: The Yankee Group, 14th Floor, 89 Broad St., Boston, Mass. 02110.

How to get your people on-line. On the double.

One-touch access

The new Scanset 415 HS™ is more than a quick way to get information. It's a quick way to plug computer-shy managers into your information system.

Because Scanset was designed for convenience. Users get single-button dial-up and log-on to your computerized system. You get the ability to program remote Scansets with phone numbers, function keys, even screen brightness and speaker volume. All from your mainframe, without overriding managers' protected entries.

Plus, you can hook Scanset up using normal phone lines.

1200 baud graphics

The Scanset 415 HS will paint an entire screen of line or bar charts almost as fast as you can say, "Personal Information Terminal." And the 300 or 1200 baud rate is selectable right from the keyboard.

Once your people start getting 1200 baud decision-support, you can say goodbye to complaints about slow transfer rates.

Simplicity itself

Scanset has a built-in 36-number autodialer. So instead of the 30 or so keystrokes it takes to reach your data base, users press one button. Scanset does the rest.

And once users are on-line, programmable function keys speed them directly through to frequently-used computer commands. No need to spend time typing—One function key replaces up to 36 keystrokes.

Same goes for international phone calls. Or domestic calls, including connections to lower-cost carriers like SPRINT® or MCI® Multi-number muddles turn into single-button savings.

Answers on tap

If you're planning an information system or looking for a better way to get managers into the system you already have, look into Scanset. The Personal Information Terminal brings a whole new dimension to information management in just under a square foot of space.

Need more information? It's as easy to get as making a phone call. Which gets even easier with the new Scanset 415 HS.

(800) 622-2260

SCANSET

THE PERSONAL INFORMATION TERMINAL FROM TYMSHARE

Tymshare, Inc.
20705 Valley Green Dr.
Cupertino, CA 95014

Introducing the world's first complete, self-contained, 16-bit portable computer system.

The Panasonic Sr. Partner with a built-in printer.

Runs IBM PC Compatible Software

Panasonic
Industrial Company

Built-in Printer

A Complete System

EDITORIAL

The VDT scare: reason to pause

Warning: Working on a VDT may be hazardous to your unborn child.

Could that warning show up in computer ads and on VDTs before long?

The National Association of Working Women, better known as 9 to 5, has been campaigning against the health risks of VDTs since last May. Earlier this month, the 12,000-member organization of office workers called a press conference in a midtown Manhattan hotel to blazon discovery of a "cluster site" of pregnancy problems.

According to 9 to 5, fully half the women who became pregnant while working on VDTs at an airline telephone reservations office in San Francisco since 1979 suffered miscarriages, stillbirths or premature deliveries or saw their children come into the world with birth defects. The group also released a six-month nationwide survey in which women "who reported becoming pregnant since working with VDTs could claim only a 31.6% rate of normal, full-term delivery."

Harrowing statistics. Karen Nussbaum, executive director of the group and president of a national office workers' union, called the numbers "truly frightening" and "shocking enough to demand immediate action." It would be "irresponsible to dismiss this situation without more study," she declared.

Radio and television reporters in New York responded at once, spreading word of the pregnancy risks caused by VDTs.

But few bothered to quote a Columbia University physician brought to the press conference by 9 to 5. According to Dr. Jeanne M. Stellman, there is "no proven link" between VDTs and pregnancy problems. There is not even any "evidence of widespread pregnancy problems among VDT workers," she said.

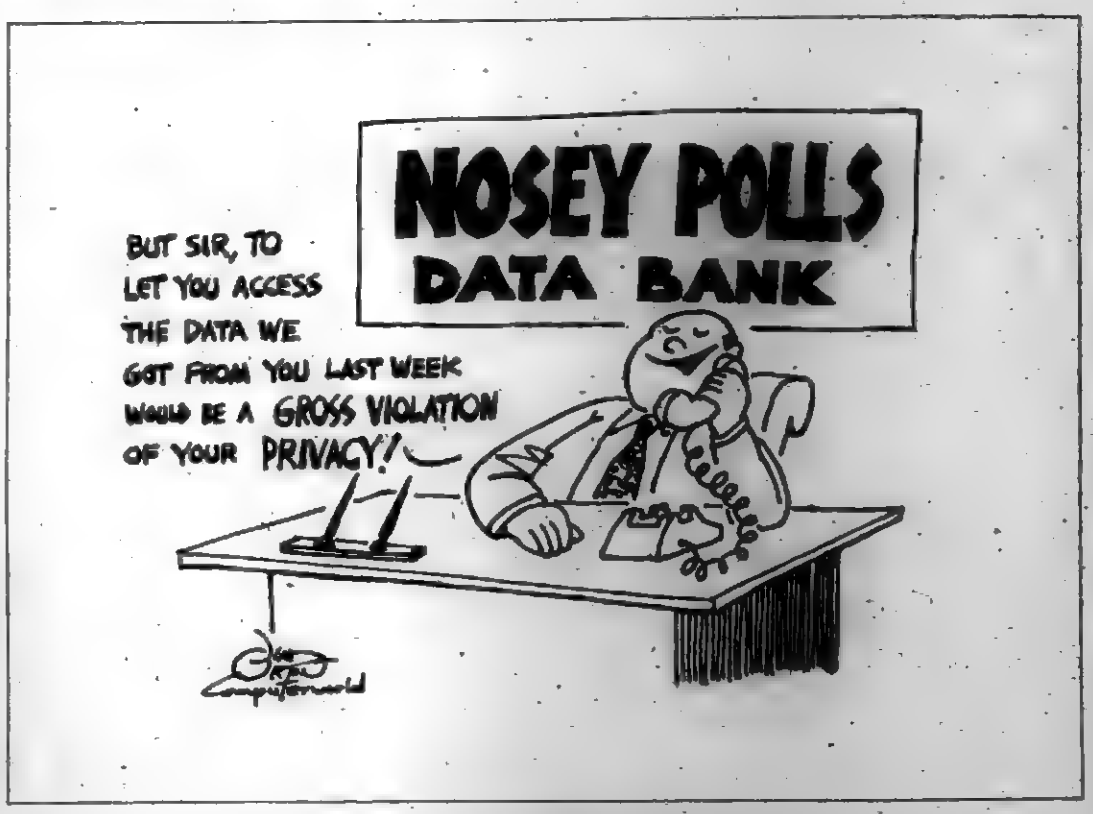
And anyone who has had a few moments to study the 9 to 5 figures might find in them reason to pause. In San Francisco, only 48 pregnancies over a four-year period were tabulated; in the nationwide survey, only 206 pregnancies were counted among the nation's 10 million VDT operators. A mathematician would point out that such an "n" — the statistical sample — was too small in both cases to support sweeping charges.

What is more, the "cluster" of pregnancy problems in San Francisco could be the result of any number of causes ranging from environmental factors — heavy cigarette smoke, exhaust fumes, nearby radioactive wastes — to statistical chance alone.

This is not to shrug off the possibility of a long-range health hazard from VDTs. As Mark A. Pinsky, editor of *VDT News*, cautioned, radiation from display terminals may have graver effects than now suspected. But this must be studied coldly and rationally, not in a manner designed to raise fear.

Nussbaum scoffs and brands as "insane" the suggestion that 9 to 5 might be raising fears among VDT workers. But women we know who heard radio reports of the 9 to 5 accusations were ready to quit their jobs as word processing operators and cancel their orders for home computers.

The effects of VDTs upon their operators' health must be studied coolly, rationally and thoroughly to prevent VDT radiation from becoming, like asbestos, a hazard that is discovered too late. And someone must speak out for the interests of VDT users. But by making charges based, at best, on incomplete data, 9 to 5 has clearly abused — if not abdicated — that role.



LETTERS

Three cheers for Charles P. Lecht: 'A fine addition' to the paper

Three cheers for Charles P. Lecht's article "Pundits and predictions" [CW, Feb. 6]. What better bit of humor to have topped off my afternoon of "getting the 'right stuff.'"

I look forward to his next round of intellectual humor — perhaps a go at terminology.

Lecht's column is a fine addition to *Computerworld*.

Lucille Boschicchio
New York, N.Y.

Expected analysis of findings, got rehash of Naisbitt's ideas

Having enjoyed and been provoked by John Naisbitt's *Megatrends*, I was excited to see J. Daniel Cougar's In Depth article "DP megatrends" [CW, Feb. 6]. I expected from the article a thoughtful analysis of Naisbitt's findings with respect to MIS.

What a disappointment. Cougar only rehashed Naisbitt's ideas and in a much less interesting fashion.

Any of your readers who skips the book due to reading the article will be missing out.

Daniel Coleman
DP manager
The Village Co.
Chapel Hill, N.C.

Computerworld welcomes letters from its readers. Preference will be given to typed, double-spaced letters of 150 words or less; they may be edited for the purposes of clarity and brevity. Letters should be addressed to Editor, Computerworld, Box 880, 375 Cochituate Road, Framingham, Mass. 01701.

COMPUTERWORLD

Editor
John C. Wilmouth

Executive Editor
Rita Shaw

Managing Editor
Bill Laberis

Assistant Managing Editor
Cheryl M. Gallo

Senior Editors:
Software
Paul Gillin
Communications
John Dix
Phil Hirsch
Systems
Tom Henkel
Industry
Peter Bartok
Features
George Hamer

Design Editor
Marjorie Magowan

International Editor
Susan Blakeney

Associate Features Editor
Barbara Van Scoyoc

Assistant Features Editor
Elizabeth Morse

Special Reports Editor
Donovan White

Staff Writers:
James Connolly
John Gallant
Lynn Haber
Patricia Keefe
Paul Korzeniowski
David Orros
Edward Warner

Correspondents:
New York
David Myers
Suite 7G
401 East 80th St.
New York, N.Y. 10021
212/570-2135

Washington, D.C.
Bureau Chief: Jane Kirchner
445 National Press Building
529 14th St., N.W.
Washington, D.C. 20045
202/347-6718

West Coast
Bureau Chief: Jeffry Beeler
Correspondent: Robert Batt
1060 Marsh Rd.
Menlo Park, Calif. 94025
415/328-6084

Chief Copy Editor
Kathie Gow

Assistant Chief Copy Editor
Charlotte Zibura

Copy Editors:
Becky Batcha
Dave Boulland
Bruce Crane
Deborah Fickling
Deborah Scaduto-Horn
Thomas Schmidt

Assistant to the Editor
Jane Fettig

Editorial Assistants:
Lorraine Brien
Mary DeChristofaro

Contributors
Education
J. Daniel Cougar
Human Computation
Jack Stone
Telecommunications Week
Larry Long
Minicomputers
Thomas Madron
The Data Center
John P. Murray
Local Networks
Charles P. Lecht

Special Publications
Computerworld Extra!
George Hamer, Editor
Computerworld on Communications
Bruce Hoard, Editor
Computerworld OA
Ann Dooley, Editor
Computerworld Buyer's Guides
Marcia Blumenthal, Editor

Main Editorial Office: Box 880, 375 Cochituate Road, Framingham, MA 01701 617/879-0700

Computerworld is a member of the CW Communications/inc. group, the world's largest publisher of computer-related information. The group publishes 44 computer publications in 18 major countries. Nine million people read one or more of the group's publications each month. Members of the group include: Argentina's *Computerworld Argentina*; Australia's *Australasian Computerworld* and *Micro Computer Magazine*; Brazil's *DataNews* and *MicroMundo*; China's *China Computerworld*; Denmark's *Computerworld Denmark* and *MikroData*; France's *Le Monde Informatique*; Germany's *Computerwoche*, *Microcomputerwelt* and *PC Welt*; Italy's *Computerworld Italia*; Japan's *Computerworld Japan* and *PC Japan*; Mexico's *Computerworld Mexico*; Norway's *Computerworld Norge* and *MikroData*; Saudi Arabia's *Saudi Computerworld*; Spain's *Computerworld Espana* and *MicroSistemas*; Sweden's *ComputerSweden*, *MikroData* and *Min Hemdator*; the U.K.'s *Computer Management* and *Computer Business Europe*; the U.S.' *Computerworld*, *Desktop Computing*, *Hot CoCo*, *InCider*, *InfoWorld*, *Micro Marketworld*, *Microcomputing*, *PC World*, *Run* and *80 Micro*.

VIEWPOINT

Develop your information center in phases

THE DATA CENTER

JOHN P. MURRAY

You have your information center in operation. Through a diligent effort, combined with a well-thought-out and carefully executed internal sales and marketing campaign, much has been accomplished. A great deal of the routine clerical effort has become a standard function of the information center. Automated spreadsheets, the computerized production of charts and graphs and the ability of MIS clients to produce many of their own reports are examples of the progress that has been made. The goal of the information center has been reached. Or has it?

It is interesting that when the information center effort begins, the usual goals revolve around the issues of the reduction of clerical effort in order to speed up reporting processes and, perhaps, to help hold down increases in the clerical staff. In addition, from the MIS perspective, another goal of the information center process may be to help stem the growth of the use of microprocessors.

While some organizations have had more difficulty than they should in reaching this goal (many have not yet reached this goal, some probably never will), the development of this environment should be viewed not as the end, but only as the completion of the primary phase in the building of the information center environment.

The attainment of this primary level of information center service may create a feeling of complacency within both MIS and the client departments. At this point, MIS attention may begin to focus on other areas, and the further development of the information center and progress toward areas in which real growth can be realized may begin to stagnate. Such a situation must not be allowed to develop; once the information center has been accepted, when the MIS clients begin to use it and identifiable results are forthcoming, MIS should begin to step up the effort to push for its use in areas in which dramatic results can be realized.

The introduction of the information center as an approach to reduce clerical effort and to speed the development of basic information outside the MIS department is a valid approach, but it should not be viewed as the ultimate goal of the information center effort.

It may not be a common occurrence that every organization that plans for the development of the information center environment will understand right from the start that once the basic clerical processes are computerized, the state will then be set for much more effective methods to help move the organization ahead, but that is indeed the case.

The introduction of the information center as an approach to reduce clerical effort and to speed the development of basic information outside the MIS department is a valid approach, but it should not be viewed as the ultimate goal of the information center effort. . . . The ability to use the organization's data, to build information center data bases that can then be manipulated to help middle- and senior-level management to obtain a clear understanding of the effect of different situations, moves the MIS contribution to the organization into areas in which its real value can begin to be understood.

Given that the organization has a reasonable record of success with its information center effort, that clients are using the computer to do much of the work they formally did by hand and that, as a consequence of those circumstances, they are willing to consider doing more, MIS management should continue its effort to expand and refine the information center function. The same principle applies here as it does to the overall issue of the MIS function: If a solid information center function is not in place, it must be developed prior to attempting to explore new horizons.

A point of movement to the next phase of the information center should be the process in which, with the help and encouragement of MIS, the clients who are now comfortable with the information center function begin to move from the processing of basic information to the area in which using that information as a base, the power of the information center can be used to address such areas as forecasting and modeling.

The ability to use the organization's data, to build information center data bases that can then be manipulated to help middle- and senior-level management to obtain a clear understanding of the effect of different situations, moves the MIS contribution to the organization into areas in which its real value can begin to be understood. Such a situation can only be of benefit to all concerned.

As an example, the organization's inventory information is available through the information center.

Using that data as the base, the client can build a model that will address questions such as, "What is the effect on cash flow of a 10% reduction in inventory?" "How would such a reduction affect the 'safety stock' requirements?" and "Is the increased cash flow worth the potential exposure to the manufacturing process that would occur as a result of the safety stock reductions?"

These are rather basic questions. Any organization should be able to answer them without an information center, right? Well, perhaps, but it is not now being done in many organizations, with or without an information center.

Simple experiment

In fact, if you have a sound information center in operation, why not try a simple experiment. Ask appropriate managers several "what-if" questions about their areas of business. Once you have their answers, build a model in the information center, using the department's data, and see if the answer is the same. If nothing else, the result may open up areas of discussion about the movement to the next phase of the information center.

It would be my guess, if the model is right, that your answer will be different from the manager's. If the manager does not have a closed mind, and if you are able to verify the correctness of your answer, your effort to move to the second phase of the information center should be much easier.

The development of the information center process is an evolutionary process that, in order to be most effective, should be done in phases. ‡

Murray is director of management information services for Rayovac Corp., Madison, Wis., and author of Management Information Systems as a Corporate Resource, *published by Dow Jones-Irwin.*

Another approach to building DP-user relationship

HUMAN CONNECTION

JACK STONE

It takes only a few triumphs on a personal computer, for example, generating statistical reports and five-year forecasts for the boss in hours rather than days, to turn a 97-lb DP user weakling into a fire-breathing computer person.

But from a DPer's point of view, the latter is a far better person to work with than a user steeped in ignorance and clouded with confusion.

With the proper communications environment — a series of letters, briefings, meetings or training sessions, depending on the style of the organization — the data processing department can help to bring the "experienced" user out of the clouds and back down to the earthly reality of production computer systems.

Work that must be accomplished

A large part of this reorientation involves explicit explanations about the tough, unsung, dirty work that must be accomplished — tasks that so many DPers are typically all mired up in — to get operational systems on-line and to keep these systems there.

In short, new users have little appreciation for what it takes in the way of systems support and how it has taken years and years for many first-rate data processing organizations to develop and maintain dependable information systems.

But what is really significant here is that the timing is right for another new approach to building relationships with users, namely, training in "systems realities," subjects that DPers have taken for granted for years, but rarely have conveyed to the user population because the needs were not there.

Up-and-coming user

The up-and-coming user is the one with an experience base of personal computers and an elementary appreciation of the complexity of systems problems.

I believe that this type of user would welcome communication and training from the DP establishment on systems matters and would develop a better understanding of the contribution of DPers to the firm.

Users want to, and should, know about such topics as:

■ *Backup.* Most users have no idea of what is entailed in backup procedures beyond the duplicate disk and file copy utilities. As hard disks continue to enter the marketplace — a technology that still raises questions of reliability — and more critical files find their ways into their storage, users are courting file-loss disasters until they install proper methodologies for backing up the files.

■ *File sharing.* In spite of the rapid developments in office automation, capabilities whereby two users can access the same file at the same time continue to be limited. The result is that large files must be reorganized into smaller ones and periodically recombined for global report generation. Getting this all together on a routine, timely basis — and correctly so — is a hairy job for the best of the DPers.

■ *Vendor relations.* Dealing with the vendors requires varying blends of political savvy, in-depth knowledge of technology, human relations in times of intense stress, the wisdom of Solomon and the patience of a saint. Those DPers who have survived the ordeal represent a source of critical strategies and tactics that should be transferred to the user population posthaste.

I can't guarantee what such information exchanges will achieve, but I suspect that the users will express their undying gratitude. ‡

Letters to Stone should be addressed to him at P.O. Box 23689, Washington, D.C. 20032.

VIEWPOINT

Getting straight about the use of FBI's NCIC

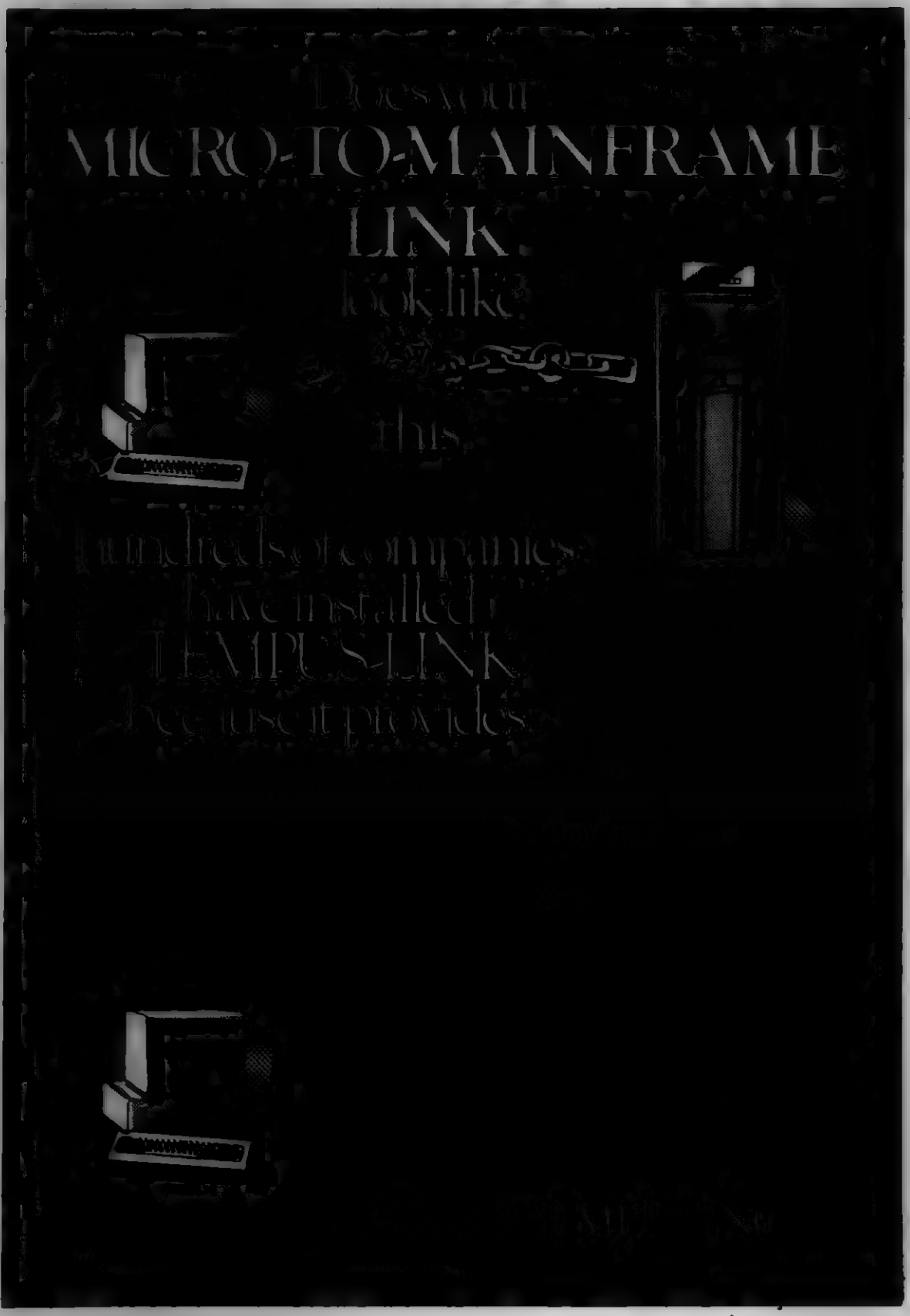
READER'S PLATFORM

KIER T. BOYD

After reading the editorial "And now, 1984" [CW, Jan. 9], I was concerned that *Computerworld* misled its readers about the use of the Federal Bureau of Investigation's National Crime Information Center (NCIC) and some of the proposed changes to enhance the NCIC system.

Since 1967, NCIC has been a valuable asset to the criminal justice community, which accesses it more than 400,000 times a day. For the past several years, the NCIC Advisory Policy Board (APB) has been planning changes to increase the system's effectiveness by various means, including the creation of new files. Suggested new applications come from both the APB and outside entities, such as local police departments, probation and parole officers, the President's Commission on Violent Crime and so on.

Since 1967, NCIC has been a valuable asset to the criminal justice community, which accesses it more than 400,000 times a day. For the past several years, the NCIC Advisory Policy Board has been planning changes to increase the system's effectiveness by various means, including the creation of new files.



The editorial mentions two suggested changes:

- A proposal to list known associates of wanted felons against whom an arrest warrant was outstanding.
- The NCIC Secret Service file.

The depiction of the reader's cousin being listed in NCIC because she baby-sat "for a mobster's sister-in-law" alludes to the proposed known associates file. This hypothetical situation was never envisioned for such a file. Obviously, the baby-sitting cousin is not an associate of a wanted felon. In any case, the proposal for a known associates file was rejected by the APB last October and will not be reconsidered.

The Secret Service file was created at the request of that agency. The U.S. Department of Justice's Office of Legal Counsel has determined that its existence is lawful. The U.S. Congress has apparently agreed, for although some members of a congressional oversight subcommittee attempted to cut off funding for the NCIC Secret Service file, the full committee rejected this attempt.

The Secret Service file, incidentally, contains information on 85 to 100 people who are serious threats to one or more of the service's protectees. That's a small fraction of the more than 9,000 cases the Secret Service investigates yearly.

Proposed new files

There are a number of proposed new files in the preliminary stages of consideration. Before there can be informed debate on their merits, specific criteria must be developed concerning the nature and quality of information that must exist before a file entry can be made, the specific uses that can be made of the information, to whom the information will be given and in what form and the standards for data quality and retention.

These matters will be considered by the APB at its public meeting and by the director of the FBI. Of course, Congress will be consulted, and Justice's opinion concerning the legality of the proposed files will be obtained. Before any implementation, the new uses will be published in the *Federal Register*.

All of this is done to ensure that the need for these files is substantiated and that all issues of personal privacy are thoroughly considered and discussed and problems resolved before any changes in NCIC occur.

'Network is open to anyone'

Finally, one other statement in the editorial concerns me. It states, "In some states the network is open to anyone and is used by many firms to see if job applicants have criminal records."

That statement is not accurate.

The data on wanted persons and stolen property is public source information and readily available through NCIC; the criminal history data to which the editorial refers is also public source information, but is not readily available. It may only be accessed pursuant to federal statute and executive order for certain limited licensing and sensitive employment purposes. ‡

Boyd is acting assistant director, Technical Services Division, FBI, Washington, D.C.

IN DEPTH

The One-Minute DP Manager

Lessons from the best-sellers

A three-part series

The message to DP management is that effective feedback need not take a lot of time. Shortcutting can be carried to the extreme, however. Imagine a "One-Second DP Manager" shaking his finger in a "one-second reprimand" or giving the thumbs up "one-second praising." With equal efficiency, the subordinate responds, "Acknowledged!"

By J. Daniel Couger

The phenomenal success of *The One Minute Manager* (William Morrow and Co.) has been an enigma to academicians in the management field. The chairman of a regional academic meeting on management concluded: "The book contains not *one* idea new to the field, nor *one* idea that has not been previously described in other management books — in much greater depth."

Admittedly, the scope of *The One Minute Manager* is limited. Just 106 pages and replete with white space, the book contains fewer than 15,000 words. It is only 15% the size of *Megatrends* and 10% the size of *In Search of Excellence*, the other two management books high on the best-seller list the past six months [discussed in this series, Jan. 16 and Feb. 6].

Sales of more than one-half million copies in the $15 hardcover edition indicate that purchasers saw a value far in excess of cost per word. The book is now also available in paperback for $6.95.

The combined background of the authors (Kenneth Blanchard, a management consultant, and Spencer Johnson, a psychologist) results in a humanistic counterbalance to managerial efficiency that makes the book unique in the field.

The book is highly readable because its message is presented allegorically, as a fable about a legendary person — the "One-Minute Manager."

The story concerns a "bright young man who was looking for an effective manager. He wanted to work for one. He wanted to become one."

The book begins at the end of his search. The young man (whom I'll refer to as the interviewer) discusses with the manager and his subordinates the reasons for his effectiveness. The authors define effective managers as those who "manage themselves and the people they work with so that both the organization and the people profit from their presence."

The effective manager says that he is neither an autocratic nor a participative manager. "I care about people *and* results," he says. "They go hand in hand."

Why is he called the One-Minute Manager? "I call myself that because it takes very little time for me to get very big results from people," he

Part three

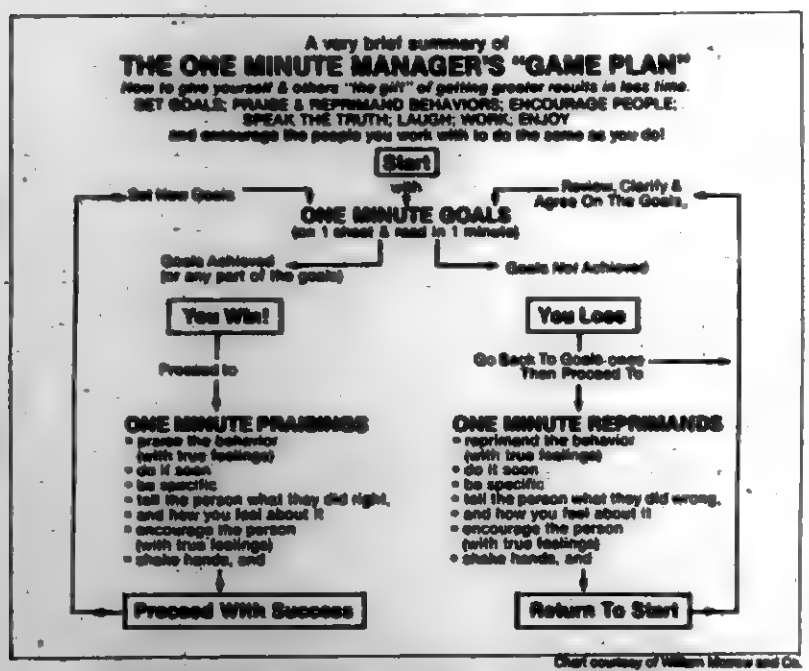


Chart courtesy of William Morrow and Co.

Figure 1. Blanchard and Johnson's summary of their book

tells the interviewer.

Why translate the book's lessons to the DP environment? Should not the general management principles presented apply equally well to DP management?

Couger, Zawacki and Associates developed a data base on more than 6,000 people from which we derived motivation norms for 18 jobs within the computer field. That data base shows the special characteristics of DP employees and their managers. General management concepts apply to this particular environment, but require translation to be most useful.

Blanchard and Johnson do not have the logical orientation of the DP manager. The concluding section of the book, for example, provides "The One-Minute Manager's Game Plan," a chart summarizing the key points. Surprisingly, this chart omits several factors stressed in the book.

Discrepancies in the book's graphics will be obvious to most people in our field, where logical analysis and graphics go hand in hand. The "game plan" is confusing because it does not distinguish activities of the supervisor from those of subordinates. The items listed under "praisings" and "reprimands" are clearly actions recommended for supervisors. The boxes "you win" and "you lose" imply that the manager wins or loses. The book never mentions either. Instead, it stresses that managers should let their people operate as independently as possible, once goals have been mutually established.

Implicit is the idea that "the organization" wins or loses depending on how well people perform. The book does not explicitly state that the supervisor/subordinate collectively win or lose, although the chart should be interpreted that way.

Figure 2 converts the Blanchard/Johnson chart (Figure 1) to correct the deficiencies. The revised version explodes the goal-setting portion of the chart, emphasizing the book's content most appropriate for DP management.

The Blanchard/Johnson chart makes it difficult to determine who originates the goals — managers or subordinates. The text, however, clearly indicates that only in the case of inexperienced subordinates are the goals originated by management. That fact is reflected in Figure 2, which also clarifies actions to be performed by subordinate or supervisor and those performed in concert.

Also missing from the Blanchard/Johnson chart is the relationship of individual goals to organizational goals. Unfortunately, this important factor is also missing from the text.

Another problem with the chart is the implication that goal statements are prepared and negotiated for all goals. The text states that "one-minute goal setting" occurs for only 20% of the goals — the three to six goals most important for that subordinate's area of responsibility. The chart also implies that the manager is not involved in selecting the top 20%, that the subordinate brings those goals into the discussion. While the book's strength is its conciseness, the section on goal setting is brief to the point of being not only incomplete, but misleading.

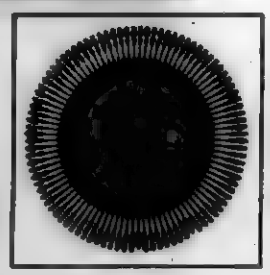
"With true feelings," the parenthetical statement at the bottom of Figure 1, may look strange to those who have not read the book. The authors are trying to emphasize that managers should express their dissatisfaction with an employee's poor performance. A subordinate tells the interviewer that the One-Minute Manager "shares with me how he feels about it — he's angry, annoyed, frustrated or whatever he is feeling."

The Blanchard/Johnson chart accurately conveys the book's strengths vs. its weaknesses. The one line devoted to goals in the chart reflects the book's sparse coverage of the subject. Three-fourths of the chart is devoted to praising and reprimands, consistent with the amount of discussion in the book.

The seven-step procedure for one-minute praisings is provided in Figure 1. The philosophy behind the procedure is, "The most important

Heavy duty.

If you can't afford printer downtime, pick the ones designed to take all the punishment you can dish out and still keep printing. Our 35 and 55 character-per-second daisywheels print sheaves of crisp, sharp letters at doubletime, with never a moan or groan. Call your distributor. Or contact Dataproducts at (213) 887-3924. 6200 Canoga Avenue, Woodland Hills, CA 91365. In Europe, 136-138 High Street, Egham, Surrey, TW20 9HL England.



Dataproducts Daisywheel Printers

The most versatile and least expensive printer for your IBM 3270 system isn't an IBM.

It's the ISI 487 that's cutting the cost of IBM on-line printing, delivering features that IBM can't match, and making a lot of people very happy. This plug-compatible, fully integrated (no box!) replacement for the IBM 3287 carries a price tag as low as $3,350 and offers you:

- outstandingly quiet operation
- 200 CPS dot matrix and 50 CPS NLQ printing
- continuous forms and cut sheet handling
- full SDLC/SCS support

For more information about the ISI 487 and our complete line of IBM compatible printers, call, write, or TWX us today!.

Interface Systems, Inc.
5855 Interface Drive, Ann Arbor, MI 48103
Telephone (313) 769-5900. TWX 810-223-6058

thing is training somebody to become a winner is to catch them doing something right — in the beginning, approximately right — and gradually moving them toward the desired behavior."

According to the book, "Most managers wait until their people do something exactly right before praising them. As a result, many people never get to become high performers because their managers concentrate on catching them doing things wrong. . . . [They] periodically zap them just to keep them moving. This is the most popular leadership style of all."

A key attribute of the effective manager is praising subordinates, even if things are not going well for him elsewhere. According to one employee, "He responds to where I am, not just where he is at the time."

"Remember," The One-Minute Manager says, "you don't have to praise someone for very long for them to know you noticed and you care. It usually takes less than a minute."

The effect is cumulative. A subordinate says, "After a while you begin to catch yourself doing things right and you start praising yourself." He concludes with a comment that sounds more like a statement for a bumper sticker than a management book: "If you don't blow your own horn, someone else will use it as a spittoon."

One-minute reprimands

Surprisingly, only half of the nine-step procedure for the one-minute reprimand is listed in the Blanchard/Johnson chart. In addition, the chart omits the evaluation procedure; hence the elaboration in Figure 2. The Blanchard/Johnson chart shows that if goals are not achieved, they are rediscussed once; a recurrence precipitates the one-minute reprimand.

Compared with the text, the Blanchard/Johnson chart is misleading. As soon as the manager is aware of a problem, he goes to the subordinate. "First, he confirms the facts." Then he "looks me straight in the eye and tells me precisely what I did wrong. Then he shares with me how he feels about it."

Moreover, he does not attack the subordinate as a person. A subordinate tells the interviewer, "The manager reprimands only my behavior — it's easier for me not to become defensive."

The Blanchard/Johnson chart's omission of the last four steps in the reprimand procedure is especially inexplicable because these steps relate to a principle the authors heavily stress throughout the book. As shown below in the full procedure, the second half of the reprimand is designed to conclude the session on a very positive note:

1. Tell people beforehand that you are going to let them know how they are doing and in no uncertain terms.

The first half of the reprimand:

2. Reprimand people immediately.

3. Tell people specifically what they did wrong.

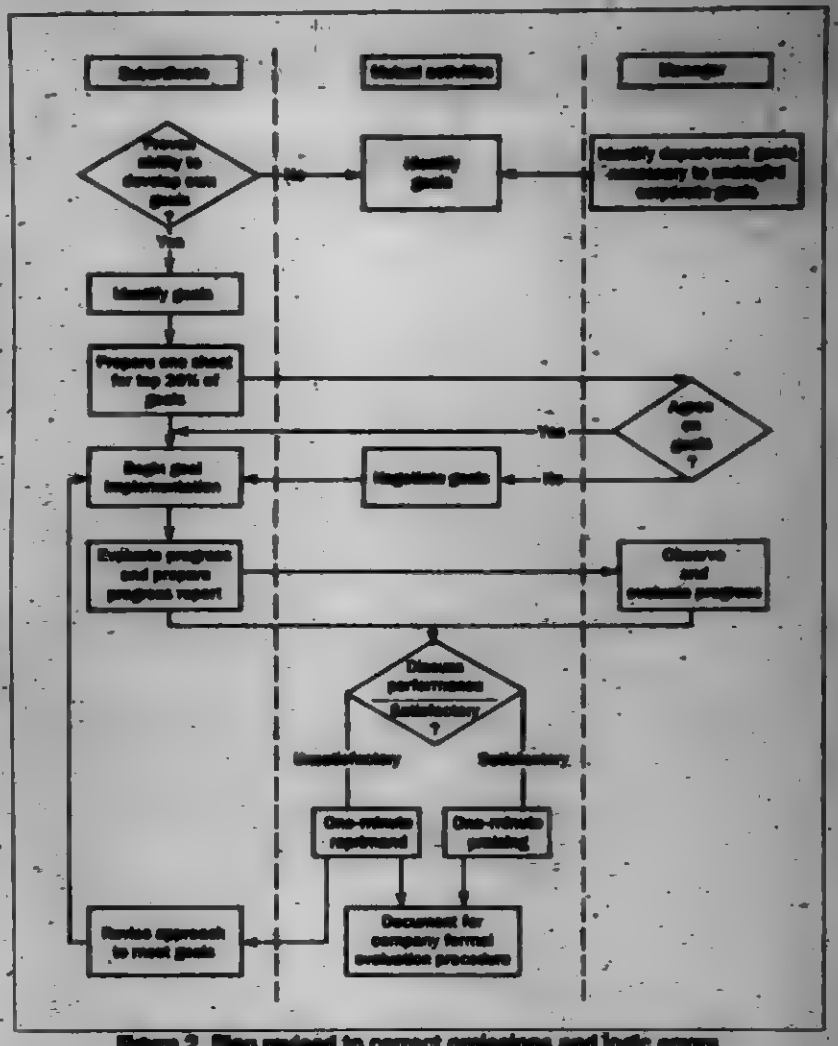


Figure 2. Plan revised to correct omissions and logic errors

4. Tell people how you feel about what they did wrong — and in no uncertain terms.

5. Stop for a few seconds of uncomfortable silence to let them feel how you feel.

The second half of the reprimand:

6. Shake hands, or touch them in a way that lets them know you are honestly on their side.

7. Remind them how much you value them.

8. Reaffirm that you think well of them, but not of their performance in this situation.

9. Realize that when the reprimand is over, it's over.

Why begin with the reprimand? The more common practice is to begin with something positive. "For some reason, it just doesn't work," says the One-Minute Manager. "If you are first tough on behavior and then supportive of the person, it works.

"Sometimes, you have to care enough to be rough. And I am. I am very tough on the poor performance — but only the performance. I am never tough on the person."

One-minute goal setting

I have held off repeating Blanchard and Johnson's procedure for one-minute goal setting because of its weaknesses. The process is as follows:

1. Agree on your goals.

2. See what good behavior looks like.

...your micro-to-mainframe connection
Big League Power!
with
Major League
Graphics
HOTLINE
800-233-3278
FORTE
Forte Data Systems, Inc.
SEE US AT INTERFACE '84
BOOTH NO. 1728

SOLVE YOUR NETWORK COMPATIBILITY PROBLEMS
The MC-80 is a versatile Micro-Processor Based Controller providing conversion between dissimilar data communications protocols. A low cost solution, the MC-80 allows a network to grow or change without making existing devices obsolete. Starting at $1,445
CPU
CRT
PRINTER
• IBM 2780/3780 BSC to Async ASCII Devices
• Burroughs Poll/Select TDI/EIA to Async ASCII
• IBM 3270 BSC to Burroughs Poll/Select
• IBM 3270 BSC to Async ASCII Devices
• IBM 3270 BSC to NCR Poll/Select
• Special Applications
• SNA available 1984
See us at Interface '84
March 12-15
Booth #1724
innovative
network data communications
(305) 624-1644
1-800-327-3555
INNOVATIVE ELECTRONICS, INC. 4714 N.W. 165th St., Miami, FL 33014

Managing a Constant Wave of Facts & Figures

Requires a Special Touch.

SOFTWARE INTERNATIONAL

Run With Us

3. Write out each of your goals on a single sheet of paper using less than 250 words.

4. Read and reread each goal, which requires only a minute or so each time you do it.

5. Take a minute every once in a while out of your day to look at your performance.

6. See whether your behavior matches your goal.

Figure 2 presents a much more realistic procedure for setting goals. However, I repeated the Blanchard/Johnson procedure because it provides their rationale for the expression "one-minute goal setting." The rationale is mighty weak! Reading and rereading goals for one-minute intervals — daily — would be a simplistic and unproductive activity for most managers. Much more beneficial is the approach of having each key goal so precisely and concisely stated that it can be read in one minute. Equally valuable is the reminder of the need for formal review of performance against goals — done by the individual frequently.

Relevance to DP managers

Few would dispute the applicability of the foregoing discussion to the DP manager. However, the degree of relevance takes on more meaning when viewed in the context of the Couger-Zawacki research on DP managers (*Motivational Management of Computer Personnel*, Wiley Interscience). One finding was that subordinates believe their managers provide insufficient feedback — at all levels. Feedback is rated significantly higher in other fields, based on a comparison with the Hackman/Oldman data base on managers in other fields (collected using the same survey instrument as in our research).

DP managers also believe that feedback from their superiors is inadequate. Apparently, in their efforts to stay current in a dynamic field, managers at all levels neglect feedback. The Blanchard/Johnson concept of timely but brief feedback is not only compatible with the DP environment, it is perfectly attuned to it.

According to Blanchard/Johnson, most managers are "gunnysack discipliners." That is, "They store up observations of poor behavior . . . and dump everything on the table" at performance review time.

"In order to look good as a manager in most organizations, you have to catch some of your people doing things wrong. You have to have a few winners, a few losers and everyone else somewhere in the middle. You see, in this country, we have a normal distribution-curve mentality."

Frequent evaluations are much more effective and take a small amount of managerial time. The goal, according to one of the One-Minute Manager's subordinates, is "crystal-clear feedback."

Management training

Also apropos to DP management is the material on training of managers. The One-Minute Manager has a lot of turnover in his area, which might appear to be symptomatic of a managerial problem. However, the reason is his ability to prepare subordinates for management. "Whenever we have an opening and need a good manager," the personnel manager says, "we call him. He always has somebody who is ready."

When asked about this situation, the manager says, "It's ironic. Most companies spend 50% to 70% of their money on people's salaries. And yet they spend less than 1% of their budget to train their people. Most companies, in fact, spend more time and money on maintaining their buildings and equipment than they do on maintaining and developing people."

He observes, "You really have three choices as a manager. First, you can hire winners. They are hard to find, and they cost money. Or second, if you can't find a winner, you can hire someone with the potential to be a winner. Then you systematically train that person to become a winner. If you are not willing to do either of the first two, then there is only the third choice left — prayer."

Although it devotes just a few paragraphs to the subject, the book also discusses goal congruence/goal ambiguity. Its relevance to the DP community was confirmed by a nationwide study recently completed by Dr. Mel Colter and me, to be reported in a forthcoming book (*Handbook of Managerial Techniques for the Computer Field*, Couger and Zawacki, 1985).

The One-Minute Manager tells his interviewer, "In most organizations, when you ask people what they do and then ask their boss, all too often you get two different lists."

How do you avoid such a situation? Unfortunately, the answer is omitted from the game plan. It is explained in the text, however, and is shown in Figure 2. After goals are accepted, performance criteria are carefully identified — not only "attitudes or feelings" but also "what is happening in observable, measurable terms."

According to the One-Minute Manager, when inexperienced people don't perform, "rather than punish them, we need to go back to the one-minute goal setting and make sure they understand what is expected of them."

A good summary appears, strangely enough, midway through the book, on Page 62. The interviewer tells the One-Minute Manager, "I found out why you call yourself a One-Minute Manager. You set one-minute goals with your people to make sure they know what they are being held accountable for and what good performance looks like. You then try to catch them doing something right so you can give them a one-minute praising. And then, finally, if they have all the skills to do something right and they don't, you give them a one-minute reprimand."

The appeal and importance of the book to DP management is its message that effective feedback does not have to take a lot of time.

DP personnel have a proven ability to shortcut lengthy, technical processes to get to the heart of a matter. Shortcutting can be carried to the extreme, however. Such would be the case of the harried One-Second DP Manager who shakes a finger at a busy subordinate and says, "One-second reprimand" or gives the thumbs up sign and says, "One-second praising" — to which the subordinate responds with equal efficiency, "Acknowledged!"

About the author

J. Daniel Couger holds the title Distinguished Professor of Computer and Management Science at the University of Colorado, Colorado Springs. He has lectured in more than 50 countries and written 15 books and more than 60 papers.

Prior to his academic appointment, Couger served as a manager in the computer field. In 1977, he was named U.S. Computer Science Man of the Year.

How Dave Vipler "dumped the dumb"

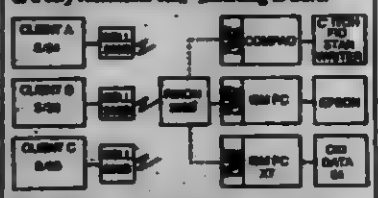
Experienced and committed consultants know that customer support is the name of the game. Dave Vipler, new managing director of the New York based *Computer Consulting Center*, in his 14 years with I.B.M. saw too many clients get burned by here today-gone tomorrow consultants. What seemed like a finished program package invariably needed additional work once the consultant left.

Dave recognized that a quality consulting service must provide continuing client support. In 1981 he founded the Center to assist business with their I.B.M. S/34, S/36, S/38, 5Mxx, 4300 series systems and PCs.

"The Center was organized to provide quality computer consulting to clients that are integrating distributed processing systems into their computer networks," said Dave.

With a staff of 22 professionals, Dave felt that the Center could adequately support its New York City users. Plans to significantly expand their New Jersey operations prompted Dave to find a more convenient method of maintenance, particularly for those programming bugs that only surface after office hours. It was one thing to have a programmer drive an hour each way to spend a full day on site, Dave reasoned, but to make the trip for a half hour of "firefighting" was too costly.

"One client said, 'How do we get you back if we have problems?' BLUE LYNX was the answer for us at a very reasonable cost," according to Dave.

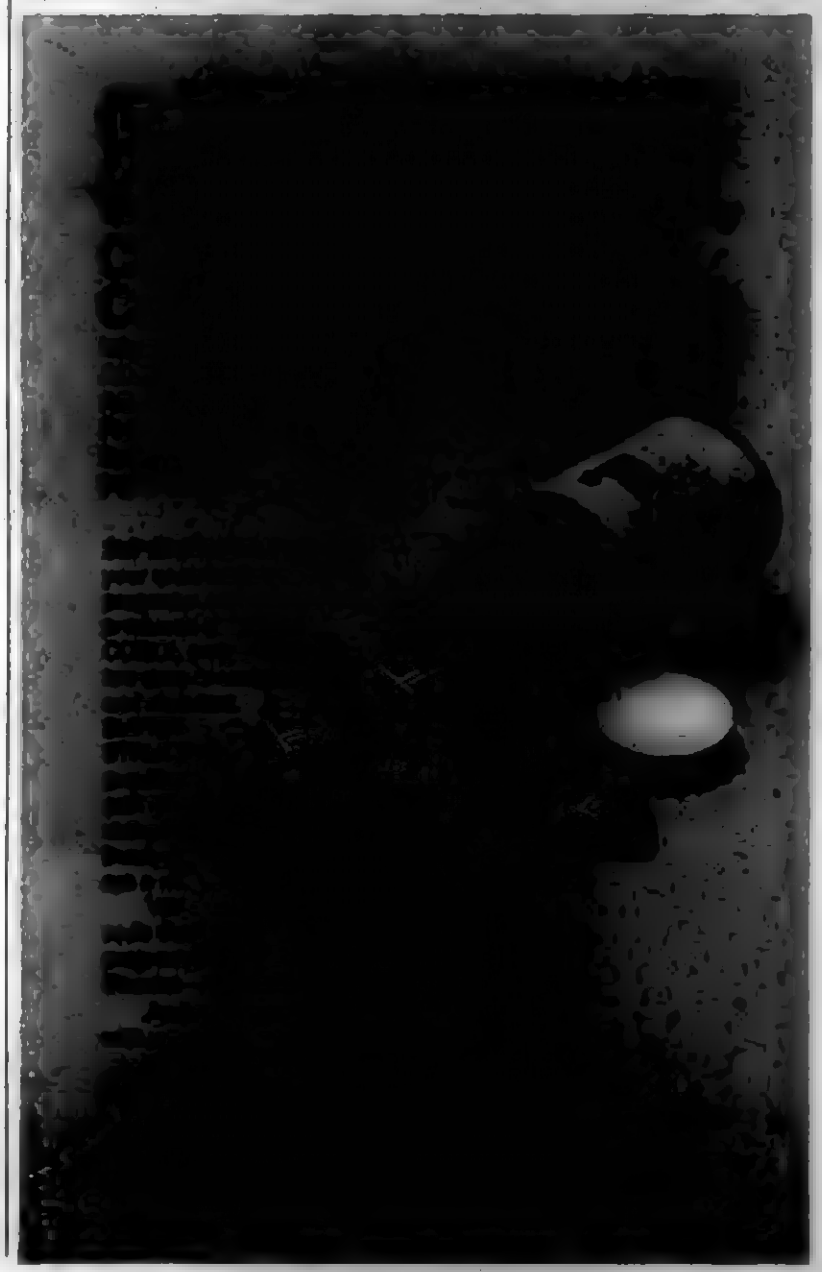


The Center now has 2 PCs, 2 XTs, and 2 Compaqs, each equipped with BLUE LYNX. Their programmers can now sit at their desks and readily program an I.B.M. host systems downtown, in New Jersey or wherever the accounts are located. Dave's clients were so impressed with BLUE LYNX that some have bought the hardware/software package for their own internal needs.

"The BLUE LYNX" documentation was excellent. It went up easily and with no support from Techland required. We now use BLUE LYNX to support clients in New York City, as well as those in New Jersey. With BLUE LYNX behind us we can now use our communications ability not only for programming tasks but also as a sales tool."

BLUE LYNX terminal packages include:
3101/12 emulation for S/34, S/36 and S/38.
3270 emulation SNA/SDLC or Bisynch.
Hardware/software package $650 complete.
Combination of 2 emulators $725.
VT100/102 - DEC VT100/52 emulation software $325

(212) 696-7788
TECHLAND SYSTEMS INC.
25 Waterside Plaza
New York, NY 10010



SOFTWARE & SERVICES

ISO group forcing issue on Cobol-80

SOFTALK

PAUL GILLIN
CW Senior Editor

The recent decision by an International Standards Organization (ISO) working group to proceed on adopting a Cobol-80 standard before similar action has been taken by the American National Standards Institute should send a strong message to Ansi. The international community is becoming impatient with the slow progress that is being made toward Cobol-80 in this country.

But perhaps a more interesting sidelight to the Cobol activity in Vienna was the adoption of a proposal to change the current schedule for revamping Cobol. Under the terms of the proposal, new features would be added to the language every two years, and clarifications, or a complete overhaul, would take place every 10 years. Currently, Cobol comes up for modification every five years, although the 10-year lag between the Cobol-74 standard and the latest proposed revision indicates that that rule is symbolic at best.

The new proposal, which was submitted by Cobol-80 advocate Jerome Garfunkel, will no doubt be extremely controversial and may never see the light of day after it leaves the ISO working group. Garfunkel himself has come under stringent criticism for downplaying issues of upward compatibility in favor of adding power to the language. However, his proposal is an interesting one.

A fundamental argument is emerging

See COBOL page 58

Consider complete security aid

By Dennis Speconte
Special to CW

For data centers that use both batch and on-line facilities, a security administrator's evaluation won't be complete before he considers a comprehensive security package designed to meet the security requirements of both batch and on-line.

Proponents of multiple security systems argue that separate security packages are necessary for IBM's TSO and CICS because they are different systems which have different rules, or "user profiles," and may even have their own dedicated terminals.

IBM's TSO, CICS, IMS and batch all recognize the standard security interface in the IBM MVS operating system and will use this interface when directed to do so. The security package that uses this interface when reacting to security supervisor calls will comprehensively protect resources. When a security verification request is made by any facility, only one security data base is used.

Furthermore, the security information for a particular user is known by the security package, regardless of the facility originating the request. When the security package is designed with a "user-to-resource" logical structure, this verification can be done with a single I/O operation.

Hooking directly into the MVS security interfaces also means that modifications will not have to be made to the operating system. Therefore, a single security maintenance procedure can update both batch and on-line, making the security package easier to maintain.

For auditors who need multiple reports, a comprehensive security package displays any user's violations in one place, a convenience that is tremendously appreciated.

A total security package affords ease of use by providing centralized administration in place of independent jurisdiction over batch and on-line uses of a file. This means when a user is on-line (TSO, CICS) or identified in a batch region, all the resources allowed to that user are known to the security product. This allows security to be centrally controlled by one security administrator. If a security administrator is required for each facility, difficulties may arise as a result of each working independently and then trying to coordinate what they've done. With a comprehensive security software product, you don't distribute the responsibility or compound your headaches.

There are obvious benefits of using a single security package for all transactions. It's easier to evaluate and purchase one package and probably less expensive to deal with a single vendor. From the installation and maintenance point of view, one package produces one set of reports, one data base and one set of rules to learn. For auditors who need multiple reports, a comprehensive security package displays any user's violations in one place, a convenience that is tremendously appreciated. These benefits save a great deal of time and effort. Why use two security products which would mean twice the work and training?

A security package for "CICS-only" will only secure certain resources while CICS is running and only when these resources are accessed through CICS. So when CICS is down, so is your security. When CICS is

See SECURE page 54

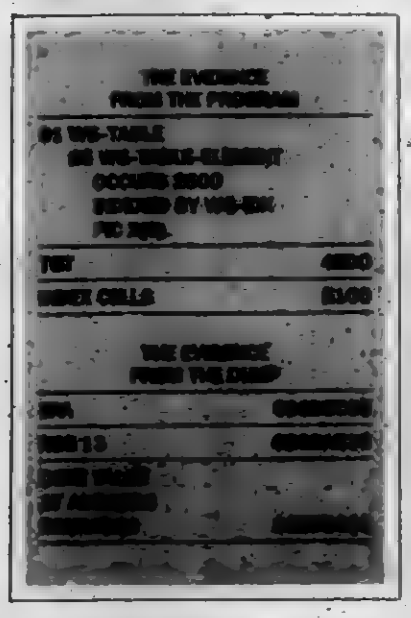
INSIDE

Systems Software/47
Productivity Aids/52
Application Packages/52
DBMS/54
Languages/54
Remote Computing Services/56
On-Line Data Bases/56

SOFTLINE/JOHN L. MINDOCK

Solving the riddle: interpreting indexes in a Cobol dump

Do you avoid using indexes in your Cobol programs because you are not sure how to interpret them in a dump? I, Watson, will relate a tale of the great programmer, Holmes, caught in just such a dilemma. First, the evidence:



And now, the narrative:

"It is the 12th occurrence," stated Holmes in his usual unemotional manner.

Only a few scraps

"You have only a few scraps of a program and a partial dump, yet you are able to decide which occurrence of the table is being referenced by the index?," I questioned.

"The TGT [task global table] was the major piece of evidence," he said. "As you can see, it begins at a displacement of X'4EDO' into the program. Also, the beginning of the fields known as 'index cells' is at a displacement of X'5100' into the program," the great programmer stated.

"I see the EPA [entry-point address] of the program is X'000B6C68,'" I retorted. "If I add the displacement of the index cells to that, I calculate that the index cells begin at core address X'000BAD68,' but located at that address is the full-word [four bytes] X'00000068,' which hardly suggests occurrence 12 to me."

Usual sticky point

"That is the usual sticky point for debuggers, but the translation from the core value to the occurrence number is quite straightforward.

X'0000068' equals '88' in base 10, which suggests that we are interested in the occurrence that begins at the 88th byte past the table's first byte," he advised.

"Since the occurrences are each 8 bytes long," he continued, "and the first occurrence begins at the 'OTH' byte past the beginning of the table and the second occurrence begins at the eighth byte past the beginning of the table, it follows that the 12th occurrence begins at the 88th byte past the beginning of the table."

"One could say," I offered, "the hexadecimal value found in the full-word index cell is added to the address of the beginning of the table to calculate the address of the occurrence being referenced."

"Quite — but it takes some translation to decide which occurrence that really is," he continued. "A formula could be devised:

O = V/L + 1, where
O = occurrence,
V = value of the full, word in base 10 and
L = the length of each occurrence.

In our case, O = 88/8 + 1 = 12," he added.

"It seems you had extra information — the beginning address of the TGT and the value of register 12, for example," I injected.

Verifying results

"This further served to verify my results. Register 13 usually contains the beginning address of the TGT," he replied. "So by adding the contents of register 13 to the offset of the index cells into the TGT, I arrived at the same address for the index cells. X'000BAB38' + (X'5100' - X'4EDO') = X'000BAD68,'" he explained.

"If there were more than one index in the program, I surmise that their values would appear in successive full words following the first index cell's full word, in order as they were defined," I stated somewhat smugly.

"Elementary, my dear Watson."

Mindock is a senior programmer/analyst at Rosemount, Inc., which is located in Eden Prairie, Minn. He is no relation to Sir Arthur Conan Doyle.

SOFTWARE & SERVICES

Seeking upgrades, user turns to the source

DALLAS — HCB Contractors, one of the nation's major construction contractors, faced an increasingly common dilemma a year ago. The backlog of requests for on-line applications was much greater than the staff of six programmers could handle. And new requests were being added at an increasing rate.

"We've gone from [an IBM] System/34 to a 4341 Model Group 1 in three years," Ed Faulkner, HCB's MIS director, said. "Our people were turning out one on-line program for each seven man-days and losing ground against the demand."

HCB installed an application development system called Magec from Al Lee & Associates, Inc. here a year ago. "We've since implemented over 650 new on-line functions, and our backlog is now often expressed in weeks rather than years," Faulkner said.

"But that opened up the door for some new problems that we hardly had to be concerned with last year — security," according to Faulkner.

Security essential

With an HCB project valued at millions of dollars, a high level of security is essential, Faulkner said. Magec includes a built-in security system for generated applications. "But it became increasingly obvious that we were going to need more," he noted. "With the number of applications and terminals we have and anticipate having, our vulnerability has increased."

HCB's network includes a variety of IBM 3270 local, remote and dial-in devices and Motorola, Inc. microcomputers.

Sensitive information carried on the network includes job cost, estimates and payroll data. HCB has recently put much of the general ledger data on-line with Magec, with the off-line processing handled by a McCormack & Dodge Corp. general ledger package that is front-ended through Magec.

HCB considered purchasing a separate security system, but found that no package fit well into its environment, Faulkner said.

"We use the Datacom/DB [data base management system] from [Applied Data Research, Inc. (ADR)], which we are pleased with and which Magec handles well. We are also using ADR's Datacom/DC teleprocessing monitor, but have been considering switching to [IBM's] CICS," he said.

"We verified that all our Magec-generated applications, and Magec itself, will transfer to CICS without any program changes; therefore, whichever security system we used would have to do the same," according to Faulkner.

Faulkner contacted Al Lee Associates and arranged for the security enhancements to be made. All of the changes were made to Magec, and HCB is now using the updated product.

Changes to Magec

Among the changes to Magec were:

■ *Addition of real-time maintenance.* The system allows the security officer to "deactivate" terminals, operators or on-line functions immediately if needed, Faulkner said.

■ *Dial-in support.* The system handles line disconnects and other anomalies of dial-in networks in addition to the usual problems with dedicated lines and locals.

■ *Low overhead.* The security system does not interfere with the ability to handle high-transaction volumes.

■ *Passwords.* Operator passwords can be periodically changed, and the system forces changes at specified intervals.

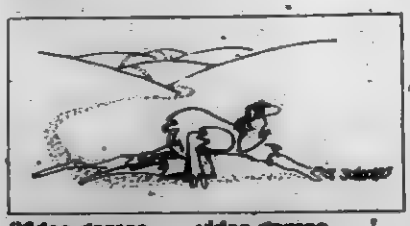
■ *Group identification.* It is possible to identify all operators belonging to a specified group in order to deactivate them as business needs change, Faulkner noted.

■ *Automatic logoff.* The system automatically logs off an operator who forgot to do so and deactivates an operator after a threshold number of inactive days, upon termination date or after a specified number of failed logon attempts.

■ *Time and day.* The system supports specifications of a range of hours and days of the week during which a terminal or operator is allowed access.

■ *Fine control.* It controls accesses at a finer level, down to what function could be done to what data.

"When you can sit down and discuss your idea of the 'perfect' system with a software vendor and then have him actually incorporate almost 100% of your input plus add some features you hadn't thought of, you can't help but be pleased," Faulkner said.



"Video games . . . video games . . ."

VIEWCOM

CICS Printer Terminal Spooling & Automatic Batch Report Distribution System

•IBM-PC Connection
•Online Access to Batch Reports
•Full Function Report Routing
•User Exit Facility
•Automatic Restart/Recovery
•Reduce Paper & Delivery Costs

StarTech Software Systems, Inc.
25-39 Borough Place, Woodside, N.Y. 11377
(212) 204-2119

"Innovation Through Technology"

StarTech Software Systems, Inc.
25-39 Borough Place, Woodside, N.Y. 11377 (212) 204-2119
☐ Send more information. ☐ Please call.
Name
Title
Company
Address
City State Zip
Phone ( )
Operating System Release

Backup system upgraded to fit DEC's RSTS/E

ANAHEIM, Calif. — Data Processing Design, Inc. has announced an upgrade to its Saver Disc Backup System to support the latest versions of Digital Equipment Corp.'s RSTS/E operating system. The package is said to provide a 100-fold increase in file efficiency by file reorganization.

According to the vendor, the upgraded Version 2.7 takes advantage of new features of RSTS/E to organize the disk for faster file access.

Saver 2.7 supports Versions 7.2 and 8.0 of RSTS/E. The price is $850.

Data Processing Design is located at 1400 N. Brasher, Anaheim, Calif. 92807.

SYSTEMS SOFTWARE

D.A. BRASK SYSTEMS, INC. CICS/TSO

D.A. Brask Systems, Inc. has introduced software support for IBM CICS transaction processing to IBM's TSO teleprocessing monitor.

CICS/TSO reportedly provides an alternative to running one or more test CICS systems, the vendor said. The package is said to give programmers immediate access to test regions that are isolated from other applications.

The software is implemented as a TSO command that creates a single-terminal CICS system within the TSO region. CICS transactions can then be processed, with CICS/TSO providing the terminal-control interface between CICS and TSO. An End command is used to switch back to the TSO environment, the vendor said.

CICS/TSO is designed for use in the IBM MVS environment and supports CICS Version 1.5.

The package is available now on a free, trial basis. A first-year license fee costs $3,000, and the annual renewal is 20% of the license fee, the vendor said.

D.A. Brask Systems, 4805 Pershing Road, Downers Grove, Ill. 60515.

PRECISION BUSINESS SYSTEMS Spy; Photo; Advisor; Access; Version 2.0 TMX-32; DMF/Driver; DV/Driver

Precision Business Systems (PBS) has announced a series of software systems for Digital Equipment Corp.'s line of VAX-11 processors running under the VMS operating system.

Three of the PBS packages are aimed at monitoring and controlling terminal usage. The Spy system is said to allow a privileged user to watch another user's terminal with or without the user's knowledge. The Photo system reportedly records and plays back a user's terminal sessions. The Advisor system is said to allow a user to redirect his keyboard so that commands and programs executed from a privileged user's terminal are executed in the context of another user.

PBS's Access system is said to be a system management security pro-

Continued on page 48

Tool fits mini, mainframe, micro systems

BATON ROUGE, La. — Communications Research Group, Inc. has announced Blast (Blocked Asynchronous Transmission), an asynchronous communications package that is available for more than 60 minicomputer, mainframe and microcomputer systems.

The package reportedly provides throughput, efficiency and error-immunity similar to synchronous communication through Blast's "sliding window" protocol. It uses a Synchronous Data Link Control-like, full-duplex sliding window Cyclic Redundancy Check (CRC) protocol, and binary or text files are transmitted as 8-bit-wide data.

Blast reportedly operates over standard dial-up telephone lines with asynchronous modems at any modem speed or over direct connections at speeds up to 19.2K bit/sec.

Blast uses a CRC algorithm to detect errors as they occur and requests retransmission of corrupted data, and data transfer, if interrupted, continues from the point of line loss, the vendor said.

The package is said to be available for a wide range of micro, mini and mainframe systems, including Data General Corp. processors under any operating system; Digital Equipment Corp.'s VAX-11, PDP-11 and Rainbow models; Hewlett-Packard Co.'s HP 3000, HP 125 and HP 150 systems; and IBM's mainframes and Personal Computer.

Blast is also available for Apple Computer, Inc. processors, Wang Laboratories, Inc. systems and Texas Instruments, Inc. and Vector Graphic, Inc. systems.

The IBM mainframe version of Blast for either the MVS/TSO or VM/CMS operating system is priced at $2,495; minicomputer versions are priced between $495 and $1,295; and microcomputer versions are priced at $250.

Communications Research Group is located at 5930 Jefferson Highway, Baton Rouge, La. 70809.

UNIX™ & C

HANDS-ON TRAINING

A complete Curriculum for:

End Users Management Applications Staff Technical Support

COURSES	NEW YORK	BOSTON	WASHINGTON, D.C.	SAN FRANCISCO	DALLAS	LOS ANGELES	TUITION	SEQUENCE TUITION*
UNIX Overview		Mar 6	Mar 6	Mar 13	Apr 10		$ 225	$860
Unix Fundamentals for Non-Programmers*		Mar 7-9	Mar 7-9	Mar 14-16	Feb 22-24 April 11-13		$ 735	
UNIX Fundamentals for Programmers*		Mar 12-14	Mar 12-14	Mar 19-21	Feb 27-29 Apr 30-May 2		$ 735	$1125
Shell as a Command Language*		Mar 15-16	Mar 15-16	Mar 22-23	Mar 1-2 May 3-4		$ 490	
"C" Language Programming*	Jan 23-27	Mar 19-23	Jan 23-27 Mar 19-23	Mar 26-30	Mar 5-9		$1225	
Shell Programming*	Jan 30-31	Mar 26-27	Jan 30-31 Mar 26-27	Apr 2-3	Jan 23-24 Mar 12-13	Jan 23-24	$ 490	$1125
Using Advanced UNIX Commands*	Feb 1-3	Mar 28-30	Feb 1-3 Mar 28-30	Apr 4-6	Jan 25-27 Mar 14-16	Jan 25-27	$ 735	
UNIX Internals	Feb 6-10	Apr 2-6	Feb 6-10 Apr 2-6	Apr 30-May 4	Jan 30-Feb 3 Mar 19-23	Jan 30-Feb 3	$1375	
UNIX Administration*	Feb 14-16	Apr 10-12	Feb 14-16 Apr 10-12	May 8-10	Feb 7-9 Mar 27-29	Feb 7-9	$ 735	
Advanced "C" UNIX Workshop*	Feb 27-29	Apr 30-May 2	Feb 27-29 Apr 30-May 2	May 14-16	Feb 13-15 Apr 2-4	Feb 13-15	$ 735	$1125
Advanced "C" Programming Under UNIX*	Mar 1-2	May 3-4	Mar 1-2 May 3-4	May 17-18	Feb 16-17 Apr 5-6	Feb 16-17	$ 490	
Berkeley UNIX Fundamentals and "csh" Shell*				April 9-13		Feb 27-Mar 2	$1225	

*Including hands-on training workshops **UNIX is a trademark of Bell Laboratories *Savings for consecutive seminar dates

CALL FOR DETAILS ON: • VIDEO-BASED COURSES • IN-HOUSE SEMINARS

To reserve your seminar space now or for additional information, call: (800)323-UNIX or in Illinois (312)987-4082 8:30-5:00 central time.

Computer Technology Group UNIX seminars are presented by experts experienced in teaching UNIX as well as in designing and implementing UNIX-based systems.

COMPUTER TECHNOLOGY GROUP
Our business is UNIX training.

COMPUTER TECHNOLOGY GROUP
Telemedia, Inc.
310 S. Michigan Ave., Chicago, IL 60604

SOFTWARE & SERVICES

Continued from page 47

gram for VMS. Access reportedly allows the system manager to limit access to a select group of programs and commands on a user-by-user basis. It also produces reports of each user's activities.

PBS also announced Version 2.0 of its TMX-32 Transaction Management Executive system, which the vendor said supports IBM CICS-like functions for applications where system availability and recoverability are required.

PBS also announced two device drivers that implement a variety of Binary Synchronous Communications (BSC) protocols under VMS. Both DMF/Driver and DV/Driver are said to be table-driven to support IBM's 2780, 3780 and 3270 primary and tributary protocols, as well as custom, BSC protocols.

The Spy, Photo and Advisor systems are priced at $1,500; Access is priced at $3,600, and Version 2.0 of TMX-32 is priced at $30,000. Object-code-only licenses for DMF/Driver and DV/Driver are priced at $9,000, and full source-code licenses for the two device drivers are priced at $27,000.

Precision Business Systems, 39 Rector St., New York, N.Y. 10006.

CENTURY ANALYSIS, INC.
List/8

Century Analysis, Inc. (CAI) has announced List/8, an end-user list management system designed to allow workstation users of NCR Corp. mainframes to input, manage, display and print data.

List/8, according to the vendor, can be used with CAI's Boss/3 and Impact/6 teleprocessing monitors on NCR's 8400, 8500 and 8600 series mainframes. The system is said to simplify the entry, maintenance and printing of information.

The List/8 system is also said to feature a simplified menu structure and screen prompts, and users can create their own entry screens appropriate to their data format. Data can be extracted by field name from one file into a new file, sorted into any sequence by specifying the field name, selected based on field contents and selected by exact match or by matching range of values.

List/8 is priced at $2,000.

CAI, 114 Center Ave., Pacheco, Calif. 94553.

TRIANGLE SOFTWARE CO.
Netcheck

Triangle Software Co. has announced Netcheck, a system management facility for IBM's DOS and OS operating systems that includes IBM's CICS/VS Version 1.5 and above.

The vendor said Netcheck solves the problem of CICS network control and allows a network operator to control and identify the status of any resource in the network. Netcheck reports when there is a resource failure anywhere in the network; creates an on-line data base on all resources, such as terminals, control units and lines; and allows the network to be dynamically organized and controlled.

The system is also said to eliminate the four-digit identification code restriction of CICS by allowing up to 20 characters. The on-line data base created by Netcheck is said to provide profiles on all resources and groups, including the CICS terminal identification, the specific location of the resource and the IBM Vtam node name.

Netcheck is priced at $8,500 for DOS/VSE and $12,500 for OS/VS.

Triangle Software, Suite 108, 4340 Stevens Creek Blvd., San Jose, Calif. 95129.

DATA 21, INC.
Release 2.0 Remote Print Facility-Extended

Data 21, Inc. has announced Release 2.0 of its Remote Print Facility-Extended, an IBM CICS spooling and teleprinting package.

Operating under CICS or IBM batch with IBM Power/VSE or Software Pursuit, Inc.'s Sage spooling systems, the release reportedly provides for print and display of IBM VM files on CICS terminals and printers.

It allows the printers to be shared by IBM CMS and CICS users without detaching and attaching devices, while providing printer scheduling and control of print tasks through a centralized system, according to the company.

It is available now. A permanent license is priced at $4,200.

Data 21, Suite 300-5, 3868 Carson St., Torrance, Calif. 90503.

AUBUCHON & ASSOCIATES, INC.
IBM Series/1 utilities

Aubuchon & Associates, Inc. (AAI) has announced a set of utilities for IBM's Series/1 computer.

The S/1 Machine Language Disassembler functions by disassembling memory in a specified partition and dumping memory in that partition. The vendor said this can be done in hexadecimal or Ebcdic and logged to devices such as printers and terminals or to files located on either disk or diskette.

AAI's UTDSK1 full disk handler utility is said to allow a user to handle all file management functions such as allocation and deletion of single and generic files. It also provides the user with volume management features such as define target or source, list volumes, initialize, rename volumes and list space on volume.

AAI also announced the EDL session manager editor, which the vendor described as a source formatter that will list formatted source to any terminal or printer. It also features the ability to write formatted source to a defined data set and restart formatting from a write failure.

AAI's $Monitor utility is said to provide the capability to display a common menu on all controlled CRTs. The system provides control of terminals by start and stop commands, and built-in functions allow a user to stop any program or terminal.

In addition, AAI announced Utility Job Running, which allows a user to display the time of system backup on the main menu. After the backup, all terminals are automatically started by the utility, and the main menu is displayed ready for the next day's work.

The AAI utilities are priced between $250 and $1,000.

AAI, Suite E, 5523 Red Bridge Road, Kansas City, Mo. 64137.

SIMWARE, INC.
Sim/Passthru

Simware, Inc. has announced a package designed to allow intercomputer communications among IBM mainframes using IBM's MVS and VM operating systems.

Sim/Passthru is intended for use by large installations, in particular those with two or more mainframes, the vendor said. It is designed to allow users with IBM 3270 terminals on MVS to access the central processor of the VM system and terminals on the VM system to access the MVS system without extensive hardware and software changes.

It is said to provide a direct link between the systems through a binary synchronous line of communications and to support 64 terminals with a single binary synchronous line or more terminals with multiple lines.

Sim/Passthru is leased for $7,500 per year.

Simware, 969 Bronson Ave. Ottawa, Ont., Canada K1S 4G8.

VM SYSTEMS GROUP, INC.
V/Force

VM Systems Group, Inc. has introduced V/Force, a software product that is said to solve the problem of the "hung-up" user or virtual machine for the system product installation.

A user can be hung up because the end of an I/O operation is not signaled correctly, a frequent occurrence with tape drives, the vendor said. When that happens, the user becomes stuck, and other users may also be unable to work. V/Force removes the problem user's operation from the system, allowing normal system operation to continue, the vendor said.

V/Force is priced at $2,050 per year.

VM Systems Group, 3123 N. Military Road, Arlington, Va. 22207.

AVP SYSTEMS, INC.
Verazip System

AVP Systems, Inc. has announced the Verazip System, which is described as a Zip Code verification system for use with IBM's Vsam and Isam or any Ansi Cobol-74-compatible software.

The Verazip System reportedly allows the user to validate Zip Codes on files or on input transactions. It consists of a data base of all valid Zip Codes in the U.S. and a series of programs that are used to access the file, edit the data and print or display the results. Programs are also included to maintain the Zip Code file and to provide on-line capabilities.

The Verazip System leases for $1,900 the first year and $950 for each subsequent year, according to the vendor.

AVP Systems, 237 Washington St., Marblehead, Mass. 01945.

See SYSTEMS page 52

Is Your Computer Talking to Strangers?

Without changing your current software, you can put a DialSafe unit between your computer and your modems. The DialSafe will accept an ID and password entered from the user's terminal, and call the user back. The user does not gain access to your computer until the auto call-back is successfully completed.

There are two DialSafe models. The DialSafe 3 serves up to 65 users, using three ports to access the host computer. The DialSafe 3Plus has added switching capability so the users can switch from one computer to another. Each port is configurable.

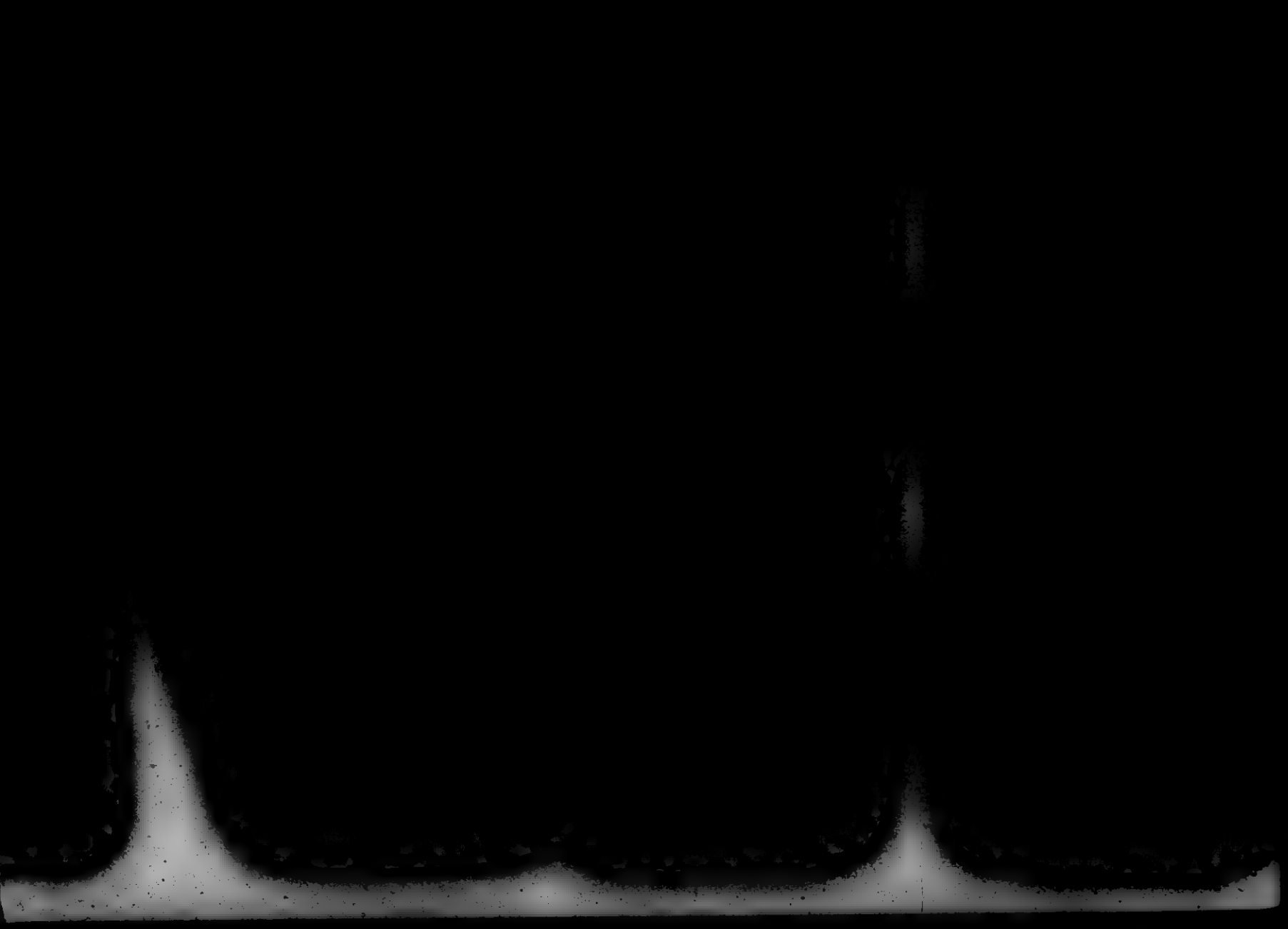
All DialSafe units have an optional printer port that enables you to keep track of incoming calls. And DialSafe units are designed for easy expansion; each one you add becomes part of your rotary system the minute it is installed.

DialSafe units are the most economical way to make your computer safe from strangers. Call today: Backus Data Systems, Inc. 1440 Koll Circle, San Jose, CA 95112 (408) 279-8711.

DialSafe gives you auto call-back, multi-channel security for less than $300 a port.

Backus
DATA SYSTEMS, INC.

A Subsidiary of Astronautics Corporation of America



SOFTWARE & SERVICES

SYSTEMS from page 48

COMPUTER NETWORKS, INC.
Honeylink

Computer Networks, Inc. has announced Honeylink, a Honeywell, Inc. VIP 7800 series terminal emulator for the IBM Personal Computer.

According to a spokesman, Honeylink combines hardware and software to provide the user with an emulator for either synchronous or asynchronous communications. It is said to be fully compatible with the full series of Honeywell 7800 video display terminals.

Honeylink reportedly provides standard terminal features, such as 72-line scroll, a buffered printer adapter and file transfer capabilities to transfer data between the Personal Computer and the Honeywell host computer. It is priced at $906.

Computer Networks, Suite 220, Building 6, 799 Roosevelt Road, Glen Ellyn, Ill. 60137.

PRODUCTIVITY AIDS

AMER-CAL, INC.
Productivity Tools

Amer-Cal, Inc. has announced three productivity tools for users of Cincom Systems, Inc.'s Mantis applications development system.

The Mantis Batch Submit (MBS) facility for IBM's DOS/VS and DOS/VSE operating systems is said to allow a Mantis program to submit jobs to the IBM Power reader queue. The JCL is defined in a Mantis interface which is created by the MBS facility, and information such as date cards or other parameters may be passed to insert into the JCL at execution time.

The Mantis Subroutine Library (MSL) is said to be designed to provide those structures commonly used in business, such as add, change, delete, display and browse, along with common subroutines needed to support those structures.

The Enhanced Mantis Security (EMS) is said to be a generic security system that provides Mantis security at the program function key level. The package is said to be resource efficient, and it allows for consistency and auditability.

MBS is priced at $2,000 or leased for $100 monthly; MSL is priced at $7,500 or leased for $375 monthly; and EMS is priced at $5,000 or leased for $250 monthly.

Amer-Cal, 115 E. University Drive, Arlington Heights, Ill. 60004.

MVC ASSOCIATES, INC.
Ramis II Reporting

MVC Associates, Inc. has announced Ramis II Reporting, which the vendor described as an addition to its interactive computer-based training library.

The system is said to utilize full screen simulation techniques to provide the student with education in the use of Mathematica Products Group's s Ramis II fourth-generation programming language. The course is compatible with IBM's Interactive Instructional System and Goal Systems International, Inc.'s Phoenix, according to the vendor.

Ramis II Reporting is interactive and self-instructional, and the simulation techniques are used to support the tutorial.

Ramis II Reporting can be purchased for $5,500 or leased at $250 per month.

MVC Associates, 849 N. Summit Ave., Lake Forest, Ill. 60045.

APPLICATION PACKAGES

ENHANCEMENT SOFTWARE CO.
Vsecalc

Enhancement Software Co. has announced an electronic spreadsheet system for IBM mainframes operating under IBM's DOS/VSE operating system.

The package reportedly provides three separate methods of creating and accessing spreadsheets: through CRTs, from user-written programs via subroutines or through batch.

The Vsecalc spreadsheet contains 64 columns and 512 rows. Cells may contain either string or numeric data or formulas that are used to calculate the value of the cell by using the values in other cells on the spreadsheet, the vendor said.

Other features reportedly provide variable column widths and attributes, random-number generation, table lookups, sorting, true/false logic, spanning of string values over column boundaries, spreadsheet merging, moving, copying and replicating of cells and cell protection.

The package is available now and is priced from $3,500.

Enhancement Software, P.O. Box 6276, High Point, N.C. 27262.

OUTLOOK SOFTWARE, INC.
Version II of Outlook/38

Outlook Software, Inc. has announced Version II of its Outlook/38 financial modeling package for the IBM System/38.

A spokesman said Version II provides more than 50 enhancements and features, including 22 predefined financial and statistical functions giving the package a total of 53 such functions.

The added functions include internal rate of return, linear regression, accelerated depreciation, least-squares forecasting, amortized repayment of principal, amortized principal amount, weighted average, correlation analysis, covariance and ranking.

The spokesman said calculations

SOFTWARE & SERVICES

can now be specified down to the element or cell level, both for model-level calculations and consolidation calculations, according to a spokesman for the vendor.

Version II of Outlook/38 is priced at $3,450.

Outlook Software, Suite 117, 1 Woodfield Lake, Schaumburg, Ill. 60195.

SHAWWARE, INC.
Stores System

Shawware, Inc. has announced the Stores Inventory and Purchasing Management System for the IBM System/34, System/36 and System/38 processors.

According to a spokesman, the Stores System comprises three modules that can be purchased separately or as an integrated system.

The purchasing management module automatically generates purchase orders and provides on-line inquiry into both the status of outstanding purchase orders and vendor performance levels.

The inventory management module provides maintenance of on-hand balances in both dollars and quantity for all products by warehouse location. The system generates suggested reorder reports. The accounts payable system provides audit controls while allowing flexibility in entering transactions, a spokesman said. The system also automatically produces and reconciles checks.

The complete Stores System is priced at $20,400 for the System/34, $25,200 for the System/36 and $28,000 for the System/38.

Shawware, 3405 Harvester Road, Burlington, Ontario, Canada L7N 3N1.

MANUFACTURING SOFTWARE SYSTEMS, INC.
MRP II Software Audits

Manufacturing Software Systems, Inc. has introduced MRP II Software Audits, an evaluation service for companies purchasing manufacturing resource planning software.

The company reviews any software package or in-house application. The service reduces evaluation time from nine to 12 months to two to three months and finds problems that companies often overlook, the vendor claimed. The reports do not recommend any package, but state facts and allow the buyer to draw his own conclusions.

The service costs $1,200/day plus expenses.

Manufacturing Software Systems, 85 Allen Martin Drive, Essex Junction, Vt. 05452.

UNILOGIC LTD.
Scribe for Unix version

Unilogic Ltd. recently announced that a version of its Scribe package for drafting, formatting and printing documents, is now available for use under the University of California at Berkeley's 4.2 Unix running on the Digital Equipment Corp. VAX-11 series.

Scribe is used to produce reports, technical manuals, proposals and similar documents and is reportedly able to print on a wide range of output devices.

The version for 4.2 Unix is provided free to all Scribe maintenance customers licensed as VAX/Unix sites. The product is available for a one-time license fee of $25,000, and maintenance fees are $200 per month.

Unilogic, 160 N. Craig St., Pittsburgh, Pa. 15213.

MCBA, INC.
P/O

MCBA, Inc. has introduced a purchase order package written in Cobol for Wang Laboratories, Inc.'s VS family of minicomputers.

The Purchase Order and Receiving (P/O) package reportedly can create and maintain purchasing records. It is capable of predicting cash requirements, monitoring vendor performance and preventing shortages of needed material, the vendor said.

P/O is said to permit on-line entry and editing of purchasing data, printing of purchase orders, correcting of purchase orders and cancellations. It also supports blanket purchase orders and drop-ship purchase orders, the vendor said.

A source code license ranges from $3,000 to $9,000 depending on the VS model.

MCBA, 2441 Honolulu Ave., Montrose, Calif. 91020.

SATCOM COMPUTING, INC.
QMS

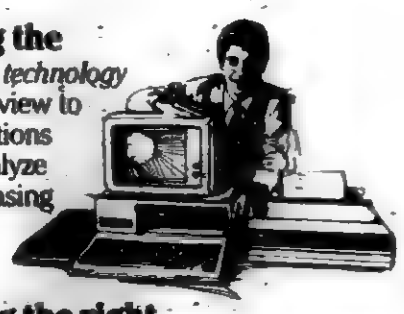
Satcom Computing, Inc. has introduced a quality and manufacturing system, QMS, that operates on Hewlett-Packard Co. HP 3000 series computers. Written in Cobol, it uses Hewlett-Packard's Image data base management system.

QMS is parameter driven and consists of four integrated subsystems which span eight data bases. Modules include quality and specifications, materials, order processing and production management reporting, according to the vendor.

The license fee for the four mod-

Continued on page 54

1."How can I be sure I'm getting the latest technology?" At GE, we're a *technology company.* So we have the technical overview to be familiar with major data communications developments. Plus the resources to analyze every piece of equipment we consider leasing to you. So you not only get the *latest.* You get the *best.*



2."How can I be sure I'm getting the right equipment for me?" We will help you analyze your need and likely growth pattern. Then help you decide on the equipment that's right for *you,* from a number of the industry's top manufacturers—like Micom, General DataComm, and IBM, to name a few.

3."How can I be sure I'll get the service I need—when I need it?" General Electric's nationwide service network is just a phone call away. Over 60 locations, with the people *and* parts you need—which usually adds up to *same-day* response.

We even carry the little stuff, like ribbon, paper, cassettes and disks—to save you valuable space.

4."How can I afford it all?" Our leasing alternative helps you conserve capital and credit, eliminate obsolescence, cut overhead, and may give you greater tax advantages than buying.

And with General Electric's service network *behind* the lease, you can minimize downtime—adding up to what may be the best *value* in the business.

GENERAL ELECTRIC.

5."How do I stop worrying?" Call us. We have the answer to practically *any* data communications question—your one-source solution, with the equipment, know-how, service, leasing—and the *security* that comes from dealing with GE.

For the phone number of the sales center nearest you, call 800-528-6050, Extension 406. (In Arizona, 800-352-0458, Extension 406.) Or write General Electric Company, Communication Leasing and Service, Building 4, Room 210, Schenectady, New York 12345.

GENERAL ELECTRIC

REPORT WRITER
for DEC computers
under RSTS and VMS

- Very powerful and user-friendly
- Better than DEC's Datatrieve
- Costs much less

etc ENTERPRISE TECHNOLOGY CORPORATION

SOFTWARE & SERVICES

Continued from page 83

sales is $135,000, which includes documentation, and a one-year product warranty.

Satcom Computing, 4530 Professional Circle, Virginia Beach, Va. 23455.

ROBERT ROUTMAN & ASSOCIATES
Impact 34/36

Robert Routman & Associates has announced Impact 34/36, a wholesale distributor software system for IBM System/34 and System/36 computers.

The package is designed to help wholesale distributors control their daily operations, the vendor said. It covers functions including order entry, pricing flexibility, invoicing, back orders, drop shipments and special orders, accounts receivable, purchasing, inventory control and manufacturer's programs.

The system also includes payroll, inside telephone salesmen's and outside salesmen's commissions, sales analysis programs, warehouse production, truck routes and catalog programs, the vendor said.

Impact 34/36 is available for a one-time license fee of $34,500, according to the vendor.

Robert Routman & Associates, 17 Colonial Drive, Youngstown, Ohio 44505.

DATA BASE MANAGEMENT SERVICES

PRIME COMPUTER, INC.
Prisam; Discover

Prime Computer, Inc. has announced a data base management product and an enhanced version of its data base management system (DBMS) Query and Report Writer for use in commercial environments with high-volume transaction processing.

Primes access method, Prisam, reportedly combines an Isam data model with automatic recovery. Concurrent data access control and automatic recovery are provided through Prime's Roam, allowing for system halts, media failure and software error, according to the company.

Discover is an enhanced version of the DBMS Query and Report Writer. It is said to update Prisam files and handle ad hoc queries and reports.

Prisam and Discover run on Prime 50 series, 32-bit superminicomputers. Prisam will be available March 19, and Discover will be available May 15.

Prisam is priced at $6,000. Discover is priced at $4,000 with Prisam support and at $10,000 with Prisam and Prime's DBMS.

Prime Computer, Prime Park, Natick, Mass. 01760

LANGUAGES

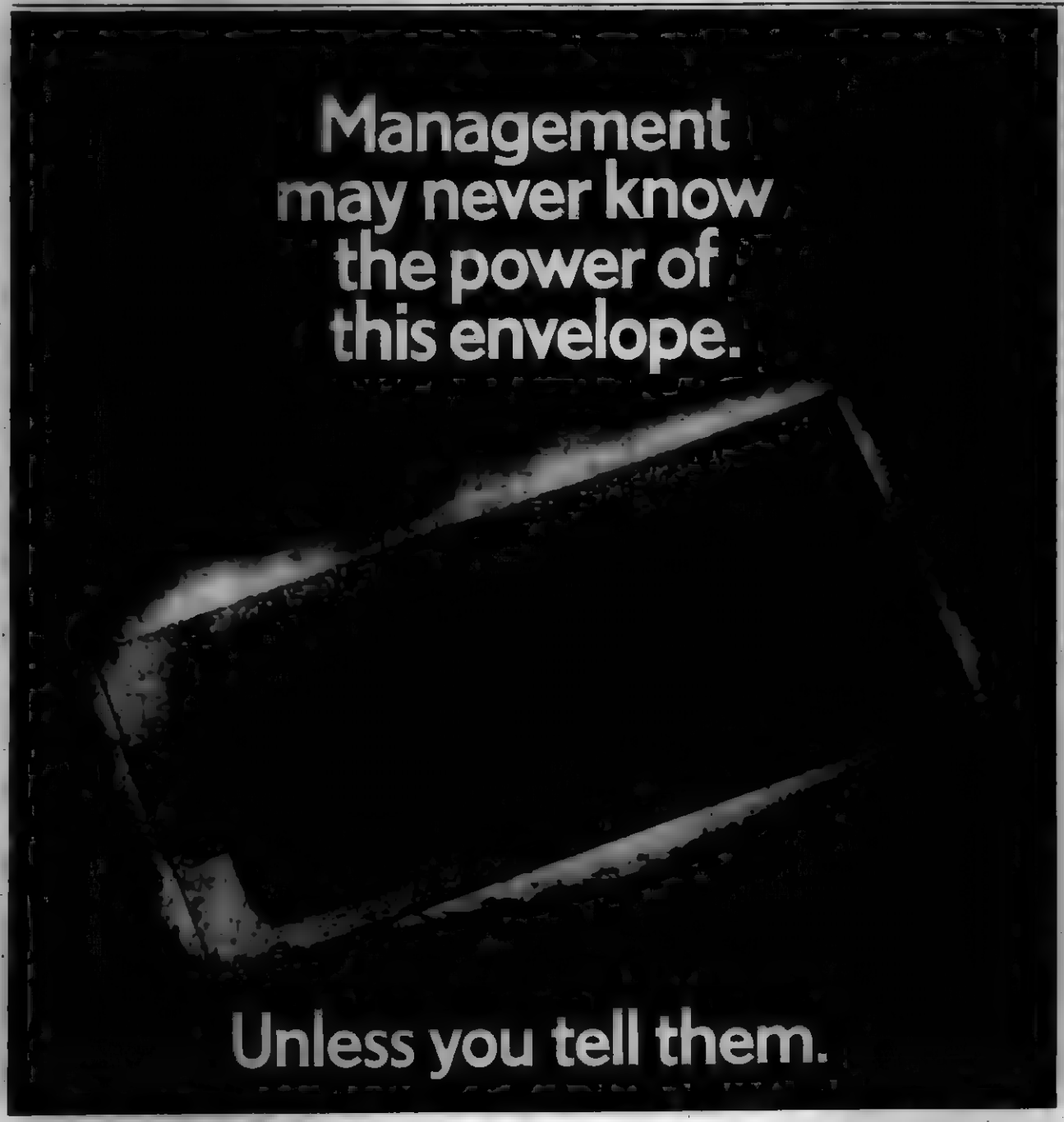
CRWTH COMPUTER COURSEWARES
Using Ramis II

Crwth Computer Coursewares has introduced "Using Ramis II," a computer-based training (CBT) course for Mathematica Products Group, Inc.'s Ramis II fourth-generation programming language.

The course runs on CBT presentation systems such as IBM's Interactive Instructional System, Goal Systems International, Inc.'s Phoenix or Boeing Computer Service Co.'s Scholar/Teach 3. It can run on IBM's TSO and CMS or any other operating system for IBM mainframe computers.

"Using Ramis II" can be leased for $3,750/year or purchased for $7,500. The license includes all new releases at no extra charge.

Crwth Computer Coursewares, Suite 900, 619 Wilshire Blvd., Santa Monica, Calif. 90401.



You don't have to tell management how easy it is to implement "E-COM" service. That can be your secret. Tell them instead about the power of an E-COM service mailing. How letters can be sent right from the company computer. How the Postal Service prints, folds, inserts, seals and delivers these letters for you. How the distinctive blue envelopes of E-COM service lend visibility and impact to your mailing.

Since you're the one who gets E-COM service up and running, you have three options—all of them easy. First, you can write the system interface yourself. It takes about a day, and Postal Service consultants are standing by to give you any help you need. Second, you can buy a dedicated interface from a third-party vendor. Third, you can access E-COM service through an independent communications carrier, without bringing the system in-house at all.

As part of the D.P. department, you're in a unique position to tell your management about the power of E-COM service. So find out more. Send us the coupon you see here. You may never again get so much credit for so little work.

"Electronic Computer Originated Mail

For more information on E-COM service, mail this coupon to: J-1
U.S. Postal Service
E-COM service, P.O. Box 23990
Washington, DC 20026-9989
Or dial toll-free 1-800-842-9000 Ext. 300

Name_____
Title/Position_____
Company/Organization_____
Street Address_____
City, State, ZIP Code_____

E·COM DELIVERS IMPACT.

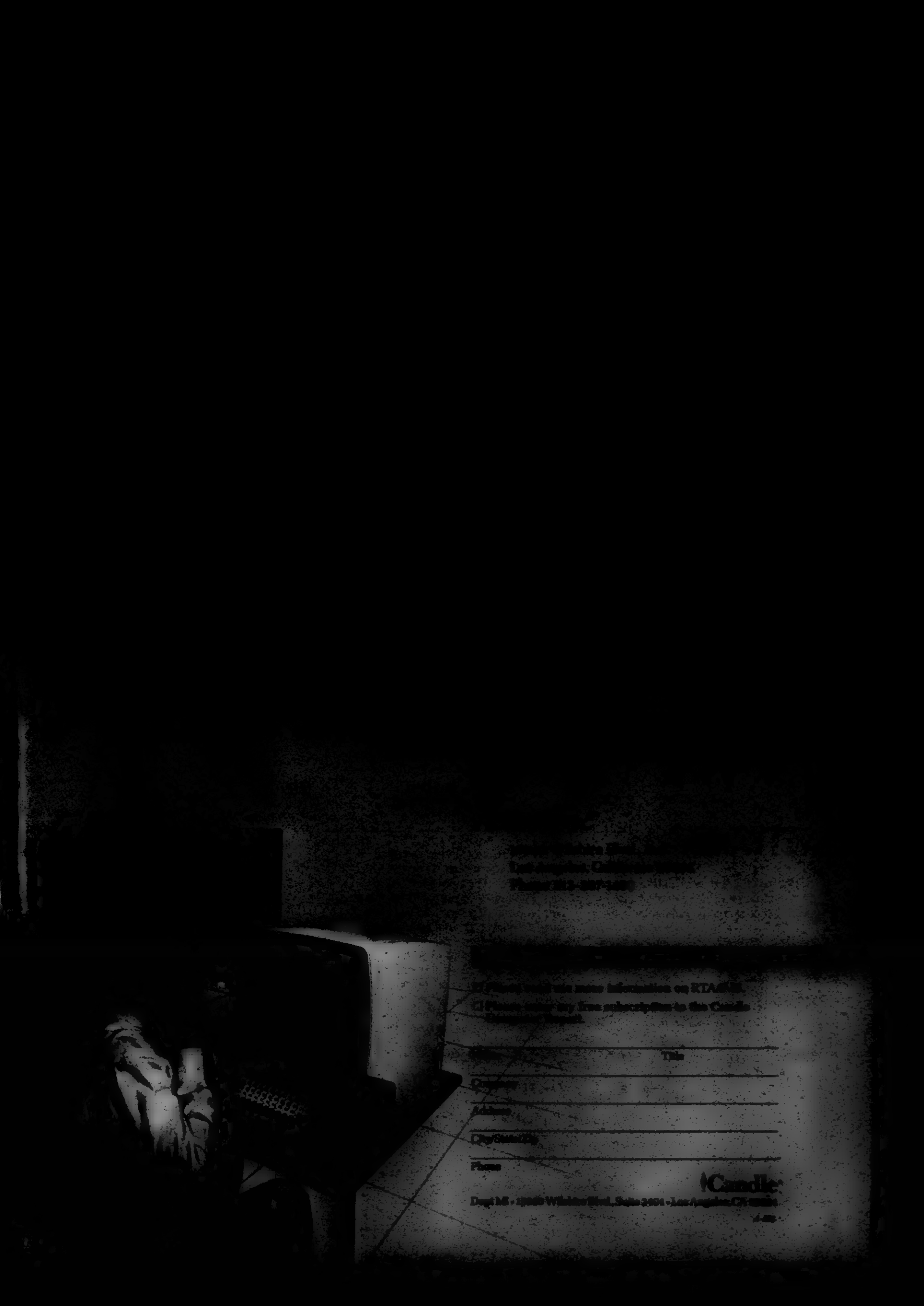
SECURE from page 45

up, the possibility of accessing protected resources through batch or TSO still exists.

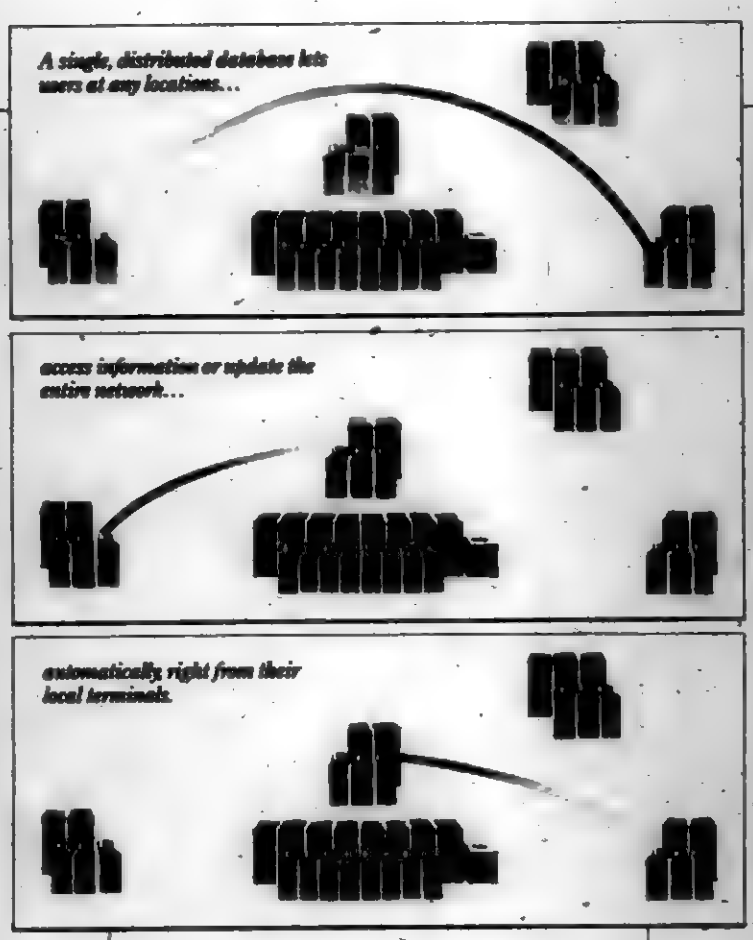
Your goal is dependable security for all the facilities in your data center. A single comprehensive security package satisfies that goal and is easier than multiple products to evaluate, learn and use.

And it provides an extra bonus: satisfied users.

Sposato is a senior security consultant with CGA Software Products Division, located in Marlboro, N.J. 07746.


Please send me more information on RTA/M.
Please enter my free subscription to the Candle
Name
Title
Company
Address
City/State/Zip
Phone
/Candle
Dept. MI • 1999 Wilshire Blvd., Suite 2301 • Los Angeles, CA

The Tandem NonStop Network eliminates information float.



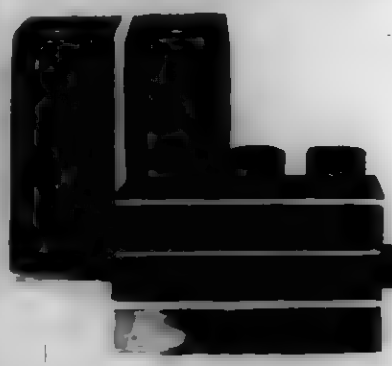
Information float. It's when your sales manager in Phoenix needs accurate inventory information from the warehouse in Atlanta—and at the exact same time a salesman at the Seattle office is asking for the product. Or when your plant foreman in Boise needs clarification on product specs from the engineering manager at the lab in Boston. When *any* of your people, in short, has an immediate need for timely, up-to-the-second information from people at other locations—and can't get it. That's information float.

Tandem's NonStop network solves the problem.

A NETWORK OF NETWORKS

With a Tandem information system, it doesn't matter where you're sitting—you've got complete and instantaneous access to the information you need—regardless of whether it's across town, or clear on the other side of the world.

The reason is simple. Each Tandem NonStop computer system has been designed from the ground up as a total information/communications system. Which means that each system is actually a self-contained network. A network that encompasses interprocessor communications in a single system at one physical location, and extends all the way to a 255-system configuration spread across the globe.



Phoenix/ Sales

By putting the most often used data on the local system, you get faster response time and lower communications costs.

way you work.

This approach to system design conforms to the way information is actually used and communicated throughout an organization—at different times by many people in various locations and at different levels of responsibility. That means that you can place the information you deal with most on your local system, giving you better response times for your users, lower communication costs, and independence from any problems that might occur at other points in the network.

In addition, because each location needs different *kinds* of information, the Tandem system lets you determine up front which departments can access what kinds of data. The result is that network-wide data is always available for corporate-level reporting and management, while the appropriate local data is available for managerial decision-making at each department, office or facility.

Tandem systems can be linked to other mainframes or networks (including SNA); a state-of-the-art fiber optics system for connecting hundreds of processors within your headquarters or plant; a

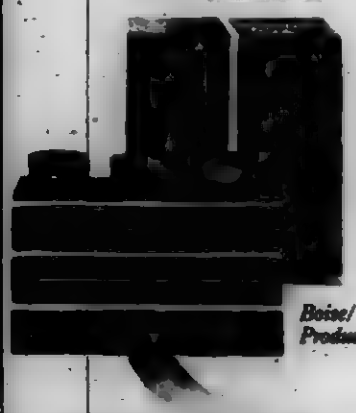
satellite link (in conjunction with American Satellite Company) for connecting widely dispersed offices; and an advanced communications package, called TRANSFER,™ to manage it all.

Plenty of room to grow. And change.

Tandem's modular approach to hardware design gives you a simple, ongoing, "building block" procedure for system expansion or rearrangement. You don't have to know up front exactly what your configuration will be. Or how—and when—it might change again. The result is that your original investment in equipment and program is always protected.

THE KEY IS A SINGLE, DISTRIBUTED DATABASE

Tandem's unique ENCOMPASS™ DBMS actually distributes a single, unified database across the entire network, providing your users with two important advantages: first, no matter where they are on the network, they can access data from anywhere else, without having to know where the data is located.



Boise/ Production

And second, by simply entering information at their local terminal, your users are instantaneously updating every single node in the system—automatically.

Relating data to information.

The key to manipulating data in such a simple, straight-forward manner is Tandem's high-performance relational database. Because setting up files merely involves creating or filling in tables with data records, no device-dependent "pointers" are used to maintain relationships, making the database extremely easy to use.

New files can be set up at any time, in any location—just by adding new tables or rows. This allows you to reconfigure your data files as needed, transferring the most often used files to the local node. So you can be continually fine-tuning your system, moving your data to where it makes the most sense, with no penalties in performance. In the proc you are reducing the float on info tion by dramatically lowering user onse time, as well as saving networ sources and increasing overall syste rformance.

Boston/ Engineering

WHEN YO NEED IT WITHOUT FAIL

From the CPU itself to our new satellite links, the entire system is maximized for completely fault-tolerant operation. If any component fails, the corresponding device or alternate data path automatically takes over and performs the function. And the defective unit can be repaired or replaced witho shutting down the s

Chicago/ Corporate

At corporate headquarters, management has network-wide access to continuously updated information for operations and reporting.

The data protection solution.

On the software side, our ENCOMPASS database manager includes a special subset called the Transaction Monitoring Facility (TMF), which is devoted solely to ensuring network-wide data integrity and recoverability.

With TMF, the system maintains an audit trail of all transactions, protects files from access when the database is in an intermediate state, and provides complete backout and roll-forward recovery procedures if a transaction cannot be completed for any reason.

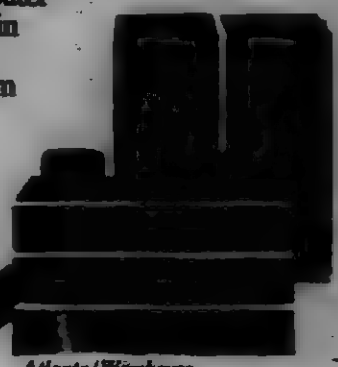
In addition, Tandem's GUARDIAN™ operating system complements the ENCOMPASS database manager to oversee all aspects of NonStop architecture, ensuring that all database linkages are consistent at each node of the network.

THE TANDEM SUPPORT NETWORK

Whether it's a two-processor system or a 255-system global network, the Tandem NonStop network is uniquely suited to the complete information requirements of multi-divisional, multinational corporations.

Tandem provides local sales and service support around the world. Including fourteen software education centers in the U.S., Canada and Europe offering professional technical training courses for your programmers and analysts.

For more information on the Tandem NonStop computer network, mail in the postcard, contact Tandem at 800-482-6336, or call your local Tandem sales office.



Atlanta/ Warehouse

TANDEM
NonStop Transaction Processing

Tandem Computers Incorporated
19333 Vallco Parkway
Cupertino, California 95014

SOFTWARE & SERVICES

REMOTE COMPUTING SERVICES

FINREPORT COMPUTER SERVICES, INC.
Twilight Service

Finreport Computer Services, Inc. has announced the Twilight service, a time-sharing service for IBM's VM/CMS-based operating systems.

The Twilight service will operate weeknights from 7 p.m. to 7 a.m. and weekends from 7 p.m. Friday to 7 a.m. Monday.

It offers a choice of programming languages, including Cobol, PL/I, Basic and Fortran, along with other VM/CMS operating-system-based products.

Twilight service is priced at $10/hour, and access is reportedly provided at a dial-up rate of 300 to 1,200 bit/sec through Tymnet, Inc.'s Tymnet.

Finreport Computer Services, One Moody Street, Waltham, Mass. 02154.

ON-LINE DATA BASES

BUSINESS RESEARCH CORP.
Investext

Business Research Corp. has announced an on-line data base designed to provide financial data on 101 American and foreign computer and data processing companies.

Investext is said to contain more than 400 reports from 27 investment banking firms on the 101 companies, as well as almost 600 reports on the computer industry and related industries.

Investext can be accessed by personal computers and terminals supported by a 300 bit/sec or 1,200 bit/sec modem.

The price is $95/hour, plus the cost of telecommunications and $4.50 per 3,000-char. electronic page. A typical eight-page report costs about $40, according to the company.

Business Research, 1660 Soldiers Field Road, Boston, Mass. 02135.

INTERACTIVE DATA SERVICES, INC.
Institutional Bond Quote Service

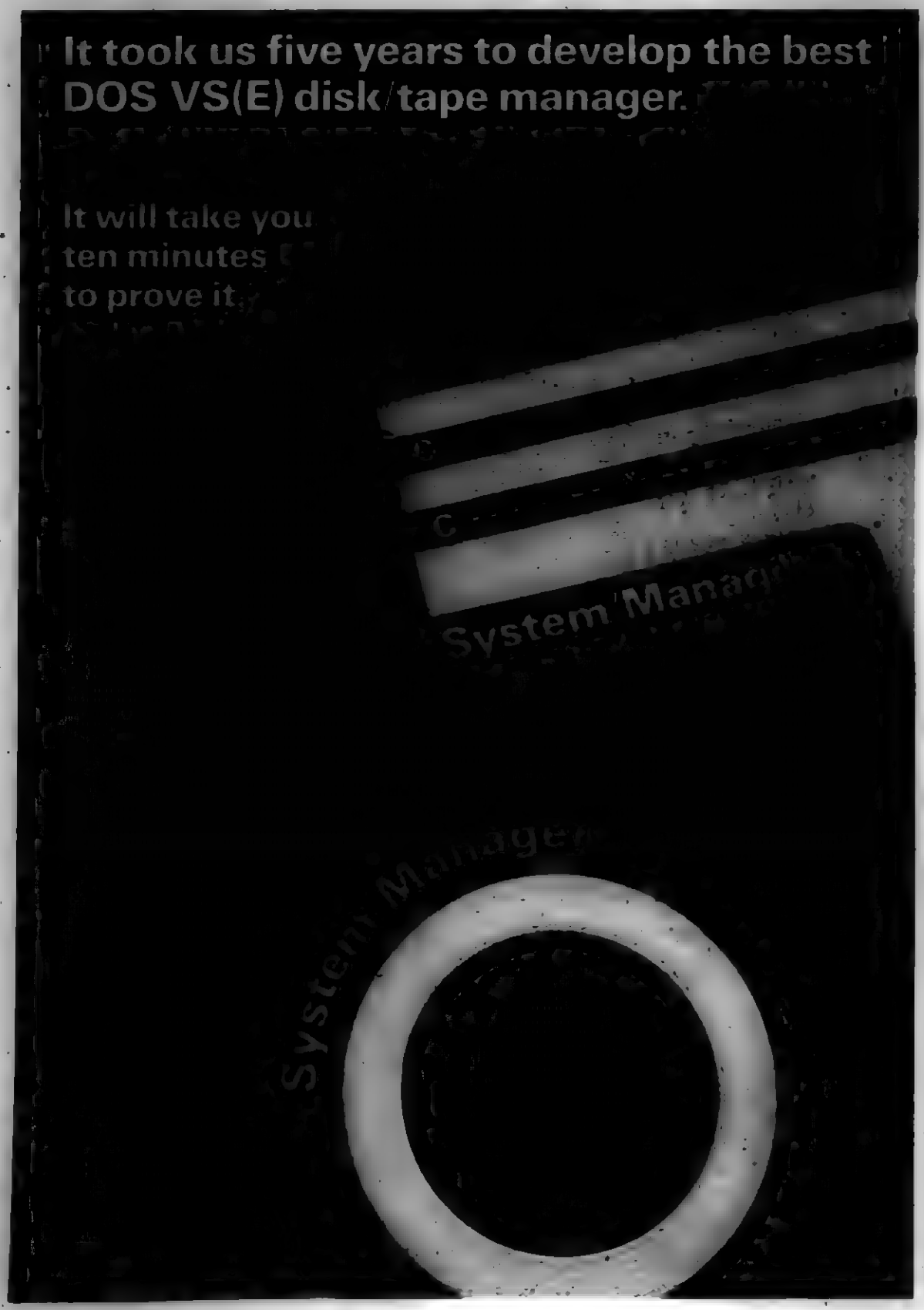
Interactive Data Services, Inc. has announced a quotation service designed to provide daily institutional bond prices.

Institutional Bond Quote Service is said to provide daily lot price quotations at 7:30 p.m. EST for bonds listed on the New York and American Stock Exchanges and more than 10,000 over-the-counter bonds.

Quotations are available on magnetic tape or by direct transmission to mainframe-type computers. Quotations are also available on-line for time-sharing users of Interactive Data Corp.

Prices vary according to the frequency of use, ranging from $8,500 per year for monthly quotations to $26,000 annually for daily quotations. In addition, customized service is available for 25 cents per quotation.

Interactive Data Services, 22 Cortlandt St., New York, N.Y. 10007.



COBOL from page 45

over the continued viability of Cobol in an environment that is starved for productivity improvements. In the past few years, fourth-generation languages have proliferated to the point that application development tools are now offered by virtually every major systems software vendor. These products are now beginning to be used for production-scale applications.

The drawback is that most of these tools still generate specialized code in which programmers must be educated to be productive. As more and more applications are developed in high-level languages, the industry's large existing body of Cobol knowledge becomes less useful.

If Cobol can be modified on a regular schedule to incorporate more of these high-level capabilities, it can establish itself as an alternative to the new languages, Garfunkel believes.

He points to the fact that some vendors have chosen to take their own course and introduce compilers based upon the proposed Ansi standards before ratification. Thus the problem of proliferating versions of the language becomes even more acute. Frustration will build and incompatibility problems will only persist if the 10-year-plus lag in the addition of new features persists.

The Garfunkel resolution is intended to keep Cobol in step with the fourth-generation languages by enabling the standard to be upgraded with new capabilities on short notice.

However, the change also poses some serious hazards. Cobol is already hamstrung by the fact that some shops have never even converted from the 1968 standard. If a new version of the language emerges every two years, the stage will be set for an unprecedented spread of diverse compilers.

But is that incompatibility problem any worse than the one already presented by the multiplicity of high-level languages? If present trends continue, the industry will find itself in a situation in which one shop has Mathematica Products Group, Inc.'s Ramis, another uses Information Builders, Inc.'s Focus and another programs in Oxford Software Corp.'s UFO.

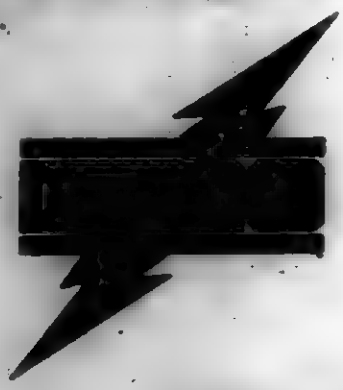
If Cobol can be made competitive with fourth-generation languages, it will at least provide an outlet for programmers who are already skilled in Cobol to take advantage of their knowledge.

Incredible as it seems, even Big Blue needs to be bailed out now and then. Personal computers are such a runaway success, they're running Information Managers ragged. The problem is personal computers and mainframes don't always work together.

The result is Computer Shock. And nothing short of a HERO™ can cure it.

HEROISM COMES TO PERSONAL COMPUTING.

HERO is the intelligent, desktop Networked Personal Computer from MDS®. It does everything a personal computer can do. And lots that it can't. But HERO's main fame derives from its interaction with the mainframe.



INTELLIGENCE AT EVERY STATION.

Mated with the MDS SUPER 21™ Communications Processor, HERO can converse intelligently in IBM networks. HERO emulates IBM 3270 SNA and the 3776 remote-job-entry systems. Our SUPER SNA™ option gives you both on one communications link. HERO runs software under MS-DOS. Plus its own multitasking operating system.

HEROS UNITE AND CONQUER.

With MDS HERO and SUPER 21, you can access private, departmental and corporate databases. Instead of not working, your entire organization can be networking. Under your control.

And only MDS offers you INTELLIGENT 3270™. So you can write your own programs and integrate them with data in the mainframe. HERO lets you retrieve information from the database, process it, display it and update it. Then either return it or store it locally.

EVEN HEROS NEED ALLIES.

In addition to HEROS, SUPER 21 is available with non-intelligent workstations within INTELLIGENT 3270 networks. MDS offer the PLUS 80™ family of plug-compatible controllers, printers and displays. They're directly interchangeable with corresponding IBM 3270 units.

MDS HERO MAKES A HERO OUT OF YOU.

With HERO and SUPER 21, your existing data processing investments become part of an ever-expanding fund of available data. All of it coordinated, cost-efficient and controllable.

MDS systems are planned for non-obsolescence. They're modular in design to accommodate future growth. So every MDS system, like a hero, is immortal.

GET THE ADVANTAGES OF BIG WITHOUT BEING BLUE.

MDS is a multidivisional, multinational corporation. We've grown by helping our customers to grow. By focusing our size and scope on responsiveness to their needs. Not just in IBM country, but beyond.

We can do the same for you, wherever you are. MDS offers service and support capability around the world, around the clock.

Ask our customers about us. And give us a call. Dial **800-MDS-HERO.** We'll show you how, when it comes to networking, MDS can help you unite and conquer.

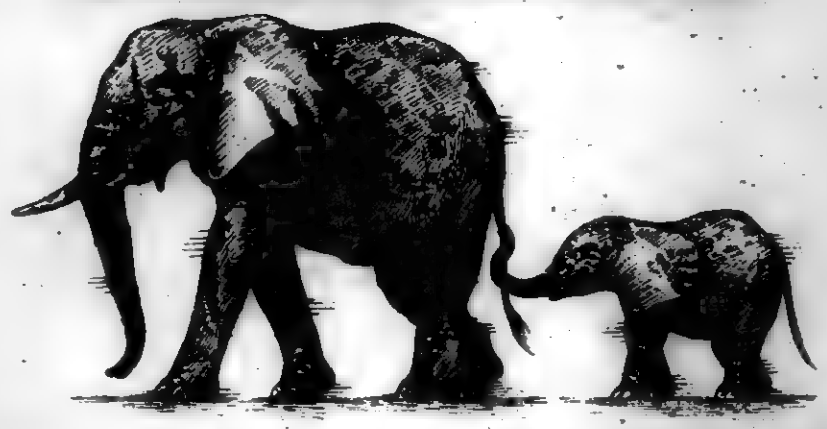
MDS MOHAWK DATA SCIENCES

7 Century Drive, Parsippany, New Jersey 07054. And over 430 locations worldwide.

MDS is a registered trademark and HERO, SUPER 21, INTELLIGENT 3270, PLUS 80 and SUPER SNA are trademarks of Mohawk Data Sciences Corp. MS-DOS is a trademark of Microsoft, Inc.

HERO SAVES IBM!

WHEN IT COMES TO LINKING PC's TO MAINFRAMES, ONE COMPANY IS A MILLENNIUM AHEAD.



You don't have to look hard to see why McCormack & Dodge has linked more PC's to more mainframes than any other business software vendor.

It's a classic case of a superior product leading to superior sales.

To begin with, our link does more than just link. It works like you do. Selectively. Analytically. And in real time—so that company decision-makers always have the freshest, latest data available. Current and accurate up to the second you display it on your PC screen.

If you've tried out other PC links, you'll notice the M&D difference the moment you start downloading information from the mainframe to your desk. For example, you'll see that you can access all applications, no matter who designed them—not just those designed by McCormack & Dodge. And you'll discover the ease of working with a system that lets you pinpoint and selectively summon exactly the portion of data you need.

Once you've called the data down to your PC, the Lotus 1-2-3 software in our link lets you crunch numbers backwards, forwards, up and down—anywhere your mind wants to take them. You can instantly construct detailed spreadsheets. You create brilliant color graphs.

And the moment you finish massaging the data to your liking, our link lets you shoot it back to the mainframe (assuming you have the proper security clearance). You do it yourself on the spot—in real time. Without keyboard operators or programmers. So the entire company has the benefit of the latest information immediately. Not days later.

The M&D PC link is one of several products in our highly acclaimed Millennium family of borderless business software. When you compare the entire Millennium concept to anything else claiming "total integration," you'll see that M&D isn't just out-linking the competition. We're out-thinking them.

WHEN YOU THINK ABOUT TOMORROW, MILLENNIUM MAKES SENSE TODAY.

McCormack & Dodge

a company of The Dun & Bradstreet Corporation

McCormack & Dodge Corporation, 1225 Worcester Road, Natick, MA 01760
Sales and Support offices throughout North and South America, Europe, Asia, Australia and Africa. 800-343-0325. Telex: 710-325-0329

COMMUNICATIONS

Sidestepping Centrex charges?

DATA STREAM

JOHN DIX
CW Senior Editor

Early this month, the Federal Communications Commission confirmed an earlier ruling on Centrex access charges [CW, Feb. 13]. Beginning on April 2, Centrex customers will pay an access fee of $2/line per month for lines in place before July 27, 1983 and a $6 fee for lines installed thereafter.

Centrex is a communications service provided by many telephone companies that provides users with features similar to, but more limited than, the telecommunications features of a private branch exchange (PBX).

The companies that offer Centrex services are rightly afraid the new access charges will drive customers away.

These customers include some of the largest telecommunications users in the country. For fear of losing them, some of the former Bell operating companies are trying to pull an end run maneuver on the access charges by filing new, lower rates with state public utility commissions that would obviate the access charges' effect.

This practice is being opposed by the North American Telecommunications Association, the trade association of independent manufacturers and suppliers of communications equipment, which argues that lowering Centrex rates is tantamount to cross-subsidization and is not in the public interest.

The former Bell operating companies counter this by arguing that if Centrex customers are forced to abandon the service, all ratepayers will suffer as telephone companies try to deal with the whipsaw effects of lost revenue and stranded investment.

How could a $2 Centrex access charge wreak such havoc, especially in light of the fact that, under the FCC access charge plan, the fees for other business lines will range up to $6 per line?

Centrex services are provided by letting users tap directly into a telephone company's central office switch, which supports all business and residential

See CENTREX page 70

National consortium proposed
To meet telecommunications needs

By Lynn Haber
CW Staff

ORLANDO, Fla. — At a meeting here last week, an ad hoc planning committee consisting of representatives from the telecommunications industry, education and government laid the groundwork for the development of a national organization for telecommunications education.

Designed to expand and improve the quality of education and training to meet the needs of the domestic and international telecommunications industry, the National Telecommunications Education Council (Ntec) will be established as a nonprofit association of organizations for users and individuals from the public and private sectors of education and the telecommunications industry.

The original call for the creation of a national consortium to meet the growing demand for telecommunications technicians occurred at the two-day Telecommunications Education Conference held in Detroit in January. That conference was jointly sponsored by MCI Communications Corp., the American Association of Community and Junior Colleges and the Association of Community College Trustees.

At the Detroit conference, Bert C. Roberts, president of MCI, told an audience of 120 participants that the demand for trained telecommunications technicians was running 30% to 50% above availability in some areas of the U.S.

At the Ntec planning meeting, preliminary charter bylaws and organizational plans were drafted. Goals established for Ntec included:

- A need for an industry education survey to identify telecommunications training materials available for use by educators and to identify current telecommunications programs offered.
- The formation of a telecommunications education institute that would be a joint venture between the North American Telecommunications Association and Ntec.
- The creation of a quarterly newsletter relating to training in telecommunications.
- The development of a national clearinghouse as a resource center where information on people, places or things related to telecommunications could be found.

See NTEC page 70

NCR unleashes product package

ST. PAUL, Minn. — In a flurry of product announcements, NCR Comten, Inc. has introduced eleven models of its 3690 communications processor; software support for the models; the Automatic Message Switch; and the Comten Communications Access Method 3 (CAM3) Release 1.0.

Ten similar 3690 processors, Models A8 through E8 (NCR does not produce a Model B8), are configured with a minimum of 512K bytes of memory and can be expanded to 4M bytes. Depending on the model and features selected, up to 512 communications lines and up to 8 channel-attached hosts can be simultaneously supported. The models can be configured for standalone, front-end or remote communications environments depending on the model specified, the vendor said.

System software support for the models includes the company's System Control Software (SCS), Communications Operating System 2/50 (COS2/50) and COS2/90, the vendor said. Prices range from $105,000 to $156,000.

The eleventh model, the T8, has 512K bytes of memory with 128 communications lines and two channel-attached hosts. System software includes SCS and COS2/50. The price is $66,000.

The Automatic Message Switch (AMS), is reportedly the first communications application program in the data communications industry to reside in an IBM Systems Network Architecture (SNA)-compatible front-end processor.

The AMS adds store-and-forward message switching services to the networking capabilities of the company's 3690 communications processor systems. The application program manages data communications with predefined terminal sets and queues messages for delivery to other terminals or host-resident applications.

Recovery, restart, retrieval and journal-

See NCR page 70

INDEX
Communications Controllers/85
Voice/Data Communications/85
Protocol Converters/85
Communications Software/85
Multiplexers/Modems/86
Test Equipment/72
Auxiliary Equipment/72

Report analyzes buying stimulus, advances in PBX mart future

WELLESLEY, Mass. — Private branch exchange (PBX) switches are purchased for voice-handling capabilities such as least-cost routing, speed calling, call restriction and direct dialing, as opposed to advanced data-handling features, according to a report released here recently.

The study, titled "The PBX Industry: A Strategic Analysis," published by Venture Development Corp., reports that the factory value of U.S. shipments of PBXs is now in excess of $1.5 billion. In five years, the market will exceed $2.5 billion.

Researchers found that the stimulus for industry growth won't be the result of a desire to create an "office of the future," and that even in the case of sophisticated third-generation PBXs, advanced data handling capabilities are desired mostly as a hedge against the possibility that they will be necessary in the future.

Data capabilities a factor

This, the report said, makes data capabilities a factor considered in selecting the specific supplier and model, but is not a factor in deciding whether or not to buy a PBX.

Researchers concluded that the office of the future evolution will proceed gradually, and Venture does not believe there will be a sudden, overwhelming demand for the new PBXs. Instead, the research company forecasts moderate growth. The more important technological advances are going to be made in the voice/data PBX field, rather than in the data-only PBX market, according to the report.

Data-only PBX sales are concentrated where large amounts of data are transferred in large companies, the report stated. They are sold to the department within the user company that also purchases local-area networks — the data processing group.

Eventually, there will be increasing integration of voice and data responsibility, the report continued, but it is unlikely that in the next few years those responsible for voice communications are going to add another PBX and a new system of interconnection unless the volume of data to be handled makes the combined cost of a voice-only and data-only PBX much cheaper than a voice/data PBX.

Venture believes that, for the next five years, sales of data-only PBXs will come from market niches that would not have been occupied by voice/data PBXs in any case.

The report is priced at $2,700 and is available from Venture Development, which is located at One Washington St., Wellesley, Mass. 02181.

BGS SYSTEMS FOR DP MANAGEMENT

COMMUNICATIONS

COMMUNICATIONS CONTROLLERS

DATAGRAM, INC.
DM2200B with Softswitch

Datagram, Inc. has announced the DM2200B communications processor with Softswitch, a system which enables Burroughs Corp. computer users to switch individual terminals selectively from host to host without affecting other terminals.

A single DM2200B with Softswitch can support a cluster of 40 terminals in the same location on multiple terminal direct interface strings. It can also support multiple RS-232 synchronous links to host computers in several other locations, the vendor said.

The communications processor with Softswitch completes the existing Datagram network architecture. Prices range from $16,000 to $21,100, depending upon configuration.

Datagram, 11 Main St., East Greenwich, R.I. 02818.

VOICE/DATA COMMUNICATIONS

M/A-COM, INC.
CP9000 Series II

M/A-COM, Inc. has announced the CP9000 Series II network node for applications such as packet- or message-switching networks.

This series utilizes a multimicroprocessor architecture capable of supporting several thousand communications lines for value-added network applications. It features some redundancy for fault-tolerant operation and security options.

Software for the series includes an X.25 packet-switching network along with routing, statistics, billing and network management and control features. Prices for a stand-alone system range from $15,000 to $250,000.

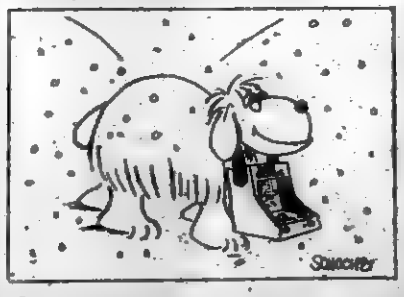
M/A-COM, 11717 Exploration Lane, Germantown, Md. 20874.

ADVANCED FIBEROPTICS CORP.
AFL-100

Advanced Fiberoptics Corp. has introduced the AFL-100 fiber-optic data link, designed for low-speed (less than 200K bit/sec) applications.

The product provides modem-recognizable signals and allows loopback testing of the transmitter and receiver electronics. The link was designed for Cmos and transistor-to-transistor logic integrated circuits, supports asynchronous and synchronous serial data transmission and requires a single 5V power supply. The link consists of the AFT-100 transmitter and the AFR-100 receiver. The price per pair is $99.

Advanced Fiberoptics, 637 S. Hayden Road, Tempe, Ariz. 85281.



PROTOCOL CONVERTERS

DIVERSIFIED DATA RESOURCES, INC.
Security feature for Hydra II

Diversified Data Resources, Inc. has announced a security feature for its Hydra II direct channel-attach protocol converter.

The new feature automatically sends a logoff sequence to the host mainframe if the line drops during communication or if the user forgets to log off.

The eight-port unit costs $6,900; the 16-port unit is priced at $9,900.

Diversified Data Resources, Suite 7, 25 Mitchell Blvd., San Rafael, Calif. 94903.

ICOT CORP.
362 protocol converter

Icot Corp. has announced the 362 protocol converter, which combines protocol conversion, line concentration and terminal emulation to allow asynchronous Ascii terminals and personal computers to emulate IBM 3270-type terminals and printers.

The product employs three processors and offers throughput for applications such as personal computer-to-mainframe file transfer. Standard features include emulation of an IBM 3274 Model 51C controller operating with Systems Network Architecture/Synchronous Data Link Control protocol, 19.2K-byte host and terminal support, split-speed RS-232C or RS-422 interfaces for asynchronous terminals and personal computers, table-driven configuration control and a message broadcast facility, the vendor said.

The standard configuration includes one host port and 16 terminal ports. The price is $9,900.

Icot, 339 Bernardo Ave., P.O. Box 7248, Mountain View, Calif. 94039.

COMMUNICATIONS SOFTWARE

MORINO ASSOCIATES, INC.
T/M Online

Morino Associates, Inc. has announced T/M Online, which the company described as an interactive TSO monitor providing real-time access to

Continued on page 68

COMMUNICATIONS

Continued from page 66

current status and utilization of TSO.

According to the vendor, using terminal displays, T/M Online assists the data center manager, operations personnel and systems programmers in tracking TSO performance, service and work-load-related problems.

The T/M Online displays the TSO System Summary Display, Response Analysis Display, Workload Analysis Display, Command Summary Display, MVS Malfunction Analysis Display, Primary Options Display, TSO User Display and Error Display, the vendor said. The price is $6,500, with a $1,300 first-year renewal fee.

Morino Associates, 8133 Leesburg Pike, Vienna, Va. 22180.

DATANEX, INC.
Version 4.0 of Hasp+

Datanex, Inc. has announced Version 4.0 of its Hasp+ communications software for users of Digital Equipment Corp.'s PDP-11 and VAX series computers.

The new version of the software supports the DEC DMF32 combination board on VAX systems. This allows users to use front-end direct memory access (DMA) capabilities at speeds to 56K bit/sec. It also provides eight DMA asynchronous lines and a DMA line printer interface. For PDP-11 users, the software supports DEC's DPV11 synchronous interface on Q-bus machines.

Enhancements for VMS users include support for automatic dialing, including alternate numbers for the same site. A new host-mode functionality has also been added to allow VMS systems to act as the mainframe in a remote job entry network. The price is $5,500.

Datanex, P.O. Box 1738, Eugene, Ore. 97440.

EDUCOM
Dreams-Mailnet Interface

Educom has announced that a software interface for Mailnet, the company's international electronic mail network, is available with DCXX Software Service's electronic mail software package called Dreams.

The Dreams-Mailnet interface provides users of Digital Equipment Corp.'s PDP/11 series, running under DEC's RSTS, with a link to Mailnet. The interface allows users to create, send and receive messages directly and communicate with other users with no additional hardware or operating system modifications. The price for the package is $3,000.

Educom, P.O. Box 364, Princeton, N.J. 08540.

MULTIPLEXERS/ MODEMS

CODEX CORP.
9035 INP

Codex Corp. has introduced the 9035 INP 124-channel statistical multiplexer designed to operate in both point-to-point and multinode networking environments, including star and ring network topologies.

The network management and control capabilities of the multiplexer include performance monitoring, statistics gathering and reporting and execution of a set of local and remote diagnostics. These functions can be centralized at one site or distributed to many nodes in a network, the vendor said.

The product accommodates any mix of asynchronous or synchronous data rates and terminal types and offers additional error protection and data compression features. Standard asynchronous speeds include 75, 100, 300, 600, 1,200, 2,400 and 4,800 bit/sec, while standard synchronous data rates include 1,200, 2,400, 3,600, 7,200 and 9,600 bit/sec. The multiplexer's maximum aggregate channel data rate is 19.2K byte/sec, the vendor said.

The basic configuration includes 16K bytes of random-access memory and supports eight channels. The price is $4,500. Units will be available in April.

Codex, 20 Cabot Blvd., Mansfield, Mass. 02048.

GANDALF TECHNOLOGIES, INC.
PIN 9101E

Gandalf Technologies, Inc. has announced the PIN 9101E, an enhanced version of the company's Private Intelligent Network (PIN) 9101 X.25 packet-switching multiplexer.

The enhancements include automatic speed adjustment; Hewlett-Packard Co. protocol support for enquiry/acknowledgement block-mode terminals; X.28 support to allow the user to control his own asynchronous channel configuration; aggregate input rate of 57.6K bit/sec; full break handling; and enhanced remote profile selection, the company said.

The product functions as a network starter kit and provides access to public X.25 networks and provides a packet assembler/disassembler function for private X.25 networks, according to the vendor.

The product is available in 4- or 8-channel stand-alone or 4- to 16-channel rack-mounted versions. Prices range from $2,650 to $5,250.

Gandalf Technologies, 1019 S. Noel, Wheeling, Ill. 60090.

GANDALF DATA, INC.
Sm/LDS 349

Gandalf Data, Inc., a subsidiary of Gandalf Technologies, Inc., has introduced the Sm/LDS 349 miniaturized synchronous short-haul modem, which operates over nonloaded, twisted wire pairs at speeds up to 19.2K bit/sec within a range of 3 to 6 miles.

The modem is designed to plug directly into terminals with RS-232C, V.24 or V.28 interfaces, personal computers and other data terminal

Continued on page 72

VMTAPE

"In only one day VMTAPE has changed my tape situation from total chaos to total control."™

VMTAPE—A comprehensive tape drive and tape volume management system for the VM environment.

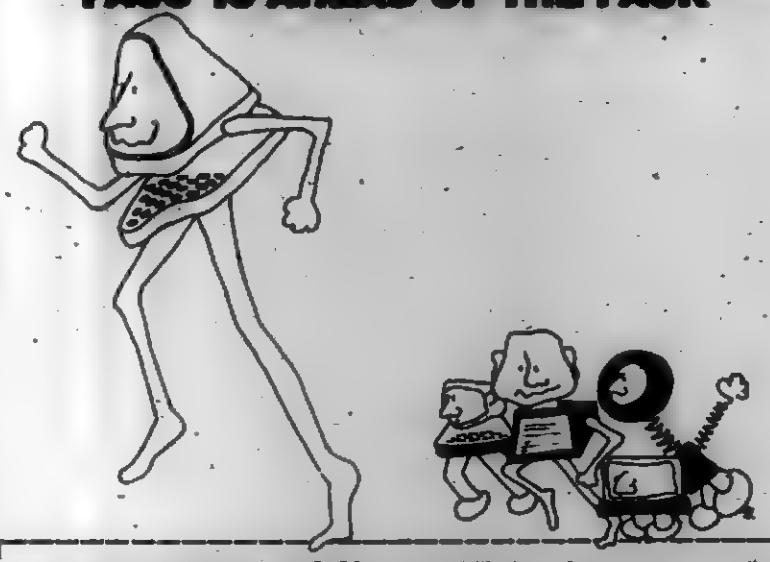
- Manages tape volumes and tape drives
- Saves data from being clobbered inadvertently by offering standard label tape support
- Provides easy management of tapes with duplicate or non-standard tape volsers
- Reduces operator tasks for each tape mount from 8 to 2 by transferring decisions to VMTAPE
- Services multiple requests concurrently
- Uses a multilevel authorization scheme
- Provides roll forward recovery through an audit file
- Requires no mods to CP or CMS

703-821-8886

VM Software Inc.

Name _____
Title _____ Company _____
Address _____
City _____ State _____ Zip _____
Phone _____ CPU _____
2070 Chain Bridge Road Suite 355 Vienna Va 22180 1-CW-0284

FOR VAX™ RESOURCE ACCOUNTING, PACS™ IS AHEAD OF THE PACK



The competition isn't even close. PACS is so good, it's the only resource accounting package in DEC's™ EAS library. Here's why:

- Flexible billing algorithms
- User budgeting and port speed accounting
- EZLOG™ for true 3-level reporting by account, project and user

Name _____
Title _____
Company _____
Address _____
City _____ State _____ Zip _____
Phone ( ) _____

SEND COUPON NOW FOR COMPLETE DETAILS ON ALL THE PACS BENEFITS

STI Signal Technology, Inc.
5951 Encina Road, Goleta, CA 93117 (805) 683-3771 Outside California call toll-free (800) 235-0787
TWX 910-334-3471
VAX and DEC are trademarks of Digital Equipment Corporation

"The office automation I bought for everyone in the corporation doesn't incorporate everyone."

Exxon stops the shock...with fully integrated office automation for everyone in the corporation.

Introducing the Exxon Business Support System.

An office automation system that can't support everyone in your corporation can lead to some very shocking experiences.

The right power to the right people

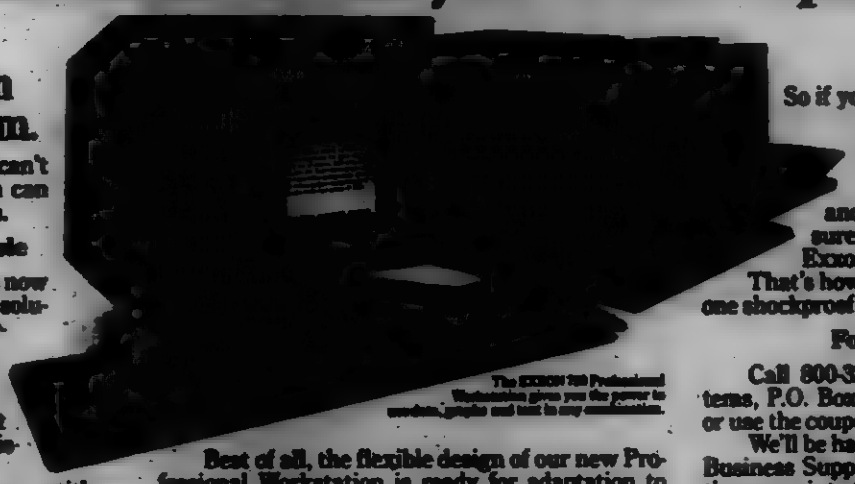
That's why Exxon Office Systems now offers more practical office automation solutions that help everyone in the corporation to be more productive. With the Business Support System, Exxon extends its fully integrated line of office automation products to support managers, professionals, and administrators, as well as secretarial staff.

Exxon puts it together for everyone with a fully integrated system — with full communications flexibility that lets you access outside data bases and interact with most mainframe computers. Without the complications. Without the shock.

Office automation for those who shape the corporation

The Exxon Business Support System features the new EXXON 750 Professional Workstation, specifically designed with powerful, integrated software that lets you move instantly from text to graphics to data processing — without changing programs.

You can divide the high resolution bit-map display into several windows and work in a number of functions simultaneously. You can shift information from one window to another. You can preview the page layout, and produce an integrated text/graphics document on our quiet EXXON 965 Ink Jet Printer. Or on a color plotter.



The EXXON 750 Professional Workstation gives you the power to combine graphics and text in any combination.

Best of all, the flexible design of our new Professional Workstation is ready for adaptation to the most popular operating systems and network interfaces.

Tying everyone together

At the core of the Business Support System is the EXXON 8400 Series controller. With its UNIX*-based operating system, it can integrate all levels of workstations to share information and programs. Everyone can keep track of schedules and meetings with time management and calendaring functions, whether their workstation is an EXXON 500 Series Information Processor or a new EXXON 750 Professional Workstation. And everyone can send and receive messages easily with transparent electronic mail.

An expandable, shockproof family

Exxon protects your office automation investment by making every workstation — from the EXXON 500 Series to the new EXXON 750 Professional Workstation — fully expandable and upgradeable.

So if you've already begun an Exxon system, the latest Exxon advances are completely compatible with our current product line.

And with our worldwide sales and service organization, you can be sure that when you need assistance, Exxon will be there.

That's how Exxon incorporates everyone—in one shockproof family.

For more information

Call 800-327-6666, write Exxon Office Systems, P.O. Box 10184, Stamford, CT 06904-2184, or use the coupon below.

We'll be happy to demonstrate how the Exxon Business Support System can help your corporation move into the future... without the shock.

*UNIX is a registered trademark of Bell Labs.

COW 02 27

Exxon Office Systems
P.O. Box 10184, Stamford, CT 06904-2184

☐ Please send me more information about the Exxon Business Support System.

☐ Please have your representative call.

Name _____

Title _____

Company _____

Address _____

City _____ State _____ Zip _____

Telephone _____

800-327-6666 (In CT, 800-942-2525)

EXXON OFFICE SYSTEMS

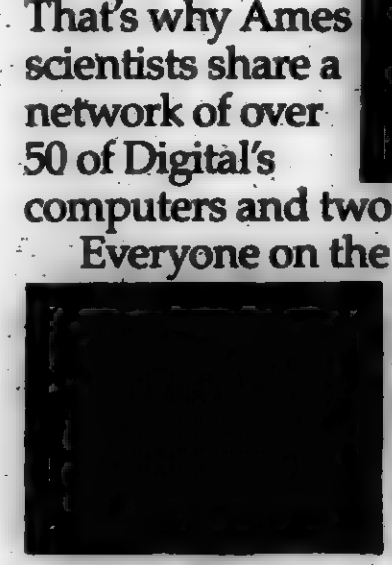
The future...without the shock.

At NASA's Ames Research Center, hundreds of scientists share hundreds of programs on one large computer network:

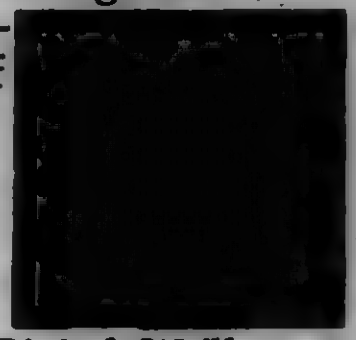
Digital's.

Aircraft design. Space biology. Computational fluid dynamics. Infrared astronomy. Interplanetary exploration. At NASA's Ames Research Center, the technology couldn't get more advanced. That's why Ames scientists share a network of over 50 of Digital's computers and two large mainframes.

Everyone on the Ames network has access to almost every computer on it. Researchers share not only data, but software, utilities, and peripherals as well. A program written anywhere is often useful everywhere on the network, so there is practically no duplication of effort and almost no need to retrain users when new programs are added. The savings, in time and money, are substantial.



The Ames network is an open-ended system. It has grown from one computer to over 50 in just eight years, with minimal disruption of service during its continuous expansion. Thanks to Digital's compatibility, even across generations, it wasn't necessary to replace any of Digital's computers. They simply added to them.



So if you're considering a network,

talk to Digital. We'll show you how you can start as small as you want. And grow as large as you need.

digital™

© Digital Equipment Corporation 1983

Stuff it to JES

Give your CICS and IMS reports to JES

The Dynamic Report System provides a bridge between on-line systems and the JES report queues. Instead of burdening CICS and IMS with printing, move it to JES and gain performance along with centralized report distribution. Let JES account for, archive and distribute reports to 327X printers, local printers, PCs, plotters, microfilm devices and 5210s.

LRS Levi, Ray & Shoup, Inc.
PO Box 16538 • Dallas TX 75216
DALLAS (214) 324-2635 • TELEX 80 4284
L.A. (213) 822-4566 • Chicago (312) 329-0853 • NYC (212) 269-2522

COMMUNICATIONS

NCR from page 63

ing functions are supported. Network users can also, without knowledge of the network configuration, reach any application on any host in the network and can access host and AMS applications in multinetwork domains, according to a company spokesman.

Data-sensitive routing, terminal-to-terminal communications and network security are also supported under AMS.

AMS is the first communications application program implemented with the newly announced CAM3 Release 1.0. The CAM3 allows users to implement value-added features, like AMS, and future communications within an SNA environment, the vendor said.

For store-and-forward message handling, AMS supports IBM 3330/3350 or compatible disk units. Terminal devices supported with AMS include TTY 33/35, 2741, 3270 Bisynchronous, 2780/3780 Bisynchronous, 3270 SNA and 3767 SNA. AMS also supports communications with IBM SNA host applications and pre-SNA host applications, the vendor said.

The price for AMS (which includes CAM3) is $945/mo. The individual price for CAM3, for users who write their own applications, is $360/mo. These two products will be available during the fourth quarter of 1984, according to the vendor.

Additional information can be obtained from NCR Comten, which is located at 2700 Snelling Ave. N., St. Paul, Minn. 55113.

NTEC from page 63

Plans were also made to have a national telecommunications education conference to formalize and finalize the plans.

Fees will vary

Funding for Ntec is proposed to come from membership fees and dues, which will vary for industry, educational institutions, faculty members, professionals and students.

A spokesman for the U.S. Department of Education said the government was committed to providing staff support in an advisory capacity to Ntec, as well as peripheral financial support in the form of computers, the establishment of data bases and so forth.

A spokesman for the ad hoc committee said that it is the goal of the committee to formalize the creation of Ntec by fall 1984.

CENTREX from page 63

telephone lines. Centrex users don't house any switching equipment or PBXs.

Typically, PBXs have trunking ratios of between 10% and 15%; that is, a single telephone line connected to a PBX will usually provide adequate support for 10 to 15 telephones.

With Centrex, every telephone must be supported by an individual line running back to a telephone company central office switch.

Herein lies the problem created by access charges.

An organization with a PBX that supports 1,000 telephones would use between 100 and 150 telephone lines. If that same company used Centrex, it would need 1,000 telephone lines.

The economics are easy to calculate. In the above example, the organization with a PBX faces access charges that may range up to $600 per month. The Centrex user, while he pays a lower access fee per line, will have to pay $2,000 per month.

And it gets worse. The Centrex access charges are slated to go up to $8 per line in 1985 for lines installed before July 27, 1983 and to $4 per line in 1986. Referring again to the example used above, by 1986 the Centrex user would be paying $4,000 per month, or $48,000 per year, in access charges.

Unless telephone companies can find some way to compensate users — by lowering rates, for example — many Centrex customers will consider installing PBXs.

Finally A Printer More Advanced than Your Software. Lear Siegler's VersaPrint™ 500.

Lear Siegler's new VersaPrint™ 500 Series printers – professional business printers for micros, minis and mainframes – utilize the full potential of your most sophisticated business software and are ready for even more.

Just one VersaPrint printer spans virtually all business applications: cut sheet letterhead correspondence, high volume continuous reports, financial spreadsheets and even complex color graphics. You can match the broad capabilities of such popular software programs as Lotus 1-2-3®.

You can have 72 x 72 and 144 x 144 dot per inch graphics for design applications on the same high volume, dot matrix printer that gives you 136 columns for reports and 224 columns for spreadsheets. All on an NLQ printer that's quieter than a typewriter.

VersaPrint printers connect to your system via RS232 serial interface or Centronics type parallel interface. You can run it at 180, 90 or 45 cps for draft, memo or NLQ quality. And it's so reliable, you won't have to change printheads for 1½ years.

Four VersaPrint models are available. To the basic Model 500, the Model 510 adds cut sheet feed, the Model 520 adds color printing, and the Model 530 adds both cut sheet and color. Short form tear bar option is available.

The VersaPrint Series is from Lear Siegler, world's favorite terminal manufacturer. It's backed by full service centers with walk-in Express Depot™ service, on-site service and extended warranty serving 3,000 cities nationwide.

Lear Siegler VersaPrint™ 500 Series printers combine with professional computers and/or Lear Siegler video display terminals for ideal workstations.

1-2-3 is a registered Trademark of Lotus Development Corp.
© 1984 Lear Siegler, Inc.

And VersaPrint printers are made in America – designed, engineered, manufactured and shipped from our Anaheim, California facility.

For more information and a complete demonstration call your local Authorized Distributor or, for quantities in excess of 250 units, your Regional OEM Sales Office.

Call Lear Siegler at **800/532-7373** for the phone number of an authorized distributor near you: Advanced Technology · Continental Resources · The Datastore · Data Systems Marketing · David Jamieson Carlyle · Digital Source, Inc. · Dytec/South · Gentry Associates · Kierulff · Marva Data Services · Peak Distributors, Inc. · Pioneer (Standard, Harvey, Gaithersburg) · Wyle Electronics

Distributor Sales & Service: Boston (617) 656-8228 · Chicago (312) 279-7710 · Houston (713) 780-9440 · Los Angeles (714) 774-1010, ext. 219 · Philadelphia (215) 245-4000 · San Francisco (415) 828-6941 · England (04867) 80666 · From the states of CT, DE, MA, MD, NJ, RI, VA and WV (800) 523-5353.

OEM Sales: Chicago (312) 279-5350 · Houston (713) 780-2585 · Los Angeles (714) 774-1010, ext. 582 · New York (516) 549-6941 · San Francisco (415) 828-6941 · England (04867) 80666

LSI LEAR SIEGLER, INC. DATA PRODUCTS DIVISION
901 E. Ball Road, Anaheim, CA 92805
(714) 774-1010

MAGIC FOR CICS AND

SOFTWARE

Faster response time is at your fingertips!

Please contact me with more information on the 3270 OPTIMIZER.

☐ IMS ☐ CICS

NAME_____

TITLE_____

COMPANY_____

ADDRESS_____

CITY_____ STATE_____ ZIP_____

TELEPHONE_____

Clip and Mail to: BMC SOFTWARE

CW P.O. Box 2002/Sugar Land, Texas 77478

COMMUNICATIONS

Continued from page 66

equipment. It operates at switch-selectable speeds of 2,400, 4,800, 9,600 and 19.2K bit/sec in controlled-carrier mode. At 2,400 bit/sec, the unit's operating range extends to 6 miles.

The modem meets AT&T 43401 and Bell Canada requirements for connection to private metallic circuits. The price is $295.

Gandalf Data, 1019 S. Noel, Wheeling, Ill. 60090.

TEST EQUIPMENT

INTERNATIONAL DATA SCIENCES, INC.
Model 61/90 EIA Tri-State LED Breakout Box; Analog Test Set

International Data Sciences, Inc. has announced the Model 61/90 EIA Tri-State LED Breakout Box and Analog Test Set, a battery-operated tester designed to troubleshoot both the digital and analog side of the modem.

The product provides access to all RS-232C and V.24 conductors at the modem-terminal interface and tests all leased or dedicated 2- or 4-wire telephone lines.

The product incorporates modem loop-back, self-test and modem eliminator simulation with terminal-modem interface and EIA interface monitoring, a vendor spokesman said. The price is $595.

The company also announced enhancements for its Hawk Model 4010 Datatrap and modem-terminal stimulator, which include full bit and block-error rate (Bert/Blert) testing as a standard feature. The unit costs $2,995.

International Data Sciences, 7 Wellington Road, Lincoln, R.I. 02865.

AUXILIARY EQUIPMENT

MICROLOG CORP.
Intelecom

Microlog Corp. has announced the Intelecom telex communications system, which allows users to access telex, TWX, Direct Distance Dialing, mailgram, telegram and cable. It can also be used to communicate with computers and word processors.

The system dials telex and TWX numbers and automatically negotiates the necessary protocols. It delivers a real-time or store-and-forward message and makes hard copy of all communications, according to the vendor.

System components include a keyboard, video monitor, high-speed printer, cassette tape storage system, work table and interconnecting cables. The price is $4,995.

Microlog Corp., Suite 116, 4 Professional Drive, Gaithersburg, Md. 20879.

INNOVATIVE ELECTRONICS, INC.
Data Collection System

Innovative Electronics, Inc. has announced the Data Collection System, a microcomputer-based data acquisition/supervision system.

The system provides the user with records of time and attendance, inventory control, patient-records accounting, positive-sample tracking (shipping and receiving), quality control and customer charge-back.

The system operates in either a stand-alone configuration or in conjunction with a host computer. The hardware components include the company's Netmaster — a 16-bit computer which may be connected to as many as 96 of the company's Transactor terminals.

The price for the system ranges from $10,000 to $50,000, depending on individual applications.

Innovative Electronics, 4714 N.W. 165th St., Miami, Fla. 33014.

FIBRONICS INTERNATIONAL, INC.
Coaxial Doubler

Fibronics International, Inc. has introduced the Coaxial Doubler, a connecting module that condenses the signals from any two ports of an IBM 3274 controller over a single coaxial cable and supports two IBM 3270-type peripherals.

According to the vendor, the Doubler can be installed by a user in minutes without special tools. It requires no external power. A pair of doublers is priced at $490 and can be delivered in 48 hours.

Fibronics International, 218 W. Main St., Hyannis, Mass. 02601.

PHILIPS ELECTRONIC INSTRUMENTS, INC.
Flexpac

Philips Electronic Instruments, Inc. has introduced Flexpac, a line of X.25 packet-switching equipment that includes a network management device, packet assembler/disassembler (PAD) modules and network switch modules.

The remote diagnostic and network management capabilities assist the end user in isolating line, terminal, host computer and equipment problems on a remote basis. The modules concentrate multiple asynchronous terminals to an X.25 network line. Models are available for use with seven or 15 asynchronous ports.

The network switch modules provide internal virtual circuit switching between all X.25 ports, as well as the routing, switching and number translation necessary to interconnect private and public networks with different capabilities and numbering plans. Prices range from $3,950 to $43,200, depending on configuration.

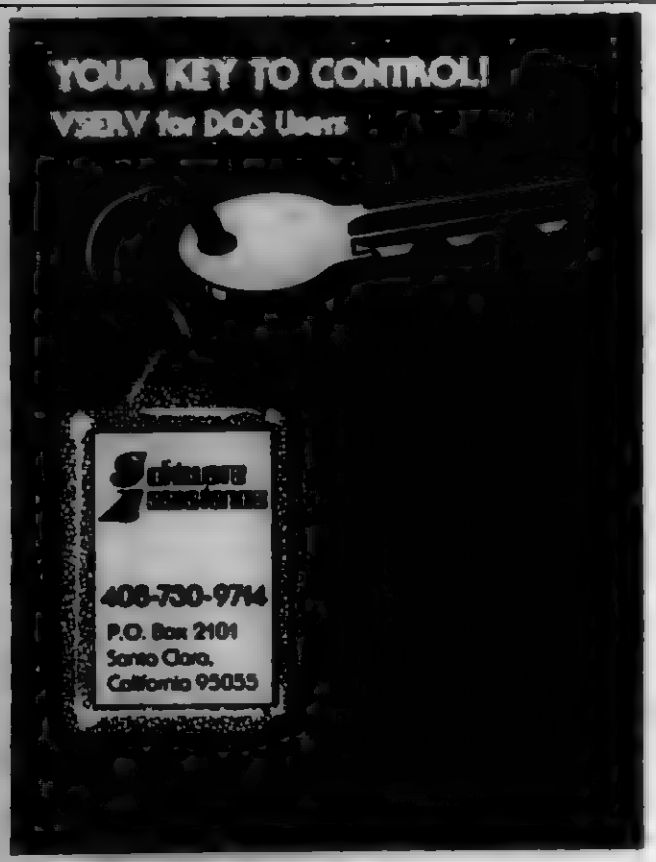
Philips Electronic Instruments, 85 McKee Drive, Mahwah, N.J. 07430.

ADM CONCEPTS, INC.
Commlock Model-96A

ADM Concepts, Inc. has announced the Commlock Model-96A, an asynchronous data encryption device that is connected between a terminal device (CRT or printer) and a communications device (modem, multiplexer port or computer port) via an RS-232C interface.

It also provides separate encryption codes for the transmit and receive paths. Commlock is programmable for data rates of 300 to 9,600 bit/sec, selectable word length (5-8 bits), parity and number of stop bits, the vendor said. The unit costs $600.

ADM Concepts, Suite 301, 1445 Los Angeles Ave., Simi Valley, Calif. 93065.



When you're ready to talk to DEC* with your IBM 3278, talk to NPI about getting attached to a PCI 74D deconverter.

It will get you everywhere!

When you can no longer stand being cut off from the rest of the world because you have an IBM 3278, come to NPI for a PCI 74D deconverter.

When the time comes that you want to talk to DEC, or check in with the Dow Jones™ News/Retrieval Service, or contact your Local Area Networks, or whatever, talk to NPI first.

Whether you want to make your non-IBM world compatible or your IBM world compatible, NPI is the place to think of first. We distribute and service all PCI products.

NPI THE HIGH-TECH DEPOT REPAIR COMPANY
800-345-8278
IN PENNSYLVANIA (215) 485-6160
45 COMMERCE DRIVE
ASTON, PENNSYLVANIA 19014

*DEC is a trademark of Digital Equipment Corporation.

SPECIAL REPORT

Network solution: panacea or placebo?

Edited by Jim Bartimo

February 27, 1984

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

SPECIAL REPORT

Mart emerging for user-controlled nets

By Ken Krechmer
Special to CW

Fifteen years after the Carterphone decision, many companies provide communications equipment for the user's site, and many carriers provide a system for site-to-site communications as well as competing for on-site communications requirements. Now, a new generation of equipment is moving into the marketplace that allows the user to own (control) his local-area communication facilities.

Descriptors such as local-area network, local computer network, establishment network (by IBM) and local-area distribution describe the equipment, software and service provided for intrasite communications that are not required to be supplied by a common-carrier. When communications of data or voice, up to and including the day of the modem and handset, was supplied by the common carriers, terms such as local-area network were not required; the common carrier supplied it all.

From the user's perspective, networks that are not common-carrier-supplied have a key distinction — the user completely controls them. Obviously, user-controlled networks can be desirable or unworkable, depending on the user's resources and technical capabilities. The last 15 years have proven that customer-controlled networks are very desirable to many users.

The market for customer-controlled networks has been emerging since 1968. First, companies such as Racal-Milgo, Inc. and Codex Corp. began to provide the equipment to allow customers greater control of their common-carrier-supplied leased lines. Then, companies such as Rolm Corp. and Northern Telecom, Inc. began to provide private branch exchange (PBX) systems to allow customers control of their local voice-switching equipment.

Now these companies and many others are offering systems and equipment to integrate the customer's control of voice and data wherever a common carrier facility is not required or to provide expanded customer control where common carrier services are utilized.

The broad range of potential customers and the unique requirements of each customer have generated a large, expanding range of products and services for the customer-controlled network market. Looking at the different products in historical perspective may provide a better view of future possibilities.

PBXs have emerged as a new form of star network for data communications for two underlying reasons. One is the ability to connect non-common-carrier-supplied devices to all PBXs. In 1976 the Federal Communications Commission implemented Part 68 — registration for direct connection — allowing users to connect modems directly to common carrier facilities, including common-carrier-supplied PBXs.

The other reason is the dramatic increase in the cost of installing cable of any kind, due to more extensive regulations of all kinds (fire codes, unions, FCC Part 15 and so forth) and rapidly rising labor costs. PBXs are the most common form of star networks.

As more and more PBXs are customer owned, new features are evolving to allow data communications on this traditionally voice communications device. The evolution is taking two major directions. Companies such as Teltone Corp. offer the ability, using FCC-registered interfaces, to connect to any common-carrier-supplied or non-common-carrier PBX and transfer data up to 9,600 bit/sec over the same wire pairs that are being used for phones, even, cleverly enough, while the phone is being used for voice.

The Teltone approach requires the use of external port switching (similar to line drivers) for terminal-to-terminal communications. A new generation of PBXs is completely digital and therefore allows for data transfer, including port switching, as an inherent part of its design.

Manufacturers such as Rolm and Northern Telecom are currently manufacturing these digital PBXs. All of these products represent direct competition to line drivers in the local network area, as they provide star networks of similar or greater data rates without the necessity for running separate wire pairs.

Further, these PBXs are the natural extension of line drivers and port switches, combining the data handling capabilities of line drivers and port switches with the voice handling capabilities of PBXs to give the user more features, more control and lower total system cost.

Standards developing

Communications, by definition, is a technology that requires standardization to be able to function. The lack of comprehensive standards and the broad array of noncompatible products has been and continues to be the basic problem hindering the growth of customer-controlled networks. The Consultative Committee on International Telephony and Telegraphy (CCITT) and the International Standards Organization are developing comprehensive interfacing standards.

Starting with its Open System Interconnection, which specifies the seven levels of protocol necessary to achieve application-to-application communications compatibility across an interface, CCITT has developed detailed standards for five of the necessary protocol levels.

The CCITT X.25 standards describe the implementation of five levels of communications compatibility, but still leave unspecified the application and presentation levels. In the U.S., the Institute of Electrical and Electronics Engineers (IEEE) 802 Standards Committee is also working on standards for networking, and drafts are currently being reviewed. The European Computer Manufacturers Association (Ecma) is also currently working on a local network standard.

As these standards are completed and the implementation is worked out, the problems the user faces in choosing a communications networking approach will become somewhat more reasonable. Unfortunately, many users are hanging back waiting to see if vendor-sponsored standards will become generally utilized or if CCITT, IEEE or Ecma standards emerge with wide acceptance.

This state of affairs means the dominant manufacturers effectively force their own standards on their user community. In this environment (lack of broad, accepted, implemented standards), the user community is holding back its commitments to new forms of customer-controlled networks as long as possible. This is not a realistic approach.

IBM users have generally accepted Systems Network Architecture (SNA), probably because of a lack of other alternatives, but are still waiting to see the total range of products supported. The Xerox Corp. Ethernet implementations, which are gaining in number, also have a realistic chance to succeed in the marketplace. Xerox should be applauded in the user community for offering a broad licensing approach to allow many manufacturers to develop products, not maligned for failing to produce the perfect network, because there is no such thing.

Between the very broad, de facto SNA standard and potential local-area network standards such as IEEE 802 lies a wealth of usable technology and capabilities. AT&T and IBM are planning to produce new implementations of local-area networks. Emerging companies such as Metapath in Foster City, Calif., and Interlan, Inc. in Westford, Mass., offer low-cost, user-oriented networking approaches.

The organization striving to implement customer-controlled networks for current and future requirements has no reason to believe that it can or should pick one vendor or networking system.

Rather, the current technology and the standards environment suggest that networking equipment should be chosen based on the best combination of hardware, software and support available to solve the current needs. So long as the hardware and software selected offer clear interfaces to allow connectability to future systems, expansion will not be sacrificed. Nor will it be simple.

Single-vendor solutions are not going to predominate in the world of customer-controlled networks. Customer-controlled networks is the direction that users have asked for. Now, with the AT&T divesture, it is the direction they will have.

Krechmer is product architect at Prentice Corp., Sunnyvale, Calif., and is a principal in Action Consulting, a sales and marketing consulting firm specializing in the development of data communications products and markets.

INSIDE

Mart emerging for user-controlled nets/SR2

Network evolution: Putting it in perspective/SR3

Trends signal future evolution of networks/SR4

Technology: Greatest risk in resource sharing/SR5

Some users opt to base local net on PBX/SR7

Networks steer mover through deregulation/SR8

Bus networks gaining on traditional star nets/SR9

Firm installs private satellite net/SR10

Fiber optic's time has come in phone network/SR13

State moves to organize independent nets/SR16

Local nets spur evolution to distributed DP/SR17

Worldwide E-Mail program helps Ford share resources/SR19

Architects' plans should allow for data wiring/SR21

Net turns broker bullish on communications/SR23

Telecommunications to be glue for info/SR26

X.25 conversion supported by PAD function/SR27

Users access bank accounts with home micros/SR36

Electronic firm ties 8,500 stores nationwide/SR37

Corporate info needs reliable transport/SR39

Intelligent nets: Tying incompatible equipment/SR41

Oil drilling firm strikes it rich by transferring info/SR44

Stock exchange trades traditional net for local net/SR46

Bank redesigns corporate net with CATV tech/SR49

PBX helps college, hospital keep costs down/SR52

Voice/data PBX at core of transparent net/SR55

Boston leaning toward broadband cable nets/SR56

Moving firm 'relocates' with distributed DP/SR58

College nets must keep pace with info needs/SR61

Multinational turns from 10 vendors to one/SR63

Firm's local net yields unexpected benefits/SR64

SPECIAL REPORT

Network evolution: Putting it in perspective

Growth of strategically important DP sector

By Ronald M. Gnoinka
Special to CW

Data communications is emerging as one of the most strategically important sectors within the information processing industry. One of the critical reasons for this trend is that data communications enables a global exchange of information. There are no bounds to it, and its functions are worldwide, driven by reasons of profit and even national security. As a major element in today's expanding business and data processing environments, data communications provides a cost-effective way to do business on a global scale (see story on SR/4).

To understand the current and emerging capabilities in today's data communications networks, we need to put in perspective the network evolutions that have occurred in the last 20 years.

The first networks occurring during the '60s basically connected a terminal operator directly to a host computer. All facilities were dedicated. The terminal — local or remote — the communications processor and the host were all dedicated to the application. As a result, initially only large applications such as an airline reservation system could justify and afford to use communications.

In this initial phase, there was little real networking activity as we know it today. There was a direct point-to-point connection, with the lines directly attached to the system, and no interaction among multiple computer systems. In this environment, the implementation was done with hard-wired controllers and multiplexers. If, for example, an aircraft maintenance worker wanted to get at some information being maintained on the reservation application, he needed his own terminal and his own set of facilities.

Networks of the '70s

Progress was made very quickly to eliminate some of these shortcomings. In the '70s, for example, a significant amount of networking activity was introduced. First of all, communications were provided between multiple host computer centers, basically the first networking function that took place. The next development was to attach remote processors out in the network to provide some form of sharing or concentration. This first level of networking in the '70s included a form of concentration within the networking capability, trunking, line switching and support for multiple host processors. In other words, we had implementations that provided a network.

The concept of trunking, which connected lines between network nodes, was introduced in the '70s. The reasons for this capability are many. With a set of multiple circuits, there is a limit of some fixed bandwidth — whether it is 9,600, 19.2K up to 56K bits — that can be economically acquired from a common carrier. But if multiple circuits or a large bandwidth is needed between multiple locations, the user will have to install multiple links.

The first concept of trunking was to take the multiple links between nodes and group them as a trunk. The resulting combined bandwidth would allow the addition of the individual line capacities and would provide a basic trunk bandwidth between two nodes. Data now could flow on multiple links between the nodes without being dedicated to one physical link.

In addition to increased bandwidth, trunking provided some reliability and some fallback. If a line was getting a high error rate, for example, or was put out of service, there would be an automatic fallback to the remaining circuits on that trunk, with no disruption in service other than, possibly, diminished response time. Service, however, was still maintained between the network nodes.

As a second major capability, the concept of alternate routing was introduced. In a multiple-node network, alternate routing allowed the user to design the network to have an alternate path through some other node in the network. It provided for a fallback method of continuing to communicate when a major catastrophe occurred, such as a large set of circuits disappearing because a microwave station was destroyed or a facility was damaged. The trunking concept, then, provided for this level of capability in the '70s.

The next major element was data concentration. Data concentration was introduced to increase the utilization of the bandwidth or to utilize the bandwidth in an optimal fashion between nodes in the network. The underlying principle was to avoid loading the network with unnecessary traffic that was not real data traffic. As a result, data concentration allowed the remote processor to control the terminal. Once the real data was obtained from the terminal, the data was then transmitted through the network to a front-end processor to the host application. That form of concentration basically increased bandwidth utilization, specifically the long-haul bandwidth that has always been expensive.

Also introduced in the '70s was terminal-initiated line switching. Early networks used dedicated terminals and lines directly attached to the application. Terminal-initiated line switching allowed the terminal user to select different applications in the network. As a result, the user could make more efficient use of the terminal and the lines in the network.

In the airline reservation system, for example, maintenance personnel could use the same reservation terminal to get some maintenance information on a flight.

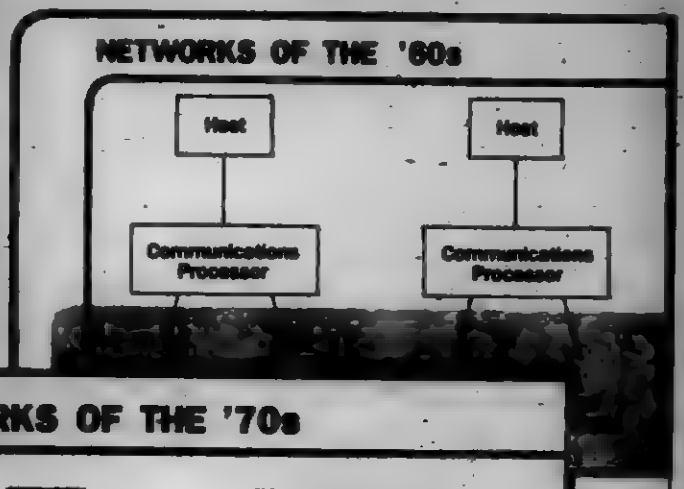
The concept of multiple host processors also became important in the '70s as the environment grew too large to be supported by individual processors. With multiple processors existing in a single large data center, terminals now had to access more than one host. This concept again allowed for the sharing of the network, getting the network attached to different applications and different hosts.

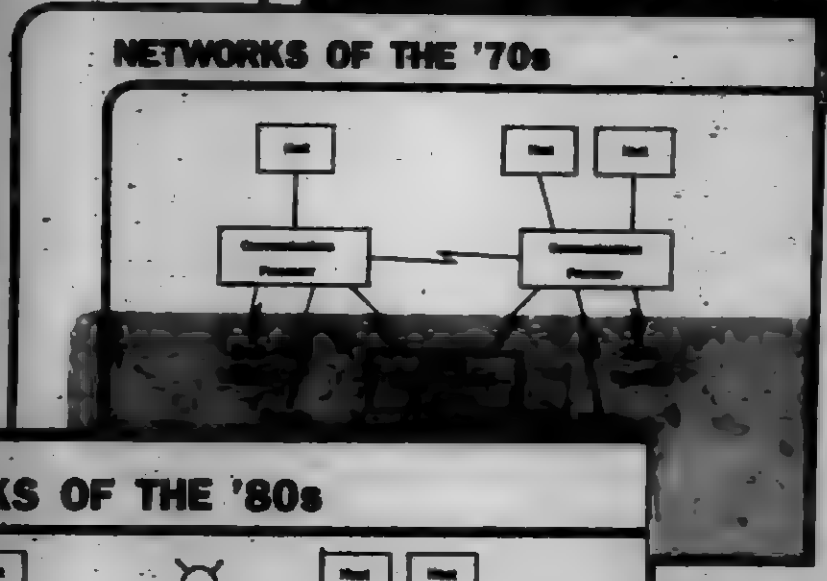
As we move to the networks of the '80s, progress is continuing. We now have regional data centers existing in networks, which are utilizing all forms of common carrier and local facilities. The attachment of public data networks is being provided for and even being used for part of the trunk bandwidth between nodes within the network.

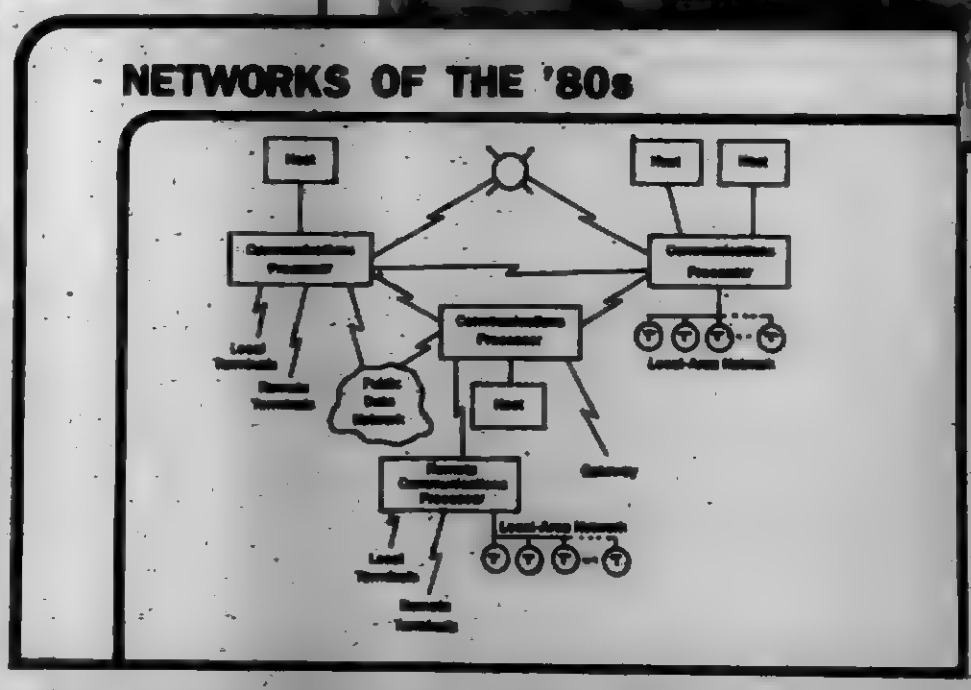
The technology of the '80s is diverse. There are many competing technologies for local-area networks, and which ones will win will take some time to determine. But the connections will have to take place in the future. The important issues in networks in the '80s include packet and circuit switching, session switching, transaction switching, the introduction of satellites, gateways, the attachment of the local-area network and the trends toward IBM's Systems Network Architecture.

The concept of circuit switching through a data communications network is one involving a dedicated

See NETWORK SR/5







SPECIAL REPORT

Trends signal future evolution of networks

SNA, public nets, micros, data centers seen significant

With the evolutions in networking, some questions arise: Where do we go from here? What else can the communications product vendors provide, and where is networking going? Some industry trends are emerging to provide answers to those questions.

One of the major considerations is that migration to IBM's Systems Network Architecture (SNA) protocol is occurring at a rapid rate. It is predicted that by 1985, 80% of all large IBM information processing systems will be performing some form of SNA communications. For the total IBM user base, SNA communications is predicted to reach around 60% to 65%. SNA is becoming a standard, and any networking plan has to consider this in its communications solutions.

Public data nets

Another consideration is the growth of public data networks, which are becoming a major factor in communications. One of the unique characteristics about public data networks is that they are based on an international standard — CCITT X.25. What we see happening throughout the world is that major countries are establishing networks based on X.25. With this common base, those countries can interconnect and communicate.

Countries around the world are establishing networks, and these networks, in many cases, are available today through the different postal, telegraph and telephone organizations. Japan has networks to which organizations can subscribe; the network in Australia is under development; in Europe, each major country is providing a packet network capability.

In North America, one of the first networks provided in the world was Datapac in Canada, and Bell Canada was an early promoter of packet network capability. In the U.S., a number of vendors provide packet network service, and in the future, AT&T will be able to provide a basic packet-switching service.

All of this means worldwide X.25 capability based on an international standard and organizations adopting that standard with very little modification.

Large data centers

Another consideration is the expansion of large data centers. In the last three or four years, we have seen a yearly expansion rate of over 50% for the host processor cycle required to do an application. This demand is mostly being driven by the requirement for on-line communications and the processing of the new information that the data communications network is putting on the host data center.

One of the reasons for this continued growth is declining costs. The cost per one million instructions per second has been reducing continually in the last 20 years, and it will still continue to decline.

Technology is also providing for this expansion in the data processing environment. By 1985 or 1986, organizations will be able to get an integrated circuit with 500,000 transistors. That half-million-transistor chip will occupy less space than the first transistor, developed just 30 years earlier.

Using new technology

We are also seeing the research organizations in major companies investing major resources to use this new technology. Their efforts in many cases are directed toward the information processing environment and the handling of data communications.

Finally, the personal computer will have a major impact on future communications networks. In 1983, approximately two million units were shipped, and we are approaching the point where micros will exceed the shipment rate for CRT terminals. The personal computer is now becoming the new information-handling device of choice.

By 1987, the expected annual shipment rate is seven million personal computers, with an anticipated installed base of approximately 50 million devices. Combine the CRT terminals that exist today with shipments of personal computers, and the figure will be close to one-fifth of the installed base of the telephone.

All of these trends are feeding the demand for on-line applications and networking capabilities ranging from local to global levels. In essence, these trends are moving data communications into the forefront of the maturing information processing industry. Advances in data communications will be integral to the future expansion and growth of the world economy.

Finally, the definitive for reaching today's data communications

It's called ANI™—Advanced Network Integration. From Infotron.

ANI is a definitive path for network growth and management that's reflected in a family of data communications products and services.

It gives you something you haven't had before—the means to plan and implement a data communications network based on long-term strategy.

ANI covers everything we make—from simple modems to stat muxes, to high-speed muxes, to network concentrators, to intelligent data switching systems.

ANI also includes everything we do. Systems engineering, from technical support to turnkey operations. Installation. Training. Telephone consultation and dialup online diagnostics. And worldwide field service.

Growth.
ANI products grow with you.

They're based on an architecture that's simple to expand and upgrade.

Because ANI products can be expanded both in size and function, they're easily integrated into larger, more complex networks. They grow with you instead of becoming obsolete.

Flexibility.
ANI products are versatile.

They can accommodate computers and terminals with almost any combination of protocols and speeds.

And because of their modular structure, ANI products will accommodate bridges to other networks, and gateways to public and private resources.

SPECIAL REPORT

Greatest risk in resource sharing: technology

By Gautam Gupta
Special to CW‡

"Networking" has been a boon to buzzword bards and jargon generators for more than a decade. Today end users are lost in a forest of local-area networks, carrier-sense multiple access with collision detection, token passing and ring topologies.

This networking problem has become more acute with the spread of microcomputers to managers and professionals who operate without a technical training base. The problem is best defined as resource sharing, rather than, in jargonese, as networking.

In this environment, how can end users assess the risks and costs of resource sharing and select a product appropriate for their needs?

How can multiple users economically share valuable computer resources? The resources that could be shared are fairly straightforward. One resource, for example, is data stored in files. Through networking, different users can conveniently access this data.

Thus, the needless replication of data for each user or application can be avoided. Hardware devices are also resources that are commonly shared by a number of users. It would be wise to share, for example, letter-quality printers and Winchester disk drives, the cost of which is often in excess of the cost of the basic microcomputer.

The greatest risk in selecting a resource sharing product is technology. Today there are no standardized resource sharing products. The multiplicity of vendors spawned by the rapidly changing computer hardware environment — mainframes to minis to micros — has made such a standard elusive.

End users should look for a resource sharing product designed to minimize organizational and operational changes needed to implement resource sharing. Because these changes bear significant costs, do not select a resource sharing product that alters the microcomputer environment just to fit a so-called standard. With some investigation, a product that most easily fits the existing framework can be found.

End users should examine whether the product was expressly designed for microcomputers. Products that have been a blessing for mini and mainframe resource sharing have not been designed for microcomputers.

Extrapolating risks great

The risks in extrapolating what works in one computer environment and applying it to another are great. Remember, what is cost-effective for mainframe and minicomputer resource sharing systems may be expensive for microcomputers.

It is risky to embark on a broad-based resource sharing system. Gradual implementation of resource sharing on a trial basis has had good results. Because resource sharing requires significant changes, starting small minimizes the surprises.

The most obvious costs of implementing a resource sharing system are the product costs and the additional costs for wiring and cabling. Additionally, while some resource sharing products also serve as managers of the resource sharing system, others require dedicated servers.

A dedicated server is a microcomputer that has been selected to act as a resource sharing traffic director. It will no longer be available as a workstation. This opportunity cost must be factored in.

First, when examining a resource sharing product, consider the resources the system will support. Disks and printers are commonly shared, but also consider gateways and communications devices to other networks. Gateways are, for example, modems for communication via telephone and micro-to-mainframe communications capabilities.

Does the resource sharing vendor have these other products as part of his product line? If he does, then one-step support and compatibility are guaranteed. If he doesn't and he promises compatibility with multiple vendors' products, then think twice.

By choosing a vendor that offers a broad, fully integrated product line, the risks of resource sharing are reduced. And, more importantly, the resource sharing product may be easily upgraded to meet increased needs due to growth. The ability to upgrade is a basic tenet that should always be kept in mind during the selection process.

Second, user access should be examined in the resource sharing system. File locking, which governs a user's access to files, can be divided into two levels. On one level, file locking is necessary for setting up arbitration logic within resource sharing. This feature is used to delineate who has access to files first, second, third and so on.

The other level of file locking is necessary for security purposes. All files should not be available to all users. A resource sharing product

See SHARING SR/6

path
and tomorrow's —
objectives.

Management.
Management and control are vital to the operation of large, widely-dispersed networks.

ANI products give you the tools for monitoring activities, gathering statistics and keeping informed of events as they occur. From a central point, networks can be configured to meet changing requirements and provide diagnostics for solving problems.

Regardless of network size or complexity, ANI provides complete accountability for network operation.

We're Infotron. We wrote the book on data communications and networking. It's yours for the asking.

For your free copy and for information on ANI products, use the coupon, or call toll-free: 1-800-345-4636.

INFOTRON SYSTEMS

Infotron Systems Corporation,
9 North Olney Avenue, Cherry Hill, N.J. 08003,
or call toll-free 1-800-345-4636.

Please send me more information about ANI™, plus a free copy of *Making It Through the Maze of Data Communications.*

CW 0227

Name_____

Title_____

Company_____

Address_____

City_____ State_____ Zip_____

Telephone_____

See us at Interface, Booth 230.

Infotron communications networking. First in performance and reliability.

NETWORK from SR/3

work is one involving a dedicated path. Point A communicating with Point B, for example, has a dedicated path through the network where the data is transmitted, and nothing is done on the traffic itself. But A can, in fact, establish a connection between different points in the network. Once that is established, data flows directly on that path.

Packet switching, however, changes the concept somewhat. With packet switching, the same connection from A to B forms a virtual, not a dedicated, path. The facilities are not dedicated to that particular connection. Instead, bandwidth is allocated when data needs to flow from A to B, and packets of information move between those particular nodes from

Network characteristics

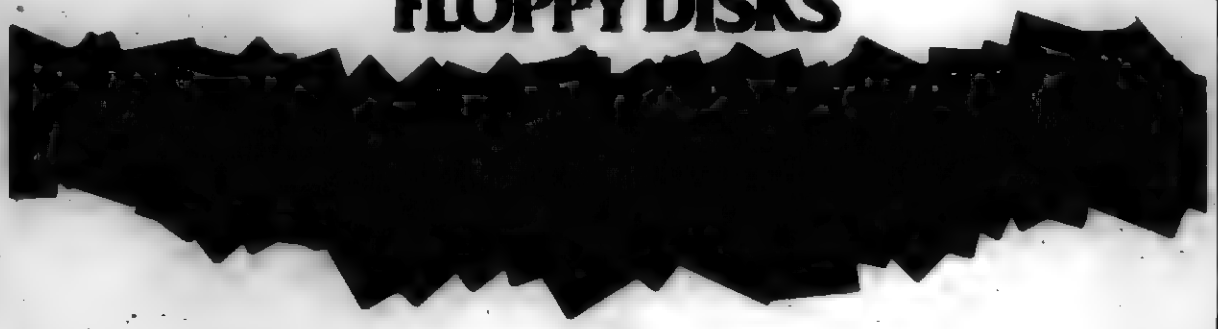
the origin to the destination end points. Packet switching also allows for network load sharing. If a node becomes congested and slows response time, alternate paths through the network can be utilized to ensure fast response time.

One of the key elements in the networks of the '80s is session switching. Session switching is an extension of the terminal line-switching concept. Where there are multiple devices on a circuit, session switching allows each individual device to have a particular path through the network. As a result, one terminal on a particular line can talk to one application, while another terminal on that same line can talk to a different application.

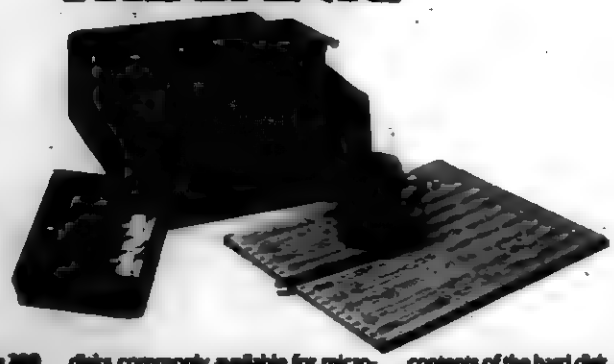
Another development in the networks of the '80s is satellite networking. One of the key elements in networking is the continually high demand for bandwidth between multiple locations, and the satellite capability is providing for a more economical method to provide that bandwidth. It is another form of communications that in certain environments provides an economical implementation of long-haul communications.

Groombe is vice-president of development at NCR Comten, Inc., St. Paul, Minn.

1000
FLOPPY DISKS



VS.
THE BANK.



Savings you can take to the bank 200 MB only $2,195. CORVUS is proud to introduce the BANK.

It's the most dramatic breakthrough in low cost, high capacity mass memory systems since CORVUS introduced the Winchester disk for microcomputers in 1979.

The BANK's removable tape cartridges hold up to 200 megabytes of information. That's equal to 1000 double density floppies or 10 times the capacity of the largest hard disks commonly available for microcomputers. You can use the BANK to complement a Winchester disk. It has 19 times the capacity.

And the BANK's cartridges are removable for unlimited capacity and storage.

On-line archival back-up you can bank on. You can use the BANK as a random access archival device. If your Winchester disk fails, you can restore selected volumes without having to restore the entire contents of the hard disk.

The BANK is the perfect solution to your back-up storage problems as a shared storage device on OMNINET™—the leading Local Area Network for microcomputers.

Call CORVUS for the name of the dealer nearest you. We're sure you'll smile....all the way to the bank.

For more information contact: CORVUS SYSTEMS, 2100 Corvus Drive, San Jose, CA 95124, 1-800-4-CORVUS.

CORVUS
THE NETWORKING COMPANY

The BANK connects to various brands of microcomputers using OMNINET Local Area Network TRANSPORTER™ interface cards. The BANK is currently available for the CORVUS CONCEPT™ and the IBM PC™. CORVUS, THE NETWORKING COMPANY, the BANK, OMNINET, CORVUS CONCEPT and TRANSPORTER are trademarks of CORVUS SYSTEMS, INC. IBM and IBM PC are trademarks of International Business Machines.

SHARING from SR/5

should accommodate restrictions on file access.

Additional security features to look for include the use of passwords, the ability to create private files, the ability to divide disks and record locking. A record-locking feature can help improve system performance. Two users can access the same file, but use different records.

Vendors making claims of strict record locking should be closely examined. The structure of some microcomputer operating systems prohibits record locking.

Discern whether it is through changes in the application software, not the resource sharing software, that record locking will be implemented. Manipulating an operating system to accommodate a record-locking feature can lead to future systems incompatibility.

Third, when assessing a resource sharing product, examine the language interface. Is the language of the resource sharing system an easy-to-use extension of the system commands already in use? Or will the resource sharing product require its users to learn an entirely new interface language?

Fourth, don't be overly concerned with promised transmission speeds when examining a resource sharing product.

Instead, be concerned with functional speed. Keep in mind how fast the microcomputer currently transfers a file to a printer or disk.

If a demonstration of the resource sharing product is available, assess system response time. Then apply that to the environment in which it will be used. A good resource sharing product should not perceptibly slow down the microcomputer's functional speed. Forget about theoretical claims, and look at system performance.

With these risks and benefits in mind, a resource sharing product can be selected wisely. The added value of utilizing resource sharing will undoubtedly lead to a more productive and, therefore, a more competitive business.

Resource sharing, if properly chosen, can be the boon to business that it has been hailed to be.

Gupta is president of IDE Associates, Inc., a designer and manufacturer of a line of peripherals for the IBM Personal Computer and Personal Computer XT.

SPECIAL REPORT

Some users opt to base local net on PBX

By Gary L. Alpert
and W. Edward Thomas Jr.
Special to CW‡

A common question asked by many organizations is "What is my best choice for local-area networking?" Unfortunately, in many cases organizations do not effectively examine and define their true needs before making a decision. Quite often, networks are established and then only after the die is cast are user applications examined and actual data communications needs clearly defined.

The advent of local-area networks has been primarily spurred by the needs of staff professionals and managers. Thorough answers to a few key questions can greatly change the makeup and often reduce the cost for a fully effective local-area network. These questions include:

- Is the data to be accessed located on the mainframe computer, another user's microcomputer or a public data base?
- How often is the data accessed, for how long, by how many users and to how many devices?
- Are the communications requirements primarily from user to computer or user to user?

Staff professionals and managers require access to multiple caches of information, regardless of the type of computer device that contains the information. They are often part of the personal computing explosion, using personal computers for information gathering and manipulation. This data for decision making is contained in many computers, and greater speeds are required for file transfer of such documentation.

One type of local-area network that is receiving increasing support is that of the digital private branch exchange (PBX). Why such increased popularity? First, organizations have seen the efficiencies of owning their own telephone and communications systems.

Most presently being purchased and installed are purely digital due to their obvious benefits, and the cost of adding data communications hardware and software is usually quite reasonable.

The leading-edge vendors can provide connections at a cost of $500 per asynchronous device and $900 per synchronous device, which compares quite favorably with a connection cost for a broadband or baseband coaxial network. Broadband networks require a fixed-frequency or frequency-agile modem, and baseband networks also require a specialized interface such as the transceiver in the IEEE 802 or the Xerox Corp. blue book Ethernet specification.

Added to the cost per connection in such a network is the coaxial cable cost, which can be anywhere from [illegible] to $7 per foot. With a digital PBX local network, the cost of the twisted pair is usually absorbed with telephony installation, which runs about 20 cents a foot per twisted pair.

In addition, most digital PBX connections for terminals and computers only require an accepted electrical interface such as RS-232 and RS-449 providing level-zero transmission compatibility with almost any vendor.

Some PBX vendors with purely digital systems enable transmission over the same wiring simultaneously with voice. Signals are transmitted in some manner of statistical or frequency multiplexing along with voice and control signals.

Other vendors transmit over a dedicated pair for data transmission, using one pair for transmitting data and one for receiving data.

What other benefits can PBXs provide to the data communications user? Certainly, in a large terminal or personal computer environment, with a need to access multiple host computers, there are many benefits in the area of contention and controlled user access.

With leading PBX technology today, if all ports are busy on a CPU, users can queue for an available port, and the PBX will signal the user when it is available. An organization can even set priority access levels for users waiting in queue; for example, a casual user would perhaps have a lower priority access level than a vice-president of finance.

In addition, users from outside the organization can dial into modems attached to the PBX and receive the same user interface from the PBX's data communications software as an internal user.

A great many statistics are provided in the leading PBX data communications packages which allow an organization to administer details of who was on-line, with what, for how long and so forth.

In the '80s, the growth of digital PBXs and personal computers will drive PBX manufacturers to provide value-added services to their data products offerings. Devices in the area of protocol conversion, network gateways, electronic mail, file and electronic (laser) print services will be developed.

Many leading vendors already pro-

. See PBX SR/12

[illegible] Advanced Intelligent Network People

The "PC-Friendly" Network

TYMNET is the data network that's friendly to personal computers. Our network gives PCs the power to communicate with mainframes. And access 3270 applications. Even format, edit, and highlight like VT100s and 3270s.

We're implementing our X.PC protocol to provide error correction on the local loop and allow PCs to access up to 15 applications over one line—simultaneously.

You may be already using PCs to access the latest stock quotes and news items. Why not expand their versatility and create the kind of PC work station that's truly productive?

Want to know more? Call us. We're the PC-friendly network people and the value-added distributor of PCs such as IBM and Digital: (408) 946-4900; TYMNET, Inc., 2710 Orchard Parkway, San Jose, CA 95134.

TYMNET®

Serving more than 7.2 million data calls per month

[illegible]

SPECIAL REPORT

Networks steer mover through deregulation

Connect agents nationwide with computerized information

ST. LOUIS — Like many companies caught in the deregulation crunch, United Van Lines, Inc. is easing the transition by implementing new high-technology products into its operations. A major part of its strategy is the integration of two different data communications networks to handle the flow of information from its headquarters here to its family of agents scattered across the country and around the world.

United Van Lines has combined the services of a public, value-added satellite network with its own private network that uses leased telephone lines. This helps its agents in their efforts to win new shipping business and keep shipments in progress running smoothly.

"By opening up the moving industry to competition based on price, the Motor Carrier Act of 1980 put us nose to nose with the strong forces of an unrestrained market," said Bob Baer, president of United Van Lines. "This challenged us to be more flexible in our rates and services while still maintaining quality service. It also forced us to be more prudent in controlling our costs."

One of the largest movers of household goods in the world, United Van Lines was formed as a cooperative association to serve the needs of a large network of agents, 600 in the U.S. and 500 internationally. Agents are owners of their respective moving companies, but depend on United Van Lines to assist them in servicing clients who wish to ship from state to state and country to country.

Although service takes on many forms at United Van Lines, according to Jim Beacher, vice-president of information services, "The change in the regulatory climate has put the need for information at the top of the list.

"Agents looked to us to provide them with creative strategies to compete in this new marketplace," Beacher explained. "We responded by devising innovative programs built on information, in operational areas such as job pricing, accounting and billing, mileage verification, shipment tracking and claims handling. These are parts of the business that play a big role in winning new business and delivering quality service."

With these programs in place, Ellie Sirota, manager of telecommunications, undertook the task of making this information accessible to agents on-line at a minimal cost. However, her options were limited due to United Van Lines' particular communications protocol. There is a wide variety of computer protocols, and not all are addressed by every data communications network, she said.

"When we went shopping for a network in the spring of 1982, [RCA Cylix Communications, Inc.] contacted us to arrange a test," Sirota said. "At the time, however, [its] network did not address our technical needs of an IBM Synchronous Data Link Control [SDLC] protocol." As a result, United Van Lines chose a private network based on leased lines to connect its agents with computerized information located here.

The RCA Cylix Communications Network added SDLC to its network in September 1982. "A month after I learned of this," Sirota said, "we tried using RCA Cylix to transmit registration infor-

See NETWORK 38/14

Networks are expanding faster than anyone expected

...and controlling that expansion, whether it is in your data processing center or data communications network, or both, is almost impossible without the NETMAN™ Information System.

NETMAN is an on-line total management software system that keeps you informed about every aspect of your network.

NETMAN...

- Optimizes your inventory and reduces equipment shortages by showing the status of your hardware and software—where it is, how it's working, how much it costs and what is on order.
- Eliminates installation delays by showing how your configuration ties together today and how it can be expanded to meet future needs.
- Minimizes problem outages by pinpointing trouble spots, noting their status, their impact, how soon correction was made and by whom.
- Improves vendor performance by tracking who is most responsive, whose products work best in your environment, and the status of contractual obligations.
- Saves money through improved financial control by validating invoice details and totals, reporting on contract status and lease accruals, and projecting current costs into the future for budget planning.

NETMAN gives you a complete on-line audit of your environment. Users say the money saved by gaining financial control alone justifies NETMAN's installation.

Available for TSO, CICS and CMS.

For more information, please contact:

california software, incorporated
1460 Fourth Street
Santa Monica, California 90401
213/451-5693 Telex: 703713 Answerback: NETMAN UD

SPECIAL REPORT

Bus networks gaining on traditional star nets

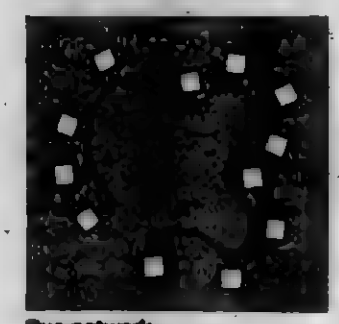
By Patrick M. Bourgeois
Special to CW

One trend that is becoming apparent is that data networks that are used in a local environment — a single building or a multibuilding campus — are beginning to take a different direction from in the past. That direction is toward bus networks and away from the traditional star configuration.

The bus networks offered today fall into three categories using two types of media: either shielded, twisted-pair lines for low-speed, low-cost requirements with total bus speeds up to 1M bit/sec; or coaxial cables for medium-speed (2M to 10M bit/sec) and high-speed (10M bit/sec) networks. The shielding afforded by these media provides excellent protection, and individual port speeds can range to speeds up to 60% of the bus speed.

Star network

Although it is difficult to fault proven equipment, it is also difficult to justify 10-year-old technology that is used in today's centralized data switches or port selectors. Similarly, it is difficult to justify the need for limited-distance modems when communicating further than the standard RS-232 distance of 50 ft over twisted wires, with the inherent possibility of line errors and electromagnetic interference problems.



Bus network

Rarely can individual port speeds exceed 19.2K bit/sec. The cost or the inflexibility, or both, just do not meet the modern-day requirements to connect low-cost, intelligent devices that vary widely in interface needs, data rates, flow control, bit configuration and even protocol.

The new direction is toward intelligent local-area networks, where the intelligence is distributed throughout the network rather than at one vulnerable site. Therefore, failure at any one site does not cause the failure of the entire network. And with intelligence being distributed to the point of interface, the node can handle the characteristics of the device located at each site.

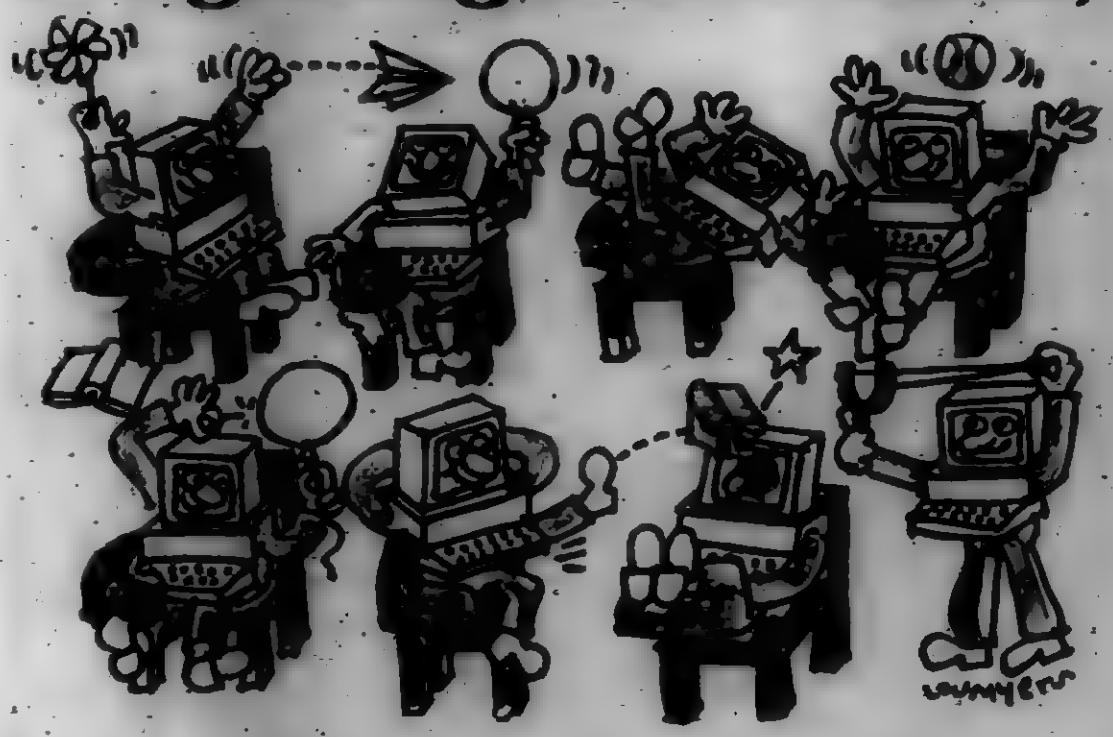
The power of a microcomputer operating system in each node allows the network to become almost device-independent, so that changes in brands of terminals, computers or peripherals allow the network to remain intact.

The centralized switch or port selector system has a port cost that usually exceeds the cost of the dumb terminal that is connected to it. Yet, the network adds no intelligence to the device, but merely provides an electrical transport between a terminal and a host computer port.

With the intelligent networks that are being offered today, there is an operating system at each device interface node which adds intelligence to the device so that flow control can be selected; printer formatting (line feeds) can be handled, as well as character formatting.

See BUS SR/14

If your company's PCs are getting out of hand,



report them to our office.

OMNILINK™

We need control over our PCs.
Please send information on OMNILINK.

Name Title
Company Phone
Address
City State Zip

ON-LINE SOFTWARE INTERNATIONAL
Two Executive Drive, Fort Lee, NJ 07024
(201) 592-0009, Toll Free (800) 526-0272
CWLOF4

Now there's a way to supply PC users with the information they need without turning mainframe access into a free-for-all. OMNILINK software allows PC users to get information from the mainframe or any other IBM/PC connected to your CICS system. But you determine which mainframe files PC users can access. And with OMNILINK's built-in security features, it's physically impossible to update files without the consent of the DP department.

In addition, OMNILINK lets you standardize your PC operations, including electronic mail, word processing, spreadsheets, graphics, program development and queries.

If you're worried about your company's PCs getting out of control, call toll-free 800-526-0272 or send for more information on OMNILINK software. We'll show you how easy it is to maintain discipline in data processing.

IBM/PC is a registered trademark of International Business Machines.

SPECIAL **REPORT**

Firm installs private satellite net

DALLAS — Communications managers and management information systems directors nationwide are faced with the burdensome responsibility of providing their organizations with efficient, manageable data communications systems at a cost-effective price. A data services firm here established its own private satellite network.

Electronic Data Systems Corp. (EDS) provides integrated data services to clients in the financial, insurance, health care, retail, manufacturing and higher education markets. The firm is a major supplier of such services to the federal government.

EDS' local data processing systems are interconnected with larger, geographically dispersed computer centers, forming an internal network the company calls Edsnet.

"In order to design, integrate and operate systems of this size," explained Dr. Clairborne H. Johnson Jr., director of technical development for EDS, "available and reliable data communications are imperative, both for our customers' operations and for services EDS offers."

To help meet its data communications requirements, EDS embarked upon the installation of a private network of satellite earth stations manufactured by Vitalink Communications Corp. of Mountain View, Calif. Vitalink provides intelligent earth stations, satellite transmissions and network program management.

EDS has completed the first phase of its network migration by installing three Vitalink earth stations between its three major data centers in Dallas, Camp Hill, Pa., and Sacramento, Calif. The Dallas site has a 9-meter, Dual-Trac earth station capable of a maximum throughput of 6M bit/sec. Camp Hill and Sacramento each operate with 7-meter stations expandable to 4M bit/sec. The EDS network is expected to quadruple in bandwidth and number of locations over the next two years.

Edsnet uses a combination of Vitalink satellite earth stations for the backbone of its network and terrestrial tail circuits to connect customer sites with EDS' regional satellite nodes. Vitalink's current generation of products enables an interstate private line of 56K bit/sec or greater to be replaced with a Vitalink network. EDS has replaced two lines between Dallas and Camp Hill and one line each between Dallas and Sacramento and Sacramento and Camp Hill. "The real payoff in switching to satellite communications," Johnson emphasized, "is in the benefits to quality and performance."

EDS' business communications must be ultrareliable and flexible enough to respond to both its customers' and its own internal network requirements. This flexibility includes being able to add bandwidth to the network or add service to a new account in a very short period of time.

The network must come as close to continuous operation as possible because outages can cost both EDS and its customers significant financial losses. For example, certain of EDS' U.S. Department of Defense contracts specify the mandatory provision of redundant data centers and communications facilities. Furthermore, there are many applications, such as videoconferencing, which require a large amount of bandwidth for a relatively short period of time. "For these reasons," Johnson said, "we determined that satellite communications was the only way to construct the kind of network we needed."

At the heart of the EDS network is the intelligent, microprocessor-driven earth station. To maintain reliability, each station is manufactured under an integrated system design with solid-state, modular components.

There are two complete and independent data paths operational in each station and through the satellites as well. In the event of a failure in any single earth station component, that network location loses only one-half of its data communications capability. The other half of the earth station remains in full operation. "This allows us to provide redundancy where required without the addition of duplicate circuits," Johnson explained.

In the event of a problem in a station, a built-in network monitoring system automatically diagnoses the condition, sounds an alarm and notifies Vitalink's Network Operations Control Center via an autodial modem in each station.

See EDS SR/12

THE NEW 924. THE TELEVIDEO SUCCESS STORY (cont'd.)

TeleVideo® has combined the best innovations in technology, design and quality of manufacturing to bring you superior terminals. Now with the new 924 we've built in comfort and productivity features that leave the other manufacturers behind.

For user comfort, the 924 has a tilt and swivel non-glare screen and DIN-standard low profile keyboard. 16 programmable, non-volatile function keys (shiftable to 32) turn often used instructions into one key commands. Extra display features include full screen editing, character and block graphics, plus 32 non-embedded visual attributes. The 924's logical attributes define protected and unprotected regions for accurate data entry.

If you don't need the full power of the 924, our 914 has all the design advantages of the 924 at less cost.

Whatever your application, nothing measures up to TeleVideo. And nothing succeeds like the 924!

Call us at (800) 538-8725 for more information. (In California call (408) 745-7760) or contact your nearest TeleVideo office:

California/Santa Ana	(714) 476-0244
California/Sunnyvale	(408) 745-7760
Georgia/Atlanta	(404) 447-1231
Illinois/Chicago	(312) 397-5400
Massachusetts/Boston	(617) 890-3282
New York/New York	(516) 496-4777
Texas/Dallas	(214) 258-6776
Central Europe (The Netherlands)	(31) 2503-35444
Northern Europe (United Kingdom)	(44) 9-905-6464
Southern Europe (France)	(33) 1-686-4412

GET IN ON THE BOOM.™

TeleVideo Terminals

TeleVideo Systems, Inc.

Service is available nationwide from General Electric Electronic Instrumentation and Computer Service Centers.

EDS from 39/10

"By setting the proper performance windows in each of the 94 control points in each station we monitor, we can usually identify a problem before it affects the performance of a customer's network," said Michael Fagan, national account manager for Vitalink. "Then we instruct the customer to replace the problem part online while that earth station is still operating at one-half capacity."

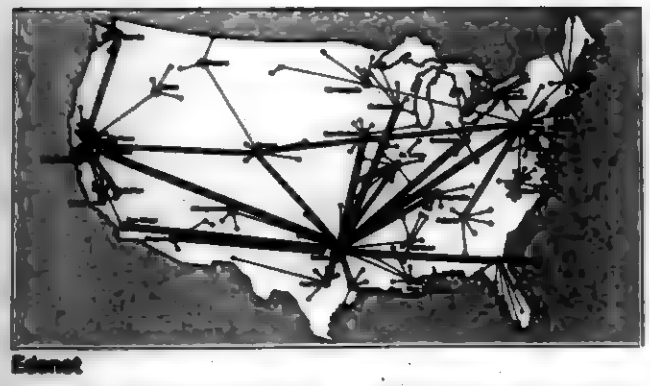
Additional functions of the network software allow the user to route bandwidth dynamically through the network as required. For example, EDS can set up a large file transfer or videoconference at 1.544M bit/sec for an hour and then drop that application off the network, paying only for the actual satellite usage. Up to four user-programmed networks can be stored in the system to be activated on a time-of-day basis as business volumes dictate.

Because of the broadcast nature of the satellite, any new location added to the network via an earth station is automatically connected to all other sites. This allows for full-mesh connectivity at about the same cost as one high-speed, point-to-point terrestrial circuit. "This answered our problem of data center backup," Johnson said.

Financially, the investment EDS has made in the earth stations allows the company to control a greater portion of its network cost through one-time capitalization.

Furthermore, Vitalink offers its network services on a fixed monthly price for terms of 12 months or longer. "For the first time, we can accurately predict and control the costs of our data communications budget," Johnson added.

The strategic benefits that EDS expects to derive from a flexible, in-house satellite data network are seen to be key to its business. Johnson noted, "Our commitment to this technology is indicative of the increasingly vital role EDS recognizes that communications systems will play in the data services the company offers."



Edenet

PBX from 39/7

vide asynchronous terminals with 3270 bisynchronous and pass-through emulation. Capabilities such as X.25 gateways, including X.29 padding functions, are also supported by leading vendors.

Agreements for joint cooperative work among microcomputer and mainframe manufacturers and PBX vendors have already been established.

The IBM purchase of 18% of Rolm Corp.'s stock last year could be construed as an endorsement that the digital PBX is the glue that binds workstations and resources in an office environment.

Many standards groups have started work on a digital PBX-to-mainframe interface, which will certainly increase the popularity of the PBX as the office hub for data communications.

In short, the era of the truly effective and flexible local-area network is just beginning, and the PBX can be expected to play a continually expanding role as more attention is directed to the real user and the real use. The technology will be available and waiting.

Alpert is a data applications consultant for the Tysons Corner, Va., branch of Rolm, and Weems is president of Office Technology Corp. of McLean, Va.

R&D had certain requirements that had to be met; manufacturing, accounting and marketing had others. Then microcomputers started showing up on desktops, with modems and printers here and there. Now you face the task of making it all work together. Sharing resources. Sharing information. And making more effective use of the information processing equipment you've already invested in.

NET/ONE LEAVES YOU IN CONTROL OF EQUIPMENT DECISIONS.

Net/One® is a general purpose communications system that turns equipment from different vendors into a fully functional, fast, powerful, information processing network. Because it can connect equipment from virtually any vendor, you remain free to choose equipment based on capability, rather than compatibility.

Off the shelf, Net/One supports industry-standard equipment interfaces—Async, Bisync, SDLC, through RS-232, V.35, RS-449 and IEEE-488—as well as many high speed parallel interfaces. The list is expanding every month. But if you have special equipment that isn't in that list, Net/One is the only local area network that's fully programmable at every level so special interface protocols can be added now, or when you need them, later.

BROADBAND, BASEBAND, OR ANY COMBINATION THEREOF. YOU CALL THE SHOTS ON MEDIA, TOO.

Net/One is the only local communications system that gives you the option of broadband or baseband or a combination of both, with architecture that will allow you to add other media such as fiber optics in the near future.

YOU DON'T HAVE TO KNOW EXACTLY WHERE YOU'RE GOING TO BUY A NETWORK THAT WILL GET YOU THERE.

Everything about Net/One has been designed to respond to your needs, as they evolve, and to remain fully adaptable to evolving communications technology. System architecture is completely modular, so it can grow at the

Net/One turns the e
now into the netwo

Net/One is a registered trademark of Ungermann-Bass, Inc. © 1983 Ungermann-Bass, Inc.

SPECIAL REPORT

Fiber optic's time has come in phone network

Offers advantages over wire line, radio systems

By Raymond White
Special to CW‡

Early technology forecasts predicted the widespread use of fiber optics in telecommunications applications. These forecasts have begun to come true. There are, at present, several trial or traffic-carrying systems in use in telephone operating company trunk and loop plants.

The use of optical fiber communications systems in the telephone network has advanced very rapidly since the first use of a fiber-optic T1 transmission system in 1977. Since then, both trunking and loop systems have been put into use carrying live traffic.

The use of fiber optics in feeder, interoffice or toll digital transmission systems can offer several distinct advantages over conventional wire line and radio systems:

■ Fewer repeaters. Fiber-optic systems can have repeater spacings exceeding 8 kilometers. As a result, most urban interoffice trunks can be repeaterless. Rural trunks would require fewer repeaters. This means lower installation and life-cycle costs.

■ High capacity for small cable size. Cables less than 2 centimeters in diameter have the capacity of several 10-centimeter-diameter wire line cables. This eases the capacity problem in overcrowded urban cable duct systems; old duct capacity can be better utilized to eliminate the need for expensive additional duct work.

■ Immunity to lightning-induced surges. The fact that the transmission medium is dielectric means that lightning-induced surges with their resulting damage to cable and electronics are no longer a problem.

■ Frequency allocation not required. With radio transmission, a long and involved licensing procedure is required in order to get Federal Communications Commission approval to operate the radio. Fiber optics is a high-capacity alternative that does not require such licensing.

Cost will be the ultimate deciding factor regarding the extent to which fiber-optic systems are used in transmission applications. Even with today's low-volume manufacturing costs, fiber-optic systems can "prove in" economically at medium to high capacities when compared with conventional systems.

The costs include typical installation and duct costs for urban installations. The fiber-optic link becomes less costly than the wire line link at a capacity of approximately 500 voice circuits. This result is typical of the comparative costs of fiber-optic and conventional systems.

Hence, fiber optics is a viable alternative to conventional transmission technologies, provided the system capacity is relatively high, above approximately 500 voice circuits.

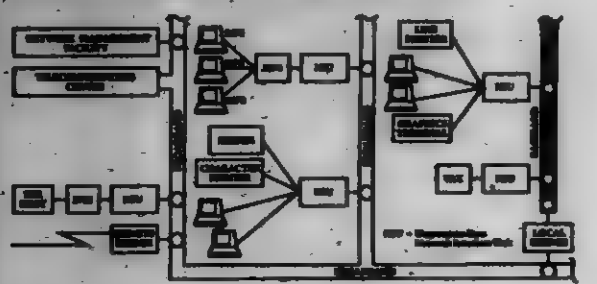
Two technologies, which are beginning to emerge from laboratory development, will have a significant effect on the application of fiber optics to digital telephone transmission. The first — long wavelength transmission — will allow repeater spacings that rival those of radio systems. The second — wavelength division multiplexing (WDM) — will allow simultaneous transmission of several signals over a single fiber through the use of "color" multiplexing.

At long transmission wavelengths, both loss and dispersion in optical fibers are

See FIBER SR/15

same time and in the same direction you do. Regardless of the direction that turns out to be.

When separate divisions within a company or a campus need to share resources, one Net/One system can be bridged to others, and to remote networks. These bridges can interconnect baseband, broadband, or Net/One systems that include both. And like vendor independence and media independence, this bridging capability is available now from Ungermann-Bass.



NOW, THE IMPORTANT DIFFERENCE BETWEEN TALKING A GREAT NETWORK AND DELIVERING ONE.

We've been installing Net/One since July of 1980. Hundreds of our systems are already out there moving information for people like Control Data, Caltech, Fairchild, ITT, RCA, Boston University, U.S. Forest Service, and Ford Aerospace.

So we can do more than talk about what you need in a local area network. We can actually deliver one, now. And we can refer you to a long list of customers who are actually using one (or two or three) now.

Let's talk about how to turn the equipment you have, now—whatever it is—into the network you want, now. And the network that can take you wherever you want to go from here. Net/One.

Ungermann-Bass, Inc., 2560 Mission College Boulevard, Santa Clara, California 95050. Telephone (408) 496-0111.

Net/One from Ungermann-Bass

quipment you have
rk you want. Now.

MOVER from 39/8

mation on a new moving job between two agent sites — one in California, the other in Boston. The trial went smoothly. Confident that the network could save us money and help our agents deliver better service, I recommended the network to my colleagues."

Initially, only new agents were linked to the network. Sirota eventually implemented a program to convert existing agent sites from leased telephone line to satellite.

According to Sirota, the ability to save thousands of dollars in line charges is one of the main reasons United Van Lines decided to go with RCA Cylix. "Leased-line service is very expensive for us because it is billed on the basis of distance rather than volume," she noted. "We have agents all over the country, so you can imagine the cost of linking everyone to the network.

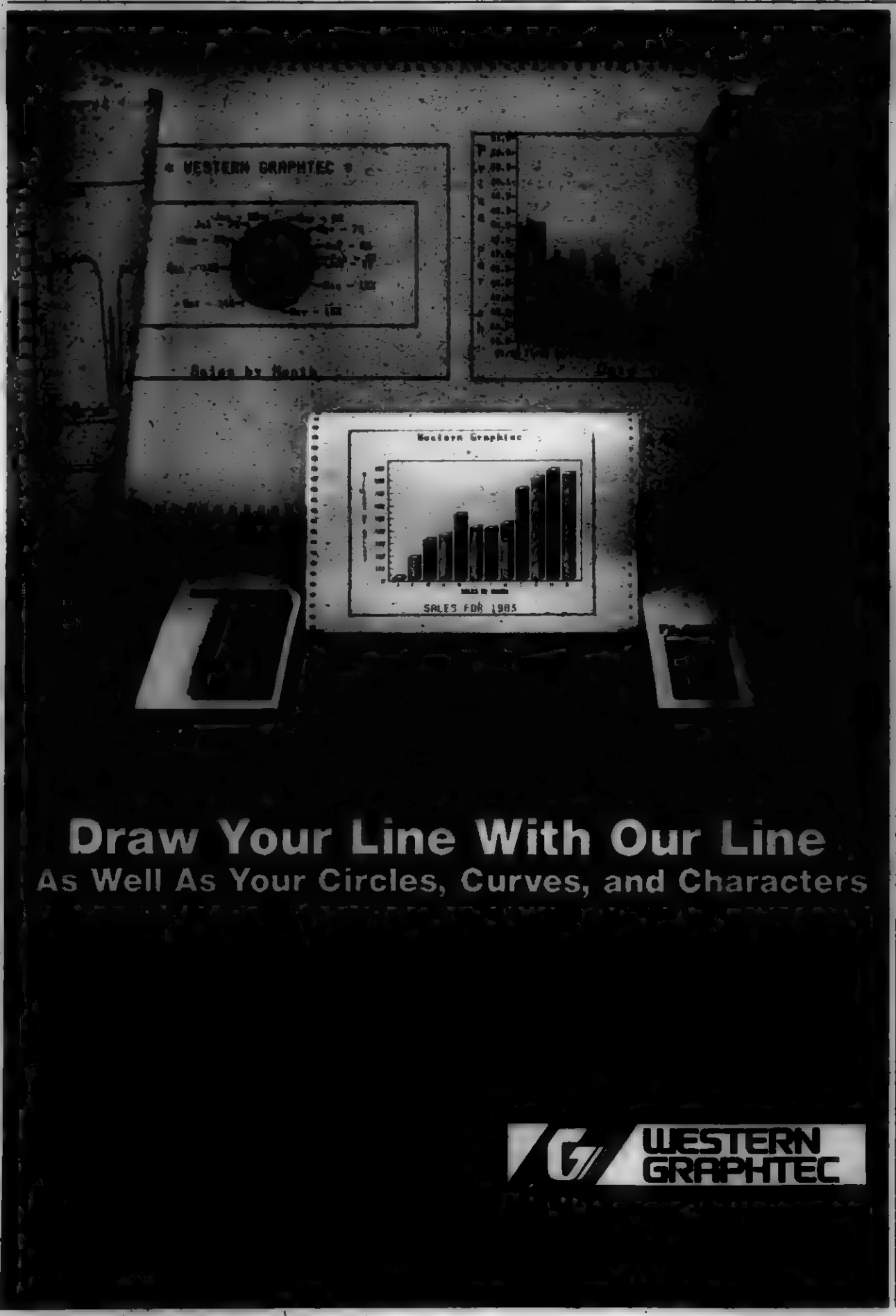
Those agents already on the satellite network are enjoying the benefits of accessing information on-line without the assistance of an operator. This allows them to provide quicker responses to a shipper's queries concerning equipment availability, shipment location and freight estimates.

Those agents already on the satellite network are enjoying the benefits of accessing information on-line without the assistance of an operator. This allows them to provide quicker responses to a shipper's queries concerning equipment availability, shipment location and freight estimates.

"The ability to supply accurate, competitive estimates can be the difference between winning and losing a prospective shipper's business," Sirota said. "This process was relatively uncomplicated under regulation because rates were set by law. Open market pricing has made things more difficult. Now, agents must compile estimates by calculating various mathematical ratios involving a shipment's weight and destination.

"United Van Lines has simplified this procedure with a proprietary software package that assists agents in their calculations. Using the satellite network, agents can access this automated mileage guide on-line to deliver an accurate freight bill quickly," Sirota said.

Since last June, the satellite network has steadily made its presence felt throughout United Van Lines' entire agent community. With 35 remote sites on the network already in place, the network equally shares the responsibility of distributing operational information with the leased-line network.



BUS from 39/9

speed adapting and many more features. The dumb terminal is no longer dumb. And none of these devices has drawn upon the operating system of any computer attached to the intelligent network.

When comparing the total cost abilities of the star network (central switch) vs. the bus network (distributed switch), it is important to consider:

- Higher hardware costs (redundancy, line drivers and so forth).
- Higher installation costs (greater distances of wire).
- Higher expansion costs (wiring and line drivers).
- Total system reliability questions.
- Some limitations of type of I/O devices.
- Higher cost of transmission media per foot.

With the simplicity of stringing a single-bus cable in a building, attaching switching intelligent nodes where desired, the whole networking concept becomes easy — easy to install, operate and expand.

Bourgeois is vice-president and director of marketing for Complex Systems, Inc. located in Huntsville, Ala., a manufacturer of data communications equipment.

FIBER from 59/13

reduced relative to the loss and dispersion of so-called short wavelengths. As a result of improved transmission characteristics, link length or repeater spacing can be dramatically increased.

The technology of WDM allows the combination, transmission and subsequent separation of several different optical signals each of a slightly different wavelength. WDM, combined with the very large bandwidth of optical fibers, makes possible very high-capacity cables using only a few optical fibers.

For example, if WDM was used to combine 10 duplex signals onto a single optical fiber, a capacity of 40,320 simultaneous two-way telephone circuit would result. The technology to accomplish that will be available in a short time. Multiple wavelength systems are today being demonstrated in the laboratory. The advent of integrated optics will make such systems even more practical.

While fiber-optic trunking systems are a practical reality today, fiber-optic subscriber loop systems appear to be a few years off. One major telephone company (Bell Canada) has predicted that fiber loops will be economical by 1986. There are, however, several major trials being conducted. Among the more prominent are the Bell Canada Yorkville trial, the Manitoba Telephone System/DOC Elie trial and the Japanese Hi-Ovis experiment. Fiber-optic local loop systems are attractive for several reasons:

- Broadband capability. Fiber-optic systems have such a large bandwidth that they are capable of transmitting multiple services, including voice, video and data signals. Fiber optics is the likely pipeline that will be the key to future "wired city" broadband systems. However, it should be pointed out that there are political and social considerations that could delay single-pipeline broadband networks.
- Ultimate low cost. The rising cost of copper, coupled with the falling cost of optical fibers, indicates a crossover in cost some time in the near future. Furthermore, the fact that fiber-optic systems can carry more services than copper will mean a lower cost per service with the fiber-optic system.
- Immunity to lightning surges. Local fiber-optic systems would eliminate the need for lightning protection in the local loop.

One present-day drawback of local fiber-optic systems is that an alternative means of powering the telephone set is required. The approach considered most often involves the use of local ac power with a battery backup in the home capable of powering the telephone service for up to eight hours in the event of power outage.

The services provided by the system are:

- Multiple telephone and data channels.
- Broadcast, pay TV and educational TV.
- Library and information retrieval (so-called "viewdata" system).
- Entertainment audio programming.
- Fire, security and panic alarms.
- Meter reading and power shedding.
- Electronic banking and shopping.

Two technologies will have a significant effect on the application of fiber optics to digital telephone transmission. The first — long wavelength transmission — will allow repeater spacings that rival those of radio systems. The second — wavelength division multiplexing — will allow simultaneous transmission of several signals over a single fiber through the use of "color" multiplexing.

- Subscriber-originated video for business conferencing and video games.
- Opinion polling.

Cost studies using computerized parametric analysis have been carried out for the system. An estimated cost per subscriber for a system serving 100,000 subscribers is approximately $700 to $800 per subscriber, which is reasonably attractive, especially considering the variety of services provided and the flexibility of the system.

The results given in the foregoing discussion indicate that:

- Fiber-optic trunking systems are cost-competitive today while offering users several other advantages.
- Future technology developments will make fiber-optic trunks even more attractive.
- Local fiber-optic broadband systems can provide moderate-cost, flexible-service networks.

What remains for the future implementation of such systems is political actions and social acceptance. It can certainly be said that fiber optics is a technology whose time has come as far as application in the telephone network is concerned.

White is manager of West Coast systems for the Excess and Surplus Lines Division of Cigna Corp., an insurance company located in Los Angeles.

IS YOUR COMMUNICATIONS NETWORK BREAKING UP?

Don't miss
"MANAGING THE COMMUNICATIONS NETWORK."
Exclusively from
Computerworld Reports.

How many vendors, how many different technologies does it take to make your network work? How many end users, how many decision makers can it take before something—or someone—cracks up? And does the telephone company break-up mean telecommunications tie-ups?

These are some of the critical questions posed by host John Gantz in "Managing the Communications Network," third in a lively, provocative series presented on 30-minute videocassettes and produced by DELTAK and CW Communications.

This month, you'll get the views of an industry expert, an MIS director, and a leading communications consultant. And be sure to stay tuned, because next month's Report will address another vital concern: the AT&T divestiture and its impact on information management. Watch for future Reports on subjects such as application development centers, artificial intelligence, end user training, the maturing information center, and more.

To learn all the signs of network break-up before your organization cracks up, order Computerworld Reports: "Managing the Communications Network." Call DELTAK order entry at (312) 369-3000; (416) 678-9222 in Canada.

DELTAK
East/West Technological Center
1751 West Diehl Rd., Naperville, IL 60566
(312) 369-3000 (800) 532-7695

375 Cochituate Road
Box 880, Framingham, MA 01701
(617) 879-0700

© Copyright 1984 DELTAK, inc.

State moves to organize independent nets

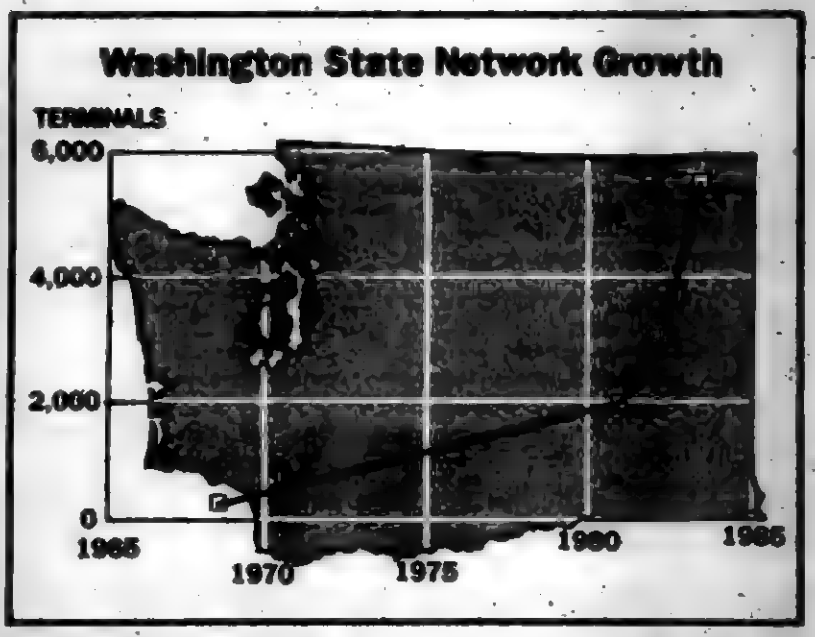
For optimal use in decentralized management structure

By Dennis Jones
and John Flanagan
Special to CW

Today, Washington state government is poised on the threshold of a new era in telecommunications. New responsibilities for end-to-end network management, new competitive environments for acquisition of hardware and facilities, new service offerings such as electronic mail and a confusing new array of vendors and rates are but a few of the challenges that must be faced. Washington state's confidence in its ability to meet the future is founded on a cooperative organizational concept, structured to meet these coming challenges.

Long before the court-ordered Bell divestiture became an issue, Washington state government recognized the need to bring order and efficiency to its communications networks. In the 1960s, the pressures for improvement seem to have grown at an exponential rate, paralleling the state's growth in telecommunications. (Currently there are about 6,000 remote terminals installed on Washington's networks, and these are doubling every two years.

The demand seems unrelenting as terminals and microcomputers spring up in government offices throughout the state. Income assistance determination, criminal offender tracking, determinant sentencing, business licensing and college class scheduling are just a few of the state's programs where interactive computing is being demanded for improving services to citizens.



Administrative systems such as accounting, budgeting, personnel and payroll have also gone on-line to streamline management control. In addition, increased computer literacy among government workers is bringing demands for electronic mail, electronic document distribution and shared access to various data bases.

While almost everything involving telecommunications has seen dramatic changes over the past decade, Washington's decentralized network management structure has remained intact. In the past, with few exceptions, various Washington state agencies and institutions have independently planned, implemented and operated their own data communications networks.

There are at least 20 significant independent networks in existence. The most frightening aspect of this is not knowing just how many networks there really are.

The severity of the current situation can be illustrated with examples such as the government offices in the city of Wenatchee, Wash., which are linked individually to 12 different state networks.

It is clear from the description of Washington state's networking structure that many of the fundamental problems may be attributed to the decentralized data processing management.

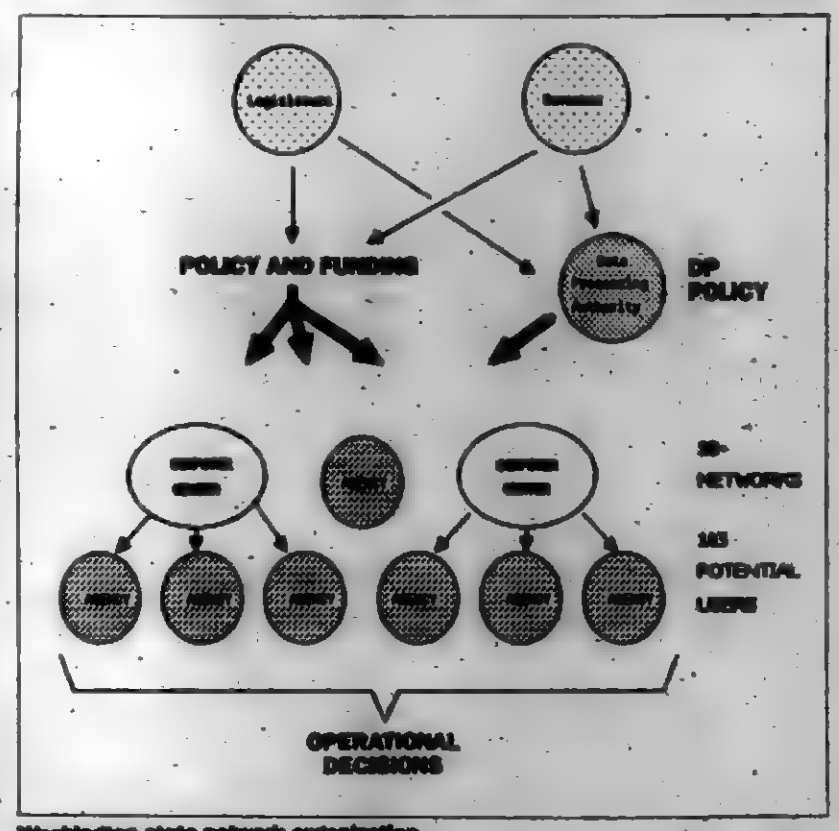
While this structure may complicate and confuse the optimization of resource usage (be it networks, systems or staff), it does provide agencies with direct control and simplifies the application of information processing to their business problems.

The challenge facing Washington state is not how to organize for optimizing network resources, but how to organize the network for optimal use in a decentralized management structure.

The focal point of this challenge is the state's Data Processing Authority (DPA). Created in 1973 to provide for the efficient and effective use of data processing in state government, this board consists of 11 members — seven state government executives and four private sector executives — and is supported by an executive director and eight professional staff members.

Traditionally, the DPA had concerned itself with control over the proliferation of computer installations. By the 1980s, the DPA's early achievements of consolidated computer centers and close control of acquisitions seemed less important. The new demands for resource sharing (systems, data and networks) and resource optimization appeared attainable only through some massive

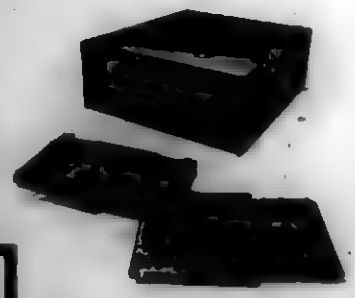
See STATE SR/18



Washington state network organization

Honeywell and IBM terminal emulation at prices that will blow the socks off the competition.

We began by designing the best protocol converter on the market, favored for years by discriminating buyers, including several FORTUNE 500 companies. They like our quality. But they love our prices. As much as 60% below the competition. Line for line, we've got the best



Number of Lines/ System	Suggested List Price*
4	$ 4,620.
8	$ 5,620.
12	$ 6,620.
16	$ 8,620.
20	$ 9,620.
24	$10,620.
28	$11,620.

*Plus a one-time software user license of $500 per system. Call or write for complete price list and discount schedule.

product at the lowest price you'll find. Our MZ-80 is a real workhorse in a remarkably compact cabinet. And at the heart of it all, the 6 Mhz Z-80B™, the fastest, most powerful 8-bit cpu available. It will run bi-sync to your IBM-compatible host using ASCII CRT's to emulate 3270 terminals. Printers and other devices are also supported. For slightly more, we can handle most other popular host protocols, including Honeywell VIP.

But that's not all. There's a whole range of other functions this little wonder can perform. Try it risk free for 30 days, and if you're not completely satisfied, we'll take it back.

TEC Thomas Engineering Company
1060 Oak Grove Road
Concord, CA 94518
(415) 680-6640

SPECIAL REPORT

Local nets spur evolution to distributed DP

By Ralph E. Stuguemann
Special to CW

Local-area networks have captured the imagination of the computer user community — with good reason. Local-area networks provide the necessary links by which microcomputers, minicomputers and large mainframes can be interconnected with one another and with other information-processing devices into a cohesive system where vital information and expensive resources can be shared. Fueling the heightened interest in local nets is the proliferation of powerful but relatively inexpensive personal workstations.

The evolution in computing has been away from large central computers and toward smaller application-specific systems. A recent Data Decisions, Inc. survey found that data processing managers look to microcomputers to improve managerial or professional productivity, reduce mainframe work load and provide faster access to data. Increased experience with computers, an attendant benefit, was also cited by DP managers as an avenue to future productivity increases. Clearly, distributed information processing using microcomputers will play a vital role in the future.

The most visible sign of this movement from centralized to distributed information processing is the number of personal computers installed in offices throughout the U.S. Though only 7% of the office workers in the U.S. had a personal computer at the end of 1983, an estimated 40% will be using a personal computer to access information by 1990. The personal computer revolution that we have been hearing about for the past five years has merely begun. In the near future, these personal computers will not only share information among themselves but will also easily and transparently be able to obtain information from and enter information into centralized data bases such as mainframe computers.

Local-area network technology allows very high communications bandwidths to be implemented economically, with data rates typically from 1M bit/sec to 50M bit/sec. This bandwidth is essential if large numbers of stations are to be accommodated, and it is vital for increasing user productivity when moving files between workstations and centralized data bases.

This technique contrasts with the conventional private branch exchange (PBX) or data switch approach of dividing bandwidths simultaneously among many slower speed transmissions. In addition, local-area networks use distributed communications processors rather than centralized processors, providing the dedicated intelligence needed to interconnect specific devices. Because local-area networks and PBXs solve different communications problems, they will continue to coexist for the next several years.

Currently, over 16,000 local-area networks of all types are installed worldwide, with 65% of these in the office. By the end of 1988, the number of local-area networks installed is expected to reach more than 100,000. This expansion is mirrored in the growth of local-area networking systems suppliers both in total number in the marketplace and in the size of each individual supplier.

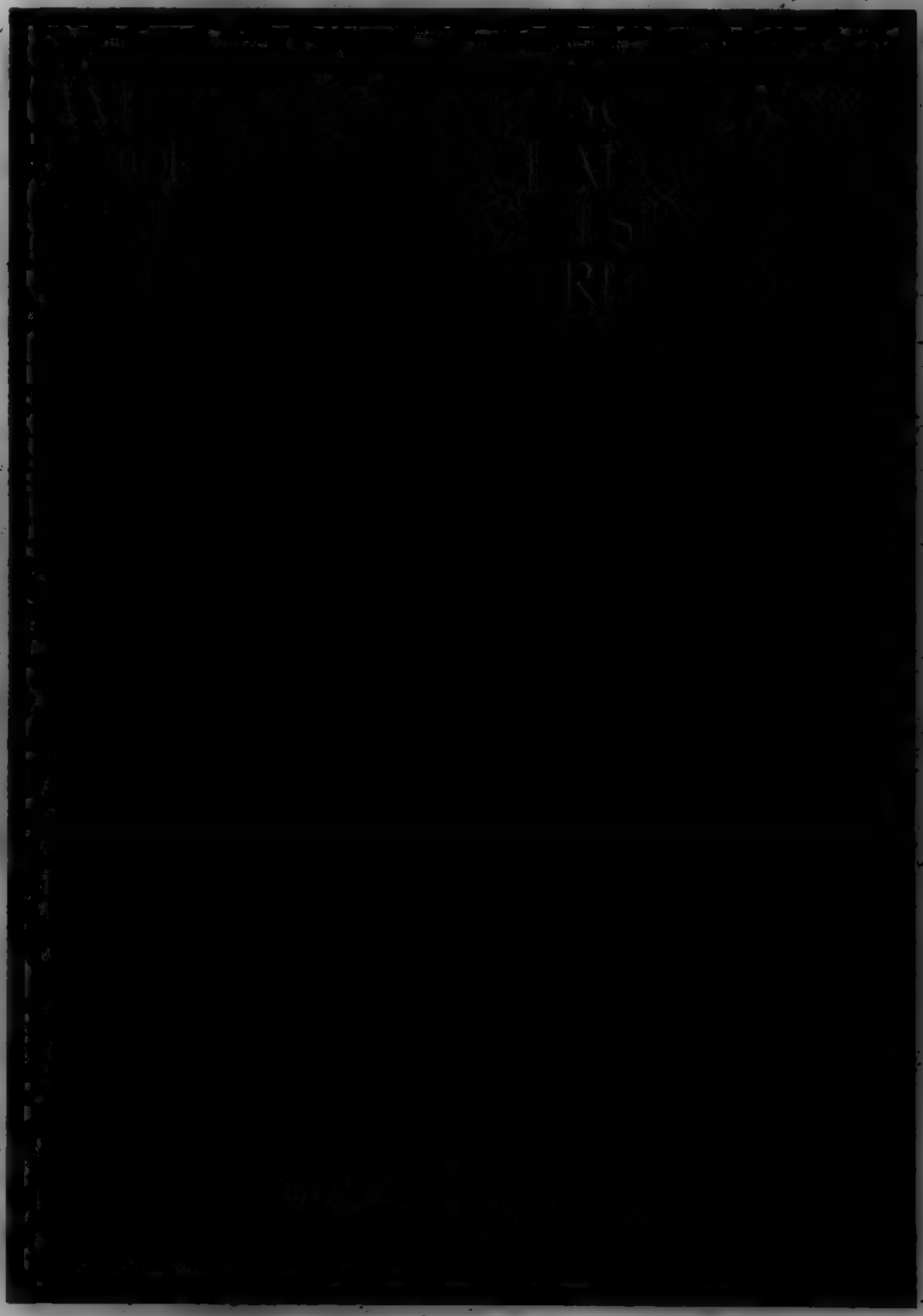
Local-area network technologies come in many shapes, sizes and levels of capability and are offered by an equally broad range of vendors. As a result, two local-area network markets have emerged: proprietary computer systems and vendor-independent communications systems. The latter market can also be divided into three segments: namely, personal computer clusters, mainframe computer room networks and general-purpose networking systems, which incorporate aspects of both micro-to-micro and mainframe-to-mainframe networks.

The size of the general-purpose local-area network market will exceed $150 million this year and will at least double annually for several years. Thus, the market may well be in excess of $1 billion by 1987. This market, though large, will not be big enough for computer vendors to abandon their proprietary approach to local nets, however.

Because such diversity exists in the local network environment — from physical interfaces to data exchange management — it will become increasingly important that international industry standards be established. The development of such standards not only provides the basis for increased compatibility among many vendors' products, but also significantly lowers the cost of local-area network products since industrywide semiconductor implementation is possible. Moreover, customers need to know that a network installation is a long-term proposition, capable of serving tomorrow's communications needs as well as today's.

Much of the industry discussion about local nets has centered on what

See STORY 2, P. 18



SPECIAL REPORT

STATE from SR/16

reorganization toward centralized management and leadership.

In 1982, after consideration of other options, the state chose to continue with the decentralized data processing management structure. This new method of operation relies on three key principles:

■ Deal with a few specific addressable issues at a time, making use of subcommittees to deal specifically with the issues.

■ Involve top data processing executives and staff from state agencies in the process of identifying these issues, defining goals, establishing objectives and developing solutions.

■ Place greater emphasis on planning and leadership, while de-emphasizing some regulatory and control responsibilities.

Over the last year, three significant elements of the architectural strategy have been developed that have led to a clearer picture of Washington's net organization.

The first element is the definition of primary nodes. Nine major data processing centers have been designated as the primary nodes in the statewide data network. (Communication links do not exist at this time among all primary network nodes, although several service centers have taken the initiative to create some of these links.)

Secondly, each state agency has been assigned to one of these primary nodes as the agency's primary link to the data communications network. As the network plan is developed, it is expected that the definition of communications standards between agencies and their hosts will be simplified.

Lastly, the expected benefits and merging technologies indicate that voice and data telecommunications must be addressed simultaneously.

Although the definition of these elements is important, there are many more complex issues which must be resolved. The plans for the next step of requirements definition, planning and design are now being finalized. Among the issues to be addressed in this next step are:

■ Network management. Will a common statewide network be managed by a single state agency? Should network management services be contracted out?

■ Services required. The scope of services provided by a common network may vary from simply providing least-cost circuits to providing a variety of value-added services like gateways and protocol conversions.

■ Private vs. public transmission systems. Should the state establish its own telecommunication circuits in the high-density corridors? (In 1982, there were 594 circuits for voice and data between Seattle and the state capital in Olympia.)

Jones is the assistant director of the state of Washington's Office of Financial Management. Flanagan is senior data processing coordinator for the state's DPA.

GROW from SR/17

transmission medium should be used — broadband (multiple channels) or baseband (single channel) coaxial cable or fiber-optic cable. The major growth in 1984 will be seen in broadband, which by the middle of 1984 is expected to represent almost 50% of the market.

If, as anticipated, IBM uses data-grade twisted pair for its local nets, we can expect to see this medium rapidly gain industry acceptance as the dominant medium for the next few years. Fiber-optic-based local nets, in their infancy now, will ultimately become the most common, because they offer extremely high bandwidths together with resistance to electrical interference.

In 1984, local nets will be even more widely used to implement effective distributed information-processing. Providing long-term integrated local-area network solutions will require that corporate-wide networks utilize several media, be capable of interconnecting all equipment — regardless of vendor — and support international standards. Thus, adherence to international standards will become a key issue in the upcoming year.

Ungermann is president and chief executive officer of Ungermann-Bass, Inc. of Santa Clara, Calif.

SPECIAL REPORT

Worldwide E-Mail program helps Ford share resources

DEARBORN, Mich. — To the businessman facing a deadline, nothing is more frustrating than the knowledge that his urgent message to a distant colleague is traveling at the speed of an office boy's mail cart. Or, that his rush telex may be 20th in line for transmission. Time zones and communications equipment differences magnify the problem for companies dealing worldwide.

Ford Motor Co., based here, is eliminating communications bottlenecks with a three-phase program based on electronic mail.

Faced with the need to tie together the efforts of U.S. operations and those of its foreign affiliates in developing automotive products with international market appeal, Ford is emphasizing a sharing of resources, exchanging ideas and engineering techniques, for example, to achieve high product quality while reducing development costs.

Implementing this kind of operating strategy on a world scale calls for highly effective worldwide communications — in Ford's case, a unified electronic mail system that integrates the majority of Ford's communications requirements and both simplifies and speeds the transmission of administrative messages, word processing documents, business reports and schedules.

Gerald L. Decker, manager of Telecommunications Services at Ford headquarters, said his department's objective is to build a user-friendly corporate electronic mail system that acts as a hub for all electronic mail activities within the company.

"Ford presently uses several different forms of electronic mail technology," Decker said. "Most are centered around a 'community of interest,' where users need to communicate with each other on a regular basis. Our goal is not to replace local community-of-interest electronic mail systems, but to provide a means of information exchange among them."

Two years ago, the company replaced a private-wire teletypewriter network with the Worldwide Integrated Communications (Wiznc) electronic mail service. Wiznc is a service of Mohawk Data Sciences Corp. (MDS) of Parsippany, N.J. Now, Ford users can transmit typewriter-quality documents at speeds of up to 2,400 word/min, in comparison with 66 word/min on the teletypewriter system.

"The new electronic mail network has resulted in annual savings in excess of $200,000 in equipment and services, as compared with the previous in-house network," Decker noted. "This is in addition to savings related to increases in productivity, something that at this point is evident, but has not been evaluated in actual dollars."

See FORD 39/20

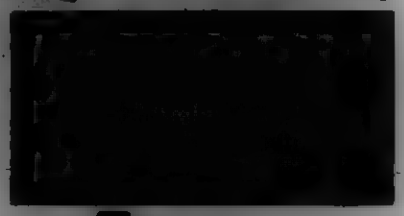
Connect with success.

IRMA™ is the industry's most successful IBM 3270 Decision Support Interface,™ with more than 25,000 installations.

IRMA, the first coaxial cable link between the IBM PC/PC XT and IBM 3270 networks, delivers the industry's best performance record. She's working successfully right now in more than 25,000 installations worldwide, giving PC users easy, economical mainframe data access, selection, storage and communication back to the mainframe.

And she's more capable than ever, with standard text file transfer software for VM/CMS and MVS/TSO mainframe environments, IBM 3278 Models 2, 3, 4 and 5 and IBM 3279 Models 2A and 3A screen support, plus optional APL Terminal Emulation.

If you want PC/3270 decision support that goes to work literally minutes out of the box, connect with success. With IRMA, the industry's most widely used and most thoroughly proven decision support interface. For information write DCA, 303 Technology Park, Norcross, Georgia 30092. Phone (404) 448-1400, TLX 261333 DCAATL. Or call us toll-free 1-800-241-IRMA. **Connect with success.**



dca
Digital Communications Associates, Inc.

IBM PC and IBM PC XT are trademarks of International Business Machines Corporation.
IRMA and Decision Support Interface are trademarks of Digital Communications Associates, Inc.
©1984 Digital Communications Associates, Inc.

FORD from 28/19

Ford is building a three-phase network. Phase I is an automatic electronic mail service that links 97 of Ford's factory and corporate locations in the U.S. and Canada with interconnection to international record carriers for worldwide message distribution.

Ford uses MDS message terminals and communications processors. Installed at strategic locations throughout the company, the terminals serve as message centers for employees in each vicinity. Terminals in the domestic network are controlled by the Winc operations center in Norwalk, Conn., a facility managed by MDS.

"Pickup and delivery of messages from these centers is automatic, requiring no operator involvement," said John Nopiuk, telecommunications specialist at Ford. Ford's electronic mail system could have accessed the public dial telephone network, but using existing voice lines rather than dedicated lines keeps the cost of the network low, according to Nopiuk.

In planning a corporate electronic mail system, Ford insisted on an open network concept. "The system had to be flexible," Nopiuk said, "allowing different types of terminals to access the network depending on each user's requirements. This is the primary focus of Phase II of the system, implemented in 1982."

Any standard communications terminal — a word processor, personal computer, electronic mail or buffered time-share terminal — can access the Ford network. Six different brands of word processors are presently accessing the network on a dial-in basis. In addition to normal business correspondence, letter-quality documents such as engineering reports or market analyses can be transmitted to Ford facilities around the world in a matter of hours.

Relating this capability to Ford's overall business philosophy, Decker said, "Electronic mail fits perfectly into our world-car-company strategy. The system enables a free-flowing dialogue to take place between our foreign and domestic operations, whether it be the sharing of technical information regarding research and development or correspondence between high-level executives." Mayford Roark, Ford's executive director of Systems, is a particularly enthusiastic user of the electronic mail system. Roark regularly uses both his office terminals and a terminal at his home to send messages to systems managers in the U.S. and overseas.

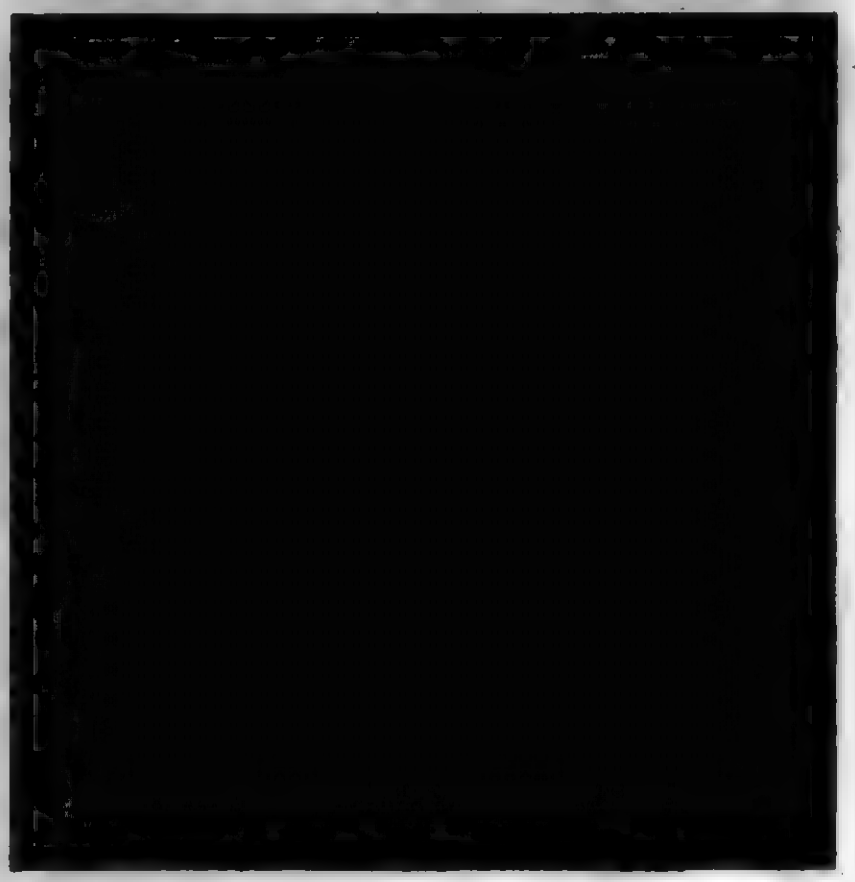
"Electronic mail is most useful as a replacement for the telephone call, which is time-consuming and expensive," Roark said. "Without interrupting or waiting for the other party, I can send questions or instructions to one manager and copy three or four others at the same time."

Since Roark composes much of his own correspondence, he spends little time dictating or revising. And, unlike the telephone, the electronic mail system gives him hard copies of all his messages.

Ford is preparing for Phase III, which will further enhance the use of word processors on the corporate electronic mail system. "Presently, our word processors are supported in a 'plain text' mode," Nopiuk said. "Because the word processing industry has not standardized on a common protocol and code set, transfer of documents between dissimilar word processors is limited.

"With the Phase III enhancement, we will have the ability to exchange text and document format control codes — underline, tab, page-number commands and so forth — between different models."

How can you afford to have an office full of computer equipment that can't communicate?



XLAN™ lets your mini and micro computers, along with related peripherals, talk to each other. Regardless of type, brand, or nationality.

Because XLAN is compatible with virtually all kinds of computer equipment, its versatility makes networking easy. Your office is connected with an inexpensive shielded-pair cable. It's economical to install and maintain, and it easily permits network additions or reconfigurations.

XLAN was designed for easy use. And cost-efficient operation. Think of it as a computer party line for sharing information and resources. The simple network from Complexx. XLAN.

Complexx Systems, Inc., 4930 Research Drive, Huntsville, AL 35805
205/830-4310.

COMPLEXX

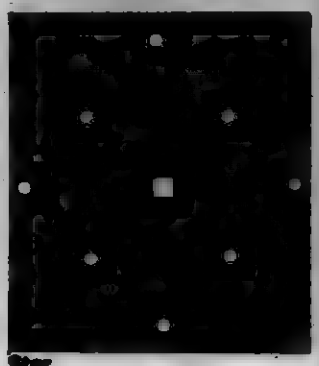
SPECIAL REPORT

Architects' plans should allow for data wiring

By James Hamilton
Special to CW

While there is still some conjecture about the automated office of the future, two things are relatively certain: It is not that far in the future, and it probably will utilize at least as many data terminal devices as the office of today does telephones.

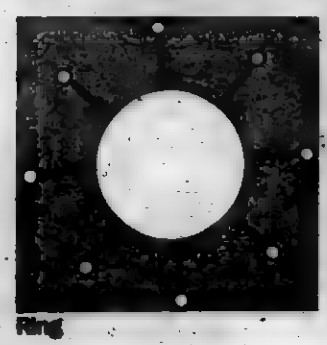
Consequently, this affects — or certainly should affect — the architect's planning today. If the architect does not provide for a well-planned and effective data wiring system or local network in the budget for each building, the tenants may well be destined to work in a chaotic data communications environment.

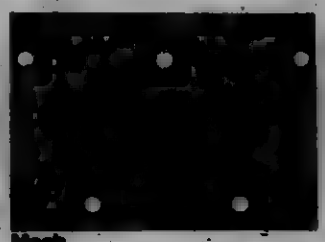

Star

Tree

A local-area network is the connection portion — wires, adapters and access protocols — of a system that makes possible the transfer of information between devices that are all located on the same premises. This could be an office building or portion of one, a manufacturing plant, hospital, university campus and so forth. The information will typically be carried on the network at speeds exceeding 1M bit/sec.

The devices linked in a local-area network may include a variety of informat-


Ring


Mesh

tion display stations, word processors, file and printer units, facsimile equipment, computer-graphics devices, video cameras and monitors, even whole computer systems, control systems or telephone switchboards.

Obviously, the design of a local network and possibly its installation might require electrical engineering skills and electrical contractors. But it is up to the architect to include communications wir-

Bus

ing needs in the budget and building plan if they are to become reality.

Why is it necessary to plan for data communications wiring? Whatever the outlook for the office of the future, the number of data terminals in the office of today

See WIRES 39/22

WIRES from SR/21

has been growing 25% to 30% a year, and a wide variety of these devices are now counted in the millions. Moreover, the number of terminals moved from one location to another ranges from 10% a year to 100% within six months and averages nearly 30% a year.

Until now, initial installation and movement of these devices has been a haphazard process. Consequently, a lot of cables that are no longer usable may still be installed and take up valuable and limited space. Individual cables may be unlabeled, and systems overall are not well documented. An existing cable is useless if the user does not know where both ends are. And, unfortunately, when a terminal is moved, a new cable must often be installed.

Up to the present, this approach has simply added to the maze of cables and their cost. But when the number of terminals reaches predicted levels, it will be a physical impossibility.

Consequently, modern, user-oriented data communications wiring requires the architect to plan for:

- As many wall outlets to plug in data terminals as the average office has telephone outlets today.
- A structure wiring approach for data communications, with wiring closets and a system of cross-connect panels similar to those employed for telephone communications to simplify installations, maintenance and change. This can be achieved either by using larger wiring closets to accommodate both data and telephones or by using a separate, adjacent closet for each.

This approach can potentially reduce the cost of a cable run to an office. It may allow the same cable to be used over and over for a variety of terminals, particularly when the wiring system is designed to handle several transmission systems which have wide use and will simplify movement of terminals within an establishment.

For example, if a department moves from the fifth floor to the eighth floor, its terminals will be unplugged on five, plugged into the wall receptacle on eight, and interconnections will be changed in the closets. There will be no cables to pull, hence little expense and time lost.

By contrast, if some firms want to make a major move in an existing building, up to six months are needed in order to get the required new cables installed.

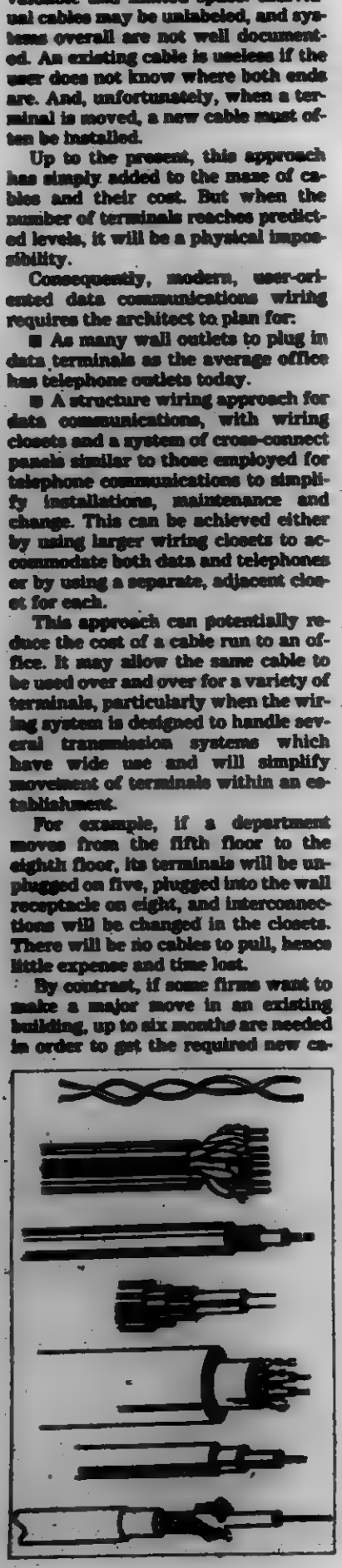
Naturally, the wire that must be installed to serve an individual terminal is the most expensive. In a building that has partitioned walls and removable ceiling tiles, it may cost $200 to $300 to install a new cable from the office to the computer room. But in an older building with stone walls, marble floors and old-fashioned ceilings, the cost can go up to $5,000. In contrast to pulling separate wires for individual users, it often costs much less per user to pull multiple cables at a time.

Eventually, the electrician or electrical contractor will be spared even that. The single-cable approach (not necessarily a single conductor) is the way local networks are evolving. The cable may include the familiar twisted pair or shielded multiple twisted pairs; coaxial, twin-axial and triaxial cables; mixed-media cable; and fiber optics. These cables will be linked in a variety of ways: star, mesh, bus, tree, ring and so forth. And in many instances, the architect may no longer have to design for, nor the electrician cope with, the volume of wires necessary in the past.

The newer communications wiring systems offer a user maximum flexibility, higher data transmission speeds, more channels with less noise and interference and the like. One goal of the architect should be to design or remodel buildings so that whichever local network the user ultimately adopts, the building design will facilitate the network's installation, maintenance and alteration.

Some of the factors to consider in

See WIRES SR/24



Era one.

SPECIAL REPORT

Net turns broker bullish on communications

PITTSBURGH — As a highly successful investment management firm located here, Federated Investors, Inc. knows the importance of planning for the future. It also knows that having ready access to the right information at the right time is vital to itself and its clients. For these reasons, the company made expandability and accessibility the main priorities when it decided to implement changes in its computer system.

Expandability was important because Federated was growing at a rapid pace. Over a period of three years, the company grew from approximately 65 to over 750 employees. During that same period, monies under management went from $2 billion to $31 billion. Because this expansion was expected to continue, it was essential for Federated's computer system to be able to handle continually increasing data processing requirements.

Accessibility was important because Federated and its clients depended upon the data processing capabilities of the resources and the information these resources contained.

Federated wanted a system that could readily provide it with access to the knowledge it needed to continue to serve the interests of its clients.

Of these two priorities, accessibility was a more complicated, though not necessarily more important, problem. System resources and users were widely dispersed. In addition to 12 Tandem Computers, Inc. T16 Nonstop II CPUs and an IBM System/34 in here, Federated accessed an Amdahl Corp. host in Kansas City, Mo., and an IBM 4300 in Blawnox, Pa., a town about 20 miles outside of Pittsburgh. The users of these resources included over 1,600 clients around the country and Federated personnel in three buildings.

Achieving accessibility was further complicated by Federated's use of equipment from different vendors and its separate asynchronous twisted pair and synchronous IBM 3270 coaxial systems. System incompatibility in this multivendor environment caused applications to be bound to a particular terminal family and denied some users access to all the resources. A number of other users needed two different terminals to perform all their job-related tasks.

The addition of new computers and terminals would be a step toward addressing Federated's growing needs, but it would not address the problem of accessibility. Neither would it be a very cost-effective solution, especially over the long term, since the cost of equipment and new cabling could quickly get out of hand.

The fundamental need, therefore, was seen to be a cost-effective method of integrating widely dispersed and different data devices into a readily accessible data communications network that could handle future growth.

Three goals

To create this network, Federated concentrated on three things: linking the separate systems, providing users with the ability to switch among the computer hosts and minimizing the need for additional equipment and cabling facilities.

Federated accomplished these goals by installing Alastrus Data Communications Corp. C-80 protocol converters, Gandalf Technologies, Inc. Line Miser data-over-voice, two-wire local modems and a Gandalf Dual Pacx IV data private automatic branch exchange. The protocol converters make the synchronous systems accessible from Ascii terminals, and the Line Misers provide data service to Federated personnel over existing telephone lines. Both help to maximize the use of existing terminal and cabling facilities.

The key to integrating the network, however, was the Gandalf Pacx, through which everything was routed. The Pacx allows a terminal user to switch among the various resources, which are grouped by classes. Users access any resource by asking for a particular class of service.

Before the installation of this equipment, Federated's system was relatively complex. Synchronous terminals in accounting accessed the System/34 over direct coaxial cable links. Asynchronous terminals in various other internal departments accessed the Tandem CPUs over direct links or used Infotron Systems Corp. multiplexers when cabling considerations dictated.

Also interfaced to the Tandems were Digital Equipment Corp. LA34 keyboard/printer terminals in 1,200 financial institutions around the country. These devices accessed the CPUs via an X.25 packet-switched network. The institutions used the terminals, which comprised Federated's "edge network," for such investment transactions as the purchase and redemption of Federated's money market funds.

The IBM 4300 host in Blawnox, on which Federated bought time, was used to develop application software. The Amdahl host in Kansas City,

See IBM SR/24

Era One saw the personal computer increase the productivity of the business executive dramatically. Yet for all their power, personal computers have not fulfilled their potential. Because the different makes have been unable to communicate reliably with one another and with the various public data networks.

But now, Microcom moves the personal computer into a new era of communications compatibility with Era 2–the first Personal Computer Communications System with the industry-standard communications protocol MNP. Era 2 finally enables dissimilar personal computers to communicate with one another reliably and cost effectively. It also allows the personal computer to access public data networks easily and error-free.

Era two.

A closer look at Era 2.

Era 2 with MNP is a 1200 baud Communications System (software and inboard modem) designed to operate with the IBM PC, PC XT, compatibles and PCjr; Apple IIe, Apple II Plus and Apple II. Its features include IBM 3101, Digital VT100 and VT52 terminal emulations. Era 2 executes multiple functions with a single keystroke. Stores a virtually unlimited number of telephone numbers – each one up to 31 digits. Era 2 is Bell 212A compatible, works with Pulse or Touch-tone™ dialing. Its speaker alerts you to busy signals, wrong numbers, etc. Era 2 gives your personal computer error-free compatibility with other personal computers, data bases, mainframes, almost any information source that can be reached by telephone line.

Microcom, Era 2 and MNP are trademarks of Microcom, Inc. Apple is a trademark of Apple Computer Inc. Digital is a trademark of Digital Equipment Corporation. IBM is a trademark of International Business Machines Corporation.

A new era in dependability. Era 2's electronics are so well put together we're able to offer a four-year warranty–twice the term of protection you get from yesterday's products.

On top of that our product support is outstanding. Our 800 number operates 9AM to 8PM (EST), Mondays through Fridays, 9AM to 5PM Saturdays with experts available to solve any problem or answer any question.

The state of the price of the state of the art.

We're able to offer Era 2 for an amazing $429. By any standard the price/value ratio of Era 2 is outstanding.

Move your personal computer forward into a new era of communications. Visit your Era 2 dealer soon. Call 800-322-ERA2 (in MA, 617-762-9310) for the name of one nearest you. Or write us, Microcom, Inc., 1400A Providence Highway, Norwood, MA 02062. We'll send you a brochure with complete information on Era 2.

Only from Microcom: The Personal Computer Communications System with MNP.

LINK from 39/23

which was accessed via 3270-compatible modems and Four Phase Computer Systems, Inc. 3274 controllers, was used for shareholder accounting. Approximately 120 terminals were interfaced to the controllers by coaxial cable.

Most of the terminals interfaced to the Amdahl host were in account administration and bank services. These departments used the terminals to access on-line inquiry updates of client accounts. Bank services also had eight asynchronous terminals which provided access to the Tandems. The asynchronous terminals were used to enter data for those financial institution clients that did not have edge network terminals.

Although this system adequately served Federated's needs, there were two problems. The first was that the system was actually four separate systems. The second problem was that a larger user base for any or all of the separate systems required more terminals and computer ports. In addition to the expense this would involve, there would be the expense and trouble of pulling more cable to install the equipment.

With the solution Federated opted for, however, the resources and terminals are integrated into a single data communications network. This network provides the accessibility Federated needs. It also makes more efficient use of existing facilities and allows for cost-effective expansion.

In the current system, all the resources of the previously separate systems and all the terminals, except the edge network terminals, are interfaced to the Pacx. A DEC VAX-11/780, which is used for distributed word processing and marketing information, has now been added and is also interfaced to the Pacx.

The VAX and the Tandem CPUs are connected directly to the Pacx. All the other resources are interfaced through Alanthus protocol converters installed in the Pacx cabinet. Modem links are used between the protocol converters and the remote hosts, and Line Misers are used for most internal terminal connections.

Besides being accessible, the system is cost-effectively expandable. Now, less expensive Ascii terminals can now be used, and only one terminal per desk is ever required. The Line Misers make the installation and relocation of these terminals inexpensive and fast. Federated can now install terminals at a cost of about $2,500, including the cost of the terminal, Line Miser, Pacx terminal board and installation.

WIRES from 39/22

optimizing a local network installation include provision for:

- Ample wireways.
- Wiring closets.
- Duct systems (trenches and cells, raised floors).
- Conduits.

Wiring closets should be aligned vertically, and whatever the data wiring facility, it should be connected to a wall outlet with a faceplate in the office.

Typically, a conduit runs from the outlet to the wiring tray or duct with ample space for telephone wiring as well as data wiring.

Proliferation of terminals complicates the architect's life in two more areas. Ideally, a cluster of terminals should have a separate power circuit because the increased number of new devices may likely require more power. Terminals also have a significant effect on air conditioning. Air-conditioning needs are usually related to the number of employees in an area. But one school of thought now contends that one employee plus one terminal has the same air-conditioning requirement as two employees.

For decades, architects have done a thorough job of including facilities for power and telephone wiring, but they have not really addressed information processing needs throughout the building. These rapidly growing, rapidly diversifying requirements can no longer be ignored.

The architect who thinks the office of the future is a concern for the interior designer should look again.

Hamilton is a senior marketing support representative for IBM in Raleigh, N.C.

ONE OF THE BEST BRAND NAME PRINTERS HAS A BRAND NEW NAME.

GENICOM

The General Electric 3000 family of printers has become an industry leading product. But now, this popular printer series has a new name, because the Data Communication Products Department of GE is now an independently owned company called Genicom.

At Genicom today, we offer the same complete line of printers we offered while a part of General Electric. We have the same facilities, the same nationwide service network, and the same corps of experienced employees...only the name has changed.

Above all, Genicom offers you the same reliable product quality you've come to expect from us over the years. Our Genicom 3000 printers feature outstanding performance for end-users as well as superior flexibility for many OEM's, distributors, retailers and dealers. There are 3000 models with speeds from 40 to over 400 cps. Single or dual mode printing. Type quality from EDP to NLQ. Multi-color printing. Graphics. Selectable type fonts, American craftsmanship and more. There are even 3000 family printers for personal computers...ideal for business needs.

We're proud of the excellent brand reputation we established under General Electric. But now we're going to make a new name for ourselves by bringing you more innovations, and more of the reliable quality you've always found in each of our products.

Genicom Corporation, One General Electric Drive, Dept. M331, Waynesboro, VA 22980. In Virginia, call 1-703-949-1170.

GENICOM

For the solution to your printing needs call

TOLL FREE 1-800-437-7468

Only Lee Data's Universal Terminal System can satisfy all of your information processing needs... 3270, Async and personal computing.

Finally, there's a single, universal way to satisfy the individual information processing needs of all your people. From sales manager to accountant. From research to production. The Lee Data Universal Terminal System can do it all.

And our system is modular by design to provide you any or all of these cost-effective, problem-solving advantages:

3270-compatibility plus more

Combine complete 3270 system-compatibility with an innovative Lee Data design and you have a System that delivers greater convenience and flexibility.

Our System not only offers standard 3274-compatible local and remote control units, but now also provides combination local/remote controllers with a unique dual-host access capability.

In addition, you can choose from a full line of terminal capabilities, beginning with our cost-effective 3178-compatible display on up to our popular All-In-One Display which offers, in a single unit, four selectable screen sizes—including 132-column—a great advantage in program development, spread sheet applications and many others where flexibility is required.

3270-plus-Async: another cost-effective advantage

If your application needs currently find you switching between 3270 and VT100-style terminals to get the job done, Lee Data has a better way.

As part of our System, you can enjoy the further advantage of a 3270/Async capability that allows dynamic selection of 3270 and VT100 operating modes from a single Lee Data display. A simple command entered at the keyboard provides you access to applications running on an IBM CPU, non-IBM systems (such as DEC, H-P or Prime), as well as timesharing services. Another Lee Data solution to simplifying your company's terminal network.

And now integrated personal computing too

That's right! Now our System also includes a sophisticated personal computing package that can easily be integrated into an existing Lee Data 3270 system.

With our approach, you get continued interactive access to host-based files, plus all the advantages of professional business computing from the same Lee Data workstation.

Advanced features include a host file transfer capability, a single-board design, four standard system expansion slots and, of course, complete IBM-compatibility.

All these additional capabilities plus the same user-friendly Lee Data displays.

Plus these added benefits...

To any Lee Data System, add our unique Coax Eliminator products and realize additional savings of up to 85% in cabling costs alone.

Combine this with all the outstanding features already mentioned and you'll find a System offering everything you need for efficient, cost-effective operation.

Discover the advantages of our Universal Terminal System for yourself. For more information, call our system specialists toll free:

800/328-3998

Designers of innovative systems for the information worker

LEE DATA CORPORATION

7075 Flying Cloud Drive
Minneapolis, MN 55344
TWX 910-576-1690

SPECIAL **REPORT**

Telecommunications to be glue for info

By John Vacca
Special to CW

Telecommunications will become the glue that holds all of the information resources together in the 1980s and 1990s. This technology will be the force that allows information managers to integrate computers, systems, networks, distributed processes and office systems into an effective integrated-resource management capability.

Advances in telecommunications are accelerating rapidly, and costs are dropping. The telecommunications movement is likely to build into an explosive force in the next 20 years; a force making possible automation, communications and information movement heretofore not even dreamed of by information managers.

Microwave links, which were considered exotic 15 years ago, will become much more common for business, medical and other communications needs in the next two decades. These links will probably consist of 4.632M-bit systems, using 21 channels of 168 each. They will be able to handle all data transmission between various points at speeds ranging from 14,400 to 57,600 bit/sec.

A major trend in the use of satellite communications systems is forecast for the '80s and '90s. The space shuttle and the proposed space station for the early 1990s will work together to manufacture and put into orbit huge satellites — weighing hundreds of tons, spanning thousands of feet — to cast communications footprints that will cover half of the world.

Two such satellites, in geosynchronous orbit some 30,000 miles in space, would cover the entire world. By the year 2000 there will be a worldwide need for 240 transponders for data, 2000 transponders for voice and 16,000 transponders for videoconferencing. Therefore, the satellite will be one of the stars of our emerging communications technology.

By the year 2000, some 72 million households in the U.S. will have subscribed to CATV. The recent marriage of CATV and satellite communications will eventually result in the manufacturing of cheap antennas at a cost of $65 each by 1995. These antennas could then be rented to home owners for about $5 a month.

The terrestrial answer to satellite communications will be fiber optics. Fiber-optic technology, which carries communications on a beam of light, will lower terrestrial communications costs dramatically for decades because it is so inexpensive to manufacture. Benefits include higher bandwidth, less noise interference, greater security and suitability for digital transmission.

While still more costly than copper cable, fiber optics will fall from today's 70 cents per meter to one cent per meter by the year 2000, thus eventually being cheaper than today's copper wiring. In the 1990s, we will see a rapid growth in the use of fiber optics by the telephone industry, CATV, computer coaxial cable and in government and industry installations.

Infrared transmissions will be another technology utilized before the turn of the century. Infrared is an optical transmission system that uses the infrared spectrum of LED.

By the year 2000, these systems will be able to operate as high as 15M bit/sec and if multiplexers are used, be segmented into 7.1M, 14.4M, 28.6M, or 57.6M bit/sec. It will be cost-effective at less than $5,000 per unit and replace local loops, which tend to be the weakest link in any system.

Private branch exchange

See BASE SR/34

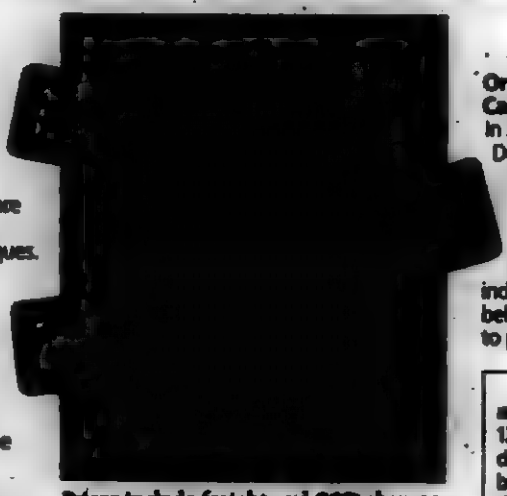
5 Day Delivery!

Paradyne 2,400, 4,800, 9,600 BPS CHALLENGER Modems

Call 1-800-482-3333
and Paradyne will send your modems COD to be delivered at your site, anywhere in the continental U.S., within just 5 days! Paradyne's CHALLENGER Series high performance modems are state-of-the-art technology using advanced signal processing techniques.

Installation is Fast and Easy. You can install these modems yourself!
Plug in the modem, follow a push button configuration procedure, attach your DTE connection and the modular jack, connecting the modem to your 4-wire leased phone line. You're ready to go!

High Performance Backed With Paradyne Reliability. All three models operate in either point-to-point or multipoint applications. An optional four-port buffered multiplexer is available for the 4800 and 9600 models. And the Series has a calculated mean time between failure of more than four years.



Prices include freight and COD charges.

State-Of-The-Art VLSI Technology. Front panel soft strapping configuration is easy and each modem has automatic, adaptive equalization at all speeds, including 2,400 bps.

If You Need Modems NOW, Order Direct From The Manufacturer — Call 1-800-482-3333 or mail in your order. In Florida please call 813-530-2516.
Delivery time and price discounts for large quantities available on request. Multiplexer option available at additional cost. Dealer inquiries invited. The new CHALLENGER Series...a challenge to the modem industry offering quick delivery at prices below what you normally would expect to pay...only from Paradyne.

1,200 BPS Modem. Also available for 5 day delivery is the DTU 1200D, a 212A compatible full duplex dial modem. This 1,200/300 bps modem features automatic dialing, CRT prompts and automatic test capabilities and sells for $655 including freight and COD charges.

paradyne

Paradyne Corporation P.O. Box 1347
8550 Ulmerton Road, Largo, FL 33540

SPECIAL REPORT

X.25 conversion supported by PAD function

Seen as an alternative to standard leased lines

By Leigh S. Hawley
Special to CW

Many companies currently operate multiple data networks, which are linked only between hosts used for file transfers. However, as communications costs begin to soar, alternatives to standard leased lines become more attractive.

One widely used alternative is the X.25 packet-switching network, which allows companies to consolidate their network facilities, eliminate duplicate communications lines and reduce overall network costs. X.25 networks also provide enhanced services that allow increased device utilization and flexibility by providing worldwide multiple host access to specialized applications and protocol conversions.

Further, the X.25 networks can provide users with increased reliability due to redundancy and automatic backup facilities, as well as simplified network expansion and improved network management and control. Using X.25 network technology, corporations are able, therefore, to create a single, integrated, easily managed network that is cost-effective.

But in order to use the packet network, each user device must communicate with it using the X.25 protocol defined by the Consultative Committee on International Telephony & Telegraphy (CCITT). Unfortunately, most data processing devices use either an asynchronous protocol, a Binary Synchronous Communications (BSC) protocol (for example, contention BSC for remote job entry [RJE] devices or polled BSC for IBM 3270-like devices) or a bit-oriented synchronous protocol.

These non-X.25 devices, therefore, require their native device protocols to be converted to X.25. The equipment or software used to perform this conversion is known as a packet assembler/disassembler (PAD).

The PAD function may reside in different kinds of equipment. For example, many public X.25 packet-switching networks have built the PAD function into their network nodes. Alternatively, many host computers support PADs built into their front-end communication software, thereby significantly reducing line interface hardware costs.

Vendors of front-end software PADs include IBM (NPSI software), NCR Corp. (Comten, Comm-Pro) and GTE Telenet Communications Corp. (DMEP software).

Some terminal manufacturers also have developed terminals which support some of these PAD protocols. Most prevalent is the "black box" PAD. More than 15 vendors today provide these black box PADs, which are best described as specialized concentrators which interleave several device lines into one X.25 line to the packet-switching network. These PADs may support one or more PAD protocols simultaneously.

In addition to converting native device protocols to X.25, the PAD is responsible for establishing X.25 virtual circuits (the communications paths through the packet network) for detecting and correcting device-related errors and for ensuring the smooth transfer of data between end users.

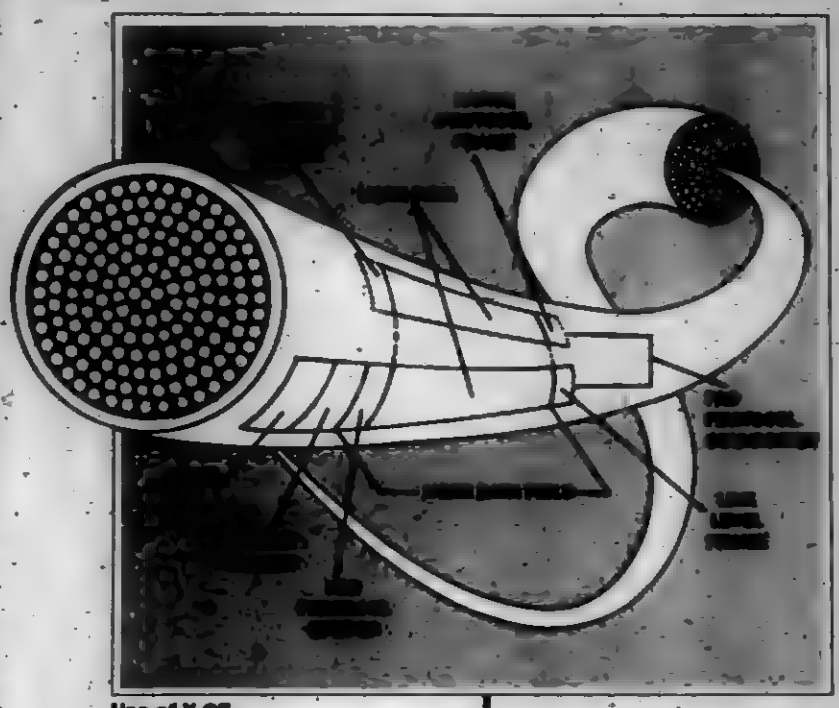
Thus, the "PAD protocol" that defines the rules used to perform these functions is specific to each device to be supported by the network. Also, the same PAD protocol must be used at both end points of a virtual circuit so that data may be properly transferred.

All PAD protocols share certain basic characteristics. For example, all PAD protocols transfer both PAD protocol control information and user data through the network. All information is passed in the user data field of X.25 data packets.

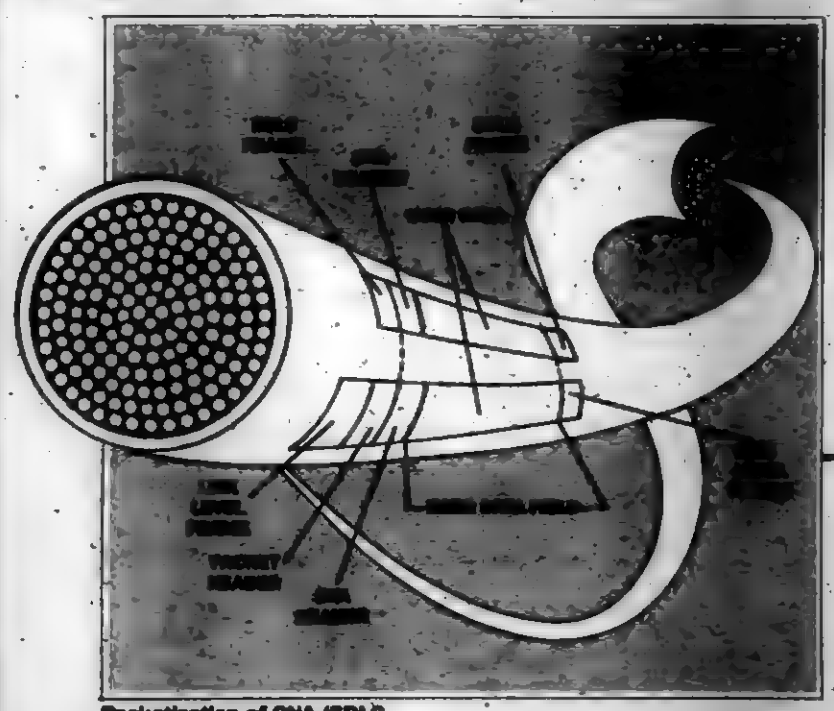
Some PAD protocols use separate packets called "qualified data" packets for PAD protocol control information. These are distinguished from normal data packets by setting the "qualified data bit" in the X.25 packet header. Other PAD protocols send the PAD protocol control information in a "PAD protocol header," which usually occupies the first few bytes of the user data field of the data packet. The X.25 network passes all information in the user data field of the data packet transparently through the network.

Another basic characteristic of PAD protocols is that a PAD is always required at each end of the X.25 virtual circuit in order for two end users to communicate. When sending data through the network, the sending PAD translates the end-user data into the X.25 protocol for-

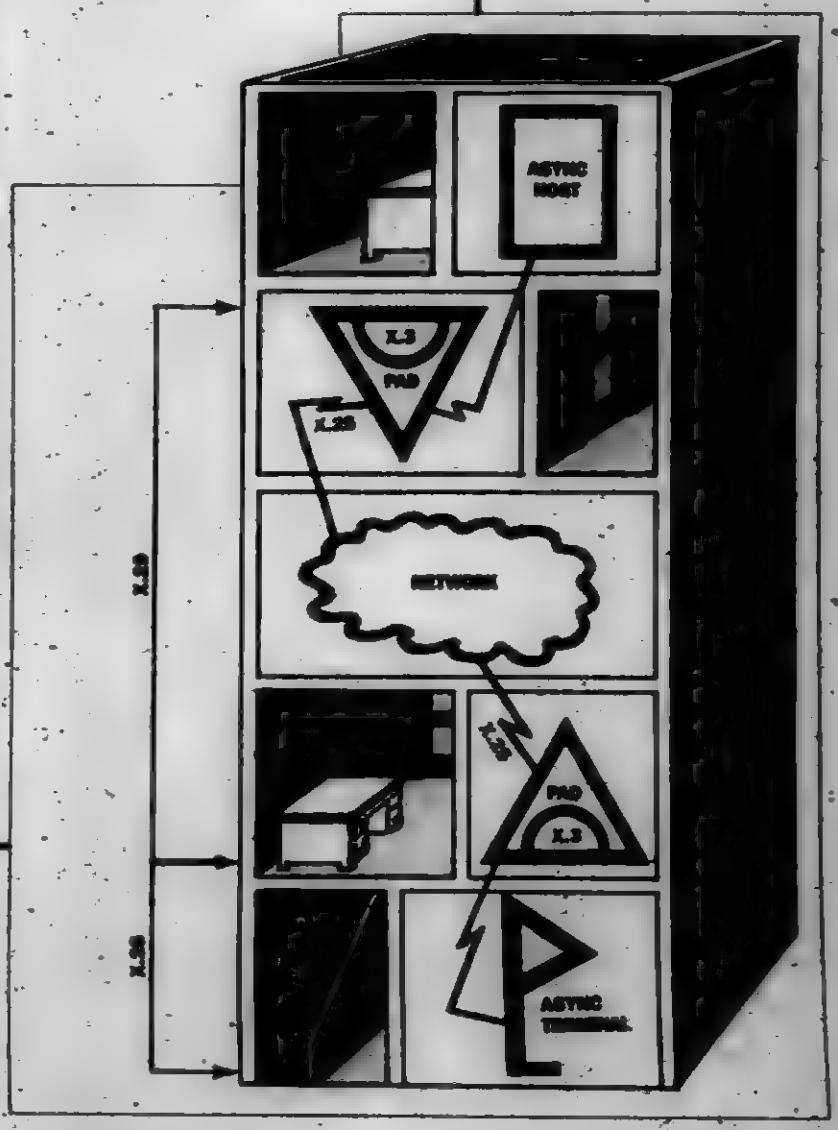
See PAD SR/30



Use of X.25 by PAD protocols



Packetization of SNA/SDLC



Can your terminal talk with 3 different hosts and is it compatible with IBM, DEC, and Sperry? Alfaskop can. And is.

ERICSSON

Alfaskop.
A simple solution to some costly problems.
Call 1-800-331-1100 and ask for operator 184, or mail the coupon.

184

Ericsson Information Systems (Ericsson Alfaskop)
P.O. Box 4109, Grand Central Station
New York, New York 10163

☐ Please send more information on Alfaskop.

☐ Please have a salesman call.

Name _____ Title _____

Company _____

Address _____

City _____ State _____ Zip _____

Telephone _____

ERICSSON

PAD from SR/27

mat, and the other PAD translates the data received in X.25 format into a format recognizable by the receiving end user. The PAD protocol control information is used to tell the receiving PAD how to translate the user data properly.

Actually, X.25 alone cannot support end-user to end-user (for example, device-to-host) communications. The X.25 protocol is only a network interface standard. X.25 defines how to get information into and out of the network — not what to do with the information once you have it. Thus, a PAD protocol is always required to control end-user to end-user communications through a packet-switching network. So far, the CCITT has defined PAD protocol recommendations only for asynchronous devices and hosts. All other device-specific PAD protocols have been left up to the PAD equipment vendors to define. As a result, the packet-switching equipment vendors have developed pseudo-standards for the PAD protocols they use to support some device types.

These PAD protocols are: the 3270 Display Systems Protocol (DSP) for 3270 BSC devices; the block-mode PAD protocol (Bpad) for BSC RJE devices (such as 2780/3780); and the high-level data link control PAD protocol (Hpad) and IBM's Qualified Logical Link Control (QLLC), the last two for Sychronous Data Link Control devices. Other device-related PAD protocols have been developed, but they are proprietary to the developing vendor and therefore are not standard throughout the industry.

CCITT Recommendations X.28, X.29 and X.3 define the PAD protocol for allowing asynchronous devices and hosts to communicate through an X.25 packet-switching network. These recommendations were adopted in 1977, and since then many PADs have been developed to support them, including the access facilities of most public X.25 packet-switching networks.

With this PAD protocol, a virtual circuit is established for each asynchronous device on the X.25 network. X.28, X.29 and X.3 (nicknamed the "triple X" recommendations) use only qualified data packets to transmit control information. The X.3 recommendation defines this control information in the form of parameters.

The value of each parameter determines how a particular event is to be interpreted and handled. For example, one parameter defines how to handle break; another defines how to handle character echoing; and another defines the packet-forwarding rules.

The X.28 recommendation defines how the terminal user communicates with the PAD to control the connection through the X.25 network. The terminal user may ask the PAD to establish or clear a virtual circuit or to change the values of specific parameters for a virtual circuit. The X.29 recommendation defines how data and control information flow between PADs.

DSP defines the procedures that control the emulation functions and coordinate the host and terminal PAD operation. These procedures cover the 3270 data transmission through the network, virtual call establishment methods and procedures and local and end-to-end error recovery. The DSP protocol uses both qualified data packets and PAD protocol headers to pass control information through the network.

In order to communicate with a host, each 3270 device must first establish a virtual circuit through the network. Since separate virtual circuits are established for each 3270 device, each terminal can access a separate host or host application on the network. Once a virtual connection between a 3270 host and 3270 terminal is established by the PADs, the network is completely transparent.

The Bpad protocol allows BSC remote job entry devices, such as IBM 2780s and 3780s, to communicate through an X.25 packet-switching network. The Bpad protocol defines the procedures for virtual circuit establishment, flow control, time-out handling, error recovery and data transfer.

All BSC control sequences may be processed locally so that only user data is sent through the network. Unlike 3270 DSP, the Bpad protocol is a symmetrical protocol. Thus, it allows host-to-host and terminal-to-terminal communications through the X.25 network in addition to host-to-host terminal communications.

As X.25 packet-switching networks are expanding their services to support more synchronous devices, the need for PAD protocol standards is growing. These standards allow devices to communicate with multiple hosts on X.25 nets provided by vendors all over the world.

They allow the interconnection of synchronous services on public and private X.25 networks, domestically or internationaly. Standardized PAD protocols are an integral step toward providing universal access to X.25 networks, thereby obtaining a single integrated network supporting all communications needs.

Hamby is manager of network services for GTE Telenet Communications, a public packet-switched network services vendor in Vienna, Va.

IT'S WHEN NO ONE KNOWS THERE'S BEEN ONE.

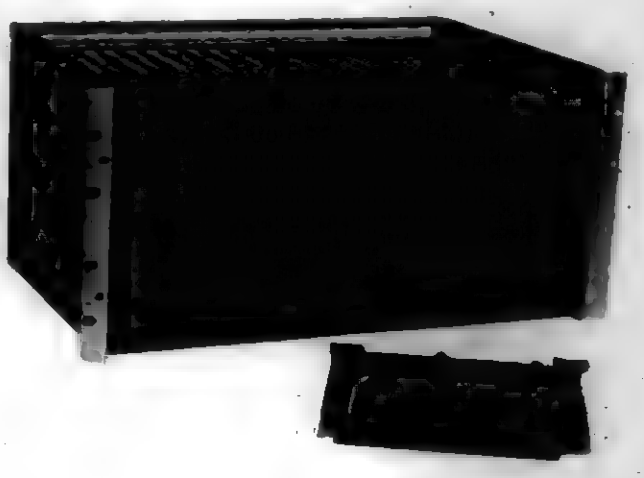
Computer crime is 10 times more profitable than robbing a bank. That's a fact. But, this statistic is only available on KNOWN computer crime... it's impossible to know how much monetary and informational theft goes undetected; some of it, perhaps, from your own system.

The ability to access computers via dial-up ports adds efficiency and reduces cost. But it creates a potential exposure akin to leaving the vault door unlocked. Disgruntled employees, strikers, malicious hackers and dishonest competitors can obtain information, vandalize the system, even misappropriate inventory... all from a push-button phone.

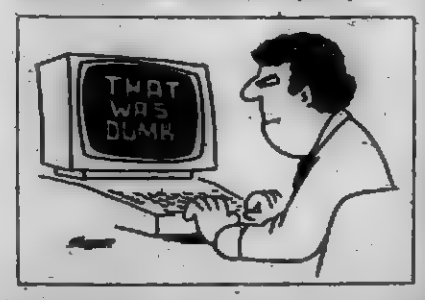
Now, this computer crime, fraud and abuse can be stopped. LeeMAH has a "lock" for your computer even the whiz kids can't crack... LeeMAH's Secure Access Systems, both the single port (SAU) and multi-port (SAM).

Both SAU and SAM reduce your system's vulnerability by allowing access to AUTHORIZED LOCATIONS ONLY via callback. This separate piece of hardware connects on the analog side between modem and telephone lines.

You can stop the perfect crime... with LeeMAH's SAU and SAM.



LeeMAH 729 Filbert Street, San Francisco, CA 94133 • Telephone: (415) 434-3780



CHANGING OUR NAME WAS A STICKY BUSINESS.

After 14 years as Intertel, it wasn't the easiest thing to do. Sure there were the obvious problems; like licking 19,453 labels so we could show off our fancy new logo. But we also found that Intertel was more than just a name to the hundreds of companies that depend on our network command center systems and diagnostic modems for high-availability data communications. It was a constant reminder to them of our commitment to providing the products, support, and services they need to keep pace with the ever increasing size and complexity of their private-line networks.

However, we had to face the fact that our old name described only a part of what our current products can do and what the systems we are developing will offer in the future. We decided that changing our name would be an important first step in linking our past accomplishments with future networking needs.

Now, when you think of controlling, managing and measuring the performance of large networks, remember what we did as Intertel. When you need to assure fault-tolerant operation of networks with both analog and digital links, remember Intertel did it first. But when you're ready to find out more about our networking capabilities, please think of them as INFINET.

INFINET
Six Shattuck Road
Andover, MA 01810
(617) 681-0600

Size us up.

We solve tomorrow's computer problems today. EVERYWARE™ systems from Perkin-Elmer.

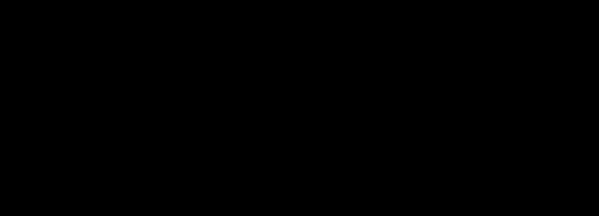
With so much at stake, your doubts about choosing the right computer system are well-founded. That's why you should take a look at the one family of computers that without a doubt offers everything you've been looking for: EVERYWARE systems from Perkin-Elmer.

The EVERYWARE family embodies a comprehensive merging of the world's major hardware, software and communication standards. A solution for virtually every computing need. Ready to grow with you, while protecting your software investment and data integrity every step of the way.

A Comprehensive Family.

We offer one of the broadest choices of mutually-compatible professional micro and supermini computers, easily integrated and supplemented as your processing needs change. Our Series 3200 32-bit superminis span a complete spectrum of computing capabilities with outstanding performance. . .from the compact, economical 3205 to the incredibly fast and powerful 3200 MPS. And all points in between.

The newest member of our family is the advanced, M68000-based 7350 super micro, bringing EVERYWARE systems to your desktop. With vivid color graphics. Windowing convenience. And



a choice of off-the-shelf applications software–including word processing, spread sheets, graphics packages and development tools.

Operating Environment Flexibility.
Only EVERYWARE systems offer such diverse operating environment alternatives. Real-time processing under our proprietary OS/32 operating system. Reliance PLUS, our proven on-line relational DBMS that enables powerful, user-friendly transaction processing. The Resilient System,™ a new concept in fault tolerance that offers the high-availability advantages of two real-time, on-line processors while assuring 99+% uptime. Or time sharing. Or batch processing. Work in the environment that suits your needs. Or run any combination of them simultaneously through one powerful system!

To protect your single most important investment–the software–EVERYWARE computers offer a common operating environment derived from world-standard UNIX* software. Via FORTRAN and C, it's bridged to our OS/32 real-time operating system. That's the best of both worlds. And results in true software portability, from system to system, environment to environment.

Communications Everywhere.
We can share information with IBM environments via SNA and BSC emulators. Form a local network using Ethernet. Or communicate globally through the CCITT X.25/X.29 Packet Switching Network.

And that's about the size of it. Except to remind you that Perkin-Elmer is strongly committed to supporting your systems with complete customer training, worldwide service. . .and world-class products.

We invite you to "size us up" soon.
For more information, return the coupon.
Or call toll-free **1-800-631-2154.**
In New Jersey, 1-201-870-4712.

Tell me more about **EVERYWARE Computers.**

☐ Please send information on _____
☐ Please have salesman call.

Name _____ Title _____

Company _____

Address _____

City _____

State _____ Zip _____

Telephone _____

Mail to:
The Perkin-Elmer Corporation, Marketing Communications
Two Crescent Place, Oceanport, N.J. 07757

CH8629A

EVERYWARE is a trademark of The Perkin-Elmer Corporation.
The Resilient System is a trademark of The Perkin-Elmer Corporation.
*UNIX is a trademark of Bell Laboratories.
IBM is a registered trademark of International Business Machines Corporation.

PERKIN-ELMER

The science and computer company.
Where solutions come first.

SPECIAL **REPORT**

April: A little machine goes a long way

The dust from the corporate microcomputer boom is finally starting to settle. For many firms, the mad dash to buy and install microcomputers is ending, and the development of plans for coordinating and controlling micro use is beginning.

Computerworld will publish its second annual "Micros in Big Business" Special Report in the April 30 issue. This special section will focus on the success and failure of micros in large organizations. Included will be articles covering micro-to-mainframe links, microcomputer networks, compatibility issues and the growing concern about security and data protection.

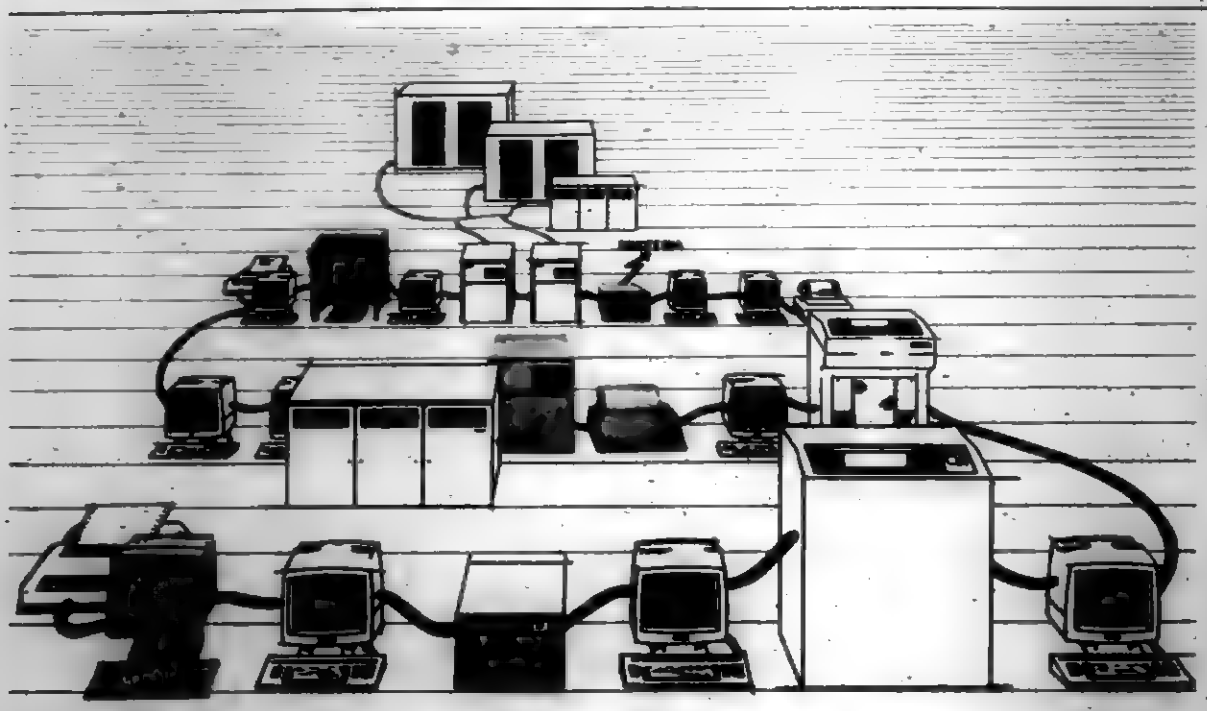
How are microcomputers working out in your organization? If you have a story you would like to share (either bitter or sweet), *Computerworld* would appreciate hearing from you.

Contributions can take one of two forms: a tutorial article that discusses an issue in corporate microcomputing; or a story that outlines a user's experience with micros.

Articles must be typewritten (double spaced) and no longer than eight pages. Artwork such as charts or photographs is encouraged. Authors should include a brief biography and a phone number where they can be reached.

The deadline for submissions is March 5.

Articles for the April 30 Special Report should be addressed to Donovan White, Special Reports Editor, *Computerworld*, 375 Cochituate Road, Box 880, Framingham, Mass. 01701.



3270 Networking: No More No Man's LAN.

Imagine. 3270 Processing. IBM-Compatible Personal Computing. Local Area Networking. And SNA Compatibility. In One System.

Imagine a system that successfully settles the uncharted territory of 3270 local networking—that "no man's LAN" of unlinked and unrealized potential.

Imagine a system that delivers the power of 3270 processing, and the flexibility to build two local area networks from a single controller. Imagine being able to attach up to 120 devices to that controller. Or attaching four distinct controllers—and multiple coaxial links of up to 10,000 feet each—to any of those LANs.

Imagine the economies of a system that handles that networking with standard 3270 coax. That requires no commitment to special architectures or non-standard LAN technologies. And that, thanks to a multi-drop, station-to-station design, can eliminate thousands of feet of new coax.

Of course, such a system would have SNA compatibility. But it would also have a set of capabilities to dramatically increase throughput, while reducing hardware and support costs in *any* environment. Capabilities like multi-host and multi-personality support, application and address switching, and system printing.

This system would have multi-user personal computing "built into" the network—allowing you to assign true 16-bit computing power, maintain overall MIS control, and share expensive disks and printers.

Such a system would boast an intelligent display station that displays a mastery of ergonomic and aesthetic design. With multi-screen formats, anti-glare screen, low-profile keyboard, and a tilt-and-swivel pedestal with the smallest footprint in the industry. Such a system would also include a full line of printers.

Imagine. 3270 processing. IBM-compatible personal computing. Versatile, economical, powerful local area networking. In one system.

Braegen *has* imagined just such a system. They have designed it. Built it. And called it the ELAN™ System.

If such a system sparks your imagination, give us a call. We know the feeling. The Braegen Corporation, 525 Los Coches Street, Milpitas, CA 95035, (408) 945-8150; TWX: 910-338-7332.

BRÆGEN

*ELAN is a trademark of The Braegen Corporation.

GLUE from 39/26

switches will represent another technical evolution. Data and voice will be merged and transmitted over the same lines.

In the next two decades, 78% of all switches will be digital, while today, 90% of them are of the analog variety. Digital networks will eliminate the need for special cables and modems to translate from analog to digital and back again. These networks are faster, of better quality, lower cost and computer-compatible.

In addition, they will allow all terminals, computers, telephones and other data and voice communications systems to hook up to the same physical lines. Digital technology will have a profound impact, not only on business communications, but for consumers as well.

Growing on a variety of different fronts is the new service of electronic mail. The U.S. Postal Service's effort to stay in business in the next decade will be its proposal for electronic communication of mail.

In addition, banks will provide electronic-mail lockboxes to speed corporate cash flow; communicating word processors will spread rapidly around corporate offices; message-switching systems will grow at a fantastic pace; and facsimile transmission for physical document distribution will be much faster and cheaper. As more users are found for this new mode of communication, electronic mail will no doubt continue to increase steadily.

Teleconferencing in the year 2000

As an alternative to person-to-person communications, teleconferencing promises to be one of the most effective future methods of communication. By the year 2000, teleconferencing will be available in virtually all U.S. cities.

Present rates will drop to $1.50 per minute for coast-to-coast calls. The system which presently connects two groups in separate cities so that they see, hear and interact audiovisually with each other as if they were in the same room, will eventually be able to connect as many as eight separate groups together. A $90/hour meeting will pay for itself many times over in tens-of-thousands of dollars saved in travel costs.

The real future of teleconferencing will be international. Slow-scan or freeze-frame video will be used to provide service on an intercontinental level.

These new technologies and services are all examples of the dramatic changes that we can expect in the world of telecommunications. This new technology and accompanying changes will give the information and telecommunications managers both the challenge and the opportunity to put them to work for the corporation. Computing and communications costs will eventually replace labor and transportation costs.

Communications and computers will rapidly merge into a single industry. As we move into the interlinked information world of tomorrow, the growing cost of telecommunications services in the company will receive increasing attention from management. A more sophisticated management will be needed to meet the future challenges of this increasingly complex environment.

Vacca is a free-lance writer based in Topeka, Kan.

SPECIAL REPORT

Users access bank accounts with home micros

NEW YORK — Paying bills has always been a tedious chore for many people — writing checks, addressing envelopes, buying postage stamps or perhaps even hand delivering payments to creditors. This time-consuming process, along with the accompanying paperwork, can now be eliminated with the help of a new electronic home banking system developed by Chemical Bank of New York.

Offered on selected personal computers, the Pronto Home Banking System has already allowed hundreds of customers to pay bills, send messages and conduct banking transactions quickly and reliably from their own homes.

The system, which has been tested by 200 users in the New York metropolitan area since November 1982, was launched commercially to the public in September 1983, according to Charles Forbes, a vice-president in Chemical Bank's Electronic Banking Division. Over 1,500 customers had subscribed to the service by the end of 1983.

More than 400 New York area and national merchants, including major department stores, credit card companies, utilities and large landlords, already accept payment from the home banking system. In addition, Chemical Bank has licensed Pronto to eight banks throughout the U.S. and plans to create a nationwide network for home information. Pronto currently is offered on personal computers from IBM, Apple Computer, Inc. and Atari, Inc.

To ensure the service's around-the-clock availability, Chemical Bank runs Pronto on a Nonstop II computer system from Tandem Computers, Inc. Tandem builds fault-tolerant machines designed to keep on working even if a processor fails.

The home banking function currently supports six major services: bill paying, bank balance inquiry, funds transfer, bank account statements, budgeting and electronic check register.

To pay bills, customers simply key in the amount and date of the payment. Until the payment is actually made, the user, sitting at home, can modify or cancel it. The user receives immediate confirmation, and a reference number indicates the payment has been scheduled.

"Bill paying is the most important banking service we offer," Forbes said. The average customer receives and pays about 150 bills per year. Pronto allows these bills to be paid directly from accounts without writing checks.

Because this eliminates paperwork and speeds up the entire bill paying process, it saves money for everyone involved — banks, creditors and consumers. In fact, many companies will soon begin billing consumers electronically, yet still provide as much information as they now do on a paper invoice, he says.

Robert Lipp, president of Chemical Bank, agreed. "By eliminating the paper bill and postage required to deliver it to the customer, along with the customer's check and return postage, we estimate annual savings in the billions of dollars," he said. "Consumers will benefit from these savings directly as well as indirectly in the form of lower prices on merchandise."

Lipp also noted that U.S. companies mail out about eight billion bills each year at a cost of $1.03 per piece, including postage and check handling. In contrast, electronic bill payment runs about 35 cents each, he said.

Another important home banking function, balance inquiry, permits customers to check balances on all their Chemical Bank accounts — checking, savings, Mastercard, Visa or installation loan files. For example, customers can verify Visa balances by pushing a button and calling up detailed account listings on their home screens.

The electronic mail service allows customers to send messages instantly, either to the bank or to one another. Similar to a telephone book, the electronic directory service provided by Chemical Bank assists users in looking up other customers' names. In addition, electronic mail permits Chemical Bank to contact customers individually or as a group.

With account maintenance, users can change their personal identification codes or request that new bank accounts be added to their Pronto service. This feature is extremely popular because it gives customers the flexibility to change the way they use the service without first contacting the bank, Forbes said.

Additional services include funds transfers, which allow users to transfer money between predesignated accounts approved by the bank; statements, which provide descriptions of all transactions; budgeting, through which customers can establish up to five separate budgets and classify payments into 50 possible budget categories; and electronic checkbook.

"Electronic checkbook is a mini-account reconciliation program,"

See [illegible] 59/38

IF YOU'VE
EVER OUTGROWN
A FINANCIAL SYSTEM,
THIS IS A SEMINAR
YOU WON'T WANT TO MISS.

The Walker "Once and for All" Seminar. If you're looking at financial applications software, you're probably planning to replace an unwieldy system. One that fails to meet your needs for information management, technological compatibility or operating efficiency. Even perhaps, all three.

Walker offers a full range of financial systems specifically designed to grow with you. Easily. Which means the Walker Seminar could be the last financial software seminar you'll ever attend.

You know the problem. Every time you have to change or add to your current system, you discover new roadblocks. Custom reports have to be programmed on top of your old system. Changes and additions have been so frequent that nobody understands just what the system can do. Or how it does it. New technology could make your business run better...but your financial system won't run on it. And you must divert valuable time and resources to find a new system. Again.

Financial software you won't outgrow. Walker introduced a revolutionary technology: Software that separates the applications (what the software does), from the database (how the system interfaces with your data center). It's a proprietary technology which continues to grow with the needs of hundreds of corporations. Worldwide. Including the 1984 Olympics.

GL, AP,
MM, PO,
AND SOON ARC

Better management tools. Walker's "Strategic Software" allows you to modify your financial system to work the way your company works. And change as your company changes. Simply. Immediately.

Freedom. Walker financial applications packages are not dependent upon a specific technology, operating system or data base management system. By utilizing a unique "software bridge," Walker isolates the applications software from both the mainframe and the DBMS. Which means you're free to choose the technology and DBMS that's best for your company's needs. Without the need to replace or rewrite your financial system, or retrain your staff.

A free seminar. In a few short hours, you can see how integrated, interactive financial systems can save you time for years to come.

Even a free phone call. You can fill in the coupon below, or call us today, toll free: 1(800) 4 WALKER (outside California), (415) 495-8811 (within California). That way we can register you for the seminar that's most convenient for you. In realtime. Like Walker software.

Walker Interactive Seminar

Atlanta 4-5, 5-15	New Orleans 4-10
Boston 4-4, 4-5	New York City 4-11, 4-12, 5-8, 5-9
Chicago 4-4	Omaha 4-17
Cincinnati 5-2	Orange City 4-11
Cleveland 4-19	Philadelphia 4-10
Columbus 4-12	Phoenix 4-3
Dallas 4-19	Pittsburgh 5-1
Denver 4-24	Portland 4-19
Des Moines 4-19	Rochester 4-24
Detroit 4-24	St. Louis 4-26
Fort Wayne 4-25	Salt Lake City 4-12
Hartford 4-3	San Antonio 4-19
Houston 4-2	San Diego 4-17
Kansas City 4-18	San Francisco 4-26
Los Angeles 4-2	Seattle 4-4
Louisville 4-10	Tampa 4-4
Memphis 4-11	Toronto 4-4
Miami 4-3	Tulsa 4-3
Milwaukee 4-26	Wash. D.C. 4-25
Minneapolis 4-10	Winnipeg 5-1
Montreal 5-8	Winston/Salem 4-24
Nashville 4-12	

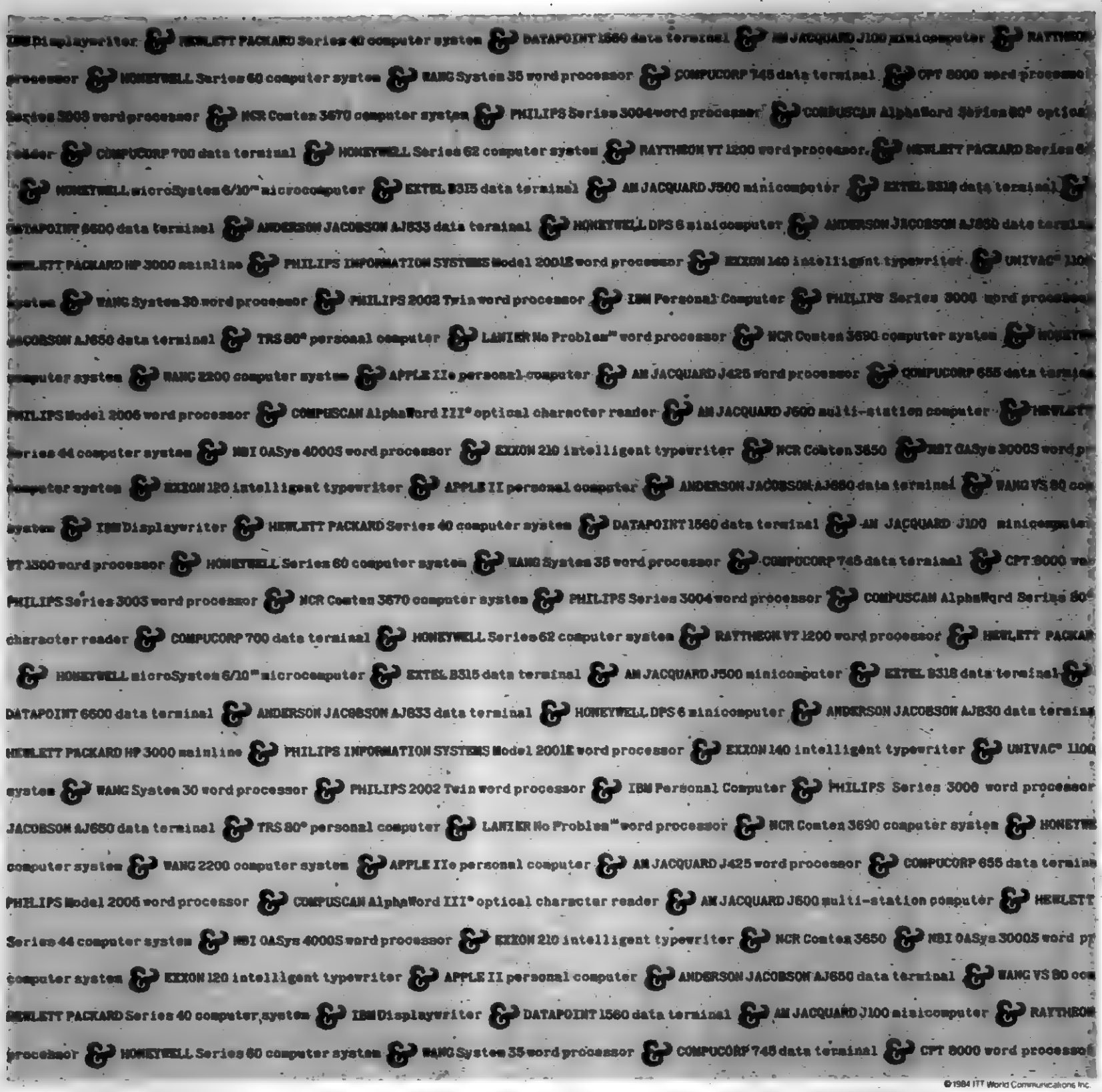
Official Supplier of Financial and Accounting Systems Software to the 1984 Olympic Games

WALKER
WALKER INTERACTIVE PRODUCTS
100 Mission Street, San Francisco, CA 94105

Yes, I'm interested in attending the Walker Interactive Products Seminar at (City)_____ on (Date)_____. Please send me my registration forms and full particulars.

Name_____
Company_____
Address_____
City_____ State_____ Zip_____
Telephone #_____
Our computer is:_____
TP Monitor_____ DBMS_____

©1984 Walker Interactive Products, Inc. CW-2/27



©1984 ITT World Communications Inc.

matchmaker, matchmaker.

A word processor and a computer aren't a match made in heaven.

Of course, neither are a telex machine and CRT. Or any of the machines listed here.

Rather, they're all matches made by us: ITT World Communications.

You see, until we came along, it wasn't very easy for businesses to send information from a word processor to a computer. Or from a telex to a CRT. Or vice versa.

Now all that (and more) is possible—by sending information through us.

Our network simply eliminates all the usual problems of unlike equipment.

So a company never has to be in the costly position of owning unneeded terminals, just to "talk" to other terminals.

Which means, you'll not only get the communications your company needs, but you could save money as well.

Advanced communications *and* economy?

It sounds like a perfect match to us.

For more information contact your local ITT sales representative or write Marketing Department A/PR, ITT World Communications, 100 Plaza Drive, Secaucus, New Jersey 07096.

ITT

SPECIAL REPORT

Electronic firm ties 8,500 stores nationwide

FORT WORTH, Texas — With some 5,500 company-owned retail stores and 3,000 dealer/franchise outlets, Tandy Corp. operates the largest number of consumer electronics outlets in the world. Efficient management of this $2 billion per year business has mandated the evolution of a highly reliable and efficient data transmission network.

The initial charter of Tandy data processing — operating out of headquarters here — was to support the corporate mailing list. Today, Tandy's corporate data processing department supports literally every phase of the domestic operation as well as some international needs. Whether it's manufacturing, distribution, payroll, accounting or mailing lists, DP growth has accompanied corporate expansion.

The retail stores and dealer sites are supported by six regional warehouses located here and in Boston; Charleston, S.C.; Columbus, Ohio; and Woodland and Garden Grove, Calif. Fort Worth is the locale of a "force-feed" warehouse which supplies both overseas and domestic outlets.

Until recently, order entry, warehouse distribution and inventory control were carried out using a combination of manual and batch procedures. Gary Jolley, DP operations manager of warehouse distribution, explained some of the old methods: "Preprinted order forms were filled in by hand at the stores and mailed to our warehouses," he said. "These forms were sorted and then taken out to the warehouse floor where merchandise was pulled."

The old method, in short, was not keeping pace with Tandy's growth. More significantly, it wasn't contributing to that growth, as Tandy's DP distribution system manager Mary Lou Edwards pointed out.

"The data on those orders was then keypunched and transmitted to our corporate data center at headquarters through a 2,400 bit/sec modem on a dial-up line daily," Edwards said. "The next morning we sent the warehouse a printout of their invoices, a billing method which did nothing to increase warehouse productivity. The warehouses weren't getting enough reports in a timely enough fashion to help them control their work flow.

"About seven years ago we began developing a plan to computerize our warehouse distribution system," Edwards said. "At first, we elected to install a computer at one of the remote warehouses as well as here in Fort Worth. Each warehouse would have its own computer, handle its own data processing activity and just transmit records to the central mainframes at night.

"The total cost for that approach would have been comparable to that of our present system; however, with our present configuration we have better central site control over the data base. We don't have to worry about things like software updates and file control, and we require fewer technical support people both here and at the remote sites," Edwards said.

So Tandy opted for a centralized processing approach for the warehouse distribution system.

Radio Shack's own TRS 80 Model 4 microcomputers at each retail store handle an operating system which

See TRS SR/38

FACT:

HASP+ on VAX with DMF32 is the lowest cost/overhead interconnect to IBM, CDC, other mainframes, and networks on the market today.

Using the DMA front-end processing capabilities of the DEC DMF32, speeds up to 56Kbps are obtainable.

Over 13 years of field-proven reliability make HASP+ the choice of experienced firms. For more information on this user-friendly communications software for the whole family of DEC computers, call or write Datanex. Price, system one, $5,500 for VAX.

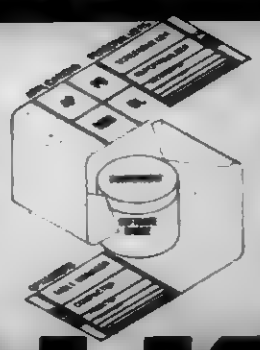
Coming SOON — HASP+ from DATANEX for the IBM PC!

HASP+

datanex
DATANEX, INC. P.O. Box 1728, Eugene, OR 97440
Phone (503) 687-2520 • TELEX 364412 INTR

WALKER. THE MOST WIDELY-USED FINANCIAL SYSTEMS ON ADABAS.

Walker offers ADABAS users a real time, integrated, interactive financial system: Accounts Payable. Purchase Order. Materials Management.



General Ledger. Accounts Receivable. Call us for a full demonstration of the most complete financial packages available to run under ADABAS.

WALKER

Official Supplier of Financial and Inventory Systems Software to the 1984 Olympic Games

©1983 Walker Interactive Products

WALKER INTERACTIVE PRODUCTS, 100 Mission Street, San Francisco, CA 94105

Atlanta	(404) 843-0050	Toronto	(416) 368-7298
Boston	(617) 227-6076	San Francisco	(415) 495-8811
Chicago	(312) 693-8680	New Jersey	(201) 368-1234
Houston	(713) 367-0026	New York	(212) 308-6770
Rocky Mtn.	(916) 546-5528	London	(44) 296-314-73

SPECIAL **REPORT**

TRS from SR/37

performs, among other things, the order-entry function. Tandy's store operating system assists the store with information on what to order, how much and when, in order to maintain optimum inventory levels.

The orders are transmitted to the corporate data center here, and then the information goes to the system located at the Fort Worth distribution DP center. Inventory will either be shipped out of the Fort Worth forcefeed warehouse, the computer warehouse or one of the regional warehouses; at this point in the ordering process, all data transmissions between the mainframes and the warehouse terminals are on-line. And the volume of traffic in the network is enormous.

Tandy's Fort Worth warehouse alone distributes 800 shipments daily, requiring a pulling of some 120,000 lines and shipment of more than 6,000 cartons. Combined regional warehouse daily volume totals some 2,100 shipments of 65,000 lines in 28,000 cartons.

Data describing 50 million lines and 500,000 shipments is transmitted through the network annually. All of the warehouses throughout the U.S. access the mainframes through Codex Corp. data communications equipment.

Each of Tandy's warehouses and the data center are configured with Codex 6030 Intelligent Network Processor statistical multiplexers.

Most warehouses have 13 terminals and five printers. The 6030s take data from multiple terminals and concentrate it using statistical multiplexing and data compression techniques.

In the event problems occur, backup is available with the modems. "The Codex LSI 9600s have dial backup capability," Edwards noted. "So if we lose a telephone line, we can provide backup service. And with the Codex Comm diagnostic equipment, we can detect line problems and actually determine the type of problem."

Some six different warehouse systems have been installed within a 16-month period as modular additions to the warehouse mainframe and Codex equipment. "This expansion caused absolutely no impact on any of our existing warehouses," Edwards said. "We simply added them on weekends or nights."

HOME from SR/35

Forbes said. When the customer enters the check number and amount, Pronto balances the account for them. "Electronic checkbook is an invaluable service for those of us who always seem to have trouble balancing our accounts."

Forbes added that the Pronto system soon will include several nonbanking services. "We plan to package the system with other capabilities, including recordkeeping, news and educational services, catalog shopping, weather reports, stock quotations and portfolio analysis."

To use the Pronto home banking service, the customer needs a home computer, with a modem hooked up to a telephone, and a television set or display terminal.

Costs and security

Forbes said the cost for the home computer and modem is as low as $125, while the monthly subscription rate is $12. For security, each authorized user assigns himself an identification number, as well as an individual code name or "handle."

The user activates Pronto by inserting a special communications software cartridge or floppy disk into the home computer and instructing it to dial up the bank automatically through a public packet-switching network.

After the home terminal connects with the bank's computer system, a three-item main menu appears on the screen, allowing the user to call up either the electronic mail, account maintenance or home banking functions, Forbes said.

Subscribers can access the service 24 hours a day, seven days a week through an automatic dial-up modem attached to their terminals and telephones.

Forbes pointed out that as the network of banks using Pronto expands, the computer system will grow with it. Chemical Bank currently has an eight-processor Nonstop II system.

NETWORK HEALTHCARE

DATA COMMUNICATION NETWORKS AREN'T LIKE PEOPLE BUT...

One thing's for certain. Poor advice early in the design stage, the wrong equipment, or inadequate product support could make your network very sick.

We can help prevent that. Meet ComDesign's data comm "doctors". They are a group of dedicated, service oriented data communication specialists. Talented, qualified, and helpful, they dispense the application engineering answers that will keep your network in the pink. For large networks or small. And you don't have to be a ComDesign customer to take advantage of this service. As a matter of fact, you'll never even need an appointment. Just use the **toll-free** number below. The doctor's always in.

(800) 235-6935
(805) 964-9852 in CA

ComDesign

751 S. Kellogg Ave. Goleta, CA 93117

Manufacturers of Advanced Statistical Multiplexers and Other Networking Products

SPECIAL REPORT

Corporate info needs reliable transport

Network failure may mean large dollar losses

By Alan Ruhl
Special to CW‡

Corporations are now facing one of their toughest challenges — the information explosion. As business becomes more complex, executives at all levels find they must have more information relating to how the company operates. This quest for expanded information has led to the increased collection of data in virtually all departments within a company.

As these data bases proliferate, information must not only be accessed, but analysed and processed throughout the corporation in an understandable form.

And since most business information systems are now automated, the ability to deliver information where and when needed within the organization becomes crucial to efficient, continuous operation.

With the growth of personal computers and local-area networks, automated delivery of information within a corporation requires a reliable transport mechanism readily available to all users. This type of transport mechanism is typically referred to as the corporate communications network. It provides the capability for management to access vital information and maintain a competitive edge. It's also the resource that keeps customer service at eye level in a post-divestiture environment.

In many industries, the uninterrupted flow of information is the lifeblood of a company. Airlines, hotels, car rental firms, banks and brokerage houses are among the more noteworthy examples. As such, companies in these industries are extremely dependent on an efficient, real-time data communications network.

If a network failure occurs, companies dealing in time-critical information are vulnerable to high revenue losses, to say nothing of good will — $10,000 per minute in the case of airlines and up to $1 million per minute for an international brokerage firm (see Figure 1).

With increased reliance on corporate communications facilities, operating costs have steadily risen. This has lead telecommunications professionals to seek tools that help to optimize their operations. Network managers, working closely with data communications suppliers, have developed specialized systems to control network operations totally.

Originally, these systems were based on test equipment that monitored technical operating parameters to give highly trained communication network specialists detailed data. Such systems measure complex parameters and were meaningful only to skilled technical personnel.

Now, sophisticated computer-based communications systems have dramatically increased the quantity, quality and availability of critical data for the decision-making process. Using computerized analysis of network data, the telecommunications staff is now able to create a data base that helps to make the corporate communications system more reliable and less costly to operate.

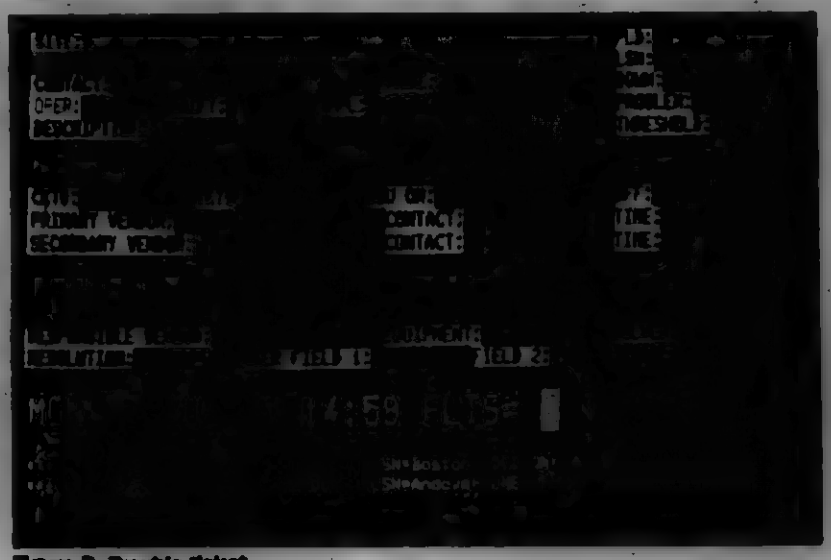


Figure 2: Trouble ticket

Continuous monitoring of normal network operating parameters is vital to improving the efficiency of these systems. When operators know the network threshold levels that are needed for trouble-free operation, they can easily detect degrading line conditions that lead to malfunctions and outages within the network. Operators can download these parameters, and the system will automatically alarm if the thresholds are exceeded (see Figure 2).

These systems will help provide nonstop operation, optimize network configuration, record all network faults and events and continually monitor network performance. In or-

See INFO SR/40

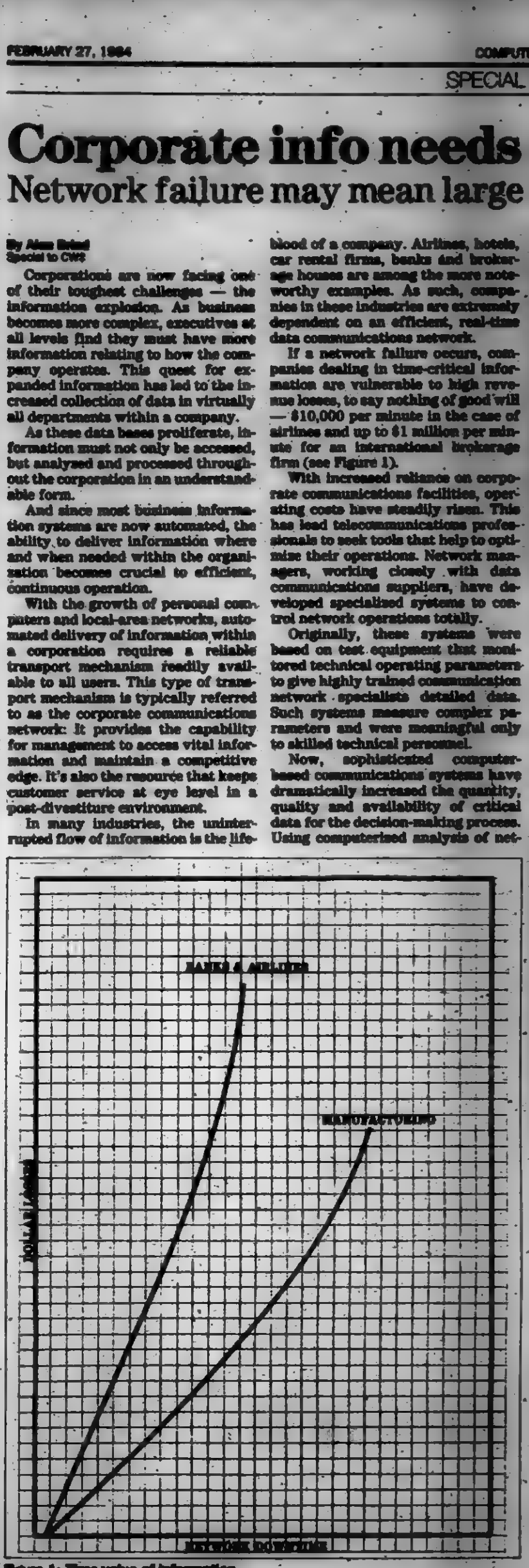
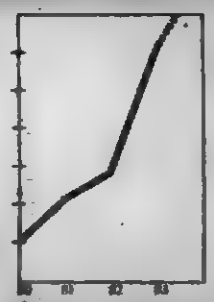


Figure 1: Time value of information

IF YOU'RE GROWING LIKE WALKER MAYBE YOU OUGHT TO GROW WITH WALKER.

Companies growing in the ADABAS, DL/1, IMS or virtually any major IBM environment, have discovered something: Walker's Integrated, Interactive Financial Software (I/FS), is a better way to grow.



- Real-time Accounts Payable, Purchase Order, Materials Management, General Ledger, and Accounts Receivable. Call us for a full demonstration of Walker's "Better way to grow." The I/FS System.

WALKER

Official Supplier of Financial and Inventory Systems Software to the 1984 Olympic Games

©1983 Walker Interactive Products

WALKER INTERACTIVE PRODUCTS, 100 Mission Street, San Francisco, CA 94105

Atlanta	(404) 843-0080	Houston	(713) 367-0088	Rocky Mtn.	(619) 548-8888
Boston	(617) 227-6078	New Jersey	(201) 368-1234	San Francisco	(415) 495-6611
Chicago	(312) 693-8080	New York	(212) 308-6770	Toronto	(416) 368-7388

INFO from SR/39

der to collect this type of data, the system must have the capability to monitor the condition of these communications lines, terminals and cluster controllers, which provide intelligence for a variety of devices operating on the network.

The ability to collect this network data gives management the key to making the network operate more efficiently and with greater reliability, both from the external perspective of line, modem and terminal failures, and from the internal dimension of software problems, bit error rate, response times, mainframe problems and other parameters of the data processing system.

As long as operations are maintained within normal limits, system operators receive no unusual indications at the control center. However, any deviation from established norms can trigger a series of alarm indications, depending on how the system is programmed.

On lines which must remain operational, it is possible to set alarm thresholds to give preliminary warnings even when the slightest deviation from normal is detected. The establishment of threshold levels is an important criterion that must be considered carefully by those versed in the corporate goals of the network. If levels are set too tightly, alarm indications will be triggered for random line deviations, often wasting the time of staff specialists on little more than routine situations.

On the other hand, if levels are set too loosely, serious line degradations might not receive attention until a line is close to a total outage. In the final analysis, the proper threshold level can only be determined by the telecommunications manager.

Today's integrated systems make it possible for network operators to track performance data in real-time. Network faults and alerts are typically detected within one minute. If users at a specific location indicate they are experiencing response-time problems, an operator in the network control center can immediately confirm the status of network facilities.

With access time at about five seconds for this type of information, the operator has immediate answers that help to pinpoint the cause of malfunctions and estimate when off-normal conditions can be corrected, thereby improving the reputation of communications staff among users. Once a problem has been isolated to a specific location or parameter, it is much easier to apply specific test sequences. This, in turn, reduces the time to clear an off-normal condition.

As more detailed performance data becomes available, specialized software will allow a variety of users to access detailed network information. While technical specialists may need to have very precise tabular data displayed, corporate managers may not. Their requirements may be for more general summary statistics in an easy-to-read graph.

Maximum graphics

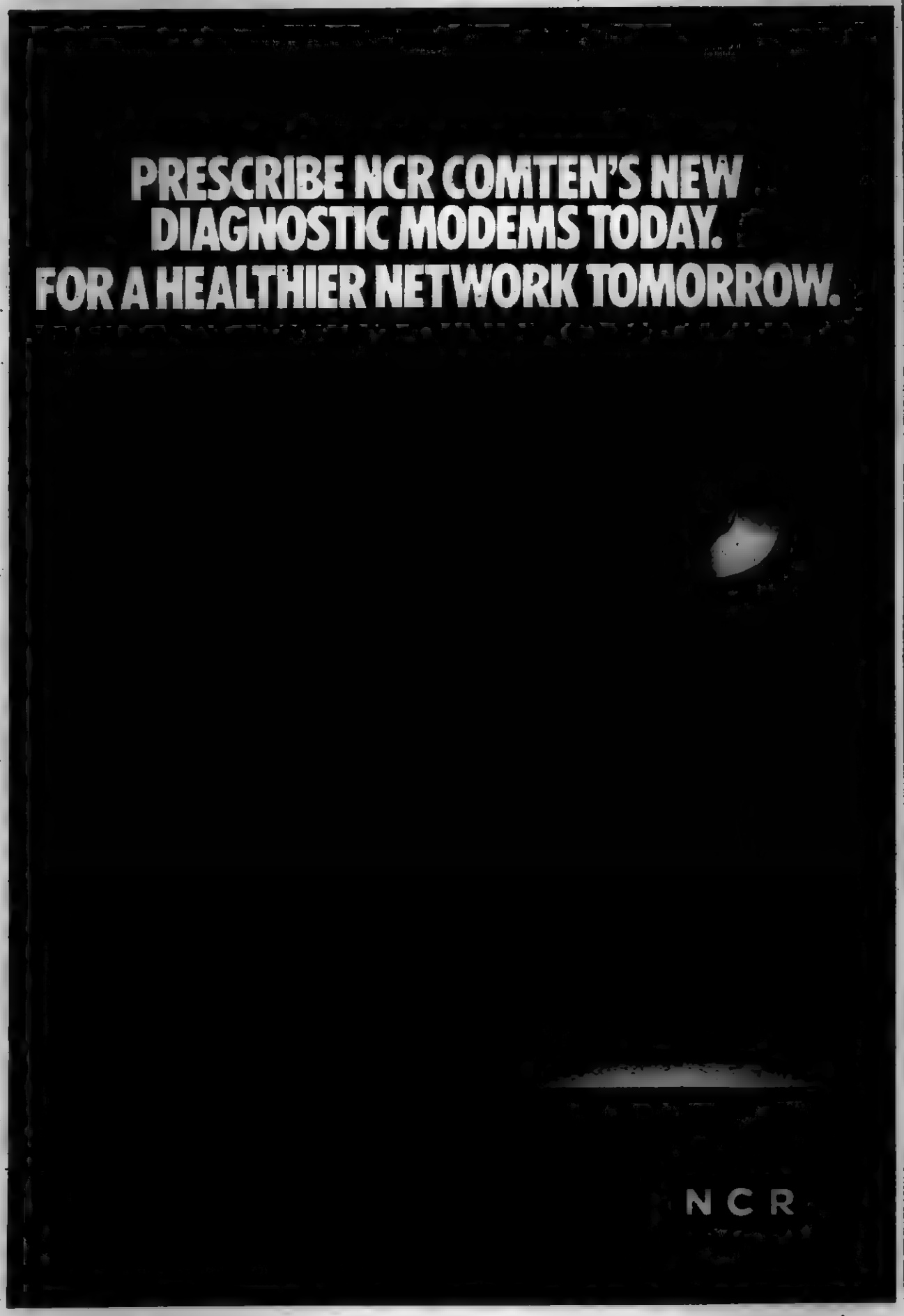
A fully integrated network command center system can provide maximum graphics features to serve the needs of both specialists and managers. In these systems, network performance data can be displayed in color on visual display terminals or printed out for hard-copy analysis. The availability of a system processor with a large data base provides the flexibility to present network data in a format that can answer a multitude of questions relating to network operation and performance.

By providing telecommunications features necessary to present network data in graphics formats, it becomes easier to make management aware of network operations. Nontechnical managers may not want to see a detailed report on technical data, but might be interested in a summary of terminal usage in certain time periods or by application.

Using stored traffic pattern data, the telecommunications manager can simulate the impact of more terminals, higher speed modems and similar changes to existing network operations. Proposed solutions can be easily tested against the known traffic patterns.

Indeed, the age of information is upon us. And with networks growing faster

See INFO SR/42



SPECIAL REPORT

Intelligent nets: tying incompatible equipment into cohesive info system

By Joel Edwards
and Sandy Klotz
Special to CW3

While technology planning is best done before incompatible computing equipment is purchased, computing equipment tends to spread a lot faster than technology plans. There is one way to implement technology planning after incompatible equipment is in place, a way that will leverage that equipment into a cohesive information system. It involves the concept of an intelligent network.

An intelligent network integrates existing incompatible equipment into a single information network, so data generated in diverse application domains is available to the corporation as a whole (see figure). This can be accomplished by implementing a backbone network of similar processors and gateways linking that network with applications throughout the company.

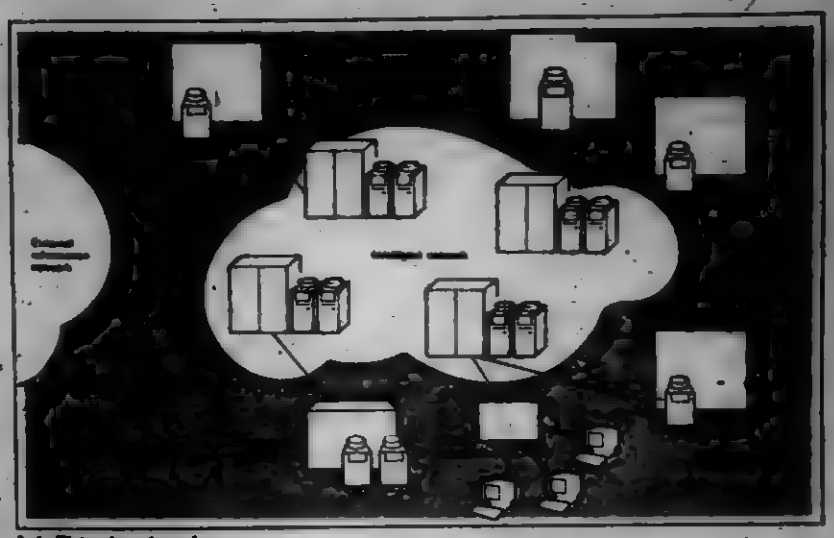
The backbone network performs all advanced communications and integration functions for the corporation, such as managing a corporate data base that includes data from all the application domains and message-switching for the various forms of information (graphics, text, facsimile) that are available through the gateways. Each gateway is a customized interface designed specifically to meet the needs and capabilities of its application domain. When new domains are added or new equipment is added to existing domains, integrating that equipment becomes a matter of adding another gateway.

There are stringent requirements that must be met to implement an intelligent network successfully:

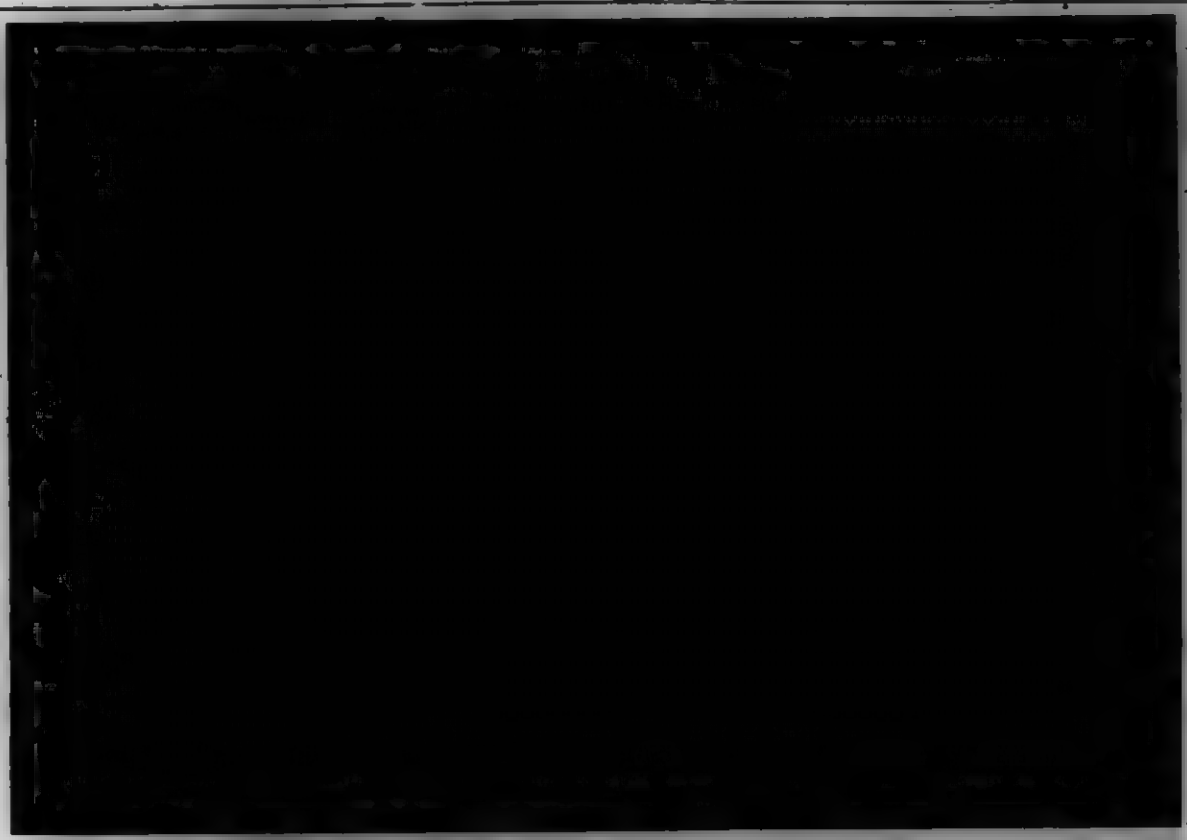
- The information that it manages must be continuously available. The intelligent network stores and handles vital corporate information. It must, therefore, be extremely reliable. Virtually no downtime can be tolerated because any system failure will cripple the organization. In addition, the system must guarantee the integrity of the information that it stores and transports.
- The information must be accessible from any application domain. Users must be able to access information throughout the network from any of these domains, assuming that they have the right access privileges.
- The network must be flexible enough to accommodate change. It must allow the organization to adapt to changing technologies, changing organizational topologies, increased information volume and varying reporting requirements.
- The network must be able to store and transport any type of information relevant to the business. Graphics displays, data base records, edit files, facsimile images, digitized voice and so forth must all be accommodated, and the system must provide straightforward, consistent interfaces between them.
- The distribution information in the intelligent network must be accessible as a single corporate resource. The information system must consolidate and control the flow and sharing of data in the distributed environment (that is, between many sites of activity).

To meet all of these needs requires a backbone network with a combination of features. Sophisticated networking facilities are necessary to keep the various application domains in constant communication, and to make full use of this corporatewide communication, the network

See NET SR/42



Intelligent network



Do you have a data communications network or does it have you?

Why tie up your resources when you can take advantage of ours? And there's never been more reason for taking advantage of RCA Cylix than right now during this period of deregulation and divestiture. Here's why.

Unlike the other guys, we don't just hand you a line. We deliver the stars. Because we're a satellite based, value-added network. Providing end-to-end management and a permanent virtual circuit that's perfect for transaction oriented applications.

What's more, you'll always get our undivided attention. Because data communications is all we do. And since you're working with just one company—not several—you'll never get lost in the shuffle.

RCA Cylix isn't just more convenient. It's also more efficient. Setting up your own network involves a huge commitment of time, personnel and capital funds. Our single vendor simplicity eliminates all that.

One phone call puts our experienced people to work for you. Setting up your network. Handling all those dealings with all those phone companies. And then keeping your network running smoothly thanks to our unique service concept. Plus our design flexibility makes growth easy.

We can do all this more efficiently than you can due to our years of experience. And that can save you money. Because research indicates that personnel, benefits and associated overhead account for up to 1/3 of all networking costs.

Whether you're expanding an existing network or building a new one, now more than ever RCA Cylix is not only the easy choice. But the right one for data networking anywhere in the United States, Canada or Alaska. For more information and our free brochure, "Managing Your Network: Post-Divestiture Costs and Concerns" call our marketing department today at 901-683-3043. Or send in this coupon.

RCA
Cylix
Communications
Network

Not just a source but a resource.

NAME_____
TITLE_____
COMPANY_____
ADDRESS_____
CITY_____ STATE____ ZIP_____
PHONE_____
Protocols currently used (including localities)
☐ IBM 3270 ☐ SDLC
☐ Burroughs Poll/Select
☐ X.25 ☐ Other_____
Number of remote locations_____
Geographic Scope
☐ National ☐ Regional ☐ Local

RCA Cylix Communications Network
Dept. CW, 800 Ridge Lake Boulevard
Memphis, TN 38119, 901-683-3043

SPECIAL **REPORT**

"Maybe it got garbled in the transmission?"

NET from SR/41

should include an electronic mail system.

The purpose of the mail system is to facilitate noninteractive communications. This allows information to be delivered in a timely fashion throughout the network, whether the recipient is immediately available or not. Information can be communicated between application domains in this manner.

To accommodate such communications, the information and processing capabilities of the backbone network must be distributed. Distribution of control enhances the efficiency, modularity and reliability of the intelligent network as a whole. It also allows the diverse application domains to customize their particular interfaces to the network.

A sophisticated backbone network with distributed intelligence makes another feature possible — a distributed data base. The files in a distributed data base are located on systems throughout the network, wherever they are most needed. This means that corporate headquarters in New York can access manufacturing data located at a manufacturing plant in Texas. At the same time, that plant in Texas has local access to the data, as well as local control.

The intelligence located within each network node means that the nodes can be multifunctional. Each node must have the capability of running various applications and utilities (local or network) and acting as an intelligent switch between the application domains and the backbone network.

Fault tolerance and on-line access are also necessary features in an intelligent network. Because the business is literally run with that network, the network must be continuously available despite component failures. And the information available throughout that network has to be available on-line because it may be needed at any given moment for use in critical business decisions.

An intelligent network with these features would solve the problem of integrating incompatible computing equipment and would leverage an investment in existing software. Being evolutionary and flexible by nature, an intelligent network leverages investments without locking the user into a single vendor solution or requiring integrated networking standards to be set.

With an entire corporation integrated in this manner, productivity and, therefore, profitability would be vastly improved. Increased corporate communications, improved decision making through the constant availability of timely information and remote access to locally controlled data are just some of the benefits of linking a corporation into a single operating entity through an intelligent network. But implementing an intelligent network requires more than technology; it requires a firm decision and commitment by upper management.

Edwards is a data communications engineer and Metz is a technical public relations specialist at Tandem Computers, Inc. in Cupertino, Calif.

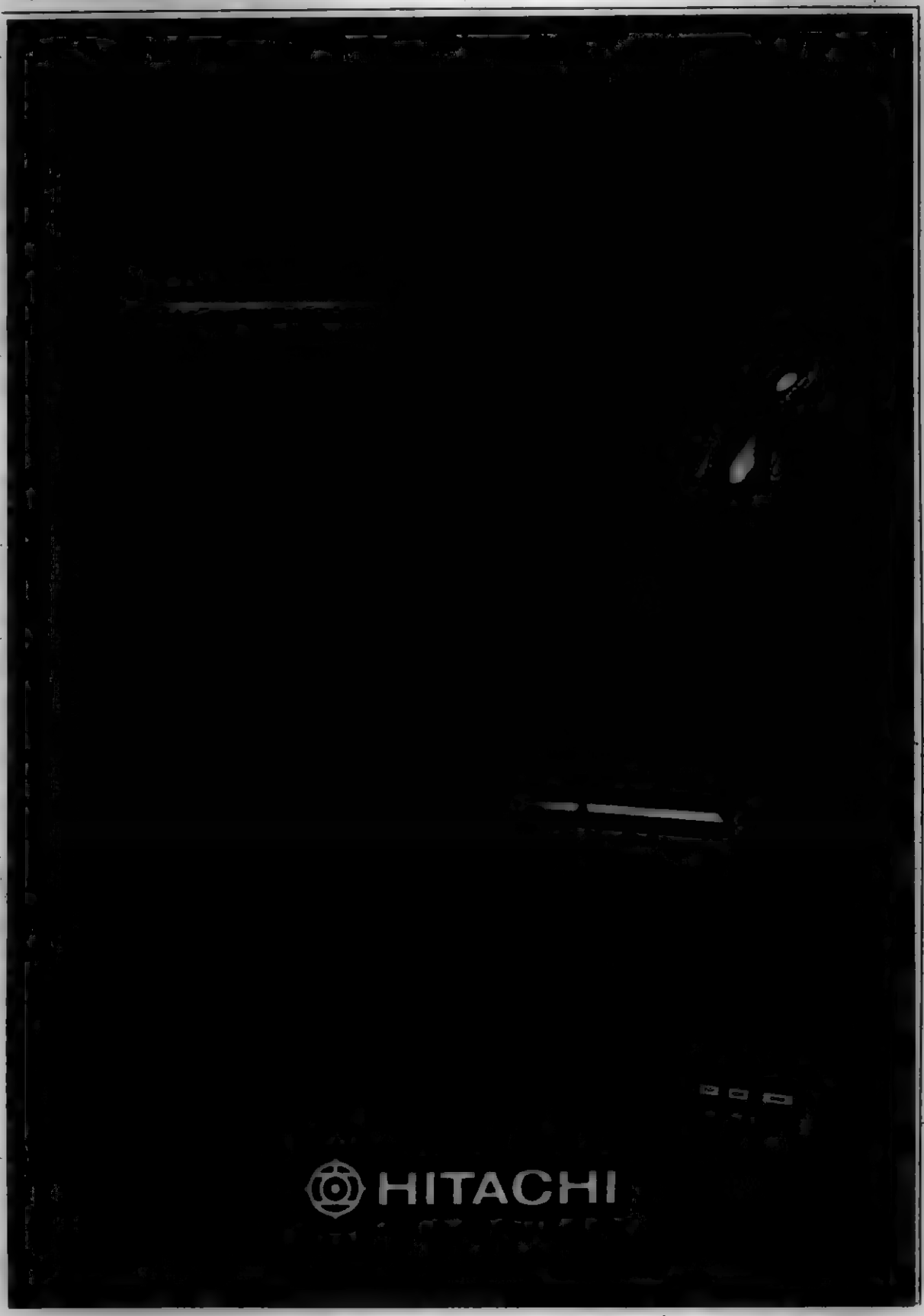
INFO from SR/40

than the availability of people to manage them, strategic communications planning is beginning to take place on many levels.

Analyzing user needs and responding to these needs are the foundations of such strategic planning. And it is along this path that fault-tolerant networks earn their daily bread, applying the technology to acquire and disseminate information in a sensitive marketplace.

As more and more companies are learning, the corporate communications network is sparking a transformation in the way they conduct their business and providing an ever-present vision of the network as a corporate asset.

Brind is manager of product marketing for network command center products at Infinet, Inc. of Andover, Mass.



Now you don't have to be rich to be powerful.

Riches and power don't always go together. Take Plexus, for instance. The world's most powerful UNIX*-based supermicros.

Powerful because multiple processors share the UNIX load. So processing power is distributed to where it does the most good.

Terminal I/O. Disk I/O. Data communications. And, of course, data processing.

Our unique architecture also lets us bring you the world's first UNIX Network Operating System (NOS). So you can combine Plexus systems in an Ethernet network for even more power.

NOS gives you real time, continuous access to files. From anywhere in the network.

Files are also updated on the same basis. So everyone in the network works with up-to-the-minute data. Automatically.

No waiting for file transfers. And that's a decided improvement over everything else that's out there.

You also get to save money on powerful UNIX-based software, including COBOL, FORTRAN, Pascal, BASIC, and C. Database management and word processing, too. As well as hundreds of third party UNIX packages.

Plus our own software and maintenance support. And even a software referral service for your OEM programs.

Does all this make us expensive?

Absolutely not.

In fact, Plexus systems cost thousands of dollars less than the minicomputers we outperform.

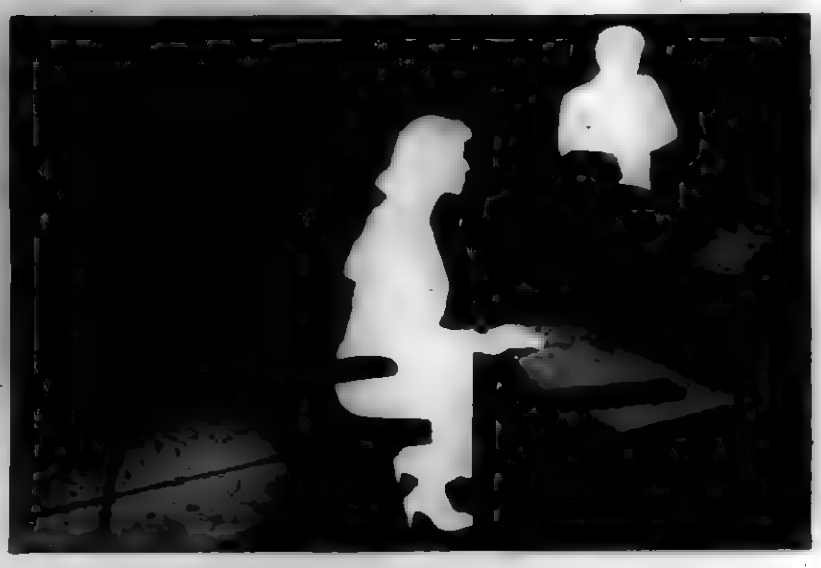
To get a better idea of just how good that performance is, come get a demonstration. Call *800-528-6050*, ext. *1444*. In Arizona, *800-352-0458*, ext. *1444*. Or write Ralph Mele at Plexus Computers, Inc., 2230 Martin Avenue, Santa Clara, CA 95050.

You see? You don't have to be rich to be powerful. Just smart.

PLEXUS

Built for speed.

© Plexus Computers, Inc., 1983
*UNIX is a trademark of Bell Laboratories.



Oil drilling firm strikes it rich by transferring info with own packages

FORT WORTH, Texas — Since 1939, Western Co. of North America based here has provided the petroleum industry with essential drilling and completion services for the exploration, development and production of oil and gas. With assets in excess of a billion dollars, Western has consistently been a pacesetter in this highly competitive industry.

But high growth has brought on new technical challenges. According to Joe Adamo, telecommunications manager, "During the 1979 to 1980 time frame, with the [Organization of Petroleum Exporting Countries] price increases, drilling activity was very high, and the company was doubling its growth. We had to improve the handling and transfer of information critical to our operations."

This information — everything from materials inventory and equipment maintenance to management reporting and payroll — is continually transferred between Western's regional office centers, 50 district offices and corporate headquarters. "Prior to 1980, many functions were accomplished through manual systems," Adamo said. "The districts maintained written logs on materials usage and inventory. Some managers would stock lightly, while others would stock heavily on items. It was essential to even out inventories and go into volume purchasing across the company to improve materials management."

Ben Albino, shift supervisor in the operations section, also noted the inefficiencies. "We had an IBM 370/138 operating under DOS, with .5M byte of memory. After the data was mailed in from the districts, it would take a day to key it into the system for processing — and our payroll would take an agonizing 16 to 26 hours to run."

It was apparent that a major upgrade in computer and communications capabilities was required. Western's management viewed the investment as one that would increase both service to customers and the efficiency of internal operations.

The comprehensive blueprint for data processing and the supporting communications network that Western designed more than met the company's goals, resulting in an inventory tracking system that Western is marketing to other companies. Western customers benefit from an engineering software package that gives them better analysis of field data on well drilling operations. They also have access to Western's "supervan," a mini computer center on wheels that does analysis at the well sites.

Success of new software programs

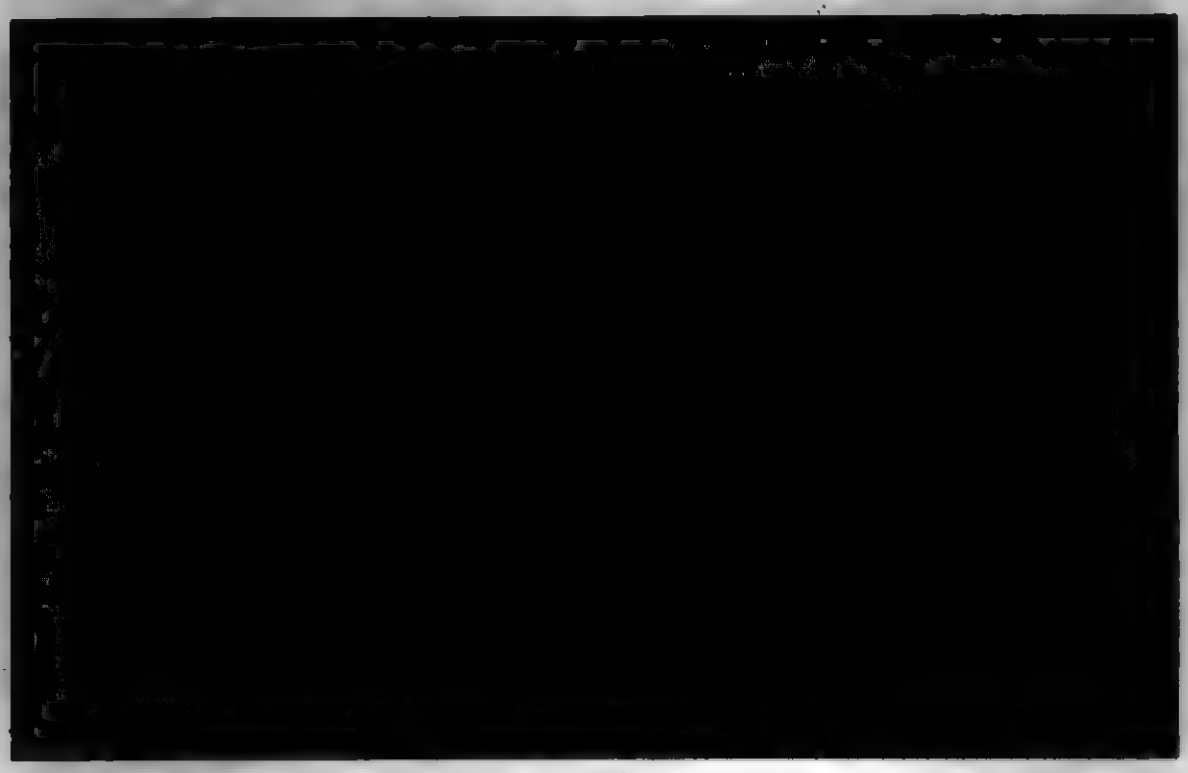
The success of the new software programs developed by Western depended upon how readily the programs could be accessed by Western personnel at remote locations around the country. Western needed a communications network that would reach all locations cost-effectively and reliably while being centrally controllable.

Why was central site control crucial? "The staff in our regional and district offices is comprised of sales and administrative-type personnel who simply do not have the technical background or training required to assist in extensive network testing," Adamo said.

Fifty-eight dedicated private leased lines tie 73 separate locations to the Western data center here. An

See Oil, SR/48

Combining Boeing's distributed services with IBM's PCs could revolutionize your financial planning.



We know.

Introducing a totally new program from Boeing Computer Services. Designed to help you take maximum advantage of IBM's technology in microcomputers. While ensuring you get the same reliable, high quality computing solutions that are synonymous with the name BOEING.

For financial planners, Boeing offers the EIS® Micro Workstation — a distributed extension of the well-known EIS Decision Support System. EIS software gives business managers the information they need. Faster. More accurately. Without complicated computer programming. And now delivered economically to your desktop, via the IBM PC/PCXT.

The EIS Micro Workstation lets you download, manipulate and upload data to our MAINSTREAM® remote computing network. It gives you extensive graphics capability. What's more, with MAINSTREAM power, you gain access to the many economic and financial data banks you need for up-to-the-minute modeling. And through our Value Added Dealer (VAD) relationship with IBM, Boeing can be your single, reliable source for host processing, PC/PCXT hardware, software, maintenance, consulting, and training.

You save valuable financial planning dollars while gaining greater control over your planning and business management.

The EIS Micro Workstation is just one more unique service from Boeing, a leader in software and computing solutions. Give your decisions more support. Call 800-447-4700. Or write Boeing Computer Services, M.S. CV-26-9A, 7980 Gallows Court, Vienna, VA 22180.

BOEING COMPUTER SERVICES A Division of The Boeing Company

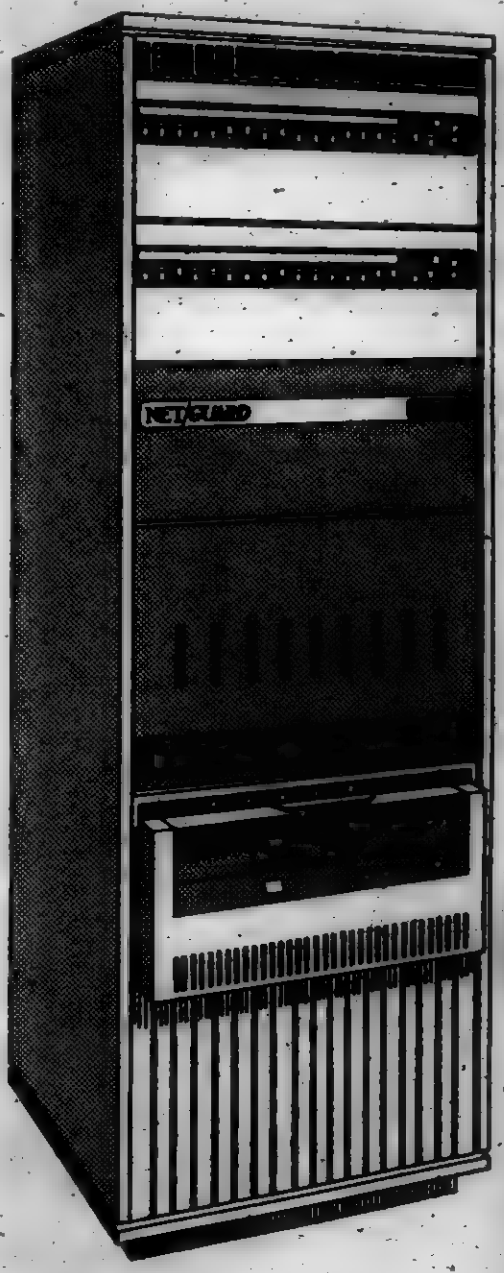
Boeing is an authorized Value Added Dealer for the IBM Personal Computer and Personal Computer XT.

IBM is a registered trademark of International Business Machines.
EIS and MAINSTREAM are registered Service Marks of The Boeing Company.

Avant-Garde announces

NET/GUARD™

The System Solution to PC Integration



Net/*Guard*:
- Allows datacom network managers to control access by personal computers to the central network, databases, and computers.
- Provides basic performance and utilization monitoring of any dial-up device.

Net/*Guard* means you can:
- Know who is accessing the network and why.
- Provide real-time operational control.
- Alert operations to potential functional and performance problems.
- Plan for growth and additional capacity.
- Provide greater end-user service and credibility.

Net/*Guard* means your users can:
- Dial in to your network.
- Use central database and computing resources.
- Communicate with the network control center.
- Send and receive mail.
- Maintain files to which access is restricted.

See Net/*Guard* at Interface booth 279. If you can't make it because your network has you tied up in knots, fill in the coupon fast. We'll speed you information about Avant-Garde's products to simplify network management. Or call Art Alberding on (609) 424-9620.

Avant-Garde Computing Inc.
2091 Springdale Road
Cherry Hill, New Jersey 08003

Please rush me information about Net/*Guard*, the system solution to PC integration.

My network has: ____ Users and ____ terminals.

Host: ____ Protocols: ____

Name

Title

Company

Address

City ____ State ____ Zip

( ) Telephone

© 1984, Avant-Garde Computing Inc.
Net/*Guard* is a trademark of Avant-Garde Computing Inc.

SPECIAL REPORT

Stock exchange trades traditional net idea

NEW YORK — Compared with more traditional arrangements, local networks are usually touted as a better way to allow the sharing of information, whether on a central computer, peripherals or a number of microcomputers. But a primary benefit of phasing out a traditional network can be to decrease the number of I/O devices, thus conserving a very scarce commodity: floor space in a crowded stock exchange.

Over a period of years, the American Stock Exchange (Amex) designed and implemented a data communications network to serve the trading posts located on the exchange floor.

The network also connected the posts with the member brokerage houses of the exchanges. Unfortunately, the design of the network dictated that increases in overall trading volume often led to the installation of new peripherals on the trading floor.

Flow of transactions

The general flow of transactions around the network was as follows: Orders for the purchase of stocks were usually entered in a member firm's own computer network by the firm's stockbrokers at their offices around the country. The orders were then transmitted either to a message-switching host computer at Securities Industry Automation Corp. (Siac) or directly to the firm's own booth area at Amex.

Siac, a subsidiary of the New York and American stock exchanges, acts as the data processing organization for the exchanges. Amex is located on Wall Street in New York and is the second largest stock exchange in the U.S. Orders sent to Siac are routed via Siac's common message switch to a host computer designated post-execution reporting (PER) for initial processing. PER then routes the order to a printer at the appropriate post on the trading floor.

Each stock is traded at only one floor post. Orders sent directly to a firm's booth area are carried to the appropriate post by the firm's personnel. Each order is then handled manually by the specialist for that particular stock, who then matches compatible buy and sell orders.

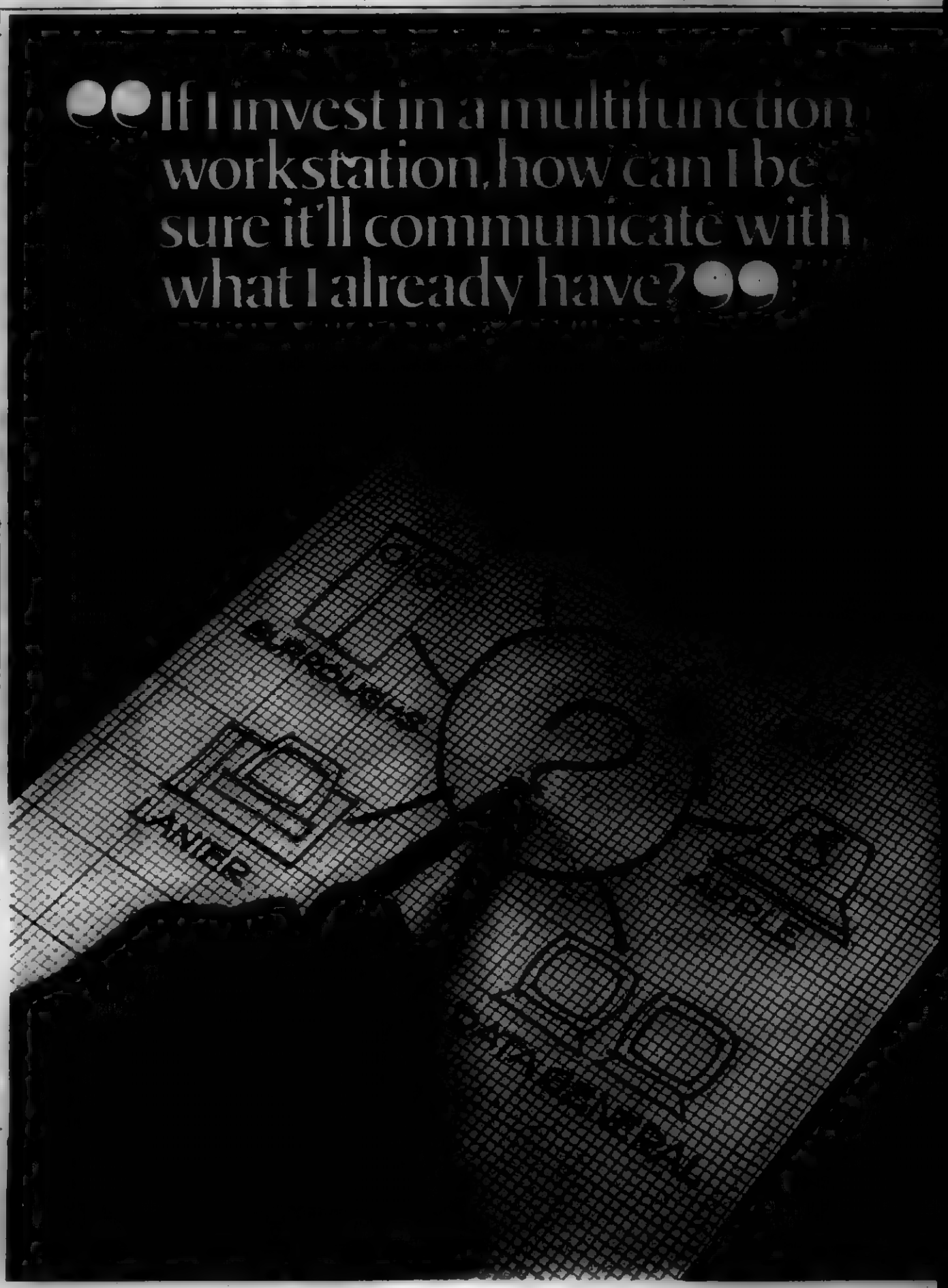
Once an order is executed, either one or two cards are marked to record the trade. Orders that entered via a booth produce a market data switch (MDS) card that is sent to the MDS host computer. This computer produces the well-known ticker that shows all trades. Orders that entered through Siac produce an MDS card and a PER card that is sent to the PER host. Eventually, the order information is routed back to the originating brokerage firm and then back to the office placing the order.

Initially, PER and MDS each had its own dedicated card readers and printers. Before long, the number of these peripherals began to mushroom. As these devices began proliferating, so did wiring and modems. If an additional device was needed, due to increased overall trading volume, two devices had to be added — one for PER and one for MDS. Since the devices used a dedicated communications line, each new device meant another line from Amex to Siac, with the host computer site located a few blocks away.

More computers also meant more card readers and printers. The hardware and wiring needs began to snowball, and the problem was intensified by the shortage of space on the exchange floor.

In late 1980, Siac and Amex began looking for a new network design and technology to support Amex trading. Around the same time, local-area nets were emerging, and this technol-

"If I invest in a multifunction workstation, how can I be sure it'll communicate with what I already have?"



SPECIAL REPORT

for local network to conserve floor space

ogy was chosen as the most effective means of coping with the problem of connecting the devices and computers while efficiently using space on the trading floor.

The local network approach offered many advantages. First, and perhaps most important, a local network costs about half as much as an equivalent message-switching approach. The use of the local network meant that one card reader or printer could serve MDS and PER as well as all future hosts. In addition, the number of dedicated lines and modems would be reduced. The local network also would help to reduce future wiring and installation costs and, thus, would provide a relatively inexpensive incremental growth path.

Another advantage is the network's ability to handle multiple data channels, as well as CATV, closed-circuit TV and voice and facsimile transmissions.

The network, provided by Contel Information Systems, Inc., Great Neck, N.Y., is based on an early version of Contelnet, a local network developed by Contel that uses broadband coaxial cable bus architecture.

The initial application of the network connected 30 card readers distributed on the exchange floor to the MDS and PER host computers located in the Sinc building. Twenty-four communications lines and 48 modems were eliminated in the first phase of development. Plans are now under way to provide communications between the hosts and printers on the floor of the exchange.

Once the local network technology was chosen, Sinc's and Amex's long-range objective was to implement the overall architecture. The new network is called the American Stock Exchange Network (Amnet). However, Amex and Sinc decided to take a phased approach to the realization of their final architecture. The first step is a network named Amex Card Reader System (Acars). The Amnet configuration will be realized during the recently begun phase of network development.

Bus interface units

Both Acars and Amnet use bus interface units for connections to devices and hosts. These are micros that provide the hardware and software interface between the card readers and the cable bus. The bus interface units perform protocol conversion, insulate host software from the card readers and control all the movement of card images between bus interface units over the bus.

Only card readers are supported on the Acars network. Printers continue to be handled by each host. Further, because the RS-232C cabling from the Amex equipment center to the trading posts was already in place, the bus interface units supporting the card readers were not distributed around the exchange floor. Instead, all bus interface units are located on shelves in the Amex equipment center. Since the host and the network control center are located in a separate building, communications lines are necessary to connect these devices to the local networks.

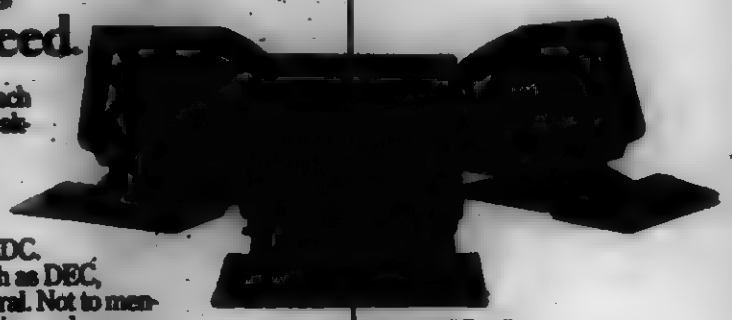
In addition to the bus interface units, Acars includes a network control center that provides eight on-line control capabilities:

■ Network definition and initialization commands allow the user to define the particular configuration. For example, the user must define the characteristics of each bus interface unit and each port.

■ Downline loading is available under operator or programmed control. Downline loading occurs at initialization and fault detection in

See ANEX 59/68

Northern Telecom's information processing products have the communications capability you need.



The 500 Family.

Besides being compatible with each other, Northern Telecom's 503 desktop computer and 565 and 585 information processing systems communicate effectively with a multitude of mainframes, including IBM, Burroughs and CDC. They also talk to other minis such as DEC, Hewlett-Packard and Data General. Not to mention word processors such as Lanier, and even micros such as TRS-80 and Apple.

This means you'll have more flexibility—and more control over your information system. Even if more and more personal computers are becoming a part of it. Our 500 family supports the CP/M* operating system software, so employees can have the personal computing capabilities they want, while your company keeps the organizational unity it needs.

At the same time it's running CP/M, the family can also be running its own unusually powerful operating system which is compatible across the whole 500 line. It permits a unique approach to multitasking—with a few simple keystrokes, up to 16 tasks can be performed simultaneously on the same terminal. Data processing, personal computing, spread sheets, word processing, information management, electronic mail, whatever task needs to be done can be done at the same time. An incredible timesaver.

All in all, the 500 series is quite a family. Versatile, reliable and a perfect example of Northern Telecom's OPEN World* commitment to compatibility. Northern Telecom is a world leader in digital technology and we're using this expertise to make sure our products fit comfortably into a multivendor world.

For more information, call 800-621-6476 (in Illinois 800-572-6724), or write to Northern Telecom Inc., P.O. Box 10934, Chicago, IL 60610.

*Trademark of Digital Research Inc. *Trademark of Northern Telecom Limited

SPECIAL REPORT

OIL from 38/44

IBM 3705 serves as the front end to an IBM 370/3033 mainframe operating under OS/MVS, ACF-Vtam/Network Control Processor with IBM Systems Network Architecture/Synchronous Data Link Control. From the 3705, all data is sent through a Codex Corp. Intelligent Matrix Switch, which is used primarily for line monitoring and A/B switching within the 3705.

"The Intelligent Matrix Switch gives us the ability to monitor any line. . . . We can also do any reconfiguration electronically instead of using manual patching," Adamo said.

From the Intelligent Matrix Switch, data paths are concentrated in five centralsite Codex 6040 Intelligent Network Processors (INP). All of the data traffic between the five regional concentrator locations in New Orleans; Midland, Texas; Oklahoma City; Denver; and Houston are transmitted over five 9,600 bit/sec leased lines. The statistical multiplexing and data compression capabilities of the INPs yield an apparent 225% to 230% efficiency on the 9,600 bit/sec trunks.

About 100,000 Intelligent Matrix Switch and time-sharing transactions alone are transmitted through Western's network each day.

Improved management reporting has been, perhaps, one of the most important benefits of the network.

"Our detailed general ledger reports used to be printed here in the data center and mailed to the districts," Adamo said. "And they wouldn't receive it for a day or two after printing, whereas all of our upper level management staff at headquarters here would have same-day service. Consequently, they'd call the districts with questions on expenditures before the managers had a chance to see the same information.

"Now everything — from the profit-and-loss statements to the detail general ledger — can be transmitted in real time. That's one of the major benefits we've been striving for: improved corporate communications," Adamo added.

Fill in your IBM micro/mainframe communications picture.

AST Research, the leader in IBM PC enhancement products, brightens your micro/mainframe communications picture with a full palette of economical, integrated hardware/software masterpieces. With AST Products, you can emulate IBM terminals or create PC-based Local Area Networks.

AST improves your office operating cost picture.

AST communications products give your IBM PC the flexibility to act as a terminal for your host system or as a stand-alone computer for smaller tasks. Your PC won't bog down the mainframe with unnecessary small jobs and local computing on the PC eliminates phone line charges too. Get the power of a mainframe when you need it and personal computer convenience right at your fingertips.

Applications solutions that save shelves of goodies.

AST keeps pace with your ever-changing applications requirements with reliable, high quality, cost effective communications products. AST products provide support for Bisync and SDLC communications protocols as well as networking multiple PCs for sharing resources.

Choose AST products — by the numbers.

These AST communications packages are currently available:

1. AST-SNA™ emulates a 3274/3276 controller and 3278 or 3279 display terminal using SDLC protocol.
2. AST-RJE™ emulates 2770 batch RJE and remote 3270 display terminals using 3270 Bisync protocol.
3. AST-POOL™ allows your PC to connect to an IBM 3274/3276 cluster controller via coax cable and emulates a 3278 or 3279 display terminal.
4. AST-3780™ emulates 2770, 2780, 3741, and 3780 RJE workstations using Bisync protocol.
5. AST-5251™ emulates a IBM Model 11 remote workstation connected to an IBM System 34, 36 or 38.
6. PCnet™ is the first Local Area Network designed specifically for the IBM PC or XT and the PC-DOS 1.1 or 2.0 operating system.
7. DC-232™ is a user-programmable dual-port card capable of communicating in Async, Bisync, SDLC or HDLC protocols.

Discover how well AST can fill in your micro/mainframe communications picture. For descriptive data sheets, write or call: AST Research Inc., 2121 Alton Ave., Irvine, CA 92714. (714) 863-1333. TWX: 3106708TASTRES

AST RESEARCH INC.

Number One Add-Ons for IBM PC.

AMEX from 38/47

order to load or reload software to one or more interface units.

Status display continuously displays the up-to-the-minute status of the cable, each bus interface unit and each port. The status is derived from periodic status messages and on-occurrence error reports from the bus interface units.

Network control commands allow the control center operator to set the state of a bus interface unit or a port, switch a device to a new port, switch to a backup interface unit, downline-load a particular program to one or more interface units, transmit specified interface information to the control center, copy the screen contents to the printer and control the logging and reporting functions.

Event logging includes the capture of status, error and alarm information and all operator commands and actions taken by the network control center. Logging can be to disk and/or to the printers.

Printed reports allow printing the contents of the status CRT terminal in three standard report formats.

Switch-over control handles switch over from the primary to the backup net control center in the event of a control center failure.

Bus interface unit parameter modification allows the network control center operator to use a mnemonic name to change the value of any parameter in the software of an interface unit.

Using the Acars network control center architecture, Siac can achieve any level of availability simply by increasing the number of control centers. Siac uses two active control centers and maintains a third for program development and hardware backup that includes all of the vendor's standard software development aids.

Eleven months passed between the active date of the Acars contract between Contel and Siac and the beginning of acceptance testing. Toward the end of that period, Siac and Amex made a gradual cutover to full operation. Occasional vendor support was required before full cutover could be made.

SPECIAL REPORT

Bank redesigns corporate net with CATV tech

PORTLAND, Ore. — When First Interstate Services Co. (Fisc), the communications services provider for First Interstate Bank (FIB), launched a massive redesign of its corporate data network, it teamed up with a cable television vendor. The resulting relationship was one of only a handful of its kind in the country.

Fisc handles communications services (voice and data) for FIB's 11-state network. Tom Findley, Fisc assistant vice-president, heads up the Oregon network supporting 170 branch banks, 35 of which fall within the geographic boundaries of Rogers Cablesystems, Inc.'s Portland CATV service area.

In 1981, Findley's mission was to deploy a corporate-mandated advanced communications facility for Oregon. This meant incorporation of new technology as well as the redesign of the Oregon network. At that time, Fisc was operating on two networks — one for automatic teller machines (ATMs) and teller terminals operating on seven backbone circuits to corporate headquarters in El Segundo, Calif., and a different network for the administrative services with backhauls into Portland.

Rogers' involvement in cable-delivered data communications services was mandated by its 1980 franchise to serve the city of Portland. While the franchise granted residential service rights for Portland's East Side only, rights to provide business services on a B cable, or Institutional Network, were granted citywide. Operating on a separate bandwidth on the East Side's A-2 cable and built to order on the West Side of the city, Rogers' Institutional Network is now about 1,000 miles long and serves hospitals, schools and government agencies as well as banks.

In redesigning the Fisc Oregon network, all FIB branch banks reachable by cable were excluded onto their own analog network. "This was not accidental," Findley said. "We wouldn't have done it if we hadn't known that cable-delivered data service was possible." With the conversion of all of Portland's 35 branch banks to cable, Fisc would be able to drop three analog circuits without losing any branches.

Fisc's redesigned network has all nodes in Oregon, regardless of terminal type, coming into a central hub in Portland. Data is then processed through one multiplexed 56K bit/sec highway to El Segundo.

The idea began to become reality in July 1982 when, after eight months of preliminary planning, Rogers initiated service to Fisc with a 60-day demonstration using two terminal drops and a host drop operating at 9,600 bit/sec. The test simulated the activity of a remote branch 12 miles from the host. Findley said in a report following the demonstration: "In comparison with conventional analog circuits . . . [there was] a 100% reduction of recoverable errors and nearly a 40% reduction in nonrecoverable errors."

In 1983, a contract was signed for the conversion of all Portland FIB branches to Rogers' Institutional Network. Although delays in obtaining downtown underground construction permits have slowed the conversion, eight drops are now in place, and the remainder of the conversion to cable should be accomplished in 1984. The reliability figures stated in Findley's report still hold for that circuit, he said, but now Fisc is monitoring the performance of the new cable circuits closely.

Cable delivery also simplified Fisc's cost planning in that Rogers' data transmission price rates are based solely upon speed. The elimination of distance and usage sensitivity, Findley said, "changes the way you design the network. Cable allows us to deliver low-speed service to those who require only a low speed and to deliver high-speed service exclusively to those users who require high speed. This translates in a budget perspective to knowing — when we put a new branch onto CATV — exactly how much it's going to cost us for the next year, regardless of its usage."

Increased security is a further advantage of the Rogers technology and of the finite nature of cable coverage itself. According to John Rivenburgh, Rogers' Institutional Network manager, "The system is sweep-scanned by a Digital Equipment Corp. PDP-11/44 every 10 to 12 seconds. All amplifiers are polled, and status information is reported. Any illegal tap, unless the network has actually been cut, creates signal noise that is seen on the diagnostic equipment."

Findley said, "The way the network is designed and amplified adds a level of security we don't have on the analog circuits today. It is possible for somebody to tap into an analog circuit with common technology available today and eavesdrop on our data. Whereas on cable, any time a tap is made, it is detected that it has been done and that it is happening between two particular amplifiers."

Flexibility was another factor that

See CATV 39/54

In a world of dumb printers, Memorex has a Remote Printing System that thinks for itself.

In theory, remote computer output printing is a dynamite concept.

Reports get out to the right people, right away. Turnaround time goes down, costs go down. Your central printer gets a break instead of a breakdown.

In theory.

Perhaps your own experience has been less than ideal. Because most remote printing systems aren't designed with enough control to manage a really heavy workload; there's no flexibility. No security measures, either.

But consider DPS by Memorex. The first Distributed Printing System with complete flexibility for the remote user, and complete control for the central site.

Why it's better.

For starters, installation is a matter of minutes, integrating perfectly into your MVS or VTAM System without modification and without an IPL.

Second, DPS will accept data from batch output, from a TSO data-set print command, or directly from user-written programs.

And the data stays confidential. You can assign specific or master passwords, and DPS will ignore any command that doesn't include your assigned code.

You can also specify that reports be printed on special forms (labels, checks, invoices, etc.).

Network control.

No matter how big the load, DPS keeps your system *manageable*. From either the central console or from remote terminals, you can enter commands such as start/stop, display, cancel, re-route, change copy count, priority, names or other attributes.

Data with a life of its own.

DPS keeps your reports safe from accidental erasure. You can print them or purge them, but DPS won't lose them, ever. Even after system error or failure.

Free 30-Day Trial.

We'll give you free installation and a 30-Day free trial to see how our system and your hardware can give you incredible printing performance.

Just call now (408) 987-9604, collect, or fill out the coupon below and send it *today!*

Remember — just because your current system falls short, doesn't mean you don't have a second chance. It just means you don't have DPS.

Memorex Corporation
San Tomas at Central Expressway, Santa Clara, CA 95052
ATTN: Software Marketing Manager, MS 1216

If DPS can think for itself, I'm interested in giving it some thought.

NAME:

TITLE:

COMPANY:

ADDRESS: STATE: ZIP:

TELEPHONE: EXTENSION:

MEMOREX
A Burroughs Company

Computers took the strain out of processing data.

Now Raytheon has taken the strain out of data processing.

Introducing the PTS-1000/4000 family of 3270-type information display systems. Designed to combine mainframe compatibility, operator comfort, and peace of mind for DP managers too.

How can we promise all that?

After more than a decade of experience in 3270 emulation, Raytheon designed the PTS-1000/4000 family to offer the utmost in flexibility, so you can mix and match any of our new controllers with any of our new display and printer terminals.

When it comes to operator comfort, no one offers interactive displays with more built-in ergonomic features than Raytheon. Features especially designed to ease the strain on one's neck and back, hand and wrist, and eyes.

The microprocessor-based PTS-1000/4000 family enables efficient distribution of your data processing workload with flexible configuration options and extensive self-diagnostic capabilities. Binary synchronous, systems network architecture (local and remote), and airline link control communication protocols are supported. Large and small control units, multiple screen sizes, and a wide variety of peripheral input/output devices and printers can be mixed and matched with varying star, multidropped cabling, or multiplexed configurations.

Special system features include productivity enhancements like local format storage, response time monitors, row/column indicators, and unprotected field indicators.

As for the DP manager's peace of mind, Raytheon offers flexible financing and leasing options, competitive pricing, over 2000 service people worldwide, and a commitment for today and tomorrow that can come only from the largest independent supplier of intelligent terminal processing equipment.

The PTS-1000/4000 information display systems from Raytheon Data Systems. We take the strain out of your data processing. For the sales office nearest you, check your telephone directory or call 1-800-343-6676.

RAYTHEON

Raytheon Data Systems
Box 7, Marketing Communications
1415 Boston-Providence Turnpike
Norwood, Massachusetts 02062

SPECIAL REPORT

PBX helps college, hospital keep costs down

EVANSTON, Ill. — Many corporations have found that one sure way to reduce operating costs is to purchase, rather than lease, their telecommunications systems. Industry experts predict that within the next three years, 75% of Centrex users who utilize more than 5,000 lines will make decisions to purchase their own systems. Some large corporations are even creating their own independent communications networks.

Northwestern University and Northwestern Memorial Hospital here have been working to create their own telephone company. That company is built around a Northern Telecom, Inc. SL-100 private branch exchange system. Scheduled to cut over in September 1984, this system will be the largest privately owned network based in the Chicago metropolitan area and one of about 12 of that size nationally. The 10,000-line system will link the Northwestern University campus and Northwestern Memorial Hospital facilities in downtown Chicago with the university campus here. It provides for voice, data and two-way video transmission.

A digital switch installed in Chicago will service approximately 6,000 lines in the 19-building complex there. Another 4,000 lines in 155 buildings on the Evanston campus will be serviced by a separate digital switching center there. Included with the system are a communications management center and Halon fire prevention systems at both switch sites.

In 1981, the university and the hospital jointly initiated studies to examine communications operating efficiency, cost control and maintenance. These studies concluded that significant cost savings could be realized if both institutions made a shared purchase of a telecommunications system.

Northwestern Telecommunications Services (NTS) will administer the installation and operation of the system for the participating institutions. Based on its research and needs analysis, NTS established several objectives for the purchase and installation of the telecommunications network: NTS wanted a system that:

- Is easy to manage.
- Requires a minimum of staff to operate.
- Can be quickly and easily installed.
- Allows control of time and costs in order to make adds, moves and changes.

The bottom line was, as always, the bottom line — Northwestern wanted to save money. Lee Ellis, senior vice-president for business and finance at Northwestern, projected that the university and the hospital would spend $50 million for telephone services over the next 10 years if they did nothing to reduce the expenditure. With the new system, Northwestern expects a total buyback in seven years and cost containment in the years ahead.

Because it was actually creating its own telephone company from the ground up, NTS wanted a vendor with experience in that area. Eight of the original 11 vendors who submitted bids for the Northwestern proposal were dropped because they were primarily manufacturers that were not directly involved with the operation of a telephone company.

The final choice of Centel Business Systems as the vendor was based on two factors: It is a subsidiary of Centel Corp., which operates the nation's fifth largest telephone company, and the Chicago area is Centel's largest operating service area.

NTS decided that experience would be vital to the engineering, installation and maintenance that would go into creating Northwestern's telephone network. In addition, Centel had experience operating the Northern Telecom DMS-100, a product similar to the SL-100.

A major concern for Northwestern was the necessity for continuous communications service to the hospital. Through the network, the hospital and university facilities in downtown Chicago will be hooked up to two central offices. There will also be another central office for the Evanston campus, so that three central offices service the system. To maintain communications in the event of a disaster or other potential disruption of service, the system will have dual power from two separate power stations, backed up by a four-hour battery source and a diesel generator. In addition, emergency stand-alone service will be provided should the main system fail.

The choice of fiber optics rather than a microwave application was also an effort to ensure reliability. Although the bid did not specify fiber optics, Northwestern chose it because it was seen to be more cost-effective and because of its greater capacity and greater reliability. Outside cabling will be installed along 13 miles of the existing Chicago and Northwestern Railroad lines between downtown Chicago and suburban Ev-

See NTS SR/54

Your Most Precious Resource

In any business, time is money! This is especially true when dealing with Data Communication Networks where system performance and RESPONSE TIME is critical to the user.

Degradation of system performance (responsiveness) is inevitable as customer work loads increase. Installing faster, more sophisticated hardware is a popular but temporary solution. It is only a matter of time until the problem reappears.

Questronics offers a solution through statistical performance analysis of your system. Over seventy-five categories of line utilization and response time information can be generated in eleven different reports (hard copy and/or data based).

Questronics model CPA/7 is setting the standard in the industry by providing vital performance statistics in the areas of:

- •User/System Response Time
- •Network Transmission Time
- •Line Utilization
- •Polling Counts
- •Character Transmission Counts
- •Poll List Wrap Time
- •Transmission Errors
- •Histograms
- •Host Resident Time
- •Alarm Conditions

Utilizing this information, DataCom managers can then make the crucial decisions necessary to fine tune and balance the network. Each line may also be further refined to greater efficiency, enabling planning and projection for new growth.

Call Questronics and discuss your situation. We'll give you straight answers.

SEE US AT BOOTH #1000
INTERFACE '84

Answers through Analysis

QUESTRONICS INC.

3685 South West Temple, #5 • Salt Lake City, Utah 84115 • (801) 262-9923 • TWX 910-925-4000

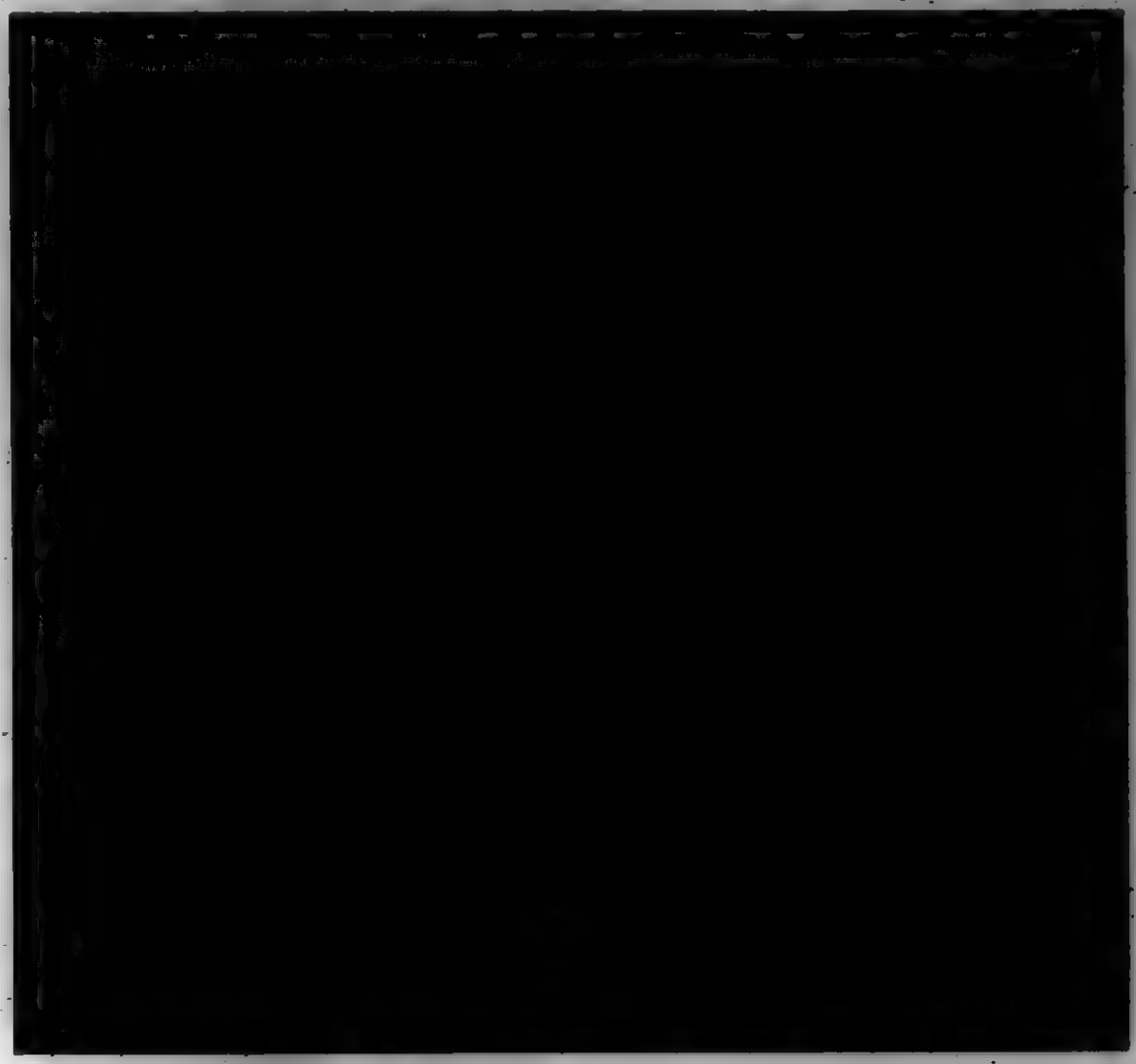
ADVERTISEMENT

PCOX™

YOUR PC-TO-HOST CONNECTION NOW ONLY $1145

FEATURES:

- Connects by coaxial cable to any channel-attached IBM 3274, remote BSC or SNA/SDLC 3274 or 3276, or 4321/4331/4361 Display/Printer Adapter
- Exact emulation of 3278 - Models 2, 3 or 4 or 3279 Models 2A or 3A,
- Screen print and screen save to disk
- Screen-control application program interface
- U.S., foreign and RPQ Keyboard support (including Entry Assist)
- Menu-driven installation
- Compatible with IBM PC, PC-XT or any IBM-compatible personal computer
- DMA-attached for high performance
- Proprietaty microprocessor architecture
- Menu-selected high-speed file transfers between PC and host
- Binary and compressed text options



PCOX, the Personal Computer Coaxial Interface from CXI, is the best, most economical way to connect your IBM* or IBM-compatible personal computer to your IBM host-based network, and it's available *now*! For $1145, CXI combines the PCOX Personal Computer Coaxial Interface, Control Unit Terminal Program and Professional Workstation Facility. PCOX lets you enjoy many of the functions of the IBM 3270-PC and offers extra features available only from CXI.

*Trademark of IBM Corporation.

CXI is not simply another PC-compatible board company. We understand the IBM 3270 and its marketplace, and we are introducing a family of products to allow your PC to grow with your needs.

For immediate delivery and a list of PCOX distributors, call CXI today at toll-free (800) 221-6402. In California call:

cxi
CXI, Inc.
3606 West Bayshore Road
Palo Alto, California 94303
(415) 424-0700

ADVERTISEMENT

CXI Announces Bundled Pricing

For $1145, CXI combines the PCOX Personal Computer Coaxial Interface, Control Unit Terminal Program and Professional Workstation Facility. PCOX supports the operation of IBM or IBM-compatible personal computers as IBM 3278s or 3279s. In addition to the support of 1920-character (Model 2) screens, PCOX offers support of 2560 and 3440-character (Model 3 and 4) screens. PCOX also provides the ability to save screens to disk, to print screen contents and, via the Professional Workstation Facility, to transfer files between the PC and TSO or CMS host. For existing PCOX users, the Professional Workstation Facility is available, as an upgrade, for $195.

CXI, Inc., 3606 West Bayshore Road, Palo Alto, CA 94303.
Toll-free number (800) 221-6402. In California 415/424-0700.

CXI Offers PCOX/m3278/SPF

For $1895, CXI's PCOX/m3278/SPF combines the PCOX Personal Computer Coaxial Interface, the Control Unit Terminal Program and the Professional Workstation Facility with m3278/SPF.* For the programmer, systems analyst or any other user of IBM's TSO/SPF (System Productivity Facility), this package provides SPF functions without the usual host connect time and usage charges. Current PCOX users may buy an upgrade package for $845. The m3278/SPF utility menu accesses a number of utilities, including the file transfer capability of the Professional Workstation Facility. PC files may be treated as members of partitioned data sets.

*Trademark of Pinnacle Systems, Inc.

CXI, Inc., 3606 West Bayshore Road, Palo Alto, CA 94303.
Toll-free number (800) 221-6402. In California 415/424-0700.

CATV from SR/48

made CATV attractive.

"The planning and scheduling necessary to alter the host-dependent relationships of branches on the CATV network is much less than that of a comparable analog network," Findley's report stated. Fisc's teller and ATM network is a series of backbone circuits with dependent loops running between the host controller and remote teller workstations. This allows multiple branches to operate off one host controller.

When remote loops are CATV, one physical cable carries and broadcasts all signals throughout the network. "What we can then do," Findley said, "is designate a host controller with spare capacity for remote loops that is not used. Then, when a controller goes down someplace, all we need to do is go to the downed controller and reprogram the radio frequency modem there to the spare modem's frequency levels and — presto. We don't have the branch that's housing the controller up, but we've got the remote branches up."

The disadvantages Fisc has experienced with cable delivery are, in Findley's words, "not all that significant." There is, as in all DP shops, risk inherent in dealing with a new vendor. Problems tend to appear in direct proportion to the number of vendors employed. "We knew," Findley said, "that the Institutional service is a new service for Rogers Cable-systems as well, and they need to learn to support that service differently than they support their residential service." Rivenburgh said that Rogers employs different response procedures, different monitoring procedures and different technicians to support Institutional Network service delivery.

Fisc's early projections show the cable vs. analog costs being about equal in hard dollars. CATV costs are projected based on a 9,600 bit/sec backbone service (twice the speed of the analog service) and a 2,400 bit/sec dependent loop service. Analog costs are projected based on a 4,800 bit/sec backbone service and a 2,400 bit/sec dependent loop service.

For the future, Fisc envisions using the cable network for applications beyond data transmission. Point-of-sale credit card authorization is one possibility as analog service increases in cost.

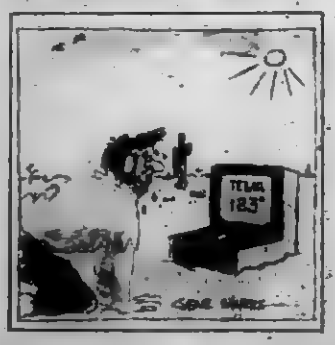
NTS from SR/52

anston. This was a faster, more cost-effective alternative to laying cabling under the shores of Lake Michigan.

In an effort to reach its objective of a quick and easy-to-install system, Northwestern used Centel as a general telecommunications contractor. Centel has taken on the responsibility for finding vendors for projects such as air-conditioning the private branch exchange rooms and construction of the rooms themselves and all other areas of the installation. Before launching into the system installation, Centel held several work-through sessions with Northwestern officials.

Inclusion of the communications management center in the system will allow Northwestern to exercise the management control over communications that it set out to achieve. Operating on a Data General Corp. MV8000 Series 2 with 2M bytes of memory and 354M bytes of disk storage, the communications management center will include data collection and report generation, data base management, directory assistance and maintenance and status reporting. These features will be helpful in reducing usage costs and in quickly locating and correcting any problems with the system.

The Northwestern system will also have twisted-pair cable to allow for voice and data integration at every location. Almost 1,000 data terminals will be interfaced upon cutover in September. Currently, 95% of the plant engineering is complete.



RAMIS II MAKES YOUR INFORMATION CENTER A GREAT PLACE FOR PEOPLE.

LISTEN TO OUR USERS

Send for our free guide, "Why Information Centers Succeed." It contains practical suggestions for success from RAMIS II Information Center staffs of organizations like yours. Organizations that have found that RAMIS II, the real leader in complete software for business, is the sure way to make an Information Center a great place for everyone.

To get your copy, contact your local Mathematica office, call toll free (800) 257-5171, or return the coupon below.

MATHEMATICA PRODUCTS GROUP
A MARTIN MARIETTA DATA SYSTEMS COMPANY
P.O. Box 2392
Princeton, NJ
08540

RAMIS II's complete solution is the most effective way to multiply the productivity and satisfaction of your end users and your Information Center staff. Today, RAMIS II means success at hundreds of Information Centers around the world.

POWER AND SIMPLICITY FOR END USERS

RAMIS II provides everything users need for maximum productivity. Its powerful report writer, relational database and language, full-color business graphics, SAS® interface, and many other capabilities meet the most advanced decision support needs. And, with our new RAMLink, IT series, and RAMIS II/PC software, end users have the ideal solution for mainframes and personal computers.

RAMIS II English comprehension extends the power of your Information Center to a multitude of new computer users. Through advanced knowledge-based technology, even people who've never been on speaking terms with a computer can ask questions, obtain answers, and create reports in only a few minutes using everyday English.

EFFICIENCY AND RELIABILITY FOR SUPPORT STAFF

Our complete solution lets your existing staff support many more users by dramatically reducing the number of products you need. And RAMIS II makes your support job easier with built-in computer-based training plus facilities to monitor and control usage.

RAMIS II delivers the performance and reliability needed to tackle even the largest decision support tasks with confidence. In fact, because RAMIS II is also a complete application development system, single-user systems can evolve smoothly into full-fledged applications.

SAS® is a registered trademark of SAS Institute, Inc.

MATHEMATICA PRODUCTS GROUP
P.O. Box 2392 Princeton, NJ 08540

Please send me a free copy of "Why Information Centers Succeed."

Name
Title
Company
Address
Telephone
Computer Operating System

CW2

RAMIS® II... THE LEADER BY DESIGN

Boston (617) 357-9430 Chicago (312) 670-9710 Dallas (214) 788-1916 Houston (713) 850-0407 Los Angeles (213) 670-6962
New York (212) 935-0977 Princeton (609) 799-2600 San Francisco (415) 461-4305 Washington, DC (202) 484-0702 Basel (061) 429923
Bergen (5) 321350 Buenos Aires (541) 418881 Calgary (403) 290-0444 Heidelberg (06221) 14051 Hong Kong 5-435714
Johannesburg 27 11 788-1680 Kingston (809) 929-7225 London (01) 580 3481 Milan (2) 546-9030 Schaumburg (2) 984788
Ottawa (613) 230-8436 Paris (1) 776 61 71 Rotterdam (2) 31894 Singapore 273 9235 Stockholm 08 520720 Sydney (02) 923 1677
Tel Aviv (052) 78564 Toronto (416) 671-2272

SPECIAL REPORT

Voice/data PBX at core of transparent net

By Tom Rizzo
Special to CW

Change is upon the information management world like a rising tide of never-ending bits and bytes. However, the basic need or premise for the information managers who try to control this seemingly chaotic onslaught remains the same: that is, to determine application needs in order to choose the right information conduit. It's never been more necessary to realize that the application determines the network.

The past several years have seen the coming of word processing, office automation, information centers and personal computers all within the office business environment. This might be called the micro environment pertaining to business information networking.

On the macro scale, we've seen the rapid growth of value-added networks and the emphasis on digital as opposed to analog methods of communication to interconnect various information nodes on a predominantly nationwide business scale.

And now the official breakup of AT&T in the U.S. and the development of national digital networks are leading toward universal information handling.

Specifically, the word processing/office automation arena showed management how information could attain the status of a commodity with intrinsic value. This monetary orientation within this environment is still being developed with the realization that the private branch exchange (PBX) can be used as the controller for office information management.

Information centers served an extremely useful purpose because they began to break down the barriers between word processing and data processing on both the end-user and MIS level. The end user realized he could use a computer, and the computer expert became aware of the business profit-oriented area.

Personal computers now are everywhere and, combined with integrated voice and data PBX, are forming the networking tentacles necessary to exploit a universal and versatile information network.

So what the business world is witnessing is a total entwining of communications and computer technology that embraces the office, the home and the public sector.

Among the various kinds of computers and office equipment available, the telephone instrument or system obviously is the most commonly used apparatus. This being the case, a universal and versatile information network should be developed using this device that could embrace all applications ranging from conventional telephone switching to very high-speed data link categories.

This development has to take place within the micro world of the office environment, or else the macro and universal networks simultaneously being developed will leave this cluster of automation, called the automated office, an isolated island.

Let's concentrate now on this office-oriented telephone environment. If the phone system is to be the information hub, it must handle not only voice, but data, text and image.

This local phone-based network must handle various kinds of communications, each having different traffic characteristics, such as holding time, data transfer rate, protocol conversion, format translation and so on. The local communications network must, therefore, include transmission, switching and data processing technologies.

But the network cannot stop at this point because it must adjust to different end-user-dictated sizes, from a small-scale network in an office building through intrapremises networks to a nationwide or international interpremises network.

Currently, it appears as though no one technology or architecture can do all that is required from the standpoint of technical feasibility and cost-effectiveness to satisfy all network users.

But one thing is becoming exceptionally clear. The integrated voice and data PBX that includes applications software combined with coaxial cable/fiber-optic extension is the foundation, or cornerstone, upon which to build a versatile micro information network that is macro- or wide-area-network-oriented while being universal in scope.

Therefore, the base PBX controller system would accommodate, in reality, three types of internetworking subsystems: the high-transfer 30 bit/sec or more optical fiber loop, the medium-transfer 10M bit/sec or less baseband coaxial cable system as well as the low transfer speed twisted-pair telephone cables that are found in most offices today.

This, coupled with packet-switching techniques and network tandem capabilities, should be what is necessary to form a universal and versatile information network transparent to the end user.

Rizzo is chief executive officer of RPC Systems Integration, a Dallas consulting firm.

CONNEWS.™ THE APPLICATION MENU THAT GIVES YOU THE HOT NEWS AND THE COLD FACTS.

CONNEWS is the user-friendly ACF/VTAM software product that lets 3270 users select from a convenient application menu of view up-to-the-minute information from an electronic bulletin board. No systems modifications are required.

CONNEWS. It's the MENU that really satisfies your taste for applications, and installation NEWS. Some of the more desirable entrees include:

- Customized Company LOGO displays
- Individual MENUs for specific terminal groups
- Terminal ID permanently displayed
- Operator MODIFYable "HOT NEWS" area
- Availability status for menu entries
- 999 page electronic Bulletin Board
- Single or Multi Domain operation

If you want your menu to be easy-to-read, friendly, and highly flexible, CONNEWS is the one for you. Call us today to make a reservation for a FREE TRIAL.

cxi
CXI, Inc.
3606 West Bayshore Road
Palo Alto, California 94303
(415) 424-0700

SPECIAL REPORT

Boston leaning toward broadband cable nets

Could ease daily operations, reduce long-term capital costs

BOSTON — Technology advances over the past 10 years, coupled with the acceptance of CATV, will soon benefit the city of Boston. Broadband-based data communications are being used to alleviate crowded wiring conditions in many of Boston's older buildings, expand data processing services and provide information processing to a growing number of subscribers.

In 1969, then-Mayor Kevin White commissioned a study on the feasibility of CATV for the city of Boston. The commission reported that the technology was not mature enough to serve the city's diverse needs. Ten years later, the mayor commissioned another study, and this time the results were positive.

CATV had been installed successfully in other cities throughout the U.S. The popularity of CATV was enhanced by entrepreneurs like Ted Turner, and technology had been developed to increase the number of channels available to the general public. The available bandwidth for CATV had expanded from less than 300 MHz to over 450 MHz — allowing for an increase of between 30 and 52 new television channels. New applications had been developed that used the same television cable hardware and radio frequency as CATV, but with the added advantage of being designed for two-way data communications rather than video distribution.

Before these developments, most data communications installations were either tied in to twisted-pair IBM. The latter approach, the IBM 3270, consisted of point-to-point connection between 3274 cluster controllers and 3278 baseband coaxial cable. However, a problem occurred because the cable used in these configurations — RG-62 A/U — had a characteristic impedance of 93 ohms, which differed from that used for CATV. Another dilemma was the vast amount of wiring that existed in many of Boston's older buildings, which left no room for additional wiring for new services.

Broadband data communications was looked on as a possible alternative, since the technology was immune to twisted-wire problems such as the difficulty of relocating equipment and susceptibility to electromagnetic and radio frequency interference and ground loop problems. Another favorable aspect of broadband technology was that a single piece of ½-in. coaxial cable was comparable to over 50,000 twisted pairs of wires in terms of capacity.

Until broadband-based data communications began to attract the attention of potential users, the most popular method of sending information from one point to another had been modems. However, that method had no provisions for error detection and correction or circuit switching.

After weighing the possibilities of broadband data communications, the Boston commission gave a positive recommendation of CATV to the mayor. The process of awarding the franchise began, and in 1980, Cablevision Systems Development Co. was selected as the CATV operator for the city of Boston.

Three developments influenced the commission's decision. Digital Equipment Corp., Xerox Corp. and Intel Corp. jointly announced Ethernet, and more importantly, Intel pledged to develop custom-integrated circuits for implementing the access technique known as carrier-sense multiple access with collision detection (CSMA/CD).

A second factor was the development of a reliable, low-cost and frequency-agile broadband-based radio frequency modem by Network Resources Corp. The third factor was the development by Sytek, Inc. of a protocol for a broadband-based, packet-switched network using CSMA/CD as the cable access.

The cable network consists of four separate cable systems: S1, S2, I1 and I2. S1 is the basic CATV video distribution system. S2 is a video distribution system with additional programming and movies for extra fees. I1 is the public institutional system, while I2 is controlled by Cablevision. Both I1 and I2 allow an equal amount of bandwidth distribution in both directions in the same cable. They are also designed to support two-way video and data communications simultaneously. These multiple video channels can be used for different program material, and multiple data channels can be used for different data communications at the same time.

The data communications requirements for the city of Boston began with communications within a building. The typical DP center was provided with emergency standby power, fire extinguishing systems, air conditioning and a series of ducts or wireways that lead to other parts of the building. Some of the problems that could arise range from central processor failure, resulting in loss of processing resources to all users; processor power being used for I/O and communications control instead of a distribution of resources; and space limitations.

Whether the traditional or newer techniques or combinations of both are used, an intelligent communications network can result in significant savings both in daily operations and in long-term capital costs.

Boston's City Hall, an eight-story complex, has a computer room on the first floor that includes an IBM 3033, disk drives, high-speed printers, a 3274 cluster controller and a 3705 communications controller. There is a DEC PDP-11/70 on the seventh floor. Other equipment includes Wang Laboratories, Inc. distributed word processing systems, IBM Displaywriters and several IBM Personal Computers.

Currently, the duct space into the computer room is exhausted, and additional duct space is too expensive.

In addition to supporting intrabuilding data communications requirements, the City Hall DP department is also responsible for support-

See BOSTON SR/90

BURROUGHS USERS
5 UNIQUE DATA COM DEVICES

1 MARS

Peripheral Connections to Poll Select Networks
- Any RS-232 or Parallel Device
- New Xerox 2700 Laser Printer
- 8-20s, Apples, TRS-80s, Word Processors
- Cost Under $400 Per Port for Multiple Devices
- Data Sharing Between Devices
- Optimized Data Com (Compress & Line Activity)

Burroughs Terminal Adaptations
- Mix Sync, Async, and TDI Terminals on Same Line
- Mix Various Speed Terminals on the Same Line
- Message Switch Between Terminals
- Poll/Select Generator (Terminal Tester)

Data Com Configurations
- Secondary asynch network from a sync drop
- Async or Sync Modems on TDI Line
- Multiple Modems on Single TDI Drop

2 S2A
SYNC TDI

SYNC TO TDI conversion with an elastic buffer and RTS/CTS modem control. Handles multiple terminals - Only $895

3 EX-CON
TDI OR RS-232 TDI OR RS-232

TDI LINE EXPANDER AND CONVERTER
- Inexpensive Async RS-232 to TDI conversion and TDI line extender - $195 up

4 DeCAT
TERMINAL TERMINAL TERMINAL TERMINAL

DeCATENATOR a modem Splitter with diagnostics that eliminates terminal dependent concatenation. Operates up to four terminals independently - Only $160

5 TAP
MONITOR PORT
AUXILIARY PORT

TERMINAL ADAPTOR PORT device
- MONITOR PORT permits any Burroughs CRT Terminal to be used as a bi-directional line monitor
- AUXILIARY PORT provides an in house synchronous network drop - Only $325

6 LSD
MODEM MODEM

LINE SHARING DEVICE
- Connect Multiple Modems to the same line adaptor
- Share slave printer among several CRT terminals - $325

For further information, check your preference and return to

COMPUTER PERIPHERAL SYSTEMS, INC.
P.O. Box 29262
Atlanta, Georgia 30329
(404) 289-0065

NOW YOUR APPLE® CAN HOOK TO ANY MAINFRAME.

Apple is a registered trademark of Apple Computer, Inc. CP/M is a registered trademark of Digital Research, Inc.

If you have an Apple II, Apple II Plus, or Apple IIe, we have good news for you. Now there's an inexpensive software program that can turn your Apple into a much more valuable tool.

Softerm 2 connects you with your company's computer.

Softerm 2 lets you gain access to the information stored in your company's main computer from your home or office in any format you choose—DOS, CP/M, or Pascal.

Also included is a source program for your host computer to ensure compatibility with Softerm's file transfer capabilities. Other features include user-defined keyboard macros, built-in phone book for automatic dialing, terminal mode line capture simultaneously to print or disk, copy screen to print or disk, and terminal status display.

Makes your Apple work smartly like any major terminal.

Softerm 2 provides complete emulation of these terminals: ADDS Regent 20, 25, 40, 60; ADDS Viewpoint; Data General D200; Datapoint 3601; DEC VT102, VT52; Hazeltine 1400, 1410, 1500, 1520; Hewlett-Packard 2622A; Honeywell VIP7205, VIP7801, VIP7803; IBM 3101 Model 10 and 20; Lear Siegler ADM-3A, ADM-5; and TeleVideo 910, 925, 950.

Free update service.

We make improvements available to you free. To update your program, just dial our computer and transfer the improvements to your disk.

Now low price.

Softerm 2 is only $195, and it's available now from dealers or Softronics, Inc. For more information or to order, call today.

SOFTRONICS

3639 New Getwell Road, Suite 10, Memphis, Tennessee 38118, (901) 363-8850

WHEN THERE'S NO CHOOSING, CHOOSE ICOT.

More personal computers. More workstations. More remote locations.

Everyone seems to be demanding *more* of your 3270 network. And management says, "Do it—but do it for less."

It's a tough spot to be in, unless you know about ICOT's Virtual Terminal System™ protocol converters. In place in your network, they deliver the compatibility everyone wants and the economy and flexibility you need.

You can make inexpensive asynchronous terminals and printers compatible with your BSC or SNA/SDLC network. A single terminal can access multiple applications and multiple hosts. And personal computers can be included easily in your network. All without expensive software modifications.

You have the flexibility of either dial-up or leased-line communications, letting you choose the option that's least expensive for your situation. Plus the option of adding ICOT's value-enhanced 3270 lookalike terminals.

It can all be done easily. Economically. With a built-in flexibility that makes future expansion fast and simple.

And when you use ICOT's protocol converters, we back them up with our expert installation, service and engineering support.

Now you don't have to choose between expansion and economy. Just choose ICOT. To find out more about the ICOT Virtual Terminal System, call or write:

ICOT Corporation
830 Maude Avenue, P.O. Box 7248
Mountain View, CA 94039
(415) 964-4635
TWX 910-379-6479

SPECIAL REPORT

Moving firm 'relocates' with distributed DP

GLENDALE, Calif. — With nearly 100 years experience, the Bekins Co. based here is one of the oldest moving companies in the U.S. In the late 1970s, when the company decided to change its method of centralized bookkeeping and recordkeeping, it chose to move some of the processes out to field locations, using a technique that had recently come of age — dispersed data processing.

Bekins is one of the world's largest local, long-distance and intrastate moving and storage firms. Services include the transportation and warehousing of household goods, office and industrial equipment, electronics, business records and air freight forwarding.

Management of these businesses — subsidiary companies that generate $325 million in revenues annually — requires extensive accounting procedures including accounts payable, accounts receivable and general ledger. Bekins uses dispersed data processing to collect the necessary information from its 150 locations across the country.

"When we first started using automated data processing in the early 1970s, we had two computer sites, one in Chicago and one on the West Coast," said Robert Forstrom, MIS vice-president. "It was a classic situation of central sites serving subsidiaries from each city. The data processing was later consolidated in Glendale, where data was entered interactively or on-line batch to an IBM mainframe from information supplied by the subsidiaries."

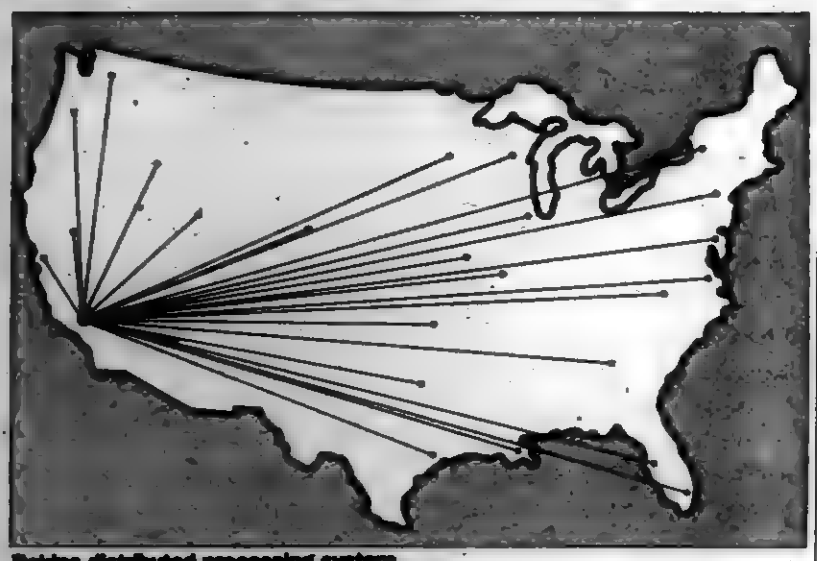
During the mid-1970s, Bekins acquired a number of other companies. "Some had their own computer systems," Forstrom continued. "Others were using service bureaus for data processing. It became apparent that Bekins would have to standardize its operations and move data processing out to the field locations. Even though we wanted to give the field that control, the cost of on-line processing from various locations was high."

Bekins' various locations today include 40 company-owned offices and 350 independent U.S. agents. Of this total, 150 now have dispersed data processing equipment in offices across the country supplied by Datapoint Corp. The Datapoint Small Business Computer systems, which consist of a desktop microcomputer, 64K bytes of memory, a 2M-byte diskette drive and a communications interface for each system, collect and process data which is later transmitted via GTE Telenet Communications Corp.'s Telenet to the Bekins IBM mainframe here.

"At first we weren't sure if we should keep the data processing centralized, regionalize it or totally disperse it. We knew we had to satisfy the needs of the smaller subsidiaries, allowing them to do some basic financial processing. Yet we wanted to keep a large mainframe in Glendale to consolidate the accounting, payroll and business data the subsidiaries would generate," Forstrom said.

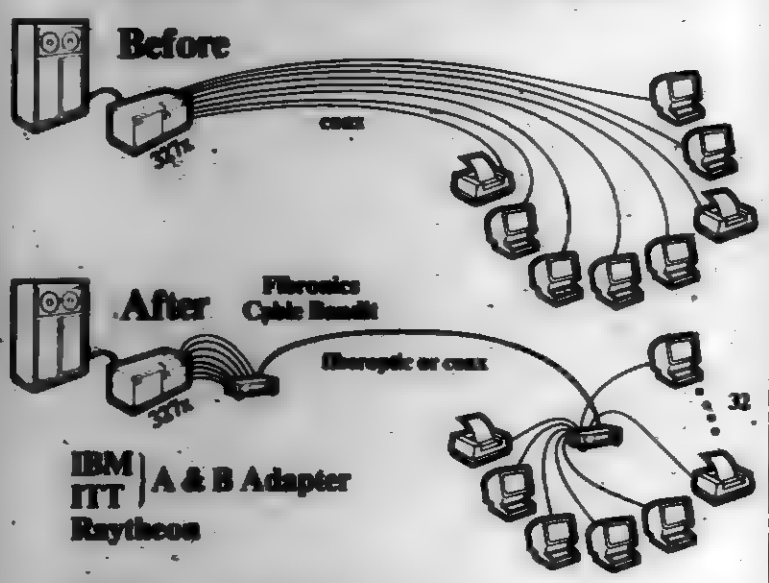
"A larger problem was this: How do we collect the resultant data concurrently from 150 locations across

See BEKINS SR/60



Bekins distributed processing system

IBM® 3270 Users.



fibronics International Inc.
fiberoptic communications
218 West Main Street • Hyannis, MA 02601 • (617) 778-0700 • Telex 951297

3725's, 3705's Terminals . . . Centron DPL Leases from the Front End Out.

We understand the value of a flexible lease to accommodate your changing environment. Centron DPL offers tailored lease terms with professional support.

- Highly Flexible Leases
- Upgrade and Feature Inventories
- Customer Engineers
- Tax-Exempt Finance Programs

Lease your network hardware from the company that understands communications.

Centron DPL Company
7480 West 78th Street
Minneapolis, Minnesota 55435
612/944-9161

Talk with us about your other IBM hardware needs.

miLINK

BEKINS from SR/58

the country (including our offices and a portion of the 350 agents we had at the time)?" Forstrom continued.

Decentralizing the data processing operations was selected for two main reasons. It avoided the time delay caused by sending paper through the mail, and it gave the subsidiary offices more control over their data.

"Each business is a profit center that can generate more profit by controlling its costs. Using distributed computers has saved Bekins more than half a million dollars in costs," Forstrom said.

"The offices with Datapoint computers can dial up Glendale at any time. The dial-up and batch transmission features were part of the cost justification for buying Datapoint equipment.

"In the past, the offices had hard-copy terminals. When they were ready to send data to Glendale, they dialed the number and then began to key data. We were paying connect charges all the time. Now the offices key in the data off-line and then batch it all to Glendale," he said.

An automatic process takes over on an IBM host here. Forstrom explained that the transmission causes data to be stored on disk for the host to process overnight. The result is billing and accounting for each Bekins service, including general ledger and payroll.

The types of applications Bekins is developing are as diverse as Bekins' services.

One universal application Bekins runs is its interstate on-line scheduling and dispatch system for management of a nationwide fleet of household moving trucks. Forstrom reported that 90% of the Datapoint processors installed across the U.S. enter data into that system.

Four Bekins staff programmers developed all the software, using the Dataprints business programming language. Bekins also designed an applications generator program for systems development using a small Datapoint Attached Resource Computer local-area network, which allows up to 255 processors to share the same disk files and other peripherals.

Bekins has a technical services group that is responsible for training and installation. The first 50 Datapoint sites were installed by two Bekins technical representatives who personally delivered most of the computers during a cross-country tour.

Training was done at the site on the actual computer that would be used. As more applications are developed, training continues to be done on site. The majority of users are clerical personnel.

BOSTON from SR/56

ing remote, off-site data processing. In-house processors are used with off-site terminal equipment connected via telephone lines on a dial-up basis. The existing phone users include the public school system, the police department and the fire department. These telephone lines dump into the 3705. The primary application is administration, but some of the resources are used by the school system for teaching.

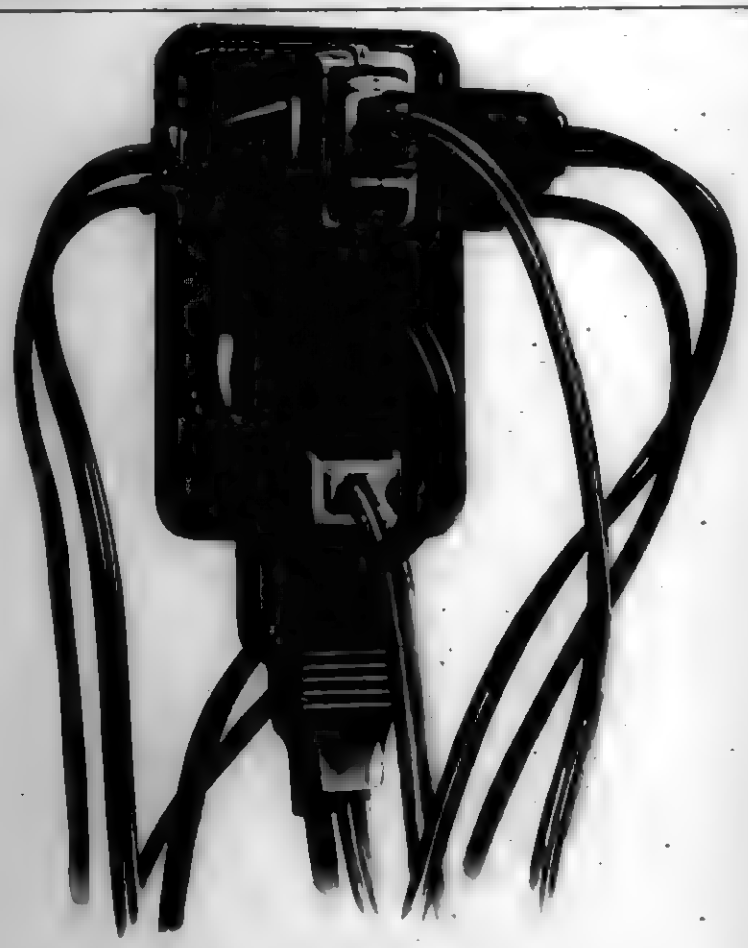
This alone is not enough to justify the installation of broadband-based local-area network technology. The reasons behind Boston's decision also include the following: Broadband supports multiple users; the technology is vendor-independent; the capacity of a single coaxial wire is enough to replace 50,000 twisted-wire pairs, relieving duct space crowding and allowing for future expansion of broadband wiring.

Boston is currently evaluating Localnet 20, a broadband-based data communications system manufactured by Sytek. It is expected to save money for the city on modem rental charges, remove the modem bottleneck and allow any authorized user access to the resources of the local-area-network-based system.

The manager of information systems planning for the city of Boston, Jerrold Patz, developed an application for accessing the IBM system. Rather than use an IBM 3270 display station, which must be directly connected to a 3274 control unit with dedicated point-to-point wiring and cannot be used with any other system, he is replacing the 3278s with dumb teletypewriter-type Ascii asynchronous terminals that have 3278-like keyboards. He has attached a protocol converter to one port of the 3705 via RS-232, through which up to 24 users can be served.

Current applications include IBM's TSO and CICS. The same terminal can be used to access the PDP-11/70 on the seventh floor. The dumb terminal approach costs approximately $1,000 for each terminal — compared with the $4,000 price tag for the 3278s. The existing 3278 terminals are leased, so removing them will save the city approximately $3,000 per terminal. The elimination of the 3278s also means that a 3274 is no longer needed and no additional wiring is needed.

The final step after City Hall has proven the technology and demonstrated the methodology of broadband-based data communications is for Cablevision to offer data communications on the commercial and institutional cable system, I2.



Pull the plug on your inefficient data communications. We can help.

Many data communications networks, perhaps yours included, have grown in the same add-on way as this common octopus plug arrangement. Yes, it works. But it contains many built-in risks and could ultimately let you down.

The time is right for you to take a careful look at how General DataComm can streamline and improve your data communications, and save you money at the same time.

Here's how.

Since we are a full-line data communications manufacturer, everything from modems and multiplexers to network management systems and service support, we can design a complete system for your company. It will not only work better but save line costs, too.

When we install a system it not only means higher efficiency now but it will expand easily to meet your needs tomorrow.

Tie your network together.

Our true systems approach also helps eliminate compatibility problems. Since we design and manufacture the full product range, you can be sure everything will always work in harmony.

Put our experience to work for you, especially now in the new divested telecommunications environment.

For a free brochure detailing our approach and product range call or write to General DataComm Industries Inc., One Kennedy Avenue, Danbury, CT. 06810. (203) 797-0711.

General DataComm

We're the full line data communications company.

The Data Movers

SPECIAL **REPORT**

College nets must keep pace with info needs

By Albert L. Harris
Special to CW:

The influx of networks into the college and university environment is beginning to accelerate. Several schools have taken an evolutionary approach to the opportunity afforded by this capability. Networks are not just for students, but rather a tool for the entire institution, especially faculty and staff.

Demand and reliance on computer resources at every college and university are at an all-time high — and increasing. Most students expect computer training as part of their education. It has not stopped at the student level either.

To keep pace with the students, most members of the faculty are requiring access to computer resources. To keep up with the faculty, the staff is demanding access to the latest in technology. As needs increase, networks are providing the solution.

College networks are being created to meet the needs of institutions with a large number of terminals and microcomputers. They also must meet the communications needs of such environments. Two types of networks are being used and developed. Neither type is fully developed to allow users maximum use of the resource. The two types are microcomputer networks and mainframe-based networks.

Microcomputer networks are communications links that connect large numbers of microcomputers and other peripherals and storage equipment. They usually include communications (networking) cards, containing communications software used to control the entire network; storage devices, including Winchester disks, cartridge tape and floppy disks; and printers, plotters and other hard-copy media.

When part of microcomputer networks, individual microcomputers do not have to have a floppy or hard disk capability. This allows colleges to keep the costs of microcomputer networks low. Program and data libraries are maintained on the system's disk storage. Peripheral and storage devices can either be dedicated to one user or be used as system resources.

Currently, microcomputer networks are being used by several colleges for instructional use. Some schools are also using this concept for administrative data processing. The concept requires a substantial communications network.

The advantages of the microcomputer network in a college environment include low initial cost, centralized data storage and unlimited expansion. The disadvantages of this approach include limited disk capacity and limited vendor support.

Mainframe-based networks rely heavily on the central computing capability or on another central processor. Here, the mainframe acts as the system controller and data manager. Access on mainframe-based networks in colleges is through hardwired terminals and dial-up capabilities. If a user operates a microcomputer, it usually acts like a dumb terminal.

The ultimate capability is for the microcomputer to be able to access data as stored on the mainframe's disk and use its microcomputer capabilities to execute the programs and manipulate the data.

In this manner, the host mainframe and the users' microcomputers can access the data, given the proper security, as if it were a standard file. This type of network capability would allow colleges and universities to maximize the capabilities of both the mainframe and the microcomputer.

The advantages of this type of network in a college environment are centralized storage and control and data compatibility and accessibility. The disadvantages of the mainframe-based network are cost and the fact that different mainframe manufacturers maintain different communications standards.

Several colleges and universities are approaching the solution from a mainframe-based network. These schools are generally setting the standards or dictating the microcomputer that will be used to reduce communications protocol and data storage incompatibilities. Usually, the standard revolves around the mainframe manufacturer's network software packages and capabilities.

Networks are needed to support the college environment in three important application areas. These are: office automation, faculty needs and staff requirements.

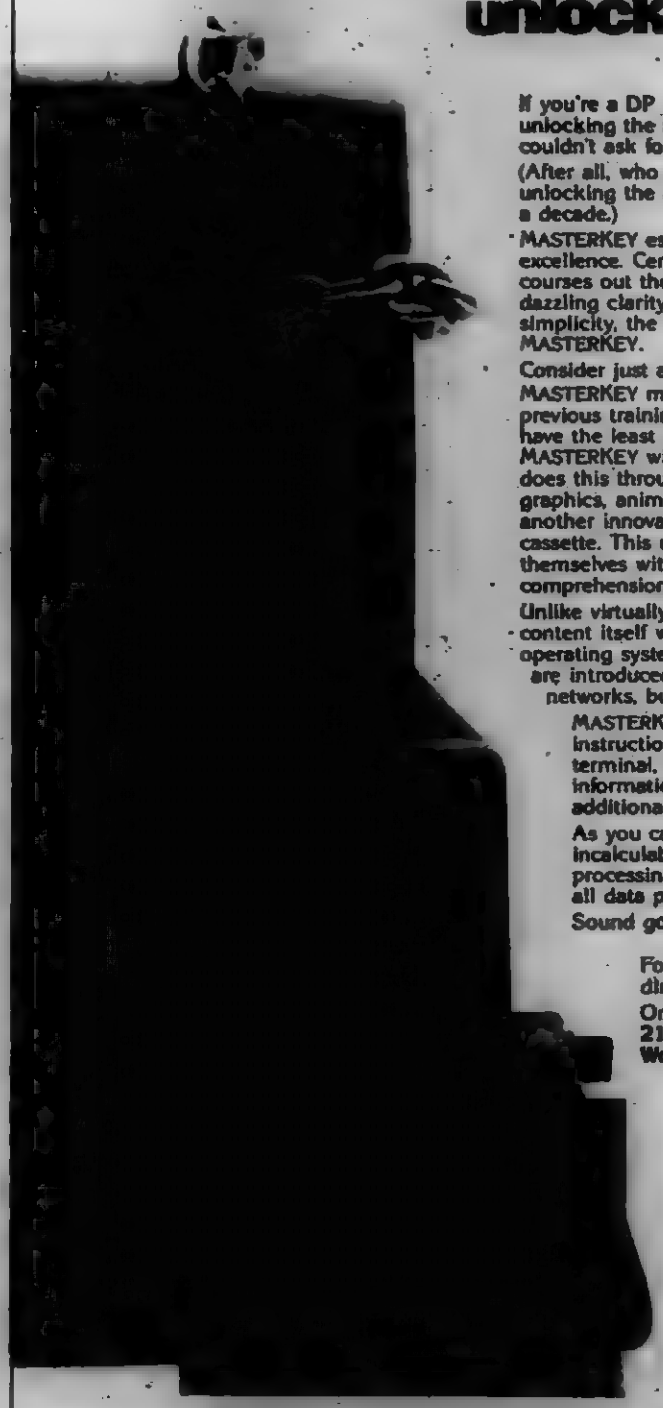
Office automation is usually the first application that is implemented on a network basis. Office automation includes access to information, communications, document generation, personal computing and personal management. Office automation functions are usually justified through an increase in productivity.

Access to accurate and timely information is one of the primary advantages of the network concept. By creating networks, individual users

See PAGE 39/62

ATS introduces MASTERKEY.

The ultimate way to unlock the mysteries.



If you're a DP Manager, you know that when it comes to unlocking the mysteries of the IBM® PC for your people, you couldn't ask for a more brilliant source than ATS.

(After all, who has more experience than we do? We've been unlocking the mysteries of computers for more than a decade.)

MASTERKEY establishes a whole new standard of tutorial excellence. Certainly, there are other good IBM PC teaching courses out there. Yet none combines in one package, the dazzling clarity, the building block by building block simplicity, the sweeping, comprehensive range of MASTERKEY.

Consider just a few of its advantages:

MASTERKEY makes learning a snap for anyone. It requires no previous training whatsoever — even for those who seem to have the least aptitude. In astonishingly little time, MASTERKEY will give them a solid grasp of the IBM PC. It does this through an extraordinary combination of powerful graphics, animation and sound. MASTERKEY also boasts another innovation: an interactive but separate audio cassette. This unique concept allows students to pace themselves with far greater ease, thereby making comprehension practically effortless.

Unlike virtually every other course, MASTERKEY doesn't content itself with just teaching the keyboard and the operating system. It goes well beyond that. Students are introduced to word processing, communications networks, business graphics and spreadsheets.

MASTERKEY leaves nothing unexplored. It offers full instruction on how to use the IBM PC as a smart terminal, and how to access, retrieve and store information from S/34-38. It even advises you on what additional software you may need.

As you can see, MASTERKEY is a tool of incalculable value. It enables you and your data processing department to take firm control over all data processing functions.

Sound good?

For more information — or to order MASTERKEY directly — simply call the number below.

Or write to: Automated Training Systems
21250 Califa Street, Suite 107
Woodland Hills, California 91367

Toll Free 800-423-5206
In California call (818) 999-5753

MASTERKEY
FROM ATS

CANADA 1-800-668-5333 • In BC & Parts of SASK: 112-800-668-5333 • UNITED KINGDOM (01) 241-5565

SPECIAL **REPORT**

The use of networks in colleges and universities has come a long way since the days of traditional data processing. Because of their potential in everyday college life, networks are here to stay. It is incumbent upon colleges and universities to take the lead in the use of networks.

PACE from SR/61

will have access to the needed information in an understandable format.

Document generation includes word or text processing, but goes far beyond the simple clerical tasks most people think of today. Professional faculty and staff will find it easy to input text, especially internal documents, access student papers and information and create research papers.

Faculty needs are the second set of applications that should be a part of the college network. Faculty applications include the availability of office automation tools, support for research and tools for increasing teacher productivity. Faculty will use many of the applications available.

Support for research will include the technical, data gathering and data storage and handling needs to support the research efforts of faculty members. Statistical packages must be a part of the network. Microcomputers will be a big aid in supporting the data handling and minipulation needs of research.

Finally, tools for increasing teacher productivity will be part of the college or university network. Examples of faculty tools are computer-aided instruction and computer-managed instruction. Tools must be available to assist individual faculty members to create automated teaching aids and assist in grade retention, filing and computation and recordkeeping and reporting. Use of the college network will mean all faculty members access and use the same data bases and programs to increase consistency in recordkeeping tasks.

The final focus will be on staff requirements. Areas such as institution research, decision support, alumni and development and job placement are just a few examples. Many of these applications are computerised now, but their inclusion in the network will enhance their usefullness. As with the other applications, access to college or university data will expand the ability to perform these tasks.

The use of networks in colleges and universities has come a long way since the days of traditional data processing. There are more improvements to come. Because of their potential in everyday college life, networks are here to stay. It is incumbent upon colleges and universities to take the lead in the use of networks.

All the tools, however, are not available now. We are on the verge of technological breakthroughs to allow maximum use of the networked environment. Common data and programs and the communications link between microcomputers and possibly one or more mainframes provide the real advantages of networks.

There will be problems, but those problems will lead to opportunities and those opportunities to innovation. Colleges and universities must keep pace with industry in the area of network systems to prepare students better.

Industry is marching toward communications networks that will link managers' and professionals' microcomputers to each other and to the corporate data bases. Toward that end, networks must go to college if colleges are to be the training grounds for the next generation of information users.

Harris is president of Management/Systems Advisors, Inc., an Atlanta-based firm specializing in university DP planning, acquisition and usage.

...It will be a lot tougher to copy our performance

In 1980 when Tandberg Data introduced the TDV 2200 family, they were the first and only terminals in the world meeting the stringent specifications of the 1985 German Ergonomic Standard... a standard set to protect the safety, health and comfort of the operator. The TDV 2200 includes such features as tilt, swivel, height adjustment, ultra-low profile, detachable keyboard for comfort of operation, non-reflective surfaces, and anti-reflex tube for screen clarity. Since its introduction and as a testimonial to its innovative design, over 50,000 units have been installed. Today, there are a lot of "me-too" terminal manufacturers who have tried to copy our ergonomic design and that's certainly a plus for the industry. But, with our new TDV 2200S, an even improved version, it will be a lot tougher to copy our performance.

The TDV 2200S can emulate virtually any popular terminal and protocol. It can be equipped with up to 56k bytes of memory and some models will store up to eight pages of data. It has superb communications capabilities including networking; up to 1024 different characters in a single terminal; optional high resolution business graphics; a 70Hz refresh rate for flicker-free viewing; and a 15" screen and big letters for easy readability.

Like its predecessor, the TDV 2200S also features sixteen soft switches called PUSH keys that recall previously stored words, phrases or code sequences; a simplified menu protocol that cuts set-up time in half; and character, page, block or line/field transmission. No other terminal on the market today can match all of these features. But, they are probably trying.

So, you can wait while they try to catch up with us, or you can go with the terminal that sets the pace for the industry. Tandberg Data, Inc., P.O. Box 99, Labriola Court, Armonk, N.Y. 10504. Phone: (914) 273-6400. Telex: 137357 Tanberg Amk.

TANDBERG DATA

Tandberg Data, Inc.

SPECIAL REPORT

Multinational turns from 10 vendors to one

MEMPHIS — In mid-1981, the International Consumer Products Division (ICPD) of Schering-Plough Corp., based here, determined that its 10-vendor computer environment (and spiraling information systems costs) needed to be replaced with a systems architecture that would better meet the present and future needs of ICPD, a division with international operations scattered worldwide. Schering-Plough is a diversified manufacturer of pharmaceuticals and consumer products, including Coppertone suntan lotion and St. Joseph's aspirin.

The plan would necessitate a complete revamping of all computer application systems and a retraining of all systems personnel.

In addition to high systems costs, ICPD had no ability to share resources, to have cooperative systems development projects or to implement a cost-effective communications facility, due to the 10-vendor environment. As a result, costs were increasing, efforts were duplicated, productivity was low, and there was little systems documentation.

It was the spiraling costs that prompted ICPD to look closely at its worldwide systems situation. Also, the division realized that worldwide communications networking would eventually be a necessity, and that a standard architecture would be a tremendous asset in making such a network a reality. The general inaccessibility of computerized data — along with the cumbersome means by which key operating data was being sent into ICPD (Telex, followed by a labor-intensive rekeying effort) — simply dictated that the entire situation be reviewed.

Two major efforts

So, there were two major efforts that were put on the drawing board: a project to standardize computer hardware and software and a project to provide access to computer systems and data bases on a worldwide basis. The computer hardware chosen for the majority of ICPD's sites was the IBM System/38, with the System/34 and System/36 designated for the smaller ICPD businesses.

The system packages chosen included the McCormack & Dodge Corp. G/L system; IBM's DMS/38 customer service applications (order entry, receivables, sales reporting); and Arthur Andersen & Co.'s Mac-Pac manufacturing system.

As the division headquarters' financial reporting requirements increased fivefold, an IBM System/38 was implemented. This System/38 served not only as a vehicle for customizing the above packages for the division's offshore sites, but also as the financial consolidation and planning system for ICPD staff-level personnel.

Since beginning the computer hardware standardization project in mid-1981, ICPD has installed System/38 computers in Memphis; Toronto; Grosspetersdorf, Austria; Dusseldorf, West Germany; Caracas, Venezuela; London; and Basel, Switzerland. It has also installed System/34 computers in Sydney, Australia, and Johannesburg, South Africa.

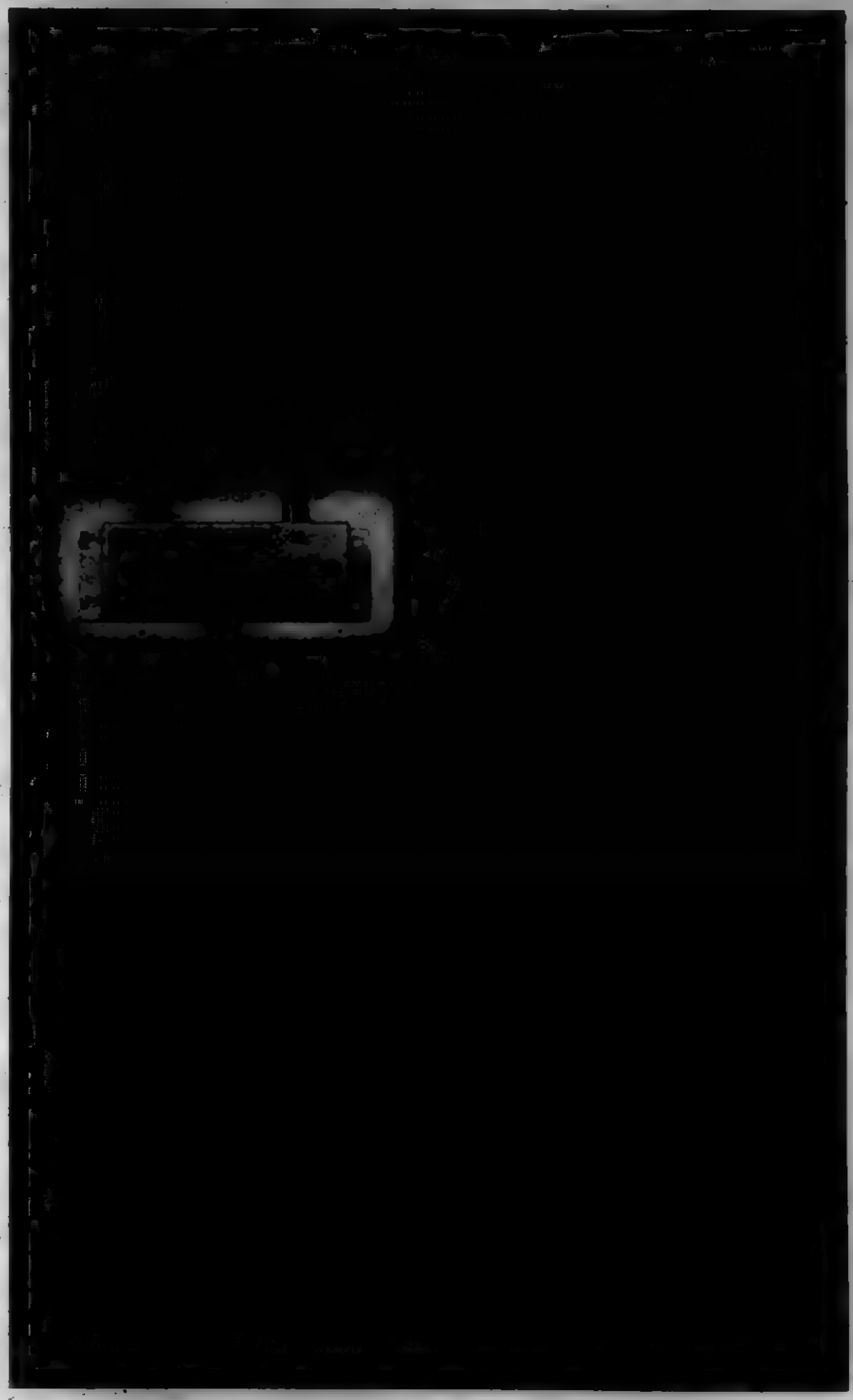
ICPD has assisted four of its smaller businesses in their transition to the world of automation via outside DP service bureaus. It has scheduled System/38 installations for Stockholm, Mexico City, Frankfurt and Paris over the next 12 months, and another six international installations have been scheduled for 1985. By the end of 1983, ICPD had reduced worldwide information systems staffing by 32%, and had provided 1982-1983 accumulated cost savings of $1.27 million in the information systems functions alone.

While the overall divisional systems architectural direction and the selection of the System/38 were originated by the ICPD staff, each business unit information systems group provided the "horsepower" needed during the implementation/conversion process.

Not only did costs come down, but the quality of the divisionwide information systems functions (as well as the applications systems) increased dramatically, and cost benefits began to accrue in areas other than information systems. Substantial cost reductions, totaling hundreds of thousands of dollars, have been targeted divisionwide in general administrative areas and in manufacturing/inventory areas.

In response to the problem of not being able to get subsidiary data effectively and efficiently into the ICPD system, an IBM Series/1 communications minicomputer was installed to act as a front-end system to the System/38 general-purpose computer.

Via a Series/1 software package, Systar Corp.'s Gateway, the Tymnet, Inc. international packet-switch communications network and an IBM 3101 CRT, to be located at each offshore subsidiary, each of the business units will have access to the Memphis-based host in an on-line mode for the purpose of inputting financial, operating and planning data.



SPECIAL REPORT

Firm's local net yields unexpected benefits

FRIDLEY, Minn. — Although a manufacturing firm here is still in the early growth stages of its local network, a number of unanticipated benefits have been realized.

The standardization of terminals, printers and modems on the network has allowed the firm to leverage buying power through large-scale purchases, but has not forced it to rely on a given manufacturer or type of device.

The company — Medtronic, Inc. — is a manufacturer of implantable medical devices. The largest manufacturing site and the location of the corporate MIS function is the Rice Creek facility in this Minneapolis suburb. The facility consists of three buildings connected physically by a tunnel and a skyway.

A single terminal connected to a network interface unit has access to many different processors, from micros to mainframes. Cabling requirements have been considerably simplified and standardized.

Medtronic's central data processing configuration consists of a Sperry Corp. mainframe, a Prime Computer, Inc. supermini and an IBM System/38. Medtronic also supports some two dozen IBM System/34s and 36s distributed worldwide at remote manufacturing and sales sites and linked to the central Sperry by a batch communications network on dial-up phone lines.

During the construction of the newest building and the skyway, a dual broadband coaxial cable was installed in parallel throughout the facility. Although one cable is used primarily for video and audio and the other for data, they differ only in the location of taps, so that either cable can be used simultaneously for both data and video, thus providing a measure of backup redundancy.

The Sperry and Prime machines first made use of the cable for workstation support through radio frequency modems and multiplexers. Before a true local-area network area utilizing general-purpose gateways to the transmission medium could be implemented, a measure of peripheral standardization had to be achieved since the Sperry and IBM processors each use their own incompatible synchronous protocol and the Prime communicates asynchronously.

Asynchronous peripherals were chosen for their low cost and superior compatibility with different network architectures, which necessitated protocol conversion for the synchronous Sperry and IBM processors. After considerable research and testing, a Kanfman Research Manufacturing, Inc. converter was chosen for the Sperry and a Perle Systems Ltd. for the IBM machines.

For compatibility with the protocol converters and wide market selection, the Digital Equipment Corp. TE100 terminal protocol was chosen as the network standard. However, the nature of the network is such that a wide variety of asynchronous devices are easily supported.

To provide the general-purpose gateways to the network, 3M Corp.'s LAN/1 network interface unit was chosen. The ultimate architecture of the network is a logical token-passing ring imposed on the physical bus structure of the cable, with more than enough bandwidth.

There were a number of unanticipated benefits in some formerly unrelated areas of the operations, many of which grow out of novel combinations of hardware made possible by the peripheral standardization realized as a part of network implementation.

Annual seminars

Once a year the central MIS groups present a week-long seminar for the Medtronic worldwide data processing community to chart a course for the coming year and to promote a face-to-face interchange of ideas.

Since the broadband cable system is available in the meeting rooms that were used for the presentations, the data processing resources of the entire Rice Creek installation were available.

One of the talks was concerned with the IBM System/36, and the speaker was able to illustrate some points by signing on to the machine in the data center.

Rather than using a standard terminal, however, the company used an IBM Personal Computer running a terminal emulation program. The Personal Computer's video output was used to drive three large-screen projector TV sets so that everyone in the room was able to see the examples easily.

The Personal Computer was also used as a presentation device in lieu of a standard slide or overhead projector, again displaying the images on the large-screen TVs.

A second interesting application for data transmission and peripheral interconnection is computer-aided education. Various departments within MIS give classes on the different hardware and software tools available within the company.

Typically these have consisted of lectures given in a classroom equipped with an overhead projector, followed by hands-on sessions at whatever terminals happen to be free, as the instructor tries to keep track of where the students are and vice versa. By placing a network interface unit and a protocol converter in the classroom, giving the instructor a Personal Computer connected to a large-screen TV and each student a terminal, lecture and lab can be combined and questions and answers shared.

A general-purpose, multifunctional network can provide far more than simple computer connectivity and peripheral sharing. It can lead to new connections between formerly unrelated areas of the company. The network can also be fertile ground for the germination of ideas.

Medtronic has done some initial experiments with combined video and data video cassette recorder-based computer education. It is possible to distribute data processing into the homes of employees using inexpensive equipment and dial-up phone links.

Its sites worldwide are making use of the protocol conversion lessons that were learned during the network installation. And the network continues to grow and suggest new uses for itself.

The Solution.

Dial-Up 3270

LineMaster An intelligent device for dial-in access to your mainframe 3270 Bisync line. **LineMaster** is a communications watchdog which keeps a line in service until a user dials in.

- For any remote 3271/4/6 line—up to 19.2K baud.
- Compatible with any 3270 BiSync emulator including microcomputers.
- Connects between modem and mainframe.
- Installs in minutes.

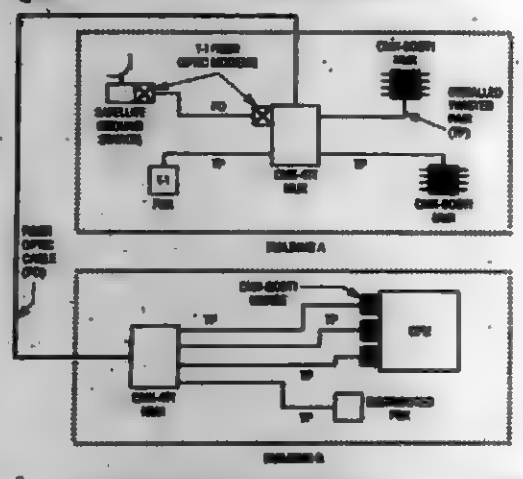
$639.

MF

Microframe, Inc.
205 Livingston Avenue
New Brunswick, NJ 08901
(201) 828-4499

Connectivity.

NOW! Use your existing twisted pairs. Combine with fiber optic cable between buildings. Compatible with the T-1 industry standard.



Please Call or Write Today for Details.

CANOGA DATA SYSTEMS
21918 VANOWEN ST • CANOGA PARK, CA 91303-2880 • 818/888-3308

IDS

The UNIX™ Systems Specialists
Custom Configured Host Systems

PYRAMID 90x CONVERGENT MEGAFRAME DEC VAX

Offload your CPU with Workstations!

CONVERGENT WORKSTATIONS — MS DOS, CTOS, CPM or XENIX
IBM PC/XT — PC DOS or UNIX Port

Communications Software upload/download to host

NETWORKING

Host Host Workstation Workstation

international data services, inc.
2231 Calle de Luna
Santa Clara, Ca. 95050
(408) 986-1972

UNIX is a trademark of Bell Laboratories

SYSTEMS & PERIPHERALS

Whatever happened to IBM's FBA?

By Tom Henkel
CW Staff

Shortly after it announced its long-awaited 4300 series of processors in late 1979, IBM dropped another bombshell on the computer industry. This time it was a new way of storing data in disk drives.

Fixed block architecture (FBA) differs from the traditional count key data (CKD) storage format in that it divides the memory tracks on disk drives into 512-byte blocks. While FBA does not give users the freedom to decide where on a disk platter information will be stored, many industry watchers feel that in the long run, FBA is more efficient than CKD because it greatly reduces the amount of disk space used for internal housekeeping functions.

When FBA — and the 3370 disk drive with which it was introduced — was announced in 1980, many industry watchers said IBM had created a new standard for data storage. But now, more than four years later, IBM has done relatively little to bolster the technology. In fact, the two big system disk drives announced since the 3370 — the 3375 and the 3380 — use the CKD format.

IBM statement in support of FBA

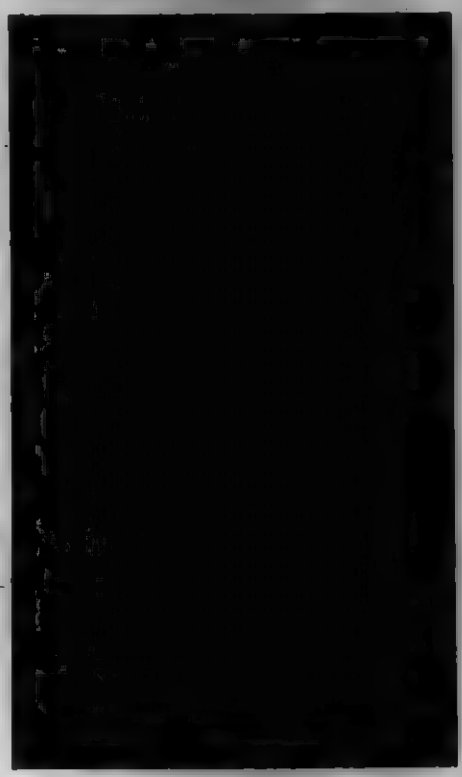
Perhaps the only strong statement IBM has made in support of FBA came last September, when it announced four enhancements to the 3370 line [CW, Sept 19]. The enhancements boosted the maximum capacity of a 3370 drive by 27% to a maximum of 730M bytes.

But nearly a year before that announcement, back in October of 1982, IBM had announced a no-charge feature for the 3310 and 3370 drives which appeared to offer users a migration path away from the FBA format and back to the CKD format [CW, Oct. 25, 1982]. The option allowed FBA drives to emulate the CKD formats on the larger IBM drives.

An IBM spokeswoman said IBM still considers FBA a viable part of its product line, but she would not elaborate on IBM's future plans for the recording technique.

Fred Moore, manager of corporate systems engineering for competitor Storage Technology Corp., said that to date FBA has not been one of IBM's more popular items. In fact, according to Moore, a lack of demand for FBA devices prompted STC to stop production of its IBM-compatible 3370 look-alike, the 8870.

Currently, Memorex Corp. is the only compatible peripheral manufacturer making a 3370-compatible product (its 3690). Control Data Corp., the third major vendor of IBM-compatible peripherals, never offered a 3370-compatible disk drive.



However, STC's Moore contends that FBA is not dead, but merely resting up for another grand appearance — possibly later this year in the form of a new top-of-the-line disk drive. It was the timing of the 1980 FBA announcement and not the concept itself that contributed to whatever acceptance problems IBM may be having with the storage format, he maintained.

Moore explained that storing data in the FBA format requires users to convert from a CKD environment. How difficult and how expensive that conversion is depends on several factors, such as the amount of data that has to be converted.

In general, however, the conversion tends to be fairly easy for users of IBM's Vsam, Moore said. For users of other IBM access methods, the conversion is much more difficult.

Moore pointed out that there are many more Vsam users today than in 1980, when FBA came out, so the market may be ripe for an FBA revival.

Jeoff Seabrook, director of marketing for Memorex, thinks the FBA revival is already here. Like STC, Memorex decided to get out of the 3370 market, but the firm's international divisions insisted it continue to market the 3690.

"That proved to be one of the more fortunate decisions we've made," Seabrook said, predicting that Memorex could probably sell twice as many 3690 drives as it can produce.

"The market seems to be getting stronger and stronger," he added, noting that sales of 3370-compatible devices are outstripping sales of 3375-compatible products by 4:1. "It's a nonglamorous product, but we're making a lot of money."

With many IBM watchers predicting that the company will announce a larger capacity version of its top-of-the-line 3380 disk drive (currently a CKD device), STC's Moore said a double-density or quad-density 3380 drive would be an ideal way for

See FBA page 78

INSIDE

Turnkey Systems/74
Processors/76
Data Storage/76
Printers/Plotters/77
Graphics Systems/77
Power Supplies/77
Board-Level Devices/78
Auxiliary Equipment/80

Harris to offer gallium arsenide-based circuits

MILPITAS, Calif. — Harris Microwave Semiconductor, Inc., a division of Harris Corp., claimed to be the first semiconductor house to offer commercially available circuits based on gallium arsenide technology.

The firm announced two products that are said to be five times faster than similar circuits based on conventional silicon technology: a universal shift register and a binary counter. The firm expects the strongest appeal for devices from developers of very high-speed signal processing, test instrumentation, computing and telecommunications applications, Harris said.

The gallium arsenide circuits are available immediately and cost about $325 each in quantities of 100. The spokesman said similar silicon-based devices cost between $20 and $40 each; however, they are not as fast as the gallium arsenide units.

Harris Microwave Semiconductor is located at 1530 McCarthy Blvd., Milpitas, Calif. 95035.

Calma introduces workstation based on Apollo CPUs

SANTA CLARA, Calif — Calma Corp. has introduced a workstation for the design, analysis and simulation of digital electronic circuits and components.

Called Tegastation, the product is based on 32-bit Apollo Computer Corp. nodal processors that use Apollo's Domain local-area network, a spokesman for the company said.

Tegastation features the following software:

- Taskmaster — an interactive graphics editor for constructing schematics for a variety of design uses, including printed-circuit boards and integrated circuit designs.
- Termim — a technology-independent logic and design verification simulator for integrated circuit and printed-circuit-board design.
- Tscope — an interactive waveform display processor of simulation results in analog form.
- Textout — an interactive program that allows the user to obtain printed reports of simulation output in truth table or character waveform displays.
- Tnet — an integrated communications link that allows data transfer between the Tegastation and a Digital Equipment Corp. VAX-11 superminicomputer.

There are two Tegastation models: the DN300 with a 34M-byte disk and the DN420 with a 156M-byte disk, according to the company spokesman.

The DN420 system can be expanded with additional memory, peripherals and communications capability to act as a file server and/or communications gateway for a ring of Tegastations, according to the the company spokesman.

Prices for Tegastation begin at $50,000, the company spokesman said.

Calma is located at 2901 Tasman Drive, Santa Clara, Calif. 95050.

Uptime

Provide 24 hour CICS access

CICS Dynamic File Allocation is a must for effective CICS scheduling. It is the gateway to non-stop, round-the-clock CICS systems. It eliminates batch update constraints. It guarantees bullet proof restarts. It allows you and your batch jobs to add and remove CICS files at will, without disrupting your user community.

NETEC Netec International, Inc.
P.O. Box 19539 • Dallas, TX 75219
214 324-2948 • Telex 80-4294

SYSTEMS & PERIPHERALS

Masscomp MCS-537 bows

WESTFORD, Mass. — Masscomp has introduced the MCS-537, a higher capacity configuration of its 32-bit Unix-based MC-500 series computer systems.

The MCS-537 features a 474M-byte Fujitsu Ltd. Eagle Winchester disk drive and a Cipher Data Products, Inc. vacuum-column ¼-in. magnetic tape drive. The Fujitsu drive has a slip-sector capability that is said to relocate bad blocks of data automatically.

The Cipher tape drive records information at either 800 or 1,600 bit/in. and can read/write at a speed of 125 instruction/sec.

A typical configuration of the MCS-537, supporting up to 16 users, is priced at $71,000. The configuration includes a 32-bit virtual address CPU, with a 4K-byte cache memory and 1M-byte error-correcting memory; Unix System III with Berkeley 4.2 extensions and Masscomp's Real-Time Unix software enhancements; Fortran and C languages; three RS-232C serial lines; and single disk and tape drives.

The mass storage devices may also be purchased separately as upgrades to any MC-500 system. Prices are $23,000 for the Fujitsu Eagle and $19,000 for the Cipher tape drive. Other options for the MCS-537 include additional storage, process controller and graphics display terminals and software.

Masscomp is located at 1 Technology Park, Westford, Mass. 01886.

TURNKEY SYSTEMS

STRATUS COMPUTER, INC.
APPLIED COMMUNICATIONS, INC.
Base 24-atm system

Stratus Computer, Inc. and Applied Communications, Inc. (ACI) have announced the availability of ACI's Base24-atm processing and switching software on the fault-tolerant Stratus/32 Continuous Processing System.

The Base24-atm system was designed for financial institutions requiring medium- or small-size automated teller machine (ATM) networks. It reportedly provides fail-safe operation and on-line availability 24 hours a day, seven days a week. It allows an institution to provide customers with electronic funds transfer services through a proprietary network and through sharing arrangements with other institutions and national ATM networks.

Features of the software include a variety of transactions, three types of authorization, a settlement and reporting module and the capability to switch transactions into national and regional interchanges.

A full configuration of Base24-atm costs $140,000 and is available from ACI. An entry-level 4M-byte Stratus System/32 costs about $140,000 from Stratus. It includes one to two terminals, 60M bytes of disk storage, a magnetic tape drive, operating system software and a Cobol compiler.

Stratus, 17 Strathmore Road, Natick, Mass. 01760. ACI, 206 50th Ave., Omaha, Neb. 68154.

REMOTE COMPUTING CORP.
Scheduled Amortizations System

Remote Computing Corp. has announced the Scheduled Amortizations System, which was designed for use with the IBM Series/1 minicomputer and the multiuser Datamedia Corp. Model 932 microcomputer.

A spokeswoman said software will be sold as a turnkey system with an IBM or Datamedia processor and will utilize Pick & Associates, Inc.'s Pick operating system. The Scheduled Amortizations System features book basis and tax basis calculations, standard depreciations and appreciation

Continued on page 78

Large systems hardware is not an impulse buy.

Now there's a guide coming to you that will help with your homework.

The *Computerworld Buyer's Guide to Large System Hardware* is designed to give you a valuable, one-stop information source for large systems hardware and peripherals. Take a look at all the tools it will give you to help you make the right large systems choice:

- Large systems product listings, including mainframes, supermini's, minis and small business systems and the terminals and peripherals designed to work with them. You'll get listings of printers, memory products, teleprinters, controllers, magnetic media and supplies, plotters, digitizers and much, much more.
- Vendor profiles that include company name, address, contact information, and primary markets served.
- An industry-specific editorial section that's designed to keep you right up to speed on the trends in large systems hardware. We'll give you news of the latest developments in mainframes, superminis and minis and their changing roles. You'll get information on the latest management techniques used in running data centers; planning for cost effectiveness and the new technologies in fifth generation computing.
- In addition to its comprehensive listings and editorial, the *Computerworld Buyer's Guide* will give you pages of detailed ads for large systems hardware products and peripherals that you can refer to all year long.

Each issue of the *Buyer's Guide* is updated before publication, and contains hundreds of listings that are accurate, complete and easy to use. The *Buyer's Guide to Large System Hardware* is distributed to *Computerworld's* 114,000 subscribers in the U.S. — it's one more of the additional benefits you get as part of your *Computerworld* subscription. Look for it this April 16th.

And if you market your products to buyers of large systems hardware and peripherals, this *Buyer's Guide* will reach them with your product message just when they're researching products and vendors. Reserve space in this *Buyer's Guide* by March 2nd by calling one of the sales offices listed below, or call Ed Marecki, National Sales Director or Kevin McPherson, Product Manager, at (617) 879-0700.

To: Ed Marecki, National Sales Director
CW Communications/Inc.
Box 880
Framingham, MA 01701

☐ Please send me advertising information for Computerworld Buyer's Guides.
☐ Please have a sales representative call me.

Name _____
Title _____
Company _____
Address _____
City _____ State _____ Zip _____
Telephone _____ 322

COMPUTERWORLD BUYER'S GUIDE

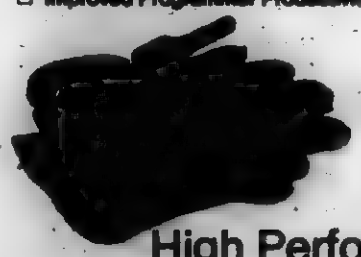
Sales Offices
BOSTON/Chris Lee, Bill Cadigan, Alice Langley (617) 879-0700
CHICAGO/Chris Lee, Bill Cadigan, Joan Broderick (312) 827-4433
NEW YORK/Mike Masiera, Tom Flynn, Gale M. Palermo (201) 967-1350
ATLANTA/Mike Masiera, Tom Flynn (404) 394-0758
SAN FRANCISCO/Bill Healey, Ruth Gordon (415) 421-7330
LOS ANGELES/Bill Healey, Beverly Rees (714) 261-1230

HIGH PERFORMANCE HANDLING

File-AID Puts You in the Driver's Seat to Access Data without Programming.

File-AID gives you high performance handling benefits.

- ☐ Immediate Data Access Without Programming
- ☐ Improved Testing Effectiveness
- ☐ Lower Conversion Costs
- ☐ Better Use of VSAM
- ☐ Reduced Production Delays
- ☐ Increased Security
- ☐ Improved Programmer Productivity



File-AID the Key to High Performance.

File-AID speeds up the utility functions associated with record and file handling.

File-AID is a dependable and reliable tool. And it is supported by a crew of professionals at Compuware, a company with over 2,000 users worldwide.

File-AID is flexible and able to respond in all situations: test and production; regular and special functions.

File-AID is efficient. It combines many utilities into one inexpensive, easy-to-use productivity tool.

File-AID gives the professional greater control over his data environment.

File-AID can put you in the driver's seat fast. It is easy to use and requires virtually no training. The menus, panels, tutorials and control-information make it a natural extension of your current environment.

File-AID/SPF

All Access Methods.

File-AID/SPF supports BROWSE, EDIT & UTILITY functions for all standard IBM access methods.

Record/Member Selection.

File-AID/SPF provides expanded IF, AND, and OR logic for record or member selection and processing.

Logical JCL Processing.

File-AID/SPF recognizes JCL as a special format and JCL is treated as logical statements.

Improved Edit.

File-AID/SPF provides a record editor for all access methods with no record or file length restrictions.

New SPF Utility Functions.

File-AID/SPF provides many new utility functions including:

- ☐ Load module CSECT and directory entry mapping
- ☐ Selective COPY functions for records/members.
- ☐ New full function VTOC utility.
- ☐ Full VSAM cluster, alternate index and path support (display, delete, etc.) without the IDCAMS utility.

Ease of Use.

File-AID/SPF requires no training.

File-AID/BATCH

All Access Methods.

File-AID supports all standard IBM OS or VS access methods and device types.

Multi-Function Utility.

File-AID/BATCH is a parameter-driven utility which combines the most often used file and record handling functions.

- ☐ Print, list or dump whole records or portions of records.
- ☐ Copy up to 99 datasets without control cards while mixing any file organization or record format.

File-AID is a comprehensive, easy-to-use data manipulation utility.

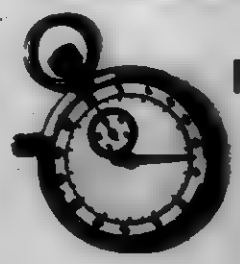
- ☐ Selective retrieval or sampling from any file based on record position, or data contents to the bit level.
- ☐ Altering data format or record structure.
- ☐ Access multiple datasets.
- ☐ Accumulate data in any format.

Additional Information.

File-AID/BATCH provides complete audit trail information as well as concise control card error messages.

Flexibility.

The flexibility of File-AID/BATCH is demonstrated by its ability to combine data from different sources or to copy data from or to unlike devices or access methods or record formats.



Test Drive File-AID with a FREE PRODUCT EVALUATION TIME TRIAL.

Get behind the wheel. Try File-AID's High Performance Handling with your own drivers and crew. For your FREE 30-day evaluation call 800-521-9363 (in Michigan or Canada: 313-540-0400).

☐ Trial Information ☐ Additional Product Information

Name _____

Title _____

Co. Name _____

Address _____

City _____ State _____ Zip _____

Phone _____ Operating System _____

File-AID

Corporate Headquarters
32100 Telegraph Road
Birmingham, Michigan 48010
(313) 540-0400

COMPUWARE
SYSTEMS SOFTWARE THAT MAKES SENSE

International Offices: New South Wales, AUSTRALIA Phone: (61-2) 816-1177 / Luton, Bedfordshire, ENGLAND Phone: (44-582) 39-403 / Paris, FRANCE Phone: (33-1) 347-1941 / Herzlya, ISRAEL Phone: (972-52) 58012 / Milano, ITALY Phone: (39-2) 345-2211 / Tokyo, JAPAN Phone: (81-3) 479-1600 / Oslo, NORWAY Phone: (47-2) 56-6570 / Bryanston, SOUTH AFRICA Phone (27-11) 878-6800 / Hamburg, W. GERMANY Phone: (49-40) 22-0361

SYSTEMS & PERIPHERALS

Continued from page 74

tions, including straight line, sum of the month's digits and double-declining balance.

The system also offers standard as well as custom management reports. Standard reports include detail and summary trial balances, detail and summary reports by location, sales and retirements and current depreciation. It is integrated with Remote Computing Corp.'s General Ledger System for the IBM Series/1 minicomputer and the Datamedia 932.

The Scheduled Amortizations System for the IBM Series/1, including standard hardware configuration, is priced at $100,000. The system for the Datamedia 932 is priced at $60,000.

Remote Computing, 1076 E. Meadow Circle, Palo Alto, Calif. 94303.

EASTMAN KODAK CO.
Release 1.2 of KAR-4000

Eastman Kodak Co. has introduced Release 1.2 of KAR-4000, a software package for its KAR-4000 information system.

According to the vendor, the KAR-4000 is a system that stores document images on microfilm and corresponding computer data on magnetic media. Enhancements include multivalue data entry, batch data entry, check digit routines and international date capability.

The system includes a Mentor Graphics Corp. CPU, disk storage of varying size, CRT terminals, a printer and operating system and application software, the company said.

The software is free to system customers. The price for the KAR-4000 system starts at about $70,000.

Eastman Kodak, 343 State St., Rochester, N.Y. 14650.

PROCESSORS

COMPUTER AUTOMATION, INC.
Syfaplus

Computer Automation, Inc. last week unveiled a slightly smaller version of its Syfa 16-bit minicomputer for distributed processing applications.

Called the Syfaplus, the unit can either function as a stand-alone minicomputer or be integrated into the firm's Syfanet local-area network. The Syfaplus system reportedly offers roughly the same performance as the firm's upper-end Syfa 1000 processor plus the cache memory capability of the firm's top-of-the-line Syfa 2000 processor. The company refused to comment on whether the Syfa 1000 or 2000 is still being offered.

The CPU, which occupies a 2-ft cube, comes with 256K bytes of random-access memory, a 32M-byte Winchester disk drive (expandable up to 100M bytes) and a 10M-byte streaming cartridge tape drive for backup. The system has between eight and 24 I/O ports and can accommodate up to 24 terminals. The system can communicate with IBM mainframe processors via IBM's Systems Network Architecture, the vendor said.

Like the earlier Syfa systems, Syfaplus uses Computer Automation's Sybol programming language and the firm's Syclops operating system.

Syfaplus costs between $19,000 and $20,000.

Computer Automation, 1800 Jay Ell Drive, Richardson, Texas 75081.

JOHN FLUKE MANUFACTURING CO., INC.
2400B

John Fluke Manufacturing Co., Inc. has announced the 2400B, an intelligent front-end processor for data acquisition and control and product testing applications.

The 2400B is said to interface with any mainframe, microcomputer or instrument computer at distances up to 4,000 ft. The unit can also be accessed from remote locations through modems and telephone lines.

A 16-bit, on-board CPU provides the system's stand-alone capability through a stored application program of up to 28K bytes of random-access memory, which may be downloaded from the host or stored permanently in erasable programmable read-only memory. That intelligence enables the 2400B to monitor numerous analog and digital inputs, such as voltage, ohms, thermocouples, real-time device strain, frequency, time intervals, totalizing, binary coded decimal and binary and contact closure.

Depending on the specific user application, the vendor said, options are available for up to 1,000 analog inputs, 1,024 digital I/Os and 128 analog outputs. The 2400B is user programmable and features a resident, high-level, English-like language.

The 2400B costs $4,390. System prices range from $5,400 to $100,000, according to user applications and requirements.

John Fluke Manufacturing, P.O. Box C9090, Everett, Wash. 98206.

DATA STORAGE

DYLON DATA CORP.
Model 1066A magnetic tape controller

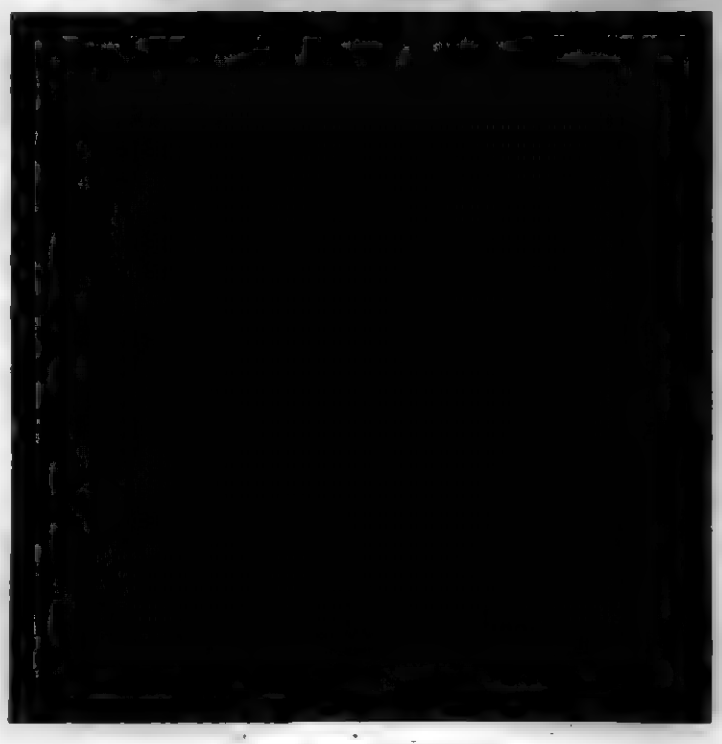
Dylon Data Corp. has introduced its Model 1066A magnetic tape controller for use with Hewlett-Packard Co. HP 1000, HP 3000 and HP 9000 series processors.

The 1066A is hardware- and software-compatible with the HP 7970E drive and requires no change to the driver software, the company said.

The tape controller features 45 in./sec and 75 in./sec operation, the vendor said.

It is priced at $4,995.

Dylon Data, 9561 Ridgehaven Court, San Diego, Calif. 92123.

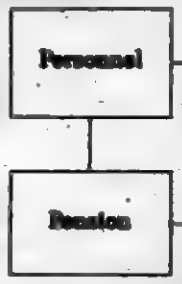


Whether you're looking for Payroll, Personnel, Pension Administration or Claims Processing software, Information Science's "Whole Person" software gives you a comprehensive system that provides superior technical features.

Systems for both Database and Non-Database

InSci's state-of-the-art payroll/personnel database system is integrated into a number of database management environments–including IMS, DL-1, and IDMS. Native mode, the system is designed to take full advantage of each specific database structure, eliminating clumsy, resource-draining interface programs.

In addition, InSci offers two non-database systems. One using a sequential file structure, the other using a VSAM access method.



INSCI INT
"WHOLE PERSON" SOFTWA
SYSTEM THAT MEETS AL
PROFES

Introducing On-line PAS

PAS–InSci's new Pension Administration System–is available as a complement to our payroll/personnel package or as an independent, stand-alone system. PAS automates most aspects of pension administration from ERISA reporting and compliance to benefits calculation, retirement counseling, vesting schedules and benefits statements.

Software for Health Insurance Claims

Our health insurance claims processing system permits your organization to self-administer group health, dental, and disability claims--providing significant cost savings while eliminating the need to keep duplicate information for insurance purposes.

The Complete Human Resource Package

We call it "Whole Person" software because it is the most comprehensive, technically advanced set of human resource systems avail-

SYSTEMS & PERIPHERALS

EMC CORP.
Pstor-300

The Pstor-300, a 300M-byte sealed media disk subsystem for Prime Computer, Inc. processors has been introduced by EMC Corp.

Based on a 315M-byte unformatted Winchester-type drive, the Pstor-300 is a rack-mountable unit, EMC said. A single module can be housed in a communications cabinet or under a tape drive. Up to three modules can be mounted in an EMC-supplied cabinet, providing up to 900M bytes of formatted storage.

A single Pstor-300 module is priced at $10,500 and includes formatting of the drive, according to user specifications, a Prime controller upgrade kit, cabling, mounting rails and installation.

When housed in an EMC-supplied stand-alone cabinet, a single module is $11,200 installed. Two modules, providing 600M bytes, are priced at $21,000 including cabinet; three modules, or 900M bytes, are $30,500.

EMC, 12 Mercer Road, Natick, Mass. 01760.

PRINTERS/PLOTTERS

SYNERGY PRINTER SYSTEMS, INC.
LW400, LW800

Synergy Printer Systems, Inc. has introduced the LW400 and LW800 line printers.

According to the vendor, the printers produce near-letter-quality printing at speeds of 400 and 800 lines per minute. They utilize an 80-yard cassette ribbon, an intelligent control panel and a four-character, alphanumeric display.

The price of the LW400 with a Dataproducts, Inc.- or a Centronics Data Computer Corp.-compatible parallel interface, acoustic cabinet and paper basket is $5,950. The price of the LW800 with the same features is $7,950. The optional RS-232 serial interface is $495.

Synergy Printer Systems, 4020 Fabian Way, Palo Alto, Calif. 94303.

GROUP THREE ELECTRONICS, INC.
Guardian Data HP1503, HP3003, HP6003

Group Three Electronics, Inc. has announced three line printers compatible with Hewlett-Packard Co.'s HP 3000 line of superminicomputers.

The Guardian Data HP1503 reportedly features a 96-char. Ascii set for DP printing at 150 lines/min and correspondence printing at 80 lines/min. It also has a 64-char. Ascii set for condensed printing at 200 lines/min. in uppercase letters only.

Standard features are said to include a forms-length selector switch, double-high characters, underlining and full-dot addressable graphics. Options include additional character fonts and bar-code and label-generation hardware, a spokesman said.

The printers require an RS-232 interface to the HP 3000, but do not require any software changes to the system, the spokesman said.

The HP1503 costs $4,740.

Two other models offer similar features to the HP1503, but have faster printing speeds. The HP3003, priced at $6,395, has a print speed of 300 lines/min. The HP6003, priced at $8,295, prints at 600 lines/min., the spokesman said.

Group Three Electronics, 3613 Manhattan Beach Blvd., Redondo Beach, Calif. 90278.

GRAPHICS SYSTEMS

NEW MEDIA GRAPHICS CORP.
Graphover 9500

New Media Graphics Corp. has introduced a color graphics generator called the Graphover 9500.

The Graphover 9500 is a color graphics generator that combines graphics coming from a computer with video coming from any videodisk, videotape or TV camera.

The Graphover 9500 offers features such as encoders, decoders, video and audio switchers, videodisk interfaces, graphics tablets, light pens and touch-screen controls.

Applications for the Graphover 9500 include interactive training, simulation, presentation graphics, point-of-sale and process control.

Available under the Government Services Administration, the list price of the Graphover 9500 is $9,850. Quantity discounts are available.

New Media Graphics Corp., 570 Cambridge St., Burlington, Mass. 01803.

POWER SUPPLIES

DATAPOWER, INC.
DP-7000 series

Datapower, Inc. has introduced a line of 750W switching-power supplies that are available in seven voltage-current output combinations ranging from 2V and 150A to 28V and 26A.

The DP-7000 series of power supplies delivers more than 2.5W of output power per cubic in., the vendor said. Seven voltage-current output models are available: 2V/150A, 5V/150A, 12V/62A, 15V/50A, 18V/41A, 24V/31A and 28V/26A.

The models are priced at approximately $650 each, according to the vendor.

Datapower, 3225 W. First St., Santa Ana, Calif. 92703.

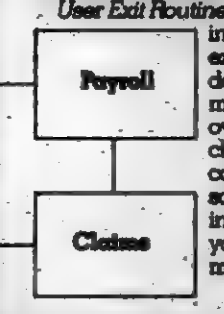
See POWER page 78

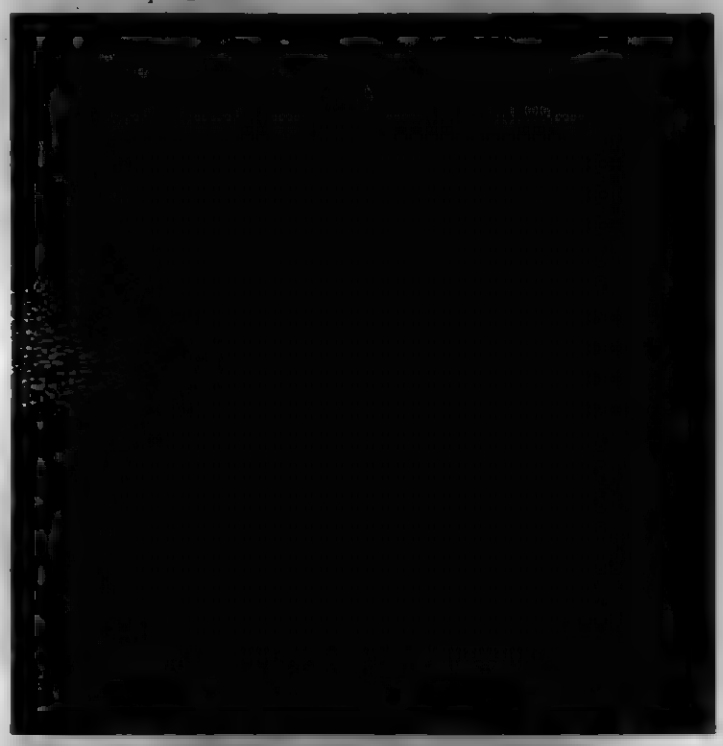
able. InSci started the HRS industry back in 1965, and we've led the field ever since. Our technical experts have provided you features unmatched by any other company.

Modularized Design For Easy Maintenance. InSci "Whole Person" software was designed from the top down and is highly modularized, providing maximum flexibility. A single module or subroutine supports each specific function in the system.

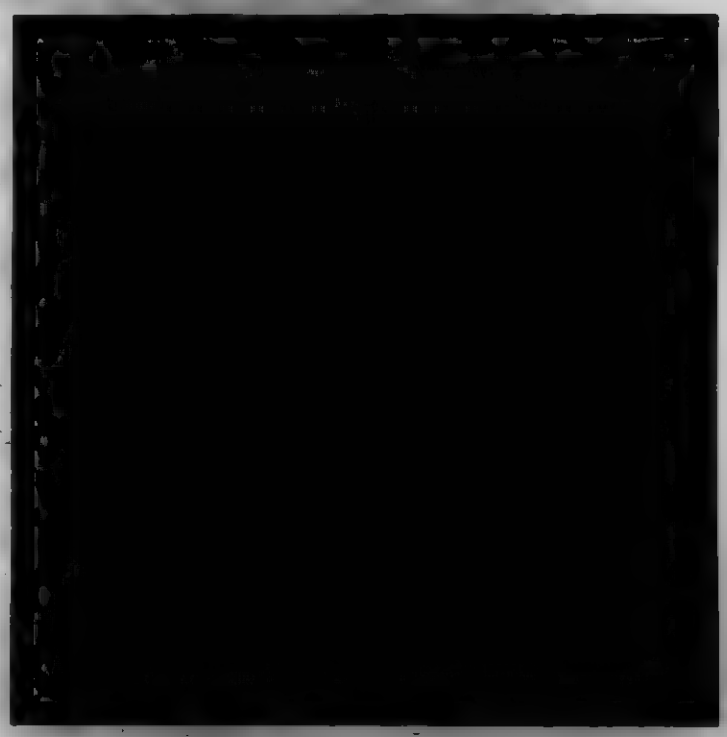
User Exit Routines. Strategic areas built into the InSci system allow exits to override the standard system routines. This means you can add your own programs without changing database system codes. InSci also gives you source codes so you can go into the system directly if you desire and still receive maintenance.

Preliminary or final processing mode. InSci systems let you select the most efficient operating mode for each processing task. All changes can be processed in real-time, so they become effective immediately. Preliminary processing allows for simulating situations such as a payroll run without affecting the database. And, of course, InSci systems provide state-of-the-art security precautions, complete maintenance support and training.





RODUCES
RE. THE FIRST SOFTWARE
L THE NEEDS OF THE DP
SIONAL.



Write us. Or Call.

InSci "Whole Person" software–for more information, write us or call: Information Science Incorporated, 95 Chestnut Ridge Road, Montvale, New Jersey 07645. Attention: Chris Honavan. 201-391-1600.

InSci
WHOLE PERSON SOFTWARE.

SYSTEMS & PERIPHERALS

POWER from page 77

ELECTRONIC SPECIALISTS, INC.
KLR portable line conditioners

Electronic Specialists, Inc. has announced its KLR series of portable line conditioners designed to protect sensitive computer equipment.

Available for 250W, 500W, 1,000W and 2,000W loads, the KLR line conditioners deliver 120V at 3% regulation for 90V to 140V input variations. Other features of the KLR series include input spike suppression, transformer surge suppression, wide-band prefiltering and isolated winding line noise elimination.

The 250W unit is priced at $292, the 500W unit at $391, the 1,000W model at $562 and the 2,000W model at $977.

Electronic Specialists, 171 S. Main St., P.O. Box 389, Natick, Mass. 01760.

BOARD-LEVEL DEVICES

EMC CORP.
ES-II

EMC Corp. has announced a 2M-byte, add-in memory card for the Prime Computer, Inc. Series 50 computer systems.

The ES-II was designed for use in any Prime system up to and including the P350. Using a 64K-byte, random-access memory component, the ES-II is hardware- and software-compatible with Prime memory cards and host processors, EMC said.

Other features of the memory card include on-board error check and correc-

Continued on page 80

FBA from page 73

IBM to breathe life back into FBA. The reason, Moore stated, is FBA is a much neater way of storing data.

CKD, FBA differences

CKD devices, explained Jeffrey Buzen, an analyst with the Lincoln, Mass., processor performance consulting firm of BGS Systems, Inc., allow users the option of placing most active files where they can be quickly accessed. But they also require users to pay a penalty in overhead.

Buzen explained that pointers and other housekeeping items that keep track of where data is stored on a CKD disk drive can become cumbersome. The problem is not so much the pointers themselves, Buzen said, as it is the tiny gaps that CKD devices require between fields.

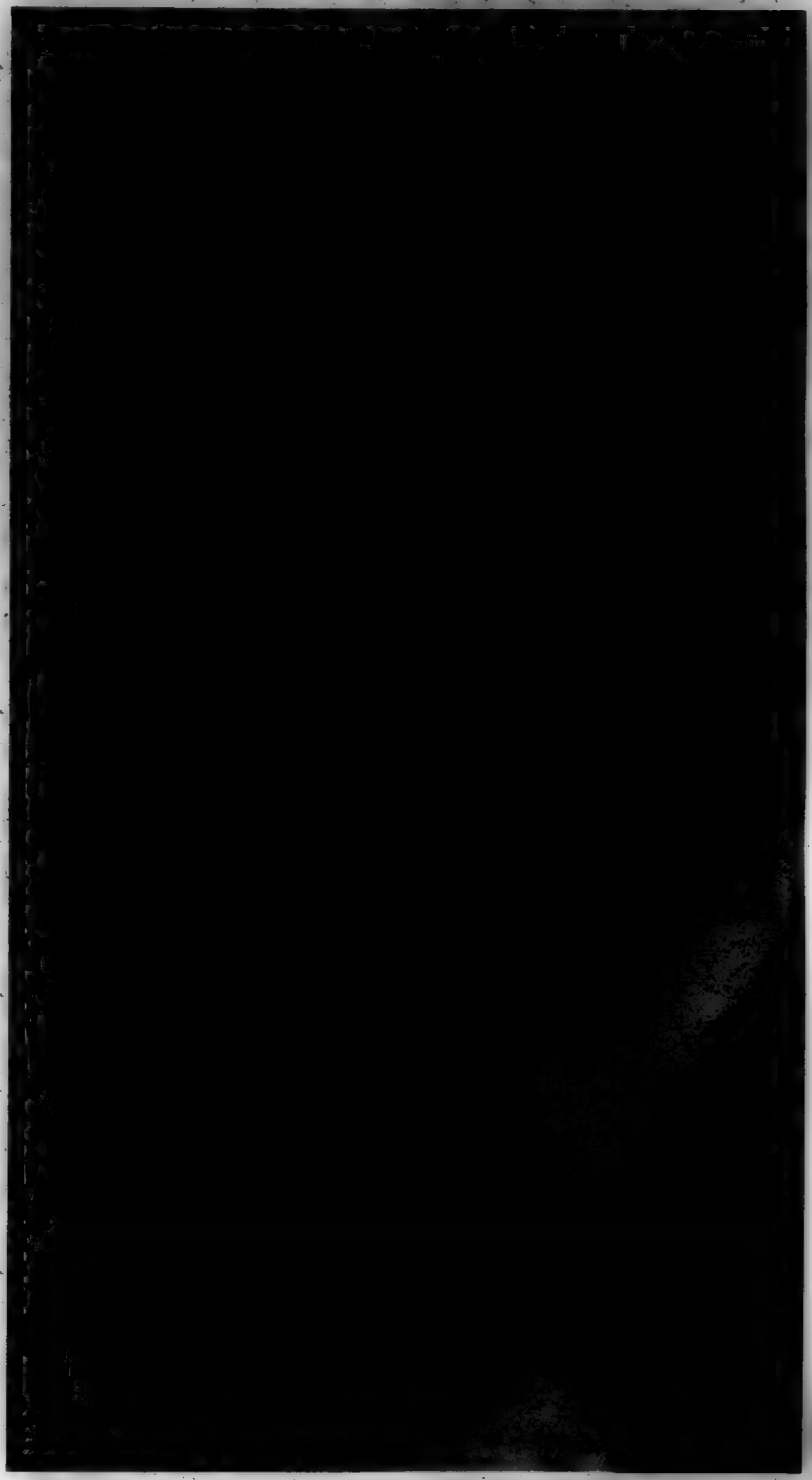
The gaps must be uniform in length; as the storage density is increased, the storage capacity lost by those tiny gaps also increases — almost to the point where the gaps take up more space than the actual data.

FBA, on the other hand, automatically stores data for users according to logic built into FBA devices and Vasas.

Noting that one of the problems with FBA has been the reluctance of CKD users to convert, Buzen said IBM could create a hybrid disk drive that employs both technologies.

With the flood of microprocessors on the market today, Buzen said IBM could easily develop specialized microprocessors to convert CKD data to an FBA format.

The result would be a high-capacity disk drive that, to the user, appears to be a CKD device. But under the surface, the unit would have all the trappings of an FBA drive.



"You can't just plank down a bunch of computers in an office and expect things to happen. You've got to prepare people for office automation. Give them all the support you can ...and more."

With Wang, you can get all the support you need. Whenever and wherever you need it.

Support that begins long before installation and extends for the life of the system.

So whether you need assistance in customer engineering, training, documentation, implementation, supplies or software, with Wang you get a response, not a referral.

A response from the people who've been in office automation longer than anyone else in the industry.

WANG

The Office Automation Computer People.

CM87

© 1984 Wang Laboratories, Inc.

SYSTEMS & PERIPHERALS

Continued from page 79

tion and support for interleaving and wide word memory modes.

According to EMC, the EB-II provides 2M bytes in a single slot, enabling the user of single chassis machines to expand memory up to 8M bytes.

The EB-II is available at a price of $12,000.

EMC, 13 Mercer Road, Natick, Mass. 01760.

APPLIED MICRO TECHNOLOGY, INC.
ST4505

Applied Micro Technology, Inc. (AMT) has introduced a standard graphics controller said to generate a display of 640 by 480 pixels.

The ST4505 is a 64K-byte memory board featuring user-selectable wire-wrap options, programmer-definable intensity, direction and size and a memory-mapping design.

Multiple ST4505 boards reportedly can be chained together to generate gray-scale or color outputs.

A Digital Research, Inc. CP/M-compatible software support package is provided on an 8-in. diskette.

The software reportedly emulates a standard plotting device by supporting plot, draw, label, character drawing and associated functions.

The ST4505 is shipped with software, source code, example Basic programs and technical manual and costs $450 in quantities of 50.

AMT, P.O. Box 3042, Tucson, Ariz. 85702.

PLESSEY PERIPHERAL SYSTEMS, INC.
Memory expansion

Plessey Peripheral Systems, Inc. has reconfigured the standard memory capacity for its Series 6200 22-bit computer system based on Digital Equipment Corp.'s LSI-11/23 board-level minicomputer.

The expansion features range from two 256K-byte memory boards to one dual-wide 512K-byte board. The expansion can free up one additional card slot for additional communications devices or peripheral controllers for the Models 6244 and 6245.

Memory capacities of Models 6247 and 6248 have increased to 1M byte from 768K bytes. The memory redefinition of the models provides an additional card slot in the bus.

Prices for the Model 6244 and 6245 remain the same at $10,485 and $12,650, respectively. Models 6247 and 6248 are increased to $11,885 and $14,050, respectively.

Plessey Peripheral Systems, 17466 Daimler, Irvine, Calif. 92714.

AUXILIARY EQUIPMENT

ADALOGIC
Gateway

Adalogic has announced a stand-alone computer password security device that reportedly can be used with asynchronous modems on dial-up or leased lines connecting to microcomputers, minicomputers or mainframes.

Called Gateway, the device requires entry of both a correct identification code and password before entry is permitted, a vendor spokesman said. If the correct codes are not entered in three attempts, the security device forces the modem to disconnect.

The user also can define a time limit for a successful logon attempt, after which time the device breaks the connection, the spokesman said.

Gateway provides up to 20 passwords and user identification codes.

The device connects between the modem and host computer to any RS-232 full-duplex port and reportedly operates at 300 or 1,200 bit/sec on dial-up lines and 300, 1,200 or 9,600 bit/sec on leased lines.

It is available for $395, the vendor said.

Adalogic, 1522 Wisteria Lane, Los Altos, Calif. 94022.

COMPUTER SECURITY INSTITUTE
Free security booklet

The Computer Security Institute is offering a free guide booklet on the topic of computer security.

The 12-page booklet, titled "Computer Security — A Manager's Guide (Pure and Simple)," was designed to provide company managers with basic background on the need for computer security, the vendor said.

The booklet can be ordered by sending a self-addressed, business-size envelope with 37 cents postage to Computer Security Institute, the vendor said.

Computer Security Institute, Department B-14, 43 Boston Post Road, Northborough, Mass. 01532.

INTEL CORP.
Speech transaction products

Intel Corp. has increased the power and added more natural responses to its line of speech recognition products.

The family of speech transaction systems includes the Speech Transaction Development System (ISBC 570 and Intellec Development System), the ISBC 576 Speech Transaction Board and the ISBC 577 chip set. The Model 576 can remember and adapt to changes in the operator's vocal pattern, the vendor said.

A number of application-independent functions have been added, including utterance, field, transaction, prompt and Help functions to support speech synthesis. The enhanced products can be integrated into other systems and complement other I/O devices, according to the vendor.

All are compatible with Intel open systems standards, as well as Intel's iRMX and Microsoft, Inc.'s Xenix-based System 300 family of microcomputers.

Prices are $4,900 for a single ISBC 570 development set, $2,900 for the ISBC 576 board and $600 for a minimum order of 500 units for the ISBC speech chip set, the vendor said.

Intel, 3065 Bowers Ave., Santa Clara, Calif. 95051.

Think of us as the only TRUE TSO for VS1.

Because we are.

TONE 3

HIGH PERFORMANCE-LOW OVERHEAD

- Edit with full screen capability
- Internal reader job submit
- Output retrieval with RES support
- System maintenance
- Program development
- Data entry
- System debugging
- Text editing
- Performance monitoring support
- User command interface
- Interactive program execution
- Operations console support
- Dataset maintenance
- Catalog management
- Standard IBM TSO commands
- Enhanced 3270 usability
- Full ASCII terminal support
- No user swapping
- No TCAM
- No VS/2 overhead

TONE Software Corp.

1735 S. Brookhurst
Anaheim, CA 92804
(714) 991-9460 Telex 181392

Omnium

15 years of experience
with only one computer manufacturer: Honeywell-Bull.

THE GROUP OMNIUM INFORMATIQUE
PRESENTS

FORUM 8

GCOS 3 TO GCOS 8 MIGRATION
DIALOGUE BETWEEN USERS

WEDNESDAY MARCH 14th AND THURSDAY MARCH 15th 1984
PAVILLON GABRIEL, 5 AVENUE GABRIEL 75008 PARIS, FRANCE

This international and highly technical seminar, intended primarily for information processing managers and systems software engineers will raise all the questions relative to GCOS3-GCOS8 migration, and will provide you with all the answers through solutions found by the users themselves.

The guest speakers, SR 2000 or SR 2300 users, are from the following large organizations:

Air Canada (Canada)
Caisse Régionale du Crédit Agricole de Rennes (France)
Credit Mutuel Ocean (France)
General Electric (Etats-Unis)
Groupe Bull (France)
Little Woods (Angleterre)
Societa d'Informatica per le Banca e l'Impresa (Italie)

Simultaneous interpretation in French, Italian and English will be provided.

A considerable part of the programme will be set aside for discussion, led by Mr Bernard FUSEY, Assistant General Manager CTR-Lyon, and Mr Georges LECLERE, Head of the Scientific Division of the french television network A2.

For registration form and further information or for telephone or telex registration, please contact:

MADAME ELYANE PRADEU
COMMUNICATIONS MARKETING
OMNIUM INFORMATIQUE
RESIDENCE DU SOLEIL, ROUTE DES MILLES - 13100 AIX-EN-PROVENCE
TEL.: (42) 26.24.40 - TELEX: OMNIAIX 441 137F

Finally, someone who sees the forest. As well as the trees.

In their great rush to fill the office with personal computers, people lost sight of the ultimate objective. To work together more productively.

Then Sperry appeared.

With a remarkably simple solution. The Sperry PC.

It was personal, but not so personal that it would keep people from being part of a system.

It could run all of the software of IBM's PC.

It performed all the user-friendly functions people expected. It was, in fact, even friendlier than IBM's machine.

It had a more comfortable keyboard. A more dramatic display of graphics. And a high-speed "turbo" switch that allowed it to run 50% faster than IBM.

And it could keep people in touch with the most valuable resource an organization can have —the main computer.

No matter whose big system they have.

Sperry *or* IBM.

Or both.

The Sperry PC.

Admittedly, big picture.

But then, that's what happens when you look at the forest. As well as the trees.

See how the Sperry PC can work for you. Call 800-547-8362, toll-free. Or write us. Sperry Corporation, Computer Systems, Department 100, P.O. Box 500, Blue Bell, PA 19424.

© Sperry Corporation, 1985

SPERRY PERSONAL COMPUTER SPECIFICATIONS	
OPERATING SYSTEM	KEYBOARD
MS DOS Version 1.25 or 2.0 with G.W. BASIC	84 keys, 6 ft. cord
MICRO-PROCESSOR	AUXILIARY MEMORY
High-Speed 16-bit 8086	Up to two internal 5¼" diskettes
DISPLAY SCREENS	10MB internal fixed disk when configured with single diskette
High Definition monochrome display	USER MEMORY
High resolution color display	Standard 128K bytes, expandable to 640K
IBM compatible graphics	DIAGNOSTICS
COMMUNICATIONS	Powerup self test
Built-in Asynchronous	CLOCK
	Time-of-day with battery back-up

SPERRY

The Sperry PC.
What the personal computer should have been in the first place.

Adv. No. 100-83-0236—PACE

Prepared by LEVEL, GRAHAM & STREET INC., Philadelphia.

10,000 CICS Users Said There Had To Be A Better Way . . .

We Gave Them GENER/OL™

Feature for unique feature, GENER/OL is the leader in on-line CICS applications development. This 5-star performer channels on-line technology for maximum productivity, efficiency, and flexibility.

Complete with award-winning documentation and responsive support, GENER/OL offers uncommon software productivity in the Pansophic tradition.

Call us today for the performance of a lifetime!

PANSOPHIC®

(800) 323-7335

Pansophic Systems, Inc., 709 Enterprise Drive, Oak Brook, Illinois 60521. In Illinois, call (312) 986-6000.

MICROCOMPUTERS

Portable micro, cluster device out from IBM

By Tom Henkel
CW Staff

BOCA RATON, Fla. — IBM has added a portable version of its Personal Computer to its growing line of microcomputer offerings. At the same time, IBM announced a feature that reportedly allows up to 64 Personal Computer, Personal Computer XT or entry-level PCjr micros to be connected in a cluster.

Available March 1, the Portable Personal Computer will apparently only be offered in very limited quantities. Industry watchers speculated that IBM will give delivery preference to big national accounts over the firm's 1,400 retail outlets.

The unit weighs approximately 30 lb and uses the same Intel Corp. 16-bit 8088 microprocessor used in the desktop Personal Computer, Personal Computer XT and the PCjr.

The unit also supports IBM's PC-DOS Release 2.1 and Microsoft, Inc.'s MS-DOS operating systems. It comes in a 20-in. by 17-in. by 8-in. carrying case and features 256K bytes of random-access memory, expandable to 512K bytes. A standard 9-in. amber monitor is included, which can display graphics and up to 25 80-char. lines of text, according to a spokesman for IBM.

The Portable Personal Computer offers a 360K-byte half-height disk drive and adapter. A second half-height disk drive can be added to expand the total disk storage to 720K bytes, IBM said.

A Portable Personal Computer with 256K bytes of user memory, a 360K-byte half-height disk drive, display keyboard, carrying case and IBM's PC-DOS Release 2.1 operating system costs $2,795. A second half-height 360K-byte disk drive costs $425, IBM said.

Personal Computer Cluster Program

In addition, IBM announced the Personal Computer Cluster Program, a $92 program that allows users to connect as many as 64 processors. With the program, messages and information can be exchanged and shared between workstations. However, the workstations must be connected via a cable, IBM said. In addition, the Cluster Program allows workstations to share information on a fixed disk drive at one machine in the cluster, according to the IBM spokesman.

Since the Cluster Program license is required for each processor in a cluster, IBM is offering, in addition to the Cluster Program, the Five-Pack, which includes one diskette copy of the program, five licenses and five sets of publications to support the program.

The Five-Pack costs $400, IBM said. To support the interconnection of different IBM Personal Computers, IBM announced a series of options.

The IBM Personal Computer Cluster Adapter is required for each IBM Personal Computer, Personal Computer XT or Portable Personal Computer in the cluster. The Adapter costs $340 and fits into one of the full-size expansion slots in the microcomputer's backplain, according to the spokesman.

For attachment of a PCjr to a cluster, a special adapter, which attaches to the side of an entry-level PCjr, was also announced.

Currently, the entry-level model is the only one which can be connected in a cluster. The adapter costs $400, the IBM spokesman said.

IBM is also offering a Cluster Cable Kit, which provides the cables and connectors to connect two Personal Computers to

See IBM page 84

INSIDE

Systems/84
Storage/84
Board-Level Devices/92
Auxiliary Equipment/92
Micro Software/92

S1 gets kudos, but needs major endorsement

By Paul Gillin
CW Staff

The S1 operating system announced recently by Multi Solutions, Inc. [CW, Feb. 13] appears to incorporate nearly every major capability demanded by microcomputer software developers and then some. But while observers agree that S1 has impressive features, they point out that the software has yet to capture an endorsement from a major hardware vendor. That could be the most difficult hurdle to clear, they say.

Among the facilities developers claim for S1 is portability across most microprocessors, from 8-bit to 32-bit. The system supports up to 256 parallel processors, can read and write files to and from virtually all of the major micro operating systems, as well as Digital Equipment Corp.'s DEC Files 11, and it is fully machine-independent. A command processor allows commands to be abbreviated or changed so that the operating system can emulate virtually every other micro operating system, according to Charles J. Lombardo, chairman of Multi Solutions, based in Lawrenceville, N.J.

In fact, developers claim there is almost no capability that can't be added to S1. The reason is the system's modularity. Written in a high-level language called SL, the operating system can be ported to other hardware with three months or less of reprogramming, Lombardo said.

SL was developed by Robert R. Knight, a former Princeton University professor who has designed more than 60 compilers. Similar in structure to Pascal or C, SL performs "almost at machine-code level," making it fast and easy to compile, Lombardo said.

One observer who has seen the operating system in action concurred. "SL appears to be more flexible than C," said Mark Tebbe, a technical consultant at Arthur Andersen & Co. in Chicago. "It's also very easy to follow and maintain. If I had an SL compiler, I'd write in that before I'd write in C."

SL consists of only 12 statements and an automatic load linker to generate an operating system ranging from 2K bytes to 120K bytes in the full implementation. Because the operating system is modular, the designer can incorporate only those features that are needed, Lombardo said. Modules can be added to the operating system at any time, using the linker to create the links at runtime.

Some of the features developers claim can be added include multitasking, win

See S1 page 92

Multiuser DbaseII introduced for IBM micros now, Apples later

CULVER CITY, Calif. — Ashton-Tate has announced a multiuser version of its Dbase II data base management system for microcomputers.

A four-user data base manager running under Musys Corp.'s Turbodos operating system and able to manage 65,000 records, the multiuser software package operates over 3Com Corp.'s Etherseries local-area network, which is based on Xerox Corp.'s Ethernet.

Ashton-Tate President David C. Cole said that as "more and more local-area networks come on-line and get a reasonable following, we will adapt the product to them."

Ashton-Tate said support of Corvus Systems, Inc.'s Omninet, Novell Data Systems, Inc. Netware and Orchid Technology, Inc.'s PCnet networks is "soon to come."

A feature of the new product allows many users to share information, but only allows one user at a time to make changes. Price of a four-user data base manager was given at $1,000, with four-user update kits to permit later groups to join the data base network listed at $500. The product will be available on May 4.

Initially the software will run only on IBM Personal Computers, Cole said. In the fourth quarter, the product will be available for Apple Computer, Inc.'s Lisa II. Availability on Apple's Macintosh is also planned.

Ashton-Tate is headquartered at 10150 W. Jefferson Blvd., Culver City, Calif. 90230.

Appleline, cluster controller said to link Apples to IBM nets

CUPERTINO, Calif. — Apple Computer, Inc. has announced a coaxial attachment unit that allows Apple microcomputers to connect to an IBM or IBM-compatible network.

Called Appleline, the unit enables Apple micros to use existing coaxial cable installations and IBM 3270 cluster controllers servicing a mainframe computer network. Appleline reportedly can be used with the Apple Macintosh, Lisa and Apple III to provide IBM 3278 terminal emulation.

In a related announcement, Apple unveiled the Apple Cluster Controller, an alternate method for communications with IBM and IBM-compatible networks for organizations that have not installed IBM 3270 cluster controllers and 3278 terminals.

To utilize Appleline, Lisa users are required to use Apple's Lisaterminal data communications software; Macintosh users are required to utilize Apple's Macterminal communications software; and Apple III users are required to utilize Apple's Access 3270 software.

Appleline is priced at $1,295. The Apple Cluster Controller costs $4,500 for a three-port version and $7,000 for a seven-port version. The Access 3270 and Lisaterminal packages are priced at $150 and $295, respectively. Macterminal, priced at $99, will be available the first quarter of 1984.

Apple Computer is located at 20525 Mariani Ave., Cupertino, Calif. 95014.

MICROCOMPUTERS

SYSTEMS

AKA COMPUTERS, INC.
AKA PC; AKA Plus

AKA Computers, Inc. introduced two microcomputers compatible with IBM's Personal Computer XT.

The microcomputers feature an Intel Corp. 8088 microprocessor, 128K bytes of random-access memory (RAM), five expansion slots, two serial ports and a parallel port. The microcomputers can be expanded with four floppy disk drives and 256K bytes of RAM.

AKA PC costs $3,295. AKA Plus, with 10M bytes of hard disk storage, sells for $4,795.

AKA Computers, P.O Box 36247, Charlotte, N.C. 28236.

KAYPRO CORP.
Kaypro 4 enhancements

Kaypro Corp. has announced an enhanced version of its Kaypro 4 microcomputer that incorporates a built-in modem, improved display facilities, graphics and improved screen features.

The Kaypro 4's built-in 300 bit/sec modem automatically adapts the micro for communications and electronic mail applications and offers access to data bases, a spokesman said.

Screen features include a clearer display, highlighting, dual-intensity display segments and blinking cursor.

Improved graphics are made available through a monitor with a resolution of 100 pixels by 160 pixels, the spokesman said. For word processing, the Kaypro 4 incorporates a new 80-col. by 25-line display.

The enhanced version sells for $1,995, according to a spokesman for the vendor.

Kaypro, 533 Stevens Ave., Solana Beach, Calif. 92075.

STORAGE

DAVONG SYSTEMS, INC.
Mac Disk

Davong Systems, Inc. has announced a family of hard disk drives for Apple Computer, Inc.'s Macintosh microcomputer.

Called Mac Disk, the unit is available in six memory configurations: 5M, 10M, 15M, 21M, 32M and 40M bytes. The units will be shipped with all necessary cabling and adapters, software utilities and documentation. Prices range from $1,995 to $4,995, a spokesman said.

Davong Systems, 217 Humboldt Court, Sunnyvale, Calif. 94089.

AVCOM, INC.
Safe-Gard

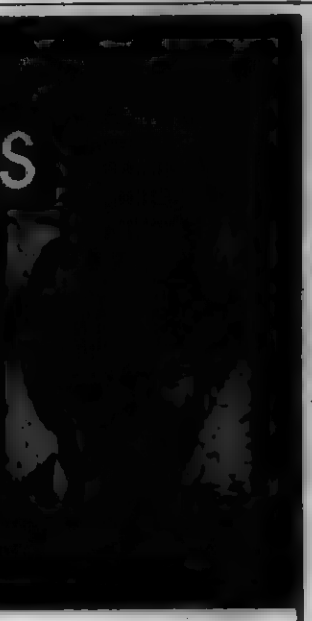
Avcom, Inc. has introduced Safe-Gard, a disk security system for the IBM Personal Computer, Personal Computer XT and compatible systems.

Using a custom-layered encryption algorithm, Safe-Gard diskettes are said to prevent programs from bit copying and also allow users to write-protect disks to avoid accidental erasure. Backup copies can be made but will work only on Safe-Gard disk, according to a vendor spokesman.

Two Safe-Gard diskettes cost $9.95 with quantity discounts available.

Avcom, P.O. Box 29153, Columbus, Ohio 43229.

8 Good Reasons to Attend the James Martin Seminar



1. James Martin has been writing THE BOOK on the Computer Industry for over 3 decades.
2. He is the most sought after consultant in the Computer Industry.
3. His predictions and recognition of major computer developments are unsurpassed.
4. With over 31 top-selling books, Martin is the industry's #1 selling author of all time. His book, *Application Development without Programmers*, is the Computer Industry's #1 selling book of all time.
5. James Martin has the unchallenged reputation as the world's finest lecturer in his field. Over 20,000 individuals worldwide have attended the James Martin Seminars. Many return year after year.
6. James Martin "... can lay fair claim to being the most influential DP guru of all time." – *ICP Interface*
7. A fast-moving, high-density, interactive 5-day program packed with information for all DP designers, management, and staff. Quite honestly, the James Martin Seminar is the industry's best educational value for the money.
   - Attend the seminar designed to dramatically increase your DP capability.
   - A major increase in productivity is attainable through the methods taught in this seminar.
   - 5 days with James Martin will dramatically alter your approach to DP.

Many DP organizations are beginning to break the cycle of low productivity, poor responsiveness, and high application backlog of traditional DP. Now is the time for you to act. Attend the James Martin Seminar this spring. Learn the new technologies and their application to your organization. You'll discover why James Martin is ....

8. ... The Man the DP Experts Listen To!

Check the appropriate box on the coupon for more information on James Martin's 1-Day Seminar, THE END USER REVOLUTION for executives and professionals everywhere who ought to be using computers more effectively. This 1-day seminar will be held on the first day of the 5-day seminar.

Call (213) 394-8305 or mail the coupon today for a detailed brochure.

Washington, D. C.	April 2-6, 1984
San Francisco	April 9-13, 1984
Chicago	April 23-27, 1984
Boston	April 30-May 4, 1984

Send more information on the following James Martin Seminars

☐ New! 1-day End User Revolution Seminar
☐ New 5-day DP Revolution Seminar

NAME
COMPANY NAME
ADDRESS
CITY/STATE/ZIP
TELEPHONE

TECHNOLOGY TRANSFER INSTITUTE
741 10th St., Santa Monica, CA 90402, (213) 394-8305

IBM from page 83

form a cluster. The Kit costs $110. Three or more microcomputers can be connected by using multiple Cluster Cable Kits, IBM said.

IBM announced the Portable Personal Computer and Cluster Program through its Entry Systems Division, located at P.O. Box 2989, Delray Beach, Fla. 33444.

IBM offer comes as no surprise

BOSTON — For at least one industry watcher, IBM's announcement of a Portable Personal Computer and Computer Cluster Program did not come as a surprise.

Chris Christiansen, an analyst with The Yankee Group market research firm based here, noted that IBM has been expected to announce a portable version of the Personal Computer for some time.

Christiansen noted that the Portable Personal Computer, other than putting the IBM seal of approval on portable computers, does not offer anything that compatible portables offered by Compaq Computer Corp. and other vendors do not.

The next step, he said, both for IBM and the other portable manufacturers, is to develop a lap model of the Personal Computer.

Noting that the Portable Personal Computer is expected to be available in extremely limited quantities, Christiansen noted its introduction will probably have little short-term impact on non-IBM vendors of portables. Most portable vendors will, however, be forced to lower their prices, Christiansen noted.

Contending that IBM has been rumored to be readying a local-area network for its microcomputer lineup, Christiansen called IBM's Computer Cluster Program a stopgap measure until IBM can offer a local-area net.

Like the Portable Computer announcement, Christiansen said, the cluster technique is not a new technology.

Software Digest
THE RATINGS NEWSLETTER

A new, hard-nosed testing and rating service to give you rapid, reliable information on how IBM PC programs compare in 9 different ways:

- Ease of Start-up
- Ease of Learning
- Ease of Use
- Error Handling
- Performance
- Versatility
- Overall Evaluation
- Value for Money

REALISTIC TESTS

Competing programs are all tested exactly the same way, with practical application tests designed specifically for that type of software.

MULTIPLE TESTING

The tests are repeated 10 times for each program, by 10 individual testers with a typical range of backgrounds and varied levels of experience.

UNBIASED RATINGS

The test scores are averaged to further reduce the possibility of bias, and the ratings are determined objectively by formulas.

CONCISE REPORTING

The test results and ratings are presented concisely. With a minimum of words. And no advertising. Just useful, bottom-line information from the most methodical, consistent testing organization in the field.

EASY REFERENCE

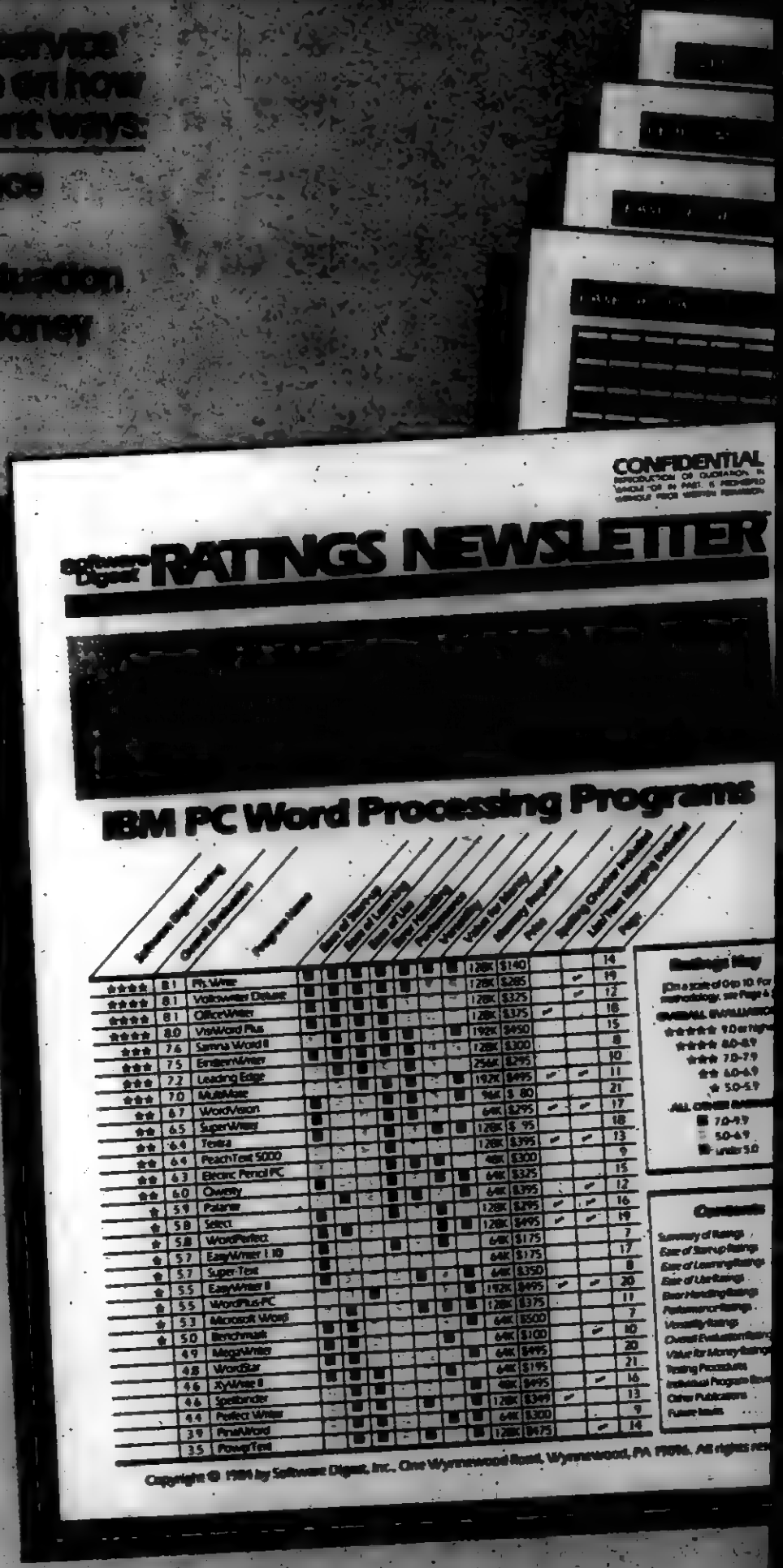
All reports about competitive programs are in the same issue. Easy to find. Easy to understand.

TEN IMPORTANT ISSUES IN 1984

Each issue covers one category. And, because there are so many changes during the year, each of these 10 categories will be completely retested annually:

1. Word Processing
2. Data Management
3. Spreadsheets
4. Graphics
5. Time Management
6. Self-Improvement
7. Tax & Investment
8. Communications
9. Special Applications
10. Integrated Software

Subscribe today, and you'll soon know more about the comparative merits of IBM PC programs than even the top experts knew just a few weeks ago.



Software Digest RATINGS NEWSLETTER

Yes, I would like to receive the results of your extensive tests of IBM PC programs. Enter my subscription to the Software Digest RATINGS NEWSLETTER, and send my FREE COPY of the first issue right away. If for any reason I am not satisfied after receiving the second issue, I may cancel at any time and you will send me a prompt refund for all unmailed issues.

☐ 1 Year (10 Issues) for $135 ☐ 2 Years (20 Issues) for $240

(Overseas orders must add $3 per issue and be fully prepaid in US currency.)

☐ Payment enclosed ☐ Bill me ☐ Bill my company

Charge to my ☐ MasterCard ☐ VISA ☐ AmericanExpress AmericanExpress orders should be mailed in envelope or phoned in

Card # Exp. Date

Name

Company

Address

City, State, Zip

Signature

SPECIAL TOLL-FREE LINE FOR CREDIT CARD ORDERS: 800-223-7093 (IN PA: 800-222-3315)

SDSC024

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

7

BUSINESS REPLY CARD

FIRST CLASS PERMIT NO. 526 WYNNEWOOD, PA

POSTAGE WILL BE PAID BY ADDRESSEE

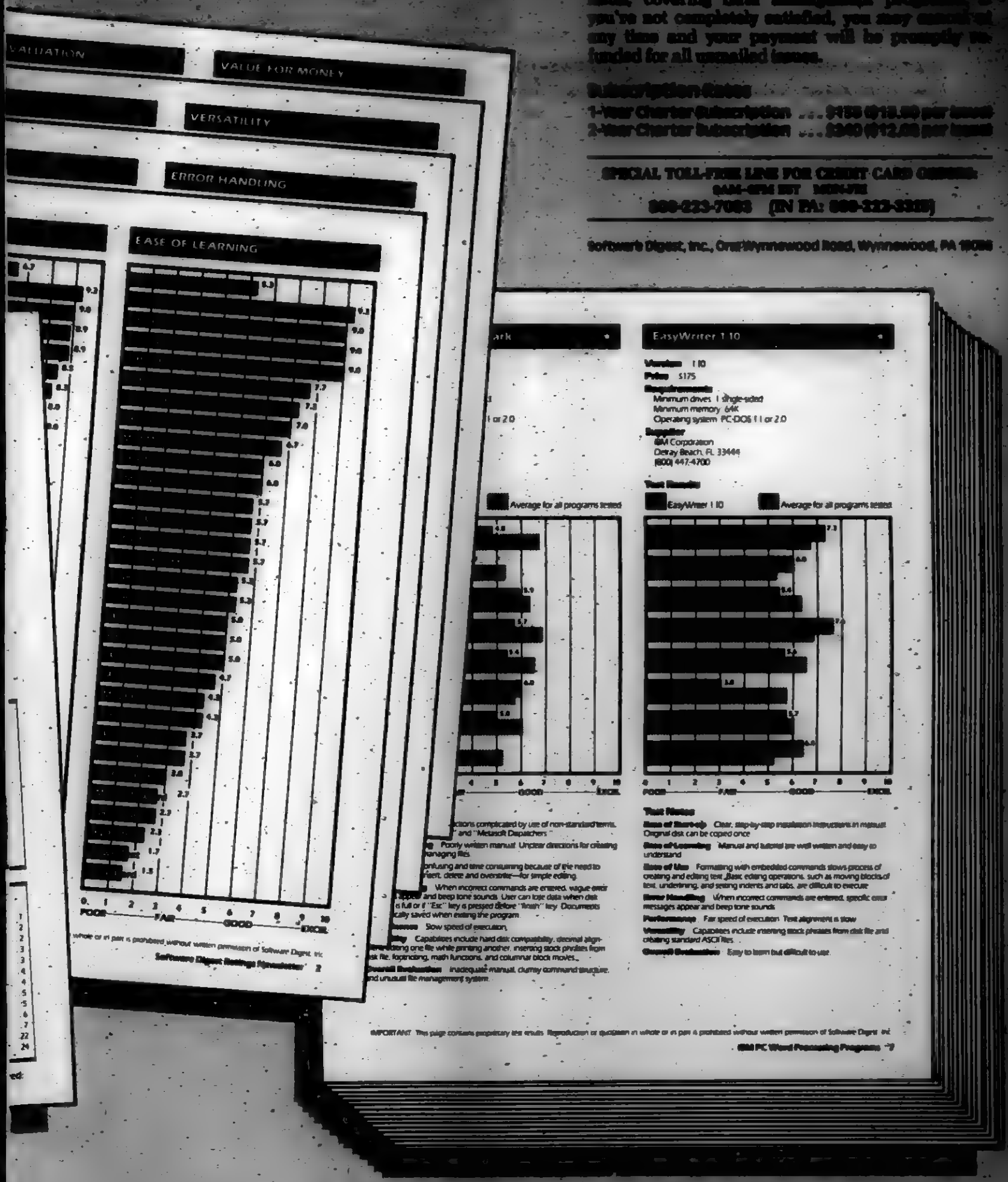
Software Digest
One Wynnewood Road
Wynnewood, PA 19096

Take a 1-year or 2-year subscription
and get one complete word processing
Your paid subscription will begin with the
issue, covering data management programs. If
you're not completely satisfied, you may cancel at
any time and your payment will be promptly re-
funded for all unmailed issues.

Subscription Rates
1-Year Charter Subscription ... $155 ($13.00 per issue)
2-Year Charter Subscription ... $240 ($12.00 per issue)

SPECIAL TOLL-FREE LINE FOR CREDIT CARD ORDERS:
8AM-4PM EST MON-FRI
800-223-7083 (IN PA: 800-223-7385)

Software Digest, Inc., One Wynnewood Road, Wynnewood, PA 19096



Want to know how Software Digest ratings are determined? Please turn this page ▶

Here's how Software Digest tested and rated 30 IBM PC word processing programs—a project that took two months and cost over $100,000. The testing of data management programs is currently being completed with a different series of tests designed just for that application. Each category of software will be tested with the same methodical thoroughness, consistency and impartiality.

Reproduced from the first issue of the Software Digest RATINGS NEWSLETTER.

THE SOFTWARE DIGEST RATINGS METHODOLOGY

Testing and Rating Procedures for Word Processing Programs

Testing Procedures

Our testing procedures for word processing programs consisted of three phases:

In the first phase (INSTALLATION), the reviewers installed the program following the instructions given by the software supplier. This generally included making one or more backup copies of the master disk, adding the operating system to the program disk, creating a data disk, and selecting the correct type of monitor (color or monochrome) and printer. The installation procedure was timed and comments noted.

During the second phase (THE "2-HOUR TEST"), reviewers were given exactly two hours to learn how to edit a simple letter with the program, plus whatever else could be learned within that period. This was the only phase with a specific time limit. A two-hour limit was chosen because it is about the maximum time a typical user would spend with a program before trying to use it.

In the final phase (EDITING/PRINTING), reviewers were given a prepared disk file containing a standard one-page letter with text to be changed, deleted, moved, copied, centered, underlined, and then printed. As with the installation procedure, editing and printing were timed. Thus, the test was designed to answer the question: "After spending two hours to learn this word processing program, how difficult and time consuming is it to produce a typical business letter?"

At the end of each phase, reviewers reported their observations on a detailed report form. Individual scores were recorded for the ease of performing a typical range of editing functions, as well as ease of installation, ease of learning, ease of use, speed of execution, error messages, error resistance, and overall evaluation.

Rating Procedures

Information provided by the tests was statistically summarized in eight rating categories described below. Each category had a possible score between 0 and 10 (10 being the highest rating).

Ease of Start-up Ease of getting the program "up and running." It included the average time required for installation (inverted and adjusted for upper and lower limits) and the average Ease of Installation score.

Ease of Start-up = ((10 − ((Installation Time − 5) / 45 • 10)) + Ease of Installation) / 2

Ease of Learning The average Ease of Learning score. It was a measure of how simple it was to learn to use the program, as determined by each reviewer.

Ease of Learning = Total Ease of Learning Scores / 10

Ease of Use Statistical mean of the average time required to edit and print the standard letter (inverted and adjusted for upper and lower limits), the average Ease of Use score, and the average Functional score (composed of a series of editing procedure scores).

Ease of Use = ((10 − ((Minutes to Edit − 15) / 105 • 10)) + Functional Score + Ease of Use) / 3

Error Handling A weighted composite of reviewer scores (50%) and our Technical Department's error-testing procedures (50%). Reviewer scores included whether the program "froze" (i.e., refused to respond to further user commands), whether data was lost, and the average scores for Error Messages and Error Resistance. The Technical Department procedures included tests for how the program handled specific situations: disk full, disk directory full, attempting to read a disk with the drive door open, reading and writing to a non-existent drive (e.g., Q:), writing to a write-protected disk, system memory full, printer cable disconnected, and printer turned off. Each program was also checked to see if it prompted users when they attempted to leave the system before saving the current text to disk.

Error Handling = (Freeze + Data Lost + Error Messages + Error Resistance + (4 • Lab Score)) / 8

Performance Statistical mean of the average Execution Speed score and the average letter score (i.e., how well the reviewers were able to correctly edit and print the final copy of the letter).

Performance = (Execution Speed + Letter Score) / 2

Versatility The program's power, above and beyond simple word processing functions, based on a checklist of 20 advanced features. One point was given for each of the 20 features on the following list which the program possessed, and the total was divided by two to place it on a 10-point scale.

Versatility = (Five or more printers specifically supported +
Hard disk compatibility +
User can reassign keys or build macro commands +
Shows preview of printing +
Decimal alignment +
Can edit one file while printing another +
Can insert stock phrases from disk file +
Deletions can be restored +
Creates standard ASCII files +
Split screens or windows +
Multicolumn formatting +
Virtual memory +
Footnoting capability +
Mouse compatible +
Math capability +
Index and/or table of contents creation +
Columnar block moves +
Soft hyphenation +
Text can be more than 80 columns wide +
Print selected page or range of pages) / 2

Overall Evaluation A weighted average of all of the preceding ratings and the average Overall Evaluation score, as follows:

Overall Evaluation = ((2 • Ease of Use) + Ease of Start-up +
(2 • Ease of Learning) + Performance +
(2 • Error Handling) + Versatility +
(2 • Overall Evaluation)) / 11

Value for Money An indication of what to expect for your money. The two variables were the Overall Evaluation rating and the program price. For the purpose of fair comparison, the retail price of each program was adjusted by subtracting $50 for each major accessory program included (such as list/text merge and spelling checker programs). These accessory programs were not tested and, therefore, played no part in the reviewer scores.

Value for Money = (Overall Evaluation + (10 −
(Adjusted Price − 50) / 45)) / 2

For more information about The Ratings Newsletter, please refer to the preceding two pages.

Software Digest, Inc., One Wynnewood Road, Wynnewood, PA 19096.

MICROCOMPUTERS

BOARD-LEVEL DEVICES

EDUCATIONAL MICROCOMPUTER SYSTEMS
M68K development package

Educational Microcomputer Systems has introduced its M68K hardware/software package, which allows the development and debugging of Motorola, Inc. 68000 programs on the IBM Personal Computer, Apple Computer, Inc. Apple II and Radio Shack TRS-80.

According to the vendor, the hardware is a standalone 68000 single-board computer with a 6-MHz or 10-MHz 68000 CPU, 20K bytes of static random-access memory, 16K bytes of erasable programmable read-only memory, two RS-232 serial ports, a 16-bit parallel port, five 16-bit counter timers and an expansion bus to allow for memory and I/O expansion.

The package starts at $795 for a 6-MHz version.

Educational Microcomputer Systems, P.O. Box 16115, Irvine, Calif. 92713.

PATHWAY DESIGN, INC.
Pathway Design/3770; Communications Adapter; Adapter Cable

Pathway Design, Inc. has introduced Pathway Design/3770, which transfers files to and from IBM hosts in Systems Network Architecture/Synchronous Data Link Control (SNA/SDLC) or Binary Synchronous Communications (BSC) networking environments by emulating 3770 remote job entry stations.

The product works with the IBM Personal Computer and the Wang Laboratories, Inc. Professional and can be enhanced to support the Digital Equipment Corp. Rainbow and Unix-based systems.

Pathway Design/3770 allows the microcomputers to send and receive data simultaneously by emulating a multilogical unit that supports six data streams.

The product supports host data compression, full-formatted printing, multiple-selectable devices and Ascii or Ebcdic line transmission, the vendor said.

The vendor also announced its Pathway Design/Communications Adapter, a multifunction, dual-channel circuit card that operates in conjunction with the vendor's software and the Pathway Design/Adapter Cable.

The Pathway Design SNA/SDLC and BSC products are priced at $595.

The Communications Adapter is $295, and the Adapter Cable is $50.

Pathway Design, 177 Worcester St., Wellesley, Mass. 02181.

AUXILIARY EQUIPMENT

PMC INDUSTRIES, INC.
Model 033

PMC Industries, Inc. has introduced an ac line transient/surge suppressor designed to protect microcomputers and microprocessor-based instrumentation.

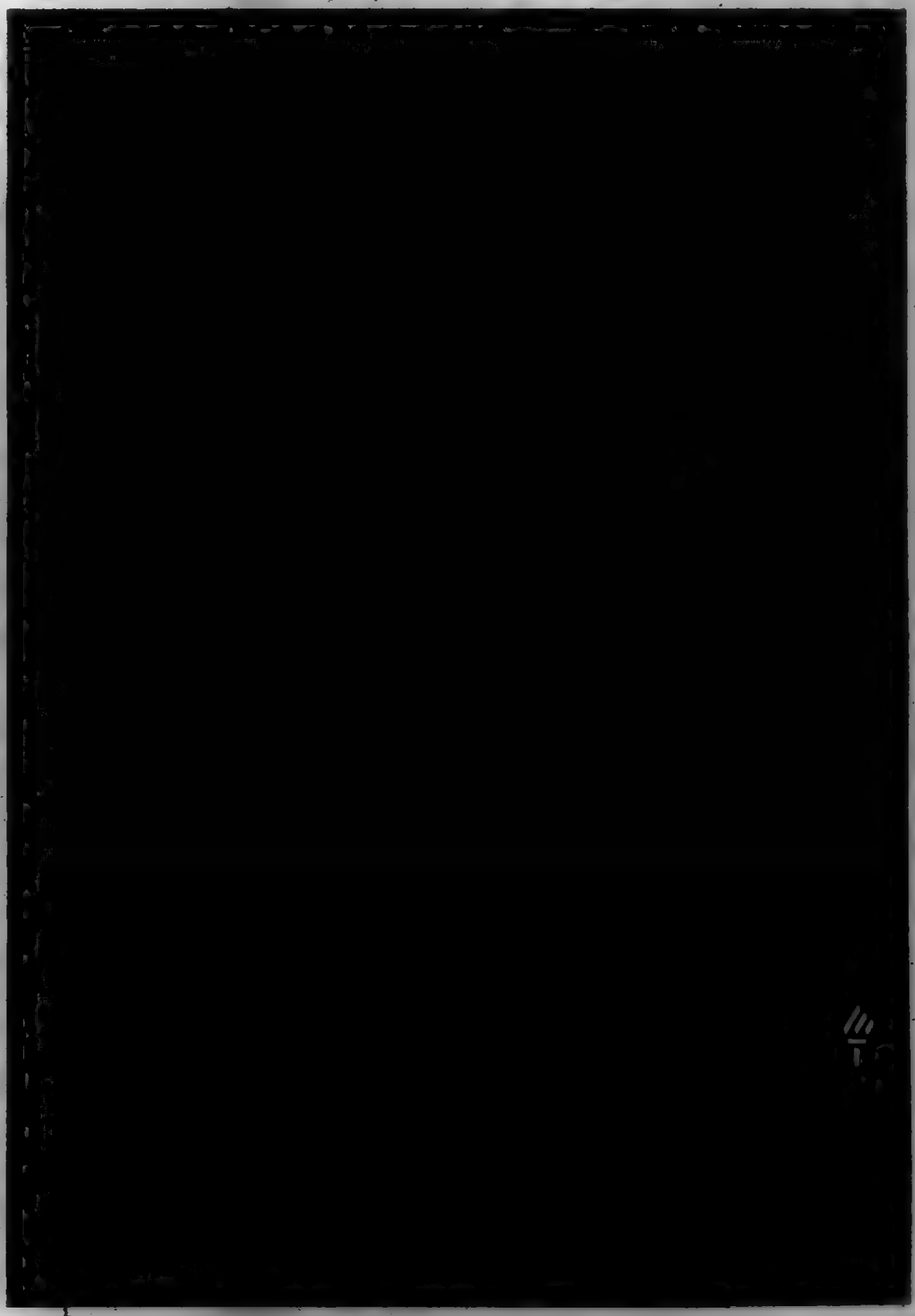
According to the vendor, Model 033 is designed to sense and suppress very high-voltage transients, which can cause damage and data scrambling. It features suppression capabilities of 15,000A maximum surge current.

It reportedly works on any standard 120 Vac line and responds to transients and surges in less than 25 nsec.

Model 033 costs $135.

PMC Industries, 9353 Activity Road, San Diego, Calif. 92126.

VAX™ USERS!
NOW GET SPREADSHEET AND GRAPHICS IN ONE PACKAGE.
• Full business graphics • Advanced features • Affordable price
GRAPHIC OUTLOOK™
from STONE MOUNTAIN COMPUTING
1096 Cambridge Dr.
Santa Barbara, CA 93111 (805) 964-6101
VAX is a trademark of Digital Equipment Corporation.



MICROCOMPUTERS

MICRO SOFTWARE

CUBICOMP CORP.
Easel version

Cubicomp Corp. has introduced a new version of Easel, a graphics software package used to paint full-color images with a graphics tablet.

The package runs on Microsoft, Inc.'s MS/DOS Version 1.1 or 2.0 and requires 500K bytes of memory on an Intel Corp. 8087 coprocessor. It runs with the vendor's CS-5 solid modeling design system for IBM Personal Computers and compatibles.

Easel costs $2,450; the CS-5 graphics system, with graphics display generator, is $9,700.

Cubicomp, 3165 Adeline St., Berkeley, Calif. 94703.

FISCHER INNIS SYSTEMS CORP.
Watchdog

Fischer Innis Systems Corp. has introduced Watchdog, a software-based security product for the IBM Personal Computer running on IBM's PC-DOS Versions 2.0 and 2.1.

According to the vendor, users must provide passwords to verify their access authority when they turn on the computer or log onto the system. Information can be enciphered or scrambled, and the system administrator can order customized audit reports on user activity.

The Watchdog package, consisting of two diskettes with a system administrator guide and a user guide, is priced at $295.

Fischer Innis Systems, 4175 Mercantile Ave., Naples, Fla. 33942.

THE SMALL COMPUTER CO., INC.
Filepro NCR

The Small Computer Co., Inc. has announced Filepro NCR, a data base management system for NCR Corp.'s Tower multiuser microcomputer.

The menu-driven package allows the user to create electronic files, or it can automatically arrange user-defined fields on a screen or report, the vendor said. Data also can be transferred between files.

Other features include conditional processing, recalculations for complete files based on new data, automatic error checking, indexing and file selection functions and file search capabilities.

Up to 15 users can run programs at the same time on the same system in the same file. Security protection is provided at field, screen, file, user or system level. Minimum hardware requirements for Filepro NCR are a Tower with 512K bytes of internal memory, hard disk drive and terminal. It is available at an introductory price of $995.

The Small Computer Co., Suite 1900, 230 W. 41st St., New York, N.Y. 10036.

MICROSPARC, INC.
Lexicom Version 3.0

Microspare, Inc. has introduced a version of its Lexicom software, a file transfer utility for users of Apple Computer, Inc. microcomputers.

Lexicom Version 3.0 is said to create standard sequential files from

Continued on page 95

NETWORKING UNRAVELED FOR YOU!

Technology Transfer Institute's Seminars by THE EXPERTS ON NETWORKS

It might seem as though the technology for configuring networks these days has become a real nightmare. The truth is that the maze of choices simply needs to be put in the proper perspective. Should you use satellites, phone lines, public or private networks, value-added networks, broadband, baseband, fiber optics, all or some, and in what configuration? The list goes on and on. Besides the options, the jargon is enough to drive you crazy — LANS, MANS, VANS, X. this, X. that and who knows what else, not to mention keeping track of the emerging standards.

To assist you in putting all of these network technologies in their proper perspective, Technology Transfer Institute has assembled an amazing set of Network Pioneers to conduct the Spring '84 series of NO-NONSENSE SEMINARS.

TTI'S line-up of "EXPERTS ON NETWORKS" will help you unravel your networking dilemmas, be it performance, evaluation, queueing, protocols, configuration, planning or architectural concerns.

To get all the facts on the TTI seminars, give us a call or send the coupon today for your Spring '84 catalogue of network courses. Discover why TTI seminars continue to be "the standard in the field against which all others are measured."

- **Experts on Networks** — KLEINROCK/WARMENHOVEN/WEIR/ROBERTS
  April 30–May 3, Washington, D.C.
- **Queueing Systems and Computer Applications** KLEINROCK
  April 3–6, Washington, D.C.
- **Integrated Voice/Data PBX: Architectures and Products** — OPDERBECK
  May 21–23, Washington, D.C.
- **SNA** — MARKOV/PIATKOWSKI
  April 23–25, Washington, D.C.
- **Strategic Planning for Telecommunications** McQUILLAN AND GUESTS
  May 7–9, Washington, D.C.

Call **(213) 394-8305** or mail the coupon today for your detailed brochure.

NETWORKING SEMINARS UNRAVELED

NAME

COMPANY NAME

ADDRESS

CITY/STATE/ZIP

TELEPHONE

CW2/27/84
OCV/14/84

TECHNOLOGY TRANSFER INSTITUTE
741 10th St., Santa Monica, CA 90402, (213) 394-8305

S1 from page 83

dowing and bit mapping, graphics and utilities, support for IBM Isam and Vsam file structures as well as B-Tree and removable files. S1 supports all forms of memory management, including virtual memory, they say. Compilers are also available for most major programming languages and even for more esoteric languages like Modula, Snobol and Lisp.

Comments from the few independent observers who have seen S1 bear out the company's claims. "They've taken mainframe operating system concepts and implemented them in S1," said John Farley, manager of software development at IMS International Corp. in Carson City, Nev. Among the more attractive large machine concepts he cited are multiprocessing, communications and the availability of semaphores and locks. He added that he has seen no other micro-based operating system that combines those features.

"From my standpoint the product is phenomenal," Tebbe said. "If it doesn't become accepted, it will be because it doesn't get market recognition, not because of any technical shortcomings."

S1's potential problems arise from the fact that it still lacks a major endorsement, although Lombardo claimed one was imminent. "I'm just surprised if it's so wonderful that more people haven't made commitments to it," said Peter Marvit, senior analyst with Yates Ventures in Los Altos Hills, Calif.

Tebbe pointed out that the product's claimed portability may also act as a hindrance. "To be truly portable you have to sacrifice certain capabilities that different processors have," he said. "But if they had it on [an IBM Personal Computer] with a [Microsoft, Inc.] MS-DOS emulator, they could open a big door."

However, he noted that for a small, two-year-old company like Multi Solutions, a major endorsement promises to be difficult. "If I'm a hardware vendor, why should I buy the heart of my machine from a company like this when I can buy MS-DOS or Unix?" he asked.

Lombardo asserted that the portability of S1 will make it popular with chip vendors. "It takes five man-years to put an operating system on a new chip, and we can do it in nine man-months. They no longer have to build features like networking, multitasking and keyed fields into the applications because that's already in the operating system."

The Star of Team Xerox.

XEROX

The Star 8010 professional workstation has always been known as a computer of dazzling capabilities, especially in its graphics, information processing and document preparation.

Team Xerox

But what some people may not know is that the Star is also the key element in Team Xerox, a system of office machines designed to work together like a team.

When part of an Ethernet network, the Star can work with a wide array of word processors, mainframes, personal and business computers, printers, electronic mail and file services, facsimile terminals, communicating Memorywriters, other networks and, of course, other Stars. It also provides 3270 and TTY emulation.

Its full 17" bit-mapped screen lets you view two full pages simultaneously and open up to six documents at a time without covering up a previous document.

It's also the only workstation that can create and print documents in more than a dozen languages, including Russian and, for the first time, Japanese (Katakana, Hiragana and Kanji).

While other workstations may use Xerox innovations like the mouse, icons, windows, property sheets and combined text and graphics, the Star simply does more with them.

For example, the Star's extensive software is fully integrated, to allow you to work with text and graphics simultaneously. You can draw a flowchart right in the middle of a full page of text without having to resort to a separate program and limited buffer "scratchpad" or "clipboard."

In terms of capabilities, ease of use and overall value, the Star would have to be considered the stellar workstation in the industry.

When Computerworld delivers the goods on manufacturing systems this March 26th, you'll definitely want to be there.

Ad deadline is March 9th.

In response to the increasingly heavy involvement of DP/MIS people in computer-aided manufacturing (CAM) and computer-aided engineering (CAE), *Computerworld* is preparing a Special Report that focuses on CAM/CAE, manufacturing resources planning (MRP), robotics, inventory and shop floor control.

We'll also cover the effect these new technologies are having on traditional manufacturing operations. And on the delicate relationships between traditional DP departments and the factory automation specialists.

If you act before March 9th — your products or services can be represented. To reserve space in this issue, call one of the sales offices listed below or call Ed Marecki, National Sales Director at (617) 879-0700.

To: Ed Marecki, National Sales Director
CW Communications/Inc.
Box 880
Framingham, MA 01701

☐ Please send me advertising information for *Computerworld*.
☐ Please have a sales representative call me.

Name _____
Title _____
Company _____
Address _____
City _____ State _____ Zip _____

CW3/9

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Sales Offices
BOSTON/Chris Lee, Jim McClure, Ron Mastro, Jayne Donovan, Michael Kelleher, Alice Longley, (617) 879-0700
CHICAGO/Art Kossack, Chris Lee, Russ Gerches, Jean Broderick, (312) 827-4433
NEW YORK/Mike Masters, Doug Cheney, Ray Corbin, Joan Daly, Fred LoSapio, Gale M. Paterno, (201) 967-1350
ATLANTA/Jeffrey Melnick, Mike Masters, (404) 394-0758
SAN FRANCISCO/Bill Healey, Barry Milione, Theodora Franson, Ernie Chamberlain, Nicole Boothman (classified), (415) 421-7330
LOS ANGELES/Bob Hubbard, Bill Healey, Bernie Hockswender, (714) 261-1230

MICROCOMPUTERS

Continued from page 92

Apple's DOS 3.3 operating system. The files can be created from several types of files, the vendor said.

Lexicom 3.0 is available for $49.95. Current owners of any version of Lexicom can receive an update for $10 with return of the original disk.

Microspare, P.O. Box 285, Lincoln, Mass. 01773.

DIGITAL EQUIPMENT CORP.
Construction Management System

Digital Equipment Corp. has announced a portfolio of business software packages designed for small- to medium-size commercial contractors using DEC's Decmate II Business Computer System or Rainbow series of microcomputers.

A 10M-byte Winchester hard disk-based Construction Business Management System for the Decmate II reportedly enables contractors to manage 99 jobs, keep track of employees on weekly payroll lists and monitor more active subcontractor accounts than was possible with floppy-based systems. It costs $4,995 and will be available in mid-March.

The floppy disk-based Construction Management System for the Decmate II offers an entry-level automation tool to contractors, DEC said, and has modules for accounts receivable and payable, payroll and job costing. It is available now for $3,500.

Included in the portfolio are Comshare, Inc.'s Target, providing a part chart structure for orderly completion of complicated projects, priced at $329 and available now; and Contractor's Management Systems' Easyest, designed to develop job estimates, priced at $500 and available in mid-March.

DEC, 146 Main St., Maynard, Mass. 01754.

THE COMPUTER CO.
TRS-80 version of APL.68000

APL.68000, an APL interpreter from The Computer Co. that can address up to 16M bytes of main memory, is now available for Radio Shack's TRS-80 Model 16B 16-bit microcomputer.

APL.68000 is an advanced version of IBM's APL.SV interpretive programming language. Features include a system function and Quad-CC, which facilitates development of full screen applications, as well as an APL.68000 "run-time" version for third-party software development.

The TRS-80 16B version of APL.68000 is priced at $1,500, according to the vendor.

The Computer Co., 1905 Westmoreland St., Richmond, Va. 23230.

ARTSCI, INC.
Magic Office System

Artsci, Inc. has introduced the Magic Office System, an integrated office package for Apple Computer, Inc. and Franklin Computer Corp. systems.

The Magic Office System consists of three programs: word processing, an electronic spreadsheet and a spelling checker. The word processor displays the document as it will be printed, the company said. The spreadsheet is a Visicorp Visicalc-type program that will load Visicalc files.

The three products are integrated through a file folder and file cabinet display. Each data diskette is organized into a single file drawer, while multiple diskettes make up multiple drawers.

The system requires 64K bytes of memory, 80-col. display and two disk drives. It is priced at $295.

Artsci, 5547 Satsuma Ave., N. Hollywood, Calif. 91601.

SOFTWARE PUBLISHING CORP.
PFS:Proof

Software Publishing Corp. has introduced PFS:Proof, a proofreader for the IBM Personal Computer.

According to the vendor, PFS:Proof flags misspelled words in a document and provides correct spelling from its 100,000-word dictionary. It also checks for irregular capitalization, double words and typographical errors.

The program can be used with Software Publishing's word processor PFS:Write or any other Ascii text file, the vendor said. PFS:Proof is priced at $95.

Software Publishing, 1901 Landings Drive, Mountain View, Calif. 94303.

See TRS-80 page 98

MIGRATING TO MVS/XA THIS YEAR?

Don't be a lonely pioneer.

Much has been said about the complexity of the migration to XA. The destination is clear but the route is still hazardous. The good news is that you don't have to "go it alone" any longer. The experiences of others who have blazed the trail before you have been collected by ASI. Benefit from these experiences. Learn while these pioneers tell you where they found problems, and where and how they found the help they needed. They'll also tell you the effort they needed and the resources they used. ASI has a new series of courses available to help you plan your migration,and utilize the potential of XA. This resource is available to you today to help in your migration.

ASI's help does not end with the migration. Once you are there, consolidate your position by using the remainder of ASI's vast MVS/XA training curriculum to show your staff how to manipulate and take advantage of this new environment.

For details of our special introductory offer covering "MVS/XA Migration Considerations" and "Harnessing the Productivity Potential of XA" call or write ASI today.

ASI

Advanced Systems, Incorporated
2340 South Arlington Heights Road • Arlington Heights, IL 60005

Toll-Free Customer Number:
(800) 323-0377

Hewlett-Packa surge in office

Introducing the Person

The principle is simple. Boost the productivity of individual PCs. Your people, your department, even your entire company will follow suit.

The first boost occurred when we introduced the touchscreen HP 150 as an office and managerial workstation. This made personal computing so much easier and faster that individual productivity soared.

Now the Personal Productivity Center combines the flexibility of the HP 150 with the power of our HP 3000 family of distributed computer systems.

You can shape each Productivity Center just the way you want it by adding other office and computing products from our extensive range.

You can link managerial and secretarial work stations. Create impressive presentations, merging business graphics and word processing. Store them on large disc files. And print them out on laser printers and color plotters.

Your PCs also grow more productive by increasing the range of software they can run. In addition to leading PC programs like 1-2-3™ from Lotus™ and popular word processing packages, they can use HP 3000 business software like our exclusive DeskManager. This combines electronic mail, quick memo

rd touches off a productivity.

al Productivity Center.

writing, personal filing and calendar functions. And each PC can access data processing systems and large corporate data bases.

Personal Productivity Centers can communicate with similar networks in other parts of your company, as well as your mainframes. Each system can expand to handle more than 100 workstations. And you can grow without involving your programmers in any software conversion.

So if PCs alone are making your people more productive, just wait till you see them all working together. And you can see them right now by calling your local HP sales office listed in the white pages. Or write for complete information to: Hewlett-Packard, Dept. 03191, 19447 Pruneridge Avenue, Cupertino, CA 95014. In Europe, contact Henk van Lammeren, Hewlett-Packard, P.O. Box 529, 1180 AM Amstelveen, The Netherlands.

It could turn your whole company into a productivity center.

Productivity. Not promises.

HEWLETT PACKARD

1-2-3 and Lotus are trademarks of Lotus Development Corporation.

TOOLS from page 95

SOFTCRAFT, INC.
Btrieve, Btrieve/N enhancements

Softcraft, Inc. has enhanced its file management systems: Btrieve, designed for a single user, and Btrieve/N, which is used with networking systems.

Enhancements include new file characteristics, sorting capability, more efficient use of disk space and high-speed handling options, according to the vendor. The programs feature variable cache buffers, error control and automatic file recovery, the vendor said.

The programs run on the IBM Personal Computer, Hewlett-Packard Co. HP 150, Wang Laboratories, Inc. Professional Computer and Texas Instruments, Inc. Professional Computer.

Btrieve sells for $245; Btrieve/N costs $595.

Softcraft, P.O. Box 9802, No. 590, Austin, Texas 78775.

METASOFT CORP.
Benchmark packages; Word Processor Version 4.0; Spelling Checker Version 2.0

Metasoft Corp. has announced several business software programs and enhanced versions of its word processing and spelling checker programs for several microcomputers.

Four programs have been added to the vendor's Benchmark series. The Administrator is a directory program that reportedly integrates nine Benchmark application programs. It enables the user to perform configuration and disk formatting and copying procedures as well as interface with most Microsoft, Inc. MS-DOS applications programs and utilities, a spokesman said.

The Financial Planner is a programmable three-dimensional spreadsheet for business planning. The Data Manager is a data base program for storing business and technical information. Business and Presentation Graphics can display data in such formats as a clustered bar chart, a stacked bar chart, a horizontal bar chart, a pie chart, a line graph and an X-Y plot. It also provides the ability to draw freehand and generate arcs, rectangles, circles and text strings, the spokesman said.

Prices are: Financial Planner, $295; Data Manager, $295 to $395; and Business and Presentation Graphics, $295. Word Processor Version 4.0 will be priced between $295 and $350, and Spelling Checker Version 2.0 will cost $125, the spokesman said.

The programs run on the IBM Personal Computer and Personal Computer XT, Texas Instruments, Inc. Professional Computer, Digital Equipment Corp. Rainbow, NEC Corp. PC-8800 and Victor Technologies, Inc. 9000 microcomputers.

Metasoft, Suite 12, 6509 W. Frye Road, Chandler, Ariz. 85224.

WADSWORTH PROFESSIONAL SOFTWARE, INC.
Statpro for Lisa 2

Wadsworth Professional Software, Inc. has introduced a version of its Statpro series of integrated statistics, graphics and data management programs for the Apple Computer, Inc. Lisa 2 microcomputer.

According to the vendor, Statpro contains five modules for statistical procedures. The package runs on a Lisa 2 with 512K bytes of memory. It also runs on the Apple II with 64K bytes of memory, the Apple III with 256K bytes and the IBM Personal Computer and Personal Computer XT with 128K bytes of memory, the vendor said.

The package, scheduled for release in June, is priced at $1,995.

Wadsworth Professional Software, Statler Office Building, 20 Park Plaza, Boston, Mass. 02116.

APPLIED SOFTWARE TECHNOLOGY, INC.
Versaform

Applied Software Technology, Inc. has introduced Versaform for the Corvus Systems, Inc. Concept microcomputer.

According to the vendor, Versaform allows the nontechnical user to automate business application requirements using a form-oriented record.

Versaform, which runs under IBM's PC-DOS or Microsoft, Inc.'s MS-DOS operating systems, is also available for the IBM Personal Computer and Personal Computer XT. The package can also be used on Apple Computer, Inc. Apple II, IIe and III micros, as well as those manufactured by other vendors. The release is written under the UCSD P-system and costs $495.

Applied Software Technology, 170 Knowles Drive, Los Gatos, Calif. 95030.

CDEX CORP.
Training programs

Cdex Corp. has announced two training tutorials for IBM Personal Computer users.

Both products include four diskettes of interactive instruction and a reference of important keystroke sequences and operating system commands.

The goal of the course is an understanding of Basic programming, applications software, fundamental hardware concepts and operating systems. The programs are menu-driven, allowing the user to determine the depth of instruction and the pace at which it is given.

The programs are available at retail outlets for a fee of $69.95 each.

Cdex, Suite 200, 5050 El Camino Real, Los Altos, Calif. 94022.

ANNOUNCING
the premiere of
jr.®

Learning to use your *IBM PCjr* becomes easy and fun with jr magazine. Because jr keeps things simple, the whole family will *learn and understand while they enjoy themselves.*

jr will explain how the *PCjr* works and guide you step-by-step in setting up your system. Most of all jr will answer your most important questions month after month . . . like

- **What can I use my *PCjr* for?** jr magazine will teach you how to prepare household budgets, balance your checkbooks, do your taxes and organize schedules and lists.
- **What about the kids?** From kindergarten to college, jr helps the kids with educational programs in every subject area.
- **Are there more serious uses for *PCjr*?** Yes! You'll improve your own business skills by learning about word processing, spreadsheets and graphics.
- **What about having fun with *PCjr*?** Relax and enjoy all the latest games with your whole family.

Plus:

- **What programs should I choose for the *PCjr*?** jr magazine will tell you what programs on the market will run on the *PCjr*, and which ones won't. Plus what new programs are on the way. jr will evaluate them *before* you buy.

Order your subscription to jr today and you'll get the special charter subscription rate of $14.97. That's 25% off the basic subscription rate! Plus, with your pre-payment of check, American Express, Visa or Mastercard we'll send you a FREE issue making a total of 13 issues for $14.97.

Take advantage of this incredible charter subscription offer. Mail the attached coupon or call TOLL FREE 1-800-258-5473. In New Hampshire call 1-924-9471 . . . TODAY!

Sign me up as a charter subscriber to jr. I understand that with prepayment of check or credit card I'll receive a FREE issue making a total of 13 issues for $14.97. Save $5.00 off the basic rate!

☐ CHECK/MO ☐ MC ☐ AE ☐ VISA ☐ BILL ME

Card # _____ Exp. Date _____

Signature _____

Name _____

Address _____

City _____ State _____ Zip _____

Canada & Mexico $17.97, 1 year only, US funds drawn on US bank. Foreign Surface $34.97, 1 year only, US funds drawn on US bank. Foreign airmail, please inquire. Please allow 6–8 weeks for delivery.

ACSPCW

jr. For IBM's Home Computer
Box 903 Farmingdale, NY 11737

COMPUTER INDUSTRY

Apple wakes up to reality of IBM

INDUSTRY INSIGHT

PETER BARTOLIK
CW Senior Editor

After mistakenly believing they would storm the business market with the Lisa microcomputer product, Apple Computer, Inc.'s personnel have apparently woken up to the reality of doing business with businessmen.

They're still brash and still very bold. But they've definitely been humbled.

A year ago, it would have been akin to treason for an Apple man to express the idea that Big Blue could 'whup' the blue jeans-clad and long-haired crowd from California. But that's exactly what Apple Vice-President William Campbell admitted, with an IBM man sitting next to him, during a recent seminar hosted by *Fortune* magazine.

"IBM really kicked our tails in that marketplace," Campbell said with refreshing candor. Noting Apple has "not been a serious contender in the Fortune 1000 market," Campbell said the Lisa introduction a year ago "was an aborted attempt." With no mainframe access and no networking and communications capability, the Lisa was destined to fail.

Now Apple is aggressively going after the end-user market, seeking to enter the corporate environment by building up a cadre of supporters who become comfortable with computing via the recently introduced Macintosh. The revamped Lisa family will have a limited networking capability and some ability to pull data from a mainframe, he added.

■

After showing Apple's new ads for the Macintosh and the controversial 1984 ad that ran during the Super Bowl in January, Campbell revealed that Apple tried to pull off the futuristic film, but couldn't sell it all the time.

Thinking that the money for running the ad could be put to better use elsewhere, Campbell said that Apple tried to sell its commitment for 30-second and 60-second spots, but could only find a

See APPLE page 105

IBM portable to impact mart

But Compaq chief expresses little concern

By Peter Bartolik
CW Staff

Compaq Computer Corp. posted earnings of $111 million in its first year after filling a void in the IBM line of Personal Computers with a transportable compatible computer that won much-prized shelf space next to IBM units at large computer retail stores. But IBM recently announced its own portable with a very competitive price.

"I don't think IBM took aim at any particular company, but it probably took note of our success," Rod Canion, president of Compaq, told *Computerworld* shortly after IBM's announcement.

The IBM portable was priced at $2,795 for a 256K-byte random-access memory version with one disk drive, $200 less than Compaq's general retail price for the Compaq Portable Computer.

Canion expressed little concern about Big Blue's move. "There's really nothing new that they've come out with," he said. "They seem to be quite a bit behind us; our first product was announced 15 months ago, and it's certainly behind our second generation product, the [Compaq] Plus."

Shelf space at premium

With retail shelf space at a premium, Compaq is generally regarded as the most successful compatible-manufacturer because it was able to win space in retail stores that deal in IBM Personal Computers. Canion conceded that IBM's latest move has the "potential" to tie up shelf space previously earned by competitors, but maintained, "we've invested a lot the last year in dealer relations and customer satisfaction; we've really become the standard for portables."

He added, "There definitely will be an impact [on available shelf space], and it will hurt those vendors that are not already accepted."

In light of reports that IBM will only ship a limited number of its new portable machines and the fact that the actual "street price" for the basic Compaq is below IBM's announced price, Canion said he believes the company is well positioned to remain competitive. The company is pres-

See COMPAQ page 101

Outside firms training IBM users

By Robert Batt
CW West Coast Bureau

MENLO PARK, Calif. — In a departure from tradition, IBM has appointed four outside training companies to teach users the fundamentals of its Personal Computer systems.

The four firms — Applied Computer Consulting (ACC) in Oakland, Calif; Computerknowledge Corp. of Dallas; PC Support Center Ltd. in Honolulu; and Patricia Ritchie Associates of Burlington, Mass. — are training microcomputer users at selected IBM product centers across the nation.

According to Alan Hunt, manager at IBM's national marketing division in Atlanta, "This is the first time that IBM has gone outside the company to provide a service within the IBM organization. We decided to do it this way because we were not sure we could meet the volume of demand from our own resources."

The training provided by the four companies is designed to give business and professional users of the Personal Computer, Personal Computer XT and PCjr a basic grounding in the various hardware features and software applications of the respective machines.

Users may take introductory or advanced courses in the Lotus 1-2-3 spreadsheet package from Lotus Development Corp.; Visicalc, a program from Visicorp; Multiplan, a financial forecasting package manufactured by Microsoft, Inc.; and IBM's own DOS operating system.

According to the training companies involved, many of the students are first-time users, often from Fortune 1000-type firms.

"Actually getting your hands on the computer from the very beginning is the

See TRAIN page 102

STC

Storage Technology Corp. reported a loss of $40.9 million for 1983, including a $31.5 million expense resulting from cancellation of a mainframe development project/**100**

FORTUNE

A range of micro distribution channels is best for consumers, an IBM executive said at a recent *Fortune* magazine seminar/**104**

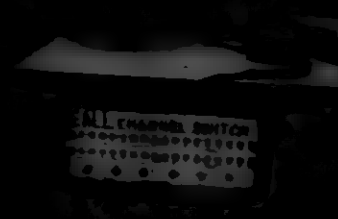
INSIDE

■ IBM, Sears and CBS announce a joint videotex venture planned for home computer users/**100**

■ Digital Equipment Corp. restocked its executive team recently, promoting several managers to vice-presidents/**102**

■ Anacomp, Inc. settles debt problems, reports quarterly losses and 'terminates' a top executive/**103**

A Simon Legree for Computers



John Beall & Company, Inc.

IBM, CBS, Sears to offer joint home videotex service

NEW YORK — IBM, CBS and Sears Roebuck & Co. announced a joint videotex venture last week to develop a commercial service for home computer users. But the service is unlikely to be available for several years, according to a press release.

Shortly after the announcement, an IBM spokesman said "We will support NAPLPS, Ascii and probably other formats." NAPLPS — the North American Presentation Level Protocol Syntax — is the recently adopted U.S. videotex standard; it specifies the format of the bits that create the graphics displayed on the viewer's screen.

Based largely on Canadian technology, NAPLPS has been promoted in this country by AT&T and CBS. Within the past year, a software-based NAPLPS decoder for the Commodore Business Machines, Inc. Commodore 64 personal computer was developed by Avcor Ltd. of Toronto [CW, July 4, 1983]. Retail sales of the decoder, priced at $100 to $125, began recently.

Last week, Avcor's Marketing Vice-President Zal Press reported his company is developing a similar decoder for the IBM Personal Computer that is expected to be available in about three months. The price will be under $200. Avcor also plans to develop a low-cost NAPLPS decoder this year for the IBM PCjr.

At least four other companies, including two in the U.S., are developing and marketing software-based NAPLPS decoders for personal computers, Press added.

The possibility of using the Personal Computer as a videotex terminal may have been a major reason CBS teamed up with IBM and Sears. Earlier, in collaboration with AT&T, CBS sponsored "Venture One," a videotex trial in Ridgewood, N.J. But the terminal was an expensive, specially built television set supplied by AT&T.

The phone company is marketing a similar terminal in Miami, where Knight-Ridder Newspapers recently began Viewtron, the nation's first commercial videotex service. The Viewtron terminal is priced at $600, but reportedly costs much more than that to build.

There's a market for your product abroad.
You can reach the right people in the major computer markets throughout the world. The people who make the buying decisions—in countries already importing more than $3 billion in computer hardware, software and supplies.

CW International Marketing Services gives you one, efficient source for direct contact with the leading local computer publications in the world's major computer markets. How can we do this for you? We have a wide network of editorial offices around the world and provide first hand marketing information to our clients. Plus, we have over 10 years experience in the publishing industry.

We're a division of CW Communications/Inc., publishers of *Computerworld* and the world's largest publisher of computer-related newspapers and magazines.

CW International Marketing Services makes it easy.
We'll translate your ads for you and give you production services to meet the specifications of any or all the newspapers and magazines we publish or represent—and—we'll even bill you in dollars. What's more, when you place your advertising through CWIMS, you save the V.A.T. (value-added tax). It's as easy as advertising in your local publications.

We'll even help you with market facts, and, in the case of the People's Republic of China, we can arrange for you to give product and marketing seminars there! You can run your ads in our periodicals in these countries:

*Argentina	*Denmark	*Italy	*Norway	*Saudi Arabia	*Sweden
*Australia	Finland	*Japan	*People's	South Africa	*The Netherlands
*Brazil	*France	Korea	Republic of	*Southeast Asia	*United Kingdom
Chile	Greece	*Mexico	China	*Spain	*West Germany
	India		Peru		

*Published or co-published by CW Communications/Inc.

For more information on how we can help you promote your product all over the world, send us the coupon below or call Diana La Muraglia toll-free at (800) 343-6474 or telex #95-1153. In Massachusetts, call (617) 879-0700.

CW COMMUNICATIONS/INC.
Diana La Muraglia, General Manager
International Marketing Services
CW COMMUNICATIONS / INC.
375 Cochituate Road, Box 880
Framingham, MA 01701, USA

Please send me rate cards and information on publications in the following countries:

Name _____ Title _____
Company _____
Address _____
City _____ State _____ Zip _____

STC reports net '83 loss of $40.9 million

LOUISVILLE, Colo. — Storage Technology Corp. (STC) recently reported a net loss of $40.9 million for 1983, reflecting sharply reduced revenues and a $31.5 million expense resulting from the recent termination of a mainframe development project.

With its stock hovering at the $12 mark, down from a high of $40 two years ago, the losses reported for 1983 represent a per-share cost of $1.19.

STC reported that revenues for the year were $886.6 million, down 17.8% from the $1.07 billion reported a year earlier. In the fourth quarter, revenues were $226.9 million, down 19.1% from the fourth quarter in the previous year.

For the year, the company reported losses of $9.4 million, or 28 cents per share, from ongoing operations, and losses of $31.5 million, or 91 cents per share, from the ill-fated attempt to develop a high-range, IBM-compatible mainframe [CW, Feb. 6]. In the fourth quarter, losses from ongoing operations were $7.8 million, or 23 cents per share, and losses from the mainframe project were $27.6 million, or 80 cents per share, for a net quarterly loss of $35.4 million, or $1.03 per share.

In 1982, STC had posted profits of $64.7 million, or $1.88 per share, and fourth-quarter profits of $8.1 million, or 25 cents per share.

STC Chairman Jesse I. Aweida said the decision to cancel the mainframe project was disappointing but unavoidable in light of program delays, the reduced likelihood of successfully marketing the project and the additional funds that would have been required to complete it.

Class-action suit

STC has been served with a federal class-action suit filed by a member of the partnership which the company formed to raise funds for the project, charging the company fraudulently obtained an additional $10.6 million in funds just four months before the decision came to cancel [CW, Feb. 13].

The company has not publicly commented on that suit.

Commenting on the impact the 1983 losses might have on 1984 operations, Aweida said the company's creditors had been kept fully informed of the mounting losses. "Our credit needs are well within the resources available to us," he said.

Aweida added that products recently introduced by the company are being well received by customers and that he expects the products to continue to do well in the marketplace.

TRANSPORTABLES[1]

Microcomputer	Weight (Lbs.)	RAM	Bits	Operating System	Storage	Display	Price as of 2/84
[illegible]							
[illegible]							
[illegible]							
Computer Devices, Inc. Dot 3000 A	27	64K	16	MS-DOS	1 Floppy Drive	10 in.	$3,220
[illegible]							
[illegible]							
[illegible]							
Non-Linear Systems, Inc. Keygre 10		64K	8	CP/M	1 Floppy Drive 1 Hard Disk	9 in.	$2,795
Keygre IV		64K	8	CP/M	2 Floppy Drives	9 in.	$2,795
Corona Corp. Absolute	20	256K	16	CP/M MS-DOS	2 Floppy Drives	5½ in.	$3,795
Radio Shack/Tandy Corp.[2] TRS-80 Model 4P	26	64K	8	TRS-DOS[5]	2 Floppy Drives	9 in.	$1,799
[illegible]							
Televideo Systems, Inc.[2] Joleste I	30	64K	8	CP/M	2 Floppy Drives	9 in.	$1,999

Shaded Machines Indicate IBM Personal Computer Compatibility
[1] Source: International Data Corp.
[2] Data Provided by Vendor.
[3] MS-DOS from Microsoft, Inc.
[4] CP/M, CP/M 86 from Digital Research, Inc.
[5] TRS-DOS from Radio Shack.

Canion urges compatibility with standard

By Patricia Keefe
CW Staff

HOUSTON — "Don't jump in front of a speeding train, and if you sleep in the same room with an elephant, make sure you are aware [short] before he is."

In this way, Rod Canion, Compaq Computer Corp.'s president and co-founder, talked about competing in an IBM-compatible microcomputer world at the recent PC World Exposition here. Compaq is one of the more successful makers of IBM-compatible microcomputers.

Canion said that IBM's Personal Computer is a de facto industry standard independent even of IBM, primarily because of the amount of business software written for it by third-party vendors. As a result, he predicted, IBM, too, will think twice about making any future architectural changes to its Personal Computer for fear those changes will make it incompatible with the mother lode of software written to run on the current Personal Computer architecture.

Canion said that while some vendors have chosen to ignore the standard and others merely "dabble" in it, Compaq's success comes from recognizing the standard. Canion said micro vendors should be 100% compatible with the standard; paying lip service with halfway "compatibility" is not enough.

Truly compatible to Canion means the capability to run all software as is, off the shelf; same keyboard and program layout; operating system; support for the same peripheral devices; and utilities and documentation commands.

"I don't think you should stand on the tracks in front of a speeding train [IBM] with a flag to stop it. Instead, you should climb on board and work your way [via compatibility/improvements] to the front," he said.

Some areas in which he suggested improvements could be made were cheaper graphics, a reduced footprint, networking and faster and more memory capacity and storage.

COMPAQ from page 99

ently doubling manufacturing capacity and is pushing the Compaq Plus with hard disk and 10M-bytes of memory.

Canion would not comment on whether the company intends to discount its first model to increase its attractiveness to consumers. "We will do what is appropriate," he said.

IBM's new product was announced just a few weeks after it won its first skirmish against previously ignored Personal Computer-compatible manufacturers.

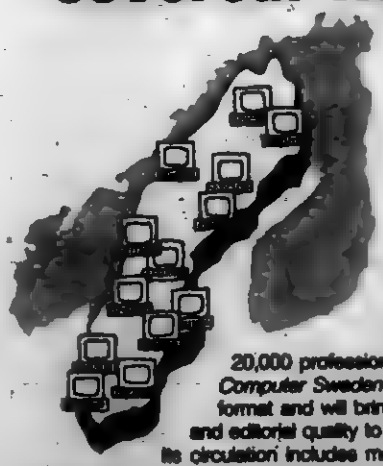
Late last month, IBM filed lawsuits charging Corona Data Systems, Inc. and Handwell Corp. with infringing on copyrighted routines used in the IBM Personal Computer, and both agreed to redesign their products.

"It is our intention to protect our copyright," IBM spokesman Ed Nanas told *Computerworld*.

Nanas said the settlement recently obtained by Apple Computer, Inc. in its copyright suit against Franklin Computer Corp. [CW, Jan. 23] did not affect IBM's decision to prosecute. But it did influence Corona to settle: "We decided that rather than fight the case, the best route was settlement," said Larry Lotito, a Corona spokesman.

Corona subsequently announced it would begin shipping a new read-only memory that it said does not infringe upon IBM copyrights.

We've got the Swedish computer community covered. Have you?



In 1982, sales of computer hardware, software and services reached $1.2 billion in Sweden. This market is expected to grow at an annual rate of 18% with the government and manufacturing industry being most effected.

And now our new sister publication, *Computer Sweden*, can bring your advertising message to 20,000 professionals in this expanding marketplace. *Computer Sweden* is published bi-weekly in a tabloid format and will bring *Computerworld's* high standards and editorial quality to the Swedish computer community. Its circulation includes managers, marketing directors, engineering management at computer hardware, software and service suppliers, educators, consultants, DP managers and technicians.

CW International Marketing Services is your one-stop advertising service in countries around the computer world. For more information about *Computer Sweden* or any of our other foreign publications, just fill out the coupon below.

Dierie La Maraglia
Manager, International Marketing Services
CW COMMUNICATIONS, INC.
375 Cochituate Road, Box 880, Framingham, MA 01701
(617) 879-0700

CW COMMUNICATIONS/INC.
Publishers of Computerworld and other leading computer publications around the world.

Please send me more information on:
☐ *Computer Sweden* ☐ Your other foreign publications

Name _____ Title _____
Company _____
Address _____
City _____ State _____ Zip _____

#1 FOR TSO or VM/CMS

DYNACALC

The fastest and friendliest spreadsheet system

NEW ★ Color Graphics ★ Database Interface

IMPROVED ★ Worksheet Consolidation ★ VisiCalc® Support™

COMPARE US TO THE COMPETITION!

For a free 30 day trial call (312) 525-6400

ChicagoSoft™ 738 N. LaSalle • Suite 2 • Chicago, IL 60610

*Dynacalc is owned by Dynasoft Corp.
**VisiCalc is a registered trademark of VisiCorp. VisiCorp is not associated with Dynasoft.

DEC restocks exec team by promoting nine managers

MAYNARD, Mass. — Digital Equipment Corp. recently restocked its executive team by promoting nine senior managers to vice-presidential positions. Each has been with the company for 10 years or longer.

Promoted, effective Feb. 15, to vice-presidents, were:

■ John L. Alexanderson, 44, Peripherals and Supplies Group. Previously manager of that group, he joined DEC in 1969 and served in a succession of sales and marketing management positions.

■ Don K. Busiek, 48, Corporate Software Services. Since joining DEC in 1969, he held various management positions in field-service technical support and product support groups before assignment as manager of Corporate Software Services.

■ Gerald V. Butler Jr., 43, Computer Special Systems. After joining the company in 1966, he held various marketing, engineering and general management positions, including manager of PDP-15 engineering, and was most recently manager of Computer Special Systems.

■ David W. Grainger, 41, area manager — Western and Central states. Most recently area manager for the Western and Central States Management Center, he had served as regional manager for Northern Europe, regional manager for the Mid-Atlantic states and U.S. field-service manager since joining DEC in 1969.

■ Delbert E. Lippert, 41, Educational Services. He had been manager of Corporate Educational Services since 1974 and held a succession of field-service management positions since joining the company in 1967.

■ Charles E. Shue, 37, area manager — Northeast states. He joined DEC in 1970 and held various district and regional sales management positions and was most recently area manager for the Northeast Area Management Center.

■ Peter J. Smith, 39, Computer-Aided Engineering and Manufacturing. Formerly manager of that group, he joined DEC in 1970 and served in various marketing management positions.

■ Harvey L. Weiss, 40, area manager — Mid-Atlantic and Southern states. Most recently area manager for those states, he joined the company in 1971 and served as marketing manager of the Large Computer Group and product group manager of the Government Systems Group.

■ Richard H. Yen, 53, Far East Engineering and Manufacturing. He joined DEC in 1972 and served as general manager, Taiwan, and director of Far East Manufacturing before becoming manager of Far East Engineering and Manufacturing.

HP posts 12% increase in first-quarter profits, but costs rise 23%

PALO ALTO, Calif. — Hewlett-Packard Co. recently reported that profits for the first quarter of the fiscal year were $95 million, or 37 cents per share, up 12% from the $85 million, or 34 cents per share, reported in the corresponding period one year ago.

At the same time, however, total costs and expenses during the quarter were $1.1 billion, up 23% over the year-earlier report. John A. Young, president and chief executive officer of HP, said that incoming orders outpaced the expenses and are expected to generate increased sales growth.

For the quarter, the company reported sales of $1.2 billion, up 21% from the $1.06 billion reported a year earlier. The largest increase, 26.4%, or $144 million, resulted from sales of computer products; sales of electronic test and measurement equipment climbed 18.3%.

International orders also increased by 32% over the year-earlier figures, but part of that, about five percentage points, was due to HP's increase in equity from 49% to 75% in Yokogawa-Hewlett-Packard, a joint-venture company based in Tokyo, Young said.

TRAIN from page 99

only way we have found to ease the fear of computers that many users experience," explained Nancy Clano, president of ACC.

ACC conducts training sessions at IBM centers in five western states, listing one of its biggest customers as Pacific Gas and Electric Co. According to Al O'Connor, supervisor of administrative services for the utility, over 100 professional staff members have been trained, including six senior managers.

"As a result of the ACC courses, our people have been coming up with new ideas and ways to increase productivity and effectiveness, and we have expanded the use of our Personal Computers into areas where hitherto they were not used — for example — in presentation graphics," he claimed.

O'Connor said the Personal Computer training was instrumental in the formation of several microcomputer users groups within the company designed to act as forums for sharing new applications and ideas and for resolving problems.

At the IBM product center in Honolulu, the PC Support Center courses are geared a great deal toward managers and professionals working in financial areas, such as the controller's office.

Andy Friedlander, president of Monroe & Friedlander, Inc., a Hawaiian-based commercial and industrial real estate company, recently completed an introductory course there.

"In order to remain at the forefront in this business, we must stay on top of technological developments in the personal computer industry. I felt I would be left behind in my own company if I did not come to grips with computers. The introductory course on the [Personal Computer] gave me the confidence of knowing that I can learn a great deal very quickly."

For Computerknowledge, the IBM contract has created the opportunity for establishing business relationships in 56 Big Blue product centers in the eastern half of the U.S. According to company president, David Barrie, business has been so lucrative that the company is now designing courses to train users who plan to integrate their micros with the corporate mainframes. Contracts have been signed with Informatics, Inc. and Information Builders, Inc., with the first sessions due to begin in April.

According to one IBM user, multimillion-dollar publisher Prentice-Hall, Inc., the use of outside training companies is a decided advantage. "With a firm such as Computerknowledge, what you get is pure training. It trains people rather than promotes or sells products, and it is able to present the material in a way that is attentive to the level of user in the classroom," asserted John Kilcullen, market sales coordinator.

NEW COURSE ANNOUNCEMENT

BECOME AN IMS EXPERT

SysEd offers challenging "hands-on" training for motivated programmers who want to be real pros and are willing to work.

Our experienced instructors specialize in using real-life programs and design problems. Whether it's IMS Data Base Design, IMS/DB (DL/I) Application Programming, IMS/DC & Message Format Services Programming, IMS Recovery and Restart or IMS Utilities, they encourage students to bring in the specs of their own projects for discussion and analysis.

SysEd students spend one third of class time in actual hands-on workshop sessions with our 4341/II computer. There are six 3270 terminals dedicated to the class. Each student receives an original manual especially designed for each course. The manuals are comprehensive guides and programming models written especially for each course. They are thorough, clear, and well organized, and serve as reference manuals long after the course.

Classes are held at SysEd's fully equipped classroom/computer facilities in New York City and Chicago. Class size is limited so applications are accepted on a first come first serve basis.

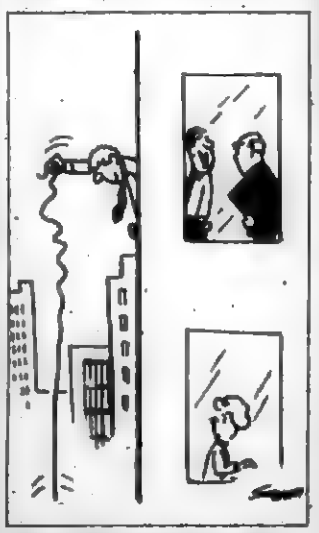
Customized course offerings are also available for on-site sessions at company installations.

Other Technical Curricula include: CICS, IDMS, VSAM, and MVS.

For information, call Dave Shapiro (212) 889-3386.

ONE PARK AVENUE
NEW YORK, NY 10016

SYS-ED



"We're just trying to find out how much tape is really on the reel"

ADDERS/Data Entry BEATS ALL OTHER DATA ENTRY SYSTEMS ON SIMPLICITY, FUNCTIONALITY, AND COST

Simplicity: ADDERS/Data Entry runs on existing 3270 terminals under CICS or stand-alone in pseudo-conversational mode. End users can set up their own input screens to mirror source documents. No additional hardware needed!

Functionality: ADDERS/Data Entry offers all the functions of the best key-to-disk systems plus on-line power and direct data entry.

Cost: ADDERS/Data Entry protects your resources by removing the need for specialized hardware and making optimum use of your mainframe power.

ADDERS/Data Entry provides the missing link between today's batch systems and tomorrow's on-line applications.

Call: 1 (800) 556-7845 now for a free trial. Your payback can start in just three months.

Rendeck
5 Fennell Hall Marketplace
Boston, MA 02109 • (617) 367-6100

COMPUTER INDUSTRY

Anacomp restructures $44.6 million loan

INDIANAPOLIS — Anacomp, Inc. recently restructured its $44.6 million loan, reported a $38.9 million loss for the quarter ended Dec. 31 and announced the termination of a top executive.

Five member banks restructured $44.6 million in revolving-credit loans into term loans and provided the company with an additional $6.2 million credit line. Anacomp was in danger of defaulting on the revolving-credit loan.

The restructured loan permits the sale of Anacomp assets. According to a company spokesman, Anacomp has raised $5 million from the recent sale of some assets.

The company's latest loss followed a $12 million loss in the third quarter, according to the spokesman.

Anacomp's fiscal problems reportedly are linked to its late delivery of its Continuous Integrated System (CIS), an interactive, on-line data base banking system.

Anacomp officials claim that CIS was delivered in December and is being used on a limited basis by the Provident National Bank in Philadelphia. Bank officials refused to comment on the system.

In early February, John J. Flanigan, the company's chief operating officer, was terminated and his position eliminated. Ronald D. Palamara, chairman, president and chief executive officer, assumed responsibility for the company's daily operation, the company spokesman said.

To all reps: Price changes on following items effective immediately: No. 10-11A, 10-114A, 10-AL.

Chris: The latest offer looks better, although it's still not what we were hoping for. Try for another compromise.

Just got the word from Gary: increased our share by 6%. If trend holds, we'll pass competition by third quarter!

Smartcom II communications software, currently available for IBM PC, DEC Rainbow 100, Xerox 820-II and Kaypro II.

Smartmodem 1200 for all computers with an RS-232C interface; Smartmodem 1200B plug-in board for the IBM PC.

Microcomputer communications? Get control of the situation with

Hayes

Microcomputer communications can present the DP/MIS staff with a tangle of mis-matched hardware, user-hostile software, and a situation that can quickly get out of hand.

Hayes can help you avert that chaos, with a telecomputing system designed expressly for microcomputers.

A system so advanced, it's downright simple. Economical. And requires no handholding from you.

Hayes. The computer's telephone. Our Smartmodem 300™ and Smartmodem 1200™ connect to any desktop computer with an RS-232C port. They operate with rotary dial, Touch-Tone® and key-set telephone systems. At full or half duplex. And both feature self-test capabilities, as well as indicator lights and built-in speakers for monitoring calls.

The lower-priced Smartmodem 300 is ideal for local data swaps and communicates at 300 bps. A built-in speed selector on Smartmodem 1200 automatically detects transmission speeds (110, 300 or 1200 bps).

Smartmodem 1200B™ is also available as a plug-in board for IBM® Personal Computers. And Hayes manufactures the Micromodem IIe® for Apple® II, III, IIe and Apple Plus computers, as well. It comes packaged with Smartcom I™ communications software.

Speaking of software, more programs are written for Hayes modems than for any other. And that impressive list includes our own incomparable communications software. Smartcom II™ Complete, menu-driven software for the IBM PC, DEC Rainbow 100,™ Xerox 820-II™ and Kaypro II.™ Even first-time communicators will find success with Smartcom II. Screen prompts guide users in the simple steps it takes to create, send, receive, list, edit, name and re-name files.

Tasks like simultaneously receiving, printing and storing data—completely unattended—are easily managed with Smartcom II, because it takes full advantage of Smartmodem's capabilities.

The program reduces lengthy dial-up and log-on sequences to a single keystroke. It stores communications parameters for 25 remote systems.

Plus, there's an on-line help feature that explains prompts, messages and parameters.

Our reputation speaks for itself. Hayes has five years of solid leadership in the microcomputer industry. Nationwide availability through retail computer stores. Trouble-free factory service and call-in assistance. A limited two-year warranty on all hardware. And the most efficient telecomputing system available. Anywhere.

If you're involved in linking micros or setting standards for configurations, remember this. Everything your people need to know about communications can be summed up in one word: Hayes.

Hayes Microcomputer Products, Inc., 5923 Peachtree Industrial Blvd., Norcross, GA 30092. 404/441-1617.

Smartmodem, Hayes is a registered trademark of Hayes Microcomputer Products, Inc.
Smartmodem 300, Smartmodem 1200, Smartmodem 1200B, Smartcom I and Smartcom II are trademarks of Hayes Microcomputer Products, Inc.
Touch-Tone is a registered service mark of American Telephone and Telegraph.
IBM is a registered trademark of International Business Machines Corp.
Apple is a registered trademark of Apple Computer, Inc.
DEC, Rainbow 100 is a trademark of Digital Equipment Corporation.
Xerox 820-II is a trademark of Xerox Corporation.
Kaypro II is a trademark of Non-Linear Systems.
CB is a trademark of Xling, Inc.
Hayes Microcomputer Products, Inc.

Smartmodem Specifications
Low Speed Data Formats (Smartmodem 1200 and Smartmodem 300 Series): binary, asynchronous: 7 or 8 data bits; 1 or 2 stop bits; odd, even or no parity (0-300 bps).
High Speed Data Formats (Smartmodem 1200 Series): binary, asynchronous: 7 data bits; 1 or 2 stop bits; odd, even, or fixed parity or 8 data bits; 1 or 2 stop bits; no parity (1200 bps).
Dialing Capability: Touch-Tone® and rotary dial pulse dialing. Command buffers 40 characters.
Commands (unnecessary with Smartcom II software): A: Immediate answer. AA Repeat last command. C: Transmit carrier. D: Dial command, including pause dialing, waiting for second dial tone, auto-dialing and other features. E: Local echo. F: Full/half duplex. H: Switch hook. M: Audio monitor. O: On-Line. P: Pulse dialing. Q: Quiet mode. S: Register read/write mode. S+?? "Set" commands speed, escape code character, number of rings to answer on, etc. Z: Clear operational parameters above. T: Touch-Tone dialing. V: Verbal result codes.
Result Codes (can be suppressed with mode Q): Command line ok. 1/Connect: Carrier detected. 2/Ring: Phone is ringing. 3/No Carrier: Carrier lost or never heard. 4/Error: Error in command line. 5/Connect 1200: Carrier detected at 1200 bps. (Smartmodem 1200 only)
Audio Monitor: Tone-lock speaker with volume control.
Data Switch: On-off switch, power jack, RS-232C connector, modular phone jack connector, volume control.
Operation: Full or half duplex.
Data Rate: 0-300 bps and 1200 bps for Smartmodem 1200; 0-300 bps for Smartmodem 300.
Interface: RS-232C.
Intelligence: Z80™ microprocessor with 4K byte control program for Smartmodem 1200; Z8 microprocessor with 2K byte control program for Smartmodem 300.
Modulation: Compatible with Bell System 103 or 212A; compatible subset or answer mode for Smartmodem 1200; Bell System 103 compatible subset or answer mode for Smartmodem 300. Receive Sensitivity: -45dBm for Smartmodem 1200; -28dBm for Smartmodem 300.
Transmit Level: -10dBm.
Registration: FCC registered for direct connect to the communications system. Connects with modular jacks (part 68, FCC rules).
Power Needs: 0.1 Amps/105VAC, 60Hz, 0.9VDC output.
Size: 2.5" x 5.5" x 9.0"

Micro marketing strategies analyzed for '80s

NEW YORK — IBM believes microcomputer consumers "are best served by having the widest range of [distribution] options available to them," a company executive said during a recent seminar here sponsored by *Fortune* magazine, at which several players in that marketplace stressed the value of marketing strategies.

Charles E. Pankenier, director of communications for IBM's Entry Systems Division, made that remark at *Fortune's* seminar, "The PC Revolution in Business — Marketing Strategies for the '80s." Joining him at the podium were representatives of Apple Computer, Inc., Lotus Development Corp., Computerland Corp. and International Data Corp. (IDC).

Joseph L. Levy, vice-president of corporate marketing for IDC, said consumers "don't want to be computer experts . . . our job is to forget about some of this technology we're so in love with."

'A gamble'

IBM's Pankenier said IBM's decision to jump into the micro market "was a gamble with some risk involved." Well conditioned to selling large systems to technical managers, Big Blue had to deal with "a new type of product, new channels of distribution and a new audience," he said. To reduce consumer apprehension about computers, IBM introduced the Charlie Chaplin advertising character to "warm up" people both to the product and to the company, Pankenier said.

A variety of distribution channels will serve consumers, he added, but vendors have to convince end users that they need the product. "Up to now [IBM's Personal Computers] have been bought; from here on out they will have to be sold . . . our job is to take technology and turn it into a utility," he said.

William V. Campbell, vice-president for sales and former vice-president of marketing for Apple, said his company is seeking to enter the large business market by sidestepping the established DP departments. "We're not going after the MIS director; we're going after people, and we're calling them knowledge workers," he said.

Commenting on Apple's 100-day, make-it-or-break strategy to sell the recently introduced Macintosh, Campbell said Apple is seeking "mainstream acceptance" with an easy-to-use product that will provide an alternative to IBM. By selling the product to "knowledge workers of the future — college students" and to professionals who would like a productivity aid on their desk, Apple does intend to "be accepted to some extent by the office market," in the long haul, he said. That acceptance will focus on the Lisa products, and "Mac is the building block to that."

Christopher Morgan, vice-president for communications at Lotus, said his company identified a distinct profile of users, with the majority being middle managers and professionals in all companies. He said Lotus spent what is believed to be a record amount in advertising to launch the highly successful Lotus 1-2-3 product and hopes to continue the trend with the just-announced Symphony by accomplishing "one major task — to make a complex-appearing product be as simple and as straightforward as possible."

Dealing with consumer perceptions was also addressed by C. Roger Lewis, vice-president of marketing for Computerland. He said Computerland had determined that most consumers do not know what to expect from a computer retail store. "It's the role of the manufacturer to create demand . . ."

HAVE YOU BEEN BLIND COMPUTER WITH THE

NEC's Advanced Personal Computer offers the sharpest color graphics of any personal computer.

NEC's Advanced Personal Computer offers the widest range of quality graphics.

One reason the APC is better is that it lets you do more kinds of graphics than any other personal computer.

In fact, it gives you the kind of graphics you'd expect only from a much more expensive computer.

With the APC, you can produce color transparencies, color slides, or output to a variety of printers and plotters.

You can even do Computer Aided Design (CAD).

Our screen is graphically better.

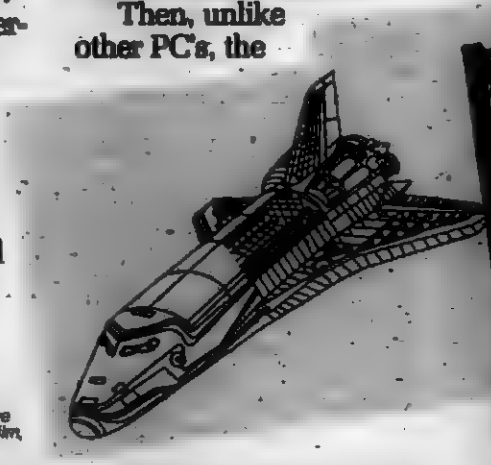
Seeing is believing. And one look at our color screen will prove it's the best.

But it's no accident. It starts with the NEC 7220 graphics processor, the most advanced graphic chip available.

Then, unlike other PC's, the

Graphics are being used more and more by businesses every day. They give companies a clearer picture of their place in the market. They make for more effective presentations. And with slides and color transparencies, they can let a room full of people see the same thing at once. Although most people see the value of graphics, very few are aware of the personal computer that lets them create the best color graphics.

It's the Advanced Personal Computer from NEC.



This slide was produced from the screen using Videograph™ software, an inexpensive Screen Shooter™, and Polachrome™ 35mm film, in less than 5 minutes. For less than $1.00!

Context MBA is a trademark of Context Management Systems, Inc. Graphwriter is a trademark of Graphic Communications, Inc. Grapholen is a trademark of Chang Labs, Inc.

SUPERSHORTS

London-based Thorn EMI Information Technology Ltd. has formed Thorn EMI Computer Software, Inc., headquartered in Costa Mesa, Calif., which will publish and market personal computer software for business and home use in the U.S.

■

Xerox Computer Services will provide on-line remote time-sharing services to Gendex Corp. of Milwaukee, a manufacturer of dental X-ray equipment. The services will include integrated financial applications for the planning and management of manufacturing and distribution. Gendex recently acquired the dental X-ray business formerly owned by General Electric Co.

■

Direct, Inc. has signed a service contract with Xerox Corp., naming Xerox as an authorized contractor for Direct's installed base of integrated personal computers in the U.S.

■

Comstcom of Concord, Calif., has been awarded a contract to supply AT&T Information Systems, Inc. with DS-1 voice and data multiplexers. AT&T will offer Comstcom's D/I MUX as an enhancement to its product line under the name DS-1 Channel Multiplexer.

■

Cray Research, Inc. has sold a Cray-1 S/1000 computer system, valued at $7.1 million, to Sandia National Laboratories, a multiprogram research and development organization that operates a no-fee, no-profit contract for the U.S. Department of Energy. The system will be the third Cray system installed for Sandia and the second such system installed at Sandia's Livermore, Calif., location.

■

Auto-trol Technology Corp. has announced the formation of Auto-trol Development Ltd., a limited partnership to fund the development of a comprehensive software system for process plant design. The $7 million private placement was managed by Hambrecht & Quist, Inc. of San Francisco.

■

Burroughs Corp. has announced an agreement in principle with the University of Michigan's Graduate School of Business Administration to provide approximately $5 million in hardware, software support and services for a new computer network. The school will contribute $6 million in new facilities and equipment. The projected installation date for the new network, which will be tied into two existing university computer networks, is September 1984. Burroughs will also sell micro workstations at "substantially reduced prices" to faculty, staff and students.

■

Modular Micros, Inc., a subsidiary of Modular Computer Systems, Inc. (Modcomp), has discontinued production and marketing of the Zorba portable computer. Modcomp will continue to service the Zorba portable personal computer through its nationwide service organization.

TO THE PERSONAL BEST COLOR GRAPHICS?

Context MBA™ runs in high resolution color on the APC. But it can only run in one color on the color monitor of the leading brand.

APC graphics option has its own dedicated memory, so there's never a tradeoff between color and resolution.

Software will make you a big-time producer.

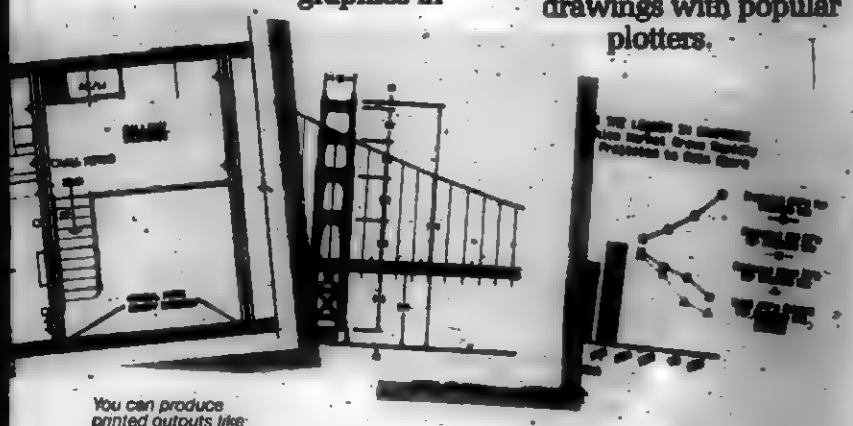
Better hardware alone isn't enough. You also need better software. And NEC provides that, too.

Take Graphplan™ for example. Graphplan can take spreadsheet format data and produce customized business graphics on paper. Instantly.

Graphwriter™ will let you produce professional color graphics in over 20 different formats. Then turn them into transparencies or hard copies using the most popular pen plotters.

Videograph™ makes creating free-form color images for slide presentations easy and inexpensive.

Autocad™ lets architects, engineers and designers create sophisticated graphics and designs, then produce precise drawings with popular plotters.



You can produce printed outputs like these with the APC.

This software combined with the APC hardware will give you the best graphics you can get on any personal computer.

For the complete picture, call NEC.

For product literature on any of NEC's APC graphics capabilities, call 1-800-343-4419.

Designers can use Autocad™ to make the design process faster and easier.

In Massachusetts, call 1-617-264-8635.

And find out why more and more graphics users with vision are saying "NEC and me."

NEC AND ME

NEC Infomation Systems, Inc. 1414 Mass. Ave. Boxborough, MA 01719

Screen Shooter is a trademark of NPC. Polachrome is a trademark of Polaroid. Videograph is a trademark of Xphres. Autocad is a trademark of Auto-Desk, Inc.

APPLE from page 99

buyer for the 30-second spot and decided to go for it. In light of the publicity created by the ad, the firm is glad it couldn't pull it off, he said.

Although almost everybody in the industry thinks Apple's Big Brother was supposed to represent Big Blue, Campbell claimed "the ad was on the boards even before we knew IBM was going to beat our brains out."

Personal Queries And Reports On IBM/38?

FUSION 4/38, the first full information retrieval and presentation system for the non-technical user.

FUSION

PO Box Fusion
Mill Valley, CA 94942
Telex 176009 FUSION

POSITION ANNOUNCEMENTS

Excellence In Action

That's what you'll find at DRC. Our reputation for excellence has been established over the years by our team of highly-skilled professionals, men and women who are acknowledged experts in their fields. Working as a close-knit group, we provide an atmosphere that stimulates creativity and encourages personal growth. If you're frustrated by big-company bureaucracies or the limitations of a small company environment, consider DRC. We have the talent, the facilities and resources that add up to excellence in action.

Our **Software Engineering and Management Group** provides technical and management services to DOD agencies responsible for planning, acquiring, operating, and maintaining weapon systems software. These services include systems design analysis, quality assurance methods, software, configuration management, modeling, costing, requirements analyses, and overall plans and programs.

We have immediate and ongoing requirements for degreed Software Engineers with 2-10 years' defense-related experience in one or more of the following specialties:

- **Software standards development**
- **Software quality assessment**
- **Configuration status monitoring**
- **Cost/Schedule/Manpower estimating**
- **Computer resources support planning**
- **Software req's analysis/specification**
- **Independent verification & validation**
- **Software project management**

You will be applying your expertise in the following high-technology areas: C^3, avionics, undersea & missile systems, software metrics and software nuclear safety; using a wide range of state-of-the-art tools including PLS/PSA, SREM, PASCAL, CMS-2, ADA, DATATRIEVE, and PDL, together with VAX-11/780, DEC Rainbows, and IBM PC's.

Our **Information Systems Department** is involved with exciting, state-of-the-art software development in support of our DOD Systems engineering efforts.

We have immediate and near-term requirements for degreed programmers, analysts, technical specialist and project managers, with 2 to 20 years of experience, preferably in a DOD environment, in one or more of the following areas:

- **Data base systems design & development**
- **On-line management information systems**
- **Decision support systems**
- **Packaged and Turnkey applications**
- **Operating system support**
- **Graphics**
- **End User Facilities**

Our facilities and equipment are designed to provide you with an environment that encourages technical growth. You'll be working with the following hardware and state-of-the-art software systems:

- **Hardware—Honeywell DPS-8, 8/52 and 8/70; VAX-11/780; IBM PC's; Tektronix 4052, 41XX**
- **Software—Operating Systems; GCOS, VMS, MS-DOS; DBMS; IDS II, ORACLE; On-Line; DMI V/TP; Languages; COBOL; PASCAL; FORTRAN**

If you want to work with and be the best, come join in the excellence at Dynamics Research Corporation. Only qualified, experienced candidates should send their resume, in confidence, to Matt McKechnie, Dept. C227 , at the address below, or call him at (617) 658-6100 Ext. 2855 for additional information. **We do not currently have any entry level openings. U.S. Citizenship is required for all positions.**

Dynamics Research Corporation
60 Concord Street, Wilmington, Massachusetts 01887
An equal opportunity employer, M/F.

D.P. Professionals

Career Oriented?

Consider Puget Power

Based in Bellevue, Washington, Puget Power, one of the largest investor-owned electric utilities in the Pacific Northwest, is looking for dedicated, creative D.P. Professionals.

Business Applications Analysts
Operations Analysts
Technical Support Analysts

Experience:

COBOL	IMS
CICS	JCL
MVS	JES 2
Model 204	TMS
Large Main Frame	DMS

We offer the stability of a private utility with a challenging opportunity to achieve with a talented, highly motivated team. Our compensation is competitive with an excellent benefits program.

Please send your resume with cover letter in confidence to: Scott Bradshaw, Staff Coordinator/Management, Puget Power Building, Bellevue, WA 98009. Resumes accepted for this position only. Principals only please. We are an equal opportunity employer male/female/handicapped.

PUGET POWER
Meeting the challenge of change.

COMPUTER SYSTEMS PROGRAMMER
GS-334-12/13
($28,374 to $45,406)

The Parklawn Computer Center (PCC) located in Rockville, Maryland is seeking an experienced systems programmer for a challenging full-time permanent position. PCC is a large MVS shared DASD, teleprocessing installation running WYLBUR, TSO, CICS, ADABAS, MODEL 204, and JES2 RJE on multiple 3081-class processors. The incumbent will install and maintain JES2/RJE, tune operating system software and perform other system programming design and development tasks. Programming experience in assembler and at least one high-level language is mandatory. Experience modifying JES2 is required. College level courses in computer science or related fields or equivalent experience are also required. Civil Service status is required. Further information regarding qualifications may be obtained by calling Ms. Brenda Dixon at (301) 443-4003; or interested candidates may submit an SF-171 to:

MS. BRENDA DIXON
FDA Personnel
5600 Fishers Lane
Room 4B-28
Parklawn Building
Rockville, Maryland 20857
An Equal Opportunity Employer

Systems Analyst/ Operations Supervisor

Broad-scoped role to challenge all your systems and operations talent.

We have an excellent career opportunity for an all-around and highly qualified professional who can supervise a two shift facility computer operation and can assume diverse responsibility for design, programming and operations functions.

You will design, program and implement medium-scale systems; direct, train and develop programmers and operators; perform hardware evaluations/selection of software packages; and effectively allocate hardware, human and software resources.

Position requires related systems/programming experience that reflects proficiency in systems design/development and supervision of operations. You must be able to work independently and have strong leadership ability, as well as excellent problem-solving/communications skills. Knowledge of COBOL II, RPG, and PL/1 is essential and familiarity with SPL, OS JCL and MRJE communications is desirable.

As a progressive manufacturing facility of a major Fortune 100 company located in central N.J., we have the resources to offer you a progressive and productive career. Find out more by sending your resume with salary requirements to:

CW-84566, Computerworld
Box 880, Framingham, MA 01701
An Equal Opportunity Employer

Systems Engineers
Software Architects and Developers

Freedom to make a difference

We have openings in the following areas of expertise:

- ☐ Communications planning
- ☐ Communications protocols
- ☐ Computer networking
- ☐ C³
- ☐ Database management
- ☐ Digital services
- ☐ Distributed signal processing systems
- ☐ Local area networks
- ☐ Market definition for new technologies
- ☐ Measurement systems
- ☐ Network optimization tools
- ☐ Network planning
- ☐ Operations automation
- ☐ Packet switching
- ☐ Performance measurement and analysis
- ☐ Software development tools
- ☐ Subjective testing
- ☐ UNIX™ Operating System
- ☐ UNIX System applications

These openings are at our facilities in New Jersey, Ohio and Pennsylvania.

Having an impact, doing important work, creating something significant–even memorable–there's no feeling in the world quite like it.

AT&T Bell Laboratories offers you an excellent opportunity to make this kind of technical contribution...

Because of the variety and interdisciplinary nature of our work.

Because of the considerable resources placed at your disposal.

Because of the caliber of the people around you.

Because of the freedom to pursue your own approaches to problems.

And because we will soon be free to take the knowledge behind the most extensive and sophisticated communications network in the world and apply it in new ways–to new markets.

With the development of new and expanding projects, we are seeking people who can evaluate alternative architectures, perform competitive analyses, assess service viability, define, implement and measure systems or develop strategies to get products to market.

If you have a Master's or PhD in Systems Engineering, Computer Science, Electrical Engineering, Mathematics, Physics, Statistics or Operations Research with hardware and/or software experience–or a BS in these fields with a minimum of 5 years highly relevant experience –and are looking for a chance to make a difference, please send your resume to:

Director, Technical Employment,
AT&T Bell Laboratories,
Dept. 63/4909/84
150 John F. Kennedy Parkway,
Short Hills, New Jersey 07078.

An equal opportunity employer

AT&T Bell Laboratories

The Network of Tomorrow... Today at UNINET

While other companies are anticipating and planning for tomorrow, we are already there.

UNINET, a UNITED TELECOM company, is offering true state-of-the-art opportunities in the further development of our Fourth Generation Public Data Network. This network employs a fully distributed microprocessor architecture based upon 80186 and 80286 processor modules in a four-level bus hierarchy.

We offer the unique opportunity to apply your expertise in support of the design and development of a Public Data Network that achieves sophistication in high-level protocols and data switching rates unattainable under previously available technologies. We see this as a major breakthrough in providing a practical solution to today's business communications problems.

NETWORK SCIENTISTS

Immediate opportunities for applied research exist in the areas of:

- **Packet and message switching strategies**
- **High-level network protocols including routing and congestion**
- **Incorporation of satellite facilities into backbone services**
- **Evaluation of theoretical topologies**
- **Analysis of algorithms**
- **Network management and control**
- **Protocol translation schema**

UNINET offers an environment which encourages creative applied research and development addressing the most current opportunities in data networking. Candidates possessing advanced degree in Computer Science and Mathematics with significant experience in network architecture and network design are encouraged to apply.

DATA NETWORK SOFTWARE ENGINEERS

Immediate opportunities exist for the development of:

- **Network Configuration and Control Systems (VMS)**
- **Network and Access Control Systems (RMX)**

Candidates should have a strong background in the implementation of CCITT packet network protocols or network management and control protocol. Applicants desiring positions in network access engineering should possess detailed knowledge of X.3, X.28, X.29 and X.25 as well as synchronous DTE protocols. SNA experience is considered desirable. Degreed computer scientists with formal software engineering experience are encouraged to apply.

If you feel that your expertise can assist us in the further development of our future network, we invite your inquiry into the positions available. UNINET offers an excellent environment for career advancement and rewards.

For immediate consideration, forward your statement of qualifications in confidence to:

UNINET, INC.
A United Telecom Company
ATTN: Cheri McDougall
Dept. CW-2
10951 Lakeview Avenue
Lenexa, Kansas 66219

An Equal Opportunity Employer

UNINET

Computer

SR. PROGRAMMER ANALYST

Challenging position available for Diagnostic Programmer or Programmer/Analyst.

Responsibilities will include the design and development of ALC software for AMDAHL 580 Series Processors and Peripherals.

Candidates must be knowledgeable of the IBM 360/370 Processor and I/O architecture. A knowledge of diagnostics such as ADAM/AMATS, MDM, FRIEND or OLTEP is desirable.

CITIZENSHIP REQUIRED.

We offer a highly competitive salary, a comprehensive benefits package and a dynamic atmosphere. Please send resume and salary history to:

Personnel Department

AUTOMATED SCIENCES GROUP, INC.

700 Roeder Road, MS5415
Silver Spring, MD 20910
EOE M/F/H/V

EMPLOYMENT SERVICE FOR PROGRAMMERS AND ANALYSTS

National Openings With Client Companies and Through Affiliated Agencies

Scientific and commercial applications • Software development and systems programming • Telecommunications • Control systems • Computer engineering • Computer marketing and support

Call or send resume or rough notes of objectives, salary location restrictions, education and experience (including computers, models, operating systems and languages) to either one of our locations. Our client companies pay all of our fees. We guide, you decide.

RSVP SERVICES, Dept. C
Suite 709, One Cherry Hill Mall
Cherry Hill, New Jersey 08002
(609) 667-4488

RSVP SERVICES, Dept. C
Suite 211, Dublin Hall
1777 Walton Rd., Blue Bell, PA 19422
(215) 629-0595

From outside New Jersey, call toll-free 800-257-8132

RSVP SERVICES
Employment Agents for Computer Professionals

THE SOUTH WANTS YOU!

Multiple openings in Atlanta, Tenn. and Florida. Our clients pay ALL fees, including interviewing and relocation!

PROG'S, PIA's, SIA's IMS DB/DC	$38K
CICS (CMD/MORO)	36K
MVS SYST PROG'S	40K
REX11M or 8000/PLM	38K
LIFE 845 (IMS)	36K
RETAIL (MVS)	38K
MFG (Oppc, Telist, Enviros)	28K

All positions require a min. of 2 yrs. hands-on, professional exp. Send resume to:

THE DATA GROUP
Div. Management Search, Inc.
3490 Piedmont Rd., N.E.
Ste. 535, Atlanta, Ga. 30305
OR CALL (404) 231-5764
"Confidential Searches for S.P."

Computer Science Faculty Position

The Pennsylvania State University in Erie. Continuing position starting Fall, 1984. Tenure track if appointment is made at Assistant Professor level or higher. Duties include teaching and course development of undergraduate computer science courses. Minimum qualifications: Masters degree in Computer Science or related area and industrial or teaching experience. Rank dependent on qualifications. Salary and benefits competitive.

A detailed resume, three letters of reference and official transcripts should be sent to Dr. R.E. Larson, Acting Head, Division of Science, Engineering and Technology, Department M, The Pennsylvania State University, Erie, PA 16563. Applications deadline is March 31, 1984 or until a suitable applicant is identified. *An equal opportunity/affirmative action employer.*

SAUDI ARABIA
S/34 PROGRAMMER/ANALYST

An Arabian Software House (ACP) is looking for a dynamic and independent programmer to work in Saudi Arabia. At least 5 years experience in design and development of business applications, of which 3 years on S/34 or S/36. Arabic speaking is preferred but not necessary. Knowledge of MAPICS is appreciated.

In addition to an attractive tax-free salary, the company will provide housing allowance, full medical expenses, vacation tickets, plus many other benefits. Forward resume or call:

Mr. Dib
ACP, P.O. Box 5548
Jeddah-21432, Saudi Arabia
Phone: (02) 657-4666
Telex: 404666 ACPJED SJ

COMPUTING SCIENCE FACULTY POSITION TRINITY UNIVERSITY SAN ANTONIO, TEXAS

Tenure-track position at the rank of Assistant Professor of Computing and Information Sciences. Ph.D. in Computer Science or equivalent required. Starting date is August 1984. Salary is commensurate with background and experience. We teach a total of 9 hours per semester in computer science courses at both the graduate and undergraduate levels, conduct research, advise students, and serve on appropriate committees.

Department currently consists of nine full-time faculty and some part-time lecturers; chairs the 6/8 and 8/8 degrees; has 215 undergraduate majors and about 60 graduate students; was founded in 1968 and supplies all of Trinity's service coursework in computer science in addition to the major programs. Computing facilities include IBM 3081 with 6 MBy, 3 billion characters of disk storage, more than 40 time-sharing terminals devoted to faculty and student use, several minicomputers, well equipped microcomputer laboratories, and a graphics laboratory.

Trinity University was founded in 1869 and is now located on a beautiful 100 acre campus in San Antonio. Enrollment is approximately 2700 students. San Antonio is widely recognized as one of America's unique cities. Population is approximately one million. San Antonio has a warm climate and is noted for its scenic beauty, places of historical interest and diverse cultural influences.

Send resume and letters of recommendation to Dr. M.L. Rogers, Department of Computing and Information Sciences, 715 Stadium Dr., San Antonio, Texas, 78284. Deadline for application with letters of recommendation: March 31, 1984.

Trinity University is an equal opportunity/affirmative action employer.

Programmer/Analyst
System 36 - Model 8

A midwestern division of an international corporation has recognized the need to develop an integrated on-line information system to provide management, operation, sales, and service departments with timely and relevant data. The substantial growth of the M/36 department has created the need for several new employees that are interested in becoming part of a challenging and rewarding project. This project will require experience on an IBM System 36, or series 1.

- 8/36 PROGRAMMER/ ANALYST
- SERIES 1 PROGRAMMER/ ANALYST
- Develop, test, and implement new or enhanced systems and programs.
- Develop and maintain systems and user documentation.
- Excellent corporate benefits and fringes offered.

Experienced Only

Submit resume, including salary history to:

THE WESTIN HOTEL
Personnel Dept.
Renaissance Center
Detroit, MI 48243

PROGRAMMER/ANALYST

Excellent opportunity available in the Sunbelt for an experienced Programmer. Our rapidly expanding savings and loan has an immediate opening for an individual with 2-3 years direct programming experience. Familiarity with COBOL, Burroughs B2000 series and THRIFT financial systems preferred. College degree a plus.

We offer an excellent benefits package and salary commensurate with experience. Please send resume with salary history to: South Savings and Loan, P.O. Box 888, Shreveport, LA 71166, Attn: Gail Simpson.

You Know That...

General Electric Information Services Company provides the largest commercially available teleprocessing network in the world.

But Do You Know This...

We're Pioneers in Personal Computer Integration

GE Information Services has made a big commitment to the acquisition of IBM PC's and to the integration of personal computers with our remote computing services. This marriage of network-oriented remote services and personal computers into cohesive applications systems has created exciting career opportunities for these professionals:

- IBM PC Project Manager with PC/Mainframe integration experience
- MVS/XA Software Systems expert
- IMS/DC Systems Internal Specialist
- Communications Integration Specialist

We're IBM Mainframe Applications Specialists

Our IBM based service interfaces with our worldwide network to provide large business users the opportunity for improved data processing productivity and utility. Our environment includes VM MVS, 3081s, 3033s, and 4300s. We would like to talk with you if you:

- Are an experienced Fortran, Pascal or Assembly applications specialist with a background in structured programming techniques such as office and health care systems.
- Are a Database Specialist with a background in IDMS, Focus, and CICS/VS, are skilled in database design, development and implementation, and have experience in large, complex information systems.

We're Communications Systems Experts

We design, develop and maintain the hardware, software and communications software of today's and tomorrow's worldwide network. We're interested in professionals with experience in:

- IBM based systems: ACF/NCP and IBM SNA
- Real-time mini and micro operating systems design
- Assembly and Fortran
- Honeywell and IBM operating systems development and testing; analysis and support
- Communication protocols; compiler writing

We're Advanced Engineers, Performance Analysts & Project Planners

We're interested in talking with you if you are a:

- Hardware Engineer with knowledge of chip technology, communications networks, image processing and micro hardware and software development
- Performance Analyst with analytical and measurements skills and a background in IBM performance analysis and system tuning under MVS or MVS/XA
- QA Deployment Specialist with knowledge of hardware and software configuration plans.
- IBM Hardware Configuration Management Specialist to support our engineering development facility.

We're Innovators in Marketing Strategy

We're positioning ourselves as a major provider of enhanced data communications. We're interested in talking with:

- Data Communications Marketing Strategy experts with proven strategic implementation experience in:
  - International communications
  - VAN and LAN
  - Private networks

We're the Developers of a Unique Honeywell-Based Operating System

With tremendous computer power, our 35 DPS 870s operate internationally to provide distributed transaction processing, shared applications and database management support. It's a major product area in which you can apply your expertise as a:

- Senior Systems Engineer responsible for high level hardware design and full life cycle project activities.
- Mid-level Systems Programmers with experience in multiple hardware environments.
- Programmers who have a background that has prepared them to participate in writing new computer languages.

We're Software Product Developers

With over 2000 proven software packages on our shelf, we're one of the leaders in software product development. We're engaged in the development of a common communications capability for value added, private, local and distributed networks; office communications and international financial services. We have opportunities for:

- Senior Technical Products Specialists with backgrounds that include network architecture, protocol conversion and packet networks.
- Analysts with solid background in modeling and business experience in the telecommunications industry.
- Senior Product Planners who have successfully participated in the initial planning through product completion cycle.

We're Technology Implementers

We will continue to play a major role in the future of business information solutions. If you would like to be a part of this exciting effort and share in the rewards of being a GE Information Services employee, we'd like to talk with you. Send your resume and salary requirements in confidence to: Professional Staffing (H-6883), GENERAL ELECTRIC INFORMATION SERVICES COMPANY, 401 North Washington Street, Rockville, MD 20850.

INFORMATION SERVICES

General Electric Information Services Company
A Division of General Electric Company U.S.A.

An Equal Opportunity Employer

DATA PROCESSING EMPLOYMENT SERVICES
SALES AND TECHNICAL POSITIONS
S.E. UNITED STATES

Global Business Consultants' objective is to introduce the right person to the right job. The Computer Professionals, Russell G. Henderson, Richard S. Zambruski, Ida Vollenwelder, and Martha Sue Blythe would like to meet you.

Mail to our address below or call.
GLOBAL BUSINESS CONSULTANTS
4470 Chamblee Dunwoody Road, Suite 260
Atlanta, Georgia 30338
404/458-8088 or 404/458-4631

TIRED OF THESE LONG COLD WINTERS?

DATA PROCESSING PROFESSIONALS with skills in Large Systems or Mini's, DATABASE or ON-LINE SYSTEMS, consider a move to the beautiful SAN FRANCISCO BAY AREA

Our clients have the most CHALLENGING and GROWTH ORIENTED career opportunities CALIFORNIA offers.

LOGICAL OPTIONS
One Market Plaza, Spear Tower, Suite 828140
San Francisco, CA 94105 • (415) 777-3988

Arizona/California/Texas/Colorado/Florida/Boston

SCIENTIFIC OR BUSINESS PROGRAMMERS

All fees and relocation paid. $20-40,000

If you have a BSEE, BSCS, BS in Mathematics or Physics or equivalent, we need you right now.
For Business: OS/DOS/IMS/CICS/MVS/JES Prog/Anal/Systems/Data Base. All large scale installations.
For Scientific: experience in the computer, communications, semiconductor, or aerospace/defense industries.
Your name, resume, and present employer will not be given out without your permission.
For sincere personal service, please send a confidential resume to:
Don Pullman (602) 274-4848
PULLMAN PERSONNEL
2999 North Central Ave., Suite 900, Phoenix, Arizona 85012

HOME OF THE BOLD

Home Of The Bold...not just a catchy phrase, but the watchword of our thinking in these exciting times. In 1981 we had 11 employees. Now that figure is over 750 and we have emerged as a leading innovator in the design, development and manufacture of advanced digital telecommunications switching equipment. With our dynamic expansion plans, we have truly outstanding opportunities for exceptional technical professionals who are not afraid of challenge, commitment and success. The following positions are immediately available at our suburban Dallas facility:

CALL PROCESSING
Design and development of real time telephone, attendant, trunk control and call processing software.

MAINTENANCE/DIAGNOSTICS
Design and development of configuration, control and diagnostic software for distributed processing systems.

OPERATING SYSTEM
Design and development of real time operating systems software for distributed microprocessor based systems.

SWITCH ADMINISTRATION
Design and development of administration, data base and message accounting software.

SYSTEM INTEGRATION AND SUPPORT
Hardware and software test and integration on system level. Interface with customer and field operations.

HARDWARE DESIGN
Design experience should include microprocessor communication interfaces, peripheral controllers and memory systems. Familiarity with Z80, Z8000 or other microprocessors, as well as dynamic Ram components is a must.

All positions require a BS/MS CS, EE, Math or related discipline. Experience with Assembly language and/or "C" highly desirable.

We can offer competitive salaries, extensive company-paid benefits, and excellent potential for professional recognition and advancement. For prompt consideration, please send your resume in confidence to:

Staffing Manager
Dept. CW 229 R
Digital Switch Corporation
P.O. Box 830911
Richardson, Texas 75083-0911

equal opportunity employer

HELP WRITE A BOLD NEW CHAPTER IN TELECOMMUNICATIONS HISTORY

DEVELOP YOUR FUTURE AT CANDLE CORPORATION

CANDLE CORPORATION is a multi-national high technology company and developer of OMEGAMON®. We have several exciting opportunities for qualified individuals to join our expanding team of professionals.

Sr. MVS Software Developers

If you have a desire to get away from SMP installs and third shift system outages that interrupt your sleep or want career advancement without getting into management, then build your future by developing quality systems software at Candle.

Qualified applicants will have strong IBM Assembler programming skills and good knowledge of the internals and performance consideration of the MVS operating system.

Please call or send your resume to: Joe Weinstein, 2 Gannett Drive, Suite E-1, White Plains, NY 10604. (914) 694-1949.

Technical Support Specialists

We're seeking support specialists to be the technical interface between Candle and its customers. Requirements include extensive knowledge of MVS and either IMS or CICS operating systems experience. Knowledge of performance and tuning concepts also desired along with excellent communication and presentation skills.

Please call or send your resume to: Barry Weinstein, 777 Third Ave., 22nd Floor, New York, NY 10017. (212) 593-6300.

CANDLE offers an excellent compensation and benefits portfolio as well as an opportunity to work with some of the top software professionals in the world.

We also have other similar positions available in our So. California offices. Please contact Joel Prescott, 10960 Wilshire Blvd., 8th Flr., Los Angeles, CA 90024. (213) 478-8277.

Equal Opportunity Employer

Candle

ACP/TPF SENIOR PROGRAMMERS SYSTEMS PROGRAMMERS

Our client, located at a beautiful site in Northern California, is the leader in its industry and a company you can be proud of.

Due to expected expansion, the realtime applications environment is to be redesigned to accommodate new services and large volume increases. This is a ground floor fresh opportunity to be in from the start on this several year project.

Excellent compensation, benefits, thrift plan. Relocation assistance. Professional working environment with outstanding office facilities. For confidential consideration, please submit resume to: Realtime, 1201 Howard Ave., Suite 102, Burlingame, CA 94010, or call Sam Parise (415) 579-6550. Equal Opportunity Employer. Employer retained.

Realtime Associates
Agency of Northern California

EXECUTIVE INFORMATION PROCESSING

A key governmental agency, recognized nationally as a leader in its field, is currently seeking a highly skilled professional to assume control of a 7 million dollar "state-of-the-art" information processing bureau. Candidates should possess data processing, word processing and personal or micro-computer applications background plus a significant management expertise which includes comprehensive management analysis and productivity analysis skills. The individual selected will develop both short and long range plans and implement a comprehensive data processing system, to meet the needs of both Administrative and Engineering areas. For details send resume immediately to Mr. Richard Hanley

STATE OF ILLINOIS - CMS
Executive Recruitment
[illegible] Building, Springfield, IL 62706
an equal opportunity employer

LEAD PROGRAMMER ANALYST
LOAN APPLICATIONS

FIS, a large financial Data Processing Center in Central Florida, seeks an individual with extensive knowledge in loan applications along with 6-8 years experience in COBOL programming in a development and maintenance environment. Strong administrative, interpersonal, and communication skills required in addition to experience with large Burroughs hardware and Data Base systems. Project management and control skills needed. Excellent salary and fringe benefits. Send resume and salary requirements in confidence to:

Jerry Jason
FLORIDA INFORMANAGEMENT SERVICES
P.O. Box 1647
Orlando, FL 32802
Equal Opportunity Employer

OBERLIN COLLEGE
DIRECTOR OF DATA PROCESSING OPERATIONS (Search Extended)

This is one of three top level Computing Center management positions that reports to the Director of Computing and is responsible for the Operations, Input/Output Control, and Maintenance Group within the Computing Center. The Data Processing Operations position is responsible for a variety of traditional and non-traditional data processing services that require innovative administrative and management skills. A staff of 10 report to this position.

Requirements include 3-5 years of management experience in computer operations or a closely related area; experience in organizational development, hardware planning, and defining operations procedures; highly developed oral and written communications skills; demonstrable supervisory capabilities; and a baccalaureate degree. An advanced degree is highly desirable.

This position is to be filled as soon as possible. Salary offer will be commensurate with experience and qualifications. Fringe benefits include a generous pension program, fully paid medical and long term disability insurance, one month vacation, life insurance and tuition support for children.

Interested parties should submit resumes by March 15 to:

George M. Bowie
Director of Computing
Oberlin College
Oberlin, OH 44074

Affirmative Action, Equal Opportunity Employer

To succeed in the future you must learn to speak its language.

Everyone involved with computer software will come to know *Ada*. The U.S. government, the largest consumer of software in the world, has already selected *Ada* as its language of preference. Widespread use of *Ada* throughout industry and business is assured.

OUR COMMITMENT TO EXCELLENCE

Martin Marietta is committed to a future of computer software excellence. And *Ada* is part of that future. For us, it's more than a new language, it is a new beginning. But our commitment to becoming the software center of excellence requires exceptional people—people who don't wait for the future, but work to create it.

STEP INTO THE FUTURE

Martin Marietta is now looking for software professionals to move ahead with us, to step into the future and help lead the way. There are already many opportunities to work with *Ada* as we explore its many applications. We have even started intensive on-site education for our employees, including a full-time, 13-week introductory program.

So, if you want to succeed in the future, come to where we already speak its language.

WE CURRENTLY HAVE THE FOLLOWING POSITIONS FOR SOFTWARE PROFESSIONALS AVAILABLE:

[illegible]
Microprocessor firmware design, Intel 8086 type assembly language experienced required.

[illegible]
CAD software development; VLSI and LSI design and implementation; VAX/VMS experience preferred.

[illegible]
Control system design and robotics, including control system analysis, software design, programming, test and integration, and fabrication.

[illegible]
Communication System Engineering, Military Command and Control, and Voice Data Communications. Design and implementation of microprocessor based communication network architectures. Includes communication system analysis and requirements generation for Message Handling, Accountability, Integrity, Security, and Switching, Local Area Networks (LANS), C^3 Systems, MMI, and System Control Monitoring.

[illegible]
Experience in mathematical modeling and analysis of C^3 and C^3I systems, communications traffic models, security models and data acquisition.

[illegible]
Experience in spacecraft flight software, RF software, mission operations software, real-time process control software, and real-time closed loop simulation applications.

[illegible]
Systems programming (internals) experience on virtual memory operating systems and real-time executives for both mini-computers and large mainframes. Performance monitoring and management experience of particular interest. UNIVAC, DEC, HP, IBM, MODCOMP, and SEL experience is desired.

[illegible]
Developing and maintaining technical baselines for software configurations.

[illegible]
Expertise in requirements specification, DBMS selection, design programming. Experience in DBMS languages, theoretical and conceptual DB analysis, and DB security.

[illegible]
Experience in architectural selection, distributed systems, human-machine interface, display technology, computer security, fault tolerant architecture (Assessment, Validation, Software Development, Modeling.)

[illegible]
Flight software algorithm development, implementation, and checkout.

[illegible]
Experience with IBM and/or UNIVAC COBOL based systems highly desirable.

[illegible]
Artificial Intelligence design with LISP programming experience.

[illegible]

[illegible]

If qualified for any of the above positions, please send a confidential resume to: Martin Marietta Denver Aerospace, P.O. Box 179, L1311, P592, Denver, CO 80201. No agencies please, we prefer talking to the individual.

U.S. [illegible]

An Affirmative Action Employer
Actively Seeking the Veteran and Handicapped

***Ada*: The language of the future.**

MARTIN MARIETTA

Can an Information Systems Analyst build a career on world-class aircraft engines?

Yes!

If they're GE's T700s, F404s and F101s there's an important and direct career relationship. Because we're a high tech organization that believes in applying the most advanced system and programming technologies at all stages of a highly sophisticated manufacturing operation.

Deal authoritatively with design assignments

You'll be involved in the design and implementation of new or improved manufacturing information systems of key importance to our operations. The work requires an ability to define and interpret needs; and the capability to apply innovative solutions to complex problems. You'll also be concerned with determining computer hardware/software feasibility and compatibility with operational and planned systems; integrate assigned systems activities with other Information System, Computations and functional personnel.

Be prepared to lead

Solid credentials are needed. You should have a degree, preferably in Computer Science (or equivalent work experience); demonstrated project leadership; and well developed communications skills.

Your experience must include a thorough grasp of mini-micro computer applications and structured DB techniques. You should also present prior applied Cobol experience and have held major responsibility for the design, programming, testing and implementation of business systems on large/small scale general purpose computers; PRIME computer experience especially desirable.

Besides stimulating work...

what can you anticipate? Strong technical support...a salary base tied to these upscale responsibilities...comprehensive benefits...and career mobility within a highly successful organization.

Whom to contact

Send resume with salary history to Mr. Warren Green, Ref. 34-W, General Electric Aircraft Engine Business Group, 1000 Western Avenue, Bldg. 1-4509, Lynn, Mass. 01910.

An equal opportunity employer

AT FAIRCHILD WESTON: INDIVIDUALS HAVE PROJECT RESPONSIBILITY

Look to Fairchild Weston if you seek the individual challenges, responsibilities and rewards of seeing projects through from start to finish. For 30 years, we've been the leader in EMR telemetry, signal processing and data acquisition systems. Our technological excellence and innovation have resulted in steady sales growth, creating exciting career opportunities for experienced engineering and/or computer science professionals.

The following positions require U.S. citizenship, and extensive background investigations may be conducted:

SOFTWARE Q.A. ENGINEER

An exciting career opportunity exists for an individual experienced in software quality assurance. We seek a person with strong leadership skills to develop and head our software Q.A. function. Experience with real-time software specifications, design, development and documentation desired. Experience with software Q.A. mil-standards required. The successful applicant will develop and implement a Q.A. program for our system software products. A BSEE or BSCS or applicable experience preferred.

SOFTWARE SPECIALISTS

Positions require experience in the design and implementation of large scale real-time systems utilizing structured methology. Experience with VAC-11, RSX-11M or VMS operation systems and assembly language/FORTRAN required. Knowledge of signal processing, graphics, data base implementation or large scale netted computer systems is highly desirable. Project leader position requires prior experience with proposal generation and cost estimating.

Fairchild Weston offers top compensation, liberal fringe benefits, relocation assistance, and a casual but challenging work environment.

Sarasota is a beautiful beach community on Florida's Gulf Coast. Sarasota enjoys a respected school system, attractive residential communities, a low tax structure, no state income tax, and a year 'round recreational climate.

For confidential consideration, please submit your resume, including salary history, to: Tom Salmon, Manager, Professional Employment.

FAIRCHILD WESTON SYSTEMS INC.

P.O. Box 3041
Sarasota, Florida 33578

An Equal Opportunity Employer

DATA PROCESSING

AN OPPORTUNITY TO BE CREATIVE

That's what we offer Systems Analysts, Designers and Programmers. Your entry requires extensive experience and current knowledge of modern technology, techniques and languages in the super mini/mini/micro area.

The best qualified candidates for this entrepreneurial opportunity also have experience in local networking, data communications, and application support of financial institutions. The quality of experience counts more than the quantity. The independent, high-energy individuals who work with us earn their way. They receive excellent compensation and benefits for their success in finding creative solutions that stretch their talents.

To take advantage of this opportunity, send your resume and your requirements to:

S & L COMPUTER TRUST
ATTN: Human Resources Department
907 Walnut
Des Moines, Iowa 50309
An Equal Opportunity Employer M/F

SYSTEMS ANALYST

Responsible for the design, development, testing, modification and documentation of process control software. Provides system installation, maintenance and troubleshooting service. Keeps current with hardware and software developments that are revelant to process control systems.

This position is in the software development group of the Process Automation unit, located in Houston, whose responsibilities include the instrumentation and automation of the company's manufacturing facilities worldwide.

Requirements include a BS degree in Engineering, Computer Science or Math with minimum of three years previous experience in developing real-time process control software using FORTRAN and Assembly languages. Experience in the petrochemical industry and with MODCOMP equipment preferred. Strong interpersonal and problem solving skills are essential. Some travel, both domestic and international, required.

Please forward resume and salary history to:

Shirley G. Arline
Employee Relations Supervisor
ARCO Chemical Company
Division of Atlantic Richfield Company
3801 West Chester Pike
Newtown Square, PA 19073

ARCO CHEMICAL COMPANY

An Equal Opportunity Employer

DIRECTOR OF COMPUTING AND INFORMATION SYSTEMS

The Director is responsible for computing and information processing systems for the Board of Regents. The Board oversees twenty seven public colleges and universities in Massachusetts. Applicants must have 5 to 10 years of relevant programming, communications and systems development experience. A sound knowledge of DBMS Technology and MIS in a complex higher education governing board environment, and strong managerial and communications skills are required. A Master's Degree in Computer Science or equivalent degree is also required. Familiarity with Cyber mainframe technology is desirable. Salary and Benefits are competitive.

Send resume and cover letter to: Director of Management Systems, Board of Regents of Higher Education, McCormack Building, Room 616, 1 Ashburton Place, Boston, MA 02108-1530. EEO/AA Employer.

Marketing Representative

New York City based computer sales/leasing company requires aggressive, dynamic, highly motivated sales person. Individual must have proven sales track record with equipment of major computer equipment manufacturer. This is a start-up branch operation for a major European computer sales and leasing company. Opportunity for the right person for high earnings and quick advancement to branch manager responsibilities. Send resume to:

CW-B4572
Computerworld
Box 880
Framingham, MA 01701
or call (212) 319-6660.

DATA ADMINISTRATOR
U.S. Dept. of the Interior
Washington, DC

The Department of the Interior is seeking a Data Administrator to develop and implement a department-wide data administration program. The responsibilities include: policy development, strategic planning, data standards development and development of data dictionaries/data resources directories. Salary range $42,712-$55,538 depending on qualifications/experience. Call 202-343-4821 for a copy of vacancy announcement or write: U.S. Dept. of the Interior, Division of Personnel Services, Room 5464, 18th & C Streets, NW, Washington, DC 20240. SF-171, Personnel Qualifications Statement, required. Closes 3/26/84. Equal Opportunity Employer.

PROGRAMMER - Design/impl. ticker processing system for info. on Stock Exchange. Maint./enhance system & provide vital skills to ensure effic. operation. 2 yrs. or 2 yrs. in systems maintenance. Bach. degree in Engin. or Comp. Sci. Knowl. ASSEMBLER on Data-General Minicomputers, FORTRAN & "C". $25,000 p.a. 40 hrs/5 days/wk. Reply to CW-B4569, Computerworld, Box 880, Framingham, MA 01701.

DP and System Support Professionals

SPECIFY YOUR PLACE IN THE FUTURE OF TELECOMMUNICATIONS

AT&T Information Systems is the end-to-end service organization created to handle the vast data processing and communication needs of the "new" AT&T. Performing tasks never before attempted, on an unprecedented scale, the organization is expanding rapidly, taking on new roles, and creating an environment for career growth like no other in the world!

We are extending the technology of MIS and system support, applying new sophistication to marketing and service management. We have literally scores of openings, at many levels, in many fields, based in New Jersey. And the building of this organization and the full development of its capabilities will go on for years.

We've put together this check-list application, so you can quickly, and easily, tell us your areas of expertise. We'll then be in a position to inform you of job matches as they occur—immediately, or in the months ahead.

Don't delay. The completed application, attached to your resume, could launch you on a rewarding career based on the future of telecommunications. Send to Box CW-B4583, Computerworld, Box 880, Framingham, MA 01701. (We regret we cannot pay agency fees.)

An equal opportunity employer

AT&T Information Systems

HARDWARE

- ☐ IBM 308X (3, 1, 4), 3033, 3080XS, 3084, 3705
- ☐ IBM 303X, 3081X
- ☐ DEC VAX 11/780, PDP 11/70
- ☐ DEC 11/70
- ☐ IBM 3705
- ☐ COMTEN 3690
- ☐ CCI VARIAN
- ☐ Microcomputers

LANGUAGES

- ☐ COBOL
- ☐ FORTRAN
- ☐ PL/1
- ☐ APL
- ☐ BAL
- ☐ SAS
- ☐ EMPIRE
- ☐ FOCUS
- ☐ ADRS
- ☐ APLDI
- ☐ C

DBMS

- ☐ Model 204
- ☐ IMS/DB

SYSTEM/ NETWORKING ENVIRONMENTS

- ☐ MVS/SP
- ☐ MVS/XA
- ☐ VM/CMS
- ☐ VM/SP
- ☐ EMPIRE
- ☐ FOCUS
- ☐ SMF-4
- ☐ TSO
- ☐ ISPF/PDF
- ☐ JCL
- ☐ Utilities
- ☐ VTAM
- ☐ TCAM
- ☐ BTAM
- ☐ VSAM
- ☐ UCC-X Products
- ☐ VAX/VMS
- ☐ IBM DATA Dictionary
- ☐ APLDI
- ☐ SAS
- ☐ MVS/VM
- ☐ CICS
- ☐ IMS/DC
- ☐ UNIX*

*Trademark of AT&T Bell Laboratories

FUNCTIONS

- ☐ MIS
- ☐ Hot Line System Support (user problem solving)
- ☐ Financial
- ☐ Payroll
- ☐ Accounts Payable/Receivable
- ☐ Order Entry/Billing
- ☐ Inventory
- ☐ Software technical support
- ☐ Personnel Information & Services
- ☐ Performance Measurement
- ☐ Capacity Planning
- ☐ Marketing Support
- ☐ Internal Networking
- ☐ Computer Operations
- ☐ Systems Tuning
- ☐ DASD Management
- ☐ Data Security
- ☐ Long Range System Planning
- ☐ Modelling
- ☐ Systems Architecture
- ☐ Data Administration
- ☐ Application and Data Architecture
- ☐ Network Planning
- ☐ Hardware Planning
- ☐ System Software Planning
- ☐ AOS Planning
- ☐ System Consulting
- ☐ Information Center USER Counseling
- ☐ RACF

I have ____ years experience as a programmer

I have ____ years experience in Operations

I have ____ years experience in MIS applications

I have ____ years experience in telecommunications software ☐ hardware ☐

I have ____ years experience in systems support

I have ____ years experience in other (please specify)_____

My resume and salary history are attached.

SALES and SUPPORT OPPORTUNITIES

SALES PROFESSIONALS (7)

SYSTEMS ENGINEERS (3)

Equal Opportunity Employer M F H

SAUDI ARABIA

ABWA Corporation, a Data Processing Facilities Management Contractor offers opportunities to qualified professionals for positions in Riyadh Saudi Arabia.

ABWA needs highly qualified and motivated personnel, knowledgeable with the DOS/VSE environment, and experienced in teleprocessing and Database Management using such products as CICS/VS and ADABAS/NATURAL.

ABWA offers an excellent compensation package that includes housing, car, medical care, insurance, schooling for children, eight weeks vacation and air fare.

The following positions are offered:

SENIOR SYSTEMS ANALYST

This position requires a degree in Computer Science or equivalent and 8-10 years practical experience in all phases of systems analysis from initial contact through design and implementation. Emphasis is placed on the thorough knowledge and practical experience in structured methodologies, teleprocessing and database techniques. Organizational skills and the ability to manage small project teams essential.

SENIOR SYSTEMS PROGRAMMER

This is a senior position for Operating Software Maintenance and requires a degree in Computer Science with at least three years experience in DOS/VS and CICS/VS internals. The prime responsibility consists of maintaining a 70 plus terminal.

Network utilizing CICS/VS, operating under ACF/VTAM with NCP, NPDA, and NCCF. Proven ability in Assembler and System Tuning a must, experience in ADABAS, ICCF, STAIRS or ATMS III desirable.

SENIOR PROGRAMMER

Requires a degree in Computer Science or equivalent work experience in Business Application Systems. Technical requirements include experience in teleprocessing and database, preferably CICS/VS and ADABAS. Position requires practical experience in structured methodologies and ability to assume responsibilities such as minor analysis, design and documentation. The ability to organize personal workload and work independently required.

COMPUTER OPERATORS

Position requires a minimum of two years experience in a DOS/VSE, CICS/VS operating environment supporting a large scale teleprocessing network. Responsible persons are required to rotate on a 2 shift basis.

USER TRAINERS

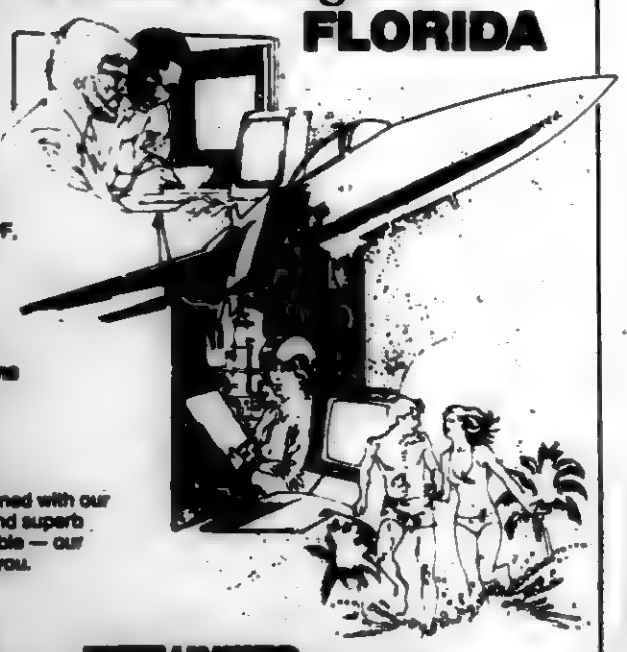
Position requires a degree as well as past experience in teaching or training and a minimum of three years experience in either programming, analysis or computer operations. Fluency in Arabic and English, both written and oral an absolute must. Responsibility will include training users in the use of Application Systems and providing liaison between users and the systems development group. Some limited travel to various locations within the Kingdom is required.

If you wish to be considered for a position with ABWA Corporation please send your resume indicating the position for which you are applying along with salary history to:

ABWA CORPORATION
P.O. Box 1633
Riyadh, Saudi Arabia 11441
Attn: Project Director

PROGRAMMER/ PROGRAMMER ANALYSTS

It's time to migrate to **FLORIDA**



PRATT & WHITNEY is seeking individuals with a Degree in Computer Science or related area and 2-5 years experience with COBOL, IBM JCL, MVS, TSO, SPF, IMS DB/DC on large IBM mainframes in the following areas:

- Business Applications
- Data Center Applications
- Operations Analysis
- IMS Data Base
- Systems Programming

The opportunities we offer combined with our excellent South Florida climate and superb recreational facilities are unbeatable — our employees love it here — so will you.

Please send your resume to Professional Placement, P.O. Box 2691, West Palm Beach, FL 33402.

UNITED TECHNOLOGIES PRATT&WHITNEY

An Equal Opportunity Employer M/F

Senior Systems Programmer/Analyst

Join the Corporate Data Processing staff at National Health Laboratories in Dallas, TX. Design, program, and install on-line data systems nationwide, utilizing Digital Equipment Computers. Require college degree, preferably in Computer Science and 3 years experience. Desire mini-computer experience. Send resume to:

National Health Laboratories Incorporated
10300 N. Central Expressway
Meadow Park Central IV, Suite 220
Dallas, Texas 75231

Researching all your options will show you that your best source is COMPUTERWORLD

SENIOR OPENINGS

D.P. - ROBERT MONTGOMERY

Prog. Anal. to $30,000
(2 yrs H-P & COBOL) NC location
Prog. Anal. to $28,000
(2 yrs Mfg. CICS & COBOL) NC location
Prog. Anal. to 28,000
(2 yrs banking B/S & COBOL) VA location
Syst. Prog. to $40,000
(2 yrs MVS or MS) DC location
Syst. Prog. to $40,000
(2 yrs NCP & VTAM) FL location
Syst. Anal. to $36,000
(2 yrs ins. appl. & COBOL) TN location

ENGINEERING - MIKE HUNTER

Systems Engineer (CS) to 70,000
Software Mgr's (Communications) to $95,000
Software Supv. (Telephony) to $60,000
Sr. Software Eng's (Unix-DEC or INTEL) to $65,000
Software Eng's (Microprocessor) to $60,000

Post-Nams is the nations largest corporate owned co. with over 150 offices located throughout the nation. For a clear understanding of our clients needs call 919/872-5040 or send resume to:

J.A. MORRIS ASSOCIATES

CHAIRPERSON
APPLIED COMPUTER SCIENCE
ILLINOIS STATE UNIVERSITY

Applications are invited for the position of Chairperson of the Department of Applied Computer Science at Illinois State University. The Chairperson has administrative responsibilities for leadership in defining goals, planning and budgeting. Teaching load is one class per semester. The Department has 21 full-time faculty and 600 majors. The program is non-traditional, application-oriented and follows the DPMA model curriculum. The Department is nationally recognized and has grown significantly. Facilities include large IBM-compatible mainframe with 150 terminals, microcomputer laboratory with PC's and Apples, and network connections to CYBER. Applicants should have an earned doctorate in Computer Science/Information Systems or related field and should have a proven record of research, publishing and scholarly accomplishments. Salary is commensurate with qualifications and experience. Position available July 1, 1984. Applications will be accepted until April 15, 1984, or until position is filled. Applicants will send a complete resume with four references to:

Chairperson
ACS Search Committee
College of Applied Science and Technology
Turner Hall Room 149
Illinois State University
Normal, IL 61761

Affirmative Action
Equal Opportunity University

300 DP Openings

DP employment agency, #1 DP employment consultant for 1982 in IPA (150 agencies, 300 consultants), now #1 agency in NFC (100 agencies, 400 consultants). Fee paid.

Bob Young, EPS (704) 535-1020

Corporate Personnel Consultants, Inc.
3735 Latrobe Drive, Suite 310
Charlotte, N.C. 28211

Computer Science:
Tenure-Track position beginning August 1984. Assistant or associate professor to assume chair duties of established program in liberal arts college using DEC 11/44, and PRIME 750. Also Vectors Graphics Processor. Must be able to teach upper-level courses including Data Structures, Operating Systems, and Compiler Design. Ph.D. desired in CS or related field. Masters in computer science required. Teaching experience preferred. Nine-month contract with summer teaching possible under separate contract. Salary competitive in computer science field. Equal fringes. Apply to:
Dr. Kenneth C. Cairney
Academic Dean
Quincy College
Quincy, IL 62301
EOE

SYSTEM 38 PROFESSIONALS
Expanding Upstate NY economy has multiple S/38 (RPG II, RPG III, COBOL) positions available. Need managers, project leaders, programmers & analysts. Prof. exp. or distribution degree and 4-year degree. To $42,000.
ROBERT HALF OF BUFFALO, INC.
1313 Liberty Bldg.
420 Main St.
Buffalo, NY 14203
(716) 842-0801
(Agency)

Join The Team That Created The Elegant NS16000

An elegant approach led to a very elegant solution — National's NS16000 microprocessor and its product family. The revolutionary top-down architecture delivers 32-bit power, and memory management capabilities on par with the latest mainframes. The upward-compatibility will accommodate a shift from 16- to 32-bit hardware. In essence, the NS16000 performs more like a computer than a chip, and we think that's a very elegant package.

A "Software-Intensive" Effort.

The NS16000 microprocessor is the spring-board for an entire family of products currently being developed at National's Microprocessor Systems Division. The key to their success lies in the development of software that enhances the NS16000 family's performance, applicability, and elegance. From development through marketing, our "software-intensive" effort is rapidly gaining momentum as we develop demand-paged UNIX® systems based on Berkeley 4.1bsd and 4.2bsd for National's NS16032 and NS32032 microprocessors. We are also working with Bell Labs to define a version of SYSTEM V, . . . ,etc., for NS16032 and NS32032. These developments are creating opportunities for software professionals with UNIX and IBM PC® experience to join us in the following areas:

Sr. Software Engineers: Compiler Development

You will be involved in developing compiler code optimizers for "C", Pascal, FORTRAN, etc., to take advantage of the NS16000 elegant architecture. Your background should include two to five years' experience in compiler development; UNIX experience is desirable.

Sr. Software Engineers: Language Tools Development

You will be involved with developing assembler, linker, or debugger. Requirements include two to five years of language tools development experience, including knowledge of "C", Pascal, FORTRAN, and UNIX.

Sr. Software Engineers: UNIX System Architect

You will be involved in defining the future UNIX system products for NS16032 and NS32032. Two to five years' experience in UNIX kernel and system development is desired.

Sr. Software Engineers: UNIX Kernel Development

You will work on porting Berkeley 4.2bsd to NS16032 and NS32032 based microcomputer systems (including a popular PC configuration with NS16032 and NS32032 add on boards). Two to five years' experience in UNIX kernel development is desired.

Sr. Software Engineers: Networking

You will work with developing/porting networking software under Berkeley 4.2bsd on NS16032 and NS32032 based microcomputer systems. Two to five years' experience in networking protocol design and development is desirable.

The Rewards Of Elegance.

The elegance and power of the NS16000 will become evident as more software is developed for it. And those who develop that software will reap the rewards, personally and professionally. That's definitely something to think about if you're ready to take on the challenge of our opportunities.

To learn more about National's Microprocessor Systems Division, send your resume to National Semiconductor, Dept. MS, P.O. Box 62499, Sunnyvale, CA 94088. We are an equal opportunity affirmative action employer. Principals only please.

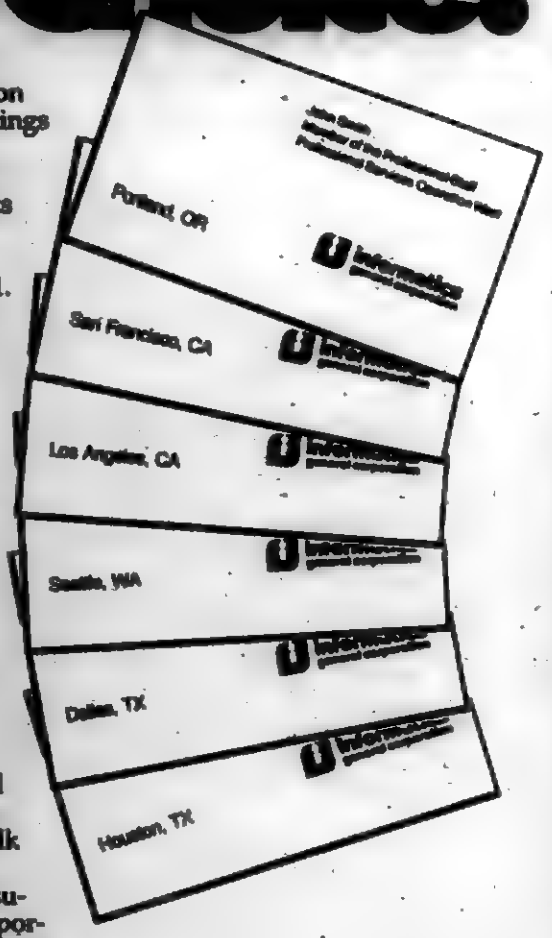
NS16000
Elegance is everything.

[redacted] talk about your career.

National Semiconductor

Consultants, Analysts and Programmers

Your Choice.



You can join Informatics' Professional Staff at the location of your choice. We have openings for DP Professionals with growth-oriented technical and consulting skills. Requirements include at least two years of experience on large-scale IBM systems using COBOL or PL/1. It's a plus if you also have experience in IMS, MARK IV or CICS.

Informatics has completed twenty successful years of providing professional services for systems development and consulting projects. Present activity includes development assignments on major state-of-the-art systems for a variety of application areas. The most advanced development techniques are emphasized for all assignments.

If you are interested in a professional career, pick a card for the location of your choice. Call toll free 800-527-4631 to talk with us. In Texas, call collect 214-669-0831. Or send your resume to Informatics General Corporation, 9441 LBJ Freeway, Suite 410, Dallas, TX 75243. We are an equal opportunity employer.

informatics general corporation

Portland, OR **Los Angeles, CA** **Dallas, TX**

San Francisco, CA **Seattle, WA** **Houston, TX**

ATTENTION: D.P. INDEPENDENTS

IDMS	CICS	MS
With Either	With Either	With Either
• ADS On-Line	• COMMAND	• DB
• DB or DC	• MACRO	• DC
• IDD	• DL/1 or IDMS	• COBOL or PL/1
• DB DESIGN	• INTERNALS	• INTERNALS

For New York, New Jersey, Washington, D.C., Cincinnati plus most major D.P. cities.

Relocation Assistance

* High Rates * Immediate and Future Starts

* Long and Short Term Contracts

Beamer Associates is becoming one of the nation's leading brokers of Data Processing independents. At Beamer we never charge you or share in your rate. The market is hot – don't get burnt by not responding.

In confidence, contact:
Mr. David Reingold, Vice President

In N.Y. Call: (212) 838-4441 Out of Town Call: (800) 223-2354

BEAMER ASSOCIATES
747 Third Avenue, Department CW
New York, NY 10017
An Equal Opportunity Employer M/F

Programmers

MVS SYSTEMS PROGRAMMERS

Burroughs Corporation's Systems Development Group has many challenging opportunities for highly motivated, results-oriented MVS Systems Programmers who want to break free from routine and channel their creativity into exciting new dimensions.

Your software experience (CMS, CICS, TSO, VTAM, NCP or RACF) will be fully utilized supporting the development of new Burroughs networking software on an IBM 4341/2. You will be responsible for operating systems maintenance, systems software troubleshooting, implementation of operating procedures, and all other related areas of system software.

Qualified candidates should possess 3-5 years' systems programming experience and a BS/MS degree in Computer Science or related technical field.

You will be located in our Downingtown facility, in west suburban Philadelphia. We offer attractive benefits, competitive salaries and a cooperative, relaxed atmosphere conducive to personal and professional growth. For immediate consideration, send your resume in confidence to:

R. W. Herholz
Burroughs Corporation
P.O. Box 235, Dept. CW
Downingtown, PA 19335
An Affirmative Action Employer

Burroughs

NEW MEXICO

SYSTEMS SOFTWARE SPECIALISTS

SANTA FE, nestled against the *Sangre de Cristo* mountains, is one of the most attractive places to live. With a mild climate, this growing city of 50,000 is rich in history, culture, art, and outdoor recreational opportunities.

The New Mexico Information Systems Division is recruiting professional **SOFTWARE SPECIALISTS** to support its rapidly expanding multiple processors environment. Openings currently exist for systems software supervisors and systems programming personnel in the MVS, VM, and Teleprocessing areas.

The operating environment of the State of New Mexico's central computer installation includes two IBM processors running MVS and VM. Both SNA and non-SNA communications support CICS and VM/CMS.

APPLICANTS should have extensive knowledge of IBM software and assembler. MVS applicants must possess extensive knowledge of MVS, JES2, and TSO; and VM applicants should have similiar backgrounds in VM/CMS, preferably utilizing VCNA and VRNA.

Depending on the position and your qualifications, salaries range from $24,012 to $39,120. A comprehensive benefit package is included, and a four-day work week and flex time are also offered.

For **IMMEDIATE** and **CONFIDENTIAL** consideration, please submit your resume to:

JOHN BOYD, Technical Services Bureau
715 Alta Vista
Santa Fe, New Mexico 87503

EQUAL OPPORTUNITY EMPLOYER M/F/H/V

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

TECHNICAL SUPPORT FUNCTION LEADER

to directly manage a staff responsible for communicating to an ACP computer system's stability reliability & integrity. Will support maintain & develop ACP systems software on-site programming & data base management to achieve max system availability & user confidence. Requires 4-6 years ACP system internals experience.

STAFF TECHNICAL ANALYST

Responsible for the development, implementation & maintenance of the ACP system its components & sub-systems. Critical experience requirements are in-depth knowledge of complex hardware systems configurations & related software components. Indirect management of 6-person staff.

TECHNICAL SUPPORT ANALYST

To insure the integrity & availability of the ACP computer system by performing problem resolution activities & assigned maintenance functions. Must possess strong understanding of IBM systems 370 Assembler language to perform software changes and for problem determination of ACP system faults.

Positions are located in a desirable East Coast environment. Client offers excellent salary liberal benefits, and an outstanding relocation program.

CALL COLLECT
Frank Santiago, 215-561-3700
BRESSLER, KUNKEL & WEISS, INC.
5 Penn Center Plaza
Philadelphia, PA 19103

CECORP

CECORP is an on-line systems company that has been marketing its broad range of hardware and software products to HDR computer users for over 9 years. Our introduction of CEMOS, a true distributed processing system that enables microcomputers to process data extracted from mainframe files has created demands for qualified key people as follows:

PROJECT ENGINEER/MANAGER - We require an experienced Engineer/Programmer who can roll up his sleeves and lead by example, a small hand picked team that develops software and hardware for intercomputers and LANS. He must have system design experience and be able to interface with our mainframe development team.

CUSTOMER SERVICE MANAGER/ENGINEER - If you have the ability to communicate well and direct service personnel providing service on CECORP products installed throughout the U.S. and international locations, become involved in total systems integration and installation, and be a part of one of the most important functions in a company on the leading edge of distributing processing technology, then act now. If you want to be a vital member of a small dynamic team call us or send resume and salary history to:

CECORP
3199-B Airway Avenue
Costa Mesa, CA 92626
(714) 754-0321

ROMAC

Romac & Associates/Personnel Consultants (agency) specializes in the placement of Data Processing, Accounting, Banking and Financial Personnel. All Fees are paid by our client companies. Excellent career opportunities. Qualified candidates are invited to call or write for appointment. NO RESUME NEEDED. Replies held in confidence.

SOFTWARE ENGINEER
$33,000

1221 [illegible]
[illegible], NEW YORK 14604
716-232-4610

SYSTEMATICS, INC. is the nations largest leasing software and facilities management company. We are currently searching for talented, aggressive data processing professionals for our corporate headquarters in Little Rock, Arkansas and many of our 43 data centers across the U.S.

Experience preferred includes:
- 3+ years COBOL programming in IBM shop
- CICS
- Banking Applications

We offer competitive salaries, comprehensive benefits package, in-house education, semi-annual salary and performance reviews, and superior working environment.

If you have the above qualifications please submit resume, including salary requirements in confidence to:

Katherine Decker
Regional Recruiting Manager
Systematics, Inc.
4001 Rodney Parham Road
Little Rock, AR 72212

COMMUNICATIONS SOFTWARE PROFESSIONALS

GO WITH NUMBER ONE

Since its founding in 1972 Prime has been the leading innovator in the computer industry. In October of that year our first product the Prime 200, was the world's first minicomputer to use all MOS memory. In 1976 we announced the Prime 400 Central Processor, the world's first 32-bit virtual memory large scale minicomputer. In 1979 we offered the world's first commercially available token-based ring network with RINGNET communications software. In 1980 our Prime 850 was the first 32 bit supermini to feature multistream architecture. And today our 9950 is one of the most powerful multi-user virtual memory superminis on the market.

During 1984 we're planning significant expansion for our Software Communications organization. They will be responsible for advancing the state-of-the-art in areas including Networking, Telecommunications, Distributed Operating Systems and IBM interface. In Local Area Networking we're using PRIMENET, ETHERNET, IEEE 802 and IBM Token Ring. In Packet Switch or Packet Data Networks we're working with TELENET ©, TYMNET, DATA PAC © and UNINET. As we continue to introduce new software communications products to the marketplace we will also be expanding our Marketing Support and Customer Service organizations as noted below.

Specific openings exist in the following areas:

RESEARCH AND DEVELOPMENT

Senior Technical Consultant

This individual will be responsible for leading the architecture and design of new networking products in Communications Software Engineering. Specific areas of experience should include protocol design in OSI layers 3 and above as well as network management. Previous involvement with national or international networking standards organizations would be a consideration as the technical direction of PRIME networking is closely aligned with these efforts.

Software Engineer

Individual will be involved in design coding and testing of new network terminal subsystem in PRIMENET development section. Specific areas of responsibility will include security-related mechanisms for access control, usage accounting, etc., and dynamic operational control interfaces. Previous development experience with networking, terminal subsystems or Primos is required.

Senior Software Engineer

Several openings exist for engineers to develop test beds for the testing of new communications products. Prior experience with SNA, X.25, 3270 BISYNC or software for microprocessor based controllers is a plus.

Senior Software Engineer

An excellent opportunity for an IBM systems programmer to move from data processing to software development. Requires prior experience with VTAM or CICS and knowledge of SNA.

Principal Software Engineer

Use your knowledge of 3270 BISYNC or other synchronous communications for our product development. Experience in high level languages, especially PL1 is a plus.

Senior Software Engineer

Opportunity for engineer experienced with X.25 protocol to do network product development. Experience with X.28 PAD implementation would be desirable.

For the above positions, please send resumes to Dale Walsh

MARKETING SUPPORT

SNA Product Support Specialist

As a senior systems specialist with a heavy SNA background and strong managerial skills, you will be responsible for leading the SNA product introduction from a technical standpoint which will include presentations, network designs, benchmarks, and controlled release worldwide.

Extensive customer and senior management interface requiring excellent verbal and writing communications skills.

Qualified candidates must have a technical degree and 8 to 10 years of general communications experience.

For the above position, please send resumes to Paul White.

Education Representatives

Responsible for developing and conducting training courses for Prime's products. Modify and develop instructional programs taught to customers and employees. Travel: 10% to 25%. Computer industry teaching experience desired. BS/BA or equivalent.

Openings available up to and including Sr. level in the following area:
- Communications (X.25, BISYNC, SDLC/SNA)

For the above positions, please send resumes to Mary Purviesh.

CUSTOMER SERVICE

Communication Systems Specialists

Responsible for high level technical support to our world-wide customer base. At least 2 to 5 years communications support or programming with experience in X.25 standard, LAN, IBM 3270 protocol and IBM SNA, Remote Job Entry (RJE), FORTRAN, PL/1, BSCS or related degree and strong oral and written communications skills.

For the above positions, please send resumes to Adrian Byrd.

Our concern for our employees is reflected in our outstanding compensation and benefits package as well as our on-site health centers that provide a full range of fitness activities.

Please forward your resume to the appropriate recruiter, Dept. CW227, Prime Computer, Prime Park, Natick, MA 01760. Prime is an affirmative action employer seeking outstanding individuals.

PRIME Computer

THE ONE YOU'VE BEEN WAITING FOR.

Computer Corporation of America

Database Positions In Denver

Since our founding in 1965, Computer Corporation of America has become a recognized leader in the research and development of data management systems, data communications, distributed database, and man-machine interfaces. Our strong commitment to advancing the state-of-the-art in database technology through research - often using entirely new techniques and exceptionally sophisticated software solutions - has resulted in several commercial products, including **MODEL 204**, the most powerful and fastest growing DBMS for IBM mainframes.

Now, CCA has opened a major new branch in **Denver**, including a Western Region Education Center and a Research and Systems Group. Our expansion creates exciting **ground floor opportunities** for Database Consultants, Software Analysts, Programmer/Analysts, Computer Scientists, and Project Managers.

COMPUTER SCIENTISTS

Computer scientists with experience in database management systems are needed to apply advanced data management technology to a variety of projects. Knowledge of database machines, database security, network communications and query languages desired. Experience with large DoD projects a plus. Requires an advanced degree in Computer Science.

DATABASE SUPPORT

Large Applications Systems

We have a variety of challenging opportunities for Database Consultants, Systems Analysts and Programmer/Analysts to support the design, development and implementation of large, complex applications systems utilizing **MODEL 204**. Duties include advising customers on the application of advanced data management techniques including database design, data dictionaries and distributed data management. Experience with a commercial DBMS in a large IBM environment required; background including large DoD projects highly desirable.

DISTRIBUTED DATABASE MANAGEMENT SYSTEMS

A Project Manager, Lead Systems Analyst and several Systems Analysts/Programmers are needed to design, develop and implement a production distributed database capability for an interactive IBM environment with **MODEL 204**. Experience in the design and development of large software systems in an IBM environment is required. Training in DBMS technology and experience using a commercial DBMS is essential. Knowledge of IBM system internals, VTAM, and SNA a plus. BS/MS in Computer Science is preferred.

All positions require U.S. citizenship, and may involve special background investigation. Recent experience on Government/DoD state-of-the-art programs is an asset.

Send your resume, specifying position of interest, to Kathleen Hubbard, Dept. CW 227B4, Computer Corporation of America, 4 Cambridge Center, Cambridge, MA 02142.

An Equal Opportunity Employer M/F

Senior Executive

SOFTWARE DEVELOPMENT

Medstat Systems, Inc. is a company specializing in providing computerized decision support systems for Fortune 250 companies for controlling their medical insurance costs. We presently have an opening at the senior executive level for an individual to direct software development and bring new products on line.

Responsibility:
Total responsibility for planning, organizing and executing the development and enhancement of the company's new software products. Day to day management of all products and development teams.

Requirements:
- Outstanding performance record required. Proven track record for developing software products on schedule
- 5 years relevant management experience
- 8 to 10 years experience in a product development/production environment
- Knowledge of data structures
- Experience in interactive programming (using Fortran preferred)
- Background in statistics, simulation, modeling, CAI or medical economics preferred.

Other senior level software development positions are also available:

In addition to an excellent opportunity for professional growth, we offer a highly competitive salary and comprehensive benefit package. Please send your resume with salary history to: Victor Sztangel, MEDSTAT Systems, Inc., 3135 S. State Street, Suite 107, Ann Arbor, MI 48104.

An Equal Opportunity Employer M/F

MEDSTAT SYSTEMS, INC.

AA

American Airlines

ENGINEERS/COMMUNICATION SYSTEMS

LET YOUR CAREER SOAR IN THE SOUTHWEST

AMERICAN AIRLINES is offering you the chance to do what you do best in the exciting field of computer technology. We have immediate openings for Analysts/Engineers that can demonstrate a working knowledge of automated baggage/materials handling systems. A working knowledge of the computer hardware and software that control such systems and expertise in FORTH and DECassembler languages are necessary. Degree in DP or related fields desired. Extensive travel required. Salary commensurate with experience.

Whether you are single or have a family, you'll enjoy the Tulsa lifestyle. Tulsa is one of the few major cities with favorable economic conditions in a safe, clean environment offering warm hospitality in the appealing climate of the Sunbelt. Come enjoy all the amenities of a major metropolitan city without the hassle of big city living.

* Compensation *Exceptional Benefits *Relocation Assistance

Look into an AMERICAN AIRLINES career. The potential makes it a must for any serious professional. Take the first step and send your resume and salary requirements to:

ENGINEERS
American Airlines
P.O. Box 51009 M.D.32
Tulsa, OK 74151

A male/female equal opportunity employer.

COMPUTERWORLD CLASSIFIEDS WORK!

- POSITION ANNOUNCEMENTS
- BUY SELL SWAP
- SOFTWARE
- SOFTWARE WANTED
- TIME & SERVICES
- REAL ESTATE
- BUSINESS OPPORTUNITIES
- SEMINARS/CONFERENCES
- BIDS AND PROPOSALS

It's easy to advertise in COMPUTERWORLD. If you don't have an advertising agency to supply us with copy, layout and order, or camera ready mechanical, stat or film negative of your ad, just call one of our ad-takers at 1-800-343-6474. They will be glad to take your ad and typeset it in available fonts at no extra charge. If you have lengthy ads that require logos and artwork, just send a clean typewritten copy of your ad to the classified advertising department at Computerworld (telecopier service is available); note the ad size you want; and, if you want your company logo to appear in your ad, please be sure to include a camera-ready copy with you insertion order. You should also supply any special borders, headlines and artwork that you want in your ad. Our Art Department will follow your suggested layout as closely as possible if you wish to send one.

To reserve space for your ad, or if you'd like more information on Classified advertising in COMPUTERWORLD, call or mail your advertisement to us.

Computerworld
375 Cochituate Road
Box 880
Framingham, MA 01701

800-343-6474
Telecopier service - (617) 879-0700

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

Free!

New 1984 Salary Data

No doubt, during 1983, you knew that many firms took a hard line on awarding salary increases—or, in some cases, even enacted across-the-board cuts.

Yet, on the other hand, did you know that salaries for some computer professionals soared right on through the uncertain business outlook?

Computer salaries are up.

The new, *1984 Computer Salary Survey and Career Planning Guide* is based on contacts with more than 44,000 computer professionals and 35,000 organizations. Not only are salary averages for fifty-eight positions reviewed (including ten new ones), but high and low compensation ranges are also provided.

Included are positions in programming, software, systems design, data base/data communications, Edp auditing, operations, computer sales, marketing, marketing support and management.

In addition, the new Survey details seven ways to maximize your chances of getting ahead through a proven, seven-step system that has helped thousands of computer professionals advance their careers.

Free to computer professionals.

The new 32-page Survey is available to you without charge. Since 1968, this annual report has helped approximately a quarter of a million computer professionals understand current trends in technology and compensation, realize how and where they fit in and what they need to do to reach their full potential.

You owe it to yourself—especially if most of your career lies ahead—to call or write today.

Call today for your complimentary copy.

Call the Source Edp office nearest you for a free copy of our new 32-page report. We'll mail a copy to you in strict confidence, without obligation.

If unable to call, write:

Source Edp
Department 084
P.O. Box 7180
Mountain View, CA 94039

When writing, please include your title.

source edp®
Personnel Services
The world's largest recruiting firm devoted exclusively to the computer profession.

Source Edp offices

United States	
Alabama	
Birmingham	205/933-8745
Arizona	
Phoenix	602/279-1010
Tucson	602/795-0570
California	
Northern	
Mountain View	415/969-4010
Sacramento	916/446-3470
San Francisco	415/434-3410
Walnut Creek	415/945-1910
Southern	
Fullerton	714/738-1313
Irvine	714/553-1730
Los Angeles/ Downtown	213/689-0041
Los Angeles/ South Bay	213/540-7000
Los Angeles/West	213/203-6111
San Diego	619/231-1600
San Fernando Valley	818/781-4000
Colorado	
Denver	303/773-5700
Connecticut	
Danbury	203-797-0880
Hartford	203/522-0303
New Haven	203/787-4288
Stamford	203/967-4888
Stratford	203/375-7240
District of Columbia	
Washington D.C.	202/659-6655
Florida	
Fort Lauderdale	305/491-8145
Jacksonville	904/355-1550
Miami	305/854-3688
Georgia	
Atlanta/Downtown	404/688-6980
Atlanta/North	404/993-0880
Illinois	
Chicago/E. Loop	312/861-0770
Chicago/W. Loop	312/346-1280
Oak Brook	312/986-0422
Rolling Meadows	312/392-0944
Indiana	
Fort Wayne	219/432-7383
Indianapolis	317/631-2999
Iowa	
Des Moines	515/243-0191
Kansas	
Overland Park	913/888-6885
Wichita	316/685-1821
Kentucky	
Louisville	502/581-9988
Louisiana	
Baton Rouge	504/924-7183
New Orleans	504/581-9060
Maryland	
Baltimore	301/727-4080
Greenbelt	301/441-5700
Towson	301/321-7044
Massachusetts	
Boston	617/482-7813
Burlington	617/273-5180
Wellesley	617/237-3128
Michigan	
Detroit	313/259-7807
Grand Rapids	616/459-6539
Lansing	517/484-4561
Southfield	313/352-6530
Troy	313/362-0070
Minnesota	
Minneapolis	
West	612/544-3600
Downtown	612/332-6480
St. Paul	612/227-6100
Missouri	
Kansas City	816/474-3388
St. Louis	314/862-3600
Nebraska	
Omaha	402/346-6700
New Hampshire	
Nashua	603/883-4457
New Jersey	
Cherry Hill	609/488-6888
Edison	201/494-8888
Morristown	201/267-8882
Paramus	201/845-8888
Princeton	609/452-7277
Somerset	201/469-6464
New Mexico	
Albuquerque	505/837-4888
New York	
Albany	518/459-8888
Buffalo	716/856-6888
New York City	
Grand Central	212/687-6811
Penn Station	212/736-7440
Wall Street	212/968-6888
Rochester	716/288-5370
Syosset, L.I.	516/364-6888
Syracuse	315/422-6411
White Plains	914/948-6888
North Carolina	
Charlotte	704/588-6877
Greensboro	919/379-1180
Raleigh	919/847-7888
Winston-Salem	919/784-6888
Ohio	
Akron	216/688-1180
Cincinnati	513/769-6888
Cleveland	216/771-6370
Columbus	614/764-6888
Dayton	513/461-4888
Toledo	419/865-6861
Oklahoma	
Oklahoma City	405/755-7010
Tulsa	918/665-7788
Oregon	
Portland	503/620-0180
Pennsylvania	
King of Prussia	215/265-7888
Philadelphia	215/665-1777
Pittsburgh	412/281-6848
Rhode Island	
Providence	401/751-6888
South Carolina	
Columbia	803/256-7446
Greenville	803/271-7044
Tennessee	
Nashville	615/889-6888
Texas	
Austin	512/478-6789
Dallas	
Carrell	214/934-1188
North	214/387-1888
Fort Worth	817/332-6888
Houston	
Downtown	713/781-6188
Galleria/Post Oak	713/439-6888
San Antonio	512/342-6888
Utah	
Salt Lake City	801/359-3888
Virginia	
McLean	703/734-6888
Washington	
Seattle	206/464-6488
Spokane	509/838-7677
Wisconsin	
Green Bay	414/468-1188
Madison	608/251-6184
Milwaukee	414/277-6845
Canada:	
Ontario	
Toronto	
Don Mills	416/498-6729
Downtown	416/868-1138
Mississauga	416/848-6844

COMPUTER ROOM SUPERVISOR

Middle South Services has one of the South's largest data processing centers serving one of the nation's largest power systems. Middle South Utilities, our parent company, is a major electric utility. Our hardware environment includes two IBM 3081s, and IBM 4341 and Tandem mini 16s. If you are a career-minded EDP professional, we have an immediate opening for an experienced Computer Room Supervisor.

The ideal candidate MUST have a minimum of 10 years in operations including round-the-clock supervision of a large scale IBM OS/MVS environment. This key position in our company will entail day to day operational decisions, policies, and heavy user interface. Will lead 3 Shift Supervisors and approximately 40 Operations Personnel.

Our company offers room for growth, an excellent starting salary, and a strong benefit program. For consideration please forward your resume in confidence or call Richard Jackson, MIDDLE SOUTH SERVICES, INC., P.O. BOX 61000, NEW ORLEANS, LA 70161.

1-800-231-4461
In Louisiana, call collect (504) 588-4660

MIDDLE SOUTH SERVICES INC.
Equal Opportunity Employer M/F

SYSTEMS PROGRAMMER

Openly, for both, with OS/MVS or DOS/VSE have stayed, who is tired of systems, & desires an exciting career with a small growing suburban mfr. Install the latest information! Many perks. $30-$40,000.

ROBERT HALF OF HARTFORD, INC.
111 Pearl St.
Hartford, CT 01603
(203) 278-7170
Personnel Consultants

COMPUTER SYSTEMS ENGINEER for SYSTEMS ANALYSIS and ENGINEERING INFORMATION SYSTEMS DESIGN, MATHEMATICAL MODELING and OPTIMIZATION programming for industrial manufacturing and office automation. MASTER of SCIENCE DEGREE in COMPUTER ENGINEERING required. Salary $24,600 per year. 40 hour week. Send resume to: MICHIGAN EMPLOYMENT SECURITY COMMISSION, ROOM 415, 7310 WOODWARD, DETROIT, MI 48202. Reference Number 3884. This is an employer paid ad.

3033 ... DOS ... BAL ... DL-1 ... CICS ... 3705 ... CICS/VS ... TSO ... Telecomm ... 3084 ... SYSGENS ... BAL ... ATM ... PL/1 ... MVS/SP ... DC ... On-Line ... Cobol ... Command/Macro ... VS1/370 ... 3033 ... OS/MVS ... NCP/VTAM ... VTAM ... LU6.2/PU2 ... Banking ... TCAM ... Retail ... VSAM ... ANS Cobol ... DATACOM/DB ... Utilities ... Large Scale IBM ... HOBAM ... SDLC ... Bisynchronous ... Manufacturing ... 4341 ... ADABAS ... Assembler ... RJE ... Insurance ... Structured Programming ... 1018 ... HP3000 ... JES II ... Informatic ... 3033 ... DOS ... BAL ... DL-1 ...

We have openings in Banking, Insurance and Manufacturing. The strongest need is for SYSTEMS PROGRAMMERS, especially those with heavy IBM/S experience. They may choose between Florida, California and several locations in between. Programmer Analysts, Programmers and Systems Analysts can also choose among multiple locations. Salaries are competitive, installations are state-of-the-art, benefits and growth prospects are outstanding on most current openings.

We guarantee: 1) NEVER A CHARGE TO YOU-our company clients pay everything-fees, interview costs, relocation, etc. 2) STRICT CONFIDENTIALITY 3) PROFESSIONAL REPRESENTATION by JIM KING AND ASSOCIATES, a nationally ranked recruiter in the computer industry.

If you would be willing to consider an unusually good career opportunity today, (or in the future) please send me a copy of your resume. If you would like additional information first, please call (904) 539-7971 collect.

STEVE STEVENSON, PARTNER
Jim King and Associates
1049 Gulf Life Tower/Jacksonville, Florida 32207
(904) 539-7971

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

Lockheed-Georgia Company

DATA PROCESSING SPECIALISTS

The Lockheed-Georgia Company, world-renowned leader in aviation technology offers challenging careers in the following areas:

IBM MVS SYSTEM SOFTWARE SPECIALIST

Position requires a minimum of three (3) years experience in support of large IBM mainframe or compatible computers using the latest IBM software. Must be able to perform SYSGEN's, apply maintenance using SMP/E, trouble shoot system problems and performance tune and measure in a TSO environment. Assembly language proficiency mandatory.

HARDWARE - IBM, 3081 X 32, IBM 3380, STC 8650, 3800, 1403, 3705
SOFTWARE - MVS-SP1, ACF VTAM, NCP, TSO/SPF, CICS, VS/COBOL, VS/FORTRAN, RACF

IBM VM SYSTEM SOFTWARE SPECIALIST

Position requires a minimum of one to two years experience in installation and maintenance of VM/SP and related products including RSCS, APL, ADRS, GDDM, PROFS and ISPF. Assembly Language coding is desirable and knowledge of SDX/VSE or other guests systems running under VM would be a plus. Experience is not required in all areas.

HARDWARE - IBM 43 XX, 3270, 3274, 8870
SOFTWARE - VM/SP, APL, GDDM, PROFS, ISPF, SDX/VSE

IBM IMS/VS SYSTEMS PROGRAMMER

Position requires experience as an IMS applications programmer using COBOL plus two years experience as an IMS/VS system programmer with proficiency in the following areas: Installation, SYSGEN, Maintenance, Problem Determination, Debugging, Performance Measurement and Tuning, OS JCL, SMP/4.

IBM IMS/VS DATABASE SPECIALIST

Position requires a minimum of two years experience in technical support of IBM/DL/1 in IMS/VS environment. Must be able to design data bases, define control environment, apply maintenance, and trouble shoot system problems. Proficiency in BAL required.

HARDWARE - IBM 3081 and 3033; 3380 and 3350 direct access.
SOFTWARE - MVS/SP, IMS/VS, DL/1 ADF, VS/COBOL

IBM COMMUNICATIONS SPECIALIST

Position requires a minimum of three years experience in installing and maintaining ACF/VTAM and ACF/NCP with bi-sync and SDLC devices. Must be proficient in assembler language coding, network planning and debugging.

HARDWARE - IBM 3081, 3083, 3705, 3274
SOFTWARE - MVS/SP1 ACF/NCP, ACF/VTAM, NSF

The Lockheed-Georgia Company offers excellent salaries, comprehensive benefit program including Company-paid relocation to the Atlanta area. For immediate confidential consideration, please forward resume to:

Lockheed-Georgia Company
Professional Employment
Dept. 66-31-42Z
Marietta, Georgia 30063

An Equal Opportunity/Affirmative Action Employer

Lockheed
-Georgia Company
LEADERSHIP IN TECHNOLOGY

DATA PROCESSING

zilog

Systems Engineer
(Boston based)

ZILOG, the leader in UNIX* based 16-bit supermicrocomputer systems has an outstanding opportunity for a versatile Software Systems Engineer to work in the small business computer/office automation markets.

You will become part of our Sales team and provide pre-sales technical support to the team, systems houses and commercial OEMs.

Industry experience required in COBOL, BASIC, FORTRAN, data communications, and commercial applications software development. If you do not know UNIX this is an excellent time to learn.

For confidential consideration, submit resume and salary history to **Jeff Taylor, Area Manager, ZILOG, Inc., Corporate Place, 99 S. Bedford Street, Burlington, MA 01803.** Or you may call **(617) 273-4227.** Principals only, please. An equal opportunity employer. .

*UNIX is a trademark of Bell Labs.

Zilog
an affiliate of
EXXON Corporation

WANTED:
Software Engineer Extraordinaire

Continued strong acceptance of our systems software products worldwide together with product introductions scheduled during 1984 has us really hopping. Lucky for you, because we are now searching for a VERY Senior Software Engineer to fill a key position in our engineering staff.

Our requirements are high. To be considered for this position, a candidate will have 5-7 years progressive experience in IBM large systems, strong Assembler Language skills, a thorough knowledge of MVS and VM/CMS internals, and recent experience with CICS/VS, IMS/VS, or IMS/VS. The qualified candidate will have a broad base industry knowledge and a strong desire to develop advance software product for the world's largest information processing centers.

This key individual in our Engineering department will be responsible for identifying new product directions and opportunities, and leading the technical effort to bring these products to market. This position will require the fullest use of your talent and offers the visibility and opportunity only a small high growth company can provide.

For immediate consideration, call or send your resume to:

Doug Strelka (408) 554-8121

TriangleSoftwareCo.

4045 Stevens Creek Boulevard, Suite 166
San Jose, CA 95129

DIRECTOR
OF MANAGEMENT INFORMATION SYSTEM

Ground floor opportunity in a 300 bed community hospital presently involved in the development of a hospital wide information system (H.I.S.). Responsibilities include: long range systems planning, hardware/software procurement and installation, interaction with all levels of end-users, and departmental management. Current systems include: a state-of-the-art micro processor network, a shared data laboratory information system, and time sharing financial applications. Implementation of a Digital PBX is scheduled for Spring 1984. If the opportunity to select, install and manage leading edge technology interests you and if you have a minimum of 5 years DP experience, preferably within the health care industry please submit your resume and salary requirements to:

The Director of Personnel
MERCY HOSPITAL
144 State Street
Portland, Maine 04101

ASSISTANT DATA PROCESSING MANAGER

Aeneton Wire & Importing Company, one of the largest wholesale distributors in Texas, needs a senior systems guru to fill the number 2 position in Data Processing. Environment is System 38 Model 7 with 3 remote locations. The Assistant Data Processing Manager will supervise, in a distributive manner, system operations and system development in the areas of Order Entry and Inventory Control. Heavy user interface. At least two years solid 38 background, user skills, maturity and stability will qualify you for consideration. Position leads directly to Manager. Salary negotiable. Send resume to:

Jeff Olson, MIS Director,
AWI, 2831 Maple Street,
Dallas, Tx 75235.

HIRING?

More computer people read Computerworld than any other newspaper in the United States - more than half a million computer people every week.

And, among our 529,650 readers at user organizations about half claim to look at recruitment ads at least every other week (only a small percentage say they never look at recruitment ads).

No wonder Computerworld carries more recruitment ads for computer people than any other publication.

To place your ad or to get a rate card with complete details on Computerworld Classifieds, call or write:

Classified Advertising

Box 880
Framingham, MA 01701
617-879-0700

IMS DBA

Fortune 500 firm seeks DBA to do all planning, design and implementation for start-up division. Will SUPERVISE IMS-DBDC environ. Unisys equip. to work in planning and design on new Unisys DBMS from launch. $40,000.

SYSTEM 36 SPECIALIST - MAINE

Permanent multi-site, solo, onsite highly motivated SYS 36 analyst for new in-service DBMS sales. Direct, prog. enhancement to prod. lib. equip. for main frame/mini switching system. Public. Exceptional challenge in stimulating 4-seasons vacation area. $35,000.

RESIDENT STAFF OF BOSTON, INC.

100 Summer Street
Boston, MA 02110
(617) 423-1300
Personnel Consultants

Senior Consultant Divisional Services

Multi-billion dollar Ohio based retailer seeks self-motivated individual able to work autonomously in an unstructured environment for newly created position consulting with store divisions on their DP needs. This will entail consultation on hardware and software issues and applications; analysis of state-of-the-art technology and applicability to internal needs; and other research projects.

The ideal candidate should be a business person first, technical expert second, and should possess the following: 7-10 years progressive DP experience either in computer applications, systems development, or systems software; extensive IBM experience in hardware and software peripherals, data bases, and personal computers; strong oral and written communications skills; corporate experience in management and/or cross-functional training of DP & experience a plus.

Please submit resume with salary compensation to:

CW-84084
Computerworld
Box 880
Framingham, MA 01701

TELECOMMUNICATIONS NETWORKING ARCHITECTURE

Openings in
Boston & NY Metro area
Development, Design & Programming

Permanent and/or
Independent Consulting

WANG-VS-Assembler, DEC-PL/1, DECNET, IBM PL/1, BAL, VTAM, IBM CICS Internals, IBM PC.

Openings at all levels
Call MAGGIE LIPTAK,
212-697-8930,
or submit resume to Interface Inc.,
17 West 54 St., NY, NY 10019.

KEARNEY STATE COLLEGE
Kearney, Nebraska

COMPUTER SCIENCE: Two tenure track positions in Computer Science. Ph.D. in Computer Science preferred, will consider Ph.D. in related area with strong C.S. background, or Master's Degree in C.S. Starting date: 8/84. Closing date: 4/1/84 or when positions filled. Positions include full-time teaching, academic advising of undergraduates, and curriculum development. 400 majors from 8,000 student body. Community of 22,000. Salary competitive. TIAA-CREF, Blue Cross-Blue Shield. Send letter of interest, resume, 3 letters of recommendation, and transcripts to: Marilyn R. Jewett, Search Committee Chairman, Kearney State College is an Equal Opportunity Employer and Affirmative Action Employer.

PROGRAMMER/ANALYST

Start the year off right with a career move. We offer promotion from within, exceptional salaries and Magna including bonus, paid overtime, Blue Cross, dental, optical, etc. Join the elite of the profession which comprises our staff. Those with experience in one of the following only need apply.

SAS-COBOL	PDP/11 RSX11-M
IBM S/36 RPG II	IDMS ADS/O
D.E.C. VAX COBOL	CICS PL/I
D.E.C. DIBOL	PASCAL
IBM PL/I	MBA Software

Call or write to arrange a mutually convenient meeting.

RAND SYSTEMS CORP.
6895 W. Maple Road
Suite 2012
W. Bloomfield, MI 48033
(313) 855-4077

Software Design Engineers

If you like technology, you'll love Texas Instruments in Dallas or Lewisville.

Join the Equipment Group of Texas Instruments in the design and production of state-of-the-art electronics systems and subsystems such as radar, missile guidance, electro-optics, communications, navigation and intelligence systems. Our continued innovation in every realm of the government electronics business has made Texas Instruments a leader.

As a result, we're creating new career opportunities for qualified software design engineers. You'll work with a team that works on complete systems — not just components. You'll have the chance to broaden your technological capabilities and be recognized and rewarded for your accomplishments.

Right now, we have immediate openings for experienced software design engineers in the following areas:

- Real-time electro-optics projects (mid-level positions)
- Tool and language development (ADA and Pascal experience preferred; mid-level positions)
- Artificial intelligence software design
- Systems analysts for VAX/VMS operating systems
- CAD/CAM programmers
- Speech recognition applications designers

All positions require U.S. citizenship, a four-year technical degree and at least two years of related experience.

Now is your chance to make your career move to the dynamic Sunbelt and enjoy the Texas environment and lifestyle. Dallas and Lewisville (just outside of Dallas) have year-round recreational activities, lakes, major league sports, museums and theatre. The Dallas area boasts one of the lowest costs of living of any major metropolitan area in the nation and Texas has no state or city income taxes.

For immediate consideration, send your resume in confidence to: Ed Haynes/ Texas Instruments/P.O. Box 226015, M.S. 3186/Dallas, Texas 75266.

U.S. citizenship is a firm requirement for all Equipment Group positions.

An Equal Opportunity Employer M/F

TEXAS INSTRUMENTS

Creating useful products and services for you.

DATA LINK

Give us your resume
We'll Give YOU New England!

Some people come to ski on Cape Cod, some to ski in the White Mountains, and some to walk along the Maine beaches. But the professionals choose to the real reason, and it is every bit as exciting.

There's nobody better qualified than Data Link to introduce you to New England. We know everyone in EDP worth knowing, and our list of client companies reads like the Who's Who of the business world.

Send your resume today, or call. All fees, interview, and relocation expenses are paid by our clients.

DATA LINK
National Recruiting Consultants
Exeter Professional Building
Hampton Road, Exeter, NH 03833
(603) 772-6400

PROGRAMMER ANALYST

Person must maintain, modify, analyze, evaluate, and install operating systems, data bases, and support software for the University Hospital Packard 3000, Sperry 1100/60-1100/70, and Sperry V77/600 computer system. Must have knowledge of Assembler and one or more higher level languages. Must be able to effectively communicate with technical and nontechnical personnel. A degree in Computer Science or a comparable area is desirable, although some work experience may substitute for education. Salary range $17,913-$26,869. Position is half time permanent with good possibilities of becoming full time. Send resume to the Employment Office, P.O. Box 6160, University, Alabama 35486.

An Equal Opportunity Affirmative Action Employer

ROCKY MOUNTAIN OR NATIONAL

Data Base Designers	IDMS, IMS, DB/DC, ADABASE
Programmers/Analysts	Graphics, DOD, Telecom, Business
Systems Anal/Prog	IBM, DEC, HP, PRIME, CDC, TANDEM

Contact: Margo Kolle

Software Engineers	Aerospace, Telecom, Data Acquisition
Software Test EE's	ATE, Diagnostics, S/W Specs, IV & V
S/W Systems Develop.	8 & 16 Bit MPU's, C & UNIX, LAN

Contact: Vic Tuttle

Career Marketing Associates
7100 E. Belleview #208
Englewood, CO 80111
(303) 770-8888

amdahl

Peak Performance

People come first at Amdahl. Top quality people who thrive on working with the world's fastest, most reliable computers. From the beginning Amdahl has invested time, care and effort in supporting and motivating quality people. Reach your peak performance by exploring these opportunities in our Coporate Computer Center, one of the largest data centers in the country.

UTS System Programmer

Install and maintain the UTS systems (Amdahl's version of UNIX running under VM). You'll consult with internal users and interface with Amdahl's UTS development group on testing and enhancements. BS/MS in computer science required, with UNIX and C programming experience. Knowledge of VM and some background in operating system support a plus.

MVS Performance and Tuning Specialist

Requires 2 to 4 years C.P.E. experience including performance management, monitoring, configuration analysis, application analysis and operating system changes. Working knowledge of SAS, Assembler and OS/MVS system internals required.

Lead IMS System Programmer

Requires a minimum of three years IMS systems programming experience with knowledge of IMS DB/DC internals, SMP, and strong diagnostic skills. Project leadership skill and interest a must.

When you join Amdahl's progressive Corporate Computer Center in Sunnyvale, California, you will enjoy these advantages reserved for the most select team in large-scale systems:

- Leading-edge software including MVS/SP, ACF/NCP, ACF/VTAM and MSNF, VM/SP, IMS/DB/DC.
- A hardware configuration that consists of two 5860s, eight 470/V8s, five 4705s mass storage system, over 400 spindles of DASD and over 1,000 terminals.
- An extensive training and education program.

To explore one of these opportunities, call Bob Tyler TOLL FREE at (800) 538-8460, ext. 6190. In California call COLLECT (408)746-6190, or send your resume to his attention at Amdahl Corporation, MS-300, Dept. 2-018, P.O. Box 3470, Sunnyvale, California 94088. We are an equal opportunity employer through affirmative action.

the amdahl phenomenon

PROJECT LEADER/ OIL & GAS PROGRAMMER

Relocate to Baton Rouge for long-term, major project...

Participate in an important 3-way joint venture involving a major bank, oil producer and software house. This is an exceptional opportunity for a qualified data processing professional to initiate technical support for a large and complex application package, and prefer prior experience in oil and gas programming.

The ideal candidate will share responsibility for presales support, customer installation, post sales support, and development of add-on sub-systems. Requirements for this position include first-class COBOL skills, some systems analysis experience and the ability to interface in a vendor/customer environment. Experience with Honeywell DPS 6 or equivalent mini computers would be helpful, and knowledge of oil and gas accounting will give you a significant advantage.

We offer a competitive salary and benefits package, plus extended hands-on training in Denver, Colorado prior to permanent relocation in Baton Rouge, Louisiana.

If qualified, please send your resume with salary history in confidence to:

NATIONWIDE ADVERTISING SERVICE, INC.
Confidential Reply Service
Dept. 2KF 149
1980 West Loop South, Suite #1780
Houston, Texas 77027

Equal Opportunity Employer, M/F

A New Information Center!

- Do you want to make maximum use of your talent?
- Are you creative and resourceful?
- Do you like to make things happen?
- Do you want to be a key part of a new venture?
- Do you like to work hard?

If your answers are "yes", we need your talent to develop a new information center service. We are one of the fastest growing, most dynamic retailers in the Midwest.

WE OFFER:

- Competitive salary and benefits
- Good personal growth
- A positive dynamic environment

We need someone with knowledge of one or more products such as SQL, ADRS, CIBE, FOCUS, NOMAD, PROFS, or SAS and experience in an information center. Any work with personal computers in a corporate setting is a plus! This newly emerging department will become a vital part in our DP network and will also interact with a highly innovative PC network. This rapidly expanding area offers an exceptional challenge to the career oriented professional. Put your talent to work with our fine organization by calling the following numbers TODAY!

Call Steve Hooper or Jack Prewitt
(402) 691-4937 or 691-4935 (call collect)
Tuesday through Friday, 8 am - 5 pm CST

RICHMAN GORDMAN

Corporate Office
12100 West Center Road,
Omaha, NE 68144

An Equal Opportunity Employer M/F

Richman Gordman

PROGRAMMER/ANALYST
$30,000 - $40,000+

NYC Dept. of Transportation/Traffic Operations has openings for Programmer/Analysts with knowledge of state-of-the-art systems design methods to work on key projects. Excellent career and benefits package. Applicants must have four (4) to eight (8) years of satisfactory full time paid experience in IBM OS operating systems, COBOL/C.I.C.S. and Data Base. Adabas is a plus. Four (4) years of full time paid experience plus a BA degree from an accredited college; six (6) years of full time paid experience and an AA degree or sixty (60) credits from an accredited college; eight (8) years of full time paid experience and a high school diploma or a combination of experience and education may be substituted as a satisfactory equivalent. Excellent opportunity to become part of an expanding Data Center directly involved in computer systems that benefit the public. Send resumes and salary requirements to:

NYC Dept. of Transportation
40 Worth St., Room 801
New York, NY 10013
Attn: Laura Allin

DOT is an Equal Opportunity Employer

INSURANCE PROGRAMMER/ANALYSTS

Excellent Opportunity Available In The West For An Experienced Programmer Analysts. Our Rapidly Expanding Life Insurance Company Has An Immediate Opening For The Right Individual. Candidate Must Possess Working Knowledge Of Life-Comm, And Have IBM DOS/VSE, CICS Experience. The Selected Individual Must Be Able To Communicate And Work With Users. Salary Commensurate With Experience And A Comprehensive Benefit Package Offered. Send Resume And Salary Requirements To:B.P. Manager, P.O. Box [illegible], Salt Lake City, UT. 84110.

CURIOUS ABOUT CLASSIFIED?

If you are interested in advertising with Computerworld, but don't know how to do it, give us a call! We will be glad to send you our current rate card, which explains sizes, costs, deadlines and requirements. All you have to do is ask! Our toll free number is 800-343-6474, in Massachusetts call (617)879-0700, just ask for the Classified Advertising Department. Or, you can look for our classified order form located in the classified section of Computerworld. Fill it out, attach your ad with a check, and return it to us. Computerworld Classified Advertising, 375 Cochituate Rd., Box 880, Framingham, MA 01701. We're anxious to help!

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

SENIOR PROGRAMMER/ANALYST

Reliance Metals, Inc. a subsidiary of the Wyman-Gordon Company and leading West Coast specialty metals forging company has an opening for an experienced Senior Programmer/Analyst to develop new on line applications for manufacturing functions.

Applicant will be responsible for interfacing with computer users in the design and implementation of new and maintenance of existing systems.

Position requires prior experience on IBM-MSHS and DEC-VAX 8 Systems. Knowledge of IBM SDA or DEC PMS documentation techniques and systems design beneficial. Knowledge of RPG II and COBOL required.

Excellent employee benefits. Send resume and expected salary requirements to:

John P. Simonich, Jr.
Manager of Industrial Relations
RELIANCE METALS, INC.
6065 E. Firestone Place
South Gate, CA. 90280
SOEM-F

DISTRICT SALES MANAGER

Computer Communications, Inc. requires a District Sales Manager with a proven sales record. CCI specializes in front-ending, networking, message switching and tunneling SNA terminal protocols.

Opening is in greater San Francisco Bay area. Compensation plan includes base salary, draw, commissions and bonuses. $95K package.

Call (213) 320-9101 and Ask for Debbie Schust For More Details

---

DATA PROCESSING

Intofied, a leader in health care data processing has the following openings due to rapid growth.

SYSTEMS ANALYSTS

Good communications skills. Five years systems analysis experience. IBM-PC a plus. New systems development team.

PROGRAMMER/ANALYSTS

Three to five years experience in one or more of the following: BAL, Univac 90/70X, Communications and Financial Systems.

Health Care Applications experience a plus. Excellent salary and benefits. Please send resume and salary history to:

PATRICIA MURIL
Intofied
200 US Route 1
Monmouth Junction, NJ 08852
EOE

Programmers

Our newly installed 4300 system has created 2 new positions in our MIS organization.

Systems/Programmer

Successful candidate must be a take charge individual with minimum of 3 years experience in DOS/VSE operating environment and have comprehensive knowledge of CICS and 4300 system software.

Programmer/Analyst

Successful candidate must have a minimum of 3 years programming experience in the financial application area - including strong end user and MIS management communication skills.

We offer excellent company paid benefits and competitive salaries, as well as upward mobility within our organization. Please send resumes to: Betty Klein, CASIO, Inc., 570 Park Avenue, New York, NY 10019.
An Equal Opportunity Employer

Data Processing

FEDERAL EXPRESS... PREPARING FOR TOMORROW

We're expanding our commitment to high technology with the new Hybrid Department within the user divisions of Line Haul Operations - Information Systems for Maintenance and Engineering. Here, you will find the opportunity to contribute to the future of Federal Express, and to your career future, within Systems Development, Systems Operations, and Program Engineering functions. If you are looking for deep involvement in progressive technology, Federal Express is the place to be. Our people have the use of seven IBM 3081 and Wang mainframes and approximately 5,000 terminals. Positions are immediately available for the following:

RESEARCH & DEVELOPMENT GROUP
SENIOR TECHNICAL RESEARCH ANALYST

You will analyze through the use of sophisticated state-of-the-art, computer-based models and other operations research methods, broad and complex division problems and projects utilizing voice, video, data and text technologies. You will also provide Senior Management with recommendations of solutions and best alternatives; and provide a broad base of consulting capabilities to the division. A Bachelor's degree or equivalent is required in Math, Operations Research or Computer Science and six years experience in a quantitative field with at least four years experience in operations research. A Master's degree in Operations Research or Computer Science is preferred.

SYSTEMS DEVELOPMENT GROUP
SENIOR SYSTEMS DESIGNER

You will design and transform user requirements and provide technical advice and expertise to Line Haul Operation management on all aspects of user application systems, as well as state-of-the-art information of related industry data processing application systems. Six years experience in Data Processing with at least four years experience in systems development is required. A Bachelor's degree in Computer Science, Math, Engineering, or Business, and complex systems experience in IBM/Wang systems is preferred. Previous experience with airline business applications systems in a maintenance and engineering environment would receive preferential consideration.

SENIOR PROGRAMMER/ANALYST

You will design and transform user requirements into an application program for information systems, work on highly complex projects and provide technical leadership for user personnel for automated processing. Position requires five years programming experience including working knowledge of FORTRAN and COBOL and a Bachelor's degree in Computer Science, Math or Engineering is preferred. Previous experience with airline business applications systems in a maintenance and engineering environment is preferred along with experience on IBM/Wang systems. You must also have ability to communicate technical information to user.

Both positions require experience in FORTRAN, SAS, PL1, EMPIRE, and YELL-A-GRAF.

SYSTEMS OPERATIONS GROUP
SR. SYSTEMS MAINTENANCE COORDINATOR

You will maintain, enhance, document and implement existing application software. Five years experience in systems development, maintenance and enhancement is required. A Bachelor's degree in Computer Science, Math or Engineering and previous experience with airline business applications systems in a maintenance and engineering environment is preferred.

PROGRAMMER/ANALYST

You will design and transform user requirements, maintenance and enhancements to our application program for information systems, work on highly complex projects and provide technical leadership for user personnel for automated processing. Three years programming experience including working knowledge of FORTRAN and COBOL is required. A Bachelor's degree in Computer Science, Math or Engineering and previous experience with airline business applications systems in a maintenance and engineering environment is preferred. Must be able to communicate technical information to user.

COMPUTER OPERATIONS TECHNICIAN

You will maintain and operate computer equipment and provide technical assistance to users within the Line Haul Operations Division on IBM and Wang equipment. Three years experience in Data Communication networking or computer operations is required along with experience in system design and technical knowledge of computerized system analysis. An Associate's degree in Computer Operations is preferred.

SYSTEM ENGINEERING GROUP
PROJECT MANAGER-PROGRAM ENGINEERING

You will plan, organize, direct and control the engineering and testing of sophisticated software, hardware, and communication networks within Line Haul Operations to ensure compliance with corporate strategies for voice, video, data and text systems.

A Bachelor's degree or equivalent in Computer Science, Math or Engineering, and six years data processing experience with three years in hardware, software and communications engineering is required. Data base, testing, and data protection experience is preferred.

ENGINEER/SENIOR ENGINEER

You will perform the design testing activities relevant to hardware, software and communication implementation for Line Operations. A Bachelor's degree or equivalent in Computer Science, Math or Engineering is required. Two years experience in systems hardware/software support is necessary for the position of Engineer and four years experience in systems hardware/software and communications is required for the position of Senior Engineer for voice, video, data and text.

DATA BASE & PROTECTION ANALYST

You will be responsible for developing, maintaining and editing all existing Line Haul Operations developed data bases and ensure protection for the Systems. Three years programming experience with one year in Data Base Protection is required. Knowledge of MAS data processing techniques is desirable. We prefer you have a Bachelor's degree in Computer Science, Math or Engineering.

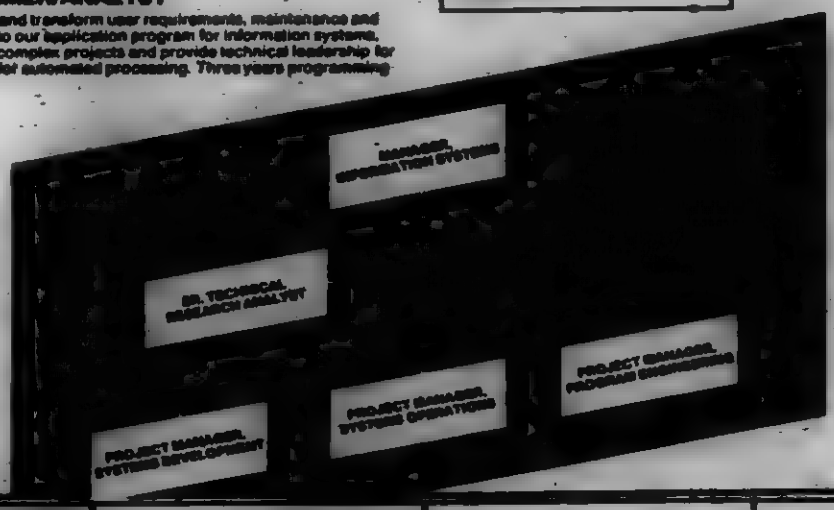
Bring your special talents to Federal Express. We offer an excellent salary structure and complete benefits. Opportunity for advancement is frequently available due to continued growth and a strict promote from within policy. Write us a letter indicating your experience and salary history. Enclose your resume if you have one.

TO EXPEDITE CONSIDERATION, PLEASE CLEARLY INDICATE THE POSITION IN WHICH YOU ARE INTERESTED ON YOUR REPLY ENVELOPE.

FEDERAL EXPRESS CORPORATION
Mr. Willard Baldwin
Attn: (job title)
P.O. Box 727, Dept. 6411-125
Memphis, TN 38194

Equal Opportunity Employer M/F

FEDERAL EXPRESS



PROJECT MGR

A unique opply in prominent publishing firm, for solid technical project leader to assist in the implementation of an IBM 4341. Candidate should have similar bkgd under DOS/VSE. COBOL exp essential with CICS familiarity. Urgent need!

$40,000 FEE PAID

BOSQUET SCHULZ
551 Fifth Avenue
New York, N.Y. 10017
212-661-4260 (Agency)

SUNNY SOUTH

Since 1970, specializing placement of DP professionals in all Sunbelt Cities & USA.

Client companies pay all fees, interview & relocation expenses. Confidential.

Programmers & Systems Analysts, Data Base, Tech Support, Network, Project Leaders. All Hardware, software, applications. $25-50,000.

COMPUTER GRAPHICS
THE UNIVERSITY OF AKRON

Full time, Visual Designer/Artist with specialization in computer graphics. Rank and salary depending upon qualifications. Starting date September 4, 1984. For details write Nancy Hoffman, Department of Art, University of Akron, Akron, OH 44325. *The University of Akron is an Equal Education Employment Institution.*

NEW ENGLAND
EDP OPPORTUNITIES

Outstanding opportunities exist in New England for Project Leaders, Systems Programmers, Systems Analysts, Programmer Analysts, Software Engineers with two plus years experience.

Explosive growth of our units continuing your career goals. Call or write today in total confidence.

KUEBLER ASSOCIATES
Data Processing Division
Executive Office Center
Two Manchester Square
Portland, ME 04101
(207) 774-0100

UNIVERSITY OF SOUTH DAKOTA
COMPUTER SCIENCE FACULTY POSITION

The Computer Science Program is accepting applications for 2 faculty positions for Fall 1984 to teach graduate and undergraduate courses plus participate in the development of a new MA program. Master's degree in Computer Science minimum, PhD preferred. Salary competitive. Send vitae, graduate transcripts, and 3 letters of reference to: Dr. Vern Ellingboe, Computer Science, University of South Dakota, Vermillion, SD 57069. Closing date: April 1, 1984.

AA/EOE

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

One of the best reasons for working in Austin is living in Austin.

Lockheed-Austin is breaking new technological ground in Texas. Just minutes from the green banks of the Colorado River, you'll find some of today's most challenging career opportunities. They're matched by Austin's affordable living and pleasant year-round climate. If you are interested in advancing your lifestyle as well as your career, our current employment opportunities include:

★ **DATA SYSTEMS AND SOFTWARE SPECIALISTS**
Experience in systems architecture, computer systems modeling and performance analysis, real-time executives, compiler enhancement, DBMS with relational data-base/UNIX systems, graphics/man-machine interface, data fusion and artificial intelligence is required.

Systems include CRAY, Rolm 1666, Data General, VAX 11/780, DEC-PDP-11s and various microcomputer systems and applications. Language requirements include Fortran, Ada, PL/M, Assembly and LISP.

Experience in guidance/navigation, aero-dynamics and C³I with MIL-STD development process/documentation is desirable. Tasks include both project application and technology development in C³I.

Lockheed-Austin's unmatched wage and benefits package includes medical, dental and life insurance. A retirement and savings plan is provided, along with much more.

If your qualifications match those listed above, send your resume to Professional Employment, Dept. 653-0284, P.O. Box 17100, Austin, TX 78760. Lockheed is an equal opportunity, Affirmative Action employer. U.S. citizenship is required.

Lockheed-Austin
Leadership in Technology

DIRECTOR OF MANAGEMENT INFORMATION SYSTEMS
FAIRBANKS MEMORIAL HOSPITAL

FAIRBANKS MEMORIAL HOSPITAL (FMH) is a 200-bed full-service institution located in Fairbanks, AK. FMH is member of the Lutheran Hospitals and Homes Society of America, Inc. (LHHS), which is a multi-institutional organization operating 73 institutions in 13 states. FMH, in concert with LHHS, has recently completed a major planning process to significantly increase its' data processing capabilities and is seeking an experienced data processing professional to assist in the execution of this plan and fill the position of Director of Management Information Systems.

THE DIRECTOR will be expected to work with FMH and LHHS home office staff in expanding the data processing capabilities at FMH. The Director will be responsible for the general management and administration for all current data processing activities, including FMH data center operations, liaison with LHHS data center operations; and assisting FMH staff in defining and satisfying data processing needs. In addition, the Director will participate in the formulation of data processing policy, review and update the long-range data processing plan, and assess new hardware and software technology relative to FMH needs.

THE QUALIFIED CANDIDATE will have a Bachelor's Degree with senior-level experience in planning, design, development, and operations of hospital information systems; and at least 2 years of experience in the direct management of a data center. Advanced degree or additional experience is desirable.

We offer an excellent compensation package and complete benefits, including medical/dental/vision insurance, 3 weeks vacation, pension plan, and the unparalleled outdoor activities of interior Alaska. For immediate consideration, please send your resume to:

Russell Cox
FAIRBANKS MEMORIAL HOSPITAL
1650 Cowles Street
Fairbanks, AK 99701
An equal opportunity employer

PROGRAMMER/ANALYST
SYSTEM/38

Fast growing company in rural country setting needs experienced programmer/analyst for development of manufacturing & retail distribution systems. The successful candidate will have 1 or more years hands on System/38 and 5 or more years Data Processing application development experience. Principles only please.

Please send resume and salary requirements to:
MIS Director

RENOVATOR'S SUPPLY, INC.
MILLERS FALLS, MA 01349

Data Processing
IF YOU'VE OUTGROWN YOUR CURRENT POSITION, TRY US ON FOR SIZE.

As a seasoned Data Processing professional, you know when growing pains occur. It starts with a feeling that the challenge has ended. You've gone as far as you can.

Take a look at Southeastern Computer Corporation, a subsidiary of Florida Progress Corporation. As a national supplier of large-scale integrated tax and vehicle fleet administration systems for government and commercial clients, we'll give you responsibility, high visibility, and the unlimited growth potential that can only be found in this innovative field. You can apply great talent in a unique state-of-the-art environment which may include work in a variety of operating situations. Additionally, your career can pace your growth by making new challenges.

The following positions are available:
- Sr. Analysts
- Programmer Analysts
- Sr. Programmer Analysts
- Programmers

If you have a BS degree in Science (Math, Computer Science etc.) and 1-10 years experience in Data Processing, including on-line systems (CICS or IMS and MCS/DOS), you may be a perfect fit for the job.

For a tailor-made opportunity, send your resume and salary requirements, in confidence, to James E. Burkhalmer, SOUTHEASTERN COMPUTER CORPORATION, 2536 Countryside Boulevard, Suite 545, Clearwater, Florida 33575.

SOUTHEASTERN COMPUTER CORPORATION

EOE M/F U.S. Citizenship Required.

LOOKING?

Find the job you want in Computerworld's classifieds. No other publication carries as many ads for computer professionals as Computerworld, so no other publication can give you as wide a choice of jobs, salary and location as Computerworld. You can even try a "Position Wanted" ad to look for exactly what you want, where you want.

Be sure you look over our recruitment ads every week, so you don't miss the opportunity that's just right for you.

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY
375 Cochituate Road, Framingham, MA 01701 / (617) 879-0700

California State University System

Associate Director, Telecommunications

The California State University (CSU) system consists of a central Headquarters and 19 diverse campuses which serve the higher education needs of 315,000 students. The system carries out its instructional and public service mission on a statewide scale with a $1 billion annual budget. The Headquarters Division of Information Systems (DIS) is seeking a dynamic, seasoned manager for a newly created position at the State University Computer Center located in the mid-Wilshire area of Los Angeles. The Division performs system-wide planning and coordination activities for all facets of information processing services, manages the CSU Data Communication Network, and operates a large control computer complex.

This position reports to the Director, DIS and will be responsible for planning and development of a future statewide telecommunications network to meet voice, data and video communication needs, in cooperation with campus and State government offices. The successful candidate will have had experience in analysis and design of voice/data/video systems and in planning integrated systems. A record of technical and managerial competence is essential, including outstanding oral and written communication skills, and the ability to work with diverse people in a large, highly decentralized enterprise.

Minimum qualifications include a Bachelor's degree or equivalent in telecommunications or engineering-related discipline and five years of professional experience in telecommunications networking which includes 2 years of major management responsibility in this area. A Master's degree in a related field is desirable.

This is a challenging opportunity to contribute significantly towards a CSU goal of the highest priority. If you have had technical design/engineering experience, managed large scale planning/development projects and are looking for an opportunity at ground level to lead in the development of an integrated network, then you should consider joining us. Salary is commensurate with qualifications and experience. Resumes must be received in Personnel Services by March 19, 1984. Apply to:

Personnel Services, Ref: A:DIS-3
The California State University
400 Golden Shore, Suite 112
Long Beach, CA 90802

Equal Opportunity
Affirmative Action Employer

SAFECO · · HAS THE KEY

PROGRAMMER/ ANALYST CAREER OPPORTUNITIES

Seattle

Safeco is one of the top 25 diversified financial corporations in America. Our data processing center offers our employees a state-of-the-art, quality work environment with the stability and commitment of management to develop our people — Safeco's greatest resource.

Qualifications should include 2 to 4 years experience of insurance, business or accounting applications in a COBOL, OS/MVS, IMS/DL-1, IBM 30 XX environment. Knowledge of RAMIS also a plus, as is IBM PC experience.

Responsibilities will include all aspects of system development life cycle. These are permanent positions offering uniquely varying assignments. Job rotation is based on personal motivation and expressed interests.

Safeco's headquarters overlook the picturesque campus of the University of Washington and its adjoining lakes and mountains. We offer excellent salary, complimented by a comprehensive company paid benefits program. For more information about an exciting opportunity in America's most liveable city, send your resume to: Ms. Karen Hedine, Safeco, Safeco Plaza, Seattle WA 98185. EOE.

Direct contact will receive preferred handling.

SAFECO

Codex Communicates Success.

For over 20 years, Codex has communicated success. In data communications. In computer networking. In career opportunity. You can be an essential contributor to our continued success. Join us in one of the following positions.

Principal Support Engineer

You will be responsible for both pre-and post-sales support of the T1 Mux, to insure total customer satisfaction with advanced Codex communications solutions. To qualify, you should have a BSEE plus a minimum of 5 years of sales support experience. An in-depth knowledge of T1 Carriers, PBX interfaces, product design and data communications systems problems is essential. Excellent communications and interpersonal skills are a must.
Contact Paul Johnson.

Manager—Systems Integration & Applications

You will manage the day-to-day department operations, both technical and administrative, of the Systems Integration and Applications group. The group's primary function is to insure the technical integrity of communication systems that meet specific customer needs. The engineers in this group have responsibility for the design, integration, installation, and acceptance of major communication systems; pre- and post-sales, engineering support (consulting); and custom engineering of systems products or specials. Minimum of 5 years of applicable experience in the telecommunications/data communications field which must include at least 3 years of managerial experience.
Contact Paul Johnson.

Engineer—Systems Integration & Applications

You will provide the engineering support necessary to successfully integrate and install major communication systems. Individual has opportunity to provide pre- and post-sales engineering support, and design and support customer specials (RPQs). Individual will primarily work in conjunction with a project engineer. Minimum of 3 years experience in the telecommunications/data communications environment. BS in Engineering/Computer Science or equivalent in years of experience. Knowledge of protocols; exposure to datacomm applications, field service or application engineering experience a plus, but not necessary.
Contact Paul Johnson.

Development Manager

In this vital position, you will have full responsibility for LAN product development. Specific duties include product planning, design and implementation, plus department staffing, budgeting, and development. The preparation of specifications, proposals and strategies is also required. To qualify for this leadership position, you must have at least a BSEE or BSCS with a minimum of 8 years experience in software development which must include at least 2 years of project leadership. Familiarity with hardware, multiprocessors, data communications protocols, packet switching, LAN, or IBM SNA is highly desirable.
Contact Bob Lippman.

Principal Software Engineer

You will work with Codex professionals in the development and enhancement of communications software for network processors. Specific duties include coding programs and tools in "C" and Assembler languages, performance benchmarking and analysis of UNIX™ operating systems and working with users to ensure the optimum performance of internal communications software. To qualify, you must have a BSCS or its equivalent, plus at least 7 years of programming experience utilizing a high level language (e.g. PASCAL). An in-depth knowledge of UNIX™, "C" Language, and proper coding and documentation techniques is essential.
Contact Bob Lippman.

Please forward your resume to CODEX CORPORATION, Dept. 200-227, P.O. Box 567, Canton, MA 02021, to the attention of the appropriate individual.

codex

MOTOROLA INC.
Information Systems Group

An Equal Opportunity/Affirmative Action Employer M/F/H

BUSINESS PROGRAMMER/ANALYST SYSTEMS ANALYST

Your skills are unique. So are we.

As a computer professional, your skills in the application of advanced business systems designs are a unique asset in today's fast-paced business environment. At Ciber, we're also unique. We're a growing, innovative consulting firm that provides applications development services to diverse customers nationwide.

If you're an individual with a minimum 3 years experience as a Programmer, Programmer Analyst, or Systems Analyst, consider a future with Ciber. We offer a challenging career where your technical know-how can be put to use in diverse assignments with clients in various industries.

Our projects are development-oriented, so you'll be involved in analysis, programming, implementation and documentation with emphasis towards IDMS, IMS, CICS and other software packages. With us, you'll also gain the kind of recognition and visibility found only with a company where opportunities are still taking shape - a company like Ciber. We have offices located in Atlanta • Chicago • Dallas • Denver • Detroit • Houston • Phoenix • Sacramento • and St. Louis. If qualified and interested in becoming a Ciber professional, call collect or send your resume to:

Ciber
Personnel Department
67 E. Weldon, Suite 121
Phoenix, Arizona 85012
(602) 234-0411

An Equal Opportunity Employer M/F

CIBER

VAX/VMS SENIOR SYSTEMS PROGRAMMER ANALYST

Rapid growth of Digital's Colorado Springs Support facility has created an exceptional opportunity for you.

To support growing number of VAX Systems utilizing a VMS Operating system, you'll be responsible for capacity planning, performance monitoring, benchmarking, user training, hardware procurement, technical support for software installation and business applications.

This position requires:

1) Minimum of three years VMS experience.
2) Detailed knowledge of VAX/VMS Operating System with considerable experience as system manager and user interface.
3) Demonstrated strong system programming experience using MACRO, BASIC and DCL.
4) Proven capability to interact successfully with others on resolution of computing problems.
5) VAX clusters experience desirable.

If you join us, you'll be rewarded with a fully competitive salary and benefits package.

Send resume to: S. Chamberlain, Digital Equipment Corporation, DPUII, Dept. 0227 3804, 4405 N. Chestnut Street, Colorado Springs, Colorado 80907.

We are an affirmative action employer.

digital™

Dunhill Means Experienced Systems Programmers, Analysts & Programmers

At Dunhill of Charlotte our only business is finding the right people for the job. We represent many of the largest and most respected corporations across the country. That's why we can offer the busy data processing professional the opportunity to explore the job market without doing any more than simply sending us a resume.

We are not asking you to make any commitment. There is never a fee with Dunhill of Charlotte, and all matters are held in strict confidence. What more could you ask for? We will also keep you up to date on industry trends and current salary ranges in the DP area.

Keep your career running in high-gear by letting Dunhill of Charlotte find the opportunity you have been searching for as a professional. We want to go to work for you today! We specialize in the placement of experienced Programmers, Analysts and Systems Programmers in the Carolinas and throughout the beautiful Southeast and Southwest. Give us a call now, or send your resume to:

Keith Reichle, CPC
Data Processing Consultant
6401 CARMEL ROAD
SUITE 107
CHARLOTTE, NC 28226
1-800-438-3912
In North Carolina call collect (704) 543-0812

Dunhill of Charlotte, Inc.

An Equal Opportunity Employer M/F

TECHNICAL SUPPORT DATABASE ADMINISTRATION

Information Systems Department
SYSTEM 34.36.38

Prominent nationwide real estate firm has an exceptional career opportunity for a technical professional.

The ideal candidate will have a BS or equivalent plus 4 years related experience. A thorough knowledge in data communications networking, capacity analysis and planning and database administration is required.

This is an internal consulting position requiring excellent communication and problem-solving skills. This position offers an opportunity to assist in planning and implementing a multi-location equipment network and developing a broad spectrum of new application systems.

If you can provide the internal technical support necessary to ensure the success of the Information Systems Department and desire a truly competitive salary coupled with an excellent benefit program send resume with salary history and requirements to

Grace Ben-Ezra

CUSHMAN & WAKEFIELD
THE NATIONAL FULL SERVICE REAL ESTATE ORGANIZATION
1166 Avenue of the Americas
New York, New York 10036
An Equal Opportunity Employer

COMPUTERWORLD

The Recruitment Connection...

... the best connection to have when you are looking for quality computer professionals. There is a good reason why COMPUTERWORLD is the number 1 computer industry trade newspaper. No other newspaper of its kind can give you the broad exposure that you will get by advertising in COMPUTERWORLD. It is read by over half a million people, most of them top-notch professionals with top-notch computer companies.

COMPUTERWORLD publishes every Monday and the deadline for receiving your advertisement is always ten days prior to the issue date desired. The open line rate is $9.15 per line with a minimum size of 2 column inches. Send in either camera-ready material or clearly typed copy with a layout if desired. We also have a telecopier service and a team of ad-takers who will gladly take copy over the phone.

Our mailing address is COMPUTERWORLD, Classified Advertising, 375 Cochituate Road, Box 880, Framingham, MA 01701. Or call for more information at 1-800-343-6474 or, in Massachusetts, (617)879-0700.

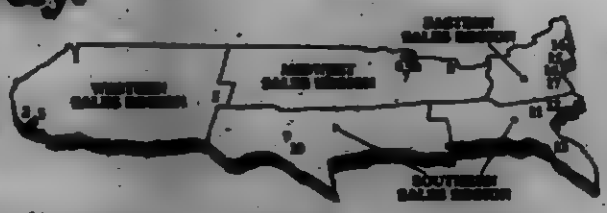
COMPUTERWORLD
THE BEST CONNECTION TO HAVE.
THE ONLY CONNECTION YOU'LL NEED.

Experienced Computer Sales & Marketing Representatives

Get off the sales rollercoaster with strong sales support, stability...and opportunity.

The HP Way.

If you're tired of the same old promises, consider Hewlett-Packard. We have outstanding opportunities for career-minded professionals with 2 or more years' specialized sales experience in the minicomputer field. With a degree in engineering, physics, math, computer science, business or the equivalent combination of education and experience, you could qualify for consideration.



1. Bellevue, WA
2. Santa Clara, CA
3. N. Hollywood, CA
4. Los Angeles, CA
5. Englewood, CO
6. St. Paul, MN
7. Rolling Meadows, IL
8. Nord, MI
9. Dallas, TX
10. Houston, TX
11. Atlanta, GA
12. Raleigh, NC
13. Orlando, FL
14. Lexington, MA
15. Paramus, NJ
16. Valley Forge, PA
17. Rockville, MD
and other cities across the U.S.

Careers are yours for the making.

HP offers more than a job. You can reach the top of your field right across the nation. But you'll need to be creative, enthusiastic and have the business maturity and technical know-how to interface effectively with end user decision makers.

Two areas of opportunity for Experienced Field Sales Representatives:

Technical Computer Sales

These positions are responsible for selling HP's technical computer products to scientific, technical and manufacturing customers in your assigned territory. Besides degree or equivalent, 2 years' successful CAE/CAD/CAM or manufacturing minicomputer sales experience is desirable.

Commercial/Business Computer Sales

These positions are responsible for selling large-scale minicomputers, primarily to the manufacturing market. As well as managing the existing customer base in your assigned territory. Besides degree or equivalent, 2 years' successful business computer sales experience is desirable.

Invest in your future... long term.

We rank high among major computer companies in terms of sales growth, earnings, product innovations and employee retention. This means career stability... year in and year out. It starts with in-depth training for up to 10 months, covering every aspect of the business... from learning the HP product line to the most sophisticated sales techniques. You'll quickly gain hands-on experience working with senior HP people.

With HP you'll reap the benefit of rapid production, delivery and installation, plus strong pre-and post-sale technical support. Because our credo is "productivity - not promises."

Consider the HP advantages.

Besides excellent compensation and benefits, you'll find your career progression with us a lot smoother than what you've experienced in the past. For immediate consideration, please send your resume with salary history, indicating your preferred city.

Eastern Region
Murray Kaplan
HP Dept. CW
4 Choke Cherry Rd.
Rockville, MD 20850

Midwest Region
Barbara Meyer
HP Dept. CW
5201 Tollview Drive
Rolling Meadows, IL 60008

Southern Region
Karl Frost
HP Dept. CW
2000 South Park Place
Atlanta, GA 30339

Susan Benson
HP Dept. CW
930 E. Campbell Road
Richardson, TX 75081

Western Region
Blair Parr
HP Dept. CW
3939 Lankershim Blvd.
N. Hollywood, CA 91604

HEWLETT PACKARD

An Equal Opportunity/Affirmative Action Employer
No Agencies Please

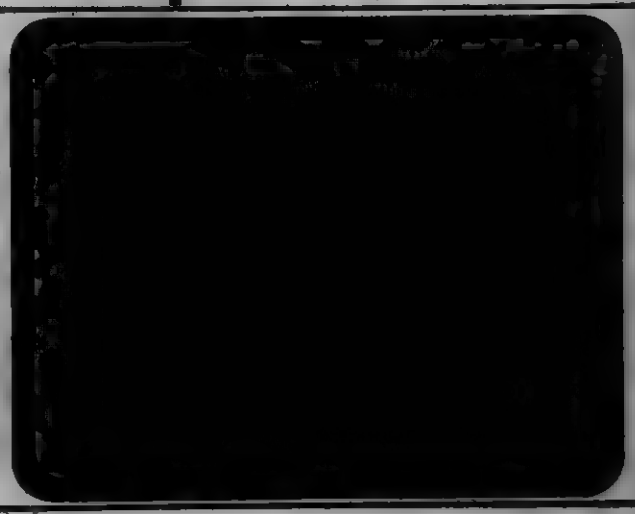
Professional Master's Degree Computer and Information Science

Advance your career in information systems through Dartmouth's distinctive professional program. Our two-year program is designed to equip you to take a leading role in planning, designing, and developing effective business solutions to business problems.

In the CIS Program, you will study current methodologies for planning, analysis, and design; strategies and issues in the management of information systems; business organization; project management; database systems; networks and distributed processing; professional communication. Learn from guest lectures by practicing managers of information systems, case studies, and professionals-in-residence. An internship is required of each student.

If you have previous experience in the computing field but want to be equipped to assume more responsibility and leadership, consider joining us next year. For more information, write: Program in Computer and Information Science, Dept. C, Nathan Smith Building, Hanover, NH 03755.

Dartmouth College



DATA PROCESSING PROFESSIONALS

THE FUTURE IS HERE TODAY

ERLANGER MEDICAL CENTER, located in Historic Chattanooga, TN, is beginning the second phase of its long range data processing plan. Several growth opportunities are available for dedicated Data Processing Professionals interested in the professional challenge of implementing state of the art on-line, data base systems utilizing COBOL programming and transaction processing technology. Our newly constructed Data Center includes dual 12 MEG Burroughs B7900's, minicomputers, microcomputers, and office automation systems. We offer the opportunity to expand your technical and professional skills in a progressive health care setting.

OUR REQUIREMENTS are for individuals with 2 to 4 yrs. experience on medium to large scale batch and on-line systems. We seek above average skills in communication, organization, sensitivity to end user needs and a stable employment history. Burroughs and Health Care backgrounds are a plus.

APPLICATIONS DEVELOPMENT MANAGER - This is a fast track management position requiring you to carry out concurrent implementation of several vendor packages. You will need a strong project management background and be skilled at developing detailed project estimates and budgets. Responsibilities will include the supervision of approximately 12 analyst and programming personnel. You will provide both technical expertise and functional specifications for data base and batch processing applications in a COBOL environment and be responsible for timely completion of assigned projects. Heavy user contact is required for developing user requirements, documentation and in establishing technical and user training.

SYSTEMS ANALYST - You will serve as liaison between users and the Data Systems Dept. Responsibilities include specification, design and installation of financial and patient care systems. You will oversee analyst programmers in projects through implementation. Four yrs. experience as a system analyst with hands on implementation experience with custom and application packages involving data base and data communications and the ability to handle multiple projects. A Bachelor's degree and programming background are desirable.

ANALYST PROGRAMMER - Assignments include detailed program design, coding, testing and debugging as well as documentation and implementation of batch and on-line systems. You will assist in systems specifications, design tasks, and end user training. At least 2 yrs. of heavy experience in COBOL program design, coding, and testing. Familiarity with Assembler language programming, micro and mini computers a plus.

COMPUTER OPERATIONS SUPERVISOR - Your responsibilities will be to cover our dual B7900 computer processing activities on your shift. This will involve assuring effective data control, personnel and work scheduling, developing and maintaining standards and procedures, operator run instructions, and other related duties. A minimum of 4 years of operations experience is required, 2 of which must have been in a supervisory roll.

YOUR FUTURE will hold outstanding technical opportunities and challenges. In addition to a mild four season climate, the warm hospitality and historic traditions of the South, you'll find a comprehensive benefits package that recognizes your individual achievement and performance. Tennessee has no state tax and ranks among the lowest in annual cost of living.

IF YOU'RE READY for the challenge, send your resume to:

EMPLOYMENT MANAGER
ERLANGER MEDICAL CENTER
975 EAST THIRD ST.
CHATTANOOGA, TN 37403

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

Systems Professionals

Burroughs Corporation's System Engineering Division works with selected large domestic and international accounts to solve challenging customer problems in the areas of distributed systems, networking and real-time transaction processing. We're looking for take-charge professionals to get involved in current activities such as Requirements Identification, Network and Systems Design, Modeling, and Performance Analysis.

We require in-depth knowledge in at least 2 of the following areas:

- ***DMS II***
- ***BNA***
- ***NDL/NDL II***
- ***MCP***
- ***GEMCOS/TPS***
- ***SMF II***

with at least 5 years' experience in systems support or systems design with medium or large systems. Specific expertise in Performance Management, Capacity Planning and Network Design is highly desirable.

Burroughs offers the chance to take your talent to the limit of professional creativity and growth in a supportive environment, as well as an excellent salary and benefits package combined with the low-cost-of-living and cultural amenities of the Philadelphia area. For confidential consideration, call ***(215) 964-5967****, or send your resume to:*

Diane McGonigle
Burroughs Corporation
System Engineering Division
240 Radnor-Chester Road
Radnor, PA 19087
An Affirmative Action Employer

Burroughs

SENIOR SYSTEMS ANALYST

Abbott Laboratories is a $2.9 billion, rapidly growing leader in the expanding medical care products field. The sophisticated technical environment at our new facility in Austin, Texas, combined with our continued growth, has created an exceptional opportunity for an experienced Senior Systems Analyst.

Under the direction of the Data Processing Manager, this position will be responsible for long-range systems planning and the design/implementation of manufacturing and business systems. Ideal candidate will have a B.S. in business or a related degree, with an emphasis in computer science. 5-10 years of programming and systems analysis and design experience as a project leader on manufacturing data collection systems is required. Design experience using System 38 is also required. Knowledge of Series 1 and RPG II is desired.

Abbott provides excellent potential for career development and an attractive wage and benefits package that includes profit sharing and stock retirement plan. For consideration, send resume with salary history in confidence to: Marsha Gardner/Personnel Representative.

ABBOTT
3900 Howard Lane
Austin, TX 78728
An Affirmative Action Employer

MANAGER OF DATA PROCESSING

A Fortune 500 company based in the Los Angeles area is looking for a Manager of Data Processing. This is a senior position, reporting directly to a member of the executive board. The successful candidate will be responsible for one of the largest Data Processing systems in southern California and for both the operating and applications programming aspects of the installation in support of a high technology R&D and manufacturing organization.

To qualify, one must have at least 5 years experience in a senior management position and have demonstrated familiarity with both the business and practical applications of electronic data processing and computer systems. A B.S. in a technical discipline or Business is required. An advanced degree is preferred.

For prompt and confidential consideration, please forward your resume to:

CW-84567
Computerworld
P.O. Box 880
Framingham, MA 01701

Equal Opportunity Employer M/F/H
U.S. Citizenship Required

TECHNICAL SUPPORT PERSONNEL

Kennametal Inc., a world leader in the development of hard carbide metals and advanced tooling systems, has several openings in its technical support group. These positions, located at the corporate headquarters facility in Latrobe, Pa., would provide central support for the multi-CPU data center in Latrobe and to remote single-CPU data centers.

SENIOR SOFTWARE SPECIALIST FOR CICS

Three to five years' experience in CICS installation, maintenance, troubleshooting, tuning, and interfacing with IBM support center, and at least two years in an MVS environment are required. Knowledge of IMS/DB, DMS and UFO is desired. Experience with MRO and ISC is helpful.

SOFTWARE SPECIALIST FOR CICS

One to three years' experience in CICS table maintenance and problem resolution with one year in an MVS environment are required. Experience with IMS/DB, DMS, UFO, MRO and/or ISC is an advantage.

SOFTWARE SPECIALIST FOR VM/MVS

Two to four years' experience in system generation, maintenance, problem resolution and product installation in a VM and/or MVS JES2 environment are required. Experience with NJE and VSAM is desired. Information system and/or UCC1 experience is a plus.

Situated in the heart of the recreationally rich Laurel Highlands, Latrobe is only an hour away from the culture, commerce and excitement of Pittsburgh. If you have the qualifications, please submit your resume and salary requirements in confidence to:

Kennametal Inc.
Attn: Robert Kendra
P.O. Box 231
KENNAMETAL® Latrobe, PA 15650

An equal opportunity employer m/f/h 8764-144

PROGRAMMER ANALYST

Needed for small college administrative computing center. Start to finish development, implementation and maintenance of software systems. 3-5 years RPG II programming with systems analysis experience. Requires experience on IBM System/34 or 36 OCL and utilities, including WSU. Good knowledge of BASIC and microcomputers. BA or BS in Data Processing or related field desirable. Accounting or business background a plus. Salary commensurate with experience. Comprehensive benefit package. Send resume with current salary by April 1, 1984 to: Data Processing Manager, Maine Maritime Academy, Castine, ME 04420. An Equal Opportunity Employer.

COMPUTERWORLD CLASSIFIEDS

Advancements are constantly being made in the fast-paced computer industry. As a result, businesses are also progressing very rapidly. And many of them depend on COMPUTERWORLD Classifieds to keep them on top of their ever-changing needs. Broad coverage and quick solutions make COMPUTERWORLD the #1 computer trade newspaper in which to advertise. If you haven't already advertised in COMPUTERWORLD, why not become a part of our success and the success of many businesses like yours?

Our classifications include: Position Announcements, Buy Sell Swap, Software for Sale, Time & Services, Real Estate, Business Opportunities and The Bulletin Board.

We'll keep you in step with progress.

Call us at 1-800-343-6474
In Massachusetts, call (617) 879-0700

DIRECTOR DATA PROCESSING
SALARY $34,183-$43,680

The Child Support Enforcement Unit of the Office of the Attorney General of Texas has an immediate opening for Director of Data Processing. This position requires a bachelor's degree in CS or related field and 7 years of successful professional experience in data processing, including 5 years in supervisory and management positions. Desirable knowledge includes systems analysis and design, software tailoring, on-line network control, computer operations, and production control. Some experience with different hardware brands and hardware procurement is also desirable. Some knowledge of CICS will initially be helpful. DUTIES: Supervise data processing, operations, and production staff; assist in the evaluation of data processing needs, the procurement of required hardware, and the procurement or development of required software; coordinate division activities with other divisions in the AG's office and with DP divisions in other government agencies. Send detailed resume to Office of the Attorney General, Personnel Division, P.O. Box 12548, Austin, Texas 78711 by 5pm on March 9th.

EOE/AA

DP PROS
in
TECH SUPPORT
Make
$40,000+
doing customer support, in-house, or R & D
need
IBM OS or DOS exp.
Call or send resume:
(617) 965-9700
Paul Silver
c/o Judge Inc.
2 Newton Exec. Park
Newton, MA 02162
Days and Evenings

SYSTEMS ANALYST

In an academic environment. Position available for Manager of User Services in rapidly growing university computer center with a staff of over 20 student consultants and permanent programming staff. The individual selected for this position will manage computer consultant services for almost 200 faculty members as well as students who are enrolled in Computer and computer related courses. Working knowledge of statistical software packages such as SPSS, BMDP, SAS, and IMSL is required. A Master's degree or equivalent experience in computer science, statistics or a related discipline is required. Ability to communicate well orally and in writing is mandatory. Annual salary range: $25,971 - $31,059. Submit cover letter and resume by March 9, 1984 to:

Personnel Office
George Mason University
4400 University Drive
Fairfax, VA 22030

AA/EOE

MISSISSIPPI STATE UNIVERSITY is seeking Programmer/Analysts for Administrative Data Processing. BS Degree and DMS 1100 experience required. Send resume to:

Gerald Matthews, Director
Computer Center
and Services
Drawer CC
Mississippi State, MS 39762

MSU is an equal opportunity/affirmative action employer.

Accountemps puts the pro in edp PROductivity.

There's no longer a reason for data processing work to fall behind—Accountemps professionals are available on a moment's notice. Specialists in systems analysis, programming, computer operations, data entry and even word processing.

Accountemps specialists are the ideal solution when work starts to pile up—when employees are sick or on vacation—or when specific projects must be completed quickly and cost effectively. And because they're slightly over-qualified, they need little or no orientation. They get right to work and finish the job right the first time—and quickly too.

A call to any one of 80 offices in the United States, Canada and Great Britain will bring you the help you need immediately—for a day, a week, a month or longer—whenever you need them—evenings or weekends.

accountemps.
Rent an Expert.

© 1984 Robert Half International Inc. All offices independently owned and operated.

FIELD ENGINEERS

Rapid expansion of our computer maintenance organization means excellent opportunities for aggressive individuals in the Chicago area with two or more years experience in DEC PDP-10, 11 or VAX.

For further information please send your resume in confidence or call collect to:

Bob Kroupa,
TYMSHARE, INC.
4513 Lincoln Avenue, Suite 106
Lisle, IL 60532
(312) 964-9248

or Jim Abele,
TYMSHARE, INC.
6333 Harry Hines Blvd.
Dallas, TX 75235
(214) 638-2130

Additional openings exist in Washington, D.C., Los Angeles, CA, San Francisco CA, and Dallas, TX.

Equal Opportunity Employer M/F/V/H

TYMSHARE

THE RESUME SYNDROME

19 of 20 Resumes end up in somebody's wastebasket. If you want your resume to be the 1 in 20 that gets results, send $5.00 for our Booklet, "How to Write A Resume." To receive a FREE COPY, attach a copy of this ad to your resume and mail it to in U.S.A. only:

NH - MAINE
DP PROFESSIONALS

We have numerous clients seeking qualified people with experience in COBOL, RPG, DOS or OS. Financial and manufacturing applications. All vendors considered. Excellent salary, benefits and relocation plans.

Fee paid. Reply in confidence to:

ROGERS AND SEYMOUR

84 Auburn St. - Portland, Me. 04103

WASHINGTON D.C. & EAST COAST OPENINGS

We're TECHNICAL RECRUITERS, the Technical Placement Specialists, based in the Nation's Capital and serving the NEW ENGLAND, MID-ATLANTIC, and SOUTHEAST regions. Our client companies currently need experienced professionals at all levels:

Systems Software Development
Systems Programming
Telecommunications
Graphics Systems
Data Base Systems
On-Line Systems
Scientific Programming

Companies pay all fees, interview and relocation expenses. Send resume in complete confidence to A. J. Rachele or call (collect):
(202) 626-4637

TR TECHNICAL RECRUITERS 1120 G St. NW, Suite 300, Washington, D.C. 20005

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

Data Processing Professionals

With IBM in your past and PRC in your future, that's serendipity.

Washington, D.C. Metro Area, Norfolk/Virginia Beach, VA and Charlottesville, VA.

Sometimes the chips fall right, so that two plus two equals more than four. With a good, solid IBM hardware background, this could be it for you!

Planning Research Corporation, having forged to the lead worldwide in diversified professional services, continues to generate growth and with it outstanding opportunities for accomplished career professionals.

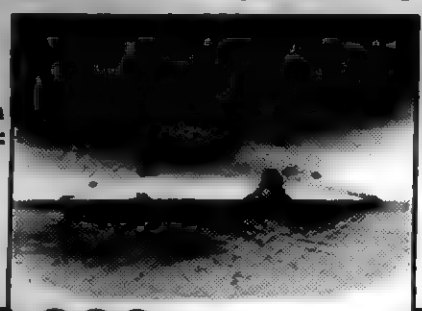
THREE LOCATIONS!
Right now we have openings in three locations: Charlottesville, VA, Norfolk/Virginia Beach, VA and the Washington, D.C. metro area. Positions require a minimum of 1-5 years' experience in the following areas:

SYSTEMS PROGRAMMERS (Norfolk/Virginia Beach and Metro Washington, D.C.). Strong knowledge of operating systems internals in either an MVS or VM environment.

APPLICATIONS PROGRAMMERS (Charlottesville). Data base experience (Model 204 preferred). FORTRAN or COBOL and modeling background.

TASK LEADERS (Metro Washington, D.C.). Experience in any of the following: UNIX, ETHERNET, XNS, and ADABAS.

For immediate consideration, please send your resume to: Jim Aquino, Planning Research Corporation, 1500 Planning Research Drive, Dept. JA-31, McLean, VA 22102. An Equal Opportunity Employer M/F/H/V. Principals Only.



prc
Planning Research Corporation

ADABAS NATURAL

Are you ready to take another step forward in your career—making the most of your DBMS talents and skills? Do you desire involvement implementing current data base technology, and ADP systems design, development and programming? Then consider a positive career move to Computer Data Systems, Inc.. As a rapidly growing data processing company with well over 1600 employees, we realize that our success is a direct result of our staff's commitment to excellence.

Qualified candidates should have 6-7 years of data processing experience which includes 3-4 years of IBM COBOL as well as 1-3 years work experience with ADABAS/NATURAL.

We offer a rewarding, stable work environment, as well as competitive salaries and a comprehensive benefits package, including health, dental, 100% tuition assistance and retirement profit-sharing plan. For immediate consideration, call Mark Prime collect at (301) 657-1740 or send resume to:

Computer Data Systems, Inc., Suite 8000, Dept. HRO-488, 7315 Wisconsin Avenue, Bethesda, MD 20814.

CDS and CODIN are federally registered service marks of Computer Data Systems, Inc.

An Equal Opportunity Employer M/F/H/V

ST. ANDREWS PRESBYTERIAN COLLEGE
Director of Computer and Information Services

Located in Laurinburg, North Carolina, St. Andrews Presbyterian College is a four-year, liberal arts, coeducational, residential college with an enrollment of approximately 700 students.

DESCRIPTION OF POSITION:
The College is in the process of upgrading its computer center both in terms of hardware and software. As such, the college is advising a highly qualified individual to direct the implementation of this upgrade.
The director will supervise the computer center manager and programmer as well as have responsibility for a staff of work-study students. The director's major responsibilities will include, but are not limited to, the following:
(1) development and implementation of user education programs for Administrative users; (2) oversee the day-to-day operations of the computer center; (3) long-range planning of the college's computer needs; (4) budgetary control of the computer center.

EQUIPMENT AND SOFTWARE:
Current equipment consists of one PDP11/60 system and one recently installed PDP11/44. Existing plans call for the PDP11/60 to be converted to a PDP11/44. One system is expected to serve 48 terminals for student instruction and the other system will serve administrative needs. The college, through the assistance of a consultant, is in the process of reviewing administrative software.

QUALIFICATIONS:
Candidate should hold a graduate degree, or have a minimum experience of three years in a senior position. Candidate should be experienced in the operation of the PDP11 family of computers and RSTS/E operating systems.

SALARY:
Salary will be very competitive and commensurate with qualifications.
Send letter of application, resume and letters of recommendation by March 15, 1984 to:

Jerry Surface, Business Manager
St. Andrews Presbyterian College
Laurinburg, North Carolina 28352

St. Andrews Presbyterian College is an equal opportunity employer.

$80,000/YR.—CICS PROGRAMMING

Acquire one of the most demanded & rewarding programming skills in months instead of 2 years. A complete & practical guide to CICS Command Level Programming. It's based on CICS latest release 1.6, written in COBOL, with special emphasis on VSAM. Brand-new 2nd edition, contents printed in two colors, handsome mylar-coating cover. 150 examples illustrate use of CICS commands. 15 sample CICS programs address all major applications. Sample programs include: Menu, Add, Update, Delete, Browse, Multi-record display/update. Print 24x80, 66x132, any-size report. Message Routing, Screen Formatting, VSAM alternate index design, setup and handling, Dynamic table manipulation, Audit Trail Indication and more

Gifts these savings— and more
It's hard to believe the learning can be so easy until you try it. In hours you can start creating BMS maps. In days, you can start writing Pseudo Conversational CICS programs. You'll cut your learning curve at least in half. Many programmers report even greater savings. Some CICS techniques are especially hard. When you're stuck for the technical problems, you'll be thankful you have this book. All CICS techniques and problem areas are thoroughly covered. You'll find the topics on: Production abend handling, Test system debugging, Dump reading, Trace table usage, CEDF monitor, CSMT, CEMT commands, CICS internal tables setup & effects on application programs, Terminal Paging commands, complete procedures to install a CICS transaction and more. Why spend hours searching for the right technique — when this book gives them to you already written.

Tips on moonlighting on CICS projects
Consulting will be the trend of the 80's for CICS due to great shortage of experienced CICS programmers. An average CICS contract programmer makes $30-$45/hr. Some CICS consultants even make $1000/day (1983 Datamation)! Moonlighting on CICS projects is very rewarding. A typical 18-screen system can mean $15,000-$25,000 cash. This book contains 11 pages of tips on moonlighting like: how to market your service, locate the contracts, write a proposal, make a presentation, quote the right prices to beat consulting firms and draw a contract agreement without a lawyer. Written proposal & sample contract agreement are included for your convenience.

Try this book at our risk
How much is this book worth to you? It's hard to say until you try it. That's why we want you to use it for 10 days. If you're not completely satisfied, simply return it at our expense for a prompt full refund. If we brought 10 copies, none would be sold. Over 90% of programmers who bought this book are satisfied with it. See how much time it saves you. How it leads you to the gold mine of programming. That's how sure we are that once you use it, nothing could make you part with it. This book will pay for itself over and over, year after year. But act now. Send $34.95 for 1, $29.95 ea. for 2, $27.95 ea. for 3, $26.95 ea. for 4 & over (plus $2.00/copy for P&H) on check or M.O. to: CCD Online Systems, P.O. Box 750750, Dallas, TX 75379. Allow 1 to 2 weeks for delivery.

MANAGERS

Midwest opportunities listed exclusively with our firm:

MANAGER, END-USER COMPUTING
for very large CMS/TSO network. Background in commercial or in-house corporate time sharing organization is sought. $50-60K base salary.

DIRECTOR, MIS/DSS
with the charter to combine business skills and EDP skills toward the development of an information management and DSS strategy to support all management groups. Salary to $55K.

SERVICE BUREAU MANAGER
requires a budget and profit center oriented manager with experience maintaining support for several hundred diverse users on a far-reaching network. $50-60K base salary.

Call or write Tom Kobiak

HALBRECHT

675 Third Avenue, N.Y., N.Y. 10017 (212) 682-3333

There's No Time For DOWNTIME!

So while the industry works on your system's problems, let us work on your business problems. Advertise in–

COMPUTERWORLD CLASSIFIEDS!

One insertion will let a potential audience of over a half a million readers know what you are looking for or have to offer. Whether you are looking to recruit computer professionals, want to buy, sell or lease equipment, have computer time or services to offer, or software packages to sell, and more, Computerworld Classifieds will help you get a lot of exposure and get things done faster.

The open line rate is $9.15 per line and there is a minimum size of 1 column by 2" at a cost of $256.20. We can accomodate up to 5 columns and depth measurement increases by half inch increments.

Ads may be mailed in, clearly typewritten, with a letter stating the size desired and the issue in which it is to be run. Our team of adtakers will take ads that require no artwork or borders over the phone. We also provide telecopier service.

Any borders, logos, or artwork should be sent in with your ad and must be dark and clear enough to be reproduced.

Computerworld comes out every Monday and our deadline for receiving ads is 10 days (or six working days) prior to the issue date desired.

First time advertisers must send payment along with their first ad.

Our mailing address is:

Classified Advertising
Computerworld
Box 880
375 Cochituate Rd.
Framingham, MA01701

800 343-6474
(617) 879-0700

COMPUTER SYSTEMS PROFESSIONALS

Participate In Challenging Projects At Our Advanced Technology Research Center

As a dynamic part of a Fortune 100 corporation, Babcock & Wilcox enjoys a worldwide reputation for technological innovation and excellence. These immediate opportunities are at our modern R&D facilities in Alliance, Ohio, a pleasant and uncrowded Midwest city.

SYSTEMS & SOFTWARE GROUP SUPERVISOR

The heavily experienced professional we seek will supervise development and implementation of Applied Mathematics/Scientific Programming and Business Systems. You'll also propose and manage projects in support of an engineering staff. A PhD in Applied Mathematics is preferred, with at least 10 years experience, including some supervisory background. Excellent oral and written communications skills are required.

OFFICE AUTOMATION AND PERSONAL COMPUTING SPECIALISTS

In these diverse positions, you'll be involved with evaluation, implementation and support of office automation equipment. You'll also have the opportunity to develop your expertise in supporting VAX Systems Software. You should have at least 5-8 years of related background including personal computer evaluation and applications, and word processing on PDP-11 or VAX equipment. Excellent oral and written communications skills are required as is a BS/BA in Math, Computer Science or a related discipline.

VAX SYSTEMS ENGINEERS

If you are a Fortran Senior Systems Programmer with VAX VMS background, these positions offer you the opportunity to enhance your digital communications skills. Your at least 5-8 years of experience should include hardware/software configuration. You will have the opportunity to develop voice communications expertise. A degree in Math, Computer Science or EE is required.

Salary and benefits are excellent as is the potential for career development. For confidential consideration, please send your resume to: Roseann Taylor, Division Personnel Manager, ALLIANCE RESEARCH CENTER, Babcock & Wilcox, Research & Development Division, 1562 Beeson Street, Alliance, Ohio 44601. An Equal Opportunity Employer M/F/H/V.

Babcock & Wilcox
Research & Development
a McDermott company

COMPUTER SYSTEMS ENGINEERS

The Upjohn Company, a leading pharmaceutical company with headquarters in Kalamazoo, MI, has two highly challenging opportunities for Computer Systems Engineers.

The first position requires a Bachelor of Science degree in Electrical Engineering, Physics, Computer Science or a related field, and a minimum of four years' recent experience in the design and implementation of data acquisition projects. Good interpersonal and communication skills are essential. Knowledge and use of analytical instrumentation found in the pharmaceutical business is desirable.

Duties will include systems design, electronic device development, software design, and implementation of laboratory automation systems used for data acquisition.

The second position requires a Bachelor of Science degree in Computer Science with a heavy content of computer logic programming, plus two years' experience as a systems programmer. VM CP and CMS system knowledge and experience are required, along with a thorough working knowledge of the 370 Assembler language. VM related program product and PL/1 language experience is desired.

You'll assist or perform VM CP and CMS operating systems generation and maintenance for multiple large scale processor configuration; install and support various program products which run under CMS; participate in software and hardware planning and user consultation where advanced operating system or program product knowledge is required.

In both positions, you'll become active members of a small team of professional designers in the challenging computer systems engineering field. Your varied assignments will involve both hardware and software solutions to unique problems found in this field.

Kalamazoo is a mid-sized southwestern Michigan community offering a mix of cultural/recreational opportunities that include lakes, nearby colleges, and a four-season climate. In addition, The Upjohn Company offers a competitive salary, and benefits that include generous relocation assistance.

For confidential consideration, please call from outside of Michigan toll free 1-800-253-8900 and ask for extension 3-5757; or call from Michigan collect 616-323-5757 to request that a specialized employment application be sent to you immediately. Please refer to ad number 15812-E when calling.

Upjohn

A Century of Caring

An Equal Opportunity Employer M/F

NATIONAL UNIVERSITY OF SINGAPORE

INSTITUTE OF SYSTEMS SCIENCE

We require Teaching and Development staff in the following areas:

- OFFICE AUTOMATION
- PROJECT MANAGEMENT • LOCAL AREA NETWORKS
- INFORMATION RESOURCE MANAGEMENT
- SYSTEMS DEVELOPMENT METHODOLOGIES
- MICROCOMPUTER-BASED INFORMATION SYSTEMS

THE JOB:

You will be working in small teams to develop short intensive courses aimed at upgrading the skills of executives, users, I/S managers and I/S professionals from organizations in Singapore and South East Asia. You will also participate in teaching a post-graduate Diploma course in Systems Analysis. In addition, you will have opportunities to engage in consultancy and applied research.

ISS provides a stimulating environment for state-of-the-art practitioners from a variety of backgrounds to interact and develop through close teamwork.

THE INSTITUTE:

Established in 1981, the Institute's objective is to promote the rapid development of leading edge computerization both in the public and private sectors, and to participate in the development of Singapore as a regional center for software and development and services. Technical leadership is exerted through quality management education, advanced technical training, consulting services and applied research. ISS has excellent educational and computer facilities.

SINGAPORE:

Singapore is well-known as a commercial, financial, industrial and communications center in South East Asia. Vigorous economic growth persists, and it has the second highest per capita income in Asia after Japan. American and British expatriates have consistently rated Singapore as one of their 3 overseas postings.

APPLICANTS:

Applicants should have a strong practical background in at least one of the areas mentioned and be motivated towards a job involving a substantial portion of development and teaching of leading edge material.

Applicants for positions at a more junior level, should have at least 3-5 years of experience.

COMPENSATION:

Salary to $66,000/year is commensurate with experience. Benefits include an additional 23% Provident Fund contribution, heavily subsidized accomodation, medical and leave benefits, passage assistance and baggage allowance, settling-in allowance and children's education allowance. (U.S. $1.00 = $2.13 approximately).

Application forms and further information on conditions of service may be obtained from:

MR. PETER LIM, Director
North America Office
NATIONAL UNIVERSITY OF SINGAPORE
One Harkness Plaza
61 West 62nd Street...Suite 4J
New York, New York 10023, U.S.A.
TEL: (212) 765-1670

or: THE DIRECTOR,
Personnel Department
NATIONAL UNIVERSITY OF SINGAPORE
Kent Ridge, Singapore 0511
REPUBLIC OF SINGAPORE

CALIF. & CICS
+ Openings in IMS, IDMS; MVS/VM Sys. Programmers
(714) 891-1244
CPU COMPUTER PROFESSIONALS UNLIMITED, agency
7911 Garden Grove Blvd., Ste. B, Garden Grove, CA 92641

Sr. Systems Programmer
—Michigan Technological University is recruiting qualified, highly motivated persons to maintain, develop and enhance Operating Systems and associated software for our computers. Michigan Tech provides educational, research and administrative systems and applications support for Sperry 1100s and IBM 4341s running under VM/SP, as well as various microcomputers. The University is committed to excellence in computing and computer graphics to support a strong engineering and science program. Interested persons with a bachelor's degree in a related field and four years of experience should send letters of application with resumes to: Ken Williams, Dir of Systems Programming, Michigan Technological University, Houghton, MI 49931 Michigan Technological University is an equal opportunity educational institution/equal opportunity employer.

Product Development Analyst. Assist in defining parameters for the development of micro-computer based business systems for use in accounting and auditing. Confer with clients to ascertain software needs. Develop, test and market proto-types. Use knowledge of Fortran and Assembly language. Forty hours/week; $21,000/year. Bachelor's in business; 6 months experience on job offered or 1 year experience as accountant; 12 hours in computer science. Apply at Texas Employment Commission, Houston, Texas or send resume to Texas Employment Commission, TEC Building, Austin, Texas 78778. Job Order # 3871578. Ad paid for by an equal opportunity employer.

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

WE WANT WETWARE

FOR OUR DATA PROCESSING CLIENTS.

CompuSearch, a division of Management Recruiters, serves the nation's top companies and they demand the best DP specialists to fill their job openings. In turn, they offer positions with meaningful challenge, on-going training and defined promotional paths.

Call toll free 1-800-227-3800, Ext. 7017

CompuSearch®
A Division of Management Recruiters International

Data Processing

APPLICATIONS PROGRAMMER

Desirable Carolinas Location

We are the Information Services Center of a widely recognized manufacturing company located in the central Carolinas. Due to our expansion, we are seeking an Applications Programmer to maintain responsibility for the development, installation and modification of manufacturing-oriented systems.

The ideal candidate will have 3-5 years of experience in applications programming using COBOL in an IBM environment. Exposure to IMS, MVS, JCL, ROSCOE or TSO, and GAMMA is preferred.

This challenging position offers a competitive starting salary and a comprehensive fringe benefits package. For further information, send your confidential resume and salary requirements to:

CW-84570
Computerworld
Box 880
Framingham, MA 01701

Equal Opportunity Employer M/F

SYSTEMS $35-$42,000

We are recruiting on behalf of a major NYC financial institution for

DATA SYSTEMS REVIEW ANALYST

To qualify you must have:

- 4-7 years D.P. experience covering Programming, Design & Analysis.
- A good understanding of new systems development processes & controls.
- Conceptual understanding of principles of data communications and Data Base management systems.
- MBA and/or Banking experience preid.
- Relocation paid.

Send Resume in confidence or Call:

(212) 269-0351

DALTON MANAGEMENT CONSULTANTS LTD.
244 East 79th St., NYC, N.Y. 10021

WANTED: SOFTWARE SUPPORT HEAVY WEIGHT

Continued strong acceptance of our systems software products worldwide has created an immediate need for a Software Support Engineer.

The successful candidate will have 3-5 years progressive experience maintaining, modifying, and supporting MVS systems software. Strong Assembler Language skills, and a thorough knowledge of OS/VS JCL is also required. Current experience with MVS/XA, TSO Dialogue Manager, ROSCOE, VM/CMS and COBOL would also be a plus.

This is a key position, with responsibilities for worldwide product support. You will also be responsible for identifying, designing, and implementing enhancement that keeps our product at the leading edge of large system technology. Your contributions will be highly visible in our small company, high growth environment.

For immediate consideration, call or send your resume to:

Doug Stelka
(408) 554-8121
TriangleSoftwareCo.

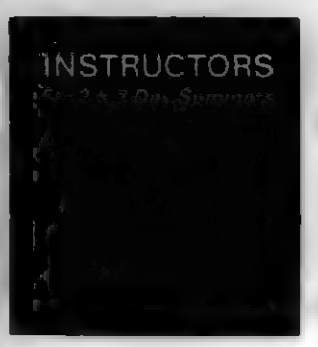
4340 Stevens Creek Boulevard,
Suite 106
San Jose, CA 95129

REPS - DEALERS

Leading manufacturer of anti-glare mesh filters expanding our marketing program looking for independent reps nationwide - and dealers call:

(804) 499-1798
Ask for M. Gauthier
or R. Fox
DRM, Inc.
91 South Witchduck Road
Virginia Beach, VA 23462

SEMINARS



In a bind?

Do you need real professionals? Advertise in Computerworld to find exactly who you're looking for. Because...More computer people read Computerworld than any other newspaper in the United States—more than half a million computer people every week. And, among our 529,650 readers at user organizations, about half claim to look at recruitment ads at least every other week (only a small percentage say they never look at recruitment ads). No wonder Computerworld carries more recruitment ads for computer people than any other publication.

To place your ad or to get a rate
Call or write:

Classified Advertising
Computerworld
Box 880 Framingham, MA 01701
(617) 879-0700 (800) 343-6474

COMPUTER INFORMATION SYSTEMS: Tenure appointment to the Computer Information Systems faculty to begin September, 1984. A Ph.D. in Computer Science preferred. Degree in related area considered. Salary and rank dependent on experience. Duties include teaching undergraduate and graduate computing courses. Send resume and references to Dr. Phillip Register, Chair, Department of Mathematics/Computer Information Systems, Jacksonville University, Jacksonville, Florida 32211. Application deadline March 30, 1984. Jacksonville University is an Affirmative Action/Equal Employment Opportunity Institution.

SUDDEN IMPACT
DP BANKING
$25,000 - $100,000

You will create a sudden impact when Ashley and Associates represents you to our key clients from coast to coast. As a respected name in search and recruitment for the banking industry, we can provide a unique confidential service. If you have 3+ years experience as a programmer, analyst, technical consultant, or manager go ahead and SMILE SIT BACK and call:

Andy Pack
(919) 370-1201
Banking Division
Ashley and Associates
P.O. Box 16092
Greensboro, NC 27406
Always Fee Paid

THIS SPACE FOR HIRE.

[Inquire at Classified Advertising Dept.]

BUY - SELL - SWAP

PCM

Pioneer Computer Marketing
214/343-2904

BUY - SELL
LEASE
- All IBM Systems
- Peripherals
- Tapes
- Disks

SERIES/1
- Systems
- Features
- Peripherals

SYSTEM 34
- CPU
- Peripherals
- Upgrades

PIONEER COMPUTER MARKETING
11448 Pagemill Road
Dallas, Texas 75243
214/343-2904

The Conley Stacker DOUBLES productive space by stacking IBM Controllers.
- Organizes work area - boosts efficiency
- Saves money
- Keeps controls accessible
- Safe, neat cable installation

- Sturdy, secure construction

For details, call Michael Conley
(716) 634-7716

CONLEY STACKERS for IBM 3274 CONTROLLERS and other models

"A COMPUTER LEASING COMPANY'S FINANCIAL STABILITY IS VITAL."

We said that in 1973, when Randolph became a subsidiary of The First National Bank of Boston . . . and we say it again, because it is still true and even more important today.

As an important part of The First National Bank of Boston, one of the nation's oldest and leading financial institutions, Randolph has a built-in financial stability that continues to be unique in the third-party computer leasing industry.

LEASING COMPUTERS IS OUR ONLY BUSINESS.

Randolph specializes in leases for IBM 3081, 303X and 4300 computer systems and peripherals . . . firm evidence that we plan to perpetuate our computer leasing activity.

Our people have an average of 18 years experience in the DP industry . . . from 360's to 3081's. They know all about alternative financing to be sure, but they also know their way around a DP department and the hardware in it.

WE SPECIALIZE IN SOLVING PROBLEMS.

Machine installed on a rental basis? Long wait for delivery? Stuck with a lease on your old machine? Own a 3081 but need cash? Whatever your problem, we can tailor a lease that will fit your exact needs and let you start saving money right away.

SAVE $80,000 EVERY MONTH FOR THE NEXT 5 YEARS.

You can lease the same 3081 that IBM rents for more than $180,000 per month from Randolph for less than $100,000 per month. If you're renting an older machine, we can save you even more—and you'll get about 4 times the throughput in the bargain.

WHEN IS THE BEST TIME TO TALK TO RANDOLPH?

The sooner the better. But it's never too late, even if you already have a machine installed.

Our 19 years in computer leasing gives added assurance that Randolph will continue as the leader in the computer leasing industry . . . continue to live up to the terms and conditions of our agreements . . . provide upgrades . . . fulfill all of our commitments.

LET RANDOLPH HELP YOU GET THE SYSTEM YOU NEED NOW, *NOW.*

We've already done it for many of the Fortune 500 companies . . . and we can do it for you. Call Joseph B. Kelly, Jr., Executive Vice President, 800-243-5302.

537 Steamboat Road
Greenwich, Connecticut 06830
203 661-4200

Randolph

A MEMBER OF COMPUTER DEALERS & LESSORS ASSOCIATION RANDOLPH COMPUTER CORPORATION A subsidiary of THE FIRST NATIONAL BANK OF BOSTON BANK OF BOSTON

DATA GENERAL

Hanson Data Systems

FORSYTHE McARTHUR ASSOCIATES, INC.

DEALER / LESSOR OF IBM Computers and Peripherals

FOUNDED 1971

Home Office
Chicago
919 North Michigan Avenue
Chicago Illinois 60611
312 943-3770

Branch Offices
Atlanta 404-953-9157
Milwaukee 414 765-9544

CMA

Will the real lessor please stand up!

Who do you want to deal with during your computer lease?

An investor? An insurance company? A consortium of banks? Or your leasing company!

As computer experts, we understand your individual equipment requirements. Hartford Computer Group doesn't sell your leased equipment to an investor who will not understand or care about your requirements.

When you sign a lease with Hartford Computer Group, you deal only with us. We maintain complete ownership and control of your leased equipment and can therefore give you the *flexibility* you want in a computer lease. We can do this only by refusing to participate in tax-advantaged leasehacks that give investors control over your leased equipment. Tax-advantaged leases allow for little or no flexibility!

We give you Hartford Computer Group. Want to lease computer equipment? Want to upgrade your computer equipment, renew your lease, or change your leased system completely? With no outside investors or participants to inhibit your transaction, Hartford Computer Group is free to offer the ultimate flexibility in customer service.

You deal with one company, before and after the lease begins, the real lessor... Hartford Computer Group!

Your questions about our unique computer leasing program are answered in our brochure. Write or call for your copy.

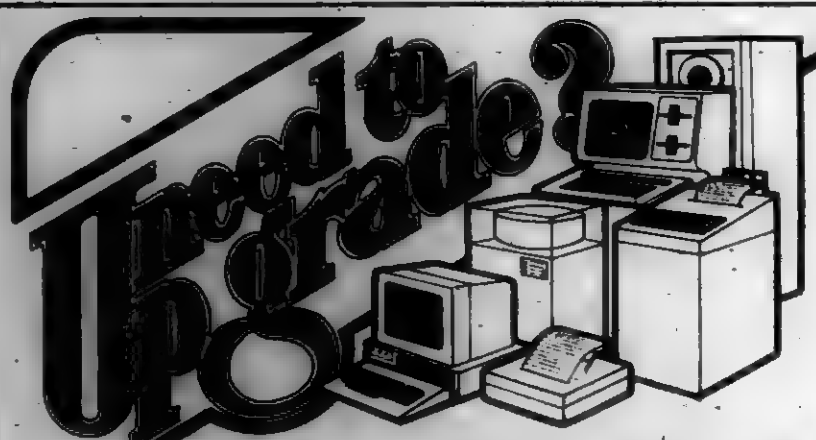
Hartford Computer Group **800 323 6355**

A Subsidiary of Hartford Financial Corporation
515 East Golf Road, Arlington Heights, IL 60005
or 312 364 0505

IBM
3115 3120
3741 3742
DATAMASTER
1255 MICR
SYSTEMS
34 36 38 32 70
All Peripherals Available
BUY SELL LEASE
Pittsburgh, Chicago, Boston, Cincinnati, Philadelphia, Kansas City, Dallas, Detroit, Cleveland, Minneapolis, Greensboro
Call Today for Quotation
(816) 358-8585
SOUTHERN DATA SYSTEMS
Nashville, Tennessee

AMDAHL
FOR SALE
V/8-I 8 X 12 MARCH 1
V/8 12 X 16 MARCH 1
V/8 16 X 16 APRIL 1
SUBLEASE
V/7 16 X 16 MARCH 1
V/8 12 X 16 FEBRUARY 1
IBM
WANTED
3033 U8, U12, OR U16
CALL: CHARLIE BERRY
OR TOM STARR
(612) 933-6000
MAJOR COMPUTER
INCORPORATED
10227 YELLOW CIRCLE DRIVE
MINNETONKA, MN 55343
COMPUTER CMA

STC
TAPE/DISK
BUY • SELL • LEASE



System 34s • 36s • 38s • 4300s
3270s • 370s • all peripherals and I/O
214/258-0541

MCC
Metroplex Computer Company, Inc.
320 Decker Drive, Suite 180 • Irving, Texas 75062 • TWX 910-860-9285

SYSTEMS
4341 4331
38 36 34
32 3
BUY • SELL • LEASE
COMPUTER BROKERS, INC.
2978 SHELBY ST.
MEMPHIS, TENNESSEE
CB
TOLL-FREE
800-238-8405
901-372-2822
PERIPHERALS
3203 3370
327X 3411
3350 3420

FREE
DEC and DATA GENERAL
Discount Guide
NEWMAN
313 994-3200
CMA

Buy & Sell
Your Equipment
in
BUY-SELL SWAP.
Call COMPUTERWORLD
To Place Your Ad
1-800-343-6474
In Mass. (617) 879-0700

COMDISCO

A Commitment To Excellence

IBM PROCESSORS

- 3081
- 3083
- 3033
- 4341
- 4341/4381
- 4331-2/4361
- Amdahl Available February

IBM PERIPHERALS

- 3350
- 3880-1
- 3380 AA4 B4
- 3370/3375
- 3803-2
- 3420-4/6/8
- 3705/3706
- 3725
- 3278/3278-1
- 3890

The Leader in Full-Service Leasing

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

WE'RE NUMBER 1 FOR SERIES/1

Computer Options, Inc. is a major remarketer of both new and used IBM SERIES/1's and related peripherals. We offer your firm the option of purchase or a variety of custom leasing programs for your hardware acquisitions. Call us toll-free for more information.

AVAILABLE NOW FOR IMMEDIATE INSTALLATION

4955-F	4964-001
4955-E	4973-2
4959-A	4974-001
4962-2	4975-2L
4963-64A	1310

ALSO AVAILABLE-SYSTEMS 34 & 38

Call toll-free 800-328-5718

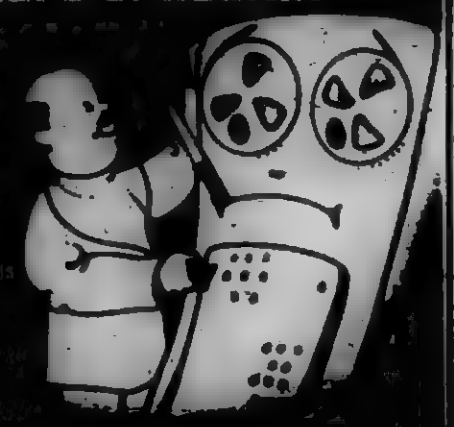
(In Minnesota, 612-544-8880)

COMPUTER OPTIONS, INC.
"the best option"
1660 South Highway 100
Minneapolis, MN 55416

The new Technicon...

We make every computer the picture of health!

- Reconfiguration
- Refurbishing
- Installation
- Maintenance
- Printers
- Disk drives
- Tape drives
- Communications equipment



Call Ron Arosemena or Javier Elzondo at (312) 766 5400

TECHNICON

345 Belmont Avenue Wood Dale, IL 60191

S/38
S/36
S/34
Series 1

Buy... Sell... Lease...

- Immediate availability
- 5224 & 5291 • Upgrades
- Short term leases • Trade-ins
- Guaranteed IBM maintenance

The Datacomp Leasing & Service Group, Inc.

Toll Free 800/323-3288

Chicago 312/323-1200 New Jersey 201/467-9696

COMPUTER CORPORATION

Your Full Service Computer Dealer

DPD	S/34	Series/1	3270's
MAIN FRAMES	S/36	•Systems Designed To Your Specs.	3277 ◆ 3278
PERIPHERALS	S/38 AND RELATED PERIPHERALS	•All Features and Peripherals Available •Depot Repair Systems	3274 ◆ 3276
COMMUNICATIONS	— Call — RICHARD LOSASSO	— Call — JOHN SHELBY	3271 ◆ 3272
— Call — FRED HANSEN			— Call — TERRY FERRIS

TOLL FREE 800-[illegible] IN TEXAS [illegible]

IBM UNIT RECORD EQUIPMENT & DISK DRIVES

DISK PACKS • DATA M. • [illegible] • MAG TAPE • DISKETTES

SALE OR LEASE

machines

026—029—082— 083— 084
085—087—088— 129— 514
519—548—557

disk packs

2316—3336(1)—3336(11)—3348(70)

5 MEG. TO 300 MEG. PACKS—NEW & USED

Highest Prices Paid for Used Packs & Machines

THOMAS COMPUTER CORPORATION

5633 W. Howard St. Chicago, IL 60648

800-621-3606 312-647-0660

Authorized Distributor – Memorex, CDC, 3M, BASF, Verbatim, Dysan

---

The nationwide market - a call away!

DEC/DG

SYSTEMS/PARTS/PERIPHERALS

NEW/USED/SURPLUS • DISCOUNT PRICES

Since 1977! Buy, Sell, Trade and Broker.

PHIL	BRYAN	JENNIFER
DG	11-VAX	8-LSI

CALL TODAY - (305) 392-2005 TELEX 568-670

thomas business systems, inc.
4301 Oak Circle - Unit 11 Boca Raton, Florida 33431

IN STOCK!

Fujitsu Eagle
with cabinet, cables, slides & terminator:
$13,000

New Fujitsu SP 380
80 character per second, letter quality printer:
Introductory Special - $2,795

MANDERS

303-693-3035

2771 S. Jasper • Aurora, CO 80013

Want to Buy

5291, 5251, 5256 Defective Planar Boards

$100 each

For Details Call

(915) 692-9141

Russell Sullivan

We Buy & Sell

DEC

Systems Components

digital computer resale

call:713 445-0062

[illegible] Houston, Tx 77099

DATA GENERAL SPECIALISTS

FOR

Surplus New & Used Equipment & Systems

with full depot repair facilities.

CALL US

WE TAKE THE TIME.

- WE CARE -

JM Associates

991 W. Chapel Avenue
Cherry Hill, NJ 08002

609-663-1115

MEMORY BOARDS

LSI/11	64K	$1095
VAX 11/780	256K	$4300
ECLIPSE	64K	$575
NOVA 4	64K	$1400

Call For Others

New 100% Compatible

EQUIP YOURSELF IN THE CLASSIFIED PAGES OF COMPUTERWORLD

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

CMI

AMERICA'S LEADING SPECIALIST SERVING THE USED MARKET

Absecon, NJ (609) 646-7262
Boston, MA (617) 367-5755
Chicago, IL (312) 693-2750
Dallas, TX (214) 386-0606
Encino, CA (818) 788-0113
Houston, TX (713) 780-7480
Lebanon, TN (615) 449-6633
Miami, FL (305) 442-2666
Newport Beach, CA (714) 752-6448
New York, NY (212) 349-0718
Tampa, FL (813) 273-0026
Frankfurt, Germany Telex: 414661 LCO D
Montreal, Quebec (514) 871-1121
Nyon, Switzerland Telex: 27209 CMI CH
Paris, France Telex: 613910 CMI FR
Toronto, Ontario (416) 842-3065
(416) 863-6160
Vancouver, B.C. (604) 986-6196
Windsor, Ontario (519) 973-3010

CMI FINANCIAL SERVICES GROUP
2600 Telegraph Rd., Bloomfield Hills, MI 48013
(313) 456-0000

CMI

A Torchmark Company

2600 Telegraph Rd., Bloomfield Hills, MI 48013
TWX/TELEX: 810-232-1667 CMI CORP. TRMI
(313) 456-0000
CMI 4300 Series Hotline Number: 800-331-4300
Member CDLA

3081-D16 Sale or Lease

3081-K24 Sale or Lease

For Sale/Lease **4361** 1st Quarter Delivery

3033 All Models

New **Series 1** with Data Operating System "Unix" to run the System 1 IBM Master VM/

3350's Available Now On a Short Term Lease 3370 3375 3380

3690-A6 Available Now **4700** Banking Equipment Buy/Sell/Lease

3725 Lease Financing Available For your System or Ours 2,3,4 or 5 Year Terms

3800 LASER PRINTER Model 1's Immediate Delivery Model 3's Lease Financing Available Any Term 3262-5 3211-1 & 3211-3 3262-5 4248-1

Tapes Immediate Delivery **3803-3420** Buy/Sell/Lease

Wanted **4341-M2 4341-L01** Call Now

3276, 3278 3277, 3276 Terminals All Models Immediate Availability

3705-3704 Available for Immediate Delivery Sale or Lease

STRATUS 32 Model 7 & 8 Available Now New - Used **STRATUS 32** 2, 3, 4 or 5 Year Terms Lower rates than IDC **8100's** Available Now - Sale or Lease

Series 1/O All IBM Peripherals Any Used Configuration CDC Fixed/Removable Disks Tape Back-up 9-track CDC/Telecom/Printronix NEC/Printers Buy/Sell/Lease

CPR:RESALE

Computer Products & Repair

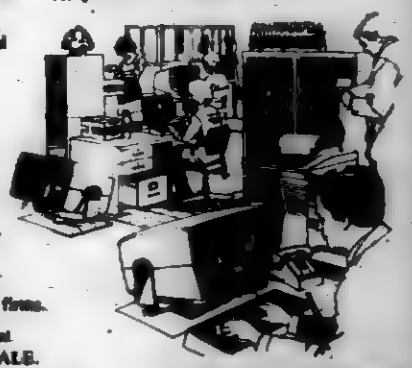
No charge to tell the Data General world.

Call us to list the DG equipment you have to sell or buy. There are no fees. CPR's large, computer-based sales force will find you a MATCH TODAY through national phone sweeps, direct mail, and advertising to 500,000 contacts.

Buy at the price you want. Sell at the price you need.

$2 Million is also available to buy and sell your inventory fast, with aggressive trade-ins, and leasing through national firms.

Expect the price you want TODAY with CPR:RESALE.



CPR gets you results. California 800-392-2317

800-843-2047

1830 Fourteenth Street, Santa Monica, California 90404 213-450-0010

HP

1000
3000

encore
(213) 452-9117

DEC

RENT • BUY • UPGRADE • SELL

PDP, 11/83, 11/84, 11/23, 11/24, 11/34, 11/44, 11/70, VAX/730, VAX/750, VAX/780

SYSTEMS • OPTIONS • SUPPLIES

11/84 1MB, Dual RLO2, DZ11-A, Dual H9642 (new)	$34,995
11/83 + 256KB, Dual RLO2, DZV11-C, VT100, Remote (new)	$16,299
11/70 512KB ECC, LA36 (new)	CALL
VAX/750 1MB, RM80, RL02, V80 Remote (new)	CALL

Customized Configurations—Call With Your Request.

In Stock		Specials		In Stock	
11/24-EC (new)	$11,299		BB11-PB (new)	$4,195	
DB11-A (remote)	$ 495		BB750-CA (new)	$4,195	
DWF32-AB (new)	$ 2,495		BB750-DC (new)	$6,299	
DMP11-BA (used)	$ 995		RX700 (new)	$2,295	
DZ11-F (used)	$ 3,195		RX811-BA (used)	$2,495	
H9642 (new)	$ 1,295		RL211-AK (new)	$5,499	
KT24 (new)	$ 795		RM401-AA (new)	Call	
LP11-WA (remote)	$ 2,495		VT55-AA (new)	$ 495	

BROOKVALE
800-645-1167 NY: (516) 273-[illegible]

APRIL 6TH

4381 P2

LOWEST LEASE AND SALE PRICES
MANY OTHER CPU's AND PERIPHERALS AVAILABLE
CALL: RUSS SCHNEIDER **800-IBM-4341**
IN CALIF. CALL 408 241-3677

SEVEN YEARS AND 300 CUSTOMERS STRONG

marketex
Marketex Computer Corporation
1601 Civic Center Dr., Ste. 203, Santa Clara, CA 95050

WANG WORD PROCESSORS
AT THOUSANDS OFF!

Guaranteed, remanufactured WPS 20, WPS 30 and Wangwriter units available for immediate delivery. You don't pay a cent till Wang installs and tests equipment under service contract. 15-day return privilege. Buy, Lease, Rent.

For Free Info mail your business card today!

1-800-321-2966

ELECTRONIC OFFICE MACHINES, INC.
Dept. SCB1340 • Box 7287 • Ann Arbor, MI 48107

MISSISSIPPI CENTRAL DATA PROCESSING AUTHORITY

Sealed proposals will be received by the CDPA, 508 Robert E. Lee Building, Jackson, MS 39201 for the following data processing equipment and services:

Request for Proposal No. 910, due 3:30 p.m., Wednesday, March 14, 1984, for the upgrade or replacement of a Burroughs B1955 computer system and acquisition of packaged software to address Fund Accounting, Student Records/Registration, Human Resource and Fixed Asset Accounting applications for Hinds Junior College District.

Detailed specifications may be obtained from the CDPA office. The CDPA reserves the right to reject any and all bids and proposals and to waive informalities.

Dorothy Hooper or Elaine Rivers,
State Central Data Processing Authority
601/359-1365

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

DISK DRIVES • CONTROLLERS • PERIPHERALS • MEDIA

WANG • DEC

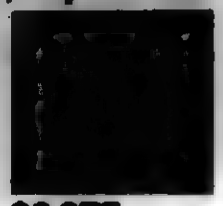
National authorized CDC OEM-Distributor (for Controllers and Media) offers *New Equipment*, fully warrantied for 90 days:

$12,900

CDC Model 9766 (300 Mb.) WANG Models 2285V-2, and 2285 (300 Mb.) DEC Model RM0 5 (339.1 Mb.)

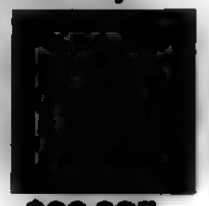
$7,750

CDC Model 9702 (80 Mb.) WANG Model 2285V-1 (75 Megabytes), DEC Model RM0 3 (67.1 Mb.)



$8,875

CDC Model 9448 (85 Mb.) WANG Model 2280-3 (80.4 Mb.) WANG Models 2280 V-3, 6560 (85 Mb.) DEC Model RM0 7 (80.4 Mb.)



$20,825

CDC Model 9775 (676 Mb.) WANG Model 2285 V-3 (640 Megabytes), DEC Model 2-RM0 5a (512.2 Mb.)

ERST

INTERNATIONAL CORPORATION

225 Lafayette Street, New York, NY 10012

ERST is the leading dealer in pre-owned WANG equipment—2200, VS, WP (CPUs, Terminals, IOPs, Controllers, Printers, Memory Upgrades).

Next time give us a call . . . Toll Free 1-800-FOR-ERST . . . In N.Y. 212-431-1100

PEARL HAS IBM 3741's

and we have System 34, System 36 and System 38 and a large inventory of CPU's, CRT's and printers. Call us about our flexible lease plans for buying, selling, leasing, renting and purchase/leaseback.

Call Dave Allen or Shirley Shreeve.

Pearl Computer Division

P.O. Box 24026 • 4717 Centennial Blvd.
Nashville, TN 37202 (615) 383-8703

IPS Information Processing Systems Inc.

TELEPHONE: (201) 262-9500 Telex: 642-197

BUY / SELL / LEASE

158 V/6
168 V/8
3031 AMDAHL
3032 V/7
3033-3033 V/8

INTERESTED IN ALL MODELS AND CONFIGURATIONS
ALSO, MODEL-FEATURE-MEMORY UPGRADES

HAVE REQUIREMENT FOR 3033 PROCESSOR
MOTOR GENERATORS AVAILABLE

WE WOULD LIKE TO TALK WITH YOU
PLEASE CONTACT: DALE HAUGHER OR CHARLIE BERRY
MAJOR COMPUTER INCORPORATED
10237 Yellow Circle Drive
Minnetonka, MN 55343
(612) 933-0600

NPA SYSTEMS INC.

SPECIALIZING IN:
PURCHASE
SALE, TRADE,
LEASE, RENT
AND SERVICE OF
Data General
EQUIPMENT

101 OAKES AVENUE, HOLBROOK, N.Y. 11741
TELEX # 510 222 0882
(516) 467-2500

S/36 S/34

• BUY • SELL • LEASE
• MAINTAIN • UPGRADE

For information call

201-343-4554

• COMPLETE SYSTEMS • PERIPHERALS • PROMPT DELIVERY

MARION

DSI

WE BUY SELL & LEASE!

BURROUGHS

Discover the DSI alternative.

800-641-5215

All equipment available immediately and guaranteed for Burroughs Maintenance.

DSI Serving the Burroughs Community Worldwide
2480 W. Alameda Ave. Denver, CO 80223 (303) 922-8331
TWX 910 931 0483

DATAPOINT
4630

6600, 20MB (2)
3600 Processors
9001 Letter Quality Printer
1600 128K, 10MB Cartridge
5500 2.5MB Drives (3)
9822 Printer
9214 Printer, 230-340 LPM
9370 25MB Drives (2)
9371 25MB Drives (3)
9584 1600 BPI, 10.5 Inch, Reel to Reel Tape Drive

• BUY • SELL

2600 Clients
(703) 790-9433

EL CAMINO COMPUTER CO.

offers:

4381-M2

DELIVERY POSITIONS AVAILABLE

early MARCH
APRIL
MAY
JUNE

(213) 986-2411

4827 N. Sepulveda Blvd.
Sherman Oaks, CA 91403

COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

375 Cochituate Road, Box 880, Framingham, MA 01701/(617) 879-0700

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

TexCom

Join the more than 200 other major companies that lease IBM equipment from TexCom - the IBM specialists.

WE BUY • SELL • LEASE

SERIES 1
- All features and peripherals available
- Buy, sell, trade
- Leases available

4361/4331
- Two, three and four year leases

IBM S/34
IBM S/38
- All models and peripherals available

IBM S/36
- 1, 2, and 3 year leases
- We take S/34 trade-ins

4331/4341
- 1, 2 and 3 year leases
- All models available

TERMINALS
3291 5225 3278
5251 8277 3287
8256 3279
AVAILABLE NOW

DISKS
3370 3380 3340
3375 3350
AVAILABLE NOW

WE WANT TO BUY
- Your IBM systems and peripherals
- Your rental credit equipment

MEMPHIS • SAN ANTONIO • HOUSTON

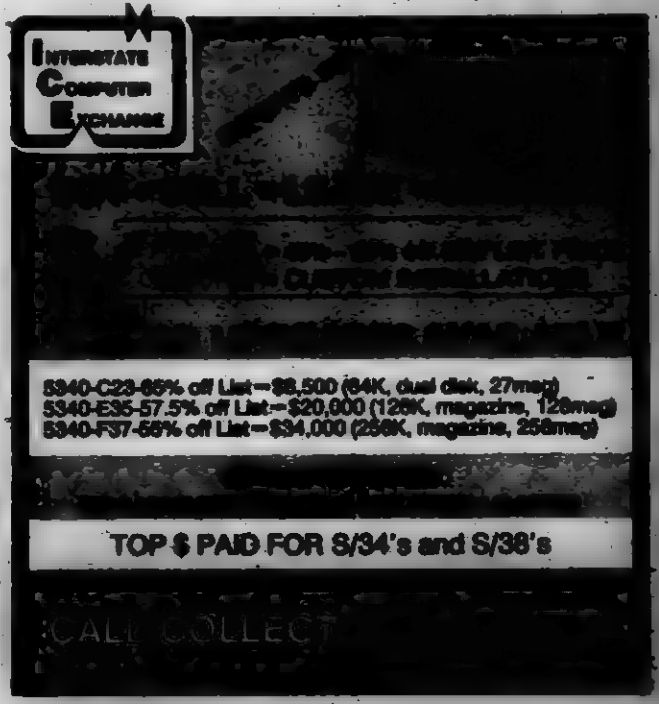
(512) 349-9955

SHORT TERM LEASES AVAILABLE

CSI

COLA

INTERSTATE COMPUTER EXCHANGE



5340-C23-65% off List—$8,500 (64K, dual disk, 27meg)
5340-E35-57.5% off List—$20,000 (128K, magazine, 128meg)
5340-F37-55% off List—$34,000 (256K, magazine, 256meg)

TOP $ PAID FOR S/34's and S/38's

CALL COLLECT

BUY • SELL • LEASE

SERIES-1
S/34 • S/36 • S/38
4300

S/23 S/32 5110-20
Tape-Disk-Printers-Tubes

AMCOM CORPORATION
5500 W 73RD ST · MINNEAPOLIS MN 55435
(612) 835-4737

CALL TOLL FREE
800-328-7723

data3

IBM PROCESSORS/PERIPHERALS

GSD		DPD
S/38	BUY • SELL • LEASE • SUBLEASE	4331/4341
S/36		TAPE
S/34		DISK
SERIES/1		PRINTERS
S/3		TUBES

- All Peripherals
- Special Features
- Upgrades
- Flexible Leases
- On-time Delivery
- Purchase/Leaseback

COLA

We've Got Your Number

S/34 ALL MODELS QUICK DELIVERIES

SERIES 1 CONFIGURED TO YOUR NEEDS

S/36 ATTRACTIVE LEASE RATES

S/38 NEW & USED MACHINES

5110/5120 NEW LOW PRICES

PERIPHERALS
CRT'S, PRINTERS, DISK, TAPE, MODEMS

CARLYN COMPUTER SYSTEMS
[illegible] Braddock Road Annandale, VA 22003

"CALL COLLECT" (703) 642-1950

IBM

3270

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

SERIES I SPECIAL

Control Data
126MB Removable Drives . . $12,900
Diskette Drives . . . . . $ 1,495
Printers & Displays

New or Used
Immediate Delivery

IBM
4956 Processors
4967 200MB Disk Drives
All Peripheral & Features

DEC

Check out our unbeatable combination — huge inventory at low, low prices.

Call toll free 800-328-7000

In Minnesota (612) 894-4020

MIDWEST SYSTEMS, INC.

7831 Ridgewood Drive, Burnsville, Minnesota 55337

*** * * * DEC * * * ***

BUY—SELL—LEASE—TRADE—CONSIGN
SYSTEMS — PROCESSORS — OPTIONS
PERIPHERAL — MODULES — MEMORY
— SPARES —

NATIONAL COMPUTER EXCHANGE
(800) 624-9299
600 North Lunar Avenue, Brea, CA 92621
TWX: 910-596-1499 (714) 990-5988

IBM
Series/1 • S/34 • S/36
S/38 • 4300
5110 - 5120 • S/32
BUY • SELL • LEASE
All models, systems & peripherals AVAILABLE NOW!

(408) 425-7333
SOURCE DATA PRODUCTS INC

Buy•Sell•Lease
SERIES 1
S/34 S/38
4300 S/36
5110 S/23
XERXES COMPUTER SALES
800-328-3684/612-339-3042

FOR SALE
DEC EQUIPMENT

RK06	(67MB)	$4,300
RK06-AA	(Mint, 15MBs)	$12,500
LP11-CA	(600 LPM)	$7,200
VT78	(Terminal)	$150
RK750	11/750 Controller	$4,000

Massachusetts Enterprises
Essex St. - Middleton, MA 01949
(617) 777-4566

dda
For All Your DEC Requirements

I.B.M. SYSTEM III 15D
256 K Memory
3340 A2 Disk
3344 A2 Disk
1403 600 LPM Printer
19 3277 CRT'S
1 3276 CRT
2 3278 CRT
2 3287 Matrix Printers
Extensive Software Available
Available 3rd Quarter 84
Best Offer
Call Richard Hill
617-586-4343

Buy - Sell - Lease
S/32
S/34
S/38
IBM
3741
3742

CPU's CRT's PRINTERS
ALL MODELS
PURCHASE/LEASEBACK
SHORT & LONG TERM LEASES
CMA
Computer Marketing of America, Inc.
P.O. Box 71
638 Bryan Street
Old Hickory, Tennessee 37138

1-800-251-2670
In Tennessee: 615-847-4031

C.D. SMITH & ASSOCIATES, INC.
DEC computer systems & options
12905 East Freeway, Suite 319
Houston, Texas 77015
(713) 451-3112
TELEX 76-2547

DEC

WE ARE BUYING: VAX 11/780

WE ARE SELLING:

ME750-DC	8,500	DB8-W	1,495
ME750-CA	4,000	RK07-AA	18,000
ME750-DC	8,000	TS11-CA	10,000
FP750-AA	2,700	RP06-AA/PT10	8,000
DW750-AA	10,000	11/780 CPU	CALL

If you would like on our Mailing List, call Valerie (713) 451-3112.

NEW AND USED EQUIPMENT FOR SALE BY END USER
DATA GENERAL

7) 6025A 32 MB DISK	12000	1) 6073 LP2 PRINTER	900
6) 6010 32 MB SUBSYSTEMS	20000	1) 6080 LP2 SUBSYSTEM	1100
1) 6026 12.5 MB DISK W/FLOPPY	2500	1) 6180 LP2 PRINTER (NEW)	1800
2) 6120 32 MB DISKS (NEW)	5000	1) 6181 LP2 SUBSYSTEM (NEW)	2250
3) 6120 25 MB DISKS	4500	8) 4014/4004 LPS CONTROLLERS	500
1) 6027A 15 MB DISK (NEW)	4000	1) 4027A 4 LINE ASYNC MUX	350
6) 6067 20 MB DISK CNTRL	700	2) 6400 ASR 16 20 MA DTR BOARDS	1100
2) 6020A NOVA 4C 5 SLOT 64 KB CPU	1200	1) 1144A 1 BAY CABINET	600
1) 1075A 1 BAY INDUSTRIAL CABINET WITH AIR CONDITIONER (NEW)	4,400		
1) 1076B 1 BAY INDUSTRIAL CABINET WITH HEAT EXCHANGER (NEW)	2,000		
1) NOVA 4X 5 SLOT 128 KB 15 MB DISK W/FLOPPY & ULM 5 BOARD	10,500		
1) NOVA 4X 5 SLOT 128 KB 12.5 MB DISK W/FLOPPY & ULM 5 BOARD	9,500		

MODEMS & TERMINALS

8) HAYES VENUS 1200 BAUD MODEMS	400	20) ADM3A LEAR SIEGLER	375
11) 801234 MODEM 2 CHANNEL MODEMS	595	8) ADM5 LEAR SIEGLER TERMINALS	750

CONTACT: ROBERT FULWILER 214-258-0814

Inflation Fighters
Quality & Savings
Slightly used. Money Back Guarantee. Full Reels. All External Labels Removed. Guaranteed for use at 800 BPI through 6250 BPI.

2400' Reel	$4.95 ea.
1200' Reel	$4.25 ea.
600' Reel	$3.50 ea.

All Tapes with Hanging Seals
We pay freight on orders over 200 tapes.
All orders shipped within 48 hours.
Call or Write
Computer Tape Mart
44A Seabro Avenue
N. Amityville, New York 11701
(516) 842-8512

BIDS & PROPOSALS

Accepting Bids University of Missouri

Sealed bids will be received by the University of Missouri until 9:00 A.M., Tuesday, March 13, 1984, for the Sale of Used Computer Equipment, located in the Computer Room, Math Science Annex, University of Missouri - Columbia, Columbia, Missouri. For more information contact, Mrs. Kathleen Brumfield, 537 Clark Hall, University of Missouri - Columbia, Columbia, Missouri, Telephone (314) 882-7001.

LEGAL NOTICE

The Memphis City Schools offers to sell and will accept written proposals for an IBM 4341 MG2-8 MEG Processor with Console. Additional information, bid requirements and bid packets are available at; Memphis City Schools, 2597 Avery Avenue, Purchasing Division, Memphis, TN 38112. Sealed bids will be accepted until 11:00 am 29 March 1984 and will be publicly opened at that time. Contact H.B. Edwards at (901) 454-5376.

BUYING?

Whether you're looking for big computers little computers, terminals, printers, software, time sharing or services, you'll find it in Computerworld classifieds.

Pages of ads every week, with everything from Discs to DEC's from time sharing to terminals, and software for every size computer system.

You'll find what you need in Computerworld classifieds.

Call 800-343-6474 (or 617-879-0700) for more information

The Bulletin Board

PRIME

PRIME
LARGE SELECTION OF USED PRIME COMPUTER SYSTEMS ...SAVINGS TO 50%
Peripherals also available:
Memories-Disk Drives-Controllers
Modems-Terminals-Printers
1st SOURCE
...Your Ultimate Source
A DATAMATION SERVICES, INC., COMPANY
3001 EAST CAMPBELL AVE.
PHOENIX, ARIZONA 85016
(602) 957-0888
ASK FOR DON OR MATT

BURROUGHS

BUY SELL LEASE
All Systems & Peripherals
AVAILABLE
• B1955 Sys • B1965 Sys
• B90s • B900s
(Configured To Your Specs.)
• Visual 800 Terminals
• 200 Terminals except 100 & 110
• 7000s, MT900s, MT9000
• 300 & 307 Style Disk Drives
• Various Tape Sub-systems
• Memory Upgrades
• Printers 5245 & 5640 Styles
Guaranteed Burroughs Maint. Depot Maintenance Available
COMPUTER PROVISIONS
(213) 349-7575
(Member ADP)

BURROUGHS B700 System
Processor: B711
Disk: AS450-22
Printer: AS240-2 180 LPM
Best Offer
Call Joe (209) 823-7661

DATA GENERAL

MV 10000/4000
& MV 8000/8000
2 Mb Memory Boards
Available Now
Liberal Trade In
On Your Old Boards
M-600 ½ Mb System $18,000
C-300 ½ Mb System $16,000
MV-8000 2 Mb System Call
MV-8000 2 Mb System Call
6026-H Nova 4S 64 Kb $6,000
w/6046 & Logidyn Cab
6021-H Nova SD 256 Kb $7,000
LILM 8, 6046 & Cab
6046 10 Mb Disk Subsystem $8,500
6030 10 Mb Disk 1-on-On $7,500
6031 192 Mb Disk Subsystem $15,000
6031-A 192 Mb Disk Add-On $13,000
6020 Business Industrial Cmbl $900
6762 CDC 80 Mb Drive $3,600
6056 Eclipse 256 Kb Memory $2,500
6057 6140 256 Kb Memory $2,500
6057 Nova 4X 256 Kb Memory $2,500
6053 CRT Terminal $975
6026 800/1600 Tape S/S $10,500
6099 12.5 Mb Disk S/S $2,500
6703 2 Mb MV 8000 Memory Call
6703 512 Kb MV 8000 Memory Call
4215 600 LPM Printer $9,500
Int'l. Computing Systems Co.
(612) 941-8901

NEW 64 CRT's
D-210 $795
D-410 $1395
D-460 $1695
Desktops 10% to 35% Off List
Keyclick 200 $695
Any & All DG Cables In Stock
We Will Not Be Undersold On
Any New or Used DG Equipment
Maxco Data Systems
(216) 697-2004

Desktop Generation
10, 30, 30 Immediate Delivery
Systems, Software, Service
Copley Management
(617) 227-3402

HEWLETT PACKARD

HP3000/HP3000/HP300
0/HP3000/HP3000/HP30
00/HP3000/HP3000/HP3
000/HP3000/HP3000/HP
BUY/BUY
SELL/SELL/SELL
RENT/RENT/RENTR
LEASE/LEASE/LEASE
Complete Systems
Processors • Peripherals • Parts
ConAm Corporation
Santa Monica, California
(213) 459-3943 (800) 643-4664

BUY & SELL
1000 & 3000
Systems • Components
WESTERN DATA SALES, INC.
(213) 373-0463

Buy-Sell-Lease
HP3000 3X, III, 4X
and related peripherals
Call Carol
CSU INDUSTRIES, Inc.
516-239-4310

HARDWARE SYSTEMS CORP.
LEASING
Hewlett-Packard
Complete Systems
Tape Drives
Disk Drives
Printers
Terminals
1-800-328-5788
(201) 845-3884

HONEYWELL

HONEYWELL LEVEL 62 COMPUTER FOR SALE
Available March 1, 1984

CEN PROC 180KB	CP62000
CONSOLE 120CPS	CSF2109
DISKETTE DRIVE	DDU0001
PERF MOD 117	CPF2105
2□ 1200 PRTR	PRU1200
2□ 80MB DISK	MSU0360
2□ 80MB DISK	MSU0331

All Under Maintenance Contract With Honeywell
INQUIRE OR MAKE OFFER
COMPUTER SYSTEMS
P.O. BOX 8004
GRAND RAPIDS, MI 49508

LEVEL 6 & DPS 6 EQUIPMENT
Refurbished Like Printers
PRU8103 240 LPM, 96 Chsr... $4,125.
PRU8104 300 LPM, 64 Chsr... $4,725.
PRU8106 600 LPM, 64 Chsr... $6,525.
New (Never Used) Disk Drives
CDU 9116 100MB
(F & SR) CMD ..... $3,200 Ea.
Randover Computer Services Ltd.
(617) 688-4030

HONEYWELL DPS8/49
512K CPU
80 MB Disk (87 + 19)
1-300 LPM Printer
1600 BPI Tape-A Controller
2-7801 CRTs
Available Approx 5/1/84
Buy Our Equity and Take Over Last 12 Months of FMV Operating Lease
(216) 524-0797

HONEYWELL DPS-6/31
Like New
Call For Details
(301)-388-1060
Ext. 6666
Ask For Dave Madsley

LIMITED QUANTITY AVAILABLE
At Bargain Prices
VIP7200's
VIP7801's
Maxco Systems Inc.
9800 W. Lawrence Ave.
Schiller Park, IL 60176
(312) 671-8080

BASIC FOUR

FOR SALE
BASIC FOUR, 210
32 MB, 8800 LIGHTNING
DIOT, 132LPM PRINTER
TAPE CARTRIDGE DRIVE
JACQUES MORET
1350 BROADWAY
NEW YORK, N.Y. 10018
(212) 736-8041

MISC.

Buy • Sell • Lease
• Short Term Rentals •
DATAPOINT
FOR SALE

9400	Discs	$1,100
9400	Multiports	$400
9600	CRT's	$1,200
1500	Systems	$1,000
9870	20MB Expansion	$6,700
9832	100 CPS Printer	$1,200
9000	Acc Proc. 256K	$5,500
9830	Diskettes	$1,200
3601	Diskettes	$600

24 HOUR DELIVERY
Cougar Computer Corp.
(216) 261-3660

DEC

BUY • SELL • TRADE

1170 Sys.	DZ11-E	RX750	
DL11-E	RF11-D	RM03-AA	
DL11-W	LA120-DA	RM05-AA	
DMC11	M7268	RP04/5-C	
DR11-B	M8012	RP05-AA	
DZ11-B	MX11-DE	TE16 Mstr.	

NEW YORK COMPUTER EXCHANGE
(516)752-0300 (800)645-9199

DEC
PDP 11/34A
2 RK07-EA
4 VT100's
1 LP11-VA
$18,500
CALL
(609) 888-1331 Ext 370

FOR SALE
DEC RS750-DA
COMPATIBLE MEMORY "As Is"
(2) INTEL MU8750 1MB $1800. ea.
(2) MOSTEK 2MB $750. ea.
DEC DISK PACKS/CARTRIDGES
(4) RP06 Used $200. ea.
(3) RK05 New $95. ea.
REGENSTREIF INSTITUTE
(217) 359-7400

DEC 11/03 System
With 32KB, RXV11-BA, Cabinet, LA36 Printer, RT11 License
$1,975
Call Ray
(617) 275-6600

DEC & PRIME SPECIALS
- MS780-FD Avail Now Call
- MS780-E Upgrade 9X $18,900
- 1144-DA New $24,500
- VT101-AA New $695
- RM80-AA $10,000
- PDP 11/70 128KB Core Memory $24,900
- RM03-AA $6,200
- CDC 9775 600MB Call
- CDC 9766 300MB $7,500
- VAX 11/750 1MB, 64K chip New $43,500
- Dataprinter 180LPM Band Printer $4,900
- VAX 780 1/4MB MS210 $900
- RM05 Call
- Prime Computer Systems Available Upon Request

SEVCO INC.
(617) 486-6936
(617) 486-6331

DEC

DEC BARGAINS

11/84A CPU Bd.	$1,595
11/44 KB44-A "DB"	$2,975
4A-CS780 System Kit	$9,950
RDV11-AA	$495
DR780-AA	$9,400
DZ11 MUX Bd.	$1,125
DZ32-B	$1,870
FP11A	$1,195
KX11-A	$1,795
KX11-B	$2,575
KW11-P	$350
MS11-MB	$1,275
MS780-DC	$4,980
MS780-FD	$2,595
MSV11-PK	$1,195
MSV11-PL	$1,275
RLV11	$975
VAX 1MB MS780-CA	$2,595
VAX 1MB MS780-CA	$2,995

Call Ray
at CEL, Inc.
(617) 275-6600

DEC NEW & USED
BUY — SELL — EXCHANGE
Systems • Processors • Memory
Options • Peripherals • Modules
LAKEWOOD COMPUTER CORP.
(408)296-8545

VAX
RESOURCE ACCOUNTING
$1200.00 U.S.
ON LINE-MENU DRIVEN
DISK ACCTG-MGMT REPORTS
Virtual Computing
#100, 525-11 Ave. S.W.
Calgary, Alta., Canada T2R0C9
(403)269-7449

DEC New & Used

BA64	$125	MM11-DP	$50
DL11-W	$245	MS11-LD	$1,250
DZ11A	$1,750	RK06/RK07	$950
HYPERCA	$495	RK11-D	$395
H9642P	$995	RK611-A	$350
LA36CE	$395	VT52AE	$695

Jagoe Computer Sales
(516) 288-6886

Digital
DEC Writer III
Printer
Model LA-120-AA
Excellent Condition
$2,800 New
Quick Sale $1,600 Each (2 Available)
(312) 461-0407

J-11's Available
Immediate Delivery
Turnkey O-Bus Systems
Various Configurations
All DEC Parts
• Micro-J-11's w/Winchester/Floppy
• J-11's w/RL02's
Jagoe Price
E. E. C. Systems, Inc.
(617) 449-6182

MISC. SYSTEMS

For Sale
DATAPOINT
4630
300 LPM Printer
(216) 464-6626

Micro to Mainframe
Transmit DOS Direct
"NATIVELINX"
3270 - 2780/3780
Dealer, Quantity, Educational Discount
Viking Associates
(303) 632-7004

DATAPOINT
4660 System
120MB Disk
128K Processor
8020 Processor 128K
General Data Processing
(713) 523-6454

WANG

Present...
WANG USERS.....
HAVE YOU HEARD ABOUT THE GROUP OF FORMER WANG EMPLOYEES IN ATLANTA WHO BUY & SELL USED WANG EQUIPMENT AND PLUG COMPATIBLES?
LC.A. (404) 977-4285 or
1-800-241-3186

For Sale
Several VS-65 Systems
Incl: 256-512K, 2 Wk. Stn's.
80 Meg "Phoenix", 600 LPM
Printer. Prices $65.K Each.
Also Available: OIS 115-4 (80 Meg)
(617) 273-6030
CPR Associates
Secondary WANG Specialists
Since 1978

For Sale
VS25
1MB Memory, 65MB Disk Drive,
(3) Exp. Work Stations, Word Processing, 5577 Printer, 1 yr. old.
Save $15,000 ..... $41,900
New 200MB Wang Computer
Disk Drive $9,995
Dungan Technology
(202) 338-6000

IBM

For Sale
IBM
5251 Mod 11 Available Now
5251 Mod 12 Available Now
5256 Mod 3 Available Now
5225 Mod 2 Available 3/30/84
Call Pat
(312) 882-2211 ext. 5

RENT...LEASE
S/36 DELIVERIES
5281's, 5224's, 5225's
Monthly, 1, 2 or 3 year leases
Trade-in your 5364
DENNIS CAPITAL CORP.
New York (212) 370-0457
Houston (713) 667-7117

AMDAHL
470 V/7 & V/8
Purchase or Lease
Available Now
(415) 948-0900

PRINT TRAINS
IBM 1416 & 3216
Bought - Sold - Lease
Repaired - Reconditioned
COMPU-ACT COMPANY, INC.
(513) 668-8491

SYSTEM 3 MODEL 12
W/Direct Attach 3741
5203 Printer/300 LPM
3340 Disk Storage
Available Immediately
Call Frank Mercando
(908) 423-5265

WANTED
4341-1
Call Bill Cahill
(914) 238-9631

IBM SYSTEM 34
CPU 5340-C22
2D Diskette
64K
27MB
FOB Florence, KY
$10,500.
(606) 371-6511

For Sale Or Lease
SYSTEM 38s
For Lease
3280s
(512) 476-6362

IBM

SALE SALE SALE
FOR FEBRUARY ONLY
Any System/34 CPU
The Lowest Prices Ever
Call any other computer dealer before you call us. If we can not beat the best price quoted, we will send you $100.00.*
All upgrades, peripherals and S/34's are available at the best prices around.
PROCOM
(212) 279-1717
* Contingent on delivery of machines at the quoted price and if available within 4 weeks of the sale agreement.

FOR SALE
5280
SYSTEM 810
w/Communication
5251-Z Displays
5225-1 Printers
Call Ron Ohio (614) 369-8991

Buy • Sell • Lease
IBM
Cougar Computer Corp.
Suite 219
34600 Euclid Office Plaza
Euclid, OH 44132
(216) 261-3660

Buy ... Sell.... Lease
IBM MICR
3890 - 1419
(813) 722-4534

SYSTEM/36's
A11*A16*A22*B20*B24
Available Now!
FOR SALE OR LEASE
STAR DATA SYSTEMS
1 (800) 531-5662
(512) 822-5662-Texas

FOR SALE (All Upgradable & Systemed)
64 Meg Upgrade ($/34)
5120-C20, 5311, 5321-11
120K (2 1/2 F For 5340)
Migration For 5364
Sales 1 (800) 531-5662 (512) 822-5662
5251-001 5251 & 5180
Available Now At A Great Price!
DATAMARC (800)635-7400
6565 Peachtree Ind., Atlanta, GA 30360

SYSTEMS 34/36/38
Lease Or Sale
S/36 DELIVERIES
WANT TO BUY S/34's
1-800-LEASPAK
In TX (817)268-6622

Fox Computer Sales, Inc.
Buy • Sell • Rent • Lease
Datapoint • IBM
Telecom
W.T.B.: Used Equipment
195 Alpha Drive
Cleveland, OH 44143
(216) 449-6565

FOR SALE OR LEASE
IBM 4341-K9
With 3278-2A
and 4631 Keyboard
Available 3/1/84
Call (612) 424-4888

Buy, Sell, Lease
IBM 4341 M2
Available 3/1/84
will Lease on Short Term Basis
Various Quantity 3350's with 3880
Mallco Ltd.
Call Tom Stanchfield
(804) 794-3660

SALE/LEASE
4381-M2
Ships 6/22/84
Call Bill Cahill
(914) 238-9631

THE BULLETIN BOARD

A Low-Cost Way to Sell Hardware and Software in Computerworld.

What is The Bulletin Board?

It's a classified section in Computerworld designed especially for the selling and buying of individual pieces of hardware in a convenient, low-cost format. It is especially suited to companies that have a piece of used equipment they want to sell. For one low price, you can inform more than half a million Computerworld readers around the country of your equipment's availability.

How Does The Bulletin Board Work?

Bulletin Board ads come in standard units (one column wide by one inch deep) and standard typefaces. (Units may be combined to produce deeper ads, but one column is the maximum width and no units of less than one inch are available.) Ads are arranged under headings (such as "IBM", "DEC" or "Printers"). The headline of the ad is set in larger, bold type, and should contain the standard equipment identification. The body copy should describe the equipment very briefly and give the person to contact. This is all the information an interested buyer needs to follow up. No ad should have more than one piece of equipment or software.

The price for each standard unit is only $130.00 (One unit minimum and no fractional units available.) Anyone can place an ad, but no agency commissions are paid, no quantity discounts allowed, and no credit toward rate is given for contract advertisers who advertise in other sections of Computerworld. It's a simple and effective system for buying and selling hardware and software.

How to Place an Ad in the Bulletin Board.

Ads are accepted in the mail, by phone or by telecopier. Ads can be accepted up until the Monday before issue (7 days in advance of issue date). You should write out your ad before submitting it. (The standard size will hold approximately 25 words of copy.)

Once you've written your ad, send it in with the coupon below or call one of our ad-takers. (If your company has never advertised with us before we request a check with your order.)

Remember that all ads are standard. No special typefaces, no borders and no logos are allowed. Ads are set on a six-column page in our classifed section under the heading "The Bulletin Board.". We assume no liability for errors beyond the price of the ad in the case of material errors.

ORDER FORM

COMPUTERWORLD BULLETIN BOARD

Issue Date: Ads can be accepted up until the Monday preceding the issue desired. Computerworld comes out every Monday.

Classifications: Most ads will be classified according to the brand of equipment that is being bought or sold. These classifications are: Altos, Burroughs, Control Data, Data General, Digital/DEC, Hewlett Packard, Honeywell, IBM, NCR, Selenaa, Sperry Univac, Teletype, Terminals, TI, WANG, Miscellaneous.

Copy: Copy for your ad must be clearly typewritten and may be sent in via the mail or by telecopier (telecopier extensions are 410 and 451). Ads may be given over the phone to our team of ad takers. The standard size is 1 column by 1 inch deep. These units may be combined to form larger sized ads. Describe the equipment very briefly, give the price and the name of the person to contact. All ads will be set up using a standard format. No borders or logos are allowed.

Cost: The price for each standard unit is $130.00 (One unit minimum and no fractional units allowed). There are no agency commissions and no quantity discounts.

Billing: Once you've written your ad, send (or call) it in with your name and address for billing purposes and we'll run it. (If your company has never advertised with us before, we request a check with your order.)

Issue Date(s): _____

Signature: _____

Name: _____

Company: _____ Title: _____

Address: _____

Telephone: _____

Send this form to:
COMPUTERWORLD BULLETIN BOARD
375 Cochituate Road, Box 880
Framingham, MA 01701
(800) 343-6474 (617) 879-0700

SOFTWARE FOR SALE

WE INVITE YOU TO JOIN
The Growing Harris Software Product Distributor Network
. . . and market application software products for the IBM System/34, 36 and 38.

. . . WE DID!!

"Timely information implies action and profitability . . . Harris Data Service helps us to produce this effect for our customers."
—Albany Data Systems, Inc.

"HDS/DINET is a rapidly maturing international link with high quality software companies. The Network is well run and offers many opportunities for cross-fertilization of ideas and products."
—Information System Services, Ltd.

"The HDS Distributor Network offers benefits to all. Users enjoy nationally distributed software with local expert support. Distributors can confidently install proven software quickly. IBM benefits from satisfied users of their hardware."
—Peterco, Inc.

"Harris Data Service's software and Distributor Network allows the local software service organization to concentrate on the business needs of their clients rather than writing or debugging existing software problems."
—Steelpointer Data Consultants, Inc.

. . . THE NETWORK ORGANIZATION FOR IBM SOFTWARE SUPPORT FIRMS THAT "WORKS" . . . FOR ALL OF US!

Please call . . . Please join
HARRIS DATA SERVICE, INC.
11629 W. Dearborn Avenue
Milwaukee, WI 53229
(414) 475-1760

Offices Nationally
Distributors Internationally

More IBM System/38 Users Are Choosing RTC Systems.

For technically superior software in a wide range of Financial, Manufacturing, Distribution and Management Business Systems.

The International Software Developers.

RTC Systems, Inc.
40 Plain Street
North Attleboro, MA 02760
(617) 695-5008

IBM S/38 PAYROLL

- 99 COMPANYS
- 99 EARNINGS
- 99 DEDUCTIONS
- 401 (k)
- ALL STATE TAXES
- RPG II
- MENU DRIVEN
- ON-LINE
- EMPLOYER TAXES
- G/L DIST
- CHECK HISTORY
- DATA BASE

CIC
CONSOLIDATED INFORMATION CO.
177 POST STREET, SUITE 908
SAN FRANCISCO, CA 94108
(415) 433-5333

CS SOFTWARE

VAX
PDP-11

Payroll • • Job Cost
General Ledger • • Fixed Assets
Accounts Receivable • • Accounts Payable
Inventory • • Order Entry
Client Writeup

Compu-Share
3624 - 50th St. • Lubbock, TX 79413 (806) 792-3785

SELL YOUR SOFTWARE IN THE CLASSIFIED PAGES OF COMPUTERWORLD

SOFTWARE FOR SALE | SOFTWARE FOR SALE | SOFTWARE FOR SALE

HIGH QUALITY, LOW COST IBM SYS34/36 SOFTWARE

$999 per PACKAGE:
ACCOUNTS PAYABLE
GENERAL LEDGER
PAYROLL
INVENTORY CONTROL
ACCOUNTS RECEIVABLE

$1999 per PACKAGE:
ORDER ENTRY/BILLING
PURCHASE ORDER

INCLUDES COMPLETE SOURCE
(30 DAY MONEY BACK GUARANTEE)

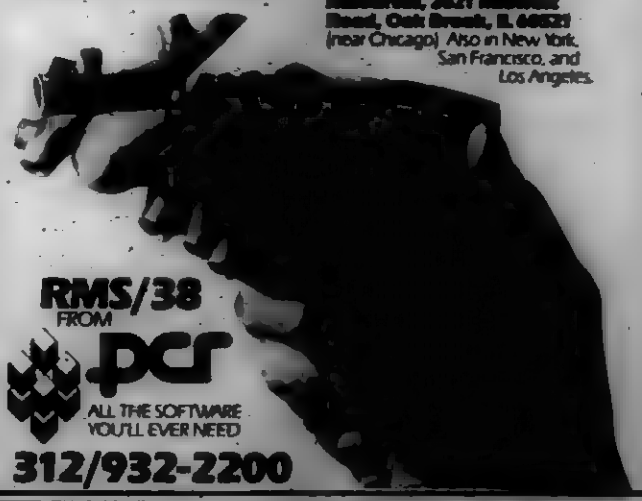
HEINECK ASSOCIATES, INC.
SMALL SYSTEMS DIVISION
DEPT. CW, ONE CARRIAGE COURT
STONY BROOK, NEW YORK 11790
(516) 751-6835

Transplant! The way to a stronger distribution system

If the heart of your distribution system skips a beat now and then, you may need an RMS/38 transplant. RMS/38 for the IBM/38 is a complete distribution operations and planning system that lets you better utilize warehouse inventory, provide current out-of-stock and short information to reps for better customer service, provide demand and shipment information for more efficient purchasing, anticipate credit problems rather than react to them.

RMS/38's nine powerful applications also allow financial management, generation of user reports with its query facility, and a PC link that lets you transfer information to your IBM Personal Computer for interaction with popular micro products. Plus advanced data base architecture which allows direct access to all stored information, making expansion simple and economical.

For a free demonstration or more information, contact PCR, Professional Computer Resources, 2421 Midwest Road, Oak Brook, IL 60521 (near Chicago). Also in New York, San Francisco, and Los Angeles.



RMS/38 FROM pcr
ALL THE SOFTWARE YOU'LL EVER NEED
312/932-2200

SOFTWARE WANTED

Turn Your Efforts Into $$$

Wanted: Software. Successful software company seeking additional products to market. Must run on IBM mainframes or PCM's. Prefer programmer/operations productivity aids. If you have written a program and you need an international company to market it for you, send an abstract of the product to:

Triangle Software Company

J. Zipp, Triangle Software
4340 Stevens Creek Blvd.
Suite 100
San Jose, CA 95129
(408) 554-8121.

BUSINESS OPPORTUNITY

Series 1
Communications
POWER/VS Remote Print Using SSPOOL
Automatic Forms Control
COMM/1
Paragon Computer Company
524 Union St., #208
San Francisco, CA 94133
(415) 398-7228

Elegant Software
for IBM S/34, 36 and 38

General Accounting	Payroll/Personnel
Financial Reporting	Property & Equipment
Accounts Receivable	Report Writer
Accounts Payable	Oil & Gas
Order Processing	All Systems are:
Inventory Management	RPG II/RPG III
Sales Analysis	Data Base
Job Cost	Interactive

J.D. Edwards & Company
4940 South Syracuse Street/Suite 800
Denver, CO 80237
303/779-5782
Dallas — 214/ 458 0836
Houston — 713/ 880 8278
Northern California — 415/ 697 7784
Southern California — 714/751 8982

Your own representation in Dusseldorf City

OSC

TIME & SERVICES

VAX 11/780 AND PDP-11 DEVELOPMENT TIME
NO KILOCORE TICK CHARGES / NO CPU CHARGES
Omnicomputer
$7/$14
RSTS/E VMS
PER HOUR CONNECT TIME
BUDGET BYTES℠ 212-944-9236
Omnicomputer, Inc.
1430 Broadway, New York, N.Y. 10018

ICOTECH
Innovative Computer Techniques
COMPUTER SERVICES
IBM 3081 DEC-10
- Remote Job Entry
- Batch Processing
- Optical Mark Reading
- Online Processing
- Timesharing
- Laser Printing

COMPUTER OUTPUT MICROFILM
- Datagraphix Mini Auto-Comp
- Datagraphix Datamaster
- 6250 BPI Capability
- Free Testing

Route 202
Raritan, NJ 08869
201-534-5163
Contact: Joyce Segnenko

DATA CENTER SERVICES
TWO 3033U16
BURNS

COMMERCIAL DATA PROCESSING
4341-2 370/168-3
OS-DOS-VM/CMS
CICS-ROSCOE
REMOTE JOB ENTRY
CICS DEVELOPMENT
CUSTOMIZED SOFTWARE
XEROX LASER PRINTING
Contact Greg Gerde
(201) 777-3464
15 MINUTES FROM LINCOLN TUNNEL
ONE PASSAIC STREET
WOOD RIDGE, N.J. 07075

Computer Time
IBM 4341
- OS/VS1
- VM/CMS
- Negotiable Rates
- Good Environment

Contact Ray Reuth
(212) 777-5040
ICCS
39 East 21st Street
New York, NY

VAX/VMS TIMESHARE
5c
$2 PER HOUR CONNECT TIME
ONE MB DISK STORAGE INCLUDED
AVAILABLE NATIONWIDE VIA TELENET
LEASE-A-PORT™ WITH 10 MB DISK & NO CPU OR CONNECT CHARGES FOR $800 PER MONTH
NRCCH CORPORATION
(714) 594-8211
(213) 516-0500
(714) 560-8570

Tell us about the Time & Services you have to offer...here in COMPUTERWORLD's Classified pages.

CLASSIFIED ADVERTISING ORDER FORM

Computerworld's Classifieds work.

Issues Dates: Ad closing is every Friday, 10 days prior to issue date.

Sections: Please be sure to specify the section you want: Time and Services, Software for Sale, Position Announcements and Buy/Sell/Swap. (Available upon request: Software Wanted, Business Opportunities and Real Estate).

Copy: We'll typeset your ad at no extra charge. Please attach CLEAN typewritten copy. Figure about 35 words to a column inch, not including headlines.

Cost: Our rates are $128.10 per column inch. (A column is 2" wide.) Minimum size is two column inches (2" wide by 2" deep) and costs $256.20 per insertion. Extra space is available in half-inch increments and costs $64.05. Box numbers are $15.00 extra.

Billing: If you're a first-time advertiser, (or if you have not established an account with us,) WE MUST HAVE YOUR PAYMENT IN ADVANCE.

Ad size desired:_____columns wide by_____inches deep.

Issue Date(s):_____

Section:_____

Signature:_____

Name:_____

Company:_____

Title:_____

Address:_____

Telephone:_____

Send this form to:

COMPUTERWORLD

CLASSIFIED ADVERTISING,

375 Cochituate Road, Box 880,
Framingham, MA 01701

Foreign Editorial/ Sales Offices

England: Terry Cartwright, EEC Publications, 196-200 Balls Pond Rd., London N1 4AQ. Phone: 01-359-3525, Telex: (851) 894065 (Computer Management, Computer Business Europe only).

Euan Rose, Bill Dunlop, Stephen Thomas, Beere Hobson Assoc., 345 Goswell Rd., Islington, London EC1V FHN. Phone: 01278 3415/6 (reps for all CWCI publications except Computer Management and Computer Business Europe).

W. Germany: Eckhard Utpadel, CW Publikationens, Friedrichstrasse 31, 8000 Munich 40. Phone: (089) 38172-0. Telex: 5215350.

France: Axel Leblois, Le Monde Informatique, 185 Avenue Charles De Gaulle, 92200 Neuilly Sur Seine, Paris. Phone: 758.14.14. Telex: 613234 F.

Japan: Mr. Shuji Mizuguchi, Computerworld Japan, 7-4 Shintomi 1-Chome, Chuo-ku, Tokyo 104. Phone: (03) 551-3882, Telex: 252-4217 (Computerworld Japan only).

H. Kajiama, Tokyo Representative Group, Yamaguchi Bldg., 2-12-9 Kanda Jimbo-cho, Chiyoda-ku, Tokyo 101, Phone: (03) 230-4117/8, Telex: J26960 (reps for all CWCI publications except Computerworld Japan).

Australia: Alan Power, Computerworld Pty. Ltd., 37-43 Alexander Street, Crows Nest, NSW 2065. Phone: (02) 4395133, Telex: AA74752 COMWOR.

Brazil: Eric Hippeau, Data News, Computerworld do Brazil, Servicos e Publicacoes Ltda., Rua Alcindo Guanabara, 25/10th Floor 20031 Rio de Janeiro, RJ Brazil. Phone: (021) 240-8225. Telex: 2130838(WORD BR).

Mexico: Richard Small, Computerworld de Mexico, Oaxaca 21-2, Colonia Roma, Mexico City 7 D.F. Phone: (905) 514-4218, (905) 514-6309. Telex: 1771300 ACHAME, 1777809 ACHAME.

Spain: Neil Kelley, Computerworld/Espana, Gravina, 13, Madrid 4. Phone: 231-23-85; 231-23-86; 231-23-89. Telex: 47894(CW E).

Denmark: Preben Engell, Computerworld/Denmark, Gammel Strand 50, 1202 Copenhagen K. Phone: 01-1284-11. Telex: 27566 cwdan.

Sweden: Bengt Mamfeldt, Computerworld/Sweden, Nova Media AB, Vertavagen 58, 11539 Stockholm. Telex: 8105089 NOVACW.

The Netherlands: Johannes A. Vilhoet, Mgr. Dir., Computerworld Benelux, Van Eeghenstraat 84, 1071 GK Amsterdam. Phone: 020-646436. Telex: (844) 18242.

Italy: Daniele Bandoni, Gruppo Editoriale Jackson, s.r.l., Via Rosellini 12, 20124 Milano.

Argentina: Ruben Argento, Gen. Mgr., Computerworld Argentina, Av. Belgrano 406-Piso 9, CP 1092 Buenos Aires. Phone: 34-6583/5684.

Norway: Mr. Per Berrefjord, Editor, CW Norge A/S, Hovinveien 43, P.O. Box 2662, Toeyen, Oslo 6. Phone: 2/647725. Telex: (856) 76476.

Singapore: Mr. David Hatch, General Manager, Asia Computerworld, Pte. Ltd., 11-09/11-10 Goldhill Plaza, Newton Road, Singapore. Phone: 250-444. Telex: (786) RS 37003

Saudi Arabia: Mr. Omar Dussuki, General Manager, Saudi Computerworld, P.O. Box 5455, Jeddah. Phone: 6675916/6660380. Telex: (926) 401205.

ADVERTISERS INDEX

Advanced Systems, Inc. 56
American Telephone & Telegraph 49-51
Applitek 52/59
A.S.T. Research 52/48
Avant-Garde Computing, Inc. 52/48
Automative Training 52/61

Bachus Data Systems 46
John Beall Company 59
BGS Systems, Inc. 64
BMC Software 71
Boeing Computer 52/44
Bruegen 52/24

Cablesharo 52/17
California Software Inc. 52/8
Candle Corp. 55
Canoga Data Systems 52/64
Centron 52/58
Cincom 28-29
CMI 91
Codex Corp. 14-15
ComDesign 52/26
Comdisco 27
Complexx Systems 52/20
Computer Corporation of America 24-25
Computer Peripherals Systems 52/54
Computer Technology 47
Compuware 75
Context MBA 17
Corvdale 58
Corvus 52/6
Cullinet 9
CW Buyer's Guide 74
CW DP 100
CW Supplement 96
CW Sweden 101
CXI, Inc. 52/53,52/54

Data General 22
Datamax 52/27
Dataproducts 39,40
DEC/Networking 68-69
Deltak, Inc. 52/15
Digital Communications, Assoc. 52/13-52/19
Dynamic 101

Enterprise Technology 52
Ericsson Corp. 52/28-52/29
Exxon Office Systems 67

Fibronics 52/58,52/63
Forte Data Systems, Inc. 41
Fusion Products 106

General Data Comm 52/60
General Electric 53-53
GENICOM 52/24
Group Operations 44

Hayes Microcomputer 102
Hewlett Packard 94-97
Hitachi 52/42
Hughes Aircraft 11

ICOT 52/57
IDS 52/54
Infinet 52/31
Informatics 19
Information Sciences 76-77
Infotron 52/4-52/5
Innovative Data Processing 7
Innovative Electronics 41
Interface Systems 40
ITT 52/36

Lear Siegler 70
Lee Data Corp. 52/35
LeeMAH 52/30
Levi, Ray & Shoup 70

Mathematica 52/54
McCormack & Dodge 83
MDS Systems 60-61
Memorex 52/40
Micom Systems 52/31
Microcom 52/22-52/23
MicroFrame 52/64
MicroTempus 30
MSA 144

NCR Comten, Inc. 52/40
NEC 104-105
Netec 74
Newsory Products 72
Northern Telecom 52/46-52/47

Omnitec Informatique 60
On-Line Software 65,52/9

Panasonic 36
Panosphic Systems 52
Para Research 24
Paradyne 52/26

Perkin Elmer 52/32-52/33
Phoenix Computer Corp. 32
Plexus 52/45

Questronics 52/52

Raytheon Data Systems 52/50-52/51
RCA Cylix 52/41
Rondeck Corp. 102
RMI Company 18

Sage Systems, Inc. 25
SAS Institute 30-31
SDI 30
SET 26
Signal Technology Inc. 33,95
Softronics 52/56
Software AG 89
Software Assistance 72
Software Digest 26-96
Software International 42-43
Southern Systems 5
Sperry Corp. 81
StarTech 46
Stone Mountain Computing 91
Syncsort 8
Syscd 103

Tandberg Data 52/62
Tandem Computers 54-57
Techland 44
Technology Transfer Institute 84,96
Televideo Terminals 52/11
Thomas Engineering 52/16
3 COM 12-13
Tone Software 16,80
Tymnet 52/7
Tymshare 94

Ungermann-Bass 52/12-52/13
Unimet 52/10
Universal Data Systems 78
US Postal Service 54
U.S. Robotics 10

VM Software, Inc. 66

Walker Interactive 52/26,52/27,52/28
Wang Laboratories 79
Wayne Green 98
Western Graphtec 52/14

Xerox Corp. 81,84

This index is provided as an additional service. The publisher does not assume any liability for errors or omissions.

Computerworld Sales Offices

Vice-President/Sales/Donald E. Pagan
Director/National Sales/Edward P. Maraldi
Marketing Support Manager/Kathy Doyle
COMPUTERWORLD, 375 Cochituate Road, Box 880,
Framingham, MA 01701
(617) 879-0700

BOSTON SALES OFFICE (617) 879-0700
Northern Regional Director/Chris Lee
District Managers/Jim McClure, Ronald Masters,
Jayne Corcoran, Michael F. Hallpher
Sales Assistant/Alice Longley
COMPUTERWORLD, 375 Cochituate Road, Box 880,
Framingham, MA 01701

CHICAGO SALES OFFICE (312) 827-4433
District Managers/Arthur Kossack, Russ Gardner
Sales Assistant/Joan F. Broderick
Northern Regional Director/Chris Lee
COMPUTERWORLD, 2600 South River Road, Suite 304,
Des Plaines, IL 60018

NEW YORK SALES OFFICE (201) 967-1380
Eastern Regional Director/Michael J. Masters
Senior District Manager/Doug Cheney
District Managers/Ray Costin, Joan Daly, Fred La Rosa
Sales Assistant/Gale M. Polomo
COMPUTERWORLD, Paramus Plaza I,
140 Route 17, North, Paramus, NJ 07652

LOS ANGELES SALES OFFICE (714) 261-1230
Senior District Manager/Bob Hubbard
District Manager/Bonnie Rickenwonder

Western Regional Director/William J. Healey
COMPUTERWORLD, 18008 Sky Park Circle, Suite 260,
Irvine, CA 92714

SAN FRANCISCO SALES OFFICE (415) 421-7230
Western Regional Director/William J. Healey
Senior District Manager/Barry Wilcox
District Managers/Theodore Parsons, Ernest Chamberlain
Account Manager, Classified/Nicole Boothman
COMPUTERWORLD, 300 Broadway, Suite 20,
San Francisco, CA 94133

ATLANTA SALES OFFICE (404) 394-0756
District Manager/Jeffrey Mehlich
Eastern Regional Director/Michael J. Masters
COMPUTERWORLD, 1200 Peeler Road, Suite D,
Atlanta, GA 30338

CLASSIFIED ADVERTISING (617) 879-0700
Al DeMilo
COMPUTERWORLD, 375 Cochituate Road, Box 880,
Framingham, MA 01701

CW INTERNATIONAL MARKETING SERVICES
General Manager/Diane La Mongia
COMPUTERWORLD, 375 Cochituate Road, Box 880,
Framingham, MA 01701
(617) 879-0700
Manager, West Coast/Peter Crockett
COMPUTERWORLD, 1060 Marsh Rd.,
Menlo Park, CA 94025
(415) 328-8804

CW COMMUNICATIONS/INC.
Board Chairman/Publisher
Patrick J. McGovern
President
W. Walter Boyd
Senior Vice-President
Lee Vance

Group VP-Communication Services, Jack Edmonston. Group VP-Circulation, Margaret Phelan. VP-Marketing, Donald E. Pagan. VP-Finance, William P. Murphy. VP-Editorial, John Wilkinson.

Computerworld Headquarters: 375 Cochituate Road, P.O. Box 880, Framingham, MA 01701
Phone: (617) 879-0700, Telex: 95-1153.

SALES — Vice-President, Donald E. Pagan. National Director, Edward P. Maraldi. Corporate Advertising Administrator, Frank Collins. Marketing Support Manager, Kathy Doyle. Display Advertising Supervisor, Anne Hadley. Display Advertising, Deborah Bryer, Pam Valentines, Elaine Cotton, Carolyn Medeiros, Cindy Chaves, Mary Waddick. Classified Operations Manager, Cynthia Delany.

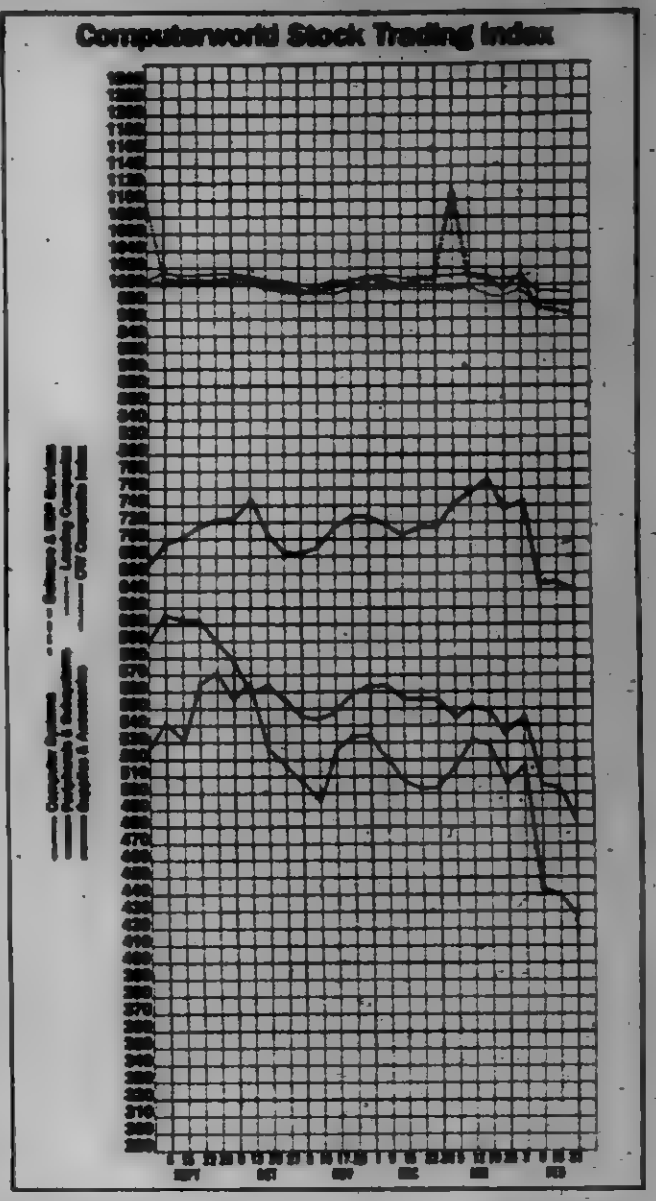
COMMUNICATION SERVICES — Group Vice-President, Jack Edmonston. Director Research, Kathryn Stevens. Sales Promotion Director, Liz Johnson.

PRODUCTION — Production Director, Peter Hahn. Production Manager, Marlene Sibel. Paste-Up Manager, Yash Gautama. Systems Manager, Tom Flinn. Typesetting Manager, Carol Polish. Art Director, Tom Monahan. Graphic Designer, Mark Fling.

CIRCULATION — Group Vice-President, Margaret Phelan. Circulation Manager, Jane Dasbeck. Fulfillment Manager, Maureen Burke.

Computerworld (ISSN 0010-4841) is published on 35 mm microfilm through University Microfilms Inc., Periodical Entry Dept., 300 North Zeeb Rd., Ann Arbor, Mich. 48106. Phone (313) 761-4700. Address subscription orders to Circulation Dept. for subscription information.

Computerworld Stock Trading Index



Computerworld Stock Trading Summary

All statistics compiled computed and formatted by TRADE QUOTES, INC Cambridge, Mass. 02138

CLOSING PRICES WEDNESDAY, FEBRUARY 22, 1984

	1983-84 RANGE	CLOSE FEB 22	NET CHANGE	WEEK PCT CHANGE
COMPUTER SYSTEMS				
ALPHA MICROSYSTEMS	11- 36	13 1/2	+ 1/4	+1.9
ALTOS COMPUTER SYST	8- 23	9 1/2	- 1/2	-5.0
ANSWER CORP	9- 26	25 1/4	+ 1/4	+1.0
APPLE COMPUTER INC	15- 63	37 3/4	+ 1/4	+0.7
AT&T	13- 17	15 7/8	+ 1/8	+0.7
BURROUGHS CORP	28- 38	48	- 1/4	-0.5
COMPUTER AUTOMATION	9- 17	9 3/8	+ 1/8	+1.3
COMPUTER CONSOLES	6- 22	10 5/8	+ 3/8	+3.6
CONTROL DATA CORP	21- 69	23 3/8	- 1	-4.1
CONVERGENT TECHNOL	15- 41	15 1/4	- 3/4	-4.7
CRAY RESEARCH INC	70- 95	91 7/8	- 1	-1.3
DATA GENERAL CORP	19- 47	42 3/8	+ 7/8	+2.1
DATAPOINT CORP	11- 38	11 5/8	+	+4.0
DIGITAL EQUIPMENT	63-132	83 1/8	+2 1/8	+2.6
EXCEL INC	9- 16	10 5/8	+ 1/2	+4.1
ELECTRONIC ASSOC.	5- 10	7 3/4		0.0
FLOATING POINT SYST	16- 44	38 1/8	- 1 3/4	-4.2
FOXBORO	25- 47	39 7/8	- 1/8	-0.3
GENERAL AUTOMATION	3- 16	10 1/2	- 7/8	-7.6
GERBER INC	29- 44	37 1/2	- 1 3/4	-4.5
HARRIS CORP	26- 51	36 3/4	- 3/4	-2.1
HEWLETT-PACKARD CO	72- 98	98 5/8	+ 3/4	+0.8
HONEYWELL INC	78- 99	96 1/4	+ 3/4	+1.3
IBM	97-134	108 1/8	- 1/2	-0.4
ICL SYSTEMS INC	3- 14	4 3/4	- 1/8	-2.6
M/A-COM INC	10- 30	13 7/8	-2 1/8	-13.3
MANAGEMENT ASSIST	1- 3	3 3/8	0	0.0
MANAGEMENT ASSIST	3- 78	22 1/2	- 1 3/8	-5.7
MATSUSHITA ELECTRONI	67- 88	77 1/2	- 1	-1.3
MODULAR COMPUTER SYS	6- 16	7 3/8	+ 1/8	+1.3
MOHAWK DATA SCI	10- 18	10 7/8	+ 1/8	+1.1
MOTOROLA INC	68-148	115	-3 1/2	-2.9
NAT'L SEMICONDUCTOR	13- 60	12 3/4	-1 1/8	-1.9
NBI INC	21- 51	22 3/8	- 1/8	-0.5
NCR	38-135	111 1/8	- 1 3/4	-1.5
PERKIN-ELMER	17- 37	25	- 1/2	-1.9
PRIME COMPUTER INC	11- 30	28 3/8	+ 3/8	+1.3
SPERRY CORP	21- 39	38 3/4	- 1/4	-0.6
TANDEM COMPUTERS INC	14- 44	32	- 1 1/2	-4.5
TRIDY CORP	21- 68	32		0.0
TELEVIDEO SYSTEMS	11- 41	11 3/4	+ 1/2	+4.4
TELXON CORP	8- 18	8 7/8	- 1 1/8	-12.3
TEXAS INSTRUMENTS	71-178	130 3/8	- 1 7/8	-1.4
ULTIMATE CORP	6- 24	19 1/2	+ 1/2	+2.6
VECTOR GRAPHICS INC	3- 11	4 7/8	- 1 1/8	-11.7
WANG LABS "B"	19- 42	32 1/8	- 1 1/8	-3.4
WANG LABS "C"	11- 42	27 1/2	- 1 1/8	-3.9
XEROX CORP	39- 82	61 7/8	- 1/8	-0.2
LEASING COMPANIES				
BOOTHE FINANCIAL CP	11- 37	35 1/4	+ 3/4	+2.1
COMDISCO INC	7- 48	11 1/4	- 1/4	-2.1
CONTINENTAL INFO SYS	3- 10	9 3/4	0	0.0
DPF INC	9- 21	12 1/8	- 1/2	-3.9
SELECTRON INC	13- 21	18	- 1	-7.1
U.S. LEASING	19- 47	39 1/8	- 1/8	-0.3
COMPONENTS				
ADVANCED MICRO DEV	13- 37	27 7/8	+ 1/2	+1.8
ADV'D SEMICONDUCTOR	19- 38	29 3/4	+1 3/4	+7.2
ANALOG DEVICES INC	19- 42	34 3/8	- 1 1/4	-3.5
ANALOGIC CORP	15- 27	18 3/4	- 1 1/4	-6.2
APPLIED MAGNETICS CP	16- 37	17	- 1 3/8	-7.7
TRANSVUE	14- 39	38 1/4	+	+0.6

CREDIT GRADES FOR: A=AMERICAN; P=PACIFIC E=EASTERN
L=NATIONAL M=MIDWEST; O=OVER-THE-COUNTER
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
1/2 TO NEAREST DOLLAR

	1983-84 RANGE	CLOSE FEB 22	NET CHANGE	WEEK PCT CHANGE
SOFTWARE & EDP SERVICES				
ADVANCED COMP TECH	1- 9	3 1/2	- 3/4	-17.6
ADVANCED SYSTEMS INC	3- 16	4	- 1/8	-3.0
ADR COMPUTERS INC	7- 32	23 1/2	- 3/8	-1.5
AMERICAN SOFTWARE	14- 32	15 1/2	- 3/4	-4.7
ANACOMP INC	3- 8	3 1/2		0.0
ANALYSTS INTL CORP	6- 20	7 1/4	- 3/4	-9.4
APPLIED DATA RES	4- 10	5	0	0.0
ASK COMPUTER SYSTEMS	6- 20	14 1/4	- 3/4	-5.0
AUTOMATIVE COMP INC	1- 4	2 3/8		0.0
AUTOMATIC DATA PROC	31- 47	46 1/8		-0.7
CDA COMPUTER ASSOC	11- 24	17 7/8	-2	-10.1
COMPUTER GENNC INT'L	9- 17	16 3/8	- 1/4	-1.5
COMPUTER HORIZONS	9- 35	28 3/8	- 3/4	-2.7
COMPUTER NETWORK	4- 15	8 5/8	- 1/8	-1.4
COMPUTER SCIENCES	11- 23	18 1/4	- 3/4	-4.0
COMPUTER TASK GROUP	1- 3	2 1/2	- 1/8	-3.8
COMPUTER USAGE	3- 7	7		-10.8
COMPUTONE SYSTEMS	3- 17	6 1/4	- 1/2	-7.4
CONSISTV CORP	3- 14	8 7/8	- 1/8	-1.4
CONTROL	7- 14	8 7/8	- 1/4	-2.7
CULLINET SOFTWARE	15- 46	38 7/8	- 1/2	-1.7
CYGNUS SYSTEMS INC	4- 15	11 3/4	- 1/4	-2.0
ELECTRONIC DATA SYST	11- 27	27 3/8	-1 1/8	-3.9
HORIZON SYSTEM INC	11- 27	27 3/8	- 1/2	-1.8
GENERAL ELECTRIC CO	48- 57	52 3/4	-1 3/4	-3.2
GTE CORP	25- 34	28 3/8	-1 3/8	-4.6
INFORMATICS INC	15- 45	20 3/4	- 1/2	-2.3
INFOTRON SYSTEMS CRP	15- 45	17 1/4	-	-0.8
KEANE ASSOCIATES	1- 11	8	0	0.0
LEXICON	4- 23	20 1/2	-1 1/2	-6.8
MCI COMMUNICATIONS	2- 15	8 3/4	- 3/4	-8.0
MGMT SCI AMER INC	9- 25	17 1/4	- 3/4	-4.2
MATHEMATICAL APP GRP	3- 15	6	-1	-11.1
MICRO SYSTEMS INC	9- 25	22 1/2	0	0.0
MORNING-WEBER CP	4- 22	6 1/8	- 3/4	-8.8
NATIONAL DATA CORP	9- 28	18 3/4	- 1/2	-2.6
ON-LINE SOFTWARE INT	10- 28	23 1/2	-1 1/2	-6.0
PANAMETRIC SYSTEMS	9- 25	18 1/2	- 1/8	-0.7
PLANNING RESEARCH	3- 13	13 1/4	- 1/4	-1.9
POLICY MGMT SYSTS CP	15- 35	34	- 1/2	-1.4
PROGRAMMING & SYS	1- 9	4 3/8	- 1/8	-2.8
REYNOLDS & REYNOLD	17- 33	32	- 3/4	-2.3
SEI CORP	13- 34	18 3/4	- 1/4	-1.3
SHARED MEDICAL SYST	19- 42	38 7/8	- 1/8	-0.1
SCIENTIFIC COMPUTERS	3- 15	8 3/4	- 1/4	-2.8
SOFTWARE AG	9- 16	11 1/2	- 3/4	-6.1
SYNCHRONIC INC	12- 37	13 3/4	-	-15.8
UCC CORP	7- 18	12 1/2	- 1/2	-3.9
UNLY CORP	7- 17	8 5/8	- 1/4	-2.8
PERIPHERALS & SUBSYSTEMS				
AM INTERNATIONAL	5- 7	3 1/8	-	-4.8
ANDERSON JACOBSON	3- 20	7 5/8	- 3/8	-4.7
AUTO-TROL TECHNOLOGY	9- 28	10 1/8	- 1/4	-2.3
DASCTEC INC	7- 28	21	- 1/4	-1.2
DECISION DAT'L	7- 28	8	- 1/8	-1.5
DELTA COMPUTER & MEM	9- 25	17 1/4	- 1/4	-1.4
DIGITAL CORP	1- 4	1 5/8	- 1/8	-7.1
CONTINENTAL DATA GRP	9- 28	12 1/4	- 1/2	-3.9
GTEC CORP	5- 12	7 3/4	- 1/2	-6.1
GENRITRONICS	3- 10	3 1/2	- 3/8	-9.7
SUPPLIES & ACCESSORIES				
AMERICAN BAR PRINT	7- 22	18	- 1/2	-2.7
DARRY GRIENT	15- 27	22 3/4	-1 1/8	-4.7
DUPLEX PRODUCTS INC	12- 27	23 1/4	-1 1/8	-4.6
FANIS BUS. FORMS	9- 18	13 3/4	- 1/2	-3.5
3M COMPANY	48- 68	72 1/8	-1 3/8	-1.7
MOORE CORP LTD	18- 31	28 1/2	-1 1/2	-5.0
[illegible] RESISTED	11- 24	23 1/2	0	0.0
WALLACE BUS FORMS	11- 20	19 3/4	- 1/4	-1.2

15 pointed questions to ask MSA or any software supplier

These questions will help you when you sit down with individual software companies.

They're tough questions. Relevant ones. And any supplier who is worth his salt should be able to answer them without backpedaling.

Ask MSA

We'll answer all these questions to your satisfaction—plus any others you may have.

In fact, we're probably the best equipped to answer them. Because MSA is the software company. We offer the most complete line of totally integrated systems in the software industry, including financial, human resource and manufacturing.

So you avoid the headache of trying to tie together individual systems. (And the even bigger headache of adding to them.)

With MSA's integrated systems, there's no unnecessary duplication of data or effort. Reporting is faster. All your company's information is more timely and accurate—and in the right form.

Our technical edge comes from experience

Staying ahead is easier for a company that's steeped in software technology. MSA has spent years developing, refining, testing and enhancing our systems.

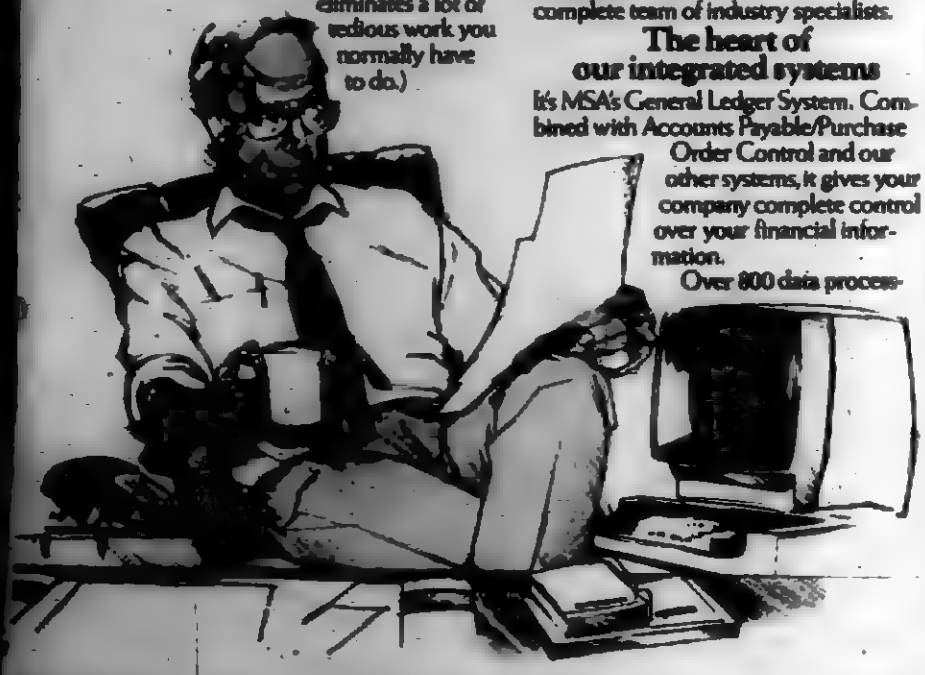
This year alone, we'll invest $25 million to make sure all our systems are technologically razor sharp. That gives us a decided advantage over flash-in-the-pan technology that may not have the bug-free logic of a more experienced system.

It also gives you a decided advantage over "custom" systems you have to update yourself.

MSA relieves you of that time-consuming burden. We update and enhance your software for a full year. Then we continue this service for a surprisingly low annual fee.

Maintenance includes keeping your system up-to-date technologically. Enhancing it with new features that make it work even harder for you.

And making sure it reflects changes in accounting procedures and government regulations, including 401(k), TEFRA, and FAS52. (That eliminates a lot of tedious work you normally have to do.)



Save this box. It can help you make an intelligent software decision.

1. Can you offer us a complete range of software systems designed to work together?
Or will we have to piece together a patchwork of systems?

2. Are your systems just record keepers, or can they really help us make decisions?
Can we pull together information from any of our integrated systems? In exactly the form we want it?

3. Can you provide business software for both mainframe and microcomputers?
Do you develop this software yourself or do you simply market it for another company?

4. Are your systems truly online so all of our information is current?
How many of your systems are online? How secure are they?

5. Will my company have to be the one that discovers the bugs in your brand new system?
Just how long have your systems actually been used, and how have they been tested?

6. Will you update your systems as technology advances and regulations change?
What are some of your most recent updates? Will you keep us current on regulatory changes?

7. Do your systems really do everything you say they will?
Or will we have to change them or add to them to get the features we want?

8. How long have you been in business?
What are your revenues? What is your growth record? Where will your company be five years from now?

9. How many systems has your company installed?
How many of these were installed in the past six months? How many of your earlier customers are still using —and liking—your systems?

10. Do your financial systems handle unlimited foreign currencies?
Do your financial systems use a common set of currency exchange rates?

11. Can you link our executives' computers directly to the mainframe—so they can get their own information?
Is that software available right now?

12. How will you make sure our own people thoroughly understand your system?
Do you have educational centers near us, or will we have to travel all the way across the country to find one? Will you be there to help during installation and after?

13. How many of your people specialize in software for my industry?
How many accountants work for you? Human resource specialists? Manufacturing experts?

14. Do your systems have built-in features that make them easier to use?
What happens if someone needs help figuring out a feature? Do you have online documentation that's easy to understand?

15. As my business changes will your system be flexible enough to change with it?
Or will we have to pay a lot to revamp it? Or even regenerate it?

© Management Science America, 3445 Peachtree Road, N.E., Atlanta, Georgia 30326

35,000 days of training

At MSA, we make sure your people have a firm grasp of our systems. Last year alone, we conducted more than 35,000 student days of customer training for over 1,800 companies. At education centers all over the world, as well as at our headquarters.

From training sessions to cassettes to complete, easy-to-understand documentation, MSA provides the most extensive Customer Education Programs in the industry.

And MSA systems are just as friendly as our people. Our online HELP feature actually guides users through our systems, and EASY-SCREEN™ lets them design their own screens without creating data processing nightmares.

If there's ever a question or problem with our systems, MSA customers are always close to service.

Our Account Managers are knowledgeable, responsive, and backed by a complete team of industry specialists.

The heart of our integrated systems

It's MSA's General Ledger System. Combined with Accounts Payable/Purchase Order Control and our other systems, it gives your company complete control over your financial information.

Over 800 data processing specialists, accountants, and financial experts work together to make MSA's financial systems the most advanced and most highly integrated in the industry.

MSA has the answers

Whatever your size—whatever your business—MSA has a total software solution.

We'll provide the highest quality integrated online software.

We'll tie your business and manufacturing software systems together, using our exclusive Extended Closed Loop™ manufacturing system.

We'll provide business software for your microcomputers, through our Peachtree Software Company.

We'll even link your microcomputers to your company's mainframe—with MSA's Executive Peachpak™ application software. A revolutionary concept that lets executives get the mainframe information they need through their personal computers.

MSA ready-to-install application software
1. General Ledger
2. Accounts Payable/Purchase Order Control
3. Budgetary Control/Encumbrance
4. Fixed Assets Accounting
5. Capital Expenditure Tracking
6. Forecasting & Modeling
7. Accounts Receivable
8. Order Processing
9. Foreign Exchange
10. Inventory & Purchasing
11. Payroll
12. Personnel Management & Reporting
13. Manufacturing Control System (MRP II)
14. Executive Peachpak™ II
15. Peachtree Software™ business systems for microcomputers
16. Peachtree Software™ office productivity systems for microcomputers

EASY-SCREEN, Executive Peachpak II, Peachtree Software, and Extended Closed Loop are trademarks of Management Science America, Inc.

Talk to us

If we've whetted your appetite with our 15 questions, clip the coupon below.

We'll send you a concise booklet that will help you even more in your deliberations. We'd also like to send you more information on how MSA can help you plan for software. And on individual systems.

Just fill in the information below, or contact Robert Carpenter at (404) 239-2000.

Management Science America, Inc.
3445 Peachtree Road, N.E.
Atlanta, Georgia 30326

☐ Please send me a free detailed brochure.
☐ Please send more information on the following systems. (Write numbers from product list.)

_____

Mainframe Computer Type/Model _____

_____

Name _____

Title _____

Company _____

Address _____

City _____

State _____ Zip _____

Business Phone ( ) _____

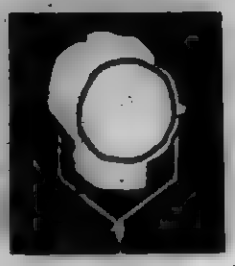
MSA
The Software Company

VOL 18
ISSUE 10
MR 5 1984
UMI

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

COMPUTERWORLD

$2.00 A COPY; $44/YEAR | MARCH 5, 1984 | VOL. XVIII, NO. 10



Product Spotlight
The lowdown on mainframe spreadsheets **13-15**

In Depth
An index to In Depths of 1983 **ID/1**

Feedback
IBM users react to 3080 X models/4

Dartmouth
College wires its dorms/**87**

CDLA to urge tax changes

Financial benefits in offing for users, lessors?

By John Kirchner
CW Washington Bureau

WASHINGTON, D.C. — The Computer Dealers and Lessors Association is readying a well-financed lobbying blitz to seek tax law amendments that could mean millions of dollars of benefits for computer users.

The object of the campaign is to get the U.S. Congress to place computer equipment in a three-year, accelerated cost-recovery system depreciation category. This would allow those who sell, lease or use computers to obtain the full extent of investment tax credits and depreciation benefits during the useful life of the machine, which, CDLA argued, is closer to three years than five years, as suggested in existing law.

The 1981 Economic Recovery Tax Act placed computer equipment in the five-year depreciation category with a 10% investment tax credit. CDLA Executive Director James F. Benton said government revenue losses caused by a shorter depreciation schedule would be offset by reducing the tax credit to 6%, as the association proposed. This would put it in an existing category that includes light-duty cars and trucks, certain research equipment and other short-lived machinery.

The benefits of the proposed change would

See CDLA page 8

Unix, C language seen hot tickets to success in DP job market

By John Gallant
CW Staff

WALTHAM, Mass. — If you are a software design engineer with three to five years of experience with Unix operating systems or the C language, you may be able to write your own ticket to success.

That was the consensus among software manufacturers represented at the Softfair '84 job fair held here last week. Among the 29 local companies seeking applicants at Softfair, at least 22 were looking for software design or development engineers. Thirteen companies advertised for software personnel with a Unix or C background, and many others interviewed by *Computerworld* said that such experience would be useful for a candidate.

Touted by its promoters as the nation's first job fair solely for software professionals, the two-day event gave programmers, analysts, designers and software support specialists an opportunity to slip out of work early and meet with recruiters from a variety of high-tech firms. The number of job openings offered by the companies at Softfair

See JOBS page 6

TOP OF THE NEWS

Extortion, bribery and a sting all highlighted a busy week in high-tech crime, capped by a string of arrests. **Page 2.**

■

Fraudulent misrepresentation could cost Honeywell, Inc. up to $1 million, as a judge rules in favor of a Level 6 minicomputer user. **Page 5.**

■

Did "slavery" to her VDT cause the multiple birth defects of an operator's child? That's what one woman told a U.S. House of Representatives subcommittee last week. **Page 8.**

■

A reconsideration of the FCC's access charge plan may be in the works, according to the chief of the commission's Common Carrier Bureau. **Page 11.**

■

Disclosure of a mayoral candidate's medical records may have hurt the candidate and has prompted privacy concerns about access to the increasing number of such records kept on-line. **Page 18.**

■

Sherpa guides and yaks will tote a high-tech load as an American team begins its assault on Mt. Everest. **Page 26.**

■

A computer was a key tool in a recent discovery about cancerous tumors. **Page 29.**

■

FYI

Teenage burglars play swap 'em with stolen micros

By James Connolly
CW Staff

ATLANTA — Burglarizing businesses and swapping $10,000 computers like baseball cards, a gang of "basically good kids" amassed a $250,000 collection of stolen microcomputers, according to police.

The gang, with a half-dozen teenage participants involved at various levels, allegedly broke into 30 businesses within five months, selectively taking computers, modems, expansion cards and software, apparently for their own use.

DeKalb County Police investigator Randy Fitch, a personal computer user himself, pursued the thieves for five months and broke the case in February on a tip that IBM operator manuals had been stored in an apartment complex.

According to Fitch, the 15- and 16-year-old thieves were of average intelligence — "not geniuses" — and were interested in computers and electronics. He said they initially stole out of curiosity and accumulated equipment that they traded "the way kids traded baseball cards 30 years ago.

"It was a case of 'wants' problems — people who wanted something and couldn't afford it, so they just took it. One

kid in particular found a way to break into businesses, a certain flaw in the way big office complexes were built. He and a couple of others started going in to look around. But all of that stuff was there, and they just started taking it. They said they had become interested when they took computer science courses in school," Fitch said.

The youths took not only computers, but also medical equipment such as stethoscopes and optical lenses. They almost always stole software, sometimes leaving businesses with no corporate records. One confessed to Fitch that they knew their stolen goods were worthless without software. In one case, they allegedly stole eight Apple Computer, Inc. Lisa systems, valued, with software and peripherals, at $126,000.

The youthful burglars were selective. "They gained entry to at least one computer equipment store, and rather than take the equipment that was for sale, they took the operating equipment and software. Sometimes they didn't even take the whole computer. They would take an IBM [Personal Computer] XT apart because they wanted the modem card out of the expansion board," Fitch reported.

One allegedly stripped the hard disk drive out of one Personal Computer XT and added it to a second XT. "That gave him 20M bytes. I asked him how long he figured it would have taken him to fill it, and he said he had just scratched the surface and that it would take him 30 years," added Fitch, who said he and his wife use an IBM Personal Computer in their home.

See THIEVES page 6

CW 48106UIVYMUIVYMA FCSSB DIR 04255
UNIVERSITY MICROFILMS INTL
SERIAL PUBLICATIONS
300 N ZEEB RD
ANN ARBOR MI 48106

NEWSPAPER

Sting foils $1 million chip plot

By Robert Batt
CW West Coast Bureau

LOS ANGELES — In what is believed to be the biggest-ever sting operation of its kind in Southern California, two businessmen were arrested here last week and charged with illegally attempting to buy $1 million worth of semiconductor parts.

The two men, Benzion Blumenfield and Nahum Sahar, were arrested after a three-month undercover operation conducted by Silicon Valley chip manufacturer Signetics Corp. and local detectives. They are due to appear in court here Wednesday, charged with receiving stolen property.

Sahar, who owns a company called Aero Distributors in Beverly Hills, is accused of attempting to pay $300,000 for chips he believed to be stolen.

Blumenfield, although not directly participating in last week's transaction, is alleged to have been involved in four previous illegal transactions valued at $40,000.

According to Bruce Radetich, chief corporate investigator for Signetics, the company first became aware of Blumenfield, owner of a Woodland Hills, Calif.-based firm called Bentronics, when he tried to solicit random-access memory and read-only memory chips worth hundreds of thousands of dollars from the firm's subsidiary in Bangkok, Thailand.

Suspicion confirmed

"Our plant manager in Bangkok was very suspicious of this inquiry, so, posing as another company, we brought in an undercover officer and arranged to meet Blumenfield in Los Angeles. It was there that he introduced us to Sahar, who turned out to be the big money man, and we did a couple of deals with them in which we sold them purportedly stolen products," Radetich claimed. None of the chips were in fact stolen, he added.

Signetics said the sting operation was revealed when Sahar paid a $150,000 deposit for $1 million worth of 74 LS series chips, a popular chip design made by Signetics and other chip manufacturers. The chips are in short supply at the moment and were expected to bring an inflated price on what has become known as the "gray market" — the twilight zone between legal and illegal trafficking in chips.

Under the terms of the alleged deal, Sahar was to pay the remaining $150,000 shortly after receiving the parts. He was instead arrested by a Los Angeles detective as soon as he took possession of the parts.

"While we have been involved in similar sting operations in the past, this is the first time we have taken part in an operation in which this much money was involved," commented Jerry Good, a detective at the West Valley division of the Los Angeles Police Department.

The successful sting is the fourth such operation involving Signetics in the last 18 months.

Social Security DP official charged with extortion

By Patricia Keefe
CW Staff

BALTIMORE — A ranking government DP official was arrested here late last month and charged with attempted extortion of more than $400,000 for fixing a subcontract.

Kenneth M. Barry, director of the Social Security Administration's (SSA) Software Technology Center in Woodlawn, Md., was arrested by Federal Bureau of Investigation agents. The attempts to bribe a Los Angeles software firm allegedly took place from April 1981 to April 1982, when Barry was director of the SSA's Office of Data Communications.

The subcontract Barry allegedly tried to fix was related to a larger contract held by Paradyne Corp., against which the Securities and Exchange Commission (SEC) has a pending fraud suit.

Federal prosecutors in Los Angeles are expected to seek an indictment against Barry, who was released on a $50,000 personal recognizance bond. If convicted, he faces a maximum sentence of 20 years and a $10,000 fine. An SSA spokesman said Barry is on "administrative leave with pay" pending the outcome of the case, but declined to comment further. Attempts to reach Barry's attorney were unsuccessful.

An affidavit by FBI agent Jonathan Hersley attributed remarks to Barry that implied he may have helped to influence the award of the $100 million hardware contract to Paradyne in 1982. That contract award has spawned numerous protests from competitors, two pending court suits, a congressional inquiry and an investigation by the Department of Health and Human Services (CW, April 4, April 11 and April 25, 1983).

Michael Wolansky, an SEC attorney, said the SEC had previously taken depositions from Barry and may recall him for further testimony in light of Hersley's statement. Hersley claimed that Barry met in Florida with a principal of Engineering & Contract Labor International (E&CLI) — the Los Angeles software vendor — and John Applegate, a former Paradyne vice-president overseeing the SSA contract.

Hersley also alleged that Barry encouraged a joint venture between Alfred Leung, a consultant to Paradyne and a former SSA employee, and E&CLI for the purpose of handling the software subcontract, which he promised to secure from Paradyne after arranging for Paradyne to obtain the $4 million base contract.

The affidavit also alleged that Barry told E&CLI officials that he planned to leave the SSA and wanted them to provide funds to "stake him" in a new company.

Barry also provided E&CLI principals with in-house SSA documents that they weren't entitled to, according to Hersley.

Two accused of soliciting bribes from software development firm

By John Gallant
CW Staff

BALTIMORE — Federal officials are seeking indictments against a Defense Department employee and a New York City oil company executive who were arrested last week and charged with soliciting nearly $645,000 in bribes from a Boston software developer.

Edward D. Thomas, an employee in the Defense Department's Tri-Military Information Systems (Trimis) office, and A. Walton Hill, an executive with an unnamed oil company, were arrested Feb. 25 in Bethesda, Md., by Federal Bureau of Investigation agents posing as representatives of Intersystems Corp. of Boston.

According to FBI spokesman Andrew Manning, Thomas and Hill are accused of soliciting payments from Intersystems in exchange for inside information about a $44.5 million military contract. Manning said Thomas approached Intersystems in November and offered to supply information that would help the firm in bidding to supply software to be used in a computerized health care system for the Defense Department.

Manning said that Intersystems' attorneys immediately contacted the U.S. attorney's office in Boston, which subsequently turned the investigation over to the FBI here. It was not until Feb. 16, however, that an FBI agent posing as an Intersystems employee first met with Thomas at a Bethesda restaurant. At that time Thomas allegedly promised to supply all information necessary for Intersystems to win the contract and told the agent to work out payment details with Hill in New York.

During three-way telephone conference calls with the undercover agent on Feb. 21 and 22, Hill and Thomas proposed a series of four cash payments totaling $200,000, plus an additional payment of 1% of all or whatever portion of the contract Intersystems was awarded. A meeting on Feb. 25 was also arranged, at which the first $50,000 payment was to be made.

On that date, according to Manning, Hill arrived in Bethesda and was transported by Thomas to a Holiday Inn where the meeting took place. After Hill accepted the cash payment from the undercover agent, other FBI investigators rushed into the hotel room and arrested him. A short time later, Thomas was arrested at a gas station a few blocks from the Holiday Inn.

Manning said Thomas was charged with violating a federal antibribery statute, and Hill was charged with aiding and abetting a bribe.

Both men were held until last Monday when they appeared before a federal magistrate in Hyattsville, Md. The two were released on $25,000 bond.

NEWS SUMMARY

Some users of IBM 3083 and 3081 processors are disappointed by IBM's announcement of newer X models of the 3080 line/4

Honeywell, Inc. is charged with defrauding a user in a minicomputer system sale/8

A VDT operator told a House subcommittee last week that she suspects working in front of a terminal caused the birth defects of her recently born child/9

A communications consultant predicts that bypass will become a $10.7 billion business by 1994/10

An FCC official hinted at another reconsideration of the commission's access charge ruling/11

A Commerce sting nabbed a French national for conspiracy and violations of the federal Export Administration Act/12

Product Spotlight: Mainframe spreadsheets/13-15

Speakers at last week's Software Tools for Distributed Decision Support Systems Conference in Boston focused on the manager's role in DSS/16-17

Hospital groups are saying that a lack of data security safeguards may be leading to misuse of patients' medical records/18

The head of the Defense Advanced Research Projects Agency said that the Japanese computer industry does not pose a strategic threat to the U.S./23

Kelly Service's survey reveals that secretaries welcome office automation with open arms/24

A portable computer is playing an integral part in an expedition to the summit of Mount Everest/26

A Florida firm has developed a computer data base job-matching service/30

A series of break-ins into a high school has resulted in the suspension of three students and a beefing up of system security/32

Fire departments are enlisting the aid of a computer to help pinpoint targets of arson/34

The Wall Street Journal has moved on-line to an electronic text management system/37

International Report/19
Turnaround Time/40
Calendar/42

IN DEPTH

Software exports/Follows page 70
Static communication/ID/13

EDITORIAL/46
SOFTWARE & SERVICES/53
COMMUNICATIONS/67
SYSTEMS & PERIPHERALS/71
MICROCOMPUTERS/79
COMPUTER INDUSTRY/87

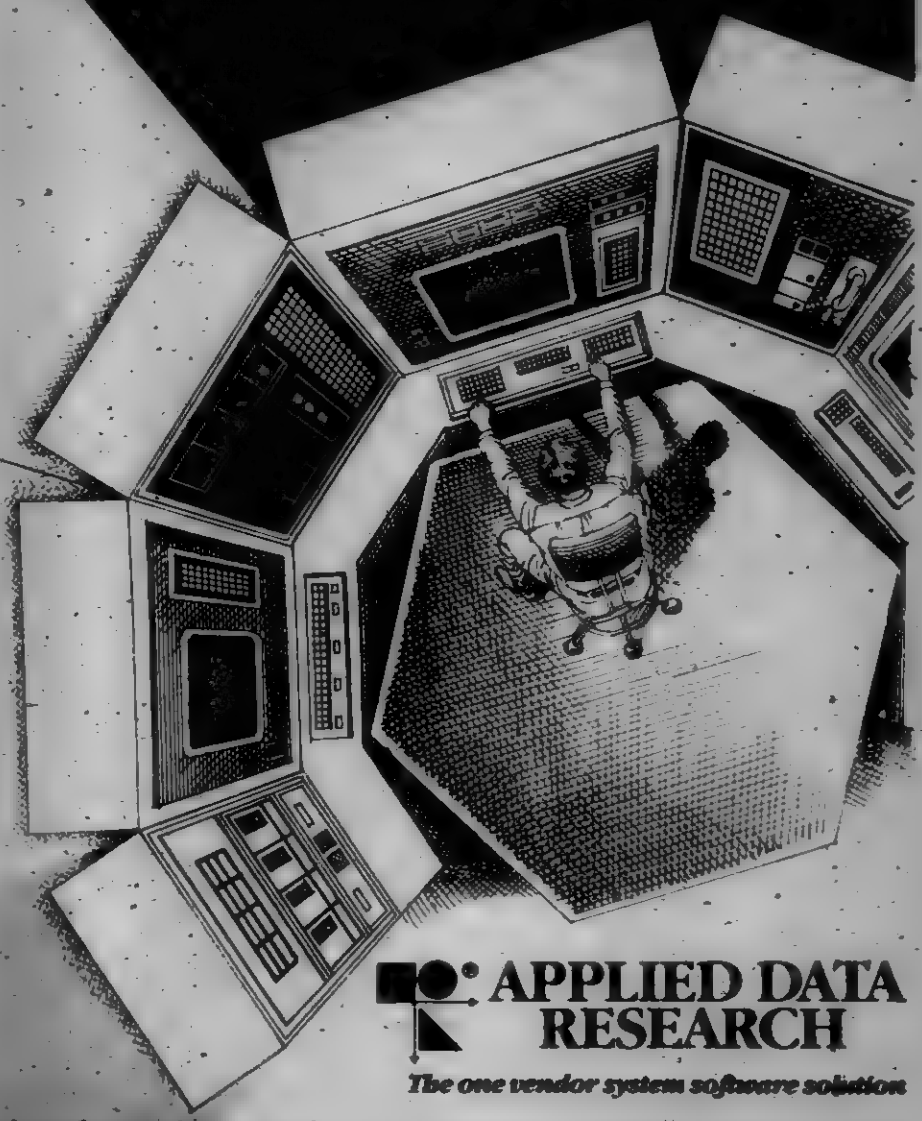
ADR/IDEAL
puts you in command of the application backlog

IDEAL is the one system with *everything* you need to break the application backlog. IDEAL, under one interactive workstation environment, combines a relational DBMS, an active data dictionary and a fourth-generation language with facilities for managing the entire application lifecycle.

IDEAL is *the* standard in fourth-generation application development systems. Of course, other systems have subsets of these facilities. But why should you settle for anything less than IDEAL?

IDEAL SOLVES THESE PROBLEMS

- Large-Scale Applications
- Production Applications
- Departmental Applications
- Application Enhancements
- Online Retrieval
- Online Transaction Processing
- Dialog Management
- Batch Reporting
- Complex Updates
- Design
- Coding
- Testing & Implementation
- Documentation
- Project Management



IDEAL DELIVERS THESE FACILITIES

- Panel Definition
- Report Definition
- Procedure Definition
- Application Definition
- Data Definition
- Intelligent Editors
- Split Screen
- Online Help
- Menus
- Commands
- Online Checkout, Compilation, Execution
- Printing Services

IDEAL COMBINES THESE TECHNOLOGIES

- Relational DBMS
- Non-Procedural Languages
- Active Data Dictionary
- Library Management
- Structured Design & Development
- Advanced Interactive Environments

APPLIED DATA RESEARCH

The one vendor system software solution

Route 206 & Orchard Road, CN-8, Princeton, NJ 08540, (201) 874-9000

NEWS

IBM X models disappoint 3080 series users

By Tom Henkel
CW Staff

Users of IBM 3083 and 3081 processors were disappointed but not surprised by IBM's recent announcement of 3080 X model processors, DP managers polled by *Computerworld* last week revealed.

IBM announced last month that six new X models of the 3080 series will replace current models in the line [CW, Feb. 26]. For the same price as existing models, the processors offer 5% to 14% greater internal throughput. Users of existing models, however, cannot field-upgrade to the newer processors.

While industry analysts were calling the IBM announcement a slick marketing move aimed at squashing a potentially fertile market for used 3080 series processors, users contacted seemed to accept the possibility that their processors will now have a lower-than-expected resale value. All agreed their chief complaint about the announcement was the lack of field-upgradability from the older 3080 systems to the X models.

Contending processor life cycles are growing much shorter, almost to the point where mainframes have become disposable business items, Harold Colby, senior vice-president of DP at Boston's John Hancock Mutual Life Insurance Co., said he never expected his one 3083 and five 3081 processors would have much resale value by the time the insurance company decides to replace them. Colby said the 3080 series X models fit into a general trend in the processor marketplace, where systems rarely outlive their first owners' processing requirements. Rapid-fire technological advances often make processors obsolete in under three or four years, he added.

Could have been worse

The lack of field-upgradability from the older 3080 series processors was a disappointment for Colby. However, being forced into making a processor swap does not present as big a problem as migrating to another operating system would, he added. Things could have been worse, he said, if IBM had changed the ground rules on its systems software.

The manager of technology at another large user site, the Information and Computer Services Division of Shell Oil Co. in Houston, echoed Colby's feelings. Emphasizing that Shell does not particularly enjoy it when IBM announces new products that make their current hardware obsolete, Merle Bone said such a turn of events is a possibility users must take into consideration — especially if they are using the biggest and newest processors IBM is offering.

"We would have preferred it to be a retrofit," Bone said. But he equated the X model announcement with IBM's cutting hardware prices six months after a firm purchases a system. In the case of the price reduction, no one would expect IBM to refund the user's money. Likewise, if IBM offers a faster version of its current processor lineup at the same price as a previous version, users cannot realistically expect IBM to refund current users' money.

But a smaller user, John H. Porter, director of the Academic Computing Center at Boston University, was not as understanding as Colby and Bone. He felt IBM deceived him.

When Porter was considering a 3081 processor, he flatly asked IBM if the processor would be field-upgradable to newer models. At the time, he said, IBM answered in the affirmative. Now IBM appears to have changed its mind, he said.

"How many times can IBM do this in the period of a decade without losing all credibility?" Porter asked. He noted that users of IBM 370/155 and 165 processors were placed in a similar situation several years ago.

According to Porter, the amount of impact the IBM X models' introduction will have on his operation will depend on how easy it will be to migrate from the older 3080 processors to IBM's next line of processors, sometimes called the Sierra line.

Some industry watchers speculate that the newer 3080 X models may be field-upgradable to the yet-to-be-unveiled Sierra processor line. If that turns out to be the case, Porter said, he will be very upset.

"I couldn't care less about the X models," Porter said, explaining that since his DP requirements are growing at an annual rate of about 25%, the moderate performance increases offered by the X models would not help much.

In contrast, users like Brian Scott, president of Banks of Iowa Computer Services, Inc., felt they had won in the IBM processor game. Scott noted that his firm was one of the first to receive a 3081 processor two years ago. That means the firm has already had a fair amount of use from the processor. Other users who were leasing 3080 series processors said they were glad they chose to lease rather than purchase the machines.

Third-party lessors downplay X series' impact on residual values

While there is general agreement that IBM's new X model 3080 series processors will hurt residual values of installed 3080s, third-party lessors dealing in IBM hardware last week said they did not feel the impact would be significant.

Gerald L. Minsky, president of Technology Finance Group, Inc. of Westport, Conn., noted that third-party leasing firms with 3080 systems already out on lease will probably not be hard hit by the X model announcement. Lessors that will have problems, Minsky said, are those who have 3080 series processors that have yet to be leased to an end user.

Minsky explained that most third-party leasing firms anticipated a very low residual value on 3080 series processors.

Therefore, he claimed, the X model announcement may not have a devastating impact on leasing firms.

The big question, Minsky said, is what sort of migration path IBM will provide to its anticipated next series of large processors, sometimes called the Sierra line.

If IBM offers current users of 3080 series processors a bridge to the Sierra line, the residual values of currently installed systems may not be seriously affected, he continued.

In fact, if there is a bridge to the Sierra, Minsky said the older 3080s will suddenly become good buys. But if the X model processors are field upgradable to the Sierra line, which is what some industry watchers expect, older 3080 series processors will be very hard to lease or sell, according to Minsky.

But Richard Forsythe, president and chief executive officer of the Chicago-based Forsythe/McArthur Associates, Inc., believes even if the newer X models are field-upgradable to the Sierra line, there will still be a market for the older 3080s.

As an example, Forsythe noted that the IBM 3033 series processor is still selling, even though the IBM 3033 line has been outdated for about two years.

Forsythe explained that not every user is eager to migrate to the latest processor available from IBM. Further, he said not every IBM user is making a hurry-up effort to migrate to IBM's MVS/XA operating system.

"I'm glad I don't have any," Svend Hartman, president of Computer Merchants, Inc. of Chappaqua, N.Y., said of the older 3080 machines.

Hartman, who deals in smaller systems, explained it will be difficult to sell or lease an older 3080 series processor until IBM resolves the questions surrounding the migration path to the Sierra line.

Group announces test results of micro interfaces with B6800s

LONG BEACH, Calif. — Michael Stahura and Associates, Inc. has made available the results of the Microcomputer Common Interest Group (Micro CIG) Initial Microcomputer Test completed here recently.

The test addressed the interface of several microcomputer systems with a Burroughs Corp. B6800 mainframe at B.J. Hughes Corp. in Houston.

The performance of each microcomputer — an Apple Computer, Inc. Apple IIe; Burroughs ET 2130; ECS Microsystems, Inc. ECS 4500; IBM Personal Computer; Televideo, Inc. TS802H; Victor Technologies, Inc. Victor 9000; and Xerox Corp. 820-II — was examined in the areas of hardware interfaces with the mainframe, terminal emulation mode capabilities, switching from micro mode to system mode, terminal control functions and file transfer capabilities.

Micro CIG, part of the Cooperating Users of Burroughs Equipment, which is listed as the official users group for Burroughs Corp. computing equipment, is responsible for collecting, coordinating and disseminating information on microcomputer interfaces with Burroughs mainframes.

The Initial Microcomputer Test results are available for $5 postage and handling from Michael Stahura and Associates, located at 500 Havana Ave., Long Beach, Calif. 90814.

Second-class postage paid at Framingham, Mass., and additional mailing offices. *Computerworld* (ISSN-0010-4841) is published weekly, except: January (5 issues), February (5 issues), March (5 issues), April (7 issues), May (5 issues), June (5 issues), July (5 issues), August (5 issues), September (5 issues), October (5 issues), November (5 issues), and a single combined issue for the last week in December and the first week in January by CW Communications/ Inc., Box 880, 375 Cochituate Road, Framingham, Mass. 01701.

Copyright 1984 by CW Communications/Inc. All rights reserved.
Computerworld can be purchased on 35 mm microform through University Microfilm Int. Periodical Entry Dept., 300 Zeeb Rd., Ann Arbor, Mich. 48106. Phone (313) 761-4700. *Computerworld* is indexed: write to Circulation Dept. for subscription information.
PHOTOCOPY RIGHTS: permission to photocopy for internal or personal use of specific clients is granted by CW Communications for libraries and other users registered with the Copyright Clearance Center (CCC), provided that the base fee of $3.00 per copy of the article, plus $.50 per page is paid directly to Copyright Clearance Center, 21 Congress Street, Salem, MA 01970.
Permission to photocopy does not extend to contributed articles followed by this symbol. ‡
Special requests should be addressed to Nancy M. Shannon, CW Communications/Inc. Box 880, 375 Cochituate Rd., Framingham, MA 01701. ISSN 0010-4841/82 $3.00 + $.50
$2.00 a copy: U.S. — $44 a year; Canada, Central & So. America — $110 a year; Europe — $165 a year; all other countries — $245 a year (airmail service). Four weeks notice is required for change of address. Please allow six weeks for new subscription service to begin.

POSTMASTER: Send Form 3579 (Change of Address) to Computerworld, Circulation Dept., Box 880, 375 Cochituate Road, Framingham, Mass. 01701.

NEWS

Victim of Honeywell fraud to claim damages

NEW YORK — Already judged a victim of fraud at the hands of Honeywell, Inc., a computer user will return to federal court soon to claim damages of up to $1 million.

In addition to providing William M. Selden, former owner of a New York service bureau, with yet-to-be-determined compensation, the verdict may help other users to win suits against vendors whose sales pitches misrepresent their products, according to the victor's attorney.

Selden recently won a civil suit in which he charged that Honeywell officials defrauded him and his company, Accusystems, Inc., in 1978 when they told him the Honeywell Level 6 minicomputer with TL-6 utility software would allow him to run up to 32 terminals and multiple tasks.

But, according to Selden, the software never performed as Honeywell claimed, failing to support more than three users even when he bought more memory on Honeywell's advice, and that failure drove him out of business. He sold his payroll and accounting services business and his family farm to pay his debts and moved to Los Angeles, where he now works as a consultant.

Selden had sought $9 million in actual and punitive damages in his 1980 suit [CW, Oct. 27, 1980]. Last month, U.S. District Court Senior Judge Dudley B. Bonsal found that Honeywell had defrauded Selden, but he dismissed most of Selden's damage claims. Bonsal is expected to hold a new hearing in late spring to determine Selden's losses.

Bonsal ruled in favor of Honeywell on Selden's claim that Honeywell was negligent in servicing the system. But of the fraud allegation, the judge said, "The representations made by Honeywell to plaintiffs prior to the agreement [purchase contract] were known by Honeywell to be false or made recklessly without knowing whether they were true or false, in order to induce plaintiffs to enter into the agreement. . . . The representations that the TL-6 operating system had been extensively tested and could concurrently perform multiple tasks for multiple users were representations of fact and not merely promises of future action or statements of intent."

The judge declined to award damages at the time of his verdict, noting that Accusystems failed to mitigate its damages when it became apparent in May of 1979 that the TL-6 system would not work right. He said Accusystems can collect for damages suffered only between February 1978, when Selden bought the system, and May 1979. He also refused to assess Honeywell for Selden's lost profits or for punitive damages.

Selden, who claimed to be one of about 40 dissatisfied TL-6 users, said, "I would be looking for something in the neighborhood of $1 million." He said that two other TL-6 users settled suits against Honeywell for undisclosed sums and that others settled out of court. However, Selden's attorney, Thomas K. Christo, noted, "I think we are probably in the $500,000 to $800,000 range."

Honeywell's attorney, James D. Liss, offered a still lower estimate of damages. "We believe the award in the case will be under $250,000," according to Liss.

Liss also foresaw no long-term impact from the case, saying that the judge's ruling "ignores the contract" and relates only to misrepresentations made before the signing of the standard contract. That contract limited Honeywell's liability to repair or exchange defective equipment.

'Psychological' impacts

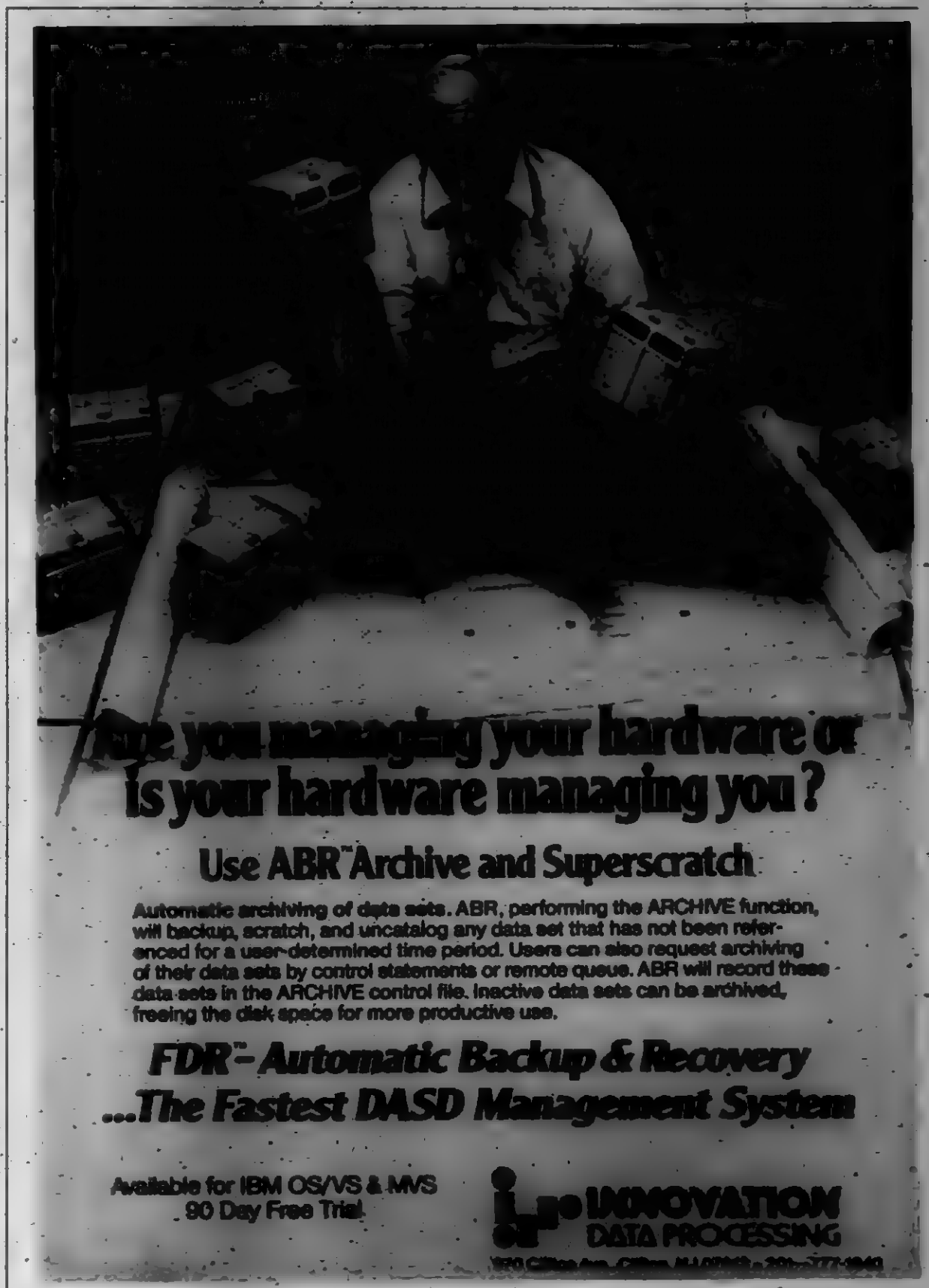
But Christo predicted three, at least "psychological," impacts from the ruling. "It means that if somebody lies about what a given product can do, they can be held liable for fraud, no matter what the contract says," he said. He also cited the import of Honeywell's unsuccessful bid to show that Selden, a former systems analyst for IBM and a member of the team that developed Cobol, was knowledgeable about computers and shouldn't have relied on the sales force's statements. He said the verdict could keep other vendors from relying on the theory of caveat emptor (let the buyer beware).

The third point cited by Christo was that Selden's win came in a jury-waived trial, where the losing vendor couldn't complain about a user's emotional appeal swaying unsophisticated jurors.

Attorneys for both sides said decisions would be made later on whether to appeal the portions of the case which they lost.

Selden ordered six Level-6 computers when he started his business in 1977, but received only one. He paid Honeywell about $40,000 for his system.

The Level 6 and the MOD-200 operating system with the TL-6 option, installed in about 100 locations, are still available, but only on an "as available basis," according to a Honeywell spokesman. The spokesman declined comment on the case because it remains active in the courts.



Job fair seen one of many recruiting tools

WALTHAM, Mass. — The job fair is only another weapon in the battle to attract high-quality software specialists, according to recruiters at Softfair '84.

"I think it's a good idea," said Ron Koloski, employment specialist for Canton, Mass.-based Codex Corp. "The job fair draws together a pool of qualified people. But you can't rely on it totally; it's only one tool among many."

Other representatives of the high-tech companies attending Softfair had mixed feelings about the effectiveness of job fairs in recruiting software professionals. "I have found that a lot of the people attending are entry-level candidates. Experience is rare, and people who have it are tough to find. But I think this is an excellent idea. It brings together a lot of good prospects in one central location," said Richard Bielefeld, technical support manager for McCormack & Dodge Corp. in Natick, Mass.

"We get a lot of resumes, and most aren't of any interest to us," said R. Kent Blackett, software development manager for Masscomp of Westford, Mass.

"There is a lot of paper on the market that doesn't fit our needs. But overall, our experience with this sort of thing is positive. If we can find even one or two good people, it beats paying finders' fees to an employment agency."

The outlook was not much different on the other side of the booths. "This is great for people with lots of experience," according to one entry-level applicant looking for an opening in technical software support. "But all the resumes go into one big pile, and that won't help me any when the recruiters review them later."

"I don't have an electrical engineering or a computer science degree, so I'm not sure I'm in demand here," another hopeful with programming experience said. "But this is a good way to approach a company. If you can make a personal contact, it beats just sending a letter."

JOBS from page 1

ranged from as many as 300 to as few as three.

Recruiters said they were looking for candidates with an average of three to five years in the industry, although openings in such areas as documentation and entry-level programming were also available to applicants with less experience. Applicants with backgrounds in most programming languages and major operating systems were in demand, but the emphasis was clearly on Unix and C specialists.

"We're especially interested in finding candidates who have at least three years of experience in C. It's important to us because we're a multisystem software manufacturer. Our products run on a variety of processors, and C is a very portable language," said Edward McHugh, director of software engineering for Interlan, Inc. Based in Westford, Mass., Interlan designs and manufactures local-area network systems.

Gregory Denaro, senior employment representative for Bunker Ramo Information Systems in Trumbull, Conn., was also in the market for Unix experience. "Unix is going to be hot in the next few years, and it's hard to find qualified candidates. A lot of them are overpriced, which means that you're going to have to spend lots of money to get them. Software development engineers are big, too; you can judge that just by the number of positions available."

According to Ron Koloski, employment specialist for Canton, Mass.-based Codex Corp., opportunities are wide open for C programmers and Unix specialists. "The market is extremely good, and people seem more secure in seeking out these opportunities. They're not sitting around trying to hang on to what they have. The economy is booming, and people are moving."

While traditional programmer and programmer/analyst jobs were not in abundance at Softfair, there were many openings for graphics and communications software professionals. "It's never easy to find data communications people," Koloski said.

"The market for communications specialists is pretty tight right now," McHugh said. "We've had some success finding qualified applicants here, but we're looking for skills that are pretty hard to find."

C language, Unix get nod over Cobol

WALTHAM, Mass. — Applicants at last week's Softfair '84 job fair here agreed with employers on site that skills in the Unix operating system and the C language are highly marketable assets.

"If you look around, you'll see there are still some openings for people with Cobol background. But I've heard nothing but praise for Unix and C. That seems to be the big thing around here," said a software quality assurance analyst who, like others, asked not to be named.

A programmer/analyst armed with a stack of resumes agreed. "I'm quite surprised at how few of the recruiters are looking for Cobol experience. It's obvious to me that C is on the rise. Telecommunications specialists are also in demand, from what I've seen here."

According to one graphics applications programmer, the applicants most in demand are those with experience in Unix, C and graphics software design. "The market is great for graphics people like me. I don't know how long that will last, but for the moment, I feel like I'm a valuable commodity."

When asked what advice he would offer to those about to choose a career in software, a former design engineer said, "I'd tell them to get into systems programming on high-end microcomputers. That's where you're going to see the real money. Experience in graphics and telecommunications will open a lot of doors, too."

"My advice," said to a programmer seeking a career change, "would be to get as broad a background as possible in system design and to learn at least a couple of languages."

For $1750 plug into the IBM 3270 with low-cost printers.

InterLynx™/3287 protocol converter features:

- Fully compatible with IBM 3274/3276 controllers.
- Use low-cost ASCII dot matrix and letter quality printers on 3270 controllers.
- 3270 Type A coax-to-async ASCII conversions.
- LU 3 (BSC) and LU1 (SCS SNA/SDLC) modes.
- Full operator panel (including reprint).
- Front panel menu setup.
- RS-232C and Centronics interface standard.
- Pseudo-transparent data feature.

Find out why over 2,000 companies worldwide use Local Data protocol converters to expand their IBM mainframe communication capabilities.
Call today for more information. And ask about our 30-day free trial program.

Local Data
INTERLYNX™/3287

LOCAL DATA • 2701 Toledo Street • Torrance • California • 90503
Telephone 213-320-7126/TLX 182518

"Your Lynx to IBM."

See us at Interface '84, Booth 1627, Las Vegas, March 12-15.

THIEVES from page 1

The gang allegedly traded computers for other "wants," such as bicycles: One swapped a Personal Computer XT for a 10-speed bike.

They wrote their own game programs, sometimes erasing corporations' data to reuse diskettes, and tried hacking, with only minimal success.

They used telephoto camera lenses to peer through office windows and read telephone numbers posted near modems. However, they accessed only electronic bulletin boards with their computers, according to their statements.

The equipment, allegedly taken in breaks throughout DeKalb and Cobb counties here, was recovered in apartment building storage areas and has continued to stream into Fitch's office as the suspects turn in stolen goods in hopes of leniency. As goods are recovered, the value of everything taken in the breaks could soar past $350,000, in addition to the less tangible losses businesses suffered when their software disappeared, Fitch said.

The youths, who remain unidentified under juvenile laws, are awaiting trial.

Export act extended for 30 days

WASHINGTON, D.C. — The U.S. Congress last week extended the Export Administration Act for 30 days as the U.S. Senate neared completion of its bill to restructure government export controls.

The interim measure came last Wednesday with the existing law set to expire that midnight. It became necessary because although the House approved new export controls late last year, the Senate did not take up its bill until late February. When the Senate passes its bill, the two houses must seek a compromise between the two versions before a final measure can be sent to the president.

The Export Administration Act originally expired in the fall, but has been temporarily extended several times.

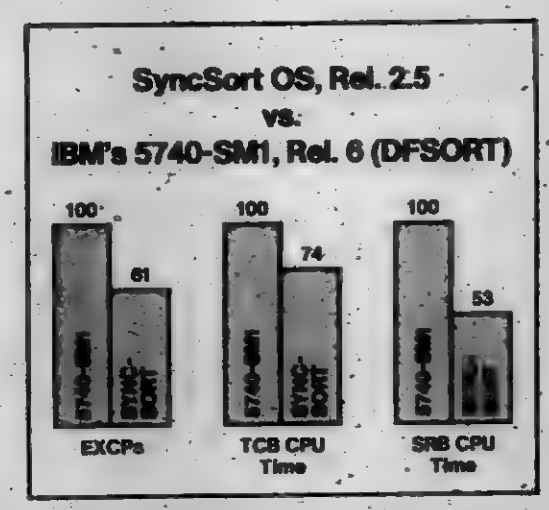
Passage of a new export control law has been delayed because of a continuing controversy over the extent to which exports must be restricted to protect national security.

ENCOUNTER

How new SyncSort outperformed IBM's Release 6 by 36% in their very first meeting!

Call (201) 568-9700.

Try our hot new OS Sort.



Ironically, some of SyncSort's most glowing recommendations come from the mouths of IBM systems engineers. Here's the latest example.

One of our systems engineers recently visited the computer center of a well-known worldwide manufacturer. His mission was to install and demonstrate SyncSort 2.5, the latest and most advanced release of our OS sort program.

As our man sat down at the console, an IBM "MVS Specialist" joined the group. "Can I help with the installation?" he asked. Of course, Our Man replied, thanks for the offer.

After SyncSort 2.5 had been installed, the IBMer came up with another helpful suggestion. "Would you mind if we benchmarked your sort against our 5740-SM1, Release 6? I just happen to have a copy here."

Not in the least, Our Man replied. It was the first duel between SyncSort 2.5 and Release 6 (also known as DFSORT). But our systems engineer was confident that 2.5 could outperform Release 6 anywhere, anytime.

The benchmark was run, and the results bore out Our Man's confidence. SyncSort 2.5 had outperformed Release 6 by a wide margin.

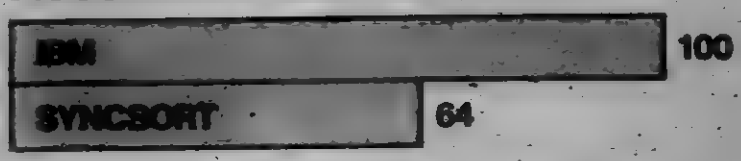
The IBMer was clearly disappointed. But he wasn't ready to concede yet. "Let's take a look at the results on the monitor I've installed," he said.

He explained that the monitor had an "awesome capability" for measuring total resource consumption. It produced an overall "resource utilization" index that reflected the aggregate impact of such vital items as SRB CPU Time, TCB CPU Time, and EXCPs.

Suppressing a grin, Our Man agreed. And this time the IBMer shot himself in the foot with his own monitor.

SyncSort 2.5 had outperformed Release 6 by a whopping 36% – as the charts below indicate:

Resource Utilization Index



How did the IBMer react? Like a gentleman and a scientist. "Well," he said affably, "I've always known a lot of specialized software houses can produce better products than we can in certain areas. Obviously, you've got the best sort."

Then he deleted his sort program from the system and went on to other duties.

Who said chivalry is dead?

syncsort INC.

Syncsort Incorporated 560 Sylvan Ave., Englewood Cliffs, N.J. 07632

CDLA from page 1

be tremendous for CDLA members, Benton explained. They could get more favorable credit terms when writing equipment leases, would write more leases because user turnover of computers would be more rapid and would get access to used computers — already a $2.5 billion-to $3 billion-a-year market — while the machinery is newer and, thus, more attractive. Vendors would see more sales as well, he added.

For end users, the benefits would be just as dramatic, said Charles Greco, director of financial services at International Data Corp., a Framingham, Mass., market research and consulting firm. Users who lease computers would see "more aggressive rates," reflecting the better credit terms dealers could obtain. Those purchasing computers would make out even better, Greco said.

As an example, Greco said that a buyer of a $1 million computer who wants to upgrade to a better machine after three years would, under current law and financial practices, lose two years of depreciation and have to pay back to the government at least one-third of the 10% investment tax credit. It is hard to persuade the corporate finance office to approve a new purchase if it would mean a loss of $433,000 in tax benefits, he noted.

Three-year depreciation would allow an MIS manager to move out obsolete equipment "without some treasurer breathing down his neck," Greco said, because the user would receive the full tax benefits before updating equipment. It would "give the user tremendous flexibility . . . to move to newer technology if it is available," he said.

The CDLA has prepared a white paper with the arguments for the shorter depreciation schedule and drafted a letter to congressmen and senators, seeking support for legislation to implement the change. The lobbying campaign will be discussed at the association's meeting in Acapulco, Mexico, later this week.

The thrust of the letter is that the five-year schedule is too long, unfair and a "bias against new advances in computer technology [that] — if left uncorrected — will hurt the American industry, help Japanese and other foreign competitors and retard future growth throughout the entire computer industry."

Congress will love the proposal, Benton predicted, because of government concern about the health and international competitiveness of U.S. high-technology industries. In any case, CDLA has levied a special assessment on its members to pay for the lobbying effort. "I'm really looking at a big pot. . . . We've got a lot of money in the bank," according to Benton, who has also enlisted the aid of the high-powered Washington, D.C., law firm Patton Boggs and Blow in the campaign.

The association also plans to meet with other industry groups in an effort to form a joint coalition on this topic, Benton said. Officials at the Computer and Business Equipment Manufacturers Association and the Computer and Communications Industry Association told *Computerworld* they are interested in getting the tax law changed, but indicated they have more pressing concerns at the moment, such as export control law amendments and research and development tax credits.

Benton acknowledged that in an election year, there is not much likelihood of tax law amendment, especially one that might be perceived as reducing government revenues. Thus, the campaign may not be successful until 1985, Benton concluded.

British banks give check-clearing system rave reviews

By Susan Blakeney
CW Staff

LONDON — A decade ago, British banks began looking for a faster way to clear checks. Ten years and approximately $30 million later, they have implemented the Clearing House Automated Payments System (Chaps) and realized their goal.

The banks officially inaugurated Chaps on Feb. 9, and according to project leader Edward Stubbs, the chief inspector of London's Bankers' Clearing House, "It's working extremely well, and we've had no problems."

Chaps was developed by the British software house Logica Ltd. The distributed system is expected to extend same-day check clearance (which is presently available only in London's financial district) to individual and corporate clients throughout the country and facilitate same-day clearance of checks well beyond the current 3 p.m. deadline.

"Right now we've limited the system to deal only with payment between £10,000 and £100,000 sterling," which is equivalent to about $15,000 to $150,000, explained Stubbs. "We intend to increase the upper limit within the week to £1 million and eventually remove all limits."

Prior to Chaps, British bankers relied solely upon London's network of 6,000 messengers, who scrambled about the congested city on a daily basis, supporting the bank's paper-based check-clearing system. Now running parallel to the messenger service, the on-line Chaps system enables payments and credits to be transferred at the speed of electricity "immediately and irrevocably throughout the day," Stubbs noted.

Even banks with different computer systems can use Chaps, according to Stubbs, because each bank has a separate electronic gateway into the British telephone information switching service. They communicate with each other through an interface from Tandem Computers, Inc. "The Tandem interface between the bank's main computers communicates over telephone lines — it's a message-switching system, actually," Stubbs said.

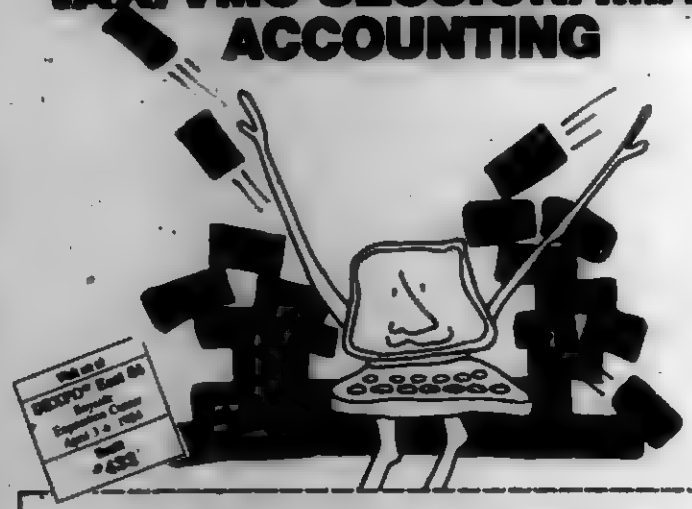
The coded information on each check is electronically recorded and sent from one computer gateway to the gateway of the receiving bank. Payment is guaranteed by the sending bank the moment the information passes through the gateway.

Chaps is expected to result in sizable bank savings from reduced paper and messenger use. Stubbs said 80% of London's banks are already using Chaps, and the full benefits of the system will soon be realized when the remaining banks come on board and all upper and lower limits are removed from the system.

In the few weeks that Chaps has been on-line, it has sparked quite a bit of interest from the financial community, Stubbs remarked. "We've had inquiries from banks all over the world," he said proudly.

"I suppose I'm a bit biased, but I can't tell you anything detrimental about the system. I'm very encouraged," Stubbs concluded.

BREAKTHROUGH IN VAX/VMS SESSION/IMAGE ACCOUNTING



Only EZTRACK™ allows examination and tracking of VMS session/image resource data by user, time interval, terminal port and other key fields. EZTRACK offers:

• General query and interactive capabilities • Flexible report writer and graphics
• Full screen forms reporting

Name
Title
Company
Address
City State Zip
Phone ( )

SEND COUPON NOW FOR COMPLETE DETAILS!

STI Signal Technology, Inc.
5851 Encina Road, Goleta, CA 93117 (805) 683-3771 Outside California call toll-free (800) 235-8787
TWX 910-334-3471
VAX/VMS is a trademark of Digital Equipment Corporation

IBM analysis seminar set for May

MILWAUKEE — Fred Lamond, an observer of trends in data processing and of IBM in particular, will present an in-depth analysis of alternative growth strategies for IBM users during seminars in May in San Francisco and Washington, D.C.

Among the issues to be covered in the "Lamond on IBM" seminars are alternative network architectures, compatibility and data base requirements; the future of IBM large systems; and the future of the centralized production center. Lamond will also attempt to answer such questions as "Will the IBM Personal Computer replace the 3270 terminal?" and "Can the 3083 win against Japanese competition?" according to Pakala Bennett, a spokeswoman for Cap Gemini DASD, the seminars' sponsor.

A speaker at conferences around the world since 1975, Lamond worked for five years in market research in Great Britain and has worked for other firms in the computer industry.

The San Francisco seminar will be held May 2-4 at the Westin Miyako, and the Washington, D.C., seminar will be held May 7-9 at the Sheraton International Conference Center.

Both seminars have limited enrollments and are the only U.S. appearances for Lamond this year. Seminar registration is $895 per person from Cap Gemini at 9045 N. Deerwood Drive, Milwaukee, Wis. 53223.

NEWS

Mother links child's birth defects to VDT use

By John Kirchner
CW Washington Bureau

WASHINGTON, D.C. — A Syracuse, N.Y., insurance company clerical worker told a congressional subcommittee last week she suspects her "slavery" to work place automation caused the multiple birth defects of her recently born child.

Rebecca Alford told the House Education and Labor Subcommittee on Health and Safety that her employer, the Equitable Life Assurance Society, introduced VDTs to its clerical operations with no regard for its employees. This, she said, "enslaved us to the new machinery and subjected us to health and safety hazards."

Her testimony came last Tuesday as the subcommittee opened its investigation into VDT safety. Subcommittee Chairman Rep. Joseph M. Gaydos (D-Pa.) said later hearings will allow representatives of VDT manufacturers, users and the scientific community to present their sides in the growing controversy over possible VDT health dangers.

Survey information released last month by 9 to 5, the National Association of Working Women, contained anecdotal information suggesting widespread health hazards related to prolonged VDT use [CW, Feb. 20, Feb. 27]. Eyestrain, backaches, stress and other ailments resulting from ergonomic factors of terminal design and use are generally conceded even by representatives of equipment manufacturers, who argue most of these problems could be alleviated by better work place design and working conditions.

Manufacturers fight bills

Manufacturers are strenuously fighting legislated regulation of VDT operation, saying the cure would be worse than the problem. They note that long-standing suspicions that VDT radiation causes birth defects, miscarriages and permanent vision damage have been uniformly refuted by several scientific investigations. But prompted by the kind of information produced by 9 to 5, Congress and a number of state legislatures are investigating VDT safety and considering bills on work place automation.

Alford, for her part, said she has little doubt that VDT use causes long-term, serious health problems. She described her co-workers suffering from nightmares, depression, irritability, nervousness and other stress-related problems she attributed to VDT use. Then she added, "Recently, I gave birth to a child with multiple defects. I cannot help but think there is a connection. Though other women in the office have so far been spared this tragic consequence, a significant minority of pregnancies have resulted in miscarriages."

Alford is a representative of the Service Employees International Union (SEIU), which is allied with 9 to 5. Also appearing before the subcommittee was Jackie Ruff, SEIU district director, who said the 9 to 5 data cannot be dismissed as "statistical quirks." She reiterated the group's call for government investigation of VDT-related vision problems, back and muscle strain and what she called "a near epidemic of stress-related diseases."

Elaborating on these complaints, Alford described for the subcommittee the working environment of about 70 Equitable clerical employees, "primarily women of child-bearing years, who work from eight to 10 hours a day, sitting in long rows at impersonal workstations dominated by video display terminals" processing insurance claims.

She said many of the workers "have noticed the deterioration of our vision since working on the terminals. . . . At home, after a day on the tube, I have a difficult time focusing on close objects. My eyes frequently tear and sting. Only after a weekend away from the terminal do my eyes begin to feel better."

Alford complained that "in our office, the windows cannot be opened. The intense heat of the VDT combined with dirty air creates a stifling environment. Simple requests to clean the curtains to remedy some part of the problem have been denied, and many employees consequently suffer from dry, flaky skin, rashes and light-headedness.

"Back and neck problems abound," she continued, "a result of tubes, chairs and desks that we cannot adequately adjust and of long hours sitting in one position. Getting up and moving around during the day to alleviate cramping and stiffness and give our sore eyes a rest is discouraged and, in fact, is penalized since our machines are electronically monitored for productivity."

Noting VDT use is only just beginning, Alford called the Equitable workers "guinea pigs. Judging from the severe problems surfacing already, we may be headed for a society of victims of VDT-related diseases and disabilities." In the absence of collective bargaining for most clerical workers, she said, "strong legislation is needed to provide all VDT users with basic protection."

■ BDS / Dataproducts Plug-Compatible Printers
■ Built for Handling Continuous High-Volume Output

IBM · DEC · HP
BURROUGHS
BDS

■ Since 1975, the Largest Independent Supplier of Plug-Compatible Printer Systems
■ Over 5,000 Systems Installed
■ Complete Line of High Quality Daisy Wheel, Matrix and Band Printers. 55 CPS to 2000 LPM
■ 30-50% Savings
■ Quick Delivery (30 Days or Less)
■ Reliability Built-In (BDS Controllers and Interfaces)
■ Low Maintenance Cost
■ TRW Nationwide Service
■ Price Includes Installation and 90 Days Parts and Labor Warranty

I would like more information on plug-compatible printers
☐ 80-300 CPS Matrix Printer
☐ 55 CPS Daisy Wheel Printer
☐ 300-2000 LPM Band Printers

Name
Title
Company
Address
City State Zip
Phone ( )

(415) 965-8115
BDS Corporation
800 Maude Ave.
Mountain View, CA 94043
U.K. (734) 735055 Australia (03) 241-3322

NEWS

Consultant sees big business in bypass tech

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — Recent developments in technologies to bypass local telephone networks may spawn a multibillion dollar business, according to a communications consultant.

However, Jerome Lucas added, about 70% of the revenue produced by bypass facilities in 1994 will be earned by telephone companies rather than by their competitors.

During a seminar here last week sponsored by his market research company, Telestrategies, Inc. of McLean, Va., Lucas offered some predictions on future communications markets. By 1994, he said, CATV, microwave, satellites and other local exchange bypass technologies will be earning $10.7 billion per year; in 1984, by comparison, the total will be $106 million. He expects that optical fiber will account for 65% of the 1994 revenue; CATV and microwave will each have a 15% share, while satellites will account for the remaining 5%.

MCI Communications Corp., one example of a commercial carrier sampling the bypass waters, is testing a bypass system in Fort Lauderdale, Fla., that uses CATV to route analog voice traffic around the local telephone network, Lucas reported here last week.

AT&T and the recently divested Bell operating companies will become major factors in the bypass business, Lucas added. The former has already announced plans to offer "shared multitenant services," one form of bypass, in collaboration with United Technologies Corp., and the local telephone operating companies have requested permission from the Federal Communications Commission to offer digital termination services (DTS), another local exchange alternative.

Lucas expects the carriers to explore a number of other options in the next few years. He specifically mentioned local telephone operating company investment in local CATV networks, efforts by both AT&T and the local telephone operating companies to become communications resellers outside their present markets and use of AT&T's No. 4 Electronic Switching System network switch as a digital private branch exchange replacement for Centrex facilities provided by the local telephone operating companies.

The FCC's latest revision of its access charge plan is almost certain to encourage greater bypass, Lucas said. By deferring access surcharges for residential and small-business users, the commission has made it necessary to increase the usage-based access charges to be levied on interexchange carriers and paid by their customers, he explained. Reportedly, the deferral means that the latter charges must be increased enough to raise an additional $2 billion annually. Business users will pay most of this increase.

Lucas also predicted that by 1992, 89% of all U.S. households will be passed by CATV systems, vs. 43% today, and 60% of all those passed will be subscribers, vs. 43% today. These figures suggest the possible impact of systems like MCI's new Cablephone, which divides a 6 MHz cable TV channel into 240 voice channels capable of servicing 2,400 users.

Several other emerging alternatives to the local telephone network were also mentioned at the conference.

Michael Shiff, satellite equipment marketing manager for M/A-Com DCC, Inc. of Germantown, Md., reported his company has developed a "personal earth station": a two-way, 1.8 meter in diameter dish antenna which reportedly can be installed in six hours and can communicate directly with a Ku band (14/12 GHz) satellite. The uplink data rate is 9.6K bit/sec, and the downlink rate is more, Shiff said.

Computer Graphics '84 slated

ANAHEIM, Calif. — Computer Graphics '84, the fifth annual conference and exposition sponsored by the National Computer Graphics Association (NCGA), will be held May 13-17 at the Anaheim Convention Center.

The conference reportedly will feature 25 tutorials and more than 70 technical sessions on more than 20 computer graphics topics, with an emphasis on microcomputers.

The exposition is expected to showcase computer graphics technology for use in computer-aided design and manufacturing, management, cartography, structural analysis, medicine, animation, marketing and architecture.

Pre-registration for the exhibits is free, while on-site charges range from $10 to $20. Fees for the tutorials range from $185 to $355 and for the technical sessions from $235 to $460, depending on the number of sessions attended. Discounts are available for members of the NCGA and the Institute of Electrical and Electronics Engineers, Inc.

More information on Computer Graphics '84 is available from the NCGA, Suite 601, 8401 Arlington Blvd., Fairfax, Va. 22031.

The world's most advanced personal computer

It all depends on how you look at it.
As a powerful standalone, the Wang Professional Computer offers data, voice, and image processing. And Wang word processing, the world's standard. It can support Wang Office, the most comprehensive office automation software in the industry. And it supports the most popular business software available today.

CW84
© 1984 Wang Laboratories, Inc.

Another review seen on access charge plan

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — Another reconsideration of the Federal Communications Commission's access charge plan may be necessary, the chief of the commission's Common Carrier Bureau, Jerald N. Fritz, said here last week. If that happens, the new, higher rates proposed by AT&T and local telephone companies could be deferred beyond April 3, their presently scheduled effective date.

Fritz, who spoke at the Bypassing Access Charges conference sponsored by Telestrategies, Inc., said, "We've just issued the second reconsideration of the access charge order, and from recent reported statements of [AT&T Chairman Charles Brown], we could be looking at a third." He was referring Brown's statement that the commission's latest revision of the access charge plan is unfair to AT&T because it doesn't charge the company's competitors enough for use of local telephone network facilities. AT&T has asked the commission to reconsider this part of the plan.

Fritz said that much has to be done by both the commission and the commercial carriers if present rates are to be replaced with pending, access-charge-based tariffs next month. Both AT&T and the National Exchange Carriers Association, for example, have to resubmit the tariffs they filed last October, and the commission staff must analyze this material and recommend action to the commission. The size of the task is suggested by the fact that when the original tariffs were filed last October, they totaled 210,000 pages.

Asked what would happen should the FCC not meet the April 3 deadline, Fritz said, "We'll cross that bridge when we come to it."

Another conference speaker, economist Alan Pearce, indicated that efforts to restructure intrastate communication services have made even less progress than federal efforts.

One key question, he said, is whether state or federal regulators should decide if local telephone carriers can offer inter-Lata (Local Access and Transport Area) services. If they can, it would be a valuable source of additional revenue and could benefit ratepayers, he added.

As most states contain more than one Lata, the related traffic is intra- rather than interstate. However, the Modified Final Judgment, which settled the government's antitrust case against AT&T, specifically bars the divested Bell operating companies from offering inter-Lata services. Pearce believes the U.S. Supreme Court will have to resolve this question.

Another issue is whether inter-Lata carriers such as AT&T Communications, MCI Communications Corp. and GTE Telenet Communications Corp. will be allowed to offer intra-Lata services. Pearce said the carriers are now "wining and dining" key officials in an attempt to gain entry into various intra-Lata markets. Competition is now allowed by five states, and studies to allow competition are under way in several others.

Va. lawmakers pass categorical computer crime bill

By Paul Korzeniowski
CW Staff

RICHMOND, Va. — The Virginia state legislature overwhelmingly passed a computer crime bill that renders obsolete current legislation and clearly defines categories of computer crime. The bill awaits the signature of Gov. Charles S. Robb, after which it will become effective July 1.

Sponsored by the Virginia League of Savings Institutions, the bill divides offenses into five categories: computer fraud, trespassing, invasion of privacy, threat to security and forgery. "The law clearly labels categories of crime that previously didn't exist," said Daniel R. Burk, an attorney with Thomas and Fiske P.C., the Alexandria, Va., law firm that represented the league. "It is designed to stop anyone who uses a computer for an illegal activity."

Minimum sentences for persons convicted under the new law range from a $500 fine to a five-year prison term.

"There is a wide range of sentences which helps to ensure that the punishment fits the crime," according to Burk.

To draft the bill, Burk studied computer crime bills currently in place in 21 states. "We wanted to ensure that the bill had comprehensive, clear language," he said.

One issue that the new bill does not address is illegal copyrighting. "We may explore that issue next year," Burke noted.

just happens to be the world's most universal workstation.

As a versatile, multi-purpose workstation, the Wang Professional Computer can tie into the entire family of Wang products. It can operate as a virtual workstation on the Wang VS, OIS and 2200 systems. And it can even function as an interactive workstation in the IBM environment, either through remote communications or through local attachment.

The Wang Professional Computer. It's more competitive. It's more compatible.

No matter how you look at it. No matter how you use it.

For a demonstration of the Wang Professional Computer, call 1-800-225-9264. Or write to: Wang Laboratories, Inc., Business Executive Center, One Industrial Avenue, Lowell, MA 01851.

WANG

The Office Automation Computer People.

U.S. sting nabs alleged high-tech smuggler

By Patricia Keefe
CW Staff

NEW YORK — A U.S. Department of Commerce sting operation has netted a French national who allegedly attempted to export a graphics plotting system, which can be used to design integrated circuits for advanced weapons, to an Eastern-bloc country.

The arrest, made late last month here, marks the second successful undercover operation against high-technology smugglers in less than two weeks and involves technology similar to that which was illegally shipped to the Soviet Union in 1979 by Richard Mueller, a West German, according to Commerce. Earlier this month, a U.S. Customs Service sting operation resulted in the arrest of five people, including a Chinese national, on charges of conspiring to smuggle high-tech equipment into China [CW, Feb. 20].

Gilles Gouzene, 28, has been charged with conspiracy and attempting to export without a proper license, according to Assistant U.S. Attorney Peter Norling. At press time, Gouzene had not met his bail, which had been set at $50,000. A grand jury is scheduled to look into the case, and a hearing was held March 1 to determine whether Gouzene should be held for trial.

Gouzene, an employee of the Paris-based import and export firm of Exportations Industrielle et Agricole (EIA), was arrested Feb. 23 in a hotel near John F. Kennedy International Airport here. EIA is owned by Gouzene's father, Pierre, who is alleged to have taken part in the scheme, although no charges have been filed against him.

Anstruther Davidson, acting director of the Office for Export Enforcement, explained that Commerce agents never actually met the father. Instead, they allegedly communicated over the phone and via cablegrams with someone who said he was Pierre Gouzene. The senior Gouzene is believed to be in France, whose extradition treaty with the U.S. does not consider technology smuggling.

The Gouzenes first came to Commerce's attention in March 1983, after they allegedly falsified an export license application for a Xynetics, Inc. Model 2000 Graphic Plotting System valued at $145,000. When the equipment arrived in France, "individuals associated with the export realized that the true destination was not India [as stated on the license], but an unnamed Eastern-bloc country," Davidson said. As a result, the machine was returned to the U.S. Davidson said he did not know whether the French government was formally involved in the decision to return the system.

It was at this point that the Commerce sting went into operation. Agents acting as brokers for the resale and exportation of the system were allegedly offered $5,000 to ship the system illegally. When they cabled the senior Gouzene that a second export license for the system had been denied, he is alleged to have cabled back, "You were recommended for this affair. We expect you to deal with this effectively . . . you knew from the start the difficulties you could meet," Davidson said.

Gilles Gouzene was arrested after a series of meetings during which the $5,000 fee was discussed, although no money ever exchanged hands, Norling said. Both Norling and Davidson declined to comment on whether the EIA and the Gouzenes are suspected to be part of a larger smuggling operation.

Have a story on productivity?

Computerworld's May Special Report will take a close look at software productivity, something our readers are continually trying to improve upon.

The Special Report will focus on application backlogs and the efforts being made to reduce them; the programmer shortage and whether it really exists (or are there other, unseen problems); high-level languages and structured programming; and code generators and reusable code.

Contributions being sought for the Special Report should take one of two forms: a tutorial article discussing an issue or trend in software productivity or a user application story outlining a particular firm's experience with a product or methodology.

Articles must be typed, double spaced and no longer than eight pages. Artwork, such as charts, graphs or photographs, is encouraged. Authors should also include with their articles a brief biography and a telephone number where they can be reached.

The deadline for submissions is March 28. If you have a tale to tell, address it to Donovan White, Special Reports Editor, *Computerworld*, 375 Cochituate Road, Box 880, Framingham, Mass. 01701.

Spreadsheets help micros upset mainframes

PRODUCT SPOTLIGHT

By Paul Gillin
CW Staff

"Mainframe vendors have been trying to reach out to the end user for years. It took the micro people to come along and teach us how."

Ed Spire, president, Dynasoft, Inc.

After years of trying to look like mainframes, microcomputers have finally turned the tables on their big brothers. Spreadsheets, the financial analysis software that single-handedly legitimized the micro in business, are being installed with increasing frequency on large systems.

The success of this upward migration has exceeded the expectations of most observers. In the barely three years that large system spreadsheets have been available, they have garnered a base of more than 3,500 users in the IBM mainframe community alone, according to vendor estimates. And they have set the stage for further integration, which could soon make applications available on the mainframe that are substantially similar to some of the most popular integrated software on the micro.

Vendors interviewed by *Computerworld* expressed heady optimism about the growth potential of large system spreadsheets. Some expect to expand capabilities to include data base management, word processing, integrated graphics and even voice recognition. However, some observers are not so sure.

"Ultimately, all spreadsheet tools will be on the personal computer," said Rick Swanberg, manager of technical planning and operations at Index Technology Corp. in Cambridge, Mass. "Now, because every office doesn't have a [personal computer], people accommodate and go to the mainframe. But eventually, the mainframe spreadsheets are going to offer download to the [personal computer] for responsiveness and upload for consolidation."

Software gaining momentum

But for the short term, at least, the software seems to be gaining momentum. The popularity of large system spreadsheets is largely due to four factors. One factor is political: MIS departments are frantically searching for a way to regain the control they lost when users became enchanted with the fast, dedicated processing power offered by micros. "MIS managers are tired of popping for $5,000 for another [personal computer] every week," Ed Spire, president of Dynasoft, Inc. in Chicago, said. "They'd rather hook into the data base and not have data sitting around in briefcases."

Another major incentive is cost. With prices of even the largest spreadsheets running less than $30,000, the option appeals to some managers who want to protect their existing base of terminals. "There are over four million [IBM] 3270-type terminals out there," said Randy Whitesides, vice-president of The Mega Group, Inc., the Irvine, Calif.-based vendor of Megacalc, a spreadsheet for IBM mainframes. "This has given MIS the ability, with very little money, to make them useful."

Security is also an issue. The new popularity of micro-to-mainframe links has presented the potential headache of users downloading sensitive corporate data onto a diskette that is then left on a desktop or stuffed into a briefcase. Mainframe products retain data integrity while preventing information leaks. Tower Systems International, for example, first planned to make its Omnicalc package a feature of its Surveillance IBM CICS security system. But response to initial advertisements was so overwhelming that the company released the software as a standalone application. "Our best salesmen are DP staffs, because they want to control their empire," Greg Collins, vice-president of marketing and sales, said.

The fourth and most disputed advantage is sheer power. With models ranging up to virtually unlimited size, dozens of mathematical functions, interfaces to other host software and three-dimensional and consolidation capabilities, large system spreadsheets offer advantages many micro packages cannot approach.

Micro limitations

"The micro spreadsheets haven't been good at solving the problem because they're oriented toward putting it all in one box," said William Peake, president of Unicorp, which markets Unicalc for IBM mainframes. "End users will use the micro if they don't need the mainframe capabilities. But they find they're quickly frustrated by the limits of micro spreadsheets."

However, others are not as quick to concede the power issue to the mainframe. "If you look at how quickly a spreadsheet has to operate, the micros are simply faster," said Alan Hirsch, a group managing editor at Datapro Research Corp. and principal author of the report "All About Electronic Spreadsheets."

Hirsch said micro spreadsheets offer nearly all the capabilities of their large system counterparts, but are easier to use and more flexible. Companies that install their spreadsheets on the central computer for the purposes of short-term cost savings or

See SPREADS page 15

GET A GRIP ON YOUR MAIL MANAGEMENT PROBLEMS.

Benchmark-winning performance nationwide makes COM-MAIL® products the industry standard for speed, accuracy and reliability.

SAVE WITH CARRIER ROUTE SORTING SYSTEM (CR$S). Optimizes postage discounts for greatest bottom line savings. Totally parameter driven. Needs no user coding. No royalty fees. Maintenance optional.

GET ZIP + 4 DISCOUNTS WITH EZ-9. Add the extra 4 digits to your ZIP codes—without programmer intervention—IN ONE PASS of an address file with a ZIP + 4 master file.

MORE HANDS DOWN WINNERS FROM COM-MAIL.
- EZ-5 Zip Code Correction
- List Conversion
- Duplicate Elimination (Merge/Purge)
- Generalized Selection
- Regular Presort
- Label Printing

HAND OVER YOUR MAILING PROBLEMS to the advanced mail management software system with proven performance and savings from day one! COM-MAIL's fully integrated systems, individually or in combination, turn mailing problems into profits.

CALL TOLL FREE
(800) 368-5806
LOCAL (202) 537-7281

COMNET
COMPUTER NETWORK CORPORATION

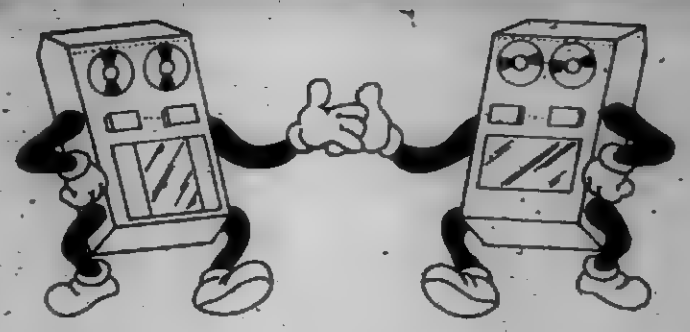
COM-MAIL® Division, Dept. CW074
5185 MacArthur Boulevard, N.W.
Washington, D.C. 20016-3387

☐ I WANT TO SAVE MONEY IMMEDIATELY. CALL ME TO SET UP A FREE BENCHMARK.
☐ Send more information.

NAME_____
TITLE_____
COMPANY_____
ADDRESS_____
CITY_____
STATE_____ ZIP_____
PHONE_____

Products require IBM/COMPATIBLE or UNIVAC 80/90 MAINFRAME

OUR SWITCHES MAKE YOUR IBM SYSTEMS WORK LIKE A TEAM!



If you have more than one IBM or plug compatible processor, Digital can help you get the most for your hardware investment. Our switches allow you to achieve backup and peripheral configuration flexibility at a fraction of the cost you're probably thinking.

Whether you have two processors or more, Digital has a switch to suit your requirements.

- Model 4101 The lowest priced matrix switch on the market.
- Model 3421 The only manually operated channel switch in the industry.
- Model 3403 A remote controlled channel switch designed for underfloor installation.

DIGITAL CONTROLS

2779 Orchard Run Road • Dayton, Ohio 45449 U.S.A. • (513) 435-5455
Dallas 214-669-0089 New York 201-585-9416

*Registered Trademark

NEWS

Spreadsheet usage shifts toward micros

PRODUCT SPOTLIGHT

By Paul Gillin
CW Staff

Large system spreadsheets are not everybody's cup of tea. While some users rave about them, others are finding that microcomputer versions offer better response time and greater flexibility.

Two users of large system spreadsheets interviewed by *Computerworld* reported dramatically different reactions to the software in their installations.

At Saks & Co. in New York, which owns the Saks Fifth Avenue retail chain, Oxford Software Corp.'s Maxicalc has "made our lives much easier," according to Mary Anne Kern, director of financial analysis.

However, Johnson & Johnson Corp. of Raritan, N.J., has seen enthusiasm wane for its Business Model Systems, Inc. Business Modeler package since micros began making inroads into its subsidiary companies, said John Harsh, international management services consultant.

Saks has about 20 users tied into Maxicalc from locations as far away as San Diego, Kern said. The software supports all levels of users in areas including personnel, accounting and operations. The company plans to distribute Maxicalc access to about 50 users, including managers of most retail stores, who will employ predesigned spreadsheet templates.

Better flexibility

Saks installed Maxicalc last August after testing it against Tower Systems International, Inc.'s Omnicalc. Maxicalc proved to be the easier of the two to use and included the flexibility to recalculate on demand rather than automatically, Kern said.

A mainframe spreadsheet was considered "because we didn't want the proliferation of micros that didn't interface with our mainframes," Kern noted. Originally purchased solely for the financial analysis operation, Maxicalc is now used in that division for analysis of capital projects, productivity analysis and profit and loss statements. In other divisions, the software is used to control budget goals, analyse payroll and generate daily management reports.

"The important thing is that we now have control," Kern stated. "I've also been pleasantly surprised with the flexibility of the system. You can delete rows and columns with automatic calculation adjustment and you can control formatting to a great extent. It lets you put out a good-looking report with very little effort."

She noted that user demands for microcomputers have dropped since the software was installed. "I haven't heard of any new requests for the last two months or so," she said. "I think users seem to be willing to wait and see how this goes first."

Kern's only complaint about Maxicalc is that individual spreadsheets cannot be copied into other spreadsheets. However, she said that feature is slated for a future enhancement.

Johnson & Johnson has owned a corporate license to distribute Business Modeler to its international subsidiaries since 1980. The company's management information center currently supports about 45 copies around the world, mostly on IBM System/34s and System/38s.

"When we first brought it in, a lot of companies were very excited about it," Harsh said. "But we're finding out now that many aren't using it as much as they originally intended."

Micro packages apparently present a more attractive alternative, he said. "I don't think Business Modeler is as easy to use as the company says it is," he said. "In companies where micros are coming in, they're discontinuing Business Modeler." He added that in a recent questionnaire, most subsidiary companies did not request the newest release of the software.

Although Business Modeler is a powerful package, "It's not the type of power most users would be able to deal with themselves," Harsh said. "It's useful for something like an interface to the data base or other files. But DP still has to come in for that."

Step-oriented

In addition, Business Modeler is "very step-oriented," Harsh added. "You have to define titles, column headings and line entries. And after you've done all this, you still haven't put in any data."

Nevertheless, some subsidiaries are still gung ho on Business Modeler, he noted. For example, Ortho Pharmaceutical, Inc. of Toronto runs its general ledger on the spreadsheet and uses it for net profit analysis by product group, commercial expense allocation and sales division reporting.

"We will continue to support the user companies," Harsh said. "But in the future, we would probably recommend personal computer tools instead."

Vendor Name	Operating Environment	CP-compatible with which micro spreadsheets[1]	Worksheet size (cells)	Windows (Max. No.)	Cell-level security	Special Functions[2]	Decimal places	Price
Access Technology, Inc. Supercalc 20	IBM VM/CMS, Unix, minis from DEC, DG, Prime	Acess Tech. 20/20, Visicalc, Lotus 1-2-3	1,000 X 1,000	2	locking	43	14	$12,500 — VM $4,800 — other versions
Business Model Systems, Inc. Business Modeler	DOS, MVS, w/CICS most major minicomputers	Business Modeler	9,999 X 97 X 9,999	2	None	70	6	$18,000 — DOS $25,000 — MVS
Chang Labs/Dynamic Spreadsheet	MVS/TSO VM/SP/CMS	Visicalc	999 X 702	2	protected	41	15	$8,500 — CMS $8,500 — TSO
Entrepreneurial Software Co. CP/Calc	CICS, DOS/VSE	None	Unlimited	2	protected, hidden, locking	44	16	$3,500 — on-line $2,500 — subroutine $2,500 — batch
Hewlett-Packard Co. Visicalc/3000	HP 3000/MPE	Visicalc	254 X 254	Limited by screen	protected, hidden	35	16	$2,500
Honeywell, Inc. Personal Computing Facility (PCF)	Gcos, Gcos8	No	60,000 X 60,000 character up to 16,700 fields	17	None	66	60	$200/mo including maintenance
Houghton Systems, Inc. Calcmaster	Wang MVP, LVP, SVP, VP, VS	None	64 X 999	64	protected, locking	53	8	$495
IBM Opcalc	MVS/TSO, VM/CMS	N/A	132 X 32,000	Limited by screen	protected, hidden	37	15	$8,000
Logitech, Inc. Logitech	DEC VAX-11 under Unix	Visicalc	2,500 X 2,500	9	No	24	9	$1,200 — object code $3,500 — source code
The Magic Group, Inc. Magicalc	MVS/TSO VM/CMS	Visicalc, Supercalc Lotus 1-2-3	702 X 9,999	150	hidden	50	16	$15,000 — purchase or $375/mo
Oxford Software Corp. Maxicalc	DOS/VSE, OS/VS	None	64 X 512	None	protected, hidden	N/A	15	$9,000 — DOS $12,000 — OS
Parallax Systems, Inc. Autocalc	VM, MVS	Visicalc Software Arts DIF	702 X 999	2	formula, column	30	16	$5,000
Rabbit Systems, Inc. Rabbit-calc	DEC PDP-11, VAX-11	Ascii-based	16,384 cells variable matrix	2	protected, encrypted	28	15	$489 — RT-11 $978 — PDP-11 $1,956 — VAX-11
Sperry Corp. Sperry Calc	Sperry 1100 series	None	511 X 511	2	protected	48	9	$5,000 — $7,000
Tower Systems International, Inc. Omnicalc	CICS, VM/CMS, TSO	None	32,768 cells variable matrix	22	protected	36	5	$4,800 — DOS/CICS $6,500 — OS/CICS $5,500 — CMS $6,500 — TSO
Trax, Inc. Electronic Spread Sheet	VM/CMS, MVS/TSO	Visicalc, Lotus 1-2-3	1 million X 1 million	Unlimited	protected, hidden, attributes	29	127	$220/mo $2,400/yr
Unicorp Visicalc/370	OS, DOS, VM	Visicalc Lotus 1-2-3	Unlimited	Limited by screen	protected	27	15	$19,500

[1] File-level compatibility with upload/download capabilities
[2] Common function categories include algebraic, financial, arithmetic, statistical, trigonometric, programming, spreadsheet, truncation and editing
[3] Common options include dollar sign, floating decimal, commas, negatives, percentages, rounding, justification, highlighting, underlining and blinking cells

NEWS

Host system spreadsheet vendors eye future

PRODUCT SPOTLIGHT

Caught in a market that may soon start shrinking in the face of competition from micros, vendors of host system spreadsheets are planning to add new functions to their software to keep it attractive to large DP installations.

Unicorp President William Peake believes large system spreadsheets have the potential to become the primary user interface of the information centers of the future. His company's Unicalc is based on a Codasyl model network data base management system (DBMS), in which "the matrix is really a series of records that relate to each other," he said. That feature could make Unicalc useful in writing medium-size application programs.

In the immediate future, Unicorp plans to build a "personal DBMS" on the mainframe, similar to Radio Shack's Profile. The software will allow users to view individual data bases through the spreadsheet and construct small applications without tying up the mainframe DBMS.

The Mega Group has recently added three-dimensional consolidation to its Megacalc spreadsheet, upload and download facilities to the IBM Personal Computer through Megalink and a relational filing system called Megafile. Graphics facilities are planned for the future, a spokesman said.

Tower Systems International, Inc. will "get into a more integrated approach," with its Omnicalc spreadsheet, according to Greg Collins, vice-president of marketing and sales. Future enhancements will include an interface to IBM's Graphic Data Display Manager, word processing, interfaces to popular DBMS and a Basic compiler to allow users to write their own Basic subroutines.

Business Model Systems, Inc. plans "a big thrust into the micro arena," with a recently announced version of its Business Modeler spreadsheet for the IBM Personal Computer, according to Marketing Director Ken Kay. Another project will be to provide a direct tie-in for file transfer between Business Modeler and the DBMS in the user's shop, he said.

Business Model Systems is also researching the area of voice recognition, allowing the user to perform basic spreadsheet functions by simple voice commands. However, Kay admitted the technology to allow voice interaction is still two to three years away.

SPREADS from page 13

MIS control are shortsighted, he said. "Companies that have identified personal computers as the way of the future for productivity increases and [IBM] 3278 emulation are more enlightened than others," he said.

The market seems to bear out Hirsch's remarks. "The micros are really eating into our market share," said Ken Kay, marketing director at Business Model Systems, Inc., which markets Business Modeler, one of the first large system spreadsheets to be released. "Prior to that, we were going great guns."

Large spreadsheet vendors have chosen to accommodate rather than fight the micro. Promoting the optimal capabilities of the mainframe, they promise easier access to host data bases, interfaces to general ledger and other critical applications, work sheet consolidation, query languages and file-level compatibility with popular micro spreadsheets. "It's a lot more than just a spreadsheet calculator," said Marian Sanford, principal engineer in the Large Computer Products Division at Honeywell, Inc.'s Perasonal Computing Facility in Phoenix.

Consolidation has proven to be one of the most popular capabilities of the host spreadsheets. "If you have 15 different people putting together budgets, you can pull that all together very quickly and easily," Index Technology's Swanberg said.

However, that function, too, will soon fall prey to improved micro software, and most observers agree that the host spreadsheet market is headed for a shakeout. In response, the vendors are planning to build a variety of new applications on top of their existing products (see related story). But the true winners will probably be those vendors that fare best at accommodation.

"The winners will be the ones that write spreadsheets so you can work in the same command syntax in both a [personal computer] and mainframe environment and transfer easily between the two, as well as to other software such as word processing and data base," Swanberg said.

1000	Limited	Yes	Yes	Limited	7 options	C	Natural mode recalculation, Iterative goal-seeking User-defined command files, Portable
>600	Yes	No	Yes	No	Limited	Cobol	Versions for entire IBM line, User-defined, multiple-level consolidation, 2-level ease-of-use features, Iterative goal-seeking
150	No	Yes	Yes	No	13 options	Assembler	Sort by multiple keys, Cell naming, Stored commands, Redefinable PF Keys, Report extraction
15	No	No	Yes	Yes	6 options	Assembler	Base index capability, Tutorial
N/A	No	Yes	No	No	13 options	Pascal	File & command-level compatibility with Visicalc Visicalc superset also runs on HP 150, Integrated with other HP 3000 software
170	No	No	Yes	Yes	6 options	Assembler	Hard copy printing, Free-formatted forms Audit trails, Supports VP 7800 terminal graphics Help examples
N/A	Yes	Optional	Yes	No	6 options	Basic	Split screen enables menu-type prompts
>50	No	Yes & integrated	No	No	7 options	PL/I	N/A
>10	No	No	No	No	5 options	C	Interface with University of Calif. at Berkeley's Scribe word processing, Files accessible with Unix commands, Portable
100	Yes	Yes	Yes	Yes	10 options	Assembler, PL/1	Color graphics, 3-D arrays up to 35 sheets in memory, Full directory support, Macro commands Data conversion to and from micros
250	No	Integrated graphics	No	Yes	7 options	Assembler	Mainframe & CICS printer support, Videotape training included, Compatible with Oxford security system, Telephone support
150	No	Yes	No	Yes	5 options	APL	Upload/download with Visicalc Diagnostic messages
>500	No	Yes	Yes	No	9 options	Macro-assembler	"Designed for speed," Ascii file structure, Call routines to Ascii files, Chained spreadsheets
>100	Yes	Yes	Yes	Yes	9 options	Fortran & Assembler	Duplicate cells with auto adjustment, Tab to cell or enter from central spot, Calculations by row or column, Table handling for lookup, search, index, Synchronized screens,
>960	Yes	Yes	Yes	Yes	8 options	Assembler & Cobol	Supports most European languages, On-line and utility print functions, Pseudo-conversational in CICS, Replication of formulas & data
100	No	Yes	Yes	No	N/A	Assembler	Command-level Visicalc compatible, Numbers from 10^{37} to 10^{-37}
20	Yes	Yes	Yes	Yes	7 options	Basic assembly language	N-dimensional, Master terminal administration, Librarian function for archiving

The list of vendors represented here was assembled from the forthcoming International Data Corp. report "Requirements for Decision Support: Trends in the 1980s" and represent as complete a collection of large system spreadsheet vendors as was available. For the purposes of this report, large systems are defined as ranging from supermini to mainframes. Vendors were asked to list their offerings in each area and to provide up to five additional capabilities not included in the chart. The micro spreadsheets mentioned here are Lotus Development Corp.'s 1-2-3 and Visicorp's Visicalc.

'Third era' of info systems — DSS — examined

By John Gallant
CW Staff

BOSTON — Choosing the proper hardware and software tools is only one phase in successfully implementing and managing decision support systems (DSS) in the "third era" of information systems.

CW AT SOFTWARE TOOLS

That was the message from Gary K. Gulden, keynote speaker at last week's Software Tools for Distributed Decision Support Systems conference held here.

Gulden, vice-president of Index Systems, Inc., described the first era of information systems as the automation of clerical functions, such as transaction processing. The second era involved the use of large processors for operational control of such functions as inventory management and shop-floor control, he said.

We are now in the third era of information systems, he continued, the age of end-user computing — or DSS — for managerial planning, decision making and "mind support." Control in the third era has slipped from the "high priests" of data processing, requiring a unique management focus to utilize and control the new information systems successfully.

"The end users' needs are old, and the management support systems (MSS) are relatively new," Gulden said. "Reliance on invisible forces is not enough to ensure that you are getting value from these systems in the proper places within your organization."

Organizations typically pass through three phases in the growth of MSS, according to Gulden. The initial phase involves learning, encouragement and experimentation, and it leads to the second phase, in which management attempts to assess the rewards of end-user computing. The third phase is one in which management seeks to regain control, often as a result of the unbridled growth of MSS.

Most companies tend to focus too much attention on the first and third phases, Gulden said. "There is usually a great fanfare about getting started, then it becomes very important to get control. But there isn't enough attention focused on getting value from these systems. Often, people assume that aspect of MSS will just take care of itself, and that is a mistake."

'Find high-impact areas'

In order to develop what Gulden described as a well-balanced approach that ensures both control and value, management must uncover those areas within the organization that will benefit most from end-user computing. "You must find the high-impact areas, those functions within the firm where it makes sense to apply these tools. You must learn to access these so-called markets in your own company. They may not be the obvious ones, but they may have a much greater strategic impact."

One method for doing just that, Gulden explained, is to apply the Critical Success Factors (CSF) approach espoused by Dr. John Rockart, a professor at MIT (CW, April 18). According to Gulden, CSFs are those key areas within a business in which high performance is essential if objectives and goals are to be met. Once the CSFs are identified, MSS tools can be targeted to the proper areas within an organization.

"The CSF technique is a tool for sniffing out high-payoff opportunities for MSS. Most firms, for example, tend to concentrate MSS on the analytical staff. That is an internal market segmentation. But it may not be the area of greatest payoff. The CSFs may point out that your functional and general managers are a valid market for MSS also," Gulden said.

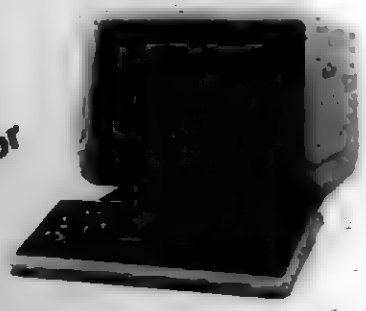
PRC urges increase in Ecom rates

WASHINGTON, D.C. — A hefty increase in Electronic Computer-Originated Mail (Ecom) rates is needed to recover the service's costs and prevent Uncle Sam from competing with private industry, the U.S. Postal Rate Commission (PRC) recommended late last month.

The commission said the new rates for the controversial service should be 52 cents for the first page and 15 cents for the second. Currently, Ecom charges 26 cents for a one-page message and 31 cents for a two-page message; the U.S. Postal Service had proposed rates of 31 cents and 40 cents, respectively. Although Ecom's critics said the PRC has sounded Ecom's death knell, the commission contended the service could begin making a profit in fiscal 1986.

While it greatly increased the Postal Service's proposal for new rates, the PRC endorsed two other requests without change: One would do away with the present requirement forcing Ecom users to send at least 200 messages at a time; the other would allow users to include a business reply envelope. Before the recommendation can be implemented, it must be considered by the Postal Service's board of governors, which is scheduled to meet here tomorrow.

Three Reasons Why... No Other Burroughs Emulator Can Meet Our Standards



1. Features • • • 32 programmable function keys • • • complete keyboard reprogrammability • • • non-volatile RAM can store up to 375 characters • • • with power-on soft key storage can store in excess of 16K bytes of reprogrammed keystrokes.

2. Support • • • multi-million dollar inventory of PC's, CRT's, printers and modems • • • extensive leasing base to meet any budget • • • same day on-site service from nationwide service locations.

3. Price • • • limited time only special leasing price of $75/mo. including on-site service • • • and to totally convince you DASI will give you a two week Free trial so you can see the high standards of this Burroughs emulator for yourself.

The Visual 383 and DASI...
An Industry Leader for 15 Years

Call 800-257-7748 today
or fill out the coupon below for more information.

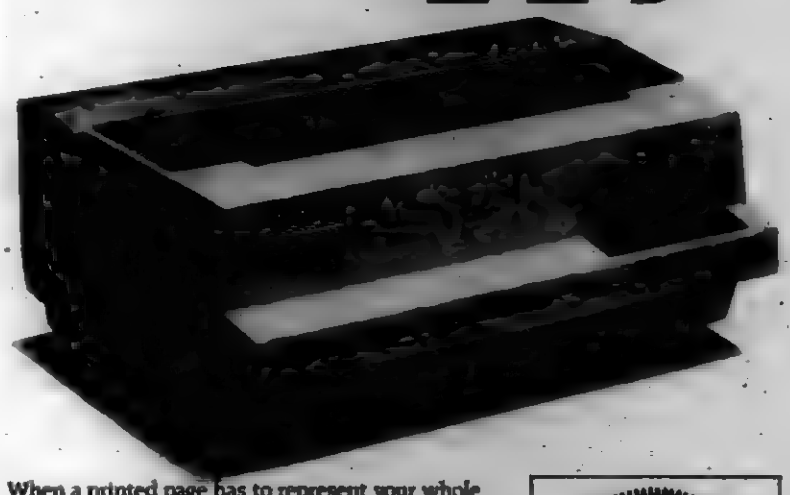
District Offices:
Atlanta (404) 998-2295 · Los Angeles (213) 532-2238
Boston (617) 769-6420 · Minneapolis (612) 854-4466
Chicago (312) 967-0440 · New Jersey (201) 227-6860
Cleveland (216) 473-2131 · New York City (212) 564-9301
Cincinnati (513) 793-4430 · Philadelphia (609) 228-6660
Denver (303) 337-4103 · Phoenix (602) 254-1927
Detroit (313) 979-7300 · San Francisco (415) 872-1811
Houston (713) 682-5885 · Seattle (206) 575-1448
Washington, DC (301) 498-3377

DAS DATA ACCESS SYSTEMS, INC.
Coles & Camden Avenues
P.O. Box 1239
Blackwood, NJ 08012
609/228-0700 800/257-7748
In NJ 609/228-9518

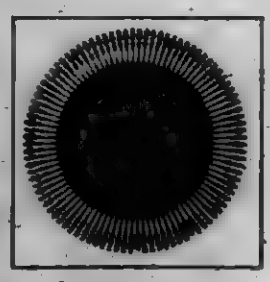
Name _____
Company _____
Address _____
City _____ St. _____ Zip _____
Telephone _____

Clip this coupon and mail today.

Make it snappy.



When a printed page has to represent your whole company, it'd better look sharp. Our DP-35 and DP-55 daisywheels rival the finest office typewriters for crisp clean impressions. And they zip along at just about a page a minute. Call your printer distributor. Or contact Dataproducts at (213) 887-3924, 6200 Canoga Avenue, Woodland Hills, CA 91365. In Europe, 136-138 High Street, Egham, Surrey, TW 20 9HL England.



Dataproducts Daisywheel Printers

DSS execs urged to make blueprint for future

By John Gallant
CW Staff

BOSTON — Decision support systems (DSS) personnel must become architects, providing the blueprints for future data, communications and management structures within their organizations.

Speaking at last week's Software Tools for Distributed Decision Support Systems Conference here, Peter G.W. Keen said DSS management's role is to develop a migration path that will allow organizations to take advantage of future technological advances. Management must be flexible enough to use current DSS tools without becoming locked into them.

"It is a grave mistake to focus only on DSS software or hardware. We need to focus on architecture, to look ahead and shape a base for the future. We need a DSS infrastructure blueprint that will allow us to evaluate opportunities in the coming years, that will allow us to migrate to new technologies," according to Keen, a visiting senior lecturer at the London School of Business and former chairman of the Cambridge, Mass.-based Micro Mainframe, Inc.

In designing a data architecture, Keen said, DSS management is faced with the threatened shakeout among micro manufacturers, a choice between competing operating systems and limited micro-to-mainframe links and deciding whether to select software for a 16- or a 32-bit arena.

Prepare for integration

The communications architecture involves an additional set of difficult choices, according to Keen. DSS personnel must prepare for the integration of voice, data and image; select among services offered in the recently deregulated marketplace; and choose between differing communications standards, such as those for local-area networks.

Keen cautioned that "architectural decisions" based on wrong assumptions can be costly, but planning is critical to ensuring that both hardware and software provide the necessary migration path to new technologies. That planning is also essential to accommodating increased system traffic in the future. "Whoever builds these architectural highways must fuel innovation without losing control," Keen said.

Perhaps more important than the data and communications architectures is the organizational or management structure that supports DSS, Keen said. He said DSS and data processing management have come to an uneasy truce following DSS' inroads into the once sacrosanct realm of corporate data. It was DSS, he said, that created the end-user environment and taught management to go outside DP for decision-making information. "But DSS has failed organizationally — it has no organizational base to support it. The authority still rests with DP, so the meshing of the two is to the benefit of both. We have to get away from the separation of telecommunications, DSS and DP. The technology and skills are changing so rapidly that we must have a mutual sharing of ideas and information between the three," Keen said.

In order to secure its position within the organization, Keen said, DSS must work closely with upper management. "Upper level management must provide direction in the drawing of blueprints and the building of data and communications highways. A good DSS person will work toward that top management commitment to get mandates and action that will end the fragmentary, bottom-up approach to office technology," Keen said.

CW AT SOFTWARE TOOLS

FMS seminar set for April 3

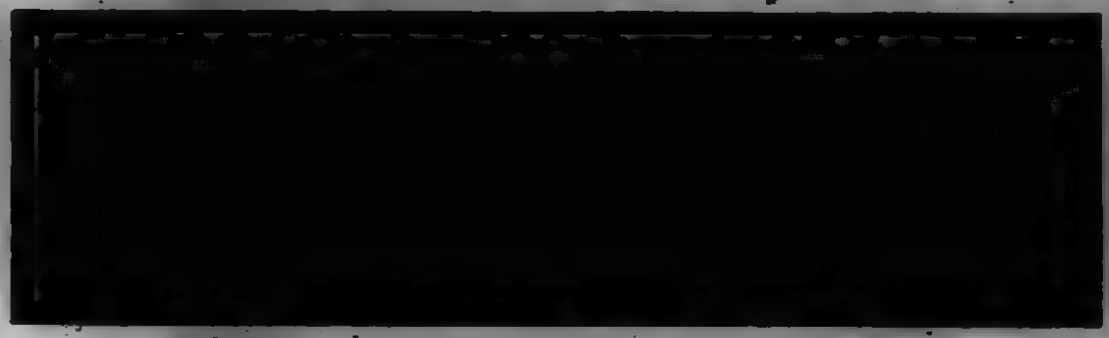
SCHAUMBURG, Ill. — The Computer Automated Systems Association of the Society of Manufacturing Engineers (SME) will hold its Flexible Manufacturing Systems (FMS) '84 seminar April 3-5 at the Hyatt Regency Woodfield here.

The seminar will feature an introduction to FMS and their components. Also scheduled are seminars on FMS implementation, sensor strategies for FMS, material-handling devices, software and control systems, simulation for FMS, group technology aspects of FMS and integrating robotics into FMS.

Eight different user case histories will be presented on successfully implemented FMS. FMS builders and component suppliers will exhibit their wares with a group of tabletop exhibits.

Registration fees are $425 for SME members and $485 for others. SME is located at One SME Drive, Dearborn, Mich. 48121.

Remember the Seminar of 1776?



If Computers Existed 200 Years Ago, These Men Would Qualify as Seminar Leaders for Technology Transfer Institute

BENJAMIN FRANKLIN
As developer of the Post Office would discuss office automation and electronic mail.

ALEXANDER HAMILTON
Electronic banking and transfer of funds.

JOHN HANCOCK
Encryption and security.

THOMAS JEFFERSON
The inventor of indoor plumbing would discuss local area networks.

YOU WON'T FORGET THE SEMINARS OF 1984!

When you need to learn about a specific subject within the computer/communications and data processing industry, you really should learn from an expert. As those men were so considered 200 years ago, so will our speakers be 200 years from now. Call or send for our newest Spring 1984 brochure outlining all of our offerings. We urge you to attend one of our seminars and discover why TTI seminars have become the standard in the field against which others are measured.

Call or write for further information: (213) 394-8305

Please send me more information on the seminars I have checked

NAME
COMPANY NAME
ADDRESS
CITY/STATE/ZIP
TELEPHONE CW 3/5

TECHNOLOGY TRANSFER INSTITUTE
741 10th Street, Santa Monica, CA 90402

Concern mounts over misuse of medical records

By David Gosse
CW Staff

CHICAGO — In the thick of last year's mayoral race here, damaging information about Republican candidate Bernard Epton's medical history was revealed, perhaps influencing the election results.

Some health care groups fear the potential for similar disclosures of supposedly confidential medical records — whether those of politicians or the general public — is becoming more likely. The growing use of computerized medical records in U.S. hospitals is posing an Orwellian threat to patients' privacy, according to one top health care official.

"Never before has the privacy of health records been so endangered," said Dr. Stuart A. Wesbury Jr., president of the American College of Hospital Administrators (Acha), in a recent report that warned of the "potentially serious threat" posed by increased computerization.

New demands for information by the federal government and insurance companies have prompted the college and other health care groups to call for stronger safeguards for computerized medical records. The 28,000-member college is the nation's largest organization for health care workers.

Last October, the government began new payment procedures in which hospitals are paid predetermined rates for the care given Medicare patients, Wesbury said. This has made it necessary for hospitals to correlate patient information and financial information "as never before."

The new payment structure has made it virtually impossible for a hospital to function efficiently without its own in-house computer system, service bureau or other outside time-sharing service, Wesbury noted.

The new Medicare payment procedures raise the likelihood that access to information will be available not only to doctors and nurses, but also to data processing and accounting department personnel, he said. An average of 75 people in each hospital now have access to patient records, according to research by the college.

The government and insurance companies are not the only organizations seeking patient information, Wesbury continued. Many employers are now establishing their own health insurance plans and are seeking patient data before making payments. An employer conceivably could gain access to medical information that the employee wanted kept confidential, he said.

Health organizations are recommending that hospitals implement policies on data security to help protect patient privacy.

Confidentiality of patient records "is a problem, but it can be overcome," according to Peter Wagemann, director of the Institute for Medical Record Economics, Inc., a Boston-based research organization serving the health care industry. The institute has recommended that every staff person with access to patient information be required to sign a statement of confidentiality, with violations punishable by reprimand or dismissal.

Wesbury said he was alerted to the security issue last August after a widely publicized incident in which computer hackers gained access to patient files at the Memorial Sloan Kettering Cancer Center in New York.

That kind of incident "perks up your ears," he said. "What if you have someone who really knows what they're doing and has more sophisticated hardware and software?"

The American Medical Records Association, in a statement on confidentiality and security of health records, urged hospitals using computers to adopt security safeguards such as limiting access to patient records, controlling access by passwords, establishing user input and output limitations, using numbers instead of names for both patients and health care providers and maintaining backup files on magnetic disk or tape.

One group is addressing the problem of access to medical information by creating model state legislation. A drafting committee of The National Conference of Commissioners on Uniform State Laws, a quasi-governmental body comprised mainly of lawyers appointed by the nation's governors, has completed a preliminary draft of a Health Care Information Act.

According to Alan Bennett, a Washington lawyer and reporter for the drafting committee, the legislation, which involves records on paper as well as in computers, contains provisions to protect access of certain medical records, prohibit disclosure of data without patient consent and place restrictions on access by law enforcement agencies.

Input error blamed for Monsanto's hefty GOP gift

ST. LOUIS — Input error has been blamed for the Monsanto Co.'s $12,439 contribution to the Missouri State Republican Party, money that was supposed to go to a Monsanto vendor.

It took more than six weeks for the error to come to light, and it did so only when the vendor, Forest Products Co. of Chicago, demanded its money.

"Apparently one of our employees punched a zero on a computer when they should have punched a three," said Dana Spitzer, Monsanto's midwest regional director of state government and civic affairs.

That input error in August led to Monsanto sending checks of $10,322.62 and $2,117.23 to the state offices of the GOP, whose account number with Monsanto is that one digit different from Forest Products' account number.

Party officials accepted and banked the $12,439 contribution, even though it was far in access of the "$500 or so" that the company usually gives to the party, according to Spitzer.

When Forest Products complained that it hadn't been paid, Monsanto discovered the error and notified Republican State Chairman Shannon Cave.

Spitzer reported that Monsanto expects to be reimbursed as soon as party officials meet to approve repayment.

Naginey named Cause chief

UNIVERSITY PARK, Pa. — Charles H. Naginey, director of management services at Pennsylvania State University, has been elected president of Cause, the Professional Association for Development, Use and Management of Information Systems in Higher Education.

Naginey has served on the Cause board of directors since 1982 and last year served as secretary/treasurer of the organization.

He holds B.S. and M.S. degrees in industrial engineering from Penn State and is a doctoral candidate in higher education at the university.

Need general accounting software for IBM System/38?

We've simply solved your problem.

LAWSON ASSOCIATES has solved it with the first general accounting software specifically designed for IBM System/38. Not merely compatible, but state-of-the-art to fully utilize your computer's capabilities. Compare. You won't find a total software solution like it anywhere else.

DESIGN FEATURES: They include: on line systems using data base management; menu driven, user friendly programs written in RPGIII, the System/38 language; and integrated modules. Their benefits: ease of installation and use, plus maximum employee productivity.

INTEGRATED MODULES: Those available include: General Ledger and Report Writer/Accounts Payable/Accounts Receivable/Fixed Assets/Payroll/Personnel/Purchase Order/Order Entry/Inventory Control

SERVICE FEATURES: Fully documented and supported. Onsite training and implementation. One year warranty. Available now for immediate installation.

For more information, please call or write:
Lawson Associates, 2021 East Hennepin Ave., Minneapolis, MN 55413
(612) 379-2633

LAWSON ASSOCIATES
WE SIMPLY SOLVE PROBLEMS

NEW COURSE ANNOUNCEMENT

BECOME AN IMS EXPERT

SysEd offers challenging "hands-on" training for motivated programmers who want to be real pros and are willing to work.

Our experienced instructors specialize in using real-life programs and design problems. Whether it's IMS Data Base Design, IMS/DB (DL/I) Application Programming, IMS/DC & Message Format Services Programming, IMS Recovery and Restart or IMS Utilities, they encourage students to bring in the specs of their own projects for discussion and analysis.

SysEd students spend one third of class time in actual hands-on workshop sessions with our 4341/II computer. There are six 3270 terminals dedicated to the class. Each student receives an original manual especially designed for each course. The manuals are comprehensive guides and programming models written especially for each course. They are thorough, clear, and well organized, and serve as reference manuals long after the course.

Classes are held at SysEd's fully equipped classroom/computer facilities in New York City and Chicago. Class size is limited so applications are accepted on a first come first serve basis.

Customized course offerings are also available for on-site sessions at company installations.

Other Technical Curricula include: CICS, IDMS, VSAM, and MVS.
For information, call Dave Shapiro (212) 889-3386.

ONE PARK AVENUE
NEW YORK, NY 10016

SYS-ED

NEWS

INTERNATIONAL REPORT
CW International News Network

AUSTRALIA

ADELAIDE — Competition in the large financial systems market is heating up following the entry of a new player, Walker Interactive Products, Inc., represented here by SPL Australia Ltd. SPL recently beat out strong competition from other established vendors — SI Products, McCormack & Dodge Corp., Arthur Andersen & Co. — in winning a major contract here from oil mining company Santos Ltd.

CHINA

BEIJING — Eastern Computers, Inc. (ECI) has unveiled a Chinese microcomputer that features 30,000 Chinese characters. The ECI 3916 system comes in two versions — one for the People's Republic of China and one for Taiwan. According to the vendor, it takes the user between three and eight days to become proficient at entering data into the system. The 16-bit system comes with 256K bytes of random-access memory, 1.2M bytes of floppy disk capacity, full word processing keyboard, two serial ports, one parallel port and a 25- by 40-line character display screen. It is priced from $4,495.

FRANCE

PARIS — Gixi, a French software and engineering house, has launched a 2048- by 2048-pixel graphics terminal called Radiance 2000A. Developed for computer-aided design and manufacturing applications, the terminal consists of a 20-in. screen, a keyboard and a digitizer. It is said to be compatible with Tektronix, Inc.'s 4014/4016 units and costs approximately $17,000.

JAPAN

TOKYO — Toshiba Corp. has released a 5¼-in. floppy disk drive called ND-06D that can handle up to 1.6M bytes — the largest memory capacity available with a 5¼-in. product, the vendor claimed. In addition, because of its large-scale integration design, the disk drive can reportedly transmit data at the rate of 500K bit/sec. The product is priced at $221.

■

TOKYO — NEC Corp. has released an operating system for its MC Series of minicomputers that is compatible with Unix software. Called MS-UX, the product features window display screen editing functions via windows, numerical value calculation, input and editing of Japanese text and a remote job entry facility to NEC's Acos Series mainframe. MS-UX will be available in April for $6,809.

WEST GERMANY

FRANKFURT — Within a few short years, one out of every two personal computers will be used in a commercial environment, according to a recent report published here by Diebold Deutschland GmbH. The analysis claimed that big business is making great use of the microcomputer, while there is not yet much personal computer activity in small and medium-size companies.

■

BOEBLINGEN — Hewlett-Packard GmbH announced that it is very optimistic about its growth rate. During fiscal year 1983 (ending September 1983), the company showed a 20% increase in revenues. According to chairman of the board Eberhard Knobloch, HP GmbH is in the running to claim the No. 3 spot in the personal computer market here.

■

MUNICH — The German Federal Postal Administration has commissioned a consortium of German telecommunications and aerospace companies, headed by Siemens AG, to establish a German communications satellite system by 1987. The system has three main tasks to accomplish: high-speed transmission of telephone and teleconferencing calls and data; expansion of telephone and data channels to Berlin; and trial operation of a new frequency range for future television use, according to a consortium spokesman.

RAMIS II MAKES YOUR INFORMATION CENTER A GREAT PLACE FOR PEOPLE.

RAMIS II's complete solution is the most effective way to multiply the productivity and satisfaction of your end users and your Information Center staff. Today, RAMIS II means success at hundreds of Information Centers around the world.

POWER AND SIMPLICITY FOR END USERS

RAMIS II provides everything users need for maximum productivity. Its powerful report writer, relational database and language, full-color business graphics, SAS® interface, and many other capabilities meet the most advanced decision support needs. And, with our new RAMLink, IT series, and RAMIS II/PC software, end users have the ideal solution for mainframes and personal computers.

RAMIS II English comprehension extends the power of your Information Center to a multitude of new computer users. Through advanced knowledge-based technology, even people who've never been on speaking terms with a computer can ask questions, obtain answers, and create reports in only a few minutes using everyday English.

EFFICIENCY AND RELIABILITY FOR SUPPORT STAFF

Our complete solution lets your existing staff support many more users by dramatically reducing the number of products you need. And RAMIS II makes your support job easier with built-in computer-based training plus facilities to monitor and control usage.

RAMIS II delivers the performance and reliability needed to tackle even the largest decision support tasks with confidence. In fact, because RAMIS II is also a complete application development system, single-user systems can evolve smoothly into full-fledged applications.

SAS® is a registered trademark of SAS Institute, Inc.

LISTEN TO OUR USERS

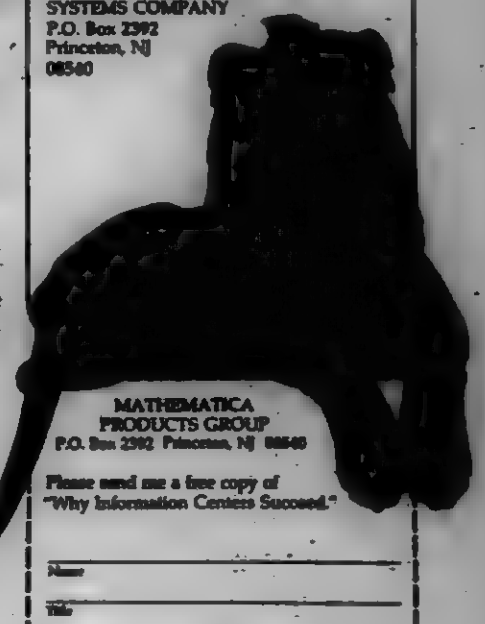
Send for our free guide, "Why Information Centers Succeed." It contains practical suggestions for success from RAMIS II Information Center staffs of organizations like yours. Organizations that have found that RAMIS II, the real leader in complete software for business, is the sure way to make an Information Center a great place for everyone.

To get your copy, contact your local Mathematica office, call toll free (800) 257-5171, or return the coupon below.

RAMIS® II... THE LEADER BY DESIGN

Boston (617) 357-8424 Chicago (312) 670-6710 Dallas (214) 788-1916 Houston (713) 850-0697 Los Angeles (213) 670-6082
New York (212) 765-8877 Princeton (609) 799-3000 San Francisco (415) 495-6305 Washington, DC (202) 484-9738 Basel (061) 428925
Bogota (5) 322309 Buenos Aires (541) 394891 Calgary (403) 269-8466 Hamburg (04121) 14051 Hong Kong 5-435714
Johannesburg 27 11 788-1680 Kingston (809) 926-7225 London (01) 399 3681 Milan (2) 345-0830 Montevideo (2) 980768
Ottawa (613) 236-0664 Paris (1) 779 46 71 Santiago (2) 31654 Singapore 273 0281 Stockholm (08) 982720 Sydney (02) 923 1477
Tel Aviv (052) 75854 Toronto (416) 671-2272

MATHEMATICA PRODUCTS GROUP
A MARTIN MARIETTA DATA SYSTEMS COMPANY
P.O. Box 2392
Princeton, NJ
08540



MATHEMATICA
PRODUCTS GROUP
P.O. Box 2392 Princeton, NJ 08540

Please send me a free copy of "Why Information Centers Succeed."

Name
Title
Company
Address
Telephone
Computer Operating System

CW2

"Rockwell International eliminates order management paperwork and ships products faster with a ***Tandem NonStop*** *Computer System."*

Robert F. Murovich, VP and Controller
Avionics Group

"Our Tandem NonStop computer helps us dramatically streamline order tracking for our broad line of products there at the Collins avionics facilities in Cedar Rapids. This automated operation has meant we've been able to ship our products faster, as well as respond to customer inquiries in a much more timely, accurate fashion.

"The Tandem system consolidates all data pertaining to the orders, from order entry to scheduling, inventory issue to packing lists, and right on down the line to shipping. And, because the system is on-line, other departments have immediate access to this information as well. Accounting, for example, now generates invoices automatically, resulting in much improved cash flow; Manufacturing is saving $175,000 a year in internal freight charges due to the reorganization of ordering and shipping procedures; and the Group as a whole has been able to eliminate more than 300,000 reproduced documents a year.

"Other system benefits contributing to our improved customer service include better control of backorders, more accurate pricing information, and the ability to make detailed forecasts of market conditions for planning purposes. The net result is an operation that is helping us achieve some very significant gains in plant productivity.

The NonStop System. Ideally suited to on-line transaction processing where continuous availability of up-to-the-second information is critical to your business.

Tandem. Fully supported by worldwide sales, training, service and manufacturing organizations.

For information on how a Tandem NonStop system can improve your productivity or your P/L statement, call your local sales office or Tandem Computers Incorporated 19333 Vallco Parkway, Cupertino, California 95014, U.S.A. Toll Free 800-482-6336 or (408) 725-7500 in California.

TANDEM

NonStop Transaction Processing

NEWS

Model assesses how OA equipment improves productivity

By Lynn Haber
CW Staff

COLUMBUS, Ohio — A computer model that assesses how office automation equipment can improve office productivity has been developed by a research and development facility here.

The model is an offshoot of a program that Battelle Memorial Institute's Columbus Division has been working on since 1978 to measure industrial productivity at the plant level.

The office model enables researchers to measure total current productivity by clerical, management and technical personnel, then determine specific areas in which improvements can be made.

The Battelle model can be used to measure productivity in industrial, service and government organizations. Such functions as budgeting, purchasing, data control, management and support can be analyzed.

"Once we establish a relative measurement," explained Dean F. Poeth, a researcher at the facility, "through the use of the model, we're able to play 'what-if' games.

"If you introduce such and such equipment, you might have such and such effect. However, there is capital investment, energy requirements and space allocations. . . . Exercising the model, we come up with a prioritized list of what one might do to improve the productivity, given the measures that have been internally generated."

Will send in team

To utilize the productivity model, a company must contract to have Battelle evaluate the areas it is interested in having studied. Battelle will send in a team that includes computer people, industrial engineers and other individuals with a multidisciplinary background to match the area being evaluated to become the facilitators of structuring the model.

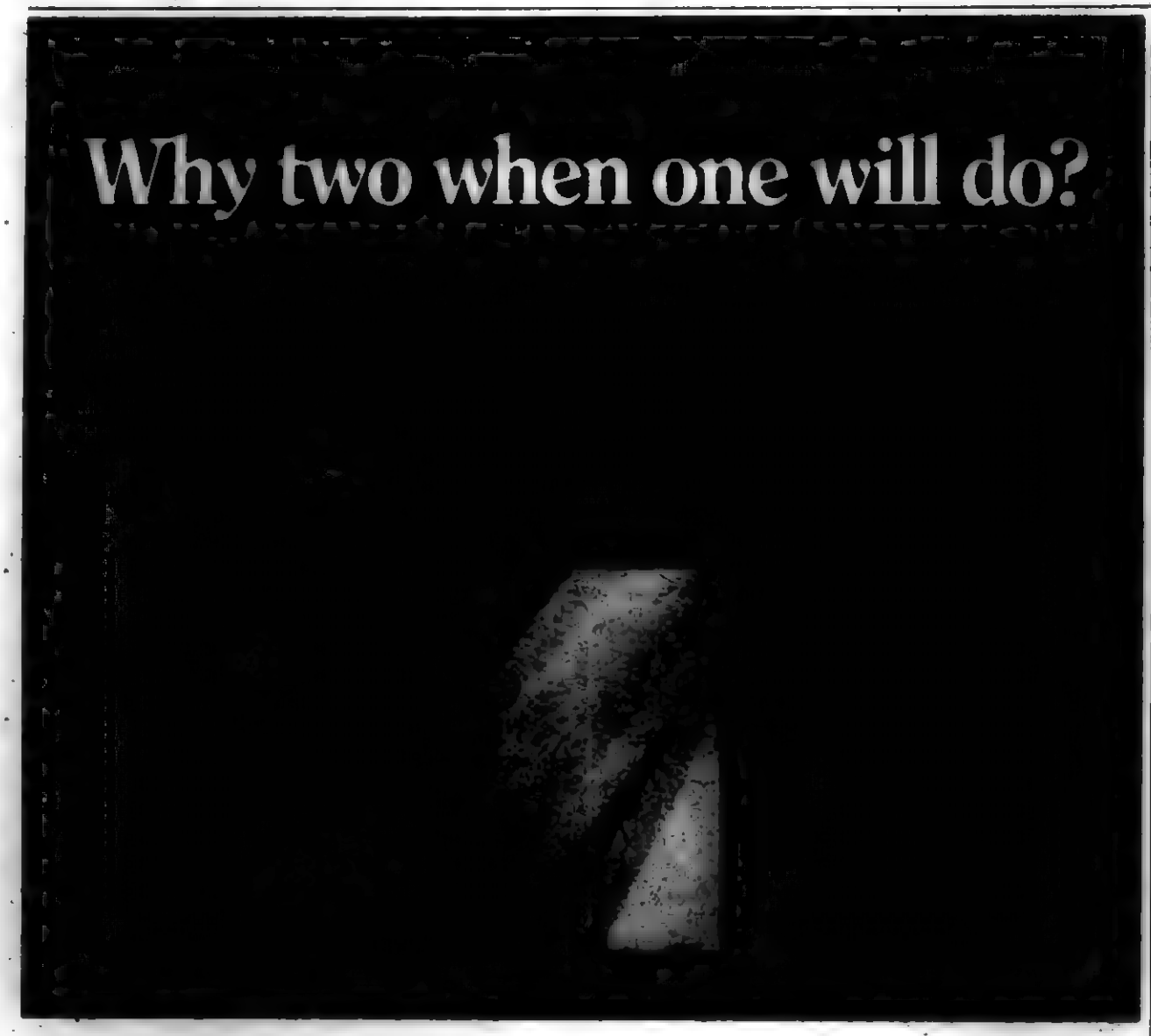
The researchers will modify the computer program for that specific model and implement it so the contracting company's employees can run it.

"It's not a canned program at all," Poeth said. "It's used as a planning tool designed for people to look at the potential for inputting office automation or any kind of productivity improvements," according to Poeth.

Poeth estimated that for a typical organization with a few hundred people, the modeling study could be done in three months.

The cost for a program evaluating several hundred people to 10,000 could range from $30,000 to $50,000.

Further information is available from Battelle Columbus Laboratories, 505 King Ave., Columbus, Ohio 43201.



Lee Data's universal terminal system design provides access to both 3270 and VT100 applications.

Now with Lee Data's new 3270/Async Communication System (Series 400) you can eliminate the cost and inconvenience of needing separate displays for access to 3270 and VT100 applications.

The Lee Data universal terminal system approach is another innovative Lee Data design that allows a single Lee Data display to access applications and data from an IBM CPU, a non-IBM system such as DEC, H-P or Prime, and timesharing services. And a simple command entered from the display keyboard is all that is required to switch from 3270 to VT100 operating mode and back again. What could be easier?

The Series 400 System incorporates a new hybrid approach to system operation that is simpler and more efficient than protocol conversion. This approach allows a Lee Data controller to provide dedicated 3270 and VT100 processors for concurrent, but independent application access.

In addition, a single Lee Data controller provides you 3270 compatibility via either a remote BSC or SNA/SDLC or a local SNA or non-SNA interface, as well as 1 to 16 RS232C ports for your asynchronous application needs. Line speeds available are from 300 to 19,200 BPS.

The Series 400 System also provides you support for up to 32 devices, including Lee Data's unique All-In-One display that offers dynamic selection of 4 screen sizes—three 80-column and one 132-column. Lee Data's 3279-compatible color displays and a full line of printers are also available as part of the 32-device complement.

3270 and VT100 capabilities combined in a single terminal system—a reality with the new 3270-plus-Async system from Lee Data.

Discover what our system can do for your company's terminal network. Call our system specialists toll free:

800/328-3996.

Designers of innovative systems for the information worker

LEE DATA CORPORATION

7075 Flying Cloud Drive
Minneapolis, MN 55344

Course on SAS announced

ARLINGTON HEIGHTS, Ill. — Advanced Systems, Inc. has announced a videotape training course titled "Using the Statistical Analysis System." The Statistical Analysis System (SAS), developed by SAS Institute, Inc. in Cary, N.C., is a data retrieval and management, programming, statistical and reporting system.

The course, which was designed for managers and programmers, teaches how to write SAS code, input and analyze data and produce reports.

The course is leased to companies for prices that range from $50 to $100 per year, depending on the length and type of lease, the vendor said.

Advanced Systems is located at 2340 S. Arlington Heights Road, Arlington Heights, Ill. 60005.

Japan no big threat to U.S. vendors, Darpa chief says

By John Kirshner
CW Washington Bureau

WASHINGTON, D.C. — A top Pentagon researcher last week said Japanese computer makers, contrary to fears widely expressed in this country, do not threaten to supplant American firms as the major suppliers to the U.S. market.

Dr. Robert S. Cooper, director of the Defense Advanced Research Projects Agency (Darpa), dismissed fears that the Department of Defense and other users of advanced computer systems might have to rely on Japanese companies for supercomputers by the end of the century.

Cooper told an Institute of Electrical and Electronics Engineers (IEEE) conference here Tuesday that he has just returned from a visit to Japan during which he inspected a number of university, government and industry high-technology laboratories and viewed operations of the new class of supercomputers recently installed by Hitachi Ltd. and Fujitsu Ltd.

Cooper was "very much impressed" with the new supercomputers and said they may prove better than existing U.S.-made computers by some performance criteria. But, he added, the real question is how the Japanese will compete with the next generation of U.S. supercomputers, those with 10G floating-point operation/sec now under development by ETA Systems, Inc. and Cray Research, Inc. for 1986-87 release.

Although he was concerned that the Japanese may have a two-year jump on those American efforts, Cooper also insisted he does not believe the Japanese will overtake and supplant the U.S. in this area. "I feel our industry is highly competitive," he said. "The Japanese have a serious problem on their hands trying to address any market in the U.S."

In any case, Cooper said, Darpa's "strategic computing" program, aimed at developing several classes of superfast machines using artificial intelligence to control advanced weapons systems in the 1990s, guarantees the U.S. will be able to supply future supercomputer needs.

Of the Defense Department program, he predicted that "much of the research will spin off rapidly" to boost the American computer industry. The program, with a proposed 1985 budget of $95 million, will eventually cost $150 million a year, according to Cooper.

He also called the program "an insurance policy" against IBM's decision not to reenter the supercomputer industry. He said IBM is "the key to the whole issue" of U.S. dominance over Japan in this industry. Unless IBM becomes more aggressive in advanced computers, it will continue to lose worldwide market share, he said, predicting its market share could drop to 20%.

Other speakers at the session on supercomputers also looked to IBM for the continued health of the U.S. computer industry. Dr. Kenneth G. Wilson, Cornell University physicist and 1982 Nobel laureate, called for a cooperative program involving IBM and other industry firms to develop a business market for supercomputers.

Wilson said he has been assured by executives at ETA Systems, the Control Data Corp. supercomputer spin-off, that current technology permits development of a $500,000 supercomputer if there is a market for it. He suggested that U.S. government support is also crucial to the U.S. supercomputer effort.

Wilson, who has been active in trying to get greater U.S. scientific community access to advanced computing facilities, chastised Congress for ignoring what he called critical economic and scientific needs and spending too much time on defense, the deficit, taxes and "struggling with all the other stupidities that go on in this town."

Engineers group looks to start research centers

By John Kirshner
CW Washington Bureau

WASHINGTON, D.C. — The National Academy of Engineering (NAE) has proposed establishment of 25 engineering research centers, joining industry and academia in various engineering projects, including design, manufacture and operation of computer and telecommunications systems.

In a report to the National Science Foundation (NSF), which has provided for initial support of the program in its proposed 1985 budget, the NAE said the centers would enhance the quality of American engineering education by familiarizing students and faculty with "how engineering knowledge is converted by industry into societal goods and services."

The centers are needed, according to the report from a special NAE panel, because of a "particular weakness" in current engineering education: "an overemphasis on analytical research, with less opportunity for 'hands-on' experimental research; inadequate exposure of engineering students to engineering practice; and a lack of interaction between faculty and industrial practitioners of systems engineering."

The academy said the centers, which would be established at engineering schools, would bring an interdisciplinary approach to industry/university research.

NAE noted an NSF report that claimed there is a growing need for engineering education that cuts across the engineering subdisciplines and applied sciences.

The academy estimated each center would cost between $2.5 million and $5 million per year, requiring a minimum NSF support level of $100 million. However, the NAE report suggested the program could be developed in steps, with an initial establishment of five to 10 centers.

DEC TO IBM SNA

Now available...full SNA capability for your DEC computer! Comboard/SNA gives your terminals access to IBM interactive applications. Data can be transfered between systems transparently, all in the complete fully supported package, from Software Results.

Comboard/SNA is a proven and reliable, single-board, 256KB communications computer that plugs into your DEC Unibus. Teamed with Comboard software, the system is a cost-effective solution to troublesome SNA communications problems.

Comboard/SNA allows your DEC to emulate an IBM PU Type 2 communications node. You have a full gateway into your SNA without the trouble of passing through a secondary network.

For further information, fill in the coupon below or call Software Results... the leader in DEC to IBM communications.

COMBOARD

NAME
COMPANY
ADDRESS
CITY, STATE, ZIP
Telephone

SOFTWARE RESULTS CORPORATION

Call Toll-free
1-800-SRC-DATA
(1-800-772-3282)
In Ohio call collect
1-614-267-2366
267 Silver Drive, Columbus, Ohio 43081
Telex: 437-438 SRC DATA CI

Comboard™ Software Results Corporation
DEC Unibus™ Digital Equipment Corporation
IBM, SNA,™ International Business Machine Corp.

ATTENTION: MANAGERS — ENGINEERS — SITE PLANNERS

HAVE YOU HEARD ABOUT FIPS PUB 94?

GUIDELINE ON ELECTRICAL POWER FOR ADP INSTALLATIONS

A COMPUTER INDUSTRY FIRST! qA

NOTICE: THIS MILESTONE DOCUMENT HAS BEEN REVIEWED BY MEMBERS OF THE POWER INTERFACE COMMITTEE OF THE COMPUTER BUSINESS EQUIPMENT MANUFACTURERS ASSOCIATION, (IBM ,DEC, BURROUGHS, HONEYWELL, UNIVAC, NCR, CDC, ETC.) AND THEREFORE REPRESENTS A CONSENSUS AMONG THESE POWER EXPERTS.

FEDERAL INFORMATION PROCESSING STANDARDS PUBLICATION

COMPUTER POWER SYSTEMS CORP. A CONTRIBUTOR TO FIPS PUB 94 WILL CONDUCT THESE SEMINARS, TO FULLY EXPLAIN THE TECHNICAL CONCEPTS PRESENTED.

MARCH 22	LOS ANGELES	SEPTEMBER 6	NEW YORK CITY
APRIL 5	DETROIT	OCTOBER 18	BOSTON
JUNE 28	PHILADELPHIA	NOVEMBER 8	DALLAS
JULY 19	CHICAGO	DECEMBER 6	ATLANTA
AUGUST 14	SAN FRANCISCO		

SEMINAR DETAILS WILL BE PROVIDED WITH YOUR RESERVATION

YOU'VE ALL BEEN INVOLVED IN CONTROVERSIES ABOUT

- HOW TO GROUND A COMPUTER?
- HOW MUCH ISOLATION REQUIRED?
- WHAT KIND OF POWER CONDITIONER IS NEEDED?

DON'T MISS THIS UNIQUE OPPORTUNITY!

THIS ONE-DAY SEMINAR COULD BE YOUR BEST INVESTMENT IN 1984!!

☐ ENROLL ME IN _____ (CITY)
☐ ENCLOSED IS MY CHECK FOR $195.00
☐ BILL ME (ENCLOSE BUSINESS CARD)

COMPUTER POWER SYSTEMS CORP.
P.O. BOX 6349, CARSON, CA 90749
213/515-6666 X 237 R. MILLER

NOTICE: PAYMENT IS DUE 10 DAYS PRIOR TO EACH SESSION

NEWS

Survey reveals OA accepted with open arms

By John Gallant
CW Staff

A recent survey of more than 500 secretaries and administrative assistants indicated that despite management fears, office automation has been accepted with open arms.

But the survey also revealed that for those who master the skills of the high-technology office, expectations of higher pay and career advancement often go unfulfilled.

Titled "People in the Electronic Office," the survey was conducted for Kelly Services, Inc. by the New York-based research firm Research & Forecasts, Inc. The nationwide poll was designed to gauge the sentiments of 507 full-time corporate secretaries toward recently introduced office automation tools, primarily word processing equipment.

On a scale of emotional responses ranging from love to hate, 83% of the secretaries said they love WP equipment, while none expressed the opposite reaction. Eighty-seven percent said they feel WP skills will lead to new career opportunities, and even more (88%) said those skills will result in salary increases.

But the survey revealed a number of puzzling discrepancies, according to Kelly Services spokeswoman Rose Leach. Despite the optimism of most secretaries, only 30% had actually received pay increases as a result of acquiring WP skills. And when asked what opportunities open up through WP skills, very few of the respondents named positions which could be considered even middle management.

Furthermore, the respondents said old-fashioned personal initiative still ranks No. 1 in determining pay raises and promotions.

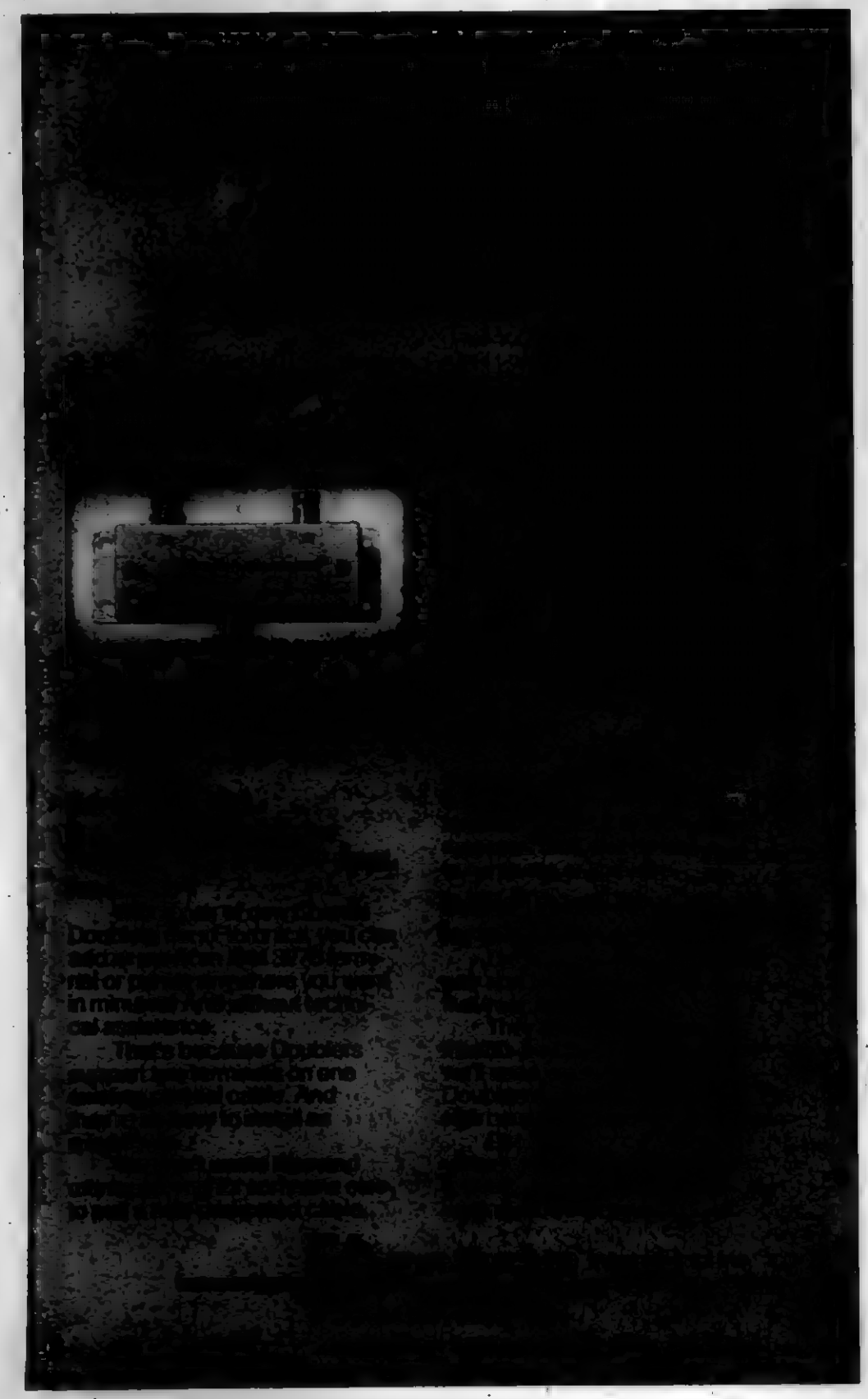
Three-quarters of the secretaries said OA equipment frees them from typing chores and allows more time for work that involves decision making. But when asked what new responsibilities the electronic tools allow them to undertake, most named tasks that Leach described as traditional secretarial duties, such as drafting letters and researching and writing reports.

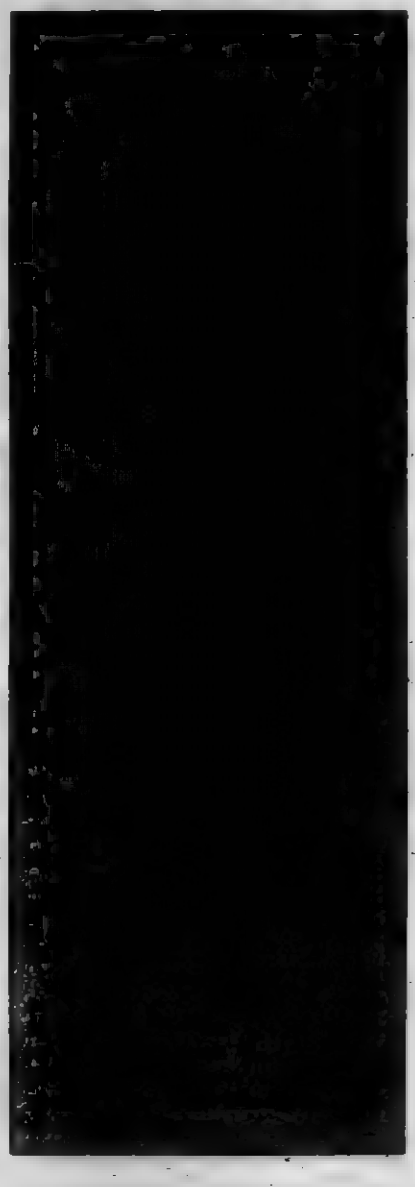
"We were very excited about the finding that secretaries are pleased about word processing. There has been a lot of concern and confusion about how they would adapt to that," Leach said. "But more important, the survey also brings out the disparity between their beliefs and reality."

Age, according to Leach, was an important factor in the survey. Forty-eight percent of the respondents under age 25 reported pay increases resulting from WP skills, compared with much lower figures among older secretaries. The younger secretaries said their knowledge of WP is more important than such customary skills as shorthand, while their older counterparts place more value on such traditional abilities.

In addition, almost a third of the younger respondents already had training in either Cobol or Basic programming. Leach said those results reflect the "mobile secretary of the future, one eager to learn about new technologies and to advance as a result of the newly acquired skills."

Copies of the survey are available free from Kelly Services, Public Relations Department, 999 W. Big Beaver Road, Troy, Mich. 48084.



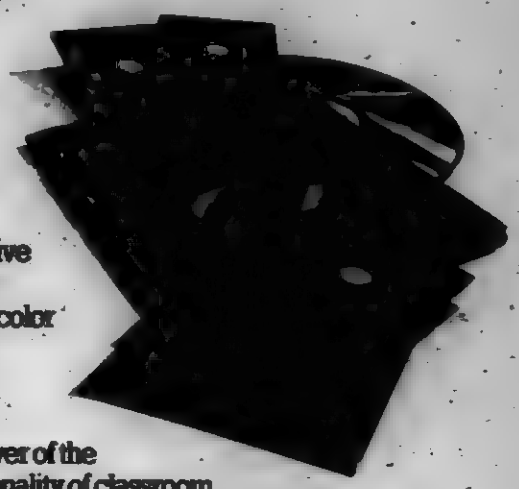


A WORD TO ANYONE LOOKING FOR UNIX® TRAINING:

Guaranteed.

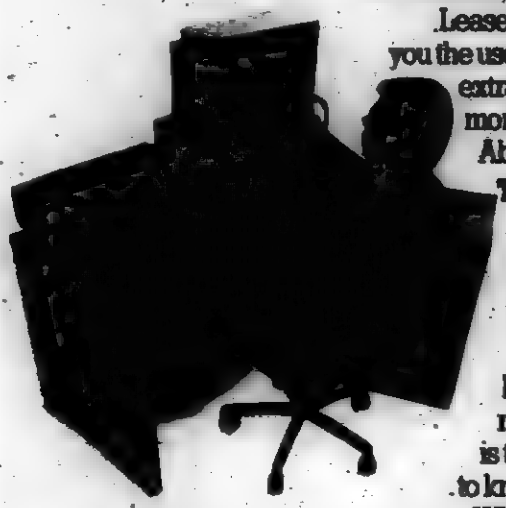
Introducing Vision. The first UNIX Interactive Videodisc Training Curriculum. And our 30-Day Money-Back Guarantee.

Simply lease any one of three Vision Courses: UNIX Overview, UNIX Fundamentals or 'C' Language Programming. If you're not satisfied, for any reason, return it for a full refund. No questions asked.



A Free IBM PC and Laser Discplayer.

Lease all three Vision Courses for one year. And we'll give you the use of a complete interactive videodisc system at no extra cost. You get an IBM PC, laser videodisc player, color monitor and Interactive Training System Controller. Absolutely Free.



Training in Action.

Interactive video training combines the power of the computer, the speed of a laser disc and the personality of classroom instruction. To involve, to motivate, to excite. To capture and hold a student's interest in a way no other medium can.

Students learn by doing, so they learn faster, comprehend better and retain information longer. Because training is targeted, they learn only what they need to know to do the job. Now.

What's more, Vision was developed by Interactive Training Systems, the acknowledged leader in interactive video training. And Computer Technology Group, a leader in UNIX training.

The result? UNIX training so fast, so effective and so affordable, we back it with a full 30-Day Money-Back Guarantee. (Frankly, it's one guarantee we're confident you'll never get to use.)

Send us the attached coupon. Or call us at 1-800-227-1127.

AFTER MARCH 31, 1984 OUR FREE INTRODUCTORY OFFER IS NO LONGER FREE!

☐ Please have a representative contact me immediately.

☐ Please send me more information about Vision, the UNIX Interactive Video Training Curriculum.

Name _____

Company _____

Title _____

Address _____

City _____ State _____ Zip _____

Telephone _____

® Bell Laboratories (UNIX) Licensee

Interactive Training Systems, Inc.
4 Cambridge Center, Cambridge, MA 02142

Portable to help mountaineers scale Everest

By Paul Somerson
CW Staff

In 1924, British explorers George Leigh-Mallory and Andrew Irvine unsuccessfully attempted to become the first climbers to reach the summit of Mt. Everest in Tibet. On February 27 of this year, 16 mountaineers began a three-month quest to be the first team of Americans to retrace the British explorers' course. A portable computer will play an integral part in the journey.

"The computer will serve a number of purposes," said Robert Berg, an expedition member and president of Zepher Industries, Inc., a Seattle-based distributer. "With it, we can easily alter our route. Variable factors such as temperature, snowfall, energy consumption and available equipment are used to determine the best route to the summit. Completing calculations with a computer will be much easier than using a pencil and paper."

The computer will also be used to monitor expedition members' health. After medical information, such as pulse rates, is input, recommendations will be made concerning whether climbers should journey into the cold or remain in the expedition's warm research tent.

Seven tons of equipment, eight yaks and 15 Tibetan porters are part of the expedition, dubbed Ultima Thule, a Greek and Latin phrase meaning "the ultimate outer limits of achievement."

"The computer will help us track inventory by calculating how much food and energy is available and how much is needed for each part of the trip," Berg said, who has climbed Mt. Rainier and Mt. St. Helens in Washington.

The mountaineers were scheduled to pitch camp at seven locations. While the computer will not reach the mountain's top, at 29,028 feet, it will be used at a camp located at 21,000 feet, where temperatures will be quite chilly. "Throughout the trip, temperatures will range from 0 degrees [Fahrenheit] to 40 degrees below 0," Berg said. "The heat will be on at some times, but not all the time. We have to conserve as much energy as possible. One reason we decided to use a portable computer was that it doesn't use much electricity."

One climber, Tom Clement, must ensure that the computer functions in any weather. According to Berg, Clement teaches at the University of Washington and contacted a friend to write the programs that will be used on the trip.

The expedition costs approximately $600,000, according to Berg, with a number of items donated: Microsoft, Inc., based in Bellevue, Wash., helped write the programs; Columbia Data Products, Inc. of Columbia, Md. donated its Multipersonal computer; and Okidata Corp. in Mount Laurel, N.J., presented the expedition with its Microline 92 printer.

Weather will be a critical factor in the expedition's quest to reach the summit. "If the monsoons kick up early, we will have to quit," Berg said. "We're hoping to get cooperation from the weather." If all goes well, the expedition will be completed on June 1.

CASE #4

SOFTWARE SURVIVAL

Aaahh. The headaches of developing software. Your projects are too late. Too expensive. And frankly, don't always meet user needs.

So you look for help. You turn to software development aids. But instead of getting peace of mind, all you get are piecemeal solutions. Not so with Nastec.

NASTEC CASE 2000™ products provide computer aided development and a managed life cycle approach that fit well with your existing methods. You'll have more control over your software development process, which means higher quality software. On time. On budget.

So now you have a choice. You can take two aspirins. Or you can call Nastec in the morning.

Call toll-free 1-800-872-8296 (in Michigan 313-353-3300). Or write Nastec Corporation, 24681 Northwestern Highway, Southfield, MI 48075, for more information about our NASTEC CASE 2000™ Workstation and Software Products. Our software survival solution is just what the doctor ordered.

The Computer-Aided System and Software Engineering Company

NASTEC CASE 2000

We don't promise.
We deliver.

Adcis session slated for May in Columbus

BELLINGHAM, Wash. — Dr. Fred Hofstetter of the University of Delaware has been elected as the Dean Memorial Lecturer for the 25th International Conference of the Association for the Development of Computer-Based Instructional Systems (Adcis), an organization for applied research in the use of computers for support of direct instruction.

The Adcis preession and conference will be held May 14-18 at the Columbus, Ohio, Hyatt Regency Hotel. Running from May 14 into the morning of the 15th, the preession will be devoted to in-depth presentations and discussions of several topics.

Hofstetter, who is director of the University of Delaware's Office of Computer-Based Instruction, has served as principal investigator in several research projects dealing with instructional technology.

Conference fees for members are $50 for the preession, $85 for the conference and $105 for the conference and preession. For nonmembers, the fees are $60 for the preession, $120 for the conference and $140 for both. For students and spouses, the rates are $20 for the preession, $35 for the conference and $35 for both, according to a conference spokesman.

More information on the conference is available from the Adcis International Headquarters, located at Miller Hall 409, Western Washington University, Bellingham, Wash. 98225.

Soup up your Volkswriter.

Everybody knows Volkswriter, the word processing software package that's become synonymous with high performance. Now, there's a way to get even higher mileage out of your Volkswriter. Hook it up to a Dataproducts P Series dot matrix color printer.

The versatile P Series translates the executive class, word processing capabilities of the Volkswriter into brilliant full color charts, graphs and text. It delivers a full page of text quality print in nothing flat while its sheet feeder automatically prevents loading hassles. And the P Series uses pin feed or plain paper and has the brains to fill every appropriate line with crisp, sharp copy, even if it has to justify to do it. And the P Series color printer has dual speed capability for correspondence quality output for the Volkswriter's many word processing applications and high speed output for draft and spreadsheets.

The Dataproducts P Series color printer. Think of us as a supercharger for your Volkswriter.

For more information go to your nearest computer store and ask about the Dataproducts P Series color printer, or call Dataproducts, 1-800-258-1386.

Dataproducts computer printers

Nobody puts ideas on paper so many ways.

Volkswriter is a registered trademark of LIFETREE SOFTWARE, INC.

Capable COBOL.

For over twenty years, COBOL has proved it can handle the most awesome data handling requirements of the business world.

And Microsoft® COBOL brings this power to the MS™-DOS environment in an even more flexible version. It's the ideal choice for transporting and adapting the thousands of mainframe and minicomputer programs now on the market.

Microsoft COBOL was designed after the ANSI COBOL standard. Its quality and performance has been fully certified by the GSA.

Microsoft COBOL includes a complete set of file handling facilities including support for sequential, line sequential, relative and B+ tree indexed sequential (ISAM) files.

MICROSOFT. The High Performance Software

The advanced screen handling features, compatible with Data General,® make it easy to create forms and menus for interactive user programs. Direct cursor positioning, highlighting, automatic format conversion, projected fields, and automatic field skip are just some of the capabilities.

An interactive source code debugging tool allows you to step through your program in symbolic form. There is no need to wade through object code and addresses in memory to see what is going on. It's a complete development package.

Applications developed with the compiler can be distributed without a runtime support charge.

Like all Microsoft languages, the standard linking interface makes it easy to combine assembly language subroutines.

Call 800-426-9400 to order the capable COBOL. $700.*

In Washington State, call 206-828-8088. Ask for operator F3, who will rush you your order, send you more information, or give you the name of your nearest dealer to see Microsoft COBOL in action.

*Price exclusive of handling and Washington State sales tax.
Microsoft is a registered trademark and MS is a trademark of Microsoft Corporation.
Data General is a registered trademark of Data General Corporation.

NEWS

Micro tracks cancerous tumors at McGill

By Paul Gerstenzang
CW Staff

MONTREAL — A computer was a key tool leading to the recent discovery that cancerous tumors in advanced stages of growth fend off a body's defense mechanisms.

Dr. Peter Noble, a specialist in cancer research at McGill University here, found that certain white blood cells, which in many cases are attracted to and destroy cancer cells, are actually repelled by a chemical secreted by advanced cancer cells.

To observe cell movement, Noble used a microcomputer system from Electro-Optical Information Systems, Inc. (Eios) in Santa Monica, Calif. The microcomputer employs frame grabbing, a technique that transforms individual pictures into pixels. Graphics data is then fed into a series of Fortran programs, developed by an electrical engineer at McGill, that determines in which direction cells are moving.

This method of determining movement was pioneered by McGill University engineers. "We developed the first applications, which used time-lapse photography and the Markov Theorem to determine movement," Noble said. The Markov Theorem provides a model in which the probability of an event is dependent only on the event that precedes it.

"A student in the mathematics department was helping us apply the Markov Theorem," Noble said. "He approached Dr. Martin Levine, an electrical engineer, and asked him to write a program which would speed calculations.

"Originally, we were using a Digital Equipment Corp. VAX/11 superminicomputer. Last year, we switched to the Eios system." The Eios system uses an Intel Corp. 8086 microprocessor, Digital Research, Inc.'s CP/M 86 operating system and Eios frame-grabbing software.

"The program is designed to transform pictures into graphics data," said an Eios spokesman. "Since we customized the program, it is used by a number of different companies. We customized Dr. Noble's system so that it could use Fortran subroutines."

Noble bought an Eios system for $17,000 Canadian. "There were problems with the VAX system," Noble said. "We are located in a separate building, so communication was a problem. The VAX was expensive to own and operate and required extensive programming knowledge." In addition, he noted that a large number of users would tax the system's capacity to the point that the DP department's turnaround time for some programs was sometimes as long as one week. The Eios system allows for more rapid turnaround, he said.

A number of other researchers are using the system. "Since the system is easy to use, any biology student can use it," Noble said. "Before, it was used only by electrical engineers. I think it will be used for a number of research projects and also as a health care tool."

"Women and computers first!"

The TC-500A is available in 16- or 32-channel chassis configurations. 16-channel unit shown above.

COMDESIGN INTELLIGENT STATISTICAL MULTIPLEXERS

MORE FEATURES FOR YOUR COMMUNICATIONS DOLLAR

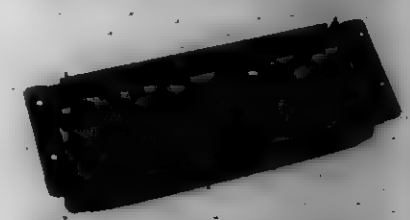
An attractive price and a long list of features make ComDesign's TC-500A Intelligent Statistical Multiplexer a great value. In fact, it would be hard to beat this multiplexer for data concentration, error control and throughput.

But that's not all.

The advanced intelligence of the TC-500A also gives you the complete system control you would expect only from an expensive network processor.

IT'S FLEXIBLE

Compatible with virtually any host computer, the TC-500A can connect up to 32 terminals, printers, personal computers, or other CPU's over one phone line.* With all the performance of a direct connection. Just select the exact channel configuration you need. The TC-500A supports all popular speeds, flow control conventions, and special character formats.



The TC-500A's unique firmware module, Flexpak, permits easy in-the-field software upgrades and access to latest ComDesign software releases.

*16 asynchronous or 16 synchronous and 4 asynchronous.

Free application engineering and support is available to all customers from ComDesign's highly-qualified "data comm doctors."

EASY TO USE

The TC-500A is also surprisingly user-friendly. For starters, you never have to flip DIP switches or figure out complicated codes. As a matter of fact, the TC-500A is menu driven, in plain English. All commands are simply entered via the convenient front panel or through the supervisory CRT.

A NETWORK CONTROL CENTER TOO

The TC-500A's multiple microprocessor based architecture makes it powerful enough for network control and management functions. From either end of the network, you can monitor and test the entire system or its individual components, perform complete reconfiguration or change any operating parameter.

And, should anything ever go wrong, the TC-500A's extensive self-diagnostic capabilities make it easy to pinpoint the problem and effect immediate corrective action.

Add it all up, and we think you will agree, that the TC-500A will give you more for today's *and* tomorrow's communications dollar.

For complete information, write to us at ComDesign, Inc., 751 South Kellogg Ave, Goleta, CA 93117 or better yet call us toll-free.

(800) 235-6935
(805) 964-9852 in CA

ComDesign

See us at Interface, Booth #122-4-6.

NEWS

Data base service available for job matching

By David Gosse
CW Staff

WEST PALM BEACH, Fla. — A data base service called Careersystem was started recently by Careersystem, Inc., a wholly owned subsidiary of General Database Technology, Inc. based here.

The service allows employers to match job requirements against the data base to find qualified job candidates, usually after no more than a 10- to 15-minute search, according to spokesman James Blakenship. Careersystem also enables individuals whose resumes are in the data base to be continually matched with jobs for which they may qualify.

The service is targeting jobs for professional, technical and middle-management personnel because "that's where the demand is," Blakenship said. Among the first companies to utilize the service are American Express Co., AT&T, Harcourt Brace Jovanovich, Inc. and Pratt & Whitney Aircraft.

The data base is accessed through Falco Data Products, Inc. TS1 CRT terminals provided by Careersystem to employers and employment services such as personnel agencies. The data base resides on a Tandem Computers, Inc. Nonstop II system, which has the capacity to store 837,000 career profiles per node and is expandable to 256 nodes.

The key to the service, Blakenship said, is the software, which permits users with the Falco terminals to search, match and communicate needed information. The program, called the General Database System, was developed by company Chairman Dale Learn, President William Berry and Senior Vice-President Philip Morgan, who also are the firm's co-founders.

The data base is composed of career profiles that include information such as an individual's career objective, work experience, education background and current and preferred salary level.

There is no fee for individuals who want their career profiles listed in the data base.

A company or employment service must pay a $150 monthly fee for the terminal connection to the data base. There also is a $2/min. connect-time charge.

For each qualified candidate the employment recruiter locates, employers must pay a $20 charge for receiving an information packet about that person.

Careersystem is located at 1675 Palm Beach Lake Blvd., West Palm Beach, Fla. 33401.

Deltak series designed for non-DPer

NAPERVILLE, Ill. — A 15-course multimedia training series to provide non-DP personnel with a basic understanding of computer-based systems and their applications is available from Deltak, Inc.

Titled "Computers at Work: Concepts and Applications," the series explains the history of computers and their applications. Videotapes in the series feature interviews with data processing professionals and end users.

The individual programs in the series, produced by Mitchell Publishing, Inc., can be rented or purchased. Rental fees range from $50 to $125 per course, depending on volume. Courses can be purchased for $1,750 each.

More information is available from Deltak, Inc., East/West Technological Center, 1751 W. Diehl Road, Naperville, Ill. 60566.

We wrote the book on portability. In nine different languages.

	8080/8085/Z80 CP/M MP/M II	8086/8088/8185 CP/M-86 Concurrent CP/M™	8086/8088 IBM PC DOS	8086/8088 MS DOS	MC-68000 CP/M-68K
FORTRAN-77		✓	✓	✓	TBA
C BASIC Compiler	✓	✓	✓	✓	✓
Pascal/MT+	✓	✓	✓	✓	✓
Level II COBOL	✓	✓	✓	✓	TBA
PL/I	✓	✓	✓	✓	TBA
C		✓	✓	✓	✓
Assembler Plus Tools	✓	✓	✓	✓	TBA
Access Manager	✓	✓	✓	✓	TBA
Display Manager	✓	✓	✓	✓	TBA
micro/SPF		✓	✓	✓	
COBOL Animator	✓	✓	✓	✓	TBA
Personal BASIC		✓			TBA
Dr. Logo		✓	TBA		

NEWS

Health firm improves care with automation

By Lynn Haber
CW Staff

AUSTIN, Texas — A hospital development and management company here relies heavily upon automation to help make decisions at its headquarters and to improve patient care at its 12 facilities nationwide.

Automation at Healthcare International began in the fall of 1980, when its first computer, an IBM System/34, was installed at one of the company's hospitals in Memphis.

In the fall of 1981, two more IBM systems were installed, one in the corporate office and one in a Houston-based hospital. Soon after that, seven more systems were installed, and two more were scheduled to be installed in January 1984.

"We've had a pretty big growth rate," Don Landrum, Healthcare's director of information systems, noted. "Presently, we're evaluating an IBM System/36 for our larger hospitals. We're constantly upgrading."

The company also uses IBM 5520 word processing systems at the corporate office and IBM Displaywriters at all of the hospital facilities. In all, the company has about 65 workstations.

"On our IBM System/34, we're running all the basic applications — accounts payable, ledger, payroll and fixed assets. We also have a financial reporting system that we've written in-house and a consolidation reporting system," Landrum said. "But our most unique application is our referral system."

Admittance inquiries

When someone inquires about admittance to one of Healthcare's hospitals, an employee records information about the patient on a terminal.

"We use our referral system for tracking where the patient is calling from, what part of the country he's interested in and what his problem is," Landrum said.

"We also note whether we admitted the patient to one of the company's hospitals or why we didn't — for example, was it because we don't treat that particular type of disorder?

"We hope that in two to three years we'll have enough of a data base built on that type of information that we can use it to decide where better markets are to be found or for research and development types of applications."

Referral system

The referral system has only been in operation for a year. "We're in the beginning stages of building our patient data base, so it will be a couple of years before we can use it as a tool the way we would like to," Landrum said.

The company would also like to use the stored information to decide whether new programs or medical equipment should be added to match the needs of potential patients.

Healthcare International started out 40 years ago as a hospital development company for a family-owned business and changed management and ownership in 1980.

To every software developer who'd written off portability as an impossible dream, Digital Research humbly announces a few monumental breakthroughs.

We not only offer languages that are portable from 8 to 16 to the 32-bit chips of the future, they're portable across all popular operating systems, too. What's more, we supply the broadest range of quality languages and development tools available today. And will tomorrow.

So rest assured. Whether you design applications at a major corporation, plan to become a major corporation or just qualify as a hobbyist, you only have to write it once.

Simply pick the Digital Research language that's right for you. From Personal BASIC™ to Digital Research FORTRAN-77.™ The newest member of our remarkable family.

To complement languages, we offer a complete workshop of development tools. Our Display Manager™ and Access Manager™ simplify the design of screen displays and data bases. So you spend less time and effort.

If you write in COBOL, our Animator™ source level debugger will get your software running in record time.

And for programmers skilled with IBM mainframe SPF, we offer micro/SPF.™ An editor that helps turn your invaluable experience into valuable new software applications.

At Digital Research, we work as hard for you after the sale as we do to get the sale. With backup like quality documentation, software updates and a phone line to our technical support team.

With so much productivity and service to draw on, it's small wonder IBM chose our languages for its IBM® PC, XT and the new IBM 3270/PC.

For more information, call your IBM representative.

DIGITAL RESEARCH

Or, for the Digital Research retailer nearest you, call 800-227-1617, ext. 400. In California, 800-772-3545, ext. 400.

micro/SPF is a trademark of Pinnacle Systems, Inc. Animator and Level II COBOL are trademarks of Micro Focus, Ltd. IBM is a registered trademark of International Business Machines Corporation. The Digital Research logo and products are either trademarks or registered trademarks of Digital Research Inc. ©1984 Digital Research Inc. All rights reserved.

IBM/36 INFO CENTER. TODAY!

PC INTERFACE AVAILABLE

Call or write for details on FUSION/36 Information Center. Includes integrated retrieval processor (report/queries) personal database and IBM PC Interface to S/36 files..

FUSION

(415) 461-4760

[illegible] LARKSPUR LANDING [illegible]
LARKSPUR, CA 94939
TELEX [illegible]

NEWS

Three suspended for tapping school's system

By Patricia Keefe
CW Staff

SAN DIEGO — A series of break-ins into the computer system at a specialized math and science high school here last month has resulted in the suspension of three students and a beefing up of system security.

Officials of the San Diego School Department and Gompers Secondary School decided against filing criminal charges with local police, even though four students allegedly deleted grades and altered other students' homework filed on the school's Digital Equipment Corp. minicomputer system.

Initially, the students confined their activities to changing passwords so teachers couldn't access their programs. No data was lost, however, because the teachers had maintained hard-copy backup, according to Albert Cook, the assistant superintendent of schools here.

Although Gompers officials are reportedly now planning to educate students and their parents about the ethics and legalities of system violations, Cook said new students are regularly given an orientation regarding the ethics of computer science, including tampering.

Three of the students involved attended Gompers, while a fourth attended Patrick Henry High School, which also has a computer science program. Three of these students have been suspended from the computer science program for the remainder of the year, Cook said.

Their activities were discovered after the chairman of the Gompers computer science program realized that phone lines used by students to do computer science homework at night were being used during the day. After setting up a monitoring system, the chairman learned that a student at another school, using information supplied by his brother at Gompers, figured out the passwords needed for full access to the Gompers computer system. The two brothers then circulated the passwords among other students.

School officials still aren't sure how many students ended up with the ability to access the system. Although the students claimed the passwords were relatively simple, the teachers say the students were extremely lucky to have guessed them, Cook said. The only security precautions the school can take, according to John Crane, director of DP for the San Diego schools, is to change the passwords, which has been done. There is no need for anything more since the Gompers system is not connected to any school administration computers, he added.

Fill in your IBM micro/mainframe communications picture.

AST Research, the leader in IBM PC enhancement products, brightens your micro/mainframe communications picture with a full palette of economical, integrated hardware/software masterpieces. With AST Products, you can emulate IBM terminals or create PC-based Local Area Networks.

AST improves your office operating cost picture.

AST communications products give your IBM PC the flexibility to act as a terminal for your host system or as a stand-alone computer for smaller tasks. Your PC won't bog down the mainframe with unnecessary small jobs and local computing on the PC eliminates phone line charges too. Get the power of a mainframe when you need it and personal computer convenience right at your fingertips.

Applications solutions that are strokes of genius.

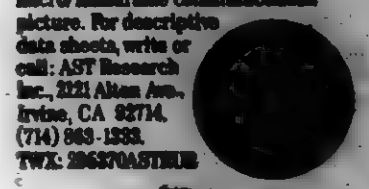
AST keeps pace with your ever-changing applications requirements with reliable, high quality, cost effective communications products. AST products provide support for Bisync and SNA/SDLC communications protocols as well as networking multiple PCs for sharing resources.

Choose AST products — by the numbers.

These AST communications packages are currently available:

1. AST-SNA™ emulates a 3274/3276 controller and 3278 or 3279 display terminal using SDLC protocol.
2. AST-BSC™ emulates 2770 batch RJE and remote 3270 display terminals using 3270 Bisync protocol.
3. AST-PCOX™ allows your PC to connect to an IBM 3274/3276 cluster controller via coax cable and emulates a 3278 or 3279 display terminal.
4. AST-3780™ emulates 2770, 2780, 3741, and 3780 RJE workstations using Bisync protocol.
5. AST-5251™ emulates a 5251 Model 12 remote workstation connected to an IBM System 34, 36 or 38.
6. PCnet™ is the first Local Area Network designed specifically for the IBM PC or XT and the PC-DOS 1.1 or 2.0 operating system.
7. CC-285™ is a user-programmable dual-port card capable of communicating in Async, Bisync, SDLC, or HDLC protocols.

Discover how well AST can fill in your micro/mainframe communications picture. For descriptive data sheets, write or call: AST Research Inc., 2121 Alton Ave., Irvine, CA 92714. (714) 863-1333. TWX: 230370ASTRUR



AST RESEARCH INC.

Number One Add-Ons For IBM PC.

EFT expo set for April 1-4

ORLANDO, Fla. — Robert B. Gill, vice-chairman of the board of J.C. Penney Co., will keynote the opening general session of the Electronic Funds Trainafer (EFT) Association's annual convention and exposition. The EFT expo will be held April 1-4 here at the Hyatt Regency Grand Cypress Hotel.

The conference program this year will include sessions devoted to point-of-sale systems, automated teller networks, home financial services, automated clearinghouse services, EFT operations, technology issues and marketing opportunities.

The registration fee is $495 for members and $625 for nonmembers. Information is available from 1029 Vermont Ave. N.W., Washington, D.C. 20005.

EQUITABLE LIFE
LEASING CORPORATION

OPERATING & TAX PRICED LEASES
FOR

Data General

IBM

digital

PRIME

HEWLETT PACKARD

WANG

EQUITABLE LIFE
LEASING CORPORATION

For more information call any of the offices listed below

Atlanta
Boston
Chicago
Detroit
Houston
Los Angeles
Minneapolis
New York
Philadelphia
San Francisco

Visit Booth #93 984 Office Automation Conference & Convention Center Feb. 19-20-21 1984

System to aid five cities pinpoint likely arson targets

By David Gleave
CW Staff

QUINCY, Mass. — Fire departments in five U.S. cities will soon be enlisting the aid of computers to help pinpoint buildings that are likely targets of arsonists.

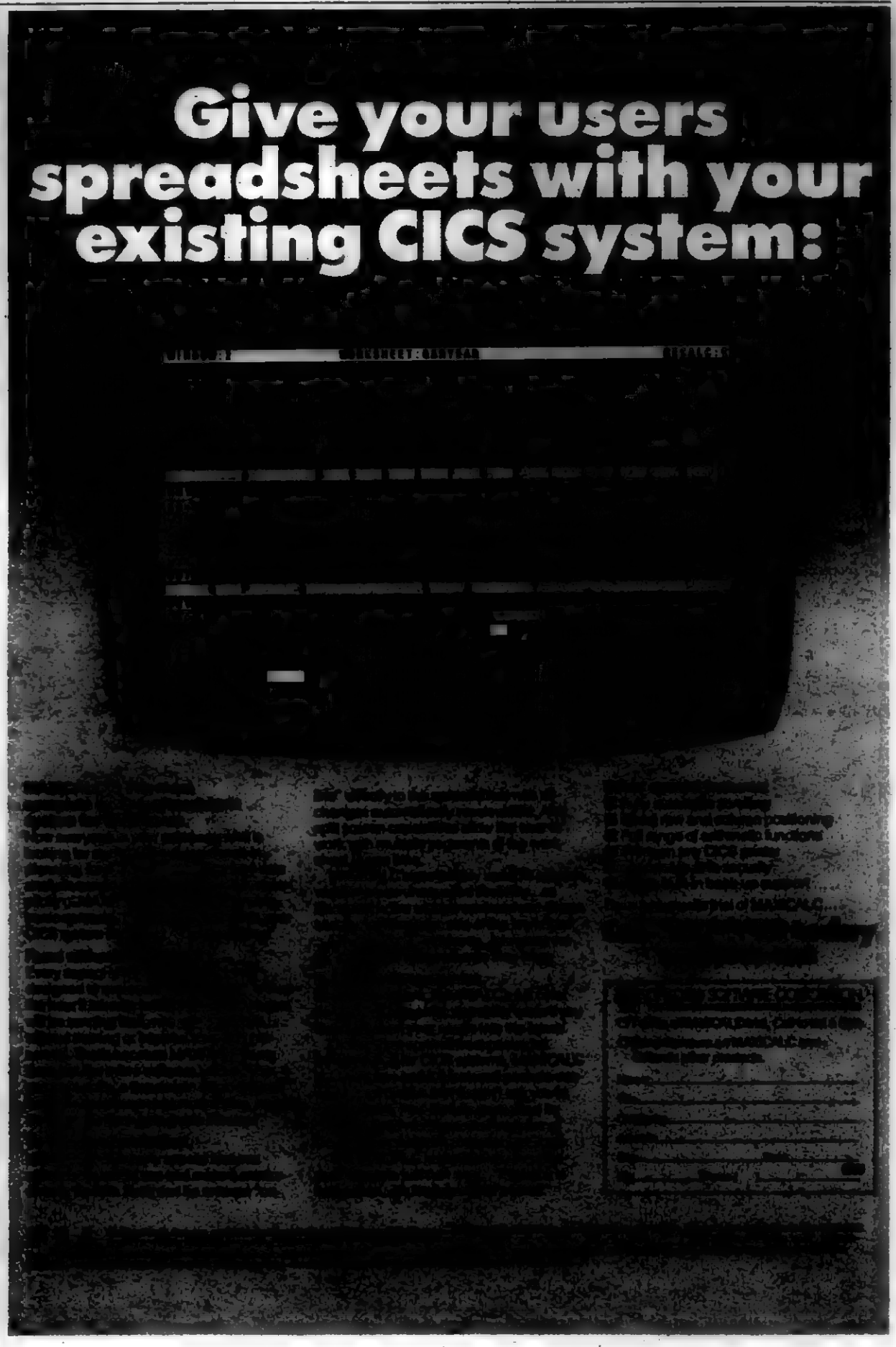
The Neighborhood Arson Information Management System will be operating in arson-prone areas in Dayton, Ohio; Kansas City, Mo.; Louisville, Ky.; Oakland, Calif.; and Providence, R.I. The Ford Foundation has awarded $501,000 in grants to organizations in those cities to carry out the program.

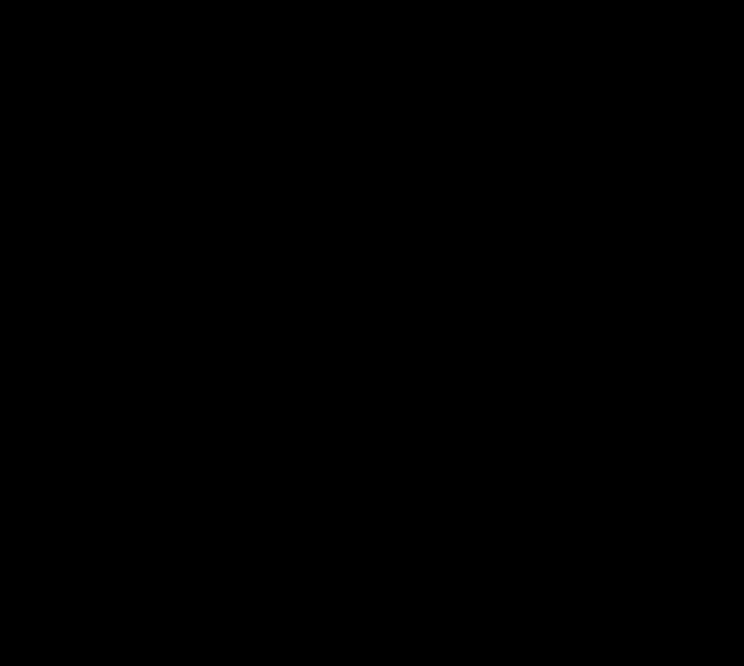
The National Fire Protection Association (NFPA), a Quincy, Mass.-based nonprofit organization, is spearheading the two-year program.

The Neighborhood Arson Information Management System is built around a software program designed by Marmen Computing, Inc., a Menominee, Mich., software company. Using criteria developed by the NFPA, Marmen developed an application for Ashton-Tate's Dbase II data base management program.

Several insurance groups contributed a total of about $45,000 to supply each of the participating cities with a Compaq Computer Corp. microcomputer and an Okidata Corp. Microline 92 printer.

Arson prevention programs in Boston, New York and New Haven, Conn., have used common indicators to develop detailed computer profiles of likely arson targets. Some of those indicators are tax arrearage, insurance policy information and a history of building code violations and fires of suspicious origin.




1. A full line of software!
2. Ribbons, paper, and supplies of every description!
3. Rental, leasing, and purchase plans for every need!

DATABASE SOFTWARE FOR DIRECT MARKETING.

PHONE (617) 235-2600

Originally created for high-volume Club/Continuity and Catalog mail order companies throughout Europe, the Advanced Direct Marketing System became available in the United States last year.

After a decade of fine-tuning by European businesses, ADMS controls the more complex aspects of mail order operations easily, and solves troublesome Club Plan problems just as effectively.

It is an extraordinarily powerful, IBM-based software system that is multi-faceted, flexible, and capable of troublefree growth as your mail order business diversifies and expands.

ADMS is not for everyone, though, because it is not cheap. But then, cheap is usually expensive for fast-growing mail order businesses in the U.S.

DIRECT MARKETING SYSTEMS, INC.

Database software for direct marketers

20 William Street
Wellesley, Massachusetts 02181

'Journal' to retire typewriters, move on-line

By Edward Warner
CW Staff

NEW YORK — The clattering of typewriters has almost completely died away in the newsroom of *The Wall Street Journal*, one of the nation's most traditional newspapers and one of the last to convert to electronic text management.

In a year or two, the last of the typewriters will be retired, as Dow Jones Co., owner of the *Journal* and *Barron's* magazine, completes the switch to a fully electronic newsroom. That transition took another step forward last month with the announcement by Dow Jones that it would purchase $8.8 million worth of electronic pagination equipment from Information International, Inc. of Culver City, Calif.

The pagination equipment won't send any of the *Journal's* IBM Selectrics or Olympia USA, Inc. manuals to the closet, but it will eliminate the painstaking chore of page composition, in which the long columns of copy for which the *Journal* is known and all photographs and advertisements are pasted onto paper sheets that later become the printing plates for the *Journal's* pages.

The *Journal's* transition to word processing got a boost last year with the introduction of 75 Radio Shack TRS-80 Model 100 transportable microcomputers for the 100 reporters in the New York bureau, largest of the paper's 26 bureaus worldwide. Some typewriters still remain there, but in the words of one editor, Jim Hyatt, "Most everybody has begun using the [Radio Shack] machines."

To date, though, only about 250 of the machines have been supplied to the *Journal's* 450 reporters, editors and copyreaders worldwide; most of the others use typewriters. Dow Jones, according to the director of its operating services group, Kim Breese, recognizes the limitations of the machines — their LCD screen is relatively small, for example — and is seeking another system for its far-flung news staff, a system expected to cost as much as $8 million to $10 million. A vendor for that system will be chosen in the next six months, Breese said, and delivery of the desktop terminals and associated equipment should take place within one to two years.

Breese said Dow Jones was forced to "sort of drag our feet" on the move to full electronic text management and decided to go that route only two or three years ago. A slow pace was needed, he explained, because of the difficulty finding equipment that could meet the paper's specialized production needs. The *Journal* has printing facilities in five different U.S. locations and computer centers for text production both in Dallas and in Chicopee, Mass. All are linked via satellite.

Using the newly ordered pagination equipment, which won't be online until sometime early next year, editors will be able to design news pages on the screens of desktop terminals. Finished page designs, complete with headlines, photos and advertisements, will then go to the *Journal's* existing laser scanner, which will broadcast them to the paper's production facilities, according to Kevin Howard, manager of media and public relations for Information International.

"What's coming in hasn't been done before," Howard boasted. "Our system, once it's up and running, will be the most complex in the newspaper industry." Currently only one newspaper in the U.S. produces printing plates for its press run directly from the page designs drawn by editors on their VDTs, Howard said, and that system is still only in the testing stages. The Information International system will go that technology one better, he added, by linking with the *Journal's* satellite transmission equipment.

Meanwhile, in New York, the *Journal's* assistant wire room supervisor said acceptance of the new technology has been very high among the paper's news staff, though. "There are a few die-hard old timers who don't like to go to the new system."

As for Hyatt, he's keeping all of his bases covered: He has a Data Data Systems Corp. editing terminal, a Radio Shack Model 100 and a manual typewriter, all on his desk.

Sobol to keynote Compacs March 20

LONDON — Michael I. Sobol, president of the MIS Training Institute, Inc., will be the keynote speaker at the eighth annual European Forum on Computer Audit, Control & Security (Compacs), which will be held here March 20-23.

Sobol, a computer audit consultant, will speak on the role of computer auditors.

Conference registration information is available from Compacs '84, IIA-UK, 82a Portland Place, London, England W1N 3DH.

WILL THE AT&T BREAKUP MEAN AN MIS SHAKEUP?

You'll know, when you view "DIVESTITURE: IMPACT ON INFORMATION MANAGEMENT" Exclusively from DELTAK's Special Edition: Computerworld Reports.

The AT&T divestiture is undoubtedly the most earth-shaking event in recent business history. The repercussions will be felt throughout the telecommunications industry for many years to come. It will also profoundly change the way your company processes all forms of information. That's why you owe it to yourself to watch "Divestiture: Impact on Information Management," an up-to-the-minute half-hour video cassette report presented by DELTAK and CW Communications.

This month, you'll enjoy the invaluable insights of a respected communications consultant, and a major communications vendor whose company may benefit from the recent breakup. Your program host is John Gantz, noted MIS author and contributing editor of INFOWORLD magazine.

And be sure to keep watching, because more hard-hitting issues of Computerworld Reports such as DP/Office Automation Integration and The Maturing Information Center will be coming in the months ahead. Or, previously released Reports addressing major issues are still available including: The MicroMainframe Link, Integrated Microcomputer Software and Managing the Communication Network.

Remember, before the Big Breakup shakes your information system up, order "Divestiture: Impact on Information Management." Call DELTAK order entry at (312) 369-3000; (416) 678-9222 in Canada.

DELTAK
East/West Technological Center
1751 West Diehl Rd., Naperville, IL 60566
(312) 369-3000 (800) 532-7699

375 Cochituate Road
Box 880, Framingham, MA 01701
(617) 879-0700

NEWS

Speaker urges retraining in switch to OA

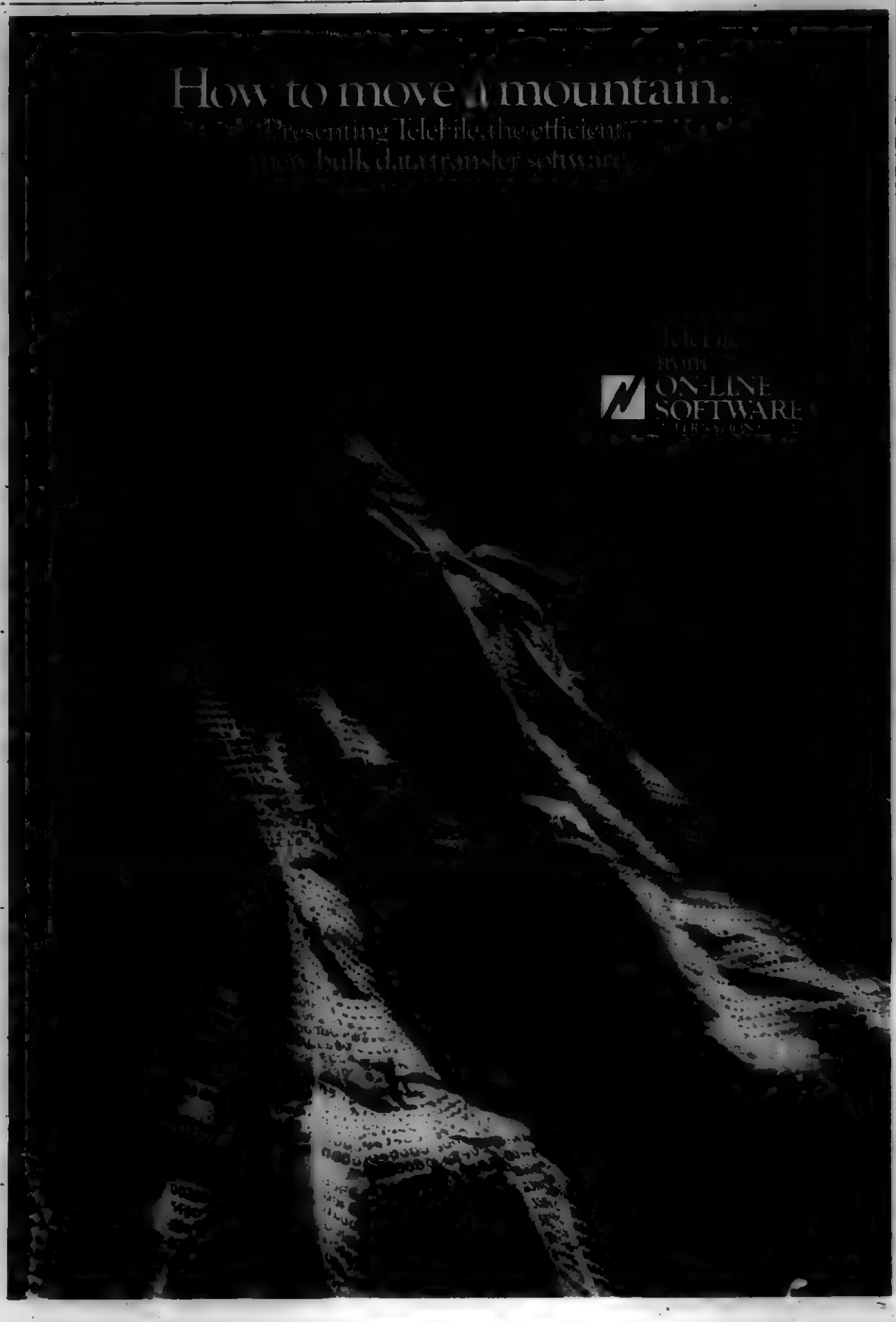
By Robert Batt
CW West Coast Bureau

LOS ANGELES — Data processing analysts are in the best position to deal with the office automation needs of their organizations, but radical retraining is required if they are to become effective.

This was the message delivered to OA specialists at the recent 1984 Office Automation Conference (OAC '84), sponsored by The American Federation of Information Processing Societies, Inc. (Afips).

Speaking at a conference session titled "Turning a Data Processing Analyst Into an Office Automation Analyst," Nigel Harrison, director of System Concepts Ltd., a London-based concern, said that while people with the right skills and experience to develop successful office systems are rare, most organizations have analysts and designers on their staffs with many of the right attributes.

"The aptitude of the DP professional for analytical thinking and problem solving needs to be refocused for office systems, but his basic skills in this area give him a head start on many of his colleagues," Harrison asserted.



In retraining DP specialists for office systems work, Harrison said it is important for DP specialists to look at office systems from a user's point of view and not bring a preconceived technical solution to problems.

"The DP analyst needs to develop office automation analysis skills. He will need to take into account all the different views in the office, or any proposed system will fail," Harrison warned.

In terms of objectives, he added, data processing traditionally tends to be concerned with improving the basic efficiency of an organization — seeking better ways to do existing jobs.

By contrast, office systems will be concerned much more with improving the effectiveness of the organization by seeking ways to do new jobs.

"Office systems will affect many people and will therefore make human and behavioral issues a central and critical aspect of their introduction," Harrison said.

OA analyst's function

The function of an OA analyst is to understand a business system rather than a technical system. It is therefore imperative that DPers working with office systems understand the business activity of the organization.

A detailed set of analysis skills are needed to perform office systems work effectively, he contended.

"The skills needed to implement office systems successfully will be different from those needed to implement DP systems.

"Office systems will involve broader and often new development skills, with an emphasis on the analysis and implementation aspects. In addition, organizations will need to bring together many of the technology skills they already possess, but which are presently dispersed throughout the organization," he maintained.

Also speaking at the session, Pat Macauley, manager at Trigon Systems Group, Toronto, focused on the prerequisites needed to design an appropriate office system:

- A pilot project must be set up so that it leads to a permanent system.
- Users must contribute significantly to the project by gathering and analyzing data and by being actively involved in implementation.
- There must be visible management support for new office systems, and managers themselves should be seen using the system.
- Response time, accessibility and reliability are critical to the success of an office system.

On-line data system tracks railroad's cargo

PHILADELPHIA — The Consolidated Rail Corp. (Conrail) runs about 2,500 freight trains each day and must manage about 225,000 individual freight cars. Keeping daily track of its rolling stock and individual cargoes led to the evolution of an extensive computerized management system.

A 1976 act of the U.S. Congress formed Conrail with the merger of six bankrupt rail carriers. One of the five largest U.S. railroads, Conrail operates about 15,000 route miles in 15 states, the District of Columbia and two Canadian provinces.

In 1982, Conrail began implementing an extensive on-line data system network known as the Resource Management System (RMS). The system includes more than 60 IBM 8100 computers distributed throughout Conrail's routing structure. Using about 2,500 IBM terminals, employees perform two primary functions — processing customer shipping orders (waybills) and monitoring freight as it moves from destination to destination.

The first 8100 was installed in Allentown, Pa. "It took us about four to five months to get out of there and get to the second one," said John Green, Conrail's director of Transportation Systems.

With installations of 8100s and satellites at a total of 300 locations, "we started in earnest in the summer of 1982 and put the last unit in during November of 1983," he said. Additional resources for training would have speeded up that process somewhat, he said.

Repetitive code

One key benefit of the 8100 system is the development of the Repetitive Waybill Code (RWC). The RWC is a code assigned to a specific pattern which occurs when the same customer ships the same commodity to the same location a number of times. Conrail employees enter the 10-digit RWC, the car initials, the car number, the waybill number and the date. All other information (the origin, the destination, the commodity, etc.) can be automatically generated from the RWC.

When an employee makes an inquiry for an RWC, the file of the local 8100 is searched. If the code is not found, the request is relayed to the central data processing host in Philadelphia, an IBM 3081 operating under CICS. The network is managed using IBM's Team.

"Once you get a central system established, it's more of an evolution than a revolution," Green said. Conrail's central data processing was started with an IBM 370/155 in the mid-1970s; the next step in the evolution was an IBM 3033, which gave way to the 3081 last spring.

Approximately 90% of the RWC retrieval is done at the local level with the 8100. This provides two benefits — rapid response time and stand-alone capability. If the communication link to the central system is broken or the central system is down, the local sites still can perform their waybill functions.

The principal equipment for these functions are 56 IBM 8100s operating under IBM's DPCX software. The 8100s are each configured as a central machine and serve approximately 180 satellite (communication links) locations. Thus, the mainframe can be located in one location, but a satellite can be located 50 or 100 miles away in another railyard.

"It used to take three minutes to generate a waybill," Green said. "Now a waybill can be generated in under a minute."

The end product: a hard-copy waybill, an IBM card which represents the car as it moves across the railroad and shipment data which is concurrently transmitted to the central files as it's entered.

Another part of Conrail's Resource Management System is the car management center. In all, there are six car management centers, each one equipped with an 8100 operating under IBM's DPPX software. The centers perform an order matching function, taking the requirements of the customer for a loaded car and matching it with the available freight cars.

The management centers receive approximately 5,000 requests a day. The car management function takes the data which has been generated by the other 8100s and sends it to the host processor.

The goal is for the car-ordering center not to wait to assign the car to an order before it has arrived at its destination. It is an effort on Conrail's part to cut down on the distance a freight car travels empty.

During the course of a day, Conrail's central data system processes about 180,000 transactions, Green said. Every time a message is entered on one of the local 8100s, the central file is updated. Having the central files updated on a regular basis provides Conrail and its customers with quicker, more reliable service.

"The customer is satisfied and we're saving money," Green said. "In my eyes, that's a tough combination to beat."

New from Interactive Systems/3M:

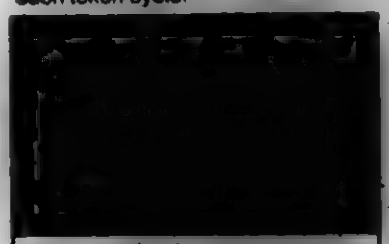
The first high-speed broadband local-area network that guards against data crashes.

If you've been thinking of investing in a contention network, consider this: How do you guard against data crashes during times of heavy system use?

Answer: You don't, because contention schemes simply don't provide any kind of data insurance.

Fortunately, there is a new type of network that does protect against data loss. It's called 3M Videodata® LAN/1. And it's the first intelligent broadband local-area network that's designed to get data through on time, no matter how much traffic is on the cable.

Videodata® LAN/1: The efficiency of token-passing plus the proven flexibility and expandability of broadband.
Token-passing networks eliminate contention troubles and data crashes by passing an electronic "token" from terminal to terminal. When a terminal has to transmit, it grabs the token and sends data packets to the receiving device. Receipt is acknowledged and the token is automatically released to continue its rounds. Because the system assigns a network entry address to each user, everyone has an opportunity to send data during each token cycle.



Because Videodata LAN/1 is a broadband system, dedicated channels can be used for full-motion video applications such as CAD/CAM and teleconferencing. These video signals are kept entirely separate from digital traffic on the network's token-passing channels.

So far, so good. But most token-passing networks are baseband systems, meaning that terminals must share a common channel as they would in a typical contention network. This can limit speed and capacity in some applications.

LAN/1 overcomes this possible limitation by combining token-passing with a proven broadband technology that allows many channels to be put on a single cable. The payoff: higher channel speeds, ranging up to 2.5 MB/s over a maximum seven-mile radius, with terminal data rates of up to 19.2 KB/s. Plus a capacity of up to 10,000 devices to allow plenty of room for future expansion.

In the Videodata LAN/1 network, messages can be sent from any terminal to any other without going through the host processor. Network Interface Units (NIUs) connect digital devices to mechanical taps (shown as small circles) on the main coaxial cable. A Network Monitoring Unit, or NMU, keeps a statistical record of network performance.

Self-monitoring, with a printed record of network performance.
LAN/1 gives statistical proof of its own performance in printed form, thanks to a microcomputer-based Network Monitoring Unit (NMU). This unit, which also helps in routine maintenance and troubleshooting, may be used for remote monitoring as well.

Separate channels for voice, video, and graphics. Plus the ability to work in point-to-point applications.
Because LAN/1 is a broadband network, channels can be set aside for real-time voice, video, and high-speed graphics. This can be done without compromising digital traffic capacity.

LAN/1's broadband design also permits flexibility in network architecture, so that it can be used in high-speed point-to-point applications which can't be served efficiently with contention systems.

Other benefits include full transparency, an automatic shut-off feature to keep any one terminal from capturing the token, and compatibility with both dumb and intelligent terminals. The list of features goes on and on.

For the full story on the new Videodata LAN/1 network from Interactive Systems/3M, call 800-328-1684 toll-free. (In Minnesota, 800-792-1072.) Or mail the coupon.

Mail to: Interactive Systems/3M CW-3-5
P.O. Box 33600
3M Center
St. Paul, MN 55133

☐ Please send details on your new Videodata LAN/1 intelligent network.
☐ Please have a representative call.

Name
Title
Company
Phone ( )
Address
City
State ZIP

3M knows you...

3M

NEWS

TURNAROUND TIME
Larry Long

Q The two people in our newly established information center and 30 programmers report to me. I'm comfortable with managing programmers, but have not fared well with the two people in the information center.

Our information center has five micros and eventually will have several terminals. Having no experience in this area, I didn't know whom to hire, so I recruited one person from corporate training and the other from my programming staff.

I thought that would be the perfect combination, but I've had nothing but complaints. The programmer tries to impress people, and the trainer simply can't answer questions about the hardware or software.

What type of background is best for persons working in information centers?

A It seems as if there are a dozen concepts for information centers. I see an information center as a place that has the tools to help users help themselves. These tools include hardware, software, technical support and education.

To date, no credentials package has emerged for information center personnel. In your environment, you must have people with a solid technical base who can use and explain the use of available tools. They can come from either MIS or the user community.

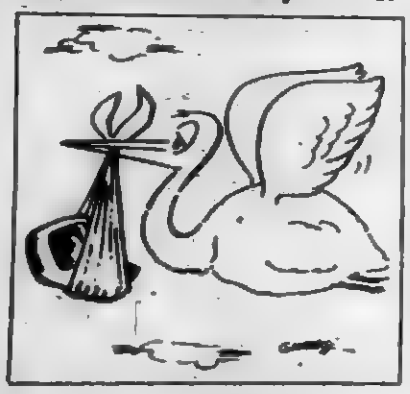
After technical competence, you can look for certain desirable personality traits. The person working directly with users must genuinely want them to learn so that they can eventually work independently. He must have patience and recognize that the users are not going to learn in one hour something that took him years to learn.

A common failing in information centers is that support personnel would rather just do the work than show users how to do it themselves. In the long run, this is counterproductive.

Q I've worked in technical systems for the past five years and have spent much of the past year learning about and installing local-area networks. My boss has asked me to prepare and present a one-day, in-house seminar on local networks.

My longest presentation to date was 10 minutes, and, frankly, I don't know where to start. Do you have any suggestion on effective presentation?

A Let me highlight a few key considerations. Prepare a detailed outline of the entire seminar for yourself, then condense it to a one- or two-page handout. The act of preparing an outline causes you to crystalize your subject material into a logical sequence, and it gives the attendees a "road map" to follow.



Prepare examples that illustrate key points. You can't have too many examples.

People not accustomed to speaking tend to underestimate the time required to present material. If you think that it will take 30 minutes, plan on an hour and you will be about right.

You will know local nets better than anyone attending, so exhibit confidence from the start. There is always at least one person who will attack at the first sign of instability. This person is more concerned about making you look bad than learning about local nets. Confidence is your best retort to this person.

Allow time for interaction, but never permit the discussion to drift away from the central focus of the seminar. As the seminar leader, you are responsible for directing the discussion. If you don't intervene, you may find the group talking about basketball rather than local nets.

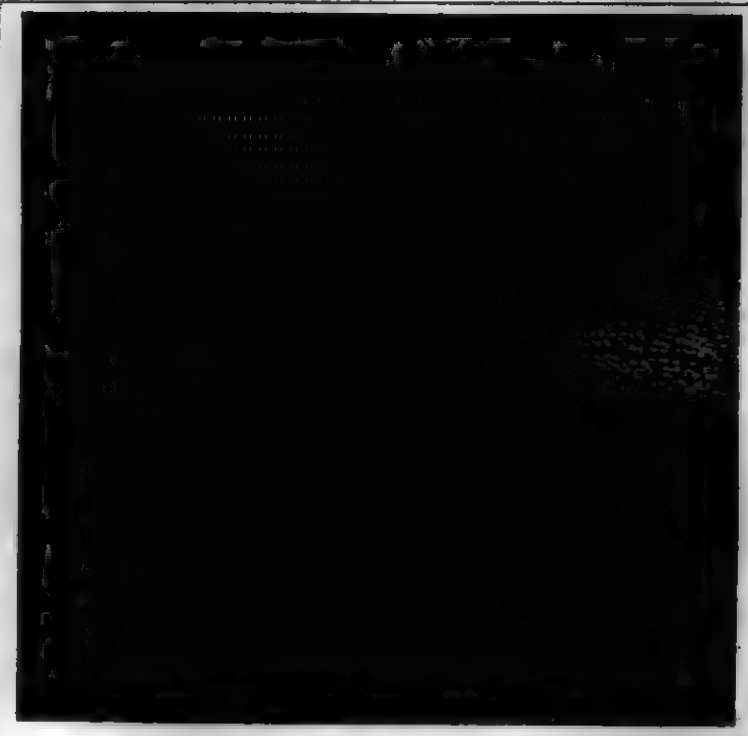
Above all, have fun. If you appear to enjoy giving the presentation, then others will enjoy attending.

Q I'll graduate from college in June and eventually hope to work in the DP field. I'm considering graduate school, but my adviser suggested that I get a job and devote my energies to working for a few years, then return to graduate school full time. I would appreciate your input.

A Students often ask me whether they should stay for a master's degree or go to work. My response differs from one person to the next based on the individual's level of maturity, continued enthusiasm for academic work, the institution he wants to attend and other factors.

If your adviser knows you and your circumstances well, you have probably been given some sound advice.

Long, president of Long and Associates, is a consultant, lecturer and author in the field of information services. If you have a question you'd like him to address, send it to Larry Long, Editorial Department, Computerworld, P.O. Box 880, Framingham, Mass. 01701.



Whether you're looking for Payroll, Personnel, Pension Administration or Claims Processing software, Information Science's "Whole Person" software gives you a comprehensive system that provides superior technical features.

Systems for both Database and Non-Database

InSci's state-of-the-art payroll/personnel database system is integrated into a number of database management environments–including IMS, DL-1, and IDMS. Native mode, the system is designed to take full advantage of each specific database structure, eliminating clumsy, resource-draining interface programs.

In addition, InSci offers two non-database systems. One using a sequential file structure, the other using a VSAM access method.

Personnel

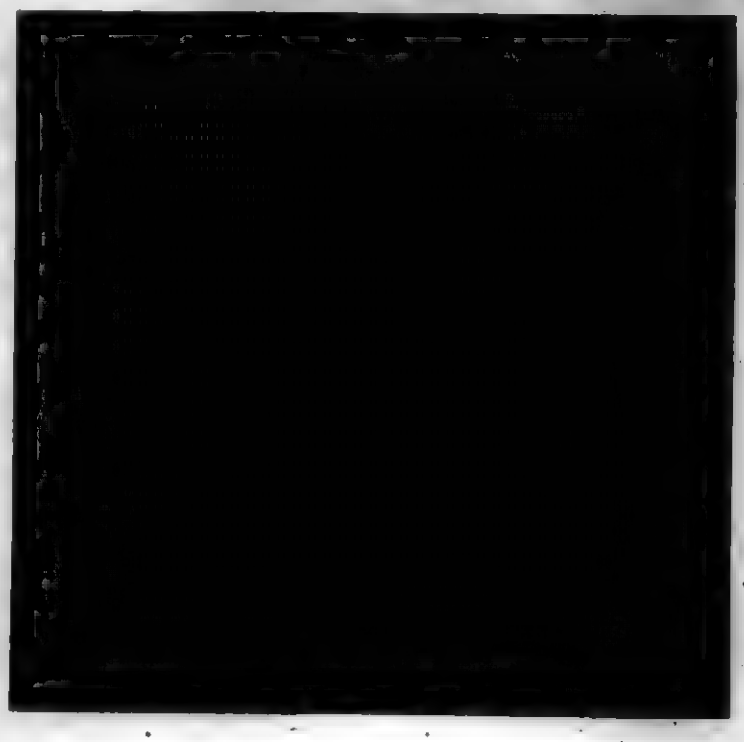
Pension

INSCI INT

"WHOLE PERSON" SOFTWA

SYSTEM THAT MEETS AL

PROFES



Introducing On-line PAS

PAS–InSci's new Pension Administration System–is available as a complement to our payroll/personnel package or as an independent, stand-alone system. PAS automates most aspects of pension administration from ERISA reporting and compliance to benefits calculation, retirement counseling, vesting schedules and benefits statements.

Software for Health Insurance Claims

Our health insurance claims processing system permits your organization to self-administer group health, dental, and disability claims–providing significant cost savings while eliminating the need to keep duplicate information for insurance purposes.

The Complete Human Resource Package

We call it "Whole Person" software because it is the most comprehensive, technically advanced set of human resource systems avail-

NEWS

Realtor hones analyses with financial modeler

By Paul Korzeniowski
CW Staff

NEW YORK — Pan American Properties, a real estate, farming, and forestry company here, realized that using Hewlett-Packard Co. calculators for financial modeling was not the best method of determining the feasibility of multi-million-dollar purchases.

"When we evaluated the purchase of a corporate office, we used calculators to help arrive at profit-and-loss estimates," said Bernard Ross, data-processing manager. "We could calculate information for 200 different leases, but we were unable to integrate that data so it would be meaningful."

To alleviate the situation, Pan American began evaluating financial modeling products that would run on the company's IBM System/34 minicomputer.

"The package had to complete conditional programming, set limited parameters and handle GOTO subroutines," Ross said. "Most modeling packages were not sophisticated enough to meet our needs."

Pan American needed sophisticated programming, but it lacked an experienced programmer. "We were leery of developing the initial program," Ross said. "It was complicated, and we didn't have anyone with programming experience."

Business Model Systems, Inc. in Oak Brook, Ill., agreed to design the initial package with one condition: If the program did not meet Pan American's standards, the company could return Business Modeler, a $12,000 interactive financial modeling package.

"They developed a complicated real estate property program, which included conditional loops and other utilities," Ross said. Pan American's acquisition department now uses the system to integrate information from all leases, identify market rates and calculate probabilities of tenants moving.

"If our purchasing analysis accuracy increases by 1%, the system would pay for itself," Ross said.

As Ross gained programming experience, he transformed the initial program into a complete system. "We expanded the program so that it acts as a miniature data base," Ross said. "We used an RPG program to connect the data files from the accounting and acquisition departments. The system produces special reports that each department uses. We have a more complete picture of our operation.

"Our California office has an IBM Personal Computer XT," Ross said. "With an [IBM 5251] Model 12 terminal emulator, it can use the modeling analysis capabilities."

TI users meet set for March

AUSTIN, Texas — A meeting of Texas Instruments, Inc. computer users, the TI-MIX 1984 International Symposium and Exhibition, is scheduled for March 25-28 at the Opryland Hotel in Nashville.

The sponsor has scheduled 29 sessions on hardware, languages, software, applications, management and marketing relating to TI products.

At-the-door registration for the full symposium costs $190 for TI-MIX members and $205 for nonmembers. One-day registration costs $80 for members and $95 for nonmembers.

Further information is available from TI-MIX 1984 Symposium, P.O. Box 2909, M/S 2200, Austin, Texas 78769.

able. InSci started the HRS industry back in 1965, and we've led the field ever since. Our technical experts have provided you features unmatched by any other company.

Modularized Design For Easy Maintenance. InSci "Whole Person" software was designed from the top down and is highly modularized, providing maximum flexibility. A single module or subroutine supports each specific function in the system.

User Exit Routines. Strategic areas built into the InSci system allow exits to override the standard system routines. This means you can add your own programs without changing database system codes. InSci also gives you source codes so you can go into the system directly if you desire and still receive maintenance.

Payroll

Claims

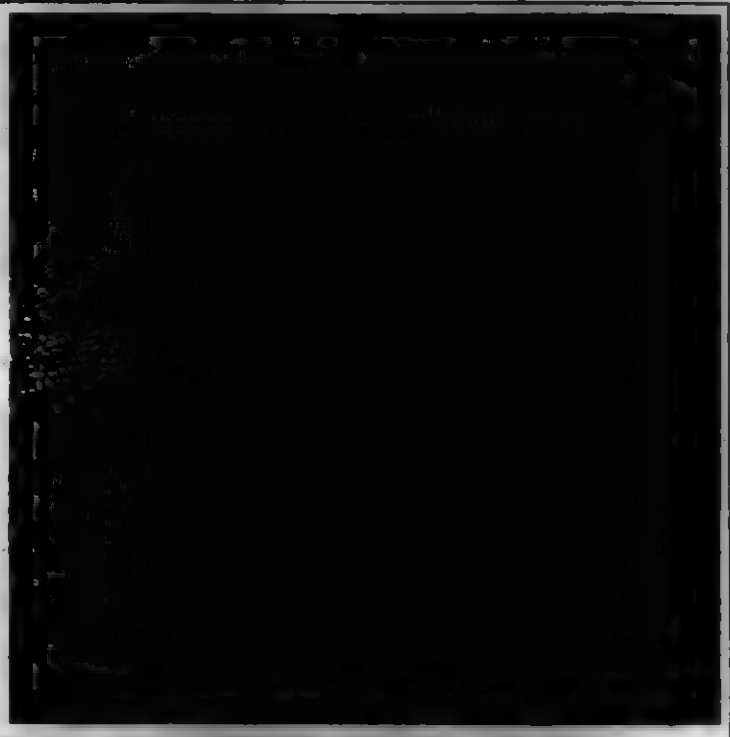
Preliminary or final processing mode. InSci systems let you select the most efficient operating mode for each processing task. All changes can be processed in real-time, so they become effective immediately. Preliminary processing allows for simulating situations such as a payroll run without affecting the database. And, of course, InSci systems provide state-of-the-art security precautions, complete maintenance support and training.

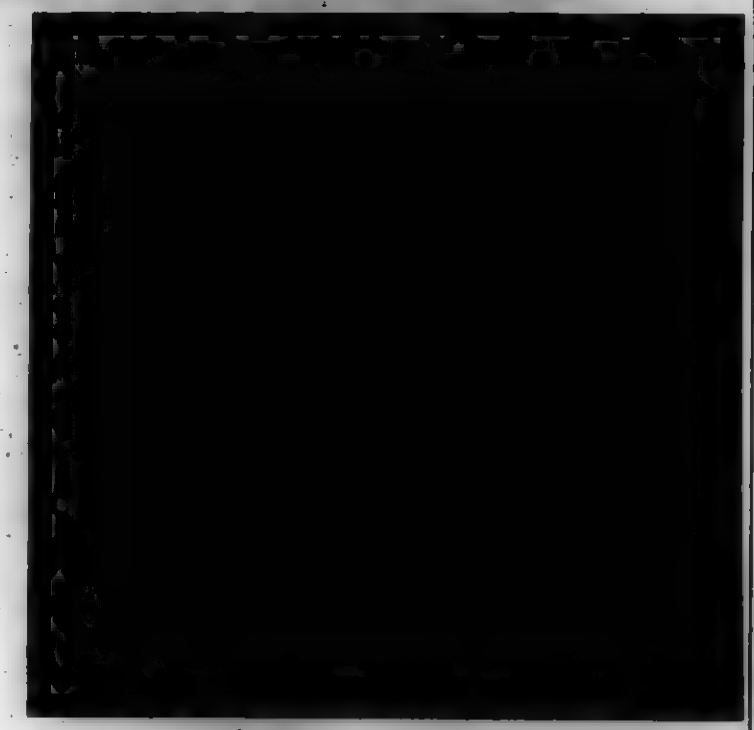
Write us. Or Call.

InSci "Whole Person" software—for more information, write us or call: Information Science Incorporated, 95 Chestnut Ridge Road, Montvale, New Jersey 07645. Attention: Chris Hanavan. 201-391-1600.

InSci
WHOLE PERSON SOFTWARE.

RODUCES
RE. THE FIRST SOFTWARE
L THE NEEDS OF THE DP
SIONAL.





COMPUTER ROOM DESIGN

- IBM
- CITIBANK
- HUD
- US NAVY
- PRUDENTIAL

Do What These Companies Have Done . . .

When Planning To Build, Expand, Relocate Or To Evaluate Your Computer Center...Call The Full Service Engineers.

CONVERGENT RESOURCES, INC.
201 - 666-5498
118 Broadway, Hillsdale, NJ 07642
Members Of The
Marketing Technology Group

NEWS

CALENDAR

WEEK OF MARCH 18

MARCH 19-23, SANTA FE, N.M. — Structured Analysis and System Specification Workshop. Contact: J. Baldwin, Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

MARCH 19-23, HOUSTON — Structured Systems Analysis. Contact: Learmonth and Burchett Management Systems, Inc., Suite 405, 2900 N. Loop W., Houston, Texas 77092.

MARCH 19-23, BOSTON — Structured Analysis for Real-Time Systems. Contact: J. Baldwin, Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

MARCH 19-23, ORLANDO, FLA. — IDMS Programming. Contact: Harris Education Center, 6320 S. Orange Blossom Trail, Orlando, Fla. 32809.

MARCH 19-23, MINNEAPOLIS — Structured Design Workshop. Contact: J. Baldwin, Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

MARCH 19-23, WASHINGTON, D.C — Unix for the DP Professional. Contact: Webco Industries, Inc., 8613 Washington Ave., P.O. Box 15505, Alexandria, Va. 22309.

MARCH 19-23, RICHMOND, VA. — Advanced Systems Analysis. Contact: Association for Systems Management, 24587 Bagley Road, Cleveland, Ohio 44138.

MARCH 19-23, DALLAS — Data Base Concepts and Design. Contact: American Management Associations, 135 W. 50th St., New York, N.Y. 10020.

MARCH 19-23, INDIANAPOLIS — Structured Design and Programming Workshop. Contact: J. Baldwin, Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

MARCH 19-23, ORLANDO, FLA. — Tutorial Week East '84. Contact: IEEE Computer Society, P.O. Box 639, Silver Spring, Md. 20901.

MARCH 19-23, PHOENIX — Structured Design for Real-Time Systems. Contact: J. Baldwin, Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

MARCH 19-23, INDIANAPOLIS — Information Modeling Workshop. Contact: J. Baldwin, Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

MARCH 19-23, CHICAGO — Structured Analysis and Design Workshop. Contact: J. Baldwin, Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036. Also being held March 19-23 in San Francisco.

MARCH 19-23, DALLAS — Computer Capacity Planning for Sperry Corp. 1100 Systems. Contact: Compumetrics Training Institute, P.O. Box 3015, Commerce, Texas 75428.

MARCH 19-23, CONCORD, MASS. — C Programming Workshop. Contact: Plum Hall, One Spruce Ave., Cardiff, N.J. 08232.

MARCH 19-30, PARSIPPANY, N.J. — 68/370 Assembler. Contact: Chubb Institute, 3 Sylvan Way, Parsippany, N.J. 07054.

MARCH 20, ORLANDO, FLA. — The C Programming Language. Contact: IEEE Computer Society, P.O. Box 639, Silver Spring, Md. 20901.

MARCH 20, ORLANDO, FLA. — Local Networks. Contact: IEEE Computer Society, P.O. Box 639, Silver Spring, Md. 20901.

MARCH 20-21, SAN JOSE, CALIF. — Implementing Voice Technology. Contact: Patti Restaino, Votan, 4437 Technology Drive, Fremont, Calif. 94538.

MARCH 20-23, BOSTON — CAD/CAM Systems. Contact: Ruth Dordick, Integrated Computer Systems, 6305 Arizona Place, Los Angeles, Calif. 90045.

MARCH 21, ORLANDO, FLA. — Small Computer Local-Area Networks. Contact: IEEE Computer Society, P.O. Box 639, Silver Spring, Md. 20901.

MARCH 21, ORLANDO, FLA. — Software Quality Assurance. Contact: IEEE Computer Society, P.O. Box 639, Silver Spring, Md. 20901.

MARCH 21, ORLANDO, FLA. — The Unix Operating System. Contact: IEEE Computer Society, P.O. Box 639, Silver Spring, Md. 20901.

MARCH 21-23, WASHINGTON, D.C. — Data Communications: An Introduction to Concepts and Systems. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

MARCH 21-23, SUNNYVALE, CALIF. — Structured Design Seminar/Workshop. Contact: Oberland Associates, 4036 N.E. Sandy, Portland, Ore. 97212.

MARCH 21-23, SAN FRANCISCO — Personal Computers: Strategies for Managing. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

MARCH 21-23, ZURICH — International Symposium on the Performance of Computer Communications Systems. Contact: Harry Rudin, IBM Research Laboratory, Saumerstrasse 4, CH-8803 Ruschlikon, Switzerland.

MARCH 21-23, NEW YORK — Systems Analysis and Design: Concepts and Effective Practices. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

MARCH 21-23, COLORADO SPRINGS — Presentation Techniques for MIS Managers. Contact: Claire Newkirk, Newkirk Associates, Inc., 1550 Oak Hills Drive, Colorado Springs, Colo. 80919.

MARCH 21-23, SAN FRANCISCO — Information Center Concepts: Organization and Implementation. Contact: Datapro Research Corp.,

STOP YOUR STRINGING YOU

Lease a Codex Cable Multiplexer for your IBM 3274 system. It can link up to 32 terminals with a single cable.

NEWS

1805 Underwood Blvd., Delran, N.J. 08075.

MARCH 21-23, CHICAGO — Evaluating, Selecting and Using Computer Software Packages. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

MARCH 22, ORLANDO, FLA. — Computer Communications Protocols. Contact: IEEE Computer Society, P.O. Box 639, Silver Spring, Md. 20901.

MARCH 22, ORLANDO, FLA. — Reusable Software Engineering. Contact: IEEE Computer Society, P.O. Box 639, Silver Spring, Md. 20901.

MARCH 22, ORLANDO, FLA. — Unix Systems on Small Computers. Contact: IEEE Computer Society, P.O. Box 639, Silver Spring, Md. 20901.

MARCH 22-23, NEW YORK — Telecommunications Management in the Post-Divestiture World. Contact: Marilyn Chastean, The DMW Group, Inc., 2020 Hogback Road, Ann Arbor, Mich. 48104.

MARCH 22-25, SAN FRANCISCO — The Forth Interest Group (FIG). Contact: FIG, P.O. Box 1105, San Carlos, Calif. 94070.

MARCH 23-25, SAN FRANCISCO — The Ninth West Coast Computer Faire. Contact: Computer Faire, Inc., Northern California Office, 570 Price Ave., Redwood City, Calif. 94063.

WEEK OF MARCH 25

MARCH 25-28, NEW YORK — The Third Panoptic Users Learning and Sharing Exchange Conference (Pulse). Contact: Karen Taylor, National Pulse Coordinator, Panoptic Systems, 709 Enterprise Drive, Oak Brook, Ill. 60521.

MARCH 26, ST. LOUIS — Microvos. Contact: Evaluation and Planning Systems, Inc., Suite 1540, 110 Plaza, New York, N.Y. 10119. Also being held March 27 in Stamford, Conn.

MARCH 26, NEW YORK — Introduction to the IBM PC. Contact: Center for Advanced Data Processing, Inc., Suite 402, 450 Seventh Ave., New York, N.Y. 10123.

MARCH 26-27, SAN FRANCISCO — The Impact of the Computer Revolution 1984. Contact: J. Baldwin, Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

MARCH 26-27, ROCKFORD, ILL. — Microcomputers: A Tool for Increased Productivity. Contact: Association for Systems Management, 24587 Bagley Road, Cleveland, Ohio 44138.

MARCH 26-27, SAN FRANCISCO — IBM Systems Network Architecture: A Master Plan for Teleprocessing. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

MARCH 26-27, DALLAS — Rapid Prototyping. Contact: Infocl, Inc., Box 7117, Menlo Park, Calif. 94026.

MARCH 26-27, HOUSTON — Managing Projects in the Structured Environment. Contact: J. Baldwin, Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

MARCH 26-27, COLUMBUS, OHIO — CBT Base Authoring Workshop. Contact: Goal Systems International, Inc., 5455 N. High St., Columbus, Ohio 43214.

MARCH 26-27, ROCHESTER, N.Y. — Dbase II. Contact: Center for Advanced Professional Education, Suite 110, 1820 E. Garry St., Santa Ana, Calif. 92705. Also being held March 29-30 in Albany, N.Y.

MARCH 26-28, NEW YORK — Data Communications: Effective Network Design. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

MARCH 26-28, WASHINGTON, D.C. — Structured Quality Assessment Workshop. Contact: J. Baldwin, Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

MARCH 26-28, DENVER — Advanced Office Automation for the 1980s. Contact: Software Institute of America, 339 Salem St., Wakefield, Mass. 01880.

MARCH 26-28, WASHINGTON, D.C. — Microcomputers: A Guide to Selection and Application. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

MARCH 26-28, BETHESDA, MD. — Strategic Data Planning Conference. Contact: Barnett Data Systems, 19 Orchard Way N., Rockville, Md. 20854.

MARCH 26-28, NEW YORK — Data Communications for Microcomputers: Acquisition, Application and Implementation. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

MARCH 26-28, STATELINE, NEV. — Planning the Automated Office. Contact: Cyberserve International Co., 1091 W. California Ave., Mill Valley, Calif. 94941.

MARCH 26-28, ATLANTA — The Data Entry Management Association (Dema) 1984 Conference and Seminar. Contact: Marilyn S. Booke, Dema, P.O. Box 16711, Stamford, Conn. 06906.

MARCH 26-28, CHICAGO — Data Base Management Systems: A Comparative Analysis of General-Purpose Systems. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

MARCH 26-28, WASHINGTON, D.C. — Strategic Data Planning Conference. Contact: Barnett Data Systems, 19 Orchard Way N., Rockville, Md. 20854.

MARCH 26-28, CHICAGO — Data Communications and Networking for Personal Computers. Contact: Software Institute of America, 339 Salem St., Wakefield, Mass. 01880.

MARCH 26-29, NEW YORK — CICS/Testing and Debugging. Contact: Compsci Technical Corp., 10 E. 21st St., New York, N.Y. 10010.

See MARCH page 47

3274 SYSTEM FROM ALONG.

IBM 3274 system users no longer have to pull individual cables each time they add or relocate terminals.

The Codex Cable Mux provides transparent, high speed communications for up to 32 terminals through one single cable. It saves you money and offers unlimited flexibility in setting up terminal clusters throughout your entire organization.

The Codex Cable Mux also offers a variety of purchase and service options no other vendor can match.

Like the opportunity to lease a unit for as little as $26 a month.

And a choice of on-site or back-to-the-factory maintenance.

For more information about Codex's Cable Mux, call 1-800-821-7700 ext 888. Or write: Codex Corporation, Dept. 707-88, 20 Cabot Blvd. Mansfield, MA 02048.

codex

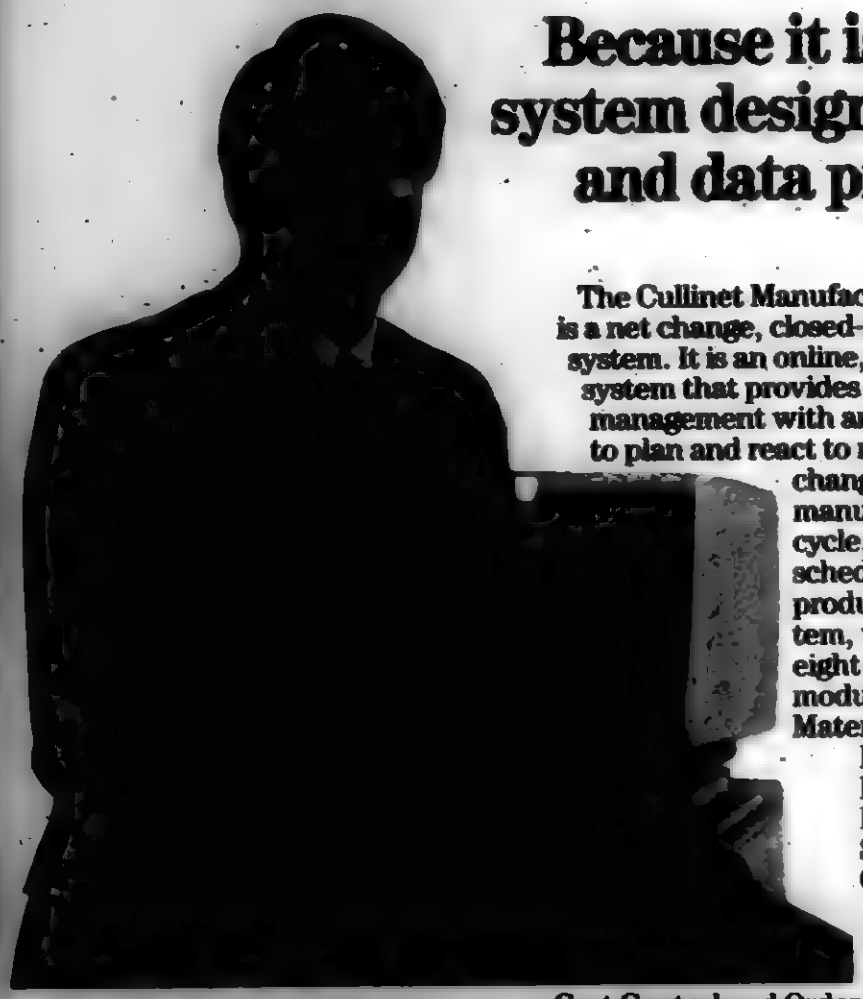
MOTOROLA INC.

© 1983 Codex Corporation.

SEE US AT INTERFACE, LAS VEGAS, MARCH 12-15, BOOTH #736.

"The Cullinet Manufacturing System is a major advance in application software technology."

—Fred Buckley*



Because it is the first manufacturing system designed for both manufacturing and data processing professionals.

The Cullinet Manufacturing System is a net change, closed-loop MRP II system. It is an online, interactive system that provides manufacturing management with an effective way to plan and react to real world changes in the manufacturing cycle, from master schedule to finished product. The system, which includes eight functional modules: Bill of Materials, Material Requirements Planning, Inventory, Shop Floor Control, Master Production Scheduling, Purchasing, Cost Control and Order Entry, provides a new level of control that can dramatically increase productivity.

This level of control is made possible through the Cullinet Manufacturing System's unique horizontal and vertical integration with Cullinet's Database Software.

Horizontal integration means that all manufacturing data is controlled and accessed directly from Cullinet's IDMS/R database management system. For example, when you issue material from inventory, the system automatically updates inventory balances, allocates the quantities to Shop Floor Control and converts the units to dollars for Cost Control. Additionally General Ledger Accounts are updated because the Cullinet Manufacturing System is completely integrated with Cullinet's Financial System.

Vertical integration means that the manufacturing system is designed and developed using IDMS/R and ADS/OnLine, Cullinet's fourth generation programming productivity tool. This unique architecture provides data processing with the means to tailor and modify the system. Since you don't want to change your business to match the features of a software package, Cullinet provides the tools to tailor the manufacturing system to meet your company's requirements.

The combination of horizontal and vertical integration means, for the first time, a manufacturing system is available that meets the requirements of both data processing and manufacturing management.

Attend a productive seminar explaining this integrated manufacturing system. To participate in one of the 700 Cullinet seminars scheduled internationally, send in the coupon or call 1-800-225-9930. In MA, 617-329-7700.

**Fred Buckley is Cullinet's Manager of Manufacturing Applications Software Development. His efforts have been crucial in achieving the integration that makes Cullinet's manufacturing system unique. Fred joined Cullinet in 1977. Fred holds a degree in Computer Science from Thames Valley State and is a member of the American Production and Inventory Control Society.*

Manufacturing Seminars cities and dates

City & State	Date	City & State	Date
Boston, MA	March 6	Portland, OR	March 15
Columbus, OH	March 9	Raleigh, NC	March 20
Grand Rapids, MI	April 10	Rochester, NY	March 28
Meadowlands, NJ	March 7	Toronto, ON	March 20
Minneapolis, MN	March 28	Vancouver, BC	March 14
Montreal, PQ (Eng)	March 21	Washington, DC	March 8
New York Alpe, NY	March 13		

I'd like to attend your seminar on _____ Date

in _____ City

Name/Title _____

Name/Title _____

Company/Department _____

Address _____

City _____

State _____ Zip _____

Phone ( ) _____

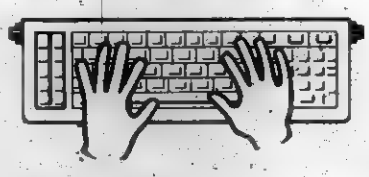
Mail to: Cullinet Software, Inc., 400 Blue Hill Drive, Westwood, MA 02090-2198.
Attn: Corporate Meetings
Cullinet Software products are designed to run on IBM 303X/43XX, 4361 or 4381 or plug-compatible computers.

26 CW

Manufacturing: Cullinet

© 1984 Cullinet Software, Inc., 400 Blue Hill Drive, Westwood, MA 02090-2198.

Look for our ad further on in this issue and see how you can get a TRIAL REVIEW of **Data Decisions**™ MICROCOMPUTERS



the only information service with hands-on testing of microcomputer software packages

SPECIAL OFFER

for Computerworld readers

Take a Trial Review of the new

Data Decisions™

MICROCOMPUTERS

and receive a

Free Bonus Report on LANs.

(*regularly* 39^{00})

Absolutely no obligation to buy anything!

NEWS

MARCH from page 43

MARCH 26-29, LOS ANGELES — Software Engineering with Ada. Contact: The U.S. Professional Development Institute, Software Engineering with Ada, Department A, 1620 Elton Road, Silver Spring, Md. 20903.

MARCH 26-29, TORONTO — Advanced Interviewing and Analysis. Contact: Brandon Systems Institute, 4720 Montgomery Lane, Bethesda, Md. 20814.

MARCH 26-29, ORLANDO, FLA. — The Seventh International Conference on Software Engineering. Contact: IEEE Computer Society, P.O. Box 639, Silver Spring, Md. 20901.

MARCH 26-30, SEATTLE — Structured Analysis and Design Workshop. Contact: J. Baldwin, Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

MARCH 26-30, ORLANDO, FLA. — CICS Programming. Contact: Harris Education Center, 6220 S. Orange Blossom Trail, Orlando, Fla. 32809.

MARCH 26-30, ATLANTA — Structured Analysis and System Specification Workshop. Contact: J. Baldwin, Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

MARCH 26-30, ST. LOUIS — IBM DB/DC Data Dictionary. Contact: Joan Grillion, McDonnell Douglas Corp., P.O. Box 516, St. Louis, Mo. 63166.

MARCH 26-30, PHILADELPHIA — Structured Design and Programming Workshop. Contact: J. Baldwin, Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

MARCH 26-30, LONDON — The 19th International Symposium on the Application of Computers and Mathematics in the Mineral Industries (Apcom) 1984. Contact: Apcom '84, The Conference Office, The Institution of Mining and Metallurgy, 44 Portland Place, London W1N 4BR England.

MARCH 26-30, WASHINGTON, D.C. — Structured Design for Real-Time Systems. Contact: J. Baldwin, Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

MARCH 26-30, WASHINGTON, D.C. — Capacity Planning and Modeling. Contact: Institute for Software Engineering, 510 Oakmead Pkwy., Sunnyvale, Calif. 94086.

MARCH 26-30, ROANOKE, VA. — Basic Systems Analysis. Contact: Association for Systems Management, 24587 Bagley Road, Cleveland, Ohio 44138.

MARCH 26-30, NEW YORK — Vsam Structure, Functions and Usage. Contact: Syncd, One Park Ave., New York, N.Y. 10016.

MARCH 26-30, ORLANDO, FLA. — Auditing in the Contemporary Computer Environment. Contact: Marge Umlor, EDP Auditors Foundation, 373 S. Schmale Road, Carol Stream, Ill. 60187.

MARCH 26-30, CHICAGO — CICS/Command-Level Application Programming. Contact: Comped Technical Corp., 10 E. 21st St., New York, N.Y. 10010.

MARCH 26-30, CONCORD, MASS. — Advanced C Topics Seminar. Contact: Plum Hall, One Spruce Ave., Cardiff, N.J. 08232.

MARCH 26-30, HOUSTON — Structured Systems Design Workshop. Contact: Learmonth & Burchett Management Systems, Inc., Suite 405, 2900 N. Loop W., Houston, Texas 77092.

MARCH 27, NEW YORK — Spreadsheet Using Lotus 1-2-3. Contact: Center for Advanced Data Processing, Inc., Suite 402, 450 Seventh Ave., New York, N.Y. 10123.

MARCH 27, NEW YORK — Introduction to Dbase II. Contact: Center for Advanced Data Processing, Inc., Suite 402, 450 Seventh Ave., New York, N.Y. 10123.

MARCH 27-28, DAYTON, OHIO — The Eighth Annual Computer Fair. Contact: Dan Schumacher, University of Dayton, 300 College Park Ave., Dayton, Ohio 45469.

MARCH 27-29, NEW ORLEANS — SAS Processing Course. Contact: SAS Institute, Inc., P.O. Box 8000, Cary, N.C. 27511.

MARCH 27-29, PHILADELPHIA — Structured Analysis: Tools and Techniques. Contact: Mary Aliano, AGS Management Systems, 330 Walnut St., Philadelphia, Pa. 19106.

MARCH 27-30, DALLAS — Structured Systems Designs. Contact: Georganna Carson, Ken Orr and Associates, Inc., 1725 Gage Blvd., Topeka, Kan. 66604.

MARCH 27-30, GENEVA — Technobank '84 International Exhibition of Technologies and Services for Banking and Finance. Contact: Technobank, P.O.B. 625, CH-1211 Geneva 1, Switzerland.

MARCH 28, NEW YORK — Dbase II for Application Development. Contact: Center for Advanced Data Processing, Inc., Suite 402, 450 Seventh Ave., New York, N.Y. 10123.

MARCH 28-29, AMERSFOORT, NETHERLANDS — The Second European Conference and Exhibition on Developments in CAD/CAM. Contact: Suzanne Mayhew, Oyez Scientific and Technical Services Ltd., Bath House 3rd Floor, 56 Holborn Viaduct, London EC1A 2EX England.

MARCH 28-30, CHICAGO — Data Communications: An Introduction to Concepts and Systems. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

MARCH 28-30, MIAMI BEACH — Frost & Sullivan's Sixth Annual Computer Graphics Conference: Forecast and Assessments. Contact: Carol Sapchin, Frost & Sullivan, Inc., 106 Fulton St., New York, N.Y. 10038.

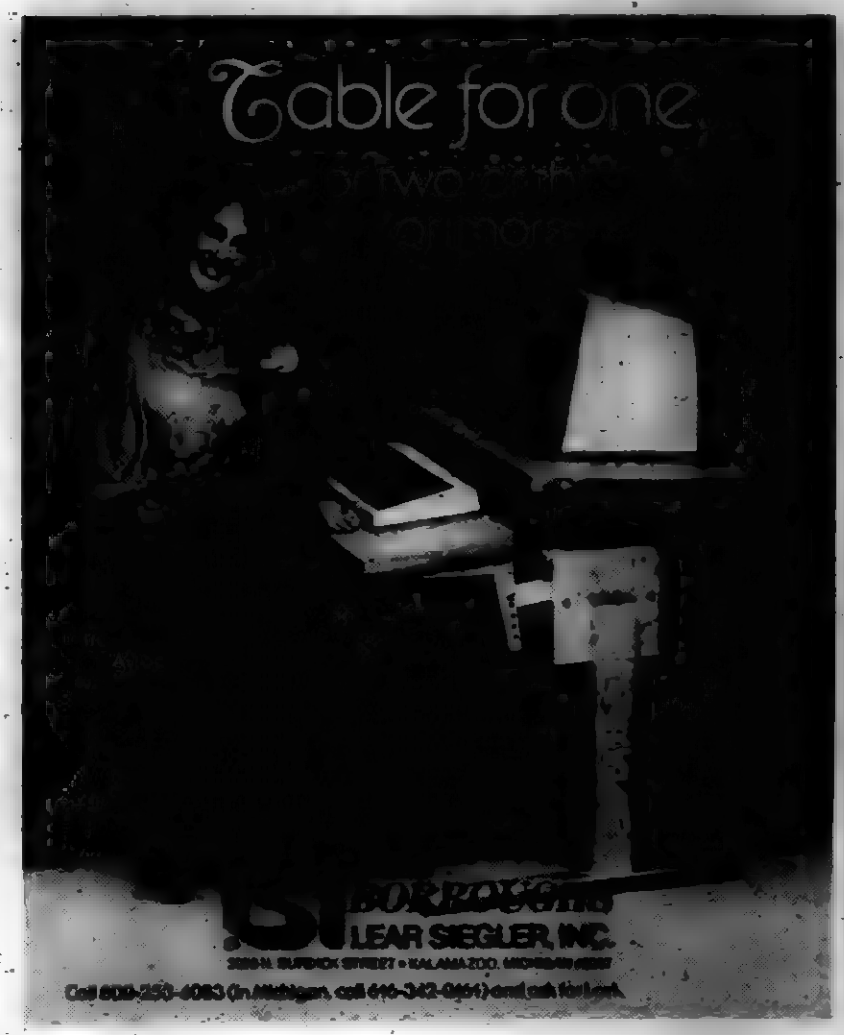
MARCH 28-30, WASHINGTON, D.C. — Computer Operations: Effective Production Scheduling and Control. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

MARCH 28-30, COLUMBUS, OHIO — CBT Course Design Workshop. Contact: Betty Bruce, Goal Systems International, Inc., 5455 N. High St., Columbus, Ohio. 43214.

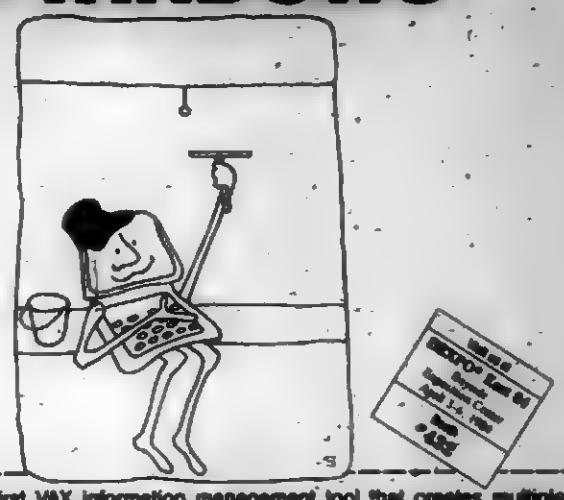
MARCH 28-30, INDIANAPOLIS — Data Base Management. Contact: Center for Advanced Professional Education, Suite 110, 1820 E. Gerry St., Santa Ana, Calif. 92705.

MARCH 28-30, NEW ORLEANS — SAS Basics Course. Contact: SAS Institute, Inc., P.O. Box 8000, Cary, N.C. 27511.

MARCH 28-30, LAS VEGAS — Data Communications Systems.



MAKE YOUR VAX DO WINDOWS



SMARTSTAR™ is the first VAX information management tool that creates multiple window applications—and can scroll your screen to 400 lines. The SMARTSTAR family includes:

- SMARTDESIGN™ for designing applications without programming
- SMARTQUERY™ for powerful, easy-to-use application processing
- SMARTCALL™ when VAX host programming is required
- REQUEST for integrated report and query

Name _____
Title _____
Company _____
Address _____
City _____ State _____ Zip _____
Phone ( ) _____

SEND COUPON NOW FOR DETAILS AND JOIN THE 4TH GENERATION

STI Signal Technology, Inc.
5951 Encina Road, Goleta, CA 93117 (805) 683-3771 Outside California call toll-free (800) 235-0787
TWX 910-334-3471

EDITORIAL

A few lessons in salesmanship

Providing data security is a lot like staying in shape; everyone agrees it's a great idea, but most find it easier to talk about fitness than to run laps at the gym.

As indicated by a recent survey of the Data Processing Management Association, the vast majority of upper level managers concurs that corporate information assets should be protected [CW, Feb. 27]. But many firms surveyed in the DPMA poll allocate nothing for data protection, and most of those that do, actually provide very little in the way of funding.

It would be too easy and, perhaps, too simple to say that top management pays little more than lip service to what are, in fact, pressing data security needs that often go unmet. After all, if a stolen disk or tape shuts down the data processing department, top management will feel plenty of heat when the system failure bills are tallied.

Could it be, then, that DP and MIS professionals need a few lessons in salesmanship?

The DPMA members polled in the survey seemed to think so, given their recommendations for improving the funding of data security projects. But other, somewhat disturbing factors that have come to light recently indicate that top management may not be getting the security message all that clearly.

For example, Digital Equipment Corp. performed a comprehensive market survey prior to making a multimillion dollar commitment to establishing a nationwide records management network. DEC's survey indicated that most companies that tend to data security needs do so in-house, rather than using any of the growing number of off-site storage companies or disaster recovery services. The problem is with some of the security techniques being employed — such as that of a DP specialist in Boston who took sensitive tapes home each night and locked them in her closet.

In the more usual case, key disks and tapes are kept in storage cabinets, where they are easy marks for pilferers and saboteurs. According to the DPMA, the greatest threat to data security is misuse of data by in-house staffers, while other recent surveys and studies bear out the rising incidence of unprotected data being destroyed or altered. If management isn't acting forthwith to protect such vital corporate assets, perhaps the security sell job is falling short of illuminating the potential dangers of unguarded resources.

First, top management must realize that the expense of protecting corporate information assets is just another cost of doing business. This can only follow a detailed, unembellished and honest accounting of the DP shop's security needs — doomsayers need not apply for the sales job.

Also, bear in mind that top managers, like the end users the DP shop serves, are inherently solution-oriented. DPers, on the other hand, can be rather detail-oriented. There must be a meeting of the minds somewhere in the middle, with security concerns hanging in this balance.

Stamp of approval

LETTER

Challenging the view that superminis, CPUs in same performance class

Our management would like to challenge the contention in "IBM 4300 rivals reach 95 in number" [CW, Jan. 30] that superminicomputers and IBM mainframes are in the same performance class. We recently purchased a Prime Computer, Inc. information supermini together with fully integrated application software (Manfact II), developed by Compufact of Santa Ana, Calif. Under the leadership of our plant manager, we installed order processing, sales history, payroll, materials management, a full complement of financial applications and replaced an IBM 4331 in less than nine months while reducing the MIS budget by 50%.

Using a query/report writer, our users have direct access to the entire production data base. System availability for the 23-terminal network has been very high, with less than five hours downtime in 18 months.

An MIS manager concerned with cost-effectiveness and responsiveness of his department should consider the significant advantages superminis have over mid-range mainframes. These include ease of operation and installation and expansion without software conversion. Based on our experience, this kind of system could be installed for less than $250,000.

David L. Hayes
Management information systems consultant
Heatilator, Inc.
Mount Pleasant, Iowa

Computerworld welcomes letters from its readers. Preference will be given to typed, double-spaced letters of 150 words or less; they may be edited for the purposes of clarity and brevity. Letters should be addressed to Editor, Computerworld, Box 880, 375 Cochituate Road, Framingham, Mass. 01701.

COMPUTERWORLD

Editor
John C. Wilmouth

Executive Editor
Rita Shaw

Managing Editor
Bill Laberis

Assistant Managing Editor
Cheryl M. Gallo

Senior Editors:
Software
Paul Gillin
Communications
John Dix
Phil Hirsch
Systems
Tom Henkel
Industry
Peter Bartok
Features
George Harrar

Design Editor
Marjorie Magowan

International Editor
Susan Blakeney

Associate Features Editor
Barbara Van Scoyoc

Assistant Features Editor
Elizabeth Morse

Special Reports Editor
Donovan White

Staff Writers:
James Connolly
John Gallant
Lynn Haber
Patricia Keefe
Paul Korzeniowski
David Olmos
Edward Warner

Correspondents:
New York
David Myers
Suite 7G
401 East 80th St.
New York, N.Y. 10021
212/570-2135
Washington, D.C.
Bureau Chief: Jake Kirchner
445 National Press Building
529 14th St., N.W.
Washington, D.C. 20045
202/347-9718

West Coast
Bureau Chief: Jolly Bader
Correspondent: Robert Bell
1060 Marsh Rd.
Menlo Park, Calif. 94025
415/328-8084

Chief Copy Editor
Kathie Gow

Assistant Chief Copy Editor
Charlotte Zibrak

Copy Editors:
Becky Batcha
Dave Bouffard
Bruce Crane
Deborah Fickling
Deborah Scadutto-Hom
Thomas Schmidt

Assistant to the Editor
June Fetig

Editorial Assistants:
Lorraine Brian
Mary DeChristoforo

Contributors
Education
J. Daniel Couger
Human Communication
Jack Stone
Timesharing Time
Larry Long
Minicomputers
Thomas Madron
The Data Center
John P. Murray
Leaks on Science
Charles P. Lecht

Special Publications
Computerworld Extra!
George Harrar, Editor
Computerworld on Communications
Bruce Hoard, Editor
Computerworld On
Ann Dooley, Editor
Computerworld Buyer's Guides
Marcia Stonesifer, Editor

Main Editorial Office: Box 880, 375 Cochituate Road, Framingham, MA 01701 617/879-0700

Computerworld is a member of the CW Communications/inc. group, the world's largest publisher of computer-related information. The group publishes 44 computer publications in 16 major countries. Nine million people read one or more of the group's publications each month. Members of the group include: Argentina's *Computerworld Argentina*; Australia's *Australasian Computerworld* and *Micro Computer Magazine*; Brazil's *DataNews* and *MicroMundo*; China's *China Computerworld*; Denmark's *Computerworld Denmark* and *MikroData*; France's *Le Monde Informatique*; Germany's *Computerwoche*, *Microcomputerwelt* and *PC Welt*; Italy's *Computerworld Italia*; Japan's *Computerworld Japan* and *PC Japan*; Mexico's *ComputerworldMexico*; Norway's *Computerworld Norge* and *MikroData*; Saudi Arabia's *Saudi Computerworld*; Spain's *ComputerworldEspana* and *MicroSistemas*; Sweden's *ComputerSweden*, *MikroDatorn* and *Min Hemdator*; the UK's *Computer Management* and *Computer Business Europe*; the U.S.' *Computerworld*, *Desktop Computing*, *Hot CoCo*, *InCider*, *InfoWorld*, *Micro Marketworld*, *Microcomputing*, *PC World*, *Run* and *80 Micro*.

VIEWPOINT

The chrysanthemum or the sword

LIGHT ON SCIENCE
Charles P. Lecht

I was having breakfast at the Hotel Okura in Tokyo when I read in the Feb. 17 issue of *Japan Times* about the breakthrough: Hitachi Ltd. scientists had produced a high-performance circuit switch of silicon emitter coupled logic (ECL) that won the world speed record in the continuing race to produce faster signal processing capabilities. Registering gate delays of an astonishingly low 84 picoseconds through the usage of sidewall base contact structured (Sicos) transistors, the Hitachi achievement cuts, by two-thirds, previous gate delay records for ECL circuits.

According to Dr. Minoru Nagata, leader of the development team, "The Sicos logic circuits may well clear the way for the development of a future generation of ultrafast computers." What he means, of course, is that the incorporation of such high-speed gates into circuits on very large-scale integration (VLSI) chips can produce super-duper computers that'll beat the pants off any mere supercomputer known to science today. No doubt American scientists are working on similar and not so similar technologies to match and improve upon Hitachi's gate performance, but, for the moment, the Japanese fulfill our American dream of being No. 1, and they should be proud of this accomplishment.

After the flogging Hitachi took in the American press in late 1982 and throughout 1983, this early 1984 news may come as a surprise to our computer establishment. Publicly accused of obtaining U.S. technology illicitly and disqualified after having been low bidder for installation of computer systems into the same U.S. bureau (the Federal Bureau of Investigation) that helped smoke out what it was apparently up to, Hitachi was then shamed into telling its prestigious Japanese clientele that it would have to start paying software royalties to an American competitor for what was thought to be Hitachi's software.

Americans might well expect to be forgiven if they overlooked the fact that Hitachi was engaged in legitimate research of its own. By the volume of reports of Hitachi's misdeeds, some Americans may have even concluded that Hitachi had converted all its research microscopes into spy telescopes and sent its scientists to America to seek our hot research results, possibly reading these from the desks of our inventors from trees outside their suburban office windows and posting these to Tokyo before they cooled. Now it turns out that at least some Hitachi researchers must have stayed home — however else could they have had the time to make their new "picoswitch?" They've got to be "clean" on this one, folks; you can't copy and be No. 1.

Which brings me to the point of this essay. Hitachi's success comes only a few days after Fujitsu Ltd. sent a 1984 valentine to the American supercomputer community in the form of an announcement of a computer system with the curious capacity to run programs written for IBM 370 lineage systems while doing the number crunching expected of the next generation of Cray Research, Inc.'s latest supercomputer and Nippon Electric Corp.'s (NEC) announcement of a 1.33-byte processor.

American/Japanese relations

These 1984 "openers" from Japan should provide the U.S. computer systems manufacturing and user community with reason to pause to think about American/Japanese science relationships and their future. They signify to me that the timing couldn't be better for American and Japanese scientists to seek increased cooperation in basic research.

The Japanese computer industry is still very small in comparison with our own, less than 10% in dollar volume of world sales, most of which occur in Japan. While short on income, it is long in brains — the stuff that counts in creating competitive products. VLSI improvements (like Hitachi's), new systems architectures (like Fujitsu's) and high-performance supercomputers (like NEC's) are essential to improve the price/performance potential of our products if we are to continue to maintain the world leadership in computer technology we currently hold.

Since at the present time the high-technology Japanese community is inclined toward American leadership and is itself a bastion of free enterprise that truly believes in our capitalist system of competition, we would minimally do well to nurture the status quo through friendship and mutual support of our common goals. These include world peace through world trade.

Of course we cannot easily forgive any company, Japanese or otherwise, that violates the just rights to ownership of the products of another company, be it American or otherwise. But forebearance and prudence must be exercised to overcome the inevitable disputes that have their origins in cultural differences and whose resolution defies logic. Hitachi's admission of its guilt and its settlement with the company whose rights it violated were exemplary in this sense. Nothing could be gained by our continued punitive interest in this affair, except, perhaps, a lessening of friendship with the Japanese computer industry, which is compelled to notice that very few Japanese computer systems products have ever made their way to American users, while ours still account for most of their installed base.

Japan's population is roughly half the size of ours. Together we account for less than 10% of the population of our global community, but roughly 80% of its computer systems business income.

Nothing new like Hitachi's breakthrough has emerged in years from our European colleagues, save perhaps those working in American companies abroad. The stagnated European computer systems industry cannot help but notice that the vital ingredient it lacks, namely, research for development of indigenous products, is available in Japan. Many American companies have noticed this and have benefited by innovation in Japanese research. Better cooperation with Japanese technology companies by American industry will ultimately stop the trend of Europeans to play one against the other in a competition that benefits neither.

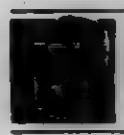
Since we, at the moment, hold world leadership in almost every research, development and manufacturing category, the negative effects of an increase in cooperation, when compared with those accruing from an increase in competition, seem preferable to me.

Negotiation would help

Negotiation for better cooperation from a position of strength in international marketplaces would help us. That America's international marketplace strength is diminishing is evidenced by our diminishing world marketplace share. That this is occurring during a period of intensive home growth, and at a time when creating computer systems is possible by all developed countries, should provide some measure of comfort. But today's vitality of our computer industry and tomorrow's promise have not diminished one iota, by my reckoning, international marketplace

See MAYBE page 82

Bargain basement personal computer clones: a play



HUMAN CONNECTION
Jack Slone

I'm askance at how IBM Personal Computer "cloners" are claiming vast capabilities for their machines while cutting their prices to levels that seem to be only a hair's width away from manufacturing costs. It certainly does make the process of selecting a personal computer a confusing one, particularly for the millions of American fathers who are trying desperately to purchase an IBM-like machine for their prodigious programming/systems development offspring at prices that do not siphon off all the family wealth.

The time and place: Today, Big City, U.S.

The characters: Harold Rockman, well-to-do businessman. Jeremy Rockman, Harold Rockman's son.

The scene: Harold Rockman enters the living room, both arms loaded down with bundles of personal computer sales literature. He is wearing a wry smile, ready to enter what he believes to be the final and winning round of the year-long, computer-acquisition joust he's been having with his bright 11-year-old hacker/kid, Jeremy. The child comes skipping into the living room.

Harold: Jeremy, my beloved son, after long, agonizing hours of study and research, do I have the machine for you! Let me quote from the ad: "IBM Clone — The Sanyo 550 for Under $1,000!"

Jeremy: Papa, dear papa, I find myself totally unable to comprehend how a processing device with qualities allegedly comparable to those of an IBM Personal Computer can possibly be marketed for a grand.

Harold: Well, then, kiddo, let me enumerate the ways. I submit that the Sanyo is the machine for you to have and to hold from this day forward because you buy a load of features and functions for the buck. For instance, it positively glows with processing power, what with 128K bytes of random-access memory of the 16-bit variety oriented around Microsoft, Inc.'s MS-DOS, a vast improvement over the 8-bit, Digital Research, Inc. CP/M vintage machines.

Jeremy: You're turning my head.

Harold: Naturally, it has bundled software that meets your needs exactly. Like the word processing software Wordstar from Micropro International Corp.

Jeremy: Wordstar? That's so clumsy you need control keys just to control your control keys.

Harold: The Sanyo is a creature of modern times. It's loaded with program function keys.

Jeremy: How sweet it is! When do I hear the bad news?

Harold: To be sure, there are a few minor deficiencies, but I feel confident you can work around them.

Jeremy: Lay it on me.

Harold: Well, for one, it's slightly shy of a monitor. But don't worry about it. One of the fellows at the office told me we can pick up a used one from the classified ads. And then it's somewhat short of a second disk drive. But better one drive than a tape cassette recorder. Of course, we'll have to add a printer, but that's not too bad a problem. I saw a preowned daisywheel job advertised for under $300.

Jeremy: Is it the one that speeds along at all of 10 char./sec.?

Harold: Okay, okay. But it sure beats a pencil and paper. So my young friend, what do you say? Shall we make the big move?

Jeremy: Tell you what, pop. Why don't we just skip this generation and wait for AT&T to provide an IBM Personal Computer emulator on its soon-to-be announced Unix-driven 32-bit machine? ‡

Computers took the strain out of processing data.

Now Raytheon has taken the strain out of data processing.

Introducing the PTS-1000/4000 family of 3270-type information display systems. Designed to combine mainframe compatibility, operator comfort, and peace of mind for DP managers too.

How can we promise all that?

After more than a decade of experience in 3270 emulation, Raytheon designed the PTS-1000/4000 family to offer the utmost in flexibility, so you can mix and match any of our new controllers with any of our new display and printer terminals.

When it comes to operator comfort, no one offers interactive displays with more built-in ergonomic features than Raytheon. Features especially designed to ease the strain on one's neck and back, hand and wrist, and eyes.

The microprocessor-based PTS-1000/4000 family enables efficient distribution of your data processing workload with flexible configuration options and extensive self-diagnostic capabilities. Binary synchronous, systems network architecture (local and remote), and airline link control communication protocols are supported. Large and small control units, multiple screen sizes, and a wide variety of peripheral input/output devices and printers can be mixed and matched with varying star, multidropped cabling, or multiplexed configurations.

Special system features include productivity enhancements like local format storage, response time monitors, row/column indicators, and unprotected field indicators.

As for the DP manager's peace of mind, Raytheon offers flexible financing and leasing options, competitive pricing, over 2000 service people worldwide, and a commitment for today and tomorrow that can come only from the largest independent supplier of intelligent terminal processing equipment.

The PTS-1000/4000 information display systems from Raytheon Data Systems. We take the strain out of your data processing. For the sales office nearest you, check your telephone directory or call 1-800-343-6676.

RAYTHEON

Raytheon Data Systems
Box 7, Marketing Communications
1415 Boston-Providence Turnpike
Norwood, Massachusetts 02062

VIEWPOINT

Sharing perspectives on fifth generation

LETTER

The article "Fifth generation poses challenge" [CW, Jan. 16] will, I hope, stimulate needed thought and action. In order to meet that challenge, however, it is important that we share further perspectives. Japan's Fifth-Generation Computer Systems (FGCS) Project is a 10-year, government-industry collaboration that was initiated in October 1981. The project's philosophy includes concepts of commercial applications and world preeminence, but transcends that with visions of meeting projected needs of "the economy and society of the future," providing "new insights to and outlooks on the nature of intellect and knowledge," enhancing international understanding and cooperation and contributing to "more advanced, humane behavior" and, thereby, to a "more balanced society," the FGCS said.

In pursuing those goals, they seek far more than new architectures, packaging techniques, circuit substrates and further understanding of artificial intelligence concepts and their use in a computer system. Their concept of "data" is enlarged to "knowledge information." Whereas our AI seeks to work in conventional computers, they are reconceiving "computers" entirely.

They seek to develop not only new theories, but also "the framework of a new theoretical system . . . a new system of theories," the FGCS said. Comprehensive and component theoretical grounding pervades their project as a fundamental requirement.

The article's concerns about the Defense Advanced Research Projects Agency (Darpa) being the prime money pump for our fifth-generation work are understandable, but can be assuaged by other considerations. Darpa's involvement is due not to the likelihood of initial fifth-generation uses being military, but rather, to industry's default. However, Darpa's role does not preordain government control over the computer market.

Ironically, the U.S. fifth-generation computer industry may turn out to have been built on the foundations laid by U.S.- and Japanese government-sponsored research and development. For the Japanese project is a remarkable, open enterprise, involving extensive international cooperation and exchange programs.

Stephen E. Sandler
President
Uniconsult
New York, N.Y.

The PC security problem

eliminated

JAPAN from page 40

diminution or not. It would follow that a revitalized cooperation between Japan and the U.S. could help bring to bear the best of both together to counter erosion in the foreign marketplaces of either.

And never has European dependence on U.S. technology in the key area of large systems development been stronger. With the opening of the new Chinese marketplace, only Japan has the capability to supply large systems technology, if it isn't acquired from us. Still trying to lessen imports of these systems from the U.S., Japan's export capability will be limited for some time to come. Would it not make sense to put Japanese/American computer systems affairs in the best of condition at this moment and, were it possible, to tighten business relationships to coordinate external sales efforts for mutual benefit? European countries create multinational joint venture companies to attack foreign marketplaces; aircraft produced by these companies fly all over America these days. Just think of the performance such a Japanese/American joint venture could expect in computer systems manufacture and sales.

Ruth Benedict's classic, *The Chrysanthemum and The Sword* (published by Meridian Books in 1946), provides Americans with a picture of the patterns of Japanese culture as perceived in America following the calamity of the early 1940s. Though the book is beautifully written, it still is hard for Americans reading it to understand the why's and wherefore's of Japanese thinking from its pages; for example, the story of the 47 Ronin. But one thing is clear throughout the text: The Japanese respect, even admire, American ingenuity and leadership. There have been startling changes since 1946 in Japan, but most have created a better alignment with our principles, be these in business or elsewhere. In view of what I perceive to be the case, Japan's computer industry may soon grow tired of offering chrysanthemums to potential American partners hoping for nothing more than fairness by anyone's standard. If this isn't in the offing, human mettle of the kind which swords are tempered may stiffen the resolve of a spurned Japanese industry to seek to redress their wounds elsewhere.

Lecht is chairman of Lecht Sciences, Inc., a New York-based think tank specializing in computer and communications technologies.

SOFTWARE & SERVICES

Using contractor offers advantages

Timely completion of urgent tasks

By Richard W. Schlosser
Special to CW‡

Careful use of systems programmer contractors and consultants can provide important benefits to your data processing organization, especially when good programming talent is hard to find.

The Data Service Bureau of the city of Los Angeles provides data processing services to over 50 departments within the city as well as to over 60 outside agencies. Our annual budget is $23 million, with a biweekly payroll of $350,000 for 340 employees. We support dozens of applications for a broad range of city services as well as an information center.

The technical support section of the Management Services Division provides systems programming support, network support and long-range systems planning.

In late 1981, with several major projects and migrations beginning to occur at the same time, the technical support section faced a critical shortage of qualified systems programmers.

Among the solutions we selectively employed were to conduct more aggressive recruiting through advertising and various job fairs. We also sought qualified personnel in other sections of the department or in other departments of the organization. In specialized cases, personal service contracts for ex-employees were used.

We also used systems programmer contractors and consultants. However, differences between contractors and consultants have to be considered before hiring.

Contract systems programmers are typically oriented toward software internals, have recent detailed technical expertise and may assume some of the responsibilities of a lead systems programmer. A consultant, on the other hand, is more oriented toward conceptual viewpoints and the concerns of management.

Contractors are usually best used in control software installations, migrations, modified control software coding or maintenance of existing software. Consultants commonly deliver studies, analyses, methodologies and recommendations. A contractor is normally employed longer in a single engagement, may have less experience and will likely be less expensive.

In the first quarter of 1982, a contractor was hired to aid in the management of a direct-access storage device. By the second

See USING page 61

- Cincom's Mantis enhanced/84
- Wang VS systems get IBM Cobol programming capability/84
- DEC VAX-11s tied to Cray-1 supercomputers/84
- Application generator unveiled for DEC VAX-11s/85
- 3270 users get image-viewing facility/85
- Omnibase DBMS put on data base machine/85
- Pansophic's Easytrieve updated/85

INSIDE

Systems Software/86
Productivity Aids/89
Application Packages/92
DBMS/94
Languages/96
On-Line Data Bases/98
Methodologies/98

Priming users for package installation

By Sheila M. Olson
Special to CW‡

All too frequently, a software package that supplants the manual way a company does business meets with nothing but displeasure from those who are faced with using it. Certain guidelines that can help allay these complaints should be followed. Familiarizing the user with the capabilities of the software package, offering company-specific applications and making management's objectives for using the package clear to everyone will ensure a more successful implementation and help prevent "false starts."

The cry is often heard, "What's wrong with doing it the old way? No doubt, the "old way" worked and produced satisfactory results; however, someone high on the hierarchical ladder saw the limitations and took action.

Old ways tend to be department specific. For example, a group of managers devised a way to acquire project totals. Management gave little consideration to standardizing reporting procedures since it received the required information. Additionally, other departments had their needs met with their own reporting procedures. With everyone generating the same information, but in a different manner, reverting to a manual method of reporting across department lines became necessary — a wasteful and inefficient use of resource time. In our quest for greater productivity, standardizing the way we do business makes retrieval of information easier and less costly overall.

When management has decided to implement software to facilitate its goals, the package should provide the functionality provided by the old method. Since today's packages are sophisticated in their specialized area, the potential exists to take the application beyond the functionality of the "homegrown" system.

Instruction in the full functionality of a software package helps users to comprehend this grand view and apply it to their specific needs. While application may be limited and somewhat basic during the initial stages of implementation, a presentation of its total capabilities will offer an awareness and an appreciation of the total package. Some users will never venture beyond the basics of the total package. Oth-

See USERS page 61

MVS/VS1 Users

Haunted By Shared Device Problems?

Let These Shared Device Management Products Eliminate Your Multi-CPU Ghosts!

Shared Tape Allocation Manager—STAM
Manages your shared device pool to give you a more productive environment.

Shared Dataset Integrity—SDSI
Gives you the benefits of sharing datasets without all the problems.

Superconsole—SCON
Provides cost savings by eliminating redundant operator consoles.

Call:
1-800-323-2800
412-323-2800

DUQUESNE SYSTEMS INC.
Two Allegheny Ctr.
Pittsburgh, PA 15212

Mantis release features enhancements

CINCINNATI — Expanded interactive and operational capabilities for prototyping, documentation and file access are featured in Release 3.7 of Cincom Systems, Inc.'s Mantis application development system.

Enhancements in the new release include automatic access to the Logical User View (LUV) component on Cincom's TIS relational data base management system (DBMS).

Enhancements to the interface to IBM's DL/1 file structure include the unqualified Call Profile design facility, which provides a menu of options for handling DL/1 calls; Path Calls, which allows the user to use command codes to manipulate multiple segments within a call; optional semi-reserved words in the interface area definition; data base access via logical or secondary indexes; prefixing; dynamic override of the program specification block name and program communication block number in a Call Profile; and use of Boolean commands to connect a segment search argument with the next argument list in the Call Profile search field list, according to a spokesman for the vendor.

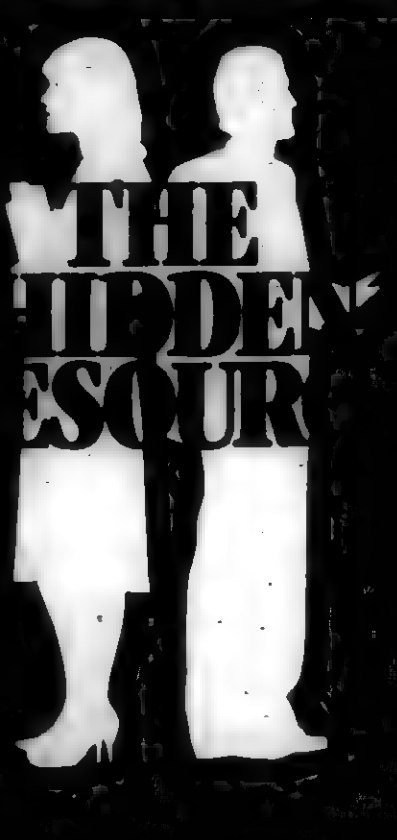
A batch print facility allows for printing of all Mantis entities including screens, files and programs, the spokesman said. An enhanced create/update screen facility lets users add or delete a line while updating a screen design without reentering data. It also provides for use of confirmation messages for library functions and includes an increase in interface parameters, an enhanced directory facility and the ability to run a program by name retry.

Mantis runs in Cincom's TIS-DC and IBM CICS environments and ranges in price from $21,000 to $59,000.

Mantis DBMS support and external LUV support each cost $5,000. DL/1 support costs $9,950, the vendor said.

Cincom is located at 2300 Montana Ave., Cincinnati, Ohio 45211.

A MESSAGE TO DATA PROCESSING DECISION MAKERS



Mail to: Starlex Systems & Services, Inc. • 275 Madison Avenue • 5th floor • New York, N.Y. 10016

Name _____ Title _____

Company _____

Address _____ City _____

State _____ Zip _____ Telephone ( ) _____

Netron's CAP modified to run on IBM CPUs

NEW ORLEANS — Netron, Inc. announced at the Softcon International Conference and Trade Fair for the Software Industry that its Computer-Aided Programming (CAP) software development system currently offered on Wang Laboratories, Inc. VS computers has been modified for use as a development tool for IBM mainframes.

CAP employs reusable code, a high-level language and a "frame" concept that is said to eliminate most hand coding of standard applications. Users develop programs by filling in menu screens, and CAP generates most of the Cobol code. In addition, programs can be modified and customized using the high-level language.

Netron President Alex Risin said the new capability allows CAP to be used as a dedicated program creation tool in large IBM shops. The Wang VS can typically compile a 5,000-line Cobol program in under three minutes; code that is generated under CAP on the Wang VS can run immediately under IBM CICS, but cannot run on the Wang, he said. CAP supports fully interactive IBM 3270 terminal emulation.

Wang will not market CAP, but will publicize it to users through its technical symposia. With the IBM emulation capability, CAP requires IBM's MVS, CICS and Vsam files. It will be available in the fourth quarter of this year at a price of $16,000 for the first terminal and $8,000 for each additional terminal, according to the vendor.

Netron is located at 90 St. Regis Crescent N., Downsview, Toronto, Canada M3J1Y9.

V-Link joins VAX-11, Cray-1

KANSAS CITY, Mo. — United Information Services (UIS), a division of Control Data Corp., has announced a distributed data processing system said to connect Digital Equipment Corp.'s VAX-11 series superminis to UIS's Cray Research, Inc. Cray-1 supercomputer.

V-Link reportedly allows users to submit jobs to the Cray-1 from their VAX-11 environment. The system includes UIS's interface software; a communications processor; modems; and a dedicated, conditioned telephone line.

The system supports high-speed, high-volume throughput using 16K bit/sec lines. Also, V-Link commands conform to the DEC VMS standard, a spokesman said. Through V-Link, users can also use the UIS library of engineering programs, according to the vendor.

V-Link pricing includes a $5,000 one-time installation fee and a $5,000 monthly fee, which includes $2,000 worth of Cray processing, the vendor said.

UIS can be reached through P.O. Box 8551, Kansas City, Mo. 64114.

Omnibase on data base machine

GOLETA, Calif. — Signal Technology, Inc. has announced that its Omnibase data base management software is now being sold with the Britton-Lee, Inc. Intelligent Database Machine as a relational data base management system.

The package is designed to operate with multiple Digital Equipment Corp. VAX-11 superminicomputers, freeing the VAX-11s for uses other than data base management.

Omnibase is said to include Signal Technology's Opal programmers' applications library for accessing the Intelligent Database Machine through any VAX-11 host language, and Signal Technology's Smartstar, a family of programs for applications generation.

The Intelligent Database Machine reportedly supports a data base of more than 16G bytes and can be connected to several VAX-11s with IEEE-488 parallel interfaces.

Prices for Omnibase range from $17,000 to $40,000, and prices for the Intelligent Database Machine range from $45,000 to $99,800, according to the vendor.

Additional information can be obtained from Signal Technology is located at 5951 Encina Road, Goleta, Calif. 93117.

Easytrieve Plus gets update

OAK BROOK, Ill. — Panaophic Systems, Inc. has announced a new version of its Easytrieve Plus information retrieval and data management system. The system was formerly called PRO/grammar.

Enhancements to Version 4.0 include expanded reporting flexibility through the use of special logic procedures along with other options for the dictation of special formatting requirements. Improved file processing facilities now include a synchronized multifile input facility for an unlimited number of files.

An extended debugging and compile option capability has been added along with increased logic facilities, including logic statements and the ability to use up to 18 digits automatically. The new release also incorporates object code creation capabilities and does not restrict the size of program and storage areas.

The new release will be offered to current Easytrieve and PRO/grammar users on maintenance at no charge. Easytrieve customers who purchased PRO/grammar prior to this announcement will be compensated based on their purchase price of the product and their length of use. Easytrieve Plus costs $25,000 for IBM DOS users and $35,000 for IBM OS users.

More information is available from Panaophic, located at 709 Enterprise Drive, Oak Brook, Ill. 60521.

Facility out for Scanmaster

RYE BROOK, N.Y. — Claiming to have developed a new way for users of its 3270-type terminals to route and retrieve mail and documents, IBM has announced an Image View Facility for its Scanmaster I document transceiver. The facility is said to allow users of IBM's 3270-Personal Computer, 3278 CRT terminals, 3279 color CRT terminals, 6775 CRT terminals and the 3290 Information Panel to view images of documents such as signed letters, insurance application forms or line drawings.

IBM said the image viewing facility offers an alternative to manual filing, microfiche and optical disk systems.

Requirements for the Image View Facility are a processor employing 370 architecture (such as IBM 4300 series or 30 series processors) and a Scanmaster I. The facility operates as a CICS program in a Discos/MVS Version 3 operating system environment with Discos/PS Release 1.1.

Also required is IBM's Graphical Data Display Manager Release 3 program product and IBM's PL/I transient library.

The facility works on any IBM 3270-type display equipped with at least six programmed symbols.

There is a one-time license fee of $5,400 for the Image View Facility. The Scanmaster I, which was announced in 1983, is a Systems Network Architecture/Synchronous Data Link Control device which operates over switched or nonswitched communications facilities at speeds up to 9,600 bit/sec. The unit consists of a controller, scanner and printer and costs $11,800, IBM said.

More information can be obtained from IBM Information Systems Group, 600 King St., Rye Brook, N.Y. 10573.

Smartstar targets VAX/VMS

GOLETA, Calif. — Signal Technology, Inc. has introduced Smartstar, an applications generator for Digital Equipment Corp.'s VAX/VMS users.

The product offers Smartdesign, a user tool for specification of data records, field attributes and forms layout; Smartquery, a fourth-generation program for query, entry, editing and deletion of data records viewed through a multiple window or scrolled forms; Smartcall, a programmer's interface to Smartstar through a runtime library; and Request, an integrated report and query system.

Smartstar ranges in price from $4,080 to $13,600.

Signal Technology is located at 5951 Encina Road, Goleta, Calif. 93117.

DOS/VSE and CICS/VS Frustration?

BIM gets it out of your system.

BIM presents a line of proven programs that maximize your system's capabilities, saving you time, labor and expense. These program products help get the most out of your system and people.

BIM-EDIT — the editor with more than 25 significant features that ICCF can't match.
BIMSPOOL — Prints output in POWER/VSE spooling queue on local or remote 3270 terminal printers. (Received ICP Million Dollar Award 1982).
BIMSPOOM — On-Line to Batch Print Spooling. Prints data passed from CICS application programs into the POWER spooling queue.
BIM-PDQ — POWER Dynamic Queuing performance enhancement. Eliminates 85% of the I/O to heavily used POWER queue.
BIM-ODIS — Comprehensive problem analysis and display of operational CICS system.
BIMTEXT — Word processing, document composition system. Create formatted documents from free-form input.
BIMSWAP — Switch local 3270 BTAM terminals between multiple CICS partitions without special hardware or additional ports.
BIMCMPRS — CICS 3270 data compression system. Reduces response time for remote terminals significantly. Available for OS/VS1 and MVS also.
BIMP3270 — Comprehensive CRT screen image print facility. Copy to terminal printers or spool queue for system printer.
BIMSERV — On-line display of library directories and entries, VSAM Catalog entries, disk VTOC's, etc.
BIMDSLOG — Console Message File display. Used by computer operations and programmers.
BIMMONTR — DOS/VSE System Status, Performance Measurement, and POWER Queue display.
BIMDEVC — Displays Logical Unit assignments for physical devices, to resolve operational problems.
BIMSUBMT — On-line Job Edit and Submission facility.

BIM programs are cost-efficient, many less than $600, highest $4000. You can save even more with our group package offerings. Products are available on permanent, annual, or monthly leases, and shipped on a 30-day free trial basis. Product documentation is available on request.

BIM also performs systems programming consulting, with consultants based in Minneapolis and Washington, D.C. Computer time services are also available on our 4331-2 system, on-site or remote.

BIM
BIM MOYLE ASSOCIATES, INC.
5798 Lincoln Drive
Minneapolis, MN 55436
612-933-2686
Telex 297 893 (BIM UR)

VMBACKUP

"When VMBACKUP creates a backup tape of our DASD, we know that the minidisks and files can be restored."

VMBACKUP—The fastest incremental backup system available for the VM environment.

- Verifies quality of tapes and DASD files to ensure restorability
- Reduces backup time by up to 90%
- Cuts backup tape usage by as much as 80% with incremental dumps and packing
- Provides full screen restore for end users
- Includes standalone restore facility
- Offers optional encryption
- Provides complete catalog of backups
- Uses full standard labels to protect backup tapes
- Requires no mods to CP or CMS

703-821-8285

VM Software Inc.

Name _____
Title _____ Company _____
Address _____
City _____ State _____ Zip _____
Phone _____ CPU _____
2070 Chain Bridge Road, Suite 355, Vienna, Va 22180 1-CW-8684

SOFTWARE & SERVICES

SYSTEMS SOFTWARE

DYNAMIC MICROPROCESSOR ASSOCIATES, INC.
Termcom

Dynamic Microprocessor Associates, Inc. has introduced a terminal emulator that reportedly enables any microcomputer to replace dedicated terminals in communication with minicomputer and mainframe computers.

Termcom software permits local or remote communication between micros and mini or mainframe applications that were designed for specific terminals, a vendor spokesman said.

Termcom is available at two levels. Level 1 is said to emulate conversational terminals, but it requires that features to be emulated are supported on the microcomputer. Level 2 does not require identical features; the buffered terminal emulator supports features found in block-oriented terminals, the spokesman said.

Termcom requires an asynchronous serial port. The product will work with the Zilog, Inc. Z80 microprocessor and the Intel Corp. 8086 and 8088 microprocessors. It is compatible with Digital Research, Inc.'s CP/M 80 and CP/M 86, Microsoft, Inc.'s MS-DOS, IBM's PC-DOS and Muse Corp.'s Turbodos operating systems.

The Level 1 costs $145 and Level 2 costs $180. Both are available now in minimum quantities of 50.

Dynamic Microprocessor Associates, 545 Fifth Ave., New York, N.Y. 10017.

MIRODA SOFTWARE ENGINEERING
Genprep-1 price cut

Miroda Software Engineering has announced a price reduction for its Genprep-1 program product for IBM mainframes.

The price for a permanent license has been reduced, effective immediately, from $3,000 to $2,000.

Genprep-1, available for IBM OS, DOS and MVS operating systems, is a general-purpose language preprocessor. It reportedly provides character string and numeric variables, execution control statements, recursive macros and the ability to invoke user-written subroutines, according to the vendor.

Miroda Software Engineering, P.O. Box 10089, Chicago, Ill. 60610.

NICOLET ZETA CORP.
ZDDM

Nicolet Zeta Corp. has announced a graphics capability package said to provide IBM mainframe users with the ability to create high-resolution pen plotter output.

The ZDDM software package functions as a postprocessor and reportedly converts IBM Graphic Data Display Manager (GDDM) code directly into the compact language used to drive all Nicolet Zeta Intelligent Pen Plotters. ZDDM is capable of reading all levels of GDDM, including Graphic Data Files.

The software costs $1,795 and requires one of the Zeta plotters, which start at $6,000, a spokesman said.

Nicolet Zeta, P.O. Box 4002, 2300 Stanwell Drive, Concord, Calif. 94524.

CHARLES RIVER DATA SYSTEMS, INC.
UN/System V; Unos Rev. 4

Charles River Data Systems, Inc. has announced two additions to its software products, including an implementation of the Unix System V operating system that is compatible with its proprietary Unos operating system.

The UN/System V operating system features record and file locking, interprocess synchronization, shared data facilities, priority scheduling and real-time-oriented device driver interfaces.

The vendor also announced Rev. 4 of Unos, which adds terminal-handling features, expanded process/memory device control facilities and automatic bootstrapping to the proprietary operating system.

The two operating systems run on the vendor's Universe 68 family of computers.

The UN/System V operating system is priced at $4,000; the Unos Rev. 4 costs $3,000.

Charles River Data Systems, 983 Concord St., Framingham, Mass. 01701.

JOHNSON SYSTEMS, INC.
Umax Version 3.1

Johnson Systems, Inc. has announced Version 3.1 of its IBM CICS Utilization Monitor and Chargeback System (Umax).

Version 3.1 includes full support for IBM's OS CICS/VS Release 1.6.1 and operating system release-independent real CPU time and paging statistics data collection. In addition, security enhancements permit screening of Umax transactions and prevention of unauthorized execution, the company said.

This release of Umax includes virtual storage constraint relief through individual file and program-level collection techniques as well as the addition of a file nesting-level indicator.

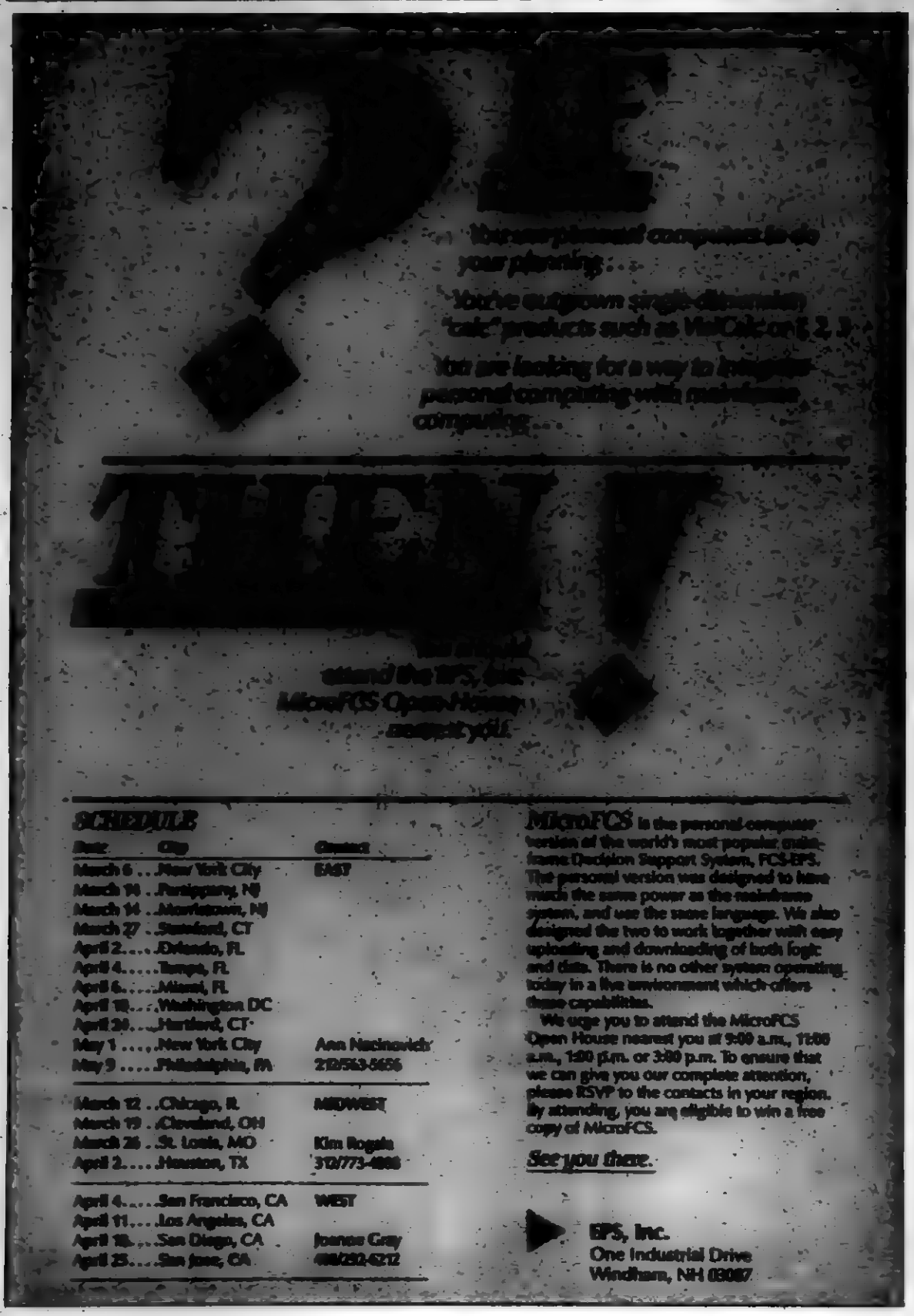
Release 3.1 of Umax supports OS CICS/VS 1.5, 1.6 and 1.6.1 and is priced at $6,000.

Johnson Systems, 8300 Greensboro Drive, McLean, Va., 22102.

ELECTRON INFORMATION SYSTEMS
Micro asynchronous communications package

Electron Information Systems has introduced a new version of its micro

Continued on page 88



Introducing MARK V™ for CICS users: a *unique*, 4th generation non-procedural application development system that saves you time and money at every stage of your application life cycle—and makes it all easy.

For two years, MARK V has been saving millions of dollars in application development for IMS users worldwide. Now Informatics has expanded MARK V to the CICS environment, too. Even so, MARK V is not for everyone. *But it may be for you if:*

- ☑ You need to reduce your backlog of medium to complex CICS or IMS applications.
- ☑ You use CICS or IMS with IBM-supported data access such as VSAM or DL/I.
- ☑ Your CICS or IMS system demands highly efficient application execution.

Then, MARK V can help you produce efficient compiled applications that rival the execution of well-written COBOL—in less than half the development time!

Easy application development and maintenance is just the beginning!

MARK V improves productivity throughout the application development and maintenance cycle—not just in the coding—by providing:

- Interactive application design and simulation
- Easy to use, menu-driven specification language for development and maintenance
- Transparent and complete data access/communications control
- Automatically produced application documentation

That means with MARK V your programmer need only specify the solution. MARK V generates the complete application. This methodology allows you to solve more complex problems more efficiently using less highly trained personnel—and that saves you money!

Reserve your free demonstration of MARK V—the simple way to develop and maintain your medium to complex CICS or IMS applications.

As a data processing professional, you're also a professional skeptic. But the simplicity, versatility and timesaving capabilities of MARK V are easy to see—and prove. To do so, simply mail the coupon below or call toll free. We'll schedule your *free demonstration* as quickly as we can. Remember, however, that interest in MARK V is unusually high. Scheduling is on a "first come" basis. So mail the coupon or call *today*.

To see MARK V CICS/IMS for yourself, mail the coupon or call toll free

1 800 227-3800, ext. 911

(In Canada, call collect, (416) 488-7782)

Informatics general corporation

THE SOFTWARE ENGINEERS

NOW FOR CICS and IMS USERS WITH IBM-SUPPORTED DATA ACCESS

YES. I want to learn how MARK V can make my medium to complex applications development and maintenance both fast and easy.

☐ Please call me to arrange a free demonstration right away. I understand that there is no cost or obligation.

☐ I'm not yet ready for a free demonstration. But please send me a free fact kit on the MARK V application development system.

Name_____

Title_____

Company_____

Address_____

Phone_____
Number (include area code)

_____

City_____ State_____ Zip_____

Mail this coupon to: Informatics, MARK V Free Information, P.O. Box 1482, Canoga Park, CA 91305

CI-A1

SOFTWARE & SERVICES

Continued from page 66

asynchronous communications package to interface the IBM Personal Computer and compatible equipment to Sperry 1100 mainframes, a vendor spokesman said.

According to the vendor, the software is an extended version of Digital Research, Inc.'s CP/M operating system with identical features, including 300 or 1,200 bit/sec asynchronous communications, Basic and assembler languages on the micro, Cobol and assembler on the Sperry 1100, menu-driven, with error correction and retransmit during file transfer.

System requirements include 128K bytes of random-access memory and one disk drive, according to the vendor spokesman.

The package is available for $795, the spokesman said.

Electron Information Systems, 5554 S. Prince St., Littleton, Colo. 80120.

FOUR-PHASE SYSTEMS, INC.
ATS/IV

Four-Phase Systems, Inc. has announced an asynchronous terminal simulator software program that reportedly enables users of its Series 4000 and 5000 computer systems to access remote computing and information services such as the Dow Jones News/Retrieval Service and Reader's Digest Co.'s The Source.

The ATS/IV, an addition to the vendor's Multifunction Executive (MFE) product line, is said to allow access to time-sharing networks, other host application programs, additional devices with an asynchronous Ascii interface and other vendor's systems, a Four-Phase Systems spokesman said.

The ATS/IV program reportedly accommodates 32 concurrent communication lines and up to 32 MFE users, according to the vendor spokesman.

The ATS/IV program is priced at $1,500 per copy with quantity discounts available.

Four-Phase Systems, 10500 N. DeAnza Blvd., Cupertino, Calif. 95014.

EMPACT SOFTWARE
Stop-X37

Empact Software has introduced the Stop-X37, a program designed to stop B37, D37 and E37 abends in an IBM MVS environment.

Stop-X37 intercepts the job at the time of the abend, finds available disk space, allocates the space to the job and continues the job, the vendor said.

The user has control of which jobs are recovered and what recovery actions are taken. An audit trail is provided that documents each recovery, according to the spokesman.

A permanent license for Stop-X37 ranges from $5,000 to $10,000.

Empact Software, Post Office/Drawer 1297, Atlanta Office, Stone Mountain, Ga. 30086.

AMALGAMATED SOFTWARE OF NORTH AMERICA, INC.
Manifold

Amalgamated Software of North America, Inc. has introduced Manifold, a multiple index support for the IBM System/34. Manifold is for use with the vendor's Accler8 system.

According to the vendor, Manifold enables any field (less than 30 bytes) to be used as an index to a data file. The programmer can decide whether to add an index entry to each index when an addition is made.

Manifold will be available the second quarter of this year. The price is $1,200 for Accler8 users or can be rent-

MICRODATA INTRODUCES THE RELATIONAL OFFICE.

IT'S WHERE YOU'VE ALWAYS WANTED TO WORK.

"You left your computer in the kitchen and took the microwave to work by mistake!"

SOFTWARE & SERVICES

ed for $60 per month, according to the vendor.

Amalgamated Software of North America, P.O. Box 1058, Malibu, Calif. 90265.

SST COMPUTER SERVICES
Movjob

SST Computer Services has introduced a software program that reportedly enables IBM System/38 computers to move jobs from an inactive queue to an active job queue.

Called Movjob, the program permits users to move the job to another job queue without affecting the other jobs in the queue, according to a spokesman for the vendor.

The program is currently available and is priced at $50 per CPU, the vendor said.

SST Computer Services, 1112 St. Agnes Ave., Columbus, Ohio 43204.

MACKINNEY SYSTEMS, INC.
JCLXREF; CICS/CEMT; Power Commander/CICS; Power Commander-Batch

MacKinney Systems, Inc. has announced four software products for programmers using IBM's DOS/VSE operating system.

JCL Cross-Reference (JCLXREF) reportedly reads JCL and produces cross-reference lists showing every JCL member that uses each file, program or procedure, device, form and library. More than 30 optional reports can be generated in a single run, a spokesman said.

CICS/CEMT is said to allow CEMT commands to be issued from a batch job stream to open or close CICS files and disable transactions.

Power Commander/CICS is an interface between CICS and IBM's Power utility that reportedly enables users to enter Power commands using a menu screen. Security logic can be added to limit certain terminals to certain commands or jobs, the spokesman said.

Power Commander-Batch is said to allow Power commands to be issued from a batch job stream.

When a job is completed, the spokesman said, the user can automatically release other jobs to run in other partitions.

The programs are available for purchase now for $495. A one-year lease is available for $195, the vendor said.

MacKinney Systems, Rt. 2, Box 270-A, Fair Grove, Mo. 65648.

PRODUCTIVITY AIDS

HELP/36 SYSTEMS
Codebank

Help/36 Systems has introduced Codebank, a source code library system and self-customized program generator for the IBM System/36.

According to the vendor, Codebank lets users enter source code interactively by filling in blanks and allows them to enter, retrieve and change modules easily.

Codebank comes with more than 100 modules and seven program frames. Users do not need to wait until they enter their own source code to generate programs, the vendor said.

Codebank is priced at $950 per CPU, according to the vendor.

Help/36 Systems, 15102 Minnetonka Industrial Road, Minnetonka, Minn. 55345.

INFORMATION BUILDERS, INC.
Focus training courses

Information Builders, Inc. has announced a series of training programs for Focus, its fourth-generation programming language.

"Focus Basic Report Preparation," which runs on the IBM Personal Computer, consists of 16 modules that explain query and reporting facilities, creation of master file descriptions, relational file operations and commands, the vendor said. The course costs $5,000 for a site license which includes 10 copies of the course.

Also available is a self-study course booklet, "One Hour Focus Reporting Lesson," which costs $3.50.

"Video-Based Basic Report Preparation" consists of five half-hour video tapes covering Focus concepts and report writing. The course sells for $5,000.

Information Builders, 1250 Broadway, New York, N.Y. 10001.

BGS SYSTEMS FOR DP MANAGEMENT

JOBS from page 59

quarter, a critical need in the CICS area became apparent. Since the contractor was both experienced and interested in CICS internals, he was transferred into the CICS group. He has since become a permanent employee and one of our most knowledgeable CICS experts.

Other successful hires in the second quarter included a contractor to work on network performance and consultants to assist in establishing a formal ongoing capacity planning program. They have had a very positive effect on the staff.

One of the primary benefits of using contractors or consultants is the timely completion of critically urgent tasks. At the Data Service Bureau, several new functions of CICS required for an extensive law-enforcement system were installed, tested and implemented by a contractor.

Another advantage is that deliverables can have long-term benefits. Studies, analyses, recommendations, procedures, training guides and other forms of documentation can be referenced usefully even years beyond their origin.

A contractor can also offer candid observations on the operations of a shop. This is particularly true when the individuals involved come with a large variety of experiences in shops similar to your own.

Also, the requirement to define clearly the work environment to an outside party can encourage a supervisor to improve the documentation and organization of assignments and responsibilities.

My foremost recommendation is that you have a clear understanding of your requirements, including deliverables and time frames. This enables a better evaluation of alternatives and a more straightforward choice.

Once the decision to hire a contractor or a consultant has been made, steps should be taken to minimize any negative impact on staff. Selecting personnel who are both qualified and personable cannot be overemphasized. Consider global markets. Telephone interviews may be effectively conducted in these instances, particularly when prearranged outlines are used among several interviewers.

A panel of at least two individuals should meet to interview the prospective candidates. This not only ensures a more thorough review of a candidate's qualifications, but may encourage greater staff cooperation by involving more of them in the decision-making process. A candidate's personality should be factored into the evaluation to minimize negative impact on the staff.

Hidden costs such as travel expenses, per diems and administrative expenses should be clarified during evaluation. Other items to clarify involve guarantees about the quality and policies concerning which individuals will participate and replacement criteria.

A final recommendation when working with consultants is to express to them your nontechnical and management concerns.

Schlesser is technical support manager in the city of Los Angeles' Data Service Bureau.

RISKS from page 59

minimize this risk.

The inflexibility of contractual terms may prove to be a disadvantage if unforeseen circumstances shift the emphasis or direction of the work. In our case, the loss of an individual changed our priorities from direct-access storage device to CICS. Fortunately, flexible contract terms permitted us to respond with a contractor already on board.

A common risk among consultants is being less than candid with a client. To ensure future business or to please an acquaintance, a consultant may report only what a client wants to hear.

A final risk is the possibility of lowering morale among employees. We took several steps to avoid this. The first was to present fully to the staff the extent and impact of the vacancies. The second was to demonstrate what other alternatives were available and why they were inadequate. The third was to describe the various benefits that short-term technically qualified personnel could provide them.

USERS from page 59

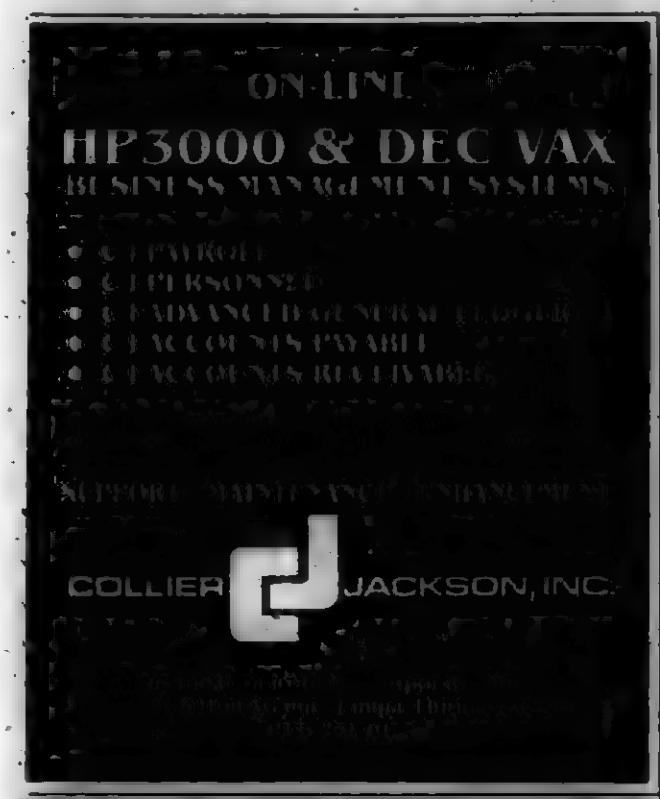
ers will draw on its capabilities and acquire some expertise in its application.

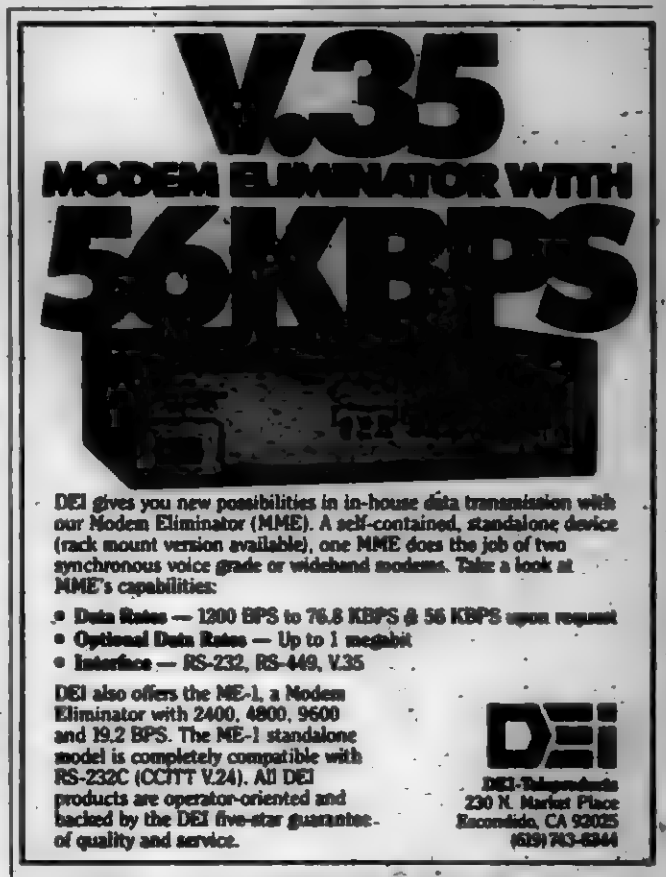
Training in company-specific applications must supplement overall system instruction. This areas can provide the opportunity for presenting company standards, policies and procedures in light of the package's total capabilities.

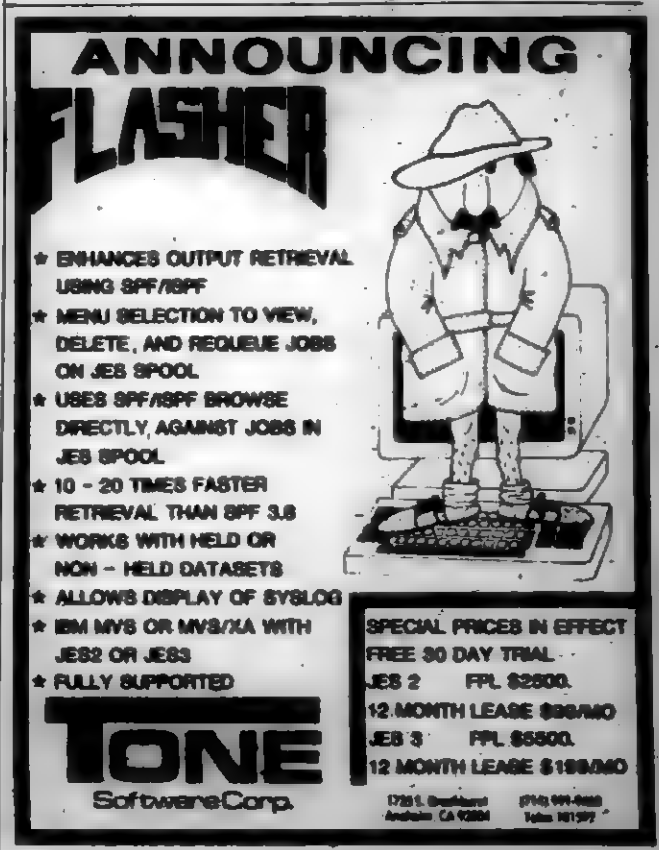
Most importantly, management establishes the objectives for implementing the package and makes these objectives known to everyone who will be using the software system.

Finally, adequate training in the capabilities of a software package must work in conjunction with managerial direction and support.

Olsen is project control coordinator at Wang Laboratories, Inc. in Chelmsford, Mass.







SOFTWARE & SERVICES

APPLICATION PACKAGES

MINI COMPUTER BUSINESS APPLICATIONS Full MRP

Mini Computer Business Applications (MCBA) has announced its new Full Material Requirements Planning (MRP) package written in Dibol.

According to the vendor, the new release closes the loop on the 17-package modular integrated MCBA Manufacturing System. It is available for Digital Equipment Corp. PDP-11 minicomputers under DEC's RSTS/E operating system.

The full MRP enables the user to create a master schedule and determine the quantities of raw materials, components and subassemblies required to support the schedule. It generates a material plan by utilizing data from departments within the organization.

A source code license is available for $4,000.

MCBA, 3441 Honolulu Ave., Montrose, Calif. 91020.

HEWLETT-PACKARD CO. 'Steps to Effective Business Graphics'

Hewlett-Packard Co. has published "Steps to Effective Business Graphics," a 54-page book that explains how to prepare business graphics.

Seven steps guide the reader to design of business graphics. The book explains how to choose a chart, use design principles, write messages clearly and work with color, the vendor said. Subjects discussed include preparing proportional graphics, special effects for overheads and 35mm slide techniques.

The book costs $12, according to the vendor.

Hewlett-Packard, 1820 Embarcadero Road, Palo Alto, Calif. 94303.

ALGOR INTERACTIVE SYSTEMS, INC. Supersap

Algor Interactive Systems, Inc. has announced a package designed to help engineers and designers conduct finite element stress and heat transfer analysis in construction and manufacturing.

Supersap, developed for use on Prime Computer, Inc. 50 Series superminicomputers, reportedly includes preprocessing, modeling, linear elastic analysis and postprocessing.

Options include interactive graphics, nonlinear analysis and Algor's Superdraw, an interactive design and drafting system, according to the vendor.

Supersap is priced at $5,000.

Algor Interactive Systems, Suite L3, Essex House, Essex Square, Pittsburgh, Pa. 15206.

PROFESSIONALS UNLIMITED Software directories

Professionals Unlimited has introduced software directories for IBM System/34 and System/38 users.

The 1984 directories are sent on diskettes that can be viewed on-line or printed. According to the vendor, they are updated daily.

The directories are available directly from the vendor, priced at $29.95 for the System/34 and $49 for the System/38.

Professionals Unlimited, 3951 Lantern Drive, Silver Spring, Md. 20902.

ABACUS DATA SYSTEMS, INC. Entag-M

Abacus Data Systems, Inc. has announced Entag-M, described as an inventory count system for use with Arthur Anderson and Co.'s Macpac inventory system on Hewlett-Packard Co.'s HP 3000 processors.

According to a spokesman, Entag-M is built on Abacus' basic physical inventory system known as Entag. Entag-M can be installed without changes to a user's Macpac programs or data base, and an initiator program will extract data from Macpac to support the system.

The system will print inventory tags for each part, showing the part description and unit of measure.

Written in Cobol II, Entag-M is priced at $2,400, according to the vendor.

Abacus Data Systems, 5000 W. Bloomingdale, Chicago, Ill. 60639.

N. DEAN MEYER AND ASSOCIATES, INC. 'Get OA Moving'

N. Dean Meyer and Associates, Inc. has announced a training and consulting service designed to develop and implement office automation.

"Get OA Moving" is said to include a series of executive briefings, management awareness programs and pilot projects.

The service is priced at $12,000.

N. Dean Meyer and Associates, 233 Mountain Road, Ridgefield, Conn. 06877.

KEY SOFTWARE, INC. Keysoft Order Management System

Key Software, Inc. has announced an order management system for distribution and manufacturing companies utilizing the IBM System/34 and System/36 small business computers.

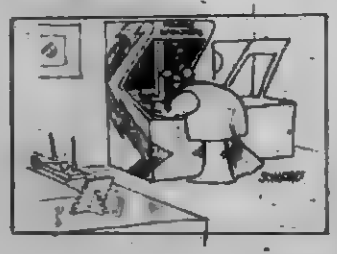
The Keysoft Order Management System features order entry with flexible item pricing, automatic inventory allocation, real-time physical inventory update and on-line data entry to variable line screens, a spokesman said.

It also offers accounts receivable with cash applications and credit management, past payment performance histories and comprehensive financial reports.

Additional features include invoicing/billing with an automatic back-order system, inventory control with on-line planning and forecasting and sales analysis with multiple comparisons, the vendor said.

A one-time license fee of $15,000 includes installation, training, documentation and code.

Key Software, 20212 Redwood Road, Castro Valley, Calif. 94546.



點心

"Wait a minute. Are you trying to tell me those terrific little Chinese dumplings improve programmer productivity?"

An understable confusion. "Dim Sum" does mean "terrific little Chinese dumplings."

But dmSum™ means "direct IMS update manager," a system development tool that lets IMS/VS and CICS/VS programmers examine, modify, and create DL/I test data from an online terminal. No waiting for batch turnaround, no job queue delay, and no complicated control statements to write. Just bring up the dmSum screen and key in the *same* DL/I parameters you'd code in an application program, including up to 6 SSAs. dmSum displays the contents of data base segments and paths in character and hex format; to update them you just overkey what's displayed and REPLace. Or ISRT new segments. Or DLET. You can browse through a data base, selectively updating and deleting, even if the segments lack unique keys. And you can use PF Keys to scroll through very large segments or paths, or to get HELP.

To find out more or arrange for a 90-day free trial, write to Peacetable Systems at 3250 Wilshire Boulevard, Suite 900, Los Angeles, California 90010 — or call us at (213) 225-4003.

Turn Your VAX into a Total

FINANCIAL

Solution

INTEGRATED FINANCIAL MANAGEMENT SOFTWARE

BOSS INTEGRATES KEY FINANCIAL FUNCTIONS

MAPS is a new generation of software merging decision support tools and financial accounting applications into a powerful, flexible financial management capability. And all Ross products are fully on-line, interactive and bring you multi-user access.

MAPS/MODEL—Powerful financial modeling

MAPS/GRAPH—Quality business graphics

MAPS/DB—Flexible database management

MAPS/Pro—Micro modeling and graphics

MAPS/GL—Comprehensive general ledger

MAPS/AP—Full featured accounts payable

OUR SERVICE AND SUPPORT MAKE THE DIFFERENCE

We bring a commitment to our customers and products that reflects our 12 years of consulting experience. Our staff of experienced professionals can work closely with you to install our products, and to provide the ongoing training and support that make them true financial solutions.

MAPS from Ross Systems. The single source for integrated financial management software.

DEC and VAX are trademarks of Digital Equipment Corporation. MAPS and BOSS/NET are trademarks of Ross Systems, Inc.
MAPS/GL was developed by Peter Weatherman under the name "TARP" and adapted for the VAX by Ross Systems, Inc.

MAPS

from Ross Systems

Financial Software Solutions

DISTRICT OFFICES: Palo Alto, CA, San Francisco, CA, Los Angeles, CA, Dallas, TX, New York, NY

CORPORATE HEADQUARTERS: 1036 Embarcadero Road, Palo Alto, CA 94303, (415) 856-1100

Dynamic mainframe looking for suitable personal mate.

If you speak or want to learn IFPS®, we could make beautiful decisions together. P.S. Let's meet at the Information Center.

In the past, the hardest thing about financial planning was planning how to do it. That was until Execucom introduced IFPS. IFPS makes problem solving and decision making a lot easier. The tangle of technical details is avoided. And managers are able to master it in a very short time.

Now, financial planners have an opportunity to extend the power of IFPS Decision Support Software to their personal computers, an incredible advantage over any other Decision Support System available.

See Your Mainframe And Personal Computer Work Together At The Information Center.

When IFPS/Personal™ is linked to your mainframe through the Corporate Information Center, the reach of financial planning software is extended throughout your entire organization. You can easily and quickly transfer models and data between your mainframe and desktop computers and solve these models on *either* end.

You can share and consolidate individual models, reports and data files. You can create them all on your Personal Computer and process them on your mainframe. And IFPS is compatible with the leading general ledger, database and statistics software packages used by corporations.

Do All Your Planning And Modeling In English.

Thanks to the non-procedural language used in both IFPS and IFPS/Personal, you do not have to be a computer expert to build sophisticated models. Or to understand those that other people construct.

Receive The Most Comprehensive Computer Software Training And Service Program Available.

Not only a fact, but a promise. We have developed a support program that offers mainframe-level support on IFPS/Personal. It includes expert technical support for installation, superb documentation, comprehensive training programs, HotLine support, specialized consulting, periodic product enhancements and user associations. We believe that state-of-the-art technology deserves state-of-the-art service.

If the personals ad above looks like it may have been written by your lonely mainframe, call or write Execucom immediately and we'll tell you how you can get it an IFPS/Personal mate. If your mainframe doesn't have IFPS yet, call or write us today and we'll help you make your decision. Execucom Systems Corporation, 3410 Far West Boulevard, Austin, Texas 78731. Call 1-800-531-5038 or in Texas or Canada, call 512-346-4980.

EXECUCOM

IFPS, IFPS/Personal are registered trademarks of Execucom Systems Corporation.

SOFTWARE & SERVICES

DATA BASE MANAGEMENT SERVICES

CONVERGENT SOLUTIONS, INC.
ADS Release 1.5

Convergent Solutions, Inc. has introduced Release 1.5 of its Application Development System (ADS), a relational data base management system designed for the vendor's equipment.

According to the vendor, access to the data base is through application systems built using a high-level, nonprocedural, forms-oriented language. The ADS system may be used on a stand-alone workstation or a clustered configuration.

New features of ADS include an "Accept Invisible" command for security, multiple scrollable windows and system programming language extensions.

The first cluster license is priced at $6,000 and can support up to 16 users, according to the vendor.

Convergent Solutions, Suite 900, 97-45 Queens Blvd., Forest Hills, N.Y. 11374.

INDECS SERVICES
Version 3.1 of X-Cell

Indecs Services has announced Version 3.1 of its X-Cell data management system for Digital Equipment Corp.'s PDP-11 processors in the DEC RT-11 environment.

According to a company spokesman, X-Cell is a data base and information retrieval system that features data entry and retrieval, sorting, report generation, numerical calculation and document-generator capabilities. The system is said to allow users to define and allocate field space for any combination of alphanumeric and numeric entries.

Data base switching is done through a single menu entry, and numerical data fields can be defined by linear and nonlinear functions of other numeric fields, the vendor said. Under RT-11, X-Cell requires a DEC VT100 or compatible terminal.

Version 3.1 of X-Cell is priced at $350 for a single copy.

Indecs Services, 9 Pinecrest Drive, Taunton, Mass. 02780.

VISTA COMPUTER, INC.
Datascan enhancement

Vista Computer, Inc. has announced an enhanced version of its Datascan data base management system, which is said to offer self-programming and improved query capabilities on Data General Corp. computers.

Datascan is designed for nonprogrammers and performs data management functions that include creating data entry screens and menus, reports, cross-tabulations, graphs and statistics, according to a vendor spokesman.

The self-programming feature is said to provide improved performance over fixed, table-driven systems. Datascan automatically writes custom programs for each screen, query or report, the vendor said.

A perpetual license for the product costs $20,000 for a stand-alone version or $25,000 for a DG AOS or AOS/VS operating system version, according to the spokesman.

Vista Computer, 85 Executive Blvd., Elmsford, N.Y. 10523.

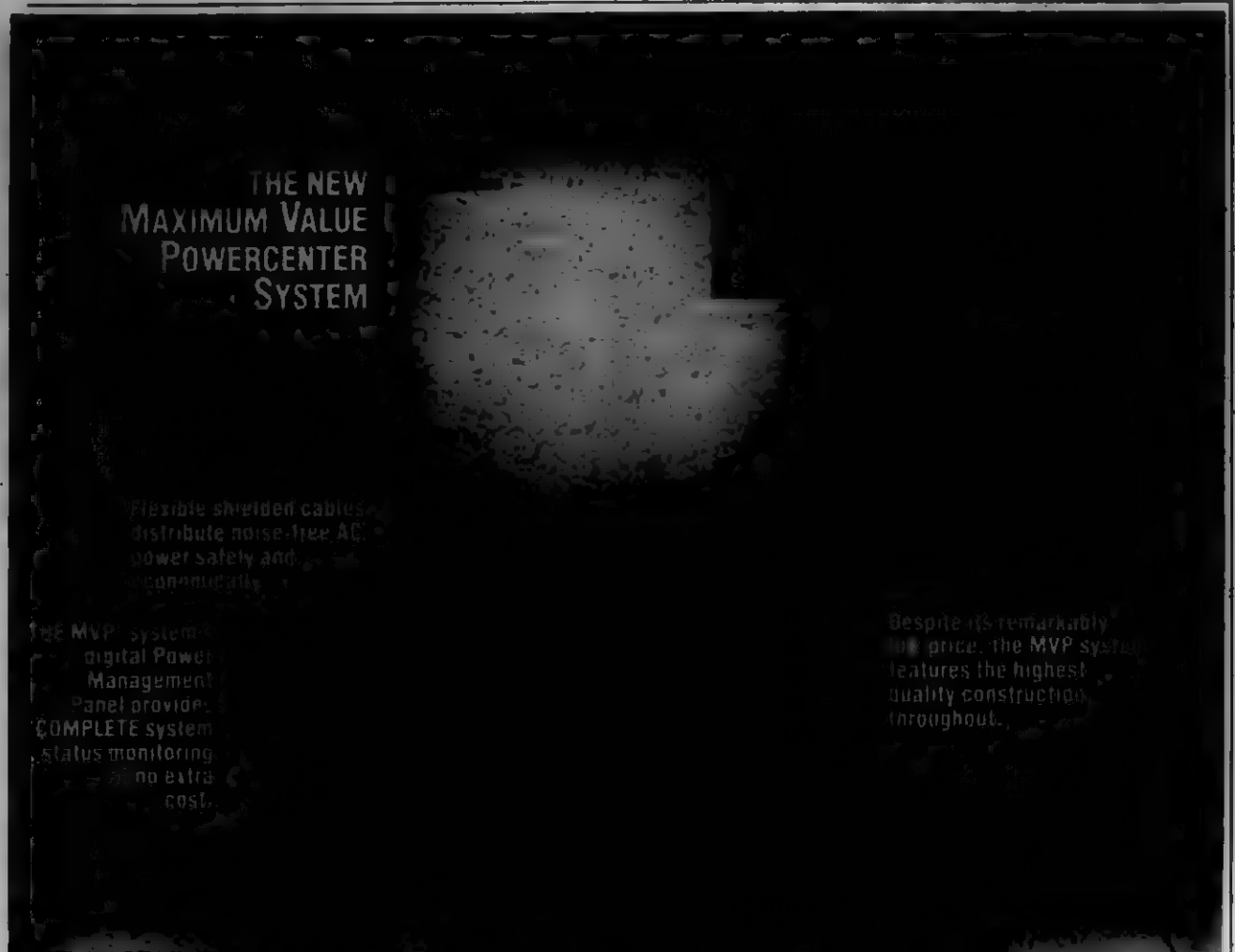
INFORMATION BUILDERS, INC.
Describing Focus Files

Information Builders, Inc. is offering a computer-aided instruction course for users of its Focus nonprocedural data base management system.

The course — dubbed Describing Focus Files — functions in an on-line, interactive mode under IBM's Interactive Instructional Presentation System or Goal Systems Corp.'s Phoenix. It is self-paced, parallels Focus classroom instruction and can be customized to fit individual requirements, a vendor spokesman said.

Describing Focus Files consists of eight integrated modules, which cover building file definitions, relational operations and data base networking. The course provides computer simulation of live Focus sessions coupled with an interactive question-and-answer format.

The course is available under IBM's VM/CMS, TSO, CICS or IMC/DC. It has a purchase price of $3,000 or is



THE SPECIFIERS' CHOICE.

Maximum value means top quality at the lowest possible price. That's what specifiers look for in a computer-room power distribution system — and that's why the new MVP™ system is the specifiers' choice.

The MVP system provides complete computer-room power distribution, and is specifically designed to meet all common industry specifications at an uncommonly low price. The MVP system uses flexible shielded cables to safely and economically distribute AC power throughout a computer room. It protects sensitive equipment against problem-causing electrical noise transients and voltage spikes. And it offers computer-grade grounding, complete power monitoring, a fully rated isolation transformer, front cable access, building-alarm interface, UPS interface, and main circuit breakers for each output load center — all as standard equipment.

Don't sacrifice quality for economy. Get both — by specifying the new Maximum Value Powercenter system from Topaz.

Specifications
Input Voltage: 480V three-phase delta; **Output Voltage:** 208Y/120 VAC; **Output Power:** 100 kVA, 125 kVA, 150 kVA; **Operating Frequency:** 57-63 Hz; **Efficiency:** 97.5% minimum; **Common-mode Noise Attenuation:** 55 dB for any frequency in 300 kHz; **Transverse-mode Noise Attenuation:** 20 dB at 100 kHz; **Voltage Adjustment Taps:** Two 2½% adjustment taps above nominal; Four 2½% adjustment taps below nominal; **Output Circuit Breakers:** Up to 126 pole positions; **Cable Positions:** Up to 75 cable positions; **Grounding Style:** Ultra-Ground® internal single-point grounding system; **Heating Loss:** maximum 85 Btu per kilowatt of load.

For complete information about this new MVP system, fill out this coupon or call us today.

TOPAZ; 9152 TOPAZ WAY
SAN DIEGO, CA 92123-1105
PHONE: (619) 279-0831
TWX: (910) 335-1526

☐ Please send me complete information about the MVP™ power distribution system.
☐ Please have a representative call me.

Name_____
Title_____
Company_____
Address_____
City_____ State_____
Zip_____ Phone_____

TOPAZ®
SOURCE D COMPANY

SOFTWARE & SERVICES

available for rent at $125/mo.

Information Builders, 1250 Broadway, New York, N.Y. 10001.

SOFTWARE HOUSE, INC.
Version 2.0 of 1032

Software House, Inc. has announced Version 2.0 of its 1032 relational data base management system for Digital Equipment Corp. VAX-11 computers running DEC's VMS operating system.

Version 2.0 increases data security to the field level within a record and allows security restrictions to be set via password, user name or user identification number, according to the vendor.

The new release also allows users to change their minds about various data base defaults after loading data without dumping and reloading, the vendor said.

Version 2.0 of 1032 is licensed for $40,000 for the VAX-11/780 and $32,500 for the VAX-11/750. A 60-day, full-system trial of the product is available for $95.

Software House, 1105 Massachusetts Ave., Cambridge, Mass. 02138.

LANGUAGES

CSP, INC.
Mini-MAP Fortran compiler

CSP, Inc. (CSPI) has announced a Fortran compiler for its Mini-MAP family of array processors.

Designed to run on Digital Equipment Corp.'s VAX computers, the compiler generates code for execution on a Mini-MAP array processor interfaced to VAX-11, PDP-11 and LSI-11 products. The compiler processes Fortran statements and generates object code for direct execution by the array processor.

The Fortran compiler is priced at $7,500 and will be available in May, according to the vendor.

CSPI, 40 Linnell Circle, Billerica, Mass. 01821.

NOVELL, INC.
BI-286 Business Basic II capability

Novell, Inc. has announced that Control C Software, Inc.'s BI-286 Business Basic II interpreter works with Novell's Netware networking system.

Business Basic II is a programming language developed by Open Systems, Inc. Netware supports multiple printers, simultaneous file updating and a file manager, according to the vendor.

The system costs $520 for two to six users, $930 for seven to 12 users, $1,390 for 13 to 24 users and $1,725 for 25 to 64 users.

Novell, 1170 N. Industrial Park Drive, Orem, Utah 84057.

ON-LINE DATA BASES

DIALOG INFORMATION SERVICES, INC.
Disclosure/Spectrum Ownership

Dialog Information Services, Inc. has introduced a data base that reportedly provides ownership information for 5,000 public companies in the U.S.

Disclosure/Spectrum Ownership is said to provide financial institutions, managers and analysts with information about institutional holdings, 5% ownership details, ownership data and ownership summaries, according to the vendor.

The cost of the service is $60 per hour of connect time and $25 for each full record printed either on- or off-line, the vendor said.

Dialog Information Services, 3460 Hillview Ave., Palo Alto, Calif. 94304.

INFORMATION ACCESS CO.
Search Helper enhancement

Information Access Co. has introduced an enhanced version of its Search Helper program that reportedly reduces by more than two-thirds the cost of conducting on-line searches of the vendor's literature indexes.

The enhanced program is said to enable the user to develop search parameters off-line using Eagle Computer, Inc.'s Eagle II, IBM's Personal Computer or Apple Computer, Inc.'s Apple II series microcomputers. The program then automatically dials Dialog Information Services, Inc., Information Access' data base vendor, and calls up the appropriate literature index, a vendor spokesman said.

The cost of each search is $2.50, with up to 20 citations provided.

Search Helper is available for $1,950, a package price that includes $200 for a one-year license and $1,750 for 700 on-line searches with up to 20 citations per search. Additional packages of 700 on-line searches cost $1,750.

Information Access, 11 Davis Drive, Belmont, Calif. 94002.

METHODOLOGIES

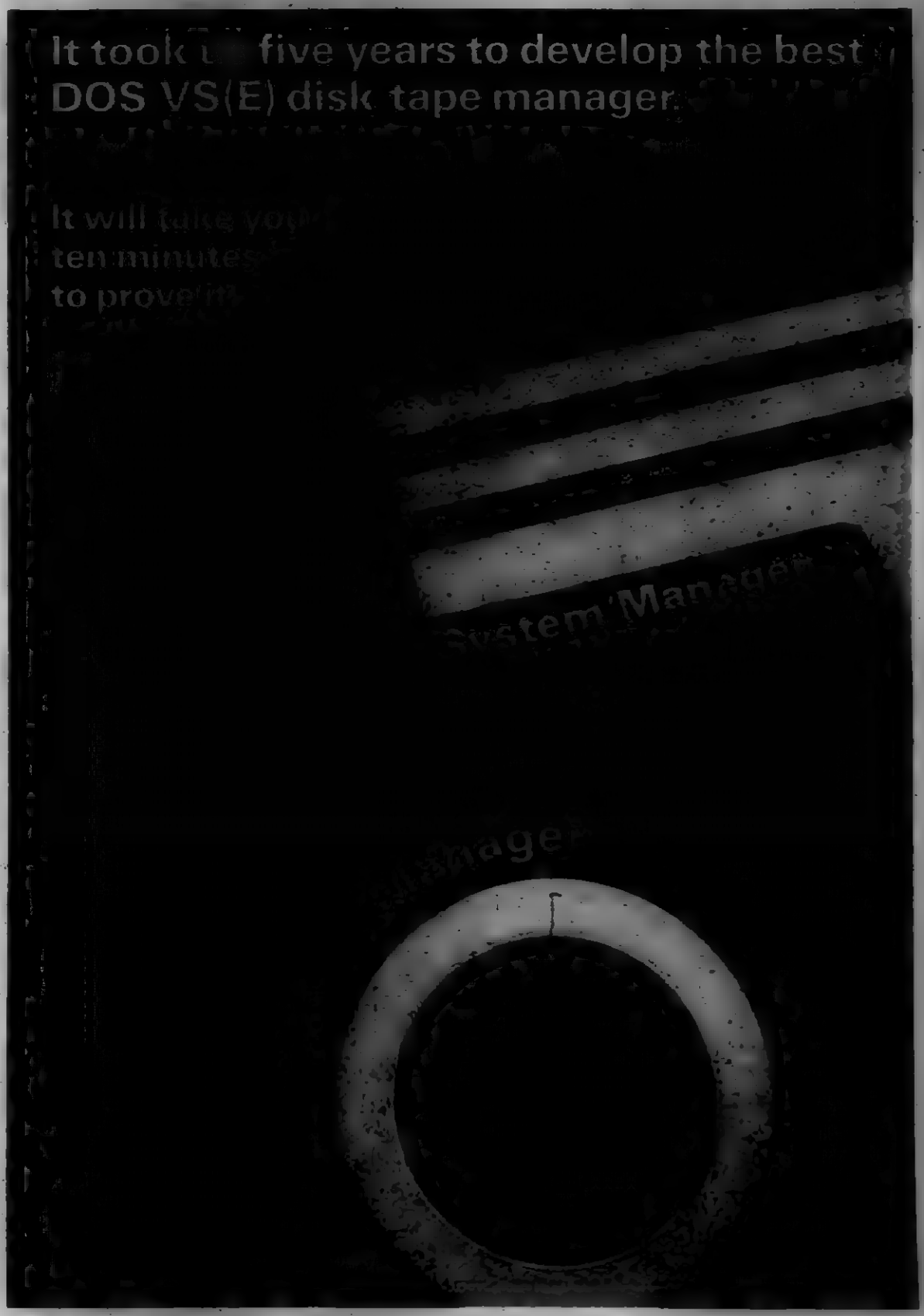
VAN NOSTRAND REINHOLD
'Software System Testing and Quality Assurance'

Van Nostrand Reinhold has published a book for software specialists on the subject of system testing and quality assurance.

Software System Testing and Quality Assurance, written by Boris Beizer, is intended as a guide to the development and maintenance of reliable, high-quality software, according to the publisher.

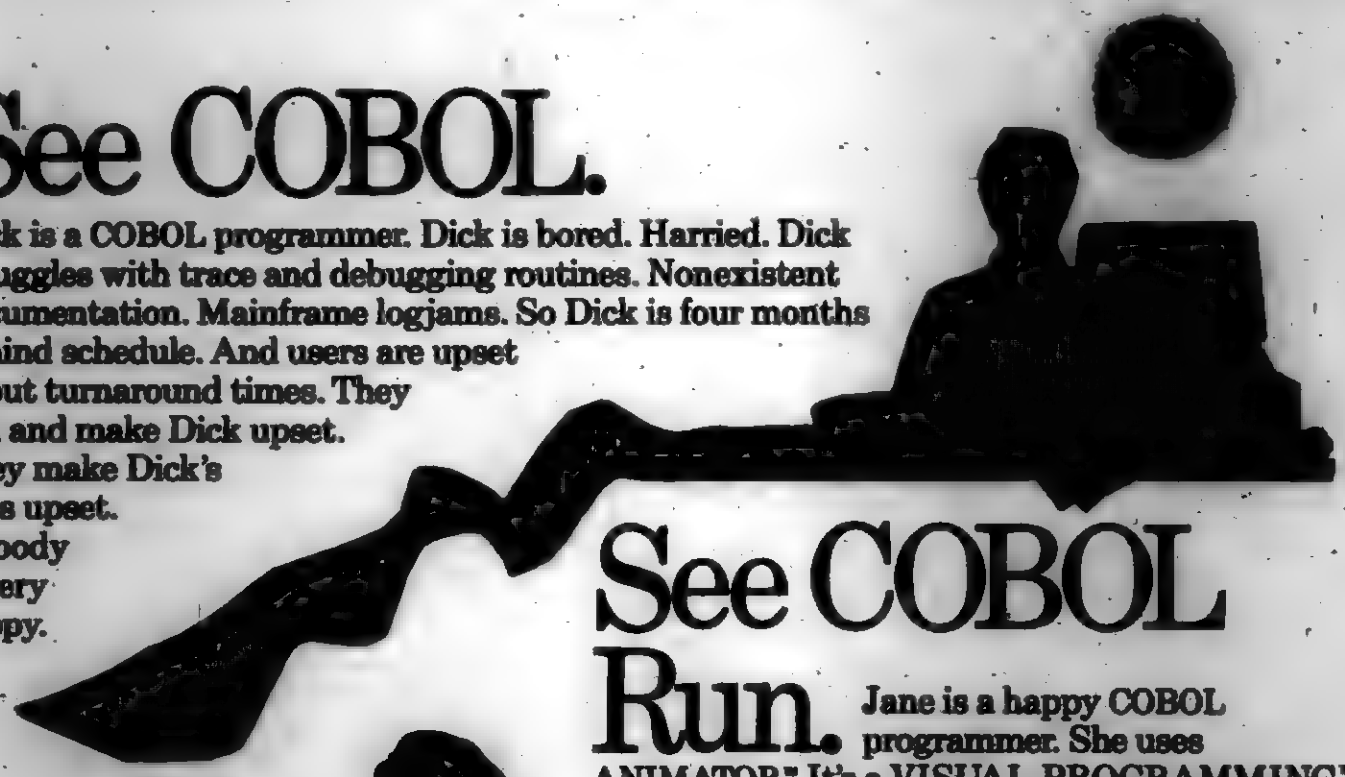
The 284-page book contains 45 illustrations and costs $34.50, according to the publisher.

Van Nostrand Reinhold, 135 W. 50th St., New York, N.Y. 10020.



See COBOL.

Dick is a COBOL programmer. Dick is bored. Harried. Dick struggles with trace and debugging routines. Nonexistent documentation. Mainframe logjams. So Dick is four months behind schedule. And users are upset about turnaround times. They yell and make Dick upset. They make Dick's boss upset. Nobody is very happy.



See COBOL Run.

Jane is a happy COBOL programmer. She uses ANIMATOR.™ It's a VISUAL PROGRAMMING™ aid for MICRO FOCUS™ LEVEL II COBOL.™ It runs on a micro. It makes child's play of mainframe test and maintenance chores.

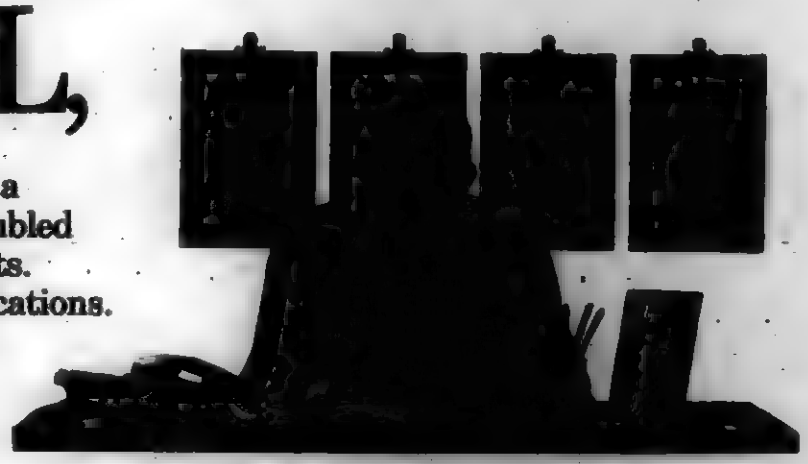
With ANIMATOR Jane sees a picture of the program explaining itself. In live action. In real time. In COBOL source code. ANIMATOR tracks the program's exact execution path. Including subroutine branches.

Jane can have the program run fast. Or slow. Or stop. With one key. This makes it easy to spot problems. Insert fixes. Set breakpoints. Instantly.

Jane's programs sometimes win awards. Yet she always meets schedules. Jane's boss likes this about Jane. Because he doesn't like users to yell at him.

Run, COBOL, Run.

This DP manager got a bonus. Because he doubled productivity. Cleared backlogs. Cut costs. Boosted morale. Produced terrific applications. Quickly. Put control and prestige back into the central DP function. And nobody yells at him anymore. All thanks to ANIMATOR.



See ANIMATOR now.

Let Micro Focus put your DP shop on the fast track.

ANIMATOR runs with MICRO FOCUS LEVEL II COBOL for compatibility with ANSI '74 High Level COBOL implementations. A mainframe-micro communications link is recommended for downloading mainframe programs.

Write for more information.
Or call (415) 856-4161. Right now.

MICRO FOCUS™

2465 East Bayshore Rd., Suite 400, Palo Alto, CA 94303
I'd like more information

Name_____ Title_____
Company_____ Phone_____
Address_____
City_____ State____ Zip_____

© 1984 Micro Focus Inc. All Rights Reserved.
LEVEL II COBOL, ANIMATOR, VISUAL PROGRAMMING, MICRO FOCUS and the MICRO FOCUS Logo are trademarks of Micro Focus Ltd.

COMMUNICATIONS

Capitalizing on divestiture: US West

Subsidiary to offer national communications services

OMAHA — US West, the regional holding company of three former Bell operating companies, is trying to capitalize on divestiture, the cause for its existence, by offering services designed to help companies stay afloat in the backwash of the Bell system breakup.

Interline Communication Services, Inc., a subsidiary of US West, will provide nationwide communications systems management services, as well as installation and maintenance support, to Fortune 1,300 companies. The company hopes to be operational in 30 major metropolitan areas by May.

"Now that the responsibility for the telephone network has been segmented among the seven new regional holding companies and AT&T," Interline President Paul J. Lee said, "telecommunications managers no longer have a single point of contact to provide nationwide support at their headquarters and branch offices. Interline's strategy is to fill that void."

Consulting and engineering services available from the new organization will

INTERLINE

reportedly include the evaluation of needs, the development of systems specifications and the recommendation of vendors whose equipment meets those specifications.

Interline said that it will not sell that equipment, mark it up or take a commission on any products that it helps to procure.

Once equipment decisions have been made, the company also offers wiring design and engineering services and will install the equipment, which may include telephone sets, cable and wire, private branch exchanges, key systems, computer workstations, data terminals, microwave links and other equipment, the company said.

At the customer's request, Interline will also act as the liaison with the local telephone company to arrange for installment of telephone trunks.

Ongoing maintenance services, provided by technicians in each branch office, are available on a contractual or an hourly basis.

All of these services are said to be available individually, according to Ronald A. Gelok, vice-president of Interline's Northeast region, so companies with large in-house communications management staffs may only use support in areas in which they are weak.

■ Bridge Communications, Inc. to offer Binary Synchronous Communications interfaces for Ethernet/68

■ New microwave TV service may offer interactive services/68

INSIDE

Communications Controllers/69

Voice/Data Communications/69

Multiplexers/Modems/69

College to install outlets for micros

By John Dix
CW Staff

HANOVER, N.H. — Stereos used to be the entertainment focal point of a student's dorm room. But the personal computer may be changing that.

Harvard University said recently that beginning next year all new students in its graduate school of business would be required to have an IBM Portable Personal Computer.

Now, Dartmouth College has announced that it will wire the 30-odd dormitory buildings on its campus to provide "communications outlets" in some 2,600 rooms, a project that is being underwritten by a $500,000 grant from the Pew Memorial Trust.

Students using Apple Computer, Inc.'s Macintosh personal computers, supplied by Apple at discount rates, and a variety of dumb terminals, will be able to plug into these outlets to gain access to the college's large time-sharing computer system.

Stanley Dunten, a systems engineer with Dartmouth's Kiewit Computation Center, said that each dorm room on campus will be wired with four, telephone-type shielded wires.

All four wires will be needed to support Ascii asynchronous terminals like those networked in the college's present system (a wire each for ground, send, receive and a data terminal ready signal).

But it will be possible, Dunten said, to connect up to 32 Macintoshes on a single pair of wires configured as a bus. Access to the bus will probably be through a type of token-passing protocol that will be loaded into each Macintosh by diskette.

While the bus capability could be developed at the college, Dunten indicated a desire to wait and see if Apple will introduce a similar product, which would ensure a greater degree of compatibility with the vendor.

By using a bus to support a number of personal computers, all of the devices attached can be given host support through a single host access point. The decision to wire with four wires instead of two was made because of the need to support Ascii asynchronous terminals, and because the wire cost less than the cost to install it, Dunten said. Given unknown future requirements, this leaves more options open.

The wiring of Dartmouth is slated to be complete by the time students roll back into town next September. But there may be a hitch.

The college has coaxial cable running to some of its dorms, but for the most part circuits leased from the local telephone company are relied on to tie campus buildings together. That telephone company now says that it cannot provide more of these links because it does not have the proper tariffs to provide intra-facility leased lines between buildings.

Dunten said the older leased lines were procured through a loophole found in the tariffs by a local telephone company sales person at one time, but that now the phone company cannot put its finger on that clause.

Utility reduces errors with mobile terminals

By Lynn Haber
CW Staff

TORONTO — A major power utility here is in the process of installing mobile digital terminals in its service vehicles to reduce communications errors and lessen radio frequency interference the company was experiencing with its mobile voice/radio system.

The system, being installed for North York Hydro by Mobile Data International, Inc. (MDI) of Richmond, British Columbia, includes 80 mobile digital terminals, a base station controller and a communications controller.

Another firm, Datap Systems of Calgary, Alberta, designed the overall system and wrote the custom software.

The utility is installing the mobile terminals, which are based on Zilog, Inc.'s Z80 microprocessor and include a small monitor and 48K bytes of memory, in its field service vans, supervisors' pickup trucks and construction trucks.

Error-free messages

"Messages and forms are received error-free on the terminals and displayed or stored in terminal memory," MDI reported. "Field service personnel complete and retransmit the forms, which become part of a running record that is printed out at the host computer at the end of a shift."

Communications between the service vehicles and dispatch can be switched automatically between voice and data. Supervisors at three dispatch centers can send single messages or broadcast selectively to a group of units or to all units.

Prior to installation, communications between the central office and the field units were via a two-way voice communications mobile radio system. The impetus to move to the MDI system came from the desire to integrate the company's UHF and VHF radio systems because, as two independent systems, users couldn't talk to one another.

"We also wanted to solve some [radio frequency] overcrowding problems we had during certain parts of the day and certain times of the year," said Michael Butler, director of customer services at North York Hydro.

Another advantage of the new system is that it allows a dispatcher to control the voice/radio system. According to Butler, with the old system, anyone could use it at any time by simply picking up a microphone, keying it and talking. Now a dispatcher controls all communications.

Use drastically reduced

Butler said that with the new system, the use of voice communications has been drastically reduced, and the majority of communications with the service vehicles is via the terminals. "This is one of the things we were hoping for. Now we have virtually no traffic [radio frequency] congestion, which means we're more effectively utilizing the frequency resources

See MOBILE page 68

Interface options let devices with BSC access Ethernet

CUPERTINO, Calif. — Bridge Communications, Inc. has introduced two interface options that reportedly allow any computer device equipped with IBM Binary Synchronous Communications (BSC) capability to access Xerox Corp.'s Ethernet local-area network.

Designed for use with the vendor's Communications Server (CS/1 and CS/100) network units, the CS/1-BSC and CS/100-BSC reportedly permit any computer or peripheral that communicates as an IBM BSC 3270- or 2780/3780-type device to utilize Ethernet for interoffice and internetwork communications.

The CS/1 allows up to 32 devices with RS-232 or RS-432 serial interfaces to connect to an Ethernet network, the vendor said. The CS/100 links up to 10 RS-232 devices to Ethernet.

The CS/1-BSC, a CS/1 with the BSC interface, is available for $9,900. The CS/100-BSC with four ports is priced at $3,900; with 10 ports, it costs $4,900, according to the vendor.

Bridge Communications is located at 10440 Bubb Road, Cupertino, Calif. 95014.

Microband's Urbanet will go into operation in fall

WASHINGTON, D.C. — Interactive information services that are selected using a Touch-Tone telephone and displayed on a standard TV screen equipped with an interface device is one likely application of Urbanet, a wideband transmission system slated to be put into operation in New York, Washington, D.C., Milwaukee and San Francisco this fall.

Urbanet was developed by Microband Corp., a specialized common carrier that distributes pay TV programs through omni-directional transmitters in major cities. Microband is a subsidiary of Tymshare, Inc.

Initially designed as a cheaper, more quickly implemented alternative to CATV, Urbanet will use microwave, one-way, addressable broadcast television technology. Viewers will receive the signals through a small antenna and an interface unit referred to as a "down-converter."

Later this year, Microband hopes to implement a system allowing subscribers to order specific TV programs using Touch-Tone telephones. By dialing a local phone number the subscriber will be connected to one of the 1,200 nodes of Tymnet, the packet-switched communications network operated by a subsidiary of Tymshare.

Computerized voice system

A computerized voice system will guide the user in the selection of a program, which he will pick by punching a code number into a Touch-Tone key pad. This information, in packetized form, will then be routed by Tymnet to the Urbanet control center.

This capability will eventually enable the company to offer teleshopping and telebanking services, as well as the downloading of software to personal computers within the next few years, claimed Microband Board Chairman Mark Foster.

In addition to the cities scheduled to have Urbanet services this year, Microband has signed agreements to provide services in 1985 to Chicago; Philadelphia; Norfolk, Va.; New Orleans; Portland, Ore.; Kansas City, Kan.; Pittsburgh; Boston; and Tampa, Fla. Agreements are also being negotiated in about a dozen other cities as well, Foster said.

MOBILE from page 67

available to us."

System implementation was begun in October 1983. Total benefits of the new communications system won't be realized until it is completely in place.

In the future, Butler said the mobile computer system will be interfaced with other computer systems used by the utility, providing access to the in-house batch computer that handles trouble calls.

'The boss said he's going to replace me with a computer if he can ever find out what it is I do.'

INTELLECT.
NO SOONER SAID THAN DONE.

To use INTELLECT, the natural language query system, all you have to do is ask—in everyday conversational English—and you'll retrieve. Immediately, in either text or full-color graphics.

INTELLECT, the world's only successful true natural-language query system, is an ideal tool for your information center. INTELLECT's powerful information retrieval capabilities are so advanced that it understands questions and responds with answers as if you were talking to a knowledgeable colleague. Executives access data themselves—more easily than ever before—without learning any technical jargon or "computerese." It's so easy to use, it doesn't even have a training manual!

Whether you use INTELLECT as a retrieval system or as an effective data analysis tool, it transforms raw data in the data base into information and presents it in finished color graphics in a matter of seconds. It's a live dynamic interface that fully integrates your existing database and graphic systems.

Already hard at work in hundreds of organizations, INTELLECT is ideal for marketing, finance, personnel, manufacturing, and banking applications.

INTELLECT is an important technological breakthrough. You can learn more about it by attending one of our nationwide seminars. Or put its amazing power at your fingertips in minutes with one of our demonstration tapes.

Call or send coupon for more details. Look into INTELLECT, and be an eyewitness to the future of computing.

Tell me more about INTELLECT.
Name _____ Title _____
Company _____
Address _____
City _____ State _____ Zip _____
Telephone _____
Hardware Type _____ Info Center? _____
_____ Demo Tape _____ Seminar _____ Sales Presentation
ARTIFICIAL INTELLIGENCE CORPORATION
100 Fifth Avenue, Waltham, MA 02254 CW4

ARTIFICIAL INTELLIGENCE CORPORATION
100 Fifth Avenue, Waltham, MA 02254 617-890-8400

COMMUNICATIONS

COMMUNICATIONS CONTROLLERS

NCR COMTEN, INC.
3650 Models G8, H9, J8, K9

NCR Comten, Inc. has announced four models of its 3650 communications processor, each supporting up to 1M byte of memory in front-end and remote communications processor configurations.

The new 3650 models provide the same footprint characteristics as the recently announced 3650 Models G8 through K8 communications processors. Models G9 and H9 are for front-end configurations. Models J9 and K9 are remote concentrators, the vendor said.

The price for the front-end models configured with 512K bytes of memory, one IBM Channel Interface Adapter, a program load device and one communications interface module with attachment interfaces for eight modem interface modules is $44,000.

The price for remote communications processor models configured with 512K bytes of memory, one communications interface module with attachment interfaces for eight modem interface modules and one NCR Comten DLC modem interface module for remote initial load capacity is $46,000. A 512K-byte increment of memory is available for $18,800.

NCR Comten, 2700 Snelling Ave. N., St. Paul, Minn. 55113.

VOICE/DATA COMMUNICATIONS

NORTHERN TELECOM, INC.
V.35 ADM

Northern Telecom, Inc. has announced the V.35 Add-On Data Module (ADM), a version of the ADM for use with its SL-1 digital private branch exchange.

The device provides CCITT standard V.35 interface capabilities while supporting all synchronous data features and capabilities of the SL-1 ADM, the vendor said.

The product permits synchronous data transmission at rates up to 56,000 bit/sec. It reportedly can be used with any synchronous protocol.

The price is $1,100.

Northern Telecom, 1001 E. Arapaho Road, Richardson, Texas 75081.

MULTIPLEXERS/MODEMS

AUSCOM, INC.
Model 8300 high-speed channel interface

Auscom, Inc. has announced the Model 8300 high-speed channel interface, designed to provide single-board interface to IBM byte multiplexers, block multiplexers and selector channel devices that have a serial or parallel interface.

The product operates under the control of its own on-board processor and can emulate any one of several control units, according to the vendor.

It can transfer data at rates of up to 500K bit/sec and also features a random-access memory buffer of up to 16K bytes.

The Model 8300 high-speed channel interface is priced at $6,000, the vendor said.

Auscom, Suite 102, 2007 Kramer Lane, Austin, Texas 78758.

RACAL-MILGO, INC.
Modem 112K

Racal-Milgo, Inc. has announced the Modem 112K, a 112K bit/sec modem designed for use in wideband carrier systems such as microwave and/or satellite networks.

The modem features full-duplex operation and manual down-speed switching for compatibility with the company's Modem 56K and for transmission over degraded communications lines. The modem incorporates diagnostics such as analog loop-back, data terminal equipment loop-back and data test, the vendor said.

The price is $16,500.

Racal-Milgo, 8600 N.W. 41st St., Miami, Fla. 33166.

EMULEX CORP.
CS32; Statcon Series 32

Emulex Corp. has announced the CS32 and the Statcon Series 32 communications multiplexers, which offer Digital Equipment Corp. VAX-11 series users expanded asynchronous line capabilities.

The CS32 is an asynchronous communications multiplexer subsystem capable of supporting up to 128 users. All CS32 lines have full modem control. The printed-circuit board controller installs in a DEC Unibus slot in a VAX-11 Unibus adapter chassis and requires only 4A of power from a 5V power supply.

The Statcon Series 32 adds multiple-link statistical multiplexing to the CS32 and is capable of handling up to 256 local/remote lines by the addition of from one to 16 CM32 port concentrators. The CM32 port concentrator is the link interface between the controller and the EM8320 remote data concentrator, according to Emulex.

Functionally, the CM32 handles the link initialization and synchronization, link configuration, retransmission-on-error and other dialogue with the remote data concentrator, the vendor said.

The price for the 16-line CS32 is $5,000. The 16-line Statcon Series 32, which includes the first CM32 port concentrator, is $8,100.

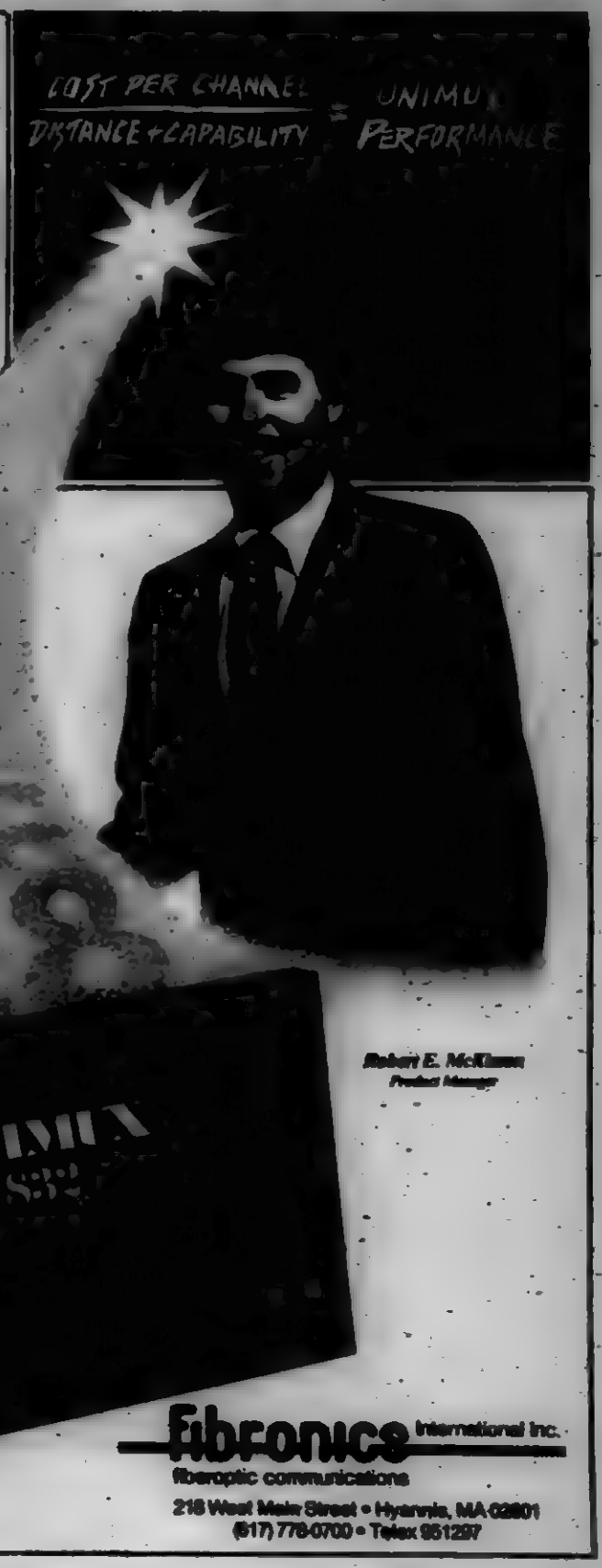
Emulex, P.O. Box 6725, 3545 Harbor Blvd., Costa Mesa, Calif. 92626.

"The 128 channel UNIMUX™ from Fibronics has the power to solve your trunking and multiplexing problems."

IN A GROWTH MODE? REORGANIZING YOUR INFORMATION TRANSFER SYSTEM? Now is the perfect time to learn about the cost-effective features of UNIMUX, Fibronics' universal time division multiplexer. The UNIMUX eliminates the need for line drivers, avoids noise problems, and offers EMI, RFI, and EMP immunity.

- Expandable from 4 to 128 v.24 or v.25 ports
- Full duplex, high speed communications to 64 KBPS (RS-232C or v.35)
- Synchronous/Asynchronous operation, each channel independent
- Communicates over one fiberoptic or coaxial cable
- Built-in test diagnostics with status indicators

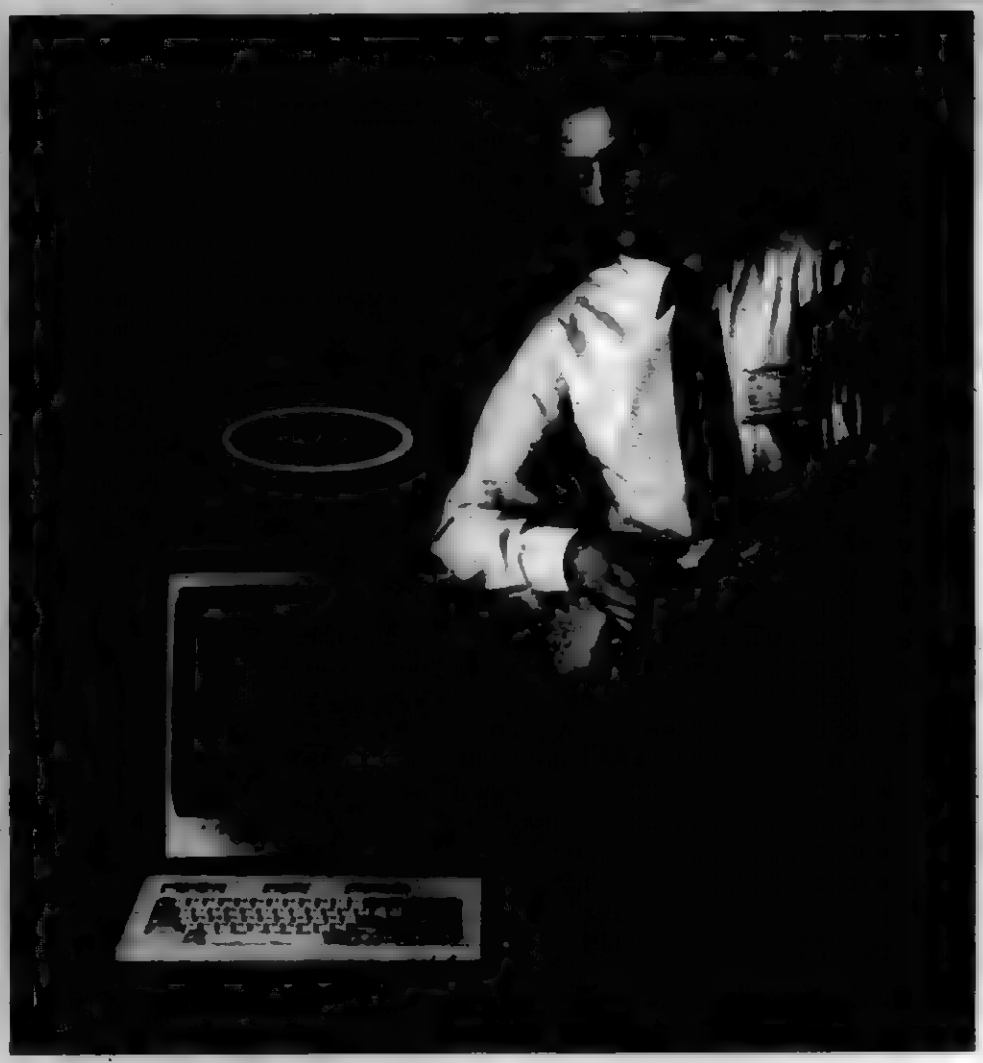
Call today for a free brochure (617) 778-0700, or write UNIMUX, Fibronics International Inc., 218 West Main Street, Hyannis, MA 02601



Robert E. McKinnon
Product Manager

Fibronics International Inc.
fiberoptic communications
218 West Main Street • Hyannis, MA 02601
(617) 778-0700 • Telex 951297

HOW THE TERMINALS THAT GIVE YOU SO FEW PROBLEMS CAN WIND UP GIVING YOU NONE AT ALL.



While we at Teletype Corporation like to talk about our terminals' remarkable record for reliability, we have to admit that every once in a while you just might have a problem with one.

But if you contract with Teletype's Product Service Organization, getting good service is no problem at all. That's because no one can service our full line of CRTs and teleprinters as well as our service technicians. Each one of them is a company-trained, job tested professional who must continually meet our expectations—and yours.

Help is never more than a phone call away since our technicians are on-call 24 hours a day, 7 days a week. And with our network of 100 offices nationwide, we're able to provide fast response time, even to remote areas. You can contract with us for response times as low as 2 hours, or less, as your needs dictate.

But at Teletype, we feel there's something more important than fast response time. And that's fast restoral. So when our technicians call on you, they'll have the necessary test equipment and original Teletype® parts to get your terminals up and running in no time flat.

We'll even help solve problems before they occur with scheduled preventative maintenance. You can also choose our installation service option that includes everything from getting your terminals on-line to user orientation. It's all a part of our Full Service Maintenance Agreement.

So to keep your problems from becoming big problems, write Teletype Corporation Product Service Organization, 2330 Eastern Ave., Dept. 2800-A Elk Grove Village, IL 60007. Or call toll free at 800-323-4226, ext. 300. (In Illinois, 1 800 942-4192, ext. 300.)

TELETYPE: VALUE SETS US APART.

© 1984, Teletype Corporation.
"Teletype" is a registered trademark and service mark of Teletype Corporation.

AT&T
Teletype Corporation

IN DEPTH

An index of 1983 In Depths and Special Reports

In Depth presented 114 stories in 1983, full-length features on topics as diverse as software maintenance and protection, user friendliness, subsecond response time, relational data bases, computers in Japan and The People's Republic of China, SNA, the Cobol validation facility, computermarts, advertising and information centers. We interviewed Tom Watson Jr., William Norris and John Kemeny. We ran articles by such writers as Alan Westin and Peter Keen and excerpted *The Fifth Generation* and *High Output Management*.

And each month, the Special Reports section of *Computerworld* provided dozens of tutorials and applications stories targeted on one topic.

This index is intended to help readers locate articles on particular topics of interest from last year.

To order a back issue, write: Circulation Department, Customer Service, *Computerworld*, P.O. Box 880, Framingham, Mass. 01701. Each issue costs $1.50 prepaid. Issues published on Feb. 21, Feb. 28 and June 20 are not available.

In Depth articles:

Jan. 10	Richard Lindgren	Politics and System Justification
Jan. 10	Edmond Weiss	Usability: Toward a Science of User Documentation
Jan. 17	Henry and Elizabeth Urrows	The Greening of Silicon Valley
Jan. 24	Peter Tanquay	DOS to MVS: Not Just a Technical Change
Feb. 7	Dave Ackley	A True Data Base Environment
Feb. 14	James Bradley	Data Is Money
Feb. 14	Colin G. Trass and Lowell S. Bensky	Systems With Staying Power
Feb. 14	Richard Rayzman	Putting Your Data on the Line
Feb. 14	Girish Parikh	How to Pick a Methodology
Feb. 21	Judith Larkin	A Career Planning Tool
Feb. 21	Marsha Sinetar	Managing the High-Tech Creative
Feb. 21	Rex Malik	Interview: Clive Sinclair
Feb. 28	Terry Goodbody	Information Systems Engineering
Feb. 28	Jan Lee Ozer	Tax Breaks on Software
March 7	Delbert L. Keenon and Norman R. Carlson	A Guide to Patenting Software
March 7	Stephen Jacobus	Managing Departments in Conflict
March 14	Gerald M. Weinberg	Power Politics
March 14	Norman L. Wilson Jr.	Software Copyrights: Mapping New Territory
March 14	Donald Gertsman	Team Planning
March 21	Donald B. Holden	The Personal Computing Library
March 21	Robert E. Umbaugh	DP Resource Planning: How to Get There From Here
March 21	William C. Ramsgard	Stop Documenting
March 28	Joan Wackerman and Jim Gleason	Manual Dexterity
March 28	John R. Vacca	BSP — How Is It Working?
March 28	Jim Van Speybroeck	Three by Van Speybroeck
April 11	Austin C. Dumbri, Frank J. Procyk and Walter Rosenzweig	The Making of the 256K RAM
April 11	Clyde Holsapple and Andrew Whinston	Software Tools for Knowledge Fusion
April 18	Dick Smith	Faster Is Better (A Business Case for Subsecond Response Time)
April 18	Robert H. Holland	The Art of Planning Distributed Data Bases
April 25	David A. Wormser	Exporting High Tech: Licensing Laws May Get Tougher
April 25	Charles C. Wood	The IRM Perspective
April 25	Jack O'Connor	Made to Last? Never Undervalue Users' Input to System Design
April 25	Irv Brownstein and Nancy Lerner	Nurturing Your Own Productivity
May 2	Robert W. Bailey	Human Performance Engineering
May 2	Paul Harmon	Training: Psychology Meets Technology
May 9	Rex Malik	France's Social Agenda for *Le Computer*
May 16	Edward Feigenbaum and Pamela McCorduck	The Fifth Generation: An American Response
May 16	Katherine Hafner	John Kemeny: An Interview With the Originator of Basic
May 16	Peter G.W. Keen	A Policy Statement for Managing Microcomputers
May 16	Paul Bassett and Scott Rankine	Software . . . The Maintenance Challenge
May 23	Henry and Elizabeth Urrows	Venture Capital
May 23	Franklin M. Fisher, John J. McGowan and Joen E. Greenwood	Folded, Spindled and Mutilated [The IBM Antitrust Case]
May 30	Thomas J. Gambino, Thomas W. Johnson and Diane D. Wilson	The Microcomputer User Learning Curve
June 6	Vincent C. Ranzino	Data Base Machines: The Present and Possible Future
June 13	Jack B. Rochester	Interview: Thomas Watson Jr.
June 13	Marcia Ann Bowles	Basic Guide to Conversion
June 20	Jon E. von Gunten	Where Job Interviews Go Wrong
June 20	D.F. Coble	New Systems for Managing Graphics Data
June 27	Donald R. Powell	The Everlasting Mainframes
July 11	Dale Farmer	Bytes & Bolts: Can Manufacturing Midlands Lure High Tech?
July 11	Kenneth M. Sullivan	Rethinking Computer Chargeback
July 18	George Harrar	The Computer Book Boom
July 18	Robert Peterson	Evolutionary Systems Development
July 25	Gene Knauer	Striking Out on Your Own
Aug. 1	W.F. Clocksin and Jon Young	An Introduction to Prolog
Aug. 8	Joanne Kelleher	Looking Behind the Ad Image
Aug. 15	Forest Woody Horton Jr.	Tapping External Data Sources
Aug. 15	Irving Bengelsdorf	Interview: Leonard Kleinrock
Aug. 15	Michael J. Albrecht Jr.	Managing Employee Careers
Aug. 22	George Harrar	The Unix Story (Interview with Larry Crume)
Aug. 22	Thomas F. Haughey and Robert M. Rollason	Function Analysis — Refining Information Engineering
Aug. 29	Lois Zells	A Practical Approach to a Project Expectations Document
Sept. 5	Vincent C. Ranzino	Natural Language Processors
Sept. 12	George Harrar	Interview: William Norris
Sept. 12	David B. Powell	Future Smart
Sept. 12	Bernard H. Boar	Prototyping
Sept. 12	Douglas and Lenore Meng	What's in a (Data Item) Name?
Sept. 19	Andrew S. Grove	Decisions, Decisions
Sept. 19	Marilyn Richardson	Marketing the Information Center
Sept. 26	David R. Vincent	Information as Corporate Asset
Sept. 26	Gopal Kapur	Software Maintenance
Sept. 26	David A. Savner and Barry D. Weiss	A Hard Stand for Software Protection
Oct. 3	J.E. Richard and Michael F. Spratt	Pay, Perks and Promises
Oct. 3	Edward Roche	Information Architecture
Oct. 3	Gloria S. Bronsema and Peter G.W. Keen	Education Before Change in Systems Implementation
Oct. 10	Robert Campbell	Locking Up the Mainframe (Part 1)

(Continued on ID/2)

IN DEPTH/INDEX

(Continued from ID/1)

Oct. 10	James H. Bradley	Why Tolerate Untested Programs?
Oct. 10	William R. Durell	Data Cohesion: A Means to Data Base Flexibility
Oct. 10	Dan Kamoji	A Checklist for Acquiring Applications Packages
Oct. 17	Robert Campbell	Locking Up the Mainframe (Part 2)
Oct. 17	Istvan Sebestyen and Matthew Nimetz	Public Videotex; A Democratic Use of New Technology
Oct. 17	Carol E. Shulman	Achieving the Promise of DBMS
Oct. 24	Matthew Allen	Dallas, Boston Break Ground on 'Computermarts'
Oct. 24	Alexandra J. Rand	Producing Reports Managers Really Use
Oct. 24	David B. Hertz	Artificial Intelligence and the Business Manager
Oct. 24	William F. Zachmann	The Idle, Indispensable Micro
Oct. 31	Paul F. Nesdore	Friendly to All or None?
Oct. 31	William G. Quirk	Designing for Novice & Expert
Oct. 31	Mike Ruggera	Four Tools to Build Systems Synergy
Nov. 7	Howard K. Dicken	Semi-Smart [Semiconductors]
Nov. 7	CW Japan	Computer Crime in Japan
Nov. 7	Ken Meyer, John Piggott and Rod Grealish	Cobol Input Validation; Will the Fourth Generation Reach Cobol?
Nov. 14	Philip Kraft and Steven Dubnoff	Software Workers Survey
Nov. 14	Vaughn J. Mantor	Can the People's Republic Catch Up?
Nov. 14	Chen Liwei	China's Goal to Build Own Computer Industry
Nov. 14	David M. Baer and Jim Sturch	SNA Primer for Programmers (Part 1)
Nov. 14	Kenneth E. Lantz	On-Line Insurance
Nov. 21	Stewart L. Stokes Jr.	Getting the Right Things Done on Time
Nov. 21	David M. Baer and Jim Sturch	SNA Primer for Programmers (Part 2)
Nov. 21	Harold Lundy	Justifying Subsecond Response Time
Nov. 21	Neil Boorstyn	Software Copyright Litigation: After Apple vs. Franklin
Nov. 28	Katherine Hafner	Entrepreneurs From the Halls of MIT
Nov. 28	Alan F. Westin	New Eyes on Privacy
Nov. 28	Raymond R. Panko	Kanji Keyboard Chaos
Nov. 28	William H. Inmon	What Price Relational?
Nov. 28	Richard Nicholson	Mapping for Decision Makers
Dec. 5	Herbert Z. Halbrecht	Moving Out and Up to Executive Offices
Dec. 5	Forest Woody Horton Jr.	The Knowledge Gateway System to Information Access
Dec. 5	Nancy P. James	Insuring Against Data Processing Losses
Dec. 5	Robert E. Lief, Robert D. Dodge and Ralph L. Ogden	Adapting DP Strategy to Management Style
Dec. 12	George Tuccio	Distributed Processing or Teleprinting?
Dec. 12	Alvin Artell	On-Site Hazards, Off-Site Safety
Dec. 12	Fred Gregoras	Software Protection: Beyond Copyright
Dec. 19	Monica Hickey	IMS/VS vs. System R

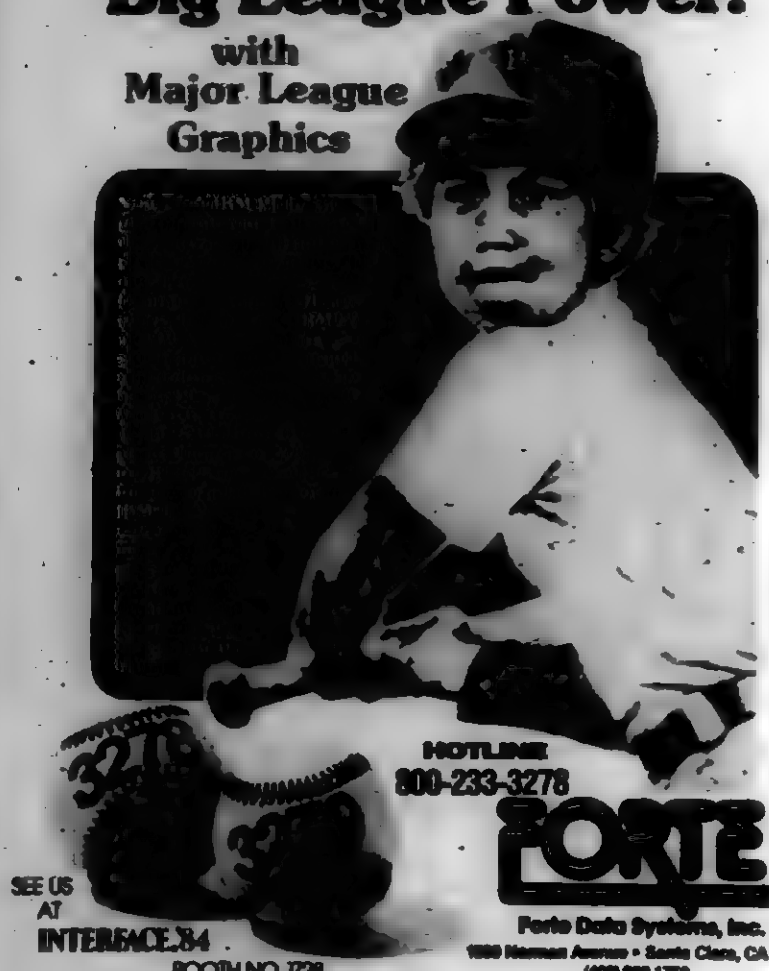
Special Reports:

Jan. 31	Data Communications Networks
Feb. 28	Applications Software Packages
March 28	Micros in Big Business
April 25	Manufacturing Systems
June 27	Software Productivity Packages
July 25	Graphics Systems
Aug. 29	Data Communications Terminals
Sept. 26	Minis and Small Business Systems
Oct. 31	Data Base Management Systems
Nov. 28	Protecting the Corporate Information Resource

...your micro-to-mainframe connection

Big League Power!

with Major League Graphics



HOTLINE 800-233-3278

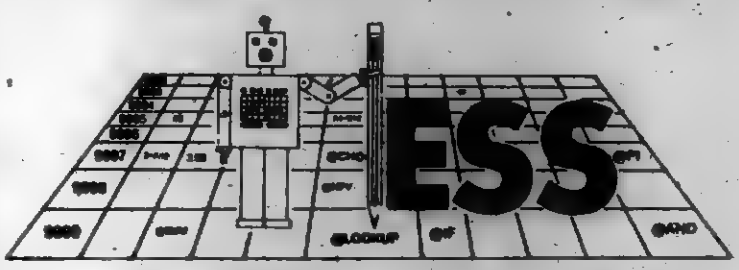
FORTE

Forte Data Systems, Inc.

1000 Harrison Avenue • Santa Clara, CA 95050

(408) 988-1780

SEE US AT INTERFACE 84 BOOTH NO. 1728



Electronic Spread Sheet for VM/CMS & MVS/TSO

- Not Just Another CALC -

Powerful - Spreadsheet size is limited only by available virtual storage. ESS easily handles spreadsheets with thousands of rows and/or columns.

Proven - Already in use at over 100 installations.

Compatible - ESS accepts the same commands as VisiCorp's VisiCalc® program for microcomputers. A person familiar with VisiCalc® can be using ESS productively in minutes. In addition, ESS can load and save files in VisiCalc® format.

High Performance - Assembler language code and sophisticated storage management techniques give you fast response, even with very large spreadsheets.

Easy to Install - Just load the ESS program. No additional program products or languages are required.

Cost Effective - ESS gives all your users access to personal computing capabilities for just $220 per month. Compare that to the cost of buying hundreds of microcomputers.

Questions? - For more information about ESS, or to arrange a 30-day free trial, call or write TRAX.

TRAX

TRAX Softworks, Inc.
10801 National Blvd., Suite 205
Los Angeles, CA 90064
(213) 475-6729

IN DEPTH

Controls on software

What can be exported where

Federal law prohibits unlicensed export of "technical data" and certain commodities. All software is technical data since by its very nature, a computer must use software to be utilized. There are two federal statutes all exporters must be aware of: the Export Administration Act and anti-boycott legislation.

By L.J. Kutten

U.S. statutes place firm controls over the export of software, whether it be developed in-house for internal use within a multinational company or for sale by a vendor. Failure to understand the terms of these statutes could bring substantial penalties for the user or exporter.

Federal law affects exactly what can be exported and to where. All exporters must be aware of the Export Administration Act (EAA) and anti-boycott legislation.

The EAA [now being considered for revisions] and its applicable regulations prohibit the export of "technical data" and certain commodities listed on the Controlled Commodity List (CCL) without prior authorization from the Department of Commerce Office of Export Administration (OEA). Copies of the regulations are available from either the Government Printing Office or the local field office of the Department of Commerce.

Exports of commodities and technical data from the U.S. are controlled for three government policy purposes:

National security: The EAA prohibits export of those items that could make a significant contribution to the military potential of another country to the detriment of the U.S. Even the video display chips in many arcade games have military applications.

Foreign policy: Export controls can be used to implement foreign policy interests of the U.S. After the Soviet incursion into Afghanistan, for example, President Carter banned certain exports to the Soviet Union.

Domestic short supply: The government may wish to prevent excessive drain of scarce materials from the U.S. economy.

The CCL states what goods can be exported to what countries under what conditions. It has divided the world into a number of country categories (see Figure 1 on ID/4).

A company does not need export authorization for commodities and technical data intended for use or consumption in Puerto Rico or any other U.S. possession, territory or dependency. They are

considered domestic shipment, but a shipper's export declaration must usually be submitted.

Unless nuclear energy is involved, a firm does not need an export license for commodities or technical data that will be used or consumed in Canada. A shipper's export declaration may be required.

The OEA export control authority extends to:

- Export of commodities and technical data from the U.S.
- Re-export of U.S. origin commodities and technical data from one foreign destination to another.
- Exports and re-exports from a foreign country of foreign products containing U.S. origin parts and commodities.
- Exports and re-exports from a foreign destination of foreign products based on U.S. origin technical data.

Warning: An exporter is also liable if the foreign importer re-exports the software to a prohibited country.

Exactly what is prohibited?

Federal law prohibits unlicensed export of "technical data" and certain commodities.

"Technical data" is defined by federal regulation: "Information of any kind that can be used or adapted for use in the design, production, manufacture, utilization or construction of an article or material. The data may take a tangible form such as a model, prototype, blueprint or an operating manual; or it may take an intangible form such as technical services."

All software is technical data since by its very nature, a computer must use software to be utilized. It does not matter if it is a video arcade cartridge or program controlling a nuclear reactor. It may seem strange that all microcomputer software, including a video game like Pac-Man, is included as technical data. The Commerce Department has been asked and has refused to waive any type of microcomputer software from the regulation.

Among the commodities specifically controlled are:

1. All magnetic media, except that made specifically for voice and music recording. This group includes floppy and hard disks and all magnetic tape made especially for computers.
2. Computer-aided design and manufacturing (CAD/CAM) software usable in the design or manufacture of integrated circuits.
3. Software designed for use with numerically controlled machine tools.
4. Software designed to control or perform the function of cryptographic equipment (code machinery).

If your software involves one of these areas, obtain legal advice in writing before proceeding.

Warning: Software is considered two items. You will need two separate licenses to export software stored on a magnetic medium — one for the software and one for the medium.

Getting the export license

OEA regulations provide for two main types of export licenses:

Validated license: This formal license is issued by the OEA after reviewing the written license application. It permits the exporter to ship a specified commodity to a named consignee in a particular country for a designated use.

General license: This license permits export without the exporter having to submit a license application.

A general license is effective immediately upon the exporter's satisfaction of regulatory requirements. A validated license can take up to six months of review. Validated licenses are primarily used for large projects such as plant construction, highly sensitive information, exports to restricted countries and so on.

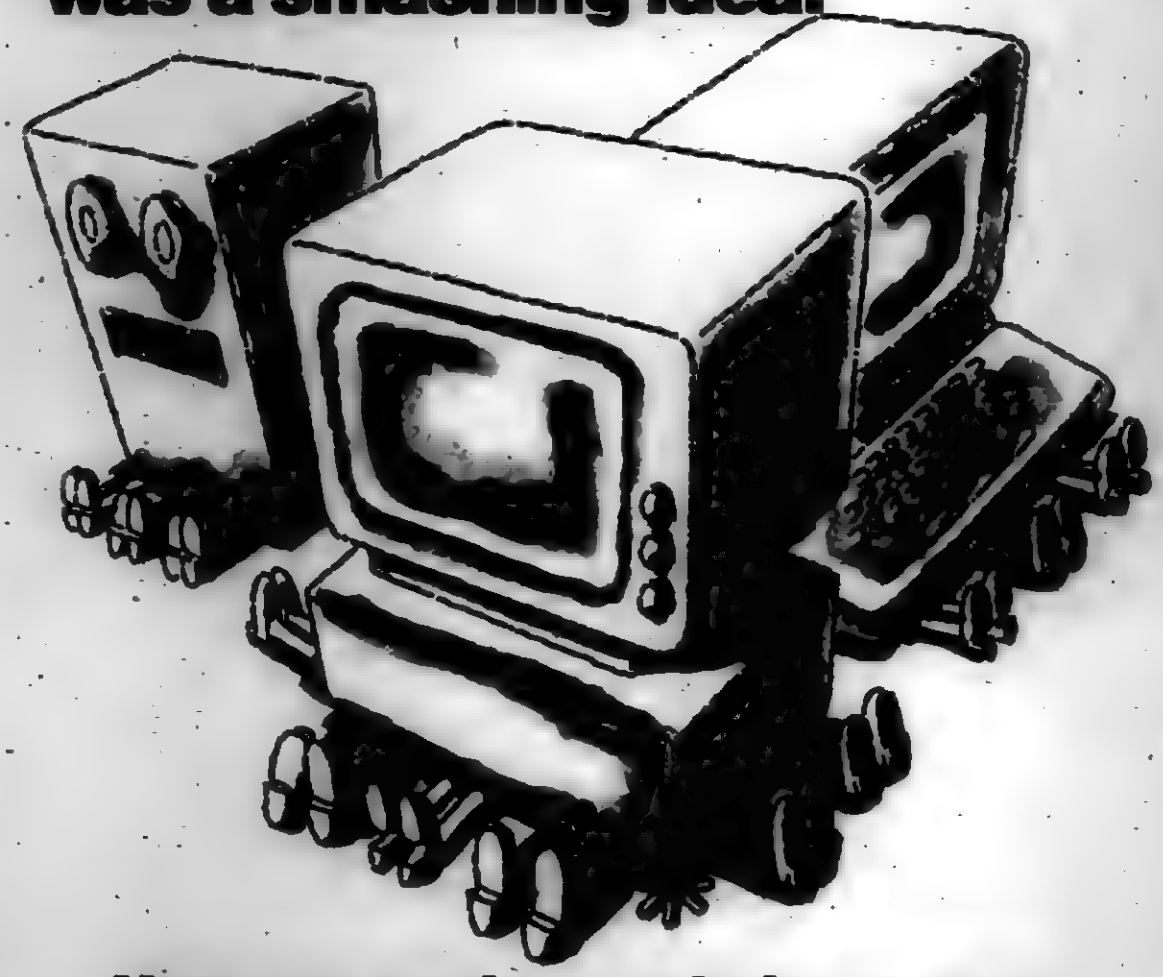
Most software can be issued under a general license. There are two types: the General Technical Data Available (GTDA) and General Technical Data Restricted (GTDR).

The simpler is the GTDA. It covers all materials that "have been made generally available to the public in any form including: 1) data released orally or visually at open conference, lectures, trade shows or other media open to the public; and 2) publications that may be purchased without restriction at a nominal cost or obtained without cost or are readily available at libraries open to the public."

Country group Q
Romania
Country group S
Libya
Country group T
North, Central, and South America, Bermuda, and the Caribbean, except Canada and Cuba.
Country group V
All countries not included elsewhere (except Canada, which is not in any group).
Country group W
Hungary
Poland
Country group Y
Albania
Bulgaria
Czechoslovakia
Estonia
German Democratic Republic
Laos
Latvia
Lithuania
Mongolian People's Republic
USSR
Country group Z
Cuba
Kampuchea (Cambodia)
North Korea
Vietnam

Export categories

Providing your employees with the latest office technology was a smashing idea.



Now you need one solution to keep them on top of it all.

With all the subtlety of a bomb, technology has arrived in your organization. And its effect on productivity can be devastating. Even your most skilled, most motivated employees may be hard-pressed to keep up.

The solution is comprehensive, continuous education and training. And DELTAK, the world leader in training programs and services, can help.

For your DP professionals, there's a wide range of job-specific multimedia and computer-based skills courses. For managers and end users, we offer microcourseware and video briefings covering critical business issues.

And to complete your expanding training needs, DELTAK now provides comprehensive consulting, professional classroom instruction and major city workshops.

So call today and find out how DELTAK can help your people stay on top of some very pressing problems.

DELTAK
East/West Technological Center
1751 West Diehl Rd., Naperville, IL 60566
(312) 369-3000 (800) 632-7855

© 1984, DELTAK Inc.

THE FIRST MOBILE COMPUTER.

THE COMPLETE COMPUTER FOR THE MOBILE PROFESSIONAL.

Professionals on the move in today's productivity-paced business environment have to run a little faster just to keep up.

They can easily spend half their time in airports, taxis, lobbies and hotels unable to do the work they'd like to get done.

But we have a solution.

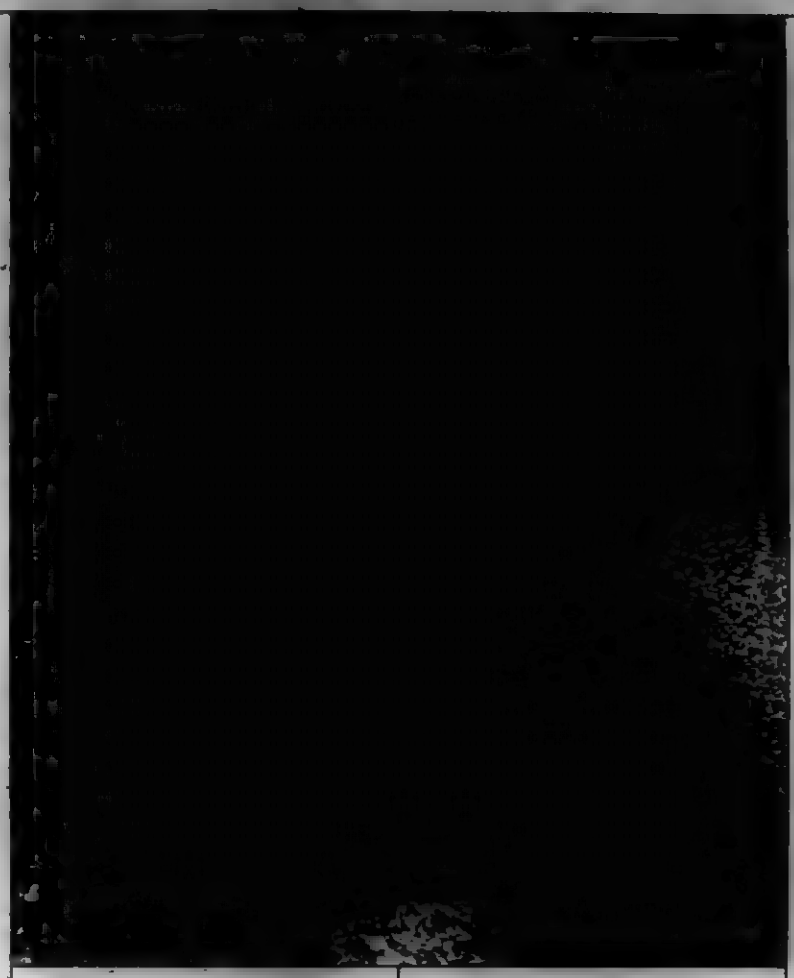
Give them the powerful 9 pound, 16-bit computer that works when and where they do.

Give them an advanced battery-powered printer that attaches securely on the computer.

Give them an interactive human interface and operating environment that takes only 15-30 minutes to learn.

And unique field-oriented software that comes in rugged plug-in capsules.

In short, give them the Gavilan™ mobile computer.



PORTABLE TURNED PRACTICAL.

Never has there been a complete business computer system as sophisticated, yet as lightweight, as the Gavilan.

Self-contained, rechargeable 8-hour batteries free the user from external power constraints.

The 8 line X 80 character screen eliminates the need for an external monitor, although you can add one if you wish.

The full-size typewriter keyboard makes data entry as convenient as it is in desktop systems.

A built-in 3½" microfloppy disk drive and modem provide the capabilities of data handling and transmission where they never before existed.

And a 50 character per second printer gives the mobile professional in the field the immediacy of hard copy text, forms, charts, spreadsheets and graphics.

All in a compact 14 pound mobile office.

WE BUILT A MORE MOBILE MOUSE.

The success of any computer depends in part on the "friendliness" and accessibility of the user interface.

Especially in the field.

A standard mouse interface is fine for the expanse of a desktop, but not for work on the move.

So with the Gavilan, we incorporated a built-in touch panel: the first fully integrated computer mouse.

It's a pressure-sensitive pad just above the keyboard. Finger movements across the touch panel control the on-screen movements of a cursor.

But like a mouse, the Gavilan touch panel actually executes virtually all of the user commands, saving the keyboard for typing only.

Through the touch panel, users store and retrieve data. Cut and paste. Move documents. Scroll through pages of information. Zoom out for a complete look at the format of a document. Or even ask the computer what just happened and what to do next. With one finger.

SOFTWARE IN A CAPSULE.

The intuitive ease of talking to the computer through the touch panel is made possible by the unique Gavilan operating environment and software packages.

The applications packages come in durable capsules called CapsuleWare.™ They plug directly into the body of the computer, adding no additional volume. The operating software, (GO System™) then lets each of the applications communicate with each other through a common interface and a sharing of data.

The result is a completely integrated information environment that lets the user combine spreadsheets, graphics and word processing text together.

All in the same uninterrupted user mode.

OUTWARD MOBILITY FOR USERS, UPWARD MOBILITY FOR OEMs.

The Gavilan mobile computer and its CapsuleWare programs are creating vertical market demands—both in MS/DOS and the Gavilan operating environment—for software packages completely unrealized one short year ago.

That means new opportunities in applications development far beyond the typical office-bound programs. From air and sea navigation to banking services. Journalism to field auditing. Anthropology to insurance.

And that means you've got the chance to be first in your chosen field.

A position we strongly advocate.

Gavilan Computer Corp.
P.O. Box 5004
Campbell, CA USA 95008
(408) 379-8000
Telex 4991278 GVLN US

Gavilan

Gavilan, CapsuleWare and GO System are trademarks of Gavilan Computer Corporation. MS/DOS is a trademark of Microsoft Corporation.

The term "nominal cost" is also defined: "realistically only the cost of preparing and distributing the publication and not the intrinsic value of the technical data. If the cost is such as to prevent the technical data from being generally available to the public, the . . . [GTDA] would not be applicable."

A safe bet would be that only public domain software could be exported under the GTDA. Software that the seller purports to license only would not be included. Software that qualifies for the GTDA may be exported to any country.

If the software does not qualify for GTDA, then the more restrictive GTDR applies. To use a GTDR, the exporter must receive a written letter of assurance from the foreign importer and/or distributor that the software will not be re-exported to another country. This assurance should be on the importer's letterhead and state that neither the technical data nor its direct product will be shipped either directly or indirectly to any country listed in Groups Q, S, W, Y, Z or Afghanistan.

Regardless of the importer statements, an exporter has a duty not to export if it has reason to believe the software would be re-exported. The more sensitive the software that is involved, the more diligence required.

Warning: All technical data, even that which qualifies for a GTDA, exported to Libya, Cuba, Vietnam and Kampuchea and most technical data exported to country groups Q, W, Y and Afghanistan, requires a validated license.

If an exporter is sending magnetic media to country groups T, V and Canada, he only needs to obtain a validated license if the shipment is worth more than $1,000. For values less than $1,000, he may mark the package "GLV" (General Limited Value).

Export declaration

Besides the export license, the exporter must file a shipper's export declaration (SED) at the place of export (or with the postmaster, if mailed) if the value is more than $500. The declaration must contain the official symbol for the license used, descriptive information on the type of goods being shipped and the Commodity Control Number if the goods are on the CCL.

Warning: Even though the declaration is only required when the value is more than $500, there is a question whether it applies to the value of blank media or the value of the recorded software. As discretion is the better side of valor, file a declaration whenever the value of the licensed software exceeds $500.

If a shipment is exported without the proper license or later diverted to a nonapproved destination, severe penalties can be applied. Civil penalties of up to $10,000 may be imposed administratively (that is, without a trial, judge or jury) for each violation, along with prohibiting either the U.S. or foreign party from exporting any goods from the U.S. for a specified time. Future licensing can be conditioned upon 1) payment of the fine or 2) posting a bond to cover the fine while the exporter litigates it.

Criminal penalties for knowingly violating the act can range up to five years in jail and a $50,000 fine (or five times the value of the goods, whichever is greater).

If technical data or restricted commodities are exported to countries in groups Q, S, W, Y, Z or Afghanistan, and they have military or cryptographic capabilities (I have seen commercial micro software which I feel would apply), the exporter can go to jail for 10 years and be fined up to $1 million.

Filing a false declaration also violates the False Statement Act. Such a violation is criminally punishable by a fine of up to $10,000 and imprisonment of up to five years.

Finally, any commodity and technical data shipped in violation of the EAA can be seized and declared forfeited. The government can auction the confiscated material to the highest bidder.

Anti-boycott legislation

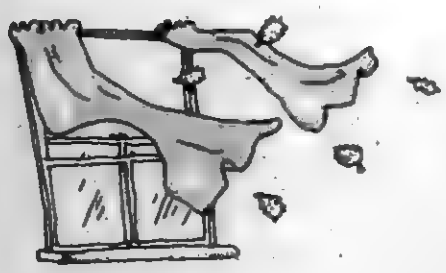
Historically, the U.S. opposes restrictive trade practices or boycotts imposed by one foreign country against other countries considered friendly to the U.S.

The EAA codifies this opposition. U.S. corporations

A few graphic words from our InterTest™ users:

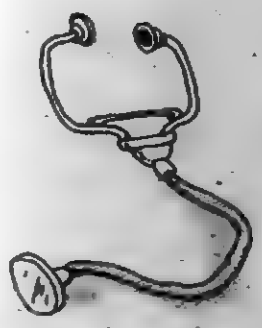
"Testing without InterTest is like climbing a mountain without a rope."

Arthur R. Conrad,
Technical Services,
The Home Insurance Co.



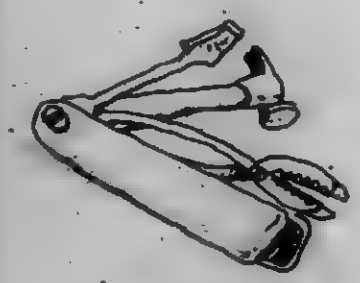
"Makes CICS debugging a breeze."

Neil A. Wells,
Manager Systems & Programming,
Top Value Enterprises.



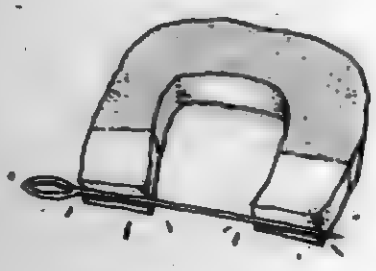
"It provides an invaluable diagnostic capability."

Alan F. James,
Systems Analyst/Systems,
First Security Bank Of Utah.



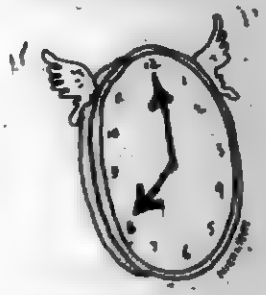
"Best tool on market to help CICS program development."

Joseph C. Chan,
Senior Project Leader,
Briggs-Weaver.



"Unmatched for finding a needle in a haystack."

Charles C. Allen,
Manager, Computer Operations,
Carborundum Co.



"Greatly speeded the debugging process up."

Robert W. Belden,
Technical Support Programmer,
R.I. Hospital Trust National Bank.

A survey was recently sent to the users of InterTest software, the industry standard for CICS testing and debugging. As you can see, the comments speak for themselves.

Call today for more information or a copy of the survey results controlled, compiled and tabulated by one of the nation's leading public accounting firms. InterTest works hard for its 1,400 users. And On-Line Software International can prove it.

InterTest from
ON-LINE SOFTWARE INTERNATIONAL
Two Executive Drive, Fort Lee, NJ 07024, (201) 592-0000 Toll Free (800) 526-0272

dealing in foreign trade have an obligation to comply with the law and report the boycott request to the Commerce Department. The law specifically prohibits U.S. citizens or corporations from:

- Refusing to do business with any blacklisted firm or boycotted country that is deemed friendly to the U.S.
- Discriminating against any U.S. citizen on the basis of race, religion, sex or national origin in order to comply with a foreign boycott.
- Furnishing information about their business relationship with boycotted countries or blacklisted companies.

Violation of the boycott provisions brings civil penalties of up to $10,000 per violation and suspension of export privileges. Criminal penalties include fines of up to $50,000 and imprisonment.

Need for local counsel

Before signing any contract with a business located in a foreign country (including Canada), an exporter should seek competent advice from an attorney in that country. What may be a general rule of business in the U.S. can violate the law elsewhere. Do not let your American counsel convince you that it can provide worldwide legal advice.

Example: In 1982, Mexico amended its Law on the Control and Regulation of the Transfer of Technology and the Use and Exploitation of Patents and Trademarks to include software specifically. Any license agreement not registered with the state is unenforceable and the parties are subject to a large fine. Among the reasons provided by the law for refusing to accept registrations are:

1. Excessive royalties (more than 3% to 4% of the net sales).
2. Any clause requiring return of the knowledge at the end of the license and cessation of use of the technology.
3. Excessive term — any clause that requires the licensee to maintain confidentiality after the expiration of the agreement violates this prohibition.
4. Any clause prohibiting the Mexican licensee from exporting its product.
5. Any clause subjecting the contract to non-Mexican law or a non-Mexican court.

Before signing any contract with a business located in a foreign country (including Canada), an exporter should seek competent advice from an attorney in that country.

It is very possible that once the license expires, the licensee may have an unrestricted world use to market the product.

Example: Assume you license a Mexican licensee to produce a Spanish version of Mathcalc. At the end of 10 years, the Mexican licensee could lawfully sell the program worldwide under the Mathcalc name. The fact that the version sold is not the current version will do you, the owner, more harm than the former Mexican licensee.

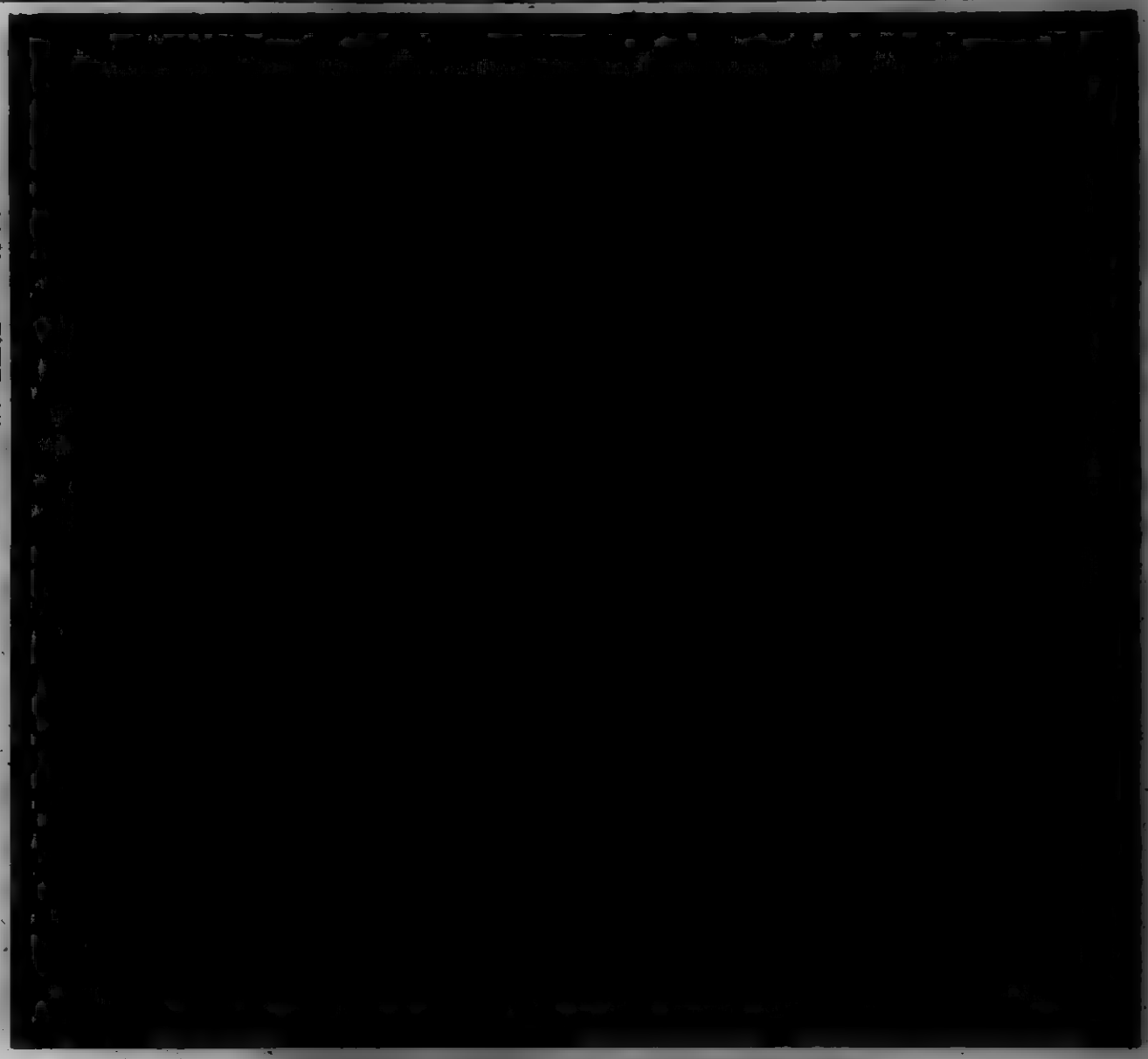
To find the names of foreign attorneys, contact either the American embassy in that country or the country's embassy in Washington, D.C. You can also find many names in the *Martindale Hubble Law Directory*, a multivolume set published each year. It lists every American attorney and many foreign attorneys and can be found in most law libraries or court houses.

Warning: In the nondemocratic countries, justice is often arbitrary. Getting contract enforcement against a prominent official (or a relative) can be an exercise in futility. Delays of five to 10 years are not uncommon.

Import Duties

Import duties differ from country to country. You can obtain current information from the country's embassy or consulate. Find out how software is classified in that country. Find out if the duty is levied on the actual selling price, manufacturing cost or replacement value.

Consider setting up "software libraries" abroad where your software can be duplicated. For example, setting up such a library in the European Economic Community can save considerable import duties in all the EEC countries.



MULTIPLE CHOICE: The UDS Modem Family

SPEED RANGE (bps)	DIAL-UP NETWORK MODEL	DIAL-UP NETWORK PRICE	PRIVATE LINE MODEL	PRIVATE LINE PRICE	LINE POWERED MODEL	LINE POWERED PRICE
0–300	103J*	$425			103 LP O/A 103J LP*	$145 $195
0–1200	202S*	$475			202 LP 202S LP*	$195 $245
0–1200			202T	$435		
1200/600	212A* 212A/D	$595 $645			212 LP**	$445
2400	201C*	$775	201B	$695		
4800	208A/B*	$1750	208A/B	$1750		
9600	9600A/B*	$3600	9600 9600A/B	$3600 $3650		

*Auto-answer **1200 bps only Single unit prices.

At speeds through 4800 bps, UDS modems are Bell-compatible and FCC certified for direct connection to the PSTN. The Model 9600 conforms to CCITT V.29 standards. All models are available as OEM boards and in multi-channel packages for central site applications.

For details and quantity quotation, contact Universal Data Systems, 5000 Bradford Drive, Huntsville, Alabama 35805-1993. Telephone 205/837-8100; TWX 810-726-2100.

Universal Data Systems

MOTOROLA INC. Information Systems Group

UDS modems are offered nationally by leading distributors. Call the nearest UDS office for distributor listings in your area.

DISTRICT OFFICES: Old Bridge, NJ, 201/251-6600 • Blue Bell, PA 215/643-3330 • Atlanta, 404/955-2715 • Shaumburg, IL, 312/885-6160 • Columbus, OH, 614/885-3325 • Boston, 617/875-8900 • Richardson, TX, 214/690-0022 • Englewood, CO, 303/694-6540 • Houston, 713/988-8600 • Tustin, CA, 714/669-8001 • Mountain View, CA, 415/969-3320 • Silver Spring, MD, 301/587-6160 • Huntsville, AL, 205/837-8100

Created by Damon/Hall, Inc., Winter Park, Florida

Account Balances of all Washington Banks
SOURCE: Washington Statistical Review
COMMERCIAL PEAKSHIFT PROJECT
FOR THE MONTH OF AUGUST
Source: San Diego Gas & Electric
Load Management Program
RESIDENTIAL PEAKSHIFT PROJECT
FOR THE MONTH OF AUGUST
Source: San Diego Gas & Electric
Load Management Program

SAS/GRAPH, Tektronix 4105 and 4695...

Your Low-Cost Graphics Solution

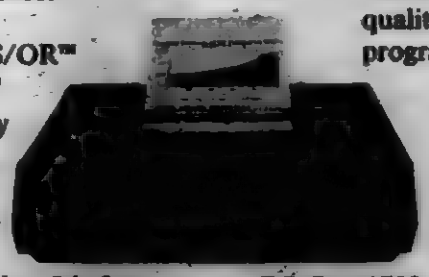
Since its beginnings, SAS Institute Inc. has provided you a "state of the art" software system. Now the Institute and Tektronix, Inc. give you a low-cost graphics solution—SAS/GRAPH,™ the Tektronix 4105 and 4695.

With SAS/GRAPH, you can produce sophisticated charts, plots, maps and three-dimensional displays with just a few simple statements. SAS/GRAPH can help you analyze data and results, and discover trends. Then you can add colors, titles, footnotes, company logos and other information to present your results to others.

What's more, SAS/GRAPH is integrated with the SAS System, so you can:

- use the data management, statistical analysis and report writing tools in SAS®
- enhance your forecasts and financial reports produced with SAS/ETS™
- clarify your data entry, editing and spreadsheet applications in SAS/FSP™
- graph planning schedules produced in SAS/OR™
- display data accessed with SAS/IMS-DL/I™

SAS/GRAPH lets you preview your display on one device, then replay it on another without re-analyzing your facts and figures. The new Tektronix 4105 Computer Display Terminal gives you the perfect tool for previewing your display. It's fast, easy to use and reliable. A "joy disk" built into the keyboard of the Tek 4105 allows you to move the cursor easily. You can communicate with the host system without interfering with the display on your screen. A special option lets you position the display at or near your eye level or tilt the display up or down, right or left.



At $3995, the Tek 4105 puts high-quality, color graphics at your fingertips.

When you're ready to print your display, push a button on the Tek 4105 keyboard. Hard copy is quickly produced on the new Tektronix 4695 Color Graphics Copier. You can use roll or sheet paper, or make transparencies. It's your's for just $1595.

In VAX™ environments, SAS/GRAPH and Tektronix communicate via asynchronous ASCII protocol. In IBM environments, the new Tektronix 4970 SNA/SDLC Cluster Controller allows for easy host interfacing of up to four graphics devices.

SAS/GRAPH, the Tektronix 4105 and 4695—high-quality graphics for less than the cost of a new programmer.

To learn more about SAS/GRAPH, call or write SAS Institute Inc., Box 8000, SAS Circle, Cary, NC 27511-8000. Telephone (919) 467-8000. Telex 802505.

For information on the Tek 4105 and 4695, call or write Tektronix, Inc., PO Box 1700, Portland, OR 97208. Telephone (800) 547-1512. In Oregon: (800) 452-1877. Telex 910-467-8708.

SAS saves time.

SAS is the registered trademark of SAS Institute Inc., Cary, NC, USA. SAS/GRAPH, SAS/ETS, SAS/FSP, SAS/OR and SAS/IMS-DL/I are trademarks of SAS Institute Inc.
VAX is the trademark of Digital Equipment Corporation.
Copyright © 1983 by SAS Institute Inc.

The long arm of the law

The far-reaching effect of the anti-boycott legislation is shown by the unusual experience of Rep. Stewart McKinney [R-Conn.]. The Commerce Department recently accused McKinney of supplying information to the government of Kuwait in violation of the EAA. The anti-boycott portion of that act prohibits U.S. citizens from aiding the Arab boycott of businesses linked to Israel. Specifically, it bars any communication about the boycott.

McKinney wrote a letter on behalf of Connecticut-based Perkin-Elmer Corp., which had sought his aid in trying to clear up a problem of miscommunication. Perkin-Elmer, apparently, was losing Kuwaiti business because a subsidiary had the same name as a different company in Greece that had ties to Israel.

McKinney claims a Commerce official approved his letter.

Warning: A lot depends on the custom agent who examines the imported goods. It is not unusual for one agent to levy a duty based on one valuation and another agent to levy another duty.

Example: Via mail, you exported two identical software packages to Australia. The first package is taxed at the value of the software (for example, 200 copies at $200), while the second is taxed at the value of the diskette (200 copies at $4).

Most exporters will find it advisable to hire a customs broker. For a fee, the broker will handle the paperwork and make any other arrangements for custom clearances.

Warning: To avoid financial surprises, require any foreign licensee to bear the cost of any import duties as well as local taxes. (Be warned that some countries state such obligation clauses unenforceable.)

Other considerations

Many countries restrict exportation of profits. These restrictions generally fall into two main types: currency control and restrictions on technology license.

Earning a large royalty income does no good if you cannot remove the income from the country. What good is earning 10,000 Polish zlotys if you cannot exchange the money for another currency and you cannot export the zlotys out of Poland?

Many countries (including Western ones such as France, Italy and Japan) have at one time or another imposed currency controls. Give some consideration as to what you will do if the foreign country restricts your rights to export profits. Is there some other purpose to which you can put the income (perhaps use the money to buy local goods to import into the U.S.)?

You may also find that there are dual levels of exchange ("official" and the "free market") or that the government requires advance notice to export the money.

Restrictions on technological licensing: Most countries either restrict the amount of technology royalty payments (5% — 10% maximum) or require the royalty arrangement to be registered with the government (Spain and Portugal, for example).

Failure to register means no royalty income can be exported.

You can get around these requirements by either requiring payment in full before shipment or requiring royalty payment be by an irrevocable letter of credit issued through an American bank.

Price Waterhouse & Co. and Ernst & Whinney, both large accounting firms, publish annual surveys of foreign exchange information.

Devaluation, revaluation

Protect yourself contractually against currency devaluation (instead of U.S. $2 = £1.00, U.S. $1 = £1.00) or revaluation (instead of U.S. $2 = £1.00, U.S. $4 = £1.00). Failure to do so can cause havoc when the change in valuation occurs.

Example: On Dec. 1, 1983, U.S. $2 = £1.00. You agree to accept a royalty payment of £10 per copy (U.S. $20). Six months later, Britain devaluates its currency and U.S. $1 = £1.00. Your royalty payment is now equal to U.S. $10.

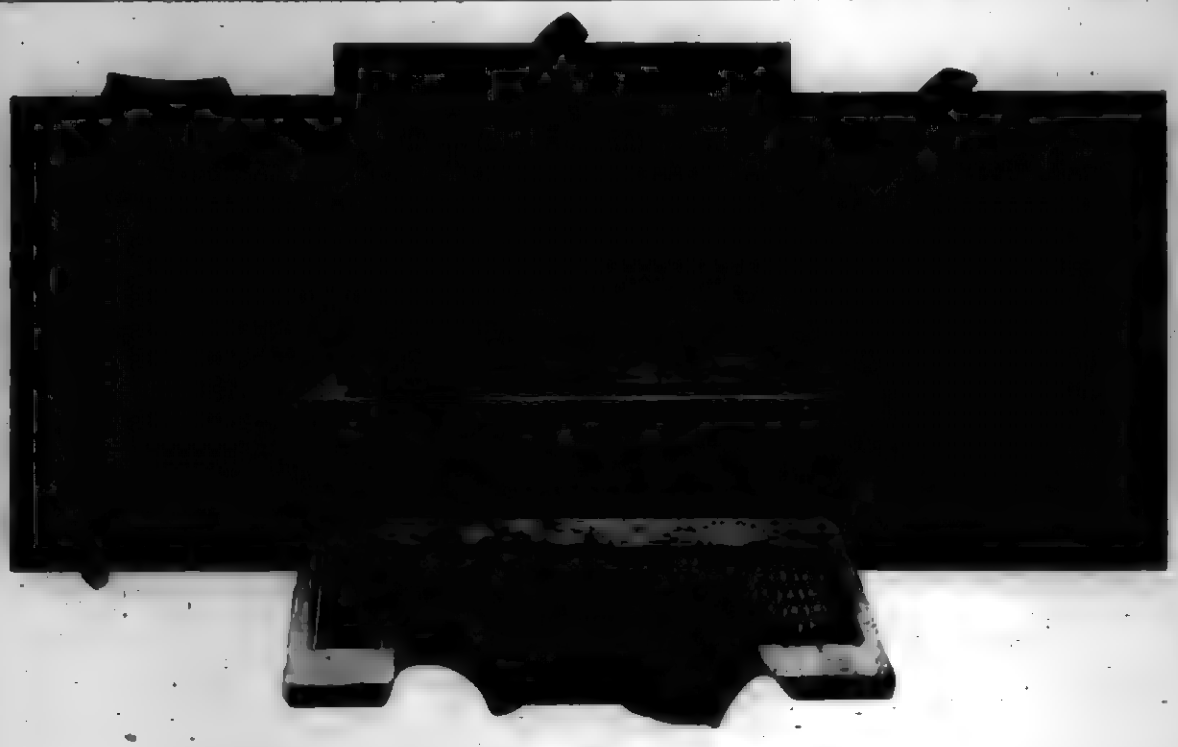
You can get around this problem by making adjustments in the royalty in the event of a change in valuation or by stating the royalty shall be paid in a stable currency (for example, the U.S. dollar or Swiss franc).

Setting up distributorship

Many countries, especially in South America, have enacted contract termination statutes that unilaterally penalize a foreign principal/licenser from terminating the business relationship without incurring a severe penalty. They assume the local agent has a proprietary interest in the local market it developed and the good will it established in the product.

Unless the relationship is terminated for good cause, the agent is entitled to monetary compensation for his interest. The general characteristics of these laws are as follows:

1. Restrict termination for anything but "just cause." Some statutes define what "just cause" consists of.
2. Prohibit any contract language from waiving the compensation and other rights granted the agent by statute.
3. Prohibit the contract from stating which country's law shall apply.



SALVO Shatters
The Information Barrier!

At last. Create your own applications in a fraction of the time compared to BASIC, COBOL or *any* data base language. You know exactly what you want. Now, let your personal computer generate that information by using SALVO, the fourth generation information manager from Software Automation, Inc. It's Better. Faster. And Easier to use.

Natural Language Interpreter. Unique to SALVO, this allows you to enter the following type command, "List my customers and their orders." Watch as SALVO generates the application. *It truly shatters the information barrier.* In minutes you get what you want, the way you want it. Inventory, Accounting, Mailing Lists, Sales Reports and more.

Fourth Generation Language. SALVO is a powerful nonprogrammer's language combined with a true relational DBMS. This method increases your productivity 10 to 20 times normal! People in all professions can benefit from SALVO. Regardless of their level of expertise.

Applications Development Package. SALVO is a complete tool for information management. Develop your own applications. Maintain your data base. Retrieve information using natural language. All of these functions can be performed *by nonprogrammers.* SALVO is also a complete application generator for advanced users and professional programmers. SALVO's secret is simple. Technological innovations including artificial intelligence (expert systems, natural language processors) combined with relational data structures.

SALVO runs on most personal computers. Compatible with MS-DOS, PC-DOS and CP/M. SALVO requires only 64K memory. SALVO is available at your local computer store or you may contact us for information on how to get your own personal preview copy.

Software Automation Inc

14333 Proton Road, Dallas, Texas 75234
(214) 392-2602

Advertising Created By The Bloom Agency, Inc.
Dallas, Texas

"Thank You to the 1,273 DP Professionals Who Attended Teradata Technical Overviews on Data Base Computing."

Dr. Jack E. Shemer
President and Chief Executive Officer

"Your enthusiastic response to our company and the DBC/1012 Data Base Computer System™ is greatly appreciated. We hope we helped to illuminate and direct the path of progress for your organization. The partner of progress is change; and in the spirit of our Partner Program, we look forward to working with each of you to make large-scale, relational data base computing possible."

Teradata™

Teradata Corporation
12945 Jefferson Boulevard
Los Angeles, CA 90066
(213) 827-8777

Regional Offices: Cincinnati • Dallas • New York • San Francisco

4. Require that the agent be given sufficient advance notice of termination.

5. Allow the agent to contest the termination by submitting the controversy to arbitration.

6. Allowing the agent to continue the relationship beyond the termination date built into the agreement.

Sources of information

Always know with whom you are dealing. The U.S. Foreign Service maintains a World Trader's Data Report (WTDR). This trade profile, which contains detailed information on individual foreign firms, is available from the U.S. Department of Commerce, Office of Export Marketing Assistance, Room 1033, Washington, D.C. 20230. You must provide the firm's complete name and address (preferably on Form ITA-431, obtainable from the above address). There is a charge of $75 for each WTDR ordered.

Typical information includes type of organization, number of employees, method of operation, general reputation in trade and financial circles and names of the firm's trading connections.

The Office of Trade Information Services (Otis) publishes lists on selected countries and industries for the purpose of assisting U.S. exporters.

The lists contain the names, addresses and other business information about foreign trade agents, distributors, manufacturers, retailers and so on. Lists include telecommunications equipment, electronic components and computers and peripherals. Current information and prices for each list may be obtained from the U.S. Department of Commerce, Office of Trade Information Services, P.O. Box 14207, Washington, D.C. 20044.

Many foreign countries (for example, Japan, Mexico, Portugal and Spain) require the registration and approval of licensing agreements. Some countries can require changes in the substance of the agreement.

Unless a double taxation treaty eliminates the requirement, all countries will require a local licensee to withhold tax on any royalty payment made to a noncitizen. This tax can be as high as 50%. You also owe U.S. income tax on the royalty. With a double taxation treaty, you are allowed to take a credit on your American taxes in the amount of the foreign taxes paid, thus avoiding double taxation. Do not be surprised if a large percentage is withheld by the licensee as payment on local taxes. If your licensee does withhold taxes, get contractual requirements that it provide evidence that it paid the tax.

Protection of ideas

American patents and trademarks have no legality outside of the U.S.

Example: The European Patent Convention, Article 52.2.c, specifically excludes "schemes, rules and methods for performing mental acts . . . and programs for computers" from patentability.

The problem is even more confusing with trademarks. The U.S. is a party to a number of trademark treaties. Under them, an American trademark owner has a set length of time (usually one year or less) to secure priority of the trademark in a foreign country.

Failure to register and secure your right within the priority period means the first person to apply and secure registration becomes the lawful owner.

Warning: In some countries (for example, France), the first applicant is entitled to register and protect the mark. If you later decide to market your program in that market, you will find yourself being "blackmailed" to doing business on the owner's terms or picking a new trademark for that market.

Copyright protection

The U.S. has ratified the 1952 and 1971 Universal Copyright Conventions.

Each signatory agrees that it shall give the same protection to works of foreigners as their own citizens provided that since first publication, each copy of the copyrighted material contains the copyright "©" symbol along with the name of the copyright owner and the year of first publication.

Warning: Notwithstanding the Universal Copyright Convention, each country can determine what is copyrightable. Recent court decisions have upheld software copyrightability in the Federal Republic of Germany, while denying it in Australia.

As of 1982, only Bulgaria explicitly stated computer programs were copyrightable. In the rest of the world, the question is still open.

Always clearly state the life of the agreement (between one and five years is reasonable), under what circumstances it can be terminated early (for example, by bankruptcy of the licensee) and the rights of each party at agreement's end.

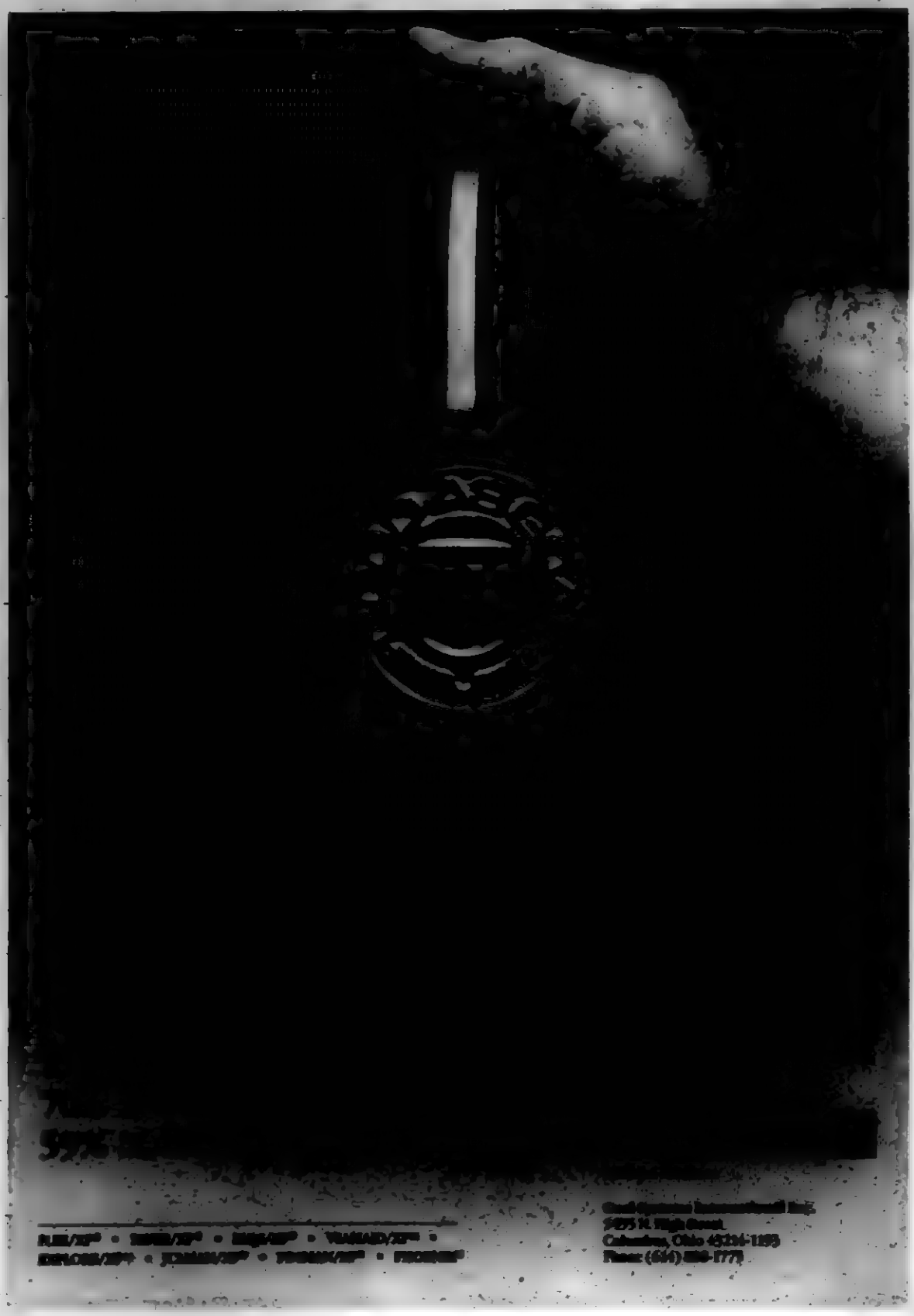
Finally, when dealing with a non-English speaking country, provide that the English version of the contract will control over the non-English version.

About the author

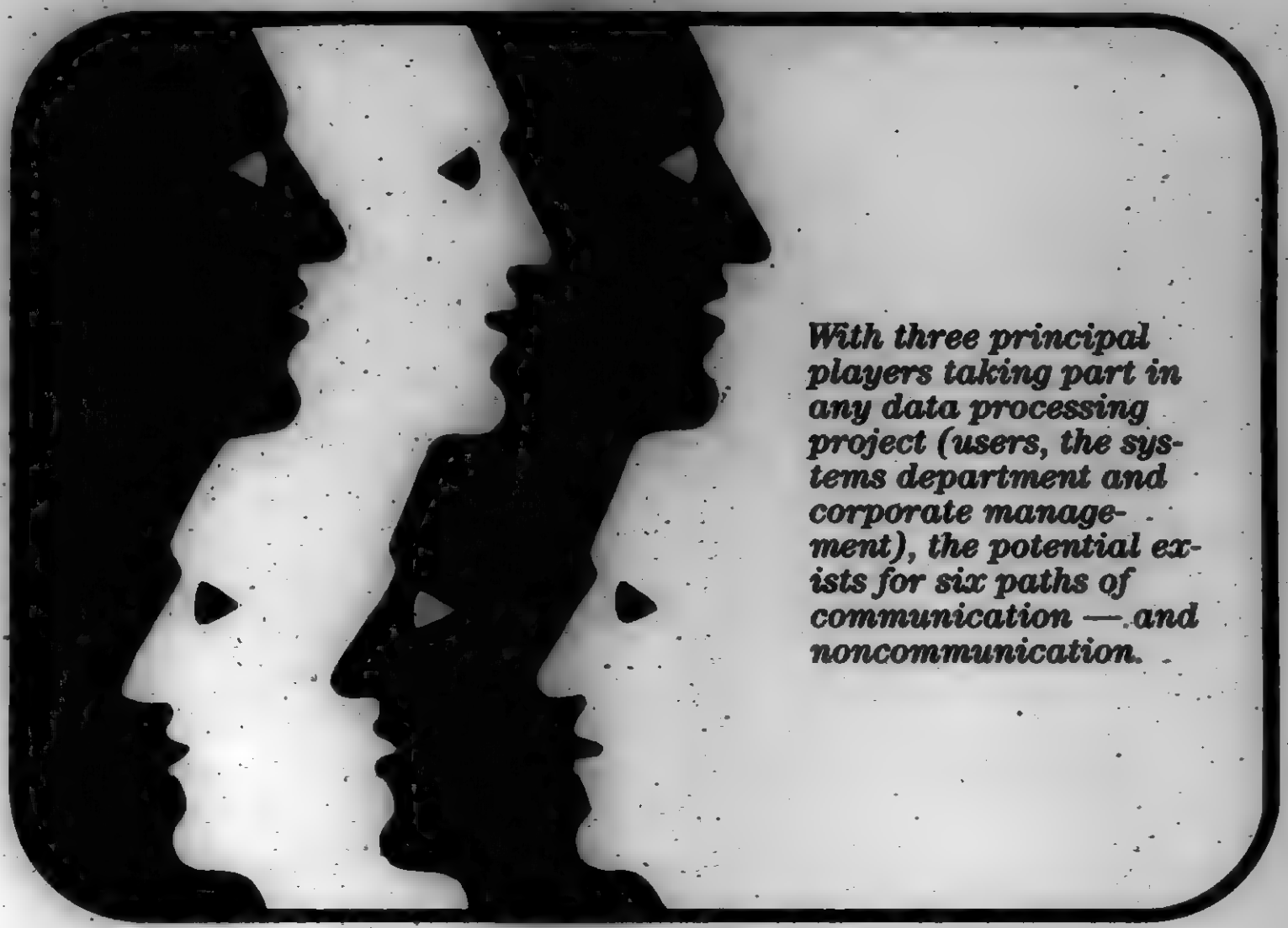
L.J. Kutten, an attorney living in La Jolla, Calif., is a member of the Missouri and Illinois bars.

A specialist in nonpatent computer law, he wrote Computer Buyer's Protection Guide, *published by Prentice-Hall, Inc.*

Kutten is currently working on a book called The Law and Software, *to be published by Prentice-Hall next fall. The book will also cover the subject of software exports.*



IN DEPTH



With three principal players taking part in any data processing project (users, the systems department and corporate management), the potential exists for six paths of communication — and noncommunication.

Static communication

By Michael Martin

The breakdown in communication during any data processing project can be traced to one or more of the three principal players: users who are asking for a particular system or service to be delivered; the systems department (either internal or external) that is charged with providing this new system or service; and the company management group that guides and approves the development/implementation of the system or service.

Between any of the three players — user, systems department and management — there are six possible directional paths for communication. Often, some of these communication paths do not exist at all; some that do exist are inadequate.

Progress toward reducing the communication problem has not kept pace with the dramatic improvements in data processing technology. The problems encountered in the mid-1960s were excused with such justifications as:

"Well, it's a new technology."

"There aren't many people out there, especially on the users' side, who understand what makes this all go."

"The vocabulary isn't intended for non-DP professionals."

Yesterday's problems today

Over time, some of the vocabulary and technology have become more comprehensible by more users — consider the proliferation of the buzzword "user-friendly," for instance. But the problems in communication have not gone away. There are still large numbers of projects that fall far short of original expectations, are seriously delayed or are abandoned altogether because of bad communication.

Sound transmitted over a long distance loses the quality and strength of its signal. The same is true of the communication process. If you go too long without reinforcing the signal, the message becomes misunderstood and eventually lost.

In a successful communication, the sender and the receiver frequently reverse roles, a bidirectional process. One classic, recurring problem between users and DPers is that one party tends to

DP projects often fall short of expectations or are delayed and even abandoned because of miscommunication or noncommunication. To clear up such problems, any organization can develop a long-range DP plan, create a corporate systems steering committee and proactively educate users, DP and management.

dictate to rather than communicate with the other.

In the systems development process, the use of formal methodologies often goes a long way in correcting some of the problems associated with the communication process. The most successful systems development methodologies share a number of common characteristics: They prescribe an iterative approach; they involve representatives from all participating groups and define their roles; they build on intermediate products and decisions; they establish standards for documentation; and they strongly encourage project management. In short, they all facilitate communication.

A word of caution: If a methodology is not understood or followed, the project may fail. One company adopted a nationally known systems development methodology that the users did not understand but the DP people believed they did. During development, the DP department prepared massive amounts of highly technical documentation based on the methodology. The documentation was presented to the users for review and correction and ultimately for approval.

Without user approval, the DP department could not proceed with the development according to the methodology, and the users would not get their system. Thus, the users were confronted with an interesting dilemma: approve something they could not understand and take a chance the outcome would be satisfactory (a 50% chance of failure) or not approve the documentation and stop the project (a certain failure).

One can imagine the decision they made and the eventual results. The DP department played by the rules, obtained user sign-offs and proceeded. Later, the department was surprised and angry when the delivered product was judged inadequate.

Each systems development methodology step refines the products of prior steps until the user ends up with the desired working system. It is crucial to the eventual success of the project that the steps in the systems development methodology produce tangible products, such as formal documentation. While written documentation is not foolproof, it has a better chance of limiting miscommunication than does verbal communication.

What we are talking about here is not only applicable to DP but to any group that must communicate with another group within an organization. In a manufacturing environment, for instance, there is the complaint that the sales force is out selling things that have not yet been designed and priced.

Commitments relative to size, style and delivery dates are made, but manufacturing is not taken into account until it is too late. Often, antagonism develops between the departments, which can result in a dissatisfied customer and a lost sale.

Drawbacks to process

There are drawbacks to the documentation process. Earlier, the example of the documentation that was too technical in nature to be understood by the users was noted. Another documentation problem occurs when the documentation is written by a select few. If the users produce it all, problems will arise with the DP people; if the DP people produce it all, the users will have significant problems in utilizing what has been created.

Another impediment to communication is the "language barrier." For years it has been taken for granted that each area within an organization has its own vocabulary and buzzwords. DP is no exception. Often the use of such specialized terminology finds its way into the documentation process. Using a systems development process with a number of product-oriented steps, those having to sign off on documentation have more

HOW CAN ANYONE BE PRODUCTIVE FOR EIGHT HOURS IF THEY LOOK LIKE THIS AFTER FOUR?

For most people, computers have become a way of life. Unfortunately, if the computer is poorly designed, it can mean a life of bleary eyes, stiff backs, and headaches.

At Burroughs, we've been doing something about these problems—by continuing to study the effects computers have on the people who use them. This is referred to as the science of ergonomics.

And out of this science we've developed a full line of ergonomic terminals and workstations, including the Burroughs ET1000 and 2000.

We found, for example, that small computer screens with poor lighting often cause strained eyes and throbbing heads. So we designed a large, adjustable, 14-inch non-glare screen with high character resolution for sharp, precise images that are easy to read.

We found that it's a lot easier for people to tilt a keyboard than it is to tilt their backs. That's why our ET series comes with a low profile, detachable keyboard that adjusts to three different heights.

We've even gone so far as to make an adjustment for something as small (but annoying) as a key click.

Of course, this sort of attention to detail is exactly why Burroughs continues to remain a leader in the computer industry.

You see, the real measure of a computer company isn't only how well their computers work. But how well a person works with their computer.

For details call 1-800-621-2020.

Burroughs

THE QUESTION ISN'T WHO'S BIGGER. IT'S WHO'S BETTER.

CICS

IPCP opens and closes CICS files using batch JCL.
✓many other CSMT/CEMT functions
✓eliminate PAUSE statements
✓free 30-day trial period
✓$1250 one-time or $63 month

sds
A Division of J.W. Lampi, Inc.
8401 University Avenue N.E., Suite 308
Minneapolis, MN 55432
(612) 571-9000

opportunities to identify potential problems and ask for clarifications.

This type of communication reinforcement can be termed "creeping commitment." Here, a project team goes along and commits to what has been developed and documented to date. The project then goes a little further along, and a new commitment is made; it goes a little further and is approved again by the team. In this way, everyone involved knows exactly where the project stands and what is to be accomplished next.

The outcome at the end of this process should not be a surprise for anyone because he has participated in every logical component as it developed.

ABC and OEM

To punctuate the horrors that could arise from developing a product by this latter method, an example is appropriate. A certain company (ABC, Inc.) wished to have a computer system installed that would provide users and management with necessary data to improve its business operations. It contracted with an OEM firm (OEM, Inc.) to provide the computer system. ABC decided to show OEM a computer system that operated the way it wanted its system to operate and took OEM to visit a company that had such a system.

This system, according to ABC, would meet its needs. The comment by ABC to OEM was, "We want a system like that." ABC management then took OEM personnel around its own facility, notes were taken, and OEM went away to develop the desired computer system.

Several months later, OEM delivered a computer system that ABC would not accept. ABC's comment was: "That's not what we wanted." OEM's reply: "But that's what you showed us." After some lengthy negotiations, OEM reconfigured the system. Again, ABC management was not totally satisfied with the final product. Since OEM felt it had gone above and beyond its obligations, it termed the contract "fulfilled."

The outcome was an inefficient end product just sitting around on ABC's premises, a waste of effort on OEM's part, a waste of money on ABC's part and lawsuits for claims and damages initiated by both sides.

Clearing up communication

There are three significant steps that any organization can take to clear up its existing and potential communication problems involving DP. The first is the development of an overall, long-range DP plan. Once developed, the plan needs to be distributed widely in the organization so that people will know what will happen, in what sequence and in what time frame. These plans need to be maintained continuously and regularly.

Along with the creation of the plan, an organization needs to have some type of corporate systems steering committee composed of the heads of the key user departments, the data processing group and senior organization managers. The committee is charged with the responsibility for a number of issues, such as establishing priorities, approving major expenditures, setting key policies and approving the allocation of resources. The committee should meet frequently and report its activities to the organization. When an important project is initiated, the work plan should include key output and decision points for committee review.

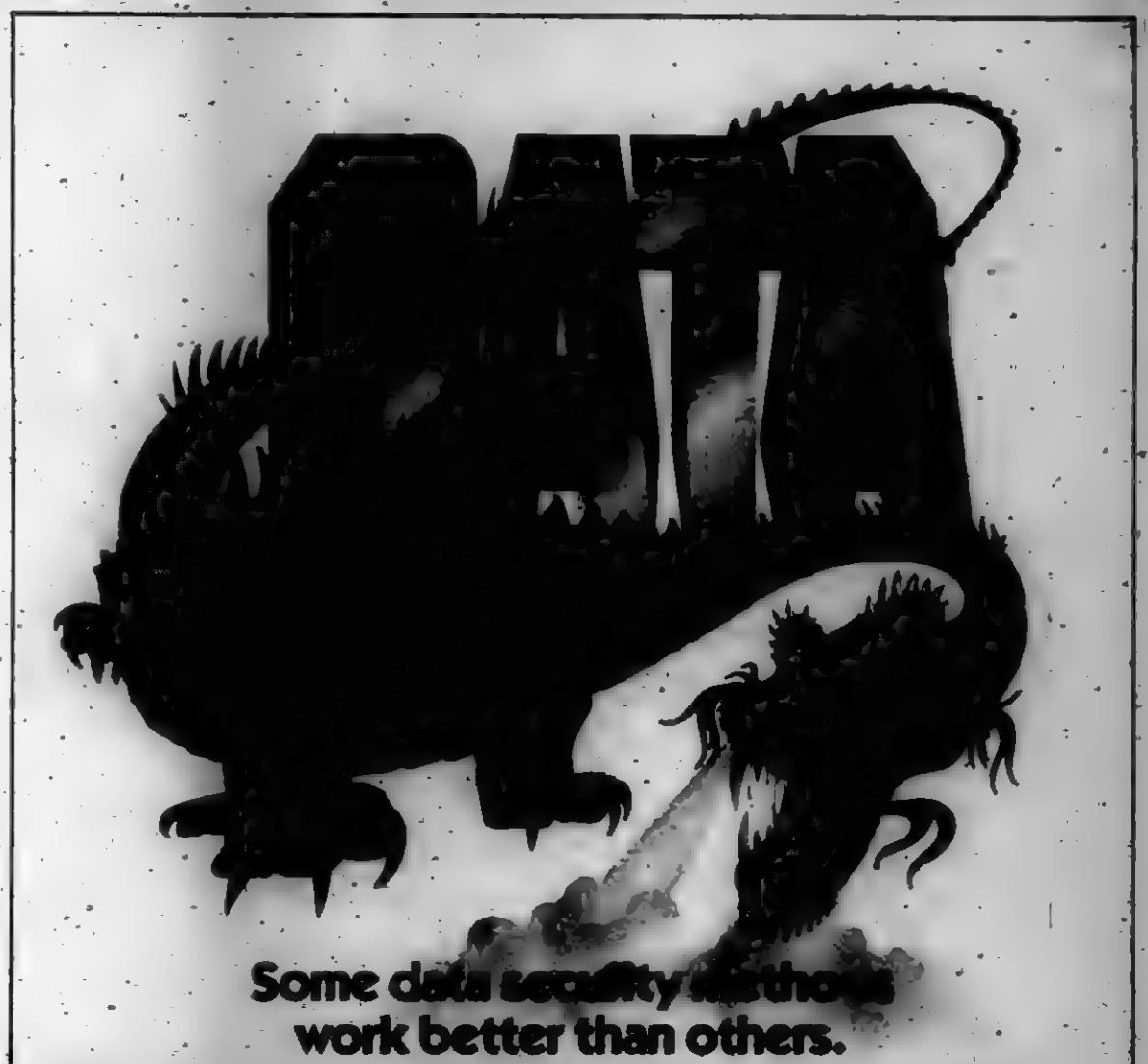
Several months later, OEM delivered a computer system that ABC would not accept. ABC's comment was: "That's not what we wanted." OEM's reply: "But that's what you showed us." After some lengthy negotiations, OEM reconfigured the system. Again, ABC management was not totally satisfied with the final product. Since OEM felt it had gone above and beyond its obligations, it termed its contract with ABC "fulfilled."

Recently, one major corporation added a new wrinkle to the committee system and has been quite successful in its approach. When a major new project is started, especially one that crosses several organizational lines, the project manager is selected by the steering group. In turn, the project manager reports back to the steering committee on a regular basis.

Since everyone on the steering committee represents a user area within the corporation, no user is ever surprised when changes are introduced or modifications made to the developing system.

The final major factor in clearing up communication problems is through a proactive type of educational process directed at users, DPers and management, primarily the first two.

Too often, there is a divergence in the underlying objectives between users and DPers. On the one hand, the users are trying very hard to get something that will help them perform better. Their instincts tell them to get the best possible product in a reasonable time frame.



TOP SECRET the state-of-the-art resource protection package for MVS works best of all.

TOP SECRET is data security at its best. Offering quick installation, phased implementation and comprehensive resource protection, TOP SECRET outdistances all other data security methods for total resource protection.

TOP SECRET immediately secures your most critical resources without impacting normal processing. Implement security with no delay and with absolutely no modifications to your operating system.

TOP SECRET is the only total resource protection package that offers comprehensive CICS security, including file and program control and protection down to the field level.

By using the Standard MVS Security Interface, TOP SECRET becomes an integral part of your operating system. Complete compatibility with all IBM and vendor products that use Standard Security is automatic and guaranteed, now and in the future.

TOP SECRET security comes with the same top-notch technical support that guarantees the quality and reliability of all CGA software products.

Protect your valuable data resources today. Join the MVS sites across the country that have considered every data security method and made the sure TOP SECRET choice.

Call for additional product information and your free trial.

800-237-2857

cga Software Products Group, Inc.

800-237-2857

CGA Software Products Group
P.O. Box CGA-1
Holmdel, NJ 07733

Given their preferred sequence, users are looking for product quality first and timing second.

DP, on the other hand, seems to have an almost infinite backlog of requests for work. While the department is not uninterested in quality, its instinct is to produce the best product possible within the time constraint placed upon it.

Therein lies the rub. Every time DP goes and talks to users, it is presented with a problem or a change or new demands. From the DPer's perspective, agreeing to the users' requests can create more work and upset the project's time schedule.

Of course, the user is merely making the system more useful and accurate. Given that the objectives of the two groups seem to be in conflict here, DP may avoid talking to users unless it is absolutely necessary.

Therein lies the rub. Every time someone from the data processing department goes and talks to users, he is presented with a problem or a change or new demands. From the DPer's perspective, agreeing to the users' requests can create more work and upset the project's time schedule. Of course, the user is merely making the system more useful and accurate. Given that the objectives of the two groups seem to be in conflict here, DP may avoid talking to users unless it is absolutely necessary.

An effective educational process will reinforce DP's role as a service function within the organization. Without users, the department has no reason to exist. It must learn more about the "business" of the business. And above all, it must improve its "people" skills, such as listening.

For their part, users must be made to understand what systems development is all about since most users tend to find the cycle confusing or incomprehensible. They should know more about the methodology and terminology used in the development process since they will increasingly play key roles during development. Finally, users must understand the consequences their demands place on DPers.

Users should come to realize that every modification to a developing system can affect the entire project. A knowledge of the consequences of a change permits a realistic appraisal of its value based on budget and calendar consequences.

Educating management

The management group also must be educated so that it understands exactly what is expected of it. Information is a corporate asset. Managers should control this asset as they would any other that affects the fortunes or failures of the corporation. In the hands of the wrong people or misused, information could inhibit the corporation's ability to be competitive and prosper. In the hands of the right people, this very same commodity could give the corporation the competitive edge it needs to excel.

It then becomes necessary to educate the management group. Management must be shown that its role is not one of a passive bystander in the process of systems development; its function is not merely to sign checks as the development process takes place. Rather, the prioritization process and approval process is a function that management must be made to understand and exercise.

Too often, management either abdicates its responsibilities to the users (the end product is intended for them) or to the DP department (which possesses the technical expertise). This attitude can only be changed through a strong education process.

Above all, education must be constantly reinforced. New players come in; old members are reassigned, promoted or retire; technology changes.

Solutions not spontaneous

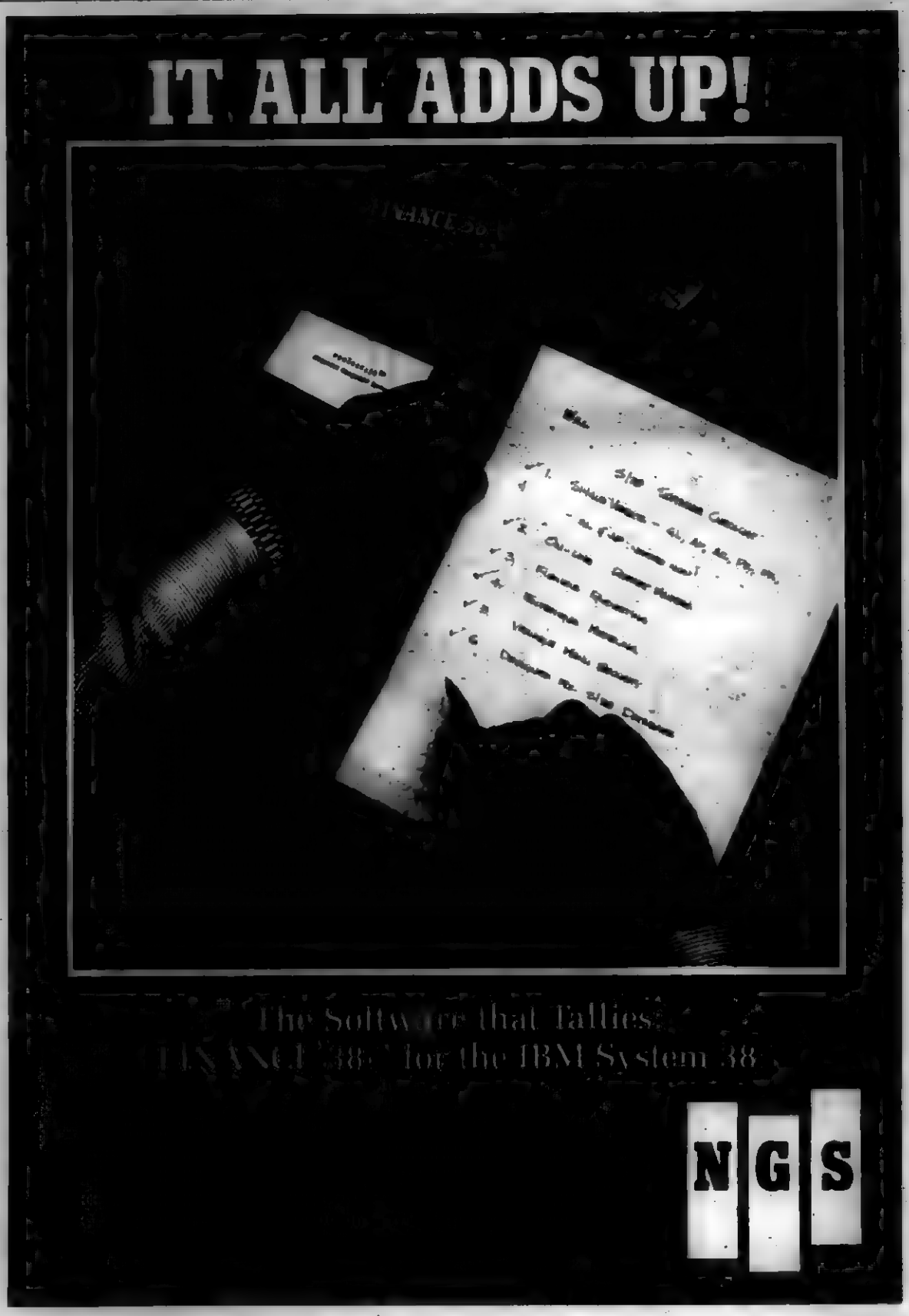
Although communication problems and horror stories abound, organizations do not have to settle for that kind of an outcome. It is not preordained that the communication problems outlined above await every new systems development project. The organizations that tend to be the best at resolving communication problems work at the problem constantly — the solutions are rarely spontaneous.

Such organizations recognize that a problem exists and go after it. They set into motion a proper organizational plan and education process, institute a proven methodology, appoint appropriate steering committees and bring on board people who understand that they cannot be passive in the communication process.

When all of these factors are blended together, the problems of systems development and communication may not go away entirely, but they can be controlled.

About the author

Michael Martin is a consulting partner and director of management consulting operations for the Connecticut offices of Touche Ross & Co. in Stamford.



SYSTEMS & PERIPHERALS

HARD TALK
Tom Henkel
CW Senior Editor

IBM tars dead-end road with X line

By replacing its 3080 series of mainframes with newer X models, IBM has steered current users of 3080 series processors onto a dead-end street. The older 3080 series processors are not field-upgradable to the newer line of processors because the X models incorporate different design and circuit packaging technologies.

The only way users of the older 3080 systems can upgrade to the newer models is to buy a whole new processor. While 3080 series users still have the option of upgrading to larger, older machines, IBM's move appears to be a reversal of the marketing tactic developed with the first of the 3080 series processors back in 1981.

When the first member of the 3080 series, the 3081 Model K, was announced, IBM appeared intent on offering a line of processors that were field-upgradable to larger models. At the time, many speculated IBM mainframe users would never have to buy additional new processors. They would simply add boards or other components to build bigger systems.

For a while, this building block architecture theory held true. When the 3083 was announced, it was field-upgradable to the 3081, and the 3081 was field-upgradable to the top-of-the-line 3084.

Now the building block architecture theory has come crashing to the ground. For owners of the old class of 3080 series processors, the end of the migration path is clearly in view. Granted, IBM cut the price on model-to-model upgrades for users of the older 3080 series processors, but is a 7% to 10% price break an adequate pacifier for being cast out of the mainstream of IBM's current big systems lineup?

See IBM page 72

Westinghouse awards grant to accelerate optical DP

By James Connolly
CW Staff

PITTSBURGH — Hoping to help raise the technology from its "infancy," Westinghouse Electric Corp. has awarded Carnegie-Mellon University a $1 million grant to establish an optical data processing center here.

"Optical processing is in its infancy, but we felt we could help to accelerate the program," said Dr. John Hulm, acting general manager of the Westinghouse Research and Development Center.

The three-year grant, approximately two-thirds of which will be used for operating expenses and one-third for equipment, is intended to spur research into various types of light-based processing.

Photons replacing electrons

"We are going to try to use photons rather than electrons. I think there is potential for doing a great deal with photons," Hulm reported.

Hulm said optical data processing could be an element in or an offshoot to the U.S. government's *Star Wars* space defense program. He noted that systems such as sophisticated radar units, laser equipment and robots could utilize the high-speed processing that may be available through optical data processing. He said that optical processing could facilitate faster array, analog and parallel processors. He added those machines might work on the same principles as the human eye or brain.

However, he added, "I think it will take at least a decade to get this sort of thing going." He said a breakthrough could be digital processing at an optical level or development of optical amplifiers and optical transistors.

He reported that some current spectrum analysis equipment uses technology that borders on optical data processing, but that there may never be true optical data processing.

"What we are beginning to look at is the possibility of optical chip sets, which combine micro circuits with optical processors. We may end up using a lot of hybrid devices," he said.

The value of optical processing, according to Hulm, rests in the ability to construct complex yet small processors that, unlike current circuits, generate little heat.

Under the grant, which can be extended by the company beyond three years, Westinghouse is paying to modernize and expand laboratories at the university and will provide equipment to the school.

The optical data processing center will be headed by Dr. David Casasent, George Westinghouse professor of electrical and computer engineering at Carnegie-Mellon.

Hulm reported that Westinghouse wanted to support the local university, spur technological developments and build a pool of optical processing researchers who may be available for future employment at Westinghouse.

Firm speeds operations with printer

NEW YORK — A laser printer is helping a commodities trading firm here remain competitive.

The New York office of Gill & Duffus is heavily involved in commodities trading, a business that hinges on timely information, which in turn calls for a fast, accurate way to perform accounting and billing functions.

Each day after the market closes, a five-person information systems staff is responsible for documenting trades, updating accounts, preparing contracts and invoicing customers. The staff also handles month-end closing and DP for several Gill & Duffus companies. The firm was leasing an IBM System/36 for accounting and some "back-office" functions.

A decision was made to automate many of the back-office operations associated with trading in May 1983. William

See [illegible] page 72

INSIDE

Turnkey Systems/72
Data Storage/76
Terminals/77
Graphics Systems/77
Power Supplies/78

Two graphics boards debut for 3270-PC users

RYE BROOK, N.Y. — IBM last week announced two optional business graphics boards which allow users of the firm's 3270 Personal Computer to create bar charts and pie charts using both microcomputer and mainframe data.

Announced last October, the 3270-PC gives users local microprocessing capabilities plus the ability to run programs simultaneously on an attached IBM mainframe processor operating under the VM/CMS operating system. One of the main features of the 3270-PC is a multiple windowing capability that allows users to run host and microcomputer applications concurrently and to share mainframe data with microcomputer applications.

The graphics capabilities announced last week consist of two circuit boards. One is located in a mainframe processor, the other is located in the 3270-PC.

Host interactive board

The Host Interactive Business Graphics board attaches to any IBM mainframe capable of running 370-era systems software. The unit allows users of 3270-PC Models 2, 4 and 6 to create eight-color graphics from host-generated data. To make use of the feature, the 3270-PC must be in a distributed-function terminal mode, and the host processor must be using IBM's Graphical Data Display Manager program product, according to IBM.

While the 3270-PC allows users to run up to four concurrent host programs, only one of those programs can be a graphics session. Further, a programmed symbols adapter card installed in the 3270-PC provides storage for up to six user-definable symbol sets. Each symbol set can contain up to 190 symbols, IBM said.

The Host Interactive Business Graphics Board costs $800 and will be available in the second quarter. First customer shipments of the 3270-PC began in February, IBM said.

The second graphics board, called PC Graphics Adapter, fits inside Models [illegible], 4 or 6 of the 3270-PC. The board allows the user to generate graphics for sessions running only under IBM's PC-DOS Release 2.0 or 2.1 operating system and provides four-color graphics with a resolution of 360 by 350 or 320 by 200 pixels. In addition, the board allows users to generate two-color high-resolution graphics at 720 by 350 or 640 by 200 pixels, IBM said.

The PC Graphics Adapter costs $550 and will be available in the second quarter.

The purchase price for a 3270-PC Model 4 with both the host and graphics boards is $6,029. The configuration includes a processor, color display, host (programmed signals) graphics adapter, a PC Graphics Adapter, printer adapter, 3270-PC control program and IBM's PC-DOS Release 2.1 operating system.

The enhancements were announced by IBM's Information Systems Group, located at 900 King St., Rye Brook, N.Y. 10573.

SYSTEMS & PERIPHERALS

TURNKEY SYSTEMS

REDWOOD SOFTWARE SERVICES
Universal Life

Redwood Software Services has developed a turnkey system based on the IBM Personal Computer for insurance agents.

Called the Universal Life system, the unit offers a standard 80M bytes of random-access memory, which can be expanded to more than 210M bytes. Software includes business, administration, reinsurance and proposal packages, the vendor said.

The business portion of the package provides current underwriting information plus predetermined underwriting requirements on command. Other features include: underwriting worksheets, a daily pending new business report with outstanding requirements, average-size policy, average premiums and average issues times.

The administration system handles multiple funds, annual statements on request as well as on the anniversary, on-line inquiry, premium notices, on-line policy maintenance and automatic error correction features.

The 80M-byte capacity of the initial unit can handle up to 800 paid new policies/mo plus 13,000 current policies. Hardware supplied is an IBM Personal Computer with IBM's PC-DOS 2.0 operating system, a printer and peripheral storage.

The complete Universal Life system, including hardware and software, costs $67,500.

Redwood Software Services, 48 Barbaree Way, Tiburon, Calif. 94920.

BUSINESS SYSTEMS DEVELOPMENT CORP.
Distribution Computer System

Business Systems Development Corp. has announced a turnkey system designed for use by automotive, hardware, electrical, construction, grocery and other product distribution networks.

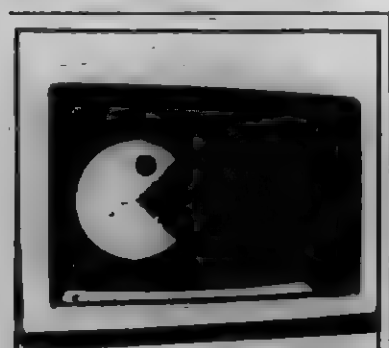
The Distributor Computer System reportedly allows a user to prepare quotes for customers; develop orders and print invoices; track and manage inventory; computerize accounting; tie into electronic mail services; help fill orders; and perform word processing functions.

According to the company, the key to the system is the request for quote file, which enables account executives to prepare a quote tailored to the customer, drawing upon the cost of a part, discounts and markups, inventory and recent quotes to customers.

The system, available now, is said to be based on Convergent Technologies, Inc. AWS and IWS minicomputers and Burroughs Corp. B30 minicomputers. Prices range from $5,000 to $30,000.

Business Systems Development, 45 Davids Drive, Hauppauge, N.Y. 11788.

See TURNKEY page 76



Are Hostile Communication Circuits
GOBBLING UP YOUR DATA?

Costing you time and money?

If you've tried to transmit or receive data over non-dedicated, voice-grade communication lines, you're familiar with missing and incorrect data. Time lapses. Repetitive retransmission. And the interminable "WAIT" while typical error detection protocol tries unsuccessfully to insure error-free data. But maybe you're not familiar with what causes these problems. Everything from phone company and secondary carrier service routing to crosstalk and impulse noise. Basically problems beyond your control.

Compsec's 9600C can't prevent the problems, but it can automatically transmit your data at the optimum rate and level to overcome whatever gremlins are lurking in your communication lines. Call Compsec today.

And stop playing video games with your important data.

COMPSEC, INC.
10000 Cle Katy Rd., #275
Houston, TX 77055
(713) 461-4467
Telex: 910-881-4573

IBM from page 71

For 3083 users, noted Charles Greco, an IBM watcher with the Framingham, Mass.-based International Data Group, the future is not so dismal because there are several possible system upgrades that can be made before reaching the end of the road. But for users of the 3081 line, the migration path is very limited. Greco noted there is a maximum of two system upgrades possible for 3081 users.

And what happens to the residual value of the older 3080 series processors? Greco theorized that the X models may be field-upgradable to IBM's Sierra or Trout series of larger processors, expected to be announced later this year. Since the X model processors do everything the older models can do, plus offer more performance for the same price, who will want the older models? Chances are, current users will wind up trading them among themselves.

The irony of IBM's announcement of the X models is the timing. While the 3080 line was kicked off with the 3081 Model D in 1981, most users did not receive 3080 series processors until about a year ago. Now the line is obsolete. IBM used to give users at least five years before announcing successors to its processors. Now users appear lucky if they get a year's worth of use out of their machines.

PRINTER from page 71

Mischler, Gill & Duffus' manager of information services, designed a strategy to reduce the manual steps required to document trades, invoices and update accounts. For example, with terminals on the trading floor, a trader can enter transaction details as easily as reporting to a secretary, and the DP system will automatically complete the job.

The back-office operations needed an electronic printer capable of producing complex forms while simultaneously filling in forms with details on transactions. The printer's graphics capabilities would have to solve other problems faced by the DP department, such as maintaining up-to-date form design, he said.

Also, "designing, storing and changing forms had become a costly headache," Mischler said. "Our business requires small quantities of a variety of forms. Each afternoon, the DP staff was delayed by at least eight different forms changes."

Since contact with customers is by telephone and correspondence, Gill & Duffus places high priority on professional-looking documents, Mischler said. Letter-quality output with high dot density was a prime consideration for his electronic printer selection. Other requirements included high speed, quiet operation, use of plain paper and graphics capabilities. To reduce hardware costs, the intelligent printer would have to operate as four different devices — system line printer, word processing quality printer, a graphics device and plotter and a forms generator.

After investigating a variety of vendors, including IBM and General Business Technologies, Inc., Mischler chose Quality Micro Systems, Inc. (QMS) Lasergrafix 1200 intelligent laser printer based on his prior experience with a QMS controller board-enhanced Printronix dot matrix printer.

Installed in October 1983, the Model 1200 uses a Xerox Corp. print engine and is maintained by the Xerox service network. The device prints up to 12 copy/min with a resolution of 90,000 dot/in. and is capable of bit mapping 8½- by 11-in. or 14-in. paper. Built-in firmware enables the Lasergrafix 1200 to produce complex graphics with simple user commands and requires no CPU memory. It is connected on-line and sits in the computer room with the System/38, which Gill & Duffus decided to purchase.

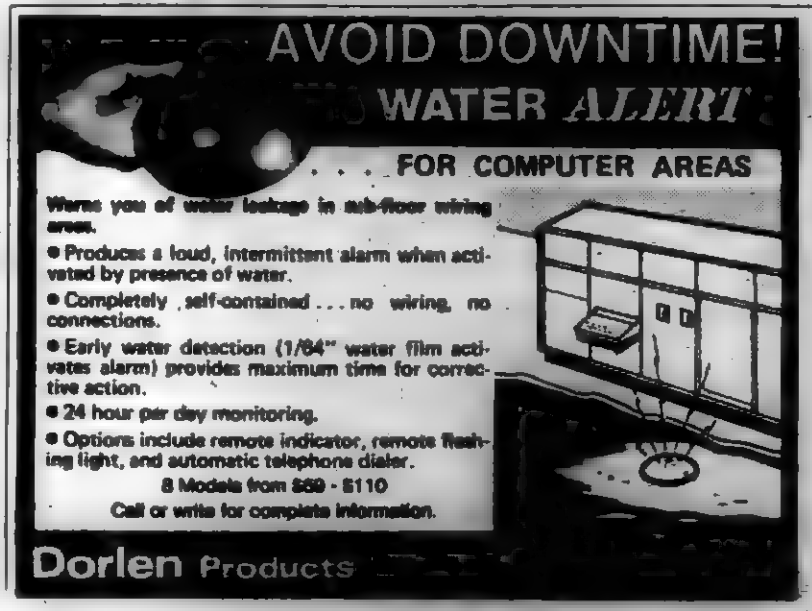
The decision to purchase came after a five-year amortization revealing that the company could save a "significant amount" of money by purchasing rather than leasing the system. In turn, the cost savings generated by the purchase helped Mischler get approval for the laser printer.

Also, another three IBM terminals have been added to the original seven attached to the System/38. User departments can now input information at the beginning of a transaction and send it to the printer, which is programmed to take over from there under an IBM spooling package, Mischler said.

"The Lasergrafix 1200 enables us to design our own forms, store them and simultaneously print the form filled in with variable information," Mischler said. It also operates as a system printer without programming changes. "We have eliminated the delays and costs associated with designing, printing and changing forms during each afternoon's documentation process," he added.

While the current use of the printer is producing documentation, Mischler is also using graphics capabilities in producing reports. "Much information we need can be reported more concisely and is more quickly understood when converted to charts and graphs," he explained. "The printer enables our staff to combine charts with text easily and avoid complicated plotting procedures. The printer does all the work."

Aside from other benefits, the laser printer is making another important contribution to the automation strategy, according to the information systems manager. "The printer is so flexible and easy to use, even noncomputer types who resist automation are intrigued by its capabilities," he pointed out.



SYSTEMS & PERIPHERALS

TURNKEY from page 72

SCOTT SYSTEMS, INC.
Pars

Scott Systems, Inc. has introduced Scott Advanced Program Airline Reservation System (Pars).

Pars features magnetic card reader support, multiple screen modes, screen memory, text string facilities, communications trace mode and networking capabilities. Pars includes reservation software, an Intel Corp. 8088 microprocessor and 64K bytes of random-access memory, which can be expanded to 1M byte.

The basic system costs $3,400, and each terminal connected to the system sells for $1,989.

Scott Systems, One Metropolitan Corporate Center, Marlborough, Mass. 01752.

STEP ENGINEERING
Step-27

Step Engineering has announced its Step-27, a development station that includes a disassembler for microprogrammers and design engineers.

The Step-27 reportedly supports bit-sliced and microprogrammed designs and provides Step Engineering's Writable Control Store memory package. It also features the company's Trace Instrumentation and its Disassembly, data-driven software package, according to the company.

It is said to use emitter-coupled-logic 10-nsec random-access memory chips connected to the address and data pods.

Step-27 prices start at $25,000, and it is available now.

Step Engineering, 757 N. Pastoria Ave., Sunnyvale, Cal. 94086.

DATA STORAGE

WINCHESTER SYSTEMS, INC.
Datasafe-24

Winchester Systems, Inc. has introduced Datasafe-24, a 15M-byte, 5¼-in. fixed Winchester disk system

Continued on page 77

To all supra Price changes on following items effective immediately: No. 10-11A, 10-114A, 10-AL.

Chris: The latest offer looks better, although it's still not what we were hoping for. Try for another compromise.

Just got the word from Gary. Increased our share by 6%. If trend holds, we'll pass competition by third quarter!

Smartcom II communications software, currently available for IBM PC, DEC Rainbow 100, Xerox 820-II and Kaypro II.

Smartmodem 1200 for all computers with an RS-232C interface; Smartmodem 1200B plug-in board for the IBM PC.

Microcomputer communications? Get control of the situation with Hayes.

Microcomputer communications can present the DP/MIS staff with a tangle of mis-matched hardware, user-hostile software, and a situation that can quickly get out of hand.

Hayes can help you avert that chaos, with a telecomputing system designed expressly for microcomputers.

A system so advanced, it's downright simple. Economical. And requires no handholding from you.

Hayes. The computer's telephone. Our Smartmodem 300™ and Smartmodem 1200™ connect to any desktop computer with an RS-232C port. They operate with rotary dial, Touch-Tone® and key-set telephone systems. At full or half duplex. And both feature self-test capabilities, as well as indicator lights and built-in speakers for monitoring calls.

The lower-priced Smartmodem 300 is ideal for local data swaps and communicates at 300 bps. A built-in speed selector on Smartmodem 1200 automatically detects transmission speeds (110, 300 or 1200 bps).

Smartmodem 1200B™ is also available as a plug-in board for IBM® Personal Computers. And Hayes manufactures the Micromodem IIe® for Apple® II, III, IIe and Apple Plus computers, as well. It comes packaged with Smartcom I™ communications software.

Speaking of software, more programs are written for Hayes modems than for any other. And that impressive list includes our own incomparable communications software.

Smartcom II.™ Complete, menu-driven software for the IBM PC, DEC Rainbow 100,™ Xerox 820-II™ and Kaypro II.™ Even first-time communicators will find success with Smartcom II. Screen prompts guide users in the simple steps it takes to create, send, receive, list, edit, name and re-name files.

Tasks like simultaneously receiving, printing and storing data—completely unattended—are easily managed with Smartcom II, because it takes full advantage of Smartmodem's capabilities.

The program reduces lengthy dial-up and log-on sequences to a single keystroke. It stores communications parameters for 25 remote systems.

Plus, there's an on-line help feature that explains prompts, messages and parameters.

Our reputation speaks for itself. Hayes has five years of solid leadership in the microcomputer industry. Nationwide availability through retail computer stores. Trouble-free factory service and call-in assistance. A limited two-year warranty on all hardware. And the most efficient telecomputing system available. Anywhere.

If you're involved in linking micros or setting standards for configurations, remember this. Everything your people need to know about communications can be summed up in one word: Hayes.

Hayes®

Hayes Microcomputer Products, Inc., 5923 Peachtree Industrial Blvd., Norcross, GA 30092. 404/441-1617.

Smartmodem Specifications
Low Speed Data Formats (Smartmodem 1200 and Smartmodem 300): Serial, binary, asynchronous: 7 or 8 data bits; 1 or 2 stop bits; odd, even or no parity (0-300 bps).
High Speed Data Formats (Smartmodem 1200): Serial, binary, asynchronous: 7 data bits; 1 or 2 stop bits; odd, even, or fixed parity or 8 data bits; 1 or 2 stop bits; no parity (1200 bps).
Dialing Capability: Touch-Tone® and rotary-dial pulse dialing.
Command Buffer: 40 characters.
Commands (unnecessary with Smartcom II software): A: Immediate answer. A/: Repeat last command. C: Transparent Carrier. D: Dial command, including pause dialing, waiting for second dial tone, auto-dialing and other features. E: Local echo. F: Full/half duplex. H: Switch hook. I/: Audio monitor. O: On-Line. P: Pulse dialing. Q: Quiet mode. R: Reverse originate/answer mode. S: 17 "Set" commands speed, escape code character, number of rings to answer on, etc. S?: Check operational parameters shown. T: Touch-Tone dialing. V: Verbal result codes.
Result Codes (can be numeric/verbal): HOK: Command line ok. 1/Connect: Carrier detected. 2/Ring: Phone is ringing. 3/No Carrier: Carrier lost or never heard. 4/Error: Error in command line. 5/Connect 1200: Carrier detected at 1200 bps. (Smartmodem 1200 only.)
Audio Monitor: Two-inch speaker with volume control.
User Panels: On-off switch, power pack, RS-232C connector, modular phone jack connector, volume control.
Operation: Full or half duplex.
Data Rates: 0-300 bps and 1200 bps for Smartmodem 1200; 0-300 bps for Smartmodem 300.
Interface: RS-232C.
Intelligence: Z80™ microprocessor with 4K byte control program for Smartmodem 1200; Z8 microprocessor with 2K byte control program for Smartmodem 300.
Modem Capability: Bell System 103 or 212A compatible originate or answer mode for Smartmodem 1200; Bell System 103 compatible originate or answer mode for Smartmodem 300.
Answer Sensitivity: -9dBm for Smartmodem 1200; -43dBm for Smartmodem 300.
Transmit Level: -9dBm.
Registration: FCC registered for direct connect to the nationwide phone system. Connects with modular jacks RJ11W, RJ12C, RJ21W, RJ22C.
Power Needs: 0.1. Rated 120VAC, 60Hz, 13.5VAC output.
Size: 1.5" x 5.5", x 9.0"

Microcomputer Products, Inc. is a registered trademark of Hayes Microcomputer Products, Inc.
Smartmodem 300, Smartmodem 1200, Smartmodem 1200B, Smartcom I and Smartcom II are trademarks of Hayes Microcomputer Products, Inc.
Touch-Tone is a registered service mark of American Telephone and Telegraph.
IBM is a registered trademark of International Business Machines Corp.
Apple is a registered trademark of Apple Computer, Inc.
DEC Rainbow 100 is a trademark of Digital Equipment Corporation.
Xerox 820-II is a trademark of Xerox Corporation.
Kaypro II is a trademark of Non Linear Systems.
Z8 is a trademark of Zilog, Inc.
©1984 Hayes Microcomputer Products, Inc.

SYSTEMS & PERIPHERALS

Continued from page 76

for Intel Corp.'s Intellec Series II and III and Mohawk Data Sciences Corp.'s MDS-800 microprocessor development systems.

The Datasafe-24 was designed to replace the Intellec dual floppy drive, doubling the system throughput and offering a transfer rate of 625K byte/sec and an average access time of 85 msec.

Datasafe-24 reportedly has 24M bytes of unformatted (15M bytes formatted) storage. It costs $7,995. The MDS-256, a 256K-byte printer spooler option that permits printing while programming, costs $1,250.

Winchester Systems, Suite 4050, 400 W. Cummings Park, Woburn, Mass. 01801.

TERMINALS

COMPUTER COMMUNICATIONS, INC.
CCI 8274 group

Computer Communications, Inc. has announced the CCI 8274 remote cluster group, an addition to its Group 8000 family of IBM 3270-type terminal products.

The line consists of the 8274C remote cluster controller, the 8178 display station and the 8287 printer station. Product features include support for up to 40 IBM 3178-type displays; a user-selectable 26th status line on the screen that contains a cursor, row/column indicator, time of day and security key/lock password protection; and concurrent Ascii-to-IBM Synchronous Data Link Control protocol conversion.

The base price for the controller is $4,995; the display station costs $1,500, and the printer costs $2,500.

Computer Communications, 2610 Columbia St., Torrance, Calif. 90503.

INNOVATIVE ELECTRONICS, INC.
MC-80/600-1

Innovative Electronics, Inc. has introduced a communications processor that emulates an IBM 3274-51C communications controller running configuration support Level A.

According to the vendor, the MC-80/600-1 converts a Digital Equipment Corp. VT100-compatible terminal into a full-function IBM 3277 Model 1, 3722 Model 2, 3278 Models 1 and 2 terminal communicating with the IBM host using the Ebcdic Binary Synchronous Communications protocol.

The stand-alone, self-powered communications processor provides up to 16K bytes of read-only memory, 16K bytes of random-access memory and two serial communications ports.

The price for the basic unit is $1,495.

Innovative Electronics, 4714 N.W. 165th St., Miami, Fla. 33014.

NCR CORP.
5070 ATM

NCR Corp. has announced an interior automated teller machine (ATM) designed for the lobby environment of financial institutions and for uses in such sites as retail stores, airports, hospitals, office buildings and universities.

The 5070 can operate either as a full-function ATM or as a cash dispenser. Five thousand transactions can be performed before replenishment is necessary, the vendor said.

The ATM measures 49¼ in. by 32 in. by 29 in. and is priced at $13,250.

NCR, Dayton, Ohio 45479.

GRAPHICS SYSTEMS

GENISCO COMPUTERS CORP.
G-6200

Genisco Computers Corp. has introduced a color raster display system for applications such as computer-aided design and manufacturing, command/control and imaging.

The G-6200 is said to feature extensive color display capabilities. The basic configuration provides a 1,536 by 1,024 bit-map refresh memory that permits selection of 16 colors from among more than 16 million possible hues. Using optional memory cards, the color selection can be expanded to up to 4,096 colors, a vendor spokesman said.

The G-6200 includes a 19-in. monitor, detached keyboard, pan, scroll, zoom, cursor control, various peripheral support and the vendor's Gencor operating system. Graph tablet, digitizing table, text terminal and color hard copy are supported, as well as both RS-232 serial interfaces and optional parallel direct memory access controllers, according to the vendor spokesman.

The product is available in models with three viewable resolutions: the G-6210, with a 396 by 1,024 bit-map refresh memory; the G-6220, with 768 by 512 noninterlaced refresh memory; and the G-6230, with 1,086 by 792 noninterlaced refresh memory.

The G-6210 and G-6220 are priced at $23,950. The G-6230 costs $24,750.

Genisco Computers, 3545 Cadillac Ave., Costa Mesa, Calif. 92626.

ALPHA MERICS CORP.
Quicklead

Alpha Merics Corp. has announced a workstation reportedly designed for general-purpose computer-aided design.

Quicklead includes a central console incorporating a high-resolution color graphics display and keyboard, 8-in. diskette or optional Winchester disk storage, digitizing tablet, soft-

Continued on page 78

Now add NCR Service to the reasons for choosing Florida Data's OSP Line

world's fastest, most versatile matrix printers

Triple mode capability: DP, WP, Optional Graphics

Triple paper path: auto cut sheet, continuous, hand

Patented MSE (Magnetic Stored Energy) printhead

NCR is a Registered Service Mark

There was already enough reason. But now you can buy OSP with the added assurance of nationwide NCR service. You'll rarely need them, but if you ever do they'll be there in two shakes.

OSP means "Office System Printers." And it means everything you need in just one high performance machine: data processing at 600 cps, word processing at 100-150 cps, with graphics and down line load capability. It's a whole new way to go.

Call (305) 259-4700 or mail coupon for details

Florida Data Corporation
6000 John Rodes Blvd.,
Melbourne, FL 32935

Yes, send me information on your OSP 120 and 130 matrix printers.

NAME
TITLE
COMPANY
ADDRESS
CITY, STATE, ZIP

FLORIDA DATA

SYSTEMS & PERIPHERALS

Continued from page 77

ware and a large format plotter, according to a vendor spokesman.

The control console comprises an Intel Corp. 8086 16-bit microprocessor, 512K bytes of memory and an optional Intel 8087 coprocessor. The CRT is a bit-mapped, high-resolution display. The basic unit is provided with dual 8-in. diskette drives with 1M-byte capacity each, the spokesman said.

The digitizing tablet has an 11- by 11-in. digitizing area and a positioning device with three function keys. The plotter is the vendor's large format, flat-bed Alphaplot device, the spokesman said.

Prices for the system range from $14,990 to $21,100.

Alpha Merics, 20931 Nordhoff St., Chatsworth, Calif. 91311.

MODGRAPH, INC.
GX-100 F5

Modgraph, Inc. enhanced its GX-100 graphics terminal to offer the GX-100 F5 workstation, a graphics processor that runs Digital Research, Inc.'s CP/M operating system.

The GX-100 F5 features dual 5¼-in. disk drives, 64K bytes of random-access memory (RAM) and 768- by 586-pixel resolution. The GX-100 disk controller reads and writes 15 disk formats, the vendor said.

The system costs $4,545.

Modgraph, 1393 Main St., Waltham, Mass. 02154.

DIGIGRAPHIC SYSTEMS CORP.
Comgraph II

Digigraphic Systems Corp. has announced an integrated hardware and software system designed for graphics creation, teleconferencing, local meeting and executive review applications.

Comgraph II reportedly features IBM Personal Computer XT compatibility with data base access, color graphic creation, electronic presentation and audiographic teleconferencing. It allows graphic files to be structured in much the same way 35mm slide presentations are prepared in carousels, according to the company.

It is said to generate graphics with data received from a host mainframe or other data bases such as spreadsheet data using Digigraphic's spreadsheet package. Graphics can also be generated by drawing on the system keyboard or by utilizing electronic graphic tablets for free-form design. Users can also develop graphics on IBM Personal Computer XTs using Digigraphic software, the vendor said.

Graphics resolution is 640 by 400 pixels, and there is a range of 4,096 colors, according to the company.

Digigraphic's audiographic teleconferencing reportedly uses standard telephone lines to transmit voice and data, and allows users to choose between 1,200 and 4,800 or 9,600 bit/sec.

Available now, the basic Comgraph II workstation, Interact 3000, includes an Intel Corp. 8088 processor, an Intel 8087 coprocessor, 512K-byte random-access memory (RAM) expandable to 640K-byte RAM, a 5¼-in. floppy disk drive, 60M-byte fixed disk memory, a 13-in. color monitor, keyboard and a conference keypad.

It is priced at $22,500.

A smaller version, Interact 2000, will be available in April and is said to include less memory and less functional expansion capacity.

The Interact 2000 is priced at $13,500.

Digigraphic Systems, 10873 Yellow Circle Drive, Minnetonka, Minn. 55343.

POWER SUPPLIES

DATAPOWER, INC.
DP-200-R series

Datapower, Inc. has introduced a family of open-frame 200W output switching power supplies, the DP-200-R series.

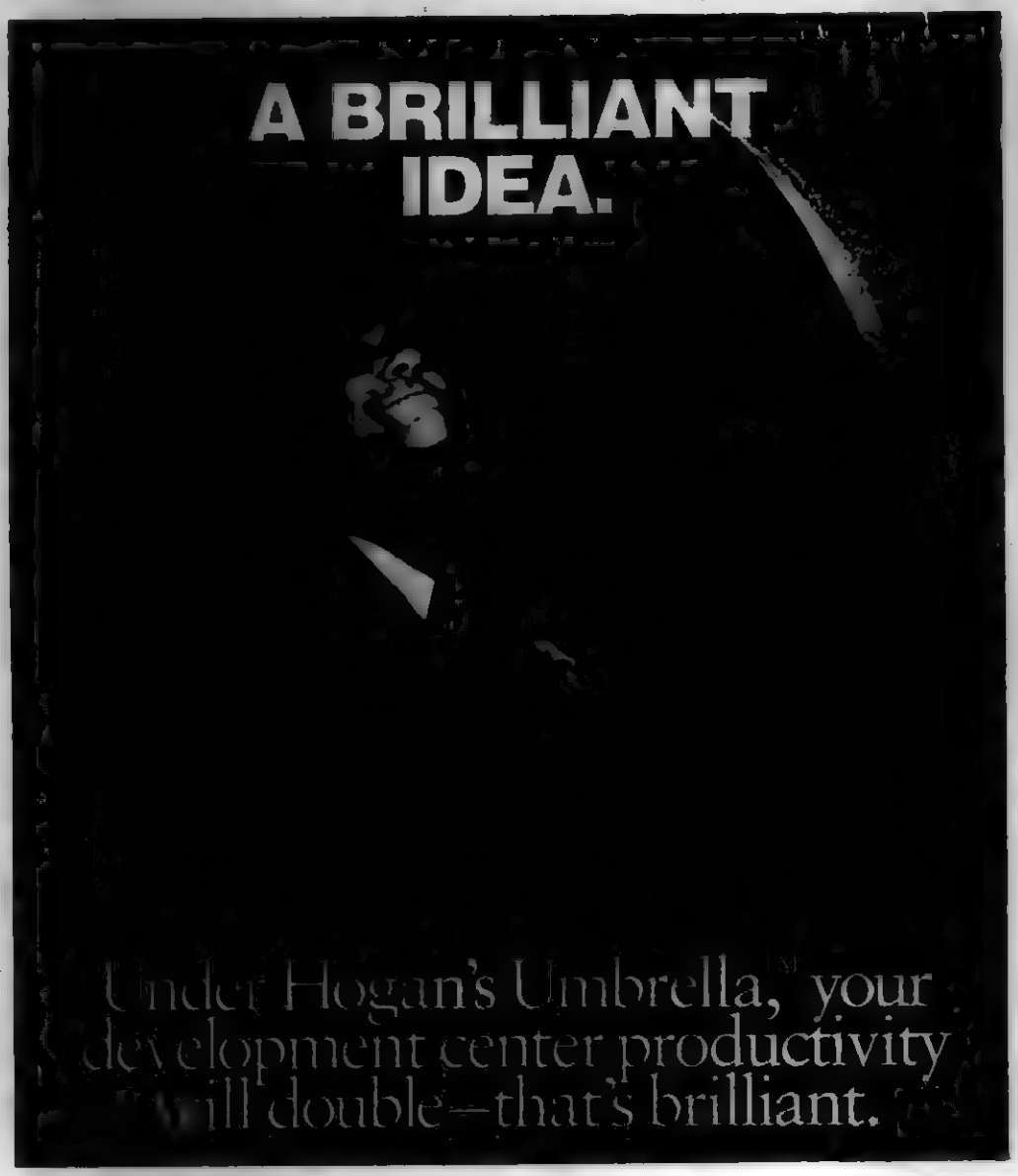
The series reportedly offers five regulated outputs and can function in a variety of voltage/current requirements.

The units are available in two model versions. The DP-200-R001's five outputs are factory preset at +5V/20A, +12V/4V, +12V/4A, +5V/2A and +24V/4V. Although the DP-2000-RXXX's five output levels are fixed at the same values as the factory preset model, the voltages can be specified by the user within the maximum power limit for the sum of all outputs, the vendor said.

Other features include internal radio frequency interference, electromagnetic interference, filtering to Federal Communications Commission and VDE noise suppression regulations, isolated returns on all outputs, remote sensing of cable losses and surge-limiting soft-start inputs.

The DP-200-R001 and the DP-2000-RXXX each cost $298, a spokesman said.

Datapower, 3323 W. First St., Santa Ana, Calif. 92703.



Imagine. A fully integrated development center system capable of upgrading and increasing output throughout the life cycle of both major and minor on-line and batch applications.

This completely automated approach to interactive development was critical in the development of our own highly successful line of applications software. That included design, management, programming, implementation, and maintenance of both on-line and batch applications. The Umbrella weathered well.

So well, in fact, users tell us that, "we beat our estimates by 50% on our very first major on-line application and that included our education time on the Umbrella."

There's a lot more the Hogan Umbrella can do. Just ask Any Umbrella user...various combinations of DOS, VS, MVS, IMS, VSAM, CICS, IDMS. And ask Ed Lomax, Vice President, at (214) 386-0020. Make a brilliant decision today.

Send me more information on your UMBRELLA System.

Name: _____

Title: _____

Company: _____

Address: _____

City: _____ State: _____ ZIP: _____

Phone: _____

Hogan SYSTEMS

TOMORROW'S SOFTWARE. HERE TODAY.

Corporate Headquarters: 5080 Spectrum Drive, Dallas, TX 75248 ☐ Atlanta, Boston, Chicago, Dallas, Detroit, Los Angeles, New York, London, Australia and New Zealand ☐ TELEX 203927 ☐ (NASDAQ Symbol: HOGN)

'Listen, Joshua — new regulations now allow me to purchase my own empty can.'

MICROCOMPUTERS

MICRO BITS
Tom Henkel

What IBM's move means to users

When IBM announced that its heretofore laboratory-oriented microcomputer, the System 9000, was available to commercial users capable of operating under Microsoft, Inc.'s Xenix operating system, it may have confused more users that it pleased.

The move means IBM is offering two lines of microcomputers aimed at the corporate user.

The popular Personal Computer line is based on Intel Corp.'s 8088 microprocessor and supports a variety of operating systems, including IBM's PC-DOS, Microsoft's MS-DOS and Digital Research, Inc.'s CP/M 86 and Concurrent CP/M. It also has recently gained support for an IBM version of Unix.

The newly announced 9002, which uses Motorola Corp.'s 68000 microprocessor, supports Xenix, some Unix applications and IBM's Caos — the operating system announced with the original System 9000, the 9001.

In addition, the 9002 supports the C programming language, as well as Ryan-McFarland Corp.'s RM/Cobol.

'Hedging their bets'

"It seems [IBM] is hedging their bets," noted Chris Christensen, an industry analyst with the Boston-based The Yankee Group. Christensen added IBM appears to be offering some kind of microcomputer for every type of user.

But which is the best buy for users? The answer is unclear. Certainly IBM, as well as third-party software vendors,

See 9000 page 81

IBM moves System 9000 into corporate sector

By Tom Henkel
CW Staff

RYE BROOK, N.Y. — IBM has moved its scientific-oriented System 9000 desktop microcomputer into the corporate sector with a more compact, four-user model supporting Microsoft, Inc.'s Xenix operating system.

Like the original System 9001, which was designed for laboratory use, the 9002 uses a Motorola, Inc. 68000 microprocessor with 32-bit registers, 16-bit data flow and 24-bit addressing. However, the 9002 occupies roughly 28% less table space than the 400-sq-in. 9001, allowing it to be installed on an average desktop. Aside from the reduction in size, the 9002 hardware is essentially the same as the 9001, IBM said.

The 9002 has 128K bytes of random-access memory, expandable to 5.2M bytes in 256K-byte increments. Also included are 128K bytes of read-only memory, which contains the Xenix operating system.

The announcement appears to offer corporate users of IBM microcomputers yet another choice. Currently, IBM's popular Personal Computer line, which is based on Intel Corp.'s 8088 microprocessor, can support Microsoft's MS-DOS, Digital Research, Inc.'s CP/M 86, IBM's PC-DOS and a version of the Unix operating system. Users have the option of selecting a multiuser 68000-based system that can run Xenix, plus many Unix-oriented programs.

The 9002 can support up to four 5¼-in. diskette drives offering 640K bytes of formatted storage or 8-in. diskette drives offering 985K bytes of formatted storage. Users can attach up to four 10M-byte hard disk drives to the 9002 system, IBM said.

Supports four users

Operating under Xenix, the 9002 can support up to four users in a multiuser, multitasking environment. Included with the Xenix operating system is a C compiler, text editor, text processing and file transfer capabilities. Xenix is based on Unix Version 7 operating system and includes enhancements developed by the University of Southern California at

See IBM page 82

INSIDE

Systems/82
Storage/86
Printers/Plotters/88
Board-Level Devices/83
Auxiliary Equipment/84
Micro Software/83

Lotus 1-2-3, Chartman, Cheetah score high in package analysis

By Wing Lonie
Special to CW‡

This analysis provides information on specific features and performance characteristics of 13 application packages. Our objective in testing these packages was not only to ascertain specific features, but also to assess performance, reliability and ease of use.

The hardware charts are provided for the reader to be used as a quick reference to the configuration for each level's need. Although some hardware can be substituted, the level of compatibility is sometimes directly related to the software design.

Graphics software packages running on the IBM Personal Computer under IBM's PC-DOS are the basic requirement for this evaluation. We have defined three levels of graphics software, ranging from simple graphics like Lotus Development Corp.'s Lotus 1-2-3 to more elaborate ones like Centec Process Systems' Cheetah.

The levels are then arranged into categories and broken down into business

See LEVELS page 80

Microgate line enhanced

AUSTIN, Texas — Gateway Microsystems, Inc. has added three terminal emulators to its Microgate line of communications products for IBM's Personal Computer, Personal Computer-XT, Compaq Computer Corp.'s portable computer and Columbia Data Products, Inc.'s MPC micros.

Microgate 6530 is an integrated, hardware/software product that emulates the Tandem Computer, Inc. 6520/6530 multipage terminals. Microgate 6530 supports local communications at 19.2K bit/sec with enhancements such as 16 pages of recallable display memory and integrated data exchange capability.

Microgate 940 is an integrated product that emulates Texas Instruments, Inc. 940/931 EVT terminals, allowing Personal Computers to be used as terminals in the TI DS990 and Business Series systems.

Microgate 742 is a TI Model 742 terminal emulator said to allow IBM Personal Computers to be placed into most 742 polling environments.

Both the 6530 and 940 emulators employ Gateway's full-duplex, asynchronous host access (Flash) protocol for high-speed bidirectional data exchange between a Personal Computer and host. Minimum system requirements include 128K bytes of memory for the 6530 and 940 and 64K bytes for the 742.

Each product is priced at $395, including a Gateway serial communications controller printed-circuit card, a diskette and a user's guide. The 742 is supplied with a modem cable. A user-supplied modem plus cables for the 940 and 6530 are required for communications with the host system over dial-up telephone lines. The file transfer package is included with the 940, but is extra with the 6530 and priced according to the host system on which it is installed.

Gateway Microsystems is located at 9501 Capital of Texas Highway, Austin, Texas 78759.

Dynabyte unveils version of Monarch processor

MILPITAS, Calif. — Dynabyte Business Computers, Inc. has announced a version of its Monarch processor aimed at low- to mid-range users of the Basic Four Computer Systems Division of Management Assistance, Inc. minicomputers.

The Dynabyte system is based on both Intel Corp. 8086 and Zilog, Inc. Z 80 microprocessors, according to a spokesman for the company.

Based on Science Management Corp.'s Thoroughbred SMC operating system, the system, called the Monarch/Thoroughbred, is capable of running many nonproprietary Basic Four programs, such as specialized applications for the medical or veterinary fields, according to the firm's president William D. Parker.

A basic system includes a standard 256K bytes of random-access memory (RAM), which is expandable to 1M byte, a 5¼-in. Winchester disk drive capable of storing up to 92M bytes of data, an 8-in. floppy disk drive for backup storage of up to 800K bytes of unformatted data and a streaming tape drive which can accommodate up to 17M bytes of unformatted data and operates at 6,400 bit/in.

The Monarch/Thoroughbred system can support up to 16 users.

The price for an entry-level eight-user system, which includes 19M bytes of RAM, a 19M-byte Winchester disk drive, a floppy disk drive and the Thoroughbred SMC operating system, is $10,590, the spokesman said.

Additional information about the Monarch/Thoroughbred operating system is available from Dynabyte, which is headquartered at 521 Cottonwood Drive, Milpitas, Calif. 95035.

A closer look at two levels

Graphics software packages that fall into the Level 1 category — that which produces either simple graphics, specialized graphics or limited graphics — tend to be moderate in price or perform a single function well. Some special features are listed below:

■ Lotus Development Corp.'s Lotus 1-2-3 is excellent for using data and programming macros from its own spreadsheet to produce simple charts. Also, 1-2-3 is capable of performing complex mathematical functions.

■ Visicorp's Visitrend/Visiplot is excellent for data analysis and chart plotting. A user can enter and save business data and recall data to do complex forecasting and analysis to produce simple graphics.

■ Micrografx's PC-Draw is excellent for producing and creating custom design templates and for supporting light pens.

■ Digital Marketing Corp.'s PC-Crayon is excellent for general-purpose graphic design that can be used to create graphics symbols, vector symbols, cursor drawings and slide-show scenarios.

■ Datasoft, Inc.'s Graphics Generator is good for producing line charts and bar charts.

■ Desktop Computer Software, Inc.'s Graph 'n' Calc is good for mathematical calculations and simple spreadsheet functions.

■ Perox Microsystems, Inc.'s

See LOOK page 81

LEVELS from page 79

graphics, complex charts/visuals and machine requirements. The following paragraphs describe software and hardware configuration for each level.

Level 1 is a category of software which produces either simple graphics, specialized graphics or limited graphics. Simple graphics are defined as capable of producing basic bar, pie and line charts. Specialized graphics are packages capable of producing specific charts or graphs with ease. Limited graphics are software packages that can only perform limited functions. Level 1 software includes Micrografx's PC-Draw, Digital Marketing Corp.'s PC-Crayon, Lotus 1-2-3, Desktop Computer Software, Inc.'s Graph 'n' Calc, Visicorp's Visitrend, Datasoft, Inc.'s Graphics Generator and Perox Microsystems, Inc.'s Graph Power.

The advantage of Level 1 is that the software tends to be moderate in price and/or capable of performing a single function well.

The limitation of Level 1 software tends to be directly related to its cost. Generally, this group provides limited interface and limited device support with other software packages and hardware.

Recommendations for Level 1 software: Lotus 1-2-3 is an excellent multipurpose package which integrates spreadsheet, data base and graphics. It also provides an excellent tutorial and documentation.

Level 2 software produces most business graphs and some complex charts. Business graphics include pie, bar, line, XY, scatter, Gantt, organization and bubble charts. Complex charts include multiple type and size fonts and basic geometric shapes. Level 2 includes Business & Professional Software, Inc.'s BPS Business Graphics, Decision Resources' Chartmaster, Giraph's Giraphy, Graphic Communications, Inc.'s Graphwriter

See LEVELS page 81

COMPLEX CHARTS/VISUALS

	Checkmark	BPS	Chart Master	Graph 'n' Calc	Visitrend/ Plot	Giraph	Graph Power	Graph Writer	Graphics Generator	Lotus 1-2-3	PC-Draw	Chartman II & IV	PC-crayon
Text 80 char.	●												
Text 40 char.	●		●		●			●			●	●	●
Special Fonts	●		●			●	●	●				●	●
Multiple type sizes	●	●	●					●		●	●	●	●
Text over lay	●	●	●		●			●			●	●	●
Polygon(s)	●										●		●
Box (var. sizes)	●										●		●
Circle (var. sizes)	●		●					●			●		●
Grid(s)	●		●								●		●
Templates	●										●		
Enjoy bar/var lines w/cursor	●										●		●
Draw curves w/cursor											●		●
Text inside shape	●										●		●
Stretch/Expand a shape	●										●		●

MACHINE REQUIREMENTS

4bit color board and display		●	●	●	●	●	●	●	●	●	●	●	●
More than one monitor needed	●												
Special hi-res. monitor	●												
RAM requirements 128k or less		●	●	●	●	●	●		●				●
RAM requirements 128k or more		●	●	●	●	●	●	●	●	●	●	●	●
RAM requirements 320k or more	●	●	●	●	●	●	●	●	●	●	●	●	●
Asynchronous adapter (RS-232)	●	●	●	●		●	●	●	●	●	●	●	
Printer adapter	●	●		●	●				●	●	●	●	●

BUSINESS GRAPHIC FEATURES

	Checkmark	BPS	Chart Master	Graph 'n' Calc	Visitrend/ Plot	Giraph	Graph Power	Graph Writer	Graphics Generator	Lotus 1-2-3	PC-Draw	Chartman II & IV	PC-crayon
Bar chart(s)	●	●	●	●	●	●	●	●	●	●		●	
Clustered bar chart(s)	●	●	●	●	●	●	●	●				●	
Stacked bar chart(s)	●	●	●	●		●	●	●	●	●		●	
Horizontal bar chart(s)	●	●	●					●				●	
Line chart(s)	●	●	●		●	●	●	●	●	●		●	
XY chart(s)	●	●		●	●			●		●		●	
Pie chart(s)	●	●	●	●	●	●	●	●		●		●	
Hi-Lo chart(s)			●	●	●								
Scatter plot	●	●	●		●			●				●	
Gantt chart(s)	●							●				●	
Organization chart(s)	●							●				●	
Bubble chart(s)								●					
Grids on chart(s)	●	●	●		●	●		●				●	
Tables (w/ruled lines)	●											●	
Rescale var/hor axis		●	●		●			●					
Absolute var/hor scale		●	●		●			●				●	
Overlay chart(s)	●	●	●		●								
Multiple Chart(s)	●		●										
Accepts DIF files	●		●	●	●		●	●				●	
Accepts Other files	●	●	●			●		●	●	●		●	
Stored formats		●				●	●	●		●			
Accepts any print file		●						●	●	●			

Ford Marwick & Co.

LEVELS from page 80

and Graphic Software, Inc.'s Chartman II.

Recommendations for Level 2 software: Chartman can solve many business graphics problems. It runs in compiled machine-language form and thus is the fastest in Level 2. The package is very easy to use with predefined formats to help a user with little time to spend on reading documentation.

Level 3 is the category of software with which almost any type of graphics application can be produced. The only graphics system for the IBM Personal Computer which falls into this category is Centec Corp.'s Cheetah.

Cheetah, which comprises both hardware and software, offers the most features when compared with other packages. It is also very easy to use. Cheetah's system can produce most complex graphics and can be interfaced with a spreadsheet by converting data into Software Arts, Inc.'s Data Interchange Format (DIF). Although most graphics programs can work with DIF data, Cheetah provides a DIF conversion utility within its menu. Cheetah can therefore take data parameters in DIF format from other spreadsheets to generate graphics output. Furthermore, the full Cheetah system can produce in-house 35mm slides, paper copies or projector transparencies.

Although Cheetah is a very powerful package, it is also the most expensive. Systems range from $6,500 to $42,000 including all hardware and software. Cheetah is primarily designed for the medium- to large-size company with large quantities of business art work. In addition, the package may be too cumbersome to use due to the overabundance of prompts.

Recommendations for Level 3 software: Cheetah is recommended for the company with quantity art work. It works very well with no major flaws and is a "low-risk" investment for the large company because, regardless of whether the package is used extensively, the hardware can be used in day-to-day operations.

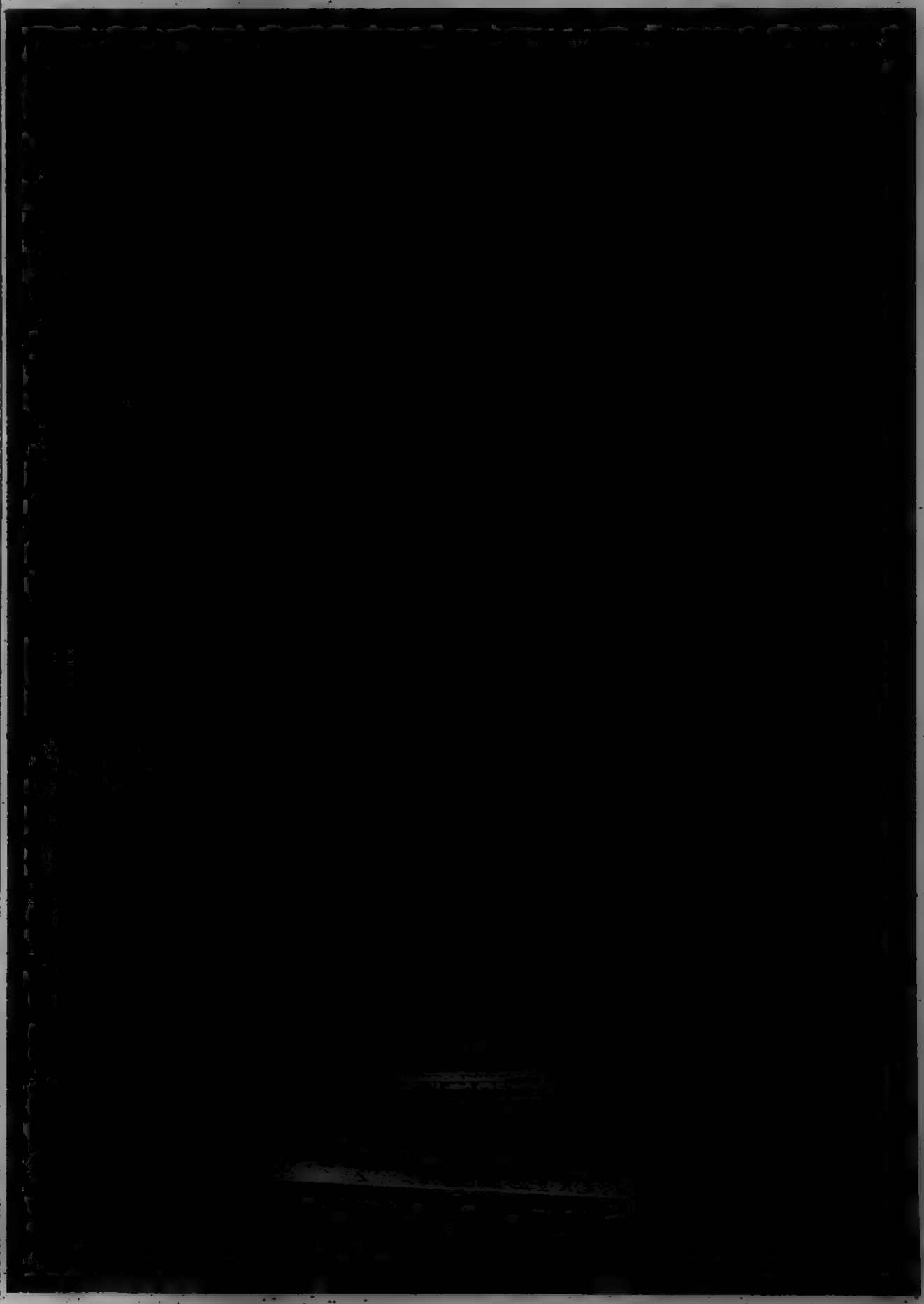
Louis is a computer specialist at Peat, Marwick, Mitchell & Co. in New York.

LOOK from page 80

Graph Power is good for character fonts and producing simple graphics.

Level 2 software is aimed at the business world. It tends to provide the best documentation of the three levels. Examples include:

- Business and Professional Software, Inc.'s BPS Business Graphics can interface with over 20 printers and plotters, produce simple graphics and perform complex mathematical functions.
- Decision Resources' Chart-Master produces six fonts with 16 sizes in color.
- Graphic Software, Inc.'s Chartman can produce simple graphics, Gantt charts, organizational charts and scatter plots.
- Graphic Communications, Inc.'s Graphwriter produces almost all types of graphs, including bubble charts.



9000 from page 79

has succeeded in developing a voluminous amount of software for the Personal Computer and Personal Computer XT. In fact, there is a whole submarket for compatible devices for the Personal Computer line. But there is also a fair amount of software available for Xenix and Unix, and up to four users can work on a 9002 at the same time, each running different applications. For small businesses, the 9002 may prove a more cost-effective alternative. For corporate users, Xenix may make it easier to develop micro-to-mainframe links.

Is it possible IBM plans to make the more powerful, multiuser 9002 its favored son, leaving the Personal Computer in the dust? In the rapidly changing microcomputer market, announcements that rock the boat can make customers think twice about which product to buy. No one wants to buy a bunch of micros that will become obsolete shortly. And no one wants to buy micros that have the dubious distinction of being different from the rest of the systems on the market. That is largely why IBM has been so successful in the microcomputer business — because it promised stability. Now that stability appears to be shaken.

MICROCOMPUTERS

SYSTEMS

DECIMUS CORP.
Microcheck

Decimus Corp. has introduced Microcheck, an item processing system for the IBM Personal Computer that is designed to help financial institutions with checking deposit analysis and reporting.

The main components of a basic system are an IBM Personal Computer; a Lundy Electronics and Systems, Inc. IMRS magnetic ink character recognition reader sorter; a Tecmar, Inc. fixed disk drive subsystem with 33M bytes of storage and 5M bytes removable storage; a Centronics Data Computer Corp. Linewriter 800 line printer; and a Decimus software package. The basic system is priced at $89,050.

Decimus, 3737 N. Main St., Walnut Creek, Calif. 94596.

COMPUTER SYSTEM ASSOCIATES
Micro 68000ECB Microcomputer Trainer

Computer System Associates has announced a self-contained educational microcomputer designed to teach technicians and engineers about the architecture of computers using the Motorola, Inc. 68000ECB board.

The Micro 68000ECB Microcomputer Trainer is a tutorial aid intended for use by colleges and corporations. It reportedly includes a 68000ECB board, 6A power supply, base plate, backplate allowing access to two RS-232 I/O ports, a parallel port and audio tape serial I/O port. According to the company, it has a resident firmware package for a self-contained programming and operating environment.

It is available now and is priced at $1,495.

Computer System Associates, 7562 Trade St., San Diego, Calif. 92121.

AES DATA CORP.
AES Savin 7100 Personal Work Station

AES Data Corp., introduced AES Savin 7100 Personal Work Station, a stand-alone word processing system which runs Digital Research, Inc.'s CP/M operating system.

The system features a 12-in. screen; a Zilog, Inc. Z80 microprocessor; 128K bytes of random-access memory; and an RS-232 serial port, the vendor said. A 45 char./sec daisywheel printer is included with the system, according to the vendor.

The system costs $5,995.

AES Data, P.O. Box 10272, 9 W. Broad St., Stamford, Conn. 06904.

CHASE TECHNOLOGIES, INC.
Chase DL expansion card

Chase Technologies, Inc. announced that its Chase DL microcomputer now comes with an Orchid Technology, Inc. PCnet expansion card.

Chase DL features an Intel Corp. 8088 microprocessor, nine expansion slots and 128K bytes of random-access memory (RAM), according to the vendor.

One expansion slot holds an Orchid Technology PCnet Plus multifunction card and 128K bytes of RAM, the vendor said.

Chase DL costs $2,395, the vendor said.

Chase Technologies, 375 Sylvan Ave., Englewood Cliffs, N.J. 07632.

ET COMPUTER SYSTEMS, INC.
ET-2010

ET Computer Systems, Inc. has introduced a personal and business desktop computer, the ET-2010.

The unit features 64K bytes of random-access memory expandable to 1M byte; a Zilog, Inc. Z80A 4 MHz microprocessor; a built-in 9-in. screen with 80 col. by 24 line display; parallel centronics and serial ports; and a 76-key typewriter-style keyboard with numeric key pad, the vendor said.

The operating system is ETPM II, an enhanced version of Digital Research, Inc.'s CP/M. Standard software includes spreadsheet, general ledger, accounts receivable and accounts payable programs.

The two-piece system, with two disk drives, a 9-in. CRT terminal and keyboard, sells for $1,349.

ET Systems, 8161 Broadway, Lemon Grove, Calif. 92045.

IBM from page 79

Berkeley. Users of the 9002 can also use IBM's Caos operating system, announced in 1982, along with the original 9001. In addition, IBM said users of the 9001 can also use Xenix.

The 9002, operating under Xenix, can support Fortran, Pascal and Ryan-McFarland, Inc. RM/Cobol programming languages. Fortran and Pascal cost $595, and RM/Cobol costs $1,250. All three languages are available through IBM, a spokesman said.

In addition to an 83-key keyboard, the 9002 is equipped with a 57-key membrane key pad for data entry. Each key on the key pad is user definable, IBM said.

Available in the second quarter, a basic 9002 desktop unit, including a keyboard, display and IBM's Caos operating system, costs $6,495; however, to use Xenix, users must add a 10M-byte hard disk drive and a memory management card. A system configured to run Xenix costs $15,960. There is a one-time license charge for Xenix of $995, and a single 10M-byte hard disk drive and cabinet cost $2,195. Memory enhancements for the 9002 cost from $1,395 for a 256K-byte upgrade to $3,190 for a 1M-byte upgrade, IBM said.

Xenix will be marketed through IBM Instruments, Inc. The 9002 is available through IBM Instruments and IBM's National Accounts, National Marketing and National Distribution divisions.

The system was announced by IBM's Information Systems Group, located at 900 King St., Rye Brook, N.Y. 10573.

Is your Mainframe suffering midlife crisis?

MICROCOMPUTERS

MICRO STORAGE

1² INTERFACE, INC.
1² Disksystem

1² Interface, Inc. has announced a 33M-byte disk subsystem for the IBM Personal Computer and compatible systems.

Called the 1² Disksystem, the unit reportedly includes a 33M-byte Winchester disk drive, cabinet, power supply, cable, connector and I/O adapter, according to the company.

Available now, the subsystem has a suggested retail price of $2,795.

1² Interface, 7630 Alabama Ave., Canoga Park, Calif. 91304.

SCIENCE AND COMMUNICATIONS, INC.
3400 Streamer

Science and Communications, Inc. has introduced 3400 Streamer, a 34M-byte, ¼-in. tape system for the IBM Personal Computer.

An intelligent front-panel display informs the user of the machine's status and permits 99 diagnostic tests.

Two models are available, one which stores 1,600 bit/in. and one which holds 3,200 bit/in. The 3400 Streamer costs $5,995; its 1,600 bit/in. model sells for $5,295.

Science and Communications, 352A University Ave., Westwood, Mass. 02090.

PRINTERS/PLOTTERS/PERIPHERALS

AXONIX CORP.
Thinprint 80

Axonix Corp. has introduced Thinprint 80, a battery-powered, full-page thermal graphics printer that weighs 4 lb.

According to the vendor, Thinprint 80 features 40 char./sec bidirectional printing, buffer memory, a print speed of 80 or 136 char./line and serial or parallel interface.

The product's retail price of $279 includes rechargeable batteries, an ac adapter and an 80-page roll of paper.

Axonix, 417 Wakara Way, Salt Lake City, Utah 84108.

BOARD-LEVEL DEVICES

WICAT SYSTEMS, INC.
Exrcom

Wicat Systems, Inc. has introduced a device to be used to provide remote training and servicing for its customers.

The Extended Remote Computer Control Service (Exrcom) was designed to connect a remote terminal to a host CPU. After the connection is made, the vendor said, the master console is able to observe while the remote user either tests or demonstrates software use.

Exrcom is available in two models. One model consists of the Exrcom device and cable connections and sells for $1,250. Another model includes an additional built-in modem and costs $1,500.

Wicat Systems, P.O. Box 520, 1875 S. State, Orem, Utah 84057.

AUXILIARY EQUIPMENT

GOULD, INC.
Personal Conditioner enhancement

Gould, Inc. has announced an enhanced version of its Personal Conditioner, a power line conditioner for the IBM Personal Computer XT.

Personal Conditioner with 400V can support a Personal Computer XT and printer, according to the vendor. The power suppressor filters noise from any amplitude, assures precise voltage and pure sine wave power to computers requiring up to 3.33A of 120V power, the vendor said.

Personal Conditioner costs $349.

Gould, Power Conversion Division, 2727 Kurtz St., San Diego, Calif. 92110.

MICRO SOFTWARE

U.S. SOFTWARE CORP.
68000 Fpac; 68000 Dpac Floating Point Libraries

U.S. Software has announced the 68000 Fpac and 68000 Dpac Floating Point Libraries, sets of subroutines used to process floating-point numbers in the proposed IEEE KCS (Kilo-characters Per Second) single- and double-precision formats for the Motorola, Inc. 68000 microprocessor.

According to the vendor, the systems are delivered in optimized source assembly language form to allow flexibility.

The price for the single-precision 68000 Fpac is $750, and the price for the double-precision 68000 Dpac, which includes the 68000 Fpac, is $1,250.

U.S. Software, 5470 N.W. Irvinebrook Place, Portland, Ore. 97229.

MICRO DATA BASE SYSTEMS, INC.
Kpaint; Ktext; Kgraph

Micro Data Base Systems, Inc. has added three modules to its Knowledgeman package for users of Microsoft, Inc.'s MS-DOS and Digital Research, Inc.'s CP/M 86 operating systems. The modules are: Kpaint, Ktext and Kgraph.

Kpaint allows the user to design forms interactively with 64 different foreground and background colors. Kgraph produces bar charts, scatter diagrams, pie charts and free-form diagrams, according to a vendor spokesman.

Ktext is a full screen text editor. Knowledgeman integrates a relational data manager, spreadsheet, statistical analysis, a screen I/O manager, printed form manager and programming language.

Kpaint costs $100, Ktext sells for $100 and Kgraph is priced at $225.

Micro Data Base Systems, P.O. Box 248, Lafayette, Ind. 47902.

See TOOLS page 84

Find a new mate.

New Attachmate-3270 adds multiple Mainframe windows to your IBM Personal Computer.

Attachmate's coax interface board can bring out the best in your existing mainframe.

When connected to your mainframe, your IBM Personal Computer can be as many as four 3278 terminals. You can work up to seven different programs and display each in a separate window.

Not one Not two But more windows

Looks just like a new IBM-3270 PC, doesn't it?

What's more:

- *Attachmate-3270 provides more mainframe security—only you have the key.*
- *You can coax connect to all existing 3270 control units and use in-place Bisync and SNA networks.*
- *You can share those high speed 3270 printers to save money, time, workspace.*
- *You can transfer files and share data with your mainframe and other PC's as well as access 3270 printer data to print, process, send or save.*
- *And, as a bonus, Attachmate's single-slot board can expand your memory by 256K bytes.*

What's less:

- *The price. Attachmate-3270 gives your mainframe and PC all of this new life—compatibility, flexibility, function and immediate delivery for less than $1,000. For more facts:*

Attachmate Corporation, (206) 644-4010, 3241-118th S.E., Bellevue, WA 98005. Dept. CW3

Name_____

Title_____ Company_____

Address_____ City_____

State_____ Zip_____ Phone_____

The Mating Call: 1 800 IBM-MATE

Attach mate

TOOLS from page 83

LATTICE, INC.
C Compiler Version 2

Lattice, Inc. has announced Version 2 of its C Compiler for the IBM Personal Computer and other computers using Microsoft, Inc.'s MS-DOS operating system.

Version 2 is said to enable C programs to access the complete 1M-byte program and data space that can be addressed by Intel Corp. 8086 and 8088 microprocessors. According to Lattice, four distinct memory models are supported. The S and P models produce code that can address up to 64K bytes of data, while the D and L models allow access up to 1M byte of data. Program size is 64K bytes in the S and D models and 1M byte in the P and L models.

Version 2 of the C Compiler is available from Lattice for $500, and the library source code has been reduced from $1,500 to $500. Current users of the compiler can obtain an update by contacting the point of original purchase.

Lattice, Box 3072, Glen Ellyn, Ill. 60138.

REALIA, INC.
Realia Cobol

Realia, Inc. has announced Realia Cobol, a compiler that also tests IBM VS Cobol programs on an IBM Personal Computer or Personal Computer XT.

For a floppy disk system, the compiler reportedly completes 700 to 1,500 lines of code/min. For a hard disk system, 1,200 to 2,600 lines of code are compiled per minute, the vendor said. The compiler accepts Ansi 74 Cobol with extensions programs and supplies structured programming facilities, according to the vendor.

The compiler features a cross-reference listing, an expanded code listing, symbolic debugger and a nonlicensed runtime library, according to the vendor.

Realia Cobol costs $995.

Realia, 10 S. Riverside Plaza, Chicago, Ill. 60606.

SOFTREND, INC.
Aura

Softrend, Inc. has announced Aura, an integrated package that includes data base management, spreadsheet, word processing and graphic applications.

Using a menu-driven interface, users can sort, select, edit and index data stored in the data base management system, according to the vendor. The spreadsheet function links different spreadsheets, supplies 255 col. and 63 rows for a spreadsheet, offers 50 statistical functions and includes a zoom function which allows the user to inspect data in related spreadsheets, according to the vendor.

The word processor can edit several documents concurrently and move text between documents. The word processor reportedly features unlimited document length, rulers, headers, footers, advanced print control and multiple copy printing. The graphics module produces free-form as well as presentation quality graphics, the vendor said.

The package is written in the C programming language. It requires 256K bytes of random-access memory and either a hard disk or two double-sided, double-density drives.

The program costs $495.

Softrend, 2 Manor Pkwy., Salem, N.H. 03079.

SOFTLOGIC SOLUTIONS
Doubledos

Softlogic Solutions has released Doubledos, an operating system enhancer that is said to allow the IBM Personal Computer and Personal Computer XT to accomplish two functions simultaneously.

By dividing a system's memory into two user-determined areas, Doubledos allows two programs to be run at the same time. A program may be loaded into either memory area and then allowed to process in the background without keyboard interaction, the company said.

Doubledos works with Release 1.1 or 2.0 of IBM's PC-DOS operating system and requires a minimum of 128K bytes of memory.

Doubledos is priced at $200.

Softlogic Solutions, 530 Chestnut St., Manchester, N.H. 03101.

VIKING SOFTWARE SERVICES, INC.
Viking Forms Manager

The Viking Forms Manager (VFM), an on-line screen formatter and data entry software package from Viking Software Services, Inc., is now available for Digital Equipment Corp.'s Professional 300 series personal computers.

According to Viking Software, all programming is eliminated to create, update and key-verify data files. The package features three levels of data validation.

VFM consists of a forms development facility, the Viking data entry software and a variety of utility programs. The single quantity price is $600 with quantity discounts available.

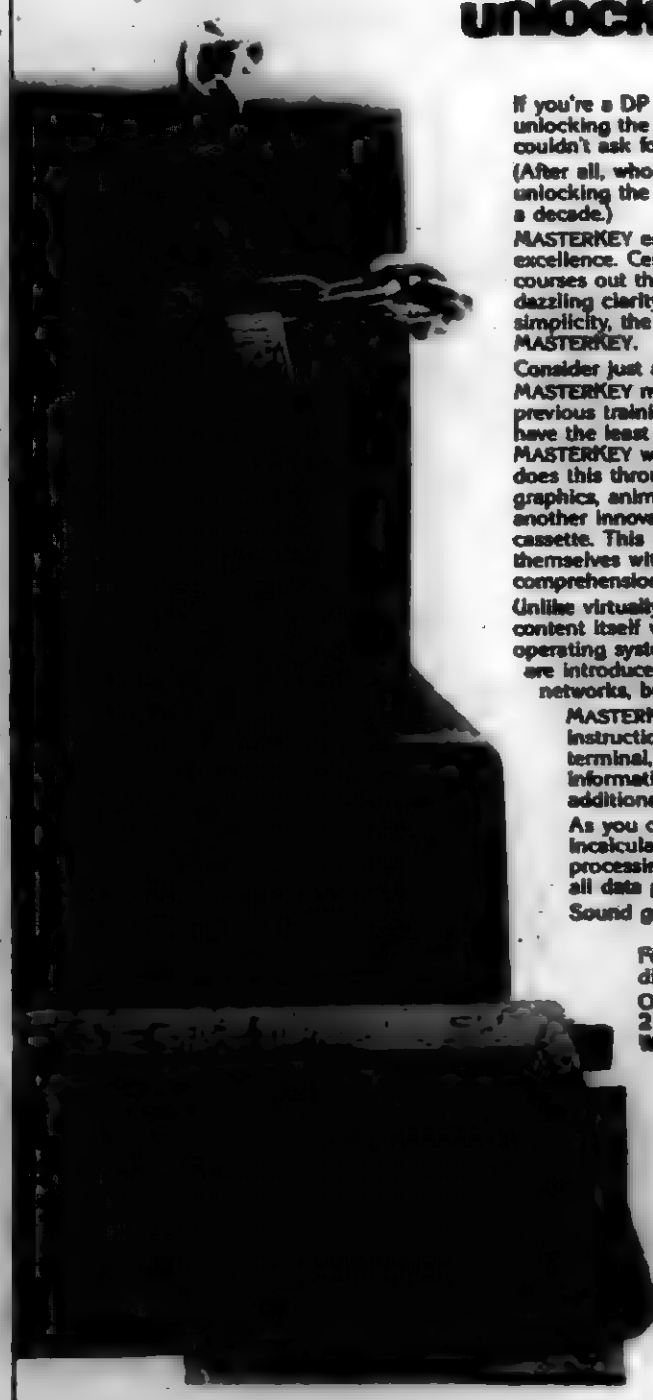
Viking Software Services, 2815 E. Skelly Drive, Tulsa, Okla. 74105.

OFFICE SOLUTIONS, INC.
Officewriter 2.0

Office Solutions, Inc. has released an updated version of Officewriter, a word processing package for the IBM Personal Computer, Personal Computer XT and compatible systems.

Officewriter 2.0 includes such

ATS introduces MASTERKEY.
The ultimate way to unlock the mysteries.



If you're a DP Manager, you know that when it comes to unlocking the mysteries of the IBM® PC for your people, you couldn't ask for a more brilliant source than ATS.

(After all, who has more experience than we do? We've been unlocking the mysteries of computers for more than a decade.)

MASTERKEY establishes a whole new standard of tutorial excellence. Certainly, there are other good IBM PC teaching courses out there. Yet none combines in one package, the dazzling clarity, the building block by building block simplicity, the sweeping, comprehensive range of MASTERKEY.

Consider just a few of its advantages:

MASTERKEY makes learning a snap for anyone. It requires no previous training whatsoever — even for those who seem to have the least aptitude. In astonishingly little time, MASTERKEY will give them a solid grasp of the IBM PC. It does this through an extraordinary combination of powerful graphics, animation and sound. MASTERKEY also boasts another innovation: an interactive but separate audio cassette. This unique concept allows students to pace themselves with far greater ease, thereby making comprehension practically effortless.

Unlike virtually every other course, MASTERKEY doesn't content itself with just teaching the keyboard and the operating system. It goes well beyond that. Students are introduced to word processing, communications networks, business graphics and spreadsheets.

MASTERKEY leaves nothing unexplored. It offers full instruction on how to use the IBM PC as a smart terminal, and how to access, retrieve and store information from S/34-38. It even advises you on what additional software you may need.

As you can see, MASTERKEY is a tool of incalculable value. It enables you and your data processing department to take firm control over all data processing functions.

Sound good?

For more information — or to order MASTERKEY directly — simply call the number below.

Or write to: Automated Training Systems
21250 Califa Street, Suite 107
Woodland Hills, California 91367

Toll Free 800-423-8206
In California call (818) 999-5725

MASTERKEY FROM ATS

CANADA 1-800-663-8329 • In BC & Parts of BASK: 112-800-663-8329 • UNITED KINGDOM (0) 341-5555

MICROCOMPUTERS

functions as spreadsheet and a data base interface. Other features are a document-to-Ascii conversion, horizontal scrolling, right justification and column move/copy/delete, the vendor said.

Officewriter 2.0 costs $325 and includes a user's guide, function key template, reference ruler and key top labels.

Office Solutions, 5702 Odana Road, Madison, Wisc. 53719.

DATAMATE CO.
Pastfile

Datamate Co. has introduced a personal data base system written in Ryan-McFarland Corp.'s RM/Cobol for the IBM Personal Computer and compatibles.

Pastfile is said to enable the user to create, update, sort and print data files without writing programs. The program has an integrated English language report writer, which includes an automatic formatting capability.

The product has up to 50 data fields per item, utilizing as many items as the user's disk will hold. One item record may contain a maximum 2,048 bytes of information, according to the vendor.

The program requires 128K bytes of storage and a printer.

Pastfile retails for $495, the vendor said.

Datamate Co., Suite 125, 4135 S. 100th E. Ave., Tulsa, Okla. 74146.

COMPUTER TEACHING CORP. COURSEWARE APPLICATIONS, INC.
Encore Language System

Computer Teaching Corp. and Courseware Applications, Inc. have introduced the Encore Language System for the IBM Personal Computer. The software package reportedly provides the features necessary to develop computer-based training materials.

Features include an authoring language, stand-alone programming capability, integrated development utilities, color graphics support, user-definable character sets, mouse and light-pen support, documentation, on-line language reference manual and student recordkeeping system.

For development use, the system requires an IBM Personal Computer or Personal Computer XT with 192K bytes of memory, two disk drives and a color graphics adapter.

The system costs $2,000 and is available now.

Courseware Applications, 906 Burwash, Savoy, Ill. 61874.

NORTHWEST ANALYTICAL, INC.
Statpak Version 3.1x

Northwest Analytical, Inc. has announced Version 3.1x of Statpak, a multifunction statistics library for personal computer users.

Statpak includes data management and manipulation with a library of data analysis functions. According to the vendor, the data can be manipulated with an array of functions including deseasonalization, user-defined transformations and subset selection.

Statpak is available on Digital Research, Inc.'s CP/M and Microsoft, Inc.'s MS-DOS, operating systems and requires Microsoft or Microsoft-compatible Basic.

Individual licenses cost $495.

Northwest Analytical, 1532 S.W. Morrison St., Portland, Ore. 97205.

INVENT SOFTWARE, INC.
Recover

Invent Software, Inc. has announced Recover, a disk file utility that allows users to retrieve files erased from the disk.

According to the vendor, all files that had appeared on the directory can be retrieved by typing in the file name.

Recover runs on IBM's PC-DOS, Microsoft, Inc.'s MS-DOS and Zenith Data Systems Corp.'s Z-DOS on IBM, Zenith and compatible computers.

The list price is $49.95.

Invent Software, 199 Willis Ave., Mineola, N.Y. 11501.

SOFTRONICS, INC.
Softerm 2 emulation program

Softronics, Inc. has announced that its Softerm 2 terminal emulation program emulates four new terminals.

Designed to allow the Apple Computer, Inc. Apple II and Apple IIe personal computers to operate like 24 other intelligent terminals, Softerm 2 now also emulates the Hewlett-Packard Co. 2622A, the Honeywell, Inc. VIP7801 and VIP7803 and the Televideo Systems, Inc. 950.

It is now available for $195.

Softronics, 3639 New Getwell St., Memphis, Tenn. 38118.

DIGITAL EQUIPMENT CORP.
Graphplan-86

Digital Equipment Corp. has announced that Graphplan-86, an integrated graphics and spreadsheet software package for the firm's Rainbow microcomputer, is now available.

Developed by Chang Laboratories, Inc., Graphplan-86 is a 16-bit program running under DEC's CP/M 86 or CP/M 80 operating systems.

Minimum hardware requirements are a Rainbow 100 or 100+ computer with DEC's Graphics Option Module and 128K bytes of memory. The Graphics Option Module comes with the GSX-86 graphics utility software that enables Graphplan-86 to display charts on such output devices as color or monochrome video monitors, dot matrix printers and pen plotters.

Priced at $295, Graphplan-86 comes with diskette, license and documentation.

DEC, Maynard, Mass. 01754.

GREAT PLAINS SOFTWARE
Version 3.0 Hardisk Accounting Series

Great Plains Software has announced Version 3.0 of its Hardisk Accounting Series microcomputer software.

The Hardisk Accounting Series reportedly consists of modules for general ledger with financial reporting and budgeting, accounts receivable, accounts payable, payroll and inventory management with point-of-sale invoicing.

In the general ledger module, the cross-account number has been expanded to allow up to 99 accounts.

Also, a monthly sales entry and editing program has been added to the accounts receivable module to reduce the need to reenter transactions that recur monthly. An option to the accounts payable module allows the user to print the check register in check number order, and the payroll module now supports tax sheltered annuities.

A point-of-sale entry feature added to the inventory management module uses a cash drawer that enables the system to perform as a cash register.

Modules in Version 3.0 of the Hardisk Accounting Series are priced at $595 and are available for the IBM

Continued on page 86

/ RENT • LEASE • PURCHASE DEC SYSTEMS / RENT • LEASE • PURCHASE DEC SYSTEMS / RENT • LEASE • PURCHASE DEC

VAX
Performance and Productivity Package

Word Processing Business Graphics
Cornerstone Accounting
ADT Data Management Spreadsheet/Modelling

We bring it all together on VAX systems with our Performance and Productivity Package, allowing you to configure your VAX system to obtain the most out of it.

Our general accounting system is written in native mode VAX Cobol and uses multi-key files and extensive application of 'COPY' facility for maintenance and standardization. The Data Management system allows user design and implementation of Query and Report procedures, as well as extended support of the general accounting system. Word processing, spreadsheet/modeling and business graphics provide tools essential to office and management personnel.

Contact us for further details or to arrange a demonstration on how our VAX Performance and Productivity Package puts new meaning in the word "System."

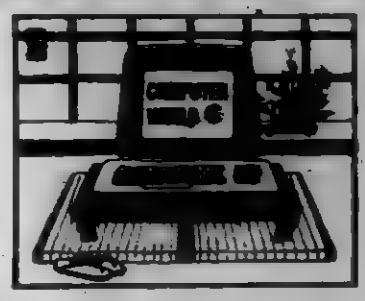
*VAX is a registered trademark of Digital Equipment Corporation.

UTS
UP-TIME SYSTEMS, INC.
AUTHORIZED DEC COMPUTER DISTRIBUTOR

1140 N.W. 63rd
Oklahoma City, OK 73116
(405) 843-8631
Short-term rentals available

/ RENT • LEASE • PURCHASE DEC SYSTEMS / RENT • LEASE • PURCHASE DEC SYSTEMS / RENT • LEASE • PURCHASE DEC

Computerworld/Japan can bring your message to the world's second largest computer market.



The Japanese computer industry is growing at a rate of 20% per year. There are currently more than 101,000 installed general purpose computers valued at over $18 billion. This figure does not include minis, micros and personal computers. Small business computers are currently the leading growth sector in the Japanese computer market.

Japan is looking for well-developed technology that will meet their future needs. And with no strong independent software industry of its own, Japan offers great opportunity for U.S. manufacturers in the packaged software market.

Computerworld/Japan is a weekly publication covering the latest developments in the Japanese computer industry with reports on new products, services and trends. Its 30,000 subscribers include top management and DP professionals throughout the country.

CW International Marketing Services gives you one-stop advertising service in countries around the world. For more information on *Computerworld/Japan* or any of our other foreign publications, just fill out the coupon below.

Diana La Mantia, Manager
International Marketing Services
CW COMMUNICATIONS/INC.
375 Cochituate Road, Box 880
Framingham, MA 01701
(617) 879-0700

CW COMMUNICATIONS/INC.
Publishers of *Computerworld* and other leading publications around the world.

Please send me more information on:
☐ *Computerworld Japan* ☐ Your other foreign publications

Name _____ Title _____
Company _____
Address _____
City _____ State _____ Zip _____

MICROCOMPUTERS

Continued from page 86

Personal Computer and Personal Computer-compatible systems, the Personal Computer XT, the Apple Computer, Inc. Apple IIe and Apple III, the Texas Instruments, Inc. TI Professional and the Wang Laboratories, Inc. Professional computers.

Great Plains Software, 1701 S.W. 38th St., Fargo, N.D. 58103.

CLEO SOFTWARE
Cleo 3270; Cleo 3780

Cleo Software has introduced two communications software packages that allow the Hewlett-Packard Co. HP 150 to emulate IBM 3270 and 3780 terminals.

The Cleo 3270 and 3780 packages utilize one of the RS-232 ports on the HP 150, and no additional hardware is required, according to the vendor. For the HP microcomputer, the suggested license price for both packages is $500.

Both 3270 and 3780 also run on Industrial Micro Systems microcomputers running Musys Corp.'s Turbodos 1.3 operating system. The 3780 supports IBM's Binary Synchronous Communications protocol for high-speed transmission, up to 9,600 bit/sec and reception of data files over telephone lines. The license price for the 3780 is $395, and the price for 3270 is $750.

Cleo Software, 461 N. Mulford Road, Rockford, Ill. 61107.

COMPUT-TOME, INC.
CT-OS 86

Comput-Tome, Inc. has announced an enhanced version of its word processing software that will run under Digital Research, Inc.'s CP/M 86 operating system.

According to the vendor, CT-OS/86 is targeted for use with Digital Equipment Corp.'s Rainbow personal computer. With it, users are able to transfer word processing files from DEC VAX and PDP-11 series host processors to Rainbows and to a variety of other personal computers that use the operating system.

The product provides search and replace, cut and paste, list processing, Ascii file handling, 132-col. document width, stored text libraries, right-justified margins, scientific character set and a repertoire of user-defined keys to invoke special word processing functions.

CT-OS/86 is priced at $950 for a single-user license, including list processing, spelling corrector and full documentation. Delivery takes 30 days after receipt of order.

Compu-Tome, 234 E. Colorado Blvd., Pasadena, Calif. 91101.

AARON/SMITH ASSOCIATES, INC.
Finder

Aaron/Smith Associates, Inc. has announced Finder, a data retrieval package for users of IBM Personal Computer and Personal Computer XT microcomputers as well as those manufactured by Radio Shack.

The package runs on IBM micros equipped with IBM's PC-DOS Release 2.0 operating system, the vendor said.

It also runs on Radio Shack TRS-80 Models II, 12 and 16 (running as a 12), with Radio Shack's TRS-DOS operating system Release 2.0 or 4.2. The minimum main memory requirement is 64K bytes for both IBM and TRS-80 systems, the vendor said.

Finder was designed to store and retrieve textual information using large data bases.

The package was designed for use by libraries, information centers and records managers, according to the vendor.

Aaron Smith Associates, Suite 518, 1422 W. Peachtree St. N.W., Atlanta, Ga. 30309.

FASTWEAR, INC.
Thor

Fastwear, Inc. has announced Thor (thought organizer), a thought-processing package for the IBM Personal Computer and Personal Computer XT.

According to the vendor, Thor integrates the free-formatting facility of a word processor and the filing and retrieval capabilities of a dedicated data base manager into a single program.

Thor reportedly allows the user to record, categorize and retrieve thoughts without any knowledge of computer syntax. Thoughts can range in size from one line to multiple pages.

Minimum system requirements are 128K bytes of memory running DOS 2.0 or more current.

Thor is priced at $295.

Fastwear, 300 Freeway Drive E., East Orange, N.J. 07018.

ADVANCED SYSTEMS CONCEPTS, INC.
Protact

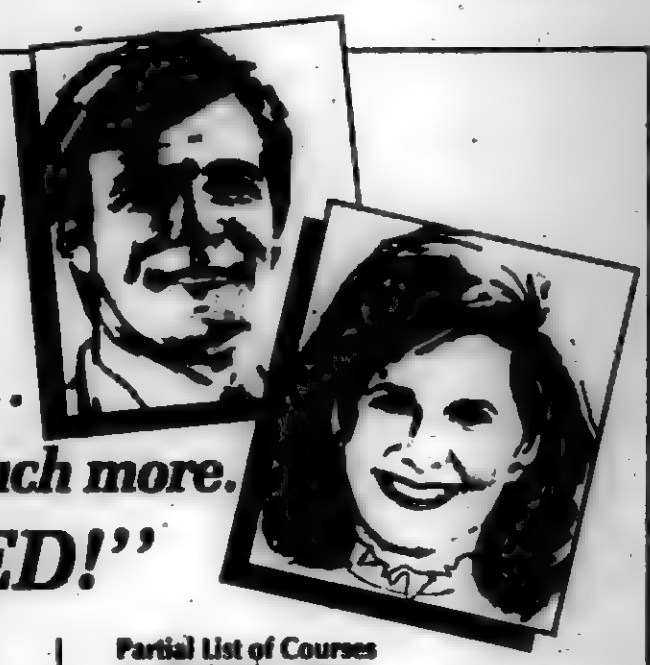
Advanced Systems Concepts, Inc. has announced the extension of its Integrated Applications Control package for the Digital Equipment Corp. Professional 300 series microcomputer.

Protact was designed to provide terminal, file and network management for the Professional 300 series. It allows one or two users to access applications on a local or remote Professional, DEC PDP-11 or VAX processor.

According to the vendor, Protact file manager uses DEC's Record Management Services as its file access method.

A Protact developer's kit is priced at $2,500; a runtime license costs $395, and the terminal server costs $595.

Advanced Systems Concepts, 22 Hudson Place, Hoboken, N.J. 07030.



"All we wanted was a basic understanding... We got much, much more. Thanks, QED!"

This is one of the many good things you have said about QED courses. Thank you for your continuing support. We look forward to serving your data processing needs during 1984.

Here are just a few of the courses we will be teaching from February-June at our several regional learning centers, on a consortium basis, and in-house. QED has over 100 courses available in systems development, structured methodologies, data base, data communications, management and interpersonal skills, information resource management, CICS, IMS, VSAM, and other technical, software topics. You will find course descriptions in our new, free 1984 catalog. Call us for details, dates, and registration information...and ask about our IBM technical/software workshops. You, too, will say, "Thanks, QED!"

CALL Toll Free 800-343-4848
In Massachusetts 617-237-5656

Partial List of Courses Available from QED

- CICS Command Level Programming
- CICS Testing and Debugging
- Conflict Management in the DP Environment
- Cost-Benefit Analysis
- Data Analysis
- Data Base Concepts and Systems
- Data Base Design
- Data Communications Concepts and Systems
- Decision Support Systems
- DL/1 Application Coding
- DP Concepts for the Non-DP Manager
- DP Documentation
- Effective Presentations
- Ergonomics of Automated Office Systems
- Human Relations: Productive Working Relationships
- IMS Application Coding
- Leadership, Managing, and Influencing People
- Managing Time Effectively
- Programming in the C Language and Unix Environment
- Project Management and Control
- Quality Assurance
- Screen Design
- Structured Programming
- Structured Techniques for System Design
- Structured Testing
- Systems Analysis Workshop
- System Design Workshop
- The Information Resource Environment: Micro vs. Mainframe
- VSAM Application Design
- VSAM for Assembler Programmers
- VSAM for COBOL Programmers
- Writing with Power

Education • Publications • Software
QED Information Sciences, Inc. • QED Plaza • P.O. Box 181 • Wellesley, MA 02181

COMPUTER INDUSTRY

INDUSTRY INSIGHT
Jeffrey Beeler
CW West Coast Bureau

'PC/34' to debut? Predictions vary

IBM is said to be preparing the introduction of an additional small business processor that will fall somewhere in performance between the company's System/36 and its Personal Computer XT.

A scaled-down version of the System/36 would make a logical addition to Big Blue's existing small business computer product line, according to a sampling of industry watchers.

But on the question of exactly what form the predicted processor is likely to take, the sources' opinions sometimes differ sharply.

One user source, who asked not to be identified, foresees the introduction of an "entry-level" System/36 that will incorporate just one diskette slot and cost less than $20,000. The low-end addition to the System/36 family will probably be announced "within the next 45 days," according to the source.

Echoing the prediction of a stripped-down System/36 announcement is Brian Jeffery, research director at the Palo Alto, Calif.-based International Technology Group, Inc. Jeffery expects the System/36 extension to occupy a critical place in an IBM product spectrum that will also eventually include an additional microcomputer capable of emulating the company's most popular small business processor, the System/34.

Tentatively nicknamed the "PC/34," the hypothesized micro will be aimed mainly at small businesses and will be intended to provide a migration route for users of IBM's existing Personal Computer XT, Jeffery predicted.

IBM's small business systems lineup would include — in ascending order — the Personal Computer, Personal Computer XT, PC/34, System/34, entry-level

See IBM page 106

Off-site backup spreading

By Robert Batt
CW West Coast Bureau

MENLO PARK, Calif. — The proliferation of microcomputers in Fortune 1,000 type organizations and fears of natural disasters and computer hackers have resulted in a surge in demand for off-site storage protection, according to service providers.

"The spread of micros in particular is drawing attention to the need for off-site storage," according to Jim Valentine, president of Secured Data Services, Inc. "Without adequate backup arrangements, the personal computer will cause a lot of problems."

The increase in awareness has also resulted in data processing managers being burdened with protecting the company's information assets as well as performing their day-to-day activities, and often they cannot cope, off-site storage providers told *Computerworld* recently.

According to Bill Dreyer, vice-president of marketing for the Iron Mountain Group, an off-site security firm in Rosendale, N.Y.; "Data processing managers are feeling the pressure. They need help and assistance. The main problem is that they are looked to to provide solutions, but they do not have the resources to identify all the information that should be backed up."

Nevertheless, security firms are reporting a big increase in demand for their services. "Since we opened our doors a year ago, we have been doubling our business every few months. We now have 100 clients alone who store computer materials, and we expect to double that figure by the end of the year," said Donald Rickgauer, executive vice-president of National Safe Depository (NSD), based in San Jose and serving the Silicon Valley area.

The number and type of storage clients vary widely. For example, Secured Data Services in Ohio opened 18 months ago and now has 24 customers storing computer media in fields such as energy, transportation and the financial sector. Iron Mountain, established in 1967, has five storage facilities and about 1,200 customers, many of them banks and high-technology manufacturers from the Northeast.

Most storage firms provide courier service to and from their clients' facilities. This is reportedly of vital importance, especially to large organizations that need their backup data available on a monthly

See STORAGE page 94

Honeywell refocusing services

By Peter Bartalik
CW Staff

NEWTON, Mass. — Third-party maintenance presents an opportunity for Honeywell, Inc. to prepare for recessionary times and to utilize a cadre of service engineers whose relative value declines as hardware reliability increases and cost decreases.

Those are the primary reasons why Honeywell is engaged in a year-old effort to turn its service organization into a service business, according to Sy Kraut, Honeywell vice-president and general manager of the company's Customer Services Division headquartered here.

A third factor, he said during a recent interview, is that smaller microcomputer vendors simply cannot afford to carry a nationwide service organization.

Honeywell, which celebrates its centennial in 1985, has been in the service business for more than 25 years, Kraut said. The company hopes to build on that tradition and move into the hierarchy of the top six third-party maintenance vendors who, according to Kraut, earn 51% of third-party maintenance revenues in the U.S. "I've seen figures saying that in 1984 there could be $800 million to $1.2 billion in third-party maintenance; we feel we can pick up our fair share of that," he said.

The company has evolved the concept of the Integrated Service Supplier, which means providing service to a business that may have many types of computer-related equipment from many suppliers. According to Kraut, a businessman with hundreds of varied processors, terminals, modems, private branch exchanges and local-area networking "wants to be able to call one

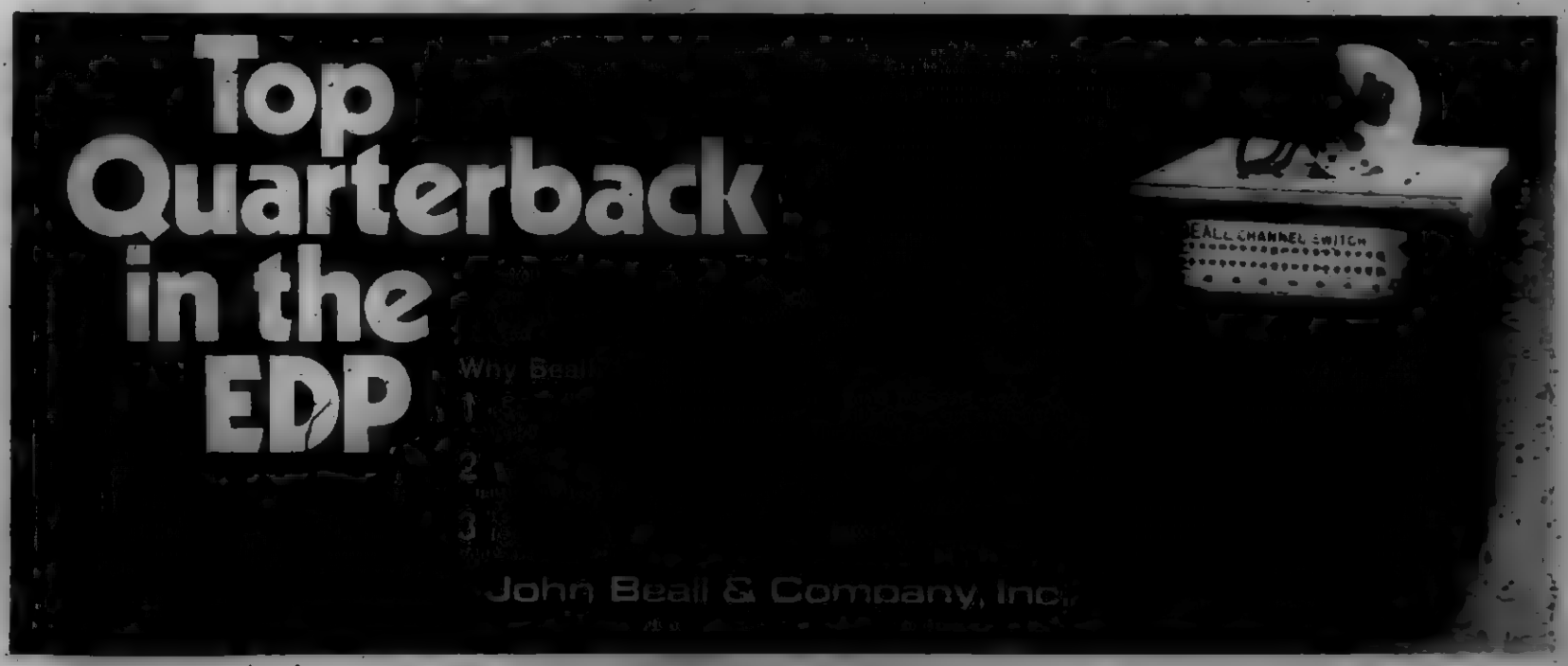
See KRAUT page 106

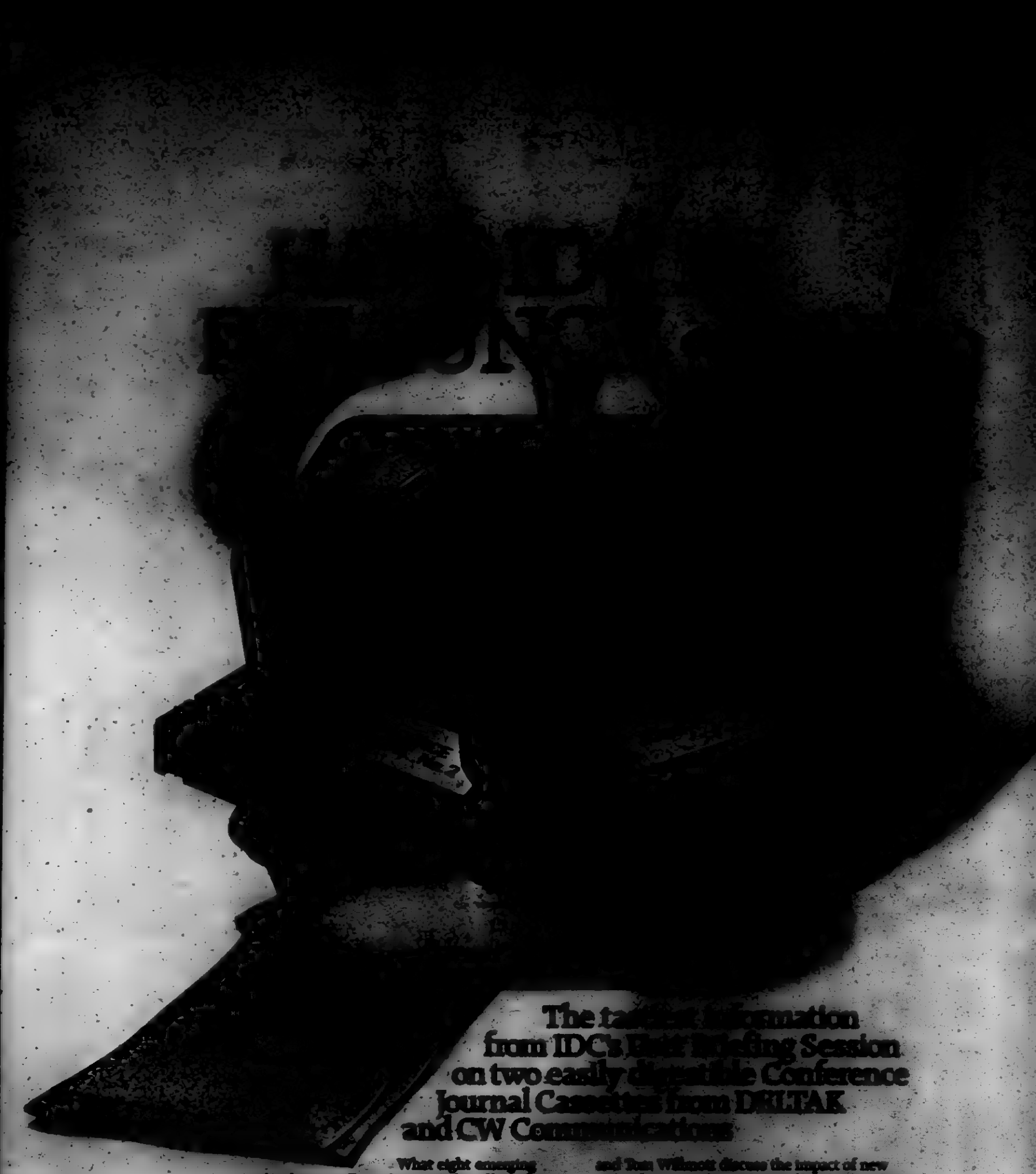
TYMSHARE

McDonnell Douglas Corp. does an about-face and again decides to acquire Tymshare, Inc., but at a lower price/**96**

INSIDE

- This may be the year the U.S. robotics industry takes off, but a proliferation of manufacturers could erode profits, and socio-economic problems could delay purchases/**98**
- Quiet talks between IBM and state-owned Stet could spell problems in Italy for Ing. C. Olivetti and Co. S.P.A./**93**
- Computer technology is moving out of the back room and into the boardroom, which means a new set of problems for attorneys, according to a Harvard Business School professor/**96**





The ta… from IDC's … Session on two easily digestible Conference Journal Cassettes from DELTAK and CW Communications

What eight emerging technologies will revolutionize the office of tomorrow? Will the AT&T breakup change the course of telecommunications? What's next for personal computing?

For the answer to these and many other critical questions, don't miss "IDC Computers the Future," two 30-minute Conference Journal programs videotaped on location during the December User Briefing. Featuring a distinguished panel of professionals from International Data Corporation, the "watchdog" of the information industry for over twenty years.

In Part I of this series, Will Zachmann and Tom Willmott discuss the impact of new technologies on the evolving office, both today and tomorrow. Then Neil Kleinman, IDC's graphics expert, gives you an insider's view on the state of computer graphics. In Part II, noted MIS author John Gantz joins forces with Zachmann to shed exciting new light on the future of personal computing.

But here's the best part. You and your associates can "attend" this lively, informative video conference over lunch—without ever leaving the office! To order or find out about other Conference Journals, call DELTAK at (800) 323-7686; in Illinois, (312) 369-2000.

DELTAK
Mid-West Technology Center
1751 West Diehl Rd., Naperville, IL 60563
(312) 369-2000 (800) 323-7686

…
…
…

COMPUTER INDUSTRY

Analysts predict 'breakout' for robotics in '84

COVERAGE LEADER
Bohdan Szuprowicz

After several false starts in previous years, industry observers and analysts are now predicting that 1984 will be the real "breakout" year for robotics.

Much of this optimism assumes that industrial plants will begin to modernize in earnest, as the economic recovery picks up steam and firms install robots to compensate for high labor and operating costs.

Most recent estimates of overall robot markets continue to be bullish, estimating robot sales of $240 million in 1983 and a $2 billion market by 1990. But the robot promoters often forget that the proliferation rate of robot manufacturers in recent years was probably even higher than that. This has eroded any profits for robot suppliers.

There are believed to be between 200 to 300 Japanese robot suppliers, up to 100 American and several dozen European firms all chasing a relatively small market in which only about 15 suppliers are expected to survive with a reasonable market share to make a profit.

This flood of competitors in the robotics field is largely blamed on excessive "media hype" which often extolls the benefits without giving equal time to the potential and real problems associated with extensive use and rapid introduction of robots. A major concern is the loss of jobs at a time when unemployment in all the industrialized countries is breaking record levels. Political pressure on Congress is mounting to estimate the labor dislocation resulting from use of robots in the future and to come up with proposed remedies and sources of funds to implement such programs.

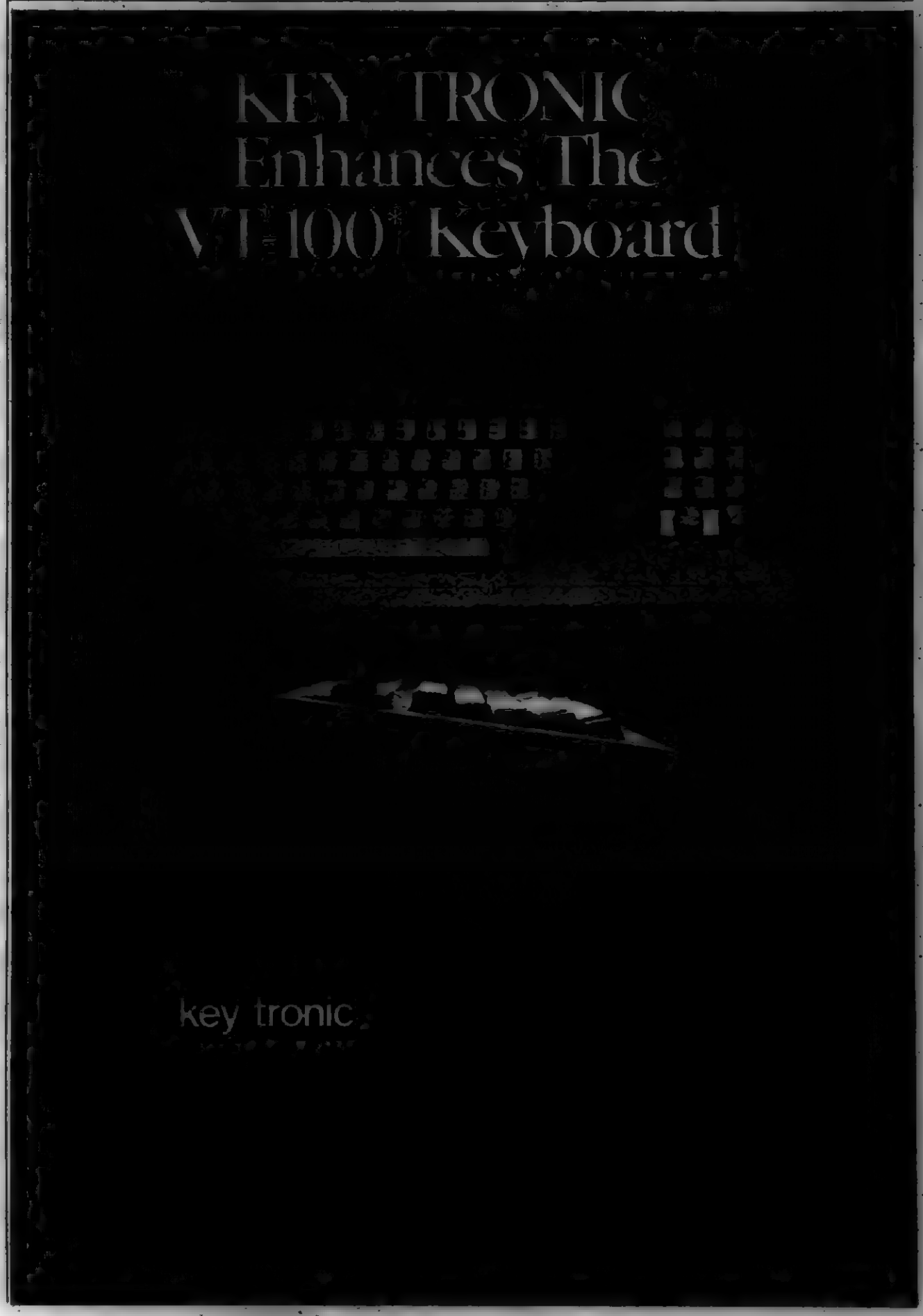
As a result, many manufacturers may be reluctant to install robots in their plants until the issues are resolved and they are assured that future labor and government action will not force them to engage in expensive retraining projects or that they will not be otherwise taxed or penalized for introducing automation that results in permanent elimination of jobs in their respective industries.

One industry where robots are making rapid inroads is electronics. Productivity in electronics plants can be improved significantly through the use of electronic assembly robots that are designed to pick and insert nonstandard parts and components into printed-circuit boards of electronic equipment assemblies. The electronic assembly robot market is in a truly emerging stage, estimated at only $3 million to $4 million today but expected to grow 74% annually through 1985, more than twice as fast as the overall robotics market. It will probably reach a $500 million market by 1990, becoming the most sophisticated segment of the robotics industry.

Critical to future productivity improvements in electronic assembly are the multivision robotic systems that depend on artificial intelligence and vision technologies as well as on precision and microcomputer controls. Price still remains a major deterrent because current vision-integrated robots cost about $125,000, while the market is unlikely to tolerate prices much above $40,000. Nevertheless, some new companies are already pioneering in this promising field with specialized robots designed to take advantage of these developing opportunities.

The latest entrant in this segment is Autobotics, a start-up specializing in robots designed to improve productivity of magnetic disk drive manufacturers. Few people are aware that about 32% of disk drives fail in-

See [illegible] page 104



COMPUTER INDUSTRY

McDonnell Douglas finalizes Tymshare acquisition

ST. LOUIS — McDonnell Douglas Corp. announced last week it has again agreed to acquire Tymshare, Inc., a move expected to boost McDonnell Douglas' subsidiary, McDonnell Douglas Automation Co. (McAuto), into the list of the three largest processing vendors.

The move had initially been announced late last year [CW, Dec. 5], but fell through. A spokesman for McAuto said the acquisition is basically the same as that announced previously, but that the parent corporation had as yet made no announcement about how Tymshare will be managed.

The value of the purchase has been reduced, perhaps reflecting Tymshare's net loss for 1983 of $1.5 million, a figure that had been reduced by favorable tax benefits from a total loss of $6.6 million.

In the fourth quarter of 1983, Tymshare posted a net loss of $1.4 million, reduced by tax benefits from a total loss of $3.5 million. In 1982, Tymshare had posted profits of $8.8 million, but had experienced a fourth-quarter loss of $2.3 million.

McDonnell Douglas, according to the spokesman, has a "definitive agreement" to purchase 12.3 million shares of Tymshare at $25 per share, for a total value of $307.5 million.

In December's announcement, the value of the acquisition had been placed at $372 million, or about $31 per share. Additionally, McDonnell Douglas has been granted an option to purchase 2.5 million unissued shares of Tymshare at $25 per share; those unissued shares had been priced in December at $31 per share.

The company intended to issue a tender offer for the outstanding Tymshare stock by last Friday, the spokesman added.

McDonnell Douglas will use Tymshare's Tymnet value-added communications network to expand into the financial services networking marketplace.

Cullinet airs 50% increase in revenues

WESTWOOD, Mass. — Cullinet Software, Inc. recently announced revenues for the third quarter ended Jan. 31 increased 50% over the corresponding period a year earlier, and profits increased 40% over the same period.

Sales for the three-month period were $31.3 million, compared to $20.9 million for the same period a year earlier. Profits for the quarter were $4.2 million, or 28 cents per share, compared to $3 million, or 21 cents per share, reported a year ago.

Cullinet reported that revenues for the nine months ended Jan. 31 were $84.8 million, up 54% over the same period a year earlier, with profits for the same period rising 45% to $11.6 million.

The company also reported that total costs and expenses were up 50.1% for the quarter and up 55% for the first nine months of fiscal year 1984, compared to year-earlier figures.

Cullinet earlier announced it had been awarded a $2.2 million contract to provide software and maintenance for the $350 million system integration project recently awarded by the U.S. Navy to Electronic Data Systems Corp. of Dallas.

Under that agreement, which reportedly involved multiple vendors in the largest benchmark test ever performed, Cullinet will provide the Navy with its IDMS data base management system for use with IBM 3081 and 4331 mainframes to integrate hardware, software and nationwide networks at each of two Navy supply centers.

The Northern Telecom system:
A benchmark in batch processing that keeps getting better.

Northern Telecom batch processing systems have proven themselves, in more than a decade of use in a variety of applications, to be among the most reliable, practical, cost-effective systems ever developed. They deliver more throughput per dollar than any competitive system.

Now, as solid evidence of our commitment to batch processing, we're improving these already-successful systems for even more productivity. For instance, we're introducing a new high-speed band printer with changeable type. Operating now with IBM's SNA, we've also added new, low-cost distributed data processing capabilities for more system versatility, and to provide for future growth toward the integrated office.

We're back

COMPUTER INDUSTRY

GSA's upcoming DP solicitation to exclude micro sales

By Andrew Mohr
Special to CW

The General Services Administration (GSA) will issue its Federal Supply Classifications Group 70, Section A schedule contract solicitation on or about March 6. In a change from past schedules, this solicitation will exclude the sale of microcomputer hardware and software.

The solicitation, commonly called the Section A schedule, is GSA's general-purpose automated data processing equipment schedule contract. It provides for the purchase, rental and maintenance of DP system configurations, control devices, input/output and storage devices, optical character recognition, analog/hybrid systems and software. The closing date for the submission of offers is April 11, 1984.

The Section A schedule is an indefinite quantity contract awarded to numerous manufacturers, distributors and dealers. GSA uses schedules to permit agencies to buy commercially available items without the delay or expense entailed in conducting a formally advertised or negotiated procurement for each purchase.

To ensure the government receives a fair deal, GSA negotiates discounts from a vendor's commercial price list before awarding a schedule to the vendor. Upon award, a schedule contractor may sell or rent its products to federal agencies and certain prime contractors working under government cost-reimbursement contracts.

GSA now manages two other DP equipment schedules in addition to the Section A schedule. These are the Section B schedule, which encompasses DP supplies and peripherals, and the newly established Section C schedule, which is devoted to micro hardware and software.

Confirming GSA's recent policy of segregating micro schedule procurement from mini and mainframe schedule procurement, GSA will exclude micro DP equipment from the Section A schedule. Micro equipment will be available only on the Section C schedule. Thus, vendors offering micro equipment in response to the Section A solicitation may have their offers rejected.

The exclusion of micros may cause problems because GSA's definition of micros remains unclear. The current Section C schedule contains equipment ranging from single-user portable computers to multiuser, multitask equipment capable of serving 64 users. GSA has indicated that DP equipment designed for an office environment will be considered to be micro equipment. However, objective criteria have not been promulgated.

Of major importance to mini and mainframe vendors, it appears that micros may continue to be sold under Section A as part of a mini or mainframe system. However, add-on sales of micros at system installations must apparently be made under the Section C schedule. This will force vendors to use both Sections A and C for serving system installations. In addition, this will result in the differing performance standards and maintenance provisions contained in Sections A and C being applied to the same type equipment at the same site.

The Section A schedule will continue to allow equipment rental. Since Section C does not provide rental, micro systems that must otherwise be sold under Section C may apparently be available for rental under Section A.

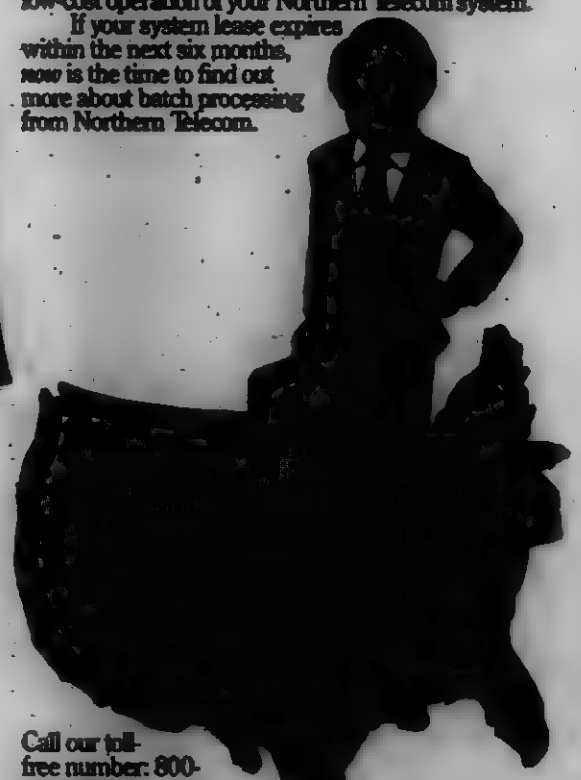
The March 6 opening date is the earliest GSA has issued the Section A schedule in years. While the early release of Section A will provide GSA more time to negotiate with bidders, it might surprise vendors expecting an April solicitation. ‡

Mohr practices at the law firm of Cohen & White in Washington, D.C., specializing in federal procurement and computer law.

Your processing may be remote. but Northern Telecom service is on the spot.

With service and maintenance professionals located at 157 cities nationwide, we're able to provide prompt response to your call for service. How fast? Two hours in major metropolitan areas; four hours in most other areas of the country. And our multi-year maintenance agreements guarantee continuing, low-cost operation of your Northern Telecom system.

If your system lease expires within the next six months, *now* is the time to find out more about batch processing from Northern Telecom.



Time-proven performance with long-term savings.

Northern Telecom's aggressive pricing is more proof of our commitment to batch. Our discount structure offers long-term savings on multi-year leases. And at renewal time, you can save even more with discounts up to 30%.

Call our toll-free number: 800-331-3113. Or write Northern Telecom, Mail Station T-240, P.O. Box 1222, Minneapolis, Minnesota 55440. We'll show you how we can tailor a batch system to your specific needs. And save you money, too.

nt northern telecom

ing batch!

The most successful first year in the history of American business.

It's true. COMPAQ® Computer Corporation had greater first-year sales than any new company in American business history.

We sold $111 million worth of our personal computers, the COMPAQ Portable and the COMPAQ PLUS™.

How did we do it?
We followed two principles.

Principle One: Offer people personal computers that simply work better. We gave them the COMPAQ Portable. It's a rugged, full-function system that runs all the most important, most useful software; literally hundreds of programs.

We followed with the COMPAQ PLUS, a high-performance version with ten megabytes of storage.

Besides being portable, both offer more capability than most other personal computers. They display text *and* graphics on the same built-in screen, to mention just one example. And they're designed to be expandable, to grow as

[illegible]

The sales figures say we did pretty well on Principle One.

Principle Two: Make it easy for people to get what they need. More than one thousand of the country's best computer dealers are now Authorized COMPAQ Computer Dealers. We back those dealers with training, service, and support to make life simpler for our users. That's one reason 98 percent said in a recent survey that they would recommend COMPAQ to a friend.

We were honored to have a history-making first year. But it's only history now. How should a company follow up the all-time best beginning?

Principle Three: Stick with Principle One and Principle Two.

For the location of your nearest Authorized Dealer, call 1-800-231-0900.

COMPAQ® is a Registered Trademark and COMPAQ PLUS™ is a Trademark of COMPAQ Computer Corporation. ©1984 COMPAQ Computer Corporation.

COMPAQ®

It simply works better.

COMPUTER INDUSTRY

IBM/Stet talks spark rampant speculation

By Wilma Rodis
and Francesco Sammartino
Special to CW

ROME — Speculation is rampant here about the possibility of a telecommunications partnership between the state-owned telecommunications organization, Stet (Societa Finanziaria per le Telecommunicazioni), and IBM.

To date, both parties have held their cards close to their chests, but talks of a future collaboration on digital private telephone exchanges and data communication networks are still very much alive. Michele Principe, chief executive officer of Stet, and John Opel, chairman of IBM, reportedly reached some preliminary agreements during a recent meeting in Paris.

One of the most significant initial pacts concerns the potential establishment of a new Italian public network, known as Itapac, a packet-switching system that will eventually allow IBM's System Network Architecture (SNA) network to be directly accessed.

No network modifications

The establishment of software compatibility between the Itapac network and IBM's SNA would enable IBM installations to be connected without any modifications to the Itapac network. This compatibility could represent a significant market advantage for both partners as well as considerable savings for their respective users, as there would be no need to invest in any new interface hardware.

Other points under negotiation include:

■ That the Itapac network be 100% owned by SIP (Stet-owned telephone company).

■ The establishment of an alliance between IBM and Italtel (Stet's telecommunications manufacturing company) on the distribution of private switching equipment.

■ The sharing of IBM/Rolm Corp. telecommunications technology with Stet.

■ The establishment of direct collaboration with SGS (Stet's semiconductor manufacturing company) and an additional agreement addressing the factory automation market.

While the potential partnership may eventually pay big dividends for Stet and IBM, it could spell disaster for Italy's native company, Ing. C. Olivetti & Co. S.p.A.

Carlo de Benedetti, president of Olivetti, recently told the Italian Senate that the IBM-Stet partnership would yield negative results. He argued that the success of the Italian industrial system is contingent upon optimizing the use of national resources. Furthermore, agreements involving partners with huge technological disparity will compromise international competition, de Benedetti maintained.

Thus it remains to be seen who will be Stet's partner. After the agreement between Olivetti and AT&T [CW, Jan. 9], many industry observers considered Stet in a weakened position, but now Stet is proving to be a most attractive telecommunications partner.

Will it be IBM or Italy's own Olivetti? While the possibility of a three-party partnership cannot be excluded, it is difficult to imagine Stet changing its present course. On the other hand, Olivetti represents the only European contender in the running.

Rodis and Sammartino are reporters at Computerworld Italia, based in Milan, Italy.

Honeywell, NCR to collaborate

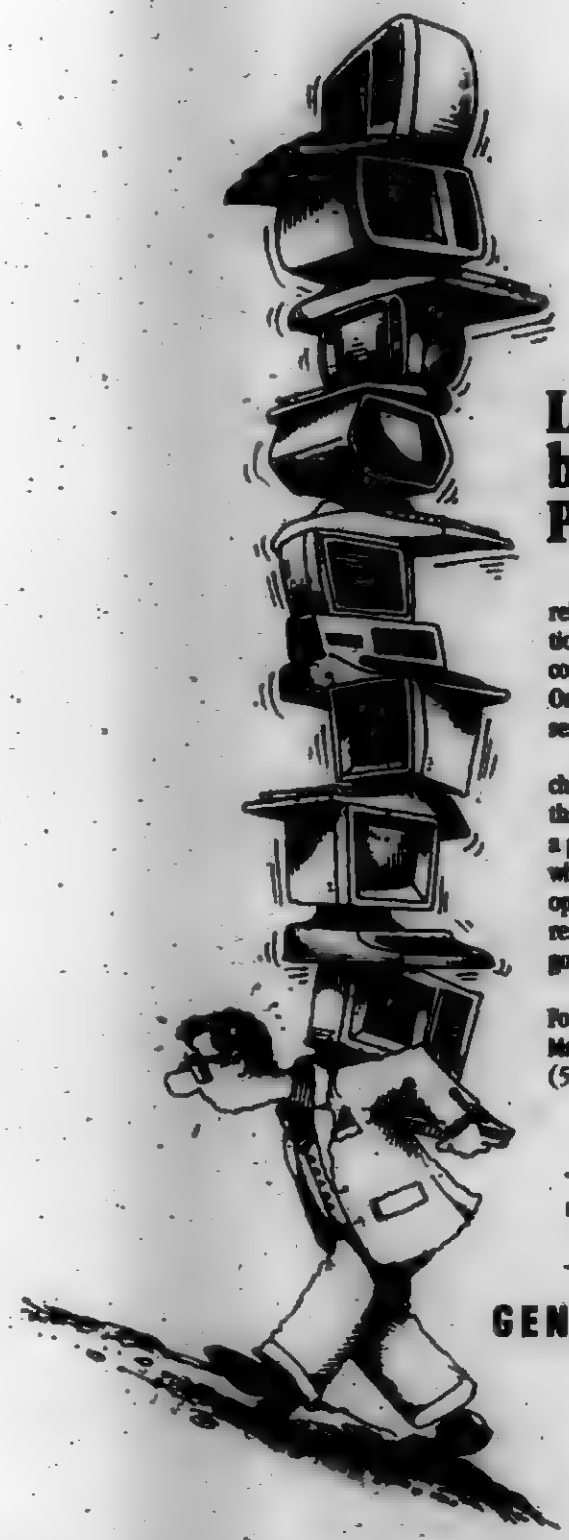
MINNEAPOLIS — Honeywell, Inc. and NCR Corp. recently announced an agreement for Honeywell to use NCR's 32-bit very large-scale integration processor chip set in the development of a planned computer system.

Additionally, the companies announced they will jointly develop a custom integrated circuit chip for use in the Honeywell system.

Honeywell said the planned system will be compatible with selected Honeywell products. James J. Renier, vice-chairman of Honeywell and president of the firm's information systems division, pointed out that the agreement "will enable us to bring new products with advanced 32-bit technology to our worldwide markets faster."

NCR's president and chief executive officer, Charles E. Exley Jr., said that the agreement with Honeywell is a milestone in efforts to market the NCR/32 chip. He stated that the chip will be manufactured at NCR's microelectronics facility, located in Colorado Springs, Colo.

NCR previously announced a computer system, the NCR 9300, built around the 32-bit chip set [CW, March 21].



Let us bear your PC burden.

General Electric now offers relief for busy managers of information systems: complete service for your company's personal business computers. On-site right where they are, or at GE service centers from coast to coast.

With GE as your service source, you choose any one of several service options that's best for you. For example, we have a program that provides you with a loaner while your PC is at our service center. If you opt for on-site contract service, we can respond fast, day or night, if something goes wrong.

So take a load off your shoulders. For more information, call Rob Rackowski, Manager—National P.C. Service Sales, (518) 385-4892.

Put GE on your PC.

General Electric Company
Instrumentation & Computer Services Dept.
1 River Road, Building 6, Room 208
Schenectady, NY 12345

GENERAL ELECTRIC

Storage sites reflect radical differences

Locations vary from mine shafts to San Jose vaults

Two companies have radically different approaches to providing maximum security for their clients.

Secured Data Services, Inc. has one of the more unusual off-site storage sites for computer data. Located in an abandoned mine some 60 feet beneath the surface, the two-acre site, about 20 miles west of Dayton, Ohio, is buried under 60 to 80 feet of solid limestone.

The complex looks like something out of a James Bond movie with its high security gates, closed-circuit television and seven-inch-thick vault door. "We wanted a site that was as secure as we could make it and that was immune to natural and man-made problems," said Jim Valentine, the firm's president.

Having secured his site, Valentine added climate-control systems and brought in electricity.

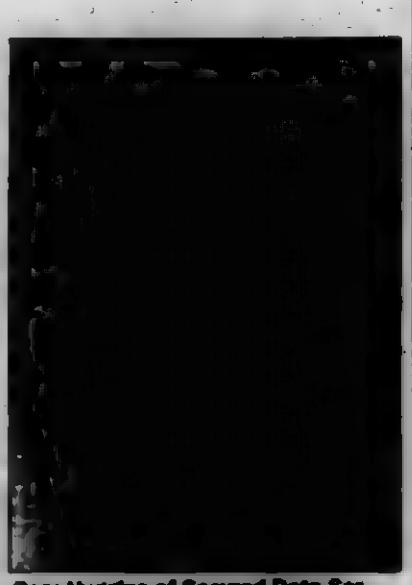
"We didn't have to worry about water, since there is a well right above our heads. And being 60 feet beneath the surface, surrounded by thick limestone walls, you also don't have to worry about anyone breaking in through the rock," he noted.

Located in San Jose in the heart of Silicon Valley, the National Safe Depository (NSD) facility takes on a quite ordinary appearance from the outside. "Our principal concern was to find a site that had good access to the main communication systems, that was not in a flood zone and at the same time was located in a good earthquake-resistant area," said Donald Rickgauer, executive vice-president and facility manager.

Surveillance cameras monitor movements inside and outside the facility, while doors, windows and walls are covered with bullet-resistant panels. The outside structure is thick concrete block, while the inside consists of a steel bank vault that is larger than many homes.

NSD President Reg Weller sees those measures as essential to providing the protection that sensitive computer data requires.

"When the on-line computers at an airline go down, it can cost that company $16,000 per minute and a big bank can lose up to $60,000 per minute," he said.



Sam Huggins of Secured Data Services, Inc. inspects one of the fire prevention units in the firm's underground media storage facility.

STORAGE from page 87

weekly or even daily basis.

The Vault Co. in Atlanta has one client with over 4,000 tapes stored at its facility. The Iron Mountain Group recorded 8,000 transactions a day in 1982, mostly in computer media.

The burgeoning nature of the data security business was further illustrated recently when Digital Equipment Corp. announced that it is making a major move into the records management and off-site storage industry [CW, Feb. 13].

For many computer users, the most pressing need is to protect their data against unpredictable catastrophes, such as earthquakes (a particular fear in the Silicon Valley), floods, fires, tornadoes and hurricanes.

A recent study by the National Fire Protection Association estimated that 70% of companies suffering a major computer room fire will go out of business.

A number of recent cases have highlighted the risks involved in not having adequate protection:

- Last August, Hurricane Alicia tore through several data processing sites in Galveston, Texas, inflicting heavy damage on the Galveston County data processing center and destroying its mainframe computer, which contained tax appraisals, payroll, accounts payable and jury selection for more than 200,000 people.
- In May 1983, a toxic chemical spill in a downtown San Francisco office building left several financial businesses without access to their records for 10 days.

In addition, publicized hacking incidents and computer theft cases have made many companies nervous. NSD recently reported the disappearance of its research and development tapes, which were stored on-site without any backup.

Such an incident could jeopardize the firm's future, NSD officials said.

Talking to the French computer world is now easier than you think...

. . . with our sister publication Le Monde Informatique.

France's rapidly growing market for computers and data processing systems is one of the largest in the world. Currently, the installed value of general purpose computer systems is more than $11.1 billion, and a tremendous continuing demand for data processing equipment will cause outside spending on computer-related equipment to increase at an annual rate of 16%, between 1981 and 1985.

When choosing new equipment and keeping up-to-date with this ever-changing industry, top systems executives will read *Le Monde Informatique*. *Le Monde Informatique* is a weekly tabloid newspaper with a uniquely targeted circulation of 22,000 copies. The circulation profile was developed by International Data Corporation, the world's leading EDP market research firm, to reach the decision-makers and buying influences at the most important DP facilities in France.

CW International Marketing Services Department can give you one-stop advertising service in countries around the world. For more information about *Le Monde Informatique* or any of our other foreign publications, just fill out the coupon below.

Diana La Muraglia,
Manager, International Marketing Services
CW COMMUNICATIONS / INC.
375 Cochituate Road, Box 880, Framingham, MA 01701 (617) 879-0700

Please send me more information on
_____Le Monde Informatique
_____Your Other Foreign Publications

Name_____
Title_____
Company_____
Address_____
City_____State_____Zip_____

Publishers of Computerworld and other leading computer publications around the world.

Honeywell, Bridge ink net pact

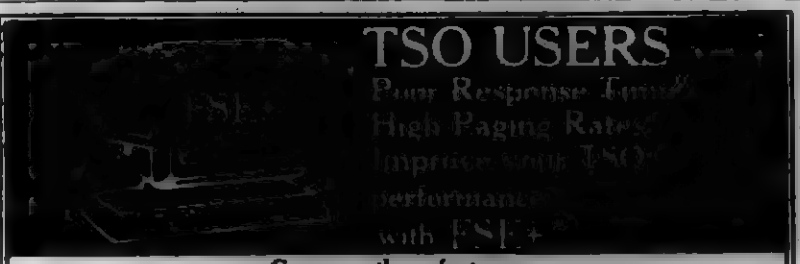
PHOENIX — Honeywell, Inc. said recently it has agreed to integrate Bridge Communications, Inc.'s local-area network product with Honeywell's distributed computer systems.

The initial product offering in the 10-year contract is a baseband, Ethernet local-area network, which will be introduced in the second quarter of 1984, Honeywell said.

Robert C. Hesser, Honeywell vice-president, said the agreement is a step toward providing customers with systems designed to integrate and transfer data, communications, video and security.

"Our long-term strategy calls for integrating private branch exchange and local-area network controllers with the full range of Honeywell computers and network processors," Hesser said.

Communications servers covered under the agreement will reportedly allow processors, terminals and professional workstations to communicate via Ethernet.



Compare these features:

- Up to 50% less overhead than SPF
- Full-Screen Editor (LRECL up to 4096)
- Data Set Manager (Controls TSO files)
- JES Sysout Previewer (Direct from JES Spool)
- File listing facility (LRECL up to 32760)
- Programmable function keys
- Split-Screen facility (Two fully-active screens)
- Customer-defined exit facility (Controls all FSE+ functions)
- FSE+ tuning parameters (Optimize performance)
- Structured menus for new users
- Command oriented for experienced users
- MVS 3.8, SP and XA support
- Free trial period

Call or write for details
Applied Software, Inc. 840 U.S. Highway #1, Suite 250
P.O. Box 13027
North Palm Beach, FL 33408 (305) 626-4818

If postcard has already been removed, use the coupon in the

Data Decisions

advertisement for MICROCOMPUTERS

or telephone

(609) 429-7100

Data Decisions™ 20 Brace Road • Cherry Hill, NJ 08034

We do the hands-on testing for you

☐ YES, send me your no-risk TRIAL REVIEW of MICRO-COMPUTERS. I am under no obligation to purchase anything and I may keep the free LANs report. Should I become a subscriber, I will be eligible for a special charter subscription price of $625—a $75 savings off the regular subscription fee of $700.

☐ Although your offer is completely risk-free, I'm still not sure. Please provide more information.

Name_____

Title_____

Company_____

Address_____

City_____ State_____ Zip_____

Phone (_____) _____
Area Code

A103

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY CARD

FIRST CLASS PERMIT NO. 3838 NEW YORK, NY

POSTAGE WILL BE PAID BY ADDRESSEE

Data Decisions™

20 BRACE ROAD
CHERRY HILL, NJ 08034

If postcard has already been removed, use the coupon in the

Data Decisions

advertisement for

MICROCOMPUTERS

or telephone

(609) 429-7100

Special limited offer for Computerworld readers only

How many micro software products do you have the time and money to examine before you buy?

Now you can look at thousands!

Introducing Data Decisions™ MICROCOMPUTERS

A unique, new, complete information service for the corporate micro buyer, featuring the industry's only independent evaluations of key software products based on "hands-on" testing by microcomputer experts in Data Decisions' own labs.

One reason for the growing popularity of microcomputers is the availability of thousands of packaged software programs. Unfortunately it's also a drawback. With so many packages to choose from, how do you find the one that's right for you?

Through actual hands-on experience. It's the only way to do it right.

But that takes time . . . costs money. Few companies can afford either. Now you don't have to spend either time or money to get the same results.

We do the "hands-on" testing

That's right. Data Decisions' own microcomputer experts do the hands-on testing for you. In our own labs . . . under controlled conditions designed to simulate the situations you'll find when you bring these products in-house.

Equally important, our experts evaluate each program, using the same fine-tuned, consistent criteria so you can compare one package against another.

The result is a comprehensive independent hands-on analysis that highlights the specific strengths and limitations of each product. You also get an exclusive line graph that shows you, at a glance, how each product measures up, on a scale of 1 to 10, with regard to operating environment, documentation, functionality, ease of use, support, system interface, vendor experience.

Available only from Data Decisions.

This independent, unique hands-on testing and evaluation of microcomputer software is available nowhere else. Only from Data Decisions.

Sure, you could do it yourself. But why would you want to when you can get complete evaluations . . . by unbiased professionals—for less than you'd pay to do it in-house or pay an outside consultant to do a similar hands-on evaluation.

That's only the beginning

This exclusive hands-on software testing and evaluation would be reason enough to subscribe to Data Decisions' MICROCOMPUTERS. Certainly these reports are worth the subscription price alone.

But you get more. Much, much more.

Look what's covered

Microcomputers—desktops . . . high-level intelligent terminals marketed as independently programmable standalones . . . multi-user Unix-type based systems . . . executive workstation/"professional" computers . . . integrated office automation workstations . . . supermicros . . . luxetops . . . portables . . . transportables . . . and more.

Expansion/extension cards—controllers . . . clocks . . . A to D converters . . . extra quad boards . . . interface boards . . . language cards . . . solid state disks . . . memory boards . . . processor enhancements . . . auxiliary processors . . . and more.

Communications—Micro LAN networks . . . micro modems . . . micro terminals . . . terminal emulators . . . micro-to-mainframe downloaders . . . database access packages . . . electronic mail . . . and more.

Peripherals—printers . . . plotters . . . monitors . . . floppies . . . hard disks . . . keyboards . . . tape drives . . . OCR . . . bar codes . . . sensors . . . power supplies . . . power source protectors . . . cooling fans . . . and more.

We do the hands-on testing for you.

You get *all this as a MICROCOMPUTERS subscriber*

Three loose-leaf volumes filled with the most complete, concise, accurate, easy-to-use, current information ever compiled on the micro marketplace . . . Consistently formatted for easy product comparisons . . . and for finding facts you need.

Hardware, Software Analyses that highlight the specific strengths and limitations and discuss product suitability for a corporate environment.

Technology Reports, Market Studies, Case Histories and Tutorials . . . on a wide range of subjects and products to help you plan appropriate courses of action.

User Ratings that let you compare your peers' opinions of products with our own expert evaluations as well as your own views.

Monthly Newsletters that highlight late-breaking industry happenings, discuss new product announcements, provide a calendar of events, and spotlight the best articles published in the microcomputer trade press the previous month—as well as a capsule version of the current month's hands-on analysis.

Unlimited Free Telephone Consulting by micro experts whose only job is to provide quick answers to your questions.

Monthly Updates, Comprehensive Surveys, Complete Vendor Directory . . . and more.

Free Bonus LANs Report

Order your trial review of Data Decisions MICROCOMPUTERS and we'll send you as a free bonus, a copy of Data Decisions' special two-part report on Local Area Networks.

The first section examines the technology and the second provides specific information on 72 commercially available LANs marketed by 59 vendors.

This report regularly sells for $39.00. But it's yours to keep—absolutely free! Just for agreeing to a no-risk trial review of Data Decisions MICROCOMPUTERS Information Service.

Save $75.00 on Charter Subscription

For a limited time, charter subscribers to MICROCOMPUTERS can save $75.00 off the regular subscription fee of $700. Order your trial review today and be eligible for this charter subscriber discount if you decide to subscribe.

No Risk Trial Offer

The only way to judge how you and your company can benefit from Data Decisions' MICROCOMPUTERS is to review it yourself. Fill out the postpaid card and mail it today. You'll receive a trial review of Data Decisions MICROCOMPUTERS. And you're under no obligation to buy anything!

We do the hands-on testing for you

Data Decisions.

29 Bruce Road/Cherry Hill, NJ 08034/800-[illegible]

☐ YES, send me your no-risk TRIAL REVIEW of Microcomputers. I am under no obligation to purchase anything and I may keep the free LANs report. Should I become a subscriber, I will be eligible for a special charter subscription price of $625—a $75 savings off the regular subscription fee of $700.

☐ Although your offer is completely risk-free, I'm still not sure. Please provide more information.

Name_____ Title_____

Company_____

Address_____

City_____ State_____ Zip_____

Phone_____
Area Code

A 155

COMPUTER INDUSTRY

Speaker cites changing legal aspects of DP

By Patricia Keefe
CW Staff

NEWTON, Mass. — Advances in technology are creating a new kind of corporate arena where computer technology is being used as a sharp competitive weapon to create lasting damage to competitors quickly, according to a Harvard University Business School professor.

As a result, the legal aspects of the whole computing environment and the thrust of the issues that attorneys will have to deal with will be very different over the next 10 years from what they've had to worry about over the last 10 years, Professor F. Warren McFarland told lawyers attending the New England Computer Law Forum here last week.

McFarland told the lawyers that new technologies are:

■ Moving corporate technologies out of the "back room" and into the forefront of corporate strategic planning and execution where they will be key to a company's "ability to survive and compete."

■ Allowing companies to score greater competitive victories and creating potential for possible abuses (such as allegations that airlines that have computerized reservations systems are using them to execute unfair competitive practices).

■ Creating new regulatory issues and problems.

This has come about as a result of very short-term, but massive changes in the cost performance of technology, leading to the installation of applications that were unthinkable a few years ago, McFarland said. A shift in the actual performance of technology has occurred, he explained, involving a combination of data processing, teleprocessing, remote office support devices and microcomputer technology. Labeling the integration of these four parts as an interorganization information system, he pointed out that this has provided corporations with the ability to link their computer to those of their customers and suppliers, allowing them to manage their business relationships in very different ways.

Integral to these systems is teleprocessing capability, or electronic links which essentially facilitate "raw transfers of power changing the fundamental nature of relationships," he said.

Corporate planners will be looking at their information systems technology to determine any strategic uses, McFarland said. Defining the "generic" competitive strategy as one with low cost, product differentiation and market focus, he said that in 1984, the strategic questions are:

■ Can the strategy create definitive entry barriers?

■ Can it strengthen the customer relationship by increasing switching costs, for example?

■ Can it change the intra-industry competitive balance?

■ Can it change the basis of competition from low cost to product differentiation?

■ Can it change the nature of supplier relationship, for example, make the supplier carry the inventory cost instead of the company?

Imagine, if you could offer Distributed Printing without RJE!

You Can! With VPS the JES/3270 RJE report distribution package. Drive up to 2,000 3270 attached printers while you improve CRT response and reduce local and remote printing costs.

Check these features:

- Total RJE replacement for Batch reports, CICS spooled reports, DS Print, VM
- Operates under JES, standard routing parameters and recovery No system modifications, JES tables or additional hardware
- Shares printers, lines and network resources Reduces hardware and telecommunications costs
- Off-loads all print to JES where it belongs Improves CRT response

270 installations driving over 20,000 printers

LRS Levi, Ray & Shoup, Inc.
P.O. Box 18538 • Dallas, TX 75218
DALLAS (214) 324-2635 • TELEX 80-4294

L.A. (213) 822-4566 • Chicago (312) 329-9853 • N.Y.C. (212) 308-2522

Paradyne posts profits decline

LARGO, Fla. — Paradyne Corp. recently reported profits for the fiscal year ended Dec. 31 were down 86.4% compared to the previous year and that the company lost $1.7 million, or 8 cents per share, during the fourth quarter of 1983.

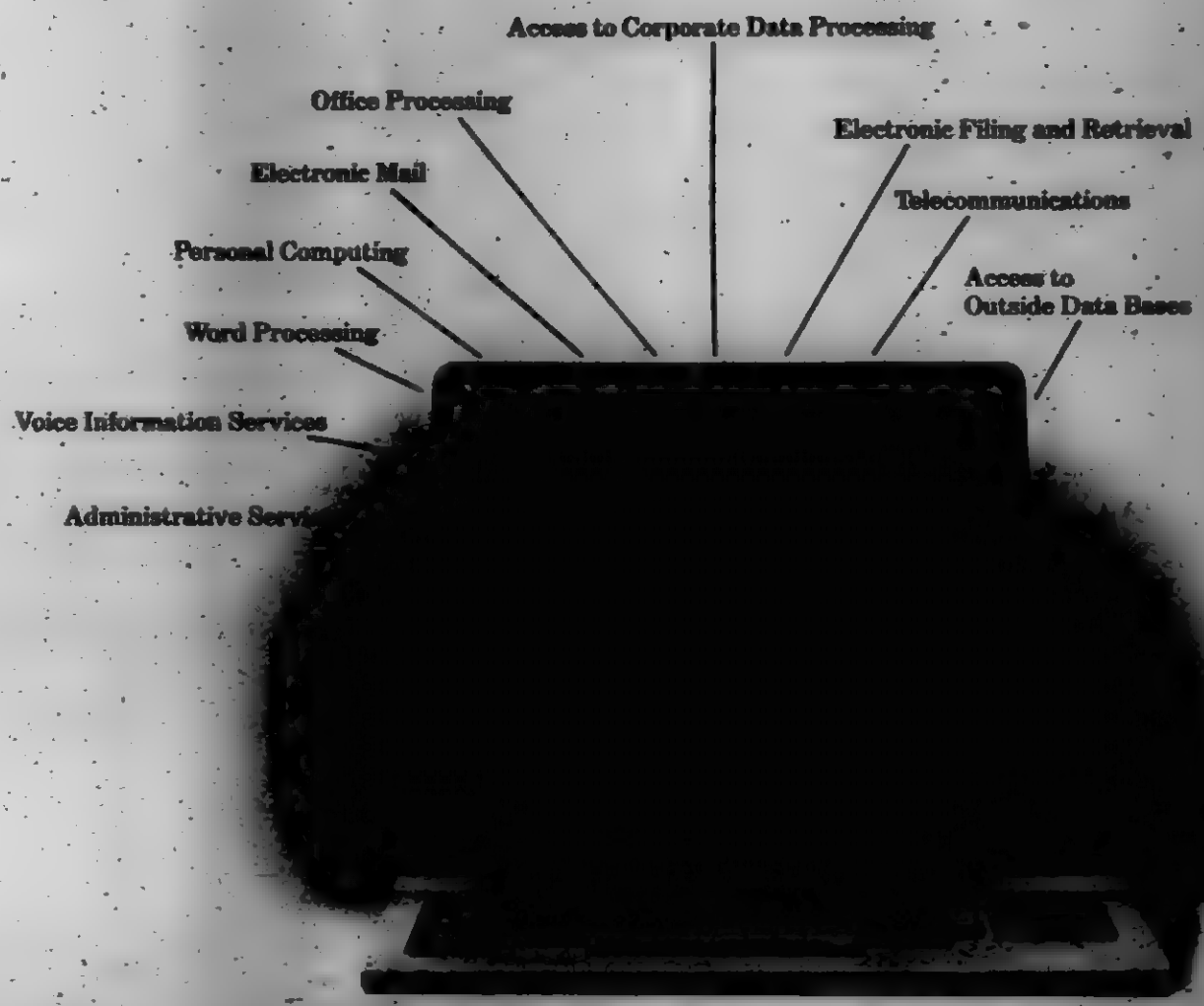
For the year, Paradyne posted profits of $3.6 million, or 16 cents per share, compared to $26.8 million, or $1.24 per share, in 1982. During 1983, revenues increased by $1.6 million to $207.3 million, just 0.78% ahead of 1982 results.

During the fourth quarter, Paradyne experienced a decline in revenues to $55.3 million, compared to $61.4 million in the comparable quarter of 1982, when the company posted profits of $7.4 million, or 33 cents per share.

The company reported that legal fees and costs paid to outside counsel were $500,000 in the fourth quarter and totaled $2.5 million for the year. Those payments reflect substantial costs incurred in defending an action brought against the company by the Securities and Exchange Commission, as well as some subsequently filed private actions and collateral matters, the company said.

Fourth-quarter expenses were increased by approximately $1 million, resulting from strengthening the firm's marketing organization, and an additional $800,000 was paid out in commissions as a result of increased sales activity, according to Paradyne. Profit margins in the fourth quarter were said to be affected by costs associated with the start-up and shipment of a new line of modems and networking diagnostic equipment.

SPERRYLINK™
OFFICE SYSTEM



Just about the only thing it won't do is brew your morning coffee.

SPERRYLINK. The one piece of equipment that can handle all your office automation needs.

It ties into the central computer for mainframe information and mainframe support.

It's a data processor when you need to handle data, a word processor when you need to handle words.

It's a personal computer for filing, retrieving, keeping your calendar, your time schedule, your memo board.

And it's a telecommunications terminal with electronic mail and digitized voice capabilities—your link to the outside world.

This is the SPERRYLINK System. A system beyond conventional ideas of office automation. Beyond words and numbers, voice and image.

It's the one system that finally brings it all together.

For more information call 800-547-8362, toll-free. Or write us. Sperry Corporation, Computer Systems, Department 100, P.O. Box 500, Blue Bell, PA 19424.

SPERRY

We understand how important it is to listen.

COMPUTER INDUSTRY

DEC, Pittsburgh Univ. renew R&D pact for VMS

By Tom Steinbeiter
Special to CW

PITTSBURGH — The University of Pittsburgh and Digital Equipment Corp. recently announced that the university will develop enhancements for the VMS operating system used on the VAX-11 series.

Under the terms of a renewed research and development relationship, the university will develop technology to allow VMS-based VAX-11 superminicomputers to communicate with other equipment using Bell Laboratories' Unix operating system, officials said. The university products will be the property of AT&T, but should help establish VMS as a compatible operating system for large networks marketed by AT&T, school officials added.

The university also will research and provide technical expertise on network maintenance and develop computer-assisted instruction software.

Winston Hindle, DEC senior vice-president, said that in exchange for this work, "Pitt will be able to purchase products at a substantial, very substantial, discount." Pitt Chancellor Wesley Posvar said that "up to $8 million worth of products from the entire DEC line will be acquired during the next three years, with special emphasis on the VAX hardware architecture."

The agreement follows by two months the Pitt-AT&T announcement of the development of a fiber optics communications network at the university. This network will provide a transportation system for voice, video and data communications for the 60-building, 131-acre campus and Pitt's regional campuses. This network will feature special communication gateways that will permit heterogeneous micros and minis to exchange data.

The Pitt-DEC agreement is an extension of a 13-year relationship between the parties. During the course of this relationship, Pitt contributed to the development of the Tops-10 operating system and the use of multiple Tri-Processors. To date, Pitt has purchased $15 million worth of DEC equipment. The university may also become a showcase for the future VAX "Venus" line and possibly for a 32-bit DEC microprocessor which is under development.

Syracuse gets advanced tech designation

SYRACUSE, N.Y. — Syracuse University was recently designated as a state- and industry-sponsored "Center for Advanced Technology" focusing on computer applications and software engineering, with major funding provided by IBM, General Electric Co. and United Technologies Corp.

The Case Center, one of seven state/government-funded technology centers around the state, is comprised of a consortium of 14 upstate New York private and public educational institutions; it has received commitments of more than $1.5 million in funds from its three major corporate backers and six other corporate sponsors. Designated under a state statute by the New York State Science and Technology Foundation, the center is immediately eligible for $135,000 in matching state funds through April 1 and for $1 million in matching state funds requested by Gov. Mario Cuomo for the fiscal year beginning April 1, according to a spokesman for the center.

Bradley J. Strait, formerly dean of Syracuse's L.C. Smith College of Engineering, resigned that position to become managing director of the center. More than 30 Syracuse faculty members and as many as 100 students are expected to participate in research projects at the center during its first year of operation, the spokesman said.

Projects will reportedly focus on three main areas: computer-enhanced reasoning, including expert systems and high-level programming languages; computer tools research, focusing on tools for hardware and software design and tools for increasing productivity; and cross-disciplinary research on the application of computer technology in various fields.

Various support facilities will be initiated, including laboratories for multiuser microprocessor development, very large-scale integration design, robotics and others, the spokesman said.

MSA introduces the shortest distance between two points. New MSA Order Processing.

MSA's remarkable new Order Processing System keeps every order on track and on schedule.

It automatically checks credit and inventory availability. Schedules shipping. Bills customers. Immediately throws a red flag if there's a problem.

Then resumes the process when the problem is resolved.

It's the perfect way to keep your customers satisfied.

Now they won't have to wait while your customer service representative keys in line after line of information. The system automatically displays addresses, preferred shipment and other order-related information.

It also instantly checks current credit records, saving your service representative that time-consuming task.

Customer inquiries are a snap with MSA's

COMPUTER INDUSTRY

Opel criticizes national industrial policy proposal

PHILADELPHIA — John Opel, chairman of IBM, recently spoke out against proposals for a U.S. national industrial policy and said efforts should be directed at reducing the increasing federal budget deficits and dealing with unemployment, productivity and educational issues.

"The argument for a national industrial policy not only originates in an assertion of a problem that we do not have — the problem of massive dehumanization — it also fails to confront the genuine problems we do have," problems with deficits, productivity, unemployment and education, Opel said at the University of Pennsylvania.

Advocates of a national industrial policy would create a tripartite national industrial policy board with power to intervene in the economy and a national development bank with remedial plans to protect declining industries.

Four assertions

Opel disagreed with four assertions that the advocates make: the U.S. is deindustrializing; its market system cannot meet subsidized world competition; deindustrialization is causing mass unemployment; and the technical revolution will leave workers as technical wizards or unemployed.

"There are four problems crucial to our economic health and competitiveness: deficits, inadequate productivity growth, hard-core unemployment and a deterioration in our educational system," according to Opel.

To solve the problems of deficits and inadequate productivity growth, he urged that the federal deficit be cut, foreign trading partners open their markets, companies strive to be low-cost producers and tax reform be implemented to encourage saving and capital investments.

Opel categorized unemployed workers into two groups: displaced and disadvantaged. He recommended government incentives for individuals who move to areas of industrial growth and companies that move to disadvantaged areas. Disadvantaged workers must become functionally literate and acquire marketable skills, he said.

"Finally, we must overhaul our obsolescent school system and restore its capacity to produce graduates who can, at a minimum, do math and read and write English," Opel maintained.

MERGERS AND ACQUISITIONS

AGS Computers, Inc. has announced its acquisition of Software Design Associates, Inc. for $12.7 million. The acquisition will see Software Design's management continuing in its present capacity. A privately held company, Software Design generated $20 million in revenues last year, compared with AGS' $142 million.

■

David C. Evans, president and chief executive officer of Evans and Sutherland Computer Corp., a Salt Lake City-based special-purpose computer manufacturer, has announced that the company has invested $3 million for a controlling interest in Cardamation, Inc., of Boulder, Colo., a producer of customizable software for computer-aided design.

■

Grumman Data Systems Corp. has agreed to acquire Cbee, Inc., a McLean, Va. computer software and systems engineering firm. Terms of the cash sale were not available.

■

Esprit Systems, Inc., Melville, N.Y., has announced an agreement in principle to acquire Perceon Data Corp. of Dallas, a manufacturer of hardware and software for local-area networks.

■

Control Data Corp. has acquired one million shares of preferred stock, convertible into 40% of the common stock of Financial Information Systems, Inc. In addition, CDC will make available a line of credit of up to $1 million to Financial Information Systems.

■

Online Computer Library Center (OCLC) has acquired Avatar Systems, Inc. of Potomac, Md. Avatar will become a subsidiary of OCLC known as the OCLC Washington Office.

system. It lets you review the status of orders, prices, credit or inventory availability at a moment's notice. You can change orders easily.

And the system is flexible enough to handle special requests for shipping vendors, packaging, delivery dates or special handling procedures.

Just as important, MSA's online realtime system helps you control internal costs. It moves orders along without costly error or duplication of effort. It provides current information on pricing, discounts and special sales agreements with individual customers.

And it's a powerful tool for controlling inventory, since you can conveniently check on inventory status daily.

You'll find MSA's new Order Processing System flexible and easy to use. It works with the MSA Manufacturing System to let you schedule production more efficiently. And promise ship dates to customers more confidently. Of course, it's also perfectly integrated with MSA's Financial System.

If your company is ready for a dramatic improvement in your order processing, contact Robert Carpenter at (404) 239-2000. Or write Management Science America, Inc., 3445 Peachtree Road, N.E., Atlanta, Georgia 30326.

MSA
The Software Company

'. . . Are you the lady with the glare problem?'

COMPUTER INDUSTRY

EXECUTIVE CHANGES

David L. Dodge has been promoted to president of Datasery Equipment, Inc.

■

Gunder Bostrom has been named president of Ericsson Communications. He recently served as vice-president of the Business Systems Division, an Ericsson Information subsidiary based in Sweden.

■

Charles A. Mathews, formerly a senior executive with Britain's Plessey Group, has joined Cipher Data Products, Inc. as president, chief operating officer and member of the board of directors.

■

Gary E. Sharpe has been appointed president and chief executive officer of Delphax Systems of Toronto.

■

David S. Krueger has been appointed president and chief executive officer at Three Phoenix Co.

■

Joseph W. Kavaly has been elected president of RCA Cylix Communications Network, Inc. He had been vice-president of finance for RCA Communications, Inc.

■

Ronald P. Bernier, former vice-president of domestic field operations for Tymnet, Inc., a subsidiary of Tymshare, Inc., has been named president and chief executive officer of Health Systems International.

■

John Thomas has been named president of Telecom Plus of Florida, a unit of Telecom Plus International, Inc.

■

Jay Callanan has been promoted to president of Information Unlimited Software (IUS), the micro software division of Computer Associates International, Inc. Also promoted at IUS were Mark Farnell, senior vice-president, marketing and sales; Richard Bond, vice-president, sales; and Sharon Anderson, vice-president, customer services and training.

■

Lewis A. Burgins has been promoted to senior vice-president of operations at Microcom, Inc.

■

Northern Telecom, Inc. has appointed three new vice-presidents and general managers. They are W.J. Vivians, Cook Electric Division; A.G. Lutz, DMS-100/200 Division; and Paul Warun, Data Test Systems Division.

■

P. Michael Sandiola, former senior vice-president for Exo Systems Corp., has joined Oracle Corp. as vice-president, marketing and sales.

■

Lawrence M. DeVere has been appointed vice-president, law and administration, at Communications Satellite Corp.'s Comsat World Systems Division.

■

Michael L. Grubbs has been appointed vice-president, corporate development, and Nick Leonetto has been named vice-president, product research and development, at Alays, Inc.

■

William J. Seager has been named vice-president of sales for Facit, Inc.'s Data Products Division.

■

John C. Kingsley has been appointed senior vice-president, finance, at Raytheon Data Systems, a division of the Raytheon Co.

■

Thomas W. Miller has been promoted to executive vice-president, corporate marketing, at Control Data Corp.

■

Peter T. Gresham has been appointed vice-president, finance, and chief financial officer of Sage Systems, Inc.

■

Merle H. Banta has been elected president, chairman of the board and chief executive officer of AM International, Inc. The company is currently operating in a Chapter 11 proceeding.

■

Ronald W. Braniff has been appointed president of Ask Computer Systems, Inc. Sandra Kurtzig, founder and former president of Ask, continues as chief executive officer and chairman of the board.

■

Gale R. Aguilar has been appointed vice-president, corporate development and strategy at Prime Computer, Inc.

SourceTools Increases
Programmer Productivity
Oregon
Software
1-800-547-3000

When Computerworld delivers the goods on manufacturing systems this March 26th, you'll definitely want to be there.

Ad deadline is March 9th.

In response to the increasingly heavy involvement of DP/MIS people in computer-aided manufacturing (CAM) and computer-aided engineering (CAE), *Computerworld* is preparing a Special Report that focuses on CAM/CAE, manufacturing resources planning (MRP), robotics, inventory and shop floor control.

We'll also cover the effect these new technologies are having on traditional manufacturing operations. And on the delicate relationships between traditional DP departments and the factory automation specialists.

If you act before March 9th — your products or services can be represented. To reserve space in this issue, call one of the sales offices listed below or call Ed Marecki, National Sales Director at (617) 879-0700.

To: Ed Marecki, National Sales Director
CW Communications/Inc.
Box 880
Framingham, MA 01701

☐ Please send me advertising information for *Computerworld*.
☐ Please have a sales representative call me.

Name _____
Title _____
Company _____
Address _____
City _____ State _____ Zip _____

CW3/9

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Sales Offices
BOSTON/Chris Lee, Jim McClure, Ron Mastro, Jayne Donovan, Michael Kelleher, Alice Longley, (617) 879-0700
CHICAGO/Art Kossack, Chris Lee, Russ Gerches, Jean Broderick, (312) 827-4433
NEW YORK/Mike Masters, Doug Chaney, Ray Corbin, Joan Daly, Fred LoSapio, Gale M. Paterno, (201) 967-1350
ATLANTA/Jeffrey Melnick, Mike Masters, (404) 394-0758
SAN FRANCISCO/Bill Healey, Barry Milione, Theodora Franson, Ernie Chamberlain, Nicole Boothman (classified), (415) 421-7330
LOS ANGELES/Bob Hubbard, Bill Healey, Bernie Hockswender, (714) 261-1230

COMPUTER INDUSTRY

SUPERMICROS

Technology and Business Communications, Inc. has announced the third edition of *The S. Klein Directory of Computer Graphics Suppliers: Hardware, Software, Systems and Services.* The directory identifies more than 500 supply sources and contains basic product information and business background on each company, including ownership, company size and sales volume. The directory sells for $60, with a special prepublication price of $47 prior to April 20 (prepaid). More information is available from Directory Manager, Computer Graphics Suppliers, Third Edition, 730 Boston Post Road, P.O. Box 80, Sudbury, Mass. 01776.

■

Contel Mobilcom, Inc., a newly formed subsidiary of Continental Telecom, Inc., has reached agreement with 22 other telephone companies to provide cellular mobile telephone services in several U.S. cities through partnership arrangements. Following Federal Communications Commission approval, Contel Mobilcom will be the controlling general partner in limited partnerships that will provide the service in Norfolk and Richmond, Va.; Mobile, Ala.; Fresno, Calif.; and El Paso, Texas.

■

SR Computers, Inc., manufacturers of Avatar universal terminal converters and PA1000 protocol converters, has changed its name to Avatar Technologies, Inc. The firm has also moved to larger quarters at 99 South St., Hopkinton, Mass. 01748.

■

Hewlett-Packard Co. and Revel, Inc. have signed a research and development contract aimed at developing data base software for HP computers.

■

Applied Digital Data Systems, Inc. (Adds) has acquired the Autograph X series of graphics terminals from Datatype, Inc. of Mountain View, Calif. Adds' Display Product Division will have responsibility for the new product line.

■

Five schools in each of 26 school districts, including 23 districts with the largest enrollments in the country, will receive up to 15 IBM Personal Computers or PCjr systems and accompanying software as part of a $12 million computer literacy program recently announced by IBM. The program follows a similar program established by IBM last year in 80 secondary schools in California, Florida and New York. The expanded program will include elementary and secondary schools and will provide training courses for teachers involved in the program.

■

ROBOTS from page 86

spection after assembly, and plant capacity is limited by availability of trained labor. The new company estimates that, by 1985, demand for hard disks will grow to 12 million units, and typical plant output will have to skyrocket from 600 to 5,000 units per day to meet it. This means that only automated manufacturers will be able to compete profitably. Autobotics is clearly targeting that particular electronic assembly market.

Intelledex is a 1981 start-up which developed an integrated-vision robot designed for assembling microelectronics components such as magnetic disk-reading heads and silicon wafers. This company already received $5.25 million in two rounds of venture capital financing from the top high-technology investment banking firm of Hambrecht & Quist. Intelledex is estimating sales of about $2 million in 1983 and is clearly shaping up as the next robotics firm that may go public.

Automatix, Inc., which went public last March, has increased its revenues by over 100% during the third quarter of this year and is clearly another robotics firm of interest to the institutional investors who are rapidly acquiring its shares for their portfolios and who already own 12% of the outstanding stock. The company produces robot systems with vision although it does not confine its market to electronic assembly applications. Object Recognition Systems and Robotic Vision Systems are two other public companies with vision-equipped robots that may also compete in the electronic markets.

Anorad, Control Automation, Microbot and Precision Robots are some of the still-private firms developing robots aimed at electronic components handling that are competing in this game, but the most interesting competitors are within the electronics industry itself.

IBM, already in factory automation robotics, presents a huge potential. Lesser known but also important in the industry is GCA Corp., which is a major semiconductor manufacturing equipment producer already developing specialized robots for the industry. But not to worry. Even if some of the newcomers do not make it on their own, they're bound to be snapped up by the big electronics firms once they start automating their operations to keep up with the fast-stepping Japanese.

{SET:SCIL}

The Source Code Interactive Librarian *for microcomputers.*

- SCIL keeps a historical record of all changes made to the library.
- SCIL maintains any source code regardless of language, including user documentation and text material.
- SCIL allows software engineers to work with source code as they do now, *using any ASCII text editor.*
- SCIL saves disk space by storing only the changes made to the program.
- SCIL provides a labeling capability for ease of maintaining multiple versions and multiple releases.
- SCIL offers unlimited description in the program library directory.
- *High visibility displays* with varied intensity for ease of viewing insertions and deletions.
- SCIL is available on CP/M, MP/MII, MS-DOS, PC-DOS and TurboDOS.

{SET} Get {SET} for Success
{SET:SCIL} is a product of System Engineering Tools, Inc.
645 Arroyo Drive, San Diego, CA 92103

COMPUTER NETWORKS AND INTERNATIONAL STANDARDS

Computer Network Technology has finally come of age, evolving from infancy to a clearly defined art. However, with this evolution there is no need for dilemma.

Now the Educational Services Division of R. L. Roper Consultants introduces a course which provides you the necessary information to make decisions about communications structure. Moreover, this course clearly defines standards which, although not relevant in most areas of information processing, are critical to the communications arena.

This 2-day seminar is designed for those responsible for, or involved in, planning corporate network activities, as well as for those implementing networks on an international or large scale level.

Among the topics to be discussed are:

- Structure of Networks
- Network Topology and Implementation
- ISO Reference Model for Open System Interconnection
- CCITT International Standards and Recommendations
- Existing Proprietary Architectures

Seminars are presented on-site and publicly in French, as well as in English.

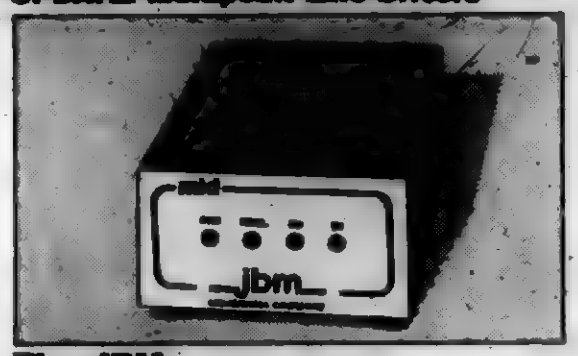
Please send the coupon below for additional information.

R.L. ROPER CONSULTANTS, INC.
122 East 42nd Street - Suite 909
New York, NY 10168 Tel: (212) 687-1166

Name_____
Title_____
Company_____
Address_____
City_____ State_____ Zip_____
Telephone_____
Area(s)

Are you having trouble talking to your computer?
Talk to us:
VISION SOFTWARE
Quality software for VM systems
Watch for our ad MARCH 19th!

UPDATE: Multipoint Line Drivers



The JBM Multipoint Line Driver

The JBM MULTIPOINT LINE DRIVER (MLD) can replace modems or multiplexers between communicating devices. The JBM MLDs are used for point to point or multi-point applications for async, sync or SNA connections and provide high quality signals at long distances. The cost is low, the installation is easy and the MLDs are available in a rack mount or stand alone version. For more information about the JBM MLD, contact the vendor at:

jbm
electronics company
(314) 731-7781
... the data communications electronics company

COMPUTER INDUSTRY

5¢ BRIEFS AND BYTES

Endata, Inc. has reported revenues for 1983 of $36.4 million, compared with $31.9 million for 1982, and net income of $2.8 million, or 60 cents per share, up 53.2% over 1982's net income.

■

Tymeplex, Inc. has announced revised earnings of 17 cents per share for the second quarter of fiscal 1984 ended Dec. 31, a reduction of 1 cent per share from the figure announced on Jan. 17. According to the company, the change was due to an error in computing the per-share figures.

■

Columbia Data Products, Inc. announced that net sales for the fourth quarter rose to $30.4 million compared to $4.3 million last year. Net income increased to $2.5 million or 21 cents per share for the period, compared to $374,000, or 4 cents per share, in the fourth quarter of 1982. Full-year 1983 net sales increased to $56.2 million from $9.4 million last year. Net income rose to $3.6 million, or 32 cents per share, compared to $269,000, or three cents per share, in the prior year.

■

Wyly Corp., whose principal operating subsidiary is University Computing Co., has reported revenues of $152.9 million up from $140.5 million in 1982. Income was $190,000, or 1 cent per share, compared with $4.1 million, or 30 cents per share, for 1982. According to the company, the increase is from its software operations in December.

■

Eagle Computer, Inc. has announced sales for the second quarter of fiscal 1984 of $19.1 million, a 34% increase over the prior quarter and a 300% increase in sales over second quarter fiscal 1983. Net earnings for the quarter were $457,000, compared with $81,000 for the prior quarter and $17,000 for second quarter fiscal 1983.

■

Computervision Corp. has reported fourth-quarter revenues of $111 million and net income of $10.6 million, up 37% and 45%, respectively, from fourth quarter last year. Revenues for the year rose to $400 million from $325.2 million in 1982. Net income in 1983 was $35.3 million, or $1.24 per share, compared with $32.4 million, or $1.18 per share, for 1982.

■

Information General Corp. has reported revenues of $197.9 million and net income of $8.5 million, or $1.67 per share, for fiscal year 1983, compared with revenues of $170 million and net income of $5.4 million, or $1.49 per share, for 1982.

■

Communications Corp. of America has reported a net loss of $462,902, or 11 cents per share, on revenues of $16.8 million compared with net income of $496,157, or 14 cents per share, for the comparable period last year. The six months ended Dec. 31 showed a net loss of $849,113, or 20 cents per share, on revenues of $32.1 million, compared with net income of $906,342, or 27 cents per share, on revenues of $26.9 million for the same period last year.

■

Syntrex, Inc. has reported revenues of $11 million for the first quarter of fiscal 1984, a 61% increase over the comparable period in fiscal 1983. Net income for the period was $1 million, or 12 cents per share, compared with a $790,338, or 9 cents per share, loss for the first period last year.

■

Phoenix American, Inc., a financial services company, which organizes and manages computer leasing limited partnerships, has reported revenues for the second quarter, ended Dec. 31, of $8.5 million, a 40% increase over the same period last year. Net income for the quarter was $2.1 million, or 25 cents per share, up 41% over the comparable quarter from last year.

■

Tandon Corp. has reported sales of $93 million and earnings of $9.2 million for first quarter, fiscal 1984, up 71% and 63%, respectively, over the comparable period last year.

Tymshare posts net loss for '83

CUPERTINO, Calif. — Tymshare, Inc. recently reported a net loss in fiscal year 1983 of $1.5 million, or 13 cents per share, reduced by favorable tax benefits from a total loss for the year of $6.6 million. The previous fiscal year, the company had posted profits of $8.8 million, or 73 cents per share.

During the fourth quarter, the company experienced a loss of $3.5 million that was reduced by tax benefits to a net loss of $1.4 million, or 12 cents per share. In the corresponding period of fiscal year 1982, the company had experienced a total loss of $6 million, reduced by tax benefits to a net loss of $2.3 million, or 19 cents per share.

Revenues for the just-ended fiscal year were down 3% from the previous year to $288.6 million. For the fourth quarter, revenues were up 9% over the year-earlier figure to $71.4 million. However, during 1983 the company divested its medical services and bank card processing businesses, which if accounted in 1982 would have produced comparable revenues of $271 million.

ANNOUNCING A DIGITAL CONSULTING ASSOCIATES SEMINAR:

WHY YOU SHOULD ATTEND
You can't afford to miss this important seminar, taught by Chris Date whose book "An Introduction to Database Systems: Volume I" is the standard text on the subject and has sold well over 150,000 copies.

By attending this seminar you will have the rare opportunity to hear about the latest developments in database technology from the individual who has been acknowledged as one of the world's foremost experts on the subject. According to Dr. George Schussel, "Chris Date is an industry phenomenon. Not only are his books the most widely used DBMS textbooks anywhere, but he is also the most highly respected and widely attended instructor on Relational Databases."

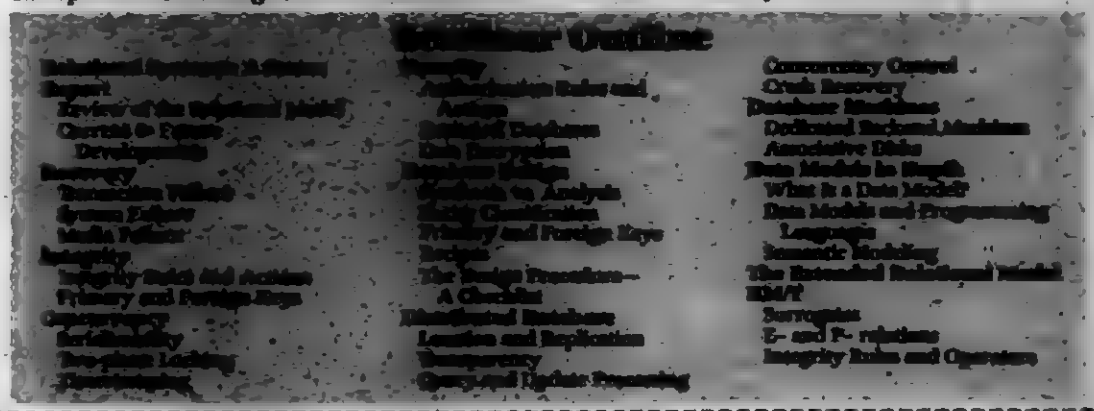
This seminar will bridge the gap between database concepts and daily practical database use. It presents examples and solutions to a number of familiar problems, such as concurrency control, authorization, and database design. Systems based on the relational model will be stressed.

This seminar is intended for DP managers • database specialists (including • database administrators • database designers • and • database applications programmers) • DP students • teachers • end-users or • DP professionals who wish to broaden their understanding of what is involved in relational and database technology.

Chris Date is one of the fundamental contributors to database theory and one of the most widely read and best known author/lecturers in the field. He has developed *Database: Technical Developments* based on his recent book "An Introduction to Database Systems: Volume II." Chris Date is renowned for his ability to communicate complex technical subjects in a clear and concise fashion.

TOPICS
Recovery • Database Design • Integrity • Semantic Modeling • Concurrency • Distributed Databases • Security • Database Machines

Seminar Outline



Concurrency Control
Crash Recovery
Database Machines
Dedicated Relational Machines
Associative Disks
Data Models in Depth
What Is a Data Model?
Data Models and Programming Languages
Semantic Modeling
The Extended Relational Model RM/T
Surrogates
E- and P- relations
Integrity Rules and Operators

Digital Consulting Associates, Inc.
339 Salem Street
Wakefield, MA 01880
(617) 246-4880

"High Technology Education— We're the Source"

Please register me for
Database: Technical Developments by C.J. Date

☐ NEW YORK (March 26–30)
☐ LOS ANGELES (April 2–4)
☐ CHICAGO (May 2–4)
Registration Fee $895 (Discounts for multiple registrations)

Name _____
Title _____
Company _____
Division/Branch _____
Street _____
City _____ State _____ Zip _____
Phone Number ( ) _____

☐ I do not wish to register at this time. Please send me a catalog.

2/84A

KRAUT from page 87

service organization and say, 'Hey, you guys take a look at the line and the modems and the terminals and you fix the problem.' "

Competing with established third-party maintenance companies such as Sorbus, Inc. and TRW Corp., Honeywell "is on the fringes of the top six" and believes it can grow in that area based on "a proven field force with a national logistics organization," Kraut said, adding that Digital Equipment Corp. and NCR Corp. have made similar but more limited efforts to enter the field.

Honeywell is attempting to capitalize on the organization it built to service Honeywell equipment, including 250 offices, more than 1,000 points of supply for parts and a force of some 2,200 service engineers throughout the U.S. and abroad.

The company last year implemented a Remote Support Facility in Atlanta, through which engineers at Technical Assistance Centers here in Newton and in Phoenix may dial into customer systems and remotely diagnose problems.

Those facilities are provided to customers with Honeywell and non-Honeywell equipment through a Totalcare Third-Party Service program that can include training, on-site support, remote support and other services tailored to a customer's needs, Kraut said.

That service reflects the relative increased expense of sending engineers out on service calls while hardware costs in general are declining. "An hour's worth of travel time is worth an hour's worth of maintenance," Kraut said.

While the company is "more oriented to the business world than to the home market," Honeywell recently announced an agreement to provide warranty and nonwarranty service to buyers of Coleco Industries, Inc.'s Adam home computer system and is planning to open by the end of the present quarter a total of 35 walk-in service centers to provide service to customers of Coleco and other vendors.

Kraut said the refocused service effort is managed by a team of entrepreneurs who are encouraged to take risks.

Currently, existing resources are being utilized, but "as they grow the business and need more resources they will get them," he said.

IBM from page 87

System/36, current System/26 and System/38, he said.

"One of IBM's great preoccupations in the small business world is to lock people into a migration path," Jeffery said, and the announcement of a System/34-compatible micro would go a long way toward satisfying that objective.

Word of an impending Personal Computer/34 introduction has also reached Chris Herron, president of Fusion Products International, Inc., a Larkspur, Calif.-based supplier of productivity enhancement software packages for IBM's small business systems.

'Real hummer'

"Everything that we've heard thus far about [the theorized micro] leads us to believe that it's going to be a real hummer," Herron said.

"It's supposedly going to be source-level compatible with the System/34, will probably come with a hard disk module and is expected to replace the entire bottom end of the System/34 product line," he said.

Moreover, he added, "the PC/34 is definitely going to happen and will be announced momentarily, probably during the first or second quarter of this year."

Different view

Not everyone, however, shares Herron's confidence. "I'd be very surprised if IBM introduced a Personal Computer that runs System/34 software," David Stein, Gartner Group, Inc. cofounder and executive vice-president, said recently during a telephone interview.

"The company would probably be very careful not to announce a low-cost System/34-like product until it had persuaded most of its customers to move upward to the System/36," he said.

On the other hand, Stein does concede the possibility that IBM may be planning soon to add an entry-level model to its System/36 processor line.

"I haven't heard any rumors as such about an upcoming System/36 announcement," he said.

But a low-end extension to that product line would be in full accord with IBM's long-term hardware strategy, which is "to migrate current users of the System/34 to the System/36 and ultimately to the System/38," he added.

Upward move

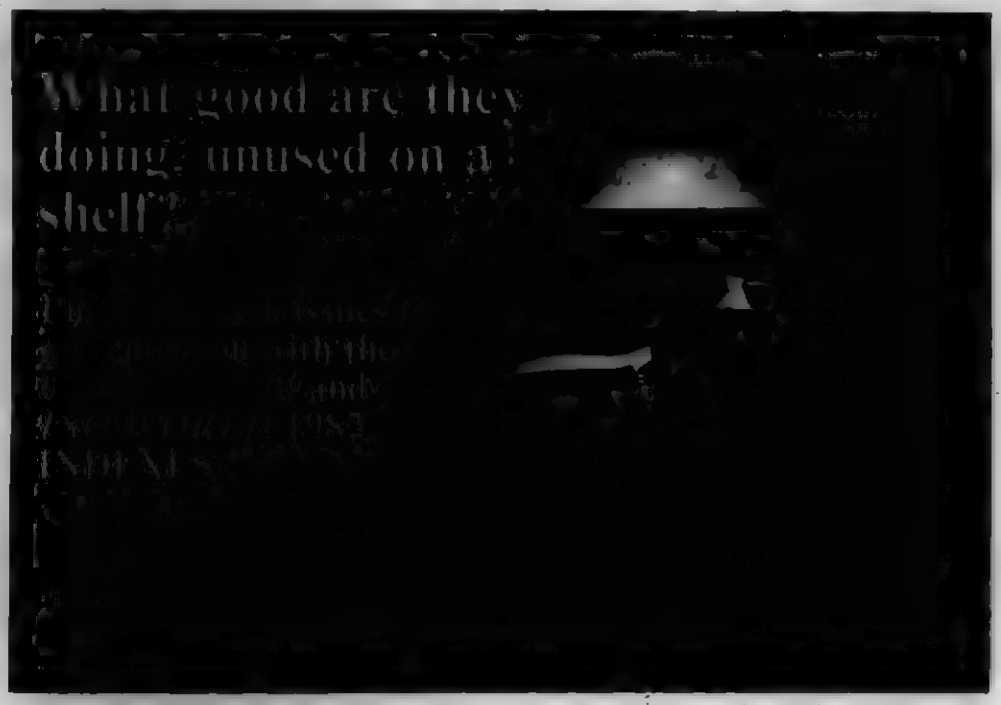
Another industry observer, Minneapolis-based computing consultant Tom Teresi, foresees the near-term future of the System/36 series somewhat differently from Stein.

"I don't see how IBM could make the product line much smaller [than it is right now] without crippling its performance," the president of Tom Teresi, Inc. said recently over the phone.

"The System/36 already overlaps the System/34 in both power and capacity," he said.

Rather than extend the System/36 downward, IBM is likely to move its Personal Computer family upward with the introduction of a multiuser micro that outperforms the Personal Computer XT, he said.

In addition to his full-time consulting work, Teresi serves as System/36 project leader for IBM's Chicago-based Common Users' group.



You'll get great material for reports, back-up material for purchase decisions, resource material for contracts, research results for long and short-range planning — in other words — a terrific reference library at your fingertips when you use one of our Indexes to access all the information that's stored in your back issues of *Computerworld*, *ISO WORLD*, and *Computer Business News*.

With the *Computerworld* Index, you get an easy reference (including page numbers and issue dates) to all the information that's packed into all 58 (including *Extra!* and *Computerworld 04*) 1982 issues — 2,636 pages of news, stories, In-Depths, Special Reports, interviews, applications stories, features and tutorials on everything from APPS to Zenith.

And in the *ISO WORLD* Index, you'll find entries from 3 issues of *ISO WORLD* and from 36 issues of *Computer Business News* — 913 pages of industry news and trends, features, new product announcements, marketing and distribution articles, perspectives, columns, and analyses, on everything from AB Dick to Zentec.

Whatever you're doing professionally — Changing systems and procedures, purchasing new equipment, drawing up a contract, doing salary reviews, looking for dealers, setting up a local area network, there'll be articles in back issues of *Computerworld* or *ISO WORLD* to help you. From government regulations, to current trends; from the phases and stances of an individual product to the pitfalls of OEM contracts — you've already got lots of professional research sitting on your shelf. Let the *Computerworld* Index or the *ISO WORLD* Index help you find it when you need it.

Take a look at just a few of the hundreds of entries listed in the *Computerworld* and *ISO WORLD* Indexes:

Index	Heading	# Entries
CW	Local Area Nets	70
CW	Microcomputers	81
CW	Graphics Systems	136
CW	Accounting Systems	101
CW	Disk Equipment	126
ISO	Dealers/Distributors	64
ISO	IBM-PC	84
ISO	Floppy Disks	51
ISO	Modems	45
CBN/ISO	Retail Stores	53

And that's a sample of just this year. We also have Indexes for *Computerworld* that go all the way back to 1976 and Indexes for CBN back to the first — (Nov. 1978-Dec. 1979)

If you don't have all the back issues of *Computerworld* and *ISO WORLD* that you need to get the articles you want, you can order back copies for the an entire year on 35mm microform from University Microfilm, Int., Periodical Entry Dept., 300 North Zeeb Road, Ann Arbor, MI 48106 —at very reasonable rates. Or you can simply take advantage of their reprint service for individual articles.

To get your Index, just fill out the coupon in this ad and send it with your check to Indexes/Marilyn Prisuta, Box 880, Framingham, MA 01701.

Year	Index	Price	Quantity	Total $
1982	Computerworld	$ 39.00		
1981	Computerworld	$ 35.00		
1980	Computerworld	$ 30.00		
1979	Computerworld	$ 25.00		
1978	Computerworld	$ 20.00		
All Computerworld Indexes for last five years (1978-1982)		$100.00		
1982	ISO WORLD	$ 39.00		
1981-1978	CBN	$ 60.00		

Add $1.25 shipping and handling for one book and 75¢ for each additional book. If your check is enclosed, we pay shipping costs.

Total cost _____

☐ Check enclosed ☐ MC (List four digits above your name)
☐ BA/Visa
☐ American Express _____ Expiration Date

If a charge, we need your signature

_____

Name _____
Firm _____
Street _____
City _____ State _____ Zip _____

You can advertise your product in 40 computer publications in 25 foreign countries—with one phone call.

There's a market for your product abroad.
You can reach the right people in the major computer markets throughout the world. The people who make the buying decisions—in countries already importing more than $3 billion in computer hardware, software and supplies.

CW International Marketing Services gives you one, efficient source for direct contact with the leading local computer publications in the world's major computer markets. How can we do this for you? We have a wide network of editorial offices around the world and provide first hand marketing information to our clients. Plus, we have over 10 years experience in the publishing industry.

We're a division of CW Communications/Inc., publishers of *Computerworld* and the world's largest publisher of computer-related newspapers and magazines.

CW International Marketing Services makes it easy.
We'll translate your ads for you and give you production services to meet the specifications of any or all the newspapers and magazines we publish or represent—and—we'll even bill you in dollars. What's more, when you place your advertising through CWIMS, you save the V.A.T. (value-added tax). It's as easy as advertising in your local publications.

We'll even help you with market facts, and, in the case of the People's Republic of China, we can arrange for you to give product and marketing seminars there! You can run your ads in our periodicals in these countries:

*Argentina	*Denmark	*Italy	*Norway	*Saudi Arabia	*Sweden
*Australia	Finland	*Japan	*People's	South Africa	*The Netherlands
*Brazil	*France	Korea	Republic of	*Southeast Asia	*United Kingdom
Chile	Greece	*Mexico	China	*Spain	*West Germany
	India		Peru		

*Published or co-published by CW Communications/Inc.

For more information on how we can help you promote your product all over the world, send us the coupon below or call Diana La Muraglia toll-free at (800) 343-6474 or telex #95-1153. In Massachusetts, call (617) 879-0700.

CW COMMUNICATIONS/INC.

Diana La Muraglia, General Manager
International Marketing Services
CW COMMUNICATIONS / INC.
375 Cochituate Road, Box 880
Framingham, MA 01701, USA

Please send me rate cards and information on publications in the following countries:

Name _____ Title _____
Company _____
Address _____
City _____ State _____ Zip _____

POSITION ANNOUNCEMENTS

amdahl

Peak Performance

People come first at Amdahl. Top quality people who thrive on working with the world's fastest, most reliable computers. From the beginning Amdahl has invested time, care and effort in supporting and motivating quality people. Reach your peak performance by exploring these opportunities in our Coporate Computer Center, one of the largest data centers in the country.

UTS System Programmer

Install and maintain the UTS systems (Amdahl's version of UNIX running under VM). You'll consult with internal users and interface with Amdahl's UTS development group on testing and enhancements. BS/MS in computer science required, with UNIX and C programming experience. Knowledge of VM and some background in operating system support a plus.

MVS Performance and Tuning Specialist

Requires 2 to 4 years C.P.E. experience including performance management, monitoring, configuration analysis, application analysis and operating system changes. Working knowledge of SAS, Assembler and OS/MVS system internals required.

Lead IMS System Programmer

Requires a minimum of three years IMS systems programming experience with knowledge of IMS DB/DC internals, SMP, and strong diagnostic skills. Project leadership skill and interest a must.

When you join Amdahl's progressive Corporate Computer Center in Sunnyvale, California, you will enjoy these advantages reserved for the most select team in large-scale systems:

- Leading-edge software including MVS/SP, ACF/NCP, ACF/VTAM and MSNF, VM/SP, IMS/DB/DC.
- A hardware configuration that consists of two 5860s, eight 470/V8s, five 4705s mass storage system, over 400 spindles of DASD and over 1,000 terminals.
- An extensive training and education program.

To explore one of these opportunities, call Bob Tyler TOLL FREE at (800) 538-9460, ext. 5190. In California call COLLECT (408)746-6190, or send your resume to his attention at Amdahl Corporation, MS-300, Dept. 3-003, P.O. Box 3470, Sunnyvale, California, 94088. We are an equal opportunity employer through affirmative action.

the amdahl phenomenon

Data Processing

IBM Training Specialists

As one of the world's largest information services companies, Computer Sciences Corporation has taken a solid leadership position in the development of technically advanced software systems.

At the Systems International Division of CSC, located in Herndon, Virginia, our continued growth in the development of sophisticated turnkey systems for foreign governments has created immediate requirements for IBM training specialists.

Selected individuals will provide course curriculum development of software-related training materials. In addition, the individuals will provide classroom instruction of foreign expatriate students on the utilization of the IBM 43XX system.

Qualifications include a BS degree in Computer Science or related field coupled with a minimum of three years training experience encompassing computer programming applications, IBM mainframe (370 or larger) systems, course development and directly applicable teaching experience. You should have direct experience in at least two of the following subject areas: COBOL, DOS/VSE, DOS/JCL, CICS/VS, DATACOM DB.

To learn more about these exciting opportunities, our excellent salaries and comprehensive company-paid benefits, please call/forward your resume in confidence to Paul Gorey, Manager, Professional Staffing, on (703) 471-3206/7.

CSC
COMPUTER SCIENCES CORPORATION
SYSTEMS INTERNATIONAL DIVISION
P.O. Box 745
Herndon, Virginia 22070
An Equal Opportunity Employer

SR. EDP AUDITOR

Northsuburban Chicago based growth oriented international manufacturer of Business/Office equipment and related supplies requires a professional level SENIOR MIS/EDP Auditor

The successful candidate must have several years of experience with knowledge of On-line, realtime systems for a manufacturing environment, including audit software programming, development and application of financial and operational applications software. Hardware environment experience should include IBM 4300 series or larger mainframe and remote "Stand-Alone" IBM mini-computer data centers. Candidates should expect a minimum travel requirement, domestic and international of 25%. A college degree with formal MIS/EDP systems and audit training is required.

Send resume with complete salary history to:

CW-B4574
Computerworld
Box 880
Framingham, MA 01701

An Equal Opportunity Employer M/F

PHILADELPHIA
I/P SUPERVISOR
TO $35,000
PL-1

Central NJ corp has ideal opening for do-it-all pro. Reqs LOGICALE IBM, PL-1, gen'l biz apps and top user skills. Perform programming, analysis/design supvy duties. Top benefits and all rels paid. Interv Rptd.

ROBERT HALF
EDP SPECIALISTS SINCE 1948
2000 Market St., Suite 700
Philadelphia, PA 19103
(215) 564-4200

DIRECTOR OF DATA PROCESSING

Assume responsibility for planning and directing all data processing functions with staff of 22. Goal is increase effectiveness of local government through use of data processing services. Bachelor's degree and 5 years progressively responsible experience in planning and evaluating data processing methods and procedures. Knowledge of IBM 4341 helpful. Salary high 30's negotiable depending upon experience. Excellent fringe benefits. Send resume by March 26, 1984 to:

Box CW-B4575
Computerworld
P.O. Box 880
Framingham, MA 01701

EOE-M Employer

As a major division of an international conglomerate, we are seeking an action-oriented and aggressive national sales executive to take on responsibilities for the strategic direction of the marketing effort for our computer-based products.

This position, based in Southern California, includes responsibility for providing leadership and motivation for a highly productive sales organization of over 150 people who expect to achieve sales revenues approximating $100 million in 1984.

We require 7-10 years of progressively responsible sales management experience, during which time you have overseen at least 4 managers generating revenues in excess of $40 million.

Our compensation package, company-paid benefits and relocation are excellent. Please forward your resume with earnings history in strictest confidence to:

5595 East 7th St., Suite 481
Long Beach, CA 90804

Equal Opportunity Employer

WALKER
WALKER
WALKER
WALKER
WALKER
INTERACTIVE PRODUCTS

In the 70's, Walker was rated at the top of *International Computer Programs* list of the 15 leading young computer companies to watch in the 80's. This prediction for success is being realized. Walker's extensive R & D efforts have taken it from a one-product company to an organization which has both superior computer technology and top-rated financial applications systems. We remain committed to raising the current state of the art in computer technology and fulfilling public prediction for our continued success. To assist us in achieving our goals, we are looking for dedicated computer professionals in the following area.

SYSTEMS ENGINEERING/ INSTALLATIONS SPECIALISTS

San Francisco, Chicago, Northeastern and Southeastern Regions

Three or more years systems programming in multiple operating systems, teleprocessing, and database environments such as VM/CMS, IMS DB/DC, IDMS DB/DC, ADABAS, COM-PLETE, CICS and DL 1.

- The ideal candidates will also be familiar with IBM mainframe environments.
- We are seeking sharp individuals who enjoy troubleshooting.
- These are positions requiring strong customer contact experience and excellent communications skills.

In addition to high growth potential in a progressive environment, we offer an excellent salary and benefits package. Please send your resume to the Director of Human Resources, Walker Interactive Products, 100 Mission Street, Suite 300, San Francisco, CA 94105.

We are an equal opportunity employer.

CICS PROGRAMMER/ ANALYSTS

Winter Park/Orlando

Ambition is the desire to lead. Innovation is the ability to create change. Dedication is the strength behind success. UCC is challenged by the future and we seek the talents of a select group of professionals to become our partners in success.

The Opportunity

To demonstrate your writing, documentation, development and design skills in the banking products industry. This is an ideal position for someone who wants to grow with an organization where your contributions will be recognized and rewarded.

The Requirements

- 3 years COBOL experience
- Computer Science or related degree preferred
- Familiarity with CICS and working knowledge of VSAM and DOS in an IBM environment
- Previous experience or knowledge related to the banking industry

This Winter Park opportunity offers excellent salary and benefits, variety and the opportunity for unlimited professional growth. For immediate consideration, please submit a resume in confidence to: **Sue Ratcliff, University Computing Company, UCC Tower, Exchange Park, Dallas, Texas 75235.** We are an equal opportunity employer. Principals only, please.

A Wyly Company (NYSE)
UCC
University Computing Company

Seven NEW Reasons to Choose Beatrice for your DATA PROCESSING Career

Beatrice Foods Co. is a fast growing, $9.2 billion multi-national, diversified success story and a leader in Corporate MIS. Two very good reasons we're among the top names in Data Processing.

And, now we have seven NEW reasons to join Beatrice today:

1. A NEW Commitment

Our new long-range corporate plans call for aggressive growth and a strong emphasis on Corporate MIS and data processing services.

2. NEW Facilities

Our commitment shows in our brand-new, ultra-modern Corporate Data Center, designed with the data processing professional's needs in mind.

3. NEW IBM Hardware

We're currently utilizing a large-scale IBM 308X mainframe with an extensive network of individual IBM Personal Computers and compatibles.

4. NEW Software and Applications

The decisions on new systems, software and applications are being made right now! It is a great opportunity to break new ground.

5. NEW Computer Workstations

Each office in the Data Center is equipped with the newest in ergonomically-designed furniture to eliminate "computer fatigue."

6. Extraordinary NEW Potential

A management-oriented career path, strong projections for continued growth and a promotion-from-within policy combine to offer you excellent potential for career advancement.

7. Excellent NEW Opportunities!

BUSINESS SYSTEMS ANALYSTS

Develops applications for Corporate MIS including:

- Decision Support Systems
- Financial Accounting/Analysis
- Purchasing and Distribution Systems
- Marketing Information Systems
- Cash Management Applications
- Tax Reporting Systems
- Human Resources Systems

Required experience:

- Systems Development
- COBOL, PL/1 or FORTRAN
- Fourth Generation languages (ie. EXPRESS)
- Functional familiarity with applications previously mentioned
- MBA preferred

DATABASE ANALYSTS

- Supports Systems Development
- Systems Review Board Participation
- Prepare/Maintain Corporate Data Dictionary
- Design Distributed Databases
- New Software Package Evaluation
- Production Environment Maintenance
- PC Technology Integration
- Design Security for 13 Gigabyte Database

Required experience:

- Relational Database Design
- Third and Fourth Generation languages
- MVS/OS and VM/CMS
- Various Hardware environments

TRAINING SPECIALISTS

- Develops Systems Analysis Training Programs
- Performs Skills Assessments for Corporate MIS
- Executive and PC training
- Assists in end-user training
- Coordinates training materials with outside vendors

Required experience:

- Systems Development
- Data Processing
- Systems Training (lecture, workshop, CAI/CMI) and materials/programs
- Concepts/Skills Training and Mastery Testing

OFFICE SYSTEMS ANALYSTS

- Analyzes Office Systems & Applications
- Assists implementation of automation plan, operating instructions and manuals
- Trains users

Required experience:

- Three plus years in developing automation goals
- System implementation
- User training
- Electronic mail, calendaring, word/record processing and/or communications preferred

TECHNICAL SERVICES ANALYSTS

- Installs/Maintains Operating Systems Software
- Tests/Evaluates Software Products
- Hardware/Software Planning
- Monitors Resource Utilization

Required experience:

- Four years large scale IBM Multi-CPU environment
- MVS and/or VM Operating Systems
- Data Transmission Technologies
- IBM-PC; Lotus-1,2,3; WORDSTAR

Please send your resume or brief letter outlining experience to:

Beatrice Foods Co.
Corporate MIS Operating Services
Two North LaSalle Street
Chicago, Illinois 60602
attn: Joan Jorgenson

an equal opportunity employer m/f/h/v

Principals Only

Beatrice Foods Co.

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

data processing

EASTERN

Eastern Airlines has the following programmer openings at its Miami Computer Center:

IBM 30xx SYSTEM SOFTWARE PROGRAMMERS

Requires one year experience with generation, internals, troubleshooting, and/or maintenance of one or more of the following: MVS - JESS - TCAM - VTAM - NCP - CICS - IMS/DB. These are system programming positions and require assembler language background. (Position JK1)

IBM 30xx INFORMATION CENTER TECHNICAL SUPPORT PROGRAMMERS

Requires experience using one or more of the following software products: MARK IV - TSO - SAS - FORTRAN. These positions assist end users in developing programs and systems. (Position JK2)

UNIVAC 1100 SYSTEM SOFTWARE PROGRAMMERS

Requires one year experience with generation, internals, troubleshooting, and/or maintenance of one or more of the following: OS1100 - TIP - DMS1100 - CMS1100 - TELCON. These are system programming positions and require assembler language background. (Position CC1)

IBM CICS APPLICATIONS PROGRAMMERS

Requires an AS or BS degree in Computer Sciences or Management Information Systems plus 2 years experience in Command Level CICS programming using COBOL and DL/1. (Position WL1)

UNIVAC 1100 APPLICATIONS PROGRAMMERS

Requires an AS or BS degree in Computer Sciences or Management Information Systems plus 2 years experience in COBOL programming. (Position WL2)

DATABASE ADMINISTRATION POSITIONS

Requires one year experience supporting databases in CICS-DL/1 or IMS-DB/DC environments. Experience must include use of IMS utilities, database recovery/reorganization and COBOL programming. (Position LR1)

PL1 PROGRAMMER

Requires minimum two years PL1 experience in an OS/MVS environment with JCL. (Position TO3)

COBOL PROGRAMMER

Requires minimum 2 years COBOL PROGRAMMING experience in an IBM environment with JCL. (Position TO3)

Working for Eastern Airlines can open up a new world for you. As an employee, you, your spouse, children, and parents can fly anywhere Eastern flies (South America, the Caribbean, the West coast, etc.) for a current charge of only $6.00 plus tax. With nearly 39,000 employees in our system, we offer tremendous career opportunities.

In applying for any of these positions, please refer to the specific position code letters in parenthesis at the end of each position description. Send detailed resume, including salary history and requirements to:

EASTERN AIRLINES
Management Recruiting
Department MB
International Airport
Miami, FL 33148

An Equal Opportunity Employer M/F

SYSTEMS SPECIALIST

NATIONAL SEMICONDUCTOR SALT LAKE CITY

A major electronics firm in Salt Lake City has an immediate opening for a VAX/VMS Systems Manager. The ideal candidate will have a Bachelor's degree in Computer Science or equivalent experience with a MS in a technical discipline preferred.

A total of 8 years of computing experience is required, 3 of which must have been as a VAX 11/780 Systems Manager working with DBMS, DATATRIEVE, in a DECNET ENVIRONMENT.

Familiarity with IBM's MVS operating system and JCL is required. Success as a project leader in a large DEC/IBM computing environment is preferred.

The individual selected will be responsible for planning, developing and implementing SYSTEM LEVEL HARDWARE AND SOFTWARE TO SUPPORT THE Comprehensive Online Manufacturing and Engineering Tracking System (COMETS).

Send your resume in confidence to:

National Semiconductor
Personnel Department
3333 West 9000 South
West Jordan, UT 84084

We are an affirmative action/equal opportunity employer

National Semiconductor

MICROCOMPUTER SYSTEMS PROFESSIONALS

Accountants Microsystems, Inc. is the nation's leading developer of vertical market microcomputer business software--with a 300% annual growth rate. We're seeking highly motivated seasoned professionals with a proven industry track record for the following key positions:

Product Managers – You'll direct a team through market research, product specification, production coordination, Beta testing, and market release. These senior level "end-to-end" project management positions require extensive knowledge of DP systems and hands-on applications experience in general, tax, legal, A/E, or financial institutions accounting.

National Accounts Manager – Develop and manage sales and marketing programs targeted at distributors, Fortune 2000, and "Big 8" accounting firms.

Software Engineers/Programmers – Use your skills in MBASIC and "C" to generate financial applications on new generation microcomputers utilizing some of the most advanced development tools in the industry.

Send resume in confidence to AMI, Personnel Department, 3633 - 136th Place SE, Bellevue, WA 98006. No phone calls.

ACCOUNTANTS MICROSYSTEMS INC.

CAPACITY PLANNING COORDINATOR

MIS

Due to the expansion of our operations in Oklahoma City, we are looking for a well experienced individual who will be required to coordinate Hertz' capacity management program. This position requires: • Experience with Sperry 1100 mainframes, preferably in a multi-vendor environment. • Experience in a high volume transaction processing environment. • Experience developing statistical and modeling packages. • Experience developing strategic plans.

We offer an excellent starting salary, a full comprehensive benefits program and exceptional opportunity for advancement. For confidential consideration, candidates must include current salaries, along with resume. Please address your resumes to:

The Hertz Corp.
Attn: Warren Pybas
16401 N. Pennsylvania
Oklahoma City, OK 73120

Hertz

EOE M/F/H

EXPERIENCED SYSTEMS PROGRAMMERS, ANALYSTS AND PROGRAMMER ANALYSTS FOR SUNBELT LOCATIONS

Job dissatisfaction, complacency, and frustration are the biggest obstacles to overcome to achieve one's career goals. Everyday new career opportunities pass us by because we are unaware of their existence. Let us keep you abreast of what your true value is in the market place. Absolutely no obligations, please call or write Keith Ferchill, CPC, Data Processing Specialist.

Dunhill

OF CHARLOTTE, INC.
6401 Carmel Road, Suite 107
Charlotte, North Carolina 28226
800-438-2012
(NC Call)
(704) 542-0312

NATIONAL BUREAU OF STANDARDS INSTITUTE FOR COMPUTER SCIENCES AND TECHNOLOGY

OPPORTUNITY FOR A CHALLENGING POSITION IN COMPUTER SCIENCE AND TECHNOLOGY

Dos Systems Programmer for VAX and PDP-11 Systems and Associated Networks

COMPUTER SYSTEMS PROGRAMMER needed to:

- Install, develop, and maintain all systems software
- Provide and maintain both implementations to existing software and new, unique software
- Assume responsibilities for all interconnections with local and wide area networks
- Assist in analysis, collecting and procurement of systems and software; and
- Participate in local and national user groups activities and professional societies

Desirable experiences includes systems programming with current VAX/VMS and UNIX operating systems. An undergraduate degree which consisted of 30 semester hours in mathematics, statistics, and computer science and included differential and integral calculus courses is required in addition to at least 3 years of experience in the computer science field.

This position is either GS-12 or GS-13 grade level, depending upon qualifications and experience. It offers competitive salary, excellent benefits and professional growth opportunities. Please send your Personal Qualifications Statement (SF-171) to:

U.S. Department of Commerce
National Bureau of Standards
Administration Building, Room A-125
Washington, D.C. 20234

Attn: Ms. Josephine White (C0720)

The National Bureau of Standards is located in modern facilities in Gaithersburg, Maryland and is an Equal Employment Affirmative Action Employer. U.S. Citizenship is required.

SYSTEM MANAGER/ BUSINESS ANALYST- PROGRAMMER

Must have minimum 4 years' college education in business and computer science, four years' applicable experience, and proficiency in COBOL. Knowledge of HP-3000 system, including MPE, IMAGE and QUERY required.

To allocate and control system resources and supervise system operator and data entry clerks. To provide key link to management users, including user interface, design and development, implementation and maintenance of administrative and accounting software.

Please telephone or send resume to:

Personnel Department

Fay, Spofford & Thorndike, Inc.

191 Spring Street, P.O. Box 682
Lexington, MA 02173
863-8300

An equal opportunity employer M/F

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

PROJECT LEADERS and PROGRAMMER/ ANALYSTS

Florida Opportunities

AUXTON COMPUTER ENTERPRISES, Inc. is a management consulting organization specializing in the development of business applications software for the telephone & communications industry.

Due to our tremendous growth and expansion, we require several experienced data processing professionals possessing the following background.

Project Leaders:

Candidates must possess solid leadership experience with technical background in PL/1, "C" language, FOCUS or COBOL.

IMS DB/DC

Solid working experience designing DB/DC based systems. Candidate should be familiar with PL/1 in an IMS database environment.

FOCUS:

Experience with FOCUS and/or other User friendly databases (i.e. RAMIS). Model 204 highly desirable.

"C"

Experience with "C" language running under UNIX* operating system.

Sr. Programmer Analysts
3 years + experience designing on-line systems using COBOL and command level CICS.

We offer selected applicants competitive starting salaries plus our comprehensive benefits package. For consideration, send resume stating salary history and requirements to: JAN ACKERMAN

AUXCO
Auxton Computer Enterprises, Inc.
201 East Pine St., Suite 210
Orlando, Florida 32801

*UNIX ® is a trademark of Bell Laboratories.
an equal opportunity employer

MOVE YOUR SOFTWARE

Our computer can help you get here or there from. Four WATS lines; 13 years' experience; 270 affiliated offices; 300+ current job orders; 3000+ company clients from Virginia to Texas to Florida! Send resume to:

DATA RESOURCES, USA
Division of Landrum Personnel Resources
P.O. Box 1373C
Pensacola, Florida 32589-1373
CALL TOLL FREE (800) 874-5497
IN FLORIDA (904) 434-3321 COLLECT

EDPeople.

For data processing brain-power think of EDPeople, a service of Robert Half.

Intelligent machines need intelligent people.
And Robert Half has been finding these people since the computer revolution began.

We know the job market,
and we know the right people
to meet your EDP requirements.

Call any of Robert Half's 80 offices
in the United States, Canada and Great Britain.
We'd like to help you hire smart.

ROBERT HALF®
The only nationwide personnel specialists.

© 1983 Robert Half International Inc. All offices independently owned and operated

---

EFT Opportunities

MOVE UP IN THE WORLD...
Come To Colorado.

Affiliated Banks Service Company, headquartered in Denver, can offer you the environment for career growth and satisfaction plus accessibility to all forms of recreation that make a lifestyle anything but routine.

We are currently looking for a Senior Programmer Analyst with EFT, demand deposit, or CIF experience to satisfy an immediate need in our growing Electronic Banking Division. Our progressive state-of-the-art organization offers: IBM 3083, TSO/SPF, 1-to-1 CRT ratio, productivity aids, personal computers, and complete training program for selected individuals.

One of the largest on-line networks in Colorado supporting:

- ATM "Diebold"
- On-line teller "Honeywell"
- National debit card "Visa"
- National switch "PSI"
- ACH "UCC PPD"

To qualify individuals must have 3-5 years experience in COBOL, 1+ years command level CICS, and proven project leadership skills.

If you are an energetic, self-starter with the above qualifications, take the first step on your "move up" by contacting us today. Send your resume, complete with employment and salary history to: Personnel Department CW, AFFILIATED BANKS SERVICE COMPANY, 8461 Delaware Street, Thornton, CO 80221.

Affiliated Banks Service Company

Equal Opportunity Employer M/F

PROGRAMMERS AND ANALYSTS

Growing software services company involved in implementing several **HOGAN** systems at leading California financial organizations is searching for Hogan expertise. You will be assigned to one of our Fortune 500 financial clients and be an integral part of their Hogan implementation process. We offer high salaries, bonuses, fringe benefits and relocation. Send resume or call collect at (213) 390-2681.

cps Computerized Programming Systems Inc.
3450 West 6th Street, #200
Los Angeles, California 90020

GMF Robotics...

located in Troy, Michigan, has an immediate opening for a:

SYSTEMS PROGRAMMER

Will be responsible for VAX/VMS systems programming and VAX performance monitoring. In addition, will perform VMS systems generation and will support DECnet and vendor supplied packages. A BS degree in EE or Computer Science is required and a MS in the same discipline is preferred. 2-4 years' experience in VAX/VMS, DECnet, and Ethernet is also required.

GMF Robotics offers competitive compensation, a unique benefit program, plus additional compensation via an incentive bonus program. Interested individuals should send their resumes, including salary history, to: R.L. Colley, Personnel Director, **GMF ROBOTICS CORPORATION**, 5400 New King Street, Troy, Michigan 48098. An Equal Opportunity Employer M/F.

Computer Professionals

JOIN US IN SOUTHERN DELAWARE-

Where Spring Begins Earlier And Summer Lasts Longer!

First Delaware Services (subsidiary of First Maryland Bancorp), a diversified financial service computer support group, began its operations in Milleboro, Delaware three years ago. We're pleased with this location, just 20 minutes from the Southern Delaware shoreline-for many reasons. Among them are the variety of affordable lifestyles and recreational opportunities and increased purchasing power due to no state sales tax!

Examine the career opportunities, excellent compensation, and benefits (including FULLY-PAID RELOCATION) offered by our growing organization, and you could be working in a location where you'd love to live-by EARLY SPRING! Due to the rapid expansion we've been anticipating, we have immediate openings for professionals with LARGE-SCALE IBM equipment experience, to begin with us in the following positions:

SYSTEMS ANALYST

Minimum of 5 years experience in an IBM shop. The successful candidate must possess excellent verbal and written communication skills and be experienced in project planning and control analysis on large scale IBM systems. Proficiency in flow charting, writing program specification and directing user/technical personnel on all levels required. CICS, IMS, TSO, SPF experience is preferred.

SENIOR PROGRAMMER/ANALYST

Requires minimum of 4 years COBOL programming on large scale IBM systems. Proficiency in problem resolution, JCL creation, and debugging techniques required. Must be knowledgeable in sub-system design and specification writing.

COMPUTER OPERATORS

2-3 years experience on a 3083 IBM OS MVS operating system. Some JCL experience preferred. Minimum 2 years college required.

We believe that time off should be relaxing and work-time should be rewarding. If you share this philosophy, you will fully enjoy the projects and the location. LET'S TALK! Call or send resume to D. Jill Connolly, P.O. Box 1596, Baltimore, MD 21203. Phone: (301) 244-4041

Experienced Programmer/Analysts

CALL US...

We'll Help You Grow

M.I.S. International is Michigan's largest software services corporation supplying data processing professionals to Midwest area companies. In addition, AUTOFLEX, Inc., a subsidiary of M.I.S., is heavily involved in the design and development of Robotics equipment and software systems.

If you have at least one year of experience in any of the following disciplines and desire a high tech, state-of-the-art environment, call Personnel Recruitment or forward your resume.

- IMS DB/DC with COBOL or PL/1
- CICS with COBOL or PL/1, DOS/OS
- PL/1, OS/MVS
- COBOL using TSO/SPF or VM/CMS
- PL/1 with MULTICS
- FORTRAN with VAX and VMS
- IBM PC with Communications

MIS INTERNATIONAL INC

24655 Southfield Road
Southfield, Michigan 48075
(313) 569-0656
(800) 521-2144

Equal Opportunity Employer
"A Total Systems Company"

PROGRAMMER ANALYST

This position requires a Bachelor's Degree in Business Administration, Mathematics, Engineering, Computer Sciences, or related fields. Experience requirements include two or more years of applicable systems analysis and programming work. Cobol programming experience is a must. Job requirements include the ability to communicate effectively with a wide range of business and engineering people and a solid foundation in structured methods for design and programming.

VAX/VMS (PROGRAMMER/SYSTEMS ANALYST)

We have acquired a state-of-the-art relational data base management system implemented in hardware as a back-end processor interfaced to a VAX/VMS host. We are looking for an individual with in-depth experience in the VAX/VMS operating system to provide technical software support services to Programmers, Systems Analysts, and Operations personnel. The requirements for this position also includes a Bachelor's Degree in Business Administration, Mathematics, Accounting, Computer Sciences, or related fields.

EQUAL OPPORTUNITY EMPLOYER – M/F

Liberal Fringe Benefits
Must be a U.S. citizen
Replies held confidential

Send resumes to:

Trudie L. Rainey
Employment Section Chief
Reynolds Electrical & Engineering Co., Inc.
Post Office Box 14400
Las Vegas, NV 89114-4400

SYSTEMS ANALYST

GOULD

is the name that delivers.

Gould, Inc. Computer Systems Division is an international leader in the real-time scientific super-minicomputer market. We are currently seeking a Systems Analyst to perform post-sales activities in our Santa Clara Office.

The ideal candidate will have a solid working knowledge of Convergent Technology hardware, including the systems architecture and operating system. Must be proficient in BASIC and FORTRAN. Knowledge of UNIX* highly desirable.

In addition to an interesting and challenging work environment, we offer an excellent salary, new, accelerated bonus program, car allowance and complete benefits package.

For immediate and confidential consideration, please send your resume, including salary history and requirements to:

GOULD, INC.
Computer Systems Division
950 W. 190th Street, Suite 240
Torrance, CA 90502

An Equal Opportunity Employer M/F/H/V

*UNIX is a trademark of Bell Laboratories.

Wilsonville, Oregon. Minicomputer software engineer to design and implement advanced software for new generation mini-computers. Must possess MS in computer science with emphasis in compiler/assembler design; working knowledge of PASCAL; limited experience in C, 8086 and/or 8088 languages; experience with microcomputers; general knowledge of computer architecture, data structures, algorithms and DBMS. Individual develops detail specifications and implements shell kernel program; adapts shell kernel to run under various microcomputer operating systems; programs detail design, develops algorithms and implements design via programming; also performs maintenance of system software and develops and executes tests to ensure software conformity with specifications. 40 hrs/week with overtime as necessary. Salary: $27,000. Send resume to: Employment Division, Attn: Job Order 1917036; 875 Union Street NE, Salem, OR 97311.

MAINE

We have specialized in data processing professional placement in Maine for almost a fifth of a century. If you qualify for positions in the $25-40,000 range, please contact us in total confidence. Our clients pay our fees and provide relocation assistance.

ROMAC.
477 Congress St.
Portland, Maine 04101
(207) 773-4748

PROGRAMMERS AND SOFTWARE PROFESSIONALS

KBS Systems Inc. is an aggressive consulting and software development firm serving a retail market. We provide our clients with expertise in VAX/VMS to facilitate both technical and business solutions. KBS is seeking the right individuals to join their team of professionals. If you have FORTRAN, COBOL, PL/1, DTR and VAX/VMS experience, then KBS would like to hear from you. Good communications and technical skills a must. Salary negotiable. Send resume in confidence to:

Jon E. Nelsen
KBS Systems Inc.
21 Bixby Street
Pittsford, NY 14534

EOE M/F/H

EDP SPECIALISTS

LIFE 70
HOGAN
IBM ASSEMBLER
CICS
CPCS
MVS/SP JES2

The market is exceptionally improving. We have 50 openings with one client in Atlanta, 40 with another in Southern Florida, 12 in Central Florida, multiple openings in NC, SC, AL, TN, TX, AZ, and selected openings in almost every part of the country. Specialists can choose a variety of locations. Our company clients are prepared to offer you the best ... state-of-the-art facilities, good growth potential, "people" orientation, liberal benefits. Company clients also pay all fees, interview expenses, relocation, etc. Confidentially guaranteed. 1 year experience minimum.

Send your resume today to:
Steve Stevenson, Partner

Jim King and Associates

1340 Gulf Life Tower/Jacksonville, Florida 32207
(904) 396-7271

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

SERVICE MERCHANDISE
AND
NASHVILLE, TN
(MUSIC CITY, U.S.A.)

Offering a great combination of an EXCITING PROFESSIONAL, FRIENDLY FORTUNE 500 Corporation and major SUNBELT city with varied recreation, LOW COST OF LIVING, and NO STATE INCOME TAX.

...OFFICE SYSTEMS...
...ANALYST...
...(PROBLEM SOLVER)...

- 5+ yrs. Distribution Systems
- Data Networks
- Electronic Mail • Graphics
- Word & Record Processing
- Spread-Sheets
- Vendor Evaluations
- System Configurations
- Proposals • Training
- Conversion Communications

Our MIS area is a DYNAMIC and INTEGRAL team offering: CAREER GROWTH PLANNING, COMPETITIVE COMPENSATION, OUTSTANDING BENEFITS, and PAID RELOCATION.

Immediate consideration to qualified applicants with complete resumes including SALARY HISTORY and REQUIREMENTS.

DARYL SEARCY
Manager of Recruitment
P.O. Box 24600 (CBA)
Nashville, TN 37202

EOE M/F/H/V

FACULTY POSITION
Purdue University School of Engineering and Technology at Indianapolis

An opening in the Computer Technology Department at Indiana University-Purdue University at Indianapolis (IUPUI) is available August, 1984. Applicants must have a strong background in IBM hardware, with particular emphasis in systems analysis and systems design or computer operating systems. Business or industrial experience, teaching experience, and a minimum of a master's degree are required. Rank and salary dependent on qualifications.

Please send resume by March 15, 1984 to:
Dr. Robert Gordon, Chairman
Awards and Scholarships Committee
Indiana University-Purdue University at Indianapolis
P.O. Box 647
1201 E. 38th Street
Indianapolis, Indiana 46223
AN AFFIRMATIVE ACTION EQUAL OPPORTUNITY EMPLOYER

ROMAC

MARKETING REPS
$30,000 to $50,000

San Jose — Chicago
Dallas — Atlanta
St. Louis — Denver

Our client requires 5 to 7 years of successful computer, minicomputer, intelligent terminal, or data equipment sales. Full relocation, growth situation, 40% travel.

1321 Harbor Hill/Ind Plaza
Rochester, New York 14624
716-232-4010

FEDERAL EXPRESS... PREPARING FOR TOMORROW

Join the corporation that created a revolution in American business. We have become the most advanced high technology package and document delivery company in the world... continually ready to greet new challenges by supplying innovative solutions. People are the heart of Federal Express because people have made us what we are today and what we will be tomorrow.

Bring your expertise to our high energy, high tech operation, where the atmosphere is charged with the excitement of rapid, yet carefully planned expansion. Positions are available in Memphis and Colorado Springs.

DATA BASE ADMINISTRATION
Technical Advisor/DBA
Sr. Programmer/Analyst - Sr. DBA Analyst

Design and Install IMS Data Bases for Large-Scale IBM Systems.

- Bachelor's degree in Math, Computer Science, Engineering or Business/equivalent work experience.
- Minimum of 5-7 years experience with at least 4 years in Systems Development
- IMS DB/DC DBA experience
- Experience preferred in: Monitoring data bases for performance; logical and physical data base design, data base reorganization and recovery procedures and utilities; PSB and DBD creation.

QUALITY ASSURANCE
Sr. Quality Assurance Analyst
Quality Assurance Analyst

Participate in the development of a quality assurance function at Federal Express. Will include such areas as: change control, system test, monitoring of standards and procedures, implementation of a structured methodology and system design reviews.

- Bachelor's degree in Computer Science, Math, Engineering, Business or equivalent work experience
- Minimum 3 years data processing experience with two years in systems development using COBOL
- IMS knowledge preferred
- Experience with systems test, design reviews, change control or structured methodology preferred
- Strong interpersonal skills.

DATA SECURITY
Data Protection Advisor
Sr. Data Protection Analyst

Career opportunities in the rapidly growing field of computer systems security. Take part in designing protection for an IMS network running a million transactions a day and developing security procedures for an increasingly large number of microprocessors.

- Five years data processing experience
- One year computer security experience
- Bachelor's degree or equivalent work experience
- Knowledge of ACF2
- Knowledge of COBOL and IMS preferred

INFORMATION CENTER
Sr. Information Center Analyst

Join a well established and highly successful group dedicated to making the computer a useful tool for non-technical business professionals through the use of a wide variety of fourth generation languages.

- Five years experience in data processing
- Bachelor's degree or equivalent work experience
- Knowledge of FOCUS, SAS TELAGRAF, PROFS preferred
- Teaching experience and good interpersonal skills preferred

Come join an established team and help us continue our growth in state-of-the-art data processing. To learn more about the rewards and satisfaction available at Federal Express, write us a letter indicating your experience and salary requirements. Send your resume if you have one.

Bob McLellan (901) 798-7789
FEDERAL EXPRESS CORPORATION
P.O. Box 727, Dept. 3171-153
Memphis, TN 38194

Equal Opportunity Employer M/F

FEDERAL EXPRESS

MIS
PROJECT MANAGER
MARKETING INFORMATION SYSTEMS

Seeking an individual to lead a team effort in the design and implementation of Marketing Information Systems. Desirable candidate must have 4-6 years experience with order processing, sales analysis, and sales forecasting systems. Project involves the integration of personal computers, communication links to customers, and bar coated labels with main frame applications. Knowledge of S/34, S/36, and MAPICS desirable. Languages: COBOL, RPG, and BASIC.

Nalge, a division of Sybron, is a leading manufacturer of plastic laboratory products. We offer competitive compensation and benefits packages. Interested and qualified candidates should submit resume to:

Barbara McGraw
NALGE COMPANY
Division of Sybron Corp.
75 Panorama Creek Drive
Rochester, NY 14602

Nalge SYBRON

We Are An Equal Opportunity Employer M/F

SUNBELT OPPORTUNITIES

BSCS or equivalent and 3+ years programming experience to include hardware and input/output channel experience with the ability to analyze system dumps for problem solving. Experience with any of the following is needed: M68000, Z80, 8088, 8085 microprocessors or cooperate; Bi-SYNC, SDLC, or SNA protocols; software development using assembly language. Responsibilities include software design, writing, de-bugging and implementing computer programming for engineering use.

Requires BSCS or related degree and 3+ years experience in microprocessor software development. Should have experience with assembler language and INTEL 8086/8088 or MOTOROLA 68000 processors. Will work as a member of a team developing operating systems architecture.

Fortune
Personnel Consultants of Raleigh, Inc.
100 C Wake Lake Court
Raleigh, NC 27609
(919) 848-4888
Company Fee Paid

MIDWEST'S BEST

DP OPPORTUNITIES

The Kansas City Star/Times publishes the sole area-wide daily newspaper serving the general metropolitan population of 1.4 million. The Kansas City Star DP department seeks added staff to support current operations using three DEC KL10/TOPS 10 systems and the Software House 1022 DBMS. Normal staff growth opportunities will be enhanced by the planned gradual introduction of new systems to keep abreast of technology.

PROGRAMMER ANALYST

Requires BS with 4 years experience in application design, program development, standards development and documentation. Skills in feasibility studies and transaction processing useful. Applied job skills will include applications design and programming, systems development, top down testing and analysis, and systems library management.

DATA BASE ANALYST

Requires BS with 3 years experience in DB management systems, business applications, transaction analysis, and structured design analysis and tools such as data flow diagrams and data dictionaries. Applied job skills will include logical data analysis and normalization, data modeling, security and control, file access methods, and performance tuning.

SYSTEMS PROGRAMMER

Requires BS or equivalent with 4 years experience in hardware-software evaluations, assembly language programming, analysis, diagnostic tests and development of applications programming aids. Applied job skills will include systems studies, selection and design of hardware-software systems to meet current and future needs, and work with the applications and computer center staffs on efficiency and systems.

Send Resume and letter detailing current responsibilities and salary history to Data Processing Director, Kansas City Star/Times, 1729 Grand Avenue, Kansas City, MO 64108.

THE KANSAS CITY STAR.
The Kansas City Times

An Equal Opportunity Affirmative Action Employer

MIS OPPORTUNITIES

Lechmere, the sales growth leader of the $6 billion Dayton Hudson Corporation, has immediate openings for experienced MIS professionals. Our imminent expansion creates opportunities in the following positions:

PROJECT LEADER
Requires excellent systems design skills with at least one year's experience as system analyst plus strong project management skills. Retail MIS experience especially desirable.

PROGRAMMER ANALYST
Solid COBOL exposure to on-line systems, hands on CICS preferred. Variety of challenging applications available.

SENIOR PROGRAMMER/ANALYST
Requires strong COBOL skills and experience with either command level CICS or ADABAS/Natural. Must have ability to work with users at all levels. Variety of challenging applications including Data Base.

PROGRAMMER ANALYST
Specialized Series I position requires strong EDX and EDL skills to expand our store level systems.

We are an IBM MVS shop currently utilizing an IBM 4341, (upgrading to an IBM 3083 by June 1984) a network of mini-computers and an electronic POS system. We offer a comfortable but exciting professional environment, excellent salary and a full line of company benefits including store-wide discount. Conveniently located to Metropolitan Boston.

For immediate, confidential discussion of your future and ours, call (617) 935-8320, Ext. 573, Mon.-Fri., 9 A.M.-5 P.M. or submit a resume including salary requirements to:

LECHMERE

Mike Zager
Lechmere, Inc.
275 Wildwood Street
Woburn, Mass. 01801

An Affirmative Action, Equal Opportunity Employer M/F. No Agencies, Please.

SYSTEMS ANALYST

Major responsibilities for the design of the software supporting computer systems. Minimum qualifications: (1) 2-5 years of full time work experience in programming, systems analysis and development. (2) Bachelor's in area of computer sciences, data processing or related field. (3) Demonstrated ability in higher languages and knowledge of COBOL, ALGOL, FORTRAN. (4) Knowledge of and experience in database and systems design concepts preferred. (5) Ability to communicate both verbally and in writing with management and users of data processing services. (6) Experience on Burroughs large systems preferred. Anticipated date of appointment is 5/1/84. Initial salary range is $20,300-$23,500, on a 12 month basis with numerous fringe benefits. Send completed WCC application to the office of employee relations, Washtenaw Community College, 4800 East Huron Drive, P.O. Box 0-1, Ann Arbor, MI 48106, (313) 973-3497. Deadline for receipt of applications is 03/23/84. "AN AFFIRMATIVE ACTION/EQUAL OPPORTUNITY EMPLOYER".

THE CITY OF DETROIT
has openings for
SYSTEMS PROGRAMMING SUPERVISOR
in a state of the art
Burroughs environment
$37,000 per year

Must have Bachelor's degree and extensive experience in programming and software systems development, including a minimum of three years of supervisory level work.

Send resume to:
City of Detroit
Personnel Department
314 City-County Building
Detroit, MI 48226

A merit system and an equal opportunity employer.

COMPUTER GRAPHICS

Strong in programming and geometry. Working knowledge of Pascal. Major NYC company.

Reply to CW-B4675
Computerworld
Box 880
Framingham, MA 01701

Sunbelt Positions

Medical Engineering, Inc., a progressive software development company in Southwest Florida, needs qualified professionals seeking opportunities as:

- Programmers • Programmer/Analysts • Systems Programmers

Hands-on COBOL experience with IBM 4341 hardware or equivalent; hospital experience helpful.

- Programmers • Programmer/Analysts

IBM 34, 36 or 38 experience; proficient in RPG III; hospital experience helpful.

- Customer Service Representatives

Hospital software familiarity desired.

- Project Coordinators

Hospital experience necessary and familiarity with hospital software desired.

- Sales Manager

Experience in both hospital industry and hospital computer systems necessary.

Forward resume and salary history to:

MEDICAL ENGINEERING, INC.
2555 Fowler Street — Fort Meyers, Florida 33901

NATIONAL BUREAU OF STANDARDS
INSTITUTE FOR COMPUTER SCIENCES AND TECHNOLOGY

OPPORTUNITIES FOR CHALLENGING POSITIONS IN COMPUTER SCIENCE AND TECHNOLOGY

Computer Scientists/Electrical Engineers

The System Components Division of the Institute for Computer Sciences and Technology at the National Bureau of Standards is seeking GS-12, 13, 14 and 15 Computer Scientists and Electrical Engineers to perform research and advanced development on multiprocessing computer systems, speech recognition, data encryption for computer security, and optical digital data storage (erasable recording). Successful applicants must possess an in-depth knowledge and familiarity with one or more of the following technological areas:

MULTIPROCESSING COMPUTER SYSTEMS

Theoretical and applied computer science and technology with emphasis on computer architecture, multiprocessing systems, or parallel processing.

SPEECH RECOGNITION

Theoretical and applied pattern recognition technology with emphasis on acoustic, phonetic, and artificial intelligence algorithms and languages.

DATA ENCRYPTION FOR COMPUTER SECURITY

Theoretical and applied computer science, data communications, mathematics, cryptographic algorithms, and computer security analysis problem solutions.

OPTICAL DIGITAL DATA STORAGE SYSTEMS AND MAGNETIC RECORDING

Theoretical and applied optical and magnetic technology with emphasis on computer mass storage, system architectures, or dynamic test and measurement techniques.

These positions range from the GS-12 to GS-15 grade levels depending upon qualifications and experience and offer competitive salary, excellent career benefits and professional growth opportunities. Please send your Personal Qualifications Statement (SF-171) to:

U.S. Department of Commerce
National Bureau of Standards
Administration Building, Room A-105
Washington, D.C. 20234

Attn: Ms. Josephine White (C2507)

The National Bureau of Standards is located in modern facilities in Gaithersburg, Maryland and is an EQUAL EMPLOYMENT OPPORTUNITY AFFIRMATIVE ACTION Employer. U.S. Citizenship is required.

MISSISSIPPI STATE UNIVERSITY is seeking Programmer/Analysts for Administrative Data Processing. BS Degree and DMS 1100 experience required. Send resume to:

Gerald Matthews, Director
Computer Center
and Services
Drawer CC
Mississippi State, MS 39762

MSU is an equal opportunity/affirmative action employer.

Systems Programmer II

The University of Alaska Computer Network (UACN)

The UACN provides the statewide University of Alaska system academic and administrative computing and data communication services. The Systems Programmer II provides technical support for computer operating systems, related software and program maintenance. In addition this post is responsible for software systems durations and design of the maintenance/installation of communications software, utilities, language translators, and standard software packages. As a minimum this successful applicant must possess a knowledge of computer systems and software, skills in Assembly language level programming, and the ability to supervise, direct, and install computer operating systems.

The position is based in Fairbanks, Alaska and will report to the Systems Programming Manager. The salary range begins at $42,764 DOE.

Application letters, together with resume and at least 3 professional references, must be postmarked by March 30, 1984 and sent to:

Statewide Office of Human Resource Development
University of Alaska
303 Tanana Drive, Room 1 Bunnell Building
Fairbanks, Alaska 99701

Your application for employment with the University of Alaska may be subject to public disclosure should you be ranking the finalists for the position. The University of Alaska is an Equal Employment/Affirmative Action Employer and Educational Institution.

FLORIDA

Let us assist you in your search for opportunities in the #1 growth state. Our staff consists of Senior Data Processing managers who understand your career needs and speak your language. If you appreciate and desire a knowledgeable, professional approach with your career then contact:

COMPUTERPEOPLE
8750 W. Hoover Blvd., Suite 204
Tampa, Florida 33614
(813) 886-6135
We Serve Computer Professionals Exclusively.
And That's Important To YOU!

CALIF. & UNIX*

Openings in a variety of areas and disciplines.
(714) 981-UNIX*

CPU COMPUTER PROFESSIONALS UNLIMITED, agency
7041 Garden Grove Blvd.
Ste. B, Garden Grove, CA 92641

*UNIX is a trademark of Bell Laboratories

INSURANCE

Life 70, Life Comm, CFO, Group Health, PMS, Vantage, ALIS, (etc.)

National Positions Available D.P. Mgr.; Prod. Leader; Analyst; Consultant; Networking; OS/DOS/VS/DOS/Systems Prog.; Shift Supvr./I.D.L. Tech.

Call Collect (318) 868-1000 For Interview.

Executive Consultants
Insurance Specialists
1600 Fairfield Avenue
Suite 100
Shreveport, LA 71101

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

SOFTWARE ENGINEERS

UNIX*, C, PDP11, M68000

Opportunities in Rochester, New York and Reston, Virginia

Computer Consoles Inc. designs, develops, manufactures, markets, and services a variety of minicomputer-based fault-tolerant information systems. Headquartered in Rochester, New York, we have all the cultural and educational advantages of a large metropolitan area as well as the ambience and scenic beauty of a small, relaxed town. Our new Office Systems Group is located in lovely northern Virginian Fairfax County just minutes away from our nation's capitol.

CCI currently has immediate opportunities for:

GROUP LEADERS/SOFTWARE ENGINEERS

You'll be responsible for the design and implementation of data base applications and utilities, or fault-tolerant operating system development including development of a multiprocessor UNIX-compatible transaction processing system.

We prefer a technical degree plus a minimum of 2 years' experience. Knowledge of C, UNIX, and data structures plus experience with data bases in a minicomputer Real Time or on-line environment and/or OS internals are also desired. U.S. citizenship or permanent residence is a must.

**UNIX is a trademark of Bell Labs*

We offer opportunities for growth plus attractive compensation and benefits including relocation.

For immediate confidential consideration, please forward your resume including salary history to the location of interest to you.

CCI COMPUTER CONSOLES INCORPORATED

S.C. Haskins
Computer Consoles, Inc.
97 Humboldt Street
Rochester, New York 14609

G.C. Allimando
Computer Consoles, Inc.
1760 Reston Avenue
Reston, Virginia 22090

Equal Opportunity Employer M/F/H/V

High Tech $$
Opportunities
$30,000-$65,000

The coast-to-coast Fox-Morris recruitment network has placed thousands of hi-tech executives in key positions with leading companies during more than two decades. Client companies pay all employment expenses. A few examples of choice 1984 opportunities include:

DIRECTOR—MIS, $60K. Midwest consumer products corp. seeks hi-energy director w/4+ yrs. exp. in sales/mktg. systems for new data center. POSITION HG-3-5.

DIR. TECH. SERVICES to $60K+. "Fortune 100" corp. Multi-site, multi-mainframe HQ environment seeks hi-energy tech services director, including Datacomm, Telecomm, and database. POSITION HG-3-4.

MGR., COMPUTER OPERATIONS to $60K. Major corp./tech. processing group. Large IBM installation multi-CPU. Prior Supr./admin. skills & networking concepts. Esc. path to Mgr. CPU & telecomm, sys. prog. POSITION AT-3.

SRVS SYST./PROG'S to $45K+. New Wilmington suburban facility, hvy. on-line environ., hi-caliber mgmt., seeks to add 3 systems programmers to top-notch tech staff: IMS, CICS, SNA, SDLC, VTAM. POSITION HG-3.

BUSINESS SYSTEMS CONSULTANT, $40K. Req'd. knowledge of budget planning, inventory control, distribution & order processing. Need strong user interface skills. Limited travel req'd. POSITION LB-3.

PL-1, $30K. Blue chip software co. in attractive suburban Phila. location seeks a number of technically strong PL-1 analysts/programmers for large dvlpmt. project. POSITION HG-3-2.

FORTRAN, $30K. Blue chip financial services software co., starting to support explosive customer growth, seeks hi-level skills & financial applications. POSITION HG-3-3.

PROGRAMMER ANALYSTS to $30K. Rapidly growing Mid-Atl client seeks candidates w/BSCS & 3+ yrs. exp. 360/4341 in COBOL, OS/MVS environ. CICS TSO/SPF a plus. POSITION DW-3.

SR. PROGRAMMER ANALYSTS to $31K. Major insurance co. needs BSCS candidates w/2+ yrs. COBOL as applied to auto, life, or comm. lines underwriting to depend. & implement PMS systems. POSITION DW-3.

For direct, confidential access to our national client network, call or send resume to Karyn Davis at our Fox-Morris corporate headquarters:

Old York & Rydal Rds., Jenkintown, PA 19046 (215-576-4884)

FOX-MORRIS
personnel consultants

atlanta • baltimore • boston • charlotte • cincinnati • cleveland
dallas • houston • jackson, ms • new york • norfolk • orange county, ca
philadelphia • pittsburgh • princeton • raleigh • san francisco

---

EMPLOYMENT SERVICE FOR PROGRAMMERS AND ANALYSTS

National Openings With Client Companies and Through Affiliated Agencies

Scientific and commercial applications • Software development and systems programming • Telecommunications • Control systems • Computer engineering • Computer marketing and support

Call or send resume or rough notes of objectives, salary, location restrictions, education and experience (including computers, models, operating systems and languages) to either one of our locations. Our client companies pay all of our fees. We guide; you decide.

RSVP SERVICES, Dept. C
Suite 709, One Cherry Hill Mall
Cherry Hill, New Jersey 08002
(609) 667-4499

RSVP SERVICES, Dept. C
Suite 211, Dublin Hall
1777 Walton Rd., Blue Bell, PA 19422
(215) 629-0585

From outside New Jersey, call toll-free 800-257-8159

RSVP SERVICES
Employment Agents for Computer Professionals

HAS THE COMPUTER PROGRAM FOR YOU

If you're not accomplishing your career goals, let us put you in the right environment. Our national database of client companies are constantly looking for progressive DP professionals who want to remain state of the art.

NATIONWIDE OPPORTUNITIES

IBM MVS/XA Network Engineer to $40K
IBM IDMS/R Developer to $35K
IBM Systems Prgmr. DOS/VS/CICS to $35K
IBM Prgmr. with UCC-10 Certification to $35K
MDN Prgmr. Team Consultant to $35K
MDN Staff Systems Analyst to $40K
DEC VAX Systems Programmer to $35K
DEC VAX Systems Prgmr./Engineer to $35K
ELR Modular System MCP Systems to $35K
ELR Tools Support (SIMSCRIPT, REL) to $35K

To become part of the growth in the 80's, contact the DP Division below.

Bryant Bureau
DP Division
4000 S. Tamiami Trail, S-910
Sarasota, FL 33581
(800) 237-0457

Willamette, Oregon. Minicomputer software engineer to design and implement advanced software for next generation minicomputers. Must possess MS in computer science with emphasis in relational DBMS. Skilled experience in kernel/communication interfacing. PASCAL or C language; experience with all environments, general knowledge of computer architectures, data structures and algorithms. Individual develops formal interface specifications for advanced DBMS; includes the specifications for advanced implementation of application design modules; enter data location and query facilities; prepares formal software specifications, detail description of human interaction and prototype implementation example via programming; performs maintenance of system software and develops and executes tests to insure software conformity with specifications; does simple system to run on various minicomputers; 40 hrs/week with overtime as necessary. Salary: $37,800. Send resume to: Employment Division, Altec Job Order 1047008; 875 Union Street NE, Salem, OR 97311.

DON'T DELAY CALL COLLECT TODAY:

For outstanding DP jobs in the BEST SOUTHEASTERN COMPANIES: Programmer/Analysts; Systems Analysts; DBA's; Technical Support.

All fees, relocations, and interview expenses paid by our clients. Call: Jan Watson.

Personnel Placement, Inc.
837-D Huffman Mill Rd.
Burlington, NC 27215
(919) 584-5891

NEW HORIZONS IN COMMUNICATIONS

Large northeast supplier of information transfer and retrieval services with proprietary packet switch network is seeking outstanding people.

SERVICE SPECIFICATION

Direct development of service requirements for a family of information services. Ensure fit of functional requirements with service requirements. Minimum 5 years' experience with switching systems, networks, and store-and-forward message systems. MIS desirable.

SERVICE IMPLEMENTATION

Identify operational service standards, evaluate performance and initiate corrective actions for new message system and proposed enhancements. Minimum 5 years' experience with switching systems, networks, and store-and-forward message systems. MIS desirable.

USER SOFTWARE

Develop requirements and standards for user software, especially for personal computers. Minimum 5 years' experience in development of user-oriented message formatting software. Knowledge of asynchronous communications protocols at the control character level. MIS desirable.

REQUIREMENTS ANALYSIS

Develop service requirements, including human factors and response times, for a family of information services and ensure fit with functional requirements. Minimum 5 years' experience in analysis of needs and service requirements as a basis for detailed software design and development. MIS desirable.

PRODUCT LITERATURE

Write product literature for customers, support personnel and sales force. Provide literature consultation for large accounts. Minimum 2 years' experience writing for business or professional organizations. Good knowledge of learning theory and presentation and format styles. BA required.

TRAINING

Develop product training for customers, support personnel and sales force. Provide training consultation for large accounts. Minimum 2 years' experience in curriculum development and with computer-based training. BA required.

INFORMATION DATA BASES

Expand information retrieval services. Coordinate details of arrangements with providers. Market services to system users. Minimum 3 years' experience in marketing information and telecommunications services. MBA desirable.

ELECTRONIC MAGAZINE

Initiate service to update features daily. Develop plan to attract advertisers. Market services to system users. Minimum 3 years publishing experience. MBA desirable.

Competitive salaries and benefits. Reply, in confidence with resume and salary history, to:

BOX CW1884
919 Seventh Avenue, New York, N.Y. 10019
An Equal Opportunity Employer M/F/H

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

Discrete Opportunities

Fairchild's Discrete Division in San Rafael, California, just 20 miles north of San Francisco in Marin County, has immediate high-visibility opportunities for the following talented professionals to meet the challenge of discrete semiconductor technology.

System Consultant

This degreed individual will have 6-10 years' experience in programming, systems analysis and project leadership working with large or small IBM systems. Responsibilities will include project leadership, design and implementation of new management information systems for marketing and financial applications.

Senior Analyst Programmer

We have opportunities in both the marketing and manufacturing application areas for individuals with 4-5 years of programming and analysis experience with large or small IBM systems. IBM S/38 and MAPICS experience is desired.

Application Programmers

Qualified individuals will have 2-3 years of programming experience with the IBM S/38, RPG III, COBOL and MAPICS.

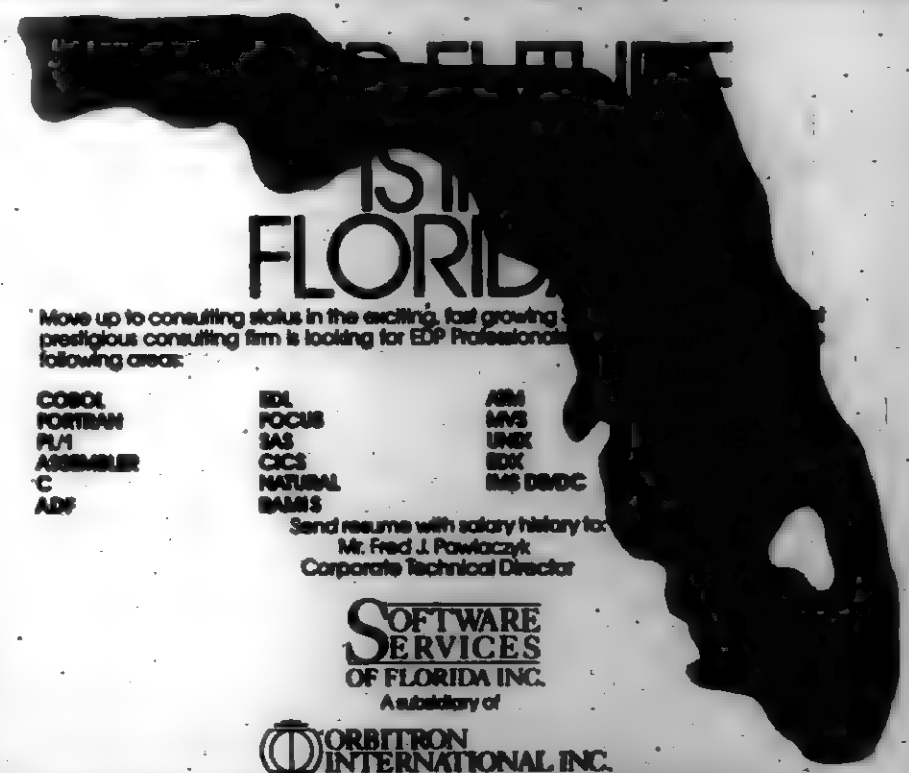
We offer an attractive salary and liberal benefits including excellent opportunity and visibility.

Please submit your resume in complete confidence to Jim Murphy, Fairchild Discrete Division, 4300 Redwood Highway, San Rafael, CA 94903. As an affirmative action employer, we encourage women, members of minority groups and the disabled to apply.

Discrete Division

FAIRCHILD

A Schlumberger Company



Move up to consulting status in the exciting, fast growing ... prestigious consulting firm is looking for EDP Professionals ... following areas:

COBOL	EDL	ASM
FORTRAN	FOCUS	MVS
PL/1	SAS	UNIX
ASSEMBLER	CICS	EDX
C	NATURAL	IMS DB/DC
ADF	RAMIS	

Send resume with salary history to:
Mr. Fred J. Powlaczyk
Corporate Technical Director

SOFTWARE SERVICES OF FLORIDA INC.
A subsidiary of
ORBITRON INTERNATIONAL INC.

PARAGON CROSSING SUITE 124 11300 4TH STREET NORTH ST. PETERSBURG, FLORIDA 33704 (813) 577-1475

Wilsonville, Oregon, Minicomputer software engineer to design and implement advanced software for new generation of minicomputers. Must possess MS in computer science with emphasis in relational DBMS; working knowledge of PASCAL; limited experience in C, 8080 and/or 8086 languages; experience with microcomputer; general knowledge of computer architecture, data structures and algorithms. Individual develops detail specifications and implements memory management, data management and generalized report generator subsystems of advanced DBMS; prepares detail design, develops algorithms and implements design via programming; also performs maintenance of system software and develops and enhances tools to insure software conformity with specifications. 40 hrs/week with overtime as necessary. Salary: $27,000. Send resume to: Employment Division, Attn: Job Order 1017007; 875 Union Street NE, Room 209, Salem, OR 97311.

PROGRAMMER/ ANALYST

Last day to apply: 3/22/84
Salary: $24,600 - $28,600

Requirements: Minimum of 2 years college credits with major work in Computer Science or a closely related field. Must have a minimum of 4 years in data processing including 2 years of programming experience dealing with IBM Systems 34 or 36 using RPG II programming language. Experience with COBOL or FORTRAN helpful. Must possess a valid Nevada drivers license upon hire. Submit application and resume to: Personnel Director, City of Henderson, 243 Water, Henderson, NV 89015 no later than March 22, 1984. Equal Opportunity Employer.

PROGRAMMER/ANALYST:

We are a fast growing vertical corporation located in the southeast Philadelphia suburbs (Bucks County) that currently has a position available for a well-motivated analyst/programmer with 2-4 years experience with an IBM-4300 system. You will participate in the analysis, design, programming and testing of new and modified financial and information management systems utilizing Datal. You must be able to work closely to problems, determine solutions, and be capable of working as part of a team or take the lead on some projects. We offer a competitive salary and a complete benefits package. Send resume with salary requirements to Mr. Robertson, Box 427, Langhorne, PA 19047.

MANAGER APPLICATIONS AND DEVELOPMENT

Twin Cities based financial services corporation is seeking a manager with large IBM mainframe and on-line development experience. Responsibilities include development and maintenance of on-line financial systems. SALARY IN MID $40's.

MARK DAVID
JOHN MILLER
ROBERT HALF
3600 IDS Center
Minneapolis, MN 55402
(612) 338-0091

DMS - 1100 EXPERIENCE WANTED

DYNAMAC CORPORATION

HAS IMMEDIATE OPENINGS IN THE NEW ORLEANS, LA & LEXINGTON PARK, MD AREAS FOR:

PROGRAMMER/ANALYSTS
&
DATABASE ADMINISTRATORS

PROGRAMMER ANALYSTS SHOULD HAVE EXCELLENT SKILLS IN THE FOLLOWING:

- COBOL
- TIP
- SMS

DATABASE ADMINISTRATOR APPLICANTS SHOULD HAVE THE FOLLOWING SKILLS IN ADDITION TO THE ABOVE REQUIREMENTS:

- SDL
- GLP
- LOGICAL DATA BASE DESIGN
- PHYSICAL DATA BASE DESIGN

EXPERIENCE WITH MANUFACTURING SYSTEMS FOR LARGE CAPITAL GOODS WOULD BE HELPFUL.

DYNAMAC CORPORATION OFFERS COMPETITIVE SALARIES AND AN EXCELLENT EMPLOYEE BENEFITS PACKAGE.

QUALIFIED APPLICANTS SHOULD CONTACT PERSONNEL AT (301) 468-2000 EXT 359 AND SEND RESUMES TO:

DYNAMAC CORPORATION
c/o PERSONNEL DEPARTMENT
THE DYNAMAC BUILDING
11140 ROCKVILLE PIKE,
ROCKVILLE, MD 20852

EOE/MF

Telecommunications Professionals

Move up to the leader in San Francisco

Bank of America's Retail Information & Processing Services Division plays an important corporate wide role in several areas of the Bank—such as Data Processing, Telecommunications and related technologies. This division is responsible for many new products and services and is known for its creativity.

Consistent growth has created a need for Telecommunications Professionals experienced in one or more of the following areas:

IBM	TANDEM
SNA, SDLC, LU$_{6.2}$, PU$_{2.1}$, NCP, VTAM, IMS, MVS, OS/VS, COBOL, PL/1	NS II, TXP, TAL, XRAY GUARDIAN ENVOY, SNAX, TL TMF, DSL, PATHWAY

- •Communication Software
- •X.25
- •LAN
- •Financial Applications
- •Personal Computer Interfaces
- •Minicomputer Interfaces

Bank of America offers competitive salary and benefits including relocation assistance. To apply for positions listed above, we invite you to send resume to: Gary Damiano, Sr. Staffing Specialist, Dept. 3448-6305A, Bank of America, P.O. Box 37000, San Francisco, CA 94137. An equal opportunity employer m/f/h/v.

Bank of America

SOFTWARE ENGINEERS

TRW has immediate openings for software engineers to perform as key members of a multi-year company funded technology development project. The project's objective will be to develop capabilities for improved productivity in the development of a military real-time, distributed, embedded computer system.

SOFTWARE SYSTEMS ENGINEERS
You will analyze present and future performance requirements for military embedded computer systems and related technology for architectures, hardware components, operating systems, developing support software, etc; will define productivity enhancement tools and procedures targeted to the characteristics of these systems; will test and evaluate capabilities developed on this project. Five years experience with an MS degree in EE/Math/CS.

SOFTWARE ENGINEERS
You will design and code productivity enhancement tools targeted for military embedded computer systems. Experience with VAX/VMS, real-time distributed systems, and MIL-STD-1879 software development required. Experience with CMS-2, Ada, SDEX, and MTASS is desirable. Five years experience with a BS degree in EE/Math/CS.

At TRW top professionals find excellent salaries and benefits (including flexible work hours, medical/dental/vision plans, and a Christmas week shutdown).

To explore this opportunity, forward your resume along with your salary history and requirements in complete confidence to:

Personnel
TRW
7600 Colshire Drive, Dept. FM
McLean, Virginia 22102

An equal opportunity employer, m/f/h. U.S. citizenship is required.

TRW

A Company Called TRW

DP Professionals

LARGE SCALE SYSTEMS

Citicorp On Long Island Can Offer You Unusual Personal Growth And Professional Opportunities

Citicorp Credit Services, based in Melville, Long Island, is growing and expanding at a phenomenal rate. Our Technical Management and Personnel teams are recruiting for qualified Programmers, Programmer Analysts (junior and senior), and Senior Programmer Analysts for exciting career opportunities and challenging work projects on Long Island. Candidates must have two (2) or more years of qualifying experience, plus a college degree OR equivalent working experience.

WE OFFER A SYSTEMS DEVELOPMENT ENVIRONMENT WHICH IS BOTH PROGRESSIVE AND DYNAMIC

- Large scale IBM OS/MVS environment with extensive Telecommunications Network (CICS) and DBMS (ADABAS, VSAM). Dedicated test environment. (IBM 3033) using TSO/SPF and Roscoe. Languages include PL1, COBOL and Assembler using structured programming. Production Systems include IBM 3032, 3033, 3081, 3083 and State-Of-The-Art peripheral equipment.
- State-Of-The-Art systems technology. Program and application data base design, within a comprehensive project life cycle atmosphere. Many opportunities exist in this environment, including management responsibilities.

EXAMINE THE ADVANTAGES WE CAN PROVIDE

- High visibility positions which translate into realistic promotion potential.
- Expanded career opportunities in a teamwork environment to get you into action faster.
- Competitive salaries.
- Liberal Citicorp benefits which include 11 paid holidays, up to 4 weeks paid vacation, medical, dental and life insurance, long term disability, 100% tuition refund, free checking.

MORE BENEFITS. MORE CHALLENGES. MORE OPPORTUNITIES. AT CITICORP, ON LONG ISLAND!

- For prompt, strictly confidential consideration, please send resume with salary history and requirements (Please, no agencies at this time) to Personnel Manager, Citicorp Credit Services, Inc., 135 Duryea Road, Melville, NY 11747. An equal opportunity employer m/f/h.

CITICORP

P.S. Opportunities are also available at our highly acclaimed SIOUX FALLS, SOUTH DAKOTA DP facility. If you are seeking the chance to combine a high-tech career in a Midwestern living environment, please indicate SOUTH DAKOTA on your resume or cover letter.

SOFTWARE ENGINEER
SYSTEMS PLANNER
DATA BASE MANAGER

We are a large public sector agency located in downtown Boston expanding our data processing function. We offer competitive salaries and fringe benefits, opportunities for advancement, a comfortable environment and challenging work to highly qualified candidates. Our equipment includes an IBM 4341, a RAMSIS data base and a network of micros and PC's.

SOFTWARE ENGINEER, for the position of Assistant Manager of Development. This person will be responsible for supervising project leaders and providing master designs for all projects and progress. The ideal candidate will have an advanced degree in computer science or software engineering, at least 4 years experience in systems development, and expertise in IBM 4341 software design, applications programming, and project management.

SYSTEMS PLANNER, for the position of Program Director of Planning. This person will provide the link between system users and our technical people. Duties include researching information needs, scoping, estimating, monitoring and evaluating systems design projects; researching software packages and writing RFP's. The ideal candidate will have an advanced degree in systems planning, at least 4 years experience as a systems planner, and expertise in project definition and communication with end users.

DATA BASE MANAGER, for the position of Information Center Unit Leader. This person will be responsible for responding to all routine and unique requests for information retrieval. Duties include supervising programmers and developing a data base query and exception reporting capacity. The ideal candidate will have a degree in a computer related field, experience as a data base manager and familiarity with RAMSIS data base.

TO APPLY, send resume with salary history to:

CW-B4573
Computerworld
Box 880
Framingham, MA 01701

WE ARE AN EQUAL OPPORTUNITY/AFFIRMATIVE ACTION EMPLOYER

IMS TEAM LEADER

As the BOSTON marketplace heats up, this Fortune 500 org. seeks a skilled proj. ldr. A strong IBM OS/MVS IMS DB/DC COBOL background req'd. Hvy tech and admin. involvement w/devel. support grps. $35,000.

COBOL/BAL/ BANKING

Exciting career oppty. awaits the fast-track MIS specialist. This recent bank offers solid growth for the IBM OS/MVS, COBOL, BAL prog/analyst w/any DOA, MICR, item processing, loan apps. Be in on the exciting world of new tech. $32,000.

ROBERT HALF

160 Summer Street
Boston, MA 02110
(617) 482-1350
Personnel Consultants

— SUNBELT CAREERS —
PIA's, SP's, SW ENG's
Our clients need your experience in CICS, IMS, IDMS, SRS, PC's, HP 1000/3000, ALC, RSX-11M, VAX/VMS, UNIX, C
Hundreds of openings nationally easily searchable on our DEC PDP11/44
Call to inquire or send resume today. Our 15th year as recruiters.

TOLL FREE
800-334-4230
In NC @ (919)484-5191

P.O. BOX 2000
FAYETTEVILLE, N.C. 28302

PROGRAMMER/ANALYST
SYSTEM/38

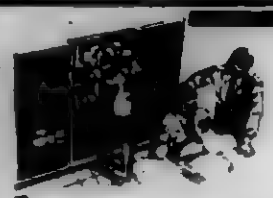
Fast growing company in rural country setting needs experienced programmer/analyst for development of manufacturing & retail distribution systems. The successful candidate will have 1 or more years hands on System/38 and 5 or more years Data Processing application development experience. Principles only please.

Please send resume and salary requirements to:
MIS Director

RENOVATOR'S SUPPLY, INC.

MILLERS FALLS, MA 01349

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS



FLORIDA!

CAP GEMINI DASD, is an internationally established data processing consulting firm and a leader in the consulting services industry. Our 2 Divisions located in Tampa, Florida have immediate opportunities for OPERATIONS, SYSTEMS & APPLICATIONS Technical Consultants.

APPLICATION/CONVERSION SERVICES DIVISION

Qualified candidates should possess a minimum of 3 years experience in Systems Development or Conversion as a Programmer, Programmer Analyst, Systems Analyst or Project leader in one or more of the following areas:

PL/1	IMS DB and/or DC FOCUS
COBOL	IDMS
RPG II or III	CICS (Command and/or Macro)
FORTRAN	MODEL 204
	SYSTEM 38 COBOL

Applications areas of particular interest include:
BOGAN, SCIENTIFIC, MANUFACTURING, and GENERAL BUSINESS applications.

OPERATIONS SERVICES DIVISION

"The Operations Expert" now offers a career path and opportunity for operations professionals. Immediate requirements exist for:

OPERATIONS ANALYSTS	MVS SYSTEMS PROGRAMMERS
NETWORK ANALYSTS	MVS OPERATORS

Experience should include:
Four years of experience in DOS, MVS, TSO/SPF, VM and a strong background with BOGAN, UCC, OPC, CLIST, DUO, JCL Creation, VTAM and IMS monitoring.

We offer a highly attractive salary, commensurate with experience and a fully comprehensive fringe benefit program including paid overtime and cash bonuses. Call or submit your resume in strictest confidence, please specify the Division in which you are interested.

CAP GEMINI DASD
100 W. Kennedy Blvd. Suite 501
Tampa, FL 33602
(813) 873-0600 1-800-282-4720 (Florida Wats)

Formerly DASD Corporation

Equal Opportunity Employer

DIRECTOR OF MANAGEMENT INFORMATION SYSTEMS

FAIRBANKS MEMORIAL HOSPITAL

FAIRBANKS MEMORIAL HOSPITAL (FMH) is a 200-bed full-service institution located in Fairbanks, AK. FMH is member of the Lutheran Hospitals and Homes Society of America, Inc. (LHHS), which is a multi-institutional organization operating 73 institutions in 13 states. FMH, in concert with LHHS, has recently completed a major planning process to significantly increase its' data processing capabilities and is seeking an experienced data processing professional to assist in the execution of this plan and fill the position of Director of Management Information Systems.

THE DIRECTOR will be expected to work with FMH and LHHS home office staff in expanding the data processing capabilities at FMH. The Director will be responsible for the general management and administration for all current data processing activities, including FMH data center operations, liaison with LHHS data center operations; and assisting FMH staff in defining and satisfying data processing needs. In addition, the Director will participate in the formulation of data processing policy, review and update the long-range data processing plan, and assess new hardware and software technology relative to FMH needs.

THE QUALIFIED CANDIDATE will have a Bachelor's Degree with senior-level experience in planning, design, development, and operations of hospital information systems; and at least 2 years of experience in the direct management of a data center. Advanced degree or additional experience is desirable.

We offer an excellent compensation package and complete benefits, including medical/dental/vision insurance, 3 weeks vacation, pension plan, and the unparalleled outdoor activities of Interior Alaska. For immediate consideration, please send your resume to:

Russell Cox
FAIRBANKS MEMORIAL HOSPITAL
1650 Cowles Street
Fairbanks, AK 99701

An equal opportunity employer

Give us your resume

We'll give YOU San Francisco!

Some people come to sail on the Bay, some to ski in the Sierras, and some to snorkle in Santa Cruz. But the professional climate is the real reason, and every bit as exciting.

There's nobody better qualified than CRG to introduce you to San Francisco. We've been here longer—over 10 years—know everyone in EDP worth knowing, and our list of client companies reads like the Who's Who of the business world.

Send your resume today, or call. All fees, interview, and relocation expenses are paid by our clients.

Computer Resource Group, Inc.
[illegible]
(415) [illegible] or [illegible],
(408) 727-[illegible]

CRG AFFILIATES IN 27 MAJOR U.S. CITIES National Computer Association

An employer-retained professional placement service

WANTED: Software Engineer Extraordinaire

Continued strong acceptance of our systems software products worldwide together with product introductions scheduled during 1984 has us really hopping. Lucky for you, because we are now searching for a VERY Senior Software Engineer to fill a key position in our engineering staff.

Our requirements are high. To be considered for this position, a candidate will have 5-7 years progressive experience in IBM large systems, strong Assembler Language skills, a thorough knowledge of MVS and VM/CMS internals, and recent experience with CICS/VS, &/or IMS/VS. The qualified candidate will have a broad base industry knowledge and a strong desire to develop advance software product for the world's largest information processing centers.

This key individual in our Engineering department will be responsible for identifying new product directions and opportunities, and leading the technical effort to bring these products to market. This position will require the fullest use of your talent and offers the visibility and opportunity only a small high growth company can provide.

For immediate consideration, call or send your resume to:

Doug Stevlin (408) 554-8121

TriangleSoftwareCo.

[illegible] Creek Boulevard, Suite 168
San Jose, CA 95129

OVERSEAS Middle East

Due to an upswing in our client hiring we are now screening resumes for the following professions:

Tandem Engs./Programmers
Systems Programmers
PL/1 Programmers
UNIX/C (Dom. & Int'L)
DP Managers/Instructors
Systems Analysts
Hardware Engineers & Techs.
IDMS Specialists

Packages include housing, food, transportation and tax free status. One and two year contracts are now available. Respond at once to:

Steve Eddington
International Personnel Inc.
2525 East Oakton, Suite C30
Arlington Heights, IL 60005
(312) 228-6868

DP/MIS MANAGER

Well established distribution company seeks "user-friendly" hands-on information manager. Recently installed computer system requires person to supervise operations, do some programming and help users maximize potential.

If you have previous similar experience, knowledge of accounting and enjoy working with end users, send resume and salary requirements to:

Westberley, Inc.
2761 Firestone Blvd.
South Gate, CA 90280

Data Communications Engineer

$40,000-$52,000

Exciting new R&D projects for a well financed company. Use your communications protocols such as SNA, X.25, SDLC, Ethernet to move to California. Interview and relocation paid by client company.

General Employment Enterprises, Inc.
Business Executives Division
1 Market Plaza, Suite 2015
San Francisco, CA 94105
(415) 896-0311 No Fee

DP POSITIONS SEATTLE/PORTLAND

MVS, Sr. Systems Programmer $40K
Sr. IMS Systems Prog. 40K
Systems Performance data base consultant to applications group.
Sr. Programmer/Analyst 36K
Financial app. COBOL/1 on line information.
Programmer/Analyst 30K
COBOL/1 or VSAM on-line env.
Sr. PTA IMS applications dev. ..... to 40K
Data Admin. Analyst ..... to 40K
data resources digest local DP design.

Please forward resume immediately to:

HOUSER, MARTIN MORRIS & ASSOC.
(206) 453-2700
[illegible], 10400-116th Ave., N.E.
Bellevue, WA 98004

PROGRAMMER

- Design, development & testing of applications from customer specifications. Analyzes test runs & directs any nec corrections. Reviews programs to increase effic & conserve storage space. 1 yr or 1 yr related exp - programming. Master's deg - Electrical Engineering. Must have knowl of APL, PL/1, FORTRAN & ASSEMBLER. $28,400/wk to work 40 hrs/5 days/wk. Send resume to Box # CW-84577, Computerworld, Box 880, Framingham, MA 01701

Electric Utility

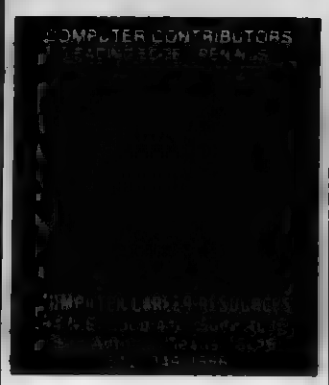
Manager, Systems Development. Position requires accounting/financial systems application in an electric utility. Supervisory experience plus analyst/programming background needed. Hardware/software background not critical. Outstanding financial growth through attractive salary, incentive compensation plus stock options. Metro southeast. All replies confidential. Willan H. Mesnor, P.O. Box 30541, Charlotte, NC 28230, (704) 372-7640.

TECHNICAL DIRECTIONS, INC.

Sub-Contract (SC) & Permanent (P) - Immediate Openings
San Diego, Los Angeles, San Francisco, Pac. Northwest

IMS DB & DC, COBOL, PL/1, ASSEMBLER, TSO/SPF (SC & P)
MANUF. & FINANCIAL APPLICATIONS (SC & P)
CICS, DL/1, COBOL, MANUF. & FIN. (SC & P)
COBOL, LIFE INSURANCE, OS (P)
MARK IV, TSO, OS (P)
PROJECT MANAGER, MANUF. SYSTEMS (P)

All positions require 2 or more yrs. exp. Degree preferred for permanent openings. Call (619) 297-5811, or send resume to: TECHNICAL DIRECTIONS, INC., 3555 Times St., Ste. 301, San Diego, CA 92103.



SAN DIEGO

Openings in O/S, Compilers, Graphics, ADA, UNIX.

CALL (619) 694-8919

CPU COMPUTER PROFESSIONALS UNLIMITED, agency OF SAN DIEGO

[illegible] Executive Drive
Ste 220, San Diego, CA 92126
Agency fee paid.

Marketing Representative

New York City based computer subcontracting company requires aggressive, dynamic, highly motivated sales person. Individual must have proven sales track record with equipment of major computer equipment manufacturer. This is a start-up branch operation for a major European computer sales and leasing company. Opportunity for the right person for high earnings and quick advancement to branch manager responsibilities. Send resume to:

CW-84579
Computerworld
Box 880
Framingham, MA 01701
or call (212) 319-6068.

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

PROGRAMMER/ANALYSTS

WE CAN KEEP YOUR COMPUTER SKILLS CURRENT!

With technology advancing and changing at such a rapid pace, are you concerned that your computer skills may be out-of-date? Over the last decade, the environment has changed from DOS to OS, from batch to online, from sequential to database, and from mainframe to distributed networks. Which environment is more marketable?

At AmeriTrust, we have changed with the times and, in many cases, before the times. Our current environment features two Amdahl V7 computers, one IBM 3081 that drive our Assist and point-of-sale networks throughout the country. We operate under OS/MVS, use CICS for our onlines, and IDMS is our corporate database. Other software/hardware includes TSO/SPF, SAS, Wang systems, IBM PC's — we even have a division that sells computers!

Our current needs are the following:

Programmer/Analysts

We seek an individual with 1-3 years experience in a large scale IBM-OS environment using Cobol. Database and online experience is preferred. We are not looking for maintenance programmers but individuals who can contribute in a major project setting.

CPCS Specialist

A major project team is being formed and needs an individual versed in CPCS check-processing software. Being the #2 man on the team, the person would be the major technical resource for the design and implementation. Familiarity with the Vector packages a plus. We are looking for a person diverse enough to move into other areas at the completion of the project.

Contact AmeriTrust today. Discover our excellent salaries and benefits and give your career greater challenge in a progressive, state-of-the-art atmosphere.

Please feel free to send your confidential resume or call:

Terry Scott
Personnel Department
(216) 687-5308

AmeriTrust
900 Euclid Avenue
Cleveland, Ohio 44101

An Equal Opportunity Employer M/F

At Control Data, success has many directions for the . . .

Achiever in State-of-the-Art Software Development

The following key positions are located at the Arden Hills, Minnesota (a suburb of Minneapolis/St. Paul) operation that is dedicated to the design and development of large mainframe computers and software.

Software Consultant - Tools & Technology
You will be a self-directed person, capable of working effectively between several technical and management levels. You will serve as the technologist for software metrics projects and coordinate the design and development of process metrics with the development of software tools. Your knowledge of the software development process, applied statistics and data bases is a must. An advanced degree in computer science, applied math or engineering is required plus 6 years of applicable experience. #100205

Principal Programming Analyst - Tools & Technology
Your responsibilities will include the leadership and design direction for compiler code generation and optimization for an advanced PASCAL based language with multiple code generation. You will be called upon to utilize your experience in code generation techniques and project leadership. A BSCS degree or equivalent is required plus 6 years of experience. #75181

Principal Programmer Analyst - Communication Software
You will be working on the internal design, development, test and implementation of an advanced communications product. Experience in communications/networks and the ISO-OSI Model is desired. Familiarity with PASCAL, NOS/NHP/CCP, X.25 packet switching, SNA or IBM 3270 protocol is a plus. Requires a BSCS or BSEE and 6 years of experience. #91879

Programmer Analyst - Network Software
You will be a key member in the design, code, test, and support of the VAX RHF product software for the Loosely Coupled Network. Background in VAX/VMS is desirable. Familiarity with FORTRAN and VAX MACRO a plus. Prefer two or more years experience in data communications and local networks plus an applicable degree. #78364

Development Analyst - Network Software
You will be a key member of a Software team for the Loosely Coupled Network IBM interface. Requires ability to design and implement software for OS/VS2, MVS system in assembly language. Will also train, install, enhance and provide some software maintenance. Data communications background preferable, but not required. Degree and minimum of five years experience required. #91148

As a Control Data employee, you will participate in one of the finest and most complete benefit programs available in the industry today including competitive relocation benefits.

If you are interested in one of the positions described above, please send your resume and salary requirements along with the number at the end of the description to:

LaEtta Flikker ARH212
CONTROL DATA CORPORATION
4201 N. Lexington Avenue
Arden Hills, MN 55112

CONTROL DATA

Addressing society's major unmet needs as profitable business opportunities.

An Affirmative Action Employer

NATIONAL SALES MANAGER

SOFTWARE

MEGATEK, an innovative, creative and rapidly growing leader in computer graphics technology, is currently seeking a dynamic individual to manage the national sales program for TEMPLATE®, our device intelligent graphics software.

The successful candidate will have an excellent track record in software sales management combined with proven technical expertise in state-of-the-art graphics software.

This position will entail managing and motivating TEMPLATE's® national sales staff to continue its rapid expansion.

MEGATEK offers an excellent compensation and benefits package including free membership in an on-site health club with a swimming pool, tennis & racquetball courts, Nautilus equipment, jacuzzi, saunas, showers and a jogging track. Interested candidates please send resume, plus salary history to: Human Resources Department KS-1 MEGATEK Corporation, 9605 Scranton Road, San Diego, CA 92121. We are an equal opportunity employer.

MEGATEK CORPORATION
A UNITED TELECOM COMPANY
Making History out of State-of-the-Art

EDP INCORPORATED

Our Clients need good

Analysts Programmers Tech Specialists

Let us help you connect with outstanding career opportunities in the *SOUTHEAST*

Our clients have many challenging positions available.

Send your resume today, before your position is filled. All fees paid by our client companies.

EDP INCORPORATED
Suite 308, Fairview Plaza One
Charlotte, NC 28210
704/554-1101

UNIVERSITY OF SOUTH DAKOTA

COMPUTER SCIENCE FACULTY POSITION

The Computer Science Program is accepting applications for 2 faculty positions for Fall 1984 to teach graduate and undergraduate courses plus participate in the development of a new MA program. Master's degree in Computer Science minimum, PhD preferred. Salary competitive. Send resume, graduate transcripts, and 3 letters of reference to: Dr. Tom Steinhaus, Computer Science, University of South Dakota, Vermillion, SD 57069. Closing date: April 1, 1984.

AA/EOE

MARKETING RESEARCH MIS PROFESSIONAL

Brown-Forman is a consumer products company and is one of the world's largest producers and marketers of distilled spirits and wines. We are presently seeking an experienced MIS professional with a thorough knowledge of personal computer business applications to develop and implement a marketing research data system to meet our corporate marketing needs.

This newly created position assumes responsibility for organizing consumer research and industry data into a comprehensive marketing research system. Candidates must have a BS degree in Computer Science or a related field, and a minimum of 5 years experience in computer sciences, marketing/management systems, and/or programming. Demonstrated ability to conduct statistical analyses, and excellent communication skills are essential. An MBA, familiarity with personal computers and related software, and previous experience in tabulating and processing consumer research data are highly desirable.

We offer an excellent salary, full benefits, and opportunities for advancement with a recognized industry leader. For immediate consideration, send a resume with salary history, in complete confidence, to:

Linda LeBlanc
Manager of Staffing

BROWN-FORMAN CORPORATION
P.O. Box 1080
Louisville, KY 40201-1080

We are an Equal Opportunity Employer M/F

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

If you want to get ahead, start with your own!

Think about your career advancement. Experienced specialists to advise you... a maximum number of excellent opportunities... skilled professional representation... long and close contact with hundreds of employers... those are the basic requirements of successful career advancement. And no one can serve you better than NCA. Think about it!

Come in. Call. Or mail your resume to the NCA firm nearest to you. Company clients assume our fees.

ATLANTA: NCA Limited
229 Peachtree Street Suite 1001-C
Atlanta Georgia 30303 (404) 521-0805
BOSTON: Robert Warren and Co. Inc.
North Brook Park Suite One 100 Bedford Street
Lexington Massachusetts 02173 (617) 862-1020
CHICAGO: Thos. Hertz & Associates
150 N. Wacker Drive Suite 1700
Chicago Illinois 60606 (312) 977-1000
CLEVELAND: Richard Thomas Inc.
55 E. Wilson Bridge Road Suite 200
Worthington Ohio 43085 (614) 846-0999
DALLAS: DataPro Personnel Consultants
12720 Hillcrest Suite 529
Dallas Texas 75230 (214) 661-8866
DETROIT: Electronic Systems Personnel Inc.
3000 Town Center Suite 2380
Southfield Michigan 48075 (313) 353-9000
FLORIDA: Data Sciences Personnel Inc.
P O Box 6577
Hollywood Florida 33082 (305) 434-8912
HOUSTON: Compass Inc.
500 Allerton Avenue
Hartford Connecticut 06105 (203) 548-4248
HOUSTON: Career Consultants Inc.
2040 South Post Oak
Houston Texas 77036 (713) 626-4999
INDIANAPOLIS: Computer Personnel Services Inc.
107 S Pennsylvania
Indianapolis Indiana 46204 (317) 634-4712
KANSAS CITY: D P Career Associates
Shawnee Mission Kansas 66202 (913) 236-6888
LOS ANGELES: Supreme Personnel Inc.
Personnel Service
27141 Ventura Boulevard Suite 200
Encino California 91316 (213) 986-4488
MILWAUKEE: EDP Consultants Inc.
7322 West State Street Suite 3
Milwaukee Wisconsin 53213 (414) 475-0877
MINNEAPOLIS: Electronic Systems Personnel
650 Twin City Federal Tower 121 S 9th St
Minneapolis Minnesota 55402 (612) 338-8714
NEW JERSEY: Systems Search
50 Millburn Avenue
Millburn New Jersey 07041 (201) 761-4488
NEW YORK: Retail Associates Inc.
7 Dey Street Suite 410
New York New York 10007 (212) 227-7570
NEW YORK UPSTATE:
CIA Accountex Personnel Inc.
5530 James Street
Syracuse New York 13206 (315) 463-3225
NORTH CAROLINA: DataMasters
Div of DataForce Inc PO Box 5969
Greensboro North Carolina 27405
(919) 373-1409
PHILADELPHIA: Systems Personnel Inc
115 West State Street
Media Pennsylvania 19063 (215) 566-8666
PHOENIX: Professional Career Consultants
4529 North 17th Street Suite H101
Phoenix Arizona 85016 (602) 274-6886
SAN FRANCISCO: The Computer Resources Group Inc
Agency 383 Sacramento Street
San Francisco California 94111 (415) 398-3535
SEATTLE: Houston Martin Morris & Associates
2040 148th Avenue N E
Bellevue Washington 98004 (206) 453-2788
WASHINGTON D.C.: ESP Systems Corporation
814 Lamberton Drive
Silver Spring Maryland 20902 (301) 649-8171

Call the NCA firm nearest to you for Salary Survey and Relocation information.

National Computer Associates

IMS SYSTEMS PROGRAMMERS

Have you been thinking of making a career move? Are you interested in new challenges? If your answer is YES to either question, read on...

Virginia's leading health carrier is outgrowing its workforce, and that means opportunity for experienced Systems Programmers. Positions require familiarity with IMS/DC installation and performance measurement and tuning, BAL, MVS, JES-2, and TSO. VTAM and NCP experience in a multi-processor (loosely coupled) environment a plus.

This position brings with it a competitive salary, excellent benefits, and the security of working with a financially strong, growth-oriented company.

If you are an individual who wants to work for the leader and you meet the above requirements, send resume and salary requirements in confidence to:

Blue Cross and Blue Shield of Virginia

EDP Employment Coordinator
Blue Cross & Blue Shield of Virginia
P.O. Box 27401
Richmond, Virginia 23279
Equal Opportunity Employer

COMPUTER SYSTEMS ANALYST

Iowa State Center, ISU, Ames

Responsible for development and operation of the computer system for a fast-building entertainment, athletic, performing arts and conference complex. Maintain & operating systems and applications software to interface with other systems. Design, implement, and operate the data base management system. Serve as liaison between users and administration on computer usage, and assist with a continuous system evaluation activity. Qualifications: bachelor's degree in business administration/computer science with emphasis in management information systems plus 2 years' experience in programming and operation of computers and 3 years of computer systems analysis and design. Salary: $28,000-$35,000 plus fringe benefits. Anticipated starting date May 1, 1984. Qualified applicants should submit resumes by March 16, 1984, to:

Dan Perkins, Associate Director
Iowa State Center, ISU, Ames, IA 50011
For More Information Call (515) 294-3947

COMPUTER SOFTWARE CONSULTANT

Desired by computer consultant company. Duties include evaluations on hardware and software, specifically database management, accounting, statistical and communications. Performs programming with database management systems, high-level languages and assembly language. Required to teach and train end users and other programmers query languages and operation of systems. Requires theoretical and practical knowledge of current software engineering environment packages. MBA in Management Information Systems required with 5 years experience as a Systems Engineer necessary. Must have knowledge of accounting, systems analysis and database theory. Programming experience in PL/1, Datatrieve, COBOL, FORTRAN, Knowledgeman, and assembler, OS/JCL, BAS, necessary. Experience on microcomputers required. Salary $18 per hour, 40 hour work week. Contact Texas Employment Commission, Fort Worth, Texas, or send resume to Texas Employment Commission, TEC Building, Austin, Texas 78778, Job Order #3554459. All paid for by an equal opportunity employer.

INFORMATION SYSTEMS SPECIALIST

LIBRARY OF MICHIGAN

Leading agency offers an outstanding opportunity to lead, design and coordinate the installation of an agency automation system. This person will be responsible for planning, cost analysis, staff allocation, application development, user training and support. This position requires a self-starting, high energy individual with a varied background including a minimum of 3-5 years experience in data processing activities, environmental systems analysis, design and programming. Bachelor's degree required. Candidates will be evaluated in terms of applicability to the position. Salary $25,700-$30,800 plus excellent benefits and working environment. Deadline for resume is March 16, 1984. For questions contact:

Robin Van Alstine
Personnel Officer
735 E. Michigan Ave., 2nd Floor
Lansing, MI 48909
(517) 373-1580

Tenure-Track Assistant/Associate Professor

PhD in Computer Science or related field. Candidate with Master's degree in Computer Science with appropriate industry experience will be considered. Previous teaching and/or industry experience are considered assets. Applicants should possess the ability to instruct in some of the following: Programming Languages (Assembler, BASIC, FORTRAN, PASCAL, PL/1), Computer Techniques, Operating Systems, Software Design, Computer Architecture, Data Structures, and Artificial Intelligence. Position is for September 1984. Applications deadline March 30, 1984. Salary $24,000-$32,000 dependent upon qualifications. Send letter of application, transcripts, and three letters of recommendation to: Dr. Charles F. Collins, Dean of the Faculty, Carroll College, Waukesha, WI 53186.

Carroll College is an Equal Opportunity Employer

EDUCATION COORDINATOR

Provide advanced training in Customer Information Control System (CICS) and Virtual Sequential Access Method (VSAM) throughout U.S. Requires 5 years experience or 3 years as Systems Analyst, strong knowledge of CICS and VSAM and ability to operate in classroom environment. Marina Del Rey. $52,000 per year. Send this ad and your resume to Job #5028, P.O. Box 985, Sacramento, CA 95804, not later than March 20, 1984. If offered employment, must show you have the legal right to work.

PROGRAMMER

- In charge of structuring, coding & debugging computer systems related to Mail Order system. Maintenance & enhancement of system & provide vital skills to ensure efficient & cost effective operation. 2 yrs. or 2 yrs rel exp. - programming. H.S. Ed. Must have knowledge of COBOL. $482/wk to work 40 hrs/5 days/wk. Retail Communications Corp., 350 Fifth Ave., New York, NY 10001 Send Resume.

WANTED: SOFTWARE SUPPORT HEAVY WEIGHT

Continued strong acceptance of our systems software products worldwide has created an immediate need for a Software Support Engineer.

The successful candidate will have 3-5 years progressive experience maintaining, modifying, and supporting MVS systems software. Strong Assembler Language skills, and a thorough knowledge of OS/VS JCL is also required. Current experience with MVS/XA, TSO Dialogue Manager, ROSCOE, VM/CMS and COBOL would also be a plus.

This is a key position, with responsibilities for worldwide product support. You will also be responsible for indentifying, designing, and implementing enhancement that keeps our product at the leading edge of large system technology. Your contributions will be highly visible in our small company, high growth environment.

For immediate consideration, call or send your resume to:

Doug Stelka
(408) 984-8121
TriangleSoftwareCo.
4040 Stevens Creek Boulevard,
Suite 108
San Jose, CA 95129

XEBEC

POSITION ANNOUNCEMENT

POSITION: Visiting Professor
Computer Information Systems
(A limited distinguished Professorship)

APPOINTMENT: Academic Year 1984-1985
Possible renewal for 2 more years

RESPONSIBILITIES:

This position will offer leadership in the development of the College's Computer Information Systems program through the design and teaching of graduate and undergraduate level courses in one or more of the following: Automated production management and shop floor control, man-machine interfacing and artificial intelligence in addition to existing computer information systems courses. The individual appointed will also be expected to assist in faculty development and conduct research in these areas.

QUALIFICATIONS:

The person who assumes this position should have experience and accomplishments in the fields noted above. An earned doctorate is desirable.

SALARY:

Competitive and negotiable, depending upon qualifications and experience. In addition, consulting opportunities with Xebec are available. Xebec is a leader in automated production and engineering of microcomputer disc drive controllers.

CLOSING DATE FOR APPLICATIONS: April 1, 1984

SUBMIT RESUME TO: Dean Richard E. Hughs
College of Business Administration
University of Nevada, Reno
Reno, NV 89557

The College of Business Administration offers programs at the Bachelor's and Master's levels in the fields of accounting, computer information systems, economics, finance, management and marketing. College of Business Administration Bachelor's and Master's Programs are accredited by the American Assembly of Collegiate Schools of Business.

THE UNIVERSITY OF NEVADA IS AN EQUAL OPPORTUNITY/AFFIRMATIVE ACTION EMPLOYER AND DOES NOT DISCRIMINATE ON THE BASIS OF SEX, RACE, CREED, COLOR, NATIONAL ORIGIN, HANDICAPPED STATUS OR VETERAN'S STATUS IN THE EDUCATIONAL PROGRAMS OR ACTIVITIES WHICH IT OPERATES.

FLORIDA DATA PROCESSING OPPORTUNITIES

Our aggressive financial institution headquartered in the heart of Florida's Suncoast has several excellent ground floor opportunities for experienced Systems Personnel:

- APPLICATION PROGRAMMER
- PROGRAMMER/ANALYST
- SYSTEMS ANALYST

IBM 4300 DOS/VSE, CICS, VTAM, COBOL environment. We seek individuals with 3-5 years experience and a financial applications background is helpful. We offer an excellent starting salary, outstanding benefits and advancement potential with a growing organization. Please send resume and salary history to:

Senior Vice President/Systems
P.O. Box 4000
Clearwater, FL 33518
Equal Opportunity Employer

Application Developers

Systems Programmers

If you have a minimum of 4 years experience, IBM has excellent career opportunities for broad systems/applications exposure in most major metropolitan areas. To qualify, you should have strong technical and personal communications skills with the ability to work in customer environments.

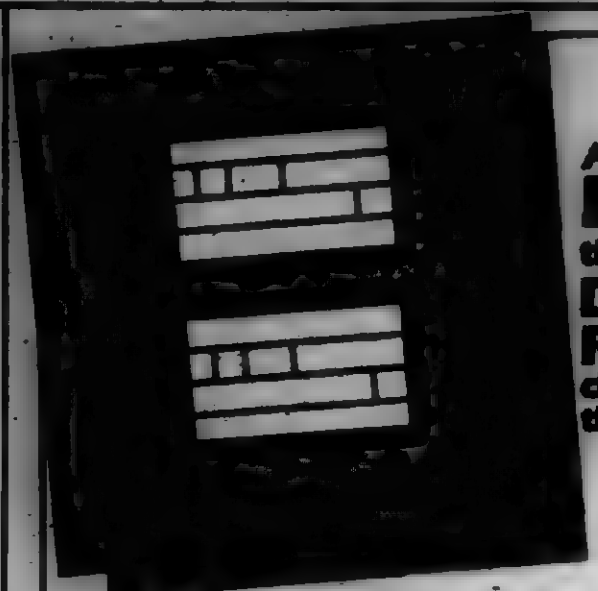
The candidates we seek must know COBOL or PL/1 or Assembler and have technical expertise in one or more of the following areas:

- Data Base/Data Communications
  — IMS, CICS
- Systems Programming
  — MVS, DOS/VS, DOS/VSE, VM
- Series 1
- Telecommunications
  — SNA, NCP, VTAM
- Operating Systems
  — Large systems design
  — MVS, DOS, ACP

You'll be involved in varied and interesting applications development and systems programming assignments providing excellent long-term career advancement potential. Please send your resume in confidence to: IBM Corporation, P.O. Box 2750, 10-15-20, Irving, Texas 75061.

IBM

An Equal Opportunity Employer



At ESL... the opportunity for DP Professionals challenges the imagination...

Creativity and imagination are just two of the requirements necessary for the DP professional at ESL. We are looking for people who will enjoy being part of a unique, stimulating team effort—that of developing state-of-the-art application systems. You must be able to function in a professional environment with advanced DP tools and with a company truly interested in its employees. If you meet these requirements . . . ESL might be the place for you.

MANAGER/DATABASE ADMINISTRATION

Dates your management experience and skills coupled with your knowledge of database systems and applications to direct logical and physical database design and manage data usage. You must know:

■ IDMS ■ ADSO ■ IDD ■ CULPRIT

SENIOR PROGRAMMERS & ANALYSTS

Superb move up for talented "hands-on" individuals (day or swing shift) to design and code new systems or integrate existing systems into the new database. You must have at least 3 yrs. COBOL experience plus background and/or experience in:

■ IDMS ■ IBM 3083 MVS ENVIRONMENT
■ COMMAND LEVEL CICS or ADSO

PROJECT LEADERS

We are seeking individuals with 5 or more yrs. experience in programming and analysis of financial applications including the development of database and on-line systems. Experience in managing a development team is a must. (Day or swing shift).

ESL, a subsidiary of TRW, has been setting the pace for 20 years as a "Systems House"—perfecting wideband digital and acousto-optic signal processing, airborne and ground-based tactical reconnaissance, complex real-time software, parallel computation and fielded Mil. SPEC systems.

Our continued momentum, creative R&D environment and superb work conditions make ESL a place where the state-of-the-art becomes a reality. Excellent salaries and benefits. Please send resume to C. Kastrop, Employment Department EJ-351, ESL, P.O. Box 3510, Sunnyvale, CA 94088-3510. (408) 743-6300. An equal opportunity employer. U.S. CITIZENSHIP IS REQUIRED FOR ALL POSITIONS.

ESL
A Subsidiary of TRW
1345 Crossman Avenue
Sunnyvale, CA 94086
408 743 6300

TRW

Opportunity In Information Systems

Atlanta Suburban Area

As a Division of a Fortune 400 company, we enjoy undisputed leadership in our industry. Innovation and growth mean interesting career challenges for the professionals who join us now.

Our company is launching a new drive further into leading edge technology information systems such as distributed processing, decision support and state-of-the-art manufacturing and distribution systems.

Environ-1/TOTAL System/Software Programmer

This position is responsible for the technical support of 3 major ENVIRON-1 networks and a TOTAL data base in excess of 150 files. Activities are planning, design, installation, performance monitoring and tuning, maintenance, technical problem-solving, debugging and consultation with application development personnel.

Assembler language required: Current environment is on IBM 3083 and 4341-2 running MVS, VTAM, ENVIRON-1, TOTAL, TSO, ROSCOE, LIBRARIAN and MANTIS.

Send resume with salary requirements to:

Dept. H-34
P.O. Box 450447
Atlanta, GA 30345

Equal Opportunity Employer M/F/V/H

MANAGER - ACADEMIC COMPUTING

The Manager of Academic Computing provides leadership and direction to faculty and students in the use of computing facilities. The manager will consult with faculty concerning application of computer technology relating to current and future curriculum. Duties include: develop and maintain public user library of applications software packages, supervise academic computing staff and develop plans to satisfy future academic computing needs. Qualifications: Bachelor's degree required and advanced degree preferred. Knowledge of instructional uses of computers at college levels. Strong communications skills and leadership potential. Salary commensurate with qualifications and experience. Females and minorities especially encouraged to apply.

The Trinity University computing environment consists of IBM 370/3033X with VM-VS1/CICS/CMS/DBMS, Apple IIs, networked IBM PCs and PDP 11/34.

The position is available June 1, 1984. Deadline for receipt of applications is March 31, 1984. Send nomination for application and resume with three references to:

Dr. James S. Vinson
Vice President for Academic Affairs
Trinity University
715 Stadium Drive
San Antonio, TX 78284

Trinity University is an Equal Opportunity/Affirmative Action Employer.

DATA BASE

Mgmt. w/MIS/ADMS/ADABAS qualifies for multiple CT. opptty's. as sr DBA in growing hi-tech co's. Be resp. for DB design/devel. and all DB issues. Must be tech competent and enjoy a challenging, growing environ. $28 - $40,000

ROBERT HALF OF HARTFORD, INC.

111 Pearl St.
Hartford, CT 01603
(203) 278-7170
Personnel Consultants

SYSTEMS ANALYST

Our progressive 420-bed hospital is seeking a people-oriented Systems Analyst to take full control of our systems design and implementation for specific projects. This major responsibility position involves the coordination & organization of certain hospital processing systems and the maintenance of various computer master files. Other duties include analyzing and preparing cost of assigned projects, systems and project documentation.

Minimum requirements of this high-visibility position are a 4 year degree, preferably in computer science/business or equivalent job experience of at least 3 years, ideally in a hospital environment.

Your efforts will be recognized with an excellent salary and premium fringe benefits. And, you'll find maximum potential for growth and advancements. For consideration send your resume with salary requirements in confidence to:

FAITH REESE
Employment Manager

SwedishAmerican
PEOPLE WHO CARE
...about each other

1400 Charles Street
Rockford, IL 61101

An Equal Opportunity Employer m/f

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

SAUDI ARABIA

SYSOREX INTERNATIONAL, a California Corporation and a rapidly growing systems management company now developing innovative multi-technology systems in Saudi Arabia, has the following challenging positions:

SR. APPLICATION DESIGNER
(Chief Designer)

Responsible for overall application design of project. Requirements: BS with 7+ yrs. experience in programming and systems design in large scale IBM environment (3033, 3081). In addition to your resume, please add a cover letter specifying and describing your experience in the following areas: 1) years "hands-on" programming; 2) CICS Internals (CICS is a requirement); 3) major IBM Database (IMS, IDMS, ADABAS); 4) application tuning; 5) Database tuning; 6) structured methodology (YOURDON, STRADIS, etc).

SR. DATABASE DESIGNER

BS required with 6-10 yrs. experience in business applications; possesses in-depth experience with database management systems; understands fundamental cost/performance tradeoffs between various physical organizations possible in database management systems; has a sound working understanding of Structured System Analysis and Design tools, including Data Flow Diagrams, logical data analysis, logic trees, transforms and transaction analysis, etc.; comfortable working in "team" environment.

SR. DATABASE/ DICTIONARY SPECIALIST

Bachelor's degree required with 6-10 yrs. data processing work experience which includes: a minimum of 1 yr. specific experience using the DATAMANAGER product, systems analysis and design, program development, development and documentation of standards, database administration, and data dictionary management. Training in database management systems, structured methodology of system development integrated data dictionaries, file access methods, data security and control, data analysis/normalization, data modelling, and performance tuning.

We offer an excellent benefit package including: medical, life, accidental death, disability and profit sharing plans. You will additionally receive 25 working days vacation, 15 holidays, free furnished housing, annual return home travel, paid relocation expenses, plus eligibility for present Federal Income Tax exclusions.

Please send resume, INDICATING POSITION TITLE FOR WHICH YOU ARE APPLYING, with present salary to Personnel Dept. CW-3/5, SYSOREX INTERNATIONAL, INC., 10590 N. Tantau Avenue, Cupertino, CA 95014. U.S. CITIZENSHIP REQUIRED. INDIVIDUALS ONLY APPLY.

SYSOREX
Sysorex International Inc.

DATA PROCESSING MANAGEMENT EXECUTIVE

FIRST DATA RESOURCES, INC. is a rapidly expanding provider of data processing services to the government, financial and cable TV industries, and a highly successful subsidiary of American Express Company. The continued expansion of our operations has created an immediate opportunity for a dynamic executive experienced in the management of a large-scale IBM shop.

Based in our Omaha corporate headquarters, this position provides management and direction for our Technical Services, Operations, and Systems & Programming groups. This responsibility includes preparing divisional budgets, developing enhancement for new and existing systems, and evaluating organizational efficiency and productivity.

The successful candidate will have a BS or BA in a relevant discipline an advanced degree is preferred, and a minimum of 5 years management experience in a large-scale IBM environment. Strong technical and communication skills are essential, as is a background in financial management and vendor interface.

In exchange for your expertise, we provide an executive level compensation program, professional autonomy, and exceptional opportunities for career growth and advancement. For prompt consideration, submit a detailed resume with salary requirements, in strict confidence to: GEORGE VOGEL, VP Human Resources, Mail Code C-10.

FIRST DATA RESOURCES, INC.
10825 Old Mill Road
Omaha, Nebraska 68154
An Equal Opportunity Employer M/F

SYSTEMS ANALYST III

DATA PROCESSING USER SERVICES COORDINATOR III

PROGRAMMER/ANALYST III

San Bernardino County Superintendent of Schools, Southern California, is opening a new data processing department utilizing the HP 3000. System Analyst III to $40,788. Application deadline March 16, 1984. Data Processing User Services Coordinator III to $36,084. Application deadline March 23, 1984. Programmer/Analyst III to $34,356. Application deadline March 23, 1984. For information and application call (714) 383-2237.

COMPUTER STUDIES INSTRUCTOR

Bachelor's degree in computer science or related field. Two years of teaching experience on a secondary level valid CCC credential. Final filing date 4/11/84 at 5:00 pm. Contact Sierra College, Personnel Department, 5000 Rocklin Road, Rocklin, CA 95677, or phone (916) 624-3333 ext. 302. EOE.

Contract Programmers
Rates $35-$45 Per Hour

1. DEC VAX/VMS/Pascal
   Radio Communications Applications
2. UNIX Internals
   Automation-Robotics Project
3. Assembly Language-IBM or Micro Experience

Several Locations
Assignments in Florida, Texas, New York and others
Call or send resume to:
Computersearch, Inc.
Contract Services Division
12801 Nicholson Road, Suite 200
Dallas, TX 75234
(214) 669-8801

SYSTEMS ANALYST

- Design & implementation of computer systems. Maintenance & enhancement of existing systems, as well as providing vital skills to ensure successful & cost effective operation. 3 yrs. or 3 yrs exp - programming. Bach. deg - Comp. Sci. or Math. Must have knowledge of PL/1, IMS/DB & IMS/DC. $39,000/yr to work 40 hrs/5 days/wk. IMS Systems Corp., 1775 Bway, NYC, NY 10010. Send Resumes.

PROGRAMMER ANALYST III

Due to progressive development in Information Resource Management the Medical University of South Carolina, located in coastal, historic Charleston is seeking a Programmer Analyst who can contribute to the Hospital Computer System implementation process. Qualified candidates should have strong PMP/IADS, COBOL, DL/1 and CICS skills. Salary range $26,000-$30,000. Apply immediately to:

Ms. Joan W. Strickland
Employment Manager
Medical University of SC
Ramsendt Center
Charleston, SC 29403
EOE M/F/H

SYSTEMS PROG

Prestigious legal firm has an opportunity for the innovative & self-motivated pro with 5+ yrs technical bkgd. The qualified candidate should come from DOS/VSE (Power) IBM 4300 environment with CICS/VS, ACF/VTAM to be in-house consultant. Expand your career with this most prominent org. $60,000 FEE PAID

ROBERT HALF
of Manhattan, Inc.
522 Fifth Avenue
New York, N.Y. 10036
212-221-0808 (Agency)

Programmer/Analyst

Immediate opening at Connecticut headquarters of national contractor for Programmer with at least 4 years experience designing financial and production applications using Fortran. Some experience in on-line, interactive applications in a networking environment required. Excellent growth potential, benefits and work environment. Reply in confidence to:

CW-84578
Computerworld
Box 880
Framingham, MA 01701

NATIONAL BUREAU OF STANDARDS
INSTITUTE FOR COMPUTER SCIENCES AND TECHNOLOGY

OPPORTUNITIES FOR CHALLENGING POSITIONS IN COMPUTER SCIENCE AND TECHNOLOGY

COMPUTER SCIENTISTS AND PROGRAMMERS needed for:

- perform laboratory studies of high-level network protocols (transmit and satellite networks, computer-based office systems protocols, and local area network protocols (CSMA and token access methods);
- perform advanced research in computer network technology including advanced network architecture design, network operating systems, and protocol design techniques;
- participate in national and international technical committees to develop networking standards; and
- design protocols using finite state machine methods.

Desirable experience include protocol design, implementation and testing, an understanding of operating system principles, use of block structured programming languages, and work with technical committees. An undergraduate degree which consisted of 60 semester hours in mathematics, statistics and computer science and included differential and integral calculus courses is required in addition to at least three (3) years of experience in the computer science field.

For the research positions, desirable experience also includes research in advanced development of network protocols/software, data communication technologies, and protocol design. A Ph.D. in computer science or a related field is preferred.

These positions range from the GS-12 to GS-15 grade levels depending upon qualifications and experience and offer competitive salary, excellent career benefits and promotional growth opportunities. Please send your Personal Qualifications Statement (SF-171) to:

U.S. Department of Commerce
National Bureau of Standards
Administration Building, Room A-153
Washington, D.C. 20234

Attn: Ms. Josephine White (C3640)

The National Bureau of Standards is located in modern facilities in Gaithersburg, Maryland, and is an Equal Opportunity/Affirmative Action Employer. U.S. Citizenship is required.

WASHBURN UNIVERSITY

MATHEMATICS AND INFORMATION SCIENCES DEPARTMENT: Faculty position. Instructor/Assistant/Associate Professor for tenure-track position open Fall semester 1984. Minimum of a Master's degree (PhD preferred) in Information Systems, Computer Science, or closely related fields with expertise in most of the following areas: Systems Analysis and Design, Data Communications/Networking, COBOL, Data Base, and Operating Systems. Other qualifications include the ability to revise curriculum offerings to stay abreast of commercial and industrial needs in systems analysis and design; a strong commitment to quality teaching at the undergraduate level; and previous college teaching and some industrial or commercial experience is preferred. Responsibilities: Teach 12 hours in Information Systems per semester, assist in the development of new courses and programs, and share in the usual university advising and committee activities. Salary is competitive depending on qualifications and experience. Application deadline is April 15, 1984. Send vita, graduate transcripts, and the names of 3 references to: Alvey J. Barker, Chairman, Search Committee, Mathematics and Information Sciences Department, Washburn University, Topeka, KS 66621. Washburn University is an equal opportunity/affirmative action employer.

FLORIDA CONNECTION
CAREER OPPORTUNITY...
All Expenses Paid

Data Entry Analyst, Edit	To $20K
Systems Prog, CICS, IMS	To $40K
Sys Pro - 370/3, COMTEN	To $40K
ADP/VTAM Sys Prog	To $40K
Sys Pro - VAX, Wang	To $40K
Prog - MVS, Cobol	To $27K
Sr. PVN, Pascal, Fortran, PL-1	To $40K
PVN MVS, COBOL, DECMOL-1	To $30K
Operations Analyst UCC-7, 11	To $30K
PVCF Data Security Analyst	To $30K

POSITIONS WANTED

SEMINARS

COMPUTER SYNERGISM
S.E.-C.S. dropout computer field systems engineer seeks large scale mainframe computer repair and maintenance and installation or management position preferably but not only at a large computer facility. 15 years experience. Salary open. Can relocate. Please contact Jon Corradino at (609) 859-1500 (24 hrs.) or please write at 231 West Terry Lane, Palmyra, NJ 08065.

WANTED
PROGRAMMER/ANALYST POSITION

A Programmer/Analyst is seeking a full-time position or on independent contract. 5 years experience in systems analysis and heavily involved in programming. 8 years as Project Leader. Solid in BASIC and MAGIC/350. Good knowledge of COBOL and ASSEMBLER. Familiar with HP300 and WANG VS.

Single. Age 27. Self starter. Self educated. Fast learner. Growth oriented. Enjoys problem solving. Willing to immigrate to the U.S.A. Will visit the U.S.A. in September 1984. Expected salary is $60,000 to $80,000. Send job offer to:

The Kling Thoeng
Jl. S No. 177, Kalipasir
Jakarta 10640, Indonesia

LOOKING?

Find the job you want in Computerworld's classifieds. No other publication carries as many ads for computer professionals as Computerworld, so no other publication can give you as wide a choice of jobs, salary and location as Computerworld.You can even try a "Position Wanted" ad to look for exactly what you want, where you want.

Be sure you look over our recruitment ads every week, so you don't miss the opportunity that's just right for you.

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY
375 Cochituate Road, Framingham, MA 01701 / (617) 879-0700

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

OPERATIONS ANALYST

An opening exists for an Operations Analyst to perform analysis on productions standards; to coordinate and control JCL activities; and to analyze computer usage for efficiency and enforcement of standards. Normal working hours are 8 a.m. - 5 p.m., Monday thru Friday. BS degree or equivalent in Computer Science or related area plus 3-5 years experience required. Will consider applicant with BS degree or equivalent in Computer Science plus 6 years experience in the related occupation of Operations Group Leader and production control in an IBM OS environment. Starting salary of $1,545.21 per month. Application deadline, 3-16-84. Send resume with Social Security number to:

INDIANA STATE EMPLOYMENT SERVICE
10 N. Senate Ave.
Indianapolis, IN 46204
Attn: W.F. Shepherd
I.D. #011577

UNIX*/C

$25,000 to $50,000
APPLICATIONS & SYSTEMS
Over 300 Openings Nationwide
Client co's pay all fees
Call or send resume
in confidence to:
J. ROGERS ASSOC
(609) 896-8484
123 Franklin Corner Rd-Dept C-D
Lawrenceville, NJ 08648
* UNIX is a trademark of Bell Labs

tangent

tangent international is a well-established multi-national consultancy with offices in New York, Dallas, Orlando, London, England and Doha, Qatar. Tangent operates the largest international FOCUS consultancy, as a major divisional activity.

This area of our business is expanding rapidly, and we urgently need to recruit additional FOCUS consultants on either a permanent or independent basis.

We require indepth FOCUS knowlege with good experience of database design, internals and optimization techniques. Candidates with similar exposure in either RAMIS or NOMAD will be considered as internal retraining is provided.

tangent offers you the opportunity to join a growing organization that provides planned career growth, varied and interesting assignments and for those who like to travel, work locations across the United States.

We are also looking for individuals with IDMS, IMS and CICS expertise for our Professional Services Division.

tangent offers an attractive compensation package which includes:

- Excellent rates of pay
- Paid relocation
- Full medical benefits
- 15 days paid vacation

For an informal discussion about your new career with **tangent** in the United States…call: PHILL CLARK, (212) 938-0438…or write to…TANGENT INTERNATIONAL COMPUTER CONSULTANTS, Inc., One World Trade Center, Suite 8007, New York, N.Y. 10048.

We are an equal opportunity employer.
Agency responses will not be acknowledged.

SUCCESS IN THE SOFTWARE WORLD **tangent**

SENIOR PROGRAMMER ANALYST

Brockway, Inc., a Fortune 500 manufacturer of glass, plastic and metal containers, offers excellent opportunity to individuals experienced in defining, designing and implementing manufacturing and business systems.

Developing and meeting project schedules to produce quality systems requires at least 5 years applications development experience, including 2 or more years in systems analysis. A BS in a related field is equally important, and experience with MVS, TSO/SPF, CICS, IDMS and related products, plus selection and installation of vendor-developed software, would be helpful.

We offer a competitive salary, comprehensive benefits and ample opportunities to reach your full potential. For prompt attention, please send your confidential resume including salary requirements to:

Lawrence Kutsch
Manager Salaried Employment
BROCKWAY, INC. (NY)
McCullough Avenue
Brockway, PA 15824

Brockway

We Are An Equal Opportunity Employer

FLORIDA

Superior career opportunities are immediately available for those PROs ready to advance.

BASIC TECH SUPT (DOS to XA)	$30K
SYSTEMS PGMRS (DOS or XA)	$28K
(DB ADMIN, ACP)	$40K
RPG (ADAPSO, Midrange)	$28K
(DL/1)	$28K
(IMS DB/DC)	$27K
PROJ LEADERS (Life-Comm)	$27K
(Life-Ins)	$27K
PROGRAMMERS (COBOL, RPG II)	$22K
(CICS)	$20K
SECURITY ANALYST (RACF)	$26K

We will confidentially represent you if you will submit resume and salary history to Mr. Dave Mitchell at:

FRANK LEONARD PERSONNEL
1211 N. Westshore Blvd.
Tampa, FL 33607
(813) 879-1000

An Equal Opportunity Employer M/F
Client Company Pays All Fees

PROGRAMMER ANALYST SYSTEMS ANALYST

Programmer Analyst 3+ years. Systems Analyst 5+ years experience and strong IBM 3031 or larger background. OS/MVS, COBOL, structured methodology. Insurance or financial background is a plus. Salaries at or above competitive level. As much challenge and growth potential as you'll ever want. If you prefer send resume and salary history. Will call you!

Attn: BETH LOBNER

Dunhill
of KEARNEY, INC.
3720 Ave. A Suite B
Kearney, NE 68847
(Call Collect) (308) 234-4666

DALLAS

MGR/PROG

Several elite Dallas firms need S/34, S/38 coding expertise to serve as mgr/programmer. Salary to $32 - 35K. Send resume to Richard Kennerly:

3720 Stemmons Frwy. 1207F
Dallas, TX 75207 (214) 637-6388
DATA PROCESSING CAREERS

MAI Sorbus Service

MAI/ Sorbus Service Division is the nation's most recognized name in third-party computer maintenance. We've just had our best sales quarter ever, which has created new opportunities nationwide.

• FIELD MANAGERS

Responsibilities include **selling** computer maintenance agreements for a variety of computer products, including IBM, managing 8-12 field engineers, and P&L responsibility. **Ideal candidates:** 3-5 years' computer maintenance agreement sales experience or computer hardware/software sales experience.

• FIELD ENGINEERS

Ideal candidates: experienced on IBM large systems and associated peripherals or strong micro/mini experience, such as **IBM systems 34 thru 38, IBM/PC, North Star, Apple, Trendy, and all Basic Four products.**

Sorbus has been rated #1 in computer maintenance by leading industry publications for the last 9 years. We need people who can help us continue to grow.

For more information about available positions throughout the U.S., please call or write:

TOM BEAHM or MAX McALLISTER
MAI/Sorbus Service Division
50 E. Swedesford Road
Frazer, PA 19355
Affirmative Action Employer

800-345-1262

MAI Sorbus Service

FOR ACHIEVERS ONLY

INTERMEDIATE to SENIOR LEVELS

- Software Development Mgr
- Technical Support Specialist
- Data Base Administration
- Voice/Data Communications
- Office Automation
- Microprocessor Software
- Systems & Programming Mgr
- EDP Audit/Security
- Systems Planning
- Manufacturing Systems

DEC, HONEYWELL, IBM, NCR, UNIVAC

BRUCE A. MONTVILLE
Managing Partner

EXETER 2100
National Recruiting Consultants
(800) 258-3732

TOLL FREE
1-(800) 258 7328

COMPUTER PARK, P.O. BOX 4870
HAMPTON, NH 03842

BUY - SELL - SWAP

Will the real lessor please stand up!

Who do you want to deal with during your computer lease?

An investor? An insurance company? A consortium of banks? Or your leasing company!

As computer experts, we understand your individual equipment requirements. Hartford Computer Group doesn't sell your leased equipment to an investor who will not understand or care about your requirements.

When you sign a lease with Hartford Computer Group, you deal only with us. We maintain complete ownership and control of your leased equipment and can therefore give you the *flexibility* you want in a computer lease. We can do this only by refusing to participate in tax-advantaged leasebacks that give investors control over your leased equipment. Tax-advantaged leases allow for little or no flexibility!

We give you Hartford Computer Group. Want to lease computer equipment? Want to upgrade your computer equipment, renew your lease, or change your leased system completely? With no outside investors or participants to inhibit your transaction, Hartford Computer Group is free to offer the ultimate flexibility in customer service.

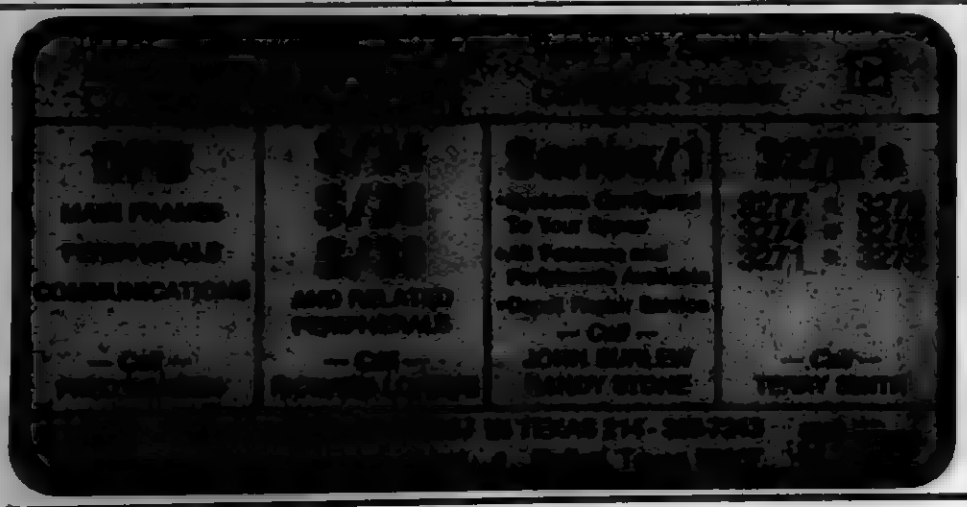
You deal with one company, before and after the lease begins, the real lessor...Hartford Computer Group!

Your questions about our unique computer leasing program are answered in our brochure. Write or call for your copy.

Hartford Computer Group **800 323 6355**

A Subsidiary of Hartford Financial Corporation
515 East Golf Road, Arlington Heights, IL 60005

or 312 364 0505



DATAPOINT
4630

6600, 20MB (2)
3600 Processors
9601 Letter Quality Printer
1600 128K, 10MB Cartridge
5500 2.5MB Drives (3)
9622 Printer
9214 Printer, 230-340 LPM
9370 25MB Drives (2)
9371 25MB Drives (3)
9584 1600 BPI, 10.5 Inch, Reel to Reel Tape Drive

• BUY • SELL

2600 Clients
(703) 790-9433

IN STOCK!
Fujitsu Eagle
with cabinet, cables, slides & terminator
$12,000
New Fujitsu SP 360
80 character per second, letter quality printer.
Introductory Special - $6,500
MANRIES
303-699-3036
2771 S. Jasper • Aurora, CO 80013

CURIOUS ABOUT CLASSIFIED?

If you are interested in advertising with Computerworld, but don't know how to do it, give us a call! We will be glad to send you our current rate card, which explains sizes, costs, deadlines and requirements. Along with that, we can send a demo paper which actually shows examples of ad sizes, typefaces, and prices. All you have to do is ask! Our toll free number is 800-343-6474, in Massachusetts call (617)879-0700, just ask for the Classified Advertising Department. Or, you can look for our classified order form located in the classified section of Computerworld. Fill it out, attach your ad with a check, and return it to us. Computerworld Classified Advertising, 375 Cochituate Rd., Box 880, Framingham, MA 01701. We're anxious to help!

Get a clear picture on all your leasing needs.

With all the high-tech equipment available, making a decision about what's right for your company isn't always easy.

That's why Greyhound Computer Corporation works with you to make those decisions. Whether you want to lease or purchase, we'll work with you to customize your equipment requirements. And we'll also work with you to customize a financing schedule that meets your financial requirements.

We've been leasing, servicing, refurbishing, maintaining and providing financing for computer and other equipment for over 20 years.

So if you have questions regarding your equipment-leasing system, call Greyhound Computer Corporation. We'll make the picture perfectly clear.

Regional Offices

Mike Coale Eastern Regional Headquarters	**(617) 272-8110**
Dave Hyland Western Regional Headquarters	**(415) 283-9900**
John O'Shea Central Regional Headquarters	**(312) 789-9100**
Ron Gell Southern Regional Headquarters	**(512) 451-0121**

Sales Offices in:

Atlanta, Austin, Boston, Chicago, Dallas, Houston, Los Angeles, New York, Philadelphia, Phoenix, Pittsburgh, San Francisco

GREYHOUND COMPUTER CORPORATION

A subsidiary of The Greyhound Corporation

BUY•SELL•LEASE

SERIES/1

SAVE ON NEW OR USED
OVER 2000 CUSTOMERS

S/38
4331
4341
4361
4381

ALL RELATED PERIPHERALS
SHORT/LONG TERM LEASES

S/34

SEE OUR NEW PRICES

S/36

SHORT/LONG TERM LEASES

3083
3081

LEVERAGED LEASES

3350	3370	3340
3360	3375	3344
3411	3420	3430
3278	3274	3276

Call toll-free 800-328-5718
(in Minnesota, 612-544-8660)

COMPUTER OPTIONS, INC.
"the best option"
1660 South Highway 100
Minneapolis, MN 55416

CW-1

SYSTEM/34
SYSTEM/36
SYSTEM/38
SERIES/1

FIND IT FAST IN OUR FAMOUS
COMPUTER MARKET ADVISOR
SEND US YOUR BUSINESS CARD
AND WE WILL SEND YOU A FREE COPY.

ECONOCOM
• BUYS • SELLS
• LEASES
- QUICK DELIVERY
- COMPETITIVE PRICING
- FLEXIBLE FINANCING
- TRADE-INS ACCEPTED
- PROFESSIONAL SERVICE
- SHORT-TERM LEASING
- LONG-TERM LEASING
- PERIPHERAL LEASING
- TAKE-OUTS DONE

CALL TOLL FREE
800-238-3098

DEC

RENT • BUY • UPGRADE • SELL

PDP, 11/03, 11/04, 11/23, 11/24, 11/34,
11/44, 11/70, VAX/730, VAX/750, VAX/780

SYSTEMS • OPTIONS • SUPPLIES

11/24	128K, Dual RL02, DZ11-A, Dual H9642 (new)	$24,995
11/23+	256KB, Dual RL02, DZV11-C, VT100, Basesize (new)	$16,295
11/70	512KB MOS, LA36 (used)	CALL
VAX/750	1MB, RUA82, RL02, VMS Basesize (new)	CALL

Customized Configurations—Call With Your Request.

In Stock		Specials		In Stock	
11/24-BC (new)	$11,295	MS11-PB (new)	$4,195
DZ11-A (unused)	$ 495	MS750-CA (new)	$4,195
DMF32-AB (new)	$ 3,495	MS750-DC (new)	$3,995
DMP11-DA (used)	$ 995	RK750 (used)	$2,995
DZ11-F (used)	$ 2,195	RK611-EA (used)	$2,695
H9642 (new)	$ 1,395	RL211-AK (new)	$5,495
KT24 (new)	$ 795	RUA81-AA (new)	Call
LP11-WA (unused)	$ 2,495	VT52-AA (used)	$ 495

BROOKVALE ASSOCIATES
800-645-1167 NY:(516) 273-7777

AMDAHL

FOR SALE

V/6-II	8 X 12	MARCH 15
V/8	16 X 16	APRIL 1

SUBLEASE

V/7	16 X 16	MARCH 1
V/8	16 X 16	APRIL 15

CALL: CHARLIE BERRY OR TOM STARR
(612) 933-6000
MAJOR COMPUTER INCORPORATED
10237 YELLOW CIRCLE DRIVE
MINNETONKA, MN 55343

APRIL 6TH

4381 P2

LOWEST LEASE AND SALE PRICES
MANY OTHER CPU's AND PERIPHERALS AVAILABLE
CALL: BUSS SCHNEIDER 800-IBM-4341
IN CALIF. CALL 408 241-3677

SEVEN YEARS AND 300 CUSTOMERS STRONG

marketex
Marketex Computer Corporation
1601 Civic Center Dr., Ste. 203, Santa Clara, CA 95050

- BUY
- SELL
- SWAP

Well-Equipped
To Serve You
In Buying
Or Selling

- HARDWARE
- SOFTWARE
- COMPUTER TIME & SERVICES

Over 500,000
people read
COMPUTERWORLD
every week

So placing an
advertisement
with us is
going to help you
take care of your
computer-related
business....
very quickly

Deal us in on
your business needs

Call 1-800-343-6474

(in Mass.)
617-879-0700

CMI

AMERICA'S LEADING SPECIALIST SERVING THE USED MARKET

REGIONAL MARKETING OFFICES

Absecon, NJ (609) 645-7282
Boston, MA (617) 367-5755
Chicago, IL (312) 693-2790
Dallas, TX (214) 385-0606
Encino, CA (818) 789-0113
Houston, TX (713) 780-7459
Lebanon, TN (615) 449-6633
Miami, FL (305) 442-2966
Newport Beach, CA (714) 752-8443
New York, NY (212) 349-0718
Tampa, FL (813) 273-8028
Frankfurt, Germany Telex: 414561 LCO D
Montreal, Quebec (514) 871-1121
Nyon, Switzerland Telex: 27209 CMI CH
Paris, France Telex: 613910 CMI FR
Toronto, Ontario (416) 842-3065 (416) 863-9100
Vancouver, B.C. (604) 685-6196
Windsor, Ontario (519) 973-3910

CMI FINANCIAL SERVICES GROUP
2800 Telegraph Rd., Bloomfield Hills, MI 48013
(313) 456-0000

CMI

A Torchmark Company

2800 Telegraph Rd., Bloomfield Hills, MI 48013
TWX/TELEX: 810-232-1867 CMI CORP TRMI
(313) 456-0000
CMI 4300 Series Hotline Number: 800-231-4300 Member CDLA

3081-D16 Sale or Lease

3081-K24 Sale or Lease

For Sale/Lease **4381** 1st Quarter Delivery

3033 All Models

New **Series 1** with Serix Operating System "Unix" ™ on the Series 1 IBM Master VAR
™ Trademark of Bell Laboratories

3350's Available Now On a Short Term Lease 3370 3375 3380

3890-A6 Available Now **4700** Banking Equipment Buy/Sell/Lease

3725 Lease Financing Available For your System or Ours 2,3,4 or 5 Year Terms

3800 LASER PRINTERS Model 1's Immediate Delivery Model 3's Lease Financing Available-Any Term 3203-5 3211-1 & 3811-1 3262-5 4245-1

Tapes Immediate Delivery **3803-3420** Buy/Sell/Lease

Wanted **4341-M2** **4341-L01** Call Now

3278, 3279 3277, 3276 Terminals All Models Immediate Availability

3705-3704 Available for Immediate Delivery Sale or Lease

SYSTEM 38 Previously Owned Models 7 & 8 Available Now Long & Short Term Leases **8130's** For Stand Alone Word Processing Available now-Sale or Lease Want To Buy All Your Peripherals-Available

Series 1 I/O All IBM Peripherals Any Used Configuration CDC Fixed/Removable Disks Tape Back-up $4995.00 CDC/Datasouth/Printronics NEC/Printers Buy/Sell/Lease

SYSTEM 38 2, 3, 4 or 5 Year Terms Lower rates than ICC **SYSTEM 34** Great Prices Sale or Lease! Want to buy 8351-11 & 12, 8358, 8232, 3262, 8234, 8251-1

You can get information on buying or leasing
IBM 34-36-38
as fast as you can dial
1/800/LEAS-PAK.
In Texas call 817/268-0023.

Up to 50% Savings

LPI

LEAS PAK INTERNATIONAL

P.O. Box 759 • Hurst, TX 76053 • 817/268-0023

Send for our free products and services brochure.

Name _____
Address _____
City _____ State _____ Zip _____
Phone _____

Limited System/ 34 deliveries, new displays and printers in stock. We want to buy your owned or rental credit equipment.

BUY · SELL · LEASE

SERIES-1
S/34 • S/36 • S/38
4300

S/23 S/32 5110-20
Tape-Disk-Printers-Tubes

AMCOM
CORPORATION
5200 W. 73RD ST. · MINNEAPOLIS, MN 55435
(612) 835-4737

CALL TOLL FREE
800-328-7723

We've Got Your Number

S/34 ALL MODELS QUICK DELIVERIES

SERIES 1 CONFIGURED TO YOUR NEEDS

S/36 ATTRACTIVE LEASE RATES

S/38 NEW & USED MACHINES

5110/5120 NEW LOW PRICES

PERIPHERALS
CRT'S_PRINTERS_DISK_TAPE_MODEMS

CARLYN
COMPUTER SYSTEMS
8100-G Beckett Road Annandale, VA 22003

"CALL COLLECT" (703) 642-1950

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

We do a lot more than publish the book you shouldn't be without

We [illegible] sell and lease [illegible] equipment.

75 SO. GREELEY AVE., CHAPPAQUA, NY 10514 • (914) 238-9631

☐ YES! I'm interested; so please enter my subscription to Computer Price Guide at the rate of $32.00 for 4 issues.*

*published quarterly in January, April, July and October

Name_____
Title_____
Company_____
Street_____
City_____ State_____ Zip_____
Phone_____
Machine Type_____

c

INTERSTATE COMPUTER EXCHANGE

5340-C23-65% off List—$8,500 (64K, dual disk, 27meg)
5340-E35-57.5% off List—$20,000 (128K, magazine, 120meg)
5340-F37-55% off List—$34,000 (256K, magazine, 288meg)

TOP $ PAID FOR S/34's and S/36's

CALL COLLEC

Roger Odom

Has Joined the Brokerage Division of

TexCom

Friends and previous customers may now contact Roger at TexCom Management Services Brokerage Division, Memphis, Tenn.
(901) 756-7055
Call Toll Free: 1-800-833-9119
"The Series I Specialists"

The nationwide market - a call away!

DEC/DG

SYSTEMS/PARTS/PERIPHERALS
NEW/USED/SURPLUS • DISCOUNT PRICES
Since 1977! Buy, Sell, Trade and Broker.

PHIL	BRYAN	JENNIFER
DG	11-VAX	8-LSI

CALL TODAY - (305) 392-2005 TELEX 568-670

thomas business systems, inc.
4501 Oak Circle - Unit 11 Boca Raton, Florida 33431

MISSISSIPPI CENTRAL DATA PROCESSING AUTHORITY

Sealed proposals will be received by the CDPA, 508 Robert E. Lee Building, Jackson, MS 39201 for the following data processing equipment and services:

Request for Proposal No. 911, due 3:30 p.m., Wednesday, March 28, 1984, for the acquisition of six (6) microprocessor based CAD systems for Itawamba Junior College.

Detailed specifications may be obtained from the CDPA office. The CDPA reserves the right to reject any and all bids and proposals and to waive informalities.

Dorothy Hooper or Elaine Knauss,
State Central Data Processing Authority
601/359-1365

CPR:RESALE

Computer Products & Power

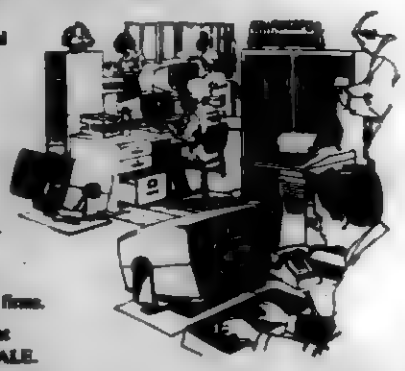
No charge to tell the Data General world.

Call us to fix the DG equipment you have to sell or buy. There are no fees. CPR's large, computer-based sales force will find you a MATCH TODAY through national phone sweeps, direct mail, and advertising to 500,000 contacts.

Buy at the price you want. Sell at the price you need.

$2 Million is also available to buy and sell your inventory fast, with aggressive trade-ins, and leasing through national firms.

Expect the price you want TODAY with CPR:RESALE.



CPR gets you results. California 800-392-2317

800-843-2047

1830 Fourteenth Street, Santa Monica, California 90404 213-450-0010

FOR SALE BY OWNER

IBM SYSTEM/38 Mod 453

Comm. (1 Line, BSC/SDLC)

Other Peripherals:

3370/A11	(8) 5251-11
3262/B01	(2) 3751-11

Available Immediately

Contact:

Prime Motor Inns, Inc.
Attn: Don Stevens
700 Route 46 East
P.O. Box 2700
Fairfield, NJ 07007
(201) 882-1010

RESULTS

Whether you're buying, selling, swapping, hiring or looking, you get results from Computerworld classifieds.

Maybe that's why Computerworld gets more classified advertising than all the other computer publications put together!

We Buy & Sell
DEC
Systems
Components

Digital Computer Resale
call:713 445-0082
800 Keeaich Ste C22 Houston, Tx 77060

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY
375 Cochituate Road, Box 880, Framingham, MA 01701/(617) 879-0700

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

PCM
Pioneer Computer Marketing
214/343-2904

BUY - SELL
LEASE
- All IBM Systems
- Peripherals
- Tapes
- Disks

SERIES/1
- Systems
- Features
- Peripherals

SYSTEM 34
- CPU
- Peripherals
- Upgrades

PIONEER COMPUTER MARKETING
11448 Pagemill Road
Dallas, Texas 75243
214/343-2904

What makes Dataserv a world leader in the IBM marketplace?

Customer satisfaction.
Over 65% of Dataserv's business comes from previous customers or customer referrals.

dataserv

HP
1000
3000
64
encore
(213) 452-9117

NPA
SYSTEMS INC.
SPECIALIZING IN:
PURCHASE
SALE, TRADE,
LEASE, RENT,
AND SERVICE OF
Data General
EQUIPMENT
10,000 SQ. FT. WAREHOUSE FULLY STOCKED
781 CRATES AVENUE HOLBROOK N.Y. 11741
TELEX # 510 222 0882
(516) 467-2500

PEARL HAS IBM SYSTEMS 34, 36, 38
and we have a large inventory of IBM 3741's, CPU's, CRT's and printers. We buy, sell, lease, rent and purchase/leaseback IBM Systems.
Call John Spight or Ken Warren
Pearl Computer Division
•P.O. Box 24026 •4717 Centennial Blvd.
Nashville, TN 37202 (615) 383-8703

LEASING A NEW IBM COMPUTER?
Compare Before You Lease!
•3R-1 Dun and Bradstreet Co.
•Fortune 500 References
•$55 Million of IBM Leasing
IBM
Dataserv Leasing & Service Group
Toll Free 800/323-3577
Los Angeles 714/671-3911
New York 201/467-9484
Chicago 312/323-1300

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

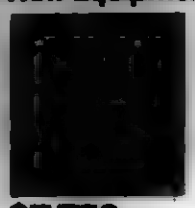
DISK DRIVES • CONTROLLERS • PERIPHERALS • MEDIA

WANG • DEC

National authorized CDC OEM-Distributor (for Controllers and Media) offers *New Equipment*, fully warrantied for 90 days:

$12,900

CDC Model 9766 (300 Mb.) WANG Models 2285V–2, and 4585 (300 Mb.) DEC Model RM05 (256.1 Mb.)



$7,750

CDC Model 9762 (80 Mb.) WANG Model 2285V–1 (75 Megabytes). DEC Model RM03 (67.1 Mb.)

$8,875

CDC Model 9448 (80 Mb.) WANG Model 2280–3 (80.4 Mb.) WANG Models 2280 V–3, 8580 (80 Mb.) DEC Model RM07 (83.4 Mb.)

$20,825

CDC Model 9776 (675 Mb.) WANG Model 2285 V–3 (640 Megabytes). DEC Model 2–RM05 (512.2 Mb.)

ERST

INTERNATIONAL CORPORATION

225 Lafayette Street, New York, NY 10012

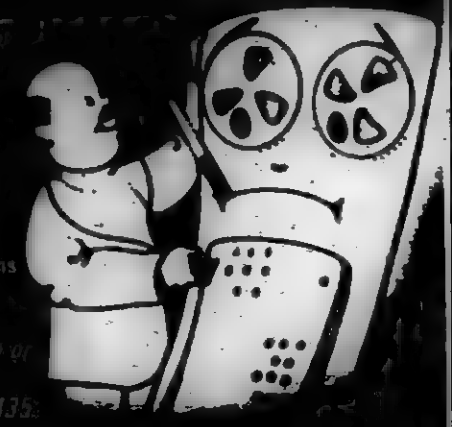
ERST is the leading dealer in pre-owned WANG equipment – 2200, VS, WP (CPUs, Terminals, IOPs, Controllers, Printers, Memory Upgrades).

Next time give us a call . . . Toll Free 1-800-FOR-ERST . . . In NY. 212-431-1100

The new Technicon...

We make every computer the picture of health!

- Reconfiguration
- Refurbishing
- Installation
- Mainframes
- Printers
- Disk drives
- Tape drives
- Communications equipment



Call Ron Arosemena or Javier Elizondo at (312) 766 5435

TECHNICON

345 Belmont Avenue, Wood Dale, IL 60191

IBM UNIT RECORD EQUIPMENT

DISK PACKS, DATA MODULES, MAG. TAPE, DISKETTES

SALE OR LEASE

IBM UNIT RECORD MACHINES
026—029—082—083—084
085—087—088—129—514
519—548—557

NEW & USED
DISK PACKS—DATA MODULES
2316—3336(1)—3336(11)—3348(70)
MAG. TAPE-DISKETTES
Every Item Guaranteed

Highest Prices Paid for Used Packs & Modules

THOMAS COMPUTER CORPORATION

FOR DEC
CALL SCHERERS

BRAND NEW DISKS:

*RL02-AK	10 MB disk with RL02K-DC	$ 2,100.
*RK07-PA	28 MB disk with RL07K-DC	3,500.
RK711-PA	Disk & Control	$ 8,000.
RLV21-AK	Disk & Control	3,500.
RLV22-AK	Disk & Control	4,400.
RL211-AK	Disk & Control	4,400.
RX211-BB	50 HZ/240 V	3,000.
RXV21-BB	50 HZ/240 V	3,000.
RA81-AA	456 MB, 16B Disk	16,150.
RUA81-AA	Disk & UDA50A	20,400.

USED DISKS: RL01's, RL02's, RK06's, RK07's RM02, RM03, RP06, RM05

SCHERERS

6145 SCHERERS PLACE
DUBLIN, OHIO 43017
(614) 889-6810

*Special pricing. Limited time offer.

SCHERERS SCHERERS SCHERERS

C.D. SMITH & ASSOCIATES, INC.

DEC computer systems & options
12905 East Freeway, Suite 318
Houston, Texas 77015
(713) 451-3112
TELEX 76-2547

DEC

WE ARE BUYING: VAX 11/780

WE ARE SELLING:

MS750-DC	8,500	TSV05-BA (New)	8,800
MS750-CA	4,000	41X44-FA	Call
MS780-DC	5,000	11750-FA	Call
DW780-AA	9,500	11780-KA	Call
FP11-A(New)	1,500	MS780-EC	39,875
DZ11-E	2,900	11/34A-YE(New)	8,800

If you want on our Mailing List, call Valerie (713) 451-3112.

4331-K2 AVAILABLE
& PERIPHERALS
Purchased, Sold & Leasing

CORPORATE COMPUTERS, INC.

Contact: Norm Burger

(203) 661-1500
116 Mason St., Greenwich, Conn. 06830
Member Computer Dealers & Lessors Association

STC
TAPE/DISK
BUY • SELL • LEASE

DOUBLE DENSITY FLOPPY DISK & 3420 TAPE SYSTEMS

CALL PAM CHRISTIANSEN

(408) 241-3677

Marketing Computer Corporation

When buying, selling or leasing computer equipment, there's a *great deal* to be gained by advertising in

- BUY
- SELL
- SWAP

Call COMPUTERWORLD's Classified Dept now at 1-800-343-6474 or (in Mass.) 617-879-0700 for the details.

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

NEW AND USED EQUIPMENT FOR SALE BY END USER

DATA GENERAL

7) 6070A 20 MB DISKS	32300	1) 6073 LP2 PRINTER	900
6) 6070 20 MB SUBSYSTEMS	3200	1) 6088 LP2 SUBSYSTEM	1100
1) 6089 12.5 MB DISK W/FLOPPY	2500	1) 6190 LP2 PRINTER (NEW)	1950
3) 6103 25 MB DISKS (NEW)	5385	1) 6191 LP2 SUBSYSTEM (NEW)	2250
2) 6103 25 MB DISKS	4500	6) 4014/4034 LP2 CONTROLLERS	500
1) 6227D 15 MB DISK (NEW)	4600	1) 4227S 4 LINE ASYNC MUX	350
6) 6227 20 MB DISK CNTRL	700	2) 5483 A/B 16 20 MA DTR BOARDS	150
2) 6362H NOVA 4C 6 SLOT 64 KB CPU	1395	1) 1144A 1 BAY CABINET	600
1) 1078A 1 BAY INDUSTRIAL CABINET WITH AIR CONDITIONER (NEW)	4,450		
1) 1078B 1 BAY INDUSTRIAL CABINET WITH HEAT EXCHANGER (NEW)	2,800		
1) NOVA 4X 5 SLOT 128 KB 15 MB DISK W/FLOPPY & ULM 6 BOARD	10,500		
1) NOVA 4X 5 SLOT 128 KB 12.5 MB DISK W/FLOPPY & ULM 5 BOARD	9,500		

MODEMS & TERMINALS

8) VADIC VA3405 1200 BAUD MODEMS	400	30) ADM3A LEAR SIEGLER	275
11) 6812/24 MICOM 2 CHANNEL MODEMS	595	5) ADM5 LEAR SIEGLER TERMINALS	350

CONTACT: ROBERT FULWILER 214-258-0614

FOR SALE
DEC EQUIPMENT

RM03	(67Mb)	$4,300
RM80-AA	(New, 124Mb)	$12,500
LP11-CA	(600 LPM)	$7,300
VT78	(Terminal)	$150
RH750	11/750 Controller	$4,000

Meadowcroft Enterprises
Essex St. • Middleton, MA 01949
(617) 777-4666

For All Your DEC Requirements

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

SYSTEMS
4341 4331
38 36 34
32 3
BUY • SELL • LEASE
COMPUTER BROKERS, INC.
2078 SHELBY ST.
MEMPHIS, TENNESSEE
TOLL-FREE
800-238-6406
901-372-2622
PERIPHERALS
3203 3370
327X 3411
3350 3420

IBM
5110 5120
3741 3742
DATAMASTER
1255 MICR
SYSTEMS
34 36 38 32 23
All Associated Peripherals
BUY SELL LEASE
• Printers • Display Stations
• Upgrades • Features/Add-ons
• Trades Taken
• IBM Maintenance Guaranteed
Call Today for Quotation
(615) 352-6505
SOUTHERN DATA SYSTEMS
Nashville, Tennessee

COMDISCO
A Commitment To Excellence
IBM PROCESSORS IBM PERIPHERALS
The Leader In Full-Service Leasing

DSI
WE BUY SELL & LEASE!
BURROUGHS
Discover the DSI alternative.
800-641-5215
All equipment available immediately and guaranteed for Burroughs Maintenance.
DSI Serving the Burroughs Community Worldwide
2480 W. Alameda Ave., Denver, CO 80223 (303) 922 8381
TWX 910 931 0483

WILL BUY...SELL...LEASE...
Systems 34/36/38/4300
• Financial Advantage Is Yours Through CPU
• New Or Previous-Owner Processors Available
• Immediate Delivery
• IBM Maintenance
• Create Cash Flow With CPU Purchase/Lease-Back
Call 503/222-2226 Collect
CPU Sales & Leasing, Inc.
3477 Northwest Yeon • Portland, Oregon 97210
CPU
MEMBER AMERICAN SOCIETY OF COMPUTER DEALERS ASCO

★ ★ ★ ★ DEC ★ ★ ★ ★
BUY—SELL—LEASE—TRADE—CONSIGN
SYSTEMS — PROCESSORS — OPTIONS
PERIPHERAL — MODULES — MEMORY
— SPARES —
NATIONAL COMPUTER EXCHANGE
(800) 624-9299
600 North Lunar Avenue, Brea, CA 92621
TWX: 910-596-1499 (714) 990-5988

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

LEASE • PURCHASE • SELL

IBM SYSTEMS

- *Purchase-Lease Back*
- *Customized Leasing*
- *Upgrade Flexibility*
- *All models and peripherals*

612-941-0510

WINTHROP
FINANCIAL CORPORATION
computer sales & leasing division

6400 Flying Cloud Drive • Eden Prairie, Minnesota 55344 • 612/941-0510

STOCK CLOSE-OUT SALE

VERBATIM CERTIFIED DATA CARTRIDGES

TC-2000-3722	300'	Only $ 13.90 ea.
TC-2450-6347	450'	Only $ 14.65 ea.

ONE-INCH CERTIFIED DIGITAL TAPE ON PRECISION ALUMINUM REEL

1" x 2500' in Canister	Only $ 19.65 ea.
1" x 1250' in Canister	Only $ 14.65 ea.

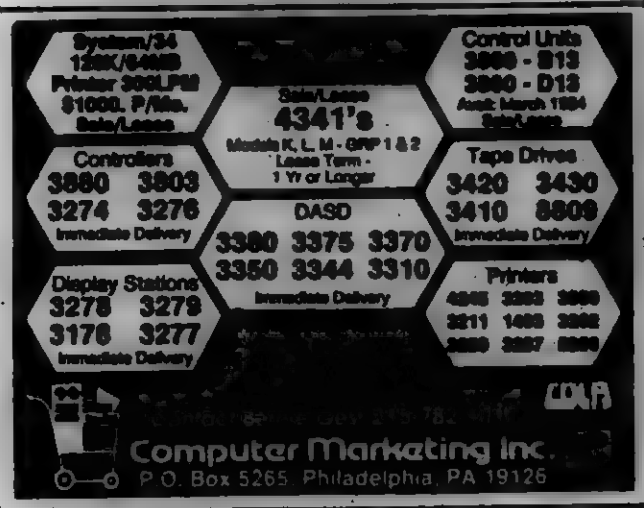
8" Syncom Diskettes

P/N# 15002	Single Side, Single Density, SS	$1.65 ea.
15004	Single Side, Dual Density, SS	1.48 ea.
15050	Single Side, Dual Density, SS	2.05 ea.
15150	Dual Side, Single Density, SS	2.60 ea.
15226	CPT-8000 Spec	2.30 ea.

Other Syncom Disks are available at close-out prices.
ALL PRODUCTS ARE IN UNUSED, NEW CONDITION.

1-800-331-6308

INDEL-DAVIS INC.
P.O. BOX 9697 Tulsa, Oklahoma 74157



TexCom

Join the more than 200 other major companies that lease IBM equipment from TexCom - the IBM specialists.

WE BUY • SELL • LEASE

SERIES I
- All features and peripherals available
- Buy, sell, trade
- Leases available

4361/4381
- Two, three and four year leases

IBM S/34
IBM S/38
- All models and peripherals available

IBM S/36
- 1, 2, and 3 year leases
- We take S/34 trade-ins

4331/4341
- 1, 2 and 3-year leases
- All models available

TERMINALS
5291 5225 3278
5251 3277 3287
5256 3279
AVAILABLE NOW

DISKS
3370 3380 3340
3375 3350
AVAILABLE NOW

WE WANT TO BUY
- Your IBM systems and peripherals
- Your rental credit equipment

MEMPHIS • SAN ANTONIO • HOUSTON

(512) 349-9955

EL CAMINO RESOURCES LTD.
offers:
4381-M2
DELIVERY POSITIONS AVAILABLE
early MARCH
APRIL
MAY
JUNE
(213) 986-2411
4827 N. Sepulveda Blvd.
Sherman Oaks, CA 91403

IBM SYSTEM
Buy
Sell
34
UPGRADES
Lowest Prices
Call Collect:
404-252-7480
DATAMARC
6065 Roswell Rd.
Suite 320
Atlanta, GA 30328
S/1
S/38

Want to Buy
5291, 5251, 5256
Defective Planar Boards
$100 each
For Details Call
(915) 692-9141
Russell Sullivan

Buy - Sell - Lease

S/32
S/34
S/38

IBM
3741
3742

CPU's CRT's PRINTERS
ALL MODELS
PURCHASE/LEASEBACK
SHORT & LONG TERM LEASES

Computer Marketing of America, Inc.
P.O. Box 71
610 Bryan Street
Old Hickory, Tennessee 37138

1-800-251-2670
In Tennessee: 615-847-4031

UNIX SUPERMICROS
$9,095.00*
- New units with warranties
- MC 68000
- 768 KB memory (expandable)
- 10 I/O ports • 1 MB floppy
- 27 MB Winchester

Call Tom Chiodo
or John Osborne
(512) 458-3224
*Call for quantity quote

Hardware, software, problems, people, pricing, ethics litigation, communication, macros, minis and micros.

We like to make an issue of it. EVERY WEEK.

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

IBM SYSTEM/34

S/3 • S/32 • S/36
5291 • 5251
3741 • 3742

BUY • SELL • LEASE
REFURBISHED • RECONFIGURATED
SHORT-TERM LEASES
PURCHASE/LEASEBACK

Tennecom MARKETING INCORPORATED
210 SPACE PARK NORTH
P.O. BOX 248
GOODLETTSVILLE (NASHVILLE)
TENNESSEE 37072

800-422-1004
IN TENNESSEE CALL: (615) 859-3872

DEC
New and Used
in Stock

COMPUTERS
Rainbow 100
DECmate I and II
Pro 350
Micro 11
WD 211
11/23 +
11/24
11/44

CRTS
VT101-AA VT102-AA
VT100-AA VT102-WA

PRINTERS
LA 34
LA 100
LQPSE

Command Data
PHONE 205/942-3154
Command Data Incorporated
165 West Valley Avenue
Suite 105
Birmingham Alabama 35209

HOW TO SAVE $30,000 PER MONTH ON A 3083 LEASE.

Lease the same 3083 that IBM leases for over $92,000 per month from Randolph—for less than $62,000 per month. That adds up to savings of $1,440,000 over a four-year lease period. If you're renting an older machine, Randolph may save you even more—and you'll get about four times the throughput in the bargain.

WHEN IS THE BEST TIME TO TALK TO RANDOLPH ABOUT LEASING A 3083?

Now—because Randolph has 3083's available for 4th quarter delivery. But it's never too late, even if you already have a machine installed. Whatever your situation, we can tailor a lease that will fit your exact needs and let you start saving money right away.

TALK TO RANDOLPH NOW.

We can solve problems like these, and more . . .

Stuck with a lease on your old machine?
We'll sublease it, and provide a new lease on a 3083.

Own a 3083 but need cash?
Sell your machine to Randolph, and we'll lease it back to you.

Machine installed on a rental basis?
We'll show you how to end the lease and install a new 3083. Any termination charges can be folded into your new Randolph 3083 lease.

LEASING COMPUTERS IS OUR ONLY BUSINESS.

At Randolph, our people have an average of 18 years in the DP industry . . . from 360's to 3081's. They know all about alternative financing to be sure, but they also know their way around a DP department and the hardware in it.

WE LEASE MORE THAN 3083's.

Whatever your needs, now is the time to talk to Randolph. We provide leases for IBM 303X, 4300 and 3081 systems and peripherals—disks, tapes—as well as 3083's.

UNIQUE FINANCIAL STABILITY.

We're an important part of one of the nation's oldest and leading financial institutions . . . The First National Bank of Boston. 19 years in computer leasing gives added assurance that Randolph will continue as the leader in the computer leasing industry . . . continue to live up to the terms and conditions of our agreements . . . provide upgrades . . . fulfill all of our commitments.

LET RANDOLPH HELP YOU SAVE $30,000 PER MONTH.

We can solve a lot of problems for you, and save you money, too. Talk to Randolph now . . . call Joseph B. Kelly, Jr., Executive Vice President, 800-243-5307.

537 Steamboat Road
Greenwich, Connecticut 06830
203 661-4200 • 800 243-5307

Randolph

A MEMBER OF COMPUTER DEALERS & LESSORS ASSOCIATION RANDOLPH COMPUTER CORPORATION A subsidiary of THE FIRST NATIONAL BANK OF BOSTON BANK OF BOSTON

Buy•Sell•Lease
SERIES 1
S/34 S/38
4300 S/36
5110 S/23
XERXES
COMPUTER SALES
1914 Harmon Place, Suite 510
Minneapolis, Minnesota 55403
800-328-3884/612-339-3042

FORSYTHE McARTHUR ASSOCIATES, INC.
DEALER / LESSOR OF IBM
Computers and Peripherals
FOUNDED 1971
Home Office
Chicago
919 North Michigan Avenue
Chicago, Illinois 60611
312 943-3770
Branch Offices
Atlanta 404 953-9467
Milwaukee 414 785-0544
EDP

• BUY • SELL • LEASE S/36
S/34 • MAINTAIN • UPGRADE
For information call
201-343-4554
• COMPLETE SYSTEMS • PERIPHERALS • PROMPT DELIVERY
MARION

WANG WORD PROCESSORS AT THOUSANDS OFF!
Guaranteed, remanufactured WPS 30, WPS 20 and Wangwriters available for immediate delivery. You don't pay a cent till Wang installs and places equipment under service contract. 15-day return privilege. Buy, Lease, Rent!
For Free Info and fast response call toll free:
1-800-321-2986
ELECTRONIC OFFICE EXCHANGE, INC.
Dept. SCSCWD • Box 7337 • Ann Arbor, MI 48107

DATA GENERAL
Hanson Data Systems

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

NORWEST
Computer Company, Inc.

34 • 36 • 38
4331 • 4341

System/34 Upgrades Disk—any increment Memory—any increment • Diskette—2D or magazine • All Features • IBM Maintenance Guaranteed • IMMEDIATE AVAILABILITY

214/991-2911
4255 LBJ Freeway Suite 211 Dallas TX 75234

National Computer Equipment Corporation

4341 CPUs
AVAILABLE NOW

JOE MICHAELS
313-774-7400
800-NAT-COEC

EXAMPLE: 4341-K1
S/N 75421
FOR SALE OR
SHORT-TERM LEASE

DEC

Check out our unbeatable combination—huge inventory & low, low prices.

Call toll free 800-328-7000
In Minnesota (612) 894-4020

MIDWEST SYSTEMS, INC.
1214 Riverwood Drive Burnsville, Minnesota 55337

FOR SALE
DATA GENERAL EQUIPMENT

8070 S/S (20MB)	$3,400
8045 S/S (10MB)	$2,500
6108 D200 CRT	$850
6104 25MB w/Floppy	$4,500
CS30, 80KB, 10Mb, LP2	$5,200
4328 - 230 LPM U/L Case	$4,500

MAIN SOURCE COMPUTERS, INC.
288 S. Beltline Road
Irving, Texas 75060
214-790-9100

FOR SALE
CDC High Speed Printers

Model 450-20, 720 lines per minute. Used in testing only. Compatible with IBM Series/1.

Call ARA Services, Inc.
(213) 933-7581,
Ext. 285

With the money you save with us, you could come to Minnesota for a visit.

If you're buying, selling or leasing IBM equipment, call us about the following: S/23, S/34, S/36, S/38 and Series I. We handle system upgrades and related peripherals. We feature flexible lease options and month-to-month rental agreements. 1-800-328-6599. (In Minnesota, 612-559-7171).

Midland Financial
12800 Industrial Park Blvd., Minneapolis, MN 55441

SELLING?

Sell your product or service in Computerworld classifieds.

Join the thousands of advertisers who use our classifieds because they get results.

You can find buyers for discs and DEC's, terminals and time-sharing, software and System 370's.

More than half a million active computer people read Computerworld each week, and you can reach them efficiently in Computerworld classifieds.

To place your ad, or to get a rate card with complete details on Computerworld Classifieds, call or write:

Classified Advertising
COMPUTERWORLD
P.O. Box 880
Framingham, MA 01701

Inflation Fighters
Quality & Savings

Slightly used, Money Back Guarantee, Full Reels, All External Labels Removed Guaranteed for use at 800 BPI through 6250 BPI

2400' Reel	$4.95 ea.
1200' Reel	$4.25 ea.
600' Reel	$3.50 ea.

All Tapes with Hanging Seals

We pay freight on orders over 200 tapes. All orders shipped within 48 hours.

Call or Write

Computer Tape Mart
414 Seabro Avenue
N. Amityville, New York 11701
(516) 842-8512

The Bulletin Board

WANG

Present...
WANG USERS.....
HAVE YOU HEARD ABOUT THE GROUP OF FORMER WANG EMPLOYEES IN ATLANTA WHO BUY & SELL USED WANG EQUIPMENT AND PLUS COMPATIBLES?
L.C.A. (404) 977-4360 or 1-800-841-3199

For Sale:
Several VS-80 Systems
Incl: 256-512K, 2 Hd. Disk's, 80 Meg "Phoenix", 600 LPM Printers. From 512K Each. Also Available: OIS 115-4 (32 Meg)
(617) 272-0330
CPR Associates
Subsidiary WANG Specialists Since 1973

PRIME

PRIME
LARGE SELECTION OF USED PRIME COMPUTER SYSTEMS ...SAVINGS TO 50%
Peripherals also available:
Memories-Disk Drives-Controllers
Modems-Terminals-Printers
1st SOLUTIONS
...Your Alternate Source
A DATAMATION SERVICES, INC., COMPANY
2901 EAST CAMPBELL AVE.
PHOENIX, ARIZONA 85016
(602) 957-0999
ASK FOR DON OR MATT

DATA GENERAL

Data General Nova 4X
256 KB, MOS Memory, (1) C350 TCU, (1) C350 Sync Interface, (1) Model 6060 96MB Disk Drive with 2 Packs, (1) 800 IPS Tape Drive, (1) D200 Terminal, (1) LP2 Printer. Under DG Maintenance Contract. Make Offer.
Contact Wayne Roberts, DP Manager
Rheost Inc.
(501) 568-1031

Other DG CRT's

D-210	$795
D-410	$1295
D-460	$1395
Desktops	15% to 25% Off List
Envoy 200	$625

Any & All DG Cables In Stock
We Will Not Be Undersold On Any New or Used DG Equipment
Kansas Data Systems
(316) 687-2209

MISC. SYSTEMS

For Sale
DATAPOINT 4630
300 LPM Printer
(216) 464-9629

Micro to Mainframe
Transkit DOS Direct
"NATIVELINX"
3270 - 2780/3780
Dealer, Quantity, Educational Discount
Viking Associates
(303) 832-7004

MICRODATA
Microdata Model 4000 or 8000 Available. 40 or 80 MB Disc, Tape, 8-24 Com. Line, 300 LPM Printer.
Must Sell
Norma Schenkir
215-469-6306

BURROUGHS

BUY SELL LEASE
All Systems & Peripherals
AVAILABLE
• B1955 Sys • B1965 Sys
• B80s • B90s
(Configured To Your Specs.)
• Visual 200 Terminals
• 500 Terminals availal with B 115
• TD830s, MT983s, MT985s
• 200 & 207 Style Disk Drives
• Various Tape Sub-systems
• Memory Upgrades
• Printers 9245 & 9249 Styles
Guaranteed Burroughs Model, Depot Maintenance Available
COMPUTER PROVISIONS
(214) 248-7575
(Member BDA)

BUY - SELL - LEASE
B1700 - B1800 - B1900
(Customs Config. Install. Avail.)
B80 through B7900
200/207/220/225 Disk
9348/49/47/48 Printers
Mag Tape Subsystems
TD830 - MT983 - SPO - Datamedia
TU/DC/CP/TT Terminals
Installation & DEPOT MA Available
UPP Corp. (512) 279-1199

For Sale
Burroughs B900 System
Memory-432 144 Total with 16KB Bi-Polar and 16KB Page. Disk Storage Capacity-8.2 Million Bites. Line Printer-350 Lines per minute. Best Offer.
Contact: Robert V. Mennone
(412) 284-2082 9:00 am to 4:00 pm
212-B City County Building
Pittsburgh, PA 15219

DEC

DEC
PDP 11/24A
2 RK07-EA
4 VT100's
1 LP11-VA
$18,500
CALL
(800) 888-1121 Ext 270

J-11's Available
Immediate Delivery
Turnkey O-Bus Systems
Various Configurations
All DEC Parts
• Micro-J-11's w/Winchester/Floppy
• J-11's w/RL02's
Inquire Price
E. E. C. Systems, Inc.
(617) 443-5100

VAX 780 Memory Upgrade
In Stock
MS780-EA $32,900
Call ESS
(701) 282-6360

DEC 11/70 SYSTEM FOR SALE
RSTS License, 1MB Mostek Memory, FP11-C, 2-250MB Century Disk Dr., 125IPS Cipher Tape Dr., LA36, 2-DZ11, 2 Cabinets, Power Supply. Now Running. Under GE Maint. $70,000.
Call Bill (602) 834-6660

DEC 11/03 System
With 32KB, RXV11-BA, Cabinet, LA36 Printer, RT11 License
$1,975
Call Ray
(617) 275-6900

BUY • SELL • TRADE

1170 Sys.	DZ11-E	RK700
DL11-E	FP11-C	RM03-AA
DL11-W	LA120-DA	RM05-AA
DMC11	M7236	RP04/6-C
DR11-B	MS312	RP06-AA
DZ11-B	MX11-CE	TE16 Mstr.

NEW YORK COMPUTER EXCHANGE
(516)752-0668 (800)645-6166

We Buy and Sell DEC Systems and Components. Wanted: VAX and 11/70 Processors.
Alphabyte
380 S. State College Blvd.
Fullerton, CA 92631
(714) 680-6611

DEC

PDP 11/70 SYSTEMS FOR SALE BY OWNER

Sys # 01700000000
DEC PDP 11/70-MP CPU/128KB
KT70-AA
TWUN-AC (RH70-TWIN)
TU58-XE
FP11-C
BA11-KE
MS11-BE 128KB memory expansion
LA36-CE
256KB National Semi Add-in Memory
768KB Monolithic Add-on Memory
1 ABLE Stackpole
(8-slot, DD11-BK equiv)
2 ABLE DMUX's
(DH11-AD replacements)
1 ABLE DZ11 equiv, 16 lines
1 CDC 9766 300mb (Fixed equiv)
Disk Drive
1 @ 9460 controller (cartridge)
for above
8 CDC 300mb Disk Packs

Sys # 01700000100
DEC PDP 11/70-MP CPU/128KB
H9880A H9880-DC
TWUN-AA (RH70-TWIN)
TU58-AE
FP11-C
2 BA11-KE's
MS11-BE 128KB memory expansion
LA36-CE
3-DH11-AA's 1-DH11-AD
13-DM11-DA's
DMR11-AC
RETIME Ver 8.0
256KB National Semi Add-in Memory
1024KB Monolithic Add-on Memory

BOTH SYSTEMS UNDER CONSTANT DEC MAINTENANCE CONTRACT
AVAILABILITY LATE-MARCH, 1984
$80,000 per system, or best offer
Call or write Bob Abarnes at:
ALDEN PRESS, INC.
2000 Arthur Avenue
Elk Grove Village,
Illinois 60007
Phone: 312-640-0800 ex 548
/ Telex: 46-6769

DEC & PRIME SPECIALS

• MS780-FD Avail Now	Call
• MS780-E Upgrade Kit	$16,900
• 1144-DA New	$24,600
• VT101-AA New	$995
• RM80-AA	$9,500
• PDP 11/70 128KB Core Memory	$24,900
• RM03-AA	$6,200
• CDC 9775 600MB	Call
• CDC 9766 300MB	$7,500
• Dataprinter 1000LPM Band Printer	$4,900
• VAX 780 1/4MB M8210	$800
• RM05	Call

• Prime Computer Systems Available Upon Request
• Emulex Systems Available
SEVCO INC.
(617) 435-6630
(617) 435-6331

DEC BARGAINS

11/34A CPU Set	$1,595
11/44 KE44-A "CIS"	$2,975
4A-C780 Spares Kit	$9,800
8DV11-AA	$495
DR780-AA	$9,400
DZ11 MUX Brd.	$1,125
DZ32-S	$1,870
FP11A	$1,195
KK11-A	$1,795
KK11-B	$2,975
KW11-P	$330
MS11-MB	$1,275
MS780-DC	$4,850
MS780-FD	$2,995
MSV11-PK	$1,135
MSV11-PL	$1,275
RLV11	$975
VAX 1MB MS730-CA	$2,995
VAX 1MB MS730-CA	$2,995

Call Ray
at QEI, Inc.
(617) 275-6900

DEC NEW & USED
BUY — SELL — EXCHANGE
Systems • Processors • Memory Options • Peripherals • Modules
LAKEWOOD COMPUTER CORP.
3880-6 Adler St., New Bern, CA 92660
(408)296-2545

HONEYWELL

LEVEL 6 & DPS 6 EQUIPMENT
Refurbished Like Printers
FRU6103 640 LPM, 96 Char... $4,125.
FRU6104 300 LPM, 64 Char... $4,795.
FRU6105 600 LPM, 64 Char... $5,525.
Many Other Used Disk Drives
CDU 9116 10MB
FP & DPS CMD $3,500 Ea.
Southern Computer Services Ltd.
(817) 336-6559

HONEYWELL DPS6/45
512K CPU
66 MB Disc (67 + 19)
1-300 LPM Printer
1600 BPI Tape & Controller
8-7801 CRTs
Available Appro 5/1/84
Buy Our Equity and
Take Over Last 12 Months
of P&W Operating Lease
(214) 234-6767

MISC.

BUY - SELL - LEASE
DATAPOINT
HARDWARE & SOFTWARE
•Turnkey Systems •FAMS Software
On-Line Accounting
(713) 529-6613

Buy • Sell • Lease
• Short Term Rentals •
DATAPOINT
FOR SALE

9480	Plans	$1,100.
9462	Multipoints	$600.
6360	CRT's	$1,200.
1382	Systems	$1,000.
9575	32MB Extension	$6,700.
9622	160 CPS Printer	$1,250.
6340	Arc Proc. 256K	$6,500.
6220	Datastations	$1,300.
5601	Datastations	$600.

24 HOUR DELIVERY
Cougar Computer Corp.
(216) 261-3500

Four Phase Systems IV-69
•1 7000m with 192k memory and NP600 processor
•2 5261 Disk Drives
•1 300 LPM Line Printer
•1 30 CPS Character Printer
•1 45 CPS Character Printer
•35 7111-A Terminals
•3 Intelligent Communications Cont
Contact: Peter Good (716) 271-6240

IBM

For Sale
IBM SYSTEM 34
Model F-37
Multi-Line Communications
5211-002 Printer
3 Years Old
Federal Mogul Corp.
(313) 354-9641

For Sale
4341-K1
W/1870
Available April 1
Arwell Corp.
(214) 386-7320

SALE
$/34 E35
FOB New Jersey Now
Call Louis Felder
(914) 238-9631

4341-L1
New - $2700/Month
4361-P2
$385 - $13,500/Month
3278-2
New - $35/Month
Syscorp
(312) 766-4510

IBM

SALE SALE SALE
FOR FEBRUARY ONLY
Any System/24 CPU
The Lowest Prices Ever
Call any other computer dealer before you call us. If we can not beat the best price quoted, we will send you $100.00.*
All upgrades, peripherals and S/36's are available at the best prices around.
PROCOM
(212) 279-1717
* Contingent on delivery of machine at the quoted price and if installed within 4 weeks of this ads appearance.

SY OWNER
3411-9 Tape Drive
System 3/12, DPF, Blayne
1403 Model 2 Printer
3340 Disk Drives
3741 Attached
5471 Console
5-3370 Modules
All Above IBM Maintained
All Manuals & System Pack
Usco Check Signer Mod. 1722
Best Offer Takes All
George E. Fern Co.
Contact Fred Collier
(513) 621-6111 ext. 59

PRINT TRAINS
IBM 1416 & 3216
Bought - Sold - Lease
Repaired - Reconditioned
COMPU-ACT COMPANY, INC.
(513) 669-8481

Buy • Sell • Lease
IBM
Cougar Computer Corp.
Suite 219
26350 Euclid Office Plaza
Euclid, OH 44132
(216) 261-3500

Buy ... Sell.... Lease
IBM MICR
3890 - 1419
(813) 722-4534

FOR SALE OR LEASE
IBM 4341-K9
With 3278-2A
and 4631 Keyboard
Available 3/1/84
Call (612) 484-4800

4341-L10
W/1870, 4MB
Now $92,500.
Call
(214) 991-2911

SYSTEM 3 MODEL 15D
256K, 160MB
1403 600 LPM
3741 Dtr. Attach.
3486 Data Entry Equip. Incl.
System Equipment W/ Comm. Feat.
No Reasonable Offer Refused
Contact Tom Frederick
(301) 477-1788

SYSTEMS 34/36/38
Short Term Rental
S/34
1-800-LEASPAK
In TX (817)268-0023

IBM

3277-2	$175 ea.
W/4001	
3271-2	$550 ea.
W/7021, 3289	
129-2	$79 ea.

Vargo Companies
(913) 384-3888

IBM

SYSTEM/36's
Immediate Availability!
STAR DATA SYSTEMS
1 (800) 531-5662
(512) 822-6868-Texas

For Sale
System 34
64K/27MB
with Peripherals
Available Immediately
(617) 863-2323

Wanted
IBM 3762
Payment Transaction Processor Station
Call Charles Brandenburg
(203) 792-3335

For Sale
188-A28
Arwell Corp.
(214) 386-7320

LEASE ONLY
3370-2
All Models
April Delivery
Call Howard King
Computer Merchants Inc.
(914) 238-9831

IBM 5251 MODEL 11
CRT's For Sale
25 Units
Available Immediately
Call Pat McIntyre
(313) 852-2311 ext. 5

Fox Computer Sales, Inc.
Buy - Sell - Rent - Lease
Datapoint - IBM
Telecom
W.T.B. Used Equipment
195 Alpha Drive
Cleveland, OH 44143
(216) 449-6395

END USER SELLING
SYSTEM/38
Model 400
1 1/2 MB Memory
280 MB Disk
2 SDLC Comm. Lines
5211-002 Printer
Available April 6, 1984
Call Ed Wald
(908) 544-4884

5291-1
Now Fully Warranteed
For Lease or Sale
Immediate Delivery
Qty. Limited
Vargo Companies
(913) 384-3888

SALE/LEASE
4331-L2
FOB Colorado
Available 5/1/84
Call Bill Hagen
(914) 238-9831

More Bulletin Board on the next page.

THE BULLETIN BOARD

A Low-Cost Way to Sell Hardware and Software in Computerworld.

What is The Bulletin Board?

It's a classified section in Computerworld designed especially for the selling and buying of individual pieces of hardware in a convenient, low-cost format. It is especially suited to companies that have a piece of used equipment they want to sell. For one low price, you can inform more than half a million Computerworld readers around the country of your equipment's availability.

How Does The Bulletin Board Work?

Bulletin Board ads come in standard units (one column wide by one inch deep) and standard typefaces. (Units may be combined to produce deeper ads, but one column is the maximum width and no units of less than one inch are available.) Ads are arranged under headings (such as "IBM", "DEC" or "Printers"). The headline of the ad is set in larger, bold type, and should contain the standard equipment identification. The body copy should describe the equipment very briefly and give the person to contact. This is all the information an interested buyer needs to follow up. No ad should have more than one piece of equipment or software.

The price for each standard unit is only $130.00. There is a one unit minimum and no fractional units available.) Anyone can place an ad, but no agency commissions are paid, no quantity discounts allowed, and no credit toward rate is given for contract advertisers who advertise in other sections of Computerworld. It's a simple and effective system for buying and selling hardware and software.

How to Place an Ad in the Bulletin Board.

Ads are accepted in the mail, by phone or by telecopier. Ads can be accepted up until the Monday before issue (7 days in advance of issue date). You should write out your ad before submitting it. (The standard size will hold approximately 25 words of copy.)

Once you've written your ad, send it in with the coupon or call one of our ad-takers. (If your company has never advertised with us before we request a check with your order.)

Remember that all ads are standard. No special typefaces, no borders and no logos are allowed. Ads are set on a six-column page in our classifed section under the heading "The Bulletin Board.". We assume no liability for errors beyond the price of the ad in the case of material errors.

ORDER FORM

COMPUTERWORLD BULLETIN BOARD

Issue Dates: Ads can be accepted up until the Monday preceding the issue desired. Computerworld comes out every Monday.

Classifications: Most ads will be classified according to the brand of equipment that is being bought or sold. These classifications include Burroughs, Data General, Digital/DEC, Hewlett Packard, Honeywell, IBM, NCR, Sperry Univac, Salvage, Terminals, Misc. Systems and Miscellaneous.

Copy: Copy sent in via the mail or telecopier (telecopier extensions are 410 and 451) should be clearly typewritten. Ads may be given over the phone to our team of ad takers. The standard size is 1 column by 1 inch deep. These units may be combined to form larger sized ads. Describe the equipment very briefly, give the price and the name of the person to contact. All ads will be set up using a standard format. No borders or logos are allowed.

Cost: The price for each standard unit is $130.00 (One unit minimum and no fractional units allowed.) There are no agency commissions and no quantity discounts.

Billing: Once you've written your ad, send (or call) it in with your name and address for billing purposes and we'll run it. (If your company has never advertised with us before, we request a check with your order.)

Issue Date(s):_____

Signature:_____

Name:_____

Title:_____

Company:_____

Address:_____

Telephone:_____

Send this form to:

COMPUTERWORLD BULLETIN BOARD
375 Cochituate Road, Box 880,
Framingham, MA 01701

617-879-0700 800-343-6474

HEWLETT PACKARD

HP3000HP3000HP300
0HP3000HP3000HP30
00HP3000HP3000HP3
000HP3000HP3000HP
BUY/BUY
SELL/SELL/SELL
RENT/RENT/RENTR
LEASE/LEASE/LEASE
Complete Systems
Processors • Peripherals • Parts
ConAm Corporation
Santa Monica, California
(213) 459-3643 (800) 643-4664

NEWLETT PACKARD
1000 • 2000 •3000
SYSTEMS & PERIPHERALS
BUY & SELL WORLDWIDE
EURODATA, INC.
(513)726-6496
Tlx: 063-3035

Buy-Sell-Lease
HP3000 3X, III, 4X
and related peripherals
Call Carol
CSU INDUSTRIES, Inc.
516-239-4310

[illegible] SYSTEMS CORP.
LEASED
Hewlett-Packard
Complete Systems
Tape Drives
Disk Drives
Printers
Terminals
1-800-[illegible]
(201) [illegible]

Want To Buy
HP 2619
Printer
Call Barry
(601) 864-6096

SOFTWARE FOR SALE

IBM 38 users...

For a tighter grip on MRP...

RMS/38 provides the tight-fisted control of a closed-loop MRP II system that allows direct user access to all stored information. Its sophisticated query facility lets you generate user reports. And advanced data base architecture makes expansion simple and economical. RMS/38 even offers a PC link that lets you transfer information to your IBM Personal Computer for interaction with popular micro products.

grab hold of RMS/38

Only RMS/38 has 15 powerful applications to provide you with total control over manufacturing, distribution and finances. **Contact PCR, Professional Computer Resources, 2021 Midwest Road, Oak Brook, IL 60521** (near Chicago). Also in New York, San Francisco and Los Angeles.

pcr
ALL THE SOFTWARE YOU'LL EVER NEED
312-932-2200

Specializing in IBM System/38
FRIEDMAN & ASSOCIATES, INC
[illegible] Wilmot Road
Deerfield, Illinois 60015
(312) 948-7160

Totally on-line order entry, complete manufacturing systems, MRP with on-line net change

- Fixed price software
- Including customizing
- Management consulting
- The team experience

We make it work!

SOFTWARE CONVERSION SOLUTIONS

Dataware provides the software translation system for your complex conversion problems. Over 15 years of conversion experience has resulted in thousands of satisfied customers, worldwide.

- COBOL to COBOL
- AUTOCODER/EPS to COBOL
- EASYCODER/TRAN to COBOL
- BAL/ALC to COBOL
- DOS/ALC to OS/ALC
- PL/1 to COBOL
- RPG/RPG II to COBOL
- RPG/RPG II to PL/1

Dataware offers services & software to meet your needs. For more information, call or write today.

The Conversion Software People
Datawareinc.
2565 Elmwood Avenue
Buffalo, New York 14217
Phone (716) 876-8728
TELEX: 91519

Sell Your Software in the Classified Pages of Computerworld

Call 800-343-6474 (or 617-879-0700) for more info.

SOFTWARE FOR SALE | SOFTWARE FOR SALE | SOFTWARE FOR SALE | SOFTWARE FOR SALE | SOFTWARE FOR SALE

IBM S/38 PAYROLL

- 99 COMPANYS
- 99 EARNINGS
- 99 DEDUCTIONS
- 401 (k)
- ALL STATE TAXES
- RPG III
- MENU DRIVEN
- ON-LINE
- EMPLOYER TAXES
- G/L DIST
- CHECK HISTORY
- DATA BASE

CIC

CONSOLIDATED INFORMATION CO.
177 POST STREET, SUITE 908
SAN FRANCISCO, CA 94108
(415) 433-5333

More IBM System/38 Users Are Choosing RTC Systems.

For technically superior software in a wide range of Financial, Manufacturing, Distribution and Management Business Systems.

The International Software Developers.

RTC Systems, Inc.

49 Plain Street
North Attleboro, MA 02760
(617) 695-9000

Elegant Software
for IBM S/34, 36 and 38

General Accounting	Payroll/Personnel
Financial Reporting	Property & Equipment
Accounts Receivable	Report Writer
Accounts Payable	Oil & Gas
Order Processing	All Systems are:
Inventory Management	RPG II/RPG III
Sales Analysis	Data Base
Job Cost	Interactive

J.D. Edwards & Company
4940 South Syracuse Street/Suite 5000
Denver, CO 80237
303/773-3732

Dallas — 214/ 458 9636
Houston — 713/ 880 8270
Northern California — 415/ 697 7764
Southern California — 714/751 6992

TIME & SERVICES

VAX 11/780 AND PDP-11 DEVELOPMENT TIME

NO KILOCORE TICK CHARGES / NO CPU CHARGES

Omnicomputer

$7/$14

RSTS/E VMS

PER HOUR CONNECT TIME

BUDGET BYTES™ 212-944-9230

Omnicomputer, Inc.
1430 Broadway, New York, N.Y. 10018

35 - 50% COST SAVINGS!

IBM 3033 full capacity - days, evenings, weekends in Western U.S.

SYSTEM DEVELOPMENT ON TSO/SPF

ISPF, COBOL, FORTRAN, PL/I, IMS, ADF, VSAPL and other aids.

MIGRATION HELP TO MVS OR A BIGGER SYSTEM

We can give you the computers and the technical help when you need it.

MODELING, PROJECTIONS, HEAVY BATCH

With VSAPL, ADRS, ADI, SAS, APE, GPSS, MPSX or your own programs.

PRIMDATA OF SWEDEN
44 Montgomery St., Suite 500
San Francisco CA 94104 - Tel. (415) 955-2612

COMPUTER TIME RENTAL
IBM 4331
DOS/VSE - ICCS
All Shifts Available
3370 Disk, 3420 Tape
Dual Density
1403-N1,
2540 Reader/Punch
Reasonable Rates
Contact: Al Palmo
Rentamatic Data Services
(212) 997-1411

COMMERCIAL DATA PROCESSING

4341-2 370/135-3

OS-DOS-VM/CMS
CICS-ROSCOE
REMOTE JOB ENTRY
CICS DEVELOPMENT
CUSTOMIZED SOFTWARE
XEROX LASER PRINTING

Contact Greg Gorab
(201) 777-3454
15 MINUTES FROM LINCOLN TUNNEL
ONE PASSAIC STREET
WOOD RIDGE, N.J. 07075

VAX/VMS TIMESHARE
5¢
$2 PER HOUR CONNECT TIME
ONE MB DISK STORAGE INCLUDED.
AVAILABLE NATIONWIDE VIA TELENET
LEASE-A-PORT™ WITH 10 MB DISK & NO CPU OR CONNECT CHARGES FOR $600 PER MONTH

MIDCOM CORPORATION
(714) 999-XX11
(213) 516-6060
(714) 999-6070

ICOTECH
Innovative Computer Techniques

COMPUTER SERVICES
IBM 3081 DEC-10
- Remote Job Entry
- Batch Processing
- Optical Mark Reading
- Online Processing
- Timesharing
- Laser Printing

COMPUTER OUTPUT MICROFILM
- Datagraphix Mini Auto-Comic
- Datagraphix Outsourcer
- 4250 DPI Capability
- Free Testing

Route 202
Raritan, NJ 08869
201-534-6153
Contact: Joyce Bagiamko

DISKETTE FILE CONVERSION
3740 8" DISKETTES to/from 5¼" PC-DOS DISKETTES
Fast Turnaround
Economical Rates
Accurate Processing
Call or Write for Information
New England Systems, Inc.
59 Interstate Drive
West Springfield, MA 01089
(413) 732-6744 - Dan Burnett

VIMAC
Venture Investment Management Company
12 Arlington Street
Boston, MA 02116
(617) 267-2786
Provides Equity Seed Capital to ENTREPRENEURS in the Computer Industry
Confidentiality Assured

COMPUTER TIME TIMESHARING
- We are time brokers.
- IBM timesharing our specialty.
- Also RJE & batch time.

Call John Rudder at
Computer Reserves, Inc.
(201) 666-5700

DEC
COMPUTER REPAIRS
DEC-DG-IBM PC
ALL BOARDS
1-2 WEEK TURNAROUND
90 DAY WARRANTY
MEMORIES
POWER SUPPLIES
ANY MANUFACTURER

DATA CENTER SERVICES

BURNS

CLASSIFIED ADVERTISING ORDER FORM

Computerworld's Classifieds work.

Issues Date: Ad closing is every Friday, 10 days prior to issue date.

Sections: Please be sure to specify the section you want: Time and Services, Software for Sale, Position Announcements and Buy/Sell/Swap. (Available upon request: Software Wanted, Business Opportunities and Real Estate).

Copy: We'll typeset your ad at no extra charge. Please attach CLEAN typewritten copy. Figure about 25 words to a column inch, not including headlines.

Cost: Our rates are $128.10 per column inch. (A column is 2" wide.) Minimum size is two column inches (2" wide by 2" deep) and costs $256.20 per insertion. Extra space is available in half-inch increments and costs $64.05. Box numbers are $15.00 extra.

Billing: If you're a first-time advertiser, (or if you have not established an account with us,) WE MUST HAVE YOUR PAYMENT IN ADVANCE.

Ad size desired:_____columns wide by_____inches deep.

Issue Date(s):_____

Section:_____

Signature:_____

Name:_____

Company:_____

Title:_____

Address:_____

Telephone:_____

Send this form to:

COMPUTERWORLD

CLASSIFIED ADVERTISING,

375 Cochituate Road, Box 880,
Framingham, MA 01701

Foreign Editorial/ Sales Offices

England: Terry Cartwright, EEC Publications, 196-200 Balls Pond Rd., London N1 4AQ. Phone: 01-359-3525, Telex: (851) 894085 (Computer Management, Computer Business Europe only).
Euan Rose, Bill Dunlop, Stephen Thomas, Beere Hobson Assoc., 345 Goswell Rd., Islington, London EC1V FHN. Phone: 01278 9415/6 (reps for all CWCI publications except Computer Management and Computer Business Europe).

W. Germany: Eckhard Utpadel, CW Publikationens, Friedrichstrasse 31, 8000 Munich 40. Phone: (089) 38172-0. Telex: 5215350.

France: Axel Leblois, Le Monde Informatique, 185 Avenue Charles De Gaulle, 92200 Neuilly Sur Seine, Paris. Phone: 758.14.14. Telex: 613234 F.

Japan: Mr. Shuji Mizuguchi, Computerworld Japan, 7-4 Shintomi 1-Chome, Chuo-ku, Tokyo 104. Phone: (03) 551-3882, Telex: 252-4217 (Computerworld Japan only).
H. Kajiama, Tokyo Representative Group, Yamaguchi Bldg., 2-12-9 Kanda Jimbo-cho, Chiyoda-ku, Tokyo 101, Phone: (03) 230-4117/8, Telex: J26860 (reps for all CWCI publications except Computerworld Japan).

Australia: Alan Power, Computerworld Pty. Ltd., 37-43 Alexander Street, Crows Nest, NSW 2065. Phone: (02) 4395133, Telex: AA74752 COMWOR.

Brazil: Eric Hippeau, Data News, Computerworld do Brazil, Servicos e Publicacoes Ltda., Rua Alcindo Guanabara, 25/10th Floor 20031 Rio de Janeiro, RJ Brazil. Phone: (021) 240-8225. Telex: 2130838(WORD BR).

Mexico: Richard Small, Computerworld de Mexico, Oaxaca 21-2, Colonia Roma, Mexico City 7 D.F. Phone: (905) 514-4218, (905) 514-6309. Telex: 1771300 ACHAME, 1777809 ACHAME.

Spain: Neil Kelley, Computerworld/Espana, Gravina, 13, Madrid 4. Phone: 231-23-85; 231-23-86; 231-23-88. Telex: 47894(CW E).

Denmark: Preben Engell, Computerworld/Denmark, Gammel Strand 50, 1202 Copenhagen K. Phone: 01-1234-11. Telex: 27566 cwden.

Sweden: Bengt Mannfeldt, Computerworld/Sweden, Nova Media AB, Vartavagen 55, 11538 Stockholm. Telex: 8105099 NOVACW.

The Netherlands: Johannes A. Wibrost, Mgr. Dir., Computerworld Benelux, Van Eeghenstraat 84, 1071 GK Amsterdam. Phone: 020-646428. Telex: (844) 18242.

Italy: Daniele Comboni, Gruppo Editoriale Jackson, s.r.l., Via Rosellini 12, 20124 Milano.

Argentina: Ruben Argento, Gen. Mgr., Computerworld Argentina, Av. Belgrano 406-Piso 9, CP 1092 Buenos Aires. Phone: 34-5583/5584.

Norway: Mr. Per Sorvefjord, Editor, CW Norge A/S, Hovinveien 43, P.O. Box 2862, Toeyen, Oslo 6. Phone: 2/647725. Telex: (856) 76476

Singapore: Mr. David Naidu, General Manager, Asia Computerworld, Pte. Ltd., 11-08/11-10 Goldhill Plaza, Newton Road, Singapore. Phone: 250-444. Telex: (786) RS 37003

Saudi Arabia: Mr. Omar Dusuki, General Manager, Saudi Computerworld, P.O. Box 5455, Jeddah. Phone: 6675916/6680380. Telex: (926) 401205.

ADVERTISERS INDEX

Apple 15
American Telephone & Telegraph 72-75
Applied Data Research 3
Applied Software 24
Artificial Intelligence 48
A.S.T. Research 28
Attachmate 83-86
Automated Training Systems 84

BMS Computer Corp. 9
BOS Systems, Inc. 89
John Beall 87
B I Boyle Associates, Inc. 85
Burroughs 47
Burroughs ID/14

CGA Software ID/15
Cadax Corp. 42-43
Caliber Jacksen 81
Cambridge 20
Comdisco 13
Compact 82
Compaq 22
Computer Power Systems 23
Compsyst 72
Confidential Resources 26
Convergent Resources 41
Corvalis 45
CS Computer Collect 44
CW France 94
CWTech 106,107
CW Supplement 108

Data Access 16
Data Decisions 96-97
Datapro Reports 10,77
DEC Datapro Reports 61
Datrek 87,ID/4,98
Digital Consulting Associates 105
Digital Controls Corp. 12
Digital Research 30-31
Direct Marketing Systems 36
Dorian 72
Dragstone Systems 53

EPS Inc. 36
Equitable Life Leasing 83
Exercom 83

Fiberlan 24,60
Florida Data Corp. 77
Forte Data Systems, Inc. ID/2
Fusion Products 81

Gartner ID/6
General Electric 33
Goal Systems International ID/13

Hayes Microcomputer 78
Hogan Associates 78

Information 87
Information Science, Inc. 40-41
Innovation Data Processing 5
Innovative Training Systems 96

JDM Electronics 104

Keytronic 98

J.W. Lampl, Inc. ID/14
Lawson Associates 18
Lee Data Corp. 32
Levi, Ray & Shoup 108
Local Data 8

MI Company 89
Mathematica 19
McCormack & Dodge 100
Microlabs 98-99
Micro Focus 66
Microsoft 35
MSA 100-101

Mantech 96
New Generation Software ID/16
Northern Telecom 90-91

On-Line Software 88,ID/8
Oregon Software 102
Oxford Software 94

Panasonic Systems 62

QED Information Sciences 86
Quasa 91

Raytheon Data Systems 50-51
Readsoft Corporation 61
R.L. Roger 104
Ross Systems 92

SAS Institute ID/5-ID/9
SDI 52
SET 104
Signal Technology, Inc. 3,47
Software Automation ID/10
Software Results 52
Sperry Corp. 29
Starlex Systems 54
Syncsort 7
Synod 18

Tandon 30-31
Technology Transfer 17
Teletype Corp. 70
Teradata ID/11
Tone Software 61
Topaz Inc. 64
Trax Softworks, Inc. ID/2

Universal Data Systems ID/7
Up-Time Systems 56

Vision Software 104
VIS Software, Inc. 88

Wang Laboratories 10-11

This index is provided as an additional service. The publisher does not assume any liability for errors or omissions.

Computerworld Sales Offices

Vice-President/Sales/Donald E. Pagan
Director/National Sales/Edward P. Marecki
Marketing Support Manager/Kathy Doyle
COMPUTERWORLD, 375 Cochituate Road, Box 880,
Framingham, MA 01701
(617) 879-0700

BOSTON SALES OFFICE (617) 879-0700
Northern Regional Director/Chris Lee
District Managers/Jim McClure, Ronald Masters,
Jayne Donovan, Michael F. Kelleher
Sales Assistant/Alice Longley
COMPUTERWORLD, 375 Cochituate Road, Box 880,
Framingham, MA 01701

CHICAGO SALES OFFICE (312) 827-4433
District Managers/Arthur Kossack, Russ Gerchak
Sales Assistant/Jean F. Broderick
Northern Regional Director/Chris Lee
COMPUTERWORLD, 2600 South River Road, Suite 304,
Des Plaines, IL 60018

NEW YORK SALES OFFICE (201) 967-1360
Eastern Regional Director/Michael J. Masters
Senior District Manager/Doug Cheney
District Managers/Ray Costin, Joan Daly, Fred La Sapio
Sales Assistant/Gale M. Polsino
COMPUTERWORLD, Paramus Plaza I,
140 Route 17, North, Paramus, NJ 07652

LOS ANGELES SALES OFFICE (714) 261-1230
Senior District Manager/Bob Hubbard
District Manager/Bernie Hockswender

Western Regional Director/William J. Hadley
COMPUTERWORLD, 18008 Sky Park Circle, Suite 260,
Irvine, CA 92714

SAN FRANCISCO SALES OFFICE (415) 421-7360
Western Regional Director/William J. Hadley
Senior District Manager/Barry Milkins
District Managers/Theadora Pardon, Brent Chamberlain
Account Manager, Classified/Nicole Bookman
COMPUTERWORLD, 300 Broadway, Suite 20,
San Francisco, CA 94133

ATLANTA SALES OFFICE (404) 394-0758
District Manager/Jeffrey Mallett
Eastern Regional Director/Michael J. Masters
COMPUTERWORLD, 1800 Peeler Road, Suite D,
Atlanta, GA 30338

CLASSIFIED ADVERTISING (617) 879-0700
Al Dabilis
COMPUTERWORLD, 375 Cochituate Road, Box 880,
Framingham, MA 01701

CW INTERNATIONAL MARKETING SERVICES
General Manager/Claire Le Munglin
COMPUTERWORLD, 375 Cochituate Road, Box 880,
Framingham, MA 01701
(617) 879-0700
Manager, West Coast/Peter Crockett
COMPUTERWORLD, 1060 Marsh Rd.,
Menlo Park, CA 94025
(415) 328-8084

CW COMMUNICATIONS/INC.
Board Chairman/Publisher
Patrick J. McGovern
President
W. Walter Boyd
Senior Vice-President
Lee Vollmer

Group VP-Communication Services, Jack Edmonston. Group VP-Circulation, Margaret Phelan. VP-Marketing, Donald E. Pagan. VP-Finance, William P. Murphy. VP-Editorial, John Whitmore.

Computerworld Headquarters: 375 Cochituate Road, P.O. Box 880, Framingham, MA 01701
Phone: (617) 879-0700, Telex: 95-1153.

SALES: Vice-President, Donald E. Pagan. National Director, Edward P. Marecki. Corporate Advertising Administrator, Frank Collins. Marketing Support Manager, Kathy Doyle. Display Advertising Supervisor, Anne Hadley. Display Advertising, Deborah Dyer, Pam Valentinas, Elaine Caton, Carolyn Medeiros, Cindy Chaigas, Mary Waddick. Classified Operations Manager, Cynthia Delany.

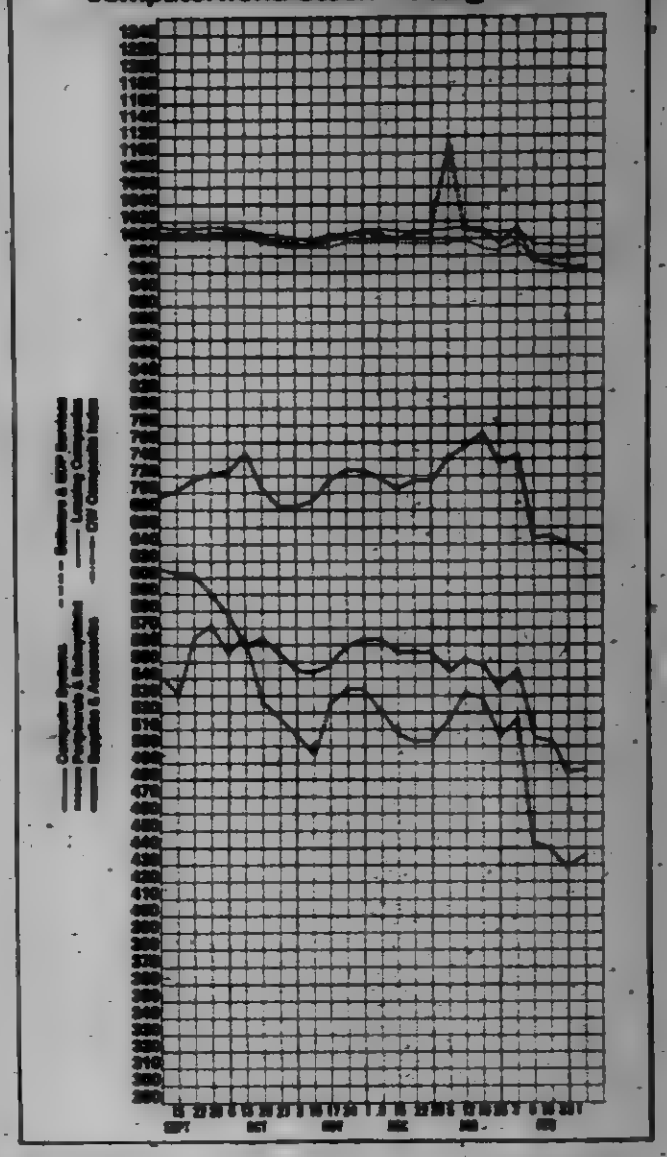
COMMUNICATION SERVICES: Group Vice-President, Jack Edmonston. Director Research, Kathryn Dimeck. Sales Promotion Director, Liz Johnson.

PRODUCTION: Production Director, Peter Hoin. Production Manager: Marlene Sokol. Paste-Up Manager, Trish Gaudette. Systems Manager, Tom Pilla. Typesetting Manager, Carol Polack. Art Director, Tom Monahan. Graphic Designer, Hank Ring.

CIRCULATION: Group Vice-President, Margaret Phelan. Circulation Manager, Jane Duxbury. Fulfillment Manager, Maureen Burke.

Computerworld can be purchased on 35 mm microfilm through University Microfilms Inc., Periodical Entry Dept., 300 Zeeb Rd., Ann Arbor, Mich. 48106. Phone (313) 761-4700. Computerworld's network calls to Circulation Dept. for subscription information.

Computerworld Stock Trading Index



Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, FEBRUARY

All statistics compiled computed and formatted by TRADE QUOTES, INC., Cambridge, Mass. 02139

	1983-84 RANGE	PRICE CLOSE FEB 29	NET CHANGE	WEEK PCT CHANGE
COMPUTER SYSTEMS				
ALPHA MICROSYSTEMS	11- 29	13	- 1/2	-3.7
ALTOS COMPUTER SYST	6- 88	8 1/2	0	0.0
AMDAHL CORP	9- 39	37	+ 3/4	+2.6
APPLE COMPUTER INC	18- 63	38 1/8	-1 1/8	-2.1
AT&T	17- 70	58 7/8	0	0.0
BURROUGHS CORP	50- 79	63	0	0.0
COMPUTER AUTOMATION	6- 17	8 1/2	+1 1/8	+12.4
COMPUTER CONSOLES	9- 38	25 3/4	+ 1/8	+0.5
CONTROL DATA CORP	21- 62	38 3/8	+1 1/8	+2.5
CONVERGENT TECHNOL	15- 41	17 1/8	+2	+13.1
CRAY RESEARCH INC	20- 58	43 1/2	+1 3/8	+3.0
DATA GENERAL CORP	18- 67	62 3/4	+ 3/8	+0.6
DATAPOINT CORP	11- 38	23 1/8	+2 3/8	+7.9
DIGITAL EQUIPMENT	82-132	94 7/8	+3 3/4	+2.1
EECO INC	8-	14	+1 3/8	+10.8
ELECTRONIC ASSOC.	5- 15	9 7/8	+ 1/8	+1.1
FLOATING POINT SYST	18- 44	18 7/8	-1 1/8	-5.6
FOXBORO	22- 47	38 7/8	0	0.0
GENERAL AUTOMATION	3- 15	10 3/8	+ 1/8	+2.5
GERBER INC	28- 44	38 3/4	+1 1/4	+3.3
HARRIS CORP	24- 61	28 3/8	-6 3/8	+19.4
HEWLETT-PACKARD CO	22- 46	36 3/8	- 1/4	-0.7
HONEYWELL INC	38- 68	51 3/8	-8 3/8	-8.1
IBM	97-134	110 4/8	+1 1/8	+1.0
IPL SYSTEMS INC.	2- 14	3 1/4	+ 1/2	+18.8
KAY-CEE INC	14- 38	14 1/8	+ 3/8	+2.7
MAGNUSON COMP SYSTS	1- 3	3/8	0	0.0
MANAGEMENT ASSIST	7- 25	20 3/8	+ 7/8	+3.8
MATERIALITA ELEC(ADR)	47- 88	78 1/4	+ 3/4	+0.9
MODULAR COMPUTER SYS	8- 16	7 3/4	+ 1/8	+1.6
MOHAWK DATA SCI	16- 18	10 3/8	+ 1/2	+4.8
MOTOROLA INC	82-140	116 1/2	+3 1/2	+3.1
NAT'L SEMICONDUCTOR	13- 60	13 3/8	+ 5/8	+4.8
NBI INC	21- 91	22 3/4	+ 1/8	+0.5
NCR	39-138	105 3/8	-1 3/8	-1.2
PERKIN-ELMER	17- 37	27 1/2	+1 1/2	+5.7
PRIME COMPUTER INC.	11- 36	17 3/4	+ 7/8	+5.0
SPERRY CORP	21- 50	41	+1 1/4	+3.1
TANDEM COMPUTERS INC	10- 46	30	+2	+6.2
TRIDY CORP	31- 68	31 3/8	- 3/8	-1.1
TELEVIDEO SYSTEMS	11- 61	12 3/8	+ 5/8	+5.3
TELXON CORP	9- 18	8.	+ 1/8	+1.4
TEXAS INSTRUMENTS	75-170	128 1/2	+2 1/8	+1.4
ULTIMATE CORP	8- 24	18 7/8	+ 3/8	+2.4
VECTOR GRAPHICS INC	3- 14	1 3/4	- 1/8	-6.6
WANG LABS "B"	13- 46	28 3/8	+1 1/4	+4.6
WANG LABS "C"	11- 42	27 3/4	+ 1/8	+0.5
XEROX CORP	30- 92	41 1/8	- 3/4	-1.7
LEASING COMPANIES				
ADDTHE FINANCIAL CP	11- 38	38 3/4	+4	+11.3
CORDISCO INC	7- 62	12 3/4	+1 1/2	+13.3
CONTINENTAL INFO SYS	9- 16	8 3/4	0	0.0
DPF INC	9- 19	12 3/4	+ 3/8	+3.1
SELECTRON INC	13- 21	12	0	0.0
U.S. LEASING	18- 47	28 1/2	- 3/8	-1.2
COMPONENTS				
ADVANCED MICRO DEV	13- 37	28 1/4	+ 3/8	+1.3
ADV'D SEMICONDUCTOR	12- 38	23 1/8	- 1/2	-1.6
ANALOG DEVICES INC	18- 42	36 3/8	0	0.0
ANALOGIC CORP	18- 27	18 1/4	+ 1/2	+2.8
APPLIED MAGNETICS CP	16- 37	18 1/2	- 1/2	-2.6
TERADYNE	16- 38	27 3/4	- 1/2	-1.7

[FOOT: A=NEW YORK; B=AMERICAN; P=PACIFIC; O=OVER-THE-COUNTER; I=INTERNATIONAL; N=INTEREST; O=OVER-THE-COUNTER
B-Y-C PRICES ARE BID PRICES AS OF 3 P.M. ON LAST BID
(1) TO NEAREST DOLLAR

	1983-84 RANGE	PRICE CLOSE FEB 29	NET CHANGE	WEEK PCT CHANGE
SOFTWARE & DP SERVICES				
ADVANCED COMP TECH	1- 8	3 1/4	- 1/4	-7.1
ADVANCED SYSTEMS INC	6- 22	10 1/2	- 1/2	-3.1
AGS COMPUTERS, INC	7- 32	22 1/4	-1 3/8	-5.8
AMERICAN SOFTWARE	10- 23	19 3/4	- 3/4	-3.7
BANCOMP INC	1- 3	3	- 1/8	-2.4
ANALYSTS INTL CORP	4- 20	7	- 1/4	-3.4
APPLIED DATA RES.	9- 31	24 7/8	- 1/8	-0.5
AQS COMPUTER SYSTEMS	8- 21	13 1/4	+1	+7.8
AUTOMATIC DATA PROC	21- 44	32	+ 3/4	+2.3
AUTOMATIX DATA PROC	21- 44	32	+ 3/4	+2.3
CDA COMPUTER ASSOC	5- 17	11 3/8	+ 7/8	+8.0
COMPUTER ASSOC INT'L	6- 35	18 1/2	-1 1/8	-5.8
COMPUTER HORIZONS	8- 28	18 3/8	+ 1/8	+1.1
COMPUTER NETWORK	4- 16	8 3/4	+ 1/8	+1.8
COMPUTER SCIENCES	31- 72	51 3/8	+ 1/8	+0.8
COMPUTER TASK GROUP	2- 22	12 1/4	- 1/4	-2.0
COMPUTER VISION	2- 22	7 3/4	+1 3/4	+29.7
COMPUTING SYSTEMS	2- 30	8 1/8	0	0.0
COMPTEK COMP	1- 10	5 7/8	0	0.0
COMSHARE	7- 14.	8	- 7/8	-9.8
CULLINET SOFTWARE	12- 36	20 7/8	-2	-8.8
CYCARE SYSTEMS INC	8- 27	17 1/2	- 1/8	-1.4
ELECTRONIC DATA SYST	18- 62	33 1/2	-1 7/8	-5.8
GENDAN SYSTEMS INC	10- 27	14 1/2	- 7/8	-5.8
GENERAL ELECTRIC CO	47- 70	52	0	0.0
GTE CORP	38- 48	38 1/8	+2 1/2	+7.0
INFORMATICS INC	10- 36	20 1/4	- 3/8	-1.8
INFOTRON SYSTEMS COR	23- 43	31	+3 3/8	+13.7
KEANE ASSOCIATES	4- 13	8	0	0.0
LOGICON	9- 31	26 1/2	+1	+3.9
MCI COMMUNICATIONS	9- 36	8 1/2	- 1/4	-2.9
MDBT SCI AMER INC	3- 10	17 1/4	0	0.0
MATHEMATICAL APP GRP	3- 11	8 1/2	+ 1/2	+6.2
MICOR SYSTEMS INC	13- 30	26 1/2	-1	-2.8
MINICHIP-WEBER CP	6- 32	8 1/2	+1	+11.7
NATIONAL DATA CORP	9- 38	18 1/4	+ 1/2	+2.8
ON-LINE SOFTWARE INT	10- 27	16	-2 1/2	+29.9
PANASONIC SYSTEMS	4- 20	12	-3 1/2	-21.2
PLANNING RESEARCH	8- 21	13 1/2	+ 1/8	+1.8
PRICE WOMT SYSTS CP	12- 38	26 3/4	+ 3/4	+3.1
PURCHASING & SYS	1- 4	4 7/8	0	0.0
REYNOLDS & REYNOLD	17- 57	39 3/4	- 1/4	-0.7
SCI CORP	11- 34	19 1/2	- 1/4	-1.8
SHARED MEDICAL SYST	15- 43	27 1/2	+ 3/8	+2.3
SCIENTIFIC COMPUTERS	6- 14	10	+ 1/4	+2.5
SOFTWARE AG	9- 17	16 3/8	- 7/8	-7.8
TYMSHARE INC	12- 30	24 1/8	+10 3/8	+75.4
UMS CORP	5- 18	13 1/8	+ 3/8	+2.9
VALY CORP	7- 17	8 1/8	- 1/2	-5.1
PERIPHERALS & SUBSYSTEMS				
AM INTERNATIONAL	2- 7	3 1/2	+ 3/8	+11.7
ANDERSON JACOBSON	7- 38	9 1/8	+ 3/8	+4.3
AUTO TOOL TECHNOLOGY	0- 20	10 3/8	+ 7/8	+9.7
AMNETICS INC	7- 28	10	0	0.0
DEVICE INT'L	6- 19	8 3/4	+ 1/8	+1.8
DALY, DESMARAIS & ASS	2- 16	10 3/8	+1 3/8	+7.9
CANNEY CORP	1- 4	1 3/8	0	0.0
CENTRONICS DATA COMP	8- 28	12 3/8.	+ 3/8	+3.1
CITEC CORP	8- 12	7 3/8	- 1/8	-1.6
COMPUTRONICS	2- 20	8 1/2	0	0.0
COMPUTER DEVICES INC	1- 21	3 1/8	0	0.0
COMPUTER TRANSDUCER	3- 12	3 1/8	0	0.0
COMPUTERVISION CORP	10- 33	24 1/4	+ 3/8	+1.6
COMTEC CORP	19- 38	28 1/2	+ 1/2	+1.8
DATAPRODUCTS CORP	10- 41	22 1/2	-1 1/8	-4.7
DATAMEN CORP	9- 12	8 3/8	- 3/8	-3.8
DATA SWITCH CORP	13- 41	21 3/8	- 3/8	-1.8
DATUM INC	2- 17	7	- 3/8	+0.0
DECISION DATA COMPUT	3- 16	3 1/8	- 1/8	-3.8
DOCUTEL-OLIVETTI	6- 28	8	- 3/8	+0.6
ELECTRONIC M S H	3- 10	6	- 1/4	-3.8
EVANS & SUTHERLAND	17- 38	18	+1	+0.2
GANDALF TECHNOLOGIES	9- 22	11	0	0.0
GEN'L DATA COMM IND	9- 28	28 1/8	-1	-3.6
GRAY SOFTWARES INC	1- 6	1	+ 1/8	+33.3
HAZELTINE CORP	9- 31	20 1/4	+1	+24.8
ICOT CORP	1- 29	3 1/2	- 1/8	-3.6
INFORMATION INTL INC	19- 32	21 3/4	0	0.0
INFORMATION SCIENCE	10- 17	10	+1 1/2	+17.6
INTEL CORP	11- 43	37 1/4	+4	+12.0
IPL SYSTEMS INC	2- 14	3 1/4	+ 1/2	+18.8
LANDY ELECTRONICS	7- 18	8 1/2	+ 1/2	+6.3
LOGISDATA CORP	6- 18	8 1/2	- 1/2	-5.8
MDI DATA CORP	18- 37	17	- 1/4	-1.4
MOHAWK CORP	9- 28	21 3/8	+ 3/8	+1.7
NETWORK SYSTEMS CORP	9- 34	18 7/8	+ 3/8	+1.8
NV AMERICAN PHILIPS	67- 78	68 1/8	+ 3/8	+0.1
NORTHERN TELECOM LTD	23- 48	38	- 1/8	-0.3
OMEX	1- 8	1/4	-1	-80.0
PARADYNE CORP	13- 38	13 7/8	- 7/8	-6.7
PERKIN CORP	7- 16	12 1/8	+ 3/8	+3.1
PHOENIX AMERICAN INC	7- 17	8 1/2	0	0.0
PLESSEY CO (ADR)	38- 61	32 1/2	+1 1/8	+3.6
PRINTRONIX INC	20- 34	26	+1	+4.3
QUANTEX CORP	9- 28	8 1/2	+ 3/4	+9.8
RAYTHEON CO	29- 58	38 3/8	0	0.0
RECOGNITION EQUIP	4- 17	12 1/8	+ 3/8	+3.1
RELA CORP	25- 68	38	+ 3/4	+2.0
SANDERS ASSOCIATES	25-130	37 3/4	+1 7/8	+5.2
SCAN DATA	1- 3	3/8	0	0.0
SCAN-TRON CORP	12- 18	15 3/4	+ 1/2	+3.3
SCIENTIFIC ATLANTA	12- 33	12 3/8	- 1/2	-3.8
STORAGE TECHNOLOGY	11- 33	13 1/4	+ 1/8	+0.9
SYKES DATATRONICS	3- 13	3 7/8	+ 1/8	+3.4
SYSTEMS & COMP TECH	20- 38	32	+2	+10.0
T BAR INC	7- 17	8 7/8	- 1/8	-1.3
TAB PRODUCTS CO	8- 24	22 3/8	+ 1/2	+2.3
TANDON CORP	14- 38	16 1/8	0	0.0
TDC INC	8- 12	8 1/4	- 1/8	-2.9
TELETRONIX INC	24- 67	38 1/2	-7	-11.9
TELEX	9- 32	21	+1	+10.0
TERADATA SYSTEMS CP	3- 17	7	+1 1/2	+27.2
TIMEPLEX INC	7- 29	17 7/8	+1 1/8	+11.7
VISUAL TECHNOLOGY	9- 38	12 3/8	- 1/8	-1.0
SUPPLIES & ACCESSORIES				
AMERICAN BUS FORMS	3- 10.	10 1/8	+ 1/8	+0.8
BARRY WRIGHT	13- 33	28 1/2	+ 3/8	+2.0
BURPEE PRODUCTS INC	12- 27	20	+ 3/8	+3.2
CHRIS CRAFT	6- 28	18 3/8	-1	-5.0
DM COMPANY	46- 88	38 3/8	-2 1/8	-5.0
FORMS CORP LTD	20- 31	26	- 1/2	-1.9
STANDARD REGISTER	11- 34	28 1/2	0	0.0
WALLACE BUS FORMS	11- 28	28 7/8	+ 1/8	+0.3

IF YOU WANT THE BEST APPLICATIONS DEVELOPMENT TOOL, TALK TO THE PEOPLE WHO DEVELOP THE BEST APPLICATIONS.

Of all the applications development tools ever designed, only one has the proven success of our new Millennium SDT.

Because Millennium SDT was designed by McCormack & Dodge, a company with over a decade of proven success developing applications. Business applications used in over thirty countries. By the world's biggest and most demanding corporate clients.

M & D design teams have developed everything from accounts payable to payroll/personnel software. Recently, they've won industry acclaim for developing the only family of systems on the market with a genuinely borderless environment. The Millennium series.

What made the Millennium series possible was our discovery of Millennium SDT, a remarkable tool based on a remarkable truth: eighty percent of the functions in all applications are, in fact, generic. Which means that 80% are reusable.

This discovery allowed us to vastly simplify and accelerate our entire systems development process. Tasks that once took months suddenly took days. And we were able to bring a breakthrough product line to the marketplace well ahead of our competition.

If Millennium SDT revolutionized our systems development process, think of what it can do for yours. You'll make more efficient use of your data processing resources than you ever thought possible.

And just to give you an idea of how fast our applications development tool works, we've included your first application in this ad. All you do is find the dotted lines, fill in the requested information, mail the completed form, and wait for the postman to bring a packet of important information. And, if you're in a real hurry, call 1-800-343-0325.

Soon your backlog will begin to disappear. You'll be a Millennium ahead.

START WITH THIS APPLICATION.

Name and Title _____

Company _____

Address _____

City _____ State _____ Zip _____

IBM Mainframe Model _____

WHEN YOU THINK ABOUT TOMORROW, MILLENNIUM MAKES SENSE TODAY.

McCormack & Dodge

a company of The Dun & Bradstreet Corporation

McCormack & Dodge Corporation, 1225 Worcester Road, Natick, MA 01760
Sales and support offices throughout North and South America, Europe, Asia, Australia and Africa. 800-343-0325. Telex: 710-325-0529

VOL 18
ISSUE 11
MR 12 1984
UMI

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

COMPUTERWORLD

$2.00 A COPY; $44/YEAR | MARCH 12, 1984 | VOL. XVIII, NO. 11

In Depth
When to modify software/17

Unix muscle
Jack Scanlon talks about AT&T's plans/3

Black holes
Supermini may shed some light for astronomer Stephen Hawking/23

CB
NI4810GUIVYNUIVYM FCWG
UNIVERSITY MICROFILMS
SERIAL PUBLICATIONS
300 N ZEEB RD

NEWSPAPER

Amdahl unleashes 3380 alternative

By Robert Gelt
CW West Coast Bureau

SUNNYVALE, Calif. — Users searching for an alternative to IBM's 3380 storage device were given a boost last week when Amdahl Corp. announced two additions to its 6000 series disk drives.

The 6380, a direct-access storage device, is manufactured by Fujitsu Ltd. and is based on the Japanese manufacturer's new Eagle 2 head disk assembly technique.

Amdahl announced two 6380 models: the Model AA4, which incorporates the firm's 6880-G2 storage control unit, and the Model B4, which is a slave disk drive. The 6380 can store up to 2.5G bytes of data on four head disk assembly units. One Model AA4 can accommodate three Model B4 units for a total capacity of 10G bytes, the vendor said.

The 6380 is said to offer 15% more performance per dollar than its IBM rival, with twice as many actuators per 1G byte. In addition, with an average seek time of 15 msec, the 6380 is said to give a 7% faster response time than the IBM product. The IBM 3380 Model AA4 has a storage capacity of 2.56G bytes, can transfer data at rates up to 3M byte/sec and costs $96,640. Aqdahl's 6380 Model AA4 costs $81,300.

In other developments involving Amdahl:

■ *Fujitsu Ltd. dramatically increased its stake in Amdahl, giving it what observers believe is de facto control of the American company. Page 5.*

■ *Amdahl announced attached and dual-processor versions of its 5860 CPU. Page 6.*

Designed for systems that process sequential, large block-size applications, the 6380, like the smaller 6280, works with the Amdahl 470 and 580 series and compatible mainframes. It runs under IBM's MVS and VM operating systems and supports IBM's Airline Control Program in Extended Architecture environments. The unit supports other system software that operates with 3380-format devices, the vendor said.

The 6380 contains a feature called Dynamic Extended Pathing which, according to Amdahl officials, improves throughput and channel use by allowing for two transfer paths to the data. This, the vendor said, means that if access to data is interrupted because of a channel, storage director or controller malfunction, the disk enclosures in the string are still accessible through the second controller-director-channel path. The 6380 has a data transfer rate of 3M byte/sec.

The DXP feature is also said to provide the interface for dynamic path selection and support for dynamic reconnection when operating in IBM 370 XA environments.

The 6280 stores data in four sealed disk

See AMDAHL page 4

TOP OF THE NEWS

On the road again: *Computerworld* covers the Bank Administration Institute's Bank Security Conference (Pages 7 and 9); the EDP Performance Management Conference (Pages 10-11); the Info Users Group National Conference (Pages 14-16); the Videotex Industry Association Security Conference (Page 17); and International Data Corp.'s Information Industry Briefing Session (Pages 18, 19 and 22).

■

Ready, set — stop . . . Analysts International Corp. pulled its application generator out of a beta site after tests found that users are not ready to shoulder the development burden. Page 2.

■

And stop again . . . Trilogy Ltd. again pushed back the target shipment date for its planned IBM-compatible processor. Page 13.

■

Guilty, said National Semiconductor Corp. to charges it had falsely certified the testing of microcircuits supplied to the U.S. government. Page 14.

■

Japanese telecommunications equipment will flood the U.S. market in the wake of the AT&T breakup, a recent report contends. Page 72.

■

Rumors are flying again that IBM will bring out a new tape drive to replace its aging 3420. Page 79.

■

Comparison shopping for mices? Allegiance to your mainframe vendor has its advantages, attendees at a recent seminar were told. Page 80.

■

Applications execs paid most

By James Connolly
CW Staff

WILLOW GROVE, Pa. — The highest paid systems and data processing employees in the U.S. in 1983 were applications programming managers, with average salaries of $38,700, according to a survey conducted by the Administrative Management Society based here.

Applications programming managers' salaries rose 7.5% over 1982 figures, helping those managers to surpass software systems programming managers, whose average salaries rose 5.8% to $38,200 from the 1982 high of $36,100.

The survey of 2,585 companies, with 60,218 systems and processing employees in 108 U.S. and Canadian cities, showed that the lowest U.S. salaries were in the West Central U.S., an area ranging from Wisconsin to Kansas. The Eastern U.S., the East Central U.S. area from Ohio to Illinois and the Western U.S. tended to have the highest salaries, according to the report.

The second annual AMS survey showed that software systems programming managers led the salary field in Canada with an average of $42,200 (Canadian) for a 9% gain, followed by applications programming managers at $41,200, up 7.3%.

The 44-page report covered 20 positions in computer operations, data entry operations, software systems programming and data base management and their salaries as of Sept. 16.

See SALARY page 2

FYI

'Riser congestion': a cabling nightmare

By John Gix
CW Staff

Take a glance at the back of any mainframe computer, and you will come face to face with the wire Hydra that is to blame for the cabling nightmares many companies are experiencing.

Installing wire or cable to support new or relocated computer equipment on multiple floors within an organization is growing increasingly difficult because the space in the vertical cable shafts, or risers, in some buildings is becoming scarce.

Bill Orlando of MPL Systems, a data communications consulting firm in Wayne, N.J., said that the vertical risers in more than 50% of the buildings he encounters are nearly filled to capacity.

Part of the problem stems from old wire and cable left in place when no longer in use, from the frequent relocation of equipment and from the rapid growth in the number of terminals and other end-user devices being installed.

Another factor contributing to riser congestion is that when users isolate an equipment malfunction as cable-related, it is usually impractical — given the lack of wiring documentation and the labor involved — to track the problem down and fix it, Orlando said. Instead, a new cable is pulled.

To remove the need to go into the vertical risers to wire for new or moved equipment, Orlando often recommends that an organization centraline its terminal controllers on a floor that is roughly in the middle of its building. These controllers are then at-

See WIRES page 8

NEWS

Vendor pulls application generator out of beta test

By Paul Gillin
CW Staff

MINNEAPOLIS — End users just may not be ready to develop their own applications, something Analysts International Corp. found out the hard way.

The consulting and programming service company recently announced that it has pulled its Corvet application generator out of beta testing after deciding that "additional features and testing would enhance the marketability of the product."

The decision, which company officials said would force Analysts International to show a loss in 1984, was made after beta-site experience showed that the company had erred in identifying the final audience for the tool. "We found that although users were influencing the sales cycle, it was programmer/analysts rather than systems analysts who would use it," said Victor Benda, executive vice-president of Analysts International. "This was unexpected."

Announced last May (CW, May 9), Corvet was billed as an IBM mainframe-based application generator that would "enable nonprogrammers to develop full production applications without intervention from the management information systems staff until the final stages." The product made extensive use of menus and prompts to guide the user through data definition, I/O and screen design. "We were trying to construct a product that was a next step [in application development]," Benda said.

However, the feedback the company received from the initial beta site indicated that the product was being used mostly by professional programmers. "We found most comments were programming-related," he said. "Some were almost phrased in Cobol terms."

Faced with the risk of creating user dissatisfaction, Analysts International decided to withdraw Corvet, "try to back down a little and compromise with the technical people," Benda said. Among the steps the company has taken are reducing some table-handling features and adding facilities for writing Cobol routines within Corvet applications. Analysts International has also contracted with a larger company site for its next beta-test stage.

Corvet-related expenses will force Analysts International to show a loss in 1984, although revenues could exceed the record $27.6 million earned in 1983, officials said. Rumblings about the beta-test difficulties initiated a slide in Analysts International stock on the over-the-counter market from $12.75 on Jan. 18 to $7 at the end of last month.

Benda said Analysts International has not altered its commitment to Corvet and that a new version will be available sometime in the second half of 1984. "The words are still good about the product, but maybe we took too dramatic a step," he said.

MSA inks agreement with NCR

ATLANTA — Management Science America, Inc. (MSA) last week announced an agreement with NCR Corp. which will make four major MSA applications available on NCR mainframes by early next year.

The announcement is MSA's third in the last two years with a major hardware supplier. In addition to the IBM mainframe market, the company also offers applications on Honeywell, Inc. and Sperry Corp. mainframes.

The latest agreement provides for NCR to modify and adapt current MSA software and future enhancements to run in the NCR environment, an MSA spokesman said. The companies will share responsibility for various other development, marketing and support activities.

MSA software will be made available for NCR 8500 and 8600 series mainframes under NCR's VRX operating system. The initial on-line applications to be ported to the new hardware include MSA's general ledger, payroll/personnel, accounts payable and budgetary control system, the spokesman said.

A joint development team will keep NCR customers informed on regulatory changes and enhancements to both the MSA software and the VRX operating system, the spokesman said.

Software sales, support and training will be handled by MSA at 3445 Peachtree Road N.E., Atlanta, Ga. 30326.

SALARY from page 1

Data entry employees, with U.S. salaries ranging from $12,300 for operators to $19,700 for supervisors, and computer operations support staff, with salaries ranging from $14,200 to $14,600, remained the lowest paid of the 20 positions.

Other managers were supervisors of computer operations, up 5.7% to $35,000, and data base administrators, up 7% to $35,000. More than 91% of the employees in the U.S. involved were nonunion, and more than 84% of the employees in Canada involved were nonunion.

The companies reported that they tended to provide compensatory time off in exchange for overtime and that they seldom gave hiring bonuses to recruits. The most commonly reported sources for recruits were newspaper advertisements, personnel agencies and in-house employees.

More than 80% of the U.S. companies said they give salary increases on a merit basis, far exceeding the number that give general increases, 21% for nonexempt employees and 23.9% for exempt employees. Less than 7% give cost-of-living raises.

While the highest systems and processing salary jump was 7.6% for lead data entry operators ($15,600 in 1983), a similar AMS report showed that noncomputer managers saw salaries jump by up to 17% for positions such as legal assistant services managers ($32,400 in 1983), plant managers ($41,900 in 1983) and managers of administrative services ($31,900).

The "AMS Systems and Processing Salaries Report" and the "AMS Guide to Management Compensation" are available for $90 from AMS at Maryland Road, Willow Grove, Pa. 19090.

NEWS SUMMARY

House and Senate conferees will begin work this week on a compromise between their widely different export administration bills/6

Fujitsu Ltd. last week increased its holdings in Amdahl Corp. to just under 50%/6

Amdahl Corp. countered IBM's announcement of high-end processors with two new systems and price cuts on existing systems/6

Bank Administration Institute Security Conference: Bankers say DP crime in the banking industry is not outrunning the technologies and managers commissioned to stop it . . . Banking by EFT is more secure than banking by telephone, specialists say/7 and 9

Jack Scanlon, vice-president of AT&T Technologies, Inc.'s computer systems division, talks to *Computerworld* about the future, limitations and application of Unix/8

EDP Performance Management Conference: An MIS manager says information centers should act primarily as in-house consulting services . . . Systems managers are taking an increased interest in helping end users improve their information processing productivity/10-11

It would be better to eliminate the National Bureau of Standards' Institute for Computer Sciences and Technology than to cripple it, a bureau adviser tells a Senate panel/12

Trilogy Ltd. again delayed the shipment of its expected high-performance mainframe based on wafer-scale technology/13

Info Users Group: According to one speaker, users must become more discriminating in applying Info language . . . Federal Trade Commission lawyers will begin putting Henco Software, Inc.'s Infotext system to the test . . . Henco President Henry Cochran formulates strategy for expanding his firm's influence in the marketplace/14-16

The first security hurdle for the information age is the naivete of users and service providers, say participants at a recent Videotex Industry Association conference on security/17

IDC Briefing Session: Predictions for 1984 and beyond/18,19,22

A donated supermini is helping British astronomer Stephen Hawking perform calculations needed to join two major, but contradictory, theories of physics/23

Organizations need a more formal approach to micro training if the investment in hardware and software is to be justified, a paper presented at a recent conference claims/25

A 10-city data communications network used during Ecuador's presidential election last January helped shorten the vote-counting process by weeks/26

A Washington, D.C.-based computer association is helping nonprofit public interest groups utilize technology to implement their goals/28

Chemical Bank Corp., a user, has become a vendor offering a home banking system that is being tried out by eight other banks/29

A small insurance firm increases productivity with automated policy system/30

A large wholesale distributor of telecommunications equipment recently installed a processor that serves as a front-end processor for its mainframe and talks the "language" of any of its customers' computers/31

Eight New Jersey school districts are sharing the services of a county computer center in an effort to provide high-quality education in a cost-efficient manner/34

An electric brake manufacturer converts to an on-line system and installs a data security package/38

A financial and distribution software system is helping a fabric wholesaler improve its cash flow and deliveries/38

A communication product is letting one service bureau avoid midnight rides to the airport to pick up reels of tape/40

A metals processing and trading firm increased productivity by 20% by automating its information management and accounting functions/42

International Report/27
Off the Press/24
Call for Papers/42
Calendar/50

IN DEPTH

Modifying packages/ID/7
Which way Cobol?/ID/15
Transaction processing/ID/21
Training courses/ID/37
Influencing people/ID/45

EDITORIAL/52
SOFTWARE & SERVICES/61
COMMUNICATIONS/73
SYSTEMS & PERIPHERALS/79
MICROCOMPUTERS/89
COMPUTER INDUSTRY/100

QUICK!

Name the fastest VM dump restore, and the fastest VM sort program.

(SYBACK & SyncSort CMS. What took you so long?)

Call (201) 568-9700.

Meet our super-sonic systems.

If you didn't choose SYBACK and SyncSort CMS as the fastest in their categories, *do not* go directly to jail. But read this very, very carefully.

SYBACK, our fast dump restore for VM systems, and SyncSort CMS, the only high-technology sort for VM/CMS, represent a great technological leap forward. No other programs of their type can provide all three of the following positive advantages:

(1) THE FASTEST VM PERFORMANCE: SYBACK and SyncSort CMS make data move like greased lightning. Compared to their "competitors," these programs can save a tremendous amount of computer resources:

- **50% in Elapsed Time;**
- **45% in VTime;**
- **55% in TTime;**
- **75% in SIOs.**

These savings are the result of our exclusive Fluid Buffering Technique (FBT). First developed in OS and DOS sorting, we've now extended the benefits of FBT to VM backups and sorts.

(2) THE BEST VM PRODUCTIVITY: SYBACK and SyncSort CMS have tremendous operational flexibility and user friendliness. They're rich in features designed to reduce human intervention in backup and sorting:

- **SYBACK**—Automatic backup based on CP directory • Stand-alone restore capability • Incremental backup facility • Catalog of backup operations • Multi-tasking and execution under CMS • Interactive command processing • Standard-label tape support • Callable by user programs • DASD to DASD conversion and copying. Much, much more.

- **SyncSort CMS**—Sorts CMS, SAM (OS or DOS), or VSAM files • Can be invoked from COBOL, PL/1 or BAL programs • Dynamically allocates disk space • Selects relevant records for sorting • Reformats records on output • Performs summaries of designated numeric fields • Produces reports with pagination, headings and dates • Can often produce simple reports in one day rather than, say, five. Much more, too.

(3) THE FINEST TECHNICAL SERVICE: Our Technical Service specialist are experts in their individual fields. You can count on fast, efficient, courteous service in both backup or sorting operations. More than 85% of all user requests for service are resolved within 24 hours.

CAVEAT EMPTOR: As with all performance software programs, the best way to find out what SYBACK and SyncSort CMS can do is to benchmark them yourself against your present programs.

That should help you make up your mind *fast!*

SYSCORT CMS • SYBACK • SYNCSORT CMS • SYBACK • SYNCSORT CMS • SYBACK • SYNCSORT CMS • SYBACK • VM

syncsort INC.

Syncsort Incorporated. 560 Sylvan Ave., Englewood Cliffs, N.J. 07632

NEWS

Amdahl offers cache for new, older drives

SUNNYVALE, Calif. — In conjunction with its announcement of a higher capacity IBM 3380-type disk drive, Amdahl Corp. last week unveiled a disk cache memory feature said to boost performance on the newly announced 6380 and older 6280 disk drives.

The Cache Controller Feature (CCF) was developed for environments that contain frequently used data. By adding an electronic memory, or cache, to the 6380 storage control unit, users can supply data directly from the cache to the processor at maximum channel speed, Amdahl said.

The 6880 CCF is available for IBM's MVS and MVS/XA operating environments. When used with the 6380 disk drives, it resides in the 6880-G2 storage control unit and can accommodate 4M to 16M bytes of memory. In the 6380 environment, the CCF supports a 3M byte/sec data transfer rate, the vendor said.

When used with the 6280 disk drives, the CCF resides in the 6880-A2 storage control unit and offers either 4M or 8M bytes of memory. Data transfer rates of 1.53M, 1.86M or 3M byte/sec are supported, according to the vendor.

The cache consists of separate memory, processors, power supplies and an operator panel and is said to be independent of the disk subsystem.

An independent microprocessor updates cache memory concurrently as data is transferred to and from the host processor, while maintenance of data in the cache relies on an extended, least recently used replacement algorithm, which is said to ensure dynamically that active data is available in the cache.

The CCF can switch itself off-line if "uncorrectable errors" occur, Amdahl said. In such an instance, the storage subsystem continues operation with no functional interruption, company officials added.

First shipment of the CCF is scheduled for the second quarter of this year for the 6280 and the third quarter for the 6380. The purchase price ranges between $61,100 and $207,200, depending on control unit model and memory size. Leasing programs are also available.

Amdahl is based at 1250 E. Arques Ave., P.O. Box 470, Sunnyvale, Calif. 94086.

ANALYSIS

Despite late entry into 3380 market, Amdahl competitive

By Robert Batt
CW West Coast Bureau

While not the first to announce a direct competitor to IBM's 3380 disk drive, Amdahl has managed to develop a product in time to remain competitive with other manufacturers of IBM-compatible, 3380-type units.

Although Storage Technology Corp. and Control Data Corp. have both introduced 3380-type drives, neither firm has thus far shipped the devices in large quantities. Storage Technology's division vice-president for I/O products, Bob Williams, recently told *Computerworld* that the firm has installed slightly more than 100 units. CDC admits its 3380 look-alike program is way behind schedule. Industry watchers contend CDC fairly recently installed its first beta-site versions of the drive.

While the plug-compatible manufacturers have lagged behind in bringing 3380 look-alikes to the market, IBM appears to have whipped its 3380 manufacturing lines into full swing. As of the end of 1983, approximately 38,000 of IBM's 3380s had been installed, according to International Data Corp. (IDC), a market research firm in Framingham, Mass. IDC estimates IBM will install between 45,000 and 50,000 of the 3380 drives during 1984.

According to Greg Kelsey, senior analyst at the San Francisco investment firm of Hambrecht & Quist, since no other competitor has been able to ship a 3380-compatible product in any volume, Amdahl can look forward to a sizable backlog of 6380 orders. "We estimate that shipments of the 6280 and 6380 will generate revenues for the company in excess of $150 million in 1984, and if you count products leased, it will amount to around $300 million," Kelsey said.

Company officials said they expect shipments of Amdahl storage products to increase between 30% and 40% this year, with about half the increased shipments coming from sales of the 6380. Hambrecht & Quist estimated the number of Amdahl storage units that will be sold this year at around 2,400.

Currently, Amdahl has sold its 6280 product, introduced in late 1982, to 200 customer sites, 15% of which do not currently possess an Amdahl processor.

"[Amdahl had] already carved out a niche for itself with the 6280 at a time when plug-compatible vendors were in the doldrums; the 6380 will make Amdahl more cost-effective, and I expect it to pick up some business from IBM," commented industry analyst Jim Porter at Disk Trend, Inc. of Mountain View, Calif.

"The feeling is that Amdahl has the technology to match anything that IBM may come up with," said Sally Upjohn, associate analyst at Hambrecht & Quist.

AMDAHL from page 1

enclosures, each containing one actuator. The enclosures are said to contain 630M bytes of data, with an average seek time of 15 msec and an average latency of 8.3 msec.

Requires less floor space

Like other plug-compatible manufacturers making 3380-compatible disk drives, Amdahl claimed one major selling point of its drives is it requires less floor space than IBM's 3380.

The firm said the 6380 requires total floor space of 23½ square feet, 40% less than the 3380.

Unlike its IBM counterpart, the 6380 does not make use of thin-film-head technology. Rather, it uses the older ferrite-head design.

Although not designed to compete directly with an upgraded, double-density version of the 3380 — a device many industry watchers believe will be announced by IBM later this year — Amdahl officials insisted the 6380 ferrite-head technology can be enhanced to keep pace with IBM. Industry watchers have speculated that IBM will announce a new version of the 3380 that will offer 1½ to two times the capacity of the current models.

The 6389 Model AA4 costs $81,200 when purchased in quantities of one to five units. On a three-year lease plan, the unit costs $2,433/mo. The monthly maintenance fee for the 6380 AA4 is $360 on an 11-hour, five-day plan, according to the vendor.

The Model B4 costs $55,600 when purchased in quantities of one to four units. The unit costs $1,772 on a three-year lease. The monthly maintenance fee is $248 on the 11-hour, five-day plan.

Both will be available in the third quarter, the vendor said. A full-string, 10G-byte configuration costs approximately $914,880, Amdahl said.

When purchased separately, the 6880-G2 storage control unit with a standard two-channel switch costs $66,730. The unit leases for $2,084 on a three-year plan and carries a $220/mo maintenance charge on the 11-hour, five-day plan.

Amdahl is located at 1250 E. Arques Ave., P.O. Box 470, Sunnyvale, Calif. 94086.

Export act compromise sought

WASHINGTON, D.C.— The U.S. House and Senate in the coming week will start hammering out differences in their bills to amend the Export Administration Act. The act, temporarily extended, expires at the end of this month.

The Senate bill, passed March 1, is viewed much less favorably by the electronics industry than the House bill, which was approved late last year. Among other controversial provisions, the Senate legislation would give the Department of Defense greater statutory export license review authority in U.S. trade to non-Communist countries. Exporters fear this would add delays to the processing of export license requests.

Further weakening Commerce Department authority in export administration, the Senate bill would also transfer export law enforcement from Commerce to the U.S. Customs Service.

In general, high-tech industry representatives say the House legislation favors business interests, whereas the Senate bill comes down more on the side of government agencies who argue that stricter export controls are needed to keep the Soviet Union and its allies from obtaining strategically useful American technology. The differences between the two bills are substantial, and the conference to produce a compromise bill is expected to be long and difficult.

Second-class postage paid at Framingham, Mass., and additional mailing offices. Computerworld (ISSN-0010-4841) is published weekly, except: January (5 issues), February (5 issues), March (5 issues), April (7 issues), May (5 issues), June (5 issues), July (5 issues), August (5 issues), September (5 issues), October (5 issues), November (5 issues), and a single combined issue for the last week in December and the first week in January by CW Communications/ Inc., Box 880, 375 Cochituate Road, Framingham, Mass. 01701.

Copyright 1984 by CW Communications/Inc. All rights reserved.

Computerworld can be purchased on 35 mm microform through University Microfilm Int. Periodical Entry Dept., 300 Zeeb Rd., Ann Arbor, Mich. 48106. Phone (313) 761-4700. *Computerworld* is indexed: write to Circulation Dept. for subscription information.

PHOTOCOPY RIGHTS: permission to photocopy for internal or personal use of specific clients is granted by CW Communications for libraries and other users registered with the Copyright Clearance Center (CCC), provided that the base fee of $3.00 per copy of the article, plus $.50 per page is paid directly to Copyright Clearance Center, 21 Congress Street, Salem, MA 01970.

Permission to photocopy does not extend to contributed articles followed by this symbol. ‡

Special requests should be addressed to Nancy M. Shannon, CW Communications/Inc. Box 880, 375 Cochituate Rd., Framingham, MA 01701. ISSN 0010-4841/82 $3.00 + $.50

$2.00 a copy: U.S. — $44 a year; Canada, Central & So. America — $110 a year; Europe — $165 a year; all other countries — $245 a year (airmail service). Four weeks notice is required for change of address. Please allow six weeks for new subscription service to begin.

POSTMASTER: Send Form 3579 (Change of Address) to Computerworld, Circulation Dept., Box 880, 375 Cochituate Road, Framingham, Mass. 01701.

Fujitsu share in Amdahl Corp. nears 50%

Move seen giving Japanese firm ready-made conduit into U.S. for range of products

By Robert Batt
and Peter Bochnik
CW Staff

SUNNYVALE, Calif. — Fujitsu Ltd., Japan's leading computer manufacturer, last week greatly increased its stake in Amdahl Corp., giving Fujitsu what some analysts feel is de facto control of Amdahl.

While Amdahl executives said the action was a friendly move, industry analysts said the Japanese company now has effective control over a distribution and service organization that inevitably will be used as a conduit into the U.S. for a wide array of Fujitsu products.

The Japanese giant, with sales of $4 billion last year, said Tuesday it has reached an agreement with Heizer Corp., a Chicago-based, publicly held investing company, to buy Heizer's six million shares of Amdahl common stock for $180 million at $29 per share.

Fujitsu also negotiated warrants entitling it to an additional 2.5 million shares.

Jump to 49.5%

The accord, if ratified by U.S. and Japanese authorities, means Fujitsu will increase its stake in Amdahl from 30% to as much as 49.5%.

Amdahl President John Lewis said he had received assurances from Fujitsu that it does not plan to interfere in the management of the U.S. company and would not seek additional stock.

"Over the years, we have worked closely with Fujitsu, particularly in the areas of research and development. I think it has become apparent to Fujitsu that Amdahl is very important to them, and they want to ensure that no unfriendly party comes in and buys up the stock," he explained.

An industry analyst, Dale Kutnick, executive director of The Yankee Group, observed that "for all intents and purposes, Fujitsu now owns Amdahl. They are the majority owner: You don't have to own 51% [of the stock] to do it; effectively they can control the company."

Positive move for Amdahl

Kutnick said the move "is very positive for Amdahl" because the company needs outside investment "to keep up with IBM."

Kutnick said he does not believe Amdahl will come out with another computer of its own and will instead assume the role of a value-added U.S. distributor of Fujitsu products. "Amdahl by itself doesn't have enough leverage to continue to support a large systems market," but does have the distribution, marketing, sales and service organization Fujitsu needs to be a major factor in the U.S. market, he said.

Peter Lebe, an analyst with Smith Barney, Harris Upham & Co., observed: "From Fujitsu's point of view, Amdahl is becoming increasingly important as an entry point for its large machines [and] disk and communications products in the U.S. This deal is a way of cementing the relationship . . . and from the Fujitsu perspective, it will guarantee that a large block of stock will not fall into troublesome hands."

Lebe said it is likely that Fujitsu will use its leverage with Amdahl to market its supercomputer — the VP-200 — in the American market. "With Amdahl having an installed base of around 600 IBM-compatible users, it has to be very appealing for Fujitsu in marketing its largest machines, and from Amdahl's point of view it would give them an extra product to sell at no risk," he said.

Bill Easterbrook, analyst with the firm of Kidder-Peabody & Co., Inc., agreed the move protects Amdahl's stock price because if Heizer had simply distributed the stock to its shareholders, "many of them would have probably turned around and sold it."

Commenting on Fujitsu's strategy, Easterbrook said, "I think Fujitsu can now do what Japanese companies have been looking to find a way to do for a long time. It gives them a large and respected marketing and servicing organization in the U.S. and in Europe. They can funnel everything they have, not just large systems, through Amdahl, and over the longer term I think that will eventually happen."

Fujitsu has worked with Amdahl for several years, assembling some computer components in Japan, building disk drives sold under the Amdahl label and exchanging technological information and patent licenses.

Three Fujitsu executives are directors of Amdahl, and the two companies have signed a marketing agreement prohibiting Fujitsu from selling its mainframes directly in the U.S. and Canada. Easterbrook said Fujitsu is likely to gain the Amdahl board seat formerly occupied by Heizer.

Here's a deduction that keeps on saving you money:

SAVE 25% ON ALL YOURDON PRESS BOOKS.

through April 15, 1984.

It's tax time. Everyone's looking for ways to save money. Everyone's looking for another deduction. Yourdon Press gives you both.

With this special offer, you can save two ways: by taking advantage of the 25% discount, and by using our expertise to cut your software costs. Yourdon Press is the leading publisher in the areas of software development and the structured techniques. Our books show you how to build efficient systems, saving time, money, and manpower. Your savings multiply year after year.

And, next April, you may be able to deduct the cost of our books from your income tax as a professional investment. So look no further.

To order, call 800-223-2452, Ext. 3328, or use the coupon below. Either way, you keep on saving.

25% OFF THROUGH APRIL 15, 1984

☐ Enclosed is ~~$30.75~~ $21.87 for *Systems Development Without Pain: A User's Guide*, by P. Ward.

☐ Enclosed is ~~$29.95~~ $22.25 for *Current Practices in Software Development*, by D. King.

☐ Enclosed is ~~$19.75~~ $15.12 for *The Practice of Structured Analysis: Exploding Myths*, by R. Keller.

☐ Enclosed is ~~$23.25~~ $17.75 for *Building Control into Structured Systems*, by A. Brill.

☐ Enclosed is ~~$18.25~~ $14.00 for *The Data Factory: Data Center Operations & Systems Development*, by E. Roesko.

☐ Enclosed is ~~$30.75~~ $22.62 for each copy of *Controlling Software Projects: Management, Measurement and Estimation*, by T. DeMarco.

☐ Enclosed is ~~$30.75~~ $23.37 for each copy of *Managing the System Life Cycle: A Methodology*, by E. Yourdon.

☐ Enclosed is ~~$30.75~~ $21.87 for each copy of *The Practical Guide to Structured Systems Design*, by M. Page-Jones.

☐ Enclosed is ~~$30.75~~ $21.87 for each copy of *Structured Analysis and System Specification*, by T. DeMarco.

☐ Enclosed is ~~$28.25~~ 21.50 for each copy of *Software Design: Methods & Techniques*, by L. Peters.

☐ Enclosed is ~~$34.75~~ $26.37 for each copy of *Classics in Software Engineering*, ed. by E. Yourdon.

☐ Enclosed is ~~$19.75~~ $15.12 for each copy of *The Politics of Projects*, by R. Block.

☐ Enclosed is ~~$21.25~~ $16.25 for each copy of *C Notes: A Guide to the C Programming Language*, by C.T. Zahn.

☐ Enclosed is ~~$34.25~~ $26.00 for each copy of *Writings of the Revolution: Readings on Software Engineering*, ed. by E. Yourdon.

☐ Enclosed is ~~$31.25~~ $23.75 for each copy of *Developing Structured Systems: A Methodology*, by B. Dickinson.

☐ Enclosed is ~~$31.50~~ $24.25 for each set of *Learning to Program in Structured Cobol, Parts 1 & 2*, by E. Yourdon, et al.

☐ Please send me your 1984 catalog, describing these books & other titles discounted through 4/15/84.

SHIPPING INFORMATION: Specify quantity per title. Prices listed include $1.25 per book for shipping and handling. Residents of CA, NY, VA & WA states, add applicable sales tax. Orders must be prepaid in U.S. funds. Or, charge your order on ☐VISA or ☐MASTERCARD.

Card No. _____
Signature _____
Expiration Date _____

Name: _____
Company: _____
Business ☐ or Home ☐ St.: _____
City: _____ State: _____ Zip: _____
Business ☐ or Home ☐ Phone: (___)_____ _____

Yourdon Press, Dept. CW3@284 1133 Avenue of the Americas New York, NY 10036
(212) 391-2828 Ext. 3328 or (800) 223-2452 Ext. 3328

YOURDON PRESS, 1133 AVE. OF THE AMERICAS, N.Y.C. 10036
(800) 223-2452, Ext. 3328 or (212) 391-2828, Ext. 3328

NEWS

Amdahl adds pair of 580 series processors

By Tom Henshel
CW Staff

SUNNYVALE, Calif. — Amdahl Corp. has expanded its 580 line of IBM-compatible mainframes with attached and dual-processor configurations of its 5860 processor. The firm also announced this month that performance on new shipments of the smaller 5850 processor has been increased by 5% to 7%.

At the same time, Amdahl cut prices on its current mainframe lineup by 3% to 14% and boosted the amount of main memory available on the entire 580 line to 64M bytes.

In addition, Amdahl announced it will support up to 128M bytes of main memory on all multiprocessor configurations in the 580 line by the first quarter of 1985. The firm said all multiprocessors will support 48 I/O channels by the first quarter of 1985.

Amdahl increased main memory on the top-of-the-line 5880 processor from 64M bytes to 128M bytes, while the maximum number of channels was expanded from 36 to 48, the firm said.

AMDAHL CORP.

Model	5840	5850	5860	5867	5868	5870	5880
Uniprocessor?	Yes	Yes	Yes	No	No	Yes	Yes
Dual-Processor?	No	No	No	Yes	No	No	No
Multiprocessor?	No	No	No	No	Yes	No	No
MIPS[1]	7.5	10.5	13	18.2	18.2	26.4	26.4
Memory Size in Bytes (Minimum-Maximum)	16M-64M	16M-64M	16M-64M	16M-128M	16M-128M	16M-128M	32M-128M
Purchase Price[2] (Memory Size)	$2,380,000 (16M)	$2,730,000 (16M)	$3,030,000 (16M)	$3,410,000 (24M)	$4,070,000 (32M)	$4,230,000 (32M)	$4,730,000 (32M)
Lease Price (Lease Term)	$71,400 (5 Years)	$81,900 (5 Years)	$100,541 (5 Years)	Not Available	Not Available	$126,874 (5 Years)	$197,415 (5 Years)
Machine Cycle Time (ns)	23.35	20.35	20.35	20.5	20.5	20.35	20.35
Channels (Minimum-Maximum)	16-32	16-32	16-32	16-48	16-48	16-48	32-48
Cache Memory Size?	64K	64K	64K	64K	64K	128K	128K
Has Attached Processor?	No	Yes	Yes	Yes	Yes	Yes	Yes
Price per MB Byte of Main Memory	$30,000	$30,000	$30,000	$30,000	$30,000	$30,000	$30,000

1. CW estimates based on vendor-supplied information. Relative performance ratings are based on an IBM 370/168-3 equaling 1.0. These numbers are designed to rank the processor into perspective with other systems; they do not necessarily reflect a buyer's guide. All systems are not alike. They run different operating systems, multiwidth data and addressing and, therefore, cannot be directly compared. In addition, actual relative performance may vary with the system.
2. Does not include disk, peripherals and software.
3. Vendor states.
4. Includes processor, console, power supply and air conditioning.
5. The 5860 and 5880 have two 256K-byte caches. The 5870 and 5880 have four 256-byte caches.

Called the 5867 dual processor and 5868 multiprocessor, the newly announced systems reportedly offer from 1.25 to 1.4 times the performance of the firm's 5860 uniprocessor. Unlike users of IBM's X model 3080 systems, users of Amdahl 5840, 5850 and 5860 systems can upgrade their processors to the 5867 and 5868, Amdahl said.

The 5867 and 5868 can be upgraded, respectively, to the firm's larger 5870 and 5880 processors. Amdahl has yet to deliver 5870 and 5880 series processors, a spokeswoman said.

The domestic purchase price of the 5867 processor with 24M bytes of main memory and 16 channels is $3,410,000. Maintenance on the system costs $12,500/mo. A 32M-byte, 32-channel 5868 processor costs $4,070,000, with a monthly maintenance fee of $13,950. Both processors will be available in the third quarter, the spokeswoman said.

As examples of the price reductions on existing 580 series models, Amdahl said a 5860 processor with 16M bytes of main memory and 16 channels used to cost $2,700,000 and now costs $2,600,000. Likewise, a 5870 processor with 32M bytes of main memory and 16 channels used to cost $4,920,000 and now costs $4,230,000. Finally, a 5880 processor with 32M bytes of main memory and 32 channels used to cost $5,300,000 and now costs $4,730,000, the firm said.

Model-to-model upgrade prices decreased for migration from the 5840 to the 5850, from the 5850 to the 5860 and from the 5870 to the 5880. As an example, Amdahl said the cost of a 5850-to-5860 upgrade was decreased from $350,000 to $250,000.

In addition to the processor announcement, Amdahl said all its 580 series machines can now support IBM's MVS/SP Version 1 Release 3.4 and VM/SP High-Performance Option Release 3.4. The firm also announced support for MVS/SP Version 2 Re-

See [illegible] page 7

WIRES from page 1

tached to "patch panels" on adjacent floors by a single 1¼-in.-round batch cable that is the equivalent of 32 cables (see Figure 1). The panels provide coaxial cable connections for up to 32 devices.

This approach is said to be particularly useful for financial organizations and other companies that move around a lot of equipment.

Another option being considered by companies looking for a way around the single-wire-per-device environment is multiplexing, an alternative employed by John Hancock Mutual Life Insurance Co. in Boston (see Figure 2). According to Tom Mangone, director of facilities management in the information services group at John Hancock, space is a scarce commodity in vertical risers in the eight-year-old John Hancock Tower.

Hancock's solution

Hancock's solution to the worsening problem was to pull all of its 3270-type terminal controllers back into the data processing center and run a broadband coaxial cable in the little space left in the risers.

The 32 ports on each terminal controller are multiplexed over a single cable, and device connection is provided by remote multiplexers, which are located on roughly every other floor of the building, according to Mangone.

While this system would seem little better than running a single cable from a host to a remote terminal controller that supports 32 devices, there are a number of benefits.

For one, in the John Hancock system, the multiplexed line need not terminate at a single point. This enables a centralized terminal controller to support terminals on different floors with one cable. When cluster controllers are dispersed throughout an organization and used to support terminals on different floors, wires for those devices must be run back into the risers to the appropriate floor.

Other benefits realized by putting the controllers in the computer room include the ability to operate them in local attach mode and provide them with a "clean" power supply. The dedicated power supply lowered error rates for the controllers, the director said, and the local attach mode "vanquished" the six- to eight-second response delays the company was previously experiencing.

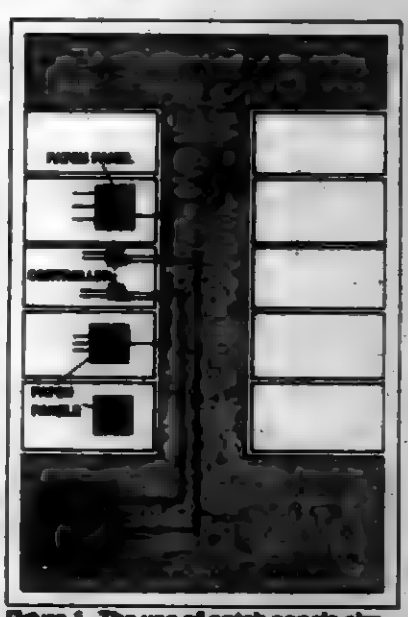


Figure 1. The use of patch panels simplifies wiring, particularly in corporations where equipment is moved frequently.

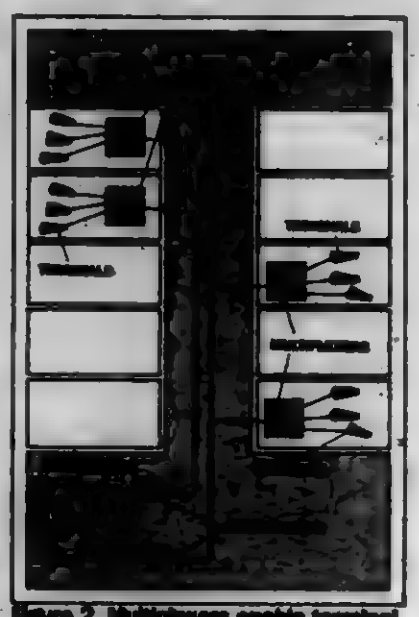


Figure 2. Multiplexers enable terminal support to be placed where it is needed as well as to reduce wire in the risers.

All told, Mangone said he expects the new cable system to meet John Hancock's needs for the rest of the decade.

The company employs 7,000 people and has roughly 3,000 terminals in place. The multiplexing system has the capacity to support between 6,000 and 8,000 terminal devices, he said.

American Express to leave its problem behind when it moves

By John Shu
CW Staff

The ideal situation for a company facing severe wiring problems is to have the opportunity to start all over again from the ground up. That is generally a luxury reserved for companies that are moving into new buildings, as is the case with American Express Co.

Mino Akhtar, manager of advanced technologies with American Express' corporate systems group, said that the cabling problems in the company's present building encouraged the study of wiring alternatives for the new building it will begin moving into at the end of the year.

In consideration of the problem, requests for proposals were issued to manufacturers of local-area networks and private branch exchanges (PBX). The company concluded that a premisewide local-area network could not be justified in terms of cost and that users did not need the capabilities offered. It was decided, however, that small local networks would be needed at the departmental level in the future, Akhtar said, mostly because of growth in the use of personal computers.

And while American Express has signed an agreement with AT&T Information Systems, Inc., Akhtar said it was too risky to have the single, 15,000-line Dimension System 85 digital PBX support American Express' voice and data needs because of the fear of creating a single point of failure.

Instead of either of those alternatives, American Express decided to wire its building with a single type of wire, a "kind of twisted pair," Akhtar said. While the particulars are still under wraps, the manager divulged that the wire will be accessible from every desk in the new building and used to interconnect the company's 2,000 to 3,000 workstations, which include Wang Laboratories, Inc. terminals and IBM 3270-type terminals and Personal Computers.

Akhtar also said that a broadband cable would be installed that would interconnect conference rooms and be used for video applications.

NEWS

Bankers say crime more potential than real

CW at BAI security conference

By James Connolly
CW Staff

WASHINGTON, D.C. — Is computer crime in the banking industry outrunning the technologies and the managers commissioned to stop it?

Not according to bank security officials who were polled here last week at the Bank Administration Institute's Bank Security Conference and Exposition. According to these attendees, crime is more of a potential than an actuality, and crime prevention systems are keeping pace with the problem.

"It's getting easier and easier for us every day. The technical people are affording all of us the protection we can ask for," said Herbert E. Grimm, one of the 400 conference attendees and a security officer for Burke and Herbert Bank and Trust Co. in Alexandria, Va. "What I've found is that we have to have somebody on our side who can talk to the computer people, who can talk their language and express our concerns.

"Of course," he added, "there is always somebody trying to get into the system, and the crooks are going to school to learn more about computers."

Hee Ja Lee, data security officer for Riggs National Bank here, thinks that "so far, the vendors have reacted very well. There are protections for the communications links and encryptions that make it very difficult to get into the computer.

"Of course, we are always looking to make it more secure, and there is always the potential for fraud with everything on-line now," she said.

She noted that some problems remain with convincing data processing personnel to be security conscious. "Too often they say, 'Nothing has happened yet. Why do you treat us like criminals?' "

Involved in security for 22 years and in bank security for five years, Willie Simmons Jr. of Chicago added, "It's a climate for security that you have to establish, not just for the computer room but as an institution. If the bank itself has a climate of security, the people in the computer room won't be saying that we are singling them out."

Simmons also noted that protecting against computer-related crime requires a "balancing of interests." In establishing computer security, he and the operations managers start with minimal precautions and build a system from there, rather than starting with the maximum and then fashioning a system by eliminating steps that limit operating capabilities.

"I consider myself a businessman first and in security as a vocation. I can't put on controls that mean the bank won't make money," Simmons noted. "My concern is that the money they make, they keep."

Of principal concern to attendees were the issues of electronic funds transfer and automated teller machines (ATM).

Grimm reported, "We don't have problems with the ATMs, we have problems with the people. They give out their personal identification numbers to their kids or leave their cards and numbers lying around."

Two conference speakers noted that the greater threat to the bank itself is with physical robberies of ATM customers and service representatives rather than ATM fraud.

John W. Kennish, director of security at Commerce Bancshares in Kansas City, Mo., and attorney Bernard Pyllit of Indianapolis argued that banks with lax security face liability suits if customers are robbed.

The problem of computer-related crime is societal, maintained Steve Bandura, assistant security officer of First National Bank of Allentown, Pa.

"I don't think computer crime is technological so much as the fault of society itself. Everything is shifting into the financial sector because it is easier to go out and pass a bad check or credit card than to hold up the local 7-11 store," he said.

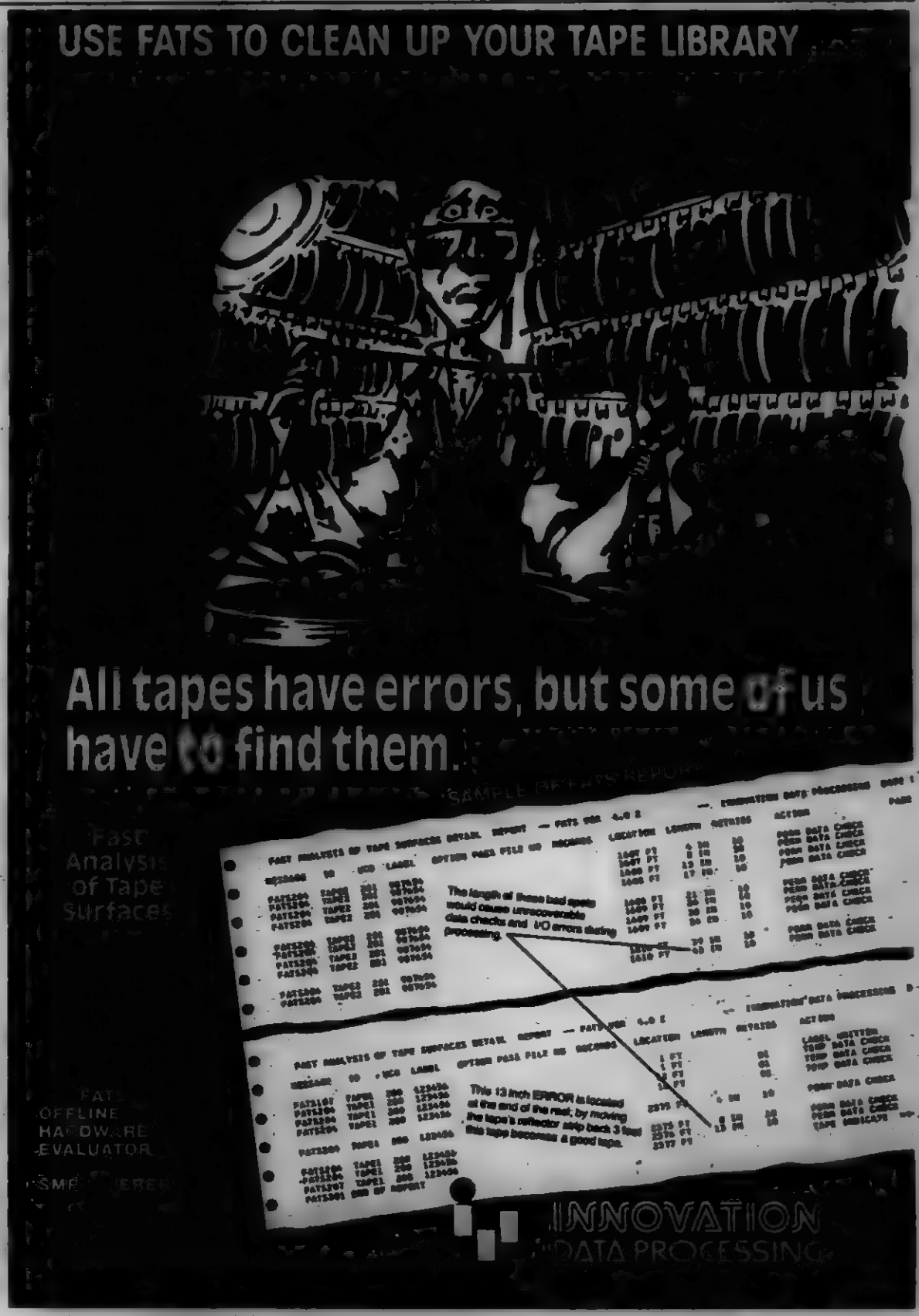
MODELS from page 6

lease 1.2 on all 580 series processors and 470 series models with the firm's 470/XA feature.

In addition, Amdahl will provide support for up to 64M bytes of main memory for users of IBM's VM/SP High-Performance Option Release 2.5 and up on all 580 models.

Industry watchers characterized the changes in Amdahl's product lineup as a response to IBM's recent announcement of higher performance X models in its 3080 line [CW, March 5].

William Easterbrook, an analyst with Kidder-Peabody & Co., Inc. in New York, noted the new Amdahl processors offer one distinct advantage over IBM: They are field-upgradable from currently installed models.



NEWS

AT&T's presence was clearly in evidence at the recent Uniforum Conference in Washington, D.C. — the third annual international conference and exposition for Unix users — underscoring its commitment to Bell Laboratories' Unix System V as the industry standard operating system.

Jack Scanlon, vice-president of the computer systems division of AT&T Technologies, Inc., joked that AT&T's forces were there to "break up the government." But the industry giant's focus was clearly on the promotion of Unix, an effort that included the announcement of an enhanced version of System V, the introduction of AT&T's own Unix applications and a joint agreement with Digital Research, Inc. to market a library of Unix application software.

In an effort to encourage industry acceptance of System V, Scanlon said in his keynote address at Uniforum that AT&T is committed in 1984 to "improving Unix's packaging for the low end; improving its overall user-friendliness; continuing to populate the list of computer companies, especially at the high end, which offer Unix operating systems as a fully supported product; and improving our user support."

A 18-year veteran of AT&T, Scanlon has become something of an industry spokesman for Unix. In a recent interview with Computerworld staff writer John Gallant, he spoke on the future of the operating system, its limitations and on coexistence in a marketplace that now includes IBM.

AT&T's Scanlon details the future of Unix

Unix enjoys wide programmer popularity, but it is not recognized as a user-friendly operating system. How do you respond to speculation that Unix's popularity will be limited in the future?

There is no question that on desktops Unix needs some improvements. But you have to ask if there are fundamental limitations to other operating systems that will be tougher to overcome.

We have used Unix to deliver complete turnkey systems inside AT&T for years, into environments with very unsophisticated users. In each case, a unique user interface was developed to make the interface to the machine as seamless as possible for the particular application. It's no big deal . . . it's not a fundamental tear-up of the operating system. You simply add an interface layer on top of it.

If you look at the limitations other operating systems have to overcome, coming from the personal computer basis up to meet new requirements as the technology evolves, I think they have more fundamental problems. They have to go from a single-task environment to a multitasking environment; they have to go from a nonvirtual memory environment to a demand page virtual memory environment; and they have to add communications capabilities and networking. Those are fundamental additions that have to be made to an operating system, and they don't come easy.

We already have a line of Unix computers that are in heavy deployment within our own company and with other selected customers. We think there is a real opportunity to move those computers into the broader commercial marketplace.

Is it practical to run Unix on large, business-oriented processors?

Unix started on the minicomputer, but inside AT&T we've got Unix running on mainframes. Unix plays very well across mainframes, minis and micros. It has this accordion-like capability to spread across that entire range. It gives you a real leg up on interconnecting those machines. We see that as fundamental if the microcomputer is ever to become a really useful device for accessing corporate data sitting on a mainframe.

In that sense, is Unix the micro-mainframe link everyone is looking for?

Absolutely. That's one reason we're successful in getting other companies to go with Unix. They see it as a way to start gluing together their incompatible architectures, and they see it as the technology that may someday make the distributed dream come true.

Will the commercial migration of Unix to the mainframe environment be the next major step in the growth of the Unix market?

If I was a betting man, I'd say that was a reasonable bet.

What type of hardware support for Unix can we expect from AT&T in the future?

We already have a line of Unix computers that are in heavy deployment within our own company and with other selected customers. We think there is a real opportunity to move those computers into the broader commercial marketplace.

What types of hardware, and when can we expect them?

I don't want to get into the details of that. When we're ready to announce them, we'll roll the whole thing out.

Does IBM's decision to go with Unix on its Personal Computer make it a slave to AT&T in that arena, or will IBM drive the Unix marketplace simply because of its larger user base?

Well, I don't think either one of those [theories] is true. IBM's announcement is a very positive thing for Unix, which is our pride. On that basis, we're very happy to see it happen.

We're all anxious to see some standards evolve, especially with independent software vendors. I think the message to the independent software vendors is that by going to Unix, the marketplace for their products is enhanced. We think that's good for us and good for the industry.

Will Unix become a self-fulfilling prophecy with all the major firms entering into the marketplace?

Most of these companies are high-tech firms that don't hop on hype. These are all businessmen. If they didn't think going toward Unix was a good business decision, I can't believe they would proceed with it.

I don't see Unix as something that will happen because big companies say it will. If you look at the history of the industry, good standards get adopted because they are good, not because somebody says, 'Hey, everybody get up and salute.' Unix speaks for itself.

The hardware guys like Unix because it gives them some freedom for architectural thought. The independent software vendors like it because it broadens their market base and insulates them from choosing which box to target their products toward. They don't have to worry that they'll pick the wrong box and go out of business next week. The end user likes it for the same reason — he doesn't want to be stuck with Company X's box forever.

IBM's announcement is a very positive thing for Unix, which is our pride. On that basis, we're very happy to see it happen. . . . I think the message to the independent software vendors is that by going to Unix, the marketplace for their products is enhanced.

If IBM comes out with its own version of Unix as rumored, what effect will that have on AT&T's current control over the Unix marketplace?

We're anxious to see IBM and other companies go with our standard. We think it's good for the whole industry. A lot of the industry infrastructure — the value-added resellers — agree with that. It's been our product for a long time, and I think the industry has been pretty successful going with our standard.

If IBM goes another way, that will be unfortunate because it will have a diversifying effect on the industry.

Why did you choose Digital Research, Inc. as a partner in the development of the Unix System V application library?

As one of the largest software companies, it has established retail channels we think can be valuable to us. It has also made a strategic decision to move away from the operating system business into the application business. It had also decided to move along Unix lines.

Can we expect any similar AT&T agreements with other software manufacturers in the future?

There's nothing exclusive about the [Digital Research] arrangement. We plan to work out similar arrangements with other companies if they meet our business interests.

Bankers told EFT more secure than phone

CW AT BAI SECURITY CONFERENCE

By James Connolly
CW Staff

WASHINGTON, D.C. — Banks have shied away from computer-terminal-originated electronic funds transfers (EFT), although such transactions may be more secure and more cost-effective than telephone transfers, bank security officials were told here last week.

However, those officials at the Bank Administration Institute's Bank Security Conference and Exposition also were told that the secrecy that surrounds EFT fraud leaves experts able only to speculate about how to prevent losses.

EFT specialists from Crocker National Bank of San Francisco and Corestates Financial Corp. of Philadelphia told the bankers that customers' use of the terminals can make the customer more responsible for authenticating transfer requests and reduce the likelihood of fraudulent human manipulation of transfers.

"Payments in electronic form move much faster than paper transactions. The potential for extremely large fraud loss is great," Rosemary O'Malley Laphen, senior vice-president of Corestates, said. But she noted that there have been no publicized instances of fraud involving terminal-originated EFTs and that few instances of telephone-originated EFT losses have been made public because banks fear the resultant publicity.

Christopher Huppert, product manager for Crocker National Bank, added, "With terminals, there is a cost savings for us. In addition, the customer has to sign a contract outlining our responsibilities and his before the terminal service is allowed. It's with the telephone where we see all of the fraud, and more with the telex than with the phone.

"One problem is that the banks won't discuss their losses," he continued. "I believe they are there. I know the crimes have been perpetrated, but I don't know how successfully." Huppert reported that the majority of EFT, since it originated in 1918, might have begun with a customer calling the bank and without written contracts, largely because of tradition.

He said banks have feared terminal transfers because of the idea of allowing a customer to communicate directly with the bank computer in regard to large sums of money.

He noted that reluctance has centered on the use of terminals for one-time, nonrepetitive transfers, where customers send funds to accounts for land deals and transactions other than routine, periodic, prearranged payments such as payroll disbursement.

Laphen noted that use of terminals minimizes the risk of an unauthorized person requesting a transfer, because it makes the customer responsible for verifying identification numbers and passwords and eliminates several manual steps in the transaction, where the risk for fraud or error is greatest.

Laphen based her opinions on research conducted for the Association of City Reserve Banks last year.

She said the study showed that fraud in an electronic transfer system has four basic causes: the introduction of a fraudulent transfer request, alteration of a valid request, destruction of records and error.

She advised the bankers to utilize transaction-origination controls until the data is entered into the EFT system, to monitor entry of the data into the system, to protect the flow of data through communications networks, to control the computer processing of the fund request and to control output by balancing accounts and ensuring that the funds have reached the proper destination.

Huppert noted that EFT traffic rose from 1.2 million transactions worth $9 billion in 1960 to 43 million transactions worth $78.6 trillion in 1980.

Firm publishes coding standard

ESTILL SPRINGS, Tenn. — Associated Technology Co. has announced a uniform coding standard designed to help establish a company's programming practices.

The guide reportedly covers documentation and coding practices for Cobol, Fortran and Basic and gives examples to show how early versions of these languages can be made to meet modern programming rules.

The 62-page book is said to include examples to aid programmers, analysts, quality assurance personnel and software designers.

The cost of the guide is $23 from Associated Technology, Rt. 2, Box 448, Estill Springs, Tenn. 37330.

At last,

a system-development course that teaches you how to make decisions, not how to draw charts

I've reviewed a lot of system-development books, courses, and manuscripts in the past few years. And almost without exception, what they teach isn't what you need to know.

Some focus on how to draw analysis and design documents at more and more detailed levels...but don't convince you the documents are worth creating, updating, or using.

Some give you plenty of tips on how to handle one part of development...but don't show you how that part fits into the overall process to help you get the system done.

And many teach you how to provide for details that are likely to change during a project...but don't tell you how to make the big decisions that will be stable and keep the project on track.

Is there a better way to develop business systems?

Unfortunately, I think the courses reflect what's going on in industry. Does *anyone* have an effective way to develop business systems?

I didn't think so until I read a practical NEW book called *How to Design and Develop Business Systems*. In my 19 years in the computer industry, this is the first book I've seen that teaches you sensible ways to create business systems. And it does it by taking you step-by-step through the development of an actual system.

Emphasis on decision-making

In 279 pages, you'll learn:

- techniques to help you make the critical development decisions that affect the success of your system the most
- what documents help you move quickly from analysis to design to implementation...and how to minimize detail in them so they're easy to create, update, and use
- how to create a data flow diagram (DFD), an analysis tool you use to describe an existing system or to model a new one
- how to use your model DFD to decide what data you need in the new system
- how to use your model DFD to create a system structure chart ...a design document that breaks the system down into logical functions and points to programs, menus, and procedures
- how to use your system structure chart to decide which parts of the system you should do first
- how to make the right database or file design decisions, so you save the hours of re-programming that late changes can cause
- why your design decisions result in easier-to-maintain systems

FREE trial and unlimited guarantee

So you don't have to risk a penny, I guarantee this book 100%. It must give you some development ideas that work for you, or send it back for a full refund...*no time limit*. But first, take 30 days to review it FREE.

So get a copy TODAY. Find out how to make development decisions that lead to better business systems ...and stop drawing charts that don't help you get the job done.

To order, call toll-free 1-800-221-5528 (In Calif., call 1-800-221-5527)

OR Mail the coupon below

Mike Murach & Assoc., Inc., 4222 W. Alamos, Suite 101, Fresno, CA 93711 CW/1

Yes, Mike, I want to learn how to make development decisions that will lead to better systems. Please send me _____ copies of How to Design and Develop Business Systems at $20 each. I must be completely satisfied, or I'll send them back at any time for a full refund.

☐ Bill me for the books plus shipping and handling (and sales tax in California).

☐ Charge the books plus shipping and handling (and sales tax in California) to my _____ Visa _____ MasterCard: Card number _____
Valid thru (mo/yr) _____ Signature _____
(not valid without signature)

☐ I want to SAVE shipping and handling charges. Here's my check or money order for full payment. Calif. residents, please add 6% sales tax to your order total. (Offer valid in U.S.)

Name & Title _____
Company _____
Address _____
City, State, Zip _____

Mike Murach & Associates, Inc.

4222 West Alamos, Suite 101
Fresno, CA 93711 • 209-275-3335

NEWS

Manager urges info centers to limit support

CW AT EDP PERFORMANCE MANAGEMENT

By Jeffry Beeler
CW West Coast Bureau

PHOENIX — Information centers should limit their support activities to providing end users with in-house consulting services, according to Warren Brown, MIS manager at Hercules, Inc.'s aerospace division.

Speaking last week at Applied Computer Research, Inc.'s fifth annual EDP Performance Management Conference, Brown urged information center staff members to avoid intensive involvement in their clients' software development projects.

Although they can legitimately aid programming efforts in an advisory capacity, information centers should resist the temptation to participate in basic development tasks such as defining specifications, designing software and writing code. The ultimate responsibility for making a new application operational should rest squarely with the nontechnical personnel who will be using it, Brown said.

For information centers that exceed their recommended roles and become entangled in the nitty-gritty of program development, the way can prove to be paved with hazards, he warned. Brown provided an anecdote involving a large U.S. Air Force base as a case in point.

Not too long ago, the military installation completed the development of its first information center, which was equipped with three workstations and staffed with two full-time employees, Brown said. One of the center's main missions was to take up some of the application development slack left by the base's overburdened central MIS department.

Recognizing the need to make its presence known to potential clients, the information center launched its operations with an open house, encouraging the base's end users to drop by for a get-acquainted visit. But the advertising ploy backfired, Brown said. By the end of its first day of operation, the center had already fielded 20 to 30 end-user requests for application development — a much heavier response than its tiny staff was prepared to accommodate.

To make matters even worse, one of the requests for new systems came from the base commander himself. That request consumed so much of the information center's resources that the other jobs had to be put on extended hold.

The kicker to the story, Brown said, was that many of the lower priority requests were comparatively simple and could have been fulfilled in an hour or two had they not been placed on a waiting list.

Such horror stories underscore the dangers of overextending an information center's charter and have helped persuade Hercules to restrict sharply the role of its own end-user support organization, he added. Started in late 1982, Hercules' information center advises the company's end users on a wide assortment of application development matters, but stops short of doing any programming itself.

"We don't create any deliverables," Brown said. "We're striving for user self-sufficiency. Our goal is to help users help themselves."

Brown described information centers as an ideal vehicle for dispensing a corporation's in-house microcomputer services and for controlling personal computer acquisitions. But whether Hercules will use its own center as a means of limiting personal computer proliferation has yet to be decided by the company's upper management, he said.

Although he still characterizes his firm's information center as an "experimental pilot project," Brown rates the installation as a corporate success thus far. The company's information center has particularly stressed the acquisition of employees with strong nontechnical, human relations backgrounds. Although every end-user support group needs at least one technical heavyweight, "people skills have proved much more important to us than DP skills," Brown said.

"You can teach someone DP experience. But the willingness and ability to work with people seems to be inborn," he concluded.

SBA opposes DP crime bill

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — The Small Business Administration (SBA) last week told a U.S. Senate subcommittee it cannot support the Small Business Computer Crime Act, a bill already approved by the House directing SBA to help small companies defend themselves against computer crime.

The agency was the lone dissenting voice as the Senate Small Business Committee began deliberations on the legislation, approved by the House last October [CW, Oct. 1]. The bill would establish an SBA/private sector task force to study computer crime in the small business sector and an SBA clearinghouse for computer crime and security information.

James Thomson, SBA associate administrator for management assistance, told the committee that although the agency wants to help small companies improve computer security, the proposed legislation would be very difficult to enact. He also said the problem has already received sufficient study, which makes the task force unnecessary.

Opening the hearing Wednesday, Rep. Ron Wyden (D-Ore.), sponsor of the House version of the legislation, said the bill is necessary because "thousands of small business people are choosing to use computers without adequate knowledge of their vulnerabilities and what steps they can take to protect the integrity of the systems."

Wyden was followed by a parade of government officials, small business representatives and security experts who supported the legislation.

SBA's Thomson said his agency "looks forward to cooperating with others to help small businesses improve the management of their computer technology and to encourage them to protect it from abuse." But, he added, although this topic is "a legitimate, growing small business concern and . . . the federal government is rightfully charged with the responsibility to help educate the small business community to protect itself from these abuses, SBA cannot support enactment" of the legislation.

He explained it would be "extremely difficult" to define the nature and scope of computer crimes against small businesses such as the bill would mandate. And, he said, "because only a very low percentage of computer crime is reported, it would be an enormous, expensive task to reach any meaningful conclusions about the unique susceptibility of small businesses to computer crime."

Much of the information the bill would direct the SBA to develop already exists, he added. "We propose instead to eliminate the formal study phase and proceed immediately to provide state-of-the-art information to small businesses on computer-related crime and abuse, along with management assistance on associated computer security controls."

He said the agency is already moving to implement this type of educational program.

Despite the SBA commitment to this type of program, congressional sources predict the legislation's supporters will push the bill in order to create a statutory mandate for this SBA effort. The SBA position on the bill had not been formalized when the House was considering the legislation last year.

Now MTI brings you famous Diablo letter-quality printing at new low prices. Call today.

MTI has them all in stock and ready to ship. Even the 630ECS series, the only letter-quality printer that can print virtually all characters the IBM Personal Computer can display, including all 128 extra characters of the PC's extended character set.

MTI is an authorized Diablo distributor, so we get these printers first and fast. The Diablo 620 API, 630 API and the Diablo 630ECS are probably the finest letter-quality printers on the market today.

Whether you lease, buy or rent our equipment, you'll find MTI is the one source for all the terminals, peripherals, systems, applications expertise and service you'll ever need. At great prices. Call us today.

New York: 516/621-6200, 212/767-0677, 518/449-8969
Outside N.Y.S.: 800/645-6530
New Jersey: 201/227-5552
Ohio: 216/464-6688

mti Diablo Authorized Distributor

Applications Specialists & Distributors, New York, New Jersey and Ohio. DEC, Intel, Texas Instruments, Datapoint, Lear Siegler, Diablo, Esprit C.Itoh, Intecolor, Rasal-Vadic, MICOM, Vested, Develcon, U.S. Design Sig.Reg., Cipher, Protocol Comp., MicroFox, Microsoft, Polygon, Select.

CORRECTIONS

"Spreadsheets help micros upset mainframes" [CW, March 5] incorrectly identified one spreadsheet vendor as Unicorp. The correct name of the company is Unicalc Corp.

"Micro family, Winnie controller among Expo debuts" [CW, Feb. 13] incorrectly lists the prices for three OSM Computer Corp. personal computers as $24,095 for the OSM-PC, $42,095 for the OSM-XPC and $67,095 for the OSM-VIPC. The correct prices are $2,495, $4,295 and $6,795, respectively.

NEWS

Growing MIS emphasis on end-user productivity lauded

CW AT EDP PERFORMANCE MANAGEMENT

By Jeffry Beeler
CW West Coast Bureau

PHOENIX — MIS managers have greatly widened the scope of their efforts to boost their companies' information-processing productivity.

That is a departure from recent trends, in which information systems directors typically restricted their productivity-enhancement activities to their own data centers. So said Phil Howard, president of Applied Computer Research, Inc., in remarks made during his firm's fifth annual EDP Performance Management Conference here last week.

Today, the accent in the MIS managers' drive to maximize information systems' efficiency is shifting increasingly to the business world's end users, Howard said.

Managers of large corporate computing departments "are looking more and more outside their own data centers and are concentrating instead on improving the productivity of their companies' nontechnical employees," he said.

Howard applauded the increased emphasis on end-user productivity and urged MIS directors to focus their systems' resources on business areas that will yield the greatest payback for their corporations as a whole.

If information processing executives improve their own departments' performance by a given percentage, the effect on corporate profitability will be minimal. But if they can raise productivity by the same amount among their end users, the bottom-line impacts can prove dramatic, Howard said.

"Don't get me wrong," he told conference attendees during his address. "I'm not saying that DP departments no longer have to worry about managing their own performance effectively. They still do."

Enhancing end-user systems performance is often much easier said than done. Not the least of the obstacles is the problem of how to find the right people for the job, Howard said.

In the past, most of the people who were assigned to the chore of helping users remedy their information processing deficiencies came straight from the computing ranks. Although such specialists boasted strong backgrounds in technology, they typically knew next to nothing about their companies' overall businesses.

Today, Howard said, large corporations would be well advised to take just the opposite approach: Insist that all their end-user support employees have a solid formal education in general business and then make sure they gain an overlay of basic information systems skills.

Howard's preference for user helpers with a sound business grounding was greeted skeptically by at least one of the conference attendees, who urged companies to seek computing expertise first and add nontechnical know-how later.

But the publishing company president defended his original position. "Many DP people enjoy working with computers and being just technicians," he said. "They don't want to do anything else. They don't want to learn about business."

MIS planning seen fitting hand in glove with business planning

By Jeffry Beeler
CW West Coast Bureau

PHOENIX — Large companies are increasingly recognizing the need to integrate strategic business plans with corporate information systems plans and responding accordingly.

That conclusion emerged as the common theme in a number of prepared presentations at last week's EDP Performance Management Conference here sponsored by Applied Computer Research, Inc.

In many corporate quarters, overall business plans and MIS plans have long been regarded as largely unrelated to each other. But that widespread perception is unfounded and is steadily being debunked, several of the conference's speakers agreed.

MIS planning is fast becoming "part and parcel" of strategic business planning and is usually "critical" to a company's overall success, according to Charles McCaig, vice-president of information services at Mutual Benefit Life Insurance Co.

So interdependent, in fact, are information systems' plans and their general business counterparts that the two have to be done together if the former realistically expects to strengthen the latter, McCaig said.

Echoing views similar to McCaig's, Paul Robichaux, Boole & Babbage, Inc.'s senior vice-president, voiced confidence that information systems planning and basic business planning can be modeled simply and that the results can later be merged.

From an MIS manager's standpoint, one of the keys to the effective integration of systems' plans and strategic corporate plans is a strong knowledge of a company's main business, Robichaux said.

How thoroughly computing department executives understand their firms' total mission will determine to a great extent whether they ultimately rise through the corporate ranks to become their employers' chief information officers, he said.

Also key to the integration of business and information systems planning is an MIS manager's ability to create a visual model that shows how computing department activities will affect a corporation's overall performance. Such a model, Robichaux said, has to be simple enough that a senior corporate executive with little or no technical background can use it routinely to make decisions.

In the words of our users.

"The Fortune multi-user environment makes information more accessible to more people more quickly."

–Esther Seid
President, ESM Corporation, Charlotte, North Carolina

FORTUNE SYSTEMS

A leader in UNIX-based commercial, multi-user systems.

101 Twin Dolphin Drive, Redwood City, CA 94065
For more information call 415/592-5140/Telex 172-632

© 1984 Fortune Systems/UNIX a e trademark of Bell Labs

SIGGRAPH '84

The Premier Computer Graphics Conference

◆ 1984 Art, Film and Video Spectaculars
Striking visual presentations of computer graphics excellence. New this year...a curated design arts show plus the first totally computer-generated Omnimax film.

July 23-27, 1984

Minneapolis, Minnesota

For information, contact the SIGGRAPH '84 Conference Office
111 East Wacker Drive (B)
Chicago, Illinois 60601
(312) 644-6610

ICST budget cuts feared crippling, if not deadly

By John Gallant
CW Washington Bureau

WASHINGTON, D.C. — An adviser to the National Bureau of Standards (NBS) said last week that the Reagan administration's plan to cut the NBS Institute for Computer Sciences and Technology (ICST) budget in half would so cripple the agency that it would be better to disband it altogether.

The administration has been trying to transfer the ICST activities in domestic computer and telecommunications standards to the private sector. The agency would continue to represent the U.S. to international standards organizations and perform a number of research projects. The fiscal 1985 ICST budget proposal is for $5 million, compared with approximately $10 million approved the last two years by Congress.

"With the proposed $5 million dollar budget, ICST simply cannot fulfill its current mandate," according to Dr. Shirley Prutch, vice-president and general manager of Martin Marietta Data Systems, Inc. of Bethesda, Md. Prutch, who chairs an independent ICST evaluation panel, said all DP users, in both government and the private sector, "need ICST's leadership."

Prutch testified last week before the Senate Subcommittee on Science, Technology and Space, which has resisted White House efforts to cut ICST funding. She told the subcommittee that "if $5 million is all that is available, we would do better to disband ICST and thereby publicly state that [its] mandate is not needed rather than waste $5 million with results that cannot be even close to acceptable."

She added that $15 million would be a more appropriate funding level for the activities for which ICST is chartered under federal law.

Private sector to fill gap

NBS Director Dr. Ernest Ambler told the subcommittee ICST has "successfully mobilized the interest of user groups" and said he is more confident than ever that the private sector would fill whatever gap would be left if ICST ended its domestic standards work.

Sen. Slade Gorton (R-Wash.), subcommittee chairman, noting what he called "the drastic reductions" proposed for ICST funding, suggested to Ambler, "You're not wildly happy to be here defending this particular part of the budget."

Ambler said the budget cut was a difficult decision, but added that a research organization such as NBS must direct its resources to meet the role and constraints it sees developing in the future. Of the ICST budget, he said, "This is the way it all comes out when you apply those criteria."

Under questioning from Gorton, ICST Director James H. Burrows, who appeared before the subcommittee with Ambler and six other NBS officials, said he knows of no private sector organization ready to take over the standards activities of the agency if the budget cut is approved. "I don't know anybody who would replace us in the will and desire to get standards out," he said.

Lottery DP center feeling load of Mass. jackpot fever

Surge of bettors eye $13 million-plus prize

By Edward Warner
CW Staff

BOSTON — Massachusetts has caught lottery fever, and the state lottery agency's computer system has been groaning, but coping well, under the load of processing as many as two million ticket purchases a day.

The cause of the upsurge in lottery ticket buying has been the lottery's one-year-old Megabucks game, which last week offered a jackpot prize of $13 million.

A jackpot drawing was scheduled for last Saturday, but if it did not produce a winner, this week's jackpot could reach $20 million, according to the director of the state lottery's computer operations, Sebastian Piccolo.

Last week, according to Piccolo, the lottery system's computers were processing an average of 35 to 40 transactions per second, most of the ticket sales going for the 1.9-million-to-one shot at the Megabucks jackpot. Bettors in the lottery create their own six-digit lottery number on any of the state's 2,023 on-line Amtote Systems lottery terminals, located at lottery agents throughout Massachusetts.

Lottery numbers are entered on keypads or on paper cards, which the terminal reads, and sent over phone lines to the state lottery system's battery of five Sperry Corp. V77-600 computers in Braintree, Mass.

The state's computers, running software also supplied by Amtote, a division of General Instruments, Inc., record the number and send a message back to the bettor's terminal, which creates his printed lottery ticket. The computers also verify winning numbers and record lottery agents' commissions.

The winning numbers are selected manually by pulling six balls from a rotating drum of 36 balls numbered from one through 36.

Increased response time

All transactions on the state's lottery system are recorded on both a Kennedy Co. 9100 tape drive and a Sperry 8433-21 200M-byte hard disk pack recorder.

The interval between when the lottery number is entered on a terminal and when the ticket is printed out is the system's response time. Piccolo said the burden of transactions on the system had caused response time to increase from 4 to around 25 seconds prior to the March 3 drawing, when the jackpot stood at $8 million. By 7 p.m. that evening, an average of 51,000 transactions were flowing into the system every ten minutes, he said.

Piccolo said his department has since adopted measures to balance the load of incoming transactions among the system's computers and added two more computers to its front-end system.

The system's response time had been reduced to a mere 2 to 3 seconds, he maintained, prior to the anticipated buying frenzy of late last week.

SIGGRAPH '84
The Premier Computer Graphics Conference

1984 Exhibition

The most intense display of high performance computer graphics equipment for current and future applications.

July 23-27, 1984
Minneapolis, Minnesota

For information, contact the SIGGRAPH '84 Conference Office
111 East Wacker Drive (B)
Chicago, Illinois 60601
(312) 644-6610

In the words of our users.

"With the Fortune System I have all the software I need to take my business through the '80's."

—Jay Dement
Executive Vice President,
Atlas Screen Printing Supplies, Inc.,
Chicago, Illinois

FORTUNE SYSTEMS

A leader in UNIX-based commercial, multi-user systems.

101 Twin Dolphin Drive, Redwood City, CA 94065
For more information call 415/592-5140/Telex. 172-632

© 1984 Fortune Systems/UNIX is a trademark of Bell Labs

NEWS

Trilogy delays wafer-based CPU yet again

By Peter Bartelt
CW Staff

CUPERTINO, Calif. — Trilogy Ltd. has again pushed back its target shipment date for an IBM-compatible mainframe based on its ongoing wafer-scale semiconductor development and announced other changes that analysts believe could limit the company's market penetration when the project is completed.

The company announced March 8 that it had solved earlier problems [CW, Jan. 23] with the wafer-scale product, which is purported to pack the capacity of 100 integrated circuits onto a 2½-in. wafer. But Trilogy said it has decided to "simplify" the design process for the crucial semiconductor and also to build a dual-processor machine, rather than the single-processor version originally planned.

Those changes will push the scheduled shipment date back to mid-1986, according to Russell B. Drew, company vice-president; it had previously been scheduled for the third quarter of 1985 and then pushed back to the fourth quarter of 1985.

Both the delay and the expected increase in unit price caused by the changes may decrease Trilogy's opportunity to penetrate the marketplace significantly, according to both Jonathan Pram, a large-system vendor analyst with Paine Webber Mitchell Hutchins, Inc., and Dave Moschella, industry analyst with International Data Corp. in Framingham, Mass.

The shift to a dual processor "dilutes the significance" of the machine, and the delay will result in Trilogy entering a more crowded market, with competition looming from Japan, Pram said.

"The longer they wait, the more their advantage shrinks," Moschella said, noting that Trilogy had planned to be first in the market with the densely packed wafer-scale semiconductor, but is allowing others to catch up. He also wondered whether Trilogy will be able to meet its goal of being substantially below the cost of comparable IBM products.

Drew said the changes will result in higher system costs, but will add power and performance. The company "feels very comfortable" with market demand for high-performance machines, he said.

The metalization process that had previously caused problems with the wafer-scale prototype had been solved and did not play any role in the latest development changes, which were prompted by a scheduled development review, Drew said.

The company said the simplified design process reduces "the level of technical risk associated with the development project" and will make the wafer-scale technology more suitable for applications in computers other than Trilogy's. Both Digital Equipment Corp. and Sperry Corp. have made significant investments in Trilogy, together investing $65 million and gaining rights to the technology.

Slower processing speeds

But the redesign resulted in slower processing speeds in the single-processor configuration, according to Trilogy, causing the company to plan on the dual-processor mode it claims will have three times the performance of the recently announced dual-processor IBM 3081 Model KX; the original had been planned to have four times the performance of the single-processor IBM 3083 Model J, Trilogy said.

Within approximately one year after first shipments, according to Trilogy, the company intends to ship a four-processor, or quadratic, version.

According to Moschella, Trilogy is entering "a market where the key to success is when they get their product out there." Any delays cut into the performance advantage planned over IBM products, he added.

Paine Webber's Pram said such delays are not unusual in the development of new technology.

SDC speeds claims processing

BOSTON — After being threatened with the termination of its contract to computerize Massachusett's Medicaid program, Systems Development Corp. (SDC) has complied with an order to reduce its processing backlog.

The state Welfare Department, which oversees the Medicaid program, had ordered SDC to reduce its claims screening and processing period from roughly 34 days per claim to 15 days. After increasing its staff and installing another computer, the vendor went the state one better and reduced the backlog to 13 days per claim. This means providers can expect to hear from SDC within 30 days, instead of the almost 90 days they previously endured.

Moreover, within the last two weeks, SDC has processed 1.7 million claims totaling $100 million.

Welfare Commissioner Charles M. Atkins said he was "absolutely delighted" with SDC's performance and concurred with SDC President and Chief Operating Officer Frederick Jenny, who said the Medicaid management information system is working well and the two parties are working well together. "They [SDC] delivered on their commitment, and I really respect them for that," Atkins said.

Atkins and Jenny denied a published report that said SDC was threatening to sue the state over $7.9 million in costs attributed to change orders — costs the state initially refused to pay but will probably make settlement on after certification.

ABC's MM ON-LINE COMPUTERIZED SYSTEM

Maintenance Management

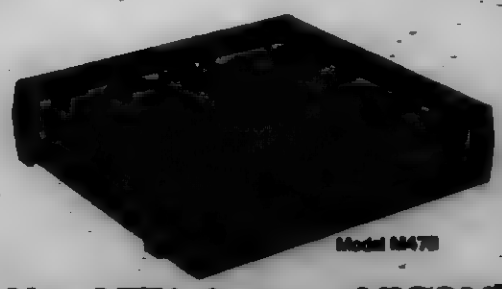
Manufacturing • Processing • Utilities
Schools • Hospitals • Public Works
Mines • Paper • Cement • Chemicals
Oil & Gas • Transportation
Construction • Service

- Cuts Maintenance Costs & Downtime
- Increases Productivity
- Corrective & Preventive Maintenance
- Automatic Scheduling
- Equipment History
- Spare Parts Inventory
- IBM, DEC, HP, COBOL, Other Computers

ABC Management Systems, Inc.
Suite 3, 805 Dupont
Bellingham, WA 98225
(206) 671-5170
TM Registered Trademark

Name _____
Title _____
Company _____
Address _____
City / State _____
Zip _____ Phone _____

For more information, cut and mail or phone



Now MTI brings you MICOM's low cost 8-channel short-haul multiplexor at a new low price. Call today.

Intemux 470™ is designed to reduce in-building or on-campus cabling and data transmission costs. Model M478 permits eight asynchronous terminals to be connected to an in-house computer facility or data PABX using only two pairs of wires at distances of up to 5000 feet. The M478 multiplexor is transparent to terminal code and speeds to 19,200 bps.

MTI is an authorized distributor for MICOM, so we get their latest equipment first and fast. And we have the expertise to put your data communications network together in the most cost effective way.

Whether you lease, buy or rent our equipment, you'll find MTI is the one source for all the terminals, peripherals, systems, applications expertise and service you'll ever need. At great prices. Call us today.

New York: 516/621-6200, 212/767-0677, 518/449-5959
Outside N.Y.S.: 800/645-6530
New Jersey: 201/227-5552
Ohio: 216/464-6688

mti

Applications Specialists & Distributors, New York, New Jersey and Ohio.
DEC, Intel, Texas Instruments, Datapredonic, Lear Siegler, Diablo, Esprit, C.Itoh, Intecolor, Racal-Vadic, MICOM, Ventel, Develcon, U.S. Design, Dig.Eng., Cipher, Protocol Comp., MicroPro, Microsoft, Polygon, Select.

NEWS

Users urged to be selective with Info language

CW AT
INFO USERS GROUP

By John Gallant
CW Staff

SAN DIEGO — "Imagine you are faced with a room full of money and you have just five minutes to remove as much as possible," proposed Jim Budd, president of Tustin, Calif.-based Command Business Systems, Inc. "To get as much money as you can, you need to have a strategy. The best strategy would be to grab all the $100 bills first, then the $50 bills and so on."

The story was provided as more than mere entertainment. According to Budd, it has great significance for users of Henco Software, Inc.'s Info fourth-generation programming language and data management system.

"Too often Info is used inappropriately for applications that could better be handled by another method," said Budd, who spoke from a user's viewpoint at the Info Users Group National Conference here. "Info is a powerful tool, but users must become more selective in choosing where to apply it. It's important to develop a strategy aimed at using Info to obtain the so-called $100 solutions and not the less-important $1 or $5 solutions, which could be obtained with traditional tools."

To develop that strategy, said Budd, who often utilizes Info in developing custom software for his clients, users must understand the system's strengths and weaknesses. He said Info is best suited to developing single-user applications and prototyping general business applications that can later be developed in another language for production environments.

"The primary strength of Info is its ability to help you see your data. It is a great data access tool. It is also well-suited to generating and managing data. Info is also strong for 'what if'-type analysis with its query and report writing capabilities. But for the traditional DP functions of managing data in a production environment, Info is not as applicable as other tools," Budd said.

According to Budd, Info does not perform as well in multiuser applications or those involving over nine data relationships. In these areas, traditional programming languages are still more useful. Budd also said the system in the past has been plagued with minor bugs, a statement almost everyone in the audience agreed with by a show of hands.

"The bugs are a sore point. But they're only shortcuts that don't work. The system is forgiving; it allows for errors and still gives the results we want. So we have to be forgiving with Info and find our way around those minor flaws," Budd said.

Viewed in one light, according to Budd, Info is no more important a tool than traditional languages such as Cobol or Fortran. But its real strength lies in the common ground it provides between end users and DP.

"Fortran and Cobol are gibberish to those of us who don't understand them. But Info has removed the veil of secrecy placed on data by DP. Users can understand what DP is saying and doing through the window of Info. This is a changing environment where Info is handshaking with other languages and fostering better communication between end users and DP," Budd said.

National Semi pleads guilty in government chip case

SAN FRANCISCO — National Semiconductor Corp. was fined $247,000 and agreed to pay damages and penalties totaling $1.4 million after pleading guilty to a 40-count indictment filed in federal court. The indictment charged the company with falsely certifying the testing of military and aerospace devices delivered to the government.

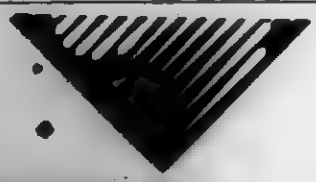
National Semiconductor and the U.S. Attorney's office here said the plea agreement, announced the same day the indictment was filed, disposes of all criminal and civil liabilities arising from a lengthy grand jury probe into the company's testing and certification of military microcircuits supplied between 1977 and mid-1981. In addition, the government agreed that no further criminal and civil actions arising from those matters will be brought against the company, its employees or its customers.

The indictment charged National Semiconductor with 17 counts of mail fraud and 23 counts of making false statements to the government. In addition to the penalties and damages, the company agreed to pay $105,000 for the government's costs for an investigation that lasted more than two years.

John Gibbons, chief of the U.S. Attorney's Criminal Division, said it is "not unusual in cases like this," involving corporations rather than individuals, for plea negotiations to be conducted concurrently with the grand jury investigation.

According to Gibbons, the government did not specify how many microcircuits were covered by the charges.

Stressing that devices that may have been insufficiently tested were as reliable as those completely tested, Charles E. Sporck, president and chief executive officer of the company, said: "We will be pleased to finally resolve this entire matter. It is important to us that the government's investigation did not uncover any instances in which undertested devices had failed in the field."



SIGGRAPH '84

The
Premier
Computer
Graphics
Conference

1984
Technical Program
and Courses

Papers exploring new techniques, panels probing topical issues and courses offering in-depth instruction.

July 23-27, 1984

Minneapolis, Minnesota

For information, contact the
SIGGRAPH '84 Conference Office
111 East Wacker Drive (B)
Chicago, Illinois 60601
(312) 644-6610

In the words of our users.

"We feel that Fortune's new operating system is the most productive currently available."

– John Walker
Manager, Information Systems,
Tektronix, Beaverton, Oregon

FORTUNE SYSTEMS

A leader in UNIX-based commercial, multi-user systems.

101 Twin Dolphin Drive, Redwood City, CA 94065
For more information call 415/592-5140/Telex: 172-632

© 1984 Fortune Systems/UNIX is a trademark of Bell Labs

NEWS

FTC to put Henco's Infotext system to test

CW AT INFO USERS GROUP

By John Gallant
CW Staff

SAN DIEGO — Attorneys at the Federal Trade Commission (FTC) in Washington, D.C., will soon begin putting Henco Software, Inc.'s Infotext document retrieval system to the test, according to an FTC staff member attending the Info Users Group National Conference here.

Infotext, which gives users the ability to include textual materials in the Info data management system, is touted by Henco as providing extensive search and retrieval capabilities for document access. Although there are currently about 1,900 Info users, only about 250 have chosen to purchase the Infotext package, according to Henco President Henry Cochran. Although he predicted a growing market for a document management tool like Infotext, the market has not developed as quickly as Henco had hoped, Cochran noted.

But, according to Dennis Lynch, a systems analyst with the FTC, that agency has already begun to utilize Infotext and will continue to expand its use if all goes well. The FTC has already provided search and retrieval capabilities for nearly 6,000 document abstracts in Infotext on the agency's two Prime Computer, Inc. Prime 750 processors running under Primos. FTC attorneys and librarians in the Washington office or in any of 10 regional bureaus can perform key word searches through the titles of the abstracts to find documents relating to any subject.

CW photo by J. Gallant
Dennis Lynch

In addition, Lynch told *Computerworld* in an interview last week, the FTC has undertaken a second, more extensive use of Infotext. About three months ago, he said, the agency began to input the full text of all documents relating to two FTC cases — one of them an antitrust suit — currently under investigation. Once the documents are keypunched into the system, attorneys working on the cases have access through terminals to all or portions of the documents through a variety of search techniques. Lynch would not divulge the number of documents involved, but he said the figure was "quite large." If Infotext proves useful in that application, the FTC's data processing staff plans to add documents relating to future cases as they arise. "Our goal was to bring many of our time-sharing jobs in-house," Lynch explained.

"One of these was litigation support, which aids attorneys in doing case research, such as word-searching transcripts or other documentary evidence. With time-sharing, we were using Infodata [System, Inc.'s] inquire on an IBM mainframe, and we wanted to provide that same functionality in-house. We were already using Info, and Infotext was really the only thing we saw that would work with our Prime systems."

Lynch said Infotext has shown "adequate" response time in testing, but he is somewhat apprehensive as to how it will perform when "pushed to the limit" by additional cases. "We still have some real questions about Infotext.

"Some of these large antitrust cases are enormous, and I doubt that we could use Infotext to maintain them," he added.

According to Lynch, the FTC hopes to have all documents relating to the test cases available through Infotext by midsummer. He said the agency has preliminary plans to unload documents for archiving once a case has been closed.

DP manager must plan, educate, consult: keynoter

By John Gallant
CW Staff

SAN DIEGO — Data processing management has lost control over many of its traditional functions, but it has gained a more important role within the corporation, according to one industry analyst.

With much of the computing power and many key applications now in the hands of end users, the data processing manager is no longer an information wizard isolated within the organization, according to John Kirkley, executive editor of *Datamation* magazine. During his keynote address at the Info Users Group National Conference here last week, Kirkley said the data processing manager must now play the roles of strategic planner, educator and consultant in helping the corporation achieve its goals. "As we move into the information age, we realize that the old methods and technologies of DP are not enough," he said.

"The DP king wears a new outfit now, but he can also be the hero of the day for the corporation," according to Kirkley.

As "backbone" of the corporation, Kirkley said, data processing must regain its control by setting standards for information use and making difficult choices in such areas as telecommunications policy and local-area network and office automation equipment.

As if that were not enough, data processing management must learn to live with increasingly demanding end users.

But the added pressures and responsibilities have their rewards, he added. "DP professionals are moving into a fascinating time where the knowledge worker is key. You know the technology, and you can be a leader in this period of change. You must exhibit that leadership not only at work, but in your communities and in the voting booth as well," Kirkley said.

Kirkley outlined the new responsibilities of the data processing manager: administering the corporate data base; leading the way in office automation; implementing an end-user strategy; concentrating on strategic planning; keeping current with developments in both hardware and software technology; establishing standards for local-area networks and telecommunications, among other things; understanding the environment in which the corporation operates; and fostering creativity in the use of information — a nebulous, but nonetheless important, goal. According to Kirkley, the changing role of data processing is evidence of what he labeled "phase three of the changing information environment.

"At first, we experienced a push toward the centralization of information, which was under the sole control of DP," he said.

"But users became increasingly restless, and we saw a move to distributed processing. But in the third phase, we see the re-emergence of data processing.

"DP is re-establishing control by becoming a policymaker and by setting standards within the organization," according to Kirkley.

Security meet set in Toronto

TORONTO — "Computer Security — A Global Challenge" will be the theme of the Second International Congress and Exhibition on Computer Security, held here by the International Federation of Information Processing Societies, Inc. on Sept. 10-12.

Speakers will address such topics as contingency planning and data and facility protection.

Registration is $595 prior to May 30; $645 prior to July 30; and $695 prior to Sept. 1, available through The International Security Congress, Inc., 160 Duncan Mill Road, Toronto, Ont., Canada M3B 1Z5.

Attention DEC* Users:

See how MTI can save you $5,260 on your next 300 lpm matrix printer.

DEC LXY12
$11,250

MTI's CI-300
(CIE Terminals)
$5,990

That's $5,260 less than the DEC LXY12, and the price includes DEC controller, cable, universal power supply, pedestal and paper basket.

MTI's CI-300 is a DEC plug-compatible LXY12 emulator. And it's a lot more printer for a lot less money. It features a resolution of up to 400 dots per inch in letter-quality mode, and up to 200 dots per inch in graphics mode. Ask your MTI salesman for information on its many advantages and superior performance over the LXY12. We are authorized distributors of CIE Terminals, and can enhance your DEC system quickly and efficiently.

Whether you lease, buy or rent our equipment, you'll find MTI is the one source for all the terminals, peripherals, systems, applications expertise and service you'll ever need. At great prices. Call us today.

New York: 516/621-6200, 212/767-0677, 518/449-5969
Outside N.Y.S.: 800/645-6530
New Jersey: 201/227-5552
Ohio: 216/464-6668

mti

Applications Specialists & Distributors, New York, New Jersey and Ohio.
DEC, Intel, Texas Instruments, Datapoint/arcnet, Lear Siegler, Diablo, Rapid C.Rob, Intecolor, Racal-Vadic, MICOM, Ventel, Dowkcon, U.S. Design Dig.Rsg., Cipher, Protocol Comp., MicroPro, Microsoft, Polygon, Select.
*DEC is a registered trademark of Digital Equipment Corp.

Henco's battle plan: increased market power

CW Staff

By John Gallant
CW Staff

SAN DIEGO — Like a commanding officer, Henry T. Cochran is formulating strategy in response to changing events on the battlefield.

President of Henco Software, Inc., Cochran has developed a two-pronged strategy that he hopes will expand Henco's influence in its existing marketplace while taking advantage of an emerging one.

That strategy calls for the addition of multiuser capabilities to Henco's primary offering, Info, and the introduction of what Cochran described as an "integrated workstation product" combining data management, spreadsheet and word processing functions.

"In the future, we aim to address the needs of the knowledge worker better through our new workstation product. We also see the inability to create multiuser applications with Info as a major weakness that must be addressed. We are attempting to extend our existing strengths and cover an emerging market simultaneously," Cochran told *Computerworld* during an interview at the third annual Info Users Group National Conference here last week.

The as-yet unnamed integrated workstation product that Cochran was alluding to is currently under development at Henco. Slated for release in mid-1985, the system is scheduled to go to initial test sites at the end of this year. Cochran said the workstation product will be integrated with Info through what he labeled a data management unit that will reside on a corporate mainframe or minicomputer. The product is targeted toward supermicrocomputer workstations such as the IBM Personal Computer XT, he said, and will provide a "gateway" for access to the host system's data.

"Clearly, our idea in shifting to a two-product approach is to address the shift in the marketplace toward decentralized computing. We're not backing off on Info; we intend to add life to its growth cycle through enhancements. But micros add a new level of possibilities, and it's important for us to take advantage of them. The products are simply two routes to the same end."

During remarks at the opening session of the conference, Cochran was quick to assuage users who may have feared Henco's new product focus would mean a lessened commitment to Info. The second prong of his strategy involves the planned Revision 10 of Info, which Henco billed as a fourth-generation programming language and data management system.

"The primary focus of Rev. 10," Cochran told *Computerworld*, "is to make Info much stronger as a multiuser product. A workstation product doesn't share data. Info, however, is a shared data system. It is a language-oriented, command-driven product, and there are a lot of people out there who want to continue using it.

CW photo by J. Gallant
Henry T. Cochran

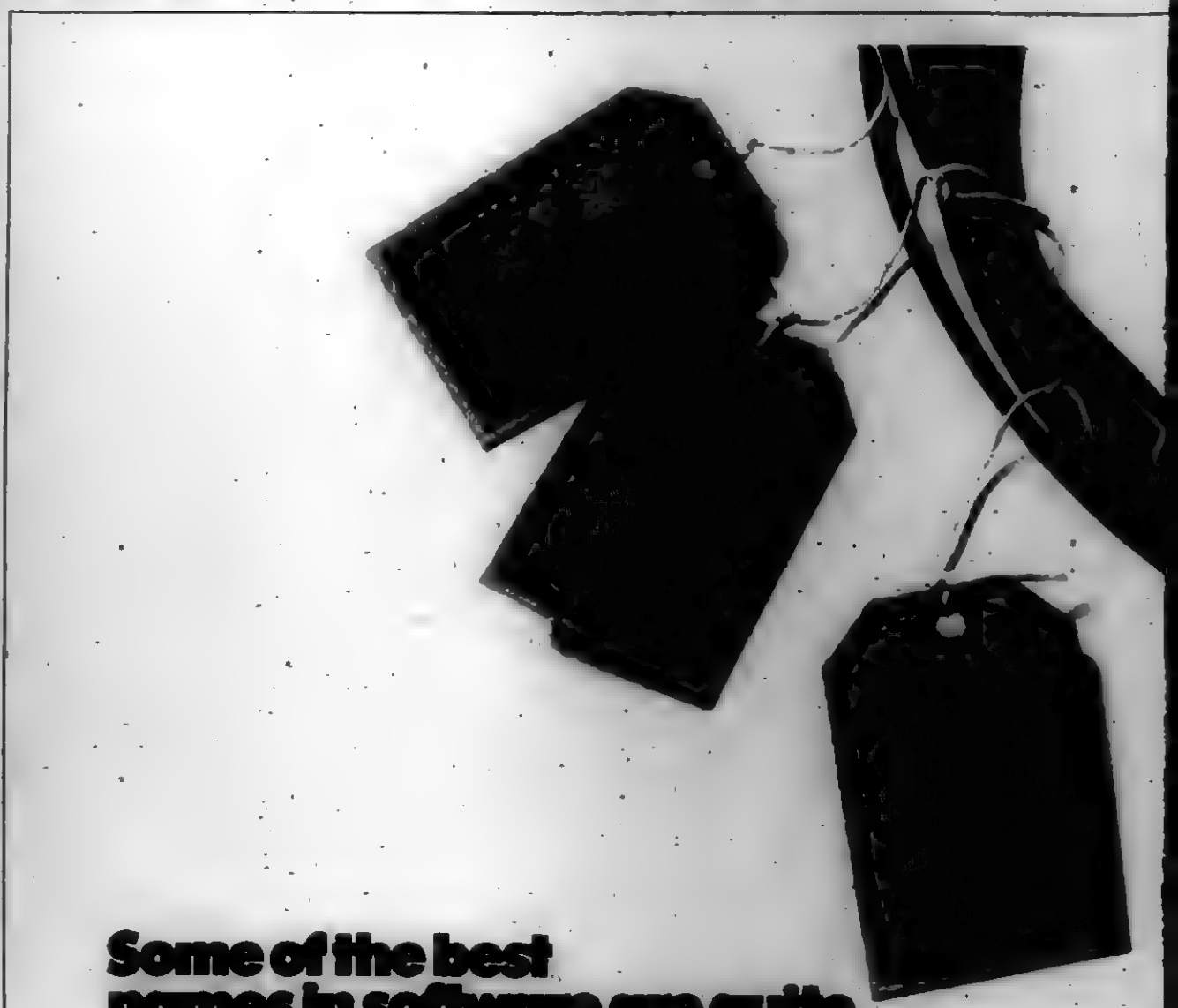
"Many people have predicted the rapid demise of dumb terminals," he continued. "I strongly disagree with that. There is a set of applications that will forever be best addressed by a shared data system accessed by dumb workstations or terminals. We've traditionally provided that capability through Info, and we will continue to do so."

Not scheduled for release until mid-1985, according to John Holman, vice-president of product development, Revision 10 will feature what he called concurrent multiple-user file updating. It will also offer record-level-locking capabilities that Holman said will make it easier for users to create multiuser applications and an upgrade path for Revision 9 applications.

CORRECTIONS

"Lotus 1-2-3, Chartmaster, Cheetah score high in package analysis" [CW, March 5] failed to note that the Cheetah graphics package, which was developed by Centec Process Systems, is marketed exclusively by Genigraphics Corp. Genigraphics is located at 4806 W. Taft Road, Liverpool, N.Y. 13088.

A chart describing millions of instructions per second (Mips) on IBM's 3080 line of processors [CW, March 5] listed the Mips rating on the IBM 3081 Model K and Model KX processors as 18.8 and 20.4, respectively. Manufacturers of competing products, as well as industry analysts, contend that in a commercial job mix, the Mips figure on the 3081 Model K should be 15. Based on that figure, the Mips rating on the 3081 Model KX should be 16.3.



Some of the best names in software are quite attached to our network.

These people know PCs. They also know a good idea when they see one. That's why they're building future networking software around today's networking standard — Ethernet. And why they chose our PC networking system to help them do it. EtherSeries from 3Com.

What EtherSeries is doing for them.

"3 large, growing, and diverse Ethernets are at the heart of our software development activities. Our 3Com hardware has been very reliable — it has never failed us."
— Bill Gates, Chairman, Microsoft (Bellevue, Washington)

"We want to develop our popular dBase II® to a multiuser networked database environment. To meet the demands of our customers we chose the high-performance 3Com EtherSeries."
— David Clayton Cole, Chairman, Ashton-Tate (Culver City, California)

"The ease of sharing information and printers led our 1-2-3® advanced development team to choose 3Com's EtherSeries® over all of the alternatives."
— Mitch Kapor, President, Lotus Development (Cambridge, Massachusetts)

"We wanted network software transparency. Our PFS:® software runs without ANY change on 3Com's EtherSeries® — it protects our user's software investment."
— Fred Gibbons, President, Software Publishing (Mountain View, California)

"The Ethernet standard and 3Com's EtherSeries® will be an important part of our in-house networking strategy. It provides the connectivity we require for our growing organization."
— Bob Frankston, President, Software Arts (Wellesley, Massachusetts)

"Our mainframe link software and Peachtree software ran perfectly in the 3Com environment. We dropped

Naivete seen as hurdle to on-line security

By John Gantz
CW Washington Bureau

ARLINGTON, Va. — The major impediment to on-line information system security is the naivete of users and providers, according to participants at a recent Videotex Industry Association (VIA) security conference here.

The two-day forum on unauthorized access was convened, VIA Executive Director Robert L. Smith Jr. said, to allow the young industry to begin developing an approach to security issues, particularly computer crime laws, before "a crisis" prompts possibly inappropriate legislation.

Forum Chairman George Minot, senior vice-president of Compuserve, Inc., said the current magnitude of the industry's security problem "is the great unknown." But, he added, "it's easily millions of dollars a month" in stolen services, system overload and downtime that denies access to legitimate users.

Asked if the association members feel federal legislation is necessary, Minot answered, "We really are naive in that regard." He suggested the member firms would support whatever deterrent is effective. Several members said they believe state legislation is preferable to a national law at this time.

"State legislation . . . is needed; it is appropriate," said Alan Grossman, director of business development and information services for Dow Jones & Co., Inc., who led forum discussions on legislation. "It is closer to where our problems are," and the U.S. Congress is more likely to follow the states' lead than tackle the issue on its own.

But, Grossman said, the industry must make sure its security practices are adequate before it can seek legislative remedies.

Based on the two days of discussions, Minot said, the association will start developing statistics and better definitions concerning the industry's security problems, begin developing security standards for information services providers and look for opportunities to work with other groups interested in DP security matters.

Addressing definitional inadequacies, Bettie Steiger, vice-president of information resources for Reference Technology, Inc., said law enforcement is hindered by a lack of definitions for property, value and damage as they relate to information services. A better understanding of what actions are malicious, unauthorized or inadvertent is needed, she said. Steiger, who moderated a discussion on considerations of security enforcement, said conference attendees were surprised to learn that the approximately two dozen state DP crime laws are being actively enforced.

Necessary steps

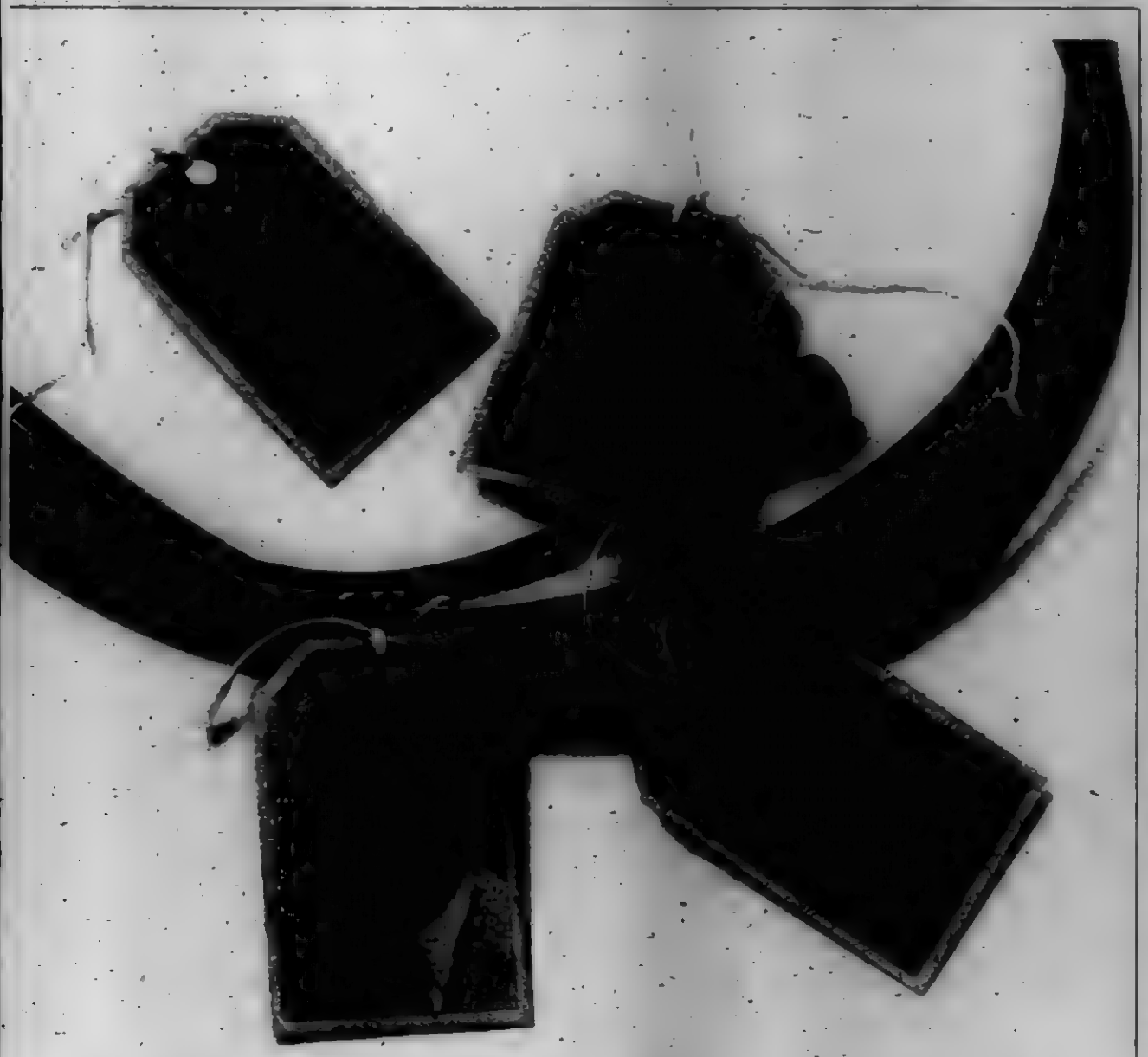
But before enforcement can be effective, she said, a number of steps are necessary, including:

- Information systems must be designed to collect and keep evidence of unauthorized access.
- The systems must be secure so that prosecutors will be willing to prosecute security violators.
- Providers must have a plan to respond to unauthorized accesses.

Steiger also commented that public opinion has to support better security and law enforcement if the problem is to be effectively addressed.

Gary Arlen, president of Arlen Communications, Inc., called for a public education effort aimed at, in order of importance:

- System users. One forum attendee decried "the level of [security] naivete on the part of so many of our customers."
- Legislators. They must be aware of the need for laws against unauthorized access, Arlen said.
- Hackers. They must understand that "we're serious that we don't want this [unauthorized access] going on and will prosecute," he said.
- Employees. A condition of employment, according to Arlen, is that "you can't play with the system."
- Media. Arlen joined with a number of persons at the forum complaining that the media is glamorizing illegal hacking activities.
- Enforcement agencies. They, too, tend to glamorize the arrests they make in unauthorized access cases, he said.
- The world at large. Arlen said society must understand that at the birth of this new industry there are important legal and moral issues that need to be resolved.



EtherSeries" right into our IBM Information Center and can now share disks and printers."
— Dennis Vohs, Executive Vice President, MSA (Atlanta, Georgia)

"We wanted the expandability of 3Com's Ethernet as a base for our networked products. VisiSeries" for EtherSeries" is the beginning of a family which will include VisiOn.""
— Dan Fylstra, Chairman, VisiCorp (San Jose, California)

What EtherSeries will do for you.

Tying into 3Com EtherSeries was a smart business move for these PC software experts. And it can be for you too. You'll maximize office efficiency, now. Cut operating costs, now. And you'll realize the full potential of your IBM PCs using software that is readily available off-the-shelf, now. All for the low price of $795 per link.

EtherSeries is available at leading computer stores. Call or write Cory Randall at 3Com for more details.

☐ Please have your 3Com representative call.
☐ Please send me more information.
CW 3/12/84
Name
Title
Company
Division
Address
City/State/Zip
Phone
3Com Corporation, 1330 Shoreline Way, P.O. Box 7390, Mountain View, CA 94039. Phone (415) 961-9602.

3Com is EtherNet.

EtherSeries" is a trademark of Action-Tec. Lotus 1-2-3" is a trademark of Lotus Development Corp. WS" is a registered trademark of MicroPro Publishing Corp. VisiSeries" and VisiOn" are trademarks of VisiCorp.

CICS/TSO

Runs 3 to 5 transactions under TSO

— increase programmer productivity
— isolate transaction testing
— protect production applications

DATASK SYSTEMS
4805 Fairview Road
Downers Grove, IL 60515
(312) 971-3681

NEWS

Tech innovation to spur info system shift: IDC

CW AT IDC BRIEFING SESSION

By Peter Bartalik
CW Staff

BOSTON — A "clustering" of related technological innovations will produce an "incredible transformation" of information systems potentials over the next two or three years, according to International Data Corp. (IDC).

Speaking here recently at IDC's 19th Annual Information Industry Briefing Session, William F. Zachman, vice-president of corporate research, said the clustering of innovations involving interrelated technologies of information "is creating the conditions for a period of fundamental change over the remainder of the 1980s." Zachman cited 17 areas of emerging technology which "over the next two or three years are going to change profoundly the way we use information systems . . . and over the next 10 to 15 years will change the way we live."

Optical disk storage "is going to be one of the most important technologies over the next five years," according to Zachman. He said optical storage technology will provide inexpensive digital information distribution and a high-capacity static storage that could possibly overtake microfiche.

Another area stressed by Zachman was the development of what he called "mindware." Included in this category are computer-aided intelligence, artificial intelligence, knowledge-based and expert systems, inference systems and computer "advisors."

Zachman predicted the explosion in home computer applications will come with the development of computer systems that "are going to be companions, advisers" that provide counseling to individuals ranging from employment strategies to personal life.

The microprocessor operating system for the late '80s "has not even been designed yet," Zachman said, predicting there "is room for many surprises yet to come."

He also predicted that data base machines will be preferred over data base management systems by the end of the decade and will be very successful in local-area network applications. "We're not far away from seeing networked distributed data base systems, and we're going to see a lot more," Zachman predicted.

Other technological innovations cited by Zachman include fourth-generation 32-bit microprocessors; peripheral and support chips with functions such as controlling disk drives and interfacing to local-area networks; Cmos technology providing low power consumption and low heat generation; 256K-byte random-access memory chips greatly expanding personal computer memory size into the 1M- to 16M-byte range; high-capacity Winchester and floppy disks; flat panel displays; low-cost graphic output devices; networking standards; micro-based multiprocessor systems; and communications processors.

DP managers seen underbudgeting salaries for '84

CW AT IDC BRIEFING SESSION

By Paul Kunsmiller
CW Staff

BOSTON — "Data processing managers have not budgeted enough money for salaries in 1984," said John Wanamaker, senior MIS consultant, at International Data Corp.'s (IDC) 19th Annual Industry Briefing Session held here earlier this month.

Wanamaker cited IDC's "1983 Data Processing Spending Survey" in which 1,000 DP managers projected a 6% average rise in salary allocations for 1984. "We feel that a 6% increase is low," Wanamaker said.

That increase barely matches a 4% increase in staff size that managers forecast. DP departments are growing four times faster than other departments, and "this growth refutes the theory that demand for DP professionals is decreasing," Wanamaker said.

DP costs are shifting toward equipment and away from personnel, the survey found. Personnel costs will drop from 43.8% of the total budget in 1982 to 38.7% in 1984, while equipment costs will rise from 26.2% of the 1982 budget to 28.5% of the 1984 budget.

"Managers are trying to get more bang for the buck," Wanamaker said. DP departments will spend $97 billion in 1984, an increase of $12 billion over 1983.

Equipment costs would be greater if DP departments were paying for microcomputers, but "the cost of microcomputers is being absorbed by user, not DP, budgets," Wanamaker noted. However, DP departments are paying for increased communications costs caused by micro-to-mainframe links. Seventy percent of the managers said that their departments pay communications costs provided to other departments.

Managers estimate that communications expenses will rise 28% in 1984, the largest increase of six spending areas that also include software, staff, hardware, supplies and overhead.

"There are two reasons for the projected rise," Wanamaker said. "First, data processing managers think that the AT&T divestiture will mean rising communications costs, and there will be a large number of new users tying into old equipment."

Software accounts for the second fastest growing expense, with a projected increase of 25% in 1984. Communications costs will account for 9% of the total budget, with software at 8% of the actual budgets.

The survey found that few DP departments charge other departments for use of the mainframe. Seventy-one percent of the DP departments do not charge for their services; only 10% charge for every service.

"It has been extremely difficult for the data processing department to determine computer costs efficiently," Wanamaker said, adding, "There is a correlation between the size of a company and whether the data processing department charges for its services." Fifty-six percent of the companies with income of more than $200 million charge for their services, while only 25% of those with less than $25 million charge users.

ATTENTION: MANAGERS — ENGINEERS — SITE PLANNERS

HAVE YOU HEARD ABOUT FIPS PUB 94?

GUIDELINE ON ELECTRICAL POWER FOR ADP INSTALLATIONS

A COMPUTER INDUSTRY FIRST!

NOTICE: THIS MILESTONE DOCUMENT HAS BEEN REVIEWED BY MEMBERS OF THE POWER INTERFACE COMMITTEE OF THE COMPUTER BUSINESS EQUIPMENT MANUFACTURERS ASSOCIATION, (IBM ,DEC, BURROUGHS, HONEYWELL, UNIVAC, NCR, CDC, ETC.) AND THEREFORE REPRESENTS A CONSENSUS AMONG THESE POWER EXPERTS.

FEDERAL INFORMATION PROCESSING STANDARDS PUBLICATION

COMPUTER POWER SYSTEMS CORP. A CONTRIBUTOR TO FIPS PUB 94 WILL CONDUCT THESE SEMINARS, TO FULLY EXPLAIN THE TECHNICAL CONCEPTS PRESENTED.

MARCH 29	LOS ANGELES	SEPTEMBER 6	NEW YORK CITY
APRIL 5	DETROIT	OCTOBER 18	BOSTON
JUNE 28	PHILADELPHIA	NOVEMBER 8	DALLAS
JULY 19	CHICAGO	DECEMBER 6	ATLANTA
AUGUST 14	SAN FRANCISCO		

SEMINAR DETAILS WILL BE PROVIDED WITH YOUR RESERVATION

YOU'VE ALL BEEN INVOLVED IN CONTROVERSIES ABOUT

- HOW TO GROUND A COMPUTER?
- HOW MUCH ISOLATION REQUIRED?
- WHAT KIND OF POWER CONDITIONER IS NEEDED?

DON'T MISS THIS UNIQUE OPPORTUNITY!

THIS ONE-DAY SEMINAR COULD BE YOUR BEST INVESTMENT IN 1984!!

☐ ENROLL ME IN _____ (CITY)

☐ ENCLOSED IS MY CHECK FOR $195.00

☐ BILL ME (ENCLOSE BUSINESS CARD)

P.O. BOX 8340, CARSON, CA 90749
213/515-0686 X 237 A. MILLER

NOTICE: PAYMENT IS DUE 10 DAYS PRIOR TO EACH SESSION

Forth meet set for June 6-9

ROCHESTER, N.Y. — The 1984 Rochester Forth Applications Conference will be held here June 6-9 at the University of Rochester.

Sponsored by the Institute for Applied Forth Research, the conference will focus on real-time systems, including such areas as process control, data acquisition, smart instrumentation, laboratory systems, computer vision, spacecraft navigation, music synthesis and voice recognition.

A call for papers has been issued on the following topics: real-time software; Forth applications, including but not limited to real-time, business, medical, space-based, laboratory and Forth microchip applications; and Forth technology, including finite-state machines, control and data structures and hybrid hardware/software systems.

Registration is $300. Full-time students may register for $150. Further information is available from the Institute for Applied Research, 70 Elmwood Ave., Rochester N.Y. 14611.

IBM doesn't have micro mart sewn up: IDC

Thirteen computer industry predictions offered for 1984

CW At IDC
Briefing Session

By James Connolly
CW Staff

BOSTON — The final decline of the IBM 360, 370 and 3080 series machines was one of 13 computer industry predictions for 1984 offered by International Data Corp. (IDC) at its 19th Annual Information Industry Briefing Session here recently.

The predictions, assembled by the Framingham, Mass.-based IDC consulting staff, were outlined by IDC Vice-President of Technology Assessment William F. Zachmann.

Other key predictions centered on Apple Computer, Inc. and Tandy Corp., providing IBM with greater than anticipated competition in the microcomputer field and on AT&T facing a possible "bath of red ink" in 1984.

The predictions included the following:

■ "The proclamation of dominance of the IBM Personal Computer by many in the media last year will prove to have been premature." IBM likely will introduce a high-end Intel Corp. 286-based system and other products, but faces competition from IBM-compatible manufacturers, Apple and the Tandy 2000.

■ "Apple blossoms in 1984." The Macintosh and Lisa II are likely to sell well.

■ "Rough sledding for AT&T." AT&T Information Systems, Inc. will introduce workstations, small processors, enhanced telephone switches and networking products, but could face a "bath of red ink" while competing with established computer companies. AT&T Technologies and AT&T Communications also face fierce competition and/or regulatory problems.

■ "The home market will prove to be both more significant and [more] demanding of capable systems than many expect." There is clearly a substantial market for professional and business computers at home.

■ "There will be many new [Cmos] processor and memory announcements from various vendors in 1984." Cmos requires less power and generates less heat than technologies used until now. New products will include 64K-byte chips and, "quite likely," 256K-byte versions.

■ "Important new tech." Optical disks will be used with a number of interactive video games and tutorial software.

■ "The final decline of the IBM 360, 370 and 3080 [series machines] will begin in 1984." The architecture will feel the pressure from supercomputers above, minicomputers and personal computers below and from IBM itself, which is due for a new line of processors.

■ "More multiprocessors will be introduced in 1984." Some of the best buys for users in 1984 will be new offerings such as networks and specialized systems from multiprocessing products manufacturers such as Stratus Computer, Inc. and Synapse Computer Corp. and from start-ups and established vendors.

■ "There will be growing importance for data base machines." Nineteen eighty-four will be the year they begin to achieve a significant level of user familiarity and acceptance. Most will be based upon a fundamentally relational data model.

■ "Ada will come into prominence in 1984." The structured language will play a role beyond the embedded military systems for which it was designed and is seen as a "superior alternative" to Cobol, Fortran and PL/I.

■ "The IEEE 802 local-area network standards will emerge as a significant force in the industry in 1984." The baseband CSMA/CD (802.3) and the broadband token bus (802.4) standards will be approved and will appear in products during 1984.

■ "There will be no clear-cut sweep for Unix in 1984." Unix is of some importance, particularly for programmers, but is not an ideal system for end users.

■ "The present semiconductor parts shortage will prove ephemeral." The shortage of popular microprocessors should disappear by midsummer, when temporary hoarding and overordering end. Major vendors may find they do not need as many chips as they anticipated, and semiconductor prices may drop by next fall.

The briefing by the market research firm was held here at the beginning of the month. It was repeated last week in Arlington, Va., Chicago and Dallas and will be given again this week in Los Angeles and San Jose, Calif.

"dBASE II helps keep us on our toes."

Robert Hubert
Marketing Director
The Boston Ballet

"The Boston Ballet was a company in search of a computer when I joined the organization earlier this year. And, after discovering that a large computer system was being considered, I urged a smaller, more sensible first step.

"Since almost no one at The Boston Ballet had any previous computer experience, I strongly recommended the purchase of a microcomputer and dBASE II.

"dBASE II, the relational database management system from Ashton-Tate, would give the people in the Company the time and the opportunity to get used to computing before bringing in a larger, more expensive system later on.

"dBASE II is a command-driven, highly flexible system that can be used for a great variety of applications ranging from very simple to highly complex."

A premier performer from Day One.

"dBASE II manages our extensive season subscriber mailings; keeps track of all our advertising insertions, costs and efficiency; and makes project time management a snap. We are now making plans to use dBASE II in handling the special promotions and manpower analyses critical to our day-to-day management.

"dBASE II made an immediate and sizeable impact on the efficiency of our operation."

The real kicker.

"Recently, we hired a custom systems house to develop a long-range computer program for The Boston Ballet. Without prejudice, they came back and said the new system should be based on dBASE II."

dBASE II can provide you with virtuoso performance, regardless of your application.

For more about dBASE II, contact Ashton-Tate today. 10150 West Jefferson Boulevard, Culver City, CA 90230. (800) 437-4329, ext. 217. In Colorado (303) 799-4900. In the U.K. (0908) 568866.

ASHTON·TATE

dBASE II is a registered trademark of Ashton-Tate.
Suggested retail price for dBASE II is $700.
© Ashton-Tate 1984.

SAS...
Power and Flex
to Meet All You

You get a headstart advantage with the SAS System. A library of ready-to-use procedures gives you the power to analyze data without formal training. SAS even provides an on-line help facility. Or you can create your own help program. With a few English-like commands, you can use SAS for data analysis, market research, capacity planning, financial reports, summary statistics, charts, plots, perpetual reports and many other jobs.

Available
for
IBM, DG ECLIPSE
and DEC VAX

ibility
r Needs

Integration called best communications tack

CW AT IDC BRIEFING SESSION

By Lynn Haber
CW Staff

BOSTON — With the advent of divestiture, end users are facing tough questions on new options and opportunities for communications network development. Major risks and confusion lie in the forefront of this change, but beyond are opportunities for both users and vendors, an industry expert told his audience at an industry briefing held here recently.

"The key word for networking and communications in the year ahead is 'integration,' which goes well beyond networking, beyond putting pieces of hardware together. It involves system integration at all levels and functions," said Kim Myhre, senior researcher in communications for International Data Corp. (IDC) of Framingham, Mass., which sponsored the briefing. "What we will hear more about is hardware, software and communications and putting those elements into useful and manageable information systems."

Myhre looked at the impact of changing technologies on communications in a talk on "Trends in Communications and Networking" at IDC's 19th Annual Information Industry Briefing Session here earlier this month. The briefing was repeated last week in Arlington, Va., Chicago and Dallas; it will be held this week in Los Angeles and San Jose, Calif.

According to Myhre, one of the greatest effects of the AT&T divestiture and deregulation is general increased competition in the communications area — specifically, competition between AT&T and IBM. Areas of potential IBM-AT&T competition include office automation, personal computers, data communications equipment, local-area networks, value-added network services, transmission services and home information markets.

"The most promising result of competition as characterized by AT&T and IBM will be the availability of new technology products and service options," Myhre said. "Competition will create new areas of opportunity for suppliers of information processing products and services and will inspire the development of new approaches and technologies for communications networking."

The development of new networking alternatives includes long-haul, metropolitan bypass and on-premises or local-area networks, Myhre said. Long-haul alternatives include satellite, microwave, packet-switching and fiber-optic technology.

"In all of these cases," Myhre said, "the purpose is to offer both public and private communications users an alternative to the traditional, leased-line public telephone service."

According to Myhre, despite the fact that bypass technology has received a lot of attention over the past year, "This is an area where alternatives to the local phone network are still not readily available or price-competitive." Some bypass technology includes digital termination systems, cellular mobile radio and two-way CATV.

According to the speaker, there has been an explosion in local-area network technology due to the "growing interest by business for provision of high-speed distributed data communications and fully integrated office automation systems." With increased interest in [local-area networks] by business, specific organizational needs and requirements, not technology, will define and drive the market. "[Local-area nets] rest in the hands of the users," Myhre said. And to accommodate potential new customers, vendors are leaving all options open, he added.

The anticipated growth of the local-area network market is expected to increase from 26,000 installed local-area nets in 1983 to 103,000 networks in 1988. The dollar value of local-area networks is expected to increase from $400 million in 1982 to $2 billion in 1988.

The fundamental question that still needs to be addressed by both vendors and potential users of local-area nets is: Why use a local-area network? Myhre cited three cases for local-area nets:

- They can often provide a more flexible means of handling terminal-to-computer communications.
- Local-area network implementation can be a cost-effective solution to facilitate resource sharing, particularly with the proliferation of personal computers.
- Local-area network facilities provide the backbone for the development of fully connective, high-speed, distributed resource systems.

Issues in local-area network market development that still need to be resolved, according to the speaker, include implementation and applications, compatibility, gateways, standards, pricing, distribution channels and private branch exchanges.

TIME
Your Most Precious Resource

In any business, time is money! This is especially true when dealing with Data Communication Networks where system performance and RESPONSE TIME is critical to the user.

Degradation of system performance (responsiveness) is inevitable as customer work loads increase. Installing faster, more sophisticated hardware is a popular but temporary solution. It is only a matter of time until the problem reappears.

Questronics offers a solution through statistical performance analysis of your system. Over seventy-five categories of line utilization and response time information can be generated in eleven different reports (hard copy and/or data based).

Questronics model CPA/7 is setting the standard in the industry by providing vital performance statistics in the areas of:

- User/System Response Time
- Line Utilization
- Character Transmission Counts
- Transmission Errors
- Host Resident Time
- Network Transmission Time
- Polling Counts
- Poll List Wrap Time
- Histograms
- Alarm Conditions

Utilizing this information, DataCom managers can then make the crucial decisions necessary to fine tune and balance the network. Each line may also be further refined to greater efficiency, enabling planning and projection for new growth.

Call Questronics and discuss your situation. We'll give you straight answers.

SEE US AT BOOTH #1000
INTERFACE '84

Answers through Analysis
QUESTRONICS INC.
3366 South West Temple, #5 • Salt Lake City, Utah 84115 • (801) 262-9923 • TWX 910-925-4000

System helps astronomer link physics theories

By Edward Warner
CW Staff

CAMBRIDGE, England — At the juncture where two of the major and most contradictory theories of physics meet sits British astronomer Stephen Hawking. Hawking specializes in research into black holes, rare celestial bodies with great mass — one is supposedly five times as heavy as the sun, but only 20 miles in diameter — and gravity so strong they absorb everything around them, including light.

To aid Hawking's research at Cambridge University here, Charles River Data Systems, Inc. of Framingham, Mass., recently donated to Hawking a Universe 68/36 superminicomputer. The system, which includes a 32-bit processor with 1M byte of internal storage and a 36M-byte Winchester disk storage unit, will be used to aid the calculations involved in Hawking's latest project: bringing together Albert Einstein's theory of general relativity and the theory of quantum mechanics, two ways of viewing physical events that once got along very poorly — that is, until Hawking started studying black holes.

General relativity holds that the presence of matter actually curves space in the vicinity of that matter. Put another way, under general relativity, nothing could escape from a black hole — the most dense item of matter in the universe — because space around it would be too curved.

If nothing could escape from a black hole, "then the laws of quantum mechanics would tell you it would have no temperature," explained Princeton University theoretical physicist Malcolm Perry, who is also researching the black hole phenomenon. To have no temperature, he said, defies the laws of quantum mechanics, a branch of physics which attempts to explain the behavior of atomic particles.

Hawking, however, found that black holes were emitting something — particles of matter possibly formed by the tremendous pressure of the black hole's gravity on its own energy.

The intensity of the movement of those particles could be measured as a temperature, explained David Smith, associate editor of *Sky and Telescope* magazine. And the existence of a temperature reading in a black hole, he said, meant that in the black hole, both general relativity and quantum mechanics might apply.

For Hawking to produce an acceptable theory explaining the coexistence of general relativity and quantum mechanics "would be a major breakthrough," on par with Einstein's work, Smith said.

The computer will aid Hawking's calculations in two areas, explained Larry Kirsch, product marketing manager for Charles River Data Systems. The greatest assistance, he said, will come from the Universe 68/36's ability to run symbolic reductions of mathematical expressions, something that will speed Hawking's efforts. Kirsch also said simulation software, modeling various explanations for Hawking's findings, will likely be run on the system as well.

Ideally, it would be Hawking himself who could best explain his work and the uses he plans for the new equipment. Confined to a wheelchair since his days as a graduate student, Hawking, now 42, has seen the degenerative nerve disease which afflicts him steal his speech and movement — but not his mental sharpness. Now one of the world's foremost astronomers, the subject of profiles in *Omni* and *The New York Times Magazine*, he speaks through an interpreter.

With his son Robert as interpreter, Hawking said any breakthrough in combining what he called the two major theories of this century is still "a long way off, [though] we've made quite a lot of progress."

Group to fete math discovery

LOUISVILLE, Ky. — The Fredkin Foundation will award a $100,000 prize for the first computer to make a major mathematical discovery.

Carnegie-Mellon University in Pittsburgh has been named trustee of the Fredkin Prize for Computer Discovery in Mathematics, according to Raj Reddy, director of the university's Robotics Institute and a trustee of the International Joint Council on Artificial Intelligence.

The prize will be awarded "for a mathematical work of distinction in which some of the pivotal ideas have been found automatically by a computer program in which they were not initially implicit," Reddy said.

Dr. Woody Bledsoe of the University of Texas at Austin, president-elect of the American Association for Artificial Intelligence, will head a committee of mathematicians and computer scientists who will define the rules of the competition.

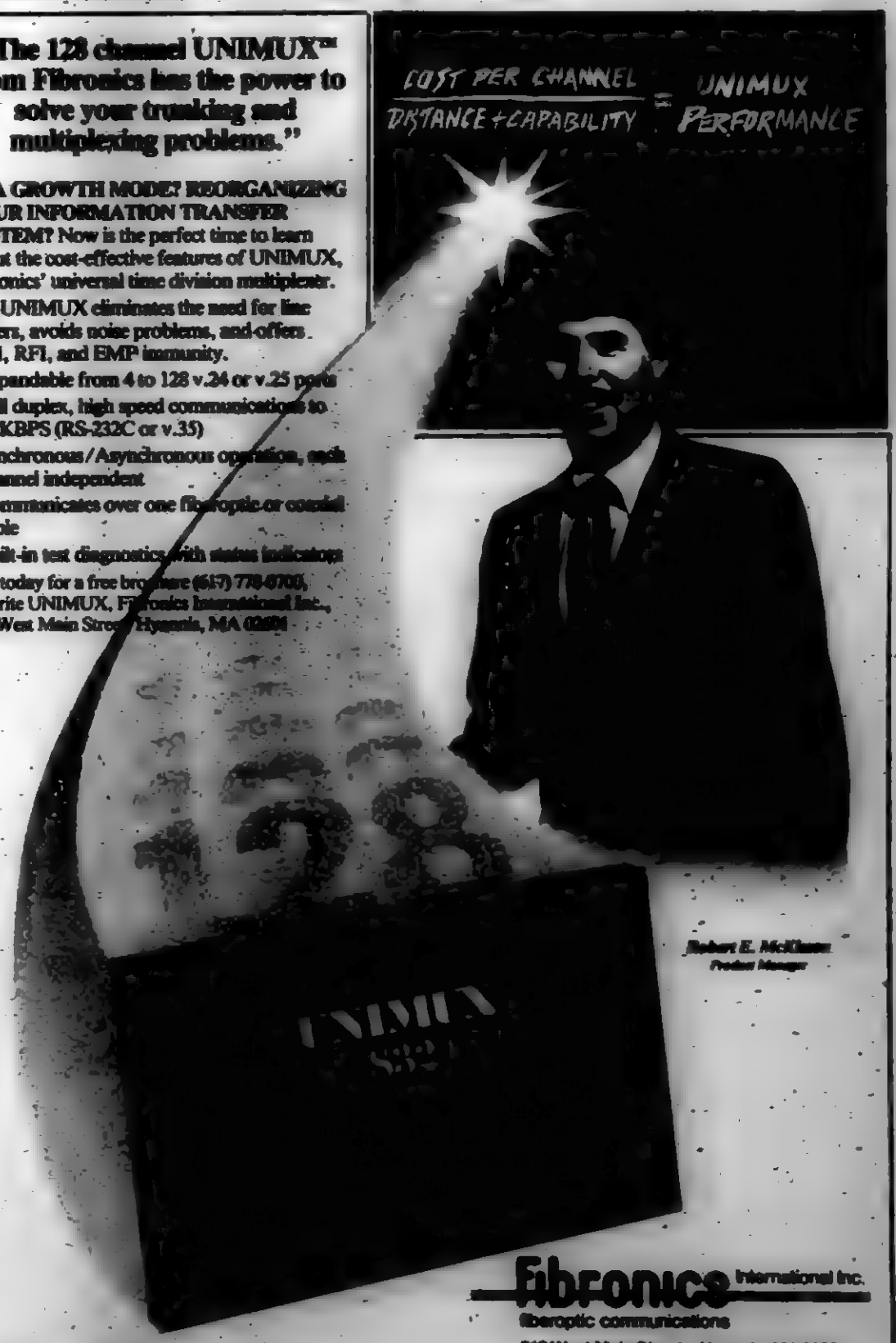
"The 128 channel UNIMUX™ from Fibronics has the power to solve your trunking and multiplexing problems."

IN A GROWTH MODE? REORGANIZING YOUR INFORMATION TRANSFER SYSTEM? Now is the perfect time to learn about the cost-effective features of UNIMUX, Fibronics' universal time division multiplexer.

The UNIMUX eliminates the need for line drivers, avoids noise problems, and offers EMI, RFI, and EMP immunity.

- Expandable from 4 to 128 v.24 or v.25 ports
- Full duplex, high speed communications to 64 KBPS (RS-232C or v.35)
- Synchronous/Asynchronous operation, each channel independent
- Communicates over one fiberoptic or coaxial cable
- Built-in test diagnostics with status indicators

Call today for a free brochure (617) 778-0700, or write UNIMUX, Fibronics International Inc., 218 West Main Street, Hyannis, MA 02601



Fibronics International Inc.
fiberoptic communications
218 West Main Street • Hyannis, MA 02601
(617) 778-0700 • Telex 951287

See us at Interface '84 Booth #681,683.

NEWS

OFF THE PRESS

George Harrar

BOOK REVIEWS

THE AI BUSINESS: THE COMMERCIAL USES OF ARTIFICIAL INTELLIGENCE

Edited by Patrick H. Winston And Karen A. Prendergast

Most arguments for the eventual commercial usefulness of artificial intelligence point to the familiar expert systems such as Caduceus, the medical diagnosis experiment, or Dipmeter Advisor, an oil field log interpretation aid. This MIT Press book relies on the same two examples to show that AI can move from theory to practice, from research labs to business offices. New examples are needed to make the case for AI among the venture capitalists who often determine which technologies will fly and which will creep into the future.

Roundtable discussions are interspersed among chapters written by experts about the research they pursue. It's a stellar lineup, including Marvin Minsky and Patrick Winston writing on the MIT Artificial Intelligence Laboratory; Larry Harris, president of Artificial Intelligence Corp., explaining what his Intellect product does, how it does it and the ways this technology will affect data processing; and Arnold Kraft, describing Xcon (expert configurer), the tool developed at Digital Equipment Corp. to help in the complex configuring of VAX systems.

The AI Business covers four areas: expert systems, work and play, robotics and today and tomorrow. Making money in AI comes under the "today and tomorrow" heading, probably more tomorrow than today.

Under "work and play," Atari Corp. Chief Scientist and Vice-President Alan Kay assesses the languages of AI. About Lisp: "It is the longest standing, good programming language precisely because it can be molded into so many different things."

About the only other AI language mentioned: "Prolog, during the first half an hour or couple of hours that you are a novice, does absolutely magic things. But it is doing these things without your having had to understand anything about what is going on inside Prolog. Then, suddenly, in order to do something real, you have to understand everything about Prolog."

Hardcover, 324 pages, $15.95, ISBN 0-262-23117-4, The MIT Press, 28 Carleton St., Cambridge, Mass. 02142.

TALKING CHIPS: IC SPEECH SYNTHESIS

By Nelson Morgan

Speech synthesis, says the author, will go a long way toward making the human-computer interface more comfortable — at least to the human. From the computer's perspective, simulating the human voice box requires enormous computational power formerly found only on special-purpose mainframes.

Then came the "talking chips" — integrated circuits capable of using the well-known algorithms that model speech. Familiar is the toy that talks; more sophisticated are the systems displayed at Texas Instruments, Inc. and Digital Equipment Corp. booths at computer conferences. They draw crowds of passersby fascinated by the possibility of a human in conversation with a machine. *Talking Chips* focuses on speech synthesis, while noting in passing its complementary technology — voice recognition.

Morgan demonstrates a command of the subject ranging from the die area of the silicon to the mathematical models and the basics of sound however it is produced, interpreted and understood. The book is not an overview but, rather, a technical description of speech synthesis written in an offbeat style. (Morgan pictures himself on the book jacket as a convict with an "author" sign hanging across his chest.)

Speech synthesis is complicated by the varying types of sound produced by humans: voiced sounds (all vowels and many consonants) such as "ee" and unvoiced sounds (many consonants) such as "ah." Algorithms, Morgan says, are still far more developed than the hardware capable of implementing them.

Hardcover, 178 pages, $24.50, ISBN 0-07-043107-8, McGraw-Hill Book Co., 1221 Ave. of the Americas, New York, N.Y. 10020.

A MANAGER'S COMPLETE GUIDE TO EFFECTIVE INFORMATION SYSTEMS

By Robert J. Thierauf

Questioning the way things are can show how far the information systems organization is from the way things should be. The author presents "a questionnaire approach," hundreds of questions on master plans, contingency controls, personnel and performance standards, computer access, equipment logs — and that's just part of questionnaire one.

Questionnaire two targets application controls, asking about verification methods, validation checks, error routines, data base controls and so on. This style forces the reader to reflect on how he manages his department. Once you start answering questions, you don't stop.

To give the reader perspective on his responses, the book presents the composite answers of nine small and nine large companies to the same questions. There is also ample elaboration on what a manager's responses show about the health of his organization.

Hardcover, 294 pages, $33.95, ISBN 0-02-933060-3, The Free Press, Macmillan Publishing Co., Inc., 866 Third Ave., New York, N.Y. 10022.

BOOKS OF NOTE

TUTORIAL ON ROBOTICS, edited by C.S.G. Lee, R.C. Gonzalez and K.S. Fu: paperback, 573 pages, $24 (nonmembers, $39), ISBN 0-8186-0615-4, Institute of Electrical and Electronics Engineers Computer Society Press, Suite 300, 1109 Spring St., Silver Spring, Md. 20910.

SYSTEMS RELIABILITY, MAINTAINABILITY AND MANAGEMENT, by Balbir S. Dhillon: hardcover, 271 pages, $29.95, ISBN 089433-195-7, Petrocelli Books, Inc., 1101 State Road, Princeton, N.J. 08540.

ROBOTS IN MANUFACTURING: KEY TO INTERNATIONAL COMPETITIVENESS, by Jack Baranson: hardcover, 152 pages, $32.50, ISBN 0-912338-39-3, Lomond Publications, Inc., P.O. Box 88-S, Mount Airy, Md. 21771.

Publishers wishing to have their books considered for review can direct books, prepublication galleys, press releases, catalogs or other information to George Harrar, Book Review Editor, Computerworld, P.O. Box 880, 375 Cochituate Road, Framingham, Mass. 01701.

Urisa nominations accepted

ST. LOUIS — The Urban and Regional Information Systems Association (Urisa) is accepting nominations for its Exemplary Systems in Government Awards program.

The annual Urisa awards recognize extraordinary achievement by government agencies in the use of automated information systems. The competition is open to all government agencies at the federal, state, regional, local and provincial levels.

Areas of interest include administration and finance, hospitals, human services, libraries, physical and economic development, planning and zoning and public safety.

Deadline for nominations is April 15. More information is available from Charles Kindleberger, St. Louis Community Development Agency, 317 N. 11th St., St. Louis, Mo. 63101.

IEEE medal goes to RCA exec

PHILADELPHIA — RCA Senior Vice-President Dr. James Vollmer has received a Centennial Medal from the Institute of Electrical and Electronics Engineers (IEEE) for exceptional service to the profession.

One of 1,984 people in the U.S. to receive the award, Vollmer is in charge of evaluating competing technologies and establishing strategic technological approaches for all of RCA's businesses. He is the company's primary interface with U.S. aerospace and defense agencies.

The IEEE's Centennial Medal commemorates the 100th anniversary of that organization.

David
Recommends The Diablo 630 Series

David Jamison Carlyle recommends the Diablo 630 Series.

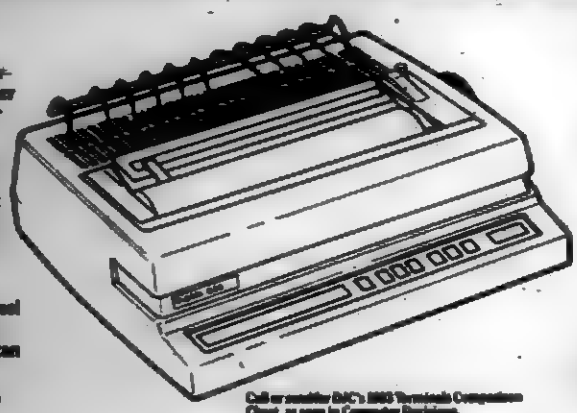
The most versatile line of daisy wheel printers for serious business applications.

630 API—The API's unique all purpose interface makes this 40 cps printer compatible with almost any computer you can name.

630 ECS—All the features of the 630 API plus the ability to print 192 fully formed characters and construct hundreds more. Perfect for scientific, financial, legal and other applications where special symbols and text are needed.

630 ECS/IBM—The only daisy wheel on the market that can truly print any character or symbol that the IBM PC can display.

Diablo from DJC, the first name in peripheral distribution.



Call or mail for DJC's 1983 Terminals Comparison Chart, as seen in Computer Decisions.

THE DAVID JAMISON CARLYLE CORPORATION
5700 Buckingham Parkway
Culver City, CA 90230

New Jersey (201) 799-4000
(800) 526-2823
Illinois (312) 799-4466
Texas (713) 721-4307
Colorado (303) 426-9000
Hawaii (808) 531-5326
California:
San Francisco (415) 354-9000
(800) 227-3610
Los Angeles (213) 410-9200
(800) 421-3000
Irvine (714) 851-5511
Florida:
Orlando (305) 628-1505
(800) 321-4000

DJC
THE DAVID JAMISON CARLYLE CORPORATION

NEWS

Organizations urged to take formal route to micro training

By Robert Batt
CW West Coast Bureau

LOS ANGELES — Organizations must take a more formal approach to microcomputer training if the substantial investment in hardware and software is to be justified.

That was the main theme of a paper presented here at the recent 1984 Office Automation Conference (OAC) by Steven Riccabona, president of Systec Resources Corp., and Ralph Vincarra and Kathleen McConkey, senior designers from the same firm. Systec is a Marina del Rey, Calif.-based information systems consulting firm.

In the training programs for micros, the trio told the the American Federation of Information Processing Societies, Inc.-sponsored conference, companies must ensure that:

- All of the employees who will be using personal computers receive appropriate training on both microcomputer fundamentals and the specific microcomputer hardware and software they will be using.
- The training received by employees is effective, so that the productivity gains offered by micros are realized.
- The training is designed for the unique requirements of each user group.
- The administrative effort required to coordinate all personal computer training activities is minimized.

Planning vital

"Careful planning is a vital ingredient in a successful training program. A thorough, well-documented training plan, coupled with a commitment to implement that plan, is the cornerstone in a successful overall program dedicated to using microcomputers to improve productivity," the paper stated.

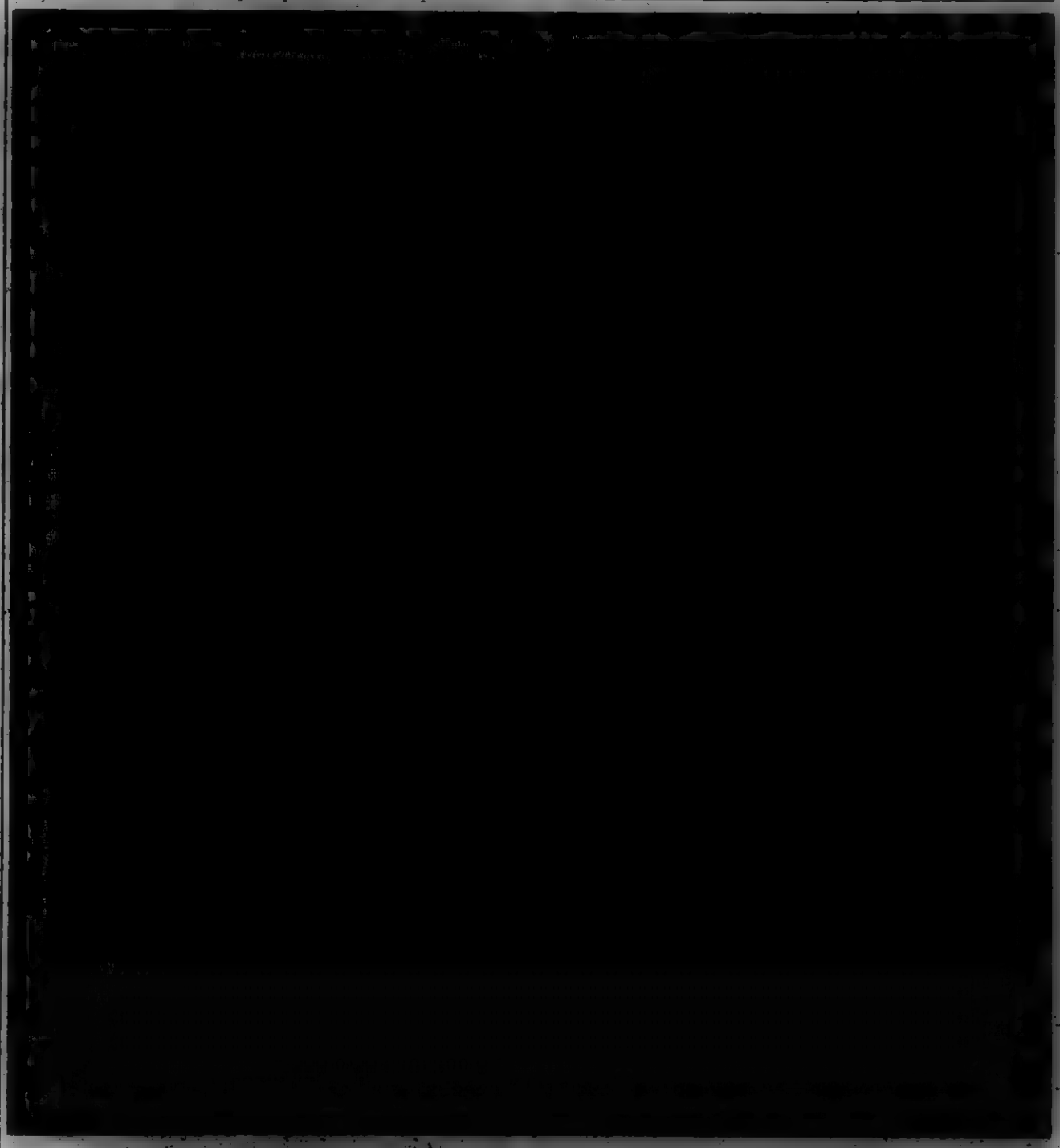
According to the authors, training should be tailored to meet the needs of the group that is being trained. There are three broad-based groups that need micro training — managers and executives, other professionals and clerical staff.

Regardless of whether they will actually be using micros themselves, managers and executives have a need to understand how personal computers can impact those departments and people for which they are responsible, the authors asserted.

In addition to the operational factors, the authors noted, micros can have a significant impact on the work habits and the traditional working relationships between employees. "Managers and executives need to understand this social impact of microcomputers in the office," they warned.

"To accomplish these objectives, training for professionals must provide both hands-on practice operating the system and case study exercises which help the professional develop a conceptual understanding of how the system can be applied to his process-oriented work," the Systec consultants concluded.

VSI - VISION
You may just mistake it for English.
VISION SOFTWARE
Quality software for VMS systems
Watch for our ad MARCH 19th!



UDS raises the speed limit for dial-up modems

At last there's a 9600 bps modem designed especially for the dial-up telephone network.

Our 9600 A/B is the ideal modem for projected system growth. Realize immediate line-charge savings by moving from 208 A/B to 9600 A/B now! Then, if your system demands dedicated lines, simple strap modifications will convert your modems. Nothing else changes!

A faster turnaround time than 208 A/B's further increases the 9600 A/B's efficiency. Multiple test modes are selectable from the front panel.

Contact Universal Data Systems, 5000 Bradford Drive, Huntsville, AL 35805. Telephone 205/837-8100; TWX 810-726-2100.

Universal Data Systems
MOTOROLA INC.

UDS modems are offered nationally by leading distributors. Call the nearest UDS office for distributor listings in your area.

Ecuador uses network to aid in general election

By David Gleves
CW Staff

QUITO, Ecuador — When presidential elections were held here in the past, it took weeks until the last paper ballots from remote communities were counted. And even then, the outcome was sometimes marred by charges of vote fraud.

In the general election on Jan. 29, however, the government of this Nevada-size country used a data processing network that allowed votes to be tallied much more quickly. "It was a good experience, and we are very much encouraged that this will be used in the future," said Antonio Mancheno, vice-consul of the Ecuadoran Consulate in New York.

Besides counting votes, the system — supplied by Burroughs Corp. and General Datacomm Industries, Inc. — was used for creating a data base in which voter registration information could be stored and retrieved. The data base resided in a Burroughs B1955 mainframe at the Supreme Electoral Tribune headquarters here in the capital city of Quito, according to Jim Nodine, the general manager for Burroughs' Ecuadoran distributor.

Ten cities linked

Ten cities across the nation were linked to the mainframe in Quito via telephone lines, dedicated microwave, local-area network or two-way radio, a General Datacomm spokesman said. Burroughs' ET 2000 and ET 1100 terminals and printers were installed at those sites. Paper ballots were transported from local polling places across the country to those 10 cities, where the results were entered into the system.

The data base also enabled election officials to print out voter lists, to verify and update registration information and to certify that citizens had complied with the country's mandatory voting requirement, Nodine said.

The voter lists were provided to newspapers for publication, and citizens could check the lists for any errors. Any corrections were then entered into the data base, and a final voter list was prepared.

"With the old method, we would have the first counting in a couple of days," Mancheno said. But in faraway provinces, "it would take a week, two weeks or maybe more" until the results were in.

That provided plenty of opportunity for political shenanigans. "We have had a lot of trouble and confrontation between political parties," Mancheno said, referring to the country's past problems with election fraud. He indicated that even with the new system, there have been some complaints about election procedures.

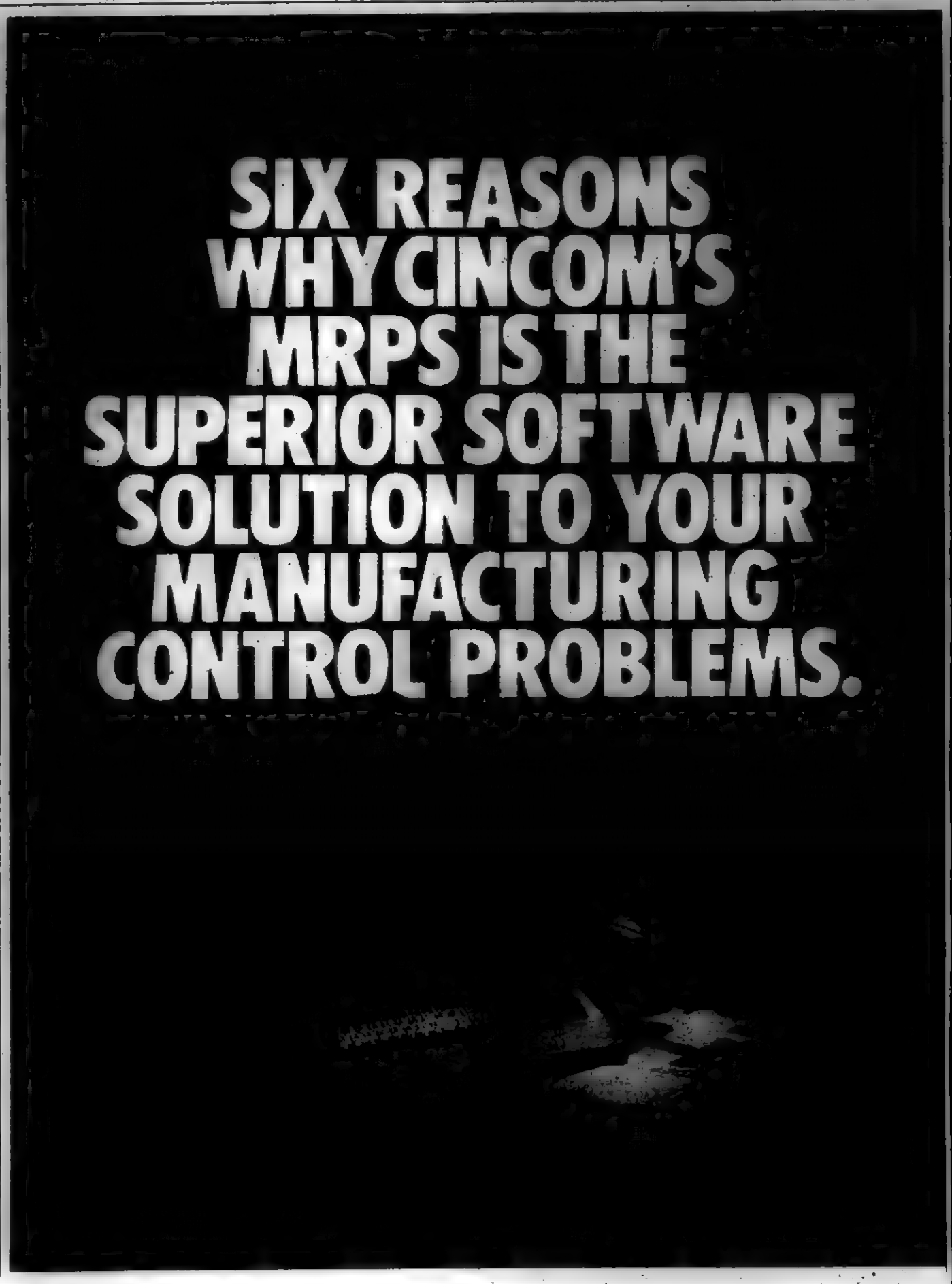
Mancheno said his government believes, however, that computerized elections may help alleviate some of those past troubles. "We are trying to make [elections] simpler, faster and safer."

General Datacomm, a Danbury, Conn., data communications firm, supplied its model DC 2020 short-haul modem and models DC 9600 and DC 9600-QP long-haul modems for the network.

Just two weeks before the election, when the equipment was being assembled in Quito for the first time, it was discovered that some incorrect parts had been ordered.

Additionally, other system components, which had been shipped disassembled from the U.S. in compliance with Ecuador's import regulations, never arrived at their targeted destination, according to a General Datacomm spokesman.

Replacement parts were ordered and shipped to Quito. All 10 cities in the network were linked to the central election office during the next 1½ weeks in an around-the-clock operation that was completed just four hours before election day, the spokesman said.



NEWS

INTERNATIONAL REPORT
CW International News Network

AUSTRALIA

SOUTH MELBOURNE — Following the evaluation of three major electronic funds transfer systems, the State Bank of Victoria has taken a different path from the Westpac Banking Corp. and the ANZ Banking Group Ltd., which both chose Tandem Computers Pty. Ltd.'s redundant Nonstop systems. The Bank of Victoria instead purchased Quadstar Corp.'s Quadstar, which runs on IBM Series/1 machines.

■

MULGRAVE — Franklin Mint Pty. Ltd. has become the first Australian user of the IBM plug-compatible Nixdorf Computer Corp. 8890 system. Franklin expects to realize annual savings of about $84,000 when it stops using ACI Computer Services' IBM-based service bureau in favor of the in-house Nixdorf system.

■

PHILLIP ISLAND — Digital Equipment Corp. reportedly upset users here with its decision to scrap its 36-bit project. Les Stirzaker, senior systems programmer at Melbourne's Deakin University, claims that in order to run the next release of the Dec-system-20 operating system, most sites will be forced to buy more expensive memory and additional hardware. The release is expected to be available later this year.

BELGIUM

BRUSSELS — During a recent meeting here, European Common Market ministers gave their stamp of approval to a five-year, $1.3 billion plan to challenge U.S. and Japanese domination of Europe's advanced information technology market. The plan has been dubbed Esprit, which stands for the European Strategic Program for Research and Development in Information Technology. The funds earmarked for the project will be distributed among the 10 Common Market governments and private industry.

FRANCE

PARIS — The French state-owned electronics group, Cie Generale d'Electricite (CGE), has reportedly been shopping for telecommunications partners in the UK. According to CGE's managing director, Georges Pebereau, negotiations are under way with British General Electric Co. (no relation to the American General Electric Co.) and Plessey PLC.

■

PARIS — France's two largest credit card organizations, Carte Bleue and Credit Agricole, have reached a joint distribution and marketing agreement for a single payment card featuring smart-card technology. The Smart Stripe Card will be embedded with a microchip and magnetic stripe to facilitate a host of financial transactions.

JAPAN

TOKYO — Fujitsu Ltd. has developed a stacked capacitor-type dynamic random-access memory. The circuit is said to offer improved packing density and larger storage capability.

WEST GERMANY

FRANKFURT — Nixdorf Computer AG plans to enter the stock exchange here. "The company wants to place 20% of its capital stock in the form of preference shares on the stock exchange in May or June," Chairman Heinz Nixdorf said.

1.
2.
3.
4.
5.
6.
800-543-3010
Cincom Systems

IBM/38
MAPICs
UNMUZZLED!
PC
Call or write for details on FUSION/4 Media-Independent Retrieval/Query/Report Processor.
NEW! IBM PC program interface supports Lotus 1-2-3, Visicalc, SuperCalc and more.
FUSION
PRODUCTS CORPORATION
(415) 461-4760
[illegible] LARKSPUR L.C. [illegible]
LARKSPUR, CA [illegible]
TELEX [illegible]

Pica offers tech support to nonprofit groups

By Lynn Haber
CW Staff

WASHINGTON, D.C. — A young computer association here is helping nonprofit public interest groups utilize computer technology to organize their offices and implement their social and political strategies on Capitol Hill.

The Public Interest Computer Association (Pica), founded by Marc Rotenberg last April, is a network of microcomputer users in the public interest community. Some of Pica's 85 member organizations include the American Civil Liberties Union (ACLU), Arms Control Computer Network, Center for International Policy, Children's Defense Fund, National Organization for Women (NOW) and the Technology Research and Action Center.

"The two objectives of Pica are to provide assistance to nonprofit organizations on how computers can be utilized in their public interest work and to provide discussion to understand the social impact of computers," said Rotenberg, a 24-year-old Harvard graduate with a background in computer science and philosophy.

The association relies on the willingness of member organizations to work with one another and to network their skills and resources. Pica sponsors monthly seminars, classes and workshops; produces a bimonthly publication; and maintains a resource center where computer-related literature, product information and application guides are housed. It also sponsors users groups for micros as well as a consultants' group for computer professionals who work with nonprofit organizations.

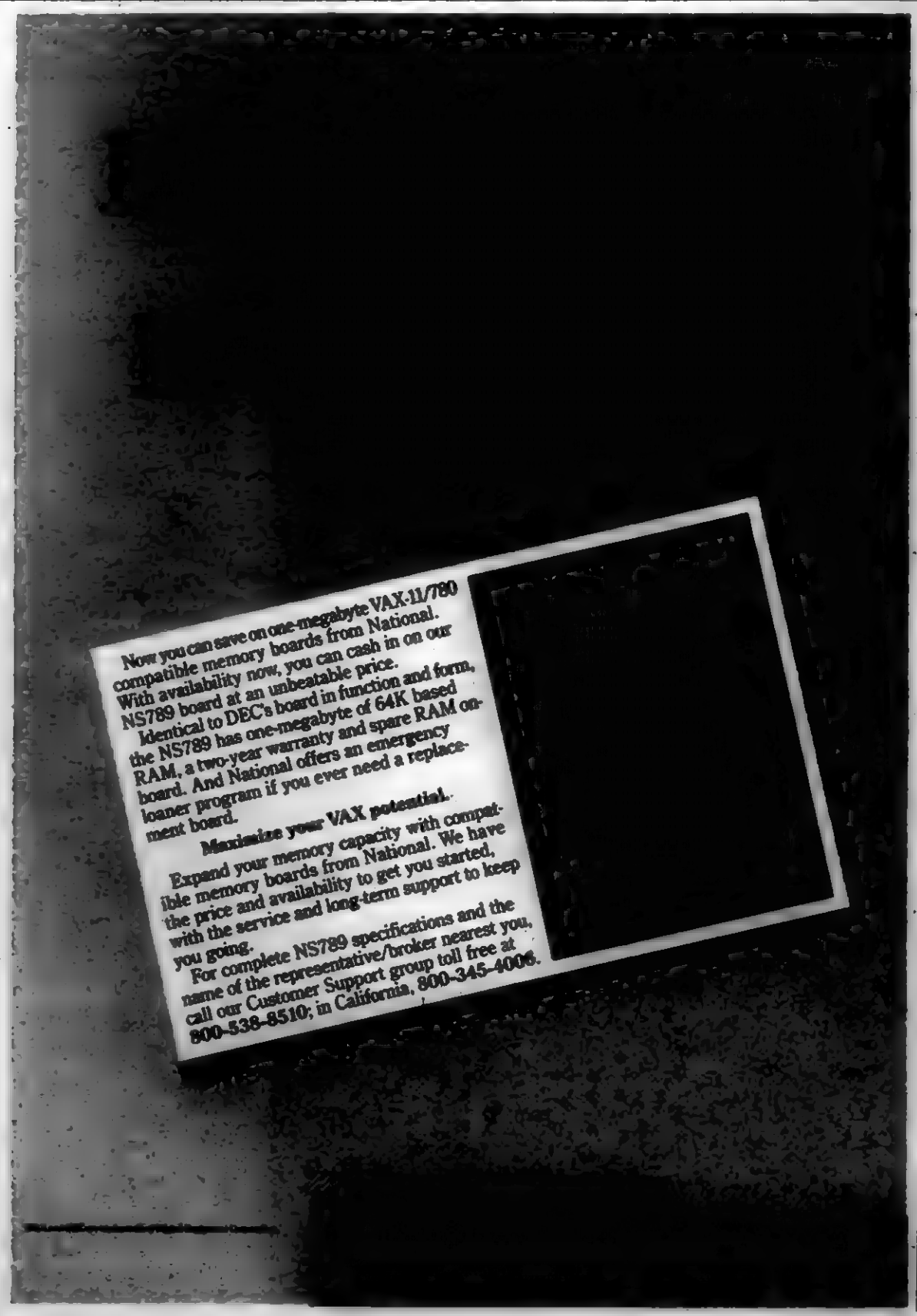
The idea for Pica occurred to Rotenberg while he worked with the Center for National Security Studies here. "As I spoke with more organizations about the type of work they wanted to do with small computers, it seemed appropriate to try to establish a way of getting people to contact one another so they could assist each other in development," he said. "In many cases with small nonprofit organizations, if you're buying a small computer, you can't afford a consultant, but you certainly need some assistance. We've tried where possible to get people in touch with others who are doing similar projects."

Last year, for example, Pica and the ACLU coordinated a computer-matching program to determine the extent of human rights violations in El Salvador.

NOW uses micros for both internal office applications, such as payroll and personnel records, and for the organization's political work. According to a NOW spokeswoman, the group subscribes to Legi-Slate, an information service that provides news about legislative activity to microcomputer users. The service helps NOW keep track of bills, sponsors and the voting records of politicians.

Since the establishment of Pica last year, more and more nonprofit public interest groups have expressed interest in learning how computer applications can aid them. Many, however, have operating budgets that don't leave room for the purchase of microcomputer systems, so Rotenberg has been talking with computer companies to try to establish access to computer resources.

According to the Pica founder, Apple Computer, Inc. of Cupertino, Calif., presently has the most extensive community grants program of which he is aware. "We wanted to go beyond an individual organization using a computer," said Mark Vermillion, manager of community affairs for Apple. "We were looking for something a little bit more exciting, so we developed this program for microcomputer networking in which we seed microcomputer networks among nonprofit groups for the purpose of sharing information and being more effective."



QED courses to span U.S.

WELLESLEY, Mass. — QED Information Sciences, Inc. will offer over 150 courses across the U.S. from now through June. Among the course topics are systems design, systems analysis, structured methodologies, ergonomics of the automated office, leadership, effective presentations, conflict management and managing and influencing people.

QED, also a publisher of books, monographs and educational software, has regional learning centers here in Wellesley; Teaneck, N.J.; Philadelphia; and Dallas-Fort Worth. QED instructors are also conducting courses under special arrangements in Washington, D.C.; St. Louis and Richmond, Va.

A catalog providing course outlines, schedules, locations and fees is available through QED Information Sciences, P.O. Box 181, 180 Linden St., Wellesley, Mass. 02181.

Banks embracing videotex to cut expenses

By Paul Kassakowski
CW Staff

Banks are beginning to look seriously at videotex home banking applications to cut expenses. "Processing a check costs at least $1.02," said Robert I. Lipp, senior executive vice-president at Chemical Bank Corp. in New York. "Electronic processing would cut the cost to 35 cents."

And, according to Lawrence Hemmen, senior vice-president at Manufacturers National Bank, Inc. in Detroit, "In addition to cost benefits, home banking reduces a bank's dependency on its branch network and paper processing."

Before banks can realize the benefits of home banking systems, however, videotex systems and home banking applications have to be developed. "Home banking applications are two or three years away from being fully developed," Hemmen said.

Competition hot

Competition to develop a home banking application is heating up. Chemical Bank, the nation's sixth largest bank, has developed Pronto and sold licensing agreements to eight other banks, including Manufacturers National. Pronto allows Apple Computer, Inc., IBM and Atari Corp. microcomputer users to complete home banking functions such as balance inquiry, bill paying, funds transfer and electronic check register.

"Although the system doesn't require an intelligent modem, it works better with one," said Mark Holthouse, vice-president at Chemical Bank's Electronic Banking Division. Pronto runs on Chemical Bank's Tandem Computer, Inc. Nonstop II system and utilizes Tymshare, Inc.'s Tymnet network, which allows the eight user banks to transfer data to and from the supermini.

For $12 a month, a user receives a program diskette or cartridge and documentation. Because Pronto is in its pilot phase, the eight user banks are limited to 200 customers each "to ensure that communications protocols are in place and each bank can easily install the system," Holthouse explained.

Implementing a home banking system is an expensive proposition. "A bank spends approximately $250,000 for this system," Holthouse said. Chemical Bank is charging $25,000 for one CPU license, $4 per customer and $1,500 for a communications interface to each host computer. Each bank pays its own Tymnet communications charges.

The system won't become cost-efficient until each bank has 15,000 to 20,000 users, according to Holthouse. "A major benefit is the number of new customers the system attracts," he added.

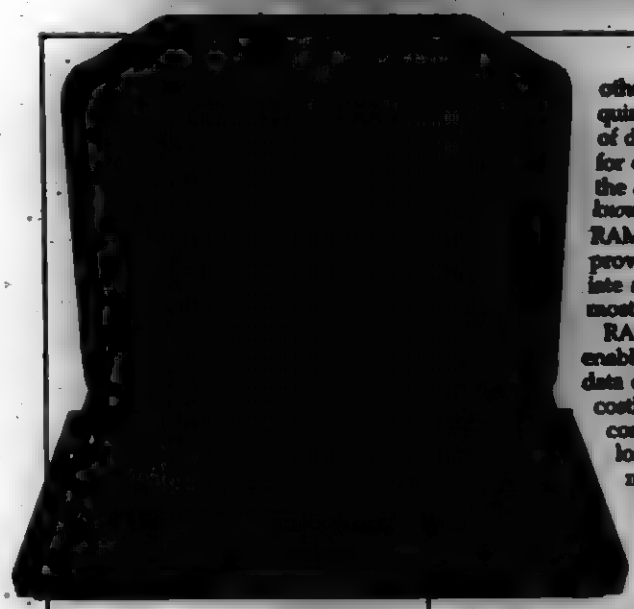
One Pronto licensee, Bankers Trust of South Carolina, Inc. in Columbia, S.C., placed an advertisement in a local newspaper to attract Pronto users. "We hoped that 150 people would express an interest in the system," said Kathy L. Nave, marketing officer. "We received more than 600 inquiries."

Pronto's limitations discouraged some potential users. A user can pay only those merchants who have an account on the system. "Some credit cards can be paid, but many vendors are not part of the system," Holthouse said. "A customer still needs a checkbook."

Bankers Trust opened its system to businesses in the area. "Approximately 50 businesses expressed interest in the system," Nave said. "Only very small businesses, those that use only a checkbook to balance their books, can use the system."

Holthouse said Chemical Bank plans "to enhance the system in the future and add applications and functions."

WITH RAMIS II ENGLISH, THE COMPUTER HAS FINALLY LEARNED YOUR LANGUAGE.



Now, you can talk to your computer the way you talk to a colleague: in plain English.

Even if you've never been on speaking terms with a computer, RAMIS II's advanced knowledge-based technology lets you ask questions, obtain answers, even create reports in only a few minutes. As a result, you can work more effectively and productively—without having to learn a specialized computer language. You just use English.

RAMIS II: ARTIFICIAL INTELLIGENCE THAT DELIVERS REAL PRODUCTIVITY.

RAMIS II English combines years of research by Mathematica in linguistics and artificial intelligence with proven expertise in developing practical, easy-to-use software products. The result is maximum fluency with minimum demands on support staff. In fact, while other systems require days or weeks of dictionary setup for each application, the *extensive built-in knowledge base* of RAMIS II English provides immediate access to most data.

RAMIS II English enables you to access data directly, without costly and time-consuming downloading or reformatting, so the latest information is always available.

Wherever your data is stored—in RAMIS II databases; in ADABAS, IMS, TOTAL, or IDMS databases; or in VSAM or sequential files—there's only one language you need to know: English. And, because English comprehension is an integral part of RAMIS II, you have full access to all of its fourth-generation capabilities, from powerful reporting and analysis to full color business graphics.

THE BENEFITS OF RAMIS II ENGLISH SPEAK FOR THEMSELVES.

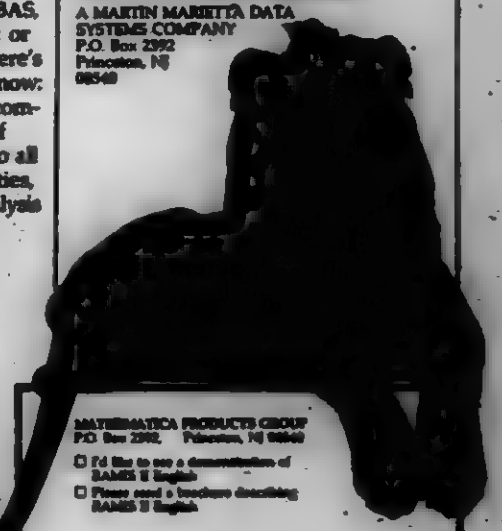
Teaching the computer to speak your language is the best way to put the vast power of today's computer systems directly into the hands of *every* user from *every* department. RAMIS II English is one more powerful demonstration by Mathematica of the increased productivity available through RAMIS II—the *real* leader in complete software for business.

RAMIS II ENGLISH MAKES IT EASY TO UNDERSTAND WHY WE'RE THE REAL LEADER IN COMPLETE SOFTWARE FOR BUSINESS.

Let RAMIS II English speak for itself. See it in action at one of our regional Product Demonstration Centers. For more information, contact your local Mathematica office, call toll free (800) 257-5171, or return the coupon below.

MATHEMATICA PRODUCTS GROUP

A MARTIN MARIETTA DATA SYSTEMS COMPANY
P.O. Box 2392
Princeton, NJ
08540



MATHEMATICA PRODUCTS GROUP
P.O. Box 2392 Princeton, NJ 08540

☐ I'd like to see a demonstration of RAMIS II English

☐ Please send a brochure describing RAMIS II English

Name

Title

Company

Address

Telephone

Computer Operating System

CW 3/12

MPG

RAMIS II ... THE LEADER BY DESIGN

Boston (617) 357-9424 Chicago (312) 670-9710 Dallas (214) 788-1916 Houston (713) 850-0057
Los Angeles (213) 670-0942 New York (212) 983-0077 Princeton (609) 799-2000 San Francisco (415) 691-6303
Washington, DC (202) 484-9793 Basel (061) 439925 Bergen (5) 323300 Heidelberg (06221) 14051
Hong Kong 5-420714 Islington (089) 929-7323 London (01) 568 3051 Milan (2) 346 0020 Montevideo (2) 920750
Ottawa (613) 236-9516 Paris (1) 776 41 71 Santiago (2) 31814 Singapore 273 9288 Stockholm (8) 320720
Sydney (02) 929 1677 Tel Aviv (052) 70564 Toronto (416) 224-4613

Insurer looks to double business with system

FRAMINGHAM, Mass. — A small mutual insurance company hopes to double its business by 1987 with the help of data processing capabilities more typical of the insurance industry giants.

Lumber Mutual Insurance Co.'s goal is a fully automated system for underwriting and issuing property and casualty policies. It is the only company of its type using the Digital Equipment Corp. Decsystem-20, according to Lumber Mutual's Corporate Information Systems manager, Wayne Di Matteo.

"It definitely has increased our productivity, allowing us to be more productive at the same cost. I would venture to say that we could increase our current book of business by one-third to 50% and maintain current staffing," Di Matteo said.

The company calls itself "small," with $19 million in premiums written in 1982, but a leader in automation. Lumber Mutual has a goal of $50 million in premiums for 1987.

According to Di Matteo, the firm was one of the first to use computers to issue policies in the early 1960s. But agents refused to accept those policies, preferring manually produced policies. In 1974, Lumber Mutual discontinued its in-house system and handed over its data processing to a service bureau that handled the company's work on a batch basis. That arrangement was unsatisfactory because the service bureau constantly changed hands and was unresponsive to Lumber Mutual's needs, Di Matteo said.

In 1979, the company installed a Decsystem-2020. It replaced that machine with a Decsystem-2040 in 1982 because the company's needs had been "grossly underestimated," Di Matteo said.

When he joined the company in 1980, Di Matteo was charged with establishing the Corporate Information Systems department and with creating a five-year data processing development plan to support the company's projected growth. At that time, the company was using the system for processing premiums and statistical reports.

The insurer had made its initial decision to buy DEC equipment because of price and has stayed with it through two upgrades because of the substantial financial commitment it made during conversion. The latest upgrade, last year, was to a Decsystem-2060, which Di Matteo said can "better handle our increased automation and heavy development."

Today, policy processing is partially automated and partially manual at Lumber Mutual and other small companies. Policies are manually rated, underwritten and typed. The data entry staff inputs policy information into the computer, which generates reports in areas of premiums/coverages, claims and finance/accounting.

Most of the home office staff of 125 use the Decsystem. Claims, accounting, financial and other specialists directly access the computer instead of going through Corporate Information Systems for each request.

However, Di Matteo and seven systems analysts and programmers are creating an on-line, integrated system due for completion in 1987.

By then, the company expects to be able to input directly policy applications, endorsements and renewals as they are received. If the policy meets underwriting criteria, it will be printed and billed by batch process immediately.

Applications that fall outside the criteria will be sent to special files so underwriters can decide whether to accept or reject them. The system will monitor individual underwriting performance through error and audit reports.

The company already is running an MSA general ledger and financial reporting software package, which Lumber Mutual hopes to extend to allow customized reports for the operational staff and management.

When complete, the automated system should allow underwriting specialists to answer customer inquiries by calling up and recreating the policies and coverages as they existed on any given date. The system will be implemented by type of policy, beginning with home owners policies this year.

Di Matteo said the Decsystem-2060 and Decnet facilitate tying into network facilities such as the Insurance Value-Added Network Services, developed by the Insurance Institute for Research, and communication with systems operated by independent agencies and two-company-owned agencies. Also expected to be included in the networking scheme are the home office's IBM Personal Computers and Wang Laboratories, Inc.'s OIS 50 office system.

But there is one drawback to the Decsystem-2060, according to Di Matteo. "The only problem is that they have discontinued the Decsystem-20 and 10 product line. So when it comes time to upgrade, we are going to have to make a substantial investment," he noted. "But I hope that is several years away."

NOW CCA'S MODEL 204 DBMS CAN DO SOMETHING EVERY EXECUTIVE CAN APPRECIATE.

NEWS

Wholesaler meets protocol needs with system

KANSAS CITY, Kan. — One of the nation's largest wholesale distributors of telecommunications equipment recently installed a processor that serves as a communications front-end processor for its mainframe and also speaks the "language" of any computer its customers might own.

"We wanted to be able to communicate with any computer," Clark Mayers, manager of information services at North Supply Co., said. "We didn't want to lose business because a customer's computer used an uncommon protocol."

With over $400 million in gross yearly sales, North Supply is reportedly the largest distributor in the interconnect industry. It is a subsidiary of United Telecommunications, Inc., which also owns the nation's third largest phone company and packet-switching network.

North Supply communicates regularly with customers who use a variety of processors, including IBM's 3033, 3083, 4331, System/32, System/34 and 370/168; Hewlett-Packard Co.'s HP 3000 and HP 3000 Series 2; National Advanced Systems, Inc.'s AS/7000; Digital Equipment Corp.'s Decwriter 2; NCR Corp.'s V-8575; and Wang Laboratories, Inc.'s 2200 MVP, as well as Teletype Corp.'s Model 28 teletypewriter terminals.

"Previously, all our data processing had been handled at a time-sharing company in Kansas City," Mayers said. "Several customers were communicating to us at the time-sharing company. They would send purchase orders via electronic mail, transmitting a text file over the phone lines into the time-sharing company's computer. We were using the same system to communicate with our vendors.

"As we began transferring processing to our in-house computer during 1980 and 1981, the need for communications capabilities on a priority basis became obvious. We needed a system that could emulate a variety of protocols," he said.

ARC local network

North Supply met this requirement by installing an Attached Resource Computer (ARC)-based local-area network from Datapoint Corp. The ARC communicates directly with the computers of more than a dozen large customers, numerous vendors and with stand-alone Datapoint systems in 11 nationwide distribution centers.

Additionally, the network is used to run spreadsheet simulator software and to perform other office automation functions.

The ARC local network allows up to 255 processors to share the same disk files, printers and other peripherals, communicating along coaxial cable at 2.5M bit/sec. North Supply's ARC system uses eight processors.

The system includes a Datapoint 6010 processor that is attached (through a communications adapter and a modem eliminator) directly to the company's Sperry Corp. 1100/60 mainframe. File processing for the network is handled by a Datapoint 6600 processor, which supports 120M bytes of memory. Data communications is handled by five Datapoint 3800 processors; they support a variety of modems running between 110 and 4,800 bit/sec.

The eighth processor on the network is a Datapoint 8600 used in the Business Information Systems Department, which supports North Supply's sales force in analyzing customer needs and configuring quotes for data communications systems.

"We use it for word processing and Microsoft, Inc.'s Multiplan," Dave Falls, product engineer, said. "For word processing, we use Datapoint [Integrated Electronic Office System] software, primarily to maintain documents we provide to our dealers, such as configuration manuals. When we have updates or price changes, we can quickly go in and change what we need, using the global replace command, then print out a new copy.

"We use Multiplan for price lists," Falls said, referring to the spreadsheet simulator software package.

For additional applications, North Supply uses MTE56, a multiple terminal emulator, and teletypewriter emulator software for communications purposes, according to Kerry Reed, programmer/analyst at the company's data center. "Direct communications speeds order processing, thus providing a valuable service for our customers and vendors. Although we have one 3800 for unattended customer order entry, we have found that we can better accommodate our customers' scheduling requirements with operator assistance. Therefore, most of the calls are attended. The customers call in, and we start a job for them," he explained.

"Another important function of our Datapoint system is to communicate with the 11 distribution centers," Reed said. The distribution centers communicate with headquarters in batch mode throughout the day.

TALK SENSE TO THE IBM PC.

Introducing PC/204, a link that lets PC users turn mainframe data into spreadsheets effortlessly.

PC/204, the newest productivity tool from Computer Corporation of America, is a powerful, efficient, easy-to-use software link between IBM personal computers and mainframes. It effectively answers the pressing problem of how to let corporate managers take full advantage of today's personal computers for making decisions, while also giving them access to the corporate database in a format they can use.

First, PC/204 guides PC users as they browse through the MODEL 204 database. Then it extracts the data they need and converts it into meaningful management information for spreadsheet analysis. Lotus 1-2-3 for example. And PC/204 does all that automatically. Without the PC user having to understand anything about mainframe technology.

If you aren't already using Lotus 1-2-3, we can supply it along with PC/204. Or you can use any current IBM PC business package.

While PC/204 is helping business managers, it's also helping MIS directors.

PC/204 uses the power and intelligence of the personal computer for increasing the overall efficiency of an application.

For one thing, it improves performance of the mainframe by offloading some of the processing to the PC, while reducing PC users' response time. It also makes communication between the PC and the mainframe more efficient.

What about security and control? PC/204 provides individual management views of the corporate database while still allowing PC users access to all the information they need.

PC/204 is the latest reason to get MODEL 204 DBMS which has been so highly rated for performance and programmer productivity.

For more information or to arrange for a demonstration of PC/204's capabilities, simply return the coupon or write to us on your letterhead.

Computer Corporation of America

CCA's Executive DBMS Seminar Schedule

March						April						May	
Columbus,OH	Mar. 1	Tallahassee	Mar. 14	San Diego	Apr. 12	Chicago	Apr. 24	Cleveland	May 8
Detroit	Mar. 22	Tulsa	Mar. 1	St. Louis	Apr. 18	Dallas	Apr. 25	Hartford	May 9
Hartford	Mar. 15	April		Washington,D.C.	Apr. 4	Denver	Apr. 26	Minneapolis	May 10
Honolulu	Mar. 22	Albany	Apr. 26	May		Houston	Apr. 27	Pittsburgh	May 10
Houston	Mar. 29	Anchorage	Apr. 12	Atlanta	May 15	Los Angeles	Apr. 27	Portland,OR	May 10
Jacksonville	Mar. 13	Boston	Apr. 12	Austin	May 10	Orlando	Apr. 27	Rochester	May 10
Louisville	Mar. 6	Cleveland	Apr. 19	Baltimore	May 15	Phoenix	Apr. 27	Seattle	May 10
Minneapolis	Mar. 9	Dayton	Apr. 26	Charlotte, NC	May 8	Princeton	May 1	Salt Lake City	May 11
New York	Mar. 27	Little Rock	Apr. 5	Cincinnati	May 2	Raleigh	May 1	Seattle	May 11
Pittsburgh	Mar. 13	New Orleans	Apr. 5	Ft. Worth	May 3	San Francisco	May 1	Stamford	May 11
Portland,OR	Mar. 29	Norfolk	Apr. 10	Harrisburg	May 2	Toronto	May 1	Tampa	May 11
Richmond	Mar. 20	Philadelphia	Apr. 3	Milwaukee	May 3	Washington,D.C.	May 1	Wilmington	May 11
Rochester	Mar. 22	Phoenix	Apr. 19	Orange City	May 24	Albuquerque	May 2	Boston	May 15
Saddle Brook,NJ	Mar. 6	Princeton	Apr. 10	Pittsburgh	May 8	Atlanta	May 2	Chicago	May 15
Salt Lake City	Mar. 7	Raleigh	Apr. 10	Santa Clara	May 24	Detroit	May 2	Dallas	May 16
						Hartford	May 2	Houston	May 16
						Honolulu	May 2	Los Angeles	May 16
						Jacksonville	May 2	Orlando	May 16
						Louisville	May 2	Phoenix	May 16
						Minneapolis	May 2	Portland,OR	May 16
						New York	May 2	Rochester	May 16
						Richmond	May 2	Seattle	May 16
						Rochester	May 2	Stamford	May 16
						Saddle Brook,NJ	May 2	Tampa	May 16
						Salt Lake City	May 2	Wilmington	May 16
						San Francisco	May 2		
						Toronto	May 2		
						Washington,D.C.	May 2		

Yes, please tell me more about: ( ) PC/204 ( ) MODEL 204 DBMS
( ) Send me a brochure.
( ) Send me info on free DBMS seminars, or call our seminar coordinator.

NAME _____ TITLE _____
COMPANY _____
ADDRESS _____
CITY _____
STATE _____ ZIP _____
TELEPHONE _____
Operating System: ( ) MVS ( ) DOS ( ) CMS ( ) Other: _____

Computer Corporation of America
Four Cambridge Center, Cambridge, MA 02142 (617) 492-8860 CW3/12PC

Inquiry system speeds service's turnaround

BOULDER, Colo. — Magazine subscription processing has become a technological challenge involving millions of pieces of mail and billions of bytes of information.

Neodata Services meets the challenge with systems — developed on an IBM 3081 processor — that answer a subscriber's inquiry within 24 hours of its receipt. In the past, 42 people might have handled a single piece of paper, but today one operator can handle the whole cycle.

"Without our system we would be in a much more difficult, a more competitive situation, from a service point of view, and we would be taking much longer to resolve any subscriber inquiries," said Pete Keeney, director of technical planning and development.

"It's working very nicely. We are processing 100,000 CICS transactions a day. The cost realization that we are getting is better than we anticipated, and there is much better service to our subscribers," he added.

In the last 25 years, magazine publishing has evolved into a sophisticated marketing operation, requiring massive sets of statistics on the buying public. Thus, the role of the fulfillment house is twofold: serving the subscribers by processing orders, payments, cancellations, change-of-address notifications, inquiries and magazine mailing labels; and serving the publishers by supplying statistical information about the marketplace.

Originally owned by *Esquire* magazine, Neodata now is a division of the A.C. Nielson Co. It reportedly is the largest independent fulfillment house in the country, employing some 1,400 people and servicing various publishers.

Subscriber services are handled by several systems linked to the IBM 3081 mainframe.

Incoming mail, with the exception of mail in unidentifiable envelopes and new subscriptions from special promotions, is processed by Scan-Optics, Inc. optical scanners that read the keyline or letter font on cards and envelopes.

All media, except inquiries, is processed on Data General Corp. Eclipse S/140 minicomputers and transferred to IBM 3380 Direct Access Storage Devices. The IBM 3081 generates output that includes mailing labels, bills, renewal promotions and responses to inquiries.

Subscriber inquiry system

Neodata developed its own system for answering subscriber inquiries approximately one year ago. Single Transaction Entry Processing (Step) takes the symptoms of a problem reported by a subscriber — for example, nonreceipt of a magazine despite proof of payment — and finds the record. Step matches the symptoms with a set of decision tables and arrives at a tentative decision about what should be done.

The system allows the adjuster to agree or disagree with Step's recommendation, correct the error and produce a laser-printed postcard to be mailed to the subscriber that night.

Company officials reported that one by-product of Step is that the inquiry system is no longer like a monotonous assembly line for adjusters; it allows for one adjuster to see a claim through from start to finish. They also noted that the system gives the employees the satisfaction of a job well done. Because of Step, the adjusters are happier, more productive workers, according to Keeney.

Company officials reported that its employees have a relatively high technological competence, which encourages recognition of how new technologies can be applied. They said such a recognition is crucial in an organization that receives 100 million pieces of mail and sends 400 million pieces of mail each year, while producing 70 million mailing labels each month. Neodata's business makes up 1.5% of the U.S. Postal Service's total volume.

Shorter response times

Keeney said that shorter response times on subscriber correspondence benefit both the client and Neodata by cutting down on the number of inquiries to be processed.

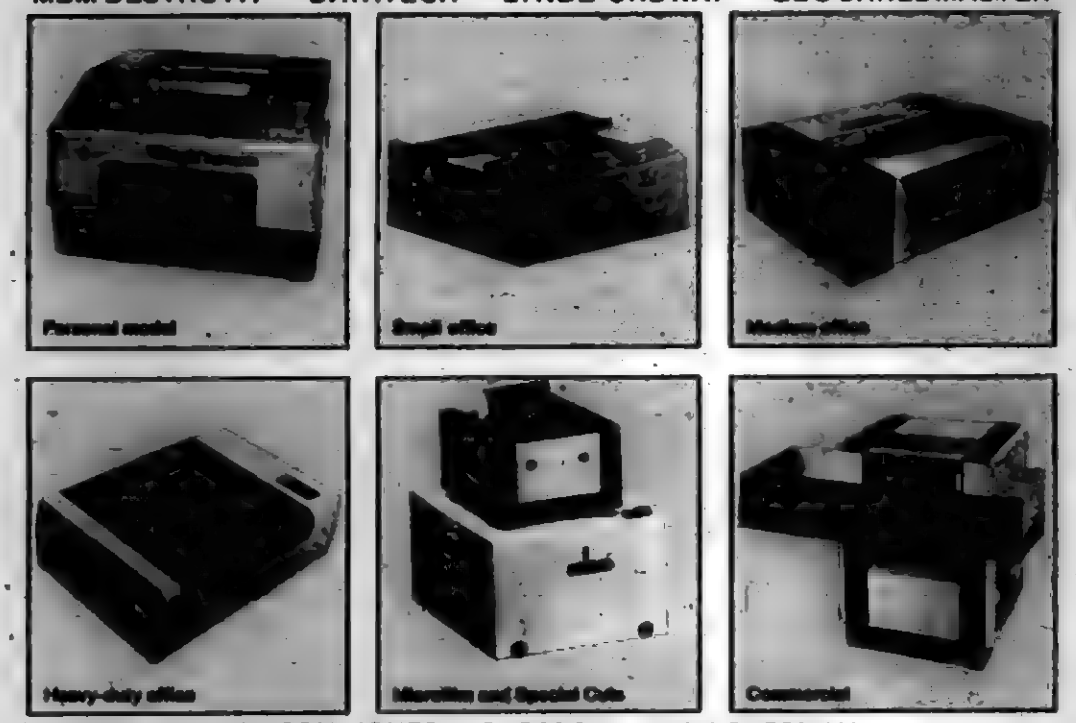
A key client service is supplying statistical information to the publisher, which is handled through an IBM DL/1 data base management system on the IBM 3081. The system continuously uses the subscriber main file of 66 million names and addresses to test promotion efforts. For example, the results of promotion pieces printed on different color paper stock can be compared, based upon the number mailed, the number returned and the percentage of those that resulted in payment or nonpayment.

Using an IBM macro language, clerical workers can select the criteria for promotion updates until the day before the promotion is run.

Such flexibility is crucial to Neodata's clients because magazines are relying more and more on subscription renewals for revenue, rather than on advertising revenue.

Confidentially, Lynde-Ordway Has The Best Names In Paper Shredders.

MBM DESTROYIT • DATATECH • LYNDE-ORDWAY • GBC SHREDMASTER



WILSON-JONES • SHREDEX • PARK-SHERMAN

Confidentiality is assured with Lynde-Ordway, Government Approved, top secret paper shredders. In today's competitive world confidential materials from computers, microprocessors and copiers must be protected. Privacy laws require it. The incidence of piracy makes it vital. That's why so many high tech companies rely on Lynde-Ordway paper shredders, to protect business secrets.

We offer a complete line of paper shredders, from small personal and office machines to commercial shredders and microfilm shredders. Lynde-Ordway is *the* major distributor and manufacturer of the best names in paper shredders. . . equipment that delivers solid value and real economy. Our large inventory and wide selection is backed by an extensive supply of parts and dependable service. Call today, you can count on fast response from Lynde-Ordway.

LYNDE-ORDWAY COMPANY, INC.
Quality and Integrity Since 1925
3308 West Warner Avenue, Santa Ana, California 92704
Call Toll Free: In CA (800) 421-0821, US (800) 782-7067 or Collect (714) 957-1311

The PCI 171 protocol converter. Designed for companies who want to use ASCII devices to communicate in an IBM Bisync environment. ASCII to BSC 3270 emulation for non-SNA applications.

The PCI 167 protocol converter. Use virtually *any* ASCII device to speak SNA, including low-cost terminals, printers, teletype printers, graphics plotters, micros, etc., etc., etc. It's the NTO software chameleon. ASCII to SNA/SDLC 3767 emulation.

New from PCI. The Series 100.

Protocol Computers, Inc. introduces the Series 100, a [illegible] approach to hooking the non-IBM world to IBM.

Now you can have Personal Computers talk to IBM. Terminals [illegible] to IBM. Printers [illegible] to IBM. Any ASCII device [illegible] to IBM. Any ASCII [illegible]

[illegible] the Series 100 [illegible] you want to talk to IBM.

Pr

School districts share computer center

The Computer Services Division of the Essex County Educational Services Commission upgraded its facilities with an interactive NCR Corp. 9050 computer, four NCR 6590 disk spindles, two NCR 6540 disk drives and six CRT terminals.

EAST ORANGE, N.J. — As part of the continuing battle to provide high-quality educational services in a cost-efficient manner, eight New Jersey school districts banded together in 1979 to form the Essex County Educational Services Commission. Among the commission's many programs is a computer center that services member school districts.

A nonprofit public agency, the commission is funded primarily through fees paid by participating school districts. Those fees are sometimes offset by state aid and grants. The agency provides direct services to students in nonpublic schools, special education programs, transportation services and computer services.

Through a cooperative arrangement, the computer center is located in Newark at the Technical Career Center, one of the Essex County vocational schools. The center not only provides service to the schools on a time-sharing basis, it enables member school districts to share computer service costs and make use of the limited number of qualified DP personnel working in the public sector. Member schools are billed annually rather than on a per-use basis.

The Computer Services Division (CSD), a part of the computer center, is guided by Director Roy Beardsley and Technical Services Manager Gil Eckert. Both realized that as school administrators faced the problem of having to operate with increasingly limited resources, there would be a growing need for up-to-date management information and controlled data processing costs.

CSD offers standard and customized software packages providing services in the areas of financial management, personnel, payroll, student record keeping and computer-assisted instruction and career planning. The systems were designed for use by non-DP professionals. CSD coordinators implement the systems, train the people who will be using them and provide continuing support.

Under this joint venture, individual school districts coordinate and control the quality and costs of computer equipment software, maintenance and technical staff. Beardsley believes that because many CSD personnel have strong educational backgrounds, they are more responsive to and better understand the particular needs of school districts.

After the commission's formation, bids were solicited from a number of vendors; several, including NCR Corp., Hewlett-Packard Co. and IBM, were encouraged to submit bids. After examining the five or six bids received, the agency selected NCR equipment and some software packages because it believed the NCR package offered the best solution to its problems.

"NCR was really the best at that time with an interactive system, and we were convinced by some of its existing software as well," Beardsley said. Specifically, some of the packages appeared to meet needs the state was going to require for financial record keeping, he added.

"We chose the NCR IRX operating system because it allows us to utilize functions in our operations and program development that are normally reserved for larger computers, often increasing productivity and eliminating the need for a large data processing staff," Beardsley said, adding, "Even now we are just beginning to appreciate what it does automatically."

CSD installed an interactive NCR 9050 computer, four 6590 disk spindles and two 6540 disk drives, along with six data display terminals. The system is on-line to 15 remote sites via an NCR 621 Multiplexer communications center. More than 100 districts receive some record-keeping services through CSD. A variety of software, including modified NCR packages, in-house-developed packages and packages from other vendors, is used to process a number of financial and educational programs.

A student data systems coordinator is responsible for implementing programs such as student scheduling, attendance, grade reporting, test history and special services information management, designed to reduce the time spent filing the plethora of reports required by state and federal mandates.

"I can run the attendance for 3,000 students in 10 minutes," William Mericle, principal of Irvington High School, said. "Before we were on-line to CSD, teachers wouldn't get attendance records until the following day."

Some data security methods work better than others.

TOP SECRET the state-of-the-art resource protection package for MVS works best of all.

TOP SECRET is data security at its best. Offering quick installation, phased implementation and comprehensive resource protection, TOP SECRET outdistances all other data security methods for total resource protection.

TOP SECRET immediately secures your most critical resources without impacting normal processing. Implement security with no delay and with absolutely no modifications to your operating system.

TOP SECRET is the only total resource protection package that offers comprehensive CICS security, including file and program control and protection down to the field level.

By using the Standard MVS Security Interface, TOP SECRET becomes an integral part of your operating system. Complete compatibility with all IBM and vendor products that use Standard Security is automatic and guaranteed, now and in the future.

TOP SECRET security comes with the same top-notch technical support that guarantees the quality and reliability of all CGA software products.

Protect your valuable data resources today. Join the MVS sites across the country that have considered every data security method and made the sure TOP SECRET choice.

Call for additional product information and your free trial.

800-227-2057

cga Software Products Group, Inc.

800-227-2057

CGA Software Products Group
P.O. Box CGA-1
Holmdel, NJ 07733

Application tool gives Coty's DP a new look

SANFORD, N.C. — Installing an application development generator at a major perfume and cosmetic house meant much more than a subtle change in the way the data processing center operated. The department got a complete makeover.

The application generator installed at Coty headquarters here resulted in increased programmer productivity and eliminated the need to augment the DP staff, according to Ed Eberbach, the company's programming and software manager. Moreover, in addition to giving users more on-line facilities, the system also helped streamline delivery of applications and reduced training requirements, he maintained.

Starting in 1980, Eberbach began to notice that more and more users were requiring on-line systems. Coty's relatively small programming staff was becoming increasingly hard-pressed to keep up with the demand.

While the maker of fragrances including Nuance, Sophia and Stetson did have CICS capability on its IBM 4341 mainframe, the system operated on an inquiry basis only, Eberbach explained. Working with the system was slow and laborious. In order to increase Coty's ability to deliver on-line facilities, Eberbach knew that something more had to be done.

"We were faced with the alternative of continuing with command-level Cobol or selecting an applications development tool to increase programmer productivity," Eberbach recalled, "but previous experience with command-level programming convinced me that we had to find more effective programming tools."

Consequently, the company began a search for an application generator that could leverage the productivity of Coty's three programmers and two systems analysts. Eberbach and Al Brown, manager of systems and operations, led the company's evaluation effort.

"Having limited in-house command-level expertise and seeing the need for more on-line development, it made it essential that we get a very user-friendly applications development facility," Brown said.

Early in 1981, Coty reviewed existing programmer productivity tools. The selection committee quickly identified IBM's DMS, Cincom Systems, Inc.'s Mantis, Informatics General Corp.'s Trans IV and Oxford Software Corp.'s User Files On-Line (UFO). Other products were rejected either because they were not suitable for Coty's environment, there was a question of continuing vendor support or the products were deemed too difficult to use, according to Eberbach.

Throughout Coty's evaluation phase, another division within its parent company — the $3.45 billion Pfizer Corp. — was undergoing a similar search for an appropriate application generator. Furthermore, the Groton, Conn.-based chemical division had many of the same requirements as Coty.

The groups began trading information and experiences based on vendor visits, and eventually they agreed upon Oxford's UFO, which promised to automate and enhance the development and maintenance of on-line applications in a CICS/VS or DOS/DC environment.

The system was installed at both divisions in July 1981, and the benefits were immediately obvious, Eberbach stated, when a programmer replacement slot was not filled. More than a year later, Coty's plan now is to fill that position from within on a trainee-level basis.

After installing UFO, the pace of developing systems picked up. "Our statistics show a five-to-one productivity ratio," Eberbach said. "A task that required five hours under command level requires only one hour under UFO."

In fact, the entire work balance of the data processing department changed. Previously, one systems analyst at Coty kept two to three programmers busy. After the installation of UFO, that ratio shifted: Now only one programmer is required to support one systems analyst, Eberbach claimed.

In two years, two programmers have successfully developed 48 on-line systems. Coty has leveraged the productivity potential of UFO by recognizing that most Coty systems were structured in similar ways: They referenced one or two data bases, and they had typical add, change, delete, list and inquire components. By structuring templates for representative systems and then using the UFO Copy facility, Coty could generate new tailored systems very quickly, Eberbach said.

Both Eberbach and Brown offered the following advice to applications development generator shoppers: Visit a site where the system under consideration is installed and actually witness a system develop from design specifications, through actual coding and testing, to delivery. "Just that experience alone can convey most of the powers that the system has," they concluded.

A little couponwork takes the endless paperwork out of data base design.

People involved in data base design have had good reason to be frustrated: They've had to endure a maze of endless paperwork and manual procedures so that others may escape it.

MANAGER SOFTWARE PRODUCTS' DESIGNMANAGER™ provides them with a method of carrying out data analysis and data base design quickly and cost-effectively – without endless paperwork.

DESIGNMANAGER's central driving force is a modeling dictionary that holds information about your organization's data resource. The content of the modeling dictionary is interactively built up by end-users and analysts directly through two complementary methodologies: top-down (Enterprise model) and bottom-up (userview model).

The reconciliation of these two components provides the basis upon which you can construct and verify models of your organization's data, and generate stable, third-normal form logical data base designs.

DESIGNMANAGER can increase user productivity whether used as a stand-alone system or fully integrated with other dictionary-driven products in MSP's MANAGER family. These include DATAMANAGER™, the data and information resource management system, and SOURCEMANAGER™, the COBOL application development system.

Find out how DESIGNMANAGER can take the endless paperwork out of your data base design work and increase productivity. Send the coupon today. Or call (617) 863-5800 (Telex 710 326 6431).

Send me more information about MANAGER SOFTWARE PRODUCTS' family of integrated, dictionary-driven products:

☐ DESIGNMANAGER ☐ DATAMANAGER
☐ SOURCEMANAGER

Name _____ Title _____
Company _____
Address _____
City/State/ZIP Code _____
Telephone Number (_____) _____
Send coupon to MANAGER SOFTWARE PRODUCTS INC., 131 Hartwell Ave., Lexington, MA 02173.
Or call (617) 863-5800. Telex 710 326 6431

DSCR08-12

msp

MANAGER SOFTWARE PRODUCTS INC

Offices worldwide: Australasia, Benelux, Canada, Italy, Japan, Scandinavia, Spain, Switzerland/Austria, U.K./Eire, U.S.A., West Germany.

NEWS

Brake maker goes on-line, upgrades security

SOUTH BELOIT, Ill. — When a major manufacturer here began converting all its applications to an on-line system, potential security problems prompted management to seek a data security system.

Warner Electric Brake and Clutch Co. is a $151 million manufacturer of motion control equipment, including electromagnetic brakes and clutches, step motors, ball bearing screws and photoelectric cells. The company has four international and seven domestic sites, including plants in Roscoe and Marengo, Ill., and Pitman, N.J., which access Warner's IBM 4341 processor at its headquarters here. The mainframe, with 4M bytes of main memory, utilizes IBM's CICS teleprocessing monitor under the DOS/VSE operating system.

Before Warner began its application conversion project, data security was the joint responsibility of the DP department and the internal auditing staff. Although the firm had not experienced any security breaches, management wanted to circumvent the possibility of unauthorized access while transferring sole responsibility for security to the internal auditing staff. Warner also felt the CICS security provided by IBM was inadequate to protect the company's expanding system.

"IBM conventions in CICS forced us to limit our security groups in CICS to only 24," said Renee Eschida, manager of systems and data processing. "That level of security was acceptable when our only on-line systems were order entry, billing and accounts receivable. But when we began adding shipping and receiving, accounts payable, bills of material, routing information and purchasing to our on-line system, we quickly ran out of CICS security groups."

A team of DP and internal audit personnel began evaluating CICS security software but, according to Eschida, found few packages designed for the DOS/VSE environment that offered the level of sophistication Warner's management required. After extensive research based on a set of management-developed criteria, the project team eventually chose On-line Software International, Inc.'s Guardian security package.

Numerous external functions

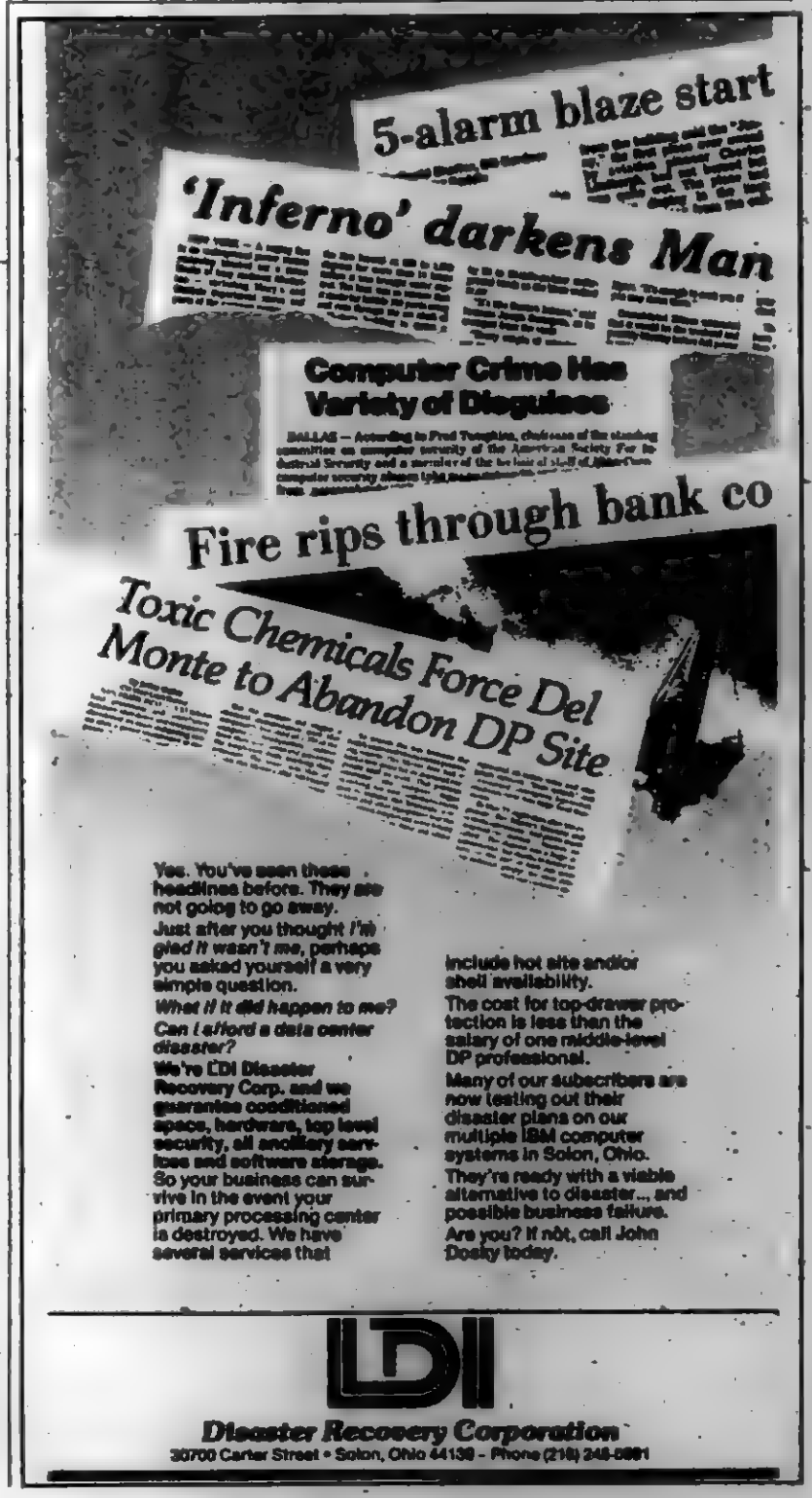
One factor behind Warner's selection of that package was that Guardian offered numerous external functions that enabled the manager of internal audit to supervise the data security system. According to Eschida, the system's structure allowed that manager, who had little DP experience, to enter the firm's security guidelines easily. In addition, Warner set the system to log all security violations, such as when Guardian shuts down a terminal because a user has made more than three attempts to log on. A reporting function helps management locate those violations.

Eschida said the system also gave Warner automatic protection at the field level as well as for all programs, terminals, files and transactions. "Our accounts payable and purchasing departments require access to the same screen," she explained, "but one department is only allowed to change vendor purchasing information, while the other is only allowed to update the vendor payment data. Consequently, the DP staff either has to develop two different screens or protect the data at the field level. Guardian lets us do the latter, which is much more efficient than creating new screens."

Currently, Guardian protects more than 200 Warner files operating under Cincom Systems, Inc.'s Total data base management system. Warner has also utilized Guardian to protect some 350 users working on 97 terminals at the three remote sites. The company has put a "time-out" parameter on each screen, which causes the screen to go blank if there is a lack of activity within a specified time interval.

For example, Eschida said, unattended screens in marketing go blank after 30 minutes because the terminals are in a secure area. But a screen with payroll information that can be accessed from a terminal on the production floor goes blank after only one minute.

More importantly, the Guardian package did not degrade the performance of Warner's other systems.



Yes. You've seen these headlines before. They are not going to go away.

Just after you thought *I'll glad it wasn't me*, perhaps you asked yourself a very simple question.

What if it did happen to me? Can I afford a data center disaster?

We're LDI Disaster Recovery Corp. and we guarantee conditioned space, hardware, top level security, all ancillary services and software storage. So your business can survive in the event your primary processing center is destroyed. We have several services that include hot site and/or shell availability.

The cost for top-drawer protection is less than the salary of one middle-level DP professional.

Many of our subscribers are now testing out their disaster plans on our multiple IBM computer systems in Solon, Ohio.

They're ready with a viable alternative to disaster.., and possible business failure.

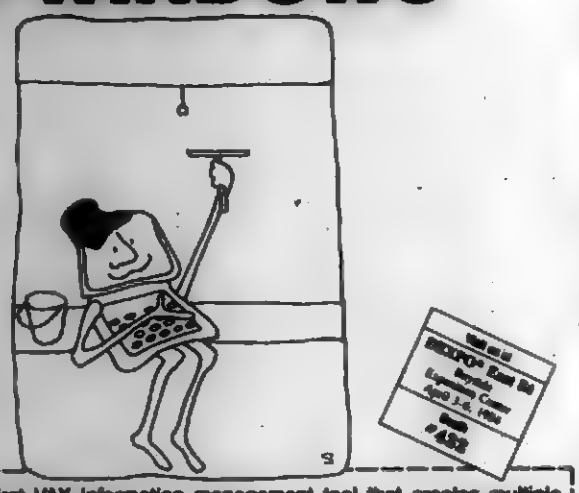
Are you? If not, call John Dosky today.

LDI

Disaster Recovery Corporation

30700 Carter Street • Solon, Ohio 44139 - Phone (216) 248-0881

MAKE YOUR VAX DO WINDOWS



SMARTSTAR™ is the first VAX information management tool that creates multiple window applications—and can scroll your screen to 400 lines. The SMARTSTAR family includes:

- SMARTDESIGN™ for designing applications without programming
- SMARTQUERY™ for powerful, easy-to-use application processing
- SMARTCALL™ when VAX host programming is required
- REQUEST for integrated report and query

Name _____

Title _____

Company _____

Address _____

City _____ State _____ Zip _____

Phone ( ) _____

SEND COUPON NOW FOR DETAILS AND JOIN THE 4TH GENERATION

STI Signal Technology, Inc.

5951 Encina Road, Goleta, CA 93117 (805) 683-3771 Outside California call toll-free (800) 235-6787

TWX 910-334-3471

VAX is a trademark of Digital Equipment Corporation

Financial system hikes wholesaler's cash flow

HAUPPAUGE, N.Y. — A leading wholesaler here is using a financial and distribution software system to improve its cash flow and delivery record and to minimize its inventory of costly sample books.

Maharam Fabric Co. is a major wholesale distributor of upholstery products, draperies and wall coverings. The firm ships products from an inventory of nearly 20,000 items stored at its headquarters warehouse here. Maharam also has a smaller warehouse at its Los Angeles showroom, one of nine showrooms maintained nationwide.

According to Data Processing Manager Ann Alesi, Maharam also has an inventory of as many as 9,000 sample books, which salespeople use to exhibit products. The company formerly kept track of the sample books, which often cost more than $20 each, through an unsophisticated program running on Maharam's Hewlett-Packard Co. HP 3000 computer. The firm's financial chores, such as accounts payable, inventory control and purchasing, were handled manually.

Looking to automate the financial functions and to maintain better control over the stock of sample books, Controller Michael Belasky reviewed a variety of software packages. Belasky eventually selected Players Computer, Inc.'s (PCI) PCI/Map 3000 financial and distribution package. Alesi said PCI/Map provided Maharam with a fully integrated, net-change business system that utilizes preformatted input screens.

'Nearly paperless'

According to Alesi, the PCI/Map system has enabled Maharam to become "nearly a paperless operation." The company utilizes the accounts receivable and payable, lot receiving, inventory control, order entry, work order, purchase order and physical inventory modules of PCI/Map. Maharam also uses the system to track the valuable sample books.

"The system lets us quickly keep track of which salesmen have the books and which of the books have been left with customers," Alesi said. "We can also keep tabs on which customers are making purchases after receiving the books. It's helped us to cut down on the number of books we utilize by letting us see that the only people who get the books are the ones who are going to buy something. That way we're not haphazardly dropping the books along the way."

Currently, Maharam clerks operate 42 interactive terminals in the Hauppauge facility and six at its Los Angeles showroom, where West Coast customer orders are received and transmitted to headquarters for shipment.

The ability to input customer orders and payments quickly has proved beneficial to the firm's cash flow and delivery status.

"Our cash flow is better because we can now input customer payments much faster than we could manually," Alesi said. "It used to take us up to two or three days to process payments manually. Also, the credit department knows exactly where people stand on payments. We couldn't call somebody and request payment if we were two or three days behind on our mail. We're also able to invoice our customers more rapidly and, as a result, get payments more quickly.

"Also," she continued, "our shipments have been going out much faster. We can take a customer order in the morning, run it through a credit check and have it to the warehouse for shipment by late afternoon. That's improved our turnaround on shipments by a couple of days."

Mini helps manage builder's far-flung projects

GREENSBORO, N.C. — A housing construction firm headquartered here is using a small office system to help solve the difficulties of long-distance management.

Key Homes, Inc., a builder of single-family homes and townhouses, uses a minicomputer to help its management troubleshoot projects at a distance to prevent cost overruns and building mistakes that can inflate the price of homes.

In February of 1983, a new management team was installed at Key Homes. The group was accustomed to utilizing data base management and working with a series of computer-generated reports. But at Key Homes, only the accounting function was computerized using an IBM 5320 batch processor with a 14M-byte hard disk pushed to its maximum capacity.

The new management team decided it wanted a system that could provide more management reports and greater control over budgets and status reports and monitor general administrative items. Henry Zalkin, vice-president of finance for Key Homes and its parent company, The Key Co., was drawn to IBM's System/34 by way of a software package called Developer Management Information System (Dmis) from Management Information Systems in Florida.

"It is an on-line system written primarily for home building companies, and it runs on the System/34," Zalkin said. Using a terminal, Dmis allows the operator to look up a house and determine costs "up to the moment." With this information, managers can detect problems such as cost overruns early enough to solve and prevent them from spreading throughout an entire subdivision.

Although Key Homes management surveyed other systems used by large home builders, it was won over by the System/34. When the System/36 was announced, the company switched its order to the new system. Delivered in mid-July, the office system included a 200M-byte hard disk drive, 256K bytes of random-access memory, an IBM 5251 terminal, an IBM 5291 terminal and an IBM 5225 printer and disk emulation for hardware and software.

Zalkin also ordered two IBM Personal Computers, which he hopes to use with a software package called Homer from M.A. Hancock & Associates of Florida.

Salesmen can use Homer to determine monthly payments, equity buildup over periods of time and whether a client is a potential investor. It can also provide customer deposit and inventory status reports. Zalkin is trying to adapt the package to run on the IBM PCjr. If successful, he plans to put PCjrs in Key Homes construction offices.

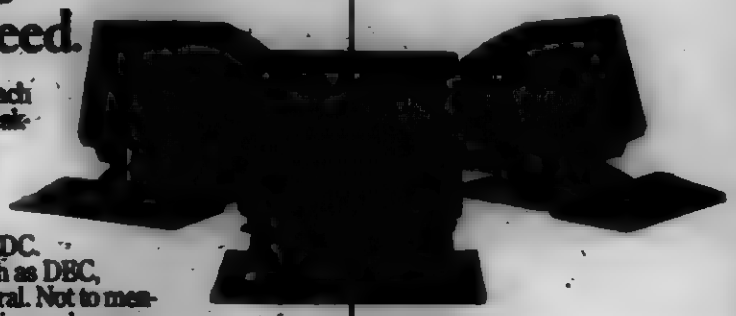
Flexibility sought

Using a Personal Computer connected to the System/36, on-site managers will gain a measure of autonomy and flexibility in managing their projects, which management hopes will stimulate growth in the company. "The Personal Computer will give Key Home builders the capability to qualify potential home buyers for loans at its on-site sales locations, bringing speed and accuracy to this task," Zalkin said.

Also, managers in Greensboro, for example, using a Personal Computer, can review the status of homes under construction each week to determine if the work is progressing smoothly.

"If we can control field supervision so mistakes aren't happening, we can sell more competitively," said Francis Tivnan, company president. "And that means that the consumer doesn't pay for the mistakes."

Northern Telecom's information processing products have the communications capability you need.



The 500 Family

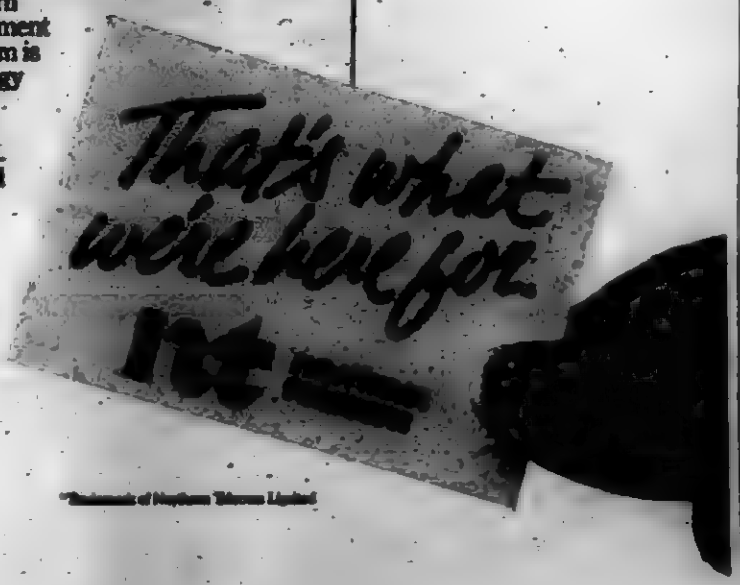
Besides being compatible with each other, Northern Telecom's 503 desktop computer and 565 and 585 information processing systems communicate effectively with a multitude of mainframes, including IBM, Burroughs and CDC. They also talk to other minis such as DEC, Hewlett-Packard and Data General. Not to mention word processors such as Lanier, and even micros such as TRS-80 and Apple.

This means you'll have more flexibility—and more control over your information system. Even if more and more personal computers are becoming a part of it. Our 500 family supports the CP/M* operating system software, so employees can have the personal computing capabilities they want, while your company keeps the organizational unity it needs.

At the same time it's running CP/M, the family can also be running its own unusually powerful operating system which is compatible across the whole 500 line. It permits a unique approach to multitasking—with a few simple keystrokes, up to 16 tasks can be performed simultaneously on the same terminal. Data processing, personal computing, spread sheets, word processing, information management, electronic mail, whatever task needs to be done can be done at the same time. An incredible timesaver.

All in all, the 500 series is quite a family. Versatile, reliable and a perfect example of Northern Telecom's OPEN World* commitment to compatibility. Northern Telecom is a world leader in digital technology and we're using this expertise to make sure our products fit comfortably into a multivendor world.

For more information, call 800-621-6476 (in Illinois 800-572-6724), or write to Northern Telecom Inc., P.O. Box 10934, Chicago, IL 60610.



*Trademark of Digital Research Inc. *Trademark of Northern Telecom Limited

NEWS

System helps service firm curb midnight rides

BLAIR, Neb. — When AT&T started using Bitran, a facility that allows telephone companies to retrieve toll call data by using telephone lines, Mid-America Computer Corp., a service bureau here, was excluded from the network. Incompatible communications equipment cost time and caused aggravation for Mid-America, which processes telephone toll call data provided by AT&T for 205 independent telephone companies in 10 Midwestern states.

"We were driving to the airport in Omaha and picking up reels of tape from midnight airline flights," Donald Waite, manager for information services at Mid-America, recalled.

"Before we could use the Bitran system, we had to wait until the end of the month for AT&T to mail us a tape with toll call data," said Waite. "Whenever AT&T was late, we had problems meeting our customers' delivery needs."

Mid-America looked at several systems that would allow its IBM 4341 mainframe to communicate with the Bitran network. For $5,500, it purchased Teleprocessing Remote Access Control System (Trace) from Sterling Software Marketing.

Trace communicates with a variety of bisynchronous mainframe, minicomputer and microcomputer devices. It runs under IBM OS and DOS operating systems.

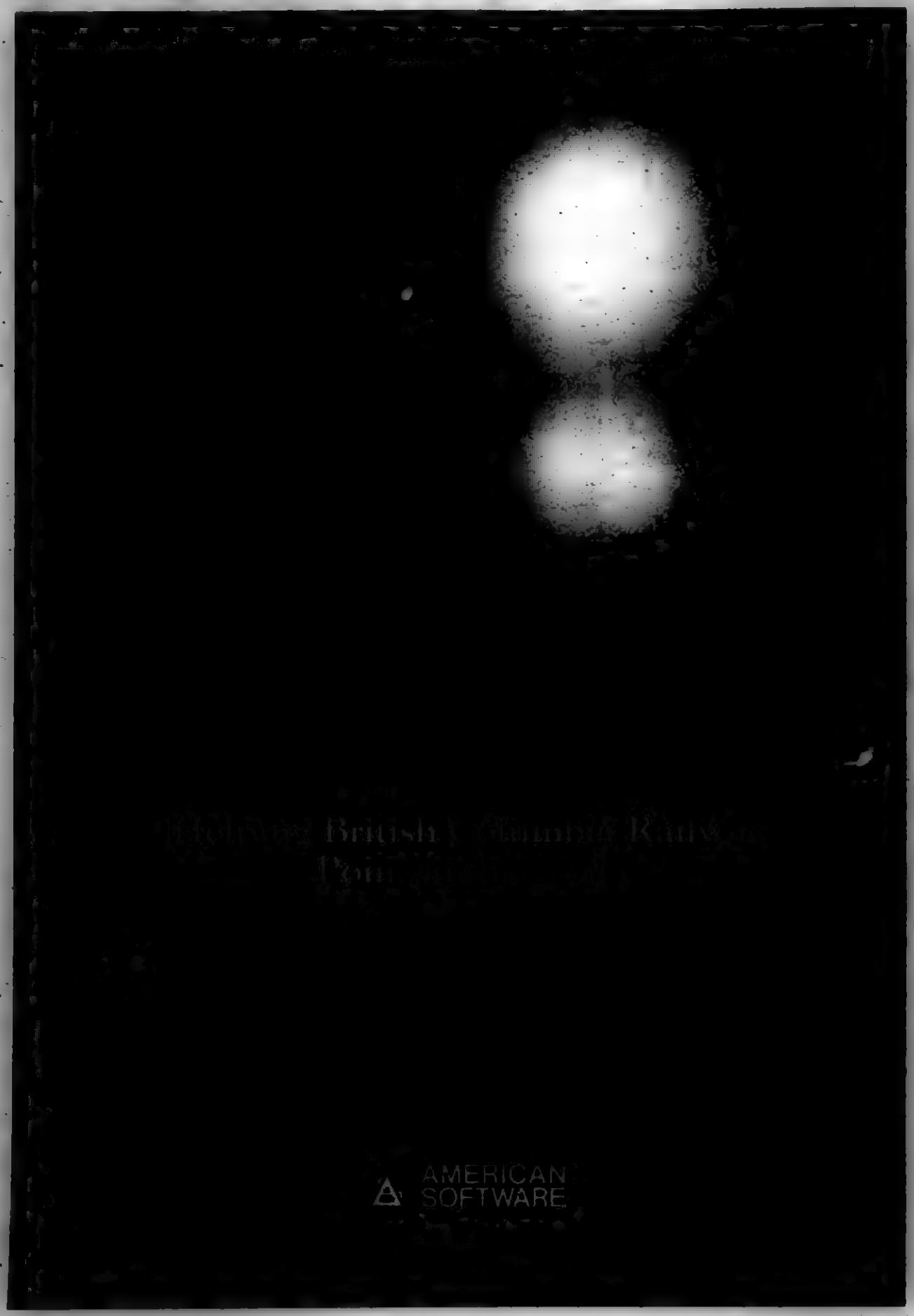
Since installing Trace, Mid-America has found many uses for the product. "We send and receive many types of telephone toll data," Waite said. Mid-America can communicate with IBM System/34s. "Since System/34 users can't use magnetic tape, they are always looking for ways to get their data," he said. "We communicate with System/34s and transmit data to them."

Trace provided Mid-America with greater productivity, Waite said. "Previously, one circuit was dedicated to CICS each morning," he explained. "If we couldn't write programs to run under that CICS facility, we couldn't use that circuit.

"With Trace, you use a vacant communication line, and you can write innumerable Trace applications. They can all use one circuit, the same communication line. You don't need multiple communication lines for multiple transmissions," he said.

Trace is easy to use, according to Waite. "It utilizes a simple keyword macro, which makes it very simple and straightforward," he said.

Mid-America may use Trace to write other applications for Bitran. "With the divestiture, there are additional reports that AT&T now requires," Waite said. "We may use Trace to produce these reports."



Adcis chief appointed

COLUMBUS, Ohio — Ronald C. Comer has been elected president of the Association for the Development of Computer-Based Instructional Systems (Adcis), an organization of professionals involved in educational uses of computers.

Comer is director of the Division of Computing Services for Medical Education and Research at Ohio State University's College of Medicine. The division designs and maintains computer-assisted instruction material in the health sciences.

Comer has been an Adcis member for 11 years and has previously held several other offices in the organization. He will preside at this year's annual conference in Columbus on May 14-16.

Introducing APS/IMS

40% Improvement in Productivity Without the "Black Box."

Introducing APS/IMS—the only application productivity system designed specifically to meet the complex needs of the IMS Development Center.

Looking For Productivity Tools?

If you're an IMS user and looking at productivity improving tools, be careful. Most products on the market today have taken a "black box" generator approach to productivity improvement. You may be looking at one right now. While these tools can be fine for putting up simple things fast in a low-volume environment, they fall apart when subjected to the complex application, performance and maintenance issues of the IMS world.

Introducing APS/IMS— The Source-Based, Layered Solution

APS/IMS is the application productivity system that, for the first time, offers a strategic solution for the IMS Development Center. Unlike "black box" productivity tools, APS/IMS offers a source-based, layered solution for IMS users.

Source-based means that APS is engineered to be compatible with your existing source-level interfaces and requires no run-time overhead. With APS, you don't have to adopt a new language or a new design methodology.

The five APS components are housed in a layered architecture. The APS layered approach uniquely addresses the different technical skill levels within your organization as well as the broad range of application development and maintenance requirements you face:

- **Screen Painter** — engineered for end-users, designers and programmers. Using the painter, designers can interactively define screens at their 3270 or PC workstations. After screens are painted, APS will generate MFS, BMS, working storage and hard copy documentation.
- **Command Level Support System** — designed for COBOL programmers and requires no IMS knowledge. Through the use of powerful DB and DC Command Sets in a Structured COBOL programming environment, this facility allows programmers with no IMS experience to write comprehensive batch, DB and online applications.
- **Macro Level Interface** — leverages the skills of senior programmers and analysts who know IMS. This subsystem provides a macro language that enables senior technicians to extend, modify and control the Command Level environment. This additional productivity layer allows senior technicians to control systems performance and integrity without being forced to "exit" to the native IMS level.
- **Data Description Interface** — reads your existing IMS data base descriptions (whether or not you use a dictionary) and automatically provides information about the data base structure to APS/IMS.
- **APS Precompiler** — combines the outputs of the other APS components and generates native COBOL, IMS source. The APS Precompiler traps coding errors, validates IMS calls and adds no run-time overhead.

Increases Productivity By 40%

The productivity gains of these five components benefit every phase of the application life cycle—from initial design through maintenance programming.

Because of the APS layered architecture, you choose the productivity and performance ratios you need based on the specific application requirements at hand. No other product offers you this degree of control.

To date, APS users are reporting design, coding and test savings of 25% to 40% over traditional methods—with savings of 50% during the maintenance phase.

Call Today For More Information

APS/IMS can begin immediately to address your IMS Development Center requirements without forcing you to sacrifice the control and flexibility you need. With APS/IMS, there is no "black box" and there are no traps.

If you think the other productivity systems you've looked at compare to APS/IMS, look again. Before it's too late.

Call now for more information. If timing is critical, ask about the *FAST TRACK* evaluation process. We'll be happy to show you how APS/IMS can address your IMS productivity needs.

YES, I am interested in APS/IMS.
☐ Tell me about the *FAST TRACK* evaluation.
☐ Contact me for a product presentation.
☐ Please send me more information.

Name _____

Title _____

Organization _____

Address _____

City _____ *State* _____

Phone _____ *Zip* _____

SAGE SYSTEMS INC.

3200 Monroe Street • Rockville, MD 20852 • 301/231-8686

Call 800/638-8703 Today

APS is available for users of IMS DB/DC, CICS, DL/I;CICS/IDMS; and CICS/VSAM. APS operates under TSO, CMS and CICS or on the IBM PC in a programmer workstation mode.

NEWS

Mini forges production boost at metals firm

JERSEY CITY, N.J. — By automating its information management and accounting functions, Schiavone-Bonomo Corp., a metals processing and trading firm here, reportedly increased productivity by 20%.

The company began automating its manual functions in 1966. Two years ago, it decided to automate its largest and only unautomated application, metals and alloys inventory.

"The system had to track material from purchase to sale, check the status of shipments in case of vendor inquiries and keep management informed on outstanding contract balances," Philip D. Carnevale, the company's controller, said. "Our IBM System/3 minicomputer could not handle all these functions."

So Schiavone-Bonomo bought a $100,000 Wang Laboratories, Inc. 2200 VS80 small business computer to provide on-line data and custom reports to traders, executives and accountants. "The system is saving the company approximately $75,000 to $100,000 per year," Carnevale said.

The system acquired by Schiavone-Bonomo, whose annual sales total more than $50 million, includes 384K bytes of main memory, two 75M-byte disk drives and a high-speed line printer. Eight workstations are connected to the system: three are needed by the programming staff; three are used by the accounting department; traders and their support staff require one terminal; and the metal and alloys warehouse uses a remote workstation.

The VS80 system was installed in June 1982, and an on-line accounting program was rewritten for the system. Recently, an on-line recurring journal was completed by Schiavone-Bonomo programmers. "It eliminated manual posting, keypunching and loading of data," Carnevale said. "We generate journals, general ledger, profit and loss statements by division, consolidated financial statements and our payroll on the computer."

Two years of planning were required to automate a complex metals tracking system. For Schiavone-Bonomo's metal traders, the new system supplies up-to-date supply contract information. "If traders can base decisions on today's — not yesterday's data — business should increase," Carnevale said.

When bidding on a supply contract, traders consider current inventory, open contracts and the average material buying price. Previously, an accounting clerk was needed to produce totals for outstanding orders. Traders now use a terminal to display outstanding contracts, quantities delivered, balances due, average prices per gross ton and the value of outstanding tonnage.

An in-house program replaced a time-consuming manual method of calculating the value of each grade of scrap metal. Traders use screen prompts to enter the market value of 12 different elements. In minutes, a report is prepared that details the values of inventory items.

Traders use the system for record keeping. By entering a vendor number, a trader can look at outstanding contracts for a shipper or display individual contract information. A twice-weekly printout permits traders to follow up on late deliveries. When vendors inquire about shipments, traders can use a screen display, rather than a walk to the warehouse, to answer questions.

Time saver

The system also saves managers time.

Previously, an employee would begin compiling information for a position report on open contract balances on Thursday and complete the report by Friday noon. The reports would then be used during a Monday meeting, where nonferrous metals and alloys price ranges are set.

"Now we can prepare the reports Monday morning, and it includes Friday's data," Carnevale said. "Because the report is more accurate and timely, management can make better decisions."

Contracts are a prerequisite for processing shipments at the warehouse. When material arrives, entering a contract number prompts the system to assign a lot number. Then, warehouse employees use a report to analyse and separate the material. A clerk or trader reviews the report, and the results are entered on a workstation.

Data from the metals and alloy system feeds into an accounts payable application. "We use an integrated system," Carnevale said. Copies of the settlement reports are mailed out with the payments. Each month, purchase data is consolidated in a journal, which updates general ledger files.

Integration allows a shipment to be traced from the purchase agreement through reclassifications to its sale.

"We maintain financial and accounting controls and user flexibility," Carnevale said. "It's a delicate balance, but we've been able to do that with the new system."

Go beyond equipment compatibility.
Reach for total performance.

The Zenith Z-100 PC's.

The Z-150 PC

In the white heat of the slalom, something clicks: skier and skis meld into one, and hurtle toward total performance. And, in your office, you'll experience that same kind of oneness with our new IBM-compatible Zenith PC's.

Their enhanced features actually take you beyond IBM compatibility. Like internal expandibility that allows you to add peripherals without adding size. Storage that can expand up to 11 megabytes. The ability to run virtually all software designed for the IBM PC. And a detached keyboard with a "smarter" key layout for added convenience.

The portable Z-160 PC

Reach for total performance with the desktop and portable Z-100 PC's: call 1-800-842-9000, ext. 1, for the name of your nearest Zenith dealer.

For the Zenith Data Systems Dealer nearest you call
1-800-842-9000 Ext. 1.

Zenith | data systems
THE QUALITY GOES IN BEFORE THE NAME GOES ON

© Zenith Data Systems

Introducing MARK V™ for CICS users: a *unique*, 4th generation non-procedural application development system that saves you time and money at every stage of your application life cycle—and makes it all easy.

For two years, MARK V has been saving millions of dollars in application development for IMS users worldwide. Now Informatics has expanded MARK V to the CICS environment, too. Even so, MARK V is not for everyone. *But it may be for you if:*

- ☑ You need to reduce your backlog of medium to complex CICS or IMS applications.
- ☑ You use CICS or IMS with IBM-supported data access such as VSAM or DL/I.
- ☑ Your CICS or IMS system demands highly efficient application execution.

Then, MARK V can help you produce efficient compiled applications that rival the execution of well-written COBOL—in less than half the development time!

Easy application development and maintenance is just the beginning!

MARK V improves productivity throughout the application development and maintenance cycle—not just in the coding—by providing:

- Interactive application design and simulation
- Easy to use, menu-driven specification language for development and maintenance
- Transparent and complete data access/communications control
- Automatically produced application documentation

That means with MARK V your programmer need only specify the solution. MARK V generates the complete application. This methodology allows you to solve more complex problems more efficiently using less highly trained personnel—and that saves you money!

Reserve your free demonstration of MARK V—the simple way to develop and maintain your medium to complex CICS or IMS applications.

As a data processing professional, you're also a professional skeptic. But the simplicity, versatility and timesaving capabilities of MARK V are easy to see—and prove. To do so, simply mail the coupon below or call toll free. We'll schedule your *free demonstration* as quickly as we can. Remember, however, that interest in MARK V is unusually high. Scheduling is on a "first come" basis. So mail the coupon or call *today*.

To see MARK V CICS/IMS for yourself, mail the coupon or call toll free

1 800 227-3800, ext. 911

(In Canada, call collect. (416) 488-7192)

informatics general corporation

THE SOFTWARE ENGINEERS

NOW FOR CICS and IMS USERS WITH IBM-SUPPORTED DATA ACCESS

YES. I want to learn how MARK V can make my medium to complex applications development and maintenance both fast and easy.

☐ Please call me to arrange a free demonstration right away. I understand that there is no cost or obligation.

☐ I'm not yet ready for a free demonstration. But please send me a fact kit on the MARK V application development system.

Name_____

Title_____

Company Name_____

Phone Number_____ (include area code)

Address_____

City_____ State_____ Zip_____

Mail this coupon to: Informatics, MARK V Free Information, P.O. Box 1462, Canoga Park, CA 91304

CW-AU

Shopping for intelligent terminals needn't be a compromise between price and performance. Consider the standards of the Ovation™ 1041 and 1051.

Both terminals feature low-profile, detached keyboards with soft set-up and non-volatile RAM. User-programmable function keys. 14-key numeric pads. User-selectable keyclick, capacitance switches and screen-saver features to name a few.

Naturally, the VDTs swivel and tilt at a finger's touch. 12-inch non-glare video displays are standard (15-inch displays are available too).

Add two industry standard communication ports, standard or custom emulations and 128 ASCII characters. Plus a broad range of graphics characters to cover the most demanding applications.

But the Ovation 1051 goes even further.

It also includes an 80 or 132 column display providing high resolution characters. Variable speed smooth scrolling. 16 user-programmable function keys (32 with shift). 256 graphics characters. Standard 32 Kbytes of RAM that can be upgraded to 64K.

There's more.

The Ovation Series™ features a broad range of custom options. Like custom functionality, firmware, keycaps, colors, even a private label option.

All things considered, you won't find better terminal values no matter where you shop.

To find out more about the Ovation 1041 and 1051, call your local Zentec sales office today.

Zentec Corporation · 2400 Walsh Avenue · Santa Clara, CA 95050 · (408) 727-7662
Zentec Sales Offices:
San Francisco · (408) 727-7662 **Los Angeles** · (213) 822-0278
Chicago · (312) 692-2240 **Boston** · (617) 890-7915
Philadelphia · (609) 983-3078 **Dallas** · (214) 690-9265
Fort Lauderdale · (305) 684-8898 **Atlanta** · (404) 956-0311
London · (011) 44-990-23377 or 26879

™Ovation and Ovation Series are trademarks of Zentec Corporation.
©1984 Zentec Corporation.

sempé

Finally, someone who sees the forest. As well as the trees.

In their great rush to fill the office with personal computers, people lost sight of the ultimate objective. To work together more productively.

Then Sperry appeared.

With a remarkably simple solution. The Sperry PC.

It was personal, but not so personal that it would keep people from being part of a system.

It could run the software of IBM's PC.

It performed all the user-friendly functions people expected. It was, in fact, even friendlier than IBM's machine.

It had a more comfortable keyboard. A more dramatic display of graphics. And it ran 50% faster then IBM.

And it could keep people in touch with the most valuable resource an organization can have—the main computer.

No matter whose big system they have.

Sperry *or* IBM.

Or both.

The Sperry PC.

Admittedly, big picture.

But then, that's what happens when you look at the forest. As well as the trees.

See how the Sperry PC can work for you. Call 800-547-8362, toll-free. Or write us. Sperry Corporation, Computer Systems, Department 100, P.O. Box 500, Blue Bell, PA 19424.

SPERRY PERSONAL COMPUTER SPECIFICATIONS

OPERATING SYSTEM	**KEYBOARD**
MS DOS Version 1.25 or 2.0 with G.W. BASIC	84 keys, 6 ft. cord
MICRO-PROCESSOR	**AUXILIARY MEMORY**
High-Speed 16-bit 8088	Up to two internal 5¼" diskettes 10MB internal fixed disk when configured with single diskette.
DISPLAY SCREENS	**USER MEMORY**
High Definition monochrome display.	Standard 128K bytes, expandable to 640K
High resolution color display.	**DIAGNOSTICS**
IBM compatible graphics.	Power-on self test
COMMUNICA-TIONS	**CLOCK**
Built-in Asynchronous	Time-of-day with battery back-up

SPERRY

The Sperry PC. What the personal computer should have been in the first place.

©Sperry Corporation, 1984

IEEE selects two keynoters for April meet

LOS ANGELES — The Internal Revenue Service's associate commissioner for data processing and the executive managing director of Japan's Hitachi Software Engineering Co. will deliver keynote speeches at the First International Conference on Data Engineering here April 24-27. The conference, sponsored by the Institute of Electrical and Electronics Engineers' Computer Society, will be held at the Bonaventure Hotel.

M. Eddie Heironimus, who oversees national IRS computer services, will speak on "Information Resources Management in the Internal Revenue Service." Dr. Deuji Tajima, a leading force in Japanese software engineering, will speak on "Inside the Japanese Software Industry."

The registration fee is $125 for members and $150 for nonmembers. The registration deadline is April 12, after which fees will rise approximately 5%.

Registration may be made through the International Conference on Data Engineering, P.O. Box 639, Silver Spring, Md. 20901.

Usus announces president, board for current year

LA JOLLA, Calif. — George Symons, an independent consultant in Inglewood, Calif., has been elected president of the UCSD Pascal System User's Society (Usus) for 1984.

Other officers elected include A. Winsor Brown of Volition Systems, Inc. in Del Mar, Calif., as executive vice-president; Eli Willner of Datatronix, Inc. in New York as vice-president of member services; James Harvison of the University of Maryland as secretary; and Linda Haskell of Ticom Systems, Inc. in Marina del Rey, Calif., as treasurer.

Usus membership consists of 2,500 users of UCSD Pascal or derivative systems.

The next national meeting of Usus will be held in Oakland, Calif., April 13-15. It is scheduled to include tutorials, technical presentations, hardware and software demonstrations, special interest group meetings and software library exchanges. Usus members who preregister for the meeting will be charged $25; there is a $10 surcharge for anyone who does not preregister.

Additional information is available from Usus through P.O. Box 1148, La Jolla, Calif. 92038.

'Enhancing Creativity' focus of NCC '84

LOS ANGELES — The 1984 National Computer Conference will have as its theme "Enhancing Creativity," with increased emphasis on computer graphics and artificial intelligence, according to Program Chairman Dennis Frailey.

Speaking at a press briefing during the recent Office Automation Conference here, Frailey said the NCC program, slated for July 9-12 in Las Vegas, will feature more than 90 technical sessions in 10 tracks: hardware and architecture; computer communications; the automated office; information processing management; data base management; artificial intelligence; computer graphics and entertainment; educational and societal issues; personal computers; and software, which will make up the largest track.

NCC '84 will also offer a series of 18 Professional Development Seminars, four half-day and 14 full-day. The seminars are available at an additional fee of $75 for a full-day and $45 for a half-day seminar. For conference attendees, advance registration fees are $100, while on-site registration is priced at $125.

The keynote address at this year's conference will be delivered on the opening day by John Akers, president of IBM, while the traditional Pioneer Day on Wednesday, July 11, will honor the contributions of the Lawrence Livermore National Laboratory.

"Computing at The Lawrence Livermore National Laboratory" will focus on the importance of computers in the research conducted at Livermore as well as explore the beginnings of the laboratory.

NCC '84 is sponsored by the American Federation of Information Processing Societies, Inc., the Association for Computing Machinery, the Data Processing Management Association, the Institute of Electrical and Electronics Engineers' Computer Society and the Society for Computer Simulation.

No other 3270 protocol converter can match all these features.

Since 1977, hundreds of companies all over the world including Bell Labs, Citicorp, ITT, Litton, Westinghouse—have used Local Data products to make IBM communications easy and inexpensive.

We believe the DataLynx™/3274 is the best price/performance 3270 protocol converter on the market.

So, before you buy any other protocol converter at any price, compare the DataLynx/3274 features first. Then decide.

- SNA/SDLC or BSC protocols supported. SNA is PU type 2.
- BSC for EBCDIC and ASCII.
- 16 bit, 8 MHZ Intel 8086-2 CPU.
- Auxiliary printer support allows each async port to have a separately addressable 3287 type printer. This feature enables dial users to combine CRT and print data over one dial-up line.
- 80 types of ASCII async display terminals can emulate IBM 3278 display stations, and ASCII async printers to emulate IBM 328X printers.
- Micro to main-frame support with our FileLynx™/3278 program for the IBM PC and PC compatibles supports terminal emulation and file transfer (upload/download).
- Hard copy KSR support with our "Paper/3278".
- Unique "paging" feature supports emulation of *all* models of the 3278 display station.
- Pseudo-transparency feature allows host application to transmit character and control codes to async terminal devices (e.g. graphics terminals, graph plotters, mini-computers, high-speed printers with down-loadable forms control units).
- "Compu" support for micro, mini and instrumentation computers as terminal devices.
- Dual host support.
- PROM cartridge for easy user upgrade of firmware.
- Powerful, friendly configurator mode, using menus to allow parameter definition for sync ports, logical units, async ports and terminal characteristics, including help utility.
- Configuration values saved in non-volatile EEPROM.
- Monitor mode displays current status of all ports and logical units.
- May be connected to a host directly (in modem eliminator mode), or via modems on a dedicated multipoint or point-to-point line (dial-up or dedicated), via RS-232C sync ports.
- Data rates to 19,200 bps (sync & async).
- Async ports may be configured for any of 15 fixed bit rates or "autobaud", with or without parity checking, and with a specified character format.
- Simple DTE/DCE change on all ports.
- Flow control on async ports may be configured for physical and/or logical signalling.
- Virtual device support enables reconnect of dial-users independent of physical port.
- Security through dual level password protection.
- Emulation of standard 3278 keyboard functions is tailored for each supported terminal type.
- 25th status line emulation.
- SAS® graphics support.
- Base color support.
- 3278-5 (27 x 132 character screen) support on 9 channels with memory expansion option.
- LU configurator options provide support for various screen formats and printer page widths.
- Front panel includes 35 function status indicators.
- Self-test of channels, memory and firmware integrity is performed continually in background mode assisted by a "watchdog" timer.
- UL and FCC approved.

For more information about the remarkable DataLynx/3274 protocol converter, call or write today. And ask about our 30-day free trial program.

Local Data

DATALYNX/3274

SAS® is the registered trademark of SAS Institute, Inc.

Local Data

"Your Lynx to IBM."

LOCAL DATA · 2701 Toledo Street · Suite 706 · Torrance · CA · 90503 · Telephone (213) 320-7126 TLX 182518

See us at Interface '84, booth 1007 Las Vegas, March 13-15

NEWS

CALL FOR PAPERS

THE INTERNATIONAL SPSS SOFTWARE USERS EXCHANGE (Issues '84)
Chicago, July 18

Issue '84 is targeted toward the following topics: information centers, census data applications, data base management systems interfaces, business graphics, econometrics, multivariate techniques, categorical data analysis, decision support systems, interfacing microcomputers, computer performance evaluation and statistical education.

Abstracts are due on March 31, and completed papers are due on June 1. More information or a "Call for Participation" that lists panels and poster sessions is available from Issue '84, 444 N. Michigan Ave., Chicago, Ill. 60611.

THE ELECTRONIC OFFICE EXPO AND CONFERENCE
San Jose, Calif., Oct. 16-18

The seminars, being held by Cartlidge & Associates, Inc., will explore the current and future needs of the electronic office environment. Qualified companies or consultants are invited to submit a 200-word abstract for consideration.

The deadline for papers is April 30. They should be sent to EOE Show Management, Suite 205, 4030 Moorpark Ave., San Jose, Calif. 95117.

SYMPOSIUM ON COMPUTER APPLICATIONS IN MEDICAL CARE
Washington, D.C., Nov. 4-7

Papers are solicited that report on original research, development and evaluation results that add to the scientific knowledge base or that survey the state of the art. All papers will be refereed, and papers accepted for presentation will be published in the proceedings.

Panel and workshop proposals are also solicited. All inquiries about deadlines, submission of papers and proposals should be made to Gerald S. Cohen, Program Chairman, SCAMC-Office of CME, George Washington University Medical Center, 2300 K St., N.W., Washington, D.C. 20037.

CONFERENCE ON INFORMATION SYSTEMS
Tucson, Ariz., Nov. 28-30

The Conference on Information Systems research conference will be sponsored by The Society for Information Management (Research and Education in Information Systems) and The Institute of Management Sciences (College on Information Systems), in cooperation with the Association for Computing Machinery's Special Interest Group on Business and Data Processing.

Papers are solicited that address the following topics: Theory of Information Systems: design, implementation and evaluation; Technology: advances and applications; Organizational and Social Impacts: promises, problems and solutions; Education in Information Systems: curricula, methods, assessment of needs, special challenges.

The program committee especially encourages submission of papers on the economics of information systems; information management within and across organizations; integrated computing/communications systems, especially office systems; management of technological innovation, including process innovations; development and evaluation of technology-user interfaces; evolution of information systems; national policies related to information technology; and strategic uses of information systems.

Papers should be based on the results of original research. The program committee especially encourages empirical research on the above subjects.

Full papers must be received by the program chairmen by May 7; all papers will be refereed by at least two independent reviewers. Notification of conference acceptance will be made by June 29.

Additional information is available from Professors John L. King and Kenneth L. Kraemer, Program Chairmen, Department of Information and Computer Science, University of California at Irvine, Irvine, Calif. 92717.

HUMANITIES AND TECHNOLOGY CONFERENCE
Marietta, Ga., Oct. 25-26

The Department of English and History at Southern Technical Institute is sponsoring a seminar on the interface of the humanities and technology, in conjunction with The Humanities and Technology Association.

Papers are invited that examine the integration of humanistic concerns and technological growth; the relationship between the humanities and technology as perceived by business and industry; ramifications of technology in ethics; history and philosophy of science, technology and architecture; public policy toward science and technology; curriculum design for the humanities and technology; roles and effects of technology in science fiction, American studies and popular culture; responses of literature, aesthetics and the arts to technology; and international technology transfer.

Abstracts should be sent by April 27 to Becky Kelly or Virginia Hein, Department of English and History, Southern Technical Institute, Marietta, Ga. 30060.

WILL THE AT&T BREAKUP MEAN AN MIS SHAKEUP?

You'll know, when you view "DIVESTITURE: IMPACT ON INFORMATION MANAGEMENT" Exclusively from DELTAK's Special Edition: Computerworld Reports.

The AT&T divestiture is undoubtedly the most earth-shaking event in recent business history. The repercussions will be felt throughout the telecommunications industry for many years to come. It will also profoundly change the way your company processes all forms of information. That's why you owe it to yourself to watch "Divestiture: Impact on Information Management," an up-to-the-minute half-hour video cassette report presented by DELTAK and CW Communications.

This month, you'll enjoy the invaluable insights of a respected communications consultant, and a major communications vendor whose company may benefit from the recent breakup. Your program host is John Gantz, noted MIS author and contributing editor of INFOWORLD magazine.

And be sure to keep watching, because more hard-hitting issues of Computerworld Reports such as DP/Office Automation Integration and The Maturing Information Center will be coming in the months ahead. Or, previously released Reports addressing major issues are still available including: The MicroMainframe Link, Integrated Microcomputer Software and Managing the Communication Network.

Remember, before the Big Breakup shakes your information system up, order "Divestiture: Impact on Information Management." Call DELTAK order entry at (312) 369-3000; (416) 678-9222 in Canada.

DELTAK
East/West Technological Center
1751 West Diehl Rd., Naperville, IL 60566
(312) 369-3000 (800) 532-7666

[redacted]
375 Cochituate Road
Box 880, Framingham, MA 01701
(617) 879-0700

© Copyright 1984, DELTAK Inc.

BGS SYSTEMS FOR DP MANAGEMENT

CALENDAR

WEEK OF APRIL 1

APRIL 1, DALLAS — **DSS-84 Fourth International Conference on Decision Support Systems.** Contact: DSS-84, 290 Westminster St., Providence, R.I. 02903.

APRIL 1-4, ORLANDO, FLA. — **Annual Convention and Exposition of the Electronic Funds Transfer Association.** Contact: Catherine Brown, Electronic Funds Transfer Association, Suite 8000, 1029 Vermont Ave. N.W., Washington, D.C. 20005.

APRIL 1-5, CINCINNATI — **Common '84: IBM Computer Users Group.** Contact: David G. Lister, Common, Suite 1717, 435 N. Michigan Ave., Chicago, Ill. 60611.

APRIL 2, HOUSTON — **MicroPCB.** Contact: EPS, Inc., Suite 1540, 110 Plaza, New York, N.Y. 10119. Also being held April 2 in Orlando, Fla., April 4 in Tampa, Fla., and San Francisco, April 6 in Miami, April 10 in Washington, D.C., April 11 in Los Angeles, April 18 in San Diego, April 24 in Hartford, Conn., and April 25 in San Jose, Calif.

APRIL 2, WASHINGTON, D.C. — **The End-User Revolution.** Contact: Technology Transfer Institute, 741 10th St., Santa Monica, Calif. 90402. Also being held April 9 in San Francisco, April 23 in Chicago and April 30 in Boston.

APRIL 2, PHILADELPHIA — **Introduction to Micros.** Contact: U.S. Professional Development Institute, Microcomputers in Government, Department AB, 1620 Elton Road, Silver Spring, Md. 20903.

APRIL 2, NEW YORK — **Introduction to the IBM PC.** Contact: Center for Advanced Data Processing, Inc., Suite 402, 450 Seventh Ave., New York, N.Y. 10123. Also being held April 4 in New York.

APRIL 2, NEW YORK — **Advanced Wordstar.** Contact: Center for Advanced Data Processing, Inc., Suite 402, 450 Seventh Ave., New York, N.Y. 10123.

APRIL 2-3, BOSTON — **Dbase II.** Contact: The American Institute for Professional Education, Carnegie Building, 100 Kings Road, Madison, N.J. 07940. Also being held April 5-6 in Salt Lake City, April 9-10 in Seattle, April 12-13 in Albuquerque, N.M., and April 18-19 in Houston and Indianapolis.

APRIL 2-3, MONTREAL — **Dbase II.** Contact: Center for Advanced Professional Education, Suite 110, 1820 E. Garry St., Santa Ana, Calif. 92705. Also being held April 4-5 in Kitchener, Ont.

APRIL 2-3, CLEVELAND — **Lotus 1-2-3.** Contact: The American Institute for Professional Education, Carnegie Building, 100 Kings Road, Madison, N.J. 07940. Also being held April 5-6 in San Diego, April 9-10 in Greensboro, N.C., April 12-13 in Kansas City, Mo., and April 18-19 in Detroit and Hartford, Conn.

APRIL 2-3, ARLINGTON, VA. — **Local Wideband Networks.** Contact: Phillips Publishing, Inc., Suite 1200N, 7315 Wisconsin Ave., Bethesda, Md. 20814.

APRIL 2-3, SAN FRANCISCO — **Computer System Security Management.** Contact: Center for Advanced Professional Education, Suite 110, 1820 E. Garry St., Santa Ana, Calif. 92705. Also being held April 4-5 in Los Angeles.

APRIL 2-3, CHICAGO — **Fourth-Generation Systems and Languages.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

APRIL 2-3, CHICAGO — **Understanding Telecommunications Technologies for Nonengineers.** Contact: Telestrategies, Suite 102, 6842 Elm St., McLean, Va. 22101.

APRIL 2-4, NEW YORK — **Job Control Language.** Contact: Chubb Institute, 8 Sylvan Way, P.O. Box 342, Parsippany, N.J. 07054.

APRIL 2-4, RALEIGH, N.C. — **Data Communications Systems.** Contact: Center for Advanced Professional Education, Suite 110, 1820 E. Garry St., Santa Ana, Calif. 92705.

APRIL 2-4, LOS ANGELES — **Data Base: Technical Developments.** Contact: Software Institute of America, Inc., 8 Windsor St., Andover, Mass. 01810.

APRIL 2-4, CHICAGO — **Basic Programming.** Contact: Management Information Systems, National Easter Seal Society, 2023 W. Ogden Ave., Chicago, Ill. 60612.

APRIL 2-4, CHICAGO — **DP Quality Assurance.** Contact: U.S. Professional Development Institute, Quality Assurance, Department KLMNO, 1620 Elton Road, Silver Spring, Md. 20903.

APRIL 2-4, WASHINGTON, D.C. — **Structured Techniques for Fourth-Generation Languages.** Contact: Technology Transfer Institute, 741 10th St., Santa Monica, Calif. 90402.

APRIL 2-4, HOUSTON — **Data Analysis and Logical Design.** Contact: Learmonth & Burchett Management Systems, Inc., Suite 405, 2800 N. Loop W., Houston, Texas 77092.

APRIL 2-4, TORONTO — **Systems Project Management.** Contact: Association for Systems Management, 24587 Bagley Road, Cleveland, Ohio 44138.

APRIL 2-4, DENVER — **Data Processing Project Management Workshop.** Contact: The Seminar Broker, 3212 W. 133 Ave., Broomfield, Colo. 80020.

APRIL 2-4, LOS ANGELES — **Data Communications I: Basic Concepts.** Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

Personal Computers have opened up all kinds of possibilities throughout your company. Including some you'd rather not think about. Somehow a balance must be struck between the performance PCs offer, and the control you have to have in a local area network to make sense of the whole system. Somehow, costs, information and information processing resources have to be managed.

INTRODUCING THE NET/ONE® PERSONAL CONNECTION. IT'S SMART, FAST, AND SNA-COMPATIBLE.

The Net/One Personal Connection™ hardware is a high performance, 10 megabit-per-second, Ethernet-compatible Network Interface Unit (NIU®) in a plug-in board for IBM® Personal Computers. It packs enough microprocessing power on a single 52-square-inch board to offload all networking functions, so it doesn't consume any of the host CPU's resources.

With Net/One SNA Server software, a PC can emulate a 3278, and get a direct SNA route to the top. So the Personal Connection is a far-sighted solution when PCs need to share information and peripherals. And it's the *only* solution when PCs need to be mixed cost effectively into a high-speed corporate network with information processing devices from different manufacturers.

The Personal Connection can do it, because it's the *Net/One* Personal Connection. That means it not only does the job from PC-to-PC, it's the newest extension of Net/One, the general purpose local area network system that can turn *all* the equipment you have now, no matter who makes it, into a fully functional, high performance network. A Big Picture network. Broadband, baseband, fiber optics. Mainframe to mini to micro. Local to remote.

Now PCs can get into without getting

Net/One, Personal Connection, NIU, Personal NIU, Diskshare and Printshare are trademarks of Ungermann-Bass, Inc.
IBM is a registered trademark of International Business Machines Corporation.

NEWS

APRIL 2-4, HOUSTON — **Data Communications: An Introduction to Concepts, Systems and Applications.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

APRIL 2-4, GREEN BAY, WIS. — **CICS/VS Internals for Systems Programmers.** Contact: Goal Systems International, Inc., 5455 N. High St., Columbus, Ohio 43214.

APRIL 2-4, SAN FRANCISCO — **IBM Teleprocessing Systems Software: An Introduction to Concepts, Systems and Applications.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

APRIL 2-4, ORLANDO, FLA. — **PC Introduction.** Contact: Harris Education Center, 6220 S. Orange Blossom Trail, Orlando, Fla. 32809.

APRIL 2-4, BOSTON — **Distributed Systems Design: Microcomputers to Mainframes.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

APRIL 2-4, ORLANDO, FLA. — **Purchasing Control System.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

APRIL 2-4, SAN FRANCISCO — **Information Systems: Modeling, Analysis and Planning.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

APRIL 2-4, CINCINNATI — **Managing Application Software Support.** Contact: Infosci, Inc., Box 7117, Menlo Park, Calif. 94026.

APRIL 2-4, CHICAGO — **Data Base Management Systems: Concepts and Guidelines.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

APRIL 2-4, NEW YORK — **Evaluating, Selecting and Using Computer Software Packages.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

APRIL 2-4, WASHINGTON, D.C. — **Office Automation: Strategic Planning, Design and Implementation.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

APRIL 2-6, SAN DIEGO — **The Third Conference on Computing in Civil Engineering.** Contact: Society for Computer Applications in Engineering, Planning and Architecture, Inc., 358 Hungerford Drive, Rockville, Md. 20850.

APRIL 2-6, NEW YORK — **Advanced Structured Analysis.** Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

APRIL 2-6, WASHINGTON, D.C. — **The New DP Revolution.** Contact: Technology Transfer Institute, 741 10th St., Santa Monica, Calif. 90402.

APRIL 2-6, NEW YORK — **DBS/DB Application Programming.** Contact: Sysed, Inc., One Park Ave., New York, N.Y. 10016.

APRIL 2-6, WASHINGTON, D.C. — **Project Planning and Control Workshop.** Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

APRIL 2-6, PORTLAND, ORE. — **Advanced Systems Analysis.** Contact: Association for Systems Management, 24587 Bagley Road, Cleveland, Ohio 44138.

APRIL 2-6, PHOENIX — **Auditing in the Contemporary Computer Environment.** Contact: Marge Umlor, EDP Auditors Foundation, 373 S. Schmale Road, Carol Stream, Ill. 60187.

APRIL 2-6, ATLANTA — **Structured Analysis and Design Workshop.** Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036. Also being held April 2-6 in Detroit and San Francisco.

APRIL 2-6, DALLAS — **The Spring 1984 USE, Inc. Sperry Series 1100 Computer Conference.** Contact: USE, Box 461, Bladensburg, Md. 20710.

APRIL 2-6, DALLAS — **Effective Data Base Design.** Contact: Institute for Software Engineering, 510 Oakmead Pkwy., Sunnyvale, Calif. 94086.

APRIL 2-6, CHICAGO — **Structured Analysis and System Specification Workshop.** Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

APRIL 3, NEW YORK — **Spreadsheets Using Lotus 1-2-3.** Contact: Center for Advanced Data Processing, Inc., Suite 402, 450 Seventh Ave., New York, N.Y. 10123.

APRIL 3-5, PHILADELPHIA — **Getting Ahead With Micros.** Contact: U.S. Professional Development Institute, Microcomputers in Government, Department AB, 1620 Elton Road, Silver Spring, Md. 20903.

APRIL 3-5, CHICAGO — **Understanding Modern Private Branch Exchange Systems.** Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

APRIL 3-5, PHILADELPHIA — **International Teleconference Symposium.** Contact: Conference Administrator, International Teleconference Symposium, Comsat, 950 L'Enfant Plaza S.W., Washington, D.C. 20024.

APRIL 3-6, WASHINGTON, D.C. — **Hands-On Pascal Workshop.** Contact: Ruth Dordick, Integrated Computer Systems, Inc., 6305 Arizona Place, Los Angeles, Calif. 90045. Also being held April 24-27 in San Diego.

APRIL 3-6, BOSTON — **Programming in C: A Hands-On Workshop.** Contact: Ruth Dordick, Integrated Computer Systems, Inc., 6305 Arizona Place, Los Angeles, Calif. 90045.

APRIL 3-6, BOSTON — **The Fifth National DEC-Compatible Industry Exposition — Dexpo East 1984.** Contact: Expoconsul International, Inc., 55 Princeton-Hightstown Road, Princeton Junction, N.J. 08550.

APRIL 3-6, BOSTON — **Implementing Local-Area Networks.** Contact: Ruth Dordick, Integrated Computer Systems, 6305 Arizona Place, Los Angeles, Calif. 90045. Also being held April 24-27 in Washington, D.C.

IT'S POWERFUL ENOUGH TO PERFORM IN HEAVY TRAFFIC.

The Personal Connection is impressive even if all you need to do now is hook up a few PCs. Our Diskshare™ software lets one PC act as a disk server and still function fully as a PC. A Printshare™ program lets a number of PCs share a printer effectively. Because the Personal Connection offloads networking functions completely, you're getting every ounce of performance from every machine as well as maximum network performance.

When you connect more than just a few PCs, or a few hundred, the Personal Connection's on-board intelligence and 10 Mbps transmission speed are more than impressive. They're critical.

The ability to handle heavy traffic, fast, and to fully integrate PCs into your corporate network—now, or later—gives you both the high performance and the manageability you need, no matter how many PCs come in the door. You get the shared access, fast response, and easy, transparent operation you're looking for. And you get better management of file storage, applications software, and costs.

HOW MUCH WOULD YOU PAY FOR A BOARD THAT DID ALL THAT?

The Net/One-Personal Connection board (Personal NIU™) and operating software are $850. Surprised?

If you're looking to harness PCs to a high performance network, or trying to solve networking problems of any kind, give us a call.

Ungermann-Bass, Inc., 2560 Mission College Boulevard, Santa Clara, California 95050. Telephone (408) 496-0111.

Net/One from Ungermann-Bass

the corporate network out of control.

©1983 Ungermann-Bass, Inc.

EDITORIAL

Ready for crush of change?

The recent Softfair '84 job fair held outside Boston was anything but kind to Cobol aficionados. In short, they found few help wanted shingles at the various recruitment booths, the nod instead going to those who had honed their Unix and C language skills [CW, March 5]. This is a nice situation for today's college grads, 80% of whom have been exposed to Unix, but a tough row to hoe for the 10- to 15-year programming "veterans" raised on Cobol.

The week before last month's job fair, IBM announced a series of mainframes as a replacement for a processor line it had been selling in volume for only two years.

Meanwhile, as noted in *Computerworld*, the Computer Dealers and Lessors Association is lobbying hard to change a portion of the federal tax code that currently allows computer owners to depreciate equipment over a five-year term. The association is arguing for a three-year depreciation that, given recent events, may still not reflect the reality of shrinking product life cycles.

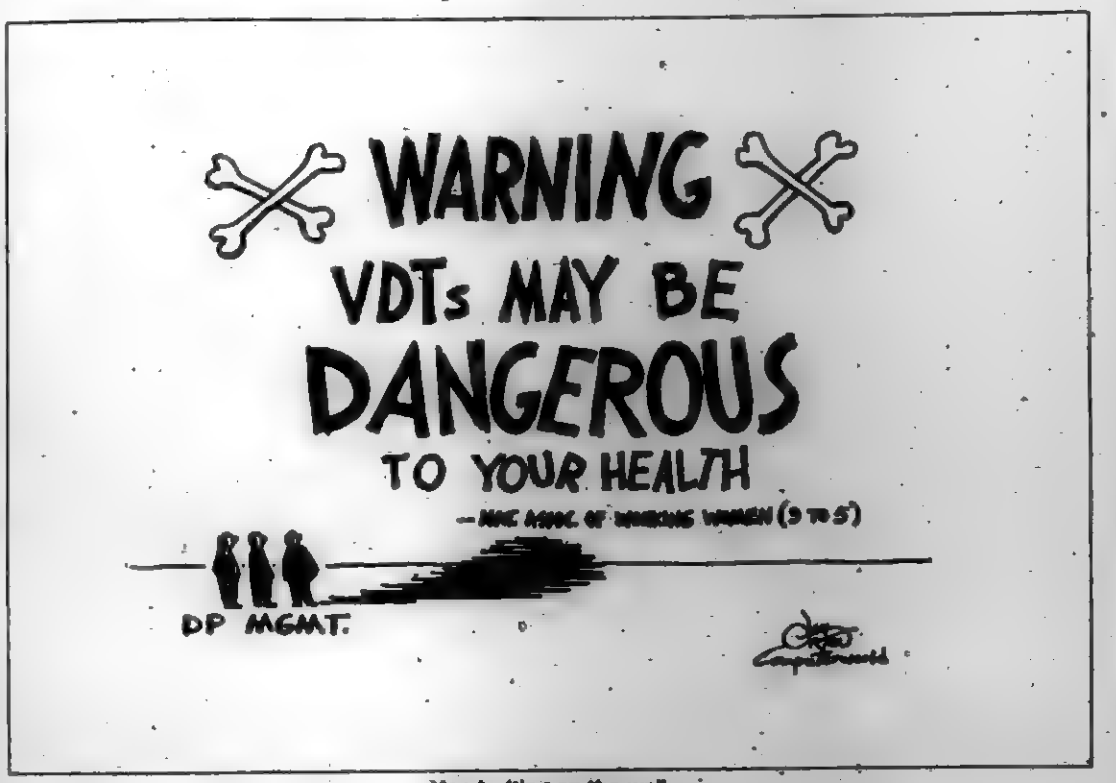
So what does all this mean? It means that the wise need not look far for evidence that the breakneck and sometimes frightening pace of technological change is accelerating. And data processing managers and MIS executives must quickly come to grips with a changing technological landscape in which words like "state of the art" have a fleeting meaning.

Thus, it is more vital than ever that DP managers stay current, which is as easy as saying America should stay strong, but about as difficult to accomplish. The coming generation of programmers, analysts and system designers will enter the job market technologically leagues ahead of their Cobol forebears. Are today's managers ready for them and for the crush of technological change that will accompany them?

In some ways, the DP community at large is anticipating and reacting to change, yet in other, more troublesome ways is choosing to ignore it. For example, at last fall's meeting of the Association of Data Processing Service Organizations, Inc., predominantly a vendor group, about half the work sessions and seminars were devoted to the implementation of microcomputers and end-user computing in general — a radical departure from the association's usual agenda.

But at last fall's annual meeting of the Data Processing Management Association, work sessions and seminars dealing with the implementation of microcomputers — perhaps the hottest issue in DP at present — were conspicuous by their absence.

If managers aren't going to deal with current, pressing matters, they probably won't do well gauging the impact of future change. Given the changes chronicled on a weekly basis in *Computerworld*, dealing effectively with what is known and anticipating the unknown will be a key to surviving in an increasingly tough business.



Handwriting on the wall

LETTER

Question of balanced reporting: a case of do as I say, not as I do?

In the editorial "The VDT scare: reason to pause" [CW, Feb. 27], *Computerworld* scores radio and television reporters because "few bothered" to balance reportage of "harrowing statistics" concerning alleged health risks of VDTs. This appears alongside quotes from a Columbia University physician who made clear at the same press conference that there is no "evidence of widespread pregnancy problems among VDT workers."

Yet *Computerworld*'s own story on the same subject in the same issue, "Survey by 9 to 5 links VDTs, health problems," also fails to quote the Columbia University physician. Furthermore, neither the story nor the editorial pointed out that the government has just completed an exhaustive review of the available evidence and concluded that VDTs show no signs of harming anyone.

Computerworld's editorial gratuitously suggests that the pregnancy problems attributed to VDTs might actually have been caused by "nearby radioactive wastes."

This is just as irresponsible as 9 to 5's allegations: No one has ever shown that "nearby radioactive wastes" have caused "pregnancy problems."

How can *Computerworld* expect the general media to report this sort of story in proper perspective when an important trade journal such as *Computerworld* fails to do so?

Lee Levitt
Executive vice-president
PR Aids
New York, N.Y.

Computerworld welcomes letters from its readers. Preference will be given to typed, double-spaced letters of 150 words or less; they may be edited for the purposes of clarity and brevity. Letters should be addressed to Editor, Computerworld, Box 880, 375 Cochituate Road, Framingham, Mass. 01701.

COMPUTERWORLD

Editor John C. Wilmouth
Executive Editor Rita Shaw
Managing Editor Bill Laberis
Assistant Managing Editor Cheryl M. Gallo

Senior Editors:
Software — Paul Gillin
Communications — John Dix, Phil Hirsch
Systems — Tom Henkel
Industry — Peter Bartolik
Features — George Hayer
Design Editor — Marjorie Magowan
International Editor — Susan Blakeney
Associate Features Editor — Barbara Van Scoyoc
Assistant Features Editor — Elizabeth Morse
Special Reports Editor — Donovan Wells

Staff Writers:
James Connolly, John Gallant, Lynn Haber, Patricia Keefe, Paul Korzeniowski, David Olmos, Edward Warner

Correspondents:
New York — David Myers, Suite 7G, 401 East 80th St., New York, N.Y. 10021, 212/570-2135
Washington, D.C. — Bureau Chief: John Kirchner, 445 National Press Building, 529 14th St., N.W., Washington, D.C. 20045, 202/347-6718
West Coast — Bureau Chief: Jeffry Beeler; Correspondent: Robert Ball, 1060 Marsh Rd., Menlo Park, Calif. 94025, 415/328-8084

Chief Copy Editor — Kathie Gow
Assistant Chief Copy Editor — Charlotte Ziems
Copy Editors: Becky Batcha, Dave Bouffard, Bruce Crane, Deborah Fielding, Deborah Scaduto-Ham, Thomas Schmidt
Assistant to the Editor — June Fettig
Editorial Assistants: Lorraine Brien, Mary DeCristoforo

Contributing Editors:
Education — J. Daniel Couger
Human Communication — Jack Stone
Telecommunications Times — Larry Long
Microcomputers — Thomas Madron
The Data Center — John P. Murray
Leaks on Science — Charles P. Lecht

Special Publications:
Computerworld Extra! — George Hayer, Editor
Computerworld on Communications — Bruce Hoard, Editor
Computerworld OA — Ann Dooley, Editor
Computerworld Buyer's Guides — Marcia Blumenthal, Editor

Main Editorial Office: Box 880, 375 Cochituate Road, Framingham, MA 01701 617/879-0700

Computerworld is a member of the CW Communications/Inc. group, the world's largest publisher of computer-related information. The group publishes 44 computer publications in 16 major countries. Nine million people read one or more of the group's publications each month. Members of the group include: Argentina's *Computerworld Argentina*; Australia's *Australasian Computerworld* and *Micro Computer Magazine*; Brazil's *DataNews* and *MicroMundo*; China's *China Computerworld*; Denmark's *Computerworld Denmark* and *MikroData*; France's *Le Monde Informatique*; Germany's *Computerwoche*, *Microcomputerwelt* and *PC Welt*; Italy's *Computerworld Italia*; Japan's *Computerworld Japan* and *PC Japan*; Mexico's *Computerworld/Mexico*; Norway's *Computerworld Norge* and *MikroData*; Saudi Arabia's *Saudi Computerworld*; Spain's *Computerworld/Espana* and *MicroSistemas*; Sweden's *ComputerSweden*, *MikroDatorn* and *Min Hemdator*; the U.K.'s *Computer Management* and *Computer Business Europe*; the U.S.' *Computerworld*, *Desktop Computing*, *Hot CoCo*, *InCider*, *Infoworld*, *Micro Marketworld*, *Microcomputing*, *PC World*, *Run* and *80 Micro*.

VIEWPOINT

Critical success factors of quality programs

QUALITY
Wayne Smith

When considering how to implement a quality program in your information services organization, it is sometimes useful to examine first what the end result should look like. By "quality program" I mean a set of management techniques, organizational approaches, technical methodologies and administrative procedures that have been put in place in order to improve the quality, timeliness, cost and user satisfaction of your development and maintenance efforts.

The "critical success factors" approach to examining this question (discussed in John Rockarts' article in *Harvard Business Review*, March 1979) can lead to some very beneficial insights into how to go about establishing a program in your organization.

The critical success factors in any enterprise are those few items that must go well in order for that enterprise to succeed. In the context of a quality program, I mean those characteristics that, when present in a program, tend to ensure its success and when not present, the programs tend not to be successful. In other words, they are both necessary and sufficient conditions for a successful quality program. The critical success factors are commitment, organization and discipline.

Commitment required

Clearly, a key success factor is commitment. The more strongly the organization is committed to a quality program, the more likely it will be successful. Commitment is required at three levels in the organization: senior or executive management, information services management and information services staff. By "commitment" I mean not simply agreeing in the meetings that quality is desirable, but rather an allocation of money, time and staff at the proper levels and when it is needed.

It is interesting to note that experience indicates that the staffs of most information services organizations are strong supporters of these programs and tend to be the easiest to sell on the need for such a program. Frequently, there will be islands of enlightenment throughout the department that on their own have taken the initiative to embrace and even implement portions of an effective quality program.

The top level, or the executive management level, of an organization needs to be presold, sold and then resold on the value of the program and how it will be an asset to them in achieving their goals and not simply viewed as another in perhaps a long line of restraints that information services has placed on them. The only language to speak here is that of profitability; a technical discussion with them on, for example, how design reviews are critical to the process will be interesting, but will likely not be persuasive in the end. But a discussion on how the quality program will add 1% of sales to the bottom line by reducing failure costs can be very persuasive. In other words, the best way to persuade a business manager is with a quantitative approach, emphasizing the profit potential of a quality information services organization.

Finally, one must get the commitment of information services management itself. This step can sometimes be overlooked and, yet, these are the very individuals who may have to change the most. As a result, great care should be taken to ensure that the quality program is a practical, results-oriented process that helps, not hinders, them in delivering quality products.

How does one know when the proper level of commitment has been attained? Two signs are:

- The rapid adoption of a quality policy and quality program charter by the organization.
- The assignment of information services' best people to help in implementing the program rather than relegating it to some hapless programmer/analyst who happens to be free at the time.

Further placement

In addition to commitment, a successful quality program must be made physically part of the organization (especially during its early stages). This means that a separate function headed by a respected manager usually reporting to the head of information services needs to be established.

This strategy provides a funding base as well as a staffing base and serves as a focal point for the advanced training that will be required for the quality function's staff and as a control point for implementing the various mechanisms that will typically be required (such as project control, change control and risk management).

The particular placement and location of the quality function within the organization also serves to define better the scope of influence of the program across the company. Finally, the organizational unit will be the basis for future growth of the quality program and serves to ensure its long-term stability and viability.

While it's true that quality is everybody's job and not just the job of the people assigned to the quality function, nevertheless, a quality group placed high in the organization whose primary objective is to ensure that the program is implemented and to assist the various project teams in carrying out the program is critical to the success of the entire effort.

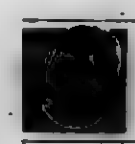
Furthermore, to help ensure the acceptance of the program and to deal more effectively with the legitimate process-oriented differences that may exist among the information services units that are affected by the quality program, it is essential to identify a respected individual in each of these groups to act as a quality coordinator or quality liaison. This individual works directly with the quality function and helps streamline the implementation of the program in his department. This person must also be a strong believer in quality, and his advocacy of its merits, practicality and long-term effectiveness together with his example will be critical to the successful adoption of the program by that department.

Moreover, the quality advocates in each information services unit can then meet to help solve common problems, share ideas and feed back modifications to the program, thus ensuring that the organization is getting the most value from the effort and not simply letting each unit treat the quality program as one more bureaucratic puzzle they must now solve any way they can.

Finally, successful quality programs have adopted a discipline that is used by the information services group to deliver their products. This discipline serves as an infrastructure of methodologies, techniques and procedures. It is usually embodied in a document that has been engineered in such a way that the various constituent methods all operate efficiently and practically and are not simply a hodgepodge of tools and techniques. Nothing turns off a project team more quickly than being required to follow a process that requires, for example, that the same data element be defined and specified in three or four different procedures.

See QUALITY page 93

Invasion of technology gadflies



HUMAN CONNECTION
Jack Stone

The front door bell rings at the residence of George Smith, an honest, hard-working sort of fellow who has just finished dinner and is reading the evening paper. George peers through the window and observes a clean-cut-looking gentleman at the front stoop, dressed in a tweed topcoat with velvet collar and carrying a Gucci briefcase.

George opens the door and asks politely, "May I help you, sir?"

"Oh, no. The question is: 'May I help you?' My name is K. Armstrong Jones. Let me shake your hand, sir, and ask you a simple question: How would you like to make $10 million during the next two years for only a trivial investment?

"Now before you answer, and I suspect I know what your answer is, let me state that I happen to be a sales representative of the M & M brokerage house that is registered with the New York Stock Exchange and is, therefore, quite legitimate and specializes in the private placement of stock offerings from new firms whose emerging technologies represent the developing frontiers of the dynamically changing computer industry which, as you may know, is expected to grow into a major factor of the U.S. economy over the next 10 years, affecting the lives of every man, woman and child in the U.S. and, therefore, represents the outstanding investment opportunity of the century. And that is why I am speaking to you, although I must state that any official solicitation can only be made by prospectus, of which I have a number with me from companies that are seeking investors, and I firmly believe you are perfectly qualified to win this pot of gold. Any more questions?"

"I'm not altogether certain I know where to begin."

Jones reaches into his case, withdraws one of a collection of legal-looking documents and waves it in front of Smith. "Now here's one of my favorites. This company is establishing *Phoenix*, a new magazine designed to help computer users whose equipment suppliers have done the belly-up routine get the most power from their defunct systems. Initial research has indicated that this is an untapped market; potential readers may ultimately outnumber those of all computer-specific publications combined. I can cut you into the offering for five cents a share."

"Sounds interesting, but I somehow feel I would be more inclined toward an investment closer to the leading edge of things," Smith says.

"Sir, here is your answer," Jones responds, waving another document in Smith's face. "The Brazen Bunch. This is a newly organized firm of former teenage hackers who have solved the problem of software pirating. No more distribution of copyable disks, and no more customer hostility evolving from noncopyable disks. Instead, users merely transmit data files over satellite communications links to the Brazen Bunch's research facility in Palo Alto, Calif., and the technical staff takes over from there."

"It would surely appear that the firm has conquered the piracy challenge, but do you really think that the users would tolerate the delays in receiving their processed output?" Smith asks.

"Don't you appreciate that an awful lot of users will be so spellbound by transmitting their files by satellite that they won't care that much about turnaround time? The Brazen Bunch's business plan is a winner. In fact, I'm planning to invest in it myself. Want to go in with me?"

VIEWPOINT

Vendor training is part of implementation methodology

Kathy Cusch's and Kathy Telban's Special Report article "Poor training renders packages worthless" [CW, Jan. 30] missed an important point: Vendor training is not a stand-alone process, but part of overall project management and implementation methodology. Strong client project management is the key to successful package implementation, and training programs must be conducted within that framework. It is the vendor's responsibility to assist the client in the establishment of project controls and guidelines. It is the client's responsibility to furnish the required resources and work with the vendor to accomplish these goals.

LETTERS

In the training phase, this means that client and vendor must have mutually defined goals with methods and timetables for achieving them. The vendor can, and should, offer detailed manuals, lesson plans and hands-on experience, while the client should provide the attitudinal climate and resources that will motivate staff and ensure success.

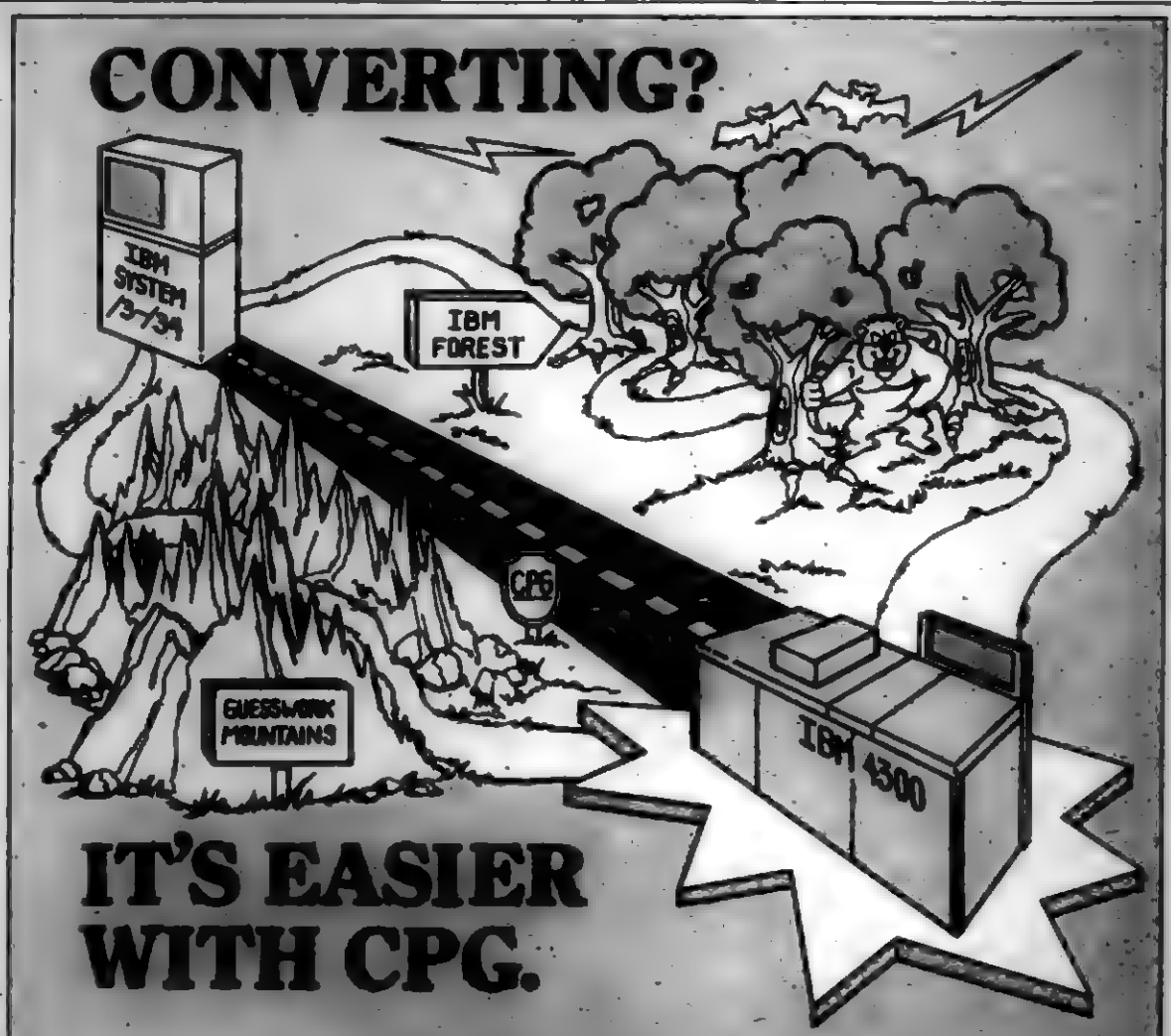
The client should adhere to the implementation schedule, resisting the impulse to add enhancements or make last-minute changes until the project is completed. If the installation is sidetracked by such changes, training quality will suffer. Additionally, lack of coordination at upper management levels and low priority assigned to training are major obstacles to the effective implementation of a package.

As a vendor of sophisticated international banking systems, my firm has found that for effective integration of the training process with overall project goals, the client must:

- Provide a climate of senior management dedication and support.
- Produce personnel resources so that staff members assigned to the implementation and training team are aware that the success of the implementation, including training, is their main task. These people must be relieved of other daily responsibilities.
- Appoint a core group, knowledgeable in the application and capable of making required decisions to serve as the focal point of a training session and to transmit their knowledge to the rest of the staff.
- Insist on a hands-on approach on the supervisory or management level.

If vendor and client bring tested methods of project management to the training function, rather than treating it as the tail end of the implementation process, then we shall all, vendor as well as client, be better served.

Linda J. Weller
Complex Systems, Inc.
New York, N.Y.



IT'S EASIER WITH CPG.

Make the move to your IBM mainframe painless and productive. Buy CPG before you convert.

CPG is the on-line program generation system from Allergo Products. It's easier to use and far more machine efficient than UPO™, MANTIS™, or TRANSIV™. It's just the system you need to prepare for a bigger machine without bigger headaches.

- CPG is easy to apply. Existing programmers become on-line experts in 1-3 days.
- CPG automatically generates optimized re-entrant, multitasking programs. Easy to create. Easy to maintain.
- CPG is powerful. Includes arithmetic & Hexspeak output; simplifies screen-mapping & screen-editing; complex interfacing to TP system is handled by CPG.
- CPG is efficient. Standard processing routines and your common routines are incorporated into the Central Routine Library (CRL). This eliminates code duplication, loading and re-loading of common code at execution time.
- CPG programs are transportable. The CRL allows programs written in CPG to work under DOS or OS and run under CICS or SHADOW II.
- CPG is user-responsive. It allows you to develop, test and implement on-line systems in less than half the normal time, at the terminal before the user's eyes.

Whether converting or simply looking for an easy way to meet the on-line workload, go CPG. Go Allergo. Call for more information today.

"On-line programming was never easier than with CPG."

Allergo Products Inc.
400 West Cummings Park, Woburn, MA 01801
Telephone 617-938-8811 Telex 951-265
A THORN EMI Company

'I'd suggest waiting'

I think worrying about the year 2000, as demonstrated in the article "The problem you may not know you have" [CW, Feb. 13], is interesting, but I also think it's wrong. While there can be no denying that problems will occur, overtime will be paid and programmers will work two shifts, one wonders if anything can be done now.

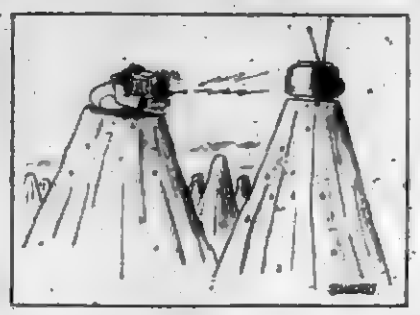
More harm than good can be done by worrying about it now, because programming errors will be made. What is the use of modifying a program, whose chance of life 16 years from now is dubious anyway, when it works fine now and can't receive "in-field" testing for 16 years?

What about the "Zip+4ing" of America's address files? I can remember many times laying out specs for an address file and wondering, "Should I make it nine, or should I make it five?" The reply was always the same: Make it five so it's compatible with all the other name and address files. Of course, that is a change that needs to be made all over, in thousands of shops.

So those of you who want to, go ahead and change your date algorithms now. But I'd suggest waiting.

Don't come crying to me the next time you have to convert data to and from external files and formats. Don't come crying to me when you realize that ever since "project early-kill," 1983 has come before 1984. And don't come crying to me when the year 2000 finally rolls around and everything goes wrong anyway. I'll be way too busy collecting overtime and working two shifts.

Russell Hoffman
Bridgeport, Conn.



VIEWPOINT

Security costs don't rise with more data protected

LETTER

After reading "A conversation with IBM's DeMaio" (CW, Jan. 30), I feel it is necessary to inform Computerworld's readers of what I consider to be seriously erroneous advice by DeMaio. I have been involved in the area of data security since 1970, when I was appointed manager of the Share security project. I guided the project in developing a series of long-range security objectives, which were published in 1973. In 1977, I designed and developed ACF2 — The Access Control Facility, an access control system for IBM's large computer systems, now installed in over 1,200 installations worldwide.

DeMaio seems to confuse the questions one would ask in order to classify data for security purposes with those one would ask for disaster recovery purposes. DeMaio asks that data users classify data into "really important" data so that if it were lost or erroneously changed, it wouldn't seriously damage the firm. These are questions one would ask in planning for disaster recovery, because this is a case in which there is a corresponding increase in costs compared to the number of applications that are considered crucial. In this case, data is either destroyed (lost) or it is not.

Data that is erroneously modified, either intentionally or unintentionally, can be an insidious cancer within an organization. Most corporate decisions are based on available data; records are relied upon by auditors; stockholders would like to believe the data they receive is accurate; and research projects' data is used in development and production decisions.

DeMaio bases his recommendations on the false assumption that security costs significantly more as the percentage of data protected rises. In fact, in order to justify this finding, IBM asked DP managers what percentage of data they would protect if the cost of data protection rose with the percentage. The answer IBM received was about 80%.

Who is going to decide which 80% should be protected, especially in the case of derivative or combined data? Where does the line of protected vs. unprotected get drawn?

IBM has designed its security products around this misguided philosophy. Since the products were designed in such a way that it costs significantly more as the percentage of data protected goes up, when using these products the costs do rise significantly as the percentage of data protected goes up.

ACF2 was designed with the assumption that all data should be protected by default. Partial protection of data was designed only for transition purposes to allow an installation to migrate smoothly from an environment in which no data was protected to a fully protected environment. With this system design, installations have found that the difference in costs between protecting some data and all data is negligible.

I'd agree with DeMaio that sometimes when an installation faces protecting all data it seems to be too large a task to get your arms around. But I'd suggest prioritizing data so that one can start the process of implementing security in a logical manner. Any progress toward the full security of all data protected is headed in the right direction. As each step is made, it reduces the corporate exposure, and each incremental step is worth it. And the installation has to decide only where to start the projection process — not where to stop.

Barry Salsburger
President
SKK, Inc.
Pleasanton, Ill.

Stuff it to JES

Give your CICS and IMS reports to JES

The Dynamic Report System provides a bridge between on-line systems and the JES report queues. Instead of burdening CICS and IMS with printing, move it to JES and gain performance along with centralized report distribution. Let JES account for, archive and distribute reports to 327X printers, local printers, PCs, plotters, microfilm devices and 5210s.

LRS Levi, Ray & Shoup, Inc.
P.O. Box 16538 • Dallas, TX 75216
DALLAS (214) 324-2635 • TELEX 80-4284
L.A. (213) 822-4888 • Chicago (312) 529-6888 • NYC. (212) 269-6888

Words Alone Don't Describe The Lasergrafix 1200 Printer.

The QMS Lasergrafix 1200 is a breakthrough in electronic page printing. But words alone just don't describe it. Because QMS designed the Lasergrafix 1200 to do so much more than words. With a built in intelligent controller that takes simple print commands through your normal data stream. Built-in applications firmware eliminates the need for additional software—and frees your computer's resources for other work.

The difference is graphic—for all your business, scientific and individual printing needs. Create forms that have multiple typefaces and letters up to ten inches high—all on the same line. CAD/CAM. Bit mapped and vector graphics. Pie charts. Bar charts. Even barcodes. At a crisp resolution of 90,000 dots per square inch. With a printing speed of 12 pages per minute.

And, of course, letter quality word processing.

The Lasergrafix 1200 interfaces with just about any computer system. With versatility that lets you take business graphics to the limits of your imagination. Ask for a demonstration. You'll discover that the whisper-quiet performance of the Lasergrafix 1200 speaks softer than words.

And says a whole lot more.

QMS®
QUALITY MICRO SYSTEMS, INC.
P.O. Box 81250 Mobile, AL 36689
Telephone (205)633-4300 Telex RCA 26 60 13
WHERE IMAGINATION LEADS

☐ Send me the Lasergrafix 1200 Information Packet, samples of mixed fonts, graphics and everything else it does.
☐ Please contact me to arrange a demonstration.

Name _____ Title _____
Company _____
Address _____
_____
Type of system you are now using _____
Number of print workstations you are considering _____
Prime applications for printer _____
QUALITY MICRO SYSTEMS, INC.
P.O. Box 81250 · Mobile, AL 36689 CW

VIEWPOINT

MIS decisions can make or break a firm

THE DATA CENTER
John P. Murray

With all the options, not to mention the confusion, associated with the changing information processing hardware and software technology, the pressure on the MIS department continues to increase. MIS clients demand, particularly as they gain somewhat more sophistication, improved service, faster response time and more information in different formats, and they want, increasingly, to be able to do more on their own.

At the same time, the organization's financial members want to reduce expenses. Members of MIS want, for a variety of reasons, to move with the technology, to develop and test new approaches and to use state-of-the-art processes.

Given all of the above, the management of MIS departments must attempt to sort out all the issues and to recognize the requirement for at least the exercise of common sense, if not caution, in facing the dilemma of doing what is best for their organizations while still holding MIS expenses to a reasonable level. As technology advances, it allows more to become both practical and affordable. As this circumstance develops, there is sometimes an emphasis on moving ahead too rapidly, without a concrete plan or development of an attainable set of goals.

Clear picture

I am a strong advocate of the movement to a state-of-the-art environment to do away with obsolescence. I still hold that position. My interest here is to make certain that we in MIS management do our best to provide our organizations' senior management with the clearest picture possible of the long-range consequences involved in certain issues.

We cannot predict with any degree of real precision what will occur, but we do need to work to make senior management understand the long-term implications of what we are proposing and to alert them to the fact that the productive uses of information processing technology and the real benefits to be gained cannot be carried on in a stop/start fashion and be effective.

The use of expanding and improving technology presents real opportunities for organizations that will take the time and effort to understand what can be accomplished through its use and that will then take the appropriate initiative to use that technology to help drive the organization ahead.

Long-term costs, consequences

However, this exuberance to realize the potential payoff inherent in the uses of such technology must be tempered with an understanding of the long-term costs and consequences associated with its use or, perhaps more importantly, without its use. Too often, MIS management is less than completely candid with senior management in terms of the identification of actual ongoing costs of a particular technical approach to a given issue. Sometimes, to be fair, MIS management may not be aware of all associated costs.

Insofar as possible and practical, MIS management has a responsibility to senior management to identify the probable continuing costs associated with improvements in the technical environment of the organization. As an example, consider the issue of the installation and expansion of an information center function within an organization.

The benefits of such an installation can be great; they can be easily identified and achieved; selling the concept presents little difficulty to the MIS manager who does his homework.

Ongoing cost

However, there is an ongoing cost associated with the information center that should be brought to the attention of senior management. The point here is that senior management should understand the real implications (both positive and negative) of the installation of the information center.

If the function is successful, demand will grow and, as a consequence, so will overall costs. These increased expenses can, in any well-managed information center, be easily offset through the increased productivity realized in the information center. The point is, however, that the likelihood of the development of such a situation should be addressed for senior management well ahead of its occurrence.

There is a clear requirement to make certain that MIS planning is defined in such a way that it will, insofar as is practical to predict, help drive the organization to realize its goals.

The requirement for flexibility and the concomitant extra cost associated with that flexibility must be

See MIS page 58

Introducing Lear Siegler's 3278 Keyboard Compatibles

Easy to Look at. Easier to Use.

Now you can combine Lear Siegler's exclusive High Touch™ style with the convenience of true IBM 3278 keyboard compatibility.

The ADM 1178 and ADM 1278 video display terminals offer superior performance and ergonomic design. With standard protocol converters, they can interface with virtually any IBM mainframe to achieve substantial savings in hardware and operator training expense.

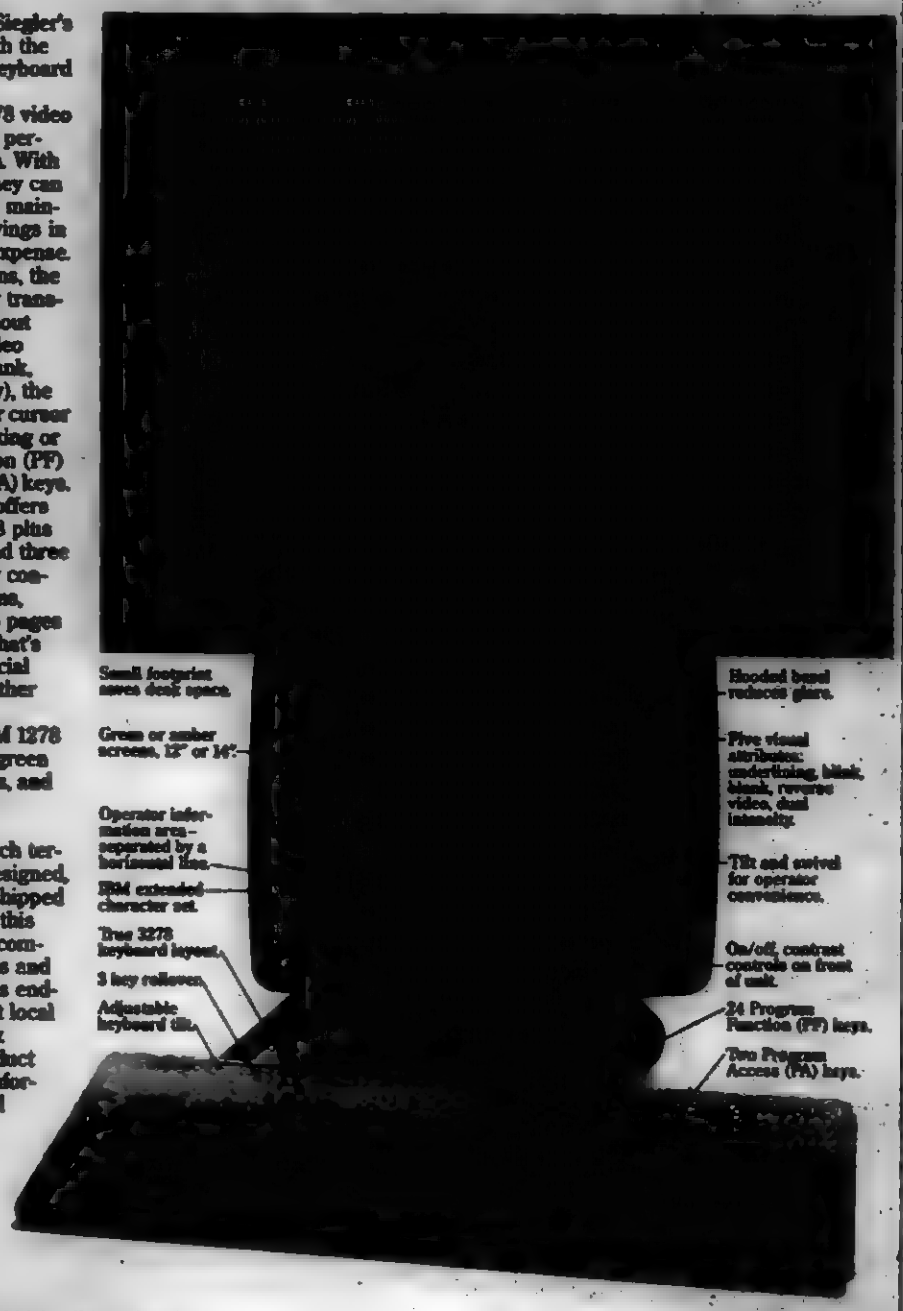
For conversational applications, the ADM 1178 can handle computer transmissions up to 19,200 baud without handshaking. It features five video attributes (underlining, blink, blank, reverse video, and dual intensity), the IBM extended character set, four cursor modes (block or underline, blinking or steady), and 24 Program Function (PF) keys and two Program Access (PA) keys.

The block mode ADM 1278 offers all the features of the ADM 1178 plus expanded editing capabilities and three variable format display memory configurations: 48 lines x 80 columns, 24 lines x 158 columns, and two pages of 24 x 80 columns. Flexibility that's ideal for word processing, financial spreadsheets, flow charts and other specialized applications.

Both the ADM 1178 and ADM 1278 are available with standard 12" green or amber or optional 14" screens, and can be modified easily for OEM applications.

These Lear Siegler High Touch terminals are made in America–designed, engineered, manufactured and shipped from Anaheim, California. With this total, on-shore capability, and a complete worldwide network of sales and service centers, OEMs as well as end-users can be assured of the best local support available in the industry.

Call our ADM 1178/1278 product specialists today for complete information on products and protocol converters.



LEAR SIEGLER, INC.
DATA PRODUCTS DIVISION
901 E. Ball Road, Anaheim, CA 92805 (714) 774-1010

IBM is a registered trademark of International Business Machines Corp.

©1984 Lear Siegler, Inc.

Soup up your Volkswriter.

Everybody knows Volkswriter, the word processing software package that's become synonymous with high performance. Now, there's a way to get even higher mileage out of your Volkswriter. Hook it up to a Dataproducts P Series dot matrix color printer.

The versatile P Series translates the executive class, word processing capabilities of the Volkswriter into brilliant full color charts, graphs and text. It delivers a full page of text quality print in nothing flat while its sheet feeder automatically prevents loading hassles. And the P Series uses pin feed or plain paper and has the brains to fill every appropriate line with crisp, sharp copy, even if it has to justify to do it. And the P Series color printer has dual speed capability for correspondence quality output for the Volkswriter's many word processing applications and high speed output for draft and spreadsheets.

The Dataproducts P Series color printer. Think of us as a supercharger for your Volkswriter.

For more information go to your nearest computer store and ask about the Dataproducts P Series color printer, or call Dataproducts, 1-800-258-1386.

Dataproducts computer printers

Nobody puts ideas on paper so many ways.

Volkswriter is a registered trademark of LIFETREE SOFTWARE, INC.

VIEWPOINT

MIS from page 28

spelled out to senior management. This issue should receive careful consideration from MIS management so that the case presented can be understood by senior management. The issues should be addressed in terms of dollars, rather than in terms of technology.

Adopting a too rigid or, even worse, incorrect course in the development of the MIS thrust for the future is not in the best interest of the organization. We must anticipate change — rapid and dramatic change in information processing technology.

Increasingly, we must work to make senior management understand and appreciate the long-term implications associated with decisions made about an organization's information processing effort.

Ultimate decisions

It seems just as valid to point out the real danger in doing nothing, or in "saving money," as it does to point out the glories of new technology. The ultimate decisions are, of course, the purview of senior management; MIS has a responsibility to point out all aspects associated with those decisions.

Too much rests on the course chosen for MIS not to press to develop the best possible understanding of the decisions' implications.

The long-term consequences of information processing's long-range course of action carry too severe an organizational impact to be ignored or misunderstood by the organization's senior management. These issues can impact the very existence of the organization. Incorrect or shortsighted decisions may very well mean the demise of the organization.

Increasingly, the actions of the organization's information processing planning and implementation efforts do take on a "bet the company" aspect.

Do it right, and the organization will grow and prosper. Do it wrong, and the organization will, at the very least, suffer. Somehow senior management must be made aware of this issue. ‡

Murray is director of management information services for Bayonet Corp., Madison, Wis., and author of Management Information Systems as a Corporate Resource, *published by Dow Jones-Irwin.*

QUALITY from page 59

Successful quality programs seem to have the characteristic that whatever discipline they have adopted quickly becomes a habit and is not continually thought of as another roadblock to overcome.

Also, this discipline does for each organization have a critical mass above which it will be unsuccessful regardless of the merits of its individual components. The critical mass can often be measured in terms of the size and the complexity of the methodologies and procedures within the discipline. It is, therefore, vitally important to assess the critical mass within your organization and to strive to ensure that the embodiment of your quality program discipline is below that threshold.

It is also important to understand that whatever discipline is established for the quality program must be made compatible with the philosophy and style of management exhibited by senior management. A quality program will have a low probability of long-term success if its underlying management principles fly in the face of the way the organization currently operates. Sometimes a management training program that serves to reorient company management may help mitigate the situation, but this substantially lengthens the process.

The most desirable enforcement mechanism for the discipline related to a quality program is based on each manager's own recognizance. However, due to many factors, this mechanism often needs to be supplemented. A useful technique is based on the concept of concurrence. Briefly, this revolves around a process whereby the quality function is jointly responsible with the project team for the success of the project or maintenance effort. The project manager is in charge, but the quality function serves to assist the team in ensuring that the proper risks are being accommodated and that the project's quality goals are being properly addressed.

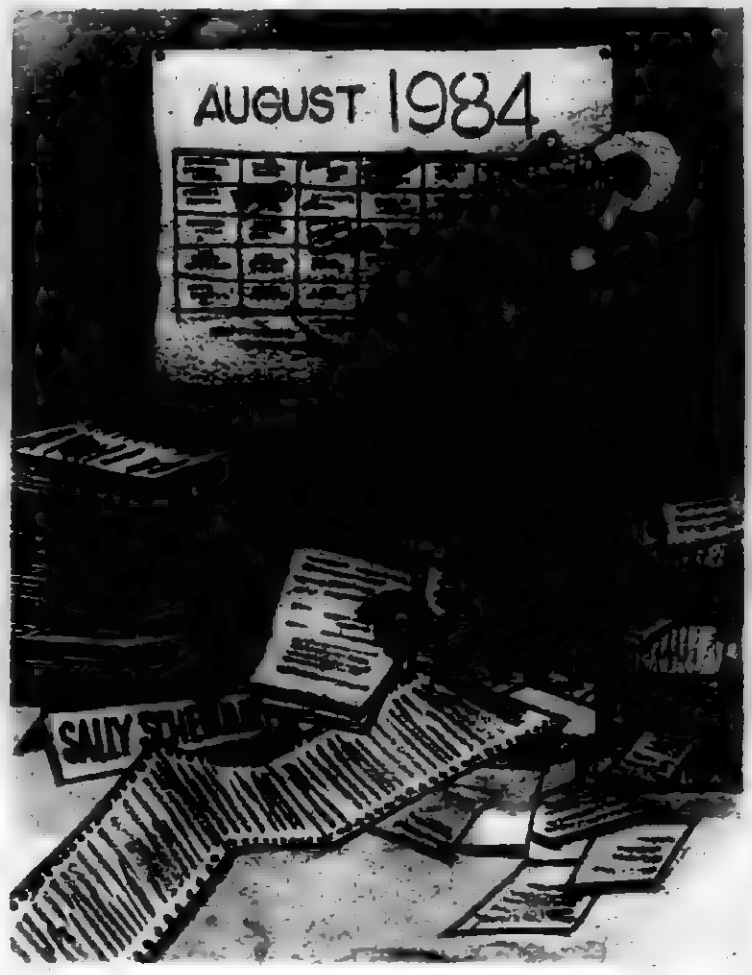
This variation tends to reorient the quality group away from being policemen, enforcers or after-the-fact memo writers (all chilling and low-productivity roles) and toward being partners in success. In addition, if differences of opinion arise, the mission of the quality function is to reach concurrence with the project manager, and only if that fails do they both simultaneously have an audience with the next level of line management.

The quality group must act very much like lawyers in the sense that they are obligated to assess risks on an effort and to offer solutions. But the final responsibility must be with the business manager or equivalent in determining the proper course of action. In other words, the quality function is obligated to provide the quantitative data by which senior management can make the informed decision.

Commitment provides the nourishment in the form of money, time and staff to initiate and sustain the program. Organization provides the structure for stability and a base for growth. Discipline provides the process for performance. ‡

Smith is vice-president, specializing in quality, at Applied Information Development, Inc. in Oak Brook, Ill.

Want Fast Relief From Your Scheduling Headaches?



APEX—Automated Production Control System. APEX is the most comprehensive production planning and workload management system available in today's market. APEX eliminates card handling and reruns due to setup errors, assures correct job sequencing, allows viewing of output before its printed, and provides immediate up-to-date status of all production processing. Some of APEX's powerful features include . . .

- Flexible Scheduling
- Interactive Job Setup
- Automatic Job Submission
- Automated Restart/ Recovery
- Online Output Review
- Management Reporting
- Single Source of Production Information for IBM 370, 303X, 308X, 43XX and all PCM's running under MVS, or VS1.

Take APEX From Johnson Systems

Call me in the morning: 1-800-368-1010

Johnson Systems 8300 Greensboro Drive, McLean, VA. 22102 1-800-368-1010 or (703) 821-1700
NATIONAL OFFICES Chicago (312) 655-3480 San Francisco (415) 562-4018 Dallas (214) 347-3252

VIEWPOINT

The first whole mirth computer-aided life catalog

BRADEN'S PLAYPOINT
Walter Murphy

The computer's end, by association, technology's impact on society has been well documented and recognized. Unfortunately, the impact for the most part has been in the business community. In *2001 — A Space Odyssey*, HAL took over when the going got rough. Now other computers have slowly begun to work with humans instead of for humans. Computer-aided design and manufacturing are as readily accepted as personal computers in the business community. With that in mind, the next wave to crash against the bulwarks of our lives will be computer-aided life, or CAL.

The primary criterion of any technological innovation should be that it improves the quality of life. CAL is the catalog for the high-tech lifestyle. Its CAL promise is incorporated into each product to make "Better living through technology" more than a slogan.

For the most part, technology has had little impact on the home. If we are to move into the next wave, consumer products must be at the breakwater. A few of the new home-use products to receive the CAL imprint will be: Florutech, Caring Rob, Distronics and FTP.

Digitized toothbrush

Florutech is a digitized toothbrush equipped with laser beam scanning capabilities to locate plaque and particles of food unseen by the human eye. The eyes may be the mirror of the soul, but the mouth is still the calling card. Florutech also comes equipped with a floss attachment and power pack so you can travel with the peace of mind that your dental hygiene needn't be neglected.

Caring Rob is the robotics child care system that is programmed to represent the parent as he wants to be remembered when he's not around.

The operating modes available are: Alan Alda Auto, for the sensitive and caring child; Clint Eastwood Correctional, for the unruly punk; and Hoigatron, for the take-charge type of kid. For each mode, Caring Rob is programmed for acceptable and unacceptable speech and behavior with appropriate responses and action. An early-warning system checks potentially disruptive or dangerous behavior by accessing memory and pattern recognition. Caring Rob takes the worry and bother out of child rearing.

Distronics is a complete line of formal dining utensils designed for those who are constantly dieting. Each utensil is equipped with a calorie counting device that, based on your desired weight, present weight, caloric intake within a 24-hour period and present attempt to place food in your mouth, will either allow you to continue or to become inoperative. When inoperative, a chemical process is initiated that causes the metallic content of the utensil to become so heavy that it is impossible to pick up.

An ear-piercing siren is also activated. This last option makes "midnight raids" impossible and painful.

Another Distronics option is Prodtronics, which is a voice simulator that chides you with the error of your ways with statements such as: "Do you really need that?" or, more forcefully, "You disgusting pig!" Distronics comes in over 100 registered patterns and will be available wherever Weight Watchers is sold.

FTP is the Food for Thought Processor, which provides you with a constant stream of mood-enhancing axioms. It is a product that combines the importance of information and its relationship to our moods. Simply, FTP broadcasts information

Who brings low-cost graphics together with the best names in software?

VIEWPOINT

over the home's intercom system. No matter what your mood, PTP will bring you out of it.

A wide selection of moods are available.

PTP is guaranteed to enlighten and inform.

Personal computers have really brought home the need for personal technology products. CAL's personal management products go one step further. Some of CAL's product announcements include PATM, Langlastics, Easy Golfer and Autoxpress.

PATM is the Personal Automated Teller Machine, which allows you to be a bank branch. Under a special licensing agreement with various national banks and the U.S. Treasury and Mint, PATM provides subscribers with instant access to their banking records and, for the first time, their money. The hand-held PATM is designed for satellite communications with your bank's headquarters from which you can access all your records for inquiry purposes. More important, due to the licensing agreement, actual currency can be printed at your PATM. Bank at home, in your car, at a restaurant, anywhere.

However, due to the unusual licensing agreements, PATM will be available only to those who qualify, the less stringent requirement being a million dollar bond be put up and held by the participating lenders. A small price to pay for the power usually available only to counterfeiters and federal employees.

Langlastics takes the worry out of learning a foreign language. Designed to look like a Sony Walkman, the Langlastics actually records any foreign language spoken within earshot and through a voice simulator translates the dialogue verbatim. This product is ideal for anyone who travels extensively or is paranoid about foreigners.

The autoresponse option translates your comments flawlessly. Never be embarrassed about your feeble attempts to sound sophisticated with remarks like: "Oh yes, the reindeer look lovely on my sister's pocketbook" or "Gosh, I am ruminating awfully." Langlastics makes the Berlitz School look like Mr. Rogers' Neighborhood.

Easy Golf is designed to take the drudgery and frustration out of the exciting sport of golf. You needn't spend hours practicing to be respectable or making excuses for missing easy taplins.

With Easy Golf, every shot you hit is a hole in one. Easy Golf can pay for itself with a few choice bets. Easy Golf is a set of three metal-seeking golf balls that when activated by even a child's tender tap are set on a direct course to the nearest hole. You could pick up extra cash with trick shots: Use a wooden cane on the front nine and test your skill with a tire iron on the back nine. You'll be at the 19th hole before your partners can say "Hey, that's cheating!"

The competitive challenge is still there as you devise ways to be creative. Caution: Due to the tremendous magnetic pull of Easy Golf's balls, jinksters cannot wear jewelry or other metal-based objects while in play. While testing Easy Golf, numerous injuries occurred to people unfortunate and tacky enough to be wearing chains while serious golfers were practicing their vocation.

For you and your car

Autoxpress lets your car say more for and about you. It is destined to be the citizens band radio of the 21st century.

From the console keyboard, you can display impromptu messages to those behind you via a rear-window-mounted screen display. It is more expressive than a bumper sticker, with only your imagination or vocabulary to limit your messages.

For example, it provides for affluent motorists an ideal opportunity to lord it over the proletariat with such jaunty displays as: HARVARD '74 or WE MADE MONEY THE OLD-FASHIONED WAY — WE INHERITED IT!

To improve the quality of life, Autoxpress is ideally designed to inform other motorists of the stupidity and arrogance of their driving styles. The highways are your canvas: Express yourself.

All CAL products include delivery and installation. Prices are subject to change without notice and on the whim of the designer.

Murphy is a consultant with a firm in New York.

Tektronix.

No graphics terminals connect you to better utility or applications software, or with a broader range of computers, than Tek's desktop 4100 Series terminals.

Among the dividends of Tek's long leadership in graphics are the scores of program development tools and powerful applications packages already on-file and immediately compatible with most computers.

From analysis to reporting; cartography to CAD: compatible software helped make Tek's low-cost 4100 Series an immediate success.

Major software vendors like ISSCO, SAS, Precision Visuals and many others offer 4100 users flexibility in data analysis and presentation.

In more technical, engineering and scientific environments, users can take advantage of ANSYS,™ PATRAN-G,™ ANVIL-4000,™ GEOMOD,™ Tek PLOT 10 Computer-Aided Drafting and Easy Graphing II.

Tek PLOT 10 graphics development software library is installed on more computers than any other in the world. It now includes the core standard IGL; the new international standard GKS and TCS, nucleus for scores of specialized packages.

The 4100 Series lets you take full advantage of all these powerful software resources.

Fast, flexible, and priced fully equipped from just $3995, quantity one, the 4100 Series includes VT100 compatibility and ANSI X3.64 text editing right along with its exceptional graphics.

Choose from a range of resolution, segment memory and color capabilities, backed by performance unique to the price range—including a flicker-free 60 Hz non-interlaced display. 38.4K baud communications. And color manipulation by keyboard function keys.

The companion 4695 Color Graphics Copier now makes color copies practical. It's a very quiet and reliable push-button easy desktop unit that doubles as an alpha-numeric printer. Single quantity cost is just $1595.

Powerful graphics team with Tek 4695 color copies and transparencies for a complete desktop analysis and presentation system.

Presentations come alive with the communications impact of full color transparencies that can be produced in minutes.

Your Tek Sales Engineer can help you find the perfect software for your computer, your needs, and our graphics. For literature or the location of your local Tek sales office, call toll-free: 1-800-547-1512. In Oregon, 1-800-452-1877.

Call Tek

Tektronix
COMMITTED TO EXCELLENCE

VIEWPOINT

The coming of age for communications: 1984

READER'S PLATFORM
Walter E. Ulrich

In communications, 1984 had been anticipated with dread by some people and enthusiasm by others. Now that the year has begun, it deceptively appears that little has changed. Data, text and voice are being transmitted the same way in January as they were in December.

Nonetheless, changes — fundamental and sweeping — have occurred. The basic premises of past communications decisions have been altered. The implications for users and vendors alike are nothing less than monumental. The procurement of telecommunications products and services is no longer the same. For vendors, there is a whole new complex set of challenges, problems and opportunities.

Nineteen eighty-four is different from previous years for three reasons. First and most obvious, on January 1, the divestiture of AT&T was completed. Second, the Federal Communications Commission began deregulating the communications industry with its Carterphone decision 15 years ago. Its efforts are just now being concluded. The coincident breakup of AT&T and the fruition of FCC competitive rulings represent an industry restructuring that is unparalleled in American history.

The third cause for this change is technological. Communications technologies are on-stream today that were unavailable one year ago. Cellular mobile radio systems are serving subscribers today in the city of Chicago. Digital termination systems offer an effective alternative to traditional local-loop telephone company plants across a community. More bandwidth is available today than ever before. Communications services now provide higher speeds, greater flexibility and lower costs.

Evolutionary changes have been occurring along with the revolutionary ones already described. Vendors are providing new and better hardware, software and services. Practical solutions can be developed for even the most complex problems.

The best news for communications users is that the competitive environment has had its intended effect. Communications prices are decreasing, and lead times are being reduced. Communications solutions can be crafted to meet a company's specific needs. As we collect and analyze more information, communications is providing an increasingly rich infrastructure to disseminate it. Properly designed, the cost per unit of communications will decline.

The bad news is that users will have to become masters of their own fate. Sole source procurements are neither wise nor practical. Freedom of choice implies a tyranny in which choices must be made, and there is a plethora of choices from which to select. Companies that choose poorly — or companies that fail to make a conscious choice — will find the cost per unit of communications increasing, perhaps drastically.

Network redesign

Networks that were designed in past years will have to be redesigned. The basic assumptions and underlying economics are different. Networks that were engineered in 1982 are no longer optimal in 1984. Network optimization now means more than juggling line speeds and changing node locations. A variety of different communications products and services should be mixed and matched for optimal function, flexibility and cost.

Competitive markets reward firms that are innovative, efficient and well managed. The rapid technological pace and fast-changing customer needs require insight. Effective marketing and promotion will be keystones to success.

Competition will be stiffer, but new markets will open up. Independent vendors will find selling to the former Bell operating companies easier. Consumers recognize the need for new communications, so the communications industry pie will be bigger for everyone.

Planning will be the key for users and vendors alike. The new communications must fit a user's information strategy. Information and communications are only effective so long as they advance and support the goals and objectives of the organization. Communications is the nervous system of companies: Failure to develop a communications plan can lead to a breakdown.

"Strategic planning," "product planning" and "business planning" are the bywords of successful companies in every industry. Vendors must understand their markets, their competitors and the technology.

This year represents a brave new world in communications. A certain courage will be required to face that world squarely. Everyone in the industry has his work cut out for him this year. ‡

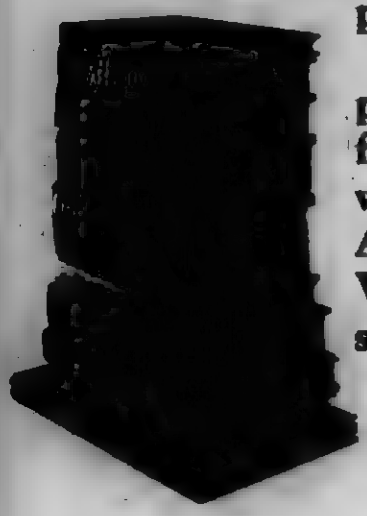
Ulrich is president of Walter E. Ulrich Consulting, a Houston-based management and technology consulting firm.

5 MB in a 5¼"?
25 MB in an 8"?

The equivalent of 10 volumes—3,000 double-spaced pages—can be stored on a single 5MB Dysan 5¼" rigid disk cartridge . . . *five times* the capacity of a high-density floppy diskette! The portability and interchangeability of a cartridge, *plus* the reliability of Winchester technology.

And all without having to search through a whole library of floppy diskettes.

Also available is the Dysan 8" rigid disk cartridge, with an unprecedented 25MB capacity—15,000 double-spaced pages of text or alphanumeric data.



They're the reason why more and more business professionals are deciding on rigid disk cartridges for their microcomputer storage needs. Compatible with 8" removable drives, such as those from Amcodyne, Disctron, Century Data Systems, and Vermont Research; and 5¼" removable drives, such as the DMA MAGNUM 5/5.

The size of a floppy. The reliability of a Winchester. Another Dysan first, from the leader in rotating magnetic storage media.

Dysan CORPORATION
Corporate Headquarters
5201 Patrick Henry Drive
Santa Clara, CA 95050
(800) 551-9000

Call TOLL FREE (800) 551-9000 and ask for "Dept. 50" to find out more about the storage technology of the future.

SOFTWARE & SERVICES

SOFTALK
Paul Gillin
CW Senior Editor

Micro impishness brightens Softcon

Like a feisty young puppy in the company of a pack of trained hunting dogs, the microcomputer software industry has provided a spark of youthful impishness that is at times a joy to behold.

Nowhere was this more apparent than at the Softcon International Conference and Trade Fair for the Software Industry held in New Orleans last month. While Softcon '84 failed to live up to expectations in many areas, the show pointed out how strikingly different the microcomputer software business is from its mainframe counterpart. A carnival-like atmosphere infused the show, complete with clowns, giveaways, song and dance and an assortment of other gimmicks.

Trade journalists could come to New Orleans carrying a 4-in.-thick folder of mail announcing press conferences, exhibit locations or just plain seeking an interview with a company president. In the two weeks before the show, the telephone rang almost nonstop with entreaties from vendors.

Indeed, the publicity campaigns that preceded the show were often more imaginative than the show itself. Companies have undertaken an assortment of colorful advertising campaigns in attempts to distinguish their products in a sea of like-minded competitors. Messages arrived stamped on diskettes, T-shirts, coffee mugs and buttons. About a dozen vendors paid the extra $10 to have their publicity releases sent by overnight mail; other envelopes arrived by certified mail. One came special delivery, and four or five were marked "personal" in flowing penmanship.

While this Pepsi Cola-like display is at times tiresome, it points out the seriousness of the problem facing vendors in

See SHOW page 65

Ironing out info center kinks

By Jean-Pierre Dubler
Special to CW$

The information center concept is fast making headway. Nevertheless, maintaining an information center still carries certain problems: How can quality service be provided? How can performance levels be assured? How can capacity be planned in response to this new type of demand, which is difficult to manage and places burdens upon corporate resources?

Futhermore, after recent innovations in the microcomputer market, especially the IBM Personal Computer XT/370, data processing specialists are faced with a short-term need to replace data center terminals with linked microcomputers, resulting in an additional series of problems — such as data distribution, security and risks in terms of incompatibility.

The following definition for an information center was adopted at a recent Share Conference for IBM users: "An information center consists of a facility and resources which can allow users to carry out their own data processing according to their immediate needs."

It would be appropriate to add "extensive" resources, because an information center, from the vantage point of a computer center, would initially seem to impose a heavy burden upon resources.

An information center requires numer-

See CENTER page 65

'Primeway' transaction system debuts

NATICK, Mass. — Prime Computer, Inc. has announced a transaction development and management system which reportedly integrates programming development and execution into one process.

The Primeway transaction development and management system is designed for use on Prime 50 series superminicomputers under Revision 19.2 of Prime's Primos operating system.

For use in distributed or centralized data processing environments, Primeway is intended to ease software maintenance and modification requirements in high-performance transaction markets, such as banks, insurance companies, utilities, education and government.

Developed in Cobol '74, Primeway is said to provide a highly structured but flexible interactive development environment, according to a spokesman. Once an application is developed, execution reportedly is managed by the Primeway transac-

See PRIME page 65

SOFTLINE/GEORGE ARMERDING

Setting the DP book straight

The latest fad is computer literacy. Enterprising vendors offer courses, books and seminars that promise quick enlightenment for the illiterate. But it appears to me that they have omitted some important, fundamental topics.

The latest computer literacy books have chapters about bits and bytes and disks and chips and even how to write programs in Basic. But they fail to mention the intangible parts of this business: the quaint quirks that affect the people who use hardware and software.

Take bugs, for example. The computer literacy books only briefly mention them. But data processing is a business in which our lives are controlled by those ornery creatures that inhabit both machines and programs.

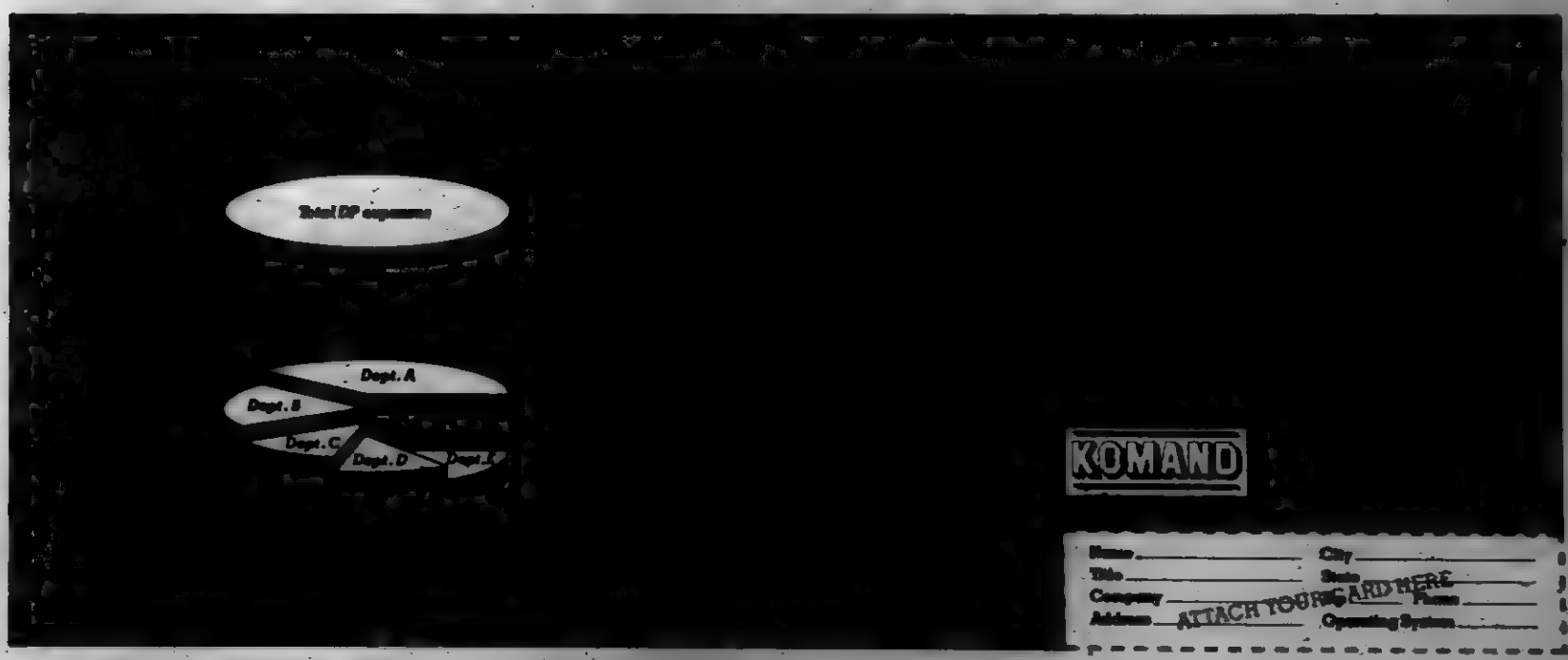
We all know that software has bugs. The errant program often causes a pro-

See SUBS page 64

- Computer Corp. of America offers Access/204 for Model 204 DBMS/66
- Report predicts strong growth in software spending/66
- Ramis II users get micro-mainframe link/66
- Information Access Co. adds text of 120 publications to data bases/67
- Applied Data Research, Inc. unveils application development tool/67

INSIDE

Systems Software/70
Productivity Aids/70
Application Packages/70
Remote Computing Services/72



BUGS from page 63

grammer to be called from a warm bed to come down to the shop because payroll just blew up and the checks must be ready in the morning. The computer literacy books don't mention midnight telephone calls. But it seems to me that any computer-literate person should know about them.

Hardware is pretty reliable these days, but even in machines there can be nasties.

Take the dreaded intermittent system. Every once in a while, usually while a critical program is running, the computer burps. Of course, when the engineer is there to fix the problem, it doesn't happen. The computer literacy books don't even mention this sort of thing. Some don't even let on that hardware might break.

Then there is program maintenance, also not discussed in the computer literacy books. Maintenance, as a proportion of total programmer time, is now greater than 50%. The computer literacy books, however, seem to imply that the job of programmers is to write new programs.

But that's not really the way it is. There's a big difference, one which the inquiring illiterate won't learn about from these computer literacy books.

Then too, the books don't mention one of our most shameful deficiencies: our inability to make reasonable estimates of programming time and cost. A program is promised in X months. After 2X months, we declare it to be ready, even though it is missing some important features.

And, of course, its cost turns out to be twice as much as our original budget. How can the reader claim to be literate if he doesn't know about our common failings?

Users blemished

Neither are the users themselves without blemish. Development programmers might wonder why the computer literacy books do not mention their most gnawing complaint: ever-changing specifications.

Every programmer has suffered the pain and indignity of preparing a program to the user's specifications only to find that when the user sees the output, he now has "just a few small changes." So the programmer retreats, hacks up the program and hopes that the result will not be too much of a monster. Often, however, the result is indeed a monster.

And how about programmer turnover? I could find no mention of it in the computer literacy books. There seems to be a large population of programmers who think that one year is a nice round number for job tenure. So the programmer quits halfway through an urgent project. Every programming manager has lived through more than a few of these nasty incidents, and his greying hair and sensitive ulcer attest to the severity of the practice.

Conversion

The books don't discuss conversion. Brought about by a momentous decision from somewhere on high, conversion requires that we stop what we are doing to spend hectic weeks or months transporting all of our fragile applications software to a new machine, operating system or programming language.

Most programmers are good for exactly one conversion. After that, they refuse to do another. And this, of course, leads to more turnover.

The computer literacy books I read contain several examples of programs; the largest is about a dozen lines. I am trying to remember the last time I saw a real program that was that small. Programs tend to be hundreds of lines; systems of programs have many thousands of lines.

Nor is programming speed discussed. The naive reader will probably get the impression that writing programs is almost as rapid as reading about them. But programming is arduously slow. Maintenance programming speed is measured in dozens of lines of code per week; development programming in terms of a hundred lines per week.

But the computer literacy book, with all of its miniature programs, can be read in about the same amount of time a programmer spends on his lunch hour.

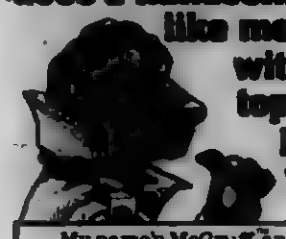
Gaps in education

There are so many other things that the literacy teachers have missed: the impossible deadlines that rob you of your sleep and perhaps even of your sanity and marriage; or the manuals which, though they may be massive tomes, just do not hold the answer to today's problem or, worse, are simply incorrect.

The purveyors of computer literacy education have a commendable goal. They want to teach people what computers are all about. It's too bad they haven't managed it.

Armerding, who spent a couple of decades supervising computer workers, now writes about them.

What business does a handsome dog like me have with a top cat like you?



My name's McGruff, and it's my business to help prevent crime. I think it should be your business, too—to teach your employees how to protect themselves. Just send for my business kit—it'll help you develop a program that teaches your employees how to make their homes burglar-proof, make their neighborhoods safer, even how not to get mugged.

So take the time, and...

TAKE A BITE OUT OF CRIME

Write to McGruff, Crime Prevention Coalition, 30 Banta Place, Hackensack, NJ 07601 for lots of information on Crime Prevention.

A message from the Crime Prevention Coalition, this publication and The Ad Council.

© 1983 The Advertising Council, Inc.

MORE THAN LIP SERVICE.

The software programming tool that delivers what it promises.

Quikjob™

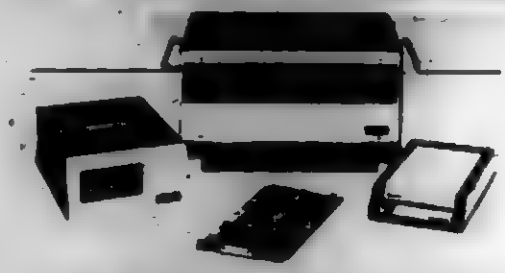
Quikjob is a one-step load and go program for one time report writing, fast file creation and dataset quick fixes for use with IBM Mainframes, UNIVAC 90 Series and System 80. • Uses free-format English-like language • Complete and fast, most programmers start using Quikjob after just ½ hour • Generates reports in hours, not days, and updates files faster than you might think possible • Rental or purchase basis • It's quick, complete, and affordable — as low as $125 per month! Try Quikjob FREE for 30 days and see for yourself. Over 1,000 users worldwide.

Call toll free 1-800-551-4444 for complete information.

SYSTEM SUPPORT SOFTWARE
6230 Springboro Pike
Dayton, Ohio 45439
(513) 439-1914

RACAL VADIC

THE LEADER IN DATA COMMUNICATION DEVICES—
300-9600 BAUD, SYNC/ASYNC, STAND ALONE, RACK MOUNT



CRTs — PRINTERS — DATACOMM — PC's
SALES • MAINTENANCE • LEASING

DSI Digital Source, Inc.

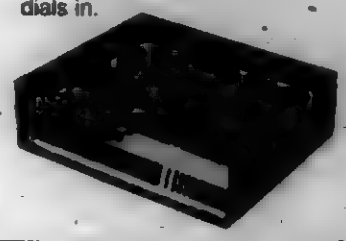
CA So Cal (800) 368-9333, (714) 540-2312, Bay Area (408) 945-1300
Colo (303) 573-5133, Mich (313) 245-2600, Ill (312) 640-7555
D.C. (301) 258-9382, Balt (301) 269-7651, So Fla (404) 458-2660

The Solution.

Dial-Up 3270

LineMaster An intelligent device for dial-in access to your mainframe 3270 Bisync line. **LineMaster** is a communications watchdog which keeps a line in service until a user dials in.

- For any remote 3271/4/6 line—up to 19.2K baud
- Compatible with any 3270 BiSync emulator including microcomputers
- Connects between modem and mainframe.
- Installs in minutes



$639.

MicroFrame, Inc.
205 Livingston Avenue
New Brunswick, NJ 08901
(201) 828-4499

CENTER from page 63

ous and diversified software resources that need many more instructions and much larger storage capacity for each transaction with a user than one would encounter with conventional transaction programs. It is necessary for information center products not only to meet the needs of basic data management systems, but to include a series of interpretive functions in order to establish a bridge between user languages and the machine's internal logic. Minor changes in specifications for high-level data processing operations can precipitate extremely lengthy modifications in the system's software.

Furthermore, software packages are generally designed for relatively intensive levels of use. For example, one company that had developed plans for an information center based on an IBM 3033 encountered a major obstacle in terms of scale: For an array containing 5,000 items, 25 seconds of CPU time was required for linear regression. But for approximately 10 items, linear regression required six seconds of CPU time. The same function could be completed more rapidly with a microcomputer outfitted with a simple tabulating unit.

The activities of nontechnical people drawing upon the resources of an information center result in a far less predictable work load for CPUs than those encountered with conventional applications. A given user may work intensively on days when completion of reports is required, whereas no work may be completed on other days.

This erratic quality introduces problems in terms of daily management of capacity unless powerful tools are available for program evaluation and statistical functions. In turn, users are inherently unaware of the work load they generate and are only conscious of problems with turnaround time. Obviously, an initial solution consists of creating oversized central storage capabilities, but significant investments are required.

Nevertheless, there are other means of overcoming this phenomenon, especially with good user training. While an information center allows nonspecialized users to work by trial and error, prudent recommendations may be needed for curtailing the impact of such trial and error on hardware use.

It is also beneficial to provide an information center "auditing" mechanism in order to attempt to identify the errors which occur most frequently. At the IBM Europe information center, an audit revealed significant deterioration of performance levels as a result of consultation of operation records. Thus, the proposed solution consisted of separating user data by periodic development of subsets of operation files.

It appears preferable to entrust this type of auditing to the information center staff, which would have the best rapport with users. It is also necessary for experts to analyse current procedures and to ensure that software packages clearly establish restrictive conditions.

Cahier is a senior writer at Le Monde Informatique, Computerworld's *French subsidiary. This article originally appeared in* Le Monde Informatique *and was made available to* Computerworld *as part of the CW International News Network.*

Pitfalls accompany micro integration

IBM's recent announcement of its VM operating system on the IBM Personal Computer XT/370 presents many opportunities for the information center. As micro power increases, it is logical to assume that more mainframe software will be ported downward.

However, from the DP department viewpoint, introduction of these new possibilities is accompanied by a range of other problems. The problem of support and maintenance of software is more complex. One possibility is to entrust this responsibility to information center personnel.

Another difficulty involves coexistence of microcomputer application software with CPU software and packages intended for the conventional microprocessing market. Until IBM and software firms develop bridges between their products, there is the danger of redundancy or incompatibility.

Links to the mainframe are also an immediate consideration. A British survey recently demonstrated that when an institution acquires personal computers, needs for links to central units develop during the subsequent six months.

New problems in terms of performance levels have also arisen, both in terms of microcomputers and in terms of networks. On the XT/370, I/O transfers continue to depend upon the speed of the Winchester disk. Peak volumes impose practical limitations on the number of microcomputers within a cluster. A high-volume local network component is not yet available for a distributed data processing arrangement.

One-Two Punch!

Charles River Data Systems OEM super microcomputers just keep leapfrogging the competition. Now it's a knockout combination of operating systems: UNIX System V on one hand, and real-time UNOS on the other.

UNIX System V for Development
Derived from AT&T-licensed UNIX System V, our new UN/System V includes a full set of UNIX development tools, Bell license, Berkeley extensions, access to UNIX application programs, and support for Fortran, RM/COBOL*, C, Pascal, BASIC, and Unify relational database.

UNOS for Real-Time/Run-Time
UNOS, our proprietary UNIX-compatible operating system, has real-time capabilities that UNIX can't offer. Capabilities, like eventcount synchronization, priority scheduling, and enhanced file system reliability, that are essential in industrial and scientific applications. And application programs written using UN/System V run under UNOS without modification and without a UNIX license, a saving that OEMs can pass on to customers.

Plus 32-Bit Power
UN/System V and UNOS run on our Universe 68 family of computers. They are true super micros, with a 32-bit, 12.5MHz 68000 processor, a second 68000 front-end processor, 32-bit 4Kb cache, 32-bit bus, up to 5Mb of 32-bit RAM, high-capacity disk drives, and 1.25 MIPS performance. Quantity-one OEM prices start under $10,000.

For more on UN/System V, UNOS, and Universe 68 computers, return coupon to Charles River Data Systems, 983 Concord St., Framingham, MA 01701. Or call (617) 626-1000.

☐ Send me technical information. CRW 3-12
☐ Have a sales representative call.
Name
Company
Address
City State ZIP
Telephone

CHARLES RIVER DATA SYSTEMS

*UNOS is a trademark of Charles River Data Systems. UNIX is a trademark of Bell Laboratories. Unify is a trademark of Unify Corporation. RM/COBOL is a trademark of Ryan McFarland.

SOFTWARE & SERVICES

CCA launches query tool for its Model 204 DBMS

CAMBRIDGE, Mass. — Computer Corp. of America (CCA) has announced a query and report writing tool for its Model 204 data base management system (DBMS).

Called Access/204, the product enables nontechnical users to scan their corporate data base, select specific data and reformat that data into reports, a spokesman said. The product can be used in conjunction with CCA's PC/204, which is a link between the IBM Personal Computer and the DBMS.

Access/204 uses "intelligent management views," which are logically related views created through a menu-driven process. Users can name each view using their own terminology. View names and descriptions are automatically entered into a list, eliminating the need to remember names, the spokesman said. DP departments maintain security and control of information.

To query the data base and format reports, users identify the information required through menu-driven programs. Data can be drawn from more than one data base, and calculations can be performed on the data. The user then qualifies the information selected and generates standard or custom reports, specifying layouts and functions.

Access/204 will be available in the second quarter of this year for IBM MVS, DOS and CMS operating environments. Prices range from $40,000 to $60,000.

Additional information is available from CCA, which is located at Four Cambridge Center, Cambridge, Mass. 02142.

SHOW from page 63

this exploding market. The small entrants in particular confront the imposing task of attracting attention in a market which is flooded with nearly 300 word processing packages and about 100 spreadsheets, according to a *List* magazine estimate.

In contrast, large system vendors have joined the marketing mainstream in recent years. With their audience well defined and their market relatively free of new competition, their ads and public relations efforts have taken on a slickness that has typically been more associated with the hardware world.

While mainframe software shows exude an air of stoicism, micro software shows appear more like a circus or perhaps a tryout for a Broadway show, with the actors all competing for the attention of a few talent scouts.

All this fun, of course, cannot continue. In time, the feared shakeout will occur; most of the vendors will go under or be swallowed by conglomerates; and the micro market will take on a slickness of its own.

But until then, this show of puckishness is perhaps just what the computer industry needs as it extends its hand to a new audience — the end user.

PRIME from page 63

tion monitor. It is also said to provide administrative facilities for operational control, security enforcement and transaction management.

Components reportedly include an automated application and documentation library and a screen editor that allows developers to paint and prototype screens for user approval.

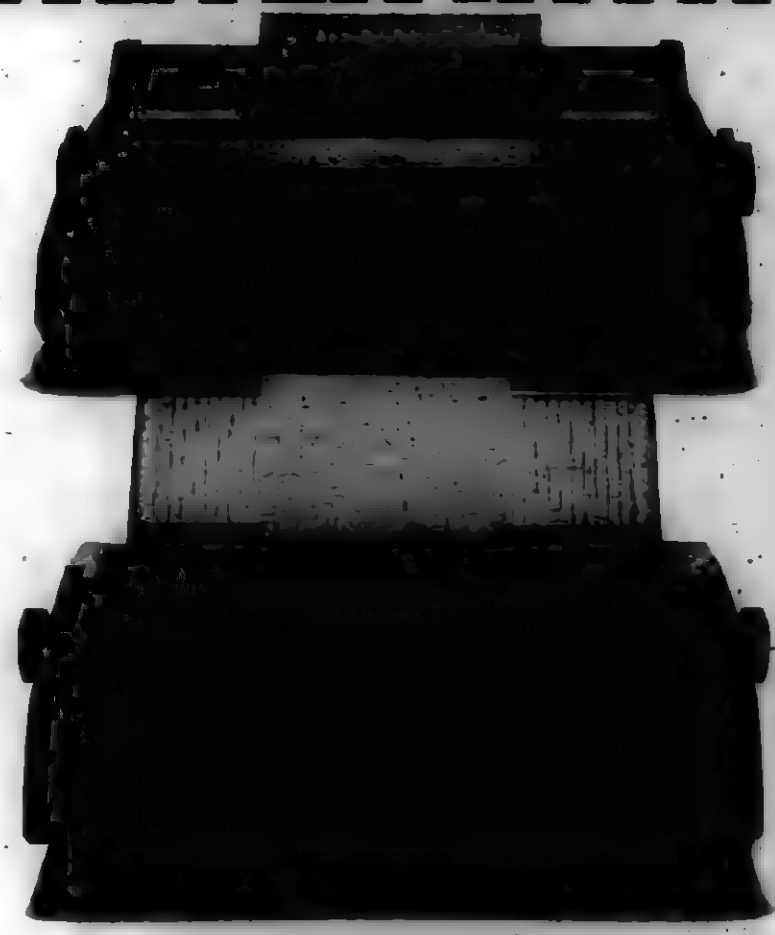
It is scheduled for availability with Prime Data Base Management System support during March and with Prime's Prism sequential access system support in the third quarter of 1984, according to Prime.

A combined Primeway Development/Execute package is priced at $55,000, and a Primeway Execute-Only package is priced at $9,600.

Prime Computer, Prime Park, Natick, Mass. 01760.

SPINWRITER INTR

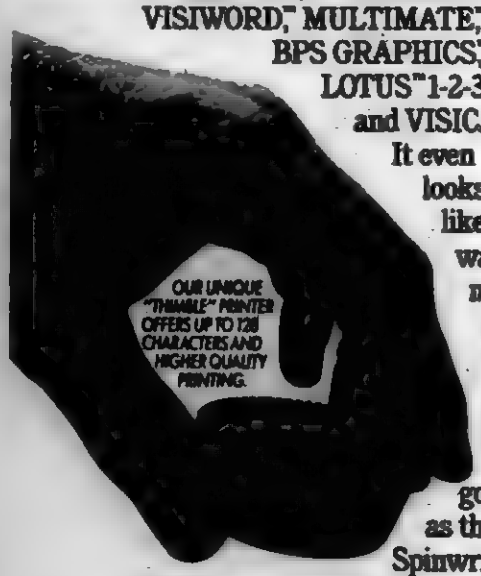
Now you have a choice of fully compatible Spinwriters for your IBM PC and XT.



NEC MODELS OFFER SPEEDS OF 200 AND 350 WORDS PER MINUTE.

First, a few words about the original, the Spinwriter 3550.

It was the first and only totally compatible letter-quality printer for the IBM PC. It plugs directly into the IBM PC and works with every piece of IBM PC software, as well as all popular third-party application packages, such as WORDSTAR,™ WORDPLUS,™ VOLKSWRITER,™ VISIWORD,™ MULTIMATE,™ BPS GRAPHICS,™ LOTUS™ 1-2-3,™ and VISICALC.™



It even looks like it was made for the IBM. Now, as good as the Spinwriter 3550 is, we recognize that a single printer can't take care of every business or professional office need. So we've added another IBM PC compatible Spinwriter: The 2050.

The new 2050 has a printing speed of 200 words per minute. And while it costs less, the print quality is still impeccable. So if low-volume letter-quality printing is what you need, the 2050 is your answer.

60 different print thimbles let your IBM PC look its best.

One of the things that gives our Spinwriter capabilities you can't even get on other printers is our unique "thimble." Each thimble holds up to 128 characters. You can even have two different type faces on one thimble or print multiple languages from a single thimble. Think of how handy

SOFTWARE & SERVICES

Publisher to expand on-line magazine service

By Jeffry Beeler
CW West Coast Bureau

BELMONT, Calif. — A publisher of on-line data bases plans to expand its existing services soon by making the full text of 120 general interest and specialty trade publications — plus their bibliographic citations — available to subscribers in electronic form.

In the past, the only on-line data Information Access Co. furnished about the 120 magazines was a catalog of bibliographic references. This spring, however, the company will enhance its data base by providing remote access to the articles within the publications, according to the firm's president, Morris Goldstein.

To take advantage of the combined text and bibliography feature, users must subscribe to Lockheed Corp.'s Dialog Information Service, a remote time-sharing facility specializing in bibliographic data bases. A licensing agreement allows Information Access' full-text files to reside in Dialog's National Advanced Systems Corp. AS/9060-based system and to be made available on demand to the company's subscribers.

For an estimated time-sharing charge of $60 to $90 per hour, customers will be able to use either a dumb terminal or a personal computer to gain remote access to the AS/9060 in Palo Alto, Calif. Subscribers can then summon to their display screens a bibliographic listing that reportedly uses the same generic subject headings as the Library of Congress.

Each bibliographic citation will correspond to a different magazine story and will include basic reference information such as the article's title, length, publication date, author and the name of the periodical in which it appeared.

By requesting the appropriate subject heading and perusing the accompanying bibliography, subscribers can quickly find out in which articles and publications a given topic has been covered. Then, from their terminal or personal computer keyboards, users can "flag" any article that especially interests them and transmit the desired text from Dialog's mainframe to their display screens.

Information Access is located at 11 Davis Drive, Belmont, Calif. 94002.

ODUCES A SPINOFF.

that would be if your business is international.

On the other hand if you have special printing needs, you can opt for a full alphabet plus numbers, sub- and superscripting and scientific and arithmetic symbols.

Incidentally, for all their versatility, our inexpensive

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
ABCDEFGHIJKLMNOPQRSTUV
АБВГДЕЖЗИЙКЛМНОПРСТУФХ
ABCDEFGHIJKLMNOPQRSTUVWXYZ
A→β*²p/÷⁶δ\≈√⁻⁹¹³⁴α⁵!%³≥⁶†
ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
ABCDEFGHIJKLMNOPQRSTUVWXYZ
¯£¡¯,´§-Æ†¤¿"¡Œ®°ÍßØÅ¨æ

SPINWRITER OFFERS OVER 40 DIFFERENT TYPE FACES.

thimbles last for over 30 million impressions.

So it won't end up costing you a fortune to look like a million.

No matter what form your business takes, Spinwriter can handle it.

A Spinwriter can actually help you put your communications in better shape. It can use any of our nine interchangeable forms handling options. And they can all be easily installed and changed by the operator.

Want to dash off a few hundred original letters to your customers? Our sheet-feeder is just the ticket. It will print on your letterhead and second sheet or envelope.

Standard features include continuous forms handlers that take paper up to 16 inches wide, variable size forms, and multi-part forms.

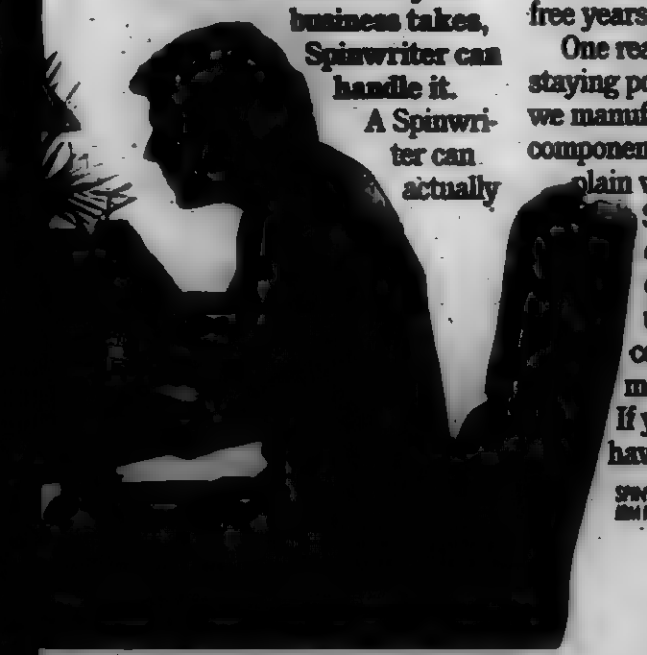
Spinwriters have a hard-earned reputation for reliability.

Spinwriters hold the industry record for mean-time-between-failure. Over 3,000 hours. Which, in terms of average personal computer usage, adds up to more than two trouble-free years.

One reason for Spinwriters' staying power is the fact that we manufacture every major component. It also helps explain why NEC Information Systems is the number one supplier of letter-quality printers to PC users in America. Of course, someday you may need a little service. If you do, it's nearby. We have a large group of NEC-trained professionals all around the country. It's also quick. Because of our modular design, normal repairs take less than 20 minutes.

9 DIFFERENT NEC-BUILT FORMS HANDLERS AUTOMATICALLY FEED ANY OFFICE FORM YOU HAVE.

You'll find Spinwriters at participating ComputerLand stores, Sears Business Systems Centers, IBM Product Centers nationwide, Entré Computer Centers and authorized NEC Spinwriter distributors. Or call 800-343-4418 for more information. And find out why more and more IBM PC users are saying, "NEC and me."



SPINWRITER CAN OPTIMIZE YOUR IBM PC CAPABILITIES.

NEC AND ME

NEC Information Systems, Inc.
1414 Massachusetts Avenue
Boxborough, MA 01719

ADR/DL out for IMS users

PRINCETON, N.J. — Applied Data Research, Inc. has announced an interactive, high-level application development program for users of IBM's IMS data base management system operating in an IBM mainframe environment.

ADR/DL reportedly provides application developers with an on-line environment under which high-level Cobol IMS programs can be created, tested and debugged. One of the program's facilities said to boost development productivity is a "program shell" concept whereby generic types of IMS programs are prerecorded in ADR/DL.

Another feature is a high-level IMS command set which is used to access IMS data bases. ADR/DL replaces the complicated IMS call parameters with high-level ADR/DL verbs, according to a vendor spokesman. The program reportedly expands the Data Manipulation Language (DML) verb into a full template for the IMS DML and all of its possible syntax options.

A permanent license for ADR/DL costs $35,700 from Applied Data Research, Route 206 and Orchard Road, CN-8, Princeton, N.J. 08540.

USER EXPENDITURE FORECAST

Delivery Mode	1983 ($M)	82-83 Growth (%)	1983 ($M)	1984 ($M)	1985 ($M)	1986 ($M)	1987 ($M)	1988 ($M)	83-88 AAGR (%)
Remote Computing Services									
Cross Industry	1985	19	2368	2785	3276	3845	4520	5324	18
Industry Specific	2888	18	3405	4038	4751	5629	6638	7786	18
Utility	1085	9	1161	1263	1374	1494	1619	1746	9
Total	5938	17	6933	8087	9401	10968	12778	14856	16
Software Products									
Applications									
Cross Industry	1642	35	2226	2940	3864	5029	6466	8285	30
Industry Specific	1438	35	1942	2736	3834	5314	7277	9926	39
Subtotal	3080	35	4168	5676	7698	10343	13744	18211	34
Systems	2685	32	3534	4668	6070	7823	9852	12479	29
Total Software	5765	34	7702	10344	13768	18166	23897	30690	32
Integrated Systems									
Industry Specific	2366	20	2840	3381	4554	5804	7539	9289	27
Cross Industry	1238	21	1492	1823	2243	2756	3388	4072	22
Total Integrated Systems	3604	20	4342	5404	6797	8560	10718	13361	25

Info services market forecast: selected delivery modes, 1983-84

Cross-industry mart seen continuing growth rate

By Paul Gillin
CW Staff

MOUNTAIN VIEW, Calif. — In contrast to some recent reports predicting a slowdown in software expenditures, a report released here by Input, Inc. anticipates that the cross-industry software market will continue a strong growth rate over the next five years.

The "Cross-Industry Market" section of "U.S. Information Services Markets, 1983-1988" predicts that cross-industry applications expenditures will grow at an annual rate of 21% through 1988. However, the report cautions that growth has indeed slacked off in certain segments of the industry. In all, cross-industry applications will comprise $34 million of the $83 million spent on information services in 1983, the report stated.

End-user oriented tools will lead the growth parade, averaging 29% annually, the survey predicted. Other high-growth areas are in planning and analysis applications for end users, value-added networks and education and training software.

Several major trends are worth noting as the cross-industry market develops, the report continued. Related applications increasingly will be integrated through a data base management system. Vendors will expand into new delivery modes, including remote computing services (RCS) and microcomputer software. Micro links to central data bases and fourth-generation languages will proliferate as end-user computing continues to drive the market.

In the systems software market, the areas most closely tied to end users will grow the fastest, the report stated. These include application development tools, with an annual growth rate of 33%; systems control software, 24%; and data center management software, 22%.

Among popular new fields that will emerge are advanced office functions, such as optical storage devices and data base management machines, high-level languages and network control software.

The applications software market is "exploding on many fronts," making it the fastest growing cross-industry delivery mode, the report observed. This sector will grow at an annual rate of 30% to $8.2 billion by 1988, with strength in both the large systems and microcomputer sectors. Education and training software will lead the way with a staggering 63% annual growth rate on microcomputers and 44% on large systems. It will be closely followed by planning and analysis applications and accounting software. Both of the latter categories will grow at an annual rate of 50% over the next five years, the report said.

The largest growth rate variance is found in the RCS market. Both value-added networks and on-line data bases stand alone in their delivery methods and will grow at healthy rates of 27% and 22%, respectively, the survey predicted. However, RCS applications in the engineering/scientific and accounting areas will grow more slowly as competition emerges from other delivery modes.

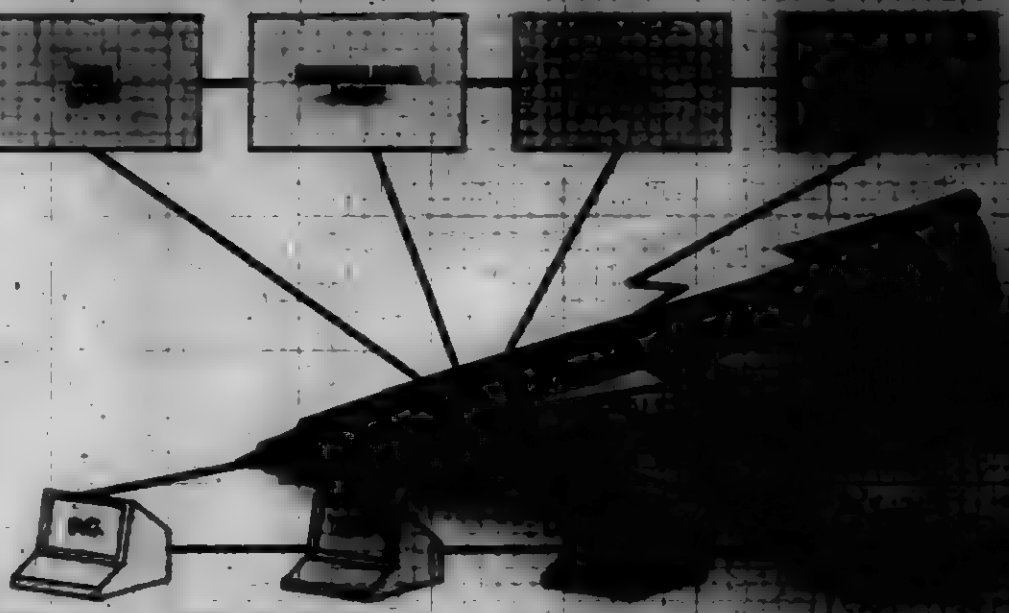
The end-user computing revolution will drive expenditures upward in the area of planning and analysis, with a 28% annual growth rate predicted. Software of this kind for microcomputers will experience a "spectacular 51% annual growth rate to become a $1.5 billion market by 1988. Large system planning and analysis software will log a healthy 33% annual growth rate, according to the report.

Value-added networks will "explode" from a $260 million market in 1983 to a $1.3 billion market in 1988,

See GROWTH page 69

Draw Your Own Conclusions.

With The Network Communications Processor, The Lines Of Communication Go Anywhere You Want.



Let us introduce the next generation of communications processing. It's a product so versatile that it can support multiple and dissimilar protocols at the same time—IBM 3270 BSC, SNA, Burroughs, ASCII Start/Stop, ICL, and many others. A product so powerful that it can network together up to 8,120 workstations and hosts of various kinds. A product so affordable that you can start using it for as low as $7920.

It's the Network® Communications Processor from Tri-Data. The first product that makes it both practical and economical to build networks out of dissimilar hosts and workstations.

With it, you can draw your own conclusions. Because the Network Communications Processor is a single solution you can use in a number of ways: right now—as a gateway, a cluster controller, an X.25 PAD, even as a packet processor where its cost can be [illegible] Tri-Data's. It's a high throughput [illegible] can be easily customized or upgraded as [illegible]

As an OEM or systems integrator, you can [illegible] Network Communications Processor to enter new markets, quickly and profitably. Or to capture a more competitive position in an existing market. As an end user, you can use it to increase utilization of installed equipment and achieve significant savings from equipment purchases and [illegible]

The Network Communications Processor. Call or write today for more information. The conclusions you draw will be money in the bank.

[redacted]

See us at Interface '84 Booth #[illegible]

Micro-mainframe link unveiled for users of Ramis II, IBM micros

PRINCETON, N.J. — Mathematica Products Group, Inc. has announced a microcomputer-to-mainframe link for users of its Ramis II data base management system (DBMS) and the IBM Personal Computer and Personal Computer XT.

A spokesman said the link — dubbed Ramlink — allows bidirectional data transfer between a number of Personal Computer software packages on the micro and Ramis II on a mainframe. Simple commands reportedly control the uploading and downloading of data between the mainframe and the Personal Computer diskettes or hard disks.

The spokesman said data transfer from the mainframe to the Personal Computer is requested by adding a transfer phrase to a standard table request, allowing all data access and manipulation facilities of Ramis II to be employed in gathering data. Ramlink reportedly enables Personal Computer data to be used directly as transactions in a mainframe file maintenance request.

Ramlink is said to reformat data automatically for a variety of Personal Computer software products, including Lotus Development Corp.'s 1-2-3 and Visicorp's Visicalc. Through Ramis II, Ramlink reportedly also provides access to mainframe data stored in Ramis II data bases; IBM's Vsam, Isam or sequential files and in IBM's IMS and DL/1; Cullinet Software, Inc.'s IDMS; Cincom Systems, Inc.'s Total; and Software AG of North America, Inc.'s Adabas data bases.

The spokesman said that with Ramlink, Personal Computers and CRTs have full screen IBM 3270-type terminal access to all capabilities of Ramis II on the mainframe through a modem, requiring no additional protocol conversion hardware.

The mainframe Ramlink component is priced between $4,500 and $9,000, the spokesman said, based on the performance level rating of the CPU. The Ramlink floppy diskette for the Personal Computer is priced at $185 per unit. More information is available from Mathematica Products Group through P.O. Box 2392, Princeton, N.J. 08540.

Seeking tales of software

Computerworld's May Special Report will take a close look at software productivity, something our readers are continually trying to improve.

The Special Report will focus on application backlogs and the efforts being made to reduce them; the programmer shortage and whether it really exists; high-level languages and structured programming; and code generators and reusable code.

Contributions being sought for the Special Report should take one of two forms: a tutorial article discussing an issue or trend or a user application story outlining a particular firm's experience.

Articles must be typed, double-spaced and no longer than eight pages. Artwork, such as charts, graphs or photos, is encouraged. Authors should include a brief biography and a telephone number where they can be reached.

The deadline for submissions is March 23, addressable to Donovan White, Special Reports Editor, *Computerworld*, 375 Cochituate Road, Box 880, Framingham, Mass. 01701.

GROWTH from page 68

a 36% annual increase. The industry-specific sector of this market will lead the way with a 66% annual growth rate, the survey stated.

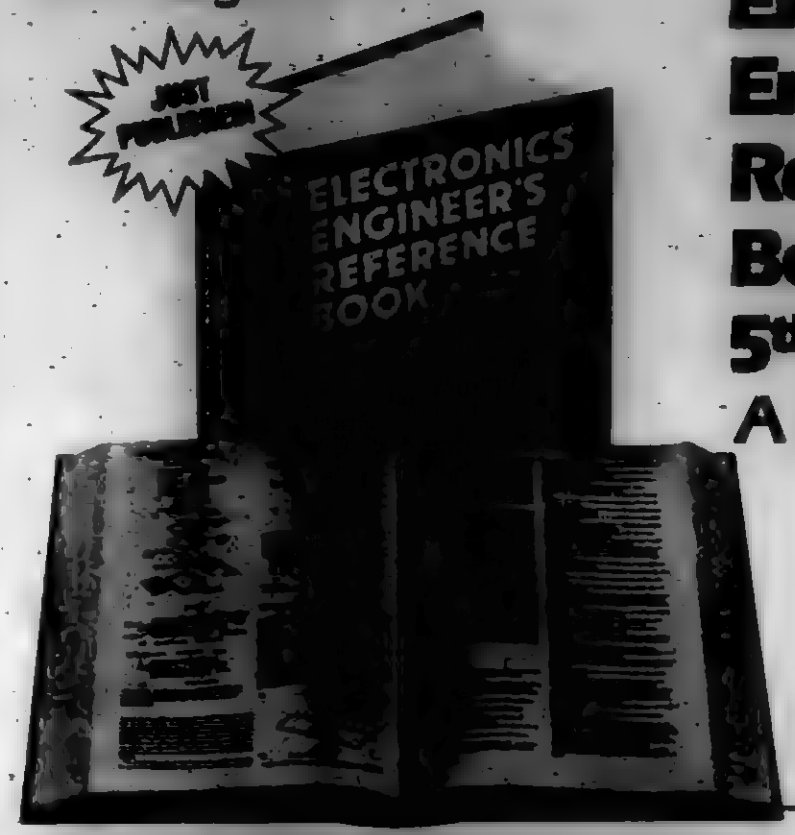
Some of the more interesting new developments in this area include the emergence of "one-stop" services, which include professional services, mainframes and custom or packaged software. Another development worth watching is the trend among "second-tier" vendors to become resellers of value-added networks offered by the market's major players.

The report is divided into two parts covering cross-industry markets and industry-specific markets. Each part costs $2,500. The entire report costs $4,000.

Input is located at 1943 Landings Drive, Mountain View, Calif. 94043.

"Well, good luck at the computer company."

Find formulas, relationships and facts on new technologies FAST in—



Electronics Engineer's Reference Book, 5th Edition

A $119.00 value

yours for only

$2.95

when you join Electrical and Electronics Engineering Book Club. You simply agree to buy 3 more books—at handsome discounts—over the next 12 months.

Stay on top of your field with—

- The most comprehensive, authoritative electronics engineering volume available.
- 800 pages; 32 sections; over 1,000 photos, diagrams, charts, graphs, and tables.
- Thousands-upon-thousands of ready-reference entries compiled by 70 internationally distinguished experts.

The #1 Choice of Engineers

For the past 20 years, engineers around the world have turned to the Electronics Engineer's Reference Book for reliable information on—

• Techniques • Physical Phenomena • Materials and Components • Electronic Design and Applications.

More Valuable Than Ever

To keep pace with the rapid technological explosion that has affected every area of the electronics engineering field, the 5th Edition now features 32 all-new sections on—

• Inductors and transformers • Printed circuits • Power sources • Microwave semiconductor devices • Hybrid, digital and linear ICs • Semiconductor memories • Microprocessors • Control systems • Satellites • Point-to-point communication • Computers • and much more!

Step Up To Career Growth.

Membership in the Electrical and Electronics Engineering Book Club provides a foolproof system for acquiring all the engineering know-how you'll need to stay up-to-date on new concepts, techniques and practices constantly being developed in your field. Begin enjoying the club's benefits by taking this $2.95 offer. It's a tremendous bargain *and* one of the most important additions you'll make to your professional library this year. Don't delay —mail the coupon today!

ASSURANCE: BENEFITS • In addition to getting the new Electronics Engineer's Reference Book for only $2.95, when you join, you keep saving substantially on the books you buy. • Also, you will immediately become eligible to participate in our Bonus Book Plan, with savings of up to 70% off the publishers' prices. • At 3–4 week intervals (15 times per year) you will receive the Book Club News, describing the coming Main Selection and Alternate Selections, together with a dated reply card. • If you want the Main Selection, do nothing and it will be sent to you automatically. • If you prefer another selection, or no book at all, simply indicate your choice on the card, and return it by the date specified. • You will have at least 10 days to decide. If, because of late mail delivery of the News, you should receive a book you do not want, we guarantee return postage.

Electrical and Electronics Engineering Book Club

Riverside, New Jersey 08075

Please accept my application for trial membership and send me the new Electronics Engineer's Reference Book (#1468) for $2.95. This massive volume contains 32 sections and over 1,000 diagrams, tables and charts. I agree to purchase at least three additional Selections or Alternates over the next 12 months. Savings range up to 30% and occasionally even more. My membership is cancelable any time after I buy these three books. A shipping and handling charge is added to all shipments.

No-Risk Guarantee: If you are not satisfied—for any reason—you may return the new Electronics Engineer's Reference Book within 10 days and your membership will be canceled and you will owe nothing.

Name_____

Name of Firm_____ (if you want company address used for your billing)

Address_____ Apt.____

City_____

State_____ Zip_____

(Offer good in Continental U.S. and Canada only. Prices slightly higher in Canada.) Computerworld 3/12/84

SOFTWARE & SERVICES

SYSTEMS SOFTWARE

TONE SOFTWARE CORP.
Flasher

Tone Software Corp. has announced software for time-sharing users operating under IBM's System Productivity Facility (SPF) or Interactive System Productivity Facility (ISPF). The product, called Flasher, reportedly speeds access to spooled output data sets.

According to the vendor, Flasher provides users with an alternative to SPF and ISPF's outlist utility, which retrieves and displays spooled data. It also reportedly aids the manipulation of spooled data sets with user controlled menus and may be installed on any currently supported release of IBM's MVS operating system, including MVS/XA. All currently supported releases of IBM's SPF and ISPF products running under IBM's TSO or Tone Software's Tone 4 may be used with Flasher, the vendor added.

A Flasher version for IBM's JES 2 is licensed for $2,500. An IBM JES 3 version is licensed for $5,500.

Tone Software, 1735 S. Brookhurst, Anaheim, Calif. 92804.

PRODUCTIVITY AIDS

GT SOFTWARE, INC.
Release 4.5 BMS/GT

GT Software, Inc. has announced Release 4.5 of Basic Mapping Support (BMS)/GT, a screen generator for IBM 3270 and compatible terminals under IBM's CICS.

With BMS/GT, a spokesman said, a user designs a map on the terminal by keying in data as it should appear in final form. The system supports line replications, full naming conventions, page building, headers and trailers and the ability to retrieve any BMS-compatible map.

A permanent license for BMS/GT, which is compatible with IBM's CICS 1.4 and up, is $5,500 for IBM's DOS/VSE operating system and $6,900 for IBM's VS/1 and MVS operating systems.

GT Software, 1965 N. Park Place, Atlanta, Ga. 30339.

APPLICATION PACKAGES

JOHN MCLEAN & ASSOCIATES
Opticalc Jr.

John McLean & Associates has announced a simplified version of its Opticalc electronic spreadsheet program for minicomputers.

Opticalc Jr. reportedly offers 260K-byte spreadsheets with 16,002 entry positions allowing the user a choice of algebraic or reverse Polish notation, the ability to read Ascii or Software Arts, Inc.'s DIF files, 12 formats, 20 functions and locked titles.

Other features are said to include value referencing, spreadsheet rearrangement and independent display windows.

According to the company, it is upgradable to the regular Opticalc program or to the Optiqube program level.

It is designed to run on the Hewlett-Packard Co. HP 3000 or on the Digital Equipment Corp. VAX-11 superminicomputers.

Now available, Opticalc Jr. is priced at $500 through March 30 and at $900 thereafter.

John McLean & Associates, P.O. Box 270507, Houston, Texas 77277.

MAYZIMA & CO.
TCPS

Mayzima & Co. has announced its Traffic Citation Processing System (TCPS) for the IBM System/34 and System/36.

The package is designed to process traffic citation data, the vendor said, and is an interactive, multiuser system. TCPS is menu-driven and supports multiple processing locations. System features include fully integrated cash receipting and automatic generation of delinquency notices.

Court appearance dates, locations and times are tracked for arraignments, hearings, trials and sentencing, as well as continuance. The vendor said appearance notices are automatically generated through a set court dates function. Inquiry functions allow access to citation data by citation number or

SOFTWARE & SERVICES

by browsing the file for the offender's name.

Pricing for TCPS begins at $18,500.

Megavisa, 811 N. Ridgewood Ave., Daytona Beach, Fla. 32015.

DECISION GRAPHICS, INC.
Fames

Decision Graphics, Inc. has announced an interactive graphics package designed to allow corporate and government facilities managers to develop space management reports and plans.

Fames is designed to run on Digital Equipment Corp. VAX-11 superminicomputer systems with a variety of terminals and plotters.

It is said to let the user enter, store and report on all space in a facility and to use graphics and menu controls. It uses colors to differentiate the floor plan underlay, space allocation overlay and text information.

Prices range from $10,000 to $30,000.

Decision Graphics, P.O. Box 306, Southboro, Mass. 01772.

BARRISTER INFORMATION SYSTEMS CORP.
Management reporting package

Barrister Information Systems Corp. has introduced a management reporting package for law firms.

The package, which is for use with the vendor's financial management system, consists of five reports and provides an analytical breakdown of attorney performance for specified time periods.

The package runs on the Barrister turnkey minicomputer system.

The management product is licensed at $4,000.

Barrister Information Systems, One Technology Center, 45 Oak St., Buffalo, N.Y. 14203.

EDP CONSTRUCTION SYSTEMS ROI/2000

EDP Construction Systems has introduced Return on Investment (ROI)/2000, a menu-driven financial modeling system developed for the real estate development industry using Hewlett-Packard Co. HP 3000 processors.

ROI/2000 is for planning, analysis and control of land development and residential construction projects, including all commonly used cash flow, profit-and-loss and balance sheet accounts and categories, the company said.

The product is available in a land and housing model for $30,000 or an individual model for $20,000.

EDP Construction Systems, 2910 E. Camelback Road, Phoenix, Ariz. 85016.

AMERICAN DATA CONSULTANTS
Vertical market packages

American Data Consultants has announced eight vertical market packages which run under the Unix operating system.

A pharmacy package costs $5,000. A nursing home charting package costs $2,500. There are three versions of its preventive medicine package: for one to three doctors, $7,500; four to six doctors, $10,000; and more than six doctors, $12,500. A Class II & III trucking package costs $5,000. An accounting package has five modules which cost $1,200 each: general ledger, accounts payable, accounts receivable, payroll and inventory. A municipal system with utility billing costs $3,500, while a municipal accounting module costs $2,400. A title insurance system costs $10,000. A mortuary package costs $5,000.

American Data Consultants, 112 E. 32nd St., Joplin, Mont. 64801.

CATRONIX CORP.
Catsolid

Catronix Corp. has announced that its Catsolid three-dimensional solids modeling software is now available for use with Apollo Computer, Inc.'s Domain 32-bit engineering workstation.

A spokesman said Catsolid allows direct transfer of data from its own files to other electronic data files, and it interfaces to computer-aided design systems through Interactive Graphic Exchange specification files.

Catsolid costs $20,000.

Catronix, 120 Ralph McGill Blvd. N.E., Atlanta, Ga. 30308.

See TRENDS page 72

Nowadays, technology is advancing so rapidly that today's latest breakthrough may be replaced as soon as tomorrow by something even more revolutionary.

PEACE OF MIND A NEW DIMENSION.

To the rapidly-changing world of high technology, Esprit—the company with more experience in terminal technology than any other—would like to introduce a new and un-changing dimension: peace of mind.

Designed right into every terminal in Esprit's complete line are the features, the functions and the flexibility that make it not only user-friendly but systems-friendly. In other words, the kind of comfort, quality and trouble-free technology that can provide real peace of mind.

Backed up with an extensive nationwide service force and our own special toll free service number (800-645-4508)—so you can reach us about anything that concerns you—to insure your own peace of mind.

PEACE OF MIND FOR THE NEXT GENERATION IN TERMINALS.

One look at the Esprit ESP 6310 and you'll recognize the next generation of terminals. With performance and features far superior to other terminals in its price category. And the kind of quality you can feel comfortable with.

DESIGNED FOR PEACE OF MIND.

From the sleek and stylish lines of its ergonomic design to the sculptured lines of its low-profile keyboard with its 11 user-programmable function keys—shiftable to 22—in non-volatile memory back-up, that can be programmed directly or down-line loaded from the host computer.

From its high resolution, green phosphor display with a well defined character font, in a large 7 x 11 dot matrix, in an 80 column x 25 line format to its screen saver feature which deactivates the screen after 20 minutes of inactivity.

From its tilt and swivel monitor to its smooth scrolling and line graphics capabilities.

Our ESP 6310 provides enhanced performance and incorporates emulations of the TeleVideo 925/910 PLUS*, ADDS Regent 25/Viewpoint* and Lear Siegler ADM3A*, as well as the popular Esprit series.

PEACE OF MIND PRICE. $695.

That means even our low price is designed to give you peace of mind. And so for your own peace of mind, please fill out the coupon below or call.

800-645-4508

Esprit Systems, Inc.
100 Marcus Drive
Melville, N.Y. 11747

☐ Yes for *my* own peace of mind I would like to receive a brochure on your complete line of Esprit terminals.

NAME_____

TITLE_____

ADDRESS_____

CITY_____ STATE_____ ZIP_____

CW312

Esprit Systems, Inc.

PEACE OF MIND TECHNOLOGY.

*(TeleVideo 925/910 Plus is the registered trademark of TeleVideo Systems, Inc. Regent 25/Viewpoint is the registered trademark of Applied Digital Data Systems, Inc. ADM3A is the registered trademark of Lear Siegler, Inc.)

SOFTWARE & SERVICES

TOOLS from page 71

UNIRAS, INC.
Bizmap

A software package for map making, which contains the resources of the U.S. government's World Data Bank I, has been introduced by Uniras, Inc. The package, Bizmap, can be used to preview world maps on a color terminal and, using the data bank's 250,000 coordinates, can project any of 191 countries, including major islands and lakes.

Bizmap users can choose countries, continents or the world in five projections, in two or three dimensions or from any viewpoint, the vendor said. The package is written in Ansi Fortran-77, and implementations are available for 32-bit and mainframe computers.

Bizmap is licensed for $5,000.

Uniras, Suite 212, 50 Mall Road, Burlington, Mass. 01803.

PROFESSIONAL COMPUTER RESOURCES, INC.
RMS/38 Version 4

Professional Computer Resources, Inc. has announced enhanced RMS/38 applications software for the IBM System/38.

The RMS/38 Version 4 consists of 15 applications grouped into a distribution module and a manufacturing module. Distribution module applications provide control of order processing, billing, sales analysis, inventory control, purchasing, accounts payable and receivable, general ledger and RMS/Query.

The manufacturing module applications provide control of product structure, product standard costing, master production scheduling, shop floor control and costing and capacity requirements planning.

License agreement prices for the complete RMS/38 system range from $55,000 to $110,000.

Professional Computer Resources, 2021 Midwest Road, Oak Brook, Ill. 60521.

ELSEVIER SCIENCE PUBLISHING CO.
Pac-Finder System 34/36 Software Directory

Elsevier Science Publishing Co. has announced a revised edition of its "Pac-Finder System 34/36 Software Directory" for IBM System/34 and 36 installations.

According to the publisher, Pac-Finder provides information on the vendor, price, source language, number of installations, functions, capabilities and unique features. Applications covered include accounting, payroll and personnel, office automation and manufacturing.

The single-copy price is $95; the standing-order price is $79.

Elsevier Science Publishing, 52 Vanderbilt Ave., New York, N.Y. 10017.

REMOTE COMPUTING SERVICES

SOFTEST, INC.
Sofgram

Softest, Inc. has introduced a software program that reportedly enables a user to create, receive and send messages over Western Union's Telex and TWX networks, as well as via AT&T's Direct-Distance Dialing (DDD) network.

Sofgram can use an existing Telex line or a mailbox available from a Telex or TWX International Road Carrier, a vendor spokesman said. Sofgram is a fully menu- and form-driven program, and it is said to permit access to the data base services available on Telex, TWX and DDD networks.

According to the vendor, Sofgram maintains an in box for each user on the system and keeps a summary of all messages received. All destination addresses are maintained and are accessible through a user-specified key.

Sofgram is available now for Altos Computer Systems, Inc.'s 586 series of desktop microcomputers. It is also available on Callan Data Systems, Inc. and Codata Systems Corp. microcomputers, the vendor said.

Sofgram costs $750 for a multiuser system and $500 for a single-user system.

Softest, 555 Goffle Road, Ridgewood, N.J. 07450.

MARCAM DATA SYSTEMS CORP.
Ultimics

Marcam Data Systems Corp. has announced a system designed to provide users of IBM's System/34, 36 and 38 with batch/lot tracking and multiple-location inventory control.

Unlimited Location/Lot Tracking Inventory Control System (Ultimics) is said to operate with the IBM Mapics manufacturing and production system.

It reportedly is designed to provide efficient use of warehouse space by allowing an infinite number of stocking locations per item and allowing the stocking of multiple items in one location. Its on-line transactions update Mapics and Ultimics files so inquiries and reports reflect the current status of inventories.

It also is said to provide batch/lot tracking capabilities to comply with governmental regulations, track assigned serial numbers to customer orders, handle theoretical usage (back flushing) and track government contracts and terms.

Ultimics is priced at $6,400 for the System/34, $6,900 for the System/36 and $8,900 for the System/38.

Marcam Data Systems, 19 Crawford St., Needham, Mass. 02192.

IF YOU'VE EVER OUTGROWN A FINANCIAL SYSTEM, THIS IS A SEMINAR YOU WON'T WANT TO MISS.

GL, AP, MM, PO, AND SOON ARC

The Walker "Once and for All" Seminar. If you're looking at financial applications software, you're probably planning to replace an unwieldy system. One that fails to meet your needs for information management, technological compatibility or operating efficiency. Even perhaps, all three.

Walker offers a full range of financial systems specifically designed to grow with you. Easily. Which means the Walker Seminar could be the last financial software seminar you'll ever attend.

You know the problem. Every time you have to change or add to your current system, you discover new roadblocks. Custom reports have to be programmed on top of your old system. Changes and additions have been so frequent that nobody understands just what the system can do. Or how it does it. New technology could make your business run better... but your financial system won't run on it. And you must divert valuable time and resources to find a new system. Again.

Financial software you won't outgrow. Walker introduced a revolutionary technology: Software that separates the applications (what the software does), from the database (how the system interfaces with your data center). It's a proprietary technology which continues to grow with the needs of hundreds of corporations. Worldwide. Including the 1984 Olympics.

Better management tools. Walker's "Strategic Software" allows you to modify your financial system to work the way your company works. And change as your company changes. Simply. Immediately.

Freedom. Walker financial applications packages are not dependent upon a specific technology, operating system or data base management system. By utilizing a unique "software bridge," Walker isolates the applications software from both the mainframe and the DBMS. Which means you're free to choose the technology and DBMS that's best for your company's needs. Without the need to replace or rewrite your financial system, or retrain your staff.

A free seminar. In a few short hours, you can see how integrated, interactive financial systems can save you time for years to come.

Even a free phone call. You can fill in the coupon below, or call us today, toll free: 1(800) 4 WALKER (outside California), (415) 495-8811 (within California). That way we can register you for the seminar that's most convenient for you. In realtime. Like Walker software.

Walker Interactive Seminar

Atlanta 4-5, 5-15	New Orleans 4-10
Boston 4-4, 4-5	New York City 4-11, 4-12, 5-8, 5-9
Chicago 4-4	Omaha 4-17
Cincinnati 5-2	Orange City 4-11
Cleveland 4-19	Philadelphia 4-10
Columbus 4-12	Phoenix 4-3
Dallas 4-19	Pittsburgh 5-1
Denver 4-24	Portland 4-19
Des Moines 4-19	Rochester 4-24
Detroit 4-24	St. Louis 4-26
Fort Wayne 4-25	Salt Lake City 4-12
Hartford 4-3	San Antonio 4-18
Houston 4-2	San Diego 4-17
Kansas City 4-18	San Francisco 4-26
Los Angeles 4-2	Seattle 4-4
Louisville 4-10	Tempe 4-4
Memphis 4-11	Toronto 4-4
Miami 4-3	Tulsa 4-3
Milwaukee 4-26	Wash. D.C. 4-25
Minneapolis 4-10	Winnipeg 5-1
Montreal 5-8	Winston/Salem 4-24
Nashville 4-12	

Official Supplier of Financial and Inventory Systems Software to the 1984 Olympic Games

WALKER
WALKER INTERACTIVE PRODUCTS
100 Mission Street, San Francisco, CA 94105

Yes, I'm interested in attending the Walker Interactive Products Seminar at (City)_____ on (Date)_____. Please send me my registration forms and full particulars.

Name_____
Company_____
Address_____
City_____ State_____ Zip_____
Telephone #_____
Our computer is:_____
TP Monitor_____ DBMS_____

© 1984 Walker Interactive Products, Inc. CW-3/12

COMMUNICATIONS

Service provides finance programs

NEW YORK — Regional and community banks and other financial institutions with personal computers can access a recently announced service that will enable them to tap remote data bases, perform stock transactions and call up and execute various financial management programs.

The Spectrum Information, Communications and Execution (ICX) service was introduced by the Investment Banking Group, a division of Union Planters National Bank, and Reuters, a company that provides electronic news and quotation services.

Warren G. Creighton, president of Investment Banking, said that Spectrum ICX will "allow users to originate mortgages for customers, dispose of those mortgages, transact stock purchases and sales and access asset/liability models to manage their balance sheets balance."

Uses satellite delivery system

Additionally, the service allows access to the news and quotation services provided by Reuters and uses that organization's satellite delivery system called the Small Dish Service (SDS).

Communications between Investment Banking and its ICX customers will be via the telephone system in one direction and broadcast by satellite in the other.

Customers will access the service from their IBM or Commodore Business Machines, Inc. personal computers by activating an autodial modem in an interface device provided with the service; they can then request the data desired. That information will be broadcast to a Reuter's SDS-type satellite dish antenna mounted on the customer's roof.

Excluding the cost of the personal computer and the phone line between the customer's premise and Investment Banking in Memphis, Tenn., the service will cost roughly $400 per month. Other Reuters services, like its money market and foreign exchange data service, are available for an additional monthly fee.

Investment Banking is located at Suite 427, 6077 Primacy Pkwy., Memphis, Tenn. 38119.

Net mart confusion cited

NORWALK, Conn. — Vendors of local-area networks have outsmarted themselves and have thrown much of their marketplace into confusion, according to a report released here recently.

The 215-page report, titled "Local-Area Networks: Applications, Technologies & Opportunities," from International Resource Development, Inc. (IRD), attributes the slower-than-expected growth of the local-area network market to "growing confusion" among users about which of more than two dozen different local-area network technologies to use, together with "major problems" of incompatibility between new local-area network products and existing workstations and personal computers.

The report also states that the proliferation of different local-area network techniques is also exasperating the semiconductor industry, which is "wasting millions of dollars" attempting to follow the twists and turns in local-area network standardization.

"There is more than a nagging doubt in the minds of some semiconductor executives that high-volume production will never be achieved on several of the local-area network chips currently on the market or in development," said Kenneth G. Bosomworth, IRD's president and a participant in the study effort.

Contributing to the malaise in the local-area network market are the expected local-area network products from IBM and AT&T, according to the study. IBM has developed a token-passing local-area network, demonstrating a prototype last year; the first of IBM's local-area network products will be announced later this year, the report states. AT&T recently introduced Datakit, a set of switching modules that can be used to fashion a local-area network and which have been used internally inside AT&T for some time.

Despite user hesitancy to purchase local-area networks, there is an opportunity for innovative suppliers of limited low-cost local-area networks to connect up to 20 personal computers, the report states. "There is a clearly defined segment of the personal computer market for which the low-cost local-area network provides an immediate and easily implemented set of systems solutions. This is where the market action will be this year," Bosomworth predicted. "In the longer term, however, the local-area network market will be gob-

See NET page 77

Messaging systems get HP interface

Telamon, Inc. has announced an interface product said to provide direct access between Hewlett-Packard Co. HP 3000 computers and Western Union, Inc.'s Telex, TWX, Easylink and other electronic messaging systems using dial-up telephone lines.

Easynet/3000 is a combination software and hardware product that reportedly eliminates the need for telex terminal equipment, allowing any terminal connected to the HP 3000 to act as a telex workstation.

According to the vendor, the product reduces operator delays experienced in manual telex operation, queues messages for later transmission, permits multiple workstations to use the same transmission line, provides message logging for cost allocation and traffic analysis and transmits documents already resident on the HP 3000 without retyping.

The system manages up to 32 transmission lines simultaneously, according to the vendor.

A basic configuration, priced at $5,250 and available now, supports two lines and requires one computer port per line, the vendor said.

More information is available from Telamon, located at Suite 302, 405 14th St., Oakland, Calif. 94612.

Breakup seen opening up U.S. market to Japanese

NEW YORK — The breakup of the Bell system will open the U.S. market to a flood of Japanese telecommunications equipment, according to report findings recently released here.

According to the report, "Japan, Inc. in the Telecommunications Market," published by Northern Business Information, Inc. (NBI), divestiture has fundamentally altered the nature of competition in U.S. telecommunications markets in several ways, all of which will benefit the Japanese.

The Bell breakup has breached the supply line between AT&T and the former Bell operating companies, the report claims, making the new regional holding companies potential customers of Japanese transmission and central office equipment.

The report contends that the regional holding companies have already shown that they intend to be major suppliers of subscriber switching equipment procured from Japanese firms.

Japanese-made key systems

All seven regional holding companies, plus AT&T affiliate Southern New England Telephone (Snet) are entirely dependent on Japanese-made key systems, according to the report, and five regional holding companies plus Snet will supply Japanese private branch exchanges (PBX).

NBI said that divestiture exposes AT&T's embedded base of obsolete electromechanical key systems and analog PBXs. This represents a potential new market for Japanese products worth about $20 billion.

Divestiture has changed the nature of competition in the U.S. telecommunications equipment market, according to the study. The historical relationship between AT&T and its customers has been weakened or broken entirely.

In the future, more emphasis will be placed on technological and cost considerations; this, NBI asserted, will tend to favor the Japanese relative to many of their North American and European competitors.

The initial stage of deregulation, the creation of the interconnect market, led to today's situation where, according to the researchers, Japanese companies made the largest proportion of key systems sold in the U.S. in 1983.

The final stage of deregulation, the breakup of the Bell system, will allow Japanese suppliers to expand their share of the PBX market to as much as 40% by 1988, the report contends.

For all but the smallest Japanese companies, establishing a large installed base of digital switching products is the key to penetrating the entire range of U.S. markets for electronic information technology.

The growing Japanese position in telecommunications and the demand that it will promote for other Japanese information technologies hold implications for the entire U.S. economy, according to NBI.

In 1983, the Japanese enjoyed a surplus in telecommunications trade with the U.S. of $389 million. Combined with a related surplus of $1.4 billion in electronic components and $767 million in computers, the total becomes $2.5 billion, nearly 13% of the entire $20 billion trade deficit the U.S. held with Japan in 1983, the report states.

The 174-page report is priced at $995 and is available from NBI, located at 66 W. Broadway, New York, N.Y. 10007.

INSIDE

Controllers/76
Multiplexers/Modems/77
Auxiliary Equipment/78

Managing a Constant Wave of Facts & Figures

Requires a Special Touch.

SOFTWARE
INTERNATI

Run With Us

COMMUNICATIONS

CONTROLLERS

CONNECTICUT MICROCOMPUTER, INC.
Busster B64R

Connecticut Microcomputer, Inc. has added a 64-digital line output module to its Busster series of I/O modules.

The Busster B64R digital output module is a self-contained RS-232-compatible device that accepts commands from any host computer through its RS-232 port and activates one to 64 digital transistor-to-transistor-logic-level lines, the vendor said.

The module can be programmed through Basic commands from the controlling computer, the company noted.

The Busster B64R sells for $495 in standard version including case and power supply, according to a spokesman for the vendor.

Connecticut Microcomputer, 36 Del Mar Drive, Brookfield, Conn. 06804.

SYSTAR CORP.
Lodestar options

Systar Corp. has announced two new options for Lodestar, its front-end product for IBM System/34, 36, and 38.

New options include a menu selection option that enables users to call up and choose an application from a menu without having to know the relation of applications to hosts by physical location; Lodestar selects the proper host for the application.

A second feature permits assignment of hosts to specified users according to the need to access. Host assignments are set by a network operator from the Lodestar network control center, the vendor said.

A new spooler option also announced provides users universal printer access in the network without user queuing. The Lodestar spooler handles all data throughput to printers on a transparent-to-user basis, queuing automatically all output. Users may send unlimited numbers of files without waiting for printer availability, the vendor said.

For NEC modems, contact your nearest distributor

ARIZONA
Zeus Distributors
Phoenix, (602) 263-6022

CALIFORNIA
A Datacom Solution
Cypress, (714) 827-8480

Davis & Hanley, Inc.
Hayward, (415) 782-7575

Western Data Group
Walnut Creek, (415) 938-9582

COLORADO
The Hall Company
Littleton, (303) 798-4160

Martec Association
Englewood, (303) 779-8151

FLORIDA
Networks, Inc.
Miami Lakes, (305) 822-6750

GEORGIA
X Point Corporation
Norcross, (404) 446-2764

HAWAII
Data Management Association
Honolulu, (808) 531-5136

IDAHO
Alster Communications
Boise, (208) 362-1272

ILLINOIS
Interbusiness Corporation
Wheeling, (312) 459-8866

MASSACHUSETTS
CSI Systems, Inc.
Lexington, (617) 863-0525

MINNESOTA
R-Com
Minnetonka, (612) 474-3449

NEW JERSEY
Consolidated Data Systems, Ltd.
Bogota, (201) 487-7737

Friedman Associates, Inc.
Union, (201) 964-6200

TRD Distributors
Merchantville, (609) 354-1315

NEW YORK
J.F. Jordan Associates
Huntington, (516) 271-9478

CSI Systems Inc.
New York, N.Y. (518) 383-0816

OHIO
Delta Products
Euclid, (216) 731-3537

Gerhard & Associates
Columbus, (614) 488-9751

PENNSYLVANIA
American Datacomm, Inc.
Pittsburgh, (412) 381-1600

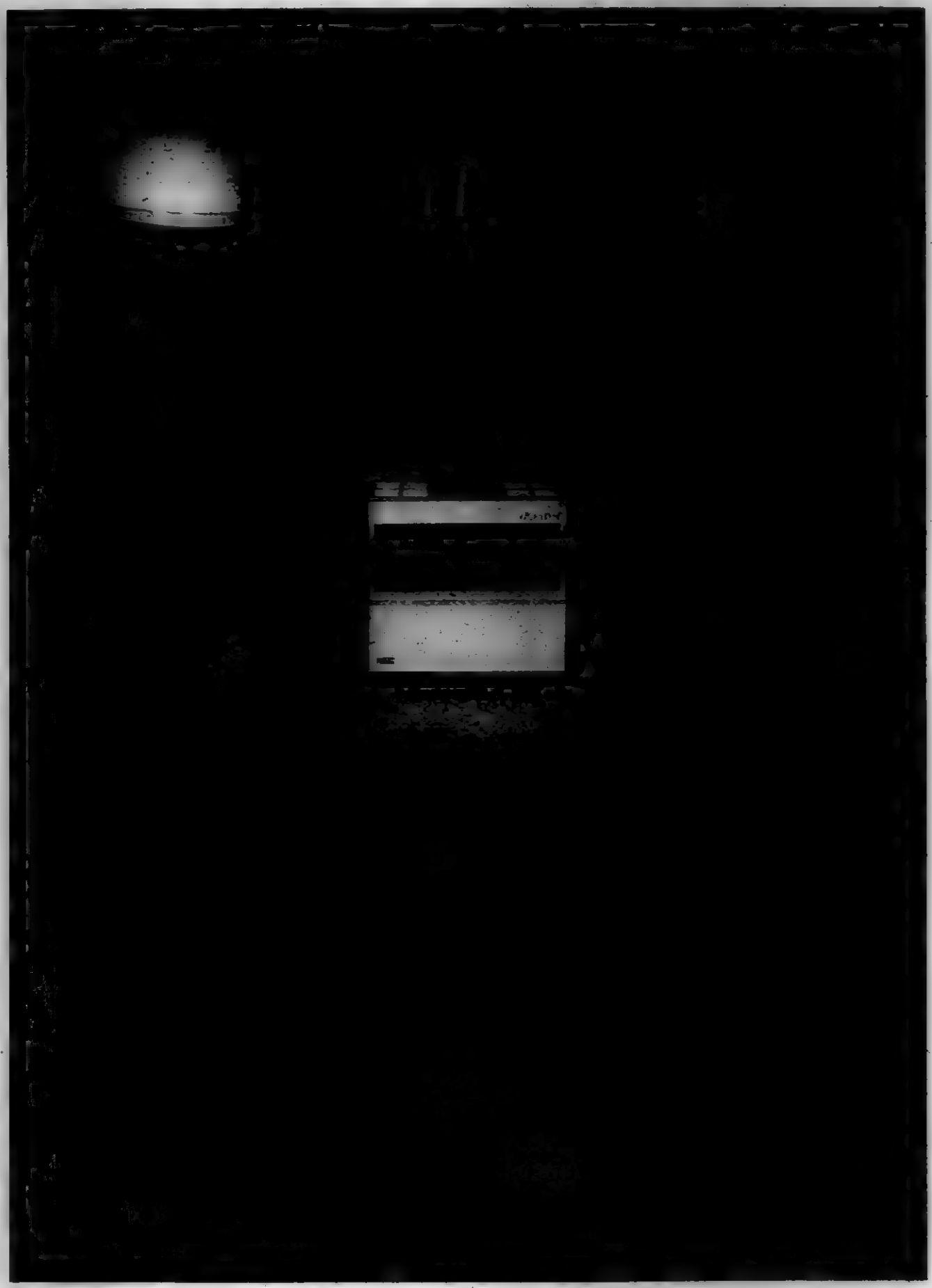
W.J. Wisely Associates
Norristown, (215) 539-1217

PUERTO RICO
Codecom
San Juan, (809) 781-9797

TEXAS
The Thorson Company
Austin, (512) 451-7527

The Thorson Company
Dallas, (214) 233-5744

The Thorson Company
Houston, (713) 771-3504



NEC
NEC America, Inc.
Data Communications Products

COMMUNICATIONS

The spooler costs $9,500. The applications-oriented features are no-charge options to Lodestar network users.

Syster, Suite 305, 1762 Technology Drive, San Jose, Calif. 95110.

MULTIPLEXERS/ MODEMS

ENVAX SYSTEMS, INC. Envax

Envax Systems, Inc., a subsidiary of Noakes Data Communications, Inc., has added Wang Laboratories, Inc.'s personal computer to the list of equipment which can use the company's communication co-processor.

The Envax is actually a buffered modem that enables personal computer users to dump messages that are sent into the modem's memory and then go about their work using the computer while the message is being transmitted. Similarly, messages can be received and stored by the modem while the attached personal computer is being used. A light indicates that data has been received.

The device, which allows access to telex, TWX and direct-distance dialing networks, costs $1,295 with associated software, the vendor said.

Envax Systems provides similar products for the IBM Personal Computer, Xerox Corp. Xerox 820, Corona Corp. and Texas Instruments, Inc. personal computers.

Noakes Data Communications, 8320 Stowell, Irving, Texas 75061.

DYNATECH PACKET TECHNOLOGY, INC.
1603, 1604 data sets; 1605, 1606 line drivers; 1610, 1611 modem eliminators

Dynatech Packet Technology, Inc. has announced a complete line of limited distance data sets, line drivers and modem eliminators for both asynchronous and synchronous applications.

The 1603 and 1604 data set models run up to 19.2K bit/sec on normal twisted pair or transformer-coupled twisted pair and provide line surge protection. The 1605 and 1606 are switched asynchronous or synchronous line drivers that will operate from 1.2K to 19.2K bit/sec. These units will run full or half duplex. Models 1610 and 1611 modem eliminators will also run asynchronous and synchronous up to 19.2K bit/sec, the vendor said.

All units are available stand-alone and rack-mounted. Prices range from $220 to $420.

Dynatech Packet Technology, 9464-G General Green Way, Alexandria, Va. 22312.

OPTELECOM
Models 4121, 4122

Optelecom has announced two fiber-optic modems, Models 4121 and 4122, both of which provide full-duplex data transmission between asynchronous RS-232C terminals, CPU ports, modems and/or multiplexers using duplex fiber-optic cables.

Both modems handle data speeds to 100K bit/sec over optical cables one mile long. Indicator lamps display operational status of the data link and modems, the vendor said.

Both models are priced at $160.

Optelecom, 15040 Luxmanr Drive, Gaithersburg, Md. 20877.

TELEBYTE TECHNOLOGY, INC.
Model 79

Telebyte Technology, Inc. has introduced the Model 79 dual short modem, a high-density, short-haul modem package.

Continued on page 78

NET from page 73

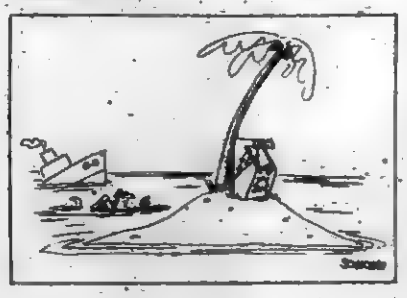
bled up by IBM derivatives and, perhaps, also by AT&T products," Bosomworth predicted.

Standards, too, are factors which are contributing to the market confusion, the report noted, although the IEEE 802 committee has made considerable progress. Currently, the Xerox Corp. Ethernet protocol is encompassed within the IEEE 802.3, and the widely used Datapoint Arcnet protocol is covered by the IEEE 802.4. Industry observers expect 802.5 to be promulgated as the new IBM protocol.

IRD expects the market for local-area networks to grow significantly from $200 million in 1984 to about $1 billion in 1988. (These figures do not include the workstations, personal computers and file servers that are attached to the local-area network and which collectively account for a much higher value of shipments than the local-area network components.)

IRD's Bosomworth expects that specialized suppliers of local-area network components and systems will be facing an increasingly uncertain future as more of the functionality of the local-area network is placed on chips and integrated directly onto printed-circuit boards within workstations and desktop computers.

The report is priced at $1,650 and is available from IRD, which is located at 30 High St., Norwalk, Conn. 06851.



TIME is MONEY

OEM 200 doesn't waste either.

You can't afford to waste time waiting for your printer to finish before your computer can move on to something else. The OEM 200 is designed for THRUPUT. The large print buffers, high speed space skip and fast paper advance combine to generate 'usable' speed, not simply impressive spec sheet figures!

With the OEM 200's unusually large buffers, you can print and process simultaneously.

NO WAITING.

Most printers have very small buffers - 2K or 4K at most. Our 150 CPS wide carriage OEM 200 comes standard with a 4K buffer which is expandable to 20K, 36K, or 68K. MPI offers the biggest buffers in the business!

The OEM 200 has other outstanding features like an optional SoftSwitch™ front panel keypad and a fast and impressive near letter quality mode. Our exclusive applications packages (AP-PAKS), providing enhanced graphics printing along with a vast selection of decorative type styles, are available for selected microcomputers.

At a suggested list price of $1045, the OEM 200 won't take your life's savings either. STOP WASTING TIME AND MONEY. BUY AN OEM 200 FROM MPI — The American Printer Company!

Call Us For More Information At: (800) 821-6848

Model shown with optional SoftSwitch™ keypad.

mpi

Micro Peripherals, Inc.
4426 South Century Drive
Salt Lake City, Utah 84123
(801) 263-3801

COMMUNICATIONS

Continued from page 77

The modem provides full-duplex operation at speeds up to 19.2K bit/sec at distances up to 10 miles over two twisted pairs, according to the vendor.

The operating status of the modems is reported to the user via four front-panel-mounted LEDs, which display the activity on the transmit, receive, data terminal ready and data carrier detect lines.

Each of the modem channels is equipped with a data terminal equipment/data carrier equipment switch and a loopback switch, according to the vendor.

All I/O connections to the modems are routed via a 30-pin, card-edge connector. The price is $225.

Telebyte Technology, 148 New York Ave., Hauppauge, N.Y. 11788.

AUXILIARY EQUIPMENT

ACCENTEL CORP.
Worldfone

Accentel Corp. has introduced the Worldfone, a teleprinter terminal that is compatible with Western Union's Telex and TWX services as well as the telephone network.

The Worldfone is said to weigh less than 33 lb. It has an 80-char., 25-line amber monitor; two 180K-byte, 5¼-in., double-density disk drives; 64K bytes of internal memory; an internal 300 bit/sec modem; an RS-232 interface; an 80 char./sec printer; and a detachable keyboard with a numeric pad, the vendor said.

Reportedly, messages created on the screen can be printed or transmitted by pushing a single button.

With an internal clocking mechanism and an autoanswer feature, an unattended Worldfone can send and receive messages, according to the vendor. The device can store up to 150 messages, which are dated and time-coded as received. A list of stored messages can be printed out.

The vendor said that the device has text editing capabilities and can run Digital Research, Inc. CP/M applications. It costs $2,995.

Accentel, 1708 Shoreline Road, Mountain View, Calif. 94043.

ANALYTICS COMMUNICATIONS SYSTEMS
Fimac

Analytics Communications Systems has added the Fimac security device to its Sherlock line of information security modules.

The product is available both as an in-circuit device and as a peripheral for intelligent terminals. There are two models: the HM-241 for peripheral attachment and the HM-244 for in-circuit placement. Both models provide an RS-232 port for connection to a data terminal; the HM-244 has a second RS-232 port for connection to communications equipment.

Available now for asynchronous and bisynchronous communication, both models are priced at $1,995.

Analytics Communications Systems, 1830 Michael Faraday Drive, Reston, Va. 22090.

DATAFLOW SYSTEMS, INC.
Tel/3000

Dataflow Systems, Inc. has announced the Tel/3000, a product which offers Hewlett-Packard Co.'s HP 3000 minicomputer users an interface to portable data entry terminals.

The portable data entry terminals are hand-held microcomputers capable of supporting an acoustic coupler or an RS-232 interface. This allows the portable terminal user to transmit data to the system, where the Tel/3000 is waiting to receive the data, check for possible error conditions and write the data to disks, the vendor said.

Some of the product's features include multiple-line processing capability, batch or message file output to disk, parity checking, error substituting, error counting, error tolerance-limit checking and automatic shutdown. It returns a steady tone to its user on acceptable transmission, and a warbled tone on rejected transmission, according to a company spokesman. The price is $3,500.

Dataflow Systems, 5302 E. Victory Drive, Indianapolis, Ind. 46203.

CLYDE DIGITAL SYSTEMS, INC.
Calout

Clyde Digital Systems, Inc. has announced the availability of Calout, a communications product that reportedly allows a user to call up any other computer from a Digital Equipment Corp. RSX-11-based host system and act as a remote user with complete file transfer capabilities.

The product enables users to transfer all types of disk files, including binary program files, using optional remote modules.

Calout is priced at $1,500.

Clyde Digital Systems, 3707 N. Canyon Road, 3-E, Provo, Utah 84604.

NATIONAL APPLIED COMPUTER TECHNOLOGIES
LCX 120A

National Applied Computer Technologies has announced the LCX 120A turnkey system, designed for use by communications service resellers.

Features include: least-cost routing based on calling privilege and dynamic cost table; customer data base management with multiple-key access; Federal Communications Commission-approved telephone switching equipment; multitasking; and multiprocessing.

A 120-port system costs $67,500.

National Applied Computer Technologies, 744 S. 400 East, P.O. Box 1870, Orem, Utah 84058.

UNIX & C

HANDS-ON TRAINING

Select your training medium according to the type of training you prefer and the number of people to be trained.

VIDEO-BASED TRAINING. The Computer Technology Group's Video-Based Training integrates professionally developed and produced video and text material, as well as hands-on exercises, into complete training programs.

Our courses are produced with the highest standards of video quality, applying the latest techniques of instructional design including the use of computer graphics and animation techniques to compress learning time. The students' time is not wasted with the "camera at the back of the classroom" or "chalk talk" approach which is so inefficient, and often ineffective, in transferring skills.

Our Video-Based Training courses are completely self-contained, including the hardware-independent hands-on exercises. All you need is a video cassette player.

COURSE	Number of Modules: Video-Based	Interactive
Computers at Work	15	
UNIX—An Executive Perspective	1	
UNIX Overview	6	6
UNIX Fundamentals	15	15
"C" Language Programming	16	16

INTERACTIVE VIDEODISC TRAINING. Our new UNIX Videodisc Training Curriculum combines the benefits of our Video-Based Training with the flexibility of microcomputer access. Designed as a one-on-one tutor, our interactive system assesses the training needs of each student and dynamically tailors the training to his/her specific needs, thus eliminating redundant training. Through engaging exercises and interactive video, we are able to increase student comprehension while reducing training time.

Developed by the Computer Technology Group and Interactive Training Systems, the curriculum uses the latest laser videodisc technology—including IBM PC, color monitor and Interactive Training System Controller.

PUBLIC AND IN-HOUSE SEMINARS. Both public and in-house seminars are offered on a wide variety of UNIX and "C" Language subjects, including:

UNIX Overview • UNIX Fundamentals for Non-Programmers • UNIX Fundamentals for Programmers • Shell as a Command Language • "C" Language Programming • Shell Programming • Using Advanced UNIX Commands • UNIX Internals • UNIX Administration • Advanced "C" Programming Workshop • Advanced "C" Programming Under UNIX • Berkeley UNIX Fundamentals and "csh" Shell.

Call toll-free: (800) 323-UNIX
or in IL (312) 987-4062
310 S. Michigan Ave., Chicago, IL 60604

COMPUTER TECHNOLOGY GROUP
Technocrafts, Inc.

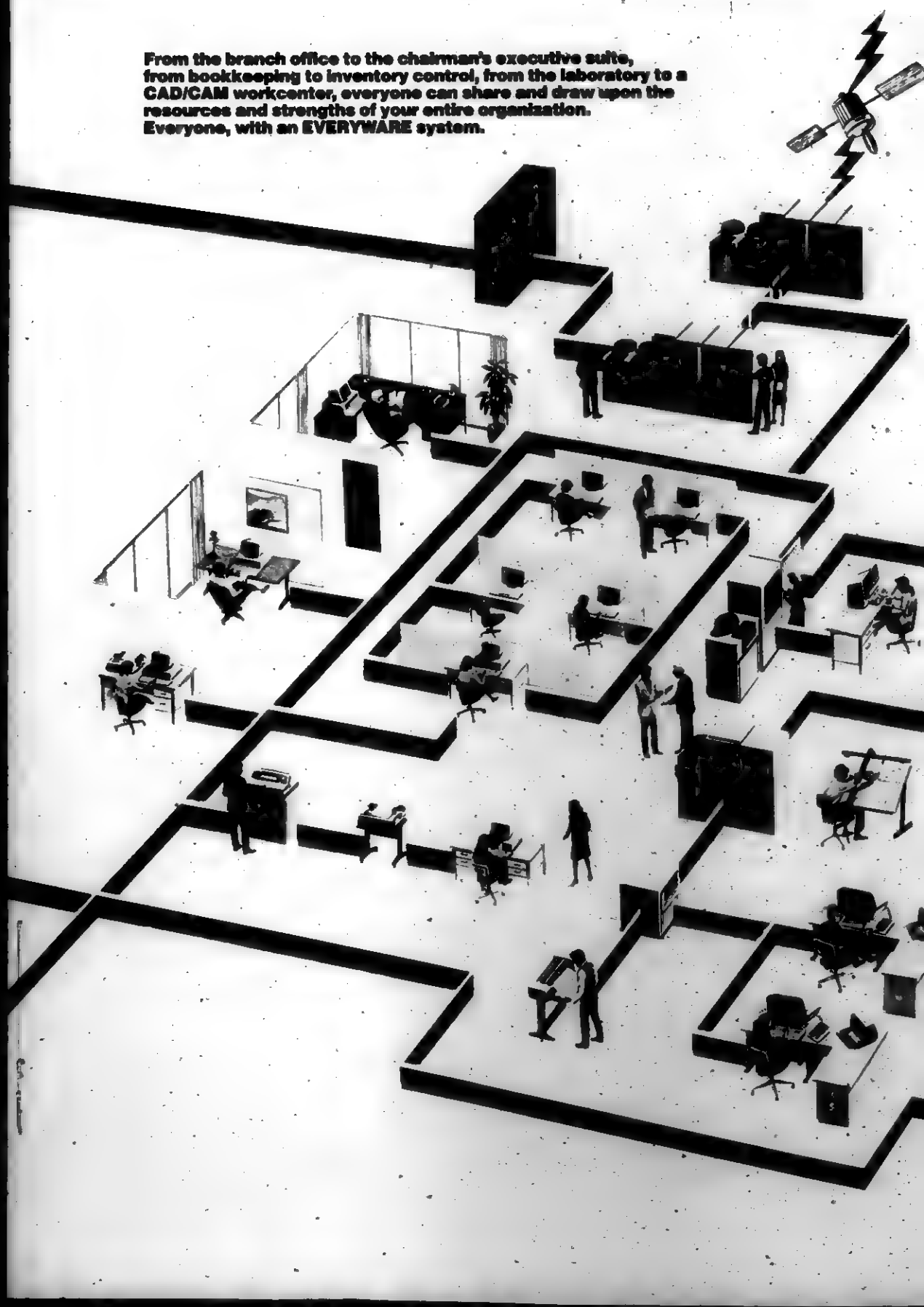
UNIX is a Trademark of Bell Laboratories

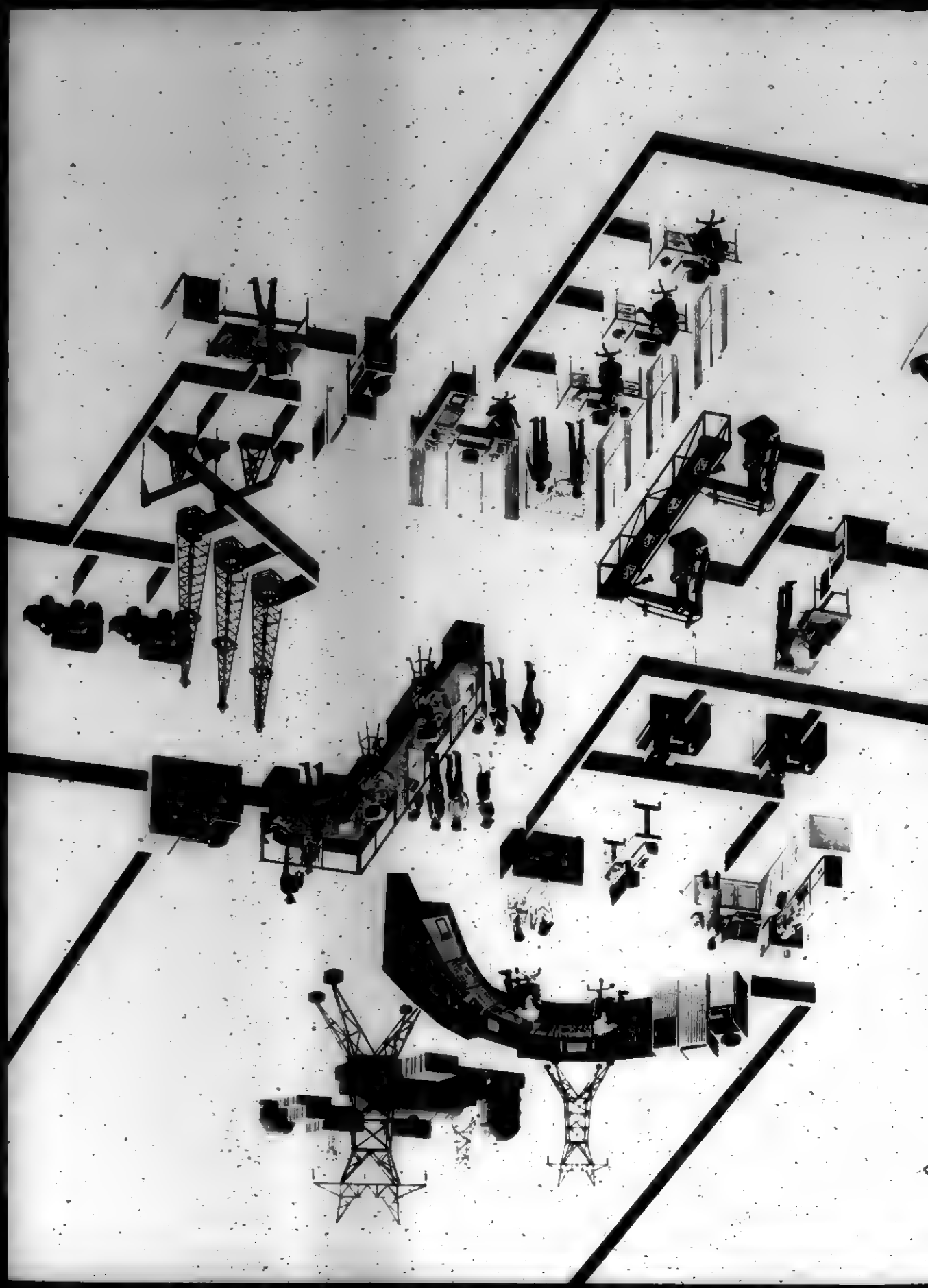
Where can you find the solutions to your compatibility, connectivity, portability, and expansion problems?

EVERYWARE™

from Perkin-Elmer.

From the branch office to the chairman's executive suite, from bookkeeping to inventory control, from the laboratory to a CAD/CAM workcenter, everyone can share and draw upon the resources and strengths of your entire organization. Everyone, with an EVERYWARE system.





EVERYWARE™ products from Perkin-Elmer.

Everything you need for the systems you want.

EVERYWARE hardware: a comprehensive selection.

Our computers range from the Series 3200 superminis—including the economical 3205 and the incredibly fast and powerful 3250XP—to the Series 7000 desktop professional computers, built around the powerful M68000 microprocessor. Since EVERYWARE hardware is based on a distributed processing architecture, it lets you bring the right amount of computing power right where you need it.

EVERYWARE software: unparalleled flexibility.

Since software is your biggest long-term investment, we set out to protect it with several key features. First, we offer a common operating system that spans our entire line of products. Derived from a UNIX* operating system, this common operating system offers programming productivity advantages. And, all our computers speak the same languages, FORTRAN and C. These languages are bridging tools that link this common operating system and our proprietary OS/32 operating system to give you both developmental advantages and real-time capability.

EVERYWARE software is more than operating systems and languages. It includes Reliance PLUS, a proven relational DBMS that shows how user-friendly a powerful transaction processing system can be. And there is the Resilient System, which links dual Series 3200 computers for high availability processing.

Finally, our operating systems allow you access to the huge library of existing third party software. For example, you can run a word processing package like VisiWord,™ or a spreadsheet like Supercomp-Twenty,™ and many other popular applications packages.

EVERYWARE communications: a commitment to standards.

EVERYWARE systems can share information with IBM environments via SNA or BSC using emulators for such products as IBM 3270, 3770, HASP and 2780/3780. You can form a local network or join one using Ethernet. And through Perkin-Elmer's PENnet-Plus you can use all the global facilities of the CCITT X.25/X.29 Packet Switching Network. EVERYWARE products conform to the ISO-OSI Reference Model, assuring long-term connectivity.

Perkin-Elmer introduces EVERYWARE™

At last, a comprehensive application of the world's major hardware, software and communications standards. For your present and next-generation information systems.

You've devoted a lot of time and money developing software programs to meet the needs of your organization. What happens when it's time to upgrade your hardware? Will your software make the transition smoothly? Especially now when the cost of writing and maintaining software continues to climb. How do you protect your existing investment and make all the right moves for the future?

The heart of the problem is the lack of universally applied hardware, software and communications standards. Now Perkin-Elmer has done something about it. Our EVERYWARE product family offers you proven, established and widely supported industry standards. You can live with them now. And tomorrow.

The compatibility and connectivity problem. The Perkin-Elmer solution: EVERYWARE products.

You face the challenge of developing new systems and software every day. Frequently, these systems have to become part of your existing processing environment. EVERYWARE products offer the ability to coexist with systems from other manufacturers. This has been achieved in three ways. First, by Perkin-Elmer's commitment to an industry standard operating system. Second, through our commitment to compatible languages. And finally, by our support of all of today's and tomorrow's major communications protocols. As a result, EVERYWARE computers can share information with other systems desk-to-desk, room-to-room, across town and across continents.

The portability problem. The Perkin-Elmer solution: EVERYWARE products.

The capability to efficiently port your software is another benefit of EVERYWARE products. From computer to computer, department to department, your programs retain their value, protecting your investment. You can develop software on an EVERYWARE computer in one system and port it to other EVERYWARE computers anywhere in your organization. For example, you can write software on a desktop microcomputer and run it on a supermini. And because EVERYWARE hardware supports an industry standard operating system, you have access to a vast library of third party software.

The expansion problem. The Perkin-Elmer solution: EVERYWARE products.

Perkin-Elmer offers one of the broadest ranges of computers in the world. It extends from 32-bit superminis to desktop workstations. So you can expand at your own speed, adding the power you need, whenever you need it. As more capacity is required, you simply connect additional processors. You can grow board-by-board, or by adding complete computer systems. Because of the built-in compatibility, there is no need to re-write your applications software. Existing programs continue to run without major alteration.

EVERYWARE™ systems

EVERYWARE systems. In finance and insurance.

Today a major nationwide financial network uses Perkin-Elmer computers to flash over 500,000 updates a day to over 11,000 terminals.

EVERYWARE systems. In flight simulation.

Perhaps the most graphic demonstration of Perkin-Elmer computer strength and real-time capability is in the re-creation of flight conditions for the training of pilots and astronauts in the United States and around the world.

EVERYWARE systems. In science.

Perkin-Elmer is the acknowledged leader in the computerization of the lab. We provide the same leadership in computers for seismic exploration and many other fields of science and research.

EVERYWARE systems. Everything you need from one respected source.

Perkin-Elmer is a major manufacturer of advanced computers. Our 32-bit supermini was the first of its kind and our supermini family is the broadest in the business. Computers from Perkin-Elmer are particularly sought after for use in demanding, high-availability environments.

EVERYWARE software provides the flexibility to develop, port or purchase programming.

EVERYWARE communications products comprise the most comprehensive collection of protocols available from a single vendor.

These are decided advantages for those of you already using Perkin-Elmer computers. And exciting considerations for those now planning the evolution of information processing centers.

Write us or call today.

The Perkin-Elmer Corporation,
2 Crescent Place, Oceanport,
NJ 07757 U.S.A.
Tel: **800 631-2154**
toll-free or (201) 870-4712.

Perkin-Elmer is a registered trademark of The Perkin-Elmer Corporation
EVERYWARE is a trademark of The Perkin-Elmer Corporation
UNIX is a trademark of Bell Laboratories
VisWord is a trademark of VisCorp, Inc.
Supercomp Twenty is a trademark of Access Technology, Inc
IBM is a registered trademark of International Business Machines Corporation

PERKIN-ELMER

Printed in U.S.A.

IN DEPTH

ILLUSTRATION BY RICHARD TIBBITT.

When and how to modify packages

By Jerrold M. Grochow

An organization looking to replace an existing system or install one in a completely new area has three options: Develop a system from scratch to its exact specifications; buy a package and use it as is; or buy a package and modify it.

In the first case, the organization can look forward to a long and costly implementation cycle with a relatively high risk of delay, overrun or inadequate definition of the system's functions leading to poor user acceptance.

In the second case, the users may find their cost saving eroded as they change procedures and policies to adapt to the peculiarities of the package. More important, it may reintroduce the risk of a long implementation period and possible dissatisfaction with the resulting product.

The third case, buying a package and then modifying it, would seem to combine either the best or the worst possibilities of the first two. If we can figure out how to combine the best characteristics of custom development and software package purchase, then we will have developed a new alternative with some exciting possibilities.

While there are any number of specific reasons a package may be found lacking, almost all can be categorized into the areas discussed below. (Some problems may have to do with the vendor itself rather than the product, which is yet another category.)

Perhaps the most obvious area for change has

In the ideal software world, packages would be designed and developed for users to tailor to their individual needs. The result would be software with the best characteristics of package purchase and custom in-house development. In the less-than-ideal world, users can still find a suitable compromise solution.

to do with reports. While most package systems come with a number of standard reports, it is highly likely that an organization will want to make changes, at least of a cosmetic nature, on many of them.

In addition, there may be a wide variety of additional reports that are necessary, either to duplicate those that come from existing systems or to make better use of new information that will be available from the system.

Potential users may be unhappy with how particular input screens are formatted. Again, proposed changes may be cosmetic — for example, changing a label from "organization code" to "responsibility center" — or more substantive in nature.

The content of the input screen may also vary depending on whether other functional changes are to be made.

Two types of change

When we start talking about the functionality of the system, there are two types of changes that must be considered. The first occurs when there is a new feature that is desired (either because existing systems have it or because its absence has been determined to be a serious fault), in which case the modification includes figuring out how to add it to the package.

Depending on the internal technical architecture of the package and the specific modification, this effort can range from a relatively straightforward task (perhaps resulting in a totally separate program) to one that involves a significant rewrite of major portions of the system.

A somewhat easier functional modification involves changing the way the package currently performs in a particular area. For example, an accounts payable package will probably allow for automatically releasing invoices for payment but may have only limited criteria for doing so. A modification, such as one to expand invoice releasing capabilities, requires a thorough knowledge of how the package feature was developed but often proves to be a simpler modification than one for which the package has no capability at all.

Finally, modifications may be made to a package to achieve integration with other systems already in operation. While it is usually simple to interface a package with existing systems by taking a file from one and passing it to the other, true integration, while much more elusive, produces greater benefits when attained.

For example, if a new accounts receivable package can be made to use the same chart of accounts table (for editing and validation purposes) as the existing general ledger system, then you can remove the need to maintain this table in two separate systems and also ensure a much higher degree of consistency in the data accepted by your applications. Unfortunately, complete integration can almost never be achieved without significant rewriting of either the existing application or the package system.

While it is usually simple to interface a package with existing systems by taking a file from one and passing it to the other, true integration, though much more elusive, produces greater benefits when attained.

The number of modifications desired and the category that describes them will, in large measure, determine the practicality of modifying the package for your application. Before you can make a decision as to whether modifying should be done (or whether the systems design team has to choose another alternative completely), consider how these modifications would be achieved, in terms of technical architecture, the tools to assist in the work and the division of responsibilities.

How to modify a package

When people talk about modifying a package, they may be discussing any of several different processes. Some people may write additional programs to front-end or back-end the package (in other words, they have not actually changed the package itself), while others may change the externalities, such as screens and reports, while still others may modify processing programs.

Figure 1 defines the software package environment to include interfaces with other systems and any front-end or back-end programs that may be written. This "interfaced package" environment represents the majority of what people are doing with packages today. It is the baseline from which to talk about how to modify a package.

Figure 2 highlights the different parts of the package that can be modified — for example, screens, reports, programs and data bases. For most packages, modifying the reports is relatively simple and involves the use of a report writer supplied with the system. Some of the more modern packages also provide screen generators to simplify the process of reformatting and modifying input screen fields.

Modifying programs can range from very simple tasks to one that almost involves rewriting. This effort is not just a function of the type of modifications to be developed but also of whether the package vendor thought about such possibilities

8 Good Reasons to Attend the James Martin Seminar

1. James Martin has been writing THE BOOK on the Computer Industry for over 3 decades.
2. He is the most sought after consultant in the Computer Industry.
3. His predictions and recognition of major computer developments are unsurpassed.
4. With over 31 top-selling books, Martin is the industry's #1 selling author of all time. His book, *Application Development without Programmers*, is the Computer Industry's #1 selling book of all time.
5. James Martin has the unchallenged reputation as the world's finest lecturer in his field. Over 20,000 individuals worldwide have attended the James Martin Seminars. Many return year after year.
6. James Martin "... can lay fair claim to being the most influential DP guru of all time." – *ICP Interface*
7. A fast-moving, high-density, interactive 5-day program packed with information for all DP designers, management, and staff. Quite honestly, the James Martin Seminar is the industry's best educational value for the money.
   - Attend the seminar designed to dramatically increase your DP capability.
   - A major increase in productivity is attainable through the methods taught in this seminar.
   - **5 days with James Martin will dramatically alter your approach to DP.**

Many DP organizations are beginning to break the cycle of low productivity, poor responsiveness, and high application backlog of traditional DP. Now is the time for you to act. Attend the James Martin Seminar this spring. Learn the new technologies and their application to your organization. You'll discover why James Martin is ...

8. ... The Man the DP Experts Listen To!

Check the appropriate box on the coupon for more information on James Martin's 1-Day Seminar, THE END USER REVOLUTION for executives and professionals everywhere who ought to be using computers more effectively. This 1-day seminar will be held on the first day of the 5-day seminar.

Call (213) 394-8305 or mail the coupon today for a detailed brochure.

Washington, D. C.	April 2-6, 1984
San Francisco	April 9-13, 1984
Chicago	April 23-27, 1984
Boston	April 30-May 4, 1984

Send more information on the following James Martin Seminars

☐ New 1-day End User Revolution Seminar
☐ New 5-day DP Revolution Seminar

NAME
COMPANY NAME
ADDRESS
CITY/STATE/ZIP
TELEPHONE CW 3/12

TECHNOLOGY TRANSFER INSTITUTE
741 10th St., Santa Monica, CA 90402, (213) 394-8305

ANNOUNCING THE WY-50.

PRETTY BABY

A NEW GENERATION OF LOW-COST TERMINALS FROM WYSE

Never before has anyone put so much into something so good looking. Or so compact. It took revolutionary design to do it. Design a lot of people couldn't accomplish for the price. But we did.

In fact, the birth of the WY-50 introduces a new standard for low cost terminals. It was conceived to give you 30% more viewing area. Developed to meet the most advanced European ergonomic standards. And best of all, delivered for a surprisingly low price.

The WY-50 sells for only $695.00.

BORN WITH ADVANCED FEATURES:

- **14" screen.**
- **80/132 column format.**
- **Soft-set up mode.**
- **High resolution characters.**
- **Low-profile keyboard.**
- **Industry compatible.**
- **Only $695.00.**

For more information on the revolutionary design, outstanding features and unique good looks of our Pretty Baby, contact WYSE TECHNOLOGY and we'll send you a brochure filled with everything you need to know.

The WY-50. It's a real beauty.

WYSE

Make the Wyse Decision.

WYSE TECHNOLOGY *3040 N. First St., San Jose, CA 95134, 408/946-3075, TLX 910-338-2251, Outside CA call toll-free, 800/421-1058, in So. CA 213/340-2013.*

Four-Phase is helping more than 2,000 DP managers win the productivity game.

Now it's your turn.

It's easy to win the distributed information processing game when you play it with the Series 4000 from Four-Phase. The Series 4000 is an integrated, growth-oriented system designed to communicate within your IBM environment. No other vendor gives you so many functions for so many years at such affordable prices. In the distributed processing arena, that's the way to score points with both end-users and top management.

You win the DDP game with software.

Four-Phase provides one of the most impressive and complete collections of software ever offered from one company. Our packages make integrating Four-Phase computers remarkably easy. And guarantee a logical growth path for years to come. Here's just a sample of what we provide:

Interactive processing: VISION®—For creating custom applications from order entry to transaction processing. It provides a high level of functionality that can be used in any distributed environment. And VISION is easier and faster to program than COBOL.

Word processing: FOREWORD®—Our powerful shared-logic word processing system allows text to be entered, stored, edited, distributed and printed.

Graphics—For business graphics, the Graphics Management System (GMS/IV) gives you an easy way to condense and conceptually present data that's easily understood by decision makers.

COBOL—Industry standard COBOL is used to write programs for handling keyboard-entered data and general batch processing.

When they want PC's you've got them!

If your end-users are like most these days, they're clamoring for their own personal computers. We play that game, too. Because at the flick of a switch, our multifunction terminals suddenly become stand-alone PC's. So now you can give your users the distributed processing capabilities they need, AND the personal computers they want. All in one integrated system.

The action starts with the Multifunction Executive.

The key to the Series 4000 game plan is the Four-Phase Multifunction Executive (MFE). This unique and powerful control program monitors each multifunction terminal in your system. Its ability to run multiple software programs allows your users to perform 16 different tasks from any terminal on the system. And each of your users can access all of our software packages with one keystroke. You get maximum distributed processing capability and control.

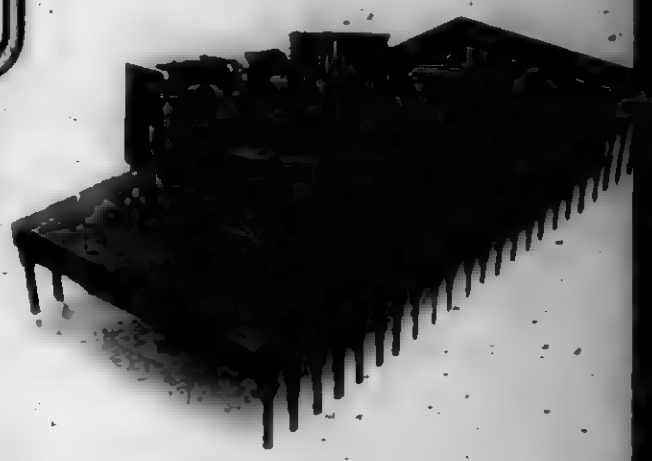
Plus, MFE dynamically allocates selected peripherals so that each device can be used by more than one program. The result—MFE eliminates the need for multiple processors, duplicate terminals and other peripheral devices at installations that require concurrent execution of software.

2,000 winners and counting.

Four-Phase was the first company to introduce the integrated approach to multifunction distributed processing. Today, there are more than 15,000 installed Series 4000 systems, helping people like you manage the information needs of over 150,000 end-users. And every machine is backed by our Customer Support Operation and over 1,000 field service people to provide continuing support and reliability at every level.

Four-Phase customers have been winning the DDP game for years. You can, too. To find out how, call us today at 1-800-529-6050, ext. 1599. In Arizona, call 1-800-352-0458, ext. 1599. For a free poster of this illustration, write to us at 10700 North De Anza Blvd., M/S 52-6A9, Dept. P., Cupertino, CA 95014.

VISION, FOREWORD and Multifunction Executive are registered trademarks of Four-Phase Systems, Inc. MOTOROLA and Ⓜ are registered trademarks of Motorola, Inc. Four-Phase and the Four-Phase logotype are registered trademarks of Four-Phase Systems, Inc. GMS/IV is a trademark of Four-Phase Systems, Inc.



MOTOROLA INC.
Information Systems Group

Four-Phase Systems
The Office Automation Company

when the system was initially designed. It is a lot easier to modify a program that was designed to be modified by others than one that was primarily designed to be maintained by the original developer (or at least internal to the developing organization).

Some vendors provide program generators or program templates to assist in this modification process. Furthermore, the package vendor's attitude will also influence the amount of system support and documentation that it has available, which also influences your ability to modify the package programs.

In some cases, what may appear to be a modification to the package can actually be handled by separate programs "bolted on" to the application (attached as subroutines at appropriate user exit points). Taking this approach also has some positive implications for ongoing maintenance and the ability to incorporate new vendor features into the overall system.

Once every seven to 10 years the vendor reimplements his entire system (just as you are doing). You may find you are forced to redo your systems at that time. Knowing where the vendor is in his own development cycle, therefore, is of great importance to the software package purchaser.

Modifications may also require that additional data be stored in the package data base. Again, it is hard to make general statements about the ease or difficulty of accomplishing these modifications. For some packages, vendors provide tools to allow the addition of fields (although it will be necessary to make similar additions to screens and reports). For others, the data base structure may be so ingrained in the programs of the system that even adding a single field becomes a major effort. Again, if ways can be found to "bolt on" additions to the data base, you are more likely to maintain a degree of compatibility with new functions and features that the vendor will add in the future.

With a modified package and with the addition of front ends, back ends and other system interfaces, we have an architecture that may be more common in the future and will provide many organizations with highly cost-effective solutions to the development of new large applications.

Who does the work?

Whenever systems are to be developed, there is a natural assumption that the in-house data processing department will be providing the resources to accomplish the work. Occasionally, an in-house data processing department will make use of contract programmers or system development consulting firms to augment staff or provide particular expertise. When packages are to be modified, this use of outside help, particularly from the package vendor, takes on increased importance.

With today's typical application software package running in the hundreds of thousands of lines of code, the user who finds himself in the position of trying to modify the actual program code may be well advised to seek assistance from the vendor. Unfortunately, many vendors are not staffed to provide this kind of assistance and, in fact, avoid situations where they will be called upon to provide this consulting. Luckily, there are a few vendors who not only provide this additional service but actually believe it to be an important aspect of improving the usefulness of their products.

If your package evaluation process determines that programs must be modified, you would be well advised to seek a vendor who has this capability. In fact, if the vendor is unwilling to assist in modifying the package, it may be a signal of other problems to come in the future vendor-client relationship.

Package vendors seem to fall into two classes regarding modifications. In the first case, the vendor is, in a sense, in the "mail-order software" business and only concerned with the software sale. Unfortunately, while many vendors in this category sell very good products, they are often not particularly concerned with the ultimate use of those products in the companies that buy them.

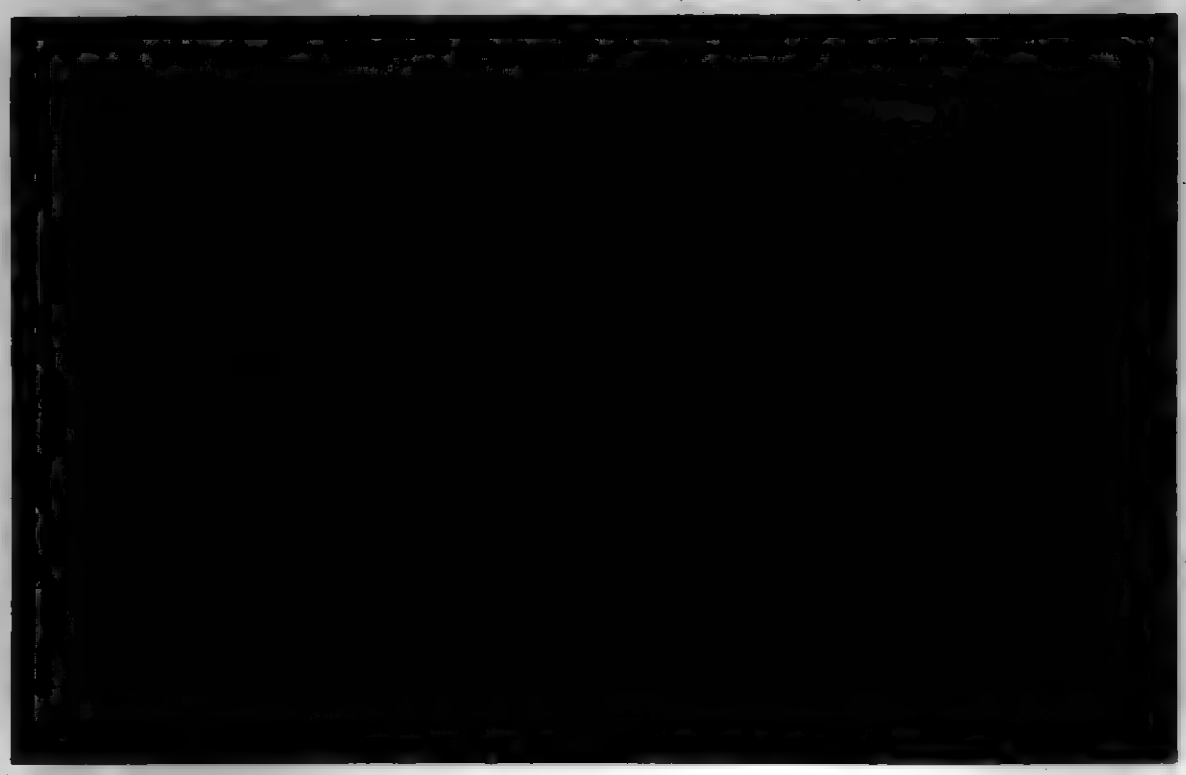
In the second camp are vendors who see the ultimate use and satisfaction of their clients as their long-term goal. They realize that add-ons and modifications are an integral part of the package implementation process — at least among the larger organizations with whom they work.

Other considerations

Other things to consider before purchasing a package with the idea of modifying it include warranty, customer support and ongoing vendor maintenance. In some cases, you may find yourself out in the cold regarding these vendor services if you touch even one field on one report. In other cases, vendors are more lenient in their policies, and these policies should be thoroughly investigated.

Vendor contracts often include a clause stating that if the package is modified, then the user is not eligible for ongoing maintenance or continuing warranty of the software. This restriction is particularly important,

Combining Boeing's distributed services with IBM's PCs could revolutionize your financial planning.



We know.

Introducing a totally new program from Boeing Computer Services. Designed to help you take maximum advantage of IBM's technology in microcomputers. While ensuring you get the same reliable, high quality computing solutions that are synonymous with the name BOEING.

For financial planners, Boeing offers the EIS® Micro Workstation — a distributed extension of the well-known EIS Decision Support System. EIS software gives business managers the information they need. Faster. More accurately. Without complicated computer programming. And now delivered economically to your desktop, via the IBM PC/PCXT.

The EIS Micro Workstation lets you download, manipulate and upload data to our MAINSTREAM® remote computing network. It gives you extensive graphics capability. What's more, with MAINSTREAM power, you gain access to the many economic and financial data banks you need for up-to-the-minute modeling. And through our Value Added Dealer (VAD) relationship with IBM, Boeing can be your single, reliable source for host processing, PC/PCXT hardware, software, maintenance, consulting, and training.

You save valuable financial planning dollars while gaining greater control over your planning and business management.

The EIS Micro Workstation is just one more unique service from Boeing, a leader in software and computing solutions. Give your decisions more support. Call 800-447-4700. Or write Boeing Computer Services, M.S. CV-26-9A, 7980 Gallows Court, Vienna, VA 22180.

BOEING COMPUTER SERVICES A Division of The Boeing Company

Boeing is an authorized Value Added Dealer for the IBM Personal Computer and Personal Computer XT.

IBM is a registered trademark of International Business Machines.
EIS and MAINSTREAM are registered Service Marks of The Boeing Company.

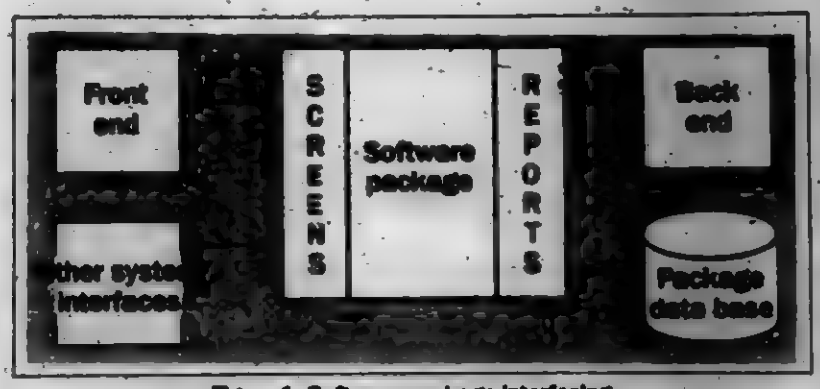


Figure 1. Software package interfacing

Figure 2. Software package modification

since one reason for buying a package is to reap the benefits of the vendor's long-term service and development program. Sometimes it is possible to modify these clauses or work with the vendor to soften them.

Assuming that this hurdle can be overcome, the next question is the impact of modifications on your ability to incorporate new releases of the software package into your operation. Not only is this capability desirable for making use of whatever new features the vendor may provide, but it may also be necessary to ensure the validity of your ongoing warranty, since most vendors require you to be on the current version within six to 12 months of its release.

In the simplest case, that of adding additional programs either through user exits or as front ends or back ends or modifying reports, you will generally not have any problem. If you go further in terms of modifying the data base or modifying programs, then you may find the need to "reapply" your modifications when the vendor's new release arrives. This job may be complicated if the new release is a significant change from the old one or if the areas of code that you modified are no longer distinguishable.

Remember also that once every seven to 10 years the vendor is going to reimplement his entire system (just as you are doing to yours). You may find you are forced to redo your systems at that time. Knowing where the vendor is in his own development cycle, therefore, is something of great importance to the software package purchaser.

Now that we have discussed the various possibilities and pitfalls of modifying a package, we are still faced with the question of how to decide whether this course is right for you. The decision will be easier if you answer the following questions during your evaluation process:

- Is the package basically sound enough to serve as the core for your systems, even without modifications?
- What is the vendor's attitude toward providing general customer assistance once you have modified the package?
- Is the system written in a computer language known to your staff so that the modifications can be maintained over a period of time?
- Does the vendor have a consulting staff who can work with you or advise you in your modifications?
- Will the vendor provide continuing warranty and maintenance support if you modify the package the way you planned?
- Does the vendor provide modification tools (screen generators, report generators, program templates or generators) to assist in this process?
- Will the vendor assist you in estimating the development time and cost of the modifications?

If you can answer these various questions positively, you may find that the modified package will save you significant time and effort. Although the modified package is a relatively new idea in the systems development business, it is not unusual to see time savings of one year and cost savings in the hundreds of thousands of dollars over in-house development. And, of course, you will continue to reap the saving over many years as the vendor provides enhanced capabilities.

In the ideal world, software packages would be designed and developed with the idea that users would then tailor them to their needs. They would serve as an effective core for what is essentially a customized system and thus provide an environment with all of the best characteristics of custom in-house development and all the best characteristics of a software package purchase.

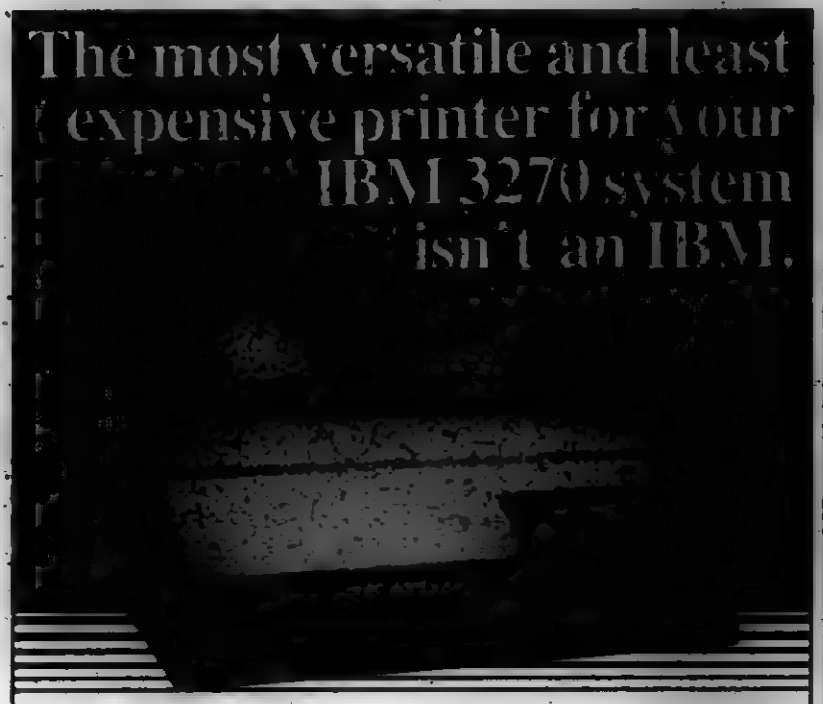
While none of us live in this ideal world, it is possible, with sufficient perseverance and analysis, to find a happy compromise with what will be the most cost-effective solution to system development that we will see for many years.

About the author

Jerrold M. Grochow is vice-president in charge of the Corporate Software Products Group at American Management Systems, Inc., Arlington, Va.

American Management Systems is the developer of the Corporate Financial System, the Generation Five Foundation Software tools and other software packages. The company provides consulting and systems development services.

The most versatile and least expensive printer for your IBM 3270 system isn't an IBM.



It's the ISI 487 that's cutting the cost of IBM on-line printing, delivering features that IBM can't match, and making a lot of people very happy. This plug-compatible, fully integrated (no box!) replacement for the IBM 3287 carries a price tag as low as $3,350 and offers you:

- outstandingly quiet operation
- 200 CPS dot matrix and 50 CPS NLQ printing
- continuous forms and cut sheet handling
- full SDLC/SCS support

For more information about the ISI 487 and our complete line of IBM compatible printers, call, write, or TWX us today!

Interface Systems, Inc.
5855 Interface Drive, Ann Arbor, MI 48103
Telephone (313) 769-5900. TWX 810-223-6058

#1 FOR TSO or VM/CMS

DYNACALC

The fastest and friendliest spreadsheet system

NEW ★Color Graphics ★Database Interface

IMPROVED ★Worksheet Consolidation ★VisiCalc* Support**

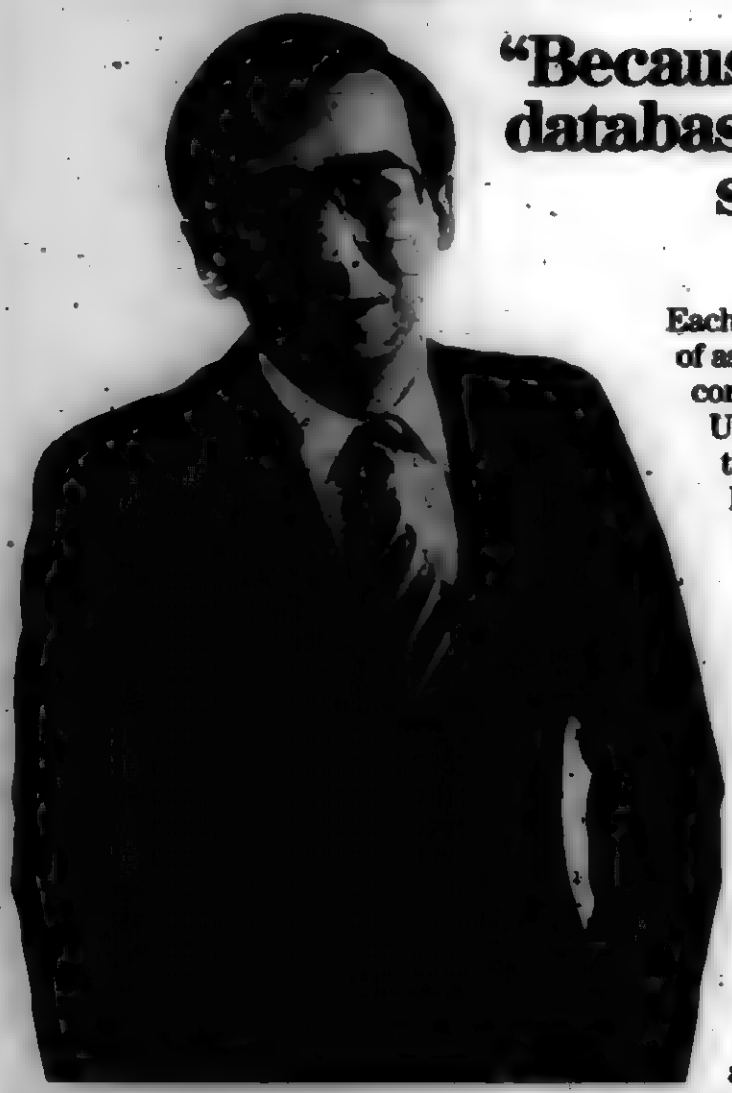
COMPARE US TO THE COMPETITION!

For a free 30 day trial call (312) 525-6400

ChicagoSoft — 738 N. LaSalle • Suite 2 • Chicago, IL 60610

*Dynacalc is owned by Dynamic Corp
**VisiCalc is a registered trademark of VisiCorp. VisiCorp is not associated with Dynamic

Why is Cullinet's information systems strategy creating so much interest?



"Because the strategy of integrating database, applications and decision support makes sense."

*Bob Goldman**

Each day, representatives of as many as eight major corporations from the United States and around the world visit Cullinet's headquarters. They are coming in increasing numbers because they've heard what Cullinet is doing in information systems technology. After the meetings, they are convinced that Cullinet's direction in information systems makes sense for their organizations. It is, in their opinion, the only coherent and intelligent approach available.

Specifically, this means the full integration of Cullinet's IDMS/R database management system, applications, including Manufacturing and Financial Software, and Decision Support Systems that link personal computers to the corporate mainframe.

In other words, a single source of software as opposed to the fragmented approach which has plagued the computer user in the past.

Often, these visitors return to our headquarters with the senior officers of their organization for an Executive Program. Senior management is interested to learn that there has been more progress made to deliver on the promise of computers for top managers during the past year than during the previous twenty. This promise of computing for top management is "knowing that they have a problem in time to take corrective action."

In order to fulfill that promise, the full integration of Database, Applications and Decision Support Systems is required. When management understands the importance of the integrated software solution, the result is a renewed enthusiasm by them for support of the information systems activities of their companies. They realize that their respective companies must put in place new information systems in order to compete or even survive in the future.

That, in the final analysis, is what Cullinet is about: providing a complete and integrated software solution for the 80's and 90's.

Call or write us for more information or attend a very informative seminar explaining this unparalleled software solution. To participate in one of the 700 Cullinet seminars scheduled internationally, send in the coupon or call 1-800-225-9930. In MA, 617-329-7700.

IDMS/R Seminar cities and dates:

City & State	Date	City & State	Date
Albuquerque, NM	May 2	Madison, WI	Mar 15
Appleton, WI	April 12	Merrimack, NH	Mar 29
Atlanta, GA	Mar 28	Milwaukee, WI	May 1
Boston/	May 3	Minneapolis, MN	Mar 28
Danvers, MA		Moline, IL	April 3
Chicago, IL	May 3	Montreal, PQ	Mar 21
Chicago/	Mar 20	(English)	
Rosemont, IL		Nashville, TN	May 3
Cincinnati, OH	Mar 21	New York, NY	Mar 20
Cleveland, OH	Mar 28	New York/	Mar 27
Columbia, SC	April 12	Long Island, NY	
Columbus, OH	May 2	Ottawa, ON	April 5
Ft. Lauderdale, FL	Mar 22	Phoenix, AZ	April 12
Ft. Worth, TX	Mar 15	Portland, OR	Mar 15
Grand Rapids, MI	Mar 27	Providence, RI	Mar 22
Greensboro, NC	April 5	Raleigh, NC	Mar 20
Indianapolis, IN	Mar 27	Rochester, NY	Mar 28
Jackson, MS	Mar 15	St. Louis, MO	April 11
Jacksonville, FL	May 1	San Antonio, TX	Mar 15
Kansas City, MO	May 2	Springfield, MO	Mar 29
Knoxville, TN	Mar 28	Spokane, WA	Mar 28
Lexington, KY	Mar 20	Toledo, OH	April 11
Los Angeles, CA	May 1	Toronto, ON	Mar 29
Los Angeles, CA	Mar 27	Tucson, AZ	Mar 20
Lubbock, TX	May 1	Wilmington, DE	Mar 27

**Robert N. Goldman is President of Cullinet Software, Inc. Starting with the Company over ten years ago, Mr. Goldman has been intimately involved with the evolution of Cullinet's software architecture. In various roles, including Director of Software Development to Executive Vice President and in his current position as Chief Operating Officer, Mr. Goldman has been a key contributor to the product and strategic directions of the Company. He holds a Bachelor of Science Degree in Computer Science from Purdue University.*

Seminar _____

Name/Title _____

Company _____

Address _____

City _____ State _____ Zip _____

Phone ( ) _____

Mail to: Cullinet Software, Inc., 400 Blue Hill Drive, Westwood, MA 02090-2198, Attn: Corporate Meetings.

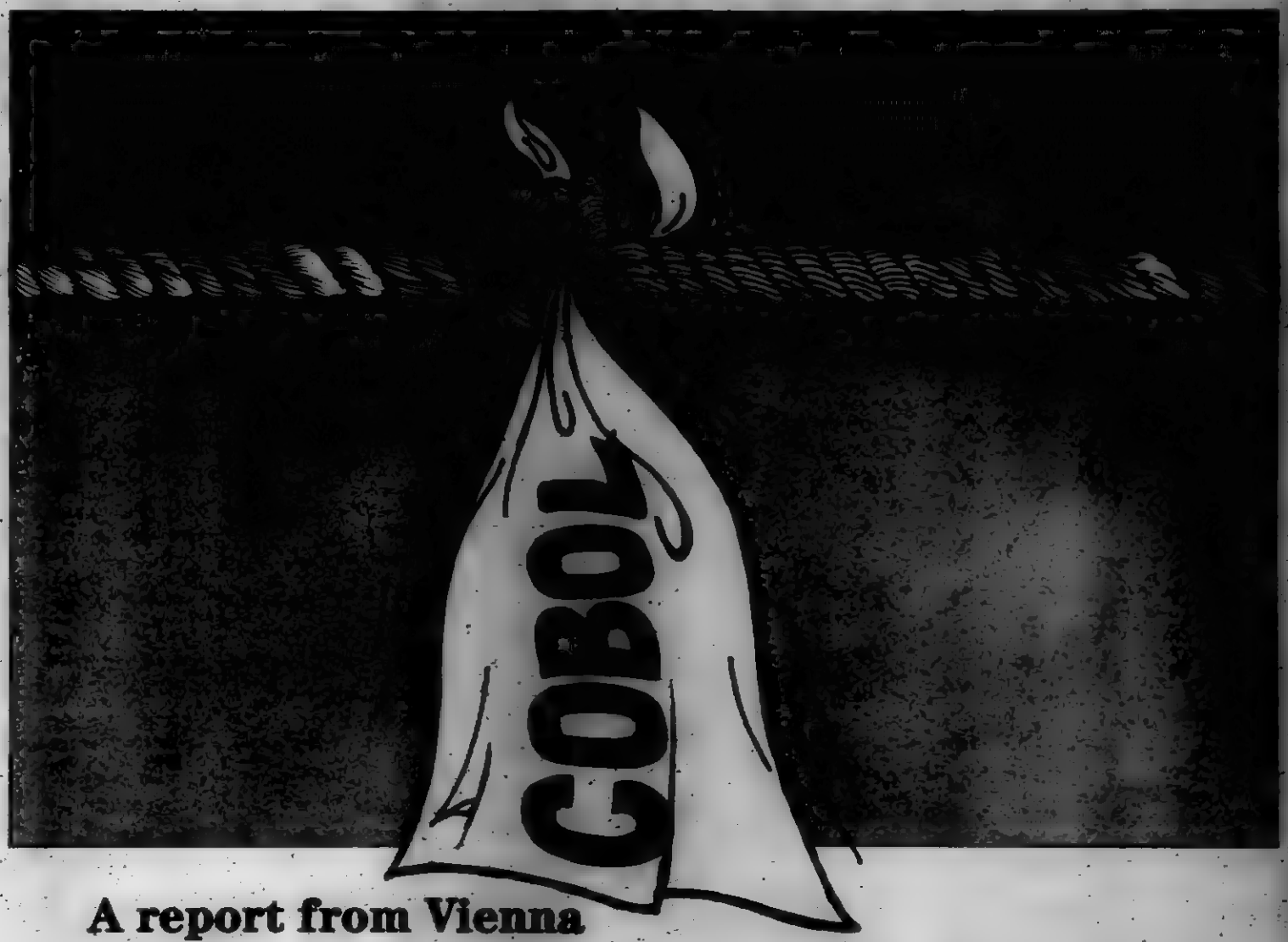
Cullinet Software products are designed to run on IBM 360/370, 30XX or 43XX or plug-compatible computers.

CW 3/12

Software: Cullinet

©1984 Cullinet Software, Inc., 400 Blue Hill Drive, Westwood, MA 02090-2198.

IN DEPTH



A report from Vienna

Which way Cobol?

By Ken Meyer

When the International Standards Organization (ISO) Cobol meeting adjourned Feb. 14 in Vienna, participants were surprised at the agreement achieved.

Two key decisions were made. One was to adopt the current draft standard (and some editorial changes) for Cobol drawn up by Ansi X3J4 and send it on to the parent committee, ISO TC97/SC5, for approval. No more changes to the draft standards! The second was to recommend that the standards development process be divided into two parts: 1) standards maintenance and 2) development of new features aimed at productivity for the programmer.

Twenty-four Cobol experts from the U.S., the UK, Canada, France, Germany, the Netherlands and Austria attended the ISO Technical Committee 97/Standing Committee 5/Working Group 8 meeting held at the Austrian Standards Institute. Japanese and Czechoslovakian groups did not attend, although their comments had been taken up on the second draft DP-ANS 747 at the WG8's predecessor Cobol Experts Group and then by the American National Standards Institute's X3J4 committee.

The Vienna meeting was the Experts Group's

Will ISO standards differ from Ansi?

Would Ansi feel obliged to accept an ISO standard?

sixth but its first as WG8. Mabel Vickers of the National Bureau of Standards is the convener of WG8; Jean Bourgain of CII Honeywell Bull is chairman, and Don Warren of Wang Laboratories, Inc. (also chairman of the Ansi X3J4 Technical Committee) serves as secretary. The U.S. is responsible for making up the draft Ansi specification in the X3J4 committee.

The X3J4 second draft "pink book" was issued for comment by the Computer and Business Equipment Manufacturers Association (Cbema) for X3 in July 1983. The three-month comment period closed Oct. 10. Comments to the draft standard were sent by 923 individuals or firms from six countries.

At its November and January meetings, the Ansi X3J4 Committee processed those comments. Approximately 700 are directly attributable to the work of Joe Brophy of Travelers Insurance Co. of Hartford, Conn. Brophy sent letters to more than 2,000 commenters on the first draft ("blue book"), offering suggested wordings for yes and no comments. Brophy has been concerned with upward compatibility between the last standard, ANS Cobol-1974, and the present draft (pink book), claiming that many features removed to the "obsolete" category and changes to the standard will cost his firm and others millions of dollars. Many firms agreed, sending photocopies of Brophy's letter as comment to Ansi X3J4.

The National Bureau of Standards, on the other hand, had presented to the U.S. government and to all interested parties a cost and benefit analysis for all programs in the federal portfolio showing a net gain.

At the three meetings of Ansi X3J4, changes have been made to the pink book in the "S" and "D" documents. These are recorded in substantive changes (84006) and editorial changes (84007). The response to Cbema comments has been mailed out. Commenters may respond until April 5. A new ballot will be taken of Ansi X3J4 (a third draft standard, if you like) on the changes between April 22 and the next Ansi X3J4 meeting May 21.

At the May 21 meeting, the responses of commenters, the results of the X3J4 letter ballot and the results of the WG8 meeting will be considered. If the results are more than two-thirds in favor, the pink book and the S and D documents will then be returned to X3.

If the X3 Committee is not in favor, an X3 committee will hold a 30-day ballot from June 20 through July 20. Comments will be considered between July 25 and Aug. 8. On Aug. 20, another X3J4 will meet again to review comments. All comments and negative votes will be considered then.

On Sept. 14, standards action will be taken by Ansi X3 and another public review will take place, like the first (blue) and the second (pink) draft, until Nov. 14. At the X3J4 meeting in December, a review of comments on all substantive changes will occur. The American National Standard may be adopted early in 1985 by X3.

International Cobol

A ballot must be held of TC97/SC5 for Cobol to be made an international standard. In the past, the ballot for SC5 has been taken after the standard has been adopted in the U.S. SC5 has solicited the international comments at the same time as X3 in the development of Cobol-8X. SC5 takes its own ballot, and it is conceivable that WG8 may meet to consider its objections after the American standard is set.

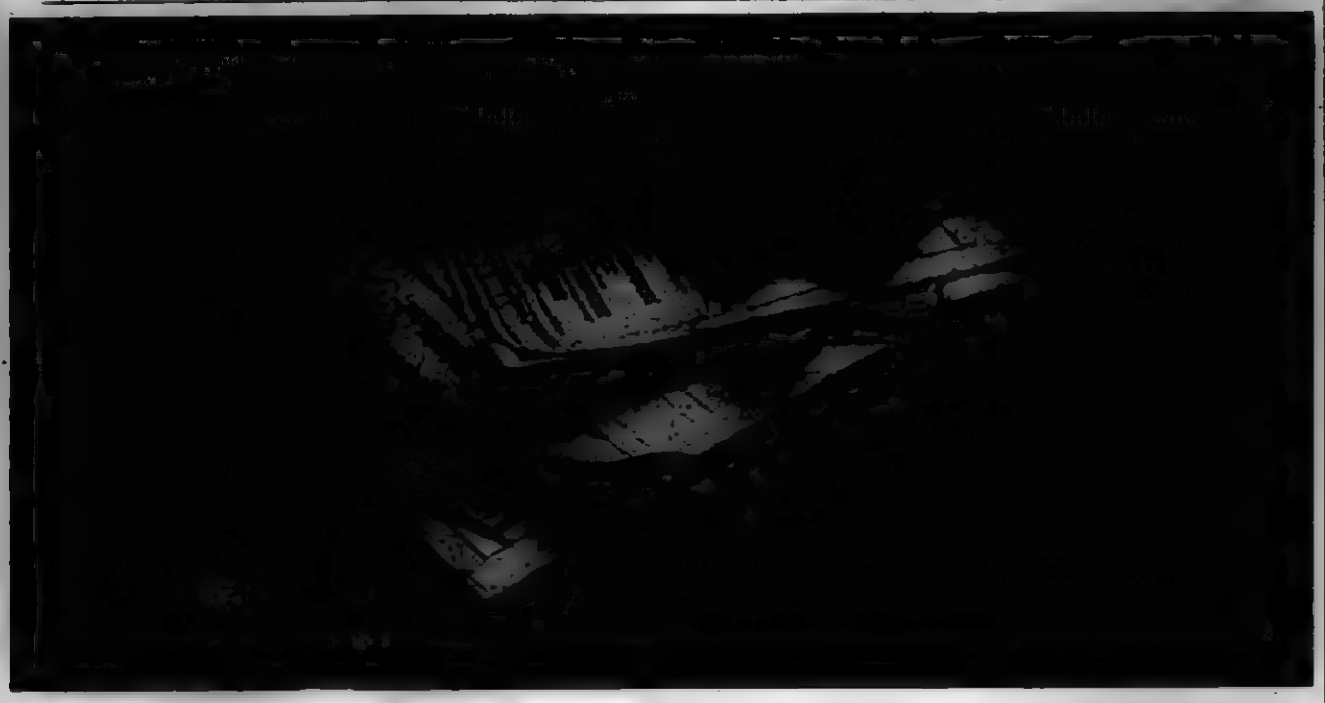
On the other hand, the SC5 committee might adopt the pink book plus S and D changes or the older blue book or (even) the 1974 standard. There is no guarantee that a separate standard might not exist internationally in addition to the ANS Cobol-8X. ISO SC5 is as freely democratic as Ansi X3 in the setting of standards.

If an ISO standard exists for Cobol, would Ansi feel obliged to accept the ISO standard?

Federal information processing standards (Fips) for use by the U.S. government may be chosen from either the ANS Cobol-8X or the ISO standard, if two exist.

Possible delay

There is a possibility of a one-year delay at several



It's time the technology of data collection caught up to the technology of data processing.

The speed of your data processing is limited by the speed of your data collection and input. Unfortunately, for a lot of people, data collection technology stopped with the development of the clipboard.

But MSI has changed all that.

Because MSI portable data collection systems are microprocessor-based answers to multipart forms. They actually extend the power of your central computer by allowing data to be keyed in right in the field. And then transmitted over ordinary phone lines to a host computer or data processing center.

MSI systems eliminate paper shuffling, keypunching, and errors by collecting data at its source. At the same time, we return control to the data processing department, eliminate costly time delays, and match the sophistication of your central system with our equally sophisticated remote system.

Our family of hand-held terminals can be used anywhere there's data to be collected. For salesman order entry, inventory control, financial reporting, manufacturing control, and field data collection tasks of all kinds.

Learn how MSI data collection products can bring your system to the peak of its capabilities. Just return the coupon.

You'll find the technology of data collection is right where you want it.

MSI Data Corporation
340 Fischer Avenue
Costa Mesa, CA 92626

I am interested in:
☐ A sales presentation
☐ Product literature

Name/Title_____
Company_____
Address_____
City_____ State_____ Zip_____
Telephone_____
Computer_____

MSI DATA CORPORATION

The world leader in portable data collection systems.

IN DEPTH/COBOL REPORT FROM VIENNA

stages in the review for ANS Cobol-8X. Wim Ebbinkhuijsen of the Netherlands expressed the concern of the group that the standard would be delayed yet again. With problems of potential disagreement in the CLASS, PERFORM, SYNC and OCCURS . . . DEPENDING clauses, further changes might be made in May.

Comments of WG6 continued, as it was visualized that Joe Brophy might unduly influence the Ansi X3J4 Committee to regress into older and outmoded forms of Cobol, to retain features like the RERUN clause which, when implemented and used, is strictly implementer-defined. The pressure to change the standard mounts to repeat the good work for the sake of upward compatibility.

Of the 923 people commenting on the standard, 58 approved of the second draft. Still there must be a silent majority of perhaps 100,000 people, Jerry Garfunkel said, who are sufficiently satisfied with the pink book not to oppose it. Not to oppose is to abstain and, by implication, agree.

Overwhelming support for the standard exists in the UK and the world, I observed. Mechanisms for changing the standards must be provided that aim at "productivity aids."

The first day of the meeting covered the majority of the agenda, including a vote on each of the substantive changes in the S and D (84007).

Some countries had written substantial comment, like Czechoslovakia, but were absent from the WG6 meeting.

Also covered was the list of comments (with X3J4 answers) from international sources and another from the U.S. to X3J4. Each of the categories was called out with some discussion, questions and clarifications by the group. It is possible that the reconciliation of the comments and answers to comments in these papers will cause X3J4 to reconsider and expand the S and D lists.

Two standards?

The chairman asked whether the group would be in favor of a direction to X3J4 to send the pink book plus the S and D changes to TC97/SC5 immediately. This first of the straw votes on recommendations for a standard passed 12-3. It was obvious that the sentiment of the group was to shorten the time required for completion of the standard.

Another straw vote was taken on directing X3J4 to send the pink book plus any S and D changes made, including the May meeting. This vote, favored by the X3J4 representatives on WG6, tied at 10-10.

A third straw vote, to take the pink book only, failed to receive an affirmative vote.

The WG6 had moved to direct X3J4 to send the pink book plus the S and D documents as of the January X3J4 meeting to TC97/SC5 as the candidate for the Cobol standard. This would be subject to a two-thirds ballot.

As if there was some doubt and because of the tied vote for the May option, the chairman required a clearer resolution. The debate continued. Willy Walz pointed out that new features were required in the language. Now that microprocessors were widely used, a new Cobol standard was required immediately, before the new features were added to the compilers in a nonstandard fashion.

The Canadian Computing Services and Supply representative, N.E. Fowrer,

Of the 923 people commenting on the standard, 58 approved of the second draft. Still there must be a silent majority of perhaps 100,000 people, Jerry Garfunkel said, who are sufficiently satisfied with the pink book not to oppose it. Not to oppose is to abstain and, by implication, agree.

Computer Interruptus

Midnight. And you wish you would be left in the dark. But miles away in the DP Department, a misplaced DD override, an invalid concatenation, or some other equally obscure JCL error brought production to a standstill.

And when the system breaks down, it's you or your staff they call up. Which usually means getting up and getting down there. And after a night like that, how productive will the morning be?

What a waste. If you had the JCLCHECK™ program, you wouldn't have JCL errors, period. None. Zilch. Zero.

Because the JCLCHECK program can catch any and all JCL errors and give you complete, on-line JCL validation and concise error diagnostics. Plus complete documentation on a job stream or entire production system suitable for insertion in the run book. And it can operate under TSO, TONE, ROSCOE or CMS.

Imagine, with no more JCL errors, your programmers can finally concentrate on what you hired them for: writing programs.

So what are you waiting for? Send the coupon or call us at (408) 554-8121 for details. We'll show you how the JCLCHECK program can bring your error detection out of the dark ages, increase production, and eliminate applications backlog. And that'll put you in the spotlight.

I'm frustrated and tired of JCL errors.
☐ Send me details on the JCLCHECK program.
☐ Have a representative call me.
NAME _____
TITLE _____
COMPANY _____
ADDRESS _____
CITY, STATE, ZIP _____
PHONE _____
OPERATING SYSTEM _____

Triangle Software Company
4340 Stevens Creek Blvd., Suite 108
San Jose, CA 95129

© Copyright Triangle Software Company. JCLCHECK is a trademark of Triangle Software Company

urged an early passage of the standard so that work could be carried on by using the Conference on Data Systems Languages (Codasyl) Cobol Committee's *Journal of Development*.

The WG8 was concerned that the abstentions in May would change the proposed standard at X3J4. Chairman Bourgain requested a vote. If the pink book and the S and D as of May 1984 were used, a mail ballot should be taken of members of WG8. If no majority was possible, the pink book would be taken along with the S and D of February. This move succeeded, but not decisively, 9-7 with eight abstentions.

"Failing the ballot, a decision should be made afterwards" was not successful, 4-12 with eight abstentions, because it would not give a firm declaration and might result in delay.

The crucial vote was framed formally by Don Warren that the X3J4 be directed to send N747 (the pink book) with 84006 and 84007 (S and D changes) to TC97/SC5. This resolution passed 14-3 with seven abstentions.

The meaning and implication of the vote were clear. Abstentions, corresponding to X3J4 members, had been "no" votes. A two-thirds vote had been cast for the resolution!

Two standards processes

The group now turned to consider the method of making the standard. Jerome Garfunkel, noted lecturer and educator on Cobol and other languages, had drafted three papers, one of which dealt with a compiler switch that would cause incompatibilities with the new standard without the obsolete category, to be flagged. This had been handled outside WG8 and was noted.

Garfunkel's 83026 dealt with the incompatibility issue and was the lead paper for the discussion of WG8 in the second half of the morning session on the second day.

Addressed to the newly created Ansi/Sparc on Programming Language Systems Group (PLSG), which deals with matters of interlanguage relations, it is, like the WG8, a liaison group. It will study the issues to identify new features such as screen handling across all languages.

Garfunkel wrote that the standards process is divided into two parts:

1) New developments that arise and enhance the language, like the EVALUATE verb and the scope terminators (END-IF).

2) Revision to existing standards to reduce ambiguities, eliminate unused or archaic clauses and to codify practice.

If the standards community can identify new developments and separate these from the revisions, the standards cycle can be sped up from its current five to 11 years. New developments have less controversy in their debate. Therefore, the validate facility [CW, Nov. 7], screen management and data base could be sped in their incorporation into a new standard.

At the same time, the "fixing-up" procedure can proceed, at its own pace, to reduce ambiguities, inconsistencies and dead wood.

How did the procedure develop to publish a separate data base addendum to the Cobol standard? Mabel Vickers answered that the charter of the group from TC97 had included this point specifically. Otherwise, X3J4 would have had to wait for completion of work by X3H2.

There is no provision at present for any supplementary or developmental standards at a different cycle other than the five-year maximum.

'Cobol family of languages'

Garfunkel continued to explain his paper (see letter to *Computerworld*, Nov. 28). Productivity aids are required within a "Cobol family of languages" in which modules are created to deal specifically with new problems. He stopped short of the theme that Cobol should be permitted to evolve into a fourth-generation language. Everyone knew that he had this in mind.

I called for productivity aids which are necessary to meet current needs: validate, intrinsic functions, screen management and report writer enhancements.

These modules could be completed in less than five years by the Codasyl Cobol Committee, as their specified responsibility is for language development.

The only possible incompatibility that could arise is in the new "reserved words." This incompatibility could be solved with a REPLACE statement as a compiler directive.

Wim Ebbinkhuijsen reminded the group that Ansi is required to work on a new standard at least every five years. ISO could perhaps support such a development.

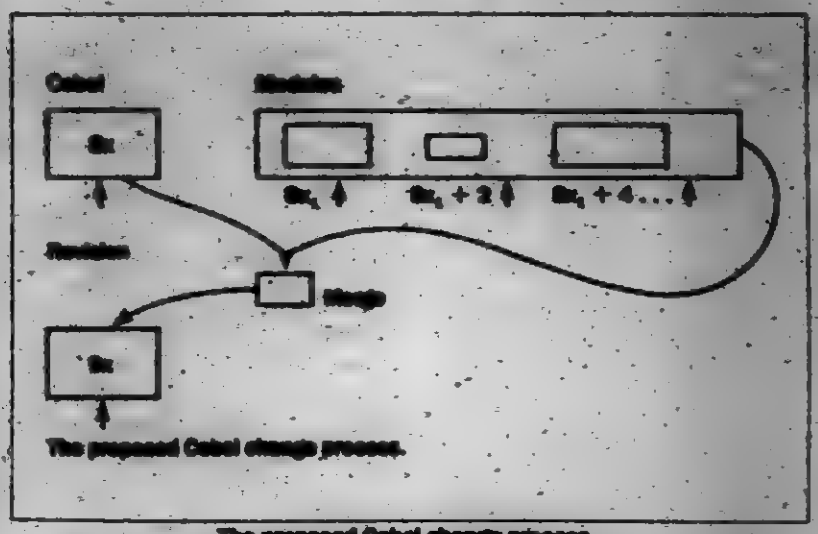
Weiss added that the change could indicate which optional modules would be included.

Bourgain thought that producing a model every several years was worrisome and that it was best to keep the old cycle and stick to a compatible revision. Others shared this view.

Garfunkel replied that a smaller subset should form the NUCleus of the language, including SEGmentation and LIBrary. Report writer and communication should comprise a separate module.

Alan Fryer of Micro-Focus, the principal supplier of microprocessor Cobol, expressed some alarm at the possibility of separate modules, standards or committees. His firm has passed testing procedures for ANS-74 and has now moved to support productivity aids for users.

In the matter of establishing separate standards and addendums, questions arose about how much the orig-



The proposed Cobol change process

inal charter of WG8 included. The WG8 is a liaison group, and X3J4 is the draft language standard group.

At any rate, the question of to whom any resolution should be addressed could not be reconciled.

Weiss continued to question the structure of a newly formatted language. New modules should be created compatible with the 8X standard, but the division between modules was important, too. If the validate facility were put in the NUCleus, then it would become mandatory and not a separate feature. All modules should be based on the Codasyl Cobol Committee placement.

The standard needs to be driven by Codasyl and without a specified time. Two years may turn out to be reasonable.

Jeanette Peters of IOL said that her organization had compiler writers who had many ideas, some of which the customers would not want implemented. A number of communitive ideas garnered many modal hits other facilities like dictionaries and utilities.

Two processes

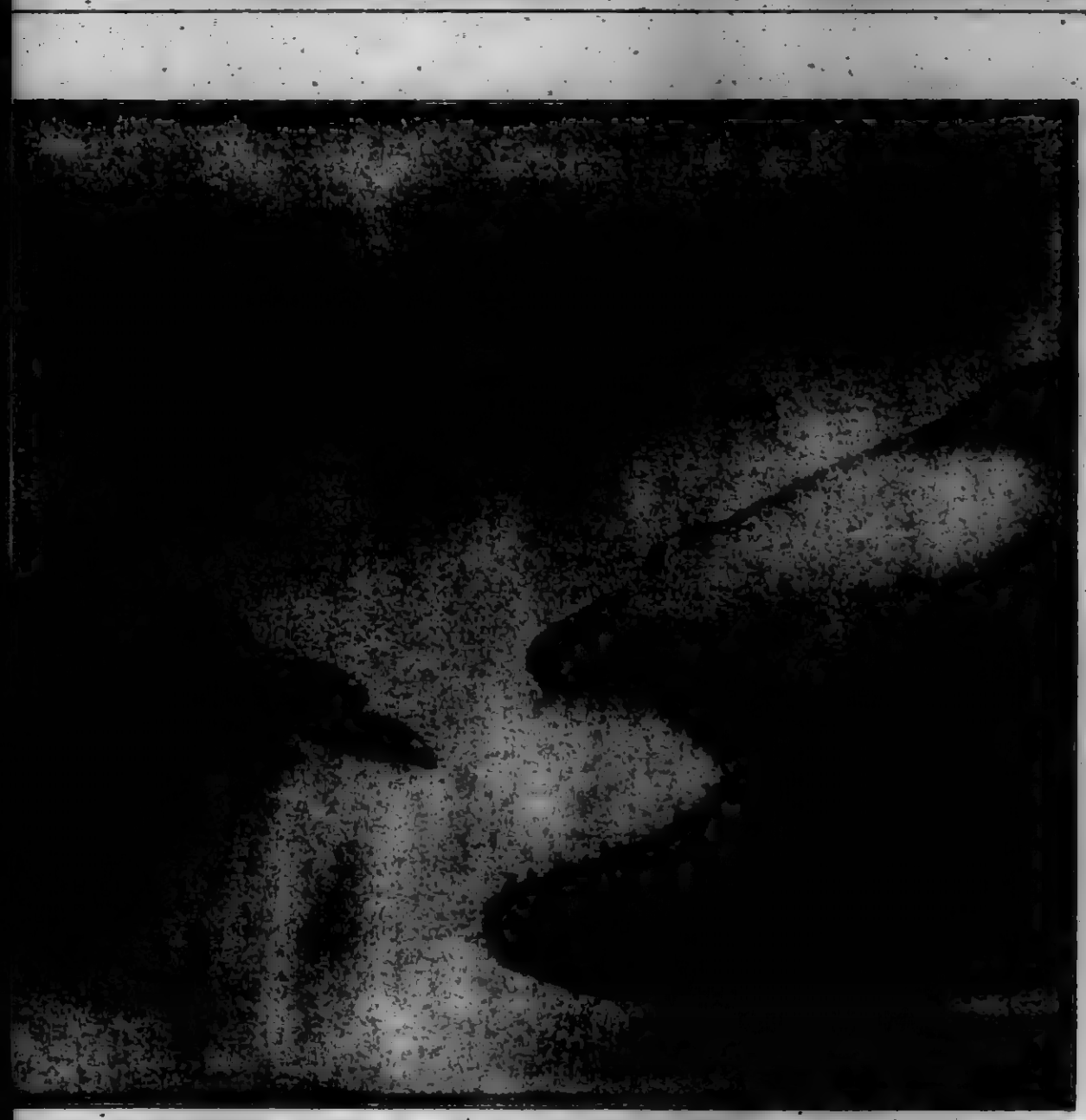
Don Warren said that the scope of changes was too large, but that a couple of features could take less time, in fixed cycles, say, Cobol-84, Cobol-87 and so on.

Weiss and Garfunkel collaborated to draw the diagram at left. Repairs to the standard are to continue at the same time as modules are created. All modules must be upward-compatible with each other and the base standard. When repairs have been completed, a final merge takes place into a new comprehensive standard, say, Cobol 9X.

Some objections were raised to the specification of detailed workings of the language revision process, but I insisted that "if this is a historic meeting, the guidelines should be written now." It was possible that other interpretations could come from any resolution.

The group proceeded to discuss some cases that might occur in the development process. All modules should be in accordance with the previous standard and modules. The update in '88 should include '86 and serve to increase the capability of the language.

Two matters of concern were reserved words and picture-character-symbols, two fundamental parts of



SCHOOL OF THOUGHT

software compatibility. And price/performance that outdoes any micro, mini, or mainframe you can think of.

What's the operating system? That's your decision. You can have our own MCS, or the industry standard UNIX®. And we give you all the mainframe language compilers you could ask for. Nine of them, altogether.

So if you're ready to head in a direction that really makes sense, get in touch with us for complete information.

Wicat Systems, P.O. Box 539, 1875 South State, Orem, UT 84057. (801) 224-6400.

We'll show you how a grown-down mainframe can take on a full-size workload. Without being swallowed alive.

WICATsystems™

The grown-down mainframe.

UNIX is a registered trademark of AT&T Information

Up to your ears in SYSOUT?

Send for SAR

Sysout Archival & Retrieval

Tired of printing, filing, and searching for system output?

Don't despair! SAR is here to ease your frustrations.

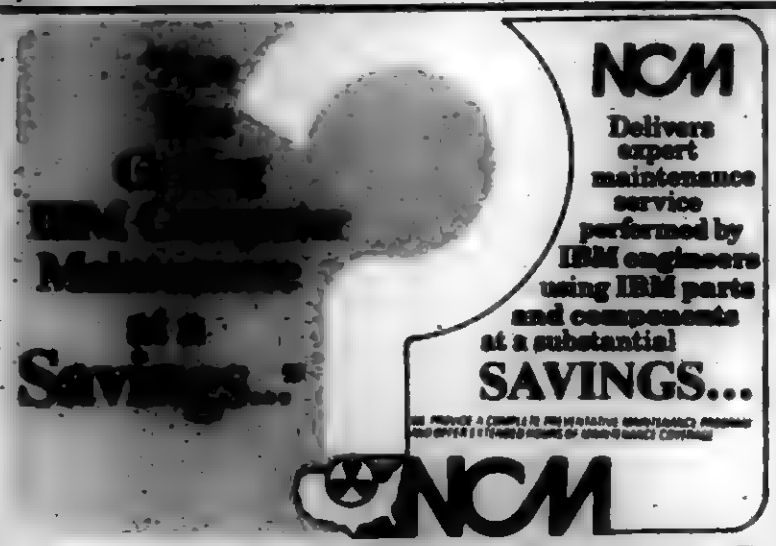
SAR enables you to archive SYSOUT and retrieve it on-line. You can browse on demand, and print only the records and reports that are needed. It ends forever the tedious, time-consuming tasks of printing, filing and searching.

Typical user comments: "Eliminated daily printing of SYSOUT which was costing us $60 a day"—"Remote users can have job status in minutes not hours"—"Eliminated overnighting"—"Eliminated a dedicated RJE station"—"Installation was quick and easy"—"SAR paid for itself in 2 months"—"I do not know why any MIS shops would not buy SAR"—"Got immediate printout when production jobs abend, or have other problems"—"Support has been excellent."

SAR is available for free trial and evaluation. Contact JCA today for literature.

SOFTWARE SUPPORT Inc.

2100 Dupont Drive
Suite 205
Irvine CA 92715
(714) 851-2143



IN DEPTH/COBOL REPORT FROM VIENNA

the language.

Procedurally, a mechanism could be described and sent to SC5 by X3J4, asking for a change in the bylaws. SC5 would then enable X3J4 in its charter to include a working item (a requirements SD). The basic idea would be worked out at WG5 and forwarded, perhaps to WG16, as a concept for solution.

Jeanette Peters of ICL proposed that Garfunkel's paper be forwarded to SC5 for assignment to WG16. This motion passed 19-0 with four abstentions.

This represented clear-cut support for the paper. Garfunkel drafted a resolution with Meyer, Abe Lange of the Netherlands Defense Ministry and Georges Lewin of France's Bindi.

The resolution to be forwarded to SC5 and to X3J4 was that, after the conclusion of the work on Cobol 8x, the language should be broken into two distinct processes. One, the revision process, should continue as at present with an interval of approximately 10 years for issuance of a long-term standard.

Second, that at approximately two-year intervals (8x+2, 8x+4),

The consideration and improvement of languages is far from dull, populated with people with good ideas, stamina and judgment.

modules aimed at specified topics or features and compatible with the base standard and previously passed modules should be published.

This motion passed 16-3 with four abstentions. It was clear that the current mood of the WG5 was not only to accelerate the current standard, but to create an environment that would encourage good standards in the future in two modes: Let the present method remain to clear out obsolete items, pare the language, look for faults and possible ambiguities and argue over interpretations of the workings of the generated code.

Let there also be a means for helping programmers and management alike to reduce the time necessary to produce programs by expanding the language to meet specific needs and problems, as in the validation facility or screen management. Work should proceed toward perfecting and expanding existing features to meet competing products in the marketplace like Visicorp's Visicalc by improving the report writer feature. The conceptual base should be improved by providing intrinsic and precoded functions.

Tomorrow, graphics must be considered. The interface to data dictionaries must be recognized. The update and analyze feature could remove the OPEN and CLOSE statements. For a trial period, verbs may be allowed for clustering local abbreviations through a Cobol macro generator facility, perhaps following another UK development, the British Computer Society's Cobol Language Extension Facility (Clef) from University of Manchester Institute of Science and Technology (Umist).

The consideration and improvement of languages is far from dull, populated with people with good ideas, stamina, judgment and persistence. If several standards emerge (Ansi vs. ISO) and new processes of making standards are recognized in separating the old from the new, the result will represent the frustrations, hope and trust of an international community dedicated to a sound, workable language, Cobol.

About the author

Ken Meyer has been active in data processing since 1955 with Pure Oil (now Union Oil), Creole Petroleum (Exxo) in Venezuela, Control Data Corp. and British Gas. He now consults, writes and lectures in the UK.

Meyer serves on the ISO Cobol working group (WG5) and belongs to the Association for Computing Machinery and British Computer Society. He strongly favors the recommendations of WG5.

You Can Read Some of the Dumps... Some of the Time...

In the past, programmers had to slave over monumental stacks of paper to resolve abends.

Trying to convert hexadecimal numbers like four score and seven or debating over where the abend occured was as tough as splitting logs.

But then was brought forth a new notion — Abend-AID. It was a great moment in dump history. Programmers were emancipated as the drudgery of solving abends was abolished. They were free to devote their time to more productive tasks.

Abend-AID transfers the burden of debugging from the programmer to the computer. Abend-AID output shows What Happened, When it Happened, Where it Happened and supplies the necessary supporting data in an easy-to-use format that can almost fit on the back of an envelope (10-12 pages, in English).

Abend-AID is available for both IBM OS and DOS installations. Listed below are unique Abend-AID options for your specific needs.

☐ **Abend-AID/COBOL** — The first practical source level debugging tool.

☐ **Abend-AID/SPF** — 80 column "easy-to-use" viewing capability which permits programmers to interactively debug abends at their terminals.

☐ **Abend-AID/ONLINE** — 80 column CRT output for easy viewing.

☐ **Abend-AID/DOS/DLI & Abend-AID/OS/IMS** — Features special diagnostic routines for IBM's data base systems.

Free Abend-AID Product Evaluation.

For additional product information, or to arrange for your 30-day FREE evaluation of Abend-AID, just give us a call at 800-521-9353 (in Canada or Michigan, 313-540-0400), or clip your business card to this ad and mail it to: Compuware, Systems Software Division, 32100 Telegraph Road, Birmingham, Michigan 48010.

Abend-AID. The civil way to address program abends and cancels.

4id

COMPUWARE
SYSTEMS SOFTWARE THAT MAKES SENSE

Compuware Headquarters
32100 Telegraph Road
Birmingham, Michigan 48010
(313) 540-0400

International Offices: New South Wales, AUSTRALIA Phone: (61-2) 816-1177 / Luton, Bedfordshire, UNITED KINGDOM Phone: (44-582) 28-463 / Paris, FRANCE Phone: (33-1) 247-1341 / Herzlya, ISRAEL Phone: (972-52) 56952 / Milano, ITALIA Phone: (39-2) 345-2211 / Tokyo, JAPAN Phone: (81-3) 479-1600 / OSLO, NORGE Phone: (47-2) 56-2070 / Bryanston, SOUTH AFRICA Phone: (27-11) 706-5600 / Hamburg, DEUTSCHLAND Phone (49-40) 29-3251.

IN DEPTH

On-line transaction processing

By Waguih Boctor and Kenneth I. Cohen

Item: Major financial institutions are turning away from batch-oriented data processing.

Problem: Most "mainline" financial applications are large, batch operations; isolated satellite minis provide on-line services for specific applications. At night, the results of the on-line applications are memo-posted to the "real" batch system data bases.

Solution: Reverse the emphasis: Batch becomes the secondary satellite process. When mainline operations are put on-line, the batch applications that remain (for example, bulk proof and transit) will operate on satellite batch machines.

Item: Large manufacturing and distribution companies are abandoning the paper-bound batch systems they've grown up with.

Problem: Customers order and complain in "real time," workers work in real time, and carrying costs of inventories and other assets accrue in real time. More and more, batch processing handles just daily, weekly or monthly reports.

Solution: Controlling costs, boosting responsiveness and managing more effectively can be achieved by on-line data bases. All operational and management staff can use the same up-to-date information, and the systems can be proactive tools of doing business, not reactive reporting burdens.

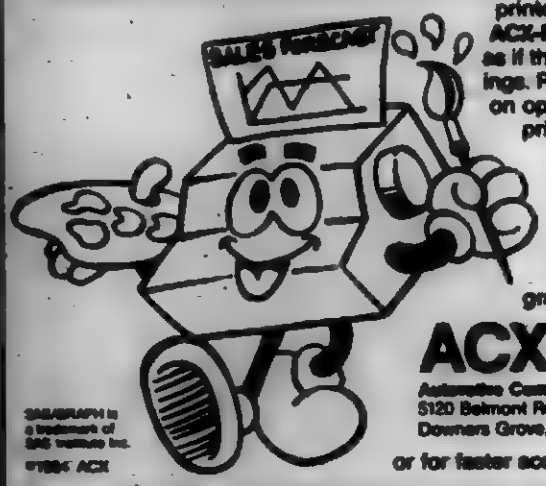
Item: Government agencies are under pressure to control costs, eliminate waste and fraud and provide improved services.

Problem: State programs implemented at the

VM/SP Graphics Users

Tired of playing roulette with your graphics environment?

SAS/GRAPH® and GDDM users can now spool and manage graphic printouts through the ACX-PM™ Printer Manager as if they were normal listings. Remove dependence on operators, decrease printer contention, and increase user control. ACX-PM supports 3287 graphic printers for both text and graphic printing.



ACX®

Automotive Computer Extensions, Inc.
5120 Belmont Road, Suite 9
Downers Grove, Illinois 60515

or for faster access, (312) 971-1505.

SAS/GRAPH is a trademark of SAS Institute Inc.
©1984 ACX

county level are rife with abuses: Individuals drive from county to county picking up checks or get eliminated from a program in one county and simply file for benefits in a neighboring one. Systems are either manual or uncoordinated between jurisdictions. By the time abuses are discovered, much money has been lost.

Solution: Needed are on-line data bases with shared accessibility to accurate and timely data. And if the legislature or oversight agencies require summary batch fiscal data, they will periodically roll up the numbers from the on-line data base.

Item: The complexity of national defense and the volatility of world developments require more responsiveness by the military and intelligence agencies than ever before.

Problem: Coordination and deployment of military personnel and materiel through batch-oriented logistics systems make rapid and sustained deployment a nightmare. The information in the reports used for decision making reflects a snapshot of the past, not current reality.

Solution: The military services are looking for instantly available information, updated as things happen and available as needed. The solution is on-line data bases with broad but secure accessibility from all points in the command.

Enter transaction processing

Whether the user is a bank president, a warehouse picker, a social worker or a lieutenant, the requirements for shared, on-line use of a large data base present a similar set of challenges to the data processing community: the creation, maintenance and operation of on-line transaction processing application systems.

Imagine writing such an application as if it were single-threaded. Imagine never coding explicit checkpoints, error recovery, data base deadlock prevention, fault tolerance or data base integrity scenarios. And imagine not having to consider system tuning and terminal load balancing in your design. Finally, imagine all the above, plus a high-performance relational data base management system (DBMS). By taking user requirements and translating them into system requirements, it is possible to define an on-line transaction design model that accelerates development of on-line systems.

In its simplest form, transaction processing is the use of a large data base by a large, on-line user community. On-line transaction processing can be differentiated from older on-line inquiry systems by the requirement for simultaneous on-line retrievals *and* updates to a data base.

The successful implementation of these transaction processing applications implies that every business decision can be predicated upon the most recent transactions. Clearly, the motivation for increased use of on-line transaction processing systems lies in the powerful management and operational capabilities.

Definition: the transaction

The term "transaction" is used in different ways throughout the business and data processing communities:

- **Work units** — People frequently refer to a transaction as consisting of all the work needed to perform a unit of work in the application. Some examples of this definition might be "entering a customer order" or "creating a new employee in the personnel system."

  Note that many terminal interactions and data base updates are generally involved in such user-level work units, what we refer to as "application units."

- **Messages** — Since on-line transaction processing systems are dialogue-oriented, a user's request-response interaction with the system is frequently called a transaction. We will refer to such user conversations as "message pairs" in this discussion.

- **Data base transaction** — The activity in this type of system results in the transition of an integrated data base from one consistent state to another. This issue of data

CUT YOUR COBOL TEST AND DEBUG TIME... AND YOUR COST!

XPF/COBOL is the first full-screen, interactive, SPF-like debugging tool on the market. It delivers a complete window into COBOL programs.

XPF/COBOL enables the user to:
- Watch the programs execute—forward or backward.
- Find and change COBOL data in COBOL format.
- Debug IMS programs.

XPF/COBOL:
- Slashes test and debug time.
- Increases programmer productivity.
- Is easy to learn and easy to use.

XPF/COBOL can pay for itself in months.

Call your nearest Boole & Babbage sales office below, or send in the coupon for complete information and user references.

Send me information on XPF/COBOL.

Name_____
Title_____
Company_____
Address_____
_____

Send to:
Boole & Babbage
510 Oakmead Pkwy.
Sunnyvale, CA
94086

Boole & Babbage
The Information Resource Management Company

Los Angeles, CA (213) 642-7580
Sunnyvale, CA (408) 773-8811
Atlanta, GA (404) 395-1264
Chicago, IL (312) 629-8910
St. Louis, MO (314) 434-5100
Englewood Cliffs, NJ (201) 461-6006
Dallas, TX (214) 385-8076
McLean, VA (703) 448-9194

WHEN IT COMES TO SOLVING BUSINESS PROBLEMS, ONE COMPANY IS A MILLENNIUM AHEAD.

Although we'd all like our business problems to fit into neat little compartments, they never seem to want to go there. Take a simple general ledger variance in your New York office. For some strange reason, it connects to a large office supplies transaction in London, which really turns out to be an erroneous distribution of a capital equipment expenditure to Peoria through your accounts payable system.

A business person can only unravel such mysteries by opening his or her mind and following the trail wherever it leads. Using business software to help.

But is your software giving you the help you really need?

Several years ago, a team of McCormack & Dodge researchers uncovered a remarkable paradox:

Business problems don't fit into compartments. Yet even the most sophisticated software packages operate on the principle of compartmentalization. In the very same vendor product line, you find general ledger packages designed one way, accounts payable another, fixed assets yet another. In actual use, these separate designs become separate walls. Barriers to problem-solving.

Even though your mind wants to move freely from one system to another, roadblocks hold you back.

Because McCormack & Dodge researchers identified this paradox first, we are years ahead of the industry in overcoming it. Our Millennium series is designed and built, from the ground up, as a genuinely borderless product line. A true family of systems in which the whole works as smoothly as any part, making the most efficient use of all your data processing resources.

With Millennium, and only with Millennium, a business person asking a question in one system can instantly enter a correction in another, seek an answer in a third, update a fourth—and move with total freedom through the entire vast information universe.

When it comes to solving business problems, McCormack & Dodge is a Millennium ahead. Shouldn't you be too?

WHEN YOU THINK ABOUT TOMORROW, MILLENNIUM MAKES SENSE TODAY.

McCormack & Dodge

a company of

McCormack and Dodge Corporation, 1225 Worcester Road, Natick, MA 01760.
Sales and support offices throughout North and South America, Europe, Asia, Australia and Africa. 800-343-0325. Telex: 710-325-0329

base transitions and internal consistency is both the objective of on-line transaction processing and critical to maintaining the data integrity required in all applications.

In our discussion, we will use this concept of the data base transaction as the definition of a transaction. This definition is appropriate because of the data base orientation of on-line transaction processing applications.

Data base consistency

Data base consistency requires that multiple data base updates be treated as an atomic unit. This unit is called a transaction. The concept of data base consistency is rooted in double-entry accounting, which requires that any change in one part of the "books" must have one or more offsetting entries in another part. For example, when a customer pays a bill, several updates must be made: The cash file must reflect the payment, and the accounts receivable file must be adjusted to reflect the customer's reduction of his debt.

In on-line transaction processing applications, the dozens, hundreds or thousands of individuals at their terminals directly generate system work load. This situation stands in contrast to batch systems, where the data center staff provides a gating function for work arriving at the system.

In a data base application, this change requires that at least two files be updated. Physically, there are at least two update activities, and a broad range of failures can intercede between the two.

Data base integrity requires, however, that the system use *some* technique to ensure that only complete sets of updates are made permanent. In the event that completion of all updates in a transaction is not possible (let's say that a power failure or disk head crash intervenes), the integrity mechanisms of the DBMS must ensure that updates of uncompleted transactions are backed out of the data base. Through these mechanisms, the "books" will never be out of balance.

Application characteristics

A complex of user needs defines the application implementer's challenge in creating on-line transaction processing systems. In addition to application-specific needs, there is a generic set of requirements that such systems must fulfill. Note that all of these needs must be fulfilled by the finished application system.

The issue of system software models and facilities is very relevant here. If the system software doesn't do them, then they become the responsibility of the application software and the application programmer.

In on-line transaction processing applications, the dozens, hundreds or thousands of individuals at their terminals directly generate system work load. This situation stands in contrast to batch systems, where the data center staff provides a gating function for work arriving at the system.

The implications of user-driven work load are that:

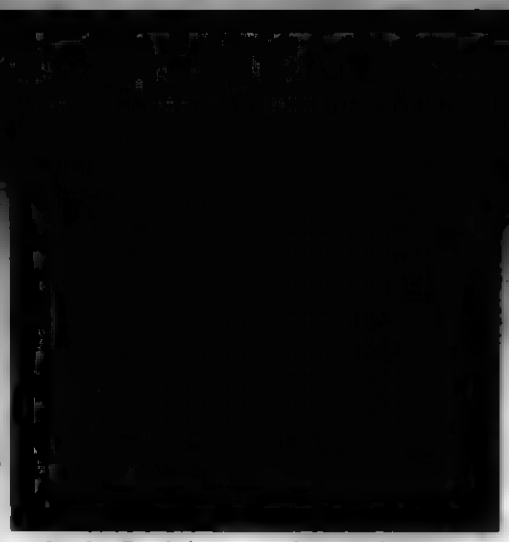
- At any time of day, users expect a consistent, fast response to their requests.
- Random message arrivals result in statistical queuing effects on the system that place instantaneously enormous demands on system resources.
- There are no "make-up" shifts for work that could not be finished during normal system hours. System outage results in an unacceptable loss of real-time transactions. To avoid this situation, either manual backup systems must be maintained or (preferably) the system must provide continuous availability and on-line backup capability.
- User work can't be rerun. Whereas a batch run that fails can be rerun using the original inputs, on-line transaction processing inputs are from sources who may not be around to re-input their messages. For example, once an automatic teller machine customer leaves the kiosk with money in hand, he won't return to repeat his transaction for the benefit of system recovery. This situation results in the need for a recovery facility that ensures that all completed transactions are permanently reflected in the data base and that work in process can be recovered and continued after a disruption of service.

Data accuracy

It is important that operator errors be caught early in the system so that contaminated data doesn't reach the data base. Thorough and efficient data validation facilities are essential. While validation can always be performed at the application program level, it is far more desirable to have the front-end system software perform the validations to minimize overhead and decrease programming effort.

Another contribution to improving the validation capabilities of on-line transaction processing systems is the presence of an active data dictionary in which standard validation definitions for all data types in the system are cataloged. The

PICK UP WHERE IBM LEAVES OFF.



Portable or desktop, you're way ahead when you pick up CORONA PC™ Because we give you everything you've ever wanted in an IBM[1]-compatible PC and more. For a great deal less.

COMPATIBLE AND MORE.

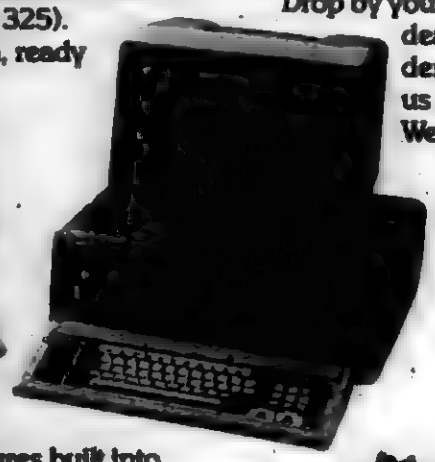
Our systems run all software that conforms to IBM PC programming standards. And the most popular software does.

We deliver twice the memory, with room for eight times as much.

We deliver a fast-access 320K floppy drive, a communication port and an improved IBM PC keyboard with indicator lights.

Our systems include high-resolution monitors (12" desktop, 9" portable) for crisper, cleaner displays, and both have built-in high-resolution graphics (640 x 325).

You get a complete system, ready to go to work.



MORE VERSATILITY.

With all the necessary features built into the main unit, the four expansion slots can be used for your special needs. For example, color or our optional 10MB hard disk.

software gives you temporary disk-type storage that works many times faster than disks.

PLUS SOFTWARE.

Our systems come with the operating system: MS-DOS.[2] A programming language: GW BASIC.[2] A training course: PC Tutor.[3] A professional word processor: MultiMate.[4] Plus DOS utilities and demonstration programs. Or you can get the p-System[5] from N.C.I. and write or run portable Pascal packages.

ALL FOR A GREAT DEAL LESS.

Even with all the extra features and performance, our systems still cost significantly less than the equivalent IBM PC.

Drop by your nearest CORONA PC dealer for a very convincing demonstration. Or contact us at 31324 Via Colinas, Westlake Village, CA 91361. (213) 991-1144 or (800) 621-6746 toll-free. Telex 658212 WSLK, in Europe 76066 CDS NL.

©Corona Data Systems 1983. 1. TM International Business Machines. 2. TM Microsoft. 3. TM Comprehensive Software Support. 4. TM Software Systems. 5. TM University of California.

corona™ data systems, inc.

Now Wang gives you office automation on a platter.

Introducing Wang Office.

It's the kind of comprehensive office software and communications package only Wang could put together.

Because only Wang can bring you the most advanced electronic mail. Only Wang can bring you the newest in time and task-management. Only Wang can bring you the industry's best word processing.

And only Wang can put all of this together with the world's most advanced communications in one flexible package—easy to put in place and virtually transparent to the user.

With Wang Office you can not only process information, you can send it to, or retrieve it from, any office, anywhere in the world. Instantly. Wang Office.

Thirty years of commitment, innovation and technology.

Yours.

On a platter.

For more information on Wang Office, call 1-800-225-9264. Or write to: Wang Laboratories, Inc., Business Executive Center, One Industrial Avenue, Lowell, MA 01851.

WANG

The Office Automation Computer People.

© 1984 Wang Laboratories, Inc.

dictionary can be efficiently accessed as needed by the system and application software.

As discussed above, data base accuracy and consistency are mandatory, regardless of the nature of the application. The software required to preserve data integrity is extremely complex and places undue demands on programmers when implemented at the application level. A critical consideration in the development of an on-line transaction processing model is the automation of data integrity at the system software level.

High system availability

End users become increasingly dependent on on-line transaction processing. If the system is unavailable, the ramifications are pervasive.

Increasingly, though, the need for availability is being addressed through truly fault-tolerant systems, which can recover rapidly from any failure.

Moreover, the extra hardware required for fault tolerance generally contributes to performance during "normal" production.

Successful on-line systems grow in both work volume and application diversity. It is thus important that the system be compatibly expandable without disruption of existing applications.

Long 'think' times

With on-line transaction processing applications, users have long think times; in other words, their messages are separated by long periods of reading the last response, thinking about their next message and keying the input. Once a message is transmitted, however, the user expects a response in, at most, a few seconds. To provide high throughput for a large user community, it is vital that the on-line transaction processing model recognize this characteristic.

Even the most on-line of application systems includes a portion of activity that is inappropriate to the on-line work mode. On the one hand, classical batch work loads are created by the on-line system; on the other, on-line activities can spin off batch jobs for background processing. Once the background job has been submitted, the terminal user can continue with interactive work and expect to be notified on completion of the background activity. Typical examples of such asynchronous transactions are auditing and printing functions, which do not always need to hold up the interactive terminal while they are in progress.

The sensitivity of on-line transaction processing applications requires that the data base be secure from unauthorized use and that users be protected from one another's accidental or deliberate attempts to trespass on another's territory. It is thus crucial that the system software provide a protected environment for the data base and the user community. The security and protection facilities must not only yield a controlled environment but also provide a *controllable* environment. This need translates into a security/protection system that is auditable and easily administered by suitably privileged users.

Successful on-line systems grow in both work volume and application diversity. It is important that the system be compatibly expandable without disruption of existing applications.

Often, development and testing will proceed on the same system being used for production applications. Both environments must therefore be concurrently supported with strict controls to prohibit interactions between them.

Model requirements

Translating user needs into system-level requirements results in the following requirements for on-line transaction processing systems:

1. Total integrity and consistency of the data base must be preserved.
2. Many small execution units are generated by many users. Each request is small, but the aggregate of requests is large.
3. Resources must be equitably distributed among users. The motto might be "the greatest good for the greatest number." This goal boils down to a *throughput* objective, rather than individual *response-time* objectives. In fact, consistent response at a particular level is more important than the measured response time for any selected user.
4. The data base and the application must be continuously available to the user community.
5. The user interface must be dialogue-oriented, in which the users conduct screen conversations with the system.
6. Because successful on-line systems always grow, the extensibility and maintainability of the application are vital.

Functional requirements

Having analyzed the typical on-line transaction processing application characteristics and derived the general features of the system, we now attempt to translate these features into more detailed functional requirements, which a system model must be capable of fulfilling.

1. The model must take advantage of the long think time typical of these applications and minimize the amount of machine resources being used by such "thinking" users so

ELECTRONIC MAIL UNDER CICS

Streamline Communications
Reduce WATS, Fax, Telex
and Express Mail Charges

Some of the major features of SYSM® include:
- Easy to use
- 327X/328X support
- Dial-up TTY support
- Simple commands
- Menu driven
- In/out baskets
- Broadcast to groups
- Forward with comments
- Full security
- DOS, VS1, MVS, CICS

Here's two good reasons why you should call today:
- 30-day free trial
- Site license
  $12,000 DOS
  $14,000 OS

CALL:
(208) 377-0336

H&W™
COMPUTER SYSTEMS, INC.

H&W Computer Systems, Inc. P.O. Box 4785, Boise, Idaho 83711-4785

CICS Solutions

How To Implement The Best New PC Decision Support Software With A Pair Of Scissors.

YES. Tell me more about The New Context MBA and The Corporate MBA.
☐ Have a Context representative call me.

Name _____

Title _____ Company _____

Address _____

City _____ State _____ Zip _____

Area Code _____ Phone Number _____

SEND TO: Context Management Systems, 23868 Hawthorne Blvd., Torrance, CA 90505.
Or call us at 1-800-637-1515 (In CA, call 1-800-552-2537)

Now it's easy to select the right decision-support software for the PC users in your company.

The New Context MBA™ and The Corporate MBA™ both have all the functions PC users in your company need: Spreadsheet, Business Graphics, Database, Word Processing, Telecommunications, and Forms Creation.

They're all *integrated* in one software package. With advantages that'll make your life a whole lot easier.

Like full 3270 emulation. So *you* can connect their PCs to your Data Center network. For immediate, yet controlled, access to decision data. No more hand-holding or custom programming.

PC users in your company get the decision-support capability they need from a single, easy-to-learn package. And you get an easy way to plug one PC software package into the entire company.

Our Context 500™ support team builds a custom training and ongoing support program for your company, so *you* don't have to.

Now *your* job of supporting *our* software is as easy as picking up the phone.

So make it easy on yourself. Cut out, fill in, and send us this coupon. And cut out a lot of heartburn over which of many PC software packages to choose.

Now where did you put those scissors?

Context
MANAGEMENT SYSTEMS
Personal Computer Software For Business Decisions.

The New Context MBA, The Corporate MBA, True Data Integration, Data Exchange Facility and Context 500 are trademarks of Context Management Systems, Inc.
©Context Management Systems, Inc. 1984.

that large instantaneous quantities of resources can be devoted to providing response to the other "waiting" users. The system can thus multiplex large numbers of users on the finite set of available resources (CPU, memory, I/O channels and so on), thereby minimizing queuing and other traditional bottleneck problems that are typical of the on-line environment and could quickly become the limiting factor in how well a system can perform.

2. The model must support a comprehensive and user-transparent recovery mechanism, guaranteeing that no data already committed to the data base will be lost and that application state can be completely recovered and restarted after a system failure. This support must be optimized to reduce the amount of time the entire application system, and not just the CPU, is unavailable to users. The direct benefit is to relieve application designers and programmers from having to worry about explicit checkpointing and so on.

3. The model should eliminate the need for any application code to perform data base concurrency control and deadlock prevention. The model should also eliminate, or at least reduce, the amount of application code needed to perform validation of input data from the application user, as well as validation of the data being stored in the data base.

4. The model should provide extensive system security at several levels. User access to the system must be checked and validated at log-in time. Further access to the system facilities must be confined to that set which has been designated as accessible to them by the installation manager. In addition, all processing done by the system on behalf of a user must be performed in isolation from all other users, and the model must guarantee that no user data currently being processed can be communicated or otherwise made accessible to other users.

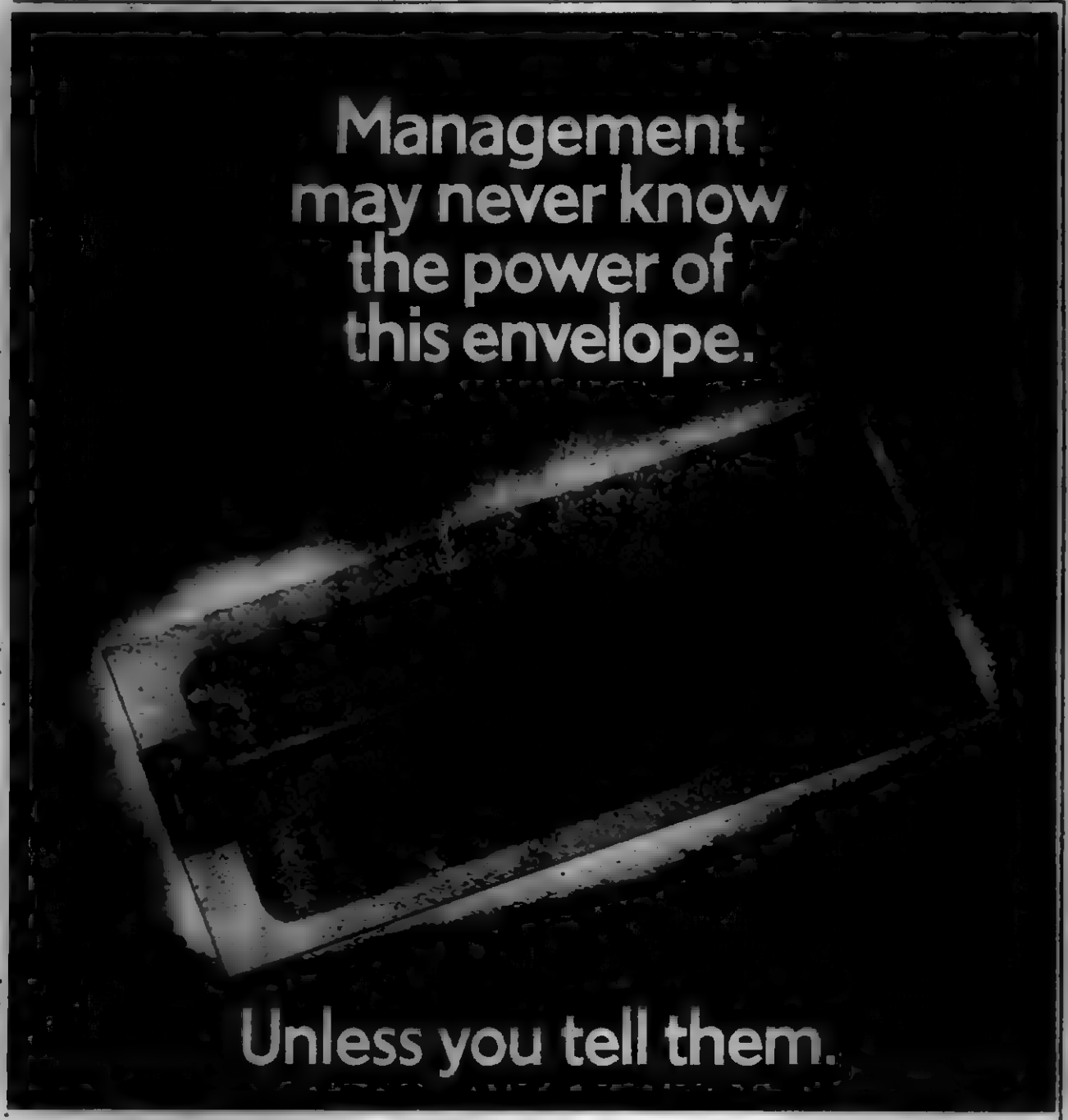
5. The model should be flexible enough to accommodate system growth over a wide range without requiring significant system retuning or load balancing, or rebuilding or otherwise changing the application system. In other words, the model must view all system components as symmetrical resources so that expansion can be reduced to adding more such resources.

6. The model must support an easy-to-use screen form interface for user data input and output, complemented by an extensive on-line "help" facility. This feature allows the application system to be more user-friendly, especially to users with no data processing background. Training requirements and operating staff resistance are thus significantly reduced.

7. The model must also minimize the overhead of accessing the data base and the user interface so that acceptable response times and overall system throughput can be achieved. Trade-offs that jeopardize data base integrity, system availability or security are unacceptable. In addition, access to these vital system facilities must be easy to program and a "natural" extension to the programming languages used.

8. The model should be built around a centralized dictionary to enhance further the integrity of the system. The idea is to catalog all data dependencies and avoid data inconsistencies, multiple data definitions and general duplication and redundancy. Such issues apply not only to user data but to system data as well.

9. The three definitions of "transaction" have arisen because of the importance of all three concepts to on-line transaction processing. The model should thus reflect an application structure that formally accommodates application units (to reflect the end user's concept of a "transaction work unit"), screen message pairs (to reflect the operator's "transaction interactions" with the system) and data base transactions. While these three concepts sometimes coincide for a given application, they generally do not. So the model should not arbitrarily force any common boundaries for the three basic constructs. The model should also lend itself to the implementation of small, modular, dialogue-oriented programs (see Figure 1 on ID/32).



You don't have to tell management how easy it is to implement "E-COM" service. That can be your secret. Tell them instead about the power of an E-COM service mailing. How letters can be sent right from the company computer. How the Postal Service prints, folds, inserts, seals and delivers these letters for you. How the distinctive blue envelopes of E-COM service lend visibility and impact to your mailing.

Since you're the one who gets E-COM service up and running, you have three options—all of them easy. First, you can write the system interface yourself. It takes about a day, and Postal Service consultants are standing by to give you any help you need. Second, you can buy a dedicated interface from a third-party vendor. Third, you can access E-COM service through an independent communications carrier, without bringing the system in-house at all.

As part of the D.P. department, you're in a unique position to tell your management about the power of E-COM service. So find out more. Send us the coupon you see here. You may never again get so much credit for so little work.

*Electronic Computer Originated Mail

For more information on E-COM service, mail this coupon to: J-4
U.S. Postal Service
E-COM service, P.O. Box 23990
Washington, DC 20026-9989
Or dial toll-free 1-800-843-9889 Ext. 300

Name_____
Title/Position_____
Company/Organization_____
Street Address_____
City, State, ZIP Code_____

E·COM
DELIVERS IMPACT.

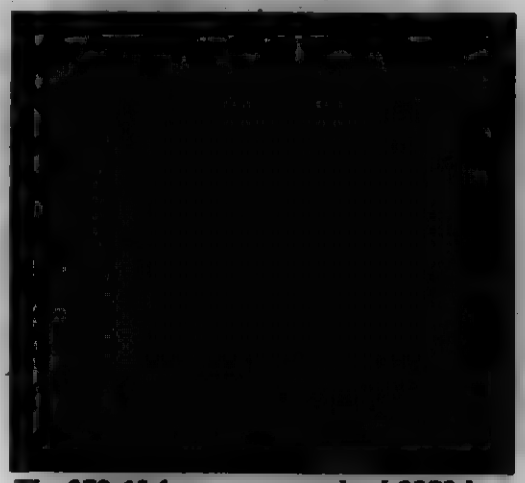
A Simple Plug For Datastream's New 5-in-1 Remote 3278 Terminal.

Anyway you look at it, the Datastream 878-15 is an extraordinary 3278 display station.

Look first at versatility. The 878-15 supports five screen sizes. IBM® 3278 Models 2 through 5. Plus DEC® VT100. So you can access any 3270 or minicomputer application from a single display station.

And all five screen sizes can be selected by the host. Or menu-selected by the operator.

Then take a look at the 878-15's sophisticated keyboard. It delivers complete 3278 functionality. And advanced 3290 features like 24 top row PF keys, an operator-definable 10-key pad and more. The 878-15 even offers a port for direct printer attachment.



The 878-15 features a standard 3278 keyboard plus 24 PF keys and an integral 10-key numeric pad. The 14" screen is available in green or amber phosphors.

And that brings us to the simple plug.

The 878-15 is designed for use with Datastream's BSC or SNA Remote Cluster Controllers, which allow the 878-15 to access its host or hosts over ordinary phone lines. All you have to do is plug it into a modem and dial in. Or connect it directly to the controller. Either way, you'll never see the expense of leased lines again.

Together, 878-15 and 178-2 Display Stations and our Remote Cluster Controllers make quite a team.

Offering advantages like sophisticated security. Remote diagnostics. Multiple concurrent sessions. Dual IBM host access. Minicomputer access. And communication with other peripheral devices.

If you're looking for flexible, reliable and inexpensive ways to extend your 3270 network, Datastream Display Stations and Remote Cluster Controllers are well worth looking into.

Call or write today. Datastream, 2520 Mission College Blvd., Santa Clara, CA 95050. (408) 986-8022. Outside CA, CALL TOLL FREE: 800-952-2500.

®IBM is a registered trademark of International Business Machines. ®DEC is a registered trademark of Digital Equipment Corporation. ©1984 Datastream.

See us at Interface, Booth #1364.

TotalCare

250 NATIONWIDE SERVICE LOCATIONS

TotalCare

TELEMAINTENANCE – REMOTE SUPPORT

TotalCare

How you can offer your customers a service program that's as good as your product.

Honeywell's nationwide service organization is now available to other companies.

We call it TotalCare™ Third-Party Service. Honeywell will tailor a service program to meet your requirements. You can select from a wide variety of service options. With more than 250 service locations around the country, we're well able to look after your customers' satisfaction.

If your business is in digital switches, modems, multiplexers, voice/data terminals, or local area networks and you're having trouble providing quality service or are dissatisfied with your current service alternatives – call Honeywell.

A quality approach to service.

We'll give you the benefit of an organization dedicated to providing first class service. Flexible service. Nationwide. At a price you'll find very reasonable.

For more information on how Honeywell can help you better serve your customers, stop by the Honeywell booth at Interface '84 (#1628) or call 800-328-5111, ext. 2717. (In Minnesota call 612-870-2142, ext. 2717.) TotalCare™ Third-Party Service, Honeywell, Telemarketing Center (MN12-4118), Honeywell Plaza, Minneapolis, MN 55408.

Together, we can find the answers.

Honeywell

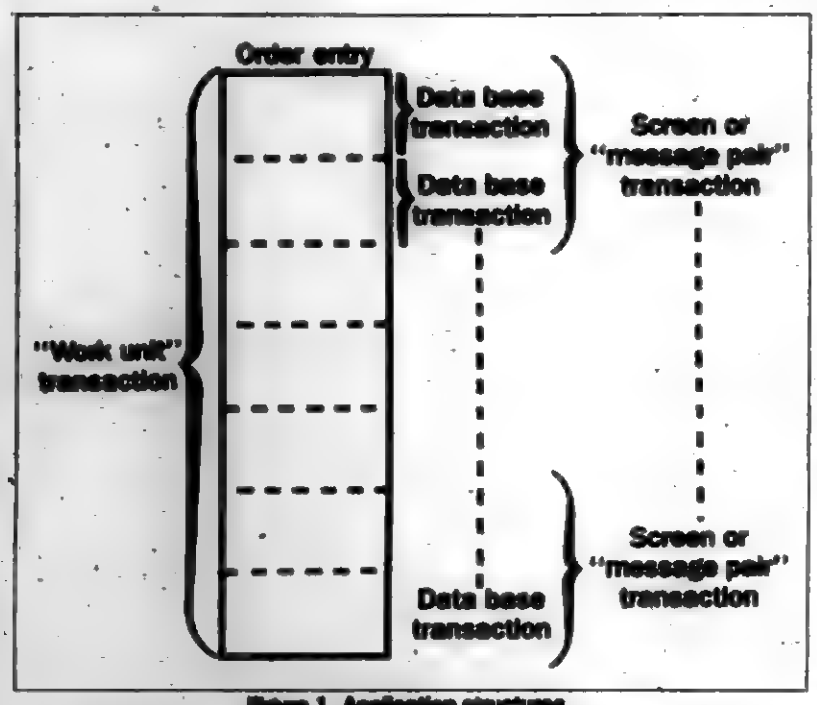


Figure 1. Application structures

10. The model should support a multisession user environment. Such sessions have the same system protection and isolation requirements, although the same set of system facilities should be made accessible to all sessions. The model should further support an interrupt/resume capability to allow a user to interrupt his current activity temporarily, perform another activity, then resume the original activity at the point of interrupt. This versatile user environment must be fully supported by the model's recovery mechanisms.

11. The model should support on-line system management and administration. It is unacceptable for an on-line transaction processing system to be unavailable while such operations as system configuration, tuning, load balancing or monitoring are in progress. In addition, those operations should not require significant effort, talent or expertise.

12. The model should support a general "system notification and reporting" facility to be used by all system components to report their status and other abnormal conditions to the system operators by name rather than by terminal. And such messages must be guaranteed safeguard by the model across system failures. In other words, they need to be part of the recoverable system data base.

13. On-line transaction processing systems generally have many remote sites with remote devices managed by remote system administrators. The environment must therefore support such notions of multiple managers with specific local responsibilities. This necessity must not affect the primary system administrator's duties.

14. The model must support asynchronous and batch processing facilities. These facilities must support the more traditional batch processing environment and also be accessible from the on-line environment so that the short, quick-turnaround but noninteractive spin-off transactions can be easily submitted and processed as background activities.

The batch facility should use the system notification and reporting mechanism to notify the submitter when these background activities are completed, especially since many of the sensitive system administration functions may in fact be performed asynchronously, as in the case of global password changes.

15. Notwithstanding all the above requirements, the environment must be conducive to easy application development and testing to allow application system implementers to complete projects promptly. This development environment should take advantage of the model's security mechanisms and be able to coexist with the production environment without any risk of contaminating it in any way.

Prevailing models

Many computer and software vendors have tried to solve the generic on-line transaction processing problem in a variety of ways. However, all successful attempts to date have implemented their solutions by starting with a multiprocessing, multitasking operating system and building a DBMS and a transaction processing manager on top of the operating system. These additions usually execute at the application software level, although most have been implemented as "privileged" user-level software.

Such solutions have been the easiest and quickest to implement and have managed to fill much of the vacuum in this marketplace. However, in most cases they have been the only possible way to build an on-line transaction processing system without a full redesign of the basic operating system.

Some vendors have gone further and modified their operating systems to accommodate some of the unique requirements of this on-line environment. Compatibility with user software developed by their existing customers has, however, significantly restricted the amount of

"We're saving $50,000 a year by eliminating SYSOUT printouts and installing JCLWTR."

That's the word from one user of AID's new JCLWTR system.

Instead of printing every production SYSOUT listing, JCLWTR stores them on disk where they're instantly accessible through special SPF screens or hard copy printouts.

The savings in paper, printing, handling, and storage costs add up so quickly that even medium and small shops can recover the system's minimal cost in just months.

JCLWTR installs on medium and large IBM systems operating under MVS and supports on-line interfaces to COM.

Find out how much you can save with AID's JCLWTR system. Send in the coupon, or call Lew Kabza at 312/654-3030.

AID Applied Information Development, Inc.
823 Commerce Drive.
Oak Brook, Illinois 60521

I'd like to know more about the JCLWTR system

Name/Title _____

Company _____

Address _____

City/State/Zip _____

Phone (____) _____

WE WROTE THE BOOK ON DOCUMENTATION. AND THEN WE THREW IT AWAY.

Communication Sciences Introduces Explain. The system that puts your software documentation where you need it most—online and in your data base.

With Explain, you can create online user help, training procedures, program documentation and more. Because Explain uses the power of your DBMS, you can maintain the documentation as easily as you do the rest of your business data.

Access to the online documentation is at the user's fingertips. With simple commands, users can retrieve the help they need—directly from any application you link to Explain.

Chosen by Comserv Corporation as the online help system for AMAPS/3000, Explain is a powerful tool for both writers and readers of software documentation. And it's available to users of HP/3000/Image and IBM series 30xx and 43xx systems.

With Explain, you can afford to throw the books away. And keep the documentation.

For more information: call us at (612) 332-7559, or write to Communication Sciences, Inc., 100 North Seventh Street, Minneapolis, MN 55403.

CSI
Communication Sciences Inc.

operating system tailoring they could do.

Operating systems generally manage all system resources. They typically consist of device and communications handlers, a file manager, a process manager, a memory manager and a command processor. In addition, various utilities and programs are provided for performing specific jobs, like compilers, linkers, editors and so on.

In most operating systems, the unit of work is the "process." This entity is the one that preserves the state and context necessary to execute programs in the system at all times. The operating system schedules and dispatches processes for execution depending on a combination of conditions such as the resources needed by the process to execute, operating system scheduling policies and process priority, level of interactivity and so on.

Requester-server model

Because most operating systems have been implemented on general-purpose computers, they tend to be general-purpose, attempting to be all things to all people. Some have stressed more real-time or batch processing support, others have emphasized time-sharing facilities. None, however, has been designed with on-line transaction processing as its primary execution environment.

As a result, the addition of DBMS or transaction processing manager capabilities has invariably been in the form of dedicated processes to perform these functions. Most systems that support on-line transaction processing use the "requester-server" model (see Figure 2).

The basic premise of this model is that the terminal environment is handled by the transaction processing manager, usually implemented as a terminal control process, termed the "requester," while the application processing is done in the contexts of a set of processes called the "servers."

The DBMS runs as a separate process and is the only one that can access the data base. The servers communicate with the requester transaction processing manager and DBMS processes via an "interprocess" message mechanism. The requester normally sends messages to the servers indicating to them what they are supposed to process, and the operating system takes on the responsibility of delivering these messages to the servers and scheduling them as a result.

Requester-server limitations

Transaction throughput: This model serves many of the purposes of the small on-line transaction processing environment but is seriously deficient as the number of system users grows. Even if we were to assume an infinitely powerful processor so that we can ignore for the moment the limitations of the hardware, the situation is still one in which all the terminals are controlled by *one* process, and the data base is managed by *one* process.

These two processes quickly become serious bottlenecks in the system. Attempting to solve this problem by dividing the labor among more than one process of each type introduces a set of even more serious problems.

On the terminals side, the transaction processing manager processes are each given a number of terminals to control. This allocation is normally done at system generation time and works fine for as long as the work-load distribution is uniform among the terminals. Since this distribution is usually hard to predict and tends to vary significantly over time, the result is often a return to the original transaction processing manager throttling effect, or an acute load-balancing problem in which the installation manager is forever playing catch-up.

On the data base side, the DBMS processes must compete for access to the disk and the data base, requiring a new level of concurrency control, which can only be handled by the operating system itself in a way it is not used to, given its general-purpose/time-sharing design biases.

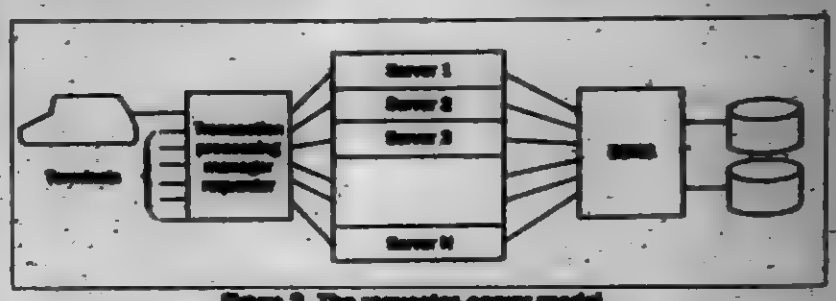
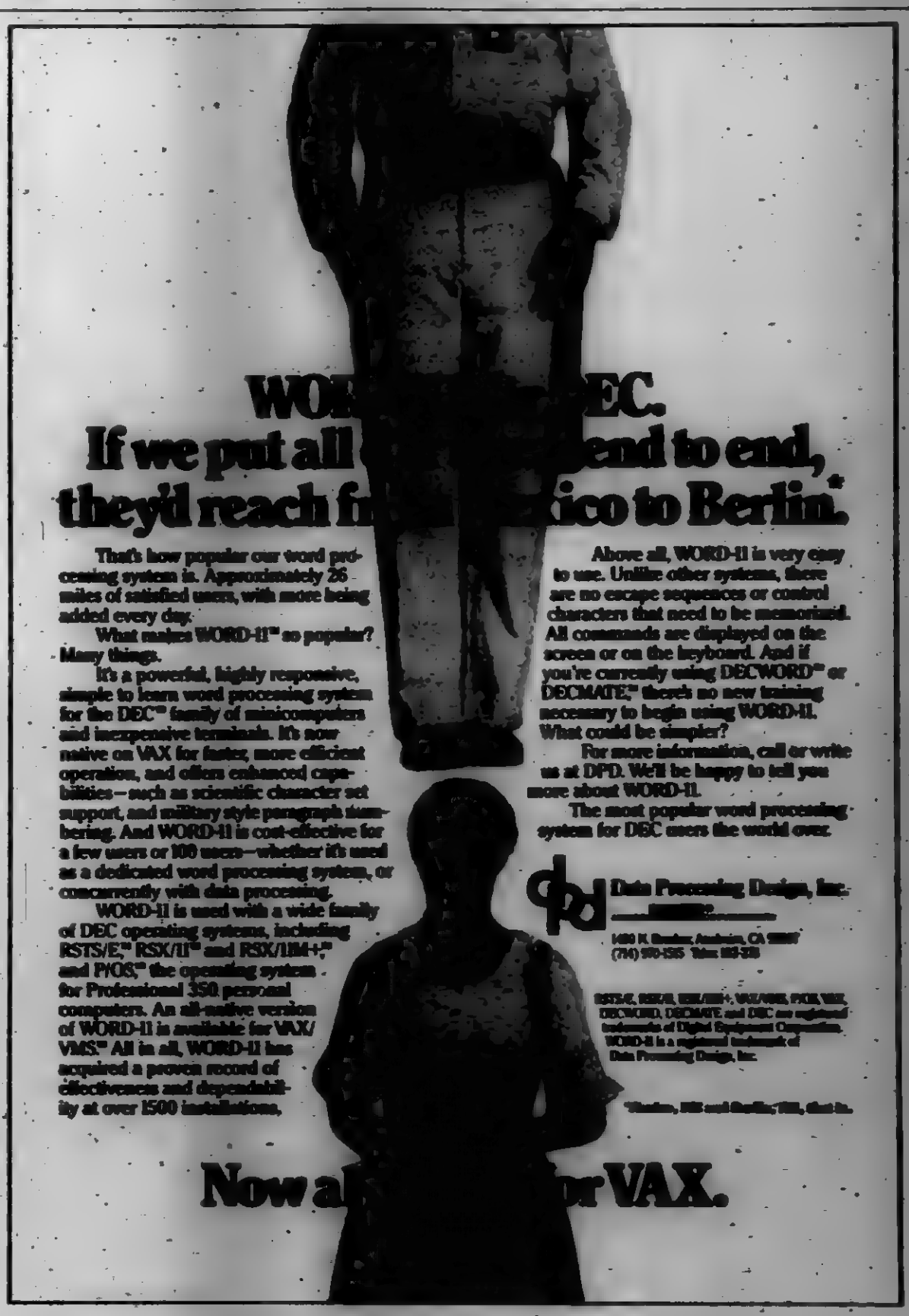


Figure 2. The requester-server model

Some systems have attempted to reduce the concurrency issues by segmenting the data base among the DBMS processes. The result is another level of control that knows how the data base is segmented, or more crosstalk between the DBMS processes when they receive requests they cannot handle themselves because of the segmentation. This solution also suffers from load-balancing effects as in the case of terminal segmentation already mentioned.

These problems are compounded many times over in real life when it comes to dealing with more finite processors and the resulting break-up of the ideal large system into



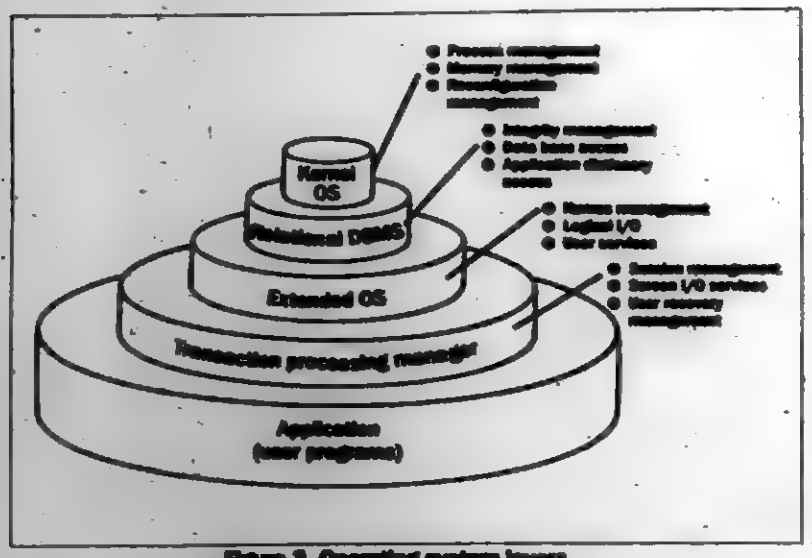


Figure 3. Operating system layers

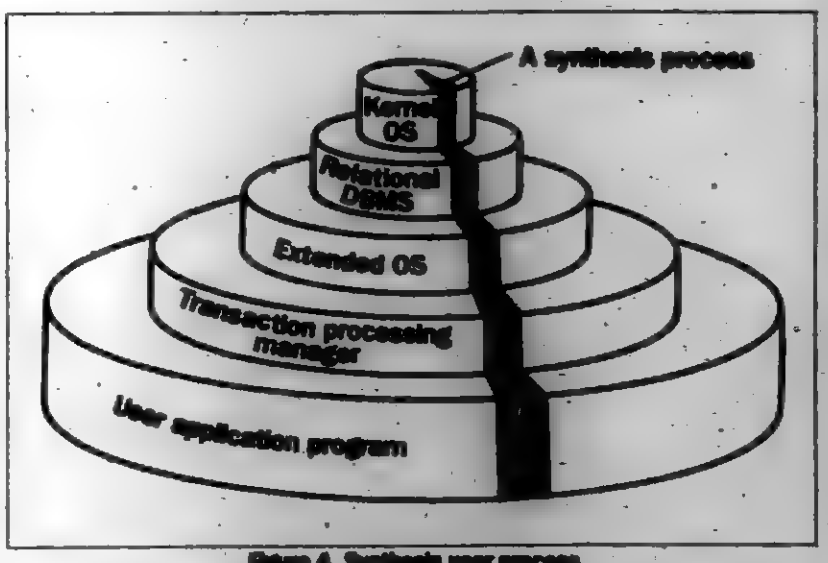


Figure 4. Synthesis user process

many smaller systems. They are then usually tied by high-speed buses of communications links. As more processing modules are added, the incremental cross-talk overhead starts to overshadow the increased net processing power of the system, and the system rapidly saturates.

User isolation and security: User isolation and protection are handled very efficiently by the traditional operating system when they are only required at process boundaries. Further protection above that must be handled by the application-level programs, in this case the DBMS and the transaction processing manager. That situation adds to their processing overhead and, more importantly, disperses the controls on isolation and protection, leaving the system more vulnerable to both accidental and malicious violations.

Application recovery: Distributing the processing done on behalf of a user among more than one process suffers from the further disadvantage of having to synchronize the processing to achieve a single point in time when both the user data base and the application state can *together* be declared consistent. This synchronization is hard to perform because it works against the operating system notion that all user processes are essentially independent, and issues that normally would only be addressed when designing distributed data bases now need to be solved within the confines of the one local system.

New approach to problem

The preceding analysis identifies many of the problems that Synapse Computer Corp. felt were typical of existing on-line transaction processing systems. These problems can be summarized by the statement that the generic requirements of such a system are, in many ways, in conflict with the traditional operating system architectures.

When given the opportunity to start from scratch, however, it is fairly straightforward to build a model that can satisfy these requirements, without affecting any existing customer base. This model is the one Synapse has selected to design and build the Synthesis software for its Synapse N+1 Transaction Processing System.

Operating software

The operating software is packaged as a ring-like architecture, in which the various components are implemented as rings, or spheres, with decreasing privileges from the inner to the outer rings.

At the heart of the software system is a kernel, responsible for memory management, a low-level file system, all device handling and process scheduling. The next layer above is the DBMS, which manages all access to the data base. Concurrency is therefore controlled at the lowest possible level in the system, and all other system layers can thus take advantage of the data base facilities.

The next layer is an "extended services" layer, responsible for the named object system, logical I/O operations and so on.

The top layer in the system is the transaction processing manager, responsible for all screen form processing, application management restartability and the user interface. Each of these system layers consists of a "code" segment and a "data" segment to maintain all static and global data that this layer manages (see Figure 3).

The server-per-terminal model

In this model, a user server process is created for each terminal (see Figure 4). All code within the operating software executes as a set of "privileged subroutines" of the user process. As a call is made to one of

VMSCHEDULE

"VMSCHEDULE has reduced our prime-time workload by 30%."

VMSCHEDULE—A complete scheduling package for end users and management.

- Optimizes machine use by running scheduled resource-intensive events during off-prime hours
- Saves systems personnel time by automatically running repetitive operations without intervention or initiation
- Automatically reschedules events when the machine has been down
- Provides optional load balancing features
- Uses simple English subcommands
- Allows concurrent operations by several users
- Increases security by verifying passwords
- Requires no mods to CP or CMS

703-821-8888

VM Software Inc.

Name _____
Title _____ Company _____
Address _____
City _____ State _____ Zip _____
Phone _____ CPU _____
2070 Chain Bridge Road, Suite 355, Vienna, Va 22180 1-CW-0384

PROGRAMMING MAINTENANCE AND DEVELOPMENT COSTS

{SET:SCIL™}

The Source Code Interactive Librarian *for microcomputers.*

- SCIL keeps a historical record of all changes made to the library.
- SCIL maintains any source code regardless of language, including user documentation and text material.
- SCIL allows software engineers to work with source code as they do now, *using any ASCII text editor.*
- SCIL saves disk space by storing only the changes made to the program.
- SCIL provides a labeling capability for ease of maintaining multiple versions and multiple releases.
- SCIL offers unlimited description in the program library directory.
- *High visibility displays* with varied intensity for ease of viewing insertions and deletions.
- SCIL is available on CP/M, MP/MII, MS-DOS, PC-DOS and TurboDOS.

{SET} Get {SET} for Success
{SET:SCIL™} is a product of System Engineering Tools, Inc.
645 Arroyo Drive, San Diego, CA 92103

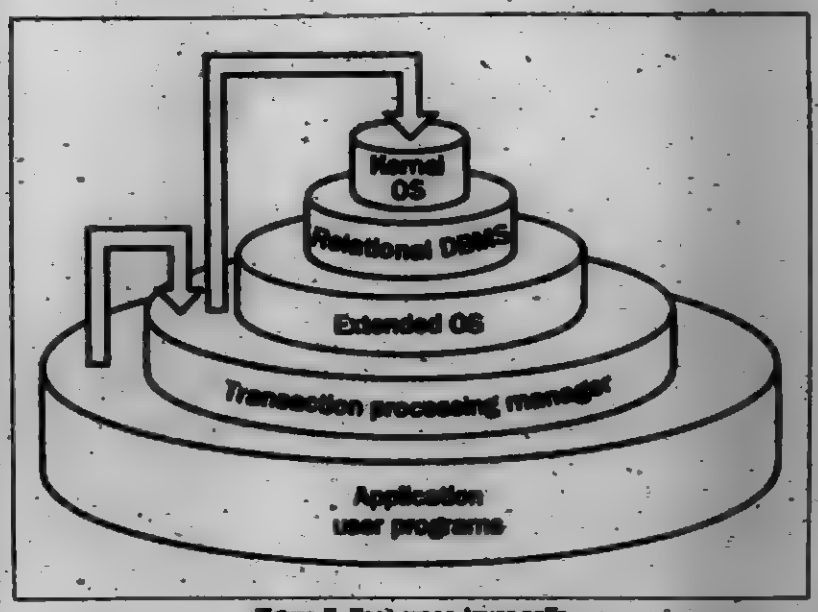


Figure 5. Fast cross-layer calls

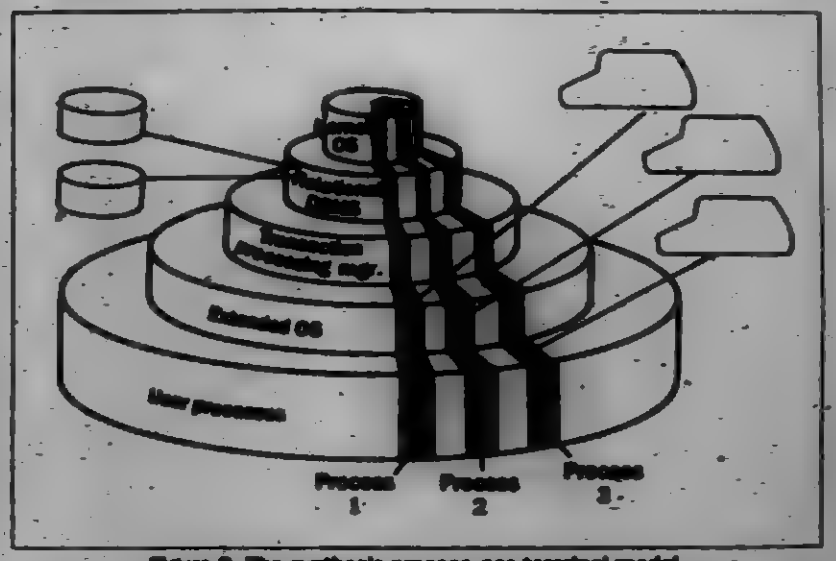


Figure 6. The synthesis process-per-terminal model

those subroutines, the process enters a state in which it can execute any code in that layer (see Figure 5). Only through this code can it access any of the data in that layer's data segment. On exit from the system layer, this access privilege is again revoked.

This expansion and contraction of privileges is most easily achieved by manipulating bits in hardware registers which make up the system's memory management unit. As a result, these system calls, and, in particular, "communications" with the DBMS and transaction processing manager, take a few microseconds, as opposed to the several milliseconds typical of interprocess message communications (see Figure 6). Since the bulk of the system overhead in the typical on-line transaction processing environment is directly related to data base and screen form access, the result is significant increase in overall transaction throughput.

The security model

Since each user's applications are being processed by a separate process, all traditionally efficient kernel protection and isolation mechanisms can be used to their optimum, without the need for additional protection mechanisms at the DBMS or transaction processing manager level, except for logical locks on the data base records as dictated by the transaction model (DBMS) and front-end user security checks (transaction processing manager).

To further enhance this model, optional controls can be placed on specific objects in the system, such as files, data base tables, screen forms, batch queues, programs, application units and so on. These allow the installation manager to restrict access to these objects to one or more users or groups of users. Moreover, these restrictions may be total (users have no access at all to the specified object) or partial (they may only be allowed certain modes of access; for example, read but no update or delete access).

The transaction model

User programs access the data base by calling into the DBMS layer but without undergoing any process context switching. As a result, data base files, or "tables," as they are more commonly called in a relational system, and/or data base records, or "tuples," can be "locked" by a shared or an exclusive lock, depending on whether the access intent was for inquiry only or update too. These locks and the ensuing inquiries and updates are all part of that user's "transaction."

This transaction remains open until it is "committed," in which case all changes to the data base become permanent or "rolled back," in which case all such changes are backed out of the data base. In either case, the locks are all dropped as soon as the transaction terminates.

This transaction model absolutely guarantees data consistency and is backed up by a sophisticated recovery mechanism, which itself is based on the transaction model. Thus, the model can also guarantee data integrity across system failures, even those that occur while the recovery process itself is in progress.

The application model

The application model takes advantage of the server-per-terminal, security and transaction models to fulfill all the requirements for on-line transaction processing.

User processes are created by the transaction processing manager. Before users are allowed access to the system, the manager validates their passwords and further controls their access, through a tightly bound menu tree, to one of a specified set of "application units" (see Figure 7).

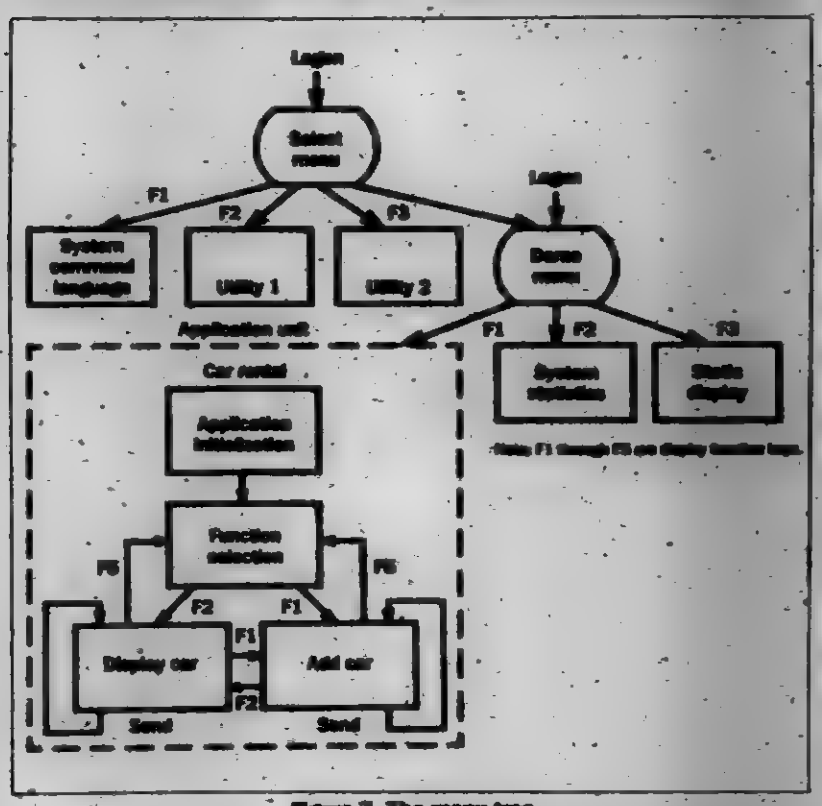
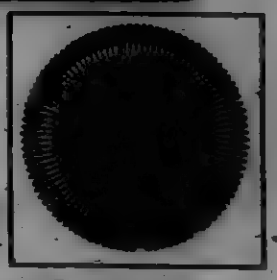


Figure 7. The menu tree

Better letters.

We can't help your spelling or grammar, but we can help your important correspondence look a little brighter than the next guy's. In less than a minute our DP-55 daisywheel dashes out a letter-perfect page. Throw out your white out, call your printer distributor. Or contact Dataproducts at (213) 887-8924, 6200 Canoga Avenue, Woodland Hills, CA 91365. In Europe, 136-138 High Street, Egham, Surrey, TW20 9HL, England.



Dataproducts Daisywheel Printers

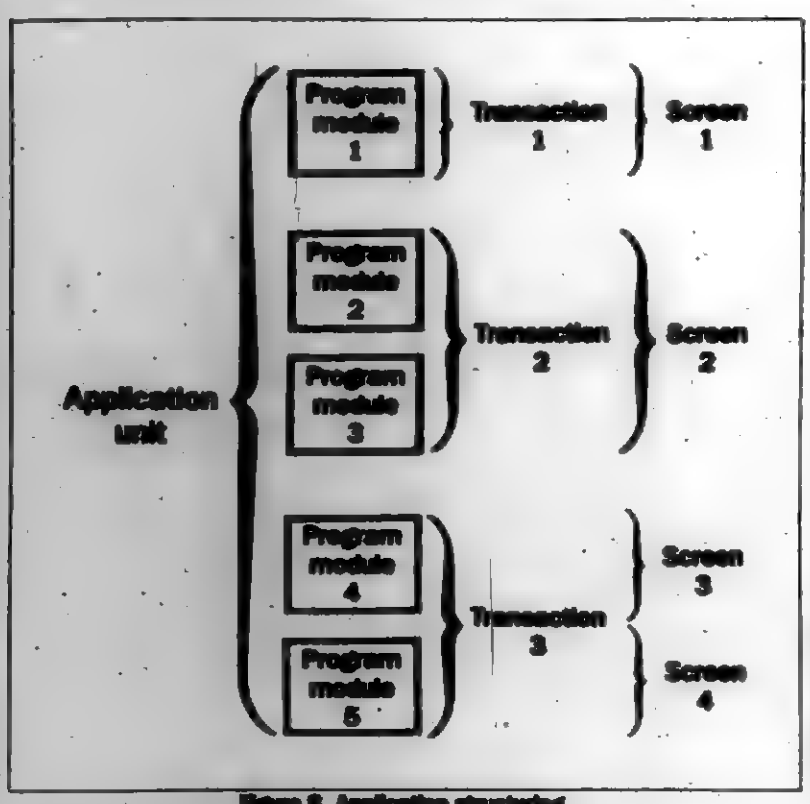


Figure 8. Application structuring

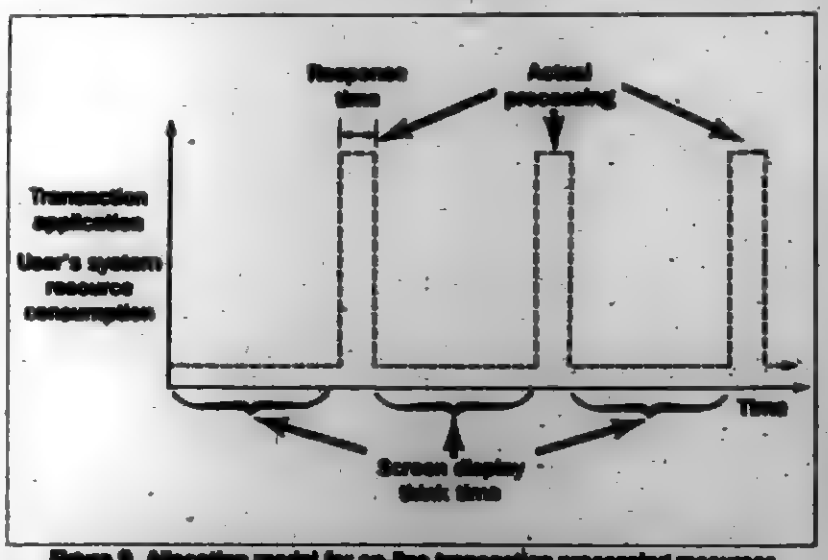


Figure 9. Allocation model for on-line transaction processing resources

These application units are made up of a number of processing steps, each of which is a separate executable program (see Figure 8). These programs are tightly bound together and to all the data base tables and screen forms that they reference. All further access to other tables, forms or programs is denied by the system. This binding occurs at application unit build time, which is a postlink "application installation" step in the development process.

Binding also improves runtime performance by resolving in advance all named references to internal system identifiers. It further enhances the application integrity by cataloging all its components in the system's application dictionary and enhances its security by providing complete containment of all the objects that the application unit programs are allowed to access.

Programs nominate their successors to the transaction processing manager via a direct "invoke" call. Options on that call can specify that one or more screen forms be displayed and/or that this interprogram point be declared an application restart point.

During the interprogram interval, only the data in the screen form buffers and an optional parallel set of nondisplay or "transfer" buffers are kept; all other application program code and working storage memory are reclaimed by the operating system (see Figure 9). Since at this point, typically, screen forms are displayed, no memory resources are wasted during that long display or "think" time. The model takes advantage of this long think time to achieve the multiplexing effect outlined earlier in this article. As a by-product of this model, application program code and data do not need to be swapped out, since they are not going to be reloaded at completion of input. Rather, the successor program specified by the "invoking" one will be loaded instead.

If the "invoke" point is declared as an application restart point, the transaction processing manager saves all the information needed to "invoke" the new program, along with the contents of the declared screen forms and transfer buffers in a set of internal data base tables, then "commits" these updates to the data base. If the application program has not independently committed its own data base updates, then the transaction processing manager's action commits both sets of updates because they all happen within the same process's context.

The result is simple and straightforward: Once the transaction is committed, any system failure causes all further data base updates, whether initiated by the transaction processing manager or the user, to be rolled back. As a result, both the application's data base and its program state, which is in the transaction processing manager's data base, are restored to their state at the previous such "application restart" or commit point. Full application restartability is thus achieved without one line of recovery code at the application level. For this model to be complete, the entry point to and the exit point from an application unit are automatic restart points.

To maintain full model flexibility, the "invoke" facility, along with all its options, is itself optional. Screen forms can be displayed "in-line," and data base commits can be independently requested of the DBMS by the application programs.

In the former case, the more traditional program swapping occurs; in the latter, the user program takes on the responsibility of synchronizing its application state with its data base state.

Implications for architecture

We have presented the generic on-line transaction processing problem, with its major characteristics and their influence on a new model for such systems. Our experience with this new model has been to observe a significant acceleration in the design and development process. We have also observed a decrease in the daily operational complexities normally encountered in production applications.

Our discussion has not been dependent on any specific hardware architecture. The relevance of hardware architecture is to optimize transaction throughput. We believe the 1980s will see the emergence of significant new advances in fault-tolerant architectures, which will be designed to facilitate high-transaction throughput for on-line transaction processing models. Whatever architectures emerge, however, the choice of a proper model will still determine the aptness of the system for design, maintenance and operation of on-line transaction applications.

About the authors

As on-line transaction processing group leader for Synapse Computer Corp. in Milpitas, Calif., Wagaih Boctor was the architect of its "OLTP transaction model." He recently was named manager of systems support.

Ken Cohen, currently the product line manager, previously worked in development with Boctor and was a major contributor to the product-specification effort.

SUBSCRIBE TO
EDP China Report
TAPPING A CHINA CONNECTION!

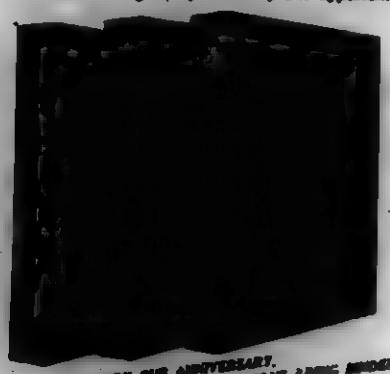
China still remains a mystery to most computer manufacturers around the world who have been eyeing the huge China market for years. But don't worry, with help from EDP CHINA REPORT, any doubt or guesswork in trading with this enigmatic country would soon be eliminated.

No Western company in the computer industry, as a matter of fact, can afford to ignore China and its potential as a buyer and manufacturer of computing equipment. Many such firms have subscribed to EDP CHINA REPORT, a newsletter starting publication October 1982, for in-depth information about the China market and to get prepared for profit opportunities.

Published semimonthly by IDC Asia Ltd., a subsidiary of International Data Corporation — the world's largest computer market research firm with its headquarters in the United States, EDP CHINA REPORT is one of the very few sources available anywhere that tell you what the entire Chinese computer industry is doing.

It's high time that you joined the hundreds of smart executives who have subscribed to EDP CHINA REPORT — the ONLY English newsletter that devotes all its pages to the Chinese computer industry.

For subscription please complete the form and send it to: EDP China Report, IDC Asia Ltd., 11/F., Goshen Mansion, 177 Gloucester Road, Hong Kong.



TO MARK OUR ANNIVERSARY, WE'VE PREPARED A FREE ELNE 3-DISC BINDER FOR EVERY NEW OR RENEWED 1-YEAR SUBSCRIBER

EDP China Report IDC

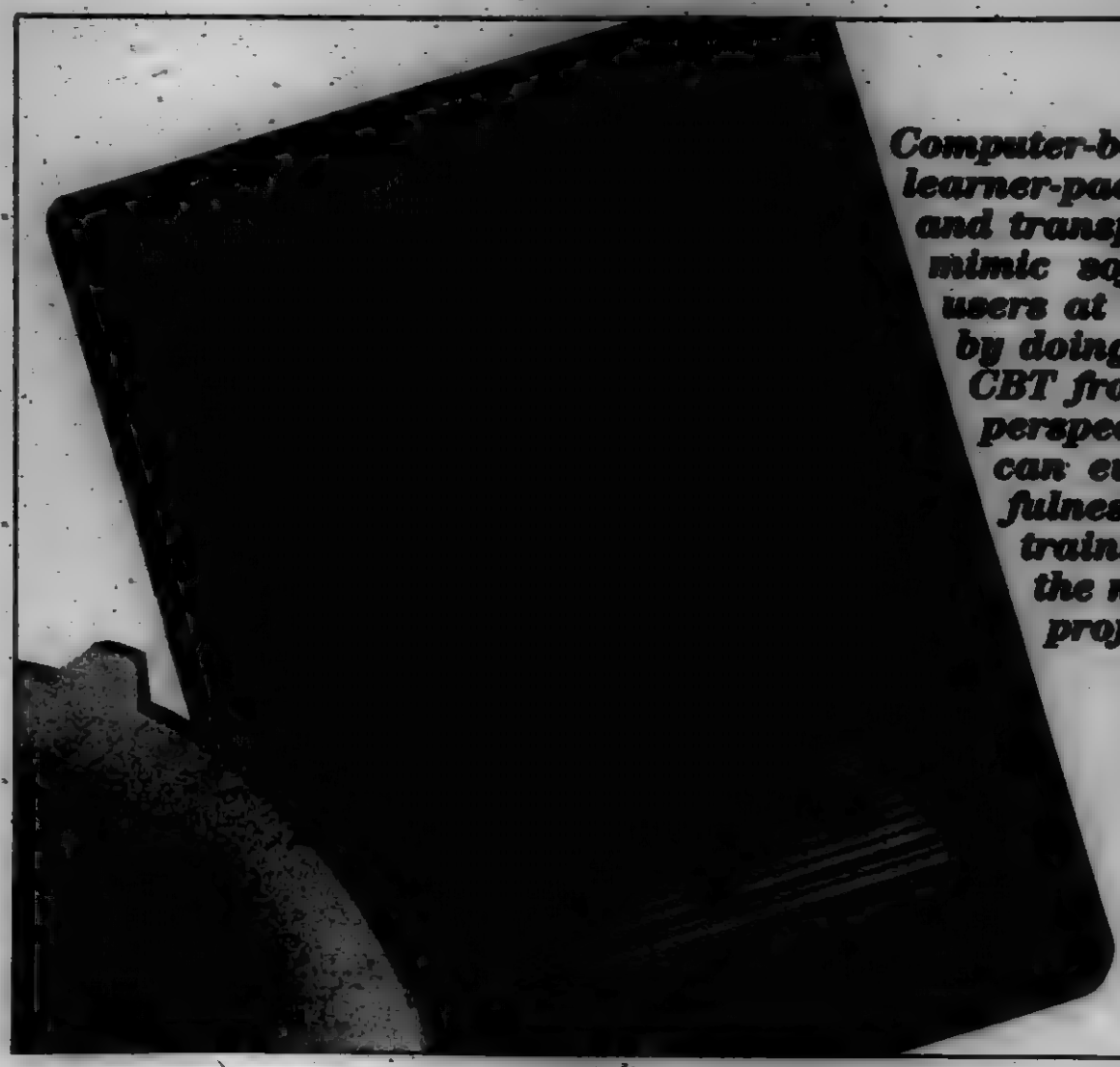
Yes! To know more about China's computer industry, I want IDC's research staff to keep me informed on key issues and business opportunities in the electronics, computer and telecommunications market in the People's Republic of China.
Start my subscription to EDP China Report today. I understand if I am not completely satisfied, I may cancel any time and the remainder of my subscription will be fully refunded.
*For subscribers outside Hong Kong, plus airmail charge of US$25.00 a year.

☐ Sign me up for one year of EDP China Report: US$250.00

Firm _____ Title _____ Name _____
Address _____
Town: _____ Phone: _____
Signature _____ ☐ A check is enclosed ☐ Bill my company

Make your check payable to "INTERNATIONAL DATA CORP. (ASIA) LTD."

IN DEPTH



Computer-based training is learner-paced, adaptable and transportable. It can mimic software so that users at any level learn by doing. By looking at CBT from a designer's perspective, managers can evaluate its usefulness for their own training as well as the needs of non-DP professionals.

Computer-based courses: Not all are created equal

By Carol Kowle Anderson

Training in fourth-generation languages is not the exclusive domain of the information center and its end-user audience. The growing use of software packages for data entry and report writing has created a demand for training that meets a variety of needs, including those of the DP manager.

Changes in application development processes have increased the use of software such as Information Builders, Inc.'s Focus or SAS Institute, Inc.'s SAS in traditional DP applications. The DP manager may direct staff in the use of such software or run an information center to assist end users.

Computer-based training (CBT) is an effective means of meeting the demand for instruction in fourth-generation languages. CBT also covers such subject areas as DP management development, concepts and programming languages and project design and development. It is transportable to remote locations, self-paced and adaptable to a variety of instructional needs.

In addition, CBT can mimic the actual software so that learners at any level learn by doing. All of these features make computer-based instruction on SAS, Focus and similar packages an ideal training choice on the part of the DP manager.

Expenditures growing

Based on a recent survey, the market research firm of Talmis in Oak Park, Ill., projects that company expenditures for CBT will grow from $165 million in 1983 to $500 million by 1987, an increase of more than 200% in four years. These statistics include the cost of custom-developed CBT for micros, microcomputer courseware in the retail market and all mainframe CBT.

Usage figures for CBT materials produced by Deltak, Inc. support the survey findings. Deltak customers installed 128 courses under the Phoenix operating system in May 1983. By October, customers had installed 2,700 courses. Goal Systems, Inc., developer of the Phoenix CBT operating system, has also reported tremendous growth in installations during the past year.

By looking at computer-based instruction from a design perspective, DP managers can evaluate its usefulness both for their own training and the needs of non-DP professionals.

The first major concern is whether the CBT offers the amount of information the student needs to become a competent user of the language or program. The second consideration is how appropriate the courseware is for an installation and whether that courseware represents the current release of the software or system.

Computer-based instruction should be selective regarding the amount of material covered. It should teach the body of knowledge needed by an average user, whether it is 30%, 50% or 80% of the actual software. A CBT course that attempts to teach every aspect of a software program in a few hours is no better than a user's manual.

This point may seem obvious, but excessive competition among CBT developers has resulted in the rapid production of courses that sometimes merely translate the user's manual into on-line text. In fact, basic-level CBT courseware need not cover more than 50% of a particular software package, regardless of whether the audience consists of DP staff or end users.

For most fourth-generation languages, the CBT only needs to cover the basics of information retrieval, data editing and report writing, if appropriate. Advanced features and additional options are not necessary, at least not in introductory, hands-on courses. CBT that covers the most widely used features of a software package has the advantage of reaching a broad audience within the company. Such training can be more cost-effective because it meets the needs of diverse groups.

For example, IBM's ISPF was designed as a programmer productivity tool but is becoming a popular editor in many installations. Programmers and end users alike employ ISPF to create, edit, move, copy and print data. It makes sense that a CBT course on ISPF would devote more instruction to the editing skills needed by a broad range of users than to technical options used by a single department. Both CRWTH Computer Courseware and Deltak courses on ISPF devote about 100 minutes to the subject of editing, although the structure and approach of the two are quite different.

In terms of the appropriateness and currency of CBT courseware, DP managers need to evaluate whether the content meets their own needs and the needs of other users at their installation. Well-planned CBT will reflect the most recent release level of the software, even if it requires the CBT development firm to upgrade existing courseware.

This issue is more complicated than it appears on the surface. For example, Pansophic Systems, Inc.'s Easytrieve is available in batch and interactive versions — the CBT may reflect only one of these. ISPF is an upgraded version of MVS/SPF — yet some available CBT covers the old SPF version. If an installation is running ISPF under IBM's VM/SP operating system, the CBT must be VM-based.

Computer-based instruction should be selective regarding the amount of material covered. A CBT course that attempts to teach every aspect of a software program in a few hours is no better than a user's manual.

Since most popular software is enhanced on a regular basis, DP managers should be alert to new releases that reflect major changes. Of course, each installation may want to tailor training to local standards, but it is important for CBT to be current.

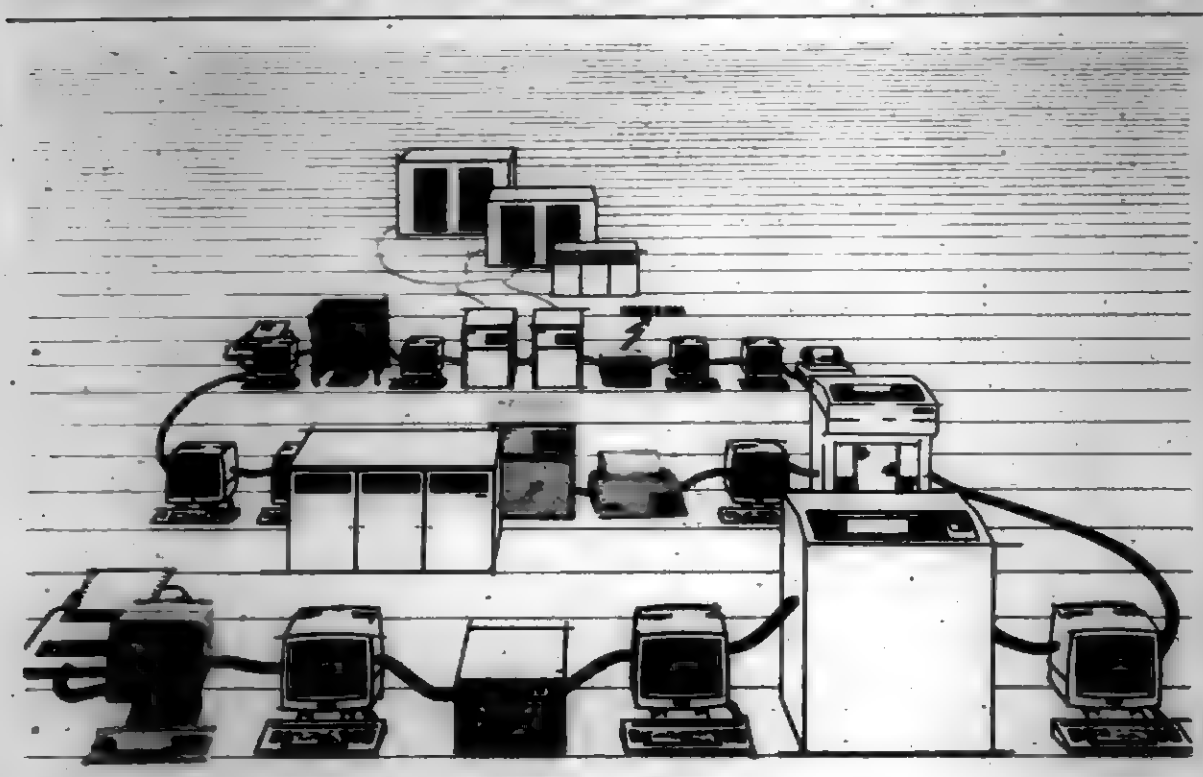
Established training firms usually survey their customers before they develop CBT. As a result, their CBT will most likely respond to identified training needs as well as represent the most recent release of a product. CBT developed under these circumstances will clearly state the nature of the content, the intended audience and the release level. Such introductions usually appear in the on-line courseware but may also appear in supplemental print materials.

What is the approach?

Because fourth-generation languages are so widely used, related CBT should apply to a broad-based audience. A successful CBT approach will be flexible and modular to accommodate the instructional needs of individual users. Other important considerations in evaluating the approach of CBT include the length of instructional units, the sequence of the material and the amount of on-line instruction vs. printed text. Finally, CBT on fourth-generation languages should emphasize practical applications of concepts wherever possible.

CBT can be more cost-effective if the training is useful to more than one audience within a company. Courseware designed for the information center does not necessarily exclude the applications development staff, especially where fourth-generation languages are concerned.

CBT courseware on fourth-generation languages by ASI, Inc., CRWTH, IBI, Deltak and other training vendors is usually designed with the nontechnical end user as the primary audience. All such courseware, however, should have built-in flexibility, allowing students to select the course or topic of interest. More experienced technical staff may bypass introductory material and go on to more germane instruction, provided



3270 Networking: No More No Man's LAN.

Imagine. 3270 Processing. Integrated Personal Computing. Local Area Networking. And SNA Compatibility. In One System.

Imagine a system that successfully settles the uncharted territory of 3270 local networking—that "no man's LAN" of unlinked and unrealized potential.

Imagine a system that delivers the power of 3270 processing, and the flexibility to build two local area networks from a single controller. Imagine being able to attach up to 120 devices to that controller. Or attaching four distinct controllers—and multiple coaxial links of up to 10,000 feet each—to any of those LANs.

Imagine the economies of a system that handles that networking with standard 3270 coax. That requires no commitment to special architectures or non-standard LAN technologies. And that, thanks to a multi-drop, station-to-station design, can eliminate thousands of feet of new coax.

Of course, such a system would have SNA compatibility. But it would also have a set of capabilities to dramatically increase throughput, while reducing hardware and support cost in *any* environment. Capabilities like multi-host and multi-personality support, application and address switching, and system printing.

This system would have multi-user personal computing "built into" the network—allowing you to assign true 16-bit computing power, maintain overall MIS control and share expensive disks and printers.

Such a system would boast an intelligent display station that displays a mastery of ergonomic and aesthetic design. With multi-screen formats, anti-glare screen, low-profile keyboard, and a tilt-and-swivel pedestal with the smallest footprint in the industry. Such a system would also include a full line of printers.

Imagine. 3270 processing. IBM-compatible personal computing. Versatile, economical, powerful local area networking. In one system.

Braegen has imagined just such a system. They have designed it. Built it. And called it the ELAN™ System.

If such a system sparks your imagination, give us a call. We know the feeling. The Braegen Corporation, 525 Los Coches Street, Milpitas, CA 95035 (408) 945-8150; TWX: 910-338-7332

BRÆGEN

*ELAN is a trademark of The Braegen Corporation.

that the structure allows them to choose their own instructional plan.

CBT that breaks down into flexible units of instruction has many advantages for the learner. Material is manageable in terms of time and learning requirements. Learners are not overwhelmed with information; they can stop at a reasonable break in the instruction and resume when it is convenient.

Goal System's Phoenix and IBM's IIPS are two CBT operating systems that provide the student with a number of decision points during instruction. The ability to see and select from course and topic lists gives the student control over the order in which to proceed. Under Phoenix's solo mode, a student can complete course topics in any sequence or choose not to begin a topic at all, because completion information is not tracked. This structure is ideal for the training needs of both the information center and the applications development center, where learners possess a wide range of knowledge and skills.

Design strategy

Within the framework of the actual instruction, topics can be organized and presented in a manner that helps the learner assimilate technical information. A good design strategy for CBT is to limit instructional units to three or four related subjects, followed by a review and application.

Exercises on the actual software at the end of a unit or topic reinforce the learning process. Because many users are managers or nontechnical staff, mastery testing before and after instruction is not needed. The ultimate success of the CBT course will be measured in terms of the student's ability to use Mathematica Product Groups, Inc.'s Ramis, SAS or Isaco, Inc.'s Tel-A-Graf, for example.

The length of a topic is not always a clear indication of well-organized and manageable instruction. Overall, however, shorter topics of 10 to 30 minutes probably help students retain technical information better. This point is especially true for courseware without a "backpaging" facility that allows students to go back and review a previous screen. It may be difficult to judge the length of a topic without completing it, as courseware rarely lists completion times for individual topics. Still, topic length is a factor to consider if such information is available.

The sequence of instruction in CBT is important, as it is in all successful training design. Two logical CBT designs are a "step-by-step" structure and a "least-to-most complex" ordering of concepts. The list of courses and topics will indicate a progression starting with getting onto the software, entering and editing data and leading to more advanced topics, such as formatting and printing.

When CBT lacks a clear design, it does not build on the student's growing body of knowledge and skills. The result is a disorganized user who does not know how to approach the actual software. Design weaknesses are more obvious in CBT than in text material, where a student can easily page back and forth between sections of instruction. Effective CBT on fourth-generation languages will be constructed so that most, if not all, instruction takes place at the terminal.

A student handbook may accompany the on-line instruction. This guide may contain a topic listing, examples, exercises, reference pages and space for individualized logon procedures and student notes. CRWTH calls this supplement a student workbook; in fact, it simply summarizes the on-line instruction and includes data for case-study applications.

CBT that relies too heavily on textbook or video support may lose its ability to simulate the software being taught. Video and CBT can work well together if a video segment introduces concepts reinforced by subsequent exercises on the computer. Execucom Systems Corp., for example, is developing a series of videos on its popular financial planning package, IFPS. A supplementary workbook, developed to accompany the videos with on-line exercises, is an alternative to actual on-line instruction. The weakness of this approach is that the student misses the specific corrective feedback that is typical of good CBT.

Practical applications

The use of practical applications is another characteristic of effective CBT, especially where fourth-generation languages are concerned. To the extent possible, examples should reflect business cases the manager or end user might experience or the programmer might encounter in dealing with users. Besides learning how particular software works, students need to see why they might want to use the software in that way.

While learning SAS, for example, the student will be shown how to produce a pie chart. In addition to learning the syntax required, the student needs to know when to use a pie chart. Effective CBT will place the student in a situation where a judgment is required. Corrective or reinforcing feedback should direct the student in the choice of command syntax to fit that situation and others like it.

Good CBT combines an understanding of a language or system with an appreciation for situations in which specific activities, commands or procedures can best be used. Solid examples and applications are difficult for course authors to produce in any medium, much less CBT. DP managers should note this potential drawback and check CBT for problems, examples and exercises

Cut Information Retrieval Down To Size

...with BRS/SEARCH— the Software That Comes In Mainframe, Micro and Mini Sizes.

BRS/SEARCH, the same information retrieval software that runs one of the world's largest online database systems is now available for your mainframe, mini, or micro computer.

BRS/SEARCH gives you instant access to all your own information, regardless of its length or format. Many powerful, easy-to-use features developed through millions of online searches have made BRS/SEARCH the system of choice among information professionals.

BRS/SEARCH runs on IBM and compatible mainframes, as well as 16 and 32 bit mini and micro computers. And because the search query language is the same no matter what size computer, you can use it on a variety of systems without any additional training.

For more information about these three new sizes of database software, call toll free: (800) 833-4707; in New York State (800) 553-5566. Or write BRS Software Sales Support, 1200 Rte. 7, Latham, N.Y. 12110. Dealer and OEM inquiries invited.

BRS SEARCH SOFTWARE
An ITG Company

CW 3/84

I'd like to know how to cut my information retrieval problems down to size. I am interested in SEARCH for the following systems:

Mainframe: .....
Mini: .....
Micro: .....

☐ Please have a salesman call.
☐ Send me more information.

NAME _____
COMPANY _____
ADDRESS _____
CITY _____ STATE _____ ZIP _____
PHONE ( ) _____

that relate concepts to real-life situations.

Computer-based training should be highly interactive, involving the student in a constant thought process. CBT that merely involves "page turning," or in other words, screens of text without student input, is an expensive substitute for stand-up lectures or print materials. The cost of CBT varies among training vendors; individual courses may cost twice as much as print or lecture materials, with discounts often available to larger groups.

However, designing meaningful interaction is a tough and time-consuming process for CBT course authors. It's an easy — and common — practice to cut down on student interaction in order to reach the training market quickly with CBT courseware on popular programs like Ramis or Focus.

In short, DP managers should not assume that CBT on software like SAS or Focus is the exclusive domain of the information center. The rapid growth in CBT usage suggests that many more organizations are coming to this realization.

Because there's so much variation in the interactive quality of CBT products, a DP manager should not judge a CBT course without looking at it carefully. If a course covers a broad range of material in a relatively brief time frame, the amount of student interaction may be minimal. One CBT course promises to teach the student how to enter data, view data, use editing commands and print data in 100 minutes of instruction. The time frame quoted would curtail on-line practice because the course covers too many major concepts during that time.

Apart from brochures and promotional materials, some training vendors offer customers an opportunity for limited testing of CBT courses, such as a 30-day free trial, before the actual purchase.

Other features should be considered when analyzing the interactive nature of a CBT course. Some CBT authoring languages lack the ability to simulate actual software or systems. Some languages are limited in the types of questions that can be asked; others are limited in the ability to judge answers and provide specific feedback. In other words, the authoring language used to develop CBT affects the overall quality of the instruction.

Determining quality

One way to determine quality is to observe the answer-judging capability of a CBT course. When students answer a question incorrectly, they should receive feedback specific to that answer and not a catchall response. Partial or "close" answers should be recognized, and students should never be "trapped" in a question. After three or four tries, they should view the correct answer and move on.

Such subtleties of CBT interaction may require a close comparison of training vendors' products. A good rule of thumb for CBT authors is to provide student interaction every three to five screens. This rule is not strict, of course, and content sometimes necessitates placing several screens of text together.

The overall result, however, should engage the student in an active process of thinking and responding to the instruction.

DP managers can easily discern whether a CBT course engages the student interactively. A closer analysis will reveal whether the quality of the interaction is sufficient to actually train the student. Some types of questions, such as yes/no, true/false and multiple choice, help reinforce concepts but don't teach students how to produce lines of code. A balance between concepts and practice is best for most types of CBT. Also, the closer the CBT approximates the "look" and "feel" of the actual soft-

The Goal News

LOGICAL beats PHYSICAL

For OS/VS

LOGICAL DUMP/RESTORE OFFERS VAST PERFORMANCE GAINS

We are pleased to report that the people who have tried FAVER/XP, the "smart" backup/restore system, are pleasantly surprised at the difference Logical makes.

Most people are used to a physical-design dump & restore system. To backup a single dataset across a number of tracks, they have to physically back up each track. The logical approach of FAVER/XP lets the system back up just the dataset you want, no matter how many volumes it occupies.

You can back up clusters, groups of clusters or an entire catalog this same way. It's much easier with FAVER/XP and everything happens faster.

Plus, FAVER/XP integrity-checks all VSAM datasets for errors before it backs up anything. If it finds anything, you know about it. If everything's OK, the backup runs automatically. You can rest easy that your backups are clean.

Just to be sure, though, you can invoke the COMPARE function to ensure that the backup tape contains exactly the same data as the disk.

Works with VSAMAID/XP for total VSAM management

Goal Systems International has revealed that they have an interface between the FAVER/XP Backup & Restore system and the VSAMAID/XP system which creates the only complete VSAM dataset management system available today.

During backup, the FAVER/XP special interface creates a historical file, which may then be used by VSAMAID/XP to create a "recommendations" report. The report tells resource managers how to manage VSAM datasets for optimum space allocation and resource utilization. VSAMAID/XP recommendations may be implemented with one command through the VSAMAID/XP Auto-Define feature.

FAVER/XP beats IDCAMS

In benchmark tests where an OS/VS installation runs backup & restore routines using IDCAMS and FAVER/XP, FAVER/XP completes the tasks required in half the time.

These figures are taken from actual timings made by product managers at Goal Systems International, the authors of FAVER/XP. They cover 100 production installations spanning five years of operation.

"The difference in speed is due to a systems design that combines the speed of a physical dump/restore with the design philosophy of logical file access," said Theodore Peppas, Chief Developer at Goal.

Users amazed at the difference

When polled by this newspaper, users of FAVER/XP revealed that the Logical approach to backup & restore is genuinely faster, more accurate, and easier to perform.

Ralph T. Bryan, Systems Manager at Turbo Rubber Company said, "Have we had been operating all these years working our tails off just to do an accurate backup & restore. And FAVER/XP comes along and automates the task. It's about time.

"We had depreciated away our investment in our old physical dump/restore system years ago. It was time to buy FAVER/XP. We were ecstatic both for a performance, but now FAVER/XP is our standard."

FAVER/XP and VSAMAID/XP are great news for OS/VS installations. They are two of the Extended Productivity Systems from Goal Systems International. Both are available for a free trial. Call Goal Systems toll free today.

800-648-4640

Goal Systems
Software Solutions

Goal Systems International Inc.
5455 N. High Street
Columbus, Ohio 43214-1159
Phone (614) 888-7775

A checklist for CBT users

- Does the CBT cover information that users at this installation need?
- Is the course current and does it reflect the version of the software or system in use at this installation?
- Is it flexible and modular to accommodate the range of users?
- How long are instructional units?
- Is the sequence of instruction based on a logical pattern?
- How much of the instruction is actually on-line?
- Does the CBT use practical problems and examples to help students apply their knowledge?
- Does the student answer questions and practice activities, or is the course simply a "page turner"?
- Is there variety in the types of questions asked?
- Does the CBT simulate the actual software?
- What is the quality of the answer-judging and feedback? Is the feedback appropriate to specific answers?

"The office automation I bought for everyone in the corporation doesn't incorporate everyone."

Exxon stops the shock...with fully integrated office automation for everyone in the corporation.

Introducing the Exxon Business Support System.

An office automation system that can't support everyone in your corporation can lead to some very shocking experiences.

The right power to the right people

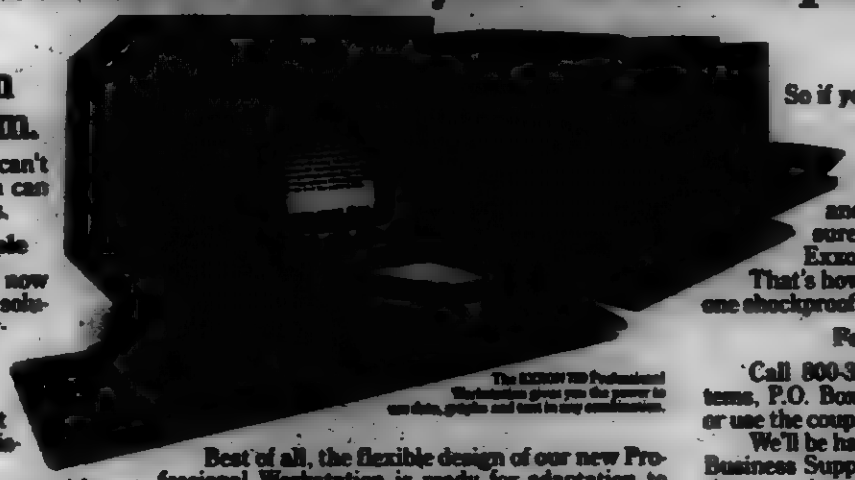
That's why Exxon Office Systems now offers more practical office automation solutions that help everyone in the corporation to be more productive. With the Business Support System, Exxon extends its fully integrated line of office automation products to support managers, professionals, and administrators, as well as secretarial staff.

Exxon puts it together for everyone with a fully integrated system — with full communications flexibility that lets you access outside databases and interact with most mainframe computers. Without the complications. Without the shock.

Office automation for those who shape the corporation

The Exxon Business Support System features the new EXXON 750 Professional Workstation, specifically designed with powerful, integrated software that lets you move instantly from text to graphics to data processing — without changing programs.

You can divide the high resolution bit-map display into several windows and work in a number of functions simultaneously. You can shift information from one window to another. You can preview the page layout, and produce an integrated text/graphics document on our quiet EXXON 985 Ink Jet Printer. Or on a color plotter.



The EXXON 750 Professional Workstation gives you the power to use data, graphics and text in any combination.

Best of all, the flexible design of our new Professional Workstation is ready for adaptation to the most popular operating systems and network interfaces.

Tying everyone together

At the core of the Business Support System is the EXXON 8400 Series controller. With its UNIX*-based operating system, it can integrate all levels of workstations to share information and programs. Everyone can keep track of schedules and meetings with time management and calendaring functions, whether their workstation is an EXXON 500 Series Information Processor or a new EXXON 750 Professional Workstation. And everyone can send and receive messages easily with transparent electronic mail.

An expandable, shockproof family

Exxon protects your office automation investment by making every workstation — from the EXXON 500 Series to the new EXXON 750 Professional Workstation — fully expandable and upgradeable.

So if you've already begun an Exxon system, the latest Exxon advances are completely compatible with our current product line.

And with our worldwide sales and service organization, you can be sure that when you need assistance, Exxon will be there.

That's how Exxon incorporates everyone—in one shockproof family.

For more information

Call 800-327-6666, write Exxon Office Systems, P.O. Box 10184, Stamford, CT 06904-2184, or use the coupon below.

We'll be happy to demonstrate how the Exxon Business Support System can help your corporation move into the future ... without the shock.

*UNIX is a registered trademark of Bell Labs.

Exxon Office Systems COW 03 12
P.O. Box 10184, Stamford, CT 06904-2184

☐ Please send me more information about the Exxon Business Support System.

☐ Please have your representative call.

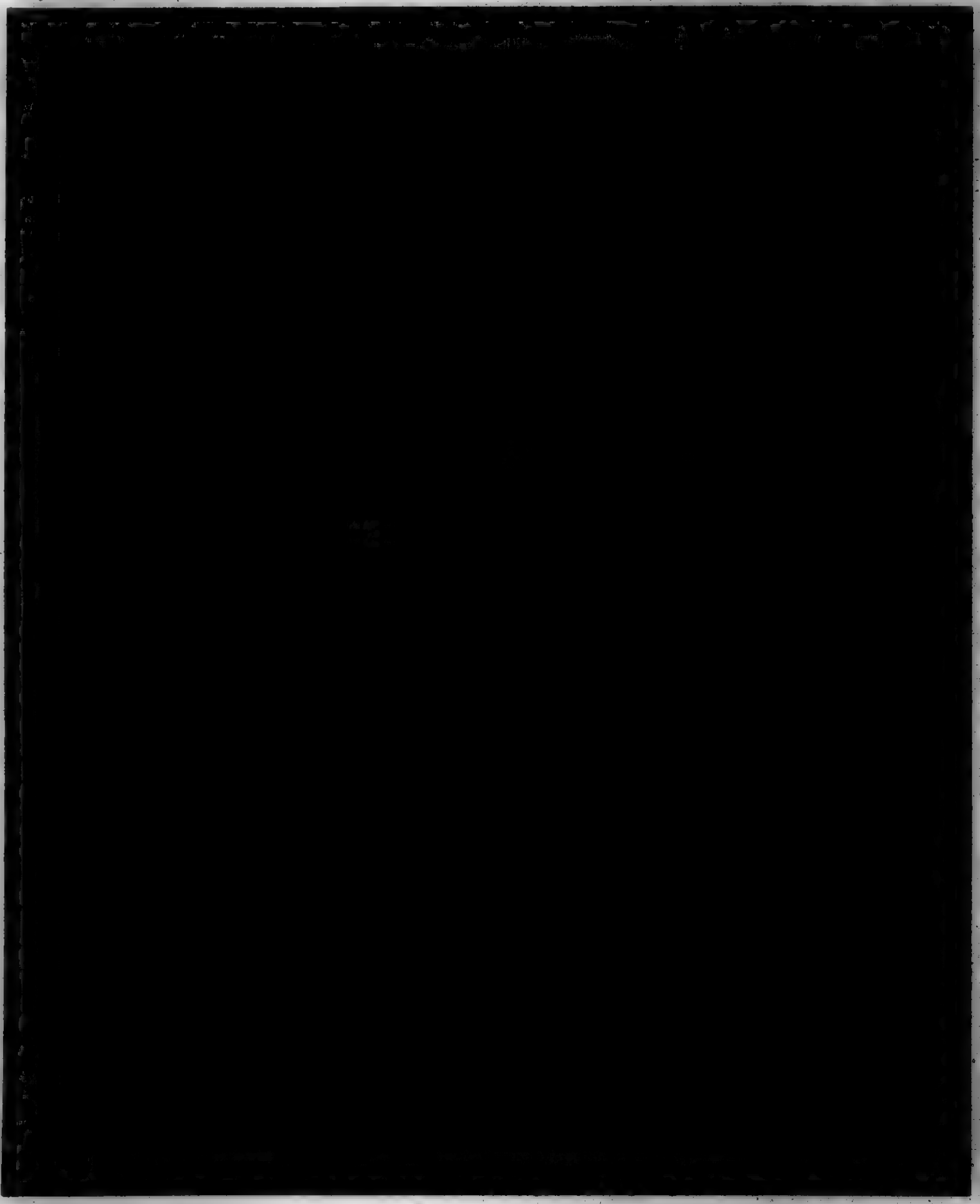
Name _____
Title _____
Company _____
Address _____
City _____ State _____ Zip _____
Telephone _____

800-327-6666 (In CT, 800-942-2525)

EXXON OFFICE SYSTEMS

The future. Without the shock.

NOW THAT YOU'VE GOT EVERYONE ON-LINE...



HOW ARE YOU GOING TO KEEP THEM IN LINE?

IS DATA CENTER MANAGEMENT SOFTWARE THE SOLUTION?

You bet.

Since large data centers are now controlling thousands of terminals, the *automatic* tracking of resources, users ... and their myriad problems ... has become mandatory.

The management of such a far flung organization has become so complex — and critical — that "going it alone" simply isn't feasible anymore.

So, UCC has developed a new kind of software package to help you effectively manage today's data center: UCC-8 Data Center Management Software.

WHAT IS DATA CENTER MANAGEMENT SOFTWARE ANYWAY?

It is a total solution to these new kinds of management problems ... not just a patch. It provides you with all the information and tools you ... and your people ... need to keep the operation running smoothly. It's a "Help Desk", an "Information Center" and a "Command Center" all rolled into one ... only better.

DOES IT HANDLE PROBLEM MANAGEMENT?

Yes. It will keep track of every one of your hardware and software problems. It will automatically respond to the problem ... and guide its solution.

DOES IT HANDLE CHANGE MANAGEMENT?

Yes. It will control all equipment and procedural changeovers ... every step of the way.

DOES IT HANDLE INVENTORY MANAGEMENT?

Yes. It will keep tabs on every one of your vendors, and every piece of their equipment.

WHAT ELSE DOES IT DO?

It will monitor the immediate status of every project in your shop. It will identify the expense associated with every particular problem. And it will help you determine priorities and assign responsibility for every project.

In fact, it can do all of this for your entire company ... as well as your DP Department!

HOW CAN I FIND OUT MORE ABOUT UCC-8?

Simple. Call us at 1-800/527-5012 (in Texas, 214/353-7312). We'll be delighted to answer all your questions about what is probably the most essential piece of software to come down the pike in years: UCC-8 Data Center Management Software.

[redacted]

The most complete software company in the world.

University Computing Company
Dallas • Toronto • London • Paris • Frankfurt • Zurich

UCC is a subsidiary of Wyly Corporation (NYSE). For information and an annual report, write 1000 UCC Tower, Exchange Park, Dallas, Texas 75235.

Designing meaningful interaction is a tough and time-consuming process for CBT course authors. It's an easy — and common — practice to cut down on student interaction in order to reach the training market quickly with CBT courseware on popular programs.

ware, the more comfortable and confident students will be in their skills.

CBT is an ideal training medium for the information center, where the range of users requires individualized pacing of instruction. As a DP manager, you may be responsible for organizing, staffing and maintaining that center.

In addition, increased computerization of information handling is changing the basic nature of DP training in many companies. In large organizations, the programmers and end users learning a language such as Focus may number in the hundreds or even thousands. Such demand can tax the training resources of both the information center and the DP department. CBT is a natural choice for situations like this because it provides a standard level of instruction across locations within the company while delivering training in features different audiences will be using.

The spread of data management and report writing software and fourth-generation languages affects the training needs of DP and non-DP managers alike. As a DP manager, you may find yourself in need of training on one or more of these tools. Because it is self-paced, CBT can meet your own training needs as well as those of end users or applications programmers.

Well-designed CBT that takes a modular approach to instruction can meet a variety of training needs within an organization, including your own.

The advantage of this type of approach is a focus on the material you and other managers or professional staff really need to know. It's a good way for DP and non-DP managers alike to develop computer skills that can enhance their own productivity.

In short, DP managers should not assume that CBT on software like SAS or Focus is the exclusive domain of the information center. The rapid growth in CBT usage suggests that many more organizations are coming to this realization.

As a DP manager, you may have had little prior knowledge of the new generation of CBT products. Not all courses are created equal.

The competition among CBT training vendors is strong, and the quality of the product varies widely as a result. Unfortunately, institutional decisions to rent or purchase CBT are sometimes made sight unseen because availability or price (or both) is attractive to management.

On the other hand, you can and should be aware of the basic qualities that make CBT effective. The CBT should reflect the release level and amount of information required by users at your installation. It should combine concepts and practice in manageable units of instruction. It should emphasize practical applications and include exercises on the actual software or system. It should be interactive and not an on-line user's manual.

With these guidelines, you will be well equipped to evaluate the usefulness of CBT courseware for your installation.

About the author

Carol Kouic Anderson is a project coordinator of instructor-led training for the Consulting Services Division of Deltak, Inc., Naperville, Ill. Previously, she was a data processing training coordinator and product developer for Deltak. She recently completed four computer-based courses on ISPF for end users.

Statistical Multiplexers From Paradyne

Paradyne's series of Intelligent Networking Multiplexers is now a family of network solutions. With User Switching and Auto Rerouting, hundreds, even thousands of your employees and customers can depend on your network.

User Switching For Efficient Communications. To be productive you need computer resources. User Switching provides a way for users to tap into the variety of your company's resources, regardless of where those computer resources are in the network. Paradyne's DCX multiplexers find the most efficient communications path to each computer.

Auto Rerouting Means Increased Productivity. Auto rerouting maintains the connection to the computer and insures user productivity in the face of degraded telco lines. When a link fails, DCX automatically looks for alternate routes in the network to reroute communications traffic, insuring continued productivity.

Advanced Networking Diagnostics. Paradyne offers the most advanced networking diagnostics in today's market. Both data and controls can be viewed to and from any channel in the network. Problems at a remote site can be isolated and diagnosed through DCX, quickly and easily.

Productivity and Efficiency. Another Paradyne systems solution. If you would like to know more about Paradyne's Series of Intelligent Networking Multiplexers call **1-800-482-3333**. We'll answer your questions and give you the location of the Paradyne sales office nearest you.

DCX 815...four or eight channels. DCX 825...four to 32 channels. DCX 840...240 channel data networking exchange. DCX 850...240 channel intelligent networking processor. DCX 861...four or eight channel statistical multiplexer with an integrated 9,600 bps modem. DCX 871...four to 32 channels with integrated 9,600 bps modem. And Paradyne's NEW T1 Multiplexer...combining the channel capacity of T1 facilities with the versatility and networking capabilities of the DCX product line.

Meeting the Communications Challenge of the 80's

paradyne

Paradyne Corporation P.O. Box 1347 8550 Ulmerton Road, Largo, FL 33540

IN DEPTH

How to win over colleagues and influence the company

The effective manager of the 1980s must learn how to meet departmental objectives in situations where he has no control over the people whose cooperation is essential. The manager needs influence — a specific set of behaviors and skills that can be learned.

By Jane Carroll Jackson

As Adam Michaels sees it, his job as MIS director is changing rapidly, and he has to change with it.

"In the old days, I spent most of my time in my office. I think everyone else in the company was a little afraid of me because I knew about computers and they didn't. They saw me as that techie in shirt-sleeves down in the basement. And that's where I actually was — down in the basement. I was cut off from everyone else except when someone called to ask if I could do this or that. I never seemed to be part of things, and consequently I got a little defensive. Deep down, I felt like a kid who has been left out of the game — you know, a bench warmer."

The "old days" weren't so very long ago. In the 1950s, the DP manager was a "waiter," in both meanings of the word. He waited down in his office until someone called him upstairs with a request. Later, when the job was done, he'd serve it up to them and go back downstairs to wait some more.

IN DEPTH/INFLUENCING PEOPLE

But the switch from ledger books to electronic screens and printouts suddenly allowed the numbers to be manipulated in previously unimagined ways. Add in the rapid rate with which DP systems increased capacities, speed and efficiency, and you have the ingredients for the MIS revolution of the 1960s. More and more departments began looking to MIS for ways of finding information that could reduce the "guess element" in decision making.

"I don't sit down in the basement anymore," Adam says with some satisfaction. "My office is up here with everyone else. Now I'm a member of the management team. I'm the manager of a department that is integrated with all the other departments. It feels a whole lot better to be part of the action, but now I have a new responsibility.

"I've got to get out of my office and sell my services to the other departments. Some of them still aren't sure how MIS can help them, or they still have some computer fears. I've got to overcome that. I'm learning how to do it, but for me it's a whole new game."

The problem is that Adam, like most MIS managers, was not prepared for this new role. He had no training and very little experience to fall back on. "There I was, sitting on the bench. All of a sudden they threw me into the game and gave me the ball, but nobody told me how to play. So I've had to learn as I go."

Learning process

What exactly has Adam had to learn in order to meet the new responsibilities of his job? There are several answers to this question. In the first place, he's had to learn to be active rather than reactive, to initiate rather than wait. But he's also had to learn how to meet his departmental objectives in situations where he has no control over the people whose cooperation is essential to the success of any given MIS mission or task. "If I was captain of the team, my job would be a lot simpler," Adam explains. "I'd just tell the other players what to do, and they'd do it. But on the teams I play for now, we're all captains."

Adam, for example, can't tell Tom Harris, the director of marketing, what to do. But if Tom declines to participate in Adam's idea for developing better information for the marketing department, Adam will not be fulfilling his own responsibilities. He needs Tom's cooperation and expertise, but he can't command it, so he must gain Tom's cooperation some other way. One of the best ways is by using influence.

In today's business world, influence is understood as the ability to produce results through other people over whom you have no direct control.

By the very nature of their positions as internal consultants, MIS managers usually find themselves in situations where they have to rely on influence in order to reach their objectives, but they are not alone. In today's business environment, where chains of command are frequently less clear and authoritative than they used to be, influence is needed by most managers at all corporate levels.

A division president does not have his own marketing staff, so he must share corporate marketing resources. How does he manage to get his fair share of those resources when he doesn't control them?

A product manager must work through manufacturing and sales in order to reach his own objectives. But how does he get them involved, committed and motivated when he has no authority to tell them what to do?

There are many other examples of situations in which authority is not clear-cut or has been spread around to several of the players. And these ambiguous situations are increasing.

Remodeled pyramids

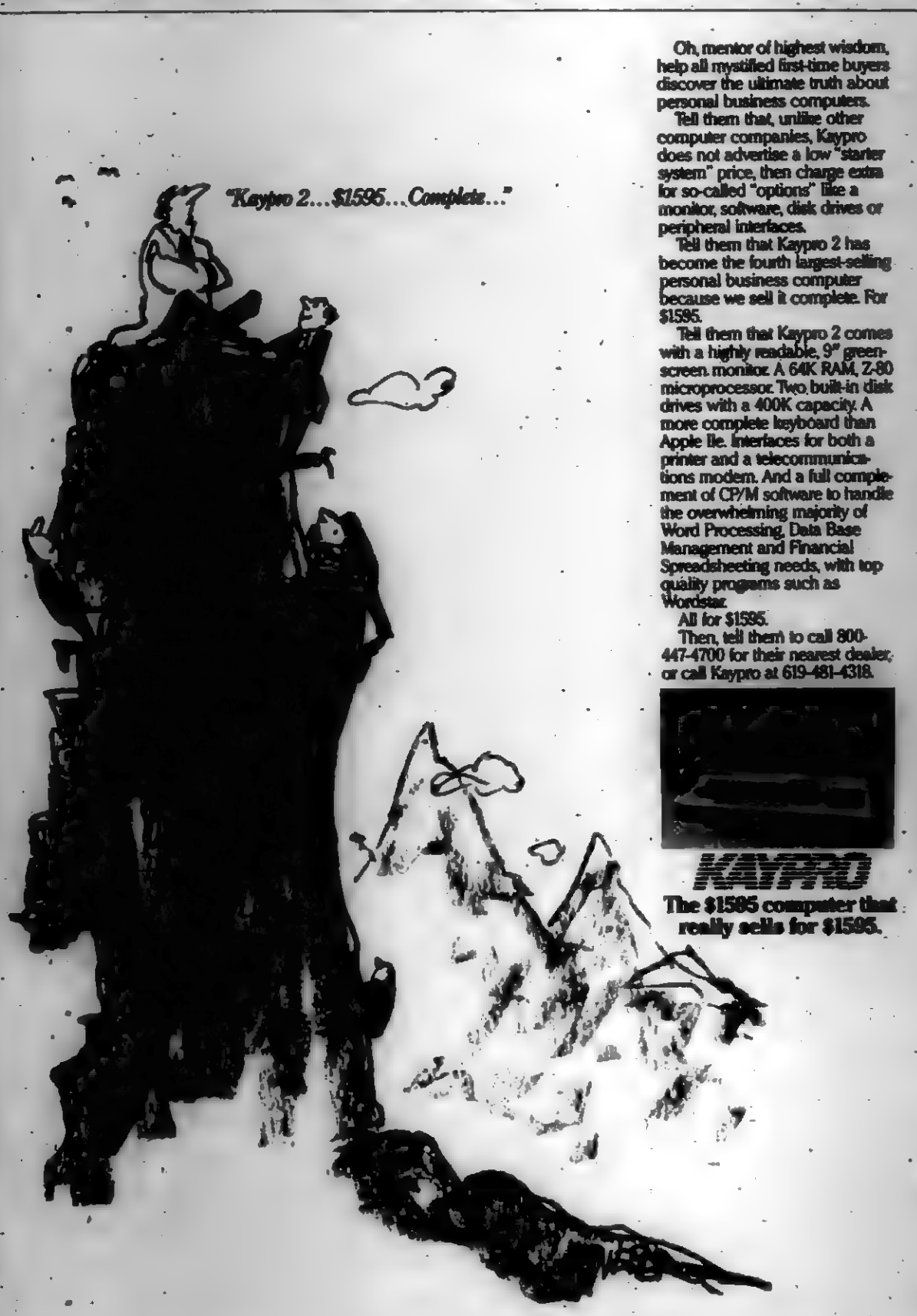
Not too long ago, most American corporations were organized as pyramids: Power originated at the top and came down in the form of orders, directives or commands. Managers were supposed to manage other people by the power of position they had over them.

Today many companies have remodeled their pyramids into flatter structures. Managers often find themselves on a team of peers where the need for flexibility, adaptability and tolerance for ambiguity in corporate settings has increased. All of these adjustments are examples of the need for influence behavior.

In response to these changes, the more quick-footed of today's managers have developed a new, nontraditional way of acting in order to reach their goals. Instead of relying on the rigid hierarchy of authority, they use influence.

Adam Michaels is quick-footed. His interaction with Tom, the marketing director, is a good example of his new managerial skills. Adam needed Tom's cooperation, commitment and knowledge in order to get results, but remember, he had no authority over him. All he could do was *sell* Tom the idea or, to put it another way, all he could do was influence him.

"When I first got the idea, I sent Tom a memo telling him what I had and how it could help him. When I think back on it, maybe I was a little too abrupt. At any rate, Tom sent a reply, which basically said he was up to his ears in other things and didn't have time to discuss my idea. He'd let me know when he could. Imagine that! There I was offering him a good idea, and he was playing hard to get. I felt like telling him what he could do with his 'time.' What did he think, my job was pressure-free?



Oh, mentor of highest wisdom, help all mystified first-time buyers discover the ultimate truth about personal business computers.

Tell them that, unlike other computer companies, Kaypro does not advertise a low "starter system" price, then charge extra for so-called "options" like a monitor, software, disk drives or peripheral interfaces.

Tell them that Kaypro 2 has become the fourth largest-selling personal business computer because we sell it complete. For $1595.

Tell them that Kaypro 2 comes with a highly readable, 9" green-screen monitor. A 64K RAM, Z-80 microprocessor. Two built-in disk drives with a 400K capacity. A more complete keyboard than Apple IIe. Interfaces for both a printer and a telecommunications modem. And a full complement of CP/M software to handle the overwhelming majority of Word Processing, Data Base Management and Financial Spreadsheeting needs, with top quality programs such as Wordstar.

All for $1595.

Then, tell them to call 800-447-4700 for their nearest dealer, or call Kaypro at 619-481-4318.

KAYPRO

The $1595 computer that really sells for $1595.

Registered Trademarks: 2-83, Zilog; Apple, Apple Computer Corp.; CP/M, Digital Research, Inc.; Wordstar, Micro Pro. © 1984 Kaypro.

YOU DON'T HAVE TO PICK OUR EQUIPMENT TO PICK OUR BRAINS.

Whether you're an AT&T customer or not, the Communications Management Institute will provide you with the latest knowledge you'll need to better manage the planning, implementation and ongoing control of information management systems.

For more than 100 years AT&T has pioneered the field of Information Management, with an endless stream of innovations. Today, no one else is better prepared to review the state of Communications and Information Management Systems—from our products to our competitors' products.

Courses will be held at Callaway Gardens in Pine Mountain, Georgia—one of 63 conference centers nationwide to receive a Four-Star Award. So you'll experience an environment conducive to learning, with outstanding accommodations.

See the schedule for detailed course objectives. Register now for seats March through July. But hurry, seats are limited.

Communications Management Institute

Call 1 800 222-4884 ext. 21 to enroll. Or fill out the attached coupon with payment or purchase order and return it to Communications Management Institute, P.O. Box 8, Pine Mountain, Georgia 31822-0008.

INFORMATION RESOURCES PLANNING "AN APPROACH TO OFFICE INFORMATION SERVICES"

3½ Days—$800
Mar. 12–15, May 14–17
Jun. 11–14

This course is for the managers and influencers who are responsible for improving the productivity and the effectiveness of people in their office environment. It provides a simulated experience in managing office information resources. This interdisciplinary approach will broaden the perspective of the planning, needs assessment and design process necessary for total office systems integration.

COURSE OBJECTIVES

Upon completion of this course, participants will be able to:

- Establish a planning process for office automation by applying fundamental organizational planning concepts.
- Extend the office automation planning process to include specific methodologies for identifying opportunities within the office that offer high potential for return of investment.
- Design and strategically manage an office automation plan with emphasis on positive performance.
- Communicate more convincingly the benefits of office automation concepts and technologies through the use of presentation aids and techniques.
- Accelerate the positive progress of office automation by providing an innovative approach to employee education and involvement with the implementation process.

INFORMATION DISTRIBUTION MANAGEMENT "NETWORKING FOR THE 90's"

4 Days–$920
Mar. 19–22, Apr. 9–12
May 21–24, Jul. 16–19

This course is aimed at managers who need increased information management skills to be more effective in their responsibilities. It provides an overview of the distributed information concepts and systems necessary to manage the planning, implementation, and ongoing control of an information network—with emphasis on the planning and management functions.

COURSE OBJECTIVES

Upon completion of this course, participants will be able to:

- Describe the changing role of information distribution management and apply a systematic approach to their information management responsibilities.
- Understand voice and data network applications, features, and operating characteristics.
- Determine potential applications for local area and value-added networks for their companies.
- Evaluate integrated data, voice, facsimile, and video systems—including CBX and networking alternatives.
- Manage the use of current approaches and procedures involved in planning, implementing, and controlling a network.
- Apply current approaches in economic evaluation of a network.

LOCAL AREA NETWORKING "BUILDING FOR THE FUTURE"

3½ Days—$800
Mar. 19–22, Apr. 9–12
May 14–17, Jul. 23–26

This course is aimed at individuals with responsibility for planning communications networks. It deals with those areas of the corporate environment where local area network solutions are applicable. The course will further examine individual vendor offerings and the management and control systems which ensure optimum performance of a local area network.

COURSE OBJECTIVES

Upon completion of this course, participants will be able to:

- Plan, design and effectively implement a local area network.
- Define primary and secondary applications within the corporate structure.

AT&T Information Systems

COMMUNICATIONS MANAGEMENT INSTITUTE
P.O. BOX 8, PINE MOUNTAIN, GEORGIA 31822-0008

NAME _____ LAST _____ FIRST

TITLE _____

COMPANY _____

( ) TELEPHONE NO. _____

MAILING ADDRESS _____

CITY _____ STATE _____ ZIP

PLEASE REGISTER ME FOR:

COURSE _____

SESSION _____

☐ Payment/purchase order enclosed.

☐ I am interested in the courses offered, but unable to enroll at this time. Please keep me informed of future course dates.

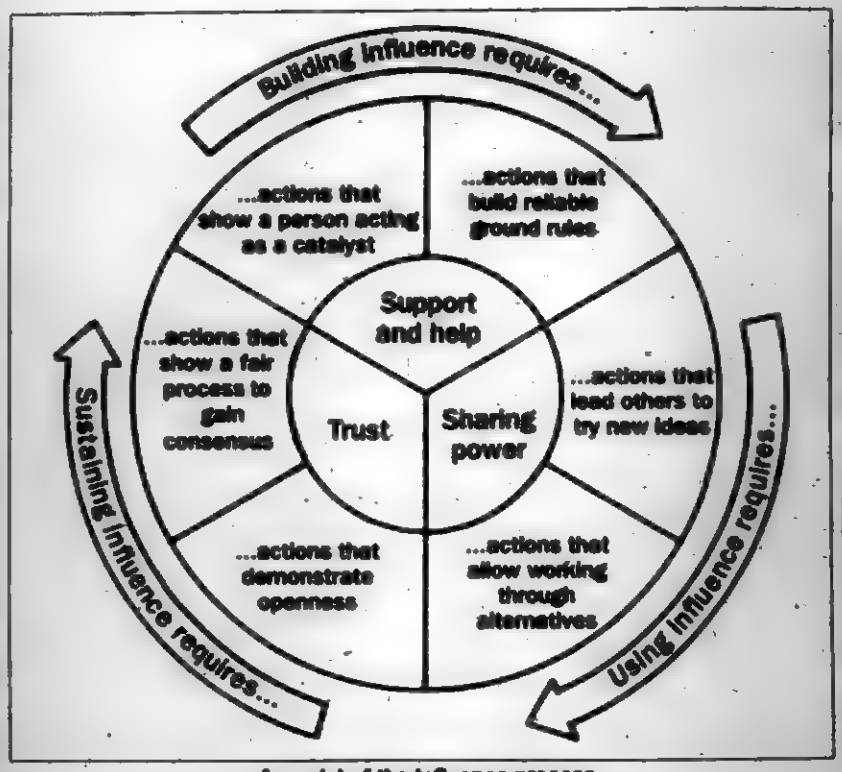
"A couple of weeks passed with no word from Tom, but in anticipation of developing the marketing project, I hired two new people. Now I was ready to go, but I was under the gun to justify their cost. So you can bet I didn't forget about Tom. Marketing was potentially one of my biggest customers.

"Then at a planning meeting a loud shoe dropped. Top management wasn't very happy with the entire DP/MIS operation. They said we weren't being fully utilized, so they decided to put the entire sales system on the computer to track and monitor all sales force activities.

"Well, I thought, here's my chance to show what I can do. It would mean a lot of work, but it was just what I was asking for. And it was immediately apparent that this new system would have a big impact on marketing. Tom said he didn't have the time right now. I'd just have to make him find it."

The next day, Adam phoned Tom and blurted out his whole story. MIS was under the gun; the clock was ticking; Adam's people were ready to begin on the sales system; it was the best time to do the marketing system and so on. He hardly gave Tom a chance to get in a word. But when he was done, Tom's position hadn't changed.

"I'm under pressure, too," Tom said. "If I get my people involved in a new system right now, they'll never get their other work done. I don't have time for your project now. And just so you know for the future, when it comes to marketing, I make the decisions."



A model of the influence process

Adam's telephone approach failed for several reasons. The most important of these was his impulsiveness. After Tom hung up, Adam sat at his desk and began to wonder what he'd done wrong.

"I was angry at Tom, no doubt about that. But I was also angry at myself. I was putting out effort, but I wasn't getting results. That's when I started to think about the way I do things.

Two motives

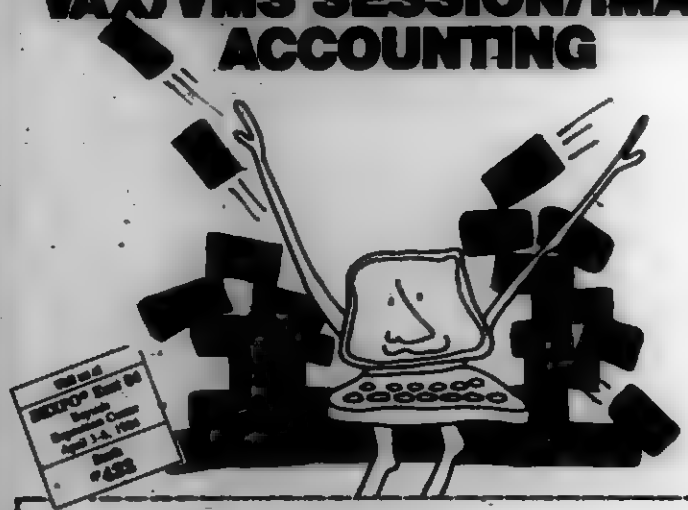
"I had two interests in mind in my dealings with Tom. I wanted to get the marketing program on-line so my department would have more to show. And I wanted to get it started immediately so it would integrate more easily with the sales program and save my department some money, which was one of my goals. These were my selfish interests.

"But I also wanted to help him. I knew the program would be terrific for marketing, and if he agreed to it, he'd thank me later. As I thought about it, I saw that I hadn't used the best approach in the first place. And the phone call had made things worse. Most importantly, I saw that I didn't have a plan. I just got the idea and fired it off.

"I had to come up with a plan that had several elements. I had to get Tom's go-ahead, which meant he had to trust me. I had to get his commitment and his agreement on what role he would play.

"We had to agree on what rules we'd follow for decision making, which meant that everyone involved would have to know their roles and responsibilities. We had to agree on the specifics to implement the plan.

BREAKTHROUGH IN VAX/VMS SESSION/IMAGE ACCOUNTING



Only EZTRACK™ allows examination and tracking of VMS session/image resource data by user, time interval, terminal port and other key fields. EZTRACK offers:

- General query and interactive capabilities
- Flexible report writer and graphics
- Full screen forms reporting

Name _____
Title _____
Company _____
Address _____
City _____ State _____ Zip _____
Phone ( ) _____

SEND COUPON NOW FOR COMPLETE DETAILS!

Signal Technologies, Inc.
8951 Entrada Road, Goleta, CA 93117 (805) 683-3771 Outside California call toll-free (800) 368-8787
TWX 910-334-3471

VAX/VMS is a trademark of Digital Equipment Corporation

The TeleVideo IBM PC compatibles. The best hardware for the best software.

TeleVideo versus IBM. Make a few simple comparisons and you'll find there is no comparison.

RUNS IBM SOFTWARE.

With the TeleVideo® IBM Compatible line—PC, XT and portable computers—you'll get the most out of all the most popular software written for the IBM® PC—more than 3,000 programs.

Because every TeleVideo Personal Computer offers the highest level of IBM compatibility on the market and has the standard—not optional—features you need to take full advantage of every job your software can do.

THE BEST HARDWARE FOR THE BEST PRICE.

Features	Tele-PC	IBM PC	Tele-XT	IBM XT
Monitor	YES	OPTIONAL	YES	OPTIONAL
Screen Size	14"	12"	14"	12"
Tilt Screen	YES	NO	YES	NO
Quiet Operation	YES (NO FAN)	NO	YES	NO
Memory	128K	128K OPTION	256K	256K OPTION
Graphics Display (640 x 200 resolution)	YES	OPTIONAL	YES	OPTIONAL
Printer Port	YES	OPTIONAL	YES	OPTIONAL
Communication Port	YES	OPTIONAL	YES	YES
MS™DOS/BASIC®	YES	OPTIONAL	YES	OPTIONAL
System Expansion Slot	YES	YES	YES	YES
RGB and Video Port	YES	OPTIONAL	YES	OPTIONAL
Typical System Price	$2995	$3843	$4995	$5754

Study the chart below. It proves that TeleVideo—not IBM—offers the best hardware for the best price.

Note that TeleVideo's ergonomic superiority over IBM extends from fully sculpted keys and a comfortable palm rest to a 14-inch, no glare screen that tilts at a touch.

THE BEST MICROCHIPS.

What is perhaps most impressive about the TeleVideo IBM PC Compatible can be found deep within its circuitry. We use the same 8088 central processing unit that runs an IBM PC. But we also employ new VLSI (Very Large Scale Integration) microchips that are designed and built exclusively for TeleVideo. These interface more efficiently with the powerful 8088 and yield numerous benefits.

For example, our tiny custom chips do the work of many of the larger, more expensive circuit boards in an IBM PC. So we can offer a computer system that comes in one attractive, integrated case, is ready to run and occupies less desk space. A computer that edges out IBM's added-cost component system for reliability, ease of service and purchase simplicity.

Fewer circuit boards to cool also allowed us to eliminate the noisy, irritating fan IBM and most other PCs force you to put up with. And TeleVideo compatibles accept any IBM hardware options without modification.

THE BEST PORTABLE FOR THE BEST PRICE.

Features	TPC II	COMPAQ
High Capacity Storage	YES	NO
2nd Disk Drive	YES	OPTIONAL
Quiet Operation (No Fan)	YES	NO
Ergonomic Display	YES	NO
Communication Port	YES	OPTIONAL
International Power Supply	YES	NO
MS™DOS 2.11	YES	NO
Graphics Display	YES	YES
Typical System Price	$3995	$5718

THE BEST LINE.

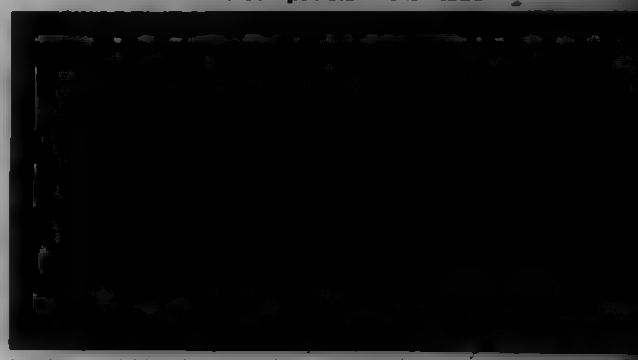
But the Tele-PC is only one element of the TeleVideo IBM PC Compatible line.

The TeleVideo XT is the best hardware for users of popular IBM XT software who would appreciate an extra 10 megabytes of storage capacity along with the advantages listed on the chart at the left.

As the chart above demonstrates, our portable IBM compatible computer, the TPC II, is far and away better hardware than COMPAQ.™ Better hardware—standard—at a better price.

THE BEST MANUFACTURER.

The TeleVideo IBM PC Compatible line is made by the world leader in multi-user computer systems and the number one independent manufacturer of terminals.



Our compatibles are available at participating ComputerLand and Entré (call 800-HI-ENTRE) dealers or you may call 800-538-8725 for the dealer nearest you. In California, call 408-745-7760.

Before you invest, make a few simple comparisons. You'll find that TeleVideo—not IBM or COMPAQ—has the best hardware for the best software. At the best price.

IBM is a registered trademark of International Business Machines. MS is a trademark of MicroSoft Corporation. GW Basic is a registered trademark of MicroSoft Corporation. COMPAQ is a trademark of COMPAQ Computer Corporation.

TeleVideo®
Personal Computers

©TeleVideo Systems, Inc.

Study identifies components of influence behavior

The growing need for influence behavior in the business world led The Forum Corp. to conduct a study to discover if successful influence behavior could be broken down into specific components. If so, Forum wanted to find out if these components could be isolated, demonstrated and learned.

Data was gathered on more than 4,000 managers from leading corporations. The extensive data base contained more than 24,000 responses concerning the skills and practices of these managers in the areas of task performance and interpersonal relationships.

The responses came from their peers, co-workers and higher level managers. The data base also included performance ratings on the 4,000 managers from knowledgeable senior managers. The study confirmed the existence of specific practices that make for successful influence behavior.

Prior to this study, influence behavior had not been clearly defined for the business world. It had been observed in the actions of successful managers, but it was generally assumed to be a "gift" or the result of personality features; if you weren't born with it, you could never get it.

Analysis of the data reversed this assumption. Forum has identified specific patterns of behavior that distinguish high performers from moderate performers.

In an earlier study, Forum had identified 23 practices that are critical to effective performance in an influence environment. In its most recent study, it determined that these practices tended to fall together in clusters. In addition, there was a correlation between a number of tactics that actually describe specific managerial actions and the 23 influence practices.

Successful influence behavior is not defined by personality. Influence skills are grounded in a multifaceted process that involves analytical behavior, logical behavior, creativity and good interpersonal skills.

The result is a description of influence behavior that can provide specific information on how others perceive a person's use of influence practices, as well as a detailed prescription for improving performance.

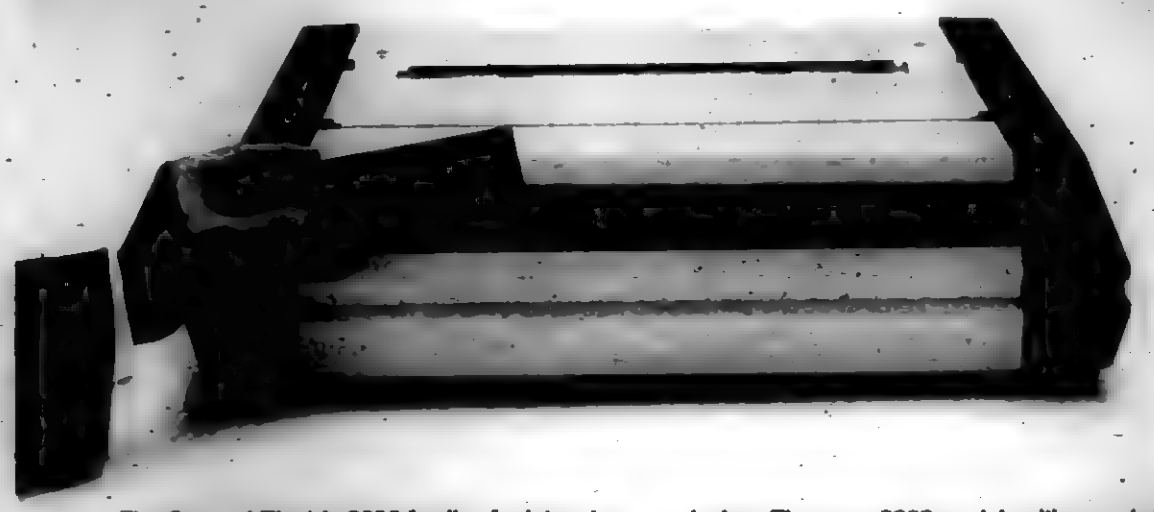
Successful influence behavior is not defined by personality. Influence skills are grounded in a multifaceted process that involves analytical behavior, logical behavior, creativity and good interpersonal skills. These skills and practices can be learned and used.

The benefits of influence behavior are available to managers who make the effort to learn how to use it. There is a method for dealing with managerial situations in which you have no direct control.

In the three-day Forum Influence Seminar, participants learn to analyze, build, use and sustain influence. Teaching techniques include simulations, group tasks, role playing, case studies, individual and group exercises and video. Each participant receives an individual feedback report rating his performance on the 23 influence practices that make up the process. Through individual personal-planning sessions, participants develop a specific plan for what they will do differently when back on the job.

ONE OF THE BEST BRAND NAME PRINTERS HAS A BRAND NEW NAME.

GENICOM



The General Electric 3000 family of printers has become an industry leading product. But now, this popular printer series has a new name, because the Data Communication Products Department of GE is now an independently owned company called Genicom.

At Genicom today, we offer the same complete line of printers we offered while a part of General Electric. We have the same facilities, the same nationwide service network, and the same corps of experienced employees...only the name has changed.

Above all, Genicom offers you the same reliable product quality you've come to expect from us over the years. Our Genicom 3000 printers feature outstanding performance for end-users as well as superior flexibility for many OEM's, distributors, retailers and dealers. There are 3000 models with speeds from 40 to over 400 cps. Single or dual mode printing. Type quality from EDP to NLQ. Multi-color printing. Graphics. Selectable type fonts. American craftsmanship and more. There are even 3000 family printers for personal computers...ideal for business needs.

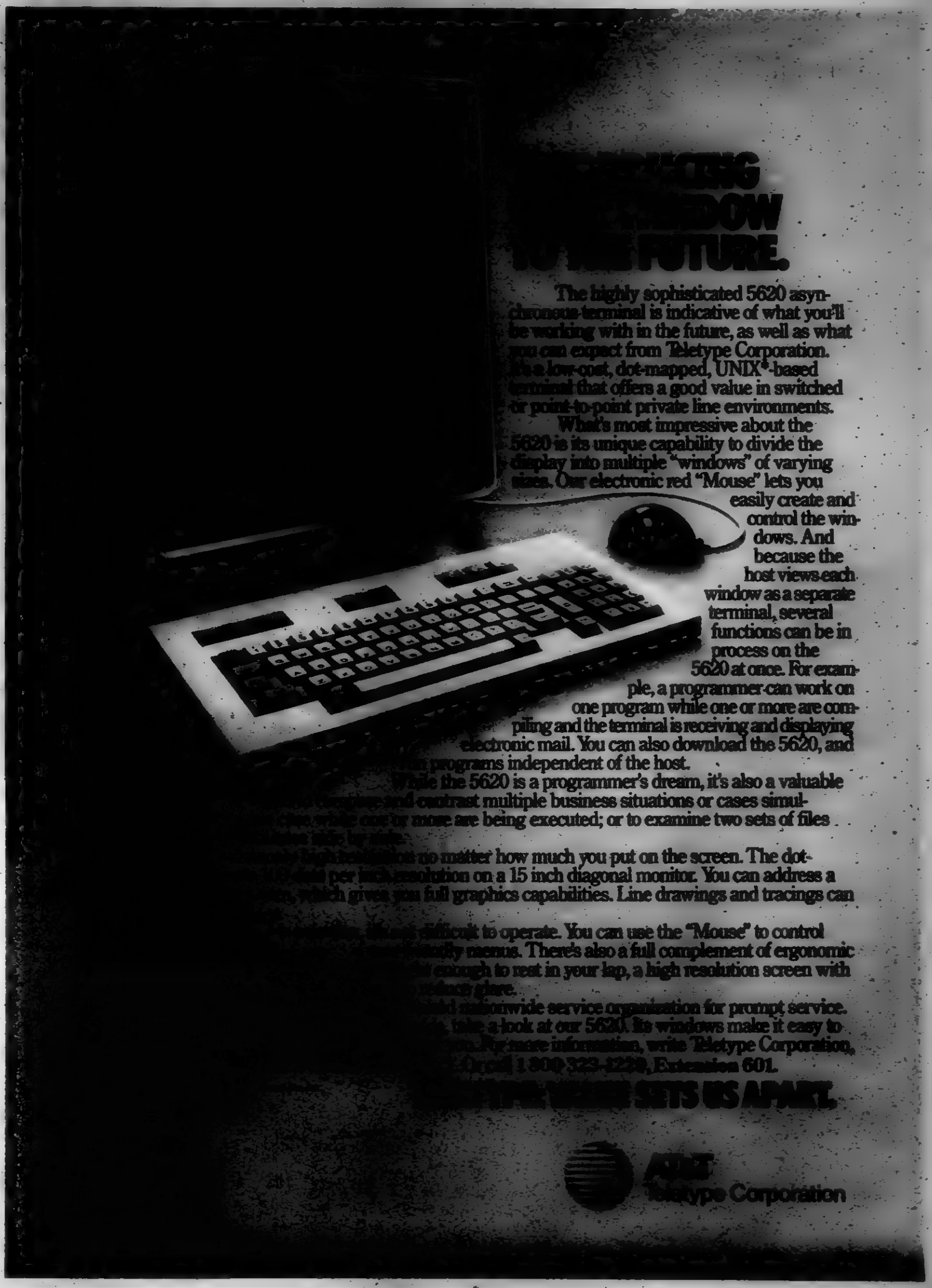
We're proud of the excellent brand reputation we established under General Electric. But now we're going to make a new name for ourselves by bringing you more innovations, and more of the reliable quality you've always found in each of our products.

Genicom Corporation, One General Electric Drive, Dept. M331, Waynesboro, VA 22980. In Virginia, call 1-703-949-1170.

GENICOM

For the solution to your printing needs call

TOLL FREE 1-800-437-7468



[illegible] FUTURE.

The highly sophisticated 5620 asynchronous terminal is indicative of what you'll be working with in the future, as well as what you can expect from Teletype Corporation. It's a low-cost, dot-mapped, UNIX*-based terminal that offers a good value in switched or point-to-point private line environments.

What's most impressive about the 5620 is its unique capability to divide the display into multiple "windows" of varying sizes. Our electronic red "Mouse" lets you easily create and control the windows. And because the host views each window as a separate terminal, several functions can be in process on the 5620 at once. For example, a programmer can work on one program while one or more are compiling and the terminal is receiving and displaying electronic mail. You can also download the 5620, and [illegible] programs independent of the host.

[illegible] While the 5620 is a programmer's dream, it's also a valuable [illegible] and contrast multiple business situations or cases simul- [illegible] while one or more are being executed; or to examine two sets of files [illegible] side by side.

[illegible] no matter how much you put on the screen. The dot- [illegible] per inch resolution on a 15 inch diagonal monitor. You can address a [illegible], which gives you full graphics capabilities. Line drawings and tracings can

[illegible] difficult to operate. You can use the "Mouse" to control [illegible] menus. There's also a full complement of ergonomic [illegible] enough to rest in your lap, a high resolution screen with [illegible] glare.

[illegible] nationwide service organization for prompt service. [illegible] take a look at our 5620. Its windows make it easy to [illegible]. For more information, write Teletype Corporation, [illegible] or call 1 800 323-1220, Extension 601.

[illegible] SETS US APART.

AT&T
Teletype Corporation

— who had to do what and when. We had to establish cost parameters and agree on a definition of expected results.

"Finally, all the members of the team, which would include my people, Tom's people and perhaps others, would have to be committed to move ahead and understand the roles they had to play.

"If it all worked out, this plan would save time and money. It would also lead to the best possible decisions because everyone involved would be putting in their best ideas.

"The first thing I did was to find out something about Tom. I casually asked around and learned two things that seemed important. One was that marketing was rolling out two new products.

"The other thing was his admitted reluctance to deal with MIS or any other service that would get him tied up with computers. It seems he was a little phobic about computers.

"Tom's an old-timer and a real pro. Everyone thinks he does a great job. But like a lot of people who get used to doing things a certain way, he was leery about change. Now I knew that he was under pressure and that he had a negative preconception about MIS. Once I was ready to address these real factors, I had a handle on the situation."

In a traditional hierarchical setting, a manager's power is his power to command. In influence situations, which by their very nature lack command, another kind of power has to be utilized. This power is based on one's own knowledge and expertise and is used to achieve collaboration.

Taking it slow

Adam reasoned that he ought to take a slow and easy approach. He decided to talk with Tom as soon as he could, but he wanted the setting to be as informal as possible. At the first opportunity, he casually joined Tom at a table in the lunchroom to share a coffee break.

Adam had two objectives on his agenda for his informal chat with Tom. First, he wanted to acknowledge Tom's current pressure. Second, he wanted to begin the process of defusing the computer/MIS mystique.

The purpose of this type of approach was to begin to establish a relationship that would lead to Tom's trust and eventually his cooperation and acceptance. After all, Adam thought, what I'm offering Tom can definitely reduce the pressure he's under, and at the same time I can teach him something about computers and MIS.

Over coffee, Adam made no mention of his idea. Instead, he made it easy for Tom to talk about marketing, a subject he truly liked. When Tom finished, Adam began to talk about the MIS department. He didn't try to convince Tom of anything, all he wanted to do was teach him something about MIS. By the time they'd finished their second cup of coffee, they had had a real exchange of information, and Adam felt he had accomplished his immediate objectives.

After their first talk, Adam and Tom had several more informal interactions. The result of these exchanges was an increased understanding of each other's departments and a growing sense of mutual trust. Finally, when they happened to meet on the elevator, Tom said, "I think it's time to talk about your idea, Adam. I'll call you this afternoon after I check my calendar."

How he did it

Adam succeeded in his effort to work with Tom and the marketing department. When his idea was finally implemented, after much input from Tom and his people, Tom did indeed thank him. The question now is: How exactly did Adam gain Tom's cooperation?

At first glance, it might seem that Adam just acted like a friendly guy whose pleasant personality won Tom over. On closer inspection, however, we see that Adam followed several important steps to reach his objective.

First Adam built a relationship, so Tom felt he was being supported. Then he purposefuly increased the amount and quality of the communication between them. As the process developed, he consciously involved Tom in the decision making and did not try to impose his own plan. The multiple inputs they received from each other and the one or two other people they consulted along the way increased the quality of their decision making.

And finally, through Adam's initiative, the two of them came up with an MIS plan for marketing that they could accept and implement.

ATS introduces MASTERKEY.

The ultimate way to unlock the mysteries.

If you're a DP Manager, you know that when it comes to unlocking the mysteries of the IBM® PC for your people, you couldn't ask for a more brilliant source than ATS.

(After all, who has more experience than we do? We've been unlocking the mysteries of computers for more than a decade.)

MASTERKEY establishes a whole new standard of tutorial excellence. Certainly, there are other good IBM PC teaching courses out there. Yet none combines in one package, the dazzling clarity, the building block by building block simplicity, the sweeping, comprehensive range of MASTERKEY.

Consider just a few of its advantages:

MASTERKEY makes learning a snap for anyone. It requires no previous training whatsoever — even for those who seem to have the least aptitude. In astonishingly little time, MASTERKEY will give them a solid grasp of the IBM PC. It does this through an extraordinary combination of powerful graphics, animation and sound. MASTERKEY also boasts another innovation: an interactive but separate audio cassette. This unique concept allows students to pace themselves with far greater ease, thereby making comprehension practically effortless.

Unlike virtually every other course, MASTERKEY doesn't content itself with just teaching the keyboard and the operating system. It goes well beyond that. Students are introduced to word processing, communications networks, business graphics and spreadsheets.

MASTERKEY leaves nothing unexplored. It offers full instruction on how to use the IBM PC as a smart terminal, and how to access, retrieve and store information from S/34-38. It even advises you on what additional software you may need.

As you can see, MASTERKEY is a tool of incalculable value. It enables you and your data processing department to take firm control over all data processing functions.

Sound good?

For more information — or to order MASTERKEY directly — simply call the number below.

Or write to: Automated Training Systems
21250 Califa Street, Suite 107
Woodland Hills, California 91367

Toll Free 800-423-5205
In California call (818) 999-5753

MASTERKEY FROM ATS

CANADA 1-800-663-5333 • In BC & Parts of SASK: 112-800-663-5333 • UNITED KINGDOM (01) 341-5555

REPORT WRITER
for DEC computers
under RSTS and VMS

- Very powerful and user-friendly
- Better than DEC's Datatrieve
- Costs much less

etc ENTERPRISE TECHNOLOGY CORPORATION

Adam's tactics:

- He showed interest in Tom as a person.
- He acknowledged Tom's unique knowledge and talents.
- He encouraged Tom to come up with ideas.
- He was accessible to Tom, but not overly forceful.
- He carefully selected the language and tone he used with Tom.

In a traditional hierarchical setting, a manager's power is his power to command. In influence situations, which by their very nature lack command, another kind of power has to be utilized. This power is based on one's own knowledge and expertise and is used to achieve collaboration.

The process that took place between Adam and Tom allowed each of them to do a better job. The ultimate output of their teaching/learning exchange, in which each widened his knowledge of the other's functions, was a higher level of decision making. Their final decision to work together was based more on fact and less on personalities and guesswork. It proved a more efficient way than exchanging irritating memos and phone calls.

The skills Adam is learning in his interactions with Tom and other managers have made him more productive. He is even being considered for a much more important position in the corporation. "I'm in the mainstream of the company now," he admitted. "There's no telling how far I can go. This never even entered my mind when I was down in the basement."

The influence process

The managerial skills on which Adam's success is based are not magical. Their foundation is the influence process, a complete and rational approach to the problems posed by today's changing business world. This process is based on the values of cooperation and collaboration to achieve overall goals.

Most managers don't know they have the influence option. They think their options are limited to giving orders or manipulating. This is not true — influence is another option. For example, Adam could have tried to manipulate Tom to get his cooperation, and perhaps he would have succeeded — the first time. But the next time around, Tom would have been more leery than ever. Nobody likes to be used and manipulated.

Adam's approach, however, was straightforward. He gave as much as he got. Chances are good that he and Tom will cooperate again in the future. As a complete system of planning and action, the entire approach Adam used represents the influence process.

Influence is a way to get results in a changing environment. As a specific management process designed and developed by The Forum Corp., a management consulting firm located in Boston, influence is based on extensive research into the work habits and interpersonal skills of more than 4,000 successful managers.

The process allows managers to succeed in situations in which they have no control over the people and resources whose cooperation and utilization are necessary to the accomplishment of their tasks.

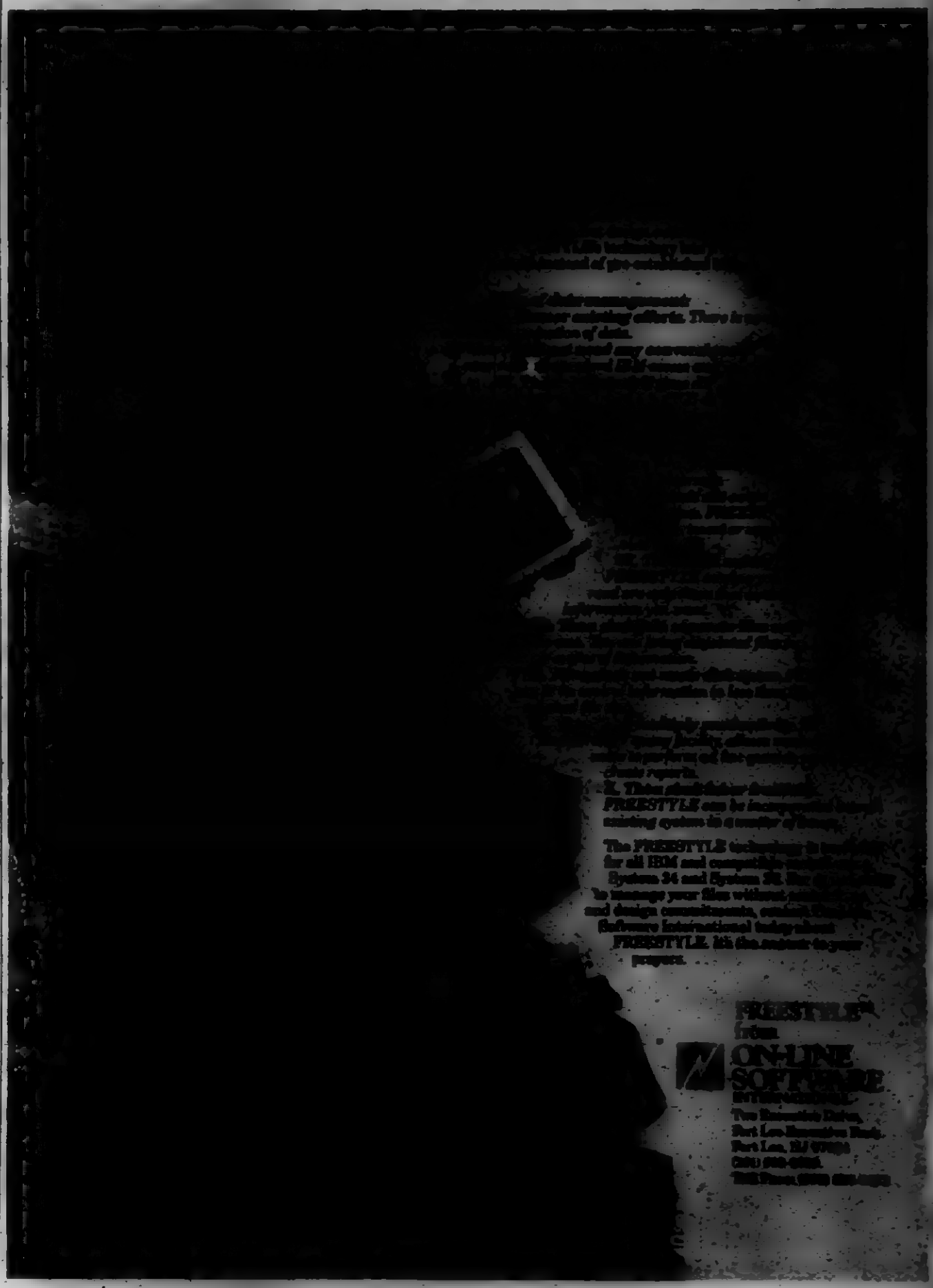
The foundation of influence behavior rests on a set of general values that are expressed by:

- Being supportive and helpful to others.
- Being willing to share power for the sake of an overall goal.
- Behaving in ways that lead others to trust you.

The influence process has three phases, which operate concurrently.

Building influence. In order to exert influence, you must first have it. The manager who builds influence does so by acting as a catalyst or initiator and by building reliable ground rules within an influence group. To do this successfully, a manager must be perceived as supporting and helping others. As a result of building influence, managers are able to make their work relationships more efficient.

Using influence. The manager who has built influence is now in a position to use it. He will encourage others to try new ideas and also provide a way to narrow down all the ideas generated to several reasonable alternatives, thereby capturing the collaborative power of



the influence group. To do this, the influence manager must also demonstrate an understanding of the importance of sharing power in the interest of the overall goal. The result of using influence in this way is that high-quality decisions are reached after a thorough examination of a wide variety of options.

Sustaining influence. The manager who has built and used influence faces the challenge of sustaining it. To do this, the individual must demonstrate an ability to get people to commit themselves to decisions and ideas, as well as remain open and flexible about change.

Underlying these traits is a fundamental method of establishing mutual trust within a network. The result of sustaining influence is the consistent execution and implementation of plans and ideas as intended.

The influence process tells people what to do and how to exert influence. The technically valid components of influence behavior are presented as precise, small-scale pieces of behavior that will cause you to be perceived as a manager who is efficient, makes creative, high-quality decisions and implements efficiently.

For example, you are leading the initial meeting of a project team composed of your peers, people over whom you have no control. Your mission is to get the project done. You have come to the meeting with a preconceived idea of how the team ought to function. As other team members express their views, you can respond in either an open or closed way.

Being closed to the opinion of others is a dead end. They cannot help but view you as a loner rather than as a team player. And if you are viewed as a loner trying to impose your preconceived view on the team, the other members will feel devalued, which leads to a lower level of their input.

If you are open, others will naturally feel free to express their ideas, which is essential to the success of any team.

Interest in others

In addition, your openness demonstrates your interest in the ideas of others, which enables them to think more creatively. The result is a genuine group effort to reach the best, most informed decisions possible. If you are able to motivate creative thinking, your mission is more likely to succeed.

But with the time pressures of your job, part of you just wants to present your ideas and get the meeting over with so you can go on to the next thing on your schedule. This behavior only tends to isolate you from the group and weaken your position in it. In the long run, this behavior is minute-wise and hour-foolish.

The most efficient use of your time is to create an atmosphere in which communication, cooperation and consensus are valued. Encourage others to express their ideas and take risks. Make sure everybody's role is clear. Arrive at agreed-upon ground rules on how the members of the team will work together.

Body language

There are specific things you can do in such influence situations. To demonstrate your interest in the ideas of others, keep the discussion going, don't close people off. Instead of fiddling with your pencil or looking out the window while someone else is talking, look into their eyes. Say a word or two to indicate your interest and keep them talking. You might move closer or smile. All of these specific actions were discovered as the result of a study of influence behavior.

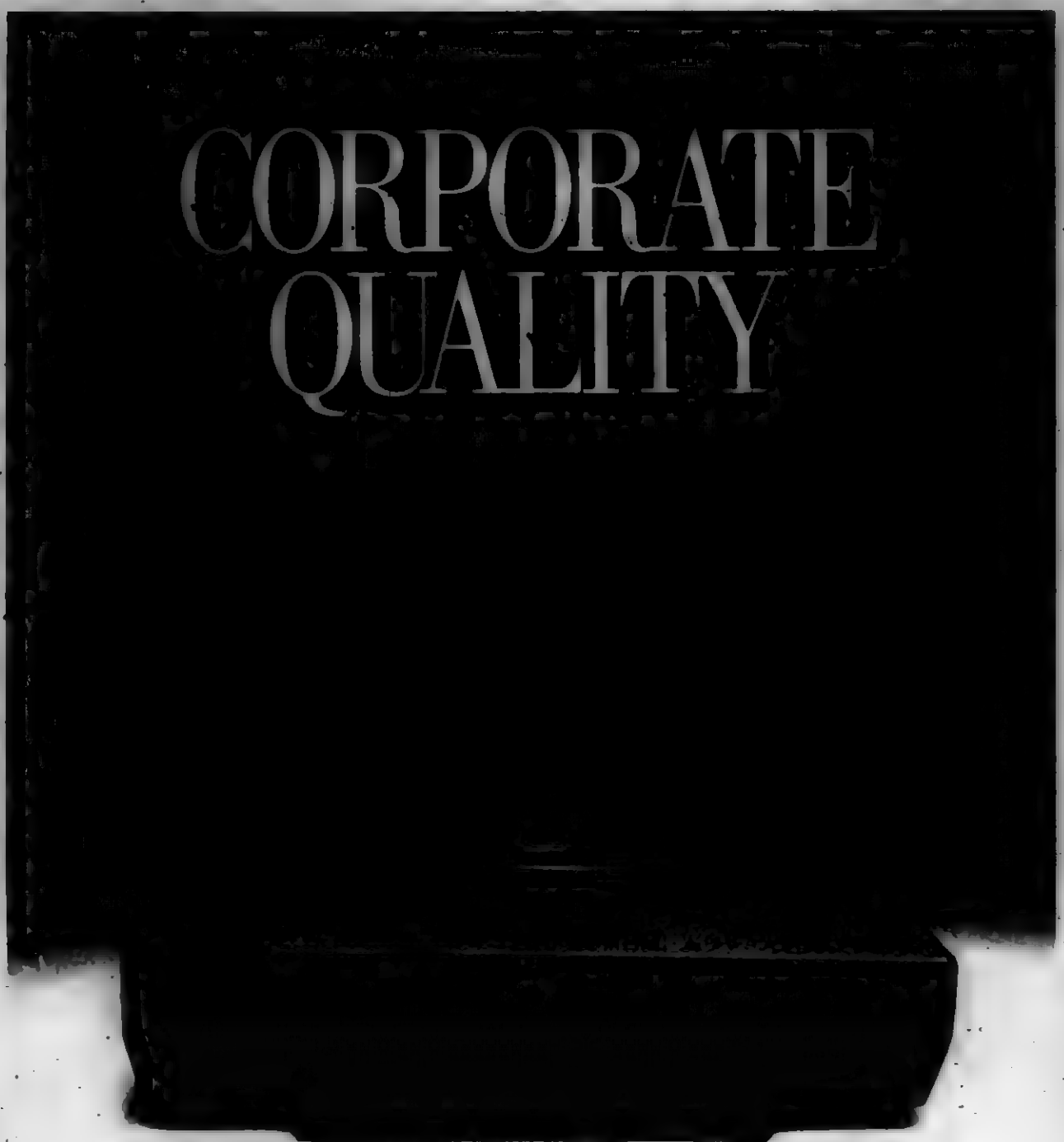
The implications of the availability of influence techniques are broad. Not only are they essential in no-control situations, they are also extremely valuable in traditional hierarchical settings.

Their usefulness to MIS/DP managers makes them invaluable in one of the fastest growing areas in corporate management.

As Adam Michaels put it, "So that's what I've been doing, practicing influence. I didn't know what to call it, but believe me, it works."

About the author

Jane Carroll Jackson is vice-president of marketing, management development and supervisory markets at The Forum Corp., an international management consulting firm based in Boston.



CORRESPONDENCE QUALITY FOR THE CORPORATE WORLD OF THE IBM PC

Introducing the Diablo 32 CQ Correspondence Quality printer, perfectly matched to the IBM PC. It's a single printer that does everything. This remarkable dual speed machine delivers both high speed printing in draft mode and superior print quality in correspondence mode. The extended character set, combined with full graphics capability, lets you get the most from your IBM PC. And all at a surprisingly affordable price.

The Diablo 32CQ: quality you can see at the Diablo dealer nearest you. Call 800-556-1234 ext. 186. In California call 800-441-2345 ext. 186. Diablo Systems Inc., A Xerox Company, Fremont, California.

Diablo Printers

IBM® is a trademark of International Business Machines Inc.

SYSTEMS & PERIPHERALS

HARD TALK
Tom Henkel
CW Senior Editor

Can PCMs fend IBM's pressure?

The race appears to be on in the high-end IBM mainframe arena. IBM started things off by replacing its 3080 line of mainframes with six new processors, called the X models, which offer up to 14% more performance than the older models at the same price. The catch is, users of the older processors cannot field-upgrade to the new systems.

Now Amdahl Corp. has joined the race. The company recently announced dual- and multiprocessor versions of its 5860 processor, which offer 1.25 to 1.4 times the performance of the most powerful uniprocessor in the 580 line. At the same time, the company cut prices on its existing 580 series processors, boosted available main memory on all 580 series processors to 64M bytes and promised to offer up to 128M bytes of main memory on the processors by the first quarter of 1985.

The turn of events is simple. IBM would like to do to Amdahl what it has already successfully done to the manufacturers of 4300-compatible processors — make the firm squirm. Amdahl, as it has done in the past, appears ready to fight back.

It is probably more than coincidence that Amdahl chose to announce its new systems exactly one week (almost to the minute) after the IBM announcement. It is also not surprising that the Amdahl processors offer slightly more performance at a slightly lower price than their IBM counterparts.

The question is: How long can Amdahl keep it up? IBM has more research and development money than all of the plug-compatible manufacturers (PCM) put together. It also has the power to change the ground rules in the high-end main-

See PCMs page 80

Why IBM has to replace its high-end 3420 tape drive

By James Connolly
CW Staff

For more than five years, industry watchers have been predicting that IBM is on the brink of announcing a new, advanced tape drive to replace its aging 3420 tape unit. During that time, IBM has remained silent. Many have criticized IBM, claiming the company has failed to provide its users with an adequate means for backing up disk drive data to tape. Others have found the persistent rumors of a tape drive announcement quite humorous.

Once again, rumors of a new tape drive are flying. But this time, analysts say, IBM has to make the announcement. Without the new tape unit, they say, IBM cannot announce a larger disk drive nor can it announce its much talked about Sierra line of large computer systems.

Industry observers cite the need for a new tape drive to provide effective backup to the IBM 3380 disk drive and to handle the transfer rates of processors that are two generations beyond the 3420-type tape drives.

"Two good computer life cycles have come and gone, and we still haven't seen any significant change in tape technology. Systems like the 4341 and up need tape systems that are a lot faster than they are now. The processors and disks have progressed, but the tape hasn't," said Ken Harvey, president of CSP by Ken Harvey, Inc. of Toronto.

Don Collier, general manager of the Freeman Reports, a storage system report published by Freeman Associates of Santa Barbara, Calif., said that even for currently available devices, like IBM's 3380 disk drive, the 3420-type system suffers from lack of speed. The unit is as big as a refrigerator, he said, adding that it is too expensive for its performance. He said the tape technology hasn't kept pace with disk and processor technologies.

"What is needed is something cheaper, smaller and newer. The performance of the 3420 is somewhat mismatched for the 3380. The 3420 transfers at just 1,250K bit/sec, while the 3380 is at 3,000K bit/sec," Collier reported.

International Data Corp. consultant Charles Greco likened the process of dumping a 3380 disk to a circa-1971 3420 backup to "running a Corvette in a 55 mph speed limit."

All three men said problems with the 3420-type rest not only in the transfer rates, but also in the storage capacity.

Collier said that a 3380, transferring

See TAPE page 80

Inside
Processors/68
Data Storage/70
Terminals/83
Graphics Systems/88
Power Supplies/94
Auxiliary Equipment/94

MAP 6420 array processor out

BILLERICA, Mass. — Computer Signal Processing, Inc. (CSPI) has announced its first 64-bit array processor, the MAP 6420, which reportedly can execute up to 7 million floating point operation/sec (flops) and comes with a Fortran compiler.

Available in August, the unit is designed for use with Digital Equipment Corp. VAX-series front-end processors.

The MAP 6420 is a rack-mountable unit 21 in. high. Initial systems will be available with between 4M and 18M bytes of main memory, but a spokesman said the MAP 6420 is capable of addressing up to 1G byte of memory. He said that in about five years the system may be able to utilize the full 1G-byte address space.

The unit comes with a Fortran-77 compiler and a library of matrix and vector functions. The unit can accommodate up to four disk controllers, each of which can manage four disk drives. According to the spokesman, various disk drives can be used on the system, but the standard device used is a 167M-byte Winchester disk drive.

The MAP 6420 with the Fortran compiler costs $100,000. The unit was designed for structural analysis, integrated circuit design and scientific simulation uses.

CSPI is located at 40 Linnell Circle, Billerica, Mass. 01821.

IBM's 64K-bit chip said to operate at 16 to 20 nsec

YORKTOWN HEIGHTS, N.Y. — Researchers at IBM's T.J. Watson Research Center here claim to have developed a 64K-bit memory chip which can operate at between 16 and 20 nsec, considerably faster than currently used chips, which operate between 70 and 300 nsec.

IBM said the chip achieves its performance through several new design concepts. These include:

- A self-timed sensing circuit that permits the chip to operate faster than conventional circuits.
- An address buffer that allows the chip to read information faster than conventional chips.
- A simpler timing technique said to reduce the number of clocks necessary to keep the chip operating properly.

In addition to faster access time, the experimental chip can discharge information in blocks twice the size of conventional memory chips. The experimental chip can discharge 16-bit blocks of information at one time, IBM said.

Another advantage of the memory chip, IBM said, is that fewer chips are required to achieve the standard 16- or 32-bit word size commonly used in many processing systems. The 64K-bit chip uses a four-device memory cell instead of the single-device cell architecture commonly used in memory chips.

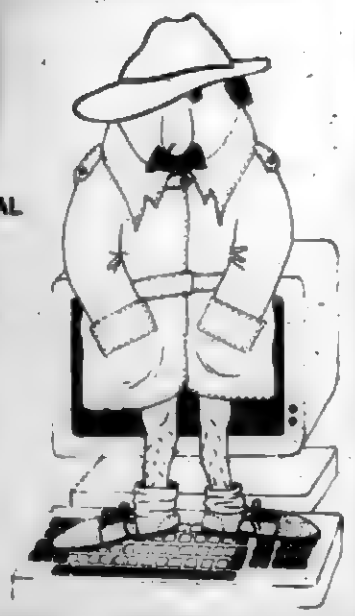
The experimental chip is roughly a ¼-in. sq and is an N-channel metal oxide semiconductor, field effect transistor device. Physically, the chip consists of four 16K-bit blocks, or quadrants, of memory cells, with associated row and column decoders in adjacent blocks, IBM said.

The chip was developed at the Watson Research Center and was fabricated and tested at IBM's General Technology Division located in Burlington, Vt.

The central intersection of IBM's experimental chip magnified 400 times.

ANNOUNCING

FLASHER



- ENHANCES OUTPUT RETRIEVAL USING SPF/ISPF
- MENU SELECTION TO VIEW, DELETE, AND REQUEUE JOBS ON JES SPOOL
- USES SPF/ISPF BROWSE DIRECTLY AGAINST JOBS IN JES SPOOL
- 10 - 20 TIMES FASTER RETRIEVAL THAN SPF 3.8
- WORKS WITH HELD OR NON - HELD DATASETS
- ALLOWS DISPLAY OF SYSLOG
- IBM MVS OR MVS/XA WITH JES2 OR JES3
- FULLY SUPPORTED

SPECIAL PRICES IN EFFECT
FREE 30 DAY TRIAL.
JES 2 FPL $2500.
12 MONTH LEASE $99/MO
JES 3 FPL $5500.
12 MONTH LEASE $199/MO

TONE SoftwareCorp.

1735 S. Brookhurst Anaheim CA 92804 (714) 991-9460 Telex 181592

Viva Italia

Now you can speak Italian to 35,000 DP professionals.

Computerworld/Italia, one of the latest additions to our International network of publications, brings the high quality of editorial that is associated with *Computerworld* to the Italian DP market. Its circulation consists of 35,000 DP professionals in computer user environments throughout Italy including the leading decision-makers in the various industries. *Computerworld/Italia* is published weekly.

The Italian computer market is expected to reach sales of over $1 billion in 1983. The booming demand in every category of the Italian computer and peripherals market provides excellent opportunities for U.S. manufactured equipment. The single largest buyers of computers in Italy at this time are manufacturers.

CW International Marketing Services can give you one-stop advertising services in countries around the world. For more information on *Computerworld/Italia* or any of our other foreign publications, just fill out the coupon below.

Diana La Muraglia, Manager, International Marketing Services
CW COMMUNICATIONS, INC.
375 Cochituate Road, Box 880, Framingham, MA 01701 • (617) 879-0700

Please send me more information on
☐ *Computerworld/Italia* ☐ Your other foreign publications

Name _____
Title _____
Company _____
Address _____
City _____ State _____ Zip _____

CW COMMUNICATIONS/INC.
Publishers of *Computerworld* and other leading computer publications around the world.

SYSTEMS & PERIPHERALS

PROCESSORS

DIMIS, INC.
Total 100

Dimis, Inc. is now marketing its Total 100 computer system as an upgradable starter system for wholesale distributors. The system features the Modular Computer Systems, Inc. Classic II superminicomputer with 512K bytes of memory, an 80M-byte storage disk, a streaming tape drive and a 300 line/min printer.

The system also comes bundled with two CRT terminals and a document printer or with three CRT terminals, the vendor said. Installation, training and software for applications such as sales analysis, pricing service and billing are all included in the system's $75,000 price.

Dimis, P. O. Box 2283, Ocean, N.J. 07712.

DATA STORAGE

APPLIED DATA COMMUNICATIONS, INC.
Series 4000 Initialise/Copy System

Applied Data Communications, Inc. has announced a robot-fed floppy disk copy system that formats and copies both sides of a disk at once. Output data formats are held in memory separate from replicated data.

The Series 4000 Initialise/Copy System comes with a robotic disk

Continued on page 82

PCM from page 79

frame market overnight.

And perhaps most importantly, IBM is making so much money that it can afford to shave a little off its profits on big systems to hurt the competition.

But let's put the marketing games aside for a moment. Users of high-end mainframes pay a lot of money for CPUs. This is a marketplace where systems start at $1 million. If, by the flip of a circuit board, IBM can make major corporate investments as worthless as scrap metal, who is really getting hurt?

Given its power and resources, IBM could easily squash a company like Amdahl. But must users be the pawns in IBM's power plays? In many ways, IBM is already the only game in town. Owning better than 70% of the worldwide mainframe marketplace, many users are so deeply committed to IBM's systems software that a conversion to another vendor's line of mainframes is simply impossible.

For many, the only alternative to IBM has been the PCMs. But the PCMs appear to be dying off at an alarming rate. Magnuson Computer Systems, Inc. wound up filing for protection from its creditors under Chapter 11 of the Federal Bankruptcy Act. Control Data Corp. dumped its Omega line of 4300-compatible processors. IPL Systems, Inc. is hurting. Smaller firms like Cambex Corp. appear to be barely surviving. The only makers of IBM-compatible systems that have been profitable are those competing against the upper end of IBM processors. Now IBM appears bent on making companies like Amdahl and National Advanced Systems, Inc. squabble for smaller pieces of the mainframe pie.

Is IBM going to take over the world? Right now, it appears to have the power to do so. But even if it succeeds in killing off its competition, IBM is big, bureaucratic and conservative. There will always be room for new vendors offering new ideas. Perhaps what has hurt the PCMs more than IBM's hell-bent devotion to destroying them is the PCM firms themselves. Companies that started out as entrepreneurial firms became big, bureaucratic and conservative — basically smaller versions of IBM. Playing a game of one-upmanship with IBM on a product level is one thing, but emulating IBM corporate structure is not a good idea. Indeed, if anything ever does IBM in, it will be its almost uncontrollable size.

For the PCMs, survival depends on getting back to basics. A "me too" product line just will not make it. The PCMs have to come up with innovative products that happen to work in an IBM environment. And they have to be more aggressive about it.

TAPE from page 79

data uninterrupted, can fill a 2,400-ft tape in 144 seconds. But he said that normal interruptions bring that time up to five or 10 minutes.

When that tape is full, a technician, if standing by, spends at least 30 seconds replacing it, a process that must be done at least 14 times in more than an hour of copying a 3.2G-byte disk onto backup tape, Collier said.

Harvey said that one drive that has exceeded the 3420's overall speed is the plug-compatible Storage Technology Corp. 4800 tape drive with cache memory. But he stressed that IBM and plug-compatible manufacturers haven't taken the lead in developing a tape subsystem that keeps pace with the high-end disk drives.

Greco blamed the delay on technical problems, such as developing an effective read/write head and dealing with the "starting and stopping" of the read/write process. He also cited the possibility that IBM is letting its plug-compatible competitors, known for copying IBM's innovations, suffer.

Collier cited the technical problems and IBM's emphasis on disk technology.

But even when the 3420 replacement is announced, it could be outdated, Harvey noted. "The product people are waiting for will be an instant compromise. It won't be fast enough, and it will still be less than 300M bytes, which is a basic and fundamental flaw. It will still need three cartridges to dump one 3380," Harvey said.

The consultants agreed that a new product could fall further behind if IBM increases the density of its disk drives and that the use of other media, such as smaller disks, for backup would be too expensive for most companies.

Greco predicted that a new IBM drive would result in "massive conversion efforts."

Greco, Harvey and Collier said any new product is likely to use cartridges rather than reel-to-reel tape.

Only Lee Data's Universal Terminal System can satisfy all of your information processing needs... 3270, Async and personal computing.

Finally, there's a single, universal way to satisfy the individual information processing needs of all your people. From sales manager to accountant. From research to production. The Lee Data Universal Terminal System can do it all.

And our system is modular by design to provide you any or all of these cost-effective, problem-solving advantages:

3270-compatibility plus more

Combine complete 3270 system-compatibility with an innovative Lee Data design and you have a System that delivers greater convenience and flexibility.

Our System not only offers standard 3274-compatible local and remote control units, but now also provides combination local/remote controllers with a unique dual-host access capability.

In addition, you can choose from a full line of terminal capabilities, beginning with our cost-effective 3178-compatible display on up to our popular All-In-One Display which offers, in a single unit, four selectable screen sizes—including 132-column—a great advantage in program development, spread sheet applications and many others where flexibility is required.

3270-plus-Async: another cost-effective advantage

If your application needs currently find you switching between 3270 and VT100-style terminals to get the job done, Lee Data has a better way.

As part of our System, you can enjoy the further advantage of a 3270/Async capability that allows dynamic selection of 3270 and VT100 operating modes from a single Lee Data display. A simple command entered at the keyboard provides you access to applications running on an IBM CPU, non-IBM systems (such as DEC, H-P or Prime), as well as timesharing services. Another Lee Data solution to simplifying your company's terminal network.

And now integrated personal computing too

That's right! Now our System also includes a sophisticated personal computing package that can easily be integrated into an existing Lee Data 3270 system.

With our approach, you get continued interactive access to host-based files, plus all the advantages of professional business computing from the same Lee Data workstation.

Advanced features include a host file transfer capability, a single-board design, four standard system expansion slots and, of course, complete IBM-compatibility.

All these additional capabilities plus the same user-friendly Lee Data displays.

Plus these added benefits...

To any Lee Data System, add our unique Coax Eliminator products and realize additional savings of up to 85% in cabling costs alone.

Combine this with all the outstanding features already mentioned and you'll find a System offering everything you need for efficient, cost-effective operation.

Discover the advantages of our Universal Terminal System for yourself. For more information, call our system specialists toll free:

800/328-3998

Designers of innovative systems for the information worker

LEE DATA CORPORATION

7075 Flying Cloud Drive
Minneapolis, MN 55344
TWX 910-576-1690

SYSTEMS & PERIPHERALS

Continued from page 80

handler as a front-end subsystem. Total copy time for 5¼-in., double- or single-sided, 48 track/in. diskettes is 21 sec/disk. Double- or single-sided, 8-in. diskettes take 39 sec/disk, the company said.

The unit has the ability to generate copies for over 300 different target system formats, the company noted, and includes error checking techniques and read-after-write testing. Security is provided by a number of copy-protection schemes including coded serial nubers, scrambled sector headers and logical traps.

Series 4000 systems are priced from $29,000, depending on configuration.

Applied Data Communications, 14272 Chambers Road, Tustin, Calif. 92680.

ALSPA COMPUTER, INC.
HD series

Alspa Computer, Inc. has introduced modular hard disk drives that are plug-compatible with any of the company's network workstations and computer systems.

The HD series is available in 10M-, 20M-, 35M- and 50M-byte versions and can be used to expand the storage capacity of an entire Alspa-Net local-area network and to distribute storage capacity throughout the network, the company said.

The vendor said the only expansion costs are for peripheral hardware and cabling. Extra communications lines do not need to be added.

The HD-5010, with 10M bytes of storage, is priced at $2,495; the HD-5020 (20M bytes) costs $3,495; the HD-5035 (35M bytes) costs $4,495; and the HD-5050 (50M bytes) costs $5,495.

Alspa Computer, 477 Division St., Campbell, Calif. 95008.

VERMONT RESEARCH CORP.
Model 83AA

Vermont Research Corp. has announced a 44M-byte disk subsystem for use with the Sperry Corp. V-77 minicomputer and the Sperry E-bus.

The Model 83AA was designed for use in difficult environments, with an operating range of zero to 50° Celsius.

The system reportedly consists of two removable cartridges and two fixed disks, each with 9.66M bytes of formatted storage allowing for self-backup; a controller; power supplies; a mounting enclosure with cooling fans; and hardware for 19-in. equipment racks.

It is said to perform formatting, format verification, block scanning, bad block checking and display and firmware track sparing.

The subsystem is available for OEMs and end users 10 weeks after receipt of order. It is priced at $13,225 per system in quantities of 50.

Vermont Research, Precision Park, North Springfield, Vt. 05150.

CIPHER DATA PRODUCTS, INC.
GCR Cachetape

Cipher Data Products, Inc. has announced a line of 6,250 bit/in. group-code-recording (GCR) tape drives designed to meet the storage requirements of 32-bit computer systems manufactured by such companies as Digital Equipment Corp. and Data General Corp.

The first models in the GCR Cachetape line, Models M991 and M990, reemploy the vendor's ½-in. tape interface for hardware integration plus the vendor's cache technology for system software compatibility.

The M990 features a cache size of 128K bytes and a maximum transfer rate of 450K byte/sec. The M991 has a 256K-byte cache size and a 790K byte/sec maximum transfer rate, a spokesman said. The maximum block size is 32K bytes for the M990 and 64K bytes for the M991.

The M991 reportedly features downstream erase, which eliminates tape repositioning on write error retries, according to the spokesman.

The models provide up to 180M bytes of data storage on a single tape reel. This capability reportedly allows the M990 to support the backup of a 500M-byte Winchester disk drive with less than three reels of tape.

The M990 will be available after June, and the M991 will be available three to four months later.

The drives will be available in OEM quantities. The M990 will be priced between $6,000 and $7,000, and the M991 will cost between $7,000 and $8,000.

Cipher Data Products, 1800 Embarcadero Road, Palo Alto, Calif. 94303.

SYMBICON ASSOCIATES, INC.
CT-5654

Symbicon Associates, Inc. has announced a self-contained processing system designed for use as a controller with up to four 3M Co. HCD-75 cartridge tape systems.

The CT-5654 is said to feature read-only memory (ROM), programmable ROM and I/O features built around an Intel Corp. 8089 I/O processor.

It reportedly uses a dual-bus architecture to allow the I/O processor to communicate with on-board devices over a 16-bit local bus and with the host system over the Intel Multibus.

The Intel 8089 reportedly performs all disk and tape control, error correction, retries and direct memory access control and executes user-written programs from system memory or from local ROM.

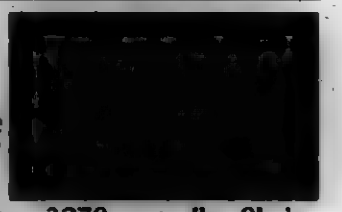
The controller is available to OEMs and end users now for $910, the company said.

Symbicon Associates, 39 St. 101A, Amherst, N.H. 03031.

She's Director of Decision Support, the leader in IBM 3270 mainframe/PC networks.

IRMA is taking charge! Her performance in over 25,000 IBM 3270 mainframe/PC installations has made her the industry's leading Decision Support Interface.™ Why? Because IRMA works. Easily and economically, IRMA's on the job giving PC users mainframe data access, selection, storage and communication back to the mainframe.

She's more capable than ever.



IRMA is a printed circuit board that slips into any available IBM PC/PC XT slot and attaches via coaxial cable to a 3270 controller. She's as easy to work with as the PC itself and provides standard text file transfer software

IBM PC and IBM PC XT are trademarks of International Business Machines Corporation. Apple Lisa is a trademark of Apple Computer, Inc. DEC Rainbow is a trademark of Digital Equipment Corporation.

SYSTEMS & PERIPHERALS

TERMINALS

PRITECH
GTC314

Pritech has announced a color graphics terminal said to offer bit-mapped display, a 4,000-color palette and programmable character sets.

The GTC314 features a 512- by 480-pixel resolution display. Utilizing a Tektronix, Inc. 4027-compatible protocol, the graphics terminal can display arcs, circles, pies, vectors, bars and polygons. Also, a Tektronix 4010 emulation mode permits use of software such as the Tektronix Plot 10, Isaco, Inc.'s Disepla and Tellagraf and Precision Visual, Inc.'s DI 3000.

Other features include dual-processor architecture, a detached keyboard and optional tilt-and-swivel stand. The GTC314 costs $2,850 and includes two RS-232C ports said to operate at speeds up to 19.2 bit/sec.

Pritech, 16902 Von Karman, Irvine, Calif. 92714.

PRINTERS/PLOTTERS

DIGITAL EQUIPMENT CORP.
LVP16

Digital Equipment Corp. has announced a color graphics pen plotter designed for use with its line of microcomputers and its VAX series superminicomputers.

The LVP16 reportedly draws on plain paper or transparencies and offers a palette of 10 colors with a choice of six for paper and seven for transparencies. It is said to accept standard U.S. and European paper and transparency sizes, to feature .001-in. accuracy and to offer a maximum speed of 15 in./sec.

The plotter features software control of the pens and a view button that allows the user to interrupt the plotter while it is operating. It also is said to allow eavesdropping, where connecting the plotter and a printer to a host frees the host for other communications needs.

The unit is available now at a price of $1,995. Interface kits cost $40 for the DEC Rainbow personal computer and VAX-11 and $35 for the Decmate and Professional series microcomputers. The eavesdrop cable for serial printer connection is priced at $75.

DEC, Maynard, Mass. 01754.

GRAPHICS SYSTEMS

PARAGON TECHNOLOGY CORP.
Series 200A; Series 300

Paragon Technology Corp. has announced that the CPU for its Model 200 computer-aided design system has been upgraded from 16 bits to 32 bits.

The upgrade, Series 200A, was designed around a 15-MHz Digital Equipment Corp. LSI-11/73 processor.

It offers an independent, 16-bit proprietary graphics processor, a company spokesman said. The system has up to 512K bytes of memory and reportedly enables the user to design complex boards that contain up to 64 layers and 1,000 equivalent integrated circuits and measure up to 32 by 32 in.

Pricing for the Series 200A upgrade is $3,000. The Series 200 is priced at $59,950 in single-unit quantities.

The company also has introduced another system, the Series 300, a 32-bit, network printed-circuit board, color computer-aided design and manufacturing system.

The Series 300 features a 32-bit DEC LSI-11/73 CPU with an associated video display console called the Network System Manager (NSM), the spokesman said.

The NSM reportedly links up to 16 of the vendor's Model 301 and/or Model 302 graphics workstations in any combination over a fiber-optic local-area network with a maximum length of one kilometer, the vendor said.

Each workstation consists of a CPU, a 16-bit graphics processor, a video display console and keyboard and a 14- or 19-in. color monitor. The system comes with a set of applications software, according to the spokesman.

Prices for the Series 300 NSM start at $35,000.

The Model 301 graphics workstation is priced at $32,500, and the Model 302 graphics workstation costs $37,500.

Paragon Technology, 2129 Nurse Drive, Pleasant Hill, Calif. 94523.

for VM/CMS and MVS/TSO mainframe environments, in addition to optional APL Terminal Emulation.

She's got more to offer.

Other IRMA products give you more ways to build cost-effective IBM 3270 and IBM PC-based decision support networks.

IRMALINE™ is the first coaxial link between 3270 networks and remote personal computers, including the IBM PC/PC XT, the Apple Lisa, the DEC Rainbow and others. IRMALETTE,™ the Asynchronous Interface, lets you run the same IRMA software in your remote personal computer that you run in the office.

So connect with success. With IRMA products from DCA. Call 1-800-241-IRMA.

Connect with success.

dca
Digital Communications Associates, Inc

IRMA, IRMALINE, IRMALETTE and Decision Support Interface are trademarks of Digital Communications Associates, Inc.
©1984 Digital Communications Associates, Inc., 303 Technology Park, Norcross, GA 30092. (404) 448-1400. TLX 261373 DCAATL.

FREE
IBM 34/36 Software

Simply call us at (617) 283-3438 and we will send you a free 30-day timed diskette for word processing or financial modeling.

PARA RESEARCH
Dept. CC, 85 Eastern Avenue
Gloucester, MA 01930

SYSTEMS & PERIPHERALS

POWER SUPPLIES

KEC ELECTRONICS, INC.
KS series

KEC Electronics, Inc. has added the KS series of multi-output units to its line of switching power supplies.

Available in 100W, 130W, 170W, 200W and 300W models, the units incorporate various output voltage combinations.

In addition, the outputs can be modified to suit special applications, the company said.

Unit prices range from $186 for the 100W model to $365 for the 300W model. Quantity discounts are available.

KEC Electronics, 20617 Western Ave., Torrance, Calif. 90501.

BOARD-LEVEL DEVICES

NATIONAL SEMICONDUCTOR CORP.
BLX-218

National Semiconductor Corp. has announced the BLX-218, a floppy disk controller board that is said to be capable of supporting up to four 8-in. or 5¼-in., single- or double-sided disk drives.

The BLX-218 expansion module is the latest addition to the firm's Series/80 family of Intel Corp. Multibus products. The units are compatible with any board utilizing the BLX on-board I/O expansion interface, the company said.

The BLX-218 supports IBM 3740 single-density, IBM System/34 double-density or other formats with sector lengths up to 8K bytes. It also performs operations in either single or mulitple sectors and has on-board data separation logic performing data encoding and decoding. In addition, it operates in either direct memory access (DMA) or non-DMA environments, the company noted.

The controller board is available for $493 in single quantities.

National Semiconductor, 2900 Semiconductor Drive, Santa Clara, Calif. 95051.

CYBERCHRON CORP.
CVM-5030

Cyberchron Corp. has announced a 1M-byte add-on memory card for the Digital Equipment Corp. VAX-11/750, VAX-11/730 and VAX-11/725 superminicomputers.

The CVM-5030 is packaged in a single hex-size module and is now available. It reportedly features 64K bytes of dynamic random-access memory and additional error check and correction bits to permit correction of all single-bit errors and most multiple-bit errors.

The memory enhancement is said to include an on-board switch that allows the memory to be taken off-line for diagnostic purposes without removing the card. It was designed for full plug-compatibility with the DEC M8750 add-on memory expansion module.

The price is $1,995.

Cyberchron Corp., P.O. Box 196, Garrison, N.Y. 10524.

SPECTRA LOGIC CORP.
Spectra 120

Spectra Logic Corp. has announced Spectra 120, a single-board storage module drive disk and ¼-in. tape controller for Data General Corp. Nova and Eclipse minicomputers.

The system features 35 sectors, increased sector buffering, compatibility with Federal Communications Commission standards and drive configuration through a single programmable read-only memory, according to the vendor. Spectra 120 attaches up to eight formatted, ¼-in. tape drives or four removable-pack or Winchester disk drives, the vendor said.

The product costs $4,800.

Spectra Logic, 1227 Innsbruck Drive, Sunnyvale, Calif. 94089.

HYBRICON CORP.
4-3010C-VHF

Hybricon Corp. has introduced a socket board that will provide a 22% increase in available board space over the firm's earlier products. The unit was designed for use with Intel Corp. Multibus systems.

According to the vendor, the 4-3010C-VHF allows the designer to place more circuitry on one board and combine analog and digital functions in one place.

The board can hold up to 168 16-pin, dual inline packages. The top I/O on the board will accept two 50-pin and one 40-pin ribbon cable connectors.

The price is $405 in single and small quantities. Delivery is within two to four weeks.

Hybricon, 410 Great Road, Littleton, Mass. 01460.

AUXILIARY EQUIPMENT

NIKON, INC.
Microplan II

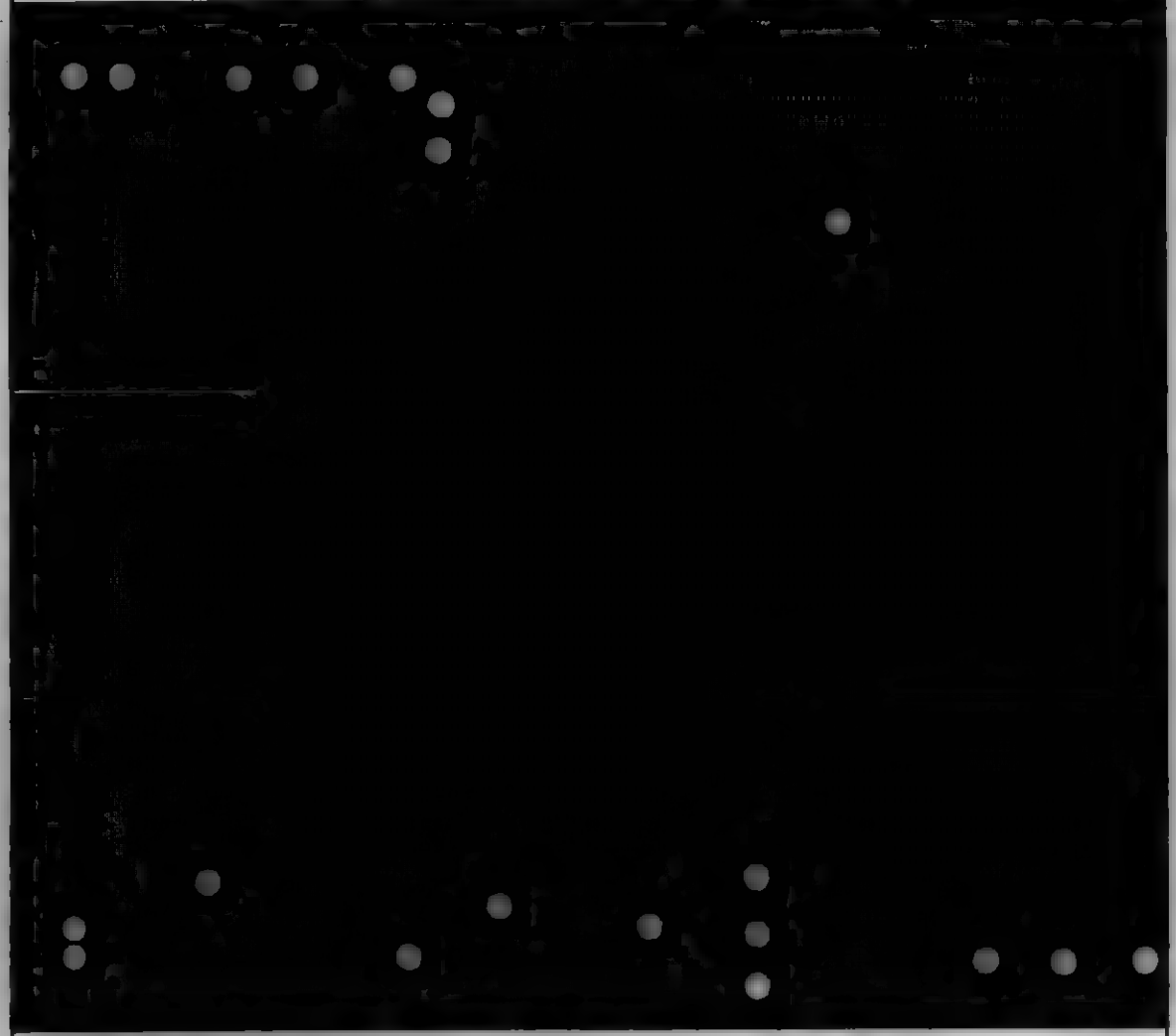
Nikon, Inc. announced Microplan II, a two-dimensional image processing system.

Microplan II includes a digital planimeter, which measures distances in two dimensions rather than one; a microprocessor; and an 80-col. dot matrix printer. The system can be used with any microscope to determine particle sizes, counts and distributions, the vendor said.

A digitized pen version of the system costs $4,165; a system with a five-button cursor sells for $4,500.

Nikon, 623 Stewart Ave., Garden City, N.Y. 11530.

TIME



Making yourself memorable.

You don't have to be a giant in the industry to attain a leadership position. Just having your name among the leaders can make a noticeable difference.

Your advertising presence in TIME Magazine can do more than gain you the attention and interest of the business community. It can position you among the major companies who already know the value of reaching greater numbers of purchasing influentials with greater visibility.

TIME's audience offers you both selectivity and reach – with the right demographic and geographic patterns for increasing your share of market as well as building awareness within the business and financial communities, and among your dealers. Being in the world's foremost news magazine puts you in the main arena. And TIME has specific demographic and geographic editions to accommodate your budget and implement your marketing strategy.

Your reputation is probably the most important element in your continued growth. Now that you're making a name for yourself in the industry, perhaps it's time to make more of your name.

To learn more about how you can use TIME and its various editions, call Charles Craig at (212) 841-2831.

TIME

Get more out of it.

© 1984 Time Inc.

What three letters represent the most powerful on-line computer in business today?

TX

The most powerful on-line

Time was, the answer to the previous page was as easy as ABC.

But that was yesterday.

Today, the world of business computing is being introduced to a system featuring over two-and-a-half times the performance and twice the price/performance of its nearest competitor.

A versatile system. Able to compile the information of the largest corporations into a single relational data base. Instantaneously updated and fully available across the entire system.

An expandable and compatible system. Allowing the simple addition of future programs and equipment, without sacrificing past investments.

And most importantly, a system that won't let you down. Because its fault-tolerant design won't let itself down. Even if a major component fails.

This system isn't from IBM.

It's from Tandem.

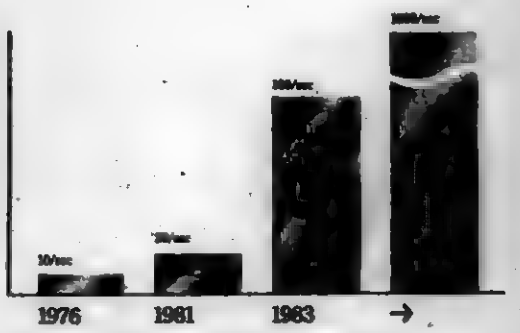
Introducing the NonStop TXP™ system.

TXP: 32-bit transaction processing.

The TXP system processes high volume loads faster and more economically than any other system. Executing over 100 transactions per second now and thousands of transactions in the near future.

It's built around multiple parallel 32-bit processors. Each addressing 16 MB of physical memory and over a gigabyte of virtual memory.

To help memory keep pace with that kind of processing, TXP pulls 64 bits on each memory access.



Our success can be summed up in a second. *Transactions per second. Numbers unsurpassed in the industry. On-line systems that fit your needs today. And tomorrow. With more processing power on the way.*

The TXP system also features parallel data paths. Manipulating 32 bits of information in a single cycle, two 16-bit operations in the same cycle.

And TXP incorporates extensive pipelining, to process multiple instructions simultaneously. Each processor overlaps instructions in three levels: Fetching one, while preprocessing a second, while executing a third.

While helping TXP deliver full 32-bit power, for less.

Cache memory pays off in faster response times.

Cache memory is a high-speed data storage area between the processor and main memory. It lets the processor store more frequently used information closer. So it can get to it faster.

And our tests have shown that the TXP cache memory has a 98% "hit rate." Which means the requested data is virtually always nearby for fast access.

The result? Larger volumes of work can be processed in shorter amounts of time. Helping TXP to be even more productive.

Making cache memory pay big dividends.

A system you'll expand, not disband.

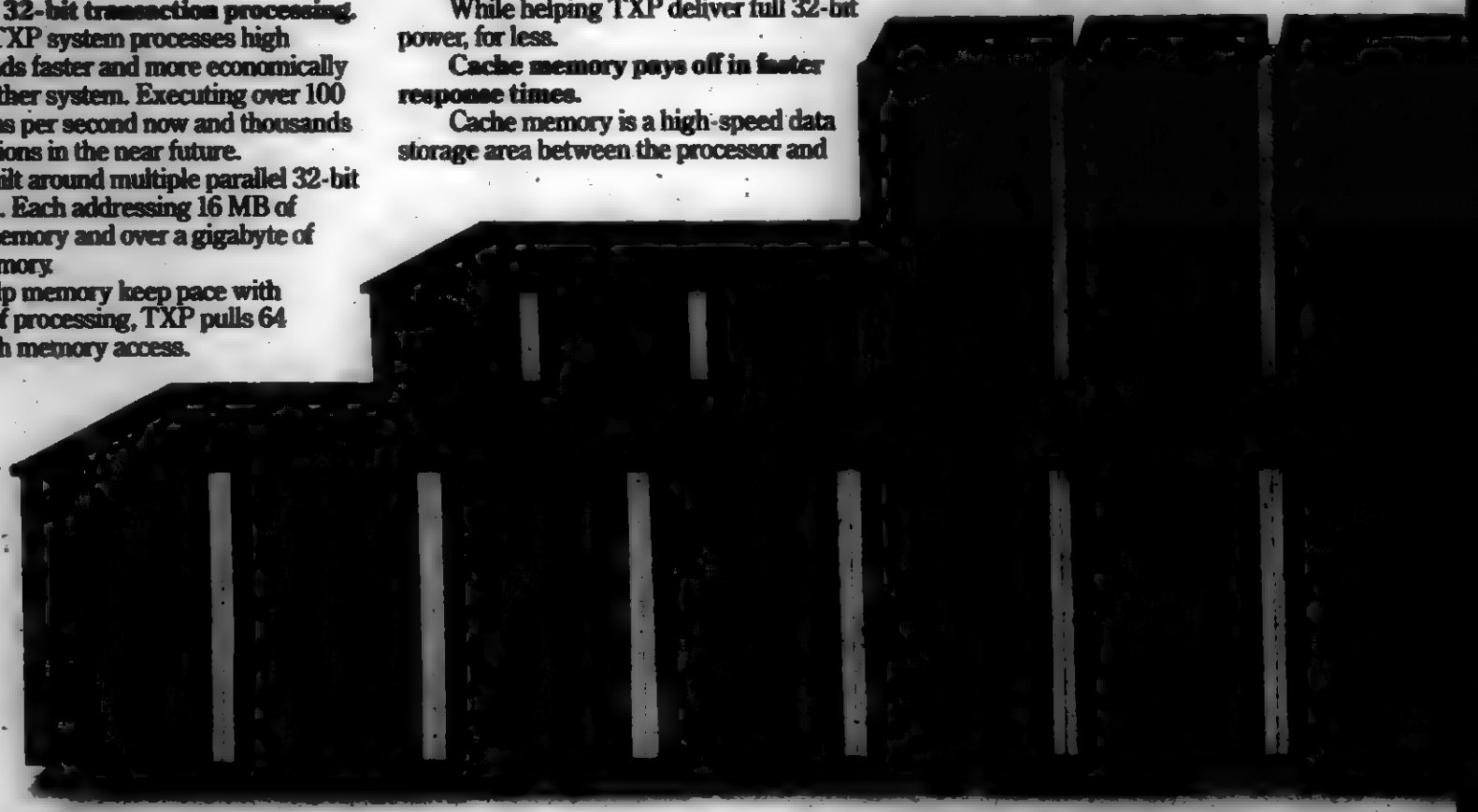
Most computer systems have very limited expandability. So if a company outgrows its computer's capacity, it usually means starting again from scratch.

Selecting and buying a larger and more expensive system.

Then reprogramming.

Then re-training.

Plus all the chaotic disruption and



XP

computer in business today.

massive loss of revenue that's unavoidable during the switch-over.

Not so with the TXP system.

It can expand from two to 16 processors. Increasing its power by a factor of eight.

That's more power than any of the largest mainframes.

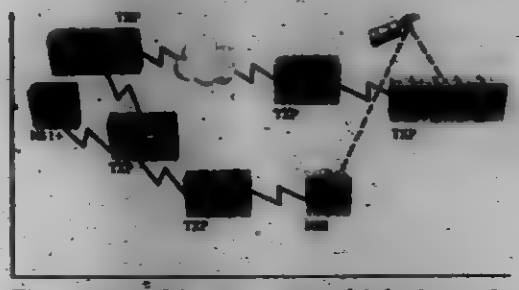
And the additional processors can be installed while TXP is running at full speed. No downtime. No reprogramming.

Still not enough power? Up to 14 TXP systems can be joined together by high-speed fiber optics. Linking the systems together as one computer with 224 processors.

But that still isn't the full potential of the TXP.

TXP systems at up to 255 sites can be joined in a worldwide network. Generating the power of over 4,000 processors.

And that gives TXP the most powerful on-line computer capacity in business.



The most powerful computer network in business today. *Users access a single unified global data base from any of thousands of terminals anywhere in the system.*

Expandability our competition wishes they could disband.

NonStop™ system compatibility from the people who started it all.

TXP can process more information and support more programs, users and devices than any other computer designed for on-line transaction processing.

Devices you most likely already have. Even devices made by IBM.

But what if your company isn't quite ready for the TXP system's awesome power?

We suggest the Tandem NonStop II™ system. The second most powerful on-line computer in business today. The cost effective solution for medium to large corporations.

What if your company is somewhere between a Nonstop II and a TXP?

No problem. They can be combined. They can share the same data and programs. In fact, NonStop II and TXP processors can coexist in the same cabinets.

And what if your company needs even a smaller computer? We make a smaller computer. The Tandem NonStop 1+ system. Perfect for those low-volume sites where less processing power is needed.

Tandem literally wrote the book on NonStop™ transaction processing. That's because we introduced the first NonStop system.

Over eight years ago.

And for over eight straight years, despite attempts by others, we've continued to lead the industry.

Learn all about TXP, ASAP.

For complete literature, contact your local Tandem Sales Office.

Or write Tandem Computers Incorporated, 19333 Vallco Parkway, Cupertino, California 95014.

Or call us, toll-free. (800) 482-6336.

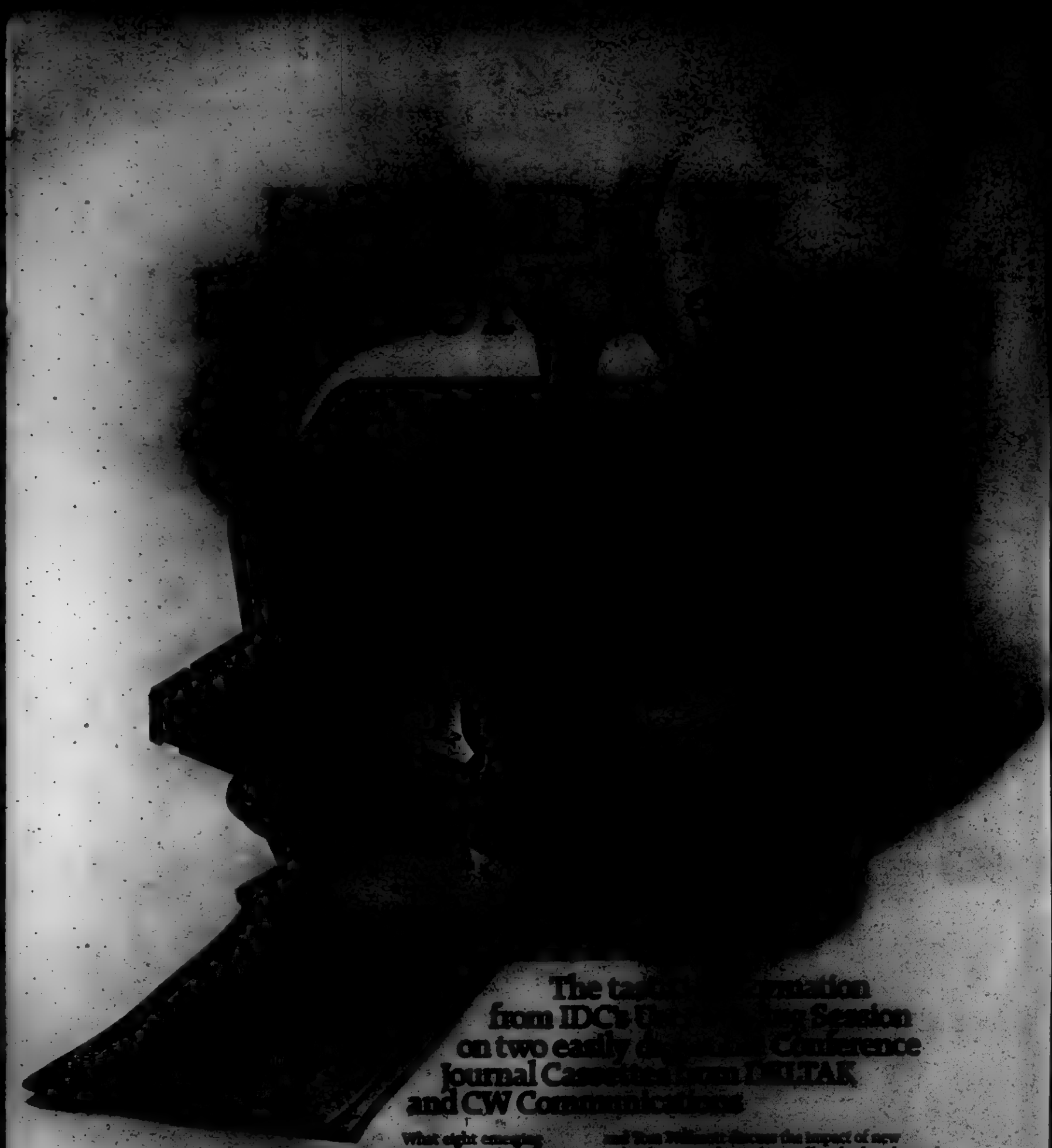
TXP is the most powerful on-line computer in business today.

Without question.

TANDEM

NonStop Transaction Processing

©1983 Tandem Computers Incorporated



The ta… formation from IDC's … Session on two easily … Conference Journal Cas… … ULTAK and CW Communications

What eight emerging technologies will revolutionize the office of tomorrow? Will the ARPANET breakup change the course of telecommunications? What's next for personal computing?

For the answers to these and many other critical questions, don't miss IDC Computers the Future, your two-cassette conference journal program of interviews featuring a distinguished panel of experts from the International Data Corporation family of information technology companies.

In Part I, Vice President Bill Hodgman and Tom Willmott discuss the impact of new technologies on the evolving office, both today and tomorrow. Thane Hall Hickman, IDC's graphics expert, gives you an insider's view on the state of computer graphics. In Part II, noted hi-tech author John Gantz plays Socrates with Zachmann to shed exciting new light on the future of personal computing.

But here's the best part. You and your associates can "attend" these lively information video conferences over and over again at your leisure. The entire 90-minute tape of your Office Conference Journals, still [illegible] for $49.95. To [illegible] (303) [illegible]

MICROCOMPUTERS

Need for micro shopping questioned

By Paul Kerzaniowski
CW Staff

NEW YORK — "In the business world, computers and vendors in place tend to remain in place," Donald Smith, president of MH Financial Management Systems, Inc. here said recently.

"Now, one might expect that since personal computers are a new phenomenon, that market will be open to careful consideration and comparison shopping."

But comparison shopping plays only a minor role in corporate microcomputer purchases; Smith told a seminar on "The PC Revolution in Business," sponsored by *Fortune* magazine.

"The current mainframe vendor has a head start and an entrenched position," he explained. "It is not easy for one vendor to displace or even gain a toehold on another. The sales force of the vendor presently in place is a powerful agent for the current vendor. A comfort level with the current vendor will overcome all but the most glaring product weaknesses," he said.

While some may question an allegiance to a vendor, Smith said he thinks it has advantages. "New vendors frequently fail to perform according to their promises and sometimes fail completely," Smith said.

MH Financial Management Systems is a subsidiary of Manufacturers Hanover Trust Co., which developed a plan to control the purchase of microcomputers. The company has already purchased 200 microcomputers, and Smith projected that it will purchase 350 microcomputers before the end of the year.

First, Manufacturers Hanover Trust determined how computers are used. "Simply, every act performed within the business relates to corporate records stored on a data base," Smith said. Manufacturers Hanover Trust divided these acts into three categories. First, there is data capture, which ensures the accuracy and currency of data. Another use is data-base inquiry for reporting. Third, knowledge workers use a computer for analysis and statistical evaluations to determine the health of the company.

Manufacturers Hanover Trust limited its micros to two brands of personal computers: IBM and Wang Laboratories, Inc. "We have IBM mainframes; IBM was a logical choice," Smith said. A number of departments were using Wang VS100 superminicomputers for word processing, so the Wang Professional was also chosen. "Right now, we are a two-vendor shop, but that could change," Smith said.

After deciding which brands of hardware to use, the company determined how to distribute personal computers. "All requests for personal computers are approved by user senior management and acknowledged by the office automation group," Smith said. "In response, office automation formed a separate personal computer unit to focus on the task."

Purchases are made at an in-house computer store. "The store is a learning center in which demonstrations and tutorials are conducted," Smith said. "Manuals are

See PURCHASE page 104

■ Add another vendor to the IBM Personal Computer-compatible portable market/93

■ MCBA unveils a general ledger package written in Ryan-McFarland's RM-Cobol/93

■ Microsoft, Inc. has a bright future. The firm may dethrone current industry leader, Digital Research, Inc./94

INSIDE

Storage/93

Auxiliary Equipment/93

Software/93

Can't take the heat? Avoid micro software mart

By Lynn Haber
CW Staff

SAN JOSE, Calif. — The microcomputer software industry is gearing up for intense product and marketing competition, and companies are already vying aggressively for future positions in the next major market battleground — new-generation software, sales of which will reach $6.5 billion by 1988, according to a report recently released here.

According to the report, titled "Integrated Software," published by Creative Strategies International, Inc. (CSI), new-generation software — both integrated software and the new operating environments typified by the "mouse and window" systems, such as Apple Computer, Inc.'s Lisa and Visicorp's Vision — will rapidly become the standard. Many companies fear that the integrated products will absorb so many of the future markets that there will be little room left for standard single-application software packages.

After 1986, sales of integrated software packages will be eclipsed by new operating environment shipments, which CSI forecasts to grow at a compound annual rate of nearly 250% through 1988. By that year, integrated software sales will be growing slowly, while sales of operating environments will still be taking off.

New product entries will be coming quite rapidly, and market shares can change quickly. CSI sees a software shakeout approaching, as leaders gain in the main markets.

What follows are the emerging trends for new-generation microcomputer software as highlighted in the report:

■ Standard new-generation software by the end of the 1983-1988 forecast period. Almost every microcomputer system will be able to address several hundred thousand characters of random-access memory, and nearly all will be able to

See MARKET page 104

MICRO BITS/Thomas W. Madron

Nonstandard operating system seen as roadblock

The advent of generalized microcomputer disk operating systems software houses, such as Digital Research, Inc. and Microsoft, Inc.—whether large or small — should no longer produce hardware-specific software.

When software is associated with an operating system rather than with a specific manufacturer's hardware, it is probably more difficult, initially, to market the product. Especially with the success of the IBM Personal Computer, software houses have attempted to capitalize on the IBM image in order to sell programs. Thus, we see numerous advertisements for IBM this and IBM that.

The advantage of such a marketing approach is that the novice user has some right to assume that the program will function on the specific machine advertised. The disadvantage is that even though the program may run on other equipment, it is clearly a gamble to make that assumption. More of a disadvantage is the tendency of hardware-specific software to encourage hardware manufacturers to produce and maintain proprietary disk operating systems.

Radio Shack, with its various models of TRS-80 microcomputers that are based on Zilog, Inc.'s Z80 microprocessor and proprietary TRS-DOS, is perhaps the "best worst example."

Because Radio Shack was an early entry into mass microcomputing, and because at one time it was one of the dominating forces in the market, Radio Shack was able to maintain use of TRS-DOS even when it became clear that many TRS-80 users were interested in using Digital Research's CP/M. It was only after Radio Shack lost its foothold in the microcomputer market that it decided to make CP/M available on its Z80 systems. Several of the TRS-80s may have found greater acceptance as business machines had Radio Shack adopted a more standard approach at an earlier date.

With the obvious popularity of 16-bit machines, especially those using the Intel Corp. 8088 or related microprocessors, we seem to be redoing past history, this time with the IBM Personal Computer. The unfortunate thing that makes the proprietary approach different from IBM's is that Radio Shack was never in a position to be a vertical monopoly in computing.

Although IBM's PC-DOS operating system for the Personal Computer came first, it is clearly turning out to be a subset of Microsoft's MS-DOS. Microsoft's development of the two operating systems seems to be in favor of compatibility, and we can hope that IBM will let that development take place. At the present time, it appears that any program written for MS-DOS will run under PC-DOS.

The war is not yet won, but it is clear that Microsoft's MS-DOS has the opportunity to become the industry standard for 8088-based systems, just as CP/M became the industry standard for Z80 systems.

However, Digital Research has not yet thrown in the towel. Its Concurrent CP/M may develop into a competitive product. It is also possible that many users will be forced to use CP/M for some applications and MS-DOS for others, although most major software houses seem to be making their products available for both operating systems.

Applications software houses, as well as consumers of microcomputer products, should probably pressure both Microsoft and Digital Research to adopt some joint standards, but without expecting the two firms to make their two operating systems the same.

Incompatibility, of course, can also be encouraged by hardware manufacturers intent on acquiring marginal profits. The decision by Digital Equipment Corp., with its Rainbow 8088-based system, to use

See BITS page 104

Hewlett-Packa surge in office

Introducing the Person

The principle is simple. Boost the productivity of individual PCs. Your people, your department, even your entire company will follow suit.

The first boost occurred when we introduced the touchscreen HP 150 as an office and managerial workstation. This made personal computing so much easier and faster that individual productivity soared.

Now the Personal Productivity Center combines the flexibility of the HP 150 with the power of our HP 3000 family of distributed computer systems.

You can shape each Productivity Center just the way you want it by adding other office and computing products from our extensive range.

You can link managerial and secretarial work stations. Create impressive presentations, merging business graphics and word processing. Store them on large disc files. And print them out on laser printers and color plotters.

Your PCs also grow more productive by increasing the range of software they can run. In addition to leading PC programs like 1-2-3™ from Lotus™ and popular word processing packages, they can use HP 3000 business software like our exclusive DeskManager. This combines electronic mail, quick memo

rd touches off a productivity.

al Productivity Center.

writing, personal filing and calendar functions. And each PC can access data processing systems and large corporate data bases.

Personal Productivity Centers can communicate with similar networks in other parts of your company, as well as your mainframes. Each system can expand to handle more than 100 workstations. And you can grow without involving your programmers in any software conversion.

So if PCs alone are making your people more productive, just wait till you see them all working together. And you can see them right now by calling your local HP sales office listed in the white pages. Or write for complete information to: Hewlett-Packard, Dept. 03191, 19447 Pruneridge Avenue, Cupertino, CA 95014. In Europe, contact Henk van Lammeren, Hewlett-Packard, P.O. Box 529, 1180 AM Amstelveen, The Netherlands.

It could turn your whole company into a productivity center.

Productivity. Not promises.

HEWLETT PACKARD

1-2-3 and Lotus are trademarks of Lotus Development Corporation.

HD02490

GET THE WORD ABOUT TRANSACTION PROCESSING. IT'S IN THE BOOK.

In our free 82-page book, "SYNAPSE TRANSACTION PROCESSING. SYSTEM OVERVIEW." And it's a revelation. To non-technical management, technical management, and staff alike.

It spells out how to accelerate development and minimize maintenance of high-performance, fault-tolerant, online transaction-processing systems.

It also discusses miracles: how to get dazzling performance from a Relational DBMS and how to expand a transaction-processing system online under power.

It reveals how to provide fault tolerance without redundant hardware and without programming. How to use a system-wide dictionary to standardize and control all definitions and relationships. How to completely automate database integrity, concurrency and recovery.

It's all there. Chapter and verse. Even a comprehensive index. To get your copy, simply mail the coupon or give us a call at (408) 946-3191. And let there be enlightenment. Synapse Computer Corporation

To: Synapse Computer Corporation,
Corporate Communications Department C2,
801 Buckeye Court, Milpitas, CA 95035.

Please send me your free, 82-page bible on transaction processing.

Name _____ Phone _____

Title _____ Company _____

Address _____

City _____ State _____ Zip _____

© 1983 Synapse Computer Corporation.

Protact targets DEC micro

HOBOKEN, N.J. — Advanced Systems Concepts, Inc. has announced the extension of its integrated-applications control package for Digital Equipment Corp.'s Professional 300 series microcomputer. Called Protact, the product provides terminal, file and network management for the Professional 300.

Protact allows one or two users on a Professional to access applications that may be on a local or remote Professional, PDP-11 or VAX processor. Protact's terminal manager presents a form to be filled in by the terminal user. Primary edit checks, specified by the programmer, are verified as the user enters each field.

Several implementations of Protact are available. The Protact Developer's Kit enables users to write and implement applications on the Professional. The Protact Run-Time System consists of the Protact components used while an application is executing. The Terminal Server has terminal and network management components for use in a Xerox Corp. Ethernet local-area network.

Protact runs on DEC's P/OS V1.5 and V1.7 operating systems. The Developer's Kit costs $2,500, the Run-Time license is $395, and the Terminal Server is $595. Multiple CPU discounts are available. Advanced Systems Concepts is located at 22 Hudson Place, Hoboken, N.J. 07030.

MCBA's general ledger tool out

MONTROSE, Calif. — MCBA, Inc. has announced the Micro Level II General Ledger package written in Ryan-McFarland Corp.'s RM/Cobol.

Designed for use with Ryan-McFarland's RM/COS operating system, the MCBA package runs on a variety of microcomputer systems including Altos Computer Systems, Inc.'s ACS 68000 and NCR Corp.'s Tower I, according to a spokesman for the company. The Micro Level II General Ledger package is said to feature a user-defined general ledger account number structure and full multicompany capabilities.

The Micro Level II General Ledger package is also said to allow profit centers to be grouped into financial entities for sectional reporting, and the user can select the level of detail to retain and make adjustments to prior and future periods.

Inquiries reportedly can be made into general ledger accounts through the terminal screen. Further, the package formats user-defined financial statements using a built-in report generator, according to the spokesman.

Micro Level II General Ledger is priced at $900.

Additional information is available from MCBA, which can be contacted at 2441 Honolulu Ave., Montrose, Calif. 91020.

Portable fits IBM micros

ROCKVILLE, Md. — International Systems Marketing, Inc. has announced an IBM Personal Computer-compatible portable computer.

The Unisystem-PC reportedly is a 16-bit system featuring the Intel Corp. 8088 microprocessor, 256K bytes of internal memory, two 360K-byte floppy disk drives and a 9-in. monochrome monitor.

The company also announced a Unisystem-XT portable, designed to be compatible with the IBM Personal Computer XT. It reportedly features an internal 10M-byte Winchester disk drive and a 360K-byte floppy disk drive.

The company also announced that a color monitor will be available as an option.

The Unisystem-PC and XT are scheduled for delivery in the second quarter of 1984, while the color monitor will be available in the third quarter.

The Unisystem-PC base price is $2,795, and the XT price is $3995. The color monitor will cost an additional $500.

International Systems Marketing is located at Suite 6, 932 Hungerford Drive, Rockville, Md. 20850.

Lotus forms Boston group

CAMBRIDGE, Mass. — Lotus Development Corp., producer and marketer of microcomputer software, has announced the formation of a Boston-area Lotus User Group.

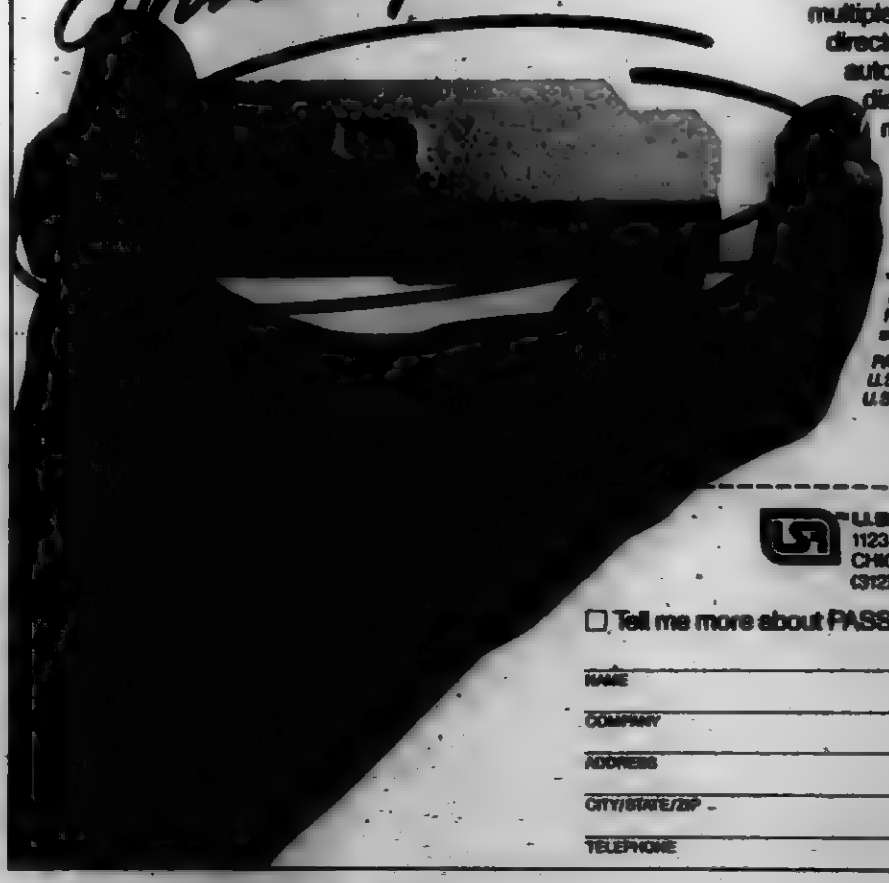
The first meeting of the group is scheduled to take place Tuesday, March 13, at 7 p.m. at Boston University's Sherman Union Building. Mitchell Kapor, president of Lotus, will be the guest speaker.

Lotus' 1-2-3 is a program that integrates spreadsheet analysis, graphics and information management.

Several independent users groups already exist throughout the U.S. All current and potential users of 1-2-3 are invited to attend the meeting.

Lotus can be reached at 161 First St., Cambridge, Mass. 02142.

Our Password™ modem's sophisticated new control panel



THE BUSIER YOU ARE, THE BETTER YOU LIKE IT.

PASSWORD™ is a modem so efficient and convenient there is little to do but turn it on to transmit at 300/1200 baud. Operating features include auto dial/answer, auto mode/speed select, full/half duplex. PASSWORD has all this, plus a two-year limited warranty, at a price of just $449.*

TELPAC™ telecommunications software (optional) programs PASSWORD to transfer files, in terminal or host mode, with multiple error checks. Phone directory gives choice of timed automatic or one-touch dial and logon. Command mode includes file display and update, menus and help, and much more. Write or call for complete specifications.

*Suggested list for PASSWORD complete with power, phone, RS232 interface cables. TELPAC software optional extra, $79.

PASSWORD, TELPAC, USR logo and U.S. Robotics are trademarks of U.S. Robotics Inc.

U.S. ROBOTICS INC.
1123 WEST WASHINGTON
CHICAGO, ILLINOIS 60607
(312) 733-0497

☐ Tell me more about PASSWORD, TELPAC.

NAME _____

COMPANY _____

ADDRESS _____

CITY/STATE/ZIP _____

TELEPHONE _____

Study ponders Microsoft, Digital Research

By Patricia Keefe
CW Staff

SAN JOSE, Calif. — Microsoft, Inc. is on its way to becoming the first billion-dollar software company, while its competitor, Digital Research, Inc., may be left with minimal market share unless it comes up with something innovative, according to a recent study released here by Strategic, Inc.

"Digital Research/Microsoft — The Key Issues" called IBM's decision to endorse Microsoft's MS-DOS — and thereby dethrone Digital Research as the "undisputed leader" of microcomputer operating systems — "one of the most important events in the last decade in microcomputers." This move not only "repositioned" Digital Research and Microsoft in the 16-bit market, but "cut off" Digital Research's greatest potential growth path, the report said.

It also chastised Digital Research for initially refusing to put its own languages under MS-DOS, while Microsoft was planning to support Digital Research's CP/M-86 with its own languages. Now the positions are reversed, Strategic claimed, with Digital Research making its languages available under MS-DOS and Microsoft stopping with a CP/M-86-compatible Basic.

The study also claimed that there are several kinds of applications software and other functions that should be standardized and built into future operating systems. These include graphics, data base, communications, multitasking and a much higher level of user interface. Praising Microsoft for taking an "ambitious" approach to address all these areas in integrated and compatible sets of MS-DOS and Xenix, the report accused Digital Research of addressing these areas "piecemeal" with separate extensions to the various versions of CP/M for graphics and networking and with multitasking and multiuser versions.

Strategic predicted there will be no contest between an integrated Microsoft Xenix-compatible version of MS-DOS with all the above functions and the "fragmented" CP/M-86 line, "especially if IBM licenses both MS-DOS and Xenix for the Personal Computer to sell under its own name, as is expected.

"Digital Research must regroup and plan a coordinated development strategy in order to have any hope of regaining market share in operating systems," Strategic asserted. The report added that while Digital Research can keep some share of the market by having products that are compatible with those of Microsoft's, it "will not have a very large share unless it can find some major enhancement that Microsoft has not considered. Reacting to Microsoft is not enough. A commitment to long-term, coordinated development is needed," the report concluded.

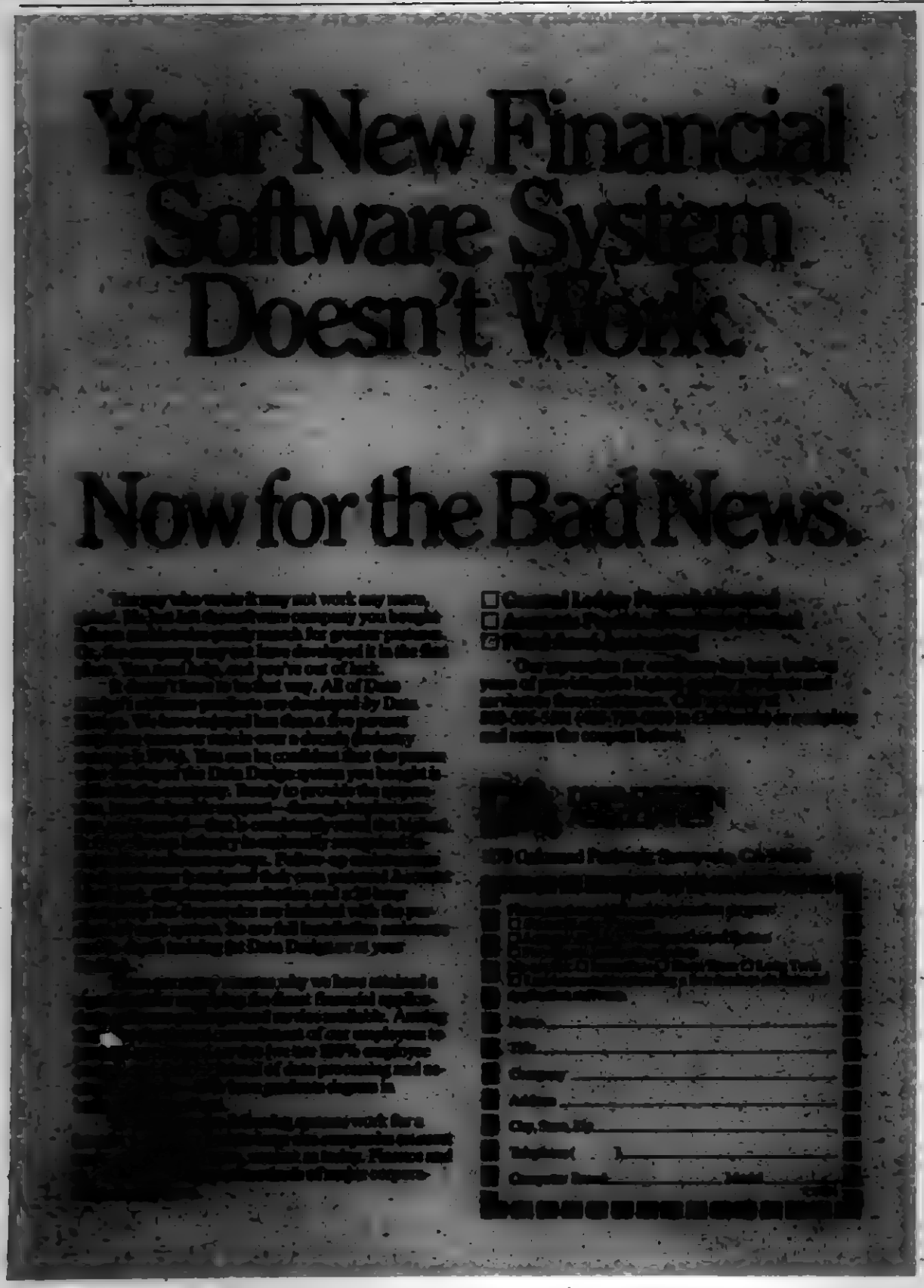
Digital Research also comes in for some scolding over customizing. The report claimed that Digital Research has left the customizing of CP/M almost entirely to the manufacturer or user and, as a result, has collected much less information on user needs and has less contact with industry than has Microsoft. "Consequently, Microsoft knows the product plans of most of the major manufacturers of home computers and 16-bit systems," the report said.

Another area where Strategic sees Microsoft outmaneuvering Digital Research is in the home computer market. However, the report pointed out that "the company that sells operating systems has an advantage in supplying programming languages and applications." Digital Research, it noted, is not about to lose its programming language market and still has opportunities in applications.

While Digital Research has gained some ground on Microsoft with its multitasking Concurrent CP/M-86, which IBM itself is selling, Strategic predicted it will lose ground to a multitasking version of MS-DOS unless it can find the path to greater levels of integration and function.

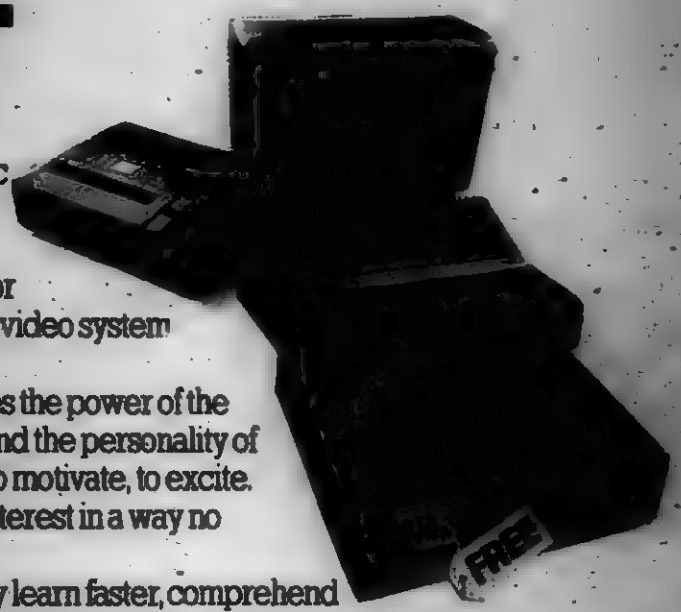
Microsoft, on the other hand, "is the only company that can set the [operating systems] standards to suit its own needs," according to the report. While developing new operating systems and applications, Microsoft can gain leverage from other software houses that are forced to support its systems software, the report added.

Overall, Strategic expects Microsoft will be expanding rapidly in the next few years. Although it originally did little besides languages, Strategic described Microsoft as "an important hardware maker, the leading operating systems house and a very significant applications developer."



A WORD TO ANYONE LOOKING FOR UNIX TRAINING:

FREE.



Introducing Vision. The first Unix Interactive Video Training Curriculum. And our last Free Introductory Offer.

Now you can own an IBM Personal Computer, laser videodisc player, color monitor and Interactive Training System Controller, absolutely Free.

Simply lease our new Unix Interactive Training Curriculum for one year. And get this complete interactive video system at no extra cost.

Interactive video training combines the power of the computer, the speed of a laser disc and the personality of classroom instruction. To involve, to motivate, to excite. To capture and hold a student's interest in a way no other medium can.

Students learn by doing, so they learn faster, comprehend more and retain information longer. They spend less time away from the job. And are more productive once they return.

Because training is targeted, students learn only what they need to know to do the job. Now.

What's more, Vision was developed by Interactive Training Systems, the leader in interactive video training, and Computer Technology Group, the leader in Unix training.

The result? Unix training so fast, so effective and so affordable, we back it with a full 30-Day Money-Back Guarantee.

Take advantage of our Free Introductory Offer. Send in the attached coupon. Or call us at 1-800-227-1127.

AFTER MARCH 31, 1984 OUR FREE INTRODUCTORY OFFER IS NO LONGER FREE!

☐ Please have a representative contact me immediately.

☐ Please send me more information about Vision, the Unix Interactive Video Training Curriculum.

Name _____

Company _____

Title _____

Address _____

City _____ State _____ Zip _____

Telephone _____

UNIX is a Trademark of Bell Laboratories

Interactive Training Systems, Inc.
4 Cambridge Center, Cambridge, MA 02142

Micro-to-mainframe:

Before you settle for solution, ask a few serious

Choosing a micro-to-mainframe communications system is no game.

If you make the wrong choice, the consequences can be very expensive.

So before you toy around with "easy" solutions, do yourself a favor and ask some serious questions.

You might want to start with these:

Will this product support full IBM Terminal Emulation?

Make sure the system you choose offers *full* protocol emulation. It should be able to emulate remote batch and interactive IBM terminals and terminal systems.

Does the company offer a variety of products to solve my problem?

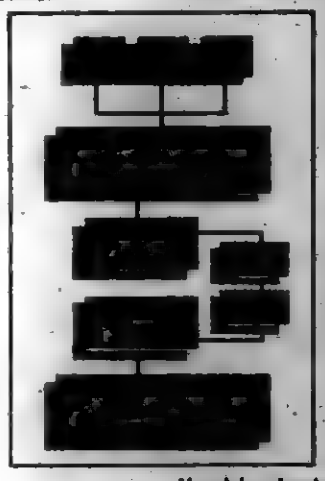
The manufacturer you select should be able to handle *any* operating environment. You should have your choice of stand-alone front-end processors, IBM PC or XT boards, or an OEM board. And make sure the products will run on the most popular operating systems, including CP/M, MS-DOS and UNIX.

Can I get fast answers to my questions?

Insist on toll-free access to qualified service personnel before and *after* the sale. A Product Support Group should be available during your normal business day.

What if I need a quick analysis of a problem?

If you run into a problem, you shouldn't have to sit through a lengthy question-and-answer session over the phone. Ask if the manufacturer has a Communications Test Center that allows for product testing over public phone lines. And find out if the product has internal diagnostics that point out problem areas right on the screen.



Suppose something goes wrong with the unit?

Be sure the company offers a service plan that includes a 30 day money-back guarantee and a 12 month warranty that includes a free replacement unit.

a simplistic questions.

What about future product development?

It's not enough for a company to solve your communications problems today. Ask about their commitment to R&D. Are they working on products you're going to need soon? If not, you might want to consider someone who is.

Who am I dealing with anyway?

In a market as volatile as this one, you need some reassurance that the people you buy from will be around to back up their products. Ask how long they've been in business. The longer, the better.

How much is all this going to cost?

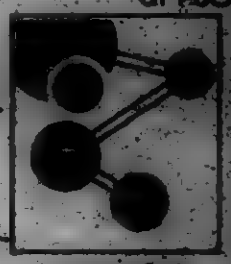
There are lots of micro-to-mainframe solutions with lots of price tags. But here's a point of reference for you:

Our own DataTalker™ product line will give you all the capabilities and services we've just described for as little as $695. Complete.

Granted, this isn't all the information you'll need to choose the right micro-to-mainframe solution. But it's a good start.

If you'd like to know more—and there certainly is more to tell—contact our Marketing Support Group at 1-800-321-7785.

We'll make sure you get the answers you need. And we won't play games.



Providing Data Communications Solutions

Winterhalter, Incorporated
3853 Research Park Drive,
P.O. Box 2180, Ann Arbor,
Michigan 48106. 313/662-2002.
800-321-7785. TELEX 234 216.
TWX 810-223-2423

DataTalker™

By Winterhalter, Incorporated

Winterhalter, Incorporated has been providing data communications solutions to major manufacturers of microcomputers and word processors since 1978. Our DataTalker front-end processors and PC boards are used by companies around the world, from start-up manufacturers to the Fortune 1000.

NASDAQ SYMBOL WHIT

MICROCOMPUTERS

STORAGE

UNISOURCE SOFTWARE CORP.
Hard disk with Venix/86

Unisource Software Corp. has announced a hard disk expansion unit, loaded with Venturcom, Inc.'s Venix/86 operating system.

The disk plugs into a floppy disk slot on IBM's Personal Computer and allows the user to run Venix/86, Venturcom's version of the Unix operating system, the vendor said. The system features a hard disk partition for Venix/86 and Microsoft, Inc.'s MS-DOS files and programs, four editors and a C compiler, the vendor said.

The unit costs $2,095.

Unisource Software, 71 Bent St., Cambridge, Mass. 02141.

AUXILIARY EQUIPMENT

THE EVALUATOR
The Order Processing and Billing Manual

The Evaluator has introduced the second in a series of business systems reference and software comparison manuals.

The Order Processing and Billing Manual, which follows the Accounts Receivable Manual, reportedly provides detailed microcomputer software package comparisons for each of the listed business questions.

The cost of each manual is $18.95, plus $3 shipping and handling. Annual trimester updates are available at a cost of $44.50 per manual.

The Evaluator, P.O. Box 4348, 1004 Hope St., Springdale, Conn. 06907.

CONDOR COMPUTER CORP.
Hands-on Condor

Condor Computer Corp. has introduced "Hands-on Condor," a self-teaching workbook made up of 12 lessons that help users learn about the Condor Management System.

According to the vendor, the workbook emphasizes business uses of the Condor, teaching each of the Condor commands with a sample application, including personnel, scheduling and transaction processing.

The workbook is priced at $24.95 and requires Condor software and a microcomputer. It will be available March 15.

Condor Computer, Suite 125, 4984 El Camino Real, Los Altos, Calif. 94022.

APPLE COMPUTER, INC.
Apple Modem 300, 1200

Apple Computer, Inc. has announced two modems, a 300 bit/sec unit and a 1,200 bit/sec model, for its Apple II, Apple III, Macintosh and Lisa personal computers.

Using the modem and standard telephone equipment, users can transmit and receive data files, electronic mail and programs to and from other personal computers, minicomputers and mainframes, Apple said. In addition, the Apple microcomputers can be used for home banking transactions or can tie into information services.

The modems are command-compatible with Hayes Microcomputer Products, Inc.'s Smartmodems and work with a variety of communications software packages, the company noted.

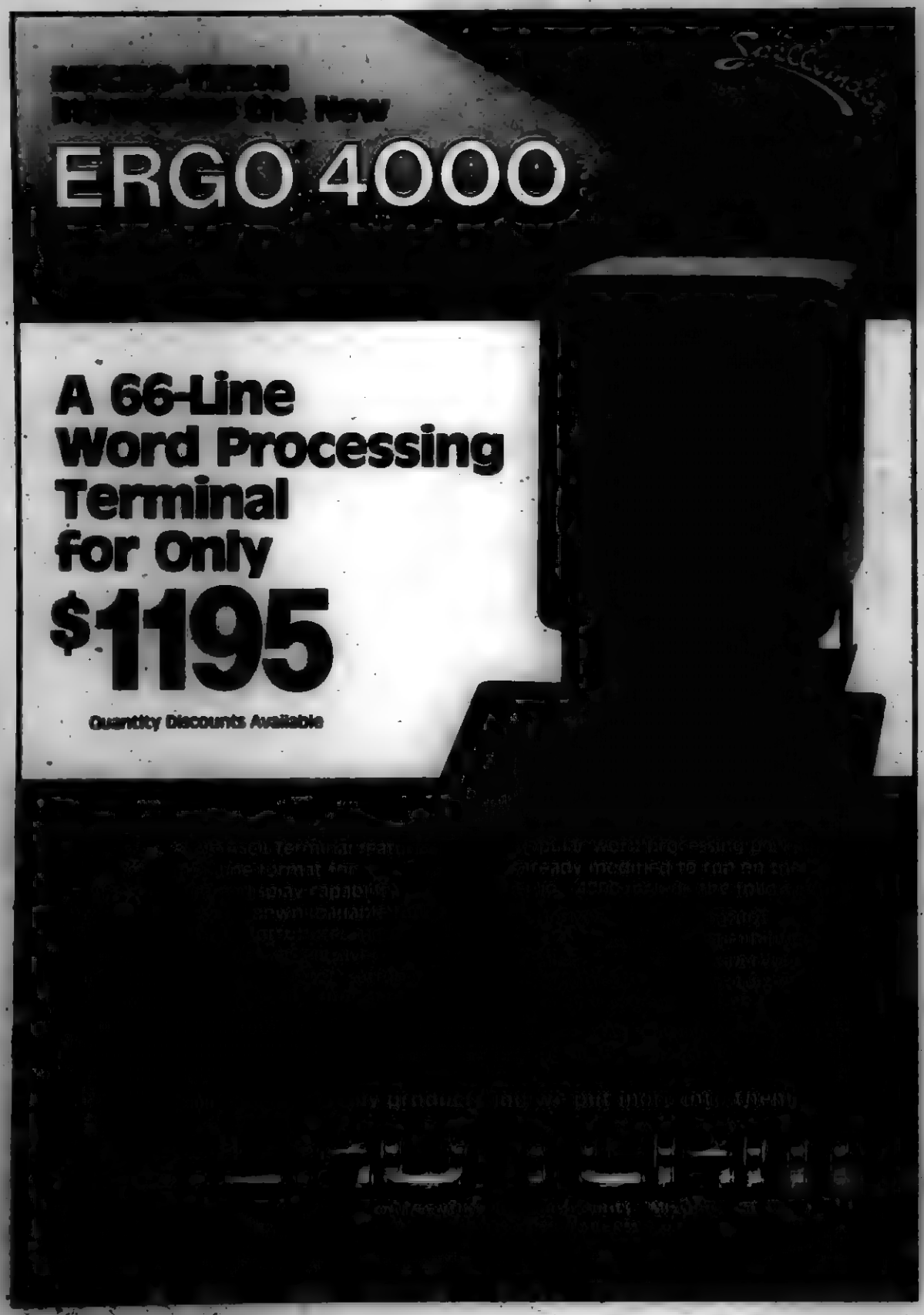
The Apple Modem 1200 operates at both 300 and 1,200 bit/sec, while the Apple Modem 300 operates at speeds of 300 and 110 bit/sec. Both modems provide built-in autodial and autoanswer functions.

The modems use an RS-232C serial interface with a 9-pin connector. A serial interface card is required to connect the modems to an Apple II. The modems plug directly into the built-in serial port of any Apple III, Apple III+, Macintosh or Lisa microcomputer.

Each modem comes with an accessory kit that contains an installation manual, a user's manual and the connector cables designed to support the user's particular systems. Apple II users may purchase an optional accessory kit that includes the serial interface card.

The Apple Modem 300 is priced at $225, or $299 with the optional accessory kit and card; the Apple Modem 1200 costs $495, or $570 with the kit and card.

Apple Computer, 20525 Mariani Ave., Cupertino, Calif. 95014.



SOFTWARE

SOFTWARE CONNECTIONS
LAN: Mail Monitor

Software Connections has introduced LAN: Mail Monitor, a package for local-area networks.

The software turns networked IBM Personal Computers, Apple Computer, Inc. Apple II and IIe micros and compatible systems into electronic mailboxes, the company said.

The product is a store-and-forward electronic mail system designed to be used as an internal message system and a file transfer system that can send data over phone lines.

Two versions are available: A standard package for up to 25 users costs $745; the large network version allows up to 10,000 users for $1,195.

Software Connections, 2041 Mission College Blvd., Santa Clara, Calif. 95054.

NBI, INC.
Tools fit Ossys

NBI, Inc. has announced that three popular microcomputer software

Continued on page 100

"The computer is down."

Every day another business goes "on line." Every day the world becomes more dependent on computers. And every day it becomes more important for the world to have a computer that won't go down, or even skip a heartbeat.

Over the past decade there have been computers designed to withstand hardware failures and eliminate downtime. However, all previous approaches depend heavily on software techniques to provide fault tolerance. A comparison of these old systems with the new Stratus/32 Continuous Processing™ System will illustrate how far we have come in one leap, by using advanced hardware technology instead of complex software.

How the Stratus Hardware Solution Supersedes the Software Solutions.

Stratus's hardware design means that fault tolerance is invisible to your application programs and users. You can even move previously developed applications to Stratus with NO CHANGES and NO PERFORMANCE LOSS for fault tolerance. In contrast, the software-based systems require complex, performance-stealing software in order to implement fault tolerance. This means that new programs are more difficult to develop, they run slower, and existing programs can't be run without major changes.

An added benefit of the Stratus fault tolerant design is that you can expand your system with additional processors as your computing needs grow. In fact, you can have up to 32 fault tolerant processors, 2000 communication lines, and 100 billion bytes of storage in a single Stratus system.

Hardware Self-checking Causes a Breakthrough in Service.

Each Stratus/32 tests itself EIGHT MILLION TIMES A SECOND while it executes your programs, so faults are detected BEFORE they corrupt your data. And when there is a failure, there's no need to rush to call your Stratus service technician. For one thing, the failed component, be it a CPU, controller, disk, or power supply, has a partner that continues operations as usual (without slowing down the system), so there's NO DOWNTIME. In addition, repairs can be made WITHOUT STOPPING THE SYSTEM. It is so easy to repair a Stratus/32 that our service is provided at about one-half the average price charged by other computer manufacturers.

$140,000, Software Included.

Our prices are competitive with "normal" systems (i.e. ones that do not provide fault tolerance), and substantially lower than the software-based fault tolerant systems. $140,000 buys you a complete four megabyte 32-bit system with 60 megabytes of disk storage, magnetic tape drive, and system SOFTWARE. If you like our hardware, you will be even more impressed with our software. (A common reaction among our users.) Briefly, our software offering includes VOS (a virtual operating system), transaction processing, networking, IBM communications, data management system, interactive forms builder, symbolic debugger, COBOL, Basic, PL/I, Fortran, Pascal, word processing....

To get more information call us at 617-653-1466.

The computer you can count on has arrived.

Stratus

CONTINUOUS PROCESSING™

Now that the world relies on computers it needs a computer it can rely on.

MICROCOMPUTERS

Continued from page 98

packages — Microsoft, Inc.'s Multiplan and GW Basic and Ashton-Tate's Dbase II — are now available for NBI's Onyx 2000 workstations.

NBI's Multinet interface allows its Onyx 64 controller to connect Onyx 2000 workstations. The three programs can be shared in the network, according to the vendor.

For one to 16 users, Multiplan costs $750; for 16 to 32 users, it sells for $1,500. GW Basic comes with Microsoft's MS-DOS operating system, which costs $425 per copy. Dbase II costs $1,995.

NBI, P.O. Box 9001, Boulder, Colo. 80304.

CONSUMERS SOFTWARE, INC.
Spreadsheet Auditor

Consumers Software, Inc. has introduced Spreadsheet Auditor, which permits users to audit the formulas behind their Visicorp Visicalc, Lotus Development Corp. Lotus 1-2-3 or Sorcim Corp. Supercalc spreadsheets.

The auditor displays the formulas on a grid on the user's screen and wraps long formulas around for easier reading, according to the vendor. With the Spreadsheet Auditor, users of Lotus Development's 1-2-3 can get a complete listing of all named and other special ranges contained in their work sheet, the vendor said.

Versions of the Spreadsheet Auditor are available for Apple Computer, Inc.'s Apple II+ and Apple IIe computers with at least 48K bytes of memory and for IBM's Personal Computer, Personal Computer XT and Personal Computer compatibles with 128K bytes of memory.

The Spreadsheet Auditor licenses for $90.

Consumers Software, Inc., Suite 106C, 214 E. Holly St., Bellingham, Wash. 98225.

NOVELL, INC.
Netware/P Operating System

Novell, Inc. has announced the Netware/P Operating System for Proteon Associates, Inc.'s Pronet local network hardware system that connects as many as 64 IBM Personal Computers, Personal Computer XTs and other Personal Computer compatibles.

Netware/P is said to make available to networking microcomputers 150M bytes of disk storage attached to a central Netware file server, which can be any IBM Personal Computer-compatible microcomputer. Up to three printers can also be connected to the file server, a Novell spokesman said.

A file server design allows different computers' operating systems to coexist on the network, sharing the same mass storage devices under the Netware shell.

Netware/P currently supports IBM's PC-DOS 2.0 and Version 1.1 and Digital Research, Inc.'s CP/M 86.

Netware/P is priced at $1,495.

Novell, 1170 N. Industrial Park Drive, Orem, Utah 84057.

AUTOMATED PROFESSIONAL SYSTEMS, INC.
Apagraph

A business graphics program called Apagraph, running under Digital Research, Inc.'s CP/M 80 operating system and able to access data from spreadsheet programs, has been announced by Automated Professional Systems, Inc.

The software produces line graphs, pie charts, bar graphs, stick graphs, step graphs and scatter plots and can read multiple data files and produce a single graph with overlayed images for each set of data, according to the vendor.

Apagraph is for the executive or professional who needs to produce graphs quickly and wants to do so without learning a command language, said Amal Chaudhuri, Automated Professional's director of research and development.

Apagraph is priced at $295 and is available through Automated Professional's software dealer network.

Automated Professional Systems, 270 Madison Ave., New York, N.Y. 10016.

DATAMENSION CORP.
Report Manager enhancements

An advanced version of Datamension Corp.'s Report Manager spreadsheet for the IBM Personal Computer has

Continued on page 162

Changing our ribbon is a snap.

Most printers make you fool with a messy ribbon.

But with Digital's Letterprinter 100, all you have to do

is snap in one of our replacement cartridges.

You'll instantly get at least 5 million more characters' worth of ink.

Easy, isn't it?

The fact is, everything about the Letterprinter 100 is easy.

For example, with just a flick of a finger you can select

up to five different typefaces. Or let your

computer do it for you, automatically.

If you can't find a typeface you like,

we'll customize one for you.

Now why would the world's second

largest computer company go to

such lengths to make the

Letterprinter 100 so

accommodating?

Simply so it can spend more

time doing what you bought it

to do in the first place.

And that's printing crisp

manuscripts and graphics

quickly. Some of our customers

in high speed printing applications

even in only 15 months.

The Letterprinter 100.

Digital is proud to announce

for the small printer

environment.

For the

Printer.

digital

MICROCOMPUTERS

Continued from page 100

been released, incorporating 60 enhancements, including a cut-and-paste feature and key word search, the vendor said.

Using the cut-and-paste feature, managers can download column data from any program, whether on a micro, mini, mainframe or time-sharing system, the vendor said, so long as the proper communications for the data transfer are established.

The software's new nested-sort feature, meanwhile, allows columns, rows or pages to be sorted individually or collectively on as many as three sort fields, the vendor noted.

The enhanced Report Manager also includes 11 new preprogrammed functions, bringing its total to 68. Among them are time-and-date stamping and billable hours calculator, the vendor said.

The advanced version of Report Manager, including a training diskette, tutorial manual and on-line Help function, is available for $495.

Datamension, 615 Academy Drive, Northbrook, Ill. 60062.

PERSONAL COMPUTER PRODUCTS
Package of file transfer programs

Personal Computer Products has released a package of file transfer programs, featuring new conversion utilities, that will allow users of Digital Research, Inc.'s CP/M-based computers, the Apple Computer, Inc. Apple II and III models or Radio Shack personal computers to route files to IBM Personal Computers and IBM Personal Computer compatibles.

According to the vendor, the package features key word fix-up, which aids the spacing of Basic programs.

The file transfer programs, the vendor said, will transfer any file, whether it is in Ascii, embedded control codes, compressed binary formats, encrypted data bases, high-level language, Visicorp's Visicalc electronic spreadsheet, word processor files or Apple's random files.

The complete package is available for $129.95.

Personal Computer Products, Suite C-18, Santa Clara, Calif. 95050.

DWJ ASSOCIATES, INC.
Pecom

IBM Personal Computer users can emulate a Hewlett-Packard Co. HP 2622A terminal and transfer files to and from their Personal Computer using a new program called Pecom from DWJ Associates, Inc.

Users will also be able to emulate HP 2623 and HP 2624B terminals, but without the graphics mode and alternative character set, the vendor said.

According to the vendor, Pecom is compatible with DOS 1.0, 1.1, 2.0 and 2.1 and has a 13 menu-function key hierarchy for selecting operating modes and performing other terminal and printer controls.

The program comes on one 5¼-in. IBM-format floppy disk and is available for $450. A $20 manual may be ordered separately.

DWJ Associates, One Robinson Lane, Ridgewood, N.J. 07450.

DELTAK, INC.
Teach Yourself Visitrend/Plot on the IBM PC

Deltak, Inc. has announced an instructional software program for IBM Personal Computer users who want to learn the vendor's Visitrend/Plot program.

Teach Yourself Visitrend/Plot on the IBM PC is said to provide users with the skills to manipulate Visitrend/Plot subprograms and menus to access various program features.

Three education diskettes provide on-line instruction, and the program handbook provides tutorial assistance and practice exercises.

Minimum program requirements are an IBM Personal Computer with 128K bytes of random-access memory, the IBM PC-DOS Release 1.0, 1.1 or 2.0 operating system, one single-sided diskette drive and an IBM video terminal that can be used with a color/graphics adapter.

The program is available now for purchase for $70. Rental rates also are available.

Deltak, East-West Technological Center, 1751 W. Diehl Road, Naperville, Ill. 60566.

THE BUSINESS LIBRARY CORP.
Business Library Information Retrieval Volume

The Business Library Corp. has added an information retrieval and report generator module to its Business Library software for the IBM Personal Computer and compatible systems.

Designated the Business Library Information Retrieval Volume, the software is said to permit data recovered from password-protected files to be used as generated or to be merged into other data files. Using a universal data base management program, it can be turned into various formatted reports or, using standard communications software, be passed to a mainframe processor for further analysis.

While the software integrates with other Business Library volumes as required, it also contains a second level of security so that confidential data such as payroll information remains protected, the company said.

Users are able to tap as many as three different data bases simultaneously, accessing as many as 40 different data fields in each, to produce a new record with a maximum of 251 characters.

The Business Library Information Retrieval Volume costs $395.

The Business Library, P.O. Box 844, Pasadena, Calif. 91102.

See TOOLS page 104

From

, to

Nobody puts ideas on paper so many ways.

If you're using your printer with a personal computer, you probably need one that can handle a variety of functions.

At the same time, the price should be in line with the computer itself. Low.

The pint-sized Dataproducts printer in the picture costs about as much as one good software package.

It prints spreadsheets, graphics and illustrations, labels, multi-part forms—even letters that look like they were typed.

But let's say you're running a big computer and it's hundred-page reports you need. Pronto. Or documents by the millions.

The printer on the right finishes a full computer printout page in less time than it takes to sneeze. At 2,000 lines a minute, it prints much faster than you can see. Three shifts a day. Year after year.

In between these two special-duty Dataproducts printers are whole families of other Dataproducts printers—daisywheel printers, non-impact printers, high-security printers for the government, and more.

In fact, we make more different kinds of computer printers than any other independent printer company in the world.

Very likely we make one that fits your needs exactly.

Write us at 6200 Canoga Avenue, Woodland Hills, CA 91365. Or phone (818) 887-3924. In Europe, 136-138 High Street, Egham, Surrey, TW 20 9HL England.

Dataproducts computer printers.

TOOLS from page 102

SELECT INFORMATION SYSTEMS
Select Bilingual

Select Information Systems has released a Spanish/English word processing package that includes both Spanish and English menus, Help screens and commands.

The package reportedly contains a bilingual version on-screen interactive tutorial, a Spanish/English spelling checker and a mailing list merge/print function.

Select Bilingual requires an IBM Personal Computer, Personal Computer XT or compatible system operating under IBM's PC-DOS Release 2.0 or 1.1, 128K bytes of random-access memory and two double-sided disk drives or a hard disk drive. It is priced at $395.

Select Information Systems, 919 Sir Francis Drake Blvd., Kentfield, Calif. 94904.

SOFTWARE ARTS, INC.
Visicalc Advanced Version

Software Arts, Inc. announced Visicalc Advanced Version, an enhanced version of Visicalc for the IBM Personal Computer.

"This advanced spreadsheet has a number of new capabilities including variable column width, keystroke memory, an extensive help facility and support of the Microsoft, Inc. mouse," said Dan Bricklin, chairman at Software Arts.

Visicorp in San Jose, Calif. was exclusively marketing Visicalc until Software Arts filed suit last month to terminate a marketing agreement the two companies signed in 1979. Visicorp continues to sell Visicalc. Visicalc Advanced Version costs $99.

Software Arts, 27 Mica Lane, Wellesley, Mass. 02181.

MARKET from page 89

move back and forth from one application to another.

Though most integrated software products are aimed at business markets, even the inexpensive home and personal computers will incorporate these features at a fraction of the 1983 price of such innovative systems as the Apple Lisa or the IBM Personal Computer XT.

According to CSI, as competition for hardware sales intensifies, manufacturers will find themselves forced to offer free software or lose important market share.

Market leaders will continue to spend more and more money on establishing name identity and brand image, and, eventually, brand-name identification will be a key barrier to entry.

Key competition in this market ultimately will center on the operating environment, offering a more sophisticated combination of single-user, multifunction features.

Telecommunications compatibility will be a major competitive battleground in upcoming years.

The report also speculates that Japanese computer companies will make significant advances into the U.S. personal computer market, and that there will be substantial room for innovation in the new-generation microcomputer software market.

The report costs $1,450 and is available from Creative Strategies International, Suite 275, 4340 Stevens Creek Blvd., San Jose, Calif. 95129.

DISK from page 89

a unique disk format without providing any formatting capability forced users to buy diskettes from DEC. Better judgment finally prevailed, and DEC recently announced the availability of a formatting program that will allow consumers to use other than DEC diskettes. We can hope that IBM will let Microsoft make PC-DOS compatible with MS-DOS rather than following DEC's bad example.

Vanilla versions

If applications software manufacturers will attempt to use "vanilla" versions of DOS and avoid nonstandard features, the efforts toward compatibility will be strengthened. Also, if consumers of microcomputer products will make known the desire for compatibility, the process will be encouraged.

Finally, hardware manufacturers would do the public a service by refraining from using proprietary operating systems. In the long run, the use of a nonstandard DOS will not benefit anyone: not the consumer, not the applications software houses and not the original hardware manufacturers.

Madron is manager of computer services at North Texas State University, Denton, Texas 76201.

PURCHASE from page 89

available, and prospective users are encouraged to learn about a package by running it.

"The store ensures that Manufacturers Hanover Trust does not wind up with an expensive inventory of unused, unsupported, misunderstood systems."

Since the store opened, the type of employee evaluating a personal computer has changed dramatically, Smith said.

"While technically oriented managers and professionals were the first to show interest in personal computers, the balance is beginning to shift to business-oriented managers," Smith said.

You can advertise your product in 40 computer publications in 25 foreign countries—with one phone call.

There's a market for your product abroad.
You can reach the right people in the major computer markets throughout the world. The people who make the buying decisions—in countries already importing more than $3 billion in computer hardware, software and supplies.

CW International Marketing Services gives you one, efficient source for direct contact with the leading local computer publications in the world's major computer markets. How can we do this for you? We have a wide network of editorial offices around the world and provide first hand marketing information to our clients. Plus, we have over 10 years experience in the publishing industry.

We're a division of CW Communications/Inc., publishers of *Computerworld* and the world's largest publisher of computer-related newspapers and magazines.

CW International Marketing Services makes it easy.
We'll translate your ads for you and give you production services to meet the specifications of any or all the newspapers and magazines we publish or represent—and—we'll even bill you in dollars. What's more, when you place your advertising through CWIMS, you save the V.A.T. (value-added tax). It's as easy as advertising in your local publications.

We'll even help you with market facts, and, in the case of the People's Republic of China, we can arrange for you to give product and marketing seminars there! You can run your ads in our periodicals in these countries:

*Argentina	*Denmark	*Italy	*Norway	*Saudi Arabia	*Sweden
*Australia	Finland	*Japan	*People's	South Africa	*The Netherlands
*Brazil	*France	Korea	Republic of	*Southeast Asia	*United Kingdom
Chile	Greece	*Mexico	China	*Spain	*West Germany
	India		Peru		

*Published or co-published by CW Communications/Inc.

For more information on how we can help you promote your product all over the world, send us the coupon below or call Diana La Muraglia toll-free at (800) 343-6474 or telex #95-1153. In Massachusetts, call (617) 879-0700.

CW COMMUNICATIONS/INC.

Diana La Muraglia, General Manager
International Marketing Services
CW COMMUNICATIONS / INC.
375 Cochituate Road, Box 880
Framingham, MA 01701, USA

Please send me rate cards and information on publications in the following countries:

Name _____ Title _____
Company _____
Address _____
City _____ State _____ Zip _____

Now you don't have to be rich to be powerful.

Riches and power don't always go together. Take Plexus, for instance. The world's most powerful UNIX*-based supermicros.

Powerful because multiple processors share the UNIX load. So processing power is distributed to where it does the most good.

Terminal I/O. Disk I/O. Data communications. And, of course, data processing.

Our unique architecture also lets us bring you the world's first UNIX Network Operating System (NOS). So you can combine Plexus systems in an Ethernet network for even more power.

NOS gives you real time, continuous access to files. From anywhere in the network.

Files are also updated on the same basis. So everyone in the network works with up-to-the-minute data. Automatically.

No waiting for file transfers. And that's a decided improvement over everything else that's out there.

You also get to save money on powerful UNIX-based software, including COBOL, FORTRAN, Pascal, BASIC, and C. Database management and word processing, too. As well as hundreds of third party UNIX packages.

Plus our own software and maintenance support. And even a software referral service for your OEM programs.

Does all this make us expensive?

Absolutely not.

In fact, Plexus systems cost thousands of dollars less than the minicomputers we outperform.

To get a better idea of just how good that performance is, come get a demonstration. Call *800-528-6050*, ext. *1444*. In Arizona, *800-352-0458*, ext. *1444*. Or write Ralph Mele at Plexus Computers, Inc., 2230 Martin Avenue, Santa Clara, CA 95050.

You see? You don't have to be rich to be powerful. Just smart.

PLEXUS

Built for speed.

© Plexus Computers, Inc., 1983
*UNIX is a trademark of Bell Laboratories.

COMPUTER INDUSTRY

INDUSTRY INSIGHT
Peter Bertolik
CW Senior Editor

Big promises belittle Trilogy

Trilogy Ltd. may have a problem similar to that being experienced by would-be Democratic presidential candidate Walter Mondale — setting its sights just a little too high, it risks severely damaging its credibility as expectations must be modified to accommodate reality.

Trilogy has again announced a delay in the scheduled shipment date of its better-than-IBM-compatible computer that will utilize wafer-scale semiconductors purported to allow dense packing of integrated circuits.

But this time Trilogy announced it has decided to "simplify" the design process in order "to reduce the level of technical risk associated with the development project."

That revision means the originally planned single processor machine would be too slow, so the company has decided to produce a dual-processor model and later on — it says a year later — put out a four-way processor.

Putting its best face on, Trilogy said the redesign will make the wafer-scale technology more "suitable" for applications other than the Trilogy machine. Undoubtedly, Sperry Corp. and Digital Equipment Corp. must be pleased to hear that the technology they've invested a combined $68 million in will be easier to plug into their own development plans.

But Sperry and DEC must surely now be having second thoughts about Trilogy's ability to carry through with its plans in a timely manner.

Delays are always to be expected with development of new technology. That's one good reason why vendors desiring credibility should not raise expectations too high, too soon.

Delays, therefore, are one thing to be

See TRILOGY page 118

Micro mart strong in business

But home personal computer mart still an enigma

By James Connolly
CW Staff

BOSTON — The market for personal computers in 1984 will continue strong in the business area, a "vacuum cleaner" for computers, but the home market is still unidentified, according to a director of user research for International Data Corp. (IDC) of Framingham, Mass.

Speaking at IDC's 19th Annual Information Processing Industry Briefing Session in Boston, Tom Willmott said, "I call business a vacuum cleaner because it is literally sucking up everything that we have, at least in experimentation with things."

Willmott also said he saw no immediate end to the "debacle" of the "price-sensitive" home computer industry.

"The home market clearly is still an unidentified application. That is not to say there won't be a crossover work load at home for business applications. Portables will be coming at us like a wave this year — business machines that can be brought home for business, word processing applications and spreadsheet applications. But that is not updating a checkbook, and you still can't get cash out of a telephone, so far as I can see. That says something about home banking. The struggle is in the fact that we have a device that costs $600 or more and really doesn't do much for us," he said.

He noted that the long-term home computer market is not the "keyboard and TV" market, but a market for the complete systems bought by professionals.

Willmott said he sees "excitement" in the use of computers in education, particularly with companies providing computers to public schools. He also reported that the use of personal computers is growing in engineering, particularly with computer-aided design and manufacturing at the personal-computer-based workstation. But he said there is "limited" use for the micro in scientific applications because most personal computers don't use the specialized programs that would be needed.

Willmott based his predictions on a recent IDC survey of personal computer users.

He said that other IDC research showed

See IDC page 112

Few takers for embedded protection

By Edward Warner
CW Staff

PETERBOROUGH, N.H. — Piracy is estimated to cost software developers millions of dollars in lost revenues, and efforts are under way to develop hardware-embedded protection for commercial programs. But there appears to be no great demand for the products as yet.

Software Protection Devices, Inc. is attempting to incorporate its Copyrighter software protection system into a microcomputer chip under joint development with The Western Design Center.

Romlock, Inc., meanwhile, has linked up with K-Byte, Inc., an OEM of video-game cartridges, to incorporate its software protection circuitry into K-Byte's cartridge circuitry. Romlock President W. V. Moore said his firm is researching applications for use in protecting software stored on diskettes.

The Copyrighter system is, however, in-

See GUARD page 115

CORRECTION

Due to an editing error, the story, "Off-site backup spreading," in the Computer Industry section [CW, March 5], incorrectly said National Safe Depository (NSD) had reported the disappearance of its research and development tapes.

The story should have read: "According to NSD, a start-up company in the Silicon Valley recently reported the disappearance of its research and development tapes, which were stored on-site without any backup."

General Electric Co. enters the microcomputer repair service, expecting the service industry to be a $1 billion market within two years/113

Kaypro links up with a Japanese giant and plans to market a notebook-size computer that can run programs designed for the IBM Personal Computer/110

INSIDE

■ The General Services Administration's computer store is radically altering government procurement of microcomputers/111

■ U.S. Commerce Secretary Malcolm Baldridge urged American industry not to "panic" about foreign competition and not to rush to embrace trade protectionism/118

With BEALL Directing, Your Computers Never Miss a Beat

John Beall & Company, Inc.

COMPUTER INDUSTRY

Kaypro, Mitsui join forces to market portable

By Patricia Keefe
CW Staff

NEW YORK — Kaypro Corp. has linked up with a major Japanese company and will reportedly begin marketing this summer a notebook-size computer that uses programs designed for the IBM Personal Computer.

The computer is manufactured by Mitsui Co., a $70 billion Japanese trading group. Kaypro announced at its annual meeting last month that it has become the "first-choice U.S. distribution channel" for the Japanese firm, in a move that gives both Kaypro and Mitsui a "foot in each market."

Kaypro plans to sell the machine as a high-end addition to its current product line, but declined to offer specifics on price and performance. When connected to its base station, the tiny computer reportedly runs programs such as Lotus Development Corp.'s Lotus 1-2-3. IBM compatibility suffers when the portable is freed from the base because of video screen differences, according to reports. Its permanent memory is said to hold programs for word processing and spreadsheets.

The distribution agreement between Mitsui and Kaypro underlines the latter's belief that success in the personal computer market is based primarily on marketing rather than engineering technology or manufacturing, according to a spokesman.

Listing market position and distribution channels as its strategic assets, Kaypro sought to capitalize on those strengths by teaming up with a partner offering "formidable engineering and manufacturing capabilities, but with limited distribution channels," according to Blair Newman, Kaypro's director of marketing and strategic planning.

As a result of the agreement, "Kaypro gets tremendously expanded production, manufacturing and engineering capabilities without spending millions to bring it in-house," explained Michael Dortch, a consultant to Kaypro. Mitsui receives the benefits of U.S. marketing and distribution channels, something Japanese players in the micro industry have always lacked, according to Dortch.

More specifically, Kaypro will handle the bulk of the research and development work, while Mitsui will either provide the manufacturing or serve as purchasing and negotiation agent for Kaypro, Dortch said. Implementation of the agreement will also allow Kaypro to label Japanese products, as well as provide access to robot assembly and advanced components.

Newman summed up Kaypro's new strategy saying future products may be labeled: "Designed in the U.S. by top independent technical talents, made in Japan by robots and sold worldwide by Kaypro."

Kaypro also announced recently it has signed a $25.2 million contract with Seagate Technology, Inc. for an undisclosed number of Seagate's ST212 half-height, 5¼-in. Winchester disk drives over an 18-month period. The 12M-byte drives will be incorporated into the Kaypro 10 portable computer.

"Have you got a card for someone who's been replaced by a computer?"

SCIENCE/SCOPE

Some of the fastest digital integrated circuits yet built have been demonstrated by Hughes Aircraft Company scientists. The circuits, made of gallium arsenide, are bi-phase clock flip-flops configured to perform frequency division. They were operated at frequencies up to 5.77 GHz, the highest division speed yet reported for integrated circuits operating at room temperature. The circuits were fabricated by electron-beam lithography (using a Hughes system) to produce gate lengths of 0.5 micrometers in the MESFET switching transistors. These gallium arsenide devices could be used in very-high-frequency signal processing or as interfaces to more complex chips, including Very High Speed Integrated Circuits.

A novel engineering tool for producing the AMRAAM missile is expected to save the U.S. government and Hughes millions of dollars and months of work. A full-scale prototype of the Advanced Medium-Range Air-to-Air Missile has been completed using actual engineering drawings, materials, and processes. The purpose of this "precision physical model" is to refine AMRAAM's design and detect potential manufacturing problems, especially those stemming from late improvements. Among other things, the model has been used to determine routes and lengths for wire harnesses so that mating connectors will line up. It also was used in designing handling and test fixtures, and to show how its components react to vibration. AMRAAM is in full-scale development for the U.S. Air Force and Navy.

Six gallium arsenide field-effect transistors, designed for power amplifiers in radar and communications applications, have been introduced by Hughes. The single- and dual-cell power transistor chips are mounted on internally matched chip carriers. The devices consist of 10-GHz, 13-GHz, and 15-GHz power FETs capable of output power levels up to 1.5 watts. They are matched to operate in a 50-ohm-in/50-ohm-out system for a full 2-GHz bandwidth.

Military commanders can get a detailed picture of tactical situations and the current status of their resources with a new display terminal. The Hughes HDD-8000 has two display screens, with one producing seven-color graphics with about twice the resolution of commercial TV. An innovative touch panel controlled by computer software lets an operator retrieve and display data very quickly. Commands that combine several complicated processes can be made with the touch of a fingertip. The system is built in modular form and is so flexible that it can be reconfigured to meet changing needs immediately. In an air defense command and control system, for example, it normally would display tactical air battle data and tactical air force resource data. As a battle grew and more information was needed, additional screens could be used.

The Hughes Tucson facility, located in picturesque Southern Arizona, is a large, modern manufacturing complex with capabilities for producing advanced missile systems developed by Hughes. We have openings for experienced and graduating engineers to work on such advanced systems as the electro-optical Maverick, radar-guided Phoenix, TOW, and AMRAAM, the Advanced Medium-Range Air-to-Air Missile. Please send your resume to Professional Employment, Dept. S3, Hughes Aircraft Company, P.O. Box 11337, Tucson, AZ 85734. Equal opportunity employer.

Creating a new world with electronics

HUGHES

HUGHES AIRCRAFT COMPANY

For additional information please write to P.O. Box 11337, Tucson, AZ 85734

COMPUTER INDUSTRY

GSA store revamps federal micro procuring

By Andrew Blair
Special to CW3

WASHINGTON, D.C. — The General Services Administration's (GSA) computer store is radically altering the federal government's procurement of microcomputers. Instead of buying micros from GSA schedule contractors or local stores, government users are flocking to the GSA store in overwhelming numbers.

The impact of the GSA store will likely increase if GSA extends the concept to its 10 regional headquarters and expands product offerings to include telecommunication equipment.

The GSA store, called Office Technology Plus, is operated under contract with The Math Box, a local retailer that teamed up with five other firms to provide a range of consulting, sales and service. First opened for business only six months ago, the store has already surpassed GSA's original estimate of $2.5 million annual sales and is now grossing over $1 million per month.

The GSA store sells a variety of popular micros, peripherals, software and supplies and also offers training and maintenance. While the store offers processors from 15 manufacturers, only some of these makes are on hand in the store for demonstration.

The store is considered a success by GSA, according to William Fraser, special assistant to the GSA administrator. "Office Technology Plus is a full-service store that can provide configuration analysis, product information, side-by-side demonstrations, sales and follow-up training and service," he said recently. "We wanted more than hardware sales. The store serves an educational function and also permits government users the same access to microcomputers as their counterparts in the private sector."

Prime contractor The Math Box agreed. "The government has the same needs as a Fortune 500 firm," said Avner Parnes, president of The Math Box. "We offer the most popular models that reflect the commercial marketplace. In deciding to accept equipment for sale in the store, we look for its volume of commercial sales, compatibility with existing makes and available supply."

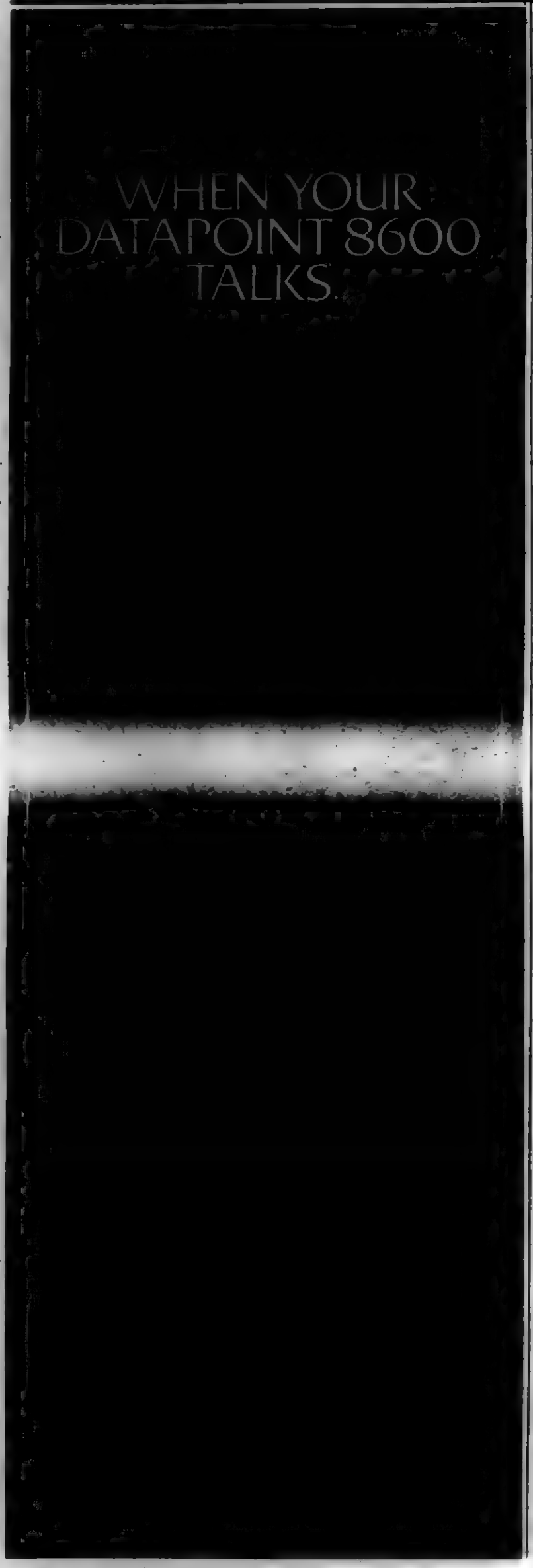
So far, approximately 45% of the processors sold have been IBM Personal Computers, 45% have been Compaq Computer Corp.'s Compaq Portable — which is IBM-compatible — and the remainder scattered among other vendors. Because of delays in delivering the Personal Computers, the store agreed to halt Personal Computer sales until back orders are filled and there is sufficient inventory to satisfy new orders.

User response has been enthusiastic. Tom Lewis, director of the Automated Systems Division for the Executive Office of the President, called the store "a good resource." According to Lewis, who has used the store several times, "The need for expertise is great. We need advice and counsel, sales and training." Lewis said the White House has also bought micros off GSA schedules. However, Lewis said he found the sales calls of hardware representatives often disruptive and a waste of time, and he prefers using the store at his convenience. According to GSA, the only problems with the store — mainly late and partial deliveries — stem from the unexpectedly large response the store has received.

The GSA store is already affecting established procurement channels. For low-dollar micro purchases, federal users previously bought micros from local stores under small-purchase procedures or from GSA schedule

See GSA page 117

I'm interested in THE HUMAN RESOURCE MANAGER.
☐ Please have a sales representative contact me at (phone) _____
☐ Please send information.
Name _____
Title _____
Organization _____
Address _____
City _____ State _____ Zip _____
THE HUMAN RESOURCE MANAGER is a trademark of Personnel Data Systems, Inc.
Whitemarsh Plaza
15 East Ridge Pike
Conshohocken, PA 19428
215-828-4884
Personnel Data Systems, Inc.



COMPUTER INDUSTRY

Micro mart shake-up seen calling for top managers

By James Connolly
CW Staff

BOSTON — The shake-up of the personal computer industry does not mean less vendors, but it does call for more responsible and better managed firms, according to International Data Corp. (IDC), a market research firm based in Framingham, Mass.

Where there were 70 personal computer companies in 1981, 180 are competing in 1984; but those 180 must be innovative, well financed and responsive to user demands, IDC Research Manager Aaron Goldberg said at the IDC Information Processing Industry Briefing Session held here.

"[The year] 1983 was the end of the gravy train," Goldberg said as he outlined causes for computer company bankruptcies to an audience of industry representatives.

However, he emphasized that a shake-up, — not the assumed shakeout — is in progress. He said that changes were inherent in a shake-up, but that a shakeout would indicate market maturity or stagnancy.

Goldberg said the market cannot support 65 IBM-compatible machines and 12 integrated systems for those machines. Some of those companies are likely to die in the competition, he conceded.

Research manager of IDC's Santa Clara, Calif., branch, Goldberg noted that other manufacturers have been scared of IBM and afraid to take initiatives. He said that while there is "a whole bunch" of investment capital available, the competition will still be tough on the small, independent companies.

Instead, he said that established manufacturers such as Wang Laboratories, Inc., Honeywell Information Systems, Inc. and Burroughs Corp. can succeed in the microcomputer market because they have the $40 million to $100 million needed to develop and sell new products.

Goldberg said price stability is important in the personal computer market, particularly for resellers to maintain profit margins.

But he warned that new products and low prices don't guarantee success. "The biggest thing is that consumers are taking over. It's no longer just the 8% to 12% who understand computers. The people don't care about technological advances. They care about doing the job," he charged.

Goldberg said personal computer buyers want instant gratification when they plug in their systems, rather than intimidating 700-page instruction manuals. As an example, he cited word processing packages that allow users "to do something instantly better than they did it before."

A key to that instant gratification is the turnkey approach to hardware and bundled software, an approach used successfully by Kaypro Corp., he said.

He said computer buyers will look at personal computers as part of corporate information systems, not stand-alone buses, and that they will maintain brand loyalty for years to come.

Goldberg also told the industry representatives that virtual memory will be available for personal computers in 1985, and that there will be more multitasking and nonkeyboard tools such as mice and trak balls.

IDC from page 109

that 40% of Fortune 1,000 companies and a like number of government agencies have finalized multiple purchase contracts and that 70% of these organizations have at least completed corporate statements of direction as to personal computer standards and guidelines.

Noting the trend toward multiple buying, Willmott said, "Clearly, cost reduction was the reason for that kind of multiple unit acquisition. It isn't very glamorous, but we can get more hardware in the door for less money."

Willmott reported that the success of micro-to-mainframe links depends less upon technological breakthroughs than on information management. He cited as an example the fact that companies may discover that there is no need for the micro user to have a payroll program, but that the user may just need access to payroll information from the mainframe.

He said IDC surveys of buying patterns indicate direct vendor-to-user sales will "go through the roof," and that regional computer stores have taken a surprisingly large share, 32%, of the micro market.

But he also warned that for anyone to be successful in the small to medium-size business market, he must offer more than a box of equipment "with a good luck sign on it." He said added value is crucial and that it may be in the form of service or support.

Sigma Data files Paradyne suit

BALTIMORE — Sigma Data Computing Corp., a subsidiary of M/A-Com, Inc., filed suit in federal court here last week seeking damages from Paradyne Corp. in connection with Paradyne's alleged misconduct in winning an $84 million Social Security Administration contract.

That contract, which prompted a Securities and Exchange Commission suit charging Paradyne with defrauding the government, was awarded in March 1981.

Sigma reportedly claimed in court that it had the second lowest bid on the contract in question and would have won the award if Paradyne had not acted improperly.

The company seeks $20 million in compensatory damages, which it seeks tripled, and $10 million in punitive damages.

COMPUTER INDUSTRY

Stress financial managing, high-tech executives told

By Patricia Keefe
CW Staff

BURLINGTON, Mass. — Analyzing the marketplace is a prerequisite to financial planning for high-technology firms, an executive of an accounting firm involved with high-tech accounts told a group of chief financial officers recently.

Robert P. Schechter, partner-in-charge of Coopers & Lybrand's high-tech practice, told the executives that winners will take advantage of the opportunities afforded by technology while steering clear of risks unique to rapid innovation. Noting three elements said to be key to a company's success — technology, business strategy and marketing skills — Schechter said he would add a fourth element, financial management.

Speaking at a recent luncheon sponsored by the American Electronics Association for chief financial officers of high-tech firms, Schechter said financial management is important because it builds a company's internal financial measurement systems, determines how costs are allocated within an organization, creates the transfer pricing schemes for moving goods and services within the organization and generally implements the business manager's motivation systems.

This is particularly important due to the attributes that differentiate high technology from other industries as well as create unique types of risks. Those attributes include the volatility of technology, shortened product life cycles, rapidly dropping prices and an increasing number of suppliers competing within the same marketplace, he said.

Most financial managers fail because they lose control, he said, adding it is difficult to remain in control in an environment of fast growth. "You need to focus on projecting cash flow, making sure the financial plan is integrated with the business plan and tracking order rates."

Schechter outlined what he called factors for success for financial management in the "Pac-Man Age."

He advised planning according to product life cycles. Because computer products and services typically have a short life span, Schechter urged financial officers to make decisions on investment, leasing programs and payback periods in the context of short and very uncertain product life cycles. He also noted that successful companies have planned the process of ending a product's life prior to its introduction.

Prudent risk taking should be encouraged, he said. Measurement systems influence the way people behave, and managers have to be careful about what it is they measure, Schechter said. Too much control results in risk avoidance, but too little control exposes the firm to abuses and unwarranted risk, he added.

Authority and accountability must go hand in hand, a relationship that is a special problem among young and rapidly growing businesses, Schechter said. "Make sure the people with the payroll and ledger responsibilities also have balance sheet responsibilities," he said, adding "You need a clear set of rules for the game so that people can act responsibly and be accountable for their actions."

Timely, relevant and accurate information gives business an edge, Schechter said. Bills of material, cash collections and status of customer orders are extremely time-critical, according to Schechter. If information is late or inaccurate, he added, it impedes the management process and causes dissidence within an organization.

Schechter said many "of the problems that surface publicly in the computer business generally have their roots in the marketing organization running far ahead of the financial organization," and he urged "a fair amount of movement in lockstep."

GE announces plans for entering personal computer repair market

SCHENECTADY, N.Y. — General Electric Co.'s Instrumentation and Computer Service Department (ICSD) has entered the personal computer repair service, expecting the market for such maintenance to reach $1 billion within the next two years.

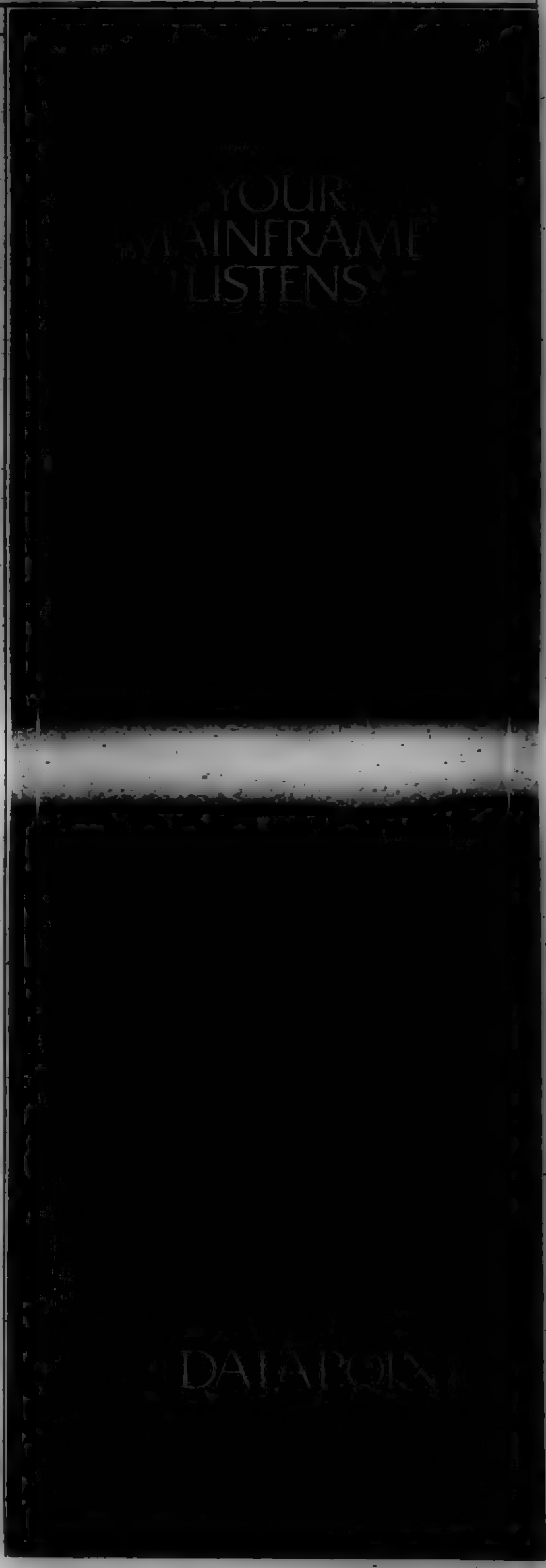
The personal computer service program is the first nationwide program under which a "loaner" computer may be offered for the duration of the repair, a GE spokesman claimed recently. Next-day delivery of equivalent hardware is provided under the loaner program, he continued.

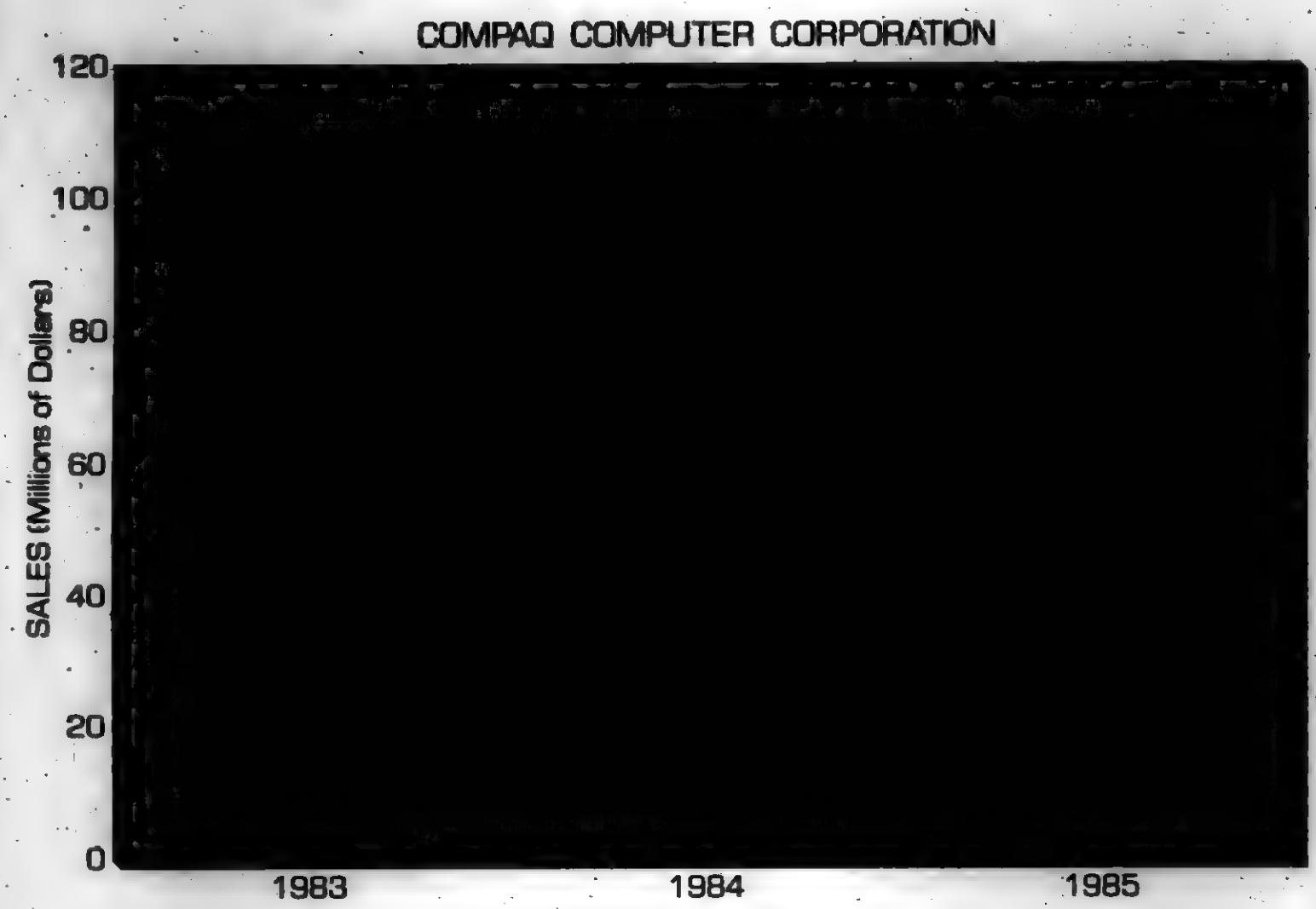
Among the personal computers that GE said it will service are IBM's Personal Computer and Personal Computer XT; Apple Computer, Inc.'s Lisa series, Apple IIes and IIIs; and computers from Hewlett-Packard Co., Compaq Computer Corp., Kaypro, Inc., Digital Equipment Corp. and Wang Laboratories, Inc.

In most areas of the country, GE said it offers on-site personal computer service at the customer's place of business or carry-in service through a nationwide network of GE service centers. Other service options available include annual service contracts and service center (depot) repair with or without the provision of a loaner computer or transaction service, which is a per-incident repair at a pre-established rate.

GE also provides equipment leases and rentals, service and repair of minicomputers, printers and data communications equipment and private branch exchange and data communications networks.

ICSD is located at Building 4, Room 300, 1 River Road, Schenectady, N.Y. 12345.





No other company can make this statement.

COMPAQ® Computer Corporation had the most successful first year in the history of American business.

We sold $111 million worth of the COMPAQ Portable and COMPAQ PLUS™ personal computers.

What made them so successful? They simply work better.

They work better because they're truly IBM®-compatible. So they run all of the most popular, most useful programs. And because they show high-resolution text and graphics on the same built-in display. And because we built them compact and rugged enough to be portable. And versatile enough to grow with you: Both take IBM-compatible boards. And the COMPAQ Portable can be converted to the COMPAQ PLUS with its integrated ten-megabyte disk drive.

By offering more capabilities than most personal computers, the COMPAQ Portable and COMPAQ PLUS have quickly earned a reputation as the most productive personal computers on the market.

What statement will we make in 1984? Our customers will have the final say. Yet in a recent survey, 98 percent of COMPAQ Computer users said they would recommend them to a friend. We like to think they'll say what we say: "It simply works better."

For the location of your nearest Authorized Dealer, call 1-800-231-0900.

©1984 COMPAQ Computer Corporation. COMPAQ® is a Registered Trademark and COMPAQ PLUS™ is a Trademark of COMPAQ Computer Corporation. IBM® is a registered trademark of International Business Machines Corporation.

COMPAQ®

It simply works better.

Victor's European distributor offers bail-out proposals

By Patricia Keefe
CW Staff

SANTA CLARA, Calif. — The European distributor for Victor Technologies, Inc. has offered two bail-out proposals to the troubled micro maker, currently in the throes of Chapter 11 bankruptcy proceedings.

Applied Computer Techniques PLC (ACT) of Birmingham, England, had given Victor, its creditors and lawyers until March 1 to respond to its offers. At press time, representatives from both firms were not available for comment.

One bid attempts to acquire the exclusive worldwide manufacturing and distribution rights to Victor products; the other less comprehensive proposal seeks acquisition of long-term full rights to manufacture Victor products in the UK.

ACT has been selling about 1,200 Victor (called Sirius in Europe) machines a month there and has an installed base of 25,000.

The latter bid reflects ACT's desire to protect its customer base and ensure a supply of Victor products, according to Christopher J. Buckham, president of ACT (North America), Inc., the company's subsidiary here. The first bid is seen by some industry observers as a buy out of Victor.

If accepted by Victor officials, either proposal could be financed from existing resources, Buckham said. These proposals are the only formal offers that Victor has received thus far, he explained.

The British computer maker also manufactures a computer called Apricot at its facilities located in Scotland.

If its offer is accepted, Buckham acknowledged that production of Victor computers could be moved to Scotland, resulting in the layoff of most if not all of Victor's roughly 500 remaining employees.

GUARD from page 109

tended for diskette-based software and would allow users of the software it protects to make an unlimited number of backup copies — but only for use on one computer, according to Heather Anderson, marketing assistant for Software Protection.

According to International Data Corp., a marketing and research firm based in Framingham, Mass., software piracy cost the software industry about $2 million in 1983 and will cost an estimated $4.5 million this year.

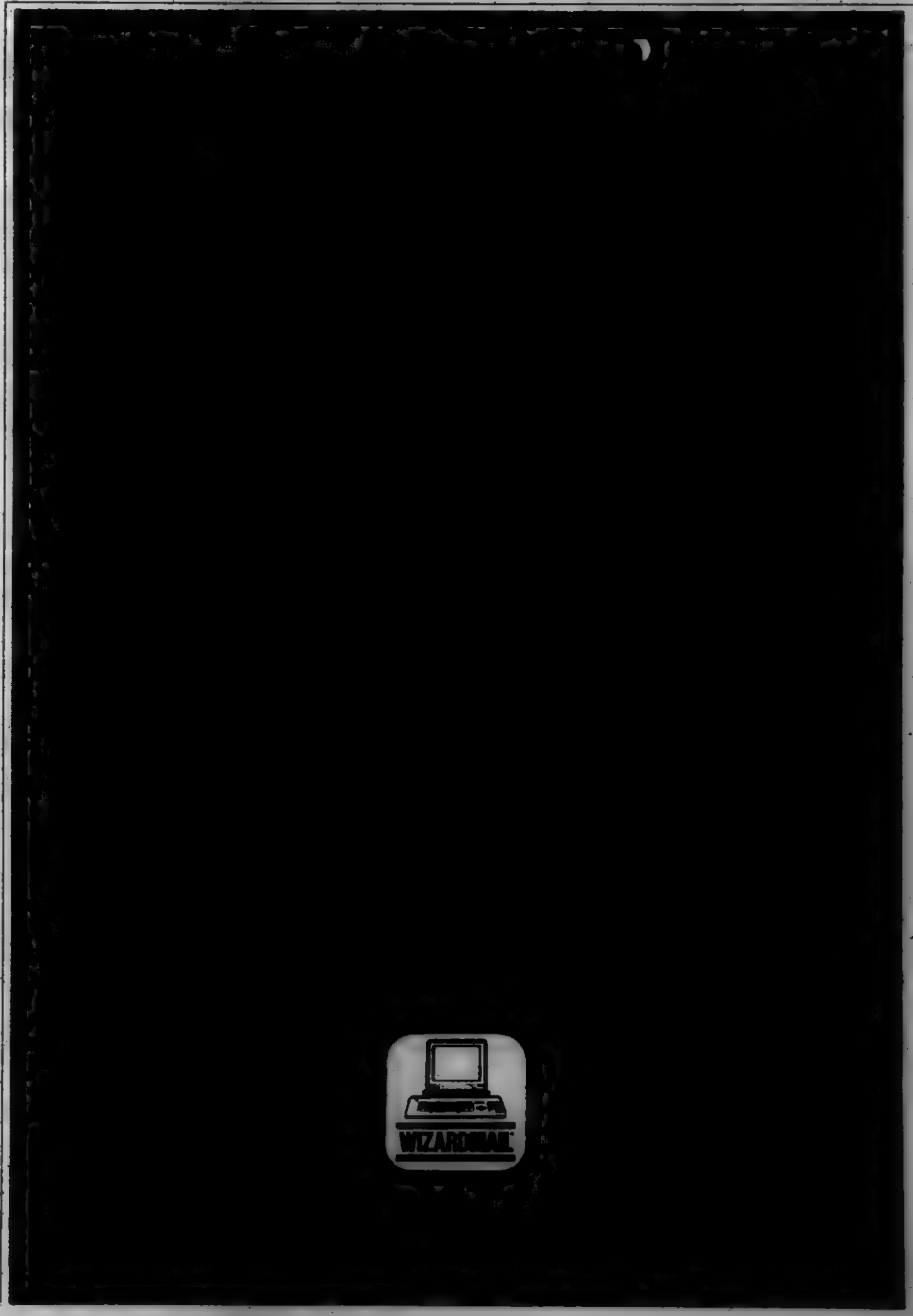
According to Anderson, software-based protection schemes, such as code words and fingerprint identification, are vulnerable to being broken. The company believes "a lot of software is being held back until good software protection comes out," because of confusion over judicial rulings on software.

Anderson said software publishers contacted about Copyrighter "think it's the way to go." But Chris Morgan, vice-president of communications for Lotus Development Corp., manufacturers of Lotus 1-2-3, said he couldn't recall having heard of Copyrighter, although "the principle sounds very good."

Jonathan Prusky, marketing manager for Microsoft, Inc.'s Microsoft word program, said he hadn't heard of Copyrighter either and expressed concern that software vendors that do adopt the system will be limiting their market, since software protected by that method will only run on what will initially be a few machines. "It's a catch-22," he said. "We are not going to limit our market."

Prusky did say he believes "the only type of protection that is unbreakable is a hardware scheme," and noted that one publisher of software for the IBM PCjr has been using that machine's

See GUARD page 124



COMPUTER INDUSTRY

FORECASTS AND PERSPECTIVE

Breakup could aid Japan

The breakup of the Bell System will open the U.S. market to a flood of Japanese telecommunications equipment and will allow Japanese suppliers to capture as much as 40% of the U.S. private branch exchange market by 1988, according to "Japan in the Telecommunications Market."

The 174-page report from Northern Business Information, Inc. claims the AT&T divestiture has changed the U.S. telecommunications market in ways that benefit the Japanese.

According to the report, NEC America, Inc. is the Japanese company in the best position to capture a large share of the U.S. telecommunications market, having fully revamped its subscriber switching line during the last two years.

The report costs $995 from Northern Business Information, 66 W. Broadway, New York, N.Y. 10007.

Inertial guidance for robots

Industrial robots will soon be equipped with gyroscopes and inertial positioning devices, according to International Resource Development, Inc.

In a recently published 135-page report, "Inertial Guidance and Advanced Positioning Systems," the market research firm claims that efforts also are being made to build affordable plastic gyroscopes for automobiles, forming the basis of possible self-navigating cars in the future.

When built into industrial robots, the inertial guidance equipment, coupled with vision and collision-avoidance electronics, will reportedly enable future industrial robots to "go almost anywhere and do almost anything a human worker does."

Priced at $1,650, the report is available from International Resource Development, 30 High St., Norwalk, Conn. 06851.

Micro communications boom

The market for personal computer communications hardware, software and services will grow from about $300 million today to $1.4 billion by 1987, according to "The Personal Computer Communications Market."

The 222-page report by Frost & Sullivan, Inc. claims that circuit boards and associated equipment that allow personal computers to emulate IBM 3270-type terminals are the largest single hardware category, accounting for $76 million in 1983 sales. Sales in this area will hit $395 million in 1987, the report concludes.

Twenty-nine hardware vendors and their products are profiled in the report, along with 20 software firms and 12 information services companies.

The report, priced at $1,475, is available from Frost & Sullivan, 106 Fulton St., New York, N.Y. 10038.

Info services mart profiled

The market for cross-industry, stand-alone, generic personal computer software will decline substantially during the next five years, but the overall software market will show tremendous growth, according to "U.S. Information Services Industry, 1983-1988."

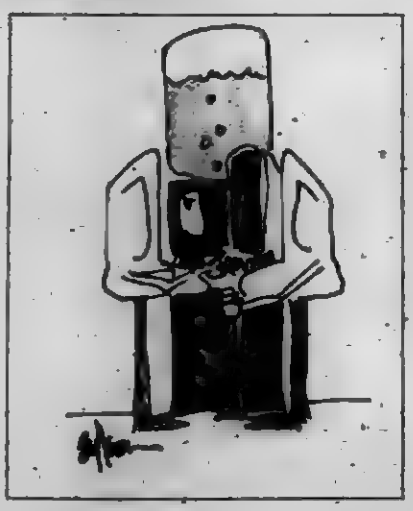
The two-volume, 500-page report from Input, Inc., a computer market research and planning firm, also claims that the market for batch processing will decline by 3% annually through 1988, based on a projected 6% annual inflation rate. Batch processing is on the decline for three reasons: an increasing demand for on-line response, the availability of inexpensive, powerful hardware and the proliferation of low-cost, quality software, the report concludes.

The report costs $2,500 per volume, or $5,000 for the set, and is available from Input, 1943 Landings Drive, Mountain View, Calif. 94043.

Price not all-important in OA

Reliability, available features and ease of use are more important considerations than price when a company is considering purchasing office and communications equipment, according to "Office Automation Survey: Analysis of Acquisition and Use of Office and Communications Equipment."

The survey from Venture Development Corp. cautions manufacturers against the use of the "price pitch" when trying to sell advanced office products. Manufacturers who sell through independent dealers and who also may have experience in consumer electronics tend to place too much emphasis on price, the survey indicated.



Computerworld presents the three most important factors in creating the #1 specialized business publication in the United States:

Factor 1 **Great Editorial.** When you ask $44 a year for a subscription — the editorial better be worth it. Ours is. Because we hire journalism skills first and computer industry background second. Our writers instinctively recognize the lead in a story. They can smell another story when they haven't even completed the one they're working on. They know how to interview; how to get the source to reveal facts that never were intended to be released.

Factor 2 **Great Editorial.** Our writers are pros at giving our readers what they need because they go where our readers are. They go to the same seminars, conferences, manufacturers' training programs and trade shows. And they don't just listen with our readers — they listen to them. So our readers get responsive editorial. And they regularly vote *Computerworld* "most useful publication" — both in our own studies and in those done by independent organizations.

Factor 3 **Great Editorial.** Because *Computerworld's* editorial department is supported by subscription revenue, our writers know who they're working for. They write the stories our readers need to see — independent from our advertising. And our advertisers appreciate our reputation for editorial integrity as much as our readers do.

Editorial. It's the most important factor in developing *Computerworld* as the #1 specialized business publication in the U.S. And you'll find that our sales people know as much about our readers and our marketplace as our writers do. They'll be happy to give you the facts, the numbers and a first-class overview of the marketplace. Just call Don Fagan, Vice President, Sales at 1-617-879-0700.

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

The survey includes information about ownership levels and the installed base, by manufacturer, of 13 products.

The study costs $1,950 from Venture Development, One Washington St., Wellesley, Mass. 02181.

Micro printer shrugs?

Vendors of microcomputer printers may be in for hard times in coming years despite booming sales of microcomputers, according to International Resource Development, Inc. A 174-page study, titled "Microcomputer Printers," concludes that trends toward micro networking, price cutting, slim margins and a lessening product differentiation are some of the major problems facing printer vendors.

The study describes major printer technologies and provides an analysis of printer markets and supplier structure. It also includes 10-year market forecasts.

The study costs $1,800 from International Resource Development, 30 High St., Norwalk, Conn. 06851.

Portable use to climb

The use of portable microcomputers will grow rapidly among major U.S. corporations by the end of 1985, according to "Microcomputer Usage Trends in 'Fortune' Corporations."

The 200-page report from Newton-Evans Research Co. contains details of a first-quarter 1984 survey of 150 DP and MIS executives from more than 150 Fortune-type corporations. The survey found that the use of portable microcomputers among these companies will grow from 2.5% presently to about 7% by the end of 1985.

Half of the responding organizations cited a need for integrated software. About 60% of the respondents believed that micro-based data base management systems are "very important" or "important" to their companies.

The report costs $750 from Newton-Evans, Suite 204, Bethany 40 Center, 10176 Baltimore National Pike, Ellicott City, Md. 21043.

GSA from page 111

contracts, which are indefinite-quantity contracts allowing the government to buy from an approved, preestablished price list. However, the GSA store offers many more services than are normally available under the GSA schedules. In addition, since GSA issued special regulations for store purchases, the store is also more convenient than competing private stores.

Jim Baroff, vice-president of Banana Computer, a local retailer, said his government sales have dropped since the store appeared. "I'm glad a small firm like The Math Box won the contract, but I don't think the government should be in competition with the private sector," he said. "The store is in a preferred position to sell to the government and has a captive audience. It represents a departure from procurement techniques meant to promote fairness."

Banana now sells through a GSA schedule. However, because of a change in GSA policy, Banana will not be able to market micros under GSA's general-purpose DP schedule next year. This will erode the competitiveness of Banana and other local retailers and heighten the GSA store's marketing advantage.

The store's impact will multiply if GSA decides to open stores in its regional headquarters. GSA's Fraser would not say whether GSA definitely plans to open new stores, although he admitted that the regional offices are clamoring for stores of their own.

Fraser did say that GSA is now considering expanding the store's product line to include office telecommunications equipment.

The store is also affecting federal microcomputer policy. Many individual users come to the store looking for advice on what to buy. Depending on the store's response, this could work to contradict the growing concern in government to coordinate micro procurement to ensure overall compatibility with agency policy.

Mohr practices at the law firm of Cohen & White in Washington, D.C., specializing in federal procurement and computer law.

Simware Delivers Protocol Conversion, PC Support ... and more.

Unique communications software
SIM3278™ is the unique, low-cost software communications package that transforms micros and ASCII video display terminals into simulated full screen 3278s. What's more, SIM3278 installs in minutes on VM or MVS systems, works with most terminals, supports from one to a thousand workstations, and operates without any additional hardware or software modifications.

More than just a protocol converter
SIM3278™ is loaded with extras no hardware converter can provide. Features such as on-line help, personal computer support, and a session manager that allows each workstation, including real 3270's to initiate up to 12 concurrent interactive sessions.

The Micro-to-Mainframe link
SIM3278™ has the added capability of providing the full screen micro-to-mainframe link for most personal computers, without having to install additional micro boards. Extended features for the IBM Personal Computer include attached printer support and file transfer during full screen operation.

SIM3278 from Simware
Today's cost-effective software solution. Get all the details and arrange for a trial demonstration today. Call (613) 235-6736

SIMWARE
a practical approach to communications

Simware Inc.
999 Bronson Avenue
Ottawa Ontario
Canada K1S 4G8

Telephone (613) 235-6736
Telex 053 4130

SIM3278, and IBM are registered trademarks of Simware Inc., and International Business Machines Inc., respectively.

Panic over foreign competition discouraged

By John Gallant
CW Washington Bureau

WASHINGTON, D.C. — U.S. Department of Commerce Secretary Malcolm Baldridge recently urged American industry not to "panic" about foreign competition and not to rush to embrace trade protectionism.

Baldridge told a joint high-technology/basic industries policy conference here that a developing climate for economic health, an increasingly technically competent work force, plus management-labor cooperation is enhancing American industrial competitiveness.

Still, the Commerce secretary said U.S. management must be more flexible and show the "imagination and discipline" that other countries, particularly Japan, have shown in adopting new technologies in the work place. "We're not improving as fast as we once did. We're not failing," he said, adding that "other [nations] are catching up."

Anthony C. Stout, whose Government Research Corp. cosponsored the two-day gathering, told the conference that changing economic and industrial trends are "forcing on Washington a policymaking decision." New policies are needed, he said, but the different agendas of the two powerful constituencies of labor and high technology have "paralyzed" the government.

Saying the government is very responsive to its constituencies, particularly during an election year, Stout explained the conference was called to find areas of common ground between those two agendas before the political parties draft their political platforms at their national conventions this summer.

The conference was cosponsored by several industrial and high-tech associations, including the American Electronics Association, the Computer and Business Equipment Manufacturers Association, the Electronic Industries Association and the Scientific Apparatus Makers Association.

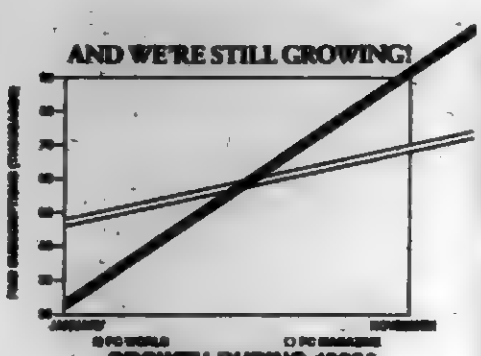
Baldridge, calling high technology "our last bastion of strength," said "too many of our companies are too timid" to adopt modern technology. He added, however, that he sees that changing. "Managers are becoming more flexible because they have to." Companies have "trimmed management fat," making them "leaner" and "more ready to compete," he added.

"We see management making progress," Baldridge said, explaining that technically trained people are beginning to take over companies from "the marketing types, the financial types."

Labor is beginning to cooperate more with management, Baldridge continued, which has helped fuel greater American productivity. He said the U.S. still has the highest productivity levels in the world, which helps offset higher wages. Japan, which is using lower wages and high-tech industrial processes to increase international competitiveness, still has productivity levels only two-thirds those of the U.S., he said.

Increased technological innovation and continued management-labor cooperation are the keys to maintaining American industrial leadership, Baldridge said. He urged U.S. business to eschew protectionism as a means to fend off foreign competition.

PC WORLD
HAS MORE READERS



IT'S A FACT: More people read *PC World* than any other IBM personal computer magazine.

In ten short months, *PC World* achieved a paid subscription base of more than 88,000 readers. After TWO YEARS the closest competitor, PC Magazine, had only 67,500 subscribers.

With their subscription dollars, readers have voted *PC World* #1 in its field.

And why shouldn't they? *PC World* is the best. We have the best writers, the best editors, and the best design. In a recent survey we found that 8 out of 10 *PC World* readers read every issue and that 93% rate *PC World* as a quality publication.

With every passing day *PC World*'s subscription leadership increases. We have the highest growth rate of any magazine in America. That's all you need to know when you're looking for the #1 IBM personal computer magazine. You can bet on *PC World* and win.

Call *PC World* today and find out what so many satisfied advertisers already know—it pays to go with the best.

*Claim statistics compiled from statements of ownership, management and circulation filed in October 1983.

PC WORLD
The Fastest Growing Magazine in America

555 De Haro Street
San Francisco, CA 94107
800-972-7800 Nationwide
800-972-7808 California

PC World is a subsidiary of CW Communications, publishers of more than 40 computer magazines, and the largest computer publishing company in the world.

TRILOGY from page 109.

expected. What is a little harder to swallow is a decision, far into the development stage, to redesign the basic technology and come up with an entirely new plan for how that technology will be configured into an actual machine.

Oh to have been a fly on the wall of the Trilogy boardroom when these decisions were made.

One has to wonder how Gene Amdahl and compatriots balanced off their own goals with the heavy-money concerns of DEC and Sperry. Serving two masters in addition to oneself can lead to ulcers; it must be expected that the two investors must surely be intent on playing a larger role in the decision-making process.

Just as would-be president Mondale is staggering under the load of union and big government endorsements, Trilogy from here on out is going to be scrutinized to see just who is going to call the shots over the long haul.

When you purport to be the coming savior, people tend to expect much more than most messiahs can produce. That can lead to serious problems when the savior turns out to be only human.

COMPUTER INDUSTRY

March 13 meet to cover U.S.-Japan ventures

SAN FRANCISCO — U.S. and Japanese business leaders and others will examine the growth of joint ventures between major corporations from both countries during a conference scheduled for the Fairmont Hotel and Tower here March 13-14 by The Conference Board, a nonprofit business information service, and the Japan External Trade Organization, a promotional body under the jurisdiction of Japan's Ministry of International Trade and Industry (MITI).

Sessions will include an analysis of pros and cons of technological cooperation, actual experiences, attitudes toward the role of government and prospects for cooperation in biotechnology, robotics and aerospace.

Speakers will include: David Packard, chairman of Hewlett-Packard Co.; Kaji Kobayashi, chairman and chief executive officer of NEC Corp.; Soichi Ishizaka, adviser to Nomura Research Institute and a former director of a MITI agency; and Sherwood L. Fawcett, chairman of Battelle Memorial Institute.

Conference registration fees are $515 for associates of The Conference Board and $565 for nonassociates. Information is available from the Board at 845 Third Ave., New York, N.Y. 10022.

CURTIS 1000 GIVES CORRESPONDENCE A CLEAN BREAK

When the computer helps out with your letters, make sure you don't end up looking rough around the edges. For correspondence with a personal look, Curtis 1000 makes a broad line of Clean-Cut letterheads, microperforated with laser-honed equipment. Curtis 1000 Clean-Cut comes in a wide variety of papers, including the popular Classic Laid. And, of course, Curtis 1000 can custom design Clean-Cut letterheads especially for your company. And Curtis 1000 offers Clean-Cut forms, too. But Clean-Cut letterheads and forms are just part of our mile-long list of products—including files, envelopes, and word and data processing supplies—that help you get the word from person to person, department to department, and company to customer. Curtis 1000. We supply the things that make business work. And we've been at it for over a hundred years.

1000 DIFFERENT PRODUCTS TO MAKE BUSINESS WORK

For samples, call your Curtis 1000 representative or write Curtis 1000 (CW-CC), Smyrna, Georgia 30080.

Tech growth seen in need of $1 trillion

NEW YORK — The information industry will need a capital infusion of $1 trillion to sustain its burgeoning growth through 1995, but will find itself competing with the federal government in a tightening credit market, two industry analysts believe.

The analysts recently predicted the industry will double its current contribution to the nation's gross national product by the end of that period and said its highest growth segments will be computer and office equipment manufacturers, telephone and telegraph services and makers of electronic components. They said these segments will increase their revenues by 250% by that year.

The analysts, Robert M. Kavner and W. Bowman Cutter, are cochairmen of the information/communication industry specialization program at Coopers & Lybrand, an accounting and consulting firm.

The three fastest growing markets, they said, will also be the ones most hungry for financing from 1985-1995. "It's likely these companies will be competing head-on with the U.S. Treasury for funds," Cutter said.

Those industry segments will be crying for capital, he explained, largely because of the great gains in productivity they will make by using mechanization to replace labor in that decade. As a result, Cutter said, it was likely that there would be no more than a 60% growth rate for information industry labor, and "we cannot look to the information industry to solve the long-term unemployment problems."

Kavner, meanwhile, pointed out that the shifting of the marketplace will cause companies to seek out what they think are safe market niches in this period. But, he warned, "Finding a niche, regardless of the industry, is like hiding in plain sight and then not inviting the competition to follow in your footsteps.

"My observations," he said, "can be summed up in two misleadingly simple points: First, too much control causes risk avoidance, too little exposes the business to abuses; and second, timely, relevant and accurate information gives management the edge, while late and unwieldy financial information impedes the management process."

This need for up-to-date information is critical, he said, because the product life cycle is shorter.

If you sell large systems software — quick — what will all your prospects be doing on June 20, 1984?

They'll be looking through a great new reference guide to software vendors — the *Computerworld Buyer's Guide to Large System Software* being published on June 20. And you'll definitely want to be there.

Look at what the Buyer's Guide gives you:

You get a large audience with heavy purchasing responsibilities — more than 114,000 paid *Computerworld* subscribers in the U.S. These subscribers are concentrated in the large professional computer-using organizations that control 84% of DP/MIS spending in 1983 — $72.2 billion. And research shows these subscribers have a significant degree of purchase decision influence — ask your Buyer's Guide sales representative to show you the *Computerworld* reader profile for details.

Look at what the Buyer's Guide gives buyers:

They get a one-source, comprehensive listing of purchase information about applications, DBMS, and systems and utility software for use with mainstream data processing systems. They get **two kinds** of listings — vendor listings and product offerings. **And**, they get a whole range of feature articles and tutorials covering new technology, large system software trends and buying techniques.

Now that you know where software buyers are going to go next June, you can arrange to be there with an ad for your product or service — right when they're researching vendors! Ad deadline is May 4. To reserve space in this issue, call one of the sales offices listed below or call Ed Marecki, National Sales Director or Kevin McPherson, Product Manager.

To: **Ed Marecki, National Sales Director**
CW Communications
Box 880
Framingham, MA 01701

☐ Please send me advertising information for Buyer's Guides.
☐ Please have a sales representative call me.

Name _____
Title _____
Company _____
Address _____
City _____ State _____ Zip _____
Telephone _____

BG5/04

COMPUTERWORLD
BUYER'S GUIDE

Sales Offices

BOSTON/Chris Lee, Bill Cadigan, Alice Longley (617) 879-0700
CHICAGO/Chris Lee, Bill Cadigan, Jean Broderick (312) 827-4433
NEW YORK/Mike Masters, Tom Flynn, Gale M. Paterno (201) 967-1350
ATLANTA/Mike Masters, Tom Flynn (404) 394-0758
SAN FRANCISCO/Bill Healey, Beverly Raus (415) 421-7330
LOS ANGELES/Bill Healey, Ruth Gordon (714) 261-1230

Suit accuses Apple of stock fraud

SAN JOSE, Calif. — Three shareholders of Apple Computer, Inc. have filed a class action suit against the company alleging senior officers reaped $84 million from stock sales after creating unwarranted optimism about the Lisa workstation computer.

The suit alleges fraud and violations of state and federal securities acts and names 13 Apple executives and/or directors, including Chairman Steve Jobs and President John Sculley.

The suit was filed in the Santa Clara County Superior Court here by attorney William Lerach of the San Diego law firm of Milberg, Weiss, Bershad, Specthrie & Lerach.

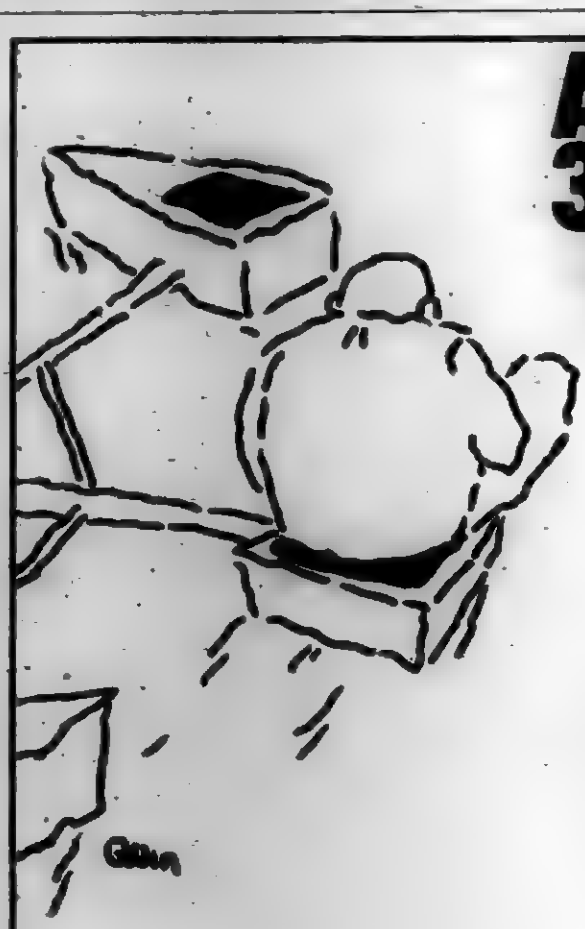
The three shareholders — William Schneider, a North Carolina resident who bought 25 shares of Apple stock, and Charles and Jeanne Cohn, Philadelphia residents who bought 150 Apple shares — alleged misleading statements concerning Lisa enabled the company's stock price to rise to $63.50 before plunging to $17.37 last fall, after the company announced a 73% drop in third-quarter earnings.

While the shares were at an "artificially inflated" price, the suit continued, the Apple officials, both present and former, sold 2.1 million shares resulting in gains of $84 million. The top seller, it asserts, was Jobs, who received $25 million on about 500,000 shares sold. Jobs has since confirmed these figures.

Despite claims the Lisa was a "revolutionary" and "phenomenally successful" new system that would "make Apple's growth before this look small," the suit alleges the product and the company were plagued by serious defects and difficulties that were known to the executives but not reported to shareholders.

Apple's general counsel, Al Eisenstat, said the company is presently reviewing the class action. "Our initial reaction is that the law suit is without merit, but we are certainly not considering it lightly," he added.

ANOTHER IBM 3274/76 USER AT THE HELM.



SORT OF.

The alternatives in printers for the IBM 3274/76 user could be categorized, basically, into two separate areas:

Take it, or leave it.

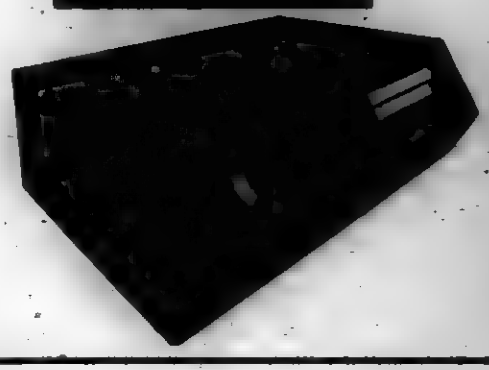
The AGILE 5287 Printer Protocol Converter allows you the intelligent alternative of a printer to suit your specific application. The flexibility to choose high speed printers, plotters, dot matrix, daisy wheel or even laser printers, provides you with the system control you intended. Pass the word: you're back in command.

Installation of the AGILE 5287 is simple. Its industry proven reliability, achieved through the 5287's built-in diagnostics, is backed by a full one-year warranty and a 30-day money back guarantee.

The AGILE 5287—call us for all the information necessary to make the choice.

After all, nobody likes to be taken for a ride.

PRINTER PROTOCOL CONVERTER



AGILE

4041 Pike Lane, Concord, CA 94520 (800) 538-1634

MERGERS AND ACQUISITIONS

SKU, a national distributor of personal and small-business computer software headquartered in Berkeley, Calif., has been acquired jointly by McKesson Corp. of San Francisco and Actien Industries, Inc., Pittsburgh.

■

The Bank of America has announced plans to acquire Davenport Data Processors of Houston. Davenport Data Processors, a subsidiary of Kirby Exploration Co., provides online and batch processing applications to more than 100 companies in the Houston area.

■

Information General Corp. has signed a letter of intent to acquire Cyma Corp. of Mesa, Ariz. Cyma produces and markets microcomputer business software. Terms of the acquisition agreement will be finalized in March.

■

Scientific Micro Systems, Inc. (SMS) has acquired all the stock of Omti, a Campbell, Calif.-based supplier of Winchester-based microcomputer systems, storage systems and data controllers for Digital Equipment Corp.- and Intel Corp.-compatible markets. Omti will operate as an SMS subsidiary.

■

Computer Task Group, Inc., Buffalo, N.Y., has acquired Holvick Corp., a professional computer services firm headquartered in Detroit.

■

Visual Computer, Inc. of Tewksbury, Mass., a subsidiary of Visual Technology, Inc., has acquired Custom Computer Systems, Inc., Marlboro, Mass.

■

U.S. Tel, Inc. of Dallas and United Telecommunications, Inc. have announced jointly that United Telecom will acquire U.S. Tel through an exchange of one share of United Telecom common stock for each four shares of U.S. Tel common stock. U.S. Tel will be part of United Telecom's intercity communications group, United Telecom Communications, Inc.

■

Grumman Data Systems Corp. has agreed to acquire Ctec, Inc., a McLean, Va., computer software and systems engineering firm. Terms of the cash sale were not available.

■

Esprit Systems, Inc., Melville, N.Y., has announced an agreement in principle to acquire Percom Data Corp. of Dallas, a manufacturer of hardware and software for local-area networks.

■

Online Computer Library Center (OCLC) has acquired Avatar Systems, Inc. of Potomac, Md. Avatar will become a subsidiary of OCLC, known as the OCLC Washington Office.

■

Emulex Corp. has completed acquisition of Personal Systems Technology, Inc. (Persyst). Persyst will be operated as a wholly owned subsidiary of Emulex.

■

Xebec, Inc. and Evotek, Inc. have agreed to terminate discussions of a purchase by Xebec of Evotek.

10,000 CICS Users Said There Had To Be A Better Way . . .

We Gave Them GENER/OL™

Feature for unique feature, GENER/OL is the leader in on-line CICS applications development. This 5-star performer channels on-line technology for maximum productivity, efficiency, and flexibility.

Complete with award-winning documentation and responsive support, GENER/OL offers uncommon software productivity in the Pansophic tradition.

Call us today for the performance of a lifetime!

PANSOPHIC®

(800) 323-7335

Pansophic Systems, Inc., 709 Enterprise Drive, Oak Brook, Illinois 60521. In Illinois, call (312) 986-6000.

COMPUTER INDUSTRY

SUPERSCRIPTS

Harris Corp.'s Lanier marketing operations in Europe, Africa and the Middle East are being integrated into Harris' Information Systems International Division, headquartered in Geneva. Lanier Business Products, Inc. merged with Harris in October 1983.

RCA Services Co. will provide third-party, on-site repairs and preventive maintenance for Pertec Computer Corp.'s System 3200 and 4200 series and the Pick & Associates, Inc. Pick operating system-based Pertec MC 68000 product line.

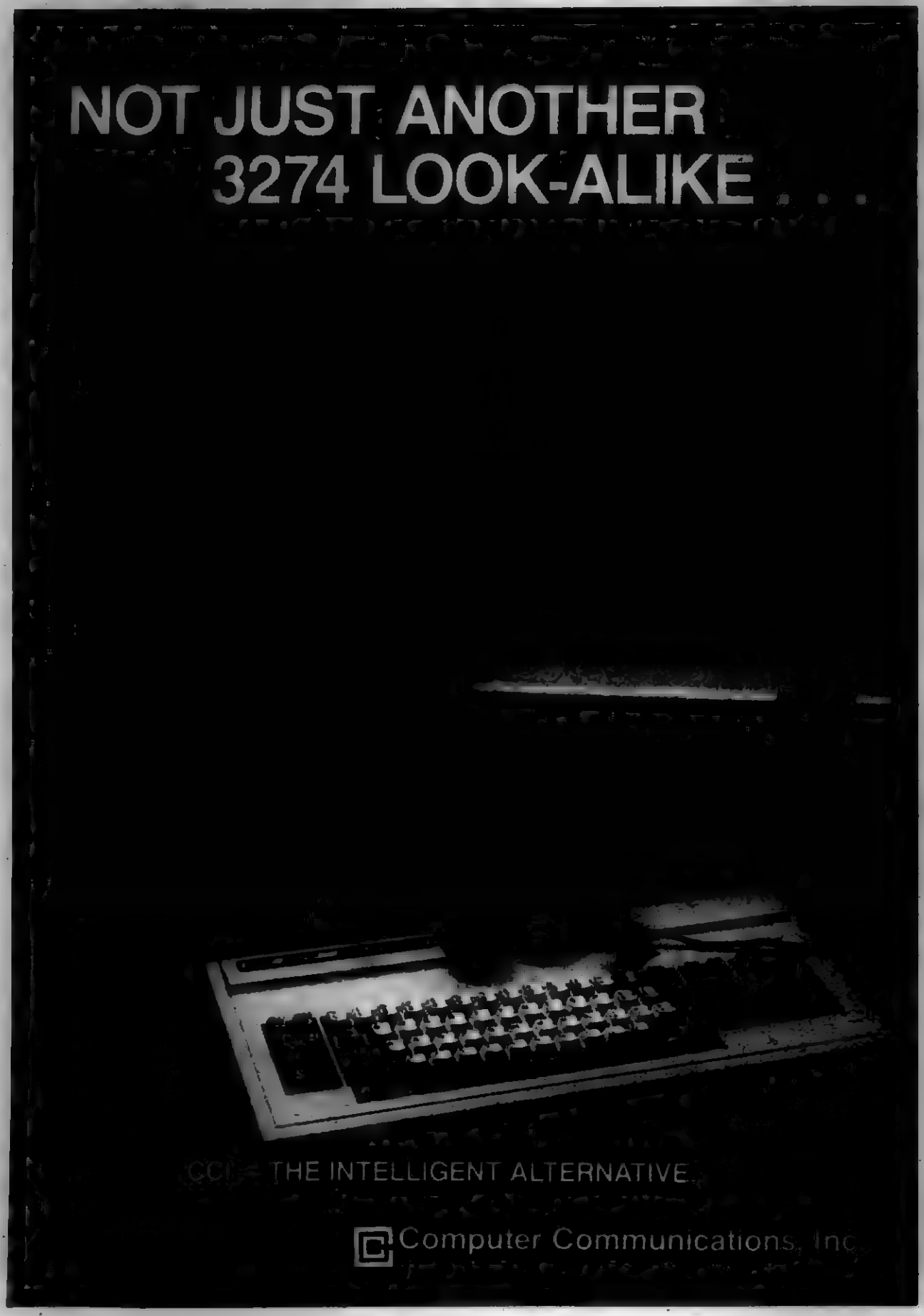
Crowntek, Inc. has announced formation of a new computer retailing subsidiary, Crowntek Technology Distributors, Inc. The new company has signed distribution agreements to handle IBM, Wang Laboratories, Inc., Sperry Corp. and Grid Systems Corp. personal computers and office systems.

Electronic Data Systems Corp. (EDS) has been awarded a contract by the U.S. Navy valued at more than $350 million over an eight-year period. EDS will replace selected computer systems by integrating hardware, software and a nationwide communications network, which will tie together remote job entry devices and several thousand CRT workstations. The contract includes two potential eight-year extension options.

Honeywell, Inc.'s Information Systems Customer Service Division has signed service agreements with Racal-Redac, Inc. of Westford, Mass., and Formative Technologies, Inc. of Pittsburgh. Honeywell will provide warranty service as well as third-party contract maintenance to customers of both companies.

Digital Equipment Corp. has agreed to manufacture, distribute and market Access Technology, Inc.'s Supercomp-Twenty, a spreadsheet for DEC computers including PDP-11, VAX, the Professional 300 series and All-In-One, DEC's integrated office environment.

The Harvard Business School announced last week that it will require the 780 students in this fall's class of first-year MBA students to use IBM Portable Personal Computers. The micros will be sold to students at a discount, and the cost is included in the roughly $17,000 expense for a student living on campus.



GUARD from page 115

game cartridge slot for users to insert a cartridge key, without which the company's diskette-stored software will not run.

Copyrighter protected software, Anderson said, would be encrypted by the software publisher program to scramble the software's machine code. Before the user could run the protected software, he would need to call an 800 number, supplied with the software, and receive a configuration code that would activate the Copyrighter decoding system.

The configuration code would permit the protected program to run each time the code is entered and, Anderson said, would allow unlimited numbers of backup copies of the program to be made, but only on the user's machine.

The Western Design Center, a Mesa, Ariz., microprocessor design firm, reportedly will design the new 16-bit CPU for pin-compatibility with the popular 8-bit 6502 microcomputer chip used in what may be as many as four million microcomputers, from the Apple Computer, Inc. Apple II to the Commodore International Ltd. Vic-20. This would reportedly upgrade 8-bit machines to run software applications designed for both 8-bit and 16-bit machines.

The potential market for the 6502-compatible, 16-bit upgrade chip is a large one, according to Steve Greenberg, spokesman for Commodore International. The 6502, he said, is the CPU for all Apple IIs, the Franklin Computer Corp. Ace, the Warner Communications, Inc. Atari 400, 600 and 800XL models and the Commodore International Vic-20. Should the upgrade chip catch on with performance-minded computer enthusiasts, "it's going to sell a lot of 8-bit computers," Greenberg said.

POSITION ANNOUNCEMENTS

DATA PROCESSING PROFESSIONALS

★ AUSTIN AREA ★

A golden opportunity to get in on the ground floor!

A leader in oil field instrumentation and industrial weighing systems has immediate openings in the Austin area for the following very special professionals:

● SYSTEMS ANALYSTS

Duties will include design, development and implementation of Manufacturing, Financial, Marketing and Distribution systems, performing systems studies, and developing systems proposals and cost justifications. Degree required, preferably in Computer Science, Marketing or Business Administration. Minimum of 3 years experience in systems analysis and design required developing batch and on-line data base applications. Experience with office automation applications also desirable.

● PROGRAMMER ANALYSTS

Duties include designing, developing and implementing batch and on-line interactive business application systems in Manufacturing, Finance, Distribution and Sales/Marketing areas. Needs degree, preferably in Computer Science, M.I.S. or Business with 3 years experience in COBOL (VSAM), DL/1, CICS, business applications.

● APPLICATIONS PROGRAMMERS

Duties will include designing, coding and testing of batch application programs, maintaining production programs. Needs degree, preferably in Computer Science, M.I.S. or Business, with 2 years COBOL (VSAM).

These permanent positions in the Austin area offer excellent salary, benefits and growth opportunity. Send resume and salary history in confidence to our company headquarters at: (Principals only.)

MARTIN-DECKER
Employment Department
P.O. Box 1179
Cedar Park, Texas 78613

Equal Opportunity Employer M/F/H

COOPER INDUSTRIES

MARTIN-DECKER

PROGRAMMER/ANALYST

Current, Inc. (Looart Press), a leading national manufacturer and marketer of greeting cards, crafts, gifts and fine stationery, is seeking a Programmer/Analyst. This position will be responsible for designing and developing applications systems relating to our manufacturing and marketing business functions.

This position requires a degree or equivalent experience, plus a minimum of three years COBOL 74 programming. We prefer Honeywell level 66/DPS, experience with DM IV, IDS II, transaction processing and TSS.

If you are interested in joining the over 900 people who call Current, Inc. their home, please forward your resume, salary history and requirements in confidence to:

CURRENT, INC.
Attn: Andrea McGeorge
P.O. Box 2559, Dept. B-3
Colorado Springs, CO 80901

An Equal Opportunity Employer M/F

Senior Technical Specialists

Saudi Arabia

Booz·Allen & Hamilton, one of the world's most widely respected names in management and technology consulting has unique opportunities for experienced senior technical specialists to accept challenging assignments in Saudi Arabia.

As a professional with Booz·Allen, you will become a part of a world-class environment where your success is limited only by your abilities. These are long term career opportunities. The technical challenges are unsurpassed . . . and when your Saudi assignment is completed, you will continue to grow and develop within the Booz·Allen organization.

To qualify, you must have a technical degree and at least 7 years hands-on experience with all types of business systems applications. Knowledge of COBOL, FORTRAN and BASIC is required. In addition, your background should include the following:

- **IBM system hardware & software**
- **Telecommunications & network integration (SNA)**
- **ADP project planning management**
- **System life cycle development**

We offer an outstanding compensation and benefits package as well as the opportunity to develop your abilities to their full potential within a highly professional atmosphere. For more information and immediate consideration, send your resume, in confidence to: Ms. Judy Merkel, MISD, Booz·Allen & Hamilton, 4330 East West Highway, Bethesda, Maryland 20814.

BOOZ·ALLEN & HAMILTON INC.

CONSULTANTS TO GOVERNMENT, BUSINESS & INDUSTRY
An Equal Opportunity Employer

CALIF. & CICS

+ Openings in IMS, IDMS, MVS/VM Sys. Programmers
(714) 891-1244

CPU COMPUTER PROFESSIONALS UNLIMITED, agency
7011 Garden Grove Blvd.
Ste. D, Garden Grove, CA 92641

Arizona/California/Texas/Colorado/Florida/Boston

SCIENTIFIC OR BUSINESS PROGRAMMERS

All fees and relocation paid. $20-40,000

If you have a BSEE, BSCS, BS in Mathematics or Physics or equivalent, we need you right now.
For Business: OS/DOS/IMS/CICS/MVS/JES Prog/Anal/Systems/Data Base. All large scale installations.
For Scientific: experience in the computer, communications, semiconductor, or aerospace/defense industries.
Your name, resume, and present employer will not be given out without your permission.
For sincere personal service, please send a confidential resume to:

Don Pullman (602) 274-6969
PULLMAN PERSONNEL
3969 North Central Ave., Suite 550, Phoenix, Arizona 85012

DATA PROCESSING PROFESSIONALS

COME GROW WITH US!

The success of **Gold Circle** is a tribute to our talented and dedicated **Gold Circle** team, of which our high-caliber data processing professionals are a key part, making our ambitious growth plans a reality.

As a leading division of Federated Department Stores with 51 stores in 4 states and annual sales in excess of $800 million, we can offer you outstanding career opportunities in our Information Services (IS) department.

Our present equipment consists of an IBM 3083 Mainframe with an MVS-SP operating system, IMS DB/DC, CICS, ROSCOE, and TSO under VTAM/NCP, digital and analog network for EPOS/receiving to our stores. Here at **Gold Circle**, you'll find a state-of-the-art environment where you can meet your potential in the following areas:

INFORMATION SYSTEMS — Our IS professionals develop new user programs and systems in an environment where 70% of our systems resources are committed to new development of on-line and data base systems such as distribution, finance, EPOS, stores, receiving and sales. Needed in IS are:

PROJECT MANAGER — QUALITY ASSURANCE
PROJECT MANAGER — DISTRIBUTION SYSTEMS
SR. PROGRAMMER ANALYSTS **QUALITY ASSURANCE ANALYST**

INFORMATION PROCESSING — Providing Data Entry, Computer Operations, Production Control, and Technical Services functions to **Gold Circle**, this area uses state-of-the-art scheduling/production assurance techniques to ensure that service level objectives are met. IP's responsibility also includes system software such as the Operating System, Capacity Planning and Communications software. Needed in IP are:

SR. OPERATIONS ANALYST **MVS SYSTEMS PROGRAMMERS**

INFORMATION RESOURCE MANAGEMENT — Administering the use of our corporate information resource and providing tools for on-line access are primary duties of IRM. Additional duties are mangement of IS standards and guidelines, disaster recovery planning, IS training, and data security. Needed in IRM are:

IMS SYSTEMS PROGRAMMER **DATA BASE ANALYST**

Interested in these outstanding opportunities? Gold Circle believes in fast action. CALL COLLECT, Julie Smith, (614) 459-3589, Tuesday, March 13 through Friday, March 16, 9 AM — 5 PM (EST). Can't call us on those days? After March 16, CALL COLLECT, Julie Smith, (614) 438-5274, 9 AM — 5 PM (EST).

P.O. Box 63, 6121 Huntley Road
Worthington, Ohio 43085

GoldCircle

An Equal Opportunity Employer M/F

WANTED:
Software Engineer Extraordinaire

Continued strong acceptance of our systems software products worldwide together with product introductions scheduled during 1984 has us really hopping. Lucky for you, because we are now searching for a VERY Senior Software Engineer to fill a key position in our engineering staff.

Our requirements are high. To be considered for this position, a candidate will have 5-7 years progressive experience in IBM large systems, strong Assembler Language skills, a thorough knowledge of MVS and VM/CMS internals, and recent experience with CICS/VS, &/or IMS/VS. The qualified candidate will have a broad base industry knowledge and a strong desire to develop advance software product for the world's largest information processing centers.

This key individual in our Engineering department will be responsible for identifying new product directions and opportunities, and leading the technical effort to bring these products to market. This position will require the fullest use of your talent and offers the visibility and opportunity only a small high growth company can provide.

For immediate consideration, call or send your resume to:

Doug Stevlka (408) 554-8121

TriangleSoftwareCo.

4948 Stevens Creek Boulevard, Suite 165
San Jose, CA 95129

DMS - 1100 EXPERIENCE WANTED

DYNAMAC CORPORATION

HAS IMMEDIATE OPENINGS IN THE NEW ORLEANS, LA & LEXINGTON PARK, MD AREAS FOR:

PROGRAMMER/ANALYSTS
&
DATABASE ADMINISTRATORS

PROGRAMMER ANALYSTS SHOULD HAVE EXCELLENT SKILLS IN THE FOLLOWING:

- COBOL
- TIP
- DMS.

DATABASE ADMINISTRATOR APPLICANTS SHOULD HAVE THE FOLLOWING SKILLS IN ADDITION TO THE ABOVE REQUIREMENTS:

- DBA
- GUP
- LOGICAL DATA BASE DESIGN
- PHYSICAL DATA BASE DESIGN

EXPERIENCE WITH MANUFACTURING SYSTEMS FOR LARGE CAPITAL GOODS WOULD BE HELPFUL.

DYNAMAC CORPORATION OFFERS COMPETITIVE SALARIES AND AN EXCELLENT EMPLOYEE BENEFITS PACKAGE.

QUALIFIED APPLICANTS SHOULD CONTACT PERSONNEL AT (301)-468-2000 EXT 339 AND SEND RESUMES TO:

DYNAMAC CORPORATION
c/o PERSONNEL DEPARTMENT
THE DYNAMAC BUILDING
11140 ROCKVILLE PIKE,
ROCKVILLE, MD 20852

EOE M/F

SYSTEMS PROGRAMMER/ CAPACITY PLANNER

Large IBM Systems

Exceptional opportunity for an innovative professional who will become involved in a wide spectrum of stimulating assignments to include:

- Monitor and evaluate current systems and future needs
- Project and anticipate CPU trends and requirements
- Analyze networks
- Advise management and systems staff

We need an individual with 8+ yrs. experience in:

- Large IBM systems
- MVS and VM
- Queuing theory
- Communicating with management and customers

ESL, on the SAN FRANCISCO PENINSULA, offers a challenging and rewarding environment along with excellent salaries and benefits. Please send resume to Professional Employment, Dept. CW-383, ESL, P.O. Box 3510, Sunnyvale, CA 94088-3510. (408) 743-6300. An equal opportunity employer. U.S. CITIZENSHIP REQUIRED.

ESL
A Subsidiary of TRW
1345 Crossman Avenue
Sunnyvale, CA 94086
408 743 6300

TRW

ASSISTANT VICE PRESIDENT FOR INFORMATION PROCESSING
University of Minnesota

The person selected for this new position will be the principal line officer for units and activities related to computing and telecommunications and will report to the Vice Presidents for Academic Affairs and Finance and Operations. The primary emphasis of the position will be on planning, coordination and management of these activities to serve the academic and administrative needs of the University.

Leadership and the responsibility for the University Computer Services, the Administrative Data Processing Division, and a new Department of Telecommunications Services to be established are major responsibilities of this position.

Candidates must have, as a minimum, a master's degree (Ph.D. preferred) in engineering, science, mathematics, management information systems, or comparable technical discipline; a minimum of five years experience in planning and management in the area of computer and/or telecommunications technology. Significant experience in a research university; understanding of and experience in conducting or supporting academic research, undergraduate and graduate education, or comparable experience in private or governmental laboratories.

Applications and nominations for this position are solicited and applicants should forward a resume, three letters of evaluation, and a personal statement in regard to the position *on or before April 20, 1984* to:

Dr. A.J. Lleek, Associate Vice President for Academic Affairs and Chair, Search Committee
213 Morrill Hall
100 Church Street S.E.
University of Minnesota
Minneapolis, Minnesota 55455

This is an administrative position of the University, with faculty benefits. Faculty rank and tenure status are possible in an appropriate academic department, depending on qualifications.

Salary: negotiable and commensurate with qualifications and experience.

The University is an equal opportunity educator and employer and specifically invites and encourages applications from women and minorities.

Systems Programmer

IBM 4341 • to $50K

An exciting opportunity exists within our banking institution's progressive data processing area for the right individual who possesses 5 - 10 years experience within an OS/VS-1, VM, CMS, CICS environment at the macro & command level. This individual must possess a solid knowledge base in COBOL, Assembler & PL1. Exposure to VSAM essential. We offer excellent benefits package as well as a stable shop environment in our conveniently located Central Nassau County, Long Island headquarters.

Qualified individuals may send resume in strict confidence to:

Box 888-S, 15 E. 41 St, NYC 10017
or call Tuesday to Friday (516) 222-6666, Ext 446

Principals Only Please • Equal Opportunity Employer M/F/H/V

ROCKY MOUNTAIN OR NATIONAL

Data Base Designers	IDMS, IMS, DB/DC, ADABASE
Programmers/Analysts	Graphics, DOD, Telecom, Business
Systems-Anal/Prog	IBM, DEC, HP, PRIME, CDC, TANDEM

Contact: Margo Kelle

Software Engineers	Aerospace, Telecom, Data Acquisition
Software Test EE's	ATE, Diagnostics, S/W Specs, IV & V
S/W Systems Develop.	8 & 16 Bit MPU's, C & UNIX, LAN

Contact: Vie Tuttle

Career Marketing Associates
7100 E. Belleview #208
Englewood, CO 80111
(303) 779-6666

Communications Engineers and Programmers.

IBM in Boca Raton seeks Developers and Designers in both.

We are looking for a few exceptional people...

IBM Boca Raton is in the early stages of developing a family of information systems for the small to intermediate price marketplace. These products must achieve new levels of cost performance and quality, and will contain advanced facilities and functions establishing this effort as the *leading edge* throughout the latter half of the decade.

Engineering Development and Design

Communication Hardware Development

Must have knowledge of current microprocessor chip sets, communication and EDS technology, and extensive experience in development process—including ability to generate specifications, plans, etc.

Communications Microcode Development

Must have knowledge of communication protocols and modern programming development methods. Code will be developed using high-level language.

Communications Test Development

Knowledge of communications protocols required. Test cases, which will be developed with high-level language, will exercise all normal and exceptional conditions in communications HW and microcode.

Engineering opportunities also exist for Systems Architecture and Logic Design of VLSI Components.

Programming Development and Design

Communications Architecture

Will develop architectures for distributed systems communications. Must have in-depth experience with internals of communications architectures such as SNA and international standards for communication.

Communications Design

Structuring components within a distributed system framework. Must know SNA, X.25, LAN's or communications structures, and be able to map them to distributed system concepts.

Communications Product Development

Will implement communications products. Requires knowledge/experience in product detail design, high-level language development programming, and communications product testing.

The added attractions are many.

IBM offers outstanding technical resources and associates, company-paid benefits package, and opportunity to pursue advanced degrees. Boca Raton—between Ft. Lauderdale and Palm Beach—offers good living at quite moderate cost.

For prompt, confidential consideration, please send your resume to: IBM Corporation, Mr. Rick A. Thompson, Dept. 85B/234-1, P.O. Box 1328, Boca Raton, Florida 33432.

IBM®

An Equal Opportunity Employer

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

AA
American Airlines

LET YOUR CAREER SOAR IN THE SOUTHWEST

THE AA ADVANTAGE

AMERICAN AIRLINES, the #1 airline, is offering you the chance to do what you do best in the exciting field of computer technology. The expansion of our ACP/TPF system software staff has created openings in Tulsa, Oklahoma at our central data processing location. If you are an experienced PARS (ACP/TPF) software professional, this is your opportunity to work on our SABRE on-line information system where in-house software development continues to be a major thrust.

Tulsa, Oklahoma, located in the heart of the Southwest, offers all the amenities of a major metropolitan city without the hassle of big city living: professional football & soccer, the fine arts, cultural and historical museums, a choice of lakes within a 15 minute drive, friendly people, plus the appealing climate of the Sunbelt.

If you are an ACP/TPF professional seeking to advance your career

CALL COLLECT
918-832-4845
9:00 AM to 10:00 PM CST
Tuesday March 13 and Wednesday March 14, 1984
or, if you prefer, submit resume in strictest confidence to:

AMERICAN AIRLINES
Flt CW-312
P.O. Box 51009 MD-32
Tulsa, Oklahoma 74151
Principals Only, Please

A male/female equal opportunity employer

Manager Of Systems & Programming

Payless Cashways, Inc., a nationally recognized leader in retail building materials with 150 stores and sales approaching $1 billion, has an extremely challenging position for a Manager of Systems and Programming.

Reporting to the Director of M.I.S., the potential candidate will share responsibility for the design, development, and implementation of a $15 million state-of-the-art, fully integrated, on-line, real-time management information system.

To qualify, you must possess a B.S. in Computer Science or closely related discipline, have been involved in the design and development of a totally integrated, on-line, real-time management information system (with a minimum of 200 files) utilizing a network data base and 4th generation language in an IBM OS/MVS environment. You must also possess a complete understanding of accounting concepts, inventory, payroll, forecasting, and their roles in retailing.

In addition to a generous salary and benefit package and the desirability of living in Kansas City, MO, we offer a stimulating and challenging role in developing one of the more sophisticated systems anywhere!

Send resume and salary history/requirements in confidence to:

PAYLESS CASHWAYS, INC.
Employment Department
P.O. Box 406
Kansas City, MO 64141 - 0406

Equal Opportunity Employer M/F

PROGRAMMER/ ANALYST

North Carolina Location

We desire an individual with 4-6 years experience in manufacturing and financial systems with a portion of those years on a Hewlett-Packard 3000. Languages required are COBOL and FORTRAN. Additional experience on IBM 4331 using CICS, PL1 is very desirable. Desire a 2 year Data Processing Degree or equivalent.

CARTER-WEBER, INC. is a medium-sized manufacturer of automotive fuel systems for foreign and domestic small engine cars and trucks. We are jointly owned by a Fortune 500 Company and a major foreign company. We offer competitive salaries and a comprehensive package of company benefits.

Send resume and salary history to:

Recruiter

CARTER-WEBER, INC.
2101 Nash Street, Sanford, N.C. 27330
(No Private Agency Referrals Please)
An Equal Opportunity Employer M/F

WASHINGTON D.C. & EAST COAST OPENINGS

We're TECHNICAL RECRUITERS, the Technical Placement Specialists, based in the Nation's Capital and serving the NEW ENGLAND, MID-ATLANTIC, and SOUTHEAST regions. Our client companies currently need experienced professionals at all levels:

Systems Software Development
Systems Programming
Telecommunications
Graphics Systems
Data Base Systems
On-Line Systems
Scientific Programming

Companies pay all fees, interview and relocation expenses.
Send resume in complete confidence to A. J. Rachele
or call (collect): (202) 626 - 4637

TR **TECHNICAL RECRUITERS** 1120 G St. NW, Suite 300, Washington, D.C. 20005

DATA PROCESSING PROFESSIONALS

DATA RESOURCE CORPORATION, headquartered in Atlanta, is a leader in quality Contract Programming and Consulting. Our growth in the Southeast and Southwest has created opportunities for versatile Professionals with state-of-the-art skills in Programming and Systems Design.

We are seeking individuals who desire to work in various stimulating Data Processing environments. IMS and CICS skills are of special interest, as are the abilities to travel or relocate.

We offer you competitive salaries and comprehensive benefits programs, including bonuses and profit sharing, and overtime pay. If you are searching for a growth opportunity with a dynamic and progressive company with a Management team that "puts people first", then DRC is your answer.

For immediate consideration, send resume to 3301 Buckeye Rd., Suite 103, Atlanta, GA 30341, or call BECKY FINLEY at 404-455-7280, or toll free:
1-800-241-8002

DRC
EOE

INSTRUCTORS/ASSIST. PROFESSORS DATA PROCESSING

The Department of Mathematics and Applied Sciences anticipates openings at the Instructor/Assistant Professor level in Data Processing for the 1984-85 academic year. These are ten month, tenure track positions, teaching in a two-year Associate Degree program. A Master's degree in Mathematics, Data Processing or related area strongly preferred. A strong background in at least three high-level languages required and in VAX Assembler preferred. Teaching experience, familiarity with display graphics and numerical analysis desired. Salary commensurate with teaching experience and teaching ability. Excellent benefits. Deadline for application is April 1, 1984. Please forward letter of intent and resume to:

Mark A. Turner
Assist. Dean, Business Affairs
University College, ML #47
University of Cincinnati
Cincinnati, OH 45221-0047

Affirmative Action/Equal Opportunity Employer

Systems Programmer II

The University of Alaska Computer Network (UACN)

The UACN provides the statewide University of Alaska system academic and administrative computing and data communication services. The Systems Programmer II provides technical support for computer operating systems, related software and program maintenance. In addition this post is responsible for software systems development and the implementation of networking software, utilities, language translators, and standard software packages. As a minimum the successful applicant must possess a knowledge of computer systems and software, skills in Assembly language level programming, and the ability to maintain, develop, and install computer operating systems.

The position is based in Fairbanks, Alaska and will report to the Systems Programming Manager. The salary range begins at $42,764 DOE.

Application letters, together with resume and at least 3 professional references, must be postmarked by March 30, 1984 and sent to:

Statewide Office of Human Resource Development
University of Alaska
208 Tanana Drive, Room 1 Bunnell Building
Fairbanks, Alaska 99701

Your application for employment with the University of Alaska may be subject to public disclosure should you be among the finalists for the position. The University of Alaska is an Equal Employment/Affirmative Action Employer and Educational Institution.

SOFTWARE ENGINEER - Design, implementation, debugging & documentation of software projects for Telex/Data Communications. 6 mos or 6 mos rel exp. - programming. Master's in Comp Sci. Must have knowl of "C", ASSEMBLER, EXORMACS & Motorola 6800 & 6809. $26,500/-yr/40 hrs/5 days/wk. Datobit, Inc., 110 Ricefield Lane, Hauppauge, NY 11788. PLS SEND RESUME.

COMPUTER CENTER STAFF

Small College Environment

Nichols College, located in Dudley, MA, requires a dynamic, flexible, diversified Computer Center Staff Person to assume major responsibility in the set-up, operation, and curriculum integration of a new Networked Microcomputer Lab. Opportunity to work on Administrative Data Base Managed applications exists.

Degree, knowledge of Micro Business Applications, familiarity with MS-DOS and CP/M/86, programming in BASIC are required. Familiarity with RBTBS, COBOL and PASCAL are desirable.

Benefits include fully paid medical, dental and life insurance, 20 working days vacation annually, free tuition for candidate and family, retirement plan.

Send resume with salary history and references to:

Dante J. Kashtanis
Director of Computer Services
Nichols College
Dudley, MA 01570-5000

Nichols is an Equal Opportunity College

There's no better climate for accelerating career growth. Call Charles Lewis today at 1-800-821-7700, ext. 800-B.

From West Texas to San Diego, opportunities for experienced computer professionals are rapidly growing—now that the economy is surging ahead, particularly in many Southwest cities.

As the world's largest recruiting firm that specializes in the computer profession, we represent hundreds of client organizations based in Texas, New Mexico, Colorado, Utah, Arizona and southern California. Many of these firms are new and looking to build their business with young, talented professionals. A small sample of current opportunities is listed below.

If you're interested in exploring any position—in vibrant areas that will also give you access to some of the best recreation and greatest weather in the country, you ought to call us soon. With the huge demand for skilled computer professionals, you'll find virtually any type of position in a wide variety of computer environments.

Call Charles Lewis today at 1-800-821-7700, extension 800-B. As soon as we receive your inquiry, we'll get back to you with information about any position that you wish to explore. Then, if you want to pursue one of these opportunities, we'll make all the arrangements in absolute confidence.

There's no cost to you for calling, interviewing or accepting a position. In fact, many of our Southwest clients offer very attractive relocation packages, which could make your next move even more inviting.

If you're unable to call, write Charles Lewis today—

Source Edp
Department C-2
P.O. Box 7100
Mountain View, CA 94039

(If you write, please include your title.)

Texas

Information Center Analyst. Major San Antonio employer seeks a person with 4th generation language experience. 4-day work week. To $30,000.

Vendor Product Manager. Expansion of international and domestic markets has created multiple openings in San Antonio, Texas. Beautiful suburban location. To $45,000.

Diagnostic Software Specialist. New product development team needs an experienced professional. Beautiful suntech location. Low cost of living. To $50,000.

Engineering DBA — Ground Floor. Experience with any graphical data bases is needed in well-known San Antonio firm. Ground floor opportunity. To $45,000.

Software Engineers — Many Openings. Experience in visual/data combination equipment sought. Positions will lead to an exciting new product development teams. To $45,000.

Programmer/Analyst — Great Location. New development efforts have created a number of openings for people with PL/I or COBOL experience. Beautiful North/ San Antonio location. To $34,000.

CAE Software Engineer. Experience in CAD/CAM of printed circuit boards, could lead to several challenging career possibilities. Ground floor opportunity. To $45,000.

CICS System Programmer. Experience in CICS internals sought. Position will lead to a challenging opportunity in consulting. A real opportunity for a technical applications person. To $40,000.

Consultant — IBM Exposure. Software/ Consulting company is expanding and seeks IBM talent in these areas: structured COBOL programming and insurance agency experience. To $45,000.

Software Engineer. Technical degree, experience in firmware development sought by major Fortune 500 firm. Any exposure to Assembler and/or C helpful. To $40,000.

New Mexico

Programmer Analyst. Fast-growing, stable insurance company in new Scottsdale, Arizona facility. Design and program using CICS, COBOL and ALC. Minimum of 2 years IBM sought. Insurance experience preferred. To $30,000.

Programmer Analysts — IMS/Training. Fortune 100 client has major new development projects. State-of-the-art OS/MVS shop with professional environment, structured methodology. Programmer/ Analysts with two years or more experience using IMS DB/DC with COBOL sought. Also have development with PL/I and CICS for new on-line transaction system. Excellent training programs, benefits and career progression. Starting salaries: $33,000 to $37,000.

Operating System Engineers — Test Engineers. Leading-edge R&D group is developing next generation operating systems for the hardware vendor 16/32 bit microprocessors. Need person with UNIX and 'C' with structured high level languages design. Research environment, suburban location in Phoenix suburb. To $45,000.

Software Engineer — UNIX, 'C'. Start up company, developing software systems for the medical field. UNIX/C or Basey Intors ALC experience desired. Possible equity position. Live and work in Las Vegas. To $40,000.

Senior Programmer Analyst — Banking. Lead installation of new auto leasing package. State-of-the-art bank. Beautiful suburban Phoenix location. Prefer auto leasing experience and/or strong IMS with COBOL. Banking and ALC preferred but not required. Excellent path to Project Management. To $32,000.

Programmer Analyst — New Development. Very stable aerospace company located in Small Southwestern town. Will develop new systems. Person with four years COBOL and CICS with OL1 preferred. To $30,000.

Software Engineers — Multiform. Stable, growing division of Fortune 500 firm seeks person to lead hardware/ software integration projects with DEC PDP11 and 280 microcomputers using ASSEMBLER and C. Will be heavily involved with hardware interface, design, development, and test. Lead small groups — project start to finish. Starting salaries to $30,000.

DEC PDP 11-RSX Software Engineers. Real-time MACRO-11 development for major multiple CPU communications applications. Low cost of living area with temperate climate. Starting salaries: $30,000 to $34,000.

Systems Analysts/Programmers — New Projects. Huge growth local firm with migrate from DOS/VS to OS/MVS this year. Primary applications are on-line (CICS) inventory and financial for large base of user service groups. Will be involved with new database projects. Strong user skills and individual responsibility are key requirements. COBOL and ASSEMBLER experience is helpful but not required. Starting salaries: $21,700 to $24,000.

Software Engineer — Graphics. Leader in the field for 3-D graphics systems. New product development. BSEE, BSCS UNIX C ALC with exposure to graphics sought. Located in Scottsdale, Arizona. To $42,000.

Software Engineers/Managers — Will Cross-Train. High-tech electronic systems manufacturer is expanding staff for new development in UNIX/C on 80BX, M68000X microprocessors. Real-time operating systems, compilers, hardware control, software tools and application specialists are needed. Can train solid PASCAL/ ASSEMBLER experienced on UNIX and C. Prefers BSEE or Technical BSCS. Excellent company benefits. Starting salaries: $31,000 to $45,000.

Programmer Analyst — Las Vegas. Major bank in Nevada is expanding. Large scale Burroughs experience with COBOL preferred. Telecom and banking exposure sought. To $27,000.

Systems Analysts/Programmer Analysts. Fortune 500 headquartered in Phoenix needs staff to support user groups in developing new system developments to upgrade financial and inventory systems. Environment is large scale OS/ MVS using IMS and CICS with structured methodology. Sustained growth of departments and company over last five years has continually allowed internal promotions to fill senior positions. Starting salaries: $33,000 to $35,000.

Programmer/Analysts — 10 minutes from the Slopes. Major services firm needs Programmer/Analysts to support new hardware upgrades in 1984. OS/ MVS, CICS COBOL environment. Opportunity to enjoy the outdoors and live in a low cost-of-living area at the base of the Rockies. Starting salaries: mid to high twenties.

Programmer/Analysts — Systems 34, 36, or 38. Exciting opportunities in new development of financial and reporting systems for seven year old Phoenix firm. Professional staff has doubled in the last year. Multiple CPU's installed migrating from System 34 to System 38 with planned addition of System 38 as demand increases. Starting salaries: $28,000 to $30,000.

Texas

Operating System Specialist. Leading San Diego software firm seeks System Programmer with three to five years including IBM OS experience. Opportunity for exposure to multiply mainframe and minicomputer operating systems. To $30,000.

Marketing Director. One of the fastest growing systems/software developers seeks a successful Marketing Director to direct its staff based in San Diego. Will develop marketing strategies and motivate staff. To $55,000.

Major Data Center Expansion — Multiple Opportunities. Well-known San Diego firm is expanding on-line systems. Firm seeks Programmer/Analysts, System/ Analysts and DBAs, System Programmers (MVS, CICS, VTAM, IMS). Extensive in-house IBM training in database and on-line services. To $40,000.

Software Engineers — New Product Development. Rapidly-growing San Diego computer manufacturer seeks degreed individual with three years UNIX and 'C' programming experience. Assembler and VAX exposure helpful. Will develop new software. To $40,000.

Engineering Programmer/Analysts. Join a growing state-of-the-art San Diego firm. Openings exist for those with engineering or process control applications experience. Fortran knowledge, graphics and database exposure preferred. Great learning environment. To $40,000.

Software Engineer — Microprocessor High Technology. Major high technology manufacturer located in a rural setting minutes from San Diego seeks Microprocessor Software Engineers with three years of real-time software design experience on Intel 8080, Z-80, or Motorola 6800 using Assembler and PL/M. A BSEE or Computer Science degree helpful. To $40,000.

IMS Programmer/Analysts — Data Center Expansion. Major San Diego company with multiple IBM 360X and 3100 distributed processing environment is expanding its systems development staff by 100 people. Salaries to $35,000.

Senior Programmer/Analyst — New Project. Major division of Fortune 500 firm in suburban San Diego location seeks individual with two plus years IBM OS/ COBOL and CICS experience for a new development project. Opportunity provides high visibility with top corporate management as well as technical exposure. To $31,000.

CAD/CAM Programmers — Growth Potential. San Diego manufacturer, undergoing major expansion in graphics development, needs CAD/CAM Programmers. Will contribute and be rewarded immediately relative to level of contribution. Excellent management potential. BS, EE or BS, CS sought. To $40,000.

Programmer — Move To Consulting. Prestigious East Coast consulting firm is expanding in San Diego and seeks an aggressive Programmer desiring a career in analysis consulting. Opportunity for travel. State-of-the-art environment. Two years programming, good communication skills and Bachelor's degree sought. To $40,000.

Lead Systems Programmer — Management Opportunity. Major Denver-based financial firm seeks Programmer with CICS internals experience. Will become Manager in six months with proven performance. To $37,000.

Colorado

VTAM NCP — Project Leader — Data Center Expansion. Rapidly-expanding Denver division of major U.S. corporation seeks project lead experience or strong exposure to VTAM NCP systems programming. Expansion plans for 1984 will create multiple opportunities for rapid career development. To $40,000.

COBOL Programmer — HP New Development. Exclusive Source client seeks a COBOL Programmer/Analyst to join a select staff of computer professionals. This is a prestigious Denver firm showing a plush working environment, outstanding benefits and rapid career growth, including a 90 day salary review. One year of HP COBOL applications experience sought. Knowledge of packaged GA systems helpful. To $24,000.

Assembler Programmer — Learn CICS. Prestigious Denver firm with sophisticated network expansion plans for '84 is seeking IBM Assembler programmers. Promotion to first line management is obtainable in 12–18 months. Two-five years of BAL on large IBM systems sought. Online training will be provided. To $26,000.

Programmer — Move to Small Mountain Town. Manufacturing company located in the Rocky Mountains near major Colorado ski area has an immediate opening for a two year COBOL or RPG II Programmer. Company will provide training on HP 3000. Full relocation provided to this beautiful, rustic, mountainside community. To $25,000.

Applications Programmer — New Systems Development. Major insurance organization in Denver has multiple positions open due to expansion. Company is developing a new insurance processing system. Participate in a state-of-the-art on-line development project. Prefer backgrounds in insurance and IBM Assembly. To $25,000.

Applications Programmer — Learn IMS. Denver-based financial organization is expanding its MIS staff to keep pace with growth. Training in IMS DB/DC will be provided for candidates with 2 years of PL/ 1 or COBOL on large scale IBM systems. To $24,000.

Sales Representative — New Branch. Leading company in local area network technology is opening a new branch in Denver. They seek a self motivated senior level telecommunications systems sales professional to establish and build the Rocky Mountain market. Package to $75,000.

Branch Manager — New District Office. Fastest-growing data base software firm in U.S. is expanding to the Denver area. Seeks manager with a solid sales track record in systems software or data base packages. Package to $100,000 plus.

Senior Systems Programmer — Pearl Of Pikes Peak. Dynamic Colorado Springs national firm is expanding its Systems Department. Professional with three years MIS internals sought. Full relocation package. To $42,000.

source edp
Personnel Services

The world's largest recruitment firm that specializes exclusively in the computer profession

Call today: 1-800-821-7700, ext. 800-B

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

BUSINESS PROGRAMMER/ANALYST SYSTEMS ANALYST

Your skills are unique. So are we.

As a computer professional, your skills in the application of advanced business systems designs are a unique asset in today's fast-paced business environment. At Ciber, we're also unique. We're a growing, innovative consulting firm that provides applications development services to diverse customers nationwide.

If you're an individual with a minimum 3 years experience as a Programmer, Programmer Analyst, or Systems Analyst, consider a future with Ciber. We offer a challenging career where your technical know-how can be put to use in diverse assignments with clients in various industries.

Our projects are development-oriented, so you'll be involved in analysis, programming, implementation and documentation with emphasis towards IDMS, IMS, CICS and other software packages. With us, you'll also gain the kind of recognition and visibility found only with a company where opportunities are still taking shape - a company like Ciber. We have offices located in Atlanta • Chicago • Dallas • Denver • Detroit • Houston • Phoenix • Sacramento • and St. Louis. If qualified and interested in becoming a Ciber professional, call collect or send your resume to:

Ciber
Personnel Department
67 E. Weldon, Suite 121
Phoenix, Arizona 85012
(602) 234-0411

An Equal Opportunity Employer M/F

CIBER

SALESPERSONS/ SALES MANAGERS/ TECHNICAL MANAGERS

Informatics General Corporations PROFESSIONAL SERVICES GROUP has openings for skilled professionals throughout the United States.

If you can help us sell and manage consulting services where you now live and work you may be eligible to join one of America's premier software firms.

For immediate consideration rush your resume in strictest confidence to:

Mr. Donald A. Toy,
Vice President & General Manager
PROFESSIONAL SERVICES GROUP

informatics general corporation

555 Madison Avenue, New York, NY 10022

An Equal Opportunity Employer M/F/H

TANDEM EXPERTISE

IS YOUR KEY TO SUCCESS IN INFORMATION SERVICES AT ENTRE'

Entre Computer Centers, Inc., America's fastest growing franchisor of retail computer stores, is looking for first rate Programmer/Analysts. TANDEM product line knowledge is a must. Familiarity with Accounting and Distribution application areas is desirable.

These positions offer outstanding professional compensation and exceptional growth opportunity in a fast-paced dynamic environment. Our corporate headquarters are conveniently located in Northern Virginia with easy access to the nation's capital.

To pursue these opportunities further, call or send your resume with salary history to:

Mr. Neil J. Comiskey
Director, Information Services

ENTRE

1651 Elden Drive, Suite 400
Vienna, VA 22180
(703) 556-0660

Sorry, no entry level positions are available at this time.

PROGRAMMERS
IBM SYSTEM 38
DIGITAL 11/70 (RSTS/E)

Ventron, a specialty chemicals division of Morton Thiokol, Inc., located just north of Boston, is growing at a rapid pace. To meet the challenges of expanding markets and increasing business, our MIS staff is assuming more responsibility and needs additional support.

Converting to an IBM System 38 during the past 10 months and increased business applications in this area has created an opening for a programmer on the IBM system. Retaining our Digital 11/70 requires competent personnel to maintain this area of programming as well. Two programmer positions are currently open:

IBM SYSTEM 38

as part of the IBM effort, you will be working with a state-of-the-art data base, a virtual machine, and software packages that perform financial and distribution functions. The desired candidate will be strong in RPG II or RPG III with at least 1 years experience in addition to a college degree in Business or Data Processing.

DIGITAL 11/70 (RSTS/E)

as part of the DEC effort, you will be enhancing existing business applications and assisting in any IBM conversion. The desired candidate will be strong in BASIC PLUS with at least 1 years experience in addition to a college degree in Business or Data Processing.

Please send your resume and salary requirements to:
JUNE A. VETTER
Personnel Administrator

MORTON THIOKOL, INC.

Ventron Division
150 Andover Street, Danvers, MA 01923
An Equal Opportunity Employer M/F

PROGRAMMER

Textron, Inc., is seeking an experienced Computer Programmer aspiring to work as a Systems Analyst to develop and establish information and analysis programs and systems for a specialized department in the Corporate Office. The ability to work independently is essential.

We offer an excellent starting salary and an outstanding benefits package. Forward resume, salary history and starting salary requirements in complete confidence to:

Paul D. Berk
TEXTRON, INC.
Human Resources Dept.
40 Westminster Street
Providence, RI 02903

An Equal Opportunity Employer M/F

COMPUTER CENTER DIRECTOR

Virginia State University invites applications for the position of Director of the Computer Center. Responsible for all data processing, equipment and software selection, system analysis, programming, data entry, computer operations and supervision of Computer Center personnel. Master's degree in computer science or related mathematical area preferred and extensive supervisory experience in data processing, including data based management and systems design work in higher education desired. Send letter of application, resume, three letters of reference by March 30, 1984 to:

Virginia State University
Employee Relations Director
Box PP
Petersburg, VA 23803

Affirmative Action/
Equal Opportunity Employer

Senior Technical Representatives

We're looking for that rare breed--senior technical individuals with strong personal skills and a desire to travel and work with people.

We're Iconics--the developers of TRANSFORM™ fifth-generation software products which automate the software development process.

As Sr. Customer/Marketing Support Technical Representative, the software environment with which you must be completely familiar is MVS and IMS DB/DC. These positions require a thorough knowledge of COBOL programming, JCL and developing online systems under IMS.

Iconics is a young and growing company, offering top pay and benefits. If you qualify and would like to be a part of the application development revolution, please reply to:

Technical Support Manager
Iconics, Inc.
8902 E. Via de Ventura
Scottsdale, Arizona 85258

ICONICS INC.

An Equal Opportunity Employer

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

ROBERT HALF

SEATTLE

SR DBA

Seeking data base analyst with 3+ years experience designing and installing data bases in IBM IMS DB/DC environment. High $30's

COBOL P/A

Seeking programmer/analyst with 2+ years heavy COBOL programming experience in IBM OS MVS environment to design and develop financial applications. Excellent environment for those seeking rapid career advancement. To low $30's

WANG VS SYSTEMS PROGRAMMER

Seeking systems programmer with 1+ years Wang VS 45 operating system programming experience. Mid $30's

DDPX SYSTEMS PROGRAMMER

Seeking individual with 2+ years IBM 8100 DDPX systems programming experience. Sr position with light involvement in documentation and performance monitoring, heavy internal technical consulting responsibilities in remote to mainframe networking environment. Salary DOE

Marijo Petersen
ROBERT HALF
of Seattle, Inc.
600 University St. #2230
Seattle, WA 98101
(206) 624-6600

WASHINGTON

TECHNICAL SUPPORT

Do you really know CICS? Do you like large IBM systems? Grow with this Virginia data center. To $35,000

ROBERT HALF
of Washington
7316 Wisconsin Ave.,
Suite 401
Washington, DC 20814
(301) 652-1900

MILWAUKEE

SYSTEMS ANALYST

Fortune 500 giant is setting up PMS system at corporate headquarters. Company is testing grounds for all new state-of-the-art IBM hardware. Requires strong knowledge of PMS with background in COBOL and CICS. $33-40,000

MAS CONSULTANT

Established CPA firm seeks "up-and-comer" in DP systems. Must have top-notch technical skills in either a manufacturing or financial environment. Seeking 3+ years heavy design & high-level user interface. To mid $40's

Brian Krueger
or Dick Bird
ROBERT HALF
of Wisconsin
777 E. Wisconsin Ave.
Milwaukee, WI 53202
(414) 271-HALF
(271-4253)

BOSTON

DB/TECH SVCS

Fast-track $2B firm seeks proven mgr to oversee the DBA & tech support depts. Multi-CPU IBM OS/MVS IMS DB/DC shop. Super oppty to manage tech growth of fast paced org. $50s,000

OS/MVS SYS PROG

Prestigious fin'l svcs co offers challenging oppty for SAL internals pro. You should have solid networking know! in an IBM OS/MVS IMS environ. Upward mobility for the internals specialist. $35,000

IMS TEAM LDR

Exciting career oppty awaits the tech skilled ldr. You should have strong IBM OS/MVS IMS DB/DC COBOL bkgrd for this Fortune 500 org. Hvy admin/tech involvement with development tech support reqs. $30s,000

ROBERT HALF
of Boston, Inc.
160 Summer Street
Boston, MA 02110
(617) 423-1260

HARTFORD

PROJECT MGR

Propitylcasualty ins bkgrd w/successful track record req'd by CT corp to direct new on-line IBM proj. To $30,000

DATA BASE

CT corp expanding DB dept! Exp w/data modeling, data arch, w/exposure to IMS, IDMS or TOTAL. Sr staff pos leading to mgmt. To $40,000

SYS ENGINEER

5 New Eng hi-tech client seeking exp'd DEC/VAX, PDP 11/44 w/VMS or RSX 11M oper exp. 3 yrs + exp. Mfg & eng oriented applications. To $40,000

SYS PROG

Outstanding oppty in a sub hi-tech CT co for OS/MVS, JES3 trained sys prog. VM & SMP bkgrd a plus. Exc benefits & great potential To $40,000

SR PROGRAM/ANALYST

If you have 1+ yrs w/OS/MVS or DOS/VSE & exposure to CICS or DL1 plus seek challenging new devel opptys you qualify for exciting growth oppty in CT mfg hi-tech & fin'l co's. To $30,000

PROJECT MGR

BS + 5 yrs min exp in the design, devel of mfg sys — MRP, packaging & invtry qualities for new pos to lead implementation of dist mfg sys for multi-div mfg co. Many extras. To $40,000

ROBERT HALF
of Hartford, Inc.
111 Pearl Street
Hartford, CT 01603
(203) 278-7170

PROVIDENCE

MANUFACTURING SYSTEMS ANALYST

Major consumer goods mfr seeks Sr Systems Analyst for challenging applic develop proj. 10 yrs mfg sys bkgrd w/5+ yrs sys analysis skills. APICS cert a plus. $30s,000

ROBERT HALF
of Providence, Inc.
76 Westminster Street
Suite 600
Providence, RI 02903
(401) 270-5700

SOUTHERN CALIFORNIA

SYSTEMS ANALYST

Leading Santa Barbara user needs your COBOL/BAL exp in a mainframe shop. Full relocation paid to "THE" coastal community of So-Cal. To $30,000

ROBERT HALF
of L.A.
3699 Wilshire, #1000
Los Angeles, CA 90010
(213) 389-6805

SAN ANTONIO

DP MGR

Degree preferred. Must possess 2+ yrs in Sys 36-RPG III with retail applic exp. Overall 7+ yrs in DP with mgmt position exposure desired. Start up situation with co. Software already selected. Manage staff and bring up system. Excellent oppty for the right person with "drive." $40,000

SYSTEM ANALYST

Degree preferred. Must have 3+ yrs Series 1 exp with EDX-RPS etc. Development and Planning Dept position. Offers total overview of project. High visibility with potential for upward mobility. "No better" co benefits/perks anywhere. $30-32,000

PROGRAMMER/ ANALYST

Degree or equivalent work exp req'd. IBM/CMS/VSAM/COBOL/CICS exposure a MUST. Fin'l - Distr applic preferred with good attitude toward coding req'd. Member of 4 person team. Good growth potential. $30-35,000

All positions above and many more are in Texas where "Long Necks," "Armadillos" and the "Cotton Eyed Joe" call home.

Bob Baldini
ROBERT HALF
of San Antonio, Inc.
8940 IH 10 West,
Suite 4000
San Antonio, TX 78201
1-800-531-6402
In TX dial (512) 735-9407

NEW ORLEANS

SYS SYSTEMS PROGRAMMER

3 yrs exp & knowledge of MVS, JES, tps IBM mainframe & related disk subsystems. Responsible for MVS/SP oper sys & major subsystems. To $35,000

PROGRAMMER/ ANALYST

One yr exp with IBM 3033, OS/MVS, COBOL, CICS. Total data base desired, IMS accepted. Exp with IBM on-line programming development tools. To $25,000

EDP AUDITOR

3 yrs hvy bank auditing exp with hvy technical sys exp. Knowledge of audit retrieval, library & parmatec. To $35,000

ROBERT HALF
of New Orleans
P.O. Box 57020
New Orleans, LA 70157
(504) 566-4200

NEW YORK

SYSTEMS PROGRAMMER CICS

Golden opportunity for proven COBOL programmer to join this multi unit retailer. 3+ years application design experience, solid CICS (command level) under DOS/VS and 2+ years of project leadership work. Retail and ICCF knowledge preferred but not essential. Fee paid. $35,000

SR PROGRAMMER ANALYST INTERNATIONAL TRAVEL

Outstanding situation for growth and international travel exists with major pharmaceutical company. Ideal candidate should possess strong accounting background, RPG II or COBOL and business application experience. User interface essential. Fee Paid. $37,000

PROJECT MANAGER IBM/4341

Prominent force in the apparel industry offers a unique opportunity for a solid technician for a Project Manager position. Growth to Director of Data Processing within a few months. Candidate should be from an IBM/4341 background under DOS/VSE. COBOL experience essential with CICS familiarity. A fabulous opportunity. Fee Paid. $40,000

ROBERT HALF
of New York, Inc.
522 Fifth Avenue
New York, NY 10036
(212) 221-6900

ST. LOUIS

DP MANAGER TO CHATTANOOGA TN

Large mfg firm has excellent mgmt opportunity for a degreed individual with mfg & COBOL experience to manage small staff. Pluses are 4331 DOS/VSE, TOTAL, CICS, COPICS, EASYTRIEVE and MBA software. Opening due to promotion. Relocation paid and excellent benefits! To $37,000

RPG III/38 P/A

St. Louis manufacturer has immediate need for 2 yr RPGIII S/38 programmer analysts. Small shop environment with MAPICS! To $30,000

IBM TECHNICAL SUPPORT

Major St. Louis-based corporation seeks seasoned individual with 7+ years in DP, 2 of which should include Tech Mgmt. Good planning skills are a plus! Excellent benefits, MBA required! To $60,000

Randy Pace or
Warner Coffman
ROBERT HALF
of St. Louis
7733 Forsyth
St. Louis, MO 63105
(314) 727-1585

MINNEAPOLIS ST. PAUL

DP MANAGER RETAIL ROBERT HALF EXCLUSIVE!

Challenging opportunity at Twin Cities headquarters of industry leader marketing product worldwide. State-of-the-art IBM. Firm expanding Point-of-Sale area. Requires 5+ yrs DP and retail bkgd. S/38 knowledge a plus. Salary $30-45,000

Mark David
or John Miller
ROBERT HALF
of Minnesota, Inc.
3600 IDS Center
Minneapolis, MN 55402
(612) 338-0001

ALBUQUERQUE

PROGRAM/ANALYST

Excellent co offers growth position to DP professional with 3 to 5 years IBM large-scale exp. COBOL, CICS. Financial applications. Salary $30,000

Dick Starnes
ROBERT HALF
of New Mexico
PO Box 3320
Albuquerque, NM 87190
(505) 884-4567

FREE:
Ask for our latest Salary Survey.

SAN FRANCISCO

HARDWARE TECHNICIAN PROGRAMMER

North Bay firm seeks grad working bkgrd on Data General for minor maintenance & repairs. Interest in electronics work: Cabling, wiring & some soldering. Fortran/DG programming on the side. $20s,000

PROGRAMMER ANALYST

City firm seeks 4+ years COBOL progrr: applications, analysis, & documentation. DEC VAX 11/780 preferred to do financial, order processing & distribution. $30s,000

MANAGEMENT CONSULTANT

Firm in NYC & Washington, DC seeks 5+ yrs line management, information systems. Must have advanced degree. Consulting in banking or manufacturing a big plus. Business development. MBA highly desirable. Will relocate. $40-50,000

APPLICATIONS SPECIALIST

East Bay firm seeks 5+ years data communications, project management & coordination. SNA architecture & SDLC protocols. Pick operating sys. Interfacing communications devices w/IBM hosts. Mini exper helpful. 3780 protocol, data-streams & ASYNCH big pluses! Will relocate.

DP MANAGER

City firm seeks 3 yrs RPG/II, heavy IBM S/34. Good management skills! Will relocate. Into $30's

2 SR SYSTEMS ANALYSTS

South Bay firm seeks 10+ yrs in local area networks to eval and conduct trades to select recommended vendors. Must be familiar w/HP & IBM networking capabilities. $40K+

SYSTEMS/ PROGRAMMING/ MANAGER

Firm 2 hrs east of SF seeks 2+ yrs Digital PDP 11/70 experience w/Basic Plus 2, RSTS, MACRO & RMS (Record Management System) to supervise 4 P/As, maintain 300 programs & lead development. $35-35,000

VP MIS

Peninsula firm seeks degree in Bus Admin or CS w/5 yrs min MIS. Systems Analysis and hands on management. Familiar w/COBOL. Honeywell and GESCO preferred. Computer operations and S&L/Banking helpful. Will relocate. $40,000

*Note: Include salary on resume.

Patricia K. Brown
ROBERT HALF
of Northern California
111 Pine Street,
Suite 1000
San Francisco, CA 94111
(415) 434-1900

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

Systems & Applications Programmers

Our vision in office automation gives your career an advantage.

For a century, NCR's foresight has translated into the ability to anticipate market demands... and fulfill them with breakthrough products that redefine the state-of-the-art. Products such as our WorkSaver and a family of multi-function, shared resource systems are making tremendous impact on the office automation industry.

Our advances, marketing savvy, and commitment to R & D put your career in the lead with broad exposure and the opportunity to team up with top-notch systems thinkers at our leading Office Systems Division in Columbia, South Caroline

Distributed Systems Software Development

Including microcomputer operating systems, I/O drivers, distributed Db management systems, SW to control peripheral interfaces, electronic mail SW for UNIX* based systems, networking capabilities, and systems test/integration.

Customer Service Support Center

Provide direct customer support via "800" toll free service including fault isolation, problem resolution in operating systems, systems and applications SW, communications, a variety of SW development tools and vertical market applications.

Third Party Software Acquisition Specialist

Providing third party SW for the Division Marketing organization, including locating, evaluating, negotiating contracts, internal marketing and marketing support.

Qualifications for these positions include BS/MSCS and experience in one or more of the following:

- DbM, DDP
- UNIX*, CTOS, CP/M, MS-DOS
- IMS, CICS, DISOSS, FOCUS
- DISTRIBUTED OFFICE AUTOMATION DATA COMMUNICATIONS, TELECOMMUNICATIONS, SNA
- TECHNICAL SUPPORT TO CUSTOMERS
- MICROCOMPUTER EXPERIENCE
- PASCAL, BASIC, FORTRAN, COBOL, PL/1, AND C
- MICROCOMPUTER SOFTWARE SALES EXPERIENCE

Explore the career opportunities that the $3.7 billion NCR Corporation offers...along with the many attractions of Columbia's sunbelt location. Send confidential resume with salary history to: Gordon Davidson, Personnel Resources, Dept. V56, NCR Corporation, 3325 Platt Springs Road, West Columbia, South Carolina 29169.

NCR

1884-1984
Celebrating the future

An equal opportunity employer

*UNIX is a trademark of AT&T Bell Laboratories

PROGRAMMERS

We have immediate openings for COBOL programmers with 1-2 years experience on an IBM Main Frame System.

The individuals will work on a large applications system under development and must be experienced with OS, JCL, VSAM and structured coding. Send resume to:

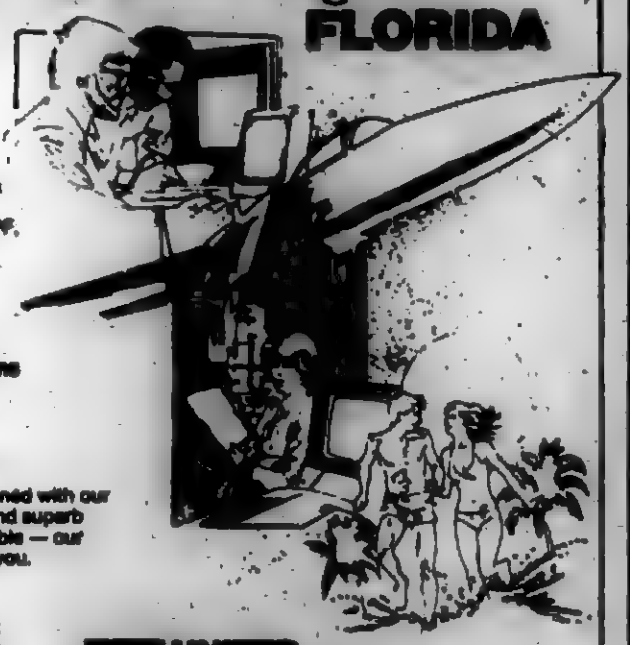
Blue Cross Blue Shield
of Southwestern Virginia
Roanoke

Human Resources Department
P.O. Box 13047
Roanoke, VA 24045
(703) 985-8060

Equal Opportunity Employer M/F/H/D/M/V

PROGRAMMER/ PROGRAMMER ANALYSTS

It's time to migrate to **FLORIDA**



PRATT & WHITNEY is seeking individuals with a Degree in Computer Science or related area and 2-5 years experience with COBOL, IBM JCL, MVS, TSO, SPF, IMS DB/DC on large IBM main frames in the following areas:

- Business Applications
- Data Center Applications
- Operations Analysis
- IMS Data Base
- Systems Programming

The opportunities we offer combined with our excellent South Florida climate and superb recreational facilities are unbeatable — our employees love it here — so will you.

Please send your resume to Professional Placement, P.O. Box 2691, West Palm Beach, FL 33402.

UNITED TECHNOLOGIES PRATT & WHITNEY

An Equal Opportunity Employer M/F

COMPUTER SCIENCE
FACULTY POSITION
Santa Barbara City College
Campus overlooking Pacific Ocean

QUALIFICATIONS: Bachelors degree, Masters preferred, at least two years computer experience, college level teaching experience desirable.

DUTIES: Full time permanent to teach 15 semester units in courses such as Computer Concepts, COBOL, Assembler, FORTRAN, RPG, BASIC, & PASCAL.

SALARY: Competitive; based on academic preparation and experience.

CLOSING DATE: Resume and completed District application required by April 17, 1984.

BEGINNING DATE: September 18, 1984.

Send complete resume to:
Mr. Don Orosz
Santa Barbara City College
721 Cliff Dr.
Santa Barbara, CA 93109

Affirmative action equal opportunity employer

Faculty Position

Computer Science, one and possibly two openings, requires MS or PhD in computer science or PhD in related area with significant computer science experience. Successful applicant will evidence ability to teach undergraduate computer science courses in rapidly expanding program. Participation in student advising and committees; assistance in meeting regional needs; and commitment to professional development are expected. Assistant/Associate Professor. Nine month continuing appointment beginning September 1984. Competitive salary commensurate with experience. Apply to:

Paul Orban
Search Committee
Western Oregon State College
La Grande, OR 97850

May 1, 1984 or until the position is filled.

AA/EOE

SENIOR SOFTWARE ENGINEER - Dev software for oper syste, applications & protocols to be used in Statistical Multiplexers, Node Processors, Protocol Converters, Packet Assemblers/Disassemblers. Liason w/French Company for joint devel of a Node Processor/Statistical Multiplexer. 2 yrs or 2 yrs rel packet switching exp. Mast. or equiv in Electrical Engin. Must have knowl. of common switching & of X.25 & X.75 Protocols. $35,000/yr/40 hrs/5 days/wk. DataSK, Inc., 110 Rockwell Lane, Hauppauge, NY 11788. PLS SEND RESUME.

HOGAN CONSULTANTS

$60K to $80K plus relocation benefits to sunny California. Six openings require 2 plus years in Hogan applications (TDA, DDA, FIPM, etc.) or systems tuning with PEM internals in either CICS or IMS environments.

Dunean White EDP Search
P.O. Box 3678
Culver City, CA 90230
(213) 839-6754

THE UNIVERSITY OF ASTON IN BIRMINGHAM

Computer Centre

Lectureships in Computing and Information Technology.

As a result of continued developments in Computer Science and Information Technology generally, we are seeking to attract young people of exceptional promise for a small number of new appointments. The successful candidates will be required to undertake research and to contribute to the Centre's Teaching Programme.

Ideal candidates would have a higher degree preferably in Computer Science and special experience in either:

(a) Database and Information Systems
(b) Computer Architecture or
(c) Intelligent Knowledge-based Systems

Initial salary will be within and up to the maximum of the range £7,190 to £14,125 per annum. Appointments will commence as soon as possible and will be made for a fixed-term of three years initially with the possibility of renewal or subsequent transfer to a continuing appointment.

Application forms and further particulars may be obtained from the staff officer (Quoting ref:594/244), University of Aston in Birmingham, Gosta Green, Birmingham B4 7ET England (Tel: 21 359 3611 ext. 4684).

Closing date for the receipt of applications is April 27, 1984.

COMPUTING POLICY POSITION

UNIVERSITY OF CALIFORNIA, BERKELEY

ASSISTANT VICE CHANCELLOR-

INFORMATION SYSTEMS AND TECHNOLOGY

Newly created position--responsible for formulation and evaluation of policies for development and management of all campus information and computing systems, services, facilities and networks. In coordination with the administration, select and implement such policies. Supervise administration of campus computing facilities. Provide liaison between segments of the computing community, the administration, and external agencies.

Qualifications: Demonstrated managerial skills in diverse computing environment within a university or academic research setting and thorough knowledge of computing and networking systems. Ph.D. or extensive experience in related field required--eligibility for faculty position strongly preferred. Salary commensurate with experience.

Position available July 1, 1984. The deadline for applications has been extended from March 1, 1984 to April 1, 1984. Send full professional resume and five references to Chair, Search Committee, Office of the Vice Chancellor-Research, 200 California Hall, University of California, Berkeley, California 94720.

The University of California is an Equal Opportunity, Affirmative Action Employer

DATA LINK

COME TO NEW ENGLAND

and see what we have to offer!

New England has skiing, sailing, mountains, beaches, a Courier and has atmosphere, and a professional climate that is very exciting; i.e., PIA's, S/P's, SW Eng's with experience in PDP, INTEL, HONEYWELL, IBM, WANG, A UNIX, C and graphics background is also desirable.

Send us your resume or call, and let DATA LINK introduce you to New England.

Our list of client companies is endless, and all fees, interviews and relocation expenses are paid by our clients.

DATA LINK
National Recruiting Consultants
Exeter Professional Building
Hampton Road, Exeter, (NH office)
(603) 772-5422

SYSTEMS PROGRAMMERS MVS

Fast growing Maryland suburban data processing services company needs an organized, fast learning, technically smart senior systems programmer who knows MVS 3.8 and JES-2. The person we want will be excited to join us and help us grow into a major provider of services. We are prepared to pay a competitive salary and offer the right person an almost unlimited chance to grow, both professionally and personally. For immediate consideration, send your resume with salary requirements to:

CW-8482
Computerworld, Box 880
Framingham, MA 01701.

SERVICE MERCHANDISE
AND
NASHVILLE, TN

A great combination of an EXPANDING, PROFESSIONAL, FRIENDLY FORTUNE 500 Corporation and major SUNBELT City with varied recreation, LOW COST OF LIVING, and NO STATE INCOME TAX.

SYSTEMS ANALYSTS (PROJECT LEADERS)

REQUIREMENTS
- 4+ years total experience
- 3+ years project leadership

THE POSITION:
- New Systems Development
- Varied applications
- Supervise 2-10 professionals
- No Coding

PROGRAMMER/ ANALYSTS

REQUIREMENTS
- 4+ years COBOL-or-BASIC
- Database experience

THE POSITION
- Development and Maintenance
- Varied Applications

Our MIS area is a DYNAMIC and INTEGRAL team offering: CAREER GROWTH PLANNING, COMPETITIVE COMPENSATION, OUTSTANDING BENEFITS, and PAID RELOCATION.

IMMEDIATE CONSIDERATION
800-541-8632

C.R. WEDLER
Manager, MIS Recruiting
P.O. Box 24600 (SA)
Nashville, TN 37202

EOE M/F/H/V

The Network of Tomorrow... Today at UNINET

While other companies are anticipating and planning for tomorrow, we are already there.

UNINET, a UNITED TELECOM company, is offering true state-of-the-art opportunities in the further development of our Fourth Generation Public Data Network. This network employs a fully distributed microprocessor architecture based upon 80186 and 80286 processor modules in a four-level bus hierarchy.

We offer the unique opportunity to apply your expertise in support of the design and development of a Public Data Network that achieves sophistication in high-level protocols and data switching rates unattainable under previously available technologies. We see this as a major breakthrough in providing a practical solution to today's business communications problems.

NETWORK SCIENTISTS

Immediate opportunities for applied research exist in the areas of:

- **Packet and message switching strategies**
- **High-level network protocols including routing and congestion**
- **Incorporation of satellite facilities into backbone services**
- **Evaluation of theoretical topologies**
- **Analysis of algorithms**
- **Network management and control**
- **Protocol translation schema**

UNINET offers an environment which encourages creative applied research and development addressing the most current opportunities in data networking. Candidates possessing advanced degree in Computer Science and Mathematics with significant experience in network architecture and network design are encouraged to apply.

DATA NETWORK SOFTWARE ENGINEERS

Immediate opportunities exist for the development of:

- **Network Configuration and Control Systems (VMS)**
- **Network and Access Control Systems (RMX)**

Candidates should have a strong background in the implementation of CCITT packet network protocols or network management and control protocol. Applicants desiring positions in network access engineering should possess detailed knowledge of X.3, X.28, X.29 and X.25 as well as synchronous DTE protocols. SNA experience is considered desirable. Degreed computer scientists with formal software engineering experience are encouraged to apply.

SALES REPRESENTATIVES

Positions require a proven track record in sales of data communication or time sharing services, or computer hardware and software to Fortune 1000 companies. A generous compensation package insures that you will be compensated in direct relation to your efforts.

All positions require an energetic, entrepreneurial spirit which will be recognized and rewarded. A background in communications coupled with excellent written and verbal skills and a BS or BA degree will qualify you for these opportunities. An MBA is preferred.

Positions currently available in San Jose, Los Angeles, Minneapolis, Houston, and New York in addition to Kansas City.

MANAGER, BUSINESS PLANNING

This key management position requires an extensive background in marketing, strategic planning, financial analysis and management, in addition to:

- **Technical Bachelor's Degree (BSEE, Math, Engineering)**
- **MBA (Finance, Economics, Marketing)**
- **Excellent written and verbal communication skills**
- **High Technology industry experience (communications)**

Your primary responsibility will be to serve as the catalyst for developing short and long range business plans and strategies. Major emphasis will be placed on the ability to bring your technical expertise in the communication industry to the planning process. Skills in acquisition and joint venture analysis are essential, as is the ability to coordinate effectively with other operational units. This is a highly visible position, with responsibility for the design and implementation of strategic plans which will positively impact corporate revenues and profit growth.

INTERFACE '84 ATTENDEES...

Call Us During INTERFACE '84 In Las Vegas To Schedule Your Interview...

(702) 798-3488

Our representatives will be in Las Vegas during Interface 84 to identify and interview the most talented candidates for our diverse opportunities. Even if your expertise lies in another area of data communications or computer networking, we should discuss our current openings. Call UNINET in Las Vegas any time, from Sunday, March 11 through Thursday, March 15.

If you feel your qualifications can contribute to the further development of our network, forward your statement of qualifications in confidence to:

UNINET, INC.
A United Telecom Company
Attn. Cheri McDougall/Dept. CW-3
10951 Lakeview Avenue
Lenexa, Kansas 66219

An Equal Opportunity Employer

UNINET

Associate Director for Academic Computing

Applications are invited for the position of Associate Director for Academic Computing. Reporting to the Director of Computer Services, the Associate Director is responsible for long range hardware and software planning and implementation for academic computing facilities and for providing consulting services and training for faculty development of academic computer projects. Other duties include: assisting in the development of grant applications for computer-related projects; acting as a liaison between faculty and the Director of Computer Services; providing supervision for the staff supporting the Academic Computer; responsibility for budgeting and ordering supplies for the Academic Computer Facility. Qualifications: Bachelor's degree in computer science, mathematics or other pertinent field plus three years teaching experience and 1 - 2 years experience in academic uses of computers. Master's degree may be substituted for equivalent experience. To guarantee consideration, applications/resumes must be postmarked on/by March 28, 1984. Please respond to: Director of Personnel Services, Hudson Valley Community College, 80 Vandenburgh Avenue, Troy, New York 12180.

AFFIRMATIVE ACTION/EQUAL OPPORTUNITY EMPLOYER

Tenure-Track Assistant/Associate Professor

PhD in Computer Science or related field. Candidate with Master's degree in Computer Science with appropriate industry experience will be considered. Previous teaching and/or industry experience are considered assets. Applicants should possess the ability to instruct in some of the following: Programming Languages (Assembler, BASIC, FORTRAN, PASCAL, PL/1), Computer Technology, Operating Systems, Software Design, Computer Architecture, Data Structures, and Artificial Intelligence. Position is for September 1984. Applications deadline March 28, 1984. Salary ($24,000-$32,000) dependent upon qualifications. Send letter of application, resume/vita, and three letters of recommendation to: Dr. Charles F. Collins, Dean of the Faculty, Cornell College, Mt. Vernon, IA 52314.

Cornell College is an Equal Opportunity Employer

EMPLOYMENT SERVICE FOR PROGRAMMERS AND ANALYSTS

National Openings With Client Companies and Through Affiliated Agencies

Scientific and commercial applications • Software development and systems programming • Telecommunications • Control systems • Computer engineering • Computer marketing and support

Call or send resume or rough notes of objectives, salary, location restrictions, education and experience (including computers, models, operating systems and languages) to either one of our locations. Our client companies pay all of our fees. We guide; you decide.

RSVP SERVICES, Dept. C
Suite 700, One Cherry Hill Mall
Cherry Hill, New Jersey 08002
(609) 667-4488

RSVP SERVICES, Dept. C
Suite 211, Dublin Hall
1777 Walton Rd., Blue Bell, PA 19422
(215) 629-0585

From outside New Jersey, call toll-free 800-257-8787

RSVP SERVICES
Employment Agents for Computer Professionals

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

COMPUTER NETWORKING AND COMPUTER SECURITY

The Los Alamos National Laboratory has several challenging career opportunities for Computer Scientists/Engineers in the areas of computer networking and computer security.

- **Scope of Work:**

  Design and develop network control and communication software. Specific areas include network gateways, local area networks, high-speed packet switching, terminal concentrators, secure communications. Work to resolve security problems in the area of networks, communications, and related areas.

- **Requirements:**

  Demonstrated professional experience in computer networking, operating systems, or computer security. These positions are for individuals who are able to work and communicate effectively in a team effort, require a minimum of supervision, and are highly motivated. B.S. degree in computer science or equivalent education and experience will meet minimum educational requirements.

- **Position Offers:**

  Competitive salaries and fringe benefits, including 24 days annual vacation; 18 days annual sick leave; 11 paid holidays; medical, dental, and retirement programs.

  The Los Alamos National Laboratory is located in the mountains of northern New Mexico, at an elevation of 7400 feet. The living is uncrowded, casual, and pollution-free. The sunny climate is superb; cool summers and mild winters. Los Alamos has an excellent school system and ample recreational opportunities.

To apply, send resume in confidence to:

Tim Merrigan, Div. 84-W
C-5, MS-B255
Los Alamos National Laboratory
Los Alamos, New Mexico 87545

University of California

U.S. Citizenship is required.

LOS ALAMOS

An Affirmative Action/Equal Opportunity Employer.

PROGRAMMER/ ANALYST

"New Systems at UConn
—Join Us—
Be Part of Our New Team"

The Department of University Computer Systems is seeking highly qualified individuals with state-of-the-art experience in designing, developing and maintaining on-line systems using IBM's CICS software; design computer forms, set-up computer job runbooks, and computer operations procedures; review all systems changes and schedules for offices; design and coordinate user system control functions with user departments and data processing operations; provide technical support to user departments and Computer Systems staff. Minimum qualifications: Bachelor's Degree in related field. Additional background desired: Three (3) years of programming and systems development experience in on-line systems. Salary range $18,000 to negotiable. Apply to:

Mr. Malcolm Teed, Director
Department of
University Computer Systems
Math Sciences Building

UNIVERSITY OF CONNECTICUT

Box U-139, Storrs, CT 06268
Applications will be considered as of March 16, 1984
AA/EOE (Search #3724/3748)

COMPUTER SCIENCE POSITION

Tenure track position beginning August 24, 1984. Master's degree in computer science or related field required. Must be able to teach upper-level courses in a newly formed computer/information science curriculum. Preference will be given to persons with business computing experience. Send resume and names of three references to: James E. Williamson, Department of Mathematics & Computer Science, University of Dubuque, Dubuque, IA 52001. Closing date: April 1, 1984 or until position is filled. An Equal Opportunity Employer.

HP-3000
SENIOR SYSTEMS DESIGNER

Our client, a Fortune 100 manufacturer, has given us an exclusive assignment to locate a Senior Systems Designer to direct the installation and enhancement of the MANMAN manufacturing system. Additional responsibilities include the implementation of a data collection system using bar codes and the selection of various software packages. Some international travel will be required. Qualified applicants will have several years of experience on the HP-3000 in a manufacturing environment with knowledge of IMAGE and VIEW.

For additional information regarding this position, as well as others around the country involving HP-3000 expertise, call Mr. Lee Martin:

(804) 499-2666 or
Forward Resume to:

Fortune

Personnel Consultants
of Virginia Beach
819 South Independence Blvd.
Virginia Beach, VA 23452

WASHINGTON, D.C.

EQUITY + UNIX

Well financed start-up co. seeks nationally recognized UNIX systems programmer. Hands on design and implementation essential! Will manage ten. $150K package.

ROBERT HALF

ROBERT HALF OF WASHINGTON, INC.
7316 Wisconsin Ave. Ste 401
Washington, D.C. 20014
(301) 652-1600

Data processing

MVS SYSTEMS PROGRAMMER

CPHA is a growing, dynamic organization developing innovative technology and offering dependable services to meet the health industry's rapidly changing needs. CPHA offers a broad spectrum of data processing services, data management products and data bases dedicated to the improvement of hospital and medical care.

We are currently seeking individuals with state-of-the-art skills in MVS and telecommunications to assume a leadership role in these areas and assist in designing our network. Experience with MVS/SP 1.3 sysgens and performance tuning, along with NCP and VTAM support under SNA, would qualify you to work in our large scale IBM shop with two processors sharing over 24 gigabytes of DASD.

We are located in Ann Arbor, Michigan and offer a competitive salary and company paid benefits. If you are a highly motivated individual who would like the challenge of working in this rapidly evolving team environment, send resume in confidence to the address below. *Principals need only apply.*

CPHA

CPHA
1968 Green Road
P.O. Box 1809
Ann Arbor, MI 48106

Equal Opportunity Employer M/F/H/V

[redacted]

It's a Breakthrough! ...In Systems and Careers.

[redacted]

The Hospital Patient Management System of Dynamic Control represents a breakthrough in hospital information control. Our resulting success can represent a breakthrough in your software career if you qualify to join us.

PROGRAMMERS PROGRAMMER/ ANALYSTS – Make the most of your experience in RPG II on System/3 or System/34 or RPG III on System/38 in an interactive on-line environment. We require a minimum of 2-3 years programming experience.

Positions available in Development, Installations, Pharmacy, and Customer Support.

FINANCIAL INSTALLERS – You will work with hospital financial staffs to assist with the installation of automated financial and accounting systems. Other duties will include training of hospital personnel and systems modifications. Two-three years accounting experience and/or financial implementation of automated systems is required.

Meeting new challenges and finding solutions takes the ability of a skilled professional. In accordance, we provide an excellent salary, complete benefits, RELOCATION ASSISTANCE, and opportunity for further professional advancement. To apply, please call Personnel, TOLL FREE, 1-800-327-5352, or from within Florida, call COLLECT 305-671-6453. If unable to call, send resume to: Personnel Department, 1311 S. Semoran Blvd., Winter Park, FL 32792.

Dynamic Control

A division of Transnet Laboratories, Inc.

An Equal Opportunity Employer M/F

$80,000/YR.—CICS PROGRAMMING

Acquire one of the most demanded & rewarding programming skills in months instead of 2 years! A complete & practical guide to CICS Command Level Programming. It's based on CICS latest release 1.6, written on COBOL, with special emphasis on VSAM. Brand-new 2nd edition, contents printed in two colors, handsome mylar-coating cover. 150 examples illustrate use of CICS commands. 15 complete CICS programs address all major applications. Sample programs include: Menu, Add, Update, Delete, Browse, Multi-record display-update, Print 24x80, 66x132, any-page report, Message Routing, Screen Refreshing, VSAM alternate index design, setup and handling, Dynamic table manipulation, Audio Tape Initiation and more.

Still, more coding—and more

It's hard to believe the learning can be so easy until you try it. In hours you can start creating Shell mode. In days, you can start writing Pseudo Conversational CICS programs. You'll cut your learning curve at least in half: many programmers report even greater saving. Some CICS techniques are especially hard. When you're stuck for the technical problems, you'll be thankful you have this book. All CICS techniques and problem areas are thoroughly covered. You'll find the topics on Production abend handling, Task system debugging, Dump reading, Trace table usage, CEDF monitor, CSMT, CEMT commands, CICS external tables setup & effects on application programs, Terminal Paging commands, complete procedures to install a CICS transaction and more. Why spend hours searching for the right technique — when this book gives them to you already written.

Tips on moonlighting on CICS projects

Consulting will be the trend of the 80's for CICS due to great shortage of experienced CICS programmers. An average CICS contract programmer makes $30-$45/hr. Some CICS consultants even make $1400/day (9-10 Datamation). Moonlighting on CICS projects is very rewarding. A typical 10-person system can mean $15,000-$25,000 cash. This book contains 11 pages of tips on moonlighting: how to market your service, locate the contracts, write a proposal, make a presentation, quote the right price to beat consulting firms and draw a contract agreement without a lawyer. Written proposal & sample contract agreement are included for your convenience.

Try this book at no risk

How much is this book worth to you? It's hard to say until you try it. That's why we want you to use it for 10 days. If you're not completely satisfied, simply return it at our expense for a prompt full refund. Fair enough? Thousands of copies have been sold. Over 99% of programmers who bought this book are satisfied with it. Say how much time it saves you. How it leads you to the gold mine of programming. That's how sure we are that once you use it, nothing could make you part with it. This book will pay for itself over and over, year after year. But act now. Send $34.95 for 1, $29.95 ea. for 2, $27.95 ea. for 3, $25.95 ea. for 4 & over (plus $2.00 copy for P&H) in check or M.O. to: CCD Online Systems, P.O. Box 797756, Dallas, TX 75379. Allow 1 to 2 weeks for delivery.

Grinnell College Computer Services has an immediate opening for a full time Director of Administrative Computing. Duties include meeting the computing and information needs of the administrative offices. Must understand computer hardware, software systems, information management and office automation. The director will supervise the administrative programming staff and work with a diverse user clientele. Knowledge of DEC VAX or RSTS systems preferable. Knowledge of the FOREE data management system and DEC micro computers helpful. Application deadline: March 23, 1984. Send application letter, resume and names of three references to: Malcolm J. Sherman, Director of Computer Services, Grinnell College, Grinnell, IA 50112-0810. *Grinnell College is an equal opportunity/affirmative action employer and especially seeks women and minority candidates.*

TECHNICAL STAFF (1)
Interactive Computer Graphics Laboratory

Position available for highly experienced APL and Graphics Programmer. Familiarity with APL 2 and some procedural languages desired particularly Fortran and Pascal. Must be proficient in the use of VM/CMS and word processing programs like Script.

This job will involve developing 3-dimensional graphics software system for advanced technology graphics devices. Experience in this area and an interest in the human factors of user-computer interface is highly desired. Much of the development will involve state-of-the-art software concepts and must generally be written in APL 2. A strong mathematics background is recommended and a Bachelor's degree in a related field is required.

Please send resume to:

MR. KIRK ALEXANDER
APL & Computer Graphics Research
I.C.G.L. Engineering Quadrangle
PRINCETON UNIVERSITY
Princeton, New Jersey 08544

An Affirmative Action/Equal Opportunity Employer

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

PROJECT LEADER
positions now open...with
FORMATION.

Our growth continues in design, sales and support of software systems for manufacturing and other applications—including our own acclaimed MRP II system, **FORMAIR**. This software tool gives the manufacturing manager an on-line system to control inventories and workplace and production costs. This is a new system, developed with the latest technology including Virtual Operating Systems and Database Managers. **FORMAIR** runs on any 370, 43XX, and 30XX-compatible computer, such as our own F4000, a 32-bit minicomputer. *We have immediate openings in the Philadelphia area for:*

Senior Project Leaders

Your ability to display initiative, your strong technical background, and your management skills in scheduling, organizing, problem-solving, and personnel management are needed for project leadership. You will need experience in developing a wide range of applications projects, preferably financial & manufacturing, using interactive Database systems in an IBM 370 systems environment.

These openings are immediate, and offer excellent compensation and benefits plus a results-oriented, totally professional climate. *You'll enjoy the opportunity for contribution and individual development not often found in a major firm.*

If you feel qualified and are interested in arranging a local interview with appropriate management, send your resume, complete with salary history, to: **Vice President of Personnel, FORMATION, 823 East Gate Drive, Mt. Laurel, New Jersey 08054.** An equal opportunity employer M/F.

formation®

FIELD ENGINEERS

Dataserv Computer Maintenance is expanding nationwide. We now have immediate openings in major cities and will be adding more in the near future.

These are key positions and provide excellent opportunities that will lead to further promotion in a fast growing company. Excellent compensation plan and good fringe benefits for experienced individuals. Your potential for personal advancement with a $100 million plus company is the greatest right now as we expand.

We now have an immediate opening in:

Omaha, Nebraska - Customer Service Representative required for a large data center with IBM 3033 Mainframe. Experience on 3420's, 3350's and printers essential.

Dataserv will soon have additional opportunities for field engineers and technical specialists in several other major cities throughout the United States. If you are considering a change in employment, contact Dataserv for a review of what we have to offer.

For immediate consideration and more information call **Toll Free — 800-328-6729** or send your resume to: **Bev Walters, Dataserv Computer Maintenance, Inc., P.O. Box 3003, Hopkins, MN 55343.** We are an equal opportunity employer and all inquiries are considered confidential.

dataserv

OFFICE AUTOMATION PROFESSIONALS

Technology Planning/Analysis/Design

SOHIO's Cleveland Data Center supports 15 multibusiness users of 50 distributed mini/micro stand-alone computer systems. This includes 30 distributed shared logic systems and 250 computer workstations. To provide our clients with advanced technological products, we need technology planning and analysis/design professionals.

MICRO-COMPUTER SPECIALISTS ■ IBM PC and COMPAQ required ■ HP or DEC helpful ■ Micro-computer communications experience — micro to mainframe required; micro to micro, micro to mini, Local Area Network desirable.

OFFICE AUTOMATION GENERALISTS ■ Integrated Software package experience required ■ Broad mini-computer experience a must ■ Voice store-and-forward, Electronic Mail, and word processing experience helpful.

Major responsibilities:
- Technology tracking and planning
- Hardware/software evaluation of multivendor distributed computing products
- Development and maintenance of products designed to improve productivity and reduce costs

BUSINESS SYSTEMS DESIGNERS/ANALYSTS ■ 3-5 years' combined experience in distributed mainframe and mini/micro technologies ■ Knowledgeable in a wide range of information processing technologies.

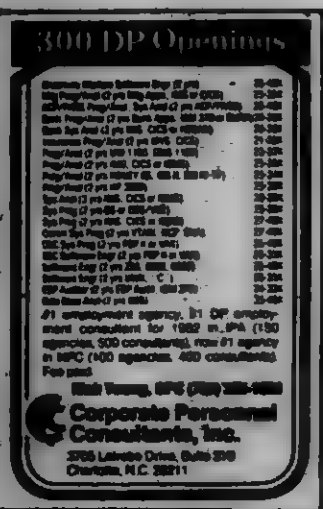
Major responsibilities:
- Analysis of user problems/needs
- Design/development of successful business solutions
- Ongoing self development/training to enhance professional expertise

SOHIO offers a highly competitive salary reflecting your individual experience, an excellent benefits package, and a working environment suited to personal and professional growth. **Our comprehensive relocation package for new hires includes all normal moving expenses. Homeowners also qualify for mortgage interest differential allowance, third party home purchase and other features typically restricted to internal transfers.**

Take the first step in joining one of the nation's most successful business entities by sending your resume detailing your education, experience and abilities, in strictest confidence to:

Ms. Jean Heflich, Senior Executive Recruiter
THE STANDARD OIL COMPANY (Ohio)
1424 Midland Building — 617CW • Cleveland, Ohio 44115
An Equal Opportunity Employer M/F/H/V
NO THIRD PARTY INQUIRIES, PLEASE.
"Help us Help to Assure America's Energy Future"

SOHIO



POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

MEANINGFUL INFORMATION.

That's what ENHANSYS is all about. Founded in September 1982, we are a well-financed software company in the exciting field of interactive computer languages, working with a customer base of Fortune 500 accounts. Our system provides a friendly interface to a wide range of tools useful in data acquisition, manipulation, analysis and presentation. High-visibility, great growth potential, and plenty of challenge await you in this ground floor opportunity.

Sr. Salesperson

You will:

- assist in meeting sales goals
- set sales strategy
- provide follow-up customer support
- handle other marketing/sales functions

Ideal candidate will possess a college degree or equivalent and 5+ years of direct sales experience, preferably in the computer field.

Field Software Specialist

You will:

- provide technical support for product marketing
- provide technical field support to customer base
- make technical sales presentations

Ideal candidate will possess a college degree or equivalent, 3-5 years of direct data processing experience, with a background in IBM/VM or DEC environment. Previous SE experience is a definite plus.

At ENHANSYS, we are a people-oriented company that offers a solid compensation and benefits package, as well as a stock purchase plan. Now it's up to you.

For immediate consideration, please forward your resume to: Human Resources, ENHANSYS, INC., 20111 Stevens Creek Blvd., Cupertino, CA 95014; (408) 255-2920. We are an equal opportunity employer.

THE INTELLIGENT DECISION:

ENHANSYS INC.

MANAGER OF ACADEMIC COMPUTING

The University of Nebraska Medical Center has an opening for Manager of Academic Computing. Manages the Academic Computing Group in providing consultation and participate for computer-related projects that support the instruction and research activities of the campus. Requirements include: Bachelor's degree and 5 years of professional experience in computing development, supervisory experience, a working knowledge of mainframe and distributed systems, a familiarity with various methods of data communications, good communication skills and a strong history of project development and implementation. Direct experience in applications, research and/or health care settings and a master of science degree in mathematics, statistics, a health science field, or a computer-oriented scientific field is preferred. Qualified applicants should submit resume to:

Department of Human Resources
UNIVERSITY OF NEBRASKA MEDICAL CENTER
[illegible]
Omaha, Neb. 68105

An Equal Opportunity Employer M/F/H/V

Market Planning Analyst

Salary $30,000-$35,000 Per Year

40 Hour Week

Opening for person who would be responsible to develop and utilize statistical models of performance and use such models and other decision systems to analyze marketing, promotional and distribution programs and evaluate their potential benefits; to develop systems to monitor retail performance and develop, coordinate and maintain the data bases necessary for use in the systems; to assist in the development of product plans and strategic business plans; and to conduct special analyses of retail and service outlets.

Requirements are one year of experience involving creative business/economic analysis and computer programming in a technical or business environment; an MBA degree with at least three courses each in finance and statistics; and must be technically proficient in applied business statistics and be able to program PL/I.

Send resumes with transcripts of MBA courses attended to: The Ohio Bureau of Employment Services, 3100 Euclid Avenue, Cleveland, OH 44115, to the attention of Ms. Mildred Bradd, Order Number 4389868.

SOFTWARE ENGINEERS

Join a company which is experiencing a growth rate of 700% each year. Salary and compensation packages are above average to match the expertise of our staff.

If your background fits one of the following categories, please send us a resume:

...no entry level positions available at this time.

- TYMNET X25 IBM PROTOCOLS
- IDMS/UNIVERSE
- CICS COMMAND/MACRO
- PDP 11 RSTS
- VAX/VMS/DECNET
- C/BASIC/PLUS, PASCAL

VERTEX SYSTEMS CORP.
10 East 21st Street
New York, NY 10010

HP 1000 SENIOR PROGRAMMER

Outstanding Growth Opportunity

FORTRAN REQUIRED

Assembler A Plus

Realtime Applications

Send resume w/salary history to:

Vice President Computer Systems
P.O. Box 13429
Orlando, FL 32859

SYSTEMS AND PROGRAMMING MANAGER

Expanding central New Hampshire life insurance company has an exciting employment opportunity for a Systems and Programming Manager.

Qualified applicant must possess a college degree and/or equivalent experience, plus 5-7 years of data processing experience primarily in a large IBM MVS environment, and a minimum of 3 years experience in a DP management position.

Interested applicants should forward resume and salary requirements to Angela Flower, Human Resources Department, Chubb Life[illegible]

"BETTER YET CONNECTICUT"

SYSTEM 36 PROGRAMMER ANALYSTS

Numerous opportunities in Connecticut area with 1+ years Sys. 36, RPG III experience. Good benefits, attractive salaries, excellent advancement potential. For immediate confidential consideration call 203-547-0010 or forward resume to: POSITIONS, INC., 59 Washington St., Suite 1401, Hartford, CT. 06106

INFORMATION CENTER (IC) SPECIALIST

N.A.P. Consumer Electronics Corp. (manufacturers of Magnavox, Philco and Sylvania audio/visual products) has an immediate opening for an Information Center (IC) Specialist to establish and manage the IC for our company. The nucleus of the IC will be financial modeling software (FCS/IDS, by EPS, Inc.) and personal computers. Successful candidate will:

- Have an in-depth knowledge of data processing equipment, systems and procedures.
- Be able to relate well with users and instruct users both individually and in classroom settings.
- Have the working knowledge of FCS/IDS, CMS, graphics and PC software.
- Troubleshoot users programs.

Position will be located in our Knoxville, Tennessee office.

This position offers above average salary, excellent benefits and growth opportunity. For immediate consideration, forward your resume and salary history in confidence to:

Employment Manager
N.A.P. CONSUMER ELECTRONICS CORP.
P.O. Box 1210
Greeneville, Tennessee 37744-1210

NAP CONSUMER ELECTRONICS CORP.

SYSTEMS PROGRAMMERS

MORE OPENINGS THAN WE CAN FILL for qualified Systems Programmers with experience on large scale IBM computers. Several locations in Florida, Texas, Atlanta, Belgrade and the Carolinas. Company clients vary from nationally known firms to rapidly growing local and regional companies. All have state-of-the-art installations and are expanding rapidly. Companies are more than willing to pay fees, relocation and interview costs, etc. Their benefit programs vary but are all considerably better than average. We Recruit:

PROJECT LEADER - HEAVY MVS/XA	TO $75K
SR. SYSTEMS PROG. - MVS	TO $45K
SOFTWARE SPECIALIST - MVS	TO $45K
IMS DC SYSTEMS PROG	TO $42K
MVS/SP JES2 SYS PROG	TO $38K

SEND YOUR RESUME TODAY TO

Steve Stevenson, Partner
Jim King and Associates

1049 Gulf Life Tower/Jacksonville, Florida 32207
(904) 399-7371

JAMES COOK UNIVERSITY OF NORTH QUEENSLAND FOUNDATION PROFESSOR OF COMPUTER SCIENCE

The Commonwealth Government has approved of special funding to enable the University to expand its program in Computer Science and to establish a Department of Computer Science within the Faculty of Science with effect from July 1, 1984.

Applications are invited for the position of Foundation Professor of Computer Science. The appointee will also be Head of the new Department of Computer Science.

The appointee will be responsible for the development of undergraduate and postgraduate programs in Computer Science and will be expected to provide guidance on the integration of these programs with existing programs in the University.

The salary for the position of professor is currently A$45,827 per annum, and in addition a locality allowance will be payable at the rate of A$1,455 per annum for a staff member with dependants (as defined) or A$649 per annum for a staff member without dependants.

Further information may be obtained from the Registrar, James Cook University, Townsville, Qld 4811, Australia, with whom applications close on April 30th, 1984. In reply please quote Reference No. 84027.

DATA PROCESSING

We are searching for experienced, enthusiastic individuals who wish to contribute to an active, progressive data processing team. If you are self-motivated, career-oriented, and possess the following qualifications, we would like to hear from you.

SYSTEM PROGRAMMER

Applicants should have 2-3 years experience in System Programming and degree in Computer Science. Will have primary responsibility for the implementation, table generation, table maintenance, and tuning of multiple IBM CICS/VS data communications environments. Must have knowledge of VM/SP and DOS/VSE operating systems. Hardware environment consists of 4341-12 and 4381-2.

Excellent benefits and salary. Send resume and salary history to:

Attn: Personnel Department
(NO TELEPHONE INQUIRIES, PLEASE)

Liggett & Myers Tobacco Co.

P.O. Box 1572, Durham, NC 27702
An Equal Opportunity Employer

ATTN: IBM DP MANAGERS

Earn extra consulting income. Will not interfere with present employment. Reply in confidence:

Mr. Lee
(800) 554-8888
AK, HI, GA
Call Collect
(404) 955-5851

PROGRAMMER/ANALYST

St. John's University is seeking an experienced Programmer/Analyst for the Administrative Computing Center. Individual will have responsibility for developing applications using total DBMS, structured COBOL, and related software products. The University utilizes Harris processors, and a variety of data entry terminals and word processing equipment. Requires a B.S. in Computer Science, Data Processing or related field and at least three years experience in data processing using COBOL preferably in a higher education environment. Salary commensurate with qualifications ranging from $22,000-$30,000. Applications received after April 1, 1984 cannot be guaranteed consideration. Women and minorities are encouraged to apply. Send resume to: Director of Personnel Services, St. John's University, Collegeville, MN 56321.

Data Processing

SOFTWARE SYSTEM ARCHITECT

Transaction Technology Inc., a wholly-owned subsidiary of Citicorp, seeks a Software System Architect to lead high level design efforts.

Qualified candidates will have had experience with large scale transaction processing systems and have had significant experience in several of the following areas: Distributed Processing, Operating Systems, Communications Networks, Database Management Systems, and Applications Systems. Familiarity with large scale IBM systems is desirable.

Key responsibilities will include defining and evaluating the architectural alternatives, integrating current and emerging technologies into the design effort, and evaluating strategies for architectural evolution.

We reward our employees with a strong salary and a comprehensive benefits program including unique financial services and education assistance. For immediate consideration, please send resume with salary history to:

TTI TRANSACTION TECHNOLOGY INC.
Department 133 NS
3100 Ocean Park Blvd.
Santa Monica, CA 90405
A Subsidiary of CITICORP
Equal Opportunity Employer

Data Processing Professionals— Come Grow With Westinghouse!

Are you looking for an opportunity that will let you realize your potential career growth? Then it's time you grew with Westinghouse!

The Westinghouse Defense and Electronics Center located near Baltimore Washington International Airport and in Columbia, Maryland are rapidly becoming the most exciting data processing complex in the Mid-Atlantic area. In current use are IBM 3083's, NAS AS/8000's, Univac 1100-84 mainframes, distributed IBM 4341's, HP 3000's and 1000's, VAX 11-780's, DPI 150's, and small business and personal computers. The near future will bring distributed processing, satellite and broadband communications, and distributed data base design.

Westinghouse, the largest private employer in Maryland, has long been a leader in computer technology and is committed to maintaining this position with a multi-billion dollar backlog. We're growing. And so will you when you become a Westinghouse professional!

The following opportunities are available:

Data Base Analysts
At least 4 years data processing experience in an IMS DB-DC environment with a minimum of 2 years experience as a data base analyst is required. Contact Les Caraher at (301) 765-0298.

MVS Systems Programmers
Minimum of 2 years experience with IBM MVS as a systems programmer (preferably with SMP and VSAM) is required. Contact Bill Murray at (301) 765-3208.

Production Control Shift Supervisors
Minimum of 3 years in production control (preferably as a DP shift supervisor responsible for job processing and recovery). Good oral, written, and user-client skills are necessary. Contact Don Miles at (301) 765-6459.

Production Support Analysts
Accomplished in defining, documenting, and enforcing DP production standards as well as control and recovery functions in a large scale Univac or IBM environment. Minimum 3 years DP experience. Contact Don Miles at (301) 765-6459.

U.S. citizenship is required for all positions.

Your knowledge and expertise will be rewarded with an excellent salary and comprehensive benefits package which includes a 100% tuition refund program.

If you qualify for any of the above positions, we want to hear from you! Call the Data Processing supervisor listed above (collect), Monday-Friday, 9am-Noon.

If you are unable to call, send your resume, stating present salary and area of interest to: R.A. Richmond, Westinghouse, Dept. CW312, P.O. Box 1693, Baltimore, Maryland 21203.

An Equal Opportunity Employer.

You Can Be Sure If It's Westinghouse

Westinghouse

SOFTWARE SYSTEMS ENGINEERS

San Francisco Peninsula

Be a key member of a first rate R&D team and assume one of the following high visibility positions. Your efforts will be focused on our latest product development: The BTI 8000 32-bit supermini multiprocessor system with exclusive Variable Resource Architecture. As an experienced computer industry professional, consider these opportunities:

Transaction Processing System Designer

Your responsibilities will be to design and implement state-of-the-art data base transaction processing. You should have at least 7 years of experience in software engineering with 3 years of design experience in this area of concentration. Good written and verbal communication skills are a must. BSCS or equivalent.

Data Communications Designers

Senior and Intermediate Software positions are available to design and implement the monitor and protocol software for a 68000 based intelligent communications controller. The senior position requires at least 6 years experience with emphasis in SNA/SDLC. The intermediate position requires a minimum of 2 years experience. In both positions, knowledge of real-time monitor construction is a plus.

BTI offers a highly competitive salary and benefits package which includes profit sharing, stock options, flexible working hours, 34 paid days off each year, an informal working environment and much more. For immediate consideration, please send resume with salary history to Professional Employment, Dept. CW, BTI Computer Systems, 870 W. Maude Avenue, Sunnyvale, CA 94086. An equal opportunity employer.

BTI COMPUTER SYSTEMS

"Two programmers needed to work for software development company in Austin, Texas to design communication software systems & sub-systems to solve problems associated with computer networks. Plans, implementation of these systems. Develops, debugs & tests systems. Prepares technical reports & documentation associated with these & other communication systems. Provides technical leadership to less experienced programmers. Knows & utilizes top down structured programming techniques. Knowledgeable in computer hardware from various manufacturers. Broad background in computer software including languages, operating systems & software packages. Must have Master of Science in Engineering, Degree & twelve (12) computer science. Familiarity with Pascal, PL/I, Fortran, Cobol, IBM & other assembler languages. Knowledge of IBM S/370 family products of operations. Knowledge of IBM VTAM, SNA, VTAM, NCP, ODM/B, MVS. Experience in Asynchronous communications & SDLC. Background in microprocessors also required. Must have one year's experience as systems engineer or systems programmer. Salary $34,000 per year; 40 hours per week, may require some overtime 0-10 hours per week. Apply or send resume to Texas Employment Commission, TEC Building, Austin, Texas 78778. J.O. #388-4008. An paid by an equal employment opportunity employer."

The EDP Specialist
Specializing in career placement of EDP personnel of all disciplines. Our nationwide clients offer opportunities spanning the full spectrum of the Data Processing and Software/Hardware Engineering Field.

TRIMBEC GROUP
Liverpool, N.Y. 13088
451-4000

PROGRAMMER/ANALYST

SYSTEM/38

Fast growing company in rural country setting needs experienced programmer/analyst for development of manufacturing & retail distribution systems. The successful candidate will have 1 or more years hands on System/38 and 5 or more years Data Processing application development experience. Principles only please.

Please send resume and salary requirements to:
MIS Director

RENOVATOR'S SUPPLY, INC.
MILLERS FALLS, MA 01349

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

WE WANT WETWARE

FOR OUR DATA PROCESSING CLIENTS.

CompuSearch, a division of Management Recruiters, serves the nation's top companies and they demand the best DP specialists to fill their job openings. In turn, they offer positions with meaningful challenge, on-going training and defined promotional paths.

Call toll free 1-800-227-3800, Ext. 7017

COMPU SEARCH®
A Division of Management Recruiters International

SENIOR COMPUTER REPAIR TECHNICIAN

Challenging position within expanding computer leasing organization requires individual with a minimum 3 years' computer-oriented technical education, specifically on IBM peripheral and/or CPU equipment.

The successful candidate will be responsible for the repair, reconditioning and installation of feature changes and testing of IBM tape drive, disk drive and I/O equipment. This individual must be able to understand logic diagrams, use various test equipment and have good verbal and written communication skills. Travel on occasion is required.

This is a senior level position requiring in-depth field experience of IBM technology over the past 3 years.

Excellent starting salary and full benefits package.

For immediate consideration, forward resume in complete confidence with salary requirements to: **CMI Corporation, 2600 Telegraph Rd., Bloomfield Hills, MI 48013.**

CMI
A Torchmark Company

Equal Opportunity Employer M/F

If an MIS career with Ampex interests you. . .

We house the latest state-of-the-art equipment in a stimulating atmosphere of creativity and professionalism. We start with top data processing professionals and work with them to further upgrade and advance their skills in the exciting world of data processing. At AMPEX, our emphasis is on personal career development. Our technical environment includes:

- 4300's and 3033-U12
- DOS/VSE with POWER
- MVS and JES 2
- CICS and DL/1
- ACF/VTAM and ACF/NCP
- Data Dictionary
- TSO and SPF
- SNA Multisystems Network
- DCMS/VCI Job Scheduler

We currently have openings in our Data Processing area for the following:

MVS Systems Programmer

We have an opportunity for a Systems Programmer to install, maintain and tune MVS/SP and related software products (VTAM, NCP, SPF, CICS, IMS & JES 2). You will also support programmers, operators and management through problem solving design and consultation. Excellent communication skills, IBM JCL, UTILITIES & Assembler experience are required.

Senior Data Base Analyst

You will be responsible for data base design and maintenance on our DOS/VSE/4341, DL/1 & CICS environment. You will also be supporting our MVS/3033, IMS & CICS development. A strong understanding of physical and logical data base design, data base back-up and recovery procedures and excellent communication skills are required.

AMPEX offers a competitive salary and highly desirable benefits package. You are encouraged to contact: Stacy Fisher-Conner at (415) 367-4423 COLLECT, or send your resume to her, at: Ampex Corporation, M.S. 2-21, 401 Broadway, Redwood City, CA 94063. We are an affirmative action/equal opportunity employer.

AMPEX

PORTLAND, OREGON
Interview and relocation paid.

Unix, C
$30K - $60K. Degreed, Project Engineers and Project Managers. Base system. Pascal, 68000, real-time. Assembler, operating systems. Profit share paid monthly.

Telecommunications
$50K - $38K. BSEE, experience in hardware/software digital design. Experience in several families of microprocessors. EKTS experience a plus.

Analog Design
$40K - $45K. 3-5 years experience with computer I/O & data acquisition systems. Sweep monolithic D/A & A/D converters, hybrid IC & digital display. MSEE or BSEE.

Graphics Software
$28K - $45K. Positions available include: Software Development Engineers, Customer Support Engineers, Quality Assurance, Applications Engineers, Systems Engineers, R & D Raster Graphics.

Marketing Product Manager
$28K - $45K. Experience in marketing strategies of high-tech products. Development of line enhancement, replacements, and product obsolescence. Profit sharing paid monthly on top of salary.

All fees paid by our client companies. Call or send your resume in confidence. We specialize in high-tech. Many other positions available.

(503) 227-1451
HEADHUNTERS
Northwest Agency, Inc.
1700 SW Skyline Blvd.
Portland, OR 97221

SYSTEMS PROGRAMMER

Boise, Idaho

We are seeking an experienced Network Systems Programmer to join our technical support staff. We will provide a challenging and progressive environment working with an IBM 4341 under DOS/VSE using ADR's Datacom software products.

This position will be responsible for planning, monitoring and supporting the remote communications network. You must have experience with STAM and/or VTAM and NCP with IBM 3705 BSC SNA SDLC communications protocols.

We offer competitive salary and benefits programs. Please send resume with salary history, in confidence to:

Personnel Manager
BLUE CROSS OF IDAHO HEALTH SERVICE
P.O. Box 7408
Boise, Idaho 83707

Affirmative Action/
Equal Opportunity Employer

PROGRAMMER/ANALYST
IBM SYSTEM 38 MOD 7

The RVI Home Care Products Division is the fastest growing division of Richardson-Vicks Inc., a leading billion dollar packaged goods firm (Oil of Olay®, NyQuil® and Vidal Sassoon® Shampoo). Our division markets and manufactures Formby's® furniture care products and Thompson's® Water Seal®. We expect our rapid growth to continue and need to add an experienced Programmer/Analyst to our staff. Specific requirements are:

- 3-5 years total experience with a minimum of one year experience with IBM System 38 equipment
- experience working on a variety of projects with various user departments.

In return we will offer a highly competitive salary and benefits package, the opportunity to make an important and immediate contribution and a chance to join a company which prides itself on being an innovative leader.

If you're ready to make a positive career change, forward your resume and a cover letter which outlines your three most significant business accomplishments and salary expectations to:

MR. J.E. VAN EYSSEN, Personnel Director

RVI
Home Care Products Division
825 Crossover Lane, Suite 240
Memphis, Tennessee 38117

We are an equal opportunity employer, (M/F/H/V) and encourage minorities and women to apply.

DATA PROCESSING PROFESSIONALS

Cutler-Williams Incorporated is a major diversified Data Processing Company and we currently have immediate openings in the sun belt for individuals possessing any of the following skills:

- CICS, DL/1
- IMS DB/DC
- PROGRAMMER/ANALYSTS
- PROJECT MANAGERS

We offer top-level salaries, overtime pay and a full benefit package. Call or send resume to:

CW
PRES D'HOMMES

John Earl
Cutler-Williams Inc.
2955 Villa Creek Drive
Suite 295
Dallas, Texas 75234
(214) 243-3421
(800) 527-4867

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

NIPSSA

We Are Information Systems At The

Naval Intelligence Processing System Support Activity

A major expansion of our capabilities has created opportunities for information systems professionals interested in new and creative systems technologies in the areas of:

- Local Area Networking
- Relational Data Base Administration
- IBM MVS Systems Programming
- DEC VAX/VMS/UNIX Systems Programming
- Configuration Management
- Computer Security
- Distributed Processing
- Software Engineering
- Automated Message Handling

We are currently seeking analysts and programmers. If you have a bachelor's degree with training in the computer field and a solid record of performance in the development and support of these or similar systems, we can offer you a significant and unique opportunity for career enhancement. If you are a recent college graduate with a degree in a computer-related field and a good academic record, we can provide unparalleled opportunities for professional development and education.

Your career at NIPSSA will provide you with hands-on challenges involving IBM MVS, IDMS, VAX/VMS, VAX/UNIX, PDP-11/RSX-11, ORACLE RDBMS, CDC NOS (BE), System 2000 and Zilog Z80 (CP/M) based systems work. Salary range from $17,139 to $48,887.

To begin your challenging new career in intelligence information-processing, please send an SF-171 or resume to the following address:

Naval Intelligence Processing System Support Activity
ATTN: NIPSSA-07 CW
4600 Silver Hill Road, Washington, D.C. 20389

A background investigation for security clearance purposes is a requirement for employment.

An Equal Opportunity Employer • U.S. Citizenship Required

Software Technologists for four surging northeast cities.

Washington, DC Princeton, NJ
New York, NY Philadelphia, PA

Surging is a good word to describe Martin Marietta Data Systems, too. New hardware/software offerings, deeper involvement in total systems integration, plus the exciting recent merger with Mathematica. The result? We have needs. You have opportunities.

SOFTWARE ENGINEERS

Requires 4-5 years' experience programming in BAL in a development environment. Thorough knowledge of IBM operating environments with particular emphasis in VSAM, IBAM, OS, DOS, CICS, BTAM. Communications skills including documenting procedures required. These positions located at Mathematica's Princeton, NJ headquarters or in our Philadelphia area operation.

HP SYSTEM SOFTWARE PROGRAMMERS

Knowledge of HP 3000, model 64/68, 44/48 or 40/42 using MPE. Prior experience in database systems very helpful. Candidate must have at least 3 years' experience with related hardware and operating systems. Positions located at our headquarters in Greenbelt, MD, a suburb of Washington, DC.

IBM SYSTEM SOFTWARE PROGRAMMERS

Knowledge of SSX/VSE or DOS/VSE using VM/CMS. Prior experience using databases (CICS or IDMS) a strong plus. Minimum of 3 years' experience required in a multiple CPU and distributive network environment. Knowledge of Assembler required along with prior program product installation. Positions located at our headquarters in Greenbelt, MD, a suburb of Washington, DC.

PROGRAMMERS

Knowledge of COBOL, IDMS, ADS/O. Background in applications such as: financial, medical and insurance. Positions located at our headquarters in Greenbelt, MD, a suburb of Washington, DC.

IDMS DATA BASE ADMINISTRATORS

Data Base technicians needed for large development project. Requires experience in the Cullinet product line in areas of product installation, internals, performance monitoring and tuning, utilities, design and use of the IDD. Knowledge of ADS/O and CULPRIT helpful. Positions located at our headquarters in Greenbelt, MD, a suburb of Washington, DC.

ADABAS DATA BASE ADMINISTRATORS

Heavy on-line design experience with a minimum of 3 years in the data base administration field. Must have IM ADABAS experience using NATURAL language. CICS would be a strong plus. This will be in the development effort for a long-term project in New York.

For immediate consideration, please call toll free 800-492-6753.
Or, send your resume in confidence to: P. H. Shockley or J.P. Byars, Martin Marietta Data Systems, 6305 Ivy Lane, Dept. PS-14, Greenbelt, Maryland 20770.

MARTIN MARIETTA

An Equal Opportunity Employer Principals Only

Programmers

Pacific Telecom's aggressive diversification into new markets and strong traditional bases of operation in telecommunications have created unusual new opportunities in the **Beautiful Southern Washington Area of the Pacific Northwest.**

Programmer/Analysts
Senior Level

Two opportunities exist for experienced professionals to assist in the development, modification and maintenance of computer applications supporting the Company's information processing needs. Both positions will:

- Research, analyze and document user needs and assist in systems specifications
- Help transfer a designed system into a working product by coding, testing, debugging and documentation
- Participate in the installation and maintenance of a computer application

One position requires minimum 3 years of VAX programming experience to include knowledge of Basic, COBOL and FORTRAN; Datatrieve and FMS, experience desirable, prior experience in engineering related systems preferred.

A second position requires at least 3 years COBOL programming experience; knowledge of SPF/TSO, MVS, JCL and data base essential. IDMS experience desirable; Telephone company billing system experience preferred.

Programmer
Intermediate Level

You will code computer instructions for individual programs, create and modify computer execution control statements and test individual computer programs. To qualify, you must have at least 2 years COBOL programming experience as well as experience on a Honeywell DPS6 or IBM mainframe in an MVS environment. Knowledge of telephone application preferred; thorough understanding of JCL or ECL, IDMS, TSO, SPF desirable. Experience with OCRIS service order processing system preferred.

Our salaries and benefits are outstanding as is our new Corporate Headquarters environment. For consideration, please send resume, with salary history to Isaac Dixon, Personnel Analyst, PACIFIC TELECOM, P.O. Box 9901, Vancouver, WA 98668-9901. No agencies, please. Equal Opportunity Employer.

PACIFIC TELECOM

ROMAC

Romac & Associates/Personnel Consultants (Agency) specializes in the placement of Data Processing, Accounting, Banking and Financial Personnel. All Fees are paid by our client companies. Below are representative opportunities. Qualified candidates are invited to call or write for appointment. NO RESUME NEEDED. Replies held in confidence.

SOFTWARE ENGINEER
$45,000
1221 [illegible] PLAZA
ROCHESTER, NEW YORK 14604
716-232-4610

UNIX
Software Engineer
San Francisco, CA
$40,000 Plus
Equity Stock Available

Use your UNIX kernel or internals to join an exciting new R&D project in the Bay area. Interesting and relocation paid by client company.

General Employment Enterprises, Inc.
Business Executives Division
1 Market Plaza, Suite 2015
San Francisco, CA 94105
(415) 896-0511 No Fee

OPPORTUNITIES IN REAL-TIME SYSTEMS DEVELOPMENT

Wyle is seeking Senior Analysts with a minimum of 2 years MODCOMP Classic experience. Knowledge of the operating system and the ability to effectively communicate and interact with people essential. Real-time programming and supervisory experience is desired. Successful candidate will be directing the efforts of a 7 person programming team.

This is a ground floor opportunity in a new department developing software and hardware to support testing of state-of-the-art aircraft in the wind tunnels at NASA's Langley Research Center, Hampton, Virginia.

If you are looking for a technical challenge with first level supervisory responsibilities and a location that offers a mild climate and extensive recreational attractions, contact L. Stewart COLLECT at (804) 865-0000 or send resume to: WYLE LABORATORIES, 3200 Magruder Boulevard, Hampton, VA 23666.

WYLE LABORATORIES SCIENTIFIC SERVICES & SYSTEMS GROUP

An Equal Opportunity Employer

Data Processing

Performance Analysis Capacity Planning

Move up to the Leader in San Francisco

At Bank of America, our configuration includes 15 3OXX-class CPU's, IMS databases spanning 120 3350's, 1800 spindles of total DASD, and multiple 3705 controllers with hundreds of communications lines and thousands of worldwide terminals.

That's not because our Capacity Planners are unfamiliar with efficiency. It's because Bank of America, one of the world's leading financial institutions, has a tradition of using technology to bring good banking service to our customers, from pioneering the use of Magnetic Ink Character Recognition in the 50's to using PC's for home banking in the 80's.

That's given us a very large computer installation, but we're still on target: efficient, low-cost, innovative, automated banking. To do the planning in the 80's, our Performance/Capacity Consultants have designed some sophisticated workload forecasting techniques, including a "model bank facility".

If you're good at...

—Designing and tuning the resources to support large, complex, high-volume applications

—Balancing business needs with technical strategies

and your background includes...

—an understanding of the internal architecture of IMS, VM, or MVS or

—a penchant for modeling, measurement, statistics in a large-scale computer environment or

—experience using such tools as BEST1, SAS, CAPTURE/MVS, VMAP, SMART, RMF/SMF, on-line monitors and logging software,

then our Capacity Planning/Performance Analysis team would like to know about you. For immediate consideration please send your resume to: Nan Schustus, Sr. Systems Recruiter, Dept. 3228-0312A, Bank of America, Box 37000, San Francisco, CA 94137. We are an equal opportunity employer.

Bank of America

The Professional's Choice.

TRAINING AND ORGANIZATIONAL DEVELOPMENT MANAGER

The largest truck leasing and rental company has an opening for an Internal Consultant to our Finance and M.I.S. function.

Minimum of 5 years training experience required plus a graduate degree in the behavioral sciences. Ph.D preferred.

Please send resume with salary history and requirements in confidence to:

J.L. Scarpa
Personnel Services
RYDER TRUCK RENTAL, INC.
P.O. Box 020816
Miami, FL 33102-0816

An equal opportunity employer

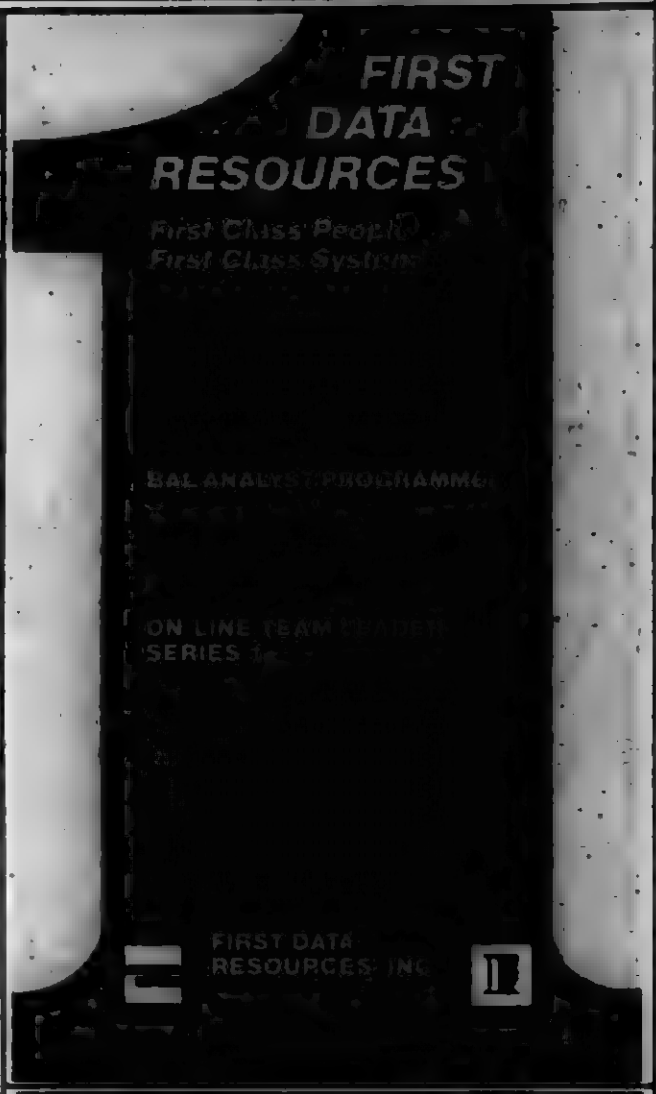
SE DP OPPTYS

Mgr. Voice & Data Communications - $48K+. Major SE financial organization req. exp. mgr. to assume responsibilities for all communications planning, budgeting, including presentations to corp. mgmt. Sup. staff of 25. Degree pref. w/strong tech. and mgmt. skills.

Mgr. Tech Support - $60K Major SE manufacturer with future plans for significant HRDWR/SFTWR upgrade seeks exp. tech. mgr. w/5+ yrs. large scale IBM, IMS/MVS exp. Requires tuning, cap. planning, perf. monitoring with proven written and oral communication skills.

For further information on the above and other SE opptys, contact Larry Stone at (704) 375-0800 or send resume with salary information in confidence to:

FOX-MORRIS
212 S. Tryon St./Suite 1360
Charlotte, NC 28281



DATA COMMUNICATIONS Systems Programmer

Responsible for analyzing communications requirements, providing detailed network specifications, and developing or modifying communications software. Requires a Bachelor's degree in Computer Science, Engineering (or related discipline) and 2-3 years in communications, or equivalent. Familiarity with Decnet, SNA, Ethernet, or X.25 extremely desirable.

Send resume and salary history to: University of Rochester, Personnel Department, Box 6360, 259 Crittenden Boulevard, Rochester, New York 14642. An equal opportunity employer m/f.

UNIVERSITY OF ROCHESTER

1984 EDP Pro's

Get in with a company going places.

At AP Telecomputing Corporation, our track record speaks for itself. With a 300% growth rate in 1983 and a projected 200% increase in 1984, the opportunities for career advancement in this totally DP-oriented organization are significant for people looking to stretch their talents.

We have major commitments to the continued development of proprietary software for use in both manufacturing and financial markets. We are therefore seeking the right career-minded DP professionals to join our dynamic team.

EDP GENERALIST—8-12 years DP experience with significant exposure to hardware/software management and/or applications development.

PROJECT MANAGERS—3-5 years experience as project, systems or programming manager.

SR. PROGRAMMER ANALYSTS—6+ years experience in applications development with high technical proficiency in COBOL.

PROGRAMMER/PROGRAMMER ANALYSTS—2-5 years experience in applications development using COBOL.

In addition to brand new Corporate facilities, we are able to offer excellent salary and benefit packages.

To arrange a local interview, please call John DeGrosa, (305) 832-3799 or send your resume with salary history to: AP TELECOMPUTING CORPORATION, P.O. Box 2091, West Palm Beach, FL 33402. Equal Opportunity Employer, m/f.

AP TELECOMPUTING CORPORATION

MIS MGRS

Mgr of Oper & Tech Support

Rural Penna corp hdqtrs. Converting from DOS/VSE to MVS report to Director MIS. Salary 50K.

MIS Mgr

Sys 38 supervise assem. Mfg firm. Top spot report to VP Finance. Rural Penn. Salary Open.

Mgr of Systems Analysis

Design, document and direct financial group project authority. Salary 40K.

Wilson Allen Agency, 39 W. State St., Binghamton, NY 13901 (607) 772-1060

TELECOMMUNICATIONS APPLICATIONS ENGINEER - Network analysis & design of custom features for custs networks on Statistical Multiplexer Packet Assembler/Disassembler & Packet Node Processors. 2 yrs or 2 yrs rel exp - telecommunications. Bach or equiv in Electrical Engin. Must have knowl of packet switching networks, analog digital interfacing & X.25 protocols. $40,000/yr/40 hrs/5 days/wk. Databit, Inc., 110 Ricefield Lane, Hauppauge, NY 11788. PLS SEND RESUME.

CONSULTANTS to $350/DAY

$60,000

PER ANNUM

NYC/NJ/CT

Call or forward resume to:

PERMANENT CONSULTANTS CORP.
95 MADISON AVENUE
New York, NY 10016

(212) 684-6966

PROGRAMMER ANALYSTS

Oklahoma City Location

The Hertz Corporation, a leader in the transportation and travel industry and a major division of a Fortune 500 corporation, is currently seeking experienced Programmer Analysts. To become a member of our professional team working in our large IBM mainframe MIS environment, you must possess the following:

- Strong analytical skills
- Structured methodology experience
- Solid database expertise-IDMS preferred
- Heavy COBOL experience
- Minimum of 3 years of related experience

In exchange for your professional contribution, we offer a competitive salary, excellent benefits, a modern facility and a progressive environment. If this opportunity sounds right for you, and you wish to maximize your career potential, please send your resume with salary history in complete confidence to:

Mr. Neal Oistacher
THE HERTZ CORPORATION
5801 Northwest Expressway
Oklahoma City, OK 73132

Hertz

Equal Opportunity Employer, M/F/V/H

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

ERIE INSURANCE GROUP

MVS Systems Programmer

The ERIE Insurance Group is a major property/casualty and life insurer employing over 1700 people. We consistently receive an "A+" Excellent rating from A. M. Best Company, America's foremost authority on insurance company ratings.

We are seeking an MVS Systems Programmer to work in our state-of-the-art Systems Programming Department. We utilize MVS, VM, and DOS/VSE on our three IBM processors.

As the MVS Systems Programmer, you would be responsible for the installation, maintenance, measurement and tuning of our MVS/JES2 operating system and related software.

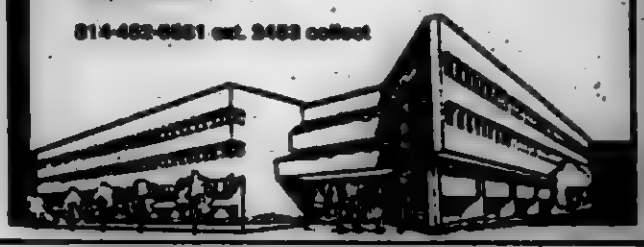
The position requires four or more years experience in an MVS environment with internal knowledge of MVS/SP and JES2. Knowledge of ACF/VTAM, NCP, SNA/SDLC and CICS would also be beneficial. Excellent salary and benefits including relocation plus exciting growth potential are offered.

Please send your resume with salary history in confidence, or call:

David J. Acker
Corporate Recruitment Supervisor

ERIE Insurance Group
100 Erie Insurance Place
Erie, PA 16530

814-452-6581 ext. 3453 collect



EDP Professionals

Middle South Services has one of the South's largest data processing centers serving one of the nation's largest power systems. Middle South Utilities, our parent company, is a major electric utility. Our hardware environment includes two IBM 3081s, and IBM 4341 and Tandem mini 16s. If you are a career-minded EDP professional, we have the following opportunities available:

(MVS) SYSTEMS PROGRAMMERS We currently have 2 openings for Systems Programmers with 2+ years experience in MVS operating systems. You will install, monitor, help problems solve, tune and assist in the installation of MVS/XA systems migration.

PROJECT LEADER With strong leadership skills needed to coordinate the enhancement/maintenance and program performance effort of our power plant maintenance information systems. Previous experience as a lead analyst or project leader in power plant or maintenance systems is required. Experience on large IBM mainframe is needed and exposure to IMS DB/DC is a plus.

ANALYST/PROGRAMMERS (APPLICATIONS) Several positions are currently open for experienced IMS DB/DC Analyst Programmers. Experience with COBOL or PL-1 in plant maintenance or business applications is needed.

SYSTEM ANALYST With experience in on-line corporate data base design and/or information systems planning is needed to work in an information resource management section. The ideal candidate will have at least one year experience in logical data base design along with 2 or more years of IMS experience or other data bases management systems.

SENIOR REAL-TIME APPLICATIONS ANALYST must have 6 years real-time experience in the design, implementation and documentation of various real-time application programs.

DIGITAL INSTRUMENTATION & CONTROL ENGINEER must have minimum 4 years experience in developing and implementing Telemetering systems. Plus design/specification of equipment used in integrated digital computer-based instrument and control systems.

Due to our size and scope of operation, we offer access for advancement, career stability and an excellent salary with major benefits. For more information, call our number below or to apply directly, send your confidential resume to Byron Heath or Richard Jackson, MIDDLE SOUTH SERVICES, INC., P.O. BOX 61000, NEW ORLEANS, LA 70161.

1-800-231-4481
In Louisiana, call collect (504) 569-4080.

MIDDLE SOUTH SERVICES INC.
An Equal Opportunity Employer M/F

Programmers/Analysts
Princeton University

Two positions are available in Campaign Information Systems to provide computer-based systems support for the fund raising activities of the University.

PROGRAMMER/ANALYST

Works with users of the Fund-Raising Information System to determine their needs, analyzes problems, develops specifications, produces detailed designs, implements and tests systems. Has technical responsibility for installing database system and performs tasks associated with maintenance and modification in collaboration with software vendor.

SYSTEMS PROGRAMMER/ANALYST

Provides technical support for a DEC VAX-11/780 computer system. Maintains VMS operating systems, analyzes performance, configures system, installs software, develops procedures, and administers system. Assist users at various levels in making maximum use of the system. Will have some responsibility for the Fund-Raising Information System. Experience with hardware and data communications desirable.

Both positions require Bachelor's Degree and 1-2 years of experience with BASIC and VAX/VMS, evidence of strong analytical skills and ability to communicate effectively both orally and in writing. Please send resume with salary requirements to: ANNE PETERSON, PRINCETON UNIVERSITY, PERSONNEL SERVICES, CLIO HALL-CWIS, PRINCETON, NEW JERSEY, 08544.

An Equal Opportunity/Affirmative Action Employer M/F

WANTED:
SOFTWARE SUPPORT HEAVY WEIGHT

Continued strong acceptance of our systems software products worldwide has created an immediate need for a Software Support Engineer.

The successful candidate will have 3-5 years progressive experience maintaining, modifying, and supporting MVS systems software. Strong Assembler Language skills, and a thorough knowledge of OS/VS JCL is also required. Current experience with MVS/XA, TSO Dialogue Manager, ROSCOE, VM/CMS and COBOL would also be a plus.

This is a key position, with responsibilities for worldwide product support. You will also be responsible for identifying, designing, and implementing enhancement that keeps our product at the leading edge of large system technology. Your contributions will be highly visible in our small company, high growth environment.

For immediate consideration, call or send your resume to:

Doug Stretin
(408) 554-8121

TriangleSoftwareCo.

4340 Stevens Creek Boulevard,
Suite 160
San Jose, CA 95129

HELP!

Our clients throughout the U.S. and Overseas need qualified, experienced professionals now! We are members of National Personnel Associates with 200 offices alive and have HUNDREDS of current opportunities.

LIFE INSURANCE: Programmer/Analysts, Systems Analysts, Project Leader and Programming Manager positions. EDP and Life experience required.	TO $40K
PROGRAMMER/ANALYSTS: 0S/0 or OS & COBOL. CICS, DL/1 or IMS a plus.	To $30K
SYSTEMS ENGINEERS: Defense systems, degree.	To $30K
PL/1 & IMS: Programmer/Analysts and Systems Analysts.	To $30K
DATA BASE ANALYSTS: IMS, IDMS or ADABAS.	To $40K
UNIVAC: Programmer/Analysts, DMS 1100, COBOL.	To $30K
SYSTEMS PROGRAMMERS: DOS, MVS, VM/S or UNIX.	OPEN
PROGRAMMER/ANALYSTS: IBM ASSEMBLY Language.	To $30K
MINI/MICRO: Real-Time, ASSEMBLY, PASCAL or FORTRAN.	To $40K
IBM: Payroll/Personnel, IBM, COBOL.	To $30K
EARN ABILITY: 2 year family status computer; free housing. Degree required.	
PROGRAMMER/ANALYST - Payroll/Personnel, CICS, DL/1	To $24K
SYSTEMS PROGRAMMER - VM/CMS, VSY, CICS, SAS/+	To $30K
FOOTLOOSE? Learn new skills and live in different U.S. locations for 6 months to a year. IBM, Burroughs or Univac COBOL experience. CICS and/or DL/1 a plus.	To $30K

If you're ready for a career change, or interested in examining new opportunities, call or send your resume to:

Bob Williams
ROBERT SHIELDS & ASSOCIATES
1950 W. Bay Area Blvd., Suite 101
Friendswood, Texas 77546
713/482-7551

1,000 SMILEY SPENCERS

D.P. - ROBERT MONTGOMERY

Prog. Anal. (3 yrs H/P & COBOL)	to $35,000 NC location
Prog. Anal. (3 yrs bilg. CICS & COBOL)	to $28,000 NC location
Prog. Anal. (3 yrs banking S/36 & COBOL)	to 28,000 VA location
Sys. Prog. (3 yrs MVS or VM)	to $40,000 SC location
Sys. Prog. (3 yrs NCR & VTAM)	to $40,000 FL location
Sys. Anal. (3 yrs fin. appl. & COBOL)	to $35,000 TN location

ENGINEERING - MIKE HUNTER

Systems Engineer(CA)	to $70,000
Software Mgr's (Communications)	to $65,000
Software Engr. (Telephony)	to $50,000
Sr. Software Eng's (Unix-68K or INTEL)	to $50,000
Software Eng's (Microprocessor)	to $50,000

Pre-Alamo is the nations largest corporate search co. with over 100 offices located throughout the nation. For a more comprehensive listing of our clients needs call 919/872-5040 or send resume to:

PRE-SEARCH ASSOCIATES
3101 Poplarwood Court
Raleigh, NC 27625

PROGRAMMER/ANALYST

This position is a joint appointment serving both the College of St. Benedict and St. John's University. Responsibilities include all aspects of programming for a DEC PDP 11/70, also the direction, planning and coordination of systems analysts in regard to data processing applications. Bachelor's degree in Computer Science or related field including course work in one or more of the following languages: BASIC, FORTRAN, PASCAL, COBOL, MACRO-11, Assembler Language. Course work in accounting and statistics desirable; hardware interfacing and technical writing preferred. Position available July 1, 1984. Send letter of application and resume to: Director of Personnel, St. John's University, Collegeville, MN 56321. Applications received after May 1, 1984 cannot be guaranteed consideration. Women and minorities are encouraged to apply.

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

COMPUTER POWER GROUP PTY LTD

HOGAN

CONTRACTS IN AUSTRALIA

Computer Power, Australia's leading software house and representatives for the Hogan Banking Systems in Australia, need Analyst/Programmers now for 12 month contracts.

Location will, be Sydney, one of the world's most beautiful cities, where the sunshine and beaches can enhance the quality of your lifestyle.

Return airfares are included in the contract and working visas and accommodation will be arranged on your behalf. Start dates are flexible.

If you have good experience in the development and implementation of Hogan applications then call Computer Power or send us your resume.

Computer Power representatives will be in Dallas to conduct confidential interviews and finalise contracts.

Call Moray Robertson on this number now (214) 556-2930 or telex Australia: AA 70977 Setey or send your resume to:

MORAY ROBERTSON
COMPUTER POWER
5215 North O'Connor
2nd Floor
Irving, Texas 75039

SENIOR SOFTWARE ENGINEER - Design, implementation, debugging & documentation of projects rel. to European mkts. Coord. of requirements, specs & policies for packet switching network w/overseas clients. 2 yrs or 2 yrs rel packet switching exp. Mast. or equiv in Electronic Engin. Must have knowl. of commun. switching & of X.25 & X.75 Protocols. $35,000/yr/40 hrs/5 days/wk. Datakit, Inc., 110 Rockfield Lane, Hauppauge, NY 11788. PLS SEND RESUME.

BURROUGHS
Banking

Project Leaders, Programmer Analysts and Programmers with banking applications experience needed for Southern locations.....Data Comm, ATM and IRS positions also available.

Call or send resume to:

Executive Consultants
1600 Fairfield Avenue
Suite 102
Shreveport, Louisiana 71101
(318) 222-1000

PROGRAMMER ANALYST II
Colorado location. Starting salary to $28,000 depending on qualifications. Outstanding fringe benefits. Excellent work environment in new Civic Center in Denver suburb. Position requires experience with NCR VRX system using Cobol. Experience in conversion of programs from NCR IRX to VRX systems using VMOS a plus. Send resume detailing experience with NCR VRX systems to Personnel, City of Thornton, 9500 Civic Center Drive, Thornton, CO 80229 by March 30. AA/EOE

Programmers/Analysts

Consultants for full-time contracts in the following areas:

- RASCAL
- ADA
- COMPUTER SCIENCE
- SEMANTIC PROGRAMMING
- MICROPROGRAMMING
- ANSI/X-7, ANSI/X-50 ASSEMBLY
- UNIX & C
- COBOL

Call or send resume to CSI:

Office Information Systems, Inc.
10800 Lyndale Avenue South
Minneapolis, MN 55420 (612) 884-9199

Contract Programmers

Computervision, a national software contract services company, has continuing needs for Programmers and Software Engineers with any of these backgrounds:

(1) Motorola Assembly Language
(2) DEC VAX/Unix or PDP-11/RSX-11M.
(3) AT&T/ATLAS Programmers.
(4) Telephone/Telecommunications Appls.
(5) UNIX Applications/Kernels.

Rates $35-$45 per hour and many locations nationwide.

Call or send resume to:

Computervision
13901 Midlothian Road, Suite 200
Dallas, TX 75234
(214) 620-0001

PROGRAMMER ANALYST

City of Greeley, Colorado. Responsible for design, implementation and maintenance of major computer systems. Requires 2-3 years of progressively responsible programming experience, preferrable with UNIVAC 90 or 1100 series. Must have COBOL experience in data base and communications very desirable. Starting salary $1,456-$1,880 per month depending upon qualifications. Apply by March 31 to Personnel-PA, City of Greeley, 919 Seven Street, Greeley, CO 80631. Women, minorities and the disabled encouraged to apply. EOE.

BURROUGHS/BANKING
MCP-DCOM-EFT-ATM

New Project Leader and Programmer positions now open in both Tech Support and EFT areas. We process 300 banks with 2,500 terminals on 34 Medium Systems using CP3600's. Plusses are DCOM, MCP, IPS and Hardware Planning experience OR EFT, Diebold and ATM network experience. Other banking opportunities available. Send resume to:

S. J. Kuebbing
First Financial
Management Corporation
3535 Buford Highway
Atlanta, Georgia 30329

SYSTEM PROGRAMMER I
University of Wisconsin-Parkside

We seek a system programmer to help maintain an IBM 4341 and DEC 11/70 computer systems running VM/SP, DOS/VSE and RSTS/E. Responsibilities include assisting in the generation and maintenance of operating systems, system utilities, and languages.

Candidates should possess 2 or more years of programming experience in PL/I or COBOL. Experience as a system programmer in a CICS environment is desired.

Starting salary ranges from $18,000 to $20,000 depending upon experience and education. Advanced educational opportunities available.

UW-Parkside is a medium-sized university in a pleasant suburban environment, located in southeastern Wisconsin.

Send resume to:
William Wisemann
Director, Computer Center
University of Wisconsin-Parkside
Box No. 2000
Kenosha, WI 53141

AN EQUAL OPPORTUNITY EMPLOYER

TEACH AND TRAVEL

The University of Maryland University College seeks faculty to teach undergraduate computer science and information systems management courses on U.S. military bases in Europe or Asia. Two-month renewable appointments are available beginning August 1984. Candidates should have at least a master's degree in computer science or a related field and recent college teaching experience. U.S. citizenship is required. Benefits include transportation, a currency adjustment allowance and military base privileges (PX, commissary, etc.). Frequent travel and the cost of relocating make these positions difficult for those with children. Send your resume to:
Dr. Lois A. Slater, Overseas Programs, The University of Maryland University College, College Park, MD 20742.

MARKETING REPS
$00,000 to $00,000

San Jose	Chicago
Dallas	Atlanta
St. Louis	Denver

We are looking for 5 to 7 years of successful computer, mini/micro, intelligent terminal, or data equipment sales. Full relocation, growth situation, 40% travel.

Reply to CW-84001
Box 880
Framingham, MA 01701

UNIVAC

Programmers, Systems Analysts, Data Base Analysts, Systems Programmers. Individuals interested in the Midwest and Northeast are currently in high demand. To confidentially explore exciting new career opportunities, rush a resume or call Gary Repetto, CPC.

[redacted]
[redacted]
Albuquerque, NM 87110
(505) 883-1971
[redacted]

COMPUTER SCIENCE/ MATHEMATICS INSTRUCTOR
Adams State College

Teach take and advanced courses in Math and Computer Science starting August 24, 1984. Master's Degree in Computer Science or Math with strong coursework in computer languages, data base management systems and simulation required. Doctorate preferred for advancement to associate or full professor. Preference given to those familiar with PDP-11 and VAX-11 family computers. Send letter of application, resume, official transcripts, and three letters of recommendation to:

Ron Lesser,
Adams State College,
Alamosa, CO 81102.

Closing Date: April 30, 1984

Programmer Analyst

Industry leader located in Midwestern city has an opening for a professional with 3-4 years experience using RPG II and MAPICS on a System 36. A challenging opportunity in a growing Company. Competitive salary and benefit package. Please send resume and salary requirements in confidence to:

CW-84008
Computerworld
Box 880
Framingham, MA 01701

EOE/M/F

EDP MANAGER - Estab. & maint. a data processing dept. in charge of computerization of engineering & design of new aircraft under devel. 4 yrs or 4 yrs rel Computer Mgmt exp. Bachelors degree - Computer Science or Engineering. Must have background in Engineering. $40,000/yr/40 hrs/5 days/wk. Hallo Aircraft Ltd., Highway 126, Pittsburgh, Kansas 66762. Pls send resume.

SEMINARS

INSTRUCTORS

There's No Time For DOWNTIME!

So while the industry works on your systems problems, let us work on your business problems. Advertise in–

COMPUTERWORLD CLASSIFIEDS!

One insertion will let a potential audience of over a half a million readers know what you are looking for or have to offer. Whether you are looking to recruit computer professionals, want to buy, sell or lease equipment, have computer time or services to offer, or software packages to sell, and more, Computerworld Classifieds will help you get a lot of exposure and get things done faster.

The open line rate is $9.15 per line and there is a minimum size of 1 column by 2" at a cost of $256.20. We can accomodate up to 5 columns and depth measurement increases by half inch increments.

Ads may be mailed in, clearly typewritten, with a letter stating the size desired and the issue in which it is to be run. Our team of ad-takers will take ads that require no artwork or borders over the phone. We also provide telecopier service.

Any borders, logos, or artwork should be sent in with your ad and must be dark and clear enough to be reproduced.

Computerworld comes out every Monday and our deadline for receiving ads is 10 days (or six working days) prior to the issue date desired.

First time advertisers must send payment along with their first ad.

Our mailing address is:

Classified Advertising
Computerworld
Box 880
375 Cochituate Rd.
Framingham, MA01701

800 343-6474
(617) 879-0700

FIRMWARE OPPORTUNITIES...

Spokane, Washington

ISC Systems Corporation, the leader in microprocessor-based terminal systems for the financial industry, is seeking Firmware Professionals to join their expanding Spokane operation.

SENIOR FIRMWARE ENGINEER

We require BSCS, BSEE, or equivalent with at least 5 years direct experience designing firmware, hardware and software. Extensive experience in the development of real-time, multi-function, interrupt-driven firmware with contention timing is also required. Broad knowledge of state-of-the-art hardware and microprocessors is required.

You will be instrumental in designing products produced in high volume and will direct and advise firmware and hardware engineers.

FIRMWARE ENGINEER

We require a BSCS, BSEE, or equivalent with at least 2 years direct experience developing real-time, multi-function, interrupt-driven firmware with contention timing. Disc controller experience preferred.

You will design firmware for products produced in high volume and will interface frequently with hardware and software engineers.

We offer an excellent salary plus generous benefits. Please forward your resume for prompt confidential review to: Bill Baumann,

ISC SYSTEMS CORPORATION
P.O. Box TAF C-8
Spokane, WA 99220
equal opportunity employer

BUY - SELL - SWAP

BUY-SELL-LEASE

SERIES/1

SAVE ON NEW OR USED
OVER 2000 CUSTOMERS

S/38
4331
4341
4361
4381

ALL RELATED PERIPHERALS
SHORT/LONG TERM LEASES

S/34

SEE OUR NEW PRICES

S/36

SHORT/LONG TERM LEASES

3083
3081

LEVERAGED LEASES

Call toll-free 800-[illegible]
(In Minnesota, 612-[illegible])

COT COMPUTER OPTIONS INC.
"The best option"
[illegible], Minneapolis, MN [illegible]

SAA 59

Pioneer Computer Marketing
214/343-2904

BUY - SELL LEASE

- All IBM Systems
- Peripherals
- Tapes
- Disks

SERIES/1

- Systems
- Features
- Peripherals

SYSTEM 34

- CPU
- Peripherals
- Upgrades

PIONEER COMPUTER MARKETING
11448 Pagemill Road
Dallas, Texas 75243
214/343-2904

"A COMPUTER LEASING COMPANY'S FINANCIAL STABILITY IS VITAL."

We said that in 1973, when Randolph became a subsidiary of The First National Bank of Boston . . . and we say it again, because it is still true and even more important today.

As an important part of The First National Bank of Boston, one of the nation's oldest and leading financial institutions, Randolph has a built-in financial stability that continues to be unique in the third-party computer leasing industry.

LEASING COMPUTERS IS OUR ONLY BUSINESS.

Randolph specializes in leases for IBM 3081, 303X and 4300 computer systems and peripherals . . . firm evidence that we plan to perpetuate our computer leasing activity.

Our people have an average of 16 years experience in the DP industry . . . from 360's to 3081's. They know all about alternative financing to be sure, but they also know their way around a DP department and the hardware in it.

WE SPECIALIZE IN SOLVING PROBLEMS.

Machine installed on a rental basis? Long wait for delivery? Stuck with a lease on your old machine? Own a 3081 but need cash? Whatever your problem, we can tailor a lease that will fit your exact needs and let you start saving money right away.

SAVE $80,000 EVERY MONTH FOR THE NEXT 5 YEARS.

You can lease the same 3081 that IBM rents for more than $180,000 per month from Randolph for less than $100,000 per month. If you're renting an older machine, we can save you even more—and you'll get about 4 times the throughput in the bargain.

WHEN IS THE BEST TIME TO TALK TO RANDOLPH?

The sooner the better. But it's never too late, even if you already have a machine installed.

Our 19 years in computer leasing gives added assurance that Randolph will continue as the leader in the computer leasing industry . . . continue to live up to the terms and conditions of our agreements . . . provide upgrades . . . fulfill all of our commitments.

LET RANDOLPH HELP YOU GET THE SYSTEM YOU NEED NOW, *NOW.*

We've already done it for many of the Fortune 500 companies . . . and we can do it for you. Call Joseph B. Kelly, Jr., Executive Vice President, 800-243-5367

537 Steamboat Road
Greenwich, Connecticut 06830
203 661-4200

Randolph

A MEMBER OF COMPUTER DEALERS & LESSORS ASSOCIATION RANDOLPH COMPUTER CORPORATION A subsidiary of THE FIRST NATIONAL BANK OF BOSTON **BANK OF BOSTON**

DATA GENERAL

Hanson Data Systems

FORSYTHE McARTHUR ASSOCIATES, INC.

DEALER / LESSOR OF IBM
Computers and Peripherals

Home Office
Chicago
919 North Michigan Avenue
Chicago, Illinois 60611
312 943-3770

Branch Offices
Atlanta 404 [illegible]
[illegible] 414 [illegible]

FMA

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

Will the real lessor please stand up!

Who do you want to deal with during your computer lease?

An investor? An insurance company? A consortium of banks? Or your leasing company!

As computer experts, we understand your individual equipment requirements. Hartford Computer Group doesn't sell your leased equipment to an investor who will not understand or care about your requirements.

When you sign a lease with Hartford Computer Group, you deal only with us. We maintain complete ownership and control of your leased equipment and can therefore give you the *flexibility* you want in a computer lease. We can do this only by refusing to participate in tax-advantaged leasebacks that give investors control over your leased equipment. Tax-advantaged leases allow for little or no flexibility!

We give you Hartford Computer Group. Want to lease computer equipment? Want to upgrade your computer equipment, renew your lease, or change your leased system completely? With no outside investors or participants to inhibit your transaction, Hartford Computer Group is free to offer the ultimate flexibility in customer service.

You deal with one company, before and after the lease begins, the real lessor...Hartford Computer Group!

Your questions about our unique computer leasing program are answered in our brochure. Write or call for your copy.

Hartford Computer Group **800 323 6355**

A Subsidiary of Hartford Financial Corporation
515 East Golf Road, Arlington Heights, IL 60005
or 312 364 0505

NCR COMPUTER SYSTEM FOR SALE

NCR V-8565 2MB USED 2 YEARS ONLY.

CONFIGURATION:

1 CPU	V-8565 (2MB)
1 Line Printer	9420 (600 L/M)
1 Console	7200
1 Hard Copy	260-1
1 Multiplexor	621
1 I/O Controller	6550
1 Tape Unit	6542-2 X 6
5 Disk Drives	6581
17 CRT	7900 - 3
4 CRT	7900 - 1
7 Matrix Printers	9440
20 Disk Packs	

9869-02 (C.D.C.)

INFORMATION:
TRADE MANAGEMENT SERVICES S.A.
61-65 FILONOS STREET
PIRAEUS - GREECE
PHONE No. 4114-701
and 4113-033/5
TELEX No. 21-2227/21-1276

C.D. SMITH & ASSOCIATES, INC.

DEC computer systems & options
12905 East Freeway, Suite 310
Houston, Texas 77015
(713) 451-3112
TELEX 76-9547

DEC

WE ARE BUYING: VAX 11/780

WE ARE SELLING:

MS780-DC	8,500	TEV68-BA (New)	8,500
MS780-CA	4,000	11X44-FA	Call
MS780-DC	8,500	11780-FA	Call
DW780-AA	8,500	11780-KA	Call
FP11-A(New)	1,500	MS780-EC	39,975
DZ11-E	2,500	11/84A-YB(New)	8,500

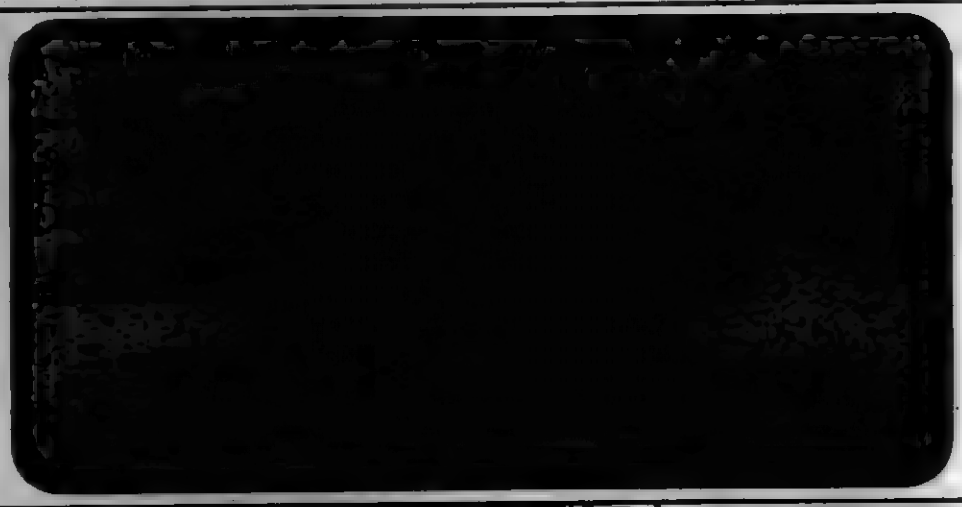
If you want on our Mailing List, call Valerie (713) 451-3112.

Buy•Sell•Lease

SERIES 1 S/34 S/38 4300 S/36 5110 S/23

XERXES

COMPUTER SALES
1914 Harmon Place, Suite 210
Minneapolis, Minnesota 55403
800-328-3884/612-339-3042



NPA SYSTEMS INC.

SPECIALIZING IN:
PURCHASE
SALE, TRADE,
LEASE, RENT,
AND SERVICE OF
Data General
EQUIPMENT

14,000 SQ. FT. WAREHOUSE FULLY SPRINKLED
701 COATES AVENUE HOLBROOK, N.Y. 11741
TELEX # 510 222 0662
(516) 467-2500

WANT TO BUY
SYSTEM/34 PERIPHERALS
5251's, 5291's, 5224's, 5225's, and 5256's

Call 214/258-8541

MC METROPLEX COMPUTER COMPANY, INC.
320 Decker Drive • Suite 180 • Irving, TX 75062
TWX 910-860-5888

We Buy & Sell
DEC
Systems
Components

call:713
445-0062

Digital Computer Resale
660 Kenrick Ste C22
Houston, Tx 77060

DATA GENERAL SPECIALISTS
FOR
Surplus New & Used Equipment & Systems
with full depot repair facilities.
CALL US
WE TAKE THE TIME.
- WE CARE -
JM Associates
991 W. Chapel Avenue
Cherry Hill, NJ 08002
609-663-1115

For Immediate Delivery

VAX 11/730

1 MB MOS MEMORY
LA12
DMF32
VMS 3.5
RUA82
RL02

CALL TODAY:
(703) 841-5634

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

HP

encore
(213) 482-0117

SYSTEMS
4341 4331
38 36 34
32 3
BUY • SELL • LEASE
COMPUTER BROKERS, INC.
2976 SHELBY ST.
MEMPHIS, TENNESSEE
CB
TOLL-FREE
800-238-8405
901-372-2622
PERIPHERALS
3203 3370
327X 3411
3350 3420

COMDISCO
A Commitment To Excellence
IBM PROCESSORS IBM PERIPHERALS
Full Service Leasing

BUY • SELL • LEASE
SERIES-1
S/34 • S/36 • S/38
4300
S/23 S/32 5110-20
Tape • Disk • Printers • Tubes
AMCOM CORPORATION
5200 W 73RD ST - MINNEAPOLIS, MN 55435
(612) 835-4737
CALL TOLL FREE
800-328-7723

* * * * DEC * * * *
BUY—SELL—LEASE—TRADE—CONSIGN
SYSTEMS — PROCESSORS — OPTIONS
PERIPHERAL — MODULES — MEMORY
— SPARES —
NATIONAL COMPUTER EXCHANGE
(800) 624-9299
600 North Lunar Avenue, Brea, CA 92621
TWX: 910-596-1499 (714) 990-5988

System/34
Sale/Lease
4341's
Models K, L, M - GRP 1 & 2
Lease Term - 1 Yr or Longer
Control Units
Controllers
3880 3803
3274 3276
Immediate Delivery
Tape Drives
3420 3430
3410
Immediate Delivery
DASD
3380 3375 3370
3350 3344 3310
Immediate Delivery
Display Stations
3278 3279
3178 3277
Immediate Delivery
Printers
3211
CDLA
Computer Marketing Inc.
P.O. Box 5265 Philadelphia PA 19126

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

WE'RE NUMBER 1 FOR SERIES/1

Computer Options, Inc. is a major remarketer of both new and used IBM SERIES/1's and related peripherals. We offer your firm the option of purchase or a variety of custom leasing programs for your hardware acquisitions. Call us toll-free for more information.

AVAILABLE NOW FOR IMMEDIATE INSTALLATION

4955-F	4964-001
4955-E	4973-2
4956-A	4974-001
4962-2	4975-2L
4963-64A	1310

ALSO AVAILABLE-SYSTEMS 34 & 36

Call toll-free 800-328-5718

(In Minnesota, 612-544-3660)

COMPUTER OPTIONS, INC.
"the best option"
1640 South Highway 100
Minneapolis, MN 55416

TexCom

Join the more than 200 other major companies that lease IBM equipment from TexCom - the IBM specialists.

WE BUY • SELL • LEASE

SERIES 1
- All features and peripherals available
- Buy, sell, trade
- Leases available

4361/4381
- Two, three and four year leases

IBM S/34
IBM S/36
- All models and peripherals available

IBM S/36
- 1, 2, and 3 year leases
- We take S/34 trade-ins

4331/4341
- 1, 2 and 3 year leases
- All models available

TERMINALS
5291 5225 3278
3251 3277 3287
5294 3279
AVAILABLE NOW

DISKS
3370 3380 3340
3375 3350
AVAILABLE NOW

WE WANT TO BUY
- Your IBM systems and peripherals
- Your rental credit equipment

MEMPHIS • SAN ANTONIO • HOUSTON

(512) 349-9955

IPS Information Processing Systems Inc

TELEPHONE: (201) 262-9500 Telex: 642-197

CPU & PERIPHERALS BUY • SELL • LEASE

AMDAHL • BURROUGHS
DATA GENERAL • DEC
HEWLETT PACKARD • NCR
NAS • SPERRY/UNIVAC • WANG

CALL DATASERV TOLL-FREE **800/320-6729**

dataserv

509 SECOND AVE. SO., HOPKINS, MN 55343

NEW AND USED EQUIPMENT FOR SALE BY END USER

DATA GENERAL

7) 6070A 20 MB DISKS	$3500	1) 6073 LP2 PRINTER	500
8) 6070 20 MB SUBSYSTEMS	3500	1) 6098 LP2 SUBSYSTEM	1100
1) 6098 12.5 MB DISK W/FLOPPY	3500	1) 6180 LP2 PRINTER (NEW)	1200
2) 6103 25 MB DISKS (NEW)	5000	1) 6191 LP2 SUBSYSTEM (NEW)	2200
2) 6188 25 MB DISKS	4500	8) 4014/4034 LP2 CONTROLLERS	500
1) 6227D 15 MB DISK (NEW)	4500	1) 6227S 4 LINE ASYNC MUX	350
8) 6027 30 MB DISK CNTRL	750	2) 5493 AMI 16 BD MA DTR BOARDS	150
2) 6260H NOVA 4C 6 SLOT 64 KB CPU	1300	1) 1144A 1 BAY CABINET	600
1) 1079A 1 BAY INDUSTRIAL CABINET WITH AIR CONDITIONER (NEW)			4,400
1) 1079B 1 BAY INDUSTRIAL CABINET WITH HEAT EXCHANGER (NEW)			2,800
1) NOVA 4X 5 SLOT 128 KB 15 MB DISK W/FLOPPY & ULM 5 BOARD			10,500
1) NOVA 4X 6 SLOT 128 KB 12.5 MB DISK W/FLOPPY & ULM 5 BOARD			9,800

MODEMS & TERMINALS

8) VADIC VA3400 1200 BAUD MODEMS	400	33) ADM3A LEAR SIEGLER	275
11) 9612/24 MICOM 2 CHANNEL MODEMS	595	8) ADM5 LEAR SIEGLER TERMINALS	350

CONTACT: ROBERT FULWILER 214-259-0814

The nationwide market - a call away!

DEC/DG

SYSTEMS/PARTS/PERIPHERALS
NEW/USED/SURPLUS • DISCOUNT PRICES

Since 1977! Buy, Sell, Trade and Broker.

PHIL	BRYAN	JENNIFER
DG	11-VAX	8-LSI

CALL TODAY - (305) 392-2005

TELEX 568-670

thomas business systems, inc.
4301 Oak Circle - Unit 11 Boca Raton, Florida 33431

USED TEXAS INSTRUMENTS

Deal Yourself In On BUY-SELL SWAP.

Call COMPUTERWORLD To Place Your Ad 1-800-343-6474 In Mass. (617) 879-0700

CMI

AMERICA'S LEADING SPECIALIST SERVING THE USED MARKET

Aberdeen, NJ (908) 946-7282
Boston, MA (617) 367-5795
Chicago, IL (312) 693-2799
Dallas, TX (214) 385-0906
Encino, CA (818) 789-0113
Houston, TX (713) 780-7480
Lebanon, TN (615) 449-6633
Miami, FL (305) 443-2996
Newport Beach, CA (714) 752-8443
New York, NY (212) 349-5719
Tampa, FL (813) 273-0026
Frankfurt, Germany Telex: 414961 LCO D
Montreal, Quebec (514) 871-1121
Nyon, Switzerland Telex: 27209 CMI CH
Paris, France Telex: 613910 CMI FR
Toronto, Ontario (416) 842-3065
(416) 863-6100
Vancouver, B.C. (604) 685-6196
Windsor, Ontario (519) 972-3010

CMI FINANCIAL SERVICES GROUP
2000 Telegraph Rd., Bloomfield Hills, MI 48013
(313) 456-8000

CMI

A Torchmark Company

2000 Telegraph Rd., Bloomfield Hills, MI 48013
TWX/TELEX: 910-232-1067 CMI CORP TRAN
(313) 456-0000
CMI 4300 Series Hotline Number: 800-321-4300
Member CDLA

3081-D16 Sale or Lease

3081-K24 Sale or Lease

For Sale/Lease 4381 1st Quarter Delivery

3033 All Models

New Series 1 with Basic Operating System "Unix" on the Series 1 IBM Master VAR

3350's Available Now On a Short Term Lease 3370 3375 3380

3880-A6 Available Now 4700 Banking Equipment Buy/Sell/Lease

3725 Lease Financing Available For your System or Ours 2,3,4 or 5 Year Terms

3800 LASER PRINTER Model 1's Immediate Delivery Model 3's Lease Financing Available Any Term 3800-3 3211-1 & 3811-1 3262-3 4245-1

Tapes Immediate Delivery 3803-3420 Buy/Sell/Lease

Wanted 4341-M02 4341-L01 Call Now

3278, 3279 3277, 3276 Terminals All Models Immediate Availability

3705-3704 Available for Immediate Delivery Sale or Lease

SYSTEM 36 Model 7 & 8 Available Now New - Used SYSTEM 38 2, 3, 4 or 5 Year Terms Lower rates than IDC 8100's Available Now - Sale or Lease

Series 1 I/O All IBM Peripherals Any Used Configuration CDC Peripherals Available Tape Back-up 9-track 6250 CDC Diskettes/Peripherals Available IBM Diskettes Buy/Sell/Lease

DEC

RENT • BUY • UPGRADE • SELL

PDP, 11/03, 11/04, 11/23, 11/24, 11/34, 11/44, 11/70, VAX/730, VAX/750, VAX/780

SYSTEMS • OPTIONS • SUPPLIES

11/04	16KB, Dual RL02, DZ11-A, Dual H9642 (new)	$14,995
11/23+	256KB, Dual RL02, DZV11-C, VT102, Basmos (new)	$16,250
11/70	512KB MOS, LA36 (new)	CALL
VAX/730	1MB, RA60, RL02, VMS Basmos (new)	CALL

Customized Configurations—Call With Your Request.

In Stock		Specials		In Stock	
11/84-BC (new)		$11,395	MS11-PB (new)		$4,195
DS11-A (unused)		$ 495	MS750-CA (new)		$4,195
DMF32-AB (new)		$ 2,495	MS750-BC (new)		$3,895
DMP11-BA (used)		$ 995	RA730 (sales)		$2,995
DZ11-F (used)		$ 2,195	RX211-BA (used)		$2,695
H9642 (new)		$ 1,395	RL211-AK (new)		$5,495
KT24 (new)		$ 795	QUA31-AA (new)		Call
LP11-WA (unused)		$ 2,495	VT102-AA (used)		$ 495

BROOKVALE ASSOCIATES
800-645-1167 NY (516) 273-7777

IBM

5110 5120
3741 3742
DATAMASTER

1255 MICR

SYSTEMS
34 36 38 32 23
All Models/All Peripherals

BUY SELL LEASE

- Printers, Display Stations, Upgrades & Cabling Available
- Trades Taken
- IBM Maintenance Contracts

Call Today for Quotation
(615) 352-8565

SOUTHERN DATA SYSTEMS
Memphis, Tennessee

CPR:RESALE

Computer Products & Repair

No charge to tell the Data General world.

Call us to list the DG equipment you have to sell or buy. There are no fees. CPR's large, computer-based sales force will find you a MATCH TODAY through national phone sweeps, direct mail, and advertising to 500,000 contacts.

Buy at the price you want. Sell at the price you need.

$2 Million is also available to buy and sell your inventory first, with aggressive trade-ins, and leasing through national firms.

Expect the price you want TODAY with CPR:RESALE.

CPR gets you results. California 800-392-2317

800-843-2047

1830 Fourteenth Street, Santa Monica, California 90404 213-450-0910

MISSISSIPPI CENTRAL DATA PROCESSING AUTHORITY

Sealed proposals will be received by the CDPA, 505 Robert E. Lee Building, Jackson, MS 39201 for the following data processing equipment and services:

Request for Proposal No. 912, due 3:30 p.m., Monday, April 2, 1984, for the acquisition of Consulting Services for the Mississippi State Highway Department.

Request for Proposal No. 913, due 3:30 p.m., Thursday, April 5, 1984, for the acquisition of a tape cartridge/streamer for the State of Mississippi Computer Center.

Request for Proposal No. 914, due 3:30 p.m., Friday, March 23, 1984, for the purchase of 5 magnetic tape drive and controller to attach to a Data General Nova CS-80 minicomputer system at the Mississippi Bureau of Narcotics.

Request for Proposal No. 915, due 3:30 p.m., Thursday, March 29, 1984, for the acquisition of a distributed processing minicomputer system with word processing, batch data processing, RJE, TSO, and CICS capabilities for the PEER Committee.

Detailed specifications may be obtained from the CDPA office. The CDPA reserves the right to reject any and all bids and proposals and to waive informalities.

Dorothy Hooper or Elaine Knowes,
State Central Data Processing Authority
601/359-1365

IBM 3270

National Computer Equipment Corporation

JOE MICHAELS
313-774-7400
800-NAT-COEC

4341 CPUs

AVAILABLE NOW

EXAMPLE: 4341-K1
S/N 75421
FOR SALE OR
SHORT-TERM LEASE

CDA

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

DISK DRIVES • CONTROLLERS • PERIPHERALS • MEDIA

WANG • DEC

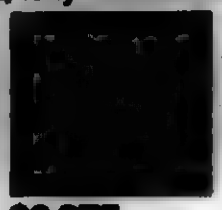
National authorized CDC OEM-Distributor (for Controllers and Media) offers *New Equipment*, fully warrantied for 90 days:

$12,900

CDC Model 9766 (300 Mb.) WANG Models 2200V–2, and 2285 (288 Mb.) DEC Model RM05 (205.1 Mb.)

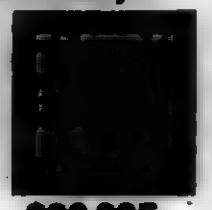
$7,750

CDC Model 9762 (80 Mb.) WANG Model 2200V–1 (75 Megabytes). DEC Model RM03 (67.1 Mb.)



$8,875

CDC Model 9448 (88 Mb.) WANG Model 2200–3 (80.4 Mb.) WANG Models 2200 V–3, 2280 (80 Mb.) DEC Model RM07 (83.4 Mb.)



$20,825

CDC Model 9775 (676 Mb.) WANG Model 2285 V–8 (640 Megabytes). DEC Model 2–RM05 6s (810.2 Mb.)

ERST

INTERNATIONAL CORPORATION

295 Lafayette Street, New York, NY 10012

ERST is the leading dealer in pre-owned WANG equipment—2200, VS, WP (CPUs, Terminals, IOPs, Controllers, Printers, Memory Upgrades).

Next time give us a call . . . Toll Free 1-800-FOR-ERST . . . In NY. 212-431-1100

We've Got Your Number

S/34 ALL MODELS QUICK DELIVERIES

SERIES 1 CONFIGURED TO YOUR NEEDS

S/36 ATTRACTIVE LEASE RATES

S/38 NEW & USED MACHINES

5110/5120 NEW LOW PRICES

PERIPHERALS

CRT'S...PRINTERS...DISK...TAPE...MODEMS

CARLYN

COMPUTER SYSTEMS

9160-G Guilford Road Annapolis, MD 20701

"CALL COLLECT" (703) 642-1950

Buy - Sell - Lease

S/32
S/34
S/38

IBM

3741
3742

CPU's CRT's PRINTERS ALL MODELS

PURCHASE/LEASEBACK SHORT & LONG TERM LEASES

CMA

Computer Marketing of America, Inc.

P.O. Box 71
610 Bryan Street
Old Hickory, Tennessee 37138

1-800-251-2670

In Tennessee: 615-847-4031

CW-1

SYSTEM/34
SYSTEM/36
SYSTEM/38
SERIES/1

FIND IT FAST IN OUR FAMOUS COMPUTER MARKET ADVISOR!

SEND US YOUR BUSINESS CARD AND WE WILL SEND YOU A FREE COPY.

ECONOMIC COMPUTER SALES, INC.

3419 CROSSOVER LANE • P. O. BOX 24227 • MEMPHIS, TENNESSEE 38124

ECONOCOM

- BUYS • SELLS
- LEASES
- QUICK DELIVERY
- COMPETITIVE PRICING
- FLEXIBLE FINANCING
- TRADE-INS ACCEPTED
- PROFESSIONAL SERVICE
- SHORT-TERM LEASING
- LONG-TERM LEASING
- PERIPHERAL LEASING
- TAKE-OUTS DONE

CALL TOLL FREE

800-238-3098

EL CRIMITO

offers:

4381-M2

DELIVERY POSITIONS AVAILABLE

early MARCH
APRIL
MAY
JUNE

(213) 986-2411

4827 N. Sepulveda Blvd.
Sherman Oaks, CA 91403

FOR SALE BY OWNER

IBM SYSTEM/38 Mod 453

Comm. (1 Line, SSC/SDLC)

Other Peripherals:

3370/A11 (8) 5251-11
3262/B01 (2) 3751-11

Available Immediately

Contact:

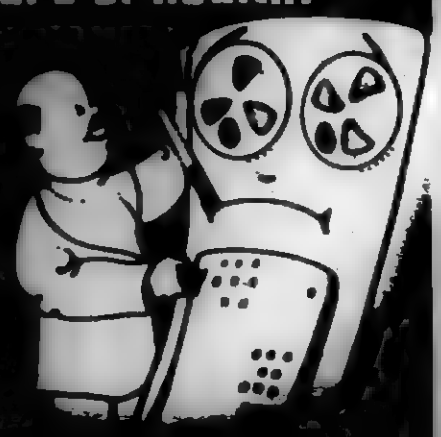
Prime Motor Inns, Inc.

Attn: Don Stevens
700 Route 46 East
P.O. Box 2700
Fairfield, NJ 07007

(201) 882-1010

The new Technicon...

We make every computer the picture of health!



- Refurbishing
- Returns
- Installation
- Maintenance
- Printers
- Disk drives
- Tape drives
- Communications

TECHNICON

735 Belmont Avenue Wood Dale IL 60191

Inflation Fighters

Quality & Savings

Slightly used, Money Back Guarantee, Full Reels, All External Labels Removed Guaranteed for use at 800 BPI through 6250 BPI.

2400' Reel $4.95 ea.
1200' Reel $4.25 ea.
600' Reel $3.50 ea.

All Tapes with Hanging Seals

We pay freight on orders over 200 tapes. All orders shipped within 48 hours.

Call or Write

Computer Tape Mart
44A Seabro Avenue
N. Amityville, New York 11701
(516) 842-8512

MEMORY BOARDS

LSI/11	64K	$1695
VAX 11/780	2MB	$4395
ECLIPSE	64K	$875
NOVA 4	64K	$495

Call For Others

Now 100% Compatible

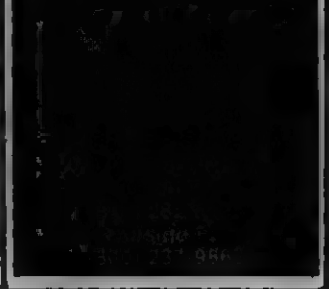
FOR SALE

Complete And Powerful DEC 2060 Computer System

52 KW, 48 Ports
1 RP06, 1 TU45

Contact: Mr Saint-Oyant
INSEAD
Boulevard De Constance
77305 Fontainebleau
France
Tel: (33) 6 422-48-27

NEW HEWLETT PACKARD



EQUIP YOURSELF IN THE CLASSIFIED PAGES OF COMPUTERWORLD

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

FOR DEC
CALL SCHERERS

BRAND NEW CPU's:

11/23-BC	11/23+ 256 KB	$ 4,500.
11/23-BE	11/23+ 512 KB	$ 5,000.
11/34A-YE	11/34A-256 KB	$ 7,000.
11/44-DA	One MB Rack Mount	$25,400.
11X44-FA	New Class A	$26,000.

11/24-AC	5 1/2"	256 KB	$10,000.
11/24-CC	5 1/2"	1 MB	$ 9,900.
11/24-BC	10 1/2"	256 KB	$11,000.
11/24-DC	10 1/2"	1 MB	$11,250.

SCHERERS

9145 SCHERERS PLACE
DUBLIN, OHIO 43017
(614) 889-6010

USED CPU's:
11/02, 11/03, 11/04, 11/05, 11/10, 11/34A, 11/44, 11/70

SCHERERS

SHORT TERM LEASES AVAILABLE

CSX COLA

Check us out for DEC

11X44 $23,000 ☐ RL02-AK $2,300 ☐ 11/23 Any Config.
VAX 750 $43,000 ☐ VAX 780 $131,000

All immediate and guaranteed, Everything from 11/23 to VAX

DATAWARE SYSTEMS LEASE
800-221-6318 30 Bay St. S.I. N.Y. 10301 (212) 447-4911
TELEX 429364/TWX 710588-6736

DSI

WE BUY SELL & LEASE!

BURROUGHS

Discover the DSI alternative.

800-641-5215

All equipment available immediately and guaranteed for Burroughs Maintenance

DSI Serving the Burroughs Community Worldwide
2480 W Alameda Ave. Denver, CO 80223 (303) 922 8331
TWX 910 931 0483

data3

IBM PROCESSORS/PERIPHERALS

GSD | DPD

BUY • SELL • LEASE • SUBLEASE

• All Peripherals • Flexible Leases
• Special Features • On-time Delivery
• Upgrades • Purchase/Leaseback

COLA

PEARL HAS IBM 3741's

and we have System 34, System 36 and System 38 and a large inventory of CPU's, CRT's and printers. Call us about our flexible lease plans for buying, selling, leasing, renting and purchase/leaseback.

Call Dave Allen or Shirley Shreeve

Pearl Computer Division
•P.O. Box 24026 •4717 Centennial Blvd.
Nashville, TN 37202 (615) 383-8703

WANG WORD PROCESSORS AT THOUSANDS OFF!

Guaranteed, remanufactured WPS 3B, WPS 3D and Wangwriters available for immediate delivery. You don't pay a cent till Wang installs and places equipment under service contract. 10-day return privilege. Buy. Lease. Rent!

For Free Info and fast response call toll free:

1-800-321-2986

ELECTRONIC OFFICE EXCHANGE, INC.
Dept. SCSCWD • Box 7337 • Ann Arbor, MI 48107

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

SERIES I SPECIAL

Control Data
126MB Removable Drives . . $12,900
Diskette Drives . . . . . $ 1,495
Printers & Displays

New or Used
Immediate Delivery

IBM
4956 Processors
4967 200MB Disk Drives
All Peripheral & Features

IBM UNIT RECORD EQUIPMENT

SALE OR LEASE

IBM UNIT RECORD MACHINES
026—029—082—083—084
085—087—088—129—514
519—548—557

NEW & USED
DISK PACKS—DATA MODULES
2316—3330(1)—3330(11)—3348(70)
MAG. TAPE-DISKETTES
Every Item Guaranteed

Highest Prices Paid for Used Packs & Modules

THOMAS COMPUTER CORPORATION

AMDAHL

FOR SALE

V/6-II	8 X 12	MARCH 15
V/8	16 X 16	APRIL 1

SUBLEASE

V/7	16 X 16	MARCH 1
V/8	16 X 16	APRIL 15

CALL: CHARLIE BERRY OR TOM STARR
(612) 933-6000
MAJOR COMPUTER INCORPORATED
10237 YELLOW CIRCLE DRIVE
MINNETONKA, MN 55343

DEC

...our unbeatable combination—
...upgrade inventory at low, low prices.

Call toll free 800-328-7000
In Minnesota (612) 894-4020

MIDWEST SYSTEMS, INC.
12447 Riverwood Drive, Burnsville, Minnesota 55337

NEW TELETYPE

IBM 3270 TYPE

Information Display System Consisting of Lee Data Model 310 Controller and 9 Model 1210/1220 Display Stations. Equipment is 2 1/2 years old and well maintained.

Cost: $37,000.
Sell: $17,500.

Call 9-5
(415) 398-4015

• BUY • SELL • LEASE **S/36**

S/34 • MAINTAIN • UPGRADE

For information call

201-343-4554

• COMPLETE SYSTEMS • PERIPHERALS • PROMPT DELIVERY

MARION

IN STOCK!
Fujitsu Eagle
with cabinet, cables, slides & terminator:
$13,000
New Fujitsu SP 380
80 character per second, letter quality printer.
Introductory Special - $2,500

MANDERR
303-693-3035
3771 S. Jasper • Aurora, CO 80013

WANTED

FOR SALE
DEC EQUIPMENT

RM03	(67Mb)	$4,500
RM03-AA	(New, 134Mb)	$12,500
UP11-CA	(300 LPM)	$7,300
VT78	(Terminal)	$150
RH780	11/780 Controller	$4,000

Bloodhawk Enterprises
Eden St. • Middleton, MA 01949
(617) 777-4666

For All Your DEC Requirements

Buy/Sell/Lease
SWITCHING
IBM 2914/3814
Locom LC36-500
T-bar 3915/3816
DataSwitch 1000
Bealt BCS-3/BCS-5
Digital Ind 3403/4101
Jack McAuliffe
4255 LBJ Freeway #218
Dallas, TX 75234
214-661-3661

When buying, selling or leasing computer equipment, there's a *great deal* to be gained by advertising in

• BUY
• SELL
• SWAP

Call COMPUTERWORLD's Classified Dept now at 1-800-343-6474 or (in Mass.) 617-879-0700 for the details.

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Computer Equity Corporation

FOR SALE OR LEASE:
IBM 3033 — AP16
SERIAL No. 20523
• 3042 — 002
• DATA STREAMING
AVAILABILITY — MARCH
535 Fifth Ave., New York, N.Y. 10017
(212) 286-0880

STC
TAPE/DISK
BUY • SELL • LEASE
(408) 241-3677

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

BIDS & PROPOSALS

REQUEST FOR PROPOSAL

New Computer System For The American Society of Civil Engineers New York City

Computer manufacturers, software houses, and/or turnkey vendors are hereby invited to contact the American Society of Civil Engineers to receive a Request for Proposal for a new computer system.

The Request for Proposal may be obtained from Management Information Services, American Society of Civil Engineers, 345 East 47th Street, New York, NY 10017. Phone requests will be accepted at (212) 705-7542.

The Proposal must be received by ASCE at the above address before 5:00 pm on May 7, 1984. The vendor selection is anticipated to be finalized by June 5, 1984.

STATE OF CONNECTICUT
REQUEST FOR PROPOSAL
(RFP)
REFERENCE: R419

Legally Created Office Automation Specialty
Office of the Connecticut Attorney General
(A public agency of 130 attorneys.)

- Word Processing & Document Retrieval
- Docketing & Case Tracking
- Attorney Time & Record Keeping
- Administrative Functions

Interested vendors must contact:
Gordon L. Pynchon, Director
Office of Resources
and Facilities Planning
State of Connecticut (DAS)
340 Capitol Avenue, 1st Floor
Hartford, CT 06106
(203) 566-3004

American Computer Software Manufacturers and Third Party Vendors

The City of Eugene, Oregon is requesting proposals for the acquisition of INTEGRATED SYSTEMS SOFTWARE that includes query language, report writer, application development tools, data base management, data dictionary software. We are preliminarily interested in a system that will allow end users to easily create their own ad-hoc online queries that will provide powerful fourth generation application tools for our programming staff. Proposals will be reviewed by the City of Eugene Purchasing Division until April 16, 1984.

A preproposal conference will be held at 9:00 am PST on Friday, March 23, 1984, at the Regional Information Services classroom, Lane County Public Service Building, 125 East 8th, Eugene, OR. Request for proposals may be obtained from the City of Eugene Purchasing Division, 777 High Street, Room 208, Eugene, OR 97401, (503) 687-5386.

The Bulletin Board

Buy • Sell • Lease Buy • Sell • Lease Buy • Sell • Lease Buy • Sell • Lease

HEWLETT PACKARD

HP3000HP3000HP3000

The Bulletin Board

BURROUGHS

BUY SELL LEASE
All Systems & Peripherals
AVAILABLE
• B1955 Sys • B1965 Sys
• B80s • B900s
(Configured To Your Specs.)
• Mixed 200 Terminals
• 300 Terminals mostly 102 & 110
• 80 Disks, M7705s, M7720s
• 200 & 300 Mags Data Drives
• 1200 Lines Data Communications
• Memory Upgrades
• Printers 2000 & Wide Styles
Guaranteed Burroughs Maint.
Depot Maintenance Available
COMPUTER PROVIDERS
(216) 349-7979
(Extension 2004)

IBM

SALE SALE SALE
SALE ENDS MARCH 19
Any System/24 CPU
The Lowest Prices Ever
Call any other computer dealer before you call us. If we can not beat the best price quoted, we will send you $100.00.*
All upgrades, peripherals and S/36's are available at the best prices around.
PROCOM
(212) 279-1717
* Contingent on delivery of machine at the quoted price and if installed within 4 weeks of this ads appearance.

PRINT TRAINS
IBM 1416 & 3216
Bought - Sold - Lease
Repaired - Reconditioned
COMPU-ACT COMPANY, INC.
(513) 859-8491

Buy • Sell • Lease
IBM
Cougar Computer Corp.
Suite 210
26600 Euclid Office Plaza
Euclid, OH 44132
(216) 261-3660
FOR SALE (All Upgrades & Systems)
64 Meg Upgrade ($/34)
5424-CSS, 8011, 8201-11
5424 (E To F Per $/34)
Migration For $/34
Sales 1 (1255) 5424/5520
8201-201 8/34 & 5110
Available Now At A Great Price!
INTERMEC (404)979-7400
6855 Peachtree Rd., Atlanta, GA 30328

IBM

FOR SALE OR LEASE
IBM 4341-K9
With 3278-2A
and 4631 Keyboard
Available 3/1/84
Call (612) 434-4668

SALE
$/34 E35
FOB New Jersey Now
Call Louis Felder
(914) 238-8631

SYSTEM/36's
Immediate Availability!
STAR DATA SYSTEMS
1 (800) 531-5908
(512) 822-6060-Texas

4341-L1 Now - $XXX/Month
4361-P2 $XX - $XX/Month
3278-2 Qty. Now - $XX/Month
Syscomp
(513) 766-4316

SYSTEMS 34/36/38
Short Term Rental
$/34
1-800-LEASPAK
In TX (817) 268-6023

Fox Computer Sales, Inc.
Buy • Sell • Rent • Lease
Datapoint • IBM
Telephone
W.T.B.: Used Equipment
195 Alpha Drive
Cleveland, OH 44143
(216) 449-6366

For Sale
IBM SYSTEM/34
CPU Model #4X5
256K of Memory
120MB of Disk Storage
1 Communications Line
Diskette Magazine Drive
$22,500
(601) 939-4601
Monte Wright

For Sale
IBM 5211 Printer
300 LPM
(716) 683-9010

IBM

Buy ... Sell.... Lease
IBM MICR
3890 - 1419
(813) 722-4534

MEMOREX 1377
CRT's FOR SALE
$600. Each
Available Immediately
If Interested Please Contact:
Steve Nelson
at (203) 661-4146

4331, 4341
J1 Group 2
Sale/Lease Plan
With I/O
Vargo Companies
(315) 234-2660

For Sale
4341-K1
W/1979
Available Now
Arwell Corp.
(214) 385-7320

IBM 5251
MODEL 11
CRT's For Sale
20 Units
Available Immediately
Call Pat McIntyre
(313) 662-2311 ext. 6

For Sale
MEMOREX
1270
BISYNC/ASYNC
32 Lines
Mike (213) 599-0211

3370's
A12 & B12
A62 & B62
Available Now!
Ceres Capital Corp.
New York (212) 279-4667
Houston (713) 627-7117

FOR SALE
3380-A2 w/6150
3380-B2 (4)
3380-B2F
3380-C2 w/6150
Call Howard King
(914) 238-8631

IBM

For Sale By Owner
IBM S/34 E35
1 5211-02 Line Printer
1 5262-00 Dot Matrix Printer
3 5251-11 Terms W/Cable Thru
Marlow Terminals Corp.
Jan Brooks (416) 568-6576

SYSTEM 3 MODEL 15D
256K, 16MB
4430 600 LPM
3741 Dir. Attach.
5444 Data Entry Sys. Incl.
System Backed W/ Comm. Fac.
At Reasonable Offer Refused
Contact Tom Frederick
(201) 477-1788

FOR SALE
3704-A2
Low-Cost
Communication Controller
– Available Now
Call Bill Cahill
(914) 238-8631

Call
(800) 343-6474
Or
(517) 979-6700
To
Place
Your
Ad
Today

PRIME

PRIME
LARGE SELECTION
OF USED PRIME
COMPUTER SYSTEMS
...SAVINGS TO 50%
Peripherals also available:
Memories-Disk Drives-Controllers
Modems-Terminals-Printers
1st SOURCE
...Your Ultimate Source
A DATAMATION SERVICES, INC., COMPANY
3991 EAST CAMPBELL AVE.
PHOENIX, ARIZONA 85018
(602) 957-0888
ASK FOR DON OR MATT

HONEYWELL

LEVEL 6 & DPS 6 EQUIPMENT
Refurbished Like Polaroid
6/43 Disk Drives
6/45 CPU
6/45 Disk (67 + 16)
1,200 LPM Printer
1600 BPI Tape & Controller
6/7601 CRTs
Available Again 6/1/84
Buy Our Equip. and
Take Over Last 12 Months
of FMV Operating Lease
(516) 334-0707

NCR

500 DISK UNITS
NCR Main Avail. Immed.
Financial International Corp.
3 Northgate Park, Ste.300
Chattanooga, TN 37415
Tel. (615)870-8000
We supply more NCR Computer Equip. To More NCR Users Than Any Other Company, Except NCR!

NCR 8251
128K Memory
2 .5MB Disk Drives
1 9400 300LPM Printer
All or Part, Best Offer
(212) 741-7007
Bob Pedersacht

WANG

For Sale:
Several VS-80 Systems
Incl. 256-512K, 2 WK Stn's,
30 Meg "Winchester", 600 LPM
Printers. From SMALL Sys.
Also Available: OIS 115-4 (20 Meg)
(617) 272-6530
CPR Associates
Specializing in WANG Specialists
Since 1978

Paypot...
WANG USERS.....
HAVE YOU HEARD ABOUT THE GROUP OF FORMER WANG EMPLOYEES IN ATLANTA WHO BUY & SELL USED WANG EQUIPMENT AND PLUG COMPATIBLES?
LC.A. (404) 977-4366 or
1-800-241-5186

MISC.

Buy • Sell • Lease
• Short Term Rentals •
DATAPOINT
FOR SALE
5/40 Disk $1,100
5/40 Cartridge $600
5/40 CRT's $1,200
1/50 Cartridge $1,000
5/40 Memory Expansion $1,000
5/40 200 CPS Printer $1,200
5/40 Asc Prin. 8850 $1,200
5/40 Communications $1,000
5/40 Terminations $300
24 HOUR DELIVERY
Cougar Computer Corp.
(216) 261-3660

WANTED
Not for profit organization seeking donations in return for fair market value tax credits.
1) HP Systems, Peripherals, Boards, etc.
2) Misc. Computerists for WPB+ consulting Functions.
Contact Tom at (305) 974-5445

Credit Bargains
M/80 21/40 complete $6000.00
P/250 Printronix $4000.00
Information Resource Center
500 Trotter Avenue
Drexel, MA 01888
(617) 897-1388
Jean M. Royer

MISC. SYSTEMS

Micro to Mainframe
Transmit DOS Direct
"NATIVELINX"
3270 - 2780/3780
Coax, Coaxity, Baseband Channel
Viking Associates
(305) 692-7004

For Sale
DATAPOINT 1500
128K
10MB Cyclelia Disk
Under Datapoint Maintenance
DP Associates Inc.
(601) 857-5260

Your ad
can be here
for
$130

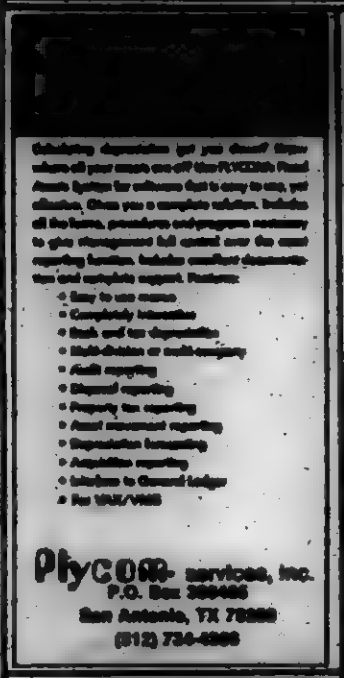
SOFTWARE FOR SALE

CS SOFTWARE
VAX
PDP-11
Payroll • • Job Cost
General Ledger • • Fixed Assets
Accounts Receivable • • Accounts Payable
Inventory • • Order Entry
Client Writeup
Compu-Share
3824 - 50th St. • Lubbock, TX 79413 (806) 792-3785

More IBM System/38 Users Are Choosing RTC Systems.
For technically superior software in a wide range of Financial, Manufacturing, Distribution and Management Business Systems.
The International Software Developers.
RTC Systems, Inc.
49 Plain Street
North Attleboro, MA 02760
(617) 695-5008

SELLING SOFTWARE?
SELL IT HERE.
Place your ad in the BUY-SELL-SWAP pages of COMPUTERWORLD
1-800-343-6474 or
(In Mass.) (617) 879-0700

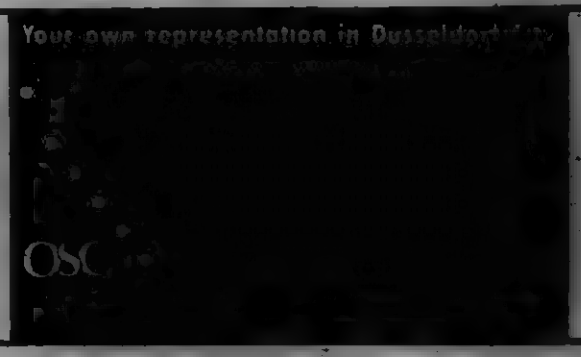
SOFTWARE FOR SALE | SOFTWARE FOR SALE | SOFTWARE FOR SALE | SOFTWARE FOR SALE | SOFTWARE FOR SALE



Plycom services, Inc.
P.O. Box [illegible]
San Antonio, TX [illegible]
(512) 734-[illegible]

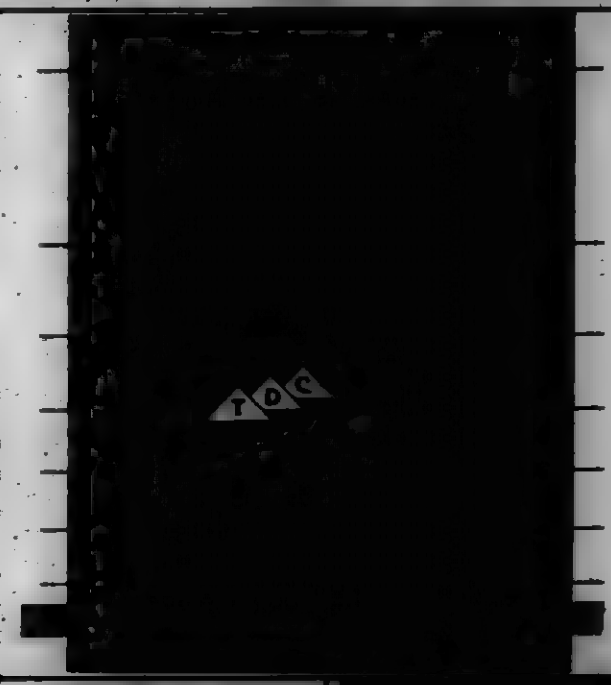
BUSINESS OPPORTUNITY

Series 1
Security
Tiered Record of
• Dial-In Access
• Program Usage
Responsetime/1
Paradigm Computer Company
524 Union St., #208
San Francisco, CA 94133
(415) 398-7228



TIME & SERVICES

ICOTECH
Innovative Computer Techniques
COMPUTER SERVICES
IBM 3081 DEC-10
-Remote Job Entry -Online Processing
-Batch Processing -Timesharing
-Optical Mark Reading -Laser Printing
COMPUTER OUTPUT MICROFILM
-Telegraphic Mini Auto-Comb
-Telegraphic Datamaster
-6250 BPI Capability
-Free Testing
Route 202
Raritan, NJ 08869
201-534-9183
Contact: Joyce Bagwadia



35 - 50% COST SAVINGS!
IBM 3033 full capacity - days, evenings, weekends in Western U.S.

SYSTEM DEVELOPMENT ON TSO/SPF
ISPF, COBOL, FORTRAN, PL/I, IMS, ADF, VSAPL and other aids.

MIGRATION HELP TO MVS OR A BIGGER SYSTEM
We can give you the computers and the technical help when you need it.

MODELING, PROJECTIONS, HEAVY BATCH
With VSAPL, ADRS, ADI, SAS, APE, GPSS, MPSX or your own programs.

PRIMDATA OF SWEDEN
44 Montgomery St., Suite 500
San Francisco CA 94104 - Tel (415) 955-2612

COMMERCIAL DATA PROCESSING
4341-2 370/168-3
OS-DOS-VM/CMS
CICS-ROSCOE
REMOTE JOB ENTRY
CICS DEVELOPMENT
CUSTOMIZED SOFTWARE
XEROX LASER PRINTING
Contact Greg Gorab
(201) 777-3464
15 MINUTES FROM LINCOLN TUNNEL
ONE PASSAIC STREET
WOOD RIDGE, N.J. 07075

VAX/VMS TIMESHARE
5¢
$2 PER HOUR CONNECT TIME
ONE MB DISK STORAGE INCLUDED
AVAILABLE NATIONWIDE VIA TELENET
LEASE-A-PORT™ WITH 10 MB DISK & NO CPU OR CONNECT CHARGES FOR $800 PER MONTH
HYDRA CORPORATION
(714) 5[illegible]
(213) 5[illegible]
(714) 5[illegible]

DATA CENTER SERVICES
[illegible]
BURNS

VAX 11/780 AND PDP-11 DEVELOPMENT TIME
NO KILOCORE TICK CHARGES / NO CPU CHARGES
Omnicomputer
$7/$14
RSTS/E VMS
PER HOUR CONNECT TIME
BUDGET BYTES™ 212-944-9238
Omnicomputer, Inc.
[illegible] 1430 Broadway, New York, N.Y. 10018

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY
375 Cochituate Road, Box 880, Framingham, MA 01701/(617) 879-0700

CLASSIFIED ADVERTISING ORDER FORM

Computerworld's Classifieds work.

Issue Dates: Ad closing is every Friday, 10 days prior to issue date.

Sections: Please be sure to specify the section you want: Time and Services, Software for Sale, Position Announcements and Buy/Sell/Swap. (Available upon request: Software Wanted, Business Opportunities and Real Estate).

Copy: We'll typeset your ad at no extra charge. Please attach CLEAN typewritten copy. Figure about 25 words to a column inch, not including headlines.

Cost: Our rates are $128.10 per column inch. (A column is 2" wide.) Minimum size is two column inches (2" wide by 2" deep) and costs $256.20 per insertion. Extra space is available in half-inch increments and costs $64.05. Box numbers are $15.00 extra.

Billing: If you're a first-time advertiser, (or if you have not established an account with us.) WE MUST HAVE YOUR PAYMENT IN ADVANCE.

Ad size desired: _____columns wide by _____inches deep.

Issue Date(s): _____

Section: _____

Signature: _____

Name: _____

Company: _____

Title: _____

Address: _____

Telephone: _____

Send this form to:

COMPUTERWORLD

CLASSIFIED ADVERTISING,

375 Cochituate Road, Box 880,
Framingham, MA 01701

Foreign Editorial/ Sales Offices

England: Terry Cartwright, IEC Publications, 196-200 Balls Pond Rd., London N1 4AG. Phone: 01-359-3525, Telex: (851) 894085 (Computer Management, Computer Business Europe only).

Euan Rose, Bill Dunlop, Stephen Thomas, Beare Hobson Assoc., 345 Goswell Rd., Islington, London EC1V 7HN. Phone: 01278 3415/6 (reps for all CWCI publications except Computer Management and Computer Business Europe).

W. Germany: Eckhard Utpadel, CW Publikationen, Friedrichstrasse 31, 8000 Munich 40. Phone: (089) 38172-0. Telex: 5215380.

France: Axel Leblois, Le Monde Informatique, 185 Avenue Charles De Gaulle, 92200 Neuilly Sur Seine, Paris. Phone: 758.14.14. Telex: 613234 F.

Japan: Mr. Shuji Misaguchi, Computerworld Japan, 7-4 Shintomi 1-Chome, Chuo-ku, Tokyo 104. Phone: (03) 551-3662. Telex: 252-4217 (Computerworld Japan only).

H. Kajiama, Tokyo Representative Group, Yonaguchi Bldg., 2-12-9 Kanda Jimbo-cho, Chiyoda-ku, Tokyo 101, Phone: (03) 230-4117/8, Telex: J26660 (reps for all CWCI publications except Computerworld Japan).

Australia: Alan Power, Computerworld Pty. Ltd., 37-43 Alexander Street, Crows Nest, NSW 2065. Phone: (02) 4396133, Telex: AA74762 COMWOR.

Brazil: Eric Hippeau, Data News, Computerworld do Brazil, Servicos e Publicacoes Ltda., Rua Alcindo Guanabara, 25/10th Floor 20031 Rio de Janeiro, RJ Brazil. Phone: (021) 240-8225. Telex: 2130838(WORD BR).

Mexico: Richard Small, Computerworld de Mexico, Oaxaca 21-2, Colonia Roma, Mexico City 7 D.F. Phone: (905) 514-4218, (905) 514-6309. Telex: 1771300 ACHAME, 1777809 ACHAME.

Spain: Neil Kelley, Computerworld/Espana, Gravina, 13, Madrid 4. Phone: 231-23-85; 231-23-86; 231-23-88. Telex: 47894(CW E).

Denmark: Preben Engell, Computerworld/Denmark, Gammel Strand 50, 1202 Copenhagen K. Phone: 01-1234-11. Telex: 27566 cwdan.

Sweden: Bengt Mamfeldt, Nova Media, Nova Media AB, Vartavagen 55, 11536 Stockholm. Phone: 08-234260. Telex: 8105089 NOVACW.

The Netherlands: Johannes A. Witvoet, Mgr. Dir., Computerworld Benelux, Van Eeghenstraat 84, 1071 GK Amsterdam. Phone: 020-646426. Telex: (844) 18242.

Italy: Daniele Comboni, Gruppo Editoriale Jackson, s.r.l., Via Rosellini 12, 20124 Milano.

Argentina: Ruben Argarin, Gen. Mgr., Computerworld Argentina, Av. Belgrano 406-Piso 9, CP 1092 Buenos Aires. Phone: 34-6883/6884.

Norway: Mr. Per Berneljord, Editor, CW Norge A/S, Hovinveien 43, P.O. Box 2862, Tasyen, Oslo 6. Phone: 2/647725. Telex: (856) 78478

Singapore: Mr. David Naidu, General Manager, Asia Computerworld, Pte. Ltd., 11-08/11-10 Goldhill Plaza, Newton Road, Singapore. Phone: 250-444. Telex: (786) RS 37003

Saudi Arabia: Mr. Omar Dujaili, General Manager, Saudi Computerworld, P.O. Box 5455, Jeddah. Phone: 6679916/6660380. Telex: (926) 401205.

ADVERTISERS INDEX

Quad Systems International ED/46
Quadram Magnakey 119
Quasar Operations ED/46

Ramtek Reduced 58-61
Honeywell Information Systems ED/30-ED/31
Raytheon Advanced 120
RCA/V Computer Systems ED/28

RDM 37
REC Asia ED/28
Reflectronics 48
Renaissance Data Processing 7
Resource Training Systems 95
Retrofitting Systems ED/13

RCA Software Inc. ED/10
Robocom Systems 88

Rogers ED/46

Laser Kingdom 36
Lee Data Corp. 81
Levi, Ray & Shoup 35
Liberty Corp. 109
Logical Data 47
Lynnde Ordway, Co. 32

MacMillan Book Club 89
Manager Software Products 25
Mantissa Corp. 28
McCormack & Dodge ED/28
Micro Peripherals, Inc. 77
MicroPrecis 84
Micro-Term 23
MRI 109
MSI Data Corp. ED/15
MTI 14,15,16
Mike Mercer & Associates 9

National Semi Conductor 22
NCR ED/26
NEC 64-67,76
Northern Telecom 30-31

On-Line Software ED/10

Pace 88
Paradigm 123
Para Research 69
Paradyne ED/44
PC World 119
Perkin Elmer ED/1-ED/6
Personnel Data Systems 111
Plessey Computer 103
Prentice 29

Quality Micro Systems 96
Quantronics 33

Rago 41
RAS Institute 30-31
RBT ED/24
Rental Technology Inc. 39,ED/40
Rexnord 117
Software AG 89
Software International 74-75
Sperry Corp. 40
Steel Rentals 115
Stratus Computer 98
Synapse 26
Syncsort 3
Systems Support Software 94

Tandem Computers 56-57
Technology Transfer Institute ED/8
Telebyte Inc. 60-61
Teletype Corp. ED/31
Televideo Systems ED/40
TCCM 16-17
Theis, Inc. 94
Time Software 69
Triangle Software ED/17
Tri-Data 60

Unigraphics Data 58-61
Universal Data Systems 35
University Computing Corporation ED/42-ED/43
US Postal Service ED/32
US Robotics 90

Vision Software 25
VM Software, Inc. ED/24

Walker Interactive 73
Wang Laboratories ED/35
Wicat ED/18-ED/19
Winterhalter Associates 96-97
WYSE Technology ED/9

Yourdon 5

Zenith Data Systems 42
Zentec 44-45

ABC Management 12
ACM Sigcraph 11,12,14
ACX ED/23
Ad Council 84
Agile 123
Allergo Products 84
American Software, Inc. 49
American Telephone & Telegraph ED/47,166-167
Applied Information Development ED/22
Ashton Tate 13
Asycom 103
Automated Training Systems ED/53

John Basil 100
BGS Systems, Inc. 49
Boeing Computer ED/12
Boole & Babbage ED/23
Brougier ED/10
BSR ED/20

CBA Software 84
Charles River Data 86
Chicom 56-57
Communication Solutions Inc. ED/22
Compaq 114
Computer Communications Inc. 124
Computer Corporation of America 30-31
Computer Power Systems 15
Computer Technology Group 78
Compuware ED/20
Context MBA ED/27
Corvus Data Systems ED/34
Cullinet ED/14
Curtis 1000 120
CW Buyer's Guide 121
CWCI 116
CW IMS 98,104

DaTeam 17
Data Design Associates 84
Datapoint 112,113
Data Processing Design ED/28
Dataproducts 97,ED/38,100
Datastream ED/39
DEC/TPG 101
Deltak 58,59
Diablo Systems ED/54
Digital Communications, Assoc. 62-63
Digital Source 64
Disaster Recovery 26
D.J.C. Corporation 84
Dynacomb ED/13
Dynax 62

Enterprise Technology 52
Expert Systems 70-71
Exxon Office Systems ED/41

Fibronics 22
Fortune Systems 11,12,14
Four Phase Systems ED/10-ED/11
Fusion Products 27

GENICOM ED/50

This index is provided as an additional service. The publisher does not assume any liability for errors or omissions.

Computerworld Sales Offices

Vice-President/Sales/Donald E. Fagan
Director/National Sales/Edward P. Marecki
Marketing Support Manager/Kathy Doyle
COMPUTERWORLD, 375 Cochituate Road, Box 880,
Framingham, MA 01701
(617) 879-0700

BOSTON SALES OFFICE (617) 879-0700
Northern Regional Director/Chris Lee
District Managers/Jim McClure, Ronald Murphy,
Joyce Donovan, Michael F. Hollister
Sales Assistant/Alice Longley
COMPUTERWORLD, 375 Cochituate Road, Box 880,
Framingham, MA 01701

CHICAGO SALES OFFICE (312) 827-4433
District Managers/Arthur Kossack, Russ Gendzia
Sales Assistant/Joan F. Broderick
Northern Regional Director/Chris Lee
COMPUTERWORLD, 2600 South River Road, Suite 304,
Des Plaines, IL 60018

NEW YORK SALES OFFICE (201) 967-1350
Eastern Regional Director/Michael J. Masterson
Senior District Manager/Doug Cheney
District Managers/Ray Costin, Joan Daly, Fred Lo Bello
Sales Assistant/Gale M. Palermo
COMPUTERWORLD, Paramus Plaza I,
140 Route 17, North, Paramus, NJ 07652

LOS ANGELES SALES OFFICE (714) 261-1250
Senior District Manager/Bob Hubbard
District Manager/Bernie Hockenberger
Western Regional Director/William J. Hadley
COMPUTERWORLD, 18000 Sky Park Circle, Suite 260,
Irvine, CA 92714

SAN FRANCISCO SALES OFFICE (415) 421-7330
Western Regional Director/William J. Hadley
Senior District Manager/Tony Milone
District Managers/Theodore Pompeo, Ernest Chamberlain
Account Manager, Classified/Kevin Shortman
COMPUTERWORLD, 300 Brannan, Suite 20,
San Francisco, CA 94107

ATLANTA SALES OFFICE (404) 394-0758
District Manager/Jeffrey Mandell
Eastern Regional Director/Michael J. Masterson
COMPUTERWORLD, 1400 Parker Road, Suite D,
Atlanta, GA 30338

CLASSIFIED ADVERTISING (617) 879-0700
Al DeMilo
COMPUTERWORLD, 375 Cochituate Road, Box 880,
Framingham, MA 01701

CW INTERNATIONAL MARKETING SERVICES
General Manager/Diane La Mantia
COMPUTERWORLD, 375 Cochituate Road, Box 880,
Framingham, MA 01701
(617) 879-0700
Manager, West Coast/Peter Crockett
COMPUTERWORLD, 1400 Marsh Rd.,
Menlo Park, CA 94025
(415) 328-8084

CW COMMUNICATIONS/INC.
Board Chairman/Publisher
Patrick J. McGovern
President
W. Walter Boyd
Senior Vice-President
Lee Vidaver

Group VP-Communication Services, Jack Edmonston. Group VP-Circulation, Margaret Phelan. VP-Marketing, Donald E. Fagan. VP-Finance, William P. Murphy. VP-Editorial, John Wilkinson.

Computerworld Headquarters: 375 Cochituate Road, P.O. Box 880, Framingham, MA 01701
Phone: (617) 879-0700, Telex: 95-1153.

SALES — Vice-President, Donald E. Fagan. National Director, Edward P. Marecki. Corporate Advertising Administrator, Frank Collins. Marketing Support Manager, Kathy Doyle. Display Advertising Supervisor, Anne Hadley. Display Advertising, Deborah Bryer, Pam Valentinas, Elaine Calos, Carolyn Medeiros, Cindy Cleland, Mary Waddick. Classified Operations Manager, Cynthia Delany.

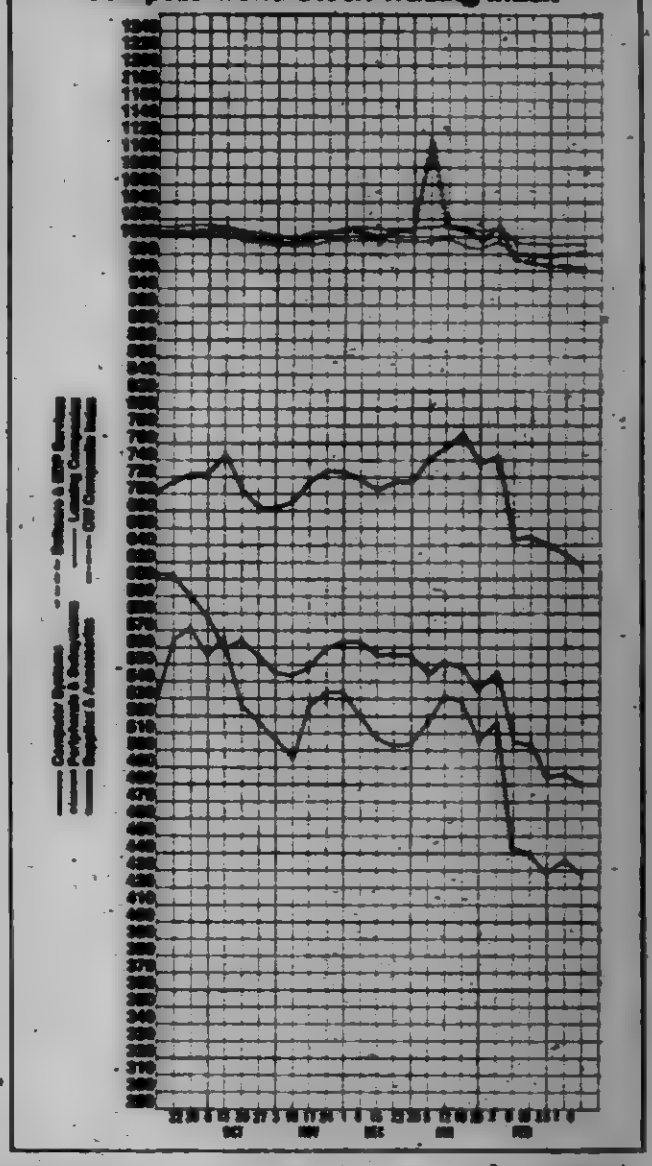
CONFERENCE SERVICES — Group Vice-President, Jack Edmonston. Director Research, Kathryn Dresken. Sales Promotion Director, Liz Johnson.

PRODUCTION — Production Director, Peter Holm. Production Manager, Melissa Sibiel. Paste-Up Manager, Trish Gaudette. Systems Manager, Tom Flau. Typesetting Manager, Carol Polack. Art Director, Tom Monaghan. Graphic Designer, Hank Ring.

CIRCULATION — Group Vice-President, Margaret Phelan. Circulation Manager, Jane Duxbury. Fulfillment Manager, Maureen Burke.

Computerworld can be purchased on 35 mm microfilm through University Microfilms Int., Periodical Entry Dept., 300 North Zeb Rd., Ann Arbor, Mich. 48106. Phone (313) 761-4700. Computerworld is indexed, refer to Circulation Dept. for subscription information.

Computerworld Stock Trading Index



Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, MARCH 7, 1984

All statistics compiled, computed and formatted by TRADE QUOTES, INC Cambridge, Mass. 02139

COMPUTER SYSTEMS

		PRICE 3/07/84	CLOSE	HIGH	HIGH
	NAME	(1)	1984	CHANGE	CHANGE
A	ALPHA MICROSYSTEMS	11- 3/4	12	-1	-7.8
A	ALTOS COMPUTER SYST	5- 7/8	6 3/4	+ 1/4	+5.6
A	ANADAC CORP	5- 3/4	17 7/8	+ 7/8	+5.1
A	APPLE COMPUTER INC	19- 1/2	28 1/2	+ 1/4	+0.9
A	AT&T	17- 7/8	17	+ 1/8	+0.7
A	BURROUGHS CORP	46- 1/2	48 1/8	+ 7/8	+1.9
A	COMPUTER AUTOMATION	9- 1/2	9 1/8	-1	-10.3
A	COMPUTER CONSOLES	9- 3/8	14 1/2	- 1/8	-1.8
A	CONTROL DATA CORP	31- 3/4	32 1/2	- 1/8	-0.6
A	CONVERGENT TECHNOL	15- 1/2	16 1/8	- 1/8	-0.6
A	CRAY RESEARCH INC	39- 1/2	42 3/8	+ 7/8	+2.6
A	DATA GENERAL CORP	40- 1/2	44 1/4	+1 1/2	+3.5
A	DATAPOINT CORP	31- 3/8	33 1/2	+ 1/4	+0.8
A	DIGITAL EQUIPMENT	62- 1/2	62 1/2	- 3/8	-0.7
A	EXIDY INC	9- 1/8	13 3/4	- 1/4	-1.7
A	ELECTRONIC ASSOC.	9- 1/2	9 5/8	- 1/4	-2.5
A	FLOATING POINT SYST	11- 1/4	14 1/4	-1 3/8	-10.3
A	FOREMOST	22- 1/2	26 3/8	- 1/4	-0.9
A	GENERAL AUTOMATION	9- 1/8	10 1/2	- 1/4	-2.3
A	GERBER INC	39- 1/4	40	+ 1/2	+1.2
A	HARRIS CORP	32- 3/4	36 1/8	- 1/4	-0.6
A	HEWLETT-PACKARD CO	32- 1/2	34 1/2	- 7/8	-2.6
A	HONEYWELL INC	73- 1/2	81 1/2	- 3/8	-0.7
A	IBM	97- 1/2	107 3/8	-2 5/8	-2.3
A	IPL SYSTEMS INC	3- 1/2	4 3/4	- 1/2	-9.5
A	M/A-COM INC	14- 3/8	18 3/8	- 1/8	-0.6
A	MANNESMANN CORP SYSTE	1- 1/2	3/4	-	0.0
A	MANAGEMENT ASSIST	7- 1/2	8	- 3/4	-9.3
A	MATHEMATICA CLSC(ADR)	43- 1/2	50	-1 3/4	-3.4
A	MORALAY COMPUTER SYS	4- 1/2	7 3/4	0	0.0
A	MORGAN DATA SCI	10- 1/2	10 1/2	- 1/8	-1.2
A	NATIONAL INC	135- 1/2	147 1/2	-3 1/2	-2.7
A	NAT'L SEMICONDUCTOR	12- 3/8	13 1/2	- 1/8	-0.9
A	NBI INC	21- 1/2	28 3/4	-	-0.7
A	NCR	39- 1/2	107 1/2	- 1/4	-0.2
A	PERKIN-ELMER	17- 7/8	22 1/4	- 1/4	-0.8
A	PRIME COMPUTER INC	11- 3/8	17 7/8	- 1/8	-0.7
A	SPERRY CORP	31- 1/2	38 1/8	-1 3/4	-4.2
A	TANDEM COMPUTERS INC	14- 1/2	30 1/2	-1 1/2	-4.7
A	TANDY CORP	31- 1/2	31 1/8	0	0.0
A	TELEVIDEO SYSTEMS	11- 1/4	11	-1 3/8	-11.1
A	TELTRON CORP	9- 1/8	8 3/4	- 1/4	-2.7
A	TEXAS INSTRUMENTS	71-1/8	155 1/8	-3 3/8	-2.0
A	ULTIMATE CORP	6- 3/8	12	+ 7/8	+8.3
A	WESTERN GRAPHICS INC	3- 1/4	3 1/4	0	0.0
A	WANG LABS "B"	13- 1/2	17	-1 3/8	-7.5
A	WANG LABS "C"	11- 1/2	15 1/2	- 7/8	-5.3
A	XEROX CORP	39- 1/2	38 3/4	-1 3/8	-3.4

LEASING COMPANIES

A	BOOTHE FINANCIAL CP	11- 1/2	41 1/2	+2 1/8	+5.3
A	CORESCO INC	7- 1/2	13 3/8	+ 3/8	+2.8
A	CONTINENTAL INFO SYS	9- 1/2	9 3/4	0	0.0
A	DPF INC	9- 1/2	11 1/2	+ 3/4	+6.8
A	SELECTRON INC	13- 1/2	15 1/2	+ 1/2	+3.3
A	U.S. LEASING	39- 1/2	39	- 1/2	-1.2

COMPONENTS

A	ADVANCED MICRO DEV	10- 3/4	27 1/2	-1 1/8	-3.9
A	ADV'D SEMICONDUCTOR	11- 3/4	28	+ 3/8	+2.3
A	ANALOG DEVICES INC	19- 1/2	31 3/4	+ 3/8	+1.1
A	ANALOGIC CORP	10- 3/4	15 1/2	- 3/4	-4.6
A	APPLIED MAGNETICS CP	15- 1/2	15 7/8	- 3/8	-2.3
A	TERADYNE	14- 3/4	27 1/2	- 1/4	-0.9

SOFTWARE & EDP SERVICES

A	ADVANCED COMP TECH	1- 5/8	2 1/4	+	0.0
A	ADVANCED SYSTEMS INC	6- 1/2	10 3/8	+ 1/8	+2.4
A	ASK COMPUTERS INC	7- 1/2	22 3/4	+ 1/2	+2.2
A	AMERICAN SOFTWARE	4- 3/4	10 1/2	+ 1/4	+2.9
A	ASHTON-TATE	21- 1/2	44 1/2	- 3/8	-0.8
A	AUTOMATIC DATA PROC	43- 1/2	54	- 1/4	-0.5
A	BANCTEC INC	4- 1/2	4 5/8	- 3/8	-7.5
A	BASIC/FOUR CORP	7- 1/2	7 1/4	+ 1/4	+3.6
A	BUSINESS DATA SYS	4- 1/2	4 3/4	- 1/4	-5.0
A	CMA/VITA CORP	1- 1/2	1 1/4	+ 1/4	+25.0
A	COMPUTER DATA SYST	4- 1/2	5 1/2	+ 1/4	+4.7
A	COMPUTER SCIENCES	11- 1/2	13 7/8	-1 1/2	-9.7
A	COMPUTER TASK GROUP	7- 1/2	12 1/4	+	0.0
A	COMPUTER VISION	7- 1/2	8 1/4	+ 1/4	+3.1
A	COMPUTERVISION	7- 1/2	8	+	0.0
A	CULLINET SOFTWARE	17- 1/2	38 3/4	-1 1/2	-3.7
A	CYGNET SYSTEMS INC	5- 1/2	17 1/4	+ 1/4	+1.4
A	ELECTRONIC DATA SYST	19- 1/2	33 7/8	+ 3/8	+1.1
A	HORIZON SYSTEM INC	4- 1/2	17 3/4	+ 1/4	+1.4
A	INFORMATION ELECTRIC CO	19- 1/2	20 1/2	-1 1/4	-5.8
A	GTE CORP	29- 1/2	37 3/4	- 1/2	-1.3
A	INFORMATICA INC	3- 1/2	3 3/4	- 1/8	-3.3
A	INFOTRON SYSTEMS COR	19- 1/2	29 3/4	- 1/4	-0.8
A	KEANE ASSOCIATES	4- 1/2	8		0.0
A	LOGICON	19- 1/2	33 3/4	-1 1/8	-3.2
A	MCI COMMUNICATIONS	3- 1/4	5 1/4	- 1/4	-4.5
A	MANY SCI ANCH INC	3- 1/2	10	-1 1/4	-7.2
A	MATHEMATICAL APP GRP	3- 1/4	3	0	0.0
A	MICRO SYSTEMS INC	23- 1/2	38	-2 1/2	-6.2
A	MOHAWK-MOHER CP	1- 1/2	2 1/8	- 1/2	-8.2
A	NATIONAL DATA CORP	9- 1/2	17 3/4	-1 1/2	-7.7
A	ON-LINE SOFTWARE INT	3- 1/2	3	-1	-10.0
A	PANSOPHIC SYSTEMS	3- 1/2	5 1/2	- 1/8	-4.8
A	PLANNING RESEARCH	9- 1/2	13 3/8	- 1/8	-0.9
A	POLICY MGMT SYSTS CP	19- 1/2	33	-1 3/4	-7.9
A	PROGRAMMING & SYS	1- 1/2	3 3/8	+ 1/2	+10.2
A	REYNOLDS & REYNOLD	11- 1/2	19 1/4	-1 1/2	-6.7
A	SCI CORP	11- 3/8	19 1/4	- 1/4	-1.3
A	SHARED MEDICAL SYST	19- 1/2	38	-1 1/2	-3.8
A	SCIENTIFIC COMPUTERS	3- 1/4	3	- 1/2	-14.2
A	SOFTRONIC INC	3- 1/2	12 3/8	+1 3/4	+16.4
A	TYMSHARE INC	11- 3/8	25 1/4	+ 1/8	+0.5
A	UNI CORP	9- 1/2	13 1/8	+ 1/8	+0.9
A	UNLV CORP	7- 1/2	9 1/4	+ 1/8	+1.3

PERIPHERALS & MEMORIES

A	AM INTERNATIONAL	7- 1/2	9 3/8	- 1/8	-1.3
A	ANDERSON JACOBSON	7- 1/2	7 7/8	+ 3/8	+5.0
A	AUTO-TROL TECHNOLOGY	13- 1/2	15 1/2	+ 1/2	+3.3
A	BASTEC INC	7- 1/2	8 3/4	-1 1/4	-11.3
A	BRUNTON INT'L	4- 1/2	5 3/4	0	0.0
A	BOLT-BERANEK & NEW	7- 1/2	17 3/4	-1 1/8	-5.7
A	CANRAD CORP	1- 1/2	1 1/2	0	0.0
A	CENTRONICS DATA CORP	9- 1/2	13 1/8	+ 1/2	+3.9
A	CETEC CORP	3- 1/2	3 1/4	+ 3/8	+13.1
A	CONTROLDATA	7- 1/2	9 3/4	+ 1/4	+2.6

SUPPLIES & ACCESSORIES

A	AMERICAN BUS FORMS	7- 1/2	8 1/8	+ 1/8	+1.5
A	BARRY WRIGHT	13- 1/2	20	- 1/8	-0.6
A	DATAPRODUCTS CORP	7- 1/2	8 1/4	- 1/8	-1.5
A	DATUM INC	7- 1/2	7 3/4	- 1/8	-1.7
A	DECISION DATA COMPUT	3- 1/2	3	-	0.0
A	DIGITAL DATA SYSTEMS	3- 1/2	3 1/8	- 1/8	-3.8
A	ELECTRONIC M & D	11- 1/2	11	- 1/8	-1.1
A	ENDATA INC	3- 1/2	3 1/8	+ 1/8	+4.0
A	EVANS & SUTHERLAND	17- 1/2	18 3/4	- 1/4	-1.3
A	GAMMA/F TECHNOLOGIES	3- 1/2	3 1/8	- 1/8	-3.8
A	GEN'L DATA COMM IND	7- 1/2	8 1/8	- 1/8	-1.5
A	GREAT SOUTHWEST IND	7- 1/2	7 3/8	- 1/8	-1.6
A	HASELTINE CORP	7- 1/2	8 1/8	- 1/8	-1.5
A	ICOT CORP	3- 1/2	3 3/8	- 1/8	-3.6
A	INFORMATION INTL INC	19- 1/2	21 1/2	- 1/8	-0.5
A	INFORMATION RESOURCE	11- 1/2	11	-	0.0
A	INTEL CORP	19- 1/2	26 1/8	-1	-3.6
A	IPL SYSTEMS INC	3- 1/2	4 3/4	- 1/2	-9.5
A	LUNDY ELECTRONICS	7- 1/2	8 1/2	0	0.0
A	MAGNAVOX CORP	11- 1/2	13 1/8	- 3/8	-2.8
A	MDI DATA CORP	3- 1/2	3 7/8	- 1/8	-3.1
A	MORGAN CORP	19- 1/2	21 1/4	- 1/8	-0.5
A	NETWORK SYSTEMS CORP	19- 1/2	22 1/2	- 1/2	-2.2
A	NO AMERICAN PHILIPS	43- 1/2	48 1/2	- 1/2	-1.0
A	NORTHERN TELECOM LTD	11- 1/2	36 3/8	- 1/8	-0.3
A	OMNI	3- 1/2	3 1/8	0	0.0
A	PROCOMP CORP	19- 1/2	21 1/8	- 1/8	-0.5
A	PERKIN CORP	7- 1/2	8 1/8	- 1/8	-1.5
A	PHILIPS AMERICAN INC	7- 1/2	8 1/8	- 1/8	-1.5
A	PLESSEY CO (ADR)	3- 1/2	3 1/4	- 1/8	-3.7
A	PRINTRONIX INC	7- 1/2	8	- 1/8	-1.5
A	QANTEX CORP	3- 1/2	3	- 1/8	-3.6
A	RAYTHEON CO	39- 1/2	57 3/4	- 1/4	-0.4
A	RECOGNITION EQUIP	19- 1/2	31 3/4	- 1/4	-0.7
A	RELA CORP	19- 1/2	20 1/4	- 1/8	-0.6
A	SANDERS ASSOCIATES	19- 1/2	27 1/4	- 1/2	-1.8
A	SCAN DATA	1- 1/2	1 1/2	0	0.0
A	SCAN-TRON CORP	7- 1/2	8	- 1/4	-3.7
A	SCIENTIFIC ATLANTA	11- 1/2	22 1/8	- 1/4	-1.1
A	STORAGE TECHNOLOGY	11- 1/2	11 1/8	- 1/8	-1.1
A	SYCOR DATATRONICS	3- 1/2	3 1/8	- 1/8	-3.8
A	SYSTEMS & COMP TECH	3- 1/2	3 1/8	- 1/8	-3.8
A	T BAR INC	1- 1/2	1 3/8	- 1/8	-8.3
A	TAB PRODUCTS CO	19- 1/2	21 1/8	- 1/8	-0.5
A	TANDON CORP	19- 1/2	21 1/8	- 1/8	-0.5
A	TEC INC	3- 1/2	3 1/8	- 1/8	-3.8
A	TEKTRONIX INC	39- 1/2	57 1/4	- 1/4	-0.4
A	TELEX	7- 1/2	8 1/8	- 1/8	-1.5
A	TERMATA SYSTEMS CP	7- 1/2	8 1/8	- 1/8	-1.5
A	TIMEPLEX INC	7- 1/2	8 1/8	- 1/8	-1.5
A	VISUAL TECHNOLOGY	7- 1/2	8 1/8	+ 1/8	+1.5

EXCH: A=AMEX VIEW; O=OVER-THE-COUNTER; P=PACIFIC; R=REGIONAL
I=INTERNAL; W=WIDENED; 0=OVER-THE-COUNTER
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

15 pointed questions to ask MSA or any software supplier

These questions will help you when you sit down with individual software companies.

They're tough questions. Relevant ones. And any supplier who is worth his salt should be able to answer them without backpedaling.

Ask MSA

We'll answer all these questions to your satisfaction—plus any others you may have.

In fact, we're probably the best equipped to answer them. Because MSA is the software company. We offer the most complete line of totally integrated systems in the software industry, including financial, human resource and manufacturing.

So you avoid the headache of trying to tie together individual systems. (And the even bigger headache of adding to them.)

With MSA's integrated systems, there's no unnecessary duplication of data or effort. Reporting is faster. All your company's information is more timely and accurate—and in the right form.

Our technical edge comes from experience

Staying ahead is easier for a company that's steeped in software technology. MSA has spent years developing, refining, testing and enhancing our systems.

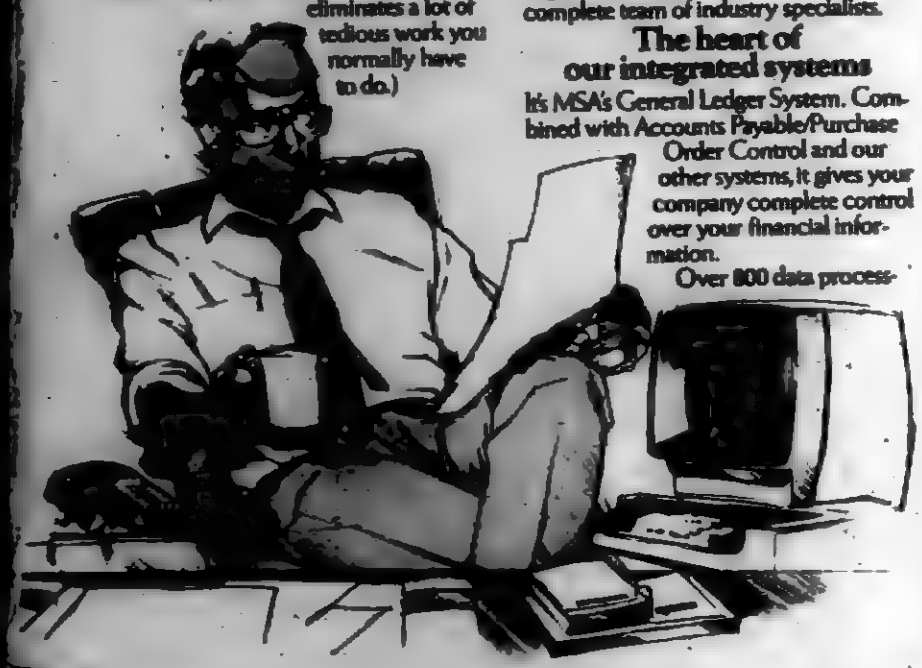
This year alone, we'll invest $25 million to make sure all our systems are technologically razor sharp. That gives us a decided advantage over flash-in-the-pan technology that may not have the bug-free logic of a more experienced system.

It also gives you a decided advantage over "custom" systems you have to update yourself.

MSA relieves you of that time-consuming burden. We update and enhance your software for a full year. Then we continue this service for a surprisingly low annual fee.

Maintenance includes keeping your system up-to-date technologically. Enhancing it with new features that make it work even harder for you.

And making sure it reflects changes in accounting procedures and government regulations, including 401(k), TEFRA, and FAS52. (That eliminates a lot of tedious work you normally have to do.)



Save this box. It can help you make an intelligent software decision.

1. Can you offer us a complete range of software systems designed to work together?
Or will we have to piece together a patchwork of systems?

2. Are your systems just record keepers, or can they really help us make decisions?
Can we pull together information from any of our integrated systems? In exactly the form we want it?

3. Can you provide business software for both mainframe and microcomputers?
Do you develop this software yourself or do you simply market it for another company?

4. Are your systems truly online so all of our information is current?
How many of your systems are online? How secure are they?

5. Will my company have to be the one that discovers the bugs in your brand new system?
Just how long have your systems actually been used, and how have they been tested?

6. Will you update your systems as technology advances and regulations change?
What are some of your most recent updates? Will you keep us current on regulatory changes?

7. Do your systems really do everything you say they will?
Or will we have to change them or add to them to get the features we want?

8. How long have you been in business?
What are your revenues? What is your growth record? Where will your company be five years from now?

9. How many systems has your company installed?
How many of these were installed in the past six months? How many of your earlier customers are still using —and liking—your systems?

10. Do your financial systems handle unlimited foreign currencies?
Do your financial systems use a common set of currency exchange rates?

11. Can you link our executives' computers directly to the mainframe—so they can get their own information?
Is that software available right now?

12. How will you make sure our own people thoroughly understand your system?
Do you have educational centers near us, or will we have to travel all the way across the country to find one? Will you be there to help during installation and after?

13. How many of your people specialize in software for my industry?
How many accountants work for you? Human resource specialists? Manufacturing experts?

14. Do your systems have built-in features that make them easier to use?
What happens if someone needs help figuring out a feature? Do you have online documentation that's easy to understand?

15. As my business changes will your system be flexible enough to change with it?
Or will we have to pay a lot to revamp it? Or even regenerate it?

© Management Science America, 3445 Peachtree Road, N.E., Atlanta, Georgia 30326

35,000 days of training

At MSA, we make sure your people have a firm grasp of our systems. Last year alone, we conducted more than 35,000 student days of customer training for over 1,800 companies. At education centers all over the world, as well as at our headquarters.

From training sessions to cassettes to complete, easy-to-understand documentation, MSA provides the most extensive Customer Education Programs in the industry.

And MSA systems are just as friendly as our people. Our online HELP feature actually guides users through our systems, and EASY-SCREEN™ lets them design their own screens without creating data processing nightmares.

If there's ever a question or problem with our systems, MSA customers are always close to service.

Our Account Managers are knowledgeable, responsive, and backed by a complete team of industry specialists.

The heart of our integrated systems

It's MSA's General Ledger System. Combined with Accounts Payable/Purchase Order Control and our other systems, it gives your company complete control over your financial information.

Over 800 data processing specialists, accountants, and financial experts work together to make MSA's financial systems the most advanced and most highly integrated in the industry.

MSA has the answers

Whatever your size—whatever your business—MSA has a total software solution.

We'll provide the highest quality integrated online software.

We'll tie your business and manufacturing software systems together, using our exclusive Extended Closed Loop™ manufacturing system.

We'll provide business software for your microcomputers, through our Peachtree Software Company.

We'll even link your microcomputers to your company's mainframe—with MSA's Executive Peachpak™ application software. A revolutionary concept that lets executives get the mainframe information they need through their personal computers.

MSA ready-to-install application software
1. General Ledger
2. Accounts Payable/Purchase Order Control
3. Budgetary Control/Encumbrance
4. Fixed Assets Accounting
5. Capital Expenditure Tracking
6. Forecasting & Modeling
7. Accounts Receivable
8. Order Processing
9. Foreign Exchange
10. Inventory & Purchasing
11. Payroll
12. Personnel Management & Reporting
13. Manufacturing Control System (MRP II)
14. Executive Peachpak™ II
15. Peachtree Software™ business systems for microcomputers
16. Peachtree Software™ office productivity systems for microcomputers

EASY-SCREEN, Executive Peachpak II, Peachtree Software, and Extended Closed Loop are trademarks of Management Science America, Inc.

Talk to us

If we've whetted your appetite with our 15 questions, clip the coupon below.

We'll send you a concise booklet that will help you even more in your deliberations. We'd also like to send you more information on how MSA can help you plan for software. And on individual systems.

Just fill in the information below, or contact Robert Carpenter at (404) 239-2000.

Management Science America, Inc.
3445 Peachtree Road, N.E.
Atlanta, Georgia 30326

☐ Please send me a free detailed brochure.
☐ Please send more information on the following systems. (Write numbers from product list.)

Mainframe Computer Type/Model _____

Name _____

Title _____

Company _____

Address _____

City _____

State _____ Zip _____

Business Phone ( ) _____

MSA
The Software Company

VOL 18
ISSUE 11A
MR 14 1984
UMI

Computerworld

March 14, 1984
Vol. 18, No. 11A

On Communications

Special Section: Local-Area Nets

Centrex Battle

CPE Buying Spree

Rolm Profile

CW
MI48106UIVYMUIVYM FCMB
UNIVERSITY MICROFILMS
SERIAL PUBLICATIONS
300 N ZEEB RD
ANN ARBOR MI 48106

...most of it installed.

Whether you're adding only a few more terminals or personal computers, or implementing a more efficient minicomputer access method for hundreds of terminals at a time, you probably don't even have to pull new cables, much less install a complicated new network.

Your in-plant telephone network is already wired into almost every office and potential terminal site in your building. And fortunately, for your data communications needs, its wires can carry voice conversations and data *at the same time*—with a little help.

All you really need is a way to connect a terminal and a telephone to the same set of wires, and that's where MICOM's INSTALINK Voice/Data Multiplexor comes in. A component of MICOM's INSTANET™ Local Network, the "instant" remedy to local area communications headaches—INSTALINK plugs into your existing telephone jack and allows you to use your terminal and your phone independently—without interference of any kind. It supports asynchronous transmissions of up to 19,200 bps, full-duplex, for over a mile—plenty for almost any local networking application.

And it provides something else that many other in-house networks don't or can't: complete portability. A terminal can be moved to a new site and connected to any telephone line already in place. No rerouting of cables. No complicated interfacing. Just plug it in.

Best of all, INSTALINK provides all this without requiring any long-term commitment, without major investment, without disrupting normal business operations, and without fuss—*instantly*.

Call or send for a brochure which explains how.

MICOM

Chatsworth, CA 91311 • [illegible] • [illegible] • [illegible]

[illegible] • 404-455-2999 • Boston, MA • [illegible] • [illegible] • [illegible]

[illegible] • St. Louis, MO • [illegible] • [illegible] • [illegible]

[illegible] • Reading, Berkshire RG2 0LS, England • [illegible] • [illegible]

AL CO AR AZ DE FL GA HI IA ID IL KS KY LA MA MD ME MI MO MS MT NC ND NJ OH OK OR PA RI SC UT WA WI WY

CONTENTS

11 **Non-Integration of Voice and Data**
By Patti Hartigan
Despite all the talk about voice and data integration, there is a spirit of antagonism between the two.

16 **The Uncertain Future of Centrex**
By Jeff Kaplan
Amidst the claims and counterclaims about Centrex, some plain talk about this embattled service.

22 **Howard Anderson**
An interview with Howard Anderson, the outspoken president of a company baldly seeking world domination.

27 **Microwave Marvel**
By Katherine Hafner
Westinghouse blazes the way to network self-sufficiency with Wesdin, a microwave masterpiece.

Special Section: Local-Area Networks

31 **After the Storm**
At long last, David Liddle talks candidly about Ethernet and the Great Local-Area Network Battle.

39 **A Network Perspective**
By Jim Bartimo
Just what has been going on with local-area networks, anyway? Here is a post-hype guide.

45 **The Token Ring**
By David Potter
The token-ring topology is becoming a standard, and IBM has blessed it. Here's a basic rundown.

51 **Charting the Waters**
By Michael J. Zak
Getting physical and logical are the best ways to go local.

55 **Rolm in the Fast Lane**
By Jeffry Beeler
This little-known manufacturer of ruggedized military computers is also into communications.

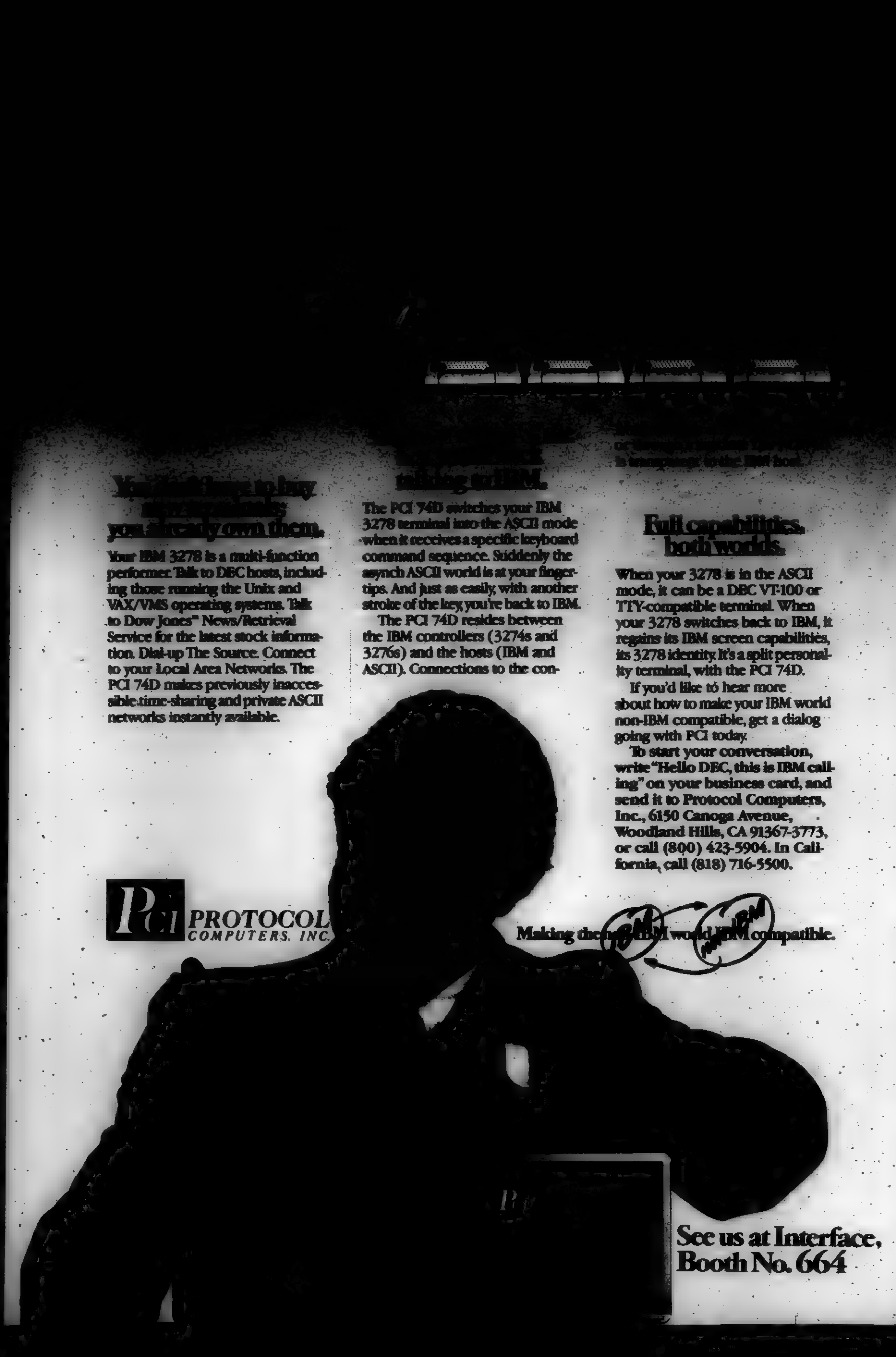
59 **Workstation Telephones**
By George Colony
Inexorable advances in technology have brought together two of our most popular office devices.

63 **The Great CPE Shopping Spree**
By Katherine Hafner
Freed from their forced marriage to the former Western Electric, the BOCs are buying up a storm.

67 **International Connections**
By Phillip A. Tenkhoff and James C. Collard
As more carriers get involved, transmitting data internationally is more complicated than ever before.

DEPARTMENTS

Editorial ____ 3
Pro & Con ____ 4
Dialogue ____ 6
At Large ____ 9
Washington, D.C. ____ 10
Exit ____ 72



You don't have to buy new terminals; you already own them.

Your IBM 3278 is a multi-function performer. Talk to DEC hosts, including those running the Unix and VAX/VMS operating systems. Talk to Dow Jones™ News/Retrieval Service for the latest stock information. Dial-up The Source. Connect to your Local Area Networks. The PCI 74D makes previously inaccessible time-sharing and private ASCII networks instantly available.

talking to IBM.

The PCI 74D switches your IBM 3278 terminal into the ASCII mode when it receives a specific keyboard command sequence. Suddenly the asynch ASCII world is at your fingertips. And just as easily, with another stroke of the key, you're back to IBM.

The PCI 74D resides between the IBM controllers (3274s and 3276s) and the hosts (IBM and ASCII). Connections to the con-

is transparent to the IBM host.

Full capabilities. both worlds.

When your 3278 is in the ASCII mode, it can be a DEC VT-100 or TTY-compatible terminal. When your 3278 switches back to IBM, it regains its IBM screen capabilities, its 3278 identity. It's a split personality terminal, with the PCI 74D.

If you'd like to hear more about how to make your IBM world non-IBM compatible, get a dialog going with PCI today.

To start your conversation, write "Hello DEC, this is IBM calling" on your business card, and send it to Protocol Computers, Inc., 6150 Canoga Avenue, Woodland Hills, CA 91367-3773, or call (800) 423-5904. In California, call (818) 716-5500.

PCI PROTOCOL COMPUTERS, INC.

Making the non-IBM world IBM compatible.

See us at Interface, Booth No. 664

EDITORIAL

Vanishing Videotex?

The cavalcade of new and innovative communications technology is impressive and seemingly never-ending. In the past few years, we have witnessed the introduction of local-area networks, satellite networks, digital private branch exchanges (PBX) and a host of other ground-breaking technologies.

There is a tendency to assume they are all smashing successes. However, in the case of videotex, we wonder. Videotex uses telephone lines and CRT screens to send and receive data and graphics. Its technological cousin, teletext, is a receive-only service that broadcasts over the airwaves.

Videotex has been around in its current form for a few years now. It has been the subject of international attention through many articles in both the trade and general press. The French government has been one of the most notable videotex boosters, implementing a test network around Paris as part of its nationwide *Informatique* computerization program. The French planned to give videotex terminals to all users free of charge with the expectation of making up for the losses by selling the terminals in this country. U.S. sales have not been impressive.

Here, videotex has barely gotten off the ground. Only one commercial venture is currently in operation. It is run in southern Florida by Knight-Ridder Newspapers, Inc. and AT&T. Another that is being offered by Times Mirror, Inc. is scheduled to start this July in Orange County, Calif.

Recently, IBM, CBS, Inc. and Sears, Roebuck & Co. gave the lagging technology a publicity shot in the arm by announcing a joint videotex venture *that won't begin for several years*. The politics of this are more interesting than the service itself. It looks like IBM vs. AT&T.

Over the past two years, CBS tested a videotex service with AT&T in Ridgewood, N.J., called Venture One. CBS is said to have broken off the relationship with AT&T because IBM plans to offer its service to residences with personal computers, while AT&T made Venture One available only over $600 terminals that could not be used for anything else. CBS reportedly dumped $10 million into Venture One. The key here is personal computers, or more appropriately, home computers, since the IBM-CBS-Sears service is destined for homes as opposed to businesses.

For many years, industry pundits predicted the widespread proliferation of home computers. It just hasn't happened. Ask Texas Instruments, Inc., which cancelled its home computer. Prices have been too high and applications too few.

People are slow to change their culture and habits. Bringing a computer into their homes represents a radical change, and they won't make such a change without very compelling reasons. So what if they can do shopping from home? Most people would rather go out to shop, given the choice.

The time may come when computers or some kinds of terminals are commonplace in the home. But that is not going to happen for at least another 10 years, when integrated services digital networks become universally accessible.

In the meantime, unless videotex technology can be popularized outside the home market, it will remain on the outside looking in.

Announcing . . .

I am proud to announce that *Computerworld On Communications* is increasing its frequency of publication from six to 12 times a year, effective with our June issue.

The events of 1984 have underscored the need for more information on the communications industry. The breakup of AT&T and the formation of a virtually new industry has placed an unprecedented burden on the shoulders of computer and communications professionals. There are new opportunities and new problems. There is new technology.

By going monthly, we intend to bring the changing communications picture into sharper focus for you. We will be adding a news analysis section and our departments and features will become twice as timely. It all adds up to more comprehensive coverage of the most dynamic industry in the world.

We look forward to sharing that coverage with you.

Bruce Board

Computerworld On Communications

CW COMMUNICATIONS/INC.
Box 880, 375 Cochituate Road
Framingham, Mass. 01701

Board Chairman/Publisher
Patrick J. McGovern

President W. Walter Boyd
Senior Vice President Lee Vidmar
Group VP-Communication Services Jack Edmonston
Group VP-Circulation Margaret Phelan
VP-Sales Donald E. Pagan
VP-Finance William P. Murphy
VP-Editorial John Whitemarsh

Special Focus Publications Administrator Jenny Glendenworth

Editor Bruce Board
Managing Editor Patti Hartigan
Staff Writer Katherine Hafner

Art Director Tom Monahan
Art Assistant Marlisa Bonacci
Production Director Peter Holm
Production Manager Marlene Stikal
Pasteup Supervisor Ann Finn
Typesetting Manager Carol Polack

Advertising Traffic, Special Publications Pam Valentinas

Second-class postage paid at Framingham, Mass., and additional mailing offices. *Computerworld* (ISSN-0010-4841) is published weekly, except: January (6 issues), February (6 issues), March (5 issues), April (7 issues), May (5 issues), June (6 issues), July (6 issues), August (5 issues), September (6 issues), October (6 issues), November (6 issues), and a single combined issue for the last week in December and the first week in January by CW Communications/Inc., Box 880, 375 Cochituate Road, Framingham, Mass. 01701.

Copyright 1984 by CW Communications/Inc. All rights reserved. Reproduction of material appearing in *Computerworld* and *Computerworld On Communications* is forbidden without written permission. Send all requests to Nancy Shannon.

Computerworld subscription prices: $2.00 a copy; U.S. — $46 a year; Canada, Central & S. America — $110 a year; Europe — $165 a year; all other countries — $245 a year (air mail service). *Computerworld On Communications* single copy price: $5.00. Four weeks notice is required for change of address. Please allow six weeks for new subscription service to begin.

Computerworld can be purchased on 35mm microfilm through University Microfilms Int., Periodical Entry Dept., 300 Zeeb Road, Ann Arbor, Mich. 48106. Phone: (313) 761-4700. *Computerworld* is indexed: Write to Circulation Dept. for subscription information.

PHOTOCOPY RIGHTS: Permission to photocopy for internal or personal use or the internal or personal use of specific clients is granted by CW Communications for libraries and other users registered with the Copyright Clearance Center (CCC), provided that the base fee of $3.00 per copy of the article, plus $.50 per page is paid directly to Copyright Clearance Center, 21 Congress Street, Salem, Mass. 01970.

Permission to photocopy does not extend to contributed articles followed by this symbol. ‡

POSTMASTER: Send Form 3579 (Change of Address) to Computerworld Circulation Dept., Box 880, 375 Cochituate Road, Framingham, Mass. 01701.

Computerworld On Communications is a member of the CW Communications/Inc. group, the world's largest publisher of computer-related information. The group publishes 44 computer publications in 18 major countries. Nine million people read one or more of the group's publications each month. Members of the group include: Argentina's *Computerworld/Argentina*; Australia's *Australasian Computerworld* and *Micro Computer Magazine*; Brazil's *DataNews* and *Micro Mundo*; China's *China Computerworld*; Denmark's *Computerworld/Danmark* and *MikroData*; France's *Le Monde Informatique*; Germany's *Computerwoche*, *Microcomputerwelt* and *PC Welt*; Italy's *Computerworld Italia*; Japan's *Computerworld Japan* and *PC Japan*; Mexico's *Computerworld/Mexico*; Norway's *Computerworld Norge* and *MikroData*; Saudi Arabia's *Saudi Computerworld*; Spain's *Computerworld/Espana* and *MicroSistemas*; Sweden's *ComputerSweden*, *MikroDatorn* and *Min Hemdator*; the UK's *Computer Management* and *Computer Business Europe*; the U.S.' *Computerworld*, *Desktop Computing*, *Hot CoCo*, *InCider*, *InfoWorld*, *MICRO MARKETWORLD*, *Microcomputing*, *PC World*, *Run* and *80-Micro*.

PRO & CON

Clamping the Cuffs on Centrex?

The furor over the Federal Communications Commission's (FCC) proposed access charges for Centrex users has galvanized the interest of two sharply divided groups. The first group is comprised of the Bell operating companies that offer Centrex, a central office-based competitor to private branch exchanges (PBX). The second group is the North American Telecommunications Association (Nata), which represents PBX and other equipment manufacturers.

Last July 27, the FCC proposed that a $2 maximum access charge be levied on each Centrex line purchased before that date and a $6 maximum charge be placed on lines acquired after it. The FCC reaffirmed its commitment to that scheme in early February.

Nata sees that policy as a bailout for Centrex, while the operating companies feel it will give PBX users an unfair advantage and drive the operating companies into financial ruin.

In this month's "Pro and Con," we present the opinions of both sides.

PRO

By Edwin B. Spievack

While the questions surrounding the determination of equitable access charges for Centrex users appear complex, the central issue is quite simple. Should access charges for large corporate and institutional users of Centrex service — which competes directly with private branch exchange (PBX) products offered by competitive equipment suppliers — be subsidized at the expense of all non-Centrex ratepayers, competitive PBX and Key system suppliers and continued technological innovation?

The thrust of the Federal Communications Commission's (FCC) initial access charge decision, announced in December 1982, was reasonable: "Users of the local telephone network should be responsible for the costs they actually cause." Essentially, charges were divided into two categories: traffic-sensitive costs, whereby customers would pay according to their actual use of the network, as they do now; and nontraffic-sensitive costs, whereby all users — business and residential — would pay flat rates to recover the basic costs of maintaining the wire or trunk line between the customer's premises and the central office switch. The nontraffic-sensitive rates have stimulated the controversy between Centrex and PBX users and suppliers, not to mention the related outcry by residential customers.

Phase 1 of the protectionism campaign culminated in July 1983, when the FCC proposed a major bailout to the Bell operating companies. Their existing or "grandfathered" Centrex users would pay only $2 per month in nontraffic-sensitive trunk line charges, compared with $6 per month for all other multiline users, including customers who signed up for Centrex after July 27, 1984. Incredibly, the cut-rate treatment for Centrex users — big business, big government and large institutions — was the same afforded residential customers. The decision — on its face, arbitrary and capricious — has been appealed to the courts by the North American Telecommunications Association (Nata).

Predictably, however, the Bell operating companies said the generous July Centrex bailout provided insufficient protection. A hypothetical example illustrates why. Let's say a PBX user has 100 telephones in his office. Because so much of his traffic is handled internally by the on-premises PBX switch, he might need only 10 truck line connections to the central office. At $6 per line, his monthly access charge payments would be $60.

A similar office with 100 telephones, but with Centrex, would require 100 trunk connections.

(Continued on Page 5)

Spievack is president and executive director of Nata, Washington D.C.

CON

By Jim Epperson

Unnecessary expenses. Fewer choices. More uncertainty in the telecommunications industry. Higher local rates.

These and other hardships could become reality if the Federal Communications Commission (FCC) does not permit fair pricing policies for Centrex-CO services. The issue at hand is the discrepancy between how access charges will apply to private branch exchange (PBX) systems and Centrex-CO lines.

Southwestern Bell Telephone Co., other Bell operating companies and many business organizations believe that the FCC could provide an equitable solution by applying the same set of pricing rules to both PBX and Centrex service. A closer examination reveals that much is at stake.

Under the current FCC plan, the Centrex customer would pay far more than a customer served by a comparable PBX — even though the systems provide equivalent service. Here is an example, comparing a Centrex system serving 1,000 stations with a PBX of the same size. The Centrex system would have 1,000 loops or lines connecting the customer's business to the telephone switching office. The PBX would typically have 89 trunks for exchange access. An existing Centrex customer would pay $24,000 annually in interstate access charges. The PBX customer would pay about $6,400 — again for comparable service. A new Centrex customer, defined by the FCC as one who ordered the service after July 27, 1983, would be charged $72,000 based on the commission's current order.

There would be an unfortunate result of this discriminatory policy. Many current Centrex customers would be forced to incur the unnecessary expense of changing their telecommunications system, not because Centrex no longer meets their needs, but because they could not afford higher rates imposed by the FCC.

As existing Centrex customers abandon the service, Southwestern Bell would be burdened with a substantial amount of idled plant for some time. Even though the plant would not be used, and therefore would not be producing revenue, it would remain an earnings requirement to be borne by the general body of ratepayers.

As a result, other customers would be forced to shoulder this unnecessary expense — estimated to be about $9 per year for remaining access lines.

Because the higher business end-user access charge would apply to all new Centrex systems, it is likely that potential customers would find the service economically unfeasible. This is unfortunate, because existing outside plant and central office capability — which could have been used by new Centrex customers — would instead become an additional burden to ratepayers.

The FCC's approach would effectively reduce the number of options available to customers, as well as add yet another element of uncertainty to the telecommunications industry.

What is the solution? Centrex customers should pay end-user access charges commensurate with PBX customers of comparable size. This could be accomplished by applying a PBX trunk equivalency ratio. To determine the appropriate ratio, existing or proposed Centrex systems could be examined to see how many trunks would be required if the customer were served by a PBX based on industry trunk equivalency studies. Access charges would be applied accordingly.

Some parties have wrongfully argued that end-user access charges should be applied to all Centrex lines because, like regular business and residential lines, they are connected directly to the telephone switching office. But there is a substantial difference.

(Continued on Page 5)

Epperson is staff manager, corporate news, Southwestern Bell, St. Louis, Mo.

PRO

(Continued from Page 4)

Even at the bargain-basement rate of $2 per line, the Centrex user's monthly payments would be $200. What the Bell operating companies want is the total elimination of Centrex access charges or a skewed parity formula that gives Centrex service a preferential pricing advantage over competitive equipment suppliers.

Thus, Phase 2 of the Centrex bailout was launched, and it incorporated three equally spurious arguments. First, the Bell operating companies, accompanied by Fortune 500 corporations still using Centrex, introduced the concept of PBX trunking equivalencies. Stripped of its "scientific" veneer, the concept is simple: If our hypothetical PBX user with 100 telephones and 10 trunk lines pays $60 a month in access charges, then our hypothetical Centrex user with 100 telephones should also pay $60, despite the reality that he requires 10 times as many lines.

Second, the Bell operating companies argued that because Centrex customers often use their lines for nonbasic exchange calls, they should be assessed less. Their argument conveniently evades the basic point of the FCC decision: access charges to cover the nontraffic-sensitive costs of network maintenance have nothing to do with how or how often the lines are used.

Finally, the Bell operating companies, with some support of state regulators, have raised the threat that without further protection, users will continue to abandon Centrex and saddle the telephone companies with stranded investment in central office plant. The claim is untrue. Testimony from telephone company executives in several state proceedings indicates that the utilities could reuse all but 10% to 30% of their outside wires and probably all central office equipment now devoted to Centrex for the provision of basic local exchange service.

Who will suffer from a Centrex bailout?

■ *All PBX and Key system users.* They will be discriminated against by having to pay higher access charges.

■ *All PBX and Key system suppliers.* They will be forced to compete against the Bell operating companies' underpriced, subsidized Centrex service.

■ *All residential and business ratepayers.* They will be forced to make up the shortfall in Centrex access charges through higher long-distance bills. Someone must pay for the network.

■ *Technological innovation.* PBX technology was developed to satisfy market needs not met by Centrex, its predecessor. A bailout of Centrex rewards outmoded, inefficient technology and penalizes modern, more efficient alternatives.

■ *Competitive policy.* A Centrex bailout contradicts the thrust of the FCC's deregulation policy, the AT&T antitrust settlement and recent legislative proposals.

Compared with the multitude of losers, there are only two beneficiaries of a Centrex bailout: a small class of corporate and institutional users and the Bell operating companies. The choice is clear: protectionism or the public interest? ■

CON

(Continued from Page 4)

Business and residential access lines are used exclusively to access the local and long-distance networks.

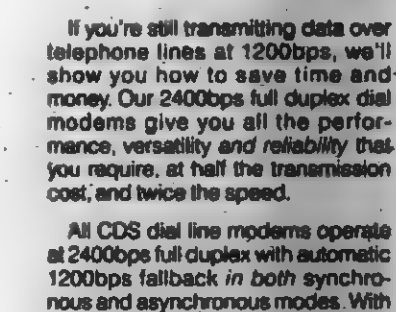
On the other hand, a considerable amount of traffic on Centrex systems never reaches the public network — instead it stays in the system in the form of intercom calls. The bottom line is that Centrex and PBX systems provide equivalent exchange service. In fairness, then, equivalent pricing rules should apply.

Southwestern Bell has formally asked the FCC to reconsider its position regarding the imposition of access charges on Centrex-CO lines and to adopt the PBX equivalency ratio. The FCC's most recent decision reaffirms its earlier position. There is no doubt that reaffirmation will have a substantial impact on Centrex users, Southwestern Bell and, equally important, all the company's customers. It is crucial that the FCC modify its ruling so all customers will be treated fairly. ■

WE HAVE 2400 GOOD WAYS TO UPGRADE YOUR DIAL LINE DATA COMMUNICATIONS

If you're still transmitting data over telephone lines at 1200bps, we'll show you how to save time and money. Our 2400bps full duplex dial modems give you all the performance, versatility *and reliability* that you require, at half the transmission cost, and twice the speed.

All CDS dial line modems operate at 2400bps full duplex with automatic 1200bps fallback *in both* synchronous and asynchronous modes. With our modems you can communicate from or to any terminal, micro, mini, or mainframe computer (even your PC), with support of BSC, HDLC, SDLC, X.25 or *any other* full or half duplex protocol.



Double your data rate and cut transmission costs with complete reliability.

And with CDS 2400bps full duplex dial modems, you won't have to sacrifice one bit of data integrity. Our modems all use advanced signal processing techniques, and feature automatic adaptive equalization. Sophisticated modem diagnostics including analog and digital self-test and an internal test pattern generator rapidly isolate modem faults. With a CDS 2400bps modem, your data will come through smoothly and accurately, even on poor telephone lines.

Communicate with mainframes, minis or micros using any sync or async protocol.

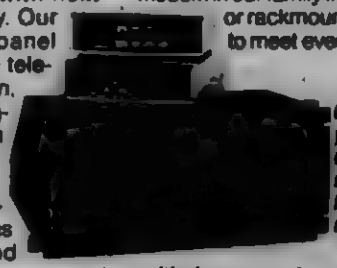
CDS modems combine user-friendly engineering with next-generation technology. Our touch sensitive front panel allows you to select the telephone line configuration, operating mode and diagnostic tests you need. An optional front panel synch/asynch selector lets you switch from synchronous to asynchronous transmission swiftly and easily, without monkeying around with internal modem straps.

Our new 2400bps autodial modem eliminates extra telephone hardware and lets you leave your modem unattended...ready to communicate when telephone rates are lowest. It supports both touch-tone and rotary dialing systems and operates with "dumb" or intelligent terminals using keyboard or software controlled commands.

Send data at all-hour rates with 2400bps modems!

We've built our reputation on products that give you advanced engineering at down to earth prices. Our 2400bps full duplex modems range from $995 to $1195 with attractive quantity discounts available.

There's a 2400bps full duplex dial modem in our family in either tabletop or rackmount configuration to meet every need.



Get the features you want in the configuration you need from our full family of 2400bps modems.

It's time you got more data for your dollar. Call or write, Concord Data Systems, 303 Bear Hill Road, Waltham, Massachusetts 02154 (617) 890-1394, or contact the CDS representative nearest you.

CONCORD DATA SYSTEMS

LINKING COMMUNICATIONS TECHNOLOGY

BROCHURE DISTRIBUTORS: HYATT/ARIES (800) 346-8088, (303) 388-8854, (201) 798-8582, (609) 779-8300 PA (412) 921-0883, (215) 639-8888 SC/NC (201) 882-8888, (201) 201-0138, (201) 391-4344 NC (919) 832-8788, (919) 373-0400, (704) 523-8888 SC (803) 799-1806, (803) 271-4888 GA (404) 951-0880, (404) 498-3800 FL (800) 282-8120 (inside), (800) 237-8963 (outside), (813) 894-0828, (904) 398-4003, (305) 791-5488, (305) 847-5469 KY (502) 244-0131 OH (800) 543-7838, (419) 389-1111, (216) 582-0700, (614) 895-8582, (513) 294-3779, (513) 981-0778, (606) 885-8882 IN (317) 849-0880 MI (317) 849-5772 IL (312) 893-3440, (312) 893-2280, (217) 352-3807, (217) 544-8825 WI (414) 251-4142 MN (612) 888-4444 MO (816) 353-3705, (314) 731-0401 OK (405) 478-8020 TX (915) 542-1783, (214) 980-1851, (713) 988-7728, (512) 327-8900 NM (505) 884-8882, (505) 292-1212 AZ (602) 994-5488, (602) 994-4351, (602) 623-8413 CO (303) 777-8570, (303) 449-3282, (303) 694-0882, (303) 572-9133 NE (800) 533-1613, (402) 896-8880 UT (801) 486-8582 IDAHO/WASHINGTON (800) 227-8866 CA (800) 854-0872 (inside), (800) 421-4888, (800) 421-4406 or (800) 854-0873 (outside), (213) 998-8804, (213) 998-8822, (415) 940-1515, (714) 835-8801, (714) 891-8142, (714) 827-8435, (916) 366-8888

See Us At Booth 1570

INTERFACE '84

March 12 to 15 □ Las Vegas Convention Center

DIALOGUE

Do you foresee a conflict between communications and DP managers?

Howard Frank, president, Contel Information Systems, Inc., Great Neck, N.Y.:

"I see more than just a conflict. I see a battle that I believe will be won by the DP people and will end up absorbing the communications functions as part of DP.

"The reason is based on two indisputable facts. Look at the DP organization today, and you see a much larger staff than the corresponding communications organization. Second, examine the level of reporting as compared to communications, and you will find the head of the DP organization reports in at a much higher level. He may be a vice-president or he may be a director, but he is always at a higher level of the corporate hierarchy than his communications counterpart.

"In the '70s, communications was an uncontrollable cost expense that required little management. Correspondingly, the communications manager was an order-taker who worked between the end user in the organization and the telephone company. As such, he did not need to be so high up in the organization. The reality has profligated itself. Communications has grown in stature, but not to the level of the DP department, which grew up as long ago as the '60s."

Former telecommunications manager, currently telephone systems manager of a supermarket chain:

"I've been in communications for 25 years. We veterans feel we have been doing telecommunications for so long that we know our way is the best way.

"I even dropped out of the [Telecommunications Association] because I felt I was getting very little value out of it. You see, in many companies, the people in the communications area are pretty new in the industry. They were just seeking information from TCA. So we decided it wasn't worth our time to participate.

"There is a definite split between data communications and voice communications. There are different networks for the two types of systems. Eventually, it will have to be brought under one person, one head. [Private branch exchanges] exist, and they handle both data and voice. We are going in the wrong direction. The two jobs should be merged, not split.

"As I see it, DP people want to get more involved in communications, because it is the new frontier, just as DP was years back. There will definitely be a conflict. DP people might be trying to take over communications or responsibility for a larger portion of it. It is a trend I'm aware of. Actually, it is a trend I have seen. It has changed, but not for the better."

Shaun Delany, telecommunications and planning analyst, H.J. Heinz Co., Pittsburgh, Pa.:

"When I came here six years ago, communications was an add-on to office services. Now it has been folded into the communications systems department. It has tremendous visibility and responsibility now.

"Telecommunications is getting so much publicity, and its value has been heightened so much in the past 10 or 15 years — the way you deal with the telephone company and the skills needed are so much more. It's the thing to get into. It is corporate visibility.

"All I can say is communications people have not effectively sold upper management on the importance of communications. The telecommunications person who loses and finds himself in effect reporting to data processing has not done an effective job of communicating what he is doing.

"I do not see any conflicts in my environment in particular. I think those conflicts existed in the past. It depends on the company and who the communications people report to. It is clear that computers and communications are merging. The PBX Heinz just put in is a microprocessor.

"At Heinz, both computing and communications report to the same general manager. I work full-time on communications planning and activities, and another fellow works more on day-to-day operatons. I work with DP people when necessary.

Larry Abearn, manager of technical services at Harper & Row Publishers, Inc., New York:

"That is tough for me to answer because at our company, the DP people are the communications people.

"I don't see any real conflict because we separate communications into voice and data. Data communications is handled mostly by data processing people here. The people on the voice side are

SAVE MONEY ON TALK FASTER.

THE CODEX 224 DIAL MODEM.

responsible for the telephone system, taking care of the economics of it and so on. I don't see it as a conflict. There might be a conflict for companies where data communications was separate from data processing, but not at this company.

"In my department, technical services, we handle the data communications side of things, such as modems. We are the ones who take care of line problems and response time problems. We are involved with hooking up personal computers to the host and installing protocol conversions.

"We do not have anything to do with the telephone system itself. We are a multilocation company, and we have various PBX systems installed in different places.

"Data processing never had anything to do with the PBX, until recently. Now, they are being asked to start to study those things and learn more about them and see how they tie together. What we've been doing with voice and data communications is somehow going to merge. The PBXs are so capable of handling data transmission that we see ourselves getting involved in that area. There are no definite plans to merge, but it will happen."

Francis X. Daubeck, president, Communications Network Architects, Inc., Washington, D.C.:

"In most major organizations, there will not be a conflict because communications and data processing people are coexisting in the same functions and, in all probability, they report to a common managerial function.

"There is a major conflict occurring in organizations where this does not occur, and those organizations are going through the throes of that conflict. The impetus is the co-mingling of voice and data.

"In large corporations that are forward-thinking, they are integrating the responsibility functions of voice and data."

John Malone, president, Eastern Management Group, Parsippany, N.J.:

"If you had asked me that question 18 months ago, I would have said that I see a very real conflict establishing itself between the communications manager and the DP manager, as each jockeyed for control of the [management information systems] function within the companies they worked for.

"But what we have found over the last 18 months in the research we do is that both groups understand that as the technologies they are responsible for converge, there is a definite requirement for individuals who clearly understand their own discipline, yet have an appreciation for their counterparts.

"Therefore, as I look at the next five years, I do not feel the relationship between the communications manager and DP managers will be adversary, nor that either of these parties view the future of the relationship as being threatening.

"I think the way they tend to view it is that voice, image, text and data will converge. However, there will clearly be a requirement for the expertise of data communications managers to address some of these specific piece parts such as the requirement for the communications manager to understand the role of the PBX switch and how it fits into the role of the entire communications environment."

LETTERS

Hysterical Harry

The article was fantastic.
Best wishes.

Harry Newton
Publisher
Teleconnect
New York, N.Y.

Congratulations on the January issue of *Computerworld On Communications*. You certainly are getting an excellent variety in coverage and depth of the articles.

Harry Newton's picture on the cover led me to conclude you had sold him the inside page to advertise *Teleconnect*, but then I understood: Harry had sold you. He certainly brings an almost irreverent view to the industry, but never irrelevant. His knack of reinforcing the role and sophistication of the end user is a great contribution to the emerging infrastructure of the business.

Desmond F. Hudson
President
Northern Telecom, Inc.
Nashville, Tenn.

Please send information about how I can contact Harry Newton and his Telecom Library. You article has really aroused my interest.

Jim Greig
Olympic Business Computers
Bellevue, Wash.

YOUR PHONE BILL.

If you're running 212 modems in a dial-up network, Codex has a new product that can significantly reduce your phone bills.

It's the Codex 224 modem.

At 1200 bits per second, the Codex 224 is fully compatible with Bell's 212 modem. But because the Codex 224 also runs at 2400 bits per second you can transfer more data faster and therein lies the economy.

You can run at 2400 bps full duplex asynchronous or synchronous over public telephone lines, even unattended. And because the Codex 224 incorporates advanced equalizers you're assured of high performance at higher speeds even over marginal lines. In addition, the Codex 224 automatically recognizes 1200 or 2400 bps transmissions and adjusts automatically.

And with faster file transfer and screen fills, people in the network will be able to get more done in the same time.

What all this means is that you can get better productivity and significant savings in your 212 network simply by installing Codex 224 modems.

The Codex 224, which meets the CCITT international standard, can be leased directly from Codex or purchased outright.

In short, you don't have to make a massive investment to run a better, faster, more economical network.

All you have to do is call Codex.

Call 1-800-821-7700 Ext. 895. Or write: Codex Corporation, Dept. 707-95, 20 Cabot Blvd., Mansfield, MA 02048.

codex

MOTOROLA INC.

© 1983 Codex Corporation.

SEE US AT INTERFACE, LAS VEGAS, MARCH 12-15, BOOTH #736.

Fill in your IBM micro/mainframe communications picture.

AST Research, the leader in IBM PC enhancement products, brightens your micro/mainframe communications picture with a full palette of economical, integrated hardware/software masterpieces. With AST Products, you can emulate IBM terminals or create PC-based Local Area Networks.

AST improves your office operating cost picture.

AST communications products give your IBM PC the flexibility to act as a terminal for your host system or as a stand-alone computer for smaller tasks. Your PC won't bog down the mainframe with unnecessary small jobs and local computing on the PC eliminates phone line charges too. Get the power of a mainframe when you need it and personal computer convenience right at your fingertips.

Applications solutions that are strokes of genius.

AST keeps pace with your ever-changing applications requirements with reliable, high quality, cost effective communications products. AST products provide support for Bisync and SNA/SDLC communications protocols as well as networking multiple PCs for sharing resources.

Choose AST products — by the numbers.

These AST communications packages are currently available:

1. **AST-SNA™** emulates a 3274/3276 controller and 3278 or 3279 display terminal using SDLC protocol.
2. **AST-BSC™** emulates 2770 batch RJE and remote 3270 display terminals using 3270 Bisync protocol.
3. **AST-PCOX™** allows your PC to connect to an IBM 3274/3276 cluster controller via coax cable and emulates a 3278 or 3279 display terminal.
4. **AST-3780™** emulates 2770, 2780, 3741, and 3780 RJE workstations using Bisync protocol.
5. **AST-5251™** emulates a 5251 Model 12 remote workstation connected to an IBM System 34, 36 or 38.
6. **PCnet™** is the first Local Area Network designed specifically for the IBM PC or XT and the PC-DOS 1.1 or 2.0 operating system.
7. **CC-232™** is a user-programmable dual-port card capable of communicating in Async, Bisync, SDLC or HDLC protocols.

Discover how well AST can fill in your micro/mainframe communications picture. For descriptive data sheets, write or call: AST Research Inc., 2121 Alton Ave., Irvine, CA 92714. (714) 863-1333. TWX: 295370ASTRUR

AST RESEARCH INC.

Number One Add-Ons For IBM PC.

IBM is a registered trademark of International Business Machines Corporation. PCnet is a registered trademark of Orchid Technology Inc. AST-3780 is a product developed by AST Research, Inc., and Wilmot Systems, Inc. AST-PCOX is a product developed by AST Research, Inc., and Software Spectrum, Inc., of Jefferson City, MO. PCOX is a product developed by CXI Inc.

KATHERINE HAFNER

Rolm Wasn't Bought in a Day

The courtship between **IBM** and **Rolm Corp.**, heading for full bloom, is providing much fodder for the troughs of industry speculators and journalists alike. Ever since Big Blue's unconsummated connection with Mitel Corp., the whole world has been watching the IBM-Rolm liaison with bated breath. IBM's share in Rolm was 20% at press time, up 5% since the initial acquisition last June. And IBM watchers fully expect IBM to buy the maximum 30% allowable by the end of 1984.

As a leading manufacturer of private branch exchanges (PBX) in Europe since 1971, IBM has been considering a move into the U.S. PBX market for the past decade. Its brief encounter with Mitel ended when Mitel could not deliver its software on time. So IBM cast about for another relationship and anchored itself with Rolm. Now that IBM is pretty well ensconced in its new relationship, everyone is buzzing with conjecture about the course the two plan to take.

"In broad terms, IBM plans to integrate Rolm into its [office automation] plans," said Kenneth Bosomworth, president of International Resource Development, Inc. "At a strategic level, IBM's interest is to have a particular version of a PBX around which it can construct network elements of OA strategies."

Translated into actual products, IBM's local-area net offering and micro-to-mainframe communications will integrate Rolm switches, Bosomworth speculated.

In order to maintain account control, one IBM pundit said, Big Blue has no choice but to include a switch in its offerings. "Technology is forcing IBM to do things it probably hadn't planned to do," said William A. Morgan of TelePC Consulting. Morgan sees the coexistence of broadband networks and PBXs as the optimum networking solution for the future.

Depending on whom you listen to, IBM is either in this for the switch or for the research and development expertise available at Rolm. "I think IBM's involvement is primarily for market research rather than for something it is planning to market," Phil Reagan, a California consultant, suggested. "IBM does say it's an investment. What they don't say is that it is an investment in research and development."

IBM, of course, offers little light to shed on the matter. "As a practice, we don't really discuss plans," said one IBM spokesman.

On Communications staff writer Hafner collects tidbits of communications news for "At Large." She welcomes suggestions.

"It's not a cut and dry situation," said a second.

And the following was offered by a third corporate communications specialist: "We intend to negotiate specific agreements providing for cooperative development efforts and possible joint ventures outside the U.S."

AT&T Information System's long-awaited **Net 1000** service has confounded the communications community to the point where speculation is something of a joke. The value-added net is described by AT&T Information Systems public relations people as a "shared, distributed, customer-programmable intelligent data communications network alternative" to such plain-vanillas as GTE Telenet and Tymnet, Inc.

But industry analysts and beta testers appear to be decidedly unimpressed by what they have seen to date. "Net 1000 seems to be pretty much plain vanilla, too," Alysa Subtelny, a market analyst at The Yankee Group, said. "Or if it's got sprinkles, they're the same sprinkles everyone else has."

Net 1000 has already died many deaths since its first incarnation in 1975 as Bell Data Network, which was scrapped and then replaced in 1978 by Advanced Communication Service — nicknamed "Almost Communication Service" by some of its early detractors. In 1981, AT&T scuttled the system yet again, and when American Bell, Inc. was formed in June 1982, the network resurfaced as Net 1. The name Net 1 was shortlived, as Ungermann-Bass, Inc. had already claimed that for its local-area network. Thus, Net 1000 was born.

Net 1000's identity crises have been compounded by the suspicion among analysts that the product is having difficulty finding a comfortable user niche among its two dozen beta testers.

Gary Schultz of Northwest Industries in Chicago, which tested Net 1000 for two months last spring, seemed to confirm that suspicion. "Our needs for the network were limited," he said. "We wanted strictly data transport services. American Bell kept saying, 'We're not in the transport business.' In fact, they said that so often the words still ring in my ears. But when you logged on to the network, it was clear you were logging on to a time-sharing system. When you got your bill, you knew you were billed according to how much processing time you used."

Schultz branded the network "a bit of an overkill." He explained, "We wanted a simple method for communicating and transporting data. The price was higher than what we wanted to pay.

"Net 1000 certainly has potential," he said. "But the direction they were going with it seemed to be at a 45-degree angle."

Undeniably, progress has been made. Net 1000 was demonstrated live for the first time at the recent Communications Networks exposition in Washington, D.C. At the same time, AT&T Information Systems announced a third-party software agreement with AGS Computers, Inc., whereby the Mountainside, N.J. company will develop customized software for users to "sign up electronically" for the Dow Jones & Co., Inc.'s News/Retrieval via Net 1000.

In 1981, the FCC gave AT&T approval to spend up to $500 million developing Net 1000. According to Allen Rehert, director of Net 1000 product support at AT&T Information Systems, while capital spending on the network to date is well below that ceiling, Net 1000 will still "take some time to implement." With phased implementation, Rehert said, the system will be up and running by the third quarter of 1984.

If AT&T Information Systems is going to gain an edge on the marketplace, that edge will be obtained by dint of AT&T's reputation for reliable service and technical support. "We were immensely pleased with the support we got," Schultz pointed out. "Their technical support is the best we've had in a long time."

Subtelny echoed these sentiments. "From the feedback we've gotten, even from the test sites that felt Net 1000 wasn't right for them, people across the board were very pleased with the support they got from AT&T. It was like in the good old days with IBM, when IBM camped out with your system if anything went wrong."

Other field testers for the network are Transamerica Corp., Roadway Express, Inc. and Ford Motor Co. Transamerica has reportedly had extensive problems with the product: "The issue there was one of deployment," Rehert insisted. Ford's beta test began in February, so a full evaluation of the system is yet to be made.

According to Robert Everhart, Ford's project manager for data communications planning, Net 1000 will be used for an experimental "parts locater" system, whereby a dealer can inquire about the status of another dealer's inventory.

Ford was seriously considering Tymnet for the same inquiry system, but decided on AT&T Information Systems. "We wanted to give them an opportunity to see what they could do with this," Everhart said.

Ford's 90-day agreement with AT&T Information Systems is just for the pilot test, for which AT&T Information Systems is developing the software to run on the network. At the end of the 90 days, Ford will decide whether to expand the system nationwide or discontinue it entirely.

At this early stage, Everhart said he is pleased with the support he has seen from AT&T Information Systems. "But the proof of the pudding will be when the test gets under way, and we see how well it works," he added. ■

ALAN PEARCE

When Weaning Turns to Warring

A traditional and historical alliance will come to a crashing and competitive end this year.

For over a hundred years, AT&T and the Bell operating companies have worked together to give the nation rapid, efficient and low-cost telephone service. They have never competed head to head. Even when U.S. Federal District Court Judge Harold Greene approved the divestiture of the Bell operating companies in settling the antitrust case, there were few who saw that the breakup of the company would result in inevitable competition among its parts.

But it is now becoming clear that the divested Bell operating companies are ready to enter the inter-Local Access and Transport Area (Lata) toll market, while AT&T is preparing to become the major local telephone bypasser. In addition, the two former allies are already competing in the customer premises equipment field — a rivalry that will become more intense as the year progresses. Finally, both AT&T and the operating companies want to amend the Federal Communications Commission's (FCC) 1980 Computer II decision.

CHARLES ROSENBLATT

It is perhaps ironic that the biggest threat to the future of AT&T's competitive prospects in the long-distance telephone market is from its newly divested operating companies. The regional holding companies are determined to set aside the business restrictions that prevent them from competing with their former parent in long-distance telecommunications — the inter-Lata market.

Under the terms of the Modified Final Judgment, which settled the antitrust case, the local operating and regional holding companies can provide only exchange access and local service functions.

They may not provide any other service that "is not a natural monopoly service actually regulated by tariff," according to the Modified Final Judgment.

If these restrictions were set aside this year or next, the Bell operating companies would be able to compete much more effectively with AT&T Communications and carriers such as MCI Communications Corp., GTE Sprint, Western Union, Satellite Business Systems and others. Indeed, the fact that GTE was given permission to take over Sprint gave rise to the Bell operating companies' expectations and intentions regarding their reentry into the toll market.

A regional operating company such as Ameritech, which combines the midwestern Bell operating companies, might want to buy a regional toll carrier and reseller, for example Lexitel. Lexitel would be an ideal purchase for Ameritech, and it may be that the regional carrier, based in Detroit, will need some capital, which Ameritech could provide, in order to expand its network.

The Bell operating companies may benefit from growing sympathy coming from Capitol Hill. Judge Greene is known to pay close attention to Congress, and any heavy political support for the Bell operating companies reentering the toll market might influence him. Clearly, if Ameritech purchased Lexitel, Lexitel would have to operate as a separate subsidiary, just like Sprint operates as a separate subsidiary in the GTE corporate structure.

Thus, we see a situation in which other telephone operating companies such as GTE can become toll carriers, while the divested Bell operating companies cannot. This, it will be argued, is unfair. The state regulatory commissions appear to be allies for the Bell operating companies' entry into inter-Lata toll, especially if there is a belief that their reentry into the toll market would help keep local rates down.

For its part, AT&T will not sit idly by without any competitive response. It believes that there are no restrictions preventing AT&T Communications from constructing its own local bypass facilities. Indeed, the newly reorganized AT&T sees that it is perhaps the only company with the technological and financial means to provide a nationwide web of local bypass facilities.

For the most part, AT&T's competitors are financially strapped and will focus on expanding their interexchange networks rather than on constructing local bypass facilities. However, the competitors may attempt to strike deals with existing bypassers, for example cable companies, which are also financially strapped.

Those who have studied local bypass technologies and the capital required to construct them have decided that the wise course for now is to stand back and see what the local telephone companies and AT&T Communications decide to do. After all, the Bell operating companies and AT&T, in competition with each other locally, might be able to provide much less expensive and more efficient bypass options than those constructed by others.

In addition, the Fortune 100 companies have many uses for capital other than building transmission facilities that may prove to be uneconomic if they are provided at lower cost by AT&T and the Bell operating companies. In addition, most of the big companies lack the skills necessary to manage complex telecommunications networks. This is a short-term problem, but a problem nonetheless.

Therefore, it appears that only AT&T Communications and the Bell operating companies will be in the construction of bypass facilities business, at least on a big enough scale to accomodate the short-term needs of major users.

This year will certainly see further modifications to the FCC's Computer II Decision, which was made in 1980 and became effective on Jan. 1, 1983. Both AT&T and Bell operating company lobbyists in Washington, D.C., are saying that Computer II is irrelevant after divestiture. There is growing sympathy for that view among senior staffers and some commissioners at the FCC.

Computer II requires that AT&T Communications and AT&T Information Systems build duplicate facilities in order to offer regulated and nonregulated telecommunications services. This does not make business or economic sense, but it was demanded by the FCC in 1980 in order to allow competition to develop. AT&T is now arguing that the breakup of the company renders Computer II's restrictions on AT&T's operating flexibility an unfair competitive burden. As a result, there is a good prospect that AT&T may be relieved of some of the restrictions placed on it under the terms of Computer II.

The Bell operating companies also want to amend Computer II in two areas: customer premises equipment and the offering of enhanced telecommunications services. Under the terms of Computer II, the Bell operating companies can offer customer premises equipment only via a separate subsidiary. The separate subsidiary restrictions, the Bell operating companies claim, add unnecessary costs, cause customer confusion and restrict the Bell operating companies' flexibility.

Furthermore, Computer II and the Modified Final Judgment appear to prevent the Bell operating companies from offering enhanced telecommunications services on a deregulated, detariffed basis, even if a separate subsidiary is formed. Therefore, the Bell operating companies will seek clarification from the FCC regarding whether or not they can provide enhanced services and, if so, under what regulatory or deregulatory conditions. Judge Greene may also be involved.

The two former allies are going to find themselves locked in competitive battles in toll markets, local telephone bypass, customer premises equipment and enhanced telecommunications services. The fact that AT&T and the Bell operating companies have the financial and technical resources to compete vigorously in these markets may have a chilling effect on potential competitors.

Nonetheless, the operating flexibility of both AT&T and the Bell operating companies will be determined by the FCC, the courts, the U.S. Congress and the state regulatory authorities. ■

Pearce, a regular contributor to On Communications, *is president of Information Age Economics, Inc., Washington, D.C.*

THE NON-INTEGRATION OF VOICE AND DATA

BY PATTI HARTIGAN

Non-integration

narrow. Until just recently, a voice manager consisted of person who looked at the phone bills to make sure that 400 clerks weren't making long-distance calls to their mothers. A clerk could do the job.

The Lanes are two of the many voice communications and data processing managers that are confronting each other face to face. As voice and data merge, it is becoming more and more complicated — and more and more crucial — to manage the two functions effectively. When the two functions are separate, problems of redundancy, incompatibility and cost-effectiveness arise. A firm may be supporting two networks when one network would suffice.

Such excess can and should be trimmed off the corporate budget, but in order to do so, data processing and communications people must work together, perhaps even be consolidated into one department.

But what happens when two previously separate functions are forced to grow closer together? Is there a race to see who calls the shots? Do they repel each other like oil and water? Does one function reign, making the other obsolete?

Surprisingly, many consultants contend that there is no conflict, that the problem was solved years ago when digital switches were first introduced. George Colony, president of Forrester Research, Inc., a Boston-based consulting firm, said he conducted a survey of Fortune 500 companies. "Typically, I saw telecommunications coming under DP control," Colony explained.

"I also saw the emergence of Swat teams, consisting of the DP manager, the telecommunications manager, the [management information systems] manager and the vice-president of finance or administration," Colony continued. These committees plan and coordinate purchasing, eliminating the problem of network redundancy and planning for future growth.

But what happens when you move out of the boardroom and into operations? The problem, it turns out, is a bit too complex to be solved by a committee.

I've never been fond of committees. It's like putting a Democrat and a Republican in the same office and telling them to solve our economic problems. They may have the same goal in mind, but their methods are going to be totally different.

John Lane

For now, a committee can be effective in determining priorities and objectives. But in terms of management, I don't think you can have two separate entities managing one collective item. You would have infighting all the time.

Judith Lane

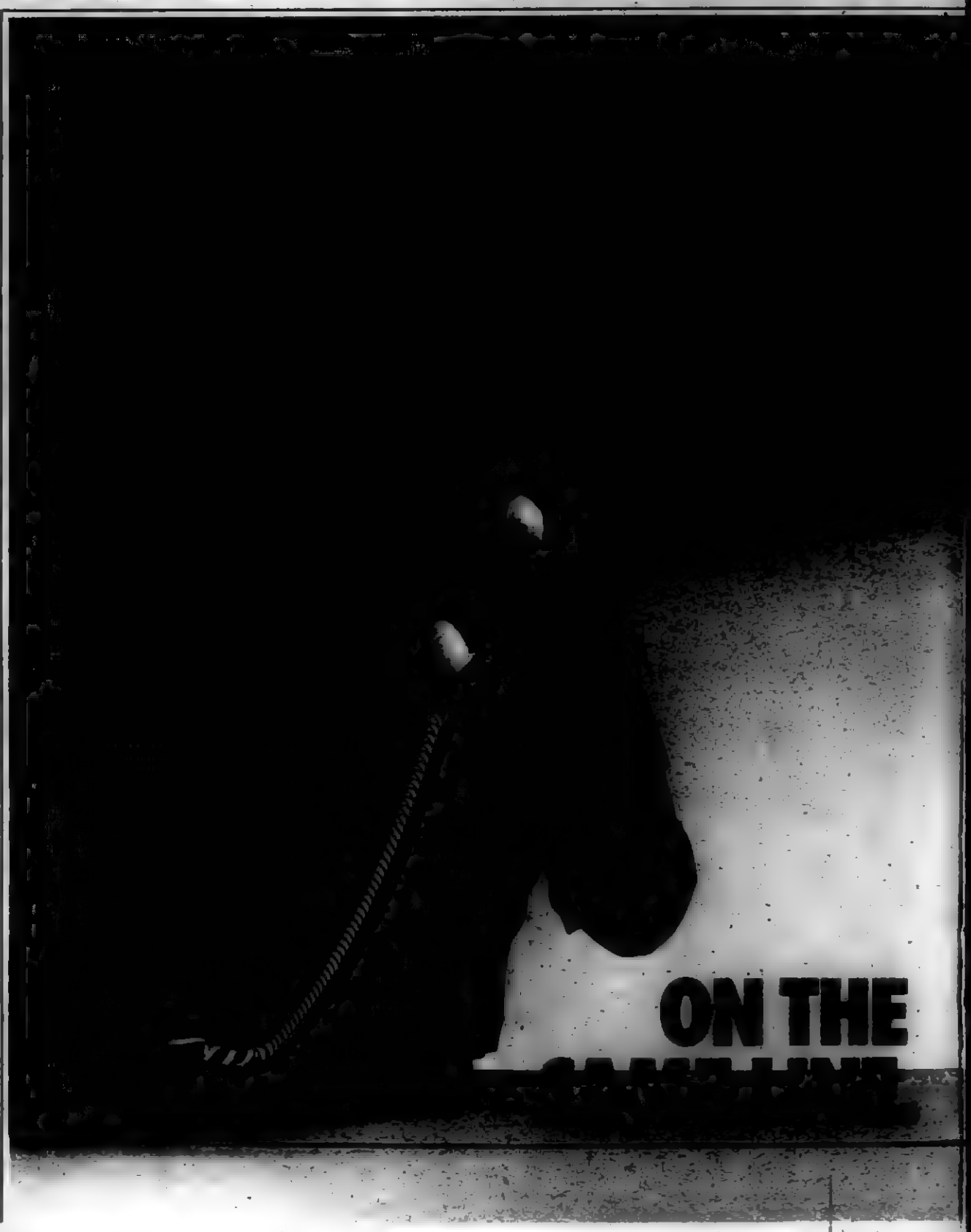
A committee would not have solved the conflict that arose several years ago at a high-tech firm with offices scattered throughout eastern Massachusetts. According to the company's former voice communications manager, voice and data were separate functions, with voice part of corporate services, which was in turn, part of administration. Data was part of information resources, which housed the DP shop. In 1979, the voice communications department set up a microwave network to bypass the local telephone company.

According to the former voice manager, who wished to remain anonymous, relations between the two departments were far from tranquil. "We tried to talk the MIS people into using the microwave network, but we were put off. They feared we were going to take over because we controlled the transmisson," he said. The data people did not begin to use the microwave network until 1982. "Things boiled down to a political situation," he remembered. "People weren't considering the corporation; they were considering their own political well-being."

SO, THE PEOPLE IN voice communications decided to "fight a war," in the words of the former voice manager. This war centered on territorial issues and on who could do a better job managing the communications function. "In addition to having a sophisticated shop, the voice people were also in charge of the data communications budget. And the data people were not very good at planning, didn't understand the technology," he explained.

"We considered the DPers to be wasting a lot of money, which may or may not have been a legitimate complaint, but that was how we perceived it. They weren't as user-oriented as we were. When things were happening, they did not respond in a fashion that we thought appropriate. So in order to protect ourselves and the corporate interest, we had to take over that responibility."

This, needless to say, did not go over big in the data department. "They resented that we had control of their budget and bashed them over the head every time they did something we didn't



agree with," the manager explained. "If we asked for an explanation, they didn't feel it was required for them to explain."

But as in any war, there was a price to be paid. "We won the war, but we lost the peace," he said. Data was finally introduced into the microwave network, but in addition, voice communications was absorbed into the MIS department. "It would have been all right if we simply got integrated with data communications. But we had to report to data processing people who really do not understand communications whatsoever and who made a lot of bad judgment errors."

As a result, there were casualties on both sides. "There was a lot of attrition on the data side," he explained, "and I left in 1982."

The problem, however, did not simply involve control, but also involved a lack of understanding between the two departments. "The most unfortunate thing was that the people we were given to in data processing did not appreciate us, nor did they understand what the hell we were doing," he added.

According to the former voice manager, this problem is not unique to his former firm. "Many DP shops are extremely conservative," he explained. "A lot of them are low risk takers. These days in communications, there is no such thing as no risk: Everything is risky. If you take no risks, you will sink in place. In order to stay above water, you've got to take risks. Many DP shops are not used to that," he explained.

Two crucial issues arose at the firm described above. "We fought two wars," the former manager explained. "The first involved who takes over — the communications people or the DPers. The second war involves where in the organization the merged function will fall — under communications or management information systems."

The first war — who will lead the merged functions — tends to be territorial. Clearly, both sides agree that the leader must have a working knowledge of both functions. However, they disagree about where that leader will come from. Both sides take a chauvinistic stance, each defending his own discipline as the best breeding ground for the leader of the merged functions.

A good data manager would probably be able to learn voice communications concepts in a fairly short period of time. I do not believe that that is true of the voice people that I have met.

John Lane

You find people in voice more amenable to learning data. Data is easier to learn because it it more highly structured.

Judith Lane

Although the Lanes were interviewed separately, their reasons for defending their respective disciplines tend to be mirror images, with each one claiming the same advantages and criticizing the other for the same disadvantages. Each partner in the marriage tends to cling to the idea that his discipline is more sophisticated than the other, that it is harder to learn.

Firmly entrenched in his or her own discipline, both managers take pride in what they do. It took them years to acquire their knowledge, and they do not think just anyone off the street, or from another department, could pick up this knowledge in a short period of time. They do not necessarily have a mutual disrespect for the other side, but more a firm respect for their own discipline, exaggerated by the possibility that their specialty may receive the short end of the stick when the two functions merge.

In addition, in the post-AT&T divestiture environment, there is a wider array of options than ever before and an encyclopedia of tariffs to consider. And both data processing and voice communications managers claim that they have more experience with handling these issues.

Most data managers have had to buy leased lines, to deal with direct-dial charges and make decisions about whether it is cheaper to dial direct, to buy a leased line or to go microwave. Until just recently, I don't think any "communications manager" on the voice side had that many options.

John Lane

The voice manager has so much more to consider than the data manager. He has to watch out for traffic and cable problems, worry about the equipment on the switch. He has to understand grade of service, to queue or not to queue, how to distribute calls, decide on the kind of transmission facilities, how to route those calls and so much more.

Judith Lane

The Lanes could argue at length about which technology is more sophisticated, which discipline breeds a better manager for the merged function. But at some firms, the problems of the "first war" — who will lead the merged functions — can be avoided, without two bruised egos struggling to gain control of the merged functions. For example, at Kaiser Permanente, a health maintenance organization based in southern California, the problem between communications and data processing was strictly organizational. And the "second war,"

Make sure your modem has all these PC:IntelliModem features

Integrated Voice/Data
- Switch between voice and data communications
- Programmable telephone handset jack

Status Reporting
- Line status detection (dial tone, busy, ringing, voice answer, modem answer, incoming call)
- Audio monitor
- Programmable LED

PC:IntelliCom Software Included
- 99-name on-line telephone directory
- Auto-dial, auto-repeat dial, auto-answer
- Link to another number if busy
- File transfer
- Data capture to diskette
- Programmable auto log-on sequences

Compatible with Crosstalk™/PC-Talk III™

Receive Sensitivity: -50 dBm

Speeds: 110, 300, 1200 baud

PC:IntelliModem is now ready to make connections with computers—and people—much faster and more conveniently. It's like getting a modem *and a telephone* for the price of a modem alone.

The ultimate status seeker.

The PC:IntelliModem also monitors your telephone line's status more closely than other modems. It listens to the line much like you do, and detects signals for dial tone, ringing, busy and voice—some of which other modems completely ignore. It then automatically takes the

start indication of
on, you always
call is progressing.

A soft touch to

Included with our single plug-in modem board is PC: IntelliCom,™ our exceptionally easy-to-use software package. It guides you step by step during use, through on-screen menus, entry instructions, an

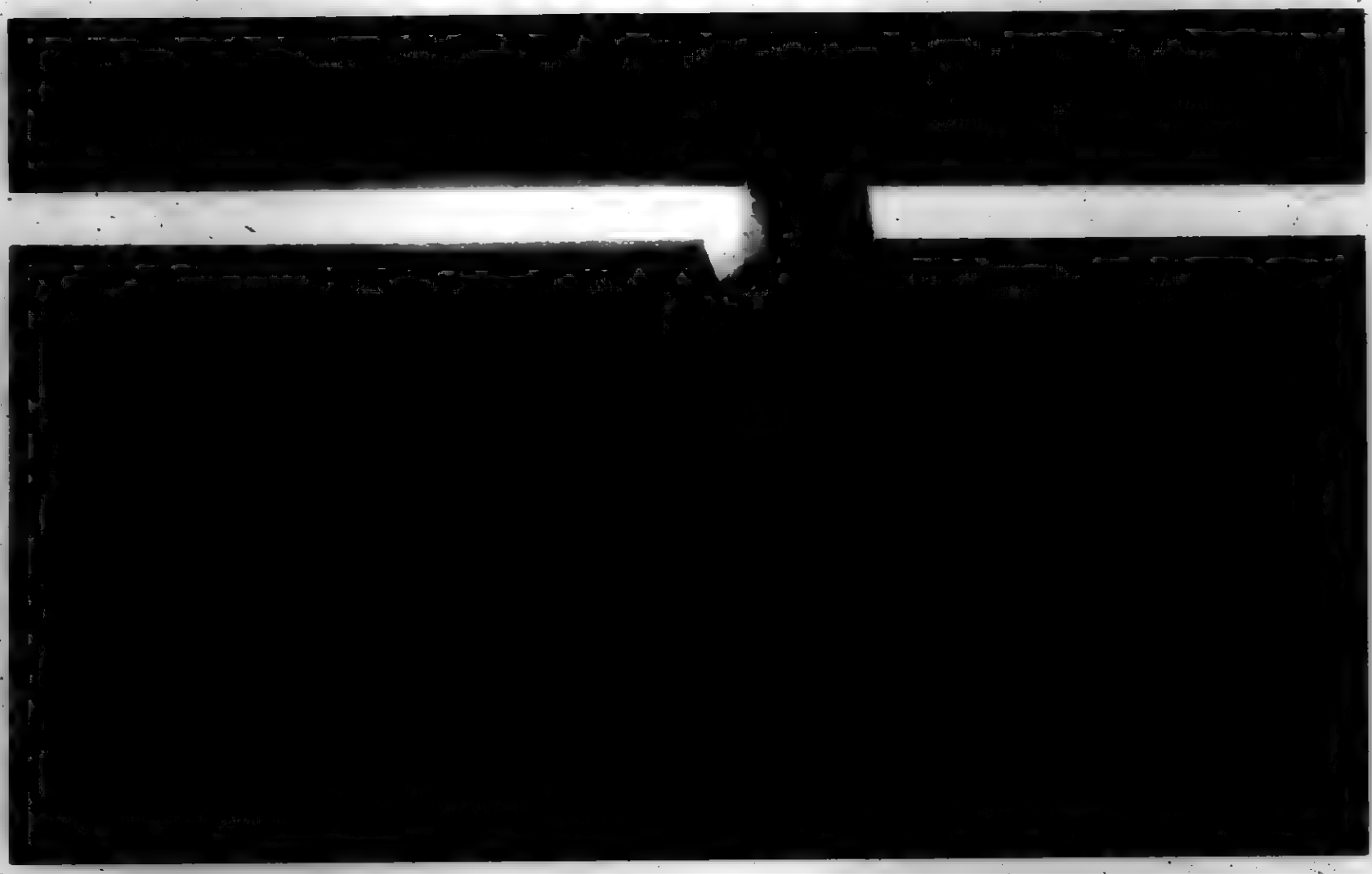
Or
Bizcomp
532
Sunnyvale, CA
408/745-1616.

You'll find there's only one modem that does it all, including voice communications: the PC:IntelliModem.

PC:IntelliModem and PC:IntelliCom are trademarks of Business Computer Corporation. IBM is a trademark of International Business Machines Corporation. Crosstalk is a registered trademark of Microstuf Inc. PC-Talk III is a registered trademark of The Headlands Press Inc.

BIZCOMP®

We've got people talking.



How To Get A Better Grip On Your 3270 Network.

With More Flexibility Than Ever Before.
Getting a grip on your 3270 applications is a real challenge. You've got to find the best way to bring IBM host applications to non-3270 terminals and personal computers. Without a lot of fuss and bother.

Fortunately, Datastream has a flexible solution. One that won't cost you an arm and a leg.

With our 3270 SNA or BSC Cluster Controllers, you can attach personal computers, ASCII terminals and printers to IBM hosts, giving more people 3270 functionality. And giving you more control of the computing activities in your company.

Our Multi-Path Controller allows personal computers and ASCII terminals to communicate not only with multiple IBM mainframes, but with minicomputers (including DEC®) and time-sharing hosts as well. It even allows personal computers and terminals in the network to talk to each other.

All Datastream controllers feature security, dial-in or direct-connect access, remote dial-in diagnostics and more.

To extend your 3270 investment even more, use our controllers with Datastream's low-cost Display Stations. They offer 3278 functionality keystroke-for-keystroke. Plus features even IBM doesn't have. Like DEC VT100 emulation. Remote dial-in. Additional soft keys. And other 3290-type keyboard features like 24 PF keys.

All this makes for a very tidy, secure, economical way to expand your network.

And put 3270 within everyone's reach.

Call toll free: 800-952-2500
(Outside California)

DATASTREAM

2520 Mission College Blvd.
Santa Clara, CA 95050
408/986-8022

®DEC is a registered trademark of Digital Equipment Corporation.
©1984 Datastream

See us at Interface, Booth # 1364

where in the organization the merged function will fall, was solved without a battle.

Until just recently, voice communications was under facilities design and construction at Kaiser Permanente. "It just so happened that the way this organization was structured for years, the major role of communications was in support of our billion-dollar building program," Joseph Bedard, the health firm's communications manager, explained. "We build a considerable number of medical centers and clinics, so the real role of communications in the past focused on building needs.

"Today with the integration of voice and data, that role is changing," he pointed out.

The voice network has always been dominant at Kaiser Permanente, but there has been substantial growth in the data network over the past few years, according to Tom Fleshman, the firm's director of information systems, which traditionally housed DP. "The two areas were not in direct confict, but they were not always talking to each other," Fleshman explained.

"Each side went along and did its own thing, until it got to a point where the two could no longer coexist without a joint focus and integration," he added.

In November 1983, voice communications was absorbed under information systems, and as yet, no problems have arisen. Asked if he felt any tension about the move, Bedard answered with a simple, "No, none at all.""

Fleshman agreed. "As far as I can tell, there is no tension," he said. "In fact, I have been told by the communications manager and others that this was a positive move for them, that it provided them with a broader career path," the information systems director said.

The same solution, however, might not prove as smooth at another organization. "I have been here 4½ years, and there has never been any problem between the voice and data people," Fleshman pointed out. "That is not what precipitated this; that is not the issue at all.

"In other companies, if there is an all-out war, the same type of solution might not work," he explained.

"It depends on a lot of things: the nature of the business that the organization is in, to what extent communications plays a role and what type of role it plays.

"For example, for us, no matter how large our data network gets, voice will always be dominant. It is the key access into our system. Our patients' main entrance is via phone to make appointments, talk to doctors and so on. We run something like 23,000 voice lines," Fleshman said.

"If another company were to look at us and say 'Gee, should we put it all under DP?' — I don't know. It depends on the people involved, the comfort level of management, the track record and so on, rather than the turf issues of who it should report to and so on," Fleshman added.

It really boils down to which is the most sophisticated department. But I strongly suspect that in the larger companies, the most logical place to put a consolidated function would be in data processing.

John Lane

Where the merged function falls depends on the company. What kind of network do they need? Voice and data will probably remain separate entities but under one realm — communications.

Judith Lane

Just as the question of where the merged function will fall depends on the individual organization, the answer to the conflict between DP and communications depends on each particular case. There is no simple solution to the problem; in extreme cases, the only possible answer may be a complete reorganization, restaffing and time to heal.

Although the problem can rarely be avoided, it can be cushioned. Managers need to educate themselves, to learn more about the other discipline, keep an open mind. This is easier said than done, for there is a vacuum in the market for managers with a working knowledge of both disciplines. However, there is a world of opportunity for managers able to ride the wave of change.

Is there hope, then, for an eventual resolution of the conflict between voice communications and data communications managers?

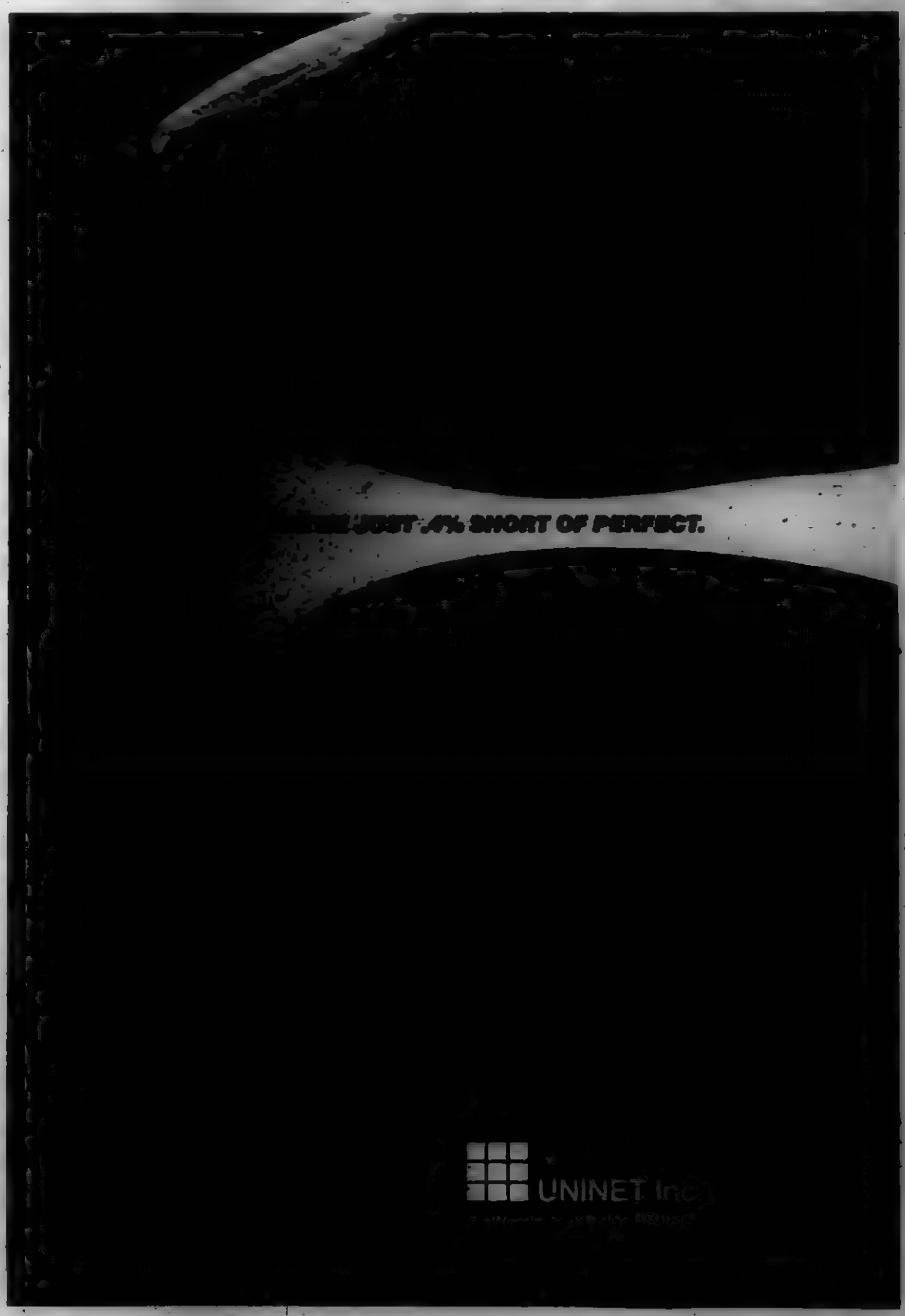
The two will always be fighting to some extent. Their priorities tend to be different, their background, training. I'm not sure you'll ever get a perfect blend of that.

John Lane

I think ideally, the two can work happily together, but they must be administered. One person manages the information and the other makes sure that Jack can talk to Jill — and it doesn't matter whether Jack is a computer and Jill is a computer or Jack is a manager and Jill is a customer or whatever.

Judith Lane

Will Judith Lane's prediction prove right? Or will the conflict continue? Only time will tell. ■



DOUG SMITH

THE UNCERTAIN FUTURE OF CENTREX

BY JEFF KAPLAN

One of the most important issues facing many telecommunications managers as they attempt to adjust to the new AT&T and reacquaint themselves with their local telephone companies is what to do about their Centrex systems. The Federal Communications Commission's (FCC) Feb. 3 decision to stand by its local access charge scheme for Centrex services may mean significant increases of $2 per line per month in the telephone bills of Centrex subscribers. This prospect may drive these major users away from Centrex, leaving the local operating companies with a huge chunk of unused central office switch capacity. In addition, it may settle small business and residential users with even higher local telephone costs.

However, favorable state tariff rulings permitting more flexible pricing and rate stability may help to offset the added access charges and limit the amount of migration away from the Centrex service.

For the uninitiated, a brief description of the Centrex system is in order. Basically, Centrex is a service offered by all the Bell operating companies and a handful of independent telephone companies. It links each of an organization's telephones to a central office switch located at the operating company's plant. The service was first developed in the early '60s to give large organizations direct dialing capability in and out of the organization. The system evolved to include basic station features such as intecom, call holding and call transfer.

Eventually, two forms of Centrex emerged. Centrex-CO has been the standard service emanating from the central office switch. Centrex-CU combined basic central office service with additional on-premises switching. As a result of AT&T's efforts to move subscribers toward its private branch exchange (PBX) products, the Bell operating companies no longer offer Centrex-CU.

The debate over the local access charge plan has brought together strange bedfellows, like the local operating companies and state regulatory agencies that oppose the plan. It has also brought out some of the subtle tensions that have been brewing between AT&T and its newly emancipated operating companies. (This debate is elaborated on in "Pro and Con," Page 4).

But based on extensive interviews with federal and state regulators, congressional staff, interconnect industry representatives and marketing people in the Bell operating companies, International Data Corp. (IDC) believes that predictions of Centrex's abandonment and demise in 1984 and after may be exaggerated.

There were approximately 7,425 Centrex systems installed at the end of 1983, according to the North American Telephone Association (Nata). This represents a 50% drop in the number of systems installed since 1981, when 15,100 systems were in place. This number appears relatively small when compared with the nearly 21 million PBXs that Nata estimates are currently installed in the U.S.

However, it is unfair to compare the number of Centrex systems with the number of PBX instruments in place. The operating companies charge Centrex users on a per line basis. And new central office switches enable the Bell operating companies to offer customized Centrex service with additional features to smaller offices with fewer telephones than in the past. Because the service can now be directed at smaller clusters of telephones, the number of lines served is more important than the number of systems installed. Some analysts guess that 60% of the Fortune 500 companies and an even greater percentage of major nonprofit institutions use Centrex.

Centrex service represents a major component of the basic operations and revenue structure of the Bell operating companies. In Massachusetts, 122,000, or 22%, of New England Telephone Co.'s 579,000 business lines are dedicated to the Centrex-CO service. Over 52% of the main station lines provided by Chesapeake and Potomac Telephone Co. in the Washington, D.C., area use the Centrex system. And approximately 46% of the business lines in California are serviced by Centrex.

As an office switching service that provides an array of station features to improve telephone efficiency in organizations, the Centrex-CO competes head-on with PBX systems. The fundamental difference between the two is that Centrex performs all switching functions off-premises by establishing a separate loop for each telephone station, while the PBX is installed on the premises where it switches stations internally and feeds and sends external calls through trunks.

There are additional factors that differentiate the two systems. Financing and service have been the two most important. Centrex users pay an installation fee and monthly charge per station adjusted by the number of stations connected to the central office switch and the add-on features requested. This permits smaller organizations or organizations with limited funds to avoid a heavy capital outlay for an on-premises switching center. Total system shutdowns are also avoided under Centrex because each station is individually linked to the central office switch. PBXs require special power-support systems to ensure that an organization's telephone lines are not lost if the office suffers a power blackout.

PBX systems offer the user greater control and cost savings through customized design for an organization's unique needs. Organizations can expense their financing costs and depreciate the system over time. After system features, relative independence from the local operating company is the intangible goal and advantage that PBX vendors emphasize most.

Both systems were originally ▶

Kaplan is a senior market analyst in telecommunications for IDC's Communications Research Program, Framingham, Mass.

configured for analog transmission, but today's trend is toward digital traffic capability. Third-generation PBXs offer add-on digital transmission capability, and analog/digital converters have been used to permit data communications through the Centrex system. The Bell operating companies have been making a concerted effort to replace or upgrade their central office switches to permit routine high-speed data traffic. At the same time, fourth-generation, fully digital PBX systems are expected to come to market within the year.

Because they add an additional system to the telephone network, PBX systems can cause some switching impairment on-premises and transmission degradation. But PBX users have been willing to make this short-term sacrifice while the overall telephone network is upgraded to accommodate the on-premises systems.

Centrex began to lose its luster in the late '70s. AT&T strategists believed that Centrex could not compete against the new PBX offerings over the long haul. As a state-regulated service, Centrex lacked the price flexibility necessary to compete in a price-sensitive market. And under the Modified Final Judgment of 1982, the divestiture plan accepted by AT&T and the Justice Department, the Bell operating companies were prevented from providing enhanced services and customer premises equipment unless they set up separate unregulated subsidiaries. This severely limited the operating companies' ability to market Centrex.

AT&T introduced its own PBX, the Dimension system, and instructed the Bell operating companies to push its offering. Centrex was not stressed in AT&T's 1982 market strategy.

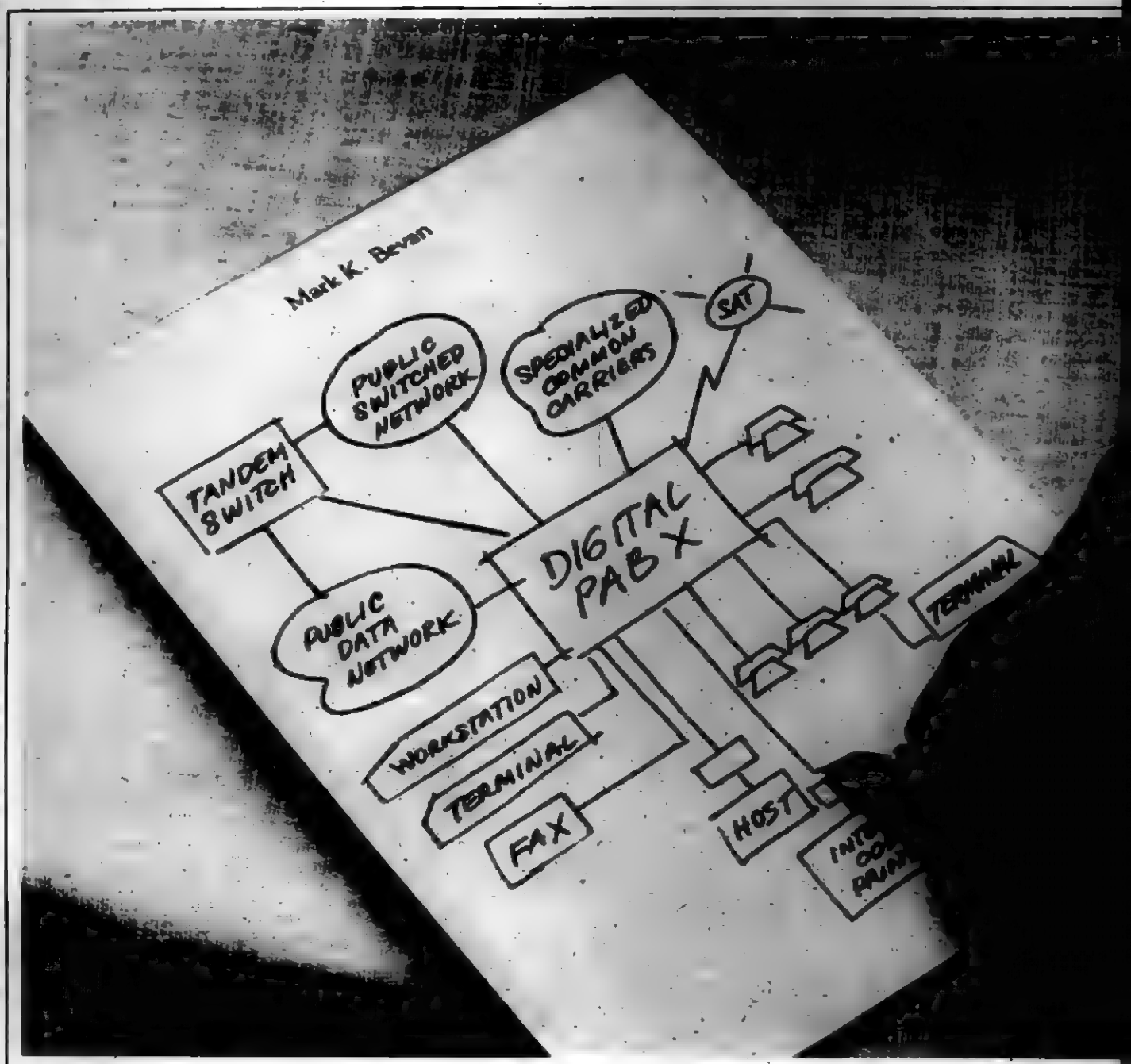
The Dimension system and early System 85 releases encountered a series of engineering and delivery problems. American Bell, Inc., AT&T's unregulated subsidiary responsible for marketing PBX products, struggled through internal political and organizational problems as well. It emerged with a new name, AT&T Information Systems, and a credibility problem to overcome.

The Bell operating companies attempted to make the most of a difficult situation. AT&T had negotiated a favorable deal with

The Bell operating companies have been making a concerted effort to replace or upgrade their central office switches to permit routine high-speed data traffic.

the Justice Department, which freed it of the burdens of local operations and state regulators. It took the most profitable business — long-distance services. It preserved its vertical integration by retaining Bell Laboratories, its research and development arm; AT&T Technologies, formerly Western Electric, its manufacturing operation; and AT&T Information Systems, its young marketing vehicle. It left the Bell operating companies with the difficult task of local switching and service. The Bell operating companies were given Centrex and its significant central office switch investment, but they were not given the freedom that they needed to earn the return that they required.

The Bell operating companies attempted to salvage Centrex and pushed favorable tariff decisions



It used to take six different companies to build a communication system like this.

Now it only takes one.

through state public utility commissions. The tariff agreements permitted more flexible rates and long-term contracts that ensured rate stability. They lowered or eliminated their minimum line requirements, allowing smaller offices to take advantage of Centrex. This also allowed the Bell operating companies to expand their market base. Pacific Northwest Bell gained approval of a new Centrex system called Centraflex, which is offered to business and residential subscribers with only two lines or more. And the operating companies continued to add service features, such as call forwarding and station message detail recording, to remain competitive with PBX offerings.

On Dec. 22, 1982, the FCC issued its Third Report and Order, which called for local access charges, including the customer access line charges that concern Centrex users and the Bell operating companies. Under the FCC's original plan, all lines entering a local operating company's central office switch would be charged a monthly access fee beginning Jan. 1, 1984. The plan was based on the premise that all users of the local telephone network should pay for the fixed or nontraffic-sensitive costs associated with operating the system.

The FCC's plan was the first step in its efforts to transform the regulated telephone rate structure into a cost-based system. Rather than allow long-distance users to continue to subsidize the local network through artificially established rates, the FCC determined that the AT&T breakup should serve as an impetus for a more rational rate structure.

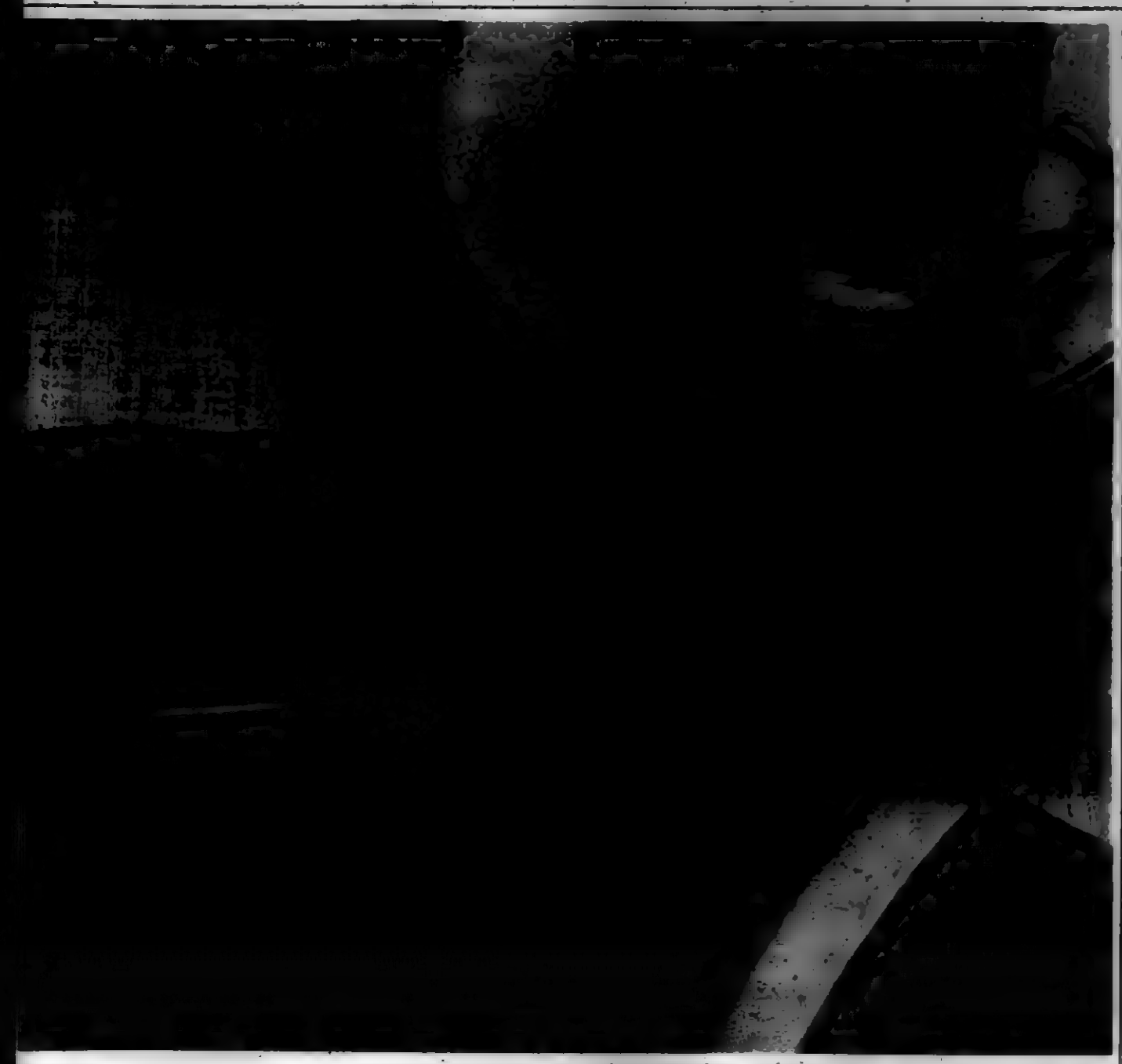
The FCC proposed that residential users should be charged a maximum of [illegible] per month per line beginning in 1984 and eventually pay a maximum of $6 a month per line in 1986. Business users would immediately pay a maximum of $6 a month per line.

The FCC's plan generated overwhelming opposition. On July 27, 1983, in response to 35 petitions, the FCC issued a Memorandum Opinion and Reconsideration Order modifying its original plan. Under the new proposal, which was published in August, residential and Centrex users would pay a maximum of $2 per line each month for existing lines as of July 27, 1983. The monthly rate would increase $1 per year in 1985 and 1986. New Centrex users or expanded Centrex systems would pay the full $6 per month charge for their new Centrex lines.

Although the FCC reduced the immediate rate shock of its original order, the Bell operating companies and Centrex users were only mildly relieved by the new plan. Under the FCC's modified formula, Centrex users could still pay more than 10 times as much as PBX users in monthly fees. That is because each of the telephones in a Centrex subscriber's office will be charged for tying into the central office switch, while the PBX user will only pay for the trunks that carry its external calls to and from the central office switch.

THE BURDEN of the access charges may fall most heavily on major nonprofit institutions that have relied on Centrex systems in the past and lack the financial resources to invest in a PBX system. The Mayo Clinic and its affiliated hospitals in Rochester, Minn., estimate that they will pay $255,864 per year in access fees for Centrex lines under the FCC's revised plan.

The potential impact of the FCC's plan has generated an unusual ground swell of state and federal lobbying. The nonprofit sector has been led by such organizations as the American Hospital Association. The International Communications Association (ICA) filed a petition with the FCC on behalf of Centrex users, requesting



We've made complex telecommunications simple. As your single source for an entire system we will custom tailor it to your exact needs.

That means fast information flow for both voice and data and increased organizational efficiency. All of which can add up to savings in operating costs.

We provide all components from telephones, to terminals, to PABX's, to transmission equipment. And we offer the experience needed to build a system that will serve you effectively today and grow with you in the future.

Fully integrated data capability and advanced features will be available through easily implemented system upgrades. Just as important, we offer a service organization that will be there when you need them.

But our communication services don't stop at your office door. You can use GTE's Telenet public data network and Telemail electronic mail system to speed communications throughout the country. And GTE's Satellite Communications subsidiary can link your office to a satellite.

In a field as complex as telecommunications you'll find you can simplify your problems by dealing with the company that has it all.

For more information write Marketing Services, GTE Business Communication Systems Incorporated, 12502 Sunrise Valley Drive, Reston, VA 22096. In Canada, AEL Microtel Limited, 1211 Denison St., Markham, Ontario L3R 4B3.

We've simplified a complicated business.

GTE Business Communication Systems

a further reconsideration of the local access charge plan.

State regulators also solicited Centrex user statements and submitted their own petitions to the FCC. The state regulators believe that a large number of Centrex users will abandon the service if the access charge stands. This will leave the Bell operating companies with a significant amount of unused central office switching capacity. In order to recoup their investment in this equipment, the Bell operating companies will be forced to boost their local rates, particularly those of residents and small businesses.

Northwestern Bell estimates that it will lose 92% of its existing Centrex lines within three years if the FCC plan is enforced. Pacific Northwest Bell predicts that all of its 24 largest Centrex users in Washington state, accounting for 72.8% of the state's Centrex lines, will abandon the service by the end of 1986. This will leave a stranded investment of nearly $35 million.

The state regulators asserted in their petitions that although the FCC's plan is well-intentioned, it is poorly designed. They claimed that Centrex rates were set at the state-level to be cost-sensitive and bring an adequate return to support local operating costs. Therefore, the FCC's local access charges would be an unnecessary surtax on Centrex users to cover costs that have already been provided for.

Not only may the FCC's charge on Centrex users be unnecessary, but a petition submitted by Northwestern Bell, Mountain Bell and Pacific Northwest Bell claims that the FCC plan may even be counterproductive. The Bell operating companies predicted that if a major share of their Centrex users abandon the service in the next two years in favor of PBXs, as their surveys indicate they will, then the local operating companies in this region stand to lose $700,000 per month in access fees due to a reduction in the total number of access lines entering central office switches.

As a compromise, the Bell operating companies, state regulators and Centrex users proposed a PBX-equivalency formula to the FCC for determining the local access charges on Centrex subscribers. Under this proposal, a Centrex user with 100 lines would pay the same overall charge as a PBX user with trunking capability up to 100 lines. This proposal was based on the assertion that the bulk of the telephones and lines used by Centrex subscribers are used for intra-office communications. Therefore, their lines are not imposing an equal burden on the central office switch and should not be charged a flat rate. The proponents of this approach suggested that engineering data could have been used to determine an appropriate formula.

The PBX-equivalency concept was vehemently opposed by PBX manufacturers and vendors. Nata, representing the interconnects, attacked the scheme and the Bell operating companies' efforts to protect Centrex.

The interconnects believe that Centrex, by virtue of its direct-line architecture, cannot be equated with PBXs. In their petitions to the FCC, they point out that although each Centrex line may not be used for external communications, each one has that built-in capability, placing the same burden on the central office switch regardless of how it is actually used. Because of this, the interconnects call a PBX-equivalency formula inappropriate.

The second area of contention between the interconnects and the Bell operating companies is over the definition of enhanced services. Under the Computer II decision and the Modified Final Judgment divestiture plan, AT&T and the Bell operating companies were prohibited from offering any products or services that represented an enhancement to their basic transmission function, except through a separate unregulated subsidiary, such as AT&T Information Systems.

The interconnects' petitions to the FCC contend that the new features being offered for Centrex — such as least-cost routing, call forwarding and storage and automatic call distribution — represent enhanced services and violate Computer II and the Modified Final Judgment. The Bell operating companies' petitions respond that the new services are now possible because of hardware enhancements rather than software enhancements and are within the legal restrictions.

AS IF THE CENTREX issue was not confusing enough, Congress decided to get into the act in the fall of 1983. In November, the House of Representatives, concerned about the impact of local access charges on residents and small businesses and the threat they posed on universal service, passed H.R. 4102, which called on the FCC to revise its plan. The legislation did not specifically address the Centrex issue, but instructed the FCC to review its

plan's impact on nonprofit institutions and state and local governments that rely on Centrex.

Congressional aides incorrectly predicted that the Senate would pass similar legislation by February. But the legislation was put off until next year.

The Reagan administration also criticized the FCC plan, but expressed concern about legislative actions that delay or disrupt the smooth implementation of the AT&T divestiture.

AT&T initiated an intense lobbying campaign to prevent Congressional intervention and further modifications of the FCC plan. It threatened to retract its proposed long-distance telephone rate reductions if the access charges were lowered or if they were withdrawn.

Amid all of this controversy and confusion, the FCC decided to delay the implementation of the local access charges until April 3, 1984. Although the FCC continued to stand behind its plan, it has decided to reopen the issue and welcome a new round of petitions concerning the proposed charges.

In a surprise move on Jan. 19, the FCC accepted a staff report recommending that the $2 monthly charge on residential and single-line business users be put off another year to allow the FCC more time to reevaluate its plan. At the same time, the FCC upheld the $6 monthly charge on multiline business users. The Centrex issue was left unanswered until Feb. 5, when the FCC decided to uphold its July 27, 1983 ruling.

It is clear that the FCC made a calculated political move to diffuse the public backlash to its local access charge plan when it postponed the $2 monthly fee on residential and single-line business users and let the charges imposed on multiline users stand. The one-year postponement will push the charges back until after this year's elections, making the charges less of an immediate political issue. But the FCC 's decision to stand by the charges on multiline businesses will certainly generate greater migration from the local telephone networks toward PBX and bypass technologies to avoid the access fees.

It appears that the FCC's decision has ended Washington's role in the access charge controversy for the time being. The ICA will review the FCC's action and may file for further reconsideration on behalf of Centrex users, but no substantive changes are expected from the FCC. And Congressional aides believe that Congress will not come to the rescue of Centrex users in the way that it was willing to intervene on behalf of residential and small businesses.

IN THE MEANTIME, THE Bell operating companies and the Centrex users are not sitting still. The Bell operating companies have submitted new rate filings to state regulators and revised their Centrex pricing schedules to compensate for the local access charges if they do become a reality. Rates are expected to be reduced so that the impact of the charges on subscribers is minimized.

The Bell operating companies are also investigating ways to live with the the concept of structural separations between their regulated and unregulated businesses as outlined in Computer II and the Modified Final Judgment. Although all of the Bell operating companies claim that they have not crossed the invisible line into the area of enhanced services, in recent interviews with IDC, several Bell operating company officials had a difficult time avoiding the term while describing the new features they will offer Centrex subscribers.

Several regional holding companies and Bell operating companies are discussing joint venture agreements with interconnects as one method of circumventing the structural separations requirement. Under these agreements, they will refer Centrex users to the outside vendors for the enhanced service features.

Major Centrex users are not sitting around either. Anticipating that the selection process and installation time for a PBX system is over two years, many Centrex users have issued requests for proposals to PBX vendors to get ready in case the local access charges stand.

Despite the controversy and confusion surrounding Centrex, IDC believes the pronouncements of its demise are premature. Although some of the regional holding companies are still uncertain aobut how to market Centrex, others have been quick to promote it as their flagship service. The regional holding companies and local operating companies have staff committed to the service and are ready to revise prices and add features to hold their subscribers. They believe they offer a viable switching system and that user loyalty and their commitment to service will see them through this challenge.

Because of this determination and the added service features that will be available for Centrex, IDC believes the service will survive the access charge threat and withstand the PBX challenge. ■

Era One saw the personal computer increase the productivity of the business executive dramatically. Yet for all their power, personal computers have not fulfilled their potential. Because the different makes have been unable to communicate reliably with one another and with the various public data networks.

A new era in dependability. Era 2's electronics are so well put together we're able to offer a four-year warranty-twice the term of protection you get from yesterday's products.

On top of that our product support is outstanding. Our 800 number operates 9AM to 8PM (EST), Mondays through Fridays, 9AM to 5PM Saturdays with experts available to solve any problem or answer any question.

Era two.

But now, Microcom moves the personal computer into a new era of communications compatibility with Era 2–the first Personal Computer Communications System with the industry-standard communications protocol MNP. Era 2 finally enables dissimilar personal computers to communicate with one another reliably and cost effectively. It also allows the personal computer to access public data networks easily and error-free.

The state of the price of the state of the art.

We're able to offer Era 2 for an amazing $429. By any standard the price/value ratio of Era 2 is outstanding.

A closer look at Era 2.

Era 2 with MNP is a 1200 baud Communications System (software and inboard modem) designed to operate with the IBM PC, PC XT, compatibles and PCjr; Apple IIe, Apple II Plus and Apple II. Its features include IBM 3101, Digital VT100 and VT-52 terminal emulations. Era 2 executes multiple functions with a single keystroke. Stores a virtually unlimited number of telephone numbers – each one up to 31 digits. Era 2 is Bell 212A compatible, works with Pulse or Touch-tone™ dialing. Its speaker alerts you to busy signals, wrong numbers, etc. Era 2 gives your personal computer error-free compatibility with other personal computers, data bases, mainframes, almost any information source that can be reached by telephone line.

Move your personal computer forward into a new era of communications. Visit your Era 2 dealer soon. Call 800-322-ERA2 (in MA, 617-762-9310) for the name of one nearest you. Or write us, Microcom, Inc., 1400A Providence Highway, Norwood, MA 02062. We'll send you a brochure with complete information on Era 2.

Only from Microcom: The Personal Computer Communications System with MNP.

Microcom, Era 2 and MNP are trademarks of Microcom, Inc. Apple is a trademark of Apple Computer Inc. Digital is a trademark of Digital Equipment Corporation. IBM is a trademark of International Business Machines Corporation.

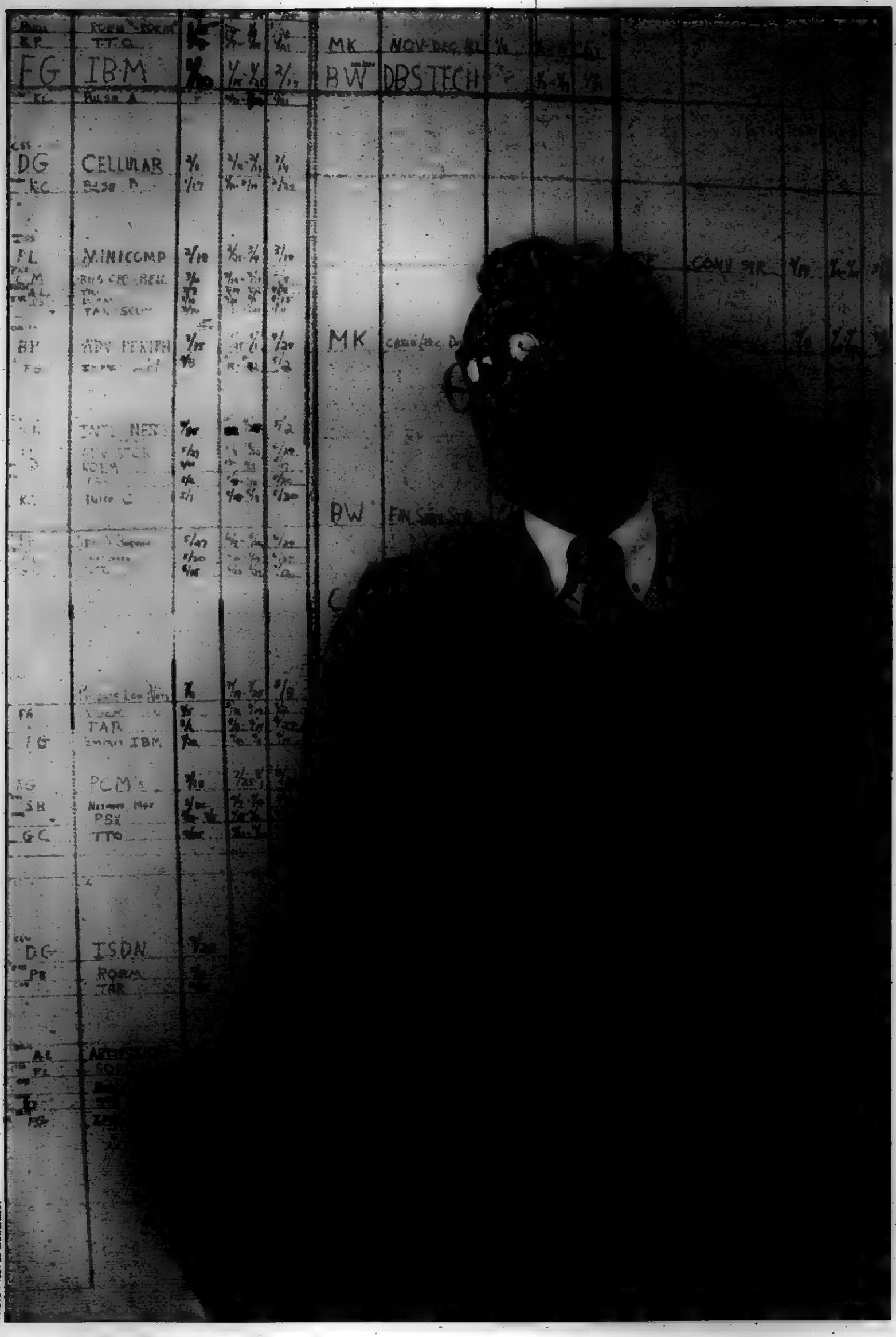


PHOTO © 1994 ED BRAVERMAN

Are these the best or worst of times for the communications industry?
The best of times.

Why?
Mao Tse-Tung had an expression: "There is great chaos under the sun, everything is beautiful."

What is it about chaos that's beautiful?
It presents opportunities for users and those vendors that can see the future better than their competitors. Strategy dictates that a company do something that is different from its competitors. Here is the chance to do something different.

Specifically, for whom are these times good?
It is a good time for the regional operating companies. It is a good time for independent equipment manufacturers. It is relatively a good time for new and enhanced services.

Who's having a bad time now?
AT&T. Anytime you go from a 97% market share to something that in four years may be a 64% market share, you don't really stand up and say this is the best of times. I'm talking about AT&T Communications.

How can companies do what you suggest and find the opportunities?
Opportunities never present themselves as multibillion-dollar opportunities. Often they are small niches that are best taken advantage of by quick, flexible, fast moving, aggressive companies such as Rolm [Corp], Intecom, [Inc.], Ztel, [Inc.] When you round to the nearest 100 million, which AT&T does, you cannot get in markets that are small. You are almost muscle-bound.

Look at AT&T Technologies, an enormously competent company. Yet historically, it only entered a market when the market size was sufficient to support its efforts — in fact, when Bell Labs told it to go and get in that business. Well, these markets are often software-driven today, which means they are kind of customized. It's not like turning out products on cookie cutters.

How will AT&T Technologies fare in the new industry?
I think AT&T Technologies is going to break out. I think it has reached the conclusion that its technology is too impressive to be bottled within AT&T Information Systems. It will look at every available distribution system out there as appropriate vehicles for its technology, including value-added resellers, Computerland, Sears and, once again, the operating companies.

What will it take to win the operating companies back?
An act of faith by AT&T management that it can leverage its position in 256K chips, that it will be market-responsive and that the market will actually salute on products that AT&T Technologies may build.

[illegible] "BE YOUR OWN BELL" [illegible]

The Inc. magazine commendation on Howard Anderson's burnished brown office wall cites his communications research company, The Yankee Group, as one of "America's fastest growing private companies in 1982." Yet that is seemingly not enough for its founder and managing director. What more could he expect?

"The goal of the Yankee Group, and I've never made any bones about this, is world domination," he says. "We want to be the most important company in our industry." For insight on how he expects that to happen, look no further than his business card. Over the company name is the aphorism: "The Network as a Strategic Weapon."

Anderson has already become one of the most important individuals in the communications industry — if public exposure is any measure of importance. Whenever big news breaks in the communications world, as it has so frequently in the past two years, newspapers and magazines call on Anderson for analysis.

The 39-year-old Anderson majored in economics at the University of Pennsylvania and earned an MBA from Harvard Business School in 1968. He worked as a "marketeer" at Shintech, Inc., a computer graphics and facsimile manufacturer. He founded The Yankee Group in 1970 and built it from a one-man operation to a firm with 72 employees and offices in four countries.

The Yankee Group has gone from earning 100% of its revenues from consulting in the early days to just 4% today. Consulting has been supplanted by what Anderson calls "multiclient studies." The studies cover four different areas and are offered to the firm's 425 clients on a subscription basis for $30,000 a year. The goal of the studies is to make sense out of today's turbulent communications times.

A frequent speaker at industry conferences, Anderson combines his forceful delivery with a biting sense of humor. During a recent speech in Washington, D.C., he alluded to his distaste for local-area networks, saying to the audience, "By the way, the Ethernet users group will be meeting outside in the phone booth where they will hold their yearly prayer meeting."

So what does Anderson make of these turbulent times? On Communications Editor Bruce Heard interviewed him last month in his Boston office to find out.

Along those lines, will Bell Laboratories continue to be the preeminent institution it has been?
I disagree with your assumption that it is the preeminent institution. I think that 90% of the problems of AT&T can be directly laid at the feet of Bell Labs. Bell Labs has been a shadow government at AT&T for two decades. Bell Labs made the decisions on what products to make and what not to make. Bell Labs caused development to start or cease. Most manufacturing companies have an R&D lab. AT&T had an R&D lab with an adjunct that did manufacturing. Bell Labs was in fact the tail that wagged the dog.

Can you cite an example?
[Private branch exchanges] — the hottest new market in the U.S. and AT&T did not have an entry.

Why not?
Bell Labs made the decision not to pursue this. One of the reasons was least-cost routing. Putting in a least-cost routing device may give you an equipment advantage, but reduces the amount of long-distance calling. AT&T is a company that historically had Long Lines in the center, and Long Lines always was protected like a king on a chess board. The better the equipment performed, the worse the Long Lines revenue.

What happened was that the users found they could wander off the reservation with a [Northern Telecom, Inc.] SL-1 or with a [Rolm] CBX. Least-cost routing devices like Wats boxes provide an 80% return on investment. With a least-cost routing device, I could take my tie line usage from four hours per day per tie line to seven at no increase in cost. In other words, I'd get almost three free hours of telephoning per day. Bell Labs made the decision not to go in there.

How can AT&T compete?
I think you're going to see AT&T make strategic investments in companies, not unlike what it has done with Olivetti [Co.] or like IBM has done with Intel [Corp.] and Rolm. AT&T realizes it is not going to change the culture of that company overnight. It may not be possible to ever change the culture of AT&T.

Why are things good for the spun-off Bell regional operating companies?
They are a superb distribution system. The real genius of AT&T wasn't Bell; it wasn't his chief engineer Thomas Watson; it was Theodore Vail, because Vail came up with the idea of franchises. And the operating companies are the finest franchise idea since the Catholic Church.

They have always been superb distributors. They were distributing AT&T Technologies gear, and they were distributing Long Lines service for AT&T. They can say, "We are no longer bound to give you only what AT&T Technologies provides, we can give you an Intecom PBX, a NEC Telephones, Inc. Neax 2400 and so forth and so on."

While we are talking about customer

Howard Anderson

premises equipment, what does the sale of embedded customer premises equipment mean? Is it good for people to buy it? Does it lock them into Bell? Will it create a glut of equipment so manufacturers of the fancy new products won't be able to sell their stuff?

It means there is the beginning of a price war, and the user will be the beneficiary of that war. He now has anything from technologically simple to sophisticated equipment to choose from. He may have to put in a special waiting room for all the salesmen who want to call on him. There is not a glut of equipment on the market, and there are 250,000 units that have to be replaced over the next few years. The operating companies are the preferred vendors for customer premises equipment, and Northern Telecom is going crazy supplying it.

What are the implications of users buying all this equipment?

Every major user is becoming what Don Gooding of The Yankee Group calls BYOB — be your own Bell. If you're a large user, you're going to be an integrator. If you have a lot of moves and changes, you're going to hire your own installation and maintenance person to do it. For the sophisticated problems, you may use an operating company.

It used to be if you were a major customer, AT&T Long Lines was where you went. Look at the decisions the user has to make. He's got to make decisions on customers premises equipment. He's probably got 12 decent distributors to choose from — well, make it six. He's got to make decisions on local wiring: Do I do it myself? What do I put in? What kind of topology? Can a hybrid PBX do it? He has to make decisions on local loop: Do I run my own microwave? He has 200 options in the way of long-haul communications. The user has become his own telephone company.

Does your
MICRO-TO-MAINFRAME
LINK
look like
this?

hundreds of companies
have installed
TEMPUS-LINK
because it provides:

MICRO TEMPUS INC

"What I would say to anyone trying to undertand divestiture is that it is a natural occurrence like electrical utilities. You buy your appliances from one person, whether that's General Electric or Sony."

If you had to explain the divestiture of AT&T and deregulation of the communications industry to somebody who was reasonably intelligent but knew nothing about what was happening, how would you tie it all together?

Let me go back a minute. The first research report I wrote was in 1974. It was called "The Unbundling of AT&T." It said the Justice Department will sue AT&T for antitrust. They will attempt to break AT&T into pieces, and they will be successful. The conventional wisdom in 1974, '75 and '76 was that I didn't know what I was talking about. The suit was brought Nov. 21, 1974.

What I would say to anyone trying to undertand divestiture is that it is a natural occurrence like electrical utilities. You buy your appliances from one person, whether that's General Electric or Sony. You buy your electricity from a local generating company.

What's the biggest misconception business users have now about the post-Bell era?

It is going to get easier; the decisions will be more obvious; and they can take a reactive role and still do well. Technology is leaping. The decisions are going to get harder and more complex. The hardest problem that a communications manager or computer manager has is understanding

the implications of the technology before the internal users do.

How are large users meeting the challenge of deregulation?
All users who understand this industry are building embryonic [integrated services digital networks]. Some are completely bypassing the Bell System. For example, Citicorp is putting advanced workstations in the hands of their largest users. They are making econometric data bases and information about money available. What's the price of deutsch marks on the world exchange?

They're helping users by integrating publicly available data bases with privately available data bases. They are then going to put on the roof of your building, for your use or shared use, a [digital termination system], avoiding the local operating company. Finally, in the coup de grace, they have two transponders on Westar V. Citicorp is a registered common carrier.

In the companies that anticipated change, was it top management or is it the people in the trenches of communications and DP that goaded their companies into action?
Top management has to be proselytized. In some cases, top management understands, and it is middle management that will become the impediment. Half the speeches we make are made to boards of directors where top management understands the implications of this. They once asked Napoleon who rules France, and his answer was "10,000 file clerks."

What priorities should users establish?
Put your efforts in those areas that will give you an advantage. Federal Express says, "Our business is threatened not by Emory [Worldwide], not by Airborne [Freight Corp.], not by the U.S. Postal Service. It's threatened by IBM, Wang [Laboratories, Inc.], Digital Equipment [Corp.]

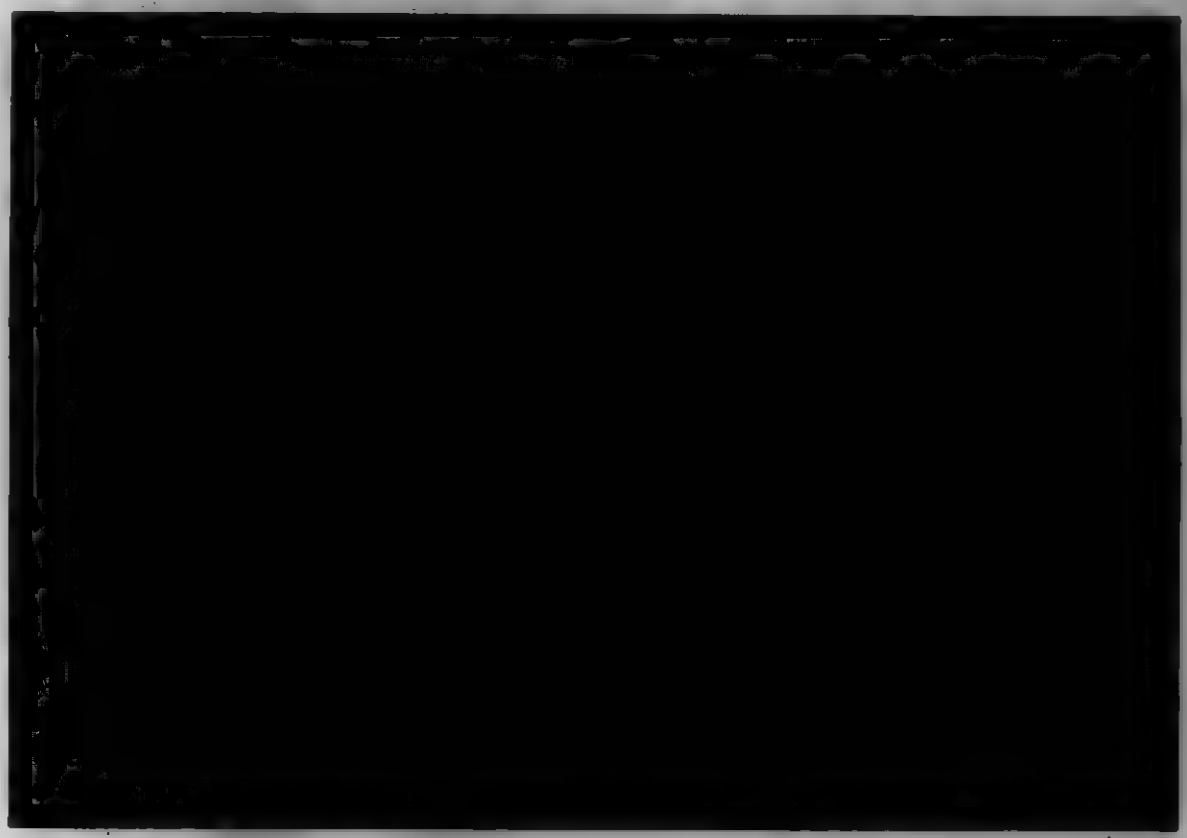
"The user eventually will be able to bypass us because 60% of our small packages, which itself is 60% of our business, are alphanumerics and computer tapes. Therefore, we will devise a system that can avoid our airplanes all together." That is where you put the technology.

Let me throw a new buzzphrase at you: telecommunications enhanced real estate. Does that mean anything to you?
It sure does. Are we going to see high-tech offices? The answer is yes. What is a high-tech office? It is an office that has high-speed data communications built into the walls and into the roof. It probably has 1.5M bits of data on every desk, available to plug in. It has least-cost routing. It has a building that has parts of artificial intelligence built in. It knows when it is hot; it knows when it is cold. It knows when you are not in the room; it does your energy management; it does security.

"Top management has to be proselytized. In some cases, top management understands, and it is middle management that will become the impediment. Half the speeches we make are made to boards of directors where top management understands the implications of this. They once asked Napoleon who rules France, and his answer was '10,000 file clerks.'"

Is the installed base of twisted-pair wiring usable for speeds up to 1M bit or not? If so, is it usable with the kinds of systems we are talking about here?
Yes. Over short distances, twisted-pair will be fine.

How do you view the controversy over access charges?
There is a lot of double-talk about access charges. A Centrex system is a shared PBX. It is a central office PBX. Some say Centrex is no longer viable with the new access charges. Baloney. Two of our clients, Prudential Insurance [Co.] and General Motors [Corp.], share with us the idea that the local operating company would manage to keep their costs under control. Who gets the access charge? The local operating company. If Centrex charges $30 before access charges, and now the access charge comes in at $6, could not



Do you have a data communications network or does it have you?

Why tie up your resources when you can take advantage of ours? And there's never been more reason for taking advantage of RCA Cylix than right now during this period of deregulation and divestiture. Here's why.

Unlike the other guys, we don't just hand you a line. We deliver the stars. Because we're a satellite based, value-added network. Providing end-to-end management and a permanent virtual circuit that's perfect for transaction oriented applications.

What's more, you'll always get our undivided attention. Because data communications is all we do. And since you're working with just one company—not several—you'll never get lost in the shuffle.

RCA Cylix isn't just more convenient. It's also more efficient. Setting up your own network involves a huge commitment of time, personnel and capital funds. Our single vendor simplicity eliminates all that.

One phone call puts our experienced people to work for you. Setting up your network. Handling all those dealings with all those phone companies. And then keeping your network running smoothly thanks to our unique service concept. Plus our design flexibility makes growth easy.

We can do all this more efficiently than you can due to our years of experience. And that can save you money. Because research indicates that personnel, benefits and associated overhead account for up to 1/3 of all networking costs.

Whether you're expanding an existing network or building a new one, how more than ever RCA Cylix is not only the easy choice. But the right one for data networking anywhere in the United States, Canada or Alaska. For more information and our free brochure, "Managing Your Network: Post-Divestiture Costs and Concerns" call our marketing department today at 901-683-3043. Or send in this coupon.

RCA
Cylix
Communications
Network

Not just a source but a resource.

NAME_____
TITLE_____
COMPANY_____
ADDRESS_____
CITY_____ STATE____ ZIP____
PHONE_____
Protocols currently used (including lookalikes)
☐ IBM 3270 ☐ SDLC
☐ Burroughs Poll/Select
☐ X.25 ☐ Other_____
Number of remote locations_____
Geographic Scope
☐ National ☐ Regional ☐ Local

RCA Cylix Communications Network
Dept. CC, 600 Ridge Lake Boulevard
Memphis, TN 38119, 901-683-3043

Howard Anderson

that Centrex charge go to $24? What is the net result: $30 to the operating company.

What's in the future for Centrex?
What we need and what we are seeing is the next generation of central offices, the next generation of Centrex, what we call super Centrex. It will probably be done on devices like a DMS 100 from Northern Telecom.

We are telling our largest users now that they do not want a PBX in some cases. They want a central office. If they are going to be their own telephone company, then go all the way, buy a central office. A shared-use central office and a shared PBX are one and the same thing. I can use microwave development to share a PBX here with Sheraton Hotels up the street by putting a little dish on the top of my roof.

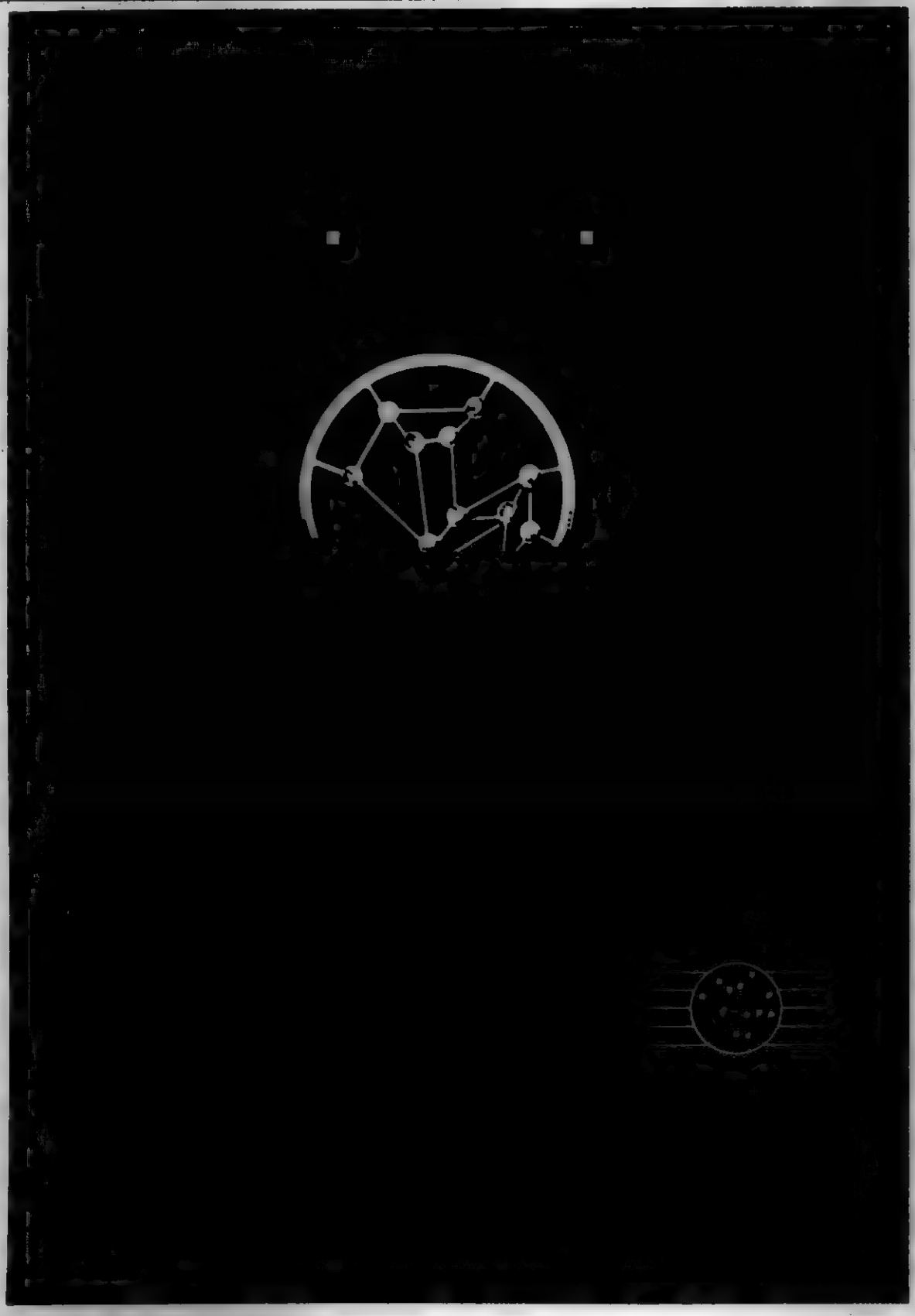
What are the implications of the Supreme Court decision in the Litton [Industries, Inc.] antitrust suit against AT&T? I mean, will costs and liabilities eventually be passed down to the [Bell operating companies] if the other 50 pending cases go the same way as Litton's? Is this a tempest in a teapot?
It is a real concern. That money will eventually be paid by every homeowner and every business in America.

Even if nobody else wins, if Litton is the only successful litigant?
The rules of monopolistic practice are vague enough so that if a judge or jury is convinced one side is truly wrong, he can award that way.

And one case going to completion is almost a priori evidence that others stand a chance of succeeding.

What do people think of Howard Anderson?
Hopefully what they think is, original thinker, occasionally arrogant.

When?
When arrogant? In that the goal of the Yankee Group — and I've never made any bones about this — is easily world domination. We want to be the most important company in our industry. We want the vendors to build the systems that we think the market will want.



"The goal of the Yankee Group — and I've never made any bones about this — is easily world domination. We want to be the most important company in our industry. We want users to buy systems that will be forward processing."

We want the users to buy systems that will be forward processing, that will forgive without penalty.

I think I am regarded as a good, occasionally exceptional speaker. I think the company is representative of both my strengths and weaknesses.

Your weaknesses being?
Oh, sometimes a tendency to go right to the conclusion without building every logical step. The tendency to want to lead the industry as opposed to follow the industry.

What kind of crowd turns you on when you're speaking?
The smarter the better.

How can you tell a smart crowd?
They laugh at the right time. ■

WESTINGHOUSE'S MICROWAVE MARVEL

BY KATHERINE HAFNER

PITTSBURGH, Pa. — Pittsburgh is filled with surprises these days. The city Charles Dickens once described as "that ugly confusion of backs of buildings" is enjoying a reincarnation as a cultural and corporate mecca, attracting enough diverse talent to rival the haughtiest of metropolises.

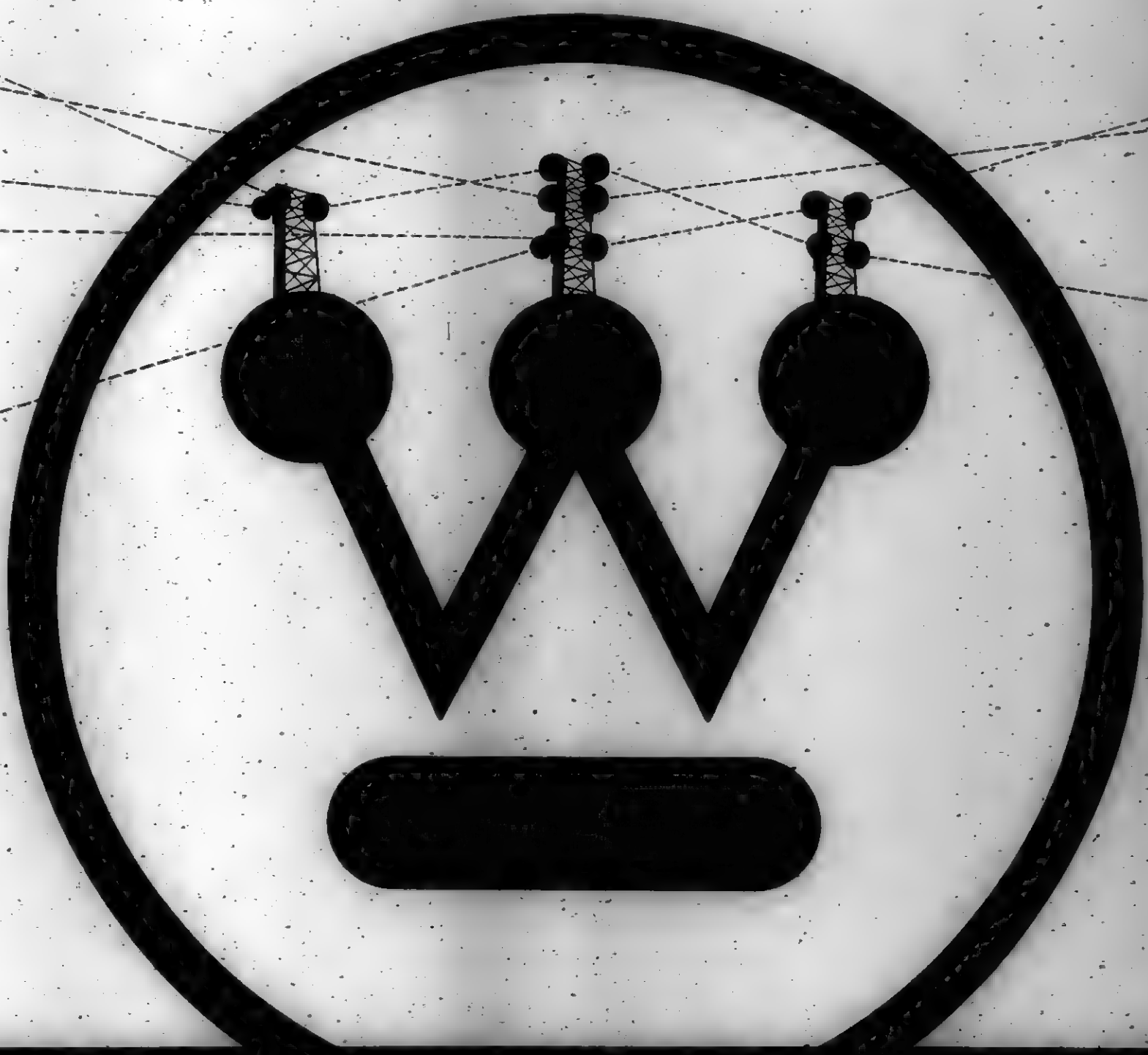
In fact, Pittsburgh is the nation's third largest center for corporate headquarters. And not least among the occupants is Westinghouse Electric Corp., the industrial conglomerate whose commitment to the Pittsburgh metropolitan area has traditionally run wide and deep.

Hafner is staff writer for On Communications.

In the past few years, however, Westinghouse has literally passed over its locale by installing a private digital microwave communications network that blankets the metropolitan Pittsburgh area. This network deprives Bell of Pennsylvania of $500,000 to $1 million a year in transmission revenues and equipment rentals. According to Westinghouse's own projections, the private network will produce some $66 million in savings over a 10-year period.

Spanning a 20-mile radius, the $26-million Westinghouse Digital Information Network (Wesdin) serves 15,000 Westinghouse employees, primarily for voice communications. With the network in place, Westinghouse has managed to bypass the local operating company almost completely, according to Robert Bennis, Westinghouse's communications systems manager.

Barring the passage of costly tariff legislation, the private setup is expected to pay for itself by 1988. Bennis frowns on pending legislation that would place a surcharge on those who bypass local operating companies. While he has not yet calculated the cost of operating the network if the ▶



bypass legislation becomes law, Bennis is not encouraged by his initial estimates.

"It sounds like they want to penalize bypassers to a point where it would be economically unattractive to bypass and sock you for more than it would cost you to have a private system," Bennis said. He considers the bypass bill a "misguided" piece of legislation. "I don't think it is necessary. Given the nature of the divestiture process and the effort the [Federal Communications Commission] has made to address the kinds of concerns that the bill supposedly addresses, I think it is counter-productive."

The headquarters for telecommunications at Westinghouse are as inconspicuous as Wesdin's radio towers are imposing. The telecommunications division is tucked between Frank's Jewelry and Ardmore Beauty Supplies in the shopping center 10 miles east of Pittsburgh.

Wesdin, often cited as the most advanced and technologically innovative network of its kind, was not so much the result of tremendous technological foresight as necessity.

The headquarters for telecommunications at Westinghouse are as inconspicuous as Wesdin's radio towers for transmitting and receiving signals are imposing. The telecommunications division is tucked between Frank's Jewelry and Ardmore Beauty Supplies in the Forest Hills shopping center 10 miles east of Pittsburgh. It is there that Bennis, his engineers and managers implemented the private communications system for Westinghouse, which four years ago anticipated concerns that would crop up as a result of AT&T's divestiture in 1984.

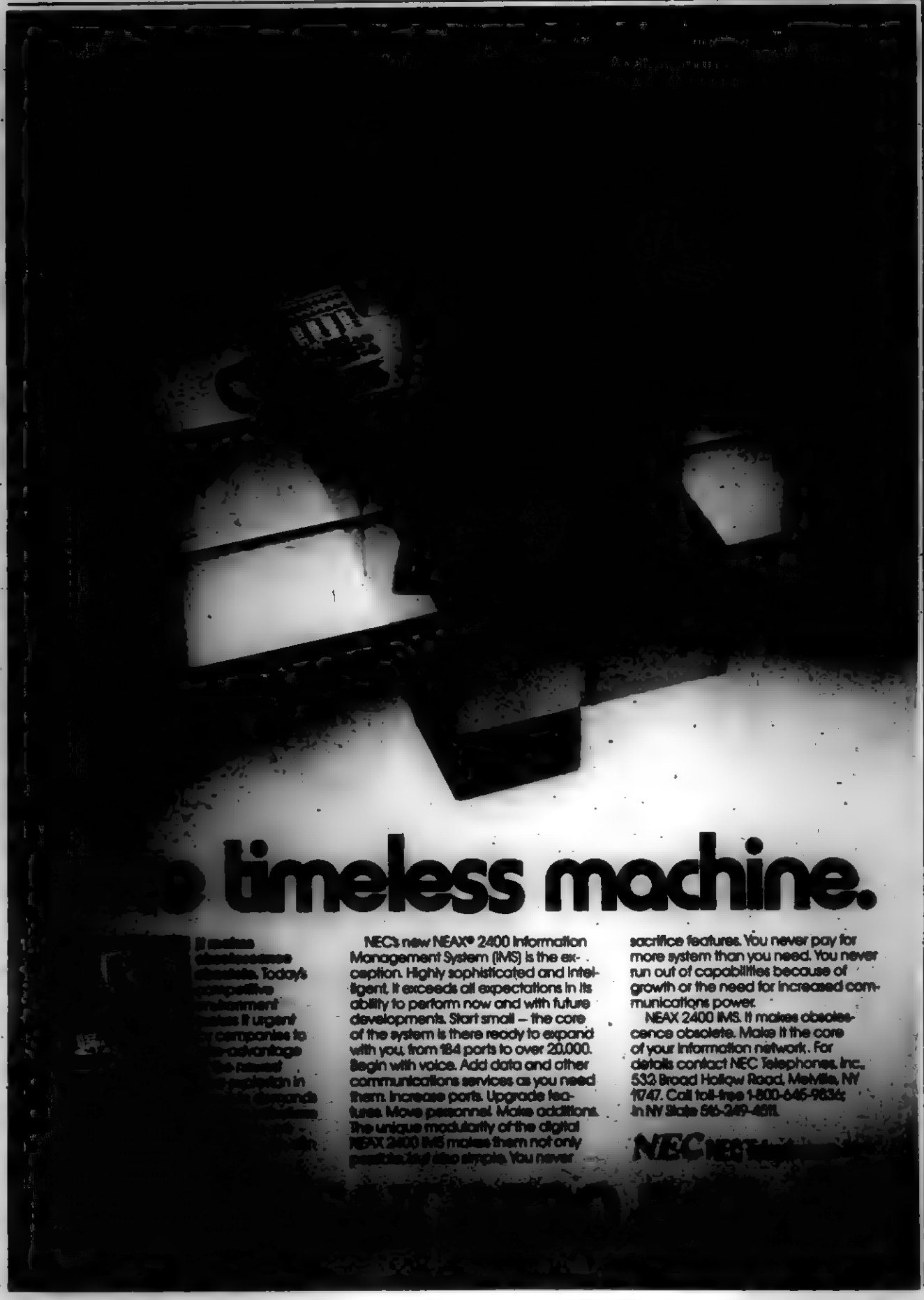
According to Bennis, communications staff members at Westinghouse began to think seriously about installing its network when the Centrex service that had been in place for 15 years first headed for obsolescence. Bell of Pennsylvania notified Westinghouse that the local telephone company was considering the termination of its Centrex offering and planned to file with the local utilities commission for a substantial rate increase.

"Their original indications were that they would phase out Centrex and encourage users to install the new Dimension [private branch exchange] system," Bennis said. "We didn't want to be forced to have one option of either seeing Centrex gradually phased out or become prohibitively costly, with the only alternative being to pull Centrex out and replace it completely with a Dimension system. We didn't feel that was the only alternative that should have been made available."

So with plenty of lead time, Bennis and his group then began to evaluate different ideas for a private network. The only strict criterion, according to Bennis, was that the network be digitally based and that it employ "technology of the future."

Bennis explained, "If we were going to make a change of this type, we wanted to go with a technically superior kind of system."

So Westinghouse, whose total communications expenses reach as much as $100 million per year, went shopping for a private voice and data communications network



that would bypass Bell of Pennsylvania and integrate such office automation capabilities as facsimile transmission and eventually video transmission.

"We gave vendors one page of specifications with 13 items on it," William Hunkele, operations manager at Westinghouse, said. The chief system requirements included all-digital facilities, touch-tone dialing, centralized operators, least-cost routing and transmission capabilities up to 56K bit/sec.

After a lengthy and thorough evaluation of each vendor, the contenders for the project were narrowed down to Bell of Pennsylvania, General Dynamics Communications Co. and GTE Business Communications Systems, Inc.

"Bell of Pennsylvania finally withdrew on the basis that it didn't have the kind of capability we were asking for in the time frame we wanted it," Bennis said. "We wanted to begin installation in the early part of 1981. So that left General Dynamics and GTE. We finally selected GTE primarily on the basis of price, technical capabilities of the proposal and the kind of project management capability they demonstrated."

INSTALLATION OF THE GTE system began on schedule in February, and the last node was in place "on schedule and within the budget" in December 1983, Bennis said. Westinghouse employees and machines communicate with one another through a series of GTD PBXs. The "hub and spoke" configuration of Wesdin revolves around three major tandem switches, incorporating six GTD 4600 PBXs, which handle up to 10,000 lines, 12 GTD 1000 PBXs, carrying up to 1,000 lines, and two GTD 120 PBXs. The end-to-end digital network connects 23 locations, either with digital microwave links operating on an industrial bandwidth at 2-, 12- and 18 GHz, with the bulk of the traffic on the 12 GHz channels, or with coaxial cable.

The PBXs themselves provide dial-up switching capability, along with synchronous data speeds reaching 56K bit/sec. Utilizing the digital transmission facilities, dedicated data circuits provide host-to-host and terminal-to-host transmission capabilities.

The hub of the network is Westinghouse's Network Control Center, about two miles up the hill from the telecommunications office. The status of the system is tracked at the control center, and corporate telecommunications data is gathered and processed by a Digital Equipment Corp. PDP 11/70 16-bit minicomputer. In a room with a wall-sized map of the U.S. covered with blue and red blinking lights, control operators monitor Westinghouse's nationwide communications network of 4,500 circuits at 1,000 locations, as well as the local Wesdin.

Bennis said that in his 19 years at Westinghouse, Wesdin is the most technologically advanced project he has been involved with and is "certainly the largest in terms of cost and magnitude."

The only hindrance to the completion of the network, Bennis noted, was community opposition to the building of a radio tower that would have changed the complexion of a local residential area.

"Putting those towers up was sort of an emotional thing for some of the residents in the towns where they would go," Bennis said. "We had originally planned to put a 110-foot tower on property owned by Westinghouse, and the town withdrew its initial approval. So we had to go look for another site."

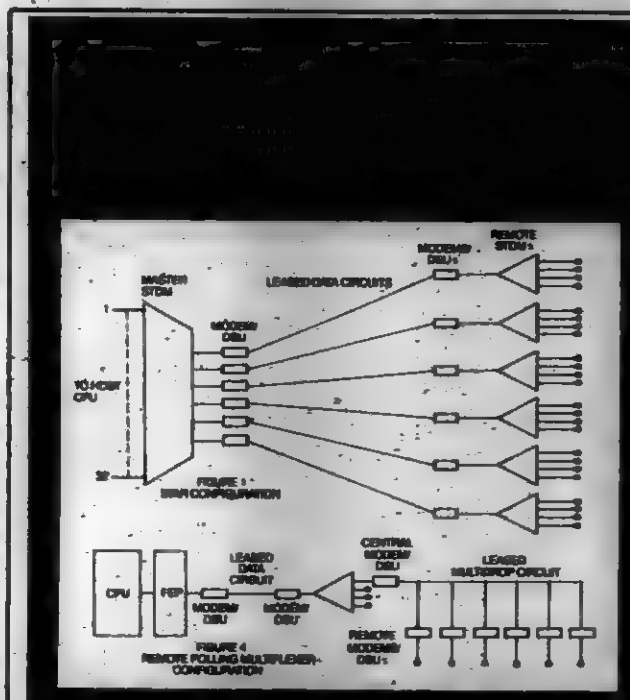
Westinghouse uses four radio towers for the network, two of which the company constructed itself. The highest of the towers stands 250 feet tall, looming over the eastern section of the metropolitan area, with seven receiving dishes hanging off its sides.

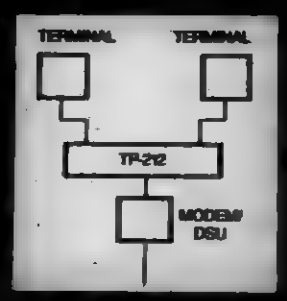
According to Bennis, Wesdin is completely transparent to the end users, most of whom use the system for voice communications, which makes up the bulk of the transmission over the network, leaving only 8% to 12% to data traffic. An even smaller percentage of the network traffic is devoted to facsimile and fast-freeze video transmission, which are still in the experimental stages, Bennis said.

Aside from a few additional "software glitches that gave us heartburn for 24 hours" and some "technical crises," the installation of the system went smoothly, Bennis said.

The system was phased in gradually; the first large system was constructed in east Pittsburgh, where the Tele-Computer center, or the control point for the rest of the network, originated. Additional nodes to the system were gradually installed, and it was not until the spring of 1983 that the microwave portion of the system became operational. As of now, the network is 95% complete.

Westinghouse recently built a second private microwave network in Puerto Rico, where the company operates 30 assembly plants. The analog microwave network in Puerto Rico was installed





in the last two years for accommodation of "fairly significant communications between the Puerto Rico plants and their parent plant in the U.S.," Bennis said. "The existing network had unreliable facilities and problems brought about by storms and water seepage. After many years of struggling to communicate, we decided to put in our own system."

Bennis is also quick to note that Westinghouse does not have a total bypass system. "Some of our locations are using Bell facilities, and all our backup lines are through Bell," Bennis explained. "So this is not 100% private microwave. It is actually evolving into a hybrid system."

While more than 90% of the Pittsburgh system operates on digital microwave, Bennis said that Bell of Pennsylsvania, now competitive as a subsidiary of Bell Atlantic, is negotiating with Westinghouse to provide the company with a fiber-optic system. This system would would augment existing facilities.

Bennis explained, "1984 is a big transition year with a lot of churning and confusion and juggling around of tariffs and rates and everybody trying to get part of the turf. But once we get over the transition and the enormous amount of misconception that's been generated by this thing, it will be interesting. The innovative possibilities will begin to surface even more than they have in the past."

"Since we have gone the microwave route, Bell of Pennsylvania has become very interested in joining with us in the development of the network," Bennis said.

"They have been proposing that we add more locations to the original Wesdin project. Rather than put in another microwave link, they'd like us to consider putting in fiber-optic capability," he explained.

"I think that looks like a very viable alternative. Fiber optics is hard-wired so we wouldn't have to be as concerned about security as we are with the radio system. And I don't have to invest capital dollars. I can consider an operating lease."

And as a result of the AT&T divestiture, Bell of Pennsylvania is now ready to compete for Westinghouse's business. "We view Westinghouse as a very important customer," Jack Patterson, marketing manager for Bell of Pennsylvania, said.

For its long-haul links, Westinghouse relies on AT&T's Enhanced Private Switch Communication Service, a standard private network package AT&T provides to two dozen private corporations. The company also maintains a companywide electronic mail system, which connects 28 foreign countries with Westinghouse offices.

Westinghouse is served by a variety of suppliers, each of which meets a different communications requirement for the company. In addition to AT&T, the company subscribes to both MCI Communications Corp. and GTE Sprint for long-distance services. Bennis said the telephone systems come from "all the major suppliers," including Rolm Corp., Northern Telecom, Inc., Hitachi Ltd. and Stromberg-Carlson.

In addition, the electronic mail service is provided by ITT Dial-Com, and Westinghouse also uses the packet-switching services of GTE Telenet, Inc. and Tymnet, Inc.

"As you can see, we've been in the business of dealing with non-Bell suppliers since the mid-'70s," Bennis pointed out. "I even think we were MCI's second customer."

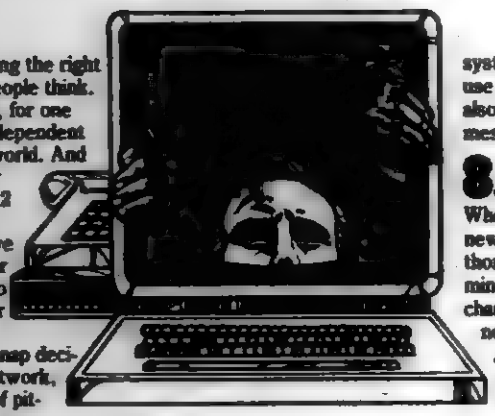
Bennis believes the future growth of the network depends largely on whatever happens to the telecommunications industry as a whole in coming months.

He explained, "1984 is a big transition year with a lot of churning and confusion and juggling around of tariffs and rates and everybody trying to get part of the turf. But once we get over the transition and the enormous amount of misconception that's been generated by this thing, it will be pretty interesting.

"The innovative possibilities will begin to surface even more than they have in the past," Bennis added.

"And I think that as the user, we're going to have a pretty full plate to choose from." ■

10 PITFALLS TO AVOID IN CHOOSING A PUBLIC NETWORK.



There's more to selecting the right public network than most people think.

How do we know? Well, for one thing, ADP is the largest independent computing company in the world. And when we built Autonet—our public data network—over 12 years ago, we did it right.

For another thing, we've listened very carefully to our clients. Especially those who have come to us from other networks.

So before you make a snap decision about a value-added network, why not look over this list of pitfalls? It just might save you some expensive mistakes.

1. Going Beyond the Outage Limits
Don't risk losing time and money to equipment outages. Every network's goal should be 100% uptime. If your network doesn't achieve at least 99.5% service availability, you don't need it.

2. The Low-Density Low Blow
Chances are, if your remote locations are really remote, you may have to pay more than you should. Other networks charge as much as $5 per hour extra for access from second or third tier cities. So be sure to compare their price schedules with your geographic distribution.

3. Personal Attention
You're going to want a lot of one-on-one support to help you control costs and increase efficiency as usage grows. Be sure you get it. Demand detailed usage summaries, customized if necessary. And make sure client support is part of the service agreement.

4. The More-Is-Better Myth
Many networks emphasize size over accessibility. So remember this: it doesn't matter how *many* access locations a network has. What matters is how many of them are where you need them to be. Make sure you're covered.

5. Back-Up at Black Market Prices
Don't pay double for redundancy. Make sure your network provides back-up host circuits that are effective, transparent and—above all—economical.

6. Future Shock
Can the network meet your future needs? Videotex and electronic mail included? Be sure you'll be able to get the services you need. Without going to another vendor or playing guinea pig to unproven technology.

7. Out-of-Date Updates
Does the network have a free on-line directory designed to keep you current on new services and access information? Ideally, that system should be interactive, easy to use and updated regularly. It should also give you a fast way to send messages to network headquarters.

8. The Great Software Experiment
When your network rolls out new software, be certain it's been thoroughly pre-tested on a pilot or mini-network. Never accept major changes in your software as part of a normal host interface arrangement. And never, never choose a network that schedules downtime when it will disrupt your service.

9. Troublesome Troubleshooting
"Fast response time" should also apply to service. You have every right to expect standardized "trouble ticket" reporting and tracking. And your network should be willing to call on top management to solve your problems, if that's what it takes.

10. Terminal Tomfoolery
When you invest in costly equipment, it should meet your needs — not someone else's shortcomings. Insist on optional functions for such things as special character handling, speed, page width and other terminal features.

Now that you know some of the problems involved in choosing a public network, how do you go about avoiding them? You start by sending for our free information booklet, "Going Public: The ADP Guide to Value-Added Networks." Call or write for your copy today.

ADP Autonet
The Reliable Network Service
175 Jackson Plaza, Ann Arbor, Michigan 48106 313/769-6800

Autonet is a service mark of Automatic Data Processing, Inc.

Special Section: Local-Area Networks

AFTER THE STORM

As general manager and vice-president of Xerox Corp.'s Office Products Division between 1979 and 1982, David Liddle was on the front lines of the Great Local-Area Network Battle. The battle pitted Ethernet, Xerox's innovative baseband local net that was introduced in 1981, against the rest of the communications world. The primary battleground was the trade press. Although Xerox fired the first salvo with its widely covered Ethernet introduction, it wasn't long before the company — whose forces were marshaled by Liddle — found itself under heavy attack from all sides. And the attacks were dutifully reported in the newspapers and magazines covering the communications scene.

The fight basically revolved around two transmission techniques: baseband as employed by Xerox, and broadband, the ▶

David Liddle

chosen method of Wang Laboratories, Inc., Sytek, Inc. and others. Baseband features only one channel for message transmission while broadband offers multiple channels.

Xerox and Ethernet looked worse and worse as the conflict continued. Then, just as quickly as it had started, the battle was over.

Third-party negotiators pointed out the fact that the two rivals could coexist. It was the application, not the technology, that mattered. The media lost its appetite for the fray. End of battle. Uneasy truce.

Liddle and former Xerox Office Products Division President Donald Massaro left Xerox to start Metaphor Computer Systems in October 1982. Metaphor expects to have its first products available later this year. According to Liddle, they will provide local and remote access for business communications users.

On Communications *Editor Bruce Hoard talked with Liddle recently about the Ethernet days and found him far more open and opinionated than ever before.*

What emotions do you experience when you remember the days when Ethernet was first introduced?

Well, it is complex. I feel good about it in the sense that Ethernet has actually done all the things that people were skeptical about: that it could become a standard or be widely adopted or that vendors would make parts for it. In that respect, that has all happened.

I was surprised — in retrospect, I shouldn't have been — at how much basic resistance there was to the idea of adopting a local-area network standard. I thought it would be relatively easy because Ethernet was well described; we had a lot of experience with it.

There were several major vendors signed up for it, so it wasn't a proprietary advantage to any particular class of vendor.

And I remember back then wondering why there was so much foot-dragging.

There were quite a lot of people who attended all the meetings without any real enthusiasm to push something through, simply out of the fear that somebody's ox would get gored if anything became a standard.

"There were quite a lot of people who attended all the meetings without any real enthusiasm to push something through, simply out of the fear that somebody's ox would get gored if anything became a standard."

So, looking back on it, is that how you would explain the foot-dragging?

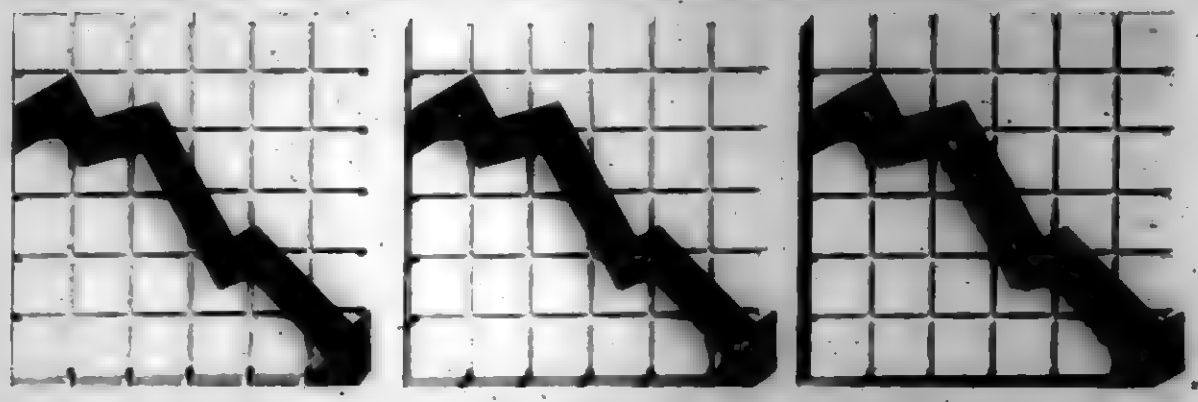
Yeah. You see, the problem with the foot-draggers is that almost all of them have come around one way or another, either to the Ethernet standard or a close variation of it.

Will you name any names there?

You probably recall that [Hewlett-Packard Co.] went through a period of reluctance, and the executive vice-president was saying that Ethernet had "dangerous grounding and finite addressing." Of course, HP adopted Ethernet and uses it now. They simply wanted to put their

SIEMENS

SATURN PABX. The Business It Saves...



In an age in which the ability to communicate quickly and cost-effectively has become vital to the continued success, growth and even survival of your business…choosing your next PABX system just might be the most important business decision you'll ever make. But it needn't be a difficult one, thanks to Siemens, a world leader in advanced telecommunications technology.

SATURN™, our third-generation digital PABX family provides growing businesses with all the benefits of a dependable, feature-filled voice system—plus the designed-in capability to expand incrementally to include simultaneous voice/data communications as required.

Designed with an eye on your business future, SATURN offers simple, flexible, non-blocking architecture…facilitating your local office network design. And SATURN can provide additional features and capabilities through straightforward software enhancement. What's more, SATURN doesn't require a special "computer-room environment" to operate—an important consideration in today's cost-conscious business world.

Sophisticated performance, engineered for simplicity and savings… SATURN offers the ability to integrate the diverse technologies in your office—telephones, electronic mail, voice messaging, data terminals, computers—forming a powerful communications tool to upgrade productivity and increase business efficiency as it monitors, controls...and reduces business costs.

SATURN...
Advanced PABX technology from Siemens.

fingerprints all over whatever was adopted as a standard, feeling that they were otherwise going to be at a marketing disadvantage with Xerox and [Digital Equipment Corp.], I guess.

HP held things up for a long time and turned around at the last minute and said, "Yeah, well OK, we ought to approve this now. This is all right after all."

That was sort of a surprise to me, because HP is a very progressive company. They've done a lot in the general area of standards, and there were never really any technical disagreements about it. It was more a question of: "What will this mean to us out there in the marketplace?"

"We were just trying to say, 'Look guys, this isn't a galactic telecommunications system. It's a simple network. You ought to be able to hook lots of different kinds of stuff to it, and we at Xerox are committed to making that happen.' "

And I shouldn't just characterize HP that way, because I think a lot of companies felt that way. There was a certain fear that Xerox, DEC and Intel [Corp.] had something "up their sleeves" or some hidden thing on the agenda, and that simply was not true.

We all wanted to create a situation in which we thought we all would be able to sell a lot of products by having it be more interconnectable.

There was a lot of talk about baseband vs. broadband confrontations at IEEE-802 meetings and that the Wang people in particular were against Ethernet.

That was really different in that it was solely a marketing motivation. I mean, if you go to those guys now, you can find that they've basically just quit and given up on it.

Given up on Wangnet?

Sure. By any comparison to all the wild claims that they made. But, if you think about what happened there, we introduced Ethernet as a simple concept.

We were just trying to say, "Look guys, this isn't a galactic telecommunications system. It's a simple network. You ought to be able to hook lots of different kinds of stuff to it, and we at Xerox are committed to making that happen."

Well, that was more simplistic than we meant it to be. Many, many customers turned around and said, "Well, gosh, here's a network I can hook everything to. What are you doing Wang? What are you doing, IBM, along these lines?"

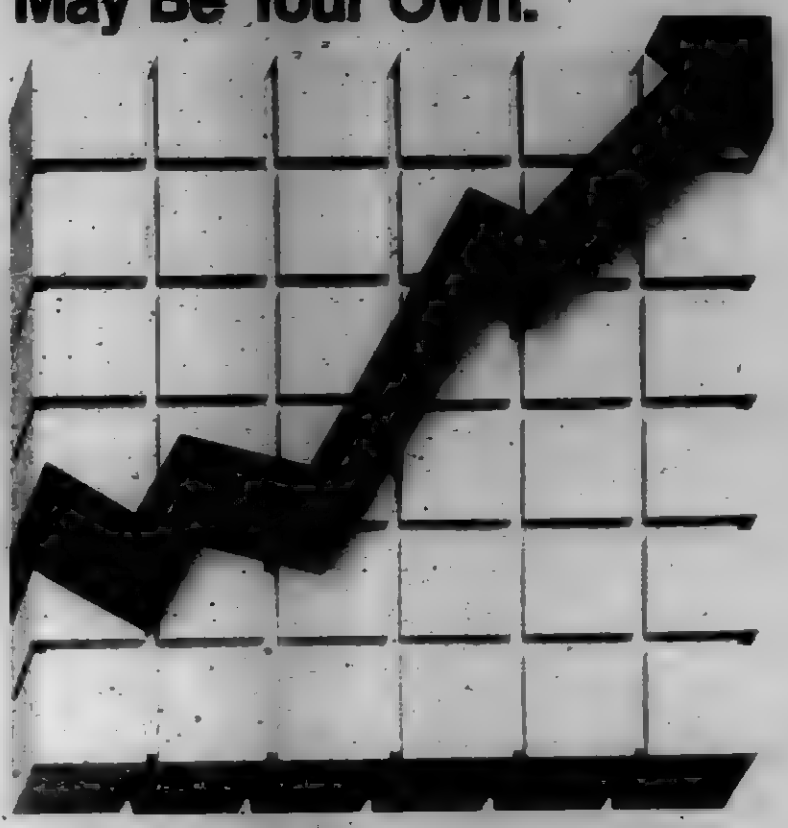
And that became very threatening, if you see what I mean. That was not what we intended to do, but that was part of the reaction. And so Wang immediately jumped up and said, "Whatever you can do, we can do twice as well.

Ours will not only be broadband, but will go at 12M bits in the high end, the Wangband, rather than the 10M bits that you're doing."

And they made a lot of claims that it had a specification and a price long before they had done any real development.

What has happened since those early days in the area of local networks

May Be Your Own.



So before you choose your next PABX, you owe it to yourself—and your business—to take a close look at SATURN. After all, it's nobody else's business but your own.
For further information, or the name of the SATURN Gold Seal Dealer in your area, call 1-800-327-0636.
In Florida, Alaska, or Hawaii, 305-994-8100 ext. 5330.
Siemens Communication Systems, Inc.
Office Systems Group
5500 Broken Sound Blvd.
Boca Raton, FL 33431.

David Liddle

that you least expected to happen?

The thing that I least expected was that the IEEE would agree to endorse, at least discuss endorsing, a network standard with a totally exhorbitant licensing fee like the one for the ring net.

The first thing that happened following the first meeting of the IEEE-802 committee was that committee chairman Maris Graube called me up and said, "Now David, we can't proceed any further with even looking at an Ethernet-like standard until you promise us that you'll license it openly at a very reasonable fee — that's IEEE policy."

"We licensed Ethernet for $1,000, and that was just because that was what it literally cost us to process the license paperwork and allocate blocks of addresses. Well, people huffed and puffed about that and said 'OK, 1,000 bucks, that's fair, we'll go along with it.' "

And I said, "OK, we'll do that, let me go off and count the beans." And he said, "Now, IEEE-488 is licensed one-time only for $400." I said, "Right, that was a few years ago, let me go and look at what we can do."

And as you well know, we licensed Ethernet for $1,000, and that was just because that was what it literally cost us to process the license paperwork and allocate blocks of addresses to people who wanted to have a unique address block. Well, people huffed and puffed about that and said, "OK, 1,000 bucks, that's fair, we'll go along with it."

But before they could even have another meeting, I had to agree to that and dot the i's and cross the t's.

Now you have this situation where the same group says, "Well, IBM's paid a million bucks or whatever it is [the actual figure was over $5 million] for free rights to this token ring of Soderblom's [Olof Soderblom is the inventor of a local-area network token passing scheme].

I believe that the deal is $65,000 or $75,000 up-front payment plus $50 or $100 per connection [the actual charge is $25,000 up-front plus $45 or 7% of the value of each attached node].

What do you think of that?

It is ludicrous that the IEEE would even discuss it. If I had said that to them, they would have kicked me out. But because IBM is pushing this standard, and the IEEE is so fearful of not "making a standard" around something that IBM has agreed to do, they looked at it differently.

In other words, the arrow's been shot at the barn, so now they want to paint a target around it.

What hasn't happened that you thought would happen?

I thought that broadband campus or backbone-type networks would go a little faster than they have.

You've talking about networks like Sytek, Inc.'s?

I mean they are all in a sense the same. That is, all of those guys offer that kind of a network. Ungermann-Bass, [Inc.] does, Sytek does, 3M [Corp.] does and so on.

I'm not talking about the success of any one

Our 3000 family of printers has an impressive list of features. But the most prominent new change on our printers is our new name.

Formerly the Data Communication Products Department of General Electric, we're now independently owned...and our new name is Genicom.

So the GE 3000 family is now the Genicom 3000 family. But while the name has changed, the product retains its established superiority.

The Genicom 3000 series of output printers still features speeds from 40 to over 400 cps. Single or dual-mode printing. Type quality from EDP to NLQ. Multi-color printing. Graphics. Selectable type fonts. American craftsmanship and more.

Genicom 3000 printers will be as popular as ever with end users as well as OEM's, distributors, retailers and dealers...thanks to our list of outstanding features, plus the unique commonality advantages of several models all based on a single design.

And Genicom will also offer other products including our 2000 teleprinters and the soon to be introduced 4000 shuttle matrix printers. You'll find we have the same complete product line we had with GE.

Genicom. We have proven products, experienced personnel, established manufacturing facilities, a nationwide service network, plus a new commitment to excellence that stands behind our new name.

Genicom Corporation, One General Electric Drive, Dept. M311, Waynesboro, VA 22980. In Virginia, call 1-703-949-1170.

GENICOM

For the solution to your printing needs call

TOLL FREE 1-800-437-7468

company because the companies are doing fine, but I was just expecting more of them to be out there than there are now.

Why aren't there more of them out there?

I don't really know. I suspect that it's worrying about IBM. It may be because there isn't any standard, and it may be because the connection technology is sort of inherently more expensive until somebody really tries hard to drive those costs down. That, as you know, is what happened with the Ethernet.

How viable are local-area networks as they were originally envisioned? Do people really need multimegabit workstations on their desks?

It sure looks that way to me. Look at the people who are distributing software. Look at the network software trend. For instance, you now have 3com [Corp.], for one, and lots and lots of other people selling their own and other peoples' software in a network configuration.

By that I mean you buy a file server and a networkwide license for software, and you've got one standard set of the software for which you've paid a one-time charge.

That gets downloaded out to the individual workstations, and you get a lot of data that's distributed in that way.

You're seeing more and more use of networks where the stuff that used to go from a disk directly into memory is now passing through a network on the way.

How did you think [private branch exchanges] would fit into the local-area network scene when Ethernet was first introduced?

I always figured that PBX vendors would offer as one of their interfaces a port onto which you could hook an Ethernet to allow traffic along your high bandwidth, processor-oriented devices.

I thought that people would continue to use the PBX to carry voice and to carry relatively low-speed digital data — by that I mean up to 200K bits to support intelligent terminals and things like that.

In your opinion, is that the way that things have more or less evolved?

I don't really know how they've evolved at the PBX level, but I have certainly seen a lot of people do what I just mentioned. I have not seen any significant number of PBXs interconnecting multiple computers or multiple substantial servers.

All the PBXs that I know of that support digital traffic are installed with a lot of terminals getting access to one or two mainframes.

What came out of the great broadband vs. baseband debate?

"I always figured that PBX vendors would offer as one of their interfaces a port onto which you could hook an Ethernet to allow traffic along your high bandwidth, processor-oriented devices. I thought that people would continue to use the PBX to carry voice and relatively low-speed digital data — by that I mean up to 200K bits to support intelligent terminals and things like that."

Baseband. I think that broadband vs. baseband was a marketing approach.

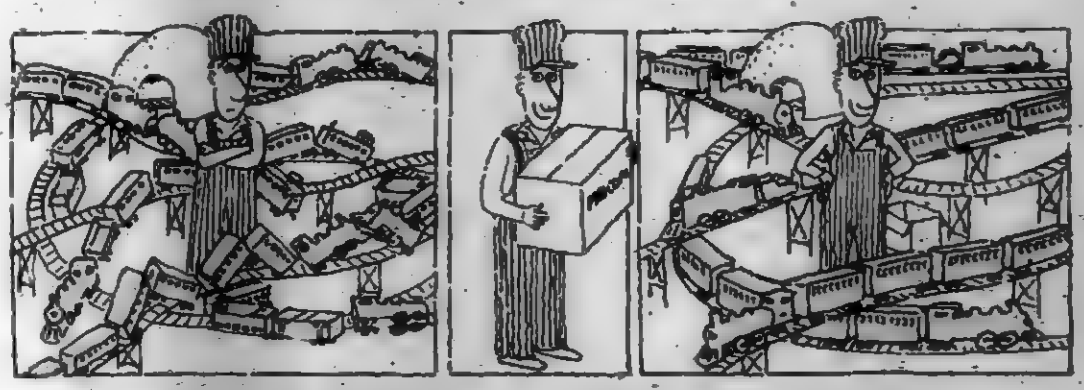
Wang is a remarkably brilliant company sometimes. When they are pressed a little bit, they do really some remarkable competitive things. All of a sudden, you're talking to bankers and manufacturing people and lawyers and everybody else that buys this stuff, and you're talking about modulation techniques, not about whether it costs less or has more data flowing through it.

You're not asking whether there are many vendors supporting it or if you get it to work or if you have to retune it or any of that stuff: These were the reasons we didn't use broadband.

It seemed at the time that Ethernet was really on the losing end of this marketing war. What was it like for you during the period of that war? Did you find yourself getting frustrated?

WHEN IT COMES TO CONTROLLING YOUR DATA NETWORK,

THE IDX-3000™ PUTS YOU ON THE RIGHT TRACK.



Control can be a major problem with a large network. That's why our IDX-3000 Local Communication System features the IDX-Net™ network controller. With IDX-Net, you handle configuration management on-line. You can manage major network topology changes, such as disaster recovery, with only a few keystrokes.

IDX-Net lets you access network control commands and diagnostics from any terminal in the network, including dial-up. This means that you, or MA-COM Linkabit's Hotline Service, can diagnose your problem in seconds without having to be in your computer room.

Programmability
IDX-Net's 68000-based network controller software provides you with the capability to interface host-resident application programs to the network. You can build-in your own custom-tailored network management features.

User convenience
In addition to traditional data/PABX port contention and resource selection, IDX-Net provides your authorized users with many of the features offered by modern telephone systems. They can connect, disconnect and hold lines to multiple computer resources and execute third-party connects.

For the office of now
With the IDX-3000, you can start with a small system that fits your current needs and budget, then grow to obtain non-blocking, full-duplex asynchronous communication for as many as 3072 lines, all at data rates of up to 19.2 Kbps. The IDX-3000's proven TI-based technology is fault-tolerant, with optional redundancy features throughout its distributed architecture, and automatic, continuous self-testing. The IDX-3000 isn't one of those products of the future. It's here now—proven, in use, and backed by MA-COM, one of the nation's largest communication companies.

If you want to get control of your network, contact Ruth Stoffel at MA-COM Linkabit, 3033 Science Park Road, San Diego, CA 92121, toll-free (800) 626-6640 or (619) 457-2340. We'll put you in control.

© 1983 MA-COM Linkabit, Inc.
IDX-3000 and IDX-Net are registered trademarks of MA-COM Linkabit, Inc.

THE NETWORK YOU CAN CONTROL

MA-COM

BE A HERO. BUY A HERO.

Heros were meant to rise above it all. So why is it you keep getting caught in the middle? Is it your fault that personal computers in every department are hoarding data? They won't even have a simple conversation with the mainframe.

Why should you be pestered by complaints when work is lost? Or duplicated? Even triplicated? Not to mention what happens to costs.

Your organization is a victim of Computer Shock. Badly in need of a HERO™.

HERO RESCUES COMPUTER WORLD FROM CHAOS.

MDS HERO is the intelligent, desktop Networked Personal Computer. It does everything a personal computer can do. And more. But most of all, our HERO is famous for interacting—it works beautifully with mainframes.

With the MDS SUPER 21™ Communications Processor, HERO can converse intelligently on IBM networks. HERO emulates IBM 3270 SNA and 3776 remote job-entry systems. Our SUPER SNA™ option gives you both on one communications link.

HERO also runs software under MS-DOS. Plus its own multi-tasking operating system.

HEROS OF THE WORLD UNITE.

With HERO and SUPER 21 on your side, there's no end to what you can conquer. You can draw on private, departmental, and corporate databases. Bring individual workstations out from their isolation. Thanks to you, information will be bound together, in a network of organization. All under your control.

What's more, if you take advantage of our own INTELLIGENT 3270™ (only MDS has it), your people can write their own programs, and integrate them with data in the mainframe. Using HERO, you can reach into the database and retrieve information. Then either return it, or store it at the workstation.

HEROISM GETS REWARDED.

With our HERO and SUPER 21, you'll have what's out-of-control under control, fast. Your current data processing investments will become part of a growing bank of knowledge. All of it cost-efficient.

Besides, old HEROS never die. Nor do they fade away. They're modular in design, so they manage to be immortal. They grow with you. All the way.

YOU CAN BE BIG WITHOUT BEING BLUE.

MDS is everywhere Big Blue is. We even stretch beyond the Blue horizon. And we grew big for one big reason: we've helped our customers to grow.

MDS can do the same for you, too. Wherever you are on this Big Blue planet, we'll give you more than mere office automation. We'll organize your organization. Our service people will be at your beck and call. Around the globe. Around the clock.

So be a hero. Buy a HERO. Ask our customers about us. And give us a call. Dial **800-MDS-HERO.**

You'll soon see that heroism has its rewards.

MDS MOHAWK DATA SCIENCES

7 Century Drive, Parsippany, New Jersey 07054. And over 430 locations, worldwide.

MDS is a registered trademark and HERO, SUPER 21, INTELLIGENT 3270 and SUPER SNA are trademarks of Mohawk Data Sciences Corp. MS-DOS is a trademark of Microsoft, Inc.

David Liddle

Well, yeah, in the sense that yo-yo journalists and consultants were writing a lot of stuff without doing their homework.

I would get a clipping from a sales rep coming back and saying, "A guy at major account X asked us to explain why this is true or why this isn't true."

And as soon as it was cleared up, they wanted to buy X number of workstations. That was incredibly frustrating, the reason being that Wang had gone and said, "Well, we are going to do all this unbelievable stuff, and we are going to do it all 18 months from now."

For a while, you couldn't press them very much on where the results were.

By the way, although it doesn't effect me now, by the time it was clear that Wangnet had failed so miserably and that their claims were so completely unfounded and that they had gone through a whole collection of product managers like tissue paper, the press lost interest.

"By the way, although it doesn't effect me now, by the time it was clear that Wangnet had failed so miserably and that their claims were so unfounded and that they had gone through a collection of product managers like tissue paper, the press lost interest. Nobody ever writes about or cares about Wangnet any more; they're only interested in it as a plausible opponent to Ethernet."

It's funny — nobody ever writes about or cares about Wangnet any more; they're only interested in it as a plausible opponent to Ethernet.

I was frustrated by that at the time, and one of the worst things about it was that in order to hit back effectively at that kind of talk about broadband, you had to trample on some little and fairly worthy broadband vendors that were not making any unreasonable claims at all.

We were trying to offer a real service that everybody needed. I did not want to "fight" against broadband.

The companies like Sytek and Ungermann-Bass and others were building a product that was needed, but not as a local-area network to hook up four separate workstations.

Did Xerox's top management back you at the time?

You bet. They certainly did. They really backed me on all of the Ethernet stuff, and they never wavered about whether it was OK to have done this. They never flinched about all the broadband stuff and all that. They were very good about it.

The president and chief executive officer of Xerox would clearly say where we were going with Ethernet, what we felt was important about that, why we were pursuing the IEEE and why we hadn't gone with broadband and so on. They were really very solid about it.

If you knew then what you know now, what would you have done differently?

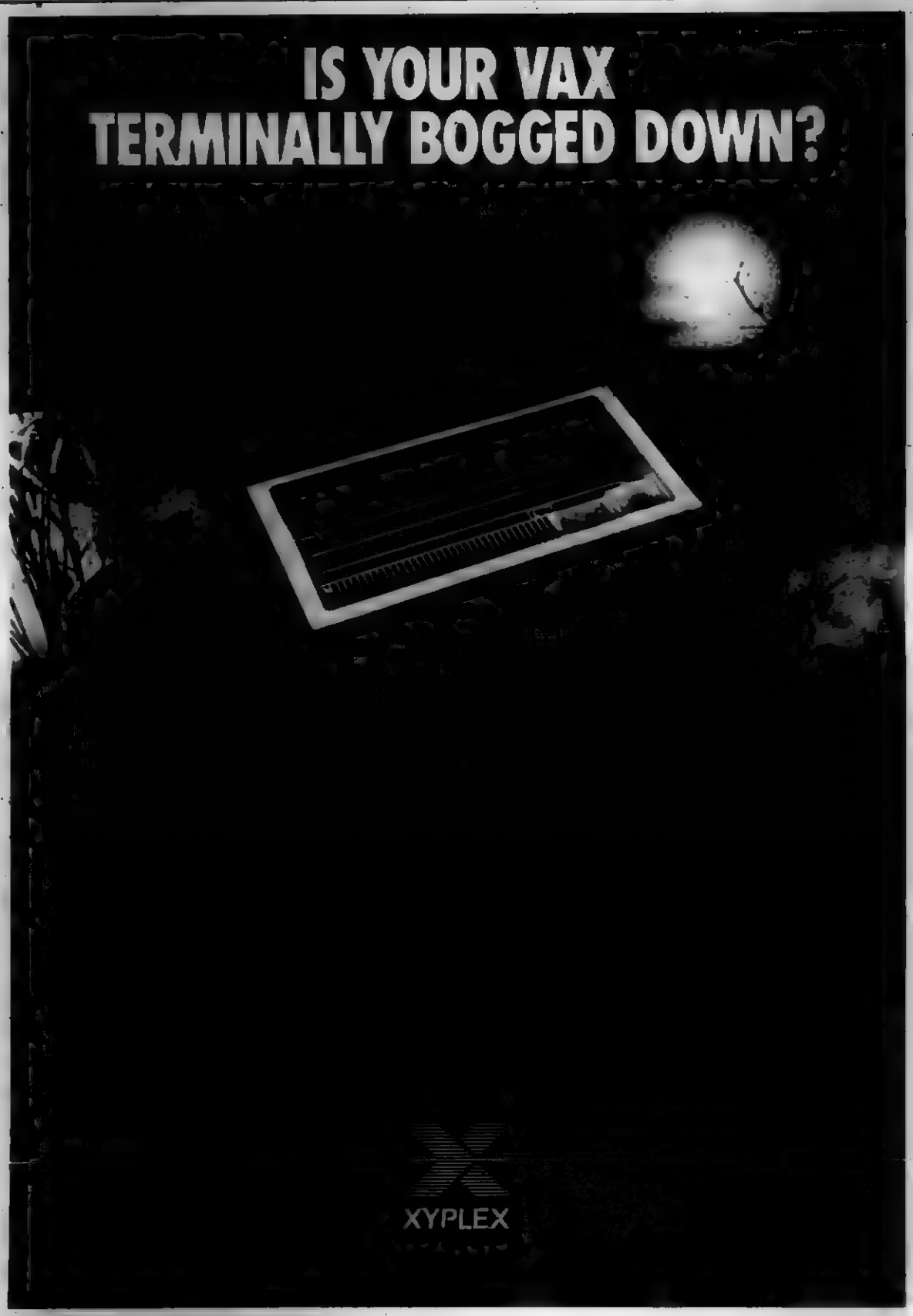
I would go to IBM and say "I have seen the future, and I know you're going to have a terrible time with this ring net. Why don't you sign up?"

We did chat with IBM about Ethernet. They looked at it and decided it wasn't a sensible way to go.

But if I were armed with the information that exists now, I'd go to IBM and Wang and say, "Look guys, honest, this isn't a commercial ploy, and it will be a better world for all of us if you agree to use this lower level protocol. You can remain independent in higher level protocols if you choose, but at least we'll be driving down hardware costs and sort of opening the door."

Otherwise, there wasn't a lot that we could have done differently. We threw the door open on it at the earliest moment with [Digital Equipment Corp.] and Intel and swore an oath in blood that we would change those things where it could really be shown that it improved the quality of the product.

But we weren't going to politicize the whole thing and try to fence certain people in and certain people out and all that sort of stuff. I think that was really all we could do. ■



Special Section: Local-Area Networks

A NETWORK PERSPECTIVE

By Jim Bartimo

Whither the local-area network? While two years ago, the talk of local-area nets seemed unending, today it is almost unfashionable to think about them. "There was a time when a week wouldn't go by when you didn't get a flyer for another seminar on carrier-sense multiple access with collision detection [CSMA/CD] vs. token passing," one Wang Laboratories, Inc. engineer

---

Bartimo is senior writer at InfoWorld, *the magazine for microcomputer users, Menlo Park, Calif.*

said with a sigh.

Even the most astute industry observer has the right to ask, "What happened?" The answer is that a number of factors have changed in the local networking industry since Xerox Corp. released Ethernet, one of the first local-area networks, three years ago.

Even the most astute industry observer has the right to ask, "What happened?" The answer is that a number of factors have changed in the local networking industry since Xerox Corp. released Ethernet, one of the first local-area networks, three years ago.

Although International Data Corp. (IDC) reports that there are approximately 16,000 local-area networks installed today, many users are confused, frightened and suspicious of the technology's slow acceptance in the market.

The introduction of fourth-generation private branch exchanges (PBX) that can switch data at high speeds is but one of the monkey wrenchs thrown into the networking picture. Some vendors claim a PBX can fill the need of a local net.

TO DISMAY USers even further, IBM has yet to announce officially a local-area network that would work with its alphabet soup of architectures such as Systems Network Architecture/Synchronous Data Link Control (SNA/SDLC) and Distributed Office Support System (Disoss). IBM's 3270 version of its Personal Computer is another networking tool to consider, since its double personality can use a mainframe for file exchange and other networking functions.

IBM and the PBX came into the picture just when most users were still trying to discern the differences between CSMA/CD and token-passing access methods; broadband or baseband bandwidths; coaxial, fiber-optic or twisted wire pair cable; and star, ring or bus topologies. For those that did not learn these terms during the first go-round, a brief description is in order:

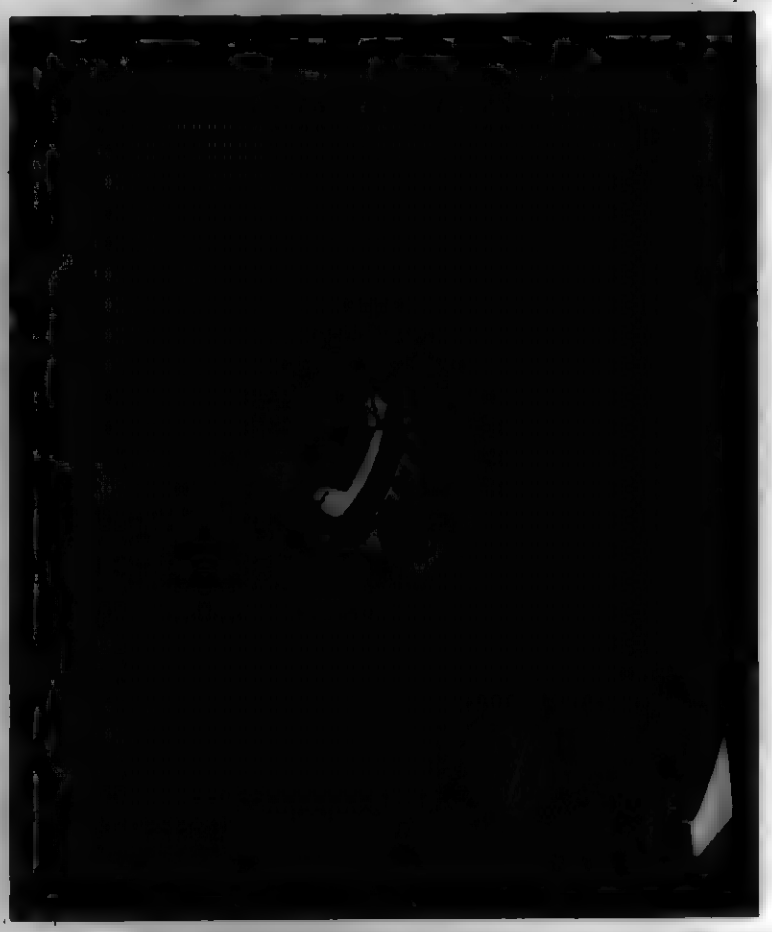
■ *Broadband vs. baseband.* Broadband local-area networks such as Wang's Wangnet can transmit data, graphics and even video because they feature a wider bandwidth and multiple channels piped through the cable. Baseband networks transmit over only one channel, but one baseband network, Ethernet, is now thought to be a de facto standard by many users and industry observers. Broadband networks are also available from Sytek, Inc. (Localnet) and Ungermann-Bass, Inc. (Net 1), among others.

"I don't think it's an issue of broadband vs. baseband," said Kim Myhre, manager of communications research for IDC. "That is a marketing ploy of the companies that support those technologies. The two technologies work well together.

"For instance, you may have a number of baseband rings connected by one broadband network," Myhre said.

■ *Coaxial, fiber-optic and twisted wire pair cable.* These three types of cable each offer at least one advantage and disadvantage. Coaxial cable is the thick

A SMART PHONE SYSTEM SHOULDN'T MAKE YOU FEEL DUMB.



With most smart phones, the only way you can access advanced features is through complicated calling codes.

With Focus ET, you just push a button.

Because Focus gives you five fixed buttons and 18 programmable buttons to work with. The five fixed buttons are pre-set for convenience functions like hold, flash, microphone on/off, speaker on/off, and call transfer. The other buttons can be programmed individually. For example, you can push one button and transfer all calls directed to your station over to another station within your network. Push another button to reach a busy station or outside line without redialing. Page hard-to-find people. Dial automatically. And more. Plus, Focus ET gives you one-button access to multiple business and private lines.

To make your calling even easier, all 23 buttons are labeled in plain English. So you don't have to look up instructions or secret operating codes to find the feature you want.

Our smart phone comes in two models: The Focus ET I, with all the advanced features mentioned above, and the Focus ET II with the same features, plus a 40-character LCD display. The display clears the clutter of message slips by recording the names and numbers of callers directly on your phone. The messages can't be misplaced or mistaken for trash. And only you can forget them.

Our Focus ET is the smart phone for smart business people. So next time you're looking for an important message or operating instruction, stop. And look up American Telecom at 3190 Mira Loma Avenue, Anaheim, CA 92806, (714) 630-7721, TX 685571.

American Telecom Inc.

CHANGING OUR NAME WAS A STICKY BUSINESS.

After 14 years as Intertel, it wasn't the easiest thing to do. Sure there were the obvious problems; like licking 19,453 labels so we could show off our fancy new logo. But we also found that Intertel was more than just a name to the hundreds of companies that depend on our network command center systems and diagnostic modems for high-availability data communications. It was a constant reminder to them of our commitment in providing the products, support, and services they need to keep pace with the ever increasing size and complexity of their private line networks.

However, we had to face the fact that our old name described only a part of what our current products can do and what the systems we are developing will offer in the future. We decided that changing our name would be an important first step in linking our past accomplishments with future networking needs.

Now, when you think of controlling, managing and measuring the performance of large networks, remember what we did as Intertel. When you need to assure fault-tolerant operation of networks with both analog and digital links, remember Intertel did it first. But when you're ready to find out more about our networking capabilities, please think of them as INFINET.

INFINET

Six Shattuck Road
Andover, MA 01810
(617) 681-0600

Whither?

cable that subscription television companies use. It offers reliable transmission, but can be costly and cumbersome to install. Fiber-optic cable provides very fast transmission, but can be sensitive to shock. Twisted wire pair cable, although already installed for telephones, is slower in transmission speed.

■ *Token passing vs. CSMA/CD.* Both of these access methods prevent messages from crashing into each other on the network. Token passing is thought to be IBM's preferred method. CSMA/CD is the method used in most other baseband networks, such as Ethernet and Wangnet.

■ *Star, ring and bus topologies.* These three topologies describe the arrangement of the devices on the network. In a star network, all the devices connect to a central node, which is usually a switch or controller. Multiple star networks are sometimes connected to a larger star network to create a hierarchical configuration offering higher and higher levels of connectivity.

Devices in a ring topology hang off a circular connection and therefore must have the capability to recognize which messages are headed for a particular device and which messages should continue around the circle.

As is the case with a string of old-fashioned Christmas lights, if one node fails, so does the entire ring.

In a bus configuration, all devices share a common backbone connection. Because the devices are in effect directly connected to each other via the bus and interface units, the failure of one node does not affect the other nodes in the configuration.

ACCORDING TO Harvey Freeman, vice-president of engineering at Architecture Technology Corp. in Minneapolis, there are three network access standards today: CSMA/CD as used in Ethernet; token bus as used by Concord Data Systems, Inc., Datapoint

To all reps: Price changes on following items effective immediately: Mo. 10-11A, 10-14A, 10-AL.

Chris: The latest offer looks better, although it's still not what we were hoping for. Try for another compromise.

Just got the word from Gary. Increased our share by 6%. If trend holds, we'll pass competition by third quarter!

Smartcom II communications software, currently available for IBM PC, DEC Rainbow 100, Xerox 820-II and Kaypro II.

Microcomputer communications? Get control of the situation with

Hayes™

Microcomputer communications can present the DP/MIS staff with a tangle of mis-matched hardware, user-hostile software, and a situation that can quickly get out of hand.

Hayes can help you avert that chaos, with a telecomputing system designed expressly for microcomputers.

A system so advanced, it's downright simple. Economical. And requires no handholding from you.

Hayes. The computer's telephone. Our Smartmodem 300™ and Smartmodem 1200™ connect to any desktop computer with an RS-232C port. They operate with rotary dial, Touch-Tone® and key-set telephone systems. At full or half duplex. And both feature self-test capabilities, as well as indicator lights and built-in speakers for monitoring calls.

The lower-priced Smartmodem 300 is ideal for local data swaps and communicates at 300 bps. A built-in speed selector on Smartmodem 1200 automatically detects transmission speeds (110, 300 or 1200 bps).

Smartmodem 1200B™ is also available as a plug-in board for IBM® Personal Computers. And Hayes manufactures the Micromodem IIe® for Apple® II, III, IIe and Apple Plus computers, as well. It comes packaged with Smartcom I™ communications software.

Speaking of software, more programs are written for Hayes modems than for any other. And that impressive list includes our own incomparable communications software.

Smartcom II.™ Complete, menu-driven software for the IBM PC, DEC Rainbow 100,™ Xerox 820-II™ and Kaypro II.™ Even first-time communicators will find success with Smartcom II. Screen prompts guide users in the simple steps it takes to create, send, receive, list, edit, name and re-name files.

Tasks like simultaneously receiving, printing and storing data—completely unattended—are easily managed with Smartcom II, because it takes full advantage of Smartmodem's capabilities.

The program reduces lengthy dial-up and log-on sequences to a single keystroke. It stores communications parameters for 25 remote systems.

Plus, there's an on-line help feature that explains prompts, messages and parameters.

Our reputation speaks for itself. Hayes has five years of solid leadership in the microcomputer industry. Nationwide availability through retail computer stores. Trouble-free factory service and call-in assistance. A limited two-year warranty on all hardware. And the most efficient telecomputing system available. Anywhere.

If you're involved in linking micros or setting standards for configurations, remember this. Everything your people need to know about communications can be summed up in one word: Hayes.

Hayes®

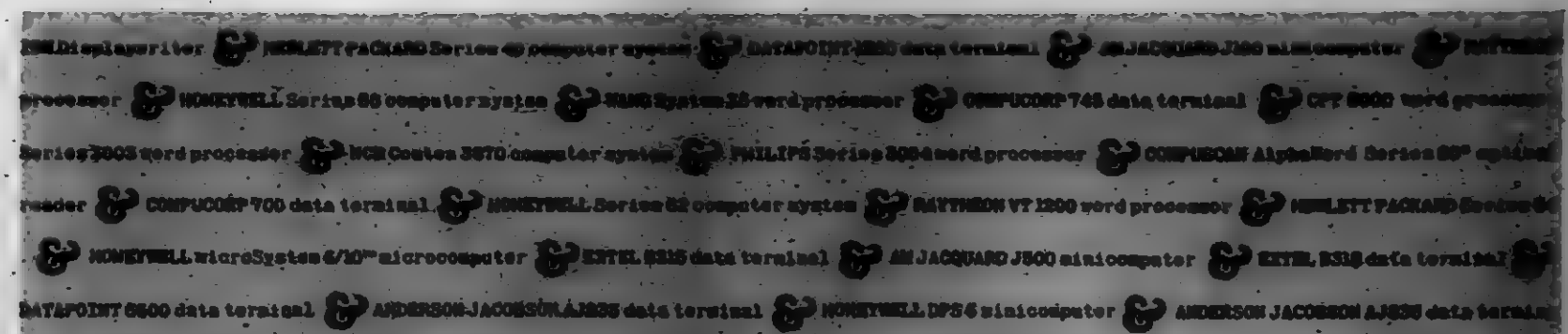
Hayes Microcomputer Products, Inc., 5923 Peachtree Industrial Blvd., Norcross, GA 30092. 404/441-1617.

Smartmodem 1200 for all computers with an RS-232C interface; Smartmodem 1200B plug-in board for the IBM PC.

Smartmodem Specifications
Low Speed Data Formats (Smartmodem 1200 and Smartmodem 300) Serial, binary, asynchronous: 7 or 8 data bits; 1 or 2 stop bits; odd, even or no parity (0-300 bps).
High Speed Data Formats (Smartmodem 1200) Serial, binary, asynchronous: 7 data bits; 1 or 2 stop bits; odd, even, or fixed parity or 8 data bits; 1 or 2 stop bits; no parity (1200 bps).
Dialing Capability: Touch-Tone® and rotary-dial pulse dialing.
Command Buffer: 40 characters.
Commands: (unnecessary with Smartcom II software) A: Immediate answer. A/: Repeat last command. C: Transmitter Carrier. D: Dial command, including simple dialing, waiting for second dial tone, auto-dialing and other features. E: Local echo. F: Full/half duplex. H: Switch hook. M: Audio monitor. O: On-Line. P: Pulse dialing. Q: Quiet mode. R: Reverse originate/answer mode. S: 17 "Sn=" commands speed, escape code character, number of rings to answer on, etc. S?: Check operational parameters above. T: Touch-Tone dialing. V: Verbal result codes.
Result Codes (can be suppressed/verbal): 0/OK: Command line ok. 1/Connect: Carrier detected. 2/Ring: Phone is ringing. 3/No Carrier: Carrier lost or never heard. 4/Error: Error in command line. 5/Connect 1200: Carrier detected at 1200 bps. (Smartmodem 1200 only.)
Audio Monitor: Two-inch speaker with volume control.
Rear Panel: On-off switch, power jack, RS-232C connector, modular phone jack connector, volume control.
Operation: Full or half duplex.
Data Rates: 0-300 bps and 1200 bps for Smartmodem 1200. 0-300 bps for Smartmodem 300.
Interface: RS-232C.
Intelligence: Z80™ microprocessor with 4K bytes control program for Smartmodem 1200; Z8 microprocessor with 2K byte control program for Smartmodem 300.
Modem Capability: Bell System 103 or 212A compatible originate or answer mode for Smartmodem 1200; Bell System 103 compatible originate or answer mode for Smartmodem 300.
Receive Sensitivity: -39dbm for Smartmodem 1200; -45dbm for Smartmodem 300.
Transmit Levels: -10dbm.
Registration: FCC registered for direct connect to the nationwide phone system. Connects with modular jacks RJ11W, RJ12C, RJ21W, RJ22C, RJ31W, RJ32C.
Power Needs: D.C. Input 12VDC, 600ma. 15.5VAC output.
Size: 1.5" × 5.5" × 9.5"

© 1983 Hayes Microcomputer Products, Inc.

Microcomputer Ile is a registered trademark of Hayes Microcomputer Products, Inc.
Smartmodem 300, Smartmodem 1200, Smartmodem 1200B, Smartcom I and Smartcom II are trademarks of Hayes Microcomputer Products, Inc.
Touch-Tone is a registered service mark of American Telephone and Telegraph.
IBM is a registered trademark of International Business Machines Corp.
Apple is a registered trademark of Apple Computer, Inc.
DEC Rainbow 100 is a trademark of Digital Equipment Corporation.
Xerox 820-II is a trademark of Xerox Corporation.
Kaypro II is a trademark of MicroLinear Systems.
Z8 is a trademark of Zilog, Inc.



© 1984 ITT World Communications Inc.

matchmaker, matchmaker.

A word processor and a computer aren't a match made in heaven.

Of course, neither are a telex machine and CRT. Or any of the machines listed here.

Rather, they're all matches made by us: ITT World Communications.

You see, until we came along, it wasn't very easy for businesses to send information from a word processor to a computer. Or from a telex to a CRT. Or vice versa.

Now all that (and more) is possible—by sending information through us.

Our network simply eliminates all the usual problems of unlike equipment.

So a company never has to be in the costly position of owning unneeded terminals, just to "talk" to other terminals.

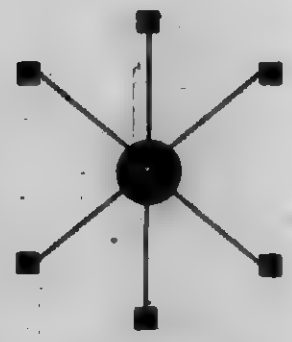
Which means, you'll not only get the communications your company needs, but you could save money as well.

Advanced communications *and* economy?

It sounds like a perfect match to us.

For more information contact your local ITT sales representative or write Marketing Department A/PR, ITT World Communications, 100 Plaza Drive, Secaucus, New Jersey 07096.

ITT



Star Topology

Corp. and Nestar Systems, Inc.; and token ring as used by IBM.

In spite of the confusion over multiple choices, there is hope for the local-area network. IDC predicts a worldwide installed base of 103,210 by 1988.

One user that is extremely pleased with the Ethernet local-area network is the state of Kentucky, an alpha and beta test site for Xerox. "Ethernet has been very good for us," Dobree Adams, director of the state's division of information resources, explained. "With Ethernet, we have demonstrated real productivity gains," Adams pointed out.

With 300 users on the network and five buildings wired together, the state plans to gateway to IBM's Disoss and to a Wang VS system.

"The ability to transfer graphics is the best feature," Adams said.

Another successful beta test site is Chase Manhattan Bank, which has tied together four buildings in lower Manhattan with Wangnet.

And Chase has plans to widen the network to Long Island via microwave and internationally over packet-switched lines, according to Chase vice-president Harvey Hershkowitz.

As Wang's second largest commercial customer, Chase was a natural candidate for beta testing the network in the late '70s. Considering all the changes in local-area networks since then, does Chase regret experimenting with the technology so early?

"We have no regret because we have a system that is up and running, and that is more than most people can say," Chase's Hershkowitz said.

"We're looking at a new PBX network, but it will coexist with Wangnet," he continued.

Chase's attitude toward local-area networks is perhaps the only successful one to which users of local nets can subscribe. There are so many options that a top-to-bottom approach employing, or at least open to, many different technologies is the most feasible option.

"There are four different approaches," according to Michael French, director of communications studies at Quantum Science Corp. in New York.

"For medium-size office automation, Ethernet is quite a good product," French said. "It has limitations in bandwidth, but it is good for office systems," he explained.

The second approach is the networking of personal computers. This low-end networking is led by Corvus Systems, Inc. and Nestar, which will effectively "link together low-cost personal computers with low traffic," according to French.

Big Blue offers the third approach. According to the *IBM Journal of Research and Development* and a host of industry pundits, the IBM local-area network will be a baseband token-passing ring using twisted-wire pairs to connect a variety of ring topologies.

Finally, AT&T will announce a network this year, French maintained. He added that the new AT&T network will be similar to IBM's, but will tie into the System 85 PBX.

. It is interesting to note that AT&T and Wang recently announced a joint agreement that will allow PBX support for Wang's products.

Wang has also announced agreements with Northern Telecom, as have many other data processing vendors. The most notable telecommunications and data processing agreement — Rolm Corp. and IBM — has set the stage for a vendor commitment to hybrid networks.

If gateways to the PBX environment are one half of the local-area network solution, gateways to IBM are the other half. Wang has already announced gateways to SNA for Wangnet. In addition, Xerox claims that it will make a similar announcement sometime in the future.

"SNA serves mainframes, and Ethernet serves the office environment," a Xerox spokesman said.

"We also have a good deal of communications with PBX vendors," the Xerox spokesman continued.

The hybrid network may include baseband, broadband, PBX and IBM 3270 terminal technologies all tied together.

"One should never think of the local-area network alone," said Joseph Ehardt, president of Ehardt and Associates. "People want to see a multivendor approach."

Freeman also espouses the hybrid approach. "Large institutions will use broadband as a backbone for the others such as baseband and the PBX," he said.

Certainly, the price of local-area networks will drop from the $200 to $500 basic connect cost through the use of very large-scale integration. The local-area network controller is being shrunk down by chip makers such as Intel Corp. and Mostek, Inc.

Announced more than a year ago, these chips are expected by industry observers to be available by the end of 1984. As with any technology reduced to a chip, the price will drop dramatically.

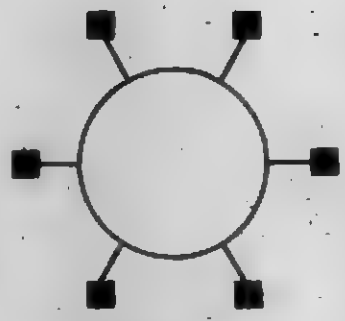
But Myhre is quick to point out that local nets are more than just hardware. In fact, the lack of software is yet another reason some users have stayed away. "Software development has been void," leading to a lot of wires and taps, but no real protocol conversion, he said.

As Hershkowitz put it: "You can call France if you have the telephone, but you still have to speak French to communicate."

According to Dick Parkinson, vice-president of Infotel Systems Corp., B.C., Canada, the software/protocol conversion void is so severe that "the Ethernets of the world are just an alternative to RS-232."

So with the local-area network coming out of its infancy, users are still awash with alternatives. The ultimate motivating factor will probably not be IBM, the PBX makers or even the chip makers.

In spite of all the problems facing local network planning and implementation, one fact remains, as Hershkowitz and Chase Manhattan found out: "People want one terminal on their desks that can access everything." ■



Ring Topology

High-End Local Net: Miracle or Monster?

The purpose of local-area networks — when all is said and done — is to connect different devices to a CPU for file transfer and peripheral sharing.

Many local-area networks fall short of this goal because they do not perform protocol conversion; they only provide the hardware connection.

Perhaps the low-end Xerox Corp. Ethernets and Wang Laboratories, Inc. Wangnets could take a lesson from two high-end big brothers that have emerged to connect mainframes.

The two most notable mainframe local-area networks are Network Systems Corp.'s Hyperchannel and Control Data Corp.'s Loosely Coupled Network.

Hyperchannel allows transmission at up to 50M bit/sec and, with the use of its Netex software, among unlike mainframes from Digital Equipment Corp., IBM and Sperry Corp.

"When you get these Hyperchannel boxes, they allow IBM to talk to other mainframes," Dick Parkinson, vice-president of Infotel Systems, Corp. in B.C., Canada, said. "It's addressed at the operating system level."

Like Hyperchannel, CDC's Loosely Coupled Network allows mainframes to share tape drives and disk drives, but at a somewhat lower speed of 36M bit/sec.

"The people who designed the Hyperchannel had worked here at CDC," according to Ernest Larson, who is CDC's product marketing manager.

According to Philip Enslow, professor of information and computer sciences at the Georgia Institute of Technology in Atlanta, these networks are "used to move files from one place to the other on the mainframe and are very much back-end networks."

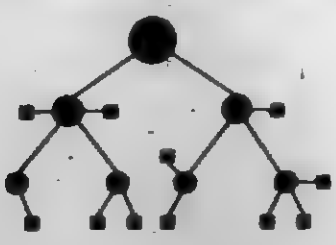
IBM's protocol Systems Network Architecture "is primarily a front-end solution," Enslow said.

If these networks can do at the mainframe level what smaller networks cannot do at the lower level, why aren't most users opting for the big boys? According to Kim Myhre, manager of communications research at International Data Corp., it is a question of high prices. The price tags on these networks can run anywhere from $40,000 to as high as $100,000.

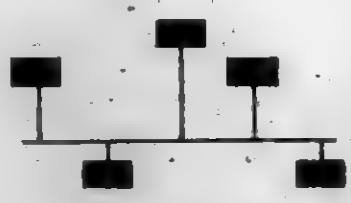
While price cuts of up to 35% have been predicted for these networks, the price tags still remain high. Despite this, "it's a growth market because mainframes are a growth market, and there are a lot of multivendor shops out there," John King of James Martin Associates of Carmel, Calif., said.

In addition to high cost, only extremely large shops could make good use of these networks and the cables that are more than an inch thick and cost $30 per foot. "They are monsters," Parkinson pointed out. "They are as stiff as the conduits" into which the cables usually fit.

And while these networks are impressive, they cannot supplant the low-end local-area networks. They can only work with them.



Hierarchical Topology



Bus Topology

Special Section: Local-Area Networks

THE TOKEN RING

By David Potter

One of the oldest forms of local network topology is the ring, a physical sequence of stations that closes on itself. The original form has been extended to several important variants. The ring has been studied extensively and implemented both as a research vehicle and in commercial products. The Institute of Electrical and Electronics Engineers (IEEE) 802 Local Network ▶

Potter is founder and vice-president for research and advanced development, Interlan, Inc., Westford, Mass.

Standards Committee has written a draft of a standard for ring topology, token-access local-area networks. As of this writing, that draft standard is on its way through the approval process that will result in it becoming an IEEE standard. It has been endorsed, wholly or in principle, by several companies, including IBM.

Now that the 802 ring is emerging from the laboratory into the harsh light of commercial development, it is important to review the capabilities of the ring that appears to have the most chance of widespread use. The token-passing, ring topology local network is is now available in several forms and promises to be significantly more visible in the future.

Ring topologies, as their name implies, consist of physical sequences of equipment. The simplest of these has the form of a single ring, as shown in Figure 1. In the course of installing and

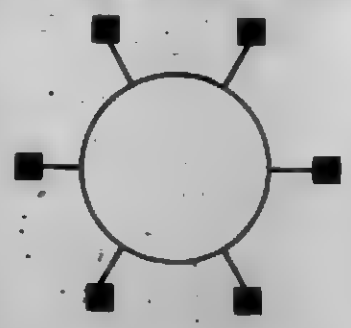


Figure 1. Single Ring

maintaining such a connection, it may be necessary to route connections in accordance with immediate needs rather than in the shortest path. This may result in the pattern shown in Figure 2. The connections also form a ring, but one that is hard to see because of the wiring runs. The wire center was designed to overcome this sort of headache and will be examined in more detail below. Variations of the basic ring topology have been proposed and, in some cases, built to improve reliability or performance.

The use of a ring topology network involves sending data traffic from one station to the next station in the sequence. This traffic may have originated with the first station or may have been received from another station. The process of receive and retransmit continues until the data packet arrives at the station to which it is addressed. That station copies the packet into a memory buffer, marks it as received and retransmits it to the next station.

Eventually, the packet is received by the station where it originated, which removes it from the ring. The time required for a packet to travel completely around the ring is called the walk time. Ring networks have a 1-bit delay in each station. The total of the 1-bit delays and the propagation delay in the cables determines the minimum walk time. The walk time may be made long-

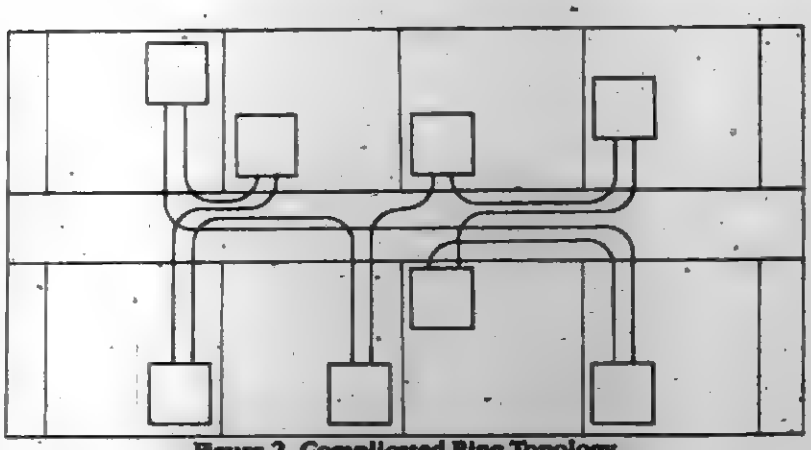


Figure 2. Complicated Ring Topology

er by additional delay in one or more stations. This would be done to ensure a minimum value that allows one complete token frame to circulate.

There are several approaches to managing the right to transmit a packet on the ring. In the most common approach, a packet is marked as "in use" by the state of one of the leading bits in a section called a token. If a station has a packet that it must send, it waits, monitoring the traffic on the ring, until it detects a token that is marked as "available for use." It then sets the bit in the token to its "busy" state and appends its message. It must transmit at the proper clock rate so that its message does not get out of synchronization with the receiving stations's clock.

It may send a long packet, since the packet is removed again at the sending station. At the end of the

When you're ready to talk to DEC* with your IBM 3278, talk to NPI about getting attached to a PCI 74D deconverter.

It will get you everywhere!

When you can no longer stand being cut off from the rest of the world because you have an IBM 3278, come to NPI for a PCI 74D deconverter.

When the time comes that you want to talk to DEC, or check in with the Dow Jones™ News/Retrieval Service, or contact your Local Area Networks, or whatever, talk to NPI first.

Whether you want to make your non-IBM world compatible or your IBM world compatible, NPI is the place to think of first. We distribute and service all PCI products.

NPI
THE HIGH-TECH DEPOT REPAIR COMPANY
800-345-8278
IN PENNSYLVANIA (215) 485-8180
45 COMMERCE DRIVE
ASTON, PENNSYLVANIA 19014

*DEC is a trademark of Digital Equipment Corporation.

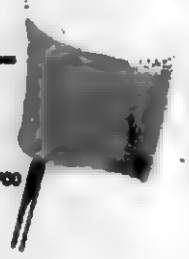
Talking to the French computer world is now easier than you think...

. . . with our sister publication Le Monde Informatique.

France's rapidly growing market for computers and data processing systems is one of the largest in the world. Currently, the installed value of general purpose computer systems is more than $11.1 billion, and a tremendous continuing demand for data processing equipment will cause outside spending on computer-related equipment to increase at an annual rate of 16%, between 1981 and 1985.

When choosing new equipment and keeping up-to-date with this ever-changing industry, top systems executives will read *Le Monde Informatique*. *Le Monde Informatique* is a weekly tabloid newspaper with a uniquely targeted circulation of 22,000 copies. The circulation profile was developed by International Data Corporation, the world's leading EDP market research firm, to reach the decision-makers and buying influences at the most important DP facilities in France.

CW International Marketing Services Department can give you one-stop advertising service in countries around the world. For more information about *Le Monde Informatique* or any of our other foreign publications, just fill out the coupon below.



Diana La Muraglia,
Manager, International Marketing Services

CW COMMUNICATIONS / INC.
375 Cochituate Road, Box 880, Framingham, MA 01701 (617) 879-0700

Please send me more information on
_____Le Monde Informatique
_____Your Other Foreign Publications

Name_____
Title_____
Company_____
Address_____
City_____ State_____ Zip_____

Publishers of Computerworld and other leading computer publications around the world.

Now Wang gives you office automation on a platter.

Introducing Wang Office.

It's the kind of comprehensive office software and communications package only Wang could put together.

Because only Wang can bring you the most advanced electronic mail. Only Wang can bring you the newest in time and task management. Only Wang can bring you the industry's best word processing.

And only Wang can put all of this together with the world's most advanced communications in one flexible package —easy to put in place and virtually transparent to the user.

With Wang Office you can not only process information, you can send it to, or retrieve it from, any office, anywhere in the world. Instantly. Wang Office.

Thirty years of commitment, innovation and technology.

Yours.

On a platter.

For more information on Wang Office, call 1-800-225-9264. Or write to: Wang Laboratories, Inc., Business Executive Center, One Industrial Avenue, Lowell, MA 01851.

WANG

The Office Automation Computer People.

CC3

© 1984 Wang Laboratories, Inc.

packet, a frame check sequence allows the receiving station to verify the accuracy of what it received. That station may then assert a bit at the end of the packet signal indicating that it has received the packet correctly. The transmitting station would monitor the end of the packet (perhaps testing the frame check sequence to verify a proper operation of the ring) to see if the intended receiver was able to copy the packet. If not, the packet could be sent again. This type of ring is called a token ring.

Another token-based access method involves having several tokens on the ring simultaneously. This is accomplished by dividing a specific walk time, which may be achieved by delays in the stations, into slots. Each slot can accomodate one small packet of fixed size, and each slot has its own token at the beginning. This is called a slotted ring.

There is also a type of ring that uses a contention-access protocol. It is similar to the Xerox Corp. Ethernet in its access rules. A station with traffic to send must defer if there is an active packet being sent, but may transmit immediately if no other station can be heard. Just as in any contention-access method, there is the possibility of a collision.

It is necessary for the transmitting stations to compare what comes back around the ring for at least one walk to detect collisions. When the station finishes sending its packet, it appends a token to the end of its transmission. Another station that has been waiting to send its traffic can seize the token, mark it as "in use" and send without danger of colliding. The contention ring thus acts as a token ring under moderate to heavy use and like an Ethernet under a light load.

The final type of ring is not based on token-access rules, but on register insertion. In this form, a station with traffic to send will insert that packet at the end of some other station's packet while storing incoming traffic in a buffer memory. After sending its packet, the station sends the traffic that has accumulated in the buffer and resumes listening.

The rat's nest of Figure 2 (on Page 46) illustrates one of the practical difficulties that characterize ring topology networks. It can be very difficult to manage the physical wiring of a ring-connected local-area network. It is also difficult to install or remove a station from the ring without a significant loss of service to the other stations. These considerations can be tolerated, as the number of ring networks in use can testify, but a better approach is needed.

The wire center is an attempt to overcome the physical inconvenience of the ring topology. A wire center is a common location at which connections and bypass relays are located, usually in a compact box, and to which all stations run a pair of cables. The cables form the ring sequence through the connectors of the wire center. Wire centers may be interconnected to form extended rings up to the physical limit of the ring.

By use of strategically located wire centers, a ring topology installation will be significantly simplified. The problem of which stations to cable to is reduced to finding a free connector pair on a wire center. The interruption in service when connecting a new station into the ring will be reduced to the time required for a relay to open. A packet may be lost. Congestion at a wire center can by relieved by simply installing a new wire center nearby and connecting it to the one that is out of connectors. Figure 3 (on Page 50) illustrates a cascade of wire centers. The interconnection of wire centers can extend the physical ring boundaries to a large area while keeping the management of the physical plant a reasonable task.

The rules that determine access to a shared resource are critical determinants of the properties and performance of a network. A local network usually has a physical channel as

"GET IBM 3270, 3780 AND HASP COMMUNICATIONS—ADDING A ONE-BOARD PROCESSOR TO MY PC?"

"YOU CAN WITH PERSYST."

The Persyst DCP/88. The only compatible front end communications processor that can support a range of IBM communications.

It's a Persyst exclusive.

The DCP/88 distributed communications processor. A one-board computer that can be configured by software to handle communications between a PC and another computer system.

In fact, the DCP/88 enables the IBM or TI PC to support a range of sophisticated IBM communications—all with just one processor.

So it gives corporate users unprecedented, low-cost flexibility to incorporate the PC into virtually any environment.

Convert any PC into an IBM 3270 terminal. An IBM 2780/3780 RJE workstation. Or a HASP/RJE workstation—instantly.

Just combine the DCP/88 with Persyst software—and you can connect your PC to any compatible host mainframe or minicomputer.

PC/3270 enables your PC to emulate an IBM 3274 Cluster control unit and 3278 terminal, supporting up to four additional devices. Including a printer and three other PCs functioning as 3278 terminals.

PC/3780 converts your PC into a 2780/3780 remote job entry terminal that can send and receive batch files to and from the host.

And with PC/HASP, your PC instantly becomes a full-function HASP/RJE workstation that can support up to seven input and seven output multi-leaved job streams concurrently.

Capability to support your communications needs now. And in the future.

Because the DCP/88 supports bisync, SDLC, HDLC and async protocols, it is the only communications processor you'll ever have to buy.

Use it to connect your PC to an expanding network of IBM communications. Configure your system to meet virtually any communications need—without adding another piece of hardware. Or expense.

All of which makes the DCP/88 as practical as it is powerful.

The Persyst Coax/3278. Still another way to expand your IBM communications.

Here's another fast way to incorporate the PC into existing SNA or bisync data processing installations.

The Coax/3278. A single-slot expansion board that converts your PC into an IBM 3278 display terminal. And with its high-speed coaxial port, you can connect the PC directly to IBM 3274 or 3276 cluster controllers.

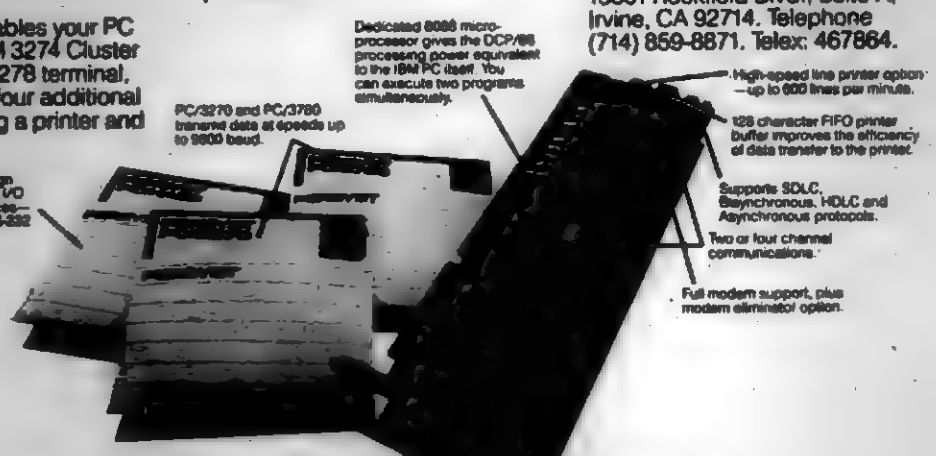
Sophisticated communications products for the corporate user. Insist on Persyst.

Persyst communications products are designed to make corporate information systems more powerful. And more efficient.

Write or call Persyst today for complete information.

PERSYST

Persyst Products, Personal Systems Technology, Inc., 15801 Rockfield Blvd., Suite A, Irvine, CA 92714. Telephone (714) 859-8871. Telex: 467864.



THE DCP/88™ BY PERSYST.

Computerworld presents the three most important factors in creating the #1 specialized business publication in the United States:

Factor 1

Great Editorial. When you ask $44 a year for a subscription — the editorial better be worth it. Ours is. Because we hire journalism skills first and computer industry background second. Our writers instinctively recognize the lead in a story. They can smell another story when they haven't even completed the one they're working on. They know how to interview; how to get the source to reveal facts that never were intended to be released.

Factor 2

Great Editorial. Our writers are pros at giving our readers what they need because they go where our readers are. They go to the same seminars, conferences, manufacturers' training programs and trade shows. And they don't just listen with our readers — they listen to them. So our readers get responsive editorial. And they regularly vote *Computerworld* "most useful publication" — both in our own studies and in those done by independent organizations.

Factor 3

Great Editorial. Because *Computerworld's* editorial department is supported by subscription revenue, our writers know who they're working for. They write the stories our readers need to see — independent from our advertising. And our advertisers appreciate our reputation for editorial integrity as much as our readers do.

Editorial. It's the most important factor in developing *Computerworld* as the #1 specialized business publication in the U.S. And you'll find that our sales people know as much about our readers and our marketplace as our writers do. They'll be happy to give you the facts, the numbers and a first-class overview of the marketplace. Just call Don Fagan, Vice President, Sales at 1-617-879-0700.

COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

its lowest level of shared resource. The access rules that determine which station may use the ring have already been mentioned, being either token or contention or buffer insertion. It is helpful to examine the token-access ring in detail since it is being standardized by IEEE-802.

It is important to recognize the difference between token passing on a bus, such as the IEEE-802.4 protocol, and token access on a ring. A logical sequence is created on a physical bus, and the token is an explicit message that must pass from one station to the next for each station in the sequence. The overhead — which is not usually much — for each station to receive and retransmit the message is always present on a token bus.

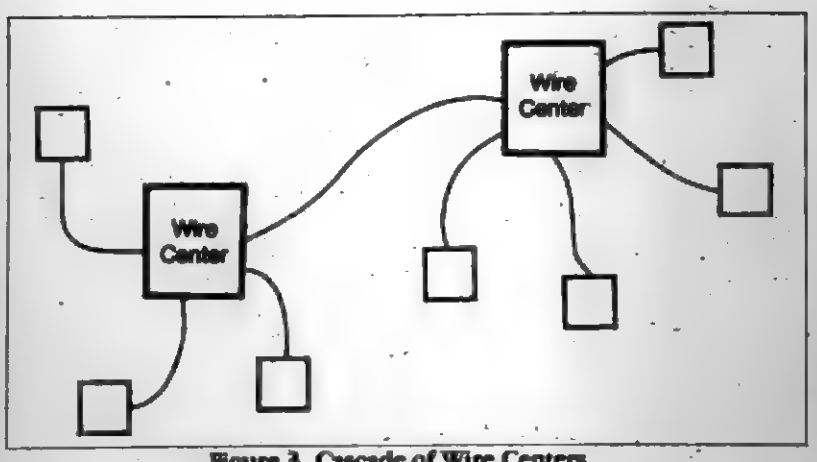


Figure 3. Cascade of Wire Centers

On a ring, the token is associated with a circulating packet and can be ignored by stations with no traffic to send. It might have been desirable to have had different terms to describe the two types of tokens, but the usage appears to be embedded by this time.

The use of the token on a ring as a means for access control occurs as follows. A station on the ring with a packet to send will monitor the data it detects passing on the ring until a sequence that it recognizes as a token appears. It converts the token to a connector, usually by inverting one bit. It sends its packet, concatenated with the connector, to another station on the ring. The station listens for the connector to come back around and converts it back into a token. The next station with traffic to send that recognizes the token may send its packet.

The station that sent the packet has no way of knowing if it was received correctly unless it can check what comes back around the ring for a correct frame check sequence and acknowledgment from receiving station that the packet was copied. The IEEE-802.5 standard explicitly provides an acknowledgement field at the end of the packet that the receiving station must modify as it retransmits the packet.

One bit indicates that the packet was or was not received with correct frame check sequence. A second bit indicates that the receiving station did or did not have a buffer available in which to store the packet. Thus, the sending station would know whether or not to retransmit the packet.

The station that is sending the packet could have a second packet to send already in the queue when it sent the first one. It could simply leave the token bit asserted and transmit the second packet immediately and a third frame and so on until the queue is empty. This mode of operation is called exhaustive transmission. It has the advantage to the sending station that very high throughput can be sustained once the token has been seized.

It has the disadvantage to the rest of the stations that an indeterminate time may elapse before the first station exhausts whatever process is supplying packets and passes the token. The IEEE-802.5 standard allows the transmission of multiple packets.

The IEEE-802 Local Network Standards Committee has drafted a standard for local-area networks that incorporates several different approaches to topology and access control. These approaches include carrier-sense multiple access with collision detection on a baseband bus (Ethernet), a token-passing bus that can be employed on either a baseband or broadband bus and a token ring definition. The latter, incorporated in section 802.5 of the standard, is widely regarded as IBM's choice. This is due to the fact that the IBM contributions to the work of the committee dominate the 802.5 definition, and IBM has publicly supported the token ring as a local network form. However, IBM has not announced any products that include the 802.5 ring, and the firm's spokesmen have refused to state any commitment to it. Time will tell. ■

Mom files best.

Introducing PC/COM.™ Truly, the fastest, easiest way to manage information today.

When MOM™ says she has a software system that can manage information faster than anything else on the market, believe it.

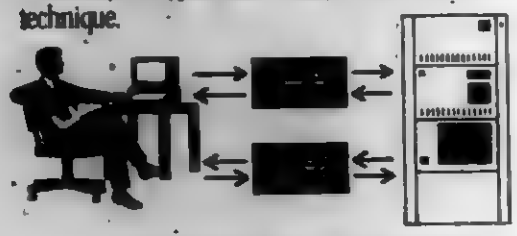
It's called PC/COM. A revolutionary automatic file transfer and management system that opens up a whole new realm of opportunities to PCs and PC-users.

Your mainframe works faster with PC/COM. Your PC gets more file management features.

If you are a mainframe user of TSO, CMS, or CICS, PC/COM will prove invaluable.

MOM says any job worth doing is worth doing fast.

MOM's PC/COM manages information at an incredible speed. And PC/COM will handle just about any file type with its unique binary transfer technique.

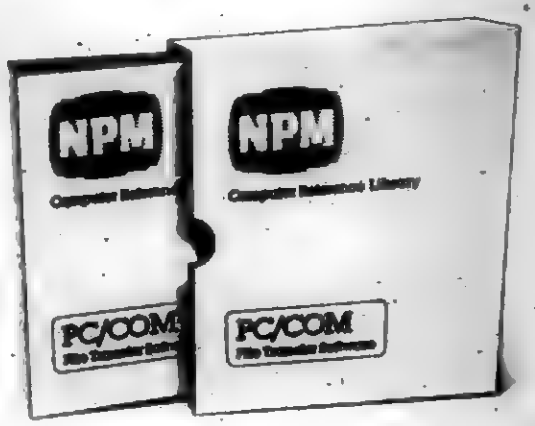


You can even back-up your hard disk on the mainframe. Leave it parked there until you need it. All it takes is the press of a key to get it moving again.

PC/COM is bi-directional, to save time getting information out of the mainframe onto your desk. And vice versa.

Security conscious, private and flexible — that's MOM.

The PC/COM has file access control and security built right in. So only those parts of the mainframe that should be accessed, are.



PC/COM is user-friendly and menu-driven so it's easy to understand. And simple to operate. All the features (and believe you, MOM, there are plenty) are initiated by a single function key.

Call MOM. 1-800-241-1170.

Talk to MOM. Tell her what you have and what you need. Ask her any questions about PC/COM and get good, clear answers.

MOM wants you to understand what you're getting into with PC/COM — and how much you can get out of owning the best, and fastest, file transfer and management system on the market.

The revolutionary PC/COM. Of course, from MOM. Phone 1-800-241-1170 or 404-351-2902.

MOM™

Specialists in Marketing of Micros to Mainframes.
Two Northside 75, Atlanta, Georgia 30318
A division of NPM, Inc.

MOM and PC/COM are trademarks of National Product Marketing, Inc. ©1983, The MOM Corporation

Special Section: Local-Area Networks

CHARTING THE WATERS

By Michael J. Zak

In recent years, many local-area network products have appeared. Vendors have promoted these products based on the performance benefits available from local-area network technology. Typical customers have been early adopters, tending to be technically adept and appreciative of the performance benefits that are inherent in local-area network technology. ▶

Zak is director of market planning, Network Control Products Division, Codex Corp., Mansfield, Mass.

A LONG, DRAWN EXPLANATION OF THE DCA

There is hope for potential local net users who are trying to find a way out of the confusion reigning in the market. Network selection can be made much easier by doing some preparation before meeting with vendors.

At the same time, a great deal of confusing activity has occurred among standards bodies. Debates have raged over the peculiarities of one access method vs. another or one transmission media vs. another. In addition, many questions have arisen. Which access method is best — carrier sense multiple access with collision detection (CSMA/CD) or token passing? Should a local-area network system employ a broadband cable plant or should the system use baseband techniques?

Vendors, early adopters and standards bodies have focused on the above issues, and as a result, discussion has been drawn away from critical issues that will determine whether or not local-area networks are accepted by users. Local-area networks must be shown to solve real-world user problems in order for their user base to grow.

THERE IS HOPE for potential local-area network users who are trying to find a way out of the confusion reigning in the market. Network selection can be made much easier by doing some preparation before meeting with vendors that have vested interests in specific technologies.

In this preparation, the user's objective should be to understand the scope of the problem he wants to solve and to use those boundary conditions in dealing with vendors. Because users often need to solve a current problem with a solution that has the flexibility to respond to growth and change in the user environment, an effort should be made to define today's problem and to predict tomorrow's problem.

Two types of problems tend to crop up in local data communications. The first type of problem can be labeled physical and includes such specific difficulties as:

- The need to provide connectivity so users can gain access to multiple applications from a single display terminal;
- The proliferation of cabling and the resultant space and cable labeling problems, which are especially relevant in user environments where terminals are moved often;
- The limitations on terminal and CPU driving distances and the need to incur additional costs to extend driving distances;
- The need for increased transmission speeds in order to handle applications that require high speeds, such as peripheral sharing and communications via transferring of files;
- The interconnecton of geographically dispersed local-area networks via wide-area network facilities;
- The management of the physical inventory, maintenance and financial status of equipment within the local-area network;
- The need to perform troubleshooting and diagnostics on the physical components of the local-area net.

The preceding list includes the most basic problems that a data network manager who has significant local data communications responsibilities must confront. Even though these problems are quite common, there are few easy solutions.

In the synchronous world of IBM and IBM-compatible cluster controllers and display heads, there remains the requirement to lay in separate runs of coaxial cable for each display head.

In the world of asynchronous communications typical of minicomputers, dumb and smart terminals, the data private branch exchange (PBX) offers a reprieve from some of the problems stated above. If local data communications problems were exclusively physical and if data communications consisted solely of asynchronous communications between Ascii terminals and minicomputers, the data PBX might be an adequate solution to the local-area net problem.

Logical problems come to the fore after the network manager has solved the physical problems. While physical problems aggravate the network manager, the logical problem usually afflicts the network user.

The second problem that afflicts data network managers can be called a logical problem. Logical problems come to the fore after the network manager has solved the physical problems. While physical problems aggravate the network manager, the logical problem usually afflicts the network user. Specific examples of logical problems are:

- How can a user, employing terminal equipment and applications that are unique to a given vendor's proprietary architecture, gain access to applications and data bases that are unique to another vendor's proprietary architecture?
- How can network availability be guaranteed?
- How can system loading and system capacity be managed to ensure minimum response times?

A local-area network problem is complex and hard to define. Physical problems tend to be evident today, but the logical problems are just beginning to emerge. The essence of the buyer's challenge is to define today's physical problem, outline tomorrow's logical problem and then choose a vendor that solves today's problem.

A few hints are helpful for users engaged in problem definition. First, avoid the jargon that has afflicted the local-area network industry. Do not express a requirement for Xerox Corp.'s Ethernet or a broadband system because of all the bandwidth it will handle. Instead, define your application and force the vendor to do his job — to demonstrate to you that his product solves your problem.

Finally, do not hesitate to call in one or two vendors to use their applications engineering expertise to help solve the problem. Using vendor expertise in the early stages of problem definition is a low-risk way to gain valuable insight into a vendor's commitment and capabilities in the local-area network business.

In searching for a vendor, establish priority problems for the local-area network system to solve.

OUT
DATA NETWORK.

It's really very simple: A DCA network can integrate all your datacomm equipment—IBM or non-IBM—into one flexible, efficient system. We call it Integrated Network Architecture (INA). And it offers many remarkable advantages.

Like network transparency. Our hardware is compatible with all hosts and terminals —synchronous or asynchronous. So you're free to use less expensive async terminals and modems.

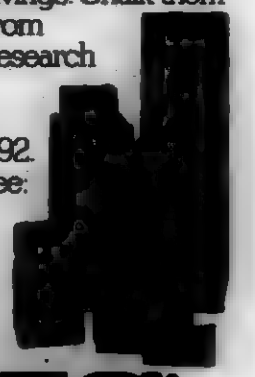
Host selection: With INA, any async terminal in the network can access any host in the network. Including IBM hosts, packet mode hosts and public data networks. And any 327X terminal can access any host running 3270 BSC.

High speed transmission: You can transmit combined voice and data at speeds up to 1.544 MBPS.

Modular hardware: You can upgrade and expand your network simply by adding—instead of replacing—low-cost DCA components.

And since data is routed through a network processor instead of a dedicated host, no host software is involved and no extensive programmer training is required.

Simplicity. Flexibility. Efficiency. Savings. Chalk them up to INA. From DCA, 303 Research Drive, Norcross, Georgia 30092. Call us toll-free: 1-800-241-5793.



dca
Digital Communications Associates, Inc.
DCA Products Are Available Worldwide.

The failure to establish priorities for product capabilities, thereby stating an implicit unwillingness to compromise, suggests that the only viable course for a user is to contract a custom local-area network, with its attendant costs and the difficulties of supporting nonstandard products.

The required local-area network solution can be outlined in many ways. Once the user makes the distinction between physical and logical problems, he can relate the two generic problems to his applications environment. For example, a network manager might legitimately consider a local-area network because he has a lack of space for additional cabling to support terminal-to-CPU traffic. This physical problem might dictate a fundamentally different solution than that required for a logical problem such as resolving protocol incompatibility.

In evaluating solutions for local data communications problems, the network manager should assess speed and performance, flexibility, security and cost. These items should be included in a statement detailing the problems a vendor is required to solve.

Having prepared a definition of the local communications problem, the user then proceeds to evaluate the alternatives available for solving the problem. This evaluation should entail far more than a review of products. It should also include an evaluation of the vendors that provide the products.

Astute users will assess a vendor's motivation for being in the local-area network business. If the vendor's traditional business has been the sale of CPUs, does the local-area network offer communications services to hardware manufactured by other vendors? Often, local-area networks offered by CPU vendors support only the proprietary communications architectures of that vendor. In the ideal case, the local-area network vendor should be motivated by a desire to solve the general communications problems of the user. It is critical for the vendor to show that he solves today's problems with his current product and that he has a strategy that will address tomorrow's problems. ■

For NEC modems, contact your nearest distributor!

ARIZONA
Zeus Distributors
Phoenix, (602) 263-6022

CALIFORNIA
A Datacom Solution
Cypress, (714) 827-8480

Davis & Hanley, Inc.
Hayward, (415) 782-7575

Western Data Group
Walnut Creek, (415) 938-9582

COLORADO
The Hall Company
Littleton, (303) 798-4160

Martec Association
Englewood, (303) 779-8151

FLORIDA
Networks, Inc.
Miami Lakes, (305) 822-6750

GEORGIA
X Point Corporation
Norcross, (404) 446-2764

HAWAII
Data Management Association
Honolulu, (808) 531-5136

IDAHO
Alster Communications
Boise, (208) 362-1272

ILLINOIS
Interbusiness Corporation
Wheeling, (312) 459-8866

MASSACHUSETTS
CSI Systems, Inc.
Lexington, (617) 863-0525

MINNESOTA
R-Com
Minnetonka, (612) 474-3449

NEW JERSEY
Consolidated Data Systems, Ltd.
Bogota, (201) 487-7737

Freidman Associates, Inc.
Union, (201) 964-6200

TRD Distributors
Merchantville, (609) 354-1315

NEW YORK
J.F. Jordan Associates
Huntington, (516) 271-9478

OHIO
Delta Products
Euclid, (216) 731-3537

Gerhold & Associates
Columbus, (614) 488-9751

PENNSYLVANIA
American Datacomm, Inc.
Pittsburgh, (412) 381-1600

W.J. Wisely Associates
Norristown, (215) 539-1217

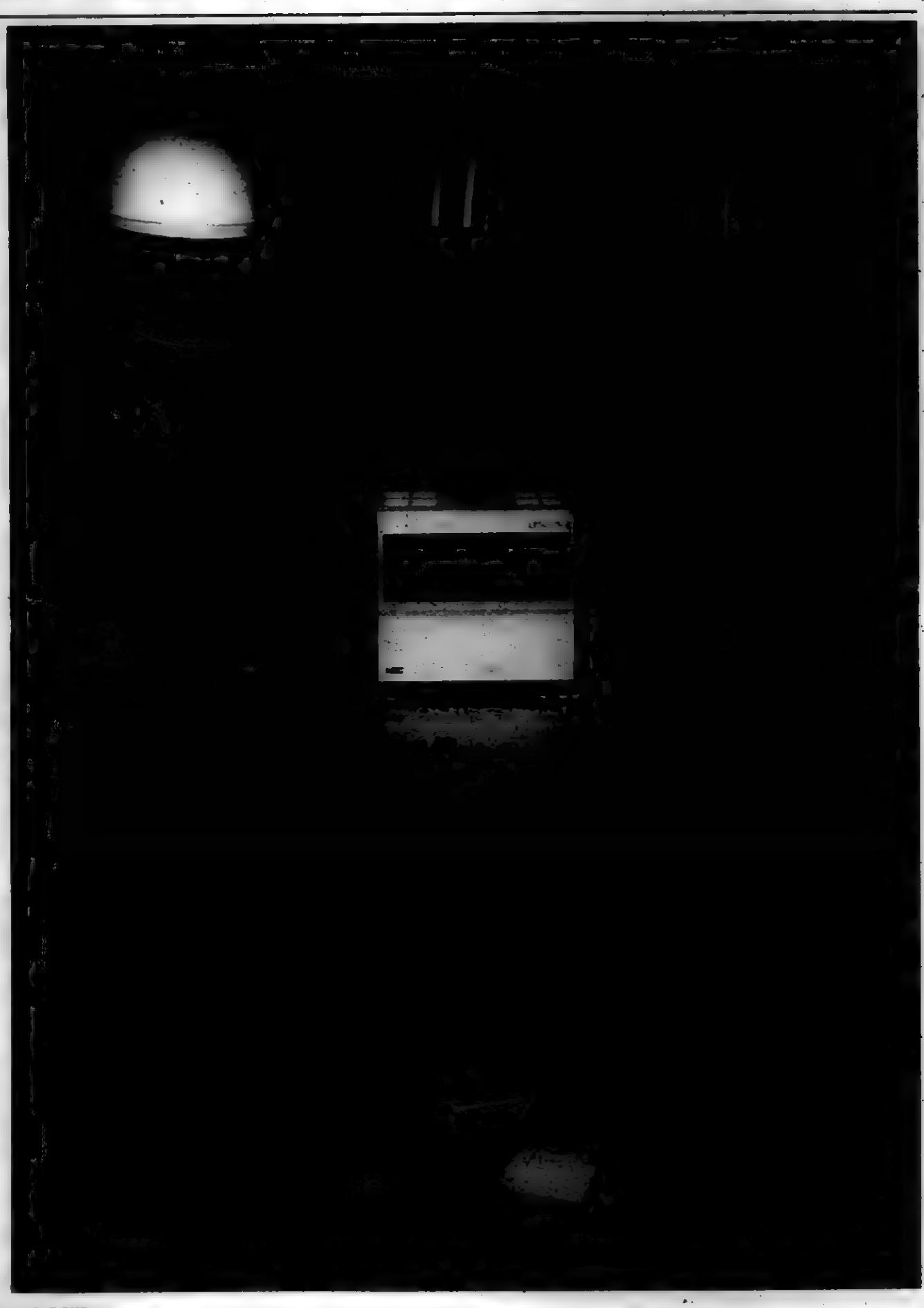
PUERTO RICO
Codecom
San Juan, (809) 781-9797

TEXAS
The Thorson Company
Austin, (512) 451-7527

The Thorson Company
Dallas, (214) 233-5744

The Thorson Company
Houston, (713) 771-3504

NEC
NEC America, Inc.
Data Communications Products



Rolm Corp. rigorously defines the computer and communications industry's rampant one-upsmanship. "One of the keys to our business strategy is to try to see new market opportunities before they get noticed by the general herd," Rolm's executive vice-president and co-founder Robert Maxfield explained.

"Rather than provide products that are merely plug-compatible with someone else's, we like to find a problem that other people don't know exists yet and then be the first ones to solve it," Maxfield said.

Baxter is West Coast bureau chief for Computerworld.

Maxfield is the company's penchant for finding new technological and market ground more closely dominated than in its recent exploits in the private branch exchange (PBX) arena. Rolm's debut as a PBX supplier came in 1975 with the introduction of the Computerized Branch Exchange (CBX), a real-time switching system that could serve as the hub of a corporation's voice communications network.

But though its initial foray into the business communications field proved to be a huge commercial success, the firm quickly became restive. Within about a year or so, ▶

Rolm's executives and engineers were already hankering to exploit their newly won market advantage by enhancing their existing PBX to support data as well as voice communications.

The aim behind the suggested product upgrade was to address the then-emerging problem of how to enable the business world's growing hodgepodge of incompatible terminals and other data devices to communicate with each other. Rolm's proposed solution was to centralize all the necessary protocol conversion and other data-switching capabilities in a customer's PBX and then allow users to contend for communications resources. Such an arrangement, the company reasoned, would minimize transmission costs through resource sharing, allow data to be exchanged over existing telephone cables and provide computerized office equipment with the same level of universal connectivity that had long characterized telephony.

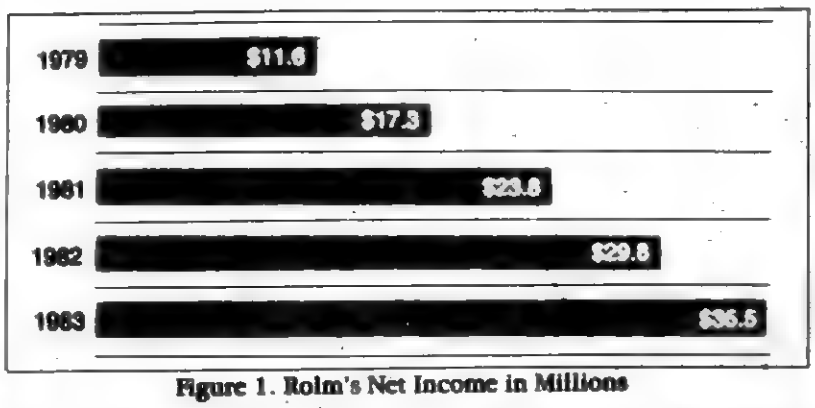


Figure 1. Rolm's Net Income in Millions

At the moment of its conception, the notion of combining voice- and data-switching capabilities in a single box proved to be about five years ahead of its time — a fact that forced Rolm to postpone the announcement of its enhanced CBX. By early 1981, the problem of interconnecting diverse models of office equipment had received enough widespread user attention to convince Rolm that its integrated voice and data PBX was finally ready for formal introduction.

But even though the product's release was significantly delayed, the company still ranked among the first PBX vendors to add data communications support to its existing real-time voice capabilities. Only archcompetitor Northern Telecom, Inc. rivaled Rolm for the honor of perfecting the industry's first combined voice and data switching system, Maxfield recalled.

Since then, Rolm has substantially broadened the scope of its communications business to encompass many of the desktop data devices and applications that a central switching system supports. Some of those data communications accessories and software packages include Cypress, a combination display terminal and digital telephone, and Phone Mail, a computerized system that takes, forwards and distributes messages.

Rolm's long-standing participation in the integrated voice and data switching market and its subsequent expansion into the automated office equipment field graphically illustrate one of the key tenets of the company's guiding management philosophy: Commercial success lies in carefully identifying selected business opportunities and then doggedly pursuing those target markets through good times and bad.

Unlike some of its main rivals, whose business interests span nearly the full spectrum of communications products and services, Rolm deliberately restricts its focus to just one narrowly defined specialty — business communications. "We have consciously avoided participating in the central office and carrier equipment field," marketing vice-president Richard Moley said. "Nor are we interested in making stand-alone kinds of office products that exist outside the context of PBX systems. We would obviously be foolish at this late date to try to compete in stand-alone word processing with companies like Wang [Laboratories, Inc.], which is already well-entrenched in that field."

Rolm's strong emphasis on business communications is reflected in the breakdowns in the company's latest sales figures. Only about nine years after its debut in the voice communications arena, PBX and office accessories sales already account for roughly 85% of the firm's total revenues. The balance of Rolm's business comes from the sale of ruggedized military computers, the products that gave Rolm its corporate start.

The combination of judicious market selection, strict adherence to a preset business course and a corporate culture that stresses

NETWORKING UNRAVELED FOR YOU!

Technology Transfer Institute's Seminars by
THE EXPERTS ON NETWORKS

It might seem as though the technology for configuring networks these days has become a real nightmare. The truth is that the maze of choices simply needs to be put in the proper perspective. Should you use satellites, phone lines, public or private networks, value-added networks, broadband, baseband, fiber optics, all or some, and in what configuration? The list goes on and on. Besides the options, the jargon is enough to drive you crazy — LANS, MANS, VANS, X. this, X. that and who knows what else, not to mention keeping track of the emerging standards.

To assist you in putting all of these network technologies in their proper perspective, Technology Transfer Institute has assembled an amazing set of Network Pioneers to conduct the Spring '84 series of NO-NONSENSE SEMINARS.

TTI'S line-up of "EXPERTS ON NETWORKS" will help you unravel your networking dilemmas, be it performance, evaluation, queueing, protocols, configuration, planning or architectural concerns.

To get all the facts on the TTI seminars, give us a call or send the coupon today for your Spring '84 catalogue of network courses. Discover why TTI seminars continue to be "the standard in the field against which all others are measured."

- **Experts on Networks** — KLEINROCK/WARMENHOVEN/WEIR/ROBERTS
  April 30-May 3, Washington, D.C.
- **Queueing Systems and Computer Applications** KLEINROCK
  April 3-6, Washington, D.C.
- **Intergrated Voice/Data PBX: Architectures and Products** — OPDERBECK
  May 21-23, Washington, D.C.
- **SNA** — MARKOV/PIATKOWSKI
  April 23-25, Washington, D.C.
- **Strategic Planning for Telecommunications** McQUILLAN AND GUESTS
  May 7-9, Washington, D.C.

Call **(213) 394-8305** or
mail the coupon today for your detailed brochure.

NETWORKING SEMINARS UNRAVELED

NAME

COMPANY NAME

ADDRESS

CITY STATE ZIP

TELEPHONE

TECHNOLOGY TRANSFER INSTITUTE
741 10th St., Santa Monica, CA 90402, (213) 394-8305

technological trailblazing rather than copycatting has stood Rolm in remarkably good stead. Between 1979 and 1982, the company's combined revenues more than tripled from $121 million to $380.6 million. In 1983, sales rose an additional 32% to top the half-billion-dollar mark for the first time in the corporation's history, and for the first six months of fiscal 1984, revenues jumped again to $288 million. In addition, the firm's impressive net income and shareholders' equity figures are shown in Figures 1 and 2.

Rolm's steadily expanding sales mirror its growing participation in the PBX field, where the company currently holds an estimated 15% market share, second only to industry behemoth AT&T. The smaller of the two firms also claims to control possibly the largest installed base of data-switching products in the U.S.

In fact, the vendor's latest commercial ventures have proven so successful that they recently attracted the notice of none other than IBM, which last summer bought 15% of Rolm's common stock and since then has acquired an additional 5%. Under the minority-purchase agreement, IBM can exercise its option to boost its interest in the business communications company to a maximum of 30%.

For Rolm, the benefits of the newfound relationship with Big Blue are manifold. For one thing, the partnership seems almost certain to ensure a high level of connectability among IBM's future hardware modules and Rolm's PBXs, Maxfield predicted. In addition, the accord is expected to promote the development of widely accepted interfacing standards that may eventually enable a broad assortment of competing data devices to communicate with each other.

A second major advantage of the IBM-Rolm union is that it significantly enhances the communications company's presence in markets abroad, Maxfield said. At present, international sales account for only about 5% of the firm's overall annual revenues. Except for an installed base consisting of 25 to 30 PBXs in Japan, Rolm's penetration of the potentially lucrative foreign market is restricted to a relatively modest number of customer sites in Italy, Latin America and Korea. The supplier also boasts a joint venture in Mexico.

In the future, however, Rolm expects an increasingly hefty percentage of its total voice and data communications business to come from overseas. "We definitely have ambitions to be a worldwide supplier," Moley said.

IBM's minority position in Rolm is further expected to benefit the smaller firm by substantially magnifying its credibility in the eyes of current and prospective customers, especially large national accounts. Until recently, when major U.S. corporations were pondering the acquisition of a centralized voice- or data-switching system, Rolm often

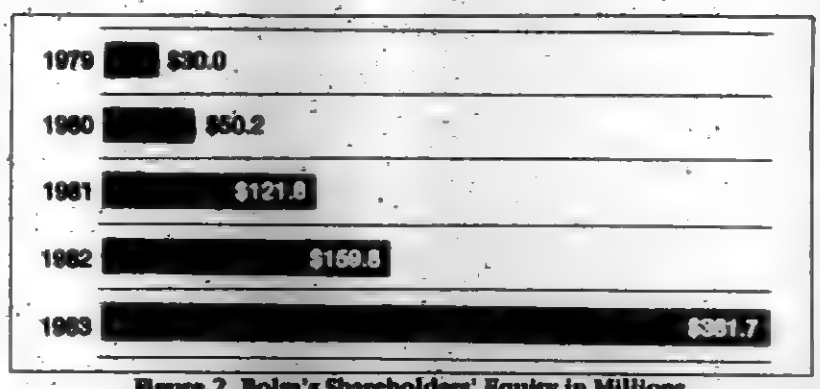


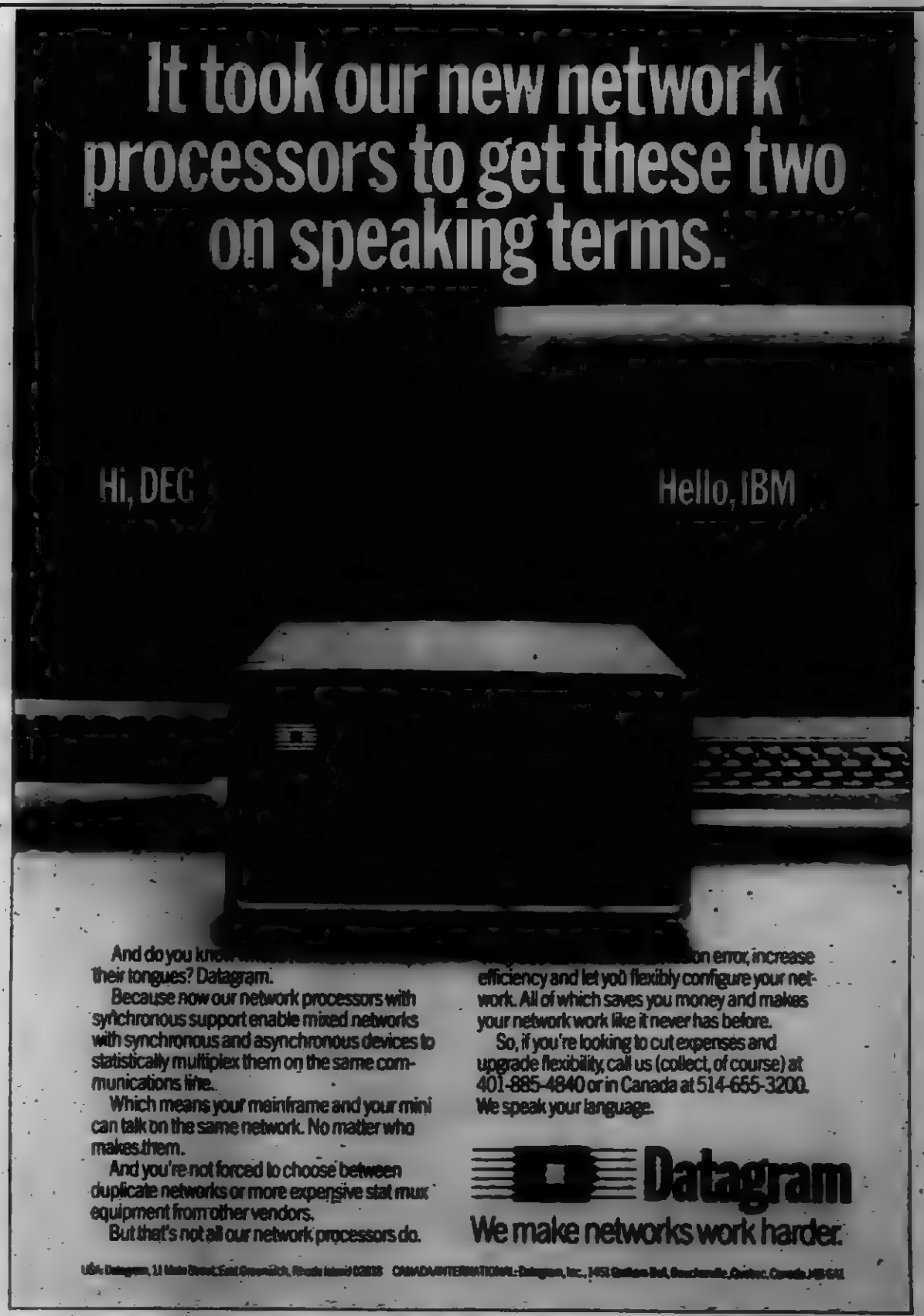
Figure 2. Rolm's Shareholders' Equity in Millions

fared badly in comparison to established communications giants like AT&T, Northern Telecom and the large Japanese manufacturers. The problem had less to do with shortcomings in the company's products than with serious misgivings about the long-term viability of the vendor itself.

"As you move higher and higher into customer organizations, the issue of vendor survivability becomes increasingly important," according to Bill Warren, a product manager responsible for the telephone and voice-switching side of Rolm's telecommunications business. "So even though we currently have annual revenues exceeding $500 million, we still may look relatively paltry compared to AT&T and the Japanese."

But now, in the wake of Rolm's newly forged alliance with IBM, doubts about the communications company's market staying power are rapidly disappearing.

"Suddenly, [the association with IBM] has made us the safe buy, particularly in view of the recent Bell breakup" and its resulting industry disarray, Janice Carnes, a product manager for the



DATAPOINT
We sparked the revolution.

Seven years ago, when DATAPOINT introduced the world's first local area network, ARC® (Attached Resource Computer), we sparked a revolution in business communications. Today, DATAPOINT's comprehensive approach to office automation, communications, dispersed data processing and desktop computing continues to make major demands on software technology. DATAPOINT is the undisputed leader with more than 5,000 ARC® local area networks installed...more than all the others!

SUPPORT ANALYSTS
Your team will be the key in support of office applications such as WP, mail and multiplan. You will also be involved in reviewing of specifications and documentation for support of those applications.

OPERATING SYSTEMS PROGRAMMERS
From a creative point of view, you will design and implement current as well as future operating systems and utilities. You will need knowledge of Assembly, Pascal and "C".

OFFICE AUTOMATION PROGRAMMERS
You will be a part of a highly skilled professional team developing the office of the future - stressing reliability and user friendliness. Programming experience using high level "C" and similar languages, and interactive software tools is desired.

SOFTWARE QUALITY ANALYSTS
Join a team that has high visibility in our quality-conscious organization. These positions involve systems test, analysis, planning, and development as well as software performance analysis and testing.

DOCUMENTATION WRITERS
We are looking for proven communicators with skills in operating systems, languages, communications, and office applications. End-user documentation experience preferred. Knowledge of on-line documentation, "Help" facilities, and other user aids helpful.

FILE MANAGEMENT & LANGUAGES DEVELOPMENT PROGRAMMERS
Operating Systems, DBMS, or language development in assembly language is required for this advanced team of software professionals. Experience in using "C" language or Pascal is a plus.

CALL THE
#1 TEAM IN
NETWORKING
1-800-531-5770
1-800-292-5106
(In Texas)

DATAPOINT offers excellent salaries and one of the best relocation packages in the industry. We want to make sure your move to the "sun country" and growth is successful! Activate your career by calling and mailing your resume to: Technical Recruiter, Datapoint Corporation, 9725 Datapoint Dr., MSG-05-101, San Antonio, Texas 78284. We are an equal opportunity employer m/f/h. (refer to ad: 101)

MAKE A MOVE
TO
GROWTH and success!

data-switching side of Rolm's operations, maintained.

FOUNDED IN 1969, Rolm derives its unusual moniker from the first letters of the last names of its four co-founders — Gene Richardson, Ken Oshman, Walter Loewenstern and Maxfield, all graduates of Rice University. For roughly the first six years of its corporate existence, the company devoted its energies exclusively to manufacturing and selling military-oriented computers capable of withstanding severe temperatures and other hostile operating conditions.

In 1975, the firm entered the second phase of its organizational evolution when it diversified its product line with the introduction of the CBX. Since then, Rolm has steadily broadened its switching systems line to include a wide assortment of additional CBXs, ranging from very small to very large models. Last November, the company further enhanced its PBX family with the announcement of its CBX II, a second-generation digital communications system.

Today, Rolm consists of two main business entities — the Mil-Spec Computer Division, which supplies the ruggedized military computers, and the Business Communications Division, which came into existence with the advent of the firm's first PBX. The Business Communications Division, in turn, embraces two main product disciplines: telecommunications and automated office systems.

Unlike the telecommunications group, which specializes in providing PBXs and digital as well as analog telephones, the office equipment organization focuses on the development of applications and desktop data devices that complement the corporation's switching system technology.

Within the Business Communications Division also lie two of Rolm's other major commercial operations — its international telecommunications and industry systems groups. The international telecommunications organization concentrates primarily on tailoring the company's U.S.-made PBXs to foreign specifications and then selling the products to customers abroad. The industry systems group, meanwhile, aims to maximize the firm's penetration in selected end-user markets like health care and hotel management.

Rolm currently employs about 7,600 people, more than 3,000 of which are ensconced in the fountain-studded, garden-like setting of the company's Santa Clara, Calif., international headquarters complex.

As Rolm's work force and the extent of its commercial activities have steadily expanded during the past 15 years, many of the company's methods of doing business have slowly, but profoundly changed.

Only three or four years ago, "customers looked on PBXs as just another utility," Warren recalled. "Buying a PBX was like ordering a coffee pot." The result was that PBXs were typically bought by telephony managers, who usually based their product selections on one simple criterion — line costs.

But today, the picture is rapidly changing. With PBXs increasingly being regarded as components of a user organization's overall information system, Rolm is selling a growing number of its products to management information systems directors and vice-presidents of finance rather than to telephony managers.

That shift in the composition of its customer population, in turn, is forcing the firm to revise its selling tactics to stress expandability features and functions instead of costs per line.

Within large corporations, PBX buying decisions are fast acquiring the same degree of strategic significance as the acquisition of a central mainframe — a development that has prompted Rolm to upgrade its sales pitches accordingly, Carnes said.

LOOKING AHEAD TO the future, Maxfield foresees a continuation of his firm's past business successes, but is wary of of the potential dangers of managing rapid corporate growth. "Our strategies, opportunities and current market positions are winners," he said. "But no matter how good they are, all our plans still have to be implemented, which is always a challenge.

"And implementation ultimately boils down to people and to our ability to manage them effectively and develop them professionally," he added.

To a limited extent at least, Rolm's long-term financial outlook also hinges on future directions within AT&T, its prime competitor. If the newly divested communications giant elects to cross-subsidize the unregulated part of its business with revenues from its long-line monopoly, Rolm and other PBX suppliers may find themselves hard-pressed to compete, Moley said.

But in the absence of such unfair business practices, the company expresses confidence in its ability to continue meeting AT&T's formidable market challenge. "The office automation and computer business is highly dynamic and is an environment where you have to be very fast on your feet to survive," Moley said. "We're accustomed to competing in that kind of environment. AT&T, on the other hand, is a huge company where the top management is utility-oriented and is used to an environment where your investment lasts a long time and yields a guaranteed return." ■

THE RISE OF WORKSTATION TELEPHONES

A new type of workstation is emerging that could strongly challenge the personal computer in the battle for managers' desks. The computerphone offers blended telephone and personal computer functions, resulting in a machine optimized for communications. Examples of first-wave computerphones include Northern Telecom, Inc.'s Displayphone; Rolm Corp.'s Cypress; Cygnet Technologies Corp.'s Cosystem; and Zaisan's ES.1. By year-end 1988, 1½ to two million computerphones could be installed in the U.S.

The computerphone's major thrust is toward access above all other functions. This distinguishes it from the applications-oriented personal computers. The computerphone's networking specialization makes it suitable for the daily activity of higher [illegible] managers and executives [illegible] of data [illegible] information and ideas for [illegible] messages [illegible] And they spend [illegible] of their day dealing with [illegible] of the telephone — looking up numbers, dialing or talking on the telephone.

Telephony is moving into a new era, with next-generation private branch exchanges (PBX) pushing a range of special features out to the telephone instrument. These PBXs — for example, Rolm's CBX II; Ztel, Inc.'s PBX; and CXC Corp.'s Rose — promise to switch data in addition to voice, radically altering the telephone's office role. They will also dispense applications to user workstations including data base and other executive functions.

These two factors — managerial and executive focus in communications and the coming of high-tech telephony — are expected to unleash the computerphone market over the next three years.

Several elements are basic to the computerphone's function. The first is telephone capability, including numerical dial from screen and other advanced telephone functions. Basic computerphones are equivalent to full-feature electronic telephones and are capable of plugging into any analog PBX line. In the future, computerphones will be closely linked with third- and fourth-generation digital PBXs and will be able to exchange data and voice using the switches' proprietary digital signaling techniques.

The computerphone includes two keyboards — a function key dashboard and a standard alphanumeric keyboard. In addition, it includes a CRT and enough intelligence and memory to compose and store directories and short messages. ▶

Colony is president, Forrester Research, Inc., Cambridge, Mass.

Workstation Telephones

The computerphone market can be divided into three segments. These are:

- *PBX proprietary computerphones*, which are designed to hang off a specific PBX;
- *Stand-alone computerphones*, which can attach to any telephone line or PBX;
- *Personal computer add-ons*, with the computerphone function added to a personal computer.

The PBX proprietary computerphone is sold as part of a complete telephone system. Examples include Rolm's Cypress and Northern Telecom's SL-1 Displayphone. These machines are differentiated from the stand-alone computerphone in that they are protocol- and software-compatible with a specific PBX. Three types of protocols apply: voice signaling, data signaling and feature access.

Advanced PBX computerphones have several distinguishing features. They offer one wire set connectivity. One twisted pair carries interleaved voice and data between the PBX and the computerphone. They also support high-speed communications. PBX computerphones signal to the PBX at 56K or 64K bit/sec. In the future, speeds in the 1M bit/sec range will be supported. In addition, these PBX propriety units offer easy access to a broad range of telephone functions.

Rolm, AT&T Information Systems, Northern Telecom and Mitel Corp. are the budding players in the PBX computerphone segment of the market. Rolm and Northern Telecom perceive the computerphone to be an important future business. Rolm estimates that Cypress I and Cypress II, which is still unannounced, could generate between $35 million and $50 million in revenues in 1985 and double that amount in 1986. AT&T Information Systems may position the business communications terminal as a personal computer alternative in 1984.

One major disadvantage of the PBX computerphone is its all-or-nothing implementation. Users must install specific types of PBXs to run the PBX computerphones. This makes the PBX computerphone tough to pilot — an important evaluation method used by large companies.

Vendors Year-end 1983	Potential Vendors Year-end 1985	Potential Vendors Year-end 1988
Rolm Corp. AT&T Information Systems Northern Telecom, Inc. Mitel Corp.	IBM Wang Laboratories, Inc. Ztel, Inc. Ericsson,Inc. CXC Corp. Lexar Corp. NEC America, Inc. GTE Corp. Harris Corp. Siemens Corp. Hitachi Ltd. Intecom, Inc. TIE Communications, Inc.	Regional operating co. Digital Equipment Corp. Hewlett-Packard Co.

Source: Forrester Research

Figure 1. Outlook for PBX Proprietary Units

THE SECOND TYPE OF computerphone, the stand-alone unit, can attach to any analog telephone line — PBX, Centrex, keyset or single-line. Important stand-alone machines include Northern Telecom's Displayphone, Zaisan's ES.1, Mitel's Kontact workstation and Ambi Corp.'s Ambiset.

An important distinction between the stand-alone computerphone and the PBX computerphone is the level of telephone function supported. The PBX computerphone will be attached to one digital line in the future, and it will be software- and function-compatible with the PBX. For example, when the call-forwarding button is pushed, the PBX computerphone will interact with the PBX's call-forwarding software using a specialized digital management protocol. The stand-alone computerphone can access some PBX functions using dual-tone multifrequency and flash, which is quick switch-hook depression.

The primary advantage of the stand-alone unit is its ability to fit into any office environment regardless of the level of telephone service offered. About 97% of telephone lines installed in the U.S. at year-end 1983 were analog, a large universe of potential installations for stand-alone computerphones.

Looking ahead to 1988, there will still be an extremely large universe of nonproprietary telephone lines, representing the potential market for stand-alone computerphones.

Finally, the definitive for reaching today's – data communications

It's called ANI℠—Advanced Network Integration. From Infotron.

ANI is a definitive path for network growth and management that's reflected in a family of data communications products and services.

It gives you something you haven't had before—the means to plan and implement a data communications network based on long-term strategy.

ANI covers everything we make—from simple modems to stat muxes, to high-speed muxes, to network concentrators, to intelligent data switching systems.

ANI also includes everything we do. Systems engineering, from technical support to turnkey operations. Installation. Training. Telephone consultation and dialup online diagnostics. And worldwide field service.

Growth.
ANI products grow with you.

They're based on an architecture that's simple to expand and upgrade.

Because ANI products can be expanded both in size and function, they're easily integrated into larger, more complex networks. They grow with you instead of becoming obsolete.

Flexibility.
ANI products are versatile.

They can accommodate computers and terminals with almost any combination of protocols and speeds.

And because of their modular structure, ANI products will accommodate bridges to other networks, and gateways to public and private resources.

A THIRD TYPE OF computerphone that is closely linked with personal computers has emerged. This group includes Cygnet's Cosystem, which adds computerphone functions to the IBM Personal Computer. The major appeal of the personal computer add-on unit lies in its ease of implementation. No corporate workstation standards are violated by this type of machine. And with the add-on unit, users do not have to learn new interfaces, keyboards or routines.

In addition, this type of computerphone builds off the already accepted personal computer; no major internal selling program is necessary.

Vendors Year-end 1983	Potential Vendors Year-end 1985	Potential Vendors Year-end 1988
Mitel Corp.	IBM	Apple Computer, Inc.
Northern Telecom	Wang Laboratories, Inc.	Tandy Corp.
Zaisan	Digital Equipment Corp.	
Davox Communications Corp.	Display Telecom Corp.	
GTE Corp.	NEC America, Inc.	
Suva Corp.	Televideo Systems, Inc.	
Scott-Thompson Corp.		
Sydis, Inc.		
Digital Transactions, Inc.		
Tymnet, Inc.		

Source: Forrester Research

Figure 2. Outlook for Stand-Alone Units

In preparation for a recent report on computerphones, Forrester Research, Inc., a research firm based in Cambridge, Mass., surveyed office automation and management information systems planners within 25 Fortune 1,000 companies. Few of the users had computerphones installed in their companies. However, the concept excited respondents. A typical comment was: "The computerphone will be the way we take automation to vice-presidents and general managers. That level of personnel doesn't want clunky personal computers with spreadsheets."

While the general idea of telephony automation made sense, real application of the machines was difficult for users to envision. One respondent stated this ambiguity well: "Before we begin to install the computerphone, I don't think we can know how we'll use it."

Much of the sample saw the computerphone as a means of communicating with internal and external data bases. The respondents mentioned sales records, IBM's professional office system, decision support systems, electronic messaging systems, Digital Equipment Corp.'s Datatsieve and Wang Laboratories, Inc.'s Alliance, among others.

Other results of the survey are listed below:

- Telecommunications management within the companies is expected to oversee computerphone purchase and installation. This reflects the machine's close association with the PBX.
- The computerphone must be relatively inexpensive. Most users believed that it should cost between $700 and $900.
- Personal computers and computerphones must be linked. The capability to move messages, spreadsheets and other information between personal computers and computerphones was important.
- Users expect to install large numbers of computerphones over the next five years. The average number of telephone lines with computerphones was expected to be approximately 35% of all installed telephone lines by 1988.
- The computerphone was seen as a replacement system. Survey respondents saw the computerphone as a means for replacing several diverse terminal types. These types include telephones, Ascii asynchronous terminals, IBM 3270-type terminals and personal computers. This multifunctionality will be an important means of cost justifying the computerphone.

To date, the computerphone has posed little threat to the personal computer. At year-end 1983, there were approximately 15,000 computerphones installed in the U.S.

Of that number, 10,000 were Northern Telecom Displayphones, 1,200 were Davox Communications Corp.'s Desksets, 1,000 were Mitel Kontacts, 1,500 were GTE Corp.'s or Tymnet, Inc.'s Action Stations and 1,200 were others. Shipments will increase modestly in 1984, with approximately 20,000 placed in the U.S. Of these, 65% will be stand-alone models, which is a reflection of the paucity of third-generation, fully digital PBXs.

The inflection point in the

path and tomorrow's objectives.

Management.
Management and control are vital to the operation of large, widely-dispersed networks.

ANI products give you the tools for monitoring activities, gathering statistics and keeping informed of events as they occur. From a central point, networks can be configured to meet changing requirements and provide diagnostics for solving problems.

Regardless of network size or complexity, ANI provides complete accountability for network operation.

We're Infotron. We wrote the book on data communications and networking. It's yours for the asking.

For your free copy and for information on ANI products, use the coupon, or call toll-free: 1-800-345-4636.

INFOTRON SYSTEMS

Infotron Systems Corporation,
9 North Olney Avenue, Cherry Hill, N.J. 08003,
or call toll-free 1-800-345-4636.

Please send me more information about ANI™, plus a free copy of *Making It Through the Maze of Data Communications.*

CW3/14

Name_____

Title_____

Company_____

Address_____

City_____ State_____ Zip_____

Telephone_____

See us at Interface, Booth 230.

Infotron communications networking. First in performance and reliability.

computerphone market is expected to come in the 1985 to 1986 time frame. In that period, Rolm, AT&T Information Systems, Northern Telecom and Mitel will be heavily marketing the computerphone. A number of new challengers may have entered the market including IBM, Wang, Hewlett-Packard Co., NEC America, Inc., Hitachi Ltd. and DEC. The computerphone will be a market requirement for PBX vendors, drawing in Ztel, Intecom, Inc. and other switch makers.

By year-end 1986, 600,000 machines will be installed. The population could grow to between 1.8 million to two million by 1988. This represents a penetration of 4% to 6% PBX and Centrex lines.

Stand-alone computerphones will lead the market through 1987. This reflects the limited availability of digital third- and fourth-generation PBX lines. But PBX computerphones will overtake stand-alone models and grow to dominate the market by year-end 1988 (see Figures 1 and 2). This hegemony will derive from the close linking of the computerphone and advanced PBX functions such as messaging and protocol and applications bridging.

In addition, personal computer add-on units will experience steady growth through 1988. By year-end 1988, 460,000 personal computer add-ons, or 2.3% of total U.S. personal computer installations, will be installed (see Figure 3). By year-end 1988, 60% of computerphones will be attached to proprietary PBX lines, and 40% will be attached to nonproprietary dual-tone multifrequency lines.

Vendors Year-end 1985	Potential Vendors Year-end 1986	Potential Vendors Year-end 1988
Cygnet Technologies Corp.	Apple Computer, Inc.	Personal computer vendors
Display Telecom	Tandy Corp.	
Davox Communications Corp.	AT&T Information Systems	
Digital Equipment Corp.	IBM	
Wang Laboratories, Inc.	Convergent Technologies, Inc.	
Grid Systems Corp.	NBI, Inc.	
Televideo Systems, Inc.	Exxon Corp.	
	CPT Corp.	

Source: Forrester Research

Figure 3. Outlook for Personal Computer Add-Ons

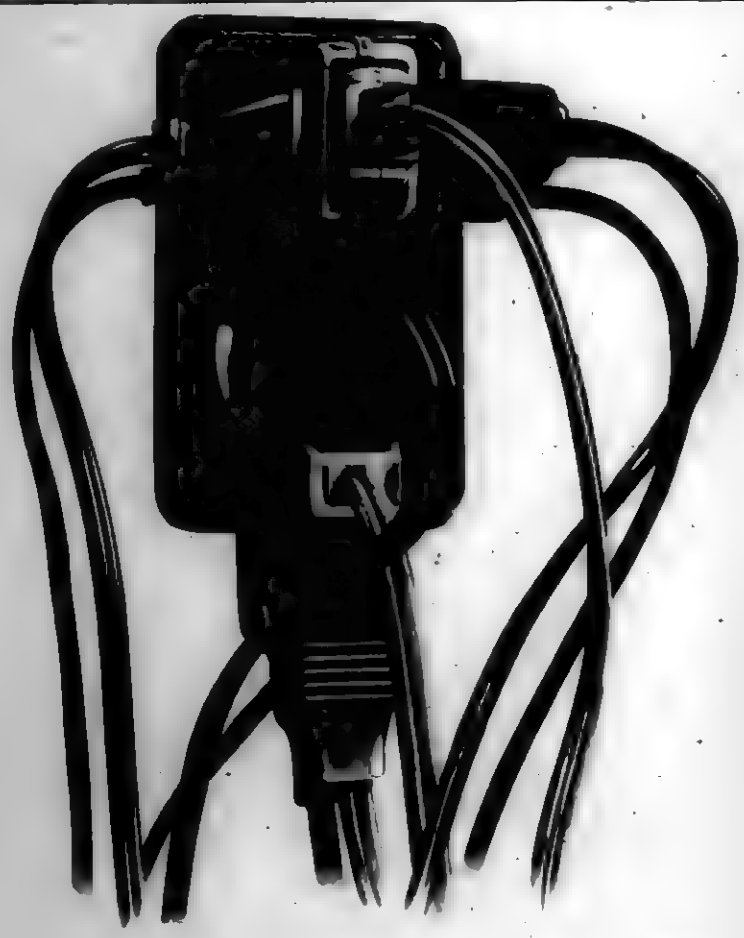
Without applications and PBX links, the computerphone is little more than an expensive autodialer and semi-intelligent terminal. There will never be a demand for computerphones that lack links to higher level systems. Northern Telecom expected to sell 100,000 stand-alone Displayphones in its first year of shipments, but only 10,000 have been shipped to date. Their efforts were continually plagued by the user query, "But what do I do with it?"

THE CREATION OF the computerphone market will hinge on two factors: first, finding a niche function within user organizations and proliferating from that entry point; and second, creating usable communications applications such as data base, videotex, professional computer synergy, messaging and telephony automation.

Just as spreadsheets became the launching pad for personal computers, telemarketing could become the linchpin for the computerphone. In the first phase of the market (1983-1986), computerphones are expected to find their way into large corporations via sales departments. Vendors with experience in the market, such as Davox and Northern Telecom, indicate that their machines are being installed where there is a clear intersection of the telephone and data base functions. For example, Morgan Stanley brokers are using 300 Davox Desksets to track sales leads and access client files. Burlington Northern Air Freight uses Davox for credit collection. A large medical supplier uses 300 Displayphones for sales tracking.

Once the computerphone is installed and supported by a sales data base, it could branch out into the executive suite and onto managers' desks. This second computerphone phase (1987-1990) will center on the availability of communications applications including an easy-to-use data base, perhaps videotex; message creation, storage, retrieval and transmission; personal computer links; and advanced telephone functions.

The computerphone market is still in its infancy. Emerging technologies, such as voice I/O, digital PBXs, packet-switched interfacility links, and the recent AT&T divestiture are converging to create special conditions. These market shifts could make the computerphone the next hot workstation. ■



Pull the plug on your inefficient data communications. We can help.

Many data communications networks, perhaps yours included, have grown in the same add-on way as this common octopus plug arrangement. Yes, it works. But it contains many built-in risks and could ultimately let you down.

The time is right for you to take a careful look at how General DataComm can streamline and improve your data communications, and save you money at the same time.

Here's how.

Since we are a full-line data communications manufacturer, everything from modems and multiplexers to network management systems and service support, we can design a complete system for your company. It will not only work better but save line costs, too.

When we install a system it not only means higher efficiency now but it will expand easily to meet your needs tomorrow.

Tie your network together.

Our true systems approach also helps eliminate compatibility problems. Since we design and manufacture the full product range, you can be sure everything will always work in harmony.

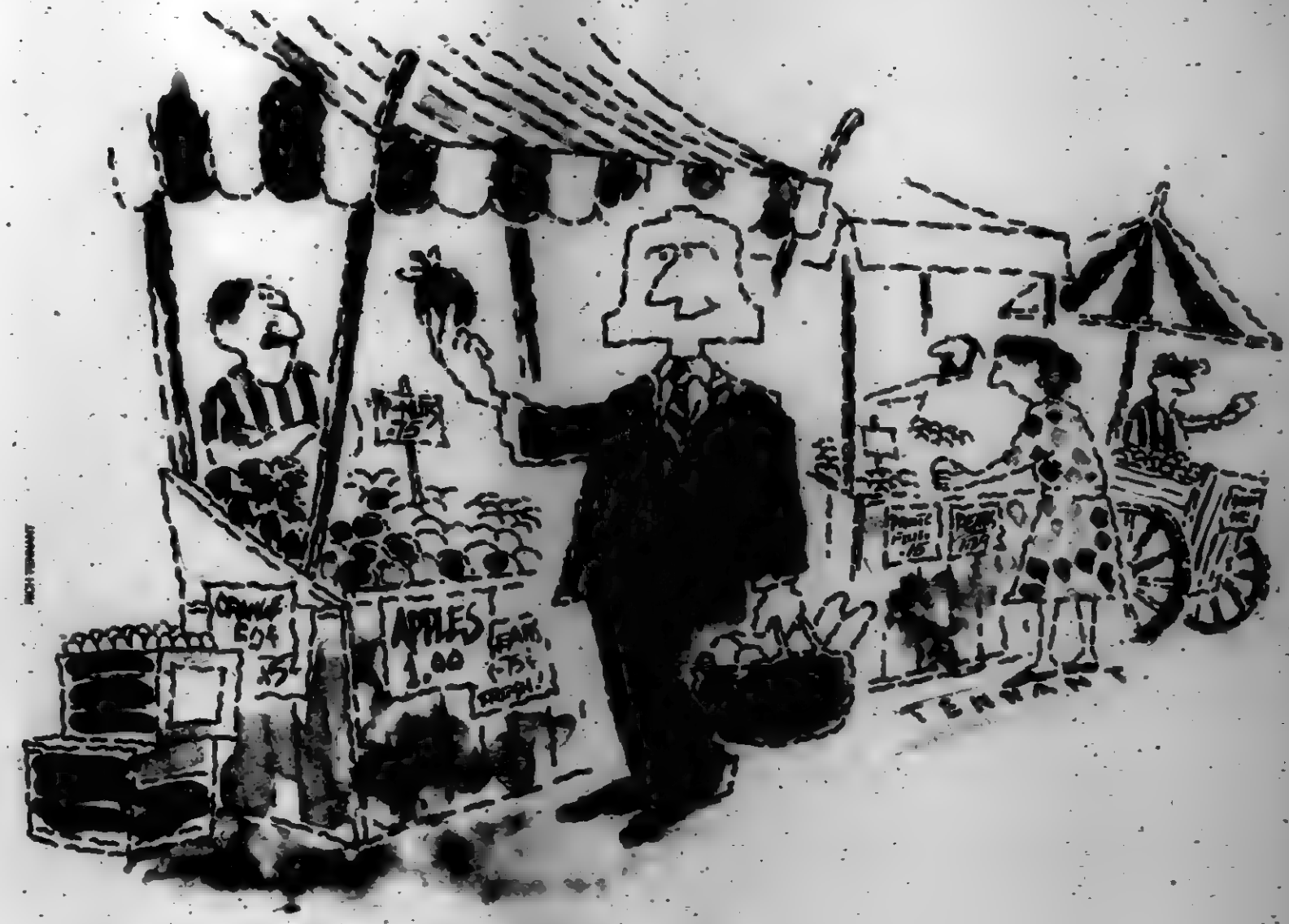
Put our experience to work for you, especially now in the new divested telecommunications environment.

For a free brochure detailing our approach and product range call or write to General DataComm Industries Inc., One Kennedy Avenue, Danbury, CT. 06810. (203) 797-0711.

General dataComm

We're the full line data communications company.

The Data Movers



THE GREAT CPE SHOPPING SPREE

BY KATHERINE HAFNER

The regional operating companies, thrust into the competitive marketplace for telephone equipment, have been faced with the formidable task of buying the equipment they will resell to customers. The resulting situation is an OEM extravaganza, with communications vendors hot on the tail of seven companies that, until recently, recognized but one supplier — Western Electric.

The newly unleashed regional companies have recently signed contracts that commit them to over $1 billion in purchases of customer premises equipment over the next three years.

Hafner is staff writer for Computerworld On Communications.

Three of the big winners in the race to supply the local companies are Northern Telecom, Inc.; NEC America, Inc.; and TIE Communications, Inc., along with its Technicom International, Inc. subsidiary. TIE, a relatively low-profile manufacturer of small business telephone systems based in Shelton, Conn., has signed contracts with six of the regional companies, as well as Southern New England Telephone (Snet), which is minority-owned by AT&T.

Other vendors of telephone and switching equipment that have won contracts with the regional companies include American Telecom, Inc., ITT and Comdial Corp.

No longer constrained by an exclusive dependability on equipment from the former Western Electric, which has been renamed AT&T Technologies, the operating companies have had a field day with all the equipment available. The list of products being purchased by the local companies includes everything from single-line cordless telephones to private branch exchanges (PBX) for large businesses.

Never having been presented with such freedom of choice and by no means immune to the marketing blitzes that can plague many a consumer, the local operating companies did not have the easiest time making their purchasing decisions.

"We went for the established ▶

vendors with state-of-the-art equipment," commented Pat Hammerstrom of BellSouth Corp., the holding company for Southern Bell and Southeastern Bell. "We had to look not only at the products, but also at the kind of contract that could be worked out with the different vendors." (See the figure on Page 67 for a list of vendors and their products).

BellSouth has signed contracts with nine separate vendors sifted from an initial pile of over 100. For BellSouth, the selection process started in June 1982 and lasted a full 18 months. The result was a group of contracts ranging in duration from two to four years and totaling $200 million.

"We did a tremendous amount of testing," Hammerstrom pointed out. "We had an entire task force that did nothing but test equipment."

While loath to cite specific reasons for choosing one vendor over another, Tom Stoddard, a BellSouth spokesman, pointed out general characteristics BellSouth was looking for in its evaluation of products. "We looked at just about every factor you can think of," he said.

These included "quality, technical leadership, stability, the ability to provide enhancements and lots of internal things such as how similar the stuff was to what our people are familiar with, as well as the training and support we would receive from the manufacturer," Stoddard said.

Ameritech, the Chicago-based conglomerate of Illinois Bell, Indiana Bell, Michigan Bell, Ohio Bell and Wisconsin Telephone, went through a similarly intensive search, but in half the time. Ameritech has given its business to NEC America, TIE Communications, Ericsson, Inc. and AT&T Technologies.

"We began with a list of about 100 vendors worldwide in the spring of 1983 and narrowed it down to about 45 by the summer," Ameritech spokesman Bill Hensley pointed out.

"When we got down to the final 12, we scrutinized the products and companies. We looked at the total company from its top management on down. We reviewed software, supply capabilities, production and, of course, pricing. Then we came down to the final four."

According to Hensley, the search was absolutely thorough because "these products will form the backbone of the state-of-the-art equipment we are offering to more than a million customers in the five-state area. We are striving to be a total supplier for customers."

Despite the plethora of cutting-edge technology Ameritech can now provide its customers, the regional company plans to maintain Centrex as its flagship service offering throughout the five states, selling the equipment more as an ancillary offering.

"The equipment we are marketing is designed to make Centrex even more valuable to customers," Hensley said.

"We offer a variety of PBXs as well, for customers who want to own their own switch or are in more rural areas where we can't provide Centrex," he explained.

Where does AT&T Technologies fit into this competitive tangle? While some of the regional companies are delivering their erstwhile supplier an outright snub, others such as Ameritech

Avoid Expensive Errors . . .

Plan your telecommunications future with the best communications studies available in the market today – from INPUT.

☐ **Local Area Networks: Directions and Opportunities ($750) (Available now)**

The following studies will be available this year. Call for details.

☐ **PC-to-Mainframe Communications ($2,450)**
☐ **LAN vs. CBX vs. Traditional Communications ($1,450)**
☐ **Local Area Networks: Experiences and Outlook ($750)**
☐ **Planning Methods for Telecommunications ($1,450)**
☐ **SNA Networks: Challenges and Opportunities ($750)**
☐ **Telecommunications Interfaces for the Mid-1980s ($750)**
☐ **Telecommunications Annual Report ($950)**

INPUT also offers a complete Telecommunications Planning subscription program ($74,000). Check this box ☐ for more details.

Yes! I want the studies I have checked above to help me plan for my company's telecommunications future.

☐ I am ordering _____ reports, for a total of $_____.
☐ I have enclosed a check for the above amount.
☐ Please bill my company on Purchase Order No. _____.

I need more information. Please have a salesperson call me at (___)_____.

Name _____
Title _____
Company _____
Address _____
City _____ State _____ Zip _____

Send coupon to: INPUT, 1943 Landings Drive, Mountain View, CA 94043
(415) 960-3990.

INPUT

Computerworld/Espana makes talking to the Spanish computer market easy.

Spain has become a major and fast-growing market for U.S. exporters. There are currently 4,000 general purpose computers at 3,000 sites in Spain at an installed value of 42.2 billion. In addition, there are more than 11,000 office computers in operation. Industry revenues are increasing 20% to 30% yearly contributing to Spain's GNP growth of 9% annually for the last three years. To meet this growing demand for DP equipment, products and services, computer professionals read *Computerworld/Espana* when they look to buy. *Computerworld/Espana* is the only EDP newspaper serving the Spanish data processing market. Modeled after its sister publication *Computerworld*, it is a weekly tabloid with the most up-to-the-minute information for DP professionals and users who need to keep informed on the fastest growing industry in the area. And now, *Computerworld/Espana* makes its mailing list of 9,000 EDP and MIS executives available for rental. This is a unique opportunity to test your product or service in this burgeoning market.

For further information on advertising in *Computerworld/Espana* or its mailing list, just fill out the coupon below.

Diane La Mungia, Manager
International Marketing Services
CW Communications/Inc.
375 Cochituate Road, Box 880
Framingham, MA 01701
(617) 879-0700

CW COMMUNICATIONS/INC.
Publishers of *Computerworld* and other leading computer publications around the world.

Please send me more information on
☐ Computerworld/Espana ☐ Your other foreign publications

Name _____ Title _____
Company _____
Address _____
City _____ State _____ Zip _____

have either signed actual contracts with the AT&T appendage or have some kind of plan, however indefinite, to work the company into their overall game plan.

"For now, Western Electric doesn't fall into our highest function and highest quality list," said John Phelps, vice-president of operation for Southwestern Bell Corp., which signed up with TIE, American Telecom, ITT and Northern Telecom.

"We certainly did consider Western Electric products, and this doesn't mean we will not use their products in the future. They just did not provide the marketing flexibility we were looking for," Phelps said.

Marketing flexibility can prove pivotal in a regional operating company's decision whether or not to buy a piece of equipment. "We wanted to put our name on the products, and Western didn't go along with that," Phelps commented. "We also wanted exclusive rights to market equipment in the five-state area. The marketing flexibility was a very big factor for us.

"I've been with the Bell System for 14 years," Phelps continued. "And I was just amazed at the number of manufacturers there are out there, making everything from single-line sets to sophisticated PBXs." According to Phelps, it took the company "hundreds of hours" of evaluation before deciding on the four vendors.

"I've been with the Bell System for 14 years," Phelps pointed out. "And I was just amazed at the number of manufacturers there are out there, making everything from single-line sets to sophisticated PBXs."

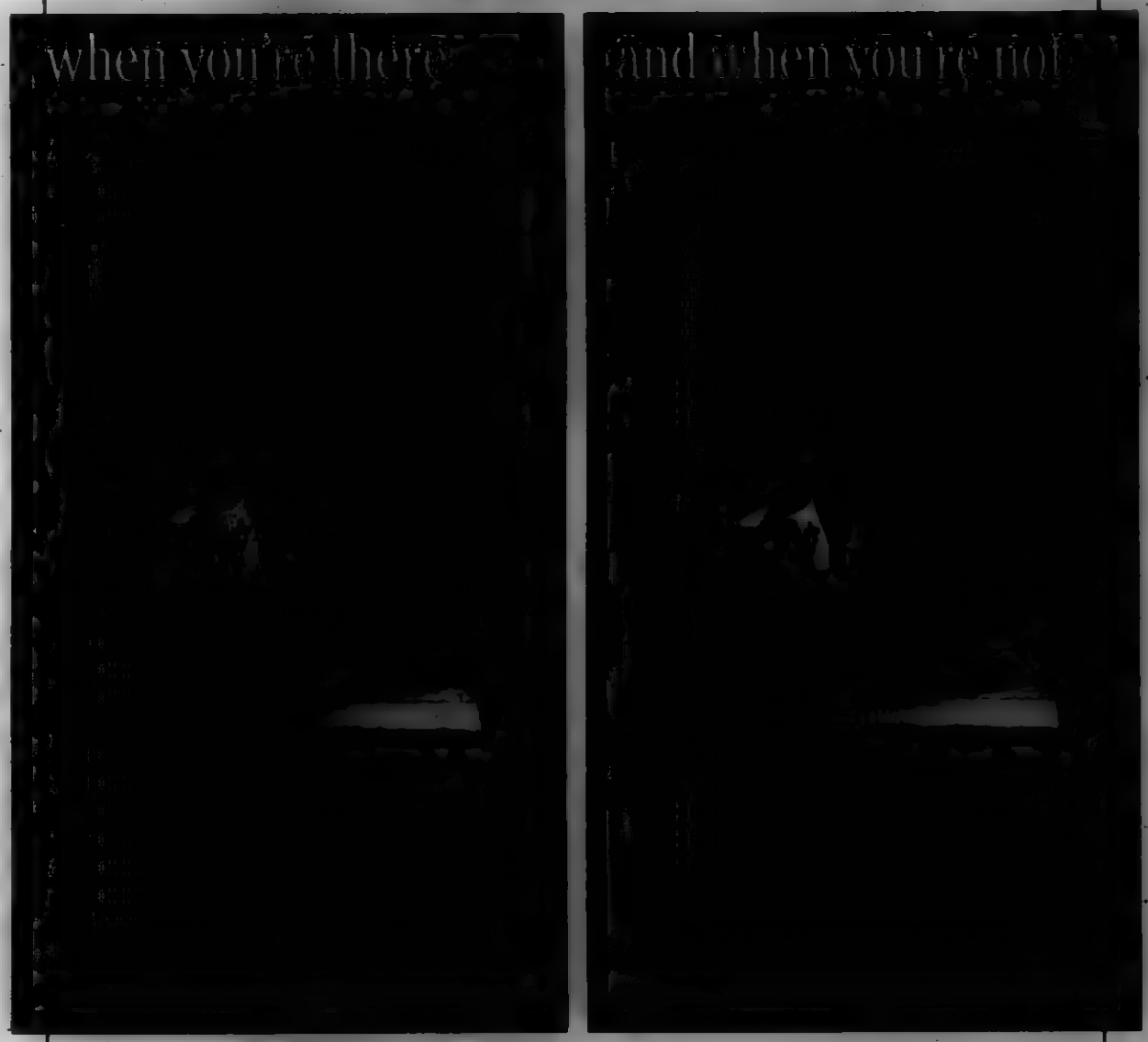
TWO OTHER factors governing a regional company's decision to buy or not to buy included production capabilities and manufacturer support. "Without exception, whoever we agreed to do business with, there was outstanding support," Phelps said. "We made our determination based largely on whether we felt the manufacturer would work with us.

"And obviously," he continued, "manufacturing capabilities determined the decision as well. We projected our needed volume to be such and such, and if they couldn't produce that much, we took our business elsewhere."

The sales to the regional companies will not make an enormous difference in the annual revenues of some of the big contract winners. For others, the contracts represent a quantum leap in overall sales. TIE, for instance, whose annual sales for fiscal 1983 totaled $320 million, sees its seven contracts as "a nice piece of new business." According to a TIE spokeswoman, the contracts with the regional operating companies will generate an additional $100 million worth of business per year.

TIE refused to elaborate on the marketing strategy that has helped bolster the company's profits so markedly. NEC America also declined to comment, a silence the company claims is part of its contractual agreement with the telephone companies.

Take control of tech control.



Introducing the Intelligent System Control Console.

The Bytex AUTOSWITCH Electronic Matrix Switching System, under control of our new color Intelligent System Control Console (ISCC), will perform tasks such as restoral switching when alarms occur, time based configuration switching, and event logging to disk of alarms, system diagnostics and operator commands—all automatically.

With additional features such as Menu/Function Control, Multi-level security codes and user created files, your ISCC Autoswitch System will provide you with the operational simplicity and enhanced flexibility to maintain network performance.

So whether you're there or not, Bytex is ready to put your tech control in control with our AUTOSWITCH Intelligent System Control Console.

See Us At Booth 277-281
INTERFACE '84

Bytex

Bytex Corporation, 2 California Ave., Framingham, MA 01701 (617) 879-5050 Telex 95151 Call Toll Free: 1-800-227-1145

CPE Shopping Spree

As Bell Canada's major supplier for nearly a century, Northern Telecom knew precisely how to go about winning the business of the regional companies in the U.S. "From working with Bell Canada, we've learned a tremendous amount about what transition entails and how to establish our marketing position with the Bell companies here in the U.S.," commented Lee Bauman, vice-president for Northern Telecom's distributor marketing division. "Our core involvement with Bell Canada has been our major preparation for our capability to work with the Bell companies."

Experience has taught Northern Telecom not only to stay tuned to a telephone company's requirements when negotiating a contract, but to look at the customer premises equipment market in a much broader perspective than one might ordinarily take.

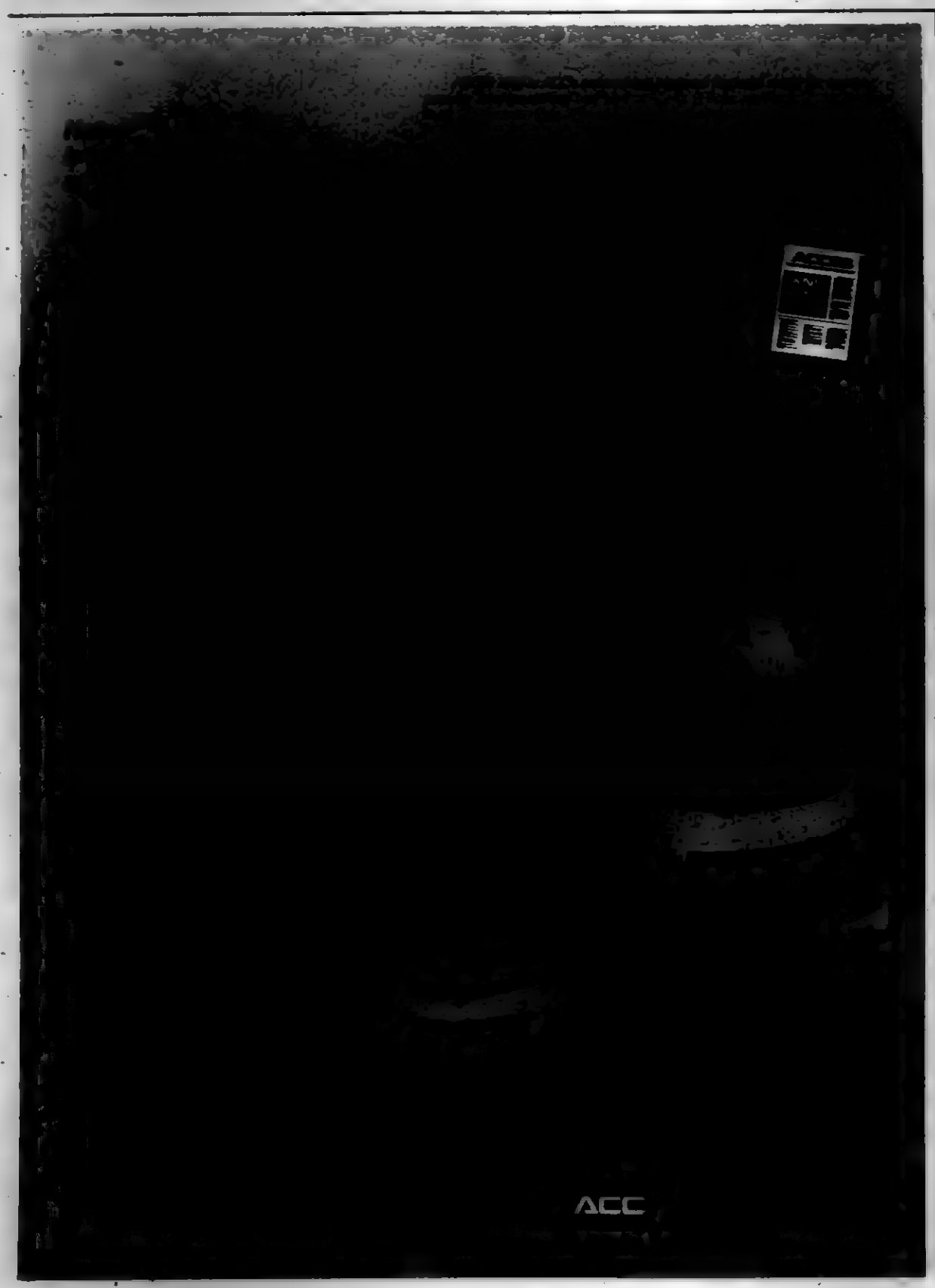
"People look at [customer premises equipment] as distinct from other areas of the communications business," Bauman said. "There are many other things happening on the network side of things that have tremendous impact on the [customer premises equipment] area and vice versa. It is very valuable to a Bell company to be able to see [a supplier's] entire breadth and depth of development. That's valuable, not only for current applications, but in the longer term as well."

Conspicuously absent from the roster is Rolm Corp., the digital PBX manufacturer whose Computerized Branch Exchange switch first encroached on AT&T's turf in 1975. According to William Krepick, director of group marketing at Rolm, the Santa Clara, Calif.-based company's lack of interest in distributing its products through the regional companies has to do with its overall marketing strategy. "About 25% of our business goes through independent distributors and the rest goes through our own sales and service centers," Krepick said. "We don't pit one distributor against another. So we wouldn't even think of selling to the operating companies.

"We did not make a single phone call to any of the operating companies," Krepick added. "We have absolutely no desire to market through them because it would be 180 degrees opposed to our distribution strategy."

American Telecom, Inc.	Focus hybrid key system
AT&T Information Systems	Merlin key system
AT&T Technologies	Home phone sets, fiber-optic and copper cable, wiring
Comdial Corp.	Touch-tone telephones, self-programmable sets
Ericsson, Inc.	Prodigy digital PBX
Electra Co.	Cordless telephones
GTE Business Communications Systems	Omni Series S1 and S3, GTD 5 central office switch
ITT	Basic telephones and speed-dialing sets
Intecom, Inc.	Integrated Business Exchange PBX
NEC America, Inc.	NEAX 2400 PBX
Northern Telecom, Inc.	SL/1, SL/100, Displayphone
Technicom Communications International, Inc.	Meritor 1E, electronic key telephone, Smart Set
Ztel, Inc.	EK 416 electronic key system
	Fourth-generation PBX

Vendors and Their Product Offerings



AND THEN THERE are Snet and Cincinnati Bell, which, by virtue of AT&T's minority ownership in the two companies, did not have to wait until Jan. 1, 1984 to enter the competitive marketplace. Cincinnati Bell, serving a 15-mile radius in the Cincinnati area and parts of Indiana and Kentucky, still relies heavily on AT&T Technologies, while Snet has gone full tilt into the open market.

"We're dedicated to a multisource philosophy," Mike McCann, a spokesman for Snet, said. "There are so many good vendors out there and so much good technology, we feel that our customers' needs cannot be served by any one, two or three vendors."

Consequently, through its Sonecor Systems distributing arm, Snet offers products from seven separate vendors. And although it serves just the state of Connecticut for telephone service, Snet is free to market its products nationwide. With a year's head start on the other regional companies in the months preceding the divestiture, Snet announced two major products: its System 2001 office system and Lightnet, a joint venture with CSX Corp. to build a fiber-optic network throughout the Southeast.

On New Year's Day, of course, the seven regional operating companies were freed to follow Snet's example. It was simply a matter of getting equipped. ■

IRCs AND THE INTERNATIONAL CONNECTION

BY PHILIP A. TENKHOFF & JAMES C. COLLARD

For many users, planners and operators, international communications represents a major unknown. Even for corporations with extensive domestic communications networks, considerable apprehension often exists concerning the most appropriate approach to satisfy international data communications needs. International data communications to and from the U.S. has been provided by specific companies that are authorized by the Federal Communications Commission (FCC). These companies have traditionally been known as international record carriers (IRC). IRCs have an exclusive license for the transmission of records on an international basis.

Five IRCs have provided communications between foreign countries ▶

Tenkhoff and Collard are president and vice-president, respectively, of Network Communications International, Olympia, Wash.

and the U.S. for several decades. These are FTC Communications, ITT World Communications, RCA Global Communications, TRT Telecommunications Corp. and Western Union International.

Prior to the '80s, the situation was reasonably static, with the IRCs generally competing with each other to offer a well-defined range of regulated, tariffed services. The principal offerings were telex and point-to-point leased circuits.

During that period of time, the IRCs competed for market share through service, in-country presence and marketing acumen. Prices were regulated by tariffs and were, therefore, virtually identical for all IRCs, with some exceptions such as telex pricing for smaller carriers. From the user perspective, there appeared to be little or no difference between the various IRCs. A telex was a telex regardless of whether it was handled by TRT or RCA.

International Carrier — Division of Responsibility

The '80s have witnessed significant changes in international communications. The principal forces effecting change are:

- Deregulation of the U.S. telecommunications industry;
- Diversification of services provided by IRCs;
- Acquisition of some IRCs by U.S. domestic carriers;
- Changing policies of foreign telecommunications administrations;
- Availability of new technologies;
- International standards adopted by Postal Telephone and Telegraphs (PTT).

A key U.S. policy change was a 1980 FCC decision that permitted the entry of new international carriers, but not record carriers. International carriers are allowed to carry voice and data only, while record carriers may carry voice, data and other services, such as telex. This decision reversed a 1967 FCC decision, which clearly separated voice and data carriers. The role of the IRCs in providing international communications between the U.S. and foreign locations must be examined in light of this changing environment.

In order to gain a better understanding of international communications, it is important to understand the role of each of the three major entities involved in providing it. These are the IRCs, foreign PTTs and U.S. domestic carriers.

The figure above is a simplified representation of the interrelationship among the three entities. The specific case of a leased circuit is shown for illustration. However, the same principles apply for telex, packet switching and so on.

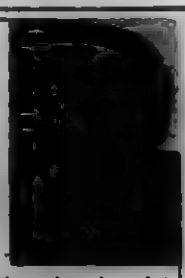
In the U.S., a domestic carrier provides service from City A to the international gateway location. The international carrier provides service between the international gateways of the U.S. and the foreign country involved. The telephone administration, usually known as the PTT in the foreign country, provides communications from that country's international gateway to the end-user location shown as City B.

With the advent of deregulation, the situation in the U.S. becomes more complex. The domestic carrier link in the figure could consist of local carriers such as U.S. West and Nynex and long-haul carriers such as AT&T and MCI Communications Corp. Conversely, the number of carriers may be less for a given situation. For example, MCI Communications Corp. now offers both domestic and international carriet service. The introduction of new international carriers, which also offer data transmission, complicates the U.S. situation. These new carriers include AT&T and Satellite Business Systems.

Even the situation with foreign PTTs is beginning to change. The UK has instituted a policy of telecommunications competition in lieu of the former monopoly. Other European PTTs are watching British developments carefully.

The important observation is that several distinct organizations are involved in providing international communications. Successful communications requires a carefully orchestrated, cooperative effort among all participating organizations.

A key result of the multiple supplier nature of international communications is that the end user must become more involved in the operational issues. The user is



How Dave Vipler "dumped the dumb"

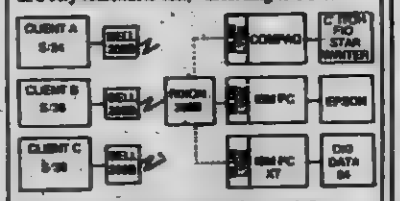
Experienced and consulted consultants know that customer support is the name of the game. Dave Vipler, now managing director of the New York based *Computer Consulting Center*, in his 14 years with I.B.M. saw too many clients get burned by here today-gone tomorrow consultants. What seemed like a finished program package invariably needed additional work once the consultant left.

Dave recognized that a quality consulting service must provide continuing client support. In 1981 he founded the Center to assist business with their I.B.M. S/34, S/36, S/38, 3Bxx, 4300 series systems and PCs.

"The Center was organized to provide quality computer consulting to clients that are integrating distributed processing systems into their computer networks," said Dave.

With a staff of 22 professionals, Dave felt that the Center could adequately support its New York City users. Plans to significantly expand their New Jersey operations prompted Dave to find a more convenient method of maintenance, particularly for those programming bugs that only surface after office hours. It was one thing to have a programmer drive an hour each way to spend a full day on site, Dave reasoned, but to make the trip for a half hour of "Firefighting" was too costly.

"One client said, 'How do we get you back if we have problems?' BLUE LYNX was the answer for us at a very reasonable cost," according to Dave.



The Center now has 2 PCs, 2 XTs, and 2 Compaqs, each equipped with BLUE LYNX. Their programmers can now sit at their desks and modify programs on I.B.M. host systems downtown, in New Jersey or wherever the accounts are located. Dave's clients were so impressed with BLUE LYNX that some have bought the hardware/software package for their own internal needs.

"The BLUE LYNX™ documentation was excellent. It went up easily and with no support from Techland required. We now use BLUE LYNX to support clients in New York City, as well as those in New Jersey. With BLUE LYNX behind us we can now use our communications ability not only for programming tasks but also as a sales tool."

BLUE LYNX terminal packages include:
3251/12 emulation for S/34, S/36 and S/38.
3276 emulation SNA/SDLC or Bisynch.
Hardware/software package $695 complete.
Combination of 2 emulators $1250.
VT100/52 emulation software $125

(212) 684-7788
TECHLAND SYSTEMS inc.
25 Waterside Plaza
New York, NY 10010

BLUE LYNX 3251 is a joint development of Software Systems, Inc. of Fullerton City, Missouri & Techland

the only organizational entity that has a complete sense of responsibility for end-to-end operation. While this conclusion is distasteful to many companies, it is nevertheless a fundamental axiom of international communications.

Two recent major acquisitions indicate future trends for the IRCs. Tymshare, Inc. acquired FTC Communications, and MCI acquired Western Union International. These acquisitions give MCI and Tymshare a combined domestic and international capability.

Other new providers of international telecommunications services are emerging and will compete with existing IRCs for market share. Communications Satellite Corp. (Comsat) has provided satellite capability to established IRCs since its inception. With the advent of deregulation, Comsat will likely become an international carrier and provide some services directly to end users.

By agreement with individual PTTs, AT&T has provided international voice service for many years, but has been precluded from providing certain data services. New FCC regulations permit AT&T to provide such data services. Other carriers will also try to compete for the lucrative and rapidly growing international data communications market.

THE PRINCIPAL deterrent to this expansion rests with the foreign PTTs. A common attitude is, "We have enough trouble establishing appropriate relationships with the five U.S. carriers; we have no desire to recognize any new U.S. carriers." Thus, even though the U.S. regulatory authorities will permit an expansion in the number of international carriers, the potential new carriers will encounter severe difficulty in being recognized by foreign telecommunications administrations.

The historical basis of IRC services has been leased circuits, telex and Datel. Datel is a generic dial access service used for the transmission of data on a worldwide basis. These traditional services existed relatively unimpeded and unchanged for years. However, current and projected services represent a greatly expanded version of these more familiar services.

Many enhanced services are available from the IRCs. A brief description of these services is outlined below.

■ *Leased circuits.* IRCs offer point-to-point leased circuits in conjunction with U.S. domestic carriers and the PTT of the affected country. While all options are not available in all locations, some typical options for users are analog or digital; speeds of 50 bit/sec to 50K bit/sec; alternate voice and data, simultaneous voice and data and data only.

■ *Telex.* Each IRC provides classic international telex services with similiar characteristics. The service is 50 bit/sec. In addition, 110 bit/sec is generally supported.

■ *Computerized message switching.* This service provides for interconnection between customer networks and the public telex networks. Such systems are being used by corporations with large message volume requirements to optimize costs. Some features of computerized message switching are: I/O at speeds up to 1,200 bit/sec, Baudot and Ascii code support, message assurance provision and code translation.

■ *Store-and-forward message services.* An enhancement to telex capability is the provision of store-and-forward message services by the IRCs. This service permits operators to enter all messages for subsequent retransmission and verification by the IRC.

■ *Packet switching.* The IRCs, in conjunction with certain PTTs, offer packet-switching service between the U.S. and selected foreign countries. This service is interconnected and totally compatible with Tymshare's Tymnet and GTE Telenet, Inc.'s Telenet network in the U.S. It is offered both to and from the U.S. with established tariffs based on use.

■ *Datel.* Datel is provided by IRCs between principal foreign countries and the U.S. This service provides for speeds up to 4,800 bit/sec (lower limits in certain countries) with charges based on use. However, most PTTs only guarantee acceptable error performance at 1,200 bit/sec, with a few at 2,400 bit/sec.

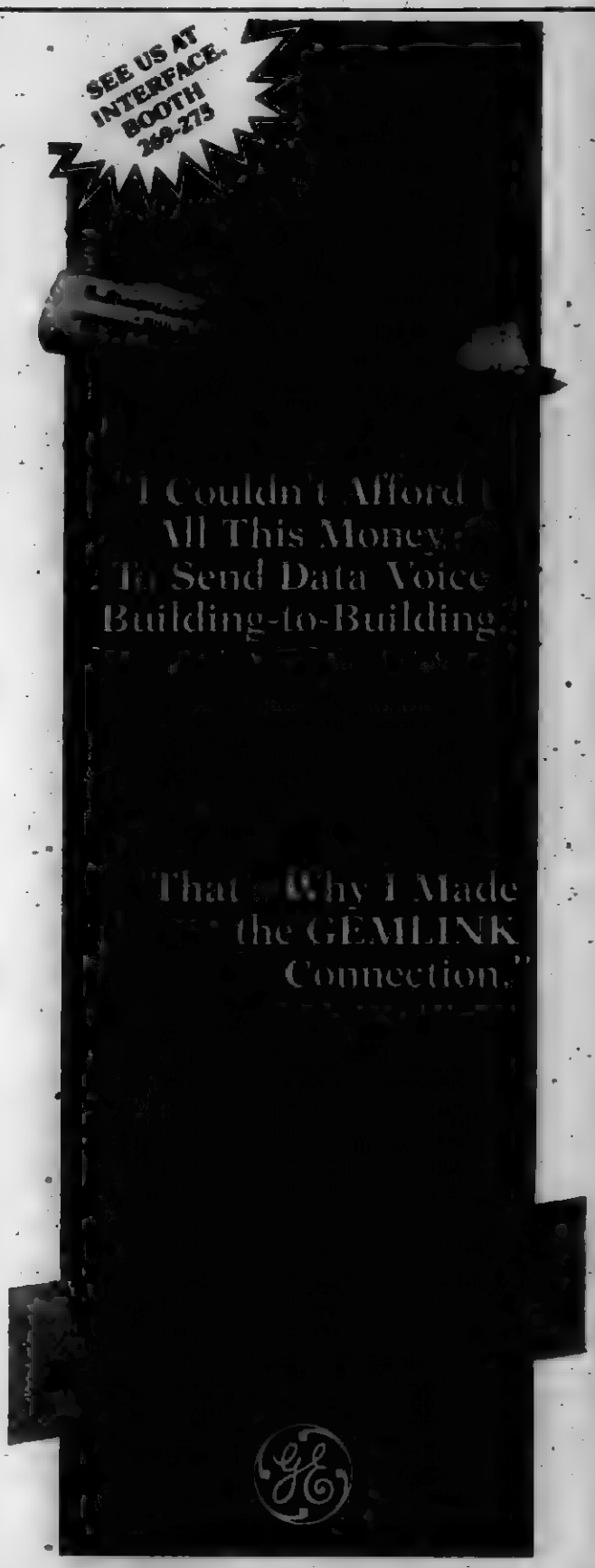
It has been our consistent observation that there is a significant gap between user expectations of services provided by the IRCs and the users' actual experiences with these services. This observation is not intended to be an indictment of the IRCs; in many cases, the IRC is constrained by the regulations and policies of the foreign PTTs.

From our experience with clients with multinational telecommunications requirements, this dichotomy between expectation and experience rests in five principal areas: support, schedules, cost, administrative complexity and availability of services.

Perhaps the most vociferous user complaint lies in the area of overall support from the IRC. Many users equate the IRC's role in international communications with the AT&T's traditional role in domestic services — that is, the IRC would assume responsibility for end-to-end service and would provide a level of support commensurate with that responsibility. In reality, the IRC cannot supply such a level of support. However, even within the sphere of responsibility of the IRC, in general, users have received a less than acceptable level of support. This includes support in planning, installation, operation and maintenance.

Those charged with the responsibility for planning and implementing international communications tend to expect installation schedules for various facilities to be comparable with similar schedules in the U.S. Experience has demonstrated the need for incorporating longer installation lead times into implementation plans.

The cost of international data communications is an issue with virtually all users. The most significant cost factor is the relatively high cost element established by the PTTs. International communications costs represent negotiated tariffs between the IRCs



The Solution.

Dial-Up 3270

LineMaster An intelligent device for dial-in access to your mainframe 3270 Bisync line. **LineMaster** is a communications watchdog which keeps a line in service until a user dials in.

- For any remote 3271/4/6 line—up to 19.2K baud.
- Compatible with any 3270 BiSync emulator including microcomputers.
- Connects between modem and mainframe.
- Installs in minutes.

$639.

Microframe, Inc.
205 Livingston Avenue
New Brunswick, NJ 08901
(201) 828-4499

You can advertise your product in 40 computer publications in 25 foreign countries—with one phone call.

There's a market for your product abroad.
You can reach the right people in the major computer markets throughout the world. The people who make the buying decisions—in countries already importing more than $3 billion in computer hardware, software and supplies.

CW International Marketing Services gives you one, efficient source for direct contact with the leading local computer publications in the world's major computer markets. How can we do this for you? We have a wide network of editorial offices around the world and provide first hand marketing information to our clients. Plus, we have over 10 years experience in the publishing industry.

We're a division of CW Communications/Inc., publishers of *Computerworld* and the world's largest publisher of computer-related newspapers and magazines.

CW International Marketing Services makes it easy.
We'll translate your ads for you and give you production services to meet the specifications of any or all the newspapers and magazines we publish or represent—and—we'll even bill you in dollars. What's more, when you place your advertising through CWIMS, you save the V.A.T. (value-added tax). It's as easy as advertising in your local publications.

We'll even help you with market facts, and, in the case of the People's Republic of China, we can arrange for you to give product and marketing seminars there! You can run your ads in our periodicals in these countries:

*Argentina	*Denmark	*Italy	*Norway	*Saudi Arabia	*Sweden
*Australia	Finland	*Japan	*People's	South Africa	*The Netherlands
*Brazil	*France	Korea	Republic of	*Southeast Asia	*United Kingdom
Chile	Greece	*Mexico	China	*Spain	*West Germany
	India		Peru		

*Published or co-published by CW Communications/Inc.

For more information on how we can help you promote your product all over the world, send us the coupon below or call Diana La Muraglia toll-free at (800) 343-6474 or telex #95-1153. In Massachusetts, call (617) 879-0700.

CW COMMUNICATIONS/INC.

Diana La Muraglia, General Manager
International Marketing Services
CW COMMUNICATIONS / INC.
375 Cochituate Road, Box 880
Framingham, MA 01701, USA

Please send me rate cards and information on publications in the following countries:

_____

Name _____ Title _____

Company _____

Address _____

City _____ State _____ Zip _____

and PTTs of each country. Since the PTTs almost always represent a monopoly, there is no competition-driven incentive to keep tariffs low. Data communications planners attempt to extrapolate the experience of the U.S. to the larger sphere of international communications; such an approach produces misleading and disappointing results.

Submitting telecommunications orders for international communications generally requires submitting separate orders to each of the suppliers. While the IRC may function as a coordinator, it cannot function as the ordering agent for PTT-provided services. The user must issue individual orders to the PTTs for the required in-country services. For certain PTTs, this requires a time-consuming process of administrative detail that greatly exceeds comparable U.S. carrier requirements. However, with the AT&T divestiture, this situation will become common in the U.S. and may no longer seem foreign.

Another difference between user expectation and experience is the availability or nonavailability of services. There is a tendency to assume that the telecommunications services available in the U.S. will automatically be made available in principal foreign locations. This is obviously not the case. In addition, foreign PTTs are generally less flexible in the interpretation of services and in permitting special modification of services than has been the U.S. experience. However, this restrictive attitude is gradually evolving toward one of more flexibility.

From our experience in working with clients with multinational needs, the two major areas of difficulty for such communications are defining information movement requirements and understanding available alternatives for international communications.

IN ESSENCE, PLANNING international communications should follow the same logical process as planning for domestic or local communications. The first step is to define carefully requirements for information movement independent of available means to satisfy these requirements. The definition should reflect needs as contrasted with technologically driven solutions.

The next step is to determine the available alternatives. This process is often the most frustrating, particularly for neophytes. Unfortunately, there is no single comprehensive source of information regarding international communications in the U.S. Often, some available sources may provide incomplete or conflicting information. Sources that may be used to help in defining alternatives are: IRCs, U.S. carriers with international interconnects, foreign PTTs, consulting firms knowledgeable about international communications and other companies with established international data communications capabilities.

Once the available alternatives are defined, the analysis of the alternatives is usually relatively straightforward. Particular attention needs to be paid toward cost, reliability, support and technical compatibility.

The most necessary, but most often neglected attribute is well-documented user procedures. Normally, the user will need to develop these procedures, because they simply are not available in a complete form from the various carriers involved.

How does a prospective user assimilate all of this to choose the IRC that best satisfies its needs? Unfortunately, the predominant method has been an ad-hoc process. Often, the selection is made without any form of meaningful comparison of available alternatives. A prevalent attitude has been that such a comparison does not make any difference.

The complexity and diversity of international communications demand a more rigorous approach toward carrier selection. The first step is a formal planning process, as outlined above, which results in a definition of requirements. The next step is the preparation of a written request for proposal. Even for relatively simple needs, selection of an international carrier should be based on vendors' formal, written responses to a statement of requirements. Examples of topics to be included in such a request include functional requirements, vendor support, maintenance, pricing and vendor range of services. They also include overseas representation, schedule requirements and customer reference.

In the future, the key theme for established IRCs and new international carriers is diversity of services. Competition for market share will be waged over attempts to provide a range of services that is most responsive to user needs.

International communications is evolving more rapidly than ever before. Advances in technology and the changing regulatory environment provide the driving force behind this change. Users need to plan and procure international data communications in a more formal, rigorous manner. ■

Overlord is Here!
Intelligence that Grows.
Power that Grows.

Overlord™ is here. The first level of a revolutionary hardware/software package that allows you to access, monitor, do the housekeeping, and control your computer/data communications network. Regardless of size, application or location.

Overlord is centralized MIS capability featuring a network data base, report writing, history file and trouble ticket generation. The information is consolidated with T-Bar's control, on-going real-time monitoring, performance analysis and fault isolation, all accessed via interactive color graphic CRTs.

Overlord's capability to learn is virtually unlimited. And, as you add to its data base, you increase its power, allowing you to manage networks at levels of efficiency and effectiveness never before possible.

Overlord establishes a hierarchy that provides centralized control for data processing or data communications. If desired, it enables you to access both facilities and merge them into an integrated management information, test and control system.

Overlord. Intelligence and power to help you improve your systems management. Find out more at Interface, or just give us a call.

T-Bar Incorporated
141 Danbury Road P.O. Box T
Wilton, CT 06897 • (203) 834-8368

T-Bar/OVERLORD™

See Overlord at Interface, Booth #856.

EXIT

Mike Harrison, above, is group production editor, Computerworld Pty. Ltd., Australia. He submitted this anecdote about an electronic editing system.

It was all very pioneering stuff when a Sunday newspaper installed the first on-line editorial system in Sydney, Australia, a few years ago. It was a hybrid thing built round a Harris Corp. CPU with insolently dumb terminals.

There were bugs galore compounded by a team of software engineers and programmers who toiled night and day to adapt an essentially American system to Australian newspaper conditions. Crashes were common, and the only people who benefited were the proprietors of a nearby hostelry where frustrated journalists retired to soothe jangled nerves, while an equally frustrated DP staff got the system up again.

Memory is dimming, but I recall one day when we had only three hours uptime in a 10-hour shift. There was even talk in the pub of dusting off the old hot metal equipment to get the paper out.

Slowly things improved; crashes became fewer, and it became possible to get through to lunch without those awful bells ringing and the red lamps flashing. A big plus was when the dumb terminals were pensioned off for what was then a magic box — the Digital Equipment Corp. VT72 intelligent terminal. We sub-editors — a strange breed of journalist known as copy editors in the U.S. — were particularly enthralled with the headfit facility, which saved hours of cursing when trying to fit heads in a particular type font.

Then it all started again: crash after crash, lost stories, cold starts and beaming smiles on the faces of the pub proprietors. The problem took some time to track down. Among our typefaces was a pi font comprising all sorts of ornaments and symbols. In one software upgrade, a routine had been altered slightly, and the system hiccuped when asked to count a headline with a pi font in it.

The edict was swift and final — no more pi fonts in headlines. One morning, the system came down, and a furious systems manager was seen with axe and block demanding the head of the culprit who had put a pi font in a headline. There was an expectant buzz among the few who had not gone to the pub.

But the witch-hunt ended as quickly as it began. No head was served up on a silver platter, and the systems people were peculiarly taciturn and unforthcoming.

It took weeks for the truth to filter out. It seems that a very senior company manager who fancied himself a dab hand at the keyboard was giving some visiting VIPs a tour, which included an aside on the great pi font mystery. To demonstrate his point, he stopped at an idle terminal, called up the appropriate test file and keyed in the command for headfit. Command, execute, crash.

Computerworld Sales Offices

Donald E. Pagan, Vice-President/Sales. Edward P. Marecki, **Director/National Sales,** Frank Collins, **Corporate Advertising Administrator,** Kathy Doyle, **Marketing Support Manager.** Pam Valentinas, **Advertising Traffic, Special Publications.** COMPUTERWORLD, 375 Cochituate Road, Box 880, Framingham, Mass. 01701, Phone: (617) 879-0700, Telex: 95-1155.

BOSTON SALES OFFICE: Chris Lee, **Northern Regional Director.** Jim McClure, Ronald Manto, Jayne Donovan, Michael F. Kelleher, **District Managers.** Alice Longley, **Sales Assistant.** COMPUTERWORLD, 375 Cochituate Road, Box 880, Framingham, Mass. 01701, Phone: (617) 879-0700, Telex: 95-1153.

NEW YORK SALES OFFICE: Michael J. Masters, **Eastern Regional Director.** Doug Cheney, **Senior District Manager.** Ray Corbin, Joan Daly, Fred LoSapio, **District Managers.** Gale M. Paterno, **Sales Assistant.** COMPUTERWORLD, Paramus Plaza I, 140 Route 17 North, Paramus, N.J. 07652, Phone: (201) 967-1350.

CHICAGO SALES OFFICE: Art Kossack, Russ Gerches **District Managers.** Jean F. Broderick, **Sales Assistant.** Chris Lee; **Northern Regional Director.** COMPUTERWORLD, 2600 South River Road, Suite 304, Des Plaines, Ill. 60018, Phone: (312) 827-4433.

LOS ANGELES SALES OFFICE: Bob Hubbard, **Senior District Manager.** Bernie Hockswender, **District Manager.** Beverly Russ, **Account Coordinator.** William J. Healey, **Western Regional Director.** COMPUTERWORLD, 18008 Skypark Circle, Suite 260, Irvine, Calif. 92714, Phone: (714) 261-1230.

SAN FRANCISCO SALES OFFICE: William J. Healey, **Western Regional Director.** Barry G. Milione, **Senior District Manager.** Theodora Franson, Ernest Chamberlain, **District Managers.** Ruth Gordon, **Account Coordinator.** Nicole Boothman, **Recruitment Account Manager.** COMPUTERWORLD, 300 Broadway, Suite 20, San Francisco, Calif. 94133, Phone: (415) 421-7330.

ATLANTA SALES OFFICE: Jeffrey Melnick, **District Manager.** Michael J. Masters, **Eastern Regional Director.** COMPUTERWORLD, 1853 Peeler Road, Suite D, Atlanta, GA 30338, Phone: (404) 394-0758.

ADVERTISERS INDEX

ACC 66
805-963-9431
ADP 30
313-769-6800
American Telecom 40
714-630-7721
AST Research 8
714-863-1333

Bisynap 12-13
408-745-1636
Bytex 60
800-227-1145

Codex 6-7
800-821-7700 ext 495
Concord Data Systems 5
617-890-1394
Cylix 25
901-683-3043
CW Communications Inc. 49
CW International 46,64,70

Datagram 37
401-885-4940, in CANADA 514-635-3200
Datapoint 98
800-531-5770, in TX 800-252-5106
Datastream 14
800-952-2500, in CA 408-986-8022
Digital Communications Assoc. 92-93
800-241-5793

General DataComm 62
203-797-0711
GE Genialink Microwave 69
800-GE-VALUE
GENICOM 94
703-949-1170
GTE Business Communications Systems 18-19

Hayes Microcomputer 42
404-441-1617

Infinet 41
617-681-0600
Inforex 60-61
800-345-4636
INPUT 64
415-960-3980
Insertion ..... Cover 4
617-692-3900
ITT Worldcom 45

Leading Edge ..... Cover 3
800-343-6833, in MA 617-828-8150 collect

M/A Com Linkabit 35
800-626-6640, in CA 619-457-2340
MDS Systems 36-37
800-MDS-HERO
Micom Systems ..... Cover 2
213-998-8844
MICRODOM 30-31
800-322-ERA2, in MA 617-762-9310
Microframe 69
201-828-4459
Micro Tempus Inc. 24
800-228-LINK, in CANADA 514-397-9512

National Product Marketing 50
800-241-1170, in GA 404-351-2900
NEC America 54
800-538-8166, in CA 408-737-7711
NEC Telephones 28
800-645-9836, in NY 516-249-4511
Newsprep Products Inc. 66
800-345-8278, in PA 215-485-8180

Paradyne 68
714-859-6871
Prosecol 2
800-423-5904, in CA 818-716-5300

Racal 68
703-451-2200

Siemens Corp 32-33
800-527-0636, in AK, PR, HI 305-994-8100 ext 5330

T-Bar 71
203-834-8368
Technical Systems 60
212-684-7788
Technology Transfer 96
213-394-8305
TeleProcessing Products, Inc. 29
805-522-8147
Tymnet 26
408-946-4900

Univel 15
800-642-9606

Wang Laboratories 67
800-225-9264

Xyplex, Inc. 58
617-371-1400

This index is provided as an additional service. The publisher does not assume any liability for errors or omissions.

THE DAY THE IBM PC BECAME OBSOLETE.

NET/PLUS

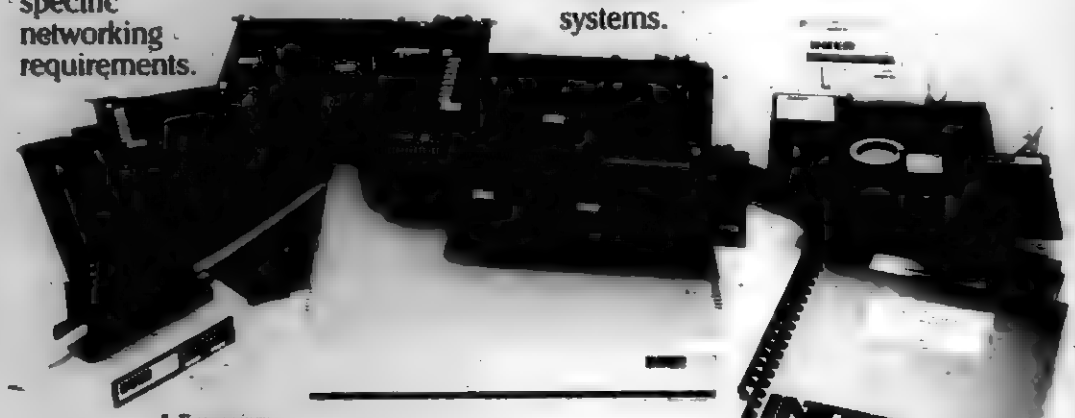
A True Multi-Vendor Local Area Network

NET/PLUS™ is a comprehensive Ethernet/IEEE-802.3 Local Area Network product line. It provides host-to-host, terminal-to-host, and device-to-device communications. And, in contrast to proprietary networks, NET/PLUS lets you tie together products built by different manufacturers, running under different operating systems.

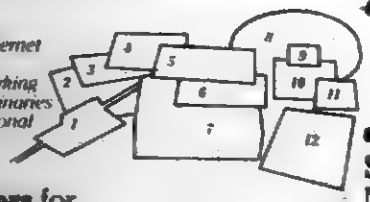
With NET/PLUS, different computers, from mainframes to personal computers, built by different manufacturers, running different software, are all tied together in a single resource-sharing network.

Plus Proven Network Building Blocks

Over twenty free-standing networking products together make up the NET/PLUS product line. You can buy a complete NET/PLUS solution, or choose individual products to meet specific networking requirements.



1. Transceiver 2. Data General Ethernet controller 3. UNIBUS Ethernet Controller 4. Q-bus Ethernet Controller 5. Multibus Ethernet Controller 6. Ethernet Protocol Module 7. Network Terminal Server (NTS) 8. Networking Software Sources 9. Networking Software Binaries 10. Ethernet Controller Diagnostics 11. Personal Computer Networking Software 12. Comprehensive User Documentation



■ **Communications controllers** for VAX, PDP-11, LSI-11, Nova, Eclipse, and MV Series, plus Multibus/68000, 8086, and Z8000 computers. Each DMA controller implements the entire Ethernet Specification and provides high-performance data transfers, extensive receive-data buffering for back-to-back frame reception, and a rich set of on-board diagnostics and network management statistics.

■ **Networking software packages** provide network-level and transport-level services for reliable, high-performance data communication. Written in portable C language, these packages implement the Xerox Network Systems (XNS) architecture and are optimized for Ethernet use. Packages are available for UNIX, VAX/VMS, and RSX-11 operating systems.

■ **ETHERNODE™ packages** incorporate controllers, networking software, transceivers, and cabling – all the hardware and software needed for host-to-host Ethernet communication among VAX/VMS, PDP-11/UNIX, RSX-11, and Multibus/UNIX systems.

■ **Network Terminal Server (NTS),** the newest NET/PLUS product, provides virtual circuit interconnection between any two RS-232-C devices on the Ethernet. Available in four or eight ports, NTS electronically establishes, maintains, and disconnects virtual circuits between computer ports, terminals, personal computers, modems, and printers. Typical applications include:

- port contention
- port switching
- resource sharing
- personal computer networking
- simplified RS-232-C wiring

Over a dozen different PCs can be networked with NET/PLUS.

■ **Multi-Vendor Personal Computer Networking Software** is available for over a dozen widely-used personal computers (including IBM, Apple, and DEC), microcomputer software development systems, and popular minicomputers. Terminal Emulation and File Transfer allow PC users to log on to other computers and freely access and transfer files throughout the network.

Networking Solutions

At Interlan, we have been delivering Local Area Network solutions since 1981, and today we have hundreds of customer installations. If you use or are considering Ethernet for reliable, high-speed communications in a multi-vendor environment, call or write for more information on NET/PLUS and the networking products that make NET/PLUS a reality.

Corporate Headquarters *3 Lyberty Way, Westford, MA 01886 (617) 692-3900 TELEX 95-1909* ***Eastern Regional Sales Office*** *10 Kearney Rd., Suite 24, Needham, MA 02194* ***Western Regional Sales Office*** *Embarcadero Corporate Center, 2483 Bayshore Road, Suite 101, Palo Alto, CA 94303* ***International Distributors*** *Toronto, Canada; London, England; Paris, France; Tokyo, Japan; Barcelona, Spain; Stockholm, Sweden; Zurich, Switzerland; Munich, West Germany*

INTERLAN

WE MAKE NETWORKS WORK.

VAX, PDP-11, VMS, RSX-11, RT-11, and LSI-11 are trademarks of Digital Equipment Corporation. NOVA, ECLIPSE, and MV Series are trademarks of Data General Corporation. MULTIBUS is a trademark of Intel. UNIX is a trademark of Bell Labs. NET/PLUS and ETHERNODE are trademarks of Interlan, Inc.

VOL 18
ISSUE 12
MR 19 1984
UMI

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

COMPUTERWORLD

$2.00 A COPY; $44/YEAR | MARCH 19, 1984 | VOL. XVIII, NO. 12

In Depth
Lost in the software forest primeval ID/1

Bypass
Manhattan has become a proving ground/6

First user
Data base computer marks two firsts for Wells Fargo/8

C
C14816UIVYHUIVVN FCNB
UNIVERSITY MICROFILMS
SERIAL PUBLICATIONS
300 N ZEEB RD
ANN ARBOR MI 48106

NEWSPAPER

TOP OF THE NEWS

The price of processors acquired from third-party lessors is up, and users can blame it on the IRS, the Computer Dealers and Lessors Association said recently. In other CDLA news, members of the organization claim the requirements of a new IBM program are "like turning over your best prospect list" to your competition; the CDLA is threatening legal action. Page 2.

■

Although DP budgets are up this year, MIS executives want still more money for purchasing software and offering employee incentives, they told the Data Processing Management Association. Page 9.

■

A service that will allow users to reconfigure their networks dynamically was promised by AT&T Communications' service development director at Interface '84. Page 11.

■

The world's first downtown teleport for satellite communications is slated for midsummer completion in Washington, D.C. Page 69.

■

A multiuser supermini that boasts mainframe power and runs VM/CMS applications has been announced by a Connecticut firm. Page 75.

■

The No. 1 micro for running spreadsheets is Sanyo's MBC 5500, Auerbach Publishers says. Page 93.

■

Gone, almost forgotten — but reborn. Renamed Programaster, Raytheon Computer Services' Readycode is now being marketed by a spin-off. Page 99.

■

Gould's first virtual CPU targets VAX

By Jamme Connolly
CW Staff

FORT LAUDERDALE, Fla. — Gould, Inc.'s Computer Systems Division last week announced its first virtual memory processor, a 32-bit machine that supports Unix and targets the Digital Equipment Corp. VAX-11 market.

Powernode 6000 operates under Gould's UTX/32 operating system, which includes features of both Bell Laboratories' System V and the University of California at Berkeley's BSD 4.2 versions of Unix. Gould said this Unix-based software can accommodate applications developed for a VAX environment.

The processor was designed for networked and stand-alone multiuser applications and is available in three basic configurations: the PN6030, the PN6050 and the PN6080 dual processor. The units were developed for software-development as well as for scientific, engineering, military, aerospace and educational applications.

The Powernode 6000 line is said to process compute-intensive tasks while allowing simultaneous workstation access to data bases. Gould claims the Powernode 6000 has outperformed the VAX-11/780, with the PN6030 and PN6050 operating 1½ to two times faster and the PN6080 performing 2¼ to three times faster than the VAX-11/780 using Unix.

The products were designed with the Gould Selbus, which offers a data transfer rate of 26.7M byte/sec. The Selbus is also used in the firm's larger Concept line of processors.

See GOULD page 4

Local-area nets still far off: Interface poll

By John Dix
CW Staff

LAS VEGAS — If sheer numbers alone tell the story, local-area networks are still only a possibility for most users and an evolving solution for the avant-garde few that have installed them.

That was the message gathered from a random selection of attendees queried at the Interface '84 conference here last week.

Sessions on local-area networks commanded standing-room-only attendance, but few of the conference participants polled said they were actually using the products. Organizations that have installed local nets reported varying degrees of satisfaction.

Kenneth Sumner, program manager of General Electric Co.'s Corporate Information Systems group, believes it will be a couple of years before local-area network technology becomes as competent as the vendors selling it.

GE has many local networks in place, but the largest one is an Ungermann-Bass, Inc. Net One. Consisting of four network segments interconnected with repeaters, this network is used to provide host access to between 8,000 and 9,000 terminals, Sumner said.

Sore points of GE's network development included growth problems and the need to keep current with the vendor as it was evolving its product line. Heavy interaction with the vendor was required to iron out some system wrinkles, Sumner said, but he noted that this was due primarily to the fact that the product was still in the early stages of development.

See NETS page 8

FYI

If you're looking for a great place to work . . .

By John Gallant
CW Staff

What could IBM possibly have in common with Walt Disney Productions, Hallmark Cards, Inc., Inland Steel Co., the Los Angeles Dodgers, Mary Kay Cosmetics, Inc. and the Reader's Digest Association, Inc.?

Despite the fact that they operate in widely disparate industries, all those companies are great places to work, according to the authors of a soon-to-be-published book called *The 100 Best Companies to Work for in America*. High-technology firms make up nearly a fifth of the 100 companies, which coauthors Robert Levering, Milton Moskowitz and Michael Katz say are rarely examined from an employee's standpoint.

After whittling an initial list of 350 companies down to 136, Levering, Moskowitz and Katz took to the road to interview employees and garner statistics about the firms. Each of the 100 companies finally selected, the authors say, has something distinctive to offer its workers, whether it be the million-dollar fitness center at Rolm Corp. or the employee vegetable garden at Control Data Corp.'s headquarters.

Along with the biggest "pluses and minuses" of working for each of the 100 best, the three have rated the companies on the basis of pay, benefits, job security, advancement opportunities and ambience. Big and small alike, most of the companies have fostered among workers an attitude of "we're all in this together."

Below are some of the high-tech firms that came under the trio's scrutiny:

■ *IBM* can make its employees feel like giants, the authors say. But those who don't abide by the industry giant's rules — laid down in a 32-page code of ethics — won't last long. According to the authors, few companies of any size can match the benefits or the job security that Big Blue offers. The authors add that IBM is a world unto itself — a world where secrecy is the hallmark. And in that world filled with ardent believers, the nonbeliever may not be very comfortable.

■ You'll get the opportunity to work with a lot of "brainy people" if you're hired by *Hewlett-Packard Co.*, but the authors warn that you may be handicapped if you don't have a degree in electrical engineering or if you're a woman. HP is a model of how a company can grow, prosper and still maintain a personal feeling, the trio writes, and workers are impressed with the company's "playful" atmosphere. Employees enjoy good pay and a good working environment — not to mention the 10 recreation areas HP owns.

■ Work at *Apple Computer, Inc.* and you'll feel like a trailblazer. There's a pot of gold at the end of your trail at Apple, the authors say, but in the end you and the company may be "munched to death by Big Blue." Levering, Moskowitz and Katz claim that Apple's high morale attracts many to the firm, and a subtle 1960s youth

See GREAT page 4

NEWS

CDLA blames IRS probes for cost hikes

By John Kirkhorn
CW Washington Bureau

ACAPULCO, Mexico — End users are now paying more for computers because of the current Internal Revenue Service investigation of two large third-party vendors, several members of the Computer Dealers and Lessors Association (CDLA) claimed here recently.

As part of a larger review of tax shelters, the IRS announced a few months ago it is investigating the "wraparound" leases and other "tax-advantaged" deals of Comdisco, Inc. and Finalco Corp. The audits are still in process.

Since then, according to the CDLA, investors who provide capital for third-party vendors in return for lease income and various tax advantages have been taking extra precautions and shying away from anything but the safest third-party deals, which do not afford the best rates for end users.

"The threat of an IRS audit is very damaging when you're trying to solicit an equity investment," CDLA President Richard A. Forsythe, who is president of Forsythe/McArthur Associates, Inc. in Chicago, said at the recent association meeting here. "It has become temporarily difficult for promotors to solicit investors. . . . As a result of that, the price of leasing a computer has gone up."

As an example of the effect the IRS investigation is having, association vice-president Robert A. Gulko, president of Unicom Computer Corp. in Sausalito, Calif., said that an end user leasing a $500,000 IBM 4341 is probably paying about $500 a month more on a four-year lease or $1,000 a month more on a two-year lease than he would have paid before the IRS action.

One reason for the price jump, Gulko explained, is that the overhead costs of preparing computer deals are "astronomical compared to what they were." Investors are insisting on much more legal and accounting work on each deal to protect themselves from IRS scrutiny. Moreover, because of "the uncertainty in the investor marketplace, we're seeing transactions that appear to be good, honest deals . . . falling apart."

Although prices for such deals always increase after the year-end rush to close tax-advantaged transactions, "the magnitude of the rise is much greater because of the IRS," Gulko said.

Forsythe speculated that the IRS would not act against the two companies unless it found they had overinflated the value of the equipment in their deals or if they had included fraudulent claims in their prospectuses.

But, he added, the IRS probably cannot give these types of transactions a completely clean bill of health and still continue its campaign against tax shelters. He predicted an eventual "have fence, will straddle" statement from the IRS that will clear the companies but still "leave a little fear of God in the investors' minds."

Lessors fighting new IBM rule

By John Kirkhorn
CW Washington Bureau

Members of the Computer Dealers and Lessors Association (CDLA) are contemplating legal action against IBM to halt what the association feels are anticompetitive actions by the computer maker.

The dispute concerns a three-month-old IBM "end-user certification" program, in which the firm requires all equipment buyers to state 30 days before delivery who will ultimately use the machinery. Third-party vendors — which are IBM's biggest customers — fear that disclosing to IBM who they are dealing with will allow IBM to try to "unhook" those deals in favor of a direct procurement from IBM.

"That's like turning over your best prospect list" to your competitor, remarked CDLA Executive Director James F. Benton. Added CDLA President Richard A. Forsythe, "It seems to us to be dirty pool."

While CDLA members said they do not know of any IBM attempts to take advantage of the situation to swing deals to IBM Credit Corp., they claimed the possibility is there. CDLA Vice-President Robert A. Gulko, who is president of Unicom Computer Corp. in Sausalito, Calif., said IBM sometimes offers a better delivery date to a customer it knows is negotiating with a third-party vendor.

The association executives said the new program is monopolistic and possibly in violation of the 1956 consent decree between IBM and the U.S. Justice Department, which in part said IBM cannot force equipment buyers — in this case third-party vendors — to disclose how the machines will be used.

IBM: 'Nothing new'

IBM, for its part, argues the program is nothing new. Company spokeswoman Nadine Fletcher explained at IBM headquarters that before December all volume buyers had to provide a certification. The new program merely brings all end users under that requirement, she said, noting third-party vendors have always had to disclose end users at some point so that the equipment could be shipped.

The change is necessary, she said, so that IBM can be sure it is treating equally all end users qualifying for volume purchases. "This is nothing new. This has been done all along," she said, adding, "In any event, end-user certification will not be used to disengage the leasing companies' leases."

The association and IBM are meeting to try to resolve the conflict, short of taking the matter to the Justice Department or a federal court. Forsythe said recently that "if there is no business solution to it, you will see some litigation."

Both parties expressed optimism that the matter will be resolved amicably within the next few months. Asked if IBM thinks the dispute can be settled by the talks, Richard M. Hayden, IBM director of industry relations, said, "It's in process right now; it's not too appropriate to comment. Obviously, we hope so."

If some legal action does ensue, it would have to come from an individual company claiming to have been damaged by the program rather than from the association, Forsythe said. According to a CDLA executive, "there are several large members with large resources" ready and willing to take on IBM in court.

Forsythe estimated CDLA members will buy between $6.5 billion and $6.5 billion worth of IBM products in 1984. "While we may have terrible differences with IBM, and we do, and while IBM may have terrible differences with us, and it does, we are not sure we want to call off the game," he said. Because of the association members' large investment in IBM equipment, they are concerned about the company's health, he said.

"As an American, I would love to see IBM prevail in the world computer market," Forsythe said. He added, however, that with increasing Japanese presence in the U.S. marketplace, and with a large unregulated market in telecommunications equipment developing, third-party vendors may find businesses with products that are more attractive than IBM products, especially if they feel IBM is making it difficult for dealers and lessors. For now, he said, the two parties need each other.

Speaking of IBM-CDLA relations in general, Forsythe said, "IBM is a legitimate corporation. It's not going to take unfair advantage." He added, however, that the certification program is just one more action in a long line the association and end users find objectionable and overbearing.

NEWS SUMMARY

Gould, Inc.'s Computer Systems Division unveiled its line of largest processors, the Concept 32/97 series/4

Because of its heavy communications traffic, the compact island of Manhattan has become a proving ground for bypass technologies/6

The first user of Teradata Corp.'s DBC/1012 data base computer reports rosy results/8

DP budgets are up this year, according to a recent Data Processing Management Association survey/8

Interface '84: No blockbuster announcements, but a number of communications products were introduced . . . Snet's chief says the White House will propose a new national telecommunications policy as soon as warring communications factions reach a consensus . . . AT&T Communications' service development director promises a new private network service by the end of the year . . . McAuto tells how it is controlling the internal use of personal computers/10-12

The Computer-Based Training Conference & Exposition: The increase in the growth of information centers during the last three years has usually occurred under the watchful eye of the MIS department in an IBM environment, according to a study detailed at the conference . . . A CBT specialist related his experiences in developing a cost-effective training strategy for Arthur Andersen & Co. . . . A consultant alerted DP trainers to the risks inherent in implementing CBT/14-16

The candidates who don't use computers in their campaigns probably will see their opponents using one, warned speakers at the Annenberg Schools of Communications' Washington Program on Communications Technologies and Politics . . . A political consultant tells how candidates can reach out to multiple sources to collect information that will target friendly voters . . . Republicans lead their Democratic opponents in use of major computerized data bases, but the Democrats are fighting back with microcomputers at the grass roots level/17-19

Just one week after going on-line, a computerized fingerprint identification system in San Francisco proved its worth/26

DP managers should set a policy for purchasing micros, but should allow users to determine their use, attendees agreed at a recent conference/28

Officials of the U.S. Secret Service and FBI warned bank executives of the potential dangers of EFT fraud/27

An Arkansas high school sophomore has been sent to a mental health clinic for counseling after admitting he tapped into the district's computer system to change his grades/28

A manufacturer of strapping systems is using a financial modeling and analysis package to improve planning and tighten cash-flow control/29

A utility is helping a bank service company streamline operation of its quality assurance group/36

A subscription agency credits its swift service to an on-line data communications network/38

Conversion from batch to on-line has improved business for a manufacturer of fire protection equipment/39

An insurer regained control of its forms inventory/41

Ford Motor Co. went in-house for structural analysis/42

Washington Update/13
International Report/23
Turnaround Time/32
Calendar/44

EDITORIAL/50
SOFTWARE & SERVICES/59
COMMUNICATIONS/69
SYSTEMS & PERIPHERALS/75
MICROCOMPUTERS/83
COMPUTER INDUSTRY/89

When you need an extraordinary printer on a budget that isn't extraordinary, get Southern Systems QT.

At 300, 600, 1000 or 1200 lpm, the QT Series of printers are extraordinary in performance, in standard features and in cost-savings.

Southern Systems, the leading add-on printer supplier, created the QT Series to meet your extraordinary requirements, including:

- the ruggedness for heavy-duty, DP production
- operator-changeable steel bands
- excellent print quality
- quietized cabinetry
- superior forms alignment capabilities
- guaranteed compatibility with most major computers (DEC, DG, Burroughs, IBM, Hewlett-Packard, TI, Perkin-Elmer, Honeywell and others)
- the reliability of SSI-designed, SSI-produced system controllers and communication interfaces
- plus many more features that Southern Systems will discuss with you in detail. Call **(800) 327-5602** today to discover more about the extraordinary QT printer systems.

Southern Systems, Inc.

2841 Cypress Creek Road, Fort Lauderdale, Florida 33309
(305) 979-1000 • (800) 327-5602 • Telex 522136
In Canada (416) 229-2588

I need an extraordinary printer at a less-than-ordinary price in the speed range of:

___ 200-300 lpm
___ 600-900 lpm
___ 1000 plus
___ 5000 plus lpm non-impact: **Wiremax I**

___ Parallel ___ Serial (Sync/Async)

My computer system is _____

Name _____
Title _____
Company _____
Address _____
City _____
State _____ Zip _____
Telephone ( ) _____

NEWS

Gould adds Concept 32/97, its largest CPUs to date

By Tom Henkel
CW Staff

FORT LAUDERDALE, Fla. — Gould, Inc.'s Computer Systems Division last week unveiled its line of largest processors, the Concept 32/97 series. Available in three basic models, the superminis are said to offer a maximum internal throughput of up to 10 million instructions per second (Mips).

Designed for scientific and engineering applications, the entry-level Concept 32/9705 boasts a four-stage instruction pipeline architecture and 4M to 16M bytes of main memory. It reportedly sports an internal performance of 4.67 Mips and comes with a standard 32K bytes of cache memory, which can be doubled with a 32K-byte expansion module.

Gould also announced a 128K-byte Shadow Memory Module which can be used in place of the 32K-byte cache memory expansion module. A user-definable cache memory option, the Shadow Memory Module can improve a user's performance in applications that require a predictable outcome, Gould said.

The 32/9705 CPU cabinet contains two chassis. A CPU/Logic chassis has a total of 38 slots including 21 CPU slots and 17 slots for attachment of devices under the firm's Selbus. Fourteen Selbus slots are available for expansion beyond the 32/9705 configuration.

The second chassis, the I/O Expansion Chassis, offers eight slots plus a line/printer floppy controller and a diagnostic processor.

An intermediate model, the 32/9750, is virtually identical to the 32/9705, but offers 18 additional I/O slots for applications that require additional interfaces or I/O devices. Both the 9705 and 9750 are field-upgradable to the top-of-the-line 32/9780 system.

The 32/9780 is a tightly coupled multiprocessor which Gould said offers internal performance of approximately 8.4 Mips.

Like the 32/9705, the 32/9780 offers 4M to 16M bytes of main memory. It consists of a central processing unit and an internal processing unit. Both processors carry equal processing power, noted Gould's Hank Taylor, manager of product planning; if one processor fails, the remaining processor can take over the entire processing load.

Each of the two processors in the 32/9780 is equipped with 32K bytes of cache memory, which can be expanded to 64K bytes per processor. In addition, each processor can accommodate one or two Shadow Memory Modules, making the shadow memory capacity 128K or 256K bytes.

Besides announcing the processors, Gould last week unveiled a Multiply Accelerator option for the 32/9705, 32/9750 and 32/9780. The feature is a two-board performance accelerator incorporating both floating-point and fixed-point processors. According to Taylor, the Multiply Accelerator adds an extra 1 Mips of performance to the processor.

The 32/9705 and 32/9750 can accommodate one Multiply Accelerator, and the 32/9780 can handle two units. A 32/9705 equipped with the Multiply Accelerator has an internal performance of roughly 5.6 Mips; a 32/9780 configuration equipped with two Multiply Accelerators offers a maximum internal throughput of 10 Mips, Taylor said.

Like other members of the Concept 32 line, the 32/97 models support Gould's proprietary MPX-32 real-time operating system. They also support Gould's version of the Unix operating system, called UTX/32.

An entry-level, 4M-byte 32/9705 costs $245,000. The price of the 32/9750 intermediate processor begins at $229,000, and the 32/9780 has an entry-level price of $309,000. A top-of-the-line 32/9780 system with dual Multiply Accelerators and 128K bytes of cache memory costs $496,000.

The processors are available 90 days after receipt of order. Gould's Computer Systems Division is located at 6901 W. Sunrise Blvd., P.O. Box 9148, Fort Lauderdale, Fla. 33310.

GOULD from page 1

The Powernode 6030 can support 2M to 6M bytes of main memory. The larger Powernode 6050 and 6080 accommodate up to 16M bytes of main memory. Other features of the Powernode 6000 family include 32K bytes of dual cache memory per processor, four-stage instruction pipeline, instruction and operand prefetch and base register support, Gould said.

Communications features reportedly include the Department of Defense's standard Transmission Control Protocol/Internet Protocol for interaction within a Unix-based network and the ability to link with Xerox Corp. Ethernet networks.

One feature of the Powernode processors that Gould claimed offers users a distinct advantage over the VAX is their size; a spokesman noted that the processors occupy about one-third the floor space of a VAX. For example, the PN6030 is packaged in a cubed cabinet 30 in. on a side. An 80M-byte Winchester disk drive and a removable 60M-byte magnetic tape cartridge drive are integrated in the 30-in. cabinet.

The more powerful PN6050 is packaged in a 71- by 29- by 30-in. cabinet. The unit is field-upgradable by adding expansion boards and peripherals to the top-of-the-line PN6080.

Gould said only the PN6050 is field-upgradable to the PN6080. This is done by adding a Gould internal processing unit to the PN6050, resulting in 80% more processing power, according to the company.

Prices for the PN6030 start at $80,000, for the PN6050 at $115,000 and for the PN6080 at $150,000. The products are available within 90 days of receipt of order, according to Gould's Computer Systems Division, which is based at 6901 W. Sunrise Blvd., Fort Lauderdale, Fla. 33310.

Bell Labs, HP and IBM among the 10 best places to work

Among the high-technology companies, which are the best of the best employers?

According to the authors of *The 100 Best Companies to Work for in America*, Bell Laboratories, Hewlett-Packard Co. and IBM are among the 10 best U.S. firms for workers.

Only HP is listed among the 10 best paying companies, and Apple Computer, Inc., Bell Labs and IBM are among the 10 best for benefits. When it comes to job security, Digital Equipment Corp., HP and IBM are among the prestigious 10 best. Tandy Corp. and IBM are represented in the list of the 10 best companies for job advancement.

But what about the truly important things in life, such as ambience? If it's ambience that you want in a high-tech firm, then you should apply to Apple and HP, say coauthors Robert Levering, Milton Moskowitz and Michael Katz. If you're looking for a company with a country club, send your resume to IBM, which maintains two such recreational facilities that employees can join for just $5 a year.

Which companies are noted for throwing the best employee parties? HP and Tandem Computers, Inc., where the authors say the Friday afternoon "beer bust" has become a hallowed tradition. Control Data Corp. gets the high-tech nod for best employee vegetable garden, and Rolm Corp. and Tandem Computers rate among the best for company-paid sabbatical plans.

If you're looking for the best vacation plan, you're in the wrong industry. No company can beat Reader's Digest Association, Inc. for vacations, the authors say. Besides, who could complain about working in a place called Pleasantville?

GREAT from page 1

culture pervades the work place. Not everyone fits in with the microcomputer giant, but those who do benefit from Apple's strong "share the wealth" attitude.

Vegetable garden notwithstanding, *CDC* is a "leader in corporate social responsibility," the authors report. CDC does not exactly attract flamboyant employees, but is more a haven for "YMCA-type do-gooders — provided they possess a strong Calvinist interest in making money." CDC doesn't believe in the relaxed and informal atmosphere of Silicon Valley high-tech firms; suits and ties are a must. But workers are also able to take advantage of the company's extensive employee assistance programs.

People communicate on a first-name basis at *Digital Equipment Corp.*, according to the authors, but for a large organization, DEC lacks structure. DEC is described as an "Eden for engineers," but the "looseness" of the company offends those engineers who want things run by the book.

Send your resume to *Bell Laboratories* if you want to work at what Levering, Moskowitz and Katz describe as the "frontier of knowledge." But there's a tension at the company which derives from the desire to do research and the need to produce a product for the parent company — AT&T. You probably won't get hired anyway; some workers say you have to be able to walk on water just to get to the interview stage.

The 100 Best Companies to Work for in America, scheduled for release this May, will be published by the Addison-Wesley Publishing Co., which is located in Reading, Mass. 01867.

Second-class postage paid at Framingham, Mass., and additional mailing offices. *Computerworld (ISSN-0010-4841) is published weekly, except: January (5 issues), February (5 issues), March (5 issues), April (7 issues), May (5 issues), June (7 issues), July (5 issues), August (5 issues), September (5 issues), October (7 issues), November (5 issues), December (5 issues) and a single combined issue for the last week in December and the first week in January by CW Communications/ Inc., Box 880, 375 Cochituate Road, Framingham, Mass. 01701.*

Copyright 1984 by CW Communications/Inc. All rights reserved.

Computerworld can be purchased on 35 mm microform through University Microfilm Int. Periodical Entry Dept., 300 Zeeb Rd., Ann Arbor, Mich. 48106. Phone (313) 761-4700. *Computerworld* is indexed: write to Circulation Dept. for subscription information.

PHOTOCOPY RIGHTS: permission to photocopy for internal or personal use or the internal or personal use of specific clients is granted by CW Communications for libraries and other users registered with the Copyright Clearance Center (CCC), provided that the base fee of $3.00 per copy of the article, plus $.50 per page is paid directly to Copyright Clearance Center, 21 Congress Street, Salem, MA 01970.

Permission to photocopy does not extend to contributed articles followed by this symbol. ‡

Special requests should be addressed to Nancy M. Shannon, CW Communications/Inc. Box 880, 375 Cochituate Rd., Framingham, MA 01701. ISSN 0010-4841/82 $3.00 + $.50

$2.00 a copy: U.S. — $44 a year; Canada, Central & So. America — $110 a year; Europe — $165 a year; all other countries — $245 a year (airmail service). Four weeks notice is required for change of address. Please allow six weeks for new subscription service to begin.

ABP mcc

POSTMASTER: Send Form 3579 (Change of Address) to Computerworld, Circulation Dept., Box 880, 375 Cochituate Road, Framingham, Mass. 01701.

MIGRAINE

How do you spell relief from the pain of Documentation? (S-Y-D-O-C.)

Call (201) 568-9700.

Cut your COBOL Maintenance costs.

SYDOC:
STRUCTURED DOCUMENTATION SYSTEM FOR OS/VS

QUESTION: Which is a bigger headache? The COBOL-documentation problem or the high-cost-of-maintenance problem?

ANSWER: Both.

* * *

We're not kidding. Documentation and high maintenance costs are both parts of the same big headache. Here's why:

1. THE PROBLEM BEGINS WITH DOCUMENTATION: And it begins right at the program-development stage.

Most programmers hate to document. And although they may think they are producing well organized programs, they really have no way of judging. If they produce badly organized programs, they will inevitably produce badly organized documentation, too. One always equals the other.

2. BAD DOCUMENTATION LEADS TO COSTLY MAINTENANCE: Even if the documentation started out being accurate, it's probably never been updated. When modifications occur, someone's got to go back and attempt to divine the underlying logic before new code can be inserted. A long and costly operation.

No wonder COBOL maintenance may consume as much as 75% of your entire budget!

FAST RELIEF WITH SYDOC: Our Structured Documentation System takes the documentation problem off the shoulders of your programmers and puts it where it belongs—on the computer:

- **SYDOC HELPS YOU DEVELOP STRUCTURED PROGRAMS.** It not only provides structured documentation, it is also a very useful guide for the production of structured COBOL programs. Flaws and inconsistencies can be spotted at the development stage. And corrected before they start driving your maintenance costs up.

As a manager, you will—for the first time—have a tool to standardize both your documentation and the quality of your programs.

- **SYDOC MAKES IT EASY TO MODIFY EXISTING PROGRAMS.** It can analyze "orphan" programs without adequate documentation and tell you everything you need to know about the program's structure, logic, variables and relationships. Armed with this knowledge, the maintenance problem shrinks.

No longer is it necessary for skilled programmers to spend days searching for clues about the program's logic. SYDOC makes all necessary information available quickly and easily.

But the best way to find out about SYDOC is to try it. If this remedy doesn't work you'll just have to try another—A-S-P-I-R-I-N.

syncsort INC.

Syncsort Incorporated 560 Sylvan Ave., Englewood Cliffs, N.J. 07632

NEWS

Big Apple at the core of bypass technology

By John Dix
CW Staff

NEW YORK — New York is perhaps the single best place to put a finger on the pulse of "local bypass" — local telecommunications services provided by companies other than entrenched telephone companies.

Because of the heavy communications traffic generated by the high concentration of corporations on the two- by 13-mile island of Manhattan, this city has become a proving ground for bypass technologies. Today the Big Apple is home to the most successful CATV-type data service, as well as the first operational digital termination system (DTS) in the country.

While still a neophyte industry even here, bypass is causing New York Telephone to take furtive glances over its shoulder and has spurred ambitious plant construction plans that the telephone company hopes will help it meet bypass' challenge.

MCTV spearheads

Spearheading that challenge are Manhattan Cable TV (MCTV) and Local Area Telecommunications, Inc., companies with operational bypass systems in place. MCTV, which began experimenting with data services in 1974, operates a CATV-type data network that is separate from its entertainment network. The two networks are managed and maintained by individual staffs.

Carl Gambello, MCTV's director of corporate development, said that the data network generated $1 million in revenues in 1983 (as opposed to the nearly $40 million made by the entertainment side of the house). The services it offers include point-to-point and multipoint data links supporting both asynchronous and synchronous traffic at speeds that range from 1,200 bit/sec to 1.54M bit/sec. Service fees are charged at a fixed monthly rate depending on the protocol used and the data rate.

Most of MCTV's bypass customers are using 9,600- and 19.2K bit/sec circuits, but recent requests have been for the 56K and 1.54M bit/sec service, Gambello noted.

A user that wants to tap into MCTV must absorb the cost of installing the link between its building and MCTV's trunk cable. That can be an expensive proposition. Depending on how close the trunk is, street-cut costs alone can range from $6,000 to $12,000. Running wire up inside a building to the appropriate location will cost an additional $550 per floor, Gambello said.

This type of commitment means that the service will be attractive to customers who can absorb the initial connection costs and see the long-term benefits of using cable. According to Gambello, the benefits of using MCTV's bypass service include contracts that can be as long as three or four years (particularly significant now, given the rate fluctuations of other services); high-speed services; a guaranteed bit-error rate of 10^{-9}; an estimated 99.9% uptime and a two-hour response to service calls; and the provision of service to customers within a maximum time frame of 90 days.

As an alternative to New York Telephone, MCTV provides only local data services and does not presently interconnect with any other carrier. Gambello said, however, that discussions have taken place with Satellite Business Systems, MCI Communications Corp. and ITT about the possibility of interconnecting their long-distance facilities with MCTV. He anticipates that a deal with one of these companies will be made within a year.

A newer company than MCTV, but one chasing the same carrot, is Local Area Telecommunications, Inc. (Lati). Lati began operation last year as the first DTS carrier in the country to bring its service up.

The company's first node in New York is located on top of the World Trade Center. From an antenna there, microwave service is provided to users with small send/receive antennas. Dedicated links' services include the usual data rates ranging from 1,200- to 1.54M bit/sec and above.

Lati President Perry Spirakis would not disclose his company's revenues nor its number of customers, but he said that the Securities Industry Automation Company, a subsidiary of the New York Stock Exchange, was its first client and presently leases 10 9,600 bit/sec circuits.

Spirakis eventually hopes to operate three or four interconnected nodes in New York.

Cutting them off at the pass

Lati and MCTV are carriers that hope to compete with New York Telephone in what Bob Helgesen, division manager of network planning for the telephone company, calls "economic bypass" — competition based on the cost of providing service.

Helgesen believes the best defense against bypass is a strong offense: "We must avoid providing incentives for bypass, and the best way to do this is to install the best technology available where it is most strategically needed."

Demand in the telephone business is traditionally felt at the central office, the switching point at which all telephone lines terminate. Because of this reality, the weak link in the system is seen as the trunks between central offices, which had limited capacity.

To breach that bottleneck, New York Telephone decided to interconnect its many switching centers in the city by installing fiber-optic cables. This would enable the carrier to offer higher speed services to its users while passing on some of the benefits of this type of medium — among them low-bit error rates and bandwidth enough to conduct video-conferences.

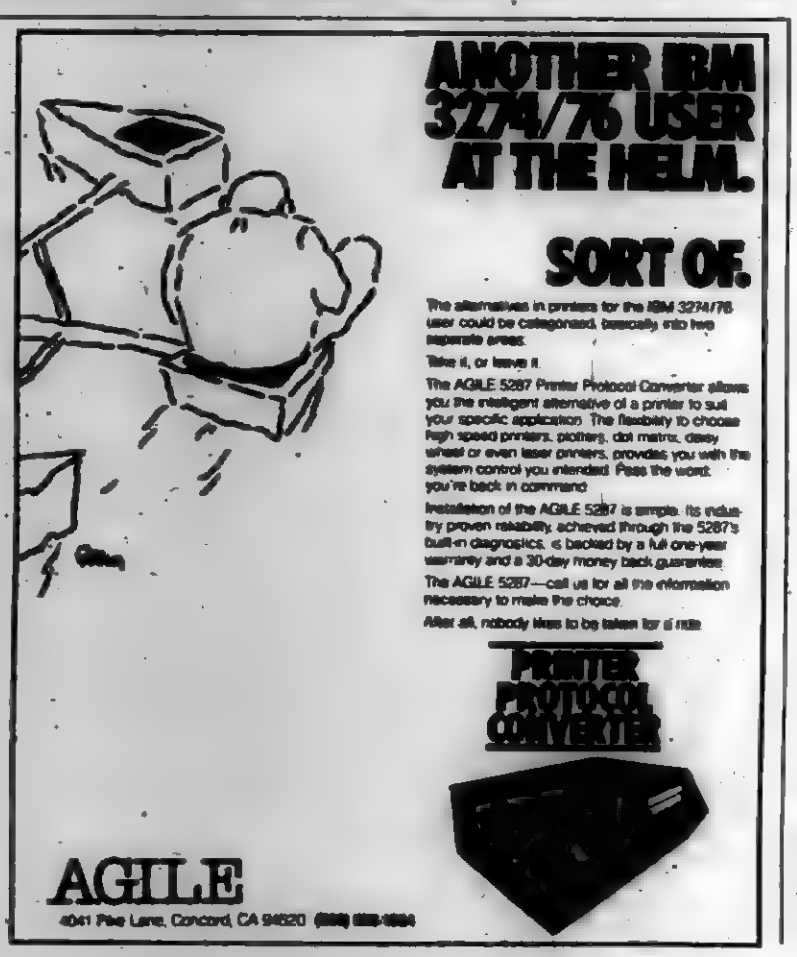
Fiber-optic projects

The first fiber-optic project undertaken was the Ring Around Manhattan, a 144-fiber cable that runs 13.2 miles and was completed in early 1983. The capacity of that system was used up so quickly, Helgesen said, that two other projects were soon launched:

- The Video Around Manhattan (VAM) project was designed as an overlay and upgrade to the first ring. Scheduled to be completed in the second quarter of 1985, VAM will include 20 miles of Western Electric Co. fiber cable (144 fibers per cable) that will operate at 135M bit/sec. NEC Corp. electronics will be used in that system.
- Also slated to be in operation by the second quarter of 1985 is the Fiber-Optics Around Manhattan (Foam) project. Representing a major upgrade to the other systems, Foam will consist of 12 miles of Siecor Corp. single-mode fiber cable (96 fibers per cable) driven by NEC hardware. Eventually, Foam will be extended to Staten Island, Queens and Long Island.

New York Telephone is still studying other transmission technologies like DTS, but Helgesen said that given the number of large office buildings in such a relatively compact area, fiber optics seems the way to go.

By upgrading its plant and pricing its services competitively, the company hopes to cut bypass carriers off at the pass.



Lament has familiar ring

BRIDGEPORT, Conn. — Phone users who are singing the blues over the AT&T divestiture now have a hit tune they can hum as they pay their bills. A parody of Neil Sedaka's 1962 hit, it's called "Breaking up is Hard on You."

In the two months since its release, 150,000 copies of the 45-rpm single have been sold nationwide, and the song has been listed as No. 76, with a bullet, on the *Billboard* magazine list of hit records.

But how could it miss, with words like these:

AT&T don't say goodbye
Don't want to use no MCI
You'll pay rates out the wazoo
'Cause breaking up is hard on you.

And these...

I beg of you, don't take my phone,
I want to lease, don't want to own.

Besides complaining of feared rate hikes, the song also takes a poke at phone company service:

Remember when you made a call
And you got through, no sweat at all;
Now you wait the whole night through
'Cause breaking up is hard on you.

The song was penned, reportedly in 20 minutes, by the American Comedy Network here in December and released to the 23 radio stations that regularly use the troupe's recordings of humorous skits and takeoffs on commercials. Radio stations were swamped with telephone calls when they played the song, according to the group's creative director, Bob James, who describes his six-member group's work as "humor with an edge on it."

The phone calls led to a recording contract with a small Boston label. The song James said had started out as "just a joke" was being played by as many as 250 radio stations.

AT&T Media Relations Manager Phil DeLong, meanwhile, said that the company has taken no position on the song, but he feels "bemoaning divestiture is a lot like beating on a dead horse.

"The song we're humming around here is 'Tomorrow'," he added.

Bank pleased with Teradata DBC/1012

Data base machine marks Wells Fargo debut as DBMS user

FIRST USER

By Paul Gillin
CW Staff

EL MONTE, Calif. — When Wells Fargo Bank N.A. installed Teradata Corp.'s DBC/1012 data base computer here in December, it marked two firsts: Wells Fargo became the first user of the large-scale machine and at the same time installed its first-ever data base management system (DBMS).

Wells Fargo has primarily used Vsam files for many years. While the company does not plan to replace that access method with the Teradata machine, it does expect to develop many of its future small- and medium-scale applications on the DBC/1012, particularly those requiring fast turnaround time.

"Wells didn't get involved in the [IBM] IMS mania of the early '70s," said Michael G. Rowloff, vice-president and district manager of the technical services district at Wells Fargo, in an interview from Wells Fargo's northern data center in San Francisco. "We still have over 100 [IBM] CICS applications using strictly Vsam files."

For new information systems requiring fast development, the department uses Information Builders, Inc.'s Focus fourth-generation language, which Rowloff said can be used to build applications in about one-sixth the time required for Cobol. However, DBC/1012's Tequel language makes prototyping and development about twice as fast as in Focus, he said.

Rowloff became interested in the data base machine when he attended a roundup sponsored by Teradata for potential users last year. "We felt they were excellent people," he said. "We were particularly impressed with their ability to achieve fourth- and fifth-level normalization. That was probably the key."

The Teradata computer's relational DBMS model and self-normalization features eliminate the need "to have a number of data base gurus constantly tweaking the system," Rowloff said. In addition, Teradata's claimed capacity of up to a terabyte — one trillion bytes — of storage presented unusual growth potential for a relational system, Rowloff said. "All my disk space combined is less than half a terabyte," he said.

That Teradata is a start-up company did not faze Wells Fargo, either. In fact, Teradata's offer of a four-month, no-obligation test period was superior to anything IBM offers, Rowloff continued. "We were willing to be the first users on this, but our attitude on IBM is not to be among the first couple of hundred," he maintained.

Wells Fargo installed the smallest configuration of DBC/1012 in December. It includes four parallel access module processors, two communications controllers and four Winchester disk packs totaling about 2G bytes of storage. Installation took about two days and presented no unusual problems, Rowloff said.

For its first application, Wells Fargo chose a data center management program that it tested internally, but soon opened the data base to the general programming community. One of the earliest applications included a "difference analysis" program in which about three million item processing balances were input and searched for discrepancies with daily transactions. Another application was a "combined management" program that provides information on accounts which have multiple relationships across divisional boundary lines.

Rowloff said he was surprised by both the speed and flexibility of the system. "We've run some jobs in the difference analysis program that have run in as little as 15 seconds," he said. "That surprised us because it would probably take as long as several minutes in an on-line environment."

Acid test

However, the acid test of DBC/1012 is still to come, Rowloff noted. Wells Fargo plans to install an accounts analysis system sometime in April. The system basically totals a customer's chargeable transactions for a specific period and matches it against the customer's account to determine how much he should be charged. "Essentially, it's a bank's bill of services," Rowloff explained.

The application will be the first to test the Teradata machine against a data base of more than 1G byte and an array of 150 rows by 120,000 columns. "We'll do some things that exercise a lot of that array and see how it does," Rowloff said.

One pleasant side benefit of the machine has been in the area of data security. Because of the relational tabular structure, "you can look at certain records but not at those owned by other [user] IDs," Rowloff said. "That's not available in Vsam and not done well in some older data base systems."

The future of DBC/1012 will probably lie in new applications that require fast turnaround. The company also expects to offer end users some limited programming functions (see story below).

"Our industry is a deregulating one," Rowloff commented. "We're looking at producing as many information products in a year as we have in the last five years put together. Something like this comes at the perfect time as far as getting products out the door quickly."

However, Rowloff reserved judgment on whether machines like DBC/1012 will eventually replace Vsam files. "There's a definite potential, but I don't think we're quite there yet," he said. "But we're carefully watching other companies that have put their production data base on this."

First user planning applications, end-user computing

EL MONTE, Calif. — Although Teradata Corp. claims its recently announced DBC/1012 data base computer is capable of handling large production-scale processing, the first user of the new machine has no plans in that area.

Instead, Wells Fargo Bank N.A. plans to use the computer for fast-changing new applications and for end-user computing.

According to Michael G. Rowloff, vice-president and district manager of the technical services district at Wells Fargo, the data base machine has proven useful for prototyping, due largely to its self-normalizing relational structure and its use of Tequel, a query language similar to IBM's Structured Query Language.

"Once data is loaded into the relational model and you define relationships, you never have to define them again," according to Rowloff. "And it's easy to modify using procedural code."

Tequel allows the user to ask for data in any order, he continued. The language applies the arithmetic and logical operators and then displays the results without further definition.

"It's so quick that you can afford to think before you implement," Rowloff commented. "If the result isn't what you want, you can just throw it out without losing a lot of time."

Rowloff also sees the possibility of using DBC/1012 to gain some valuable on-line information from sequential files. "You could put a large sequential data set out on the DBC, superimpose a set of definitions on top of that and begin to access it with new Tequel programs and gain information from it you couldn't gain in a batch environment," he said. "I could put field definitions into the dictionary and access it randomly, create new views or use any kind of criteria I created in the table definition."

Because Tequel is relatively easy to learn, Rowloff plans to present it to executive-level users in the near future. The presentation will contain a few canned screens of information, but will also allow the data base to be queried on the fly, he said. Ideally, he would like to have users writing simple Tequel queries by the end of the presentation.

"The banking industry is very information-oriented, but we tend to be secretive about what we do in MIS," he said. "Tools like Tequel can be learned very quickly."

NETS from page 1

Other problems encountered stemmed from overoptimistic assumptions about features provided. Sumner said GE was left to contend with issues like flow control, speed recognition and adjustment and certain terminal compatibility concerns.

While, all in all, he is happy with his network vendor, Sumner said it needs to improve the product's ability to handle synchronous communications and, in the near future, will need to address the handling of high-speed interactive graphics.

In contrast to GE's experience, Texas Instruments, Inc. has had to do little modification to its Xerox Corp. Ethernet local-area network, according to William Roberts, manager of communications network support. TI has interconnected three physical sites via remote bridges to make up a single Ethernet. That network supports between 300 and 400 users and supports upwards of 20 hosts.

Attached devices include eight to 10 types of equipment, including asynchronous terminals and TI personal computers.

The primary reason for installing the network was to provide access to multiple host resources from a single workstation, Roberts said. Even at today's rate of device attachment, Roberts doesn't foresee any capacity limitations or network degradation occurring for two or three years.

Part of the assurance that the capacity of that network won't be challenged comes from Roberts' assumption that TI's network won't have to support video applications.

Just the opposite requirement led the U.S. Air Force to install a Wang Laboratories, Inc. Wangnet broadband local network. Dan Gartner of the Air Force's Aerospace Guidance and Metrology Center in Ohio said that although the network is still in the implementation stage, some interesting things have come to light.

These discoveries primarily involve hidden costs. For example, Gartner said, a personal computer attached to a Wangnet needs a separate emulator board for each individual type of host with which it hopes to communicate.

Another cost consideration cited by Gartner was the high cost of the frequency-agile modems needed with Wangnet. He said that an $1,800 personal computer he can get through the Air Force requires a $1,200 modem to connect it to the network.

On the positive side, installation for the Wangnet cable in this, the first of three phases of network implementation, was accomplished below projected cost, Gartner said.

Budgets up this year, managers tell DPMA

But they want increased funds for software, employee incentives

By John Gallant
CW Staff

PARK RIDGE, Ill. — Data processing budgets are up this year, but DP managers would like to see more money allocated for software and employee incentives.

In a survey conducted in January by the Data Processing Management Association (DPMA), nearly 74% of the 200 DPMA members responding said their DP budgets are higher than in 1983. Austin Weber, editor of the DPMA newsletter "Compufax," which published the survey results in its March issue, noted that the members were not asked by how much their budgets had increased. But he added that DP expenditures now total almost 2.5% of the membership's corporate budgets. With respondents' DP budgets ranging from a high of $2.5 million to a low of $300,000, the average DP budget of the organization's membership now totals nearly $1.65 million.

According to the survey results, the increasing DP budgets appear to be riding a wave of top management support. Almost 90% of the DPMA members questioned said management was "supportive" of their budget requests, with most spending increases approved with little or no hesitation.

Personnel outlays account for the largest portion of the DPMA members' budgets — 44% — the survey found. An average of 26% of the DP budget is earmarked for large systems expenditures, both mainframes and minicomputers, and another 12% is targeted toward software spending.

Hardware and software maintenance accounts for 9% of the budget; end-user training takes only a 3% chunk of the total. Spending on microcomputers comprises the remaining 6% of the DP budget.

However, the survey showed that DPMA members are increasingly concerned about retaining qualified DP workers. Weber said a majority of the respondents urged upper level management to "provide more incentives for retaining personnel for longer periods of time." Such incentives, he said, would boost employee morale and reduce the turnover rate. "Overall, I think the most important finding of this survey is the need to cut down on employee turnover," Weber said. "Top management has got to help DP provide incentives to retain employees. That will help make DP more productive within the organization."

Among other personnel concerns, nearly 20% of the DPMA members said they would like to see an increased financial commitment to end-user training.

Another common complaint that DPMA members voiced through the survey, Weber said, is a shortage of funding for software for both large and small systems. Respondents urged top management to allocate more money for software systems — especially those geared toward data security and "productivity enhancement." The DP professionals surveyed said "management must realize that software depreciates with time and is often in need of maintenance," Weber said.

Not surprisingly, 20% of the information systems professionals responding to the survey said that top management "would be wise" to increase the DP budget to 3% to 5% of the total corporate budget. The respondents added that management should also "try harder to understand the unique problems" DP managers face.

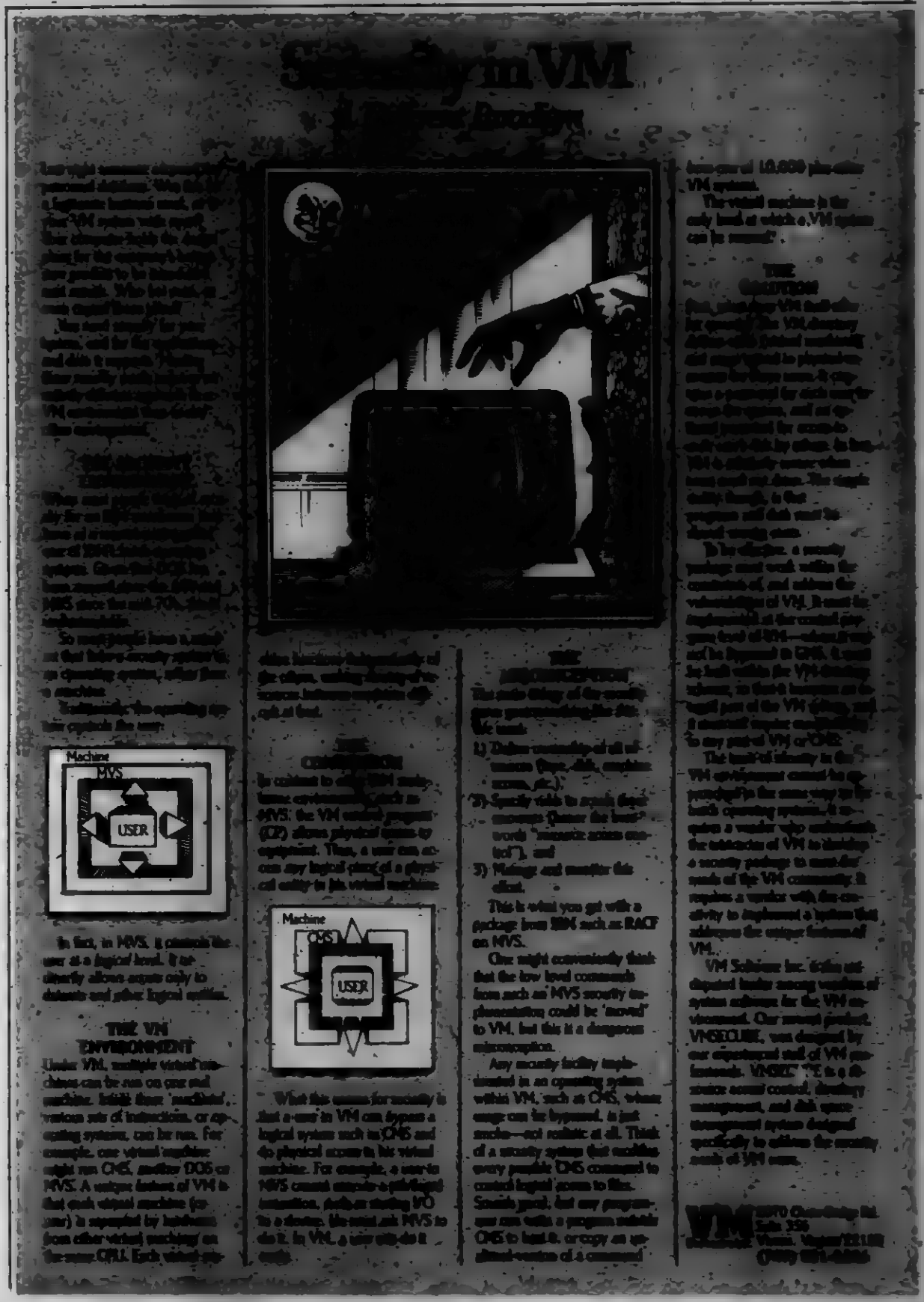
"The point of the survey is to give top management an idea of how DP/MIS feels," Weber said. "I think it shows clearly that there is an inherent need for top management to understand how and why DP managers submit their budgets. There is also a need to allocate more of the total budget for the corporate information resource."

More information about the survey results can be obtained by contacting "Compufax," DPMA, 505 Busse Highway, Park Ridge, Ill. 60068.

CORRECTIONS

"Vendor pulls application generator out of beta test" [CW, March 12] incorrectly stated that Analysts International Corp. had suspended testing at its initial beta site in order to make modifications to its Corvet application generator. While the company has suspended customer shipments in order to make the modifications, beta site testing is continuing.

The March 12 issue of *Computerworld* should have listed American Data Consultants' address as 112 E. 32nd St., Joplin, Mo. 64801.



NEWS

New version of Netway among show debuts

CW AT INTERFACE '84

By John Gantz
CW Staff

LAS VEGAS — Although lacking blockbuster announcements, the Interface '84 communications conference held here last week in the city of glitter featured a number of product introductions from several vendors.

Tri-Data Corp. announced a new version of its Netway product line, components of which it had previously provided only on an OEM basis to other manufacturers.

The Netway 274 Multi-Dissimilar Host Cluster Controller can connect a wide variety of otherwise incompatible workstations and peripherals to multiple and dissimilar hosts, Tri-Data said. Each 274 controller has 16 ports which can be configured to support hosts or terminals, both of which can be supported on a point-to-point or multidrop basis.

The Netway supports IBM 3270 Binary Synchronous Communications and Systems Network Architecture/Synchronous Data Link Control, Burroughs Corp. Poll/Select and asynchronous start/stop protocols.

A typical Netway 274 configuration with eight ports costs $12,510. Deliveries are scheduled for April.

Tridata is based at 2674 N. First St., San Jose, Calif. 95134.

AT&T Information Systems used the Interface show to bring out Level IV of its Dataphone II family of network diagnostics and management control systems. The engine of the new product is actually a stand-alone applications processor, the add-on module used with AT&T's Dimension System 85 private branch exchange.

This device has eight control channels and is said to be able to store up to 3,000 modem/device profiles and records on up to 20,000 faults. By comparison, Level III offered only one control channel and could store profiles on 400 devices and record only 400 fault alerts.

Level IV is fully compatible and integrable with existing Dataphone II products, the company reported. It ranges in price from $96,000 to $125,000, depending on peripherals. Lease costs range from $4,600/mo to $10,000/mo.

AT&T Information Systems is based at 100 Southgate Pkwy., Morristown, N.J. 07960.

Codex Corp. introduced a number of products, the most significant of which was the new 2600 series of modems, built on a bus architecture that is managed by a Motorola, Inc. 68000 microprocessor.

When coupled with a signaling processor based on a custom very large-scale integration chip set and the first commercial implementation of a new modulation technique called Trellis Coding, the top-of-the-line 2660 can achieve data rates up to 16.8K bit/sec in point-to-point applications.

The 2600 series also includes the 2640 and the 2620, which operate at 9,600 and 4,800 bit/sec, respectively.

One of the 2600 series' features is the Adaptive Rate System, whereby the modem will step down to a slower speed if the line it is using begins to degrade, then back up to the higher speed when the condition has passed.

The 2660 costs $13,000, the 2640 costs $7,200 and the 2620 costs $4,175. One- to five-year leases are available. The 2620 is the only product not presently available.

Codex is located at 20 Cabot Blvd., Mansfield, Mass. 02048.

Gateway to 3270

Infotron Systems Corp. went to Interface '84 to announce the Virtual Terminal System (VTS), said to provide a gateway to IBM 3270 applications for Infotron's multiplexer, data switches and network concentrators.

The terminal emulation system enables Ascii and other asynchronous terminals (including personal computers) to work in a 3270 synchronous network, Infotron said. Multiple applications or multiple hosts can be accessed from a single network connection. Devices and hosts are supported at speeds up to 19.2K bit/sec.

Two models are available. The $6,800 VTS 351 handles up to six Ascii devices, and the $7,600 VTS 352 supports up to 12 devices. Both are available stand-alone or in rack-mounted configurations.

Infotron also announced two terminals that are said to be designed specifically for use with the VTS. The 700 and 701 have an IBM 3278-like keyboard, menu-driven configuration capability, an RS-232C printer port with automatic speed detection and display and diagnostic attributes similar to the IBM 3277, 3278 and 3279 display stations, Infotron said.

The 700, which costs $1,100, has a fixed-display format, whereas the 701, priced at $1,750, offers eight user-selectable formats. Shipments are slated to begin in May.

Infotron is located in the Cherry Hill Industrial Center, Cherry Hill, N.J. 08034.

System 1032 for VAX

DBMS Bliss

Now there's software that users can use, programmers can program, and managers can manage.

Don't despair. If you've been frustrated waiting for ideal data management software, your worries are over.

The answer is System 1032™ DBMS for your VAX. And you can sample it at no risk or obligation. Here's the story.

Responsive Assistant

System 1032 provides a common-sense relational approach to data management, without the burden of relational calculus or SQL. Users easily grasp both simple and complex data relationships, and assistance is right at their fingertips. Special function keys make it easy to complete commands, quickly learn new ones, and see explanations of options and parameters, even in mid-command. So there's no need to struggle with a manual in the lap or consult an already-hassled wizard.

Best of all, System 1032 is fast and pretty. It answers complex queries almost instantly and produces presentation-quality reports with single commands.

Designer's Delight

Don't think it's a toy, though. Sophisticated applications designers can program in any VAX language, including System 1032's built-in block-structured language, and still access all of System 1032's powerful data management tools. A complete range of data types, format definitions, shared data structures, and other advanced features ensure that System 1032 easily satisfies the most demanding needs.

If you're a manager, you'll especially appreciate System 1032. Your users and programmers all use the same unified command language and data base concepts, so communication between them is easier than ever. And System 1032's careful human engineering drastically cuts your training costs and increases productivity.

Plus we exploit the best of the VAX architecture with shareable native code, asynchronous I/O, and proprietary inverted files—efficiently! So, unlike other software, System 1032 won't force you to buy more memory, disk space, or CPUs.

Risk Free

Software House has an impeccable decade-long reputation for reliable software and responsive technical support. System 1032 is the offspring of System 1022,™ the most widely used DBMS for DEC mainframes. Its step-oriented commands and relational design have proved themselves in years of use at hundreds of sites. And System 1032 has undergone extensive field-testing to ensure that it works right the first time for you. Although new, System 1032 is already the most mature DBMS available for your VAX.

Convince yourself. Try System 1032 on your own VAX with your own data. A 60-day trial period costs just $85. Verify our claims, browse through our manual, and test our hot-line support service. Compare and benchmark System 1032 against other software, relational or not, at whatever price. Then sit back in bliss and watch your end users and programmers accomplish more, faster than you thought was possible.

So don't delay. Call us today, or send in the bliss coupon.

©Copyright 1983, Software House. System 1022 and System 1032 are trademarks of Software House. VAX is a trademark of Digital Equipment Corporation.

System 1032™

☐ Please call me.
☐ Send me the latest on System 1032.

My VAX environment is:
☐ 11/782 ☐ 11/730
☐ 11/780 ☐ On order
☐ 11/750 ☐ Under consideration
☐ My company is an OEM

Name _____
Title _____
Company _____
Address _____
City _____
State/Prov _____ Zip/PC _____
Tel _____
CW 319

Send to:
Giselle Valdes
Software House
1105 Massachusetts Avenue
Cambridge, Massachusetts 02138

Software House
1105 Massachusetts Avenue
Cambridge, Massachusetts 02138
Tel. (617) 661-9440 TWX: 710-320-1075

White House seen proposing telecommunications policy

By Phil Hirsch
CW Washington Bureau

LAS VEGAS — As soon as the telecommunications industry's warring factions reach a consensus, the White House will propose a new national telecommunications policy and work for its adoption.

This was the view of Alfred W. Van Sinderen, president of Southern New England Telephone Co. (Snet), who delivered the keynote address here last week at the Interface '84 communications conference.

The prediction that the White House will assume an active role in developing national telecommunications policy, Van Sinderen told a press conference following his keynote address, is based on recent talks with officials at the National Telecommunications and Information Administration, the president's chief telecommunications adviser.

Other predictions

Van Sinderen also said at the press conference that:

■ There may be a need for increased government support of telecommunications research because of AT&T's divestiture. The company faces increased competition in the interstate services market, and the divested Bell operating companies are now buying terminal and transmission equipment from other suppliers. By 1986, Van Sinderen said, AT&T's earnings may be reduced to the point where it has to trim the Bell Labs budget.

■ Rivalry between the newly created regional Bell operating companies and AT&T is one reason for the decline of service since divestiture. Another is the difficulty of providing service when personnel and facilities are being shifted and new organizational charts and resource management systems have to be created.

But Van Sinderen expects much less confusion six months from now. When his company receives a service order that requires a sign-off by AT&T, Snet does the work immediately to keep the customer's goodwill, "even though we know it will be six months before AT&T pays us."

■ Digital Termination Services, Inc., a company in which Snet has a 40% interest, plans to begin premarketing its microwave-based digital termination service in Washington, D.C., and one other city — most likely to be Atlanta or Chicago — this summer.

Private network service promised by year-end

By Phil Hirsch
CW Washington Bureau

LAS VEGAS — A new private network service will be tariffed by AT&T Communications before the end of this year, Service Development Director Richard Snowden said here last week.

With the network, users who transmit the appropriate instruction codes on-line to a network control point will be able to reconfigure their networks dynamically at any time, Snowden claimed.

Snowden disclosed plans for the new offering in a talk given at last week's Interface '84 communications conference.

Accunet T1.5 enhancement

The new service, he said, will be an enhancement of AT&T Communications' already tariffed Accunet T1.5 service, composed of leased point-to-point transmission links operating at 1.5M bit/sec. Typically, each link is multiplexed into multiple voice and/or data subchannels.

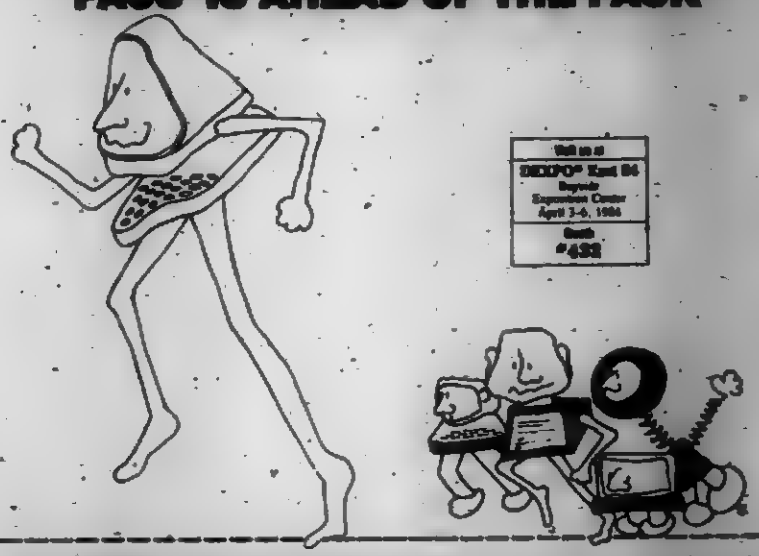
Besides changing the traffic mix to accommodate random fluctuations in message and session volume, the enhancement also will permit the network to be geographically reconfigured. As traffic peaks and valleys occur at various points, subchannels can be reconnected to provide capacity where it is needed.

"Initially, we will offer reconfigurability only with a totally private network of T1.5 subchannels," Snowden said. Later, however, users will be able to interface these subchannels to public voice and data networks; by transmitting the appropriate codes to the Accunet network control point through a teletypewriter, users will be able to connect an individual subchannel to different networks at different times as required by changes in their traffic patterns, or to exploit time-of-day or other discounts, he said.

By providing a dynamically reconfigurable transmission path for voice, data and image traffic, the service should make wideband more economically feasible for more users. The economics of wideband are likely to become more appealing after the new cost-based tariffs mandated by the Federal Communications Commission become effective. Those tariffs will increase rates considerably for voice-grade private lines.

Snowden said the Accunet T1.5 service exemplifies a major objective of AT&T Communications during the 1980s: To provide customers with the capability to manage their transmission facilities directly. He indicated there will be further offerings embodying this same idea.

FOR VAX™ RESOURCE ACCOUNTING, PACS™ IS AHEAD OF THE PACK



The competition isn't even close. PACS is so good, it's the only resource accounting package in DEC's™ EAS library. Here's why:

- Flexible billing algorithms
- User budgeting and port speed accounting
- EZLOG™ for true 3-level reporting by account, project and user

Name _____
Title _____
Company _____
Address _____
City _____ State _____ Zip _____
Phone ( ) _____

SEND COUPON NOW FOR COMPLETE DETAILS ON ALL THE PACS BENEFITS

STI Signal Technology, Inc.
5951 Encina Road, Goleta, CA 93117 (805) 683-3771 Outside California call toll-free (800) 235-0787
TWX 910-334-3471
VAX and DEC are trademarks of Digital Equipment Corporation

Now MTI brings you famous Diablo letter-quality printing at new low prices. Call today.

MTI has them all in stock and ready to ship. Even the 630ECS series, the only letter-quality printer that can print virtually all characters the IBM Personal Computer can display, including all 128 extra characters of the PC's extended character set.

MTI is an authorized Diablo distributor, so we get these printers first and fast. The Diablo 620 API, 630 API and the Diablo 630ECS are probably the finest letter-quality printers on the market today.

Whether you lease, buy or rent our equipment, you'll find MTI is the one source for all the terminals, peripherals, systems, applications expertise and service you'll ever need. At great prices. Call us today.

New York: 516/621-6200, 212/767-0677, 518/449-8989
Outside N.Y.S.: 800/645-6530
New Jersey: 201/227-5552
Ohio: 216/464-6688

mti Diablo

Applications Specialists & Distributors, New York, New Jersey and Ohio.
DEC, Intel, Texas Instruments, Datapoint, Lear Siegler, Diablo, Kaypro, C.Itoh, Intecolor, Racal-Vadic, MICOM, Ventel, Davidson, U.S. Design Dig.Mag., Cipher, Protocol Comp., MicroPro, Microsoft, Polygon, Selsat,

McAuto tells how it's controlling micros

CW AT INTERFACE '84

By Phil Hirsch
CW Washington Bureau

LAS VEGAS — At least one large company has managed to control the internal use of personal computers throughout its organization, attendees at last week's Interface '84 conference here were told.

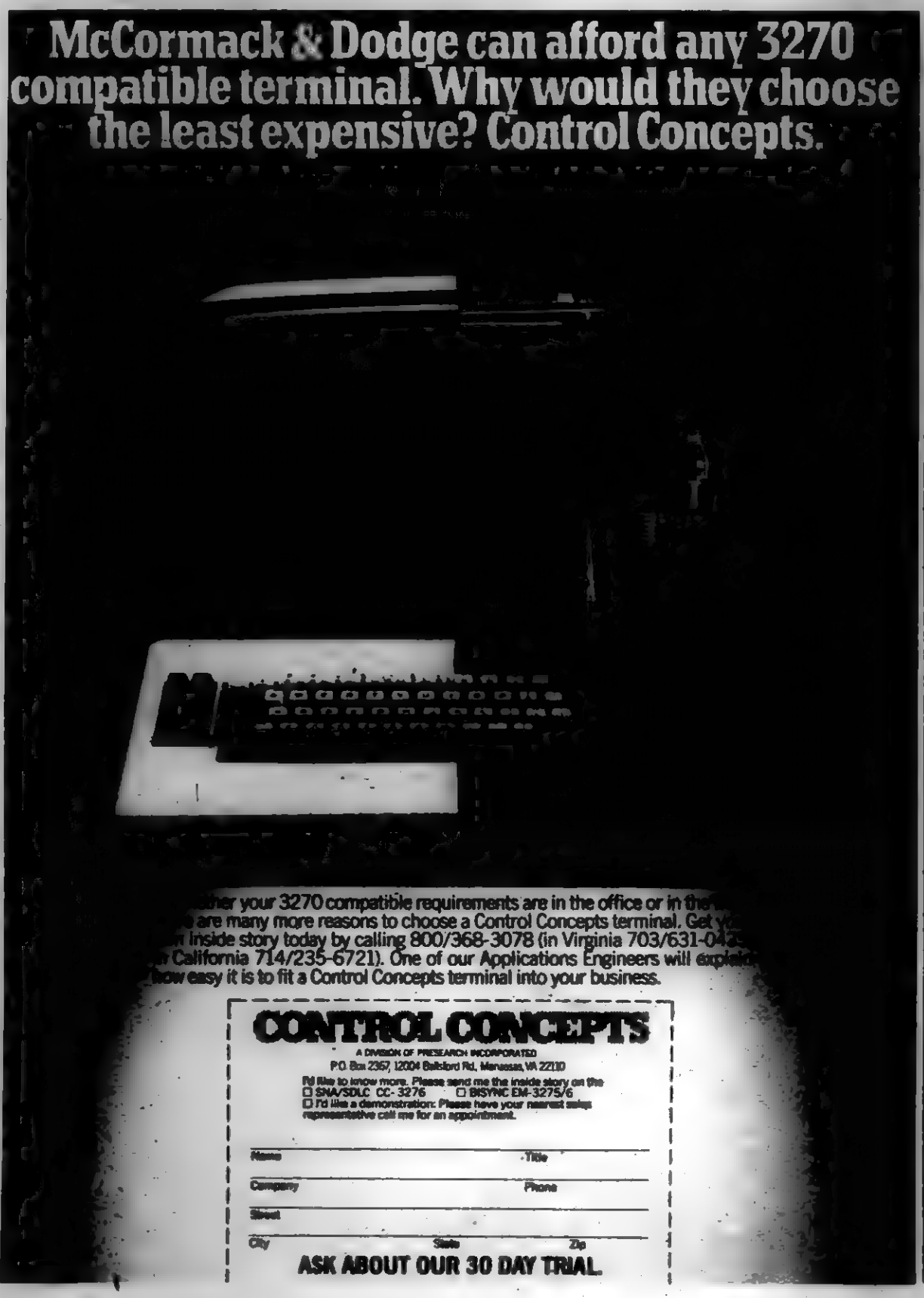
R.D. Greco, director of information resources management for McDonnell Douglas Automation Co. (McAuto), said his company began looking at personal computing about 18 months ago. At that time, McAuto's information system, based on large, centralized IBM mainframes, began breaking down. Partly because of corporate acquisitions, demands on the system changed qualitatively and increased quantitatively, Greco said. As a result, it became increasingly difficult for users to get jobs done on time.

The first step toward a solution came when the company decided to decentralize its computer activities. Personal computers immediately became a very attractive option, Greco said, but problems quickly developed. Swarms of microcomputer vendors suddenly appeared; biases for and against particular personal computers surfaced within the company, and there was growing concern that McAuto would end up with chaos — multiple personal computers and programs that would not be able to communicate with each other.

The problems were solved, he said, by:

- Setting up a technology review group to analyze and then specify the personal computer hardware and software that would be funded by the company.
- Establishing a user support center within each component of the corporation.
- Providing classes for familiarizing users with all the specified products. Heavy use is made of tutorial software developed by outside vendors.

Implementing these measures "brought immediate stabilization to our previously chaotic" computer environment, Greco said. McAuto has installed 350 personal computers so far and plans to add 400 more this year. Half of the latter will be assigned to programmers. Micros offer "significant productivity improvement potential," Greco said.



Session focuses on gateways

By John Dix
CW Staff

LAS VEGAS — IBM will make its token ring local-area network available when it can offer gateway support for it through its Systems Network Architecture (SNA), probably in the fourth quarter of this year.

That conclusion was drawn by Dan Zatyko, president of Zatyko Associates of Tustin, Calif., at a session on intelligent gateways held here at the Interface '84 conference last week.

The capabilities made available with the introduction of the SNA Network Interconnection products this year are "the most significant announcement for SNA since 1978," Zatyko said. They will pave the way for autonomous networks, including local-area networks, within SNA as well as provide for SNA network interconnection, he added.

"We will no longer have one large corporate network trying to serve all needs," Zatyko said. "We'll have smaller interconnected networks."

Getting down to basics, session leader Francis X. Daubeck defined a gateway as a hardware/software component that interconnects two heterogeneous networks; a bridge, in contrast, connects homogeneous networks. In function, gateways provide code and speed conversion, protocol interface compatibility, routing, error recovery and access capabilities, explained Daubeck, who is president and chief executive officer of Communications Network Architects in Washington, D.C.

Other than those discussed by Zatyko, typical gateways are used between vendor-specific network architectures and one of the following: X.25, SNA, Ethernet and some vendor-specific architectures.

Gateways have classically been user-created software interfaces developed to optimize investment in existing but disparate networks, Daubeck said. Like Zatyko, Daubeck said that gateways can "extend a hierarchical network to include a peer-coupled subnetwork and provide peer-coupling for hierarchical networks such as SNA."

Some disadvantages to gateways, however, are that they are complex and degrade network performance to some degree, Daubeck said.

NEWS

WASHINGTON UPDATE
Jake Kirchner
CW Washington Bureau

NSF brass asks Congress for national tech agency

WASHINGTON, D.C. — The chairman of the National Science Foundation's (NSF) supercomputer advisory panel said he supports legislation to set up a national technological foundation, which he said could help universities gain access to advanced computing facilities.

Dr. Kenneth G. Wilson, a Nobel laureate physicist from Cornell University, said on March 14 that the $20 million in NSF's proposed 1985 budget for supercomputer research and development support does not address all the needs for academic access to large scientific computer systems.

The NSF "was designed to protect long-range scientific research from short-term political crosscurrents," according to Wilson, who believes "some alternative mechanism does have to be established which would provide a second source of instrumentation grants for universities, especially grants for computing equipment."

Wilson told the House Subcommittee on Economic Stabilization that the proposed Advanced Technology Foundation Act could fill that need.

One provision in the bill would create a foundation to help support cost-cutting applied research to stimulate commercialization of new technology. The foundation would support research centers and find other ways to speed widespread adoption of technological innovations.

This type of agency, Wilson told the subcommittee, could help spur the supercomputer industry "to serve the industrial scientific market more effectively, pursuing research problems — for example in software productivity — where industrial benefits are immediate."

Justice halts firms' sales of 'abusive tax shelters'

WASHINGTON, D.C. — The Justice Department has obtained an agreement halting the sale by two firms of what the government called "abusive tax shelters" involving computer hardware and software leases.

The consent judgment was filed in U.S. District Court in San Francisco, resolving a civil suit brought at the request of the Internal Revenue Service. The defendants were Computer Alternatives, Inc., its president Robert K. Ramers, of Larkspur, Calif.; and John M. Holdaway, of Sandy, Utah, president of Compumaster Financial Services.

The IRS had accused them of selling packages of computer leases worth between $24,950 and $50,328. One hundred and one of the systems were sold in 1982, causing U.S. Treasury losses exceeding $2.2 million, according to documents filed with the District Court.

Because the packages were greatly overvalued, they lacked "economic substance," according to the government, which said, as an example, an investor in the 50% tax bracket could buy a package for $6,995 and take $10,492 off his taxes in credits and deductions.

Under the terms of the settlement, the defendants, who did not admit guilt, agreed to stop selling the packages and notify the IRS of any future tax-advantaged computer lease activities. In addition, Ramers and Computer Alternatives paid a $30,000 penalty, and Holdaway paid a $20,000 penalty.

Despite repeated attempts, neither of the defendants could be reached for comment on the settlement.

CWA adds voice to plea for VDT work place laws

WASHINGTON, D.C. — The Communications Workers of America (CWA) has joined with other segments of organized labor that are asking Congress to pass legislation to ameliorate the working conditions of video display terminal (VDT) operators.

David LeGrande, CWA representative for occupational safety and health, told a House of Representatives' labor subcommittee March 14 that VDT worker complaints of visual, musculoskeletal and job stress problems are frequent and constitute "a dangerous side effect of high tech," warranting "scrutiny by lawmakers."

The Health and Safety Subcommittee has held three days of hearings, taking testimony from labor representatives calling for government action to ensure safe working conditions for VDT operators.

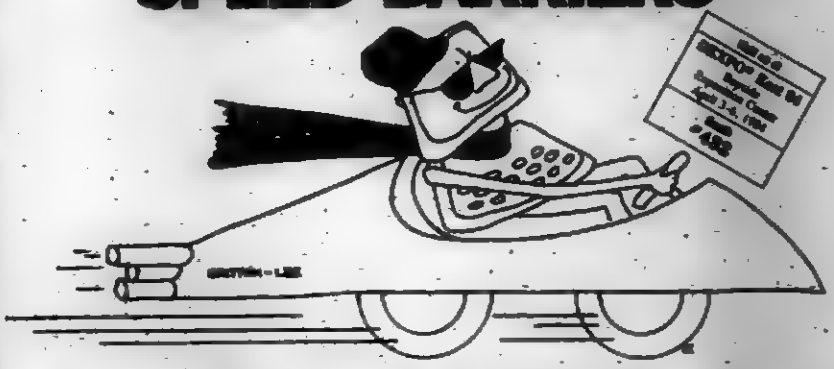
The panel will later hear from representatives of the scientific community and from terminal manufacturers.

LeGrande urged the subcommittee to encourage the National Institute for Occupational Safety and Health to begin comprehensive research projects on a number of possible VDT health hazards, including such areas as visual, job stress and reproductive problems.

He also said the Bureau of Radiological Health should set specific standards controlling the manufacture of VDTs.

Lastly, LeGrande suggested Congress adopt legislation "specific to VDT work environments." This legislation "should provide for the duration of work periods, visual testing, ergonomics, job stress research and protection from potential reproductive hazards and worker participation in the introduction and use" of VDTs.

OMNIBASE™/IDM™ BREAKS VAX™ RELATIONAL SPEED BARRIERS



Signal Technology's OMNIBASE software driving Britton-Lee's IDM database machine is breaking records because it:

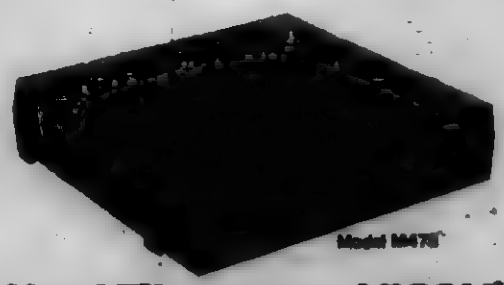
- Off-loads your VAX
- Has a much faster user response than software-only relational DBMS
- Dramatically increases productivity
- Has streamlined application development

Name _____
Title _____
Company _____
Address _____
City _____ State _____ Zip _____
Phone ( ) _____

SEND COUPON NOW FOR COMPLETE DETAILS!

STI Signal Technology, Inc.
5951 Encina Road, Goleta, CA 93117 (805) 683-3771 Outside California call toll-free (800) 368-5787
TWX 910-334-3471

IDM is a trademark of Britton-Lee Inc.
VAX is a trademark of Digital Equipment Corporation



Now MTI brings you MICOM's low cost 8-channel short-haul multiplexor at a new low price. Call today.

Instamux 470™ is designed to reduce in-building or on-campus cabling and data transmission costs. Model M478 permits eight asynchronous terminals to be connected to an in-house computer facility or data PABX using only two pairs of wires at distances of up to 5000 feet. The M478 multiplexor is transparent to terminal code and speeds to 19,200 bps.

MTI is an authorized distributor for MICOM, so we get their latest equipment first and fast. And we have the expertise to put your data communications network together in the most cost effective way.

Whether you lease, buy or rent our equipment, you'll find MTI is the one source for all the terminals, peripherals, systems, applications expertise and service you'll ever need. At great prices. Call us today.

New York: 516/621-6200, 212/767-0677, 518/449-8989
Outside N.Y.S.: 800/645-6530
New Jersey: 201/227-5552
Ohio: 216/464-6688

mti

Applications Specialists & Distributors, New York, New Jersey and Ohio.
DEC, Intel, Texas Instruments, Dataproducts, Lear Siegler, Diablo, Esprit, C.Itoh, Intecolor, Racal-Vadic, MICOM, Ventel, Develcon, U.S. Design, Dig.Eng., Cipher, Protocol Comp., MicroPro, Microsoft, Polygon, Select.

Info center seen budding under vigilant MIS

Crwth survey summarizes trends, growth

CW At CBT Conference

By Patricia Keefe
CW Staff

CHICAGO — The increase in the growth of information centers during the last three years has typically occurred under the watchful eye of the MIS department in an IBM environment, according to a recent study on information center growth.

"The Crwth Information Center Survey" was conducted by Crwth Computer Coursewares, vendor of interactive computer-based training. It was summarized at last week's Computer-Based Training Conference & Exposition here.

Among the study's findings:

■ The information center is most often organized within the MIS department, with more than half the center managers reporting to the MIS director or manager of systems and programming.

■ The user profile is broken down into business analysts who want decision-making aids (36%), clerical and administrative staff seeking basic information processing skills (25%) and supervisory personnel who need support services (15%).

■ There is no standard method for charge-back, although some respondents indicated that costs and charge-back become more of a concern as the number of users increases.

The study noted that approximately 1,400 information centers have been established since the introduction of the concept by IBM Canada in 1976. Among survey respondents, 37% launched their information centers less than a year ago. The overall number of centers is expected to double, rising to 2,100 installations by the end of this year.

This growth is not without its problems, according to the survey report. Advances in technology that are as new to experienced programmers as they are to novice end users are creating a threat to end-user support.

These technologies include fourth-generation languages, microcomputer software, networking of personal computers and mainframes, distributed data base administration and educational technology, all of which Crwth said has "landed inside the boundaries" of the information center.

The survey also found that although 88% of the respondents have less than 50 personal computers, 40% expect to add 10 to 50 more this year, typically the IBM Personal Computer. Even so, it is estimated that two-thirds of end-user applications involve large departmental or multidepartmental data bases. This suggests that end users' needs may quickly surpass the capabilities of personal computers, Crwth observed.

Other obstacles to information center implementation include a critical shortage of DP trainers, lack of end-user awareness, DP and management resistance and system resource shortages. Crwth suggested the development of an internal marketing program to communicate the benefits of the information center.

Such a program takes on added importance given Crwth's belief that a company's success will ultimately depend upon its ability to train large numbers of end users to use information resources advantageously. "By supporting end-user computing, the information center can play an important role in providing faster, better access to corporate information," the study added.

CBT combating trainer deficit: survey

By Patricia Keefe
CW Staff

CHICAGO — A "critical shortage" of DP trainers is "seriously jeopardizing" efforts to train end users to be self-sufficient in computer skills. However, many information centers are successfully overcoming this obstacle with computer-based training (CBT), a recent study on the growth of information centers found.

Conducted by Crwth Computer Coursewares, a vendor of interactive computer-based training, the study examined some of the obstacles to information center implementation. More than 150 corporations were interviewed in the survey, whose results were summarized by Crwth President Marsha Seidman at last week's Computer-Based Training Conference & Exposition here.

The survey found that the foremost obstacle to information center implementation is a shortage of DP trainers and educational/product consultants. Only 12% of the survey respondents claimed to have sufficient staff.

Moreover, very few of the information centers surveyed have full-time DP trainers or consultants. Adding to these woes are the predictions of a survey by California-based Input, a market research firm, which expects a 400% growth in the number of end users by 1986, outstripping an expected doubling of information center staff during the same period, Crwth said.

"In view of this critical shortage of DP [training staff], this problem may only be alleviated through the integration of state-of-the-art education technology in the information center," the study said. Otherwise, it warned, the information center may grind to a halt if effective alternatives are not found.

Supporting Crwth's conclusions are those information centers (56%) which have already implemented some form of CBT. In fact, the survey found that more end users are trained annually with CBT than without, regardless of staff size.

Among the information centers that do not provide CBT, 38% said they train fewer than 100 users annually, while 30% train more than 200 users a year. Conversely, among centers that do provide CBT, 22% train less than 100 users, and 45% train more than 200 users per year.

Most of the information centers using CBT, according to the survey, said it provided better training availability (97%), decreased scheduling problems (88%), offered more individualized training (94%) and improved their ability to reach remote users (81%).

The "Crwth Information Center Survey" is available free of charge to DP trainers and information center management from Crwth Coursewares, Suite 200, 613 Wilshire Blvd., Santa Monica, Calif. 90401.

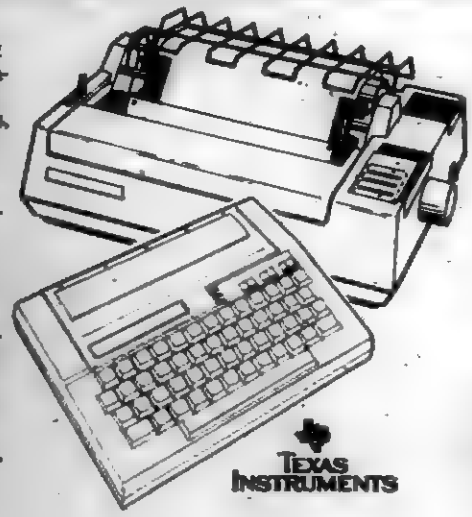
David
Recommends Texas Instruments

David Jamison Carlyle Recommends the New Generation of Printers from Texas Instruments.

Texas Instruments 850
The 850 micro printer is the first in a family of high performance matrix printers. Featuring speed (150 CPS), quality printing and graphics, plus PC compatibility, the 850 is a price performance leader with the same reliability that has made the Omni 800* series printers the standard in offices around the world.

Texas Instruments 707
The newest edition to the Silent 700 series, TI's 707 *Portable* Data Terminal uses state of the art printing and communications technology to give you all the functions needed to do business in or out of the office.

TI Printers from DJC—The Leader in Peripheral Distribution.



Texas Instruments

THE DAVID JAMISON CARLYLE CORPORATION
5700 Buckingham Parkway
Culver City, CA 90230

New Jersey (201) 788-9900
(800) 526-2623
Illinois (312) 706-4400
Texas (713) 721-4307
Colorado (303) 426-9500
Hawaii (808) 531-5136
California:
San Francisco (415) 254-9200
(800) 227-2630
Los Angeles (213) 410-9250
(800) 421-3060
Irvine (714) 854-5911
Florida:
Orlando (305) 629-1505
(800) 321-4060

THE DAVID JAMISON CARLYLE CORPORATION

CBT developers urged to focus on people needs

By Patricia Keefe
CW Staff

CHICAGO — Developers of computer-based training (CBT) products need to focus more on the diverse needs of people, developing adaptable systems to meet those needs.

"We have to learn how to make the instructional process conform to each learning personality instead of the other way around," Serge Beauregard, chief technologist and executive vice-president at Deltak, Inc., told attendees at the Computer-Based Training Conference & Exposition here last week.

Ideally, a balance must be struck between the student's and the system's control of the training. "We need an instructional medium that knows when to let go and when the student is out of control," he said, touching upon an issue that surfaced repeatedly during the conference.

See CBT page 15

CBT strategy shown to reduce training costs

CW AT CBT CONFERENCE

By Patricia Keefe
CW Staff

CHICAGO — Christopher L. Howey is a person who once practiced what he now preaches: the use of a carefully orchestrated computer-based training (CBT) strategy to reduce training costs.

Speaking before a cost-conscious flock at the Computer-Based Training Conference & Exposition here last week, Howey related his experiences in developing a cost-effective training strategy for Arthur Andersen & Co., where he is a CBT specialist.

It is not enough to know that CBT will cut costs, Howey said; proof is usually needed to convince management. Toward that end, Howey developed a methodology for examining CBT from a cost perspective.

"You want to be able to leverage capital and labor costs," he stated, and break those costs down into the four models of training delivery systems:

- Low-technology/low-labor, typically text-based self-instruction.
- High-technology/low-labor, typically computer-aided instruction alone, where few people, but a lot of equipment, are required to deliver the service.
- Low-technology/high-labor; this is an instructor-led classroom.
- High-technology/high-labor, typically the use of expert systems as job aids in work environments requiring a large labor force.

To determine which model best fits an organization's needs, Howey suggested asking how many people will be serviced, whether the course content will be stagnant over a long period and how important are other issues such as standardization of technology or instruction. Also to be considered are the pros and cons of the costs of various training alternatives, such as centralized, labor-intensive options (traditional training methods or sending people to a centralized training site); decentralized, capital-intensive options (computer-intensive training); and decentralized, labor-intensive methods (sending staff to training sessions outside the company).

CW Photo by P. Keefe
Howey

Another issue concerns the cost phases of actually developing a training program. Ticking off the three phases — design, development and delivery/maintenance — Howey urged his listeners to look out for recurrent expenditures.

Cost estimates should also be formulated, he suggested, for the participant-to-instructor ratio, the faculty ratio (how many faculty members of what type are required to teach) and the different classifications of participants, who create different billable rates. Other fixed costs include transportation, technology and production, according to Howey.

One area of cost that may be overlooked is what Howey called "lost-opportunity costs."

"The single thing that is able to justify CBT is lost-opportunity recovery, in terms of salary and travel time," he said. A shorter, more precise training period will provide a shorter payback in terms of increased productivity, he explained.

CBT from page 14

Many speakers and attendees here lamented the inflexibility of many systems that will not allow users to back up or skip over nongermane material.

Equally important is the training program's perception of who is on the other side of the screen, Beauregard said. "You have to understand that there are some limitations to a system that doesn't know whether the student is awake or asleep," he added.

Noting that each individual has a different learning profile, Beauregard predicted the development of CBT systems that take into account the aptitude, cognitive style (graphic vs. verbal orientation), motivation and personal biography of each student. To develop intelligent systems of this type, it will be necessary to "raise the IQ level" of computers, he said.

Before that can happen, however, changes will have to occur in some areas of technology, he said.

Those changes include an increase in computer "horsepower," from desktops to IBM 4300 series systems, in order to design, conceive and create more responsive learning environments; a dramatic increase in available memory; the development of a learner's "workbench" environment; and an authority system that can weave together all the parts.

These changes will open the door to the development of more expert knowledge-based systems based on artificial intelligence, he said.

Expert systems differ from such standard systems as payroll in that they can "learn" from experience, offering a diversity of information that was not in the original program; provide the combined expertise of many professionals; and use intuition in making judgements.

Attention DEC® Users:

See how MTI can save you $5,260 on your next 300 lpm matrix printer.

DEC LXY12
$11,250

MTI's CI-300
(CIE Terminals)
$5,990

That's $5,260 less than the DEC LXY12, and the price includes DEC controller, cable, universal power supply, pedestal and paper basket.

MTI's CI-300 is a DEC plug-compatible LXY12 emulator. And it's a lot more printer for a lot less money. It features a resolution of up to 400 dots per inch in letter-quality mode, and up to 200 dots per inch in graphics mode. Ask your MTI salesman for information on its many advantages and superior performance over the LXY12. We are authorized distributors of CIE Terminals, and can enhance your DEC system quickly and efficiently.

Whether you lease, buy or rent our equipment, you'll find MTI is the one source for all the terminals, peripherals, systems, applications expertise and service you'll ever need. At great prices. Call us today.

New York: 516/621-6200, 212/767-0677, 518/449-5959
Outside N.Y.S.: 800/645-6530
New Jersey: 201/227-5552
Ohio: 216/464-6608

mti

Applications Specialists & Distributors, New York, New Jersey and Ohio.
DEC, Intel, Texas Instruments, Dataproducts, Lear Siegler, Diablo, Reprit C.Itoh, Intecolor, Ricoh-Vectir, MICOM, Ventel, Develcon, U.S. Design Dig.Eng., Cipher, Protocol Comp., MicroFox, Microsoft, Polygon, Selmt.
*DEC is a registered trademark of Digital Equipment Corp.

Source code control is only one step in software configuration management.

Softool's Change and Configuration Control (CCC™) takes you all the way to full configuration control!

CCC automates: Management of changes and configurations, control over who makes what type of changes and where, tracking of trouble reports, reconstruction of previous versions, management reports, archiving, and all the remaining "steps" to total configuration control.

CCC is supported on the DEC VAX, DG MV, Gould S.E.L., Honeywell 6000 (Level 66 and DPS 8), HP 9000, and IBM 370, 30XX and 43XX computers.

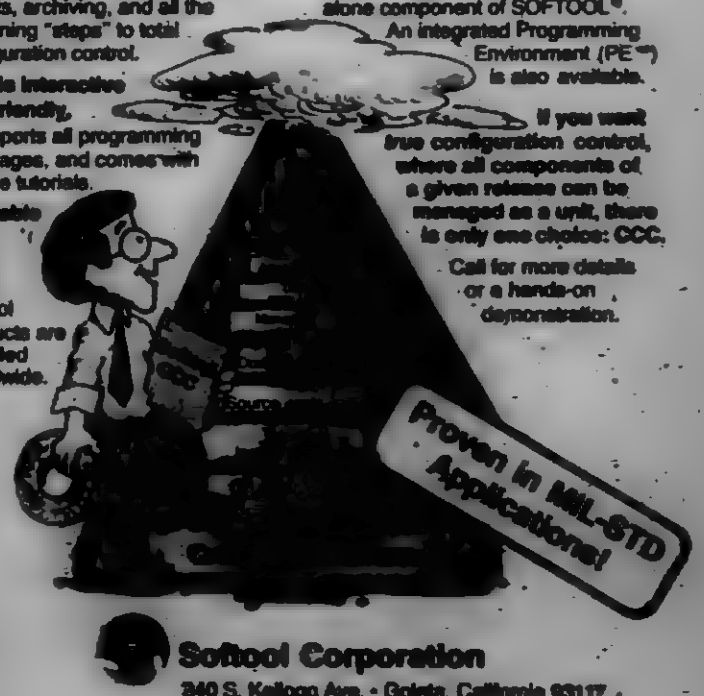
There is more. CCC is a stand-alone component of SOFTOOL®. An integrated Programming Environment (PE™) is also available.

CCC is interactive and friendly. It supports all programming languages, and comes with on-line tutorials.

If you want true configuration control, where all components of a given release can be managed as a unit, there is only one choice: CCC.

Available now! Over 1000 Softool products are installed worldwide.

Call for more details or a hands-on demonstration.



Softool Corporation
340 S. Kellogg Ave. • Goleta, California 93117 •
(805) 964-0560 • Telex: 658334

Consultant warns of inherent risks of CBT

Trainers need clear grasp of forces involved in CBT implementation

CW AT CBT CONFERENCE

By Patricia Keefe
CW Staff

CHICAGO — Advocating change in any corporate operation can be pretty risky, particularly when new concepts are involved, and "every time you do something with computer-based training [CBT], you will be doing it for the first time," a management consultant warned here last week.

The introduction of any new program boils down to five phases: initial enthusiasm, disaster, search for the guilty, punishment of the innocent and praise and reward of nonparticipants, quipped consultant Gloria J. Gery, president of Gery Associates and vice-president of The Courseware Developers, Inc.

The road to successful implementation of CBT is paved not with good intentions, but rather with a clear grasp of the forces involved — pro and con — she advised participants at the Computer-Based Training Conference & Exposition. "All too often, people are pushed to get CBT and then punished because mistakes are made," she said.

Points to consider

Gery's presentation addressed a number of points that training managers should consider when selecting and implementing CBT systems. Successful implementation of CBT, she said, starts with gaining sponsorship within the organization. Sponsorship translates as financial support and is vital to the success of any program, yet often is taken for granted, she said.

To gain corporate support, managers need to motivate change. This is accomplished by assessing the current scope of training, figuring out what the options are and creating a vision of the desired state, she continued.

It is important to be realistic here, because many CBT vendors and consultants have succeeded in creating ridiculous expectations in users, Gery contended, and training managers risk loss of credibility when these hopes are dashed.

When selecting courseware, planners should realize that training is part of the package. "A well-designed [CBT] system doesn't need a training course," Gery claimed. Some of the risk in software selection and development can be alleviated if planners first educate themselves about the process involved.

CW photo by T. Keefe
Gery

CBT advocates want to be in a position to manage change systematically, creating a favorable imbalance between the driving forces for and against CBT, Gery said. Although there are many good reasons to use CBT, the pitfalls are also many, she added.

The foremost pitfall, she said, is the impact of technological advances. Although new technologies are expected to make the transition of CBT from conceptualized ideas to a viable reality, the speed with which these changes are occurring has created a measure of instability. Courseware companies are springing up all over, and standardization is still unsettled, she added.

There are many myths about CBT development that managers would do well to avoid, Gery advised. Among those myths, she noted, is the easy program change.

She warned that the more integrated the system, the more difficult it is to make the changes. Nor is distributing those changes digitally likely to be any less a nightmare than doing so manually, Gery maintained. Moreover, getting programming help to make those changes can be difficult.

"Sell MIS on the productivity gains resulting from your program; otherwise you could be bumped off the system or end up with unused courseware," Gery concluded.

DPMA group elects chief

PARK RIDGE, Ill. — Bruce E. Spiro has been elected 1984 president of the Data Processing Management Association (DPMA) Education Foundation. Formerly vice-president of the foundation, Spiro is chief of the Automatic Data Processing Equipment (ADPE) systems management office at the U.S. Defense Communications Operations Center.

Spiro joined the U.S. Defense Communications Agency in 1965 as head of the ADPE systems for communications control. The Defense Communications Agency provides development, engineering and management for the Defense Department's long-haul communications.

Elected to the foundation's board of regents were Dr. Joseph G. Dekan of the Department of Computer Science at the University of Texas in Austin; M. H. Schwartz, general manager of Software Quality Service, Bethesda, Md., and author of *The Electronic Cottage*; and H. Ray Souder of Northern Kentucky University's Department of Information Systems.

IEEE to offer videoconference

PISCATAWAY, N.J. — "Personal Computer Software — An Aid to Improved Professional Productivity" is the subject of a one-day videoconference that will be given via satellite to selected universities, companies and other locations throughout the U.S. on June 12. It will be broadcast via an interactive one-way video, two-way audio network by the Institute of Electrical and Electronic Engineers (IEEE).

The course will provide an overview of software tools currently available for personal computers to improve professional productivity. Topics to be covered include the role of an operating system, modern programming and design languages, data base systems in the engineering process, project management tools, graphics and electronic mail.

Emphasis of the course will be on the capabilities of applications software available for professional use rather than on specific technical applications, a spokesman said. Telephone hookups will allow participants to interact with the lecturers.

Further information on the videoconference is available from the IEEE Continuing Education Department, located at IEEE Service Center, 445 Hoes Lane, Piscataway, N.J. 08854.

Face the REAL COSTS of Divestiture: Optimizing Mixed Carrier/Vendor Networks — Diagnostics — Control & Maintenance

Learn how at the new NETWORK MANAGEMENT TECHNICAL CONTROL Conference & Exposition

Seminars: May 21 & 22 Conference & Show: May 23 & 24

For full program information call: 1-800-225-4698, in Mass. 617-879-0700

Produced by the COMMUNICATION NETWORKS Conference Team, Box 880, Framingham, MA 01701

Show Sponsors Include:
Avant-Garde • Paradyne
• Dynatech Data • Pulsecom
• General Datacom • Heldmian
• Racal-Milgo

Other exhibitors include companies such as Arus Corp. Datacom Management Sciences, Digilog, Digitech Industries, Infinet (formerly Intertel), Intotron, International Data Sciences, Vezza-Lite, plus consultants and software specialists offering design, analysis and data service.

FREE EXHIBIT TICKET
Bring to Sheraton Washington Hotel,
2660 Woodley Road, N.W., Washington, D.C.
Exhibits open: May 23, 9:30 - 5:00
May 24, 9:30 - 4:00

Name _____
Title _____
Company _____
Address _____
City _____ State _____ Zip _____
Phone ( ) _____

Sperry DP study programs debut

PRINCETON, N.J. — Sperry Corp. Computer Systems Education has published a series of computer literacy self-study training programs for people interested in learning about the latest technologies.

Programs in the Sperry Computer Literacy series include "Introduction to Computers and Data Processing," $9.95; "Programming Theory and Design," $7.95; and "Number Systems," $4.95. Three other programs about Fortran, Pascal and Cobol languages are priced at $16.95 each. A program about the RPG-II language costs $19.95.

More information about the series is available from Sperry Computer Systems Education, P.O. Box 2191, Princeton, N.J. 08540.

COMPUTERWORLD READER QUIZ

YES	NO	
☐	☐	1. Is *Computerworld* on your desk every Monday morning?
☐	☐	2. Do you receive *Computerworld On Communications* and *Computerworld Office Automation* every other month?
☐	☐	3. Do you know about the latest job position announcements? (when you've still got time to send your resume)
☐	☐	4. Can you rely on *Computerworld Buyer's Guides** for product information? . . .
☐	☐	5. Do you know the very latest news in the computer field?

If you've answered **NO** to any of the above, you're probably reading someone else's issue of *Computerworld.* Don't you need your own? When you're a subscriber, we'll guarantee that *Computerworld* is on your desk every Monday morning. And, what's more, as part of your subscription, you'll receive all of our special-focus publications.

Now's your chance to say YES! Subscribe today for a full year of Computerworld at our special introductory rate of $39 (save $5 off the $44 annual subscription rate).

Complete Form On Reverse, Then Return In Attached Postage-Paid Envelope. Or Use Your Charge Card and Call TOLL-FREE: 1-800-343-5730.

☐ **Please enter my subscription (details on back)**

☐ **I'm already a subscriber, but I'd like you to change my:**

☐ address ☐ title
☐ industry ☐ other

My current mailing label is attached and I've filled in new information on the other side.

Put old label or label information here

COMPUTERWORLD

*U.S. Only

CW-138

**Please send me COMPUTERWORLD for one year. RATES: United States $44;
Canada, Central & South America $110; Europe $165;
All Other Countries $245 (Airmail Service)**

**Special Introductory Offer —
Only $39.00 Save $5.00**

☐ Check Enclosed
☐ Am-Ex ☐ BA/Visa ☐ MC (MC Only - List four digits above your name)

If charge we must have cardholder's signature: _____ Expiration Date: _____

First Initial		Middle Initial		Surname	
Your Title					
Company Name					
Address					
City			State	Zip Code	

Address shown is:
☐ Business
☐ Home

☐ Check here if you do not wish to receive promotional mail from *Computerworld*.

☐ Check here if you're interested in receiving information on *Computerworld*'s Index.

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

CIRCULATION DEPT. 375 Cochituate Road, Rte. 30, Box 897,
Framingham, MA 01701-9985

Detach here, moisten and seal envelope securely before mailing.

1. BUSINESS/INDUSTRY (Circle One)
End Users
10 Manufacturer (other than computer)
20 Finance/Insurance/Real Estate
30 Medicine/Law/Education
40 Wholesale/Retail Trade
50 Business Service (except DP)
60 Government—State/Federal/Local
65 Public Utility/Communication Systems/Transportation
70 Mining/Construction/Petroleum/Refining
75 Other User _____
Vendors
80 Manufacturer of Computers, Computer-related Systems or Peripherals
85 Computer Service Bureau/Software/Planning/Consulting
90 Computer/Peripheral Dealer/Distributor/Retailer
95 Other Vendor _____

2. OCCUPATION/FUNCTION (Circle One)
11 President/Owner/Partner/General Manager
12 VP/Assistant VP
13 Treasurer/Controller/Financial Officer
21 Director/Manager/Supervisor DP/MIS Services
22 Director/Manager of Operations/Planning/Administrative Services
23 Systems Manager/Systems Analyst
31 Manager/Supervisor Programming
32 Programmer/Methods Analyst
35 OA/WP Director/Manager/Supervisor
38 Data Comm Network/Systems Mgmt
41 Engr/Scientific/R&D/Tech Mgmt
51 Mfg Sales Reps/Sales/Marketing Mgmt
60 Consulting Mgmt
70 Medical/Legal/Accounting Mgmt
80 Educator/Journalist/Librarian/Student
90 Other _____

3. COMPUTER INVOLVEMENT (Circle all that apply)
Types of equipment with which you are personally involved either as user, vendor or consultant
A. Mainframes/Superminis
B. Minicomputers/Small Business Computers
C. Microcomputers/Desktops
D. Communications Systems
E. Office Automation Systems

OW-138

NEWS

Forum explores computing in campaigns

By James Connolly
CW Staff

WASHINGTON, D.C. — Data from drivers' licenses and magazine subscription lists, micro-to-mainframe links and laser printers let political candidates mold their campaigns and reach voters, according to speakers at a recent forum here.

Tobe

Computers in campaigns mean the ability to identify potential supporters from the 250,000 names in a congressional district, mass-mail personalized letters to those supporters and manage the business side of a campaign, said the speakers at the Annenberg Schools of Communications' Washington Program on Communications and Technologies.

"Almost all campaigns are aware that computers are affecting the campaign industry and realize that they are going to have to use them or see them used against them," said Frank Tobe, president of Below, Tobe and Associates, a Los Angeles firm that specializes in campaign software and campaign data services. Key uses for computers in elections are the identification of voters and support in reaching those voters "to change an opinion or to help the voter form an opinion."

Tobe told campaign workers, journalists and political scientists how technology can help a candidate. Using an IBM 3031-AP mainframe with 8M bytes of main memory, 4G bytes of disk memory, various tape drives and four printers — including a Xerox Corp. 9700 laser printer — Tobe's firm maintains data on 16.6 million voters in 38 states.

He and other consultants, including William P. McMillen of Connecticut and Edward Schneider of Detroit, explained how cross-matching the information in the public domain, such as voter registration and drivers' licenses, can be merged with commercially available lists, such as telephone directories and magazine subscription lists, to develop voter profiles by district, neighborhood and individual.

McMillen told the 75 forum attendees that 1980 independent presidential candidate John Anderson determined that some of his best supporters fit a particular mold. Using overlays, Anderson compiled lists of voters who were over 40 years old, drove foreign cars, read *The New Republic*, bought "high ticket merchandise" and lived in suburbia.

Schneider emphasized that such data bases must be built from various sources and that no single source provides a clear enough profile for candidates to make decisions.

Tobe said that in the 1984 election year, his company will produce 100 million pieces of mail, targeting not only voters, but also officeholders facing decisions on assorted issues. He told how laser printers can produce thousands of premarked absentee ballots with party slates checked off for voters in states that allow such balloting.

Such printers also have produced up to 2,160 mass-mailed constituent letters for each congressman, with each letter bearing a different voter's name, personalized letterhead and personalized type font. To distinguish the letters from other mass mailings, Tobe's firm asks voters to mail the letters in their own envelopes.

'Get out the vote'

The printers can also produce "get out the vote" messages, with the names of hard-to-elect candidates highlighted in their least secure voter neighborhoods.

Micro-to-mainframe links and communications among microcomputers also are becoming crucial for candidates, Tobe said. He reported that the Liberal Party in Canada is expected to use 90 or more IBM Personal Computers and compatible micros to allow campaigns of parliamentary candidates in different districts to share data in the upcoming elections there.

Tobe observed that today's voters are more "individualized" than their predecessors, and that campaigns must appeal to that individualism rather than relying on party loyalty. "If we know a person is a senior citizen, we can address that in the body of a letter. It may seem to be fleeting, but it isn't. We want to make that person pay just a little bit more attention to the message and hope [he] will remember the candidate's name favorably — or at least not unfavorably — and look for other things that the candidate has to say," Tobe said.

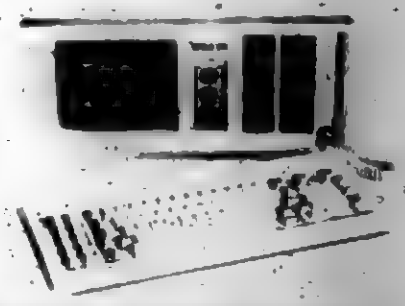
In some cases, he noted, candidates can include in data bases such details as whether a woman uses "Miss" or "Ms.," whether the person has ever met the candidate and the voter's likely ethnic background, based upon a dictionary of surnames.

When questioned by his audience about the ethics of directing a message to a single ethnic, economic or neighborhood group, Tobe emphasized that the concept of voter targeting is designed to inform voters of a candidate's stand on any of the several issues that concern the voter. The practice would be unethical, he said, only if the candidate sent "contradictory" messages to different voters.

According to Tobe, the value of computer-generated direct mail is particularly high in metropolitan areas such as Los Angeles, where it

See MAIL, page 18

Eagle Spirit
Portable Computer



Special Leasing Offer
$245/Mo. (Limited Time)
Including Maintenance

Call Toll Free
800-257-7748
In NJ 609-222-6510

Introducing the Eagle Spirit XL from Data Access Systems, Inc., a portable with the power of many desktops, including the IBM XT.

Along with its high degree of IBM compatibility, the Spirit has a memory expandable to 640K bytes, two serial and one parallel port, a 10M byte hard disk, built-in graphics and more!

So if you're looking for quality and power in a portable computer, look for the Eagle Spirit XL from DASI, the leader in quality data communication products.

DASI sells, leases and services to the corporate user from an extensive inventory of PC's, CRT's, printers and modems. Its nationwide service locations give you same day on-site service. And with its multi-million dollar leasing base, DASI will tailor a financial package to meet any budget.

The Eagle Spirit and DASI...
An Industry Leader for 15 Years.

District Offices:
Atlanta (404) 955-2255
Boston (617) 769-6420
Chicago (312) 887-0440
Cleveland (216) 473-2131
Dallas (214) 263-0252
Denver (303) 337-4103
Detroit (313) 979-7300
Houston (713) 682-3866
Los Angeles (213) 538-2230
Minneapolis (612) 854-4466
New Jersey (201) 227-6060
New York City (212) 564-6301
Philadelphia (609) 235-6660
Phoenix (602) 254-1027
San Francisco (415) 572-1611
Seattle (206) 575-1446
Washington, DC (301) 468-6977

D A S
DATA ACCESS SYSTEMS, INC.
Cotton & Canadian Avenues
P.O. Box 1230
Blackwood, NJ 08012
(609)/227-6700 NJ(609)/227-7748
In NJ (609)/222-6510

Ever wish there were about five more of you?

Multiply programmer productivity with the Programming Environment (PE™) from Softool.

With PE you compose substantial portions of an application program from prefabricated code, and produce finished software that is fully checked out, documented and standardized!

Many PROVEN tools. PE is an integrated set of proven software tools that literally multiplies programmer effectiveness. It is like having another programming staff . . . on-line! Tools available include: structured languages, source code auditor, source code documenter, interface documenter, error detectors, libraries of prefabricated code, testing aids, tracing aids, optimizers, flow analyzers, conversion tools . . . and much more.

PE is interactive and friendly. It provides a consistent user interface, plus on-line tutorials.

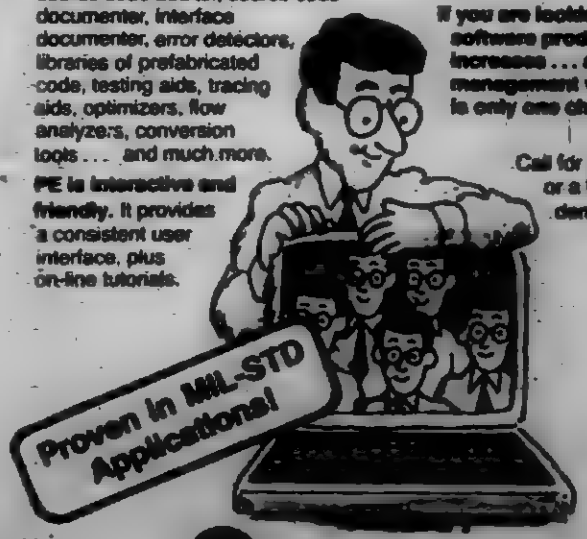
PE supports both FORTRAN and COBOL.

Available now. Over 1000 Softool products are installed worldwide. PE is supported on the DEC VAX, DG MV, Gould S.E.L., Honeywell 6000 (Level 66 and DPS 8), HP 9000, and IBM 370, 30XX and 43XX computers.

There is more. PE is a stand-alone component of SOFTOOL®. A complete Change and Configuration Control Environment (CCC™) is also available.

If you are looking for true software productivity increases . . . and for management visibility, there is only one choice: SOFTOOL.

Call for more details or a hands-on demonstration.



Softool Corporation
340 South Kellogg Avenue • Goleta, California 93117
(805) 964-0560 • Telex 658334

NEWS

Variety of sources seen critical to targeting voters

By James Connolly
CW Staff

WASHINGTON, D.C. — Drawing information from a variety of sources is the key to developing useful campaign data bases, a consultant told the Annenberg Schools of Communications' Washington Program on Communications Technologies and Politics here recently.

A computerized data base designed to target voters — to show a candidate which voters are friendly, or persuadable, and how to reach them — should utilize a combination of five sources, none of which can stand alone reliably, advised Edward J. Schneider, vice-president of Market Opinion Research of Detroit. The five sources are party organizations, previous election returns, political polls, census reports and lists such as telephone directories, magazine subscription lists and real estate tax rolls.

"What you need to do is to combine them so that the strengths of one lead into another," Schneider said. For example, party organizations and election returns might identify which voters are likely to vote and which voters need services such as rides to the polls. Meanwhile, census data can tell the candidate about a neighborhood's economic or educational makeup and give information about its home ownership pattern.

However, none of those sources tell the candidate what the voter is thinking, Schneider stressed.

'Clusters' advised

Schneider, whose company has done political work for individual candidates and for causes, advised the use of "clusters" to organize telephone or door-to-door surveys that can show what types of voters favor his firm's clients.

Those clusters can be built with the data drawn from the five key sources, Schneider said. A candidate might include in one cluster wealthy, well-educated suburban residents and in another cluster poor, uneducated urban residents.

He told how surveys will indicate, on percentage bases, which clusters favor the candidate, which are opposed and which rest in the middle, where they can be persuaded by either side in the campaign.

The data base, maintained on mainframes operated by companies such as his for major campaigns and used on microcomputers on the local level, can then be used again, he reported, to organize voter registration drives, fund raising, volunteer recruiting and "get out the vote" campaigns.

Those efforts are aided by the presence in the data bases of telephone numbers, ages, occupations and other information, Schneider noted.

Here's a hungry market for your computers

Libraries today are practically eating up computers and related products. There are 35,748 public, academic and business libraries in the U.S., with a voracious appetite for mainframe, micro and minicomputers, and for accessories and software.

Reaching the people with the power to put your computers and related products in their libraries can translate into big sales. The way to reach those decision makers is in the pages of LIBRARY JOURNAL.

LIBRARY JOURNAL is the leading magazine for news and developments in the library world, and for information and advice on the roaring growth of computer applications in libraries. It is the only full-service publication in its field, where you can effectively target your message to the influential buyers in public, college and university, and business libraries.

If you'd like to put your computers and related products on the menu of America's hungry libraries, check out LIBRARY JOURNAL. Return the attached coupon today.

☐ Please tell me more about LIBRARY JOURNAL
☐ Please have a representative call me.

Name _____
Title _____
Company _____
Address _____
City _____
State _____ Zip _____
Phone _____

Mail coupon to: Ms. Carol Brissie, Research Manager, LIBRARY JOURNAL, 205 East 42nd St., New York, NY 10017

LIBRARY JOURNAL

Hammer to talk at Federal Expo

WASHINGTON, D.C. — The former director of computer sciences for Sperry Corp., Dr. Carl Hammer, will deliver the keynote address at the 10th Federal DP Expo and Conference April 17-19 at the Washington Convention Center here. The topic of his address will be "Here Come the Micros: The Federal Future."

Hammer, president of Research Consulting Services in Washington, also served as manager of scientific computer applications for RCA Corp. He is a fellow of the American Association for the Advancement of Science. In addition to his address, he will present the first annual Hammer Award for the best conference paper.

Federal DP Expo will feature a 47-session conference highlighting the integration of desktop computers into the federal government's mainframe-based environment.

Registration for the conference for government employees is $95 for the full program or $40 for one day. Registration for all others is $125 for the full conference and $55 for one day. Government employees may attend the exhibits for free; all others must pay $10.

A discount registration fee for groups of five or more is also offered. More information about the conference can be obtained from The Interface Group, 300 First Ave., Needham, Mass. 02194.

MAIL from page 17

may be the only contact a candidate has with most voters. That may occur because a metropolitan area may have 20 or more congressional seats and dozens of candidates vying for news media exposure.

Tobe said that managing a campaign by computer has become more crucial, since the number of campaign workers has dropped, while the cost of campaigns has increased. Such management can involve organizing volunteers according to what tasks they can do and when, candidate scheduling, financial accounting, budgeting, word processing and operating telephone banks.

NEWS

GOP seen years ahead of Democrats in computer use

By James Connolly
CW Staff

WASHINGTON, D.C. — The Republican Party, with a shortage of registered voters, is "10 years ahead" of the Democratic Party in building computerized national data bases for election campaigns.

However, Democrats at the grass roots level are more quickly recognizing the value of microcomputers than are their GOP opponents.

Those observations were offered by a Connecticut political and computer consultant who spoke here earlier this month at the Annenberg Schools of Communications' Washington Program on Communications Technology and Politics.

"The Republican Party is 10 years ahead of the Democratic Party as far as using computer technology, at least with major systems and major data bases," said William P. McMillen, chairman and founder of Word Communications Systems, Inc. of Ellington, Conn. Addressing 75 campaign workers, journalists and political scientists, McMillen added that Republicans have tended to centralize their party by using mainframes at national headquarters and sending relevant data to local candidates.

In contrast, Democrats have been less likely to centralize their data, according to McMillen. Instead, they have leaned toward smaller, microcomputer- and minicomputer-based systems for campaigns ranging from municipal elections to congressional races. McMillen reasoned that a growing number of Democratic campaign workers, particularly at the local level, have been young, college-educated and computer-literate.

The systems that McMillen referred to are used in 10% to 15% of all campaigns and in almost all races for congressional seats, he reported. "Overall, it is still a comparatively low percentage of campaigns that are using computers regularly. What is happening, however, is that you talk to a campaign and they say that Uncle Joe has a computer and that they are going to try some things on that. Of course, like everything else, as the prices keep going down, there are going to be a lot more computers out there."

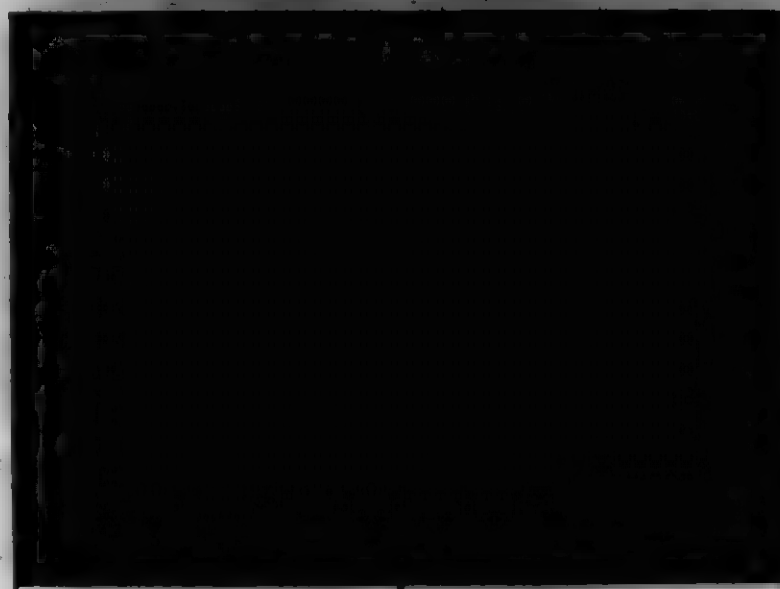
McMillen, whose firm produces Politech I software for IBM Personal Computer XTs and the Candidate Information System for the IBM System/34 and 38, contracts with candidates to compile data bases in various elections.

The systems are intended to let the candidate target and reach potentially favorable voters, contributors, volunteers and news media; help the campaign save time and money by steering away from clearly hostile voters; and help manage the campaign as an organization. Management modules perform tasks such as strategy planning, volunteer organization, scheduling, budgeting, accounting and financial reporting.

McMillen said computers are used often for word processing and generating mail. Those uses include general clerical work and direct mail — often personalized for the voter — in connection with letter writing and speech writing, many campaigns are now using their computers to tie into commercial data bases such as those offered by United Press International and The Associated Press to aid in research.

McMillen observed that campaigns haven't been at the forefront in developing or accepting computer technology. "Campaigns are still backwards. These programs that we're talking about aren't magic. They've been developed for business for 10 years. You also won't see campaigns innovating, because they're here today and gone tomorrow. What you will see are things being developed for business, and we will mimic them."

RAMIS II MAKES YOUR INFORMATION CENTER A GREAT PLACE FOR PEOPLE.



RAMIS II's complete solution is the most effective way to multiply the productivity and satisfaction of your end users and your Information Center staff. Today, RAMIS II means success at hundreds of Information Centers around the world.

POWER AND SIMPLICITY FOR END USERS

RAMIS II provides everything users need for maximum productivity. Its powerful report writer, relational database and language, full-color business graphics, SAS® interface, and many other capabilities meet the most advanced decision support needs. And, with our new RAMLink, IT series, and RAMIS II/PC software, end users have the ideal solution for mainframes and personal computers.

RAMIS II English comprehension extends the power of your Information Center to a multitude of new computer users. Through advanced knowledge-based technology, even people who've never been on speaking terms with a computer can ask questions, obtain answers, and create reports in only a few minutes using everyday English.

EFFICIENCY AND RELIABILITY FOR SUPPORT STAFF

Our complete solution lets your existing staff support many more users by dramatically reducing the number of products you need. And RAMIS II makes your support job easier with built-in computer-based training plus facilities to monitor and control usage.

RAMIS II delivers the performance and reliability needed to tackle even the largest decision support tasks with confidence. In fact, because RAMIS II is also a complete application development system, single-user systems can evolve smoothly into full-fledged applications.

SAS® is a registered trademark of SAS Institute, Inc.

RAMIS®II... THE LEADER BY DESIGN

Boston (617) 262-9626 Chicago (312) 670-9710 Dallas (214) 788-1764 Houston (713) 688-8077 Los Angeles (213) 670-6662 New York (212) 986-8877 Princeton (609) 799-5000 San Francisco (415) 986-4888 Washington, DC (Vienna) (703) 893-0700 Detroit (313) 559-5450 Bangkok (9) 321890 Buenos Aires (541) 4348881 Caracas (582) 239-0966 Johannesburg (011) 331-9945 Hong Kong 5-435714 Johannesburg 27 11 788-1600 Bogotá (1) 600-7233 London (01) 568-9281 Milan (2) 345-0330 Stockholm (8) 656789 Ottawa (613) 230-8656 Paris (1) 776 61 71 Rotterdam (10) 21414 Singapore 272 1055 Stockholm (8) 656730 Sydney (02) 923 1677 Tel Aviv (052) 76814 Waterloo (416) 571-2272

LISTEN TO OUR USERS

Send for our free guide, "Why Information Centers Succeed." It contains practical suggestions for success from RAMIS II Information Center staffs of organizations like yours. Organizations that have found that RAMIS II, the real leader in complete software for business, is the sure way to make an Information Center a great place for everyone.

To get your copy, contact your local Mathematica office, call toll free (800) 257-5171, or return the coupon below.

MATHEMATICA PRODUCTS GROUP

A MARTIN MARIETTA DATA SYSTEMS COMPANY
P.O. Box 2392
Princeton, NJ
08540

MATHEMATICA PRODUCTS GROUP
P.O. Box 2392 Princeton, NJ 08540

Please send me a free copy of "Why Information Centers Succeed."

Name
Title
Company
Address
Telephone
Computer Operating System

RW 3/19

First Chicago is launching a whole world of new banking services with ***Tandem NonStop Computer Systems.***"

At The First National Bank of Chicago, providing responsive on-line financial services for our customers is a common corporate priority. An important part of that commitment is the global implementation of core applications on Tandem NonStop Computer Systems.

Utilizing a common data base structure on systems distributed throughout the world provides immediately useable information uniquely suited to internal reporting and accounting. Included are such time-sensitive items as foreign exchange trading, money market transactions, loan contracts and SWIFT transfers. We call this system F I R S T, First Chicago International Real-time System for Transaction.

Tandem systems also support our installed and expanding consumer and commercial funds transfer, balance reporting, and cash management systems, which move billions of dollars for our customers daily. Our Cash Station ATM switch is an excellent example. The modular nature of the Tandem solution enables us to sustain and improve quality by adding such capabilities incrementally, where and when they're needed.

Our Tandem systems are proving reliable. We look forward to being impressed with the systems that support us, with our employees, with our customers. Their enthusiastic acceptance of Tandem systems is helping us improve customer service.

The NonStop System.

The only computer on the market today that can support an integrated network of up to 255 16-processor systems supporting thousands of terminals in a worldwide, distributed, transaction-based environment.

Tandem. Fully supported by worldwide sales, training, service and manufacturing organization.

For more information on the Tandem application at First Chicago and a copy of our brochure, "Solutions in Banking," contact your local sales office or Tandem Computers Incorporated, 19333 Vallco Parkway, Cupertino, California 95014, U.S.A. Toll Free 800-482-6336.

TANDEM

NonStop Transaction Processing

Navigate through performance problems with EPILOG™/MVS

Before EPILOG/MVS, performance problems were often hidden in piles of printouts and pages of reports.

With EPILOG/MVS, you can find the answers to your questions about…user response… service levels…capacity management… and more.

The problems of wading through masses of data are now solved by a breakthrough in EPILOG/MVS. It's called the System Performance Navigator. With it you visually identify a problem area on the CRT (example, Figure 1: long response time of 1.81 seconds on Tuesday, July 5). Then you simply put a command character (e.g., "D" for degradation or "R" for resource utilization) on the problem line (marked by the arrow). The System Performance Navigator will immediately generate the next display customized to the specific problem area.

EPILOG/MVS guides you from problem to solution in as little as three easy steps. The System Performance Navigator allows you to navigate: from weekly summary information to hourly details, from service levels to degradation analysis, and from degradation analysis to resource analysis.

EPILOG/MVS: Simple to use—but powerful!

For more information, contact your Candle representative.

!Candle®
10680 Wilshire Boulevard., Suite 2404
Los Angeles, California 90024
(213)207-1400

Figure 1—*User notes long response time for July 5, and enters "D" to generate degradation display in figure 2, at the arrow.*

Figure 2—*User observes that Private Page-In Wait is a problem and enters "R" to generate page dataset activity display in figure 3, at the arrow.*

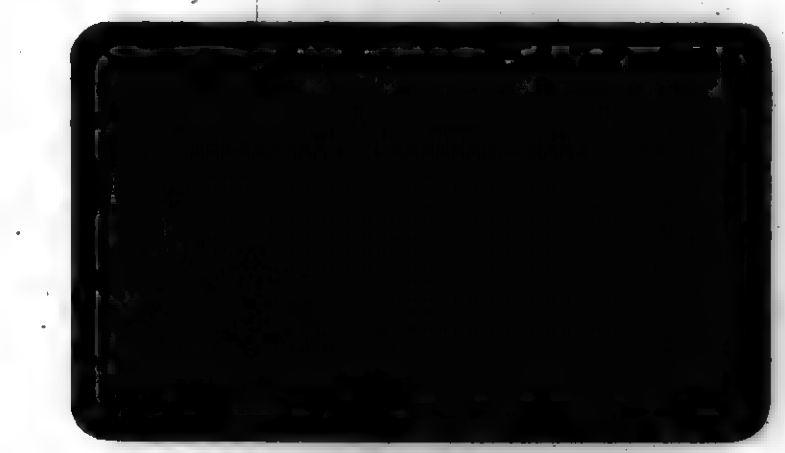


Figure 3—*For detailed analysis of the paging resource, EPILOG/MVS shows statistics on both the page datasets and the DASD devices they reside on. This screen shows the cause of the problem: device contention causing very high busy rates on devices 150-152 which contain the local page datasets.*

☐ Please send me more information on EPILOG/MVS.

☐ Please enter my free subscription to the Candle Computer Report.

Name/Title

Company

Address

City/State/Zip

Phone

!Candle®

Dept MI - 10680 Wilshire Blvd. Suite 2404 - Los Angeles, CA 90024

A-226

NEWS

INTERNATIONAL REPORT
CW International News Network

AUSTRALIA

BRISBANE — An intelligent software editor that is said to prevent compilation errors is under development here at ICL, Inc. The first working system is due for delivery within the year, a spokesman said. The front-end editor will be based on ICL's Perq Professional workstation, which features graphics capabilities in addition to processing and storage power. It reportedly will perform compilation checking at the program input stage, carrying out syntax and semantic checks.

■

SYDNEY — The Net/Master network management and control software from Software Developments Pty. Ltd. will be distributed on a worldwide basis by Cincom Systems, Inc. Under the terms of a recent marketing agreement, the two companies will receive royalties on each package or component of Net/Master sold.

■

MELBOURNE — The Broken Hill Proprietary Co. Ltd. has ordered 21 SAS Software Pty. Ltd. data management packages for its Data General Corp. MV series minicomputers, even though some of the software products have not been fully converted to run on DG equipment. The order is valued at approximately $80,000.

FRANCE

PARIS — IBM dropped prices here and elsewhere on its Personal Computers. In Paris, prices fell 18% on the diskette version of the Personal Computer and 6% on the Personal Computer XT. In Stuttgart, West Germany, IBM GmbH slashed prices by about 20% on the basic Personal Computer and 10% on the XT; in Stockholm, IBM Sweden cut prices by 20% on the Personal Computer and 8% on the XT.

■

CANNES — A series of computers and office automation systems for the European market was unveiled here recently by Northern Telecom, Inc. Called the Vienna Family, the series reportedly combines a fully compatible range of hardware, international communications standards and widely used operating systems and languages. The system is based on Intel Corp. microprocessors and a twin Microsoft, Inc. MS-DOS/Xenix operating system.

JAPAN

TOKYO — Meiji Mutual Life Insurance Co. and Toshiba Corp. will jointly develop a large-scale document managing system incorporating Toshiba's optical disk file device, Toshiba 3200 and a local-area network.

■

TOKYO — The Ministry of Labor has released a report that lists a number of guidelines for the protection of VDT operators. The report is the result of a year-long study conducted by the Ministry and consists of three parts: working environments, working conditions and health management practices. One of the many recommendations made by the Ministry is that VDT operators should take a 10- to 15-minute break after every hour worked on the VDT.

■

TOKYO — Nippon Steel, which claims to be the world's largest steel manufacturer, will establish a computer network composed of several different types of systems scattered around Japan. The first step in the planned network was the formation of a data base for the Ironworks Operation Analyzing System at Nippon's Tokyo headquarters, which can reportedly be accessed by each of the company's ironworks sites.

NETHERLANDS

AMSTERDAM — Apparently IBM's antitrust days are still not over: The case between Big Blue and the European Economic Commission (EEC) is still making news here. Two of the four original complaints — concerning interface information and the bundling of a CPU with a certain amount of memory — still stand. The other two complaints — the bundling of system software with the CPU and the system installation productivity options — were dropped last year. Dutch Commissioner Frans Andriessen will render a decision on the case.

■

AMSTERDAM — The University of Nijmegen will be Holland's first user of Lisp Machine, Inc.'s Symbolics 3600 system. In all of Europe, there are only 25 Lisp systems installed, according to a spokesman.

SWEDEN

STOCKHOLM — The Swedish white-collar workers' union, known as TCO, will offer free computer education to its 46,000 members. The TCO initiative was taken in part to close the widening gap between older office workers and younger workers, who were taught computer science in school.

■

STOCKHOLM — The Swedish electronic firm Siemens-Elema has unveiled a pacemaker that can reportedly be programmed by radio signals from the outside without removing the surgically implanted device from the patient's body.

The firm is now in the process of developing a pacemaker that can reprogram itself by responding to a patient's own biological signals.

WEST GERMANY

MUNICH — While microcomputers are making their way into large companies in the U.S., this is not the case in West Germany. Analysts theorize that data processing managers in big companies firmly believe in the centralized DP concept and have a tendency to block the "micro invasion," fearing a loss of their status in the company.

■

MUNICH — Digital Equipment Corp. here has announced the MicroVAX I and the VAX-11/725 series, which is composed of six different models, for German offices. Pricing for a basic configuration starts at approximately $50,000.

Scribe supports laser printers

You've heard a lot about laser printers . . . high print quality, attractive fonts, fast, quiet, affordable. But you haven't heard a lot about software to support them.

The Scribe Document Production System supports more laser printers than any other software. Laser printers like the Xerox 2700, 8700, 9700, the IMAGEN IMPRINT-10™, the Symbolics™ LGP-1, the DEC LN03 Laserwriter, and soon the IBM 6670.

Buying a laser printer? No matter which one you choose, you'll get the most from it with Scribe.

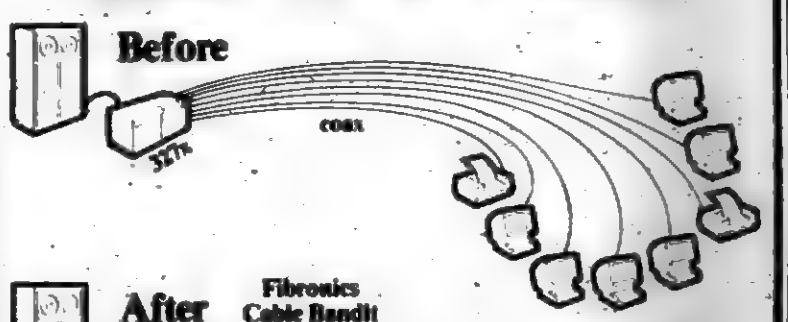
For more information, contact:
UNILOGIC, Ltd.
190 North Craig Street
Pittsburgh, PA 15213
412-621-2277

Scribe document production software is available for DEC 10, 20, and VAX, Prime, IBM mainframes, the Apollo and Sun workstations. "Scribe" is a registered trademark of UNILOGIC, Ltd.

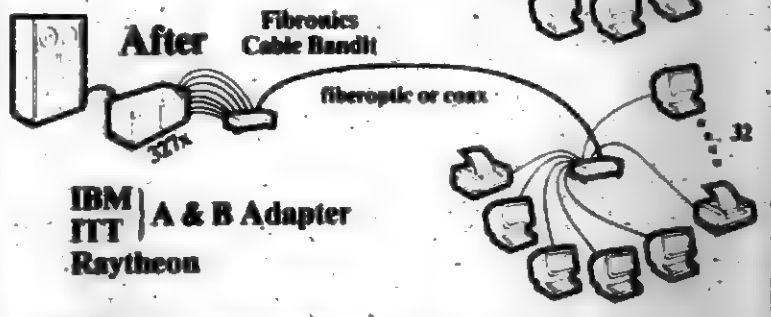
UNILOGIC

IBM® 3270 Users.

Before



After Fibronics Cable Bandit



IBM
ITT
Raytheon
A & B Adapter

Fibronics International Inc.
fiberoptic communications

218 West Main Street • Hyannis, MA 02601 • (617) 778-0700 • Telex 951297

Uptime

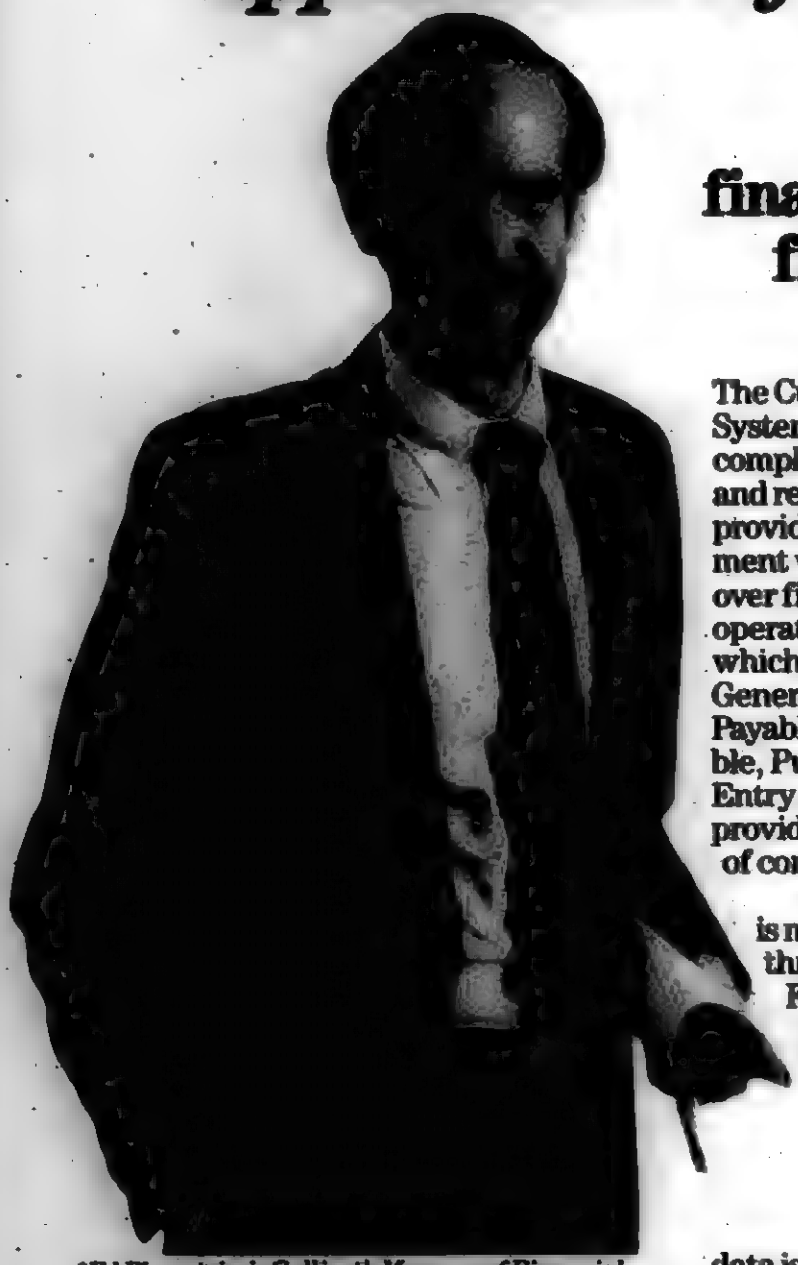
Provide 24 hour CICS access

CICS Dynamic File Allocation is a must for effective CICS scheduling. It is the gateway to non-stop, round-the-clock CICS systems. It eliminates batch update constraints. It guarantees bullet proof restarts. It allows you and your batch jobs to add and remove CICS files at will, without disrupting your user community.

Nutec International, Inc.
P.O. Box 18538 • Dallas, TX 75218
214 324-8948 • Telex 80-4284

"The Cullinet Financial System is a major advance in application software technology."

—Ed Blumstein*



Because it is the first financial system designed for both financial and data processing professionals.

The Cullinet Financial System is a functionally complete online accounting and reporting system that provides financial management with extensive control over financial planning and operations. The system, which includes the modules: General Ledger, Accounts Payable, Accounts Receivable, Purchasing, Order Entry and Fixed Assets, provides a new level of control.

This level of control is made possible through the Cullinet Financial System's horizontal and vertical integration with Cullinet's Database Software.

Horizontal integration means that all financial data is controlled and accessed directly from Cullinet's IDMS/R database management system. So, for example, a single vendor record is available to Purchasing and Accounts Payable, whether cutting a purchase order or writing a check. Thus, you are assured that the vendor information is consistent throughout all systems. The Financial System is also integrated with Cullinet's Manufacturing System in the same way.

Vertical integration means that the financial system is designed and developed using IDMS/R and ADS/OnLine, Cullinet's fourth generation programming productivity tool. This unique architecture provides data processing with the means to tailor and modify the system. Since you don't want to change your business to match the functions of the software package, Cullinet provides the tools to tailor the software to meet your business requirements.

The combination of horizontal and vertical integration means, for the first time, a financial system is available that meets the requirements of both data processing and financial management.

Attend an informative seminar explaining this integrated financial system. To participate in one of the 700 Cullinet seminars scheduled internationally, send in the coupon or call 1-800-225-9930. In MA, 617-329-7700.

Financial Seminars Cities and Dates

City & State	Date	City & State	Date
Anchorage, AK	May 23	Morristown, NJ	May 8
Baltimore, MD	June 5	New York, NY	May 15
Boston, MA	May 23	New York/	June 12
Calgary, AB	May 23	Rye, NY	
Charlotte, NC	May 10	Oakland, CA	June 26
Chicago, IL	May 3	Omaha, NE	June 13
Cincinnati, OH	May 14	Orlando, FL	May 24
Cleveland, OH	May 24	Ottawa, ON	April 5
Columbus, OH	May 2	Ottawa, ON	May 8
Dallas, TX	May 15	Ottawa, ON	June 5
Denver, CO	June 13	Pittsburgh, PA	May 16
Des Moines, IA	May 16	Regina, SK	June 13
Detroit, MI	May 23	Rochester, NY	June 21
Fairfield, NJ	June 7	St. Louis, MO	June 19
Grand Rapids, MI	June 7	San Francisco, CA	May 24
Harrisburg, PA	May 8	San Jose, CA	May 15
Hartford, CT	May 9	Seattle, WA	June 12
Houston, TX	May 10	Tampa, FL	June 6
Indianapolis, IN	May 8	Toronto, ON	April 3
Kansas City, MO	June 28	Toronto, ON	May 17
Los Angeles, CA	May 1	Toronto, ON	June 21
Miami, FL	May 17	Valley Forge, PA	May 17
Milwaukee, WI	May 1	Washington, DC	May 9
Minneapolis, MN	June 21	Washington, DC	June 28

**Ed Blumstein is Cullinet's Manager of Financial Applications Software Development and has directed Cullinet's rapid entry into this field. He joined Cullinet in 1981 with experience in database and applications software. Ed holds a B.A. in Economics from Brown University and an M.B.A. in Finance from Boston University.*

I'd like to attend your seminar on _____
Date

In _____
City

Name/Title _____

Name/Title _____

Company/Department _____

Address _____

City _____

State _____ Zip _____

Phone (___) _____

Mail to: Cullinet Software, Inc., 400 Blue Hill Drive, Westwood, MA 02090-2198.
Attn: Corporate Meetings
Cullinet Software products are designed to run on IBM 360/370, 30XX or 43XX or plug-compatible computers.

CW 3/19

Financial: Cullinet

© 1984 Cullinet Software, Inc., 400 Blue Hill Drive, Westwood, MA 02090-2198.

CW-319

Fingerprint ID system quick to solve criminal cases

By Robert Batt
CW West Coast Bureau

SAN FRANCISCO — A computerized fingerprint identification system recently installed at this city's police department yielded surprising results just one week after going on-line this month.

The $2.6 million Automated Fingerprint Identification System (Afis), manufactured by NEC Corp., has already resulted in an arrest for a previously unsolved six-year-old murder case and the identification of 40 other criminal suspects.

Announcing the system at a press conference on March 2, San Francisco Police Chief Cornelius Murphy said, "This system represents the most dramatic investigative tool introduced in the history of this city's program to equip our law enforcement officials with the tools they need to apprehend criminals quickly and effectively."

Up until this time, only Japanese police had access to Afis. Soon, however, a similar system is to be installed for state police in Alaska, and more systems, elsewhere in the nation, are expected to follow.

Removes file searching

The system is intended to remove the labor- and time-intensive fingerprint file search process. It enables local police officials to check fingerprints taken at the scene of a crime with those of known criminals on file at a rate of 650 prints per second. A trained fingerprint specialist then verifies the match and subsequently provides expert testimony that is required in a court of law.

Last week, according to the San Francisco Police Department (SFPD), computer technicians and city workers completed the electronic transfer of some three million fingerprints, accumulated over 40 years, from city hard-copy files to the new system's data bank.

Consisting of a scanning device and a reader with three components — a controller, a scanner and a processor, the Afis system converts the scanned information into binary data, which is transferred to a graphics display device called a Fingerprint Input Monitor, where forensic experts are able to enhance the print image.

The scanning process takes place on a NEC mainframe, and the data files consist of twin drives capable of storing up to 1.27G bytes of information. Prints which match up with those already stored in the data base are called up on three on-line terminals.

One of the areas where Afis is expected to reap particularly favorable results is in searching the data bank for possible matches against partial or "latent" prints taken from the scene of a crime.

According to the SFPD, partial prints — some no larger than a dime — have historically been very difficult to process manually against full-fingerprint file copies.

In the past, police officials stated, a manual search could take months, as detectives attempted to match a fingerprint taken from the scene of a crime against one in the city's files, often without success. The new system, they claimed, can complete a thorough search for a match in less than an hour in almost all cases. And for the majority of cases, search time is an estimated five minutes, they maintained.

Using a microfiche retrieval system controlled by NEC's Advanced Personal Computer and extensive new algorithms, company officials claimed the prints can be graphed, plotted, clarified, enlarged and quickly scanned to match against fingerprints in the data bank files. A NEC Spinwriter printer is used to print out the results of the matched prints.

"In one week, we have

See AFIS page 28

CASE #4
SOFTWARE SURVIVAL

Aaahh. The headaches of developing software. Your projects are too late. Too expensive. And frankly, don't always meet user needs.

So you look for help. You turn to software development aids. But instead of getting peace of mind, all you get are piecemeal solutions. Not so with Nastec.

NASTEC CASE 2000™ products provide computer aided development and a managed life cycle approach that fit well with your existing methods. You'll have more control over your software development process, which means higher quality software. On time. On budget.

So now you have a choice. You can take two aspirins. Or you can call Nastec in the morning.

Call toll-free 1-800-872-8296 (in Michigan 313-353-3300). Or write Nastec Corporation, 24681 Northwestern Highway, Southfield, MI 48075, for more information about our NASTEC CASE 2000™ Workstation and Software Products. Our software survival solution is just what the doctor ordered.

The Computer-Aided System and Software Engineering Company

CASE 2000

We don't promise.
We deliver.

DP managers urged to police micro purchase, not use

By Paul Somerson
CW Staff

NEW YORK — DP managers should set a policy for purchasing microcomputers and then allow users to determine how the machines will be used.

Users, data processing managers and industry analysts delivered that message at a conference on "Microcomputers: High Performance/High Payoff," which was held here earlier this month by Micro Mainframe, Inc. of Cambridge, Mass., and Morris Decision Systems, Inc., based here.

"The data processing manager's function is to determine a policy, not implement a plan," said Peter Berg, chairman of Micro Mainframe. "There is an important distinction between a policy and a plan. A policy establishes the rules of the game: The company will work this way. It incorporates accountability and involves complex planning. It should not be done by a chief executive, but by the MIS manager."

A policy should limit brands of hardware and software so the company is not saddled with numerous incompatible systems. But each user should determine the benefits of a given package. "If a user has been using a Cobol generator and likes it, then he should be allowed to continue to use it," said Dr. G. M. Hughes, vice-president at Pfizer, Inc., a pharmaceutical company here.

Allowing this flexibility will require a change in DP managers' thinking. "Data processing managers must recognize and respect the reality of ambiguity in a decentralized policy," Berg said.

"That requires a new style of delegation. The data processing department should license hardware and software to the user. Once he has the license, he should be able to drive wherever he wants, within limits. It is the auditor's role, not the data processing manager's, to police the drivers," according to Berg.

Berg predicted significant changes in software. "[Lotus Development Corp.'s] Symphony is the last significant product of this generation of software," he said. "We are witnessing the end of the [Visicorp] Visicalc era. Shortly, software will be written for new hardware with 1M-byte random-access memory, bit mapping, data base management and downloading features."

While software will become more powerful in the next few years, Anthony P. Morris, president of Morris Decision, a microcomputer sales and consulting firm, thinks that the user interface will remain constant.

"Once a user becomes accustomed to working with a piece of software, it is very difficult for him to switch to another package, no matter how powerful it is," Morris claimed.

AFIS from page 25

done the equivalent of six months' work. We have so far identified 40 criminal suspects just from the fingerprints, when our usual total is 60 per year," commented inspector Ken Moses of the SFPD. Moses said the system was expected to help not only with crime detection, but also with crime prevention by leading to the capture of criminals such as burglars and rapists who are apt to commit a crime more than once.

"When fingerprints are involved as evidence, there is traditionally a conviction rate of 98%, since there is very little defense against a fingerprint," he added.

In addition to "scene-of-the-crime prints," under the new system anyone arrested and booked on a felony will automatically have his fingerprints entered into the data bank. Afis, in turn, will perform an automatic check to determine if the prints have been filed previously.

Our graphics you to your

ISSCO graphics software supports more than 200 output devices from nearly 50 manufacturers.

That's right. Over 200 different terminals, plotters, printers and film recorders. And the number keeps growing as important new ones are introduced.

Only ISSCO lets you choose from such a wide range. You can mix and match computers and output devices for the best fit. And you'll protect your software investment from becoming obsolete when new items appear.

What's more, ISSCO gives you Layout Intelligence that automatically formats your graphics to fit the device used. Plus Device Intelligence that automatically takes advantage of each device's special features.

But device freedom isn't all. ISSCO software also works with many different mainframe and 32-bit minicomputers from Apollo, Burroughs, CDC, Cray, DEC, Honeywell, HP, IBM, Perkin-Elmer, Prime and Sperry.

Once you've seen ISSCO software in action, you won't want to use anything else.

TELL-A-GRAF® MAKES QUALITY GRAPHICS EASY.

ISSCO's TELL-A-GRAF software allows users to quickly make professional-quality charts and graphs themselves. Since it uses conventional English commands, it's easy to learn. In no time you'll be making beautiful line, bar, pie and word charts. Adding CUECHART™ lets completely untrained people generate high-quality TELL-A-GRAF plots.

NEWS

Bank executives warned of dangers of electronic fraud

By James Connolly
CW Staff

WASHINGTON, D.C. — "When dealing with computer security, you have to remember that computer-related crime is a people problem."

So said Anthony J. Adamsky Jr., chief of the Federal Bureau of Investigation's Financial Crimes Unit, who addressed the Bank Administration Institute Bank Security Conference and Exposition here earlier this month.

Along with John R. Simpson, director of the Secret Service, Adamsky warned bank security officials of the dangers of computer crime and outlined some steps the federal government is taking to solve and prevent such crimes.

Adamsky encouraged the bankers to "hire good people" in their computer and wire-transfer rooms and to maintain tight audit procedures. He also stressed establishing a good rapport with employees, which allows management to identify early signs of worker stress and financial problems that could lead an employee to steal. He told the bankers to set up disciplinary policies that will deter crime.

"Basically, it is the person who has authorization to work with the computer who is involved in computer crime," Adamsky said. It is the hacker mentality — the compulsion to access what they shouldn't — that leads some data processing personnel to access computers illegally. Those personnel, he maintained, should be weeded out of the company.

Adamsky told the bankers that the next several years will witness lawyers haggling over several questions of computer law, such as a definition of trespassing as it applies to data bases and of stolen goods as applied to software.

Adamsky couldn't estimate the extent of computer-related bank crime, noting that the potential is "enormous" and adding that many bank losses aren't reported. But Simpson noted later that the number of electronic funds transfer (EFT) cases reported to the Secret Service has increased rapidly in the 17 months since the agency received authority to investigate EFT fraud. In one six-month period, the Secret Service received 1,415 EFT fraud referrals.

"We can only expect the spiral to continue as the government converts more and more to electronic transfers," he said.

Simpson noted that the Secret Service investigates only cases involving U.S. Treasury Department funds, such as pension checks. "Luckily, at this point, these fraud cases have involved relatively small dollar amounts," he said.

They are typically "deceased payee" cases, where survivors continue cashing a dead person's checks, costing the government $200 to $45,000.

However, criminals are increasingly finding fraudulent ways to have the government electronically deposit checks into accounts that the criminals can access through automatic teller machines.

Simpson pointed out another criminal threat of potentially huge proportions — the manipulation of software in any one of a number of federal agencies to siphon off some of the $600 billion the government collects and the $900 billion the various agencies pay out each year.

Simpson warned, further, that the proliferation of personal computers could threaten the $30 billion that U.S. corporations transfer by wire each day.

One of the Secret Service's strategies to combat EFT fraud, Simpson said, is preliminary investigation of EFT fraud cases, even if they prove too small to pursue, because agents can learn more about the criminals' tactics and the victimized organization's weaknesses.

software leaves own devices.

THE DATA CONNECTION™ GETS ALL THE DATA.

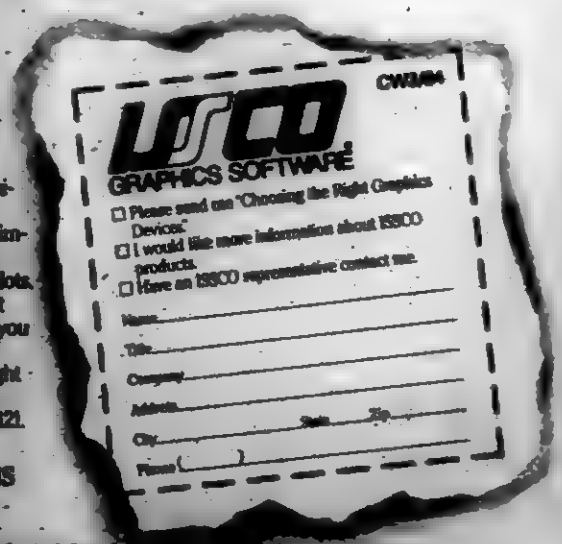
By combining TELL-A-GRAF and THE DATA CONNECTION, users can access data directly from their computers for conversion to graphics. THE DATA CONNECTION can summarize, tabulate, edit and perform mathematical manipulation to put data into the best form for graphing.

DISSPLA® CAN DO IT ALL.

With DISSPLA software, almost anything is possible. This high-powered product is a library of over 400 subroutines that facilitate data plotting. Business and scientific programmers use DISSPLA to produce everything from simple pie, bar and line charts to sophisticated 3-D diagrams, maps and contour plots.

Shouldn't you be using software that gives you great graphics, but still leaves you to your own devices? For a free copy of our 40-page manual, "Choosing the Right Graphics Devices," write ISSCO, 10505 Sorrento Valley Road, San Diego, CA 92121. Or call (619) 452-0170.

DRAW FASTER CONCLUSIONS WITH ISSCO.



High school hacker to undergo counseling

By David Gleason
CW Staff

LITTLE ROCK, Ark. — A 15-year-old high school student who admitted he tapped into the district's computer system to change his grades will undergo counseling at a mental health clinic for the remainder of the school year.

The unidentified sophomore told school officials that he gained access to student files stored in the district's Honeywell, Inc. DPS 8/44 mainframe and raised his grades and those of one other student, according to Bobby Lester, assistant superintendent for the Pulaski County Special School District. The student used a telephone and a Victor Technologies, Inc. VIC 20 home computer to break into the system late at night, Lester said.

The break-ins were discovered last December after school officials noticed that some grades had been changed. The computer's telephone access number was changed, and a tap was placed on the line.

During a two-week period in January and February, the student made six unsuccessful attempts to enter the system. The calls were traced to his home telephone number, Lester said.

"We approached him with this [information], and he admitted his guilt," Lester said. No criminal charges will be filed.

Although the student was not enrolled in any computer classes, Lester said, he had shown an interest in how the district's computers worked. "He doesn't get good grades in school, but he's a very bright student."

Before discovery of the break-in, the student had sent an anonymous letter to the director of the computer center in which he described how the system could be entered.

Under district policy, students found guilty of gaining unauthorized access to the computer are given two options: expulsion or placement in the Fullerton Adolescent Center, a state-run mental health clinic. The policy was established last December after two previous computer break-ins.

In one of those instances, a student created a fictitious course schedule for Mickey Mouse. In another, a student gained access to personnel records containing teacher salary data, Lester said.

As a result of the latest episode, the district has tightened security on its system. Junior high and high school students who use the district's more than 200 terminals are no longer given the codes that allow them to access the system — teachers now have to key in the codes themselves.

"You'd like to operate on an honor system," Lester said, "but you can't do it in a situation like this."

Software institute changes name

SUNNYVALE, Calif. — The Institute for Software Engineering has changed its name to the Institute for Information Management. A division of Boole & Babbage, Inc., the institute provides educational, publishing, research and consulting services to information management clients.

The name change was made, according to the institute's assistant general manager, Dr. Leilani Allen, "primarily because the whole thrust of our efforts has increasingly become oriented toward information as a resource, information as an asset." Allen added that the institute has come to focus as much on hardware and management issues as on software.

The institute publishes the *Journal of Capacity Management* and *Information Executive: The Journal of Information Economics* and operates a graduate degree program in information management.

MICRODATA INTRODUCES THE RELATIONAL OFFICE.

IT'S WHERE YOU'VE ALWAYS WANTED TO WORK.

NEWS

Modeling tool tightens manufacturer's cash-flow control

GLENVIEW, Ill. — A worldwide manufacturing firm here improved its long-range planning and tightened its control over cash flow when it augmented an in-house reporting system with a financial modeling and analysis package.

Signode Industries, Inc. is a leading manufacturer and distributor of strapping systems for use in packaging and materials handling. A $700 million company, Signode manufactures a wide variety of products sold in over 100 countries in such diverse fields as forest products, steel, printing and food. The company employs some 6,000 people and has 35 manufacturing locations in Europe, Asia and South and North America.

Signode's data processing department recently developed a managerial reporting system that runs under IBM's MVS operating system on an Amdahl Corp. 580 Model 5860 mainframe. Known as the Executive Information System (EIS), the reporting system is comprised of both internal operational data and external economic and competitive information. It displays data, reports and graphs on IBM 3279 color terminals operated by light pens.

To improve the range of its financial planning capabilities, Signode sought a software system for modeling and "what-if" analysis. "We looked at three outside packages and also considered developing the financial modeling system in-house," Birgis Uskup, vice-president of computer services, explained. "We made up a test problem with our own data, and we put all the packages through their paces. We had almost 24 separate criteria — each assigned a different weight — that we used to judge each package."

Costly in-house effort

Uskup estimated that to develop the software in-house would have cost five or six times as much as the outside system Signode eventually selected — the System W modeling and analysis package from Comshare, Inc. System W, he said, works in conjunction with EIS through the MVS operating system.

"With System W, we can do the types of financial analysis we need in a timely fashion and at less cost. With our programming capabilities, we could have delivered the kinds of answers System W generates, but we couldn't have done it on a timely basis."

Uskup said that System W has given Signode's managers financial modeling capabilities that help them manage the firm's large debt position on a short-term and long-term basis.

"Because of the nature of this business," Uskup said, "our debt position and our cash flow are extremely important, and the timeliness of that information is critical. System W allows us to monitor our cash position very carefully on a daily basis. It has also helped our planning by identifying for executives the factors behind key indicators such as cash flow, earnings or growth. That has sharpened our understanding and allowed us to put appropriate emphasis on the right areas."

After Signode acquired System W, the financial planning department worked with Uskup's staff to develop a one-year planning and budgeting system. "Once those reports were automated on System W, they could be done in a matter of hours, and I gained three man-months for my staff," said Frank Presocky, assistant controller for financial planning.

Uskup said System W will be an "information center offering" in the future. Signode is currently installing an IBM Model 3083 mainframe that will be devoted entirely to end-user computing, he said, including financial modeling and analysis with System W.

THE MICRODATA
REDEFINES THE
MANAGEMENT WORKSTATION
IT'S ALMOST HUMAN
Microdata
POWERFUL

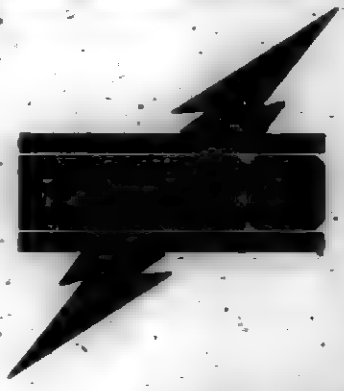
HERO SAVES IBM!

Incredible as it seems, even Big Blue needs to be bailed out now and then. Personal computers are such a runaway success, they're running Information Managers ragged. The problem is personal computers and mainframes don't always work together.

The result is Computer Shock. And nothing short of a HERO™ can cure it.

HEROISM COMES TO PERSONAL COMPUTING.

HERO is the intelligent, desktop Networked Personal Computer from MDS®. It does everything a personal computer can do. And lots that it can't. But HERO's main fame derives from its interaction with the mainframe.



INTELLIGENCE AT EVERY STATION.

Mated with the MDS SUPER 21™ Communications Processor, HERO can converse intelligently in IBM networks. HERO emulates IBM 3270 SNA and the 3776 remote-job-entry systems. Our SUPER SNA™ option gives you both on one communications link. HERO runs software under MS-DOS. Plus its own multitasking operating system.

HEROS UNITE AND CONQUER.

With MDS HERO and SUPER 21, you can access private, departmental and corporate databases. Instead of not working, your entire organization can be networking. Under your control.

And only MDS offers you INTELLIGENT 3270.™ So you can write your own programs and integrate them with data in the mainframe. HERO lets you retrieve information from the database, process it, display it and update it. Then either return it or store it locally.

EVEN HEROS NEED ALLIES.

In addition to HEROS, SUPER 21 is available with non-intelligent workstations within INTELLIGENT 3270 networks. MDS offer the PLUS 80™ family of plug-compatible controllers, printers and displays. They're directly interchangeable with corresponding IBM 3270 units.

MDS HERO MAKES A HERO OUT OF YOU.

With HERO and SUPER 21, your existing data processing investments become part of an ever-expanding fund of available data. All of it coordinated, cost-efficient and controllable.

MDS systems are planned for non-obsolescence. They're modular in design to accommodate future growth. So every MDS system, like a hero, is immortal.

GET THE ADVANTAGES OF BIG WITHOUT BEING BLUE.

MDS is a multidivisional, multinational corporation. We've grown by helping our customers to grow. By focusing our size and scope on responsiveness to their needs. Not just in IBM country, but beyond.

We can do the same for you, wherever you are.

MDS offers service and support capability around the world, around the clock.

Ask our customers about us. And give us a call. Dial **800-MDS-HERO.** We'll show you how, when it comes to networking, MDS can help you unite and conquer.

MDS MOHAWK DATA SCIENCES

7 Century Drive, Parsippany, New Jersey 07054. And over 430 locations, worldwide.

MDS is a registered trademark and HERO, SUPER 21, INTELLIGENT 3270, PLUS 80 and SUPER SNA are trademarks of Mohawk Data Sciences Corp. MS-DOS is a trademark of Microsoft, Inc.

NEWS

TURNAROUND TIME
Larry Long

Q We were informed about three months ago that our division would be merged with a recently acquired division and that both would be moved to the Southwest during the last quarter of 1984. Some employees will be asked to transfer, but their names have not been announced.

I am the director of a small computer center that may or may not exist after the move. I'm willing to make the move, but my manager continues to say that it is too early to determine who will be transferred and who will join the unemployed. How can I encourage him to make these important decisions so that we can make plans?

A I would not even try. Your boss is either inconsiderate or using you, and I suspect the latter. I would suggest that you update your resume, and seek employment elsewhere.

Q Until a few months ago, I worked for five years in a dead-end position editing technical manuals. I transferred to a more challenging position with a newly formed documentation group in the management information systems department. The job is definitely challenging, but nobody told me about the frustration.

There are three of us in the group, and none of us has a computer background. Our jobs, as they were described to us, would entail the writing of user systems manuals and, perhaps somewhere down the road, some user education manuals. We were to take the system write-ups provided to us by programmers and analysts and write "user-friendly" manuals.

The three of us are part of the systems and programming section, and everybody seems to think that our function is to document their programs, as well as write the user systems manuals.

Programmers literally dump program listings on us. Then they ask us to prepare flowcharts and document program listings. When we approached our boss and told him that we didn't feel qualified enough to do this kind of documentation, he told us to learn.

Do documentation specialists in other companies document programs?

A Documentalists involved in program documentation would normally clean up completed but rough documentation that is provided by programmers. It is extremely inefficient to ask someone not involved with designing the logic and writing the code of a program to document it. First of all, documentation is a by-product of the development process, not something that is done hurriedly after a program is running. Second, the original programmer is in a much better position to produce documentation than you.

Documentation is viewed by many as an unpleasant task that is either done haphazardly or, if possible, avoided. To these people, the establishment of your group meant no more documentation.

A well-written program is usually accompanied by good, but not necessarily clean, documentation. If your job description continues to include program documentation, then it should be a clean-up operation.

Programmers should be given minimum documentation standards that must be met before programs are submitted to you for final documentation.

Q A recent career change took me back to college to study programming and information services. In a previous incarnation, I worked in sales and marketing. The reason I chose the computer field was the potential for jobs and career fulfillment.

At this point, neither seems attainable. I have made myself available for any type of computer-related position and have done everything possible to seek employment, from answering newspaper ads to sending out large mailings. I always get the same response: "Call us in two years."

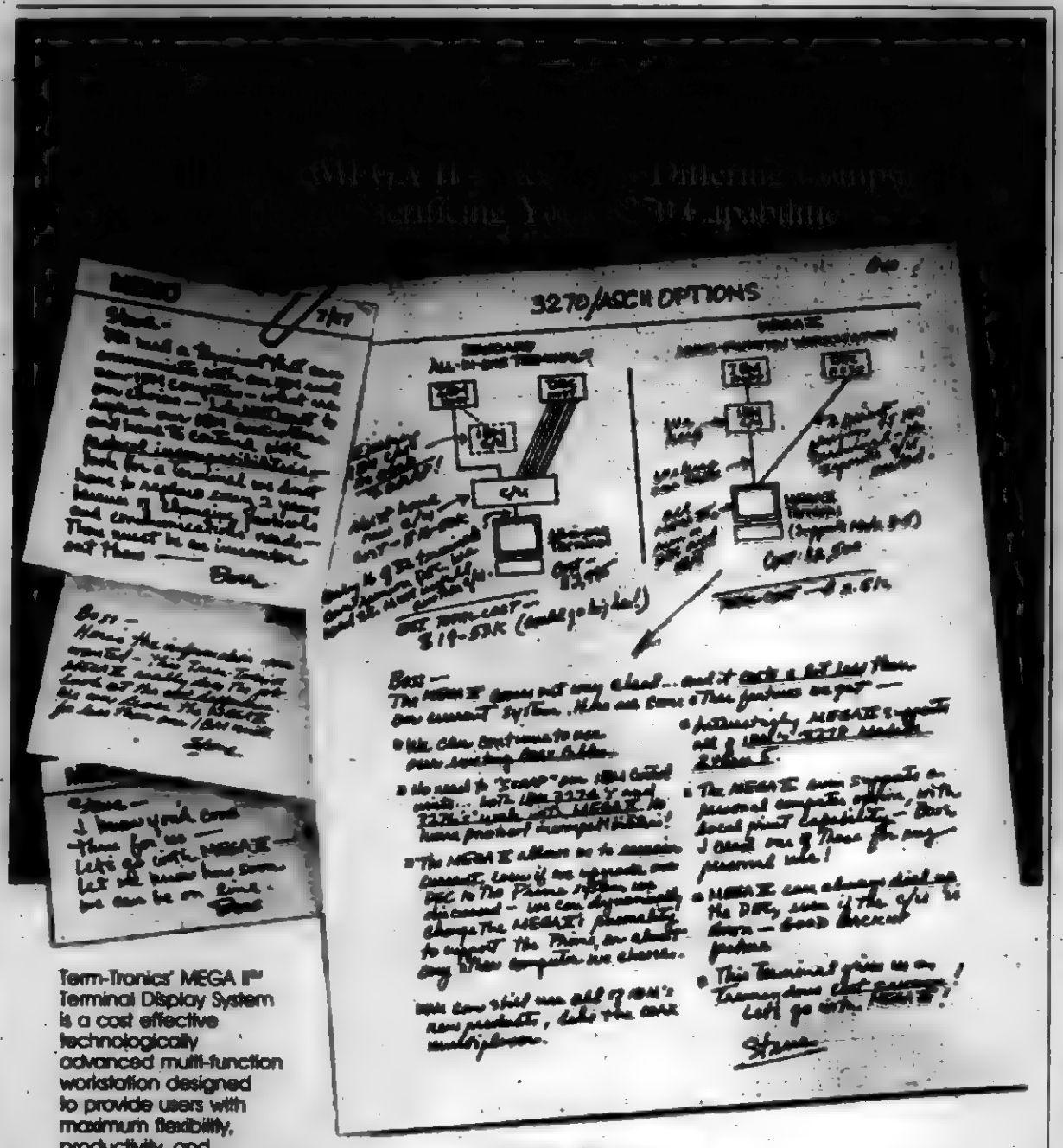
Don't employers realize that they will soon run out of people with two or three years' experience? Has it ever occurred to these employers that recent college graduates could be an invaluable investment in their futures?

A Recently, I asked a room full of MIS managers if they had openings for programmers or analysts. Then I asked them if they planned to fill these slots with experienced personnel or with recent graduates. All but one responded that they had openings, and all of those indicated that they were seeking only experienced personnel.

The problem persists, but, I hope, not for long. Most said that they were having considerable difficulty recruiting qualified people.

The conversation that ensued painted a grim picture for those seeking experienced personnel. As we talked on, I and others touted the value of recent grads, and several vowed to return to the college market. I hope this starts a trend.

Long, president of Long and Associates, is a consultant, lecturer and author in the field of information services. If you have a question you'd like him to address, send it to Larry Long, Editorial Department, Computerworld, P.O. Box 880, Framingham, Mass. 01701.



Term-Tronics' MEGA II™ Terminal Display System is a cost effective technologically advanced multi-function workstation designed to provide users with maximum flexibility, productivity, and convenience. The MEGA II™ will never become obsolete when your computer is changed or upgraded.

Regional Offices: Washington, D.C., New York, Chicago, Dallas, Houston, San Francisco, San Diego.

MEGA II
The Truly Generic Terminal System

TTI TERM-TRONICS, INC.

*IBM 3274, 3276, 3278, and DEC VT 100 are subject to trademark claims.

7408 Trade St., San Diego, CA 92121 (619) 271-1770

MAPPER SYSTEMS

MAPPER is a trademark of Sperry Corporation. © 1984 Sperry Corporation

A unique kind of computer power helps them put out fires faster.

New York. A city of 300,000 buildings, each with its own idiosyncrasies of structure and materials.

A Rubik's cube for firefighters.

Maybe worse. Ten thousand of those buildings aren't what they seem, because of non-visible alterations. Brick may conceal impenetrable steel-clad walls. Cellars may be obscurely interconnected.

When New York's firefighters are dispatched to a fire, they have this kind of vital infomation immediately at hand. Through a unique computer system called the Sperry MAPPER™ System.

MAPPER is a non-procedural, interactive system that enables non-computer people to develop their own computer applications.

In the case of the New York City Fire Department, the firefighters, themselves, report local building modifications directly to a main computer data base, using remote terminals. The information is therefore timely and accurate. And precisely defined in terms of the firefighters' needs.

According to Ernest Owens, Director of the Department's Bureau of Information and Computer Services, MAPPER has put the Department 2½ years ahead of schedule in implementing this and other computer systems. It has enabled only three programmers to accomplish what would otherwise have occupied 45 programmers, fulltime.

The fact is, MAPPER is broadly applicable to just about any task, from the routine to the highly specialized. Owens' people have used MAPPER to develop 27 applications so far, with twice that number in the works.

As Ernest Owens sees it, "If you have a creative mind, there is no end to where MAPPER can take you."

Can MAPPER be useful to the purposes of *your* creative mind? We invite you to investigate further. Call us for more information, toll-free: 800-547-8362. Or write Sperry Corporation, Computer Systems, Department 100, P.O. Box 500, Blue Bell, PA 19424.

SPERRY

We understand how important it is to listen.

IBM users group chooses officers

CHICAGO — John E. Nack, manager of the processing and network division at Caterpillar Tractor Co. in East Peoria, Ill., has been elected president of Guide International, the association of users of large IBM systems.

Other officers include Eddie G. Depew, manager of application development for Monsanto Research Corp. in Miamisburg, Ohio, elected vice-president/administration; John Pullam, national manager for data processing at Simpsons-Sears Ltd., Toronto, chosen as vice-president/conferences; Janet S. Smith, manager of the systems development division at Railinc, Washington, D.C, elected vice-president/planning & finance; and Gary S. Geeme, manager of resource evaluation, performance and capacity planning divisions at Deere & Co., Moline, Ill., chosen as vice-president/divisions.

Guide's 2,500 members meet three times a year.

Blis/Cobol meeting set for May 12-17

LAKE BUENA VISTA, Fla. — The Blis/Cobol Users Group has scheduled its annual meeting for May 12-17 at the Dutch Resort Hotel here.

Events and classes will include sessions on communications between Blis/Cobol and microcomputers, advanced programming efficiencies, hardware manufacturers' presentations, future enhancements of Blis/Cobol and reviews of the operating system.

The registration fee for members is $125 and $175 after April 1. The cost to non-members is $325 and $375 after April 1.

Additional information is available from the Blis/Cobol Users Group at Suite A, 450 Wymore Road, Winter Park, Fla. 32789.

HRSP forum to discuss people, data

FORT WORTH, Texas — The Association of Human Resource Systems Professionals, Inc. (HRSP) will hold it fourth annual conference, "People, Data and Systems ... Putting It All Together," at the Hyatt Regency here May 20-23.

The conference plans to examine automated personnel information systems and human resource management needs served by such systems.

Twenty-four workshops and six roundtable discussions are scheduled. Workshop topics will include position control, salary forecasting and office automation.

The seminar costs $400 for HRSP members and $500 for others. Additional information is available from HRSP, which is located at 3051 Adeline St., Berkeley, Calif. 94703.

Application monitoring	Unlimited number standard
Individual transaction record available	Yes
Network alarms	33 types
Immediate display of network alarms	Yes
Intelligent line data display	Yes
User-programmable automatic alarm trap	Yes
Protocol discrepancy alarms	Yes
Line utilization analysis	12 real time and 30 database components
Network configuration recognition	Automatically generated and verified
Entire database available to host	Yes
Local (non-host) database	Yes
Low maintenance design	Yes
Special A.C. power	None required

NEWS

Utility helps service firm perform quality assurance

DENVER — Randall Smith, production control manager of a bank service company here, started looking last year for ways to streamline the operation of his newly formed quality assurance group.

He wanted to find a utility that would help the internal auditors compare two versions of one program as well as allow programmers to perform data comparisons and point out the changes.

Smith's department had been promised a number of tools to help audit system modifications in programs used at Affiliated Bank Services Co. (ABSC). "A file comparison utility was something that I thought could help that department intelligently pursue its goal," Smith said.

He needed a utility that would run on the firm's IBM 3083 mainframe under MVS, one that could be used by both internal auditors and programmers. "There is an IBM utility that does crude comparisons. It will tell you two files are different, but won't say how or do any analysis," Smith said. He knew right away that the IBM utility didn't fit ABSC's needs.

Although several other companies' products were considered, ABSC only tested seriously Comparex from Sterling Software Marketing of Sacramento, Calif., a much less expensive utility by Harlan S. Hersey, Inc., and Quality Systems Corp.'s Res-q.

Comparex has two modes of comparison, a test mode that synchronizes by lines and a data mode that synchronizes by keys (fields). For comparing checking out system changes in files, the data mode has proved to be more appropriate.

Comparex can handle all file organizations, including Vsam, Isam and partition data sets (PDS). At ABSC, Vsam is generally used because of its high speed. Comparex allows comparison of source code, object code and load modules.

Its PDS (library) function can compare all members, new members only or directory members, based on a wild card. "No matter what you come up with, it can be matched," he said.

There is also some screening ability. "We could say we only wanted members starting with XYZ or even ending with XYZ," Smith said.

Some of the features of Comparex that particularly appealed to Smith were the I/O options. "You can squeeze characters out, which was useful for our purposes. If you specify that you want blanks ignored, that's what it will do," Smith said.

Comparex can compare a file from the beginning down to a certain point or from the end up, but it cannot compare a section somewhere in the middle, Smith pointed out. The Quality Systems' utility had the ability to take a section out, which was a point in that firm's favor.

Smith decided to go with Comparex. The result of the Comparex installation, which was purchased in late September, seems to be an increase in quality, though specific improvement has not yet been gauged.

Most of the code at ABSC is purchased, according to Smith. The programmers are pleased with the addition of the comparison utility because it makes it easy to determine changes that have been made to the programs that have been bought.

"We justified the purchase on less than 1% efficiency. There has been an increase in quality, I've been told, but I couldn't say how much," Smith said.

The one thing missing from the Comparex utility is a direct interface to Panvalet, a library control system from Panaophic Systems, Inc. "I've suggested the addition of a Panvalet interface, which may be added by this time," Smith said. "

CCA EMACS

The most complete screen editor available for Unix[1] and VAX/VMS[2].

CCA EMACS from Computer Corporation of America has the greatest combination of power, speed, and functionality of any text editor available for Unix or VAX/VMS. With close to 400 built-in commands, CCA EMACS allows virtually any editing task to be accomplished in just a few keystrokes, including tasks that would be difficult or impossible to do using other editors. In addition, a set of more than 60 predefined variables allows each user to customize CCA EMACS to meet various application needs and user styles. All of these features are supported by a full online documentation package that can assist the user at any point, giving information that ranges from the definition of a single command to manual pages that contain complete explanations of major CCA EMACS features.

Operating Environment

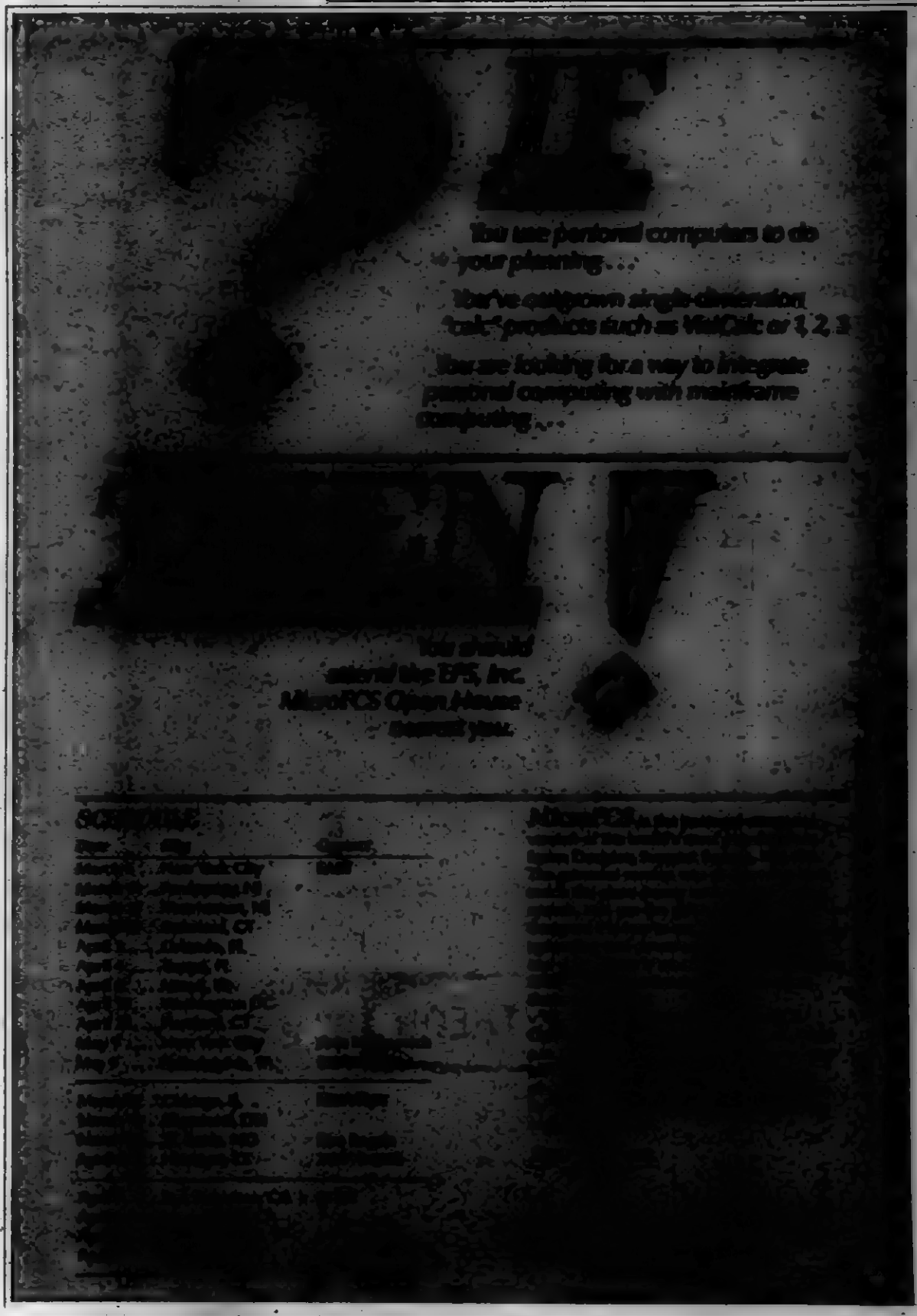
Runs on Berkeley Unix (4.1BSD and 4.2BSD), Bell Unix (System III and System V), and VAX/VMS. Requires 500 K of address space.

Price

Prices for a full source license range from $350 to $2400. Contact CCA for further details.

For More Information Contact

Computer Corporation of America, Four Cambridge Center, Cambridge, MA 02142
(617) 492-8860
OEM inquiries are encouraged.
(1) Unix is a trademark of Bell Laboratories.
(2) Vax and VMS are trademarks of Digital Equipment Corporation.



Computers took the strain out of processing data.

Now Raytheon has taken the strain out of data processing.

Introducing the PTS-1000/4000 family of 3270-type information display systems. Designed to combine mainframe compatibility, operator comfort, and peace of mind for DP managers too.

How can we promise all that?

After more than a decade of experience in 3270 emulation, Raytheon designed the PTS-1000/4000 family to offer the utmost in flexibility, so you can mix and match any of our new controllers with any of our new display and printer terminals.

When it comes to operator comfort, no one offers interactive displays with more built-in ergonomic features than Raytheon. Features especially designed to ease the strain on one's neck and back, hand and wrist, and eyes.

The microprocessor-based PTS-1000/4000 family enables efficient distribution of your data processing workload with flexible configuration options and extensive self-diagnostic capabilities. Binary synchronous, systems network architecture (local and remote), and airline link control communication protocols are supported. Large and small control units, multiple screen sizes, and a wide variety of peripheral input/output devices and printers can be mixed and matched with varying star, multidropped cabling, or multiplexed configurations.

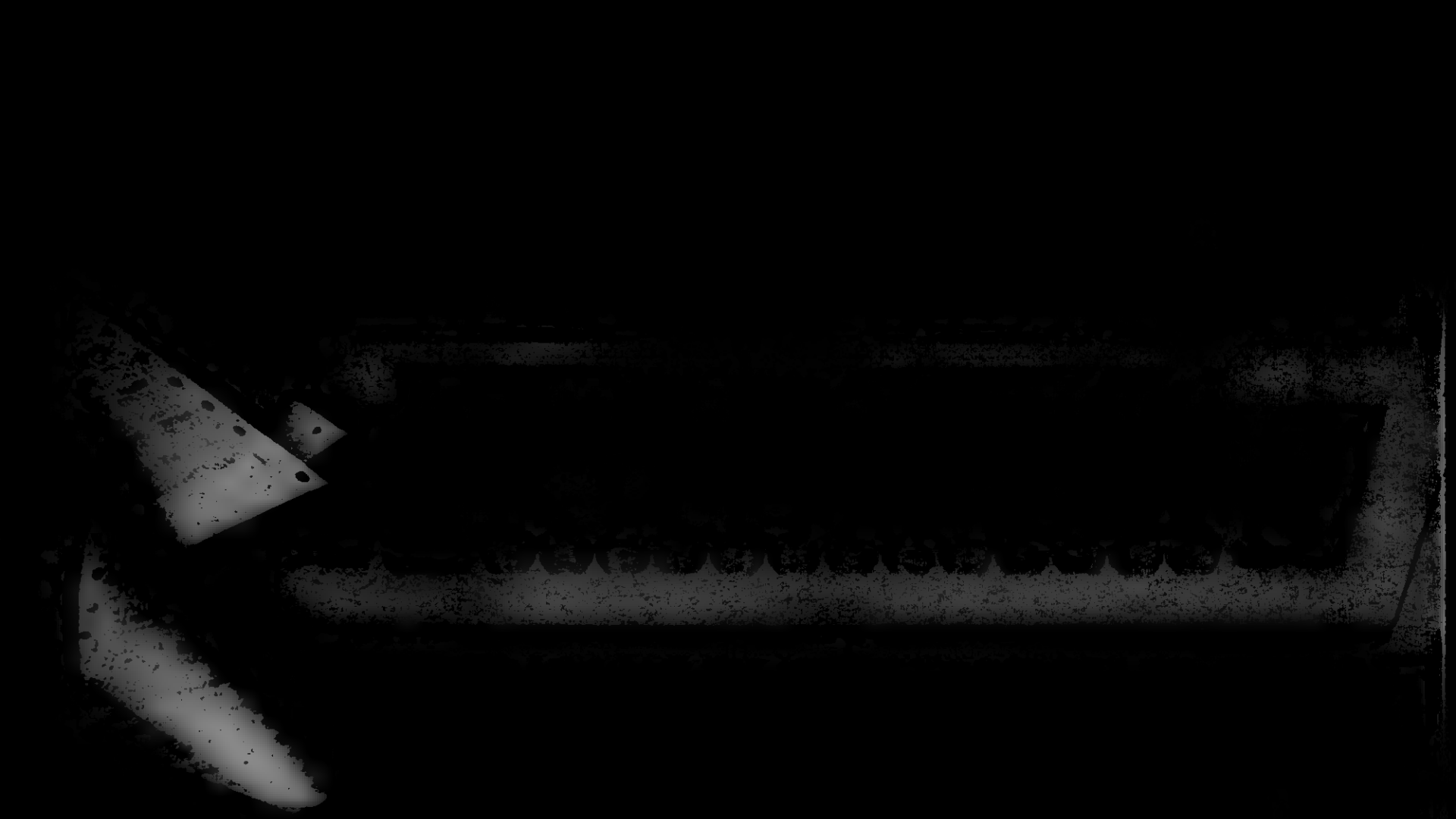
Special system features include productivity enhancements like local format storage, response time monitors, row/column indicators, and unprotected field indicators.

As for the DP manager's peace of mind, Raytheon offers flexible financing and leasing options, competitive pricing, over 2000 service people worldwide, and a commitment for today and tomorrow that can come only from the largest independent supplier of intelligent terminal processing equipment.

The PTS-1000/4000 information display systems from Raytheon Data Systems. We take the strain out of your data processing. For the sales office nearest you, check your telephone directory or call 1-800-343-6676.

RAYTHEON

Raytheon Data Systems
Box 7, Marketing Communications
1415 Boston-Providence Turnpike
Norwood, Massachusetts 02062



Subscription service credits its swiftness to on-line net

BIRMINGHAM, Ala. — One of the world's largest subscription agencies credits its swiftness of service to an on-line data communications network that can handle 130,000 daily transactions.

Fifty thousand organizations in more than 50 countries rely on Ebsco Subscription Services (ESS), a division of Ebsco Industries, Inc., to deliver periodicals needed by researchers, executives, technical experts, students and professors. In 1982, it handled millions of subscriptions to 160,000 unique titles that were delivered to 420,000 addresses.

"We're a one-stop supermarket for anything published on an ongoing basis anywhere in the world," said F. Dixon Brooks Jr., vice-president of operations. "That includes newspapers, periodicals, monographs and government publications, as well as videotex and microforms."

Subscription services

According to John Krontiras, vice-president and general manager of data processing, about 70% of his 83-person department's work load relates to subscription services. "That's understandable, given the size of the data bases we manage," Krontiras said.

"We add an average of 17,000 titles a year to a data base that now includes more than 160,000 titles offered by some 55,000 publishers. On each title, we keep complete pricing and bibliographic data, involving about 10,000 record changes each month.

"Also, since a single corporation may subscribe to 500 periodicals for distribution to offices in dozens of cities, our files include not only 50,000 bill-to addresses, but 420,000 ship-to addresses," he added.

"Because ESS is growing, our data processing requirements keep expanding. In 1979, we processed about 1.5 million subscription orders. During 1982, we handled more than 4.2 million orders. And a single order may represent many subscriptions," he said.

This constant ESS growth has made Ebsco an expert at computer system upgrades. Since the privately held company installed an IBM 1130 computer in the mid-1960s to begin subscription service automation, it has migrated through several series of IBM processors.

With its 1982 upgrade, Ebsco stepped up to twin 8M-byte IBM 4341 Model Group 2 processors with 25G bytes of disk storage capacity.

In recent years, on-line requirements have driven DP activities. Ebsco dedicates one IBM 4341 system to on-line operations, supporting an internal network that embraces 250 IBM 3278 display stations located in 14 U.S. and foreign Ebsco offices, 10

See EBSCO page 40

WIP to host conference April 6-8

PHILADELPHIA — The Advance 1984 International Conference, sponsored by Women in Information Processing (WIP), will be held April 6-8 here at the Bellevue Stratford Hotel.

Amy Wohl, president of Advanced Office Concepts Corp., will deliver the keynote address. The conference, for managers, professionals, users and students of information processing, will focus on subjects ranging from fifth-generation computing and artificial intelligence to career development and stress management.

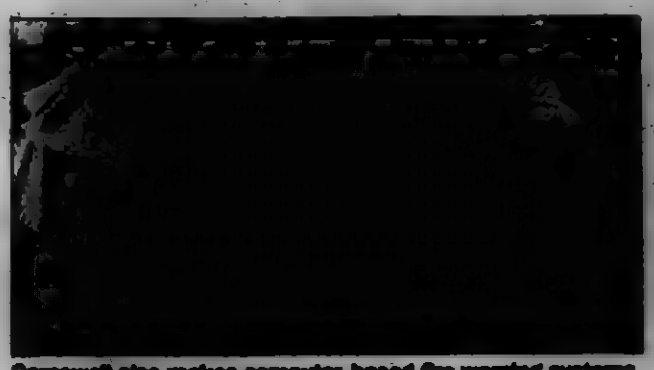
Registration fees are $240 for WIP members and $290 for nonmembers. Further information is available from WIP, Lock Box 39173, Washington, D.C. 20016.

The Northern Telecom system:
A benchmark in batch processing that keeps getting better.

Northern Telecom batch processing systems have proven themselves, in more than a decade of use in a variety of applications, to be among the most reliable, practical, cost-effective systems ever developed. They deliver more throughput per dollar than any competitive system.

Now, as solid evidence of our commitment to batch processing, we're improving these already-successful systems for even more productivity. For instance, we're introducing a new high-speed band printer with changeable type. Operating now with IBM's SNA, we've also added new, low-cost distributed data processing capabilities for more system versatility, and to provide for future growth toward the integrated office.

We're back



Gamewell also makes computer-based fire warning systems.

Move on-line provides manufacturer with up-to-date inventory information

MEDWAY, Mass. — Increased business, up-to-date inventory information and accurate work-in-progress reports were the chief goals set by Gamewell Corp. in converting from the batch processing of manufacturing data to an on-line, interactive system. Gamewell, which has been manufacturing fire protection equipment since 1852, has its offices and its plant here.

"When I came here in 1981, we had a batch processing system running on a 10-year-old computer," MIS Director Andreas B. Greuter recalled recently. "Given the size of the company, it was a very advanced system for its day. However, time has overtaken it. Our business had progressed to the point that only a complete overhaul would do."

The search to replace the existing IBM System/3 Model 10 was spurred by significantly increased business: Gamewell's sales had doubled from 1978 to 1982. On-line, up-to-date information was essential for the improvement of material management, but the old system was able only to compute costs after jobs were finished. It had no accurate ability to report exactly what the status of each job-in-progress was and what labor and material costs had been charged to it.

"With the batch system, the inventory was updated, and a report was printed weekly," Greuter said. "After a couple of days, the report was out of date and we began to lose track of the inventory until the next report was printed. Some items are critical to production, so we had to watch their actual counts closely."

Greuter and his staff considered updating the existing system, but decided against "a stopgap approach that might work for another two or three years. . . . We wanted to provide a tool for the future — perhaps something that could serve us for the next 10 years."

Most hardware vendors wanted Gamewell to use outside software houses either to develop the needed programming or to modify the vendor's programming to fit Gamewell's needs. But, Greuter said, "We wanted to deal with a company that could furnish the computer, the software and the software modifications."

The vendor's ability to modify the programs was particularly important, he added; the Gamewell DP department consists of a DP manager, his assistant and two part-time computer operators. The group had neither the time nor the programming expertise to undertake major modifications.

The system selected was NCR Corp.'s 9040 computer with NCR's Interactive Manufacturing Control System II (IMCS II) software. The computer had 1M byte of main memory and 135M bytes of disk memory. It was installed in August 1982 with 13 CRT terminals at various locations in the office and plant. Already, according to Greuter, an additional 1M byte of memory has been added to accommodate a total of 28 terminals.

The IMCS II software

See IMCS page 40

Your processing may be remote, but Northern Telecom service is on the spot.

With service and maintenance professionals located at 157 cities nationwide, we're able to provide prompt response to your call for service. How fast? Two hours in major metropolitan areas; four hours in most other areas of the country. And our multi-year maintenance agreements guarantee continuing, low-cost operation of your Northern Telecom system.

If your system lease expires within the next six months, *now* is the time to find out more about batch processing from Northern Telecom.

Time-proven performance with long-term savings.

Northern Telecom's aggressive pricing is more proof of our commitment to batch. Our discount structure offers long-term savings on multi-year leases. And at renewal time, you can save even more with discounts up to 30%.

Call our toll-free number: 800-331-3113. Or write Northern Telecom, Mail Station T-240, P.O. Box 1222, Minneapolis, Minnesota 55440. We'll show you how we can tailor a batch system to your specific needs. And save you money, too.

nt northern telecom

ing batch!

EBSCO from page 38

IBM 3279 color display stations as well as 20 daisywheel printers in regional offices.

The system also supports Ebsconet, an expanding external customer network. Within 18 months of introducing Ebsconet, the company found itself supporting on-line terminals at more than 130 customer locations.

Info-handling business

"We're really in the information-handling business," Brooke said, "and the ability to order periodicals via computer terminals isn't the main reason customers want our on-line services.

"Rather, they want to tie into our data bases to gain instant access to the information they need to make prompt, intelligent decisions," he added.

Work began in 1977 on an on-line pilot project to link the University of Alabama's Lister Hill Library of Health Sciences to Ebsco's computer system.

For this pioneering effort, Ebsco modified a software package acquired from the University of California at Los Angeles biomedical library. Now Ebsco provides the resulting Serials Control System and an On-line Subscription Service (OSS) to libraries and information centers.

Given about 24 hours, Ebsco can link any customer computer terminal to its host IBM 4341 computer and its central data base, which contains both separate and merged files, according to Brooke. Dial-up access is provided through Tymnet, Inc. telecommunications services.

Eliminated tedious tasks

OSS has automated many tedious and time-consuming manual subscription tasks. The cost of processing new orders is estimated at $20 to $75 per title for organizations using manual methods.

But with individual customer order requirements and complete title data built into Ebsco's data base, an OSS user can place an order in about 30 seconds.

"Our network uptime is now greater than 98.5%," Krontiras said. "Ebsco staffers and customers making 130,000 on-line transactions daily can count on a response time of four seconds or less.

"We've achieved this performance by converting from Bisynchronous Communications to an IBM Systems Network Architecture telecommunications environment, adding hardware and software monitors and dedicating staff to data communications," he added.

Each Ebsco regional office is equipped with an IBM 3274 control unit, while an IBM 3705 communications controller at headquarters handles all incoming lines.

State-of-the-art diagnostic tools, including a Digilog, Inc. network supervisory system, enable Ebsco to isolate and solve problems immediately.

The Digilog system takes advantage of IBM CICS software.

Krontiras lists CICS as one of a half-dozen valuable IBM network software aids.

IMCS from page 39

package is modular, with up to nine application modules interacting through a common data base. As an example, the inventory data shows, in a real-time mode, the quantity put to stock within the purchasing/receiving module, the quantity a production order has been opened for in an inventory-control screen and the quantity entered as shipped against a sales order in the order processing module, which was modified to meet the company's needs. There were problems making the transition, according to Greuter, but nothing insurmountable.

In addition to maintaining the perpetual inventory, the programming makes it possible to cycle count the physical inventory and come up with increasing accuracy. Based on the results obtained so far, counting 130 different parts each week, Gamewell is confident that cycle counting will replace the annual wall-to-wall physical inventory.

Greuter feels the new system is meeting the objectives set for it. "Our bottom line with this new system was to provide our people with a tool consisting of up-to-date management information. Since we started placing terminals in the plant, we have seen a steady increase in their use. That acceptance is probably the best recommendation our people can give."

ASI launches four courses

ARLINGTON HEIGHTS, Ill. — Advanced Systems, Inc. (ASI), a producer and distributor of on-site training courses for large organizations, is offering four multimedia courses dealing with technology and work center management.

"Managing the Economics of the Advanced Stages" is said to provide corporate executives with an overview of the value of computers. The other programs are "Technology Perspective: Harnessing the Productivity Potential of MVS/XA," "Work Center Management" and "Dispatching and Shop Floor Control."

The programs range in price from $50 to $100 per tape, depending on the leasing arrangement. They are available now from ASI, 2340 S. Arlington Heights Road, Arlington Heights, Ill. 60005.

PREV
BAD

IT SPREADS.
CORRUPTS.
ERODES.
DESTROYS INTEGRITY.

Bad data is really bad news. Because it's impossible to get good information from bad data. And once bad data gets into a system, there is no cure. The bad simply gets worse.

There is only one way to guarantee good information: *PREVENT BAD DATA.*

TSI International can do just that. We're the good information specialists. With software designed specifically to make sure your data starts good and stays good. Our products will capture, control and deliver consistently good data to assure nothing but good information. You can depend on it. No one knows more about how to prevent bad data than TSI.

NEWS

Package enables insurer to control forms inventory

Unionmutual building

PORTLAND, Maine — When a major insurance company here began to lose control of its inventory of 15,000 printed forms, it turned to a software package for assistance.

A leader in the field of long-term disability insurance, Unionmutual Life Insurance Co. has grown nearly tenfold in the last decade — its assets increased from $378 million to $3 billion in the period from 1978 to 1982 alone. The firm's need for printed forms grew just as rapidly. The burgeoning inventory of forms had been controlled through a manual card file system, but duplicate purchasing orders, recurring inventory shortages and order fulfillment delays made it obvious that it was time to automate.

A Unionmutual study team determined that a packaged software system would be more cost-effective than one developed in-house by the company's programming staff. Management representatives then visited other firms with automated inventory control systems, including the First National Bank of Boston. First National had implemented Management Science America, Inc.'s (MSA) Inventory and Purchasing System package.

Unionmutual considered several other packages, but decided upon the MSA Inventory and Purchasing System because it was the only package that could calculate consumption — or usage — rates on an ongoing basis, according to senior programmer/analyst Frank Rivera. Turning to the task of implementation, the project team first reviewed the card file information and simplified it to the bare essentials.

Next, data from the three card files in the supply, forms management and purchasing departments was entered into the system. Unionmutual continued to use the manual system in conjunction with the MSA package — a parallel run of sorts — until staff members were satisfied that the automated inventory system was completely functional.

Workers soon found that referencing an inventory item was much easier with the new system. "The project team chose to use the final five positions of the item description to indicate the latest date of any printed revision," Rivera said. "Our legal department, for example, may be doing research and needs to know which long-term disability claim form was used in New York in 1972. With the Inventory and Purchasing System, we can have an answer in minutes."

Currently, Unionmutual runs the MSA package on its IBM 3081 mainframe under MVS to keep track of 15,000 forms used in the more than 90 offices it maintains nationwide. The system has made it possible for Unionmutual to group forms by name as well as number. The categories, such as application, claim, policy page and proposal, are listed alphabetically in the supply catalog. In addition to standardizing naming conventions within the company, that feature has been useful to employees unfamiliar with the form numbers.

But the biggest advantage of the MSA software, according to Rivera, is that the firm can determine on an ongoing basis the number of forms used. "Because we're growing so fast, our average monthly usage is changing. The system not only tells us how many more months our present stock is going to last, but also where our reorder points should be set.

"We can review our information periodically and make the necessary changes," Rivera said. "This has given us one central place to access the information we need."

Because purchasing can project printing needs more accurately, Unionmutual can avoid emergency buying and negotiate with vendors for the best possible prices. The system has also helped the firm identify forms that are similar from a printing aspect, Rivera said, and that capability has allowed Unionmutual to combine form orders to reap the benefit of competitive bidding for larger orders.

FACETS. Preventing bad data begins with stable database designs. This leading edge design tool assists in all phases of database projects, from information analysis to finished design.

KEY/MASTER. From the moment you capture data, this widely used on-line data entry system helps you screen bad from good — to assure initial and ongoing accuracy.

DATA CATALOG 2. By applying inventory techniques to information, this dictionary system controls your good data — to keep it good.

DATA ANALYZER. As a powerful information center tool for the retrieval and analysis of production data, it will help turn your good data into good information.

DOCU/MASTER. A new way to deliver all your good information — from highly structured data to unstructured text. This on-line information system allows users to query any way they want.

TSI International. The good information specialists. For good data that produces good information, call us at 800-227-3800, Ext. 7005. You can rely on TSI.

TSI International

a company of The Dun & Bradstreet Corporation

187 Danbury Road Wilton, Connecticut 06897

Ford goes in-house for structural analysis

DEARBORN, Mich. — Analyzing more than 12,000 individual finite elements on a car body and 11,400 on the engine block is a task that Ford Motor Co. engineers here can only accomplish with the aid of computers.

"It is only with powerful computers and software that we are able to identify possible weak spots, simulate operations and analyze results," explained Dr. P. Perumalswami of Ford's Structural Analysis Department.

The Structural Analysis Department is a focal point for company-wide use of finite-element technology, he said. The department develops new methods, trains personnel and offers consulting and analysis service companywide, besides undertaking large and complex analysis tasks such as vehicle structures, power-train assemblies and dynamic studies.

The department serves "a couple of hundred users" via telephone lines, according to Perumalswami, and additionally provides time-sharing services to Ford engineers in the U.K. and Germany.

Ford has used computers to analyze car structures and components since the early 1970s. Then, the company was using Control Data Corp.'s Cybernet Services' cadre of Cyber 18 computers, which eventually numbered nearly 200, to develop a structural analysis operation. Now it operates two computers in-house, a CDC Cyber 176 and a Cyber 760.

The Cyber 176 and 760 in Ford's Dearborn Engineering Computer Center are the major tools for Ford's companywide structural analysis program. The computers enable designers and engineers to create mathematical models of surfaces, structures and components and to simulate performance for evaluation and change, if necessary.

The switch from Cybernet to in-house came in 1977; when Ford acquired the Cyber 176; the 760 was installed in January 1983. According to Perumalswami, engineers and designers have access to "Mainframe A" and "Mainframe B," depending on which is available. "We don't distinguish between Mainframe A and Mainframe B," he said. The computer operation accommodates batch processing, on-line processing and time-sharing.

The department's library of mathematical models and simulations is very extensive. "We subject the car and [its] select parts to all types of road conditions, even down to testing the curb-impact capabilities of the wheel rims."

Perumalswami said the ability to analyze 12,000 elements on a car body and 11,400 on an engine is a major advantage. "We've always been aware of where major stress and weak spots could occur, but could not identify those trouble areas that come with time and extensive use. Now we can subject body, engine and components to whatever tests we wish."

Ford's European operations in the U.K. and Germany rely on the Cybers in Dearborn for large-problem processing. The company's European Automotive Operations, headquartered in Dunton, U.K., is equipped with a Cyber 720, but is connected by a 9600 bit/sec satellite transmission network to the Dearborn center's Cyber 176. The Dunton Computer operations, in turn, serve a Ford research center in Merkenich, Germany.

"Because of the time difference, the time-sharing works very well," Perumalswami noted. "The European operations begin transmitting data around 1 a.m. our time, and the processing is usually completed by the time engineers in Dearborn need the computer."

Ford uses MacNeal-Schwendler Corp.'s MSC Nastran (Nasa Structural Analysis) software for about 90% of its analytical work. But it also has developed a broad range of subsystems that interface with Nastran to meet specific design and engineering needs. These programs and other commercially-available codes support a wide spectrum of analyses that relate to crash tests, structural effects of thin body parts, placement of engine mountings, vibration studies, bumper design and many others.

One such application is Ford's Movie.Byu, a software package that uses shades of color to pinpoint areas of high stress and structural weakness. When loads and constraints are applied to a particular part of body surface, the weak spots become obvious through color coding.

Ford's around-the-clock structural analysis computer center is supported by a staff of approximately 50 analysts. About 20 disk packs are mounted daily to handle the work load. Data storage is handled by 17 CDC 844 disk drives and 12 CDC 885s, for a total capacity of 15.6 billion bytes of information.

What do top computer professionals usually say when we tell them about our unique, completely portable software?

"Show me!"

And actually we are not surprised. After all it took us 5 years to figure out how to do it. And now that we've gotten over that hurdle our biggest problem has been convincing people that Tominy's* completely portable application development system really works.

Tominy allows you to develop completely portable application programs which can be used without modification on micros as well as mainframes and everything in between. That means no more costly and unproductive time spent in developing special systems to fit individual computers. With Tominy one size fits all.

We have such confidence in the system that we offer it with a 90 day no questions asked money back guarantee.

Because it is not possible to tell you here everything our portable application development system does, we have ready to send you a kit that not only offers detailed information on how the system operates but also shows how it is presently being used to increase productivity and reduce costs in over 1000 installations nationwide, including 25 of the Fortune 500 companies. It's yours free for the asking if you send in the coupon or call (513) 984-6605.

We are sure that after reading it Tominy will make a believer out of you too.

Tominy
Once is finally enough.

*Tominy's completely portable application development system is presently available for IBM's PC, System/34, System/36, Series/1, 43XX, 30XX, 370xxx, DEC VAX/VMS systems, UNIX and XENIX operating systems.

☐ I'd like to be convinced. Send me your information kit.
☐ Have a representative call.

NAME (PLEASE PRINT)
TITLE
COMPANY
ADDRESS
CITY STATE
ZIP
TELEPHONE

Mail to: TOMINY Inc.
Dept. B
4221 Malsbary Rd., Bld. #1
Cincinnati, Ohio 45242

81-CW-S-19-4

You Are Cordially Invited to a Free Focus Seminar.

FOCUS is the 4th generation DBMS that gives you all the necessary tools for fast and successful application development. Only FOCUS combines modern database technology and 3270 screen design with an English nonprocedural language for reporting, graphics, financial modeling and statistical analysis.

This Seminar will show you how FOCUS can:

Build complete screen-driven database applications.

FOCUS' built-in screen facilities include forms creation and design, PF key scrolling, dynamic control of color and other terminal attributes, data validation, table lookup and complete logical and computational facilities.

Capitalize on existing files and databases.

Powerful relational facilities enable you to read, join and report from any file in your data center (QSAM, VSAM, ISAM, IMS, IDMS, TOTAL, ADABAS, MODEL 204).

Integrate your micro/mainframe environment.

PC/FOCUS puts mainframe FOCUS on your Personal Computer, expanding it into a personal mainframe. And PC/FOCUS includes micro/mainframe communications for download/upload of critical mainframe data used for analysis and updating.

Fulfill your Information Center requirements.

Your end users can quickly learn and use FOCUS' simple English statements to perform their own queries, reports, graphics and analyses—even build simple database applications. Industry surveys shows that FOCUS is the leading 4th generation Information Center database system.

FOCUS runs on IBM or compatible mainframes under MVS (with TSO, CICS, IMS/DC), VM/CMS or OS. PC/FOCUS is available on the IBM PC/XT or XT/370 and the Wang and Texas Instruments Professional Computers.

Seminar Format: The Seminar is designed to give both DP Professionals and DP End Users a complete overview of FOCUS. It is three hours in length, including a refreshment break. The presentation features a comprehensive online demonstration. Questions and discussion are encouraged. Registration for the AM Seminars beings at 8:30 a.m. The PM Seminars begin registration at 12:45 p.m.

SPRING SEMINARS

ALBANY, NY MAY 10 AM
Albany Hilton
ATLANTA, GA MAY 3 AM
Waverly (Seattle's)
BOSTON, MA MAY 20 AM
Sheraton Boston
CALGARY, AB MAY 3 AM
Westin Hotel
CHICAGO, IL APR 12 AM
Chicago O'Hare Marriott
CHICAGO, IL APR 12 PM
Chicago O'Hare Marriott
CINCINNATI, OH APR 12 AM
Marriott Inn
CLEVELAND, OH APR 24 PM
Cleveland Airport Marriott
DALLAS, TX APR 11 AM
Westin Galleria
DENVER, CO APR 24 AM
Ramada Renaissance
DETROIT, MI APR 5 AM
Westin Renaissance Center
DETROIT, MI APR 5 PM
Westin Renaissance Center
GREENSBORO, NC APR 16 PM
Holiday Inn Four Seasons
HARTFORD, CT APR 19 AM
Sheraton Hartford
HOUSTON, TX APR 6 AM
Westin Galleria
INDIANAPOLIS, IN MAR 27 AM
Hyatt Regency
JACKSONVILLE, FL MAR 29 PM
Sheraton at St. John's Place
KANSAS CITY, MO APR 3 AM
Westin Crown Center
LOS ANGELES, CA APR 26 PM
Beverly Hilton
LOS ANGELES, CA MAY 30 PM
Hyatt Regency
LOUISVILLE, KY MAY 17 AM
Hyatt Regency Louisville
MEMPHIS, TN APR 19 PM
Peabody Hotel
MILWAUKEE, WI MAR 27 PM
Hyatt Regency
MINNEAPOLIS, MN MAY 6 PM
Minneapolis Hilton
MORRISTOWN, NJ APR 5 AM
Governor Morris Inn
MONTREAL, PQ APR 25 AM
Westin Resources
NEW ORLEANS, LA MAY 10 AM
Sheraton
NEW YORK, NY MAY 6 AM
New York Hilton
NEW YORK, NY MAY 6 PM
New York Hilton
OKLAHOMA CITY, OK APR 19 AM
Sheraton Century Center
ORANGE COUNTY, CA MAY 15 AM
Westin South Coast Plaza
OTTAWA, ON APR 26 AM
Westin Ottawa
PHILADELPHIA, PA MAR 29 AM
Bellevue Stratford
PHOENIX, AZ MAY 10 PM
Hyatt Regency
PITTSBURGH, PA APR 19 AM
Holiday Inn, Crowne
PRINCETON, NJ MAY 3 AM
Ramada Inn
ROCHESTER, NY MAY 22 AM
Genesee Plaza Holiday Inn
SALT LAKE CITY, UT APR 3 AM
Hotel Utah
SAN ANTONIO, TX MAR 29 AM
Hyatt Regency
SAN DIEGO, CA MAY 17 PM
Vacation Village
SAN FRANCISCO, CA MAY 17 PM
Westin St. Francis
SEATTLE, WA APR 17 PM
Westin Hotel
ST. LOUIS, MO MAY 10 AM
Sheraton Plaza
STAMFORD, CT MAY 3 AM
Stamford Marriott
TORONTO, ON APR 4 AM
Westin Toronto
TORONTO, ON JUN 1 AM
Westin Toronto
VANCOUVER, BC APR 19 AM
Westin Bay Shore
WASHINGTON, DC APR 26 PM
Capital Hilton
WINNIPEG, MB MAY 15 AM
Westin Winnipeg

To register for this free seminar please complete and return the attached or call our Seminar Coordinator at (212) 736-4433.

FOCUS Information Builders, Inc.,
1250 Broadway, New York, NY 10001.

☐ I cannot attend ☐ Please send me more information on FOCUS
☐ Yes, I will attend the free FOCUS Seminar
on _____ In city _____

Name _____
Title _____ Phone _____
Company _____
Address _____
City _____ State _____ Zip _____

Computer (e.g. IBM 43XX) _____
System (e.g. VM/CMS) _____
☐ Please reserve _____ additional seats.
Additional Attendee Names _____

NEWS

CALENDAR

WEEK OF APRIL 1

APRIL 3-6, BOSTON — **Structured Design and Programming.** Contact: Ruth Dordick, Integrated Computer Systems, 6305 Arizona Place, Los Angeles, Calif. 90045.

APRIL 4, NEW YORK — **Introduction to Dbase II.** Contact: Center for Advanced Data Processing, Suite 402, 450 Seventh Ave., New York, N.Y. 10123.

APRIL 4, NEW YORK — **IBM 3100 Users Group.** Contact: Con Edison, 4 Irving Place, New York, N.Y. 10003.

APRIL 4-5, GREENBELT, MD. — **Relational Data Base Systems.** Contact: Center for Management Development, College of Business and Management, University of Maryland, College Park, Md. 20742.

APRIL 4-6, HOUSTON — **Systems Analysis and Design: Concepts and Effective Practices.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

APRIL 4-6, SEATTLE — **Data Base Management.** Contact: Center for Advanced Professional Education, Suite 110, 1820 E. Garry St., Santa Ana, Calif. 92705.

APRIL 4-6, SAN FRANCISCO — **Network Design.** Contact: Systems Technology Forum, 9000 Fern Park Drive, Burke, Va. 22015.

APRIL 4-6, NEW YORK — **Local-Area Networks.** Contact: Center for Advanced Professional Education, Suite 110, 1820 E. Garry St., Santa Ana, Calif. 92705.

APRIL 4-6, CHICAGO — **Fundamentals of Data Communication.** Contact: American Management Associations, 135 W. 50th St., New York, N.Y. 10020. Also being held April 9-11 in Washington, D.C., and Philadelphia.

APRIL 4-6, SALT LAKE CITY — **Network Communications Protocols.** Contact: Center for Advanced Professional Education, Suite 110, 1820 E. Garry St., Santa Ana, Calif. 92705.

APRIL 4-6, SEATTLE — **Layered Network Architecture and the ISO Seven-Layer Standards.** Contact: Data-Tech Institute, 386 Franklin Ave., P.O. Box 569, Nutley, N.J. 07110.

APRIL 4-6, SAN JUAN, PUERTO RICO — **Personal Computers and Networking.** Contact: Center for Advanced Professional Education, Suite 110, 1820 E. Garry St., Santa Ana, Calif. 92705. Also being held April 4-6 in Pittsburgh.

APRIL 4-11, HANNOVER, WEST GERMANY — **Hannover Faire.** Contact: Hannover Faire Information Center, P.O. Box 338, Route 22 E., Whitehouse, N.J. 08888.

APRIL 5, NEW YORK — **Knowledgeman for Application Development.** Contact: Center for Advanced Data Processing, Inc., Suite 402, 450 Seventh Ave., New York, N.Y. 10123.

APRIL 5-6, HOUSTON — **Data Communications: Advanced Concepts, Products and Services.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

APRIL 5-6, NEW YORK — **Implementing Voice Technology.** Contact: Patti Restaino, Votan, 4487 Technology Drive, Fremont, Calif. 94538. Also being held April 11-12 in Chicago, April 17-18 in Atlanta and April 24-25 in Dallas.

APRIL 5-6, PHILADELPHIA — **Microcomputers: A Tool for Increased Productivity.** Contact: Association for Systems Management, 24587 Bagley Road, Cleveland, Ohio 44138. Also being held April 9-10 in Chicago and April 12-13 in Milwaukee.

APRIL 5-6, RESTON, VA. — **Local-Area Networks.** Contact: Center for Management Development, College of Business and Management, University of Maryland, College Park, Md. 20742.

APRIL 5-6, WASHINGTON, D.C — **Micro/Personal Computers: State of the Art.** Contact: Digital Consulting Associates, Inc., 339 Salem St., Wakefield, Mass. 01880.

APRIL 5-6, BOSTON — **The IBM Personal Computer: Making It Work in the IBM Mainframe Environment.** Contact: Techtran, P.O. Box 10212, 72 Cummings Point Road, Stamford, Conn. 06904. Also being held April 12-13 in New York.

APRIL 5-6, SAN FRANCISCO — **IBM Systems Network Architecture: A Master Plan for Teleprocessing.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

APRIL 5-7, NEW YORK — **The 1984 Lasers in Graphics Seminar.** Contact: Dunn Technology, Inc., 759 E. Vista Way, Vista, Calif. 92083.

APRIL 5-7, LOS ANGELES — **Comdex Winter 1984.** Contact: The Interface Group, Inc., 300 First Ave., Needham, Mass. 02194.

APRIL 6, GREENBELT, MD. — **Relational Data Base Design Techniques.** Contact: Center for Management Development, College of Business and Management, University of Maryland, College Park, Md. 20742.

APRIL 6, NEW YORK — **Advanced PC-DOS 2.0.** Contact: Center for Advanced Data Processing, Inc., Suite 402, 450 Seventh Ave., New York, N.Y. 10123.

APRIL 7-8, NEW YORK — **CICS Command Level.** Contact: Sysed, One Park Ave., New York, N.Y. 10016.

WEEK OF APRIL 8

APRIL 8-12, ORLANDO, FLA. — **Synergism '84: Micro International's Ninth Conference for Microcomputer Users.** Contact: Micro International, P.O. Box 497, Barrington, Ill. 60010.

APRIL 9, KANSAS CITY, MO. — **Introduction to Micros.** Contact: U.S. Professional Development Institute, Microcomputers in Government, Department AB, 1620 Elton Road, Silver Spring, Md. 20903.

APRIL 9, NEW YORK — **Introduction to the IBM PC.** Contact: Center for Advanced Data Processing, Inc., Suite 402, 450 Seventh Ave., New York, N.Y. 10123.

APRIL 9, BOSTON — **The Telecommunications Future.** Contact: The New England Council, Inc., 120 Boylston St., Boston, Mass. 02116.

APRIL 9, NEW YORK — **Word Processing With Wordstar.** Contact: Center for Advanced Data Processing, Inc., Suite 402, 450 Seventh Ave., New York, N.Y. 10123.

APRIL 9-10, SAN FRANCISCO — **Local-Area Networks: Selection Guidelines.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

APRIL 9-10, OTTAWA — **Dbase II.** Contact: Center for Advanced Professional Education, Suite 110, 1820 E. Garry St., Santa Ana, Calif. 92705. Also being held April 11-12 in Toronto, April 16-17 in Calgary, Alta., April 18-19 in Vancouver, B.C., April 23-24 in Arlington, Va., and April 25-26 in Washington, D.C.

APRIL 9-10, ORLANDO, FLA. — **Computer Negotiations Workshop.** Contact: International Computer Negotiations, Suite 1707, 200 St.

See APRIL, page 46

DEC TO IBM SNA

Now available...full SNA capability for your DEC computer! Comboard/SNA gives your terminals access to IBM interactive applications. Data can be transfered between systems transparently, all in the complete fully supported package, from Software Results.

Comboard/SNA is a proven and reliable, single-board, 256KB communications computer that plugs into your DEC Unibus. Teamed with Comboard software, the system is a cost-effective solution to troublesome SNA communications problems.

Comboard/SNA allows your DEC to emulate an IBM PU Type 2 communications node. You have a full gateway into your SNA without the trouble of passing through a secondary network.

For further information, fill in the coupon below or call Software Results... the leader in DEC to IBM communications.

COMBOARD

SOFTWARE RESULTS CORPORATION

Call Toll-free

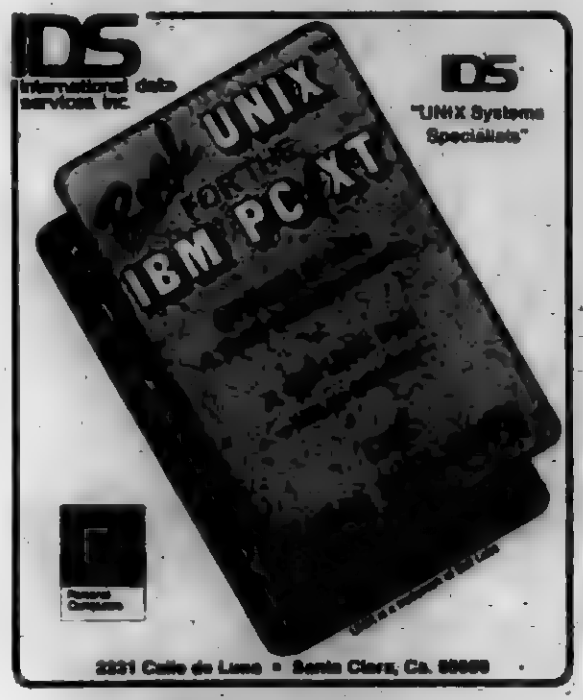
1-800-SRC-DATA

In Ohio call collect

1-614-457-2282

2987 Silver Drive, Columbus, Ohio 43211

Telex: 437-435 SRC DATA CI



See us at COMDEX/Winter '84
April 5-7, 1984
Los Angeles Convention Center
Los Angeles, California

BECOME A VSAM EXPERT.

SysEd's new 5-day VSAM course will make you a VSAM expert. You'll not only learn how VSAM works, but *how to make it work well*, and what to do if things go wrong. Even if you're already using VSAM, you'll gain a better understanding of its capabilities and flexibility . . . like how to select among the options VSAM offers for configuring data sets, both batch and on-line.

Our hands-on case study instruction begins the very first day. You'll write and test three real-life programs and use Access Method Services on our own 4341 / II computer. There are eight 3270 terminals dedicated to the class. You'll receive individual attention from our experienced teachers, and you'll want to bring your actual programming and debugging problems to class.

SysEd's VSAM course contains the most up-to-the-minute information available anywhere, including the latest features and capabilities of VSAM, and is in line with state-of-the-art hardware.

SysEd courses are held weekly and on weekends at our training centers in New York City, Chicago, San Francisco and Dallas. On-site courses at your own computer installation are also available. *Classes are limited.* For early enrollment or more information call Dave Shapiro (212) 689-3386.

SYS-ED

ONE PARK AVENUE, NEW YORK, NY 10016 • (212) 689-3386

ADR WARE™

ADR®/DATACOM/DB™

From idea to application, we get you there faster.

Faster than Cullinet.
Faster than Software AG.
Faster than Cincom.
Much faster than IBM®.

We've taken state of the art to a new state: Easy and Available.
Before you make a software decision, call ADR (201) 874-8000.
Or fill out and mail in the coupon.

☐ Please send me more information about ADR WARE.
☐ Please send me information about ADR seminars.

APPLIED DATA RESEARCH INC.
Route 206 & Orchard Road, CN-8, Princeton, NJ 08540

Name_____
Position_____
Company_____
Address_____
City_____ State_____ Zip_____
Phone Number_____
Computer Equipment_____

ADR® WARE™
From idea to application,
we get you there faster.

NEWS

APRIL from page 44

Andrews Blvd., Winter Park, Fla. 32792.

APRIL 9-10, WASHINGTON, D.C. — **How to Manage Data and Information as a Resource.** Contact: Barnett Data Systems, 19 Orchard Way N., Rockville, Md. 20854.

APRIL 9-11, ATLANTA — **Data Communications: An Introduction to Concepts and Systems.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

APRIL 9-11, NEW YORK — **Minis/Micros with IBM Mainframes.** Contact: Techtran, P.O. Box 10212, 72 Cummings Point Road, Stamford, Conn. 06904.

APRIL 9-11, WASHINGTON, D.C. — **Distributed Systems Design: Microcomputers to Mainframes.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

APRIL 9-11, ATLANTA — **Computer Network Architecture.** Contact: Center for Advanced Professional Education, Suite 110, 1820 E. Garry St., Santa Ana, Calif. 92705.

APRIL 9-11, CHICAGO — **Data Base Management Systems for Micros and Minis.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

APRIL 9-11, BOSTON — **Microcomputer Data Base Management Systems.** Contact: Digital Consulting Associates, Inc., 339 Salem St., Wakefield, Mass. 01880.

APRIL 9-11, LOS ANGELES — **Controlling Software Projects: Management, Measurement and Estimation.** Contact: Technology Transfer Institute, 741 10th St., Santa Monica, Calif. 90402.

APRIL 9-11, NEW YORK — **Information Systems: Modeling Analysis and Planning.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

APRIL 9-11, NEW YORK — **Data Communications and Networking for Personal Computers.** Contact: Digital Consulting Associates, Inc., 339 Salem St., Wakefield, Mass. 01880.

APRIL 9-11, SAN FRANCISCO — **Computer Operations Management: Effective Techniques.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

APRIL 9-11, TORONTO — **Data Base: A Manager's Guide.** Contact: Technology Transfer Institute, 741 10th St., Santa Monica, Calif. 90402.

APRIL 9-11, WASHINGTON, D.C. — **Project Management: A Practical Approach.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

APRIL 9-11, WASHINGTON, D.C. — **Computer Performance Measurement and Capacity Planning: Tools and Techniques.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

APRIL 9-12, SAN FRANCISCO — **Infocom '84.** Contact: IEEE Computer Society, P.O. Box 639, Silver Spring, Md. 20901.

APRIL 9-12, CHICAGO — **FYI/Image Management.** Contact: Association for Information and Image Management, Department of Conference and Exposition, 1100 Wayne Ave., Silver Spring, Md. 20910.

APRIL 9-12, ATLANTA — **Basic Assembler.** Contact: Advanced Technology Systems, Inc., 302 Research Drive, Norcross, Ga. 30092.

APRIL 9-12, WASHINGTON, D.C. — **The Sixth Annual International Conference on Computer Capacity Management.** Contact: Institute for Information Management, 510 Oakmead Pkwy., Sunnyvale, Calif. 94086.

APRIL 9-12, ORLANDO, FLA. — **Software Engineering With Ada.** Contact: U.S. Professional Development Institute, Software Engineering with Ada, Department A, 1620 Elton Road, Silver Spring, Md. 20903. Also being held April 30-May 3 in Dallas.

APRIL 9-13, HOUSTON — **Structured Analysis and Design Workshop.** Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036. Also being held April 9-13 in New York.

APRIL 9-13, LOS ANGELES — **Software Maintenance Workshop.** Contact: Structured Methods, Inc., 7 W. 18th St., New York, N.Y. 10011.

APRIL 9-13, DENVER — **The Counter Users Ex-**

See APRIL page 48

KEY TRONIC Refines
The Televideo-925
Keyboard

key tronic

ADR® WARE™

ADR®/DATACOM/DB™

The only widely installed relational data base management system being used for high volume update applications. Today.

We've taken state of the art to a new state: Easy and Available.
Before you make a software decision, call ADR (201) 874-9000.
Or fill out and mail in the coupon.

☐ Please send me more information about ADR WARE.
☐ Please send me information about ADR seminars.

APPLIED DATA RESEARCH INC.
Route 206 & Orchard Road, CN-8, Princeton, NJ 08540

Name_____
Position_____
Company_____
Address_____
City_____ State_____ Zip_____
Phone Number_____
Computer Equipment_____

ADR® WARE™
From idea to application,
we get you there faster.

Cullinane to keynote IEEE meet

SILVER SPRING, Md. — John J. Cullinane, chairman of the board of Cullinet Software, Inc., will be the keynote speaker at the 1984 Trends and Applications Conference (Trends and Applications '84), which will take place here May 22. The title of Cullinane's talk will be "Data Base Management Systems — Fact and Fiction."

Trends and Applications '84, sponsored by the Institute of Electrical and Electronics Engineers (IEEE) Computer Society, will be held at the National Bureau of Standards in Gaithersburg, Md. The theme of the conference is "Making Data Base Work."

The registration fee for the two-day conference is $50 for IEEE Computer Society members, $60 for nonmembers.

More information is available from the IEEE Computer Society, which can be contacted through P.O. Box 639, Silver Spring, Md. 20901.

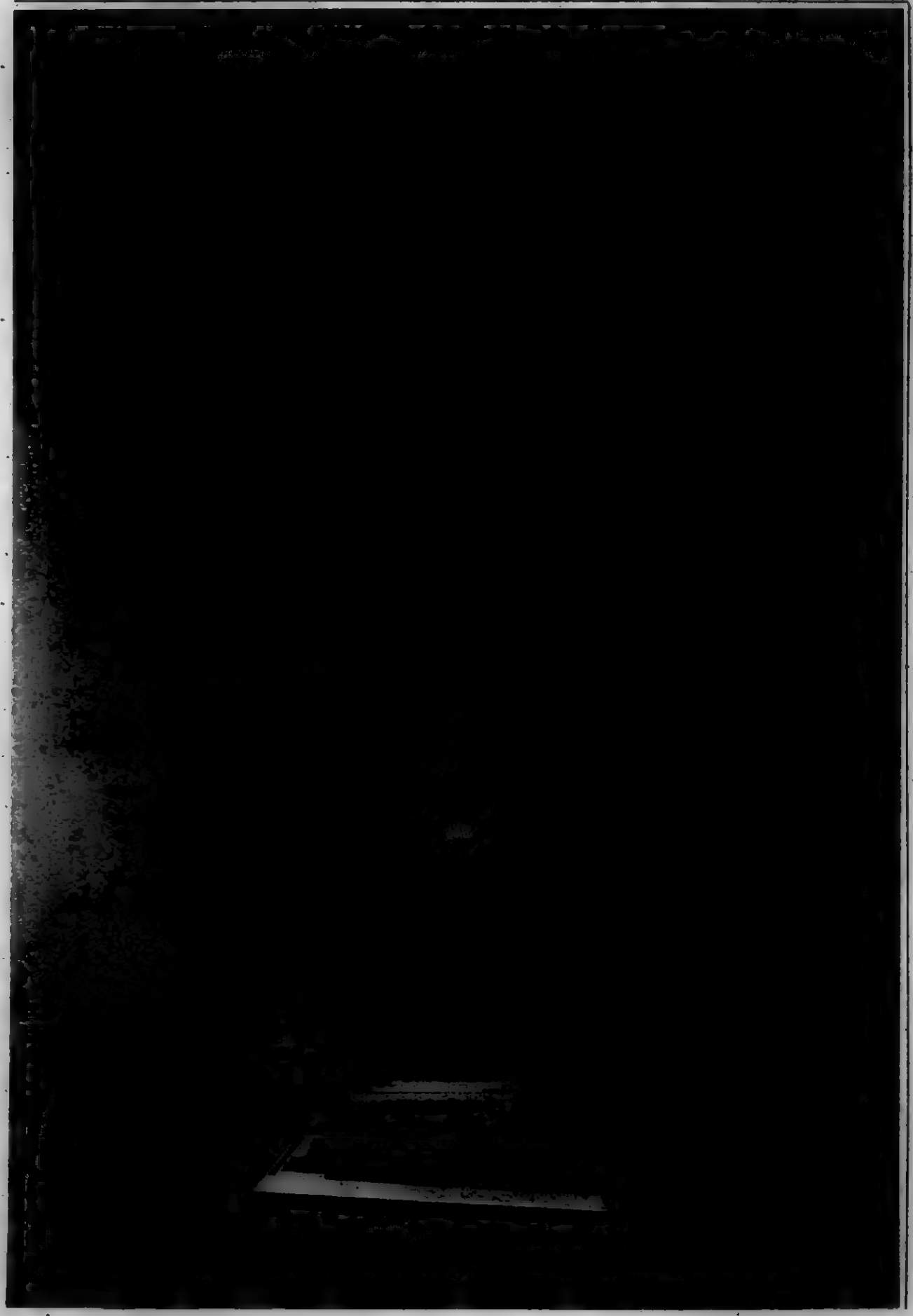
June 12 meet to discuss factory computerization

CHICAGO — The Advanced Manufacturing Systems (AMS) Exposition and Conference will be held at McCormick Place here June 12-14.

The theme of AMS '84 will be "The Computer: Mind of the Factory of the Future." Information systems and automated production systems directed to the needs of manufacturing companies will be demonstrated.

The sessions and full-day short courses will cover aspects of computer-integrated manufacturing. Exhibits will include computer-aided design and manufacturing systems and peripherals.

Information on the exposition is available from AMS '84, 706 Third Ave., New York, N.Y. 10017.



APRIL from page 46

change Spring Conference. Contact: NCE Comten, Inc., 2700 Snelling Ave. N., St. Paul, Minn. 55113.

APRIL 9-13, SEATTLE — **Contemporary Computer Auditing: Integrity Controls.** Contact: Marge Umlor, EDP Auditors Foundation, 373 S. Schmale Road, Carol Stream, Ill. 60187.

APRIL 9-13, LONG BEACH, CALIF. — **Structured Analysis for Real-Time Systems.** Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

APRIL 9-13, SAN FRANCISCO — **Unix System Workshop.** Contact: Structured Methods, Inc., 7 W. 18th St., New York, N.Y. 10011.

APRIL 9-13, CHICAGO — **Structured Analysis.** Contact: Structured Methods, Inc., 7 W. 18th St., New York, N.Y. 10011.

APRIL 9-13, SAN FRANCISCO — **Data Base Development.** Contact: Learmonth & Burchett Management Systems, Inc., Suite 405, 2800 N. Loop W., Houston, Texas 77092.

APRIL 9-13, PHILADELPHIA — **Structured Analysis and Systems Specification Workshop.** Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

APRIL 9-13, NEW YORK — **CICS Command-Level Programming.** Contact: Syscd, One Park Ave., New York, N.Y. 10016.

APRIL 9-13, PHILADELPHIA — **Systems Analysis Workshop.** Contact: QED Information Sciences, Inc., QED Plaza, P.O. Box 181, Wellesley, Mass. 02181. Also being held April 23-27 in Toronto.

APRIL 10, NEW YORK — **Spreadsheets Using Lotus 1-2-3.** Contact: Center for Advanced Data Processing, Inc., Suite 402, 450 Seventh Ave., New York, N.Y. 10123.

APRIL 10, NEW YORK — **Advanced Dbase II.** Contact: Center for Advanced Data Processing, Inc., Suite 402, 450 Seventh Ave., New York, N.Y. 10123.

ADR® WARE™

ADR®/DATACOM/DB™

Has the only migration software that converts your applications from VSAM to a relational data base management system. Overnight.

We've taken state of the art to a new state: Easy and Available.
Before you make a software decision, call ADR (201) 874-9000.
Or fill out and mail in the coupon.

☐ Please send me more information about ADR WARE.
☐ Please send me information about ADR seminars.

APPLIED DATA RESEARCH INC.
Route 206 & Orchard Road, CN-8, Princeton, NJ 08540

Name_____

Position_____

Company_____

Address_____

City_____ State_____ Zip_____

Phone Number_____

Computer Equipment_____

ADR® WARE™
From idea to application, we get you there faster.

EDITORIAL

Fujitsu: good for business

Users of Amdahl Corp. equipment who also happen to be fervent "Buy American" adherents are likely feeling a bit uneasy these days following the announcement that Fujitsu Ltd. of Japan will own just under 50% of Amdahl (CW, March 12).

But U.S. users of all types of information processing equipment may benefit from Fujitsu's acquiring what some analysts feel is de facto control of an established American firm.

Amdahl has not been a truly American business for some time now. Fujitsu has had three directors on Amdahl's board and has supplied a reported 20% of the components used in Amdahl's 580 line of mainframes.

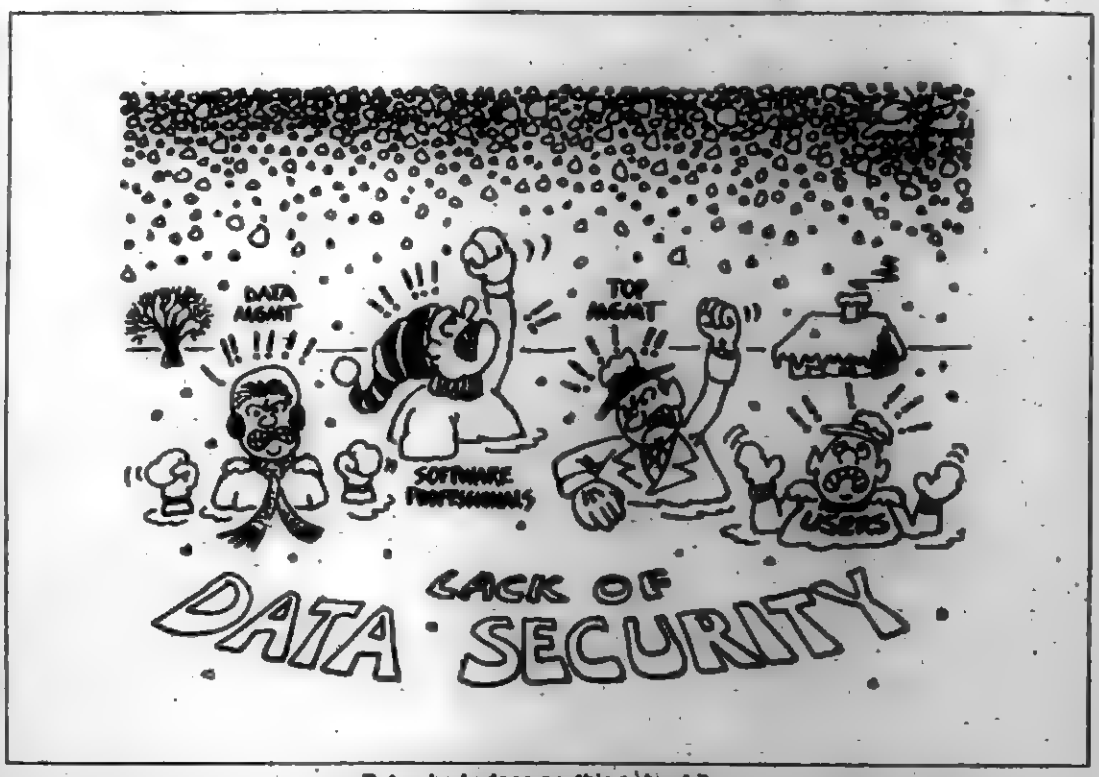
For several reasons, *Computerworld* expects Fujitsu will proceed cautiously while converting the Amdahl organization to a distributor of Japanese products, which eventually it must. Any rapid and blatant strategy to flood the U.S. market with Fujitsu products can only flame the ever-present congressional embers of trade protectionism and lead to legislation that could hurt everyone.

Fujitsu is likely to proceed at a cautious pace with this experiment, retaining the prerogative of pulling out if something goes wrong, and letting market acceptance determine how great its commitment will be.

This is very much an experiment that should not be confused with the American defeat on the earlier fields of consumer electronics. Unlike the American television vendors vanquished by Japanese competition, American computer vendors are truly multinational companies that have the resources and the technology to compete in many markets. What Fujitsu can do here, surely IBM and other major U.S. vendors have the potential to do in Japan and other Asian markets.

Consumers generally benefit from competition; therefore, the U.S. information processing community should be cheering the Fujitsu experiment. Many times over the past year, theories have surfaced that it is only a matter of time before IBM can squeeze the plug-compatible manufacturers out of the marketplace; some say the process is already under way. Fujitsu brings to the U.S. market vast resources and an impressive product line that offers something for every level of performance requirements. Fujitsu is not a limited player that will catch cold every time IBM sneezes.

Another factor to be considered is that the more Fujitsu becomes entangled in the U.S., the more the U.S. becomes entitled to Japanese technology. International trading requires manufacturers to cast off the blinkers of provincialism and answer to another sovereign — the bottom line.



But nobody does anything about it.

LETTER

Outlay of money to save lives should be encouraged

I am concerned by *Computerworld*'s editorial, "The VDT scare: reason to pause" (CW, Feb. 27), regarding health hazards from VDT radiation to unborn babies.

While acknowledging that from an epidemiological standpoint there is no conclusive evidence that VDT radiation is the cause of the danger to unborn babies, I must, nevertheless, object to the conclusion that the editorial arrives at, namely, that without proof of death and disfigurement to babies, nothing should be done to add protection for the VDT user.

The group mentioned in the editorial — 9 to 5, the National Association of Working Women — is not demanding the withdrawal of VDTs and the resultant economic collapse of the nation, but simply a capital expenditure on the part of employers and manufacturers to ensure protection from a possible hazard.

Conclusive proof on this issue at hand may cost lives.

How can this be demanded from VDT users and their families?

Surely if such an outlay of money might be responsible for saving a baby's life or its physical or mental health, then all of us should strongly encourage, even demand, that such an action be taken.

Jill R. Meyer
Bloomington, Ind.

Computerworld welcomes letters from its readers. Preference will be given to typed, double-spaced letters of 150 words or less; they may be edited for the purposes of clarity and brevity.

Letters should be addressed to Editor, Computerworld, Box 880, 375 Cochituate Road, Framingham, Mass. 01701.

COMPUTERWORLD

Editor
John C. Wildenthal

Executive Editor
Rita Shaw

Managing Editor
Bill Laberis

Assistant Managing Editor
Cheryl M. Gallo

Senior Editors:
Software
Paul Gillin
Communications
John Dix
Phil Hirsch
Systems
Tom Henkel
Industry
Peter Bochner
Features
George Hiller
Design Editor
Marjorie Magowan
International Editor
Susan Bakewell
Associate Features Editor
Barbara Van Scoyoc
Assistant Features Editor
Elizabeth Mores
Special Reports Editor
Donovan Wills

Staff Writers:
James Connolly
John Gallant
Lynn Haber
Patricia Keefe
Paul Kocakowski
David Olmos
Edward Warner

Correspondents:
New York
David Myers
Suite 703
401 East 80th St.
New York, N.Y. 10021
212/570-2135
Washington, D.C.
Bureau Chief: John Kirkhorn
445 National Press Building
529 14th St., N.W.
Washington, D.C. 20045
202/347-4719

West Coast
Bureau Chief: Jeffry Beeler
Correspondent: Robert Weis
1020 Marsh Rd.
Menlo Park, Calif. 94025
415/328-8084
Chief Copy Editor
Kathie Gow
Assistant Chief Copy Editor
Charlotte Zeros
Copy Editors:
Becky Batcha
Dave Bradford
Bruce Crane
Deborah Fickling
Deborah Scanlon-Horn
Thomas Schmidt
Assistant to the Editor
June Fettig
Editorial Assistants:
Loredna Brien
Mary DeCristofaro

Contributing Editors
Education
J. Daniel Couger
Human Communication
Jack Stone
Government Topics
Larry Long
Telecommunications
Thomas Madden
The Data Center
John P. Murray
Local Networks
Charles P. Lecht

Special Publications
Computerworld Extra!
George Hiller, Editor
Computerworld on Communications
Bruce Heard, Editor
Computerworld OA
Ann Dunlay, Editor
Computerworld Buyer's Guide
Marcia Stonehill, Editor

Main Editorial Office: Box 880, 375 Cochituate Road, Framingham, MA 01701 617/879-0700

Computerworld is a member of the CW Communications group, the world's largest publisher of computer-related information. The group publishes 33 computer publications in 10 major countries. Nine million people read one or more of the group's publications each month. Members of the group include: Argentina's *Computerworld Argentina*; Australia's *Australian Computerworld, Australian Micro Computer Magazine, Australian PC World and Directions*; Brazil's *DataNews* and *Microbrasil*; China's *China Computerworld*; Denmark's *Computerworld Denmark* and *Microbrasil*; Finland's *Mikro*; France's *Le Monde Informatique, Golden* and *OFC*; Germany's *Computerwoche, Microcomputerwelt, PC Welt, Software Markt, CW Extra-Sonder, Computer Business* and *Commodore Magazine*; Italy's *Computerworld Italia*; Japan's *Computerworld Japan* and *Focus Confidential*; Mexico's *Computerworld Mexico* and *Computerworld*; Netherland's *CW Extra* and *Microbits*; Norway's *Computerworld Norge* and *MikroData*; Saudi Arabia's *Saudi Computerworld*; Singapore's *The Asian Computerworld*; Spain's *ComputerworldEspana* and *MicroBitsness*; Sweden's *Computersvenska, MikroDatorn* and *Att Hantera*; the UK's *Computer Management* and *Computer Business Europe*; the U.S.' *Computerworld, Desktop Computing, Hot CoCo, InCider, InfoWorld, Jr., MacWorld, MICRO MARKETWORLD, Microcomputing, PC World, PC Jr. World, Run, 73 Magazine* and *SunWorld*.

VIEWPOINT

The 'whatchamacallit'

LECHT ON SCIENCE
Charles P. Lecht

Talk about dreams coming true — and happy ones to boot. Before our very eyes, the TV set, the hi-fi, the movie camera, the videocassette recorder, the telephone, the typewriter and the personal computer are fast becoming components of an integrated personal multipurpose thing, which — for lack of a better name — we can call the "whatchamacallit."

Thus, our need to acquire the whatchamacallit's components as discrete consumer items is diminishing; and as our whatchamacallit's capabilities improve, so will our needs diminish for such items as desk calculators, still cameras, voice-recording telephone answering machines, ham radio equipment — all the electronic doodads you can think of.

Other tried-and-true gadgetry are to see immediate obsolescence, as though swept away in a tidal wave of replacement technology; electrical light switches, electric outlets, cable connectors and other such physical devices are disappearing. Amazingly, some artifacts presumed unchangeable without sacrifice of quality, such as orchestral instruments, will undergo sudden change to reemerge in new forms.

The mixed device-originated/musician-originated sound will improve and enhance the musician's skills and improve new opportunities for artistic education and expression. The whatchamacallit's possibilities for providing positive and enduring change are as endless and beautiful as may be the best of man's.

It's fascinating that as the whatchamacallit is taking shape in microland, mammoth macroland computer/communications systems are being developed. These Integrated Services Digital Networks (ISDN) are impersonal multipurpose things that will nourish and be nourished by our whatchamacallits.

The ISDN suggests the vision of a computer system so large it possesses electronic broadcast and cables "buses" to pipeline data swiftly coast to coast, while servicing massive clusters of systems en route — "transistors," warehouse-size lattices of high-voltage gear and "capacitors" office-building size. These further inspire a vision of America as a giant computer room, with corners in Seattle, Los Angeles, Miami and Boston. Vested in each ISDN may be the power of a billion personal computers.

Offers great promise

While this idea is knee weakening, the knowledge that these awe-inspiring titans will serve to nourish our little personal whatchamacallits — sending them their life's blood, data and converting this into every conceivable use — is beautiful and offers great promise for improving the quality of our lives. Access to the massive external facilities, with their enormous power and memory capacities, allows us to enjoy the powers that computer systems provide as mixtures of that possible within our whatchamacallit's local environment and that found in the ISDNs.

This will enable an optimized functional specificity of the two, while permitting superefficiency at the whatchamacallit. Whether in the home, in an industrial supercomputer cluster or anywhere in between, the variety of user-accessible on-premises equipment (that is, whatchamacallits) to emerge will be as unlimited as the inventive imagination.

For manufacturers, the business opportunities are spectacular. Like massive Christmas trees awaiting adornment, ISDN accoutrements will consume the efforts of engineers and scientists for decades to come. The result will be an endless bounty of customized whatchamacallits, decorated and illuminated by all manner of technological gadgetry, yielding gifts of electronic wonder.

Consider, for example, the possibility of the heretofore unimaginable luxury of a personal videostation, capable of communicating pictures, sound and text anywhere in the world — a personal National Aeronautics and Space Administration-like mission control for the orbit of your life.

Possessing all manner of sensing devices to obtain signals from alarm to video and anything in between, capable of processing these and displaying results in user-friendly media, the terminal of the decades ahead will provide users with creative opportunities of mind-boggling proportions.

The technically inclined will revel in the possibilities this kind of environment allows for tinkering, and the entertainment seeker will have his hedonistic wishes fulfilled and then some.

Imagine having your own personal whatchamacallit, providing such integrated services as may be currently obtained only through the nonintegrated facilities of such mammoth enterprises as AT&T, the Post Office, IBM, a secretarial service, a music/video recording studio and a TV/radio station — all in one room!

Distinctions vanishing

As today's personal computers receive expanded telecommunications capabilities and telephones develop further as microprocessors, distinctions between them are vanishing. Very soon we will call both by the generic name "terminal," thus downplaying their local attributes and stressing their global ISDN roles. Performance and function will qualify this name — fast, slow, data base, graphics and so on. Each will become a whatchamacallit or a component of one.

The benefits to be reaped by a carefully orchestrated plan that weds the needs of home/office whatchamacallit users to ISDN support are immeasurable.

Admittedly, the degree to which this can be achieved will become an important factor in determining which components to buy if we insist on putting it together ourselves.

Remembering the "build-your-own" hi-fi days with chagrined embarrassment, most of us will opt for someone else to integrate separately purchasable components.

The emerging sea of options, while confounding us in one sense, provides us with overriding benefits in another sense. It will allow us to apply better today's ever-expanding data processing power to our needs. The results will profoundly improve how we see, hear and speak to one another. Ultimately, they will change the way we think.

Lecht is chairman of Lecht Sciences, Inc., a New York-based think tank specializing in computer and communications technologies.

Micro user sets record straight

HUMAN CONNECTION
Jack Stone

Because it is impossible to send personal notes to the many respondents to my column, let me here thank you one and all for your thoughtful comments to my recent expressions of concern over the rank idiocy that is plaguing the microcomputer industry.

However, I have selected one letter that clearly deserves a public airing, partly because the reader is a more knowledgeable micro user than I think I am and partly because he is a more capable writer than he thinks he is. The letter was from Richard W. Hadley, vice-president of operations, Mount Auburn Savings Bank in Mount Auburn, Ind.

"I've been enjoying your columns for a number of years, but I can't let a few of your recent statements go unchallenged," Hadley said. "In particular, I take exception to portions of your articles "Confiscatability key to transporting micros overseas" [CW, Jan. 23] and "Where are the knowledgeable micro retailers?" [CW, Jan. 30].

"This letter is being written on an Osborne Computer Corp. Osborne 1 (01). Now I'll be the first to admit that the 01 (or any of the 'transportables') would not be much fun to carry on a 5-mile hike, but 'archaic'? Hardly! What is 'ancient,' 'old-fashioned' or 'hardly used' about a 64K-byte, 4 MHz Zilog, Inc. Z80 system? A large percentage of new systems, including the basic IBM Personal Computer, specs no better."

I admit that new systems are not that much better than the 01, particularly when benefits derived are measured against dollar outlays. And for students of creative writing, like myself, new machines with the so-called advanced word processing software actually offer me reduced capability when compared with my Processor Technology Sol 20/software configuration. My problem is one of semantics. Maybe "archaeological relic" is too strong an expression, but what do you term a way-out-of-production machine that still works for you — a quasi-leading-edge system or a fairly advanced technology-based machine?

'Most computer store personnel should spend their spare time reading systems manuals or trade journals rather then playing Zaxxon or watching Whiz Kids. *But let's not blame them for the absence of standards of compatibility where none exists.'* — Richard W. Hadley, vice-president of operations, Mount Auburn Savings Bank, Mount Auburn, Ind.

"Secondly," Hadley went on to say, "is the 5-in. screen any more ridiculous, particularly for word processing, than the displays on most of the lap portables? That's a matter of opinion at best, but I'd have jumped at the chance to get another 01 for $800."

No, 01's screen and the laps' LCDs are equally ridiculous for word processing, and if the 01 weighed in at 10 lb or less, I'd be first in line with the cash.

"I think you were distinctly unfair to at least one of the retailers you visited," Hadley said. "Most computer store personnel should spend their spare time reading systems manuals or trade journals rather then playing Zaxxon or watching *Whiz Kids*. But let's not blame them for the absence of standards of compatibility where none exists.

"You really didn't expect to be able to use the tapes from a new NEC Information Systems, Inc. lap portable on your Sol 20, did you? Good grief, if you've been using a micro for six years, you know better. We've

See [illegible] page 86

VIEWPOINT

How to motivate systems professionals

READER'S PLATFORM
Robert E. Manz

Data processing managers should spend more time understanding the efficiency characteristics and potential of their professional staff and attempt to maximize this valuable resource through proper motivation.

Historically, DP managers have not spent nearly as much time attempting to maximize the efficiency of professionals' activities as they have their equipment. In fact, DP managers will spend a great deal of time and effort in attempting to increase the efficiency of their computer equipment by 10%, 5% or even 3%, while spending more money on systems analysts' and programmers' salaries than on equipment.

The attempts that have been made in improving efficiency have been in the areas generally called "human engineering." The engineering approach attempts to find the most specific job content and appropriate incentive system to maximize the efficiency of the human machine. Jobs and tasks are analyzed, and more efficient methods of accomplishing such jobs and tasks, for example, structured programming, result. Actually, the greatest increase in output (quality and quantity) of analysts and programmers is, as for any professional, through motivation.

Equipment vs. personnel

Why would this be? Why would DP managers tend to spend more time analyzing the efficiency of the equipment rather than the efficiency of personnel, even though there are few greater savings to be realized in the latter area?

The answer to this question is not difficult to find. First, motivation is difficult to measure, and equipment efficiency is not. Second, the factors comprising equipment efficiency are easily understood, and those for motivation are not. Most DP managers come from a technical background and feel uncomfortable with and have little inclination for personnel management. The problem lies, then, in the managers, not the employees.

In terms of managing, motivating and maximizing efficiency in systems and programming personnel, there are two distinct problems: first, how to perceive an existing problem; and second, how to motivate personnel on an ongoing basis to achieve maximum efficiency.

In neither case are there hard-and-fast rules or equations to be laid down for use. There are, instead, only general guidelines that may be used in solving the two persistent problems.

The most obvious opportunity for motivational activities to be effective is to solve existing problems. The most difficult portion of this is, in fact, the perception that a problem exists.

Two types of information

In order to understand and to diagnose a problem correctly, there are two types of information available to the DP manager. These fall into the broad categories of structured and unstructured information. The DP manager should organize and routinize as much crucial information as possible so that it comes to him through formal routes, and he can monitor the activities for which he is responsible. Such items as turnover rates, grievances, weekly or periodic status reports and reports of supervisors should normally tell the DP manager when something is amiss.

These pieces of structured information are signal systems set up in advance to warn the manager when problems are about to or have occurred. The greatest practical danger in the systems is total reliance upon the pieces of structured information to the exclusion of other sources. In fact, much information may be gathered outside of the formal organizational structures, and such information is necessary.

The more frequent and more useful type of information is the unstructured. The principal source of unstructured information is the social system of the organization. Off-hand comments, conflicting reports, unexpected news and a general feeling that a problem exists should all point to a potential problem among workers. These will very frequently point to potential or future problems as well as existing problems.

Own frame of reference

The most difficult aspect of understanding the information available to the manager with respect to existing problems is cutting through his own frame of reference. Each person tends to organize available information into his own preexisting views. For the manager to understand properly the organization and the personnel with which he is dealing, he must first have an accurate insight into his own frame of reference.

The errors most frequently made in the area of understanding one's own frame of reference include:

- A tendency to evaluate rather than understand.
- A tendency to equate past experiences with current experiences.
- A tendency to use only available solutions, as opposed to thinking of new solutions.

The above framework should be helpful in assisting a manager in perceiving problems within his own organization. Once a motivational problem has been found and correctly diagnosed, the following guidelines should be useful in maximizing the potential of employees.

For quite some time now behavioral scientists have been distinguishing between negative and positive motivation. Most managers, per-

See MOTIVATE page 88

ON-LINE
HP3000 & DEC VAX
BUSINESS MANAGEMENT SYSTEMS
• G/L
• PERSONNEL
• ADVANCED
• ACCOUNTS PAYABLE
• ACCOUNTS RECEIVABLE
COLLIER JACKSON, INC.

Need general accounting software for IBM System/38?

We've simply solved your problem.

LAWSON ASSOCIATES has solved it with the first general accounting software specifically designed for IBM System/38. Not merely compatible, but state-of-the-art to fully utilize your computer's capabilities. Compare. You won't find a total software solution like it anywhere else.

DESIGN FEATURES: They include: on line systems using data base management; menu driven, user friendly programs written in RPGIII, the System/38 language; and integrated modules. Their benefits: ease of installation and use, plus maximum employee productivity.

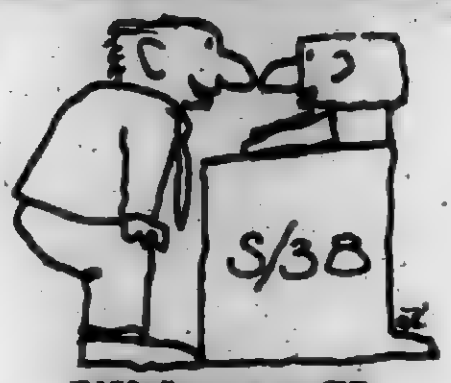
INTEGRATED MODULES: Those available include: General Ledger and Report Writer/Accounts Payable/Accounts Receivable/Fixed Assets/Payroll/Personnel/Purchase Order/Order Entry/Inventory Control

SERVICE FEATURES: Fully documented and supported. Onsite training and implementation. One year warranty. Available now for immediate installation.

For more information, please call or write:
Lawson Associates, 2821 East Hennepin Ave., Minneapolis, MN 55413
(612) 379-2633

LAWSON ASSOCIATES
WE SIMPLY SOLVE PROBLEMS

Strike up a Conversation



With your GL.

Get the information you need when you need it

Begin a productive relationship. Tell Finance/38's™ general ledger to respond through user-defined structures; on-line report writers; flexible budgeting & S/38 design.

Let us introduce you. Call today:

NGS

NEW GENERATION SOFTWARE, INC.

341 Lincoln Street, Roseville, CA 95678 Phone [illegible]
Outside California Call Toll Free 800 634-1238

DayFlo is
about to put
the basic principle
of computing
in its place.

VIEWPOINT

Implementing the information center concept: One

READER'S PLATFORM
Naomi Karten

Many people still do not agree on whether the information center is a concept, a place, a function or some combination of these. Therefore, it is not surprising that although most information centers have the same basic objective of improving user productivity through user-oriented hardware and software, the manner in which this objective is implemented varies widely.

Awareness of the many variations may be helpful to information center planners, particularly in allaying any concerns about whether they are going about it right.

In some companies, for example, the information center's sole responsibility is training and support of users in the use of fourth-generation languages. In other companies, information center staff also perform product evaluation, selection, acquisition and implementation of end-user products.

Some information centers develop and provide all training themselves. Others call in vendors or professional trainers to provide training in end-user software and/or call upon DP training staff to provide instruction in computer fundamentals.

Some information centers support purchased software only, while others also develop their own software in response to identified user needs. Some information centers depend on other DP areas to perform such tasks as file extracts, data base creation and Job Control Language setup for the information center. Other information centers perform all such terminal work themselves, up to and including the enhancement of supported products with customized user interfaces.

No programming for users

Whether or not they undertake the setup of the information center technical environment, some information centers do not perform programming for users, placing the burden of responsibility on users to learn and use available products.

Other information centers, in addition to providing training, program in response to user's ad hoc requests as a means of supporting management's needs for rapid access to computerized information.

In some companies, personal computers — and the full range of responsibilities that the acquisition and management of personal computers entails — are an integral information center function. In other companies, personal computers are managed as a separate and distinct responsibility, while in others, the decision is made (or not made) to leave the purchase and use of the personal computers to the individual users.

Some information centers that manage personal computers strictly control the personal computer software users may acquire. Others do not place any restrictions on users acquiring the software of their choice, but limit support to only selected software.

In some companies — probably most — the information center is part of the data processing organization, and all members are hired by and responsible to data processing. In other companies, the information center is somewhere between data processing and the user, with representatives from both areas involved.

In spite of the variations, certain common themes emerge: user support, user independence, quick access to information, productivity and decision support all pervade any discussion of the mission of the information center regardless of the specific method of implementation.

These differences in style

VIEWPOINT

approach not necessarily better than another

and approach are exciting because they demonstrate the many ways that companies have chosen to accomplish the same basic objective.

Benefits and risks

To be sure, there are benefits and risks to each of these approaches, as some of the more mature information centers (those in operation two years or longer) are finding out. Consider the technically oriented vs. nontechnically oriented information center staff.

Nontechnically oriented staff are often at the mercy of their technical support areas to keep the technical pieces in place, for example, installation of new product releases, resolution of software bugs, timely creation or update of user data bases. Being nontechnical, and to some extent not conversant in the stuff of technical problems, they can become caught between the demands of their users and the delays (whether valid or not) of their technical support areas. However, as a nontechnical area, this type of information center, by definition, has a ready explanation for not getting caught up in supporting the technical needs of its users and can, therefore, devote full attention to training and support.

The technically oriented information center, on the other hand, usually consists of people with both technical and training skills. The people generally have DP training and/or experience prior to joining the information center, and they want to do technical things. They can solve most technical problems that arise in the use of the supported software, with minimal reliance on other DP areas.

Having the technical skills to solve the data access needs of their users, these people may face the temptation to do so rather than invest the time in training their users — an instance of the "I can do it faster myself" syndrome. Their users, at the same time, quickly become aware that these are technical folks, and the scope of the resulting requests for support tends to extend far beyond that of the nontechnical information center.

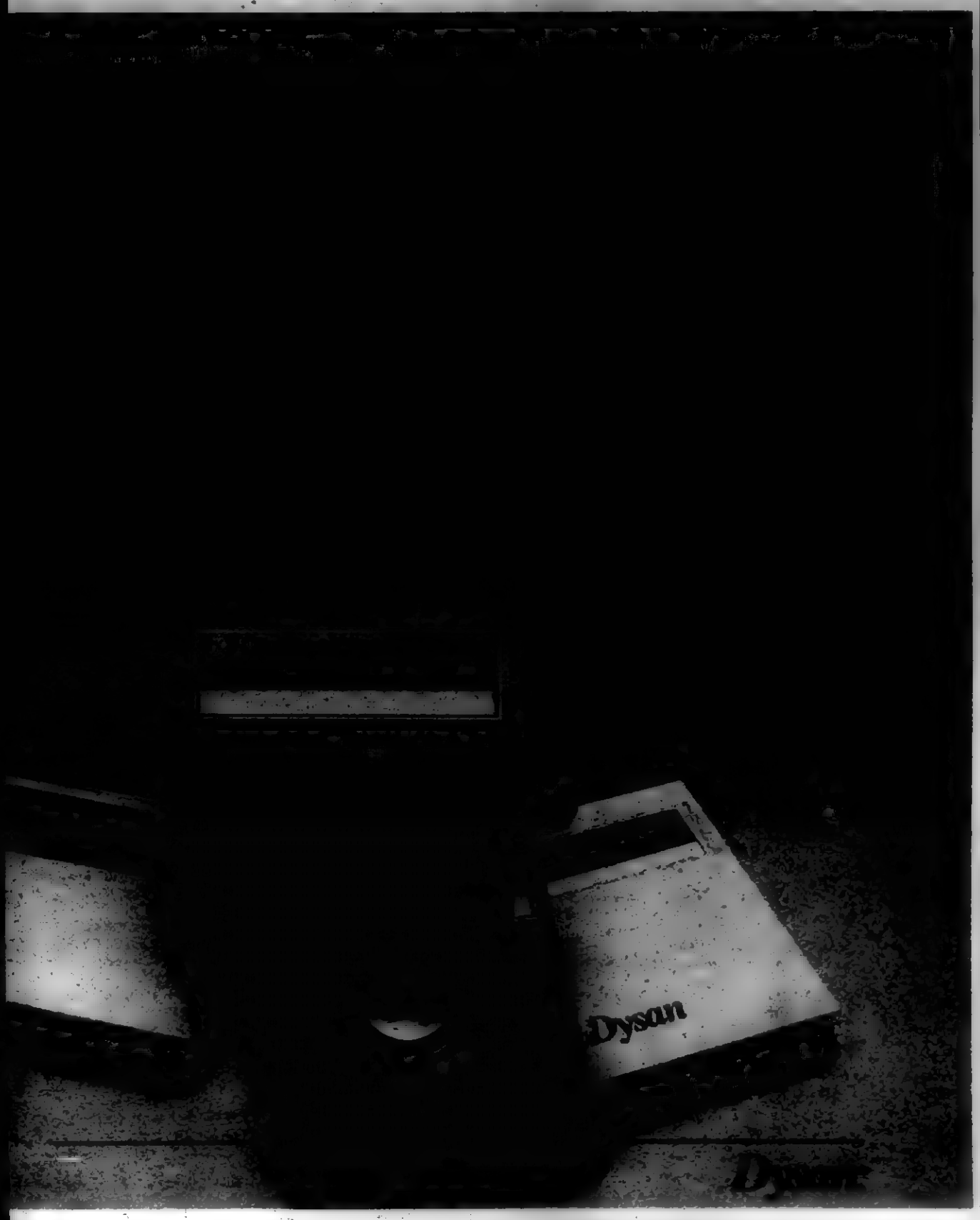
One better than other?

Is either approach to the information center better than the other? From my comparisons with managers and staff from other information centers, I would say no.

Both types have problems, but both types have had major successes in providing end users with reduced dependence on application development departments and increased independence in satisfying their data access, manipulation and reporting needs.

Most importantly, perhaps, there does not seem to be anything inherent in any implementation of the information center concept, structure or technology that would prevent an information center from evolving from its current user support methodology to any other methodology. Recognition of the many alternative paths is the key. ‡

Karten is information center manager at Blue Cross Blue Shield of Massachusetts in Boston.



Abacus Friendly Report Processor For IBM/38?

Managerial support software that is truly easy to use.

Call or write for more details on FUSION 4/38.

FUSION

PRODUCTS CORPORATION

PO Box [illegible]
Mill Valley, CA 94942
Telex: 176880 FUSION

VIEWPOINT

USER from page 51

never had a true tape standard. You're an engineer. If you want to tackle a hardware problem like that, fine, but why blame some poor store clerk who undoubtedly had never heard of a Sol 20?

"You even found one salesman who was willing to try the improbable. That should have been worth a column of praise, not a hatchet job."

Yes, I was an engineer until I found early on that my competency level was so absurdly low that teaching — and writing — was more appropriate. As a result, the prospect of installing public domain software on my Mediterranean-blue-paneled, mahogany-trimmed Sol 20 Professional Computer to support a lap job was so horrendous that I turned to the remote possibility of tape compatibility as a saving feature. I never asked the salesmen to do any more than copy a file from the NEC to the tape machine, using standard NEC commands. This they couldn't do, and even though I thrive on reading technical documentation, NEC's write-up didn't match NEC operations, and I couldn't make the copy, either.

"Your column is being read by a lot of MIS types who have apparently been studiously ignoring microcomputers for the past six or seven years, hoping they would go away. Now they're being dragged, kicking and screaming, into the real world by the users.

"Maybe those of us who have been in the micro vanguard could be of more service to those poor souls by being a little more selective about where we do our complaining. We don't need to give the MIS Luddites any more ammunition than necessary.

"I guess what it boils down to is this: I agree with most of your basic premises, but I think your examples were ill-chosen.

"My final advice? Go back and buy the used Osborne 1. After all, it was designed by the same man that designed your Sol 20. I'll even give you a disk full of communications software so that you can trade data files with your Sol. Then go on to Mexico, and enjoy yourself. You can always tell the customs folks that it's a sewing machine."

Didn't know of the Sol/01 connection. May have to re-evaluate the 01 afterall, particularly if it can thread a bobbin in less than two seconds. ‡

MOTIVATE from page 52

ticularly those with a technical orientation, are oriented toward negative motivators. These are company policy, administration, supervision, working conditions, salary, relationships within the group and security. These factors are generally called "hygiene factors."

Positive factors

Positive factors are called "motivators." These are achievement, recognition, work content, responsibility, advancement and growth.

An important difference between the two general classifications is that the hygiene factors relate to job dissatisfaction and the motivators relate to job satisfaction. If any of the hygiene factors is not satisfactory to the employee, he will be dissatisfied with his job. However, if they are all satisfactory, it is not the case that he will be content with his job or that he will perform to his maximum potential.

On the other hand, if all of the motivator factors are satisfactory to the employee, he will be satisfied with his job. If they are not, he will perform only the expected or minimum requirements of his job.

The goal of managing professional employees should be to promote their efficiency to the maximum level. The way to do this is to increase their motivation as far as possible. If problems have been recognized in this area, fine; if not, an attempt should be made to maximize motivation in any case, because it would seldom naturally occur.

By distinguishing between the two broad characteristics, it should be recognized that simply meeting salary demands and the like will only keep the person on the job, but will never begin to maximize his efficiency.

A great deal more effort is necessary in achieving the other six general motivators in order to increase the efficiency of the employee. These are more important for professional-level employees because of their background, the nature of their work, the possibilities of meeting those requirements and the salary levels and costs involved.

In trying to maximize the motivators, there are many factors that must be considered. Generally, these come under the label "job enrichment." That is, a job should be designed to have the employee meet each of the six motivators. It should be recognized that motivators should be used for producing long-term effects on employees. By having employees participate in job redesign to increase their satisfaction, only short-term movement will result. Unless the basic natures of the jobs are changed, only a temporary sense of movement will occur.

Some of the most common pitfalls of such redesign include:

- Thinking that the content of a job is fixed.
- Thinking that employee participation is necessary to improve motivation.
- A confusion of the motivators and the hygiene factors.
- Simply increasing the volume of work.
- The belief that once a job is changed, no monitoring or further action is necessary. ‡

Mese is a data processing consultant in Tampa, Fla.

ATS introduces MASTERKEY.

The ultimate way to unlock the mysteries.

If you're a DP Manager, you know that when it comes to unlocking the mysteries of the IBM® PC for your people, you couldn't ask for a more brilliant source than ATS.
(After all, who has more experience than we do? We've been unlocking the mysteries of computers for more than a decade.)
MASTERKEY establishes a whole new standard of tutorial excellence. Certainly, there are other good IBM PC teaching courses out there. Yet none combines in one package, the dazzling clarity, the building block by building block simplicity, the sweeping, comprehensive range of MASTERKEY.
Consider just a few of its advantages:
MASTERKEY makes learning a snap for anyone. It requires no previous training whatsoever — even for those who seem to have the least aptitude. In astonishingly little time, MASTERKEY will give them a solid grasp of the IBM PC. It does this through an extraordinary combination of powerful graphics, animation and sound. MASTERKEY also boasts another innovation: an interactive but separate audio cassette. This unique concept allows students to pace themselves with far greater ease, thereby making comprehension practically effortless.
Unlike virtually every other course, MASTERKEY doesn't content itself with just teaching the keyboard and the operating system. It goes well beyond that. Students are introduced to word processing, communications networks, business graphics and spreadsheets.
MASTERKEY leaves nothing unexplored. It offers full instruction on how to use the IBM PC as a smart terminal, and how to access, retrieve and store information from S/34-38. It even advises you on what additional software you may need.
As you can see, MASTERKEY is a tool of incalculable value. It enables you and your data processing department to take firm control over all data processing functions.
Sound good?

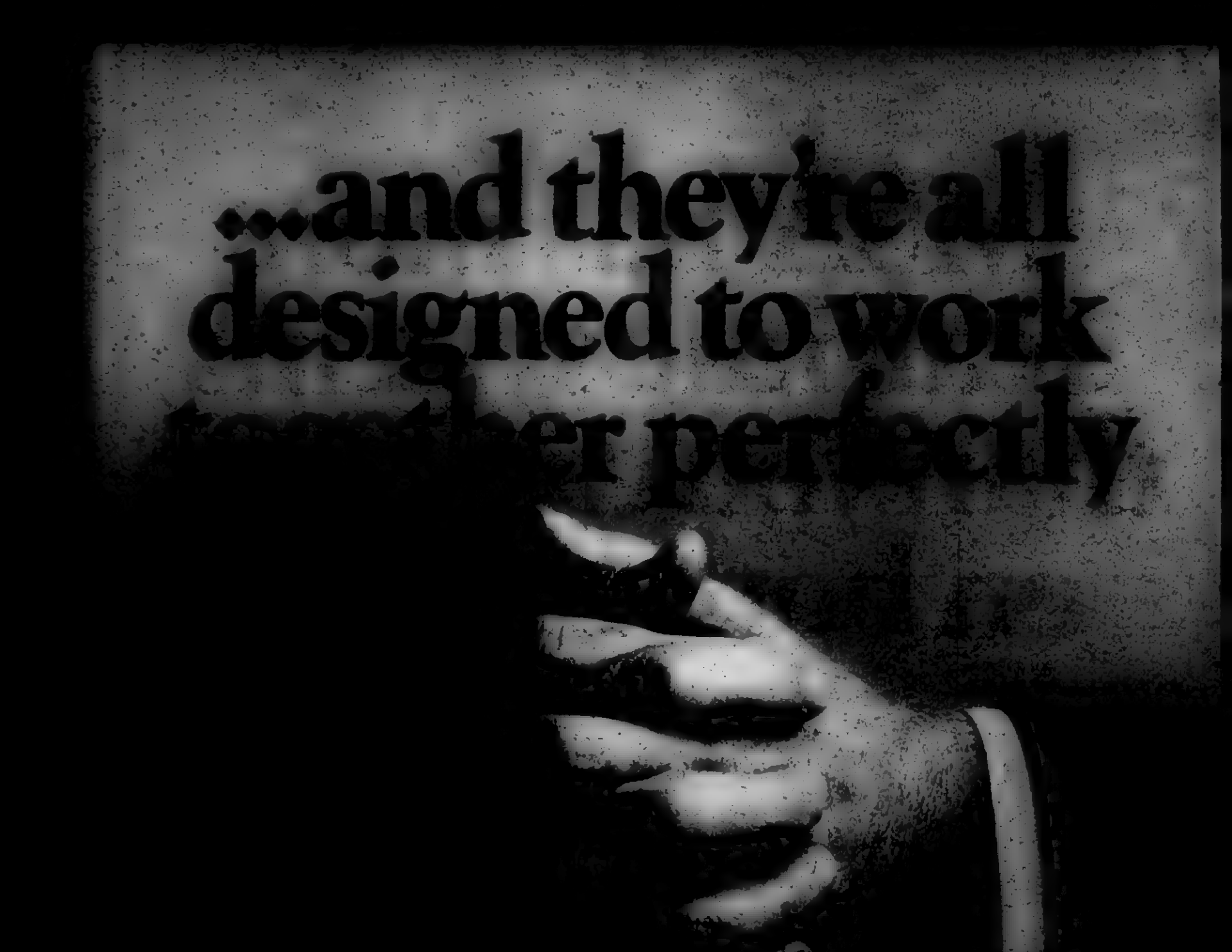
For more information — or to order MASTERKEY directly — simply call the number below.
Or write to: Automated Training Systems
21250 Califa Street, Suite 107
Woodland Hills, California 91367

Toll Free 800-423-5205
In California call (818) 999-5733

MASTERKEY FROM ATS

CANADA 1-800-663-5333 • In BC & Parts of SASK: 112-800-663-5333 • UNITED KINGDOM (01) 341-5555

...and they're all designed to work together perfectly



Information Systems

...integrated ...your next three.

...leader producing realtime ...since 1975. And solved the ...associated with realtime, ...accounting control, security and recovery. The result: a full range of finely tuned, highly reliable realtime systems.

Nobody can give you a software product line this broad. Nobody can ...a choice between realtime ...systems.

...nobody else offers a true

MSA Realtime Mainframe Systems	
1. General Ledger	8. Foreign Exchange
2. Accounts Payable	9. Forecasting & Modeling
3. Accounts Receivable	10. Manufacturing
4. Budgetary Control	11. Personnel
5. Project Tracking	12. Fixed Assets (Available for delivery December, 1984)
6. Payroll	
7. Order Processing	

...new ...lets you use plain English commands for fast and easy retrieval of information and interactive online report writing. Make the most of realtime. Get INFORMATION QUICK. Ask your MSA representative for details.

MSA

The Software Company

Management Science America, Inc.
3445 Peachtree Road, NE, Atlanta, GA 30326

SOFTWARE & SERVICES

SOFTLINE
Lee Gilem

Package solution: buy *and* make

The "make or buy" question of applications software continues to be raised by managers who are short on staff and long on user requests. Quite often, companies with a flexible attitude have been able to acquire packages such as general ledger, payroll, accounts payable and accounts receivable and implement them unchanged.

But more often than not, a package is rejected because it does not provide every feature desired or because it requires some modification or conversion effort to implement.

Because of the ever-increasing demand for applications, coupled with limited development staff size and experience, the question of make or buy must be reconsidered to include the option of "buy and make." In other words, the quickest alternative for meeting a user's needs may be to acquire a package that offers most of the capabilities required and use the in-house staff to customize, supplement and implement the product.

How do you go about determining if there are software products available that could be considered for a unique or industry-specific application? You might want to start with your mainframe vendor representative, who could use channels within the vendor organization to locate such software. Trade publications carry advertisements of vendors and their offerings. Industry conferences and exhibits often include a presentation of papers or demonstration booths informing attendees of software packages. Directories or catalogs are available by mail or even on the newsstand. Consultants can often direct you to qualified products or suppliers. The best source may be the contacts you have in your own industry.

See PACKAGES page 98

Shopping for security?

Look for accountability, integrity, auditability

By Vic Swan
Special to CW

The publicity fire storm over the movie *War Games* and the escapades of real-life hackers have many data processing managers running for cover. But shopping for computer security is no easy task.

The first step in selecting security software is to decide exactly what is to be protected. After defining the specific needs of the company and considering the high cost of even one security loss, it might be helpful to keep the following list of questions handy when approaching a security software vendor.

Is the security by exception or default? The security-by-exception philosophy proposes that if the data is to be protected, you have to identify what is sensitive, take the necessary protective action and define who can access that data. This is the list-oriented philosophy and requires considerable administrative effort to maintain the lists as users come and go.

The default system allows growth without undue administrative overhead. It involves perhaps more preplanning, . . . but the time is well spent in the long run.

For fairly small organizations with a homogeneous community of users, exception might be the more viable approach as the initial installment is often comparatively simple.

The default system allows growth without undue administrative overhead. Driven by algorithmic specifications, it involves perhaps more preplanning and more front-end thinking, but the time is well spent in the long run.

Once the default system is implemented, all data is secure unless explicitly designated otherwise. Users are grouped together by the security system, based on a particular category, or a group of categories as the company chooses.

Can the system be bypassed? In some systems, security officers have access to a list of passwords that allows them to gain access to the user's data. The problem is that a user could always point the finger at the security officer if a security exposure occurs. There is no individual accountability in such a system.

In other security systems, security officers do not have access to the users' passwords. If the user loses his password, he cannot gain access until the new password is changed to another password, which the security officer does not know and which is encrypted in storage. No finger pointing can occur in this case.

Even if the security officer attempted to bypass the system by pretending a user lost his password, the user could find out. A good auditing feature is of utmost importance in a default security system.

Can individuals be held accountable for their actions? If a physical list of passwords exists in a list or in a file folder in a storage facility, security is seriously threatened. There would be no way of knowing for certain who gained unauthorized access.

It is important to make sure a system does not flash the password on a user's terminal when the user types it in. One-way encrypted passwords that cannot be decoded and are stored in the software seem to be the most desirable.

Does the operating system offer guaranteed integrity? If so, security by default cannot be bypassed. Security by exception can. Newly created resources may be unprotected simply because no one knows of their existence, and no one has yet found time to protect the "ones they feel need protection."

Does it have auditability? Most systems have an emergency bypass system. The important consideration is to make sure that all uses of the emergency bypass can be audited.

A security officer should not be able to gain access without identifying himself. In an ideal system, auditability must exist on the following levels: individual user, resource, administrative/security officers and the security system itself.

Is data security dependent on Format 1 Data Set Control Block? If the answer is

See SECURITY page 98

- Nixdorf announces CICS application generator/98
- DEC VAX-11 processors get RPG-II/98
- File manager fits IBM mainframes/98

INSIDE

Systems Software/98
Productivity Aids/94
Application Packages/94
DBMS/95
Remote Computing Services/98
On-Line Data Bases/98
Training/98

Buyers warned of software promotion hype

By Paul Korzeniowski
CW Staff

BOSTON — "When evaluating software this year, *caveat emptor* — let the buyer beware," said Janice Antonellis, research manager at International Data Corp. (IDC), at IDC's 19th Annual Industry Briefing Session, held at the Copley Plaza here recently.

"There is a lot of hype and a great deal of money being paid to create images which may or may not be true. Promises are being made by software manufacturers. Users should realize that many of the interesting programs are not scheduled to be shipped until the fourth quarter of this year," she said.

Fierce competition is forcing software companies to spend large sums of money to promote a product, Antonellis said. Money and marketing are becoming major factors in determining a product's success. "Every company is trying to elevate itself above the clutter, noise and crowd. Mitch Kapor [president of Lotus Development Corp.] said that it took $3 million to market Lotus 1-2-3 last year. He said it would take $5 million today."

To ensure that they can compete, software companies are branching out from traditional markets and into new product areas. "Software companies are diversifying so that they will not be just a one-product shop," Antonellis said. "They are trying to maximize their current customer base and extend their traditional customer base."

Management Science America, Inc. (MSA) has added microcomputer products, productivity tools and data base management systems to its accounting software. Cullinet Software, Inc. has shifted from just selling data base management to developing financial application software as well, she pointed out.

Another method to generate revenue is consolidation and acquisition. Acquisition fever is sweeping the industry as mainframe companies acquire microcomputer companies, microcomputer companies buy microcomputer companies and noncomputer companies purchase computer companies, Antonellis said.

Partnerships allow companies to share costs without relinquishing corporate control. This year, for instance, Lotus teamed up with Dun & Bradstreet Corp., McCormack & Dodge Corp., MSA, Management Decision Systems, Inc. and Digital Equipment Corp. in an effort to distribute 1-2-3.

As the ante is raised, the ultimate winner will be the user. "We are a long way from having truly user-friendly software," Antonellis said. "But user-friendliness will have center stage as long as competition remains keen."

Nixdorf, IBM CPUs get CICS generator

RICHMOND, Va. — Nixdorf Computer Corp. has announced an application development system that it said will generate complete Cobol/CICS applications on IBM and Nixdorf mainframes.

According to a spokesman, Nixdorf's Hibol generates 100% of the code required for Cobol/CICS programs once a user has input simple, structured specifications.

The spokesman also said program debugging time is reduced by as much as 80% because Hibol produces error-free, modular Cobol source code.

Hibol reportedly generates documentation from information extracted from the data dictionary and application programs, screen layouts, reports and data element descriptions.

The system is said to provide Cobol source code portability. Hibol programs in source code can be transported, compiled and executed on any compatible mainframe with or without Hibol.

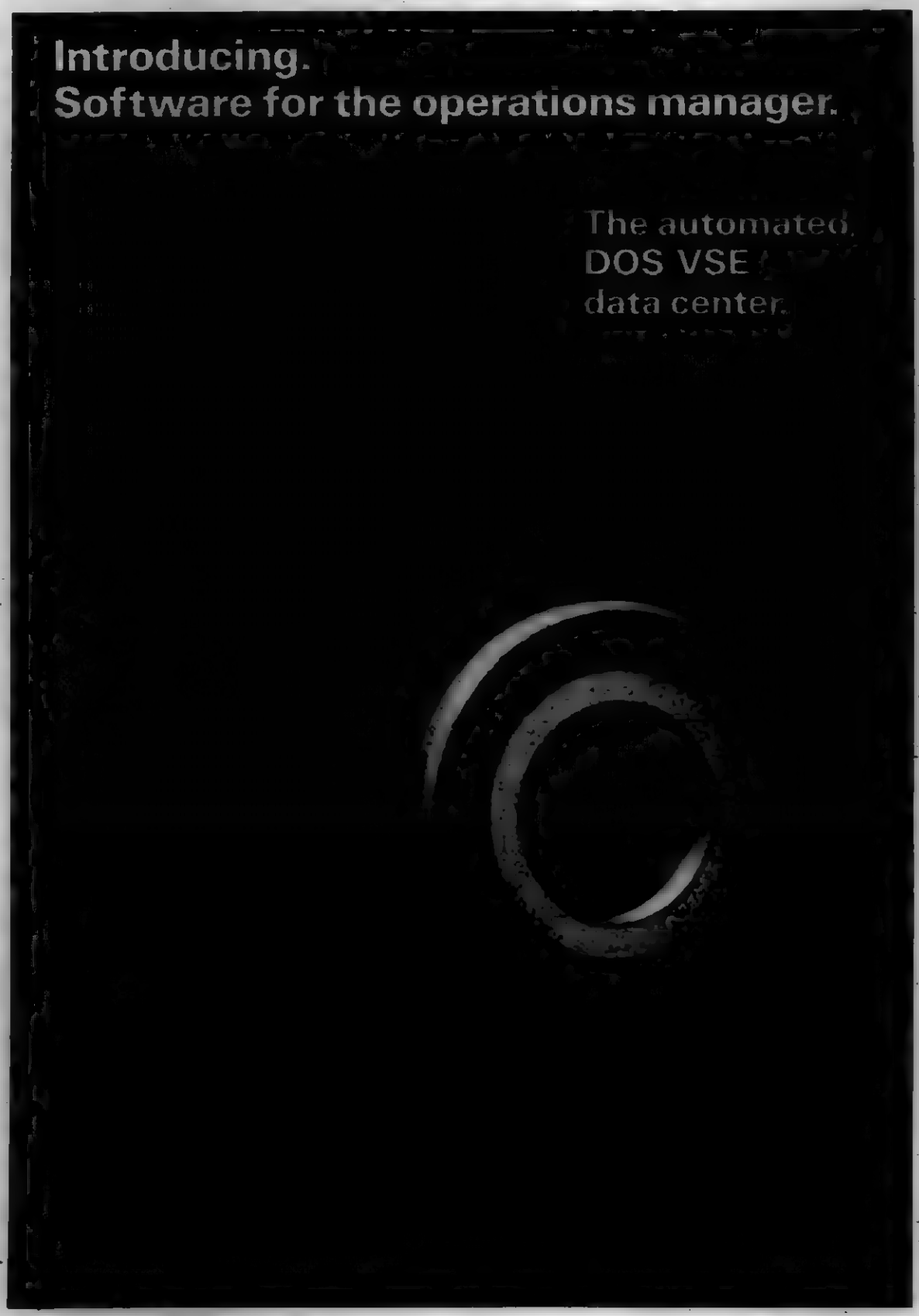
With Hibol, the spokesman said, CICS application menus can be created independently, with no programming involved. The system's menu function generates all code necessary to display the menu and to select the appropriate function.

In an on-line environment, Hibol also allows users to generate or access multiple files or records per screen and can handle multiple screens per program.

Hibol runs under IBM's CICS/VS in DOS/VSE, Edos/VSE and OS operating systems on Nixdorf's 8890 processors, IBM's 370, 4900 series, 30 series and other compatible systems.

A single-license fee for Hibol is priced at $20,000, and 12- or 24-month leasing plans are also available. The 12-month lease costs $870 per month, and the 24-month lease costs $765 per month.

More information is available from Nixdorf at 6517 Everglades Drive, Richmond, Va. 23225.



DEC announces RPG-II language for VAX-11s

MAYNARD, Mass. — Digital Equipment Corp. has announced a new RPG-II language for its VAX-11 series of processors.

The VAX RPG-II language is intended primarily for commercial applications requiring frequent report generation and ongoing file maintenance and for educational institutions training students in business programming, a spokesman said.

A native-mode language running under DEC's VMS operating system, the VAX RPG-II language is integrated into the VAX common language environment. That enables VAX RPG-II programs to call modules written in other VAX-11 languages as well as many VMS runtime library routines and VMS system services, DEC said.

VAX RPG-II also uses the VAX Record Management Service, which is said to provide mutual shared access to files by programs written in VAX RPG-II and other VAX-11 languages. DEC said the new language product consists of a compiler capable of speeds of approximately 3,000 line/min, an editor tailored to the columnar structure of the language and runtime support.

The VAX RPG-II compiler, editor and runtime component are included in the license fee of $3,000. The language is scheduled for delivery in April from DEC, Maynard, Mass. 01754.

File manager from Dylakor fits IBM CPUs

Dylakor, Inc. has announced DYL-280 II, a file and information management package for IBM mainframes.

The product features a full-function report writer, label and letter generation, linear regression capabilities, table and array handling and in-stream Cobol data definition support, the vendor said.

Dylakor's letter writing facility reportedly allows users to combine standard text with variable data from any input file.

Interval selection and random selection can generate test data, select certain records for mailing lists and collect records for data analysis, the vendor said.

Utility commands can retrieve and analyze System Management Facilities records, print in hexadecimal, convert Ascii data to Ebcdic data and retrieve and insert data into DOS communications job regions, the vendor said.

A single-CPU license for DYL-280 II costs $12,200. The system runs under IBM's DOS and OS operating systems.

More information is available from Dylakor at 17418 Chatsworth St., P.O. Box 9010, Granada Hills, Calif. 91344.

More and more, personal computers in large organizations are dramatically improving productivity. But there's also a problem involved with this improvement. People are using many different, often incompatible microcomputers, yet they still need to share information, programs, and peripherals.

It's as if everyone had an automobile, but no highways leading to their destination. No traffic signs to follow. No rules of the road. The result? Mass confusion.

Until now, that is. Until Liaison from SofTech Microsystems.

Based on the p-System,™ Liaison is a family of network software products that lets you establish a workable, efficient personal computer network. It allows personal computers and users to co-operate and work together so that your organization is altogether more effective. Liaison includes systems software products, such as an operating system, print servers and disk servers as well as development tools, including Insight Window Designer,™ a complete "window" development environment. And, a collection of network applications, including a database management package, electronic mail, and more.

Liaison lets you unite many different personal computers in an effective network. 8 and 16-bit machines from virtually all personal computer manufacturers (including IBM,® TI,® Corvus,® Apple,® and Sage™) can all share programs, all work together, all co-operate.

So if you're tired of your different personal computers driving you to the brink of insanity, give us a call at SofTech Microsystems.

We'll show you how Liaison can get you back on the road to recovery.

SOFTECH MICROSYSTEMS

SofTech Microsystems, Inc.
16885 West Bernardo Drive • San Diego, CA 92127 • (619) 451-1230

Liaison, p-System, and Universal Operating System are trademarks of SofTech Microsystems, Inc. IBM is a registered trademark of International Business Machines. TI is a registered trademark of Texas Instruments, Inc. Corvus is a registered trademark of Corvus Systems, Inc. Apple is a registered trademark of Apple Computer, Inc. Sage is a trademark of Sage Computer, Inc.

Introducing Liaison.™ Software that allows personal computers to co-operate.

The freedom some birds have to migrate is remarkably similar to the freedom you have with software for the System 8000.

Moving your application program with Zilog's System 8000 is as easy as the migration of [illegible] geese.

[illegible] solutions free you [illegible] constraints of [illegible]

Zilog's high performance, multi-user, UNIX*-based System 8000 supermicros give you a proven way to quickly port your minicomputer software onto affordable micros. For instance, we offer compatible migration tools for Basic Four BB III, DEC* DIBOL* and DG ICOS* COBOL and [illegible]. And with the UNIX oper[illegible]

GSA sched[illegible] ment applications.

For the [illegible]

Systems D[illegible]

Or write: [illegible]

Corporate [illegible]

Avenue, [illegible]

CA [illegible]

[illegible]

SOFTWARE & SERVICES

SYSTEMS SOFTWARE

SYSTEM SUPPORT SOFTWARE, INC.
Quikjob III Release 13.0

System Support Software, Inc. (SSS) has introduced a new version of its Quikjob III featuring native IBM Vsam support.

Quikjob verbs included in the release reportedly provide access to all three types of Vsam data sets. Vsam random access, sequential access and updating are all accomplished without coding subroutines, the vendor said.

Also included is a program that will print a hard-copy screen image of a Basic Mapping System map and the map name from the assembled object code.

Quikjob was designed to run on all IBM mainframes and operating systems. Release 13.0 will be distributed free to all current Quikjob III users. It is priced at $5,445 or can be leased for $125/mo, a spokesman said.

SSS, 5230 Springboro Pike, Dayton, Ohio 45439.

DELPHI DATA SYSTEMS, INC.
DD-Project

Delphi Data Systems, Inc. has introduced DD-Project, a project scheduling system that operates on IBM mainframe computers running under CICS.

According to the vendor, the system can be used to identify project schedule and staff capacity problems through both detail and exception reporting. The information provided by the system can be selected by the user, providing as much or as little detail as desired.

The perpetual lease price of the system is $4,000. A yearly and monthly lease plan, training and system maintenance are also available.

Delphi Data Systems, 9905 Hamilton Road, Eden Prairie, Minn. 55344.

HAWKEYE INFORMATION SYSTEMS, INC.
Pathfinder/38

Hawkeye Information Systems, Inc. has announced Pathfinder/38, software for the IBM System/38 that provides interactive or batch analysis of objects.

The vendor said the first module points out objects that can be deleted, while the second module points out duplicate logical views.

Pathfinder/38 is a menu-driven, command-driven documentation system that provides job stream explosions. It shows all control transfers from one program to another and supports all IBM commands.

The one-time license fee is $1,400. Users are supplied with documentation.

Hawkeye Information Systems, Suite 108, 14853 Delano, Van Nuys, Calif. 91401.

COMPUWARE CORP.
Abend-AID/CICS

Compuware Corp. has announced Abend-AID/CICS, a software product for the IBM OS/CICS environment that analyzes the cause of CICS transaction abends and provides the programmer with on-line diagnostics.

The software can be used in both test and production regions. Transaction abends will be diagnosed in each region, allowing programmers to resolve problems on-line, the vendor said. Prices for the software range from $5,500 to $13,000.

Compuware, 32100 Telegraph, Birmingham, Mich. 48010.

BOOLE & BABBAGE, INC.
IMF/MSS, IMF/SM

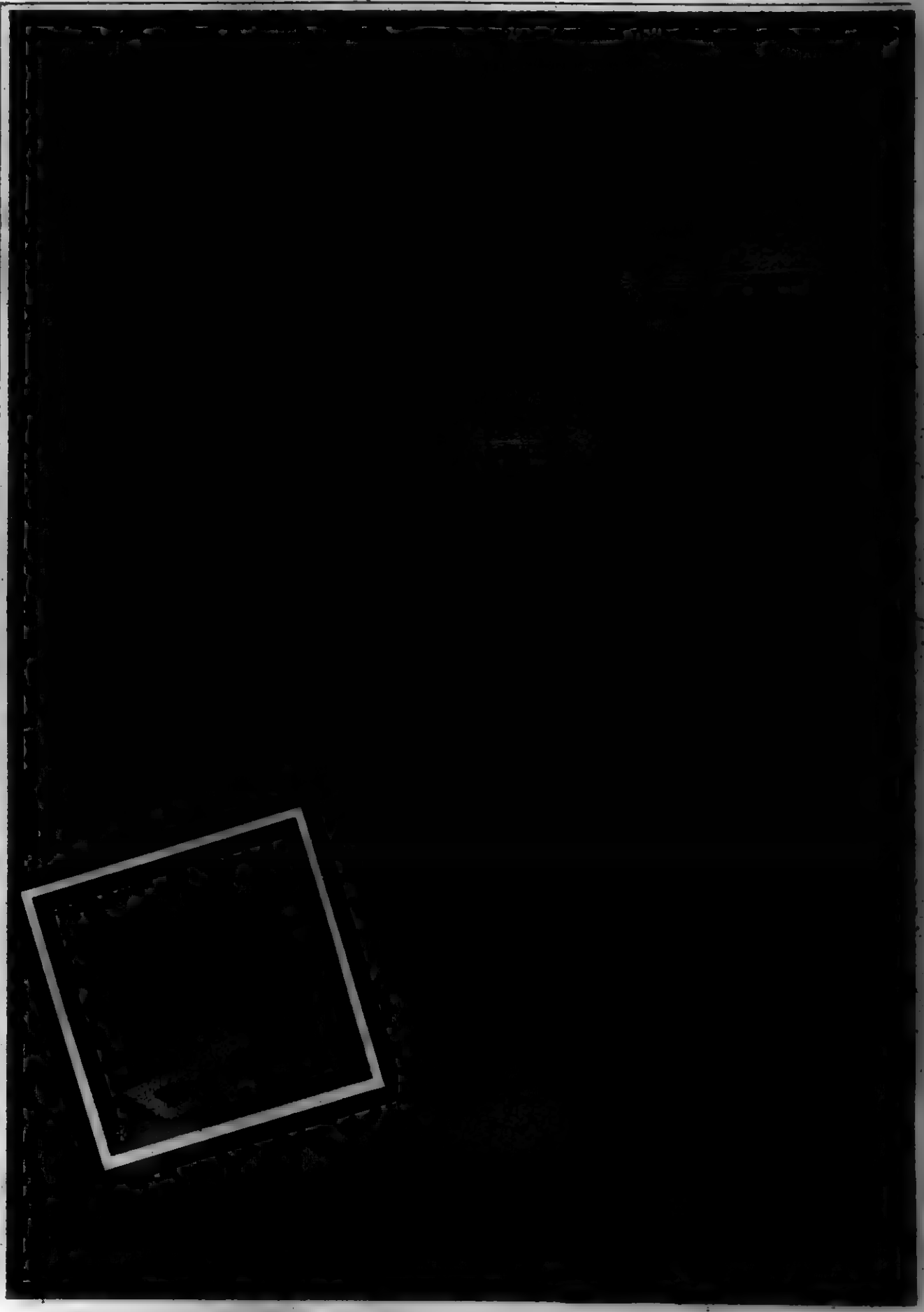
Boole & Babbage, Inc. has announced the addition of IMF/Multiple Systems Support (IMF/MSS) to its IMS Management Facilities (IMF).

IMF software, according to a spokesman, provides performance monitoring and management for IBM's IMS data base management system under IBM's MVS operating system.

With IMF/MSS, the spokesman said, users can diagnose problems and manage performance and operation of a distributed IMS network from a single location. Multiple MVS systems, even if geographically dispersed, reportedly can be managed from a single IMF terminal session.

The IMF/System Manager (IMF/SM) is an on-line program designed to improve

Continued on page 94



SOFTWARE & SERVICES

Continued from page 63.

IMS service. Using scrollable panel displays, IMF/SM is said to offer IMS master terminal operators capabilities that are similar to those that IBM's SPF provides for IBM TSO users.

The spokesman said IMF/SM can automatically start, stop or reassign IMS resources.

IMF/MSS licenses for $23,000, and IMF/SM licenses for $28,500.

Boole & Babbage, World Headquarters, 510 Oakmead Pkwy., Sunnyvale, Calif. 94086.

PRODUCTIVITY AIDS

DATA GENERAL CORP.
SGU enhancement

Data General Corp. has enhanced its Screen Generator Utility (SGU) to interface with five additional languages: APL, C, Fortran 77, Pascal and PL/I.

The user interface for the SGU is the same for all supported languages and protocols, a spokeswoman said. SGU's built-in features include function-key entry, on-line Help facility and default responses for most SGU questions. It runs on DG's Eclipse information system with AOS or AOS/VS and on DG's Desktop Generation series with AOS/VS. The user interface is identical under all operating systems, the vendor said.

Initial license fee for SGU under AOS/VS is $3,000. The fee is $1,500 under AOS; $800 for an upgrade from AOS.

DG, 4400 Computer Drive, Westboro, Mass. 01581.

PERTEC COMPUTER CORP.
System Builder enhancement

Pertec Computer Corp. has announced that it will bundle an enhanced version of its System Builder application generator with current models of its Sabre line of processors under Pick & Associates, Inc.'s Pick operating system.

The enhanced System Builder is said to be completely menu driven and allows users with no programming experience to develop, customize and document applications, the vendor said.

The enhanced version of System Builder is only available as part of the software bundled with the firm's line of Sabre computers. Prices for computers within the Sabre line begin at $9,500.

Pertec Computer, 17118 Armstrong Ave., Irvine, Calif. 92718.

CINCOM SYSTEMS, INC.
Scenario

Cincom Systems, Inc. has released a step-by-step programming aid for application prototyping as an optional feature of Mantis, its fourth-generation application development system.

With Scenario, a user reportedly can define the system flow during the design phase of an application and see the hierarchy of the screen-to-screen flow within the application. Users can then demonstrate the defined scenario as if the application had been implemented, a spokesman said. Scenario can also be used to transform a completed design into a production application.

An optional feature to Mantis Release 3.7, Scenario is priced at a single-use charge of $7,500. The annual renewal charge is $975; a one-year monthly license charge is $312, and the installation charge is $750.

Cincom, 2300 Montana Ave., Cincinnati, Ohio 45211.

APPLICATION PACKAGES

COLLIER-JACKSON, INC.
CJ/Personnel

Collier-Jackson, Inc. has announced that its CJ/Personnel personnel processing and reporting package is now available for use with Digital Equipment Corp.'s VAX-11 series of 32-bit minicomputers.

The system is a data-base-oriented, on-line, menu-driven package. CJ/Personnel features application listings, employee status notices, attendance benefit statements, federal Occupational Safety and Health Administration and Equal Employment Opportunity reports and employee transfer reports.

CJ/Personnel is licensed for $24,000.

Collier-Jackson, 3705 Jetton Ave., Tampa, Fla. 33629.

THE MEGA GROUP, INC.
Megagraph

The Mega Group, Inc. has announced Megagraph, a graphing system designed for IBM mainframe users in the MVS/TSO and VM/CMS operating environments.

The mainframe graphing system is interactive with Megacalc, the company's electronic spreadsheet. The system allows users to picture or print all data created with Megacalc in full color. Using Megagraph, all Megacalc data can be graphed into eight types of graphs, the vendor said.

Prices range from $2,500 to $4,000.

The Mega Group, 17701 Mitchell Ave. N., Irvine, Calif. 92714.

WILSON GROUP, INC.
Customer System Product

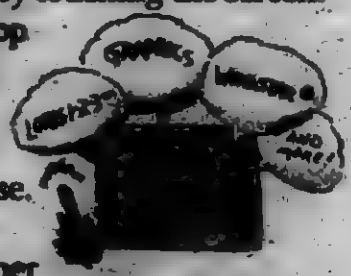
Wilson Group, Inc. has announced a software package that reportedly enables utility companies to automate customer records using an IBM 4341 computer.

Is your office operating at a crawl...

HP 150

Maybe the one thing you need to get off the ground is the Touchscreen Personal Computer. The HEWLETT-PACKARD 150. Because it's no ordinary machine. Remember the first time you approached a personal computer? If it wasn't exactly love at first sight, it was probably because a lot of machines can be pretty intimidating. Especially for first-time users. We've made the Touchscreen Personal Computer so easy to use that people like to use it. Very simply, we've taken out the intimidation factor. We've made the new Touchscreen Personal Computer so easy to operate that even first-time users can use it. Which means they'll quickly grow to love it.

For example, to select the software you want to use, just touch the screen. So whether you want to work with words, numbers or graphics, all you have to do to get started, is touch the screen. And once you get going, you can change a number in a spreadsheet, or make a chart for a presentation just by touching the screen. No complicated commands to remember. No desktop gadgets to manipulate. All that's required is the touch of your finger. MultiPlan,™ Graphics, WordStar,® Lotus 1-2-3,™ dBase II,™ VisiCalc® and a world of popular software become easier than ever to use.



The Touchscreen Personal Computer not only communicates with people. It communicates with other computers, too. Your people are your most valuable asset. But the more information they have at their fingertips, the more valuable they become. The Touchscreen Personal Computer delivers again.

SOFTWARE & SERVICES

Called the Customer System Product, the software was developed by the Iowa Public Service Co. The software reportedly supports customer service functions such as service meter installation and reading, customer information, order entry, billing, deposits, credit, collection, customer accounting, revenue accounting and service calls.

The package can be purchased for $340,000 and is available now.

Wilson Group, 333 N. Michigan Ave., Chicago, Ill. 60601.

COMPUTER RESOURCES, INC.
Projectalert modules

Computer Resources, Inc. (CRI) has added six modules to Projectalert, a menu-driven project management system that runs on Hewlett-Packard Co. HP 3000 systems.

Cost and Labor Tracking ($6,000) provides an interactive system that tracks project costs and hours against budgets, the vendor said. Alert Problem Reports ($3,000) produces exception reports that list costs or schedules which vary from original estimates. Resource Leveling ($3,000) reportedly optimizes project resource requirements and eliminates unmanageable variations in work force utilization. Micro Scheduling ($3,000) produces schedules in hourly increments. Report Organizer ($2,000) groups and produces a large number of reports, the vendor said. Activity On-Node ($2,000) allows data to be tied into a network, according to the vendor.

CRI, 5333 Betsy Ross Drive, Santa Clara, Calif. 95054.

SYSTEM SOFTWARE ASSOCIATES, INC.
BPCS Distribution

System Software Associates, Inc. has announced that its distribution application software is available for IBM System/38 computers.

Business Planning and Control System (BPCS) Distribution is one of five packages in the vendor's BPCS. The package reportedly contains features to handle multiple locations within multiple warehouses, contract and discount pricing, credit analysis, multiple companies and profit centers, taxes and sales analysis. Modules include inventory management, customer order processing, billing, sales analysis and purchasing, a spokesman said.

The program is written in RPG-III and is priced at $30,000, including source code and documentation.

System Software Associates, Suite 3620, 500 W. Madison, Chicago, Ill. 60606.

DATA BASE MANAGEMENT SERVICES

TRANSTIME TECHNOLOGIES CORP.
Datamat

Transtime Technologies Corp. has introduced Datamat, a dictionary-driven, multiuser, integrated relational data base management system.

Datamat includes bar charts and scatter plots, math functions, statistics, forms generation and text processing with a built-in interface for other word processors.

Datamat is available on a variety of operating systems and processors, including Unix; IBM's PC-DOS; Microsoft, Inc.'s MS-DOS; Zenith Data Systems Corp.'s Z-DOS; Digital Research, Inc.'s CP/M and MP/M; and Digital Equipment Corp.'s RSX and VMS. It is offered on 56K bytes of random-access memory (RAM) using Zilog, Inc.'s Z80 and Z80A microprocessor or Intel Corp.'s 8080 and 8085; Datamat is also available on 128K bytes of RAM using Intel 8086 or 8088, Motorola, Inc. 68000 and DEC PDP-11 and VAX-11 processors.

The price for Datamat ranges from $200 to $1,000.

Transtime Technologies, 797 Sheridan Drive, Tonawanda, N.Y. 14150.

WANG LABORATORIES, INC.
VS Task

Wang Laboratories, Inc., in cooperation with Cincom Systems, Inc., has announced VS Task, an interactive query and report facility for use with Cincom's Total Version 2 data base management system on Wang VS system products.

The on-line query facility reportedly provides a direct method of retrieving and reporting on information stored in Wang Total data base files. VS Task consists of a query module, through which information is retrieved, and a directory maintenance module.

Other features include a nonprocedural language, English-like syntax and on-line Help messages. VS Task requires a minimum of 256K bytes of memory and about 800K bytes of disk space. It is priced at $10,000.

Wang, 1 Industrial Ave., Lowell, Mass. 01851.

REMOTE COMPUTING SERVICES

MONCHIK-WEBER CORP.
Quote Service

Monchik-Weber Corp. has introduced a real-time pricing service called Quote Service for common stocks, stock options, debt options, index options, financial futures, commodities futures and currency futures and options.

Quote Service is available on the Tymnet, Inc. data base system to micro users with modems for $250/mo, plus $20/hour connect time. It may

Continued on page 86

when it could be flying?

communication

The HP 150 is fully compatible with the big HP 3000 computers and, with the addition of our new 3278 communications capability, the 150 can talk to IBM® mainframes as well. Your people can call up data, work with it and send it back to the host computer. All this with the use of the keyboard. The HP 150 can also send electronic mail and operate a range of peripherals at workstations. Needless to say, this can really move things along. The Touchscreen Personal Computer is a Hewlett-Packard product. This, after all, could be the most important thing you need to know about it. Your professional reputation depends on the key decisions you make. Office automation is one of those decisions. You need to know and trust the company you go with. Hewlett-Packard's long-standing reputation for excellence is a given in the industry. And our service and support will make sure you aren't standing still when you should be flying. See the HP 150 at your local dealer or for information call (800) FOR-HPPC today. Find out how a personal computer with a sense of touch makes a lot of sense for your office.

TRUST

HP 150 at a Glance	
User Memory:	256K-640K bytes
Operating System:	MS-DOS 2.0
Microprocessor:	16-bit, 8088, 8MHz
Permanent Memory:	(ROM) 160K bytes
Diagnostics:	Power-on self-testing
Display Screen:	Touch-activated, green phosphor 80 characters x 27 lines 9 x 14 character matrix Upper and lower case Simultaneous text and graphics capability 350v x 512h graphics resolution 1024 characters and symbols in ROM
Keyboard:	107 keys, 6-ft. cord attaches to system unit, 10-key numeric pad, 12 function keys (8 screen labels)
Compact Size:	2.1 sq. ft. desk space
Communications:	2 RS-232 ports (Built-in) HP-IB (IEEE-488) (Built-in) IBM 3278 (SDLC, BSC). Up to 19,200 bits per second
Peripherals:	Choice of printers (including optional internal printer), plotters, 5.5" and 5¼" floppy drives (364KB formatted), Winchester hard disks (5 and 15 MB)
Suggested Retail Price:	$3,995.00

MultiPlan is a trademark of MicroSoft Inc.
WordStar is a U.S. registered trademark of MicroPro.
Lotus 1-2-3 is a trademark of Lotus Development Corp.
dBase II is a trademark of Ashton-Tate.
VisiCalc is a U.S. registered trademark of VisiCorp.
IBM is a registered trademark of International Business Machines Inc.

Setting you free.
Hewlett-Packard Personal Computers

HEWLETT PACKARD

SOFTWARE & SERVICES

Continued from page 68

also be accessed for $280/mo from Monchik-Weber customers already leasing the firm's terminal, screen and printer package. That package leases for $500/mo.

Monchik-Weber, 11 Broadway, New York, N.Y. 10004.

ON-LINE DATA BASES

MEAD DATA CENTRAL, INC.
Electronic Clipping Service

Mead Data Central, Inc. has announced a series of additions to its information retrieval systems and a new pricing option for the on-line information services.

Electronic Clipping Service (Eclipse) is designed for use with Mead's computer-assisted retrieval services, which include Lexis and Nexis. The service allows users to track areas of interest automatically on a daily, weekly or monthly basis.

Eclipse search results can be printed in formats ranging from only the relevant portion of an article to the full text of documents, a spokesman said.

The reports contain all the information added since the last report, and users can request a printout of every document in the data base that fulfills their search. The service is priced at $216/mo for daily reports, $54/mo for weekly reports and $18/mo for monthly reports.

Mead also announced that, beginning midyear, *Time*, *Fortune*, *Sports Illustrated*, *Money*, *Discover*, *People* and *Life* magazines will be available on its Nexis service. Past issues of these publications will be added gradually, the spokesman said.

Mead Data also announced a new pricing plan for Lexis and Nexis that will be available to private sector subscribers between April 1 and June 1.

The spokesman said the price of each search will be based on the value and amount of information in the file or group of files accessed.

Prices will range from $9 to $18 per search during peak hours, and a 50% discount will be available during off-peak hours. Searches can also be modified for $3 or $1.50 during off-peak hours.

Connect charges for reading, scanning and printing on-line have been reduced to $20/hour plus telecommunications costs, which are typically $8/hour. Off-line printing on high-speed printers leased to subscribers will be 2 cent/line as of June 1.

Mead Data Central, 9333 Springboro Pike, P.O. Box 933, Dayton, Ohio 45401.

MONCHIK-WEBER CORP.
Ticker III

Monchik-Weber Corp. has introduced a service which reportedly provides real-time market information consisting of prices and statistics from over 30 exchanges as well as fundamental and historical information.

Called Ticker III, the service is designed for brokerage firms, money managers, banks and insurance companies, the vendor said.

The cost to lease the service for in-house use is $40 per accessing device with a minimum charge of $2,400/mo per account.

Monchik-Weber, 11 Broadway, New York, N.Y. 10004.

TRAINING

MVC ASSOCIATES, INC.
Focus Reporting for the End User

MVC Associates, Inc. has announced an addition to its line of interactive computer-based training (CBT) courses.

"Focus Reporting for the End User" contains between six and 10 hours of basic training for users of Information Builders, Inc.'s Focus fourth-generation language.

The course uses IBM's Interactive Instructional System and is also compatible with Goal Systems International, Inc.'s Phoenix system. The CBT costs $4,500 and can be leased for $175/mo.

MVC Associates, 849 N. Summit Ave., Lake Forest, Ill. 60045.

SECURITY from page 59

yes, security can easily be compromised because the record defines a file to the system with one bit that states whether the data set is protected or unprotected. If that bit, accidentally or otherwise, gets turned off, all protection is lost.

If the system should fail, will it fail without incident? Default systems do. Other systems that operate with exception protection may not.

Is there a transitional capacity for gradual implementation of the security system? This feature is most helpful at initial implementation.

Was the product initially designed for security by default? If a company's security software decision leans toward the default system, it would be wise to determine if it was designed that way or if it has been "patched" to the default system.

Are there users who can be contacted about the product? This could be the most important question and can yield valuable information. Another user might find it difficult to relate one specific application to a different kind of application, but could provide enlightenment regarding ease of use, installation, support systems and other information.

Susan is marketing manager for Cambridge Systems, Inc., which markets the ACF2 algorithmic security product developed by SKK, Inc.

FALCON
on-line data entry that's above and beyond the ordinary

For an easy-to-use, completely interactive data entry system that's designed especially for the end user, you need FALCON.

FALCON operates standalone or as a task under CICS and the other major TP monitors giving you total flexibility and performance. It supports both DOS and OS operating systems to provide versatility and upgrading capabilities. And FALCON automatically converts VIDEO/370 formats.

FALCON's high-level security system protects your data against unauthorized access. It lets you decide which operators can use specific functions. And with FALCON you never worry about losing data. If the system fails, all data is recovered. If a terminal breaks down, just go to another terminal, rescue your data, and start working – right where you left off.

FALCON's on-line instructions help you design screen formats, enter and verify data, maintain files, create tables, and submit your own jobs. Just touch a key, tell FALCON what you want to do, and the instructions appear right on the screen.

With FALCON, you can make decisions based on the productivity of your operators without leaving your office.

You can monitor the progress of all active terminals and view job accounting statistics on-line.

FALCON's built-in edits include table lookup, range testing, defaults, balancing, and much more. FALCON goes far beyond other data entry systems to let you use your terminal as an operator's console and view the activity and contents of the input and output queues.

So make sure you're getting the most from your resources. Choose FALCON. Call for a free trial. You'll be glad you made the right choice.

For more information contact
Phoenix Computer Corporation,
11949 Jefferson Boulevard,
Culver City,
California 90230.
Toll free (800) 255-5049 or
(213) 827-4500 in California.

FALCON®

PACKAGES from page 59

If one or more software packages are found that appear to be candidates, you should investigate a number of related factors (see checklist below).

The buyer of application software should always go in with his eyes open. Who is the vendor or supplier, and how important is his reputation, experience, financial status, support policies, staff size and continued existence? Does the proposal explicitly describe the product and services to be provided, cost of the product, cost of modification or enhancement services, delivery dates, training to be provided and the documentation that will be supplied? In some cases, a small vendor may ask for some up-front money as partial payment to finance the completion of a product. In exchange, you may be offered a royalty on future sales of the product. There is certainly room for negotiation here, but do not be diverted from the main goal of satisfying your own client first.

Additional items should be formalized in any software contract. For example, does it include penalties for late delivery, definitions of acceptance and future support services and a commitment to maintain compatibility with future versions of the operating system or hardware? Are you allowed to use the package on any computer in your company or just one specific system? If the latter is true, what will be the charge for additional copies to use on other machines? Will there be a royalty payable to you if other sales of the package are made? Are you allowed to market the package or a revised version of it? If so, what financial and support arrangements are documented in the contract? A couple of areas sometimes overlooked are the payment schedule and reimbursement for expenses.

An understanding should be reached before the contract is signed regarding implementation steps, the time schedule and each party's responsibilities. Must you furnish computer time, office space and so on for the completion of development and the conversion, or will all this work be done on the vendor's system? If there is a choice, what are the costs of each alternative? You might want to install remote terminal equipment in the supplier's offices for access to your system. Also, what other resources, such as people and test data, must be provided? Finally, clearly defining the testing procedures and what constitutes acceptance are of utmost importance.

Of course, there are many other details involved in the buy-and-make consideration than can be discussed here. I would encourage you to be free from the "not invented here" syndrome. Do not expect perfection, but demand quality products and professional services. Your primary focus should be on your user's needs and the time and cost of meeting those needs. If by buying and tailoring a software package you are able to satisfy your user in a more timely and/or economic manner, you can take pride in your accomplishments.

Gilliam is an independent consultant based in Ponca City, Okla. He is a regular contributor to Sightline.

©1984 Dutch Computer Cartoonists, Inc.

Get your hands on USING SAS* now.

Get USING SAS, the interactive computer-based training that gives end users "hands on" experience they can get their hands on now.

Designed not only to teach, but as an ongoing refresher, USING SAS is three courses in one:

- Basic SAS
- Intermediate SAS
- Advanced SAS

Report generating, statistical analysis, data manipulation are all learned by writing SAS programs. Users may select as many sessions as they need, but you install and register only once.

Written by bestselling DP author Gary DeWard Brown, USING SAS comes with a comprehensive student workbook, available for reproduction by all USING SAS customers.

And, as with all CRWTH courseware, your satisfaction is guaranteed. CRWTH'S unique free trial lets you evaluate the course to make sure it meets your training needs.

*SAS is the registered trademark of SAS Institute, Cary, N.C.

Want more information? Call (800) 282-2372. In California, (213) 391-6788. Or use this coupon to get a free catalogue of CRWTH'S Curriculum for the Information Center.

Name_____

Company_____

Title_____

Address_____

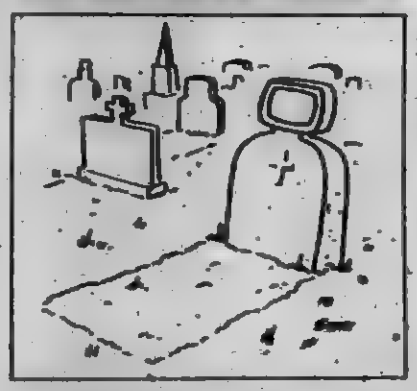
City/State/Zip_____

Telephone ( ) _____

9100 Wilshire Blvd., Suite 2000
Beverly Hills, CA 90301

CRWTH
The Information Center People

C319



COMMUNICATIONS

Capital to get downtown teleport

WASHINGTON, D.C. — The world's first downtown satellite communications teleport, which will provide direct access to both U.S. and Canadian satellites, is scheduled for completion by midsummer.

The satellite communications complex, called The National Teleport, will be built on top of the National Press Building in the heart of the nation's capital, a spokesman said.

It is intended to be used by domestic and international broadcasters, news organizations, corporations, associations and government agencies as an alternative to the telephone network for intercity transmission of video, voice and data, according to the spokesman.

The National Teleport is a partnership of National Teleport, a wholly owned subsidiary of Videostar Connections of Atlanta, and Microwave Express, a wholly owned subsidiary of Pyramid Video, located here.

Other teleports being constructed are situated in outlying suburban areas to avoid interference with other communications technologies.

The downtown location is made possible because the teleport will use Ku-band frequencies, which are not used in terrestrial communications, thus enabling the teleport to operate in even microwave-congested metropolitan areas, according to a spokesman.

Initial plans call for installation of two 5-meter Ku-band transmit/receive earth stations.

The earth stations will be connected with multiple fiber-optic cables, coaxial cables and microwave links to locations throughout the greater Washington, D.C., area, according to the spokesman.

There will be expansion space for as many as six additional earth stations, the spokesman said.

Matrix switch integrates net monitoring, management

NORWALK, Conn. — Data Switch Corp. has announced a matrix switch that has integrated network performance monitoring and management reporting capabilities. This eliminates the need for separate systems for these functions, the vendor said.

Designed and developed by Data Switch's subsidiary, Intellinet Corp., the Intelli-MAX enables users to monitor the performance of their networks and use the device to switch out bad components or lines.

A feature unique to the system, the vendor noted, is Dynamic Rotational Monitoring. This enables the user to monitor critical portions of his network continuously while monitoring less crucial lines on a rotational basis at user-defined intervals.

Up to seven layers

Network management features reportedly include graphic display of up to seven layers of network activity and information on specific communications applications.

The condition of the network is displayed using a color-coded system in which, for example, red would tell of a line failure, incomplete transaction or control unit failure.

Gradual network degradation can be monitored and flagged when it reaches a threshold specified by the user. Intelli-MAX displays network activity minute by minute and in five-minute color trends, the vendor said.

Once a failure or degrading condition has been identified, the matrix switch allows instant reconfiguration of the network via simple commands from the monitor terminal.

Intelli-MAX supports from 16 to 512 lines. The unit costs $61,400 in a fully configured system and will be available in the fourth quarter of 1984, Data Switch said from 444 Westport Ave., Norwalk, Conn. 06851.

Bell Atlantic to offer two local nets

PHILADELPHIA — Bell Atlantic announced plans here late last month to offer two local-area networks. One is the Pronet, virtually a carbon copy of IBM's much discussed but as yet unreleased token ring. The other is the Datakit virtual circuit system (Datakit VCS), manufactured by AT&T Technologies, Inc., formerly Western Electric.

Pronet is manufactured by Proteon, Inc. of Waltham, Mass. It is said to operate at a speed of 10M bit/sec between host interfaces.

The Datakit system was reportedly designed for applications involving lower transmission speeds, more users and bursty messages rather than lengthy messages.

Bell Atlantic said it had signed letters of intent with Proteon and AT&T Technologies covering the marketing of the two products.

They will be offered by Bell Atlanticom Systems, Bell Atlantic's nonregulated, separate subsidiary.

Bell Atlantic is one of the seven regional holding companies established in the wake of AT&T's divestiture on Jan. 1. The company encompasses four divested Bell operating companies — Chesapeake and Potomac, New Jersey Bell, Diamond State Bell (Delaware) and Bell of Pennsylvania.

INSIDE

Controllers/72
Protocol Converters/72
Local-Area Networks/72
Test Equipment/73
Auxiliary Equipment/73
Voice/Data Communications/74

CLIP AND RETURN FOR FAST RESPONSE
300 BAUD
103A COMPATIBLE
MODEMS
WITH ALL THE FEATURES YOU NEED
1200 BAUD
212 A COMPATIBLE
$147
MODEL 305E2-12
$377
MODEL 212E2-32
ComData

THE BIG THREE IN BUSINESS SOFTWARE. BEFORE YOU BUY, SEE HOW THEY RUN.

Run their general ledger. Their payroll/personnel. Their entire product line of financial and human resources software. Run the packages on your mainframe and link them to your PC's. Run them together and see if they work together.

You may well conclude that even though each of the big three has succeeded in business, only one of them has succeeded at integrating business application software.

And if your company size is $100 million in sales or more, this discovery could spare you the pain of much lost time and money over the next few years. Because when you acquire a half dozen systems that fit together in name only—but not in fact—you face six times the training, six times the delay and six times the anxiety.

We believe your evaluation will show you this:

Two companies offer the mere appearance of integration. An agglomeration of business applications linked superficially. Through a web of hinges, patches, bridges, shadow files and masks lurking just below the surface.

While one offers the real thing. Millennium. A true family of systems in which the whole works as smoothly as any part. In which every package has the same query mechanism, the same report writers, the same screen generation, the same on-line documentation, security and real-time capabilities. So that when the packages are put together, there are absolutely no borders between them. They fit like pieces in a jigsaw puzzle. Making the most efficient use of all your data processing resources.

There's even a Millennium application development tool, so you can create new systems as you need them. Without slow, expensive programming.

Millennium means integration in fact. Not just in name. And it is available only from McCormack & Dodge.

Of the big three in software, who's blind to integration and who's not?

When you see how they run, you'll know the answer.

WHEN YOU THINK ABOUT TOMORROW, MILLENNIUM MAKES SENSE TODAY.

McCormack & Dodge

a company of The Dun & Bradstreet Corporation

McCormack & Dodge Corporation, 1225 Worcester Road, Natick, MA 01760
Sales and support offices throughout North and South America, Europe, Asia, Australia and Africa. 800-343-0325. Telex: 710-325-0329

COMMUNICATIONS

MCI plans to expand Cablephone system

WASHINGTON, D.C. — Cablephone, an "alternative local transmission system" developed by MCI Communications Corp., may be installed in as many as eight more cities during the coming year, said MCI Senior Vice-President Brian Thompson last week. "It all depends on the FCC and local telephone companies."

Cablephone systems are now operating in five locations — Omaha, Atlanta, Fort Lauderdale, Fla., Anaheim, Calif., and Rye Brook, N. Y. All of the users are business firms, Thompson said. Although they pay the same rate for Cablephone access that they would for conventional access via telephone-company-provided analog local loops, they obtain much better quality service. "Cablephone conversations are as good as, and possibly better than, what the local telephone company provides," he contended, adding that this is because MCI controls both ends of the local loop — something it can't do when telephone company facilities are used.

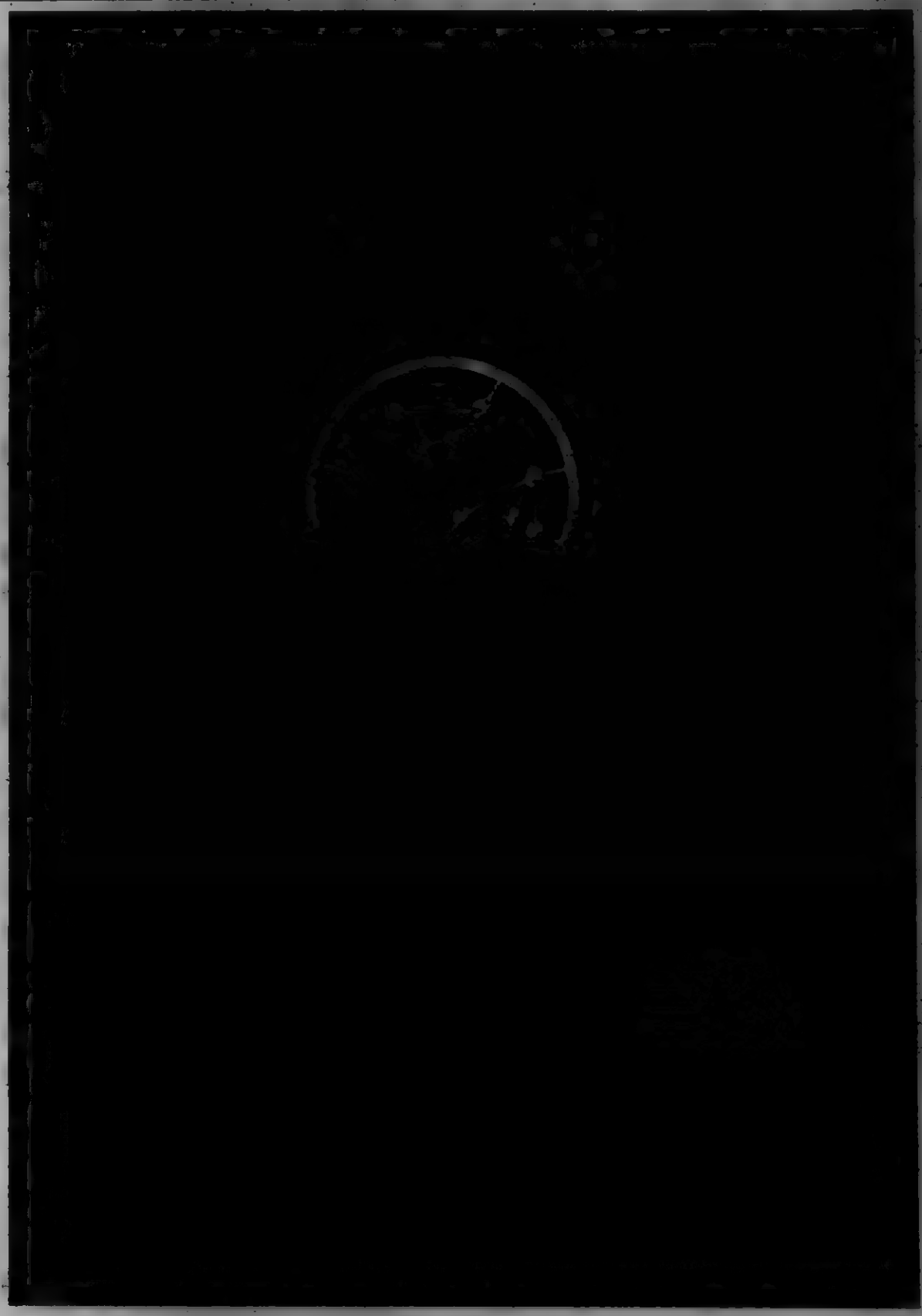
Another user benefit of the new system is that service usually can be acquired in far less time. In one case, Thompson said, MCI supplied a customer with several voice-grade circuits within a month after receiving a request for a quotation; the local phone company, he added, was unable to deliver in less than 10 months.

It costs MCI less to use CATV channels to provide service than telephone company local loops, and after April 3, when access charges are scheduled to increase considerably, the savings will be "far greater," Thompson said.

But Cablephone is not a panacea. For one thing, the system can be installed only in those cities which have institutional two-way CATV systems. It will be "several years" before these facilities are deployed in most cities, Thompson pointed out.

"Cablephone is only one of a number of alternative local distribution methods we are exercising," he explained. Others include Digital Termination Systems (DTS) and cellular radio. At the moment, Cablephone seems to be the most useful alternative, Thompson said, because it can be deployed in a limited number of cities at a favorable cost. DTS is more expensive, but "we expect the technology will become considerably more cost-effective during the next three to five years."

Ultimately, the future of Cablephone and the other alternative local distribution systems will depend on the FCC, Thompson added. "The higher the rate for local business service, the more attractive these alternatives become. Recently, the commission rejected one set of tariffs filed by the local carriers, which proposed increases of up to 300% in rates for leased lines connected to long-distance networks. It will be interesting to see what the revised rates look like and how the commission responds to them," he said.



Interface links Apollo Domain to IBM systems

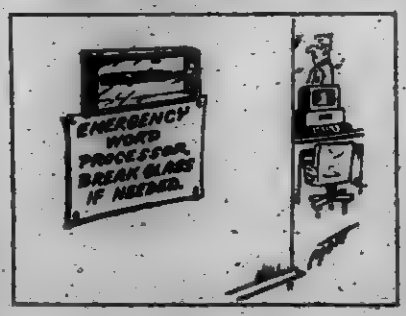
AUSTIN, Texas — Auscom, Inc. has announced an interface to link an Apollo Domain network directly to an IBM or plug-compatible mainframe.

The Model 8911A Programmable Channel Interface connects directly to the block multiplexer, byte multiplexer or selector channel of an IBM or compatible mainframe, and emulates a standard control unit in the host architecture, the vendor said.

After data is received from the host at channel speeds, a direct memory access (DMA) interface in the 8911A completes the data transfer to a Multibus/DR11W DMA card in the Apollo. This DMA card is made by Ikon Corp., Seattle, Washington. Drivers for the Auscom and Ikon DMA cards are available from Auscom and Apollo, respectively. The specification for the data protocol is available through Auscom.

All Apollo Domain nodes can have access to IBM mainframes and plug-compatibles through the interface unit, a spokesman said. Prices range from $16,000 to $21,000. The software license for the 8911A to support the interface is $1,000.

Auscom is based at Suite 102, 2007 Kramer Lane, Austin, Texas 78758.



COMMUNICATIONS

CONTROLLERS

INNOVATIVE ELECTRONICS, INC.
MC-80/600-1

Innovative Electronics, Inc. has announced a communications controller that emulates the IBM 3274-51C controller and enables the use of Digital Equipment Corp. VT100 or compatible terminals in the place of IBM 3277-1, 3277-2, 3278-1 or 3278-2 terminals for communications with IBM host systems.

According to the company, full-screen mapping is performed by the MC-80/600-1, and data displayed on the asynchronous Ascii terminals will be the same as an IBM 3277/3278 display station, with virtual screen sizes of 480, 960 and 1,920 characters. Status information is displayed in English at the bottom of the screen.

The stand-alone, self-powered controller has up to 16K bytes of read-only memory and 16K bytes of random-access memory and can support two dumb terminals for $1,495. Additional ports can be added two at a time for $200.

Innovative Electronics, 4714 N.W. 165th St., Miami, Fla. 33014.

ADVANCED COMPUTER TECHNIQUES CORP.
Network Processor

Advanced Computer Techniques Corp. has announced support for IBM and plug-compatible 3270-type display stations, printers and personal computers using its Network Processor (NP).

According to the vendor, the NP can be used in remote concentration, message switching and front-end processor applications. The NP provides access to multiple hosts from the same terminal.

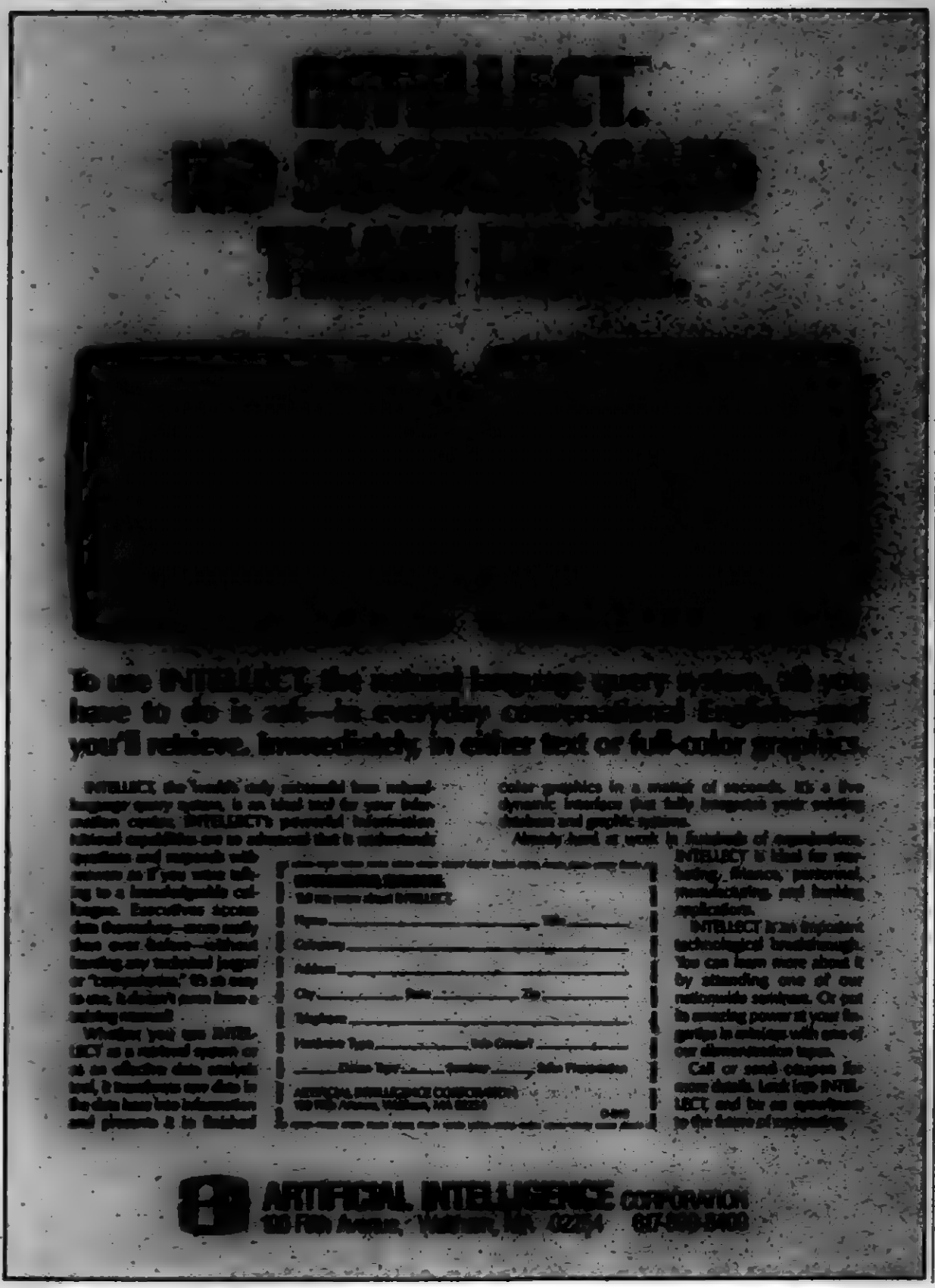
A terminal emulation facility is used when accessing host systems that do not natively support 3270 terminals or when existing applications were designed for non-3270 screen formats.

The NP supports both interactive and store-and-forward message switching and can also be used as a remote concentration device that provides local polling, a vendor spokesman said.

The system is available in several different configurations. The hardware consists of modular 16- and 32-bit CPUs and microprocessors. These configurations are designed to support from two to several thousand end points (terminals and printers) and a variety of hosts, terminal types and protocols. Stations can be connected via dial-up, leased or direct-wire lines. Auto-call support is also provided, the vendor said.

A processor with 128K bytes of memory with up to eight communications ports and a 13M-byte disk is priced at $20,000. The base price for the software is $100,000.

Advanced Computer Techniques, 16 E. 32nd St., New York, N.Y. 10016.



PROTOCOL CONVERTERS

PERLE GSD, LTD.
PDS 300/525 Release 15

Perle Gsd, Ltd., in conjunction with Perle Systems of Toronto, has announced Release 15 of the PDS 300/525 protocol converter. In an effort to add value to its protocol converters instead of offering them as simple translation devices, Perle has targeted the Release 15 at remote printing applications.

Release 15 enables an IBM System/34, 36 or 38 to be programmed to dial up and access remote devices, including the 5256 or 522X IBM printers.

The PDS 300/525 protocol converter is a diskette-based unit. It is available in 4-, 8-, 12- or 16-port configurations.

Prices range from $4,800 to $13,500.

Perle Gsd, Suite 507, 600 S. Dearborn St., Chicago, Ill. 60605.

ICOT CORP.
Protocol conversion

Icot Corp. has announced an IBM 2780/3780 to 3270 Binary Synchronous Communications (BSC) protocol conversion capability for its Crystalink 25X series of communications processors.

The series of communications processors can interface multiple standard IBM 2780/3780 RJE devices to an IBM host as a 3271 cluster controller communicating in 3270 BSC. A maximum of 27 RJE devices can be accommodated in the Model 257 communications processor — the largest of the Crystalink family — the vendor said.

Prices for the series range from $5,200 to $30,000.

Icot, 630 Maude Ave., P.O. Box 7248, Mountain View, Calif. 94039.

LOCAL-AREA NETWORKS

BRIDGE COMMUNICATIONS, INC.
CS/1-X.25

Bridge Communications, Inc. has announced an X.25 option for its Communications Server/1 Ethernet interface unit.

The CS/1-X.25 is a software and interface board option that enables the company's Communications Server/1 to serve as a front-end processor to host systems with X.25 interfaces.

This enables a host to be connected to an Ethernet network through a single X.25 interface, instead of

COMMUNICATIONS

through the 32 individual RS-232 ports previously needed, and increases to 48 the number of simultaneous sessions supported.

After the product is installed in front of the host, any terminal linked to another Bridge CS/1 or CS/100 unit can access the host, the vendor said. Hosts connected to different CS/1-X.25s can transfer files using their standard X.25 file transfer utilities.

CS/1-X.25 accommodates the three standard interfaces: RS-232C, RS-422/449 and V.35, a company spokesman said. The price is $13,000.

Bridge Communications, 10440 Bubb Road, Cupertino, Calif. 95014.

RAYCOM SYSTEMS, INC.
Raycom 2000 enhancement

Raycom Systems, Inc. has announced a multipoint/broadcast enhancement for its 2000 interconnect system for office, medical, scientific and industrial automation networks that use fiber-optic technology.

The enhancement reputedly allows any device to communicate with all other devices on the network. A multipoint protocol can be used to transmit data to all devices connected to the network.

The Raycom 2000 costs $159.

Raycom Systems, 6395 Gunpark Drive, Boulder, Colo. 80301.

TEST EQUIPMENT

INTERNATIONAL DATA SCIENCES, INC.
Bert/Biert for Hawk Model 4010 Datatrap

International Data Sciences, Inc. has announced additional features for its Hawk Model 4010 Datatrap and modem terminal simulator. The CRT now incorporates full bit and block error rate (Bert/Biert) testing as a standard feature.

The enhancement features full screen display of Bert/Biert functions, error rates and Bert patterns, a company spokesman said.

The 4010 costs $2,995. Existing field units may be upgraded, according to the vendor.

International Data Sciences, 7 Wellington Road, Lincoln, R.I. 02865.

DATACOM NORTHWEST, INC.
Datamonitor

Datacom Northwest, Inc. has announced the RS-232 V24 Datamonitor, a pocket-size device that is powered by the lines it monitors.

Seven LEDs monitor positive voltage transitions. The product has an extra female DB25 connector to allow the connection of additional data testing equipment, the vendor said.

The price is $99.

Datacom Northwest, 11300 35th Ave. N.E., Seattle, Wash. 98125.

AUXILIARY EQUIPMENT

COMPUSERVE, INC.
Interchange

Compuserve, Inc. has announced Interchange, a private videotex information service for corporations and government agencies.

Information is presented through a structure of menus pages. By choosing among the options presented, users can locate, retrieve and respond to the information of interest.

Examples of applications include office project scheduling, job listings, training programs, dissemination of high-level management directives, policies and procedures, order entry functions and newsletters. Product line price revisions, reporting policies and procedures and sales reporting are also appropriate for the videotex medium, the vendor said.

The price for two-port, unlimited access to Interchange and the company's electronic mail service is $5,000/mo for a yearly commitment, according to the vendor.

Compuserve, 5000 Arlington Centre Blvd., P.O. Box 20212, Columbus, Ohio 43220.

TELEPROCESSING PRODUCTS, INC.
TP-550

Teleprocessing Products, Inc. has announced the TP-550 channel service unit, an interface unit designed for Dataphone Digital Service (DDS) circuits.

The unit supports DDS speeds of 2,400, 4,800 and 9,600 bit/sec. It connects to a data service unit by means of a six-wire interface and to the DDS channel with a four-wire interface, according to a spokesman for the vendor.

The TP-550 channel service unit costs $540, according to the spokesman for the vendor.

Teleprocessing Products, Building 7E, 4365 E. Industrial St., Simi Valley, Calif. 93063.

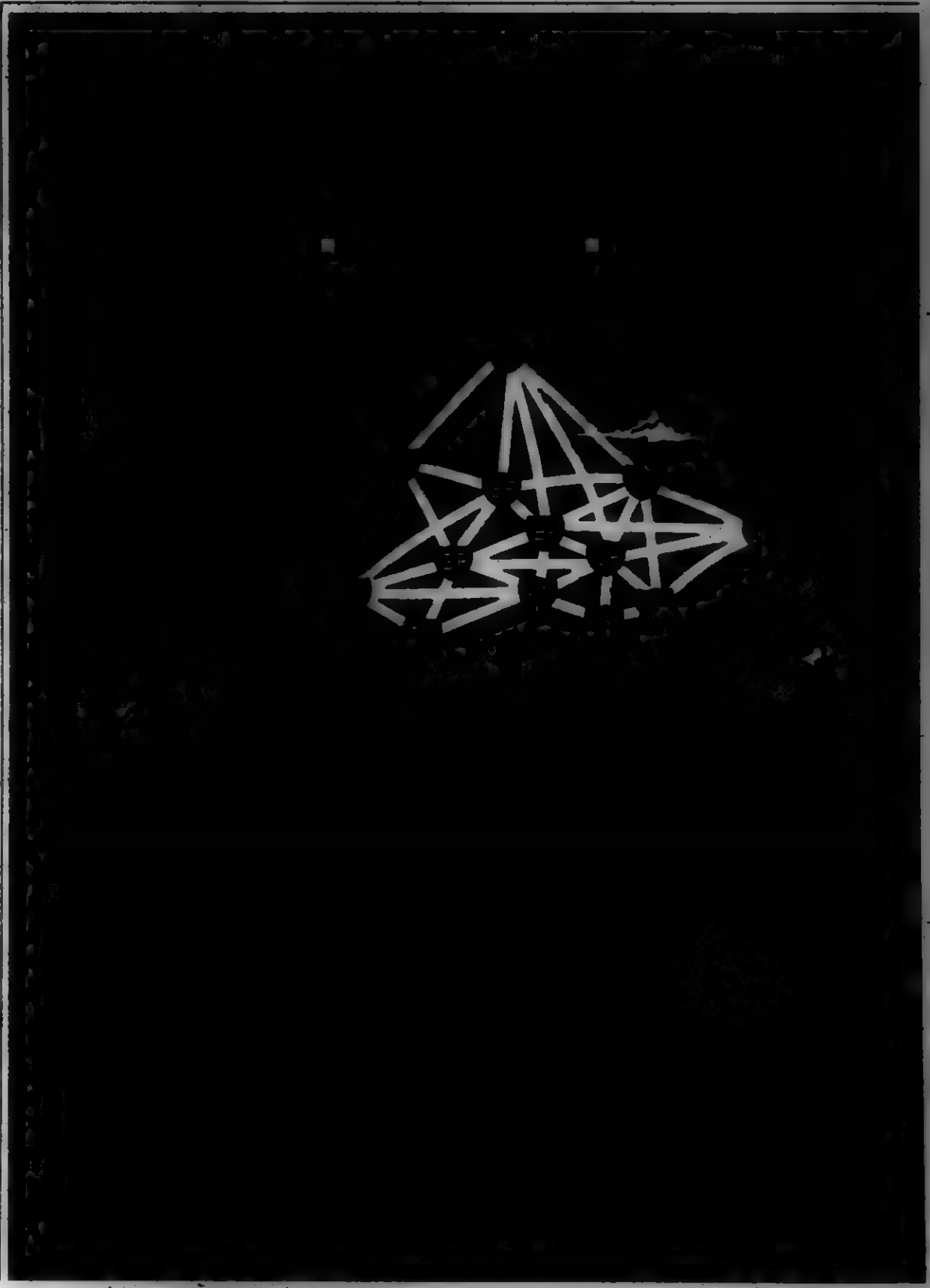
CORPORATION FOR DISTRIBUTED SYSTEMS
COM-80 Communications Interface

Corporation for Distributed Systems has announced the COM-80 Communications Interface for Hewlett-Packard Co. Series 80 personal computers.

The interface enables the user to turn a Series 80 into an application-oriented intelligent terminal and allows it to communicate with a host computer. The interface applications are function-key driven and include 2780/3780 RJE terminal emulation and asynchronous terminal emulation with file transfer capabilities, the vendor said.

In the bisynchronous mode some of the COM-80 capabilities include:

Continued on page 74



COMMUNICATIONS

Continued from page 73

support for standard speeds to 9,600 bit/sec, operation in point-to-point or switched-line environments, operation in conversational mode and automatic conversion of Ascii to Ebcdic.

Among other things, the asynchronous capabilities include standard bit rates to 9,600, according to a spokesman.

The price is $845, the vendor said.

Corporation for Distributed Systems, 15840 Addison Road, Dallas, Texas 75248.

PELORUS, INC.
Pelorus 2000

A new device recently introduced by Pelorus, Inc. speaks to telephone callers with synthesized speech and allows them to enter data to a computer system using the keys on a Touch-Tone phone.

The Pelorus 2000, with its current set of 240 words, can be programmed to ask callers to enter data such as stock numbers and prices. It can also be used for sending telegrams.

The Pelorus 2000 sells for $6,000.

Pelorus, 3624 Marvue Court, Monkton, Md. 21111.

VOICE/DATA COMMUNICATIONS

ISOLATION SYSTEMS
Enigma Secure Communications System

Isolation Systems has introduced the Enigma Secure Communications System, an integrated security and communications package for the IBM Personal Computer.

The system has a network capability of 64 terminals providing for over 2,000 potential individual links over the public telephone system. Security features include hardware-based, high-speed Data Encryption Standard encryption, key management, network organization, access control, tamper detection, authorization hierarchy and dial-back facility.

Isolation Systems, 1691 The Queensway, No. 6, Toronto, Ont. M8Z 5Y4.

For NEC modems, contact your nearest distributor:

ARIZONA
Zeus Distributors
Phoenix, (602) 263-6022

CALIFORNIA
A Datacom Solution
Cypress, (714) 827-9480

Davis & Hanley, Inc.
Hayward, (415) 782-7575

Western Data Group
Walnut Creek, (415) 938-9582

COLORADO
The Hall Company
Littleton, (303) 790-4160

Martec Association
Englewood, (303) 779-8151

FLORIDA
Networks, Inc.
Miami Lakes, (305) 822-6750

GEORGIA
X Point Corporation
Norcross, (404) 446-2764

HAWAII
Data Management Association
Honolulu, (808) 531-5136

IDAHO
Alster Communications
Boise, (208) 362-1272

ILLINOIS
Interbusiness Corporation
Wheeling, (312) 459-8866

MASSACHUSETTS
CSI Systems, Inc.
Lexington, (617) 863-0525

MINNESOTA
R-Com
Minnetonka, (612) 474-3449

NEW JERSEY
Consolidated Data Systems, Ltd.
Bogota, (201) 487-7737

Friedman Associates, Inc.
Union, (201) 964-6200

TRD Distributors
Marcharaville, (609) 354-1315

NEW YORK
J.F Jordan Associates
Huntington, (516) 271-9478

CSI Systems Inc.
New York, N.Y. (518) 389-0816

OHIO
Delta Products
Euclid, (216) 731-3537

Gerhard & Associates
Columbus, (614) 488-9753

PENNSYLVANIA
American Datacomm, Inc.
Pittsburgh, (412) 381-1600

W.J. Whaley Associates
Newtown, (215) 539-1217

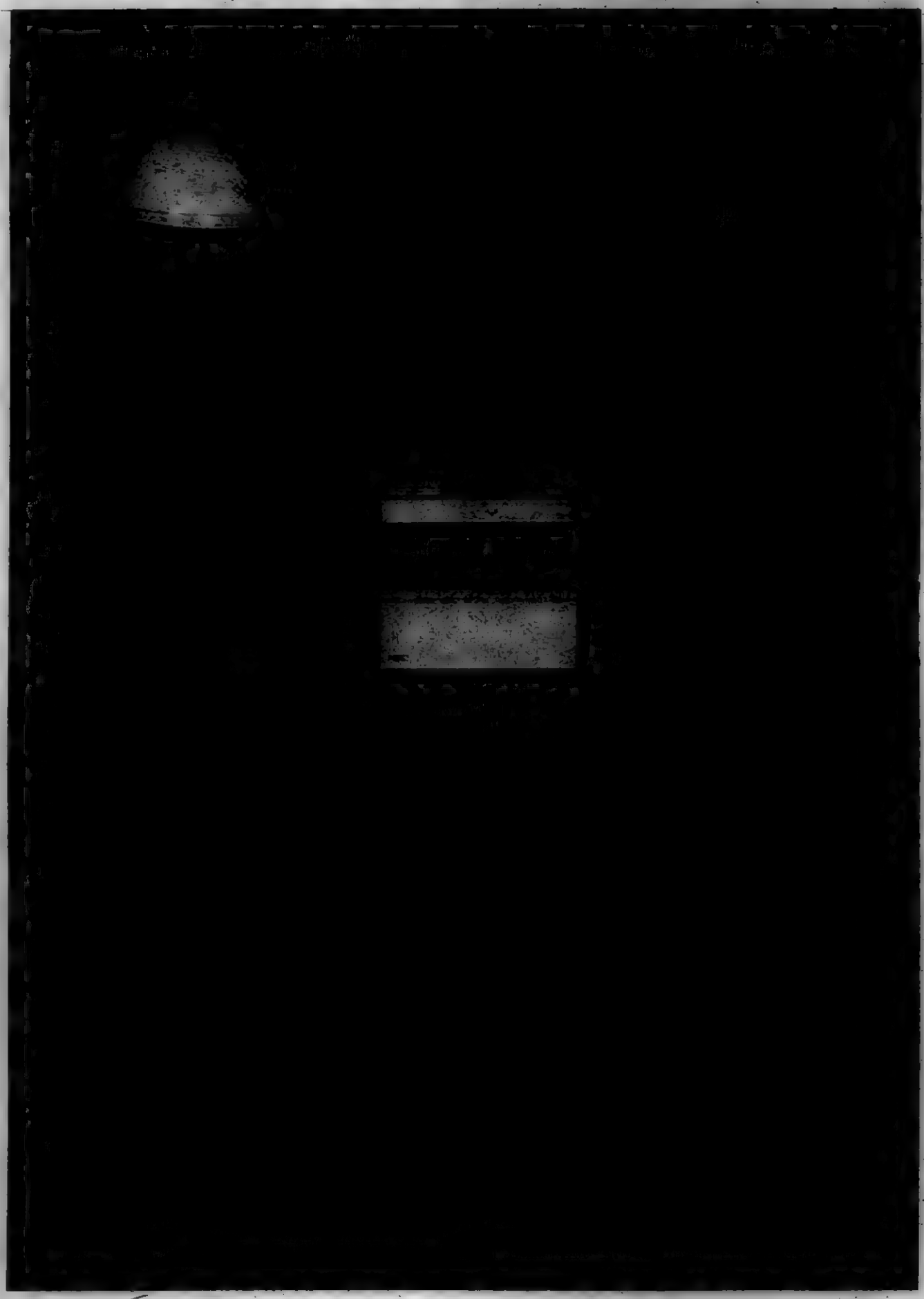
PUERTO RICO
Codecom
San Juan, (809) 781-9797

TEXAS
The Thorson Company
Austin, (512) 451-7527

The Thorson Company
Dallas, (214) 233-5744

The Thorson Company
Houston, (713) 771-3504

NEC
NEC America, Inc.
Data Communications Products



IN DEPTH

ILLUSTRATION BY T.M. BARRETT

A tale of hope for anyone. . .

Lost in the software forest primeval

By Donald V. Steward

Once upon a time, programmers needed only flowcharts to find their way through the programming forests, for indeed the forests were small and they could see out in most directions. But as the forests got bigger and thicker, they lost their ways, wandering endlessly through the GOTOs, trying to remember where they came from. And the forests were filled with mutterings of, "We're 99% through the forest. Surely the next turn will lead us out into the light." And those who waited wrung their hands. And systems were late and their costs were outrageous. And nothing could be done. For sending more people into the forest caused more people to be lost in the forest.

Then a wise man said, "Of course you are lost and befuddled. You must put aside your foolish use of GOTOs, for they will mislead and confuse you." And someone remembered that a psychologist had once said, "I have found that people can only work with a very little amount of memory at a time." And someone said, "Yes, if

The wise men of systems analysis appear to go in different directions. Which one should project developers follow? A consultant takes a little from the different approaches and says, "It's so much simpler now."

you look at the whole forest, then a piece, and then a piece of that piece, you will finally be able to see the trees for the forest, yet you will only need a little amount of memory." Some called this methodology Top-Down, and others called it Successive Refinement or Hierarchical. It was shown that you could always write programs this way, and this way was called Structured Programming. And many people put "Structured" in the titles of their books and sold many copies, for indeed, Structured was good.

Now if Structured was good for programs, then surely it must be good for systems. So a wise man took his Data Flow Diagramming methods and called them Structured Systems Requirements, and he went throughout the country teaching all who would listen. And another wise man, hearing of a marvelous method from a faraway country, developed the Warnier-Orr diagram and called it Structured Systems Design, and he too went throughout the country, also teaching all who would listen. Other wise men looked at data flow between modules and called it "coupling" and said too much of it is bad; they looked at data flow within modules and called it "cohesion" and said it was good. And they showed how modules built this way were easy to program and maintain. And they called this Structured Program Design.

Now the wise men all agreed and said to the systems analyst, "Keep it simple" and "Do it top-down so your customer can review what you have done and tell you that you are doing it all wrong. And this is good because it saves you from building great buildings that fall down because they are built on foundations of sand." But to keep it simple, they said, "You cannot show this, or cannot show that." And so the customer saw and he said, "You have not shown this, and I don't think you understand what I want." And the programmer saw and said, "You have not shown that, and I don't know how to do it." And so both were confused. So the analyst couldn't go top down from the top to the down without cheating on the rules or changing the way the system was described.

Some wise men said, "We have shown other people how to use computers. Why is it we never use them ourselves?" So they developed ways to use computers to help do systems development. But these systems became very complicated and not many people knew how to use them. So they were used only by big companies.

And so there were many wise men. And they all said "Structured this" or "Structured that." And it was found that their methods were good, and programmers could always find their way through the forests. Well, almost always. So the followers of these wise men were happy. But when you followed one wise man it was hard to follow the other wise men too, for they often appeared to lead in different directions. And so programmers again became befuddled.

And college professors said, "We have the responsibility to show our students the true path," but they don't know which path was the true path. Some of their students go into a world led by one of these wise men, and others go into different worlds led by different wise men. And even some go into worlds where flowcharts still reign. And so the professors had their students buy many books.

And then a consultant and professor, hearing all this, said, "I think I understand what these wise men are all trying to say." He took a little here and a little there; he changed this and changed that and said, "I think it all fits together now. And it looks so much simpler."

And thus we leave this tale to enter the real world of systems development.

The tools we will describe are a compatible set. Each tool will be derived from one of the conventional tools, but will be modified and extended to make it more powerful, simpler to use and compatible with the other tools in the set. Among the conventional methods drawn from are Warnier-Orr methodology (K.T. Orr, *Structured Requirements Specification*), data flow diagramming (T. DeMarco, *Structured Analysis and System Specification*) and structured design (E. Yourdon and L.L. Constantine, *Structured Design: Fundamentals of a Discipline of Computer Systems Design*).

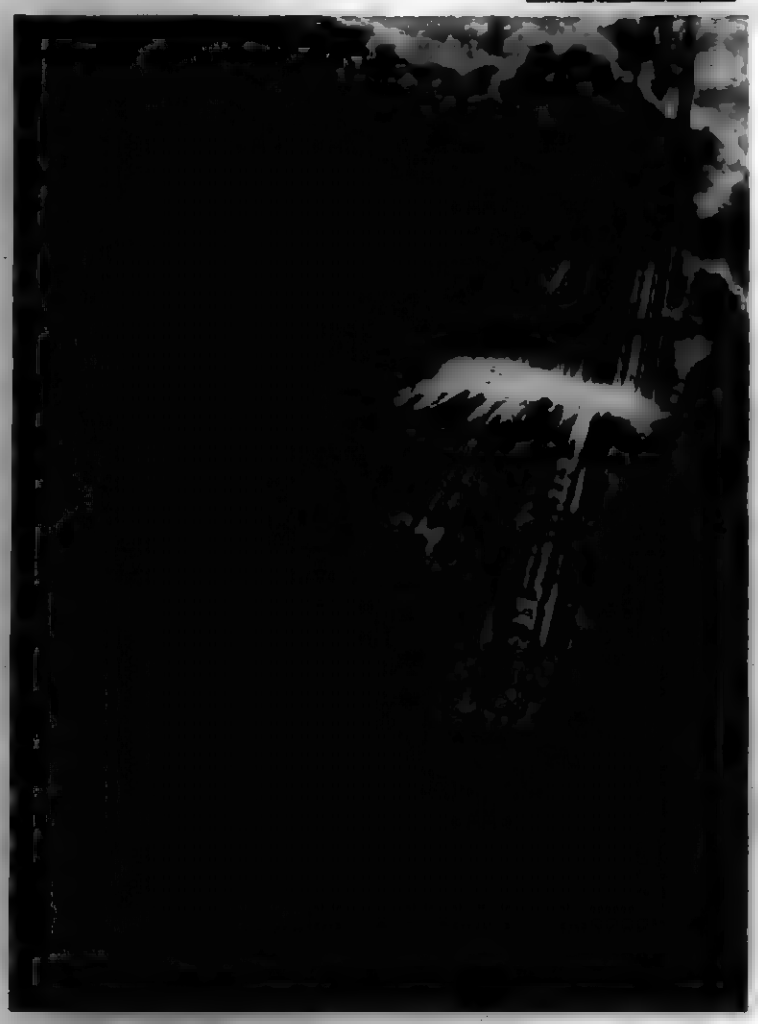
Trees

The Tree is derived from the Warnier-Orr diagram. But by using a Tree, it is possible to work with one system from the very top level at which the customer sees and understands what he wants done, down through several levels of detail, until enough logic and detail have been added that the computer program can be generated mechanically.

If you watch how people use Warnier-Orr diagrams, you will see that they violate the rules. Many of the rules for Trees are merely a formalization of this cheating.

It will also be shown how the Tree

NCR



From the cutting edge
of NCR software engineering comes
NCR/SNA Systems Network Architecture

If you are a computer manufacturer, or an OEM, there are two ways that you can implement SNA or X.25 on your systems:

- Do it yourself.
- Call NCR.

NCR systems engineers have developed portable communication products which can be easily implemented on a variety of processors and operating systems. These products allow for SNA communications, SNA network management and communication using X.25. Many of the products are immediately available, and could be ported onto most processors with minimum effort. And that's not all. NCR/SNA is backed by the resources and experience of an international company with a long background in data processing, and with the engineering technology that will keep it among the leaders.

In 1984, NCR is 100 years young. If you are going to make a major investment in a strategic product, you'll want the innovative technology and service for which NCR has long been famous.

If you are a computer manufacturer or an OEM, and would like more information contact:

NCR Corporation
11010 Torreyana Road
San Diego, California 92121
Phone (619) 452-1920

IPCP opens and closes CICS files
using Batch JCL.
✓many other CSMT/CEMT functions
✓eliminate PAUSE statements
✓free 30-day trial period
✓$1250 one-time or $83 month

sds
A Division of J.W. Lamps, Inc.
8401 University Avenue N.E., Suite 308
Minneapolis, MN 55432
(612) 571-8000

can represent the control of parallel operations and how the data flow in the Tree can be revealed to help in developing the structured design of the modules.

Two-entity data flow diagrams

Our two-entity data flow diagram is a variation of the conventional data flow diagram.

Both use the same hierarchical methods for developing a system top down. But in using a two-entity data flow diagram, it is possible, where appropriate, to show the control at the greater levels of detail. Where this detail may be confusing, it can be left off.

Because we can show the data flow in a Tree and show the control in a data flow diagram — and because both can show parallel or unordered operations — it is possible to translate between one and the other, showing that the two methods are completely compatible.

Data structure matrices

The two-entity data flow diagram can be represented by a matrix, related to the Langefors matrix method. Then, combined with a data element dictionary, it forms a data structure matrix.

Using the data structure matrix, it is possible to analyze the system to see the effects of changes, to obtain the sizes of data stores, volumes of data flows, frequencies and timing of the execution of modules and the critical path timing of transactions through the system.

The data flow matrix can be represented in a data base, making it possible to do these analyses on the computer. In addition, all the current information is simultaneously available to anyone with access to the data base.

Top-down development

All these methods depend upon the idea of a hierarchy. A system that can be represented as a hierarchy can be developed top-down.

A hierarchy is like a set of boxes nested inside each other (see Figure 1). Each box has on its top an overall description of what is inside or what is to be done with what is inside. The details inside can only be seen by opening the box. As you look at one box, you do not have to worry about the details inside that box or about any of the other boxes.

Developing a system top-down involves defining the outer boxes first, then the inner boxes. The outer boxes describe what needs to be done. The inner boxes describe how to accomplish it.

The usual form of flowcharts is not very useful in this mode of thinking. They cannot generally be understood in a succession of chunks, each small enough to be mentally digestible. GOTOs can also do violence to this form of thinking by taking you from hither to yon without any underlying structure.

How do we represent such a hierarchical structure? By a tree. The branching structure of a tree corresponds to the hierarchical nesting of structures within other structures. (The Tree and some other ways of showing nesting are shown in Figure 1.)

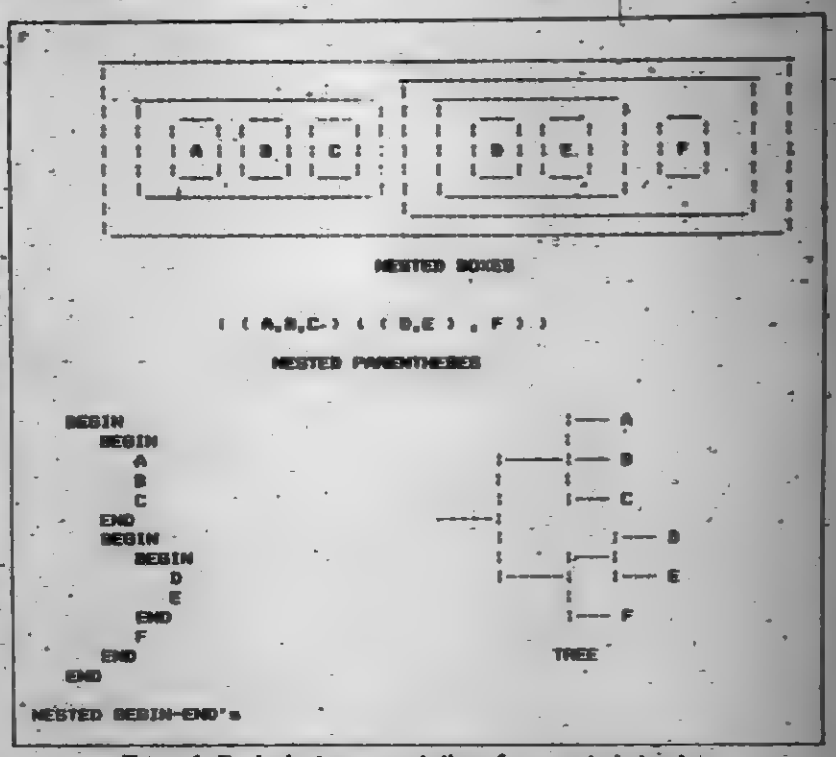


Figure 1. Equivalent representations for a nested structure

Programs as Trees

The Tree can be put to practical use with just the following rules, an elementary knowledge of structured programming, paper, pencil and a ruler. (The Warnier-Orr diagram has an advantage to its author because he can sell you a template to make the parentheses. Unfortunately, the author of the Tree probably wouldn't make much money selling you a straight edge.)

Any structured program can be represented as a Tree. The rules for a Tree are very simple. (You may wish to look at Figure 2 as you read these rules.)

1. The execution of the program begins and ends at the root. We refer

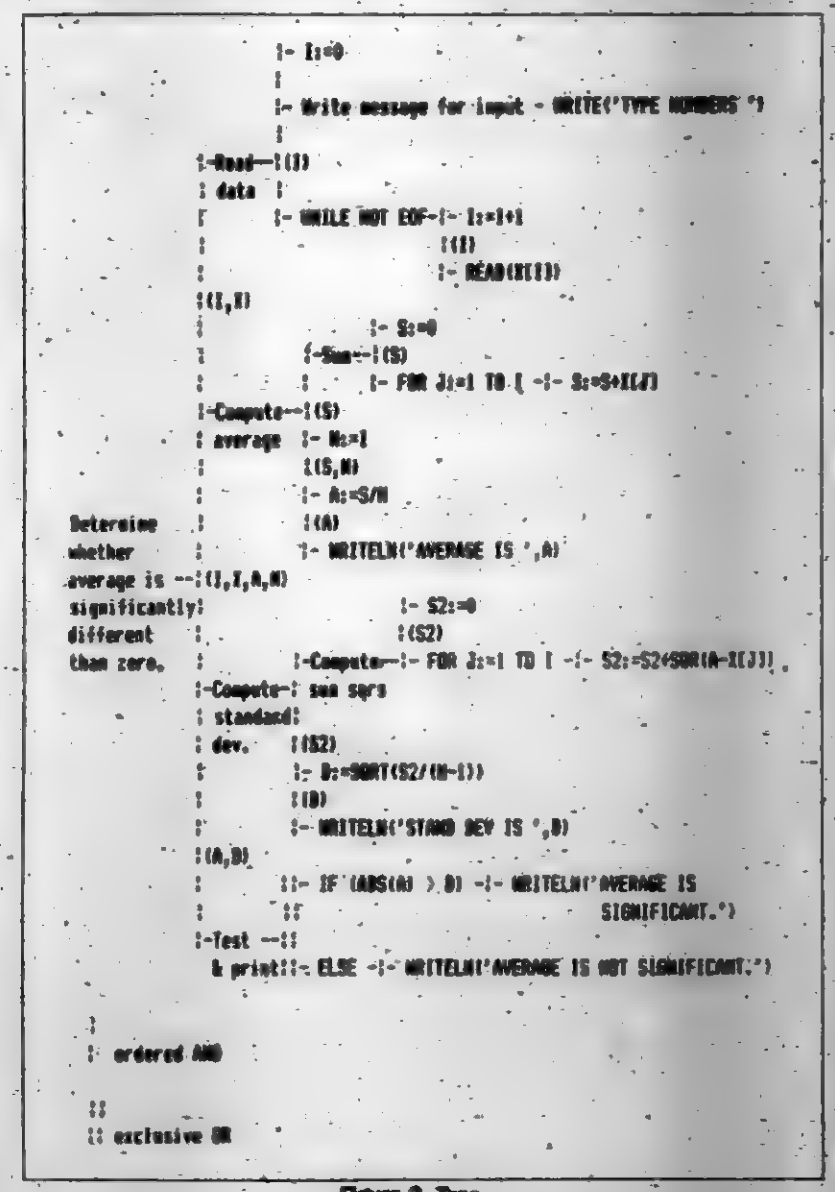
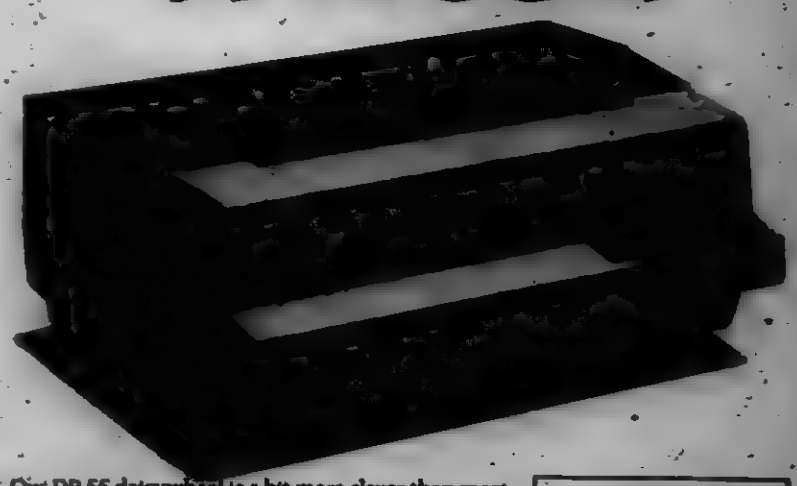
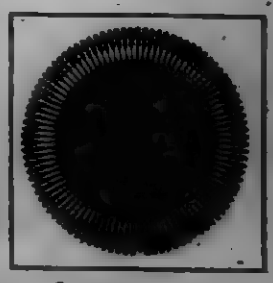


Figure 2. Tree

Brighter writer.



Our DP-55 datasywheel is a bit more clever than most. A digital status display tells you what it's doing as it prints, and how you can help when it doesn't. It can save you time and money, and that's just plain smart. Call your printer distributor. Or contact Dataproducts at (213) 887-3924, 6200 Canoga Avenue, Woodland Hills, CA 91365. In Europe, 136-138 High Street, Egham, Surrey, TW 20 9HL England.



Dataproducts Daisywheel Printers

IN DEPTH/TALE OF HOPE

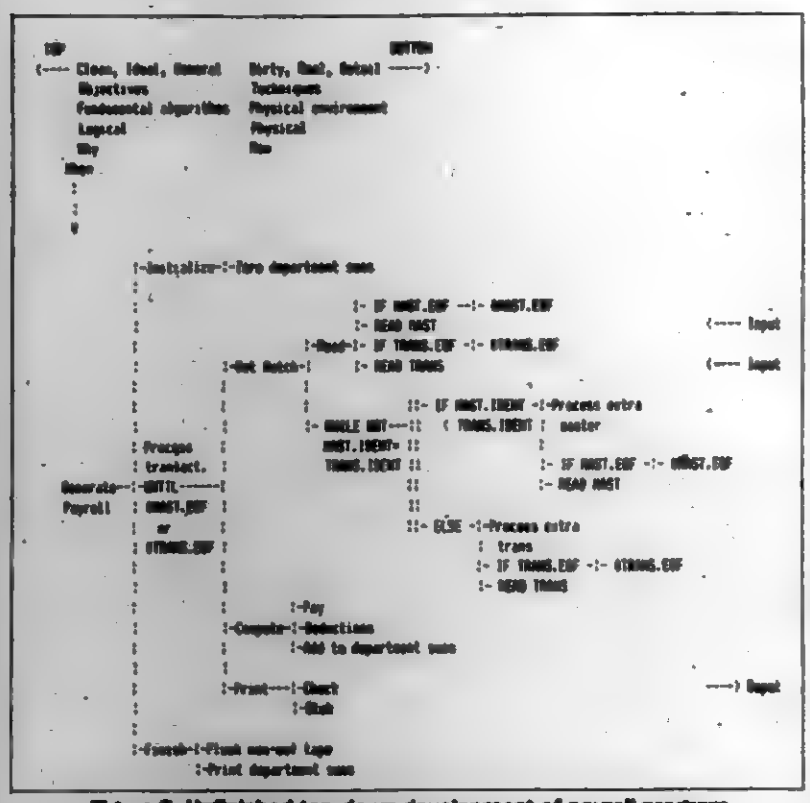


Figure 3. Unfinished top-down development of payroll program

to the root as the top of the Tree, but it is actually drawn at the left of the page. The root contains a general description of what the program does. Putting the "top" to the left and "bottom" to the right makes it easier to write text on the branches.

2. The vertical lines are called limbs, the horizontal lines, branches. The branches off the same vertical limb are executed in sequence, top to bottom.

3. The execution of a branch is completed once the subtree entered through that branch is completed. We may think of control as entering and exiting the subtree through the branch.

4. A branch may have on it a remark, a control statement or both. A remark describes what the subtree entered through that branch is to do. A control statement tells the conditions under which the branch is to be entered or how the subtree beyond is to be iterated.

5. The control statements are consistent with those used in structured programming languages: "IF condition," "WHILE condition" and "FOR variable = expression1 TO expression2." They control the execution of the subtree entered through that branch.

6. Remarks are written in capitals and lower case. Control and executable statements are written in all capitals.

7. A double limb is used to show that the branches off that limb are mutually exclusive; that is, at most one of these branches is executed. This structure is used to represent IF_THEN_ELSE and CASE.

8. A wiggly limb is used to show that the branches off that limb may be executed in parallel, or in any order.

9. The end branches, called leaves, are the executable statements, such as READ, WRITE and Assignment (that is, variable = expression).

10. A procedure call is shown on a leaf by the name of the procedure in capitals. A procedure can be represented by a Tree, with the procedure name at the root.

11. Recursion is shown by a call to a procedure within a procedure of the same name.

These rules are illustrated by the Tree in Figure 2.

Has the GOTO gone forever?

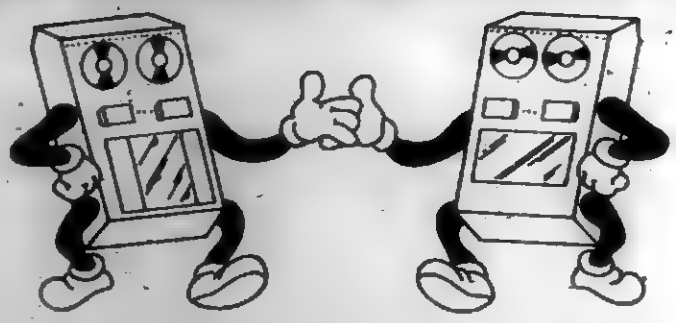
The GOTO has been hard to eliminate. Even Pascal has a GOTO for those few times when they are hard to avoid without introducing unnecessary complexity. But the Tree is a pure hierarchical form. To make the Tree work well, we must eliminate the GOTO forever. It is our claim that the "UNTIL #event" does precisely that.

The "UNTIL #event" is written on a branch. It causes the subtree entered by that branch to be iterated until the event occurs, at which time the subtree is immediately exited through the UNTIL branch. (By convention, the event name starts with #.) The event can be located anywhere within the subtree entered through the UNTIL branch, any number of levels beyond (see Figure 3.)

The "UNTIL #event" is not yet a standard structured language construct, so it must be simulated in these standard structured languages using a GOTO. It is our claim that the simulation of an "UNTIL #event" is the only time that a GOTO is ever needed, and if the language had the "UNTIL #event" construct implemented, no GOTO would ever be needed, nor would one have to write clumsy code to avoid it.

Note that the "UNTIL #event" acts like a "come from," showing where the control transfers when the event occurs. This allows an exit, not just to the next higher level, as in

OUR SWITCHES MAKE YOUR IBM SYSTEMS WORK LIKE A TEAM!



If you have more than one IBM or plug compatible processor, Digital can help you get the most for your hardware investment. Our switches allow you to achieve backup and peripheral configuration flexibility at a fraction of the cost you're probably thinking.

Whether you have two processors or more, Digital has a switch to suit your requirements.

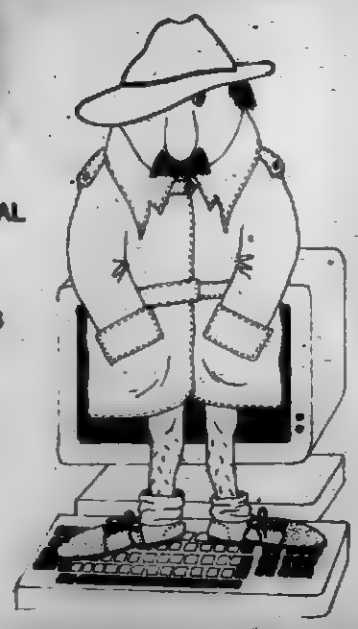
- Model 4101 The lowest priced matrix switch on the market.
- Model 3421 The only manually operated channel switch in the industry.
- Model 3403 A remote controlled channel switch designed for underfloor installation.

DIGITAL CONTROLS

2779 Orchard Run Road • Dayton, Ohio 45449 U.S.A. • (513) 435-5455
Dallas 214-699-0089 New York 201-585-9416

*Registered Trademark

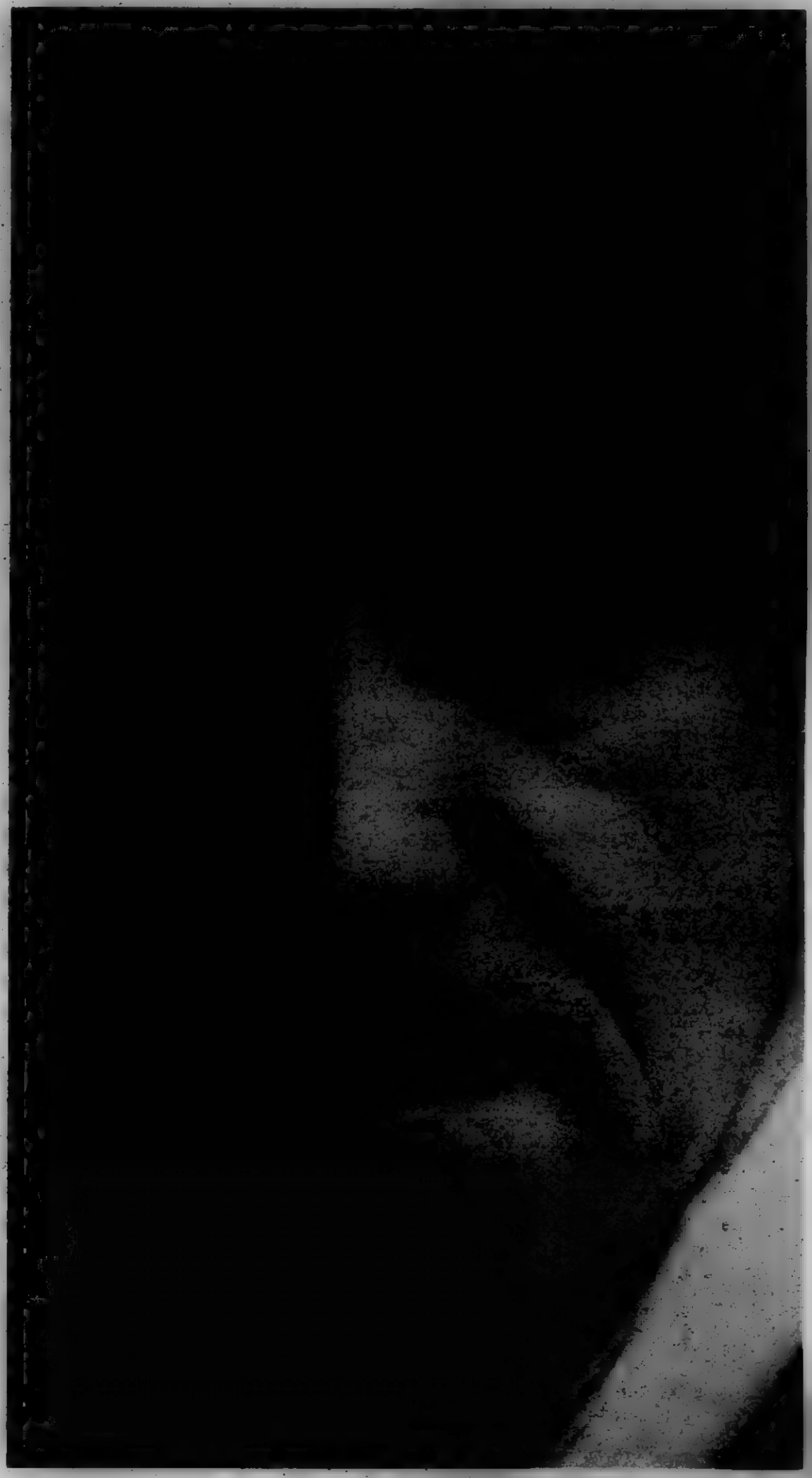
ANNOUNCING
FLASHER



★ ENHANCES OUTPUT RETRIEVAL USING SPF/ISPF
★ MENU SELECTION TO VIEW, DELETE, AND REQUEUE JOBS ON JES SPOOL
★ USES SPF/ISPF BROWSE DIRECTLY AGAINST JOBS IN JES SPOOL
★ 10 – 20 TIMES FASTER RETRIEVAL THAN SPF 3.8
★ WORKS WITH HELD OR NON – HELD DATASETS
★ ALLOWS DISPLAY OF SYSLOG
★ IBM MVS OR MVS/XA WITH JES2 OR JES3
★ FULLY SUPPORTED

SPECIAL PRICES IN EFFECT
FREE 30 DAY TRIAL
JES 2 FPL $2500.
12 MONTH LEASE $99/MO
JES 3 FPL $5500.
12 MONTH LEASE $199/MO

TONE Software Corp.
1735 S. Brookhurst Anaheim, CA 92804 (714) 991-9460 Telex 181592



"When you're talking about putting sophisticated computer systems in the hands of non-computer users, you're talking about a heavy training commitment. And I don't mean a bunch of ten-pound user manuals and a see-you-later. A lot of computer companies forget that."

Wang doesn't.

Because while other computer companies are just getting their foot in the office automation door, Wang has been there.

From day one.

And from the beginning, Wang people have made support and service their number one priority.

WANG

The Office Automation Computer People.

CW88

© 1984 Wang Laboratories, Inc.

```
                        /--PROCEDURE-A(FLAGA)
                        \
   -UNTIL FLAGA or FLAGB--/
                        \
                        /--PROCEDURE-B(FLAGB)
```

Figure 4

some languages, but to any higher level where one is prepared to handle the consequences of the exit. This device is particularly useful for exiting on end-of-file or error conditions (see Figure 3).

The "UNTIL #event" and the wiggly line are useful in handling asynchronous processes. Parallel processes off the wiggly line can be initiated and continued until interrupted by an event or by conditions on one or more events. An exit then occurs through the UNTIL branch (see Figure 4).

Top-down development

Remarks are used in top-down development to describe initially *what* is to be accomplished. Later, the details showing *how* it is to be done are supplied as the Tree is expanded to the right.

Thus, as the Tree develops from left to right, details get resolved. The user can initially use the Tree to express with remarks on the branches what he wants done. The analyst then expands this Tree to further levels of detail, and the programmer expands it further yet, until finally it can be translated mechanically into the source code of a structured language. An advantage of the Tree is that one can undertake this whole top-down process with no need to change the form of representation.

The Tree can be understood by the user, analyst and programmer alike, so that each has some assurance that what the others are doing is consistent with what he is doing. Each can see his own contribution and how it affects and is affected by everyone else's. If a change in the intent of what is to be done occurs at the top of the Tree, corresponding changes are forced on the implementation below. The whole process from conception to program is represented with growing detail, maintaining an integrity that comes from working within only one expanding diagram.

Another example

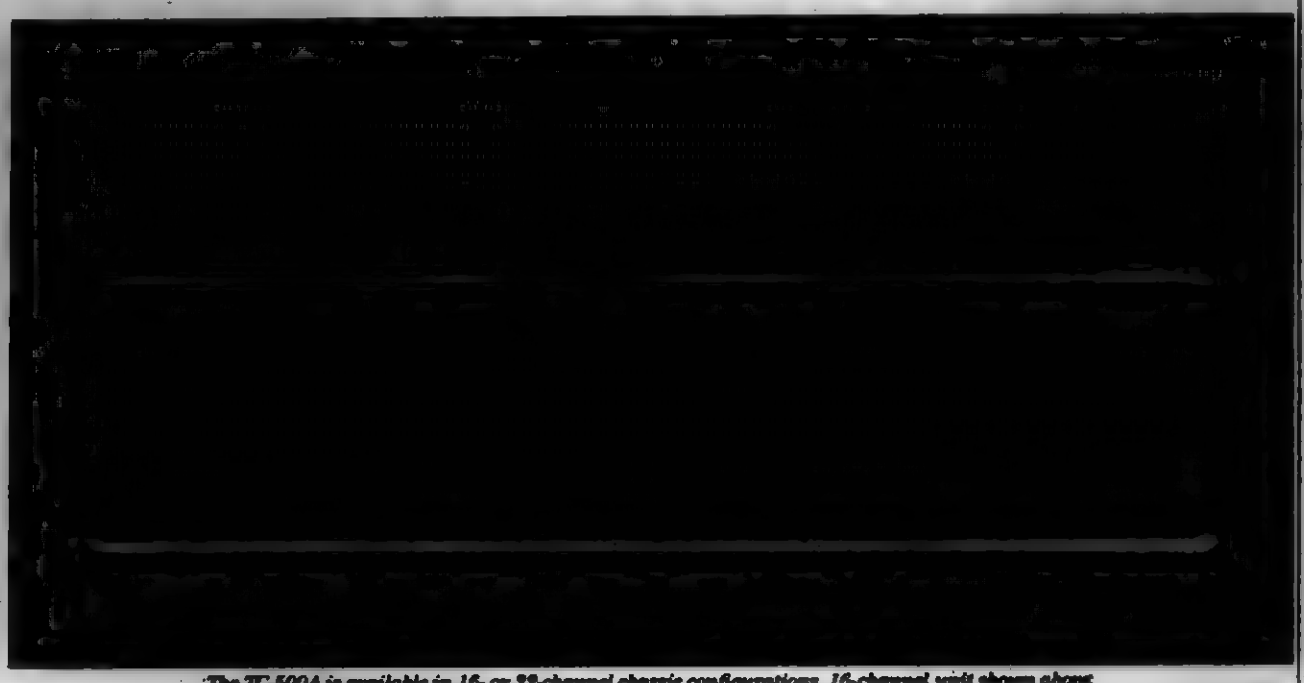
Figure 5 shows the beginning of the development of a payroll program. It shows how the top level of the program can be developed, leaving details until later.

In this example, the root tells us what the program is to do: "generate payroll." Then the branches are filled in to show how to do this. These details may not be known at first, so remarks are inserted showing what is to be accomplished, allowing the details of how it is to be done to be filled in later. The order in which these details are developed is at the convenience of the developers and need not follow the sequence in which the program executes them.

In the payroll program, the basic structure comes from processing matched records from two files until one of the files runs out of records. This process is shown by the UNTIL branch. There is an Initialize and a Finalize branch, but their details are deferred until the completion of the UNTIL subtree is worked out, at which time it is known what to Initialize and what to Finish.

Moving from left to right in the Tree shows *how* to do it, and moving from right to left shows *why* it is done. Moving from top to bottom of the limbs shows *when* it is to be done. Basic algorithms occur toward the top. Adaptations to specific environments occur toward the bottom. Modifications to accommodate the program to a new environment will usually affect only the bottom of the Tree.

Figure 3 also illustrates that branches can be interpreted as states, that is, the set of circumstances that exist at that point in the program. "Get Match" is a state in which a match exists between a transaction record and master record. When the subtree is exited through



The TC-500A is available in 16- or 32-channel chassis configurations. 16-channel unit shown above.

COMDESIGN INTELLIGENT STATISTICAL MULTIPLEXERS:

MORE FEATURES FOR YOUR COMMUNICATIONS DOLLAR

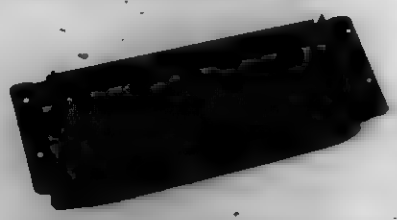
An attractive price and a long list of features make ComDesign's TC-500A Intelligent Statistical Multiplexer a great value. In fact, it would be hard to beat this multiplexer for data concentration, error control and throughput.

But that's not all.

The advanced intelligence of the TC-500A also gives you the complete system control you would expect only from an expensive network processor.

IT'S FLEXIBLE

Compatible with virtually any host computer, the TC-500A can connect up to 32 terminals, printers, personal computers, or other CPU's over one phone line.* With all the performance of a direct connection. Just select the exact channel configuration you need. The TC-500A supports all popular speeds, flow control conventions, and special character formats.



The TC-500A's unique firmware module, Flexpak, permits easy in-the-field software upgrades and access to latest ComDesign software releases.

Free application engineering and support is available to all customers from ComDesign's highly-qualified "data comm doctors."

EASY TO USE

The TC-500A is also surprisingly user-friendly. For starters, you never have to flip DIP switches or figure out complicated codes. As a matter of fact, the TC-500A is menu driven, in plain English. All commands are simply entered via the convenient front panel or through the supervisory CRT.

A NETWORK CONTROL CENTER TOO

The TC-500A's multiple microprocessor based architecture makes it powerful enough for network control and management functions. From either end of the network, you can monitor and test the entire system or its individual components, perform complete reconfiguration or change any operating parameter.

And, should anything ever go wrong, the TC-500A's extensive self-diagnostic capabilities make it easy to pinpoint the problem and effect immediate corrective action.

Add it all up, and we think you will agree, that the TC-500A will give you more for today's *and* tomorrow's communications dollar.

For complete information, write to us at ComDesign, Inc., 751 South Kellogg Ave, Goleta, CA 93117 or better yet call us **toll-free.**

(800) 235-6935

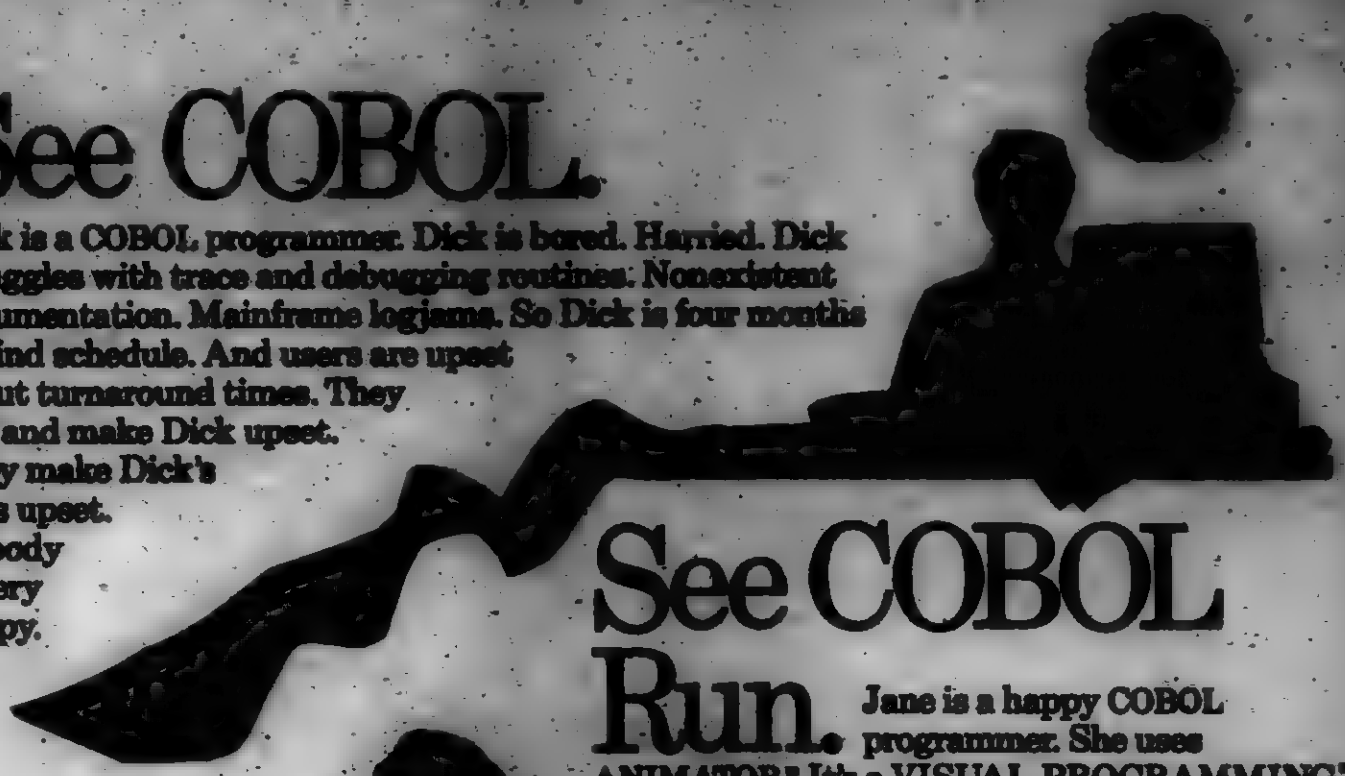
(805) 964-9852 in CA

ComDesign

See us at Dexpo East in Boston, Booth #739.

See COBOL.

Dick is a COBOL programmer. Dick is bored. Harried. Dick struggles with trace and debugging routines. Nonexistent documentation. Mainframe logjams. So Dick is four months behind schedule. And users are upset about turnaround times. They yell and make Dick upset. They make Dick's boss upset. Nobody is very happy.



See COBOL Run.

Jane is a happy COBOL programmer. She uses ANIMATOR.™ It's a VISUAL PROGRAMMING™ aid for MICRO FOCUS™ LEVEL II COBOL.™ It runs on a micro. It makes child's play of mainframe test and maintenance chores.

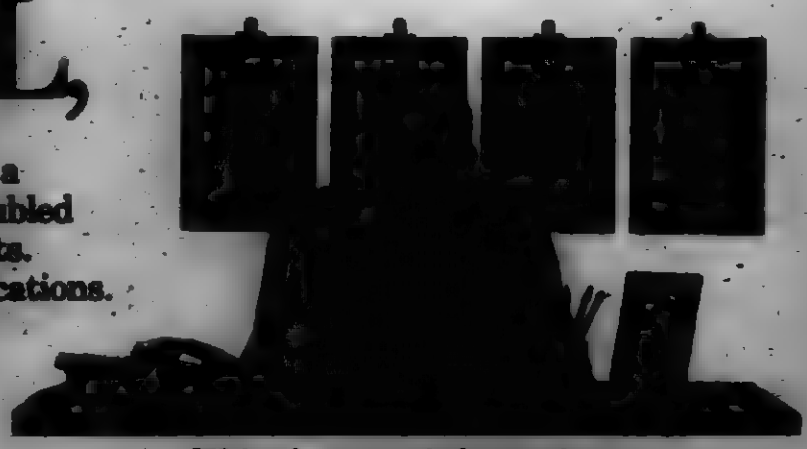
With ANIMATOR Jane sees a picture of the program explaining itself. In live action. In real time. In COBOL source code. ANIMATOR tracks the program's exact execution path. Including subroutine branches.

Jane can have the program run fast. Or slow. Or stop. With one key. This makes it easy to spot problems. Insert fixes. Set breakpoints. Instantly.

Jane's programs sometimes win awards. Yet she always meets schedules. Jane's boss likes this about Jane. Because he doesn't like users to yell at him.

Run, COBOL, Run.

This DP manager got a bonus. Because he doubled productivity. Cleared backlogs. Cut costs. Boosted morale. Produced terrific applications. Quickly. Put control and prestige back into the central DP function. And nobody yells at him anymore. All thanks to ANIMATOR.



See ANIMATOR now.

Let Micro Focus put your DP shop on the fast track.

ANIMATOR runs with MICRO FOCUS LEVEL II COBOL for compatibility with ANSI '74 High Level COBOL implementations. A mainframe-micro communications link is recommended for downloading mainframe programs.

Write for more information.
Or call (415) 856-4161. Right now.

MICRO FOCUS™

2465 East Bayshore Rd., Suite 400, Palo Alto, CA 94303

I'd like more information

Name _____ Title _____

Company _____ Phone _____

Address _____

City _____ State _____ Zip _____

© 1984 Micro Focus Inc. All Rights Reserved.
LEVEL II COBOL, ANIMATOR, VISUAL PROGRAMMING, MICRO FOCUS and the MICRO FOCUS Logo are trademarks of Micro Focus Ltd.

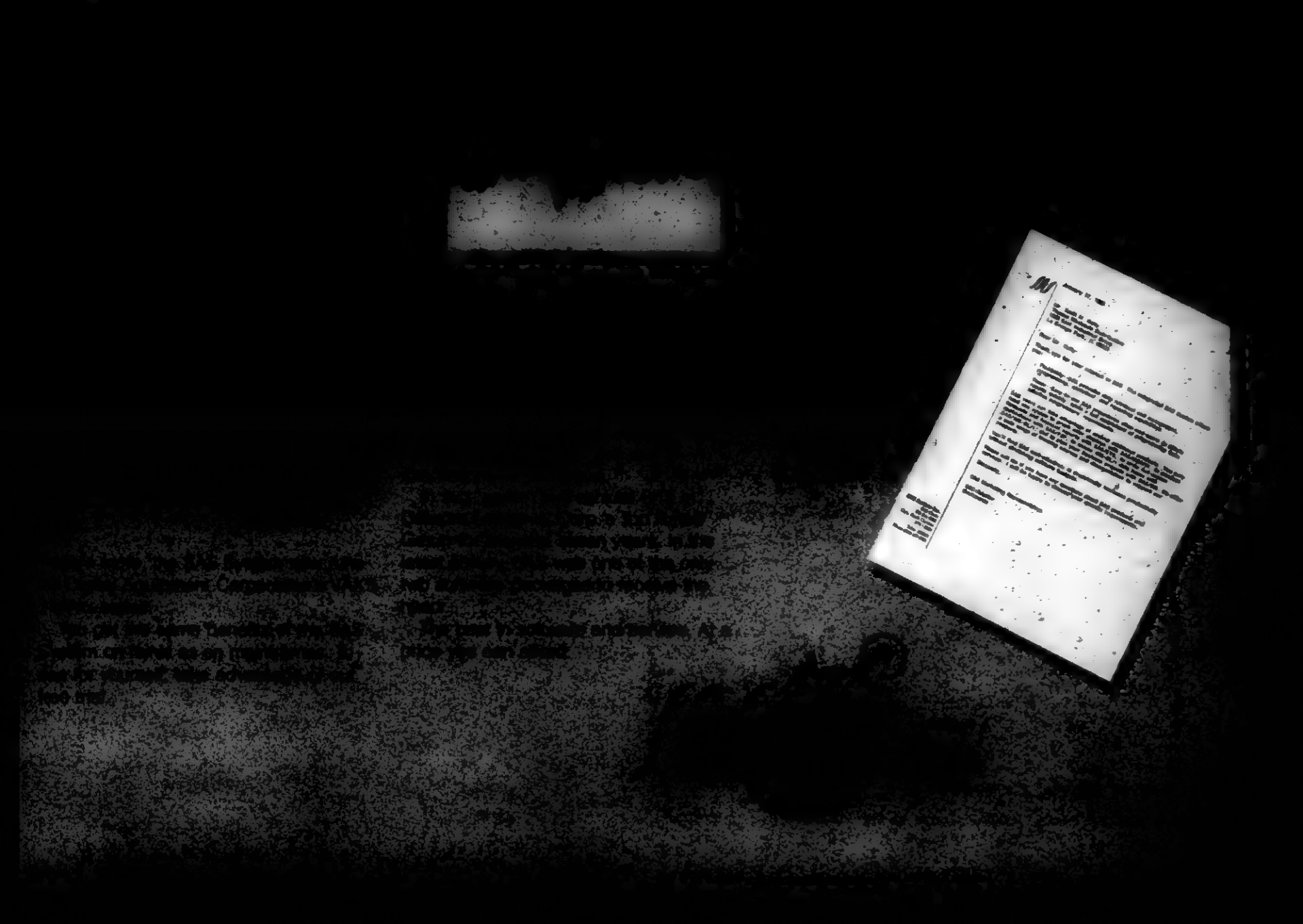
SAS...
Power and Flex
to Meet All You

you can take a big step forward with the SAS System. A library of ready-to-use procedures gives you the power to analyze data without formal training. SAS even provides an on-line help facility. Or you can create your own help program. With a few English-like commands, you can use SAS for data analysis, market research, capacity planning, financial reports, summary statistics, charts, plots, personnel reports and many other jobs.

SAS is the registered trademark of SAS Institute Inc. Cary, NC, USA. SAS/OR, SAS/ETS, SAS/AF, SAS/GRAPH and SAS/FSP are trademarks of SAS Institute Inc. VAX is a trademark of Digital Equipment Corp., Maynard, MA, USA. Copyright © 1985 by SAS Institute Inc.

Available
for
IBM, DG ECLIPSE
and DEC VAX

ibility
r Needs



Once the Tree is fully detailed, it becomes merely a mechanical process to have the Tree translated into a structured language, then compiled into an operating program. This process would not be possible if the Tree had not allowed a level of detail consistent with that required in the final program.

that branch, a match exists. Other parts of the program need to know that this match state exists, but need not know how it was produced. The details of how the match is made occur beyond the branch.

The Tree is like a management structure. At the top, everything is simple. At the bottom is the nitty-gritty. In between, the simple is matched to the nitty-gritty.

The major interfaces are defined at the top. They must be defined before the modules they tie together are designed. Any change in these interfaces will tend to affect everything below. Changes at the bottom are easier to make without affecting other parts.

The top represents the logical principles of, say, an accounts receivable system. The bottom represents the details of how the principles are applied to a particular physical implementation.

Tree editors

Trees become particularly useful when they are developed using a Tree editor. The Tree is then captured in a data structure as it is developed. The editor can then be asked to display or print out just those parts of the Tree or levels of detail that are desired. This capability makes the editor an interactive, living document, a great advantage over a dead piece of paper.

Once the Tree is fully detailed, it becomes merely a mechanical process to have the Tree translated into a structured language, then compiled into an operating program. This process would not be possible if the Tree had not allowed a level of detail consistent with that required in the final program.

Figure 5 shows how a subtree may be displayed on the editor screen. At the top of the screen is shown the sequence of parents leading to the subtree. Below is shown the subtree in indented form. Indented form is more compact for displaying on the screen. The user is in control of what part of the Tree he wishes to display or edit. He can also print out the Tree or any part of it in Tree form on a printer.

Structured design

Structured design focuses on developing programs that have low coupling (low data flow between modules) and high cohesion (parts working intimately together to satisfy a common goal within modules). The modules are our subtrees. Low coupling and high cohesion have been found to contribute to making programs easier to develop and to maintain. Changes in one module can only affect other modules through the data flows. Thus, keeping the number of data flows to a minimum makes it easier to keep track of the consequences of a change.

Data flows down the limbs. Next to the limbs we can show within parentheses the data elements that are produced above and used below that limb segment. (This finally explains the funny information in parentheses you were wondering about in Figure 2.)

The data flows shown on the

```
:-------------------------------------------------------------:
: Determine whether average is significantly different than zero.: Top shows ancestors
: Compute stan. dev.                                           : unindented
:-------------------------------------------------------------:
: Compute sum sqrs                                             :
:   FOR J := 1 TO I                                            : Bottom shows subtree
:     S2 := S2 + SQR( X(J) - A )                               : in indented form
:                                                              :
:                                                              :
```

Figure 5. Tree editor screen

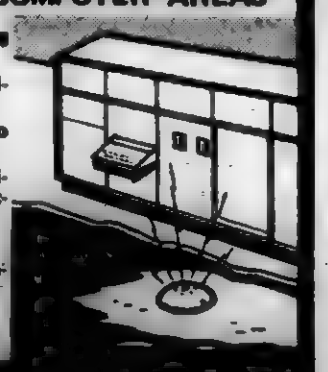
```
                        :- I  := 0
                :-Initialize--:- S  := 0
                :             :- S2 := 0
                :(I,S,S2)
                :
                :- Write message for input - WRITE('TYPE NUMBERS ')
                :
                :- Read data - WHILE NOT EOLN -:- I:=I+1
                :                              :- READ(X(I))
                :(I,S,S2,I)
                :
                :- FOR J:=1 TO I-1 -:- S:=S+X(J)
                :
Determine       :(I,S,S2,I)
whether         :             :- N := I
average is ----:-Compute------:- A := S/N
significantly   : average
different       :
than zero       :(I,N,S2,I,A)
                :
                :-Compute-----:- FOR J:= 1 TO I -:- S2:=S2+SQR(X(J)-A)
                : stand. dev. :(S2)
                :             :- D := SQRT( S2 / (N-1.0) )
                :(A,D)
                :
                :-Test--------:- IF (ABS(A) > D ) -:- OK:=TRUE
                :             :
                :             :- ELSE-------------:- OK:=FALSE
                :(A,D,OK)
                :             :- WRITE('AVERAGE IS ',A)
                :-Print-------:- WRITE('STAND DEVIATION IS ',D)
                :              :
                :              : :- IF OK -:- WRITE('AVERAGE IS
                :              : :                  SIGNIFICANT.')
                :              :-:
                :                :- ELSE-------:- WRITE('AVERAGE IS NOT
                :                                  SIGNIFICANT.')
```

Figure 6. Tree for same problem as Figure 2, poor structure (less cohesion — more coupling)

AVOID DOWNTIME!

WATER *ALERT!*

. . . FOR COMPUTER AREAS



Warns you of water leakage in sub-floor wiring areas.

- Produces a loud, intermittent alarm when activated by presence of water.
- Completely self-contained . . . no wiring, no connections.
- Early water detection (1/64" water film activates alarm) provides maximum time for corrective action.
- 24 hour per day monitoring.
- Options include remote indicator, remote flashing light, and automatic telephone dialer.

8 Models from $69 - $110

Call or write for complete information.

Dorlen Products

DOS/VSE and CICS/VS Frustration?

BIM gets it out of your system.

BIM presents a line of proven programs that maximize your system's capabilities, saving you time, labor and expense. These program products help get the most out of your system and people.

BIM-EDIT — the editor with more than 25 significant features that ICCF can't match.
BIMSPOOL — Prints output in POWER/VSE spooling queue on local or remote 3270 terminal printers. (Received ICP Million Dollar Award 1982).
BIMSPOON — On-Line to Batch Print Spooling. Prints data passed from CICS application programs into the POWER spooling queue.
BIM-PDQ — POWER Dynamic Queuing performance enhancement. Eliminates 85% of the I/O to heavily used POWER queue.
BIM-ODMS — Comprehensive problem analysis and display of operational CICS system.
BIMTEXT — Word processing, document composition system. Create formatted documents from free-form input.
BIMSWAP — Switch local 3270 BTAM terminals between multiple CICS partitions without special hardware or additional ports.
BIMCMPRS — CICS 3270 data compression system. Reduces response time for remote terminals significantly. Available for DB/VS1 and MVS also.
BIMP3270 — Comprehensive CRT screen image print facility. Copy to terminal printers or spool queue for system printer.
BIMSERV — On-line display of library directories and entries, VSAM Catalog entries, disk VTOC's, etc.
BIMDSLOG — Console Message File display. Used by computer operations and programmers.
BIMMONTR — DOS/VSE System Status, Performance Measurement, and POWER Queue display.
BIMDEVC — Displays Logical Unit assignments for physical devices, to resolve operational problems.
BIMSUBMT — On-line Job Edit and Submission facility.

BIM programs are cost-efficient, many less than $900, highest $4000. You can save even more with our group package offerings. Products are available on permanent, annual, or monthly leases, and shipped on a 30-day free trial basis. Product documentation is available on request.

BIM also performs systems programming consulting, with consultants based in Minneapolis and Washington, D.C. Computer time services are also available on our 4331-2 system, on-site or remote.

BIM — BIM MOYLE ASSOCIATES, INC. 612-933-2986
5780 Lincoln Drive Telex 287 993 (BIM UR)
Minneapolis, MN 55436

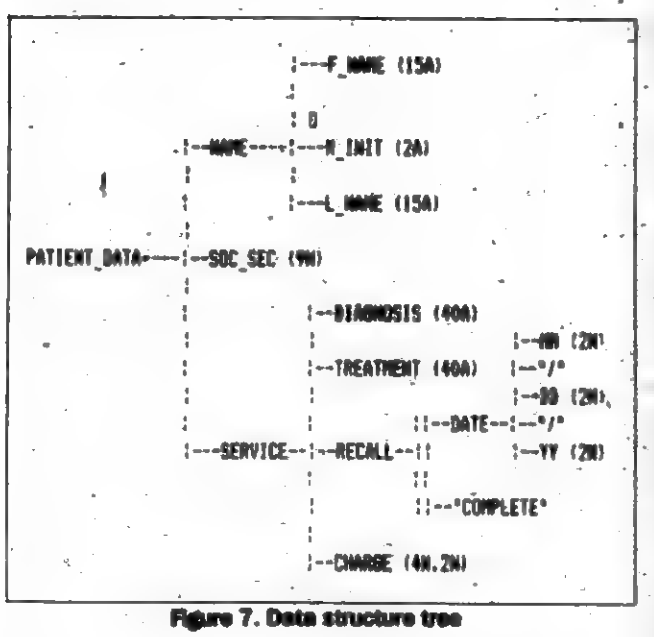


Figure 7. Data structure tree

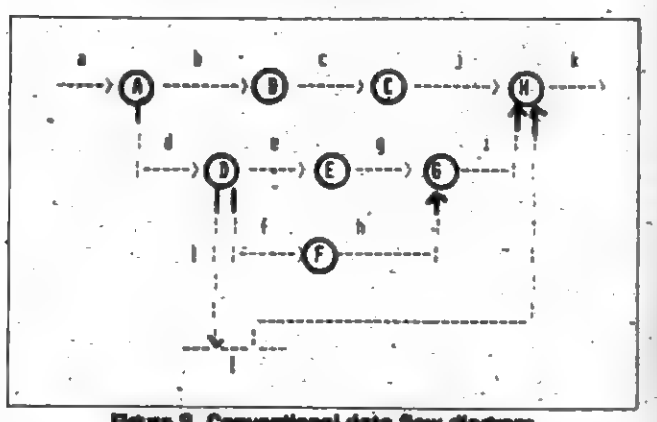


Figure 8. Conventional data flow diagram

limbs of the Tree make the coupling clear. A well-structured program will have a small volume of data flow on the high limbs (to the left), resulting in a low coupling between modules. Low coupling between modules results in high cohesion within the modules. Low coupling and high cohesion are opposite sides of the same coin.

Comparing the two versions of the same program shown in Figures 2 and 6, we can easily see that the program design in Figure 2 is better, having less data flow along the higher limbs, thus implying less coupling and consequently more cohesion.

Using the Tree and the following rules will generally produce good structured program designs:

1. Minimize the data flows on the high limbs.
2. Let the major decisions be made toward the top.
3. Keep the data and operations at the top logically clean and simple. Keep the dirty considerations about data structures on external media at the lower end of the Tree.
4. Introduce extra levels of limbs and branches as needed to keep from having too many branches exiting from any one limb.
5. Generally minimize the distance between where variables are initialized or first produced and where they are used.

Data structures

Note that the Tree helps us relate the control to the data structure to be used. Looking at Figure 4, we see that the "READ MAST" and "READ TRANS" branches deal with two records, each with their own information about an individual. The "GET MATCH" branch implies that the rest of the program may now deal with only one structure having all the necessary information about the same individual from both the master and the transaction records.

Figure 7 shows how a Tree can also be used to represent data structures. Here, O on a branch means "optional," "*" means "any number of times" and quotes enclose literals. Within parentheses is shown the number of numeric digits (N) or the number of alphabetic characters (A). Only one branch is taken off of a double vertical limb.

The Data Tree can be used to develop the Program Tree with the Warnier-Orr methodology. However, this technique will not be covered here.

Data flow diagrams

A data flow diagram shows the flow of data in a system. In a conventional data flow diagram, the bubbles represent processes and the arrows between the bubbles represent the data flows. Data storage is represented by a straight line (see Figure 8).

We have found a variant of the conventional data flow diagram to be very useful. We call this variant the two-entity data flow diagram. Processes are represented by rectangles rather than bubbles, and data flows are represented by ovals rather than labels on the arcs. Since the arcs no longer carry the data flow labels, they can now be used, when appropriate, to carry the conditions under which various data exits a process. A data flow going to more than one process is shown as an oval with multiple exiting arrows, rather than several arrows with the same label as in a conventional data flow diagram. Figure 9

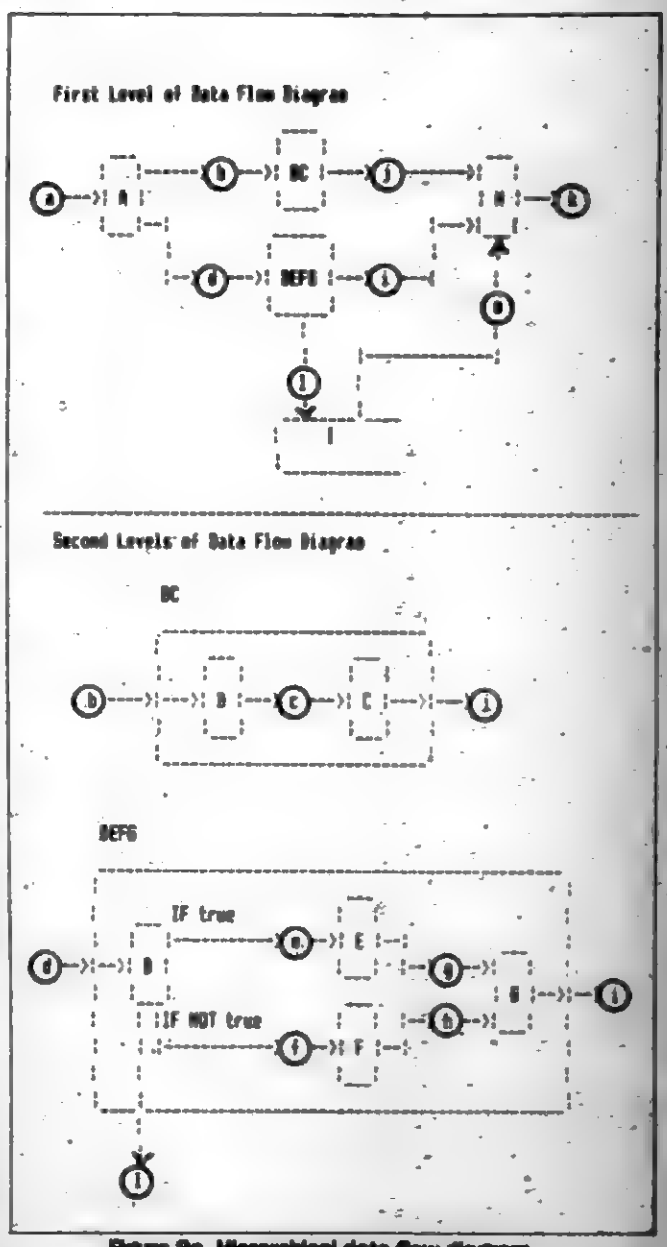


Figure 9a. Hierarchical data flow diagram

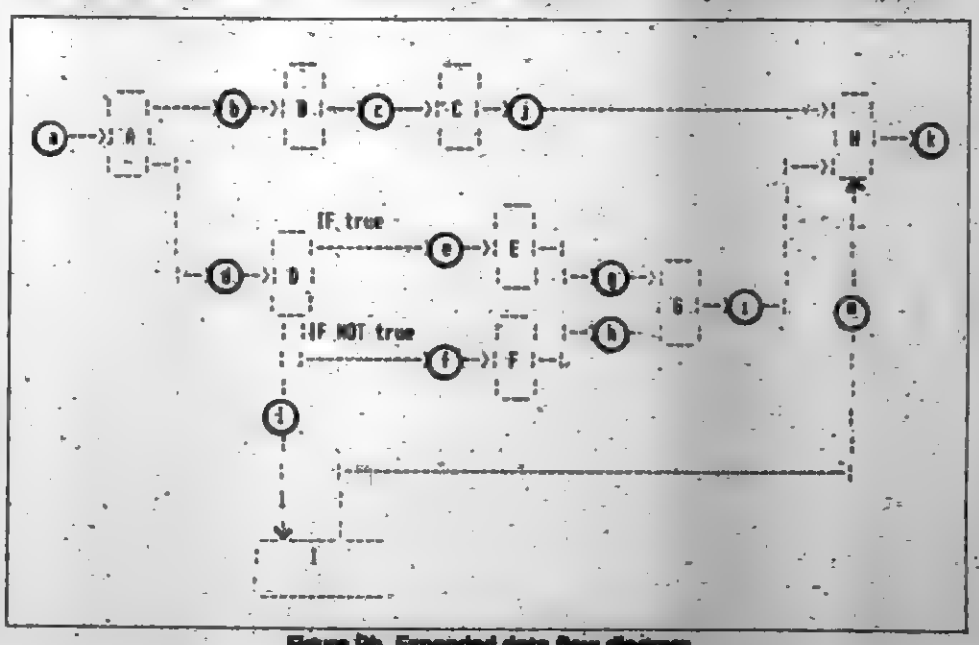


Figure 9b. Expanded data flow diagram

YIPKON
The #1 Name For
WANG
Turnkey Systems
• MOST EXTENSIVE LINE OF SOFTWARE APPLICATIONS FOR WANG, VS, 2200 AND P.C.
• 8088 CO-PROCESSOR/ ADVANCED GRAPHIC BOARD FOR P.C.
• BEST TRADE-IN VALUE FOR YOUR 2200 OR VS TERMINALS WHEN YOU BUY A WANG PC WITH OUR SOFTWARE
• BEST PAYMENT TERMS, SERVICE AND DELIVERY
IMMEDIATE DELIVERY
20/40/80 MB FIXED/REMOVABLE DISK DRIVE FOR WANG PC
©Yipkon Business Systems
An Authorized (WANG) National System House
Headquarters
New York
1 World Trade Center, Suite 7967
New York, NY 10048 (212) 524-7729

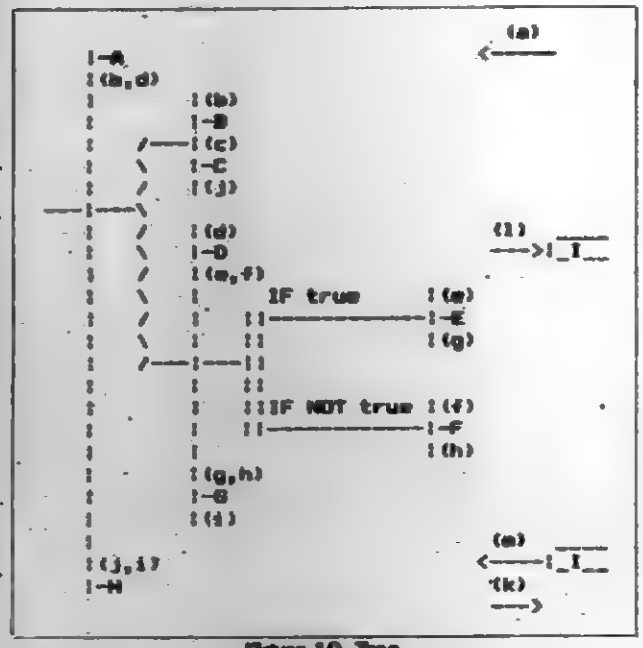


Figure 10. Tree

shows the two-entity data flow diagram corresponding to the conventional data flow diagram in Figure 8.

The two-entity data flow diagram has features that are similar to the Petrie diagram used to represent control systems.

The mathematician will see that processes are like operators; data flows are like operands. A process (operator) takes data flows (operands) as input and produces data flows as output.

Processes and data flows follow the sandwich rules: Between two processes there is a data flow, and between two data flows there is a process. We will see later how this observation makes it possible to represent a two-entity data flow diagram in the form of a matrix.

To be consistent with the sandwich rule, we represent a data storage as an open-ended rectangle. It has the same role in the sandwich as a process. Data can flow between a storage and a process. This approach treats a storage as a process that consumes or produces data, which is consistent with some modern thinking about data base machines.

The diagram can begin or end with either a process or a data flow.

One-page diagram

Data flow diagrams (either conventional or two-entity) for complex systems are developed as hierarchies. The whole system may be represented as a one-page diagram showing just the major parts of the system. Each of these parts is expanded in other diagrams. This expansion goes on until we have rectangles that represent sufficiently primitive processes that we are ready to program them. At this stage, we may wish to translate them to a Tree, an inconvenience we could avoid if we developed the whole system as a Tree. (But some customers prefer to see data flow diagrams rather than Trees.)

Figure 9 illustrates some of the rules for expanding the data flow diagram into more detailed diagrams. Each diagram should be simple enough that it can be easily understood without concern for distributing details. It can usually fit on one 8½-by-11-inch page.

Data flow diagrams (either conventional or two-entity) for complex systems are developed as hierarchies. The whole system may be represented as a one-page diagram showing just the major parts of the system. Each of these parts is expanded in other diagrams. This expansion goes on until we have rectangles that represent sufficiently primitive processes that we are ready to program them.

Each process rectangle in each diagram is numbered and can be expanded into another diagram. The diagram will have the same number as the process rectangle it represents. A decimal number system is sometimes used to keep track of which process is the expansion of which other process. For example, 4.3.6.2 would be process 2 in the diagram expanding 4.3.6.

A diagram that is the expansion of a rectangle has a boundary drawn corresponding to the boundary of that process rectangle in the higher level diagram. Outside this boundary are just the immediate inputs and outputs of this process, as shown in the higher diagram. Within this boundary is the expansion of the process. At each level of expansion, all the inputs and outputs that appear at the higher level must be accounted for. This expansion is repeated until the remaining processes are sufficiently primitive that they need no further expansion to be understood and programmed.

Note that hierarchy is shown in the data flow diagrams by a set of diagrams. In the Tree, the hierarchy is shown naturally as the branching of the Tree.

In the literature developing conventional data flow diagrams, this hierarchical development is referred to as "partitioning." This application of the word, however, is quite contrary to the way

EVERY YEAR WE REMANUFACTURE THOUSANDS OF DISC HEADS PEOPLE ALMOST GAVE UP ON.

There's no need to give up on a crashed disc head. Infoextend can remanufacture most heads and have them perform "like new." Infoextend products are part of Information Magnetics Caribe, the world's largest manufacturer of rigid media disc heads.

We remanufacture heads using the same components, and test with the same equipment as on our new head manufacturing line. The result—a remanufactured head with new head performance, without new head cost. Don't give up on your crashed heads, send them to us. We'll make them perform "like-new."

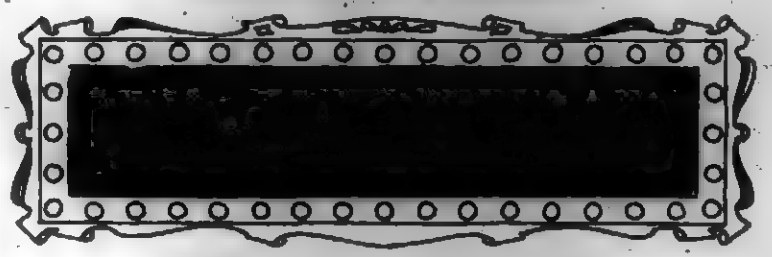
Call (800) 468-2000 for the name of the distributor near you.

INFOEXTEND PRODUCTS

Infoextend Products are made by Information Magnetics Caribe Inc. A subsidiary of CCI.

THE HIGH-TECH KICKOFF FOR '84

Norm DeNardi Presents



Thursday, April 19, 1984 ■ Hours: 12:00 to 6:00 PM
4290 El Camino Real, Palo Alto, CA

Be a part of the industry and meet today's leaders and tomorrow's innovators at the California Computer Show one-day exhibition.

A unique showcase of high technology products specifically designed to attract OEMs, sophisticated end users, dealers, and distributors.

Featuring the latest hardware and software trends, the California Computer Show highlights:

- Computers
- Engineering workstations
- Electrostatic Printers
- Graphics Systems
- Networks
- Disk Systems
- UNIX and other Software Development Tools
- Leading Peripheral Manufacturers

The California Computer Show merges the technical disciplines: corporate issues; technical considerations; industry trends, and promises for the future.

JOIN TODAY'S LEADERS AND TOMORROW'S INNOVATORS AT THE CALIFORNIA COMPUTER SHOW.

Norm De Nardi Enterprises
269 So. San Antonio Rd., Los Altos CA, 94022 (415) 941-8440

DATA FLOW MATRIX

DATA FLOWS

FILE	a	b	c	d	e	f	g	h	i	j	k	l	m	
1													I	O

PROCESS	a	b	c	d	e	f	g	h	i	j	k	l	m	FREQ /DAY	RES	EXTERNAL TRIGGER
A	I	O		O										100	2	Arrival
B		I	O											100	3	
C			I							O				100	1	
D				I	01	02						O		100	4	
E					I		O							.95	1	
F						I		O						5.2		
G							I	I	2	O				100	1	
H								I	3	3	O		I	100	2	

01 = IF true 02 = IF not true

DATA ELEMENT MATRIX

DATA ELEMENTS	DATA FLOWS a	b	c	d	e	f	g	h	i	j	k	l	m	FILES 1
aa 15	X	X	X	X	X	X	X	X	X	X	X	X	X	X
bb 826	X	X	X	X	X	X	X	X	X	X	X			
cc 12		X	X						X	X				
dd 14				X										
ee A10				X	X	X	X	X		X	X	X		X
ff 15								X		X				

Figure 11. Data structure matrix

DATA FLOWS FILES

	a	b	c	d	e	f	g	h	i	j	k	l	m	1
CHAR/REC	33	33	33	35	41	41	41	41	46	33	48	15	15	15
REC/DAY	100	100	100	100	95	5	95	5	100	100	100	100	100	200
K CHAR/D	3.3	3.3	3.3	3.5	3.9	.2	3.9	.2	4.6	3.3	4.8	1.5	1.5	3

Storage

K REC	5
K CHAR	75

TIMING

Process	Duration	Begin	Finish	
A	2	0	2	
B	3	2	5	
C	1	5	6	
D	4	2	6	
E	1	6	7	IF 01
F	2	6	8	IF 02
G	1	7	8	IF 01
H	1	8	9	IF 02
M	2	8	10	IF 01
M	2	9	11	IF 02

Figure 12. Worksheet

"partitioning" is used in other literature, that is, to draw boundaries to separate parts into distinct sets. We prefer the term "detailing" rather than "partitioning" for expanding the processes into more detailed processes. The term "partitioning" would better describe the reverse process, starting with a large diagram and partitioning its parts to develop a higher level diagram.

The data flow diagram emphasizes data flow, but the flow of data has implications on the flow of control.

The Tree emphasizes the flow of control, but the data flows can be shown on the limbs.

By putting information about flow of control in the data flow diagram, and information about flow of data in the Tree, the two are drawn closer together, making it easier to make the transition from one to the other.

Note that it is not necessary to show the control in the data flow diagram, nor the data flow in the Tree. These can be left out for a high-level view where it is felt the added detail would be confusing. But, it is possible to add this information when appropriate without having to go to a different type of diagram.

The most versatile and least expensive printer for your IBM 3270 system isn't an IBM.

It's the ISI 487 that's cutting the cost of IBM on-line printing, delivering features that IBM can't match, and making a lot of people very happy. This plug-compatible, fully integrated (no box!) replacement for the IBM 3287 carries a price tag as low as $3,350 and offers you:

- outstandingly quiet operation
- 200 CPS dot matrix and 50 CPS NLQ printing
- continuous forms and cut sheet handling
- full SDLC/SCS support

For more information about the ISI 487 and our complete line of IBM compatible printers, call, write, or TWX us today!

Interface Systems, Inc.
5855 Interface Drive, Ann Arbor, MI 48103
Telephone (313) 769-5900. TWX 810-223-6058

China Computerworld 电脑世界

The only specialized computer publication written exclusively for the People's Republic of China (PRC).

The PRC is a huge country which now has a rapidly growing installed base of computers. And the future looks very bright for the Chinese EDP market.

Government plans call for extensive use of computers in the PRC's technological modernization, and annual EDP expenditures are expected to grow into the billions of dollars in the 80's.

A good deal of this money will be spent on foreign computer equipment and the purchase decision-makers for this equipment will be using *China Computerworld* to help them choose the products and the companies they need.

China Computerworld is a joint venture of the Fourth Ministry of Machine Building and CW Communications/Inc. Its 50,000 subscribers include the key government officials and computer managers who have EDP purchase decision authority.

China Computerworld is published on the fifth and twentieth of each month. Its tabloid newspaper format gives you a unique opportunity to introduce your products and services to this awakening giant of a marketplace.

CW International Marketing Services Department gives you one-stop advertising service in countries around the world. For more information about *China Computerworld* or any of our other foreign publications, just fill out the coupon below..

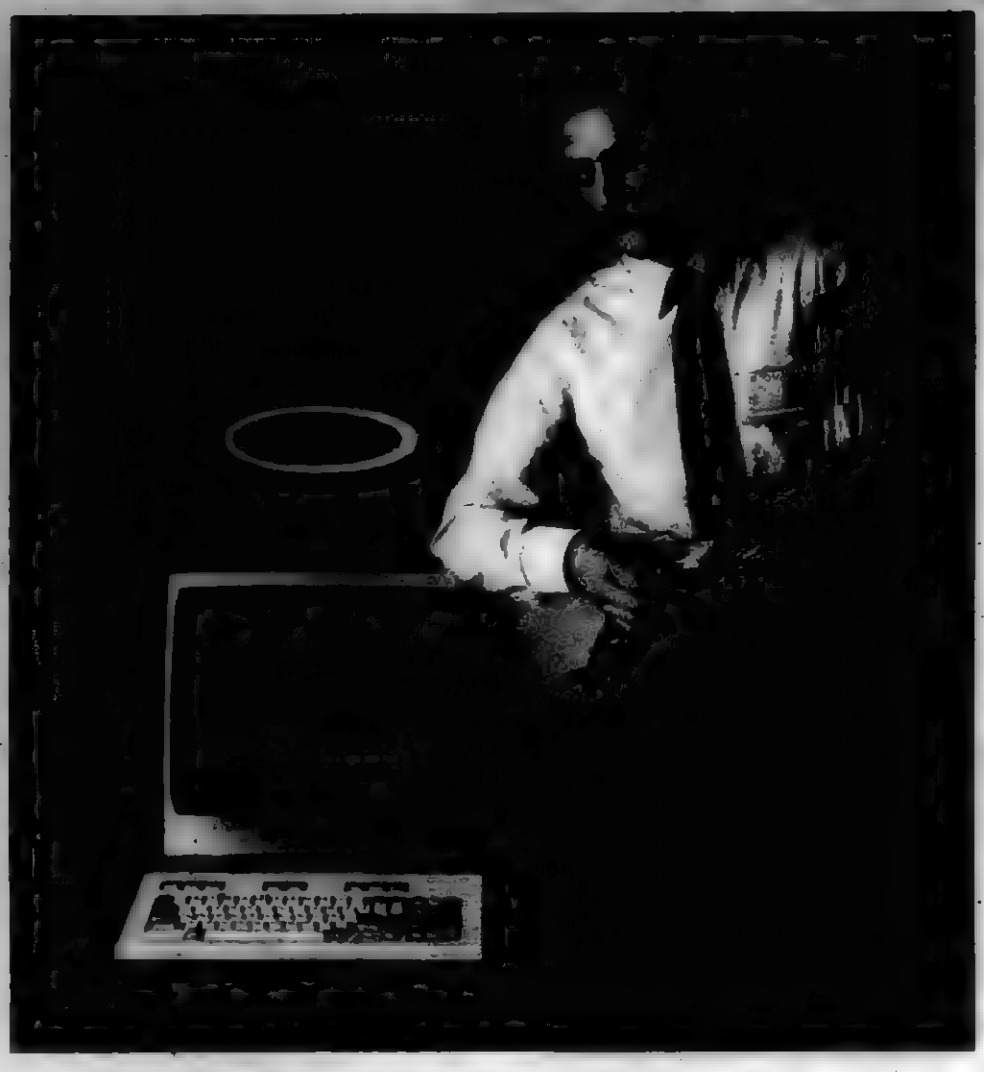
Diana La Muraglia, Manager, International Marketing Services
CW Communications, Inc.
375 Cochituate Road, Box 880, Framingham, MA 01701 • (617) 879-6700

Please send me more information on
☐ *China Computerworld* ☐ Your other foreign publications

Name _____
Title _____
Company _____
Address _____
City _____ State ____ Zip _____

CW COMMUNICATIONS/Framingham, Inc.
Publishers of Computerworld and other leading computer publications around the world.

HOW THE TERMINALS THAT GIVE YOU SO FEW PROBLEMS CAN WIND UP GIVING YOU NONE AT ALL.



While we at Teletype Corporation like to talk about our terminals' remarkable record for reliability, we have to admit that every once in a while you just might have a problem with one.

But if you contract with Teletype's Product Service Organization, getting good service is no problem at all. That's because no one can service our full line of CRTs and teleprinters as well as our service technicians. Each one of them is a company-trained, job tested professional who must continually meet our expectations—and yours.

Help is never more than a phone call away since our technicians are on-call 24 hours a day, 7 days a week. And with our network of 100 offices nationwide, we're able to provide fast response time, even to remote areas. You can contract with us for response times as low as 2 hours, or less, as your needs dictate.

But at Teletype, we feel there's something more important than fast response time. And that's fast restoral. So when our technicians call on you, they'll have the necessary test equipment and original Teletype® parts to get your terminals up and running in no time flat.

We'll even help solve problems before they occur with scheduled preventative maintenance. You can also choose our installation service option that includes everything from getting your terminals on-line to user orientation. It's all a part of our Full Service Maintenance Agreement.

So to keep your problems from becoming big problems, write Teletype Corporation Product Service Organization, 2330 Eastern Ave., Dept. 2800-A Elk Grove Village, IL 60007. Or call toll free at 800-323-4226, ext. 300. (In Illinois, 1 800 942-4192, ext. 300.)

TELETYPE: VALUE SETS US APART.

© 1984, Teletype Corporation.
"Teletype" is a registered trademark and service mark of Teletype Corporation.

AT&T
Teletype Corporation

IN DEPTH/TALE OF HOPE

The data flow matrix pulls a great deal of information about the system together in one place so that it can be analyzed for consistency and completeness. The matrix can be used to trace the effect of a change in a data element through the whole system. The matrix can also be used to make estimates of processing volumes and times.

The data flow diagram may imply that more than one process can go on at one time. In Figure 8, B and C can occur simultaneously with D, E, F and G. When programming with just one CPU, the programmer can make an arbitrary choice of which to do before the other. Modern applications more and more involve multiple control units that allow processes to be done simultaneously.

The relation between the two-entity data flow diagram in Figure 9 and the Tree in Figure 10 (on ID/12) can be readily seen. The processes are represented in the data flow diagram as rectangles and in the Tree as branches. The data flows appear in the data flow diagram as ovals and in the Tree as data flows on the limbs. Parallel processes are shown in the data flow diagram with multiple arcs exiting from the same process and in the Tree with wiggly limbs. Figures 9 and 10 demonstrate the relations between the two.

Note that in a two-entity data flow diagram, conditions can be shown at the exit of the process. This must be shown in the Tree in two steps: as the process followed by the decision, as is shown in Figure 10.

While data flows within the system are shown on the limbs, data flows into and out of the system are shown along branches entering and exiting at the leaves.

Where double or wiggly limbs obscure the data flow in or out of a process, a short limb, called a stub, is added to carry the data flow. For example, the data flows in and out of E, e and g, respectively, are shown on the stub above and below E.

Data flow matrix

We can develop a data flow matrix corresponding to a two-entity data flow diagram. In the matrix, the rows represent processes and the columns represent data flows. We use O's and I's to show where a data flow is the output or input of a process. Figure 11 (on ID/13) shows the data flow matrix for the two-entity data flow diagram shown in Figure 9.

The On's represent the conditions under which various output data flows are produced; for example, in Figure 11 the 01 represents the output under the condition True, the 02 under the condition not True.

The In's show the conditions under which the execution of a process is triggered to start by the presence of input data. If all the inputs are simple I's, then the process is triggered when all the inputs are available. If there are numbered inputs, then the process is triggered when all the inputs of any one number are available. For example, in Figure 11, it shows that G is triggered when it gets either g or h, and H is triggered when it gets both i and j.

The data flow matrix pulls a great deal of information about the system together into one place so that it can be analyzed for consistency and completeness. The matrix can be used to trace the effect of a change in a data element through the whole system. The matrix can also be used to make estimates of processing volumes and times, as discussed below.

We can also represent a data element dictionary as a matrix, called a data element matrix. Let the columns

TSO USERS

Compare these features:

- Up to 50% less overhead than SPF
- Full-Screen Editor (LRECL up to 4096)
- Data Set Manager (Controls TSO files)
- JES Sysout Previewer (Direct from JES Spool)
- File listing facility (LRECL up to 32760)
- Programmable function keys
- Split-Screen facility (Two fully-active screens)
- Customer-defined exit facility (Controls all FSE+ functions)
- FSE+ tuning parameters (Optimize performance)
- Structured menus for new users
- Command oriented for experienced users
- MVS 3.8, SP and XA support
- Free trial period

Call or write for details
Applied Software, Inc. 840 U.S. Highway #1, Suite 280
P.O. Box 13027
North Palm Beach, FL 33408 (305) 626-4818

Who's sold more printers to American business?

Epson.

Actually, we've not only sold more printers to American business, we've sold more printers to America.

Which brings up some very important reasons why Epson is the printer for your business.

Standard equipment.

Virtually every microcomputer made is Epson-compatible. Which means manufacturers make their computers to work with our printers, because Epson printers are not only the world leaders, they're the world standard.

The reason why.

We sell more printers, because we make better printers. Our features are consistently one step ahead of the competition. Our quality and value have never been equalled. And our reliability rates are second to none.

Another reason.

Epson printers are stocked by more computer stores in more places than any other brand. Which means if you ever have a problem—and you probably won't—we'll be there.

Your next printer.

It can be very confusing buying a printer nowadays. But it needn't be. If you want the features, the reliability, the quality, the value, just remember one thing.

Epson.

Number one. And built like it.

EPSON

EPSON AMERICA, INC.
3415 Kashiwa Street
Torrance, California 90505

The Epson FX-100™ can print spreadsheets in correspondence-quality type at 160 characters per second. To see it and the entire line of Epson high-performance printers, call (800) 421-5426 for the dealer in your area. In California, call (213) 539-9140.

Epson is a registered trademark and FX-100 is a trademark of Epson America, Inc.

VM/SP Graphics Users

Tired of playing roulette with your graphics environment?

SAS/GRAPH® and GDDM users can now spool and manage graphic printouts through the ACX-PM™ Printer Manager as if they were normal listings. Remove dependence on operators, decrease printer contention, and increase user control. ACX-PM supports 3287 graphic printers for both text and graphic printing.

ACX

Automotive Computer Extensions, Inc.
5120 Belmont Road, Suite B
Downers Grove, Illinois 60515

or for faster access, (312) 971-1505.

SAS/GRAPH is a trademark of SAS Institute Inc.
©1984 ACX

The worksheet shows the number of characters in each record of a data flow or file (computed from the data structure matrix). The total number of records of a data flow processed per day can be computed by summing the frequencies of all the processes that use that data flow. Each frequency must be multiplied by the percent of the time that process produces this output.

represent data flows and files, and let the rows represent data elements. A mark then shows where a data flow or file contains a specific data element. For each data element, its format and its size in characters are shown (see the lower part of Figure 11).

These two matrices, the data element matrix and the data structure matrix, have been put together by making the data flows in the columns of the data flow matrix and the data element matrix correspond. Together they form the data structure matrix of Figure 11.

Worksheet

Additional information has been added to Figure 11. For each process that is triggered externally, the figure shows what triggers the process and how often it is triggered. For each process, it is shown how long it takes from when a transaction enters the queue for that process until it is completed.

Working from the frequencies of these external triggers and how the data flows within the system trigger processes, the frequencies of all the processes can be computed. (Data flows trigger processes, but data files do not.)

Figure 12 (on ID/13) is a worksheet. The worksheet shows the number of characters in each record of a data flow or file (computed from the data structure matrix).

The total number of records of a data flow processed per day can be computed by summing the frequencies of all the processes that use that data flow. Each frequency must be multiplied by the percent of the time that process produces this output.

For example, if a process is triggered 100 times a day and the condition on the output shows it is produced 5% of the time, then this output is produced five times a day, on the average. (We might also show in the matrix whether each time the process is triggered one record or all the records of the data flow or file are processed. Here we assume only one record is processed.) The timing can be determined by critical path calculations.

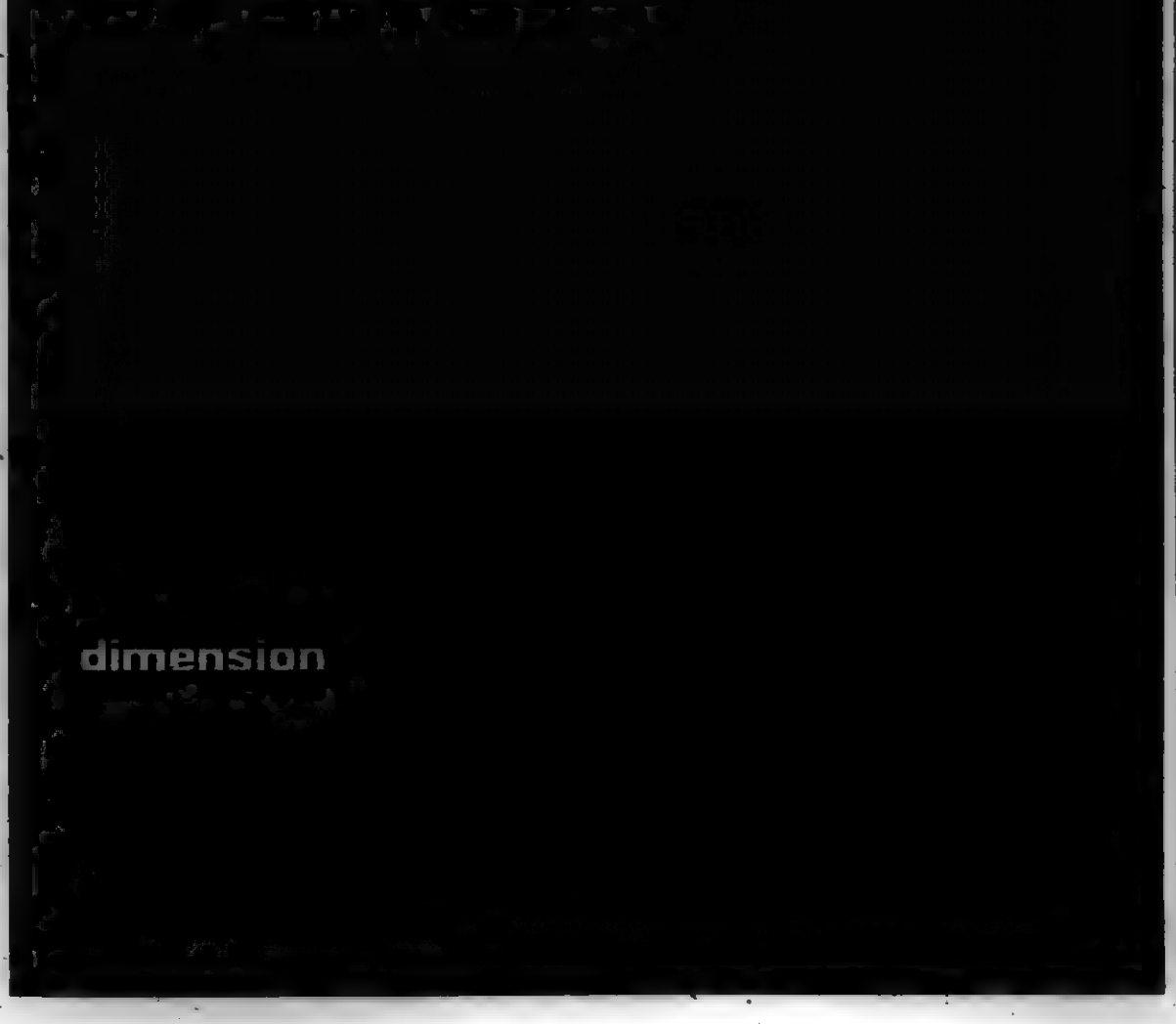
The matrix can be maintained in a data base. The data base maintains the worksheet calculations. As changes are proposed, it shows the resulting changes throughout the system. It thus becomes a requirements analysis decision support tool.

About the author

***Donald V. Steward** is a professor in computer science at California State University, Sacramento, and a consultant. He offers in-house workshops on software engineering, office information systems and the management, scheduling and control of complex systems design.*

Steward has worked in the computer field in industry for 20 years and as a professor and consultant for 10 years. He is the author of Systems Analysis and Management: Structure, Strategy and Design *(Petrocelli Books, Inc., Princeton, N.J.) and is now writing a book on software engineering.*

DIMENSION. THE MOST POWERFUL, MOST COMPATIBLE PERSONAL COMPUTER YOU CAN BUY.



SYSTEMS & PERIPHERALS

Supermini offers IBM compatibility

By Patricia Keefe
CW Staff

TRUMBULL, Conn. — Cannan Computer Corp. today unveiled a multiuser superminicomputer said to offer mainframe power and applications designed to run under IBM's VM/CMS operating system.

An extension of the firm's year-old Personal Mainframe Series 5000 single-user processor, the Multiuser Personal Mainframe 5800 series can support up to eight users either through a Xerox Corp. Ethernet-based local-area network or as a cluster of 5800 series terminals linked over telephone lines. The 5800 series also offers multiple windowing and the ability to run and control multiple applications simultaneously on one terminal, a spokesman said.

Available in April, the 5800 series features a two-bus architecture that includes Cannan's 32-bit central processor, which is said to execute an IBM 370 instruction set. Motorola, Inc. 68000 microprocessors are also used for I/O and communications processing, the vendor said.

The 5800 series runs on Cannan's updated, proprietary version of IBM's public-domain CMS Release 6, which provides an IBM-compatible user application interface. The user reportedly does not need an IBM mainframe or IBM's VM/CMS to run CMS applications. Users who want to be 100% compatible with IBM's systems software can purchase one IBM license per system, a spokesman said.

The Model 5822Z system console contains the 32-bit main processor, 1M byte of error-correction code (ECC) memory (expandable up to 4M bytes), an 85M-byte Winchester disk drive, the eight-port communications controller board and six Intel Corp. Multibus slots for system expansion. The system is compatible with current Cannan Personal Mainframe Series 5000 capabilities. Also supported are both data communications and data terminal equipment.

IBM 3270 support

Standard features reportedly include 8M bytes of virtual memory, an editor, a window graphics system, support for IBM 3278 Model 2 terminal emulation, a Centronics Data Computer Corp. parallel printer interface, a 1,200 bit/sec internal modem for remote diagnostics and two software packages — Cannan's proprietary kernel operating system and CMS compatibility. The latter allows the user to run CMS applications without conversion, according to the spokesman for the vendor.

Cannan expects to have 40 software packages certified for the 5800 series' April debut. After certification, Cannan and the vendor will sign marketing agreements to price the software on Cannan's systems at 5% to 10% of the license fees charged for mainframe installations.

For example, Information Builders, Inc.'s Focus costs $120,000 for a mainframe license, but only $6,500 on the Cannan system. Those packages are said to include popular data base management, decision support, business graphics and statistical analysis systems.

The Model 5822Z costs $24,900. The two software packages cost $1,850, and each Ascii terminal costs $1,500, according to the vendor. An eight-terminal configuration costs $79,250 and includes 4M bytes of ECC memory, 170M bytes of disk storage, a 1,600 bit/in. tape drive and the software. The spokesman said the 5800 series offers a per-user cost of about $10,000.

Additional information can be obtained from Cannan, which is located at 39 Lindeman Drive, Trumbull, Conn. 06611.

INSIDE

Terminals/76
Printers/Plotters/77
Power Supplies/77
Board-Level Devices/78
Auxiliary Equipment/78

Wang adds two systems to VS85 supermini line

LOWELL, Mass. — Wang Laboratories, Inc. has announced two packaged configurations of its VS85 line of 32-bit superminis aimed at the small and medium-size office.

Featuring differing capacities of internal disk drives, the newly announced models are the VS85-76F and the VS85-147F. Both systems incorporate the same basic configuration, including: a model VS85-1 processor with 1M byte of main memory, a 16-port serial I/O processor, an archiving workstation, a bus adapter, Wang's VS operating system, assembler language, a disk I/O processor capable of supporting two disk drives, a communications I/O processor capable of supporting three data link processors and a compiler, the vendor said.

The VS85-76F includes the 76M-byte, 8-in. internal fixed disk drive currently available on the VS25 and VS45 systems. The VS85-147F has been configured with a new product, a 147M-byte, 8-in. disk drive. Each disk drive is housed in the VS85 cabinet.

The packaged VS85 systems were designed for offices that require the processing capabilities of the firm's VS100 CPU in applications supporting up to 64 users. Because the disk drives are built into the cabinets, the systems do not require special adjustments for an office environment.

Both VS85 packaged sys-

See WANG page 79

Fault-tolerant superminis offer Unix support

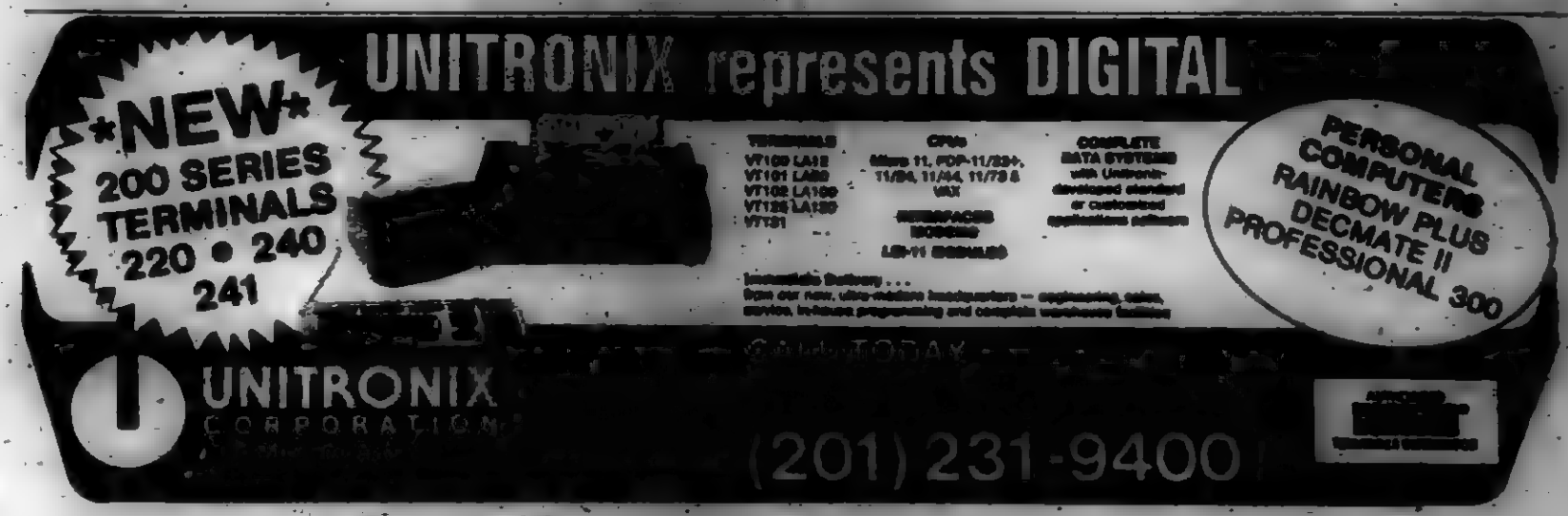
SAN JOSE, Calif. — Tolerant Systems, Inc. has announced the Eternity series of fault-tolerant, 32-bit superminicomputers. The systems were designed to use a version of the Unix operating system.

Designed for use in on-line transaction processing applications, the system reportedly offers performance comparable to Digital Equipment Corp.'s VAX-11/780 superminicomputer. The Eternity series consists of from one to 15 system modules called system building blocks (SBB). The SBBs are connected by a passive coaxial cable called the system interconnect bus, the vendor said.

Any SBB within the system can perform one or more distributed system tasks such as application processing, file serving or communications serving. Each SBB can contain from 1M to 16M bytes of random-access memory. Internal processors, such as a user processing unit and a real-time processing unit, are based on National Semiconductor Corp.'s NS32032 microprocessor. Each SBB contains two 32-bit processors, the vendor said.

One of the benefits of the Eternity system, the vendor claimed, is that the configuration of SBBs can be redefined to suit the application. For example, a system requiring heavy I/O traffic could focus more SBBs to file serving instead of applications processing. In addition, if more processing capacity is required, additional SBBs reportedly can

See SUPER page 79



SYSTEMS & PERIPHERALS

TERMINALS

THOMAS ENGINEERING CO.
TE-780XB; TE-780XV; TE-780XA

Thomas Engineering Co. has introduced three terminals with multihost protocols.

The TE-780XB is a stand-alone, synchronous model that emulates Honeywell, Inc.'s VIP 7800 terminals, including the VIP 7814. The TE-780XV offers an operator-selectable Digital Equipment Corp. VT100 CRT terminal personality for environments requiring both Honeywell and DEC protocols. The TE-780XA is an asynchronous model, which, when combined with a protocol converter, provides emulation of IBM's 3270 or Honeywell's VIP 7700 terminal.

All models include a 14-in., non-glare-screen; a tilt-and-swivel monitor; and a detachable, low-profile sculptured keyboard. More than 60 menu-selectable setup options and an auxiliary printer port are standard.

The TE-780XA is priced at $1,695; the TE-780XB and TE-780XV are priced at $1,595.

Thomas Engineering, 1040 Oak Grove Road, Concord, Calif. 94518.

TELERAY, INC.
10GRF/APL

Teleray, Inc. has introduced a terminal that offers presentation graphics, APL capability and text editing features.

The Ansi X3.64-compatible unit, called the 10GRF/APL, has a transparent printer port through which data is transmitted. Its graphics and editing memories are independent of each other, the company said.

In the graphics mode, the terminal is compatible with the Tektronix, Inc. 4010/4014 and Plot 10. The APL mode can be accessed by entering a shift out code, the company said.

The standard 12-in. model terminal sells for $2,940. Terminals are also available in 9- and 15-in. styles.

Teleray, 6425 Flying Cloud Drive, Eden Prairie, Minn. 55344.

TANDBERG DATA, INC.
TDV 2200 price reduction

Tandberg Data, Inc. has announced a 25% price reduction for its TDV 2200 series smart terminals.

The single-unit price of the terminals has been reduced from $1,875 to $1,395. Quantity discounts are available to large users, OEMs and systems integrators, a vendor spokesman said.

Tandberg Data, P.O. Box 80, Labriola Court, Armonk, N.Y. 10504.

FALCO DATA PRODUCTS, INC.
Fame 78

Falco Data Products, Inc. has introduced a terminal designed for the IBM 3270 terminal environment.

The Fame 78 is an Ascii terminal that emulates Beehive International, Inc.'s Model 78 terminal. The vendor's terminal features a green phosphor, 24-line by 80-col. display. Other standard features include a 12-in. screen, tilt-and-swivel design, microprocessor-controlled logic board and a CRT control circuit for a separate synchronous/video CRT monitor, according to a vendor spokesman.

The Fame 78 features two RS-232C ports for host communications and local printer communication. Each port is bidirectional and offers user-selectable rates ranging from 300 to 9,600 bit/sec, the spokesman said.

The terminal is said to have an IBM 3278-type keyboard, with 24 preset function keys and special IBM status line characters. Optional features are an amber tube and a 14-in. CRT screen.

The Fame 78 with a 12-in., green phosphor screen is priced at $995.

Falco Data Products, 1266 Lawrence Station Road, Sunnyvale, Calif. 94089.

PLASMA GRAPHICS CORP.
Plasmagraphics 120

Plasma Graphics Corp. has introduced what it claims is the first full-size, flat-panel display using ac and dc plasma-discharge display technology.

The Plasmagraphics 120 is a 25-line by 80-char. display said to combine a slim profile, readability and graphics-quality resolution. It is said to provide 120,000 addressable pixels arranged in 480 col. by 250 rows.

All electronics necessary to address and time the display are housed on an integral panel-driver board. The display color is bright orange, according to a spokesman.

Volume production of Plasmagraphics 120 panels will begin during the second quarter of 1984. Evaluation units are available at $1,795, and the sale price per unit will begin at under $1,000, the vendor spokesman said.

Plasma Graphics, P.O. Box 4002, Warren, N.J. 07060.

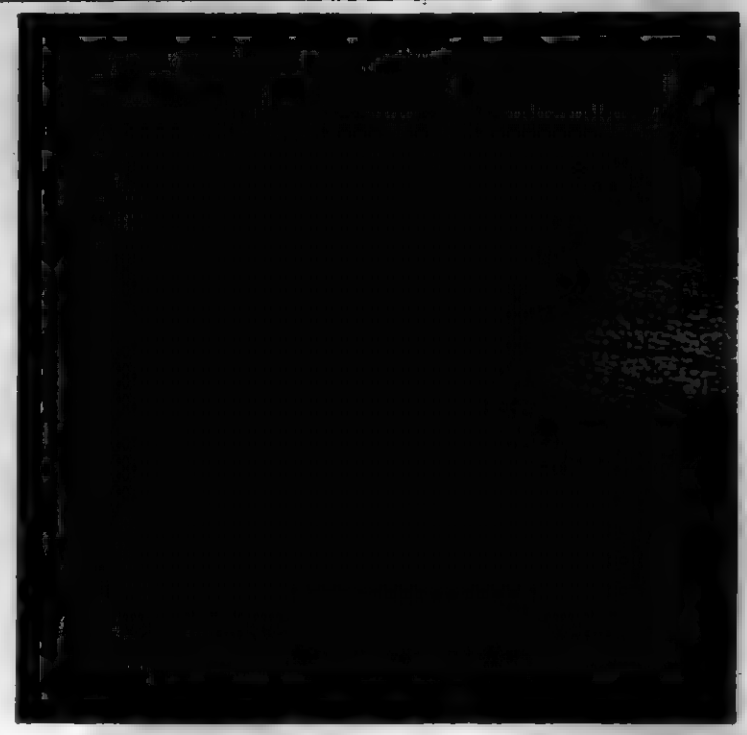
MICRO-TERM, INC.
Ergo 4000 upgrade

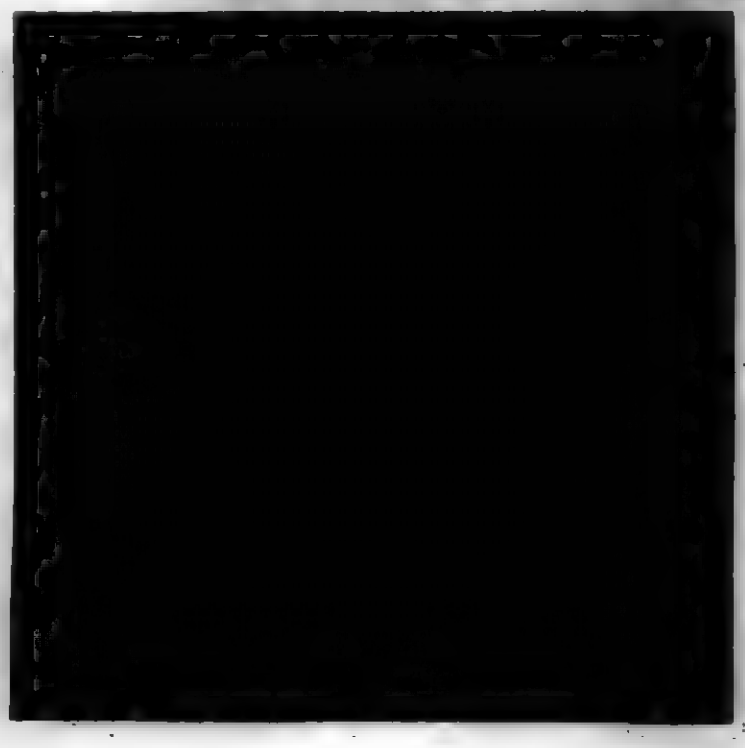
Micro-Term, Inc. has announced an upgraded version of the Ergo 4000 word processing terminal.

The terminal's character generator has been upgraded to include 128 math and scientific characters in addition to the standard 128 Ascii characters. Also improved, according to the vendor, is the unit's character generation facility. It is clearer and more readable now, the vendor said.

Micro-Term also announced that it is offering Lexisoft, Inc.'s Spellbinder word processing package to all Ergo 4000 purchasers for $295. The upgraded Ergo 4000 costs $1,195, a spokeswoman said.

Micro-Term, 512 Rudder Road, Fenton, Mo. 63026.





Whether you're looking for Payroll, Personnel, Pension Administration or Claims Processing software, Information Science's "Whole Person" software gives you a comprehensive system that provides superior technical features.

Systems for both Database and Non-Database

InSci's state-of-the-art payroll/personnel database system is integrated into a number of database management environments—including IMS, DL-1, and IDMS. Native mode, the system is designed to take full advantage of each specific database structure, eliminating clumsy, resource-draining interface programs.

In addition, InSci offers two non-database systems. One using a sequential file structure, the other using a VSAM access method.

INSCI INT
"WHOLE PERSON" SOFTWA
SYSTEM THAT MEETS AL
PROFES

Introducing On-line PAS

PAS–InSci's new Pension Administration System–is available as a complement to our payroll/personnel package or as an independent, stand-alone system. PAS automates most aspects of pension administration from ERISA reporting and compliance to benefits calculation, retirement counseling, vesting schedules and benefits statements.

Software for Health Insurance Claims

Our health insurance claims processing system permits your organization to self-administer group health, dental, and disability claims–providing significant cost savings while achieving fast, accurate claims turnaround.

The Complete Human Resource Package

We call it "Whole Person" software because it is the most comprehensive, technically advanced set of human resource systems avail-

SYSTEMS & PERIPHERALS

INNOVATIVE ELECTRONICS, INC.
MC-80/600-8

Innovative Electronics, Inc. has introduced a protocol emulator device that reportedly allows users of Televideo Systems, Inc.'s 920, 925 or 950 terminals to emulate IBM 3277 and 3278 terminals.

The MC-80/600-8 emulator communicates with an IBM host using 3270 binary synchronous communications protocol, according to a spokesman for the vendor. In addition, it is said to emulate a 3270 controller with one or two ports available for any combination of display stations or printers.

Other capabilities of the device include replacing or multidropping with IBM 3271 Models 1 and 2, IBM 3276 Models 1 and 2 or IBM 3274 Model 51C control units, the spokesman said.

When attached to the emulator, the Televideo terminals reportedly are driven as fully functional 3277/3278s with screen sizes of 12 by 40, 12 by 80 or 24 by 80, the company said.

The emulator reportedly provides up to 16K bytes of read-only memory, 16K bytes of random-access memory as well as three serial communications ports.

The device, with one binary synchronous communications port and a CRT or printer port, is priced at $1,495. A two-port configuration costs $1,695, according to the company.

Innovative Electronics, 4714 N.W. 165th St., Miami, Fla. 33014.

PRINTERS/PLOTTERS

INNOVATIVE ELECTRONICS, INC.
Innovator 202-PC

Innovative Electronics, Inc. has announced extended communications interface capability for the company's Innovator 300 line/min printer. The Innovator 202-PC reportedly provides IBM 2780/3780 emulation facilities with its built-in printer and Ascii terminal port.

Features supported include: space compression/expansion, processor interrupt reception, conversational mode, reception of Ebcdic transparent data, component selection, vertical format control and horizontal format control. Additional features of the product include: processor interrupt transmission, switch-selectable 2780/3780 modes, switched network/leased line control, auto-answer, switch-selectable Ascii/Ebcdic modes and extensive built-in diagnostics, the vendor said.

The printer system is controlled by a microprocessor-based, single-board computer system. The programmable controller is used to implement communications protocols, a vendor spokesman said. The price of the 132-column printer is $5,495.

Innovative Electronics, 4714 N.W. 165th St., Miami, Fla. 33014.

TELEX COMPUTER PRODUCTS, INC.
Telex 387

Telex Computer Products, Inc. has introduced a table-top matrix printer that is said to be compatible with IBM's 3287 printer.

The Telex 387 printer reportedly features 400 char./sec printing speed and complete plug compatibility for attachment to an IBM 3274/3276 terminal or Telex control unit. No system or controller changes are required to operate the Telex 387 within an IBM environment utilizing 3287 printers, a vendor spokesman said.

The 387 features a near letter-quality print option. Its standard print mechanism forms an 8- by 7-dot matrix reportedly capable of printing on up to six-part forms with a total thickness of .027 in. An optional print head mechanism with staggered wires, 16- by 14-dot matrix outputs and near letter-quality printing is available, the spokesman said.

A maximum of 136 print positions at 10 char./in and up to 233 print positions at 17.1 char./in are available.

The 387 is available now for $7,200.

Telex Computer Products, 6422 E. 41st St., Tulsa, Okla. 74145.

PRINTRONIX, INC.
MVP 150B

Printronix, Inc. has introduced the MVP 150B, a dot matrix printer designed for microcomputer networks.

The multimode printer works at a speed of 80 line/min in a letter-quality mode and 300 line/min in a dot matrix mode, the vendor said. The printer can reportedly use six-part paper with widths varying from 3 to 16 in. It supports software that expands or condenses print sizes; for example, a 132-col. report can be printed on 8½-by 11-in. paper, the vendor claimed.

The printer costs $3,745.

Printronix, 17500 Cartwright Road, P.O. Box 19559, Irvine, Calif. 92713.

POWER SUPPLIES

DATAPOWER, INC.
DPX-51

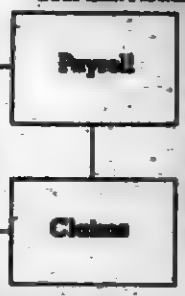
Datapower, Inc. has announced an open-frame, printed-circuit board switching power supply, the DPX-51, which reportedly has four outputs and provides up to 40W of continuous power.

The DPX-51, the vendor said, has input ranges of 90 to 132 Vac or 180 to 264 Vac that provide brownout protection and that are user-selectable. Output current levels can re-

Continued on page 78

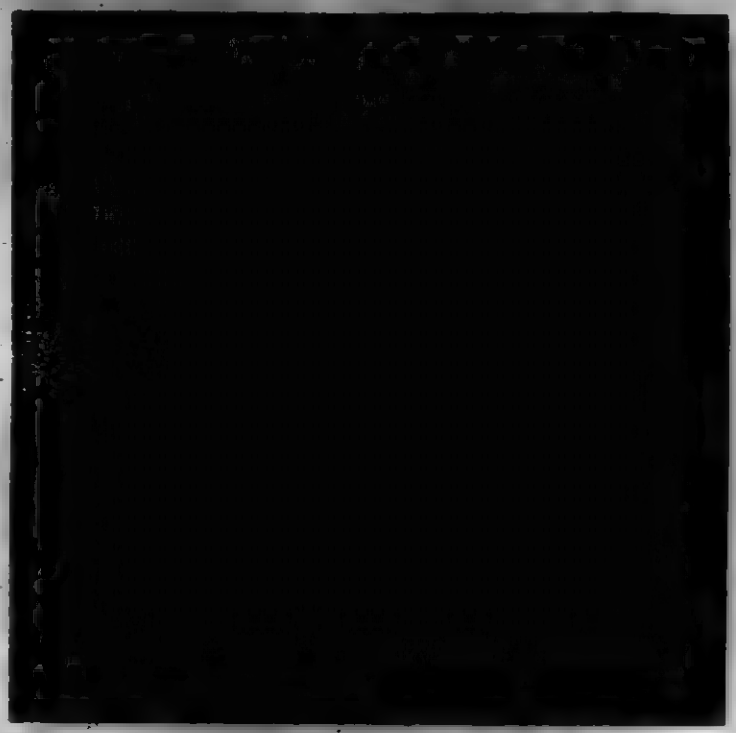
able. InSci started the HPS industry back in 1965, and we've led the field ever since. Our technical experts have provided you features unmatched by any other company.

Modularized Design For Easy Maintenance. InSci "Whole Person" software was designed from the top down and is highly modularized, providing maximum flexibility. A single module or subroutine supports each specific function in the system.

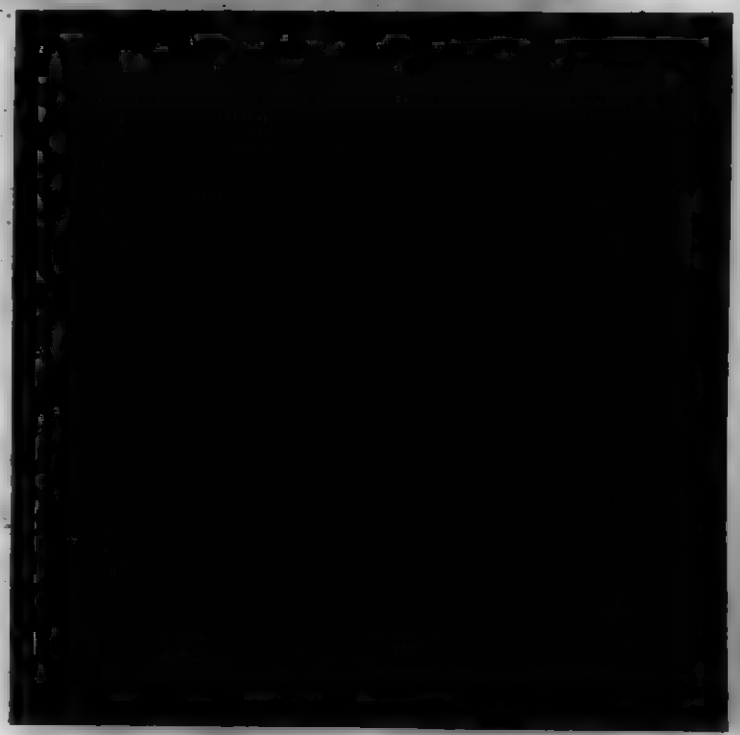


User Exit Routines. Strategic areas built into the InSci system allow exits to override the standard system routines. This means you can add your own programs without changing database system codes. InSci also gives you source codes so you can go into the system directly if you desire and still receive maintenance.

Preliminary or final processing mode. InSci systems let you select the most efficient operating mode for each processing task. All changes can be processed in real-time, so they become effective immediately. Preliminary processing allows for simulating situations such as a payroll run without affecting the database. And, of course, InSci systems provide state-of-the-art security precautions, complete maintenance support and training.



RODUCES
RE. THE FIRST SOFTWARE
L THE NEEDS OF THE DP
SIONAL.



Write us. Or Call.

InSci "Whole Person" software–for more information, write us or call: Information Science Incorporated, 95 Chestnut Ridge Road, Montvale, New Jersey 07645. Attention: Chris Hanraven. 201-391-1600.

InSci
WHOLE PERSON SOFTWARE.

SYSTEMS & PERIPHERALS

Continued from page 77

portedly be selected by the customer, and protection is said to be provided against input surges of up to 20A.

The DPX-51 weighs 14 lb and is priced at $40 for production-quantity orders.

Datapower, 3235 W. First St., Santa Ana, Calif. 92703.

HEWLETT-PACKARD CO.
HP 6032A; HP 6023A

Hewlett-Packard Co. has introduced two autoranging power supplies, the HP 6023A, reportedly supplying 200W in constant voltage/constant current form, and the HP 6032A, which supplies 1 kW.

The HP 6032A, according to the vendor, provides its power over a range of voltage and current, from 6.7V at 30A to 20V at 10A. The HP 6032A reportedly produces up to 50A at output voltages up to 20V. It develops no fewer than 1 kW through its 20V to 60V output range.

The HP 6032A is said to sense a low- or high-ac line or an over-temperature condition and then disable itself until the condition is remedied.

The HP 6032A is priced at $3,100. The HP 6023A is priced at $1,550.

Hewlett-Packard, 1820 Embarcadero Road, Palo Alto, Calif. 94303.

DISPLEX, INC.
Ac line conditioner

Displex, Inc. has introduced an ac line conditioner.

According to the vendor, the conditioner furnishes sine wave outputs by providing electronic voltage regulation as well as eliminating electrical line noise, surges and spikes.

The list price is $775 for a 1-kVA unit, $875 for a 2-kVA model and $1,295 for a 3-kVA conditioner.

Displex, Alexander Place, Glen Cove, N.Y. 11542.

CONTROLLED POWER CO.
7000 series

Controlled Power Co. has announced the 7000 series of power distribution systems, said to feature power line monitoring, power conditioning and purification.

Covering a power requirement range from 10 kVA to 225 kVA, the series reportedly offers both basic and extensive power line conditioning and system operation monitoring options. Prices begin at $3,700.

Controlled Power, 1955 Stephenson Highway, Troy, Mich. 48083.

CONTROL CONCEPTS CORP.
Isiatrac

Control Concepts Corp. has announced Isiatrac, a surge suppressor designed for small computer systems.

Isiatrac constantly tracks input power, monitors transient voltages, detects disturbances, absorbs them and supplies additional power, according to a spokesman.

The surge suppressor guards against memory loss, data disturbance, improper program execution, system crashes and deterioration of system components.

Isiatrac ranges in price from $79 to $350, depending on a computer's size and configuration.

Control Concepts, 295 Water St., P.O. Box 1500, Binghamton, N.Y. 13902.

BOARD-LEVEL DEVICES

ORIGIN, INC.
OR-86RLQ

Origin, Inc. has announced a 600K-byte disk cache memory feature, the OR-86RLQ, for Digital Equipment Corp. Model RL01 and RL02 disk drives.

The disk cache board is said to double the speed of DEC Q-bus systems and cache data accessed by programs automatically. It is compatible with Unix and DEC's RSTS/E, RT11 and RSX operating systems.

The OR-86RLQ costs $3,300 in single-unit quantities and will be available in the second quarter.

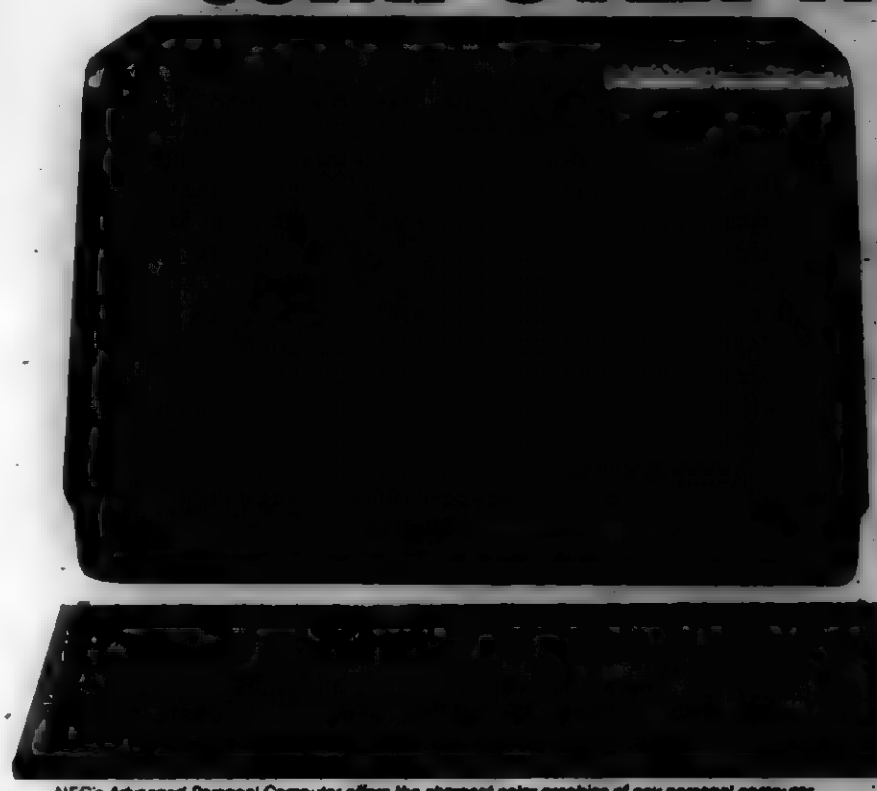
Origin, 9136 Gibson St., Los Angeles, Calif. 90034.

AUXILIARY EQUIPMENT

RELIANCE ELECTRIC CO.
Model 48C100

Reliance Electric Co. re-

HAVE YOU BEEN BLIND COMPUTER WITH THE



NEC's Advanced Personal Computer offers the sharpest color graphics of any personal computer.

NEC's Advanced Personal Computer offers the widest range of quality graphics.

One reason the APC is better is that it lets you do more kinds of graphics than any other personal computer.

In fact, it gives you the kind of graphics you'd expect only from a much more expensive computer.

With the APC, you can produce color transparencies, color slides, or output to a variety of printers and plotters.

You can even do Computer Aided Design (CAD).

Our screen is graphically better.

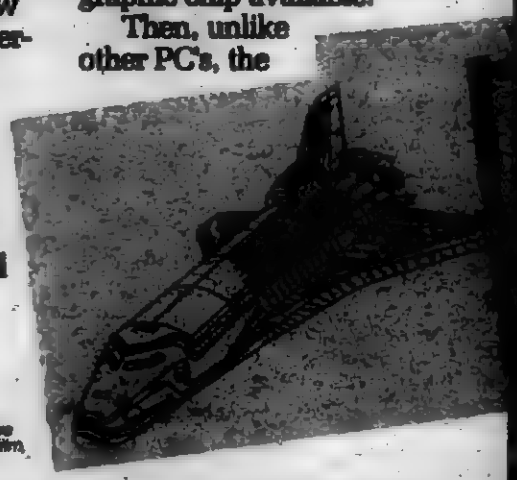
Seeing is believing. And one look at our color screen will prove it's the best.

But it's no accident. It starts with the NEC 7220 graphics processor, the most advanced graphic chip available.

Then, unlike other PC's, the

Graphics are being used more and more by businesses every day. They give companies a clearer picture of their place in the market. They make for more effective presentations. And with slides and color transparencies, they can let a room full of people see the same thing at once. Although most people see the value of graphics, very few are aware of the personal computer that lets them create the best color graphics.

It's the Advanced Personal Computer from NEC.



This slide was produced from the screen using Videograph™ software, an inexpensive Screen Shooter™, and Polachrome™ 35mm film, in less than 5 minutes. For less than $1.00!

Context MBA is a trademark of Context Management Systems, Inc. Graphwriter is a trademark of Graphic Communications, Inc. Graphplan is a trademark of Chang Labs, Inc.

SYSTEMS & PERIPHERALS

cently announced the Model 45C100 Portable Intelligent CRT programmer designed to develop and maintain application programs for the company's Automate programmable controllers.

Sized to be carried as hand luggage on most airlines, the Model 45C100 was designed to be used with different Automate programmable controllers by downloading an executive program from a micro floppy disk to its main memory, a spokesman for Reliance said.

Programs may be written off-line or on-line and loaded into a programmable controller, as well as downloaded onto blank micro floppy disks to provide a convenient method of building and storing a program library, the spokesman said. The CRT interfaces to any Automate via one or two serial channels or Reliance's R-Net local-area network.

The product is priced at $5,100 and features a 9-in. diagonal screen.

Reliance Electric, 2500 Tungsten Road, Cleveland, Ohio 44117.

SPHERE TECHNOLOGY, INC. VS1000

Sphere Technology, Inc. has announced a voice entry product that operates in a workstation environment with the IBM 3274 controller and IBM 3278 or compatible display terminals.

The VS1000 is said to provide voice data entry, local user screen formatting and help center facilities. The product's voice entry is said to reduce keyboard data entry activity by enabling users to enter and access data simultaneously while performing their other job tasks.

With the VS1000, productivity improvements of 15% to 40% are possible, the vendor said. These improvements are said to be possible without IBM host programming changes.

The product communicates with 3274 and 3276 controllers and allows 3276, 3270 and 3178 CRT terminals, as well as IBM's Personal Computer or Digital Equipment Corp. VT100 CRT terminals to be used.

The VS1000 will be available for delivery, primarily to OEMs, in July, the vendor said. The single-unit price will be $7,500 with quantity discounts available.

Sphere Technology, 152 Richmond St., Providence, R.I. 02903.

WANG from page 76

tems can be configured with local and remote workstations to support a combination of DP and office automation applications. Backup devices may be added depending on individual user requirements, Wang said.

The systems cost from $70,000 for the VS85-70F and from $77,000 for the VS85-147F. They will be available in June, Wang said from One Industrial Ave., Lowell, Mass. 01851.

SUPER from page 76

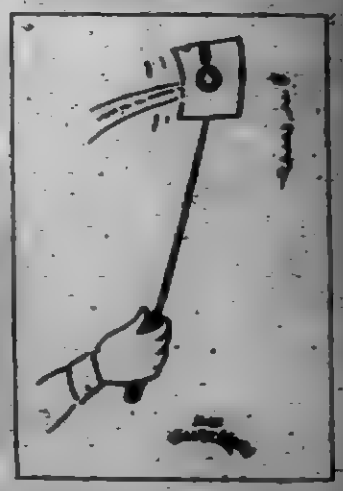
be added without taking the entire system off-line, the vendor said.

An Eternity system can handle three compatible types of storage module drive disk subsystems offering capacities from 56M to 474M bytes.

Drives can operate at an average access time of 30 msec and can achieve data transfer rates of 1.2M to 1.8M byte/sec, the vendor said.

The Eternity version of Unix is compatible with the Western Electric Corp. System V and the University of California at Berkeley Versions 4.1 and 4.2.

Designed primarily for systems integrators and value-added remarketers, an entry-level configuration costs $75,000. The vendor is located at 51 E. Daggett Drive, San Jose, Calif. 95134.



TO THE PERSONAL BEST COLOR GRAPHICS?

Contest MBA™ runs in high resolution color on the APC. But it can only run in one color on the color monitor of the leading brand.

APC graphics option has its own dedicated memory, so there's never a tradeoff between color and resolution.

Software will make you a big-time producer.

Better hardware alone isn't enough. You also need better software. And NEC provides that, too.

Take Graphplan™ for example. Graphplan can take spreadsheet format data and produce customized business graphics on paper. Instantly.

Graphwriter™ will let you produce professional color graphics in over 20 different formats. Then turn them into transparencies or hard copies using the most popular pen plotters.

Videograph™ makes creating free-form color images for slide presentations easy and inexpensive.

Autocad™ lets architects, engineers and designers create sophisticated graphics and designs, then produce precise drawings with popular plotters.

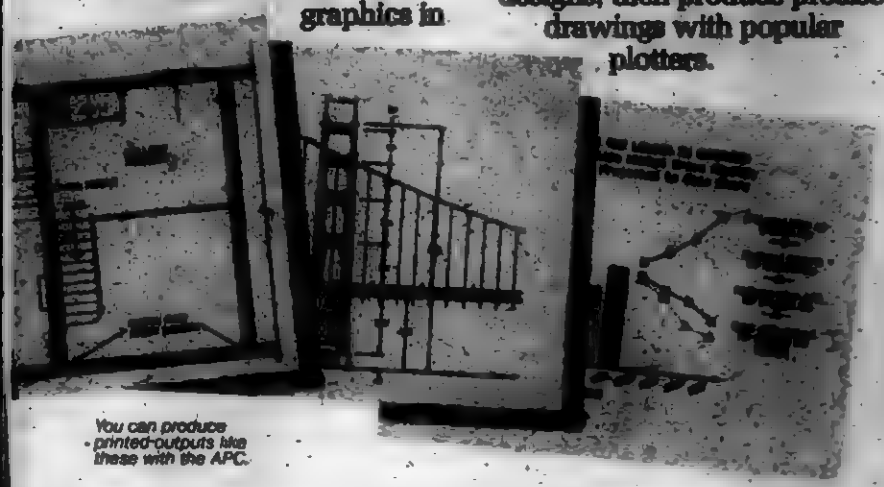
Designers can use Autocad™ to make the design process faster and easier.

This software combined with the APC hardware will give you the best graphics you can get on any personal computer.

For the complete picture, call NEC.

For product literature on any of NEC's APC graphics capabilities, call 1-800-343-4419. In Massachusetts, call 1-617-264-8635.

And find out why more and more graphics users with vision are saying "NEC and me."



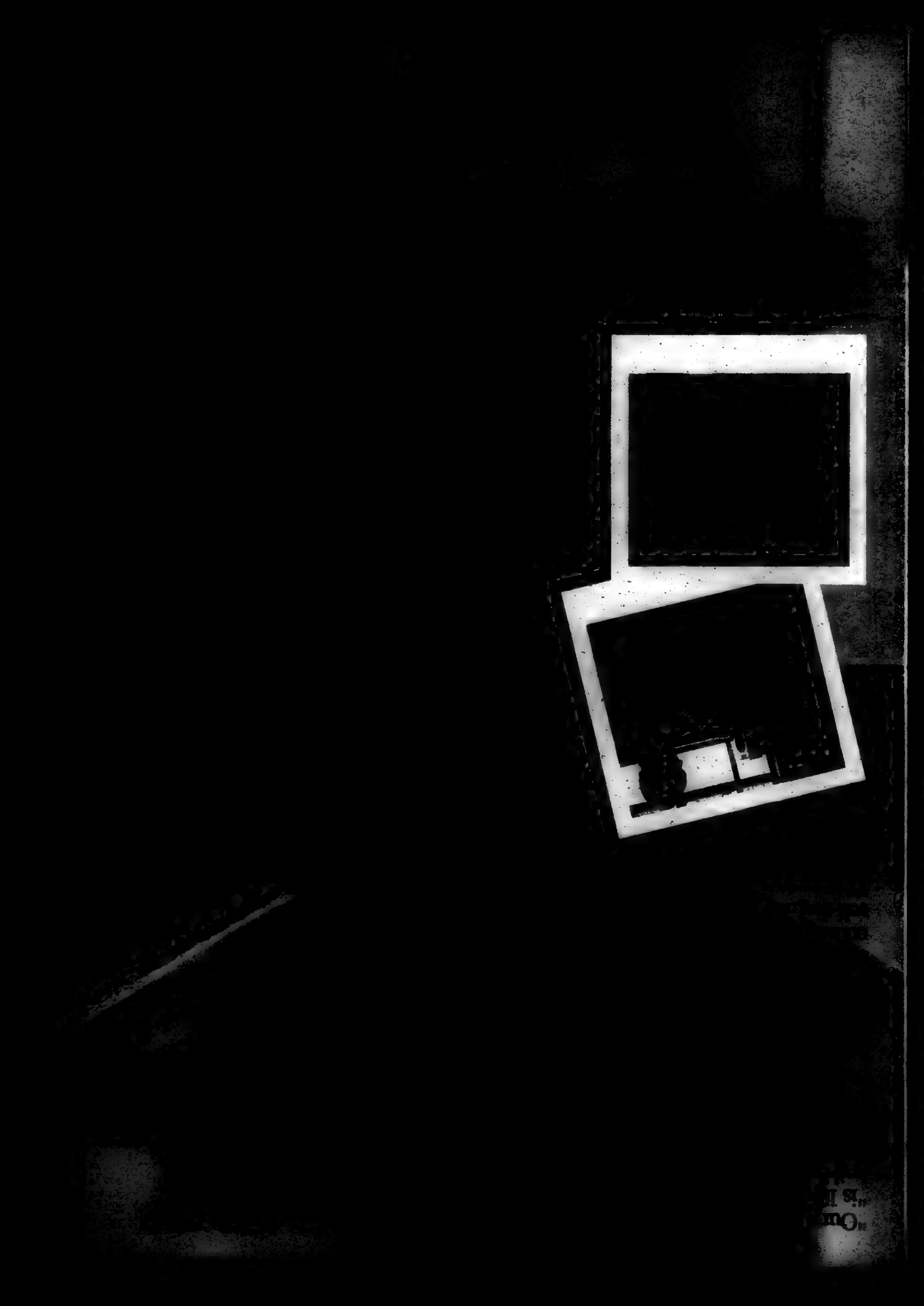
You can produce printed-outputs like these with the APC.

NEC Information Systems, Inc. 1414 Mass. Ave. Boxborough, MA 01719

Screen Shooter is a trademark of NPC. Polachrome is a trademark of Polaroid. Videograph is a trademark of Jandel. Autocad is a trademark of Auto Desk, Inc.

"EVEN BEFORE RAW MATERIALS ARRIVE, VAX HAS OUR ENTIRE MANUFACTURING LINE ON SCHEDULE."

Jo Manager Randall, Vice President, Business



Ferocious FORTRAN.

Microsoft® FORTRAN crunches numbers with a vengeance!

It combines fast and efficient native code compilation with built-in 8087 coprocessor support. The result? Mini and mainframe performance from your MS™ DOS micro.

Based on the '77 standard, Microsoft FORTRAN supports extensive statements and data types—including complex numbers and IEEE single and double-precision floating point accuracy.

Support for large arrays (greater than 64K bytes), separate module compilation, and overlays, allow you to create very large programs—up to one megabyte, with access to more than 65 thousand records in a file as large as four gigabytes.

MICROSOFT. The High Performance Software

How do programmers feel about Microsoft FORTRAN?

"The first FORTRAN compiler that takes advantage of the full addressing capability of the 8088 and the power of the 8087."

—Jack Wilschke, *Softalk*

"We decided to use the Microsoft FORTRAN Compiler for its INTEGER 4 capability and the flexibility of its 8087 implementation."

—Charlie Huizena & Chip Barnaky, *PC World*

Call 800-426-9400 to order the ferocious FORTRAN. $350*

In Washington State, call 206-828-8088. Ask for operator F3, who will rush you your order, send you more information, or give you the name of your nearest dealer to see Microsoft FORTRAN in action.

*Price exclusive of handling and Washington State sales tax.

Microsoft is a registered trademark and MS is a trademark of Microsoft Corporation.

MICROCOMPUTERS

MICRO BITS
Paul Gillin
CW Senior Editor

Help on the way for programmers

Considering that just three years ago they were kings of the computing hill, programmers who are interested in micro software must now be feeling like the last kid chosen for the sandlot baseball team. Vendors are falling all over each other in a Keystone Cops-like effort to court the end user, but there have been few good outlets for technical people to obtain the information they need.

Now a Dedham, Mass.-based firm is trying to capitalize on that perceived neglect. The Programmer's Shop, created last April, sells micro software almost exclusively to professional programmers. For example, in an average month the company ships about 150 C compilers as compared with seven Micropro International Corp. Wordstars and two Ashton-Tate Dbases, according to founder Bruce Lynch.

In fact, the company's promotional literature claims that sales people will politely turn away inquiries about the relative merits of certain spreadsheet software, but will cheerfully respond to an inquiry about the virtues of the same software as a programming tool.

To augment its sales business, the Programmer's Shop offers a newsletter, a software finder's service, product evaluations and comparisons, a computerized bulletin board and consultant and programmer referrals, Lynch said. Most of the services are provided at little or no charge.

The strategy has apparently been successful. From a volume of 15 shipments

See MICRO page 96

Reconciling MIS, micros

A case for the 'Personal Info Center'

By Richard Nanteau
Special to CW

Early this year I got a call from a friend who is a division chief financial officer of a Fortune 500-size company. "I just came from a planning meeting where two of our managers made presentations," he said. "Both used spreadsheet programs on their personal computers to produce the numbers, and each of them came up with a completely different prediction."

My friend continued, "The problem occurred when the analysts entered the actual results into their models by copying data from printouts — one used a week-old report, the other used a revised report he got that day. To make it worse, there were at least two data entry errors in the copying. Maybe the only real solution to problems like this is to take away all the personal computers and software used in our organization."

"No, I don't agree," I told him. "Your story isn't an argument against using personal computers; it's proof that they haven't been used enough."

This situation is typical in many companies. The most common problem new personal computer users have encountered is that while they may be using the same spreadsheets, they are not necessarily working with the same data.

We recently surveyed MIS directors at 80 of the largest corporate computer users in the U.S. Seventy percent of the companies we talked to said they were involved with information centers and that they felt these efforts were important and well-accepted in their organizations.

But when we talked to the same companies about personal computers, we came up with a different picture. Very few formal plans had been laid out. More importantly, we believe the MIS managers dramatically underestimated the number of personal computers in use in their companies. If we totaled up answers from 30 of the largest companies in the U.S., we came up with about 6,000 personal computers. Estimates vary, but the consensus is that there are at least 500,000 personal computers installed in the top 1,000 companies.

We have discovered that the information center user tends to be very computer-literate. Personal computer users, on the other hand, tend to be managers, analysts or other professionals whose personal computers are adjuncts to their jobs.

Through the information center, MIS has been able to deliver information to more people than ever before. However, most of the personal computer group members in our study were "Visicalcing" away, without MIS sponsorship. The end users

See MIS page 97

INSIDE
Systems/80
Storage/84
Printers/Plotters/92
Board-Level Devices/92
Auxiliary Equipment/93
Software/93

Leading Edge recalls micros

NEEDHAM, Mass. — Leading Edge Products, Inc. has recalled the first 1,170 units of its personal computer that were sent to dealers prior to Feb. 3.

According to a company spokesman, the power supplies in the CPU may be defective and continued use may be dangerous.

The CPU unit of Leading Edge Products' personal computer, manufactured by Mitsubishi Electric Co. and bearing an Underwriters Laboratories, Inc. approval, has not caused any problems yet, the company said.

Dealers and end users are asked to stop use of the system immediately. Each power supply will be replaced by Leading Edge soon, a spokesman said from 225 Turnpike St., Canton, Mass. 02021.

Sanyo's MBC 5500 tops Auerbach's spreadsheet survey

By Paul Gillin
CW Staff

PENNSAUKEN, N.J. — If you plan to make spreadsheet your principal microcomputer application, you might check out the Sanyo Business Systems Corp. MBC 5500 computer. Auerbach Publishers, Inc. has named it the No. 1 micro system configuration for spreadsheets.

Auerbach's Microcomputer Ratings on spreadsheet applications assigned the Sanyo MBC 5500 a quality rating of 12.54 points, based on capabilities and price. In contrast, the IBM Personal Computer finished in 30th place with a quality rating of 7.40. In all, the Sanyo micro captured three of the top 10 spots for spreadsheet applications [see related chart].

The survey evaluated 119 microcomputers and rated them in order of the best spreadsheet capability per dollar spent. While the Sanyo MBC 550 does not offer the most elegant features, its price of $1,793 for a configuration including 128K bytes of memory, Microsoft, Inc.'s MS-DOS operating system, a CRT monitor, 14 char./sec printer and three bundled software packages makes it a best buy, the report stated.

The Auerbach ratings were based on a recommended spreadsheet configuration that includes 64K bytes of memory, a single diskette drive, 80-col. upper/lowercase display with at least 20 lines of text displayed and a dot matrix printer. Generic components were added when not supplied by the vendor to satisfy the recommended configuration requirements, the survey stated.

The relative capabilities of each component in the system were measured using standard quality point ratings, and prices for the required components were included in the rating formula.

Based on those criteria, the five lowest rated systems included Charles River Data Systems, Inc.'s Universe 68/47, Burroughs Corp.'s B20 Series Model 22, Perq Computer's Perq, Cado Systems Corp.'s Tiger/ATS 64 and Digicomp Research Corp.'s Delphi-100. However, price was the major mitigating factor in systems of the lowest rated group, most of which were designed for more complex applications.

Extra quality points were awarded for systems handling larger word sizes, larger disk and memory capacities, CRT monitor resolution, printer capabilities, communications and I/O ports, capability to support multiple operating systems, inclusion of bundled software and price. Fifty percent of the systems evaluated were single station/single task, while 39.4% were multiple station/multiple task. Forty-four percent were 8-bit machines.

Auerbach's microcomputer ratings are available for $14.95 each or three for $35 from 6560 N. Park Drive, Pennsauken, N.J. 08109.

466 ways to use an HP 3000.

The point of buying a computer is to speed things up. So why let programming slow you down?

With the HP 3000 family of business systems, you can usually be up and running as soon as you plug them in. Because our computers come with a vast range of ready-to-use software that covers the applications spectrum from accounts payable to zoning.

We wrote many of these special programs ourselves. Last year alone, we supplied customers with more than $50 million worth of applications software. Others come from a variety of software firms working closely with us.

So the chances are pretty good that your own programming effort can be trimmed substantially. When you do need to write your own programs, the HP 3000 will help you do it much faster. With our special set of programming tools, customers have cut 500 lines of code down to 100. At about $50 a line, that really adds up.

Here's another way you save. With complete compatibility across the entire range of HP 3000s, you don't have to spend a dime converting software from one system to run on another. That's a big help when you're picking the right computer for a branch office or a regional center. Or any size office in-between.

Press here.

When you write a program for our inexpensive Series 39, you can also use it on our Series 68 distributed mainframe which handles up to 400 users. Or on our mid-range Series 42 and 48 computers.

Here's some more help in making your selection. The HP 3000 costs up to 40% less than comparable systems. So you save on the hardware as well as the software.

If you'd like to see how useful an HP 3000 can be, call your nearest HP sales office listed in the white pages. Ask a Business Computer Specialist for a demonstration. Or write for more information to Tom Rappath, Hewlett-Packard, Dept. 03184, 19447 Pruneridge Avenue, Cupertino, CA 95014. In Europe, write to Henk van Lammeren, Hewlett-Packard Nederland B.V., Dept. 03184, P.O. Box 529, 1180 AM, Amstelveen, The Netherlands.

HEWLETT PACKARD

IBM micro group considering going national

By Jeffry Beeler
CW West Coast Bureau

LOS ANGELES — A users group that caters to owners of IBM micros is strongly considering the idea of making the transition from a regional to a nationwide organization. To date, the IBM Users Group, Inc. has strictly confined its base of operations to Southern California.

"We've received a number of inquiries from people in other parts of the country," according to the group's president, Neil Zachary. "We're not really pushing [the idea], but we're not opposing it either."

During its infancy, the users group consisted of only one chapter, which was located here and served the whole Greater Los Angeles area.

Then, within the last few months, the organization formed two additional chapters — one each in the neighboring communities of Pasadena and Laguna. The members organized their own chapter and now meet locally.

In Laguna, meanwhile, a second group of users also expressed an interest in forming their own chapter. "But they didn't want to be bothered with a lot of organizational work," Zachary said, and thus approached the existing Los Angeles chapter with an appeal for help in getting started.

Now the users group may be poised for yet another expansion that would include the entire continental U.S.

Many of the group's member services, including the production of its monthly newsletter and the selection of featured speakers for local chapter meetings, are furnished centrally by the original Los Angeles organization.

Benefits whole group

The recent formation of the Pasadena and Laguna chapters has benefited the users group as a whole, Zachary said.

It provides additional sources of information for the monthly newsletter, enlarges the organization's existing library of software in the public domain, strengthens the group's ability to attract name speakers and creates additional opportunities for the exchange of useful information.

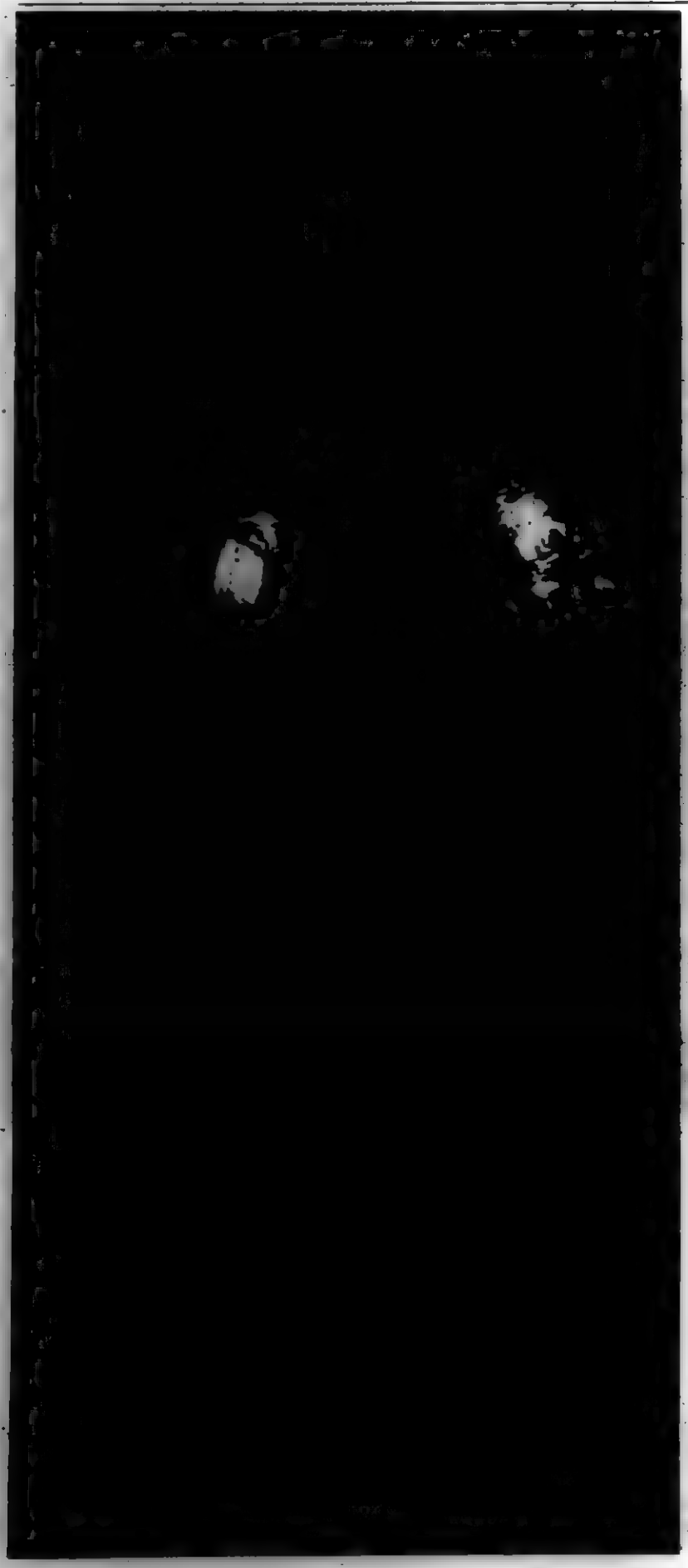
Moreover, the addition of two extra chapters greatly increases the chances for face-to-face interactions among group members. "Space permitting, a member of one chapter is free to attend the meetings of any other chapter," Zachary said.

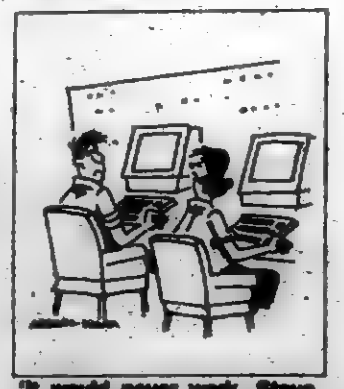
Each of the group's three constituent local organizations has its own characteristic outlook, composition and personality.

The original Los Angeles chapter, for example, boasts the widest diversity of members, with a smattering of technical people and professionals as well as a large contingent of business-oriented employees from large corporations, Zachary said.

The Pasadena chapter, by contrast, is composed primarily of technical users, while the Laguna organization is dominated by computing novices, he added.

More information about the IBM Users Group can be obtained from Zachary at P.O. Box 4136, Los Angeles, Calif. 90078.





'It would never work, Steve. I'm Fortran and you're Cobol.'

MICROCOMPUTERS

Vector Graphic announces business microcomputer

THOUSAND OAKS, Calif. — Vector Graphic, Inc. has announced a business microcomputer with memory expansion of up to 896K bytes and support for three operating systems. The Vector SX is almost twice as fast as previous Vector systems, a spokesman said.

The Vector SX employs an 8-bit Zilog, Inc. Z80 processor in addition to a 16-bit Intel Corp. 8086.

The standard operating system is Digital Research, Inc.'s CP/M 86, with a simulator that allows Digital Research CP/M applications to be run as well.

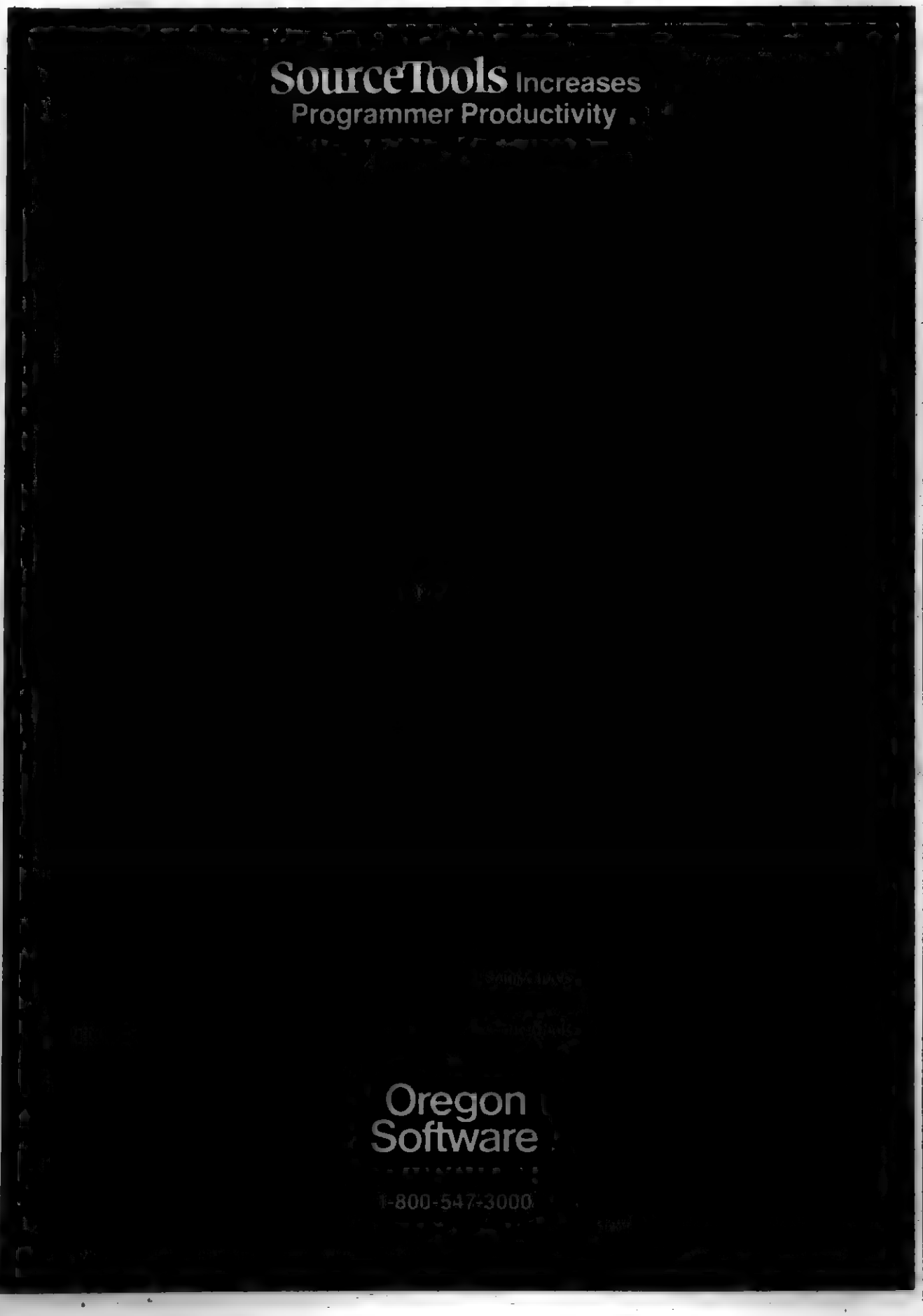
Microsoft, Inc.'s MS-DOS 2.1 operating system is optional and can co-reside with CP/M 86 on a hard disk. Digital Research's Concurrent CP/M 86 will be available in May, the spokesman said.

IBM-compatible, soft-sectored floppy disk drives and related software allow the Vector SX to read disks from a variety of manufacturers, the spokesman said.

The system also incorporates an intelligent detached keyboard, high resolution, monochrome graphics display, 32K bytes of video random-access memory (RAM), three expansion slots, a tone generator, one serial printer port, two parallel printer ports and an RS-232 communications port, according to the spokesman.

A Vector SX with a 737K-byte floppy drive and 10M-byte hard disk is priced at $6,294, including monitor. Other 128K-byte RAM systems range from $4,295 to $9,995.

Vector Graphic is located at 500 N. Ventura Park Road, Thousand Oaks, Calif. 91320.



Wang offers OIS 60 processor

LOWELL, Mass. — Wang Laboratories, Inc. has introduced the OIS 60, a clustered information processor for small and medium-size businesses.

The processor has 33.5M bytes of fixed disk memory supporting up to eight users and five peripheral devices. Standard software includes the company's word processing with advanced functions, decision processing, a sort utility for performing an alphanumeric sort on records, math support and system security. A message control function is also standard, a company spokesman said.

Information processing on the OIS 60 can be optimized through the use of Wang Systems Networking (WSN). Included in WSN is Wang Office, which provides several information management functions within a network including electronic mail, time management, user directories and file management capabilities.

The OIS 60 master, which includes word processing, utilities and advanced functions system software, costs $9,000, Wang Laboratories said from One Industrial Ave., Lowell, Mass. 01851.

SYSTEMS

PERTEC COMPUTER CORP.
4210

Pertec Computer Corp. has introduced a low-end model, the 4210, to its Pick operating system-based Sabre family of computers.

The 4210 includes 256K bytes of memory, a 10M-byte Winchester hard disk, four serial ports and an 800K-byte floppy disk. It can reportedly be field-upgraded to the vendor's 4220 model, which includes 1M byte of memory and 80M bytes of Winchester disk storage.

The 4210 retails for $9,400.

Pertec, 17112 Armstrong Ave., Irvine, Calif. 92713.

MICROCOMPUTERS

DBS INTERNATIONAL, INC.
DBS 16 enhancements

DBS International, Inc. has enhanced its DBS 16 multiuser, supermicrocomputer system so that it supports 28 users.

The system features Intel Corp. 80186 microprocessors; 256K bytes of random-access memory (RAM), expandable to 3.58M bytes of RAM; and storage capacity from 720K bytes to 40M bytes, the vendor said. An optional 20M-byte cartridge tape drive is available, according to the vendor.

The system uses Digital Research Inc.'s MP/M 86 operating system; Digital Research's Concurrent CP/M is an available option. DBS International's DBS-Net links the microcomputers. Prices range from $4,190 to $39,000.

DBS International, Welsh Road and Park Drive, P.O. Box 425, Montgomeryville, Pa. 18936.

AES Data Corp.
AES Savin 7100; AES Savin 7200

The AES Data Corp. has introduced an office workstation, which can reportedly act as a stand-alone word processor, and a word processor with the personal computer capability to support multiple work stations.

The workstation, the AES Savin 7100, can reportedly be used for both word and data processing and supports Digital Research, Inc.'s CP/M 2.2 operating system. Its basic configuration includes 128K bytes of memory, a letter-quality printer, detached keyboard, 12-in.-screen terminal, two disk drives and software for $6,495.

The AES Savin 7200, is a multifunction, shared-logic word processor that uses modular software elements. A four-screen configuration, including one CPU, using both 12- and 16-bit processors, a 10M-byte rigid disk drive and one 45 char./sec letter-quality printer, costs just under $30,000.

The Savin 7200 supports Digital Research's CP/M 86 operating system in addition to the AES proprietary operating system.

AES Data, P. O. Box 10272, 9 W. Broad St., Stamford, Conn. 06904.

DOUBLE GOLD SOFTWARE, INC.
Lock-it-up

Double Gold Software, Inc. has introduced its Lock-it-up copy protection systems for the IBM Personal Computer and compatibles.

According to the vendor, the Lock-it-up system is a menu-driven diskette copy protection and duplication utility featuring several levels of protection for standard diskettes.

The IBM version of the product protects versions that run under IBM's PC-DOS. The protection takes 6K bytes of memory and will work with up to three dual-sided drives.

System requirements include 128K bytes of memory, two or more 40-track disk drives and IBM's PC-DOS operating system. The IBM version of the product costs $495.

Double Gold Software, Suite 29, 3900 Moorpark Ave., San Jose, Calif. 95117.

COLBY COMPUTER
Colby PC-3

Colby Computer has announced Colby PC-3, a transportable microcomputer that is compatible with the IBM Personal Computer.

Colby PC-3 weighs 26 lb, uses an Intel Corp. 8088 microprocessor and has a 9-in. amber screen and two double-sided, double-density disk drives. The unit features 128K bytes of random-access memory, expandable to 1M byte, a real-time clock, serial port and parallel port. It costs $2,795.

Colby Computer, 849 Independence Ave., Mountain View, Calif. 94043.

STORAGE

ACKNOWLEDGE, INC.
AT-1600-PC

Acknowledge, Inc. has introduced a tape backup system designed specifically for the Wang Laboratories, Inc. Professional Computer.

According to the vendor, the AT-1600-PC, a 17.5M-byte system, is file-oriented, allowing users to back up and recover selectively any data they need in the order they want. The 4-track, 6.4K bit/in. serial cartridge drive can handle 17.5M bytes of data per 555 feet of tape.

The unit reportedly is driven by an intelligent interface card that takes up a single slot in the Wang Personal Computer.

The system costs $2,995, which includes controller, cables, tape drive, cabinet, power supply, software, documentation, installation and a one-year warranty.

Acknowledge, 55 Union Ave., Sudbury, Mass. 01776.

ZETRATEC CORP.
Zeke

Zetratec Corp. has unveiled an intelligent subsystem that can be used as a backup for Winchester drives or as a stand-alone unit for small business and personal computers.

Zeke reportedly offers the user full random data accessibility with up to 28M bytes of high-density storage on one cartridge tape. It is compatible with the IBM Personal Computer and Personal Computer/XT. Zeke is plug-compatible with industry-standard interfacing and functions with most regular or mini floppy disk controllers, the vendor said.

The product is priced at $1,995.

Zetratec, 1685 Olympic Blvd., Santa Monica, Calif. 90404.

See STORAGE page 62

Finally a CICS query system that's as easy for the DP department as it is for the end user.

Introducing ExecuTrieve.

From the perspective of the DP professional, ExecuTrieve represents a dramatic breakthrough in query system efficiency.

No disruption. ExecuTrieve operates with your existing files in your CICS environment. It doesn't require costly system changes or any additional programming.

Low overhead. Through the use of our proprietary access method, users can browse or create complex reports with remarkably low I/O and CPU overhead.

Easy to install. ExecuTrieve can be installed and operational in as little as one afternoon.

Of course, efficiency is only half the story. ExecuTrieve makes as much sense for the end user as it does for you. Look at it from the other side.

Introducing ExecuTrieve.

From the perspective of the end user. ExecuTrieve is a remarkably simple, but powerful query system.

Easy to learn. ExecuTrieve is a free-format fully on-line system using simple English syntax and requiring no computer sophistication. An editor even allows you to correct errors anywhere in the text.

Quick response. Our proprietary access method means quicker response to even the most complex queries. In fact, the more complex the query, the quicker the response.

Complete reports. ExecuTrieve has a report generator and graphic capability. So it's a snap for non-pros to develop effective reports.

Efficient for the professional. Easy for the end user. Any way you look at it, ExecuTrieve is a query system worthy of investigation.

Call or write On-Line Software International.

ExecuTrieve for CICS from

ON-LINE SOFTWARE INTERNATIONAL

Fort Lee Executive Park
Two Executive Drive, Fort Lee, NJ 07024
(201) 592-0069, Toll Free (800) 526-0272

MICROCOMPUTERS

STORAGE from page 91

PERTEC COMPUTER CORP.
Magnetic tape option

Pertec Computer Corp. has introduced a ¼-in. magnetic tape drive for use with its Pick & Associates, Inc. Pick operating system-based Sabre Model 4240 multiuser system.

The drive comes with an intelligent controller, reportedly allowing virtually any ¼-in. tape using the Pertec interface to be run.

The tape drive is priced at $6,000.

Pertec, 17112 Armstrong Ave., Irvine, Calif. 92713.

PRINTERS/ PLOTTERS/ PERIPHERALS

IMAGE RESOURCE CORP.
Samurai CFR Model 9

Image Resource Corp. has introduced the Samurai CFR Model 9, a business presentation color graphics system that produces color slides from an IBM Personal Computer, Personal Computer XT, Personal Computer XT/370 or 3270 Personal Computer.

The Samurai is a stand-alone film recorder and graphics processor circuit board that plugs into one of the Personal Computer expansion slots.

According to the vendor, Samurai uses a proprietary continuous writing technology instead of the discrete pixel format of most graphics screens. As a result, there are no ragged edges on graphics elements, the company claimed.

Dual 5¼-in., flexible disk drives and 192K bytes of memory are required.

The Samurai is priced at under $10,000 for the hardware interface, graphics utility software and desktop film recorder.

Image Resource, 733 Lakefield Road, Westlake Village, Calif. 91361.

ENVISION TECHNOLOGY, INC.
Vectorprinter

Envision Technology, Inc. has introduced Vectorprinter, a color text and graphics printer, enhanced to emulate printers and pen plotters compatible with the IBM Personal Computer and Personal Computer XT.

Vectorprinter's capabilities allow business and technical professionals to do word processing and graphics at one workstation, a spokesman said.

Envision has enhanced Vectorprinter to emulate the Diablo Systems, Inc. 630 family of printers, enabling it to run a variety of word processing systems.

The price of Vectorprinter is $3,495 in single-unit quantities, with volume discounts available.

Envision, 631 River Oaks Pkwy., San Jose, Calif. 95134.

BOARD-LEVEL DEVICES

MICROPHONICS TECHNOLOGY CORP.
Oto-1

Microphonics Technology Corp. has introduced Oto-1, a speech recognition system that can convert Microsoft, Inc. MS-DOS software packages to speech input for both menu commands and data entry.

The system consists of a single circuit board that plugs into any auxiliary slot in an IBM Personal Computer, Personal Computer XT or IBM-compatible computer. According to the vendor, a proprietary firmware and software combination provides a transparent interface with the applications program, allowing voice input to be used interactively with a keyboard or another data entry device.

The system includes 16K bytes of random-access memory, expandable to 64K bytes; a 128-word, on-board vocabulary; and better than 98% word recognition accuracy, the company said.

Oto-1 is priced at $795.

Microphonics Technology, P.O. Box 7411, Federal Way, Wash. 98003.

PARADISE SYSTEMS, INC.
Paradise multidisplay card

Paradise Systems, Inc. has introduced the Paradise multidisplay card for the IBM Personal Computer, Personal Computer XT and compatibles.

According to the vendor, the display card provides the user with a color display controller, monochrome display controller and printer interface, all on a single board.

The card is compatible with all IBM Personal Computer software and has the capability to support Lotus Development Corp.'s Lotus 1-2-3 using two displays.

The multidisplay card sells for $595.

Paradise Systems, 150 M. Hill Drive, Brisbane, Calif. 94005.

AUXILIARY EQUIPMENT

PARA SYSTEMS
Minuteman

Para Systems has introduced an uninterruptible power supply model that provides standby emergency power and voltage regulation for most microcomputers, disk drives and word processors.

The Minuteman is rated at 250W, the vendor said, but will safely handle some microcomputers with higher rated power, including the IBM Personal Computer XT.

When power interruptions occur, the Minuteman switches from ac power to its own emergency battery power for up to 15 minutes.

The Minuteman is priced at $485.

Para Systems, Suite 404, 11425 Mathis St., Dallas, Texas 75234.

CEAG ELECTRIC CORP.
Model COM3000

Ceag Electric Corp. has introduced the Model COM3000 triple-output power supply designed for microcomputers.

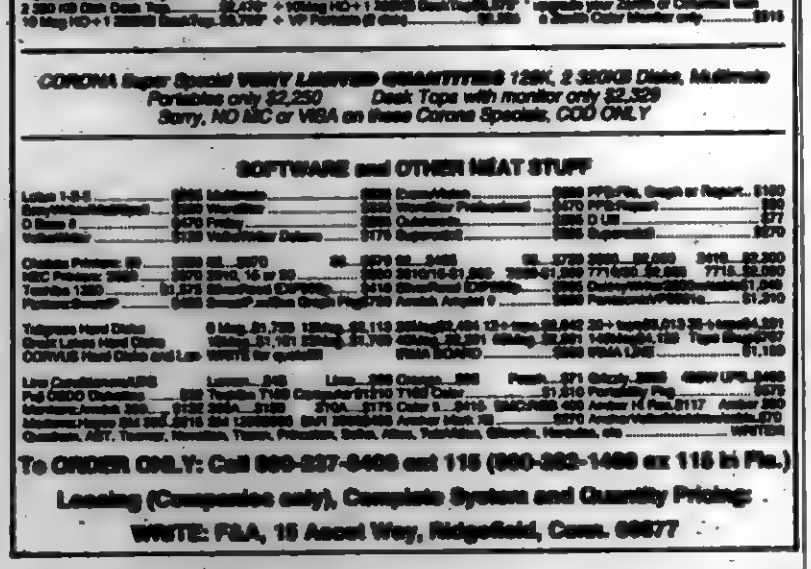
The 80W switching regulator uses a high-reliability flyback converter topology with filtered outputs and transistor-to-transistor logic. According to the vendor, each unit has overvoltage protection, is open-circuit- and short-circuit-proof and meets Federal Communications Commission requirements.

The price is $114 for each COM3000 in quantities of 100.

Ceag Electric, 1324 Motor Pkwy., Hauppauge, N.Y. 11788.

F&A THE HOME OF NO GIMMICK PRICING -
NO FINE PRINT - NO EXTRAS
ALL PRICES INCLUDE SHIPPING, HANDLING, COD or MC/VISA
PC COMPATIBLES TO SAVE YOU A BUNDLE

New! Zenith Z150's | Colombia MPC's | Sanyo MBC 550



CORONA Super Special VERY LIMITED QUANTITIES 128K, 2 320KB Disks, Multimate
Portables only $2,250 Desk Tops with monitor only $2,329
Sorry, NO MC or VISA on these Corona Specials, COD ONLY

SOFTWARE and OTHER NEAT STUFF

To ORDER ONLY: Call 800-227-8400 ext 115 (800-282-1400 ex 115 in Fla.)
Leasing (Companies only), Complete System and Quantity Pricing:
WRITE: F&A, 15 Ascot Way, Ridgefield, Conn. 06877

Here are a few good reasons why you should make Local Data your protocol converter company.

Local Data's comprehensive line of local and remote protocol converters have been used around the world to make async-to-IBM communications simple and economical.

DATALYNX™/3274.
DataLynx™/3274 remote async ASCII protocol converter supports SNA/SDLC or BSC protocols. 80 types of ASCII async terminals can emulate IBM 3278 display stations. RS-232C ASCII async printers can emulate IBM 328X printers.

DATALYNX™/3780.
DataLynx™/3780 async ASCII-to-IBM 3780, 2780, 2770 and 3741 protocol converter supports EBCDIC BSC protocol on one channel and async ASCII devices on the other two channels. Features include transparency, mini/micro support and free file transfer program.

INTERLYNX™/3278.
InterLynx™/3278 allows the attachment of low-cost ASCII CRT terminals or p.c.'s to 3274/3276/4701 and 45XX integrated adaptor Type "A" coax ports. InterLynx/3278 enables the user to use async CRT's on IBM systems and switch to async applications under terminal control.

FILELYNX™/3278.
For micro-mainframe file transfers.

INTERLYNX™/3287.
InterLynx™/3287 allows attachment of ASCII printers to IBM Type "A" coax ports or 3274/3276/4701 controller and 4321/4331 CPU's.

SNA LU1 SCS and LU3 capability are standard with the InterLynx/3287. Features include parallel and serial ports and front panel set-up.

For more information call today.

LOCAL DATA · 2701 Toledo Street · Suite 706 · Torrance · CA · 90503
Telephone (213) 320-7126
Telex # 182518

Local Data
Your Lynx to IBM.

10,000 CICS Users Said There Had To Be A Better Way . . .

We Gave Them GENER/OL™

Feature for unique feature, GENER/OL is the leader in on-line CICS applications development. This 5-star performer channels on-line technology for maximum productivity, efficiency, and flexibility.

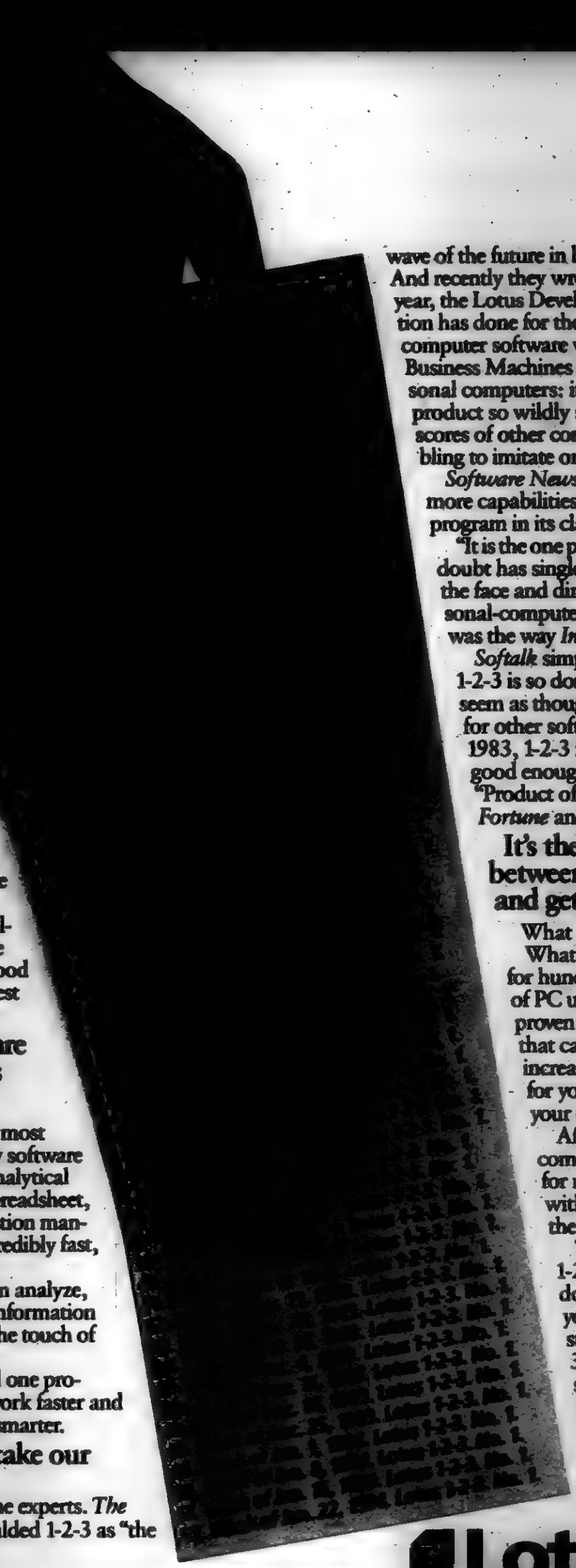
Complete with award-winning documentation and responsive support, GENER/OL offers uncommon software productivity in the Pansophic tradition.

Call us today for the performance of a lifetime!

PANSOPHIC®

(800) 323-7335

Pansophic Systems, Inc., 709 Enterprise Drive, Oak Brook, Illinois 60521. In Illinois, call (312) 986-6000.



In the world of business software, there's only one number one. 1-2-3" from Lotus.

And it's been that way almost from day one. Since January of 1983, 1-2-3 has consistently been at the top of the software best sellers lists.*

And it's the best selling PC software in the world, for one very good reason. It's the very best PC software.

The PC software that simply does more for you.

1-2-3 gives you the most powerful productivity software available today. An analytical tool that combines spreadsheet, graphics and information management into one incredibly fast, easy-to-use package.

With 1-2-3, you can analyze, interpret and report information in seconds with just the touch of a key.

And because it's all one program, you not only work faster and smoother, you work smarter.

But don't just take our word for it.

Take the word of the experts. *The New York Times* heralded 1-2-3 as "the wave of the future in business software." And recently they wrote, "In scarcely a year, the Lotus Development Corporation has done for the world of personal computer software what International Business Machines has done for personal computers: it has created a product so wildly successful that scores of other companies are scrambling to imitate or improve on it."

Software News said, "1-2-3 has more capabilities than any other program in its class."

"It is the one product that without doubt has single-handedly changed the face and direction of the personal-computer-software industry," was the way *Info-World* put it.

Softalk simply wrote, "Lotus's 1-2-3 is so dominant, it doesn't seem as though there's room for other software." And in 1983, 1-2-3 from Lotus was good enough to be named a "Product of the Year" by both *Fortune* and *Info-World*.

It's the difference between getting by and getting ahead.

What can 1-2-3 do for you? What it's already done for hundreds of thousands of PC users. Give you a proven business software that can dramatically increase productivity for you and everyone in your company.

After all, when it comes to looking out for number one, going with number one is the only way to go.

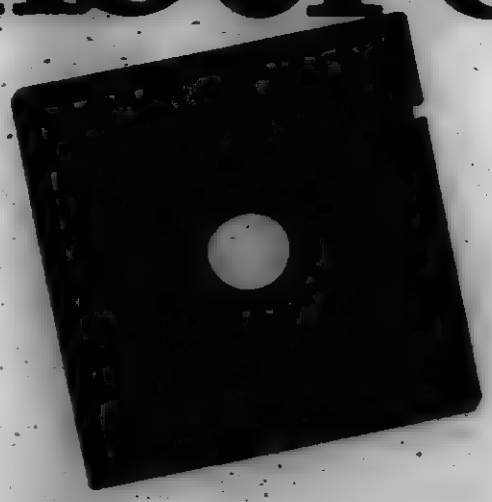
To find out what 1-2-3 from Lotus can do for you just visit your local computer store, or call 1-800-343-5414. (In Massachusetts call 617-492-7870.)

Lotus

The hardest working software in the world.

1-2-3 and Lotus are trademarks of Lotus Development Corporation.
*Based on Soford, Softalk Best Selling Software Lists, 1983.

1-2-3 from Lotus. Maybe the best way to look out for number one is to go with number one.



MICROCOMPUTERS

SOFTWARE

HEWLETT-PACKARD CO.
Lotus 1-2-3, Context MBA for HP 150; Financial Calculator

Hewlett-Packard Co. has announced that Lotus Development Corp.'s Lotus 1-2-3 and Context Management Systems, Inc.'s Context MBA are available for its HP 150 touch-screen personal computer.

The vendor has also introduced its own Financial Calculator, which turns the HP 150 screen into an HP 12C financial calculator. All the features and programming capabilities of the Financial Calculator can be used with the HP 150.

The Lotus 1-2-3 is priced at $500, Context MBA is $695 and the Financial Calculator is priced at $75.

HP, 3000 Hanover St., Palo Alto, Calif. 94304.

STSC, INC.
APL-Plus/PC

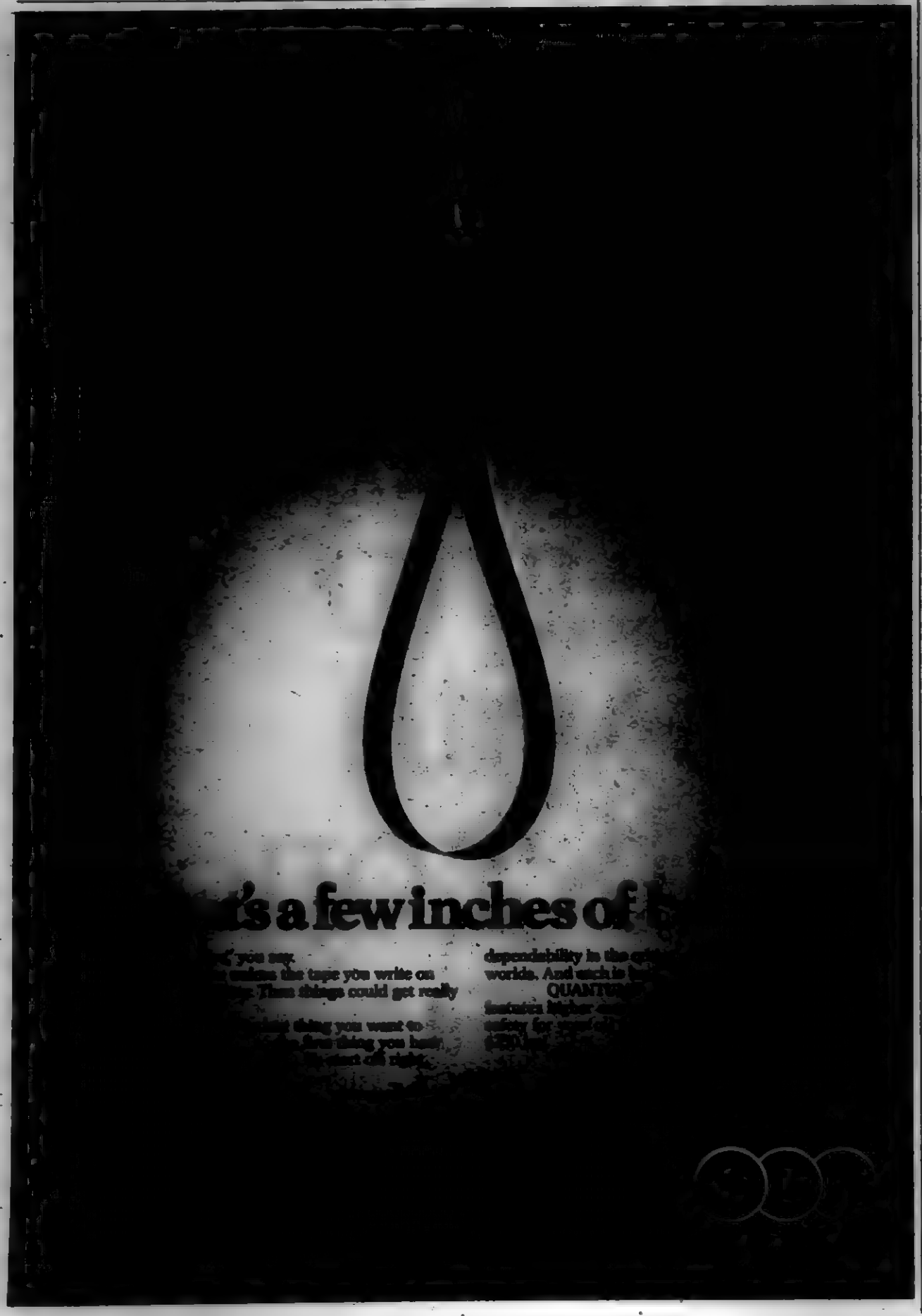
STSC, Inc. has introduced a financial and statistical package containing more than 200 programs for the IBM Personal Computer and other compatible machines.

The APL-Plus/PC financial and statistical library includes routines to perform financial calculations, forecast time series and compute statistical measures. Programs include six different types of depreciation, more than 20 types of rate-of return, 10 types of forecasting and 25 probability distributions, the company said.

It runs under IBM's PC-DOS on the IBM Personal Computer or Personal Computer XT, the Compaq Computer Corp. Compaq and compatibles.

It is priced at $275.

STSC, 2115 E. Jefferson St., Rockville, Md. 20852.



DIGITAL EQUIPMENT CORP.
Protocall 350, 1000

Digital Equipment Corp. has introduced Protocall 350 and Protocall 1000, two software applications that use the telephone management system hardware option for the Professional 350 computer.

Protocall 350 allows telephone users to replace a number of functions of a desk telephone and all telephone and address reference files, such as business card files, personal phone directories and calling calendars. It automatically places phone calls using the telephone management system.

Protocall 1000 includes all the features of the 350 and also expands the smart directory functions into a personal data base system, the company said.

Protocall 350 costs $195; Protocall 1000 is priced at $395.

DEC, 146 Main St., Maynard, Mass. 01754.

APPLIED BUSINESS TECHNOLOGY CORP.
Project Manager Workbench

Applied Business Technology Corp. has introduced the Project Manager Workbench (PMW), a software package designed as a decision support system for the project manager.

System requirements are an IBM Personal Computer or Personal Computer XT with one disk drive and 256K bytes of memory. According to the vendor, the PMW integrates Gantt charts, networks and resource allocation spreadsheets.

Data entry is done by cursor control to reconfigure a plan and cut-and-paste activities across multiple projects; an optional expert mode is also featured with single keystroke commands.

The product is priced at $750.

Applied Business Technology, 76 Leight St., N.Y., N.Y. 10013.

FOX RESEARCH, INC.
Forms Manager

Fox Research, Inc. has announced an enhancement to its 10-Base relational data base management system said to permit users to format and compose documents from information stored on their IBM Personal Computer, Personal Computer XT and compatible microcomputers.

The enhancement, called Forms Manager, reportedly allows 10-Base users to create documents of any length, unrestrained by the size of their screens. It also permits forms to be filled in automatically with data drawn from the user's data base files, the vendor said.

10-Base, including Forms

MICROCOMPUTERS

Manager, costs $495 and runs on the IBM PC-DOS 2.0 or Microsoft, Inc. MS-DOS 2.0 operating systems. Existing 10-Base users may acquire the enhancement for $15.

For Research, 7005 Corporate Way, Dayton, Ohio 45459.

DATAMENSION CORP.
Report Manager 3-D enhancements

Datamension Corp. has enhanced Report Manager 3-D, a three-dimensional spreadsheet that runs on the IBM Personal Computer.

One enhancement that works with communications software allows a user to cut and paste information from any microcomputer, minicomputer or mainframe, according to the vendor. Other improvements include support of color monitors, key word search, expanded local and global formats and nested sorting capability, the vendor said.

Report Manager is priced at $495, the vendor said.

Datamension, 615 Academy Drive, Northbrook, Ill. 60062.

See SOFTWARE page 98

USE from page 88

were getting the micro-based tools they wanted, but they wanted access to the corporate data bases, too.

The information center and the personal computer are both incomplete solutions. The information center is controlled, secure and elitist, and the personal computer is spreading wildly. Information center growth is limited by tight coupling to mainframes. Micro users are stymied by the unavailability of information from corporate data bases.

These two worlds must be brought together into a better concept called the Personal Information Center. The Personal Information Center gives users the choice between using personal reporting systems on IBM 3270-type terminals and using personal computers with direct access to corporate data bases. It must be under the control of MIS because data base access must be protected by a high level of security. MIS also must control priorities on the mainframe.

The coming of the Personal Information Center has been accelerated by some important product announcements. On the hardware side, the IBM 3270-PC physically combines the 3278 and 3279 terminals and the IBM Personal Computer in one box. It offers application developers the opportunity to build more friendly applications. It does not, however, offer direct downloading from data bases to personal computer applications. For that capability, MIS directors will have to turn to software companies.

As the Personal Information Center evolves, we think it will display a number of characteristics:

- Hardware and software will be engineered for strategic use. MIS will reject hot products which can't demonstrate staying power, extensibility and high quality.
- Data base access will be well-secured but also timely and available to all qualified users, whether from a personal computer or terminal.
- Mainframe software will be able to extract data from all pertinent data bases while allowing users to select only the data they need. Users will not have to download entire files when they only want selected records from these files.
- Personal computer users will insist on extraction software that works naturally and automatically with their favorite micro programs.

It's been almost a year since my friend's call. During that time a lot has happened, including a series of meetings he's had with his division MIS director. My friend hasn't thrown away his calculator and 13-column pads. He's now working with MIS to develop a Personal Information Center, and the two analysts will be among the center's first users.

Haanes is vice-president of the New Business Division within the Software Products Group of Information General Corp.

When You Need Computer Equipment Moved!

Rely On Experts

- One-Day Pick-up and Delivery
- Specially Equipped Radio Dispatched Trucks
- Competitive Rates
- Air Freight Handling
- Warehouse Facilities
- Full Insurance Coverage

Serving Southern California Since 1970

For more details, call toll-free:
(800) 821-5270
U.S. except Calif.
(800) 521-5537
California

Southern California Delivery Service Computer Transportation, Inc.
8314 S. 48th Street, Los Angeles, CA 90062

Announcing

The one-stop, international advertising service for micro marketers.

You'll reach microcomputer buyers all over the world with *Computerworld's* International Marketing Services (CWIMS). Because we have the microcomputer market covered with an international network of publications. And what a market!

As the need for computerization in government, industry and educational systems all over the world becomes more acute, countries look to the cost-effective, adaptable microcomputer to bring them into the computer age. This means a very lucrative market for the U.S. micro marketer, since international product demand exceeds product supply.

Now, with the help of *Computerworld's* International Marketing Services, you can advertise in 15 magazines devoted exclusively to supplying information to microcomputer users in: Australia *(MicroWorld, PC World)*, Brazil *(MicroMundo)*, Denmark *(Micro Verden)*, Finland *(Mikro)*, France *(Golden, PC World)*, Japan *(PersoCom World)*, Norway *(Mikro Data)*, Sweden *(MickoDatorn, Min Hemdator)*, Spain *(Micro Sistemas)*, The Netherlands *(Micro/Info)*, West Germany *(Micro-Computerwelt, PC Welt)*. And, your advertising message can reach buyers of microcomputer products and services around the world through special micro sections in any of our 40 publications in 25 countries.

Act now—and take advantage of this international demand for microcomputer products. Whether you want to test the market—or locate a distributor or representative—our publications will put you in touch with the right people around the microcomputer world.

For more information on getting international micro coverage, call Diana La Muraglia, General Manager, International Marketing Services, toll-free, at 800-343-6474. In Massachusetts, call 617-879-0700 or return the coupon below.

CW COMMUNICATIONS/INC.

Diana La Muraglia, General Manager
International Marketing Services
CW Communications/Inc.
375 Cochituate Road, Box 880
Framingham, MA 01701

Please send me information on:
☐ Your microcomputer publications ☐ Your other foreign publications

Name _____ Title _____
Company _____
Address _____
City _____ State _____ Zip _____

SOFTWARE from page 97

SAMNA CORP.
Samna Word III

Samna Corp. has enhanced Samna Word, a word processing package that runs under Microsoft, Inc.'s MS-DOS operating system.

Features of Samna Word III include glossaries, user-defined function keys, five mathematical functions and a spelling checker. The package includes automatic indexing, section numbering, table of contents generation, keyboard-to-printer typing and support of tree-structured file-directories, the vendor said.

Samna Word III costs $650.

Samna, Suite C-1200, 2700 N.E. Expwy., Atlanta, Ga. 30345.

MICRO FOCUS, INC.
Level II Cobol compiler; Animator; Forms-2

Micro Focus, Inc. has announced that IBM will market several Micro Focus programs for use with the IBM 3270 Personal Computer. They include Level II Cobol compiler and native code generator, Animator debugger and Forms-2 source code generator.

According to a spokesman, the Level II Cobol compiler is the only General Services Administration-certified high-level Cobol for micros.

Animator is available for $800, Forms-2 for $400, Level II Cobol for $1,600, all from IBM representatives.

Micro Focus, Suite 400, 2465 E. Bayshore Road, Palo Alto, Calif. 94303.

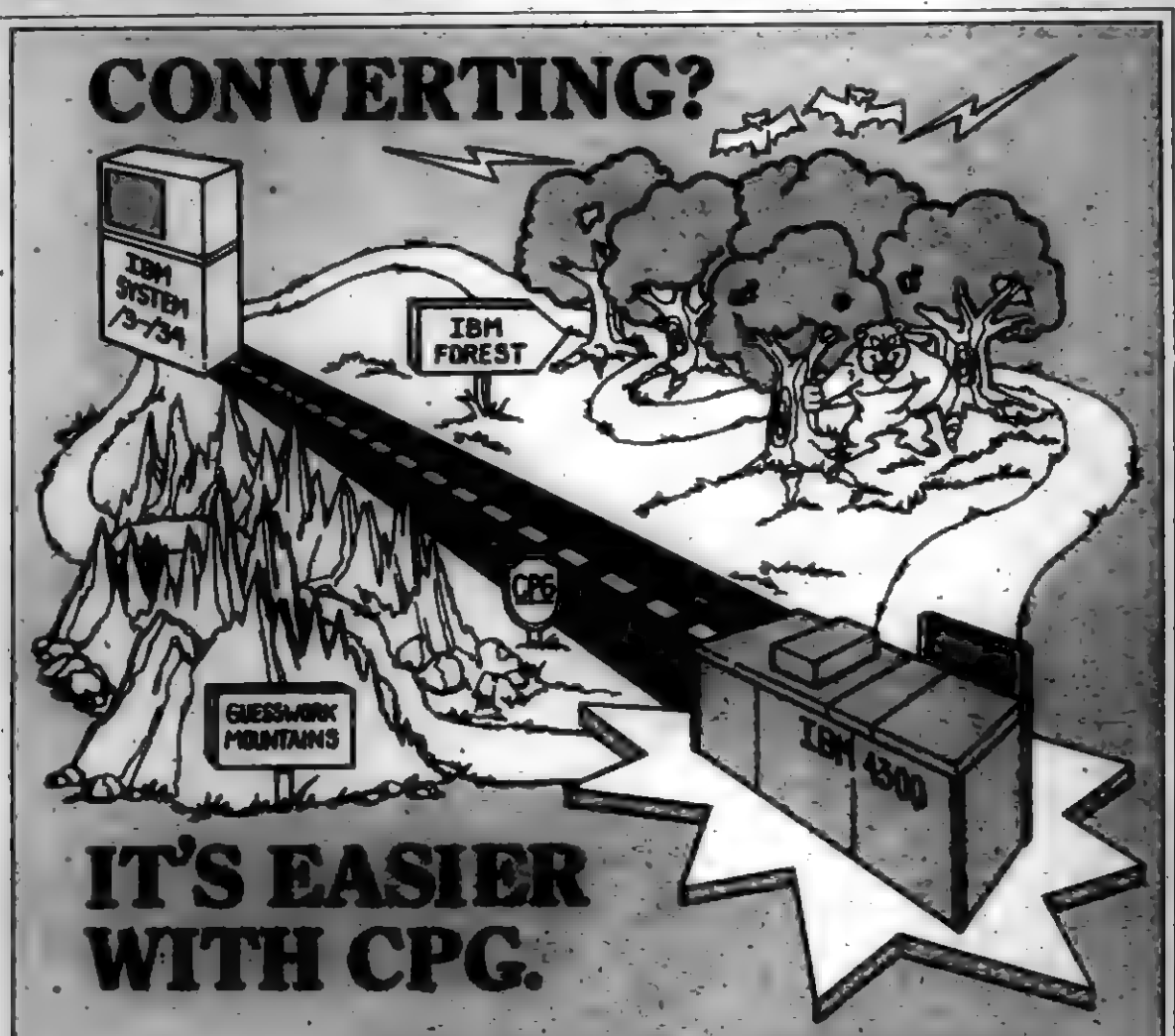
GRYPHON MICROPRODUCTS
Dbelper Part 1

Gryphon Microproducts has introduced Dbelper Part 1, a utility that assists in the writing of Ashton-Tate Dbase code. The new program reportedly allows users to set listing parameters, do macro substitution and, using the program's syntax checker, conduct error accounting.

The program also is said to produce a cross-referenced and alphabetized data dictionary of variables, keywords, constants and files. It also allows users to merge multiple procedures into a single procedure requiring no editing to run.

The program is available from the vendor for $150.

Gryphon Microproducts, P.O. Box 6543, Silver Spring, Md. 20906.



IT'S EASIER WITH CPG.

Make the move to your IBM mainframe painless and productive. Buy CPG before you convert.

CPG is the on-line program generation system from Altergo Products. It's easier to use and far more machine efficient than UFO™, MANTIS™, or TRANSIV™. It's just the system you need to prepare for a bigger machine without bigger headaches.

- CPG is easy to apply. Existing programmers become on-line experts in 1-3 days.
- CPG automatically generates optimized re-entrant, multitasking programs. Easy to create. Easy to maintain.
- CPG is powerful. Includes arithmetics & histogram output; simplifies screen-mapping & screen-editing; complex interfacing to TP system is handled by CPG.
- CPG is efficient. Standard processing routines and most common routines are incorporated into the Central Routine Library (CRL). This eliminates code duplication, loading and re-loading of common code at execution time.
- CPG programs are transportable. The CRL allows programs written in CPG to work under DOS or OS and run under CICS or SHADOW II.
- CPG is user-responsive. It allows you to develop, test and implement on-line systems in less than half the normal time at the terminal before the user's eyes.

Whether converting or simply looking for an easy way to meet the on-line workload, go CPG. Go Altergo. Call for more information today.

"The first programming tool I've ever eaten. Even with CPG."

Altergo Products Inc.
400 West Cummings Park, Woburn, MA 01801
Telephone: 617-938-8811. Telex 951-265
A THORN EMI Company

SHOP from page 83

the first month, the company now mails out about 30 packages per day, according to Lynch. About 80% of The Programmer's Shop's customers are divided evenly between commercial software developers and programmers in Fortune 1,000 companies, with consultants making up the difference. Previously, many of those clients had worked through high-volume mail-order houses or directly with manufacturers to obtain software like linkers, compilers, editors and debuggers. The Programmer's Shop maintains a stock of about 80 products and claims to have ready access to 300 more.

Of equal importance to many users are the firm's evaluation criteria. About 70% of the inquiries that come into The Programmer's Shop ask for product literature, which the retailer sends out in abundance. Customers who call the company offices can get a critical evaluation of various packages, although the evaluations are not made publicly available, Lynch said. The Programmer's Shop also maintains a list of products it has found to be "real junk," he said.

The firm is now trying to establish an information-sharing network for customers. Users typically contribute ideas and opinions to the electronic bulletin board and newsletter, and Lynch is working to put together a compendium of benchmark results submitted by customers. The results will be distributed free on diskette to anyone who contributes, he said.

The concept of this kind of specialization has apparently succeeded because programmers have a much greater stake in the quality of the software they buy, Lynch said. "A typical micro programmer might use his micro six hours a day or more," he noted, "whereas someone using Wordstar might use his machine for a half-hour."

Customers seem to concur that the clearinghouse is worthwhile. "I basically don't buy from anybody unless I buy from them," said Peter Norman, a consultant with Project Technology, Inc. in Cambridge, Mass., who said he has bought nearly 100 packages from the company. "We get a pretty good discount, and they also know something about software. They're by no means perfect, but they're so much better than anybody else."

Another customer agreed. "They're probably one of the best software vendors we've found," said Ray Ostolski, manager of Engineering Management Systems in the Apparatus and Engineering Services Operation at General Electric Co. in Schenectady, N.Y.

The Programmer's Shop uses a method to evaluate software without actually plugging it into a machine, Lynch said. Potential suppliers fill out a form detailing their experience, special features, documentation and other information. Lynch said he can scan the sheet and make a preliminary evaluation "in about 30 seconds." Technical specifics, he said, are the key.

"Products usually deliver to technical claims, but not to marketing claims," he said. "In order to get a good idea, I eliminate everything except the market leader. Then I compare everything else with that."

The Programmer's Shop is located at 908 Providence Highway, Dedham, Mass. 02026.

COMPUTER INDUSTRY

INDUSTRY INSIGHT
Peter Berlofik
CW Senior Editor

Fujitsu: answer to PCM prayers?

If you like coincidences, then you just had to get a kick out of the two Amdahl Corp.-related announcements a week and a half ago. The same day Amdahl announced two 6000 series disk drives to compete with IBM's 3380 product, it was announced Fujitsu Ltd. had boosted its ownership in Amdahl to just under 50%.

The disk drives announced by Amdahl, the Models AA4 and B4, are both reportedly manufactured by Fujitsu, and the betting is that before too long all Amdahl products will be value-added versions of Fujitsu products.

"Fujitsu has done reasonably well manufacturing disk drives on an OEM basis," Dale Kutnick, executive director of The Yankee Group, said following the Fujitsu stock announcement: "There is an opportunity there, particularly with the decline of the U.S. disk makers . . . if Fujitsu can get its act together."

The effective takeover could provide a much-needed spark to the entire plug-compatible market. Fujitsu has an array of products spanning the whole spectrum of information processing requirements, from personal computers to supercomputers. It also has reported revenues in the $4 billion range, a very healthy position from which to twitch the nose of IBM. Certainly, Fujitsu appears to have potential staying power that others in the field lack.

Computer industry analyst Bill Easterbrook, of the investment firm of Kidder Peabody and Co., Inc., noted, "Fujitsu has financial resources and

See FUJITSU page 116

'Simple' maker files Chapter 7

Facing $4 million debt

By Paul Kenenbaugh
CW Staff

LEXINGTON, Mass. — The worst fears of 49 employees of Data Concepts International, Inc. were realized March 5 when Thorpe Wright, company president, announced the company was filing for liquidation under Chapter 7 of the Federal Bankruptcy Act.

Faced with approximately $4 million of debt, hounded by 154 creditors and unable to attract sufficient capital to continue operations, the company turned over to the court its assets, including Simple, an application generator for Motorola, Inc. 68000-based systems.

Founded in 1975 by Wright, Calvin Moore and Andrew Diamond, Data Concepts, Inc. began developing a programming language and an application generator. "Initially, we had $10,000 to finance the company," Wright said.

In early 1982 with Trace, the programming language, and Simple, the application generator, completed, the company attracted $1 million in venture capital and changed its name to Data Concepts International.

"To demonstrate the application generator's power, the company chose to market the product to insurance companies and develop commercial line systems," according to a former employee, who asked not to be named.

Commercial lines represented the last principally manual insurance application. Software for the task had to be flexible enough to use a series of complicated tables and rates, while providing an on-line data base and real-time updating.

Data Concepts approached a number of insurance companies and offered them, at a fixed cost, a custom-designed commercial line system. But contract specifications did not define the system. "The company gave the users carte blanche reign," the former employee said. "Whatever they

See BANKRUPT page 114

IBM, AT&T seen squaring off

By John Gantz
CW Staff

NEW YORK — Battle lines are being drawn between titans AT&T and IBM, and the imminent confrontation will be waged for the most part in the automated office.

That was the message delivered at a Gartner Group conference, titled "AT&T and IBM: The Battle Begins," held here last week. The two-day conference examined the perceived strengths and weaknesses of the two companies, as well as the markets in which they are likely to butt heads.

AT&T, it is believed, will try to leverage its dominance in the communications industry to enter the markets for computing and office systems equipment.

According to Stephen P. Cohen, vice-president and director of Gartner's Industry Service, AT&T's ultimate goal is to become an end-to-end information products and services company that will "provide an alternative to IBM where appropriate and coexist with IBM where necessary."

AT&T strengths that will aid that bid include, among other things, an enormous financial presence, large personnel resources and demonstrated manufacturing prowess, Cohen said. He also praised AT&T's "apparent newfound corporate flexibility in its willingness to fill gaps in its product line from external sources."

Weaknesses that AT&T must overcome,

See AT&T page 116

CDLA

Targeting industries for government support has caused Japan "terrible trouble," a Commerce Department official tells the Computer Dealers and Lessors Association/**106**

ipl SYSTEMS INC.

IPL Systems, Inc. last week reported a net loss of $4.2 million for 1983, with revenues down $5.1 million/**109**

INSIDE

■ U.S. officials arrive in Japan to try and head off a crisis over a proposed software law that could require U.S. software houses to reveal their program codes/**106**

■ Tandon Corp. consolidates two California divisions and cuts another 1,000 jobs in favor of offshore production/**110**

Developers of reusable code get a second chance

By Paul Gillin
CW Staff

WELLESLEY, Mass. — The world will take little note of the passing of Readycode from the software market.

Introduced in 1981 by Raytheon Computer Services, the product incorporated an advanced technology called reusable code, but it enjoyed only limited success. After nearly three years on the market, Readycode had only about 20 users.

But Readycode is not gone from the scene. Enhanced and renamed Programaster, the product is now being marketed by a small company here that spun off from Raytheon Computer Services early this year.

Master Software, Inc. was formed when a group of Raytheon employees this year acquired venture capital and bought Raytheon Computer Services for $3 million, although Raytheon Co. still maintains a 20% share in the new company.

The firm's Programaster employs reusable technology to generate large-scale application programs on IBM mainframes, according to Larry Martin, former general manager of Raytheon Computer Services and president of Master Software.

Freed from the administrative burden of a massive parent company, Master Software hopes to be more successful at establishing an identity for reusable software. Programaster uses a Readycode base but employs such enhancements as full screen editing and improved data base access, as well as access to IBM Vsam files and an upgrade from Cobol 68 to Cobol 74.

Martin

The viability of reusable software is based on the generally accepted view that 80% of all business software code has been written before. If commonly used modules are made reusable and tied together through structured designs and logic structures, productivity improvements of up to several hundred percent can be realized, advocates argue.

Martin said the limited success of Readycode was not due to weaknesses in the product so much as to the difficulties of promoting a new and poorly understood technology within a large company. "Raytheon was a $6 billion company with a $3 million piece selling Readycode," he said in a recent interview. "In a company that size, the approval cycles are so long that it is very difficult to get things done."

Despite its apparent productivity benefits, reusable software has been only mildly successful. A major reason is that the concept is still poorly understood by most technicians, Martin added. "We didn't position Readycode well," he said. "We went first into the marketplace for productivity tools and then later switched and moved into code generation. The problem with having a product that is like little else in the market is that you have to fit yourself into somebody else's definition."

However, the concept is beginning to gain respect, according to Martin. "Two years ago it was almost impossible to get anybody to talk about [the concept]," he stated. "But recently, we've seen our sales cycles drop dramatically." Users now appear more willing to invest in this technology, he said.

Master Software still faces a formidable task. Its primary competition comes from established vendors of fourth-generation languages and application generators. However, Martin believes the line between those tools and reusable software will become clearer as the technology becomes better understood.

Master Software intends to promote the concept of a "reusable architecture" with an on-line version of Programaster, a screen generator and a tool oriented toward managing development.

COMPUTER INDUSTRY

U.S. officials decry Japanese copyright plan

By Robert Hott
CW West Coast Bureau

TOKYO — Top U.S. government officials are currently locked in urgent negotiations with Japanese authorities here in an attempt to forestall a crisis over software copyright protection.

The U.S. team arrived here recently as the deadline over a controversial proposal from Japan's Ministry of Trade and Industry (Miti) drew near. The Miti plan calls for replacing current Japanese copyright laws with a 15-year protection. It would require U.S. software houses to license and disclose their program code before a software product could be sold in Japan when the ministry deems such software to be "important to public welfare."

The proposal has led to an outcry from American electronic and computer trade associations, with U.S. officials threatening to retaliate by removing copyright protection from Japanese software sales in the U.S. Currently such software is protected for 75 years.

Top U.S. trade negotiator Clyde Prestowitz, assistant to Commerce Secretary Malcolm Baldrige, has also warned that action might be taken against sellers of Japanese software in the U.S., under domestic trade laws, if the Miti proposal is implemented.

Industry and government officials had hoped the controversy would be resolved at a recent meeting of the U.S.-Japan Work Group on High Technology Issues here, but instead Japanese officials imposed a March 27 deadline for submission of a draft proposal to the Japanese legislature.

"While we had been optimistic that the proposal from Miti would sink quietly beneath the waves, it appears the issue is still unresolved, and we are continuing to push for U.S. software interests," commented Charlotte LeGates, information officer for the Computer and Business Equipment Manufacturers Association, which has been lobbying the Reagan administration to fight the proposal.

The March 27 deadline sent U.S. officials, headed by Prestowitz, scurrying back to the Japanese capital for a new round of negotiations.

"We have continually expressed our opposition to the Miti proposal. The essential issue here is one of international law," commented Maureen Smith, director of the Office of Japan at the Commerce Department in Washington, D.C.

Smith said Miti is attempting to gain jurisdiction over the software industry in Japan with a law that would place software products outside conventional copyright protection.

"The law they are proposing is not a copyright law. Once software is covered by some other law, the Japanese will no longer be subject to international copyright agreements, and there is nothing to stop them [from] amending the arrangements to suit their needs," she contended.

The Miti proposal has also reportedly sparked a fierce fight for political power inside Japanese government circles. Currently, software copyright is administered by the Ministry of Education, which has issued a counterproposal to the Miti plan via its Copyright Council.

The Ministry of Education plan, which would offer copyright protection for software for a period of 50 years, is being backed heavily by U.S. trade associations and the Commerce Department.

Go beyond equipment compatibility.
Reach for total performance.

The Zenith Z-100 PC's.

In the white heat of the slalom, something clicks: skier and skis meld into one, and hurtle toward total performance. And, in your office, you'll experience that same kind of oneness with our new IBM-compatible Zenith PC's.

Their enhanced features actually take you beyond IBM compatibility. Like internal expandibility that allows you to add peripherals without adding size. Storage that can expand up to 11 megabytes. The ability to run virtually all software designed for the IBM PC. And a detached keyboard with a "smarter" key layout for added convenience.

The Z-150 PC

The portable Z-160 PC

Reach for total performance with the desktop and portable Z-100 PC's: call 1-800-842-9000, ext. 1, for the name of your nearest Zenith dealer.

For the Zenith Data Systems Dealer nearest you call
1-800-842-9000 Ext. 1.

ZENITH | data systems
THE QUALITY GOES IN BEFORE THE NAME GOES ON

© Zenith Data Systems

Tymshare deal to tie info group

ST. LOUIS — McDonnell Douglas Corp., which is in the process of acquiring Tymshare, Inc., announced recently it will combine Tymshare with three of its other subsidiaries into a $1 billion Information Systems Group.

Tymshare, operator of Tymnet, is in the process of being acquired through a stock tender offer that expires at the end of the month. McDonnell said it would combine Tymshare with McDonnell Douglas Automation Co. (McAuto) of St. Louis; Microdata Corp. of Irvine, Calif.; and Vitek Systems, Inc. of St. Louis.

McDonnell's president, John F. McDonnell, will assume the additional position of chairman of the new group, which will combine a total of about 12,000 employees and is expected to have sales in 1984 of $1 billion, a spokesman said. Other members of the executive board for the new group will be Robert A. Fischer, president of McAuto, and Gary E. Liebl, president of Microdata.

The first vertical industry business to be established in the group will be McDonnell Douglas Health Systems, Inc., comprised of the Health Services Division of McAuto and all of Vitek, which makes automated laboratory testing equipment.

How 3 famous names got together to

SOLVE YOUR PROBLEMS OF INTELLIGENT MICRO TO MAINFRAME CONNECTION.

Get the answers you're looking for—with the VisiAnswer Software System from Informatics, the leader in mainframe to micro integration.

Informatics has teamed the best minds in the business to solve the problems of intelligent mainframe data access for microcomputer users. The VisiAnswer™ Software System is the breakthrough result of a unique team involving Informatics Corporate Micro Systems and VisiCorp™ products working with IBM® Personal Computers.

VisiAnswer solves the timely problems plaguing data processing professionals like you.

Available for use right now, the VisiAnswer Software System is the micro to mainframe system specifically designed to help you:

- Manage *and* control the integration of microcomputers with your current mainframe—right in *your* data processing department.
- Provide your company's micro end-users with access to specific mainframe data—without wading through unrelated information for hours.
- Maintain *security*/control of restricted portions of your corporation's data.
- Supply end-users access to *current "live" information*, instead of information that's historical and obsolete.
- Intelligently access *all* mainframe data, whether it's unique application data or part of a data base management system.

VisiAnswer makes your job easier and more efficient than ever.

With more and more managers and analysts in your company using desk-top computers these days, there's a tendency to improvise the way they obtain the data they need. That leaves the door wide open for mistakes and inaccurate information.

Now you can avoid these problems and maintain a high level of data-processing efficiency for everyone who needs access to that data with the VisiAnswer Software System. It delivers intelligent solutions that make current mainframe data available to your end-users in an orderly fashion. That makes their jobs *and yours* easier and more accurate—something upper management will appreciate.

VisiAnswer was designed by the best minds in the business to fit your business.

You get Informatics' expertise in data access technology and mainframe system software... plus VisiCorp's expertise in user-friendly micro software. We chose the IBM Personal Computer for its leadership in delivering business solutions, and IBM chose us as a value-added remarketer.

This system works with *all* data bases on IBM mainframe systems. And your end-users will get data that is immediately usable with all Visi Series™ Products and other products utilizing the VisiCalc® file format.

Find out more about Informatics VisiAnswer system. Mail this coupon or call toll free today. See how VisiAnswer products can fit into your Personal Information Center as an integral part of your unique business strategy.

Get the facts on VisiAnswer—
the intelligent micro to mainframe connection.

Mail this coupon today or call toll free

1 800 227-3800 Ext. 911

(In Canada, call collect, 0 416 488-7192)

Informatics general corporation

THE SOFTWARE ENGINEERS

VisiCalc is a U.S. Registered Trademark of VisiCorp.
U.S. Registered Trademark applications pending for VisiCorp, VisiPlot/s and VisiTrend/s.

VisiAnswer Information Coupon

Mail to: Informatics, Free VisiAnswer Information,
P.O. Box 1452, Canoga Park, California 91304

I want to know how the VisiAnswer Software System can provide intelligent solutions to my micro to mainframe problems.

☐ I'd like to see the VisiAnswer Software System at work. Please contact me to arrange a free, no-obligation VisiAnswer demonstration.

☐ I'd like more information on your VisiAnswer Product. Please see that I get the full details, without cost or obligation.

Your Name _____ Title _____

Company Name _____ Phone No. (Include area code) _____

Address _____

City _____ State _____ Zip _____

CW-AV

TELETYPE CORPORATION.

WHAT'S NOW IN FRONT OF OUR NAME IS ALSO BEHIND US.

AT&T

Teletype Corporation

At Teletype Corporation, we've changed our logo. But as a part of the AT&T family, our commitment to supplying you with the latest in communications products and services hasn't changed.

With our own sales and marketing force, service organization, manufacturing facilities and distribution network, we're in an ideal position to meet all of your needs. And with the ingenuity of our expanding R&D, we're developing the kinds of terminals and systems the Information Age demands.

Today, our full line of printers and CRTs fit a wide variety of applications—from simple message transmission to sophisticated programming. Each and every terminal boasts user-friendly features that exemplify traditional Teletype Corporation quality.

We're also actively branching out into new areas such as intelligent terminals. Our 5620 intelligent graphics terminal, for example, is indicative of the kind of terminals you'll be working with in the future. It's a UNIX*-based CRT that can perform up to six functions simultaneously.

But while we're exploring new areas, we're also improving the products that have earned Teletype Corporation a strong reputation for value. Take our 5540 line of terminals. It represents our third generation of 3270-compatible devices. And we're continually adding to it, developing new displays, printers, keyboards and controllers to enhance the cost-effectiveness of your system.

Now that you've seen our new logo, it's time you took a closer look at what we can do for you. To find out more about our products and services, write Teletype Corporation, Dept. 3223-F, 5555 Touhy Ave., Skokie, IL 60077. Or call **1-800-323-1229, ext. 932.**

*UNIX is a trademark of Bell Telephone Laboratories, Inc.

©1984, Teletype Corporation.

U.S. officials optimistic about trade with NTT

By John Giuliano
CW Washington Bureau

WASHINGTON, D.C. — High-level U.S. trade officials and several American businessmen said recently they are confident U.S. firms will increase sales to Japan's Nippon Telegraph and Telephone Public Corp. (NTT).

The two countries earlier this year renewed a three-year agreement aimed at facilitating American sales to NTT. The new pact contains a number of proposals the U.S. requested to make the agreement more effective. Sales in 1983 were an estimated $142 million, a threefold increase over 1982. NTT's annual high-technology procurements exceed $3 billion.

U.S. Ambassador William E. Brock, the U.S. trade representative, told the House Subcommittee on Telecommunications, Consumer Protection and Finance that the negotiations leading to the pact's renewal were "an unqualified success" for the U.S. He added that the agreement will lead to greater sales if there are "well-planned and aggressive sales activities by U.S. firms and good faith efforts on the part of NTT."

Commerce undersecretary Lionel Olmer, who heads the department's International Trade Administration, which is responsible for implementing the agreement, said he believes NTT is interested in getting the best equipment at the best price, no matter who provides it, and does not see its main responsibility as furthering government high-technology protectionist policies.

"NTT should not be painted with the brush of Japanese industrial policies," according to Olmer, who said he is "strongly optimistic" about sales to NTT. "We are today on a better footing with NTT than ever before, and our companies support this view without exception," he told the subcommittee.

Providing a businessman's view of NTT, Charles P. Lecht, chairman of Lecht Sciences, Inc., a New York software developer, said he just completed successful negotiations with NTT to sell them Lecht Sciences' educational software products.

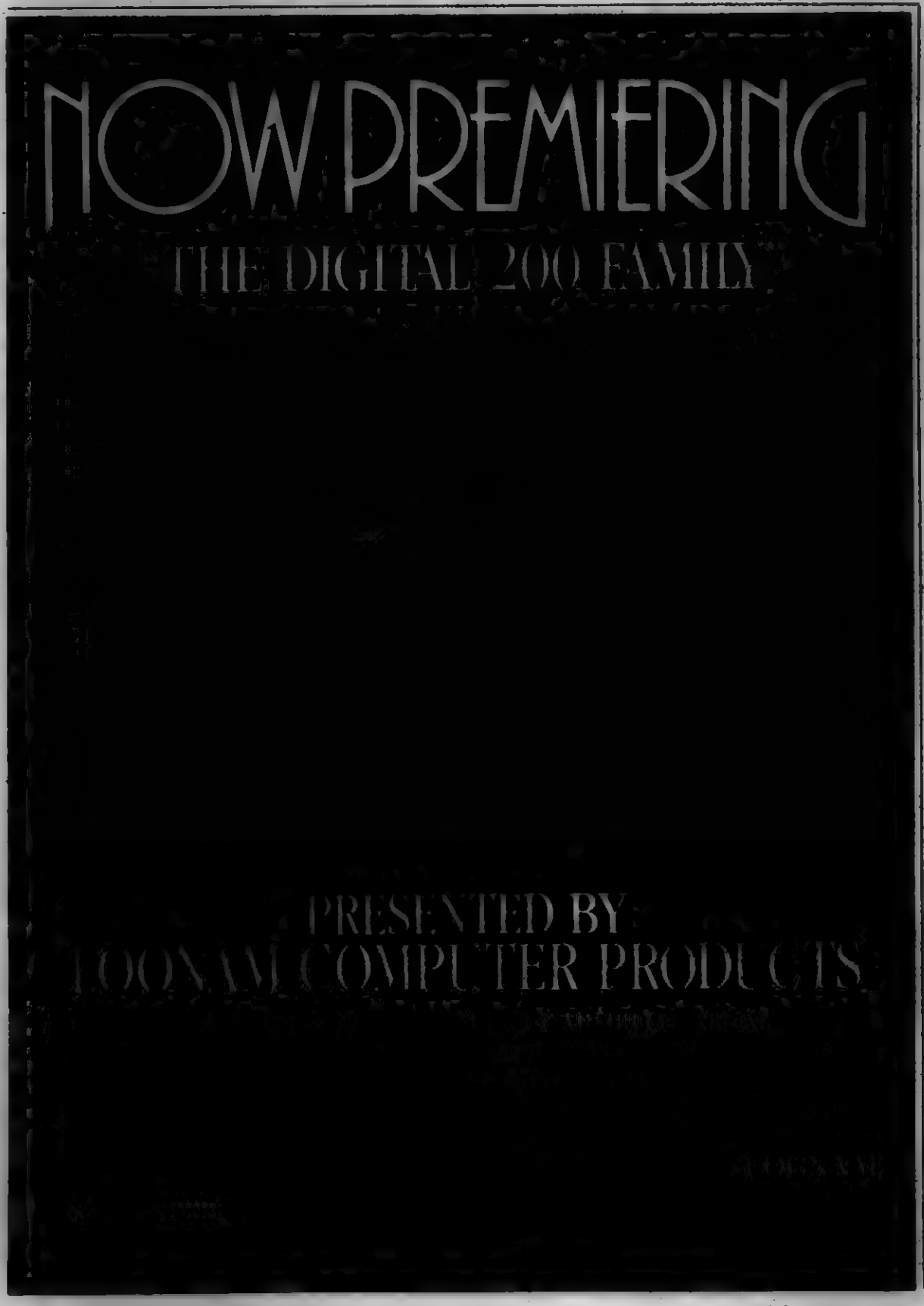
"I found NTT to be a tough but fair negotiator who knew exactly what it wanted and what it wanted to pay. . . . In the end, we both made some compromises and concluded a fair contract," Lecht told the subcommittee.

Lecht said, "Japan is not a closed market, and NTT is not impossible to deal with. What barriers exist are no greater than similar barriers in other nations. In my experience, contract negotiations even with our own government can be complex and drawn out."

He added that his company benefited from his previous business experience in Japan and expert outside counsel during the contract talks with NTT. Lecht complained that there seems to be little U.S. government assistance for small companies seeking business opportunities in that country.

In reply to a question from subcommittee chairman Tim Wirth, (D-Colo.), Lecht said he is concerned about the growing criticism in the U.S. of Japan. "The impact of very negative propaganda regarding the Japanese government and its business practices . . . may serve to undermine the enthusiasm of U.S. firms" that might want to sell to Japan, he suggested.

He also noted that the criticism of Japan may "embarrass" the Japanese and seriously poison cultural and business relations between the two countries.



Bell Labs chip supports Unix

SAN FRANCISCO — AT&T's Bell Laboratories recently announced a second-generation, 32-bit microprocessor said to take advantage of the Unix operating system and planned to be used in a series of AT&T 3B computers.

The chip, called the WE 32100, is the successor to the WE 32000, which was formerly known as the Bellmac-32A. It reportedly contains 180,000 transistors, about 30,000 more than the earlier chip, and uses Cmos technology.

"We have integrated many support functions onto the chip," said Hing C. So, head of the Very Large-Scale Integration Department at Bell Labs. "We have also added features such as an internal cache memory and have increased the speed of the chip."

The cache memory reportedly can hold 64 32-bit words, and repeatedly used program instructions can be stored there so there is no waiting time, a spokesman said.

The WE 32100 reportedly operates at speeds up to 14 MHz, is packaged in a 132-pin package and dissipates approximately 1.9W in worst-case conditions.

IF YOU MISS CW OFFICE AUTOMATION IN THE NEXT THREE MONTHS, LOOK AT THE ISSUES YOU'LL BE MISSING.

JUNE.

Microcomputers.
How they've changed
the workplace.
What's new in networks, security,
and micro-to-mainframe links.
Closes May 4.

AUGUST.

Applications Software.
A look at the real issues.
Productivity. User-friendly vs.
ease-of-use. Plus plenty of
product reviews.
Closes July 6.

OCTOBER.

Workstations. We explain the
alternatives to microcomputers,
addressing important topics like
cost-effectiveness, compatibility
and upgrades.
Closes August 31.

Office Automation is ideal both for the advertiser and the reader. Because each one offers focused, in-depth information in the area of office automation.

Readers always want to catch up on what's hot and what's not in their particular specialty. And find out what the vendors have to offer.

As an advertiser, you won't want to miss the opportunity to tell them.

Maybe that's why our OA is so popular.

Everyone wins.

For more information, or to reserve your space in any of our upcoming issues, simply call the sales office nearest you. Or fill out and return the coupon to Ed Marecki, National Sales Director, Computerworld, 375 Cochituate Road, Box 880, Framingham, MA 01701.

To: Ed Marecki, *National Sales Director*
CW Communications/Inc., Box 880, Framingham, MA 01701
Please send me advertising information on: ☐ *Workstations.*
☐ *Applications Software.* ☐ *Microcomputers.*
☐ *Please have a sales representative call me.*

Name _____
Title _____
Company _____
Address _____
City _____ State _____ Zip _____
Telephone _____
OA

Computerworld
OFFICE AUTOMATION

Sales offices.

BOSTON: 375 Cochituate Road, Box 880, Framingham, MA 01701 (617) 879-0700; CHICAGO: 2600 South River Road, Suite 304, Des Plaines, IL 60018 (312) 827-4433; NEW YORK: Paramus Plaza I, 140 Route 17 North, Paramus, NJ 07652 (201) 967-1350; ATLANTA: 1853 Peeler Road, Suite D, Atlanta, GA 30338 (404) 394-0758; SAN FRANCISCO: 300 Broadway, Suite 20, San Francisco, CA 94133 (415) 421-7330; LOS ANGELES: 18808 Sky Park Circle, Suite 260, Irvine, CA 92714 (714) 261-1230.

#1 FOR TSO or VM/CMS
DYNACALC
The fastest and friendliest spreadsheet system
NEW ★Color Graphics ★Database Interface
IMPROVED ★Worksheet Consolidation ★VisiCalc® Support™
COMPARE US TO THE COMPETITION!
For a free 30 day trial call (312) 525-6400
ChicagoSoft 730 N. LaSalle • Suite 2 • Chicago, IL 60610
*Dynacalc is owned by Dynamic Corp.
**VisiCalc is a registered trademark of VisiCorp. VisiCorp is not associated with Dynamic.

FUJI/XP* • NIVIS/XP* • SIGE/XP* • YAMAHA/XP* •
EXPOSE/XP* • JUMAN/XP* • FERMAN/XP* • PHOENIX*

COMPUTER INDUSTRY

Commerce official cites flaws in Japan's targeting

By John Kirshner
CW Washington Bureau

ACAPULCO, Mexico — Japanese government efforts to target certain industries for support and promotion have caused that country "terrible trouble," according to a U.S. Commerce Department official, who said recently that the U.S. computer industry should not be overly worried about Japanese competition.

Dr. D. Bruce Merrifield, assistant secretary of Commerce for Productivity, Technology and Innovation, said "the idea is great; the concept is beautiful, but there are two basic flaws" with such targeting.

Merrifield, who addressed the Computer Dealers and Leasors Association (CDLA) conference here recently, said the first mistaken assumption about industry targeting is that "the world is stupid and won't try to emulate you." Using the Japanese steel industry as an example, he noted that initial successes in capturing large parts of that market worldwide were followed by similar efforts by other countries, such as Korea.

Now, the world steel industry is overbuilt and operating at only half capacity, according to Merrifield. He said the situation is "a good, living, breathing example" of how "no bureaucrat knows how to target anything."

The other basic flaw of targeting, he continued, is the assumption that once a country has taken over a market, the market will last long enough to pay back the huge initial investment needed to achieve market supremacy. The danger, he said, is that targeting will "destroy an industry for everyone," leaving the targeters saddled with "an enormous debt load" that cannot be covered by future sales.

Turning to Japanese targeting of computer-related industries, Merrifield told the CDLA audience that the Japanese will be successful in continuing to build their high technology industries. But, he added, the world market is so big that it will benefit both Japan and the U.S. He called for "collaborative efforts" between the two nations, predicting "a very powerful, complementary relationship ultimately."

Discussing other U.S. competitors, Merrifield suggested mainland China will "be at the leading edge of everything at the end of the century." The Chinese "are determined and capable people," Merrifield said, noting how rapidly they are trying to assimilate Western technology and management practices.

Asked about China as a competitive threat to the U.S., Merrifield said, "I really am not worried. . . . It's not us against them." According to Merrifield there will be such a large market for high-tech products, particularly among the currently developing nations, that there will be great opportunity for all high-tech producers.

Assessing current U.S. competitiveness, Merrifield said, "We can reclaim and maintain our leadership in every area if we just get our act together." He said the U.S. "has incredible advantages over everybody."

Chief among those advantages, Merrifield said, are the most advanced technology in the world, the most readily available development capital and "a remarkable entrepreneurial culture."

However, he said, the U.S. needs to remove barriers to the increased competitiveness of American industries. Although "the last thing we need is to get the government in there funding or managing anything," he said the government can be a catalyst for industry development, by providing incentives for and removing regulatory impediments to industrial developments.

If you sell large systems software — quick — what will all your prospects be doing on June 20, 1984?

They'll be looking through a great new reference guide to software vendors — the *Computerworld Buyer's Guide to Large System Software* being published on June 20. And you'll definitely want to be there.

Look at what the Buyer's Guide gives you:

You get a large audience with heavy purchasing responsibilities — more than 114,000 paid *Computerworld* subscribers in the U.S. These subscribers are concentrated in the large professional computer-using organizations that control 84% of DP/MIS spending in 1983 — $72.2 billion. And research shows these subscribers have a significant degree of purchase decision influence — ask your Buyer's Guide sales representative to show you the *Computerworld* reader profile for details.

Look at what the Buyer's Guide gives buyers:

They get a one-source, comprehensive listing of purchase information about applications, DBMS, and systems and utility software for use with mainstream data processing systems. They get **two kinds** of listings — vendor listings and product offerings. **And**, they get a whole range of feature articles and tutorials covering new technology, large system software trends and buying techniques.

Now that you know where software buyers are going to go next June, you can arrange to be there with an ad for your product or service — right when they're researching vendors! Ad deadline is May 4. To reserve space in this issue, call one of the sales offices listed below or call Ed Marecki, National Sales Director or Kevin McPherson, Product Manager.

To: Ed Marecki, National Sales Director
CW Communications
Box 880
Framingham, MA 01701

☐ Please send me advertising information for Buyer's Guides.
☐ Please have a sales representative call me.

Name _____
Title _____
Company _____
Address _____
City _____ State ____ Zip ____
Telephone _____

BG5/04

COMPUTERWORLD
BUYER'S GUIDE

Sales Offices

BOSTON/Chris Lee, Bill Cadigan, Alice Longley (617) 879-0700
CHICAGO/Chris Lee, Bill Cadigan, Jean Broderick (312) 827-4433
NEW YORK/Mike Masters, Tom Flynn, Gale M. Paterno (201) 967-1350
ATLANTA/Mike Masters, Tom Flynn (404) 394-0758
SAN FRANCISCO/Bill Healey, Beverly Raus (415) 421-7330
LOS ANGELES/Bill Healey, Ruth Gordon (714) 261-1230

Zilog, NEC resolve differences in chip dispute

CAMPBELL, Calif. — Zilog, Inc. and Nippon Electric Co., Ltd. (NEC), involved last year in a bitter dispute involving Zilog's Z80 microprocessor and certain NEC patent claims, have resolved their differences and agreed to licensing arrangements.

Zilog, a subsidiary of Exxon Corp., announced recently it has granted NEC the first license to manufacture and market its Z80,000 32-bit microprocessor.

The alternate source agreement provides NEC with nonexclusive rights to manufacture and market the Zilog product worldwide.

Last year (CW, Aug. 8), Zilog had asked the U.S. International Trade Commission (ITC) to investigate alleged unfair competition by NEC and two U.S. subsidiaries, NEC Electronics U.S.A., Inc. and NEC Home Electronics (U.S.A.), Inc.

Earlier suit

Zilog had earlier in the year filed suit in federal court seeking $40 million in damages based upon charges that NEC and its subsidiaries had copied the Z80 circuits and imported them into the U.S. in the NEC UPD780 and UPD780-1 microprocessors.

NEC Electronics subsequently countersued for $40 million, charging that 14 Zilog parts infringed on NEC's U.S. patents.

Under terms of an agreement announced earlier this year, the companies filed a joint motion with the ITC proposing the pending investigation be terminated, and an administrative law judge issued an initial determination to do so, which has now become final, the companies said.

At that time, the companies said Zilog would receive a license to manufacture certain NEC products, and NEC would receive licenses to manufacture the Z80 and certain other Zilog products.

Other terms of the settlement would remain confidential, the companies said.

Announcing the Z80,000 agreement earlier this month, Franc R. J. deWeeger, president of Zilog, said, "NEC is one of the few companies with a process technology sufficiently advanced to make a product as complex as the Z80,000 CPU."

The 32-bit microprocessor, announced midway through 1983, will be available in "first samples" during the first quarter of 1985, Zilog said. Additional sources for the chip will be named in the future, deWeeger said.

How Dan Feeney Made The Micro To Mainframe Connection

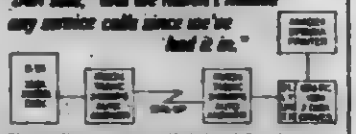
Dan Feeney, systems manager at Abrams/MBI Products in Morris, Ill., decided that line charges on one of his IBM model 12 terminals were too high. His firm's corporate headquarters in Chicago was using it to print sales and price reports from the plant's S/34 in Morris and to do online financial modeling.

A PC, Dan reasoned, could do the modeling with any one of the spreadsheet programs available and the reports could be "bicycled" the 50 miles to Chicago. Dan had the terminal removed and bought a PC. The executives were initially pleased with the new system.

"After a period of time the Chicago management missed the communications with the plant," Dan said, "Each week there's a deadline and they must have the reports the same afternoon we produce them. Couriers just couldn't get the reports there in time."

Dan began to question his prior decision to get rid of the headquarters terminal. He looked around for a way to restore communications without having to put the terminal back in. After looking at what was available, he decided to try the BLUE LYNX package.

"It worked the first time we tried it," Dan said, "and we haven't needed any service calls since we've had it in."



Phone line costs are minimal for the BLUE LYNX equipped PC when compared to the charges on the model 12 that was previously in the headquarters office. Also, the total cost of the PC with BLUE LYNX was much cheaper than that of the terminal and printer. Seven hours a day the PC is now off-line running the spreadsheets. The on-line report printing takes only a short time with a 2400 baud rate running over switched lines.

IBM 3270/12 emulation for S/34, S/36 and S/38 users. IBM 3276 emulation - SNA/SDLC or Bisynch 3680 complete. Combination of 2 emulators $1230.
VT320M - DEC VT100/52 emulation software package (requires IBM Adapter) $125

TECHLAND SYSTEMS INC.
(212) 684-7788
25 WATERSIDE PLAZA, NEW YORK, NY 10010
BLUE LYNX 3270 is a joint development of Software Systems, Inc. Jefferson City, Missouri & Techland

IDC chairman sees boon for remarketers

'Massive opportunity' for lessors, dealers

By John Kirshner
CW Washington Bureau

ACAPULCO, Mexico — Economic and technological trends indicate steadily growing business opportunities for third-party computer dealers and lessors, International Data Corp. (IDC) Chairman Patrick J. McGovern said recently. Delivering the keynote address to the recent Computer Dealers and Lessors Association (CDLA) meeting here, McGovern said an increasing demand for computer applications and a shortening life cycle for computer equipment are creating "a massive opportunity" for lessors and dealers.

McGovern

Citing IDC statistics, McGovern said there will be a 33% annual growth rate in systems sales through 1987. In the short term, he said, the computer equipment installed base will rise from last year's $123 billion to $264 billion in 1987.

In that four-year period, he predicted, mainframe sales will increase 6% per year, minicomputers 20%, small business computers 49% and peripherals approximately 19%. New, lucrative markets are arising in banking systems, particularly for automated teller machines — which numbered 36,000, worth $1 billion at the end of 1982, and will number 151,000, or $3.7 billion, at the end of 1987 — and in factory automation, which is growing at a 27% annual rate, he said. In addition, McGovern noted the independent software market is growing rapidly, climbing from $1.2 billion in 1980 to $4.5 billion in 1985 and $12.8 billion in 1990. With the cost of software rising relative to the cost of hardware, more and more users will want to spread the costs over the life of the system, which, according to McGovern, means greater opportunities for computer lessors.

Among other changes IDC expects will be an increased importance of software developers and small systems houses, which, he said, will be repackaging and selling 50% of the value of small business computers delivered in 1990.

In general, McGovern concluded, "the environment we sell to today is going to look dramatically different over the next decade." As spending for computers and related equipment becomes an increasingly greater portion of the U.S. gross national product, corporations will be taking a harder look at acquisition strategies and related government tax policies, he said.

"The end user is much more sophisticated" about the financial aspects of procuring hardware and software, he said. The result will be greater business opportunities for dealers and lessors, McGovern maintained.

Face the REAL COSTS of Divestiture: Optimizing Mixed Carrier/Vendor Networks — Diagnostics — Control & Maintenance

Learn how at the new NETWORK MANAGEMENT TECHNICAL CONTROL Conference & Exposition

Seminars: May 21 & 22 Conference & Show: May 23 & 24

For full program information call: 1-800-225-4698, in Mass. 617-879-0700

Produced by the COMMUNICATION NETWORKS Conference Team, Box 880, Framingham, MA 01701

Show Sponsors include:
Avant-Garde • Paradyne
• Dynatech Data • Pulsecom
• General Datacom • Hekimian
• Racal-Milgo

Other exhibitors include companies such as Arus Corp. Datacom Management Sciences, Digilog, Digitech Industries, Infinet (formerly Intertel), Inlotron, International Data Sciences, Versa-Lite, plus consultants and software specialists offering design, analysis and data service.

FREE EXHIBIT TICKET
Bring to Sheraton Washington Hotel,
2660 Woodley Road, N.W., Washington, D.C.
Exhibits open: May 23, 9:30 - 5:00
May 24, 9:30 - 4:00

Name _____
Title _____
Company _____
Address _____
City _____ State _____ Zip _____
Phone ( ) _____

COMPUTER INDUSTRY

IPL Systems suffers $4.2 million net loss for 1983

WALTHAM, Mass. — IPL Systems, Inc. recently reported a net loss of $4.2 million for the year ended Dec. 31, as revenues dropped $5.1 million from the level reported a year earlier.

The company reported 1983 revenues of $9.9 million, compared to $15 million the previous year, and a $4.2 million loss, compared to a profit of $277,000 the previous year. Per-share losses were 35 cents, compared to earnings of five cents per share for 1982.

For the fourth quarter, the company posted revenues of $2.2 million, down from $2.5 million in the corresponding period a year earlier, and a net loss of $3 million, compared to a loss of $1.1 million in the corresponding quarter one year ago.

Net earnings for both the year and the quarter, the company said, reflect an income tax benefit resulting from a net operating loss carried back and the utilization of previously unused losses to offset previously provided deferred tax credits. Without those provisions, the company's losses would have totaled $3 million for the fourth quarter and $7 million for the year.

Revenues suffered from delays in shipping the company's Model 4430 Continuous Compatible Computer, intended to compete with the IBM 4361 and IBM 4381 computers, a spokesman said. The company also said it believed sales were adversely affected by several factors, including the "lingering effect of the past economic downturn," potential customers holding off their purchase deci-

See IPL, page 111

For your best investment in printers.

Call your nearest Qume distributor today.

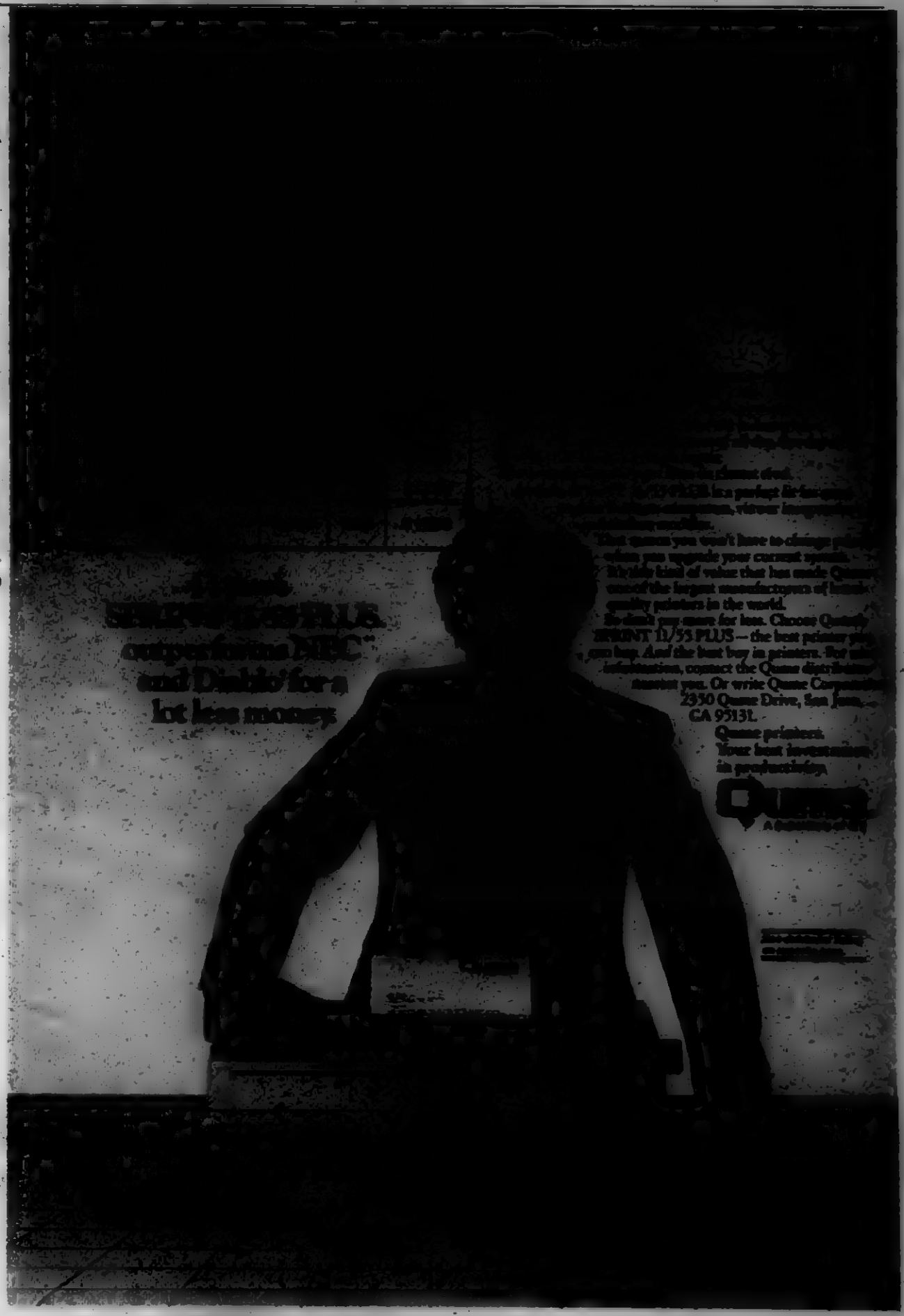
United States:

American Calculator & Computer (205) 933-2344—AL
Alnac Electronics (206) 643-9092—WA
Anacomp (206) 881-1113—CA, UT, WA
Anthem Systems (415) 342-9182—CA
Bohlig & Associates (612) 922-7011—MN
Butler Associates (617) 964-5270—CT, MA
Byte Industries (800) 972-6948 (CA Only) (800) 227-2070 (Outside CA)
David Jamison Carlyle (213) 410-8250—CA, CO, HI, IL, NJ, TX
Computers & Peripherals Inc. (315) 478-6964—NY
The Datastore (609) 778-0200—NJ
Equipment Resources (404) 955-0313—GA
Future Information Systems (212) 732-3905—NYC
Gentry Associates (305) 869-7450—FL, GA, LA, NC, SC, TN
Inland Associates (913) 764-7977—KS
InterACT Computer Systems (704) 254-1849—FL, GA, NC
Klarvill Electronics (800) 336-8811—AZ, CA, CO, CT, FL, GA, MA MD, MN, MO, NC, NJ, OH, OK, TX, UT, WA, WI
MA/COM-Alanthus Data (301) 770-1150—MD
MicroAmerica Distributing (800) 431-7660 (MA Only) (800) 343-4411(Outside MA)—CA, MA, TX
Midwest Microcomputers (419) 782-1115—OH
National Computers Syndicate (312) 459-6400—IL, MN
Pacific Mountain States (800) 272-3222—CA, WA
PAR Associates (303) 371-4140—CO, UT
PCA Microsystems (512) 664-4711—TX
PCS, Inc. (214) 247-6948—TX
Pioneer Electronics (301) 921-0660—AL, FL, GA, MD, NC, PA
Polygon Industries (504) 834-7658—LA
Printer Warehouse (213) 828-5466—(CA Only) (800) 245-6612—(Outside CA)
R.C. Data (408) 946-3800—CA
Radar Communications (212) 245-5509—NYC
Schweber (800) 645-3040—AL, CA, CT, FL, GA, IA, IL, MA, MD, MI, MN, NJ, NY, OH, OK, PA, TX, WI
Southern Microcomputer (305) 621-4237—FL
Tek-Aids Industries (312) 870-7400—IL, PA, TX
Terminal Rentals (714) 832-2414—CA
Terminals Unlimited (800) 336-0423—24 Locations
Tricom (516) 483-9700—NY
Unico (512) 451-0251—TX
Western New York Computer (716) 381-4120—NY

Canada:

Abacus Data Services (416) 677-9555—Ontario
Datamax (416) 781-8135—Ontario, Quebec
DataTech Systems (604) 479-7117—Alberta, BC, Ontario
Data Terminal Mart (416) 677-0184—Alberta, BC, Nova Scotia, Ontario, Quebec
Future Electronics (416) 697-7710—Alberta, BC, Ontario, Quebec
Micro Distributing (604) 941-0822—BC
Printers Data (416) 977-1711—Ontario

Qume. A Subsidiary of ITT



SUPERSHORTS

Bell Atlantic will market and service **Proteon, Inc.'s** local-area network, Pronet, through its new subsidiary, **Bell Atlanticom.** Bell Atlantic, comprising seven former Bell operating companies in the mid-Atlantic region, serves 14 million customers.

■

Iomega Corp. has opened a new 24,000-sq.-ft. manufacturing facility, bringing the company's total facilities to 92,000 sq. ft. The expansion will enable Iomega to boost both head and drive production to over 300 units each per day.

■

Xerox Corp. has signed a five-year lease for more than 23,000 sq. ft. of product showroom and demonstration space at Infomart, the Dallas Mart Center's International Information Processing Market Center, scheduled to open in Nov. 1984.

■

VLSI Technology, Inc. (VTI) and **Visic, Inc.** are participating in a joint venture to enhance VTI's design software and to develop process technologies using VTI's wafer fabrication facility. Visic will concentrate primarily on the product design and market development of high performance random-access memory circuits.

■

Harris Corp. has presented Purdue University with a Harris 800 superminicomputer. The gift augments the campus engineering computing network.

■

Prime Computer, Inc. and **Frey Associates, Inc.** have reached an agreement to hold the Themis trademark jointly. Lawsuits initiated by Prime in Nov. 1983 over the trademark have been dropped. Under the agreement, Frey Associates, which markets a natural language query software package, will refer to its Themis product as a Management Information System, while Prime will call their Themis product a Logic Simulator.

■

Dataquest, Inc. has expanded its coverage of the Japanese semiconductor industry to include the rapidly expanding Asian markets. Dataquest's Japanese Semiconductor Industry Service now covers Korea, Hong Kong, Taiwan, Singapore and Southeast Asia in addition to Japan.

■

The National Education Association Educational Computer Service has assessed, certified and recommended Control Data Corp.'s Plato educational courses to its 1.7 million members.

Tandon consolidates divisions, eliminates jobs

CHATSWORTH, Calif. — Tandon Corp. announced recently it is consolidating two of its five Southern California divisions and eliminating 1,000 jobs in a move toward greater reliance on off-shore production of its disk drives.

"Because of increasing price competition from our competitors manufacturing off-shore, we are being forced to rely on our production capabilities in Singapore and India more than we originally intended," company President Sirjang Lal Tandon said.

Tandon said the company will attempt to maintain as much production as possible at its California facilities, but that lower cost production is "unavoidable if we are to meet the price demands of the marketplace."

Another reported factor influencing the move to greater dependence on foreign production was that an increasing number of Tandon's customers "are involved in off-shore production and require direct delivery to their plants in the Far East and Europe."

The consolidation will reduce Tandon's U.S. work force from 2,575 to about 1,575. Tandon last month had eliminated 400 jobs in a move it said was primarily to eliminate duplicated jobs among domestic operations.

COMPUTER INDUSTRY

MERGERS AND ACQUISITIONS

Syntech International, Inc., Dallas, has reached an agreement in principle to acquire **Octagon Computer Systems, Inc.** of San Jose, Calif., for common stock, which has a current market value of approximately $1.8 million, in addition to certain earn-out provisions.

■

Banctec, Inc., Dallas, has announced a definitive agreement to acquire **Scan Data Corp.** and the **Reader/Sorter Division of Control Data Corp.** Banctec will issue 311,000 shares of its common stock for all outstanding Scan Data common stock and 300,000 shares of Banctec common stock for all the outstanding preferred stock of Scan Data.

First Software Corp., based in North Andover, Mass., has discontinued merger negotiations with **PC Telemart, Inc.** According to Ken Carpenter, chairman of First Software, further investigations indicated a merger would not have been in the best interest of First Software.

■

Cognitronics Corp., Stamford, Conn., and **American Computer Corp.**, San Diego, have announced that they have merged. Also announced was the acquisition of the net assets and business of American Computer software affiliate **Administrative Systems, Inc.** by Cognitronics. The initial purchase price is $1.2 million, payable in cash and stock with a potential maximum purchase price of $10 million, depending on substantial future growth in revenues and earnings over a three-year period.

Perkin-Elmer Corp., Norwalk, Conn., has announced that it intends to acquire the **Qualitron Corp.**, Danbury, Conn. Qualitron manufactures masks for producing semiconductor devices, as well as multilevel printed-circuit boards.

■

Computervision Corp., Bedford, Mass., has announced the acquisition of the **Organization for Industrial Research**, Waltham, Mass., a supplier of group technology and process planning software for computer-aided design and manufacturing.

■

Hewlett-Packard Co. and **Xonics, Inc.** have signed a letter of intent for HP's acquisition of the assets of Xonic's Ekoline Division for an undisclosed amount of cash. Ekoline, based in Sunnyvale, Calif., manufactures medical equipment that produces images of body structures through the use of high-frequency sound waves.

■

Data I/O Corp. of Redmond, Wash., recently announced it has entered into an agreement in principle to acquire **Callan Data Systems, Inc.** of Westlake Village, Calif., in exchange for 1.7 million to two million shares of Data I/O common stock. Callan Data manufactures the Unistar workstation using Unix and the Motorola, Inc. 68000.

IPL from page 109

sions in anticipation of an IBM announcement of a new line of mid-range computers and a general slowing of shipments as the current generation of mid-range computers "enter the later stages of their life cycle."

IPL said initial shipments of its Model 4480 are expected to take place in the first half of 1984.

NEW LIFE FOR *1401* PROGRAMS

CS-TRAN converts your 1401 object programs to COBOL for the mainframe or mini of your choice.

CS-TRAN is the only translator that accepts your object programs, patches and all, yet allows you to include actual COBOL paragraph names and record definitions.

If you'd like more details about new life for your 1401 programs just call or write Russ Sandberg.

C-S Computer Systems Inc.
200 South Main Street, P.O. Box 356
Manville, NJ 08835 • 201-526-8080

COMPUTER INDUSTRY

NICKELS AND DIMES

Visual Technology, Inc. has reported earnings for fiscal 1983 of $47.3 million, or 87 cents per share, up from $25.8 million, or 78 cents per share, over fiscal 1982.

■

Teradyne, Inc. has announced sales of $251.4 million and net income of $21.3 million, or 39 cents per share, for the year ended Dec. 1983.

■

Compucorp has reported a loss of $1.08 per share on sales of 38.2 million for the year ended Dec. 1983. This compares with earnings of 49 cents per share on sales of $35.2 million for the year ended Dec. 1982.

■

Floating Point Systems, Inc. has reported sales of $25.6 million for the quarter ended Jan. 31, 1984, an increase of 19% over the same period last year. Net earnings increased 48% to $3.2 million or 37 cents per share, compared with $2.2 million, or 25 cents per share, for 1983.

■

Wyly Corp. has announced 1983's fourth-quarter income increased to $1.2 million, or 7 cents per share, from $400,000, or 3 cents per share, over the same period last year.

■

Zenith Radio Corp. has reported earnings for 1983 of $46.3 million or $2.11 per share, compared to $24.3 million or $1.28 per share for 1982.

■

Integrated Software Systems Corp. has announced revenues for the year ended Dec. 1983 of $24.1 million, up 45% from revenues of $16.6 million for 1982. Net income rose 72% to $3 million for the year.

■

Western Union has reported a net loss for 1983 of $59.1 million, or $2.78 per share. These results compare with 1982 income of $85.8 million or $3.50 per share.

■

Dynax Corp. has announced net income of $2 million or 12 cents per share, including a net gain of $1.4 million or 8 cents per share for the first quarter ended Feb. 1984. Net sales for the quarter were $52.1 million, compared with $33.1 million for the first quarter 1983.

■

Nixdorf Computer AG, Paderborn, W. Germany, announced it will offer 20% of its share capital in the form of preferred stock in the late spring. The price of shares will be set on the placement date.

■

Datapoint Corp. has announced revenues for the second fiscal quarter ended Jan 31 of $140.8 million, compared with $134.2 a year ago. Net earnings increased to $9.2 million or 45 cents per share, from $1.8 million or 9 cents per share, for 1983.

■

Rolm Corp. has announced a tender offer for 3 million shares at a price of $41 per share. The proration period and right to withdraw tendered shares would be on March 6, and the offer would expire March 13.

■

Computer & Communications Technology Corp. has announced that revenues for fiscal 1983 were $83.5 million compared to $74.7 million for 1982. Fourth-quarter revenues were $20.9 million, compared to $16 million for the same period in 1982. A net loss of $24.6 million, or $3.21 per share, was incurred for the year, while a loss of $27.3 million, or $3.56 per share, was reported for the fourth quarter.

■

CGA Computer Associates, Inc. reported that revenues for the nine months ended Jan. 29, 1984 rose 38% to $32.6 million, while three month revenues rose 35% to $11.7 million. Net income for three months rose to $1.04 million or 29 cents per share, a 20% increase. For nine months net income rose $2.6 million, or 71 cents per share, from $2.08 million or 59 cents per share.

■

Comnet has announced that for the year ended Dec. 1983, revenues increased $440.4 million, a 7.5% increase over fiscal 1982.

■

AGS Computers, Inc. has reported revenues of $145.9 million and earnings of $5.7 million, $1.25 per share, for fiscal 1983.

Fill in your IBM micro/mainframe communications picture.

AST Research, the leader in IBM PC enhancement products, brightens your micro/mainframe communications picture with a full palette of economical, integrated hardware/software masterpieces. With AST Products, you can emulate IBM terminals or create PC-based Local Area Networks.

AST improves your office operating cost picture.

AST communications products give your IBM PC the flexibility to act as a terminal for your host system or as a stand-alone computer for smaller tasks. Your PC won't bog down the mainframe with unnecessary small jobs and local computing on the PC eliminates phone line charges too. Get the power of a mainframe when you need it and personal computer convenience right at your fingertips.

Applications solutions that are shrines of genius.

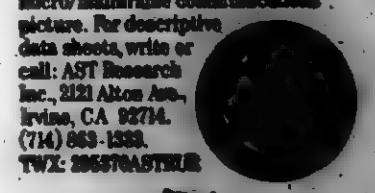
AST keeps pace with your ever-changing applications requirements with reliable, high quality, cost effective communications products. AST products provide support for Bisync and SNA/SDLC communications protocols as well as networking multiple PCs for sharing resources.

Choose AST products — by the numbers.

These AST communications packages are currently available:

1. AST-SNA™ emulates a 3274/3276 controller and 3278 or 3279 display terminal using SDLC protocol.
2. AST-BSC™ emulates 2770 batch RJE and remote 3270 display terminals using 3270 Bisync protocol.
3. AST-PCOX™ allows your PC to connect to an IBM 3274/3276 cluster controller via coax cable and emulates a 3278 or 3279 display terminal.
4. AST-3780™ emulates 2770, 3780, 3741, and 3780 RJE workstations using Bisync protocol.
5. AST-5251™ emulates a 5251 Model 12 remote workstation connected to an IBM System 34, 36 or 38.
6. PCnet™ is the first Local Area Network designed specifically for the IBM PC or XT and the PC-DOS 1.1 or 2.0 operating system.
7. CC-232™ is a user-programmable dual-port card capable of communicating in Async, Bisync, SDLC, or HDLC protocols.

Discover how well AST can fill in your micro/mainframe communications picture. For descriptive data sheets, write or call: AST Research Inc., 2121 Alton Ave., Irvine, CA 92714. (714) 863-1333. TWX: 3106708378



AST RESEARCH INC.

Number One Add-Ons for IBM PC.

COMPUTER INDUSTRY

EXECUTIVE CORNER

William T. Clifford has been appointed vice-president, Software Products Division, of Applied Data Research, Inc.

■

Arthur B. Sims, former president of United Information Services, a United Telecommunications, Inc. subsidiary, has joined Computer Sciences Corp. as a corporate vice-president and has been named president of the newly formed Industry Services Group.

■

Robert F. Andersen has been named vice-president of Honeywell, Inc.'s Indirect Sales Operation, in charge of marketing the DPS 6 line of compatible microcomputers, minicomputers and superminicomputers through independent manufacturers' representatives and value-added resellers.

■

Symbolics, Inc. has appointed three new vice-presidents. They are **John T. Holloway**, senior vice-president of technology; **John L. Kulp Jr.**, senior vice-president of research and development; and **Ben Derry**, vice-president of manufacturing operations.

■

Roswell C. Miller has been appointed vice-president, systems marketing, at U.S. Satellite Systems, Inc.

■

Jay Laveje has been appointed vice-president, systems integration, at Martin Marietta Data Systems, a division of Martin Marietta Corp.

■

R. Patrick Forster, a Litton Industries vice-president, has been appointed president of the company's Itek Graphic and Compositions Systems Division.

■

Gary E. Anderson has been elected president and chief operating officer of Execucom Systems Corp.

■

Roland Boisvert has been appointed vice-president of marketing at Computer Services Corp.

■

Pat Richard has been appointed vice-president of product development at Paradyne Corp., reporting directly to Kenneth Wall, senior vice-president, operations. Richard joins Paradyne with over 18 years of product development experience with IBM and was most recently vice-president of development for NBI, Inc.

■

Dominick A. Intartaglia has been elected vice-president, business development, for RCA Global Communications, Inc.

■

Harold L. Brownman, president of Lockheed Electronics and executive vice-president of the Lockheed Corp., has joined the board of directors at Verdix Corp.

■

Jon E. Carnell has been elected senior vice-president, semiconductor sector, at Harris Corp.

■

Graham R. Briggs has been named vice-president of finance at Charles River Data Systems, Inc.

■

James G. Moore has been appointed vice-president of systems programming and **Frederick G. Roberts** has been named vice-president of marketing at Microcomputer Graphics, Inc.

Continued on page 114

UFO Problems?
MUDSAM can help!

Marathon's UFO Documentation System, And More

MUDSAM makes UFO documentation easier and more useful, flags wasteful PDS code, and lets you see the problems in the OSCOR/GETVIS area. MUDSAM helps you improve response time for only $500.00; available now for UFO/CICS.

MUDSAM comes from the specialists who developed The UFO Cookbook and the most popular UFO training courses available anywhere, as well as a full complement of UFO consulting services.

Marathon Software & Services, Inc. For more information, call:
145 Porter Avenue
Bergenfield, NJ 07621 (201) 384-4070

MEET DATAPORT.™

THE VITAL CONNECTION IN YOUR INFORMATION CENTER.

Imagine the potential of an Information Center tool that lets even the most novice of users work with data and send it back and forth among leading micro and mainframe products.

STSC's DATAPORT product is that tool. With this versatile display and analysis product in your Information Center, there is virtually no piece of data beyond reach. DATAPORT's interfaces connect you to popular products like FOCUS®, RAMIS®, IFPS®, SAS®, ADRS-II, APL/DI, VisiCalc®, and LOTUS's 1-2-3™.

To top it off, DATAPORT is a stand-alone, full-screen entry, display, and analysis system. Its file-folder concept allows users to work with tabular data like budgets or sales forecasts and text data like memos, instructions, or reports. The DATAPORT product also provides powerful calculation routines, highlighting, report formatting, and even works with multi-dimensional data.

Most important, DATAPORT was designed from the very beginning for the wide range of users in the Information Center environment. A unique combination of menu and command-driven technology provides a level of friendliness that satisfies the needs of both expert and novice users.

See for yourself how the DATAPORT product can be the vital link in your Information Center. For a free demonstration, write or call Margaret Tanzosh, STSC, Inc., 2115 East Jefferson Street, Rockville, Maryland 20852. (301)984-5000.

STSC
A Contel Company

STSC, Inc., 2115 East Jefferson Street, Rockville, Maryland 20852
Attention: Margaret Tanzosh

☐ Please send more information on STSC's DATAPORT product.
☐ I'd like to schedule a DATAPORT demo. Please call to set a date.

Name _____ Title _____
Company _____
Address _____
Phone (___) _____

CW3/84

DATAPORT is a trademark of ZIRAN Corporation. FOCUS, SAS, IFPS, and VisiCalc are registered trademarks of Information Builders, Inc., SAS Institute, Inc., Execucom Systems Corporation, and VisiCorp respectively. RAMIS is a registered service mark of Mathematica, Inc. 1-2-3 is a trademark of LOTUS Development Corporation.

COMPUTER INDUSTRY

Continued from page 113

Gale C. Morgan has been appointed manager of the artificial intelligence marketing group at Digital Equipment Corp.

■

Jack M. Kleber has been named president of GTE Communications Products.

■

Peter F. Pellegrino has been promoted to corporate vice-president of office products marketing for Compucorp, Inc.

■

George C. Kenney has been named vice-president of Sony Corp.'s Information Products Division.

■

Charles M. Bacher has been appointed president of Emulex-Caribe, Emulex Corp.'s manufacturing subsidiary in Dorado, Puerto Rico.

■

Stephen M.D. Day has been elected vice-president, corporate development, of Communications Satellite Corp.

■

D.W. McArthur has been named vice-chairman of the Computer and Business Equipment Manufacturers Association.

■

Howard L. Nevin has been appointed vice-president, product planning and corporate development, at Verdix Corp.

■

AT&T Technologies, Inc. has announced the election of four vice-presidents. They are **Marilyn Laurie**, public relations and public affairs; **Paul M. Eslow**, assistant general counsel; **David M. Mitchell**, financial management and control; and **Robert L. Shaughnessy**, human resources and labor relations.

■

Paul E. DeLaney has been promoted to vice-president of manufacturing operations for Honeywell, Inc.'s Office Management Systems Division in Billerica, Mass.

■

Ivan Secher, former president and chief executive officer of Andax Corp. (now a subsidiary of Ungermann-Bass, Inc.), has joined Fibronics International. He will spearhead the introduction of Fibronics' "coaxial doubler" in North America.

■

William J. McCreary has been appointed vice-president, program development, of Computer Science Corp.'s Systems Group.

■

Jean-Paul Gagnon has been appointed vice-president, commercial sales, Integrated Office Systems, and **Thomas R. Worthy** has been named executive vice-president, marketing, at Northern Telecom, Inc.

■

Robert K. Reid has been appointed vice-president of product marketing at NBI, Inc.

■

Gregory J. Liemandt, chairman and chief executive officer of Wyly Corp., has assumed the responsibilities of chief operating officer in a restructuring of the company's senior management organization. **Paul E. Newton** has been appointed senior vice-president of University Computing Co., a Wyly subsidiary.

INTRODUCING YOUR NEW NIGHT SHIFT.

BISYNC communication for DEC Rainbow,® SIRIUS/Victor®, Hyperion® and most MSDOS® computers. Available now at list prices starting at $450.

BiComM-3700 lets your personal computer communicate with a mainframe even when you're asleep. Telephone costs are lower. Mainframe time is cheaper. And how many people are anxious to use your computer at 2:00 AM?

REMOTE JOB ENTRY

The BiComM-3700 communications package emulates the popular 2780/3780 series of RJE stations, with many added features. You can prepare a simple command file to direct it's operation when no one is around. Of course, you can also transfer files in an interactive, menu-driven mode day or night.

BEST ASSURED

You'll be able to sleep soundly because BiComM-3700 uses the BISYNC communications protocol—tried, tested and proven effective for over fifteen years. It contains powerful error detection features to insure that your data arrives safely and securely, writing a complete time-stamped record of everything it does.

FAST—FAST—FAST

Your new night shift works faster than others because it can communicate at speeds up to 19,200 baud, and up to 9600 baud over dial-up, voice grade telephone lines using standard modems. That means no extra costs are incurred for specially treated lines. When you arrive the next morning you'll already have a big head start on the day's activities.

BiComM-3700

Put your night shift to work for you tonight!

Packaged Solutions INCORPORATED

Dealer inquiries invited.
Packaged Solutions, Inc. One Huntington Quadrangle, Suite 2C10, Melville, New York 11747, USA
(516) 752-1640, TELEX 968856.

The BiComM-3700 was developed by Wilcat Systems Inc.

BANKRUPT from page 90

said they needed, we had to provide."

Wright defended the contracts: "These contracts worked well with some users, and we quickly developed their system. But others were, in my opinion, not reasonable. We spent a great deal of time customizing their system and not making as much money as we hoped because costs were fixed."

Some employees thought the company needed a standard product that it could tailor to each user. Jack Donovan, former marketing director, noted, "Lack of a standard product was critical in the company's demise." Wright said a standard package was under development, based on experiences with earlier users, but the company ran out of funding.

Another problem surfaced because the company hitched its star to Wicat Systems, Inc.'s System 150 microcompute s, but insurance companies were looking for systems that used IBM microcomputers. "A number of companies said they were interested in the product," Donovan said. "But they wanted us to come back when the software ran on the IBM Personal Computer." Last month, the company began testing a pilot version of the product that ran on an IBM microcomputer.

Compounding these problems was the company's explosive growth from three people at incorporation to 75 employees in June 1983. Signs of fiscal problems surfaced last summer when quarterly bonuses were promised, but not given to employees. "The company should have realized sooner that it needed additional capital," Donovan said.

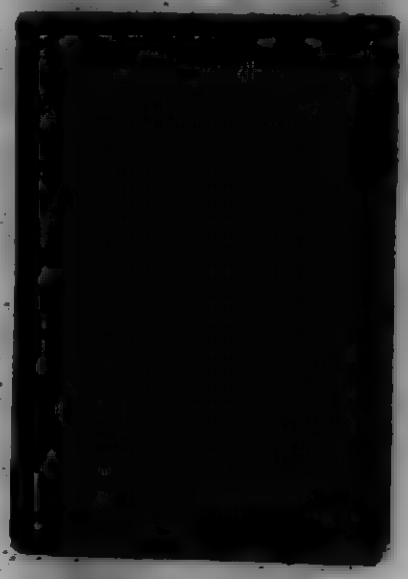
According to Wright, the company tried to do too much. "As we customized each package, upgraded the software, tailored the software to the IBM Personal Computer and developed a standard product, debts grew. In hindsight, maybe we should have tried to grow more slowly and do a little bit less."

As of now, the fate of the company's users and assets is uncertain. While a Chapter 11 filing brings a reorganization, a Chapter 7 filing requires a complete liquidation. "The company needed a financial backer to file a Chapter 11, but it didn't have one," according to one former employee.

Wright hopes to form a support company for current users. "The technology is just too powerful to let slip away," he said.

APRIL 30.

Micros
in big
business.
A look at all the different ways micros are changing the work environment.
Closes April 13.



MAY 28.

Software
Productivity
Packages.
We tell our readers all we can about software and services designed to benefit the DP manager and his technicians.
Closes May 11.

JUNE 25.

Graphics
Systems.
Here's where we focus on the latest technologies, techniques and applications in computer graphics.
Closes June 8.

IF YOU'RE NOT IN COMPUTERWORLD'S NEXT THREE SPECIAL REPORTS, LOOK AT THE ISSUES YOU'LL BE MISSING.

Computerworld's special report issues are ideal both for the advertiser and the reader. Because each one offers focused, in-depth information.

Readers always want to catch up on what's hot and what's not in their particular specialty. And find out what the vendors have to offer.

As an advertiser, you won't want to miss the opportunity to tell them.

Maybe that's why our special reports are so popular.

Everyone wins.

For more information, or to reserve your space in any of our upcoming issues, simply call the sales office nearest you. Or fill out and return the coupon to Ed Mareckl, National Sales Director, Computerworld, 375 Cochituate Road, Box 880, Framingham, MA 01701.

To: Ed Mareckl, *National Sales Director*
CW Communications/Inc., Box 880, Framingham, MA 01701
Please send me advertising information on: ☐ *Graphics Systems.*
☐ *Micros in big business.* ☐ *Software Productivity Packages.*
☐ *Please have a sales representative call me.*

Name _____
Title _____
Company _____
Address _____
City _____ State _____ Zip _____
Telephone _____
SA

COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Sales offices.

BOSTON: 375 Cochituate Road, Box 880, Framingham, MA 01701 (617) 879-0700; CHICAGO: 2000 South River Road, Suite 304, Des Plaines, IL 60018 (312) 827-4433; NEW YORK: Paramus Plaza I, 140 Route 17 North, Paramus, NJ 07652 (201) 967-1350; ATLANTA: 1853 Peeler Road, Suite D, Atlanta, GA 30338 (404) 394-0758; SAN FRANCISCO: 380 Broadway, Suite 20, San Francisco, CA 94133 (415) 421-7330; LOS ANGELES: 18808 Sky Park Circle, Suite 260, Irvine, CA 92714 (714) 261-1230.

AT&T seen leading off with superminis

NEW YORK — AT&T's coming out party is just around the corner and will be signaled by the introduction of the company's first commercially available computers, according to Stephen P. Cohen, vice-president and director of The Gartner Group's Industry Service.

The first processors AT&T will market will be the 3B20 and 3B5, superminicomputers that have been available to Bell system companies for some time, Cohen said.

Follow-up products will likely be smaller versions of the 3B5. These will include the 3B2-400 and 3B2-300 minicomputers that will range in price from $50,000 to $75,000 and provide departmental computing power, Cohen said.

He also predicted that AT&T will introduce a multiuser personal computer that will be priced in the $15,000 range.

High-end AT&T personal computer products will likely include the 3B2-200 and 3B2-100, $5,000 to $15,000 systems that support Unix and perhaps Microsoft, Inc.'s MS-DOS as a guest operating system.

To compete in the personal computer market typified by the IBM Personal Computer and Personal Computer XT, Cohen hypothesized, AT&T will rely on products from Convergent Technologies, Inc. and from Olivetti Corp.

Cohen expects all of these products to be introduced between now and the first quarter of 1985. Because equipment will initially come from many sources, he said, the company's early products may lack integration and may even occasionally compete against each other.

WILL THE AT&T BREAKUP MEAN AN MIS SHAKEUP?

You'll know, when you view
"DIVESTITURE: IMPACT ON INFORMATION MANAGEMENT"
Exclusively from
DELTAK's Special Edition:
Computerworld Reports.

The AT&T divestiture is undoubtedly the most earth-shaking event in recent business history. The repercussions will be felt throughout the telecommunications industry for many years to come. It will also profoundly change the way your company processes all forms of information. That's why you owe it to yourself to watch "Divestiture: Impact on Information Management," an up-to-the-minute half-hour video cassette report presented by DELTAK and CW Communications.

This month, you'll enjoy the invaluable insights of a respected communications consultant, and a major communications vendor whose company may benefit from the recent breakup. Your program host is John Gantz, noted MIS author and contributing editor of INFOWORLD magazine.

And be sure to keep watching, because more hard-hitting issues of Computerworld Reports such as DP/Office Automation Integration and The Maturing Information Center will be coming in the months ahead. Or, previously released Reports addressing major issues are still available including: The MicroMainframe Link, Integrated Microcomputer Software and Managing the Communication Network.

Remember, before the Big Breakup shakes your information system up, order "Divestiture: Impact on Information Management." Call DELTAK order entry at (312) 369-3000; (416) 678-9222 in Canada.

DELTAK
East/West Technological Center
1751 West Diehl Rd., Naperville, IL 60566
(312) 369-3000 (800) 532-7686

CW COMMUNICATIONS, INC.
375 Cochituate Road
Box 880, Framingham, MA 01701
(617) 879-0700

©Copyright 1984, DELTAK, Inc.

AT&T from page 99

he said, include the lingering effects of reorganization, which carries with it the necessity to breed a new corporate culture fired by competition. Perhaps even more importantly, Cohen pointed out, is that AT&T has to cultivate relationships with new sales contacts, particularly among MIS managers.

Other than further development of its Net 1000 service and its continuing efforts to sell the System 85 digital private branch exchange, Cohen predicted AT&T's adding emphasis on the marketing of its Unix operating system and the commercial introduction of a family of processors, ranging from superminicomputers to single-user personal computers, would also aid in its bid.

IBM, on the other hand, needs to beef up its communications equipment and service offerings to be a complete information industry supplier.

Richard E. Impraheim, corporate vice-president of research at Gartner, said that IBM won't wait until AT&T brings the battle to it, but will "investigate and/or enter all segments of the communications business except those that are rate-of-return regulated or union dominated." He does see, however, IBM entering rate-of-return regulated markets where strategic.

Imershein noted that while he anticipates IBM's "confrontation with AT&T in communications will be secondary to the battle in office systems," IBM will expand certain communications pieces already in place.

He speculated that IBM will build on and improve its Systems Network Architecture, beef up the Information Network and even try to acquire another third ownership share of Satellite Business Systems (SBS) by buying out Aetna Life & Casualty Co.

Imershein believes SBS losses will continue, but noted that IBM forecasts a big demand for private and semiprivate data communications networks in the late 1980s.

FUJITSU from page 99

technical resources — far more of that, including semiconductors, than any other non-IBM company."

If you have any doubts about just who calls the shots at Amdahl, just ask the man who founded the company and had to leave his name behind.

Gene Amdahl, who left Amdahl Corp. and now heads Trilogy Ltd., said in a recent interview that Fujitsu always has managed to protect its interests.

When Fujitsu representatives perceived their company had an interest in an Amdahl Corp. manufacturing area, they always made sure those interests were protected, according to Amdahl.

The acquisition "actually may be more helpful to Amdahl, [which] may be able to use more advanced technology," he said. On the flip side, it may just increase the perception that Amdahl Corp. is under the control of the Japanese, "but not any more than it always has been."

If Fujitsu actually does turn Amdahl Corp.'s marketing, distribution and servicing organization to its own use, it just may have the products and the financial stability to keep a healthy dose of free enterprise in the U.S. computer industry.

POSITION ANNOUNCEMENTS

Valley National Bank, the largest bank in Arizona, has openings for the following positions:

V.M. Systems Programmer
Systems Software Specialist II or Senior who will install, test and implement V.M. operating systems releases. Position requires 2 yrs. experience as a V.M. Systems Programmer, installing V.M. operating systems and program products. This position will involve user interface and assistance, with other bank departments.

Tandem Programmers
To provide program development for project activities and maintenance support on the following systems: on-line investment systems, multiphase home banking project, on-line ATM's systems and point-of-sale project. Positions require programming experience using COBOL, TAL and PATHWAY on Tandem equipment with IBM support. Significant user interface and systems analysis experience is desirable.

Please send Resume in confidence to:

Valley National Bank
Attn: John Kilroy
P.O. Box 71, A301 CW
Phoenix, AZ 85001

VALLEY NATIONAL BANK
The Leader

No agencies please.
E.O.E. M/F

MIAMI-DADE COMMUNITY COLLEGE - South Campus
SYSTEMS PROGRAMMER

Vital systems programming/analysis position to work closely with academic personnel to determine needs, write specifications, study market offerings/proposals, and recommend acquisition of suitable software/hardware solutions. REQUIRES: Bachelor's Degree in appropriate field and five years data processing experience with in-depth design knowledge. Two years experience as a Systems Software Programmer. At least two years experience in an appropriate field may be substituted for the degree requirement. Some experience as a systems programmer in an MVS installation. Knowledge of ROSCOE, and some DBMS understanding. Ability to coordinate solutions for a diverse user community essential. SALARY: $28,931 Minimum with Liberal Employee Benefits program. For further information, contact Al Le Duc at (305) 596-1357.

HARDWARE/ DATA COMMUNICATIONS COORDINATOR - South Campus

Directly responsible for preserving the operational integrity of all operations hardware and data communications equipment college-wide. Responsible for problem determination, solution and follow-up for all communications data circuits. REQUIRES: Bachelor's Degree in Electronics, Electrical Engineering or related field or equivalent combination or experience and training. Four years in-depth experience in data processing and/or electronic field engineering. Proven problem solving capability with computer hardware and data communications. Familiarity with medium/large scale computer hardware and data communications equipment and understanding of modems and telephone data protocol. SALARY: $22,968 Minimum with Liberal Employee Benefits program.

Submit two copies of resume, credentials and letters of reference to Personnel Services: 11011 SW 104 St., Miami, FL 33176.

AN EQUAL ACCESS/EQUAL OPPORTUNITY COMMUNITY COLLEGE

Join The Team That Created The Elegant NS16000

An elegant approach led to a very elegant solution — National's NS16000 microprocessor and its product family. The revolutionary top-down architecture delivers 32-bit power, and memory management capabilities on par with the latest mainframes. The upward-compatibility will accommodate a shift from 16- to 32-bit hardware. In essence, the NS16000 performs more like a computer than a chip, and we think that's a very elegant package.

A "Software-Intensive" Effort.

The NS16000 microprocessor is the spring-board for an entire family of products currently being developed at National's Microprocessor Systems Division. The key to their success lies in the development of software that enhances the NS16000 family's performance, applicability, and elegance. From development through marketing, our "software-intensive" effort is rapidly gaining momentum as we develop demand-paged UNIX™ systems based on Berkeley 4.1bsd and 4.2bsd for National's NS16032 and NS32032 microprocessors. We are also working with Bell Labs to define a version of SYSTEM V, . . . ,etc, for NS16032 and NS32032. These developments are creating opportunities for software professionals with UNIX and IBM PC™ experience to join us in the following areas:

Compiler Development

You will be involved in developing compiler code optimizers for "C", Pascal, FORTRAN, etc, to take advantage of the NS16000 elegant architecture. Your background should include two to five years' experience in compiler development; UNIX experience is desirable.

UNIX Kernel Development

You will work on porting Berkeley 4.2bsd to NS16032 and NS32032 based microcomputer systems (including a popular PC configuration with NS16032 and NS32032 add on boards). Two to five years' experience in UNIX kernel development is desired.

The Rewards Of Elegance.

The elegance and power of the NS16000 will become evident as more software is developed for it. And those who develop that software will reap the rewards, personally and professionally. That's definitely something to think about if you're ready to take on the challenge of our opportunities.

To learn more about National's Microprocessor Systems Division, send your resume to National Semiconductor, Dept. MS, P.O. Box 62499, Sunnyvale, CA 94088. We are an equal opportunity affirmative action employer. Principals only please.

NS16000
Elegance is everything.

[redacted] talk about your career.

National Semiconductor

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

Software Professionals!

Major Expension Opportunity!
We're Changing The Pace of Banking!!!

ISC Systems Corporation designs, manufactures and markets on-line terminal systems for financial institutions. We are seeking additional SOFTWARE PROFESSIONALS with assembler language experience. Our system utilizes a unique architecture incorporating a Z-80 microprocessor and a sophisticated multi-tasking operating system.

INSTALLATION SOFTWARE ENGINEERS

Our software engineers are responsible for coding and installation of our customized financial applications software. Customer interface is required. We have opportunities in the following cities:

Atlanta Dallas Orlando New York Metro Philadelphia Boston Glendale
Washington, D.C. Chicago Minneapolis Dayton Menlo Park

AND, in the Washington, D.C.-Philadelphia Area we have need for a:

SOFTWARE CENTER MANAGER

To qualify for this opportunity you should have the necessary software background mentioned above with 3+ years' managing a technical software group.

ALSO, in our Atlanta Regional Headquarters, we have an opportunity for a:

SOFTWARE CUSTOMER SUPPORT MANAGER

This position requires prior experience directing on-going software support combined with a strong technical background, preferably with microprocessor-based assembler. Strong customer relations skills and prior experience managing a small group of professionals is also required.

We offer competitive salaries including incentive bonuses, company paid benefits and flexible working hours. If you are qualified and interested contact our representative nearest the city you have an interest:

In Southern & Eastern States contact:
Mike Robertson
ISC Systems Corporation
1100 Circle 75 Parkway
Suite 200
Atlanta, GA 30339

In Midwestern States contact:
Kathy Ansorman
ISC Systems Corporation
2015 Spring Road
Suite 120
Oakbrook, IL 60521

In California contact:
Jennifer Tippett
ISC Systems Corporation
1040 Menlo Road
Suite 200
Menlo Park, CA 94025

equal opportunity employer

ISC SYSTEMS CORPORATION
We're Changing The Pace Of Banking

First National Bank in Albuquerque

Senior Systems Programmer

The Information Systems Department of First National Bank in Albuquerque has an excellent opportunity for a Senior Systems Programmer to be responsible for development and maintenance of our teleprocessing network. Our TP network is ACF/VTAM based under MVS/JES2 on two 4341-2 computers.

Our I/S Development Department is seeking professionals with a minimum of 3 years experience in development and maintenance of ACF/VTAM and ACF/NCP. Qualified applicants must have a thorough understanding of BSC and SNA protocols, systems maintenance using SMP, and IBM/370 assembler language. Background in CICS/VS helpful but not necessary.

First National Bank in Albuquerque, at $800,000,000 is one of the 2 largest banks in New Mexico. We offer an excellent compensation and benefits package. Please submit resume and salary history to:

Employee Relations Manager
First National Bank in Albuquerque
P.O. Box 1306
Albuquerque, NM 87103

The First National Bank of Albuquerque
New Mexico's Largest Home-Owned Independent Bank - Member FDIC
Convenient Locations City-Wide

we are an equal opportunity employer m/f/h

JOIN THE SIMON TEAM!

If you are looking for a real challenge and exciting opportunity in your field, not to mention excellent medical, dental and retirement benefits, consider joining our team. We are one of the nation's leading shopping center development and management firms and rapid expansion in our Management Information Services area is providing some excellent opportunities. If you are an experienced MIS professional, your skills could be just what our company needs.

Specifically, we need to fill the following positions:

★

PROJECT LEADERS
(PRODUCTION SOFTWARE)
Experience in mainframe application systems. Must be able to lead development and implementation of on-line computer software. Management and proven development expertise necessary.

★

COBOL PROGRAMMERS/ANALYSTS
Experience in wide range of transaction-based application software. Applicants should have a good working knowledge of COBOL and data base management systems.

★

TECHNICAL WRITER
Recent promotions have left positions open for COBOL-knowledgeable writers. This is an entry level position.

★

PC PROGRAMMERS
Experienced basic PC Programmer with PC-DOS/MS-DOS experience. Must install and maintain packaged software in addition to development of in-house software.

If qualified, you will work in a dynamically growing state-of-the-art DEC 2060 environment migrating from PDP 11/70's using TOPS 20, COBOL, SCOPE, ACCENT R, and other software.

For immediate consideration, submit resume with salary history to:

T. S. FEARS

MELVIN SIMON & ASSOCIATES, INC.

MERCHANTS PLAZA, P.O. BOX 7555, INDIANAPOLIS, IN 46207

Bryant Bureau

HAS THE COMPUTER PROGRAM FOR YOU

If you're not accomplishing your career goals, let us put you in the right environment. Our national database of client companies are continually looking for progressive DP professionals who want to remain state of the art.

NATIONWIDE OPPORTUNITIES

IBM Senior IDMS DBA	to $40K
IBM MVS Systems Programmer	to $40K
IBM Sr Systems Analyst, mfg	to $40K
IBM IDMS DB Implementation	to $38K
IBM Happy Paper Analyst	to $38K
HON SW Syst (CRT/SE, DMW)	to $40K
BUR mid systems MCP support	to $37K
BUR Tech Syst (GEMCOS, NDL)	to $38K
DEC VAX Systems Programmer	to $38K
Avionics Software Engineer	to $40K

To become part of the growth in the 80's, contact the DP Division today.

Bryant Bureau
DP Division
4905 S. Tamiami Trail, S-519
Sarasota, FL 33581
(800) 237-0457

We are currently recruiting for:

PROGRAMMERS, P/A, S/P, S/A, SDA's

If we have not called you yet:
(1) We do not know who you are
(2) Or no one has recommended you yet

If you have one year of experience or more and want to work in N.C., S.C., VA, TN or GA call one of our D.P. Recruiters collect:

Jon Watson, CPC

"THE DP PROS"
Professional PLACEMENT, INC.
837-D Huffman Mill Rd.
Burlington, NC 27215
(919) 584-0001

Our client companies pay all of your fees, interview and relocation expenses.

COMPUTER PROFESSIONALS

Opportunities with a major multinational transportation services corporation.

We're strongly positioned for continued industry leadership as we expand to meet the needs of our customers. Our computer-intensive business offers challenging and rewarding career growth opportunities in the following areas:

SYSTEMS PROFESSIONALS
- 7 years experience in data processing, with at least 3 years as a systems professional.
- Financial applications.
- Multiple IBM CPU environment.
- Software: CICS, DOS, VM, MVS.
- Bachelor's degree preferred.

SYSTEMS PROGRAMMERS
- 7 years in data processing with at least 4 years in systems programming.
- Software environment: CICS, VTAM, NCP, VM/CMS and MVS.
- Bachelor's degree preferred.

MANAGER, COMPUTER OPERATIONS
- 5-7 years computer operations management experience.
- Thorough familiarity with computer systems, controls, programming, software and data processing standards.
- Proven supervisory experience with excellent organizational and communications skills.
- IBM 4341 operating units with OS/MVS, DOS/VS, VM and CICS.

We offer salaries fully commensurate with your experience, professional talent to work with, and an attractive location in our mid-sized Eastern Pennsylvania community. Send resume and current salary information, in strictest confidence, to:

CW-84587, Computerworld
Box 880, Framingham, MA 01701

An equal opportunity employer

PROGRAMMERS

We have immediate openings for COBOL programmers with 1-2 years experience on an IBM Main Frame System.

The individuals will work on a large applications system under development and must be experienced with OS, JCL, VSAM and structured coding. Send resume to:

Blue Cross Blue Shield
of Southwestern Virginia
Roanoke

Human Resources Department
P.O. Box 13047
Roanoke, VA 24045
(703) 985-5000

Equal Opportunity Employer M/F/H/D/V/V

DALLAS

Software Engineers

Experts in applied sciences, program analysts, designers/chiefs for real time, interactively distributed systems in IBM, DEC, TANDEM, 68,000. FORTRAN, PL/1, TAL. Assembly languages. To $40K. Need on. In high-tech in Dallas!

2720 Stemmons Pkwy., 12077 - Dallas, TX 75207, (214) 637-8366

DATA PROCESSING CAREERS, inc.

FLORIDA CONNECTION

All Expenses Paid

Data Base Analyst IMS	To $35K
Systems Prog DPS, IMS	To $30K
Sys Pro - 3705, COMTEN	To $30K
ACF/VTAM Sys Prog	To $30K
Sys Pro - VM, VMAP	To $30K
Banking - MVS, Cobol	To $27K
Sr. PIA, Pascal, Fortran, PL-1	To $30K
PIA MVS, COBOL, CICS/DL-1	To $30K
Operations Analyst UCC-7, T1	To $30K
RACF Data Security Analyst	To $30K

DATA PROCESSING PROJECT ANALYST

A key position responsible for implementation of our information systems master plan and conversion to Sperry Model 90 computer. Requires 2 years college credits with major work in computer science or related field and 3 years professional experience in the computer field, including 2 years experience as a COBOL programmer and 1 year primary mini-computer experience. Call or write for city application form. Do not send resume. Apply by April 16, 1984.

City of Palm Springs
P.O. Box 1786
Palm Springs, CA 92263
(619) 323-8216

EOE AA

High Technology CONSULTING

SEI's role and reputation continue to grow as one of the nation's leading project-oriented high technology consulting organizations. The skills of SEI Consultant Teams are in demand to specify and construct sophisticated systems and applications across the country.

New SEI projects include industrial automation, advanced microprocessor systems, state-of-the-art online and distributed systems, and support for the emerging cellular telephone industry. Now getting into full swing, these projects offer you an unparalleled opportunity to be a part of major application and internals efforts from the ground up.

SEI is looking for first rate professionals – leaders and technical experts – who are eager to learn, ready to work hard, serious about their careers, and interested in the variety and challenge of consulting.

Mainframe Systems

Application Developers
$31-$61K

Get in on the ground floor of new development for the communications industry and publications industry. These are major new systems: distributed, networked, online – some of the genuinely significant development projects of the 1980s.

Qualifications: Substantial solid, real-world development experience...Familiarity with large-scale IBM environments and software: OS/MVS, VM/CMS, CICS, IMS, VSAM....Working knowledge of Structured Analysis and Design...FOCUS experience a plus.

IBM System Internals Experts
$46-$78K

Construct and enhance development and production environments. Participate in custom tailoring, installation, troubleshooting, performance optimization, capacity/configuration analysis and planning for systems and communications.

Qualifications: Significant system programming experience...In-depth knowledge of mainstream IBM products including: CICS, IMS DB/DC, VM/CMS, OS/MVS, SNA/ACF/NCP/VTAM....Outstanding assembly language programming skills...Understanding of the interaction between systems and applications.

Micro-Products

Hardware Developers
$31-$61K

Participate in the development of new integrated consumer-oriented terminals for use in a distributed environment. Help explore, define, construct, and integrate workstations for CAD/CAM/CAE.

Qualifications: Well-balanced experience in microcomputer-based device specification and integration, especially 68000-based products...Demonstrated ability to develop good business solutions as well as good technical solutions.

Software Experts
$38-$78K

Participate in the development of large-scale leading-edge micro-based products and applications. Help establish development environments, port and tailor software, contribute to firmware and hardware development.

Qualifications: Outstanding successful experience in large-scale, micro-based software development...Working knowledge of micro-based operating systems, compilers, communications, I/O drivers, LANs, and software products...IBM-PC and PC-COBOL a plus.

Leadership and Support

Development Managers
$46-$78K

Lead and participate directly in the planning and construction of major mainframe and microcomputer development efforts. We're looking for hands-on, technically-oriented managers who lead from personal practical experience in building large-scale systems.

Qualifications: Wide-ranging, hard-nosed system analysis, design, and programming experience plus at least 2 years of significant technical project management...Familiarity with system development and project control methods...Strong IBM mainframe or micro-technology background.

Technical Writers
$31-$56K

At SEI, Technical Writers are contributing consultants, not just editors of other people's drafts. SEI technical writers participate in all aspects of investigation, analysis, design, development, and training, with a focus on quality assurance and the development of production documents.

Qualifications: Broad practical experience in programming, design, and analysis...Outstanding writing/editing skills...Exceptional good sense and broad perspective on EDP...College level teaching experience a plus.

OPPORTUNITY!

Positions are available at SEI's offices in Chicago, Los Angeles, New York, Phoenix, and San Francisco and at additional project sites in Tulsa, the Virginia Tidewater area, and Putnam County, New York. SEI offers top salaries, an imaginative personalized benefits package, unlimited opportunity for growth, and the challenge of working alongside other SEI consultants – the best in the business.

For confidential consideration, send detailed resume and salary history to:

Christopher Volle
SEI Information Technology
Corporate Headquarters
450 East Ohio Street
Chicago, Illinois 60611

SEI information technology

THE BUSINESS OF TECHNOLOGY

– An Equal Opportunity Employer M/F –

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

HONEYWELL EXPERIENCE??

Call 1-800-343-1297

In Mass. Call 658-6100 (Collect)

DRC, located at the heart of Boston's Rte. 128 Technology Highway, is looking for professional software specialists with Honeywell experience. Our shop consists of HIS DPS-8, models 52 and dual 70, operating 24 hours a day, seven days a week.

Positions exist for:

- RESOURCE MONITOR
- SYSTEMS ANALYSTS
- TECHNICAL SPECIALISTS
- SR. PROGRAMMERS
- PROJECT MANAGERS
- PROGRAMMER ANALYSTS

With experience in the following areas:

- GCOS
- COBOL 68/74
- IDS II
- VMS
- FORTRAN 74/77
- DMIV
- DBMS
- MIDDLEWARE
- DMIV - TP
- SMAP

To learn more about these exciting openings, call Matt McKechnie toll free.
If unable to call, please submit your resume, in confidence to Matt, Dynamics Research Corporation, Dept. CW319, 60 Concord Street, Wilmington, MA 01887. An equal opportunity employer.

DYNAMICS RESEARCH CORPORATION
WILMINGTON, MASSACHUSETTS

MANAGER
BOSTON COLLEGE COMPUTER STORE

As a result of our recently announced participation in the Apple University Consortium, Boston College is planning to open an on-campus microcomputer store to assist university needs. We seek an individual with retailing experience and a knowledge base in microcomputers (primarily Apple and IBM) to assist in the planning for and to open and manage the store. Reporting to the Director of Computing Services, will be responsible for vendor relations, customer assistance (Boston College faculty, staff and students), and all store operations including hardware/software selection, purchase and resale; establishment of inventory systems and controls; generation of sales and other reports and data; training, scheduling, and supervising any clerical/salesperson and secretary assistant staff as required.

Send letter and resume, including salary history, to:
Mary McMillan, Personnel Officer

BOSTON COLLEGE
CHESTNUT HILL, MA 02167

Boston College is an AA/EEO employer offering generous benefits including tuition remission for employee, spouse and children and one month's vacation.

- PROJECT LEADERS -
- SYSTEMS ANALYST -
- PROGRAMMERS -

CBN University is located in Virginia Beach, Virginia, an area rich in history and culture. Its facilities are adjacent to the International Headquarters of the Christian Broadcasting Network, Inc.

The University currently extends Masters Degrees in the Schools - Biblical Studies, Business Administration, Communications, Education, Public Policy and Journalism.

We are currently in the process of design and selection of computer systems for the areas of Administration (both student and financial systems), Automated Library Systems, Office Automation and Academic Support Systems.

If you are a data processing professional with 3-5 years experience in university computing systems and desire to apply your skills in a Christian environment, please apply in full confidence to:

The Christian Broadcasting Network, Inc.
Employment Manager - Box OA
CBN Center
Virginia Beach, VA 23463

CBN is an equal opportunity employer.

**** PROJECT LEADERS ****
**** SYSTEMS ANALYST ****
**** PROGRAMMERS ****

To design and implement online computer systems using IDMS databases and the best in an array of software development tools.

Development is on a NAS 8020 - series mainframe (IBM, MVS SP-1.3). Other software products include TSO/SPF, IDMS DB/DC, online query, ICD, ADS online, ADR word processing, SAS, and financial MBA software.

Systems development efforts are utilized in supporting the popular "700 Club" television show, Operation Blessing, CBN Cable Network, International Christian Outreach projects, and the CBN Counseling Centers around the country.

Join a Christian professional team. Send your resume in confidence to:

The Christian Broadcasting Network, Inc.
Employment Manager - Box OA
CBN Center
Virginia Beach, VA 23463

CBN is an equal opportunity employer.

NATIONAL BUREAU OF STANDARDS
INSTITUTE FOR COMPUTER SCIENCES AND TECHNOLOGY

OPPORTUNITIES FOR CHALLENGING POSITIONS IN COMPUTER SCIENCE AND TECHNOLOGY

Computer Scientists/Electrical Engineers

The Systems Components Division of the Institute for Computer Sciences and Technology of the National Bureau of Standards is seeking GS-12, 13, 14 and 15 Computer Scientists and Electrical Engineers to perform research and advanced development on multiprocessor computer systems, speech recognition, data encryption for computer security, and optical data storage using computer processing. Successful applicants must possess an in-depth knowledge and familiarity with one or more of the following technological areas:

MULTIPROCESSING COMPUTER SYSTEMS

Theoretical and applied computer science and technology with emphasis on computer architecture, multiprocessing systems, or parallel processing.

SPEECH RECOGNITION

Theoretical and applied pattern recognition technology with emphasis on acoustics, phonetics, and artificial intelligence algorithms and languages.

DATA ENCRYPTION FOR COMPUTER SECURITY

Theoretical and applied computer science, data communications, mathematics, cryptographic algorithms, and computer security analysis problem definition.

OPTICAL DIGITAL DATA RECORDING SECURITY MECHANISMS

Theoretical and applied optical and magnetic technology with emphasis on computer mass storage, system architecture, or dynamic test and measurement techniques.

These positions range from the GS-12 to GS-15 grade levels depending upon qualifications and experience and offer competitive salary, excellent senior benefits and professional growth opportunities. Please send your Personal Qualifications Statement (SF-171) to:

U.S. Department of Commerce
National Bureau of Standards
Administration Building, Room A-169
Washington, D.C. 20234

Attn: Ms. Josephine White (C2307)

The National Bureau of Standards is located in modern facilities in Gaithersburg, Maryland and is an EQUAL EMPLOYMENT OPPORTUNITY/AFFIRMATIVE ACTION Employer. U.S. Citizenship is required.

Pacific Northwest

Telecommunications Analyst/ Programmer

Series/1
Communications Expertise

Westin Hotels, a major international hotel corporation, has an exciting opportunity for a motivated individual as a Senior Telecommunications Analyst/Programmer based in Seattle, center of the Pacific Northwest. The individual will support our 30+ Series/1 installations situated throughout the world. Up to 30% travel is required.

The responsibilities of this individual include the development of new software for a wide variety of telecommunications and interface equipment, the installation of hardware/software systems, worldwide support of the installed system base, and vendor liaisoning.

To qualify you should have a degree in Computer Science or Mathematics and a minimum of two years Series/1 EDL and CF experience. Excellent written and verbal skills are essential. You should have a track record of quality software development, have had exposure to communication protocols (ASYNC, BSY/HC, SNA/SDLC, X.25), be able to work under minimal supervision and accept the challenge of working with computer and communications hardware.

Join us in Seattle and become a part of a dynamic team! Even if you are the adventurous individual we are looking for this unique opportunity, you are invited to send your resume and salary requirements to: Peter Hurlburt, Westin Hotels, The Westin Building, Seattle, WA 98121. Or call Peter Hurlburt at (206) 447-4626. We offer a competitive compensation and benefits package. Relocation assistance provided.

Equal Opportunity Employer M/F.

WESTIN

TANDEM
Expertise?

Call or send resume to:
Mr. Neil J. Ourutsky
Director, Information Services
ENTRE[illegible]

1951 Kidwell Drive, Suite 400
Vienna, VA 22180
(703) 556-0900

COLLEGE POSITION

Computer science faculty position. Master's and college teaching experience required. Ph.D. with industrial or commercial applications experience on DEC hardware preferred. Salary and level of appointment based on qualifications. Apply by June 30 to: Dale W. Murray; Computer Science Department, Frostburg State College, Frostburg, Maryland 21532. *AA/EOE.*

SYSTEMS ANALYST

The Test Marketing Group, (Division of Burke Marketing Services) a leading supplier of test marketing services to the consumer package goods industry, is seeking a Systems Analyst. Individual selected will assist in the development of a new Interactive Data base using the Nomad 2® software system; including implementation, coding and documentation of the system.

Qualified candidates must possess some knowledge of data base design and reporting using Fourth Generation language and must have experience with PL/1, FORTRAN, COBOL or SAS in an IBM environment. Position also requires an ability to solve problems and learn new programming languages. Knowledge of Marketing Research, Statistics and advanced degree in Computer Science preferred, but not required.

Advancement opportunities, challenging dynamic work environment and excellent benefit package. Send resume in confidence to: Professional Recruitment, BURKE MARKETING SERVICES, INC., 3900 Victory Pkwy, Cincinnati, OH 45209.

An Equal Opportunity Employer

Burke
Marketing Services, Inc.

"NATIONWIDE"

COMMUNICATIONS GROUP

STRATEGIC PLANNERS
data/voice integration
software/hardware

COMPUTER SCIENCE GROUP

IBM & DEC Oper. Systems
MORTGAGE/FINANCIAL Systems
IBM/SECRO Oper. Systems
UNIX/"C" Applic. & Syst.

[illegible]

PERSONNEL CONSULTANTS
17744 Sky Park Circle, #200
Irvine, California 92714
(714) 754-0100

LOOKING?

Find the job you want in Computerworld's classifieds. No other publication carries as many ads for computer professionals as Computerworld, so no other publication can give you as wide a choice of jobs, salary and location as Computerworld.You can even try a "Position Wanted" ad to look for exactly what you want, where you want.

Be sure you look over our recruitment ads every week, so you don't miss the opportunity that's just right for you.

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY
375 Cochituate Road, Framingham, MA 01701/(617) 879-0700

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

Great Things Are Happening In Our NATION'S CAPITAL

And, if you're an experienced computer professional, the Washington, D.C. area can do great things for your career. This region is one of the top four technical centers in the U.S. ... and is growing rapidly. Many top companies are moving to Washington ... and a wide spectrum of computer/engineering opportunities are available with these and other firms.

No one knows the Washington job market better than Hunter Search. And, because of our extensive list of clients an 8 year track record of successful technical placement, we can find you a career that is both personally and professionally rewarding.

Look to a leader in technical placement - Call us COLLECT at (703) 354-9700. Or send your resume to:

HUNTER SEARCH
7929 Little River Turnpike
Suite 202
Annandale, VA 22003-6916

Representing equal opportunity employers.

Data Processing

ACP PROFESSIONALS

ASCI is a professional organization serving the Data Processing community with a commitment to excellence, unique to the Computer Service Field. We are seeking professionals with the following skills:

- ACP Applications
- ACP Internals
- OCP
- Coverage

We offer a competitive salary with paid overtime, excellent benefit package and relocation assistance. For further information pertaining to our organization, positions and possible Flight Benefits, please call collect (913) 268-6500 or send your resume in strict confidence to:

ASCI
Attn: Personnel
10620 W. 84th St.
Shawnee, KS 66203

Our computer can help you get here or elsewhere. Four WATS lines; 13 years' experience; 370 affiliated offices; 300+ current job orders; 3000+ company clients from Virginia to Texas to Florida! Send resume to:

DATA RESOURCES, USA
Division of Landrum Personnel Resources
P.O. Box 13730
Pensacola, Florida 32524-1373
CALL TOLL FREE (800) 874-0497
IN FLORIDA (904) 434-6321 COLLECT

Hardware and Software Professionals

Make a move to Rochester, Minnesota for an IBM career...

in small and intermediate systems and DASD development and manufacturing.

We are interested in Hardware and Software professionals who stand out clearly in a field noted for outstanding talents.

If your interest is in advanced, small and intermediate systems, explore the opportunities in this innovative and exciting environment.

Products that have been developed/manufactured here include the System 34, System 36, the new System 38, associated terminals and direct access storage devices, all using new technologies and new ideas to create pacesetting systems.

This continuing success has created a variety of openings. If you have a BS in EE, CS or related disciplines (or equivalent experience), we'll welcome your inquiry.

Positions are available in developing, testing, and manufacturing of systems and related I/O equipment:

Electrical Engineering
- System and I/O Architecture
- CPU Logic and Microcode
- LSI, Chip, and Module Design
- Digital Servo Systems
- Analog/Digital Circuits and Logic
- Test Equipment
- Computer Power Systems/Supplies

Systems Programming
- Systems Architecture
- Operating Systems
- Communications
- RAS, System Test, Performance Analysis, Simulation, and Verification
- Development Tools and Operations Support

All positions require U.S. citizenship or permanent residence visa.

Rochester, 80 miles southeast of Minneapolis, is within easy weekending in the northern lake districts of Minnesota and Wisconsin. There are multiple opportunities for sports, cultural activities, city or country living, and on-site advanced degrees in Engineering and Computer Science through the University of Minnesota. Other advantages are IBM's comprehensive company-paid benefits including tuition refund, medical and dental plans, and relocation assistance.

Please send confidential resume to:
Professional Recruiting Manager,
IBM Corporation, Systems Products Division,
Dept. 924 PP, 3605 Highway 52 No.,
Rochester, MN 55901.

IBM

An equal opportunity employer

FOR ACHIEVERS ONLY

INTERMEDIATE to SENIOR LEVELS

- Software Development Mgr
- Technical Support Specialist
- Data Base Administration
- Voice/Data Communications
- Office Automation
- Microprocessor Software
- Systems & Programming Mgr
- EDP Audit/Security
- Systems Planning
- Manufacturing Systems

DEC, HONEYWELL, IBM, NCR, UNIVAC

BRUCE A. MONTVILLE
Managing Partner

EXETER 2100
National Recruiting Consultants
(603) 926-3716

TOLL FREE
(800) 258-7328

COMPUTER PARK, P.O. BOX 4970
HAMPTON, NH 03842

TECH SVCS. DIRECTOR

Suburban Fortune 500 org. currently looking a proven mgr. to oversee the DBA & tech. support depts. IBM multi-CPU OS/MVS IMS DB-DC courses. Oppty. to manage the tech. growth of a fast paced co. $55,000.

IMS TEAM LEADER

Expanding $ billion-dlr. multi-skilled prof. ltr. Strong Mgmt. w/IBM OS/MVS IMS DB-DC COBOL a must. You'll find this exciting oppty. a compliment to your career growth!

EMPLOYMENT SERVICE OF DENVER, INC.
100 Summer Street
Boston, MA 02110
(617) 482-1555
Personnel Consultants

Programmer/Analysts

LEARDATA, a diversified data processing services company, is seeking individuals with 2 or more years of experience in programming and analysis. The ideal candidates will have experience in at least one of the following disciplines:

- IBM 3/38
- CICS/DL1
- DB/DC
- PL/1, FORTRAN, COBOL

LEARDATA currently has openings in Texas, Tennessee, Oklahoma and Virginia. For more information, contact: Barbara Martin, (214) 691-1292.

Subcontractors are encouraged to respond

LEARDATA
8750 Stemmons Freeway, Ste. 400
Dallas, Texas 75247

Equal Opportunity Employer, m/f

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

DEVELOP YOUR FUTURE AT CANDLE CORPORATION...

CANDLE CORPORATION is a multi-national high technology company and developer of OMEGAMON®. We have several exciting opportunities for qualified individuals to join our expanding team of professionals.

Sr. MVS Software Developers

If you have a desire to get away from SMP installs and third shift system outages that interrupt your sleep or want career advancement without getting into management, then build your future by developing quality systems software at Candle.

Qualified applicants will have strong IBM Assembler programming skills and good knowledge of the internals and performance consideration of the MVS operating system.

Please call or send your resume to: Joe Winterton, 2 Gannett Drive, Suite L-1, White Plains, NY 10604. (914) 694-1900.

Technical Support Specialists

We're seeking support specialists to be the technical interface between Candle and its customers. Requirements include extensive knowledge of MVS and either IMS or CICS operating systems experience. Knowledge of performance and tuning concepts also desired along with excellent communication and presentation skills.

Please call or send your resume to: Barry Weinstein, 777 Third Ave., 22nd Floor, New York, NY 10017. (212) 605-0305.

CANDLE offers an excellent compensation and benefits portfolio as well as an opportunity to work with some of the top software professionals in the world.

We also have other similar positions available in our So. California offices. Please contact Joel Prescott, 10960 Wilshire Blvd., #900, Los Angeles, CA 90024. (213) 478-1277.

Equal Opportunity Employer

Candle

DIRECTOR OF INTERNATIONAL OPERATIONS

BGS is the premier company in computer capacity management software. Our integrated family of products - BEST/1, CAPTURE, INFO/BASE, and CRYSTAL - is effectively serving the needs of over 600 large IBM facilities, worldwide. Demand for our software has been exceptional and is expected to increase considerably for both existing and to-be-released products.

Our expanding international activities consist of a London based subsidiary and distributorships throughout Europe, Australia and, imminently, the Orient and South America. Home office supporting groups include logistics, marketing and technical support personnel. The successful candidate for this newly created position will have full responsibility for these activities, including Marketing, Sales, Technical Support, and Administration, and will be capable of accomodating the extensive growth we anticipate. The position is based in Waltham, MA, and will require extensive travel.

Ideally, candidates will have had considerable and successful experience in Marketing and Management, on an international level. Preferably, such experience should have involved software or other computer-related products and/or services. Compensation will include, minimally, a generous base salary as well as an open-ended incentive arrangement.

Interested parties should forward their resumes to Ms. Charlotte Mist, prior to April 2, 1984.

BGS SYSTEMS, INC.
One University Office Park
Waltham, MA 02254

An Equal Opportunity Employer M/F/H/V

Manager of User Services:

This is a new position created primarily for the support of the academic user community. Candidates should expect their duties and responsibilities may change as the academic computer system becomes operational and the user community becomes proficient in the use of this facility. Candidates must be able to effectively communicate with both non-computer literate and computer literate individuals in a manner which promotes understanding and cooperation. The ideal candidate will have experience in a similar position including some management experience. The position requires a masters degree with some substitution of experience allowed and five years experience in systems programming, systems analysis and/or applications programming. Prefer at least three (3) years with an academic institution and at least two (2) years in a leadership position. Salary range upper $30's to lower $40's. Application deadline April 16, 1984. Send vita and two letters of reference to:

M. G. Suffolk, Chairperson,
Computer Services
Search Committee,
University of Arkansas at Little Rock,
33rd & University,
Little Rock, Arkansas 72204.
An EEO/AA Employer.

SYSTEMS PROGRAMMER

Worldwide manufacturer headquartered in the Detroit area has an immediate opening for an individual knowledgeable and experienced in VAX/VMS system, VAX-11 Fortran and Macro programming languages. 1-2 years experience in using RMS systems services and RTL required. Additional experience with computer graphics, datatrieve, Pascal and data base management systems is desirable. Responsibilities will include systems and application programming.

This position is in an innovative, creative environment working with a small group of fellow professionals. We offer a generous fringe benefit program as well as divisional and corporate career opportunities. Qualified applicants may submit their resume and salary history/requirements in confidence to:

GTE VALERON Corporation

ATTN: Mr. John Hanssen
Personnel Department
P.O. BOX 3000-P, Troy, Michigan 48007

Affirmative Action Equal Opportunity Employer. Females and Minorities are encouraged to apply.

— SUNBELT CAREERS —
PIA's, SP's, SW ENG's
Our clients need your experience in CICS, IMS, IDMS, SNA, PC's, HP 1000/3000, ALC, RSX-11M, VAX/VMS, UNIX, C
Hundreds of openings nationally easily searchable on our DEC POP11/44
Call to inquire or send resume today. Our 15th year as recruiters.
TOLL FREE 800-334-4388 In NC (919)484-6101
P.O. BOX 35665
FAYETTEVILLE, N.C. 28303

SYSTEMS ANALYST

A rural electric utility near Denver is seeking a Programmer with an interest in assigning a variety of DP management duties. This position will be mainly responsible for modifying A/P, Payroll, General Ledger, COBOL packages and to design and program inventory and the subsidiary accounting books of entry. A minimum of 4 years college or equivalent schooling related to data processing, 3-4 years experience with COBOL programming and VAX 11/780, VMS experience is preferred. Join a small DP staff for a variety of work experience by sending your resume, salary history and requirements in confidence to: Tom Bate, REA, P.O. Drawer A, Sedalia, CO 80135. EEO M/F/H/V.

PHILADELPHIA

SYSTEMS CONSULTANT TO $40,000
MANUFACTURING APPS

Mid-Atlantic Fortune 50 firm offers to recently apply for expand its VALUE SCALE MIS HOUSEHOLD. Reqs in depth mfg Systems Design/Devel exp. & excellent user interface skills. Data base, Prod Mgmt, MRP, BOM/P detail. Top benefits and all exp. expenses pd.

ROBERT HALF
of PHILADELPHIA, INC.
2000 Market St., Suite 700
Philadelphia, PA 19103
(215) 569-4300

DEC SYSTEMS ENGINEER

Orlando, Florida

At Systeme, our reputation for financial systems excellence isn't just being built... it's being earned.

In just 4 short but remarkable years, Systeme is becoming known as perhaps the most innovative manufacturer of financial hardware and software ever. Initiating breakthroughs and making the kind of advances that are propelling us further in today's leading edge technology.

Your background in financial/banking applications and current exposure to an on-line real time multi-tasking environment will be utilized in developing specifications, setting installation schedules and ensuring that customer systems become operational.

To qualify, you must have 3-5 years experience on DEC PDP 11 with RSX 11M+, working knowledge of Assembly language and related exposure to on-line terminal systems utilizing minicomputers with both up and down-line communications. Extensive interfacing with non-technical customer personnel also necessitates excellent interpersonal and communications skills and previous customer relations experience. Position involves frequent travel.

As a member of the Systeme team, you'll enjoy an excellent salary, comprehensive benefits, and the kind of career potential that can only be found in a vital growing organization. For immediate consideration, please send your resume in confidence to: Personnel Manager, Dept. CW-310

Systême Corporation
3443 Parkway Center Court
Orlando, Florida 32808
(305) 299-6180

An Equal Opportunity Employer M/F

COMPUTER MANAGEMENT INFORMATION SYSTEMS

Marshall College invites applications for a tenure track position in Computer Management Information Systems, to begin September 1984. Duties include teaching Information Systems/Design, Data Base Management and other undergraduate courses in Management Information Systems. Applicants must have at least Master's degree in Management Information Systems/Computer Science or a related degree. Preference will be given to those persons with business computing experience and/or PhD. Salary and rank dependent upon qualifications and experience. Send resume and three letters of recommendations by April 6, 1984 to:

Dr. D. Poole, Director
Dept. of Mathematics/Computer Science
Marshall College
[illegible]

IN SAN FRANCISCO ...
IT'S SPRING YEAR ROUND!

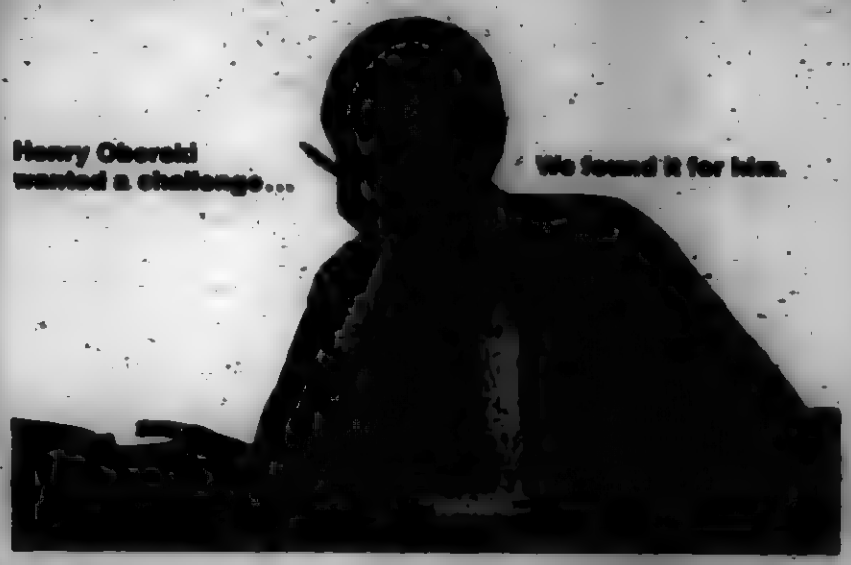
DATA PROCESSING PROFESSIONALS skilled in Main Frames, Mins or Micros, DATA BASE or ON-LINE SYSTEMS consider a move to the beautiful SAN FRANCISCO BAY AREA.
Career opportunities offering CHALLENGE, GROWTH and REWARDS

LOGICAL OPTIONS
Independent Agency Est. 1968
[illegible]
San Francisco, CA 94103 • (415) 777-0300

Hardware, software, problems, people, pricing, ethics, litigation, communication, macros, minis and micros.

We like to make an issue of it. EVERY WEEK.

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS



Henry Oberoi had been in the data processing field for a number of years before he first came to us. His education was most impressive. His EDP experience was extensive, to say the least. The problem was that, over the years, Henry had provided solutions to dozens of various challenges. He was, as a result, becoming bored with his work.

Henry was quite specific about what he wanted to do and that, indeed, became a real challenge to us. We had nothing immediately available to meet his requirements. So, we made a tremendous number of client contacts and, in time, we found a challenge that was the peak in Henry's professional life. Now he's happy and we're happy for him.

So, you see, NCA is not limited to routine placement services. Career advancement... we do it all... and no one does it better. Come in. Call. Or mail your resume to the NCA firm nearest to you. Confidentiality is assured. Company clients assume our fees.

ATLANTA: Bill Limited
229 Peachtree Street, Suite 991-C
Atlanta, Georgia 30303 (404) 581-0940

BOSTON: Robert Kirwan and Co., Inc.
North Brook Park, Suite One, 181 Bedford Street
Lexington, Massachusetts 02173 (617) 861-1660

CHICAGO: Theo. Hinz & Associates
150 N. Wacker Drive, Suite 1700
Chicago, Illinois 60606 (312) 977-1565

COLUMBUS: Micheal Thomas, Inc.
65 E. Wilson Bridge Road, Suite 201
Worthington, Ohio 43085 (614) 848-5666

DALLAS: DataPro Personnel Consultants
12720 Hillcrest, Suite 520
Dallas, Texas 75230 (214) 661-8866

DETROIT: Electronic Systems Personnel, Inc.
2000 Town Center, Suite 2580
Southfield, Michigan 48075 (313) 353-5656

FLORIDA: Data Sciences Personnel, Inc.
P.O. Box 8577
Hollywood, Florida 33084 (305) 484-8112

HARTFORD: Compsen, Inc.
900 Asylum Avenue
Hartford, Connecticut 06105 (203) 548-4249

HOUSTON: Career Consultants, Inc.
2000 South Post Oak
Houston, Texas 77056 (713) 626-4480

INDIANAPOLIS: Computer Personnel Services, Inc.
107 N. Pennsylvania
Indianapolis, Indiana 46204 (317) 634-4712

KANSAS CITY: D. P. Career Associates
8405 Mission, Suite 302
Shawnee Mission, Kansas 66206 (913) 236-6266

LOS ANGELES: Superior Resources, Inc.
Personnel Service
17141 Ventura Boulevard, Suite 200
Encino, California 91316 (213) 995-4466

MILWAUKEE: EDP Consultants, Inc.
7232 West State Street, Suite 3
Milwaukee, Wisconsin 53213 (414) 475-6977

MINNEAPOLIS: Electronic Systems Personnel
804 Twin City Federal Tower, 121 S. 8th St.
Minneapolis, Minnesota 55402 (612) 338-8714

NEW JERSEY: Systems Search
99 Millburn Avenue
Millburn, New Jersey 07041 (201) 761-4499

NEW YORK: Sobel Associates, Inc.
7 Dey Street, Suite 410
New York, New York 10007 (212) 227-7370

NEW YORK UPSTATE:
CPA Associates Personnel, Inc.
2530 James Street
Syracuse, New York 13206 (315) 463-5565

NORTH CAROLINA: DataMasters
Div. of TeleForce, Inc., P.O. Box 9988
Greensboro, North Carolina 27408
(919) 373-1401

PHILADELPHIA: Systems Personnel, Inc.
115 West State Street
Media, Pennsylvania 19063 (215) 565-9850

PHOENIX: Professional Career Consultants
4628 North 17th Street, Suite H101
Phoenix, Arizona 85016 (602) 274-9555

SAN FRANCISCO: The Computer Resources Group, Inc. Agency, 303 Sacramento Street
San Francisco, California 94111 (415) 398-8585

SEATTLE: Hosier, Martin, Morris & Associates
1940 116th Avenue N.E.
Bellevue, Washington 98004 (206) 453-2788

WASHINGTON D.C.: EDP Systems Corporation
914 Lamberton Drive
Silver Spring, Maryland 20902 (301) 649-8171

Call the NCA firm nearest to you for Salary Survey and Relocation Information

National Computer Associates

EDP Placement Firms in Baltimore, Cleveland and St. Louis can learn about the many advantages of being members of National Computer Associates by calling Jack Todd (602) 274-9555

Outstanding SENIOR MIS Opportunities

San Francisco Bay Area

COOPER LASERSONICS, one of the largest laser manufacturers in the world — and still growing — has recently expanded into a beautiful new facility and is also expanding its MIS staff!

SYSTEMS MANAGER

Design, program and maintain specialized systems software used to support all our computer operations and controls. Utilize your technical expertise in machine "internals" to correct system failures and to maximize our level of service to internal users. You will also design, write, test and document business application programs. To qualify, you must have a BSCS (or equivalent) and 2+ years systems programming experience on the HP 3000; ASK experience a plus.

SR. SYSTEMS ANALYST

Here is an opportunity to perform analysis and problem-solving for manufacturing applications software, to interface with users to evaluate requirements, and to define procedures and prepare documentation. Requirements include a BSCS degree and at least 2 years experience on the HP-3000. ASK systems analysis experience a MUST.

At COOPER LASERSONICS, we offer competitive salaries and a generous company-paid benefits package including medical, dental and life insurance. Please send resume with salary history to COOPER LASERSONICS, INC., 3420 Central Expressway, Santa Clara, CA 95051. (Refer to Box#CW319). An equal opportunity employer m/f/h.

Cooper

Cooper LaserSonics, Inc.

Director of Computer Services

Indiana University at Kokomo is seeking a Director of Computer Services to administer the computing of the administrative and academic data processing systems. The new unit has access to a Cyber 830, two DEC 11/70s, an IBM 4341, an IBM 3081, and four VAX 11/780s through the Indiana University Computer Network. Computer Services provides administrative data using Indiana University supported packages and locally developed programs and assists the faculty in the use of computers in research and teaching.

Applicants should possess a master's degree and both computing and administrative experience. Salary range is competitive with comparable college positions. The successful candidate is expected to assume his/her duties no later than Sept. 1, 1984.

Indiana University at Kokomo is one of the six regional campuses of Indiana University and is located 60 miles north of Indianapolis. Its mission is to meet the educational needs of north central Indiana through a broad spectrum of associate and baccalaureate degrees, and a limited range of graduate courses.

Applicants should send a complete curriculum vitae and the names, addresses, and telephone numbers of three references to:

Dr. Philip S. Hultsky, Chairperson
Director of Computer Services
Search and Screen Committee
Indiana University at Kokomo
2300 S. Washington St.
Kokomo, IN 46902

This search will continue until the position is filled, but applications received by April 1, 1984, are assured of consideration.

Indiana University at Kokomo is an EO/Affirmative Action employer.

PHA COBOL, CICS 10
PHA Lifemen, CFO, Life 70, CPG+ 10
Sr PHA Economics Banking 10
Sys Prog CICS/VS 10
Security-RACF 10
Application Development Mgr 10
Commercial MBA 10
PHA Banking Deposits 10
Tech Sales CPU 10
Prod Mgr Mini OS DOS 10
PHA OR MBA Professors 10
Mktg Mgr CPU - Micro 10
PHA Tech Pr Spc 10
PHA MIS DB/DC Dev. 10
Product Support 10
Assembler Prog Banking/Loans 10
Telecom Analyst 10
PHA DOS DL/1 Hospital 10
Sys 34 or 38 RPG/DOS 10
FORTRAN - Engineering 10
Sys Prog-VM 10

COMPUTERPEOPLE

STEVEN, Hoover Block, Suite 200
Tampa, FL 33614
(813) 885-8478

We Serve Computer Professionals Exclusively
And That's Important To You!

Computer

The Pyramids Beckon You . . . (Cairo, Egypt)

As one of the world's largest information services companies, Computer Sciences Corporation has taken a solid leadership position in the development of technically advanced software systems.

At the Systems International Division of CSC, our continued growth has created an immediate requirement for an IBM OS/MVS Systems Programming Trainer, to be located in Cairo, Egypt, and mobilized within thirty to fourty-five days. The selected individual will be involved in the curriculum development and instruction of the following systems software courses: IBM Assembler Language, OS/VS facilities and VSAM, MVS software, TSO, SMP, RACF, and Data Communications.

Requirements include a BS degree, minimum of three years of experience as an IBM systems programmer with at least one year of MVS internals coupled with a minimum one year teaching ADP courses. A sound Middle Eastern acumen is considered highly desirable.

To learn more, please call/forward your resume immediately in confidence to Paul Gorey, Manager, Professional Staffing at (703) 471-3206/7.

CSC
COMPUTER SCIENCES CORPORATION
SYSTEMS INTERNATIONAL DIVISION
P.O. Box 745
Herndon, Virginia 22070
An Equal Opportunity Employer

ABU DHABI - UNITED ARAB EMIRATES

Profile

Our client, a leading International Petrochemical Organisation, has commissioned the TASK FORCE Group to recruit a team of highly motivated Computer Professionals to form the basis of a rapidly expanding development department.

The exceptional opportunities being presented, provide a dynamic framework in which to contribute skills relating to database design and administration, systems and programming and computer operations.

The achievable earnings potential is significant. Our client offers an environment which is both pleasant to work in and has considerable prospects for career progression and development. The benefits package includes competitive tax free salaries, single or married status, air-conditioned accommodation to a high standard, air fares for employee and immediate family. In addition, the company extends financial assistance to dependants attending school up to completion of secondary education and also provides an interest free car loan to a maximum value of 36,000 Dirhams. All positions are permanent renewable on a 2 year basis.

The climate in the area is hot and humid in summer, temperate in autumn but moderate and pleasant during the rest of the year. Abu Dhabi is a modern city with good shopping, communications and recreational facilities. Primary and Secondary schools are available. Annual leave is 42 - 48 days dependant on seniority.

Our client operates an IBM 3090X series running under MVS/XP, CICS, TSO, VSAM, DL/1 or IDMS DB/DC, FORTRAN, COBOL and PL/1. Full job specifications and academic criteria are available for all positions advertised.

Requirements

- SENIOR SYSTEMS ANALYST(TECHNICAL) ..... REF:AA
  SALARY £38,000 - £38,000 PER ANNUM TAX FREE
- SENIOR SYSTEMS ANALYST (BUSINESS) ..... REF:BB
  SALARY £38,000 - £38,000 PER ANNUM TAX FREE
- SENIOR SYSTEMS ENGINEER ..... REF:CC
  SALARY £38,000 - £38,000 PER ANNUM TAX FREE
- SYSTEMS ENGINEER ..... REF:DD
  SALARY £21,000 - £28,000 PER ANNUM TAX FREE
- SENIOR PROGRAMMER ..... REF:EE
  SALARY £18,000 - £23,000 PER ANNUM TAX FREE
- SHIFT LEADER ..... REF:FF
  SALARY £15,000 - £18,000 PER ANNUM TAX FREE
- DATABASE ADMINISTRATOR ..... REF:GG
  SALARY £28,000 - £28,000 PER ANNUM TAX FREE
- SYSTEMS ANALYST ..... REF:HH
  SALARY £21,000 - £28,000 PER ANNUM TAX FREE

Please send C.V.
44 Kingsway
Stoke-on-Trent
Staffordshire
ST4 1 JH
ENGLAND

TASK FORCE

INFORMATION SYSTEMS CONSULTING

Our nationally prominent information systems consulting group is searching for a high-potential, achievement-oriented individual who wants to enter the consulting profession. We'll train and develop your consulting skills; you must bring excellent technical skills and an outstanding track record.

Here's a profile that we'd like you to have:

- Success at performing responsible line or staff jobs in a large scale information processing environment.
- A special area of technical or functional interest which you would like to further develop into true expertise.
- Current employment for 3 to 10 years since graduation with a well-managed large organization or vendor.
- Excellent academic preparation and a strong desire for continuing formal and informal education.
- Outstanding communication skills with a proven ability to persuade management through written analyses and effective presentations.

We have the ability and desire to help you grow at the fastest rate you can handle. Our existing clients are among the very best in their businesses, and they demand the best from us.

Write and let us know about you. We will treat your letter with total confidentiality and we'll acknowledge it even if we don't have a match. Address you letter to:

Director, Executive Staffing
CW-94566
Computerworld
Box 880
Framingham, MA 01701
equal opportunity employer

PROGRAMMER ANALYST

District Office
Salary $2,101-$2,554/Mo.

Duties: Under direction, performs system design and programming to develop and maintain on-line systems using Honeywell Level 66 hardware, performs related work as required.
Experience: Considerable progressively responsible independent programming experience preparing data processing applications in on-line, multi-programming environment. Interacting effectively with users. Experience in developing or maintaining a system using COBOL and non-procedural language.
Education: Bachelor's degree in computer science, mathematics, or a related field. Experience may be substituted for education.
Deadline: April 2nd, 1994 5PM
Inquire: State Center Community College District, Personnel Commission, 1525 East Weldon, Fresno, CA 93704. Phone (209) 226-0758.

RESEARCH PROGRAMMERS

In the Computer Facility
In the Department of Computer Science
at the University of Illinois at Urbana-Champaign, Illinois

The positions require ability and experience in developing, maintaining, and documenting system software in a large computer system consisting of several medium-sized computers and associated equipment in an evolving research environment. The person will be expected to work with and interact with a large number of research faculty and group of graduate students. Ability to work with system vendors is required. Some knowledge of computer system hardware is required.

Minimum requirement is a bachelor's degree in computer science, computer engineering, or a related scientific field. Two years of relevant experience in software systems work is also necessary. Experience with UNIX system and the C programming language is required.

The position is academic year-renewal. The salary and rank are open, will be competitive, and will be appropriate to the qualifications and experience presented. The position is available immediately. It is hoped to fill the position by July 1, 1994 or earlier. In order to assure full consideration, application should be received by April 30, 1994. Interested persons should send a complete resume and three letters of reference to Jaideep M. Srivastava, Head, Department of Computer Science, University of Illinois at Urbana-Champaign, 1304 West Springfield Avenue, Urbana, Illinois 61801, phone: (217) 333-6788.

The University of Illinois is an Affirmative Action–Equal Opportunity Employer.

PROGRAMMER/ ANALYST

San Francisco Bay Area

Focus your professional expertise on Temescal, a high technology division of an international Fortune 200 Corporation, the BOC Group, Inc. In this position, we'll look to you for a key contribution as we enforce existing applications in our MAPICS software. To help meet the increased demand for our new products, you'll also design programs for production control and other functions to assure an efficient flow through manufacturing.

To qualify, 3-5 years programming experience is essential, including 1-3 years with IBM System 36 plus a degree or equivalent in Computer Science. Languages should include COBOL, RPG-III as well as MAPICS applications software in a manufacturing environment.

Temescal offers an excellent salary and outstanding fringe benefits including medical/dental/life insurance and a savings investment plan. Send resume in confidence to Temescal, Professional Selection, Dept. CW319, 2850 - 7th Street, Berkeley, CA 94710. (415) 841-5720. An equal opportunity employer.

Temescal

FLORIDA

The time to start West was yesterday. Isn't it time you were working for us?

- ERP AUDIT-S yrs with plugs
- PA-C language
- PA-UNIX
- PA-COBOL/ABS Banking
- TECH-SHELL Sys Prog Spec
- OPEN MVS-Powerful Mail
- PA-Sun-COBOL
- PA-DEC-COBOL
- PA-Sys 36-RPGIII
- SYS PROG-MVS-Specialist
- DBA-Ideal 204
- PA-DB-ADS-COBOL
- CAP PLAN-VM or MVS Mgd
- JD DBA-IMS-Plex ops mgr
- PA-MVS-Banking-Loans

Many others to choose from. All fees paid relocation to our client.

STAN ALLEN
ROBERT HALF
OF TAMPA, INC.
5311 W. Waters Ave.
Tampa FL 33634
(813) 886-4101

HEALTH CARE/NEW MEXICO

A major Southwestern health service organization and its wholly owned data processing organization are seeking professionals to design, install and support major financial applications.

SENIOR ANALYST/PROGRAMMER

You will work closely with health services staff on applications addressing general ledger, inventory/purchasing, accounts payable, payroll, personnel, and patient accounting. Position requires a minimum of 5 years of COBOL programming experience for large scale systems, preferably in a health care setting. CICS experience is desired. Current environment includes 4341's/VM/CMS.

We offer an excellent compensation and benefits package. To be considered for this position, please forward your resume including salary history to:

TOTAL BUSINESS SYSTEMS
P.O. Box 26627
Albuquerque, NM 87125

CURIOUS ABOUT CLASSIFIED?

If you are interested in advertising with Computerworld, but don't know how to do it, give us a call! We will be glad to send you our current rate card, which explains sizes, costs, deadlines and requirements. All you have to do is ask! Our toll free number is 800-343-6474. In Massachusetts call (617)879-0700, just ask for the Classified Advertising Department. Or, you can look for our classified order form located in the classified section of Computerworld. Fill it out, attach your ad with a check, and return it to us. Computerworld Classified Advertising, 375 Cochituate Rd., Box 880, Framingham, MA 01701. We're anxious to help!

Data Processing

HOME BANKING/ VIDEO TEX

Programmers Systems Analysts

Gesco is a major computer service and software development company servicing the financial industry. In the past 5 years, we have grown 5 times in size and we project a similar growth over the next 5 years.

Gesco is currently implementing a major EFT system using ACI's SOFTWARE to include bill payment, electronic mail, information display and financial transactions. The EFT hardware is a TANDEM based (non-stop II) system with microcomputers being used as the remote access client terminal.

Currently we are seeking SYSTEMS ANALYSTS with a minimum of 3 years experience including large systems feasibility studies and the development of detailed logical and physical system design. Experience in project leadership and utilization of a System Development Methodology highly desirable.

AND we are now seeking PROGRAMMER ANALYSTS with a minimum of 2 years TANDEM experience using TAL, ENSCRIBE and PATHWAY. Additionally, you should have DATA COM experience with SDLC and BiSync protocols. Experience with ATM, large IBM mainframes and project management is a strong plus.

Fresno is just three hours away from the San Francisco Bay area and offers an outstanding educational system, climate and AFFORDABLE housing and relocation. We offer a competitive salary and benefits package.

TO BECOME A MEMBER OF OUR HOME BANKING/ VIDEO TEX PROJECT TEAM, immediately contact:

A.J. Newborn.

gesco corporation

NATIONAL BUREAU OF STANDARDS
INSTITUTE FOR COMPUTER SCIENCES AND TECHNOLOGY

OPPORTUNITIES FOR CHALLENGING POSITIONS IN COMPUTER SCIENCE AND TECHNOLOGY

COMPUTER SCIENTISTS AND PROGRAMMERS needed to:

- perform laboratory studies of high-level network, packet-switched and satellite networks, computer-based office systems protocols, and local area network protocols (CSMA and token access methods);
- perform advanced research in computer network technology including advanced network architecture design, network operating systems, and protocol design techniques;
- participate in national and international technical committees to develop networking standards; and
- design protocols using finite state machine methods.

Desirable experiences include protocol design, implementation and testing, an understanding of operating system principles, use of block structured programming languages, and work with technical committees. An undergraduate degree which consisted of 30 semester hours in mathematics, statistics and computer science and included differential and integral calculus courses is required in addition to at least three (3) years of experience in the computer science field.

For the research positions, desirable experience also includes research in advanced development of network architectures, data communication technologies, and protocol design. A Ph.D. in computer science or a related field is preferred.

These positions range from the GS-12 to GS-15 grade levels depending upon qualifications and experience and offer competitive salary, excellent career benefits and professional growth opportunities. Please send your Personal Qualifications Statement (SF-171) to:

U.S. Department of Commerce
National Bureau of Standards
Administration Building, Room A-129
Washington, D.C. 20234

Attn: Ms. Josephine White (C2340)

The National Bureau of Standards is located in modern facilities in Gaithersburg, Maryland, and is an Equal Opportunity/Affirmative Action Employer. U.S. Citizenship is required.

SYSTEMS PROGRAMMER III

The University of Alaska Computer Network (UACN)

The UACN provides the Statewide University of Alaska System academic and administrative computing and data communications services. The Systems Programmer III is responsible for the development and management of computer operating systems and programs as well as the supervision of supporting technical and related clerical personnel. Major duties include determining hardware and local systems software requirements and recommending optional configurations to satisfy these requirements. As a minimum, the successful candidate must possess a knowledge of systems software development and maintenance and skills in selecting, training and supervising systems programmers and/or support personnel. Also, abilities to evaluate EDP equipment and software, to determine requirements for new software, and to supervise the design, implementation, maintenance, and documentation of systems software are required.

The position is located in Fairbanks, Alaska and will report to the Director of Network & Operations. The salary range begins at $44,574 D.O.E.

Application letters, together with a resume and at least three professional references, must be postmarked by June 30, 1984 and sent to:

Statewide Office of Human Resource Development
University of Alaska
206 Tanana Drive, Room 1 Bunnell Building
Fairbanks, Alaska 99701

Your application for employment with the University of Alaska may be subject to public disclosure should you be among the finalists for the position. The University of Alaska is an Equal Employment/Affirmative Action Employer and Educational Institution.

NEW ENGLAND

SYS PROG MVS-COBOL/IMS/*	$40,000
DCS COMMACORD	$40,000
MANUFACTURING SYS	$37,000
BANKING SYSTEMS	$35,000
ME, NH, VT	$35,000
DMS/RM/COL-1	$33,000
VAX, PDP 11/70	$32,000
RPG SYS-SERVICE	$32,000
EDP AUDIT	$30,000
COBOL/PL-1/BASIC/C	$30,000

LEAHY & COMPANY

Jerry Battista
99 Bedford Street, Suite 201
Boston, Mass. 02110
Telephone (617) 426-6400
Personnel Consultants

EMPLOYMENT SERVICE FOR PROGRAMMERS AND ANALYSTS

National Openings With Client Companies and Through Affiliated Agencies

Scientific and commercial applications • Software development and systems programming • Telecommunications • Control systems • Computer engineering • Computer marketing and support

Call or send resume or rough notes of objectives, salary, location restrictions, education and experience (including computers, models, operating systems and languages) to either one of our locations. Our client companies pay all of our fees. We guide you directly.

RSVP SERVICES, Dept. C
Suite 700, One Cherry Hill Mall
Cherry Hill, New Jersey 08002
(609) 667-4488

RSVP SERVICES, Dept. C
Suite 211, Dublin Hall
1777 Walton Rd., Blue Bell, PA 19422
(215) 629-0585

From outside New Jersey, call toll-free 800-257-8779

RSVP SERVICES

Employment Agents for Computer Professionals

Data Processing Professionals

Move Up To The Leader In San Francisco

At Bank of America, we are setting a goal for ourselves of being the leader among the world's financial institutions. Our goal is to provide the leadership in serving people, placing our customers first, respecting, recognizing and rewarding employees and making the most of technology. We would like you to share our goals and strengthen our team.

Our Consumer Information Systems Division, located in San Francisco, is committed to developing and installing a statewide item processing bookkeeping system and we are looking for Data Processing Professionals with exceptional technical and interpersonal skills to join our C.I.S. team. This project, along with the development of the MICR Capture System which is now being used by all banking facilities, adds to our continuing success and solid reputation in defining, developing, and establishing the needs for future electronic banking. As a team member in one of the world's largest Data Processing centers, you will be creating new and highly sophisticated systems in our state-of-the-art MVS/XA and MVS/370 environment using structured COBOL, IBM OS Assembler, SCI techniques, and top-down design.

With Bank of America, you'll have the career potential possible with a leading organization.

Consider our openings for:

- **Group Systems Manager**
- **Project Manager**
- **Sr. Programmer Analyst**
- **Programmer**

If you have hands-on experience in one or more of the following areas, we want you on the team:

- Electronic Transfer Delivery/Controls
- Structured Programming Methodologies
- Check Reader Sorter
- Cycle Sort/Bulk Filing
- IBM Assembler Language Coding and Design Experience
- Structured COBOL Techniques and Top-Down Design
- TANDEM/TAL
- Banking/ACH

Bank of America offers competitive salaries and incentives, including a comprehensive benefits package and relocation assistance program.

For immediate consideration, and to make arrangements for a local interview, please send your resume to: Jacquie Bellino, Staffing Specialist, Bank of America, Personnel Operations, Dept. 3681-0319A, 150 Spear St., San Francisco, CA 94105. We are an equal opportunity employer.

Bank of America NT&SA

The Professional's Choice.

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

Experienced Fortran Programmers HP-3000 background

We are a rapidly expanding company specializing in providing computerized decision support systems to Fortune 250 companies for controlling their medical insurance costs.

Our Information Systems Group has several positions available for experienced Fortran Programmers, with HP-3000 background in areas of Data Base Administration and Product Development. All applicants must have a minimum of two years' experience in an interactive programming environment, a degree in Computer Science or equivalent. Preferred candidates will also have experience in health care systems, employee health insurance, medical claims processing or employee benefits.

SENIOR SOFTWARE DESIGNERS PRODUCT DEVELOPMENT

Responsibility:
Design & develop new products. Hands-on responsibility for developing specifications and coding.

Requirements:
- 5 years product development experience using FORTRAN
- knowledge of data structures
- background in statistics, simulation, modeling, CAI or medical economics
- 2 years relevant supervisory or team leadership experience

DATA BASE PROGRAMMERS & PRODUCT DEVELOPMENT PROGRAMMERS

Responsibility:
Implementation and maintenance of software relating to customer data bases and decision support systems.

Requirements:
- 2 years of FORTRAN experience
- knowledge of data base structures and controls
- systems analysis experience

In addition to an excellent opportunity for professional growth, we offer a highly competitive salary and comprehensive benefit package. Please send your resume with salary history to: **Victor Sztengel, MEDSTAT Systems, Inc., 3135 S. State Street, Suite 107, Ann Arbor, MI 48104.**

An Equal Opportunity Employer M/F

MEDSTAT SM
SYSTEMS, INC.

COMPUTER SCIENCE FACULTY POSITION
Santa Barbara City College
Campus overlooking Pacific Ocean

QUALIFICATIONS: Bachelors degree, Masters preferred, at least two years computer experience college level teaching experience desirable.

DUTIES: Full time permanent to teach 15 semester units in courses such as Computer Concepts, COBOL, Assembler, FORTRAN, RPG, BASIC, & PASCAL.

SALARY: Competitive; based on academic preparation and experience.

CLOSING DATE: Resume and completed District application required by April 17, 1984.

STARTING DATE: September 10, 1984.

Send complete resume to:
Mr. Don Cree
Santa Barbara City College
721 Cliff Dr.
Santa Barbara, CA 93109

Affirmative action equal opportunity employer

PROGRAMMER/ANALYST SYSTEM/36

Exceptional opportunity for qualified Programmer/Analyst with 5+ years experience in programming and system design. You will join a Kanbu oriented project team responsible for the development of integrated manufacturing and financial systems. Successful candidate will possess a minimum of 2 years System/36 experience writing interactive applications utilizing RPG III and COBOL in a manufacturing environment. Degree in C.S. or equivalent required.

MSC offers a very good salary based on experience and an exceptional benefits package.

Call Personnel (301) 498-3311

MICROWAVE SEMICONDUCTOR CORPORATION
100 School House Road
Somerset, NJ 08873

An Equal Opportunity Employer

SYSTEMS PROGRAMMER

Program Resources, Inc. has an immediate need for an Mini Systems Programmer to lead our systems programming efforts at the National Center for Toxicological Research, near Little Rock, Arkansas. Position requires at least 3 years experience in VAX/P, OS/VS1. Related experience in RSOS and commercial DBMS applications a plus. This position has excellent growth potential and vast visibility within one of the nation's largest research facilities dedicated to state-of-the-art computer technology.

Program Resources, Inc. offers excellent salaries, comprehensive benefits and relocation assistance. Qualified candidates should send resumes to:

Program Resources, Inc.
703 Giddings Avenue
Suite M6
Annapolis, MD 21401

NORTH CAROLINA LOCATIONS

PROGRAMMER ANALYSTS AND PROGRAMMERS

We currently have 60+ openings with our N.C. client companies. IBM, Honeywell or Burroughs with COBOL and CICS or IMS a plus. Salary range $25-$45,000.

Please send resume to: Peggy Allen, DP Specialist or call collect (919) 288-5330.

Graham & Associates
Employment Consultants
2100-M West Cornwallis Drive
Greensboro, NC 27408-7096

SYSTEMS PROGRAMMER/MANAGER

Maintain PRIME operating system and software, system documentation, telecommunications, system integrity, hardware/software enhancements, staff supervision, budget planning/control. BA/BS, 2 years systems programming + knowledge of PASCAL, PL/I, C, or FORTRAN; managerial experience. $28,848. Deadline: April 6, 1984. Resume:

Faculty/Staff Relations
SUNY College at Brockport
Brockport, NY 14420

SUNY College at Brockport is an AA/EO Employer

PROGRAMMER/ANALYST

This position is a joint appointment serving both the College of St. Benedict and St. John's University. Responsibilities include all aspects of programming for a DEC PDP 11/70, also site direction, planning and coordination of systems analysis in regard to data processing applications. Bachelor's degree in Computer Science or related field including course work in one or more of the following languages: BASIC, FORTRAN, PASCAL, COBOL, MACRO-11, Assembler Language. Course work in accountancy and statistics desirable; hardware interfacing and technical knowledge preferred. Position available July 1, 1984. Send letter of application and resume to: Director of Personnel, St. John's University, Collegeville, MN 56321. Applications received after May 1, 1984 cannot be guaranteed consideration. Women and minorities are encouraged to apply.

FIELD ENGINEERS

Rapid expansion of our computer maintenance organization means excellent opportunities for aggressive individuals in the Chicago area with two or more years experience in DEC PDP-10, 11 or VAX.

For further information please send your resume in confidence or call collect to:

Bob Krouse,
TYMSHARE, INC.
4513 Lincoln Avenue, Suite 106
Lisle, IL 60532
(312) 964-0246

or Jim Abele,
TYMSHARE, INC.
6333 Harry Hines Blvd.
Dallas, TX 75235
(214) 638-2130

Additional openings exist in Washington, D.C., Los Angeles, CA, San Francisco CA, and Dallas, TX.

Equal Opportunity Employer M/F/H

TYMSHARE

ACADEMIC DEPARTMENT HEAD

Applications are invited for department head, Computer and Office Information Systems. The department has 12 faculty members with programs in Computer Information Systems, Office Administration, and Business Education. The University has 11,580 students, including 2,300 in AASCP-accredited business programs. Candidates must possess good communication skills and successful teaching experience. Desirable qualifications are a doctorate in CIS, MIS, or related field; business experience related to computer/office information systems; publications; and administrative experience. Salary and rank are commensurate with qualifications. Send resume, transcripts, and letters of reference to Dr. Van McGraw, Dean, College of Business Administration, Northeast Louisiana University, Monroe, Louisiana, 71209. An EO/AA employer.

Computer Science:

Assistant or associate professor of Computer Science, tenure-track, beginning August 1984. Computer Science program closely following ACM recommendations; offering BS and AAS degrees. Ph.D. desired, but ABD or experienced MS considered. Competitive salary and benefits; summer teaching possible. University of Arkansas at Little Rock is a 10,000+ student, urban university. Application deadline May 1, 1984. Please send resume, and letters of recommendation and transcripts to:

Margaret P. Allen, Coordinator,
Department of Computer Science,
University of Arkansas at Little Rock,
33rd and University,
Little Rock, AR 72204.

An EEO/AA Employer.

Software Engineers
Systems Analysts
Programmers
$25,000-$55,000

Choice opportunities immediately available in Pennsylvania & national locations. BS, MS & PhD level positions. We have been placing DP professionals for 20 years, with many of the nation's leading companies.

All fees paid by client companies. Reply in strict confidence to Ann Scalese, Vice President.

WEIR PERSONNEL SERVICES, INC.
Box 1379, Reading, PA 19603
215-679-7512

SYSTEMS ANALYST- BUSINESS APPLICATIONS

We are embarking on a long-range project to integrate business applications using state-of-the-art technology. Your experience in the design and implementation of real-time integrated data base systems should include such applications as Manufacturing Resource Planning, Material Management, and Financial Management. You will be working with user departments developing detail system specifications, preparing project summaries, evaluating alternatives, recommending proposed solutions with related cost/benefits. Aerospace background a plus.

We offer an excellent salary, comprehensive benefits program which includes medical, dental and life insurance; 100% advance tuition payment, savings and investment plan; and relocation assistance (if necessary). Please forward your resume with salary requirements to:

Ms. Beverly DeAngelo, Professional Employment, ITT Avionics Division, 390 Washington Avenue, Nutley, New Jersey 07110.

An Equal Opportunity Employer M/F
U.S. Citizenship Required

AVIONICS DIVISION ITT
a Member of the Defense Space Group, ITT Corporation

COMPUTERWORLD

The Recruitment Connection...

... the best connection to have when you are looking for quality computer professionals. There is a good reason why COMPUTERWORLD is the number 1 computer industry trade newspaper. No other newspaper of its kind can give you the broad exposure that you will get by advertising in COMPUTERWORLD. It is read by over half a million people, most of them top-notch professionals with top-notch computer companies.

COMPUTERWORLD publishes every Monday and the deadline for receiving your advertisement is always ten days prior to the issue date desired. The open line rate is $9.15 per line with a minimum size of 2 column inches. Send in either camera-ready material or clearly typed copy with a layout if desired. We also have a telecopier service and ad-takers who will gladly take copy over the phone.

Our mailing address is **COMPUTERWORLD, Classified Advertising, 375 Cochituate Road, Box 880, Framingham, MA 01701.** Or call for more information at 1-800-343-6474 or, in Massachusetts, (617)879-0700.

COMPUTERWORLD
The best connection to have.
The only connection you'll need.

PROGRAMMERS
IBM SYSTEM 38
DIGITAL 11/70 (RSTS/E)

Ventron, a specialty chemicals division of Morton Thiokol, Inc., located just north of Boston, is growing at a rapid pace. To meet the challenges of expanding markets and increasing business, our MIS staff is assuming more responsibility and needs additional support.

Converting to an IBM System 38 during the past 18 months and increased business applications in this area has created an opening for a programmer on the IBM system. Retaining our Digital 11/70 requires competent personnel to maintain this area of programming as well. Two programmer positions are currently open:

IBM SYSTEM 38

As part of the IBM effort, you will be working with a state-of-the-art data base, a virtual machine, and software packages that perform financial and distribution functions. The desired candidate will be strong in RPG II or RPG III with at least 1 years experience in addition to a college degree in Business or Data Processing.

DIGITAL 11/70 (RSTS/E)

As part of the DEC effort, you will be enhancing existing business applications and assisting in any IBM conversion. The desired candidate will be strong in BASIC PLUS with at least 1 years experience in addition to a college degree in Business or Data Processing.

Please send your resume and salary requirements to:
JUNE A. VETTER
Personnel Administrator

MORTON THIOKOL, INC.

Ventron Division
150 Andover Street, Danvers, MA 01923
An Equal Opportunity Employer M/F

DATA PROCESSING INSTRUCTOR

We have a challenging opportunity available for a dynamic individual with the technical background and teaching skills necessary to develop, maintain, and conduct an effective, corporate-wide Data Processing education/training program.

The successful candidate will teach state-of-the-art data processing courses in a classroom environment utilizing multi-media aids including video and computer based training. Subject matter will encompass: MVS/JCL; Utilities; TSO CLIST; programming concepts; and some user and microcomputer languages.

Applicants must possess a Bachelor's degree in Computer Science, Business or Education, and a minimum of four years experience in developing and teaching Data Processing courses. Excellent oral and written communication skills are essential. Familiarity with multi-media presentations is desirable.

This position offers a competitive salary plus an excellent benefits program that includes company paid medical, vision care, dental, pension plan, life insurance and educational assistance.

If qualified please forward your resume in confidence to:

CYNTHIA JOHNSON, DEPT. C.P.
NORTHEAST UTILITIES
P.O. Box 270,
Hartford, CT 06141

ASSISTANT PROFESSOR
COMPUTER SCIENCE
Smith College

Applications are invited for a new tenure-track position in Computer Science. Initial appointment is for a 3-yr. period. Candidates with a Ph.D. degree in Computer Science will be given preference. Smith College has an undergraduate Computer Science major, now in its second year, and currently has a full-time Computer Science staff of 5 who teach undergraduate courses at the introductory, intermediate and advanced level. The teaching load is 6 courses per year. Candidates should have an interest in teaching and research. A VAX 11/780 and a VAX 11/750, as well as many microcomputers, are dedicated to academic use. Facilities at the University of Massachusetts at Amherst are readily available. Smith College is currently installing a local area network. Northampton is located on the Connecticut River in western Massachusetts, approximately 2 hours drive from Boston, 3 hours from New York City and within minutes of the Berkshire mountains. Smith is one of 6 institutions of higher learning located in the Pioneer Valley. All are connected by a free commuter bus system. The University of Massachusetts has an excellent, active Computer Science graduate program. Salary is $26,000 with excellent fringe benefits including full TIAA/CREF contributions and full pay during sabbatical leaves. Applicants are asked to submit resumes and 3 letters of recommendation by April 15, 1984 to: Bent Henderson, Computer Science Committee, McConnell Hall, SMITH COLLEGE, Northampton, MA 01063. Smith College is an Equal Opportunity Employer.

SOFTWARE PROFESSIONALS

THE COMPANY THAT BROUGHT YOU LAST YEAR'S BREAKTHROUGHS WILL DO IT AGAIN THIS YEAR.

COME TO DATA GENERAL AND BE PART OF IT.

Last year, Data General startled the industry with the introduction of DESKTOP GENERATION™, a state-of-the-art microcomputer system. That's just the beginning. In Research Triangle Park, NC, we are working to ensure our continued success.

If you're interested in a career where innovation and commitment matter, we have immediate openings in the following areas:

UNIX*

Data General is committed to providing UNIX capability throughout its entire product line. We are doing development at all levels of the UNIX system—system calls, commands, and communications. Candidates must be fluent in the C programming language and have a working knowledge of UNIX. Knowledge of UNIX internals is a plus.

ARTIFICIAL INTELLIGENCE

We're working on major AI tools components. The emphasis is on tools rather than applications and requires an MSCS (or equivalent) and related experience.

DATABASE MANAGEMENT

We're developing a relational DBMS that operates in both centralized and distributed environments. The DBMS supports programming language interfaces, user interfaces and highly available database processors.

LANGUAGES AND TOOLS

We're building compilers, general compiler components and tools to provide an integrated software development environment. We're using a high-level language that stresses portability and ease of use.

□ □ □

The superior living, recreational and cultural opportunities of the Research Triangle area can make your off-the-job life very enjoyable. In addition, there are three top universities nearby.

Send your resume (indicating area of interest), to: John Bushfield, Dept. CW, Data General Corporation, 62 T.W. Alexander Drive, Research Triangle Park, NC 27709. Investing in people to make equal opportunity employment a reality.

Data General
careers a generation ahead.

*UNIX is a trademark of AT&T Bell Laboratories

UNIVAC/TANDEM
Experience

DEREGULATION ignites multiple professional opportunities—Our client, a Fortune 500 Telecommunications "Leader" is currently offering Hi-visibility-fast track career connections with creative remuneration & fringe package PLUS a most desirable living environment.

D.B.A. - UNIVAC with DMS 1100 and MAPPER to $40K

SR. PROG. ANALYS - min. 2-3 yrs. exp. with UNIVAC ASSEMBLER, COBOL or TAL and MAPPER + to $40K.

SYS. PROGS - UNIVAC 1100 ASSEMBLER lang., TAL or COBOL. Communications exp. + to $40K.

For immediate consideration call Barry S. Allen at (914) 471-6700 or send resume to:

Ethan Allen
Professional Placement Agency
99 Academy Street
Poughkeepsie, NY 12601

COMPUTER ANALYSTS

HORMEL, a food industry leader, is seeking Data Processing professionals for its Corporate Headquarters located in Austin, Minnesota.

These professionals will be responsible for analysis, design, implementation and maintenance of large scale business data processing systems. Qualified candidates will be working in a variety of assignments with all levels of management.

Requires a BA or BS degree in Computer Science or related curricula and 2-5 years of programming and analysis experience with COBOL, OS MIS, JCL, TSO, and IMS/VS. These qualifications should be seasoned with effective communication skills.

These positions will be compensated with a highly competitive salary, including bonus and comprehensive fringe benefits package. Please send a resume indicating salary history and requirements in complete confidence to Mark C. Altnow, Supervisor of Professional Employment.

Hormel

P.O. Box 800, Austin, MN 55912

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

DATA PROCESSING PROFESSIONALS

DALLAS OPPORTUNITIES

A national network of major financial institutions depends on Peer Services, Inc. for state of the art D.P. solutions and timely information flow. We're the leading edge in specialized financial capabilities due to our emphasis on systems development and advanced technologies. We offer the opportunity to become part of a participative management concept, with professionally rewarding careers available now for:

DIRECTOR OF DATA CENTER

This position will be responsible for all EDP operations activities including hardware, help desk, systems software and operations support in a large IBM environment (3081/3083). Minimum requirements for this position include 6 to 9 years' in data processing with a minimum of 4 years' operations management experience including budgetary administration and departmental planning with corporate policy.

SENIOR SYSTEMS PROGRAMMERS
(IBM and Tandem)

Our needs currently consist of several experienced Senior Systems Programmers for both our IBM 3081, 3083, and our Tandem NonStop II computers. Your position would involve designing our on-line integrated software system. Additionally, our state of the art environment includes MVS/XA, IMS DB/DC and CICS. Your experience should include a minimum of 2 years in one of the following areas: MVS, IMS, DB/DC, CICS or Tandem. Additional experience in TAL or Pathway would be a plus

SENIOR SYSTEMS ANALYSTS

We are currently looking for several Senior Systems Analysts to work on developing our on-line integrated savings & loan system. Additional positions are also available in our Customer Service Department where you would be primarily involved in the installation and support of this system. If your qualifications include 6 years COBOL and OS JCL as well as experience in one or more of the following areas: Loans, Deposits, CIF, ATM, MSA General Ledger, IMS DB/DC, and you would like to be rewarded for the efforts of your work, then consider Peer Services as your career alternative.

We pay top-level salaries and have a comprehensive benefits package including dental insurance. Please call or respond with your resume. All replies will be held in strictest confidence.

PSI PEER SERVICES INCORPORATED

Bob Walsh or Mike Handlin
13465 Midway Road
Dallas, Texas 75234
(214) 851-0700

PRINCIPALS ONLY, PLEASE — AN EQUAL OPPORTUNITY EMPLOYER M/F

SP POSITIONS SEATTLE/PORTLAND

MVS, Sr. Systems Programmer $40K
Sr. IMS Systems Prog. $40K
Systems Performance-data base consultant to applications group.
Sr. Programmer/Analyst $30K
Financial app. COBOL/1 on line interactive.
Programmer/Analyst $25K
COBOL/1 or VSAM online dev.
Sr. PIA IMS applications dev ..... to 40K
Data Admin. Analyst ..... to 40K
data resources Mgmt local DP design.
Please forward resume immediately to:

HOUSER, MARTIN MORRIS & ASSOC.
(206) 453-2700
Oakpark, 104th-110th Ave. N.E.
Bellevue, WA 98004

TWO COMPUTER SCIENCE POSITIONS

Instructor/Assistant Professor to teach 12 credit hours of introductory and advanced courses, advise majors and assist in curricula development and revisions. Ph.D. in Computer Science preferred. Ph.D. in Mathematics, Physics, and Engineering with a strong background in Computer Science or M.S. in Computer Science will be considered.

Salary commensurate with qualifications and experience.

Send letter of interest, resume, and three references to:

Nathaniel Beckett, Dean
Mississippi Valley
State University
Itta Bena, MS 38941

An equal opportunity, affirmative action employer.

COMPUTER SCIENCES/ INFORMATION SYSTEMS

STOCKTON STATE COLLEGE IS SEEKING TO RECRUIT TWO FACULTY MEMBER FOR FALL 1984 TO TEACH UNDERGRADUATE COURSES IN COMPUTER SCIENCES/INFORMATION SYSTEMS. DOCTORATE PREFERRED; MASTER'S WITH EXPERIENCE WILL BE CONSIDERED. INSTRUCTOR TO ASSOCIATE PROFESSOR, $17,089 Instructor, $20,737 Assistant, $25,185, Associate Professor, May be higher depending on qualifications and experience. SEND LETTER OF APPLICATION AND RESUME TO:

LEONARD WOLLACK, CHAIRPERSON,
PROFESSIONAL STUDIES,
STOCKTON STATE COLLEGE,
POMONA, NEW JERSEY 08240.

SCREENING OF APPLICATIONS WILL BEGIN APRIL 15, 1984.
STOCKTON STATE COLLEGE IS AN AFFIRMATIVE ACTION/EQUAL OPPORTUNITY EMPLOYER. APPLICATIONS ARE ESPECIALLY ENCOURAGED FROM WOMEN AND MINORITIES.

SYSTEMS PROGRAMMERS

....are in demand
....are interviewing
....are being hired
$25,000-$40,000

We are a nationally ranked recruiting company (among the top 10 in our industry). We are recognized by our clients for representing top quality professionals with experience in large scale IBM installations. (1 yr. exper. minimum) Our client companies retain us (never cost to you) to provide qualified candidates for their specific job openings. All fees, interview costs and relocation expenses are paid by the company clients.

We urgently need to fill current openings for Systems Programmers in:

Dallas	Atlanta
Tampa Bay	Ft. Lauderdale
Jacksonville	Nashville/Memphis
Raleigh/Durham	Orlando
	Richmond/Newport News

Please send resume or call collect

Steve Stevenson, Partner

Jim King and Associates

1040 Gulf Life Tower/Jacksonville, Florida 32207
(904) 399-7371

SYSTEMS ENGINEERS PROGRAMMERS

In support of the development, marketing, and service of Northwestern University Library's computer software, Northwestern Online Total Integrated System (NOTIS), we are accepting applications for:

SYSTEMS ENGINEER (2 positions). One requires at least two years experience as a systems engineer. Knowledge of libraries preferred for both positions. Some travel required. Salary: $20,000-$23,000.

PROGRAMMER: Salary: $17,000-$24,160.

All positions require a knowledge of IBM Assembler and IBM operating systems.

Apply to: Lance Query, Director of Library Research and Analysis, Northwestern University Library, Evanston, IL 60201. Northwestern is an EEO/AA employer. PRINCIPALS ONLY PLEASE.

WANTED

Experienced NCR Programmer for career position. Must be familiar with NCR hardware and software, with emphasis on problem solving and/or application enhancement. Salary range $20-$30K, commensurate with experience. Please forward resume and salary history for confidential consideration to:

CW-B4584
Computerworld
Box 880
Framingham, MA 01701

SAN DIEGO

Openings in O/S, Compilers, Graphics, ADA, UNIX.

CALL (619) 455-8818

CPU COMPUTER PROFESSIONALS UNLIMITED, agency OF SAN DIEGO

10775 Scripps Poway Pkwy
Ste 205, San Diego, CA 92131
Agency Inquiries Invited.

PROGRAMMER ANALYST

Tired Of The Big City? Do You Prefer A Small City With Unique Entertainment Activities? We Have A Position For You.

We Have An Excellent Opportunity For You To Apply Your Background In The Development Of Business Systems. We Are A DOS/VSE Centralized Operation With A Variety Of Manufacturing/Accounting Systems, Both On-Line (Local, Remote) And Batch.

This Position Requires A Strong COBOL Programming Background, A User Orientation And Communication Skills. Experience With CICS, VSAM, And DL/1 (Database) Would Be A Definite Plus.

The Successful Candidate Must Have 2-4 Years Programming Experience.

Our General Offices Are Located In Champaign-Urbana, An Attractive University City. The Area Offers Big Ten Sports, Theater, Arts And Educational Opportunities.

Position Includes An Excellent Salary And Wide Range Of Benefits Including Profit-Sharing.

For Additional Information, Call Or Send Resume With Salary History To:

SOLO CUP COMPANY
1565 East Main Street Urbana, IL 61801
PH: 1 (800) 637-0660 Outside Illinois,
8:00 a.m.-5:00 p.m. CST (Weekdays)
PH: (217) 384-1800 Inside Illinois,
8:00 a.m.-5:00 p.m. CST (Weekdays)
Steven L. Long

An Equal Opportunity Employer, M/F

Peebles

PEEBLES DEPARTMENT STORES, a growing retailer, needs your skills programming on an IBM S/36, Model 8. The position requires interactive and structured programming using RPG III language. If you meet these qualifications, or have extensive programming experience on a S/34, we have a position for you. Salary negotiable. Excellent benefits package.

Send resume to:

Personnel Director
PEEBLES DEPARTMENT STORES
133 Hiatus St.
Lawrenceville, VA 23868

EOE M/F

DIRECTOR OF INFORMATION SYSTEMS

For small (1200 students) midwest college. Teaching and data processing management experience desired. Must be trained, experienced, and capable of teaching a variety of IBM software products. Located in college town; hunting, fishing abound. No state income tax. $35,000.+. Send resume to President, Room 314, Dakota State College, Madison, SD 57042-1799 by March 28. *Affirmative Action Employer.*

SYSTEMS PROGRAMMER

Charlottesville, Virginia subsidiary of ITT Corp. needs a systems programmer. Responsibility for installation and maintenance of all systems software. Knowledge of 370/Assembler language and experience with IBM 4341 DOS/VSE, CICS or other OS systems necessary. Experience with other vendor systems is helpful. Previous systems experience a must.

We offer a competitive salary with excellent fringe benefits.

Please send resume, including salary requirements to:

Reginald B. Ryals
Director of Administration
P.O. Box 7587
Charlottesville, VA 22906

The Bobbs-Merrill Company/Law Publishing is an Equal Opportunity Employer M/F.

HOGAN

PROJECT LEADERS, ANALYSTS, PROGRAMMERS, AND CONSULTANTS.

Positions available now. Nationwide coverage.

Call Collect or Mail Resume:

Executive Consultants
Hogan Specialist
1600 Fairfax
Suite 100
Shreveport, LA 71101
(318) 222-1000

MOVE AHEAD WITH COMPUTERWORLD

More computer people read Computerworld than any other newspaper in the United States; more than half a million computer people every week.

Among our readers at user organizations, about half claim to look at recruitment ads every other week (only a small percentage say they never look at recruitment ads).

No wonder Computerworld carries more recruitment ads for computer people than any other publication. To place your ad or to get a rate card with complete details on Computerworld's Classified Section, call or write:

Classified Advertising
COMPUTERWORLD
375 Cochituate Road
Box 880
Framingham, MA 01701
1-800-343-6474
617-879-0700

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

EDP Pro's

Get in with a company going places.

At AP Telecomputing Corporation, our track record speaks for itself. With a 300% growth rate in 1983 and a projected 200% increase in 1984, the opportunities for career advancement in this totally DP-oriented organization are significant for people looking to stretch their talents.

We have major commitments to the continued development of proprietary software for use in both manufacturing and financial markets. We are therefore seeking the right career-minded DP professionals to join our dynamic team.

EDP GENERALIST—8-12 years DP experience with significant exposure to hardware/software management and/or applications development.

PROJECT MANAGERS—3-5 years experience as project, systems or programming manager.

SR. PROGRAMMER ANALYSTS—6+ years experience in applications development with high technical proficiency in COBOL.

PROGRAMMER/PROGRAMMER ANALYSTS—2-5 years experience in applications development using COBOL.

In addition to brand new Corporate facilities, we are able to offer excellent salary and benefit packages.

To arrange a local interview, please call John DeGroen, (305) 832-3799 or send your resume with salary history to: AP TELECOMPUTING CORPORATION, P.O. Box 2091, West Palm Beach, FL 33402. Equal Opportunity Employer, m/f.

AP TELECOMPUTING CORPORATION

NATIONAL BUREAU OF STANDARDS
INSTITUTE FOR COMPUTER SCIENCES AND TECHNOLOGY

OPPORTUNITY FOR A CHALLENGING POSITION IN COMPUTER SCIENCE AND TECHNOLOGY

Data Systems Programmer for VAX and PDP-11 Systems and Associated Networks

COMPUTER SYSTEMS PROGRAMMER needed to:

- Install, develop, and maintain all systems software
- Provide and maintain both enhancements to existing software and new, unique software
- Assume responsibility for all interconnections with local and wide area networks
- Assist in analysis, scheduling and procurement of systems and software; and
- Participate in local and national user groups activities and professional societies

Desirable experience includes systems programming with current VAX/VMS and UNIX operating systems. An undergraduate degree which included at 30 semester hours in mathematics, statistics and computer sciences and included differential and integral calculus courses is required in addition to at least 3 years of experience in the computer sciences field.

This position is either GS-12 or GS-13 grade level, depending upon qualifications and experience. It offers competitive salary, excellent benefits and professional growth opportunities. Please send your Personal Qualifications Statement (SF-171) to:

U.S. Department of Commerce
National Bureau of Standards
Administration Building, Room A-128
Washington, D.C. 20234

Attn: Ms. Josephine White (C0730)

The National Bureau of Standards is located in modern facilities in Gaithersburg, Maryland and is an Equal Employment Affirmative Action Employer. U.S. Citizenship is required.

TANDEM EXPERTISE

IS YOUR KEY TO SUCCESS IN INFORMATION SERVICES AT ENTRE'

Entre Computer Centers, Inc., America's fastest growing franchisor of retail computer stores, is looking for first rate Programmer/Analysts. TANDEM product line knowledge is a must. Familiarity with Accounting and Distribution application areas is desirable.

These positions offer outstanding professional compensation and exceptional growth opportunity in a fast-paced dynamic environment. Our corporate headquarters are conveniently located in Northern Virginia with easy access to the nation's capitol.

To pursue these opportunities further, call or send your resume with salary history to:

Mr. Neil J. Osevalsky
Director, Information Services

ENTRE

1951 Kidwell Drive, Suite 400
Vienna, VA 22180
(703) 556-0660

Sorry, no entry level positions are available at this time.

OS DESIGNERS AND ARCHITECTS

PRIME IS LAUNCHING A MAJOR NEW OPERATING SYSTEM DEVELOPMENT EFFORT

GET ON BOARD NOW

Since October of 1972 when Prime introduced the 200, the world's first minicomputer to use all MOS memory, we've been the leading innovator in our industry. Today our Operating System and Communications Development Groups are in the initial stages of development on the first major commercial distributed operating systems to be introduced in this decade.

If you're a Designer or Architect with distributed processing and/or operating systems experience, this is a rare opportunity. Building on our existing talent base, we're expanding the capability of our OS Development Group to meet this latest challenge. This has created a significant number of ground floor opportunities at all levels. Prime has made a total commitment to the success of this project and is providing this group with the resources necessary to complete this task.

Our concern for our employees is reflected in our outstanding compensation and benefits package as well as our on-site health centers that provide a full range of fitness activities.

If you feel that now is the time to get your career back on a fast track we invite you to send your resume to Dale Welch, Dept. CW319, Prime Computer, Prime Park, Natick, MA 01760. Prime is an affirmative action employer seeking outstanding individuals.

PRIME Computer

THE ONE YOU'VE BEEN WAITING FOR.

ACP/TPF

Opportunities created by internal promotion

TECHNICAL SUPPORT PROJECT LEADER

to directly manage a staff responsible for administering to an ACP computer system's stability, reliability & integrity. Will support, maintain & develop ACP systems software: on-site programming & data base management to achieve max. system availability & user confidence. Requires 4-6 years' ACP system internals experience.

STAFF TECHNICAL ANALYST

Responsible for the development, implementation & maintenance of the ACP operating system, its components & subsystems. Critical experience requirements are in-depth knowledge of complex hardware, systems configurations & related software components. Indirect management of 6-person staff.

TECHNICAL SUPPORT ANALYST

To insure the integrity & availability of the ACP computer system by performing problem resolution activities & assigned maintenance functions. Must possess strong understanding of IBM Systems 370 Assembler language to perform software changes and for problem determination of ACP system faults.

Positions are located in a desirable East Coast environment. Client offers exceptional salary, liberal benefits, and an outstanding relocation program.

CALL COLLECT
Frank Hastings, 215-581-3700
RUEBSAM, KURNZEL & WEISS, INC.
5 Penn Center Plaza
Philadelphia, PA 19103

WANTED:

SOFTWARE SUPPORT HEAVY WEIGHT

Continued strong acceptance of our systems software products worldwide has created an immediate need for a Software Support Engineer.

The successful candidate will have 3-5 years progressive experience maintaining, modifying, and supporting MVS systems software. Strong Assembler Language skills, and a thorough knowledge of OS/VS JCL is also required. Current experience with MVS/XA, TSO Dialogue Manager, ROSCOE, VM/CMS and COBOL would also be a plus.

This is a key position, with responsibilities for worldwide product support. You will also be responsible for identifying, designing, and implementing enhancement that keeps our product at the leading edge of large system technology. Your contributions will be highly visible in our small company, high growth environment.

For immediate consideration, call or send your resume to:

Doug Steelie
(408) 554-8121

TriangleSoftwareCo.

4340 Stevens Creek Boulevard,
Suite 108
San Jose, CA 95129

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

SOFTWARE PRODUCTS SERVICES JOIN AN INDUSTRY LEADER

Digital Equipment Corporation is the world's second largest computer company.

Are you looking for a position in a company where your contribution makes a difference? If you're creative, innovative, and can successfully implement your ideas, Software Product Services (SPS) can offer you an environment where people make the difference.

SPS is a leader in the software service business. If you have experience in the computer software industry and understand that software service completes the solution, we have opportunities in the following areas:

- Networking Service Management
- Engineering Consulting
- Software Service Business Management
- New Services for New Markets
- Project Management
- Competitive Analysis

Applicants should have an undergraduate degree or equivalent in Business or Computer Science and a minimum of three or more years of experience in the computer industry. An MBA is an added plus. Please send your resume with salary history and requirements to: Mike Walsh, Digital Equipment Corporation, Dept. 0319 3804, 40 Old Bolton Road, Stow, Massachusetts 01775.

Digital Equipment Corporation provides a complete benefits package that includes medical/dental insurance, 100% tuition reimbursement and a stock purchase plan.

We are an affirmative action employer.

digital™

Contract Programmers

Computervision, a national software contract services company, has continuing needs for Project and Software Engineers with any of the following:

- Assembly Languages
- UNIX or PDP-11/VMS-11M
- TLAS Programmers
- IBM Telecommunications Applications
- User Applications/Finance

Rates $50-$70 per hour and many benefits nationwide.

Call or send resume to:

Computervision
12851 Preston Road, Suite 200
Dallas, TX 75234
(214) 669-8001

BANKING

Let our banking division specialists represent you to our clients. Including the top 50 banks in the U.S. If you qualify (have 3+ years in DP operations, systems and programming, or technical support) we will develop a strategy to market your skills to your best advantage. We will represent you exclusively, with professionalism and total confidentiality. We represent only the best. Banking is our only business. No retainer necessary, no obligation, no fees.

Adams & Associates Limited
Banking Division
P.O. Box 19082
Greensboro, N.C. 27419
Call: Andy Park
(919) 375-1881

Technical Manager Software Engineering

International software engineering consulting firm requires a Technical Manager for Software Engineering. Successful applicant will be responsible for management of one or more software engineers for one or more of the engineers clients in the United States and internationally. M.S. in Physics/Computer Science/Engineering with at least 5 years' experience required in related field or equivalent. Knowledge of the following computer languages is required: ITT CHILL, ASSEMBLER, PASCAL, PL1, UNIX and C. Telecommunications experience and knowledge of French and Spanish required. Salary $1250+ per week for basic 40 hour week. Please send resume to: Connecticut State Job Service, Technical Unit, Connecticut Department of Labor, Wethersfield, CT 06109. Refer to Job Order #397597.

SOFTWARE SALES
EARN IN EXCESS OF $125,000

The Cambridge Systems Group is looking for a few very special people to market three leading IBM system software products.

If you:

- have experience in a large scale IBM operating system environment as a System Engineer for a software or hardware vendor, or are a data center manager, a manager of systems programming, or in a related position;
- possess excellent oral communication/presentation skills;
- make a good appearance;
- are able to take direction and grasp technical concepts quickly;
- are tenacious and highly competitive;

this may be your opportunity to participate with a leader in the rapidly growing software industry.

IF YOU ARE ALSO A REFORMED AND SUCCESSFUL EX-ENCYCLOPEDIA SALESMAN YOU'D BE IDEAL FOR THE JOB!

Please send your resume in complete confidence to:

CW-84688
Computerworld
Box 880
Framingham, MA 01701
We are an Equal Opportunity Employer

MVS
SYSTEMS PROGRAMMERS

($30,000 - $50,000)

Several clients are searching for Systems Programmers with minimum 2+ years experience. Ability to Gen Systems is important. CICS, ACF/VTAM is a plus. Most systems are in new facilities with well established companies. Excellent long term career advancement potential.

-O-T-I-U-S-

666 Pennsylvania Avenue
Fort Washington, PA 19034
(215) 646-6660

Data Processing
PROJECT MGR INTERNATIONAL DIV.

Billion dollar consumer products mfr has an unparalleled supply within their MIS div. The qualified candidate should have 7+ yrs DP, today at every phase, hands-on exp in the implementation of the IBM PC-to-mainframe linkage is vital. In addition to familiarity with COBOL & IBM Mainframe prd, this overseas travel : several times/yrs. Beautiful suburban location with $40,000 FEE PAID

EXECUTIVE SERVICE
615 Fifth Avenue
New York, N.Y. 10022
212-371-2266 (agency)

M.I.S. PROFESSIONALS
HONEYWELL preferred
TECH SUPPORT
DATA BASE ANALYSTS & PROGRAMMERS

We are a $1.5 BILLION Southeast service related corporation. Reply in confidence with salary requirements. (EOE)

CW-84686
COMPUTERWORLD
Box 880
Framingham, MA 01701

SUNBELT & NATIONAL

Our major blue chip companies need:

- HARDWARE/SOFTWARE ENGINEERS — TO $60K
- DATA/TELECOMMUNICATIONS — TO $50K
- DATA PROCESSING PROFESSIONALS — TO $50K

IMMEDIATE REPLY

Send resume in confidence to:
PROFESSIONAL PERSONNEL CONSULTANTS
P.O. Box 19789 Tampa, FL 33686
(813) 977-7000
OR P.O. Box 2000
Southfield, MI 48037-2000
(313) 357-4515

COMPUTER SCIENCE

Assistant/Associate Professor, two positions, tenure track, Fall 1984. Graduate degree in Computer Science or related field. Expertise in either programming languages, software engineering, operating systems, computer architecture, communications, computer graphics or information systems, data base management, systems analysis, system and data base design, fourth generation data management software. Apply to

Dean Douglas Kindschi,
Grand Valley State College,
Allendale, MI 49401.

EOE/AA Employer

FACULTY POSITIONS GULF POLYTECHNIC IS A TOWN — STATE OF BAHRAIN

Faculty positions open fall semester, 1984

Gulf Polytechnic College invites applications for the following faculty positions:

DEPARTMENT OF ENGINEERING

Computer Science (2 Positions)
All candidates to these 2 positions should have proven experience in at least 3 programming languages.

- Lecturer: specialized in data processing, systems analysis and design, data bases and intelligent knowledge based systems.
- Lecturer: specialized in computer languages, design and graphics.
- Lecturer: specialized in computer architecture and design enhancements and process control.
- Lecturer: specialized in operating systems and computers knowledge of DAVIDC-/RAMS systems an asset.
- Lecturer: specialized in simulation techniques, CADICAM and simulation languages.
- Lecturer: specialized in data processing, data structures, and discrete structures.

Qualifications (For all above posts):
- M.Sc. or preferably Ph.D with teaching/practical experience.

Conditions of Employment:
Salary and rank will depend on qualifications. No taxes. Allowances are as follows:
- Travel expenses for self, spouse and up to three children under eighteen.
- Furnished house or apartment with air-conditioning.
- Baggage allowance equivalent to one month's basic salary.
- Gratuity of one month's salary for each year of service.
- Seventy-five percent of subsistence cost for up to three children at U.S. School in Bahrain, or cost of other schools.
- 6 weeks annual summer leave.
- Appointment for a two-year period, starting September 1984.

Monthly Salary:

Professor	BD 999.00 - BD 1399.00
Associate Professor	BD 899.00 - BD 1299.00
Assistant Professor	BD 799.00 - BD 1099.00
Senior Lecturer	BD 799.00 - BD 1099.00
Lecturer	BD 699.00 - BD 999.00
Instructor	BD 599.00 - BD 799.00

Applications: A letter of application with, detailed cv, and names of 3 references should be sent by March 23, 1984 to:

Dr. Sevan Ismail
Education and Career Information Bureau
P.O. Box 28
Plainfield, Indiana 46168
Tel: (317) 839-8187 Telex 6870004 Bahrain PTM

SYSTEMS PROJECT LEADER

Mfg. firm experiencing 25% growth has immediate need for individual to take overall control of business systems development. Includes prioritizing, design, development and analysis of all new business systems. Direct systems & programming staff as needed. Requires BS degree + 3 yrs. experience within a business environment.
SALARY: $27-34,000.

MARK DAVID
JOHN MILLER
ROBERT HALF
3535 IDS Center
Minneapolis, MN 55402
(612) 339-0091

SYSTEMS ANALYST

- Design, write, document, implement and maintain computer programs and systems that will be used in managing a health care organization. Duties include researching users' information needs, determining the appropriate system requirements, developing the software and documentation, assisting users in the proper implementation and problem solving, evaluating programming methods and hardware requirements. Facility with ANSI MUMPS programming language on DEC equipment. Requires Masters degree in Computer Science. Must have knowledge of MUMPS programming language, knowledge of operation research and system methodology, knowledge of mini and micro computers. 35 hours per week, $25,000 per year salary. Please send resumes to 7310 Woodward Avenue, Room 416, Detroit, Michigan 48202. Reference Number 4884. Employer Paid Ad.

Systems Analyst

Analyzes business procedures and problems to refine and convert to programmable form for electronic data processing. Includes studying the problems and needs of corporate clients, designing of software systems, i.e. computer programs to solve problems, implement program into hardware recommended for the company's use. Would be on call for troubleshooting or maintenance or modification of programs after first. M.S. in Computer Science required, plus 2 years experience. Must be familiar with Vax-11/780, PDP-11/70 and IBM 3/4/43. Must know "C" and Oxford and have ability to implement compilers and data bases. $30000/yr. 8-5 M-F. 40 hrs/wk. Submit resumes to DABO Corporation, 313 S. Vaughn Way #134, Aurora, CO 80014, attn: Chuck Spring.

HIRING?

More than half a million computer people read Computerworld every week. And, among our 529,650 readers at user organizations, about half claim to look at recruitment ads at least every other week (only a small percentage say they never look at recruitment ads). No wonder Computerworld carries more recruitment ads for computer people than any other publication. To place your ad or to get a rate card with complete details on Computerworld Classifieds,

call or write:

Classified Advertising

Computerworld
Box 880
Framingham, MA 01701

1-800-343-6474

617-879-0700

Vice President

SOFTWARE DEVELOPMENT

Medstat Systems, Inc. is a company specializing in providing computerized decision support systems for Fortune 250 companies for controlling their medical insurance costs. We presently have an opening at the Vice President level for an individual to direct software development and bring new products on line.

Responsibility:
Total responsibility for planning, organizing and executing the development and enhancement of the company's new software products. Day to day management of all products and development teams.

Requirements:
- Outstanding performance record required. Proven track record for developing software products on schedule
- 5 years relevant management experience
- 8 to 10 years experience in a product development/production environment
- Knowledge of data structures
- Experience in interactive programming (using Fortran preferred)
- Background in statistics, simulation, modeling, CAI or medical economics preferred.

Other senior level software development positions are also available:

In addition to an excellent opportunity for professional growth, we offer a highly competitive salary and comprehensive benefit package. Please send your resume with salary history to: **Victor Sztengel, MEDSTAT Systems, Inc., 3133 S. State Street, Suite 107, Ann Arbor, MI 48104.**

An Equal Opportunity Employer M/F

MEDSTAT SYSTEMS, INC.

SOUTH PACIFIC

The TERRITORIAL GOVERNMENT OF AMERICAN SAMOA announces several vacancies at its Computer Center.

Current hardware consists of two 1MB NCR V8465 computer systems. A large conversion task from batch processing to an on-line, integrated financial management system is about to begin using software packages supplied by Moore Data Systems Inc. The government is recruiting for the following contract positions:

Deputy Director for the Information Systems Division (1)

Responsible for planning, directing and evaluating the various functions of the Information Systems Division; under the administrative direction of the Treasurer and managing a staff of twenty-two, the Deputy Director supervises all technical and operational data processing activities of the American Samoa Government. Basic qualifications include a Bachelor's Degree and eight years of progressive responsibilities in data processing systems, at least three of which should have been on the managerial level; a salary for this position will be commensurate with qualifications and experience.

Computer Programmer/Analysts (4)

Requires a Bachelor's Degree or equivalent in computer science, mathematics or closely allied field plus six years of data processing experience; one of these positions will include managerial responsibilities. Salary range: $19K to $25K.

In addition to these minimum qualifications the successful applicants should have working experience using multi-programming operating software, COBOL 74, on-line concepts and methods as well as programming experience with typical financial applications. Knowledge of NCR's VRX O/S, RPG and system software support are highly desirable.

The American Samoa Government provides free transportation and shipping allowances for contract employees and their dependents. These positions are non-Federal employment for a two year term and include benefits such as twenty-six days annual leave, on-island medical care and furnished housing for a nominal monthly rent. American Samoa is a Territory of the United States and is located in the heart of Polynesia; it enjoys a year-round tropical climate and an informal lifestyle similar to Hawaii.

To apply for one of these vacancies, please state which position you are applying for and airmail a complete resume and copies of your credentials to: The Director, Office of Manpower Resources, **AMERICAN SAMOA GOVERNMENT, Pago Pago, American Samoa 96799.**

DEADLINE FOR RECEIVING APPLICATIONS IS March 30, 1984. Selected interviews will be conducted in the United States during April with a probable commencement date in late May or June 1984.

All applicants will receive consideration without regard to race, color, religion, sex or national origin. AN EQUAL OPPORTUNITY EMPLOYER.

Expansion of M.I.S. Creates New Career Opportunities

PROGRAMMER
Requires degree and one year COBOL experience

PROGRAMMER ANALYST
Requires degree and 1-3 years experience. Must have COBOL (prefer COBOL 74) Burroughs hardware experience preferred. Applications experience in product movement and/or business systems a plus.

SYSTEMS ANALYSTS
Positions require degree and approximately seven years total experience with at least two years in systems analysis in design of on-line/real time applications. Must have experience with Burroughs systems. Should have experience in product movement and/or business systems applications.

Competitive Salaries, Excellent Fringes
Top Relocation Assistance

If interested, send resume to: PERSONNEL SUPERVISOR

Badische

Badische Corporation
P.O. Drawer 3025
Anderson, S.C. 29621-0025

Member of the BASF Group
An Equal Opportunity Employer M/F

OPERATING SYSTEM SPECIALIST

East Stroudsburg University is seeking an individual with an in-depth understanding and at least one year of full-time working knowledge with responsibility for medium to large scale multiprocessing operating systems, preferably Burroughs MCP. Responsibilities of the position include maintenance of the operating systems and a custom transaction processing system, technical support to administrative development staff and academic users, and some applications development. The University currently has a Burroughs B6900 with 8 meg of memory and approximately 100 terminals.

Knowledge of Burroughs ALGOL and COBOL are highly desirable. Candidate should possess a bachelor's degree in computer science, data processing, or a related field. Experience may be substituted for the educational requirement. Good written and oral communication skills, and a demonstrable proficiency in programming are essential.

This position is to be available on May 1st. Salary range is 20K to 28K, depending upon experience. The position features a generous benefits package, an attractive location, and good working conditions.

Interested persons should submit resumes by April 1st to:

Mr. James R. Williams, Director
Computing Center
East Stroudsburg University
East Stroudsburg, Pa. 18301

Affirmative Action/
Equal Opportunity Employer

RESEARCH PROGRAMMER

We have a unique opportunity for an individual who wishes to expand their research programming experience using management tools. The individual we seek must have had experience in research programming, some managerial experience, knowledge of the various hardware and software available to accomplish the research goals, and ability to also service the business requirements of the firm. This individual will need to be able to direct technical professionals for developing a staff of 4-7 individuals who will be required to carry out our expanding objectives. If you feel you have these qualifications please send your resume to:

CW-04/05
Computerworld
Box 880
Framingham, MA 01701

An Equal Opportunity Employer

SALES PROFESSIONALS

Pacific Mountain States Corporation is seeking sales professionals with proven expertise in IBM plug compatible terminal and microcomputer products. PMS, a leader in computer compatible peripheral marketing, is expanding its present sales organization and opportunities exist in most major western metropolitan areas.

District Sales Manager
Los Angeles, Denver, Dallas, Houston, San Francisco

To be eligible, you must have a minimum of 3 years' technical sales experience and posses the ability to manage a large territory. Primary emphasis will be on IBM plug compatible products. The ability to convert the best products available today to immediate sales will translate to earnings in excess of $100,000 per year.

Sales Professionals
Orange County, Los Angeles, San Francisco

You must have the rare ability to quality prospects, identify customer needs, propose the solution and close the sale. You must have an outstanding sales record in the sale of IBM plug compatible peripherals, ASCII terminal products or data communications. PMS will satisfy your needs both professionally and financially.

For consideration call or forward your resume in complete confidence to:

PMS
Pacific Mountain States Corporation

14025 Sherman Way, Bldg. C-4
Van Nuys, CA 91405, (213) 787-4233

100 + current openings for systems and applications specialists (non-contract). 1-10 years experience, $25,000 to $65,000. Our clients' present needs also include several manager positions.

We specialize exclusively in ACP/PARS/TPF and are in contact with all 40 installations across the country. Whatever your salary, geographic or career goal, we can help. Your resume will be handled in absolute confidence and NEVER will be submitted to a company without your prior approval. Send resume or call

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

COMPUTER POWER GROUP PTY LTD

HOGAN

CONTRACTS IN AUSTRALIA

Computer Power, Australia's leading software house and representatives for the Hogan Banking Systems in Australia, need Analyst/Programmers now for 12 month contracts.

Location will be Sydney, one of the world's most beautiful cities, where the sunshine and beaches can enhance the quality of your lifestyle.

Return airfares are included in the contract and working visas and accommodation will be arranged on your behalf. Start dates are flexible.

If you have good experience in the development and implementation of Hogan applications then call Computer Power or send us your resume.

Computer Power representatives will be in Dallas to conduct confidential interviews and finalise contracts.

Call Moray Robertson on this number now (214) 566-2930 or telex Australia: AA 70977 Setay or send your resume to:

MORAY ROBERTSON
COMPUTER POWER
3215 North O'Connor
2nd Floor
Irving, Texas 75039

MDL

PDP-11 Programmer

Requires a minimum of 1 year in-depth programming experience. Knowledge of PDP-11 and BASIC is a must. FORTRAN or VAX-11 is desirable. A BS in Math, Engineering or Computer Science would be helpful.

To arrange for an interview, please call Personnel at (617) 655-0060.

MICROWAVE DEVELOPMENT LABORATORIES, INC.
10 Michigan Drive
Natick, MA 01760

MDL is an equal opportunity employer, M/F

MDL

ACP/TPF PROGRAMMER ANALYSTS SYSTEMS PROGRAMMERS

Our client, a Silicon Valley based international credit card company, serving the travel and entertainment industry, has 10 immediate openings.

You will be helping to redesign and program an ACP/TPF real time credit card authorization system. If you have a minimum of 2 years ACP or TPF experience, and you want to work in a truly proud "professional environment" with a company that treats you as the professional you are, where you can be all that you can be, then:

You Can Do It!

Excellent compensation, benefits, thrift plan. Relocation assistance. Professional working environment with outstanding office facilities. For confidential consideration, please submit resume to: Realtime, 1301 Howard Ave., Suite 102, Burlingame, CA 94010, or call Sam Perlee (415) 579-5566. Equal Opportunity Employer. Employer retained.

Realtime Associates
Agency of Northern California

Data Processing

INFORMATION SYSTEMS PROFESSIONALS

(Fee Paid)

We have multiple positions available in state-of-the-art DP environments for professionals with 2 or more years experience with the following skills:

- ACP APPLICATIONS/CCPI COVERAGE/SYSTEMS
- COBOL IMS DB/DC
- COBOL IMS DB
- COBOL OS/MVS
- IMP CICS/MVS

Our client companies offer company paid comprehensive benefits and paid relocation. For further information and consideration, please send your resume or call collect:

COMPUTER CAREERS INC.
P.O. Box 3833
Shawnee, Kansas 66203
(913) 268-6616

COMPUTER PROGRAMMER/ANALYST

The Lee County Tax Collectors Office invites applications for the position of Programmer/Analyst. The successful applicant must be able to analyze, design, program and document interactive, on-line oriented systems. PL/I and CICS a plus. IBM 4331 with DOS VSE, Power, and CICS. The successful applicant should possess a degree in computer science or related field; or any equivalent combination of education and experience. Resumes should be submitted to the Lee County Tax Collectors Office, P.O. Box 880, Fort Myers, FL 33902.

WASHINGTON D.C.

S/38

Rural Mid-Atlantic Large mid-atlantic retailer needs a programmer for their new IBM 38. Will consider exceptional candidate with S/34 experience. $22K

ROBERT HALF OF WASHINGTON, INC.
7315 Wisconsin Ave., Suite 400
Washington, D.C. 20814
(301) 986-9600

RESEARCH ASSISTANT/ SOFTWARE DEVELOPER

Responsible for analysis, requirements, specifications, design, implementation, test, documentation, maintenance and management of large software systems. Apply existing software engineering techniques into the development of large software systems. Coding of software systems in the following computer languages: ADA, Basic, Cobol, Fortran, Pascal and Assembler. Knowledge of compiler construction, ADA programming, VAX 11/780, Apple IIs. Master's degree in Computer Science. $17,000 per annum. 40 hr/wk. Send resume to Georgia Department of Labor, Job Service Center, 1 Peachtree Street, Atlanta, GA 30303. Contact Number 0481468.

MAINE

We have specialized in data processing professional placement in Maine for almost a fifth of a century. If you qualify for positions in the $25-40,000 range, please contact us in total confidence. Our clients pay our fees and provide relocation assistance.

ROMAC.
477 Congress St.
Portland, Maine 04101
(207) 772-4748

Programming

SOFTWARE ENGINEER

"C" S/370

Candle Corporation, a multinational high technology company and developer of OMEGAMON®, is seeking a key individual to assume a lead role in the development of advanced software using the C language in an IBM mainframe, mini, and micro environment.

The ideal candidate will have in-depth C language programming skills (in any environment), as well as significant systems programming and software development experience on IBM mainframes using IBM 370 Assembly Language, preferably in an MVS, CICS, and/or VM environment.

You must have had significant programming experience in both C and IBM 370 Assembly Language to qualify. Experience with other structured languages such as PL/I or Pascal is a plus. Strong preference will be given to candidates having in-depth knowledge (internals) of MVS, CICS or VM.

This is an opportunity to be a key contributor to the development of innovative software products in a dynamic and rapidly growing software firm.

Candle offers an excellent compensation and benefits portfolio. For consideration, please send your resume with salary history to:

Joel Fressell
10broo Wilshire Boulevard, Suite 00000
Los Angeles, CA 00000

Equal Opportunity Employer

Candle

MANAGER OF INFORMATION SYSTEMS

Kings View Corporation, a leader in the mental health field in California, is seeking a Manager of Information Systems. This position reports to the Corporate Director of Finance. Responsibilities include short/long-range planning, coordination with all levels of users, hardware/software procurement and installation of micro computers in a distributed data processing environment communicating with a System 34 at Corporate Offices. The successful candidate will be a working manager with a comprehensive knowledge of computer equipment; experience with RPG II and Basic (System 23 & 34); familiarity with mental health or general health care, and/or level experience in planning, design, development and operations.

Minimum qualifications include a bachelor's degree or equivalent in computer science or related field and five years of successful professional experience in data processing, including three years in supervisory and management positions.

Send resume and salary history to:

Director of Finance
Kings View Corporation
1515 North Fine Avenue
Fresno, CA 93727
EOE

SENIOR SYSTEMS SPECIALIST

Are you a talented systems analyst who believes in structured programming, not in structured work environments? Then consider Lexicom, a Chicago DP consulting firm. We have many large projects for telecommunication companies, and we have a position for a Senior Systems Analyst with extensive system design and programming experience in an IBM MVS COBOL environment. If you are ready to work hard, make good money, and have fun doing it, send your resume to:

LEXICOM, INC.
900 W. Jackson, 8W
Chicago, IL 60607

COMPUTERWORLD

You want your business to keep moving ahead, right?

Then you need quick, time-saving solutions to your personnel and equipment problems. Classified advertising in the #1 trade publication for the computer industry is the obvious way to get them...

...Classified Advertising in COMPUTERWORLD.

Our classifications include **Position Announcements, Buy Sell Swap, Software for Sale, Time & Services, Business Opportunities, Real Estate** and the **Bulletin Board (the ideal, low-cost way to sell pieces of computer equipment.)**

If you are looking to hire computer professionals or to buy or sell equipment, contact us at 1-800-343-6474 or, in Massachusetts, call 617-879-0700. Our mailing address is **COMPUTERWORLD, 375 Cochituate Road, Box 880, Framingham, MA 01701.**

It's about the biggest step forward you can take toward solving your business problems.

Move ahead with COMPUTERWORLD.

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 709 FRAMINGHAM, MA 01701

postage will be paid by

CIRCULATION DEPARTMENT

COMPUTERWORLD

375 Cochituate Road, Rte. 30
Box 897
Framingham, MA 01701-9985

OPPORTUNITY

At Citibank (South Dakota), N.A. opportunity is an everyday occurrence. Through aggressive marketing of our credit and banking products, this opportunity has led to outstanding success.

We are a relatively new organization in South Dakota having been established in February, 1981. Because of our success, our current staff is being significantly expanded in 1984. To meet this expansion, we are searching for experienced candidates who are seeking excellent career advancement opportunities. Under an OS/MVS IBM environment, the following positions are available:

- APPLICATION PROGRAMMING ANALYSTS
- MVS & CICS SYSTEMS PROGRAMMING ANALYSTS
- PROJECT MANAGERS
- PROGRAMMING MANAGERS
- SYSTEMS AND RESOURCE PLANNING MANAGER
- DISASTER RECOVERY PLANNER
- TECHNICAL ASSURANCE MANAGER

We are seeking programming experience in both the batch and CICS areas with knowledge of either Automatic Teller Machines, Loans, Time Deposits, Demand Deposit Accounts, Automatic Clearing House, Hogan or Direct Mail.

If you are an aggressive professional seeking challenging work and satisfying rewards, we are what you have been looking for. We offer competitive salaries and benefits including relocation assistance. If you are interested, contact us at:

Suite 1166 - CW
Citibank (South Dakota), N.A.
P.O. Box 6000
Sioux Falls, SD 57117

An Equal Opportunity Employer M/F/V/H

Citibank (South Dakota), N.A.

CITIBANK

LET US HELP YOU "FILL IN THE BLANKS"

Cornell Computer Corp. 407

_____ 19__

Pay To The Order Of _____

_____ Dollars ($_____)

Sample _____

Are you fulfilling your professional and financial potential?
Call us for a realistic comparison!

We're Cornell Computer Corp.—the premier software consulting organization—named by Inc. Magazine as the fastest growing, privately held computer consulting firm in the U.S.

We offer numerous opportunities for the Software Professional motivated by financial rewards, technical challenges and career advancements. Positions are available for a wide range of professionals from programmers to project managers experienced in the following disciplines:

Cornell Computer Corp.

NOMAD	COBOL	BAL	DOS/VSE
CICS	PL/1	OS	UNIX
IMS-DB/DC	IDMS	FOCUS	ADABAS

Send Correspondence to:

NEW YORK	NEW JERSEY	TELECOMM DIV.	CONNECTICUT	FLORIDA
383 7th Avenue	100 Menlo Park	100 Menlo Park	111 Prospect Street	1515 N.W. 167th St.
New York, N.Y. 10001	Edison, N.J. 08837	Edison, N.J. 08837	Stamford, Ct. 06901	Miami, Fl. 33169
212-594-8543	201-494-8333	201-494-1666	203-348-8575	Suite 212
Ed Tiemes	Paul Rothstein	Stephen Kudseth	Lou Mangiere	305-625-4441
				Rob Sasseno

Systems Professionals

We at Alcoa are looking forward to a major systems project for a Computer Integrated Manufacturing (CIM) system. If you have the capabilities and background to help us succeed, opportunity and reward await you.

You must possess a desire to accomplish and an impatience with the status quo. You will have a strong background in process control/systems software with expertise in one or more of the following:

- Top-down structured design concepts.
- Distributed database design.
- Layered products systems.
- Fault simulation.
- Large networking, integration and control.
- Microprocessor integration.
- Systems Engineering.

Strongly consider the rewards of becoming a part of the winning team in Pittsburgh to design, develop and implement a state-of-the-art CIM system. Engineering and DEC/VAX backgrounds are a plus.

Send resume to Julie Petkovitis, Dept. CW, 1501 Alcoa Building, Pittsburgh, PA 15219. Alcoa is an equal opportunity employer.

We can't wait for tomorrow!

ALCOA

GROUP LEADERS/ SOFTWARE ENGINEERS

You will be responsible for the design and implementation of data base applications and utilities of fault-tolerant operating system development, including development of a multi-processor UNIX-compatible transaction processing system. You will also analyze data processing requirements, plan layout and provide conceptual design for the type of computer and peripheral equipment associated with operation.

You should have 6 years' experience in systems and/or computer engineering. A B.S. or M.S. in Engineering or Physical Sciences and knowledge of UNIX, "C", DEC, PDP-11, Assembly language, RSX-11M and Micro-11 are desired. You will work 40 hours/week, 5 days/week.

** UNIX is a trademark of Bell Labs*

We offer excellent benefits and a salary commensurate with ability and experience. Respond with resume in confidence to:

PERSONNEL, DEPT. W
COMPUTER CONSOLES INC.
97 Humboldt Street
Rochester, New York 14609

An Equal Opportunity Employer M/F/H/V

PROGRAMMER/ANALYST

SYSTEM/38

Fast growing company in rural country setting needs experienced programmer/analyst for development of manufacturing & retail distribution systems. The successful candidate will have 1 or more years hands on System/38 and 5 or more years Data Processing application development experience. Principles only, please.

Please send resume and salary requirements to:
MIS Director

RENOVATOR'S SUPPLY, INC.
MILLERS FALLS, MA 01349

PROGRAMMER/ ANALYSTS

Louisville Bedding Co., a recognized leader in quilted bedroom fashions & table linens, has immediate openings for two (2) Sr. Programmer/Analysts.

Experience requirements include:

- COBOL
- Manufacturing or Marketing/ Order Entry Applications

Experience with the following areas would be helpful:

- Online & network communications
- Barcode & scanning systems
- Data Basics or Ideamy 1168
- UNIX or Xenix software

Excellent salary & benefit package. Stimulating work environment. Send resume & salary requirements to:

Ellen Pastor
LOUISVILLE BEDDING COMPANY
10499 Bunsen Way
Louisville, KY 40299
(502) 491-3979

Equal Opportunity Employer

TEXAS HEALTH CARE

SCOTT AND WHITE, a large diagnostic clinic and 628-bed teaching hospital consisting of multi-specialty group practice is seeking candidates for two positions in Data Processing.

MICRO SUPPORT

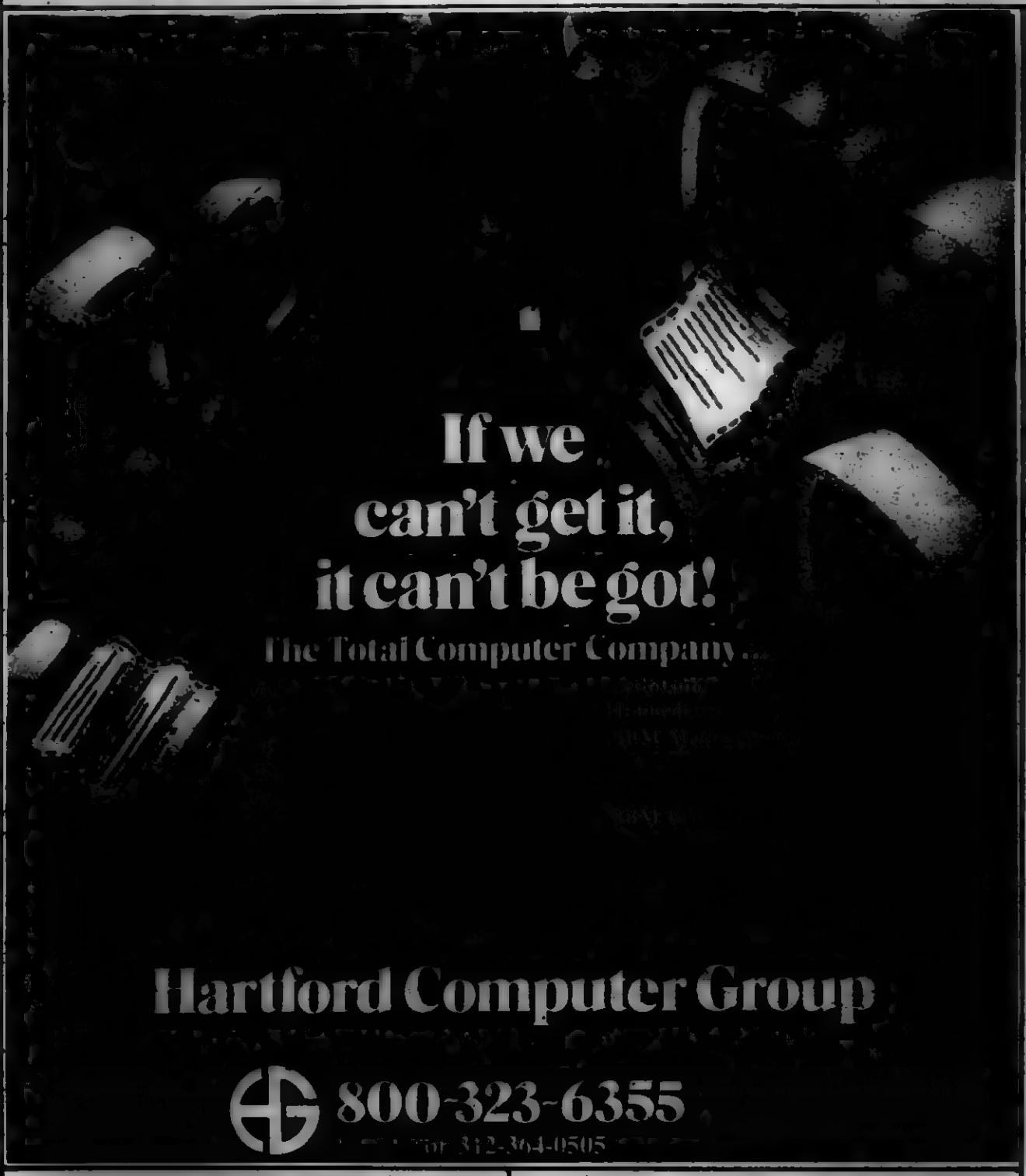
Position will take leading role in developing an institutional strategy for best utilizing micro and distributed processing. Also to assist users and potential users in planning and implementing micro computer applications. College degree preferred with strong knowledge of micros and their capabilities. Experience integrating micro applications with Host IBM systems needed.

PROGRAMMER/ANALYST

Need to add a member to the team that is developing and supporting the patient billing system. Must have 3-5 years experience with Cobol and DB/DC skills. Environment is 3033 and 4341 running DOS/VSE.

Scott and White provides excellent benefits and competitive salaries. Send resume to: Bruce A. Cole, Personnel Department, Scott and White, 2401 S. 31st St., Temple, Texas 76508 EOE

BUY - SELL - SWAP



WANT TO BUY/LEASE

Failure Analysis Associates, Palo Alto, CA needs a new/used computer system based on one of the following (or similar) computers:

IBM 4341, 4361, 4381
OR 3081
CDC 825, 835
VAX 780, 782.

Need delivery of system by 31 May 1984. Please call Colleen at 415/858-6400, Ext. 380.

FOR SALE BY USER

IBM
3272-3277-3350

Call or write:

HERMAN NICHOLS
EAST BAY MUNICIPAL
UTILITY DISTRICT
P. O. BOX 24055
OAKLAND, CA 94623
(415) 891-0353

We'll keep you up to date week after week after week

NORWEST
Computer Company, Inc.

34 • 36 • 38
4331 • 4341

System/34 Upgrades Disk—any increment Memory—any increment • Diskette—2D or magazine • All Features • IBM Maintenance Guaranteed • IMMEDIATE AVAILABILITY

214/991-2911
4255 LBJ Freeway Suite 211 Dallas TX 75234

PEARL HAS IBM SYSTEMS 34, 36, 38

and we have a large inventory of IBM 3741's, CPU's, CRT's and printers. We buy, sell, lease, rent and purchase/leaseback IBM Systems.

Call John Spight or Ken Warren
Pearl Computer Division
P.O. Box 24026 • 4717 Centennial Blvd.
Nashville, TN 37202 (615) 383-8703

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

Pioneer Computer Marketing
214/343-2804

BUY-SELL LEASE
- All IBM Systems
- Peripherals
- Tapes
- Disks

SERIES/1
- Systems
- Features
- Peripherals

SYSTEM 34
- CPU
- Peripherals
- Upgrades

PIONEER COMPUTER MARKETING
11448 Pagemill Road
Dallas, Texas 75243
214/343-2804

BUY-SELL-LEASE
SERIES/1
SAVE ON NEW OR USED
OVER 2000 CUSTOMERS
S/38
4331
4341
4361
4381
ALL RELATED PERIPHERALS
SHORT/LONG TERM LEASES
S/34
SEE OUR NEW PRICES
S/36
SHORT/LONG TERM LEASES
3083
3081
LEVERAGED LEASES
Call toll-free 800-328-8710
COI COMPUTER OPTIONS, INC.

WANG WORD PROCESSORS
AT THOUSANDS OFF!
Guaranteed, remanufactured WPS 20, WPS 30 and Wangwriters available for immediate delivery. You don't pay a cent till Wang installs and places equipment under service contract. 15-day return privilege. Buy, Lease, Rent!
For Free Info and fast response call toll-free:
1-800-321-2986
ELECTRONIC OFFICE EXCHANGE, INC.
Dept. SCSCWD • Box 7337 • Ann Arbor, MI 48107

What makes Dataserv a world leader in the IBM marketplace?

Customer satisfaction.

Over 65% of Dataserv's business comes from previous customers or customer referrals.

dataserv

IBM UNIT RECORD EQUIPMENT

SALE OR LEASE

IBM UNIT RECORD MACHINES
026—029—082—083—084
085—087—088—129—514
519—548—557

NEW & USED
DISK PACKS—DATA MODULES
2316—3336(1)—3336(11)—3348(70)
MAG. TAPE-DISKETTES
Every Item Guaranteed

Highest Prices Paid for Used Packs & Modules

THOMAS COMPUTER CORPORATION

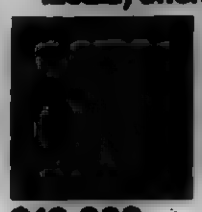
**** DEC ****
BUY—SELL—LEASE—TRADE—CONSIGN
SYSTEMS — PROCESSORS — OPTIONS
PERIPHERAL — MODULES — MEMORY
— SPARES —
NATIONAL COMPUTER EXCHANGE
(800) 624-9299
600 North Lunar Avenue, Brea, CA 92621
TWX: 910-596-1499 (714) 990-5988

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

DISK DRIVES · CONTROLLERS · PERIPHERALS · MEDIA

WANG · DEC

National authorized CDC OEM-Distributor (for Controllers and Media) offers *New Equipment*, fully warranted for 90 days:



$12,900

CDC Model 9766 (300 Mb.) WANG Models 2200V–2, and 4065 (300 Mb.) DEC Model RM0 5 (300.1 Mb.)

$7,750

CDC Model 9766 (80 Mb.) WANG Model 2200V–1 (75 Megabytes). DEC Model RM0 3 (67.1 Mb.)

$8,875

CDC Model 9448 (66 Mb.) WANG Model 2200–3 (80.4 Mb.) WANG Models 2200 V–3, 6580 (80 Mb.) DEC Model RM0 7 (66.4 Mb.)

$20,825

CDC Model 9776 (675 Mb.) WANG Model 2200 V–3 (640 Megabytes). DEC Model 2–RM0 8s (512.2 Mb.)

ERST

INTERNATIONAL CORPORATION

225 Lafayette Street, New York, NY 10012

ERST is the leading dealer in pre-owned WANG equipment – 2200, VS, WP (CPUs, Terminals, IOPs, Controllers, Printers, Memory Upgrades).

Next time give us a call . . . Toll Free 1-800-FOR-ERST . . . In N.Y. 212-431-1100

SCHERERS SCHERERS SCHERERS

FOR DEC
CALL SCHERERS

BRAND NEW DISKS:

*RL02-AK	10 MB disk with RL02K-DC	$ 2,100.
*RK07-PA	28 MB disk with RL07K-DC	3,500.
RK711-PA	Disk & Control	$ 6,000.
RLV21-AK	Disk & Control	3,500.
RLV22-AK	Disk & Control	4,400.
RL211-AK	Disk & Control	4,400.
RX211-BB	50 HZ/240 V	3,000.
RXV21-BB	50 HZ/240 V	3,000.
RA81-AA	456 MB, 16B Disk	18,150.
RUA81-AA	Disk & UDA50A	20,400.

USED DISKS: RL01's, RL02's, RK06's, RK07's RM02, RM03, RP06, RM05

SCHERERS

6143 SCHERERS PLACE
DUBLIN, OHIO 43017
(614) 889-6610

*Special pricing. Limited time offer.

SCHERERS SCHERERS SCHERERS

SYSTEM/34
SYSTEM/36
SYSTEM/38
SERIES/1

CW-1

ECONOCOM

• BUYS • SELLS
• LEASES

- QUICK DELIVERY
- COMPETITIVE PRICING
- FLEXIBLE FINANCING
- TRADE-INS ACCEPTED
- PROFESSIONAL SERVICE
- SHORT-TERM LEASING
- LONG-TERM LEASING
- PERIPHERAL LEASING
- TAKE-OUTS DONE
- MAINTENANCE GUARANTEE
- NEW OR USED

FIND IT FAST IN OUR FAMOUS COMPUTER MARKET ADVISOR

SEND US YOUR BUSINESS CARD AND WE WILL SEND YOU A FREE COPY.

CALL TOLL FREE
800-238-3098

ECONOMIC COMPUTER SALES, INC.
915 CROSSOVER LANE • P.O. BOX 34007 • MEMPHIS, TENNESSEE 38134

SELLING?

Sell your product or service in Computerworld classifieds.

Join the thousands of advertisers who use our classifieds because they get results.

You can find buyers for discs and DEC's, terminals and timesharing, software and System 370's.

More than half a million active computer people read Computerworld each week, and you can reach them efficiently in Computerworld classifieds.

To place your ad, or to get a rate card with complete details on Computerworld Classifieds, call or write:

Classified Advertising
Computerworld
P.O. Box 880
Framingham, MA 01701

1-800-343-6474 **617-879-0700**

NEW AND USED EQUIPMENT FOR SALE BY END USER
DATA GENERAL

7) S/230 20 MB DISKS	$3500	1) 6573 LPS PRINTER	500
4) S/270 30 MB SUBSYSTEM	3500	1) 6568 LPS SUBSYSTEM	1100
1) 6568 12.5 MB DISK W/FLOPPY	2500	1) 6150 LPS PRINTER (NEW)	1300
2) 6169 25 MB DISKS (NEW)	4500	1) 6191 LPS SUBSYSTEM (NEW)	2300
2) 6168 25 MB DISKS	4000	6) 4014/4004 LPS CONTROLLERS	350
1) 6537D 16 MB DISK (NEW)	4500	1) 6537S 4 LINE ASYNC MUX	350
2) 6027 20 MB DISK CNTRL	700	2) 5400 ANI 16 2B MA DTR BOARDS	150
2) 6020H NOVA 4C 6 SLOT 64 KB CPU	1300	1) 6144A 1 BAY CABINET	600
1) 16F6A 1 BAY INDUSTRIAL CABINET WITH AIR CONDITIONER (NEW)	4,400		
1) 16F6B 1 BAY INDUSTRIAL CABINET WITH HEAT EXCHANGER (NEW)	2,800		
1) NOVA 4X 6 SLOT 128 KB 10 MB DISK W/FLOPPY & ULM 6 BOARD	10,500		
1) NOVA 4X 6 SLOT 128 KB 12.5 MB DISK W/FLOPPY & ULM 6 BOARD	8,500		

MODEMS & TERMINALS

8) W&DC V.26/208 1200 BAUD MODEMS	400	10) ADM3A LEAR SIEGLER	275
1) 201264 MODEM 2 CHANNEL MODEMS	600	5) ADM5 LEAR SIEGLER TERMINALS	500

CONTACT: ROBERT FULWILER 214-258-0614

WANT TO BUY

SYSTEM/34 PERIPHERALS
5251's, 5291's, 5224's, 5225's, and 5256's

Call 214/258-0541

MC METROPLEX COMPUTER COMPANY, INC.
320 Decker Drive • Suite 180 • Irving, TX 75062
TWX 910-860-5865

DEC
New and Used in Stock

COMPUTERS

Rainbow 100
DECmate I and II
Pro 350
Micro 11
WD 211
11/23 +
11/24
11/44

CRTS

VT101-AA VT102-AA
VT100-AA VT102-WA

PRINTERS

LA 34
LA 100
LOPSE

Command Data
PHONE 205/942-3158

Command Data Incorporated
105 West Valley Avenue
Suite 105
Birmingham, Alabama 35209

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

SYSTEMS
4341 4331
38 36 34
32 3
BUY • SELL • LEASE
COMPUTER BROKERS, INC.
2976 SHELBY ST.
MEMPHIS, TENNESSEE
CB
TOLL-FREE
800-238-6406
901-372-2622
PERIPHERALS
3203 3370
327X 3411
3350 3420
aaco

IBM
5110 5120
3741 3742
DATAMASTER
1255 MICR
SYSTEMS
34 36 38 32 23
All Associated Peripherals
BUY SELL LEASE
• Printers • Display Stations
• Upgrades & Features/Add-ons
• Tapes/Tapes
• IBM Maintenance Overhaul
Call Today for Quotation
(615) 352-8565
SOUTHERN DATA SYSTEMS
Nashville, Tennessee

COMDISCO
A Commitment To Excellence
IBM PROCESSORS IBM PERIPHERALS
308[illegible]
[illegible]
3033
[illegible]
4341 [illegible]
4381
4341 [illegible]
Amdahl
3850
3800 3705 3203
The Leader in Full-Service Leasing

BUY • SELL • LEASE
SERIES-1
S/34 • S/36 • S/38
4300
S/23 S/32 5110-20
Tape•Disk•Printers•Tubes
AMCOM CORPORATION
5300 W. 73RD ST. • MINNEAPOLIS, MN 55435
(612) 835-4737
CALL TOLL FREE
800-328-7723

AMDAHL
FOR SALE
V/6-II 8 X 12 MARCH 15
V/8 16 X 16 APRIL 1
SUBLEASE
V/7 16 X 16 MARCH 1
V/8 16 X 16 APRIL 15
CALL: CHARLIE BERRY OR TOM STARR
(612) 933-8000
MAJOR COMPUTER INCORPORATED
10237 YELLOW CIRCLE DRIVE
MINNETONKA, MN 55343
[illegible] computer.....
CMA

LEASING A NEW IBM COMPUTER?
Compare [illegible] Before You Lease!
• SR-1 Dun and Bradstreet Co.
• Fortune 500 Reference
• $55 Million of IBM Leasing
Peterson Leasing & Service Group
Toll Free 800/[illegible]
Los Angeles 714/671-3911
New York 201/467-0666
Chicago 312/[illegible]

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

TexCom

WE BUY • SELL • LEASE

JOIN THE MANY FORTUNE 500 COMPANIES THAT UTILIZE IBM EQUIPMENT FROM TEXCOM . . . THE IBM SPECIALISTS

SERIES 1

- All features and peripherals
- We buy, sell or trade
- Convenient leases available

1331 1311 • 1361 1381

- We buy, sell or lease
- Two, three, four year leases

WE'VE GOT IBM PERIPHERALS

3803	3380	3350	3211
3420	3880	3370	3811
3375	3340	3203	3262

IBM S/34 — 36 — 38

- All upgrades available now
- One, two, three year leases
- We'll take S/34 trade-ins.
- All models and peripherals

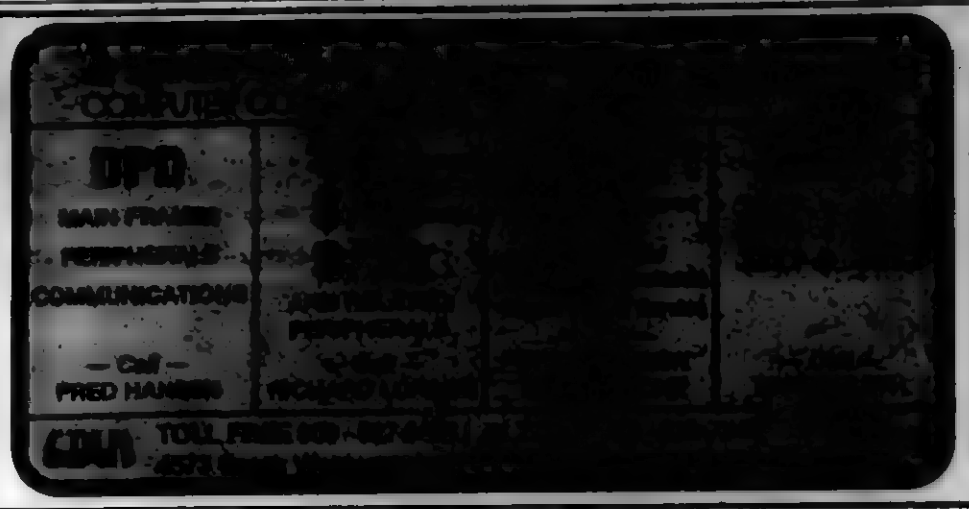
WE'VE GOT ALL IBM PRINTERS AND TERMINALS PLUS 3864 MODEMS NOW.

FOR SALE OR LEASE

IBM PC-XT'S
256K, COLOR MONITOR AND GRAPHICS PRINTER.

Call Toll Free: 1-800-833-9119

SAN ANTONIO (512) 349-9955
MEMPHIS (901) 756-7055
HOUSTON (713) 690-8714



Buy - Sell - Lease

S/32
S/34
S/38

IBM 3741 3742

CPU's CRT's PRINTERS ALL MODELS
PURCHASE/LEASEBACK
SHORT & LONG TERM LEASES

Computer Marketing of America, Inc.
P.O. Box 71
610 Bryan Street
Old Hickory, Tennessee 37138

1-800-251-2670
In Tennessee: 615-847-4031

C.D. SMITH & ASSOCIATES, INC.

DEC computer systems & options
12605 East Freeway, Suite 318
Houston, Texas 77015
(713) 451-3112
TELEX 76-2547

DEC

WE ARE BUYING: VAX 11/780

WE ARE SELLING:

MS780-DC	6,000	TBK50-BA (New)	8,000
MS780-CA	4,000	11X44-FA	Call
MS780-DC	5,000	11780-FA	Call
DW780-AA	5,000	11780-KA	Call
FP11-A(New)	1,800	MS780-EC	39,675
DZ11-E	2,500	11/84A-YE(New)	8,000

If you want on our Mailing List, call Yolanda (713) 451-3112.

S/36
S/34

• BUY • SELL • LEASE
• MAINTAIN • UPGRADE

For information call
201-343-4554

• COMPLETE SYSTEMS • PERIPHERALS • PROMPT DELIVERY

MARION

3270

We Buy & Sell
DEC
Systems
Components

Digital Computer Resale
call:713 445-0082
Houston, Tx 77080

There's No Time For DOWNTIME!

So while the industry works on your system's problems, let us work on your business problems. Advertise in—

COMPUTERWORLD CLASSIFIEDS!

One insertion will let a potential audience of over a half a million readers know what you are looking for or have to offer. Whether you are looking to recruit computer professionals, want to buy, sell or lease equipment, have computer time or services to offer, or software packages to sell, and more, Computerworld Classifieds will help you get a lot of exposure and get things done faster.

The open line rate is $9.15 per line and there is a minimum size of 1 column by 2" at a cost of $256.20. We can accomodate up to 5 columns and depth measurement increases by half inch increments.

Ads may be mailed in, clearly typewritten, with a letter stating the size desired and the issue in which it is to be run. Our adtakers will take ads that require no artwork or borders over the phone. We also provide telecopier service.

Any borders, logos, or artwork should be sent in with your ad and must be dark and clear enough to be reproduced.

Computerworld comes out every Monday and our deadline for receiving ads is 10 days (or six working days) prior to the issue date desired.

First time advertisers must send either payment or a purchase order along with their first ad.

Our mailing address is:

Classified Advertising
Computerworld
Box 880
375 Cochituate Road
Framingham, MA 01701

800 343-6474
(617) 879-0700

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

IBM SYSTEM/34

S/3 • S/32 • S/38
5291 • 5251
3741 • 3742

BUY • SELL • LEASE
REFURBISHED • RECONFIGURATED
SHORT-TERM LEASES
PURCHASE/LEASEBACK

Tennecom MARKETING INCORPORATED
210 SPACE PARK NORTH
P.O. BOX 248
GOODLETTSVILLE (NASHVILLE)
TENNESSEE 37072

800-422-1004
IN TENNESSEE CALL: (615) 859-3572

HP 3000

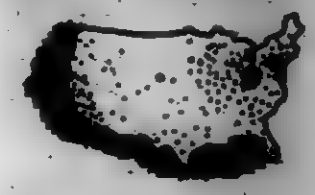
TELEX 786827
encore
(213) 452-0117

RANDOLPH'S APPROACH TO COMPUTER LEASING... AND WHY IT WORKS.

Started in 1964, Randolph has been saving its customers 30% to 70% of their DP hardware dollars . . .

And we *know* leasing is still the most financially attractive method of acquiring computer equipment at low cost without draining working capital.

But we learned early that the dollar-and-cents approach to computer leasing is only part of a company's concern. Equally important are: prompt installation . . . dependable servicing . . . flexible upgrade capabilities . . . and full support services. Our commitment to *this* approach is the key to satisfied customers . . . and our success.



RANDOLPH . . . COAST TO COAST
We presently serve customers in over 300 cities and towns from Maine to Hawaii.

EQUIPMENT ON THE MOVE
We have under management IBM computers with an original cost of over one-half billion dollars . . . and we're adding to this investment to meet the changing needs of our customers. Whether it's an IBM 3081 or 4300 system, additional tape drives, disk storage, printers or other peripherals, our equipment inventory is available to meet your company's requirements. Even hard-to-get machines are sought out and acquired for Randolph customers.

BUT . . . SERVICE MAKES THE DIFFERENCE
The real story behind Randolph's success is our approach to customer support services. To keep computer operations running smoothly and efficiently, these support services have proven to be valuable assets to our customers' D.P. operations.

Continuous IBM Maintenance Program
Manufacturer's service is available day or night, seven days a week, to insure optimal use of your system.

On-Going Technical Support
Randolph's technical staff is on call to help you reconfigure your system to meet changing data processing requirements.

Active Remarketing Division
We assure maximum return on your investment in computer equipment which you no longer use.

MEMBER OF THE FIRST NATIONAL BOSTON FAMILY
In 1972, The First National Bank of Boston purchased our S/360 leasing business, and we became a wholly-owned subsidiary.

With the Bank's financial capabilities behind us, Randolph customers benefit even more from the combined efforts of the best computer leasing and financing people in the United States.

HOW ABOUT YOU?
If your company is not presently leasing computer equipment from Randolph, you'll be interested in our new brochure outlining our special customer support services, and important facts on how we can reduce your computer costs. Call Joseph B. Kelly, Jr., Executive Vice President, 800-243-5307.

537 Steamboat Road
Greenwich, Connecticut 06830
(203) 661-4200 (800) 243-5307

Randolph

THE FIRST NATIONAL BANK OF BOSTON

A MEMBER OF COMPUTER DEALERS & LESSORS ASSOCIATION **RANDOLPH COMPUTER CORPORATION** A subsidiary of **BANK OF BOSTON**

DSI

WE BUY SELL & LEASE!

BURROUGHS

Discover the DSI alternative.

800-641-5215
All equipment available immediately and guaranteed for Burroughs Maintenance.

DSI Serving the Burroughs Community Worldwide
2480 W. Alameda Ave., Denver, CO 80223 (303) 922 8331
TWX 910-931 0483

You can get information on buying or leasing
IBM 34-36-38
as fast as you can dial
1/800/LEAS-PAK.
In Texas call 817/268-0023.

Up to 50% Savings

LPI

LEAS PAK INTERNATIONAL

P.O. Box 759 • Hurst, TX 76053 • 817/268-0023

Send for our free purchase and service brochure.

Name _____
Address _____
City _____ State _____ Zip _____
Phone _____

Limited System/36 deliveries, new displays and printers in stock. We want to buy your unused or unused credit equipment.

BBA CO

We've Got Your Number

S/34 ALL MODELS QUICK DELIVERIES

SERIES 1 CONFIGURED TO YOUR NEEDS

S/36 ATTRACTIVE LEASE RATES

S/38 NEW & USED MACHINES

5110/5120 NEW LOW PRICES

PERIPHERALS
CRT'S, PRINTERS, DISK, TAPE, MODEMS

CARLYN
COMPUTER SYSTEMS
9105-G Rockhill Road, Alexandria, VA 22309
"CALL COLLECT" (703) 642-1950

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

The nationwide market - a call away!

DEC/DG

SYSTEMS/PARTS/PERIPHERALS
NEW/USED/SURPLUS • DISCOUNT PRICES
Since 1977! Buy, Sell, Trade and Broker.

PHIL	BRYAN	JENNIFER
DG	11-VAX	8-LSI

CALL TODAY - (305) 392-2005 TELEX 568-670

thomas business systems, inc.
4301 Oak Circle - Unit 11 Boca Raton, Florida 33431

Digital Brokers, Inc.

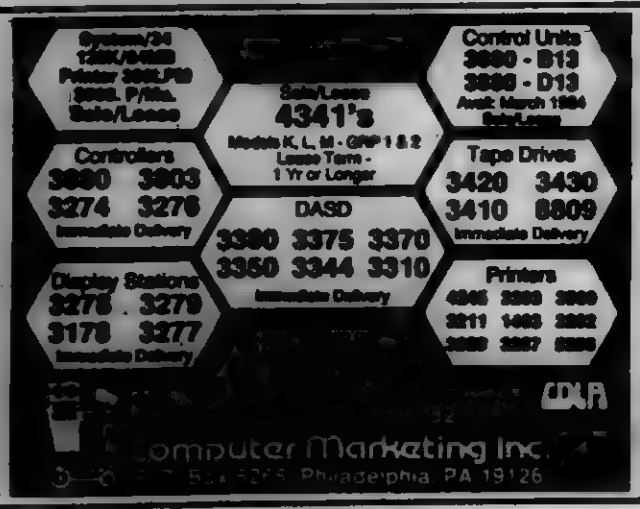
P.O. Box 81406/Atlanta, Georgia 30366/(404) 441-2780

COMPANY PRESIDENT JIM MOORE
invites you to try our services.
We specialize in:

SALES • PURCHASE
BROKERAGE • LEASING

- Digital Equipment Corporation
- Plug Compatibles
- Depot Repair Center

Buy•Sell•Lease
SERIES 1
S/34 S/38
4300 S/370
5110 S/23
XEROX
COMPUTER SALES
Minneapolis, Minnesota 55403
800-328-3884/612-339-3042



EL CRIMITO
offers:
4381-M2
DELIVERY POSITIONS AVAILABLE
early
MARCH
APRIL
MAY
JUNE
(213) 986-2411
4827 N. Sepulveda Blvd.
Sherman Oaks, CA 91403

- **BUY**
- **SELL**
- **SWAP**

Well-Equipped To Serve You In Buying Or Selling

- HARDWARE
- SOFTWARE
- COMPUTER TIME & SERVICES

Over 500,000 computer people read COMPUTERWORLD every week.

So placing an advertisement with us is going to help you take care of your computer-related business.... very quickly.

Call 1-800-343-6474
or send materials to:
COMPUTERWORLD
Classifieds
375 Cochituate Road
Box 880
Framingham, MA 01701

CMI

AMERICA'S LEADING SPECIALIST SERVING THE USED MARKET

Alsesco, NJ (609) 646-7262
Atlanta, GA (404) 256-7942
Boston, MA (617) 267-6755
Chicago, IL (312) 693-2760
Dallas, TX (214) 385-0806
Encino, CA (818) 788-0113
Houston, TX (713) 780-7466
Lebanon, TN (615) 449-6633
Miami, FL (305) 442-3969
Newport Beach, CA (714) 752-6443
New York, NY (212) 349-5718
Tampa, FL (813) 273-0826
Frankfurt, Germany Telex: 414661 LCO D
Montreal, Quebec (514) 671-1121
Nyon, Switzerland Telex: 27200 CMI CH
Paris, France Telex: 613810 CMI FR
Toronto, Ontario (416) 842-3666
(416) 963-6100
Vancouver, B.C. (604) 685-6186
Windsor, Ontario (519) 973-3619

CMI FINANCIAL SERVICES GROUP
2600 Telegraph Rd., P.O. Box 2026
Bloomfield Hills, MI 48303-2026
(313) 456-0000

CMI

A Torchmark Company
2600 Telegraph Rd., P.O. Box 2026
Bloomfield Hills, MI 48303-2026
TWX/TELEX: 810-232-1667 CMI COMP TRNI
(313) 456-0000
CMI 4300 Series Hotline Number 800-521-4300

3081-D16 Sale or Lease

3081-K24 Sale or Lease

For Solid Lease 4361 1st Quarter Delivery

3033 All Models

New Series 1 with Basic Operating System "Unix" is on the Series 1 IBM Master VAR

3350's Available Now On a Short Term Lease 3370 3375 3380

3680-A6 Available Now 4700 Banking Equipment Buy/Sell/Lease

3725 Lease Financing Available For your System or Ours 2,3,4 or 5 Year Terms

3800 LASER PRINTER Model 1's Immediate Delivery Model 3's Lease Financing Available-Any Term 3800-3 3211-1 & 3811-1 3800-8 4245-1

Tapes Immediate Delivery 3803-3420 Buy/Sell/Lease

Wanted 4341-M2 4341-L01 Call Now

3278, 3279 3277, 3276 Terminals All Models Immediate Availability

3705-3704 Available for Immediate Delivery Sale or Lease

SYSTEM 38 Model 7 & 8 Available Now New - Used SYSTEM 38 2, 3, 4 or 5 Year Terms Lessor rates from IDC 8130's Available Now - Sale or Lease

Series 1 I/O All IBM Peripherals Any Used Configuration CDC Fixed/Removable Disks Tape Back-up 9-track 6250 CDC/Datasouth/Pertec/Kennedy MSC/Pristine Buy/Sell/Lease

DEC

RENT • BUY • UPGRADE • SELL

PDP, 11/03, 11/04, 11/23, 11/24, 11/34, 11/44, 11/70, VAX/730, VAX/750, VAX/780

SYSTEMS • OPTIONS • SUPPLIES

11/24 16KB, Dual RL02, DZ11-A, Dual H9642 (new) $24,995
11/60+ 256KB, Dual RL02, DZV11-D, VT100, License (new) $16,500
11/70 512KB MOS, LA36 (new) CALL
VAX/750 1MB, RA60, RL02, VMS license (new) CALL

Customized Configurations-Call With Your Request.

In Stock		Specials		In Stock
11/24-DC (new)	$11,500	M8211-PB (new)		$4,195
DB11-A (renewed)	$ 495	256780-CA (new)		$4,195
DWF32-AE (new)	$ 2,495	256780-DC (new)		$5,000
DUP11-DA (new)	$ 995	RM780 (new)		$2,895
DZ11-F (new)	$ 3,195	RX211-EA (new)		$2,895
H9642 (new)	$ 1,350	RL211-AK (new)		$3,495
KT24 (new)	$ 795	RHA01-AA (new)		Call
LP11-WA (renewed)	$ 2,495	VT180-AA (new)		$ 495

BROOKVALE
800-645-1167 NY (516) 273-7777

ARDAIR • DUNSOURCE
DATA GENERAL • DEC
HEWLETT PACKARD
SPERRY/UNIVAC
NCR • NAS • WANG

CALL DATASERV TOLL-FREE
800/328-6729
dataserv
609 SECOND AVENUE SOUTH
HOPKINS, MN 55343

NPA SYSTEMS INC.

SPECIALIZING IN:
PURCHASE
SALE, TRADE,
LEASE, RENT,
AND SERVICE OF
Data General EQUIPMENT

201 OATES AVENUE
TELEX # 510 222
(516) 467-2500

CPR:RESALE

Computer Products & Repair

No charge to tell the Data General world.

Call us to list the DG equipment you have to sell or buy. There are no fees. CPR's large, computer-based sales force will find you a MATCH TODAY through national phone sweeps, direct mail, and advertising to 500,000 owners.

Buy at the price you want. Sell at the price you need.

$2 Million is also available to buy and sell your inventory fast, with aggressive trade-ins, and leasing through national firms.

Expect the price you want TODAY with CPR:RESALE.

CPR gets you results. California 800-648-2247

800-843-2047

1830 Fourteenth Street, Santa Monica, California 90404 213-450-6810

FORSYTHE McARTHUR ASSOCIATES, INC.

DEALER / LESSOR OF IBM Computers and Peripherals

FOUNDED 1971

Home Office
Chicago
919 North Michigan Avenue
Chicago, Illinois 60611
312 943-3770

Branch Offices
Atlanta 404 953-9467
Milwaukee 414 765-9544

LDA

DATA GENERAL

Hanson Data Systems

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

LEASE • PURCHASE • SELL

IBM SYSTEMS

- *Purchase-Lease Back*
- *Customized Leasing*
- *Upgrade Flexibility*
- *All models and peripherals*

612-941-0510

WINTHROP
FINANCIAL CORPORATION
computer sales & leasing division

6400 Flying Cloud Drive • Eden Prairie, Minnesota 55344 • 612/941-0510

IBM
Series/1 • S/34 • S/36
S/38 • 4300
5110 - 5120 • S/32
All models, systems & peripherals
AVAILABLE
(404) 425-7333
SOURCE DATA PRODUCTS INC

IN STOCK!
Fujitsu Eagle
with cabinet, cables, slides & terminator:
$12,000
New Fujitsu SP 380
80 character per second, letter quality printer.
Introductory Special - $2,295
MANDERS
303-693-3035
2771 S. Jasper • Aurora, CO 80013

FOR SALE
DEC EQUIPMENT
RM05 (67Mb) $4,200
RM80-AA (New, 124Mb) $12,500
LP11-CA (600 LPM) $7,200
VT78 (Terminal) $150
H4769 11/750 Controller $4,000
Miscellaneous Enterprises
Essex St. • Middleton, MA 01949
(617) 777-4966
dda
For All Your DEC Requirements

FOR SALE
(1) D.E.C. VS/78 - FOR32 SYSTEMS
(2) D.E.C. VS/78 - FOR1 SYSTEMS
(1) D.E.C. LS120 - HE DECWRITER
(8) SOROC IQ130 CRT'S
(10) SOROC IQ120 CRT'S - As Is
(1) Data Products 8600 Printer - As Is
(1) 3M SRC 1000 Microfiche camera
(1) Canon 2300 Microfilm camera
(1) 3M 202 FICHE developer
(1) 3M 800 READER/PRINTER
CONTACT: Steve Anderson
Jimmy Swaggart Ministries
504-769-5200

IBM SYSTEM
Buy
Sell
34 UPGRADES
Lowest Prices
Call Collect:
404-252-7480
DATAMARC
6085 Roswell Rd.
Suite 320
Atlanta, GA 30328
S/1
S/38

STC
TAPE/DISK
SALE - RENT/LEASE

BIDS & PROPOSALS

INVITATION TO SUBMIT PROPOSALS

Mount Saint Mary College intends to procure an educational computer system of approximately 20 interconnected student positions serviced by common disks, printers and associated equipment. Those interested in receiving the specifications for proposal submission should provide brief comments on their qualifications to the address below not later than 29 March 1984.

Director of Computer Science
Mount Saint Mary College
Powell Avenue
Newburgh, NY 12550

BUYING?

Whether you're looking for big computers little computers, terminals, printers, software, time sharing or services, you'll find it in *Computerworld* classifieds.

Pages of ads every week, with everything from Discs to DEC's from time sharing to terminals, and software for every size computer system.

You'll find what you need in *Computerworld* classifieds.

Call 800-343-6474 (or 617-879-0700) for more information

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY
375 Cochituate Road, Box 880, Framingham, MA 01701/(617) 879-0700

The Bulletin Board

DISK DRIVES AND PACKS

CENTURY DATA DISK DRIVES
Model T300 (80MB SMD)
Used Less Than 200 Hrs.
$6000.00/each
919-847-3466
919-851-6814

For Sale
(4) CDC-9762 Disk Drives
Like New
Under CDC Maintenance
Asking Price $2500./Each
Price is Negotiable
API Alarm Systems, Inc.
Call Richard Baumgardner
(213) 487-7080

The Bulletin Board makes selling your equipment easy!

DEC

DEC & PRIME SPECIALS

- MS780-FD Avail Now $3,900
- MS780-E Upgrade Kit $18,500
- 1144-DA New $24,800
- VT101-AA New $995
- RM80-AA $9,000
- PDP 11/70 128KB Core Memory KB11-C Call
- RM03-AA $5,500
- RM02 New $5,200
- CDC 9766 300MB $5,500
- Dataprinter 1000LPM Band Printer $4,500
- VAX 780 1/4MB M8210 $800
- LP14-DA $9,500
- Prime Computer Systems Available Upon Request
- Emulex Controllers Available

SEVCO INC.
(617) 435-8838
(617) 435-8331

DEC BARGAINS

11/34A CPU Bd	$1,695
11/44 KE44-A 'CIS'	$2,975
4A-CI780 Spares Kit	$9,800
SDV11-AA	$495
DR780-AA	$9,400
DZ11 MUX Bnd.	$1,125
DZ32-S	$1,870
FP11A	$1,185
KK11-A	$1,795
KK11-S	$2,675
KW11-P	$330
MS11-MB	$1,175
MS780-DC	$4,850
MS780-FD	$2,995
MSV11-PK	$975
MSV11-PL	$1,275
RLV11	$975
VAX 1MB MS780-CA	$2,995
VAX 1MB MS750-CA	$2,995

Call Ray at QEI, Inc.
(617) 275-6800

We Buy and Sell DEC Systems and Components. Wanted: VAX and 11/70 Processors.
Alphabyte
380 S. State College Blvd.
Fullerton, CA 92631
(714) 680-8511

DEC NEW & USED
BUY — SELL — EXCHANGE
Systems • Processors • Memory
Options • Peripherals • Modules
LAKEWOOD COMPUTER CORP.
3280-6 Bellomy St., Santa Clara, CA 95050
(408)280-2545

DEC

VT220
B/W or Amber
Immediate Delivery
(713) 445-0082

PDP-11/24 SYSTEM
64KB Memory, 4-RL02s, DE-11 16 Ports, TS-11 1600 BPI Tape, RSTS/E Version 8.0, BASIC+2, DATATRIEVE. All documentation, Under DEC Maintenance, Asking $28,000.
Business Research Corp., Boston
(617) 787-6000
J. Ruiz or S. Sullivan

For Sale
NEW SITE, GRANTS
ECRO MAINFRAME
Immediate delivery at substantially discounted prices.
For information call:
Pandora
8975 Western Avenue
Boulder, CO 80301
(303) 449-7710
(800) 821-6055

DEC 11/03 System
With 32KB, RXV11-BA, Cabinet, LA36 Printer.
$1,975
Call Ray
(617) 275-6800

BUY • SELL • TRADE

1170 Sys.	LA120-DA	RH70
DL11-W	MT298	RM80-AA
DMC11	MS918	RM03-C
DR11-B	MK11-SE	RP04/6-C
DZ11-B	MK11-CE	RP06-P
DZ11-E	RH70	TS16 Mstr.

NEW YORK COMPUTER EXCHANGE
(516)752-9088 (800)645-8160

MISC.

BUY - SELL - LEASE
DATAPOINT
HARDWARE & SOFTWARE
•Turnkey Systems •FAMIS Software
On-Line Accounting
(713) 529-9613

Buy • Sell • Lease
• Short Term Rentals •
DATAPOINT
FOR SALE

9448	Revs	$1,189.
2468	Multipoints	$950.
3500	CRT's	$1,295.
1525	Systems	$1,695.
9375	20MB Extension	$5,795.
9383	160 CPS Printer	$1,295.
9040	Arc Pros. 256K	$1,595.
9220	Datastations	$1,295.
3001	Datastations	$950.

24 HOUR DELIVERY
Cougar Computer Corp.
(216) 261-3600

NEW TELETYPE
Pin Feed AAA
Overstocked Brand New
At Dealer Cost
$870.
Data Remote/Sales, Inc.
Mr. Karkover
(213) 595-3555
or outside CA
(800) 421-4566

TANDEM
4104 (300 Meg) Disk Drives
Cables and Packs
NEW and USED
Terabit Computer Systems
(514) 337-4212
Telex: 06-824058

Call to place your ad today
(800) 343-6474
(817) 579-6756

HEWLETT PACKARD

HP3000
BUYBUYBUYBUYBUY
SELLSELLSELLSELL
RENTRENTRENTREN
LEASELEASELEASE
HP3000/HP3000/HP300
Complete Systems
Processors • Peripherals • Parts
ConAm Corporation
Santa Monica, California
(213) 450-5945 (800) 645-4954

HEWLETT PACKARD
1000 • 2000 •3000
SYSTEMS & PERIPHERALS
BUY & SELL WORLDWIDE
EURODATA, INC.
(813)725-0405
Tlx: 000-0000

Buy-Sell-Lease
HP3000 3X, III, 4X
and related peripherals
Call Carol
CSU INDUSTRIES, Inc.
516-239-6316

For Sale
HP7925S 120Mb
Disc Drive
$10,000
Dayton Timesharing
Co-op, Inc.
(513) 222-2783

DATA GENERAL

NEW 88 CRT's

D-210	$795
D-410	$1295
D-460	$1395
Desktops	15% to 25% Off List
Emulex 500	$495

Any & All DG Cables in Stock.
We Will Not Be Undersold On
Any New or Used DG Equipment
Mantis Data Systems
(213) 697-4999

DESKTOP COMPUTERS
D210's, D211's, D410's & D460's
2MB Mem for MV/4000 & MV/8000
Desktop Printers
6026 354MB Disk System
6021, 6099, 6125 Tape Drives
6161 147MB Disk System
1MB Memory for CS/80
Access Submission Inc.
(201) 889-6169

WANTED
Data General
1MB M-600
System
Contact Dale at
(213) 990-8383

Your ad can be here for $130

MISC. SYSTEMS

Micro to Mainframe
Translink DOS Direct
"NATIVELINX"
3270 - 2780/3780
Dealer, Quantity, Educational Discount
Viking Associates
(303) 632-7004

WANG

Present...
WANG USERS...
HAVE YOU HEARD ABOUT THE GROUP OF FORMER WANG EMPLOYEES IN ATLANTA WHO BUY & SELL USED WANG EQUIPMENT AND PLUG COMPATIBLES?
LC.A. (404) 977-4200 or
1-800-841-3188

SURPLUS WANG SALE
City of Fairfield, CA is selling surplus Wang equipment. Final sale for bids is March 22 at 3:00 pm PST. Call the Purchasing Division for more information (707) 428-3900 ext. 2214.

WANG VS COMPATIBLES
WANG PCs - Disk Drives: 7S, 35S, and 240Mb - Printers: 40CPS to 1200LPM - Modems: 300 thru 9600 baud - CRTs - Disk Packs and Tapes.
In Stock - New Equipment
Save 50 - Prompt Deal
Manchester Equipment Co., Inc.
(617) 725-1800

IBM

For Sale or Lease
IBM SYSTEM 34-F37
256K/258Mb; 3 Comm Lines
Attachments for 3262
and 5211 Printers
Available Immediately
Contact Charles Crowley
(816) 483-7085

FOR SALE
SYSTEM 34 MODEL F36
AVAILABLE IMMEDIATELY
128MB, 256K,
COMMUNICATIONS
$24,000
CALL BILL OR RICHARD
505-624-8571

4341-L2
With 1601 and
Memory Upgrades
Available June 1
JBI Associates, Inc.
(303) 988-0820

IBM SYSTEM 34 CPU (E34)
64MB, 128K, With 23 Diskette Magazine. IBM Maintenance Guaranteed. $14,000 or best offer. Contact Kathy at (713) 499-8611.

WANTED
IBM OS/6
Prefer with communications.
(201) 239-1005

For Sale
IBM SYSTEM 34
CPU, E-23, Model 5340
Printer-5211 Model 1
CRT-5555
$15,000.
W.A. Bonner
(404) 843-1397

Buy ... Sell....Lease
IBM MICR
3890 - 1419
(813) 722-4534

For Sale
4341-K1
W/1870
Available Now
Arwell Corp.
(214) 385-7320

IBM

SYSTEM/34 SALE
*** CPUs ***

5340-C22	$9,995.
5340-C23	$9,995.
5340-C64	$12,995.
5340-E35	$14,995.
5340-F37	$27,995.

*** Printers ***

5211-002	$4,995.
5256-001	$12,995.

*** CRTs ***
5251-011 $1,595.
Also Available All Disk and Feature Upgrades. System 23's Available. Trade In Your System 34.
(212) 279-1717

PRINT TRAINS
IBM 1416 & 3216
Bought - Sold - Lease
Repaired - Reconditioned
COMPU-ACT COMPANY, INC.
(612) 888-8481

Buy • Sell • Lease
IBM
Cougar Computer Corp.
Suite 219
29800 Euclid Office Plaza
Euclid, OH 44132
(216) 261-3600

SYSTEMS 34/36/38
Short Term Rental
S/34
1-800-LEASPAK
In TX (817) 268-0023

For Sale
3350's
Available Now
Arwell Corp.
(214) 385-7320

For Sale By Owner
IBM S/34 E35
1 5211-02 Line Printer
1 5256-03 Dot Matrix Printer
3 5251-11 Terms W/Cable Thru
Maritex Terminals Corp.
Jon Brooks (415) 986-6570

4341-L1 Now - $2XX,XXX/Month
4361-P2 $XXX - $1X,XXX/Month
3278-2 Qty. Now - $XX/Month
Syscomp
(813) 799-4310

Wanted
4331-J01
Call Dick Daniels
800-238-6405

4341-L1
W/1870, 4MB
Contact Don Barber
(503) 641-3151

BUY SELL LEASE
5251-12's W/2561 and 2560
5251-11's
5291-1's
5225-4 Printer
5256-3 and 3262-81
System 34's Most Config.
Computer Products Inc.
(513) 721-3300

4341-L10
W/1870, 4MB
Now $75,000.
Or Best Offer
Call (214) 991-2911

IBM

LEASE OR SALE
4331-L2
April Delivery
Call Bill Hagan
(914) 238-6631

IBM PERIPHERALS
5251-11
5291-01
5224-02
3 Day Shipment Anywhere in U.S.
Quantity Discounts
Ask for Steve
(813) 839-8491

4341-L10
W/1870, 3279, 4MB
Now $75,000.
Call
(516) 273-9130

SALE
S/34 E35
FOB New Jersey Now
Call Louis Felder
(914) 238-6631

The University of Missouri - Columbia, will accept SEALED BIDS until 8:00 A.M., Tuesday, April 17, 1984, for the Sale of Used Bell System 32 Computer, located at KOMU-TV Station, Highway 63 South, University of Missouri - Columbia, Columbia, Missouri. For more information contact Mr. William Reagan, KOMU-TV Station, telephone (314) 449-1122.

FOR SALE
3360-82 w/8150
3360-82
3360-82F
3360-C2 w/8150
Call Howard King
(914) 238-6631

For Sale
IBM SYSTEM 34's
Any Model or Configuration
Available Within 30 Days
Eligible For IBM Maintenance
Call Pat
(312) 668-3811 ext. 8

PUBLIC DOMAIN SOFTWARE
SYSTEM 34/36
Send $10. for library of programs/user utilities.
Brite Publishing
1914 Capital Terrace
Jackson, MS 39201

For Sale
IBM SYSTEM 34
Model F-37
Multi-Line Communications
5211-002 Printer
$39,995 FOB Chicago
Federal Mogul Corp.
(313) 354-8641

4331, 4341
J1 Group 2
Sale/Lease Plan
With I/O
Virgo Companies
(313) 254-2850

More Bulletin Board on the next page.

The Bulletin Board

THE BULLETIN BOARD

A Low-Cost Way to Sell Hardware and Software in Computerworld.

What is The Bulletin Board?

It's a classified section in Computerworld designed especially for the selling and buying of individual pieces of hardware. It is especially suited to companies that have a piece of used equipment they want to sell. For one low price, you can inform more than half a million Computerworld readers around the country of your equipment's availability.

How Does The Bulletin Board Work?

Bulletin Board ads come in standard units (one column wide by one inch deep) and standard typefaces. (Units may be combined to produce deeper ads, but one column is the maximum width and no units of less than one inch are available.) Ads are arranged under headings (such as "IBM", "DEC" or "Printers"). The headline of the ad is set in larger, bold type, and should contain the standard equipment identification. The body copy should describe the equipment very briefly and give the person to contact. This is all the information an interested buyer needs to follow up. No ad should have more than one piece of equipment or software.

The price for each standard unit is only $130.00. There is a one unit minimum and no fractional units available.) Anyone can place an ad, but no agency commissions are paid, no quantity discounts allowed, and no credit toward rate is given for contract advertisers who advertise in other sections of Computerworld.

How to Place an Ad in the Bulletin Board.

Ads are accepted in the mail, by phone or by telecopier. Ads can be accepted up until the Monday before issue (7 days in advance of issue date). (The standard size will hold approximately 25 words of copy.)

Once you've written your ad, send it in with the coupon or call one of our ad-takers. (If your company has never advertised with us before we request a check or purchase order number with your order.)

Remember that all ads are standard. No special typefaces, no borders and no logos are allowed. Ads are set on a six-column page in our classified section under the heading "The Bulletin Board.". We assume no liability for errors beyond the price of the ad in the case of material errors.

ORDER FORM

COMPUTERWORLD BULLETIN BOARD

Issue Date: Ads can be accepted up until the Monday preceding the issue desired. Computerworld comes out every Monday.

Classifications: Most ads will be classified according to the brand of equipment that is being bought or sold. These classifications include Burroughs, Data General, Digital/DEC, Hewlett Packard, Honeywell, IBM, NCR, Sperry Univac, Storage, Terminals, Misc. Systems and Miscellaneous.

Copy: Copy sent in via the mail or telecopier (telecopier extensions and 410 and 481) should be clearly typewritten. Ads may be given over the phone to our ad takers. The standard size is 1 column by 1 inch deep. These units may be combined to form larger sized ads. Describe the equipment very briefly, give the price and the name of the person to contact. All ads will be set up using a standard format. No borders or logos are allowed.

Cost: The price for each standard unit is $115.00 (One unit minimum and no fractional units allowed.) There are no agency commissions and no quantity discounts.

Billing: Once you've written your ad, send (or call) it in with your name and address for billing purposes and we'll run it. (If your company has never advertised with us before, we request a check with your order.)

Date(s):_____

Signature:_____

Name:_____

Title:_____

Company:_____

Address:_____

Telephone:_____

Send this form to:
COMPUTERWORLD BULLETIN BOARD
375 Cochituate Road, Box 880,
Framingham, MA 01701

617-879-0700 800-343-6474

BURROUGHS

BUY SELL LEASE
All Systems & Peripherals
AVAILABLE
• B1955 Sys • B1965 Sys
• B80s • B900s
(Configured To Your Specs.)
• Mixed 300 Terminals
• IBM Terminals model 100 & 115
• TOWERs, MT980s, MT990s
• 300 & 307 Style Disk Drives
• Various Tape Sub-systems
• Memory Upgrades
• Printers 600 & 1040 Styles
Guaranteed Burroughs Maint.
Depot Maintenance Available
COMPUTER PROVISIONS
(312) 348-7878
(Member ISDA)

BUY • SELL • LEASE
B1700 • B1800 • B1900
(Custom Config. Install. Avail.)
B80 through B900
Mag Tape Subsystems
TD830 • MT983 • SYF • Datasaver
TU/DC/CP/TT Terminals
Installation & DEPOT MA Available
MP Corp. (312) 870-1100

HONEYWELL

LEVEL 6 & DPS 6 EQUIPMENT
Refurbished Like Printers
PRU6100 300 LPM, 80 Char. ... $4,125.
PRU6104 300 LPM, 64 Char. ... $4,725.
PRU6105 600 LPM, 64 Char. ... $5,625.
More (Server Used) Mini Drives
CDU 9118 10MB
DF & SR CMD ... $1,350 Ea.
Broadview Computer Services Ltd.
(617) 329-4888

HONEYWELL DPS6/80
512K CPU
80 MB Disk (67 + 16)
1-300 LPM Printer
1000 BPI Tape & Controller
2-7501 CRTs
Available April 81/84
Buy Our Equity and
Take Over Last 12 Months
of Fully Operating Lease
(312) 324-0757

HONEYWELL

GREAT DEAL
HONEYWELL LEVEL 62
Leased - Complete System
2 300mb Disks MSU300
2 600mb Disks MSU500
2 600mb Disks MSU501
2 6mb 1600 MTU 0880 & 0881
CPU 6/62 CP03500
Cassette 120 CPS CSP2100
Port Mod 130% CPP2107
600LPM Printer PRU5040
10 Terminals 7760R
Communications
Much More....
Available 4/30/84
On Maintenance with HW
Contact Steve Brownrock
ISDA
P.O. Box 8736
Fort Worth, TX 76110
(817) 535-1000

PRIME

PRIME
LARGE SELECTION
OF USED PRIME
COMPUTER SYSTEMS
...SAVINGS TO 50%
Peripherals also available:
Memories-Disk Drives-Controllers
Modems-Terminals-Printers
1st SOLUTIONS
...Your Ultimate Source
A DATAMATION SERVICES, INC., COMPANY
3001 EAST CAMPBELL AVE.
PHOENIX, ARIZONA 85016
(602) 957-0999
ASK FOR DON OR MATT

SOFTWARE FOR SALE

Transplant with PCR, for a stronger distribution system

If the heart of your distribution system skips a beat now and then, you may need an RMS/38 transplant. RMS/38 for the IBM/38 is a complete distribution operations and planning system that lets you better utilize warehouse inventory, provide current out-of-stock and short information to reps for better customer service, provide demand and shipment information for more efficient purchasing, anticipate credit problems rather than react to them.

RMS/38's nine powerful applications also allow financial management, generation of user reports with its query facility, and a PC link that lets you transfer information to your IBM Personal Computer for interaction with popular micro products. Plus advanced data base architecture which allows direct access to all stored information, making expansion simple and economical.

For a free demonstration or more information, **contact PCR, Professional Computer Resources, 3021 Midwest Road, Oak Brook, IL 60521** (near Chicago). Also in New York, San Francisco, and Los Angeles.

38 Software FROM pcr
ALL THE SOFTWARE YOU'LL EVER NEED
312/932-2200

SOFTWARE CONVERSION SOLUTIONS

Dataware provides the software translation system for your complex conversion problems. Over 15 years of conversion experience has resulted in thousands of satisfied customers, worldwide.

- COBOL to COBOL
- AUTOCODER/SPS to COBOL
- EASYCODER/TRAN to COBOL
- RAL/ALC to COBOL
- DOS/ALC to OS/ALC
- PL/I to COBOL
- RPG/RPG II to COBOL
- RPG/RPG II to PL/I

Dataware offers services & software to meet your needs. For more information, call or write today.

The Conversion Software People
Dataware, inc.
2565 Elmwood Avenue
Buffalo, New York 14217
Phone (716) 875-8722
TELEX: 91519

Specializing in IBM System/38
FRIEDMAN & ASSOCIATES, INC
Totally on-line order entry, complete manufacturing systems, MRP with on-line mrp change
• Fixed price software
• Management consulting
• Net years experience
We make it work!

PlyCOM- services, inc.
P.O. Box 369486
San Antonio, TX 78269
(512) 734-4366

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY
375 Cochituate Road, Box 880, Framingham, MA 01701/(617) 879-0700

SELL YOUR SOFTWARE IN THE CLASSIFIED PAGES OF COMPUTERWORLD

SOFTWARE FOR SALE

SOFTWARE FOR SALE

SOFTWARE FOR SALE

SOFTWARE FOR SALE

More IBM System/38 Users Are Choosing RTC Systems.

For technically superior software in a wide range of Financial, Manufacturing, Distribution and Management Business Systems.

The International Software Developers

RTC Systems, Inc.

45 Plain Street
North Attleboro, MA 02760
(617) 695-2005

Elegant Software

General Accounting	Payroll/Personnel
Financial Reporting	Property & Equipment
Accounts Receivable	Report Writer
Accounts Payable	Off The Shelf
Order Processing	All Applications also
Inventory Management	RPG II/RPG III
Sales Analysis	Data Base
Job Cost	Interactive

J.D. Edwards & Company

4949 South Syracuse Street Suite 8000
Denver, CO 80237
303/ 773 3722

Dallas — 214/ 458 9552
Houston — 713/ 680 8276
Northern California — 415/ 697 7704
Southern California — 714/761 9552

TIME & SERVICES

COMPUTER REPAIRS

DEC-DG-IBM PC
ALL BOARDS
1-2 WEEK TURNAROUND
90 DAY WARRANTY
MEMORIES
POWER SUPPLIES
ANY MANUFACTURER

DATA CENTER SERVICES

TWO 3033 MP

BURNS

TIMESHARING SERVICES

VSE - JCCF - CICS
CMS - MVS/SP - TSO
CICS - IMS - DB/DC

TYMNET NETWORK

XEROX 9700 PRINTING
ON LINE - OFF LINE

STAT:TAB

THE COMPUTER UTILITY COMPANY
Statistical Tabulating Corporation
2 North Riverside Plaza
Chicago, IL 60606
CALL 312-454-0090

UNIX
DEVELOPMENT TIME
Pyramid 90X Computer
$15. Per Hour
Connect Time

Prime Office Space Available
With Computer Access.

Industrial Automation Systems
2875 Broadway
New York, NY 10025
(212) 662-6666

VAX 11-780 TIME

2.5 CENTS PER CPU SECOND
$10.00 PER HOUR CONNECT
TELENET INCLUDED

NO ADDITIONAL CHARGE
FOR SOFTWARE USAGE

EXTENSIVE LIBRARY

COMPUTER TIMESHARING CORP

(619) 226-1334

COMPUTER TIME RENTAL

IBM 4331
DOS/VSE - ICCS
All Shifts Available
3370 Disk, 3420 Tape
Dual/Density
1403-N1,
2540 Reader/Punch
Reasonable Rates
Contact: Al Pavao
Resiematic Data Services
(212) 997-1411

RESULTS

Whether you're buying, selling, swapping, hiring or looking, you get results from Computerworld classifieds.

Maybe that's why Computerworld gets more classified advertising than all the other computer publications put together!

COMMERCIAL DATA PROCESSING

4341-2 370/158-3

OS-DOS-VM/CMS
CICS-ROSCOE
REMOTE JOB ENTRY
CICS DEVELOPMENT
CUSTOMIZED SOFTWARE
XEROX LASER PRINTING

Contact Greg Gerak
(201) 777-3454

15 MINUTES FROM LINCOLN TUNNEL
ONE PARAMUS STREET
WOOD RIDGE, N.J. 07075

VAX/VMS TIMESHARE

5c

52 PER HOUR CONNECT TIME
ONE MB DISK STORAGE INCLUDED
AVAILABLE NATIONWIDE
VIA TELENET
LEASE-A-PORT™ WITH 10 MB DISK
& NO CPU OR CONNECT CHARGES
FOR 6800 PER MONTH

TYMSHARE CORPORATION
(714) 894-8311
(213) 516-6000
(714) 558-6370

ICOTECH
Innovative Computer Techniques

COMPUTER SERVICES
IBM 3081 DEC-10

- Remote Job Entry
- Batch Processing
- Optical Mark Reading
- Online Processing
- Timesharing
- Laser Printing

COMPUTER OUTPUT MICROFILM

- Datagraphix Mini Auto-Comm
- Datagraphix Datamaster
- 4250 DPI Capability
- Free Training

Route 202
Raritan, NJ 08869
201-685-0100
Contact: Joyce Bagwell

*Sperry 1100/60 Center
*Unisys *UNIS
*TIP/CMS /DMS/DPS
Time Sharing
On-Line Manufacturing Systems
On-Line Financial Systems
"Hot Site" Back-Up Service
Flash-Load & Direct Mail Processing
Contact: Mr. Lloyd Brown
(215) 337-4100

STANDARD DATA SERVICES INC.
771 Fifth Avenue
King of Prussia, PA 19406

VAX 11/780 AND PDP-11
DEVELOPMENT TIME
NO KILOCORE TICK CHARGES / NO CPU CHARGES

Omnicomputer

$7/$14
INTER JOBS

PER HOUR
CONNECT TIME

BUDGET BYTES™
212-944-9230

Omnicomputer, Inc.
1430 Broadway, New York, N.Y. 10018

COMPUTER TIME & TIMESHARING

- We are time brokers.
- IBM timesharing our specialty.
- Also RJE & batch time.

Call John Rudder at
Computer Resources, Inc.
(201) 666-5760

CLASSIFIED ADVERTISING ORDER FORM

Computerworld's Classifieds work.

Issue Dates: Ad closing is every Friday, 10 days prior to issue date.

Sections: Please be sure to specify the section you want: Time and Services, Software for Sale, Position Announcements and Buy/Sell/Swap. (Available upon request: Software Wanted, Business Opportunities and Real Estate).

Copy: We'll typeset your ad at no extra charge. Please attach CLEAN typewritten copy. Figure about 25 words to a column inch, not including headlines.

Costs: Our rates are $128.10 per column inch. (A column is 2" wide.) Minimum size is two column inches (2" wide by 2" deep) and costs $256.20 per insertion. Extra space is available in half-inch increments and costs $64.05. Box numbers are $15.60 extra.

Billing: If you're a first-time advertiser, (or if you have not established an account with us,) WE MUST HAVE YOUR PAYMENT IN ADVANCE.

Ad size desired:_____columns wide by_____inches deep.

Issue Date(s):_____

Section:_____

Signature:_____

Name:_____

Company:_____

Title:_____

Address:_____

Telephone:_____

Send this form to:

COMPUTERWORLD

CLASSIFIED ADVERTISING,

375 Cochituate Road, Box 880,
Framingham, MA 01701

Foreign Editorial/ Sales Offices

England: Terry Cartwright, EEC Publications, 198-200 Baile Pond Rd., London N9 4AQ. Phone: 01-350-3525, Telex: (851) 894085 (Computer Management, Computer Business Europe only).
Euan Ross, Bill Dunlop, Stephen Thomas, Beare Hobson Assoc., 345 Goswell Rd., Islington, London EC1V FHN. Phone: 01278 3415/6 (reps for all CWCI publications except Computer Management and Computer Business Europe).

W. Germany: Eckhard Utpadel, CW Publikationens, Friedrichstrasse 31, 8000 Munich 40. Phone: (089) 38172-0. Telex: 5215360.

France: Axel Laloix, Le Monde Informatique, 185 Avenue Charles De Gaulle, 92200 Neuilly Sur Seine, Paris. Phone: 758.14.14. Telex: 613234 F.

Japan: Mr. Shuji Mizuguchi, Computerworld Japan, 7-4 Shintomi 1-Chome, Chuo-ku, Tokyo 104. Phone: (03) 551-3662, Telex: 252-4217 (Computerworld Japan only).
H. Kajiama, Tokyo Representative Group, Yamaguchi Bldg., 2-12-9 Kanda Jimbo-cho, Chiyoda-ku, Tokyo 101, Phone: (03) 230-4117/8, Telex: J26660 (reps for all CWCI publications except Computerworld Japan).

Australia: Alan Power, Computerworld Pty. Ltd., 37-43 Alexander Street, Crows Nest, NSW 2065. Phone: (02) 4395133, Telex: AA74752 COMWOR.

Brazil: Eric Hippeau, Data News, Computerworld do Brazil, Servicos e Publicacoes Ltda., Rua Alcindo Guanabara, 25/10th Floor 20031 Rio de Janeiro, RJ Brazil. Phone: (021) 240-8225. Telex: 2130839(WORD BR).

Mexico: Richard Small, Computerworld de Mexico, Oaxaca 21-2, Colonia Roma, Mexico City 7 D.F. Phone: (905) 514-4218, (905) 514-6309. Telex: 1771300 ACHAME, 1777809 ACHAME.

Spain: Neil Kelley, Computerworld/Espana, Gravina, 13, Madrid 4. Phone: 231-23-85; 231-23-86; 231-23-88. Telex: 47894(CW E).

Denmark: Preben Engell, Computerworld/Denmark, Gammel Strand 50, 1202 Copenhagen K. Phone: 01-1294-11. Telex: 27586 cwden.

Sweden: Bengt Mannfeldt, Nova Media, Nova Media AB, Vartavagen 55, 11536 Stockholm. Phone: 08-234260. Telex: 8105099 NOVACW.

The Netherlands: Johannes A. Wevost, Mgr. Dir., Computerworld Benelux, Van Eeghenstraat 84, 1071 GK Amsterdam. Phone: 020-646426. Telex: (844) 18242.

Italy: Daniele Comboni, Gruppo Editoriale Jackson, s.r.l., Via Rosellini 12, 20124 Milano.

Argentina: Ruben Argento, Gen. Mgr., Computerworld Argentina, Av. Belgrano 406-Piso 9, CP 1092 Buenos Aires. Phone: 34-5583/5584.

Norway: Mr. Per Bereljord, Editor, CW Norge A/S, Hovinveien 43, P.O. Box 2862, Tasyen, Oslo 6. Phone: 2/647725. Telex: (856) 78476

Singapore: Mr. David Naida, General Manager, Asia Computerworld, Pte. Ltd., 11-08/11-10 Goldhill Plaza, Newton Road, Singapore. Phone: 250-444. Telex: (786) RS 37003

Saudi Arabia: Mr. Omar Dunaid, General Manager, Saudi Computerworld, P.O. Box 5455, Jeddah. Phone: 6675916/6650380. Telex: (926) 401205.

ADVERTISERS INDEX

ADT ED/10
ADS 45,47,49
Apple 6
Arrays Products 28
American Telephone & Telegraph 57-60
Applied Software ED/15
Artificial Intelligence 73
A.S.T. Research 112
Assessment Training Systems 86

B I Staple & Associates, Inc. ED/10
Bankers International 88

Cambridge Systems Group 96
Candle Corporation 25
Caliber Software 83
Candeleta 89
Candeleigh ED/6
Computer Corporation of America 35
Control Concepts 12
Covidata 89
Covia 89
CS Computer Systems 111
Cullinet 24
CW Buyer's Guide 107
CW Career ED/13
CW EDP 97
CW Office Automation 106
CW Supplement 115

Data Access 17
Datagraphics ED/3
Dayflo 89
DEC/ups 80-81
Delrina, Inc. 87,116
Digital Controls Corp. ED/4
Dove Datatech ED/12
D.P.C. Corp. 14
Dorian Products ED/10
Dynamic 105
Dysan 84-85

Elcom Corp. 34
EPS, Inc. 95
Epson America ED/14

F & A 98
Fibronics 99
Fusion Products 86

Geac Systems International 108

Hewlett Packard 82-83,84-85

IBM 44
Infodata Systems 7
Informatics ED/12
Information 101
Information Builders 92
Information Science 76-77
Interface Systems ED/12
IMOD 96-97

Keyronix 96

J.W. Lampl, Inc. ED/3
Lawson Associates 93
Local Data 98

Lomas Associates 104
Lotus Development Corp. 94-95

Marathon 113
Mathematica 19
McCormack & Dodge 78
MDS Systems 90-91
Measurex CTD 26
Micro Craft Corp. ED/16
Microdata 30-31
Microlab ED/7
Micro Focus 82
Microsoft 87,88
MSA 27,29
MTI Systems Corp. 11,13,15

Nantech 98
NCR ED/2
NEC 74,75-76
Netec 85
New Generation Software 83
NMTC 14,109
Northern Telecom 39-58,110-111

On-Line Software 91
Oregon Software 89

Package Solutions 114
Panagraphic Systems 98
Phoenix Computer Corporation 93

Quasar 48,100

Raytheon 36-37

SAS Institute ED/8-ED/9
School Library Journal 10
Signal Technology 11,13
Softnet 16,17
Soft/Tech Microsystems 81
Software House 10
Software Results 44
Southern CA Delivery Service 97
Southern Systems 2
Sperry Corp. 28
STSC 115
Syscon 5
Syscorp 44

Tandem Computers 30-31
Technisil 100
Teletype Corp. ED/14,108-109
Term Master 92
Tesdata 82
Time Software ED/4
TSI International 40-41
Tymnet 71,72

Unilogic, Ltd. 32
Unitronix 76

Vein-Tel 103
VM Software 9

Wang Laboratories ED/5

Xidem Business Systems ED/11

Zenith Data Systems 102
Zilog Inc. 68

This index is provided as an additional service. The publisher does not assume any liability for errors or omissions.

Computerworld Sales Offices

Vice-President/Sales/Donald E. Fagan
Director/National Sales/Edward P. Manwell
Manager/Marketing & Sales Operations/Kathy Doyle
COMPUTERWORLD, 375 Cochituate Road, Box 880,
Framingham, MA 01701
(617) 879-0700

BOSTON SALES OFFICE (617) 879-0700
Northern Regional Director/Chris Lee
District Managers/Jim McClure, Ronald Masters,
Joyce Donovan, Michael F. Rotsaker
Sales Assistant/Elise Langley
COMPUTERWORLD, 375 Cochituate Road, Box 880,
Framingham, MA 01701

CHICAGO SALES OFFICE (312) 827-4433
District Managers/Arthur Kossnick, Russ Gaskess
Sales Assistant/Joan F. Broderick
Northern Regional Director/Chris Lee
COMPUTERWORLD, 2600 South River Road, Suite 304,
Des Plaines, IL 60018

NEW YORK SALES OFFICE (201) 967-1390
Eastern Regional Director/Michael J. Masterson
Senior District Manager/Doug Cheney
District Managers/Ray Costin, Joan Daly, Fred La Sapio
Sales Assistant/Gale M. Polsino
COMPUTERWORLD, Potomac Plaza I,
149 Route 17, North, Paramus, NJ 07652

LOS ANGELES SALES OFFICE (714) 261-1230
Senior District Manager/Bob Hubbard
District Manager/Bonnie Hockenweiler

Western Regional Director/William J. Healey
COMPUTERWORLD, 18000 Sky Park Circle, Suite 260,
Irvine, CA 92714

SAN FRANCISCO SALES OFFICE (415) 421-7260
Western Regional Director/William J. Healey
Senior District Manager/Kathy Williams
District Managers/Theodora Parsons, Brenot Chamberlain
Account Manager, Classified/Paula Boatwright
COMPUTERWORLD, 260 Broadway, Suite 20,
San Francisco, CA 94133

ATLANTA SALES OFFICE (404) 394-0799
District Manager/Jeffrey Melnick
Eastern Regional Director/Michael J. Masterson
COMPUTERWORLD, 1827 Pastor Road, Suite D,
Atlanta, GA 30338

CLASSIFIED ADVERTISING (617) 879-0700
Al DeMilo,
COMPUTERWORLD, 375 Cochituate Road, Box 880,
Framingham, MA 01701

CW INTERNATIONAL MARKETING SERVICES
General Manager/Gloria La Murgia -
COMPUTERWORLD, 375 Cochituate Road, Box 880,
Framingham, MA 01701
(617) 879-0700
Manager, West Coast/Peter Cardani
COMPUTERWORLD, 1060 Marsh Rd.,
Menlo Park, CA 94025
(415) 328-8084

CW COMMUNICATIONS/INC.

Board Chairman/Publisher
Patrick J. McGovern
President
W. Walter Boyd
Senior Vice-President
Lee Vollmer

Group VP-Communication Services, Jack Edmonston. Group VP-Circulation, Margaret Phelan.
VP-Marketing, Donald E. Fagan. VP-Finance, William P. Murphy. VP-Editorial, John Wainwright.

Computerworld Headquarters: 375 Cochituate Road, P.O. Box 880, Framingham, MA 01701
Phone: (617) 879-0700, Telex: 95-1153.

SALES: Vice-President, Donald E. Fagan. National Director, Edward P. Manwell. Corporate Advertising Administrator, Frank Collins. Manager/Marketing & Sales Operations, Kathy Doyle.
Display Advertising Supervisor, Anne Hadley.
Display Advertising, Deborah Bryer, Pam Valentinas, Carolyn Medeiros, Cindy Chetsa, Mary Waddick. Classified Operations Manager, Cynthia Delany.

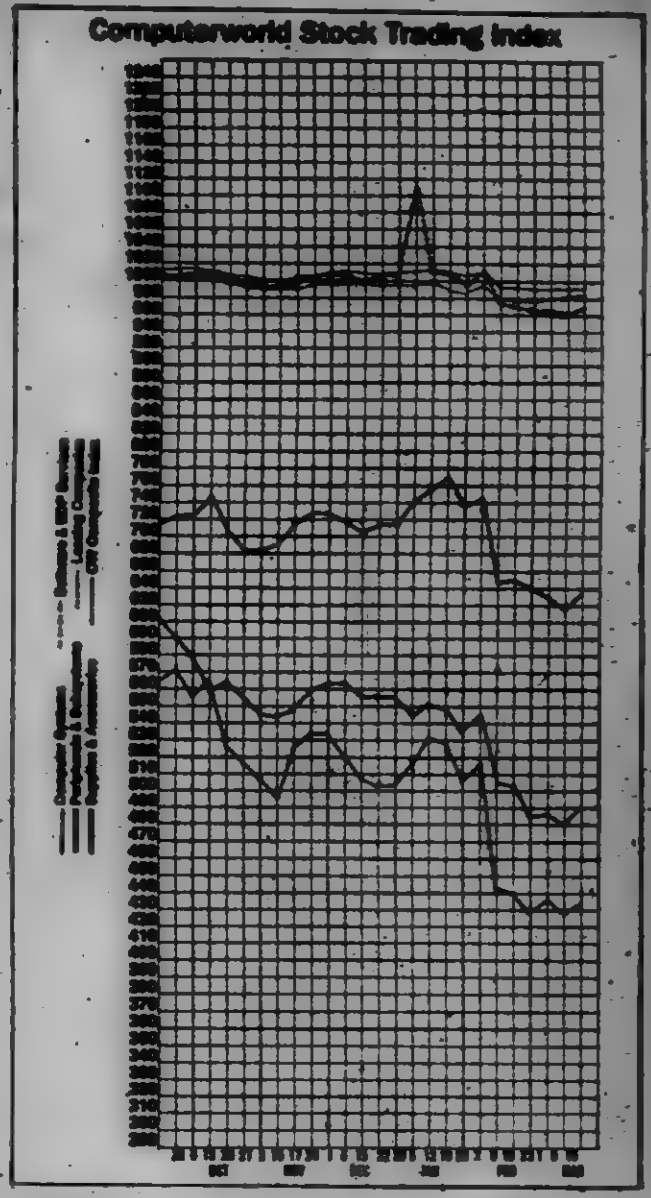
COMMUNICATION SERVICES: Group Vice-President, Jack Edmonston. Director Research, Kathryn Dinneen. Sales Promotion Director, Liz Johnson.

PRODUCTION: Production Director, Peter Hahn. Production Manager, Marlene Sibiel. Paste-Up Manager, Wah Gandette. Systems Manager, Tom Pike. Typesetting Manager, Carol Polack. Art Director, Tom Monahan. Graphic Designer, Hank Fing.

CIRCULATION: Group Vice-President, Margaret Phelan. Circulation Manager, Jane Desborg. Fulfillment Manager, Maureen Burke.

Computerworld can be purchased on 35 mm microfilm through University Microfilms Inc., Periodical Entry Dept., 300 Zeeb Rd., Ann Arbor, Mich. 48106. Phone (313) 761-4700. Computerworld's editorial policy is Circulation Dept. for subscription information.

Computerworld Stock Trading Index



Computerworld Stock Trading Summary

All statistics compiled, computed and formatted by TRADE QUOTES INC Cambridge, Mass 02139

COMPUTER SYSTEMS

	1983-84 RANGE (1)	CLOSE MAR 14 1984	WK CHNGE	WK CHNGE PCT
ALPHA MICROSYSTEMS	11- 24	12 1/8	+1 1/8	+10.6
ALTOS COMPUTER SYST	9- 20	11 1/2	+1 3/8	+13.6
APPLIED DIGITAL	9- 23	10 3/8	+ 3/8	+3.1
APPLE COMPUTER INC	29- 98	83 5/8	+ 3/8	+0.4
AT&T	57- 78	58 7/8	- 1/8	-0.2
BURROUGHS CORP	38- 65	67	+2 7/8	+4.1
COMPUTER AUTOMATION	9- 17	8 4/8	- 1/8	-2.8
COMPUTER CONSOLES	7- 22	10 1/8	+1 1/8	+11.2
CONTROL DATA CORP	21- 42	38	+3 1/2	+7.0
CONVERGENT TECHNOL	10- 24	19 3/4	- 3/8	-2.3
CRAY RESEARCH INC	29- 80	49 7/8	+ 3/8	+0.7
DATA GENERAL CORP	24- 63	48 1/8	+1 7/8	+4.0
DATAPOINT CORP	11- 38	24 1/8	+ 3/8	+1.5
DIGITAL EQUIPMENT	68-132	91	+6 1/2	+10.2
EXCO INC	9- 20	14 3/8	+ 3/8	+2.6
ELECTRONIC ASSOC.	7- 20	9 5/8	0	0.0
FLOATING POINT SYST	9- 20	13 1/8	-1 1/8	-7.9
FONDORO	22- 47	30 1/2	- 1/8	-0.4
GENERAL AUTOMATION	9- 16	10 3/8	-1 1/8	-11.1
GOULD INC	18- 45	30 1/8	- 1/8	-0.4
HARRIS CORP	39- 81	70 3/8	+ 1/8	+0.2
HEWLETT-PACKARD CO	73- 98	97	+2 1/2	+2.6
HONEYWELL INC	56- 98	89 1/8	+3 3/8	+3.9
IBM	77-124	112	+3 3/8	+3.1
IPL SYSTEMS INC	9- 15	14 1/2	- 1/8	-0.8
ITEL CORP	19- 35	34	+1	+3.0
MANNESMANN CORP SYSTS	7- 9	9	0	0.0
MANAGEMENT ASSIST	7- 22	22 1/8	- 1/8	-0.5
MATSUSHITA ELEC(ADR)	47- 68	63	+1	+1.6
MODULAR COMPUTER SYS	5- 13	7 7/8	+ 1/8	+1.6
NANMA DATA SCI	10- 18	16 5/8	+ 1/8	+1.1
MOTOROLA INC	68-118	113 7/8	+6 3/8	+5.9
NAT'L SEMICONDUCTOR	11- 28	14 3/4	+1 1/4	+9.2
NBI INC	21- 91	25 1/2	+ 3/4	+3.0
NCR	39-107	111 3/8	+3 7/8	+3.6
PERKIN-ELMER	19- 37	36	+1 3/4	+5.1
PRIME COMPUTER INC	11- 38	39 7/8	+1 7/8	+4.9
SPERRY CORP	21- 66	41 1/8	+1 7/8	+4.7
TANDEM COMPUTERS INC	14- 68	34 3/8	+2 3/8	+7.3
TANDY CORP	31- 78	32 1/8	+ 7/8	+2.7
TELEVIDEO SYSTEMS	11- 41	11 1/8	+ 1/8	+1.2
TELXON CORP	9- 18	9 1/2	+ 3/4	+8.6
TEXAS INSTRUMENTS	71-170	132 1/4	+2 1/8	+1.6
ULTIMATE CORP	9- 24	20 1/8	+1 1/2	+10.0
VECTOR GRAPHICS INC	3- 14	3 1/4	0	0.0
WANG LABS "B"	19- 62	28 1/8	+1 1/8	+4.1
WANG LABS "C"	19- 62	28	+1 1/8	+4.1
WYMAN CORP	19- 31	30 1/2	+ 3/4	+2.5

LEADING COMPANIES

BEVERLY FINANCIAL CP	11- 42	40 1/2	+1	-2.4
COMMODORE INC	7- 42	19 5/8	+1	+5.4
CONTINENTAL INFO SYS	7- 19	7	+ 1/4	+3.7
DPF INC	2- 15	13 1/8	- 3/8	-2.7
SELECTRON INC	21- 51	33 1/2	- 0	0.0
U.S. LEASING	19- 47	30 3/8	+ 5/8	+2.1

COMPONENTS

ADVANCED MICRO DEV	13- 37	28 1/8	+2 3/4	+10.1
AMI'S SEMICONDUCTOR	11- 38	30	0	0.0
ANALOG DEVICES INC	19- 42	31	- 3/4	-2.3
ANALOGIC CORP	9- 27	17 7/8	- 3/8	-2.1
APPLIED MATERIALS CP	13- 37	18 7/8	+1	+5.6
TEXASTRUMENTS	19- 38	38 1/8	+ 3/4	+2.7

(NASDAQ-NATIONAL OVER-THE-COUNTER) (A-AMERICAN) (N-NEW YORK) (O-OVER-THE-COUNTER)
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. ED LAST BID
(1) TO NEAREST DOLLAR

SOFTWARE & EDP SERVICES

	1983-84 RANGE (1)	CLOSE MAR 14 1984	WK CHNGE	WK CHNGE PCT
ADVANCED COMP TECH	1- 8	1 3/4	- 1/2	-22.2
ADVANCED SYSTEMS INC	7- 22	11	- 3/8	-3.3
ADS COMPUTERS INC	7- 22	21 3/4	-1 3/8	-6.3
ANACOMP SOFTWARE	14- 22	17 1/4	-1 3/4	-11.2
ANACOMP INC	4- 11	7 1/8	- 1/8	-1.7
ANALYSTS INTL CORP	9- 22	7	- 1/8	-2.7
APPLIED DATA RES.	7- 22	20	- 1/2	-2.4
ASK COMPUTER SYSTEMS	1- 21	11	-1	-8.1
ASTRONYME CORP INC	1- 7	1 1/8	- 3/8	-25.0
AUTOMATIC DATA PROC	27- 44	38 3/8	-1 3/8	-3.5
CDA COMPUTER ASSOC	9- 17	16	0	0.0
COMPUTER ASSOC INT'L	9- 20	20 3/4	0	0.0
COMPUTER HORIZONS	7- 20	11	+ 1/8	+1.1
COMPUTER NETWORK	1- 3	1 1/8	- 1/8	-10.0
COMPUTER SCIENCES	11- 23	14	- 1/8	-0.8
COMPUTER TASK GROUP	4- 12	12 7/8	- 1/8	-1.0
COMPUTER VISION	7- 22	8 3/4	- 1/8	-1.4
COMPUTERVISION SYSTEMS	7- 22	8 3/4	- 1/8	-1.4
COMSHARE CORP	7- 20	8 3/4	0	0.0
COMSHARE	7- 20	8 1/8	+ 1/8	+1.5
CULLINET SOFTWARE	11- 35	28 1/2	-1 1/8	-3.8
CYCARE SYSTEMS INC	11- 27	17	- 1/8	-1.4
ELECTRONIC DATA SYST	19- 37	33 7/8	0	0.0
HBOC	19- 37	33 1/8	+ 1/8	+0.3
HBOMAN SYSTEM INC	9- 20	18 1/4	+ 1/2	+2.1
HONEYWELL OLDSTYLE CO	56- 98	89 1/8	+3 3/8	+3.9
ICP CORP	7- 22	22 3/4	+ 1/8	+0.5
INFORMATICS INC	19- 37	19 3/4	+ 3/8	+1.9
INFOTRON SYSTEMS COR	19- 37	28 3/4	0	0.0
KRONOS ASSOCIATES	9- 20	9 3/4	- 1/8	-1.3
LANDICORP	1- 7	7 3/8	-1 1/8	-14.5
MCI COMMUNICATIONS	9- 20	9 1/8	-1 1/8	-11.0
MSAI SCI ANNUM INC	9- 20	9 3/8	- 1/8	-1.3
MATHEMATICAL APP GRP	1- 3	1	0	0.0
MICRO SYSTEMS INC	9- 20	8 1/8	+ 1/8	+1.5
MONOLITH SYSTEMS INC	9- 20	10 1/8	+ 1/8	+1.2
NATIONAL DATA CORP	9- 20	17 1/4	+ 1/2	+2.8
ON-LINE SOFTWARE INT	9- 20	9 1/2	+ 1/8	+1.3
PANSOPHIC SYSTEMS	9- 20	12	0	0.0
PLANNING RESEARCH	9- 20	11 5/8	+ 1/8	+1.0
POLICY MGMT SYSTS CP	17- 38	31 3/4	+1 1/4	+4.1
PROGRAMMING & SYS	1- 3	1	- 1/8	-11.1
REYNOLDS & REYNOLD	17- 28	26 3/4	+1 1/2	+5.9
SEI CORP	21- 28	28	+ 1/4	+0.9
SHARED MEDICAL SYST	19- 38	38 1/8	- 1/2	-1.3
SCIENTIFIC COMPUTERS	1- 3	1 1/8	0	0.0
SOFTWARE AG	1- 3	1 1/2	0	0.0
TYMSHARE INC	7- 22	20 1/4	0	0.0
UMS CORP	7- 20	8 1/8	0	0.0
UNIV CORP	7- 20	8 1/8	0	0.0

PERIPHERALS & SUBSYSTEMS

CPT CORPORATION	7- 7	3 1/2	0	0.0
DATAPOINT CORPORATION	11- 38	24 3/4	- 7/8	-3.4
DATA-TOOL TECHNOLOGY	19- 38	28 7/8	- 3/8	-1.3
EXACTEC INC	1- 3	1 3/4	0	0.0
EXCHIVE INT'L	1- 3	1 1/2	- 1/4	-14.7
GALY.GERHARD & MUS	1- 3	1 3/8	- 1/8	-8.3
GENRAD INC	7- 20	7 1/8	- 1/8	-1.7
GENTRONICS DATA CORP	7- 20	8	- 1/8	-1.5
OPTRIC CORP	1- 3	1 1/8	+ 1/8	+12.5
QUANTRONICS	1- 3	1	+ 1/8	+14.2

COMPUTER DEVICES INC	1- 11	3 3/4	+ 1/8	+3.4
COMPUTER TRANSCEIVER	1- 3	1 1/8	0	0.0
COMPUTERVISION CORP	7- 22	8 1/8	+ 1/8	+1.5
CONRAC CORP	7- 22	8 1/8	+ 1/8	+1.5
DATAPRODUCTS CORP	1- 11	3 1/4	+ 1/8	+3.8
DATARAM CORP	1- 3	1 1/8	- 1/8	-10.0
DATA SWITCH CORP	1- 3	1	0	0.0
DATUM INC	1- 3	1 1/8	- 1/8	-10.0
DECISION DATA COMPUT	1- 3	1	- 1/8	-11.1
OLIVETTI	1- 3	1 1/8	- 1/8	-10.0
ELECTRONIC M & M	1- 3	1	0	0.0
EVANS & SUTHERLAND	1- 3	1 1/8	+ 1/8	+12.5
GANDALF TECHNOLOGIES	1- 3	1 1/8	+ 1/8	+12.5
GEN'L DATA COMM IND	1- 3	1 1/8	0	0.0
GREAT SOUTHWEST IND	1- 3	1 1/8	0	0.0
HAZELTINE CORP	1- 3	1 1/8	+ 1/8	+12.5
ICOT CORP	1- 3	1 1/8	- 1/8	-10.0
INFORMATION INTL INC	1- 3	1 1/8	+ 1/8	+12.5
INFORMATION RESOURCE	1- 3	1	0	0.0
ITEL CORP	19- 35	34	+ 1/8	+0.3
IPL SYSTEMS INC	1- 3	1 1/8	- 1/8	-10.0
LANDY ELECTRONICS	1- 3	1 1/8	- 1/8	-10.0
LORENTH CORP	1- 3	1 1/8	- 1/8	-10.0
MSI DATA CORP	1- 3	1 1/8	- 1/8	-10.0
NANMAN CORP	1- 3	1 1/8	- 1/8	-10.0
NETWORK SYSTEMS CORP	1- 3	1 1/8	- 1/8	-10.0
NO AMERICAN PHILIPS	1- 3	1 1/8	- 1/8	-10.0
NORTHERN TELECOM LTD	1- 3	1 1/8	- 1/8	-10.0
OMRON	1- 3	1 1/8	- 1/8	-10.0
PERIPHERAL CORP	1- 3	1 1/8	+ 1/8	+12.5
PERKIN ELMER	1- 3	1 1/8	- 1/8	-10.0
PHOENIX ENVISION INC	1- 3	1 1/8	- 1/8	-10.0
PLESSEY CO (ADR)	1- 3	1 1/8	- 1/8	-10.0
PRINTRONIX INC	1- 3	1 1/8	- 1/8	-10.0
QUANTEX CORP	1- 3	1 1/8	- 1/8	-10.0
RAYTHEON CO	1- 3	1 1/8	- 1/8	-10.0
RECOGNITION EQUIP	1- 3	1 1/8	- 1/8	-10.0
RELM CORP	1- 3	1 1/8	- 1/8	-10.0
SANDERS ASSOCIATES	19- 38	19 1/4	+	+1.3
SCAN DATA	1- 3	1	0	0.0
SCAN-TECH CORP	1- 3	1 1/8	- 1/8	-10.0
SCIENTIFIC ATLANTA	1- 3	1 1/8	- 1/8	-10.0
STORAGE TECHNOLOGY	11- 38	11 1/2	- 1/8	-1.0
SYKES DATATRONICS	1- 3	1 1/8	- 1/8	-10.0
SYSTEMS & COMP TECH	1- 3	1 1/8	- 1/8	-10.0
T BAR INC	1- 3	1 1/8	- 1/8	-10.0
TAB PRODUCTS CO	9- 20	9	- 1/8	-1.3
TANDON CORP	1- 3	1 1/8	- 1/8	-10.0
TEC INC	1- 3	1 1/8	- 1/8	-10.0
TYCHOMATIC INC	1- 3	1 1/8	- 1/8	-10.0
TELEX	7- 22	8 1/8	+ 1/8	+1.5
TERADATA SYSTEMS CP	1- 3	1 1/8	- 1/8	-10.0
TIMEPLEX INC	1- 3	1 1/8	- 1/8	-10.0
VISUAL TECHNOLOGY	1- 3	1 1/8	- 1/8	-10.0

SUPPLIERS & MANUFACTURERS

ANDERSON BAN FORMS	1- 3	1 1/8	- 1/8	-10.0
DANDY RESIST	1- 3	1 1/8	- 1/8	-10.0
DUPLEX PRODUCTS INC	1- 3	1 1/8	- 1/8	-10.0
DIXIE GRAPHICS	1- 3	1 1/8	- 1/8	-10.0
3M COMPANY	1- 3	1 1/8	- 1/8	-10.0
MOORE CORP LTD	1- 3	1 1/8	- 1/8	-10.0
STANDARD REGISTER	1- 3	1 1/8	- 1/8	-10.0
WALLACE BUS FORMS	1- 3	1 1/8	- 1/8	-10.0

SECURITY

Protect sensitive information with *Ven-Tel's 212 SECURITY PLUS*. Password restrict any terminal to calling only the destinations and applications you authorize. Telephone numbers, passwords, account numbers, and log-in codes are concealed to prevent unauthorized disclosure or use.

Ven-Tel security is not limited to password protection. You are secure in the confidence that your Ven-Tel modem is the most reliable and dependable in the world.

Security is the assurance that Ven-Tel has committed the investment in research, development and production facilities necessary to continued industry leadership and provide off-the-shelf delivery.

Security is knowing that the modem you buy from Ven-Tel is the most modern, technologically advanced product available on the market today. It is knowing that when you need help, a Ven-Tel technical support specialist is as close as a telephone call. It is the confidence that Ven-Tel will be there with service and support for your equipment as long as you own it.

For information call: (800) 538-5121

CUSTOM & OEM CONFIGURATIONS AVAILABLE

Ven-Tel (408) 727-5721

OEM SUPPLIER OF INTEGRAL MODEMS TO FALCO DATA PRODUCTS TERMINALS

VOL 18
ISSUE 13
MR 26 1984

UMI

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

COMPUTERWORLD

$2.00 A COPY; $44/YEAR | MARCH 26, 1984 | VOL. XVIII, NO. 13

Special Report
Manufacturing systems: the next step
Follows In Depth

In Depth
Disaster plan in action **SD/9**

Product Spotlight
Vision recognition systems/**15**

CW 48106UIVYMUIVYM FCWD
UNIVERSITY MICROFILMS
SERIAL PUBLICATIONS
300 N ZEEB RD
ANN ARBOR MI 48106

NEWSPAPER

TOP OF THE NEWS

A system that planners hope will expose the laundering of dirty cash by tracking large cash deposits and international wire transfers is under study — and under attack. Page 2.

■

If you play the stock market, you have two new options. IBM and Merrill Lynch Pierce Fenner & Smith, Inc. announced they will market a microcomputer-based service providing an array of investment data and services; and Fidelity Brokerage Services, Inc., a leading discount broker, today started a service that enables micro users to trade securities. Page 4.

■

A terrorist group claimed responsibility for a blast last week that heavily damaged an office building leased by IBM. Page 4.

■

One in-house data center — to go. Howard Johnson Co. made the move in-house from a time-sharing service in only .15 hours. Pages 6-7.

■

If you have an adversarial relationship with your office automation vendor, you're inhibiting OA innovation and hurting the economy, Wang Laboratories, Inc. President John F. Cunningham told the Federal Office Systems Expo last week. Page 11.

■

A trio of design systems was introduced recently by Gould, Inc. Page 78.

■

Compatibility is not enough. Large companies shopping for microcomputers are showing by their buying habits that they want the IBM logo. Page 88.

■

A harsh assessment of the Amdahl-Fujitsu relationship was delivered by IBM President John F. Akers at a briefing for stock analysts. Page 97.

■

IBM replaces aging 3420 tape drive with subsystem for MVS sites only

By John Gallant
CW Washington Bureau

RYE BROOK, New York — IBM last week announced the long-awaited successor to its 3420 tape drive. The new IBM 3480, which replaces the standard 10.5-in. tape reels with 200M-byte tape cartridges, features a data buffering controller and more than double the read/write speeds of the aging 3420 units.

IBM said the new tape subsystem attaches to the 30 series, and the 4341 and 4381 processors using the MVS/XA and MVS/370 operating systems. A new Data Facility Hierarchical Storage Manager, Version 2, allows data management in the 3480 plus the 3420, IBM disk drives and mass storage devices in those operating systems, the company added.

IBM said the 3480 offers a nominal data transfer rate of 3M bytes/sec, compared to the 1.25M bytes/sec of the 3420 Model 8. The recording medium is an 18-track, 1/2-in. chromium dioxide tape with a 38,000 bytes/in. density housed in a 4- by 5-in. cartridge. The drives use thin-film recording heads and replace the vacuum columns with reel-to-reel servo control technology.

The drive units themselves consume only about half the space of a 3420 and require 60% less power and cooling capacity

See TAPE page 8

IBM unwraps low-end model of top 8100

By Tom Hanchett
CW Staff

RYE BROOK, N.Y. — IBM last week announced the 8150 Model A, an entry-level model of its 8150, the top-of-the-line 8100 distributed processing system. In addition, the company doubled the disk storage capacity on the entire 8100 line by unveiling a double-density version of its 8101 disk drive.

At the same time, IBM announced a board-level device that allows users to attach IBM Personal Computer and Personal Computer XT microcomputers directly to 8100 systems.

The 8150 Model A announced last week will be available in June in 1M-, 2M- and 3M-byte main memory configurations. The larger 8150 Model B, which was announced last October, comes in 2M-, 4M- and 6M-byte configurations.

Aside from offering a smaller main memory, the 8150 Model A processors are virtually identical to the 8150 Model B processors, an IBM spokeswoman said. The A models were announced to offer users of the smaller 8140 processors a more convenient bridge to the 8150 line, she explained.

The 1M-byte 8150 Model A costs $75,000, the 2M-byte version costs $82,500 and the 3M-byte machine is priced at $90,000. Volume discounts ranging from 10% on purchases of five Model A systems to 35% on purchases of 45 or more systems are available.

Besides the 8150 Model A, IBM last week also announced the 8102, a double-density version of the 8101 disk drive. The 8102 is available in two 129M- and 258M-byte capacities; the single-density 8101 of-

See IBM page 4

FYI

He reached out and touched no one

By John Dix
CW Staff

BOSTON — Try as he might, a customer of AT&T Communications recently found that communicating with his long-distance communications company was like trying to reach out and touch someone in a game of blindman's buff.

G. L. Clarke, a lecturer at Boston University's School of Management and facilities director for a local company here, said that when he called his Boston-based account representative to place an order for a 9,600 bit/sec Dataphone Digital Service circuit, he was told that his account had been shifted to New York.

New York representatives told him his account was held in Boston.

Stonewalled, Clarke called directory assistance for help. There was no one home at the number given to him.

He called back directory assistance, which gave him another number. The people at the second number were apparently at the same coffee klatch as the operators at the first location.

A third number called up a modem answer-back tone.

Computerworld gave it a try. The first and second numbers provided by directory assistance were never answered, and the third induced the high-pitched mating call of a lonely modem.

In desperation, Clarke called on a few friends at New England Telephone Co. They gave him a local, unlisted AT&T Communications number that was answered by a man who was able to help him.

The first thing Clarke learned was that to merit a personal AT&T Communications systems consultant in the divested world, you now have to have annual billings of $60,000 or more (making you a major account, as distinguished from a primary account, which spends less than $60,000 per year with AT&T Communications). Clarke maintained that he was never told this and, further, that AT&T has apparently never bothered to figure out who falls into the new category.

The second thing that Clarke learned from his contact was that "stated delivery" for DDS circuits, the time frame in which the company claims it will install a new circuit, is now 48 business working days. Before divestiture, Clarke said, he could count on getting a DDS circuit installed within 22 working days.

And this, apparently, is not a singular case.

James Barr of AT&T Communications

See AT&T page 8

Panel studies plan to track cash transfers

To provide 'dirt' on laundering

By Patricia Keefe
CW Staff

WASHINGTON, D.C. — An automated tracking system may one day provide federal officials with the dirt on illegal money laundering schemes, but at least one federal law enforcement official does not think the system is necessary.

At the suggestion of its chief counsel, James Harmon, the President's Commission on Organized Crime is studying a proposal to establish a computerized system that will track all large cash deposits and international wire transfers involving U.S. banks.

It is hoped that by computerizing "from A to Z" the channels through which these funds travel, more pertinent information will be recovered faster for law enforcement use, according to a spokesman for the commission.

Noting that some banks have looked the other way concerning suspicious transactions, the spokesman said the commission hopes a computerized system will work together with a "volunteer effort on the part of the financial community to report information more quickly than they do [now]."

Refining a system model

The commission is in the process of holding hearings on the concept, as well as meeting with its financial and DP experts to define a system model better. A task force is being formed that will include representatives from the American Banker's Association, he added.

Federal law requires that reports be filed on cash deposits of $10,000 or more in U.S. financial institutions. Reports compiled manually have taken as long as six months to be filed in a manner usable by Treasury Department analysts, confirmed a federal law enforcement official opposed to the plan, who requested anonymity.

The reports must be entered into a Treasury data base before a Treasury analyst can review the material, typically 45 days after the department's initial receipt of the data.

Timeliness not a problem

Although proponents of automating the process estimate that Treasury analysts could receive the reports on the day the transactions occur, the official said timeliness is not a problem.

Analysts provide their results to other Treasury workers who are usually involved in long-term investigations, he said.

Other issues that the commission needs to consider, the official said, include a huge federal manpower shortage, the cost of the system vs. its benefits and the burden, if any, that will be placed upon the banking industry. He also suggested that as a result of a computerized system, the Treasury would be swamped with an increase in financial data, much of it useless for the department's purposes.

Dictaphone sued for $22.5 million

By James Connolly
CW Staff

LOS ANGELES — The partners in a defunct word processing service bureau are seeking $22.5 million in punitive damages in a suit filed here charging Dictaphone Corp. and Pitney Bowes, Inc. with fraud, negligent misrepresentation and operating a corrupt organization.

The federal court suit, now in the pretrial motions stage, charges that Dictaphone, a subsidiary of Pitney Bowes, cheated the Tarzana, Calif.-based Informacon when Informacon ordered a word processing system from Dictaphone in March 1983. Informacon, owned by Charles W. Gunther and Royce S. Fishman, lost more than $100,000 and went out of business because the hardware and software packages that it leased failed to work properly, according to the suit. The suit also alleges that some of the products never even existed.

Dandy Witty, director of public affairs and public relations for Pitney Bowes, commented, "We are defending ourselves vigorously. We don't believe there is any basis for the suit." She noted that the court already has denied Informacon's motions for injunctions against the defendants.

Informacon owners deceived

The suit, in which Gunther's attorney, Richard D. Farkas, filed an amended complaint last month, alleged that Dictaphone representatives and advertisements deceived the Informacon owners into believing that they would receive Dictaphone's Straight Talk software and Omninet networking system. Those products did not exist when Dictaphone stopped producing and selling word processing hardware and software on Oct. 10, according to the complaint.

Witty said Dictaphone continues to service its installed word processing base.

The suit also charged that products Informacon did receive were defective. Those products included the Dictaphone System 6000, with defective features such as pagination, multiple access to a printer and multiple font handling, according to the suit.

"In truth and in fact, the defendants ... never intended to supply word processing equipment with the capabilities as represented or to provide the continuing support as represented. The defendants well knew that they were unable to act as represented or to provide plaintiffs with the equipment as promised," the suit charged.

Other listed defendants, identified as current or former Dictaphone employees, were John Lindroth, Darrell Duran, Michael Pachelli and Emmanuel Westbrook.

NEWS SUMMARY

IBM and Merrill Lynch have joined hands once again, this time forming a venture to market financial data systems and services/4

A leading discount broker introduced a nationwide service enabling investors to trade securities through their own microcomputers/4

It took only 15 hours for Howard Johnson Co. to move its nationwide reservations system from a time-shared service to an in-house data center recently. However, a year of planning preceded the conversion/6

Howard Johnson Co. is moving processing power out to its restaurants and lodges in an effort to move data between corporate headquarters and remote locations/7

SAS User Group International Conference: SAS Institute, Inc. introduced a full screen editing facility for its complete range of products. . .A member of an SAS users group outlined some factors that need to be considered when starting a regional users group/8 and 10

Wang Laboratories, Inc. President John F. Cunningham told the Federal Office Systems Expo that a vendor-user adversary relationship is inhibiting office automation innovation and hurting the economy/11

The NTIA says former Bell operating companies should be allowed to perform end-to-end protocol conversion/12

Obama executives said last week the U.S. government is prepared to retaliate against Japan if that country moves ahead with a controversial new software protection scheme/13

Inadequate backup procedures have left many microcomputer users with disasters waiting to happen, panelists at a round table said last week/14

Middle managers will face an adapt-or-get-out crisis as office automation changes their roles and transfers some of their responsibilities to their underlings, an American Management Associations conference was told/16

With the advent of the presidential elections, the work load is growing for the people at the Federal Election Commission who must keep track of who is collecting and spending campaign funds/17

The Direct Marketing Association fears that the Internal Revenue Service's plan to use computer matching to locate nonfiling tax payers will hurt the association's members/19

A study by Honeywell, Inc. found that office automation use is not widespread, but where it's used and the more it's used, the more satisfaction is expressed/22

A Yale professor's report maintains OA users must face three issues before reaping rewards of OA/23

The effective implementation of advanced office automation systems requires a broadening of skills among MIS managers, according to a number of specialists/25

A scientist who uses supercomputers to build numerical models of the sun helped uncover evidence that led to a significant solar finding/28

A public library in Washington state was swamped with enrollment requests when it began a unique, and free, computer education program/34

A tailored information center package helped Talley Industries, Inc. link its 16 diversified operating companies/36

A manufacturing resource planning system helps an instrument manufacturer schedule, track and control assemblies on the shop floor/40

By purchasing a single decision support system, a conglomerate solved the problem of consolidating data from five subsidiaries/41

A fabric and wall-covering distributor is using an information resource management system to weave its daily corporate business operation/43

Harvey Cragon, senior fellow in computer research at Texas Instruments, Inc., will receive the Emanuel R. Piore Award at the Compcon Fall '84 meeting/45

Conversion to an automated office meant increased productivity and made possible higher quality reports and presentations to clients of SEI Corp.'s Funds Evaluation Division/47

A Montgomery Ward & Co. data center discovered a disk management system eliminated the need to add an additional mass storage system/49

A limited office automation system is helping Washington, D.C., grapple with its criminal statistics/51

International Report/32
Calendar/54

IN DEPTH

Letter to vendors/Follows page 54
Up from disaster/ID/8
Reusable code/ID/17
Practical data sharing/ID/27

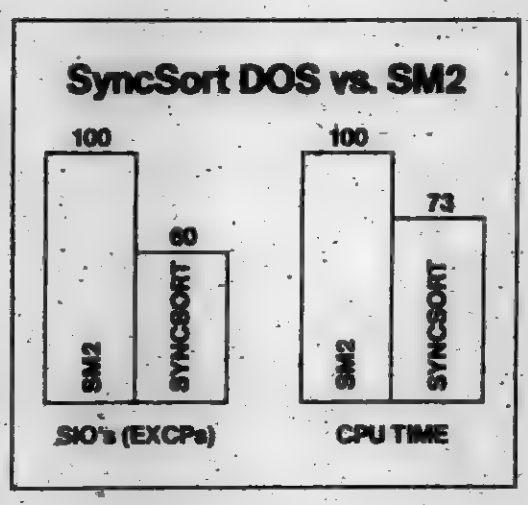
EDITORIAL/56
SOFTWARE & SERVICES/59
COMMUNICATIONS/69
SYSTEMS & PERIPHERALS/75
MICROCOMPUTERS/83
COMPUTER INDUSTRY/97

IN-LAWS

Smile, IBM. New SyncSort DOS is the perfect mate for your 4300 series!

Call (201) 568-9700.

Meet our new DOS/VS(E) release.



High performance computer without high performance sort program like bride without groom—expectation without fulfillment.

—Old Chinese Proverb.

* * * *

You say you just got this brand-new 4300 ? It's got big blue eyes, great price-performance curves and nifty disk drives? Now you're thinking about marrying it to IBM's 5746-SM2 sort program?

Well, don't do it pardner! The groom is definitely too old for the bride. Like IBM's other DOS sorts, SM2 is a hangover from an older generation of sorting technology.

There's only one sort around that's really fit for the hand of a glamorous new 4300 computer. And that's the latest release of SyncSort DOS. It's perfect for DOS/VS(E) and its new Fixed Block Architecture and VSAM type of data. Here's what SyncSort DOS can bring to the marriage:

1. BETTER PERFORMANCE. The first release of SyncSort DOS—back in 1978—incorporated many of the breakthroughs we made in OS sorting. Since then, in numerous releases, we've steadily cut the amount of resources that go into sorting. The new release carries on that old family tradition. Compared to SM2, SyncSort uses up to 50% less CPU Time and up to 70% fewer SIOs.

2. BETTER PROGRAMMER PRODUCTIVITY. SyncSort DOS has a host of features to cut the amount of programming time that goes into applications. You can often reduce the amount of time required for simple reports from five programmer days to one programmer day simply by using these features. They can:

- select relevant records;
- perform summaries on designated numeric fields;
- reformat records on output;
- insert character strings;
- convert numeric data to printable characters (including editing);
- produce reports divided into logical pages with headings, pagination and dating—and much more.

3. BETTER CUSTOMER SERVICE. We have the smartest Tech Service people in the business and the best and fastest service. About 85% of all requests for service are resolved within 24 hours. Try us and find out for yourself.

So if you'd like to match that phenomenal new computer with the perfect mate, give us a call. We'll send over one of our matchmakers to give you a personal demonstration.

Once you've seen SyncSort DOS in action, we don't think it'll be long before you call us with a familiar request: "Play it again, VSAM!"

syncsort INC.

Syncsort Incorporated 560 Sylvan Ave., Englewood Cliffs, N.J. 07632

IBM, Merrill Lynch set financial service

NEW YORK — IBM and Merrill Lynch Pierce Fenner and Smith, Inc. have joined hands once again, this time forming a venture to market financial data systems and services.

Two years in the making, the Financial Services System announced here last week will allow the installed base of IBM's line of Personal Computers to communicate largely via satellite links with Merrill Lynch's host computers to obtain an array of investment data and services. Software for the nationwide system will likely be provided by Monchik-Weber Corp., although this company will not share in the 50-50 partnership of IBM and Merrill Lynch in marketing the system.

The partnership will act as a systems integrator and remarketer, selling software, workstations, branch office and regional processors, real-time market data and related communications network services.

The prototype system, unveiled at Merrill Lynch headquarters, combines market data, information from stock exchanges and news services with advanced office automation and enhanced communications services tailored to meet the needs of Merrill Lynch's individual investors, the companies said. A pilot installation will not be up and running at a Merrill Lynch office until the second quarter of 1985, with a companywide ramp-up by the end of that year, a Merrill Lynch spokesman said.

Integrated systems

The venture's product offering will combine IBM Personal Computer-based workstations and host computers with market data and financial services programs provided by Merrill Lynch. The two companies will market these integrated systems to brokerage firms, commercial banks, money managers and the private clients of these firms.

The system also features use of the IBM 3270 Personal Computer, which will be used by the broker's account executives to track selected securities. Using the 3270-PC's windowing capabilities, Merrill Lynch executives will direct the 3270-PC to place calls automatically to clients interested in any of the 300 stocks the 3270-PC can be programmed to track.

At the same time, the executives will be able to use the workstations to run applications such as financial spreadsheet calculations, access customer files from a host system and update mailing lists, the companies claimed.

The workstations will be connected to a brokerage office's computer to provide market data services as well as a range of office automation capabilities, including word processing and, eventually, electronic mail via regional or host computers, the partnership said.

The joint venture marks the second time the two companies have combined forces in the information processing market. In 1982, Merrill Lynch became a principal provider of working capital for the IBM Credit Corp., IBM's equipment leasing branch.

Fidelity service allows trading via micros

By John Gallant
CW Staff

BOSTON — One of the leading discount brokerage houses last week announced a nationwide service that enables investors to trade securities through their own microcomputers.

Fidelity Brokerage Services, Inc.'s Investor's Express service, which starts operation today, allows customers to enter buy and sell orders on listed and over-the-counter stocks and options using most microcomputers or Ascii-compatible terminals equipped with a modem.

Communicating through GTE Telenet Communications Corp.'s Telenet packet-switched network, customers can access data bases residing on Fidelity's IBM 3083 mainframes at company headquarters here to obtain quotes, update their portfolios and review their tax records. Securities transactions entered by customers are reviewed by Fidelity's representatives and then transmitted to the stock exchanges through the firm's high-speed execution system, according to Fidelity President Robert L. Gould.

Securities trades can be settled automatically through a customer's Fidelity USA account or Fidelity money market fund, Gould said. He added that stock market quotes listed on the system are delayed approximately 20 minutes, but up-to-the-minute quotes can be obtained through an optional feature.

Customers will be able to transfer data for off-line analysis to micro spreadsheet and graphics programs, including Visicorp's Visicalc, Microsoft, Inc.'s Multiplan and Lotus Development Corp.'s Lotus 1-2-3.

Prices for the Investor's Express service include a one-time subscription fee of $195 and time-sharing charges of 40 cent/min during peak hours and 10 cent/min off peak, with a minimum monthly time-sharing charge of $10. Fidelity Brokerage Services is located at 82 Devonshire St., Boston, Mass. 02109.

Bomb blast damages IBM office building

By David Myers
CW New York Bureau

HARRISON, N.Y. — A late-night bomb blast last week heavily damaged an office building here leased by IBM. A terrorist group claimed responsibility for the attack, saying that IBM had been singled out as a target because of its business interests in South Africa.

No one was injured in the blast that occurred at 10:43 p.m. on Monday, March 19 at 3000 Westchester Ave. Damage was confined largely to the exterior of the building.

"There was a lot of broken glass but no structural damage," an IBM spokesman said from company headquarters in nearby Armonk, N.Y. The spokesman could not, however, give an estimate of the dollar amount of damage. He said the building housed "general administrative offices" employing 150 people.

The Harrison Fire Department responded to the blast, which also caused slight damage to an adjoining building owned by the Melville Corp., maker of Thom McAn shoes.

A known terrorist group calling itself the United Freedom Front claimed responsibility for the attack. "A written communique recovered in the parking lot singled out IBM as the target because of its business interests in South Africa," according to FBI spokesman Joseph Valiquette.

Ten bombings

Since first surfacing in December 1982, the United Freedom Front has claimed responsibility for 10 bombings. Valiquette said the group is under investigation by the FBI/New York Police Department Terrorist Task Force, but added that the FBI was "not prepared to say how large a group it is."

The terrorist group has named South Africa as the reason for each attack.

"We do business there," IBM's spokesman said when asked about the computer maker's dealings with South Africa. He said the company employs about 1,800 people, primarily in sales and service but also in a small punch-card printing operation. Revenues from the African nation make up less than 1% of IBM's total gross, he said.

IBM from page 1

fers a storage capacity ranging from 64M to 128M bytes.

By adding the newly announced 8102 drives, users of IBM 8140 and 8150 processors can store up to 1G byte of data.

The maximum amount of disk storage previously available was 512M bytes.

Combination of drives

Users can also mix any combination of 8101 and 8102 drives. Up to two drives can be attached to the 8130 Model A processors, up to three can be attached to the 8130 Model B, and four drives can be attached to the 8140 and 8150 processors, a spokeswoman said.

By using four of the 256M-byte versions of the 8102, users reach the maximum 1G-byte disk capacity, IBM said.

The 128M-byte version of the 8102, which costs $21,000, is field-upgradable to the 256M-byte unit, which is priced at $33,500.

June availability

Both will be available in June, according to the spokeswoman. The older 128M-byte 8101 costs roughly $25,000.

IBM last week also announced the 8100 PC Adapter, a circuit board that can be plugged into the backplane of either an IBM Personal Computer or a Personal Computer XT to allow the micros to run either 8100 applications simultaneously in IBM 3270 emulation mode or Personal Computer applications running under IBM's PC-DOS operating system.

The board also allows the micros to be directly attached to an 8100 system's loop wiring.

Controller not necessary

Previously, a controller was necessary to attach a Personal Computer to the 8100 system, according to IBM.

The device eliminates the need to use special cabling or a stand-alone controller when attaching the microcomputers to an 8100 system, according to IBM.

Scheduled for July availability, the PC Adapter costs $1,275, the spokeswoman said.

More information about the products is available from IBM, which made the announcements through its Information Systems Group, located at 900 King St., Rye Brook, N.Y. 10573.

Second-class postage paid at Framingham, Mass., and additional mailing offices. *Computerworld (ISSN-0010-4841) is published weekly, except: January (5 issues), February (5 issues), March (5 issues), April (7 issues), May (5 issues), June (7 issues), July (5 issues), August (5 issues), September (5 issues), October (7 issues), November (5 issues), December (5 issues) and a single combined issue for the last week in December and the first week in January by CW Communications/ Inc., Box 880, 375 Cochituate Road, Framingham, Mass. 01701.*

Copyright 1984 by CW Communications/Inc. All rights reserved.

Computerworld can be purchased on 35 mm microform through University Microfilm Int. Periodical Entry Dept., 300 Zeeb Rd., Ann Arbor, Mich. 48106. Phone (313) 761-4700. *Computerworld* is indexed: write to Circulation Dept. for subscription information.

PHOTOCOPY RIGHTS: permission to photocopy for internal or personal use or the internal or personal use of specific clients is granted by CW Communications for libraries and other users registered with the Copyright Clearance Center (CCC), provided that the base fee of $3.00 per copy of the article, plus $.50 per page is paid directly to Copyright Clearance Center, 21 Congress Street, Salem, MA 01970.

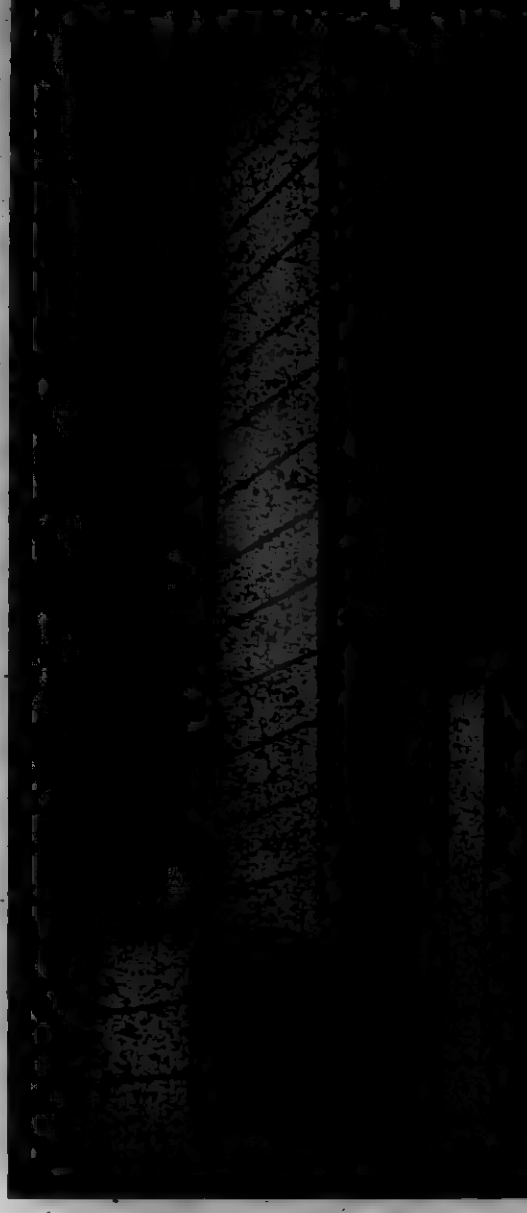
Permission to photocopy does not extend to contributed articles followed by this symbol. ‡

Special requests should be addressed to Nancy M. Shannon, CW Communications/Inc. Box 880, 375 Cochituate Rd., Framingham, MA 01701. ISSN 0010-4841/82 $3.00 + $.50

$2.00 a copy: U.S. — $44 a year; Canada, Central & So. America — $110 a year; Europe — $165 a year; all other countries — $245 a year (airmail service). Four weeks notice is required for change of address. Please allow six weeks for new subscription service to begin.

POSTMASTER: Send Form 3579 (Change of Address) to Computerworld, Circulation Dept., Box 880, 375 Cochituate Road, Framingham, Mass. 01701.

Now Xerox offers the best of both worlds for the price of one.



For the first time ever, you can get the most advanced Xerox manufacturing software, plus an IBM mainframe computer, in one complete, affordable system.

It's a new concept in computing. The Xerox Turnkey Manufacturing System includes everything you need for dependable, comprehensive information management. It's the very first system to bundle an IBM mainframe with efficient, industry-tested manufacturing, financial, and distribution software.

And because it's an off-the-shelf system, it can be acquired and fully installed at a price you never thought possible.

But price isn't the only thing that's remarkable. You get everything you need to run the system. You don't have to buy various components from different vendors and then build interfaces yourself. It's all been done for you. So there's no data processing staff to hire.

The Xerox Computer Services turnkey system has an advanced architecture that completely integrates business applications software, personal computing, information center software, decision support systems, a database manager, and fourth-generation languages. Each with user-friendly screens and "help" functions. Your current personnel can develop their own applications and handle their own information needs without assistance.

That means you get fast, economical installation, plus immediate payback in improved productivity and management control. All with minimum overhead.

And what about support? Xerox technical experts understand the manufacturing business and will help you with your system, from initial site planning to telephone hotline support after you're up and running. Of course, full documentation, training, and software maintenance are part of the package.

Best of all, this may be the last software decision you'll ever have to make. As your business expands and it's time to move to a larger computer, you can run the same software on any IBM mainframe, starting with the smallest 4300 series system up through the powerful 3084 model.

Have the best of both worlds in your world. If you need better control over your operations, but are concerned about finding a system that really fits your requirements and budget, let us tell you about our simple solution...the Xerox Turnkey Manufacturing System. Just fill in the coupon and we'll send you complete information and pricing by return mail. Or call Ron Rich at (213) 306-4000.

XEROX COMPUTER SERVICES CW/03/0084
c/o Ron Rich, 5310 Beethoven Street
Los Angeles, California 90066

Your ad was very timely. We're planning on buying a new system within ☐ 30 days ☐ 90 days ☐ 6 months ☐ 1 year.

☐ Have a sales rep call me immediately.

☐ Send me more detailed information.

Name/Title _____

Company _____

Street _____

City _____ State _____

Zip _____ Phone _____

Xerox® is a trademark of XEROX CORPORATION.
IBM® is a trademark of International Business Machines Corporation.

'HoJo' moves in-house overnight

Converts national reservations system from T/S service

By Paul Gillin
CW Staff

QUINCY, Mass. — It's 9 p.m. on a Friday night. You have 15 hours to switch an entire data center from Orlando, Fla., to a new location in Massachusetts.

If you are successful, the network will go on-line at noon the next day without a hitch.

If you fail, you will have a week to ponder what went wrong before starting the whole process over again.

The scenario sounds somewhat like one of those popular adventure computer games, but the adventure was reality for the Howard Johnson Co. recently. In one hectic evening, the management information systems staff switched the company's nationwide reservation network and processing center from a time-sharing service to a newly created in-house network and DP center here.

CW photos by P. Gillin

Waitress Karen Oster enters orders into Romanco Systems, Inc. RMS 1600 point-of-sale terminal at restaurant in Braintree, Mass.

The move was no small task. Howard Johnson's national reservations network extends to more than 500 member hotels and processes about 200,000 transactions per day. The software for the network was originally developed by National Car Rental System, Inc. and had been running on Martin Marietta Data Systems, Inc.'s remote computing service since 1980.

The decision to go in-house was motivated largely by cost. "Going in-house cut computing costs by about 25%, allows us to add applications and gives us control of our own destiny," explained Thomas Harries, director of data processing operations.

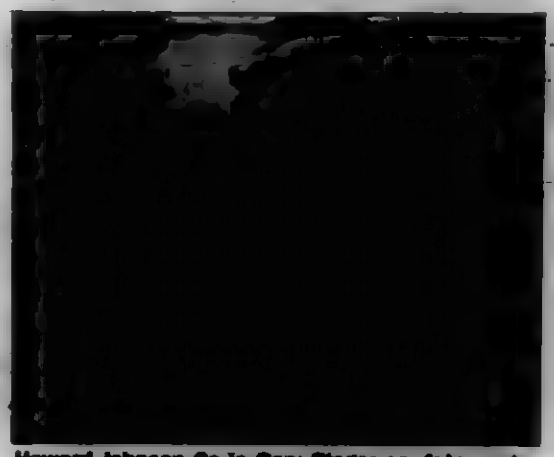
The savings were substantial despite the fact that the project required a major hardware upgrade. While Howard Johnson had been using an IBM 4341 for corporate data processing in its old data center, the new facility would include two IBM 3083s, one taking over the duties of the 4341 and the other handling the added burden of the reservation system. If the reservation system went down, the firm could easily switch over to the corporate 3083 and continue processing until the problem was repaired, Harries said.

The upgrade presented one problem on the corporate data side — all of Howard Johnson's financial software was written for IBM's DOS/VSE operating system, which does not run on the 3083. As a solution, the MIS department last spring installed IBM's VM operating system on top of DOS on the 4341 "just to get systems programmers up on it," according to Gary Singer, director of MIS technical services. The company now runs IBM's VM High-Performance Option on top of DOS on its new 3083 and plans to begin to convert to MVS later this year.

To make the transition as smooth as possible, the six Howard Johnson staff members who coordinated the conversion set up a configuration that Singer said is nearly identical to that at Martin Marietta. In November and December, the department staged two batch run-throughs, and in January it conducted two on-line run-throughs to test the hardware and software.

"If anything, this was planned to death," Harries said.

The tests involved flying copies of Martin Marietta programs and data from Orlando to Quincy, installing them in the Howard Johnson data center, switching communication lines to the member hotels temporarily to talk to the Quincy office and running trial transactions through the system.



Howard Johnson Co.'s Gary Singer on data center conversion: "You just have to plan it to death."

Communications presented another problem. Because Howard Johnson had been relying on Martin Marietta's network to communicate with the local hotels, the company had to install a leased-line network of its own and switch between the two during testing. Installation of the network's eight nodes in Chicago, Los Angeles, St. Louis, New York, Atlanta, Orlando, Washington, D.C., and Oklahoma City was completed in November.

Singer noted that the installation was rushed through to get in under the wire before the AT&T breakup. "If we'd had to do the same thing today, it would probably take twice as long."

On Friday, Feb. 3, at 9 p.m., the nationwide reservation system was shut down. While operations nodes were being switched over to the Howard Johnson communications network and tests were being run, Martin Marietta in Orlando was backing up disk packs for the Howard Johnson network onto 21 magnetic tapes.

The tapes were taken by two Howard Johnson employees to a chartered corporate jet for the flight to Boston. To be safe, other copies of the tapes were flown in early the next morning.

However, there was no need for the backup copies. The magnetic tapes were loaded onto the Howard Johnson disk packs and tested; both network and data center were running by 11:30 Saturday morning.

The key to a flawless conversion is foresight, Singer said. "You just have to plan it to death," he advised, "and don't burn your bridges. We took extensive steps to make it possible to continue processing if anything went wrong."

More than a conversion: New data center, upgrades, too

QUINCY, Mass. — The task of moving an entire national reservation network from a time-sharing service to an in-house DP center can present plenty of headaches, as the management information systems department at Howard Johnson Co. discovered here recently.

Not only did the department make the conversion, it also moved to a new data center and upgraded its hardware from an IBM 4341 to twin IBM 3083 mainframes, all in a matter of days.

At the same time, the switch gave the MIS department a chance to install some of the latest data center equipment, including a Halon fire extinguisher, power conditioners, air conditioning, two fully redundant water coolers as well as more working space.

However, the logistical details can be killers, said Thomas Harries, director of data processing operations.

"The biggest concern in moving was the fear of forgetting something," he recalled. "There's always that concern of whether we covered all the bases."

Some of the smaller items to consider included back generation of tapes, configuring communications gear to emulate that of the time-sharing service, wiring the building to plan for future growth, making printers compatible with the new hardware, planning the placement of cutouts in the raised floor and terminating the equipment in the right place.

One problem arose after the data center location had already been set near the top floor of the new office building.

"It was originally targeted to be under a restaurant until we realized the possibility of water damage," said Gary Singer, director of MIS technical services. "We moved it two floors down."

BUILDING A COMPUTER CENTER?

If you're planning a new expanded or remodeled DP facility, you need Datasphere's help.

Since 1968 Datasphere's unique combination of products and services has saved dollars, frustration and time for large and small firms around the world.

From turnkey—design/build computer rooms to the smallest support equipment, we'll do all or part—on schedule, within budget! Datasphere is unique—we're engineers, contractors and suppliers specializing in computer facilities.

Supplying a full line of support equipment, including:

- *Uninterruptible Power Systems*
- *Computer Power Centers*
- *Computer Fire Protection Systems*
- *Computer Type Air Conditioning*
- *Gas Turbines/Diesel Generators*
- *Operation Command Centers*
- *Elevated Flooring*
- *Frequency Converters*
- *Line Filters*
- *Security Systems*
- *Systems Monitors*
- *Voltage Regulators*

CALL DATASPHERE NOW!

800-223-0575

IN NEW JERSEY CALL: 201-272-1910

Write for additional information

datasphere, Inc. 49 Meeker Avenue, Cranford, N.J. 07016

NEWS

POS system prepares data to go for HoJo

By John Gallant
CW Staff

QUINCY, Mass. — As part of the reorganization of its information resources, Howard Johnson Co. is moving processing power out to its restaurants and motor lodges to facilitate the transfer of data between remote locations and the corporate data center here.

By month's end, 35 of Howard Johnson's nearly 1,300 restaurants and lodges will be equipped with a versatile point-of-sale (POS) system that enables managers at both levels to share payroll and financial information. Currently, data transfer between remote sites and the IBM 3083 mainframes is handled through dial-up telephone access, although future plans call for the uploading and downloading of data through Howard Johnson's leased-line reservation network.

The installation of the POS system is an integral part of Howard Johnson's recent moves to revamp its image and to refocus its data processing operations. This effort has also involved bringing DP functions in-house and relocating the data center to corporate headquarters here (see story on Page 6).

"Our thrust is to support this company during our period of change," said Eugene L. Daniels, vice-president of management information systems. "We aim to provide some type of processing system — whether it be a point-of-sale system or a microcomputer — for each of our properties."

As existing Howard Johnson and Ground Round restaurants are refurbished, the company is installing Remanco Systems, Inc. RMS 1600 POS equipment at a cost of approximately $30,000 per site.

Installation of the Remanco equipment is taking place at a rate of three sites per month and has been underway since July 1982. While no decision has yet been made on how many sites will be equipped with the POS processors, said Thomas J. Harries, director of data processing operations, the company is currently focusing on its more profitable restaurants and lodges.

The 16-bit microprocessor-based system functions in a dual role at the Howard Johnson sites. Waiters and waitresses enter orders from input stations on the restaurant floor, while 40-character printers print the orders for bar and kitchen workers and produce an itemized bill for the customer. The "back-office" portion of the system, which includes a CRT and an 80-character printer, automates a variety of management functions, including inventory control and personnel management.

The Remanco system is also equipped with a Cobol compiler that enables Howard Johnson's programming staff to develop application programs for the system. It has already helped programmers develop a payroll reporting program and a spreadsheet-like sales and cash report similar to manual forms already in use. Managers in restaurants without the POS equipment must complete and mail those forms to corporate headquarters each week for clerks to input to the mainframe.

At those locations equipped with the Remanco system, the payroll and financial information is input to what Harries described as "blank electronic forms" downloaded each week from the data center. The completed reports are then transmitted back to corporate headquarters via a modem, avoiding mailing delays and saving keypunch costs.

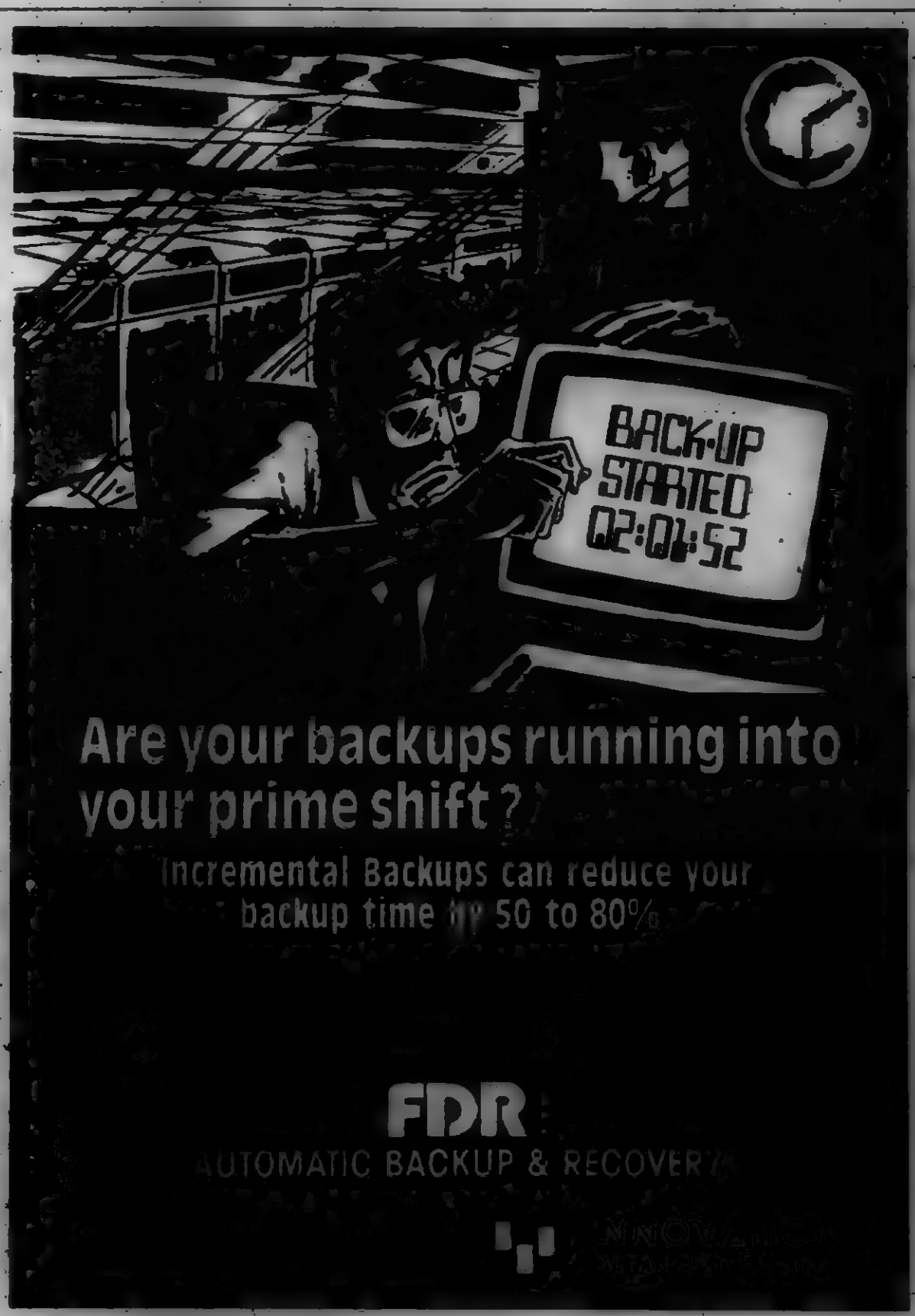
"We handle nearly 30,000 paychecks each week. With a two-day mailing window at each end, that leaves us with just three days to process all that data," Harries observed. "In addition, the Postal Service is threatening to stop mail movement on weekends. That would leave us only one day, and that's physically impossible. This system allows us to collect that data at the end of each week automatically without delay."

Howard Johnson plans to develop additional applications for the Remanco system, including programs that will utilize valuable marketing information assessed automatically in day-to-day operations. Harries said 12 restaurants equipped with the POS processors have been selected to perform nationwide market research, including menu planning and item movement studies.

Harries also noted that Howard Johnson's MIS staff is studying modifications to the company's leased-line reservation network that will accommodate data transfer to and from the systems during off-peak periods.

CW photo by R. Miller

Order, inventory and employee data from the Ground Round restaurant is stored in a Remanco Systems, Inc. micro and uploaded weekly to the corporate mainframes.



NEWS

SAS Institute releases full screen editing facility

CW AT SUGI '84

HOLLYWOOD BEACH, Fla. — At its international users group meeting here last week, SAS Institute, Inc. introduced a full screen editing facility for its full range of products. The SAS Display Manager allows the user to interact with programming statements, logs and procedure outputs without leaving SAS, a spokesman said.

The tool splits the screen into two parts, with the top half displaying the SAS log and the bottom half showing the program entry and edit area.

SAS statements can be typed into the program screen, reviewed and edited without affecting the log, the spokesman said. The program lines are not entered until the job is submitted, at which point the result is displayed in the log.

Statements, errors displayed

The log displays statements submitted to SAS from the program screen, together with notes or error messages. A scrolling facility is provided.

When the program statements submitted contain a procedure step that produces printed output, the Display Manager displays the output one page at a time.

After the last page is displayed, reviewing can be continued in page or line mode or the user can return to the program/log screen.

In addition, the user can copy external data sets, edit files and submit them to run without leaving SAS, the spokesman noted. A save command enables all program lines to be copied into an external file and then recopied into the user's file.

Special function keys

Programmed function keys are employed for special functions, which may vary depending on whether the program/log screen or output screen is employed. Editing keys are used for standard editing functions and may be used both to edit program statements in the program screen or to enter commands on the command lines of the log screen or output screen.

The Display Manager has already been shipped to current users of SAS products on Digital Equipment Corp. processors. It will be made available as an enhancement to IBM mainframe users later this year, the spokesman said.

The option will be bundled into the next maintenance release of SAS, the company said. More information is available from SAS through Box 8000, Cary, N.C. 27511.

TAPE from page 1

than the older model. Maintenance requirements have also been cut, according to IBM, which said the new units need only weekly cleaning.

Announcement rumored

Commenting on last Thursday's announcement of the new drive, which had been rumored as imminent for more than three years, Jack Hart, director of professional services at International Data Corp., a Framingham, Mass. research and consulting firm, said the new products mean IBM has "really gone back into the tape drive business."

After several years of losing ground to Storage Technology Corp. in this line of business, Hart said that IBM has finally admitted to itself that "high-speed sequential processing with removable storage medium is still an important factor in many large DP shops, and it's not going to go away."

He noted the new drives, despite their improved speed and data buffer, use data cartridges that hold 200M bytes, only a slight improvement over the older 165M-byte reels. Users will still need at least six storage cartridges to dump one 3380 spindle.

But, he added, the advances in space, power, cooling and maintenance requirements will be very attractive to users.

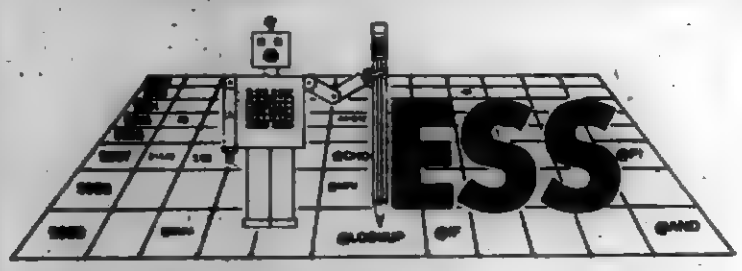
Also, he said, the error rate of the new unit is "phenomenal." IBM said the 3480 units will experience less than one permanent error for every trillion characters read.

Pricing structure

The company said the 3480 will be available in the first quarter of 1985. The 3480 Model B22 tape unit, containing two drives, is priced at $43,120. The A22 controller costs $65,430. IBM said a typical 3480 subsystem, consisting of one controller and eight drives, is priced at $237,910. The tape cartridges cost approximately $14 each in quantities of 10,000.

Volume purchase discounts start at 4% for 10 units, according to the company. It also said IBM Credit Corp. term lease rates start at $817/mo for the tape drive unit and $1,240 for the controller. The minimum maintenance charge is $225/mo for the drive and $360 for the controller. Monthly rental charges are $2,380 for the drive and $3,690 for the control unit.

The company added that the 3420 models 4, 6 and 8 will continue to be sold. More information on the 3480 is available from the IBM National Accounts Division, 1133 Westchester Ave., White Plains, N.Y. 10604 or the IBM National Marketing Division, P.O. Box 2150, Atlanta, Ga. 30055.



Electronic Spread Sheet for VM/CMS & MVS/TSO
- Not Just Another CALC -

Powerful - Spreadsheet size is limited only by available virtual storage. ESS easily handles spreadsheets with thousands of rows and/or columns.

Proven - Already in use at over 100 installations.

Compatible - ESS accepts the same commands as VisiCorp's VisiCalc® program for microcomputers. A person familiar with VisiCalc® can be using ESS productively in minutes. In addition, ESS can load and save files in VisiCalc® format.

High Performance - Assembler language code and sophisticated storage management techniques give you fast response, even with very large spreadsheets.

Easy to Install - Just load the ESS program. No additional program products or languages are required.

Cost Effective - ESS gives all your users access to personal computing capabilities for just $220 per month. Compare that to the cost of buying hundreds of microcomputers.

Questions? - For more information about ESS, or to arrange a 30-day free trial, call or write TRAX.

TRAX

TRAX Softworks, Inc.
16501 National Blvd., Suite 205
Los Angeles, CA 90064
(213) 475-8729

AT&T from page 1

admitted in a session at the recent Interface '84 conference that the company is "having trouble getting [DDS and private-line] orders completed." Barr said that AT&T has assigned a full-time line vice-president to resolve this conflict and has written him a blank check.

The problem, it seems, is that today at least three companies are involved in the installation of a DDS circuit. An order is placed and processed by AT&T Communications, which provides the long-distance portion of the service.

The local circuit is installed and maintained by the local telephone company, which also provides a fancy jack called a Customer Service Unit. And the Digital Service Unit (DSU), an interface device, can be procured from a number of companies, including nonregulated AT&T Information Systems, Inc.

If you can find all the necessary pieces, you then have to orchestrate the installation. This is no mean feat, Clarke said, considering that AT&T Information Systems will not even take an order for a DSU (which may take 50 to 60 days to receive), let alone install one, until the DDS line has been run out to the customer's premises.

In related experiences, Clarke said he has been quoted waiting periods of four to six months for 56K bit/sec DDS links, and in January he tried to order a 1.54M bit/sec T1 circuit from AT&T. "After the AT&T person stopped giggling, he told me that they couldn't deliver a T1 prior to the third quarter of 1984."

Clarke classifies himself as a small to intermediate-size user and wonders if his experiences are typical of the class of service other users his size are experiencing.

CORRECTIONS

In "Despite late entry into 3380 market, Amdahl competitive" [CW, March 12], Bob Williams, Storage Technology Corp.'s (STC) division vice-president for I/O products, was quoted as saying that STC has installed about 100 IBM 3380-compatible disk drives.

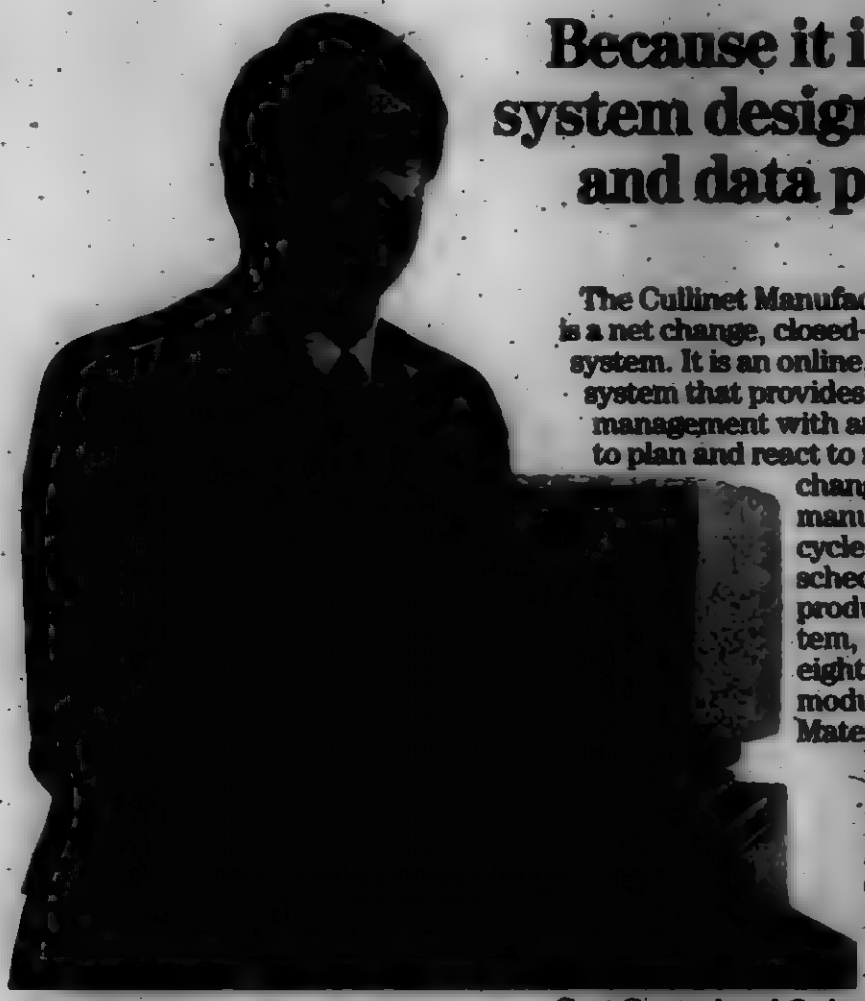
While the firm admits it has 3380-look-alike drives installed in about 100 sites, a spokesman said most sites typically have more than one drive; therefore, it has several hundred 3380-type units installed. The spokesman did not, however, state exactly how many.

A photograph in the Jan. 23 Systems and Peripherals section was incorrectly labeled as the Unidot Systems, Inc. Cerebra system. The depicted product was the Unitronix Corp. System 4000.

An announcement in the Jan. 23 Microcomputers section, "Winchester Systems, Inc., Datasafe-8; MDS-256," incorrectly identified the MDS-800 microprocessor development system as a product of Mohawk Data Sciences Corp. The microprocessor is an Intel Corp. product.

"The Cullinet Manufacturing System is a major advance in application software technology."

—Fred Buckley*



Because it is the first manufacturing system designed for both manufacturing and data processing professionals.

The Cullinet Manufacturing System is a net change, closed-loop MRP II system. It is an online, interactive system that provides manufacturing management with an effective way to plan and react to real world changes in the manufacturing cycle, from master schedule to finished product. The system, which includes eight functional modules: Bill of Materials, Material Requirements Planning, Inventory, Shop Floor Control, Master Production Scheduling, Purchasing, Cost Control and Order Entry, provides a new level of control that can dramatically increase productivity.

This level of control is made possible through the Cullinet Manufacturing System's unique horizontal and vertical integration with Cullinet's Database Software.

Horizontal integration means that all manufacturing data is controlled and accessed directly from Cullinet's IDMS/R database management system. For example, when you issue material from inventory, the system automatically updates inventory balances, allocates the quantities to Shop Floor Control and converts the units to dollars for Cost Control. Additionally General Ledger Accounts are updated because the Cullinet Manufacturing System is completely integrated with Cullinet's Financial System.

Vertical integration means that the manufacturing system is designed and developed using IDMS/R and ADS/OnLine, Cullinet's fourth generation programming productivity tool. This unique architecture provides data processing with the means to tailor and modify the system. Since you don't want to change your business to match the features of a software package, Cullinet provides the tools to tailor the manufacturing system to meet your company's requirements.

The combination of horizontal and vertical integration means, for the first time, a manufacturing system is available that meets the requirements of both data processing and manufacturing management.

Attend a productive seminar explaining this integrated manufacturing system. To participate in one of the 700 Cullinet seminars scheduled internationally, send in the coupon or call 1-800-225-9930. In MA, 617-329-7700.

**Fred Buckley is Cullinet's Manager of Manufacturing Applications Software Development. His efforts have been crucial in achieving the integration that makes Cullinet's manufacturing system unique. Fred joined Cullinet in 1977. Fred holds a degree in Computer Science from Thames Valley State and is a member of the American Production and Inventory Control Society.*

I'd like to attend your seminar on _____ Date

In _____ City

Name/Title _____

Name/Title _____

Company/Department _____

Address _____

City _____

State _____ Zip _____

Phone ( ) _____

Mail to: Cullinet Software, Inc., 400 Blue Hill Drive, Westwood, MA 02090-2198.
Attn: Corporate Meetings
Cullinet Software products are designed to run on IBM 360/370, 30XX, or 43XX or plug-compatible computers.

CW 3/26

Manufacturing Seminars cities and dates

City & State	Date	City & State	Date
Baltimore, MD	June 5	Milwaukee, WI	June 27
Boston, MA	May 22	Minneapolis, MN	March 26
Calgary, AB	May 23	Minneapolis, MN	June 21
Charlotte, NC	May 10	Morristown, NJ	May 8
Chicago, IL	May 3	New York, NY	May 15
Cincinnati, OH	May 14	New York/Rye, NY	June 12
Cleveland, OH	May 24	Oakland, CA	June 26
Columbus, OH	May 2	Omaha, NE	June 19
Dallas, TX	May 15	Orlando, FL	May 24
Denver, CO	June 13	Pittsburgh, PA	May 16
Des Moines, IA	May 16	Regina, SK	June 13
Detroit, MI	May 22	Rochester, NY	May 28
Fairfield, NJ	June 7	Rochester, NY	June 21
Grand Rapids, MI	April 10	St. Louis, MO	June 19
Grand Rapids, MI	June 7	San Francisco, CA	May 24
Harrisburg, PA	May 8	San Jose, CA	May 15
Hartford, CT	May 9	Seattle, WA	June 12
Houston, TX	May 10	Tampa, FL	June 6
Indianapolis, IN	May 8	Toronto, ON	May 17
Kansas City, MO	June 26	Toronto, ON	June 21
Los Angeles, CA	May 1	Valley Forge, PA	May 17
Miami, FL	May 17	Washington, DC	May 9
Milwaukee, WI	May 1	Washington, DC	June 26

Manufacturing: Cullinet

© 1984 Cullinet Software, Inc., 400 Blue Hill Drive, Westwood, MA 02090-2198.

User tells what it takes to start area users group

CW AT SUGI '84

By Paul Gillin
CW Staff

HOLLYWOOD BEACH, Fla. — Some people are leaders and some people are followers, but when it comes to starting a users group, it's probably up to you to take the lead.

Speaking at the SAS Institute, Inc. Users Group International (Sugi '84) conference here last week, a member of an SAS users group in Hartford, Conn., outlined some of the factors that need to be considered in starting a regional users group.

Jim C. Knoop of Aetna Life and Casualty Co. in Hartford said creating a users group requires a substantial investment of time and some careful planning. The three most critical actions to initiate up front include assessing the feasibility of a regional users group, contacting potential members and preparing for the first meeting.

In assessing feasibility, Knoop said, it is first important to confirm that no duplication of effort is involved. Contact the vendor company directly to find out if any users groups are in the area or are already in the planning phase, he suggested.

It is also important to determine that there are enough users in the area to make a group feasible, he added.

If the opportunity is there, you must decide whether you have the time and resources to commit to the start-up effort, he noted. "There's a tendency to just wait for something like this to happen," he said. "Just face the fact that you have to start the group."

CW photo by P. Gillin

Knoop

The basic resources you need are time, a commitment both from management and yourself, a fixed mailing address and telephone number and resources to handle the postage costs, he said. The best method is to talk to your direct manager to get approval for the formation effort. Trying to obtain commitment at the corporate level can quickly kill the idea.

Start by sending a notice to vendor publications informing them of the effort. Include a list of the specific topics you would like the group to cover. Also contact the vendor for a list of local installations. "Many companies have users in a variety of departments who don't even know about each other," he said.

You will probably have to provide your own facilities for the first meeting, Knoop said. The best time for a meeting is generally in the mid-afternoon in the middle of the week. Announcements mailed to local users should inform them of the time and date, directions, parking instructions, agenda and response information. Provide space for potential members to list the products they use, their interests and proficiency and their expectations of what functions a users group should embody, Knoop suggested. "The importance of this is that you don't get bogged down in a lot of housekeeping at the first meeting, and you have a chance to focus on the topics people want to cover."

Don't set your sights too high at the first meeting either, Knoop advised. "When push comes to shove, the only thing you really have to do is schedule the next meeting," he noted. "Try to define the next presentations, select topics and speakers." To keep participation active, try to schedule another company's site for the second session.

Be prepared to give the first presentation yourself, but make an effort at the first meeting to assign the second presentation to someone else within the group. The key is to provide direction and leadership, but also to stress the participation of other members in group activities, he said.

Over the first few meetings, ground rules should be laid down for frequency, length of meetings and time, he said. Decide whether the structure is going to be formal or casual. And determine whether your group should be oriented toward a broad range of products or toward specific topics.

Leadership should be ad hoc, with volunteers taking on as much of the leadership role as possible and rotating assignments between them.

Try to mix future sessions between panel discussions, seminars and traditional lecture formats to keep members interested. And don't forget the importance of social events, he said. "One of the biggest responses in the Hartford area was toward meeting other people," he said. "Try to mix things up. It sounds childish, but try to get people to sit next to [people they don't know] at meetings."

Expenses can be handled through corporate contributions in kind, "pay-as-you-go" meetings or even revenue-generating measures such as seminars for other users. You should also look into the possibility of pursuing joint ventures with other area users groups, he said.

The Conquest of Out of Space
VSAM-TUNE
Takes Up Space Mining
Files Its Claim in Disk Wasteland

VSAM-TUNE discovers space where no more is supposed to be. Here and there. Among randomly accessed files excessively fragmented in the sophisticated but much maligned VSAM Concept.

MANAGING SPACE RECOVERY- Macro 4's name for mining waste disk space successfully—is highly productive. RECOVERING up to 60% in individual clusters, 30% across the system.

OTHER RECOVERIES. I/O activity now minimized on VSAM files for gain in job throughput. Increased VSAM file buffering for optimized available storage. Improved processing throughput. System generates six intelligible, flexible Cluster Reports. And continuous file performance monitoring—actual and projected. And much more.

VSAM-TUNE Puts the User in Control of the System

No Obligation VSAM-TUNE Evaluation

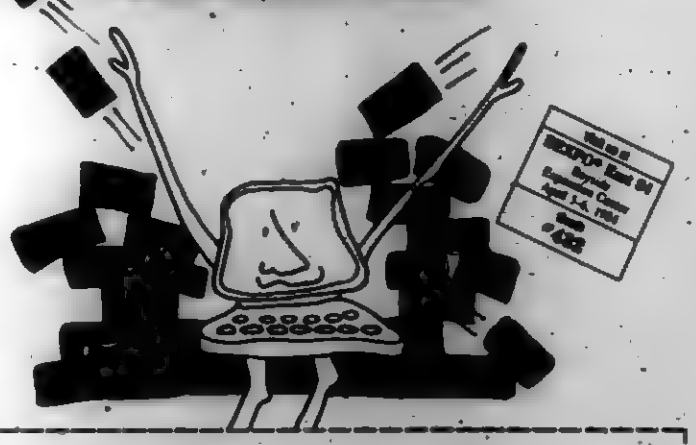
You, too, can Conquer Out of Space in your VSAM System with VSAM-TUNE. For a no obligation evaluation, call 800-223-0414. Or clip your business card to a copy of this ad and send it to:

macro 4 inc.
Systems Software
Millbrook Plaza, Mt. Freedom, NJ 07970

MACRO 4—SPECIALISTS IN IBM SOFTWARE SINCE 1968

Other Products: SYSTEM ACCOUNTING • TUBES • LOGOUT/MULTILOG • BOOST • DUMPMASTER/DUMPMASTER ON-LINE • CICSPRINT • CICS AIDS

BREAKTHROUGH IN
VAX/VMS* SESSION/IMAGE
ACCOUNTING



Only EZTRACK™ allows examination and tracking of VMS session/image resource data by user, time interval, terminal port and other key fields. EZTRACK offers:

- General query and interactive capabilities
- Flexible report writer and graphics
- Full screen forms reporting

Name _____
Title _____
Company _____
Address _____
City _____ State _____ Zip _____
Phone ( ) _____

SEND COUPON NOW FOR COMPLETE DETAILS!

STI Signal Technology, Inc.
5951 Encina Road, Goleta, CA 93117 (805) 683-3771 Outside California call toll-free (800) 235-0787
TWX 910-334-5471

*VAX/VMS is a trademark of Digital Equipment Corporation

Wang chief decries adversarial vendor-user relations

By John Riesbeck
CW Washington Bureau

WASHINGTON, D.C. — Wang Laboratories, Inc. President John F. Cunningham told an office automation conference here last week that an adversary relationship between vendors and users of office systems is inhibiting technological innovation and worker productivity.

Delivering the keynote address at the annual Federal Office Systems Expo (Fose '84) here last Tuesday, Cunningham said a trend toward cooperation among vendors in support of systems standards and compatibility is fueling "the move from a vendor-driven market to one where users really influence the vendor's products and services."

Focusing on a theme that mirrors Wang's technological and business strategies, Cunningham said the key to innovation in office systems is compatibility. "Serving the end user means compatibility, because [that] will mean survival and growth."

According to the Wang executive, "user-driven trends" show that "major opportunities will go to those vendors who support the levels of compatibility and standards required by large organizations. We have a long way to go before compatibility becomes more than the lowest common denominator of vendor features ... but we have made progress."

Pointing to accelerated acquisitions and mergers, joint ventures to develop and market new products and "the move to agree on de facto standards," Cunningham said vendors realize that if they want to sell to more than just niche markets, closer relationships between firms "will be necessary in order to compete in a new and huge marketplace." As to the products themselves, Cunningham commented that "R&D departments everywhere are humming.

"The whole objective of specialized communications and truly integrated office systems," he said, "is to make good finally on the claim that the system must support the individual user the way the user wants to be supported — at the desktop level."

This "vision of the office," he continued, "has a lot in common with a larger cultural trend toward more local autonomy — not at the cost of weakened central authority, but with the help of better centralized standards." Toward that goal, "we have to break all traces of a vendor-user adversary relationship if we're going to regain our leadership as a nation in the worldwide economy."

Former SDC consultant pleads guilty in Mass. contract case

By Patricia Keefe
CW Staff

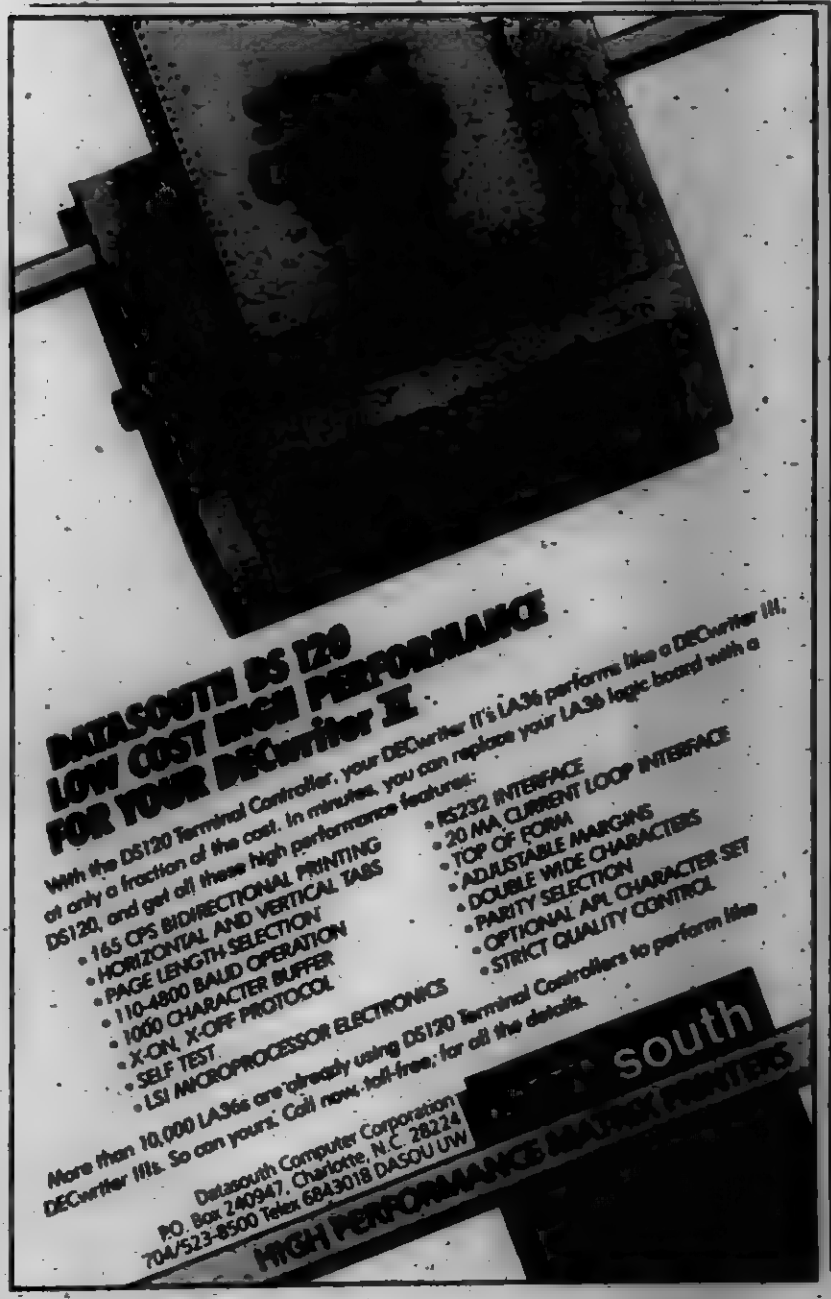
ALEXANDRIA, Va. — A former marketing director and consultant for System Development Corp. (SDC) last week pleaded guilty to charges of wire fraud, bribery and income tax evasion stemming from three separate incidents. As a result, M. James Errico faces up to 21 years in prison and fines of up to $31,000.

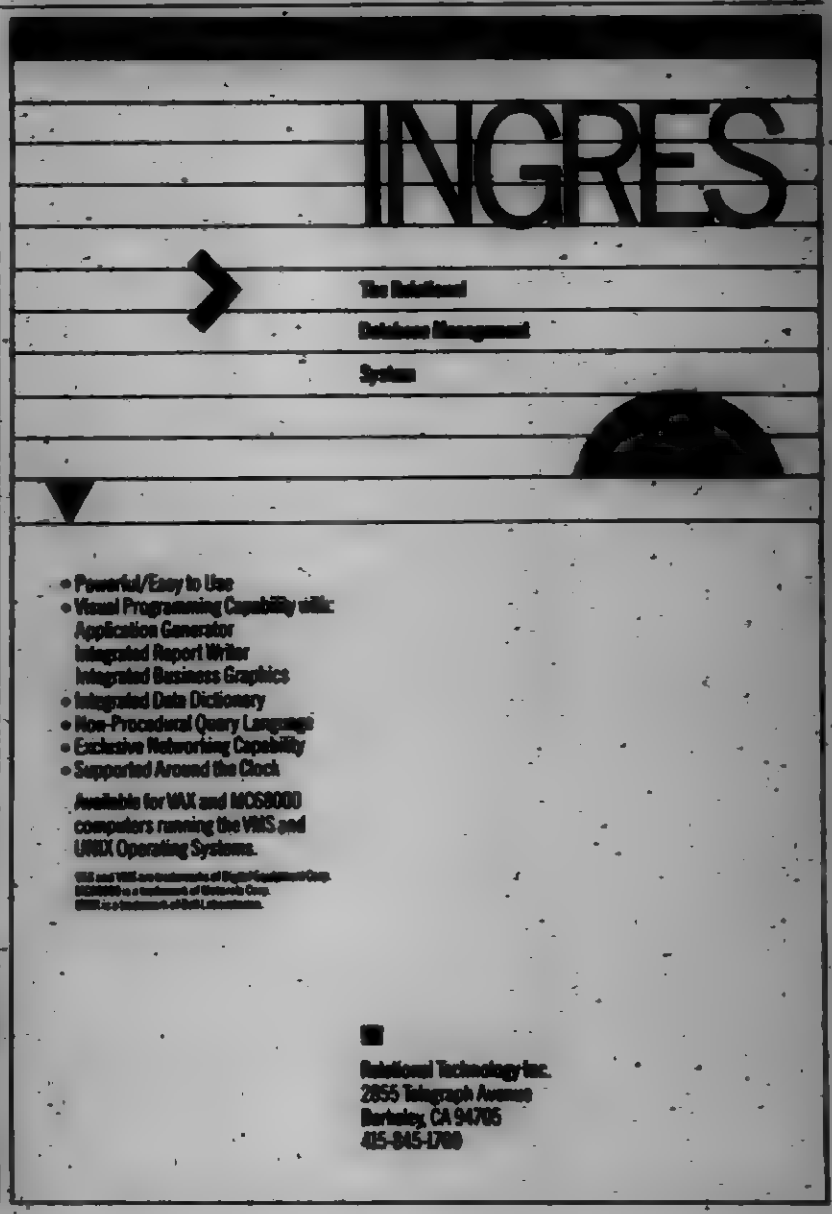
Errico avoided trial by pleading guilty and will be sentenced April 19. He was indicted last month on two counts of wire fraud, attempted bribery and interstate travel in aid of racketeering in connection with efforts to influence the award of a $3.4 million Massachusetts state contract. Errico was accused of promising a consultant hired by the state Welfare Department with future SDC consulting work in exchange for helping to have the programming contract awarded to SDC [CW, Feb. 20].

SDC is currently developing for Massachusetts a Medicaid Management Information System (MMIS), which is expected to undergo review for federal certification in June. Although the development contract has been plagued by delays and threats of cancellation, Welfare Commissioner Charles Atkins recently expressed satisfaction with SDC's performance.

However, a provision in the MMIS contract would allow the state to fire SDC if Errico were to be convicted. Attempts to reach state Welfare officials at press time to determine the impact of Errico's guilty plea were unsuccessful.

Errico also pleaded guilty to bribery in a separate case involving the Department of Energy (DOE) between 1980 and 1981, after authorities investigating the Massachusetts bribery scheme turned up other facts concerning payments made to a DOE employee in exchange for a kickback on another federal contract. As a result of other information, Errico also pleaded guilty to charges of failing to file a personal income tax in 1978.





NTIA backs former BOCs on FCC conversion restrictions

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — The recently divested Bell operating companies gained powerful support this month in their efforts to get out from under the restrictions imposed by the Federal Communications Commission's Second Computer Inquiry decision.

The FCC modified some conversion restrictions last November, but left two key provisions intact. As a result, beginning June 30 the local operating companies will have to form separate subsidiaries if they wish to market enhanced products and services, and they will have to obtain a commission waiver before performing end-to-end protocol/code conversion directly. Earlier this month, the National Telecommunications and Information Administration (NTIA) — the president's chief telecommunications adviser — supported requests from several local operating companies seeking to eliminate the protocol/code conversion restriction.

FCC reconsideration of this ruling is "especially important," the NTIA said, because "provision of such functions at the telephone company's central office may be essential to promote wider availability of . . . information retrieval, electronic banking and computer communication services. With the greatly increasing popularity of word processors, personal computers and other low-cost data processing units, the number of potential users of enhanced services and sophisticated [customer premises equipment] is expanding rapidly."

The counterargument is that if the local operating companies are allowed to provide end-to-end protocol/code conversion directly, they will gain an unfair advantage over their competitors. As the Computer and Communications Industry Association put it in comments filed March 12, the local operating companies' "regional coordination through regional holding companies and their national coordination through [Bell Communications Research, Inc., formerly the Central Services Organization] is ample evidence of broad-based control of bottleneck facilities."

This argument over Computer Decision II's application to the local operating companies comes at a time when several of the companies are reportedly planning to implement nbw "smart network" services.

For example, officials of Bell South, one of the seven regional holding companies created by the breakup of the Bell System, confirmed that the company plans to file a tariff within the next few months covering a packet-switched service called Pulsecom.

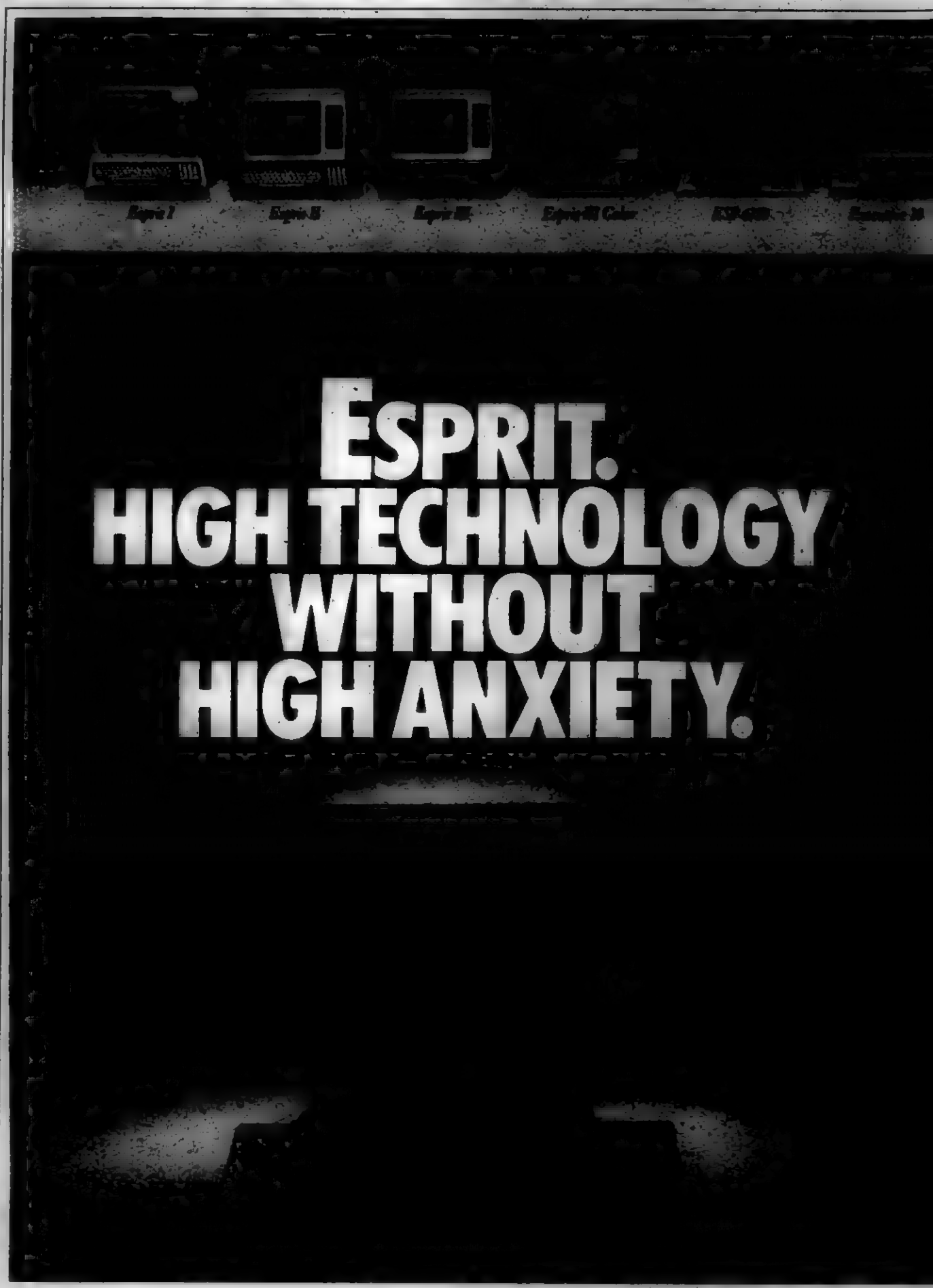
Mumps sets June meet

PHILADELPHIA — The Mumps Users Group will hold its annual conference June 4-8 at the Adam's Mark Hotel here. On the agenda are presentations, tutorials, workshops and round table discussions focusing on implementations, new technology and applications of the Mumps language.

For nonprogrammers, there will be introductory seminars on Mumps programming.

The $150 registration fee includes a one-year individual membership in the Mumps Users Group, as well as admission to technical sessions, round table discussions, the exhibit hall and social activities. Each full-day tutorial costs $120.

More information is available from the Mumps Users Group, Suite 306, 4321 Hartwick Road, College Park, Md. 20740.



Cbema: U.S. might retaliate if Japan OKs software plan

Controversial copyright protection proposal fires industry, government responses

By John Gantner
CW Washington Bureau

WASHINGTON, D.C. — Computer industry representatives last week said the U.S. government is exploring ways to retaliate against Japan if it proceeds with legislation that American vendors say will greatly reduce software protection in that country.

The U.S. Congress could retaliate by stripping Japanese vendors of all copyright protection for computer programs as well as for operating systems and firmware of products sold in this country, according to Oliver Smoot, executive vice-president of the Computer and Business Equipment Manufacturers Association (Cbema).

This reaction is permissible, Smoot said, under the terms of the Universal Copyright Convention, to which both the U.S. and Japan are signatories. He indicated that Cbema has been in contact with attorneys in the U.S. Patent Office and in the trade agencies who are working on specific legislative language that Congress would need to institute the retaliatory measure.

Smoot and Cbema President Vico Henriques told a press conference here last Monday that the action could be taken if the Japanese Ministry of Trade and Industry (Miti) goes ahead with a plan to recommend a new Japanese legal structure for software protection. The Miti proposal would replace copyright protection with a new law reducing protection to only 15 years and giving the ministry authority to mandate compulsory licensing of foreign software to Japanese end users in certain cases.

Miti has until March 27 to propose legislation if it wants the matter considered during the current session of the Japanese parliament. U.S. trade officials have been negotiating with their Japanese counterparts to kill the plan. The Cbema press conference was called to support the government efforts, according to Henriques, who said Miti "evidently thinks we aren't serious in our opposition" to the proposal.

Cbema has contacted similar associations in six European countries and in Australia and New Zealand. "The consensus is that copyright is clearly the way" to protect software, he said. He suggested that if Miti goes ahead with its proposal, Japanese vendors could face retaliation in a number of markets.

The copyright convention would allow the U.S. to pass a law offering copyright protection to Japanese vendors equivalent to that afforded U.S. firms in Japan. In other words, Smoot said, if Japan eliminates software copyrights for a new type of protection, the U.S. could also eliminate copyright protection and not replace it with a new law, leaving Japanese firms with no general system of software protection.

Although the Japanese do not have a large share of the U.S. software market, the elimination of copyright protection could also affect proprietary operating systems and control sequences embedded in read-only memories, according to Smoot. This would affect a great amount of Japanese-made hardware.

Because the U.S. industry has been working on this issue in close cooperation with high-level administration officials, including Vice-President George Bush, Commerce Secretary Malcolm Baldridge, U.S. Trade Representative William E. Brock and the staffs of relevant Senate and House committees, Henriques said Cbema is confident of "very strong support" for retaliation against Japan if the Miti proposal goes forward.

Nowadays, technology is advancing so rapidly that today's latest breakthrough may be replaced as soon as tomorrow by something even more revolutionary.

As this ever-changing technology becomes more and more available, it becomes more and more confusing to choose the precise technology to suit a particular need. All of which makes it difficult for the human mind, which is not programmed to adjust to change quite that quickly, to cope.

INTRODUCING PEACE OF MIND.

That's why Esprit would like to introduce a new concept that can make it easier to cope with this rapidly-changing world: the peace of mind that can give you high technology without high anxiety.

And back it with an extensive nationwide service network and our own special toll-free number (800-645-4508) so you can reach us about anything that might disturb that peace of mind.

Designed right into every terminal in Esprit's complete line are the features, the functions and the flexibility that make it not only user-friendly but systems-friendly. In other words, the kind of comfort, quality and trouble-free technology that can provide real peace of mind.

PEACE OF MIND FOR THE NEXT GENERATION IN TERMINALS.

One look at the Esprit ESP 6310 and you'll recognize the next generation of terminals. With performance and features far superior to other terminals in its price category. And the kind of quality you can feel comfortable with.

DESIGNED FOR PEACE OF MIND.

From the sleek and stylish lines of its ergonomic design, to the familiar sculptured lines of its low-profile keyboard with its 11 user-programmable function keys—shiftable to 22—in non-volatile memory back-up, that can be programmed directly or downline-loaded from the host computer.

From its high resolution, green phosphor display with a well defined character font, in a large 7 x 11 dot matrix, in an 80 column x 25 line format to its screen-saver feature which deactivates the screen after 20 minutes of inactivity.

From its tilt and swivel monitor to its smooth scrolling and line graphics capabilities.

PEACE OF MIND PRICE. $695.

Our ESP 6310 provides enhanced performance and incorporates emulations of the TeleVideo 925/910 PLUS*, ADDS Regent 25/Viewpoint* and Lear Siegler ADM3A*, as well as the popular Esprit series.

But at $695, it's priced below many far-less featured terminals. That means even our low price is designed to prevent high anxiety.

800-645-4508

Esprit Systems, Inc.
100 Marcus Drive
Melville, N.Y. 11747

☐ Yes for my own peace of mind I would like to receive a brochure on your complete line of Esprit terminals.

NAME_____
TITLE_____
ADDRESS_____
CITY_____ STATE_____ ZIP_____

CW888

Esprit Systems, Inc.

PEACE OF MIND TECHNOLOGY.

*(TeleVideo 925/910 Plus is the registered trademark of TeleVideo Systems, Inc. Regent 25/Viewpoint is the registered trademark of Applied Digital Data Systems, Inc. ADM3A is the registered trademark of Lear Siegler, Inc.)

Threats greater than hacking seen facing micro users

By Paul Kenaniowski
CW Staff

NEW YORK — While hackers and white-collar criminals have been portrayed as the principal threats to data security, they do not represent the chief concern of one manager responsible for managing microcomputer growth.

"Look at the statistics concerning data lost from power fluctuations," said William O'Neil, director of microcomputing at The First Boston Capital Group, Inc. in Tarrytown, N.Y. "Most of our time is spent recovering data lost from an electric problem."

O'Neil and five other panelists — representing Hewlett-Packard Co., 3Com Corp., Tallgrass Technologies Corp., the "Seybold Report on Professional Computing" and Archive Corp. — participated in "Data Security Issues in Microcomputer Applications," a round table sponsored here last week by Tallgrass.

The swift growth of hard disk systems, a rapid change in the type of workers using computers, a lack of vendor-provided education and hard-to-use software have left many microcomputer users with disasters waiting to happen, the panelists agreed.

"It usually takes a catastrophe before a user understands the importance of adequate backup," industry analyst Andrew Seybold claimed.

"If one formats an IBM Personal Computer XT and does not indicate which drive to format, the machine formats the hard disk and wipes out all data on it," Seybold noted.

'Education is the key. Users have to realize there is a problem before they will address it.'
— industry analyst Andrew Seybold.

The problem of inadequate backup will increase as microcomputers use sophisticated operating systems, such as Unix; as corporations store data on microcomputers; as Winchester disk storage capacity increases; and as less sophisticated workers use microcomputers, the panelists said.

"The situation will become much worse in the future," Frank P. Carau, HP research and development section manager, warned.

But vendors are ignoring the problem, panelists added. "I would like to see one commercial with Charlie Chaplin loading and unloading 10 diskettes to back up the hard disk records of the Little Hat Co.," O'Neil stated.

"IBM is setting microcomputer standards and has a responsibility to address the problem of backup procedures for microcomputers," O'Neil said.

Panelists advocated educating users, developing software with simple backup procedures, incorporating backup capabilities in hardware and establishing simple corporate backup procedures.

"Education is the key," Seybold maintained. "Users have to realize there is a problem before they will address it."

Retailers and corporate microcomputer support groups, as well as vendors, have to educate users. "We are finding more retailers including backup equipment in the system sale," David Allen, president of Tallgrass, said.

Current backup software procedures are hard to use. "A user will not sit and swap 10 disks," Bill Krause, president of 3Com, said. "Backup is not the principal benefit; a simple-to-use restore function would be. Currently, that feature is not available."

Microcomputer software should include features from mainframe software, according to O'Neil. "Microcomputer software should always include audit trail reports," he said. "Knowing who was the last person to use a package and what changes he made is vital in any large company."

Hardware today offers inadequate backup facilities. "The floppy disk will become the punch card of the 1980s," Krause predicted.

Hardware should incorporate sophisticated backup facilities. "We must begin to view a backup device as peripheral to a peripheral, the disk drive," M. Thomas Makmann, president of Archive, said. Optical disks, tape cartridges and removable Winchester disks were mentioned as some possible solutions to the problem.

Corporate planning is needed. "Backup procedures are a way of life with mainframe users," Seybold said, "but there are few mainframe users with any type of microcomputer backup procedures."

To succeed, plans must be simple. "Mark one tape 'Tuesday, Thursday, Saturday,' the other 'Monday, Wednesday, Friday,'" Allen recommended. "Then assign an employee to collect the tapes every night."

Once these policies and enhancements are in place, microcomputers can help protect data, according to O'Neil. "Microcomputers can be used to check the way a user logs on," he said. "If a procedure does not match a user's normal pattern, he will be denied access to the system. The microcomputer can be used to secure mainframe data."

"We're saving $50,000 a year by eliminating SYSOUT printouts and installing JCLWTR."

That's the word from one user of AID's new JCLWTR system.

Instead of printing every production SYSOUT listing, JCLWTR stores them on disk where they're instantly accessible through special SPF screens or hard copy printouts.

The savings in paper, printing, handling, and storage costs add up so quickly that even medium and small shops can recover the system's minimal cost in just months.

JCLWTR installs on medium and large IBM systems operating under MVS and supports on-line interfaces to COM.

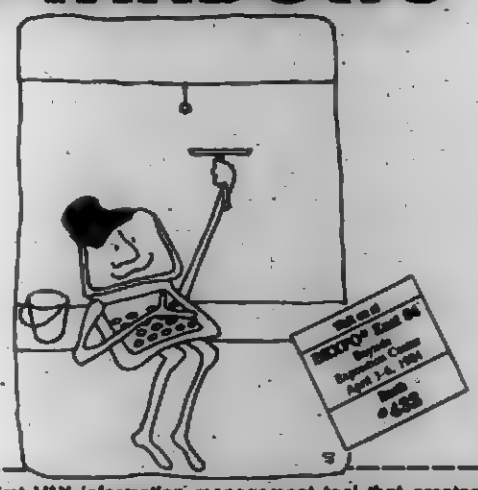
Find out how much you can save with AID's JCLWTR system. Send in the coupon, or call Lew Kabza at 312/654-3030.

AID Applied Information Development, Inc.
823 Commerce Drive,
Oak Brook, Illinois 60521

I'd like to know more about the JCLWTR system

Name/Title _____
Company _____
Address _____
City/State/Zip _____
Phone ( ) _____

MAKE YOUR VAX® DO WINDOWS



SMARTSTAR™ is the first VAX information management tool that creates multiple window applications—and can scroll your screen to 400 lines. The SMARTSTAR family includes:

- SMARTDESIGN™ for designing applications without programming
- SMARTQUERY™ for powerful, easy-to-use application processing
- SMARTCALL™ when VAX host programming is required
- REQUEST for integrated report and query

Name _____
Title _____
Company _____
Address _____
City _____ State _____ Zip _____
Phone ( ) _____

SEND COUPON NOW FOR DETAILS AND JOIN THE 4TH GENERATION

STI Signal Technology, Inc.
5951 Encina Road, Goleta, CA 93117 (805) 683-3771 Outside California call toll-free (800) 235-6787
TWX 910-334-3471
VAX is trademark of Digital Equipment Corporation

Vision systems still in infancy but promising

PRODUCT SPOTLIGHT

By Tom Henkel
CW Staff

Perhaps the least understood aspects of artificial intelligence are two functions that many humans take for granted: seeing and hearing. Humans rarely think about their ability to recognize a familiar face or voice; it is all done automatically by the brain, which can compensate for major differences in the way information is received and processed.

For developers of artificial intelligence systems, the ambiguity involved in human hearing and vision causes monumental problems. While humans can easily adapt to changes in their environment, machines cannot.

Researchers agree that both vision recognition and voice recognition machines are in their infancy. Of the two, however, vision systems appear to have experienced greater success. Optical character recognition (OCR) systems, such as those that can read bar codes and specialized type, have been around for some time. Lately, companies like Kurzweil Computer Products, Inc. of Cambridge, Mass., have improved basic OCR technology by adding artificial intelligence features to OCR readers. With the help of an operator, Kurzweil's 4000 machine, for example, can learn new typefaces.

Vision systems have also recently gained popularity as stand-alone factory floor devices performing functions like inspection, robot vision and gauging.

More than 75 companies currently offer vision systems. Many of these vendors have appeared over the past year, according to Howard Dicken, president of DM Data, Inc., a Scottsdale, Ariz., technology research firm.

Only a handful of vendors is competing in the speech recognition market. The reason is that it is much easier to understand how the human eye works than how the human ear works, said Dr. Robert J. Shillman, president of Cognex Corp., a vision recognition firm in Needham, Mass. Shillman explained that cameras can be set up to analyze an object in much the same way humans do.

Typically, that analysis takes one of two forms: The camera can be trained on a fairly large area, called an area array, or it can be set to view a slice of the overall picture, called a linear array. The latter approach can be especially useful in situations where the vision system is recording numbers, labels or some specialized codes.

Compared with the human eye, however, vision systems are far from complex. "Understanding human perception is a very difficult task," Shillman said, adding that the more complex the application, the more difficult it is to develop a vision system to handle it.

So why use a vision system? Dr. Philippe Brou, a research scientist at MIT's Artificial Intelligence Laboratory in Cambridge, pointed out that vision systems can perform many simple, extremely boring factory jobs, such as inspection tasks. And sometimes, they can perform these tasks better than humans. Machines do not get bored, nor do they suffer from personal problems or illnesses, which can affect the quality of a human's work. Moreover, for highly technical applications such as determining whether a metal object is flat, vision systems can be far more accurate than the human eye, Brou noted.

Why use a vision system? Dr. Philippe Brou, a research scientist at MIT's Artificial Intelligence Laboratory in Cambridge, pointed out that vision systems can perform many simple, extremely boring factory jobs, such as inspection tasks. And sometimes, they can perform these tasks better than humans. Machines do not get bored, nor do they suffer from personal problems or illnesses, which can affect the quality of a human's work. Moreover, for highly technical applications such as determining whether a metal object is flat, vision systems can be far more accurate than the human eye.

Presently, however, vision systems are so simplistic that it is sometimes more efficient to have a human performing the job, Brou admitted. First, humans can adapt to changes in their environment almost instantly; machines have to be retrained. Secondly, humans can perform many functions at once, some of which have been learned through experience rather than special training.

It is not surprising, Brou said, that many of the currently available vision systems cost in the $30,000 to $50,000 range. In applications where the complexity of a vision system would require a product costing more than about $50,000, the MIT researcher said, it is often more economical to hire humans to perform the job.

Big problem

One of the big problems with vision systems is that virtually all those that are commercially available are based on the same two-dimensional technology. Most were designed around a set of algorithms developed at the Stanford Research Institute in Menlo Park, Calif.

According to Brou, this approach involves using a video camera to take a picture of an object, typically in black and white. The object is then digitized, and the image is converted into a series of binary signals. The signals indicate whether a given space in the camera's view should be black or white. From there, the vision system's central processor can reassemble the digitized signals to form an image.

Some firms have developed a variation on that two-dimensional theme, adding the ability to recognize various shades of gray in addition to black and white.

While Brou was quick to point out that two-dimensional systems are ideal for some applications, he said they are not very useful for others. He cited as an example a quality control application on a factory floor. A two-dimensional system may be fine to determine whether holes have been drilled in the proper places in a given object; the object, typically moving on a conveyer belt, would pass between a camera and a light source. The light would pass through the drilled holes and would result in white spaces against the black backdrop of the item.

But this approach is effective only if the holes were drilled all the way through the object. If the application involves testing to see whether holes have been drilled deeply enough into an object, the two-dimensional system would be of little help, because it could not perceive depth.

Much of the research currently under way at MIT involves the development of vision systems that can perceive depth. This research may someday help overcome some of the problems presented by commercially available vision systems, Brou said, because it could result in vision machines which would distinguish among different, overlapped parts.

Brou said several techniques to accomplish this are currently being investigated. Some use dual cameras, which view an object from different angles, but this process tends to be slow.

Cognex's Shillman said many commercially available vision systems offer the ability to link to larger computer systems; many, for example, offer RS-232 ports. Brou, on the other hand, said that most vendors of vision recognition systems have made only minor attempts at linking vision systems to corporate mainframes, mainly because few users have demanded it.

What the future holds

What does the future hold for vision systems? According to DM Data's Dicken, vision systems will undoubtedly become more sophisticated, and more vendors will hop into the market.

Dicken predicted that the vision market, which chalked up about $30 million in sales during 1983, will jump to around $760 million by 1990. While the growth in the vision market is expected to be dramatic, Dicken pointed out that other areas of artificial intelligence will be even hotter.

For example, natural language software, which finished off 1983 with about $8 million in total sales, will jump to a $920 million market by 1990, according to Dicken.

Top 10 visual recognition firms based on 1983 sales

Firm Name	Type of System Manufactured	Price Range	Estimated 1983 Sales Revenue
AUTOMATIX 1000 Technology Park Dr. Billerica, Mass. 01821	Robotic and artificial vision systems	$30,000-$80,000	$5 Million
EVERETT/CHARLES AUTOMATION SYSTEMS, INC. 700 E. Harrison Ave. Pomona, Calif. 91767	Robotic and machine vision systems	$25,000-$75,000	$4 Million
ROBOTIC VISION SYSTEMS, INC. 536 Broadhollow Rd. Melville, N.Y. 11747	Visual recognition	$35,000-$25,000	$2.6 Million (Fy 1982)
OBSHEX CORP. 72 River Park St. Needham, Mass. 02194	Visual recognition	$30,000	$2 Million
GENERAL ELECTRIC INTELLIGENT VISION SYSTEMS OPERATION 300 7th North St. Liverpool, N.Y. 13088	Visual recognition	Not Available	$2 Million
MACHINE INTELLIGENCE CORP. 330 Potrero Ave. Sunnyvale, Calif. 94086	Machine vision systems Intelligent robot systems	$35,000-$75,000	$1.4 Million
PERCEPTION, INC. 23920 Freeway Park Dr. Farmington Hills, Mich. 48024	Visual recognition systems	$30,000	$1.5 Million
OMTEK, INC. 7 Corporate Place South Bedford St. Burlington, Mass. 01803	Visual inspection and recognition system	$18,000-$50,000	$1.4 Million
APPLIED INTELLIGENT SYSTEMS 110 Fieldland Plaza Ann Arbor, Mich. 48103	Visual recognition systems	$17,000-$70,000	$1.0 Million
OBJECT RECOGNITION SYSTEMS, INC. 521 Fifth Ave. New York, N.Y. 10175	Visual recognition systems	$20,000-$25,000	$1 Million

Source: DM Data, Inc.

1. Based on estimated sales of machine vision systems only. The figures listed may not reflect the total sales of the company.

NEWS

Middle managers told to adapt to changing OA roles

By [illegible]
CW Staff

BOSTON — Office automation means that many decisions traditionally made by middle managers will pass to those below them, forcing managers to change their ways or lose their jobs, attendees at a conference here were told last week.

Citing a poll that showed a trend toward more clerical jobs and fewer middle-management positions in the future, David Cirullo, who is a senior development specialist for Wang Laboratories, Inc., said, "There will be less and less reliance on gut reaction and more and more on a manager's proficiency with skills using office automation."

Cirullo, addressing the American Management Associations' Human Resource Conference, noted that middle management's traditional role has been to gather and disseminate information and to make decisions.

But in the information age, that information is being handled by clerical workers who can make many decisions. "Decision making is going to go down to the lowest level," he maintained.

This shift in responsibility means that during the next decade, clerical jobs will increase from 45% of a typical company's staff to 80%, while the share for middle managers will drop from 40% to 20%, Cirullo said, citing a recent Harris Survey.

'[illegible]'

Cirullo said preliminary results from his own survey of 300 firms indicate that 91% of middle managers consider computers "at least somewhat important" and that computers are important to their organizations.

He warned that automation means fewer management jobs, but also more responsibilities for those who remain.

To ease the transition, firms must recognize the importance of user-friendly systems, ongoing training, teleconferencing and remote management as companies shift to satellite operations away from the main office.

Another speaker at the conference, however, predicted that computers will have only a secondary impact on the middle-management work force. Eddie C. Smith, vice-president for human resources at Robbins and Myers, Inc. of Dayton, Ohio, pointed out that during the latest recession, the unemployment rate for managers was three times that of the general work force.

The influx of the post-World War II baby-boom generation has provided the work force with highly educated management candidates, Smith said.

But their desired positions are already filled by persons only about 10 years older. He said that the shortage of management openings will only be "exasperated" by cutbacks created by office automation.

Addressing the computer needs of middle managers, Lawrence F. Vogel, director of editorial services for The Office Systems Consulting Group, Inc. of Cambridge, Mass., observed that a new, younger generation of managers is more likely to welcome keyboards on its desks than are older managers.

Those younger managers are less likely to rely on secretaries to handle their word processing chores, he said.

He emphasized the need for ease of use, the ability to do work better with less effort. He then stressed the "level of flexibility," for example, the importance of giving a manager a computer tool to do a financial analysis that looks like it would on paper.

Finally, he cited the importance of a "degree of urgency," basically a negative factor that convinces a person that he needs a computer, even if it is only to produce a report on deadline.

UNIX™

HANDS-ON TRAINING

A complete Curriculum for:
End Users Management Applications Staff Technical Support

COURSES	NEW YORK	BOSTON	WASHINGTON, D.C.	SAN FRANCISCO	CHICAGO	DALLAS	LOS ANGELES	TUITION	SEQUENCE TUITION†
UNIX Overview	May 29 Sep 11	Jul 10 Nov 13	May 29 Jul 10 Sep 11 Nov 13	Oct 30	May 8 Sep 25	Aug 28	May 8 Nov 7	$ 225	$660
[illegible] for Non-Programmers	May 30-Jun 1 Sep 12-14	Jul 11-13 Nov 14-16	May 30-Jun 1 Jul 11-13 Sep 12-14 Nov 14-16	Oct 31-Nov 2	May 9-11 Sep 26-28	Aug 29-31	May 9-11 Nov 8-10	$ 735	
UNIX Fundamentals for Programmers	May 14-16 Sep 17-19	Jul 16-18 Nov 26-28	May 14-16 Jul 16-18 Sep 17-19 Nov 26-28	Sep 10-12	May 14-16 Oct 1-3	Jul 9-11	May 14-16 Nov 12-14	$ 735	$1125
Shell as a Command Language	May 17-18 Sep 20-21	Jul 19-20 Nov 29-30	May 17-18 Jul 19-20 Sep 20-21 Nov 29-30	Sep 13-14	May 17-18 Oct 4-5	Jul 12-13	May 17-18 Nov 15-16	$ 480	
"C" Language Programming	May 21-25 Sep 24-28	Jul 23-27 Dec 3-7	May 21-25 Jul 23-27 Sep 24-28 Dec 3-7	Sep 17-21	Jun 4-8 Oct 8-12	Jul 16-20	Jun 4-8 Nov 26-30	$1225	
Shell Programming	Jun 4-6 Oct 1-2	Jul 30-Aug 1 Dec 10-11	Jun 4-5 Jul 30-Aug 1 Oct 1-2 Dec 10-11	Apr 2-3 Sep 24-25	May 21-22 Oct 15-16	Jul 23-24	May 21-22 Dec 3-4	$ 480	$1125
Using Advanced UNIX Commands	Jun 7-8 Oct 3-5	Aug 2-3 Dec 12-14	Jun 6-8 Aug 2-3 Oct 3-5 Dec 12-14	Apr 4-6 Sep 26-28	May 23-25 Oct 17-19	Jul 25-27	May 23-25 Dec 5-7	$ 735	
UNIX Internals	Jun 11-15 Oct 8-12	Apr 2-6 Aug 6-10 Dec 17-21	Apr 2-6 Jun 11-15 Aug 6-10 Oct 8-12 Dec 17-21	Apr 30-May 4 Oct 1-5	Jun 18-22 Oct 22-26	Jul 30-Aug 3	Jun 18-22 Dec 10-14	$1375	
UNIX Administration	Jun 19-21 Oct 15-18	Apr 10-12 Aug 14-16	Apr 10-12 Jun 19-21 Aug 14-16 Oct 16-18	Oct 9-11	May 30-Jun 1 Oct 30-Nov 1	Aug 7-9	May 30-Jun 1 Dec 18-20	$ 735	
Advanced "C" UNIX Workshop	Jun 25-26 Oct 22-23	Apr 30-May 2 Aug 20-21	Apr 30-May 2 Jun 25-26 Aug 20-21 Oct 22-23	Oct 15-16	Jun 11-12 Nov 6-7	Apr 2-4 Aug 13-14	Jun 18-19	$ 735	$1125
Advanced "C" Programming Under UNIX	Jun 27-29 Oct 24-26	Aug 22-24	Jun 27-29 Aug 22-24 Oct 24-26	Oct 17-19	Jun 13-15 Nov 8-10	Apr 5-6 Aug 15-17	Jun 20-22	$ 480	
Berkeley UNIX Fundamentals and "csh" Shell	May 7-11 Oct 29-Nov 2	Aug 27-31	May 7-11 Aug 27-31 Oct 29-Nov 2	Apr 9-13 Oct 22-26	Jun 25-29 Nov 12-16	Aug 20-24	Jun 25-29	$1225	

*Including hands-on training workshops **UNIX is a trademark of Bell Laboratories †Savings for consecutive seminar dates

CALL FOR DETAILS ON: • VIDEO-BASED COURSES • IN-HOUSE SEMINARS

To reserve your seminar space now or for additional information, call:
(800)323-UNIX or in Illinois (312)987-4082 8:30-5:00 central time.

Computer Technology Group UNIX seminars are presented by experts experienced in teaching UNIX as well as in designing and implementing UNIX-based systems.

COMPUTER TECHNOLOGY GROUP
Our business is UNIX training.

COMPUTER TECHNOLOGY GROUP
Telemedia, Inc.
310 S. Michigan Ave., Chicago, IL 60604

Robots 8 meet set for June 4

DETROIT — Robots 8, an exposition and conference of robotic specialists, industrialists, engineers and manufacturing executives, is scheduled for June 4-7 at Cobo Hall here. The conference is being sponsored by Robotics International of the Society of Manufacturing Engineers (SME) and the exposition by the Robot Institute of America.

"Merging Technologies" will be the conference theme, and 80 industry experts reportedly will explain new aspects of robot implementation, applications and research.

More than 220 builders and suppliers of industrial robots, services and components are expected to exhibit, a conference spokesman said.

Advance registration for the exposition is $10. Registration for the full four-day conference is $450 for SME members and $510 for nonmembers. One-day and two-day rates also are available.

Registration forms are available from Robotics International of the SME, Box 930, Dearborn, Mich. 48121.

ONLY 76¢ A WEEK

So much, for so little . . . and all yours, as part of your COMPUTERWORLD subscription.

51 issues of **COMPUTERWORLD** plus special issues throughout the year including:

- **Computerworld OA**—*incisive coverage about office automation*
- **Computerworld On Communications**—*keep current with the rapidly changing communications field*
- **Computerworld Buyer's Guides***—*product-specific lists and latest information in major product areas*

With this order form, you pay only $39 (just 76¢ a week). That's a $5 savings off the basic annual rate of $44, an offer too good to pass up.

Now, get everything that's coming to you—Subscribe Today.

Complete Form On Reverse, Then Return In Attached Postage-Paid Envelope. Or Use Your Charge Card and Call TOLL-FREE: 1-800-343-5730.

☐ Please enter my subscription (details on back)

☐ I'm already a subscriber, but I'd like you to change my:

☐ address ☐ title
☐ industry ☐ other

My current mailing label is attached and I've filled in new information on the other side.

Put old label or label information here

COMPUTERWORLD

*U.S. Only

CW-139

**Please send me COMPUTERWORLD for one year. RATES: United States ~~$44~~;
Canada, Central & South America $110; Europe $165;
All Other Countries $245 (Airmail Service)**

Special Introductory Offer
Only $39.00 Save $5.00

☐ Check Enclosed
☐ Am Ex ☐ BA/Visa ☐ MC (MC Only List four digits above your name)

If charge we must have cardholder's signature _____ Expiration Date _____

First Initial		Middle Initial	Surname	
Your Title				
Company Name				
Address				
City		State	Zip Code	

Address shown is
☐ Business
☐ Home

☐ Check here if you do not wish to receive promotional mail from *Computerworld*

☐ Check here if you're interested in receiving information on *Computerworld's* Index.

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY
CIRCULATION DEPT. 375 Cochituate Road, Rte. 30, Box 897,
Framingham, MA 01701-9985

Detach here, moisten and seal envelope securely before mailing.

1. BUSINESS/INDUSTRY (Circle One)
End Users
10 Manufacturer (other than computer)
20 Finance/Insurance/Real Estate
30 Medicine/Law/Education
40 Wholesale/Retail Trade
50 Business Service (except DP)
60 Government—State/Federal/Local
65 Public Utility/Communication Systems/Transportation
70 Mining/Construction/Petroleum/Refining
75 Other User _____
Vendors
80 Manufacturer of Computers, Computer-related Systems or Peripherals
85 Computer Service Bureau/Software/Planning/Consulting
90 Computer/Peripheral Dealer/Distributor/Retailer
95 Other Vendor _____

2. OCCUPATION/FUNCTION (Circle One)
11 President/Owner/Partner/General Manager
12 VP/Assistant VP
13 Treasurer/Controller/Financial Officer
21 Director/Manager/Supervisor DP/MIS Services
22 Director/Manager of Operations/Planning/Administrative Services
23 Systems Manager/Systems Analyst
31 Manager/Supervisor Programming
32 Programmer/Methods Analyst
35 OA/WP Director/Manager/Supervisor
38 Data Comm Network/Systems Mgmt
41 Engr/Scientific/R&D/Tech Mgmt
51 Mfg Sales Reps/Sales/Marketing Mgmt
60 Consulting Mgmt
70 Medical/Legal/Accounting Mgmt
80 Educator/Journalist/Librarian/Student
90 Other _____

3. COMPUTER INVOLVEMENT (Circle all that apply)
Types of equipment with which you are personally involved either as user, vendor or consultant
A. Mainframes/Superminis
B. Minicomputers/Small Business Computers
C. Microcomputers/Desktops
D. Communications Systems
E. Office Automation Systems

CW-139

NEWS

FEC work load growing as campaigns gear up

By Jeanne Connolly
CW Staff

WASHINGTON, D.C. — When the Reagan-Bush '84 Reelection Committee reported 76,000 political contributions worth $4.2 million, the Federal Election Commission (FEC) was left with the task of computer indexing, microfilming and reviewing the 9,000 pages of reports.

While that filing was exceptionally large, it was only one of the thousands of election-year reports that the agency must process for public and in-house review, sometimes within 48 hours.

Established in 1971 through campaign reform legislation, the FEC handles a constant flow of information requests and financial reports, even in nonelection years. But it is during a presidential election year that the work load reaches record proportions.

"The dollar volume increases and the number of transactions increases. For example, the dollar volume for a congressional election cycle will equal the numbers for the previous presidential election, and, two years later, the next presidential cycle will be even higher," said Bob Biersack, supervisor-statistician for the agency.

The FEC has a six-year, $6 million facilities management contract with National Data Corp., which operates a Digital Equipment Corp. Decsystem-10 in Fairfield, N.J. That and related contracts make up about 8% of the agency's approximately $11 million fiscal 1984 and 1985 budgets.

Raising storage capacity

The agency enters data from the reports at its headquarters here, and transmits it via four 9,600 bit/sec lines to Fairfield. Since it became active in 1975, the FEC has amassed data that has almost filled eight 176.6M-byte disk drives. Biersack said that while the agency is nearing its storage capacity, "the biggest problem with the data base is that it is so dynamic." Paul Laramee, a supervisor systems analyst, added, "Even though we run an update every night at 7:00, when a person comes in to make a request the next day, the data may already be outdated by new filings."

Those filings are expected to peak in October and November, when candidates are likely to report up to 90,000 contributions per month just to meet the commission's public disclosure requirements. In addition to those reports, the commission receives separate reports, sometimes on magnetic tape, that can be fed into the mainframe, relating to candidates' requests for matching federal funds.

In 1984, the commission will process more than 28,000 documents.

While matching-fund requests are seldom requested by the public, the agency receives constant requests for quarterly and monthly campaign reports. Those inquiries may come from opposition candidates, public interest groups, the news media and political consultants.

Federal laws require the commission to index at least the first two summary pages of financial reports and to microfilm the full reports within 48 hours of their receipt. Those financial summaries show how the candidates raised and spent their money.

After data entry clerks index the summaries, they code those pages according to the type of data reported, then they enter the names, addresses, occupations and other detailed information relating to individual contributions and campaign expenditures over $500. The data is cross-referenced by contributors, as individuals or groups and by candidate.

Laramee reported that while data entry is now performed in-house, a contract for future work is now out to bid.

Even as new reports pour into the offices, the public access staff must deal with both on-line and batch-oriented information requests. During the six months ending in March, the agency handled more than 7,000 requests for one to 20 reports on an on-line basis, as people walked in off the street or telephoned requests. "At least as many" mail or otherwise less timely requests were batch processed, and 24,000 on-line internal accesses were processed during that time, said Richard Hooper, supervisor systems analyst.

Such requests and data are entered on the agency's 86 terminals, which include DEC VT100s, Perkin-Elmer Corp. Owls and Televideo Systems, Inc. 925s. The agency also uses Eastman Kodak Co. DMT-150 microfilm reader copiers and a variety of DEC and Data 100, Inc. printers. The terminals, linked by the communications lines to the New Jersey facility, draw information from a data base managed by a Software House System 1022 data base system on the Decsystem-10.

But even with the system in place and operating well, the agency still faces an occasional monkey wrench in the form of new legislation.

Imagine,
if you could offer
Distributed Printing
without RJE!

You Can! With VPS the JES/3270 RJE report distribution package. Drive up to 2,000 3270 attached printers while you improve CRT response and reduce local and remote printing costs.

Check these features:

- Total RJE replacement for Batch reports, CICS spooled reports, DS Print, VM
- Operates under JES, standard routing parameters and recovery No system modifications, JES tables or additional hardware
- Shares printers, lines and network resources Reduces hardware and telecommunications costs
- Off-loads all print to JES where it belongs Improves CRT response

270 installations driving over 20,000 printers

LRS Levi, Ray & Shoup, Inc.
P.O. Box 18538 • Dallas, TX 75218
DALLAS (214) 324-2635 • TELEX 80-4284
L.A. (213) 822-4566 • Chicago (312) 329-6853 • N.Y.C. (212) 269-2522

MCBA is looking for some professional bill collectors.

More specifically, we're looking for some dealers who like money. Lots of it. Because when you carry our powerful, field-proven software, that's exactly what you can expect.

Why? It's quite simple, really. The quality of MCBA's library of 17 modular manufacturing, distribution, and accounting packages is attested to by over 15,000 users worldwide. In fact, it's really the only serious software of its kind available for mini and micro environments. Thanks to its modularity and flexibility, not to mention its comprehensive documentation. All of which has helped us develop and maintain successful relationships with dealers like you for over 10 years now.

This means you can establish a relationship with us and have at your disposal a comprehensive library of software packages. All of which can be mixed or matched to suit the unique needs of your customers. And as your customers grow, they'll come back to you for more business. Because you can expand their systems with totally integrated packages that work with each other like the movement in a Swiss watch.

So no matter what size your customers are now, or what size they are tomorrow, your business keeps growing. And the bills (the green kind) keep pouring in. It might even get embarrassing.

So if you're a dealer who's in it for the money, call MCBA now at (818) 957-2900. You may not end up being famous. But you could end up rich.

MCBA®

Software that grows on you. And with you.™

2441 Honolulu Avenue, Montrose, California 91020

For HP, Wang, DEC, and TI minis and UNIX, and RM/COS-based micros.

MCBA® is a registered trademark of MCBA, Inc.

Direct marketing group assails IRS matching plan

Direct mail lists to be used to locate tax evaders

By Paul Kennedeweld
CW Staff

The Internal Revenue Service's plan to use direct mail lists to locate tax evaders has drawn fire from the Direct Marketing Association (DMA), a coalition of 2,400 direct marketing companies.

"Those lists are designed for marketing purposes and should not be used for law-enforcement," said Jonah Gitlitz, the DMA's senior vice-president.

The DMA fears that citizens will be afraid to release information that marketing personnel need in order to target prospective customers. "If the public thinks the IRS may use the information, they will be less likely to cooperate," Gitlitz claimed in a recent interview.

By matching 1982 tax filer lists against a mailing list from Washington, D.C.-based Dunhill Co. that cost the IRS $49,000, the IRS hopes to locate 1,200 tax evaders in each of four test locations: Milwaukee, Bronx, N.Y., Nevada and Indiana [CW, Sept. 1, 1983]. Dunhill's list contains 2 million names equally divided among the four locations.

"The list provides information such as name, address, estimated household income, age of occupants, spouse and number of people in a household," said Wilson Phadely, public affairs officer at IRS. "Dunhill uses public information such as census track and real estate data to develop the list."

These lists are used primarily for locating potential customers and may contain inaccurate information, according to Gitlitz. "Direct marketing companies do not qualify the accuracy of each entry," Gitlitz said. "These lists are used primarily for targeting prospective customers, not for keeping a dossier on every citizen."

Dunhill was not the first company that the IRS approached, according to the DMA. "There were a number of direct marketing companies that were not willing to rent their list to the IRS," Gitlitz said.

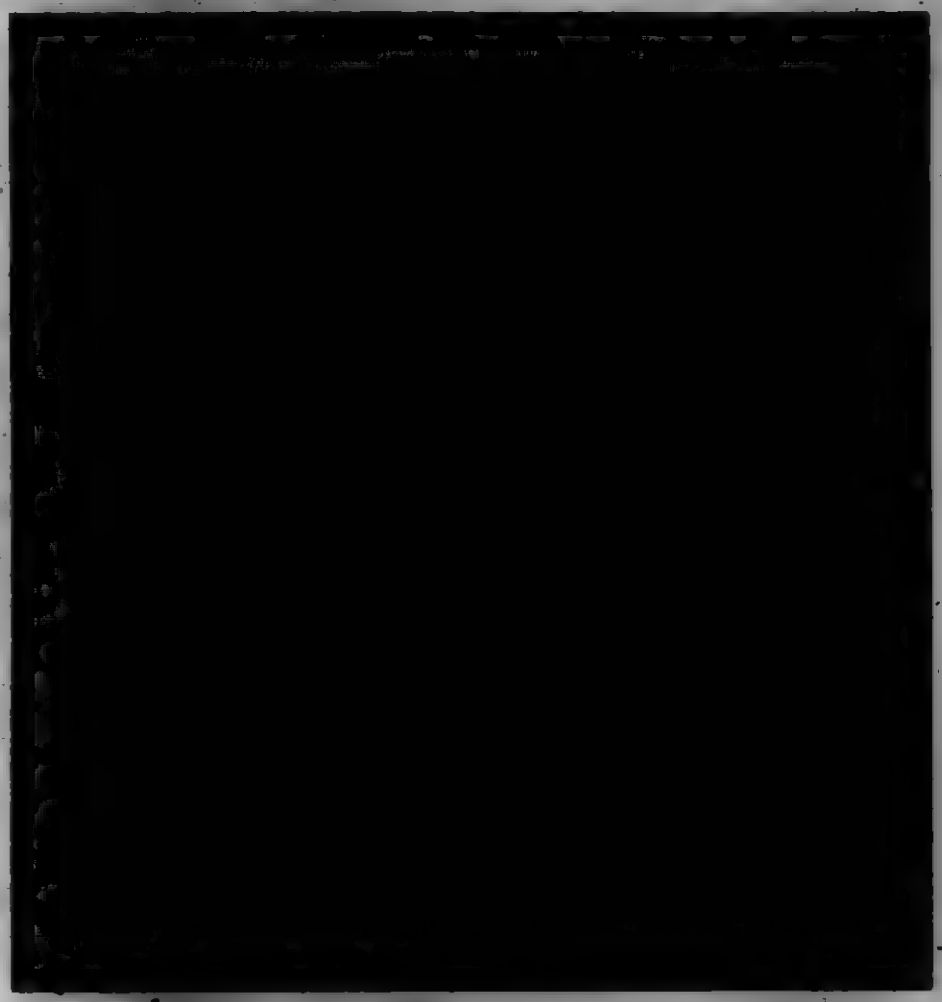
IRS' Phadely said that Milwaukee will serve as the first test site, where the IRS is running the Dunhill list against the government's 1982 Milwaukee tax return list.

"Our system [a National Advanced Systems, Inc. AS/9060] is able to match lists easily," Phadely said. "Annually, we match tax returns against the previous year's return. We have almost completed the computer matching between the Dunhill list and 1982 Milwaukee tax filers list. By April 1, we will mail a list of prospective nonfilers to the Milwaukee office."

Potential nonfilers will be given the opportunity to respond to charges. "In May or June, the local IRS office will mail to [prospective] nonfilers a notice asking why they did not file a tax return," Phadely said. "If they refuse to respond, their cases will be handled like other investigations."

Later this year, this process will be followed in other test sites. When the four test cases are completed, the IRS plans to do a cost benefit analysis on the project. "We estimate that in 1981, there was $5 billion in uncollected taxes," Phadely said. "We hope that techniques like computer matching will help us collect a portion of this money."

If the pilot program is cost effective, the IRS must decide if it wants to implement the system nationally. DMA staunchly opposes nationwide implementation. "Our members will not cooperate with the IRS' plans," Gitlitz said.



Net/One offers something unique in local area networking. A track record.

In fact, Net/One® offers a number of things unique in local area networking. True vendor independence. Media independence—baseband, broadband, fiber optics, or any combination thereof. Remote bridges and local bridges to interconnect separate Net/One systems—broadband or baseband—between buildings, or between cities, worldwide.

And all this uniqueness becomes even more so when you look at our track record. We not only talk a great network, we've actually been delivering Net/One since July of 1980. Hundreds of our systems are already out there moving information for organizations like Control Data, Caltech, Fairchild, ITT, RCA, Boston University, U.S. Forest Service, and Ford Aerospace.

Let's talk about how to turn the equipment you have now—whatever it is—into the network you want, now, with a network you can have, now. And a network that can take you wherever you want to go from here. Net/One.

Ungermann-Bass, Inc., 2560 Mission College Boulevard, Santa Clara, California 95050. Telephone (408) 496-0111.

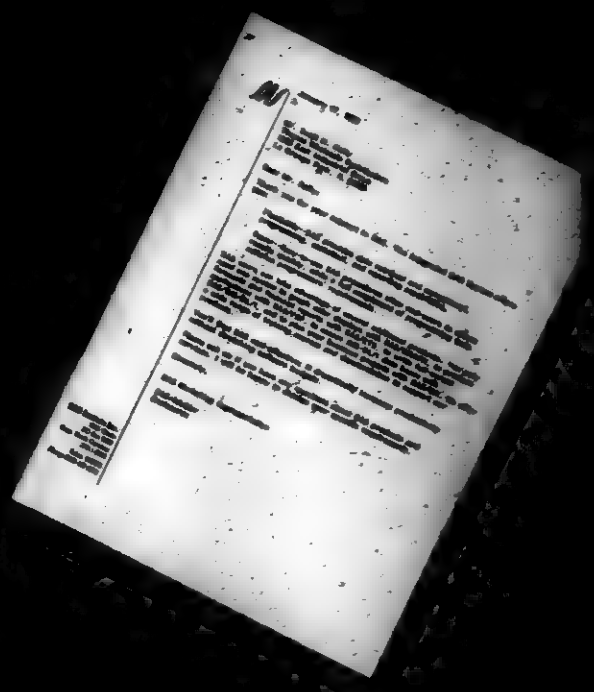
Net/One from Ungermann-Bass

© 1983 Ungermann-Bass, Inc.
Net/One is a registered trademark of Ungermann-Bass, Inc.

SAS...
Power and Flex
to Meet All You

Available
for
IBM, DG ECLIPSE
and DEC VAX

ibility
r Needs



Office automation not yet a widespread trend: survey

By Patricia Keefe
CW Staff

BILLERICA, Mass. — There is plenty of room for growth in the office automation market, according to a nationwide survey sponsored by Honeywell, Inc., which found that more than half of the offices it surveyed do not have word processing power, and fewer than one in 10 managers use a personal computer.

In an age of automation, even those secretaries working in automated offices typically share equipment or send work to an automated center, according to "Office Automation and the Workplace."

The survey was conducted by Response Analysis, a research firm located in Princeton, N.J. The results are based on a random sample of 443 information-intensive businesses with 100 or more employees. Specifically, 1,264 secretaries (99% female) and 937 managers (84% male) were questioned. One-third of the secretaries worked for three or more managers.

Only 5% of the secretaries surveyed have their own computer. Further, two-thirds of the offices surveyed did not have memory typewriters, and three-fourths or more did not have personal computers, electronic mail and computerized scheduling and filing.

However, in offices where automation has been introduced, secretaries depend upon their equipment. Forty-six percent reported that half or more of their daily work load is automated; more significantly, seven in 10 secretaries said it would be difficult or impossible to handle their work load without the equipment.

Although both managers and secretaries identified communications as the key to improving office productivity, bosses were more likely to say that more automated equipment would increase productivity, while twice as many secretaries cited the need for more of a team relationship, the report said.

The most frequent suggestion offered for improving productivity where automation already existed was more and better training. Secretaries in particular cited training as the single most important change needed when introducing automation into the work place.

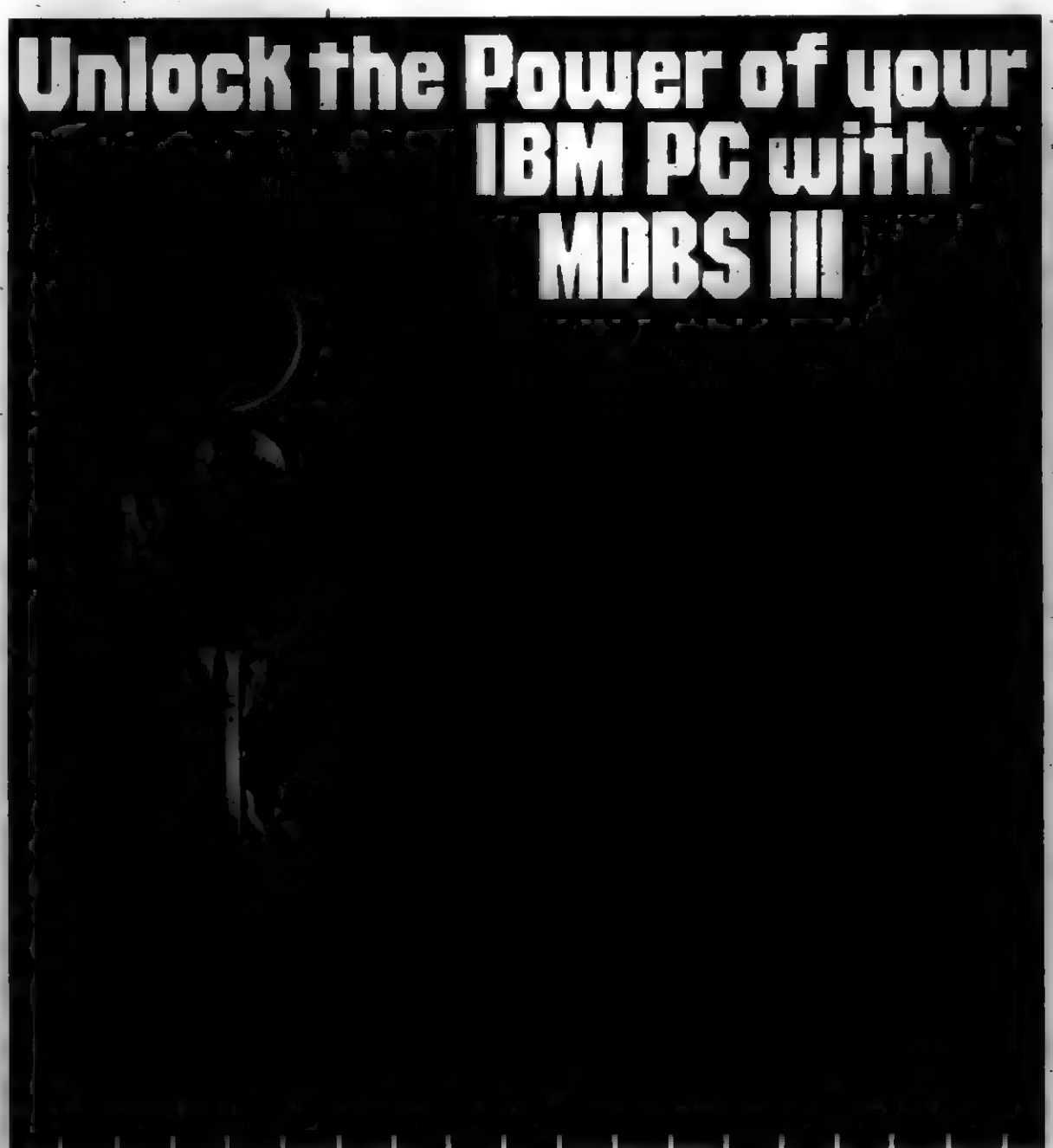
The level of satisfaction with automated equipment was found to vary according to the level of automation, with users from companies with high and medium levels of automation expressing the most satisfaction. "Nine in 10 say automated equipment makes their job easier, makes routine tasks go faster and improves work flow through the office," the report said.

Among nonusers, managers are more positive than secretaries about automated equipment, while younger secretaries were found to view automated equipment more favorably than their older peers. Also, a third of these nonusers estimate that half or more of the daily secretarial work load could be automated — an estimation borne out by 46% of secretarial users.

Overall, users and nonusers expressed few, if any, concerns about having automated equipment in their offices.

Copies of the survey are available free from Honeywell, 300 Concord Road, Billerica, Mass. 01821.

Unlock the Power of your IBM PC with MDBS III



Call 800-323-3629 today.
Please send me the following:
☐ Set(s) of documentation, including MDBS III manual and Data Base Primer and Guide for $90.00 each plus $10.00 shipping and handling per set.* (Regular price is $100.00)
☐ Set(s) of "How to Evaluate and Select a DBMS" for $5.00 plus $1.00 shipping and handling.*
☐ Professional Training Course Information.
☐ Please have a MDBS/Application Development Products Account Representative contact me.
☐ MDBS III information.
*Prices subject to change without notice. Illinois residents please add 6% sales tax.
Name
Company
Address
City
State Zip
Phone ( )
We accept VISA, MASTERCARD and American Express
Card No.
Expiration Date
Bank No. if MC
Signature
SFAC008
Micro Data Base Systems, Inc.
Application Development Products
(312) 981-9280
55 W. Algonquin Road-Suite 400
Arlington Heights, IL 60005
MDBS III, Knowledge Man and SCREEN MASTER are trademarks of Micro Data Base Systems, Inc. PCDOS and PC/XT are trademarks of IBM. MSDOS is a trademark of MICROSOFT. CP/M-86 and MP/M-86 are trademarks of Digital Research

Forum to cover factory systems

CHICAGO — The successful implementation of factory automation systems will be the focus of the Factory Systems Summit Conference, which will be held here May 15-16 at the Knickerbocker Hotel by The Yankee Group.

The event will highlight strategies and tactical approaches to managing new factory technology, according to The Yankee Group. Recent developments in factory automation will be explored, and participants will be able to compare the strategies of companies that have already undertaken automation.

According to the sponsor, registrants will be asked to outline the issues most important to them, and speakers will address their topics from the perspective of those issues.

Among the scheduled speakers are Larry Gould, research director of the Factory Systems Planning Service, who will provide an overview of current technology, and Richard Morley of Gould, Inc., who will outline the future of factory systems.

In addition, Howard Anderson, managing director of The Yankee Group, will discuss networking as it relates to industrial automation, and Frank Curtin of the General Electric Co. will speak on the vendor's role in manufacturing system planning and implementation.

Attendance for both days of the Factory Systems Summit Conference is priced at $875.

Additional information can be obtained from The Yankee Group, 14th Floor, 89 Broad St., Boston, Mass. 02110.

Three unresolved issues identified for OA users

By Patricia Keefe
CW Staff

CAMBRIDGE, Mass. — Users of office automation must face three critical, unresolved issues before they can expect to reap its rewards, according to a report by a Yale University professor based here. The issues are:

■ The tension between social roles and efficiency.

■ The "disturbing" use of OA to relieve drudgery only.

■ The need to provide more avenues for employee participation.

In her report, "Office Automation and People: A New Dimension," Rosabeth Moss Kanter asserted that the challenge of office automation is twofold: to use time saved by the computer as a "hand tool" to work on problem solving and innovation and to extend use of the computer as a "head tool" to enrich human minds and communication.

The report is a reaction to the findings of a Honeywell, Inc.-sponsored national survey on office automation. Kanter, who is a consultant to Honeywell, is both a professor of sociology and organization and management at Yale's School of Management and chairman of the board of Goodmeasure, Inc., an international management consulting firm located here.

According to Kanter, the ability to meet the challenge of OA is handicapped by traditional social roles and relationships in the office, particularly the relationship between managers and office workers. Making the best use of OA will mean office role changes, Kanter said.

Coming clash

She warned of a coming clash between office workers desiring more responsibilities and managers who want to maintain current roles. The latter stance was described as a defensive reaction against any change in status or work methods that might arise from the potential of OA to create new roles for secretaries.

The first role change is likely to see younger, lesser paid employees (typically female secretaries) instructing older, better paid managers (typically male) in OA techniques.

What appears to be a status reversal will inhibit some managers from learning about OA, Kanter predicted.

Kanter also advised using computers to help people not only do their jobs faster, but do them better by providing more brain power. "Whereas short-term productivity can be affected by purely mechanical systems, innovation requires intellectual effort," she said.

Noting that the Honeywell study uncovered a strong desire among secretarial workers for greater participation in decision making, Kanter warned that "bringing in major technical change is not simply a technical matter. Participation and collaboration [with workers] are essential to the success of innovation, particularly complex innovations like office automation."

Winners in office of future will use OA as 'head tool': professor

CAMBRIDGE, Mass. — Winners in the office of the future, according to Rosabeth Moss Kanter, will be the corporations that employ office automation as a "head tool" to enhance communication and innovation and are visionary enough to use it to reshape social roles in the office toward more participation and teamwork.

Kanter, a Yale University professor of sociology and management, as well as a management consultant to Honeywell, Inc., offers the following steps as a method to help ensure successful office automation:

■ Well in advance of system implementation, try out plans and ideas on people within the organization to ensure that all key stakeholder groups "buy in."

■ Form a steering committee to manage the entire effort and provide members of the group with special training in people-sensitive consulting.

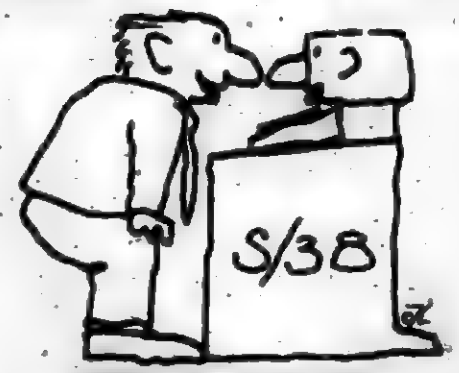
■ Ensure the involvement of potential users and affected employees by soliciting suggestions and holding management briefings long before the equipment arrives. Use this input to help shape purchasing decisions.

■ At installation, encourage dialogues between users and vendors and ensure that the vendors are willing to modify their plans to accommodate the needs of a particular office.

■ Offer open-ended, people-oriented training that is self-paced, problem-centered and based on real-life problems.

■ Establish monthly user meetings on a permanent basis that provide encouragement and support, including personal and professional growth.

Strike up a Conversation



With your GL

Get the information you need when you need it

Begin a productive relationship. Tell Finance/38's™ general ledger to respond through user-defined structures: on-line report writers: flexible budgeting & S/38 design.

Let us introduce you. Call today:

NGS

NEW GENERATION SOFTWARE, INC.

341 Lincoln Street, Roseville, CA 95678 Phone 916 [illegible]
Outside California Call Toll Free 800 824-1226

IF YOU'RE READY TO BREAK SOME RECORDS, WE'D LIKE TO SEND YOU OUR TAPE.

We're The Software Place. One of the finest sources of business and personal computer software presently expanding in selected markets across the nation.

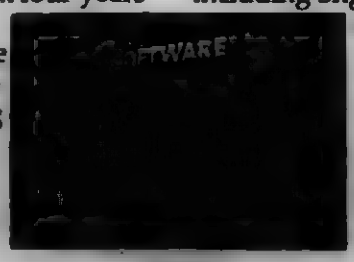
And we're now making franchises available to qualified individuals anxious to excel in a retail segment that analysts project will more than double in sales each year over the next four years to $2.9 billion.

If you meet the requisites necessary to becoming a franchise owner/manager, all you need to get started is $50,000 liquid capital plus the ability to obtain $110,000 additional financing.

Once we hear from you, we'll tell you how to receive our complete information package, featuring our videotape and brochure. You'll learn how our comprehensive franchise program will take you from site selection through store opening and beyond, including ongoing technical support, advertising and more.

So give us a call now.

With our program and your drive, it could be a record year.



THE SOFTWARE PLACE™

8701 North MoPac Blvd, Suite 165 Austin, Texas 78759 512 343-0414

ARE YOU EXPECTING MIRACLES FROM YOUR COMPUTER?

Computers have solved a lot of problems around the office.

But because of their usefulness, sometimes it's easy to expect more from computers than they can possibly deliver.

For example, computers are good for storing data. But they can't store the documents you must keep for evidentiary purposes. And they can't make your old paper files more efficient.

But computers along with micrographics can. Micrographics is 3M's concept of file management that uses microfilm instead of paper to store and retrieve your important documents.

With one of our computer-assisted retrieval systems, for example, you can dramatically improve file retrieval time and virtually eliminate the problem of lost files. All in less space than you now devote to record storage.

The result is a system that not only improves the efficiency of workers, but saves your company time, space and money.

Find out how micrographics can fit into your office automation plans and give you more control of your files. Call 1-800-328-1684 (1-800-792-1072 in Minnesota or 1-800-268-9055, Operator 13 in Canada) or return the coupon for our free booklet. Because good as they are, computers can't do it alone.

GET CONTROL. GET FILE MANAGEMENT.
Part of the 3M Orchestrated Office.

Name_____

Company_____

Title_____

Phone_____

Address_____

City_____

State_____ Zip_____

For a free booklet send to G. Collins, File Management Systems, Office Systems Division/3M, 3M Center, Building 216-2N, St. Paul, MN 55144.

COWG

3M hears you...

3M

Tips offered for developing advanced office systems

Informal survey urges MIS directors to broaden base of DP expertise

By Robert Batt
CW West Coast Bureau

Management information systems directors must broaden the base of traditional data processing expertise found in large, Fortune 1,000-type corporations when developing strategies for advanced office systems, a number of experts in the field stressed in a series of recent telephone interviews.

Philip James, vice-chairman of the Office Automation Council of Los Angeles, for example, said MIS directors must put in place an infrastructure of skills to enable the effective management of end-user computing through office systems.

"The skills required to implement technologies such as electronic mail, telecommunications, word processing and voice/data communications are not likely to be found in one person," James maintained. "MIS directors will need to draw upon the back-room data processing skills of their people and combine them with people who have front-room office skills and interpersonal skills," James added.

James, who is also director of strategic planning, corporate information resources, for Northrop Corp., the Los Angeles-based aerospace manufacturer, said very few companies have yet put in place a formal training program to develop and blend such skills.

Broad-based skills

Jack Adams, a partner in the accounting firm of Price Waterhouse & Co., also emphasized the need for broad-based skills. "There are precious few people with the background in voice and data and sufficient business acumen to make a go of advanced office systems," he observed.

"Too often, the MIS director recruits people with skills that are much too narrow and has attempted to launch an office automation program through these people. Usually it turns out to be a pretty sluggish launching," Adams said.

One company that has instituted a formal office systems strategy is Standard Oil Co. of California (Socal). Socal expects to have 1,000 personal computers installed worldwide by the end of the year.

In addition, the company has a network of some 3,000 IBM 3270 CRT terminals running under IBM's Systems Network Architecture (SNA), and it has formed an advanced office systems group to install Xerox Corp. 860 word processing systems connected via three Ethernet local-area networks.

Charles Oldenburg, Socal's general manager of computer services, said, "We are relying on in-house expertise. Our management philosophy is to keep people on a steep learning curve and emphasize team efforts in developing the data processing, telecommunication and user skills that we need."

According to Rod Asher, a person-

See OFFICE page 28

OA emergence in large firms to impact MIS

By Robert Batt
CW West Coast Bureau

The emergence of advanced office systems in large corporations will have an enormous impact on the way the management information systems department carries out its functions.

That was the consensus reached by data processing managers and industry consultants in a series of recent telephone interviews.

The development of office technology will lead to a fundamental change in the nature of many MIS programs and the way they interface with their companies as a whole, according to Steven Abraham, senior management consultant at Price Waterhouse & Co. in Los Angeles.

"The major issue facing MIS managers today as a result of office automation," Abraham said, "is how to turn their DP departments into the kind of end-user computing facilitator that organizations now require. This is no small change, since DPers will help to determine the way information is going to be used throughout the whole organization."

John Connell, executive director of the Pasadena, Calif.-based Office Technology Research Group, contended that the changes prompted by office automation are vast and vary from company to company. If the impetus for OA systems comes from the MIS department, Connell said, the developments tend to be more technologically oriented than if another de-

See OA page 28

OA from page 25

partment, such as human resources or administration, were the prime mover behind the technology.

"In some cases, political warfare has arisen as different factions within an organization attempt to increase or maintain their power through the use of office systems," he observed.

Connell sees two major directions occurring concurrently in the development of office systems:

■ The focus of the traditional data center and its support activities on transaction processing.

■ The need to move the technology out and put computing capabilities in the hands of end users.

Very different functions

"The first is a service function, while the second is a facilitating problem. They are, therefore, two very different kinds of functions, and we may not be able to put them in the hands of one person," Connell said.

Abraham suggested one solution would be to hire a new information officer, unmarked by any history of internal political wrangling, who would be responsible for bringing the different elements of advanced information systems together, while leaving the MIS director to concentrate on managing the central DP resources.

"One way or the other, the MIS job is going to change drastically. The MIS director who is protective of his status and not willing to face the new requirements posed by office systems will end up as the loser, and his DP organization will fail in the process," Abraham warned. "The MIS director who makes the necessary adjustments will come out as a big winner."

According to Philip James, director of strategic planning, corporate information resources at Northrop Corp., many DP managers seem to be slower than other departmental managers to change their perspective in dealing with office automation. But James, who is also vice-chairman of the Office Automation Council of Los Angeles, said office systems is a dynamic field that is attracting a lot of dynamic people, and if MIS managers do not develop a greater end-user orientation, they will find themselves with big problems.

"The development of advanced office systems calls for an understanding, at a broad level, of the potentialities of information technologies, a close relationship with senior management and a set of political, technical, organizational and managerial skills to drive home the office of the future effectively," he concluded.

OFFICE from page 25

nel recruiter in Los Angeles who specializes in office systems technology, MIS directors are using all possible avenues to lure office systems specialists into their camp, including such bait as extensive advertising, employment of recruitment agencies and outside consultants, internal training, increased bonuses for employee referrals, technology fairs and the traditional grapevine.

"Right now, the main experts in office automation are to be found among the OA vendors themselves, personal computer manufacturers and among the large end users who have pioneered the use of office technology," Asher said.

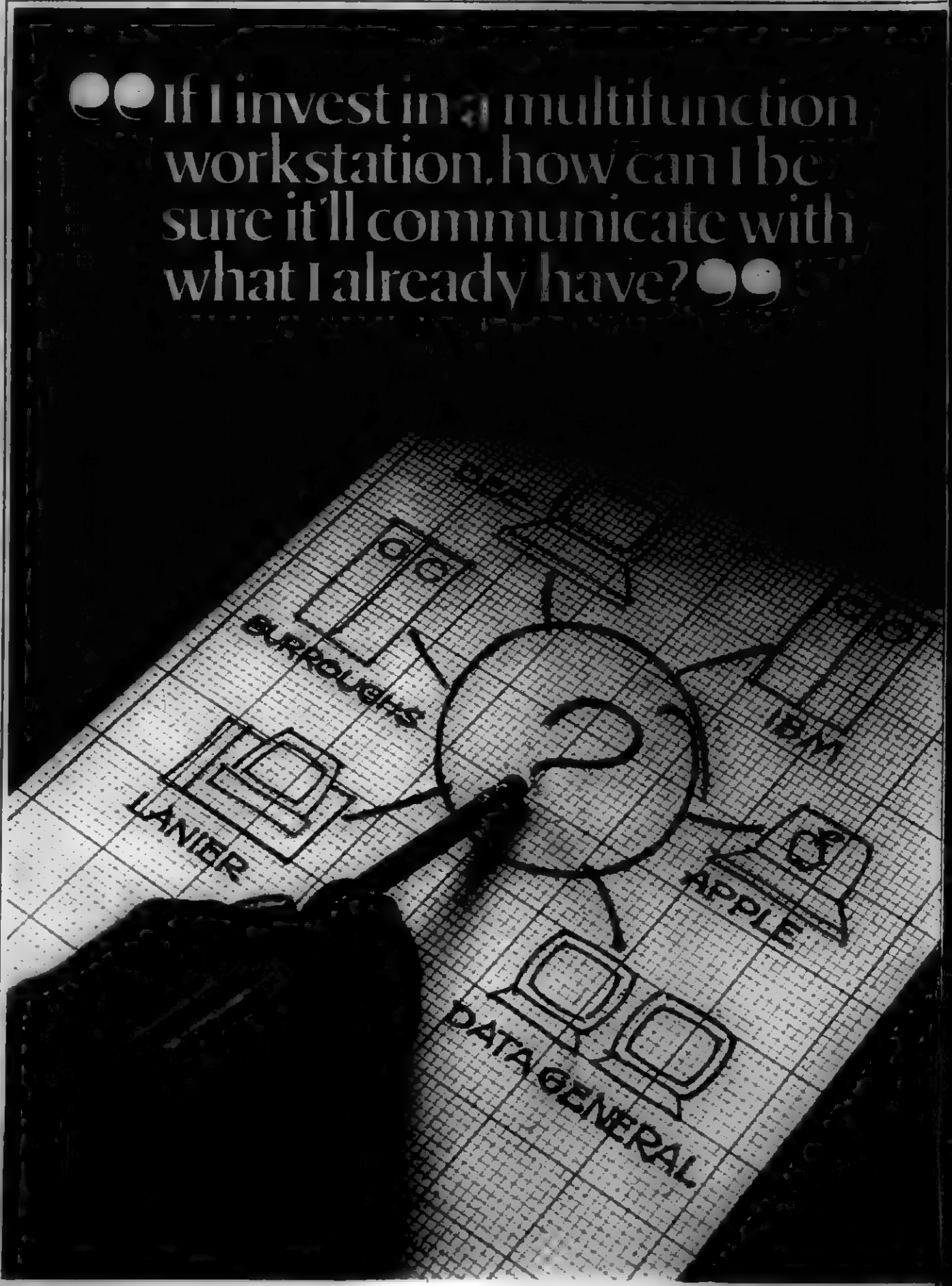
"Corporations will need to become very competitive if they are to lure these people away from their present jobs."

On the other hand, John Connell, executive director of the Office Technology Research Group in Pasadena, Calif., an international association of managers specializing in advanced office systems, contends that the frenzy over the lack of OA specialists is misplaced.

"Office technology is not difficult, and there is no shortage of skills," Connell contended.

"The real need is for people who can move the technology out to nonspecialists and make them comfortable with it.

"While someone in data processing or data communications needs to be concerned with tying the different systems into a network, the real skills are human interaction skills," Connell added. However, he said MIS directors are not well versed in developing those skills among their people.



A look at software productivity: tell us your view

Computerworld's May Special Report will take a close look at software productivity, something our readers are continually trying to improve.

The Special Report will focus on application backlogs and the efforts being made to reduce them; the programmer shortage and whether it really exists; high-level languages and structured programming; and code generators as well as reusable code.

Contributions to the Special Report can take one of two forms: a tutorial article discussing a productivity issue or trend or a user application story outlining a particular firm's experience with a software package.

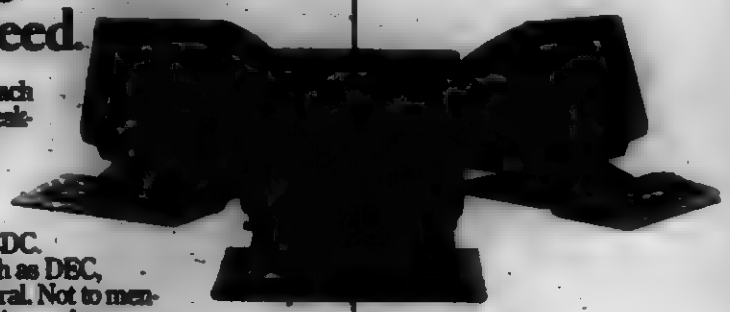
Articles must be typed, double-spaced and can range in length from four to eight pages.

Artwork such as charts, graphs and photographs are encouraged.

Authors should also include with their articles a brief biography and a telephone number at which they can be reached.

The deadline for submissions to the Special Report is March 28. If you have a tale to tell, address it and any questions to Donovan White, Special Reports Editor, *Computerworld*, 375 Cochituate Road, Box 880, Framingham, Mass. 01701.

Northern Telecom's information processing products have the communications capability you need.



The 500 Family.

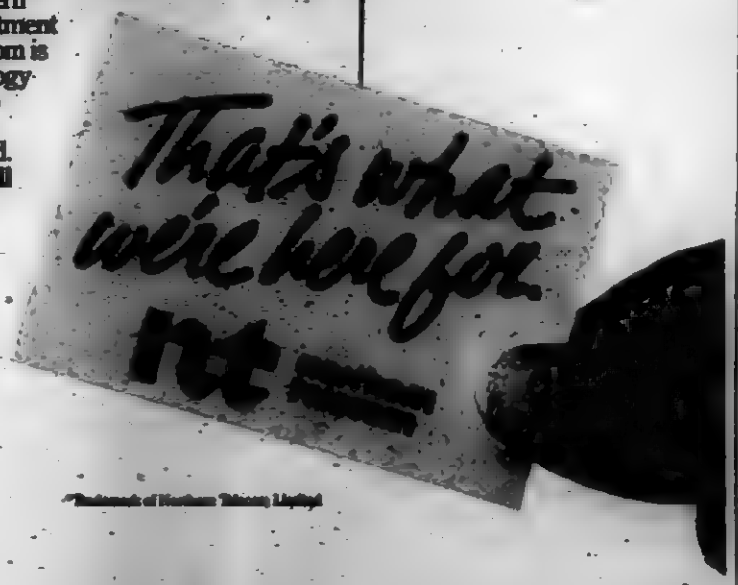
Besides being compatible with each other, Northern Telecom's 503 desktop computer and 565 and 585 information processing systems communicate effectively with a multitude of mainframes, including IBM, Burroughs and CDC. They also talk to other minis such as DEC, Hewlett-Packard and Data General. Not to mention word processors such as Lanier, and even micros such as TRS-80 and Apple.

This means you'll have more flexibility—and more control over your information system. Even if more and more personal computers are becoming a part of it. Our 500 family supports the CP/M® operating system software, so employees can have the personal-computing capabilities they want, while your company keeps the organizational unity it needs.

At the same time it's running CP/M, the family can also be running its own unusually powerful operating system which is compatible across the whole 500 line. It permits a unique approach to multitasking—with a few simple keystrokes, up to 16 tasks can be performed simultaneously on the same terminal. Data processing, personal computing, spread sheets, word processing, information management, electronic mail, whatever task needs to be done can be done at the same time. An incredible timesaver.

All in all, the 500 series is quite a family. Versatile, reliable and a perfect example of Northern Telecom's OPEN World® commitment to compatibility. Northern Telecom is a world leader in digital technology and we're using this expertise to make sure our products fit comfortably into a multivendor world.

For more information, call 800-621-6476 (in Illinois 800-572-6724), or write to Northern Telecom Inc., P.O. Box 10934, Chicago, IL 60610.



®Trademark of Digital Research Inc. ®Trademark of Northern Telecom Limited

MANAGERS ON THE MOVE

FRANK GRAU, director of management information systems for General Development Corp., has been named assistant vice-president of management information systems. Grau will have overall responsibility for administration of the corporate information and word processing functions for the Miami-based company.

Grau was with General Development from 1974 to 1981 as manager of systems and programming in the MIS department and later as assistant vice-president of community operations.

From 1981 to 1983, he served as vice-president of marketing for Colonial Data Systems, Inc. and director of management information systems for Interterra, Inc. He rejoined General Development in June 1983 as director of management information systems.

Grau holds a bachelor's degree from the University of Jose Marti in Havana and also attended City College of New York.

■

JOSEPH L. BROWN has been elected assistant vice-president of systems and programming for Lincoln First Bank's new National Bank of Westchester division in White Plains, N.Y. Brown joined Lincoln First Bank in 1976 as an analyst in the systems and programming department.

In August 1979, Brown advanced to senior analyst and in March 1981, he was appointed systems officer. In October 1983, Brown was promoted to assistant vice-president.

Prior to his arrival at Lincoln First Bank, he served 10 years with Westchester/Rockland Newspapers, Inc.

■

DOUGLAS A. STEVENS has been named director of new systems development for the Grand Union Company in Parsamus, N.J.

Prior to joining Grand Union, Stevens was product manager of on-line directory systems and manager of overseas data processing for ITT in Secaucus, N.J.

He graduated from Miami University with a B.A. in economics and from Rutgers University with an MBA.

Supercomputers aid understanding of solar activity

By David Gleeso
CW Staff

BOULDER, Colo. — Aided by a sophisticated $35 million computer facility at the National Center for Atmospheric Research (Ncar), astronomers have developed the first solid evidence of a connection between the sun's speed of rotation and the 11-year sunspot cycle.

Peter A. Gilman of the research center's High Altitude Observatory here specializes in building highly complex numerical models of the sun utilizing the center's two Cray Research, Inc. Cray-1/A supercomputers. His models were instrumental in establishing the correlation between sunspot activity and solar rotation.

A senior scientist and head of the observatory's solar variability section, Gilman worked on the project with Robert Howard, a prominent solar astronomer based at the Mt. Wilson observatory in Southern California. Pamela Gilman (no relation), a research assistant at the Mt. Wilson observatory's headquarters in Pasadena, Calif., also participated in the project.

Scientists have known that the sun is spinning rapidly, with the equatorial region making a complete rotation in about 27 days. The cycle of sunspots changes between minimum and maximum activity during an 11-year period. Gilman and Howard have discovered that the sun's rotation speeds up every 5½ years, at both minimum and maximum sunspot activity — an occurrence they call the "twin-peak effect." During these periods, the speed of the sun varies by as much as 1%.

Howard said the finding "implies that some internal dynamic — some very large internal circulation — is going on, which is probably responsible for the [sunspot] cycle and which has an effect on the sun's rotation."

May lead to an explanation

"We don't understand what causes the activity cycle," Howard added, but "we do know it's magnetic in origin and that it takes place somewhere in the sun." However, the latest finding does provide a clue that may someday lead to an explanation of the sunspot cycle.

Gilman explained that his modeling has concentrated on understanding what is occurring in the sun's convection zone, a region that is believed to occupy roughly the outer one-third of the radius of the sun.

The center's two Cray-1As are front-ended by twin IBM 4341 mainframes. The center uses an Ampex Corp. Terabit Memory System (TMS-4) for mass storage. Two Dicomed Corp. D-48C document microform systems are used for processing graphics data; they are controlled by a Digital Equipment Corp. PDP-11/34 minicomputer. Ncar staff members have interactive programming capabilities provided by two DEC PDP-11/70 minicomputers.

Gilman's finding is based on an analysis of data collected from 23,000 photographic plates of the sun taken daily over the last 67 years with Mt. Wilson's solar tower. Gilman and his colleagues plan to conduct a similar analysis of another plate collection dating back to 1906 that was recently discovered in India.

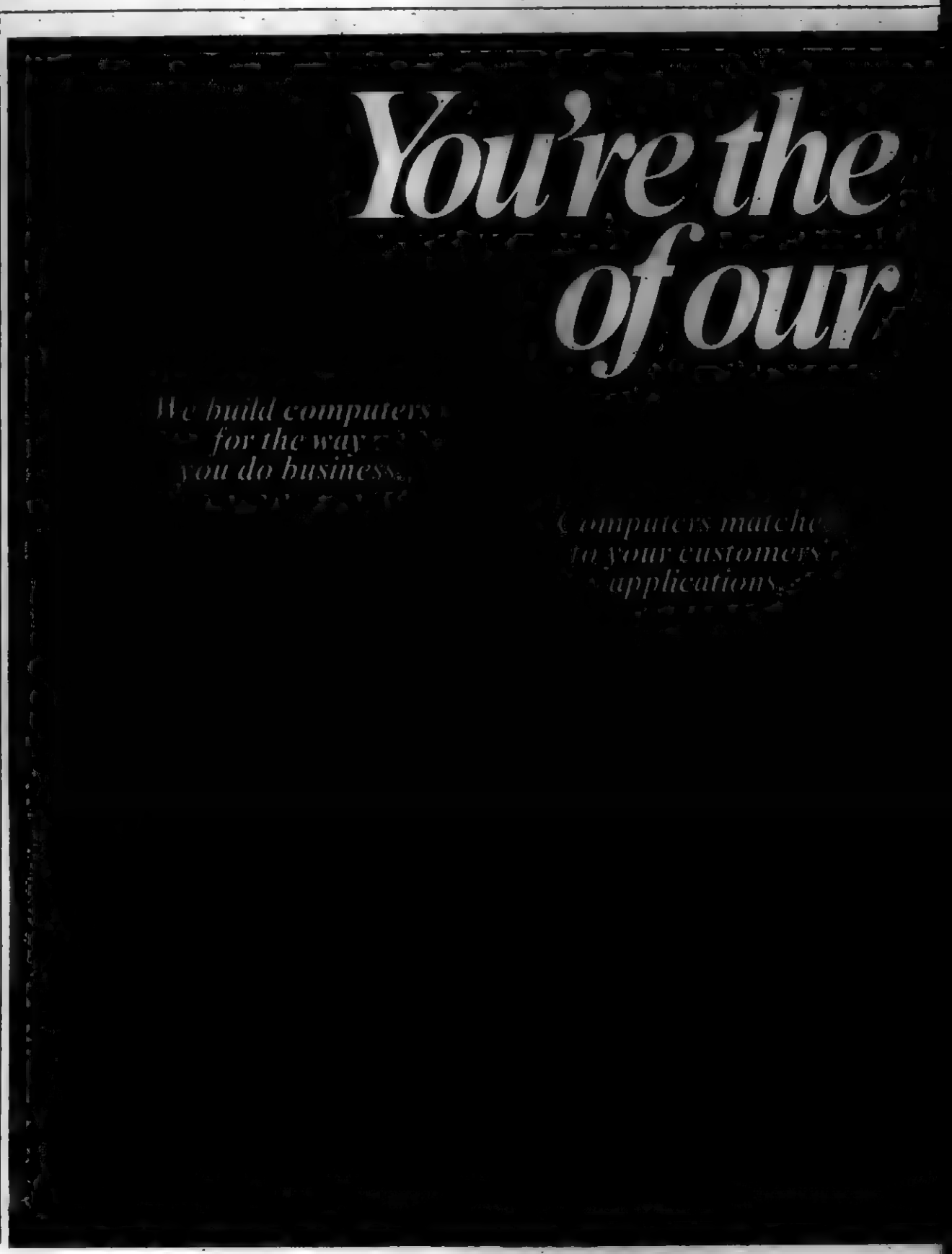
Gilman has been involved for 10 years in building mathematical models of the global, dynamic properties of the sun, in particular, convection, differential rotation and the solar dynamo — the mechanism by which magnetic fields are amplified and maintained. Before large, very fast computers were developed in the 1960s, Gilman said, it was impossible to explore systematically the theory of differential rotation and the solar cycle.

"These models do not have exactly the same physics in them that the sun does; in fact, they're considerably simpler," Gilman said. "Nevertheless, they are still very complicated and require enormous amounts of computer time." He said that performing just one large modeling calculation can require 50 hours of computing time on the Cray alone.

Supercomputers that can perform massive number-crunching calculations are now "clearly indispensable" in his work, Gilman said.

The center's computing facility is one of the largest in the U.S. dedicated to scientific research and is the only one used solely for atmospheric science and solar physics, according to an Ncar spokesman. Ncar is operated by the University Center for Atmospheric Research under the sponsorship of the National Science Foundation.

Some 80 qualifying universities and research organizations in the U.S. and Canada are linked to the center's computing facility by remote terminals.



NEWS

Upcoming electronic novels to let readers twist the plot

By Edward Warner
CW Staff

SUNNYVALE, Calif. — A woman is strolling on a beach. She spots a handsome man seated on the sand. Should she stop and talk with him? Go for a swim with him? Accompany him to the nearby bar?

Readers will get to make that decision — at their computers — in a diskette-based novel called *Island Love*, soon to be released by Home Computer Software, Inc. here.

Island Love is one of a series of interactive novels — stories where the reader decides the plot's twists — that are about to be unleashed on the reading public by several software publishers. Simon & Schuster, Inc. has signed Robert Heinlein, author of *Stranger in a Strange Land*, and six other science fiction writers to script "floppy books" for its Baen Software label, a series scheduled to debut in April. Synapse Software is said to be ready to release seven electronic novels this spring which, unlike the Home Computer Software products, will reportedly not require users to interact at all if they choose not to.

It is Home Computer Software, though, that is going for the widest ranging market, from adventure stories to mysteries, historical novels and science fiction. For the readers of romance fiction, the company will publish both teenage and adult interactive novels, said Bob Katz, Home Computer Software's marketing and sales vice-president. But, he noted, the adult romance, *Island Love*, will have no steamy beach scenes in its range of plot options.

"They're not going to get too racy; we're going after the mass market," Katz said.

The company will also market a story called *What if Lincoln Had Lived?* that will give users a chance to affect events in the Reconstruction-era South. Another, called *Your Championship Season*, makes the reader a team coach, complete with a player who has a drug problem. "That's real life, you know," Katz pointed out.

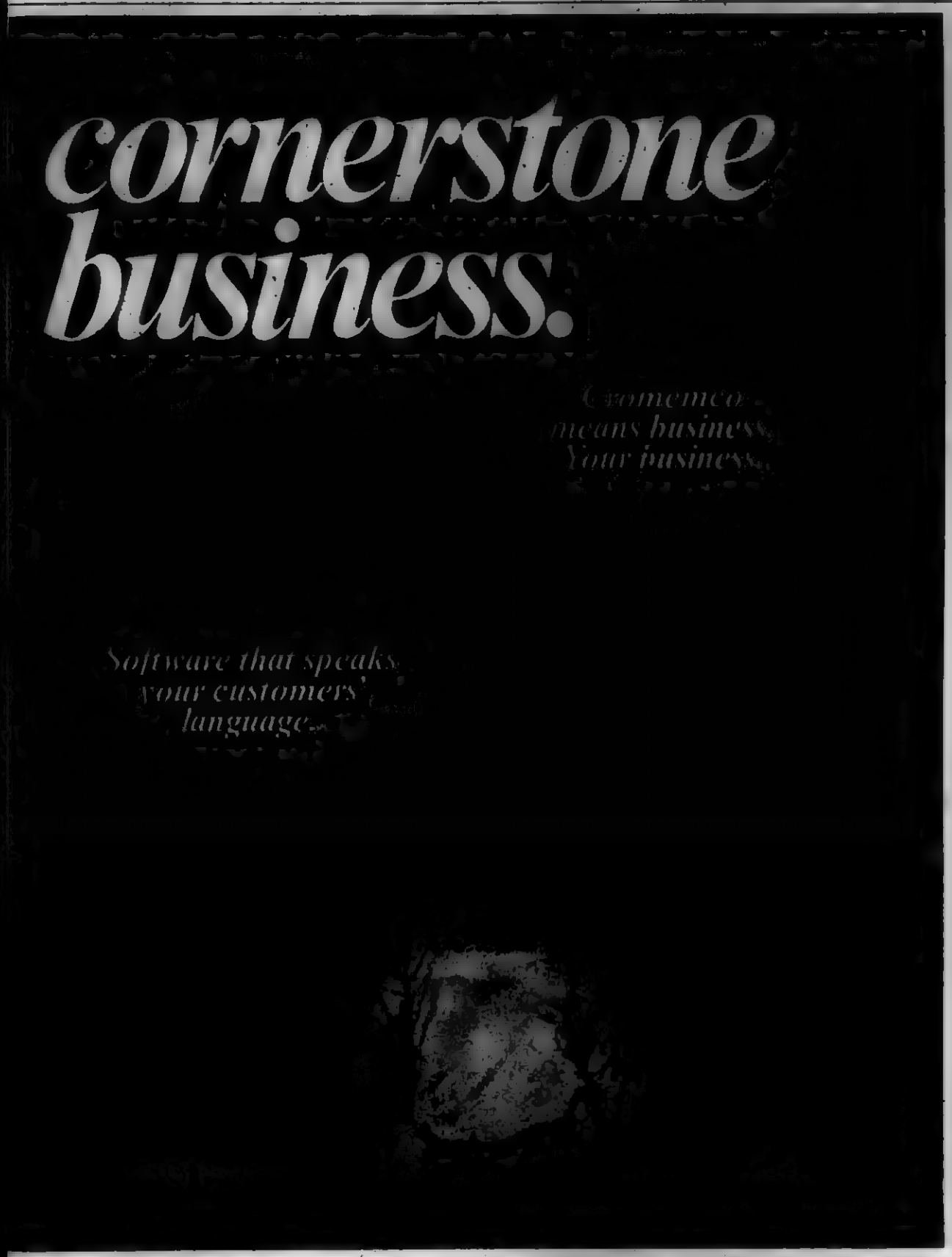
Katz said the stories, some of which have as many as 50 possible endings, will encourage reader creativity. The stories will include graphics and eventually will include electronic "bookmarks" that allow readers to shut off their novels, then turn them on again and instantly pick up where they left off.

Between 30 and 40 authors, including many teachers, are writing for the series, Katz said, adding that none have balked at turning over creative decision making to their readers. "They love it," he said. "This gives the writer the option to develop all those endings."

The Home Computer Software "Stories Alive" series will be delivered to retail book and computer stores in about 90 days, Katz said, and novels in the line will average in cost from $19.95 to $29.95, with none over $39.95. They will run on the Apple Computer, Inc. Apple II, Commodore International Ltd.'s Commodore 64 and the IBM PCjr.

Synapse Software will provide its electronic novels in July at an average price of $40, according to a spokesman. They will run on all Warner Communications, Inc. Atari computers, the Apple II series and the IBM Personal Computer and PCjr.

Simon & Schuster's Baen Software will reportedly carry an average retail price of $25 to $35 and will be available for the Apple II and IIe computers, the PCjr, Atari 400 and 800 models and the Commodore 64.



Martin seminar to open April 2

SANTA MONICA, Calif. — The Spring 1984 James Martin seminar, a four-city, five-day seminar on "The New DP Revolution," will be held first April 2-6 at the Marriott Crystal Gateway in Washington, D.C.

Sponsored by the Technology Transfer Institute, the seminar is geared toward general managers, DP managers, systems analysts and designers, programmers, data base staff, teleprocessing and networking specialists, planners, end users and business people.

Some of the topics included in the seminar include "The Information Center," "Information Engineering," "Fourth-Generation Languages," "User-Driven Computing," "Automation of Data Base Design," "Superintelligent Networks," "IBM's Architecture for Future Office Automation," "Techniques Analysis," "Automated Application Generation," "Electronic Office Integration" and "An Information Systems Manifesto."

The seminar will also be given April 9-13 at the Hyatt on Union Square in San Francisco; April 23-27 at Chicago's Hyatt Regency; and April 30-May 4 at the Hyatt Regency in Cambridge, Mass. The registration fee is $1,495.

Further information is available from the Technology Transfer Institute, 741 10th St., Santa Monica, Calif. 90402.

Capacity management conference set

Author of 'Megatrends' to keynote April 9-12 event

WASHINGTON, D.C. — John Naisbitt, the author of the best-selling book "Megatrends," will be a keynote speaker at the sixth annual International Conference on Computer Capacity Management here April 9-12.

Titled "Information Engineering — The New Frontier," the conference will examine the changing role of information management over the next 30 years.

Other keynote speakers will be William Synnott, senior vice-president of the Bank of Boston and author of "Information Resource Management," and Frank Reeder of the U.S. Office of Management and Budget's Information Policy Branch, according to the show management.

The president of Boole & Babbage, Inc., Jack Van Kinsbergen, and the originator of "Murphy's Law," Edward Murphy Jr., will also speak, according to the conference management.

Topics to be addressed at the conference will include the banking industry's approach to information engineering, successful information management, decision support systems, information as the asset of the 1990s and new computer architectures, according to meet sponsors.

The conference is sponsored by the Institute for Information Management and will be held at the Capitol Hilton.

Conference registration fees are $395 for IIM clients and $495 for nonclients. The conference's day-long tutorials are $195 each, and one-day conference attendance is $195, according to the show management.

Further details are available from the Institute for Information Management, which is located at 150 Oakmead Pkwy., Sunnyvale, Calif. 94086.

Cincom forum to target MRPS users

CINCINNATI — Cincom Systems, Inc. has announced that its second annual North American MRPS User Conference will be held April 1-4 at the Marriott Inn here.

Cincom's MRPS is a production and inventory control software package that operates on IBM mainframes and the Digital Equipment Corp. VAX-11 series of superminicomputers, according to a Cincom spokesman.

Conference activities will include user presentations on particular MRPS applications and discussions led by the Cincom staff about product and strategic plans, a Cincom spokesman said.

The conference registration fee is $250 for the first representative of a company and $150 for each additional person.

More information is available from Cincom Systems, Inc., located at 2300 Montana Ave., Cincinnati, Ohio 45211.

AMS '84 meet slated for June 12

CHICAGO — "The Computer: Mind of the Factory of the Future," will be the theme of the Advanced Manufacturing Systems Exposition and Conference (AMS '84), scheduled for June 12-14 at McCormick Place here.

The show and conference, sponsored by Clapp and Poliak (a Cahners Exposition Group), will feature demonstrations of information systems and automated production systems directed to the needs of manufacturing companies.

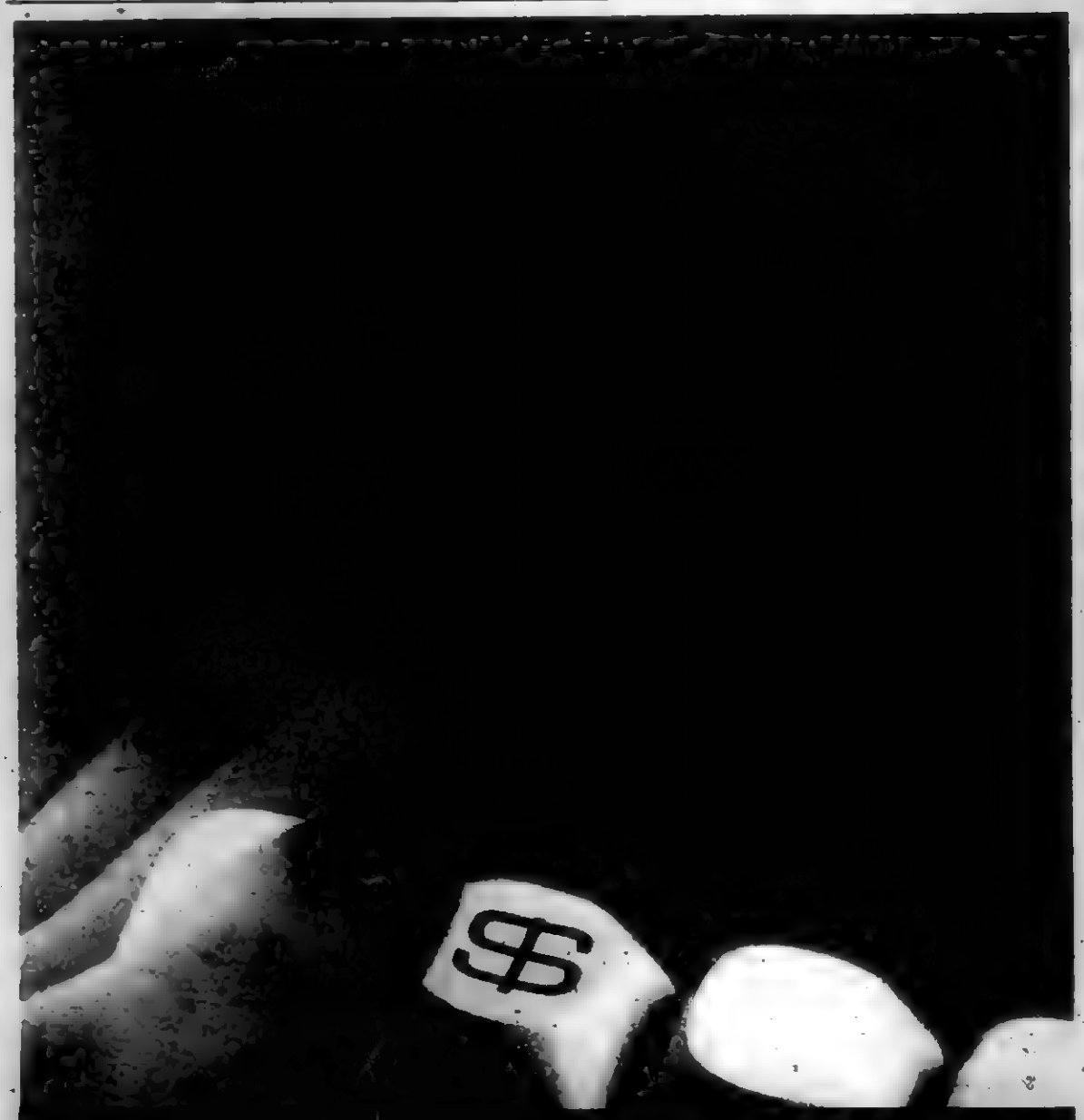
More than 50 sessions are reportedly scheduled focusing on areas such as productivity improvement systems, planning for closed-loop systems, advanced manufacturing systems technology and material control systems.

Information-related exhibits are expected to include computer-aided design and manufacturing systems, computer accessories and peripherals, various-size computers, duplicating systems, data collection and communications systems, distribution systems and software for manufacturing, according to show management.

Production-related sessions are scheduled to include robots and robotics, automated inspection equipment, programmable controllers, flexible manufacturing systems, optical measurement systems and laser equipment.

The price for the three-day conference is $295. One-day conferences are priced at $150 and half-day conferences at $85, according to the show management.

More information is available by writing AMS '84, 708 Third Ave., New York, N.Y. 10017.



ODE

Call this "Quick Response" TOLL-FREE NUMBER NOW
1-800-633-4748
For Important Details, or mail coupon to:

International Software Technology, Inc.
2822 Powers Ferry Road, Suite 240
Atlanta, Georgia 30339-6000

☐ RUSH FREE BROCHURE showing me 30 ways to save money with ODE™

Name
Title
Company
Address
City State Zip
Phone

International Software Technology, Inc.
2822 Powers Ferry Road, Suite 240
Atlanta, Georgia 30339-6000

VISUAL 50/55

The expert's choice in low cost terminals

VISUAL 50 is widely acclaimed as the best performing low cost terminal. Experts say it is in a class by itself for visual quality and price/performance.

VISUAL 55 extends its predecessor's performance even further by adding 12 user-programmable non-volatile function keys, extended editing features and selectable scrolling regions.

Both the VISUAL 50 and VISUAL 55 offer features you expect only from the high priced units.

- Tilt and Swivel Monitor
- Detached Keyboard
- Non-Glare Screen
- Smooth Scroll
- Large 7x9 Characters
- Menu Set-up Mode

And both VISUAL terminals are code-for-code compatible with the Espirit™, ADDS Viewpoint®, Lear Siegler ADM-3A and DEC VT52.® Plus the VISUAL 55 also emulates the Hazeltine 1500/1510.

VISUAL 50 and VISUAL 55. The choice of those who know terminals best.

Data Access Systems, Inc., the choice of those who want a single source supplier with widely acclaimed capabilities. DASI sells, leases and services the corporate user from a multi-million dollar inventory of PC's, CRT's, printers and modems. Its nationwide service locations give you same day on site service. And with an extremely large leasing base, DASI will tailor a financial package to meet any budget.

The Visual 50/55 and DASI...
An Industry Leader for 15 Years.

Call us today.

800-257-7748
In NJ 800-232-6510

D A S

DATA ACCESS SYSTEMS, INC.

Cates & Camden Avenues
P.O. Box 1230
Blackwood, NJ 08012
800/328-6700 800/257-7748
In NJ 800/232-6510

District Offices:
Atlanta (404) 998-2255 • Boston (617) 769-6420 • Chicago (312) 857-0440 • Cincinnati (513) 793-4430 • Cleveland (216) 473-2131
Denver (303) 337-4103 • Detroit (313) 978-7309 • Houston (713) 682-5985 • Los Angeles (213) 532-2238 • Minneapolis (612) 854-4466
New Jersey (201) 227-8660 • New York City (212) 564-9301 • Philadelphia (609) 228-6660 • Phoenix (602) 254-1927
San Francisco (415) 872-1811 • Seattle (206) 575-1448 • Washington, DC (301) 459-3377.

NEWS

INTERNATIONAL REPORT
CW International News Network

BRAZIL

RIO DE JANEIRO — A software product developed at the State University of Rio De Janeiro features a special man-to-machine interface that is said to reduce application development time significantly. The software is called Gim, and its interface reportedly prompts the user by talking him through the development process with voice commands, a University spokesman said.

■

RIO DE JANEIRO — Brazil's Special Department of Informatics has two months left to establish a firm policy for the medium-size computer systems market, which traditionally has been reserved exclusively for Brazilian companies. The computer manufacturing projects that are most often granted government approval have come from Brazilian companies that rely on their own technology or on IBM-compatible foreign technology. Four conflicting legislative proposals for a national computer policy (Informatics Law) are currently under debate and are mobilizing all political factions. The proposal of Democratic Party representative Cristina Tavares calling for strict market reservation is favored by the Brazilian business community, while it is also considered to be the most radical, sources reported.

■

RIO DE JANEIRO — While other sectors of the Brazilian economy found themselves deep in the throes of depression, the information processing industry continued to show exceptional growth in 1983, according to a recent report from the Association of the Brazilian Computers and Peripherals Industry (Abicomp). The report cited computer industry sales last year of $450 million, with personal computers and financial terminals showing the highest growth margin. The report also claimed some 16,000 jobs were created last year by the indigenous computer industry.

FRANCE

PARIS — An additional operating system plus three dual processors for its DPS 7 range of systems were unveiled here last week by Bull, the French computer conglomerate formerly known as CII-Honeywell Bull. The Gcos 7 operating system reportedly features some 20 software programs and languages for users with and without computer expertise. The operating system will run on all members of the DPS 7 family and is compatible with its predecessor, Gcos 64, according to Bull.

Falling in the medium to high end of the company's product line, the three dual processors — DPS 7/60P-Dual, DPS 7/70-Dual and DPS 7/80-Dual — feature increased memory capacity to 8M, 12M and 16M bytes, respectively. Pricing on this series begins at approximately $1 million for a 4M-byte DPS 7/60P-Dual with two 1,200 line/min printers, two 6,250 bit/in. tape drives and a front-end processor capable of managing up to 14 communications lines.

JAPAN

TOKYO — AT&T Japan, in conjunction with Tokyo University, is in the process of creating a standard for a Japanese Unix operating system that would support Kanji characters. Toshiba Corp., the original maker of Japanese Unix, is making plans to keep pace with AT&T. According to sources, a standard for Japanese Unix is needed badly because several different and incompatible Japanese versions of Unix by various Japanese vendors have sprouted up around the country.

■

TOKYO — The Ministry of Finance recently granted permission to credit companies to communicate with banks' computers. Credit-card holders will be able to use cash dispensers or automatic teller machines of the affiliate banks as of April 2.

WEST GERMANY

BONN — The German federal government has earmarked over $1 billion for technological research in microelectronics, information processing and communications over the next four years. The program is intended to bring new technologies to a practical level of use here.

VAX™

The most comprehensive
Project Management System
is *now available* for *immediate installation.*

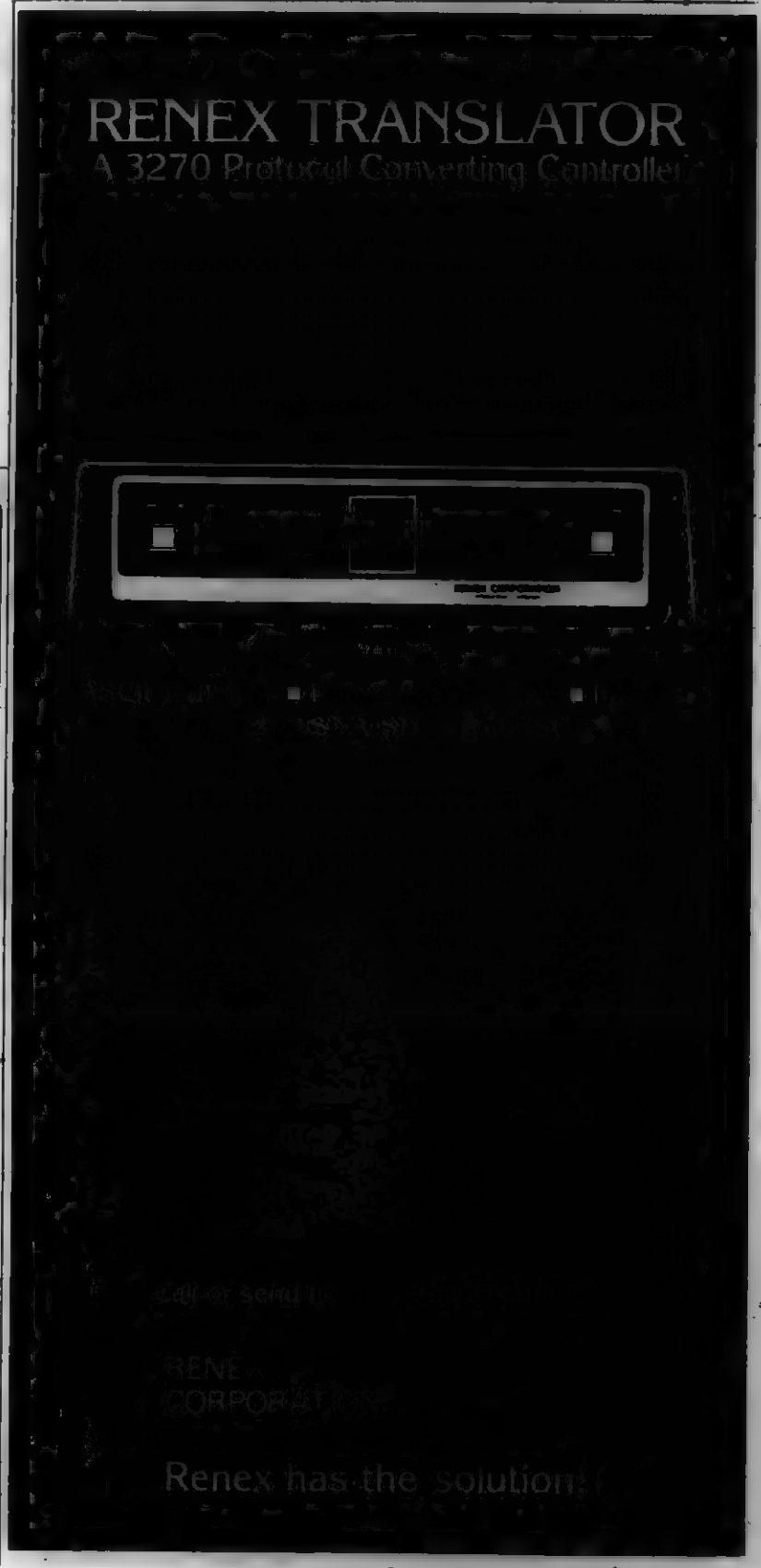
APECS/8000™
WITH TRUE RELATIONAL DBMS

From ADP's over
1,000 client-years of experience in Project
Management Computing.

CALL NOW
1-800-521-3166
Ask for Glenn Gumley.

ADP
Network Services

VAX is a trademark of Digital Equipment Corporation



A RATIONAL APPROACH TO RELATIONAL AND DECISION SUPPORT SYSTEMS

A One-Day Seminar with Bill Inmon

If you use relational and decision support systems—or if you're getting ready to use them—you won't want to miss this seminar. You'll learn about:

- Hierarchical versus relational systems
- Operational and decision support systems
- Actual cases of success and failure

In Cleveland: April 26 • In Boston: April 27

For more information, please call Lynn Kolenich in Cleveland at (216) 241-4380; in Boston, please call Sam Carroll at (617) 574-5244.

Coopers & Lybrand

Give your Information Center users the world.

An Information Center should be a company-wide resource taking advantage of modern technologies through the integration of hardware, software and data communications.

There are many communications companies in the world. There are many software companies. But for full integration of communications and software, there is only one I.P. Sharp.

With I.P. Sharp's products for the Global Information Center, your users enjoy:

- IPSANET...one of the world's most advanced private communications networks providing secure error-free transmission anywhere your company operates.
- Integrated Software...a library of end user productivity tools to reduce your applications backlog. Products for today's decision making.
- Worldwide User Support...through I.P. Sharp offices in 22 countries.
- Online Public Data...access to over 100 numeric data bases to complement corporate data and help your organization make informed decisions.
- Integration of PC's and mainframes...with a single application development language, SHARP APL.

Ready to install, ready to run, and already proven on an international scale by I.P. Sharp clients, the Global Information Center gives you the most advanced implementation of the Information Center concept.

Why not let them have the world?

Call your nearest I.P. Sharp office in one of the cities listed below and we'll show you how your Information Center users can have the world.

I.P. Sharp Associates

Products for the Global Information Center

I.P. Sharp Associates Limited
2 First Canadian Place, Suite 1900
Toronto, Ontario, Canada M5X 1E3
(416) 364-5361

Abu Dhabi, Amsterdam, Athens, Boston, Brisbane, Brussels, Calgary, Cardiff, Chicago, Copenhagen, Coventry, Dallas, Denver, Dublin, Düsseldorf, Edmonton, Frankfurt, Halifax, Helsinki, Hong Kong, Houston, London, Los Angeles, Madrid, Melbourne, Mexico City, Miami, Milan, Montreal, New York City, Newport Beach, Oslo, Ottawa, Palo Alto, Paris, Rochester, Rome, San Francisco, Saskatoon, Seattle, Seoul, Singapore, Stockholm, Sydney, Tokyo, Toronto, Vancouver, Victoria, Vienna, Washington, Washington, Wayne, White Plains, Winnipeg, Zurich

NEWS

Library's computer course swamped with registrants

TACOMA, Wash. — When the Tacoma Public Library started a free computer education program last year, library officials anticipated a good deal of public interest.

But they never imagined that more than 600 people, including the mayor, would wait for hours in long lines outside the library's main branch during a two-day class registration.

"It was quite a shock to see the overregistration that occurred," said Phillip L. Maxfield, an assistant director for the library. Today, the pilot program, named Compulit, is still a big hit with Tacoma-area residents.

Library officials developed Compulit after learning that while computer education courses were available in area schools, no such programs were available for adults. Compulit consists of three computer literacy classes, a microcomputer laboratory and a computer checkout service in which class enrollees are allowed to take home a Timex Computer Corp. Sinclair/1000 microcomputer.

The classes offered are "Computer Literacy," "Programming in Basic" and "Selected Microcomputer Applications." Designed by the library staff and consultants, the courses are restricted to persons 18 years and older. Classes are held once a week for four to eight weeks.

The computer laboratory is equipped with a variety of microcomputers — an Apple Computer, Inc. Apple II, an IBM Personal Computer, a Kaypro Corp. Kaypro II, a Morrow Designs, Inc. Micro Decision, a Radio Shack TRS-80 Color Computer and TRS-80 Model III and a Victor Technologies, Inc. VIC-20. Many popular home and business software programs are available for the various systems. Six Sinclair/1000s are available for at-home use.

The Compulit courses have proven popular with all age groups. Slightly more than half of those enrolled have been between 36 and 64 years old. The students have been about equally divided between men and women, according to library statistics.

First-year funding for the program came from a $40,000 Library and Construction Act grant from the Washington State Library Commission and $20,000 from the library budget. Maxfield said the library would like to continue, and perhaps expand, the program after the grant money is exhausted in June if a new source of funding can be found.

Update stresses productivity

ATLANTA — The Life Office Management Association (Loma) has released "The Productivity Challenge II," an update of "The Productivity Challenge," which covered the start of an extensive productivity program at The Hartford Insurance Group.

"Productivity Challenge II" follows The Hartford's program into production and describes 1982-83 developments, indicating lessons learned about specific products, implementations and support methods and organizational structures. It was written by John T. Crawford, director of MIS at The Hartford.

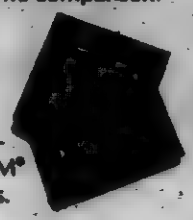
Crawford and his staff discuss reusable code, unit testing, high-level languages, business and flow graphics and software evaluation.

"The Productivity Challenge II" costs $12 for non-Loma members, $8 for members plus $2 for postage and handling from Nancy Taylor, Accounting Department, Loma, 100 Colony Square, Atlanta, Ga. 30361.

The TeleVideo IBM PC compatibles. The best hardware for the best software.

TeleVideo versus IBM. Make a few simple comparisons and you'll find there is no comparison.

RUNS IBM SOFTWARE.



With the TeleVideo® IBM Compatible line—PC, XT and portable computers—you'll get the most out of all the most popular software written for the IBM® PC—more than 3,000 programs.

Because every TeleVideo Personal Computer offers the highest level of IBM compatibility on the market and has the standard—not optional—features you need to take full advantage of every job your software can do.

THE BEST HARDWARE FOR THE BEST PRICE.

Features	Tele-PC	IBM PC	Tele-XT	IBM XT
Monitor	YES	OPTIONAL	YES	OPTIONAL
Screen Size	14"	12"	14"	12"
Tilt Screen	YES	NO	YES	NO
Quiet Operation	YES (NO FAN)	NO	YES	NO
Memory	128K	128K OPTION	256K	256K OPTION
Graphics Display (640 x 200 resolution)	YES	OPTIONAL	YES	OPTIONAL
Printer Port	YES	OPTIONAL	YES	OPTIONAL
Communication Port	YES	OPTIONAL	YES	YES
MS™DOS/BASIC®	YES	OPTIONAL	YES	OPTIONAL
System Expansion Slot	YES	YES	YES	YES
RGB and Video Port	YES	OPTIONAL	YES	OPTIONAL
Typical System Price	$2998	$3843	$4695	$5734

Study the chart below. It proves that TeleVideo—not IBM—offers the best hardware for the best price.

Note that TeleVideo's ergonomic superiority over IBM extends from fully sculpted keys and a comfortable palm rest to a 14-inch, no glare screen that tilts at a touch.

THE BEST MICROCHIPS.

What is perhaps most impressive about the TeleVideo IBM PC Compatible can be found deep within its circuitry. We use the same 8088 central processing unit that runs an IBM PC. But we also employ new VLSI (Very Large Scale Integration) microchips that are designed and built exclusively for TeleVideo. These interface more efficiently with the powerful 8088 and yield numerous benefits.

For example, our tiny custom chips do the work of many of the larger, more expensive circuit boards in an IBM PC. So we can offer a computer system that comes in one attractive, integrated case, is ready to run and occupies less desk space. A computer that edges out IBM's added-cost component system for reliability, ease of service and purchase simplicity.

Fewer circuit boards to cool also allowed us to eliminate the noisy, irritating fan IBM and most other PCs force you to put up with. And TeleVideo compatibles accept any IBM hardware options without modification.

THE BEST PORTABLE FOR THE BEST PRICE.

Features	TPC II	COMPAQ
High Capacity Storage	YES	NO
2nd Disk Drive	YES	OPTIONAL
Quiet Operation (No Fan)	YES	NO
Ergonomic Display	YES	NO
Communication Port	YES	OPTIONAL
International Power Supply	YES	NO
MS™DOS 2.11	YES	NO
Graphics Display	YES	YES
Typical System Price	$2595	$3719

THE BEST LINE.

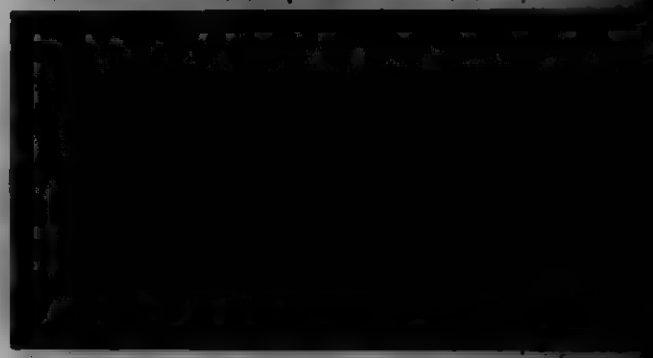
But the Tele-PC is only one element of the TeleVideo IBM PC Compatible line.

The TeleVideo XT is the best hardware for users of popular IBM XT software who would appreciate an extra 10 megabytes of storage capacity along with the advantages listed on the chart at the left.

As the chart above demonstrates, our portable IBM compatible computer, the TPC II, is far and away better hardware than COMPAQ.™ Better hardware—standard—at a better price.

THE BEST MANUFACTURER.

The TeleVideo IBM PC Compatible line is made



by the world leader in multi-user computer systems and the number one independent manufacturer of terminals.

Our compatibles are available at participating ComputerLand and Entré (call 800-HI-ENTRE) dealers or you may call 800-538-8725 for the dealer nearest you. In California, call 408-745-7760.

Before you invest, make a few simple comparisons. You'll find that TeleVideo—not IBM or COMPAQ—has the best hardware for the best software. At the best price.

IBM is a registered trademark of International Business Machines. MS is a trademark of MicroSoft Corporation. GW Basic is a registered trademark of Microsoft Corporation. COMPAQ is a trademark of COMPAQ Computer Corporation.

TeleVideo®
Personal Computers

©TeleVideo Systems, Inc.

Info center package links firm's diversified services

PHOENIX — The choices available when assembling an information center come down to two: Select from a diverse range of tools, or go with a tailored package. Talley Industries, Inc. here chose the latter, with considerable success, according to company officials.

Talley and its 16 diversified operating companies generate $300 million in annual sales. The company's commercial group manufactures clocks and timing instrumentation under the trade names Westclock and Seth Thomas. The government and technical segment is in the business of aerospace engineering and manufacturing products. A third segment consists of companies producing apparel and soft goods for major retailers. Talley's fourth segment is its realty group, involved largely in the development of industrial properties.

Executive management at Talley continually confronts the problem of improving parent company performance by analyzing the performance of subsidiary companies. But each subsidiary has a fairly high level of autonomy, which has spawned incompatibility among Talley's DP reporting systems, according to Rodney D. Palmer, manager of financial analysis and reporting.

Talley requests that each company provide the headquarters office with a financial data sheet every 30 days. "Without computer help, we found we simply could not handle that periodic outpouring of data," Palmer said. "Trying to furnish our executives with meaningful summaries and special statistics within any reasonable length of time had become virtually unattainable."

Talley chose remote on-line services offered by Xerox Computer Services, Inc. of Los Angeles. "Xerox offers a wide range of business management programs, with integrated packages available for manufacturers, distributors and public service agencies," Palmer said. "And the Xerox customer has a choice of on-line services, licensing Xerox software or a turnkey hardware/software installation on user premises."

Mixed approach

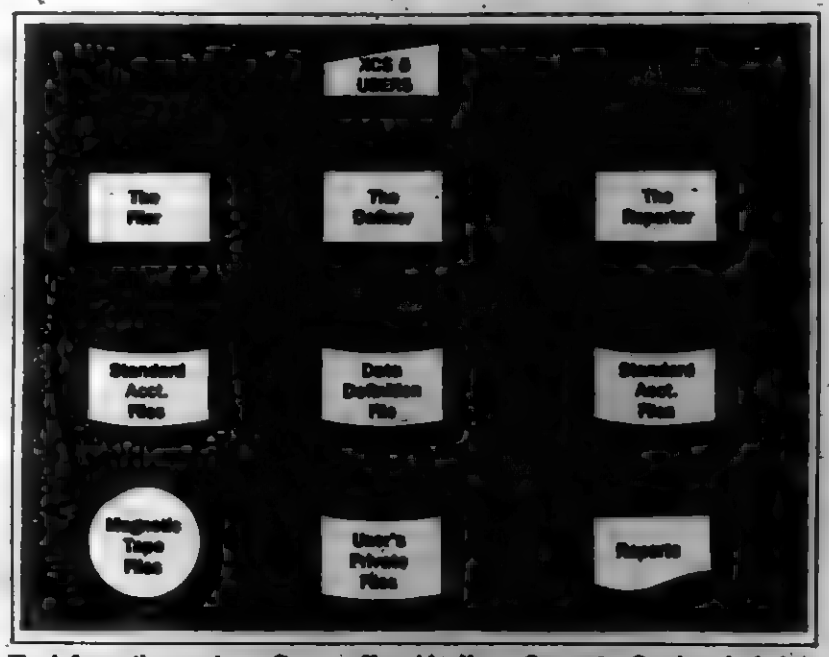
Talley went with a mixed approach, choosing the general ledger and accounts payable applications and accessing them via two Xerox terminals in the Phoenix offices and contracting for Xerox's package of information center tools. These consisted of software for creating special reports not normally produced by the application programs.

The information center package includes Xerox's Reporter report writer, Definer definition package, Filer file creation and manipulation system and Control decision support system.

Every 30 days, each operating company provides its financial data sheet covering prespecified items. They include a summary profit-and-loss statement, balance sheet, depreciations taken, capital expenditures, capital expenditure commitments, various inventory levels including finished goods, income tax information and other administrative items.

"Using the two terminals in our office, we transmit the information to the Los Angeles data center. Then, from those updated files, we create four categories of reports most useful to our executive management," Palmer said. The reports are:

■ Consolidated profit-and-loss statements.



The information center software offered by Xerox Computer Services includes these management tools, plus a decision support system called Control.

■ Consolidated financial statements.

■ Operating highlights for each company, with comparisons of actuals vs. budgets for current month and year and against the prior four years.

■ A performance report that compares on a five-year basis a number of key statistics on both a company-by-company and consolidated basis. This 30- to 35-page report offers details regarding inventory levels, receivable levels, inventory turns, day sales in receivables and so on. It also presents a graphics picture of the stockholders' investment in each company vs. the return on that investment.

Talley also uses Xerox information center tools to develop subapplications for functions unique to the business. "For example, if we wanted to establish a warranty tracking system, we would use the Filer program

See TALLEY page 38

POWER TOOLS VAX PBS

■ SOFTKEY
Customize your keyboard. Redefine any key or gold sequence as a string of up to 2000 characters. Recall and edit the last 10 lines of command or program input.

■ PHOTO
Photograph and playback your terminal session. Document bugs; create mail and handouts.

■ SPY
Watch other users with or without their knowledge: real-time or recording mode. Give demos from remote sites!

■ ADVISOR
Assist other users by entering commands or program input from another terminal. Great for remote training and problem diagnosis.

For more information on these and other products call or write to:

BUSINESS SYSTEMS

CICS PRINT FACILITY

CPF

CPF now unties more knots! Release 3.0.0 is more user friendly and more efficient than the previous release. Print online or batch reports anywhere within your CICS network with greater efficiency than ever before possible. CPF makes it as easy as loosening your tie!

Standard CPF features (new functions highlighted)

FOR THE USER: Active index of all reports, security network, menu driven, *individual page print, ability to affect all reports displayed on index with one entry*, help screens, report display on terminal, print interrupt and restart, screen copy, message sending, multiple copies, multiple destinations.

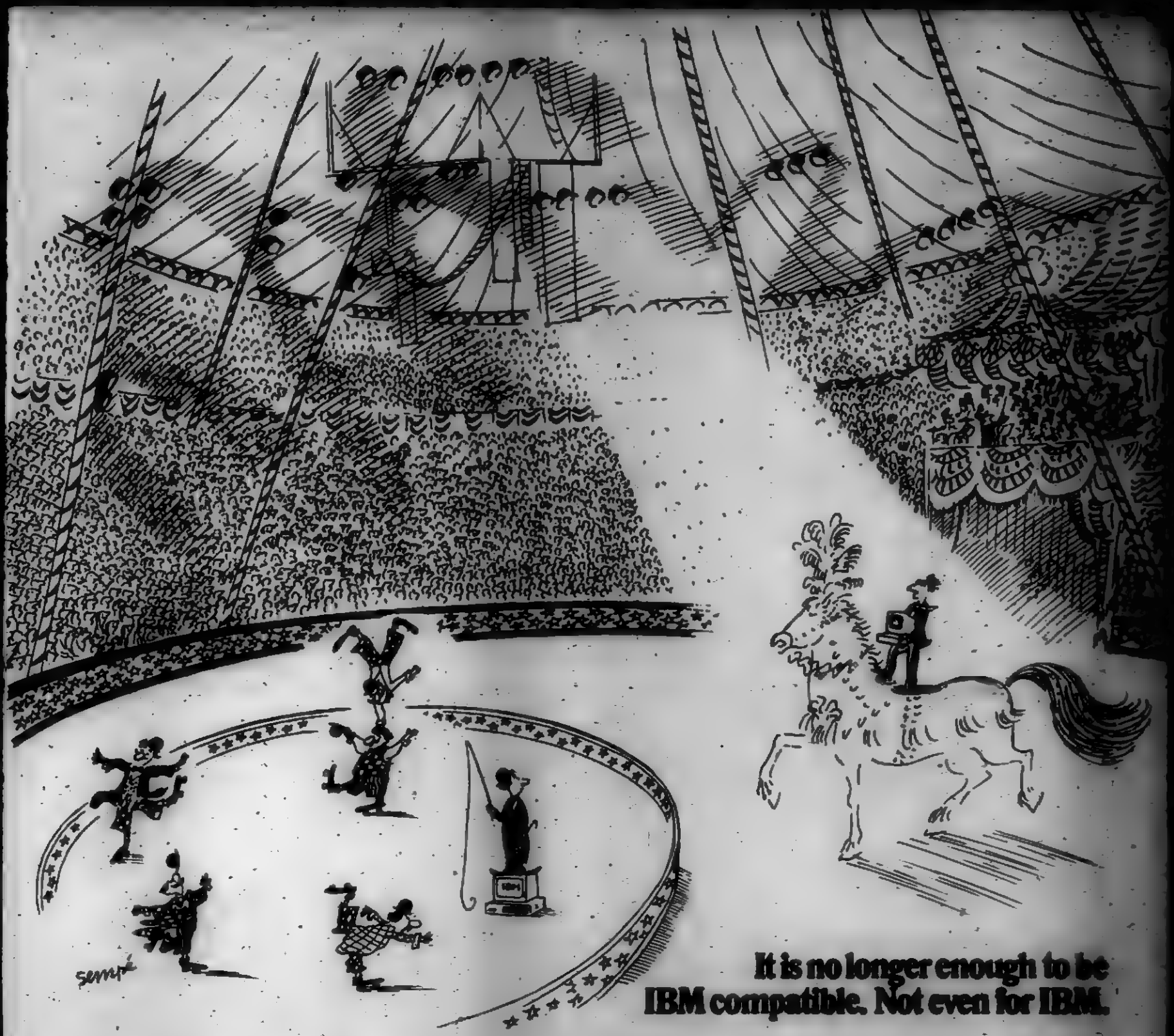
FOR THE PROGRAMMER: Online Spooling, Multiple Task Spooling, Batch Spooling, *Array Mode*, Predefined Report, *Automatic ENQUEUE and DEQUEUE, Enhanced BMS Support, Direct Spooling.*

FOR THE SYSTEM ADMINISTRATOR: *Three tier security network. Unlimited number of system and domain administrators, automatic report aging, CPF control file, Sync point and recovery restart, direct spooling to CPF report data set, blocking of data from batch sources.*

CPF operates under MVS with JES 2 or JES 3, and is not release dependent upon CICS. CPF will work with BTAM, VTAM, or TCAM.

Call or write today for more information or a free 30 day trial and loosen your tie!

Software Technology
P.O. Box 1110
Poulsbo, WA 98370
(206) 598-4400



It is no longer enough to be IBM compatible. Not even for IBM.

It was the personal computer circus.

And it had gone on too long.

The crowd grew restless as each new act continued to perform varying degrees of IBM compatibility.

Suddenly, the crowd gasped. It was the unexpected finale—the arrival of Sperry, with a performance no one could have imagined possible.

Ladies and gentlemen, it was the Sperry PC. It ran IBM compatible software.

But that wasn't the show stopper.

Because it soon became quite clear the Sperry PC didn't just *run* the IBM programs, it ran them *better*.

Better because it ran them faster—up to 50% faster.

It ran them with breathtaking graphics, far more dramatic than the IBM PC could provide.

And it ran them from a keyboard that drew roars of approval, for it was not only easier to operate, but far more comfortable than IBM's.

And as the crowd cried out for more, that's just what Sperry gave them: the ability to plug right into a company's main computer, whether that system was IBM *or* Sperry. Or both.

As the crowd sat stunned by this final flourish, Sperry left all with a most provocative question. Was it possible that the Sperry PC could do all of this and yet cost less?

Again, the crowd gasped.

Could it be?

Come see for yourself. Hands-on, side-by-side. Call 800-547-8362, toll-free. Or write us. Sperry Corporation, Computer Systems, Department 100, P.O. Box 500, Blue Bell, PA 19424.

SPERRY PERSONAL COMPUTER SPECIFICATIONS

OPERATING SYSTEM MS DOS Version 1.25 or 2.0 with G.W. BASIC	KEYBOARD 84 keys, 6 ft. cord
MICROPROCESSOR High-Speed 16-bit 8088	AUXILIARY MEMORY Up to two internal 5¼" diskettes 10MB internal fixed disk when configured with single diskette.
DISPLAY SCREENS High Definition monochrome display IBM compatible graphics.	USER MEMORY Standard 128K bytes, expandable to 640K
COMMUNICATIONS Built-in Asynchronous	DIAGNOSTICS Power-on self test.
	CLOCK Time-of-day with battery back-up

SPERRY

The Sperry PC.
What the personal computer should have been in the first place.

©Sperry Corporation, 1983

Course to cover local nets

WYCKOFF, N.J. — "Local-Area Networks" will be the focus of a two-day course being co-presented by Dr. Ira Cotton and Dr. Marshall Abrams next month. The course will be offered April 11-12 at the Fairmont Hotel in Denver and April 24-25 at the Marriott Hotel in Orlando, Fla.

The course will address such topics as current governmental and corporate experiences with local-area networks, the major considerations in implementing them and their selection criteria, among other topics. The key local-area network interfaces and communications protocols will also be discussed.

Cotton, who is with Booz, Allen & Hamilton, Inc., was formerly the manager of local-area networks and office systems at the National Bureau of Standards (NBS). Abrams, with Mitre Corp., is a former NBS employee whose work centered on network quality and performance measurement and evaluation.

The registration fee is $690, which includes meeting materials, lunches and a cocktail reception. A discount of 15% is available for three or more employees who register as a group. Additional information is available from the Special Projects Conference Management Center, c/o Information Breakthroughs, Inc., 445 W. Main St., Wychoff, N.J. 07481.

Multinational telecommunications seminar scheduled for April 11

WASHINGTON, D.C. — A seminar to help multinational corporations best use their telecommunications facilities in the face of foreign postal, telephone and telegraph regulations and data flow barriers will be held here April 11.

The seminar, titled "Optimizing Multinational Business Telecommunications," will feature Congressman Michael Oxley (R-Ohio) of the House telecommunications subcommittee as a speaker, a conference spokesman said.

Other speakers will include Herbert E. Marks, a Washington attorney specializing in telecommunications law, and Richard G. Mills, a consultant on business telecommunications strategy development.

Also speaking will be G. Russell Pipe, editorial director of *Transnational Data Report*.

The seminar is sponsored by Transnational Data Reporting Service, Inc.

Registration for the seminar is $45, according to the conference spokesman.

More information about conference registration is available from Transnational Data Reporting Service through P.O. Box 2039, Springfield, Va. 22152.

Shared DASD users, don't leave your data integrity to chance.

Protect it with Super-MSI™,
the integrity protection package designed exclusively for multiple-CPU environments.

Easy to install. Easy to maintain. Super-MSI requires no modifications to your operating system and can be implemented in an active system in as little as ten minutes—assuring complete data integrity from the moment it is installed.

Super-MSI guarantees data integrity.
No complicated job scheduling. No elaborate control schemes. No software changes. Super-MSI spans inter-system activity to give "unified system" integrity to your entire multi-system complex.

Super-MSI preserves integrity under MVS, MVS-SE, MVS-SP, SVS, MVT, VS1 and MFT systems.

Super-MSI prevents data destruction.
Inadvertant modification, simultaneous access ....Super-MSI stops the damaging data abuses that multiply in a multi-systems environment. Prevents the errors that can so easily occur—and too often go undetected—when users operate in a multi-systems complex.

Super-MSI eliminates hardware RESERVEs.
Super-MSI completely protects your data integrity and frees your systems of RESERVEs and RESERVE lock-outs. Super-MSI converts selective RESERVEs to logical controls that securely protect your data without inhibiting system throughput.

Super-MSI does more.
As part of the CGA family of single-image software for multiple-CPU sites, Super-MSI works together with MSM®, our Multiple Systems Manager which manages tape and disk storage devices and GCD®, our Global Console Director which consolidates consoles; cutting costs and streamlining operations. The result is a unified single system image that is transparent, flexible and powerful. Use them together or in any combination, CGA's multiple systems software is a must for large users.

More than 1,000 CGA single-image software packages are in use around the world, preserving data integrity and helping multiple-CPU sites hum like they're supposed to. Call today. Set up a free trial of Super-MSI, GCD or MSM.

Speak software. Talk to CGA.
800-237-2057

cga
CGA Software Products Group
960 Holmdel Road
Holmdel, NJ 07733

Electro/'84 set for May 15-17

BOSTON — An estimated 45,000 engineers and managers in fields from data processing to microelectronics are expected to attend the Electro/'84 conference here May 15-17.

Sponsored by the Institute of Electrical and Electronics Engineers (IEEE) and the Electronic Representatives Association, the conference will focus on active and passive electronic components, fiber optics, instrumentation and production and packaging, among other topics.

The estimated 600 exhibitors will be divided between Hynes Auditorium, which will house displays of computer hardware, peripheral assemblies, computer graphics and software; and the Bayside Exposition Center, the site of the Electro Professional Program. Exhibitors will reportedly include Data General Corp., Raytheon Data Systems Co., GTE Corp., Mitre Corp. and others.

Registration for the conference is $10 at the door for IEEE members and $20 for nonmembers. Preregistration for the conference is $5, a discount received via a coupon available by writing the sponsor. Further information is available from Electro/'84, P.O. Box 92275, Worldway Postal Center, Los Angeles, Calif. 90009.

TALLEY from page 36

to build a new data file based either on new inputs or on extractions from an existing file. And we'd use Reporter to design the desired report," Palmer said.

Definer allows users to define the contents and formats of special files, of records within those files and of fields within those records, Palmer said. "It lets us list the definitions for those files all without knowing anything about bits or bytes," he said.

Control uses an English language dialog and offers a library of 17 report formats and a custom-designed report facility, Palmer said. "But the major distinguishing features of Control are its capabilities to construct and exercise business and financial models," he said. "It lets us do all sorts of planning and analytical tasks."

"The computer is down."

Every day another business goes "on line." Every day the world becomes more dependent on computers. And every day it becomes more important for the world to have a computer that won't go down, or even skip a heartbeat.

Over the past decade there have been computers designed to withstand hardware failures and eliminate downtime. However, all previous approaches depend heavily on software techniques to provide fault tolerance. A comparison of these old systems with the new Stratus/32 Continuous Processing™ System will illustrate how far we have come in one leap, by using advanced hardware technology instead of complex software.

How the Stratus Hardware Solution Supersedes the Software Solutions.

Stratus's hardware design means that fault tolerance is invisible to your application programs and users. You can even move previously developed applications to Stratus with NO CHANGES and NO PERFORMANCE LOSS for fault tolerance. In contrast, the software-based systems require complex, performance-stealing software in order to implement fault tolerance. This means that new programs are more difficult to develop, they run slower, and existing programs can't be run without major changes.

An added benefit of the Stratus fault tolerant design is that you can expand your system with additional processors as your computing needs grow. In fact, you can have up to 32 fault tolerant processors, 2000 communication lines, and 100 billion bytes of storage in a single Stratus system.

Hardware Self-checking Causes a Breakthrough in Service.

Each Stratus/32 tests itself EIGHT MILLION TIMES A SECOND while it executes your programs, so faults are detected BEFORE they corrupt your data. And when there is a failure, there's no need to rush to call your Stratus service technician. For one thing, the failed component, be it a CPU, controller, disk, or power supply, has a partner that continues operations as usual (without slowing down the system), so there's NO DOWNTIME. In addition, repairs can be made WITHOUT STOPPING THE SYSTEM. It is so easy to repair a Stratus/32 that our service is provided at about one-half the average price charged by other computer manufacturers.

$140,000, Software Included.

Our prices are competitive with "normal" systems (i.e. ones that do not provide fault tolerance), and substantially lower than the software-based fault tolerant systems. $140,000 buys you a complete four megabyte 32-bit system with 60 megabytes of disk storage, magnetic tape drive, and system SOFTWARE. If you like our hardware, you will be even more impressed with our software. (A common reaction among our users.) Briefly, our software offering includes VOS (a virtual operating system), transaction processing, networking, IBM communications, data management system, interactive forms builder, symbolic debugger, COBOL, Basic, PL/I, Fortran, Pascal, word processing...

To get more information call us at 617-653-1466.

The computer you can count on has arrived.

Stratus

CONTINUOUS PROCESSING™

Now that the world relies on computers it needs a computer it can rely on.

NEWS

Manufacturer fine tunes planning with MRP system

OBERLIN, Ohio — After outgrowing a software system developed in-house and struggling for two years with a packaged system that created more confusion than it resolved, Gilford Instrument Laboratories, Inc. needed a new manufacturing resources planning (MRP) system.

Gilford, a subsidiary of Corning Glass Works, manufactures research and clinical instrumentation needed to identify biochemical examples. It has built an international reputation on the precision of its instruments. Unfortunately, in planning and controlling its production line, that same sense of precision was missing.

The company first implemented an MRP package when it became apparent that it needed a more versatile system than the one Gilford's own staff had developed in-house. Gilford operated with the package for two years, but planners felt they never really got the capabilities they needed. Inventory levels continued to rise, visibility to the shop floor was poor and work scheduling remained tied to "hot lists."

"Everybody dreaded the end of the month," recalled Dave Morrison, Gilford's production control manager. "Even though we had this formal system in place, there was no discipline in using it. We were still running the shop by an informal system out of little black books kept in shirt pockets. Every month closed with a rush to fulfill shipping quotas."

Inventory items

Gilford needed a system that could keep track of its more than 17,000 inventory items and schedule and track the 1,500 assemblies that pass through the production line.

After management reviewed several MRP packages, Gilford chose Management Science America, Inc.'s (MSA) Manufacturing System software.

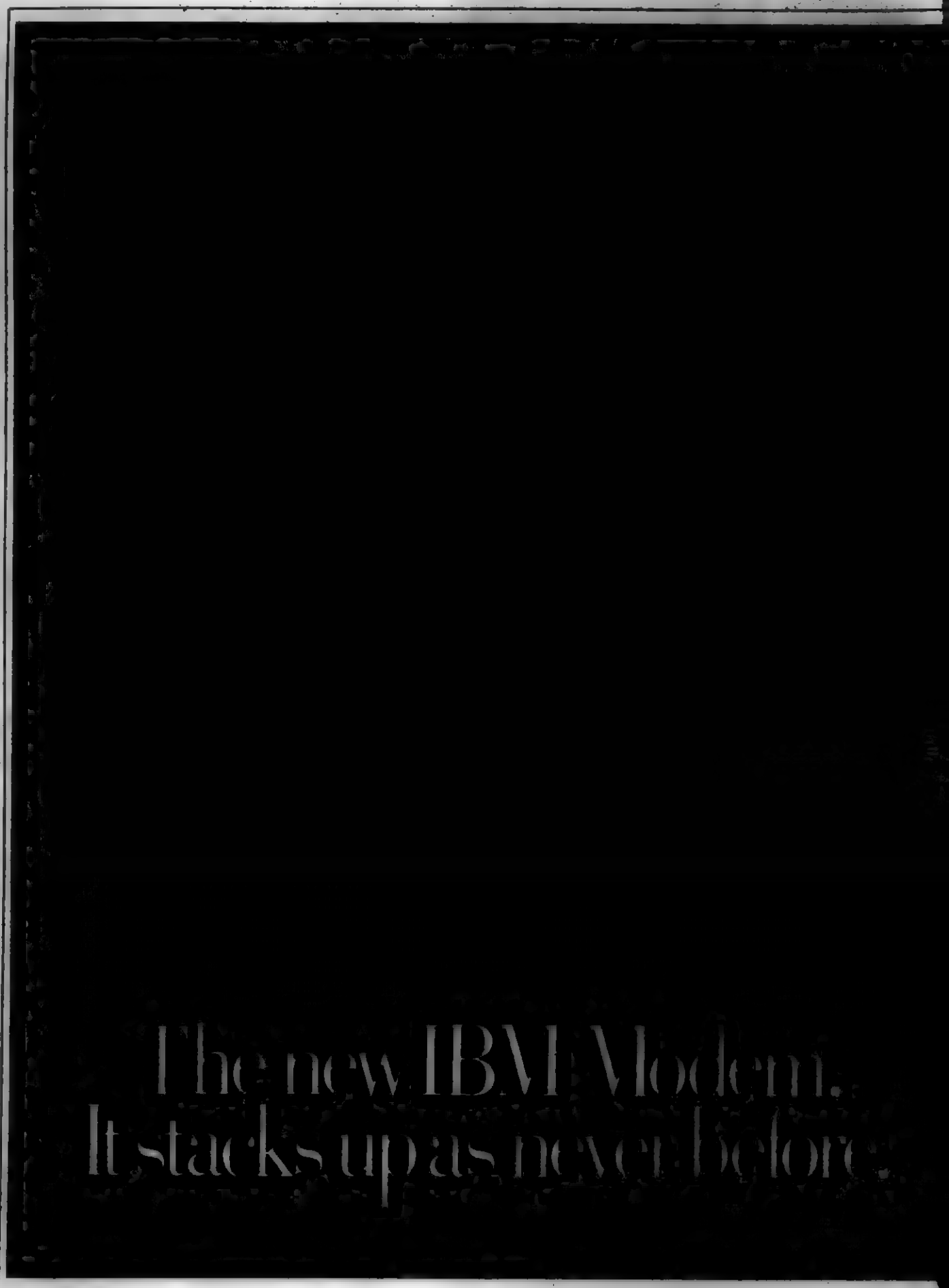
Having been involved in MRP implementations in the past, Morrison was chosen as project leader for the implementation of the MSA package on Gilford's new IBM 4300 series mainframe.

Gilford had chosen the IBM hardware in order to be compatible with the 4300 series equipment at Corning's Medfield, Mass., facility, which serves as headquarters for the corporation's Medical Products Division. MSA's Manufacturing System had also been successfully implemented at several other Corning facilities, Morrison said.

"What impressed us was the MSA Master Production Scheduling module," said James Sutorus, director of management information systems at Gilford. "Our old system was very crude. There was no time-phased schedule, and it wasn't sophisticated enough to tell the supervisors on the shop floor what they needed. They couldn't see what was coming at them down the road.

"We established a very aggressive schedule for full implementation of the MSA package," Sutorus continued. "We decided we were going to put six modules up and have them ready for operation within three months. In December 1982, we received shipment of the software, and by the last day of the year, we had the test data base up and running. In the middle of March we went live, and we've been relying completely on the package since then."

With the MSA system, according to Sutorus, all manufacturing orders to be released to the floor are time-phased, giving management the control it needs to determine when changes in the schedule are no longer cost-effective. Material planners also gained visibility into what was happening on the shop floor. Through shop order status, they can now "see" how an order is actually moving through the plant.



Firm's DSS consolidates data from five subsidiaries

For developing corporate plan dealing with different business levels

STAMFORD Conn. — An energy, cement, iron and coal conglomerate here found itself faced with a problem in 1980 when it began developing corporate plans.

It had to consolidate information from five subsidiaries to come up with a five-year corporate plan, a two-year profit plan for individual products, annual reports for each subsidiary and the parent company and quarterly forecasts that tracked performance against the two-year plan.

"At each level of the business, we were dealing with different processes: several time-sharing services and manual procedures," recalled Andrew Langlois, director of MIS at Moore McCormack Resources, Inc. "Subsidiary planning often would be done manually and figures would then be entered again for the corporate planning model. We were running up significant time-sharing charges, and there were inconsistencies in the models used by the different subsidiaries."

These problems clarified the need for a single, in-house decision support system (DSS). Subsidiary and parent company personnel identified 124 individual modeling and planning capabilities that were used or needed. These specifications were sent to 10 DSS vendors, who responded by indicating features their products offered.

Vendors were then asked to demonstrate their products to corporate users. The user group compared the software packages' ease of use, capabilities and price. The MIS department analyzed the compatibility of the products with its one IBM 3031 and two 4300 series mainframes running in the MVS operating environment.

At the end of the study, Moore McCormack Resources selected PCS-EPS from EPS, Inc. of Windham, N.H. Initially, long-range profit planning and forecasting systems were developed. Applications for departmental budgeting, subsidiary operational planning, economic forecasting and pension plan analysis followed.

Significant savings

"At last, we had a single DSS with a group of 24 to 30 people trained in its use and a variety of well-developed, stable models," Langlois said. "We experienced significant savings over external time-sharing — over $100,000 and probably closer to $150,000 a year. But just as we became comfortable with the product, in came the micros."

As IBM Personal Computers invaded Moore McCormack, MIS had to revise its strategy. Moore McCormack added a help desk, which aids users by testing new products, introducing new software, solving problems and providing DSS support. Approved forecasting software used by the company includes PCS-EPS for solving large problems on the mainframe, EPS' Micro-PCS for complex financial problem solving and Lotus Development Corp.'s Lotus 1-2-3 for most problem solving needs.

"Most users' requirements are filled by Lotus," Langlois said, "but there are a number of functions and capabilities that run on the mainframe which just can't be completed on a microcomputer. For complicated forecasts, a user will use PCS."

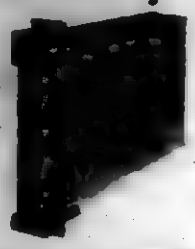
Langlois said the advantages of the current strategy are common tools, trained users at all locations and lower costs. "By incorporating Lotus 1-2-3 and Micro-PCS together, our former nucleus of 24 hard-core decision support users has expanded to 75 to 100 people."

The new rack-mounted IBM 3868 Modem saves you space. And money. And effort.

Space, because IBM's new one-inch-wide vertical package allows you to mount up to 12 modems in one enclosure that fits a standard 19-inch rack.

Money, because each enclosure needs only one power supply and cooling system to support all of its modems.

And you manage your network with less effort because the IBM 3868 Modem has the same high availability and rock-steady reliability as other modems in the 386X Series—plus an enhanced Link Problem Determination Aid (LPDA).



Working with software available for many IBM host systems, the LPDA performs greater end-to-end management. Now line conditions are identified further downstream from the host, and in more detail. For example, conditions in any multi-point circuit can be pinpointed to a particular leg, including tailed configurations off multi-plexed links.

In fact, to help you keep your network humming, the LPDA and host software monitor and provide you with a line quality value, a receive signal level, an error-to-traffic ratio and modem self-test results to help you isolate line problems. Now you can more precisely communicate them to your communications carrier.

And because the 3868 Modem is so reliable, it's backed by a full three-year warranty.

Try them for up to four weeks; just select 2400, 4800 or 9600 bps line speeds. If you purchase in quantity, discounts are available.

To get your copy of a free brochure, or to arrange to have an IBM representative contact you, call toll-free, 1 800 IBM-2468, ext. 90. Call your IBM representative or return the coupon.

IBM

IBM
DRM, Dept. BO/90
400 Parson's Pond Drive
Franklin Lakes, NJ 07417

☐ Please have an IBM representative call me.
☐ Please send me more information on the IBM Modem.

Name
Title
Company
Address
City State Zip
Phone

It's just not fair to claim that TEMPLATE® is the best graphics software available. Our competition's already discouraged.

And we like competition. We really do. It's just that it's difficult, if not impossible, to find graphics software as efficient and functional as TEMPLATE. Try as you might. TEMPLATE is the hands-down winner. With true device-independence and intelligence, total graphics functionality for CAD, scientific analysis, seismic work, process control, molecular modelling, and a host of other applications.

In almost any environment, whether it's batch or interactive, 2D or 3D, TEMPLATE wins. Benchmark tests prove it. TEMPLATE, besides being a true 3D graphics package for 32-bit or larger computers, features powerful commands that provide matchless productivity. TEMPLATE makes optimal use of available computer resources, giving you fast, efficient computer graphics program execution. And it supports over 125 graphics devices, from dumb terminals to sophisticated systems.

We also provide on-site installation and training, continuous updates, a regular flow of new device drivers, and ongoing documentation. What's more, we back you up with a telephone hotline so TEMPLATE software specialists can provide help if you need it.

But let's be fair. If you're looking for graphics software, call our competitors first. Find out what they have to say about theirs. Then call us, and find out why TEMPLATE really has no competition.

And why the competition has been so discouraged for so long.

MEGATEK CORPORATION
A UNITED TELECOM COMPANY
Making History out of State-of-the-Art

World Headquarters • 9605 Scranton Road • San Diego, California 92121 • 619/455-5590 • TWX: 910-337-1270
European Headquarters • 34, avenue du Tribunal-Fédéral • CH-1005 Lausanne, Switzerland • Telephone: 41/21/20 70 55 • Telex: 25 037 mega ch

NEWS

Info management system hems firm's paperwork

TORRANCE, Calif. — Just as an elaborately detailed pattern is woven into a fabric, so must the design of an information resource management system be interwoven throughout a corporation's day-to-day business operation.

While that may sound poetic, the parallels are quite evident at S. Harris & Co. here, the oldest fabric and wall-covering distributor in the West. In early 1980, Harris decided it had two options: either pull back and economize its operations or else take an aggressive stance and position itself for the post-recession period. It opted to go the latter route in order to stay competitive.

The manual inventory and accounting systems of the 77-year-old firm were unable to support the company's daily business objectives.

"We knew we had a problem when it started taking us three days out of every month just to age our receivables," recalled Bill Crawford, Harris' executive vice-president, noting that, while overtime became "a fact of life," Harris was still swamped with paperwork.

This spurred Harris to retain the consulting services of Michael R. Wood, president of Helix Corp., to plan and design an automated information system for Harris using the corporation's Helix Methodology. Key to this methodology is Helix's approach to the selection and implementation of automated information systems, which incorporates the disciplines of management, behavioral science and organizational and systems theory, according to Wood.

"We selected the Helix Methodology because it is the only approach that integrates such dynamic [humanistic] planning techniques into the development process," Crawford said.

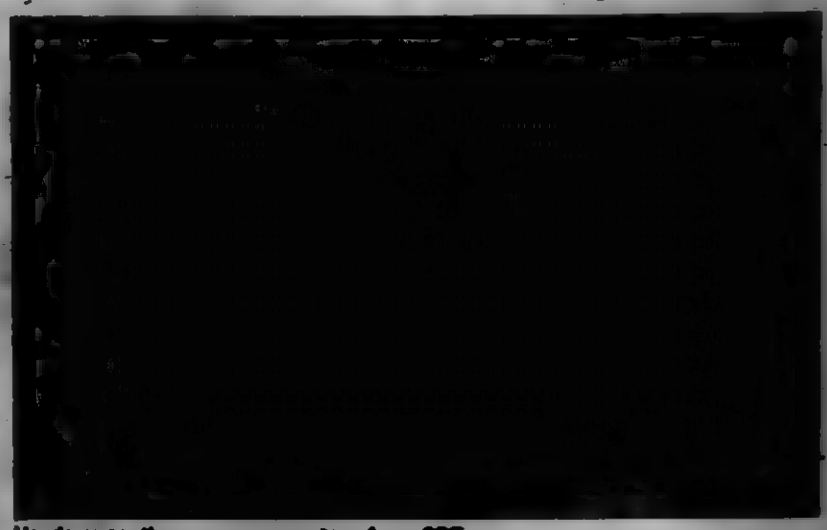
Helix's first step was to find out the impact that new information systems would have on the company and its employees. Harris employees, from clerical on up to top management, all gave their input on how they thought the systems could work best in their particular departments, detailing the changes they wanted to see included in the new systems. Once it became clear to the employees that they would be playing an active role in the system's design, their anxiety and fear slowly disappeared.

As a result of user involvement, Harris was able to identify the major goals necessary to support the corporate objective of same-day shipment of 95% of all orders. The goals included the ability to update inventory files to reflect immediately the impact of a customer's order; to retrieve a customer's order during a two- to three-minute telephone inquiry; to produce a variety of sales reports based on pattern, color and yards sold; to monitor sales by salesman and territory; to check all sales and purchasing activity related to any given pattern or color; and to produce a daily stock alert report and a back-order report that would assist in the purchasing function.

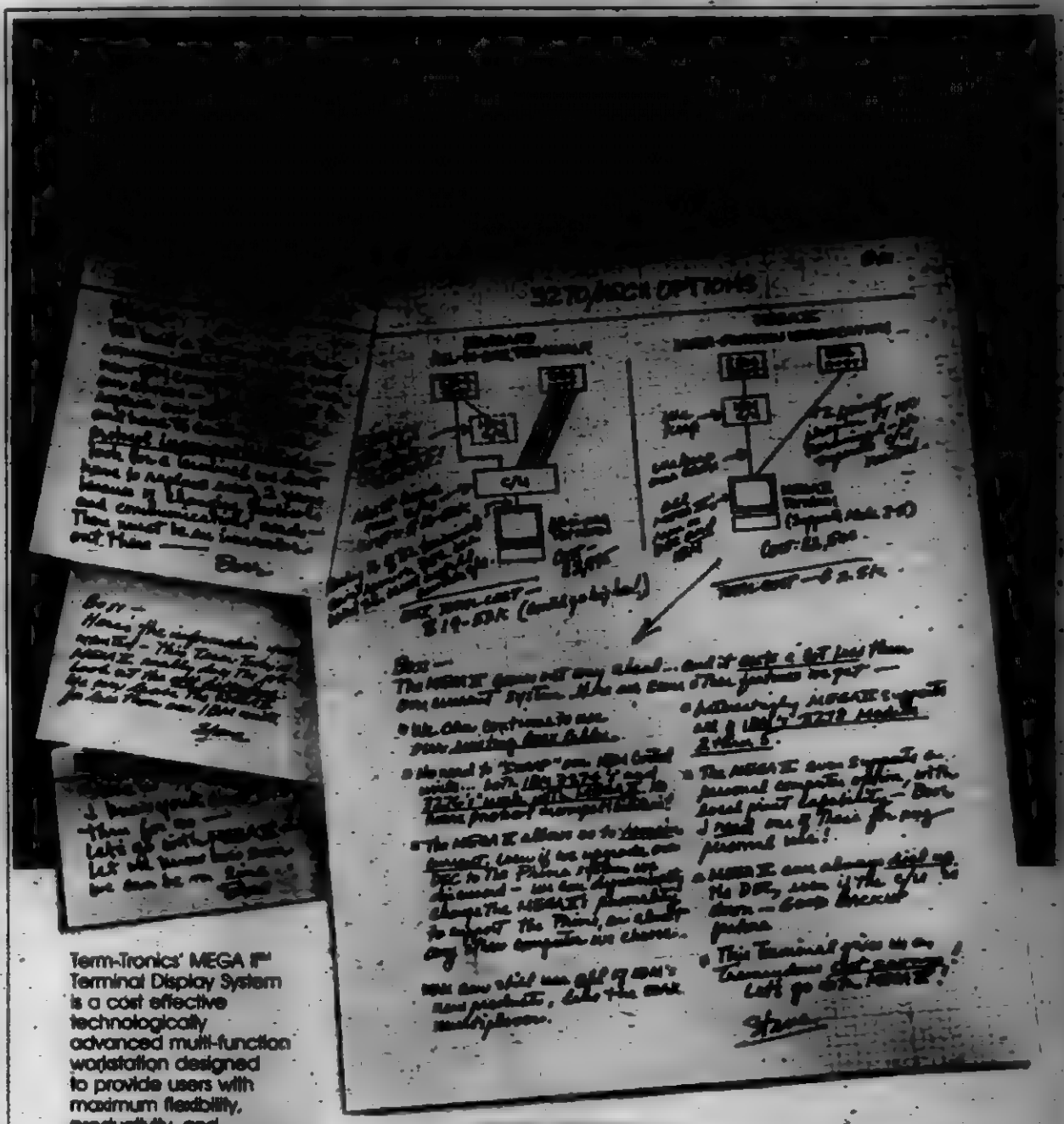
Next, Helix selected several vendors for Harris' consideration. Interactive, Inc., a software writer and turnkey vendor, was chosen because Harris felt it was the most flexible and mature of the bidders. Interactive chose Ultimate Corp.'s Ultimate operating system, which is based on Pick Associates, Inc.'s Pick operating system, to run on a Honeywell, Inc. Level 6 minicomputer, using Interactive's proprietary application software.

In July 1982, Harris installed 21 Volker-Craig, Inc. CRT terminals, a 600 line/min Printronix, Inc. printer and two 125 char./sec Texas Instruments, Inc. printers. The Interactive

See HARRIS page 46



Harris executive accesses system from CRT.



Term-Tronics' MEGA II™ Terminal Display System is a cost effective technologically advanced multi-function workstation designed to provide users with maximum flexibility, productivity, and convenience. The MEGA II™ will never become obsolete when your computer is changed or upgraded.

Regional Offices: Washington, D.C., New York, Chicago, Dallas, Houston, San Francisco, San Diego.

MEGA II

The Truly Generic Terminal System

TERM-TRONICS, Inc.

*IBM 3274, 3276, 3278, and DEC VT 100 are subject to trademark claims.

7408 Trade St., San Diego, CA 92121 (619) 271-1770

IBM selects Management Decision Systems as value added remarketer for IBM 4300 with EXPRESS®.

IBM has selected Management Decision Systems, with its industry-standard decision support software EXPRESS, as a Value Added Remarketer for IBM's 4300 computer family. The agreement enables Management Decision Systems to package its powerful decision support software with IBM's 4300 series. Now, it is easier than ever before for major corporations to meet the increasingly critical need for integrated planning and analysis.

Offering you the total decision support solution, Management Decision Systems' EXPRESS combines data base management with extensive analysis, reporting, graphics, and statistics capabilities. Backed by quality installation, training, and customer support services, EXPRESS meets all your needs for applications development and micro-mainframe integration.

With this new agreement, there has never been a better time to use the best available information technologies as your unique strategic weapon in today's world of data overload. Put the power of the IBM 4300 and Management Decision Systems on your side—and develop the winning edge.

Management Decision Systems + IBM 4300 = the total decision support solution.

For more information on what this agreement can mean for you, contact:

Walter E. Lankau, Jr.
Vice President, Sales and Marketing
Management Decision Systems, Inc.
200 Fifth Avenue
Waltham, Massachusetts 02254
(617) 890-1100

EXPRESS® is a registered trademark of Management Decision Systems, Inc.
IBM® is a registered trademark of International Business Machines Corp.

IBM Value Added Remarketer

Management Decision Systems, Inc.

NEWS

TI researcher to get IEEE award at Compcon Fall '84

SILVER SPRING, Md. — Harvey Cragon, senior fellow in computer research at Texas Instruments, Inc. will receive the Emanuel R. Piore Award of the Computer Society of the Institute of Electrical and Electronics Engineers, Inc. (IEEE) at the organization's Compcon Fall '84 conference, which will be held Sept. 16-20.

Cragon will receive the award for his "creative contribution and leadership in uniting computer architecture with inherent capabilities of integrated circuits," according to an IEEE representative.

Cragon worked on the first integrated circuit computer, delivered to the Air Force in 1961, and was a major contributor on the TI Advanced Scientific Computer, according to Prof. Ned Cornfield, a member of the committee that chose Cragon for the award.

The award, established in 1976 through an agreement between IBM and the IEEE Foundation, Inc., consists of a bronze medal, a certificate, $2,000 and a $2,500 international travel grant.

Compcon Fall '84 will be held at the Hyatt Regency Crystal City Hotel in Arlington, Va. Its theme is the "Small Computer (R)Evolution."

The registration fee is $125 for members and $150 for nonmembers.

The conference registration deadline is Sept. 2, after which conference registration costs will rise approximately 5%.

Registration can be made through Compcon Fall '84, P.O. Box 639, Silver Spring, Md. 20901.

HARRIS from page 43

software has a response time of less than one second for 90% of those entries.

Training was minimal because of user involvement and hands-on experience during the planning phase. Harris even felt confident enough not to install a DP department.

"We trained one of our own people to be our troubleshooter," Crawford explained. "With no prior computer experience, she now handles about 80% of the equipment-related problems that arise." Interactive takes the other 20%.

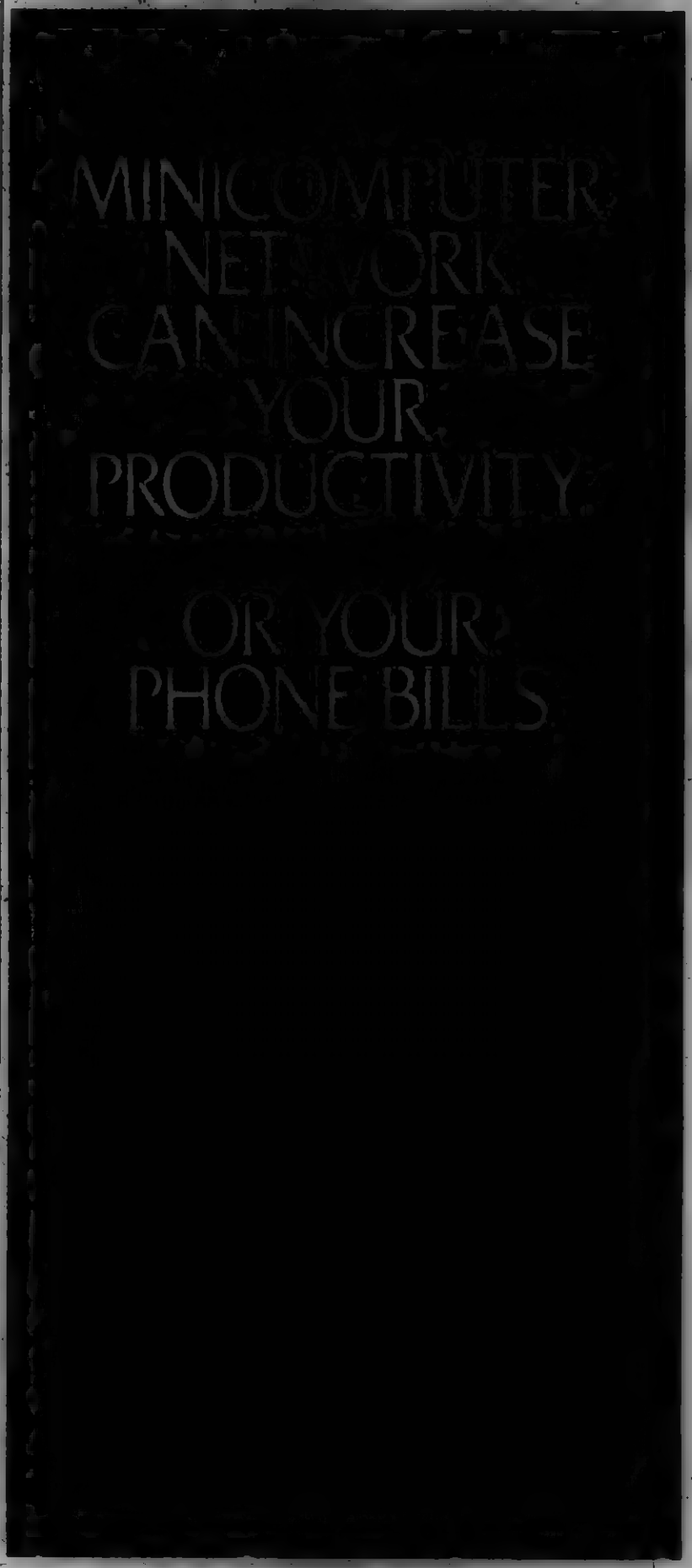
The company decided not to maintain its old manual system on a parallel basis while implementing the new system. The firm felt its employees would learn, accept and use the new system faster if they didn't have the old one to rely on.

Also, running two systems at the same time was cost-prohibitive. Because of the planning, it took only three days to transfer the entire 25,000-item inventory onto the new system.

Before the changeover, there was an eight- to 48-hour gap from the time an order was taken to the time inventory was updated. The company has now reached its goal of 95% same-day shipment service, and Harris is now able to handle three times the volume of orders with less manpower. Overtime is a thing of the past — through attrition, Harris has been able to cut its work force without overburdening those who remain.

"We expect to save over $25,000 this year in overtime expenses alone," Crawford said.

Harris believes the key reason its information resource management system is running so successfully is the company's ability to plan for any potential future data base requirements properly. "You have to think in terms of broad goals when planning for a new information system," Crawford said. "We are now at the threshold of reaching many of our goals. The planning and preparation took a relatively short period of time. When you see the results of proper planning, you realize it's the only way to go."



Most companies experience the same thing when they start tying remote terminals to their minicomputer.

Much higher phone bills.

But now there's an inexpensive solution to that costly problem: The new Codex 6002 Intelligent Network Proposesor.

This low-cost multiplexer will save you money even if you're using as few as two terminals. The 6002 boosts operating efficiency, reduces the number of needed lines and protects data from errors due to line disturbances. And it can handle any mix of up to 16 asychronous "terminals", including graphics terminal., word processors and personal computers from virtually any manufacturer.

Plus, only with the 6002 can you add asychronous equipment without worrying if your multiplexer is compatible or not. So not only will it save you money now, but also later as your network grows and grows.

The Codex 6002 Intelligent Network Processor. It's just one of our many products that enable minicomputer users to develop and efficiently manage a growing network.

To learn more about the 6002, call 1-800-821-7700, ext. 892. Or write: Codex Corporation, Dept. 707-92, 20 Cabot Boulevard, Mansfield, MA 02048.

codex
MOTOROLA GROUP

© 1984 Codex Corporation.

At Morgan Stanley,
software is like any other investment.
They judge it by the rate of return.

Automated office helps firm customize client data

CHICAGO — Conversion to an automated office meant that people "who had never seen a computer before" increased productivity and made higher quality reports and presentations to clients of SEI Corp.'s Funds Evaluation Division.

The division was formed in 1965 as the nation's first organization to provide performance evaluation and consulting services to corporate pension plan sponsors and institutional money managers. But to do so, a 1980 internal study found, client representatives spent a considerable amount of time manually customizing information for clients in the form of text, graphs, tabular data and special studies.

The Funds Evaluation Division has 250 employees handling 1,500 clients. To improve productivity, it launched plans to develop an automated office, vice-president for Product Design Mirella Shannon said.

At that time, the parent company of the division was A.G. Becker Paribas, Inc. Becker completed a separate automation research project and recommended selection of Wang Laboratories, Inc. word-processing systems.

The division installed a Wang Office Information System (OIS) 140 Model I — later upgraded to a Model III — in its Chicago office. It also installed an OIS 130-A in New York, OIS 115-2s in San Francisco, Los Angeles, Atlanta and Toronto and Wangwriters in Boston and Philadelphia.

In the first phase of implementation, personnel were trained and existing operations automated over a 12-month transition period. In the second phase, the computing, programming and telecommunications capabilities of the system were implemented. The systems were used to calculate internal and time-weighted rates previously determined by using desk calculators. Basic programming was used to develop prototype fund performance measurements, such as attribution analyses.

Also, a computerized data base containing information on more than 300 fund managers was developed for use in searches.

The systems are capable of communicating with each other and are equipped with IBM 2780/3780 and 3270 protocols for batch and on-line communication with IBM 3032 and Amdahl Corp. 470V/8 mainframes in Becker's data center, which SEI uses as a service bureau. Multifunctional Wang 5536-4 workstations are used as IBM 3270 terminals.

The division designed an interface between the OIS systems and a Xerox Corp. 9700 laser printer in the data center. The interface capability and a Wang list-processing capability are used to send quarterly seven-page letters to clients, providing summaries of fund performances.

The final phase of implementation involved development of a new client reporting system.

Although report production had been automated and accelerated in earlier phases, the documents were still providing only summary data. That meant that representatives were spending time analyzing and interpreting data and preparing additional reports and letters for clients.

Therefore, the division developed a mainframe program to prepare quarterly textual analysis of individual fund performance data automatically in the form of letters 20 pages or more in length.

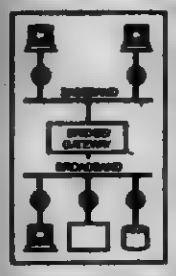
"The program composes the letters, which are customized and have the capacity for infinite variation, based on fund performance data," Shannon said. "The key result is an executive summary that provides more thorough, accurate, up-to-date and standardized information in the form of both written analyses and detailed graphics."

LAN.
THE DECISION TO WAIT AND SEE JUST PAID OFF.

Now there is a company that can satisfy your LAN needs both today and ten years from today. A company with flexible solutions backed by over 20 years of networking experience.

Codex.

In the 4000 Series LAN, we offer a system that lets you configure and control the precise mix of LAN technologies that suit your company needs.



A system, for example, that lets you combine a broadband backbone for data, video and voice applications; and less expensive Ethernet baseband feeders to support individual work areas.

A system that supports a wide array of industry standard interfaces. So you can connect practically any vendor's equipment.

Later, when your needs for internetworking and network management expand, those needs can best be met by the company that has literally written the book on adaptive routing, network management, protocol intervention, and statistical multiplexing.

Codex.

We just made the decision to get into local area networking a safe decision to make.

For more information, call 1-800-621-7700, ext. 879. Or write: Codex Corporation, Dept. 707-79, 20 Cabot Boulevard, Mansfield, MA 02048.

codex

© 1984 Codex Corporation.

TELEVIDEO'S 970: GET IN ON THE ANSI BOOM.

The TeleVideo 970 Terminal. The computer professionals' most powerful way to utilize the advantages of ANSI X3.64 code structure.

The 970's 16 non-volatile function keys (shiftable to 32) literally automate ANSI code command entry. Other features include VT-100 compatibility, block mode operation, 32 non-embedded visual attributes and a reconfigurable keyboard. An RS-232 printer port with built-in buffer is standard.

For operator comfort, the 970 keyboard offers a naturally contoured palm rest and sculpted keys, and non-glare 14-inch tiltable screen. You can utilize either the 80 column format, with 3 pages of memory, or 132 columns with 2 pages.

The 970. A combination of power, ease of use and TeleVideo reliability at a time you need it most. The ANSI boom is here. Get in on it with the TeleVideo 970.

Call us at (800) 538-8725 for more information. (In California call (408) 745-7760) or contact your nearest TeleVideo office:

California/Santa Ana	(714) 476-0244
California/Sunnyvale	(408) 745-7760
Georgia/Atlanta	(404) 447-1231
Illinois/Chicago	(312) 397-5400
Massachusetts/Boston	(617) 890-3282
New York/New York	(516) 496-4777
Texas/Dallas	(214) 258-6776
Central Europe (The Netherlands)	(31) 2503-35444
Northern Europe (United Kingdom)	(44) 9-905-6464
Southern Europe (France)	(33) 1-686-4412

TeleVideo® Terminals

TeleVideo Systems, Inc.

Service is available nationwide from General Electric Electronic Instrumentation and Computer Service Centers.
VT-100 is a registered trademark of Digital Equipment Corporation.

NEWS

Dasd tool cuts retailer's need for additional storage

KANSAS CITY, Kan. — Montgomery Ward and Co.'s data center here, one of four across the country, discovered it could do without an additional mass storage system after obtaining a data set residency management system that automated the management and contents of its direct access storage devices (Dasd).

The center operates IBM 3033 and 370/168 systems, running under the MVS JES3 operating system. On-line storage is provided with 48 IBM 3350 Winchester drives and 12 IBM 3330 Model 11 rigid disk drives, which are hooked to a 3850 B2 mass storage system.

Before obtaining a new Dasd management system, center personnel "had to clear the pack on a data set level using the IBM utilities, or dump the whole pack onto tape and restore [it] to another disk drive," according to Bob Dwyer, systems software specialist. "To do that, we needed a free pack to restore it. With DMS/OS, it is a much faster, much cleaner method, and I don't have to have a spare pack sitting out there just spinning and doing nothing."

About 1¼ years ago, the center obtained Sterling Software Marketing's data set residency management system (DMS/OS), which Dwyer said has performed better than expected.

System order canceled

He first learned of DMS/OS at a Sterling seminar, and after he discussed the product with Montgomery Ward's corporate DP cadre, the company decided to evaluate the product. An IBM 3850 B2 mass storage system had been on order, but he subsequently recommended that the order be canceled, and the center has "gained back" two disk packs formerly committed to restoring.

He continued, "One of the most helpful capabilities of DMS/OS is that you can clear a pack quickly in a critical situation. When you have a pack out there that is taking some temporary hits, for example permanent read errors, and you want to get off that spindle so your customer engineer can work with it, it is just super to be able to hit the pack with the Vsam support, move the Vsam, hit the pack with the Volume Configurator and move everything else to a string of packs.

"It's very quick. You don't have to sweat, and DMS/OS has taken care of the cataloging for you," he added.

Much of the regained space, according to Dwyer, was attributed to the Vsam Support feature of DMS/OS: "The big thing is being able to move Vsam around and get rid of some of my sub-allocated space and create the data sets as unique. I then know exactly what I have out there so I don't have to come up with a figure arbitrarily on how much space I'm going to need in the sub-allocated space to put my data sets in. Now, I can treat it almost like a sequential data set because I can look at my maps and see how much space a data set is taking up instead of going through the Idcams listing and looking at the relative byte address, which is really a very slow method of figuring out how much I am using.

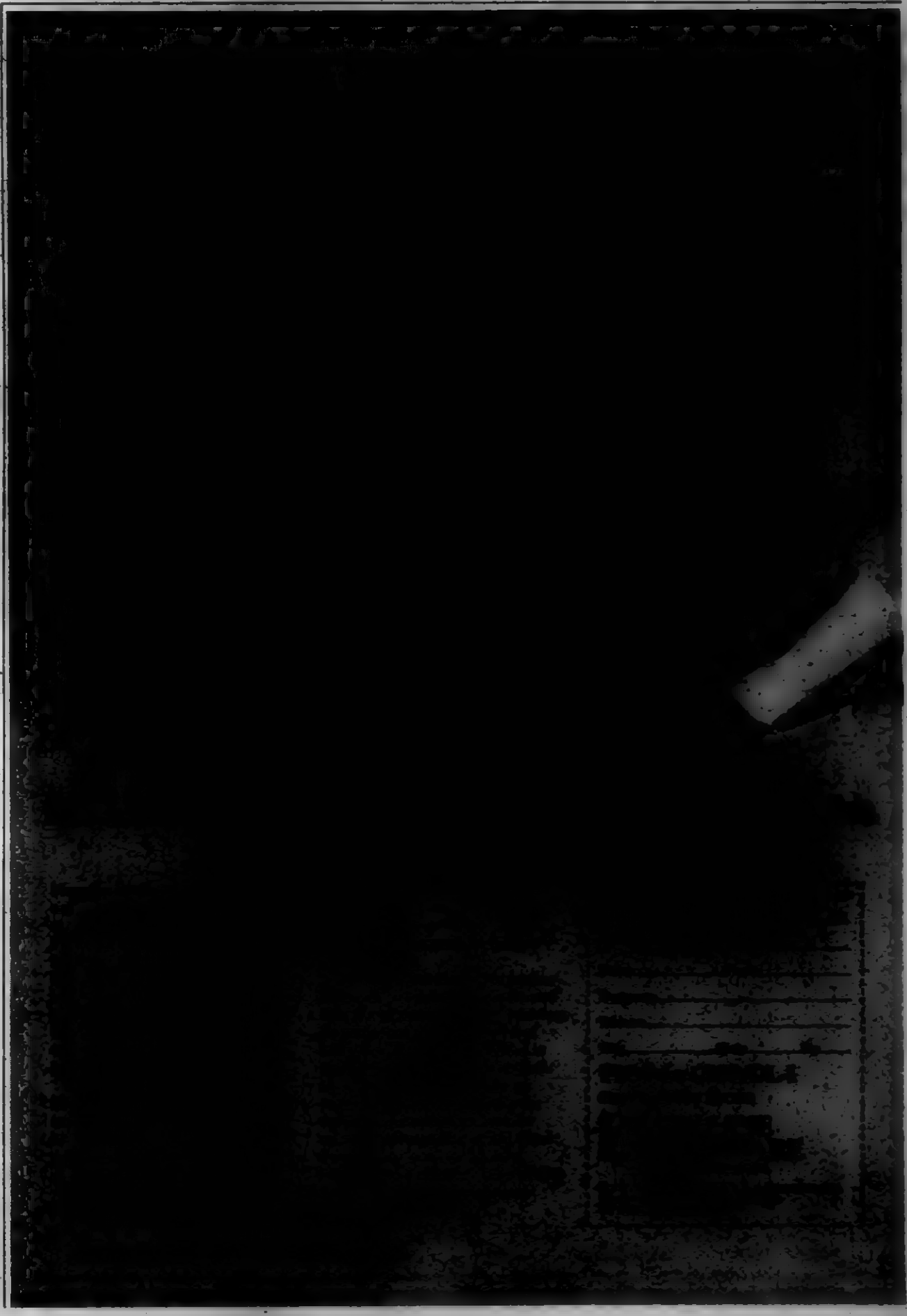
"I can't say enough about DMS/OS' ability to move Vsam data sets. . . . IBM's Export method was very slow and was done cautiously."

Dwyer was also pleased with the new System Productivity Facility (SPF)/Menu Selectable Unit of DMS/OS.

"I moved a lot of Vsam with the SPF option, which meant that I could sit right here in my chair and still get the job done.

"Without SPF, it would be a little tougher because you are dealing with building control cards," he said. "DMS/OS' method of building control cards is simple, but the SPF option takes the guesswork out of it. You get the TSO/SPF panel screen,

See DASD page 50



NEWS

Time short for public schools' system implementation

CLEVELAND — The Cleveland public school system didn't have much time to learn the best method of implementing a new computer system. "The school department decided last April to install a new system using IBM Personal Computers in each school. The scheduling and attendance applications had to be working when school opened in the fall," said Roberta Settles, administrative assistant for automation for the Cleveland public schools.

Previously, Cleveland schools used a system dependent on the city's IBM 3033 mainframe. "They wanted a decentralized system so each school could control its own attendance and grading," Settles said. "Administrators often had to wait for reports to be produced."

Pentamation Enterprises, Inc., in Bethlehem, Pa., was awarded a $1.7 million, three-year contract to tailor each school's scheduling, attendance and grading applications. "When we designed the system, it had to meet Cleveland public schools' needs," said Daniel Knerr, divisional manager for Pentamation. "Each school district has a distinct way of completing its daily attendance, scheduling and grading. We were on very tight deadline."

New experience for Pentamation

Pentamation's software is used by approximately 300 school districts. But working with a district the size of the Cleveland public school system — 78,000 students — was a new experience for Pentamation.

A training program had to be developed and implemented when Settles was hired in May. "To train Cleveland school personnel, we brought our people to Cleveland and held training sessions in each school," Knerr said. "We limited the training sessions to small groups. There were a few problems, but training was completed during the summer."

The tight deadlines were blamed for problems with the system when school opened last fall. Administrators complained about a lack of training and support.

"The people who did not use a computer before followed instructions more closely than those who were familiar with computers," Knerr said. "We sent one employee to Cleveland to answer any questions or problems an administrator had with the system."

Questions were raised about the vendor selection process. In April, the school board voted by a 5:2 margin to use the Pentamation system in its 42 junior high schools and high schools. Since Superintendent Frederick D. Holliday had used the system in two other school systems, Pentamation was awarded the contract without competitive bidding.

Today, with the Personal Computers in place, each school can produce its own reports. Reports for the entire school system require that each school transmit its data to the city's 3033. The city's mainframe then sends the data to Pentamation's host system, which consists of an IBM 4341 and two Magnuson Computer Systems, Inc. M80 computers. Data is sent back to the Cleveland school system.

Pentamation is in the process of enhancing the system. "We have a new release that some of the districts are using," Knerr said. "It has enhancements to the grade reporting and daily attendance software.

"Some administrators have asked that we add word processing and other personal computer capabilities. These enhancements will be available in the future," according to Knerr.

DASD from page 49

and it is very simple to tell DMS/OS what you want to do, which you can simulate or go in live mode. It gives you that option; otherwise, you have to bring up the Job Control Language and build your control cards. Instead, DMS/OS asks you what you want to do. You can forget about that type of function because you have it on the screen."

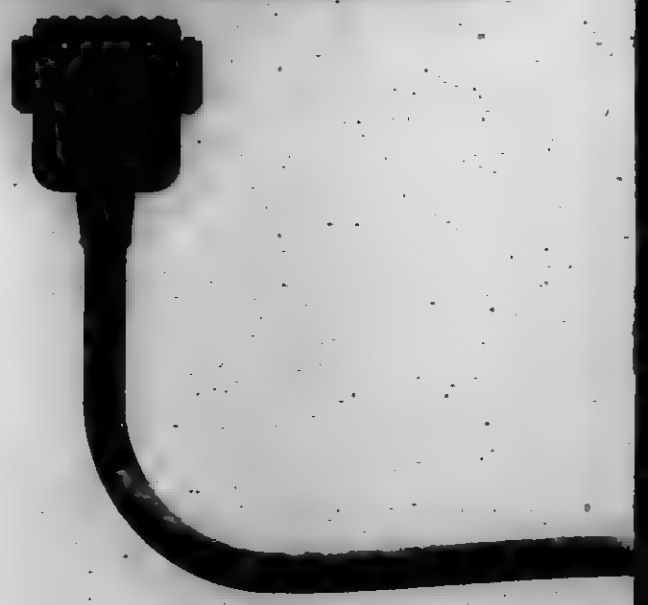
Need for 'stand-alone restore'

Sterling Software Marketing addressed initial shortcomings through enhanced releases, adding multivolume Vsam with the latest version, Dwyer said. One remaining shortcoming, he said, is the need for "stand-alone restore so we don't have to maintain two sets" of backup.

Dwyer has an additional need — the support of multivolume sequential data — that probably won't be addressed, "probably rightly so," he said; the product will not restore to more than one device.

After attending a DMS/OS seminar, Dwyer discussed it during a field managers' meeting, which included managers from all of the Montgomery Ward data centers. He was assigned the task of benchmarking it here, and a copy was sent to the Chicago corporate site. As a result, Montgomery Ward purchased DMS/OS for three sites, with the justification it would eliminate the need for a 3085 B2 at each site.

NOW CCA'S MODEL 204 DBMS CAN DO SOMETHING EVERY EXECUTIVE CAN APPRECIATE.



NEWS

OA system helps city, police grapple with crime stats

WASHINGTON, D.C. — A limited office automation system is helping this city's Office of Criminal Justice Plans and Analysis quickly generate reports on crime, repeat offenders and police finances, among other topics.

The OA system also permits that office to produce in one day the city's annual report on offenses and arrests, something that once took a full year's worth of effort, according to Robert Lester, the agency's assistant director.

Included in the system are a Sony Communications Products Co. SMC-70 microcomputer and Series 35 word processor, a Sony daisywheel printer and dot matrix printer and two Sony portable word processing units called Typecorders.

The system also includes a Hewlett-Packard Co. HP 7470A two-pen plotter and a Corvus Systems, Inc. Corvus 6MB 6M-byte Winchester disk storage unit.

Statistics and other data from the city's criminal justice agencies are entered into the SMC-70, stored on 3½-in. diskettes and retrieved using the latest version of Condor Corp.'s Data Base Management System.

City agencies that provide data to the Office of Criminal Justice Plans and Analysis include the police department, corrections department, parole board, prosecutor's office, courts and a service agency that reports on suspects' pretrial status.

That data becomes the basis for the office's reports, which research such questions as which parts of the city have the highest crime or what percentage of arrests have resulted in convictions.

The agency, a branch of the mayor's office, was always able to do those studies, Lester reported, but had to spend much more time producing them when using the police department's mainframe computer. Now, he said, many more reports will be produced than before.

The microcomputer, he said, "enables people to be aware of the month-to-month changes [in crime data] much more accurately."

Final drafts of reports are written on the office's Sony System 35 word processor, which receives data and tables from the SMC-70 over office phone lines.

The charts and graphs produced by the SMC-70, using Redding Group, Inc. Graf Talk software, are reproduced by the HP plotter.

They mark the first time the office was able to use such graphic devices in its reports and, Lester said, "if you can translate data into a bar [graph] or a pie [chart], you can understand it."

Trust the name

Lester said the Sony-based system was chosen over that of several other vendors because "we were very impressed with their word processing, and we trust the Sony name."

He also said that the portable Typecorders, which use microcassettes to record both voice and text, made the package attractive because first drafts of reports could be written on the Typecorders and then loaded into the System 35 without the need for retyping.

His only regrets, he noted, are that the system is not IBM-compatible, a drawback that prevents the agency from swapping diskettes with national associations using IBM data processing products, and that it has an 8-bit processor. The system cost the city roughly $19,000, $9,000 for the word processing system alone, Lester said. The system came on-line six months ago.

TALK SENSE TO THE IBM PC.

Introducing PC/204, a link that lets PC users turn mainframe data into spreadsheets effortlessly.

PC/204, the newest productivity tool from Computer Corporation of America, is a powerful, efficient, easy-to-use software link between IBM personal computers and mainframes. It effectively answers the pressing problem of how to let corporate managers take full advantage of today's personal computers for making decisions, while also giving them access to the corporate database in a format they can use.

First, PC/204 guides PC users as they browse through the MODEL 204 database. Then it extracts the data they need and converts it into meaningful management information for spreadsheet analysis. Lotus 1-2-3 for example. And PC/204 does all that automatically. Without the PC user having to understand anything about mainframe technology.

If you aren't already using Lotus 1-2-3, we can supply it along with PC/204. Or you can use any current IBM PC business package.

While PC/204 is helping business managers, it's also helping MIS directors.

PC/204 uses the power and intelligence of the personal computer for increasing the overall efficiency of an application.

For one thing, it improves performance of the mainframe by offloading some of the processing to the PC, while reducing PC users' response time. It also makes communication between the PC and the mainframe more efficient.

What about security and control? PC/204 provides individual management views of the corporate database while still allowing PC users access to all the information they need.

PC/204 is the latest reason to get MODEL 204 DBMS which has been so highly rated for performance and programmer productivity.

For more information or to arrange for a demonstration of PC/204's capabilities, simply return the coupon or write to us on your letterhead.

Computer Corporation of America

Yes, please tell me more about: ( ) PC/204 ( ) MODEL 204 DBMS
( ) Send me a brochure.
( ) Send me info on free DBMS seminars, or call our seminar coordinator.

NAME _____ TITLE _____
COMPANY _____
ADDRESS _____
CITY _____
STATE _____ ZIP _____
TELEPHONE _____
Operating System: ( ) MVS ( ) DOS ( ) CMS ( ) Other: _____

Computer Corporation of America, Four Cambridge Center, Cambridge, MA 02142 (617) 492-8860 CW03/84PC

CCA's Executive DBMS Seminar Schedule

March							
Columbus,OH	Mar. 1	Tallahassee	Mar. 14	San Diego	Apr. 12
Detroit	Mar. 22	Tulsa	Mar. [illegible]	St. Louis	Apr. 18
Hartford	Mar. 23			Washington,D.C.	Apr. 4
Honolulu	Mar. 23	Austin			
Houston	Mar. 28	Albany	Apr. 26	May	
Jacksonville	Mar. 13	Anchorage	Apr. 12	Atlanta	May 15
Louisville	Mar. 6	Boston	Apr. 12	Austin	May 10
Minneapolis	Mar. 9	Cleveland	Apr. 18	Baltimore	May 15
New York	Mar. 27	Dayton	Apr. 26	Charlotte, NC	May 8
Pittsburgh	Mar. 13	Little Rock	Apr. [illegible]	Cincinnati	May 2
Portland,OR	Mar. 28	New Orleans	Apr. 5	Ft. Worth	May 3
Richmond	Mar. 20	Norfolk	Apr. 19	Harrisburg	May 2
Rochester	Mar. 22	Philadelphia	Apr. 3	Milwaukee	May 3
Saddle Brook,NJ	Mar. 6	Phoenix	Apr. 19	Orange City	May 24
Salt Lake City	Mar. 7	Princeton	Apr. 18	Pittsburgh	May 8
		Raleigh	Apr. 19	Santa Clara	May 24

'Whole Earth' covers software

SAUSALITO, Calif. — The publisher of the *Whole Earth Catalog*, the compendium of New Age items, has launched a new venture: the *Whole Earth Software Catalog*.

As a preview of the software catalog, publisher Stewart Brand has unveiled "The Whole Earth Software Review," which lists only those software products tested and approved by the publication's staff, according to Brand.

The review, which went on sale last month, also lists recommended books, hardware and dial-up services.

The premiere issue includes a roundup on using computers for writing, the result of a two-month teleconference.

Also in that first issue is an article titled "MeMicro: Why the IBM Personal Computer Is a Lousy Standard for the Industry."

"The Whole Earth Software Review" is slated to be published quarterly, as part of the research process for the *Whole Earth Software Catalog*, scheduled for release late this year.

"The Whole Earth Software Review" is priced at $15 (increasing to $18 in April) and is available from The Whole Earth Catalog and Review, 150 Gate Five Road, Sausalito, Calif. 94965.

NEWS

Data base listing out

DETROIT — Gale Research Co. has announced the publication of its "On-Line Data Base Search Services Directory," which provides detailed descriptions of the on-line information retrieval services offered by public, academic and private information firms in the U.S. and Canada.

Entries in the directory furnish up to 17 points of information about each organization, including items such as on-line systems available, subject areas, associated services, availability and charges.

Six indexes provide analyses of the information contained in the entries to assist users in locating the most appropriate search service for their needs, according to the vendor.

The directory is priced at $75 from Gale Research, located at Book Tower, Detroit, Mich. 48226.

Visicalc, Easywriter aids offered

NAPERVILLE, Ill. — Software that teaches microcomputer users to use Visicorp's Visicalc spreadsheet program and Information Unlimited Software, Inc.'s Easywriter II word processing program is available from Deltak, Inc.

"Managing Your Business with Visicalc or Visicalc Advanced Version Program" provides users with an understanding of return on equity, the use of return on sales to manage operations and asset and financial structures management, according to a Deltak spokeswoman. The package runs on IBM Personal Computers with at least 64K bytes of memory and Apple Computer, Inc. Apple II or Apple IIe microcomputers with at least 48K bytes of memory.

"Training for the Easywriter II" provides instruction on how to create, change, store and print documents using the word processing program. It consists of four diskettes and a printed guide.

The Visicalc tutorial is priced at $70 for the IBM version and $60 for the Apple version. The Easywriter II tutorial is priced at $70. Both are available through Deltak sales offices.

Deltak is located at the East-West Technological Center, 1751 W. Diehl Road, Naperville, Ill. 60566.

Multimedia courses unveiled on management, DP, personal skills

ARLINGTON HEIGHTS, Ill. — Advanced Systems, Inc. (ASI) has announced eight multimedia management, data processing and personal skills courses.

The courses include "Information Systems Project Management: Life Cycle Management"; "Information Systems Project Management: Project Control and Monitoring"; "Technology Perspective: Features and Differences of IMS/VS Release 1.3"; "MVS/SP: Sort/Merge Program"; "The Making of a Salesman"; "Dynamics of Sales Management"; "Supervisory Safety Series"; and "[VME] 2900 Concepts and Facilities."

The course times range from 1½ to 32 hours. Prices range from $1,500 to $12,600 per course.

Course tapes are also available on a rental basis.

ASI, 2340 S. Arlington Road, Arlington Heights, Ill. 60005.

Book details Northeast DP job sites

SCITUATE, Mass. — The Bradford Co. has published a directory containing 600 listings of New England companies that use computers or employ computer professionals.

The 1984 New England Directory for Computer Professionals includes information such as the company's major business, latest fiscal year sales, sales growth rate and locations. The listings also include the names of company officers, department managers and size of work force.

Information about the company's data processing department includes the type of hardware, software, computer languages, data bases and major applications that are used. The directory contains appendixes about employee benefits and user hardware.

The directory costs $26.50 and is available from The Bradford Co. through P.O. Box 256, Scituate, Mass. 02066.

ALUMINUM
Disc Pack Cases ● Mag Tape Reel Cases

See your local dealer, or call/write —
ALUMINUM CASE CO.
3333 W. 48th Pl. • Chicago, Illinois 60632 (312) 247-4811

ATTENTION COPICS USERS

A truly on-line, integrated Receiving, Quality and Material Control System replaces the COPICS Field Developed Receiving Module.

In addition to updating your MRP, Purchasing and Inventory Control data bases, this powerful system, RQMCS, features:

- Automatic Back Out
- Flexibility
- Only One Data Base
- Total Audit Trail
- Quality Control
- On-Line Updating
- Posting Options
- No Conversion

RQMCS users are enthusiastic about the system's processing speed and the immediate control it has provided for their entire receiving operation. For more information call:

(404) 998-3500

LELAND INC
COMPUTER SERVICES
8601 DUNWOODY PLACE, SUITE 146, ATLANTA, GA. 30338

Our Word Is A Promise

Lear Siegler video display terminals with high performance and High Touch™ style. Including the new ADM 11, ADM 12 and ADM 34E VDTs.

SALES • MAINTENANCE • LEASING
NOW AVAILABLE — IN STOCK — ALL MODELS

DSI Digital Source, Inc.
CA [illegible]
D.C. [illegible]

SPRINT
SPOOL TO 328X
(Also 3262 and ASCII Printers)

VS1 and MVS	STAM and VTAM Support
JES, JES2, and JES3	Full FCB and UCS Support
Local and Remote Printers	No System Mods Required
Control Printer Activity from ANY VTAM terminal using SPF-like Panels	Multiple Printers Run In a Single Address Space
	Support For SCS Devices
Data Formatting Facility	SMF Accounting Records

Shares Printers With Other Applications

Worldwide Support — TONE Software Corp. — Free Trial

1735 E. Deerfield, Anaheim, CA 92804
(714) 991-9400 Telex 181982

BGS
SYSTEMS FOR DP MANAGEMENT

NEWS

CALENDAR

WEEK OF APRIL 8

APRIL 9-13, SAN FRANCISCO — **The New DP Revolution.** Contact: Technology Transfer Institute, 741 10th St., Santa Monica, Calif. 90402. Also being held April 23-27 in Chicago and April 30-May 4 in Boston.

APRIL 10-11, WASHINGTON, D.C. — **Personal Computers: A Hands-On Experience.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

APRIL 10-13, WASHINGTON, D.C. — **CICS/VS Application Design.** Contact: Applied Technology Associates, Inc., Suite 200, 131 Park St. N.E., Vienna, Va. 22180.

APRIL 11-13, WASHINGTON, D.C. — **How to Build and Use a Data and Information Resource Directory.** Contact: Barnett Data Systems, 19 Orchard Way N., Rockville, Md. 20854.

APRIL 12-13, NEW YORK — **The IBM Personal Computer: Making It Work in the IBM Mainframe Environment.** Contact: Art Solomon, Techtran, P.O. Box 10212, 72 Cummings Point Road, Stamford, Conn. 06904.

APRIL 12-13, NEW YORK — **Micro/Personal Computer Operating Systems.** Contact: Digital Consulting Associates, 339 Salem St., Wakefield, Mass. 01880.

APRIL 12-14, CHARLOTTE, N.C. — **Carolina Computer Show.** Contact: L & J Associates, Inc., Suite 102, 115 Broadfoot Ave., P.O. Box 59729, Fayetteville, N.C. 28305.

APRIL 13-15, ALBUQUERQUE, N.M. — **International Personal Robotics Conference (IPRC).** Contact: IPRC, 1547 S. Owens St. 46, Lakewood, Colo. 80226.

WEEK OF APRIL 15

APRIL 16, NEW YORK — **Introduction to the IBM Personal Computer.** Contact: Center for Advanced Data Processing, Inc., Suite 402, 450 Seventh Ave., New York, N.Y. 10123.

APRIL 16, NEW YORK — **Word Processing with Multimate.** Contact: Center for Advanced Data Processing, Inc., Suite 402, 450 Seventh Ave., New York, N.Y. 10123.

APRIL 16-18, CHICAGO — **Introduction to Data Communications.** Contact: Systems Technology Forum, 9000 Fern Park Drive, Burke, Va. 22015.

APRIL 16-18, DENVER — **Data Communications: An Introduction to Concepts and Systems.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

APRIL 16-18, BOSTON — **Data Communications: Effective Network Design.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

APRIL 16-18, ROCHESTER, N.Y. — **Data Communications Systems.** Contact: Center for Advanced Professional Education, Suite 110, 1820 E. Garry St., Santa Ana, Calif. 92705.

APRIL 16-18, WAKEFIELD, MASS. — **Data Base Management.** Contact: Center for Advanced Professional Education, Suite 110, 1820 E. Garry St., Santa Ana, Calif. 92705.

APRIL 16-18, NEW YORK — **Advanced C Language Programming Workshop.** Contact: Structured Methods, Inc., 7 W. 18th St., New York, N.Y. 10011.

APRIL 16-18, ATLANTA — **VM/SP Structure, Flow and Tuning.** Contact: Goal Systems International, Inc., 5455 N. High St., Columbus, Ohio 43214.

APRIL 16-18, LOS ANGELES — **DP Disaster Recovery Seminar.** Contact: EDP Security, Inc., 181 West St., Waltham, Mass. 02154.

APRIL 16-18, LOS ANGELES — **Managing Application Software Support.** Contact: Infosci, Inc., Box 7117, Menlo Park, Calif. 94026.

APRIL 16-18, WASHINGTON, D.C. — **Personal Computers: Strategies for Managing.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

APRIL 16-18, CHICAGO — **Videotex '84.** Contact: Sally Summers, London Online, Inc., Suite 1190, 2 Penn Plaza, New York, N.Y. 10121.

APRIL 16-18, SOUTHFIELD, MICH. — **Local-Area Networks.** Contact: Center for Advanced Professional Education, Suite 110, 1820 E. Garry St., Santa Ana, Calif. 92705.

APRIL 16-18, DENVER — **Data Communications for Microcomputers: Acquisition, Application and Implementation.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

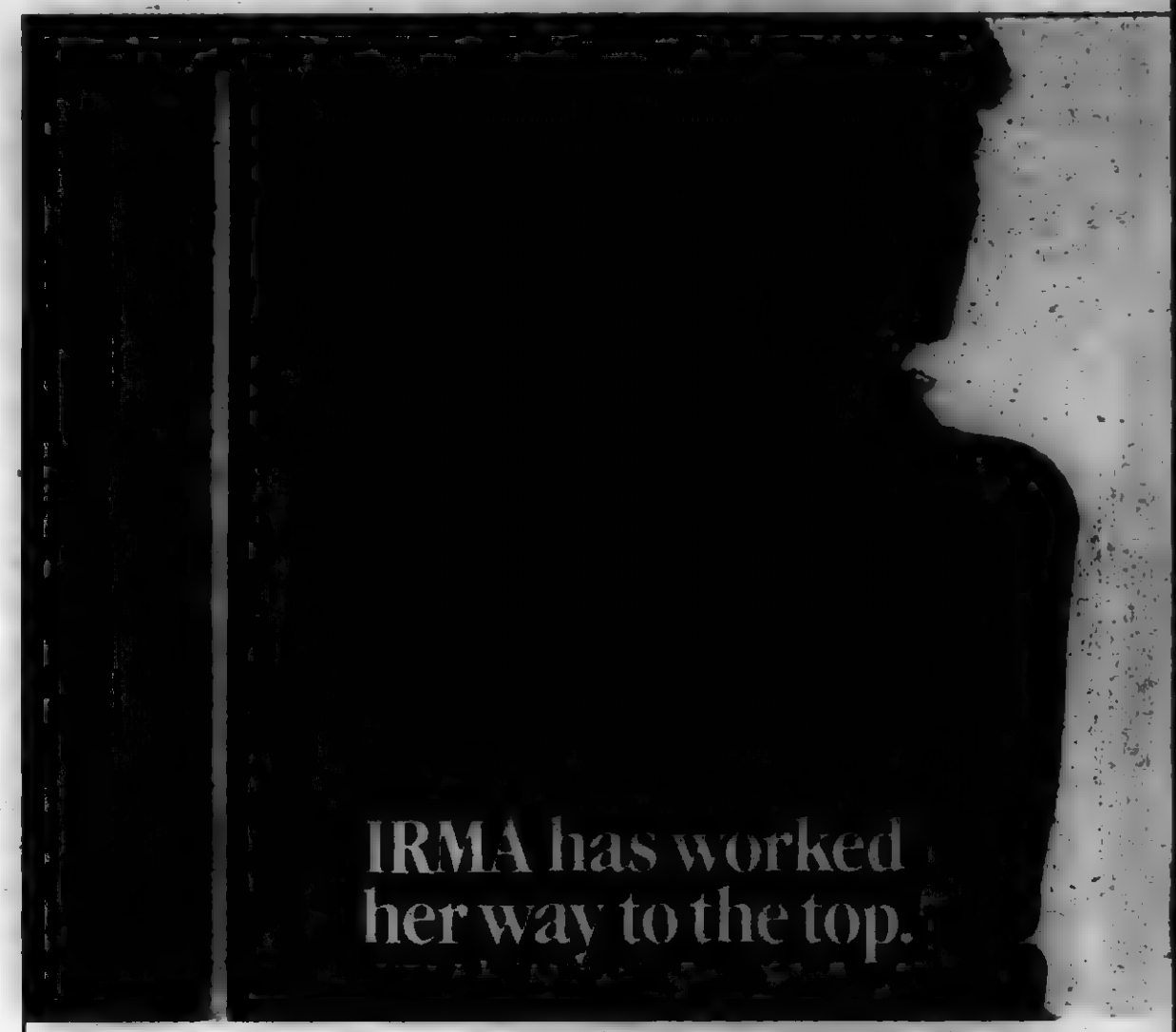
APRIL 16-18, SAN JOSE, CALIF. — **Network Communications Protocols.** Contact: Center for Advanced Professional Education, Suite 110, 1820 E. Garry St., Santa Ana, Calif. 92705.

APRIL 16-18, SAN FRANCISCO — **Office Automation Strategic Planning, Design and Implementation.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

APRIL 16-18, SALT LAKE CITY — **Personal Computers and Networking.** Contact: Center for Advanced Professional Education, Suite 110, 1820 E. Garry St., Santa Ana, Calif. 92705.

APRIL 16-19, ATLANTA — **Technical Association of the Pulp and Paper Industry (Tappi) Computer-Aided Design Seminar.** Contact: Tappi, P.O. Box 105113, Technology Park/Atlanta, Atlanta, Ga. 30348.

APRIL 16-19, SADDLEBROOK, N.J. — **Structured Requirements Definition.** Contact: Georganna Carson, Ken Orr and Associates, Inc.,



She's Director of Decision Support, the leader in IBM 3270 mainframe/PC networks.

IRMA is taking charge! Her performance in over 25,000 IBM 3270 mainframe/PC installations has made her the industry's leading Decision Support Interface.™ Why? Because IRMA works. Easily and economically, IRMA's on the job giving PC users mainframe data access, selection, storage and communication back to the mainframe.

She's more capable than ever.

IRMA is a printed circuit board that slips into any available IBM PC/PC XT slot and attaches via coaxial cable to a 3270 controller. She's as easy to work with as the PC itself and provides standard text file transfer software

IBM PC and IBM PC XT are trademarks of International Business Machines Corporation. Apple Lisa is a trademark of Apple Computer, Inc. DEC Rainbow is a trademark of Digital Equipment Corporation.

NEWS

1725 Gage Blvd., Topeka, Kan. 66604.

APRIL 16-19, NEW YORK — CICS Debugging. Contact: Syscd, One Park Ave., New York, N.Y. 10016.

APRIL 16-20, DENVER — Structured Design for Real-Time Systems. Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

APRIL 16-20, ORLANDO, FLA. — IDMS-DB Programming. Contact: Harris Education Center, 6220 S. Orange Blossom Trail, Orlando, Fla. 32809.

APRIL 16-20, CHICAGO — Information Modeling Workshop. Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

APRIL 16-20, WASHINGTON, D.C. — Network Performance Management. Contact: Institute for Software Engineering, 510 Oakmead Pkwy., Sunnyvale, Calif. 94086.

APRIL 16-20, WASHINGTON, D.C. — Unix for Users. Contact: Webco Industries, Inc., P.O. Box 15505, 3513 Washington Ave., Alexandria, Va. 22309.

APRIL 16-20, SAN FRANCISCO — Project Planning and Control Workshop. Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

APRIL 16-20, ATLANTA — Structured Design Workshop. Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036. Also being held April 16-20 in Seattle.

APRIL 17, NEW YORK — Spreadsheets Using Lotus 1-2-3. Contact: Center for Advanced Data Processing, Inc., Suite 402, 450 Seventh Ave., New York, N.Y. 10123.

APRIL 17, NEW YORK — Introduction to Dbase II. Contact: Center for Advanced Data Processing, Inc., Suite 402, 450 Seventh Ave., New York, N.Y. 10123.

APRIL 17-18, WASHINGTON, D.C. — The Second Annual Broadband Local Networks Forum. Contact: Architecture Technology Corp., P.O. Box 24944, Minneapolis, Minn. 55424.

APRIL 17-19, ATLANTA — Understanding Modern PBX Systems. Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

APRIL 17-19, WASHINGTON, D.C. — The 10th Annual Federal DP Expo and Conference. Contact: The Interface Group, Inc., 300 First Ave., Needham, Mass. 02194.

APRIL 17-19, TOULOUSE, FRANCE — The Sixth International Symposium on Programming. Contact: Professor B. Robinet, Universite Pierre et Marie Curie, Aile-55-65, 4 Place Jussieu, 75230 Paris Cedex 05, France.

APRIL 17-20, BOSTON — Structured Programming: Techniques for Productivity. Contact: QED Information Sciences, Inc., QED Plaza, P.O. Box 181, Wellesley, Mass. 02181.

APRIL 18, NEW YORK — Dbase II for Application Development. Contact: Center for Advanced Data Processing, Inc., Suite 402, 450 Seventh Ave., New York, N.Y. 10123.

APRIL 18-19, ANAHEIM, CALIF. — Higher Level Protocols for Data Communications Networks. Contact: The American Institute for Professional Education, Carnegie Building, 100 Kings Road, Madison, N.J. 07940. Also being held April 23-24 in Danvers, Mass.

APRIL 18-20, DENVER — The Seventh Annual Rocky Mountain Data Processing Expo and Conference. Contact: Industrial Presentations West, Inc., 3090 S. Jamaica Court 304, Aurora, Colo. 80014.

APRIL 19, PALO ALTO, CALIF. — California Computer Show. Contact: Norm De Nardi Enterprises, 330 S. San Antonio Road 204, Los Altos, Calif. 94022.

APRIL 19-20, LOS ANGELES — Reducing Software Complexity. Contact: Infosci, Inc., Box 7117, Menlo Park, Calif. 94026.

APRIL 19-20, ORLANDO, FLA. — IDMS-DC Transaction Design. Contact: Harris Education Center, 6220 S. Orange Blossom Trail, Orlando, Fla. 32809.

APRIL 20, NEW YORK — Advanced PC-DOS 2.0. Contact: Center

Afips OAC '85 to take place in Atlanta

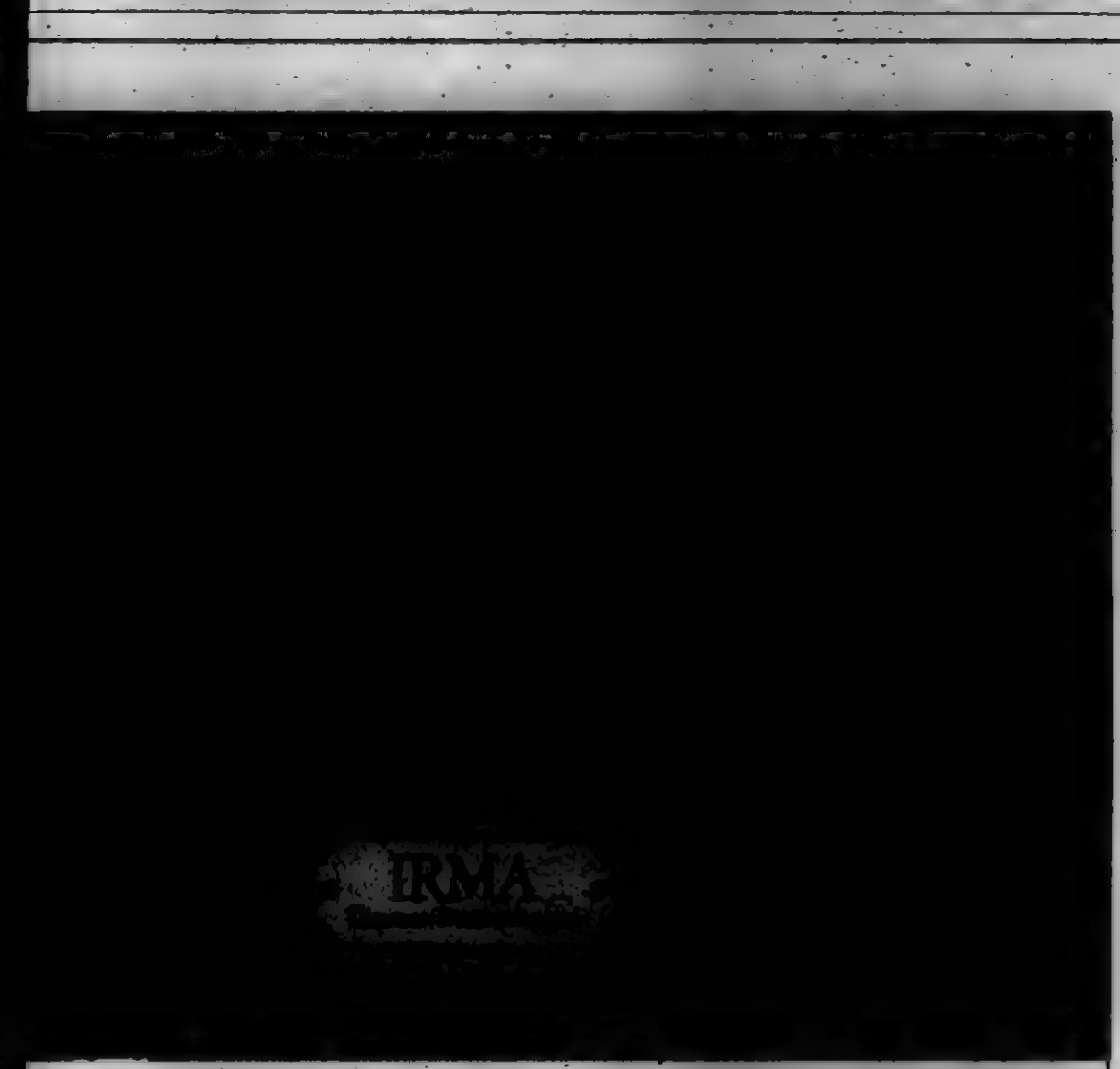
ATLANTA — "Today's Partnership: People & Technology" will be the theme for the 1985 Office Automation Conference (OAC '85), which will be held next Feb. 4-6 at the Georgia World Congress Center here.

The focus of the conference, sponsored by the American Federation of Information Processing Societies, Inc. (Afips), will be on the business value that can be achieved through the use of office automation technology. It will examine office solutions that can improve individual and organizational performance.

Emphasis will be placed on successful approaches for achieving integration and compatibility between systems, user needs and business strategies, Afips said.

The conference program will offer over 45 sessions in six tracks, including organizational impacts, "Office Workstations," "Ergonomics of the Work Place," "Communications Technologies & Issues," "Productivity & Requirements Evaluation" and "Networking Applications."

The registration fee for the full conference is $100 in advance. Further information is available from OAC '85, Afips, 1899 Preston White Drive, Reston, Va. 22091.



for VM/CMS and MVS/TSO mainframe environments, in addition to optional APL Terminal Emulation.

She's got more to offer.

Other IRMA products give you more ways to build cost-effective IBM 3270 and IBM PC-based decision support networks.

IRMALINE™ is the first coaxial link between 3270 networks and remote personal computers, including the IBM PC/PC XT, the Apple Lisa, the DEC Rainbow and others. IRMALETTE,™ the Asynchronous Interface, lets you run the same IRMA software in your remote personal computer that you run in the office.

So connect with success. With IRMA products from DCA. Call 1-800-241-IRMA.

Connect with success.

dca
Digital Communications Associates, Inc.

IRMA, IRMALINE, IRMALETTE and Decision Support Interface are trademarks of Digital Communications Associates, Inc.
©1984 Digital Communications Associates, Inc., 303 Technology Park, Norcross, GA 30092. (404) 448-1400, TLX 26-5375 DCAATL.

EDITORIAL

The risk of 'look-alikes'

When a vendor hits upon a successful product, a group of look-alike products traditionally follows. In the case of the class of machines into which Digital Equipment Corp.'s VAX-11 and IBM's 4300 falls — superminicomputers through low-end mainframes — that group has grown into a swarm.

At last count, better than 95 processors fit into the same general arena as the VAX-11 and 4300 [CW, Jan. 30]. Some are plug-compatible, or "me too," products. Others offer very similar performance characteristics. Still others offer similar performance, but with a twist, such as fault tolerance or a specialized local network.

One of the latest entrants in the supermini market is Gould, Inc., which has announced the Powernode 6000 [CW, March 19]. Introduced in a big "VAX attack" campaign, the Powernode 6000 is Gould's first virtual memory processor.

While fierce competition has been a keystone of the American way of doing business, the overload of machines in the 4300/VAX-11 marketplace is getting silly. And the situation will probably get worse; lurking on the edge of this overcrowded marketplace are hordes of up-and-coming vendors of supermicrocomputers that have set their sights on a segment of the mid-range market.

Are there really enough users out there to support the throngs of vendors claiming to have the perfect mid-range processor? Probably not. And the result could be a huge vendor shakeout from this market segment.

Some manufacturers of 4300-compatible products have already felt the sting of the overcrowded marketplace. IBM has 11 systems aimed at the mid-range processing market. As a result, firms like Magnuson Computer Systems, Inc. have fallen victim to sagging sales. Now IPL Systems, Inc. appears to be having problems coping in the IBM 4300 marketplace.

Computer companies know the risks when they embark on a new product line. But what about the users? Who will service a mid-range computer system from a defunct vendor? These are not $5,000 throwaway microcomputers; most cost better than $100,000, some closer to $500,000.

And what about enhancements to a system that is no longer marketed? Users may find themselves buying up parts on the used market or forced to convert to another vendor's system.

If and when the mid-range shakeout finally arrives, the vendors who find themselves facing Chapter 11 will have no one to blame but themselves. Countless uncharted marketplaces are just waiting for a clever entrepreneur or a progressive, established company to crack open with an innovative product.

Five years ago, then-struggling microcomputer companies like Apple Computer, Inc. had a hard time getting anyone to listen to details about their new class of processor. Now a speech by Apple Chairman Steve Jobs can pack an auditorium.

Who will pack the auditoriums 10 years from now? Certainly not the vendors of look-alike products. Chances are, many of those in the 4300/VAX-11 market will have been long forgotten. It will be executives of companies that decided to offer products different from those available from DEC, IBM and other major vendors who will draw the crowds.

LETTER

One-minute DP management no panacea, can cause loss of confidence

One-minute management, as described in J. Daniel Couger's In Depth article "The one-minute DP manager" [CW, Feb. 27], is no panacea.

A project leader once took a minute to tell me that if I knew anything about structured programming, I should know that each IF is successively indented, that ELSE goes on a separate line and so on.

Rather than show off that structured programming meant reducing flow of control to three basic types to enable proof of program correctness, I showed him that a lengthy case statement — IF . . . ELSE IF . . . ELSE IF — would cause difficulty on his terms.

He said I could get around that, and he showed off his power by leaving then.

He was not describing structured programming, but a particular implementation of it: a standard. I was not allowed to defend myself or to show how the current standards manual specifically supported me.

The project leader's standards were issued six months later.

In only one minute, by directly and unjustifiably challenging my competence, my project leader completely destroyed his manager's 10 minutes of representing to me that potentials were wide open in that shop.

I never again felt confident about working there.

Name and address
withheld by request

Computerworld welcomes letters from its readers. Preference will be given to typed, double-spaced letters of 150 words or less; they may be edited for the purpose of clarity and brevity.

Letters should be addressed to Editor, Computerworld, Box 880, 375 Cochituate Road, Framingham, Mass. 01701.

COMPUTERWORLD

Editor
John C. Wilmouth

Executive Editor
Rita Shaw

Managing Editor
Bill Laberis

Assistant Managing Editor
Cheryl M. Gallo

Senior Editors
Lehman
Paul Gillin

Copyeditors
John Dix
Phil Hirsch

Systems
Tom Hunter

Industry
Peter Bochner

Features
George Hayes

Design Editor
Marjorie Magowan

International Editor
Susan Maloney

Associate Features Editor
Barbara Van Scoyoc

Assistant Features Editor
Elizabeth Morse

Special Reports Editor
Donovan Wile

Staff Writers:
James Connolly
John Gallant
Lynn Haber
Patricia Keefe
Paul Korzeniowski
David Olmos
Edward Warner

Correspondents:

New York:
David Myers
Suite 7G
401 East 80th St.
New York, N.Y. 10021
212/570-2135

Washington, D.C.
Bureau Chief: John Kirkley
445 National Press Building
529 14th St., N.W.
Washington, D.C. 20045
202/347-6718

West Coast
Bureau Chief: Jeffry Beeler
Correspondent: Robert Ball
1020 Marsh Rd.
Menlo Park, Calif. 94025
415/328-8084

Chief Copy Editor
Kathie Gow

Assistant Chief Copy Editor
Charlotte Zilliox

Copy Editors:
Becky Batcha
Dave Boulland
Bruce Crane
Deborah Fickling
Deborah Scaduto-Horn
Thomas Schmitt

Assistant to the Editor
June Fattig

Editorial Assistants:
Lorraine Brien
Mary DeChristoro

Contributing Editors
Computerworld Forum
J. Daniel Couger

Human Communication
Jack Stone

Telecommunications
Larry Long

Management
Thomas Madron

The Data Center
John P. Murray

Letters on Software
Charles P. Lecht

Special Publications
Computerworld Books
George Hayes, Editor

Computerworld on Communications
Bruce Hoard, Editor

Computerworld On
Ann Dooley, Editor

Computerworld Buyer's Guides
Marcia Stonecipher, Editor

Main Editorial Office: Box 880, 375 Cochituate Road, Framingham, MA 01701 617/879-0700

Computerworld is a member of the CW Communications, Inc. group, the world's largest publisher of computer-related information. The group publishes 92 computer publications in 19 major countries. Nine million people read one or more of the group's publications each month. Members of the group include: Argentina's Computerworld Argentina; Australia's Australian Computerworld, Australian Micro Computerworld, Australian PC World and Directions; Brazil's DataNews and Microideia; China's China Computerworld; Denmark's Computerworld Danmark and Mikroverden; Finland's Mikro; France's Le Monde Informatique, Golden (Apple) and OPC (IBM); Germany's Computerwoche, Mikrocomputerwelt, PC Welt, Software Markt, CW Extra/Sonderausgabe, Computer Business and Communications Magazine; Italy's Computerworld Italia; Japan's Computerworld Japan and Focus Committee; Mexico's Computerworld Mexico and Computerlandia; Netherland's Computerworld Benelux and Microfacts; Norway's Computerworld Norge and MikroData; Saudi Arabia's Saudi Computerworld; Singapore's The Asian Computerworld; Spain's Computerworld Espana and Micro Sistemas; Sweden's ComputerSweden, Mikro Datorn and Alla Hemdator; the U.K.'s Computer Management and Computer Business Europe; the U.S.' Computerworld, Hot CitiOs, In-Office, Infoworld, J., Macintosh, MICRO MARKETWORLD, Microcomputing, PC World, PC Jr. World, Run, 73 Magazine and Software.

VIEWPOINT

Distributing centralized data entry function

THE DATA CENTER
John P. Murray

If you are a data center manager that is still operating a centralized data entry function, there is a very effective method you should consider to reduce your data center operational costs, while at the same time improving the level of satisfaction of your data center clients. The method is to install software that will allow you to distribute the centralized data entry function. In addition to the acquisition of appropriate software, the process is to develop a plan that will assure the success of the venture and then to act on that plan.

The first step is the selection of a software package that will allow data center clients to enter their own data. The criteria for such a package are rather simple: It must be easily installed and maintained, the input screens should be easy to build and to change, and the vendor should have a proven record of a continuing high level of support to those who purchase the software.

Price has not been listed as an item of importance. The reason is that, at least in my experience, not only is the expense associated with the purchase of such software reasonable, but the potential pay back, even in a small data entry section, is so good that the purchase price of the package should not be a serious factor. In the situation with which I am familiar, a 10-member data entry section was distributed for a net annual savings (hardware and personnel) of $130,000. The software investment was a one-time investment of $15,000.

Reliable products can be found

It is increasingly becoming the case with much of what we do in MIS that the issues involved in the distribution of the centralized data entry function center more on the political, emotional and the managerial than on the technical. The reason for this is that the technology in most areas has evolved to the point at which, if care is exercised, very good, very reliable products in all areas of the technology can be found, and they are getting better all the time.

Given that circumstance, consideration of the process used to move the data entry function in a successful fashion from the data center to the client areas may prove helpful to data center managers who would like to carry out such an effort in their organizations.

A little background first: When we began to dismantle our data entry section, all client areas had CRTs, and the clients were comfortable with operating the units. We also had a standard, rigidly enforced data entry schedule for the keying forms to be submitted to the data entry section. If the input did not arrive on schedule, it would not be processed for the next cycle. From the MIS point of view, this was a necessary constraint; from the point of view of the clients, it was not always beneficial.

We began our project to disburse the centralized data entry function in the way we have found to be effective in many of our efforts to change and enhance our MIS environment. The first step, after we had obtained permission from senior management to move ahead, was to install and test the software thoroughly. The software was rented on a 90-day basis in order to assure its quality prior to purchase. Once the software was tested, we selected a client who had an interest in the process and began by moving several of his smaller jobs under the new system.

We used a sales/marketing approach in that we started small, worked very carefully and made certain we were successful in order to build credibility. The idea here was to build our case through the development of a successful track record. A requirement was to be able to demonstrate the productivity of that which we were proposing.

Not met with unanimous joy

The announcement of the proposal to distribute the data entry function and responsibility to the client areas was not met with unanimous joy. There was understandable concern on the part of the clients who had the largest volume of data entry work that they would not be able to handle what they viewed as an increased work load. However, an examination of the function, which had been done by the data entry section prior to the announcement of the project, showed that the result of the change would not mean any increased work, only a change in function.

The crux of the argument was that, because the clients had been entering all information onto forms that then had to be delivered to the data center for keying, the direct entry of the input via the clients' currently installed CRTs would not take any longer and in many instances would be faster.

Another positive aspect of this change was that clients would gain an additional three or more hours of time every day for entry of their data. This was because the keying, which would be done in the client areas, could continue almost to the time of the processing of the various batch jobs that required that input. Under the centralized function, time had to be provided each day to receive the input forms from the client areas and then key and verify the input data.

The project, which required eight months of time, was completed on schedule. A plan was developed to move the project ahead on a phased basis. The process was to identify a particular department, correct all the work in that department and provide the required training for the client department personnel before moving to the next area. The department with the largest volume of data was the last one to be converted. The plan was to begin with the small departments, not only to make more rapid apparent progress, but also to be able to identify areas of concern on a small scale and to learn as we went along. We viewed this as an appropriate way to minimize risk. The data entry section assumed responsibility for the project.

The plan to disband the data entry section was announced to the data entry personnel well in advance of its implementation. It was made clear that the process would be carried out on a phased basis and that as the work level in the data entry section was reduced, we would work with the organization's Employee Relations Department to find those who were interested in jobs within other sections of the organization. Through careful planning, all but one of the data entry employees were offered (and accepted) jobs in other departments of the company.

Aside from the positive aspects of the reduction of the data center work load and expense and the improvement of scheduling considerations for the clients, one more unexpected, yet pleasant, benefit came about for the data center as a result of the success of the project: Complaints about the quality of the data entry work have disappeared. In all respects, the project has been a success. I certainly recommend it to anyone who still has a centralized data entry function in operation. ‡

Murray is director of management information services for Rayovac Corp., Madison, Wis., and author of Management Information Systems as a Corporate Resource, *published by Dow Jones-Irwin.*

LETTERS

Look around at changing world instead of accepting compromises

Congratulations to Nissan Motor Manufacturing Corp. U.S.A., and congratulations to *Computerworld* for its editorial "Logic resting in the illogic" [CW, Feb. 20] on Nissan's bold decision to combine its information systems operation with its purchasing department.

Imagine! Information systems no longer reporting to or being "buried" in the finance or production departments. Instead, it reports to a function whose sole qualification apparently is that it is unbiased and "will not mold them to favor the parent department." Logical? Progressive? I think not. In fact, it sounds like a selection between the lesser of two evils.

Why not try a really radical approach: a function that operates as a full partner in the corporate plan and is recognized as the key strategic resource that it is quickly becoming. To do otherwise is to perpetuate an organizational convenience that has itself been a prime contributor to the information management problems that corporations like Nissan are trying to escape.

And while we're at it, why not select an information management cum business professional as the department director.

What? You say that data processing people capable of managing a business function don't exist? Look again. Leading corporations that have come to recognize the importance that information systems have on their future are making these decisions every day.

I suggest that Nissan and *Computerworld* take another look at the rapidly changing world around them and stop being so content with compromises.

F. Richard Lennon
Vice-President, Administration
United Technologies Sikorsky Aircraft
Stratford, Conn.

Info function: little new in concept of Nissan's 'two-in-one' department

In the article "He heads 'two-in-one' department" [CW, Feb. 13], Robert A. Prinier, vice-president of purchasing and information systems since Jan. 1, describes Nissan Motor Manufacturing Corp. U.S.A.'s "two-in-one" department as a "concept [that] might knock the computer industry on its ear."

I find little new in the concept. For years, organizations have been trying to control the information function through other divisions headed by non-DP vice-presidents. Only the maturely managed corporations recognize the need to place the responsibility of information systems under an independent vice-president who is recognized as a professional information systems person.

Patrick J. Shirley
Lacey, Wash.

Overlooking the obvious: info systems, services tie together other departments

It is interesting to note that both Nissan Motor Manufacturing Corp. U.S.A. in the article "He heads 'two-in-one' department" [CW, Feb. 13] and *Computerworld*'s editorial "Logic resting in the illogic" [CW, Feb. 20] have overlooked the obvious.

Well-designed and functioning information systems and services tie together all the other production and supporting departments within, as well as the customer and vendor interfaces to, an organization.

An integrated information systems and services department is most effective when headed by an

See LETTERS page 58

4-5-6™

When you need IBM mainframe applications with the capabilities of popular micro products, your next step should be to join over 150 companies that have already licensed software from Parallax Systems.

ExecuCalc™
Electronic spreadsheets for 3270 terminals

ExecuPlot™
Color business graphics for 3270 terminals

Training
On-site classes in ExecuCalc, ExecuPlot, Lotus 1-2-3, VisiCalc, VisiPlot, and SuperCalc are available.

Distribute your micro and mainframe application activity, and provide training for both, with software and services from Parallax Systems.

Interfaces via SNA, CICS, VS, and DIF files.
Proprietary Economics (CICS) pay product. 30-day trial.

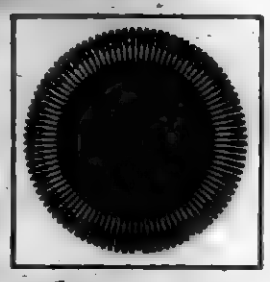
Parallax

Parallax Systems, Inc.
99 West 5th Street · New York, New York 10007
212-473-4567

ExecuCalc, ExecuPlot, and 4-5-6 are trademarks of Parallax Systems Inc.; Lotus is a registered trademark of Lotus Development Corp.; 1-2-3 is a trademark of Lotus Development Corp.; VisiCalc is a registered trademark of VisiCorp. VisiPlot is a trademark of VisiCorp. SuperCalc is a registered trademark of Sorcim Corporation; DIF is a trademark of Software Arts, Inc.

Rough writer.

In the business machine torture chamber most of us call the office, one word processing printer shows true grit. We build our DP-Series daisywheels to keep turning out letter-perfect documents month after month. In the face of adversity, and in the hands of a secretary. Call your printer distributor. Or contact Dataproducts at (213) 887-8024. 6200 Canoga Avenue, Woodland Hills, CA 91365. In Europe, 156-158 High Street, Egham, Surrey, TW 20 9HL England.



Dataproducts Daisywheel Printers

VIEWPOINT

LETTERS from page 57

executive-level vice-president reporting directly to the president.

However, with today's inexpensive hardware, a case can be made for the following distributed information systems and services organizational structure:

- The development of new subsystems resides in the engineering department using its own developmental computer.
- The operation of the existing production system resides in the production (manufacturing) department using its own production computer.
- Newly developed subsystems supposedly ready for production operation are first independently tested by the quality assurance department, using its own quality assurance computer identically configured to the production computer.
- The following personnel are trained, prior to turnover of the new subsystem to production status, by the training department on its own training computer, which is identically configured to the production computer: production personnel who ultimately must operate the new subsystem in the production environment; maintenance personnel who ultimately must maintain the new subsystem in the production environment; and user personnel who will use the new subsystem through terminals, phones and so on.

Each of these departments — engineering, production, quality assurance and training — having a portion of the information systems and services function as a subunit under it, reports to the president in the traditional organization structure.

Which information systems and services structure, integrated or distributed, is most cost-effective depends on many factors. But either is inherently superior to the situation in which an entire information systems and services department is subordinate to one of the other organizational units.

A sound case cannot be made for each department independently developing and operating separate systems. Live business information needs to be consistent in meaning and content at any given point in time throughout the organization. This cannot be effectively achieved without the use of an organizationwide data base, standards and data dictionary. Furthermore, much business information must be readily and simultaneously accessible by executive management and other departments in the organization.

Information standards and the data dictionary are maintained by the engineering department in the distributed structure or by the information systems and services department under the integrated structure.

All other things being equal, the integrated information systems and services structure provides the most efficient opportunity to undertake effective disaster recovery facilitation and data security measures. Information systems inherently ties together the entire organization. It doesn't make sense either to split it or subordinate it.

Paul F. Hessman
Timonium, Md.

Major reason for 'snake-oil' image of DP salesman: too much snake oil has been sold in form of computers

In response to Joseph P. Zammit's reader's-platform article "Are computer vendors getting a fair shake? How to avoid the 'snake-oil' salesman image" [CW, Feb. 13], the major reason for the "snake-oil" image of computer salesmen is simply that too much snake oil has been sold in the form of computers.

There are many small businesses around that have nonfictional horror stories to tell, and most of the businesses never sued. No plaintiff's computer lawyer is going to succeed in telling a farfetched computer fraud story to a judge or jury when Zammit or any other skilled attorney is representing the vendor.

It is quite common for a user to believe the salesman's claim, "This new model, the B3X, will meet all your computer needs." That salesman is usually billed as a "sales engineer" and is usually good at appearing to know what he is talking about. But too frequently, the salesman doesn't have the foggiest idea of that user's needs or the capabilities of the computer in question. Certainly, the user can be blamed for believing the salesman instead of clearly defining his needs and getting them written into the contract. Con men have flourished for centuries because most people don't insist on everything written in blood.

I've always admired the lawyer who is able to put forth, with a straight face, the following defense: "Your Honor, the plaintiff should not recover in this case if he was stupid enough to believe my client's sales talk."

It is interesting to note that some juries have rendered rather large verdicts in the past couple of years for users who have been victimized by fraud.

Because of those verdicts, some vendors have cleaned up their acts. One used to be proud of the general perception that it was the "bastard" of the industry. Now it has matured and provides even some nonexpert users with support.

Other vendors did not have much of an image problem to begin with, because they stood behind the products they sold, instead of hiding behind the small print in their standard form contracts. Tightening up their standard form contracts will help responsible vendors, but not the others.

Admittedly, the first-time computer user market is a difficult one for vendors. Those users are typically naive, unskilled and generally unwilling to appreciate the dedication of their own resources necessary to get a functioning computer system. Of course, the salesman is not going to make the sale if he emphasizes the difficulty of getting the B3X to work. But that doesn't mean that the salesman can prey on the user's naivete. It is at least deceptive, and probably fraudulent, to state that the B3X is the right computer if that's only a guess, even an educated one.

Vendors who encourage their salesmen to have the attitude "Tell them anything in order to make a sale" are going to continue to have an image problem.

Edward G. Sallaberg
Woburn, Mass.

IN DEPTH

A letter from users to vendors of application generators

By Glover T. Ferguson Jr.

DATA PROCESSING SERVICES
Computer Time
AMDAHL 470/V8.
16 Mbytes
• MVS/SP
• ACF2
• SAS*
• CICS/VS
• ROSCOE
• SAS/GRAPH*
Plus a full complement of on-line and batch programmer productivity aids.
Call Ria Ham, Vice President (704) 525-8810
ncc
Network Computing Corporation
5301 77 Center Drive Suite 40 Charlotte, NC 28210
*SAS and SAS/GRAPH are trademarks of SAS Institute Inc.

Tear out this coupon before someone rips off your CICS system.

GUARDIAN

I need more information. Please send literature.

Name Title

Company Phone

Address

City State Zip

ON-LINE SOFTWARE INTERNATIONAL

Fort Lee Executive Park
Two Executive Drive, Fort Lee, NJ 07024
(201) 592-0100, Toll Free (800) 526-0772

Country

Unauthorized data access and computer crime are problems you don't need to ignore. Facilities, people and funds protection of CICS systems at its most vulnerable.

That's why so many companies GUARDIAN,™ the security software with transparent industry standard.

GUARDIAN is comprehensive ensuring the integrity of any number of users, terminals, programs, files and data bases in any combination you choose. And GUARDIAN's new techniques allow access to define protection down to the field level.

GUARDIAN is completely compatible with CICS, IMS, DB2, Supervisor, GUARDIAN operates entirely in storage. Invisible, so it won't be circumvented by non-technical personnel.

To find out more about the CICS security system with a proven track record, just clip the coupon and mail or call toll-free 800-526-0772. Do it now.

finish the job. This approach hurts both our development and our maintenance productivity in two ways.

First, our developers and maintainers must learn and retain their skills in multiple languages — they must know both the syntax of the generator and the syntax of the shop's traditional language. This requirement means a steeper learning curve for new personnel and generally higher level skills for all personnel.

Second, the two-language approach creates confusion when testing or production problems arise. There is no single place to go to review the overall control flow of the application since the flow implied in the generator syntax may be contradicted or altered by the exit code.

Multiple debugging tools

Isolation of a problem in this environment may require multiple debugging tools — one for the generator syntax and one for the traditional code. The need for more tools increases the requisite troubleshooting skills of the programmer and reduces the potential performance of the product.

An example of good continuity is Information Build-

First, our developers and maintainers must learn and retain their skills in multiple languages — they must know both the syntax of the generator and the syntax of the shop's traditional language.

ers, Inc.'s Focus. This high-level information management system provides facilities for report preparation, data base management, interactive query and update. The following syntax example illustrates how the product provides essentially one syntax supporting a broad range of functions:

```
   SUM QUANTITY AND COMPUTE
NEWPRICE
      IF CLASS EQ 'A' THEN
         PRICE * 1.10
      ELSE
         PRICE
   BY ITEM
```

This statement will pass an inventory file and produce a report showing the total on-hand quantity of each item across all stocking locations. It will also compute and report a 10% price increase for all Class A items.

Passing a file, handling the break processing and summarization are large, high-level functions. Yet in the same statement and with the same style of syntax, we have an if-test on a single field of each record passed. It is this type of continuity that we desire.

Extensibility. Extensibility features of an application generator allow the developer to implement new syntax, which allows productivity improvements that are unique to a given shop.

We accept that the basic syntax provided by you cannot be customized to the needs of diverse industries such as banking, manufacturing and distribution or functional areas such as general ledger, order entry, material requirements planning and decision support. Certainly the product cannot consider the unique architecture and demands of each application or enterprise. Extensibility features allow industries, functional areas and enterprises to extend and broaden the power of

Announcing the birth of the *Personal* Information Center™ — a new concept in intelligent data access for your company's end users.

And you're invited to a FREE, half-day Seminar to learn all about this innovative *first* from Informatics.

At this free Seminar you'll see how the *Personal* Information Center can help you:

- Manage and control the continuing proliferation of hardware and software in your Information Center.
- Integrate your Information Center with today's mainstream DP and IBM® Personal Computer tools.

But that's only the beginning. At the Seminar there will be a lively discussion of such vital Information Center issues as...

- Selecting appropriate hardware and software for your users' needs.
- Offering immediate versus deferred processing.
- Using production data bases or duplicating files.
- Balancing unlimited data access with system security concerns.

The Seminar will also address the entire issue of the micro-mainframe connection, and many more topics of immediate interest to data professionals like you.

Plus, we will introduce Informatics up-to-the-minute solutions to your Information Center needs, including reporting and inquiry systems and micro-mainframe integration tools.

The *free* Personal Information Center Seminar is being offered in or near your city. But attendance is limited. So, mail the coupon or call toll free today to reserve your place at this valuable *free* Seminar.

Pre-register for the *free* Personal Information Center Seminar and get a free bonus. We'll send you a reprint of the *Computerworld* article, "The Micro/Mainframe Link," by Merrill Lutz.

Mail this coupon or call toll free...

1 800 227-3800 Ext. 911

(In [illegible], call 800 [illegible])

Informatics general corporation

THE SOFTWARE ENGINEERS

YES. I'd like to learn more about the Personal Information Center and how it fits my company. Send me dates, fees and a free reprint "The Micro/Mainframe Link," by...

☐ Please enroll me in the free seminar I have indicated below (check one). I'd like to attend the seminar if there's room. But if there is a wait or obligation, don't bother me.

☐ Atlanta	April 24	☐ Detroit	May 2	☐ New York	May 3
☐ Dallas	May 4	☐ Houston	April 27	☐ Philadelphia	May 1
☐ Chicago	April 27	☐ Los Angeles	April 24	☐ Toronto	May 3
☐ Dallas	April 25	☐ Oakland	May 8	☐ Vancouver	May 10
				☐ Washington D.C.	May 8

☐ I'm not ready to enroll, but please send me more information on the Personal Information Center.

Name _____ Title _____

Company _____ Phone _____

Street _____ Zip _____

Address _____

City _____ State _____ Zip _____

Mail this coupon for information. Personal Information Center Seminar, P.O. Box [illegible], Cupertino, CA 95014

Please use my company name and address for any other information you have on the Personal Information Center.

the generator. We desire more than a CALL, PERFORM or DO function as a means of extending products. Subroutines can provide common functions for our developers, but they do so at the expense of clarity. The usual interface to subroutines involves defining and formatting data areas that provide communication between the main routine and the subroutine. When maintaining or debugging the code, we must often trace back through the program to determine the exact contents at the time of the error.

Furthermore, it is often more work to invoke the subroutine than to recode the function in-line. This means the common function must be fairly large before it is economical to provide it to developers.

We would, therefore, prefer to extend the functions of our development environment by defining new syntax. New syntax can document the function being performed more clearly than subroutine call interfaces that have to be examined closely to reveal the same information. For example:

```
CONVERT DATE FROM JELIAN (WS-JELIAN)
    TO CALENDAR (WS-CALENDAR).
```

is far more descriptive than

```
CALL "DATACONV" USING
WS-CMD
WS-FROM
WS-TO.
```

Another advantage that syntax has over subroutines is that it can be partially validated at the time it is entered or prepared for execution. A call interface can only be checked by the subroutine during the execution of a test.

Finally, syntax extensions support our first requirement of continuity. Training programs for developers should include both the basic and extended syntax as opposed to basic syntax and a potentially diverse set of subroutine interfaces.

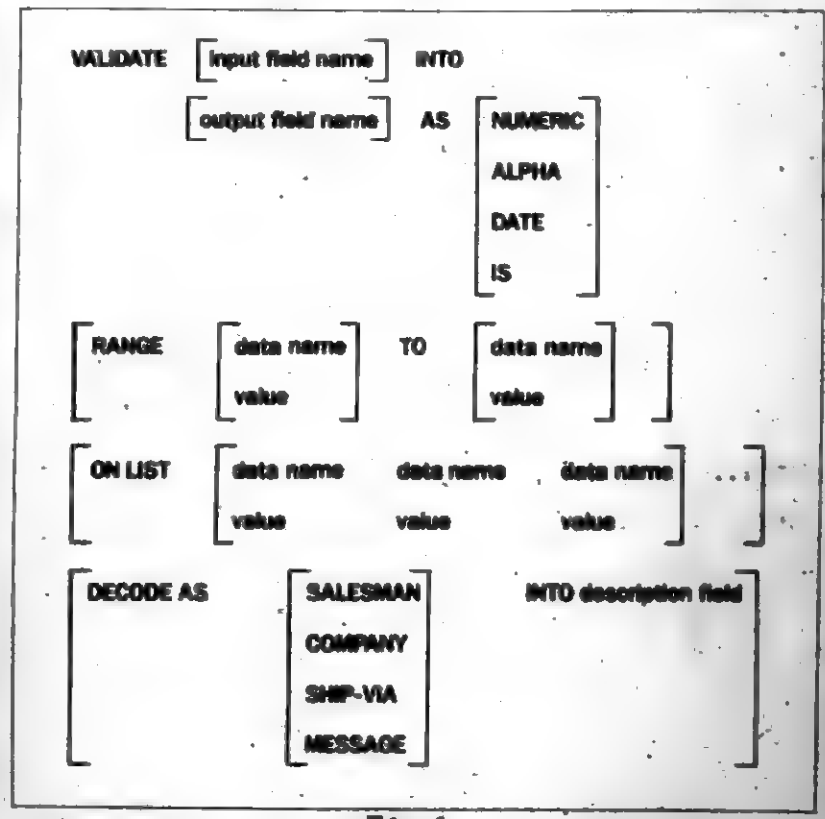


Figure 1

Pansophic Systems, Inc.'s Gener/ol is one product that provides extensibility features by allowing developers to augment the existing syntax. Gener/ol is an interactive on-line program development system that allows developers to add commands to its vocabulary, specify syntax rules for the new commands and pass data through the syntax to a user-written command processor. A potential use of this feature is to provide access to data base management systems other than those already supported by the vendor of the product.

A second example of an extensible product is Applied Data Research, Inc.'s Meta-Cobol. Meta-Cobol provides, among other things, a macro preprocessor for the Cobol language. This preprocessor allows a development group to extend the Cobol language with powerful statements that still maintain the style and data definitions of the original syntax. Figure 1 is an example of the use of this product.

This example shows two types of Cobol language extension. First, there is an application-independent function — validating the format of input fields and editing the data into a known, fixed format. Second, the implementation of the DECODE syntax references tables that are specific to a given shop such as the SALESMAN and COMPANY tables. This same syntax has been used to generate Cobol validation code for batch programs and for on-line programs that interface with IBM's CICS/VS.

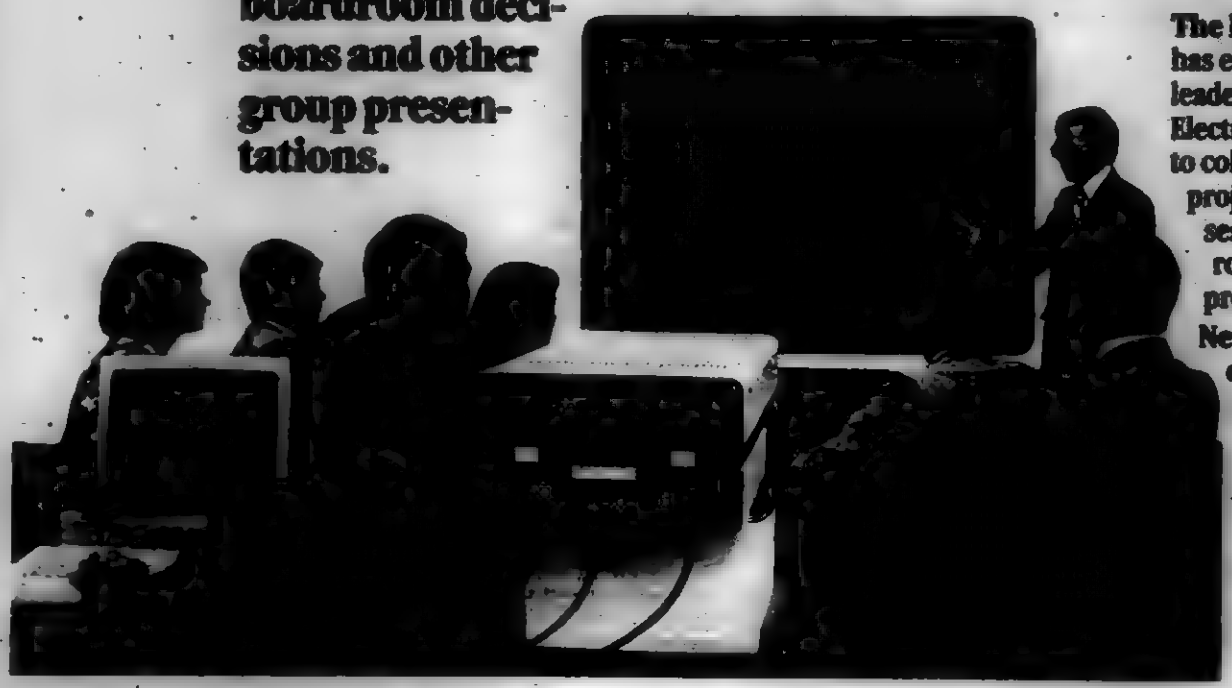
Performance. The performance of the application generators should be sufficient to allow implementation of all but a few of the application functions. Remember the 1977 Kendall Report?

Figure 2 implies that even an inefficient generator can be used to generate 50% of our programs since they

NOW ELECTROHOME HAS SIMPLIFIED

Electrohome EDP 57 has achieved worldwide success in monochrome computer projection for training sessions, sales meetings, boardroom decisions and other group presentations.

Now Electrohome ECP 1000 makes it just as easy to project color computer graphics and data or videotapes to big screen size.



The EDP 57 monochrome system has established Electrohome as a leader in computer projection. Now Electrohome is ready for your move to color computers—and your need to project color videotapes in training sessions, sales meetings, boardroom decisions and other group presentations.

New ECP 1000 is so sophisticated, it's simple. You can't imagine how easy it is to set up and operate. Colors are automatically converged in the unit and projected through a single lens—thanks to the Electrohome breakthrough in Laser Aligned Dichroics (LAD).

only consume 5% of the CPU. The diagram also suggests that we take great care with the 2% of the programs that consume 50% of the CPU, since relatively minor inefficiencies in implementation could dramatically increase the cost of running these applications.

The key to productivity is the remaining 48% of the programs that consume 48% of the CPU. If the generator can support these programs with adequate performance, then application generation can be the development approach used for at least 98% of the shop's applications. We can concentrate developer training on the proper use of the generator and retain a few people familiar with traditional languages to support the last 2% of the shop's jobs.

If the generator devours too many hardware resources to be considered for the middle 48% of our programs, then we must either support a split staff and two training curricula, or we must make everyone competent in both traditional and generator-based development techniques. The former approach is expensive and limits the flexibility with which we can assign people to projects. The latter approach tends to provide personnel who are adequate, but not expert, in both approaches.

Responsiveness. A responsive product allows the developer to define processing requirements interactively and then begin testing without a significant delay or disruption in the work flow.

Some generators require a lengthy preparation time after logic entry and to translate, compile and link the logic into executable code. Under these conditions, developers usually fill their time by working on several programs concurrently. However, when moving back and forth from one program to another, the developer's concentration is broken. The time and effort spent in regaining focus on a particular set of logic and test conditions lowers productivity and may lessen the quality of the final product.

Figure 2

We users have found substantial morale differences between developers working in environments that provide immediate reinforcement and those that do not. This points to a more subtle way in which delays can hurt productivity. Behavioral psychologists say we learn most quickly when we receive immediate positive reinforcement for correct behavior and immediate negative reinforcement for incorrect behavior. A delay between coding and testing robs us of the immediacy and satisfaction of the reinforcement that testing should provide.

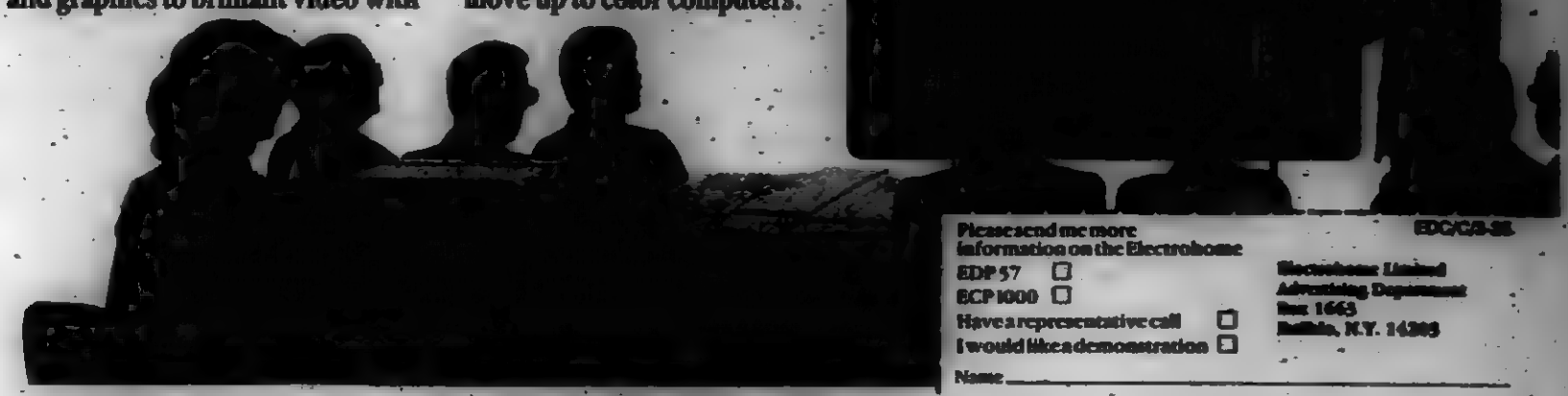
A number of application generator products are very interactive and do not require an off-line preparation procedure. Oxford Software Corp.'s UFO briefly prepares code for immediate execution without having to submit the code to another environment for preprocessing. IBM's Cross System Product/Application Development allows interpretative execution of application logic during testing. The interactive nature of these products has enabled us to make significant strides toward meeting our goal of responsiveness.

Power. A powerful application generator will allow us to manipulate sets of data instead of individual elements or aggregates. Also, it will allow us to perform many or complex operations with a few simple commands.

Power allows our design, coding and testing efforts to rise above the

COLOR COMPUTER PROJECTION.

By comparison, other systems have three lenses and dozens of controls that must be adjusted by trial and error to converge colors on the screen. You have easy one-button switching from high resolution data and graphics to brilliant video with lock-in picture size. Ideal for portable or permanent use and for front or rear screen projection. And you can benefit from the last word in color video projection even before you move up to color computers.



ELECTROHOME
ELECTRONICS

For more information U.S. customers call toll free 1-800-265-2171

Please send me more information on the Electrohome
EDP 57 ☐
ECP 1000 ☐
Have a representative call ☐
I would like a demonstration ☐

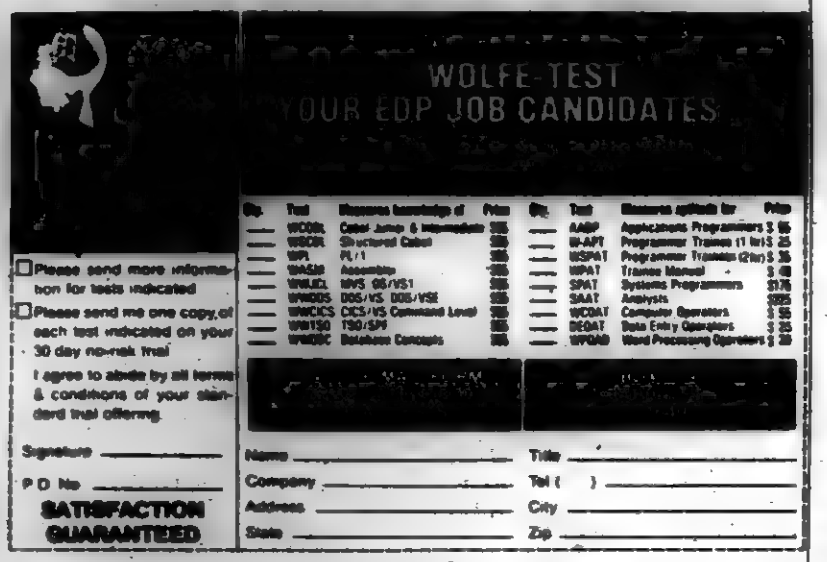
EDC/GB-SE

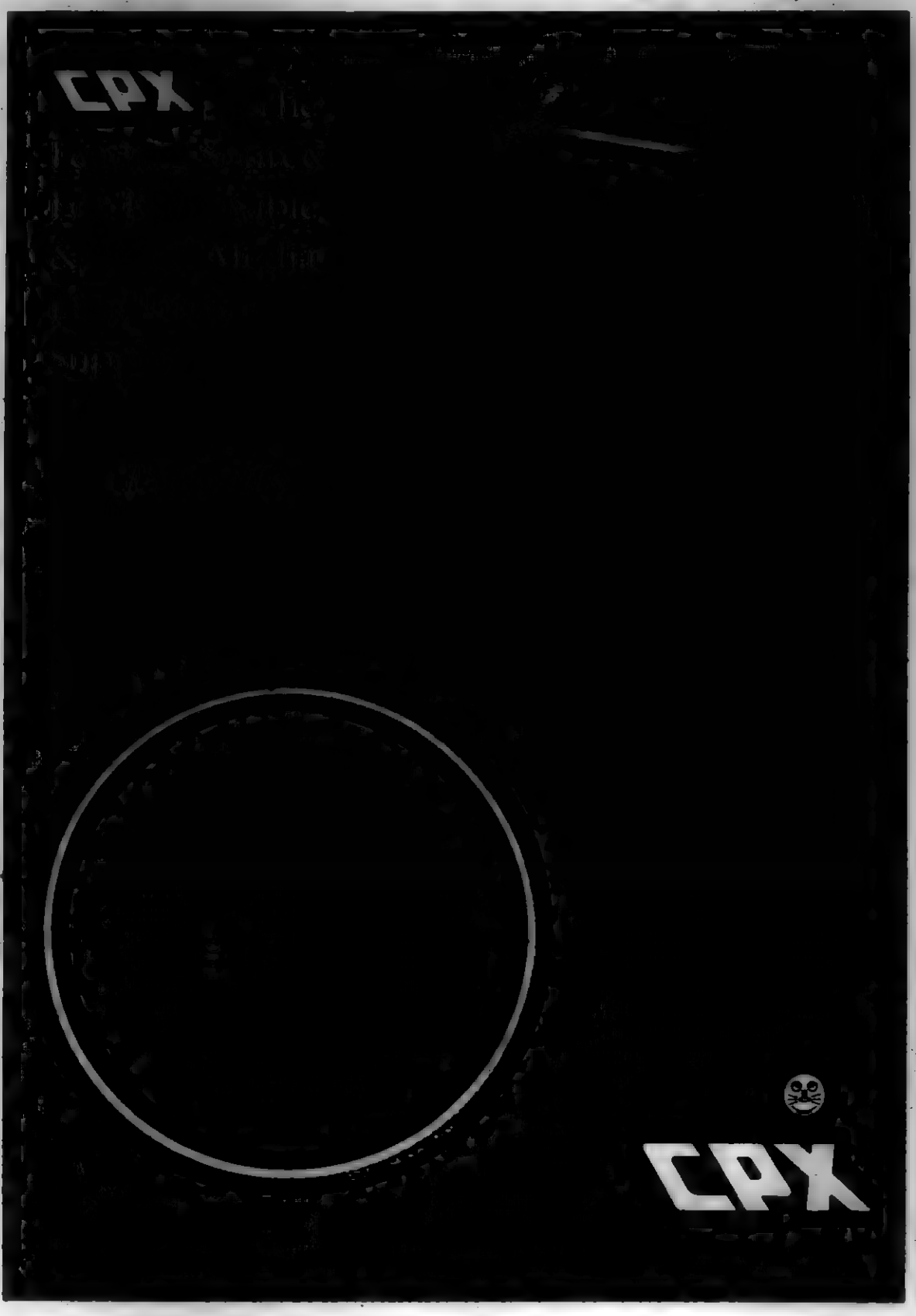
Electrohome Limited
Advertising Department
Box 1663
Buffalo, N.Y. 14205

Name
Company
Position
Street
City State/Prov.
Zip/Postal Code Phone

Electrohome Limited, 809 Wellington St. N., Kitchener, Ontario, Canada N2G 4J8. Telephone (519) 744-7111. Telex 069-55449.

See us at NCGA Show - Booth 1808





IN DEPTH/LETTER TO VENDORS

Figure 3

level of detail required in traditional approaches. In some cases, power has actually decreased when we moved from our traditional languages to the application generator. For instance, some generators have particularly weak table and array handling, a feature we take for granted with traditional languages such as Cobol or Fortran.

Another common weakness is the failure to provide field edit and reformatting facilities that will automatically perform validation and data reformatting functions when entered by the end user from a terminal.

An example from Focus emphasizes power:

```
SUM QUANTITY AND ROW-TOTAL AND COLUMN-TOTAL
  BY PRODUCT ACROSS LOCATION
```

This statement might produce a report that looks like Figure 3.

This statement navigates the data base looking for all inventory segments and then totals the QUANTITY amount across all stocking locations and reports the totals by product and by location with both columnar and row totals. This is all performed without our having to code loops, low-level data base navigational commands, control break or page break logic. Hence, the importance of power in an application generator becomes quite apparent.

Compatibility. Compatibility features allow applications created by the generator and applications created by traditional approaches to present a single system image to the terminal user. Without this feature, the users of our systems may have to follow a procedure such as the one shown below:

- Sign on to the execution component of the application generator.
- Request the desired function.
- Sign off the execution component of the application generator.
- Request a traditional application function.
- Sign back on to the application generator.

In many instances, vendors have designed a separate environment within the on-line monitor. Within this sheltered world, application generator functions are implemented. What has been neglected is a programmatic means of entering and exiting this environment in order to execute functions that reside in traditional applications.

Some of us have not been too affected by this problem. Either our users have had work assignments that did not encompass both traditional and generated applications or we have based our entire application inventory on the generator. Most of us, however, must continue to live with both old and new applications until the older ones can be retired through attrition.

To date, the best examples of compatibility have been found in approaches that create or assist in the creation of traditional language programs. IBM's Elias provides Cobol or PL/I shell programs into which "bricks" of code are placed as the developer specifies the processing needed. Application or shop-specific logic is then added to the shell to complete the program. Since the resulting program is in the traditional language, it can provide a programmatic interface with existing applications.

Testing support. Interactive debugging facilities should be integrated with the development and execution components of the application generator. These facilities should include the following features:

- The ability to place breakpoints at any statement.
- The ability for breakpoints to be conditioned on data values.
- Symbolic display of records and working areas from any breakpoint.
- The ability to correct errant logic at any breakpoint and to continue processing.
- The ability to trace the application logic flow interactively.
- If the execution components or user extensions to these components are written in the language of the generator itself, the debugging facility should not lead the developer into this code. The developer should need to debug only the logic that he has coded.

Maintainability. The structure of the generator syntax should encourage the creation of maintainable code.

Good structure can be encouraged by prompting the developer to specify his logic in levels of progressively more detailed program definition oriented to the inputs and outputs of the major data structures.

Separation of control logic from processing logic can be encouraged by controlling the use of statements that effect major changes in the flow of logic. These statements should be confined to specific areas of the program that reside at a high level in the logic hierarchy.

At each level the developer can be prompted for a description of the major business functions being performed at that level. The syntax should be self-documenting as to how the function is implemented; the comments are required to describe what the business problem is.

An example of a highly structured generation dialogue is found in IBM's Cross System Product/Application Generation. This product guides the developer through definition of the processing logic in a top-down, step-by-step fashion. A developer using this product is prompted to describe an application in terms of a group of processes.

By forbidding the developer to jump from process to process in code other than the flow section, a discipline is imposed on the resulting program that tends to enhance the system's reliability. It cannot thwart a pathological programmer, but it can at least encourage sound programming practices.

Processes consist of statements and statement groups supporting input or output of data from a file or terminal. Each process has three separate sets of statements associated with it.

First, the Before statements prepare for the I/O by formatting the data to be displayed or the key of the record to be read. Second, the After statements manipulate the data input or examine the return code of the I/O function. Third, the Flow statements alter the default flow of one process to another based on function keys, entered data or other conditions.

By forbidding the developer to jump from process to process in code other than the flow section, a discipline is imposed on the resulting program that tends to enhance the maintainability and reliability of the system. It cannot thwart a pathological programmer, but it can at least encourage sound programming practices.

Postscript to developers

We have cited a number of areas where you could improve your products to deliver more productivity benefits to us. But what do we do while we wait for the requested changes?

There are a number of strategies that offer an interim solution and, although the choice of strategy depends on the needs of each specific shop, some general recommendations can be offered:

1. Decide whether or not to use a generator for a particular application during the technical design of

In 6 hours you can protect your investment in software and enhance its capabilities

Time is tight. The software revolution is already here, and it's moving at full throttle. To keep you apprised of where it's going and how to get there before your competition does, Martin Marietta Data Systems is presenting "New Dimensions in Software: A Strategy for Managing Information". This informative seminar series will examine the trends, issues and emerging solutions that will greatly affect the way you conduct operations in the very near future.

Corporate data management, the micro-to-mainframe connection, PC proliferation in the corporate office, the application development backlog, CPU utilization . . . each of these topics share one common characteristic: the need for a unified software solution.

Not as Simple as 1 . . . 2 . . . 3 . . .

Today's corporate information needs can no longer be met piecemeal, with a software package here, a productivity tool there and everywhere a logjam of vital but inaccessible data. A comprehensive software strategy is the new order. Based on corporate-wide perspectives and the harmonious interaction of all information systems.

Integration and the Martin Marietta Difference

Martin Marietta's commitment to software technology speaks for itself: From our MAS family of high-performance application software packages . . . to RAMIS® II, the world's leading fourth-generation language and foundation for the most advanced line of productivity and systems software available anywhere . . . to the ITSoftware series of personal computer programs for transforming your desktop computer into a total information center. Plus an expertise in custom-built systems based on real-world experience.

We invite you to explore our New Dimensions in Software during this seminar series. Two distinct sessions will be held: Seminar A for corporate executives and vice presidents of manufacturing, MIS, and finance, and Seminar B for data processing executives and management. Attendance is free. And the potential benefits could have substantial impact on capital investments and productivity.

To register or receive more detailed information on the seminar series, call toll-free (800) 638-7080. In Maryland: (800) 492-7170. Or write:

Martin Marietta Data Systems
Marketing Services
6303 Ivy Lane
Greenbelt, Maryland 20770

(800) 638-7080

Information Management for Strategic Planning, Productivity Analysis, and Decision Support The Practical Impact of Emerging Software Technologies Trends in PC Software			
RAMIS II ■ For applications development ■ For the information center ■ For English language comprehension	**Personal Computing** ITSoftware for integrated personal computing	**Computer Integrated Manufacturing Systems** From the shop floor to the executive office, from the central computer to the desktop	**Finance and Administration** From planning to personnel management, from the central computer to the desktop

A—April 24	B—April 25	Philadelphia, PA, Bellevue Stratford
A—May 23	B—May 24	Chicago, IL, Knickerbocker
A—June 5	B—June 6	Los Angeles, CA, Hyatt Wilshire
A—June 21	B—June 22	New York, NY, Hilton

MARTIN MARIETTA

FREE IBM 34/36 Software

Simply call us at (617) 283-3438 and we will send you a free 30-day timed diskette for word processing or financial modeling.

PARA RESEARCH

Dept. CD, 95 Rodeo Avenue
Gloucester, MA 01930

the system rather than when you begin to implement. This will allow the designers to weigh the continuity characteristics of the tool, its performance, its power and its compatibility with existing systems against the complexity of the application and the needs of the users.

For instance, some tools can perform simple tasks very easily, particularly if the designer uses the strengths of the product instead of battling its weaknesses. Also, many applications may have a relatively short expected life span and, therefore, are insensitive to the fine points of maintainability.

2. Provide proper training in the use of the application generator for both the programmers and the designers. If the designers are to evaluate correctly the product for use in a specific application, they must understand its strengths and weaknesses. If programmers are to attain the advertised benefits, they must understand how to use properly the tool. The generator should be treated with the same respect as we have given traditional languages in terms of training and technical support.

3. Analyse where the time is really being spent in your shop. Perhaps you concentrate on maintenance and do very little development, or perhaps your systems strategy has emphasized the installation and tailoring of application packages over custom development. In these cases, an application generator can do little more than support the creation and maintenance of test data.

They may still provide significant value, but their requirements of the package are a bit different in this environment than in the custom-development environment.

4. Get control over your traditional language development. Until the generators improve or unless they are suitable for your shop as they stand, important systems will continue to be built using traditional languages. However, there are many opportunities for productivity improvement in these situations.

The generator should be treated with the same respect as we have given traditional languages in terms of training and technical support.

To seize these opportunities, you need:

- Management commitment to treat systems development as a normal business activity.
- An established methodology for systems development that can provide a framework within which productivity and quality can be managed.
- A well-defined technical architecture that will result in the use of a small set of well-tested techniques.
- A training program that teaches the prescribed set of design and implementation approaches.
- Software that insists or encourages that the standards and approaches, described in the technical architecture and which are explained in the training, are consistently applied to the development process.

About the author

Glover T. Ferguson Jr. is a manager in the Technical Services Organization within the Management Information Consulting Division of Arthur Andersen & Co., Chicago. He has worked in systems development for nine years and is manager of the CICS Futures Task Force within IBM's Guide group.

USL DATA SYSTEMS: THE SOURCE FOR DATA PRODUCTS.

RENT
for a short-term, low-risk commitment.
LEASE
to avoid obsolescence and preserve capital equipment budgets.
BUY
with much quicker delivery than most manufacturers.

Whatever options you choose in acquiring equipment, we back up every shipment with service. That means you can count on us for total product support, including maintenance and prompt follow-up on any problems or questions.

Business Computers/ Microcomputers
Digital Equipment Corporation
GRID

Hewlett-Packard
IBM
TeleVideo
Wang

Terminals
ADDS
Beehive
Datastream
Digital Equipment Corporation
Hewlett-Packard
IBM
Lear Siegler
Teletype
TeleVideo

Printers
Centronics
Datasouth
Diablo
Digital Equipment Corporation

Hewlett-Packard
NEC
Okidata
Printronix
Teletype
TeleVideo

Data Communications Equipment
Anderson Jacobson
Rixon
Ven-tel

IBM Compatible Controllers
Datastream
Teletype

Nobody offers more.

USL Data Systems
A US Leasing Company

USL Data Systems
2988 Campus Drive
San Mateo, CA 94403
Phone: (415) 572-8800

Call your local sales office for price & delivery quotations.

Personal Queries And Reports On IBM/38?

FUSION 4/38, the first full information retrieval and presentation system for the non-technical user.

FUSION

IN DEPTH

Up from disaster

By Eli Hiller

Late last year, a Philadelphia-area company entered the final stages of converting its data processing operation. The firm anticipated a Jan. 3, 1984 cutover date from its Honeywell, Inc. 2200 mainframe to an on-line Data General Corp. Eclipse MV/10000 supermini. Necessary system modifications, procedure writing, system training and data conversion were complete by the Dec. 29, 1983 year-end accounting cutoff.

Through its 10 subsidiaries and affiliates, the firm serves the insurance, health-care and leisure markets. In November 1983, the company spun off its data processing subsidiary through a public stock offering. The data processing subsidiary developed three industry application packages: subscription fulfillment, floor-covering industry software and an insurance package. The latter was being installed by the insurance subsidiary with a planned Jan. 3 cutover.

When the holiday weekend arrived, the only remaining task was to perform a data base load that required some 30 hours of computer time — 27 of which had been completed — and the operation was started the morning of Dec. 31, 1983.

At approximately 11 a.m. on New Year's Day, a fire started in the heater area of the two-story, 25,000-sq-ft

A $25-million-a-year conglomerate with a substantial insurance business was three hours away from converting from a Honeywell 2200 to a Data General Eclipse MV/10000 system. Then, on New Year's morning 1984, fire wiped out corporate headquarters.

headquarters building. The building housed all of the various subsidiaries and affiliates and their records as well as several computer systems. The fire quickly spread and by 1 p.m. had gone to five alarms. When the fire was finally tapped out some 10 hours later, the building was a multimillion-dollar total loss. Both the Honeywell 2200 and the DG Eclipse suffered fire and water damage; they were completely unusable.

The co-located data processing subsidiary decided to move elsewhere, leaving the former parent company with an immediate need.

Our consulting firm, which had been hired to assist in the conversion, had previously written several disaster plans. Unfortunately, disaster planning was not part of the data processing system conversion engagement, even though the client was queried as to its preparedness in case of disaster. The client gave the usual assurances: There was an off-site tape storage system, a back-up insurance company microfiche system and accounting records kept in a fireproof safe on premises. For the most part, duplicate or backup accounting records were not maintained off-site.

The fire quickly spread and by 1 p.m. had gone to five alarms. When the fire was finally tapped out some 10 hours later, the building was a multimillion-dollar total loss. Both the Honeywell 2200 and the DG Eclipse suffered fire and water damage; they were completely unusable.

Upon inspecting the scene on Sunday afternoon and speaking with the company's executives, who were all in a state of shock, it became apparent that not only was an instant disaster plan required, but it would be necessary to oversee the execution of the plan as it would be several days before the shock subsided.

There are many consultants who have developed disaster plans, but few, if any, who have managed the execution of such a plan.

Recovery of the data processing capability as well as the corporation in general is most difficult for single-site companies with under $100 million in revenues. Larger companies weather disaster better through distributed processing: If one IBM 3081 goes down in a disaster, the company shifts the data processing load to another 3081 in the next city or state.

Two realizations were key in writing an instant plan on Sunday evening:

- Two-thirds of all companies fail after a major disaster, according to insurance statistics.
- The reliability and judgment of the generally capable executives of this company could not be completely trusted for several days because of the varying degrees of shock each continued to sustain.

The disaster plan, therefore, had to be simple as well as foolproof in restoring the company to a functioning condition within a very short period of time. The target date of Jan. 9, 1984 was selected as achievable given a Herculean effort and no mistakes in performing what had to be done.

The disaster plan developed had only six items, each of which was put under one of the executives as his only responsibility. Employees were assigned to each of the executives as work teams in executing that responsibility. The teams would be controlled and their progress monitored from a nearby hotel conference room. The company's executive vice-president and our consulting firm were put in charge of the conference room, which also served as the "command post."

In order to maintain open communications but control rumors and make vital information generally available, a daily meeting would be held to brief all of the executives on each team's progress. Additionally, problems encountered by a given team would be brought up for discussion and solution.

The disaster plan was as follows:

- Site security, salvage and records restoration.
- Public notification.
- Locating a new facility.
- Capital equipment acquisition for the new facility.
- Insurance negotiation.
- Processing restoration (manual and computer systems).

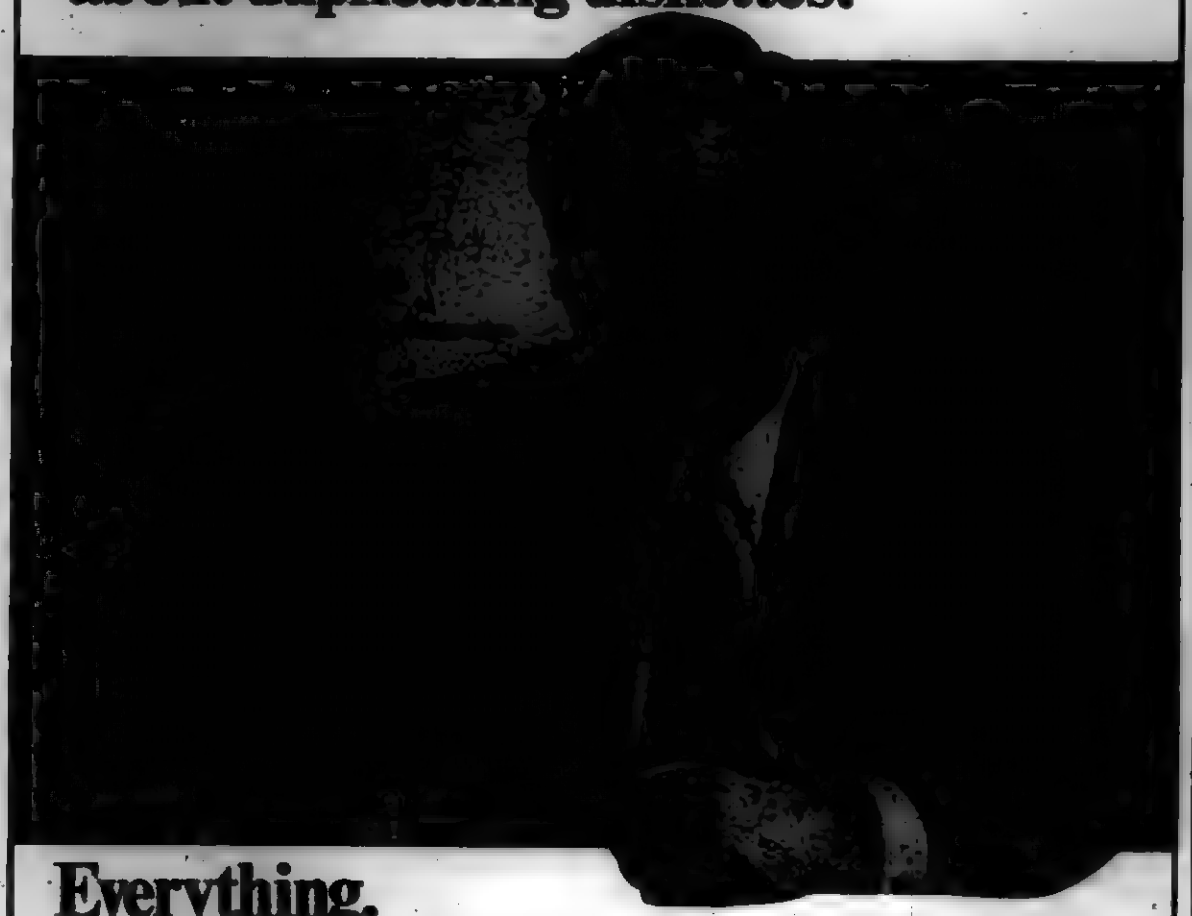
At 8 a.m., Jan. 2, the first executive meeting was held. The disaster plan was described to the company's executives, and each was assigned a responsibility.

Maintaining security

As there were some 10 subsidiaries and affiliates housed in the headquarters building, each wanted immediate access to its areas to salvage what it could. It was extremely difficult to explain to some of the middle-level managers who were trying to gain instant admission that what had not been burned had suffered extreme water damage, and they would have to wait until formalities were cleared. As a matter of fact, half of the building had collapsed and the other half was deemed unsafe.

After a major fire in Pennsylvania, the law provides that the state

What does America's foremost videocassette duplicator know about duplicating diskettes?



Everything.

Because magnetic media duplication is our business. And it has been for the past 15 years.

We've already got over 200,000 square feet of technical facilities at work daily for companies like IBM, Sony and Time-Life. At work on projects just like yours.

We've already got the systems in place to make your diskette copies, whether you need 200 or 2 million.

We've already got the people who know about labeling, package assembly, inventory and fulfillment services.

We're already geared to put your product in the proper hands according to schedule. Your schedule.

All of which is precisely why VCA Duplicating ought to be your duplicator.

When it comes to diskettes, it's all the same to us.

Call Stuart McCorkindale, Manager, Computer Diskette Services, at (201) 947-6811.

Headquarters
231 East 55th Street
New York, NY 10022
(212) 355-1505

East Coast
S T Videocassette Duplicating
500 Willow Tree Road
Leonia, NJ 07605
(201) 947-8450

Midwest
VCA Duplicating
2440 S. Wolf Road
Des Plaines, IL 60018
(312) 298-7700

Southwest
VCA Duplicating
4131 Directors Row
Houston, TX 77092
(713) 682-8600

West Coast
VCA Duplicating
5102 Argosy Drive
Huntington Beach, CA 92649
(714) 895-2225

VCA Duplicating Corporation
A VIDEO CORPORATION OF AMERICA COMPANY

THE RELIABLE, DEPENDABLE DUPLICATORS.

IN DEPTH/UP FROM DISASTER

fire marshal must inspect the premises before salvage operations can commence.

Additionally, a release from the insurance company must also be acquired. This was finally accomplished by the morning of Jan. 4.

Fortunately, some of the company's accounting and payroll records were spared because of the fireproof safe; these records were taken to a large ballroom of a nearby motel for cleaning and sorting. All salvaged company records, regardless of subsidiary ownership, went through the same process in order to maintain control and knowledge of the salvage operation. All salvaged documents were copied and the originals destroyed as the fire odor had permeated the paper.

The disaster plan developed had only six items, each of which was put under one of the executives as his only responsibility. Employees were assigned to each of the executives as work teams in executing that responsibility.

Documents that could not be copied were sent to a company in New Jersey that has a freeze-drying process to restore documents and remove the odor. The relocation of salvaged documents to a new facility would bring the undesirable odor into the new premises, and it would linger.

Surprisingly, the insurance company's microfiche was also salvaged, although it suffered smoke and water damage. Bell & Howell was notified, and two specialists from its Chicago-area headquarters arrived to instruct the salvage team employees how to treat the microfiche. That involved a rather labor-intensive ammonia process.

The team operated successfully and performed their assigned functions, including securing the old premises and salvaging a large number of documents from the disaster.

Most of the insurance files relating to ratings, agents and benefits were salvaged. About one-month's key entry could not be reconstructed.

Public notification

The company, which is a publicly held corporation, was required to notify the Securities and Exchange Commission, as well as the Insurance Department of Pennsylvania. During the course of the week, it also had to deal with insurance agents and policyholders, the press and the public at large.

Since a substantial portion of the company's vital documents had been salvaged, a news release was prepared that reflected the company's expectation to continue operations. Trading was suspended for one hour pending publication of the press release and resumed thereafter.

The Insurance Department of Pennsylvania visited the company's "command post" and discussed and analyzed the disaster plan. They were satisfied that the company could resume its insurance business given the proper execution of the disaster plan. The department then offered its assistance, particularly in providing copies of older insurance forms and rate tables (generally required for duplicate policy issue). The forms were on file in Harrisburg, Pa., as required by the insurance department's regulations.

The Consumer Services Department of the insurance subsidiary was organized to deal with the agents, policyholders and public through telephone contact.

Locating a new facility

The chief executive officer of the company wished to relocate in the same general area. He also decided to rebuild at the same location of the destroyed headquarters. The ground and building were owned outright by the company, and the executive had to deal with a host of realtors each

Innovator 300 LPM Printer System

Now! Compatible with nearly any micro, mini, and mainframe.

The Innovator printer system can interface with your IBM, Burroughs, DEC, RS-232 Serial and many additional communication protocols. Also, the highly reliable, field proven Teletype™ mechanism provides years of virtually maintenance free performance, significantly lowering your cost of ownership. Starting at..... $4,995

FEATURES:
- Impact printer with fully formed characters
- Ultra quiet acoustically damped cabinet
- BSC/SNA compatibility
- 132, 80 column, heavy-duty print mechanism
- Low cost nationwide service

NEW! IBM 3270 COAX

innovative™ network data communications

(305) 624-1004
1-800-327-5885

INNOVATIVE ELECTRONICS, INC., 4714 N.W. 165th Street, Miami, FL 33014

The New Tandy 2000

"Simply Incredible."

Microsoft Multiplan spreadsheet analysis. PFS:File electronic filing. And many more

Send me a free TRS-80 catalog.

NAME
COMPANY
ADDRESS
CITY
STATE ZIP
TELEPHONE

Four-Phase is helping more than 2,000 DP managers win the productivity game.

Now it's your turn.

It's easy to win the distributed information processing game when you play it with the Series 4000 from Four-Phase. The Series 4000 is an integrated, growth-oriented system designed to communicate within your IBM environment. No other vendor gives you so many functions for so many years at such affordable prices. In the distributed processing arena, that's the way to score points with both end-users and top management.

You can win the DDP game with software.

Four-Phase provides one of the most impressive and complete collections of software ever offered from one company. Our packages make integrating Four-Phase computers remarkably easy. And guarantee a logical growth path for years to come. Here's just a sample of what we provide:

Interactive processing: VISION®—For creating custom applications from order entry to transaction processing. It provides a high level of functionality that can be used in any distributed environment. And VISION is easier and faster to program than COBOL.

Word processing: FOREWORD®—Our powerful shared-logic word processing system allows text to be entered, stored, edited, distributed and printed.

Graphics—For business graphics, the Graphics Management System (GMS/IV) gives you an easy way to condense and conceptually present data that's easily understood by decision makers.

COBOL—Industry standard COBOL is used to write programs for handling keyboard-entered data and general batch processing.

[illegible]

If your end-users are like most these days, they're clamoring for their own personal computers. We play that game, too. Because at the flick of a switch, our multifunction terminals suddenly become stand-alone PC's. So now you can give your users the distributed processing capabilities they need, AND the personal computers they want. All in one integrated system.

MFE

The action starts with the Multifunction Executive.

The key to the Series 4000 game plan is the Four-Phase Multifunction Executive (MFE). This unique and powerful control program monitors each multifunction terminal in your system. Its ability to run multiple software programs allows your users to perform 16 different tasks from any terminal on the system. And each of your users can access all of our software packages with one keystroke. You get maximum distributed processing capability and control.

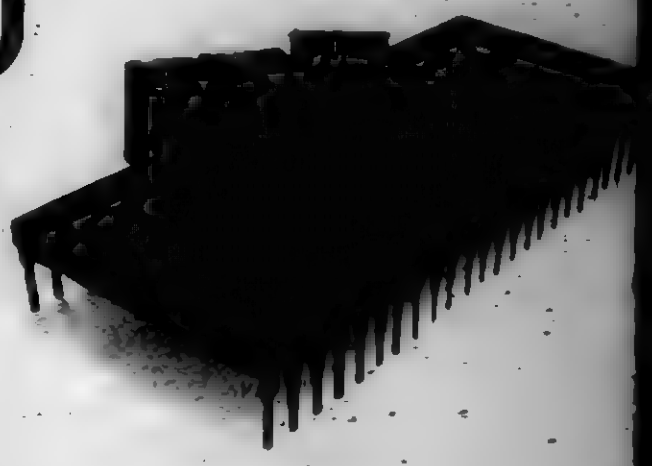
Plus, MFE dynamically allocates selected peripherals so that each device can be used by more than one program. The result—MFE eliminates the need for multiple processors, duplicate terminals and other peripheral devices at installations that require concurrent execution of software.

[illegible]

Four-Phase was the first company to introduce the integrated approach to multifunction distributed processing. Today, there are more than 15,000 installed Series 4000 systems, helping people like you manage the information needs of over 150,000 end-users. And every machine is backed by our Customer Support Operation and over 1,000 field service people to provide continuing support and reliability at every level.

Four-Phase customers have been winning the DDP game for years. You can, too. To find out how, call us today at 1-800-529-6050, ext. 1599. In Arizona, call 1-800-352-0458, ext. 1599. For a free poster of this illustration, write to us at 10700 North De Anza Blvd., M/S 52-6A9, Dept. P., Cupertino, CA 95014.

VISION, FOREWORD and Multifunction Executive are registered trademarks of Four-Phase Systems, Inc. MOTOROLA and Ⓜ are registered trademarks of Motorola, Inc. Four-Phase and the Four-Phase logotype are registered trademarks of Four-Phase Systems, Inc. GMS/IV is a trademark of Four-Phase Systems, Inc.



MOTOROLA INC.
Information Systems Group

Four-Phase Systems
The Office Automation Company

The problem was further complicated as a result of the AT&T divestiture. Three pieces of the old Bell system had to be contacted for a permanent restoration: Bell Atlantic for local and intrastate Wats, AT&T Communications for interstate Wats and AT&T Information Systems for equipment.

offering his available properties.

A short-term lease and a previously occupied office facility that would require minimal leasehold improvements was the most desirable course of action. Fortunately, they were found on Jan. 4.

The architectural plans were given to the coordinating team, and the facility was designed for the housing needs of all the subsidiaries and affiliates that evening, using as much of the existing layout as possible.

A meeting with the architects took place on Thursday, and the lease was executed Thursday evening. Alteration work began Jan. 6.

From the outset it became apparent that in order to restore functionality by Jan. 9, four items of capital equipment would have to be in place by that date. These items included a telephone system — private branch exchange (PBX) — office furniture, typewriters and copying equipment.

As part of its leisure group, the company owned a nearby motel. Bell Atlantic was contacted, and by the afternoon of Jan. 2, it had restored six of the 30 telephone lines the company had been using. The lines were hooked up to the motel, and the Consumer Services Department worked out of several motel rooms the entire week.

The process of reestablishing the entire telephone system was much more difficult. It was further complicated as a result of the AT&T divestiture, which became effective the first day of 1984.

Telephone troubles

Three pieces of the old Bell system had to be contacted for a permanent restoration: Bell Atlantic for local and intrastate Wats, AT&T Communications for interstate Wats and AT&T Information Systems for equipment. As of the first week of January, none of the three talked to each other except through a service-order paper process that none of the companies apparently understood.

For example, AT&T Communications had to issue a service order to Bell Atlantic to hook up the interstate Wats. That situation was alleviated by appealing to the old Ma Bell's common sense under an emergency condition, and slowly the lines were brought by Bell Atlantic to the new building's demarcation strip.

The slowness of the process was largely due to the company having 30 different listed and unlisted telephone numbers on two exchanges. With the exception of eight of the telephone numbers, (which no one could remember), none were in sequence as each subsidiary or affiliate had its own number.

Under divestiture, the responsibility of the Bell operating company ends when it literally brings the physical wire to a front door. It was decided that the company would take three proposals for internal equipment: the existing independent supplier (Ericsson), Bell/AT&T and Rolm Corp. The two independents both offered a temporary PBX that could be installed over the weekend of Jan. 7, including wiring the new facility.

Slow to respond

Bell Atlantic, strangely enough, proposed a Japanese-made PBX rather than a Dimension or Horizon system. The company encountered difficulties in attempting to contact AT&T Information Systems and

Normally, you might not trust a product with a new name. But while all of our products have a new name, they also have a proven history of quality and reliability.

That's because Genicom was formerly the Data Communication Products Department of General Electric. Now an independently owned company, Genicom will continue the same product line we established with GE...only the name has changed.

Our Genicom 3000 family, for instance, still offers the same performance features already preferred by users and the design flexibility so important to OEM's, distributors, retailers and dealers. Speeds from 40 to 400 cps. Single or dual mode printing. Type quality from EDP to NLQ. Multi-color printing. Graphics. Selectable type fonts, American craftsmanship and more.

Of course, we'll also offer Genicom 2000 teleprinters and the soon to be introduced 4000 shuttle matrix printers. You'll find we have the same complete product line that we had with GE. We have the same corps of experienced employees, the same facilities, and the same nationwide service network.

But above all, we have a new commitment to excellence. Which means, while we continue to serve existing customers with established products like our 3000 family, we plan to introduce more products to meet growing needs.

At Genicom, we've changed our name and we're planning to change the future with more innovations, and more of the quality you've come to expect from us under any name.

Genicom Corporation, One General Electric Drive, Dept. M321, Waynesboro, VA 22980. In Virginia, call 1-703-949-1170.

GENICOM

For the solution to your printing needs call
TOLL FREE 1-800-437-7468

The genius of Team Xerox.

XEROX

The 8010 professional workstation has always been known as a computer of dazzling capabilities, especially in its graphics, information processing and document preparation.

But what some people may not know is that the 8010 is also the key element in Team Xerox, a system of office machines designed to work together like a team.

When part of an Ethernet network, the 8010 can work with a wide array of word processors, mainframes, personal and business computers, printers, electronic mail and file services, facsimile terminals, communicating Memorywriters, other networks and, of course, other 8010s. It also provides 3270 and TTY emulation.

Its full 17" bit-mapped screen lets you view two full pages simultaneously and open up to six documents at a time without covering up a previous document.

It's also the only workstation that can create and print documents in more than a dozen languages, including Russian and, for the first time, Japanese (Katakana, Hiragana and Kanji).

While other workstations may use Xerox innovations like the mouse, icons, windows, property sheets and combined text and graphics, the 8010 simply does more with them.

For example, the 8010's extensive software is fully integrated, to allow you to work with text and graphics simultaneously. You can draw a flowchart right in the middle of a full page of text without having to resort to a separate program and limited buffer "scratchpad" or "clipboard."

In terms of capabilities, ease of use and overall value, the 8010 would have to be considered the stellar workstation in the industry.

For more information, call 800-527-1922 (in Texas, 800-442-0152), or send in the coupon. Or ask anyone who's ever used the 8010.

Xerox Corp., Box 470065, Dallas, Texas 75247.
☐ Please have a sales representative contact me.
☐ Please send me more information.
Name_____ Title_____
Company_____
Address_____ City_____
State_____ Zip_____ Phone_____

010 [illegible]

find the organization responsible for Dimension or Horizon equipment sales. Eventually, the appropriate organization was found, but the response did not seem to take into account the urgency of the situation.

The Rolm equipment was finally chosen and a temporary switch installed over the weekend of Jan. 7. The choice of Rolm and its Philadelphia-area distributor, PTC, was based upon the systems capability in handling both voice and data as well as its ability to provide and install a temporary switch over the weekend.

The final items of capital equipment selection needed for Jan. 9 functionality were typewriters and copiers. IBM Selectric IIIs and Xerox Corp. Marathon 75s were chosen based upon quality hardware, price and immediate delivery. Forty typewriters were shipped over the weekend and arrived on Jan. 9. Xerox provided loaner copiers and the first Marathon was delivered Jan. 13. A decision was made to leave the issue of noncapital equipment and supplies up to the individual departments because the ordering and delivery process is a routine matter.

Another area of concern in a multimillion-dollar disaster is insurance company negotiation. Based upon the experience of this disaster, the use of a public adjuster retained by the insured is generally worth the 5% fee. A public adjuster can achieve better settlements. His professional approach is superior to an inexperienced executive assigned to the task and helps eliminate the possibility of bias.

Processing restoration

Processing restoration was the most vital area of concern for the insurance company, which must collect premiums and pay claims. Both tasks are feasible on a manual basis for a short period of time, providing functionality has been achieved. There was little concern for the health-care and leisure operations of the company since both of those activities depended upon their own field facilities, which were not affected by the fire.

A team consisting of the underwriting manager and the claim manager of the insurance operation was assigned the task of developing a plan for manual processing. That plan was to be completed by Jan. 5 and reviewed by the executive committee.

However, it was also known that the off-site magnetic tapes and some of the salvaged tapes could be used to continue processing on a Honeywell 2200. A service bureau with a Honeywell 2200 about 100 miles away was found, and arrangements were made to use that facility. An agreement was formed to use the site until the DG equipment could be replaced and conversion restarted.

This choice eliminated the urgency of acquiring equipment overnight, including 30 terminals that could now be supported through the Rolm CBX without the need to wire the building for data. Also, recovering from the loss of the new procedure manuals, which were not salvaged, had to be considered in order to restart the conversion. The above plan, therefore, permitted an orderly conversion planning effort that could be undertaken during the rest of January to install the new system and have it operational by March 1.

This processing restoration approach covered all bases. There was little basic disruption, and the approach gave the insurance operation the ability to continue processing, including its unfinished year-end work. The only difference would be a delayed systems reference since listings would be provided, rather than a daily updated Honeywell file loaded onto the MV/10000 and accessed via a terminal. The plan also offered a carefully thought-out manual backup if the remote-site Honeywell 2200 became too burdensome.

Cutover is now planned for April 2.

About the author

Eli Hiller is a management consultant based in Cherry Hill, N.J. Eli Hiller and Co., Inc. specializes in contingency planning and business systems planning. Previously, Hiller was a manager in Coopers & Lybrand's Management Consulting Services Department.

"Oh no! Somebody got into the computer room last night."

"I don't know who was maddest - our data processing manager, our controller or our auditors. But they all came into my office and complained that anyone could get into the computer room - at any time. So, we installed an RES CARDENTRY® system, and now we control who uses the computer room. And our smart machines are protected by some other pretty smart machines.

As well they should be.

Without an RES CARDENTRY system to protect your data processing facility, it can be subject to information security breaches, as well as damage to your expensive computers.

An RES CARDENTRY system solves the problem of securing your data processing equipment. It also does away with employee keys (and the possibility of duplicating them), and lack of personnel accountability.

When we install a CARDENTRY system, we give each employee a RUSCARD™ with a personalized code. The cards are virtually impossible to duplicate. Your computer center utilizes compact CARDENTRY readers. You tell your system who's allowed in and when. Then, if an unauthorized person tries to enter the facility the door won't open.

What's more, the RES CARDENTRY system tells your security guard where and when an unauthorized entry has been attempted - in easy-to-read English text.

It's that easy to account for (and control) unauthorized access and activities. And it's that easy to save money.

Your RES CARDENTRY system can even turn utilities on and off at pre-determined times, streamline your data collection activities and provide real-time monitoring, pre-defined, and user-defined historical reports. Small wonder we're the world leader in access control & monitoring systems.

So if your computer isn't already protected by our system, it should be. After all, do you know who's using it right now?

For more information, contact: Rusco Electronic Systems, 1840 Victory Blvd., Glendale, CA 91201. Telephone: (818) 240-2540. Or, call toll free: (48 states, except CA) 1-800-556-1234, Ex. 67; (CA only) 1-800-441-2345, Ext. 67. Telex 698318.

RES® RUSCO ELECTRONIC SYSTEMS

A FIDDE INTERNATIONAL COMPANY

CARDENTRY is a registered trademark and RUSCARD is a trademark of Rusco Electronic Systems.

IN DEPTH

Reusable code, reliable software

By F. Arnold Romberg
and Alan B. Thomas

Expert systems using knowledge bases derived from a library of program specifications will be essential to fifth-generation software development. Intelligent management of reusable code will be one of the major benefits provided by these development tools.

Whenever a radical improvement is made in either hardware or software, a new generation is hailed. Progress through the fourth generation has been somewhat independent in hardware and software. Improvements in one area

'We are concerned here with one way program verification and reusable code may be combined under the direction of an expert system to produce more reliable software in less time with fewer people. The necessary technology is in the development stage. . . . Fifth-generation hardware will support fifth-generation software development methodologies.'

have stimulated and benefited from improvements in the other. However, looking back, we can see that the progression from one generation to the next in hardware was not essential for the radical improvements in software that justify the recognition of a new generation, and vice versa.

The frontiers in both hardware and software have now arrived at the transition between the fourth and fifth generations. It does seem to be a happy circumstance, since the next major advances in both hardware and software will be much more closely intertwined than any prior advances.

The Japanese have committed their computing industry to leapfrog into a position of worldwide leadership. Their efforts center on development of large and small inference engines. These processors reference large amounts of information stored in knowledge bases to identify probable additional facts and verify and modify these through dialogues with users to develop more information. Coupling an inference engine with a particular knowledge base yields an expert system. Such a system combines hardware and software to provide great help to a user by supporting him in the same way that a human expert would.

Effective use of inference engines requires development of hardware and software tools to make these powerful devices less complex and more rewarding. The fifth-generation knowledge manipulation machine will dramatically

change the way software is developed.

We are concerned here with one way program verification and reusable code may be combined under the direction of an expert system to produce more reliable software in less time with fewer people. The necessary technology is in the development stage. The individual components are commercially available today. Fifth-generation hardware will support fifth-generation software development methodologies. Intelligently managed reusable code is one of the important elements of fifth-generation software development methodology.

Development woes

The many problems with software development are well-known: It takes too long to develop an initial package; package reliability will be poor at first and will improve only with intensive code maintenance; errors are uncovered only by attempts to use the package, and some may persist well into its useful life; and the whole process costs too much.

James Martin, in *Application Development Without Programmers*, cataloged these faults and identified a primary approach to solutions: Increase the use of high-level languages both by data processing professionals and by end users. That the term "software engineering" has come into use is itself an indication of our hope that software development can move from being an artistic endeavor to being a process of pragmatic construction.

That the term "software engineering" has come into use is an indication of our hope that software development can move from being an artistic endeavor to being a process of pragmatic construction. "Information engineering" concerns the whole range of information handling activities.

The replacement of "software engineering" with "information engineering" recognizes that this process is more and more one that must concern itself with the whole range of information handling activities. The process starts with determining the goal of the information processing to be done and involves analysis and design of all phases of information handling, not just construction of computer programs.

Computer systems producers, both analysts and programmers, are good targets for productivity improvement. In part, this situation is the result of labor economics: Relatively high salaries, resulting from great demand in a labor-intensive field, are a prime motivation for automation. In part, it is also a result of the increased opportunities for and willingness and ability of computer systems people to change jobs.

Turnover has made it imperative that means be found to make the developer of a system less a part of and less essential to its continued successful use. Fifth-generation systems development technology must reduce the need for system maintenance and for human expert knowledge when systems are extended, because the humans who have that knowledge are not staying with the systems they develop.

Significance for fifth generation

Each passage from one software generation to the next has been marked by a significant advance in the ease of producing programs. The second generation was marked by the advent of assemblers to relieve the programmer of much of the work of determining machine memory addresses and operation codes. Third-generation language processors took over the task of selecting the machine instructions. Now fourth-generation languages are letting the computer perform some of the decisions about how the processor should perform some of the tasks specified by the programmer.

Although these languages have been labeled "nonprocedural," it is much more accurate to call them "less procedural." The programmer is freed to concentrate on the aspects of the procedure that are of significance to the problem at hand, leaving the computer to take most of the responsibility for the aspects that are largely concerned with the details of the computer processing.

The term "fifth-generation software" has not yet been accorded a standard definition. However, it is generally used to refer to system development approaches in which the man/machine interface is only at the specification level, while the organization of the specifications into the facts needed to create an information processing system is carried out by the software development system.

Both fourth- and fifth-generation software development methodologies emphasize the statement of application system requirements and logic in problem-oriented languages. Requirements stated in these terms may then be reviewed, tested for consistency and completeness and used to produce preliminary results for prototyping. They become the basis for generating system components such as programs and data structures.

The availability of a well-

IF YOU'VE
EVER OUTGROWN
A FINANCIAL SYSTEM,
THIS IS A SEMINAR
YOU WON'T WANT TO MISS.

GL, AP,
MM, PO,
AND SOON ARC

The Walker "Once and for All" Seminar. If you're looking at financial applications software, you're probably planning to replace an unwieldy system. One that fails to meet your needs for information management, technological compatibility or operating efficiency. Even perhaps, all three.

Walker offers a full range of financial systems specifically designed to grow with you. Easily. Which means the Walker Seminar could be the last financial software seminar you'll ever attend.

You know the problem. Every time you have to change or add to your current system, you discover new roadblocks. Custom reports have to be programmed on top of your old system. Changes and additions have been so frequent that nobody understands just what the system can do. Or how it does it. New technology could make your business run better...but your financial system won't run on it. And you must divert valuable time and resources to find a new system. Again.

Financial software you won't outgrow. Walker introduced a revolutionary technology: Software that separates the applications (what the software does), from the database (how the system interfaces with your data center). It's a proprietary technology which continues to grow with the needs of hundreds of corporations. Worldwide. Including the 1984 Olympics.

Better management tools. Walker's "Strategic Software" allows you to modify your financial system to work the way your company works. And change as your company changes. Simply. Immediately.

Freedom. Walker financial applications packages are not dependent upon a specific technology, operating system or data base management system. By utilizing a unique "software bridge," Walker isolates the applications software from both the mainframe and the DBMS. Which means you're free to choose the technology and DBMS that's best for your company's needs. Without the need to replace or rewrite your financial system, or retrain your staff.

A free seminar. In a few short hours, you can see how integrated, interactive financial systems can save you time for years to come.

Even a free phone call. You can fill in the coupon below, or call us today, toll free: 1(800) 4 WALKER (outside California), (415) 495-8811 (within California). That way we can register you for the seminar that's most convenient for you. In realtime. Like Walker software.

Walker Interactive Seminar

Atlanta 4-5, 5-15	New Orleans 4-10
Boston 4-4, 4-5	New York City 4-11, 4-12, 5-8, 5-9
Chicago 4-4	Omaha 4-17
Cincinnati 5-2	Orange City 4-11
Cleveland 4-19	Philadelphia 4-10
Columbus 4-12	Phoenix 4-3
Dallas 4-19	Pittsburgh 5-1
Denver 4-24	Portland 4-19
Des Moines 4-18	Rochester 4-24
Detroit 4-24	St. Louis 4-26
Fort Wayne 4-25	Salt Lake City 4-12
Hartford 4-3	San Antonio 4-19
Houston 4-2	San Diego 4-17
Kansas City 4-18	San Francisco 4-26
Los Angeles 4-2	Seattle 4-4
Louisville 4-10	Tampa 4-4
Memphis 4-11	Toronto 4-4
Miami 4-3	Tulsa 4-3
Milwaukee 4-26	Wash. D.C. 4-25
Minneapolis 4-10	Winnipeg 5-1
Montreal 5-8	Winston/Salem 4-24
Nashville 4-12	

Official Supplier of Financial and Inventory Systems Software to the 1984 Olympic Games

WALKER
WALKER INTERACTIVE PRODUCTS
100 Mission Street, San Francisco, CA 94105

Yes, I'm interested in attending the Walker Interactive Products Seminar at (City)_____ on (Date)_____. Please send me my registration forms and full particulars.

Name_____
Company_____
Address_____
City_____ State_____ Zip_____
Telephone #_____
Our computer is:_____
TP Monitor_____ DBMS_____

CW 3/26/84

"The office automation I bought for everyone in the corporation doesn't incorporate everyone."

Exxon stops the shock...with fully integrated office automation for everyone in the corporation.

Introducing the Exxon Business Support System.

An office automation system that can't support everyone in your corporation can lead to some very shocking experiences.

The right power to the right people

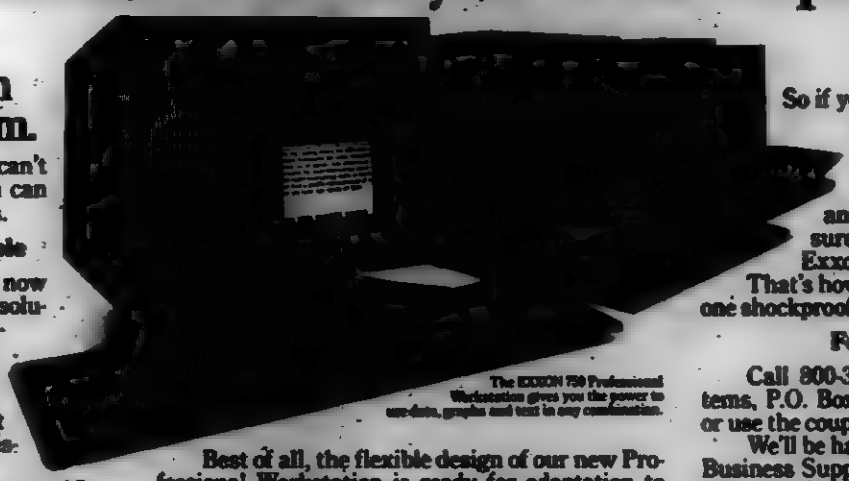
That's why Exxon Office Systems now offers more practical office automation solutions that help everyone in the corporation to be more productive. With the Business Support System, Exxon extends its fully integrated line of office automation products to support managers, professionals, and administrators, as well as secretarial staff.

Exxon puts it together for everyone with a fully integrated system — with full communications flexibility that lets you access outside data bases and interact with most mainframe computers. Without the complications. Without the shock.

Office automation for those who shape the corporation

The Exxon Business Support System features the new EXXON 750 Professional Workstation, specifically designed with powerful, integrated software that lets you move instantly from text to graphics to data processing — without changing programs.

You can divide the high resolution bit-map display into several windows and work in a number of functions simultaneously. You can shift information from one window to another. You can preview the page layout, and produce an integrated text/graphics document on our quiet EXXON 965 Ink Jet Printer. Or on a color plotter.



The EXXON 750 Professional Workstation gives you the power to use data, graphics and text in any combination.

Best of all, the flexible design of our new Professional Workstation is ready for adaptation to the most popular operating systems and network interfaces.

Tying everyone together

At the core of the Business Support System is the EXXON 8400 Series controller. With its UNIX*-based operating system, it can integrate all levels of workstations to share information and programs. Everyone can keep track of schedules and meetings with time management and calendaring functions, whether their workstation is an EXXON 500 Series Information Processor or a new EXXON 750 Professional Workstation. And everyone can send and receive messages easily with transparent electronic mail.

An expandable, shockproof family

Exxon protects your office automation investment by making every workstation — from the EXXON 500 Series to the new EXXON 750 Professional Workstation — fully expandable and upgradeable.

So if you've already begun an Exxon system, the latest Exxon advances are completely compatible with our current product line.

And with our worldwide sales and service organization, you can be sure that when you need assistance, Exxon will be there.

That's how Exxon incorporates everyone—in one shockproof family.

For more information

Call 800-327-6666, write Exxon Office Systems, P.O. Box 10184, Stamford, CT 06904-2184, or use the coupon below.

We'll be happy to demonstrate how the Exxon Business Support System can help your corporation move into the future ... without the shock.

*UNIX is a registered trademark of Bell Labs.

Exxon Office Systems — covers us
P.O. Box 10184, Stamford, CT 06904-2184

☐ Please send me more information about the Exxon Business Support System.

☐ Please have your representative call.

Name _____
Title _____
Company _____
Address _____
City _____ State _____ Zip _____
Telephone _____

800-327-6666 (In CT, 800-942-2525)

EXXON OFFICE SYSTEMS

The future...without the shock.

Managing a Constant Wave of Facts & Figures

Requires a Special Touch.

SOFTWARE
INTERNATIONAL

Run With Us

managed library of reusable code is essential to the effective use of these techniques.

What's the big deal?

Reusable code is an important approach to reducing the cost of software development while increasing the reliability of the finished product.

Everyone who has taken an introductory programming course in Basic knows about subroutines. Anyone who has written more than one program has reused sections of code. All who have worked alongside other programmers have reused other people's code. Whenever a program is bought, sold or copied, it is with the intention of reusing code. The other side of the coin is that probably the majority of all code is written to do tasks that have already been programmed before, somewhere else, in some other environment, for some other purpose.

Intensive use of a piece of code as soon as it is complete and while the development mechanism is still in place can lead quickly to a high level of reliability for the whole remaining life of the code. The prospect of using a piece of code in many contexts justifies the effort of more thorough testing.

Major efforts have been put into making existing code available where needed, and many fortunes have been amassed doing so. However, the success of fifth-generation systems requires several order-of-magnitude increases in the application of reusable code. The challenge is to surmount the technical and logistical obstacles to achieving these increases. When they are achieved, each of the problems with software productivity will be directly and significantly affected.

The development expense for a piece of reusable code may be spread across many programs in which it is used. Alternatively, it may be regarded as practically free for all users after the first.

Shared use leads to faster discovery and removal of errors. Intensive use of a piece of code as soon as it is complete and while the development mechanism is still in place can lead quickly to a high level of reliability for the whole remaining life of the code. The prospect of using a piece of code in many contexts justifies the effort of more thorough testing. The use of a mature piece of code in a new application shortens the testing time for that application, too.

An important impact on code testing practice is that the expense of applying formal verification methodologies is more easily supported when the resulting code will be widely used.

Production of one piece of code to do the work that would otherwise require many coding efforts creates obvious savings of time and effort in specification, design, construction and testing. These savings are minimally offset by the need to meet the interface requirements of a large set of environments in which the code will be used. The net effect is substantially reduced development time and cost. The savings are compounded as the resources freed are applied to additional development.

A subroutine library is the most common form of reusable code. Management of a subroutine library involves determining support responsibility, documentation standards and maintenance cycles. Talented programmers may submit routines for a companywide subroutine library. Decisions about the acceptability of such routines are difficult because of a lack of control over these concerns.

Another problem is that routines accepted for the library are often difficult to use in a new context. The result is often the growth of a number of subroutine libraries along organizational or functional lines, frequently containing multiple versions of equivalent routines. The fragmentation of libraries defeats one of the primary purposes of reusable code implementation: prevention of redundant development.

The challenges

To achieve the full benefits that reusable code promises, a number of difficult challenges will be met. The dominant theme in meeting these challenges is increasingly sophisticated automation of the processes involved in software development. That sophistication can only be provided by expert systems that support program development.

The first challenge is to maximize the reusability of any code written. Widely reusable code demands automation in the process of producing code to handle the amount of work to be done and to provide the degree of accuracy required. This automation must perform not only the many tasks taken over by programming support systems in the progression from second- to fifth-generation software, but it must also take responsibility for creating code that meets the requirements for successful reuse.

Achieving reusability is usually of little immediate interest to the programmer. He is much more concerned with meeting some current need and is justifiably willing to sacrifice future reusability, and hence future

YOUR KEY TO COMMUNICATION NETWORK COMPATIBILITY.

THE CHALLENGE
The challenge for communications network managers today is compatibility—how to integrate a growing number of information processing resources into existing and future networks.

If your organization needs to combine the power and utility of personal computers, minicomputers, office automation equipment or ASCII terminals with your mainframe network, Wall Data can provide you with a cost-effective solution using the DCF Series of communications controllers.

THE WALL DATA SOLUTION
DCF systems act as gateways into IBM SNA, BISYNC and other vendor network environments. They enable you to flex your network muscle by providing concentration, speed conversion, and protocol conversion to multiple hosts using multiple protocols at the same time.

With the DCF Series, ASCII terminal networks can be used as 327X's with IBM System/370's or as 525X's with System 34/38. And asynchronous hosts can transfer batch datastreams into SNA networks using 3770 SDLC. This means greater productivity from your ASCII terminal network because you do not sacrifice access to your asynchronous host in order to enjoy IBM compatibility—you simply alternate from asynchronous to synchronous host via a simple-to-use menu interface.

To this sophisticated multi-protocol support, add the following standard features:
- Standard redundant hardware
- Automatic backup without user intervention
- Interactive local configuration
- Remote Software Diagnostics
- Remote Software Downloading
- Asynchronous port selection
- Operator menu interface

Together these features add up to the most flexible protocol gateway available to tie your multi-vendor systems into a cohesive, cost-effective network.

Whether you just want to complement your IBM network with lower-cost ASCII devices, or to merge asynchronous and synchronous hosts into a more manageable network resource, call Wall Data today—THE DATA COMMUNICATIONS FACILITATOR.

WALL DATA
The Data Communications Facilitator

Wall Data Incorporated
14828 Northeast 95th Street
Redmond, Washington 98052
206 883 4777
1 800 433 3388

A further challenge in creating reusable code is providing standardized error reporting. Complex modules are built up of multiple levels of other modules, many of them reusable in various contexts. Noncritical failures may be reported by means of return codes from lower level functions, while major failures must lead to specific abnormal termination procedures.

productivity, for faster achievement of short-term goals. Programming support systems must help him to produce good reusable code with no delays and minimal — preferably no — extra effort.

The second challenge is to make sure that if an appropriate piece of already written and tested code is available to meet a current need, it will be used. When a programmer is faced with a particular need, the most satisfying way to meet it is to pitch in and do a little fresh programming. With the use of ever higher level languages, the human effort required to create a particular piece of needed code is relatively small. The savings achievable by reusing code are large because any given project involves creating a very large number of well-integrated and tested small pieces of code.

In order to achieve these savings, code potentially usable for a particular need must be located quickly and easily, which means it must be carried out completely automatically. The elements of the task include recognizing essential features, locating and presenting to the programmer one or more pieces of code likely to fit the current need and building the selected code into the system under development. For even a small need, the process must be easier than to generate new code.

The challenge of managing a subroutine library involves many difficult problems. The addition of new modules and the evolution of existing reusable code must be both allowed and controlled. As features are added to existing subroutines, multiple versions of a module with overlapping functionality come into being. Records must be kept telling what modules are in use in already constructed systems.

Multiple versions of similar or overlapping modules must be kept available to meet slightly different needs. For example, because of execution speed or size, a currency conversion module that includes a limited number of currencies may be preferable in some circumstances to a version that covers many currencies.

Both versions must be kept available. Correction of a bug in one may be cause to examine the other. Some application systems may be affected by the bug, so that the effort of replacing the older version with the repaired one is not only justified but essential. Another production system using the same module may be unaffected by the bug. If this situation can be verified, then the work and cost of replacing the module in this system can be avoided.

A further challenge in creating reusable code is providing standardized error reporting. Complex modules are built up of multiple levels of other modules, many of them reusable in various contexts. Noncritical failures may be reported by means of return codes from lower level functions, while major failures must lead to specific abnormal termination procedures. Error and warning reporting from one module to another must be handled in standardized ways so that testing the use of a reusable module requires only testing the

ACCESS +

+ produces CICS retrievals and batch reports without programming

+ allows end-users to produce reports with less than 1 hour of training

+ can be installed in 30 minutes for a 30-day in-house trial

the query + report writer for CICS

($16,000 DOS / $24,000 OS)

PRO-SOURCE
THE PRODUCTIVE RESOURCE COMPANY

1385 NORTH LOOP WEST, SUITE 704
HOUSTON, TEXAS 77008
OFFICE (713) 880-8009

McCormack & Dodge can afford any 3270 compatible terminal. Why would they choose the least expensive? Control Concepts.

your 3270 compatible requirements are in the office or in
many more reasons to choose a Control Concepts terminal.
story today by calling 800/368-3078 (in Virginia 703/631-
fornia 714/235-6721). One of our Applications Engineers will
it is to fit a Control Concepts terminal into your business.

CONTROL CONCEPTS
A DIVISION OF FREEDMAN INCORPORATED
P.O. Box 2367, 12004 Bellaford Rd., Manassas, VA 22110
I'd like to know more. Please send me the inside story on the
☐ SNA/SDLC CC-3276 ☐ BSC/HC EM-3275/6
☐ I'd like a demonstration. Please have your nearest sales representative call me for an appointment.

Name Title
Company Phone
Street
City State Zip

ASK ABOUT OUR 30 DAY TRIAL.

interface between it and the program using it. The module itself and the lower level modules it contains may be relied on to detect and report correctly error conditions detected at lower levels.

Facilities to meet these challenges will be a part of fifth-generation expert systems that support software development.

Software engineering

Workers at the frontier of information systems and software technology are very much concerned with bringing engineering discipline into systems and software development. Much effort is going into making sure that information gleaned at each stage of the development process is properly captured, verified and organized for effective use as the basis for work at the next stage.

The huge intellectual investments in strategic planning and systems analysis must be preserved for effective construction of the original system or software product. The availability of this information in usable form also has obvious benefits for system maintenance and can substantially extend system life. However, because of the great overlaps in the planning and analysis information for interfacing systems, the biggest payoffs occur when this information can serve as a foundation for the development of interfacing and related systems.

A variety of major research and development efforts are attacking information and software engineering at different points and from different directions. One very promising development area is the generation from design specifications of computer programs that are verifiably correct in the sense that they are known to implement the specifications. The USE.IT system by Higher Order Software, Inc. of Cambridge, Mass., allows an analyst/designer to decompose the process to be performed and the data involved in a hierarchical fashion.

The successive stages of process and data decomposition are performed according to specified rules. The entire decomposition can be checked automatically for consistency and completeness. The resulting lowest level functional primitive operations can be processed automatically to create computer code in any one of several compiler languages. If the specification passes the consistency and completeness checks, the resulting generated code can be relied on to realize the specification correctly.

The USE.IT approach to validating the specification is a powerful attack on specification errors that involve faulty data interfaces. The analysis phase tracks variables from one end of the program to the other to ensure that each variable is defined and given a value prior to being used as an input to a calculation or decision process.

The validation provided by USE.IT is limited to completeness and consistency. Successful validation promises that the resulting program can be expected to execute successfully and will do what the specification said it should do. Whether the program will do what the analyst expected it would is not the same thing, and whether it will do what another user expects is still less certain.

Achieving this level of correctness is the objective of formal correctness proofs. These make assertions such as: "If the input data submitted to program XYZ meets specific requirements, then the program will terminate with the desired result." Consider an internal sort program to be used by an on-line transaction program. Several conditions must be satisfied for the program to work properly: The size of the table to be sorted cannot exceed a maximum limit; the size of each table entry must be within another maximum; the table size must be a multiple of the entry size; and the sort key size cannot exceed the entry size.

If all these conditions are satisfied, the program will, without exception, terminate with the table entries in sorted order. An experienced or cautious programmer will include in the program tests for each of the requirements before starting the sorting process. Program code such as this, called guard code, has some drawbacks.

Detection of invalid conditions that waits until execution time costs valuable effort and delay just at the most critical time, namely, when the results of the information processing are needed. The execution time for guard code, even when no errors are present, can be significant, particularly in large modules or frequently executed lower level ones.

Well-managed reusable modules accessible to a program development system that does interface and integration checking can provide two major benefits: faster execution and faster development. Less code is necessary to do the same job, and less effort goes into producing the program.

The time required to prove a program correct is related to the number of variables involved. A reusable code module offers the advantage of reducing the total number of variables involved in the correctness check since the local variables of the reusable module do not need to be considered. Only the input and output variables of the reusable module have significance in the proof process if the module itself has been previously verified. A verified module can be used within other routines without incurring the overhead of reverification. Only the guard conditions need to be checked to fit the module into a new structure.

In contrast to software engineering, which is largely concerned with

To add markets as well as profits to your business, add Zaisan to your system.

The ES.1 voice/data workstation offers single-key access to simultaneous voice, data or text. With the touch of a button, users can also access internal and external databases, PBX functions and electronic mail.

The ES.1 is also upgradeable. So you can add application and communication software to tailor the ES.1 to the individual information needs of your users. Which can add sales to your business.

Another plus is the price. And the wide range of service options.

Add these all up and you'll see the formula for success is rather elementary. Add Zaisan.

ZAISAN
The new direction in business communications.

13910 Champion Forest Drive. Houston, Texas 77069 713.580.6191.

creating correct code based on a presumably good specification, information engineering is aimed principally at accurate and rapid recording and checking of strategic planning and analysis data. The ultimate goal includes automatic program design, based on adequately detailed and checked analysis information, with the design in turn supported by automatic code generation. Information engineering has been the target of university research projects for many years. It has become the object of much attention in consulting firms more recently.

The amount of computer-executable code that already exists is staggering; the backlog is larger still, and

The sheer volume of code to be produced makes it imperative that code production efficiency be a major concern. Code must be created and managed so that any routines created are made available to the widest possible circle of users.

the amount to be produced in the next decade is mind-boggling. This realization has motivated firms in such diverse industries as computer manufacture, hydrocarbon processing, software creation and electronics to undertake major projects aimed at mastering information engineering to break the software production bottleneck. Different projects emphasize different aspects of improving software systems productivity, usually based on the recommendations of different experts about how to convert software development from an individualized creative endeavor to a systematic engineering activity.

One approach emphasizes computer support for producing a limited number of different kinds of diagrams that help users specify, visualize, organize, review, complete and document the basic information for program construction. Another project concentrates on capturing specifications in a form suitable for automatic code generation. A third begins with an architecture that relates different phases of systems development activity, to be fleshed out with a variety of alternatives for doing the work involved in each development phase.

A fourth concentrates on producing a facility for storing all of the diverse body of knowledge that is involved in producing information systems, to be supported by numerous processors that accept and present subsets of the information in a variety of forms; including text, diagrams and matrices.

The one thing that all of these efforts have in common is that once the body of specification information has been mastered for an information engineering project, it must be possible to produce the required program code automatically. When efforts are successful to move the point where automation takes over in software development back from the design/construction interface to the analysis/design interface, the leverage provided by automatic program construction will be still further magnified.

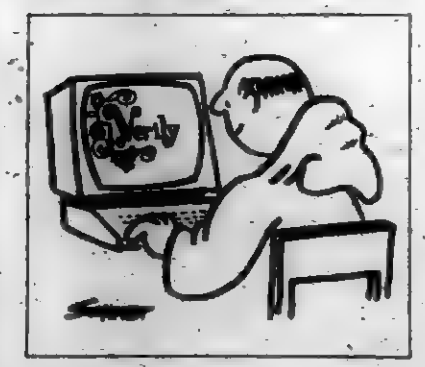
The sheer volume of code to be produced makes it imperative that code production efficiency be a major concern. Code must be created and managed so that any routines created are made available to the widest possible circle of users.

Fifth-generation development

One of the products the Japanese intend to produce as a result of their fifth-generation efforts is a complete expert system — hardware and software — aimed for use by a single individual. The goal is to produce rapid personalized support for knowledge workers to improve their productivity. The benefits to the workers include greatly increased job satisfaction and opportunity for growth. The push for a personal-scale knowledge machine is partly a consequence of the problems of data integrity and concurrency that plague distributed computing, particularly micro-based activities.

In the U.S., the current emphasis in fifth-generation development seems to be more on the production of large knowledge bases and expert systems that can make the power of the stored knowledge available to many individuals in large organizations. Information system manufacture is just one of the many problems that are susceptible to this method of attack. However, it is one that is highly leveraged, since knowledge base handling systems and expert systems using knowledge bases for information systems development must themselves be developed before the goals of fifth-generation software can be met.

The components of a fifth-generation development system are a verifiable specification language, a library management system, a knowledge



© 1984 Crwth Computer Corporation, Inc.

Get your hands on USING SAS now.

Get USING SAS, the interactive computer-based training that gives end users "hands on" experience they can get their hands on now.

Designed not only to teach, but as an ongoing refresher, USING SAS is three courses in one:

- Basic SAS
- Intermediate SAS
- Advanced SAS

Report generating, statistical analysis, data manipulation are all learned by writing SAS programs. Users may select as many sessions as they need, but you install and register only once.

Written by bestselling DP author Gary DeWard Brown, USING SAS comes with a comprehensive student workbook, available for reproduction by all USING SAS customers.

And, as with all CRWTH coursewares, your satisfaction is guaranteed. CRWTH'S unique free trial lets you evaluate the course to make sure it meets your training needs.

* SAS is the registered trademark of SAS Institute, Cary N.C.

Want more information? Call (800) 282-2372. In California, (213) 391-6788. Or use this coupon to get a free catalogue of CRWTH'S Curriculum for the Information Center.

Name_____
Company_____
Title_____
Address_____
City/State/Zip_____
Telephone ( )_____

813 Wilshire Blvd., Suite 200
Santa Monica, CA 90401

CRWTH
The Information Center People

base, a command-level analyst interface and an inference processor.

Fifth-generation specification languages will continue the present trend in the direction of nonprocedural languages. The tasks of finding out all that must be known to produce software and of recording this information so it can be automatically organized and processed by the expert system are complex.

The fifth-generation development system will take an active role in information processing analysis and target software system design. Module selection and specification verification are important elements of this role. The specification language allows an analyst to communicate readily with the knowledge base in terms of process flow, data structure and logical requirements.

After the specifications for a system have been developed and communicated to the knowledge base, they are combined with other information from the knowledge base to support construction of the target system. Tapping the knowledge base to identify candidate reusable code and to select the most appropriate modules requires comprehensive information about available modules. Important parts of this information are the conditions that must be satisfied at the time a reusable module is invoked and the conditions that will be satisfied when a reusable module terminates. In describing inputs to reusable modules, the weakest, or least restrictive, condition on the input data that will ensure successful execution is used. The weakest precondition is preferred over stronger restrictions since minimum testing and minimum module-specific preparation will be required to meet the needs of the weakest precondition.

In describing outputs, we are interested in the strongest postcondition, since this is the most restrictive statement describing the data after completion of the program. The knowledge base associates module names, locations and statements of weakest precondition and strongest postcondition.

The command-level interface assists the analyst by managing, supporting and simplifying access to the knowledge base, inference engine and specification language.

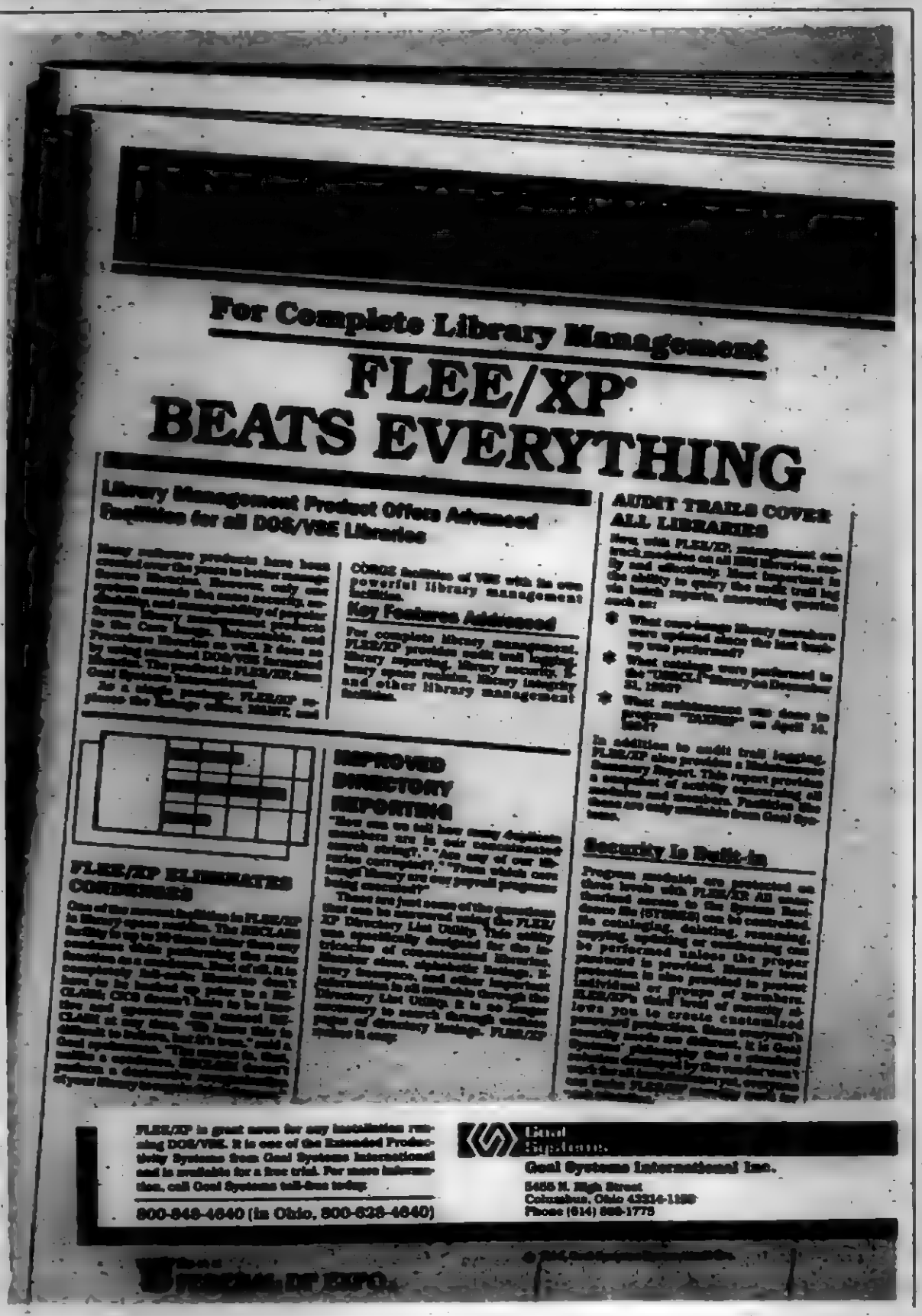
The inference engine combines user knowledge of requirements with the knowledge base's description of capabilities of available reusable modules. The expert system built on the inference engine and knowledge base presents what can be deduced about the specification and identifies and requests information required to complete it. With this achievement, the fifth-generation software development system will have taken over software construction responsibility in toto, while the analyst is freed to concentrate entirely on issues of usability and architecture.

Fifth-generation system development methodology has a number of implications. Data processing personnel requirements will change, as they have been changing steadily since computers were invented. Capital expenditures will continue to rise. Organizational structures will continue to evolve to take advantage of emerging technology. The role of the traditional programmer will shrink as "smart tools" increase the productivity of individual people.

The fifth-generation software development system will take over software construction responsibility in toto, while the analyst is freed to concentrate entirely on issues of usability and architecture.

Three classes of program developers can be identified. There will be specialists in less-procedural languages and prototyping systems who concentrate on quickly producing new information systems — these have been christened "data processing acrobats." There will be the supporters of the expert systems and the knowledge bases used for information system production. The responsibilities of this group will include creation and extension of large libraries of reusable code.

And there will be the bulk of the users of these expert systems and knowledge bases. This group corresponds to the majority of the current programmer/analyst population. Analysis work will predominate over programming in the daily activities of this large group. Fifth-generation tools will provide the needed program construction support, and one of the major elements of this support will be effective automatic management of reusable code.

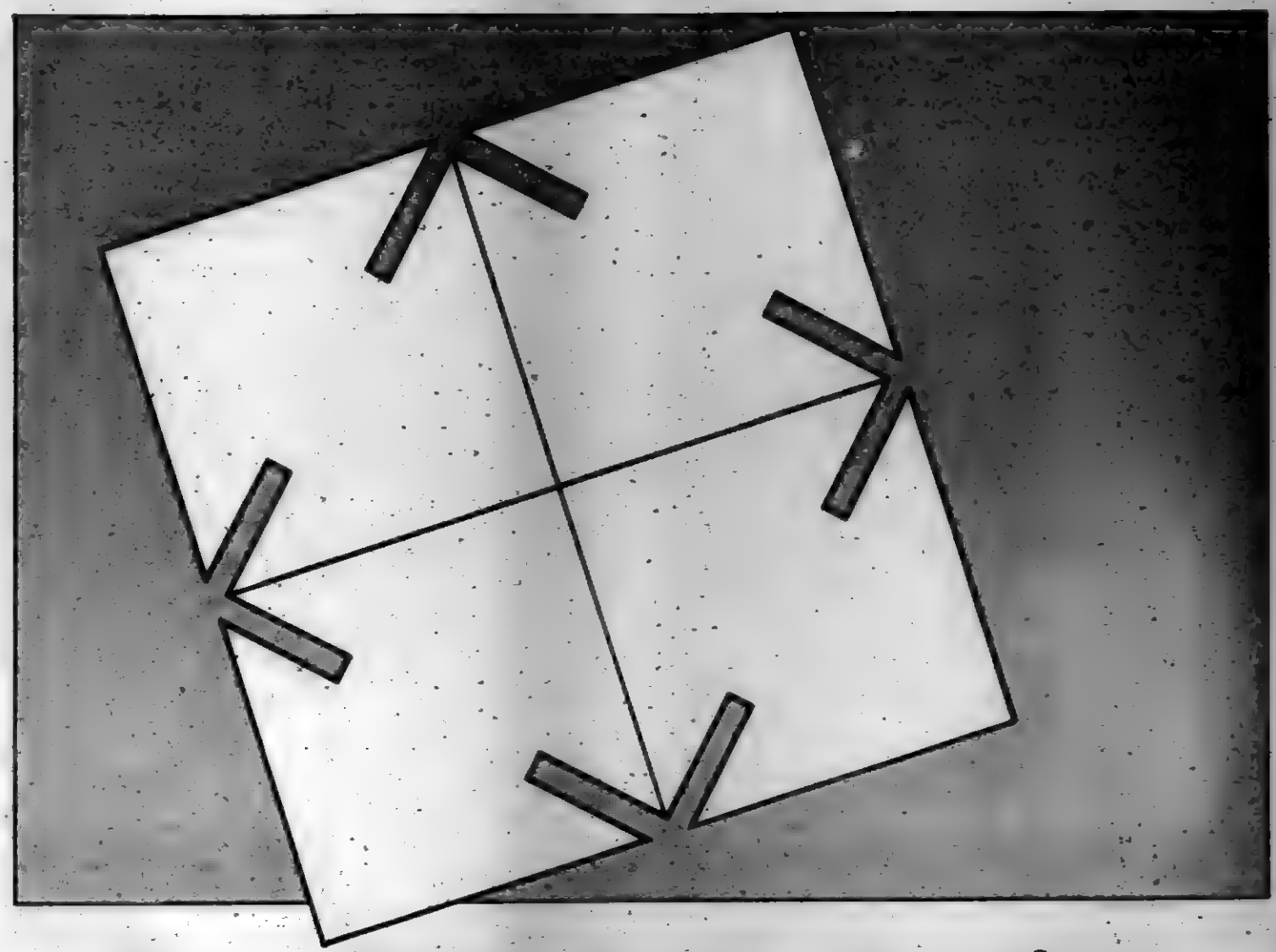


About the authors

F. Arnold Romberg is an independent consultant based in Dallas. He has been a computer systems professional since 1954. In the course of employment by a major oil company, a management science and computer software firm and an electronics manufacturer, he has worked with many kinds of software in program development, mathematical programming, corporate planning, manufacturing and information engineering. He has taught systems programming, data base management and systems analysis.

Alan Thomas has worked in the industry for nine years as analyst, project manager and supervisor. He has been with Texas Instruments, Inc. for the past six years and is now a technical consultant at Peer Services, Inc., specializing in data base management and development technology.

IN DEPTH



Practical data sharing

Disillusionment with the "universal corporate data base" concept caused a swing to DBMS as an access method. But between these two extremes there is a practical alternative — data sharing.

By V. Venkatakrishnan

Data is said to be shared if its definition and values are stored in only one physical location (record, file, data base) in the company. Shared data is accessed and updated by any number of applications without the need for duplication or redundancy. Data sharing is the strongest thrust behind the concept of data base management systems (DBMS) and is or will be inevitable for the following reasons:

- It reduces the number of batch programs to be developed and executed to interface applications that access common data. This reduction is important because the batch window is steadily decreasing because of growing demand for online operations. A side benefit is the overall increase in application productivity resulting from the decrease in the number of programs to be developed.
- It improves the validity of information by making current data available promptly.

However, because of the limitations of commercial DBMS software and the hardware limitations of today's processors, an idealistic pursuit of the preceding definition of data sharing will result in unmitigated disaster. Perhaps it was such a pursuit that led to the rise and fall of the "universal corporate data base," which was supposed to contain all the data the enterprise

would ever need. The disillusionment created by this rather impractical approach caused the pendulum to swing to the other extreme, namely, use of the DBMS as an access method with disregard of data sharing. This approach is as cost-effective as using a large tractor trailer for daily commuting.

Problems with the ideal

These are operational in nature and fall into four major categories — application development, production migration, change control and performance.

Application development: Application development normally goes through several phases, which may be generically identified as feasibility, general design, detailed design (programming), unit testing and system testing. A vital ingredient in this process is the availability of test data. In the traditional nonsharing environment, the process is relatively straightforward. Test data is generated from scratch or extracted from existing files. The criteria for test data generation can be simple or complex, depending upon application requirements. The stability of test data can be important to the development effort. All these factors are controlled effectively and easily in a nonsharing environment.

On the other hand, when data is shared ideally an unlimited number of applications must use common test data, which may be changed in unpredictable ways. This situation lengthens development time, thus aggravating the application backlog.

Production migration: Applications are individually moved into production, whether data is shared or not. There are widely accepted procedures for doing this in a nonsharing environment. These procedures are usually based on moving programs and data between libraries. With shared data, it is possible that one application wants to establish pointers or otherwise change the contents of a record that is used by an existing application already in production. This situation, although unavoidable to some extent, soon gets out of hand in the ideal data-sharing environment.

Change control: It is a fact of life that the needs of the business and application will change continually. Establishing priorities and schedules for these changes can be an impossible challenge to the best data base administrator if data sharing is not carefully planned and controlled.

The worst scenario is cascading of these changes or the domino effect, where one change implies another and so on. This effect will bring all data base operations to a standstill.

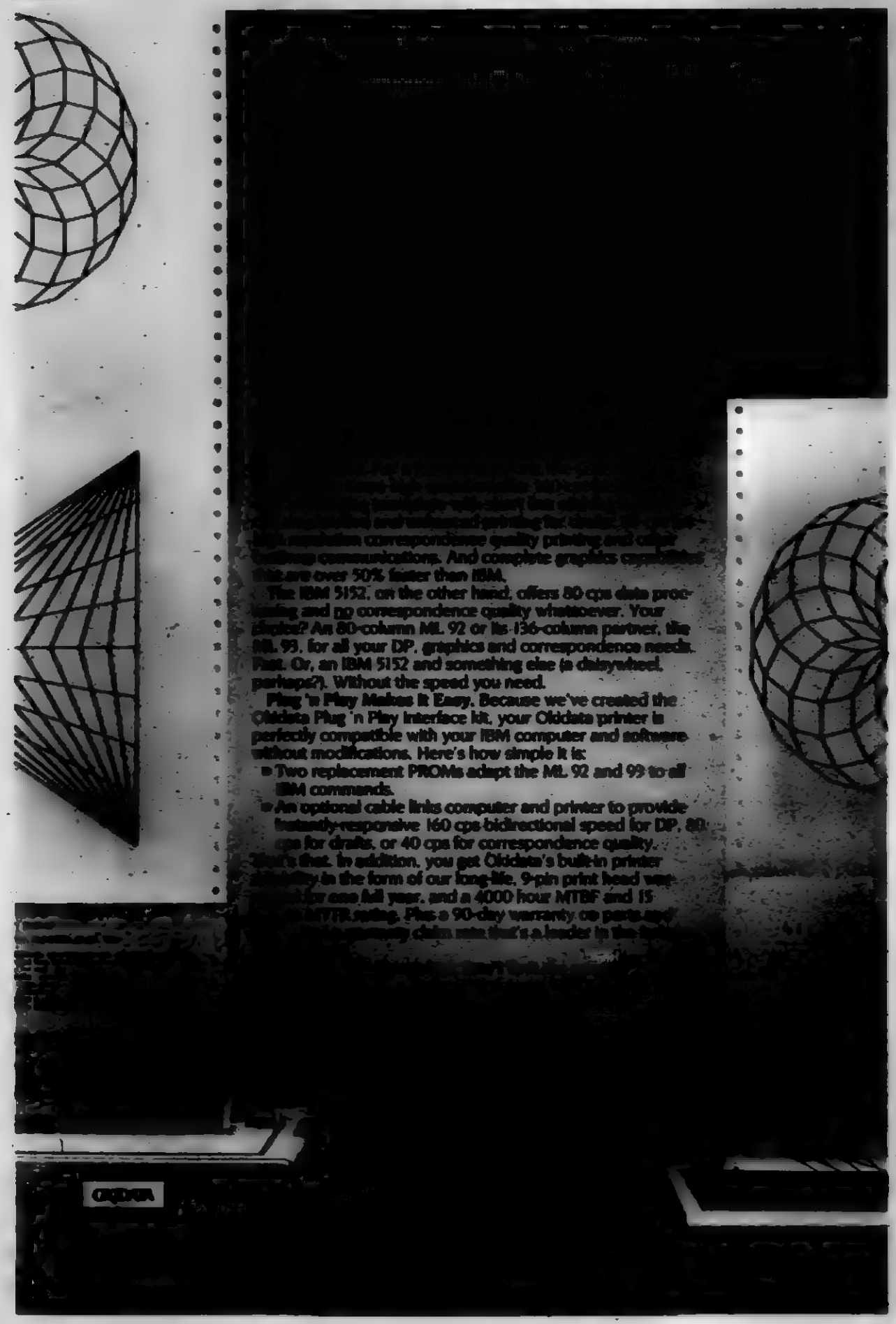
Performance: By far the greatest performance killer is the high number of I/O requests demanded by transactions. An offshoot of this is the record contention, where several users attempt to obtain a bottleneck record, which may not be technically deadlocked for the DBMS software to detect. Since the ideal data-sharing environment does not allow any data redundancy at all (other than certain primary keys), both these conditions can occur and degrade performance rapidly.

A familiar situation is that data frequently needed on-line by a new application may be buried several layers down a chain or may be scattered all over the existing production data base structure. Both contribute to excessive I/Os. Further, with widely scattered data, there is a good probability of running into record contention.

Effective data sharing

There is little doubt that the future direction of the data base is relational. However, today we do not seem to have truly performance- and integrity-oriented relational DBMS capable of handling unlimited numbers of relations in third normal form.

The majority of data base professionals believe that advanced hardware such as associative memory and parallel processors will be needed to implement efficiently fully relational systems for large concurrent transaction and query processing environments (W.H. Inmon, CW, Nov. 28, 1983). On the other hand, some experts contend that there is no reason why relational DBMS, at least in theory, cannot perform as well as any nonrelational DBMS using perfectly



WHEN IT COMES TO SOLVING BUSINESS PROBLEMS, ONE COMPANY IS A MILLENNIUM AHEAD.

Although we'd all like our business problems to fit into neat little compartments, they never seem to want to go there. Take a simple general ledger variance in your New York office. For some strange reason, it connects to a large office supplies transaction in London, which really turns out to be an erroneous distribution of a capital equipment expenditure to Peoria through your accounts payable system.

A business person can only unravel such mysteries by opening his or her mind and following the trail wherever it leads. Using business software to help.

But is your software giving you the help you really need?

Several years ago, a team of McCormack & Dodge researchers uncovered a remarkable paradox:

Business problems don't fit into compartments. Yet even the most sophisticated software packages operate on the principle of compartmentalization. In the very same vendor product line, you find general ledger packages designed one way, accounts payable another, fixed assets yet another. In actual use, these separate designs become separate walls. Barriers to problem-solving.

Even though your mind wants to move freely from one system to another, roadblocks hold you back.

Because McCormack & Dodge researchers identified this paradox first, we are years ahead of the industry in overcoming it. Our Millennium series is designed and built, from the ground up, as a genuinely borderless product line. A true family of systems in which the whole works as smoothly as any part, making the most efficient use of all your data processing resources.

With Millennium, and only with Millennium, a business person asking a question in one system can instantly enter a correction in another, seek an answer in a third, update a fourth—and move with total freedom through the entire vast information universe.

When it comes to solving business problems, McCormack & Dodge is a Millennium ahead. Shouldn't you be too?

WHEN YOU THINK ABOUT TOMORROW, MILLENNIUM MAKES SENSE TODAY.

McCormack & Dodge

a company of The Dun & Bradstreet Corporation

McCormack and Dodge Corporation, 1225 Worcester Road, Natick, MA 01760.
Sales and support offices throughout North and South America, Europe, Asia, Australia and Africa. 800-343-0325. Telex: 710-325-0329

traditional 370-type hardware (C.J. Date, CW, Feb. 13).

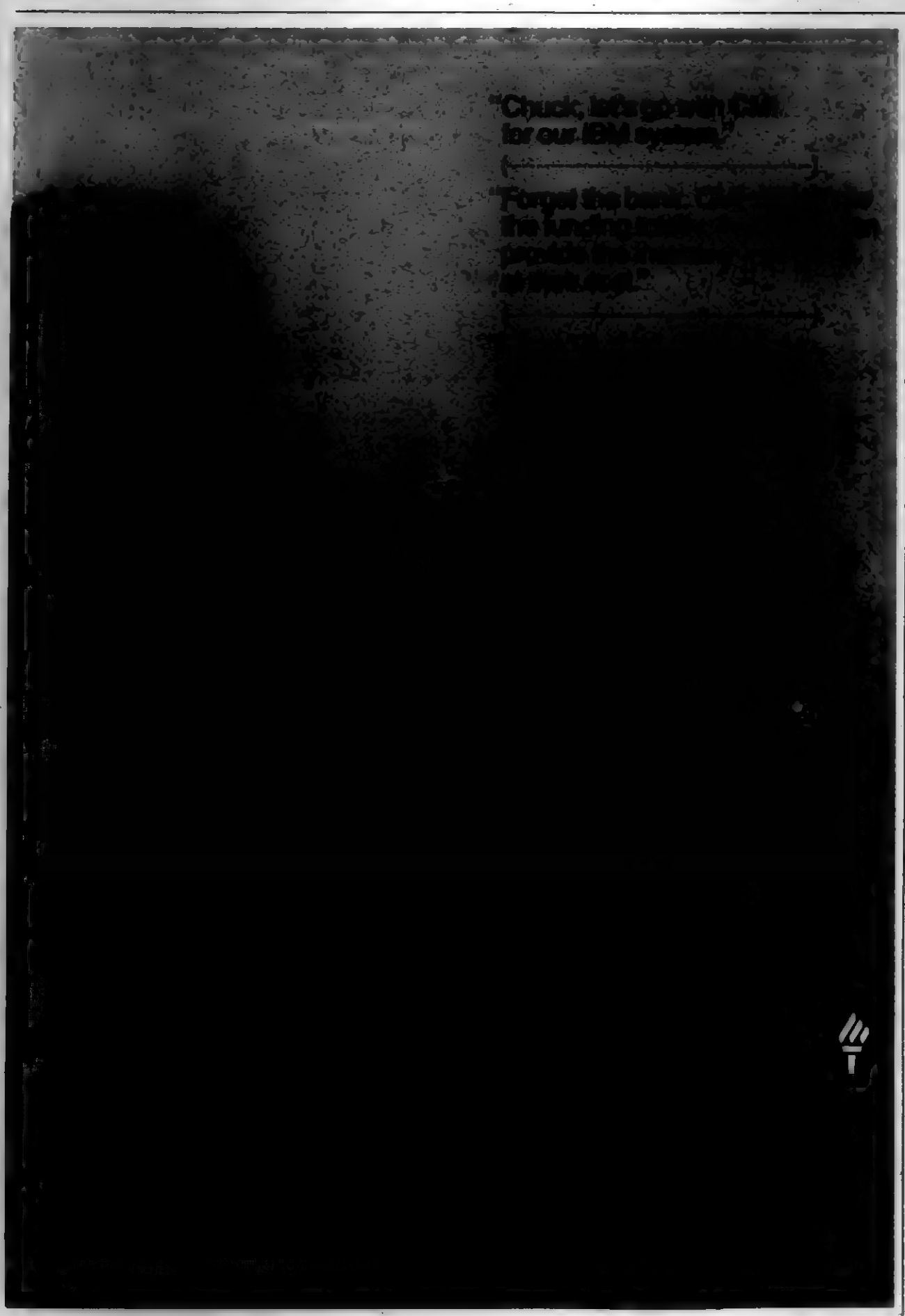
The experience of large MVS users with IBM's DB2 will settle this argument over the next five years or so, for it will take at least that amount of time for a major product to mature and win widespread acceptance. Even if DB2 proves to be as efficient as, say, IBM's IMS or Cullinet Software, Inc.'s IDMS, a number of users must continue to operate in a nonrelational environment for quite a while, since switching DBMS strategy is a monumental task, extract facilities and interfaces notwithstanding. Effective data sharing will help users reap the rewards of proven information resource management (IRM) methodologies in both relational and nonrelational environments.

Effective data sharing specifically addresses the following aspects of data sharing:

1. Sharing data definitions.
2. Criteria for sharing data.
3. Implementation.

The data definition (sometimes called "meta data") consists of the data name, a standard abbreviated name, length, storage characteristic (numeric, alpha), clear business description and special classification and notes, if any. Data definitions are centrally stored in the data dictionary managed by data administration. These definitions constitute the first step in subject data modeling and should be shared across all application systems of the company. However, because of existing systems, it is likely that there will be several versions of definition for the same data element. The number of such versions decreases as more and more functions are taken through data modeling and implementation.

The strategy of the information cycle (Figure 1) linking the end user, data definitions, data dictionary, data model, data base and applications is the key to successful data sharing. For, we cannot share something about which we know nothing, and all attempts to share data without a formal subject data model are bound to fail.



Effective data sharing will help users reap the rewards of proven information resource management (IRM) methodologies in both relational and nonrelational environments.

Business criteria

The subject data model must be studied in conjunction with business processes and functions to determine the following factors:

1. Is the business type of the new application substantially the same as the existing application(s)?
2. Are the hardware and software environments of the new application the same as those of the applications it may share data with?
3. Are security requirements of the new application parallel to those of its shareable counterpart?
4. Does the subject data model reveal any tight associations between the entities of the sharing applications?
5. Does the model indicate associations between record types of potentially large volumes?

We distinguish between two types of data sharing — passive and active. Passively shared data is updated by only one application (Figure 2). Other applications that share this data only access it. Common examples of passively shared data are pseudo entities (tables) and certain globally used data elements (name and address of employee, for example).

For instance, in Figure 2, business type 1 may represent the principal accounting functions responsible for controlling the definitions of company, department, cost center and so on, while business type 2 may represent a set of investment functions that must use the definitions.

Passive sharing is to be encouraged, because the productivity gains resulting from reduced maintenance usually outweigh the cost of its implementation. Actively shared data, on the other hand, is closely bound to two

Record volumes have a direct impact on performance and reorganization requirements. If the associated entities in the actively sharing applications have high record counts (on the order of a few hundred thousand), then logical sharing should be considered.

or more applications through DBMS pointers or program logic and usually are updated by these applications.

Active sharing involves more work for the DBA and application developers and deserves close scrutiny. The presence of active sharing indicates that the corresponding business functions are interdependent. If the business types serviced by two applications are quite different, then data sharing, if it occurs, will be passive.

The second question addresses an issue that is becoming increasingly important with the advent of microcomputers. In the simplest case, all applications that potentially share data operate in the same hardware/software environment (for example, using an IBM 308X running MVS and with 3270-type terminals). However, it may be necessary to implement part of a subject data model in another environment such as VM, mini or microcomputer because of the intended use of the data. For example, data entry and accounting functions may reside in the tighter MVS environment, while financial modeling, projection and external data may reside in the VM or micro environment. In this case, proper bridges between these environments must be built to enable transmission of necessary live data.

As a rule, all operational data should reside in the same environment. Even in this case, data may have to be distributed because of volume or processing considerations. The two known ways of distributing data are partitioning and replicating. Strictly partitioned data can be physically shared, while replicated data is only logically shared and involves interfacing procedures to maintain synchronization. A combination of the two types is typical, with predominance of one or the other. Today's large-scale distributed data strategies rarely involve concurrent updates, but use store and forward instead. Whether data is partitioned or replicated, it introduces additional considerations in data sharing. For instance, if applications in widely scattered geographical locations want to share data, it may have to be replicated because of communications costs.

Security requirements of applications with potential for data sharing must be carefully analyzed. It is possible for the sharing applications to have opposing security requirements. In this case, the more stringent requirements should be applied to shared data. The DBMS or other software must be capable of providing the desired degree of security at a record or even data item level.

The degree of sharing between two applications is indicated by the association between their entities in the subject data model. The more such associations, the higher the degree of sharing. Currency requirements of the sharing entities are important. If entity B of application 1 is associated with entity C of application 2, then we should determine how current C expects B to be and vice versa. If the currency required is instantaneous, both applications must actively share data. If one entity can lag behind the other by a day or so, then data may or may not be actively shared, depending on other constraints.

The last but extremely important consideration is the record volumes, because they have a direct impact on performance and reorganization requirements. If associated entities in the actively sharing applications have high record counts (on the order of a few hundred thousand), logical sharing should be considered.

Implementing effective sharing

The key to effective data sharing is planned and controlled data

Figure 1

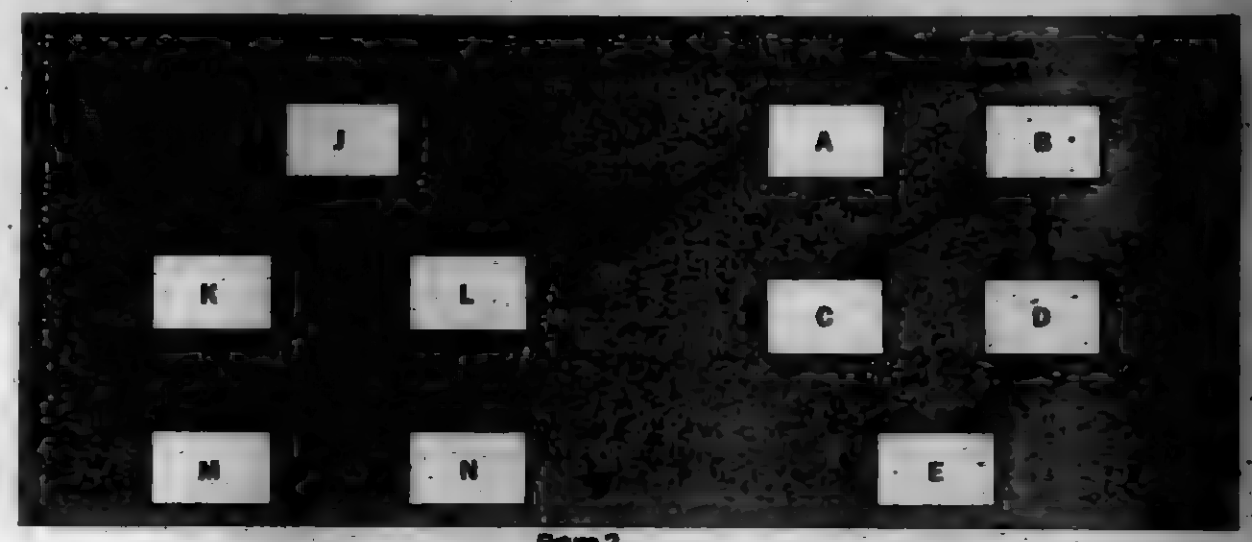


Figure 2

David

Recommends The Diablo 630 Series

David Jamison Carlyle recommends the Diablo 630 Series.

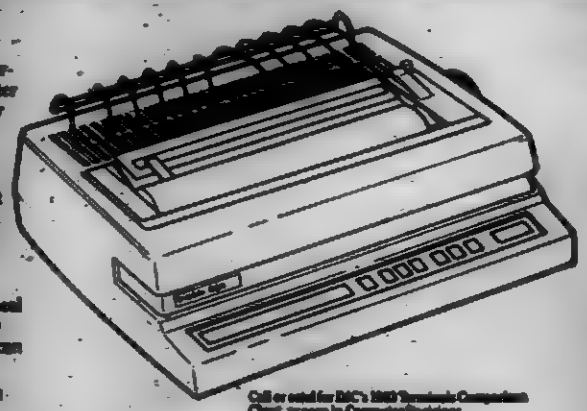
The most versatile line of daisy wheel printers for serious business applications.

630 API—The API's unique all purpose interface makes this 40 cps printer compatible with almost any computer you can name.

630 ECS—All the features of the 630 API plus the ability to print 192 fully formed characters and construct hundreds more. Perfect for scientific, financial, legal and other applications where special symbols and text are needed.

630 ECS/IBM—The only daisy wheel on the market that can truly print any character or symbol that the IBM PC can display.

Diablo from DJC, the first name in peripheral distribution.



Call or send for DJC's 1983 Terminals Comparison Chart, in use in Computer Decisions.

THE DAVID JAMISON CARLYLE CORPORATION
5700 Buckingham Parkway
Culver City, CA 90230

New Jersey (201) 785-0882
(800) 526-2853
Illinois (312) 705-4455
Texas (713) 721-4357
Colorado (303) 430-8000
Hawaii (808) 531-5205
California:
San Francisco (415) 364-4050
(800) 227-2530
Los Angeles (213) 410-8000
(800) 421-3000
Boston (714) 851-0821
Florida:
Colorado (800) 525-1255
(800) 251-4000

DJC
THE DAVID JAMISON CARLYLE CORPORATION

If data is shared between two or more applications, end users from different departments may have to participate in extensive system testing. Management commitment and a relatively high level for the data base administrator in the organizational hierarchy are necessary to bring about this cooperation between user departments.

redundancy. The first step is to construct the subject data model, which reveals the associations between the entities. This model may already exist, since by definition it encompasses more than one application. Data administration and the data base administrator carefully evaluate this model for potential sharing. The ideal answers for effective data sharing are "yes" to the first four questions and "no" to the last question.

Real-life applications, however, rarely lend themselves to such clear-cut answers. Each criterion must instead be treated as a topic for analysis, and a weighted answer must be arrived at. For example, the term "high volume" may have different connotations for different applications, depending upon their operating environments and expectations. Data sharing is decided upon when data administration and the data base administrator are reasonably sure that the issues raised can be effectively managed. In other words, data sharing is a deliberate and planned process and does not happen by default.

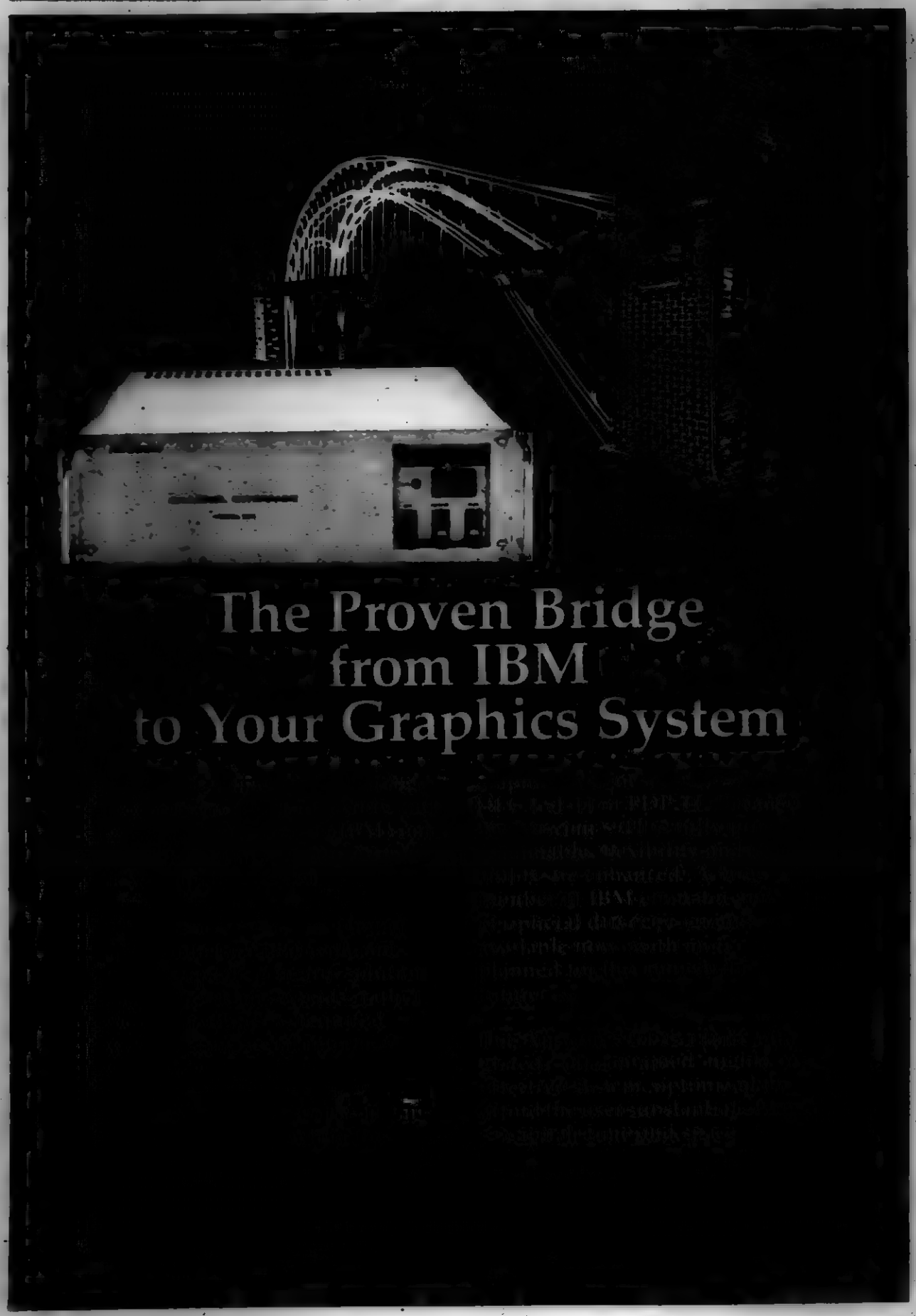
The type of sharing to be implemented, passive or active, is to be determined now. The simplest kind of passive sharing is "look-up processing," which involves periodically accessing data from another application. Essentially, these are table searches, and the applications can be truly integrated with a minimum of effort.

To implement active sharing, there are two techniques. If the volumes of the participating records are not excessive, a direct pointer relationship can be established. Otherwise, the key of the higher level record can be made into a secondary access path to the lower level record. This indeed makes the sharing logical rather than physical. Logical sharing involves program logic to keep data in synchronization. In either case, choice of physical areas, data set groups and the like must be reevaluated for ease of reorganization.

In a shared environment, the test data must be maintained centrally for those applications that follow the information cycle. While the data base administrator cannot be expected to do data entry, he may use utilities to generate adequate test data. Another data-sharing-related issue is the final system testing.

If data is shared between two or more applications, end users from different departments may have to participate in extensive system testing. Management commitment and a relatively high level for the data base administrator in the organizational hierarchy are necessary to bring about this cooperation between user departments. The price for not implementing such joint testing can be high.

Once data sharing is implemented, it is important to follow the direction of the arrow in the information cycle (Figure 1) to carry out any change control procedures. This will ensure that the original plan for the shared data continues to be effective.



About the author

V. Venkatakrishnan is data administrator in the Financial Division of Aetna Life & Casualty in Hartford, Conn. His responsibilities include building logical data models to satisfy a variety of business needs, integrating logical and physical design in a multiple DBMS environment and providing data dictionary and application development support.

SPECIAL REPORT

The next step

Manufacturing systems

March 26, 1984

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Economic forces rock industry's foundation

Management must master technology-driven production systems

By A. J. Priscia
Special to CW

It is called everything from the "New Industrial Revolution" to the "Next American Frontier." Whatever the label, the fact is that the economic forces of global competition and dwindling productivity are driving industry to alter its basic structural foundation.

In basic as well as high-technology industries, management is being pressured to breathe new life into the corporation by developing manufacturing expertise. The result, for well-run companies, will be a completely new business orientation. Growth will stem from mastering the management of technology-driven production systems, which include information processing systems, factory floor hardware and software and labor.

Several developments will result as these systems evolve:

■ Manufacturing automation markets will grow significantly as industries invest heavily through the remainder of this decade.

■ Effective information management will become the most critical concern of the evolving corporation.

■ To meet this information management requirement, all automation activity will be coordinated and, ultimately, integrated. There will also be a merging of traditional DP, engineering and manufacturing functions.

Before discussing the factory automation marketplace, it is important to discuss the management foundation required for effective implementation.

A new breed of management is evolving, and the use of automation is playing a key role in this transition. Automation itself, however, has little to do with the problem that industry is addressing. In discussions of factory automation, lack of technology is commonly and incorrectly referred to as the preeminent problem.

The real problem is a loss of competitive advantage in the marketplace, which is caused by management's inadequate response to the changing environment, not by a lack of automation.

In the automobile industry, for example, Japan did not gain its advantage through the use of automation. The fact is that Japanese automobile factories do not have more automation in place than competing American facilities, yet they have outperformed American manufacturers in virtually every productivity- and quality-related category. These gains are attributable to superior management techniques, not automation.

Automation is a tool, nothing more, and, as with all tools, will perform only as adeptly as the craftsman using it. For well-run companies, automation represents an opportunity. If used effectively, it will lead to improvements in productivity, efficiency and quality. If it is seen as a substitute for good management, however, then its use will actually prove to be more harmful than worthwhile. If a poorly managed firm does not deal with its basic management problems before bringing in advanced technology, it will only intensify its woes.

International Data Corp. has estimated 23% to 25% compound annual growth for the overall manufacturing automation market during this decade (see chart above). These technologies are segmented into four major market areas:

■ Computer-aided design and manufacturing (CAD/CAM) systems: product design and engineering applications.

■ Manufacturing information systems: applications related to the planning, control and overall coordination of the manufacturing process (MRP II, data base management systems, decision support systems).

■ Industrial control systems: hardware and software dedicated to the control and monitoring of factory floor activity (programmable controllers, numeric control, process control).

■ Flexible production systems: programmable automation dedicated to the actual production process (robots, automated handling and inspection).

The market-segment growth shown in the above chart, beyond revealing the automation vendor's opportunity, accentuates the needs of the user community. The lion's share of each pie chart is represented by products within the CAD/CAM and manufacturing information systems segments — essentially the engineering, planning and control components of the manufacturing environment (from 59% of the total market in 1983 to 80% in 1990).

This is not to say that the markets for factory floor flexible production systems do not represent areas of opportunity, but rather that the focus of management restructuring and reorganization will have to take place at the top end of manufacturing. In other words, the bulk of manufacturing automation is and will continue to be software that is employed by the management and professional sector.

Installation is easy part

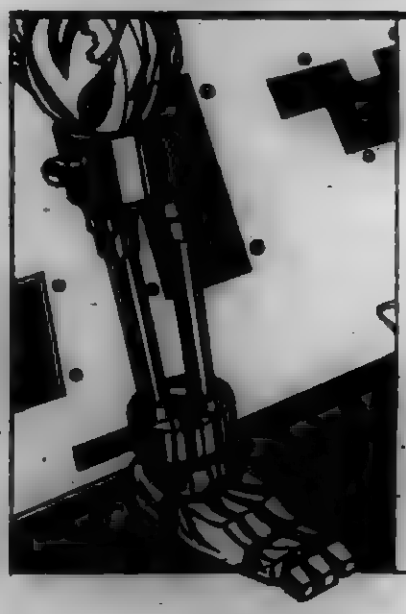
Tackling the technology implementation problem will not center on the implementation of hard automation on the shop floor. In fact, once needs have been determined and the proper management control functions have been set in place, installing the hardware is the easy part.

The question for firms considering automation should not be, "How many robots should I buy?" or "How do I implement a local-area network in a heavy industrial environment?" These questions will ultimately require an answer, but if a company has not first addressed the No. 1 question, "How will I address the information management problems inherent in using automation?" then it is not thinking in the right direction.

Building information-based manufacturing systems should be similar to building MIS organizations. For this reason, DP's involvement may prove critical to the ultimate success of this effort (building data base management systems, planning for software integration).

Product design engineering and manufacturing engineering groups, often isolated from one another, must begin to coordinate their activities. Essentially, before an integrated corporate system can work, all automation groups must be tied together, physically as well as conceptually. And as difficult as these tasks may seem, meeting the challenge is critical to success in an increasingly competitive global marketplace.

Priscia is program manager of the Computer Integrated Manufacturing Service for International Data, a market research firm based in Framingham, Mass.



INSIDE

Automation turns gears of turbine assembly/SR5

Computers link robot teams/SR5

Churning market moves daisy to first Stratus system/SR6

Materials tracking speeds Apple's production/SR7

Esprit: strategy for Europe's information age/SR9

Vision gives new perspective on automation/SR11

Test robot work cells with graphics systems/SR12

Bar code tech monitors Honeywell shop floor/SR14

Factories adopting distributed intelligence/SR15

Middle managers feeling automation ax/SR19

Criteria for pushing automation to its fullest/SR24

GM controllers solve materials handling/SR26

Programmable controllers altering shop floor/SR27

Successful MRP needs full-time project leader/SR30

Integration coming to shop floor automation/SR32

SPECIAL REPORT

Automation turns gears of turbine assembly

By Mark Anderson
Special to CW

WINSTON-SALEM, N.C. — From the management information systems used to track parts, tools and raw materials, to computer-controlled machine tools and robots, a plantwide system of computers assists in the everyday operation of Westinghouse Electric Corp.'s plant here.

The Winston-Salem plant is responsible for the manufacture of turbine components used in large steam turbines for power generation. These turbines range in capacity from 100 megawatts to over 1,200 megawatts. After the individual components are made at this plant, they are sent to other Westinghouse plants for assembly.

Among the turbine components made in North Carolina are fixed vanes, rotating blades, nuts, studs and other assorted bolting products, gear components and subassemblies and valving products, among others. Parts for new power plant sites as well as for service work at existing generating stations are made here. In addition to these traditional steam turbine components, the Winston-Salem plant has been involved in several other areas, such as general machining on a job shop basis, utilizing some of the special machine tools already in existence at Westinghouse. This plant is also involved in the manufacture of subassemblies for robots marketed by Westinghouse Unimation, a manufacturer of robotic systems.

The coordination of all of these manufacturing and assembly efforts would not be possible without computer assistance in several areas.

To understand the computer operations of the Winston-Salem plant, one must begin with the computer terminals used. Westinghouse has standardized one generic terminal style, utilizing the Ansi 3.64 protocol for all applications. This is a key concept.

When combined with a centralized integrated voice/data phone system from Rolm Corp., a user at any of these terminals is able to establish a connection with over 50 different computer systems located both in the plant and at other sites. These systems include an IBM 4341 Model Group II and a Sperry Corp. 1100/808 located inside the plant, and IBM 3031, 3032 and 3084 mainframes located at the Energy Systems Computing Center in Pittsburgh, Pa.

A Control Data Corp. 7600 and a Cray Research, Inc. Cray 1 in the Pittsburgh computing center are available for engineering use by the Winston-Salem plant. Additionally, Digital Equipment Corp. VAX systems are located at Carnegie-Mellon University in Pittsburgh, with which the plant is conducting several research activities.

The IBM 4341 Model Group II performs all of the traditional data processing applications at the Winston-Salem plant. A full inventory system, a purchasing system, accounting functions and a homegrown material requirements planning (MRP) system are all operated on this machine.

Acting as a peripheral to the IBM 4341 is a Data Pathing, Inc. Model 4122 system for factory data collection. Employees use time and attendance stations located throughout the factory to gather information on every operation in the plant. These time statistics are recorded and fed back to the 4341, where they are data-reduced and stored in a data base. This data can then be used in the calculation of costing rates, inventory tracking and work-in-process monitoring.

Additional CRT terminals located in the on-floor supervisors' offices are used by hourly workers and supervisors to monitor job progress. Using the various programs that access the data bases, the supervisors can determine the work load on each of the machine tools in their areas and then determine the next task to be performed. In addition, supervisors are able to monitor their groups' productivity and approve time-clock figures for their employees.

The second mainframe located at the Winston-Salem site is a Sperry Corp. 1100/808 system. The same generic terminals used to access the IBM are capable of accessing the Sperry computer. This system is dedicated to the support of manufacturing operations.

Using Mapper software from Sperry, Westinghouse employees are able to access several data bases containing information on machine tools, operation times, production schedules, cutting-tool designs and parts geometry.

The numerical control programming department remains the major user of the Sperry 1100. The Winston-Salem manufacturing plant contains 60 numerically controlled machine tools. Each of these machines requires a numerical control program to guide the cutting tool through the complex motions needed to manufacture a turbine blade.

Error-free programs

Parts design data bases, exchanged between the manufacturing plant's Sperry 1100 and the engineering department's CDC Cyber 845 computer, enable the parts programmers to complete large numbers of error-free numerical control programs. Further assistance to these programmers is available on the plant's Computervision Corp. Cadds 4 computer-aided drafting system.

Parts design data can be communicated from the Sperry mainframe to the Computervision system to allow automated program generation for several different types of gauges used for quality control. Here, the parts dimensions are used to create a tool-design drawing automatically. The tool designer then adds the required manufacturing detail information and tool room instructions to create a final drawing and a numerical control parts program. Other designers use the system to provide drawings, machine setup information and geometry verification data for the numerical control programmers.

Direct numerical control is made possible with a Westinghouse-designed computer system called a machine interface unit. The units provide the required interface functions to link either the Sperry or the IBM mainframe with the numerically controlled machine tools. Each of the 60 numerically controlled machine tools located at the Winston-Salem plant is equipped with a machine interface unit to eliminate the need for the more traditional paper tape.

To guarantee that parts will meet all of the customer's requirements, a number of quality control devices are employed, including two DEC PDP-11-controlled coordinate measuring machines. The Pantoscribe system feeds its data points through a PDP-11/23 to a VAX-11/750 for further analysis and reporting. A DEA system uses a PDP-11/34 for measurement verification and communicates directly with the Sperry 1100 for coordinate data transfer.

The systems at Westinghouse are used for everything from typical data processing to CAD/CAM applications. Computers have been integrated into an ever-increasing number of machine tools in the form of numerical controls and programmable controllers. The increase in productivity gained from using these computers enables manufacturing plants such as Westinghouse to make the highest quality products at the lowest possible cost.

Anderson is a data processing electronics specialist at Westinghouse in Winston-Salem, N.C.

Westinghouse steam turbine generator blades

Three I's of turbine CAD/CAM

ORLANDO, Fla. — The engineering computer services department for the Steam Turbine-Generator Division of Westinghouse Electric Corp. has adopted "three I's" as guidelines to computer-aided design and manufacturing (CAD/CAM):

- Interactive computing and graphics.
- Interfaced software and data bases.
- Integrated design-manufacturing functions.

"These are the three disciplines we concentrate on in building CAD/CAM techniques for production of the blades used in our steam turbine generator units," explained John Petras, manager of the division's engineering computer services located here.

Turbine blade design is extremely complex and requires great precision from the earliest stages to ensure efficient manufacturing and on-site operation. A single turbine generator unit has thousands of blades ranging in size from one in. to 44 in. Each row of blades varies in design to produce the required response to the incoming steam.

See BLADE 20/4

BLADE from SR/3

Other than blade geometry design, engineers must analyze steam conditions, vibration phenomena, the relationship between many different blades and the balance factor when blades are inserted on the rotating disk. Contending with all these variables makes simulations an important part of the design task, Petras noted. A broad range of simulation programs was needed to ensure that the designs will result in parts and assemblies that will perform safely and efficiently, he said.

The Steam Turbine-Generator Division initiated its CAD/CAM activities about four years ago. Since then, it has installed Control Data Corp.'s Integrated Computer-Aided Engineering and Manufacturing (Icem) system as the cornerstone for its CAD/CAM activities. The application program operates on a Control Data Corp. Cyber 845 mainframe in Monroeville, Pa.

By using a shared data base, Westinghouse facilities in East Pittsburgh and Lester, Pa., Orlando, Fla., and Winston-Salem, N.C., can access and work on the same up-to-the-minute engineering drawings. Data base development is a primary concern as the Turbine-Generator Division moves into integrated design and manufacturing.

Volumes of data

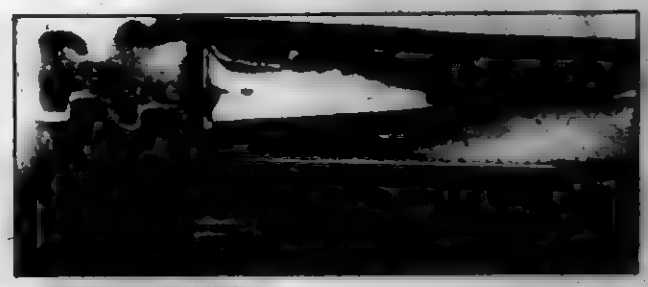
"Over the years, we accumulated volumes of engineering data that were scattered throughout the engineering department. It is important to have one central data base and to eliminate redundant data, which is expensive to store, and to make sure that design engineers have access to the best possible information," Petras said.

To achieve data base quality, Westinghouse applied CDC's information analysis methodology to formulate the data base approach. This procedure involved precise input from all users concerning the meaning of the information in the data base. A model of the proposed data base was run on the computer to determine if all user needs would be met with the proposed structure and content.

As a result, the engineering computer services department was able to demonstrate to potential users exactly what the data base would provide before additional dollars were spent on development.

With the data base structure and content in hand, Westinghouse then used CDC's DMS-170, a data management system with a modular structure and data independence, to handle the many updates and changes that characterize an engineering design environment.

The next major project for engineering computer services was to integrate the engineering and graphics data base through another system provided by CDC — the Engineering Data Library. This program allows parts geometry and other engineering data to be stored in a single data base.



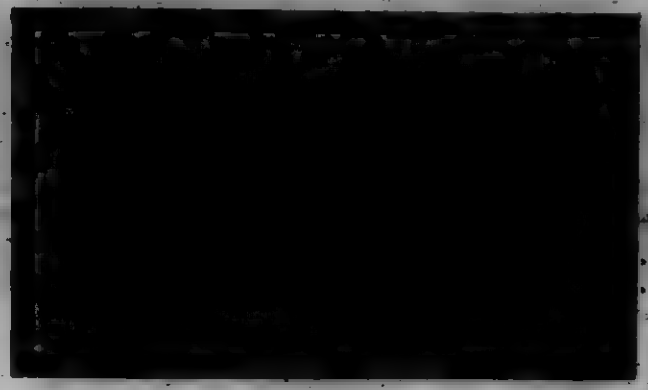
Individual turbine blades.

This capability allows engineers, manufacturing personnel, managers and administrators to access data in a common file, Petras said. "Information will be retrieved, added and deleted interactively or in batch mode," he said. "We also will get statistical and accounting data."

The wide selection of engineering software developed by Westinghouse over the years for batch processing of design data continues to be used in the CAD/CAM environment. Those programs have been made compatible with Icem, thus enabling Westinghouse to protect its software investment.

SIX REASONS WHY CINCOM'S MRPS IS THE SUPERIOR SOFTWARE SOLUTION TO YOUR MANUFACTURING CONTROL PROBLEMS.

SPECIAL REPORT



Computers link robot teams

WINSTON-SALEM, N.C. — Westinghouse Electric Corp. uses computers on the shop floor of its turbine components plant here to tie together several different machine tools, creating a team of machines from the individual units.

One such manufacturing cell has been in operation for over two years. The diaphragm blade cell links two standard machine tools to a Westinghouse Unimation Model 2000 robot. The raw material used in this process is a special preshaped bar stock. The robot accepts incoming pieces from an inclined plane and passes them to the first machine tool, which removes material from the sides of the turbine blade.

From there, the robot passes the parts to a slotting machine. A groove is placed on the part's end to serve as a locating point for subsequent manufacturing operations. A grinding operation is included as necessary to remove burrs caused by the milling and slotting operations. The finished parts are removed from the slotting machine by the robot and placed on the output inclined plane.

There are two other manufacturing cells currently under development at the plant here. A forging cell integrates two robots, a cropper/stamper, a rotary hearth furnace, two Computervision Corp. systems and an open die preform swaging machine.

Cylindrical billets

Cylindrical billets are located by one of the vision systems, acquired by a robot and placed in the furnace. After the billets reach a temperature of approximately 2,100 degrees Fahrenheit, the robot passes them to the swaging machine. There they are formed into a shape more suitable for the subsequent precision forging processes. The second robot accepts the preformed parts and transfers them to the cropper/stamper.

This machine first trims off the small piece of scrap metal from the part's end and then stamps a three-character batch identification code. The robot then moves the part to the final machine in the cell, the vision-based gauge. This device reconstructs a three-dimensional image of the part under study from a series of multiple views.

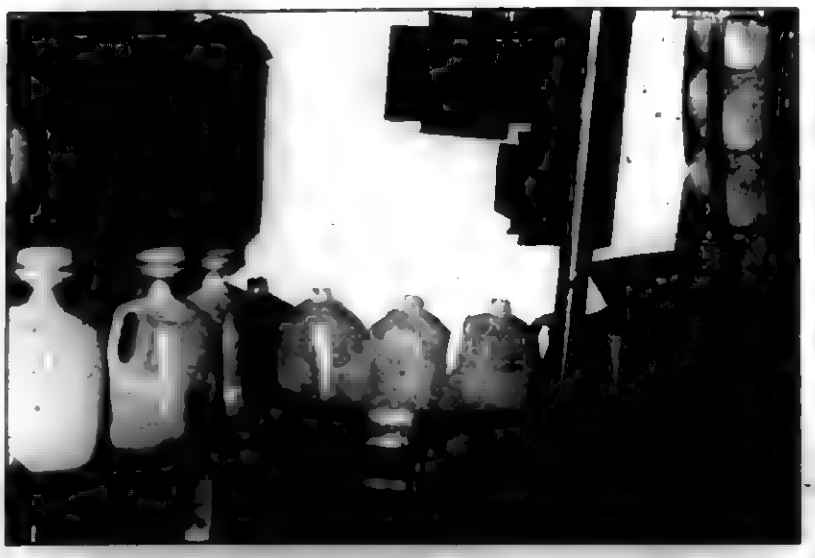
Coordinating the interactions of these computer-controlled machines requires yet another computer. In this manufacturing cell, a Digital Equipment Corp. VAX-11/750 is used as the host computer.

The second manufacturing cell being developed is a system for shotpeening turbine blades. The shotpeen operation is the last process before finished blades are shipped. The cell combines a robot, a computer-controlled shotpeen machine and a vision-based loading system.

Under guidance from the vision system, the robot is able to pick up randomly stacked blades from one of the standard materials-handling carts. The blades are then placed inside the shotpeen machine. Completed blades are then removed by the robot for packing. The host computer for this cell will be a DEC PDP-11/23.

1.
2. DBMS Integrating
5.
6.
3. Unparalleled Portability
4. Modular Growth Path
800-543-3010

SPECIAL REPORT



Churning market moves dairy to first Stratus system

LYNN, Mass. — Like any user, West Lynn Creamery wanted a computer system that it could milk for all it was worth. West Lynn was not pleased with the arrangement it had — the service bureau it used was starting to make noises about increases in its work load.

That increased work load was caused by West Lynn's growth, and Jack O'Neil, manager of information systems, saw that his company would have to make a change.

West Lynn Creamery has some 6,000 customers, about double the number it had nearly four years ago when the company bought its first computers, a pair of Nixdorf Computer Corp. Nixdorf 600s. Today, the creamery handles 120 truck routes, with about 20,000 sales transactions and 5,000 inventory transactions every working day. Losing the services of its transaction-processing computer for even 10 minutes would be "a disaster," O'Neil said.

Femcon Associates, Inc. of Westford, Mass., helped West Lynn ease its way into computerization four years ago by developing a system for the Nixdorf machines that printed load sheets for each truck route. "That was just a step to get us off writing manual load sheets; it was an interim step," O'Neil said. "Our long-range plans were to get delivery tickets printed for each individual customer and to balance out drivers as they came in off their routes. That took a year and a half."

For the better part of that year and a half, the company continued to send magnetic tape to a service bureau to create bills. Meanwhile, the company's customer base was growing at a rapid rate. "By the time we were live with this system, we had already outgrown it, so we decided to go out and see what else was available. We needed a faster, more reliable system," O'Neil said.

Work load too heavy

Around this time, the service bureau began sending signals that the company's work load was becoming more than the bureau could handle. "Our first inclination was to go for a used IBM mainframe like the one the service bureau used so there would be no conversion problem, but we were kind of taken aback by the price," O'Neil said.

Together, West Lynn and Femcon evaluated computers made by Prime Computer, Inc.; Data General Corp.; IBM; Sperry Corp.; Tandem Computers, Inc.; and Stratus Computer, Inc.

In February 1982, Stratus Computer was a start-up company just emerging from its research and development cocoon with a hardware-based approach to fault tolerance. West Lynn bought the first system that Stratus sold.

The clincher for West Lynn was the fact that Stratus offered fault tolerance and "did everything with hardware," O'Neil said.

Stratus puts two complete processor boards in a cabinet roughly 2 ft wide by 4 ft high. There are also two boards for controlling memory, two for disks and two for communications between computers. Each board includes comparative circuitry that detects errors and takes the board out of service when they occur. Operation of the system continues on the board's twin.

If a board fails, the computer automatically dials the telephone number of the Stratus Customer Assistance Center in Natick, Mass. There, another Stratus computer takes the call and displays on a terminal screen the serial number and location of the failed board and a diagnosis of the problem. Stratus then ships out a new board via overnight courier.

See BOARD SR/8

IBM PC SPOKEN HERE

SE HABLA APPLE

ON PARLE RADIO SHACK

WIR SPRECHEN KAYPRO

. . . and any other microcomputer language. The HyDra II Protocol Converter attaches directly to your mainframe *channel* and lets *any* microcomputer transfer files or talk to a host as a 3270. It also drives associated printers—*regardless of distance.*

Now your field salespeople, remote facilities, and in-house personnel can communicate with your IBM 360, 370, 43XX, 303X and 308X mainframes with their own PCs—*without* requiring retrofit, standardization, adaptive software, or any other controllers.

All they need is a modem.

All *you* need is the HyDra II . . . and a screwdriver.

For further information, call collect: (415) 499-8870, or write:

ddri

diversified data resources, inc.
25 mitchell blvd. suite 7, san rafael, ca. 94903
(415) 499-8870

SPECIAL REPORT

Materials tracking speeds Apple's production

Repetitive process manufacturing facility dedicated to Macintosh

FREMONT, Calif. — To meet the anticipated demand for its new Macintosh computer, Apple Computer, Inc. is producing the microcomputer here in a repetitive process manufacturing (RPM) facility.

The facility is dedicated exclusively to Macintosh production. It was designed around the concepts of zero inventory and just-in-time materials management, in which Sunnyvale, Calif.-based NCA Corp's. Maxcim manufacturing and financial software system plays a pivotal role.

In February 1983, Apple — a longtime Maxcim user — asked The Systems Practice, a Campbell, Calif.-based consulting firm specializing in Maxcim applications, to develop the materials tracking system that Apple would use in the new Macintosh production facility.

The system would be able to calculate materials usage and replenishment requirements by workstation and shift; to identify potential materials shortage by comparing the calculated requirements against stock balances; and to monitor overall production by workstation and line, measuring actual production against plan by shift.

The materials management system would interface, through a transaction file, with Litton Industries, Inc.'s Unit Handling System. The Litton system would provide the plant's automated materials-handling capability. Additionally, for other Apple plants not using the Litton system, facilities would be provided for entering transaction data manually.

Inspection of material

The Macintosh manufacturing process starts with the inspection of incoming material. The material is detrashed (all packing material is removed), then allocated to one of several storage media for subsequent delivery to work centers on the production floor.

Overhead hangers on moving tracks carry the larger components to the operations center where they are used. Smaller components are stored in totes; these, in turn, are stored in a multistory tote stacker. As material is required on the floor, cranes retrieve it, placing the appropriate totes on automated guided vehicles. The vehicles deliver each tote to its proper operations center.

Other material is delivered directly from incoming inspection to its appropriate consuming work centers, via automated guide vehicles, while still on the original pallet delivered by the vendor.

Apple has automated the burn-in operation for the Macintosh. Burn-in racks move along conveyers capable of handling 85 units at a time. There are seven levels of conveyers in each of the four burn-in lines, which give the plant a capacity of more than 2,000 computers per day.

Each Macintosh runs its own diagnostics during the 24-hour burn-in period and stores the test results on the micro-floppy disk used by the machine. Post-burn-in inspection is then simply a matter of evaluating the results displayed on each unit's video screen, checking the brightness of the screen display and examining the unit for physical defects. The total inspection time is 23 seconds.

Computers passing inspection are scanned — serialization tracking begins when a unit's covers go on — and two bar-coded labels are printed. These carry the unit's encoded serial number. One label is applied to the shipping container, which is palletized and shrink-wrapped. The other label is applied to the pallet's shipping manifest, which is taped to the finished pallet. The pallets are then delivered — again, via automated guide vehicles — to the shipping area for delivery to Apple's distribution centers.

One of Apple's stated design goals for the materials management system was that it integrate with the company's existing standard Maxcim functionality.

Thus, the system, as developed, uses file elements from Maxcim's bills of material, general ledger, inventory, shop routing, work order status, manufacturing cost, requirements planning and data base management system modules. The Systems Practice also created 16 new files, 16 new programs and other report programs specifically for the RPM environment.

The RPM materials tracking system requires that the user, by means of Maxcim's shop routing module, define each line on which repetitive operations are to be performed. Likewise, each component on the bill of material for the item being produced must be identified with the deliver-to-operation sequence number in which it will be used.

Using this data together with pe-

See RPM SR/10

How to load your 38 for maximum MRP performance

Not many System/38 users know how. Perhaps you already found that out by using another system. If this is your first time, check out the features that are important to you. Our users enjoy the benefits of a closed-loop MRP II system that allows direct access for anyone to all the information stored. We have a query facility that lets you generate user reports. And we utilize an advanced data base architecture which increases programmer productivity, making changes needed for expansion simple and economical. We even have a PC link which lets you transfer information to your IBM Personal Computer for interaction with popular planning micro products such as 1-2-3® from Lotus.®

Loaded with RMS/38 the potent IBM System/38 can make your business hum with the precision these economic times demand. Loaded with anything else you may have to settle for second best. In the fiercely competitive arena for manufacturing management efficiency, where survival depends on increased productivity — and profits — the software system you use can spell the difference between satisfaction or frustration, maybe even success or failure.

Only RMS/38 has 15 powerful applications to provide you with all the ammunition you'll ever need for total control. Control not only of manufacturing but all those vital support functions as well, including distribution and finance. Total software . . . RMS/38!

Reduce inventory; eliminate parts shortages; acquire time for skillful buying; schedule production based on demand, not parts availability; determine whether to buy or build needed components; improve part number, inventory and routing accuracy; and order in time for delivery on time. You can with RMS/38.

If your present MRP system, whether manual or automated, represents something less than a total integration of business and manufacturing systems; if it doesn't offer the distribution and financial support of closed-loop MRP II; if it doesn't offer you control in an unpredictable environment; then maybe it's time you investigated the building block software of RMS/38.

For a free demonstration or more information, contact PCR, Professional Computer Resources, 2021 Midwest Road, Oak Brook, IL 60521 (near Chicago). Also in New York, San Francisco and Los Angeles.

1-2-3® is a trademark of Lotus Development Corporation

pcr
ALL THE SOFTWARE YOU'LL EVER NEED.
312/932-2200

SPECIAL **REPORT**

BOARD from SR/6

When it arrives, the customer installs the board and returns the defective one to Stratus.

At the time of the purchase, Stratus was new and unproven, so West Lynn management interviewed the company's management team and reviewed their business plan to assure themselves that Stratus would be able to stay in business and provide replacement parts and service. West Lynn then bought the Stratus/32 system, which now supports 39 terminals located throughout the company. Before Stratus, O'Neil said, the company was "teetering on the edge of not having enough capacity."

"We don't see a ceiling now," Paul McWhinnie, vice-president of Pemcon, claimed.

Making the transition from one computer system to another is usually a rocky road, but, McWhinnie said, "West Lynn doesn't have any horror stories to tell."

Fault tolerance

Since fault tolerance is handled by hardware, the programmer does not have to learn any special techniques to assure fail-safe operation. The Stratus computer supports industry-standard Cobol, McWhinnie said.

Pemcon will soon be marketing the software package it developed for West Lynn, with some modifications, under the name DIS+.

The system designers faced one particular challenge: West Lynn wanted to be able to process all special requests for unscheduled, same-day deliveries. This service was difficult to provide when it had to be done manually. Pemcon designed DIS+ to have all of the sales and inventory transactions that were generated in the order process available for reconciliation before the driver returned at the end of the day.

O'Neil is now gearing the department toward telemarketing, not just order entry. West Lynn Creamery carries about 750 products. The department has 28 terminals for telemarketing representatives and four for supervisors. Each telemarketing representative makes between 150 and 200 calls a day.

The DIS+ system was designed for use by people who have little knowledge about computers and no programming experience, according to McWhinnie.

At the terminal, a representative creates an order by entering an account number or name. The system determines the route and delivery date automatically. A secondary menu offers the operator several options for entering the order. One method allows an average order to be created from a sales history file. For customized orders, the history file is used to display the customer's average order for that day and to identify noteworthy variations in the order.

Added to load sheet

When the order is completed, the products to be delivered are added to the appropriate truck's load sheet. Delivery tickets, which are used as invoices for cash customers, are then produced in delivery sequence. The system also offers supporting programs that allow maintenance and inquiry to the customer, product, price and route sequence files, McWhinnie said.

At any time, supervisors can check on the status of a route or of individual customer orders. Symbols appear next to each customer name showing whether the order is in.

Supervisors handle routing. Regular customers are automatically assigned to their regular routes, but sometimes orders have to be moved from one route to another.

Another goal the new system achieved is the elimination of estimated orders, O'Neil said. The aim was to increase the number of stops each truck can make by decreasing the amount of discretionary stock assigned to the truck — stock which, if unsold, is returned to the creamery.

One of the most noticeable effects of the system has been at the loading dock. Before the Stratus system went into use, preparation of load sheets created a bottleneck, forcing shippers to wait around for written orders so that they could load a truck. It took at least 15 minutes to prepare a load sheet by hand; the Stratus has cut that to less than one minute.

More people in your position choose ASK.

After all the sales hype, analyses and benchmarks, the choice of a manufacturing system often comes down to a gesture of faith.

Don't make it blindly.

First consider why ASK inspires the confidence of more MIS professionals. (And why customer referral has made us the biggest in our field.)

Then consider this. Our MANMAN® software integrates manufacturing and financial operations more completely. So you'll never find yourself at a staff meeting accounting for your lack of cost accounting. Or your choice of a system.

Then consider the best part. You can fully implement MANMAN on a VAX or HP 3000 in under a year. So the information burden shifts from your shoulders sooner. And smoother. Because with our comprehensive training and documentation, your users quickly learn to help themselves to all the information they need.

Find out firsthand why more people choose ASK. Contact Carol Singh at (415) 969-4442 or 730 Distel Drive, Los Altos, California 94022. Get a customer referral. Then call and ask someone in your position about MANMAN.

What you hear will answer your every prayer.

ASK

THE PEOPLE WHO KNOW MANUFACTURING.

VAX is a registered trademark of Digital Equipment Corporation.

© 1983 ASK Computer Systems Inc.

SPECIAL REPORT

Esprit: strategy for Europe's information age

By Chris F. Hindermann
Special to CW

In the shadow of World War II and following the founding of the European coal and steel community, the atomic energy community and the European economic community (EEC), a new form of community is being created in response to the challenges facing European society in the age of technology.

Of the new technologies, five aspects of information technology have been chosen by the EEC as of greatest importance for future European industrial competitiveness. These are computer-integrated manufacturing, microelectronics, software technology, advanced information processing and office systems. The EEC's urgent need to keep up with its competitors in these areas has persuaded governments and major information technology companies to embark on an unprecedented venture in international cooperation.

In the area of computer-integrated manufacturing, for example, the objective is to establish a technology base for the progressive introduction of information technology to all phases of the manufacturing cycle, leading ultimately to fully integrated production systems. As with all five areas of research, this will be achieved by collaborative research and development by EEC industries, software houses, research institutes and universities. This joint venture is Esprit — the European Strategic Program for Research and Development in Information Technology.

Strategic program

Esprit is a strategic program in two respects. First, it is aimed at precompetitive research. The EEC information technology industry already spends some $5 billion a year on research and development. Yet only a negligible fraction of this sum is spent on longer term, precompetitive R&D in Europe. The first five-year phase (1984-88) of the 10-year Esprit program will cost about $1.3 billion and will be financed on an equal basis by the EEC budget and by industry. The final budget was recently passed by EEC member countries. This figure will raise expenditures in precompetitive R&D to around 6% of the total EEC investment in information technology R&D, well in line with the competition.

Esprit is also strategic in that it is selective, concentrating its resources on key sectors of information technology development. The program focuses on the following five interrelated areas:

The central, enabling technologies, which are:

- Microelectronics.
- Advanced information processing.
- Software technology.

And two specific application areas:

- Office systems.
- Computer-integrated manufacturing.

The microelectronics drive of Esprit is directed strongly at the design, testing and production of very large-scale integration (VLSI) silicon chips, a crucial area of the information technology sector in which both the U.S. and Japan have established significant leads. Esprit will be concentrating on the fundamental bipolar and metal oxide semiconductor silicon technologies, as well as the computer-aided design techniques required by VLSI miniaturization.

Advanced information processing is at the forefront of Esprit's precompetitive research role, with its emphasis on the future industrial exploitation of information and knowledge engineering, storage and usage, signal processing and external interfaces. Its overall goal is to establish technological functions that will more closely resemble human thought processes, such as association and inference — artificial intelligence.

Software technology is a vital area of information technology in which Esprit can make an important contribution in both centralizing and disseminating software research results, as well as eventually overseeing a comprehensive set of engineering and formal standards and a unified framework of concepts and descriptive notations. As a first step, emphasis in the Esprit software effort is being placed on common tools, formal methods and transformations and information management.

Office information systems are expected to address the single largest market for information technology. The Esprit objectives will be to concentrate on the man-machine interface in areas such as document creation and distribution, workstations, integrated text-voice-image communications with value-added functions and knowledge storage and retrieval. EEC standardization is also likely to be an essential element in information technology applications where disparate systems are brought together.

Computer-integrated manufacturing will eventually mean the overall systematic computerization of the manufacturing process. Research will be concentrated on integrated systems architecture and general software development, machine control and the development of sensors and microelectronic subsystems.

The Esprit pilot phase has proved to be an encouraging dress rehearsal for the main program phase. Despite the relative novelty of the contract conditions and a short deadline (six weeks), the pilot phase was heavily oversubscribed. The $21 million set aside for this one-year phase (50% provided by the EEC) allowed the final selection of 38 out of 200 proposed projects. Most of these are likely to continue into the Esprit main phase after the year's end.

The pilot projects are valid in and of themselves and allow a quick start on activities in a number of key areas, such as defining standards and reviews of the state of the art. They also test the mechanisms proposed for the main program.

Partnerships embraced

Above all, the pilot projects have given encouraging evidence that partnerships among large and small companies, universities and laboratories have been willingly undertaken across national frontiers in the EEC. Esprit is not the private preserve of big business, nor is it in any way an attempt to create an information technology multinational based in Brussels.

Esprit is addressed, quite simply, to everyone in the EEC who can contribute to the program. In order to be eligible for aid, projects must be put forward by firms or research teams that are already established and are currently carrying out R&D work in EEC countries.

A primary justification of Esprit is the synergetic effect it will have. For this, adequate dissemination of information on all aspects of the research is of fundamental importance. Although Esprit is planned to run for 10 years, the information must be made available at least on an annual basis if it is to have the desired catalytic effect and if it is to shape the program for the coming year.

For the scientists directly involved, the EEC intends to organize workshops on each research topic. Meanwhile, a wider clearinghouse infrastructure is being established to collect systematically and make available appropriate information on work in progress. This will be done through annual conferences and the Information Exchange System (IES), an advanced information technology network now being set up for Esprit.

The IES initially will allow potential participants in Esprit to know what is going on under the program. Once contracts are placed, the IES will be the central network linking the various teams in the different countries. It will also be a means of disseminating the results of their work. With connections to national administrations and data banks, the IES should be an EEC-wide network that is of lasting value to the entire European research community.

The response to Esprit has been positive. Only the question mark hanging over the overall EEC budget prevented the program from being fully adopted by all the EEC governments well before the end of 1983, and calls for proposals for participa-

See page 59/10

SPECIAL REPORT

EEC from SR/9

tion in the main program are scheduled to go out as soon as possible.

Esprit is still only one strategic action in a wider context. While it is designed to encourage the necessary change of approach by the European information technology industry and to speed up the transfer of technology within the EEC, a technology push must be complemented by a greater market pull if industry is to amortize the costs of developing a new generation of information technology products.

The success of Esprit will thus be heavily dependent on EEC progress toward the adoption of European standards and the removal of national barriers to information technology trade.

New information technology will be one of the dominant sources of technological advance until the end of the century, and information technology will be one of the world's largest manufacturing sectors by 1990. The world information technology market is projected to grow at an annual rate of over 8%.

Europe has been slow to seize the industrial and market-building opportunities offered by information technology. Although the EEC represents over 30% of the world market, European industry commands scarcely 10% of that market and little more than a third of the European information technology market itself.

European information technology companies are also relatively small compared with world leaders. EEC governments have attempted to compensate for this by either protective measures or subsidization. These may have kept some companies alive, but no world competitors have emerged.

Liberalization in external trade, on the other hand, has allowed a spate of licensing agreements between European, American and Japanese firms. This may hold short-term benefits, but it cannot provide a long-term answer.

Kindermans is marketing manager for the Brussels office of Logica S.A. Logica is an international computer software, consulting and products company with U.S. headquarters in New York.

RPM from SR/7

rameter information that defines the physical production line characteristics, the materials management system generates a work-in-process stock status file. This file basically is a concatenation of Maxcim's stock status and product structure files. A file maintenance program does the concatenation; the same program also checks for engineering change notice activity and posts effectivity dates to changed components that have been defined previously.

To create the detailed final production schedule, the system uses a version of Maxcim's master schedule file. The system generates records for each operation defined on the routing, with planned quantities derived from the master schedule.

Phantom operations

Scheduled completion dates are calculated using logic similar to that found in Maxcim's work order system. Phantom operations — those that consume material but do not report completions — are permitted. The user must assign stage-completion part numbers out of each operation that is planned as a reporting operation. The materials handling system permits completions to be entered manually or derived automatically. The system also permits transfers between lines and/or generic rework centers.

A daily posting program is run at the end of each shift. The program calculates materials usage and generates materials requirements based upon actual production and the next shift's planned production. It also identifies potential shortages based on the balances posted in Maxcim's inventory module.

The Systems Practice is in the process of defining the materials management system's reporting mechanism. Also under development are graphics retrievals that will display materials usage vs. planned visibility, production run rates by line and work center, and work-in-process inventory stock status.

SPECIAL REPORT

Vision gives new perspective on automation

By T. K. Lakshmanan
Special to CW:

The sense of vision has added a new dimension to the capability of an automated machine or robot. Machines endowed with vision are now conducting inspection and measurement, assembly, bin picking and many other functions associated with manufacturing.

The process of extracting the information contained in a scene can consist of three steps: image formation, image analysis and image interpretation. In actual practice, the system needed to perform these functions generally consists of a camera, a lighting system, an image-processing section, an interface to other equipment (such as manufacturing machinery), a programming keyboard and an image monitor.

The camera most often used is a solid-state or television camera of the charge-coupled or charge-injection type. The screen may consist of an array of 256 by 256 pixels; each pixel generates an analog signal proportional to the intensity of light on the element.

Two categories

Vision systems fall into two categories, based on the number of shades of gray they can discriminate. Binary systems can only detect two shades: black and white. Gray scale systems can detect many shades of gray, for example, 64 or 256 gray tones, which respectively need one byte or two bytes of storage per pixel. Binary systems are much more developed and more widely used at this time. With binary systems, the processing speed required is relatively slow, and the algorithms used are relatively simple. Gray scale systems need considerable processing power and advanced algorithms.

There is actually a third category of vision system, one that uses light striping. This system analyzes binary images formed from objects on which stripes of light have been projected. The system is then able to estimate distances by triangulation and to delineate shapes from the distortions introduced in the light stripes.

There are three broad classes of algorithms that correspond to the three classes of vision systems. One popular approach is an algorithm developed by SRI International, Inc. Using the SRI approach, all objects are assumed to show up in one color (such as black) while the background is in the other color. These blobs are analyzed to determine characteristic features and are then compared with features previously stored in memory. As long as it has unique features, the object can be identified. Orientation and position can also be determined if the system is calibrated properly.

The basic approaches to recognition in both binary and gray-scale systems are template and feature matching. In the former approach, the system compares the image with the closest digitized representation in its data base. In the latter, design rule criteria and shape characteristics are used for identification.

A majority of present-day vision systems are used for product inspection, but increasing numbers are being used for product and component recognition as the technology advances.

The third and newest application area is robot guidance. This area is growing faster than the other two, alongside the proliferation of robots in most industry segments.

Cognex Corp. in Needham, Mass., has a system that analyses printed-circuit board traces or other lettering. The system has a 576- by 452-pixel resolution and 64 gray levels. Specially tailored software is necessary for each application. The system software looks for distinctive features rather than the general shape of the object. The proprietary algorithms enable the system to distinguish individual members of a common group of objects (for example, keys) by looking for characteristics of each member of the group.

Mathematical morphology is the technique used by Machine Vision International in Ann Arbor, Mich. This technique seeks differences among group members by eliminating common features. For example, in inspecting gears, the system would look to the spaces between the teeth for differences rather than to the teeth themselves. Parallel processing speeds up recognition.

Octek, Inc. in Bedford, Mass., has a technique for counting paper cups based on gray-scale processing. The system's computer uses an edge-detection technique to sense the cup rims.

General Electric Co. has a three-dimensional gray-scale approach for tracking welding seams. Seam-tracking is made possible by combining the characteristics of the crack with the size of the puddle forming the weld.

Eight stages of image processors and two stages of arithmetic logic units are used by a system from Digital Analog Design to recognize, in real time, a 3- by 3-pixel image having

See VISION SR/18

SPECIAL REPORT

Test robot work cells with graphics systems

By E. W. Baumann
Special to CW!

As the number and complexity of robot applications increase, the importance of being able to evaluate design and programming alternatives will also increase. While such evaluation can certainly be performed on a trial-and-error basis in the real world, there are advantages to be gained by testing those ideas first in a simulated world using computer graphics. These advantages include:

- The time and materials spent on physically prototyping alternative robot work cells is reduced or eliminated.
- The need to purchase or lease many different robots in order to decide which one is best for the job is reduced or eliminated. This is true only if the simulation system can handle robots of many different manufacturers.
- The possibility of inflicting physical harm to personnel or equipment in the event of a programming error is reduced. The term "system crash," when applied to the consequences of bugs in robot programs, must be taken quite literally.

The major disadvantage of using computer simulations to develop robot applications is that simulations are never perfect representations of what will happen in the real world. The user must therefore be careful to understand which aspects of real-world behavior are important to his application and how well they are reproduced by the simulation.

Also, if only a few very simple robot applications are going to be installed and there is little doubt concerning their success, an investment in a powerful general-purpose simulation system is probably not justified.

Develop general concept

Before detailed design work can begin on a new robot application, it is first necessary to develop the general concept of the work cell that will be required. This conceptual design is useful not only as the initial step in the top-down design of the new cell, but also to help convince the customer (or the engineer's own management) of the suggested approach. It is generally easier to get the idea across by viewing the simulated cell in action rather than by reading pages of text and static drawings.

While setting up the graphics representation of the work cell to be simulated, the best positions and orientations for the robot and other devices can be determined. This device location information can then be passed to those responsible for actually constructing the cell.

Off-line programming of flexible robot work cells may eventually prove to be the most important application of graphics simulation tools. Although the complexity of present robot applications resides mainly in the complexity of manipulator motions required to complete a task, this will not always be the case.

As robots are required to perform more complex tasks in less structured environments, greater emphasis will be placed on the sensing and logical control aspects of robot programs. For now, a useful first step can be provided by a system that combines motion with the remainder of a program written in the robot's native language.

In this way, an off-line program

can be produced that will already have had the robot motion portions debugged to a large extent. In cases where robot motion accounts for practically all of the program's contents, the program should be nearly bug-free.

For an off-line program developed using a simulated cell to have any chance of working in the actual cell, it is important that the modeled cell and the actual cell agree geometrically. While they can never be made to match perfectly, convenient methods still exist for resolving a large portion of the difference once a cell has been installed.

The primary emphasis of first-generation graphics simulation systems has been on providing user-friendly methods for specifying robot motion and then accurately portraying the programmed motion. There is no doubt that additional improvements can and will be made in these areas.

As more complex robot applications appear, greater attention will be paid to simulating sensor-based robot behavior and in keeping track of accumulated position and force errors that may lead to failure.

So far, these systems have only acted as providers of relatively raw information to a human decision maker. In the not-too-distant future, systems may have the ability to analyze their own simulation results and give advice to the human user during a cell design or programming session.

Baumann is a specialist in computer-aided design and manufacturing for McDonnell Douglas Automation Co. in St. Louis, Mo.

AUTOMATION NEWS

The newspaper for flexible manufacturing and robotics, tabloid size, printed on jet paper.

New Subscriber Offer Features Reduced Rate Along With Free Gift

NEW YORK–Manufacturing management and engineers can now receive AUTOMATION NEWS at a reduced, new subscriber, rate of $19.75 along with an 80 page, factory management glossary as a gift.

This introductory offer will save you $9.25 off the regular subscription rate of $29. In addition, if you become a subscriber for a full year or more we'll ship you, hopefully on payment, a comprehensive, cross-referenced, perfect bound, factory management glossary containing over 2,000 terms in advanced manufacturing technologies covering categories from CAD/CAM to Vision, robots to CIM, and components to programmable controllers.

Every issue of AUTOMATION NEWS will inform you through objective, easy-to-read reporting, of the latest factory automation developments in CAD/CAM, computers, robots, FMS, components, lasers, programmable controllers, software, vision and sensors, reports from abroad, association news, finance (complete with stock listings and bonds ratings), people on the move, industry surveys, new/used machine coverage on a local, regional, and national basis. And, don't forget our classified section.

Combined, AUTOMATION NEWS, the Factory Management Glossary, and a reduced subscription rate make this an offer you can't refuse if you want to be in the know on advanced manufacturing technologies.

To subscribe simply fill in the coupon below and mail it to: AUTOMATION NEWS, Subscription Service Dept., P.O. Box 1961, Dover, NJ. 07801 or call Mike Ryan for faster service at 212-889-6356.

To get your glossary immediately, just add your credit card.

We accept MasterCharge and VISA.

— Yes please enter a subscription in my name and bill me at the new subscriber rate of $19.75 (35% off the regular yearly rate of $29)

— I can't wait! Enclosed please find my check for $19.75. Please enter my subscription and rush my factory management glossary.

Name_____ Title_____

Company_____

Address_____

City_____ State_____ Zip_____

Type of Business_____

If mfg., product produced?_____

# of employees at location_____

Signature_____ Date_____

Please allow 4-6 weeks for service to start. All questions must be answered to qualify. If at any time you are not satisfied you can cancel and receive a refund for all issues not mailed. The glossary is yours to keep.

CW3/84

WHEN THERE'S NO CHOOSING, CHOOSE ICOT.

More personal computers. More workstations. More remote locations.

Everyone seems to be demanding *more* of your 3270 network. And management says, "Do it—but do it for less."

It's a tough spot to be in, unless you know about ICOT's Virtual Terminal System™ protocol converters. In place in your network, they deliver the compatibility everyone wants and the economy and flexibility you need.

You can make inexpensive asynchronous terminals and printers compatible with your BSC or SNA/SDLC network. A single terminal can access multiple applications and multiple hosts. And personal computers can be included easily in your network. All without expensive software modifications.

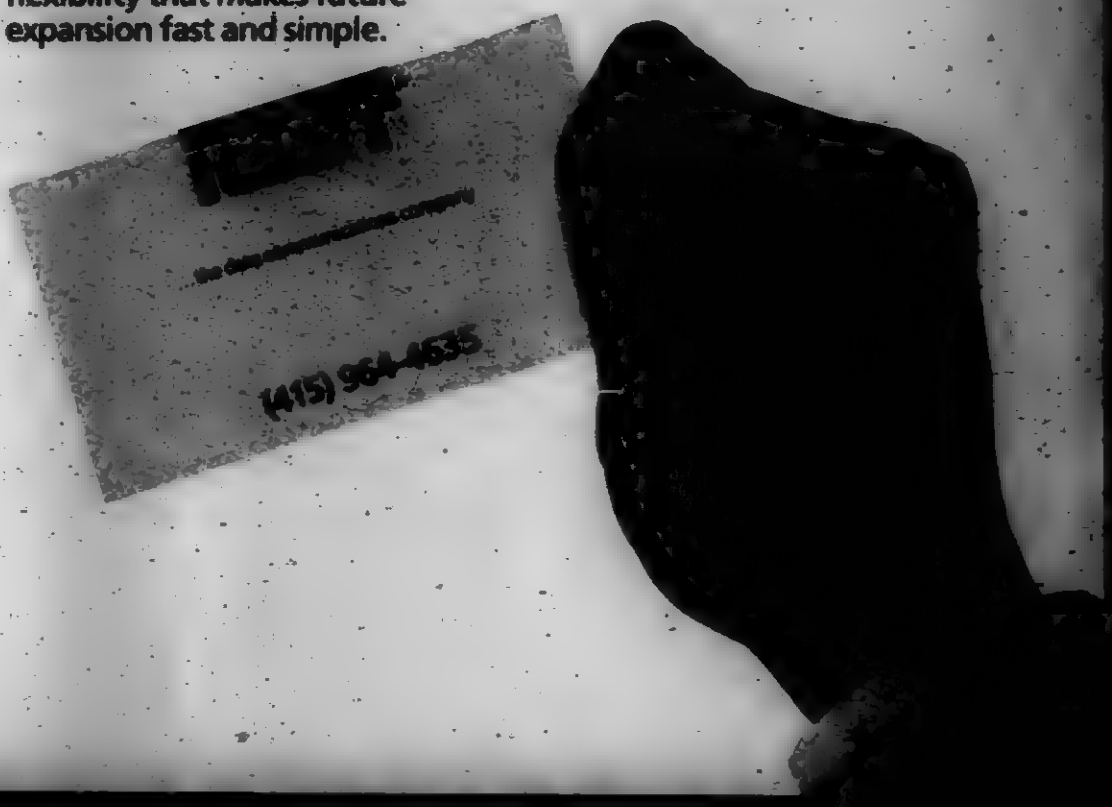
You have the flexibility of either dial-up or leased-line communications, letting you choose the option that's least expensive for your situation. Plus the option of adding ICOT's value-enhanced 3270 lookalike terminals.

It can all be done easily. Economically. With a built-in flexibility that makes future expansion fast and simple.

And when you use ICOT's protocol converters, we back them up with our expert installation, service and engineering support.

Now you don't have to choose between expansion and economy. Just choose ICOT. To find out more about the ICOT Virtual Terminal System, call or write:

ICOT Corporation
830 Maude Avenue, P.O. Box 7248
Mountain View, CA 94039
(415) 964-4635
TWX 910-379-6479



Bar code tech monitors Honeywell shop floor

DENVER — Honeywell, Inc. has installed a microcomputer-based system that uses bar code data collection technology to control work flow in the printed-circuit board area of its Test Instruments Division here.

Honeywell manufactures medical diagnostic and test instruments at the plant and produces virtually all of the necessary subassemblies on-site. The circuit card area services all of the different equipment model lines, as well as Honeywell's Field Service Department.

Consequently, there are several hundred different types of circuit boards produced in quantities that range from a single unit to several hundred. The circuit card area has production facilities to stuff, solder, test and repair the boards. Additionally, there is an inventory area that maintains a stock of parts specifically for the circuit card area.

What was really needed was timely information directly from the shop floor — the source for information about material usage, job status, personnel utilization and work flow efficiency. The problem was that information about these factors was difficult to obtain expediently and accurately.

The work flow in the circuit card area is arranged in a series of assembly lines with a central work-in-process inventory carousel. Each job is issued under a work order that contains a routing sheet and a parts list. Since there are over 500 different types of assemblies that are built in this area, it is very probable that as many as 25 different types of circuit board are being worked on simultaneously by the workers on the floor.

The circuit card area had several significant problems:

- Production scheduling was based on information maintained in a plantwide manufacturing resource planning (MRP) system that was updated infrequently. Consequently, the work load of the area fluctuated widely, and due dates were often missed.
- Material was tracked by following paper routing sheets through the production process. These sheets were frequently lost or had erroneous information. Inquiries about the status of specific jobs could be answered accurately only by physically locating the job on the production floor — a time-consuming job for the circuit card area scheduler.
- Personnel time utilization was tracked with time cards that were filled out daily by each employee. This system made accurate cost allocation difficult because direct production time was often logged incorrectly. In addition, information from over 100 employees had to be entered into the MRP system manually — another source for errors.
- Production was often interrupted because of parts shortages. This was due principally to the fact that the production planners would schedule jobs based on inaccurate stock-level information obtained from the MRP system.

Study group organized

Honeywell organized a study group consisting of representatives from the Production Scheduling Department, its engineering group and Cibar, Inc., a software development firm in Colorado Springs, Colo. The group realized that the MRP system had a great deal of functionality for planning plantwide resource requirements, integrating financial functions with invoices and bills of material and generating managerial reports.

However, what was really needed was timely information directly from the shop floor — the source for information about material usage, job status, personnel utilization and work flow efficiency. The problem was that information about these factors was difficult to obtain expediently and accurately.

Honeywell's system, like most MRP systems, is batch-oriented and relies on paper records or keyboard input for information, which makes data acquisition difficult and time consuming. Consequently, the MRP system often had information about the circuit card area, one of the most time-sensitive areas of the manufacturing plant, which was incomplete, inaccurate and out of date.

The production planners worked with engineering staff to define the functionality and information requirements necessary to schedule, monitor and adjust work flow for optimum efficiency and throughput. They worked with the constraint that the proposed solution could not

See MRP SR/22

Are you ready to upgrade your corporate information system?

1. Your company recognizes that the efficient flow of information is as crucial to your success as any other management function.

2. As your business becomes more complex, you find yourself using "patchwork" programs or "workaround" solutions to get the information you need. Even so, you'd like more visibility, more control.

3. Your management would commit to changing corporate information systems if they were convinced that a new system would work better.

1. MADIC's totally integrated data base management system supplies precisely the information your managers need. Data for any report can be drawn from any file in the system.

2. The product of 10 years of customer-directed development, MADIC probably already has all the capability your company will ever need. Using the Pick operating system, MADIC's 800 programs maintain over 2700 data fields, have 10,000 prompts, and can generate over 3,000 standard reports.

3. MADIC is used in manufacturing and distribution companies large or small, startup or established— discrete assembly, process, repetitive, or job shop operations.

MADIC Corporation

3960 Freedom Circle • Santa Clara, CA 95054 • (408) 988-8311

SPECIAL REPORT

Factories adopting distributed intelligence

Combines collection and processing of data, expedites its use

By Shelley B. Dolan
and Robert F. Williamson Jr.
Special to CW

Traditional concepts of factory automation have given way to the evolution of distributed intelligence in factory data collection systems.

The concept of collecting data historically has followed a fairly simple one-way model. Collection devices served only one purpose — to collect data. The information was then sent upstream to the host computer, where it was processed for further use. Thus, data processing has been totally separate from data gathering.

This one-way model has evolved into a more complex, yet more efficient, mode of data collection, largely due to the introduction of distributed intelligence. Because of the drop in cost of machine intelligence — the microprocessor chip — it is now feasible to use in all elements of data gathering. Automated machinery and manual operations, in addition to generating data, now can also use the data immediately to expedite a process, balance inventory or correct a production error.

A simple factory data collection system model consists of a group of terminals (keyboard, bar code or time card) that sends data to a host through a concentrator. Neither the terminals nor the concentrator processes data; they just pass it along, often after a light flashes or a beep sounds to acknowledge that the data has been received. In this model, all data processing takes place at the host, where reports are generated and become available to the plant manager, foreman or production worker hours or days later.

In the distributed intelligence system, the terminals and the concentrator, or controller, are equipped with microprocessors. While data is still sent upstream to a host, some of the data can be processed instantly at the terminal level. The advantage for the factory is that distributed intelligence greatly increases the use of data at the workbench.

Data collection methods

In the factory, there are three major methods by which data is collected: manually, as in filling out a time card; semimanually, as in key entry or bar code reading; and automatically, with machinery. The data varies according to the type of information transmitted, the speed of transmission and accuracy. Without the option to perform partial processing or to send information to the next workstation for immediate use, report generation is delayed until all data is entered, checked, sent upstream and processed at the host.

The value of distributed intelligence enters at this point. By placing intelligence at the terminal and controller levels, the option becomes available to process some data at the terminal workstation. Although the terminal can only do limited processing, it should be enough to meet the needs of the user at his workstation.

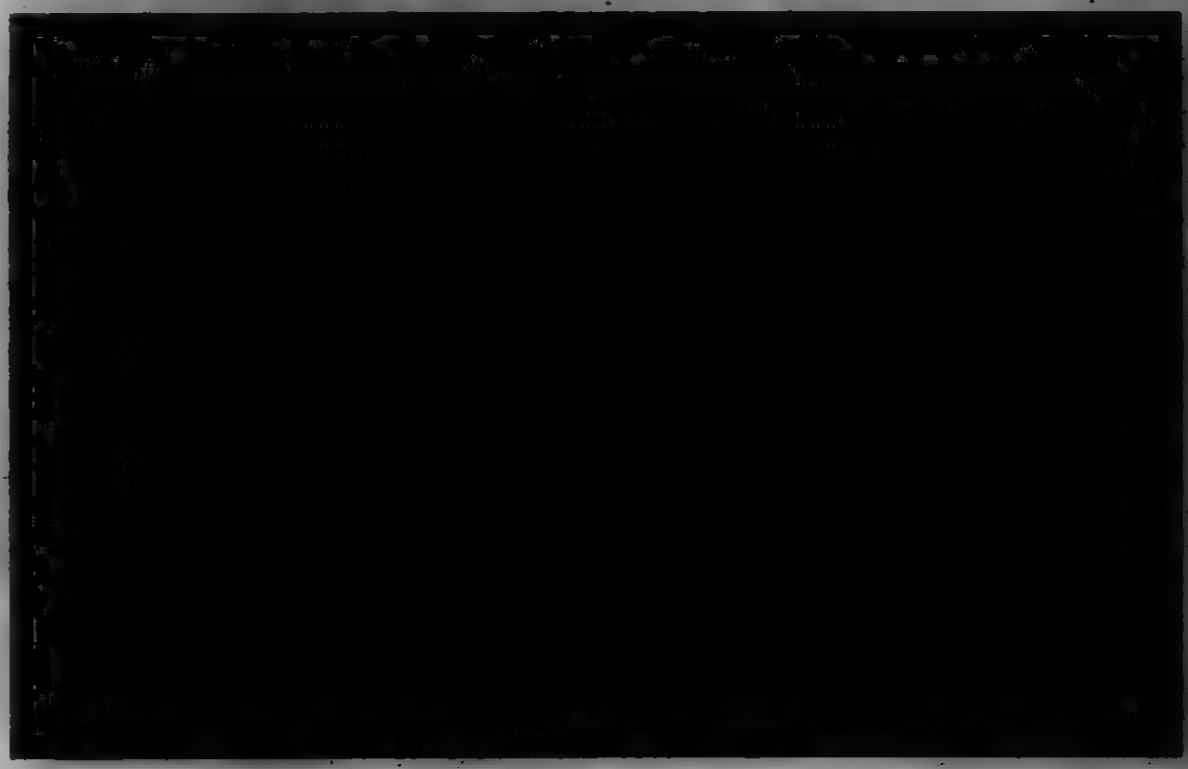
With an intelligent terminal at a robot station, the plant foreman has the ability to monitor the robot's output and to transmit to the next workstation information such as, "Five parts are on the way." The intelligent terminal at the next station, a manual assembly point, can prompt the worker through assembly steps and cue him to enter data before the product is sent to the next workstation.

Perhaps one of the most important plant functions is inventory monitoring. Placing intelligent terminals at robot stations, workstations and inventory cages can help to balance out the imparities in data collecting and transmitting capabilities between workers and machines. Excesses and shortages in inventories can be more readily identified. Higher than normal reject levels can be quickly identified, allowing the worker to deal with the problem immediately. Because the terminals are intelligent, they can receive data from the controller and the host, indicating changes in the work process.

Distributed intelligence is having a large effect on factory automation, especially with respect to the interlinking of data collection devices and processes. Traditional manufacturing technologies are changing due to a need for more efficient modes of operation. Intelligent terminals situated at workstations and robot stations provide an information interchange among themselves, the host and the controller, allowing for effective checks and balances on the shop floor. From this standpoint, distributed intelligence has become the key to peak efficiency in the automated factory.

Dolan is marketing manager and Williamson is vice-president of Innovative Electronics, Inc., a Miami-based manufacturer of data communications equipment.

Combining Boeing's distributed services with IBM's PCs could revolutionize your financial planning.



We know.

Introducing a totally new program from Boeing Computer Services. Designed to help you take maximum advantage of IBM's technology in microcomputers. While ensuring you get the same reliable, high quality computing solutions that are synonymous with the name BOEING.

For financial planners, Boeing offers the EIS® Micro Workstation — a distributed extension of the well-known EIS Decision Support System. EIS software gives business managers the information they need. Faster. More accurately. Without complicated computer programming. And now delivered economically to your desktop, via the IBM PC/PCXT.

The EIS Micro Workstation lets you download, manipulate and upload data to our MAINSTREAM® remote computing network. It gives you extensive graphics capability. What's more, with MAINSTREAM power, you gain access to the many economic and financial data banks you need for up-to-the-minute modeling. And through our Value Added Dealer (VAD) relationship with IBM, Boeing can be your single, reliable source for host processing, PC/PCXT hardware, software, maintenance, consulting, and training.

You save valuable financial planning dollars while gaining greater control over your planning and business management.

The EIS Micro Workstation is just one more unique service from Boeing, a leader in software and computing solutions. Give your decisions more support. Call 800-447-4700. Or write Boeing Computer Services, M.S. CV-26-9A, 7980 Gallows Court, Vienna, VA 22180.

BOEING COMPUTER SERVICES A Division of The Boeing Company

Boeing is an authorized Value Added Dealer for the IBM Personal Computer and Personal Computer XT.
IBM is a registered trademark of International Business Machines.
EIS and MAINSTREAM are registered Service Marks of The Boeing Company.

Size us up.

We solve tomorrow's computer problems today. EVERYWARE™ systems from Perkin-Elmer.

With so much at stake, your doubts about choosing the right computer system are well-founded. That's why you should take a look at the one family of computers that without a doubt offers everything you've been looking for: EVERYWARE systems from Perkin-Elmer.

The EVERYWARE family embodies a comprehensive merging of the world's major hardware, software and communication standards. A solution for virtually every computing need. Ready to grow with you, while protecting your software investment and data integrity every step of the way.

A Comprehensive Family.

We offer one of the broadest choices of mutually-compatible professional micro and supermini computers, easily integrated and supplemented as your processing needs change. Our Series 3200 32-bit superminis span a complete spectrum of computing capabilities with outstanding performance. . .from the compact, economical 3205 to the incredibly fast and powerful 3200 MPS. And all points in between.

The newest member of our family is the advanced, M68000-based 7350 super micro, bringing EVERYWARE systems to your desktop. With vivid color graphics. Windowing convenience. And

a choice of off-the-shelf applications software–including word processing, spread sheets, graphics packages and development tools.

Operating Environment Flexibility.

Only EVERYWARE systems offer such diverse operating environment alternatives. Real-time processing under our proprietary OS/32 operating system. Reliance PLUS, our proven on-line relational DBMS that enables powerful, user-friendly transaction processing. The Resilient System,™ a new concept in fault tolerance that offers the high-availability advantages of two real-time, on-line processors while assuring 99+% uptime. Or time sharing. Or batch processing. Work in the environment that suits your needs. Or run any combination of them simultaneously through one powerful system!

To protect your single most important investment–the software–EVERYWARE computers offer a common operating environment derived from world-standard UNIX® software. Via FORTRAN and C, it's bridged to our OS/32 real-time operating system. That's the best of both worlds. And results in true software portability, from system to system, environment to environment.

Communications Everywhere.

We can share information with IBM environments via SNA and BSC emulators. Form a local network using Ethernet. Or communicate globally through the CCITT X.25/X.29 Packet Switching Network.

And that's about the size of it. Except to remind you that Perkin-Elmer is strongly committed to supporting your systems with complete customer training, worldwide service. . . and world-class products.

We invite you to "size us up" soon.
For more information, return the coupon.
Or call toll-free **1-800-631-2154.**
In New Jersey, 1-201-870-4712.

Tell me more about **EVERYWARE Computers.**

☐ Please send information on_____

☐ Please have salesman call.

Name_____ Title_____

Company_____

Address_____

City_____

State_____ Zip_____

Telephone_____

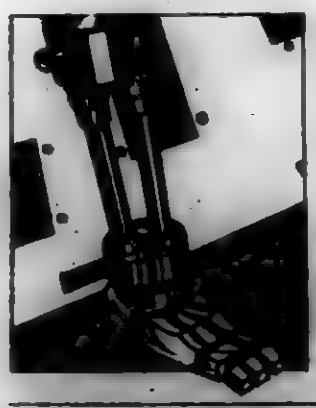
Mail to:
The Perkin-Elmer Corporation, Marketing Communications
Two Crescent Place, Oceanport, N.J. 07757

COMMRM

EVERYWARE is a trademark of The Perkin-Elmer Corporation.
The Resilient System is a trademark of The Perkin-Elmer Corporation.
*UNIX is a trademark of Bell Laboratories.
IBM is a registered trademark of International Business Machines Corporation.

PERKIN-ELMER

The science and computer company.
Where solutions come first.



VISION from SR/11

256 levels of gray. The system calculates nearly 80 million convolutions per second. The controller used is an IBM Personal Computer.

A system from International/Robomation/Intelligence in Carlsbad, Calif., uses a dedicated, highly integrated microprocessor incorporated into a multiple-processor architecture. A systolic-array coprocessor is used to build up the speed of the host from one million instructions per second (Mips) to 40 Mips.

After the camera samples the scene, digitizing is performed by the preprocessor, which also computes histograms and performs contrast analysis. The host processor and coprocessor examine gradients and detect edges, sharpen edges through a Laplacian convolution, analyze moments, perform comparisons with the data base and report on matches. The important feature here is the special coprocessor.

Object Recognition Systems (ORS) in Princeton, N.J., has an I-Bot 1, consisting of an ORS vision system utilizing special algorithms designed to deal with randomly oriented, overlapping parts. This vision system works in conjunction with a robot in performing bin picking.

The main problem with vision systems is still the high price/performance ratio. Typical system prices range from $25,000 to well over $100,000.

Even though prices have been dropping or performance has been mounting for a given price, these systems are still too high-priced for many routine automation processes.

Control Automation in Princeton, N.J., has just announced a high-performance, low-cost system that is programmable in Forth, a language that is becoming popular in factory automation. The unit scans 64 shades of gray and handles 16 cameras, expandable to 64. Resolution is 380 by 480 pixels.

Speeding automation

Systems such as these are playing a significant part in speeding up factory automation. Among the processes receiving increased attention are welding, painting, bin picking and assembly. Assembly constitutes a major part of production.

Vision systems help in the fitting process in automated assembly by enabling parts and components to be identified, acquired and presented in a predetermined manner. They also help eliminate costly jigs in robot assembly by providing proper feedback to control the position of assembly tools in an adaptive manner.

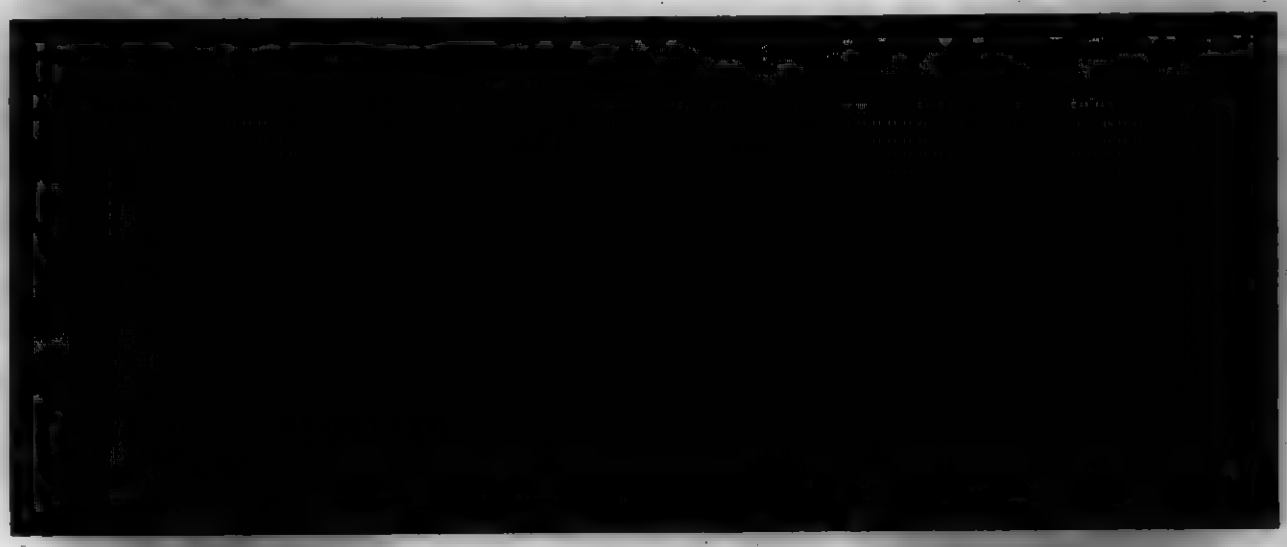
Thirdly, vision systems can continously control the path of a tool along a designated trajectory. A closely related function is in-process inspection.

Tool control for positioning or orientation is also important in fastening. Typical fastening processes are spot welding, arc welding, screwing, riveting, bolting, nailing and stapling. Vision is playing a rapidly growing role in welding.

Bin picking is another area where increasing emphasis is being placed on the use of vision systems. In this process of acquiring work pieces one at a time from containers and relocating them at predetermined places with predetermined orientations, a good deal of sophistication is called for in the vision system.

Today's vision systems are far superior to those of a couple of years ago as far as robotic applications are concerned. Even though gray-scale capabilities are much better, even better capabilities are needed as robots are called upon to see all images regardless of background lighting or overlapping. More and more powerful algorithms are being generated in order to get the greatest benefit from modern computer hardware.

Lakshmanan is a project director for Frost & Sullivan, Inc. in New York.



Spectragraphics 1500.

IBM 5080.

The chart at the right speaks for itself.

With the exception of delivery. Something we offer *now.*

Which means if your CAD/CAM or CAE needs call for an intelligent color graphics system, maybe you should take a look at our Spectragraphics 1500.

A color system with a superb reliability track record.

A system with real time 3D graphics 10 times faster than IBM's. Ten times.

A system that runs on IBM CAD/CAM software.

A system with greater communications support via fiberoptics, T1, microwave or low-speed V.35.

And a system *already delivered,* up and running in major CAD/CAM users across the country.

All coupled with one of the industry's most versatile software packages. PRISM.

Plus an enviable list of features ranging from decluttering to backsurface testing to real time polygon fill and transformations.

So before you let the IBM 5080 chart your company's course, spend a few quick minutes surveying the chart.

Then spend a few quick seconds dialing Spectragraphics. We're faster, less expensive and maybe most importantly, we're better.

Come see us at the N.C.G.A. show

SPECTRAGRAPHICS

Spectragraphics Corporation/10260 Sorrento Valley Road/San Diego, Ca. 92121/(619) 450-0611

SPECIAL REPORT

Middle managers feeling automation ax

By Theodore T. Zajdel
Special to CW

The implementation of today's more sophisticated factory automation systems often results in job displacement among the middle managers required to implement them. These middle managers are faced with a difficult choice. If they strive to implement the new system successfully, they may end up losing their present job and facing an unknown future. Resisting or even sabotaging the implementation carries its own risk. The implementation may be delayed, but it is rarely canceled. The recalcitrant manager is often the first to go.

Job displacement among middle managers due to factory automation is a relatively new phenomenon. In the U.S., job displacement discussions have revolved around the blue-collar worker and how to manage the resultant problems without strikes or other disruptions. The middle manager was not directly affected because of the low level of factory automation being implemented.

The first stages of factory automation involved the introduction of automated or numerically controlled machines such as lathes, milling machines or automated insertion machines. These machines increased productivity by increasing simultaneously the number of items produced per worker per shift and increasing the quality by decreasing operator involvement and resultant error.

Materials handling systems, automatic warehouse systems and systems to monitor materials flow or work in process sometimes resulted in job displacement among blue-collar workers. If anything, these systems increased employment among middle managers, who were responsible for planning and then monitoring the reports produced by these systems. Manufacturing resource planning (MRP) systems and the general factory data processing systems improved productivity and reduced costs, but had little direct impact on employment among blue-collar workers. Again, they created white-collar jobs.

The advent of management information systems with variance reporting, simplified interactive I/O, spreadsheets, sophisticated graphics and the increasing familiarity of managers with personal computers has begun a radical change. The upper level manager or executive can now directly access the data base and obtain information about the lowest level of the factory hierarchy without going through the intermediate management levels.

Advanced management information systems are used to tie together all of the various automated or computerized systems in the factory, from MRP and the DP center down to individual automated machines.

Direct access to all levels

Using such an advanced management information system, the director of manufacturing gains direct access to all levels of the factory. Previously, the information was available, if at all, only after being passed through several layers of middle management. With advanced MIS, this information becomes available faster and often more accurately, directly from the factory floor.

The successful implementation of advanced MIS as part of an overall factory automation project resulting in computer-integrated manufacturing can lead to the displacement of many middle managers. Factory automation of the computer-integrated manufacturing variety results in an organization consisting of blue-collar workers and high-level managers, but few middle managers.

> ***Without the cooperation of the middle managers, the implementation of a successful factory automation project and, ultimately, of computer-integrated manufacturing is difficult if not impossible. The question is how to secure their cooperation when it may hasten the loss of their own jobs.***

When building a new automated factory, this is not a problem. No jobs are eliminated. Only sufficient managers and other employees are hired to operate the factory. The problems arise when trying to automate an existing, functioning factory. Then all the normal problems of change are faced in addition to the problems arising from potential job displacement.

The job displacement problems are exacerbated when middle-management jobs are involved. When blue-collar jobs are eliminated, the displaced worker is rarely involved with the implementation of the new automated equipment and thus is unable to impact its success directly. However, when middle-management jobs are eliminated, these same managers are often intimately involved with the implementation and ultimate success or failure of the project that will culminate in their job loss.

The reason for this is that the middle managers have the information that must be incorporated into the system. The ways in which reports are formulated, data obtained and productivity measured under the prior operation must be carried over to the new system in order to ensure a smooth transition. This does not imply that changes cannot or should not be made. But the new system must be integrated with the existing, functioning system over a period of several years. Otherwise, productivity may drop precipitously, and the entire operation may be disrupted.

Without the cooperation of the middle managers, the implementation of a successful factory automation project and, ultimately, of computer-integrated manufacturing is difficult if not impossible. The question is how to secure their cooperation when it may hasten the loss of their own jobs.

A technique that is doomed to failure, but often tried, is to attempt to hide the outcome from the participant — in other words, pretend that nothing will happen; no jobs will be eliminated. However, someone intelligent and experienced enough to be a manager will surely see through the deception and will resist the project, if not act to sabotage it outright.

Another technique is to let the competition unleashed. Usually the results are the opposite of those desired.

A better technique is to plan for the changes and to develop solutions for the resulting displacements. Retraining is one part of the solution. Communication is the other.

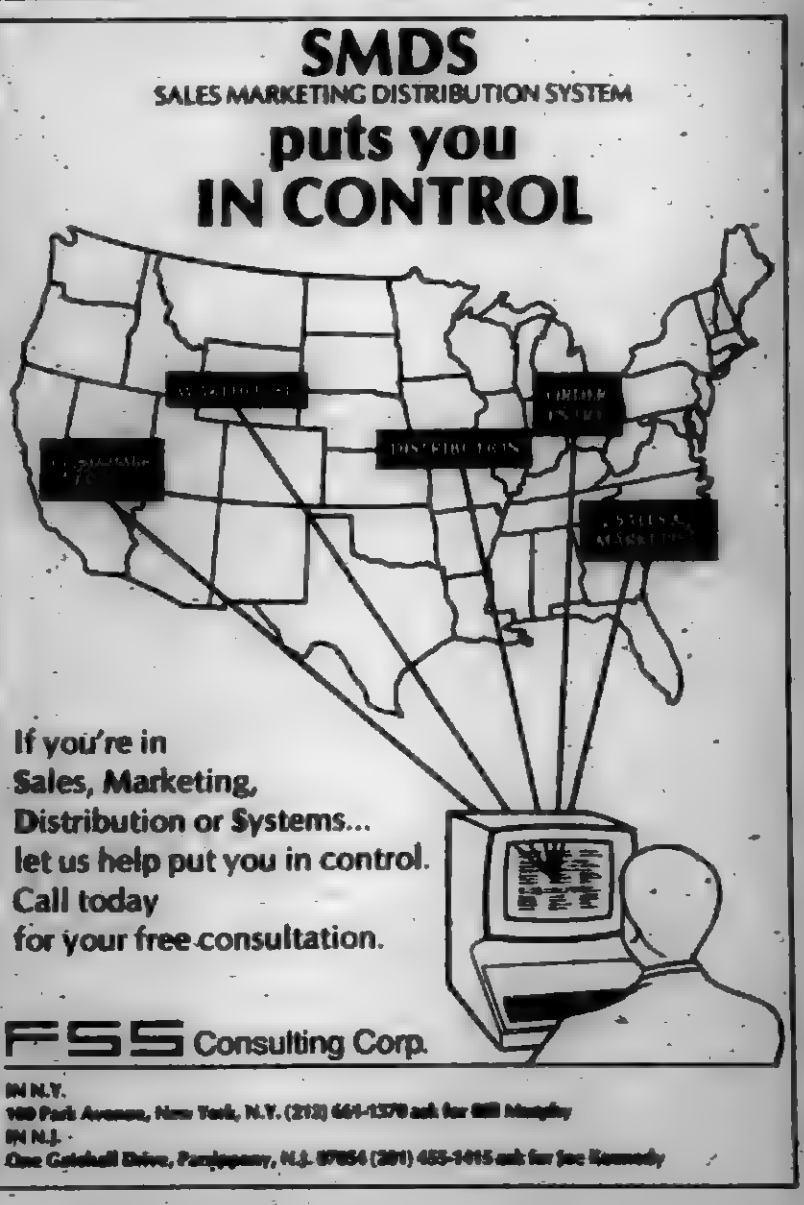
Implementation of factory automation gives many opportunities for retraining in computer-related jobs. Most importantly, by retraining, the company retains the practical knowledge and job skills of its employees. Who knows the day-to-day operation and problems of the factory better than the people who have worked there for years and perhaps came up through the ranks?

Knowing the future job opportunities and being able to train for them can go a long way toward encouraging middle managers to cooperate enthusiastically in the implementation of advanced factory automation projects that may result in the elimination of their present jobs.

This same approach should be used with blue-collar workers being displaced by factory automation. While they may be less able to hinder a factory automation project directly, companies can ill afford to lose the talent and expertise that reside in many of their skilled blue-collar employees.

It is certain that over the next 10 years the implementation of advanced factory automation systems and the emergence of computer-integrated manufacturing or the factory of the future will result in rapid change at all levels, from the blue-collar worker to the executive suite. Only through planning and retraining will smooth transitions be possible. The detailed knowledge of the manufacturing process and its problems cannot be lost by a company if it hopes for long-term success as opposed to short-term savings.

Zajdel is a senior partner at The Research Collaborative, a Boston-based management consulting firm, specializing in high technology.



BE A HERO. BUY A HERO.

Heros were meant to rise above it all. So why is it you keep getting caught in the middle? Is it your fault that personal computers in every department are hoarding data? They won't even have a simple conversation with the mainframe.

Why should you be pestered by complaints when work is lost? Or duplicated? Even triplicated? Not to mention what happens to costs.

Your organization is a victim of Computer Shock. Badly in need of a HERO™.

HERO RESCUES COMPUTER WORLD FROM CHAOS.

MDS HERO is the intelligent, desktop Networked Personal Computer. It does everything a personal computer can do. And more. But most of all, our HERO is famous for interacting—it works beautifully with mainframes.

With the MDS SUPER 21™ Communications Processor, HERO can converse intelligently on IBM networks. HERO emulates IBM 3270 SNA and 3776 remote job-entry systems. Our SUPER SNA™ option gives you both on one communications link.

HERO also runs software under MS-DOS. Plus its own multi-tasking operating system.

HEROS OF THE WORLD UNITE.

With HERO and SUPER 21 on your side, there's no end to what you can conquer. You can draw on private, departmental, and corporate databases. Bring individual workstations out from their isolation. Thanks to you, information will be bound together, in a network of organization. All under your control.

What's more, if you take advantage of our own INTELLIGENT 3270™ (only MDS has it), your people can write their own programs, and integrate them with data in the mainframe. Using HERO, you can reach into the database and retrieve information. Then either return it, or store it at the workstation.

HEROISM GETS REWARDED.

With our HERO and SUPER 21, you'll have what's out-of-control under control, fast. Your current data processing investments will become part of a growing bank of knowledge. All of it cost-efficient.

Besides, old HEROS never die. Nor do they fade away. They're modular in design, so they manage to be immortal. They grow with you. All the way.

YOU CAN BE BIG WITHOUT BEING BLUE.

MDS is everywhere Big Blue is. We even stretch beyond the Blue horizon. And we grew big for one big reason: we've helped our customers to grow.

MDS can do the same for you, too. Wherever you are on this Big Blue planet, we'll give you more than mere office automation. We'll organize your organization. Our service people will be at your back and call. Around the globe. Around the clock.

So be a hero. Buy a HERO. Ask our customers about us. And give us a call. Dial **800-MDS-HERO.**

You'll soon see that heroism has its rewards.

MDS MOHAWK DATA SCIENCES

7 Century Drive, Parsippany, New Jersey 07054. And over 430 locations, worldwide.

MDS is a registered trademark and HERO, SUPER 21, INTELLIGENT 3270 and SUPER SNA are trademarks of Mohawk Data Sciences Corp. MS-DOS is a trademark of Microsoft, Inc.

MRP from SR/14

add significant software overhead or degrade the response time of the MRP system, yet the information had to be available for use by the system. The solution was to design a stand-alone system that could communicate with the existing MRP system, which runs on a Honeywell DPS 8 Model 44 with 4M bytes of main memory. The data base takes up 300M bytes of disk storage. The system supports 75 to 85 on-line terminals running 12 hours a day.

The Production and Manufacturing Information System (Promis) was designed by Cibar and provides shop floor control, work-in-process and stock inventory maintenance and timekeeping functions in a stand-alone system that has the capability for information exchange with Honeywell's MRP system.

The primary objective of complete work flow control would be attained by collecting information from the circuit card area employees about their time utilization using the information from assembly routing sheets. Other information from the sheets would be used to define and control assembly sequencing and to monitor the location and status of all parts and assemblies.

Bar code data collection technology was chosen for data input because it provides rapid, accurate information collection from numerous sources very cost-effectively.

The capture of all this information and the availability of it in real-time and on-line would provide several benefits:

- Accurate cost allocation procedures for direct and indirect employee time.
- Reduced amount of scrap from improper assembly routing sequences.
- Comprehensive inquiry facilities to locate parts, jobs and production trouble spots.
- Accurate assessment of work-in-process levels and overall work loads.
- The capability to assess accurately standard production times, employee efficiency and current backlog for accurate production scheduling and completion time estimation.

This design was based on the premise that the information could be input by the employees who generated it. This would eliminate redundant data input and its accompanying inefficiencies. It also implied that the data collection methodology had to be easy to use and could not interrupt the work flow.

Bar code data collection technology was chosen for data input because it provides rapid, accurate information collection from numerous sources very cost-effectively.

It is easy to use and can quickly become a part of the employee's work cycle. Since it eliminates the need to fill out time cards, it actually speeds up the production process rather than inhibiting it with excessive monitoring.

Bar code wand stations were located throughout the production and inventory areas to collect information from bar code labels on employee badges, work orders, material totes and menu pads.

The employees were instructed to record the receipt of a job at a workstation, the completion of work at their stations and the movement of work from their stations. This information is input with the bar code wand and labels.

Maintains routings

Promis maintains a routing for each assembly released to the shop floor. The system uses this routing as a guide while it monitors material movement throughout the assembly process and will not permit an employee to move a job to a work center that is out of sequence in the routing.

Timekeeping functions are processed automatically by Promis, which maintains a complete record of direct and indirect time accumulated by each employee. This information is also accumulated for each job for cost allocation and scheduling information.

The work-in-process dispatcher is able to inquire about the location, priority and status of a job that might have segments in several locations within the work-in-process carousel as well as on the production floor. Using this information in conjunction with work center load data, the dispatcher is able to balance work flow on the assembly lines.

The schedulers are now able to answer inquiries from other departments using on-line information available immediately on a CRT terminal. They have a complete record of all engineering change orders applied to assemblies and can inquire about reject and rework information as it pertains to an assembly or to employees.

The system achieved its design goals because a thorough analysis of the work flow and information components available from the shop floor was performed.

This was correlated with the scheduling department's requirements for accurate planning and monitoring functions. The implementation of the system as a stand-alone gives it excellent response time and flexibility while maintaining the capability to provide the MRP system with accurate, timely information with a minimum of software and response time overhead.

MRP VERSUS OPT:
SOFTWARE vs. THOUGHTWARE

Creative Output, Inc. is a management systems firm whose products allow manufacturing organizations to identify and realize their full commercial potential.

Wang helps you manufacture the ultimate product: profit.

Whatever you may make, you have to make a profit.

And Wang office automation systems are uniquely qualified to help.

Wang systems tie every department together with word, data, image and audio processing. From engineering to accounting, to legal, to purchasing, to personnel. In every location, from your headquarters to your most remote shipping platform.

What's more, Wang integrated systems offer dozens of successfully-used applications you can put to use right away. Software is available for master production scheduling that will help eliminate bottlenecks; for material requirements planning that will reduce your inventory investment; for shop floor control that will reduce your overtime and expediting costs. And on and on.

All completely functional—right now.

With Wang, you can see whatever you need to see, whenever you need it. Including better profits.

For a demonstration of Wang computers, call 1-800-225-9264. Or send this coupon to: Wang Laboratories, Inc., Business Executive Center, One Industrial Avenue, Lowell, MA 01851.

Name

Title

Company

Address

City State Zip

( )
Telephone

WANG

The Office Automation Computer People.

OVMB

© 1983 Wang Laboratories, Inc.

SPECIAL REPORT

Criteria for pushing automation to its fullest

By Robert L. Howie Jr.
Special to CW‡

Five criteria must be met for computerized automation of information management, engineering and production to achieve its full potential:

■ Management commitment to automation at the highest levels.

■ A complete understanding of application requirements.

■ Optimum materials management.

■ Subsystem investment with integration in mind.

■ A concomitant belief that manufacturers will build solutions by managing technology, not just automating.

That leads to a sixth ingredient: The corporate business plan must be linked to manufacturing operations, and that business plan must drive the building of manufacturing competence.

The next generation of manufacturing technology will be devoted to integrating manufacturing functions with management information systems. This will require innovative manufacturing data base management to provide easy storage, retrieval and manipulation of large quantities of data; full data communications to distribute design, engineering and production data over a network of computers; operating systems and applications software as a foundation for a fully integrated system; and integration engineering services for systems capability planning.

Communications is undoubtedly the key to integration and to building the future factory. The major components of the manufacturing environment — computer-aided design and engineering, machine tools, materials handling systems — must be tied together.

On the shop floor, such a communications system enables a quick response to sudden changes in process conditions — for example, overload or device breakdown. Essentially, this kind of industrial local-area network provides real-time access control.

The industrial local-area network is an intrafactory communications system that ties together and supports transparent information transfer between users and intelligent shop floor automation. The key word is transparent; the local-area network represents a pipeline with added value and provides a standard architecture for machine-to-machine and man-to-machine interfaces.

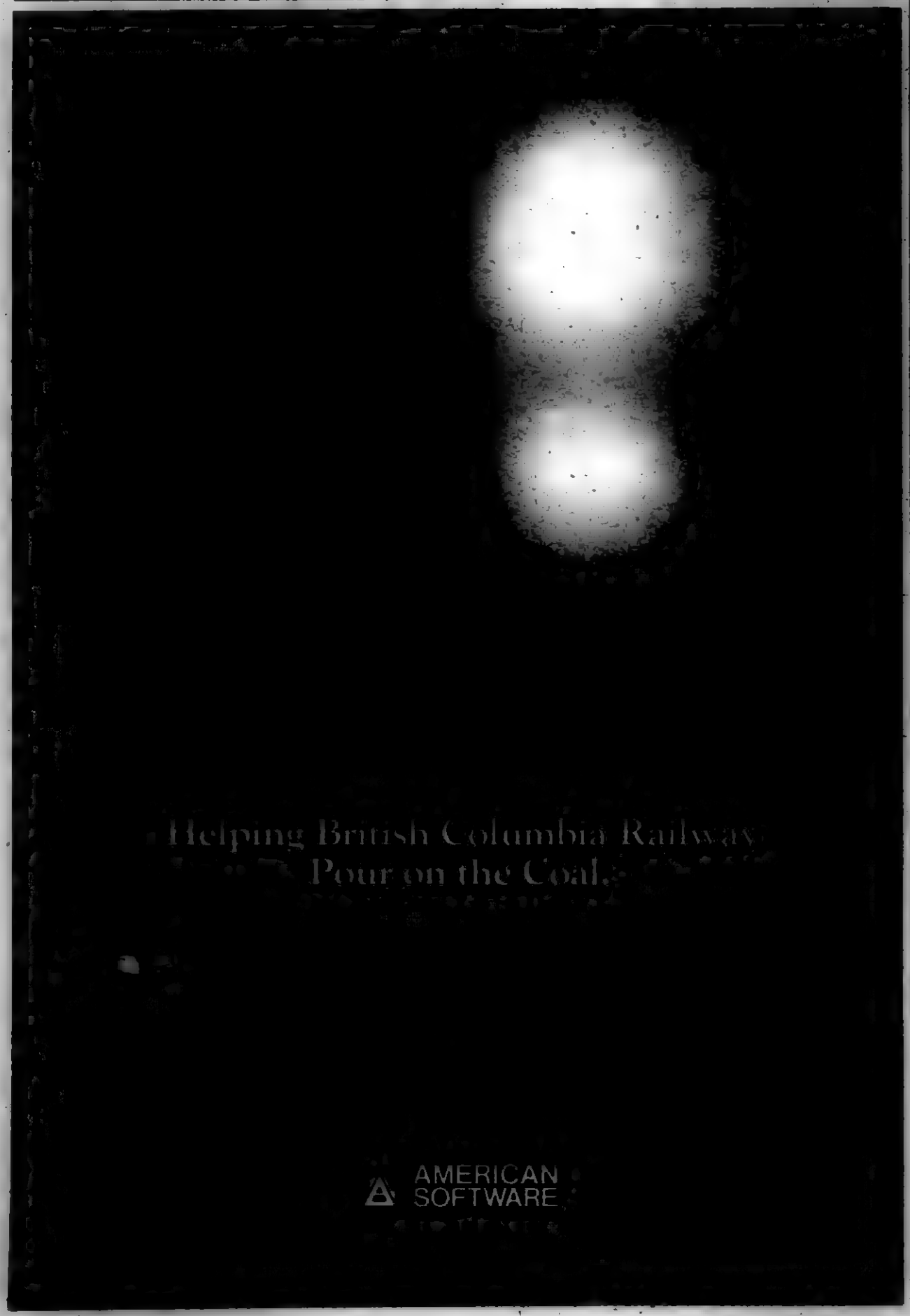
Part of total

Local-area networks do not stand alone; they should be seen as part of a total systems approach, supporting the sale of peripheral devices such as programmable controllers, robots and other shop floor automation that will hang on the networks.

Industrial local-area networks require specifications much stricter than those targeted for the office: Factories are often noisy and corrosive, and electromagnetic interference degrades communications capabilities and durability. Factory communications are much more performance-conscious — and less cost-sensitive — than those of the office, and users can expect to pay a premium for reliability, data integrity and guaranteed access time.

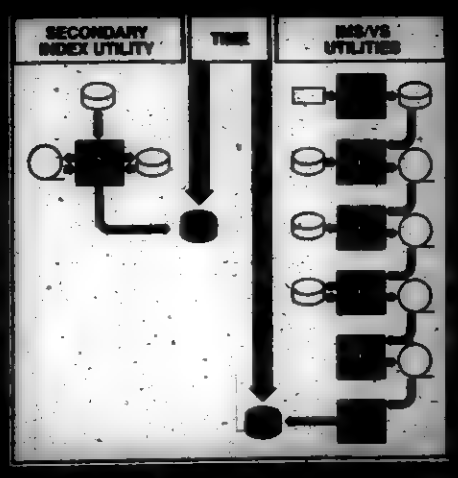
The issue of standards remains paramount. Each of the competing companies in this market has developed its own proprietary communications system. Acceptance of any one standard is a long way off. Standards in factory communications will take shape differently from standards in the office.

Howie is director of marketing of the Factory Systems Planning Service for The Yankee Group, a Boston consulting firm.



Still holding your breath for important IMS information?

Breathe easy with the SECONDARY INDEX UTILITY.



SOFTWARE

FOR FASTER ACTION CALL 713-240-8800

☐ Please contact me with more information about the SECONDARY INDEX UTILITY.

☐ I am interested in a 30 day free trial with no obligations.

NAME_____

TITLE_____

COMPANY_____

ADDRESS_____

CITY_____ STATE_____ ZIP_____

TELEPHONE_____

Clip and mail to: BMC SOFTWARE

CW P.O. Box 2002 / Sugar Land, Texas 77478

GM controllers solve materials handling

By directing disc brake assembly parts over mile-long conveyer

SAGINAW, Mich. — A programmable controller serves as the primary intelligence device to operate and control a complex conveyer line that runs over one mile at a General Motors Corp. automotive manufacturing plant here.

Programmable controllers have solved a complicated materials handling problem on the GM Manufacturing Division plant's high-volume conveyer and transfer system, which is used for machining steering knuckles here. The knuckles are part of a disc brake assembly used on front-wheel and rear-wheel-drive cars.

Where a pair of redundant Digital Equipment Corp. PDP-15 computers formerly were employed, a Gould, Inc. Modicon 584 programmable controller now makes the necessary decisions and executes the divert algorithm to control the conveyer system, relieving a redundant pair of DEC PDP-11/70s for more urgent tasks. The programmable controller is interfaced to the PDP-11/70s using twisted wire pairs.

Steering knuckles are transported on pallets attached to a chain conveyer that is installed at the plant's ceiling level. More than a mile long, the conveyer is similar to a railroad, with spur lines or side tracks leading to the various machining operations located throughout the 200,000 sq-ft area of the building. This main chain conveyer is primarily used to transfer parts from machine to machine. However, it also provides an inventory of parts between operations and can store more than 20,000 steering knuckles.

Spur lines receive pallets of knuckles destined for one of three different machining operations. These spur lines also provide a parts bank ahead of each machine to ensure a steady flow of parts to each of the machining operations. When the spur line is saturated with pallets, the control system diverts additional pallets back to the main conveyer or to an additional storage loop that can retain the pallets until they are required for one of the machining lines.

As a carrier travels along the main conveyer chain, each time it approaches a spur conveyer, the control system executes a divert algorithm. This decision, rendered by the programmable controller, determines the path of the carrier — whether it stays on the main chain conveyer or whether it is to be diverted into a spur line for a machining operation.

System design criteria

Some of the design criteria that make up the control system include:

- Parts type separation.
- System balance.
- Storage loop allocation.
- Lot control.
- Man/machine interface.

Parts type separation refers to the fact that the system produces three different sizes of knuckles that are used on a variety of disc brakes for compact, mid-size and full-size cars. Plant mix for the various knuckle sizes can change daily, since all sizes are not necessarily run each day. As a carrier approaches a spur, the control system must consider its sequence in the machining process and the type of parts the carrier contains.

Another critical factor for the system is line balance, or consideration for the machining operations that operate at a variety of speeds. The number of parts per hour that each machine can produce varies from 400 to 600; line imbalance is caused by variations in production rates and by machine utilization that is usually less than 100%, a combination that can force the system into a continuous state of imbalance. Smooth operation can be achieved through a complex algorithm that allocates units to the storage system with maximum efficiency.

A storage loop in the conveyer system is used to achieve line balance and serves as a surge tank for the main conveyer. The control system determines the optimum number of carriers on the line and switches all excess carriers onto the storage loop. If the carriers completely load the line and the storage loop is also filled, the control system shuts down that particular machine operation until there is space available on the line.

Lot control is a factor that determines the relative age of all the parts on the line and attempts to use the oldest parts first. A decision has to be made as each carrier approaches a spur line. The controller must look ahead and determine if the machine is running and if there is any storage space left on the spur line, which normally holds four or five carriers. It also must determine if any of the other spur lines have more urgent needs; if so, the carrier will pass by and be directed to a more needy machine.

The man-machine interface is required to start, stop or change the status of the control system. It gives the operator the ability to cope with the day-to-day problems of overriding the control system with human input. Items under human control include carrier data interrogate or update. This capability allows an operator to assign any carrier to a special destination for rework or to achieve system balance. It is also possible to direct a carrier to a repair station, if necessary.

Control of the conveyer line is achieved with a hierarchical control pyramid. At the base of the pyramid are 12 Gould Modicon 484 programmable controllers that are referred to as automation controllers. They operate each of the spur lines and take control of the carriers once they are diverted onto a spur. The programmable controller unloads the parts from the carrier, delivers them to the machine tool and reloads the machined parts into the carrier. Loaded carriers are then routed back on the spur line and merged into the main conveyer.

A second level on the pyramid controls traffic on the main conveyer line. For this part of the system, there are three remote I/O drops from the 584 programmable controller that are referred to as recirculation panels. These panels direct the carriers through the spur entrance on the main line and prevent collisions at the spur exits and around corners on the main conveyer. Each panel is responsible for a portion of the overall conveyer system.

A third, or intermediate, level of the control pyramid has a Gould Modicon 584 programmable controller that controls the main conveyer. This controller is the primary intelligent device for the control system. A second Modicon 584 is installed to serve as a backup unit to the primary programmable controller. The system allows manual switch-over to the backup controller if it is required. At the top of the control pyramid are the pair of redundant DEC PDP-11/70 computers. The computers are used for monitoring machine operation or for controller support, report generation or backup data monitoring to track the current status of the conveyer line in case of a failure at the intermediate control level.

In former control systems, the primary function of the computer was to execute the divert decision at the spur line. With programmable controllers making these decisions, the computer is relieved of this real-time decision making, thus allowing it to be assigned additional tasks.

Network links conveyer system components

SAGINAW, Mich. — Since the conveyer system at General Motors Corp.'s Saginaw Manufacturing Division plant uses many hierarchical levels and types of intelligence, there must be a form of communications network between all of the components in the system.

The 12 automation controllers and the three I/O drops use the simplest form of communications, with a network of hard-wired interlocks. Other networks in the system include a Gould, Inc. Modbus network for remote programming hookup to each recirculation panel and a baseband network used by the main conveyer controller to converse with the remote I/O of each recirculation panel.

A broadband link to the computer communicates with the automation controller, the main conveyer controller and the transfer machine or machine tool controllers. All the hardware in the system is configured in a hierarchy that has a maximum dispersal of intelligence and uses several independent communications networks to achieve complete control of the conveyer system.

Each level of the control system is designed with a number of maintenance tools. The automation panels have graphics displays that illustrate the loading and unloading of the carriers. The status of all limit switches, solenoids and various internal logic conditions is shown on these graphics panels, which also can be used by maintenance personnel to aid troubleshooting.

A Modicon P464 remote monitor allows interrogation of all registers, inputs and outputs. Except for the logic, the total status of the programmable controllers can be determined with the remote monitor, thereby eliminating a bulky programming panel. The monitor also makes the information gathered by the controllers accessible to the operator or to maintenance personnel.

Another maintenance tool developed with the control system is a remote register access panel that is mounted on the recirculation panel door.

The remote register access panel is used for interrogation of the programmable controller status and also as a fault display system. The panel consists of a four-digit display, an array of 16 lights and a chart that identifies the I/Os and other connections of the system and a single fault light.

A multiplexer is used to obtain information from the carriers. Readers at each divert point use a multiplexing scheme to a single input.

The control system uses a structured data base. The basis of the entire logic program is a structured format. This data was constructed first, and it consumed several months of design effort. With the structuring of the data base, the structuring of the systems logic occurred naturally. For this structuring, the main conveyer controller was regarded as a computer, with computer concepts applied to the logic of the programmable controller.

When a new tape is loaded into the main conveyer controller, it activates the initialization task. When this task is invoked, all motion of the carriers is stopped and the controller data base is wiped clean. The computer can then update the current status or proper data base to the programmable controller.

To aid in solving the complex divert algorithm, a linked list is used. This is a method of organizing blocks of information in memory. Each block has a trunk that points to the next block of information and a tail that points to the previous block. By sorting the information in memory prior to the actual decision making, the time required to solve the algorithm is reduced.

A polling system is used to reduce the communications overhead associated with programmable controllers. Each time the programmable controller changes its data base, a flag is sent to the computer. The computer constantly monitors these flags and when it detects a change of state, it only reads that portion of memory that has changed.

SPECIAL REPORT

Programmable controllers altering shop floor

By John G. Rowe
Special to CW‡

The success of factory automation technologies begins and ends with their impact on the functions of the factory floor. All of the various types of computerized manufacturing systems — material requirements planning, computer-aided design and manufacturing, robotics programming systems, numerical control programming systems, inventory control and shop floor scheduling — have as their central purpose the support of production on the floor.

A microcomputer-based revolution is occurring in control techniques down on the floor itself, a revolution that currently tends to be overshadowed by these more glamorous applications. This trend toward microcomputer control will have an impact as large as, if not larger than, the introduction of the microcomputer into the office and home. This factory micro is the programmable controller.

Programmable controllers employ stored programs in memory, recognize inputs and outputs by fixed address locations assigned to each, make logical decisions and generate commands. They also communicate quite easily by direct wiring with the devices that they monitor and control. That control consists of interpretation of simple binary events such as on/off, empty/full or hot/cold signals and data events such as time, position or product levels. In other applications, more complex sequencing, analog data interpretation and sophisticated data handling are used.

Two-part composition

The programmable controller is composed of two parts: a CPU and an interface. The CPU consists of a power supply, memory and the processor. The processor makes control decisions based upon the application program stored in memory. The interface isolates the CPU from industrial noise and provides signal conditioning to control external devices. I/O or servo control modules form this interface between the processor and the controlled operation. The input control or sensor devices on the machinery are wired to the input modules, which convert the signals to the proper voltage to provide machine or process status information to the processor, which in turn decides the appropriate status for the output devices. These signals are converted to the proper voltage and sent to the output devices by the output modules.

More recently, programmable controllers have included such advances as mathematical calculation capabilities, data transfer and comparision and the ability for peer-to-peer communications between common machines via data highways. These data highways are tailored communications networks with the logic to determine which programmable controller is transmitting and which is receiving as well as acknowledgments of receipt. Gateways are then employed for linking groups of programmable controllers from different vendors together or to factorywide networks.

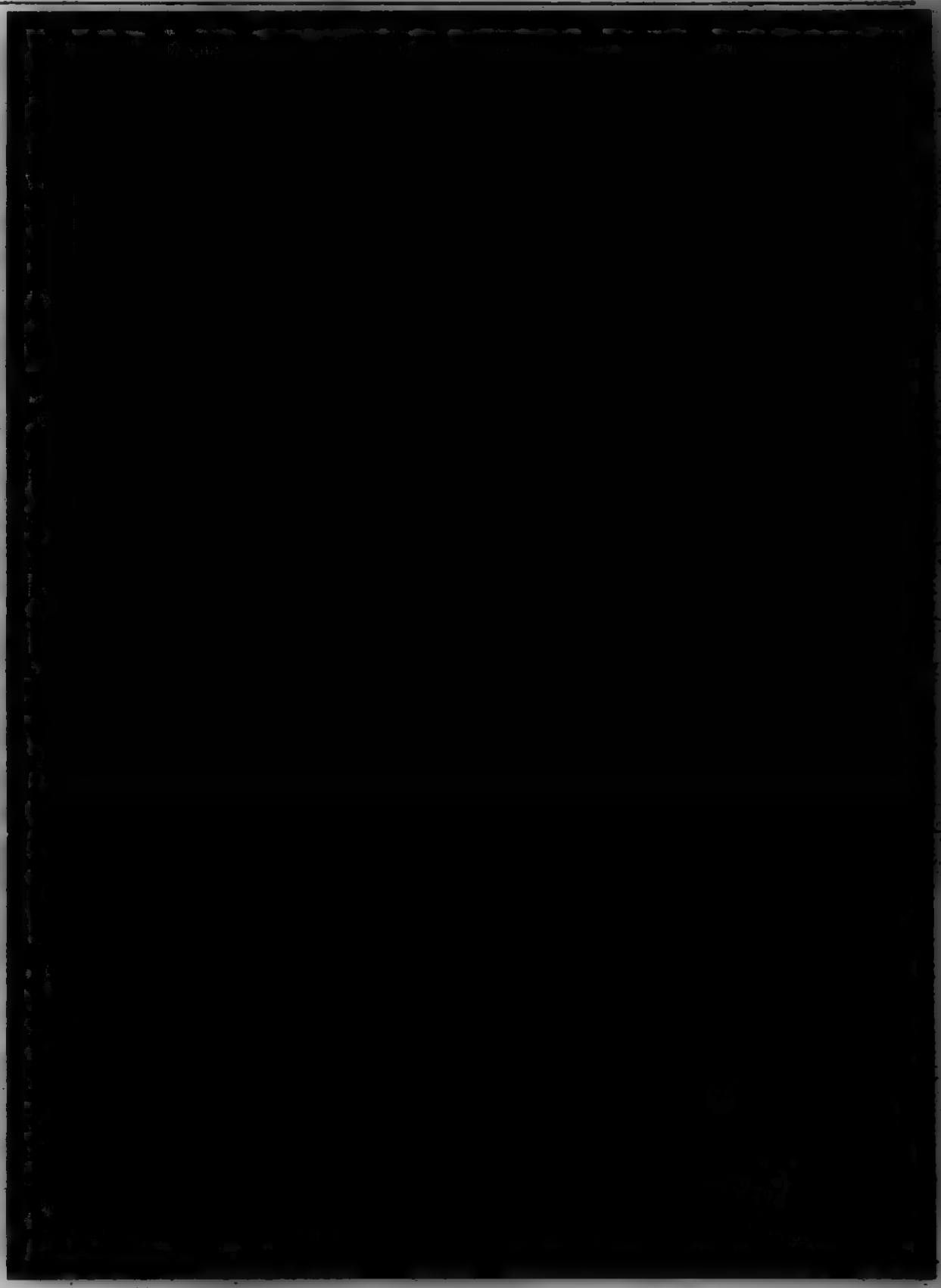
Programming these controllers usually involves the use of ladder logic diagrams — the methodology already used by factory technicians for wiring relays. Thus, ladder logic can be thought of as a high-level, user-oriented language, in that no special computer knowledge is required in the operation or maintenance of programmable controllers. Further, some manufacturers have augmented ladder logic with mnemonic commands or introduced Basic and Boolean logic as alternatives in order to make better use of the logic power of the microcomputer.

Future developments in programmable controller technology will include:

- A standard industrial ladder language.
- Standard communications interfaces and protocols.
- Color graphics in displays for machine programming and monitoring.
- Increasing capability with decreasing cost, as microcomputer-based programmable controllers take advantage of advances in semiconductor technology.

The ability of programmable controllers to handle complex operations and optimize the control of the machine to produce a part most effectively will result in a blurring of the boundary between the logic contained in the numerical control parts program and that contained in the ladder logic at the controller level. Thus, the areas reserved for microcomputer-based programmable controller applications and minicomputer- or mainframe computer-based applications for factory control will become, in time, as indistinct as those reserved for microcomputers and minicomputers in traditional commercial data processing applications.

Rowe is a principal of J.C. Rowe & Associates in Cleveland, a consulting firm specializing in industrial automation.



466 ways to use an HP 3000.

The point of buying a computer is to speed things up. So why let programming slow you down?

With the HP 3000 family of business systems, you can usually be up and running as soon as you plug them in. Because our computers come with a vast range of ready-to-use software that covers the applications spectrum from accounts payable to zoning.

We wrote many of these special programs ourselves. Last year alone, we supplied customers with more than $50 million worth of applications software. Others come from a variety of software firms working closely with us.

So the chances are pretty good that your own programming effort can be trimmed substantially. When you do need to write your own programs, the HP 3000 will help you do it much faster. With our special set of programming tools, customers have cut 500 lines of code down to 100. At about $50 a line, that really adds up.

Here's another way you save. With complete compatibility across the entire range of HP 3000s, you don't have to spend a dime converting software from one system to run on another. That's a big help when you're picking the right computer for a branch office or a regional center. Or any size office in-between.

Press here.

When you write a program for our inexpensive Series 39, you can also use it on our Series 68 distributed mainframe which handles up to 400 users. Or on our mid-range Series 42 and 48 computers.

Here's some more help in making your selection. The HP 3000 costs up to 40% less than comparable systems. So you save on the hardware as well as the software.

If you'd like to see how useful an HP 3000 can be, call your nearest HP sales office listed in the white pages. Ask a Business Computer Specialist for a demonstration. Or write for more information to Tom Rappath, Hewlett-Packard, Dept. 03184, 19447 Pruneridge Avenue, Cupertino, CA 95014. In Europe, write to Henk van Lammeren, Hewlett-Packard Nederland B.V., Dept. 03184, P.O. Box 529, 1180 AM, Amstelveen, The Netherlands.

HEWLETT PACKARD

SPECIAL REPORT

Successful MRP needs full-time project leader

By Carmine B. Morello
Special to CW!

Manufacturing resource planning (MRP) implementation is a long and arduous trek through a maze of well-intentioned advice, essential building blocks treated as givens and a myriad of buzzwords.

Three givens for successful project management are:

- The position of project leader requires full-time attention.
- The individual selected as project leader need not and should not be a systems person.
- Using an outsider as project leader does not enhance your chance for success.

The role of the MRP project leader is to organize and direct the project team, to supervise the implementation of the manufacturing control system, to assist in the development of operational procedures and to coordinate educational schedules and programs. Anyone who has performed any of these tasks can infer that, together, they require the full-time dedication of an individual.

The key words used to describe the role of an MRP project leader are: organize, implement, develop and schedule. Anyone involved with data processing, from coder to MIS director, will recognize these as essential requirements for proper job performance. To assume that a production expert from an informal or expedite-based manufacturing environment will be better suited for supporting a formal, schedule-guided environment is dangerously incorrect. A good DP manager — who must live within the constraints of a scheduled environment, has to react daily to provide needed flexibility, organizes and implements new systems on demand and constantly evaluates efficient operating procedures — is a prime candidate for consideration as a project leader.

If the DP area is unable to supply a project leader, should you settle for second choice? MRP concepts are not revolutionary by any means, but to take a hardened expedite-trained production person and expect him to embrace MRP may be a formidable task in itself. On the other hand, what you produce and how you produce it is no great mystery, and production does not differ drastically from other similar industries. An outsider, experienced and versed in MRP procedures, is more easily connected to a company's special manufacturing requirements than an expedite-trained production person is to MRP concepts.

The traditional practice has been to separate the position of MRP implementation project leader from the DP department. A great deal has been made of the fact that MRP implementation is a people project, not a computer project. The process of implementation is the same as installing an accounts payable or inventory system. User interface and input, description of the current procedures and paper flow, definition of system specifications and requirements and formulation of the standard operating procedure for new systems are all valid steps that a good DP manager follows when implementing any system.

DP personnel are no strangers to the development and implementation of new systems; MRP is just another new system. Your chances for success are enhanced by placing the responsibility for implementation leadership back into the hands of the implementation expert — the good DP manager.

Morello is MRP project manager for Perfect-Line Manufacturing Corp., a manufacturer of electrical products, located in Amityville, N.Y.

AMAPS
The Only Software
Your Manufacturing Company
Will Ever Need

AMAPS Gives You the Best of Both Worlds:
Superior Leading Edge Technology and Unbeatable User Benefits

AMAPS has been recognized in survey after survey as providing the most complete application functionality and highest system reliability. Our new technology utilizing state-of-the-art on-line architecture, with full support of Data Dictionary and 4th generation productivity tools, delivers the best to both users and data processing professionals.

Comserv offers AMAPS/3000 for minicomputers, AMAPS/Q for mainframes, and AMAPS/G for Government Contractors. Each of these systems offers true integration of Business Planning, Material and Production Planning and Control, and Financial Management with unsurpassed ease of use. All supported by the industry's most complete line of education products and experienced professional services.

Experience AMAPS yourself! Call to arrange for a demonstration.

Or to help in your software evaluation, attend one of our nationwide seminars which provides an in-depth review of the features, functions and architecture of our AMAPS products. Contact Lynn Johnson at 1-800-328-2030, or in Minnesota 1-612-881-7243.

comserv CORPORATION

LOOK INTO OUR MANUFACTURING CONTROL SOFTWARE.

YOU WILL FIND OVER 700 INSTALLATIONS ALREADY BENEFITING FROM IT.

Benefiting through reduced inventory costs, increased productivity and improved customer service.

MAS-Manufacturing, the closed loop Manufacturing Resource Planning System from Martin Marietta Data Systems, has been delivering key benefits like this to hundreds of companies around the world for over a decade.

YOU WILL FIND A FLEXIBLE SOFTWARE SYSTEM AND HARDWARE INDEPENDENCE.

MAS-Manufacturing is the fully integrated on-line Manufacturing Control System with the built-in flexibility to be used in a wide variety of manufacturing companies—both large and small. And since our system is made up of integrated modules, your company can implement them as your business or budget dictates. Without the overhead of installing functions not required.

MAS-Manufacturing delivers results by synchronizing the six most critical elements of your company's manufacturing operation:

- ☐ Master Production Scheduling
- ☐ Inventory Control
- ☐ Manufacturing or Shop Floor Control
- ☐ Purchasing
- ☐ Cost Control
- ☐ Engineering Control

And we're flexible when it comes to providing you with the hardware option that meets your requirements. MAS-Manufacturing operates on *a wide variety of computer systems* from IBM mainframes and 4300 series computers (including the 4321/SSX) to Hewlett-Packard 3000's and DEC VAX minicomputers. For use on your machine or we'll supply the hardware too.

You can even use MAS through our Remote Computing Service, avoiding any hardware investment or commitment. And, because of the hardware versatility of MAS-Manufacturing, the system can easily be brought in-house in the future.

MARTIN MARIETTA

YOU WILL FIND UNBEATABLE SUPPORT, TRAINING, AND DOCUMENTATION.

As with every Martin Marietta product, you and your company can rely on us for full support. Our manufacturing and data processing specialists are always ready to assist you throughout each step of the planning, installation and implementation.

You will also find us ready to address your needs for software customization and user training. We can provide you with full maintenance services—including a special Customer Service Hotline.

And to top it off, you will be pleased to find that our documentation is as comprehensive as you would expect from an industry leader.

YOU WILL DISCOVER A GROWING MAS FAMILY OF PRODUCTS.

We recognize that there is more to a manufacturing company than manufacturing control. To meet your company's complete needs, we offer a growing family of MAS products including:

- ☐ MAS-Manufacturing
- ☐ MAS-Personnel and Payroll
- ☐ MAS-Financials
- ☐ MAS-Project Management
- ☐ MAS-Decision Support

Not to mention the 100-plus software packages offered on our remote computing services network.

We plan to continue our efforts as your total information services company by adding even more quality products to our growing MAS family.

YOU WILL REALIZE THAT RESULTS ARE ONLY A COUPON AWAY.

Whatever your manufacturing control or information services requirements, we have a system which can give you tangible, bottom line benefits. Fill out the coupon and mail it—we'll send you complete details on how Martin Marietta Data Systems products can start paying off for your company right away. Or, better yet, call us toll-free at (800) 638-7080. In Maryland, (800) 492-7170.

I'D LIKE A CLOSER LOOK.

Send me more information on MAS-Manufacturing software. Also include details on:

- ☐ MAS-Personnel and Payroll
- ☐ MAS-Project Management
- ☐ MAS-Financials
- ☐ MAS-Decision Support

Name

Title

Company

Address

City State

Zip Phone

MARTIN MARIETTA DATA SYSTEMS ©
Marketing Services, CW-P
6303 Ivy Lane
Greenbelt, Maryland 20770

SPECIAL REPORT

Integration coming to shop floor automation

By Ray L. Dicesaré
Special to CW

There is a revolution catching fire in manufacturing. Automation that started on the shop floor is revitalizing American industry. It has included the various technologies of manufacturing resource planning (MRP), computer-aided design (CAD) and manufacturing, computer-aided engineering and robotics to boost productivity and profits.

But the movement toward high-technology solutions provided by DP personnel has not been restricted to shop floor tools and the managers of production. The revolution has now moved toward the functional integration of all these technologies. Functional integration will forever change the way business is conducted, enlisting everyone from the shop floor to the administrative floor, including the top decision makers.

The movement toward automated systems was inaugurated by the pressing needs of blue-collar managers for timely and accurate information to help them gain control of the production environment — of people, materials and equipment. Manufacturers found solutions in computer hardware and software. But the people involved soon realized that automating production on the shop floor sent reverberations of change all the way to the administrative floor. Management responsible for corporate finance, purchasing, engineering and marketing clamored for the same timely and accurate information.

While much of the information revolution taking place on the shop floor was of real value to other areas of the company, one very vital ingredient was lacking: There were no links, no bridges, to tie one area of a manufacturing company to another — marketing to order management, to engineering, to purchasing, to production, to finance and back again. What was needed was a functionally integrated solution.

While much of the information revolution taking place on the shop floor was of real value to other areas of the company, one very vital ingredient was lacking: There were no links, no bridges, to tie one area of a manufacturing company to another — marketing to order management, to engineering, to purchasing, to production, to finance and back again. What was needed was a functionally integrated solution.

Production management is most acutely concerned with planning for and controlling the resources required to produce a marketable finished product.

With all the changes wrought in the world market in the 1970s, manufacturers found themselves caught in a squeeze play. Inflation and high interest rates required that they cut inventory while increasing production efficiency. Changing consumer attitudes demanded quality, choice and service, while there was always pressure to maintain or reduce costs. Efficient, high-volume production runs had to be balanced against shorter runs for market flexibility.

MRP II gave production management the tools it needed both to plan and to control production within these constraints.

On the control side, manufacturing standards must be developed to define what goes into each product. Manufacturing standards also specify standard routings required to support the production process. Inventory control provides a means of tracking inventory from the receiving dock to the warehouse and through production. Shop floor control provides for dispatching and tracking work assignments systematically.

The planning side

On the planning side, the most important MRP II tools include master production scheduling, which is a formalized plan that tells production what, when and how much it is going to make. MRP and capacity requirements planning translate the master schedule into what materials and capacity are required to execute the plan.

All of these tools are, in themselves, important advances in the way production is managed and controlled. They produce significant cost savings by giving production management a better view of what is happening on the shop floor. They facilitate reductions in inventory levels as well as improved customer service. They give management the ability to anticipate material shortages as well as capacity bottlenecks, and they give marketing accurate information on what is available to promise.

But manufacturers began to appreciate the fact that these tools also supply information of great value to other corporate managers in the areas of finance, marketing, purchasing and engineering. Just as MRP II was the natural evolution of MRP, functional integration is the next step in providing the links and bridges tying the various pieces to a larger whole.

One of the most critical functional links takes place in the cooperative effort of production management and purchasing management to control inventories. MRP provides time-phased information on material needs, while master production scheduling increases the ability to forecast accurately production in the future.

Armed with this information, purchasing can greatly improve its performance and ability to ensure the best price and service from its suppliers. In turn, an integrated purchasing system that can record and track vendor performance serves the information needs of engineering in designing and specifying purchased parts.

Another critical functional link exists between the shop floor and financial management. Information gathered in inventory control and shop floor control is just as important to effective cost accounting as it is to shop management. The actual cost of material and labor activities can be analyzed using the cost of operations and materials defined in manufacturing standards as a benchmark. The resulting variances aid financial management in pinpointing out-of-control cost situations. This ensures that the information used to plan and control production is the same information used for cost accounting.

The axiom that knowledge is power is especially true when determining a competitive price that will return a sound profit. The pressures of the changing world market in the 1970s made it imperative that marketing have the best information available in setting prices. Marketers, in turn, were the first to become aware of shifting customer attitudes regarding buying trends. This information is crucial to forecasting and developing a workable master production schedule.

Information about what the customer likes and dislikes is extremely useful to engineering. Engineering can readily transfer that information into product design and tooling improvements as well as perform change simulations and consolidation with CAD. In an integrated system, CAD feeds that information directly into the bills of materials in manufacturing standards, which brings another information loop full circle.

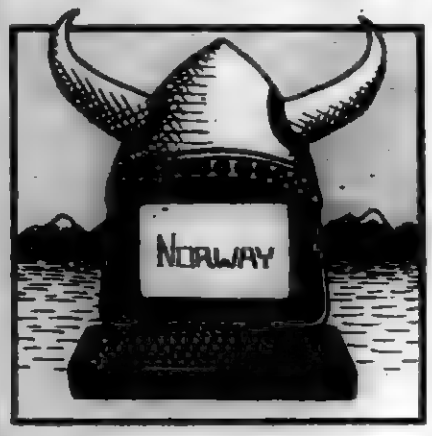
The functional link between marketing and the manufacturing plant is achieved with a formalized order processing system. Order processing marks the beginning and end point of manufacturing.

With an order processing system that is functionally integrated to an MRP II system, "on hand" and "available to promise" information can be relied upon. In a market increasingly tuned to service, this can spell the difference between a one-time buyer and a repeat customer.

The revolution that started on the shop floor has begun to come full circle. Functional integration is the thread that weaves the entire manufacturing process — from engineering, to material planning, to production, to marketing, to accounting — into one completely integrated fabric in which each of the different parts serves and supports the whole. It proves another axiom: The whole is always greater than the sum of its parts.

Dicesaré is vice-president of the Manufacturing System Division of Management Science America, Inc., a software vendor based in Atlanta.

The Norwegian computer market wants to hear from you.



The Norwegian computer market is expected to *grow* at an annual rate of 30%. The Scandinavian countries (Norway, Sweden and Denmark) constitute the fourth largest regional market in Western Europe, and according to International Data Corporation, it is a highly developed market.

Reach your potential buyers in this important marketplace with *Computerworld/Norway*. A tabloid newspaper published twice a month, *Computerworld/Norway* reports on the most timely news concerning new products, new software applications, market trends and opportunities. Editorial coverage includes trade shows, foreign markets, education, government, major industries and the implications of computers. *Computerworld/Norway* is circulated to 7,000 DP professionals in end-user related environments.

CW International Marketing Services gives you one-stop advertising service in countries around the computer world. For more information on *Computerworld/Norway* or any of our other foreign publications, just fill out and return the coupon below.

Diana Lo Rinaglio, Manager
International Marketing Services
CW COMMUNICATIONS/INC.
375 Cochituate Road, Box 880
Framingham, MA 01701
(617) 879-0700

CW Communications/Inc.
Publishers of *Computerworld* and other leading computer publications around the world.

Please send me more information on:
☐ *Computerworld/Norway* ☐ Your other foreign publications

Name _____ Title _____
Company _____
Address _____
City _____ State _____ Zip _____

SOFTWARE & SERVICES

SOFTLINE
William H. Inmon

Subject data bases: blueprint for shop

First of a two-part series

Subject data bases are the integrated, consolidated data bases that result from a rigorous data modeling effort. Subject data bases combine related data elements into a single data base, even when the elements come from vastly differing requirements. When an organization defines its subject data bases, there is no overlap between the data bases and, furthermore, all functions served by the shop are represented in the data bases.

In addition to reducing data redundancy, subject data bases also reduce process redundancy, since the fewer data definitions there are, the fewer programs need to be developed and maintained. A significant by-product of designing and implementing subject data bases is efficient development and greatly reduced maintenance work load.

Subject data bases that are produced as a result of a modeling exercise are, in essence, a blueprint for the data architecture for a shop. There is no question as to the usefulness of a well-constructed blueprint. Unintegrated systems do not lay a foundation on which future systems can build. Data and processes, in whole or in part, must be constantly recreated.

But it is not enough merely to create a blueprint. To be effective, the blueprint must be translated into tangible systems. This translation must be done carefully, because subject data bases lend themselves to some very real implementation problems.

The implementation of subject data bases must be tempered by the environment in which they will operate. Specifically, the on-line operational environment and the decision support environment are of relevance to the implementation of subject bases.

There are two primary considerations

See SUBJECT page 68

Introducing Olympic Games for computer programmers

By Phil Sokolowsky
Special to CW2

In this Olympic year, there is, unfortunately, a class of deprived citizens who cannot relate to the Olympics at all. These people are so mired in their own world that they rarely see daylight, let alone get any exercise. These unfortunates are known as programmers.

In an effort to get programmers interested in an exercise program that is compatible with their life-styles, the Winter Computer Programmers' Olympics has been created. Bear in mind that the events are geared toward a population whose only exercise is hitting a keyboard. The winter events include:

■ The kludge. Unlike the thrilling, 60-mph sport played by death-defying daredevils, this is a favorite of insecure programmers. The object of the game is to see how dense and unreadable a simple read/write program can be made. Points are scored for meaningless data names, dead code, unused files and so on. Any shred of documentation immediately disqualifies the contestant.

■ The 90-meter ski dump. There is no starting gun for this event. Instead, the player is awakened by a 5 a.m. phone call from the night officials and summoned to the operations room to fix an abend. The player must reach his destination within 30 minutes (including the obligatory stop at the local 7-11 for an extra-large black coffee and an 18-oz. bag of Frito's corn chips) in order to read the dump which, of course, has not yet been printed. In order to get a medal, the player must figure out the problem, rerun the job, burst and decollate the output by hand, shave in the company washroom and be at his desk ready for a full day's work by 8 a.m.

■ Structured figure skating. In order to qualify for this event, the contestant must first complete the grueling, two-hour Cross-Country Walkthrough. Those lucky enough to make it will be rewarded by the beauty and grace of the event. The player is judged by his peers for the design of his loops (no figure eights allowed here), for readability of his routines and for style and grace.

■ Systems bobsledding. This fast-paced, nerve-racking event is played primarily by those programmers currently seeking employment elsewhere. The gold goes to the programmer with the best explanation for why he is wearing a three-piece suit today when his normal attire is jeans and a T-shirt.

■ User-friendly hockey. All participating programmers are forced to join this event, because none of them wants to. Players are divided into two teams: programmers vs. users. Users attempt to stop programmers from employing DP jargon, while programmers try to convince users that the word "face" is actually a number.

But what of the summer programmer — that competitive breed that spends its summer vacations coding indoors? Just for the summer programmer, we present the Summer Computer Programmers' Olympics.

All the events listed are winter programmers' sports, meant to be played in an office building in which the heat has been shut off for at least 36 hours. Contestants are forced to wear winter clothing and mittens while competing at their terminals.

But what of the summer programmer — that competitive breed that spends its summer vacations coding indoors? Just for the summer programmer, we present the Summer Computer Programmers' Olympics, which include:

■ The discuss. A programmer begins this logic game by asking the analyst for which he is working, "Can I discuss with you the detailed programming specs you gave me on this cocktail napkin?" The object of the game is to ask as many pointed questions as possible within the two-minute time limit in order to prove that the analyst does not, in fact, know what he is talking about.

■ The hexadecathlon. This event is a must for the jack-of-all-trades type. Sixteen events, numbered 0 thru F, must be completed. The point is to find the programmer who is best at being all things to all people. Contestant activities include: writing business specs, because the user

See OLYMPICS page 67

INDEX
Systems Software/66
Productivity Aids/66
Application Packages/66
DBMS/66
Remote Computing Services/66
On-Line Data Bases/66
Training/66

American Software unveils system for IBM mainframes

ATLANTA — American Software, Inc. has announced its Accounts Receivable Management System for IBM mainframes. The software monitors a company's receivable assets.

The system is said to handle the requirements of open-item or trade receivables. It was designed to aid multidivision companies and has no limitation on the size or number of accounts it can handle, according to the vendor.

A credit data base provides customer history data for three six-month periods and includes pay habits, sales volumes, total credits, high credit, cost of late payments, history of unearned and excess discounts taken and total collections recovered, the vendor said.

The system prints nine types of invoices and notices using one form and interfaces with order-entry files for automatic credit checking, the vendor said.

The system was designed to operate in an OS environment on IBM's 370 and larger computers, the vendor said.

Prices range from $45,000 to $90,000, according to the vendor.

American Software is located at 443 E. Paces Ferry Road, Atlanta, Ga. 30305.

Intech development tool runs on IBM Personal Computer XT

CAMBRIDGE, Mass. — Index Technology Corp. (Intech) has introduced a software development tool that automates much of the analysis, design, organization and documentation procedures of systems analysis.

Excelerator runs on the IBM Personal Computer XT. It is an integrated, menu-driven package that utilizes graphics, a data dictionary and word processing to allow analysts to draw charts and diagrams and produce documentation. With the diagramming facilities, a user can design enterprise models, data flow diagrams, data structure charts, record and file layouts, screen definitions and report layouts, a spokesman said.

The product incorporates predefined templates and can automatically generate connections between objects. A link to Microsoft, Inc.'s Microsoft Word package allows narrative descriptions of systems design to be generated.

The integrated data dictionary stores objects, connections, text, data elements and records at the time of drawing. The dictionary holds all information about the system and its related graphs, the spokesman said. Up to 10 levels of graphs can be linked together in the dictionary for

See INTECH page 67

McDonnell Douglas' Unigraphics II multiple island machining

McDonnell Douglas unveils graphics tool

ST. LOUIS — McDonnell Douglas Automation Co. (McAuto) has announced an advanced interactive graphics software system, which the vendor said was designed exclusively for 32-bit processors.

Unigraphics II is said to be a tool for design and manufacturing engineers, draftsmen and detailers and can be used in product development, including engineering design and analysis, drafting and the generation of numerical-control data.

Unigraphics II has an associative data base that permits the user to establish and manipulate links among information to help automate design, drafting and manufacturing, a spokeswoman said. Functions automated by Unigraphics II include the dimensioning of drawings and the development of programs to machine complex product geometries.

The Unigraphics II system is designed to run on 32-bit minicomputers, such as the Digital Equipment Corp. PDP-11 under the RSX-11/M operating system, the VAX-11 under VMS and the Data General Corp. Eclipse and Eclipse MV series processors under AOS and AOS/VS.

The spokeswoman said the end product of a design developed with Unigraphics II is a three-dimensional model of a part, with all descriptive data stored in the data base. The data base is a common source of information for drawings and documentation, engineering analysis and numerical-control instructions for manufacturing and permits integration of computer-aided design and manufacturing and computer-aided engineering uses. Unigraphics II can also be interfaced with McAuto's robotics modeling and programming products.

The Unigraphics II system is priced between $40,000 and $60,000, depending on the host system, from McAuto, St. Louis, Mo. 63166.

F&A THE HOME OF NO GIMMICK PRICING -
NO FINE PRINT - NO EXTRAS
ALL PRICES INCLUDE SHIPPING, HANDLING, COD or MC/VISA
PC COMPATIBLES TO SAVE YOU A BUNDLE

New Zenith Z100's | Columbia MPC's | Sanyo MBC 550

CORONA Super Special VERY LIMITED QUANTITIES 128K, 2 320KB Disks, Multimate
Portables only $2,250 Desk Tops with monitor only $2,329
Sorry, NO MC or VISA on these Corona Specials, COD ONLY

SOFTWARE and OTHER NEAT STUFF

To ORDER ONLY: Call 800-237-3400 ext 115 (800-282-1400 ex 115 in Fla.)
Leasing (Companies only), Complete System and Quantity Pricing:
WRITE: F&A, 15 Ascot Way, Ridgefield, Conn. 06877

Hitachi joins Fujitsu, IBM, releases 31-bit address mode

By Kaoru Sumada
Special to CW‡

TOKYO — Hitachi, Ltd. recently unveiled a 31-bit addressing mode that can be expanded to a virtual memory of 2G bytes. The system is IBM-compatible and runs on Hitachi's M-280 and M-260 processors under its VOS/ES 1 operating system. Hitachi's entry into the 31-bit addressing arena was preceded by both IBM and Fujitsu, Ltd., which have already introduced 31-bit products.

Why did Hitachi hurry to the marketplace? Hitachi maintains that "the increase in the volume of user application programs and the development of more complex programs have created a need for memory exceeding 16M bytes."

The 31-bit Hitachi system can switch back and forth between 24-bit and 31-bit addressing. In addition, operating systems exceeding 16M bytes can be relocated to the increased memory of 31-bit addressing, thus creating room for more files and terminals, according to the vendor.

Users considering the third stage of on-line system implementation appear to be interested in the 31-bit technology. Particularly appealing is the increased number of terminals it supports. Others feel the price is too high, with relatively minor merits.

Costs for M-280 and M-260 field-upgrade kits start at about $3,100, Hitachi said. The upgraded operating system is VOS 3/ES 1, an enhanced version of VOS 3, with its portions exceeding 16M bytes relocated to virtual memory.

There are two versions of VOS 3/ES 1. VOS 3/ES 1-JSS 3 supports the I/O functionality under a single processor, and another version (VOS 3/ES 1-JSS 4) supports the same under a multiprocessor system.

Hitachi's operating system VOS 3/ES 1 corresponds to IBM's MVS/SP version 2 and Fujitsu's OSIV/F4.MSP. IBM supports assembler and VS Fortran, released in April, and plans to support all of its other mainframe software on 31 bit.

Currently, IBM Japan is said to be developing a 31-bit version of Cobol and PL/I.

Fujitsu's product supports Fortran 77. Cobol is under development, but Fujitsu has no plans to develop an assembler. Hitachi supports only Ofort77/EA (Optimizing Fortran77/Extended Addressing).

The Hitachi mainframe's VOS 3 operating system consists of VOS 3/SPO, VOS 3/SP1, VOS 3/SP2 and the new 31-bit operating system, VOS 3/ES 1.

However, as the VOS 3 OS series was a subject of IBM's copyright violation lawsuit against Hitachi, Hitachi does not have the full rights to this software.

Therefore, SP2 users must deal directly with IBM, or else Hitachi can rewrite the entire operating system software.

For SP1 users, Hitachi will partially rewrite the program so that it does not infringe on IBM's rights.

Sumada is a staff writer for Computerworld Japan, *a sister publication of* Computerworld *in which this story originally appeared. The article was made available to* Computerworld *via the CW International News Network.*

Here are a few good reasons why you should make Local Data your protocol converter company.

Local Data's comprehensive line of local and remote protocol converters have been used around the world to make async-to-IBM communications simple and economical.

DATALYNX™/3274.
DataLynx™/3274 remote async ASCII protocol converter supports SNA/SDLC or BSC protocols. 80 types of ASCII async terminals can emulate IBM 3278 display stations. RS-232C ASCII async printers can emulate IBM 328X printers.

DATALYNX™/3780.
DataLynx™/3780 async ASCII-to-IBM 5780, 2780, 2770 and 3741 protocol converter supports EBCDIC BSC protocol on one channel and async ASCII devices on the other two channels. Features include transparency, mini/micro support and free file transfer program.

INTERLYNX™/3278.
InterLynx™/3278 allows the attachment of low-cost ASCII CRT terminals or p.c.'s to 3274/3276/4701 and 43XX integrated adaptor Type "A" coax ports. InterLynx/3278 enables the user to use async CRT's on IBM systems and switch to async applications under terminal control.

FILELYNX™/3278.
For micro-mainframe file transfers.

INTERLYNX™/3287.
InterLynx™/3287 allows attachment of ASCII printers to IBM Type "A" coax ports or 3274/3276/4701 controller and 4321/4331 CPU's.
SNA LU1 SCS and LU3 capability are standard with the InterLynx/3287. Features include parallel and serial ports and front panel set-up.
For more information call today.
LOCAL DATA ● 2701 Toledo Street ● Suite 706 ●
Torrance ● CA ● 90503
Telephone (213) 320-7126
Telex # 182518
Canada (613) 737-8901

Local Data
"Your Lynx to IBM."

SYSTEMS SOFTWARE

THE BRIDGE, INC.
Keyplus

The Bridge, Inc. has announced Keyplus, said to be an on-line, high-speed data entry system for IBM's DOS/VSE and MVS operating systems.

A spokesman said Keyplus achieves high-speed response by working directly with IBM's Vtam. All data is said to be automatically checked at input, and mistakes are highlighted so they can be changed during the initial input session. Keyplus reportedly can also work as a front-end system to run existing batch programs on-line.

Keyplus reportedly can be used to paint screen formats interactively, control data entry and verify data. It is said to provide supervisory facilities. It works with Vtam, and its files use IBM's Vsam or Bdam. Keyplus uses standard operating system JCL and libraries. The Keyplus system also reportedly features access security, message broadcasting and backup and recovery facilities.

Keyplus licenses for $15,500 for DOS/VSE and $19,500 for MVS.

The Bridge, 199 California Drive, Millbrae, Calif. 94030.

DATA TRANSFORMATION, INC.
Cruise/38 Release 3.0

Data Transformation, Inc. has announced Release 3.0 of its Cruise/38 job scheduler system for the IBM System/38.

Among the announced enhancements to Cruise/38, the vendor said the system will now support the entire 512-byte local data area for passing parameters and will allow a job to store its current local data area upon completion to be used by another job scheduled later. In addition, users can now specify an override execution priority for jobs being scheduled by Cruise/38.

The vendor said extensive holiday support allows the user to tell the system that certain days are holidays and what action the system is to take in the event that a job schedule falls on a holiday. A new frequency has been added for scheduling a job to run every "xx," or user-specified number of days. Also, Cruise/38 maintains a more comprehensive job history, and it allows for a job-group name to identify the job.

Cruise/38 is priced at $495 until July 1, when the price will increase to $605.

Data Transformation, P.O. Box 1541, Cape Girardeau, Mo. 63701.

See SYSTEMS page 62

Integrated application module announced

Integral Systems, Inc. has announced the Advanced Data Security system for users of its human resource software.

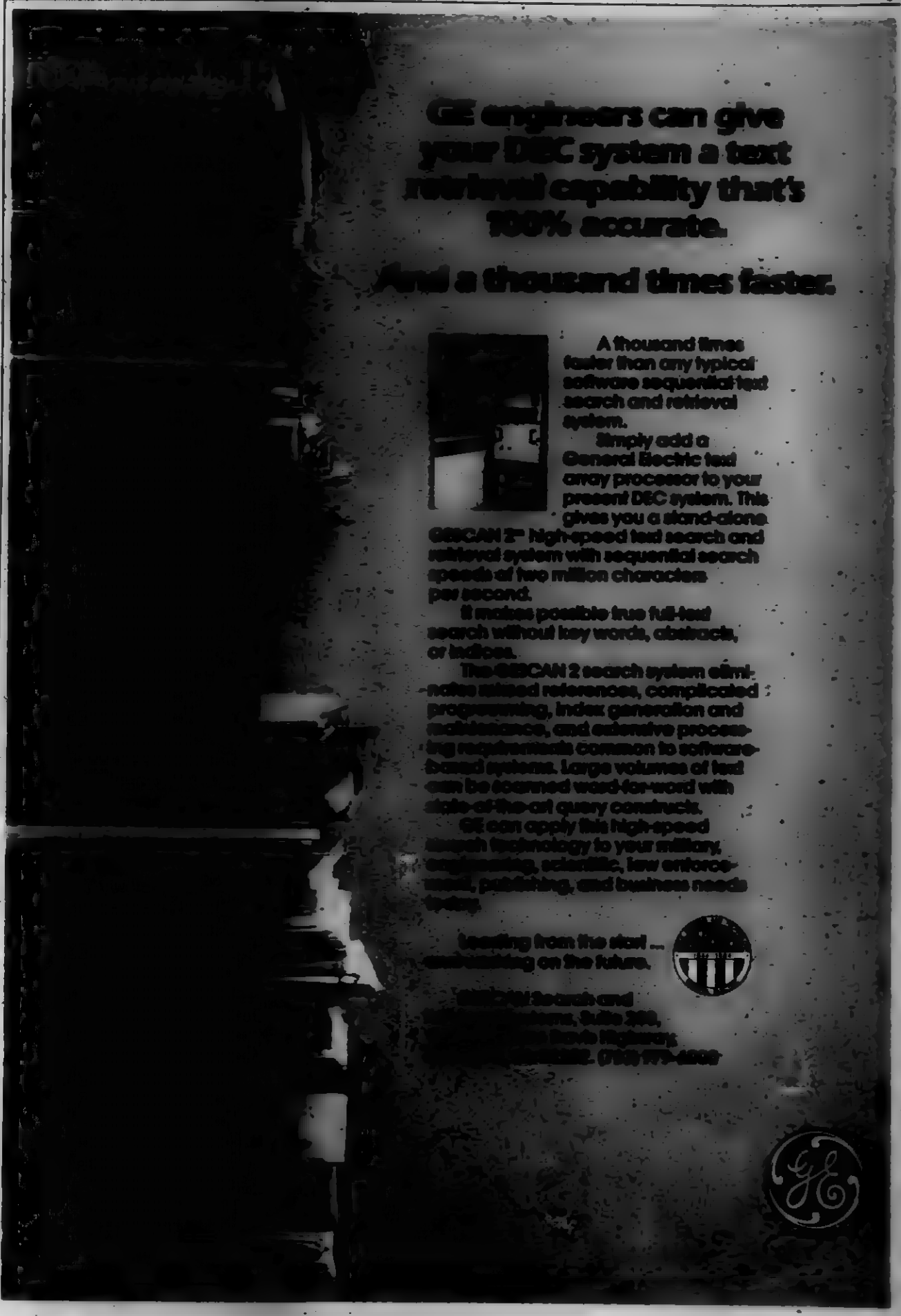
According to the vendor, the Advanced Data Security system is an integrated application module for Integral Systems' Payroll and Personnel System. The software uses Cullinet Software, Inc.'s IDMS data base management system on IBM mainframes.

The vendor said Advanced Data Security is a real-time system that can be tailored. The system was developed using Cullinet's ADS/On-line, with all screens, programs and work records residing in Cullinet's Integrated Data Dictionary, the spokesman said.

The system is said to offer dynamic checks that can restrict operator access to records of selected units, as well as employee types and data elements, on either a mandatory or a conditional (range) basis.

The Advanced Data Security system is included as a module in the Payroll and Personnel System, which is priced between $30,000 and $100,000, depending on the host environment and the modules selected, according to the vendor.

Integral Systems is at 165 Lennon Lane, Walnut Creek, Calif. 94598.



SOFTWARE & SERVICES

SYSTEMS from page 61

B. I. MOYLE ASSOCIATES, INC.
Bimedit; Release 4.0 of Bimspool

B. I. Moyle Associates, Inc. has announced its Bimedit system in conjunction with the introduction of Release 4.0 of its Bimspool program product.

Release 4.0 of Bimspool, which is designed to spool job listings in IBM's DOS/VSE power spooling queue to 3270 terminal printers under CICS, includes a variety of enhancements, including the ability to generate messages in French.

Bimedit is a program editor which has also been designed to generate messages in French. Both Release 4.0 of Bimspool and Bimedit are priced for $4,000 or can be leased annually for $2,000.

B. I. Moyle Associates, 5788 Lincoln Drive, Minneapolis, Minn. 55436.

NETWORK CONCEPTS, INC.
Release 6 of Control

Network Concepts, Inc. has announced Release 6 of its Control source management and library system for the entire series of Tandem Computers, Inc. processors.

According to the vendor, Release 6 of Control features added total network support and a relational data base directory. The new release is said to provide a secure method of allowing remote programmers to share common libraries of software.

In addition, Release 6 features a cross-reference capability, enabling Control to determine where any source file is being used. The directory allows any user on the network to search for programs with Tandem's standard query language.

Release 6 of Control is available for a one-time license fee of $9,600.

Network Concepts, Two Ridgedale Ave., Cedar Knolls, N.J. 07927.

PARK SOFTWARE, INC.
BIO

Park Software, Inc. has announced BIO, a software product that enables the migration of programs written for Digital Equipment Corp.'s RSTS/E operating system to DEC's VMS system running on the VAX-11 series of computers.

BIO allows RSTS-based application software written in Basic or Basic Plus 2 to be transported to VAX/VMS without converting the files and without major programming logic conversions, a spokesman said. This is accomplished by providing a series of external, callable routines designed to emulate the RSTS/E disk file I/O environment.

Depending on the CPU environment, prices for the product range from $500 to $3,000.

Park Software, P.O. Box 202 Northgate Station, Seattle, Wash. 98125.

HONEYWELL, INC.
TDC 3000 facilities

Honeywell, Inc. has introduced two software facilities that enable its TDC 3000 process management system to communicate with IBM's 4300 series of computers. The facilities include a Binary Synchronous Communications channel link and the ability to transfer files to 4300 hosts using IBM's Systems Network Architecture protocols.

According to the vendor, the facilities make it possible for the real-time process information acquired by TDC 3000 to be transmitted directly to an IBM 4300 for further manipulation and reporting.

The price of TDC 3000 process management systems starts at $100,000.

Honeywell, 16404 N. Black Canyon Highway, Phoenix, Ariz. 85023.

QUALITY MICRO SYSTEMS, INC.
Lasergrafix 1200 Version 2

Quality Micro Systems, Inc. has introduced Version 2 of the operating system software for its Lasergrafix 1200 electronic printer.

The latest version reportedly offers new features, including improved emulation with the Diablo Systems, Inc. Model 630 daisywheel printer; business graphics commands for automatic bar and pie chart generation; improved compatibility with Tektronix, Inc. 4010/4014 terminal plotting; new type fonts; arc and circle drawing commands; flood-fill command; and automatic page overlay, according to a vendor spokesman.

Current owners of the Lasergrafix 1200 will receive the Version 2 software at no charge, the spokesman said.

New owners of the printer, which costs $24,995, will receive the software at no additional charge, according to the vendor.

Quality Micro Systems, P.O. Box 81250, Mobile, Ala. 36689.

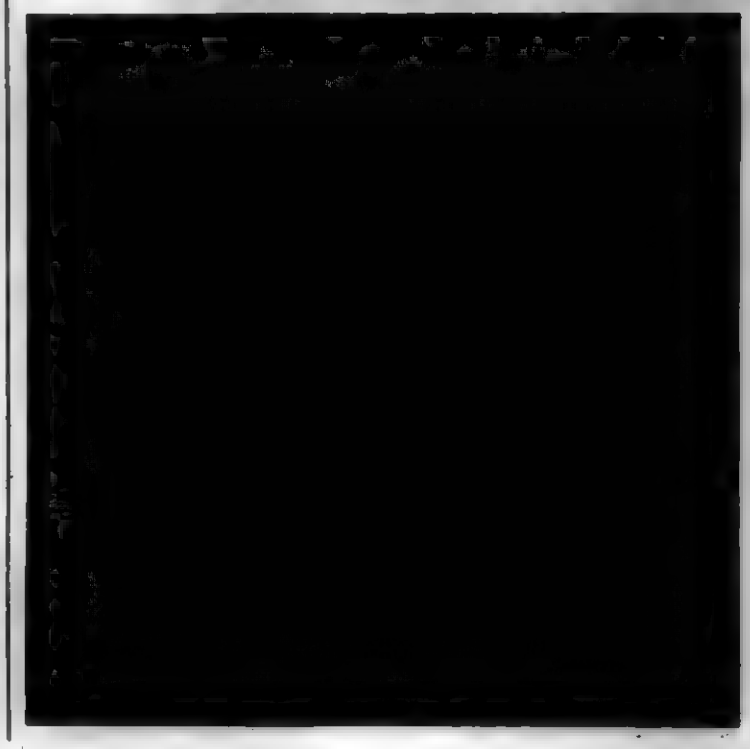
MICROTEC RESEARCH, INC.
Microtec ASM186; INT186

Microtec Research, Inc. has announced the Microtec ASM186 cross-assembler system and the INT186 interactive simulator.

According to the vendor, the Microtec ASM186 cross-assembler system is a Microtec Research implementation of the structured assembly language specified by Intel Corp. for the Intel 8086/8088 and 80186/80188 microprocessors.

ASM186 is used to assemble and link/load programs on a general-purpose host computer, then download those programs for execution on one of the above microprocessors, the vendor said.

INT186 is an interactive simulator for the Intel 8086/8088 and 80186/



Whether you're looking for Payroll, Personnel, Pension Administration or Claims Processing software, Information Science's "Whole Person" software gives you a comprehensive system that provides superior technical features.

Systems for both Database and Non-Database

InSci's state-of-the-art payroll/personnel database system is integrated into a number of database management environments–including IMS, DL-I, and IDMS. Native mode, the system is designed to take full advantage of each specific database structure, eliminating clumsy, resource-draining interface programs.

In addition, InSci offers two non-database systems. One using a sequential file structure, the other using a VSAM access method.

Personnel

Pension

INSCI INT

"WHOLE PERSON" SOFTWA

SYSTEM THAT MEETS AL

PROFES

Introducing On-line PAS

PAS–InSci's new Pension Administration System–is available as a complement to our payroll/personnel package or as an independent, stand-alone system. PAS automates most aspects of pension administration from ERISA reporting and compliance to benefits calculation, retirement counseling, vesting schedules and benefits statements.

Software for Health Insurance Claims

Our health insurance claims processing system permits your organization to self-administer group health, dental, and disability claims–providing significant cost savings while achieving fast, accurate claims turnaround.

The Complete Human Resource Package

We call it "Whole Person" software because it is the most comprehensive, technically advanced set of human resource systems avail-

SOFTWARE & SERVICES

80186 microprocessors. It executes the object modules of the target microprocessor in the controlled environment of the host development system, permitting the user to debug software.

Operating in an interactive or batch mode, INT186 performs interpretive execution of the object modules of the Intel microprocessors by implementing, in software, the registers and logic control functions of the processors.

The vendor said both INT186 and ASM186 will operate on most general-purpose computer systems, including 16-bit minicomputers. The Microtec ASM186 cross-assembler system costs $2,200 without librarian and $2,500 with librarian. The INT186 interactive simulator is priced at $1,400.

Microtec Research, Suite 335, 505 West Olive, P.O. Box 60337, Sunnyvale, Calif. 94088.

NOVELL, INC.
Netware/EMS

Novell, Inc. has announced the addition of an electronic mail system to its Netware operating system software.

A spokeswoman said the Netware/Electronic Mail System (EMS) assigns a mailbox to every user in a local-area network utilizing the Netware operating system to provide its file server capabilities.

Mail can be sent to an individual user in the network, and mailings can be made to designated groups of users or to an intersection of multiple groups, the vendor said.

User input to Netware/EMS is said to be received by a command interpreter, which allows flexibility in command entry. An EMS mail security feature ensures access by assigned users only, and an express mail feature immediately informs a user of urgent communications.

Novell's Netware operating system currently works in conjunction with several local-area networks, including Corvus Systems, Inc.'s Omninet; 3Com Corp.'s Etherlink; Gateway Communications, Inc.'s G-Net; and Proteon Associates, Inc.'s Pronet.

The Netware/EMS system is priced at $795, and the Netware operating system is priced at $1,495, according to the vendor.

Novell, 1170 N. Industrial Park Drive, Orem, Utah 84057.

PRODUCTIVITY AIDS

INTERNATIONAL LOGIC CORP.
F-Scan

International Logic Corp. has announced the availability of its F-Scan Fortran source code analyzer for IBM CMS and MVS users.

A spokesman said F-Scan operates on either Fortran IV or Fortran 77 source programs and produces reports on program structure, parameter correspondence, common usage and file usage. In addition, a precise static analysis is produced on the program interfaces.

F-Scan can be used as a debugging aid in program development, in performing analyses prior to conversion, in planning for program maintenance and for expediting changes to existing programs, a spokesman said. Consistent analysis is produced for all Fortran packages, including packages developed by previous staff or outside sources.

A perpetual license for F-Scan is priced at $4,950. Other versions of F-Scan are available for Digital Equipment Corp. VAX-11, Data General Corp.'s Eclipse and Prime Computer, Inc. processors.

International Logic, Suite 500, 22 Battery St., San Francisco, Calif. 94111.

DATA GENERAL CORP.
Screen Generator Utility enhancement

Data General Corp. announced that it has enhanced its Screen Generator Utility software to interface with five additional languages: APL, C, Fortran 77, Pascal and PL/1.

The Screen Generator Utility is an aid that is said to reduce development and maintenance time for applications requiring screen management. The software operates on DG's Eclipse minicomputer systems with DG's AOS or AOS/VS operating system and on the Desktop Generation System microcomputers with the AOS/WS operating system.

Current users of the vendor's software will receive the upgraded version at no additional cost. The first-year license fee for the Screen Generator Utility under AOS/VS is $3,000, with subsequent years costing $1,800. The first-year license fee for systems operating under AOS is $1,500, with subsequent years priced at $1,000.

DG, 4400 Computer Drive, Westboro, Mass. 01581.

COMPUTING CAPABILITIES CORP.
Insight, Autopilot enhancements

Computing Capabilities Corp. has announced enhancements of its Insight and Autopilot applications development tools. The enhancement makes both compatible with the Hewlett-Packard Co. Dictionary/3000 data dictionary.

Insight reportedly allows users to implement on-line applications without programming, while Autopilot is said to create the Vplus forms automatically. Vplus is HP's terminal handler.

Insight can be licensed for $8,500 and Autopilot for $1,700.

Computing Capabilities, Suite 223, 465-B Fairchild Drive, Mountain View, Calif. 94043.

See MISC page 94

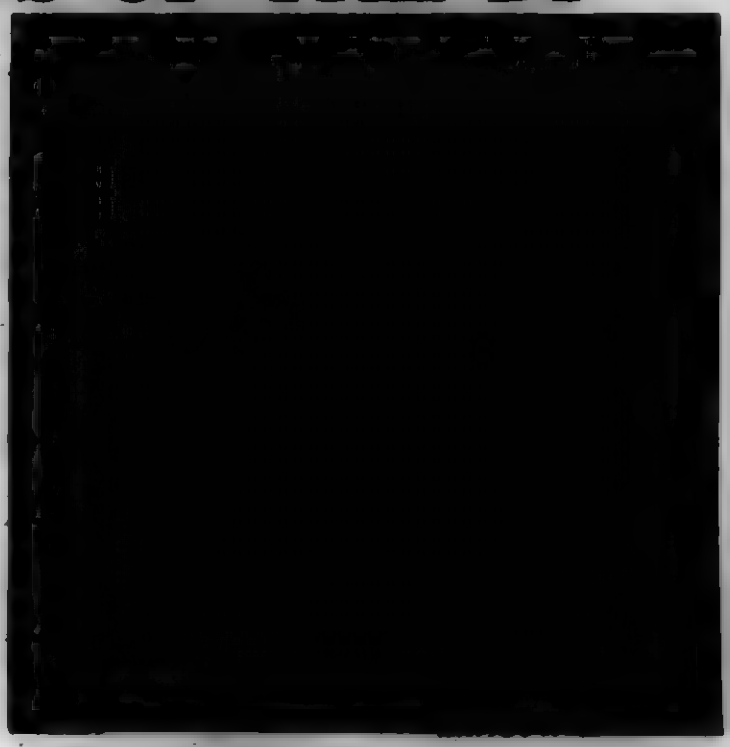
able. InSci started the HRS industry back in 1965, and we've led the field ever since. Our technical experts have provided you features unmatched by any other company.

Modularized Design For Easy Maintenance. InSci "Whole Person" software was designed from the top down and is highly modularized, providing maximum flexibility. A single module or subroutine supports each specific function in the system.

User Exit Routines. Strategic areas built into the InSci system allow exits to override the standard system routines. This means you can add your own programs without changing database system codes. InSci also gives you source codes so you can go into the system directly if you desire and still receive maintenance.

Preliminary or final processing mode. InSci systems let you select the most efficient operating mode for each processing task. All changes can be processed in real-time, so they become effective immediately. Preliminary processing allows for simulating situations such as a payroll run without affecting the database. And, of course, InSci systems provide state-of-the-art security precautions, complete maintenance support and training.

RODUCES
RE. THE FIRST SOFTWARE
L THE NEEDS OF THE DP
SIONAL.



Write us. Or Call.

InSci "Whole Person" software–for more information, write us or call: Information Science Incorporated, 95 Chestnut Ridge Road, Montvale, New Jersey 07645. Attention: Chris Hanavan. 201-391-1600.

InSci
WHOLE PERSON SOFTWARE.

SOFTWARE & SERVICES

AIDS from page 63

STERLING SOFTWARE MARKETING
Comparex Release 4.4

Sterling Software Marketing has introduced Release 4.4 of Comparex, said to be a productivity tool for programmer/analysts, data base administrators, auditors and quality assurance staffs.

According to the vendor, features of the new release include expanded reporting and interleaving, with more than 1,000 print variations to custom-tailor report output.

Comparex runs on any IBM 360 or larger mainframe under IBM's DOS, OS or VM operating systems.

Pricing for Comparex is $8,000 for the OS version and $4,000 for the DOS version. The VM/CMS version is available for $2,000 when purchased in conjunction with a DOS or OS system before May 1.

Sterling Software Marketing, 1007 Seventh St., Sacramento, Calif. 95814.

APPLICATION PACKAGES

MCBA, INC.
VAX Cobol packages

MCBA, Inc. has announced its series of VAX Cobol software packages for use with Digital Equipment Corp.'s VAX-11 series of superminicomputers.

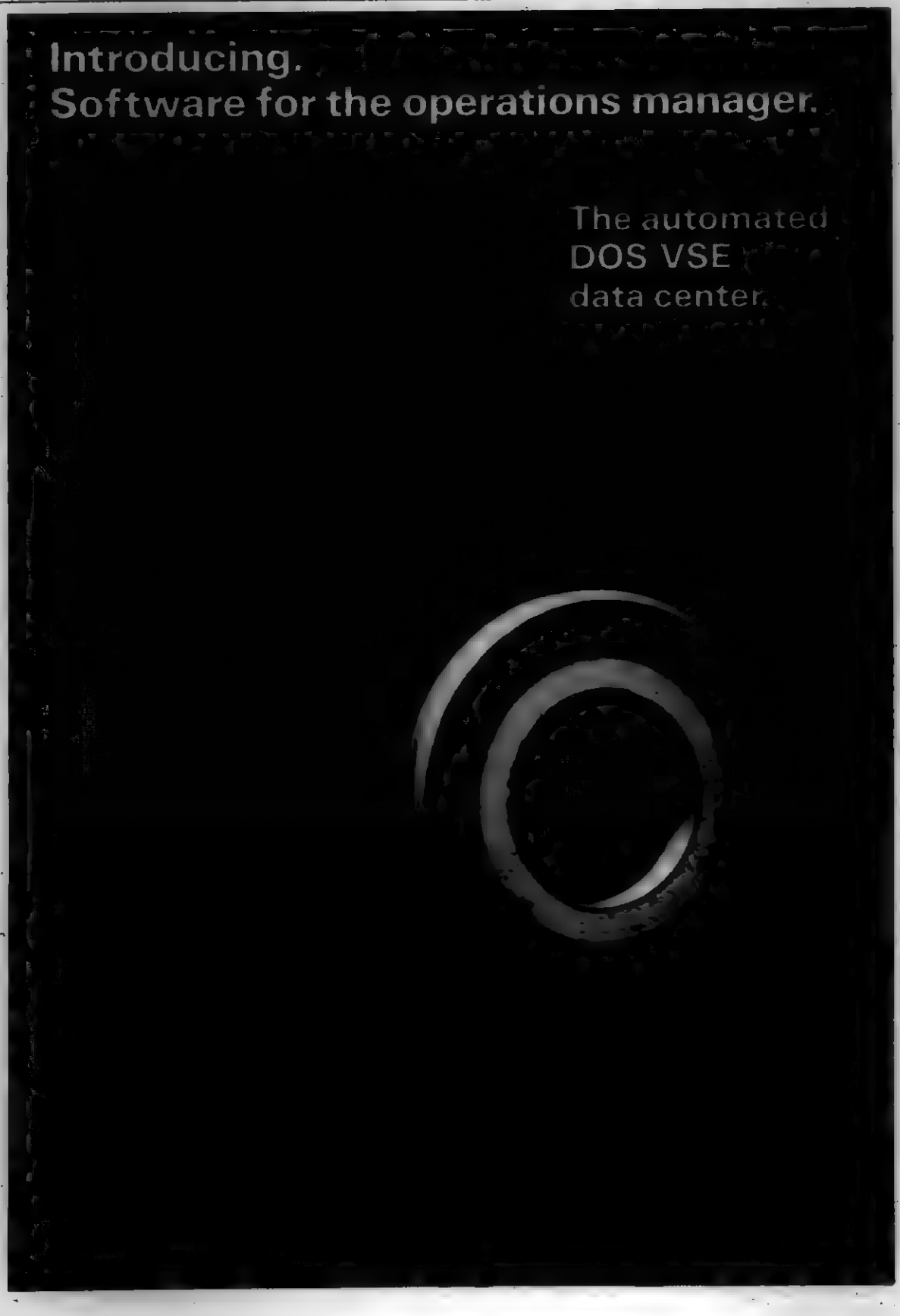
A spokeswoman said the VAX Cobol packages currently available are accounts payable, general ledger and payroll.

MCBA will also release other VAX Cobol packages, including accounts receivable, customer order processing, inventory management and purchase order and receiving. No availability date was announced.

The spokeswoman said the seven modular, interfacing packages have been designed to work together in a variety of combinations. They are also optimized for DEC's VAX/VMS operating system.

Source code licenses for MCBA's VAX Cobol packages range from $4,000 to $6,000, according to the vendor.

MCBA, 2441 Honolulu Ave., Montrose, Calif. 91020.



HONEYWELL, INC.
Business, accounting aids for DPS 6

Honeywell, Inc. has announced the availability of eight modular, interactive general business and accounting applications for use on its DPS 6 family of small business systems.

The applications were licensed to Honeywell from the developer, MCBA, Inc., and have been converted to make them compatible with Honeywell's Gcos 6 operating system. The eight modules may be used separately or in combination to form an integrated package. They are: order processing, accounts receivable, accounts payable, inventory management, bill of materials processor, general ledger, payroll and mailing list.

A Honeywell spokesman said the software is written in Ansi Cobol and uses structured coding to simplify modification. Other features include system integration for faster processing, extensive analysis and reporting capabilities, screen menus and prompts and audit trails.

The initial primary license fee for all eight modules is $15,500. Each individual package is priced at $3,000.

Honeywell, 200 Smith St., Waltham, Mass. 02154.

UNICAD, INC.
Romulus-E

Unicad, Inc. has introduced a solids modeler for use in computer-aided design (CAD) applications.

Romulus-E is said to be an enhancement of the Romulus solids modeler from Shape Data Ltd. Romulus-E combines the geometric definition and manipulation capabilities of Romulus with portions of a "universal CAD system" that the vendor is now developing, a vendor spokesman said.

The software is said to include such features as accurate boundary-file modeling of solids with tweaking, full lifting and sweeping, blending of edges and Boolean operations; symbolic command language with design-shop-type terminology; choice of the preferred interaction technique; wire-frame modeling capability; and rendering, viewing and windowing capabilities.

Romulus-E is said to run on a variety of systems, including Apollo Computer, Inc. DN300 and DN600 intelligent workstations, Digital Equipment Corp. VAX-11 series superminis and IBM 4300 series mainframes, the spokesman said. Prices range from $40,000 for intelligent workstations to more than $125,000 for mainframes.

Unicad, 1695 38th St., Boulder, Colo. 80301.

MCBA, INC.
HP General Ledger Release 2

MCBA, Inc. has announced Release 2 of its HP General Ledger package written in Cobol II for users of Hewlett Packard Co.'s Image data base management system on HP 3000 processors.

A spokesman said the enhanced HP General Ledger package has full multicompany capabilities and an expanded user-defined general ledger account number allowing up to 24 characters in as many as five levels. The system also allows the user to define financial entities interactively.

Other enhancements to the release include streamlined maintenance of financial statement formats, allow-

SOFTWARE & SERVICES

ing groups of accounts to be specified by ranges with the option to print summary or detail, the vendor said. Entry of general journal transactions is said to be speeded by allowing many fields to default to standard or previously entered values.

A source code license for Release 2 of the HP General Ledger package is priced between $3,000 and $6,000, depending on the HP 3000 model.

MCBA, 2441 Honolulu Ave., Montrose, Calif. 91020.

BAKER SOFTWARE PRODUCTS CORP.
Custom Printers Management System; Custom EDP Printers System

Two software packages, one for the graphics arts industry and the other for manufacturers of data processing labels, have been introduced by Baker Software Products Corp. Both products run on Wang Laboratories, Inc.'s OIS minicomputers.

The Custom Printers Management System, for the graphics arts industry, consists of modules for job costing, timekeeping, inventory control and print job estimating.

The Custom EDP Printers System consists of modules on prospective customers, customer data base management and history, inventory management, accounts receivable, job costing and end-of-month management analysis.

A minimum of 30 programs are contained in the label manufacturers package, which is available for $4,000 to $10,000, according to the vendor.

The graphics arts industry package is available for $14,000 to $24,000.

Baker Software Products, P.O. Box 55062, Indianapolis, Ind. 46205.

SOFTWARE EXTRAORDINAIRE, INC.
Word Processing Analysis System Release 2.0; Job Accounting and Control System Release 1.17

Software Extraordinaire, Inc. has announced new releases of its Word Processing Analysis System and its Job Accounting and Control System, both of which are designed for use with the Wang Laboratories, Inc. VS series.

Release 2.0 of the Word Processing Analysis System is said to be transparent to the word processing operator.

Release 1.17 of the Job Accounting and Control System is said to feature an audit trail of user activity, to report unauthorized logon attempts and to automatically log off users after a specified period of inactivity. It also reportedly has improved menu-building features.

The Word Processing Analysis System has an annual rental fee of $750 and a purchase price of $2,700, a Software Extraordinaire spokesman said.

The Job Accounting and Control System is priced at $1,500 per year for lease and $5,500 for purchase, according to the vendor.

Software Extraordinaire, 1507A Queen Anne Ave. N., Seattle, Wash. 98109.

COMSHARE, INC.
Additions to Profiles/3000

Comshare, Inc. has announced the addition of a report writer and a salary projection module to its Profiles/3000 personnel record-keeping and reporting system for Hewlett-Packard Co. HP 3000 series processors.

A spokeswoman said the report writer is an addition to Profiles/3000's current report writer and its existing reporting capabilities. The added report writer is said to give human resource management users additional flexibility in tailoring reports to meet personnel reporting requirements.

The salary projection module is said to be an analytical modeling tool designed for salary planning. It can be used to determine merit budgets or to allocate a salary budget according to pay-increase guidelines.

Profiles/3000, including the new report writer and salary projection module, is priced at $25,500 for a basic license.

Comshare, 3001 S. State St., Ann Arbor, Mich. 48106.

FARGO ELECTRONIC SERVICES, INC.
Fargo Business Software Series

Fargo Electronic Services, Inc. has announced the Fargo Business Software Series for users of Digital Equipment Corp.'s VAX-11 processors under the Unix operating system.

Seven program modules are available: general ledger, accounts payable, accounts receivable, job cost accounting, inventory control, mailing list management and sales lead processing and tracking.

A spokesman said the program modules are menu-driven and interactive. Information from one program automatically updates other modules that share the same data.

The series is written in C and is supplied with source code and documentation. The accounts payable and receivable modules are priced at $5,000, the inventory control and job cost accounting modules at $4,000, the general ledger and sales lead processing and tracking modules at $3,000 and the mailing list management module at $1,000.

Fargo Electronic Services, 7150 Shady Oak Road, Eden Prairie, Minn. 55344.

REDWOOD SOFTWARE, INC.
Manex

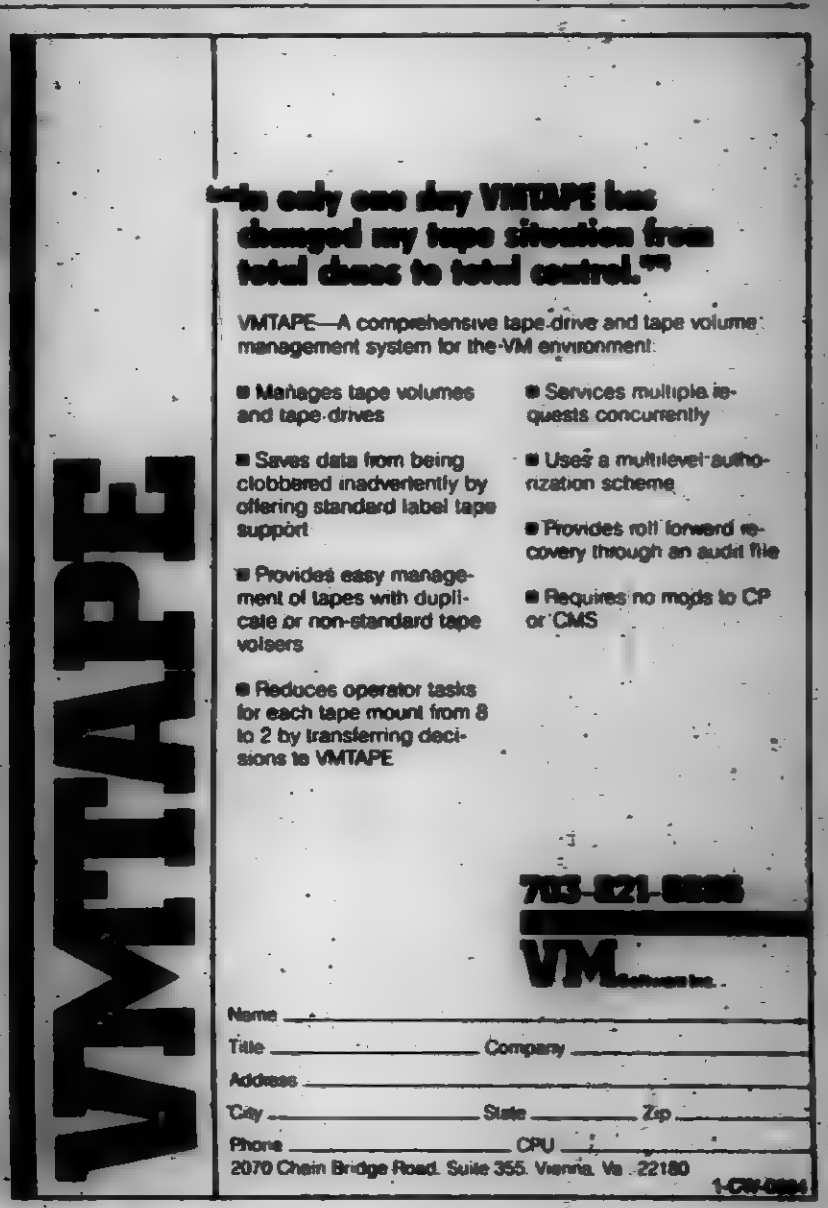
Redwood Software, Inc. has announced the Manufacturing Execution (Manex) system, which the vendor said operates on the entire series of Tandem Computers, Inc. and Stratus Computer, Inc. processors.

According to the vendor, the Manex system is a decision support tool designed to help production supervisors and workers monitor and control the manufacturing process by identifying problems as they arise.

The Manex system is priced between $100,000 and $250,000.

Redwood Software, 3960 Freedom Circle, Santa Clara, Calif. 95050.

See TOOLS page 66



SOFTWARE & SERVICES

TOOLS from page 65

MASSCOMP
Spice 2

Masscomp has added Spice 2, a circuit-simulation software package, to its MC-500 and Workstation 500 computer systems.

Spice 2 is general-purpose circuit-simulation program for monitoring dc, nonlinear transient and linear transient ac analysis, according to the vendor. The program is available free of charge.

Masscomp, One Technology Park, Westford, Mass. 01886.

DATA BASE MANAGEMENT SERVICES

MICHAELS, ROSS & COLE, LTD.
MRC-Manager 2.0

Michaels, Ross & Cole, Ltd. has announced release 2.0 of MRC-Manager, a relational data base management system (DBMS) for users of the IBM System/38.

According to the vendor, the product allows users to create on-line inquiries, reports and bar graphs of the information available on the IBM System/38.

The MRC-Manager 2.0 DBMS reportedly features help key documentation, menu-driven multilevel security, multifile retrievals, relational file joining, single or multimember file capacity and unlimited sequencing and total levels.

MRC-Manager licenses for $1,140 per CPU. Multisite pricing and worldwide licenses are available.

Michaels, Ross & Cole, P.O. Box 4538, Oak Brook, Ill. 60521.

REMOTE COMPUTING SERVICES

AUTOMATIC DATA PROCESSING, INC.
Automail revised rates

Automatic Data Processing, Inc. (ADP) has announced a revised rate structure for Automail, the company's electronic mail service. The new structure is based on the number and type of transactions performed rather than the amount of time elapsed during a session.

Under the transaction-based pricing, users will be charged for each mail activity they perform, such as sending or filing a message, adding or listing identifications in the directory, or posting information to public or private bulletin boards. Message senders will be charged according to the size of their message and the number of copies generated. Message recipients will incur no charge for reading incoming, unread messages, the vendor said.

The basic charge to create and send a message to the first addressee is 75 cents per message segment (1,000 characters). The cost to send the message to additional recipients is 30 cents per address. There is no charge for connect time when Automail is accessed directly via ADP's Autonet public data network. However, time-oriented surcharges will continue to apply to access made through third-party network and Wats connections, a spokesman said.

Automatic Data Processing, 175 Jackson Plaza, Ann Arbor, Mich. 48106.

MIDCOM CORP.
Time-share access

Midcom Corp. has announced that its time-shared system can be accessed using the GTE Telenet Communications Corp. Telenet data communications network.

The Midcom T/S service is based on Digital Equipment Corp. VAX/VMS and PDP-11 computers and features several languages, including Fortran, Basic, Cobol, Pascal, C, PL/I, Bliss and macro.

Telenet usage reportedly costs Midcom users $3/mo to $6/mo. Midcom's time-sharing service, meanwhile, is sold on the basis of the amount of user storage and either on a continuous, peak level or limited time-access basis.

For 1M byte of storage, the cost is 3 to 5 cents/CPU sec, with a $2/hour connect charge. For 10M bytes of storage, the firm offers its lease-a-port rate of $800 a month, with a minimum one-year lease.

Midcom, Suite 117, 1940 N. Tustin, Orange, Calif. 92665.

ON-LINE DATA BASES

OCCUPATIONAL HEALTH SERVICES, INC.
Hazardline enhancements

Occupational Health Services, Inc. has announced that it has enhanced its on-line Hazardline data base.

According to a spokeswoman, the number of substances listed in the interactive Hazardline data base of toxic and chemical substances has been increased to 3,000. The Hazardline data base is currently offered through GTE Telenet Communications Corp.'s Telenet and Compuserve, Inc.'s Compuserve services.

Access to Hazardline through Telenet or Compuserve is priced at $2 per connect minute. There is no monthly or subscription fee.

Occupational Health Services, 515 Madison Ave., New York, N.Y. 10022.

ITT DIALCOM, INC.
AP Videotex service

ITT Dialcom, Inc. has added the Associated Press (AP) Videotex service to its on-line news and information features.

AP Videotex provides national and international news, analysis and feature stories accessed via computer.

According to a spokesman, AP Videotex is key-word-searchable. Approximately 250 stories are filed daily on the service.

Story transmissions are made at 1,200 bit/sec over a dedicated circuit via AP's satellite system to ITT Dialcom. The circuit is an 8-level, Ascii-coded system designed to the American Newspaper Publishers Association Standard No. 1312.

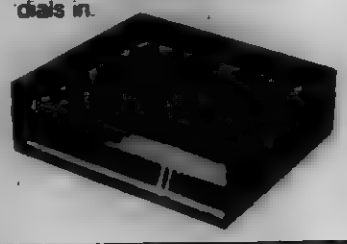
The cost of accessing AP Videotex is $27.50/hour during prime business hours (8

The Solution.

Dial-Up 3270

Linelloster An intelligent device for dial-in access to your mainframe 3270 Bisync line. **Linelloster** is a communications watchdog which keeps a line in service until a user dials in.

- For any remote 3271/4/6 line—up to 19.2K baud
- Compatible with any 3270 BiSync emulator including microcomputers.
- Connects between modem and mainframe.
- Installs in minutes.



$639.

Microframe, Inc.
205 Livingston Avenue
New Brunswick, NJ 08901
(201) 828-4499

MicroAge®

"THEY GAVE US THE BEST OF BOTH WORLDS"

...OWNERSHIP...AND THE STRENGTH OF AN INTERNATIONAL CORPORATION!"

"We wanted to offer Indianapolis something different; not just another computer store. The MicroAge idea of selling solutions really made sense to us...and with MicroAge, we're making it happen!"

"When we started in 1981, we had just three people working for us. Today, we're the largest computer store in Indiana. We've tripled our store to 7000 sq. ft. and increased our staff to 15."

"MicroAge...They're committed to excellence: The hardware shows it, the software shows it, the support for the store and customers shows it, and our solutions prove it!"

G. Michael Conaway, Founder Owner — D. Susan Wisely, Founder Owner

Building your own professional computer sales organization with MicroAge requires an initial investment of $200,000 to $300,000, which includes $80,000 in liquid assets. Write to:

MicroAge® COMPUTER STORES
"The Solution Store"®

1427 West Alameda • Tempe, Arizona 85282

(602) 968-3168

SOFTWARE & SERVICES

a.m. to 6 p.m., Monday through Friday) and $23.50/hour at all other times, the vendor said.

ITT Dialcom, 1109 Spring St., Silver Spring, Md. 20910.

INFORMATION ACCESS CO.
DIALOG INFORMATION SERVICES
Magazine Asap; Trade & Industry Asap.

Information Access Co. (IAC) and Dialog Information Services have announced two full-text, on-line data bases of major magazines.

Created by IAC, the new data bases are called Magazine Asap and Trade & Industry Asap. The Asap files reportedly will offer controlled vocabulary indexing of periodicals, as well as the full text of articles from more than 40 major general-interest periodicals and more than 80 business and trade publications on-line through Dialog. In addition, the complete text of news releases from PR Newswire will be available in Trade & Industry Asap. Coverage will date back to January 1983.

The new services will be available to all Dialog subscribers in May. There is no initial fee or monthly minimum for using the Asap data bases. Dialog charges are only for actual on-line time, plus a flat charge per article. The average hourly connect time charge is $75.

Dialog, 3460 Hillview Ave., Palo Alto, Calif. 94304.

IAC, 11 Davis Drive, Belmont, Calif. 94304.

DATA MANAGEMENT COMPUTER SYSTEMS, INC.
Knowledge/3000

Data Management Computer Systems, Inc. (DMCS) has introduced Knowledge/3000, an on-line information retrieval system for the Hewlett-Packard Co. HP 3000 computer.

According to the vendor, the regularly updated data base cross-references all the HP manuals included in the fundamental operating software — the HP Communicator — as well as publications from the HP 3000 International Users Group.

A 12-month subscription to Knowledge/3000 is available for $1,500. Annual renewals are $750. A demonstration tape costs $50.

DMCS, Suite G, 560 Wall St., Auburn, Calif. 95603.

GOVERNMENT COUNSELLING LTD.
Taurusonline

The Technology Acquisition Resource and Update Source (Taurus), a data base with government procurement regulations for data processing equipment, is now available with a computerized option, Taurusonline, from Government Counselling Ltd.

Taurus contains all government regulations, standards and laws applying to the procurement of software and hardware for data processing, office automation and telecommunications.

Users of the Taurusonline option may search the data base with an unlimited variety of search criteria, according to the company; no key fields or indexes are needed.

To access Taurusonline, which will be available at the end of March, users need any system that can communicate with an IBM host through a 3270-type terminal. The annual fee for Taurus is $2,000, with an additional fee of $180/hour and $2/transaction for the on-line option.

Government Counselling, 6525 Fedbin Court, Alexandria, Va. 22310.

See DATA page 98

OLYMPICS from page 59

cannot speak English; writing system specs, because the systems analyst thinks "on-line" is a term meaning his clothes are drying outdoors; punching cards by hand, because the keypunch personnel are on strike; and mounting tapes, because the operator is having his coffee. In short, the hexadecathlon includes all the functions expected of a programmer, none of which is listed in his official job description.

The bullshot put. This is a true/false game in which the programmer must figure out whether he is being told the truth by those around him. Phrases tossed at the programmer include: "We always compensate our staff for overtime"; "Don't worry about that program — it's transparent to you"; "Could you please stay a little late today — I'll only need you for an hour or so"; or "We're putting you on a hot development project next month."

The programmer can, of course, respond with his own—uncertain replies: "Of course I tested that module"; "You'll have it tomorrow"; and "Me? Looking for another job? Ridiculous!"

The 100-parameter dash. Speed is the main thrust of this event. The object of the 100-parameter dash is to see how fast documentation can be written for a 100-program system (which took six months of development) because operations refuses to run it and because the users are screaming for it. Last year's gold medalist took only a mere 47 nanoseconds.

Gulpundy is a New York-based systems analyst.

INTECH from page 58

explosion and sequencing diagrams.

The package includes the software on 5¼-in. diskettes, full documentation, keyboard template and the Microsoft Mouse and Word packages. Single-version prices start at $8,000, Intech said from Five Cambridge Center, Cambridge, Mass. 02142.

So you'd like to add the flexibility of a popular personal computer to the power of your WANG 2200. But you don't want to spend $10,000 to do it.

IF YOU OWN A WANG 2200, YOU JUST SAVED THOUSANDS OF DOLLARS.

What if you could get that personal computer – say an Applefe or an IBM XT – for thousands less than you'd expect to pay. Plus a hard disk and printer at no additional cost. *And* you could run just about any software package on the market today?

Interested? If you could get all of this and pay only $1,995, you'd be standing in a long line to buy one. Well, forget about that line. You've already got almost everthing you need. In fact, you *don't* need another computer...you *don't* need another hard disk...you *don't* need another printer...and you surely *don't* need to spend another $10,000.

All you need is Micro-Bridge 80, a plug-in board that allows any terminal on your WANG 2200 system to act like a CP/M-based personal computer. This revolutionary new product is the most economical way to expand your 2200 system without buying additional

computers and peripheral equipment. And it costs just a fraction of what you'd pay for a popular personal computer.

Choose the software that's best for you. With Micro-Bridge 80, you don't have to compromise any more. Now you can choose the software that works best for you...software that's easy to use or software with sophisticated features, designed to fit your specific requirements. With over 2,000 CP/M programs to choose from, you can design a system that works for you. Powerful software applications that others have been using for years are now available to you. Like dBASE II™, Supercalc, WORDSTAR™, the Peachtree Accounting Series, and many, many others. And to get you started in the right direction, we've got a bonus for you.

Free CP/M operating system and Microsoft's Multiplan! Of course you get a copy of the CP/M operating system (Version 2.2). But that's not all. You also receive a copy of Microsoft's Multiplan spreadsheet. This best-selling, easy-to-use package was voted Software Of The Year by *Infoworld* magazine, which is why we include a copy of it with every Micro-Bridge 80...we want you to start off with the best.

Remember, CP/M 2.2 and Multiplan are included at *no extra charge* with your purchase of Micro-Bridge 80.

Communications made simple. Micro-Bridge 80 has two serial (RS-232) communication ports that make it easy to communicate with public data bases like The Source and CompuServe. It's not only easy, it's fast, because Micro-Bridge 80 communicates directly with on-line services. There's no need to tie up the 2200's CPU with communications protocols and log-on procedures.

Simple and easy to use. When you want to use CP/M, just type in a single command on your WANG terminal keyboard, and Micro-Bridge 80 turns control over to CP/M. That's all there is to it. And Micro-Bridge 80 doesn't interfere with normal WANG 2200 operations. In fact, on multi-user systems you can run CP/M at one terminal while someone else runs WANG software at another terminal on the system.

Easy to install. Anyone can install Micro-Bridge 80 easily in 15 minutes. No special tools are needed. No technical expertise. Simply remove the I/O panel cover of your 2200 and slip Micro-Bridge 80 into an empty slot. No other hardware alterations are necessary.

Order your Micro-Bridge 80 today and begin running CP/M software on your 2200 tomorrow.

Micro-Bridge 80 is not a promise for the future...it's fully tested and ready for shipment *today.*

Order your Micro-Bridge 80 package today and start using the CP/M software you've needed for years. For more information concerning Micro-Bridge 80, or for the location of the Micro-Bridge 80 dealer nearest you, just call us toll-free and ask for Micro-Bridge.

The entire Micro-Bridge 80 package sells for $1,995 and includes:

- Micro-Bridge 80 circuit board
- Installation & operating instructions
- CP/M 2.2 operating system
- Multiplan spreadsheet software
- 90 day limited warranty on parts & labor

*Optional hardware maintenance and software enhancement programs available. Ask for details when you call.

dBASE II™ is a trademark of Ashton-Tate. Supercalc™ is a registered trademark of Sorcim Corporation. WORDSTAR™ is a trademark of MicroPro International Corporation. Peachtree Accounting Series is a trademark of Peachtree Software, Inc. Infoworld is a registered trademark of Infoworld Publishing, Inc. Microsoft™ is a trademark of Microsoft Corporation.

MICRO-BRIDGE

1-800-255-6350

Developed by Computer Concepts Corporation
The Software and Hardware Innovators

SOFTWARE & SERVICES

BASES from page 67

BUSINESS COMPUTER NETWORK, INC.
Point-to-Point Communications

Business Computer Network, Inc. has announced a communications protocol for users of the vendor's data base services.

The Point-to-Point Communications protocol reportedly is a method by which various types of microcomputers, connected directly or through a modem or local-area network, may communicate interactively, according to a Business Computer Network spokesman.

The protocol is designed for Digital Research, Inc.'s CP/M operating system on Kaypro Computer Corp. Kaypro II, 4 or 10 microcomputers with a Hayes Microcomputer Products, Inc. Smartmodem 300. It also operates on IBM's Personal Computer and Compaq Computer Corp.'s Compaq microcomputer.

The software is provided free of charge to customers of the vendor's data base services.

Business Computer Network, P.O. Box 36, 1000 College View Drive, Riverton, Wyo. 82501.

TRAINING

SCIENCE RESEARCH ASSOCIATES, INC.
IBM VS Cobol II facilities

Science Research Associates, Inc., a subsidiary of IBM, has announced an independent study course in IBM VS Cobol II facilities, a course announced concurrently with IBM's introduction of VS Cobol II.

The course allows users to learn the new facilities of the compiler and focuses on such topics as structured programming concepts, implementing the sequence and the case structure and selection and iteration structures.

The course consists of a two-volume text, a videocassette and a reference guide and reportedly requires nine to 11 hours to complete.

IBM VS Cobol facilities can be leased for 30 days at $315 or for 12 months at $900.

Science Research Associates, P.O. Box 5380, Chicago, Ill. 60680.

SUBJECT from page 59

of the operational environment: performance and availability. These considerations are important when following the blueprint of subject data bases because subject data bases tend to concentrate data tightly and nonredundantly. The centralization of data that results may not be optimal for either on-line performance or availability.

Performance is hindered when more than one on-line activity must access data at the same time. In the case in which two on-line processes want to update the same data at the same time, the conflict must be resolved. The result of the contention for data under integrity control is a system slowdown.

Contention also occurs when multiple large data base scans are done over the same data base. When long-running activities can be spread over multiple physical data bases or even over multiple machines, performance problems can be minimized.

But when there is a single machine with a single physical data base with much activity directed at the data base, performance most likely will suffer.

One solution is to break up the physical units of data as finely as possible into small data base records, nodes, pages or whatever is the physical unit of storage. This minimizes the amount of data locked, which, in turn, minimizes the probability that data will be unavailable for access because of contention.

The other contention problem — that of doing large data base scans — can be alleviated by implementing a standard work unit in which large activities are broken down into a series of shorter activities.

For example, a data base scan of 10,000 records can be broken into a series of 200 scans of 50 records, with intermediate reporting at the end of each scan.

Another solution

Another solution is to break a data base into multiple physical data bases. For example, a large parts data base containing parts with key values from 0000 to 9999 is broken into four physical data bases for parts based on key value. This split will allow data to be moved to different environments (such as batch or on-line), to different machines and so forth. The ability to break up data bases at the highest physical level enhances the overall performance profile of the data.

The other subject data base problem in the operational environment — availability — is alleviated when subject data bases are physically broken into different data bases. For example, a data base, A, with one million records is divided into three data bases — A', A" and A"' — each of which has about 333,333 records. The fact that the subject data base is implemented across three physical data bases does not negate the effect of modeling and integrating data. When A goes down and must be recovered, the entire system is lost. But when A' goes down, only one-third of the system is lost.

Since subject data bases tend to centralize many different environments, the separate recoverability of data is very important.

Some data base management systems have facilities for separate recoverability buried within the system software; nevertheless, the physical division of the data still needs to be carefully planned.

Inmon is a director at Coopers & Lybrand in Denver, a noted author on the subject of data base design and a regular contributor to Softline.

WE WROTE THE BOOK ON DOCUMENTATION. AND THEN WE THREW IT AWAY.

Communication Sciences Introduces Explain. *The system that puts your software documentation where you need it most—online and in your data base.*

With Explain, you can create online user help, training procedures, program documentation and more. Because Explain uses the power of your DBMS, you can maintain the documentation as easily as you do the rest of your business data.

Access to the online documentation is at the user's fingertips. With simple commands, users can retrieve the help they need—directly from any application you link to Explain.

Chosen by Comserv Corporation as the online help system for AMAPS/3000, Explain is a powerful tool for both writers and readers of software documentation. And it's available to users of HP/3000/Image and IBM series 30xx and 43xx systems.

With Explain, you can afford to throw the books away. And keep the documentation.

For more information: call us at (612) 332-7559, or write to Communication Sciences, Inc., 100 North Seventh Street, Minneapolis, MN 55403.

CSI
Communication Sciences Inc.

900 GUEST ROOMS AND COMPLETE MEETING FACILITIES IN HOUSTON'S GALLERIA.

Surround your meeting with the excitement of the spectacular Galleria. A city of 250 shops under glass, where excellence in dining, recreation, shopping and entertainment are side by side with Houston's most complete meeting environment.

Only The Westin Galleria and The Westin Oaks offer the world's largest lobby under one roof. 900 guest rooms and suites, 32 meeting rooms in a range of sizes, three ballrooms, an exhibition hall, professional in-house catering and audio-visual services. An adjoining health and sports facility has a jogging track and heated outdoor pools.

Hold your next business meeting in Five Diamond award-winning luxury, at *surprisingly competitive rates.* The Westin Hotels of Houston. Excellence, in the heart of the Galleria.

Please call, 713-960-8100, and ask for the Director of Sales. The Westin Oaks, 5011 Westheimer, The Westin Galleria, 5060 West Alabama, Houston, Texas.

THE WESTIN OAKS
THE WESTIN GALLERIA
Houston
In Dallas, stay at The Westin Hotel, Galleria.

COMMUNICATIONS

Value-added mart to prosper: report

NEW YORK — IBM and AT&T only began offering enhanced data communications services in 1983, but by 1986 they will have grabbed a 30% share of this fast-growing market, according to a study released here recently.

The report, titled "The Enhanced Data Network Market," prepared by Frost & Sullivan, Inc., estimates 1982 revenues of value-added network carriers at $300 million and forecasts 1986 sales of $1.5 billion. Firing this growth is the explosive increase in small computers requiring interconnection both with each other and with remote data bases.

Despite their orientation to analog voice communications, telephone carriers are estimated to have garnered 50% of a $4.3 billion data communications market in 1983 and will still have 67% in 1986, by which time the market will have doubled in real terms, according to the report.

However, enhanced-service carriers' share of the market will jump from 8% to 18% over the same period. Satellite carriers, also fast growing in this area, are expected to have attracted less than 4% of the market by 1986.

The appeal of enhanced data communications networks for users is their ability to link diverse equipment using dissimilar communications protocols. According to Frost & Sullivan, in today's relatively free-wheeling regulatory environment, these networks — "enhanced" through computer control and data manipulation — can be expected to put more emphasis on services that go beyond mere transmission, such as store-and-forward message services and transaction processing support.

All the established players in this young market — which, besides GTE Telenet Communications Corp. and Tymnet, Inc., who dominate the group, includes Graphnet, Inc., Uninet, Inc., Compuserve, Inc. and others — can expect to be jolted by two events of the past year, the report notes.

AT&T entered the fray with its ACS/Net 1000, combining a packet-switched network from AT&T Communications with applications-oriented services by AT&T Information Systems, Inc.; IBM rolled out the Information Network to allow its own and IBM-compatible computers and terminal equipment to link up over a network installed, operated and managed by IBM, according to the report.

From the user's point of view, there are three categories of data communications services: private, dedicated lines and networks; the dial-up public telephone network; and the enhanced services provided by packet-switched public data networks, which are the subject of the report.

"Of the three, the first category is chosen by large corporate users with large data processing centers," the report notes. "The second will satisfy most occasional users who want minimum fixed investment and are less demanding and less sophisticated about data communications, being satisfied with a slower setup, lower speeds and a higher error rate.

"Enhanced services appeal across a wide spectrum from the occasional but sophisticated user, particularly in interactive applications, to the most demanding user interested in optional special features in processing, storage and conversion.

See FROST page 72

■ Packet node building blocks/76
■ Bell South to offer Pulselink/76
■ Novell claims it serves up files faster/72

INSIDE
Multiplexers/Modems/72

Vitalink signs marketing pact with Prime

MOUNTAIN VIEW, Calif.— Vitalink Communications Corp. recently announced the signing of a joint marketing agreement with Prime Computer, Inc. that is similar to a recent pact reached with Hewlett-Packard Co.

Under the terms of the agreement, Prime will serve as the initial point of contact for the service, and Vitalink will sell and install the equipment. Both Prime and Vitalink will be responsible for system compatibility.

The Vitalink system connects to the data link interface of Primenet communications software. "This provides Primenet with multiple data paths at transmission rates ranging from 4.8K bit/sec to 56K bit/sec," the vendor said. Vitalink equipment, including the satellite dish antenna installed at the customer's site, costs $140,000 per site (more than one is needed). The service charge is $1,800/mo.

Vitalink is located at 1350 Charleston Road, Mountain View, Calif. 94043.

Ungermann-Bass inks agreements with two firms

LAS VEGAS — Local-area network manufacturer Ungermann-Bass, Inc. said at Interface '84 that it has signed separate development agreements with Davong Systems, Inc. and Protocol Computers, Inc.

Ungermann-Bass said the deal with Davong will enable it to expand the Net/One Personal Connection — an intelligent board-level network interface unit for IBM's Personal Computer — to use Davong's hard disks and streaming tape drives. This will allow networked micros to access 160M bytes of on-line storage.

The agreement with Protocol Computers, Ungermann-Bass said, will result in a series of offerings enabling access to multiple operating systems environments.

The initial products offered are said to provide conversion for asynchronous Ascii-to-SNA 3270, Ascii-to-BSC 3270 and Ascii-to-IBM Systems 34/36/38 as well as 3270 deconversion to asynchronous Ascii.

Ungermann-Bass is at 2560 Mission College Blvd., Santa Clara, Calif. 95050.

Genesys Group to install network in Oklahoma City

OTTAWA — Genesys Group, Inc. has announced a videotex public access information system geared primarily to providing tourists and residents of Oklahoma City with information about special events, activities and attractions in the state's capital city.

Users will be able to access information through public terminals in 40 locations throughout the city, including the Will Rogers Airport and a number of major hotels, starting May 1, a spokesman said.

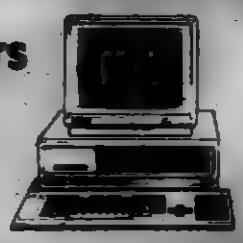
The system uses a Digital Equipment Corp. PDP-1144 mainframe computer with two 120M-byte disks and is outfitted with Genesys videotex software, which utilizes the North American Presentation Level Protocol Syntax, the vendor said.

There is no charge to users, according to the Genesys spokesman.

Further information is available from the Genesys Group, Third Floor, 1755 Courtwood Crescent, Ottawa, Ont. K2C 3J2.

DATA COMMUNICATIONS : MICROS : TERMINALS

Multiplexers
Modems
Networks



TEXAS INSTRUMENTS
KAYPRO
GE · IBM · 3M
TELETYPE · DEC
HEWLETT PACKARD
GDC · UDS · MICOM
AND MORE

CLOSE-OUT ITEMS

TEXAS INSTRUMENTS		HEWLETT PACKARD
743	$500	2631B
745	500	2382A
765	995	2624B
733	Offer	Card Readers 7260A

New Teletype Pinfeed AAA
AT DEALER COST $878 WHILE THEY LAST

DATA RENTALS SALES, Inc

Bell South to introduce packet-switched net

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — A whole new way of retailing many mass market products and services will develop from Pulselink, a packet-switched network Bell South plans to introduce later this year.

That is the opinion of Walt Weyand, Pulselink's marketing manager, who was interviewed by phone last week after disclosing some details about the network at a conference held here a short time earlier.

Pulselink, he said, provides a way of operating a network of automated gasoline service stations from a central location; it can update a retail chain's central inventory records whenever a clerk in a remote store makes a sale. Pulselink can also support home teleshopping services, download software to personal computer users, read electric utility meters, monitor home security systems and interconnect banks with widely dispersed automatic teller machines. Many of these services, Weyand added, will be offered later this year in Atlanta, Charlotte, N.C., and/or Columbia, S.C. — the first three metropolitan areas in which Bell South plans to tariff Pulselink.

Weyand said that because users of information-based services typically communicate in short bursts, a packet-switched net is better suited for this type of traffic than the circuit switch telephone net and that a greater number of terminals and users can be accommodated.

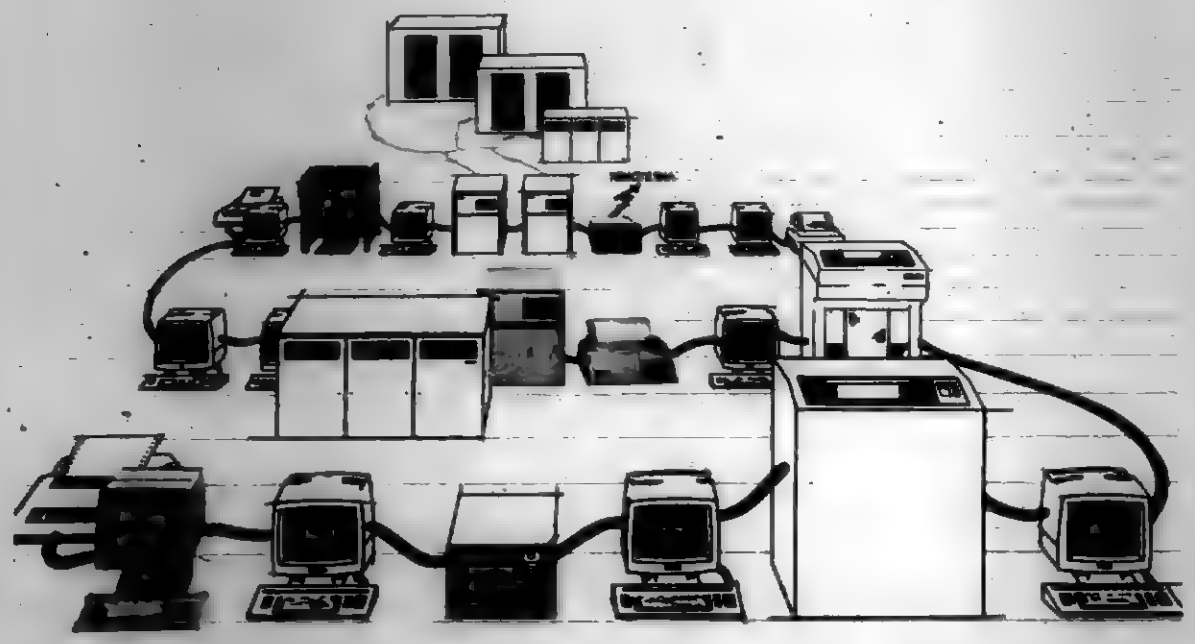
He added that because most users of on-line information services use nonpacketizing terminals, it is necessary for the network provider to include end-to-end protocol/code conversion as part of the service. This is not possible, though, according to Weyand, because of the Federal Communications Commission's Second Computer Inquiry decision. Specifically, Computer Decision II says that AT&T and the now-divested Bell operating companies can offer end-to-end protocol/code conversion only if they do so through separate subsidiaries or obtain a waiver from the commission for each service offering.

If Bell South cannot include end-to-end protocol conversion as part of its Pulselink service, Weyand said, "our revenue stream will be reduced substantially."

AT&T, contending that divestiture made the waiver process unworkable, has asked the FCC for rules that would permit it "to provide code and protocol conversion on the same unrestricted basis as other carriers," for example, GTE, which through its Telenet subsidiary, operates a nationwide packet-switched network. A number of former Bell operating companies have supported the petitions.

But several organizations representing intelligent terminal makers and vendors of on-line information services contended that the waiver provision should be retained. As the Association of Data Processing Service Organizations, Inc. put it: "The adverse consequences . . . alleged to flow from the [FCC's order] are more imagined than real. . . . [The commission] should expressly prohibit, without a waiver, the provision of code and protocol conversion services by AT&T and the [former Bell operating companies] to facilitate interconnection between disparate terminals."

Weyand said last week that Bell South plans to seek a Computer Decision II waiver for Pulselink soon. Almost certainly, the other former Bell operating companies that submitted comments late last month have similar services under development. Thus, the commission's consideration of the Bell South application could affect how quickly Pulsecom-type networks become available elsewhere.



3270 Networking: No More No Man's LAN.

Imagine. 3270 Processing. Integrated Personal Computing. Local Area Networking. And SNA Compatibility. In One System.

Imagine a system that successfully settles the uncharted territory of 3270 local networking—that "no man's LAN" of unlinked and unrealized potential.

Imagine a system that delivers the power of 3270 processing, and the flexibility to build two local area networks from a single controller. Imagine being able to attach up to 120 devices to that controller. Or attaching four distinct controllers—and multiple coaxial links of up to 10,000 feet each—to any of those LANs.

Imagine the economies of a system that handles that networking with standard 3270 coax. That requires no commitment to special architectures or non-standard LAN technologies. And that, thanks to a multi-drop, station-to-station design, can eliminate thousands of feet of new coax.

Of course, such a system would have SNA compatibility. But it would also have a set of capabilities to dramatically increase throughput, while reducing hardware and support cost in *any* environment. Capabilities like multi-host and multi-personality support, application and address switching, and system printing.

This system would have multi-user personal computing "built into" the network—allowing you to assign true 16-bit computing power, maintain overall MIS control and share expensive disks and printers.

Such a system would boast an intelligent display station that displays a mastery of ergonomic and aesthetic design. With multi-screen formats, anti-glare screen, low-profile keyboard, and a tilt-and-swivel pedestal with the smallest footprint in the industry. Such a system would also include a full line of printers.

Imagine. 3270 processing. IBM-compatible personal computing. Versatile, economical, powerful local area networking. In one system.

Braegen *has* imagined just such a system. They have designed it. Built it. And called it the ELAN™ System.

If such a system sparks your imagination, give us a call. We know the feeling. The Braegen Corporation, 525 Los Coches Street, Milpitas, CA 95035 (408) 945-8150; TWX: 910-338-7332

Imagine. Then Make It Better.

BRÆGEN

™ELAN is a trademark of The Braegen Corporation.

Net 25 family fits CCITT X.25

Telematics International, Inc. has introduced the Net 25 family of packet-switching nodes compatible with CCITT X.25.

The Net 25 family includes concentrator nodes, secondary nodes and backbone nodes, with throughput rates of up to 600 switched packets per second.

The Net 25/100 is the entry-level packet-switching node, ideally suited for use as a concentrator node, the vendor said. It has a throughput of up to 100 (128-byte) switched packets per second. It features up to 16 CCITT X.25 access lines, providing standard RS-232C interface with channel rates up to 19.2K bit/sec, 1M byte of memory and 5M bytes of local disk storage.

The Net 25/200 (primary node) has the capability to expand to a backbone node, according to the vendor. It has throughput of up to 200 (128-byte) switched packets per second.

See NET page 72

ADDS Viewpoint/Color from your point of view.

EVEN BOSSES NEED A LITTLE COLOR.

Right out of the box, the new ADDS Viewpoint/Color brings extra clarity and comprehension to any business application. Bosses like that.

They also will like the ergonomically designed detachable keyboard with its separate key cluster for numeric entry and cursor control. And the display screen which tilts from a minus 5° to a plus 15° and swivels a full 360° for comfortable viewing.

But should only a boss deserve color?

The full-featured ADDS Viewpoint/Color costs less than many monochrome terminals so there's no reason not to let color improve your communications company-wide. That makes nine good reasons to buy ADDS Viewpoint/Color terminals. Red, blue, green, yellow, cyan, magenta, white, black and price.

IT ALL ADDS UP.

ADDS
Applied Digital Data Systems Inc.
A Subsidiary of NCR Corporation
100 Marcus Blvd., Hauppauge, New York 11788

Novell testing its file server software

OREM, Utah — Novell, Inc., a designer and supplier of software for local-area networks, has begun benchmarking its file server operating system against the file server software supplied by vendors of local-area networks.

The company will compare the performance of eight local-area networks as they provide IBM Personal Computers and work-alikes with access to files in a shared Winchester disk drive.

"Preliminary tests were run on a stand-alone [IBM Personal Computer XT] to establish a set of starting-point measurements," the company reported, and then timing tests were conducted twice on each network — once with the local-area network manufacturer's own server software and again with the software provided by Novell.

Local-area networks included in the test are Corvus System, Inc.'s Omninet; Davong System, Inc.'s Multi-Link; Gateway Communications, Inc.'s G-Net; 3Com Corp.'s Ethertink; Orchid Technology, Inc.'s PC-Net; Proteon Associates, Inc.'s Pronet; Nestar Systems, Inc.'s Arcnet; and Novell's Netware/S.

The benchmark will include 128K-byte and 512K-byte read and write tests; a 356K-byte record write test; create, write and delete tests; and save and copy tests using Wordstar text. In each test, the elapsed time in seconds is recorded as the performance data, according to Novell.

The benchmarks are meant to "illustrate that performance is not only a function of hardware, but software as well," a company spokesman said. "For the first time in a network environment, there is a common denominator capable of increasing performance on all local-area networks while maintaining uniform functionality across all topologies."

Additional information is available from Novell, located at 1170 N. Industrial Park Drive, Orem, Utah, 84057.

If you're looking for a UPS system that will fit into small spaces, Exide Electronics has exactly what you need. The Exide Electronics Series 1000 UPS.

The fact is, many "small" UPS systems aren't really that small in size, especially when you consider the power they offer. And even if they could fit into available space they may not blend well with your environment.

Not the Series 1000 UPS. It packs a lot of power (3KVA) into a neat, space saving package. It's designed to fit *and* blend into the workplace. It's also designed to fit into your budget because in addition to its small size we gave it a small price (under $6,000).

Another nice thing about the Series 1000 UPS is its speedy delivery. If you need one right away you won't have to wait a month or even a week. It'll be on its way to you within 24 hours. And the Series 1000 will soon be available in 1.5KVA and 5KVA.

The Exide Electronics Series 1000 UPS. It's what small UPS systems should have been in the first place.

To: Exide Electronics, c/o Richard Wall, PO Box 58189, Raleigh, NC 27658
☐ Please send us more information on the Series 1000 UPS.
☐ Please have a salesman call.
Name
Title
Company
Address
City
State Zip
Telephone

EXIDE ELECTRONICS

P.O. Box 58189, Raleigh, NC 27658; 919/872-3020, TWX 510-926-0598
In Canada, 5200 Dixie Rd., Suite 20, Mississauga, Ontario L4W1E4

Weights listed are approximate and include smallest, standard battery (Slide, 15 min; Topaz, 30 min; Exide Electronics, 8 min) according to published literature of the manufacturer available at time of ad preparation. Battery size and weight may vary depending on system requirements. Illustrations show typical configurations and are scaled based on smallest, standard system (electronics and battery) dimensions according to published literature of manufacturer available at time of ad preparation. Battery housing of system may vary depending on system requirements.

MULTIPLEXERS/ MODEMS

GANDALF DATA, INC. GLM 528; GLM 510

Gandalf Data, Inc. unveiled two new products at Interface '84 that it has added to its Linc Miners family of multiplexers.

The GLM 528 is said to be optimized to connect a large number of personal computers or other devices to the company's PACX data network switch or directly to a host via a local or long-haul T1 (1.54M bit/sec) link.

The GLM 528 is said to cost $35 to $40 per channel and is scheduled to be shipped in April.

Gandalf also announced the GLM 510, a device with an integral modem that supports four or eight asynchronous channels over a four-wire circuit that operates at speeds up to 9.6K bit/sec.

Prices range from $375 for the module versions compatible with the company's PACX switch to $600 for the stand-alone, eight-channel model.

Gandalf Data, 1019 S. Noel, Wheeling, Ill. 60090.

EMULEX CORP. C802 series multiplexers

Emulex Corp. has announced the C802 series communications multiplexers for Digital Equipment Corp. processors.

According to the vendor, the product comes in two models: the C802/HA is designed to work with the LSI-11/23 and LSI-11/23 Plus processors, and the C802/HB works with the Micro/PDP-11 computer.

Both the C802/HA and C802/HB are list-priced at $2,300.

Emulex, P.O. Box 6725, 3545 Harbor Blvd., Costa Mesa, Calif. 92626.

NET from page 70

The backbone node, the Net 25/400, features up to four high-speed trunk channels, up to 16 CCITT X.25 access lines, 1M byte of memory and 5M bytes of local disk storage.

Additional nodes include the Net 25/800 High-Performance Backbone Node, the 25/SP Switching Pad and the Net 25/SN Supervisory Node. Prices range from $20,000 for an entry-level configuration to $300,000 for a full configuration.

Telematics International is located at Crown Center, 1415 N.W. 62nd St., Fort Lauderdale, Fla. 33309.

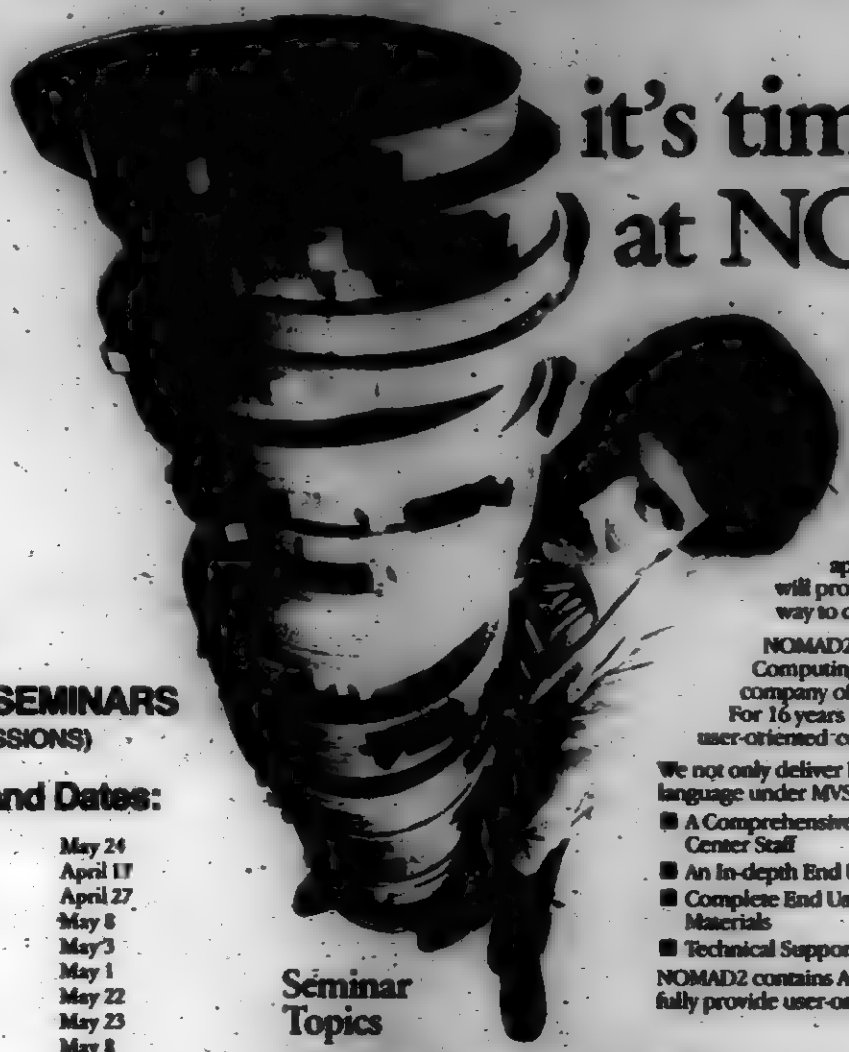
FROST from page 69

Only enhanced networks hold the promise of truly distributed data processing," the report states.

The study also analyzes and forecasts equipment demand of enhanced-service carriers. In current dollar terms, data circuit terminations equipment purchases, estimated at $35 million in 1983, are expected to reach $160 million in 1986. Switching node equipment spending by these carriers will climb from $24 million to $120 million over the same time period, and data termination equipment spending will expand from $14 million to $20 million.

The report (No. 1224) costs $1,400 and is available from Frost & Sullivan, 106 Fulton St., New York, N.Y. 10038.

If delivering user-oriented computing is getting you down...



it's time to look at NOMAD2!

Delivering user-oriented computing can be a tricky business. If it's your objective to satisfy the user community in your organization, it's time to speak to the experts. We'll share our experience with you at our FREE NOMAD2 Seminars.

Whether you're interested in an Information Center, Development Center, end-user computing or just quick applications development, our seminars will provide you with a closer look at the best way to deliver user-oriented computing.

NOMAD2 is a unique product created by D&B Computing Services, the information services company of The Dun & Bradstreet Corporation. For 16 years we have been delivering value added user-oriented computing services.

We not only deliver NOMAD2, the premier fourth generation language under MVS and VM, but also provide . . .

- A Comprehensive Training Program for Your Information Center Staff
- An In-depth End User Training Program
- Complete End User Documentation and Training Materials
- Technical Support for Your Information Center Staff

NOMAD2 contains ALL the components you need to successfully provide user-oriented computing services.

FREE
NOMAD2 SEMINARS
(HALF DAY SESSIONS)

Location and Dates:

Atlanta, GA	May 24
Austin, TX	April 17
Boston, MA	April 27
Chicago, IL	May 8
Cincinnati, OH	May 3
Cleveland, OH	May 1
Columbus, OH	May 22
Dallas, TX	May 23
Denver, CO	May 8
Des Moines, IA	May 16
Detroit, MI	May 2
Elizabeth, NJ	May 16
Harrisburg, PA	April 12
Hartford, CT	April 26
Houston, TX	May 24
Indianapolis, IN	May 17
Kansas City, MO	April 24
Los Angeles, CA	May 3
Louisville, KY	May 10
Miami, FL	May 22
Montreal, Canada	May 4
New York, NY	April 19
Oklahoma City, OK	April 25
Omaha, NE	May 15
Philadelphia, PA	May 17
Pittsburgh, PA	May 9
Portland, OR	May 9
Rochester, NY	May 16
San Francisco, CA	May 1
Seattle, WA	May 10
St. Louis, MO	May 10
Stamford, CT	May 4
Toledo, OH	May 23
Toronto, Canada	May 9
Wilmington, DE	April 10

Seminar Topics

Delivering User-Oriented Computing

■ Information Centers vs. Development Centers ■ The "Ideal" Environment ■ User Profiles ■ Delivery Strategies ■ User Training and Support ■ Microcomputer Strategies

NOMAD2: On-Line Application Development

See the "reality" of user-oriented computing with NOMAD2. Watch us build and dynamically modify a NOMAD2 application on-line. We'll build a data base structure, load data, generate reports and graphics, modify the data base and much more.

If delivering user-oriented computing is your objective, it's time to take a closer look at NOMAD2.

NOMAD2 . . . Experience the difference

D&B Computing Services

A subsidiary of The Dun & Bradstreet Corporation

Please fill out the attached registration form and return it to:

Roger Cox
D&B Computing Services
187 Danbury Road
Wilton, CT 06897
or call Roger Cox at (203) 762-2511

☐ Please reserve _____ seat(s) at your *FREE* NOMAD2 SEMINAR to be given in

(City) _____

on (Date) _____

☐ Please send NOMAD2 materials.

Name _____ Position _____

Company _____

Address _____

City _____ State _____ Zip _____

Telephone _____

®NOMAD2 is a registered trademark of D&B Computing Services, Inc.
©Copyright 1984 D&B Computing Services, Inc. All Rights Reserved.

How To Implement The Best New PC Decision Support Software With A Pair Of Scissors.

YES. Tell me more about The New Content MBA and The Corporate MBA.
☐ Have a Content representative call me.

Name _____

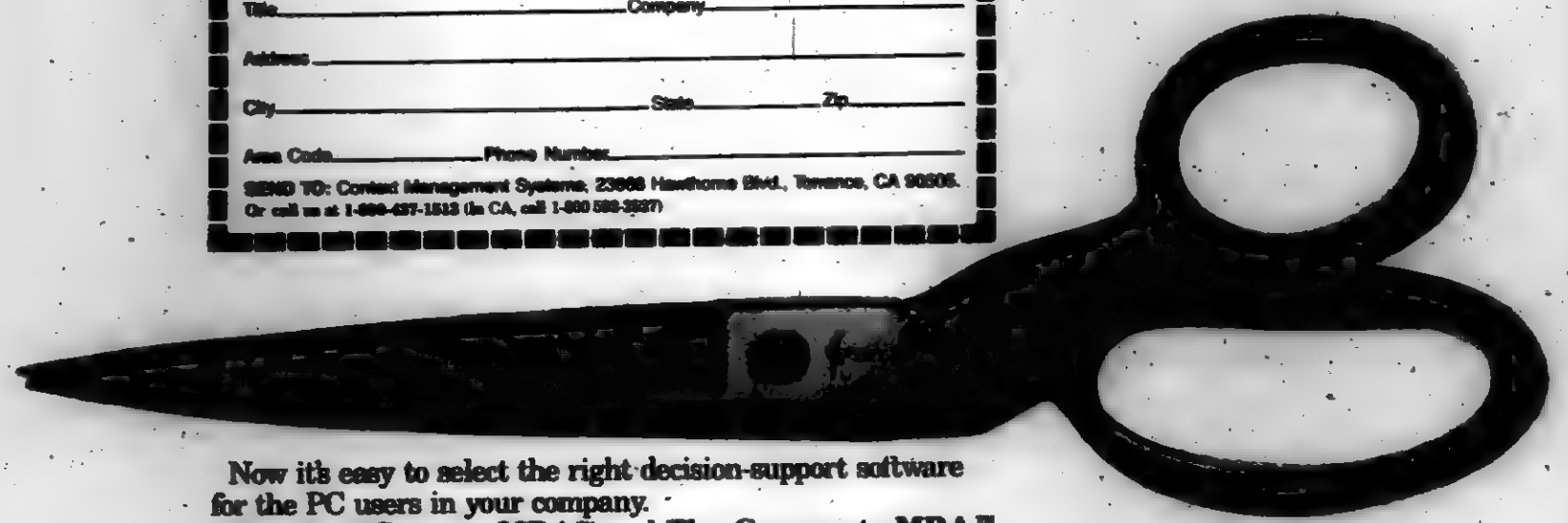
Title _____ Company _____

Address _____

City _____ State _____ Zip _____

Area Code _____ Phone Number _____

SEND TO: Context Management Systems, 23868 Hawthorne Blvd., Torrance, CA 90505.
Or call us at 1-800-437-1513 (In CA, call 1-800 588-2537)



Now it's easy to select the right decision-support software for the PC users in your company.

The New Context MBA™ and The Corporate MBA™ both have all the functions PC users in your company need: Spreadsheet, Business Graphics, Database, Word Processing, Telecommunications, and Forms Creation.

They're all *integrated* in one software package. With advantages that'll make your life a whole lot easier.

Like full 3270 emulation. So *you* can connect their PCs to your Data Center network. For immediate, yet controlled, access to decision data. No more hand-holding or custom programming.

PC users in your company get the decision-support capability they need from a single, easy-to-learn package. And you get an easy way to plug one PC software package into the entire company.

Our **Context 500™** support team builds a custom training and ongoing support program for your company, so *you* don't have to.

Now *your* job of supporting *our* software is as easy as picking up the phone.

So make it easy on yourself. Cut out, fill in, and send us this coupon. And cut out a lot of heartburn over which of many PC software packages to choose.

Now where did you put those scissors?

Context
MANAGEMENT SYSTEMS
Personal Computer Software For Business Decisions.

The New Context MBA, The Corporate MBA, True Data Integration, Data Exchange Facility and Context 500 are trademarks of Context Management Systems, Inc.
©Context Management Systems, Inc. 1984.

SYSTEMS & PERIPHERALS

Gould unveils trio of design systems

By Tom Henkel
CW Staff

FORT LAUDERDALE, Fla. — Gould, Inc.'s Computer Systems Division recently announced a 32-bit graphics system, the Powerstation (PS) 5000, and two turnkey computer-aided design and manufacturing (CAD/CAM) workstations, the Powerstation 3100 and 5100.

Based on the Unix operating system, the PS5000 was designed for compute-intensive electrical, mechanical, architectural and engineering design applications. It incorporates a 32-bit superminicomputer and a dedicated graphics processor packaged in a single cabinet, the vendor said.

The unit's CPU can accommodate up to 16M bytes of virtual memory, up to 32K bytes of cache memory per processor and the ability to interleave main memory. The system was designed around Gould's synchronous bus architecture, the Selbus, which features a 26.7M-byte data transfer rate, the vendor said.

Other features reportedly include instruction and operand prefetch, a four-stage instruction pipeline, base register support and a variety of peripherals.

The PS5000 includes an integral 80M-byte Winchester disk subsystem, consisting of a disk drive, power supply and disk processor. Data backup is achieved

Gould's PS5000 graphics workstation

through a removable 65M-byte cartridge magnetic tape subsystem, which includes a tape drive, power supply and tape processor, the vendor said.

The PS5000 supports the firm's UTX/32 operating system, which contains features of both the Bell Laboratories and the University of California at Berkeley versions of Unix, according to the vendor.

The unit's graphics subsystem is a parallel interface to the CPU that displays both color and monochrome graphics output from the PS5000. It consists of a 19-in. color display monitor, keyboard and mouse, the vendor said.

An I/O processor operates independently and in parallel with the CPU and generates a 16-bit asynchronous I/O bus that can transfer data at up to 1.5M byte/sec, the vendor said.

A basic PS5000 base enclosure consists of two 1M-byte integrated memory modules, an 80M-byte Winchester disk subsystem, a 60M-byte tape subsystem, a graphics processor, keyboard, mouse and a power supply. It costs $99,000. The base enclosure reportedly can be expanded to include an additional 80M-byte disk drive, up to 5M bytes of physical memory, 16 serial communications ports, a hardware floating-point accelerator and a link to Xerox Corp.'s Ethernet local-area network. The product is available 90 days after receipt of order.

For CAD/CAM manufacturing applications, Gould has announced the PS3100 and PS5100. The units are turnkey systems aimed at mechanical designers.

The PS3100 was designed around Gould's PS3000 16/32-bit processor and includes a color graphics terminal and graphics processor. Similarly, the PS5100 is based on the firm's 32-bit PS6000 virtu-

See GOULD page 81

INSIDE

Data Storage/76
Printers/Plotters/76
Graphics Systems/76
Power Supplies/76
Auxiliary Equipment/80

Locom add-in memory unit targets IBM processors

SAN JOSE, Calif. — Locom Corp. has announced the LCM-400, an add-in memory unit for IBM's 4331, 4341 and 4361 processors that can expand the maximum main memory capacity of those systems to 16M bytes.

Available in memory configurations ranging from 1M to 16M bytes, the LCM-400 is reportedly identical to the memory expansions available from IBM. The vendor claims that by extending the main memory capacity of the 4331, 4341 and 4361 processors beyond the IBM maximum, users can avoid upgrading their systems to larger IBM processor models.

The LCM-400 memory costs roughly $6,000 per 1M byte in small memory configurations, such as 2M bytes. When pur-

See LOCOM page 81

IPL Systems, Sorbus reach maintenance agreement

WALTHAM, Mass. — IPL Systems, Inc., a manufacturer of a line of mid-range processors that is compatible with IBM's 4300 series processors, recently announced it will use the Sorbus Division of Management Assistance, Inc. to provide maintenance on IPL systems.

Under the agreement, Sorbus will maintain all domestically installed IPL processors. Further, IPL's maintenance technicians have been transferred to Sorbus. IPL said it is training Sorbus employees to maintain IPL systems.

While Sorbus will provide local customer service, IPL said it still retains full responsibility for the performance of its products. IPL will continue to maintain its remote diagnostic facility at its headquar-

See IPL page 81

Report predicts '84 sales of computer systems to hit $52.5 billion

By Edward Warner
CW Staff

WELLESLEY, Mass. — Total sales of the American computer industry will reach $92.4 billion this year, an increase of almost 16% over 1983, according to a report released by Venture Development Corp., an industry consulting firm here.

The lion's share of those sales, $52.5 billion, will go to the manufacturers of computer systems, an increase of $6.1 billion over last year, the report said.

The report, which provides sales projections for 40 categories of computers and computer industry products produced in the U.S., is based on personal interviews with executives from American computer manufacturers and roughly 500 questionnaires returned by computer product users, said Mark Rudov, a Venture Development senior consultant.

Other market segments covered by the report were data storage systems sales, expected to rise $2.1 billion over last year to a total of $12.7 billion, and sales of terminals, which will rise to $7.3 billion from $6.5 billion last year. The sales of printers and plotters, the report said, will rise by roughly $1 billion, from $7.3 billion in 1983 to $8.5 billion this year.

Software and services, meanwhile, will rise $2 billion in sales from 1983 to $11.7 billion this year.

In all, the industry is expected this year to continue its 15.9% annual growth rate since 1980, the report said. That rate, Rudov estimated, will be sustained "at least until the end of the decade," due to what he called the failure of most firms to adopt the efficiencies of office automation.

Mirroring that annual industry growth rate is the annual growth rate since 1980 in the sales of printers and plotters, the report said. The report pegged that rate at 16.4% and noted that strong growth in that industry was being shown by line printer shipments, with an annual rate of 15%, and page printers, with an annual rate of 14.6%.

Page printer shipments, the report predicted, will reach nearly $500 million this year, with the average selling price dropping nearly 50% from its 1980 level to around $130,000. That price, Rudov estimated, is probably not likely to continue its steep plunge because a point will come where "you won't attract more customers with a lower price."

Another area seen undergoing rapid growth by the report was that of printer/plotter shipments. Booming at a compound annual rate of 33.7%, the report said, shipments of those units will more than triple their 1980 sales level to $525.1 million this year. That boom, Rudov explained, is likely due to the market's increased interest in graphics and the greater availability of graphics software.

Plotter shipments, the report said, are likely to rise to nearly $400 million this year, with the sale of flatbed plotters topping the list.

Most buyers of the report, titled "The U.S. Computer Industry, Second Edition," will be U.S. manufacturers of computers, peripherals and software, Rudov noted. "They'll use it," he said, "to give themselves a better handle on where their industry is going."

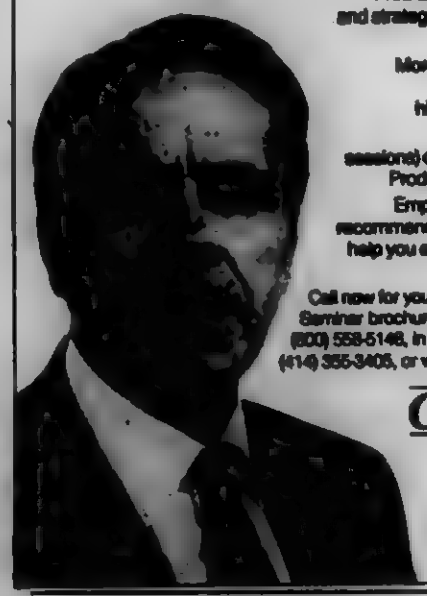
The 200-page, hardbound report is available for $1,050 from Venture Development, One Washington St., Wellesley, Mass. 02181.

CAP GEMINI DASD Presents

LAMOND ON IBM

San Francisco
The Westin Miyako
May 2–4, 1984

Washington, DC
The Sheraton International
Conference Center
May 7–9, 1984



Fred Lamond, internationally esteemed researcher and strategic-planning authority, thinks and speaks IBM. From the user's perspective.

More than 2,500 DP decision makers in 19 cities worldwide have already profited from his insightful and constructive analysis of IBM.

Lamond's intensive three-day seminar (12 sessions) discusses current and projected IBM policies. Products. Applications. Trends (including IBM PC).

Emphasis is on cost-effective alternatives to IBM recommended growth and migration paths. Designed to help you examine options and reduce the cost of doing business with Big Blue.

Call now for your free Seminar brochure, (800) 558-5148, in Wisconsin (414) 355-3405, or write:

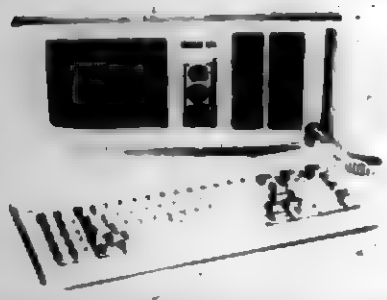
CAP GEMINI DASD™
9045 North Deerwood Drive
Milwaukee, WI 53223

GEU ACCREDITED

Eagle Spirit
Portable Computer

Special Leasing Offer
$245/Mo. (Limited Time)
Including Maintenance

Call Toll Free
800-257-7748
In NJ 609-235-4210



Introducing the **Eagle Spirit XL** from Data Access Systems, Inc., a portable with the power of many desktops, including the IBM XT.

Along with its high degree of IBM compatibility, the Spirit has a memory expandable to 640K bytes, two serial and one parallel port, a 10M byte hard disk, built-in graphics and more!

So if you're looking for quality and power in a portable computer, look for the Eagle Spirit XL from DASI, the leader in quality data communication products.

DASI sells, leases and services to the corporate user from an extensive inventory of PC's, CRT's, printers and modems. Its nationwide service locations give you same day on-site service. And with its multi-million dollar leasing base, DASI will tailor a financial package to meet any budget.

**The Eagle Spirit and DASI...
An Industry Leader for 15 Years.**

Regional Offices:
Atlanta (404) 998-2235
Boston (617) 788-6428
Chicago (312) 887-6440
Cleveland (216) 473-2121
Dallas (214) 369-8532
Denver (303) 337-4168
Detroit (313) 978-7380
Houston (713) 688-3985
Los Angeles (213) 532-2222
Minneapolis (612) 854-4466
New Jersey (201) 227-6868
New York City (212) 594-6971
Philadelphia (609) 235-6885
Phoenix (602) 264-1927
San Francisco (415) 573-1221
Seattle (206) 575-1440
Washington, DC (301) 459-3977

D A S
DATA ACCESS SYSTEMS, INC.
Cohen & Compton Avenues
P.O. Box 1215
Bridgewood, NJ 08012
609/235-0768 800/257-7748
In NJ 609/235-4210

SYSTEMS & PERIPHERALS

DATA STORAGE

AVIV CORP.
Maxfile series

Aviv Corp. has introduced a family of plug-compatible storage systems for selected Digital Equipment Corp. Massbus, Unibus and Q-bus-based processors.

The Maxfile series reportedly features storage peripherals from Control Data Corp., Cipher Data Products, Inc. and Fujitsu Ltd. packaged in a 42-in. cabinet. Disk selections include both fixed and removable media, with data transfer rates of up to 1.8M byte/sec and storage capacities ranging from 80M to over 2G byte/cabinet.

Tape selections include front- and top-loading units with streaming and start/stop capabilities. Phase-encoded (1,600 bit/in.) recording is available for file transfer and software distribution, and group-encoded recording (6,250 bit/in.) is used for high-speed backup of large files, the vendor said.

The Maxfile series is available in six configurations, and prices start at $6,500, a spokeswoman said.

Aviv, 26 Cummings Park, Woburn, Mass. 01801.

PRINTERS/PLOTTERS

DIGITAL MATRIX CORP.
Formwriter 9/132

Digital Matrix Corp. has announced a 132-col. dot matrix forms printer designed for uses where multipart, continuous forms are printed individually or in the demand-document mode.

The Formwriter 9/132 performs like a journal printer, requiring no special programming or instruction codes for normal operation, according to the company.

It reportedly eliminates manual alignment of forms in order to print single documents such as prenumbered forms or checks. Depressing the tear-form button advances the paper so that either the last line printed or the head-of-form is brought to the tear bar for separation, while releasing the button returns the head-of-form to the print head and allows printing within ½ in. of the top or bottom of the sheet, according to the company.

The printer was designed for sale through OEMs, systems houses and distributors.

Evaluation units are available now for $1,595.

Digital Matrix, 106 Filley St., Bloomfield, Conn. 06002.

DIGITAL EQUIPMENT CORP.
LN01 Font Utility; LN01 Soft Font Library

Digital Equipment Corp. has announced enhancements designed to let users of its LN01 laser printer select from a variety of mono-spaced and proportionally spaced typefaces.

The LN01 Font Utility and the LN01 Soft Font Library are intended to help LN01 laser printer and VAX-11 superminicomputer users produce professional-quality printing in the office without typesetting equipment.

The LN01 Font Utility reportedly provides access to any type font — typeface, size or weight — from the LN01 Soft Font Library. The utility is said to describe available fonts, print a text file using a specific font or series of fonts or preload the LN01 printer with the fonts to be used for the day's printing.

Editing features reportedly create new characters or modification of characters for special usage, such as bullets for reports and presentations, compound characters or character combinations for building unique symbols or logos.

The utility runs under DEC's VMS operating system on the VAX-11/730, 750, 780 and 782 systems that include the LN01 printer and have 256K bytes of random-access memory.

The LN01 Soft Font Library reportedly comprises widely used proportional and mono-space type families in various sizes and weights. Type sizes are said to range from six to 36 points. Most type families reportedly feature a multinational character set.

The company reported that several packages, such as basic office, office upgrade and complete office are scheduled to be available in March. Other packages are designed for printing directories, listings, technical papers, newsletters, management reports and catalogs.

Prices for the LN01 Soft Font Library range from $1,025 to $1,350. The LN01 Font Utility is priced at $2,000.

DEC, Maynard, Mass. 01754.

GRAPHICS SYSTEMS

LYNXYS, INC.
Lynxystem 1000

Lynxys, Inc. has announced a hardware and software system designed to allow attachment of interactive graphics devices to Control Data Corp. Cyber 170 mainframes.

Lynxystem 1000 reportedly improves the performance of highly interactive applications by offloading the user interface portion of an application from the mainframe. The system's multiple microcomputers act as dedicated, programmable controllers for interactive graphics devices that traditionally cannot be connected to the mainframe, the vendor said.

The system is based on a high-speed bus with a Cyber 170 channel interface. Depending upon the configuration, the bus may use from two to five single-board Motorola, Inc. 68000-based microcomputers, each including 128K bytes of dual-ported memory, two serial ports and an I/O expansion bus to which multiple parallel ports may be attached.

Device adapters attach to the expansion bus to accommodate graphics and other peripheral devices.

The minimum configuration, the Lynxystem 1002, is priced at about $25,000, including software.

Lynxys, P.O. Box E, West Lafayette, Ind. 47906.

POWER SUPPLIES

NOVA ELECTRIC MANUFACTURING CO.
Minitaur UPS

Nova Electric Manufacturing Co.

Continued on page 80

SYSTEMS & PERIPHERALS

Continued from page 76

has introduced its 1-kVA Mintaur uninterruptible power system (UPS) with batteries and a ¼-cycle transfer switch in a 7-in.-high module.

The Mintaur UPS is designed for operation of a variety of equipment including microcomputers, communications equipment, CATV systems, word processors, point-of-sale terminals, process-control equipment and computer-aided design and manufacturing systems.

The system can operate at 150% of its 1-kVA rating for short time periods, the company said. In addition, for loads such as motors, disk drives or transformers, the system is said to provide up to 10 times overload through automatic operation of its static transfer switch. The switch returns to normal operation automatically when the overload condition has been overcome, according to the vendor.

The Mintaur handles I/O voltages ranging from 120 Vac to 240 Vac and has output frequencies of 60Hz and 50Hz. The Mintaur Model 11-1K60-Y11 is priced at $3,700.

Nova Electric Manufacturing, 263 Hillside Ave., Nutley, N.J. 07110.

LAMBDA ELECTRONICS
LT series

Lambda Electronics has announced a series of eight power supplies designed for use in laboratory, testing and systems applications.

The LT series reportedly provides up to 60V and up to 300A and comes with built-in overflow protection and dual, digital meter readout for voltage and current. The products are said to be compatible with Lambda's IEEE-488 standard, computer-programmable power system.

The power supplies are grouped in either the LT-800 series, with a 65% efficiency at maximum output voltage, or the LT-820 series, with a 70% efficiency at maximum output.

The LT-800 series is priced at $1,650, and the LT-820 series is priced at $2,900, the vendor said.

Lambda Electronics, 515 Broad Hollow Road, Melville, N.Y. 11747.

AUXILIARY EQUIPMENT

GOULD, INC.
884A-200

Gould, Inc. has announced an addition to the 884 family of programmable controllers used in small to mid-size control systems — the Model 884A-200.

With a 75% increase in memory size, the enhanced model is said to offer increased user logic storage capacity from 2,000 nodes to 3,500 nodes of relay ladder logic.

In addition, it reportedly provides for the storage of over 1K numerical qualities (registers) and an additional 1,024 on/off (discrete) variables, for a total memory capacity of nearly 5K 16-bit words. Comprised of a series of individual components, the 884A-200 permits the user to tailor the system to meet specific needs, the vendor said.

Basic features include battery back-up for the Cmos random-access memory, a memory-protect switch and a low battery power indicator.

The 884A-200 is priced under $2,000.

Gould, P.O. Box 3083, Andover, Mass. 01810.

APPLIED COMMUNICATIONS, INC.
Base24-Stratus

Applied Communications, Inc. has announced that its Base24-ATM processing and switching software is now available for the Stratus Computer, Inc. Stratus/32 Continuous Processing System.

The Base24/Stratus system was designed for use by financial institutions requiring medium or small automated teller machine networks, according to the vendor.

Base24-ATM reportedly enables institutions to choose from three authorization procedures, allowing flexibility within shared electronic fund transfer environments.

It also is said to include a settlement and reporting module that shows the funds due each day among sharing institutions.

Prices for Base24-ATM start at $145,000.

Applied Communications, 306 S. 108th Ave., Omaha, Neb. 68154.

PRO-LOG CORP.
Price reductions

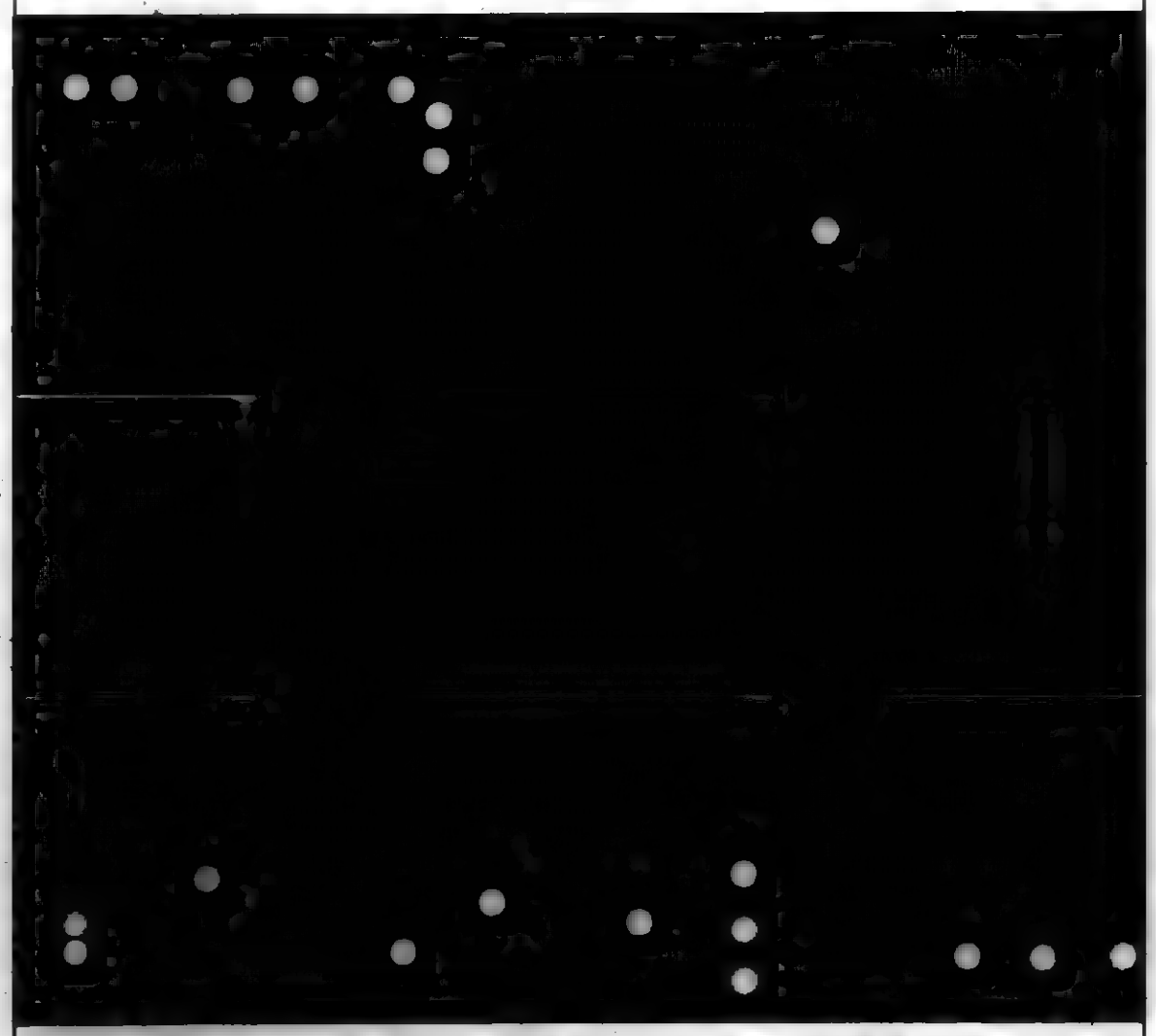
Pro-Log Corp. has announced price reductions of up to 34% on its line of programmable read-only memory programmer products. The price cuts go into effect immediately.

Pro-Log's M980 is a portable control unit designed to use any Pro-Log plug-in personality module.

Prices for the M980 have been cut

Continued on page 81

TIME



Making yourself memorable.

You don't have to be a giant in the industry to attain a leadership position. Just having your name among the leaders can make a noticeable difference.

Your advertising presence in TIME Magazine can do more than gain you the attention and interest of the business community. It can position you among the major companies who already know the value of reaching greater numbers of purchasing influentials with greater visibility.

TIME's audience offers you both selectivity and reach – with the right demographic and geographic patterns for increasing your share of market as well as building awareness within the business and financial communities, and among your dealers. Being in the world's foremost news magazine puts you in the main arena. And TIME has specific demographic and geographic editions to accommodate your budget and implement your marketing strategy.

Your reputation is probably the most important element in your continued growth. Now that you're making a name for yourself in the industry, perhaps it's time to make more of your name.

To learn more about how you can use TIME and its various editions, call Charles Craig at (212) 841-2831.

TIME

Get more out of it.

©1984 Time Inc.

"How many times have I told you not to stop the tape drive with your hand?"

SYSTEMS & PERIPHERALS

Continued from page 66

from $2,350 to $1,650 for the 8K-byte version, from $2,800 to $1,950 for the 16K-byte version and from $3,400 to $2,250 for the 32K-byte version.

The PM9060 Universal Metallic Oxide Semiconductor Personality Module is said to support all five-volt metallic oxide semiconductor Proms and microcomputers. Its price has been reduced from $1,900 to $1,450.

The System 90 includes an M990 control unit, a PM9069 module, a 28-80S pin-out adaptor, an M304 adaptor for RS-232 communication and a carrying case. Its price has been cut from $3,500 to $2,690 for 8K bytes, $3,800 to $2,890 for 16K bytes and $4,200 to $3,290 for 32K bytes, according to the vendor.

Pro-Log, 2411 Garden Road, Monterey, Calif. 93940.

TECHTRAN INDUSTRIES, INC.
TR-4 Transaction Recorder

Techtran Industries, Inc. has announced a retail management system designed to record sales transactions as they are generated by cashiers.

The TR-4 Transaction Recorder reportedly connects to standard electronic cash registers and records up to 9,600 15-char. lines on each cassette.

Individual recorders in a single- or multiple-store environment can be linked to a central processor or service bureau by telecommunications lines. The unit is said to allow a retailer to process data immediately at a central site, according to the company. The product also is said to allow retailers to hand-carry or mail cassettes to the data processing center if speed is less critical.

The TR-4 is available now for $1,125.

Techtran Industries, 200 Commerce Drive, Rochester, N.Y. 14623.

COMPUSCAN, INC.
Alphaword Series 80

Compuscan, Inc. has introduced its Alphaword Series 80 page readers, a group of three optical character readers that convert typewritten characters to electronic signals and transmit them to word processors, computers, communications systems and typewriters.

All three models reportedly feature automatic formatting for word processing applications and were designed for users with low-to-moderate input requirements. Models A and B of the series are said to scan 145 pages an hour. Model C can reportedly scan 250 pages an hour.

The three models claim an accuracy rate of less than one substitution error in 300,000 characters and include self-diagnostics and an operator message display and menu, the vendor said.

Prices in the Alphaword Series 80 line begin at $9,990 for the Model A, $10,990 for the Model B and $13,990 for the Model C.

Compuscan, Building 2, 81 Two Bridges Road, Fairfield, N.J. 07006.

PROFESSIONALS UNLIMITED
"Insights into IBM System/36"

Professionals Unlimited has announced the release of a text written for DP personnel who either have or are considering the acquisition of an IBM System/36.

"Insights into IBM System/36" reportedly provides a technical education and performance tips for those who have an IBM System/36 and offers an independent appraisal of the system's features for those considering a move to the System/36.

The text was written by David Greenblatt, a System/36 consultant and president of DGC, Inc. It costs $95.

Professionals Unlimited, 9851 Lantern Drive, Silver Spring, Md. 20902.

IPL from page 75

ters here, and IPL representatives have been placed in regional posts.

IPL said the move will allow it to offer its systems in more markets; it currently markets them in 13 domestic locations. IPL is located at 360 Second Ave., Waltham, Mass. 02154.

LOCOM from page 75

chased in larger increments, the cost is $4,000. A 16M-byte configuration costs $64,000. Locom is at 2350 Bering Drive, San Jose, Calif. 95131.

GOULD from page 75

al processor and also includes a color graphics terminal and graphics processor, the vendor said.

The two CAD/CAM systems offer the same basic functionality; however, the PS5100 offers more performance and expansion capability. The PS5100 offers the capability of adding a second terminal and is recommended for users who need extensive modeling capabilities, according to the vendor. The less powerful PS3100 is recommended for drafting applications. Both systems use a mechanical CAD/CAM package acquired by Gould, but developed by Vulcan Software, Inc.

Available in July, the PS3100 costs $69,900, including a PS3000 processor, graphics processor, the UTX/32 operating system and a drafting software package. A similarly configured PS5100 costs $115,000. A dual-user PS5100 system with a solids modeling package is priced from $152,500.

Additional information is available from Gould, which can be reached through 6901 W. Sunrise Blvd., P.O. Box 9148, Fort Lauderdale, Fla. 33310.

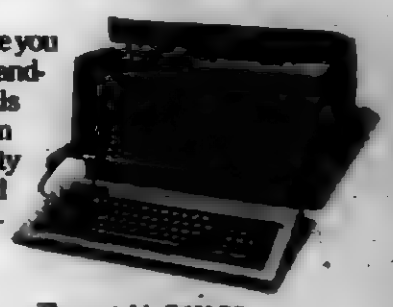
Go beyond equipment compatibility.
Reach for total performance.

The Zenith Z-100 PC's.

The Z-150 PC

In the white heat of the slalom, something clicks: skier and skis meld into one, and hurtle toward total performance. And, in your office, you'll experience that same kind of oneness with our new IBM-compatible Zenith PC's.

Their enhanced features actually take you beyond IBM compatibility. Like internal expandibility that allows you to add peripherals without adding size. Storage that can expand up to 11 megabytes. The ability to run virtually all software designed for the IBM PC. And a detached keyboard with a "smarter" key layout for added convenience.



The portable Z-160 PC

Reach for total performance with the desktop and portable Z-100 PC's: call 1-800-842-9000, ext. 1, for the name of your nearest Zenith dealer.

For the Zenith Data Systems Dealer nearest you call
1-800-842-9000 Ext.1.

Zenith | data systems
THE QUALITY GOES IN BEFORE THE NAME GOES ON

© Zenith Data Systems

IF YOU MISS CW OFFICE AUTOMATION IN THE NEXT THREE MONTHS, LOOK AT THE ISSUES YOU'LL BE MISSING.

JUNE.

Microcomputers.
How they've changed the workplace.
What's new in networks, security, and micro-to-mainframe links.
Closes May 4.

AUGUST.

Applications Software.
A look at the real issues.
Productivity. User-friendly vs. ease-of-use. Plus plenty of product reviews.
Closes July 6.

OCTOBER.

Workstations. We explain the alternatives to microcomputers, addressing important topics like cost-effectiveness, compatibility and upgrades.
Closes August 31.

Office Automation is ideal both for the advertiser and the reader. Because each one offers focused, in-depth information in the area of office automation.

Readers always want to catch up on what's hot and what's not in their particular specialty. And find out what the vendors have to offer.

As an advertiser, you won't want to miss the opportunity to tell them.

Maybe that's why our OA is so popular.

Everyone wins.

For more information, or to reserve your space in any of our upcoming issues, simply call the sales office nearest you. Or fill out and return the coupon to Ed Marecki, National Sales Director, Computerworld, 375 Cochituate Road, Box 880, Framingham, MA 01701.

To: Ed Marecki, *National Sales Director*
CW Communications/Inc., Box 880, Framingham, MA 01701
Please send me advertising information on: ☐ *Workstations.* ☐ *Applications Software.* ☐ *Microcomputers.*
☐ *Please have a sales representative call me.*

Name _____
Title _____
Company _____
Address _____
City _____ State _____ Zip _____
Telephone _____
OA

Computerworld
OFFICE AUTOMATION

Sales offices.

BOSTON: 375 Cochituate Road, Box 880, Framingham, MA 01701 (617) 879-0700; CHICAGO: 2600 South River Road, Suite 304, Des Plaines, IL 60018 (312) 827-4433; NEW YORK: Paramus Plaza I, 140 Route 17 North, Paramus, NJ 07652 (201) 967-1350; ATLANTA: 1853 Peeler Road, Suite D, Atlanta, GA 30338 (404) 394-0758; SAN FRANCISCO: 380 Broadway, Suite 20, San Francisco, CA 94133 (415) 421-7330; LOS ANGELES: 18089 Sky Park Circle, Suite 260, Irvine, CA 92714 (714) 261-1230.

MICROCOMPUTERS

Paul Gillin
CW Senior Editor

How biased are micro reviews?

Nearly everyone trusts *Consumer Reports* because it goes to great lengths to emphasize its impartiality. But do microcomputer magazines that publish software reviews merit the same confidence?

Generally not. While there are several good, impartial publications out there that take special pains to present unbiased evaluations, the waters are full of sharks, according to computer magazine editors interviewed recently. They emphasized that it's important to get to know the publication before taking its software reviews too seriously.

The major problem is that, unlike *Consumer Reports*, most micro magazines rely on advertising for their livelihood. Conflict of interest may color product reviews.

"A lot of magazines are reluctant to knock a major advertiser," said Stan Veit, editor-in-chief of *Computer Shopper*. "And I think I see more of it in the larger publications."

"Only a very few will publish bad reviews," said Stewart Alsop Jr., editor of *Infoworld*. "We have lots of fears of it, but we do it. And we've lost ads because of it."

Unfortunately, choosing a reliable source for evaluations is no simple task. Alsop pointed out that many publications list new products and their functions in a format that resembles a review in form but not in content. Others simply don't publish bad reviews at all.

List magazine editor Ted Leonsis warned further that the perspective of an "expert" reviewer is often dramati-

See REVIEW page 96

Large firms want IBM logo

Compatibles not garnering large business mart

By Paul Gillin
CW Staff

Large companies shopping for microcomputers are more interested in the IBM logo than IBM compatibility, according to vendors, analysts and retailers interviewed recently by *Computerworld*.

Only one manufacturer of IBM-compatible micros, Compaq Computer Corp., garnered a significant percentage of the microcomputer market in 1983, according to Future Computing, Inc., a market research firm in Richardson, Texas. Corporate purchases made up a significant part of Compaq's sales. "Most of our computers were sold to large companies," said Ken Price, director of corporate communications at Compaq.

Corporate sales comprise a small percentage of other compatible manufacturers' revenues. "Volume sales to large companies are a small part of our business," said one retailer who carries Columbia Data Products, Inc. products. "Large companies look to the safe choice, the well-known name when they make a purchase."

"According to our studies, the IBM name is very important to MIS managers," said Dr. Harold Kiane, vice-president at Future Computing. "Because of its limited availability, compatible manufacturers were able to sell their products."

IBM's corporate dominance is shown in a Future Computing survey of 76 Fortune 1000 companies. Forty-four companies signed volume purchase contracts for IBM Personal Computers, four signed contracts for Apple Computer, Inc. microcomputers and three signed volume purchase agreements for both Digital Equipment Corp. and Hewlett-Packard Co. personal computers. None of the compatible manufacturers had signed corporations to volume purchaser agreements.

Compatible manufacturers acknowledge IBM's dominance. "It's obvious that IBM has set the predominant standard," said Jack White, vice-president of marketing and sales at Columbia Data of Colum-

See IBM page 95

■ Entity-relationship DBMS out for micros/84
■ IBM micro gets statistical software/84
Systems/84
Storage/84
Board-Level Devices/84
Auxiliary Equipment/88
Software/89

HP continues charge into micro mart with debut of low-cost ink-jet printer

By Jeffry Beeler
CW West Coast Bureau

PALO ALTO, Calif. — Hewlett-Packard Co.'s drive to become a major force in the microcomputer field has entered its second phase, with the introduction of a thermal ink-jet printer that reportedly costs half as much as competing products offering comparable performance.

HP's 150 char./sec Think Jet printer made its debut during a recent press conference at which the company dropped a few hints about additional micro products slated for introduction later this year.

HP Executive Vice-President Paul Ely characterized the two upcoming products as companions for HP's existing Model 150 micro. "They will complement rather than replace the 150 and will be at least as important," he said during post-conference questioning.

The first of the anticipated micro offerings will appear in May and will be followed by a second such product approximately a month later. Ely also confirmed the existence of a portable HP micro that is already "well along in development" in the company's laboratories, he said. The HP portable, whose coming introduction has been rumored for some time, will reportedly have a notebook-size footprint and rival the power of the Model 150.

Credited with consuming about as much

See HP page 96

The answer to program piracy: hardware protection

By John Herzf
Special to CW

When most people think of computer crime, they recall cases of theft, embezzlement and data leaks that have occurred by means of computer manipulation. There is, however, a much larger area of computer crime in our industry today: the piracy of computer programs.

Many people who would not consider stealing goods from a store have no qualms about stealing information from programs. In fact, it has become socially acceptable to copy and use software illegally. What can the developer do to protect his investment? The best method, I believe, lies in a hardware technique.

Copyright laws have been virtually useless in guarding software. To date, there has been no clearly successful copyright infringement suit because the problems are overwhelming. First, the program's developer must find the illegal copies. This is monumentally difficult in the sea of software in use today. Even if the author thinks he has found a copy, it's hard to prove it. Just because a package does the same thing as another doesn't prove it's written exactly the same way. And even if the software developer can unquestionably establish piracy, it is unlikely that a settlement will enable him to recoup his legal costs.

Like copyright laws, other legal means of protecting software are very hazy. Contracts and licenses have been devised to intimidate would-be pirates and aid in their prosecution. It is not clear, however, to what extent such schemes can be enforced.

"Public domain" is also a problem. Because knowledge cannot be owned, a developer must guard the source listings for his programs. If they are released, the programs are in danger of becoming public property. Lawyers are advising clients on the correct messages to include in their packages in order to prevent this. Unfortunately, no two lawyers seem to have the same opinion.

Software developers have invested a number of in-house software and hardware schemes to secure their software. There are, however, two major traps in this. First, there are many computer whiz kids who regard the breach of any system as a challenge. And any system designed by a human is probably breakable by another human. The other danger is that the cost or complexity of the system will become a barrier to successful marketing.

One notable example of a protection system being too complex to be effective is copy-proof formats. These formats involve an obscure way of putting data on the disk, which would interfere with the standard copy program used by an unauthorized user. The major problem with this, however, is that copying is also difficult or impossible for the legal customer, making backup very costly. And copy-proof programs are not unbreakable. The programs must be readable in order to be read into memory for operating. Hence, they are accessible to a special copy program.

Some copy-proof programs also suffer from a "weak link" problem. Often a program has been made copy-proof and accessible at the same time. The pirate simply prints the program out on paper and keys it into another system.

Another protection method is serialization. Unused information, written into the middle of the program, allows tracing to the person who bought the copy. The idea is to intimidate buyers so they will not allow their software to be copied. This, however, is one of the technique's major failings. It is very hard to prove that the buyer allowed his

See PIRACY page 95

MICROCOMPUTERS

Forecasting, planning tool fits IBM Personal Computer

BURLINGTON, Mass. — Alpha Software Corp. has introduced its Econometric Software Package (ESP), a forecasting and planning tool designed for the IBM Personal Computer and compatibles.

According to the vendor, ESP allows the Personal Computer user to integrate, in a single program, full-functioned econometric and statistical analyses with graphics, data management and the ease-of-use of a personal computer.

The interactive, screen-oriented package allows the user to collect, store and display historical data, compute a wide range of statistics and apply a full complement of regression techniques to estimate models and generate forecasts.

ESP requires 256K bytes of random-access memory and two double-sided disk drives. It runs under IBM's PC-DOS 1.1 or 2.0 and supports all hard disks and the Intel Corp. 8087 co-processor. A dot matrix graphics printer is needed to obtain a hard copy of ESP results, the company said.

ESP is priced at $795.

Alpha Software is located at 30 B St., Burlington, Mass. 01803.

Data base management system uses entity-relationship model

OTTAWA — Xanthe Information, Inc. has introduced XIM, a data base management system that reportedly uses an entity-relationship data model.

An entity-relationship model is an extension to relational data models, according to a spokesman for the vendor.

Data dictionary, data maintenance language, query language, report writer and a user-designed forms facility are reportedly integrated into one package.

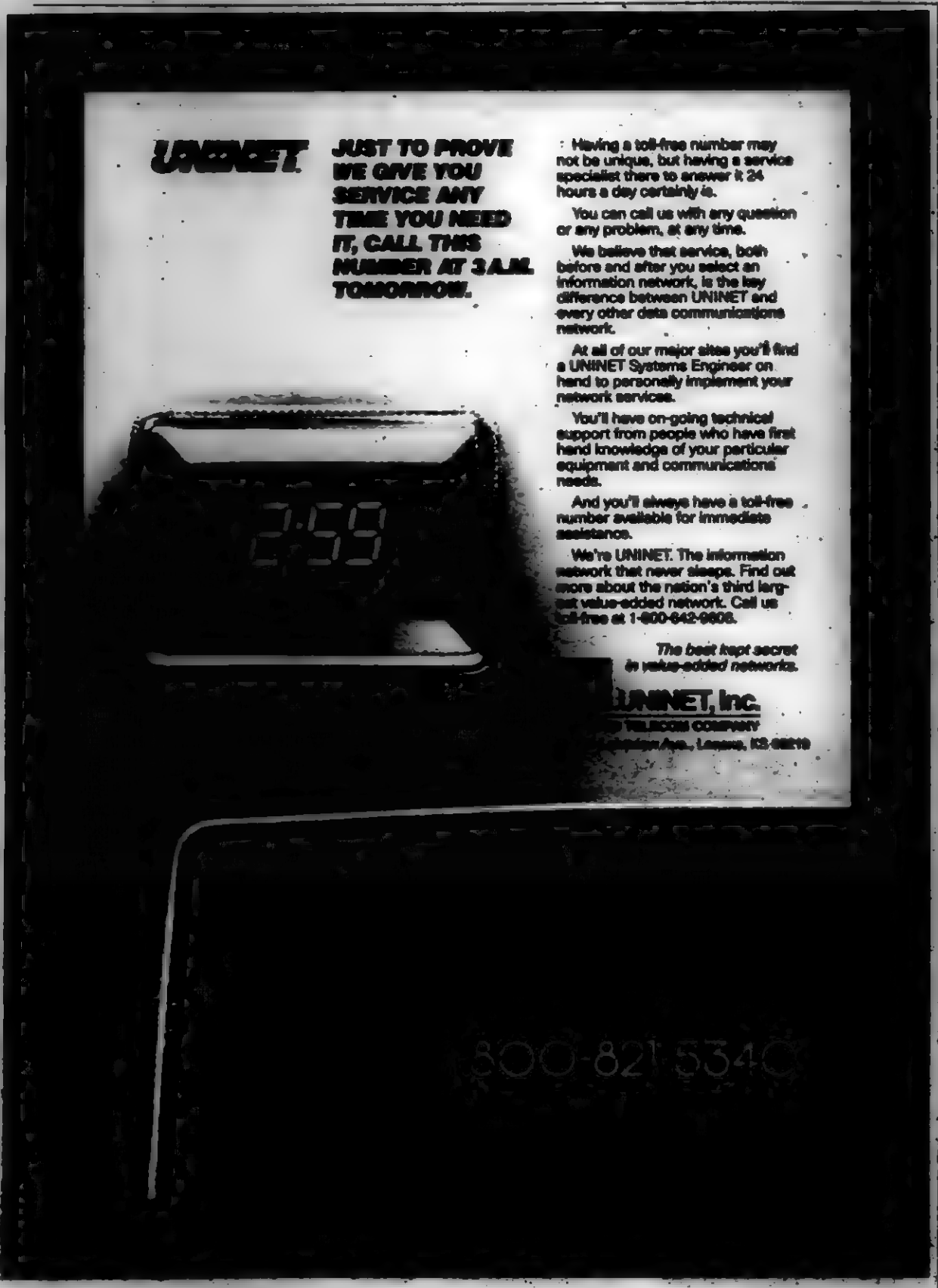
Applications are syntactically and structurally integrated, and there are no boundaries between applications, according to the vendor.

XIM reportedly handles text and numerical and graphics data.

There are two versions of the program: one runs under Microsoft, Inc.'s MS-DOS operating system and costs $1,000.

The second version runs under Quantum Software Systems Ltd.'s QNX, a Unix look-alike operating system, and costs $1,500, according to the vendor.

Xanthe Information is located at 1785 Woodward Drive, Ottawa, Ontario K2C 0R1.



SYSTEMS

TEXAS MICROSYSTEMS, INC. TMI-IPC

Texas Microsystems, Inc. (TMI) has introduced a rack-mounted computer with shock-mounted components that is designed for industrial use. The unit is said to be compatible with the IBM Personal Computer.

The product, the TMI-IPC (Industrial Personal Computer), also features shock-mounted disk drives, a key-lock power switch for system security and an optional backup battery pack. It reportedly can tolerate up to 80% humidity and runs the following operating systems: Microsoft, Inc.'s MS-DOS; Digital Research, Inc.'s CP/M-86 and Concurrent CP/M-86; and Intel Corp.'s RMX 86.

The basic configuration, including the CPU, one diskette drive and a keyboard, is available for $3,595.

TMI, 8330 Sterling St., Irving, Texas 75063.

STORAGE

DRAGON INDUSTRIES SP-65; SP-140

Dragon Industries has introduced a line of 65M-byte and 140M-byte hard disk systems for the IBM Personal Computer, Personal Computer XT and compatibles.

According to the vendor, the new line features a 30 msec average access time and 8 msec track-to-track, with 60 msec maximum, including settling.

Compatible with the IBM PC-DOS and Microsoft, Inc. MS-DOS 1.1 and 2.0 operating systems, the system is offered in two models: the SP-65 and SP-140, offering 65M-byte and 140M-byte storage, respectively.

The SP-65 is priced at $4,995; the SP-140 is $6,995.

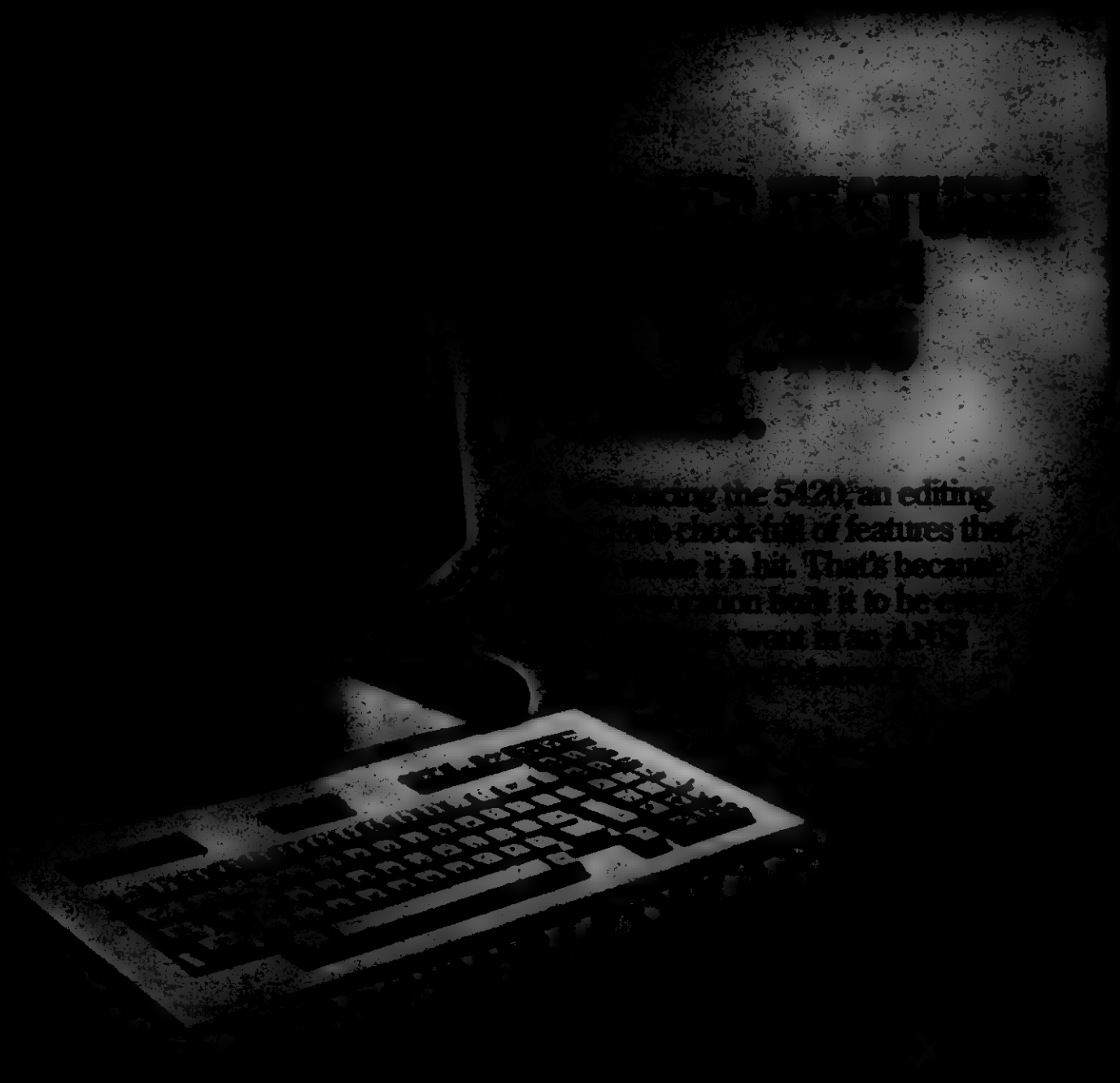
Dragon Industries, 36 Main St., Hopkinton, Mass. 01748.

BOARD-LEVEL DEVICES

APPLIED CREATIVE TECHNOLOGY, INC. Printer Optimizer

Applied Creative Technology, Inc. has announced the Printer Optimizer, an electronic printer speeder for microcomputer users.

Continued on page 86



For years, Digital's VT100 terminal has been the CRT to choose if you want the most out of your computer. It has become the industry standard for reliability and ease of use. Not to mention the largest selling ASCII terminal in the world.

Now Digital advances this standard with the VT220 family.

Terminals and terminals that embody everything Digital has learned about how to make people

MICROCOMPUTERS

Continued from page 84

The Printer Optimizer is a hardware device that physically connects between a computer and one or more printers. According to the company, it provides separation of computer and printer functions and gives the operator control over the order in which jobs are printed, stopping for paper changes when necessary.

The Printer Optimizer can act as a liaison between any mix of computer system and several printers, regardless of whether they are electronically and code-compatible, the company noted. The spooler can translate English language into foreign characters, provide access to a dot matrix printer's various type fonts and colors and create graphics.

The Printer Optimizer can also be used with a modem as a stand-alone data receiver or transmitter. Storage capacity is expandable from 64K bytes to 256K bytes.

The Printer Optimizer costs $499.

Applied Creative Technology, 9156 W. Northwest Highway C-303, Dallas, Texas 75220.

DATRICON CORP.
ACS-2A

Datricon Corp. has introduced an STD-bus microcomputer called the ACS-2A. The Zilog, Inc. Z80-based single-board computer is compatible with the Mostek, Inc. CPU-2A, using the same configuration areas and mapping read-only memory, but with several enhancements to decrease cost and increase reliability, the company claimed.

The ACS-2A has six 28-pin, byte-wide sockets, increasing on-board memory to 128K bytes. Memory expansion through the STD-bus Memex line is supported with a hardware memory management system compatible with Digital Research, Inc.'s CP/M 3.0. Expanded I/O is also supported.

Prices are $195, $235 and $260 for the 2.5, 4 and 6 MHz versions.

Datricon, Box 488, 155B Ave., Lake Oswego, Ore. 97034.

AUXILIARY EQUIPMENT

TOPAZ, INC.
Powermaker Micro UPS

Topaz, Inc. has introduced an uninterruptible power supply for microcomputers. The unit, called Powermaker Micro UPS, is said to provide up to 75 minutes of sine-wave ac power in the event of a blackout and also reportedly protects against voltage sags and brownouts.

Powermaker Micro UPS fits underneath the workstation and reportedly includes a line-loss alarm to warn when the unit has switched to battery power.

The power supply is available in models with power ratings of 400, 800 or 1,000 Vac, priced at $750, $890 and $995, respectively.

Topaz, 3855 Ruffin Road, San Diego, Calif. 92123.

IMAGING TECHNOLOGY, INC.
PC Vision Frame Grabber

Imaging Technology, Inc. has announced the PC Vision Frame Grabber, a real-time, video image acquisition and display module for the IBM Personal Computer and Personal Computer XT.

According to the vendor, the product includes a hardware module that plugs directly into an expansion slot in the IBM Personal Computer, software routines, documentation and all required interconnecting cables.

The Frame Grabber converts a camera's RS-170 analog video signal to digital data at a 10-MHz rate and stores the resulting data in an on-board frame memory, the company said.

The Frame Grabber is priced at $2,995.

Imaging Technology, 600 W. Cummings Park, Woburn, Mass. 01801.

TOPAZ, INC.
Line 2 Power Conditioners

Topaz, Inc. has introduced a series of single-phase power conditioners featuring an internal microcomputer that reportedly monitors and corrects fluctuations in voltage.

The Line 2 Power Conditioners are said to have a narrow output-voltage-regulation band, a shielded internal noise suppressor and operating frequencies of 50Hz and 60Hz.

They come in several power ratings and prices. The ½ kVA model costs $430; the 1 kVA model, $545; the 2 kVA model, $925; the 3 kVA model, $1,385; the 5 kVA model, $2,380; the 7½ kVA model, $3,110; and the 10 kVA model, $4,090.

Topaz, 3855 Ruffin Road, San Diego, Calif. 92123.

SOFTWARE

FOX RESEARCH, INC.
10-Net compatibility

Fox Research, Inc. has announced that Sperry Corp.'s personal computer, the Sperry PC, can use Fox Research's 10-Net local-area network.

Each 10-Net network package reportedly includes all hardware, software and documentation needed to link an IBM Personal Computer, a Personal Computer XT or another compatible machine with other 10-Net-based microcomputers. 10-Net reportedly does not require any dedicated network server hardware and is said to feature several levels of data access authorization to ensure file security.

10-Net operates under IBM PC-DOS 2.0 and is available for $695.

Continued on page 89

You Can Read Some of the Dumps... Some of the Time...

In the past, programmers had to slave over monumental stacks of paper to resolve abends.

Trying to convert hexadecimal numbers like four score and seven or debating over where the abend occured was as tough as splitting logs.

But then was brought forth a new notion — Abend-AID. It was a great moment in dump history. Programmers were emancipated as the drudgery of solving abends was abolished. They were free to devote their time to more productive tasks.

Abend-AID transfers the burden of debugging from the programmer to the computer. Abend-AID output shows What Happened, When it Happened, Where it Happened and supplies the necessary supporting data in an easy-to-use format that can almost fit on the back of an envelope (10-12 pages, in English).

Abend-AID is available for both IBM OS and DOS installations. Listed below are unique Abend-AID options for your specific needs.

- ☐ **Abend-AID/COBOL** — The first practical source level debugging tool.
- ☐ **Abend-AID/SPF** — 80 column "easy-to-use" viewing capability which permits programmers to interactively debug abends at their terminals.
- ☐ **Abend-AID/ONLINE** — 80 column CRT output for easy viewing.
- ☐ **Abend-AID/DOS/DLI & Abend-AID/OS/IMS** — Features special diagnostic routines for IBM's data base systems.

Free Abend-AID Product Evaluation.

For additional product information, or to arrange for your 30-day FREE evaluation of Abend-AID, just give us a call at 800-521-9353 (in Canada or Michigan, 313-540-0400), or clip your business card to this ad and mail it to: Compuware, Systems Software Division, 32100 Telegraph Road, Birmingham, Michigan 48010.

Abend-AID. The civil way to address program abends and cancels.

Aid

COMPUWARE
SYSTEMS SOFTWARE THAT MAKES SENSE

Corporate Headquarters
32100 Telegraph Road
Birmingham, Michigan 48025
(313) 540-0400

Authorized Offices Nine South Wales, AUSTRALIA Phone: (61-2) 886-1177 / Luton, Bedfordshire, UNITED KINGDOM Phone: (44-582) 28-483 / Paris, FRANCE Phone: (33-1) 267-1240 / Herzlya, ISRAEL Phone: (972-52) 58802 / Milano, ITALIA Phone: (39-2) 345-2231 / Tokyo, JAPAN Phone: (81-3) 479-1600 / OSLO, NORGE Phone: (47-2) 56-6370 / Bryanston, SOUTH AFRICA Phone: (27-11) 706-5800 / Hamburg, DEUTSCHLAND Phone: (49-40) 23-3229.

MICROCOMPUTERS

Continued from page 88

Fox Research, 7005 Corporate Way, Dayton, Ohio 45459.

SOFTCRAFT, INC.
Btrieve Release 3.0; Btrieve/N 3.0

Softcraft, Inc. has announced enhanced versions of the Btrieve and Btrieve/N file management and record retrieval systems for use with the IBM Personal Computer, Personal Computer XT and microcomputers that utilize Microsoft, Inc.'s MS-DOS. Btrieve/N is designed for use with local-area networks.

Enhancements include new file characteristics, a sorting capability, more efficient utilization of disk space and high-speed file-handling options, the company said. The new release includes a utility for converting existing Btrieve files to a format compatible with Btrieve 3.0. The added file characteristics enable keys to be defined as having multiple segments, allowing multilevel sorts to be built into a file.

The sorting capability is based on a new utility, B$index, which builds an external index for an existing file, providing a capability similar to a sort function.

Both systems include multikey access to records, an unlimited number of records per file, a variable cache buffer from 16K bytes to 64K bytes, error control and recovery within an application, automatic file recovery on system crash and duplicate and modifiable keys.

The 3.0 releases of Btrieve and Btrieve/N sell for $245 and $595, respectively.

Softcraft, P.O. Box 9802, No. 590, Austin, Texas 78766.

AUTOMATIC DATA PROCESSING, INC.
Datapath

Automatic Data Processing, Inc. (ADP) has announced an enhanced version of Datapath, its data-access software package designed for use with the Lotus Development Corp. Lotus 1-2-3 package on the IBM Personal Computer.

With Datapath, a Personal Computer user can link to ADP's central computing systems, which contain more than 35 financial, investment and economic data bases, both public and proprietary.

Datapath allows the user to screen the data bases, select the information needed and download it to the Personal Computer, a spokesman said.

The new version requires fewer steps for ad hoc data retrieval, features simpler error messages, allows unlimited retrieval of textual data and can be used with a wider range of modems, the company said.

For $235, a user receives one copy of Datapath, plus training and documentation. To purchase both Datapath and 1-2-3, as well as training and documentation for each, the cost is $690.

ADP, 175 Jackson Plaza, Ann Arbor, Mich. 48106.

MICROSOFT, INC.
Chart

Microsoft, Inc. has unveiled Chart, a graphics package for the IBM Personal Computer.

Using a menu-driven facility, Chart provides the user with eight types of charts and 45 chart formats, the vendor said. Tailoring capabilities allow users to move objects on a screen, highlight points on the chart and display 16 charts simultaneously. Users reportedly can choose segment and line patterns, font sizes and grid patterns, explode pie chart segments and rotate pies. The program reads Software Arts, Inc. Data Interchange Format or Ascii files.

Chart sells for $250.

Microsoft, 10700 Northup Way, Bellevue, Wash. 98004.

URGEO SOFTWARE, INC.
Apple-Bisync

Urgeo Software, Inc. has announced Apple-Bisync, a batch teleprocessing program for Apple Computer, Inc. Apple II and Apple IIe microcomputers.

The product allows the microcomputer to function as a workstation, the vendor said. Apple files can be transmitted into programs running under IBM's JES, RSCS environments. The program reportedly changes Ascii files to Ebcdic files. Options reportedly include record compression, truncation and blocking.

Apple-Bisync costs $950.

Urgeo Software, Box 353, Rt. 4, Cheney, Wash. 99004.

RUF CORP.
IMPRS

RUF Corp. has announced its Information Management Processing and Reporting System (IMPRS), which runs on Digital Equipment Corp. Professional 325 and 350 microcomputers.

IMPRS combines a data base management system, data manipulation language and a query language, the vendor said. IMPRS reportedly allows the user to develop ad hoc reports and design various reports that represent data in any manner. The program can use files generated on DEC minicomputers running IMPRS under DEC's RSTS/E or VAX/VM operating systems.

IMPRS for the Professional costs $1,500.

RUF, 1533 E. Spruce St., Olathe, Kan. 66061.

LEADING EDGE PRODUCTS, INC.
Datasheet

Leading Edge Products, Inc. has

Continued on page 90

COME CELEBRATE WITH US!

FEDERAL DP EXPO

APRIL 17-19, 1984
WASHINGTON, D.C.
CONVENTION CENTER

Dear Federal Computer Professional:

We invite you to help us celebrate the 10th anniversary of FEDERAL DP EXPO and Conference on April 17-19, 1984 at The Washington D.C. Convention Center.

The thrust of this 1984 event, Washington's longest running computer exposition and conference, will address a topic of the most timely concern...

★ INTEGRATING DESKTOPS WITH MAINFRAMES.

Look at what else our 10th anniversary has in store for you:

★ Over 40 conference sessions tailored to your specific DP requirements including informal, interactive Box Lunch seminars where small groups will discuss topics of special interest with the experts.

★ A new, expanded Program Advisory Roundtable of 26 prominent government experts whose direct involvement includes the tailoring of, and participation in, the conference sessions.

★ A one-day program of special briefings and other activities for Federal procurement and purchasing managers.

★ Attractive, new, low conference rates for Federal employees, plus group discount rates when associations, organizations or departments of five or more people register together.

★ An even bigger, more active exhibit floor presenting displays from leading manufacturers of computer hardware, software, peripherals, systems and services.

No wonder the 10th Annual FEDERAL DP EXPO & Conference is expected to be Washington's best and most important computer show ever!

Come celebrate this newer, bigger, more exciting event with us! For more information, call (617) 449-6600 today.

We'll be looking for you at FEDERAL DP EXPO & Conference.

Cordially,

Sheldon G. Adelson
President, The Interface Group

MICROCOMPUTERS

Continued from page 89

introduced Nutshell, an information manager software package that enables microcomputer users to store and retrieve data in almost any format, to browse through stored information and to exchange data with word processors, spreadsheets and other programs, according to the vendor.

Nutshell was designed for the Leading Edge Personal Computer, Compaq Computer Corp.'s Compaq computer, the IBM Personal Computer and compatibles. It runs under IBM's PC-DOS revision 1.1 or 2.0 with 256K bytes of random-access memory and one double-density disk drive.

Nutshell is priced at $395.

Leading Edge Products, 55 Providence Highway, Norwood, Mass. 02062.

MICRO-CLEAR, INC.
Deecur

Micro-Clear, Inc. has introduced a security system called Deecur for the Ashton-Tate Dbase II data base management system.

The Deecur system reportedly provides two levels of security by requiring Dbase II users to enter both a password and an identification number when they use Dbase II. The system does not require Dbase II users to reenter their password and identification number as they access each Dbase II program, but can be used to restrict automatically certain users from some programs, according to the vendor.

The Deecur security system is available for $99, including documentation and installation instructions.

Micro-Clear, 342 Madison Ave., New York, N.Y. 10017.

SOFTWARE PRODUCTS INTERNATIONAL
Open Access

Software Products International (SPI) has released its integrated business management software package for the IBM Personal Computer and compatible systems.

Called Open Access, the package is built around a relational data base management system and offers word processing, spreadsheet, three-dimensional graphics, telecommunications and time management functions.

The relational data base allows the user to join elements of the five modules. All interaction with the information manager module is performed in English query language terms, the vendor claimed.

Open Access retails for $695.

SPI, 10240 Sorrento Valley Road, San Diego, Calif. 92121.

ITSOFTWARE
Showit; Mailit

ITSoftware, a division of Martin Marietta Data Systems, Inc., has added a document transfer program and a business graphics package to its IT series of microcomputer software for the IBM Personal Computer and compatible systems.

Showit, the business graphics package, provides a range of standard graphics features, including pie charts, bar charts and graphs, plus additional capabilities such as three-dimensional pie charts, pyramid charts and slide show preparation, according to the vendor.

Mailit is said to provide IBM 3270-type communications capabilities among Personal Computer users. Users can prepare memos, tables, schedules and other documents using programs in the IT series or other Personal Computer software and then transfer the documents to the mainframe, where they are available for downloading to selected recipients, the vendor said.

Both Mailit and Showit are menu-driven and offer on-line help and English error messages; the company claimed. Showit costs $350. Mailit is priced at $250, with volume discounts available.

ITSoftware, P.O. Box 2966, Princeton, N.J. 08540.

QUALITY INFORMATION SYSTEMS
Data Pull/Informaster

Quality Information Systems (QIS) has announced an add-on enhancement module for its Qtime Executive package.

The Data Pull/Informaster module, when used in conjunction with a file transfer program, enables the user to pull information from existing data sources and automatically reformat it into standard Qtime format, a spokesman said.

Qtime Executive is menu-driven and is designed for data tracking in office automation applications with RM/Cobol and operating systems such as Unix, Microsoft, Inc.'s MS-DOS, IBM's OS and Wang Laboratories, Inc.'s VS.

The module costs $95 and is available now.

QIS, Suite 205, 2001 Bayford Highway N.E., Atlanta, Ga. 30329.

HAWKEYE GRAFIX
EMM

Hawkeye Grafix has introduced its electronic mail manager (EMM), a software application program for coordination of communications between multiple business offices.

EMM provides facilities for management of a private electronic mail network in conjunction with Hawkeye Grafix's Comnex communications exchange software, according to the company.

EMM is written in Ashton-Tate's Dbase II. The full-screen menu editor allows preparation of memos for

Continued on page 92

You can advertise your product in 40 computer publications in 25 foreign countries— with one phone call.

There's a market for your product abroad.
You can reach the right people in the major computer markets throughout the world. The people who make the buying decisions—in countries already importing more than $3 billion in computer hardware, software and supplies.

CW International Marketing Services gives you one, efficient source for direct contact with the leading local computer publications in the world's major computer markets. How can we do this for you? We have a wide network of editorial offices around the world and provide first hand marketing information to our clients. Plus, we have over 10 years experience in the publishing industry.

We're a division of CW Communications/inc., publishers of *Computerworld* and the world's largest publisher of computer-related newspapers and magazines.

CW International Marketing Services makes it easy.
We'll translate your ads for you and give you production services to meet the specifications of any or all the newspapers and magazines we publish or represent—and—we'll even bill you in dollars. What's more, when you place your advertising through CWIMS, you save the V.A.T. (value-added tax). It's as easy as advertising in your local publications.

We'll even help you with market facts, and, in the case of the People's Republic of China, we can arrange for you to give product and marketing seminars there!
You can run your ads in our periodicals in these countries:

*Argentina	*Denmark	*Italy	*Norway	*Saudi Arabia	*Sweden
*Australia	Finland	*Japan	*People's	South Africa	*The Netherlands
*Brazil	*France	Korea	Republic of	*Southeast Asia	*United Kingdom
Chile	Greece	*Mexico	China	*Spain	*West Germany
	India		Peru		

*Published or co-published by CW Communications/inc.

For more information on how we can help you promote your product all over the world, send us the coupon below or call Diana La Muraglia toll-free at (800) 343-6474 or telex #95-1153. In Massachusetts, call (617) 879-0700.

Please send me rate cards and information on publications in the following countries:

Name _____ Title _____
Company _____
Address _____
City _____ State _____ Zip _____

Diana La Muraglia, General Manager
International Marketing Services
CW COMMUNICATIONS/INC.
375 Cochituate Road, Box 880
Framingham, MA 01701, USA

APRIL 30.

Micros-
in big
business.
A look at all the different ways micros are changing the work environment.
Closes April 13.

MAY 28.

Software
Productivity
Packages.
We tell our readers all we can about software and services designed to benefit the DP manager and his technicians.
Closes May 11.

JUNE 25.

Graphics
Systems.
Here's where we focus on the latest technologies, techniques and applications in computer graphics.
Closes June 8.

IF YOU'RE NOT IN COMPUTERWORLD'S NEXT THREE SPECIAL REPORTS, LOOK AT THE ISSUES YOU'LL BE MISSING.

Computerworld's special report issues are ideal both for the advertiser and the reader. Because each one offers focused, in-depth information.

Readers always want to catch up on what's hot and what's not in their particular specialty. And find out what the vendors have to offer.

As an advertiser, you won't want to miss the opportunity to tell them.

Maybe that's why our special reports are so popular.

Everyone wins.

For more information, or to reserve your space in any of our upcoming issues, simply call the sales office nearest you. Or fill out and return the coupon to Ed Marecki, National Sales Director, Computerworld, 375 Cochituate Road, Box 880, Framingham, MA 01701.

To: Ed Marecki, *National Sales Director*
CW Communications/Inc., Box 880, Framingham, MA 01701
Please send me advertising information on: ☐ *Graphics Systems.*
☐ *Micros in big business.* ☐ *Software Productivity Packages.*
☐ *Please have a sales representative call me.*

Name _____
Title _____
Company _____
Address _____
City _____ State _____ Zip _____
Telephone _____
SA

COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Sales offices:
BOSTON: 375 Cochituate Road, Box 880, Framingham, MA 01701 (617) 879-0700; CHICAGO: 2000 South River Road, Suite 304, Des Plaines, IL 60018 (312) 827-4433; NEW YORK: Paramus Plaza I, 140 Route 17 North, Paramus, NJ 07652 (201) 967-1350; ATLANTA: 1853 Pealer Road, Suite D, Atlanta, GA 30338 (404) 394-8758; SAN FRANCISCO: 300 Broadway, Suite 28, San Francisco, CA 94133 (415) 421-7330; LOS ANGELES: 18808 Sky Park Circle, Suite 260, Irvine, CA 92714 (714) 261-1230.

MICROCOMPUTERS

Continued from page 90

broadcast to other mailbox destinations.

The introductory price of an EMM master/slave pair is $400. Each successive slave branch module costs $100.

Hawkeye Grafix, 23914 Mobile, Canoga Park, Calif. 91307.

PACIFIC BASIN GRAPHICS
PBG 200

Pacific Basin Graphics has introduced the PBG 200 business graphics package, a Unix-version menu-driven program that reportedly produces color and black-and-white data displays, including pie charts, stacked and clustered bar charts, three-dimensional bar charts as well as line graphs.

PBG 200 runs on Intel Corp. 8088- and Motorola, Inc. 68000-based computers and on Digital Equipment Corp. VAX-11 computers. The program supports more than 35 peripherals and can be adapted for a variety of configurations, the company said.

PBG 200 Business Graphics sells for $595. The Subroutine Library is priced at $995.

When purchased together, the total cost is $1,395, the vendor said.

Pacific Basin Graphics, Suite 5, 750 York St., San Francisco, Calif. 94110.

MORGAN COMPUTING CO., INC.
Professional Basic

Morgan Computing Co., Inc. has introduced a 16-bit version of Basic which, it claimed, can access the full memory of the IBM Personal Computer.

The new language, Professional Basic, is reportedly a window-oriented system of more than a dozen tracing and debugging screens, two of which can be displayed at a time. Users are said to be able to view changes in variables or array elements and in the progress of FOR/NEXT loops.

A syntax checking feature is also included, the vendor said.

Professional Basic for the IBM Personal Computer is written in assembler, requires 256K bytes of random-access memory and sells for $345, according to the vendor.

Morgan Computing, Suite 210, 10400 N. Central Expwy., Dallas, Texas 75231.

IT'S WHEN NO ONE KNOWS THERE'S BEEN ONE.

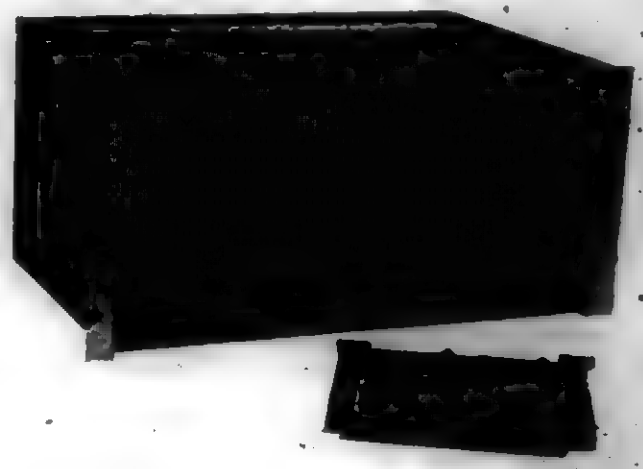
Computer crime is 10 times more profitable than robbing a bank. That's a fact. But, this statistic is only available on KNOWN computer crime... it's impossible to know how much monetary and informational theft goes undetected; some of it, perhaps, from your own system.

The ability to access computers via dial-up ports adds efficiency and reduces cost. But it creates a potential exposure akin to leaving the vault door unlocked. Disgruntled employees, strikers, malicious hackers and dishonest competitors can obtain information, vandalize the system, even misappropriate inventory... all from a push-button phone.

Now, this computer crime, fraud and abuse can be stopped. LeeMAH has a "lock" for your computer even the whiz kids can't crack... LeeMAH's Secure Access Systems, both the single port (SAU) and multi-port (SAM).

Both SAU and SAM reduce your system's vulnerability by allowing access to AUTHORIZED LOCATIONS ONLY via callback. This separate piece of hardware connects on the analog side between modem and telephone lines.

You can stop the perfect crime...: with LeeMAH's SAU and SAM.



LeeMAH 729 Filbert Street, San Francisco, CA 94133 • Telephone: (415) 434-3780

JETSOFT, INC.
Jet III

Jetsoft, Inc. has announced Jet III, an integrated application generator and data base manager.

A menu-driven program generator writes code for file maintenance, transaction processing and reporting, the vendor said. The package accommodates relational, hierarchical and network data base structures and integrates with Jetsoft's general ledger, payroll, accounts payable and accounts receivable modules.

The system runs under Digital Research, Inc.'s CP/M, Concurrent CP/M and MP/M operating systems, as well as Microsoft, Inc.'s MS-DOS operating system. A single copy of a six-user system costs $40,000.

Jetsoft, 170 Main St., East Falmouth, Mass. 02536.

PYRAMID DATA, LTD.
Number Cruncher updates

Pyramid Data, Ltd. has announced that its Number Cruncher software series now runs on Digital Equipment Corp.'s Rainbow; Eagle Computer, Inc.'s Eagle XL and Spirit; and Tandy Corp.'s Tandy 2000 microcomputers.

The Number Cruncher series consists of four programs: Number Cruncher I, Number Cruncher II, Number Cruncher III and Run Time. The series provides the user with a fourth-generation programming language that allows the user to develop software applications that meet his requirements, the vendor claimed.

Prices for individual programs range from $99.95 to $695.

Pyramid Data, P.O. Box 10116, Santa Ana, Calif. 92711.

SOFTECH MICROSYSTEMS, INC.
UCSD Pascal compiler; P-system; Insight Window Designer

Softech Microsystems, Inc. has introduced a bundled development package for the Digital Equipment Corp. Rainbow computer. Included in the package will be a UCSD Pascal compiler to permit programmers to write in UCSD Pascal.

Also included will be the firm's P-system, a portable microcomputer operating system, and Insight Window Designer, a windowing tool kit. The P-system reportedly was designed for text processing and application execution. The Insight program is said to provide windowing capabilities and enhancements for multiapplication integration.

The package is available for $399.

Softech Microsystems, 16885 W. Bernardo Drive, San Diego, Calif. 92127.

AES DATA CORP.
Office productivity software

AES Data Corp. has announced several new programs to run on its Savin 7100 Personal Work Station or its Savin 7200 Office Support System.

Inter-User Messaging, available as an option on the AES 7200, allows users to send messages to other users within a cluster system or on the AES Multi-Link network, according to the vendor. A spelling verification program, for both the 7100 and 7200, is said to provide a dictionary of thousands of common English words. The Operator Assist software, available at no cost as part of the 7200 system

Continued on page 94

Only Lee Data's Universal Terminal System can satisfy all of your information processing needs... 3270, Async and personal computing.

Finally, there's a single, universal way to satisfy the individual information processing needs of all your people. From sales manager to accountant. From research to production. The Lee Data Universal Terminal System can do it all.

And our system is modular by design to provide you any or all of these cost-effective, problem-solving advantages:

3270-compatibility *plus more*

Combine complete 3270 system-compatibility with an innovative Lee Data design and you have a System that delivers greater convenience and flexibility.

Our System not only offers standard 3274-compatible local and remote control units, but now also provides combination local/remote controllers with a unique dual-host access capability.

In addition, you can choose from a full line of terminal capabilities, beginning with our cost-effective 3178-compatible display on up to our popular All-In-One Display which offers, in a single unit, four selectable screen sizes—including 132-column—a great advantage in program development, spread sheet applications and many others where flexibility is required.

3270-plus-Async: another cost-effective advantage

If your application needs currently find you switching between 3270 and VT100-style terminals to get the job done, Lee Data has a better way.

As part of our System, you can enjoy the further advantage of a 3270/Async capability that allows dynamic selection of 3270 and VT100 operating modes from a single Lee Data display. A simple command entered at the keyboard provides you access to applications running on an IBM CPU, non-IBM systems (such as DEC, H-P or Prime), as well as timesharing services. Another Lee Data solution to simplifying your company's terminal network.

And now integrated personal computing too

That's right! Now our System also includes a sophisticated personal computing package that can easily be integrated into an existing Lee Data 3270 system.

With our approach, you get continued interactive access to host-based files, plus all the advantages of professional business computing from the same Lee Data workstation.

Advanced features include a host file transfer capability, a single-board design, four standard system expansion slots and, of course, complete IBM-compatibility.

All these additional capabilities plus the same user-friendly Lee Data displays.

Plus these added benefits...

To any Lee Data System, add our unique Coax Eliminator products and realize additional savings of up to 85% in cabling costs alone.

Combine this with all the outstanding features already mentioned and you'll find a System offering everything you need for efficient, cost-effective operation.

Discover the advantages of our Universal Terminal System for yourself. For more information, call our system specialists toll free:

800/328-3998

Designers of innovative systems for the information worker

LEE DATA CORPORATION

7075 Flying Cloud Drive
Minneapolis, MN 55344
TWX 910-576-1690

MICROCOMPUTERS

Continued from page 92

only, reportedly presents instructions and assistance at the bottom of the display screen to aid users.

The Systems Activity Management software, available for both models, reportedly permits users to determine the burden on a system and the number of terminals in use. The Work Group Activity Management software, available for both models, allows work done on a terminal to be charged to specific account numbers, the vendor said.

Inter-Unit Messaging, Systems Activity Management and Work Group Management are priced at $500; the spelling verification program is available for $1,000.

AES Data, P.O. Box 10272, 9 W. Broad St., Stamford, Conn. 06904.

ALSPA COMPUTER, INC.
Add-Net

Alspa Computer, Inc. has introduced Add-Net, an interface and software package that allows Kaypro Computer Corp. Kaypro portables and Eagle Computer, Inc. Eagle 2 computers to plug into a high-speed local-area network.

According to the vendor, Add-Net allows personal computers to operate as intelligent workstations on an Alspa-Net local-area network, which provides electronic mail and access to other workstations, peripherals and software.

Alspa's CN-4001 network master costs $1,195; Muays Corp.'s Turbodos operating system costs $750. One master computer will support up to 255 workstations, with any mix of Alspa workstations or microcomputers, a spokesman said.

Add-Net, including software, is priced at $595.

Alspa Computer, 477 Division St., Campbell, Calif. 95008.

COMPUTING CAPABILITIES CORP.
Dual/150

Computing Capabilities Corp. has introduced the Dual/150, a program that allows a Hewlett-Packard Co. HP 150 touchscreen personal computer to operate simultaneously as two terminals connected to two different computers or communication lines.

According to the vendor, the program creates two independent work spaces within one HP 150 and connects each to one of the two RS-232 ports.

Each of the work spaces functions as a complete HP 150 terminal, providing both block and format mode capability, a spokesman said.

Dual/150 is priced at $295.

Computing Capabilities, Suite 223, 465-B Fairchild Drive, Mountain View, Calif. 94043.

MAG SOFTWARE, INC.
Mag/base formats

Mag Software, Inc. has announced that Mag/base, its family of data base management systems, is available in 14 new formats.

Some of the formats include the Altos Computer Systems, Inc. Altos 586; Eagle Computer, Inc. Eagle II and Eagle 1600; Hewlett-Packard Co. HP 87/125; Kaypro Computer Corp. Kaypro II; NCR Corp. 1st Step and Decision Mate; Osborne Computer Corp. Osborne DD; Sanyo Business Systems Corp. Sanyo 2000; Televideo, Inc. Televideo 802 and 1603; Toshiba Corp. T100; and Xerox Corp. 820.

All packages are available in IBM's PC-DOS; Microsoft, Inc.'s MS-DOS; and Digital Research, Inc.'s CP/M 80, CP/M 86, Concurrent CP/M 86 and MP/M 86. Prices are $295, $495 and $795 for Mag/base[1], Mag/base[2] and Mag/base[3], respectively. Upgrades from Mag/base[1] to Mag/base[2] are $200 and from Mag/base[2] to Mag/base[3], $300.

Mag Software, Suite 305, 21054 Sherman Way, Canoga Park, Calif. 91303.

MOSAIC SOFTWARE, INC.
Softplot/BGL enhancement

Mosaic Software, Inc. has released an enhanced version of Softplot/BGL, a device-independent graphics extension system that is said to allow users to create custom graphics applications in Basic.

According to Mosaic, Softplot provides two-dimensional viewing with windows, three-dimensional plotting, dashed and colored lines, image rotation and automatic text justification.

Another feature, Emuplot, is a general-purpose plotter emulator for dot matrix printers that reportedly can produce high-resolution graphics.

The package requires 64K bytes of memory and supports a variety of Digital Research, Inc. CP/M and Microsoft, Inc. MS-DOS systems with Microsoft's M-Basic. Programs may be transported from one CP/M or MS-DOS system to another without being rewritten, the company noted.

Softplot/BGL retails for $99.

Mosaic Software, 1972 Massachusetts Ave., Cambridge, Mass. 02140.

DIRECT.AID, INC.
Impersonator

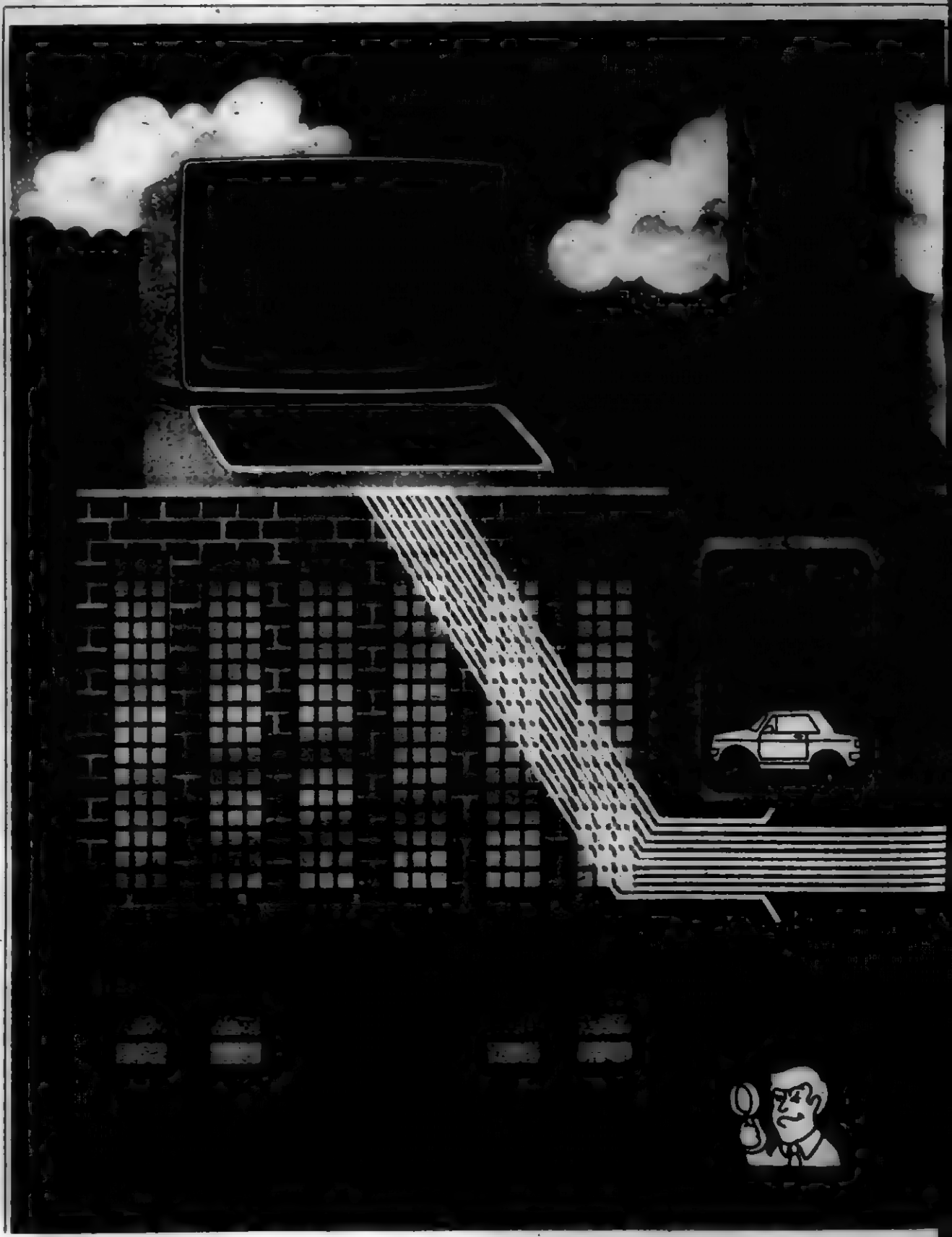
Direct.aid, Inc. has announced the Impersonator, a communications package that allows IBM Personal Computers to emulate any asynchronous terminal.

The program reportedly emulates Lear-Siegler, Inc. ADM-3A, Digital Equipment Corp. VT-52 and VT100, Hazeltine Corp. Esprit, IBM 3101, Data General Corp. D210 and Televideo Systems, Inc. 912 terminals.

The Impersonator costs $195.

Direct.aid, P.O. Box 4480, Boulder, Colo. 80306.

See SOFTWARE page 98



SOFTWARE from page 84

GMS COMPUTER SYSTEMS Infograph 100

GMS Computer Systems has announced Infograph 100, a graphics package for Digital Equipment Corp.'s Rainbow microcomputer.

The menu-driven program features decision rules that help the first-time user develop graphs and charts, the vendor said. Infograph 100 produces line, horizontal and bar charts. The program reportedly reads Software Arts, Inc. DIF files and uses the Rainbow's bit-mapped display.

The program costs $395.

GMS Software, 113 E. Severens Way, Carson, Calif. 90745.

IBM from page 83

lis, Md. "But its microcomputer is an average product. Some data processing managers may look for a better technical product or a lower price, so they turn to a compatible vendor."

Limited availability of IBM Personal Computers, not price or technical features, allowed Compaq to flourish, some analysts maintained.

"MIS managers wanted to buy an IBM Personal Computer," said Kate Cogswell-Carr, consultant at The Yankee Group in Boston. "IBM had trouble meeting demand for its microcomputers. Given the option of waiting for an IBM microcomputer or immediately receiving a Compaq, many data processing managers chose to buy the compatible."

A data processing manager disagreed with Cogswell-Carr's assessment. "We bought Compaq because it was a portable microcomputer that ran software for the IBM microcomputer," said Gary Schmidt, senior consultant at Pfizer, Inc. in New York. "IBM did not have a portable microcomputer."

IBM portable entry

Will IBM's recent entry into the portable market affect Compaq? "In the next six months, IBM will not ship enough portables to impact Compaq's sales," Kinne said. "Each retailer is limited to five IBM portables per month. With 1,400 retailers, IBM will only ship approximately 7,000 microcomputers a month," he added.

Compaq will face increased competition from other compatible manufacturers as well as from IBM. "Last year, there were 15 manufacturers claiming some level of IBM compatibility," Kinne said. "This year, there are 44 companies making that claim."

As competition increases, compatible manufacturers are attempting to increase corporate market penetration.

"Selling to corporate accounts will be an important [part], but not the major part of our growth," White said.

Compaq is increasing its support to its dealers. "We have a [toll-free] number dedicated to retailers selling to corporate accounts," Price said.

What will the future hold for compatible manufacturers? "Frankly, once IBM's production is in full gear, I don't think that many compatible manufacturers will remain in business," the retailer said.

PROTECT from page 88

package to be copied, plus it puts the developer in the awkward position of prosecuting his own customers. Also, it's hard to find the copies to begin with, and serialization is a relatively expensive procedure.

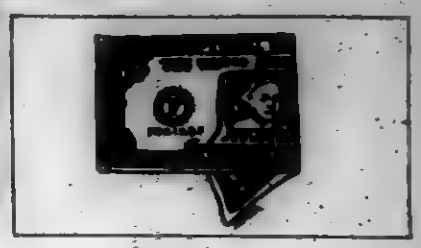
Signature techniques are software or hardware devices that are checked by the system in order to allow access. The most often tried techniques are simple code signatures that must be entered from the keyboard to allow the package to run. These, however, can be easily distributed by the buyer to someone who has been allowed to copy them, and who in turn doesn't have to worry about protecting them from unscrupulous customers.

The best potential protection devices are hardware signatures. These "black boxes," which plug into the computer, are individual to each buyer, but are controlled by the software supplier. Thus, there is no danger of the software being copied since it will not operate without the sealed "key," and this key cannot be easily reproduced. At the same time, unlike copy-proof systems, the software can be copied by the authorized buyer.

Hardware signatures, too, have limitations. They have to be manufactured, which adds to the cost of the software. There are also costs involved in keeping records. As a result, such devices are unlikely to be used for the protection of very low-cost programs. While simple, these devices still must be connected to the computer, which contributes some small additional complexity to the system. Though highly reliable, any hardware device can fail.

These problems, however, look very small when compared with the far more insurmountable drawbacks of other methods. Hardware signature devices offer the software developer sure protection for a small cost, and currently, that's way ahead of whatever is in second place.

Hurst is senior member of the technical staff at Point 4 Data Corp. in Irvine, Calif.



HP from page 83

desk space as a typical notebook, the Think Jet printer reportedly operates at less than 50 db and comes with a disposable cartridge that holds 500 pages worth of black ink.

Think Jet also incorporates assorted interfaces that enable the unit to attach both to HP micros and to competing systems from vendors like IBM, the IBM compatibles and Apple Computer, Inc., according to Product Manager Ernst Ernst.

The combination of quiet operation, compactness, disposable ink cartridges and other features gives the printer a "good shot" at becoming a de facto micro industry standard, according to Ely.

Key to Think Jet's performance is the product's removable cartridge, which integrates its print head and ink reservoir in a single $7.95 container that occupies about as much volume as a spool of thread.

With first customer shipments scheduled to begin April 1, Think Jet will sell for $495 through both authorized dealers and HP sales representatives.

More information about the printer can be obtained from HP at 1820 Embarcadero Road, Palo Alto, Calif. 94303.

REVIEW from page 83

cally different from that of a novice user. "Don't take any so-called expert's evaluation at face value," he said. "Be familiar with who is writing reviews, because that person's experience may be different from the experience of other users. And be sure the selection criteria are uniform."

How do you start? In many ways, software reviews are a lot like movie reviews. If you read enough computer magazines, you should eventually settle on a few whose judgment you trust.

A good way to identify impartiality is to scan several issues looking for negative reviews. "If the magazine never says anything negative about products, it's usually suspicious," Alsop said.

Regular contributors

Look for the same reviewer names issue after issue. It's relatively easy to find hobbyists who are willing to write reviews for a few dollars and a free copy of the software, but you probably can't take their opinions seriously.

Most publications that are serious about reviews maintain a list of reliable experts who contribute regularly. "We don't just accept reviews over the transom," Veit said.

You should also keep an eye out for reviewers whose experience matches your own. "We ask them to look at software from the end user's view, but it's often hard to get them to do that," Veit said.

Alsop noted that *Infoworld*'s most reliable reviews come from liberal arts college professors, "who are trained to think in an organized fashion."

And finally, be aware that all magazines approach reviews differently. *List*, for example, conducts a thorough analysis that details a product's claimed capabilities, the opinions of staff reviewers, interviews with users and a response from the vendor. That level of detail limits *List* to about seven reviews per month.

Editorial standards

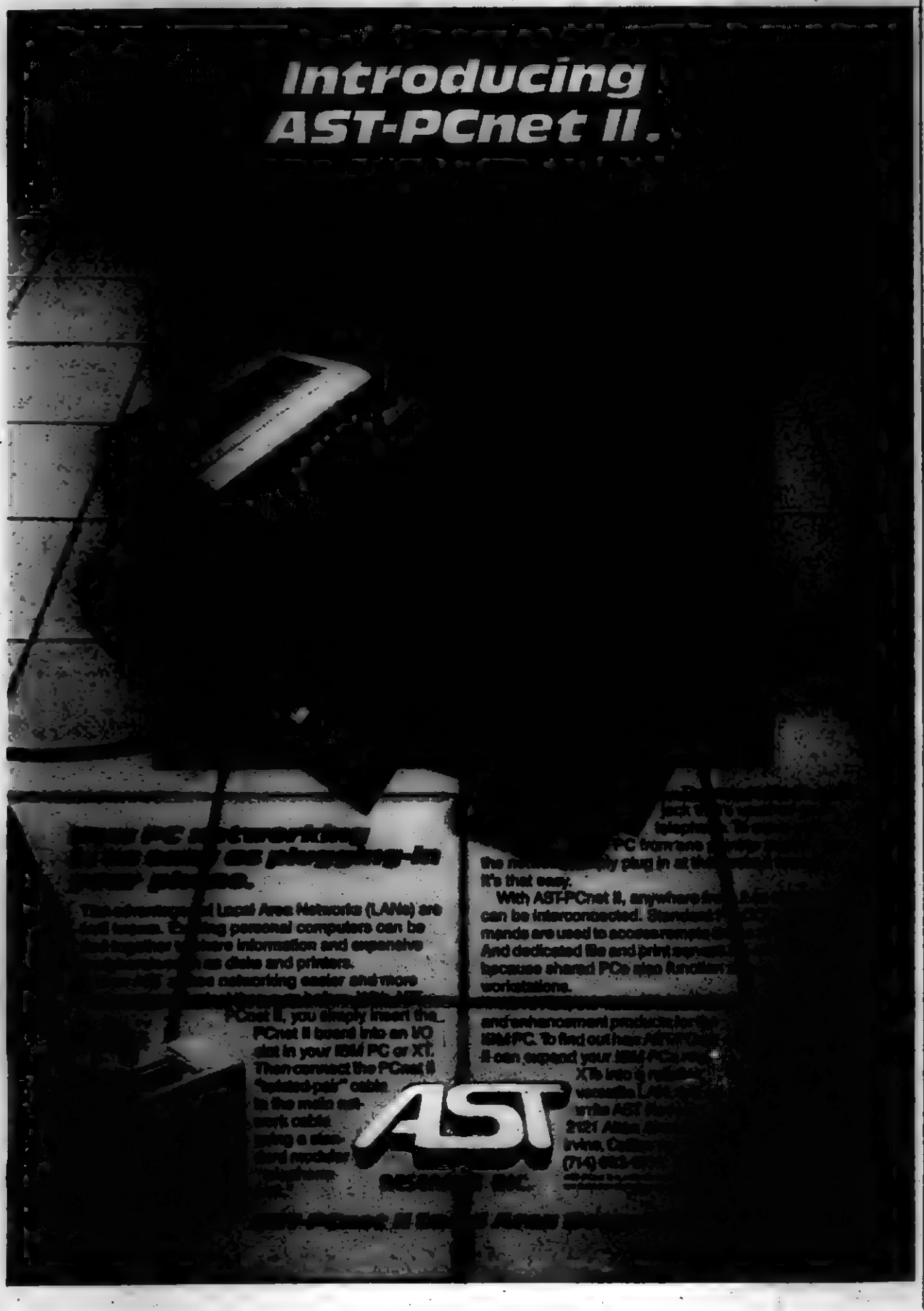
Infoworld relies on the objectivity of its reviewers and a set of editorial standards that a product must meet in order to receive certain grades on its "report card." For example, Alsop said, a product can't be judged excellent in the documentation category unless it includes on-line documentation.

Whatever magazines you read, keep software reviews in perspective, the editors advised. "There are 289 word processing software packages on the market for the IBM Personal Computer alone," Leonsis said.

"Reviews can save you time in terms of letting you whittle all the choices down to two or three. But your final step should be a personal demonstration," he added.

Alsop agreed that reviews should help a buyer weed out the four-leaf clovers from the crabgrass.

"But it's only one of three important components," he said. "The other two are personal experience and references from friends and other users."



COMPUTER INDUSTRY

INDUSTRY INSIGHT
Peter Bartok
CW Senior Editor

IBM lukewarm on local-area nets

For a company believed to be bringing out imminently *the* local-area network, IBM seems remarkably cool to the utility of such technology.

Talking to stock analysts recently at the company's Entry Systems Division in Florida, IBM President John F. Akers sounded very ho hum about the issue. He seemed to be saying that while IBM will be bringing out a local-area network it can be proud of, the company doesn't expect it to be any type of revenue leader.

Akers said it is "arguable" how much revenue will be generated by local-area networks. He did say, however, that there is a definite need in business for some method of workstation communications and file transfer on a cost-effective basis.

Make no mistake, IBM is bringing out a local-area network at some point. Akers said the company takes the need seriously and is "spending our fair share of research and development on it."

At one point, he said IBM is spending "a lot" and that company engineers have assured him the product will be based on fine technology and be "as cost-effective as anything on the market."

But for a company that daily proclaims its goal of being the low-cost provider, that hardly sounded like a blanket endorsement and certainly would seem not to herald anything incredible. Akers said he expects local-area network products to come in "many flavors," which causes one to surmise that IBM does not have a product that is going to shake up the industry.

The only point at which Akers came anywhere near to being excited about local-area network technology was when a stock analyst asked why the much-

See IBM page 109

Akers notes Fujitsu's 'window'

Says Big Blue's efforts won't 'let up for a minute'

By Peter Bartok
CW Staff

BOCA RATON, Fla. — Fujitsu Ltd.'s increased ownership of Amdahl Corp. has given the Japanese an important window to the U.S. market, IBM's president told a large group of stock analysts recently.

Speaking at IBM's Entry Systems Division headquarters here recently during a day-long briefing for the New York Society of Stock Analysts, John F. Akers — elevated a year and a month ago from senior vice-president to president — delivered a harsh assessment of the Amdahl-Fujitsu relationship and also declared IBM's intent not to let up in its drive for preeminence in the information processing industry.

Asked if the recent move by Fujitsu to boost its share in Amdahl to 49.5% was a defensive measure or represents a threat to IBM, Akers replied, "I think Amdahl has been a conduit for Fujitsu from the very beginning. I think this has given the Japanese manufacturer a very important window into the U.S."

Fujitsu's recent stock acquisition, according to Akers, "indicated [Fujitsu] thinks its participation will grow. I expect its product line will expand."

IBM will more than triple production of its Personal Computer line of products this year and still not keep up with demand, according to the head of IBM's Entry Systems Division. Page 103.

In their efforts to expand in international markets, the Japanese "have accommodated too many different relationships around the world," Akers said. Japanese manufacturers are strong competitors, he added, and at IBM "we take them seriously."

Reviewing IBM's success over the past two years — in terms of new product acceptance and healthy revenues and profits — Akers declared IBM will not become complacent because of that success. "We do not intend to let up for one minute," he

See AKERS page 107

IBM to saturate workstation mart

By Robert Blatt
CW West Coast Bureau

DALLAS — IBM intends to saturate a $6 billion workstation marketplace from high end to low end through aggressive product pricing, with the goal of controlling access to users' host computers, the Association of Data Processing Service Organizations (Adapso) was told here last week.

Speaking at Adapso's 80th Management Conference, Scott Smith, a financial analyst at The Gartner Group, a Stamford, Conn.-based research firm, said IBM will compete against hardware vendors rather

See STRATEGY page 109

U.S. crimps DEC's export privileges

MAYNARD, Mass. — Digital Equipment Corp.'s export privileges have been limited by the U.S. government, reportedly because one of the company's superminicomputers was seized on a ship bound for the Soviet Union last year.

Company officials reported last week that the U.S. Department of Commerce, in a surprise move, placed major restrictions on DEC's shipments of computers to West Germany, Norway and Austria, three countries the government considers prime diversion points to the Soviet Union.

See DEC page 108

Cullinet

Cullinet Software, Inc. has purchased an IDMS-based payroll/personnel system from Information Science, Inc./**103**

INSIDE

■ The image of Japan as an all-powerful technological juggernaut was dented by some of that country's own industrialists at a recent meeting that brought representatives of Japan and the U.S. together to discuss cooperation/**96**

■ Automatix will rewrite recent financial results and expects to report a loss; the company also fired a manager in Paris for falsifying sales records/**100**

■ No self-respecting robot can call itself intelligent if it doesn't have an advanced vision system to guide it to specific tasks/**105**

A Way to Keep Computers on the Right Track

Japan execs deny DP success, urge U.S. cooperation

By Robert Batt
CW West Coast Bureau

SAN FRANCISCO — The image of Japan as an all-powerful economic and technological juggernaut was dented by some of its own industrialists here at a two-day conference jointly sponsored by the Japan External Trade Organization and The Conference Board, Inc.

Titled "Japan and U.S.: Cooperating in High Tech," the conference brought together representatives from government, industry and academia of both countries.

Koji Kobayashi, chairman of Japanese computer maker Nippon Electric Co. Ltd., said Japan's success in the data processing and electronics fields is superficial when compared with the deep roots of science and technology in the U.S. However, he said, "although the foundations of Japanese science and technology are still weak, Japan has to have self-awareness and responsibility as an economic power and meet the challenge of high-technology development. She has to step forward vigorously on the road to healthy competition and cooperation as a trusted partner of the United States."

Kobayashi

In order to facilitate this at the stage of basic research, information should be widely disclosed, Kobayashi said. As the new technology approaches the stage of practical use, all parties should compete actively with each other and make efforts to improve production techniques and explore markets.

Another effective means of technology transfer, he asserted, is to set up plants in one another's country and to manufacture products locally. However, he warned, for this to continue, the taxation system in both countries must be fair, and he lashed out at the unitary tax enforced by some U.S. states, requiring overseas investors to pay state tax on their profits earned worldwide.

"We are strongly opposed to the unitary tax, and we sincerely hope that it will soon be abolished," he declared.

The conventional wisdom that Japan is a high-technology giant backed with millions of dollars from its own government was attacked by another Japanese speaker — Seiichi Ishizaka, adviser to the Nomura Research Institute.

Ishizaka said the Japanese government's share of expenditure on research and development is extremely small; of $27.3 billion spent on industrial R&D in 1981, only 27% of that amount involved public money, he said.

Sherwood Fawcett, chairman of the Battelle Memorial Institute, specialists in joint high-technology research projects, said Japan is more willing than the U.S. to fund research over the long haul.

"On acceptance of proposals and the funding of research programs, the Japanese have been more prone than Americans to fund research and development over the last 10 years. Their requirements are better organized for the long haul and in major targeted areas. They are willing to fund high-risk, longer term things than we are," Fawcett said.

However, Fawcett continued, there are weaknesses in the Japanese approach.

"When you look at some of the literature coming out of the Japanese universities, some of the fundamental work is very impressive, but the more practical applied work is not as impressive. We have also noticed as we work with the Japanese that everyone is careful not to stand out to be different. This attitude tends to stifle creativity and innovation," he charged.

BECOME A CICS CONSULTANT IN JUST TWO WEEKENDS.

We know that it's tough for consultants to fit a weekday course into their hectic schedules. That's why SysEd offers special CICS training courses for consultants that you can complete in only two weekends.

Our intensive weekend courses in Command Level, Macro Level, Internals, Application Design and VSAM are designed to make even non-CICS programmers immediately productive in a CICS environment. Each SysEd course provides a true-to-life learning experience with "hands-on" use of the computer; up-to-date, practical information; a solid foundation in CICS fundamentals and insights into advanced materials; and individual attention from highly qualified instructors.

SysEd's special weekend courses for consultants are held regularly at our classroom/computer facilities in New York City, Chicago, San Francisco and Dallas. Because class size is limited, applications are on a first come, first served basis.

For more information, call David Shapiro (212) 889-3386.

SYS-ED

ONE PARK AVENUE, NEW YORK, NY 10016 • (212) 889-3386

Modcomp's '83 losses equal $23.8 million

FORT LAUDERDALE, Fla. — Modular Computer Systems, Inc. (Modcomp) recently announced a net loss of $23.8 million, or $4.43 per share, for the year ended Dec. 31, 1983, as revenue declined $17.8 million from the previous year.

Sales in 1983 amounted to only $74.9 million, compared to $92.7 million in 1982, when a profit of $1.7 million, or 34 cents per share, was reported.

For the fourth quarter of 1983, the company experienced a loss of $10.9 million, or $2.08 per share, with sales of $18.1 million, an 18% decline from the corresponding period a year earlier.

Gabriel A. Rosica, president and chief executive officer of Modcomp, said that 54% of the loss was attributed to the production, marketing and subsequent discontinuance of the Zorba portable microcomputer, acquired in June of last year and discontinued in February 1984. Another factor contributing to the loss was a decline in minicomputer sales volumes, Rosica said.

The company attributed the minicomputer sales decline to the effects of the recession on Modcomp's industrial customers and the lack of significant new products.

The company reduced its work force by 14% in September and consolidated office and factory space to reduce leasing expenses, Rosica said.

The company announced two products late last year; Rosica said the Classic II/15 single-board minicomputer began shipping on Jan. 31, and the Classic 32/65 is planned for shipments in the fourth quarter.

In the words of our users.

"Our Fortune 32:16 paid for itself in the first six months. And the power of Unix is almost limitless."

—Allen Poison, President
Martek Corporation,
Barrington, RI

FORTUNE SYSTEMS

A leader in UNIX-based commercial, multi-user systems.

101 Twin Dolphin Drive, Redwood City, CA 94065
For more information call 415/592-5140/Telex: 172-632

•/ 1984 Fortune Systems/UNIX is a trademark of Bell Labs

Austin directory available

AUSTIN, Texas — A directory of businesses involved in the Austin area's growing computer industry has been announced here. The directory lists local computer stores and dealers, software publishers, programmers, repair centers and educational centers.

The first edition of the directory was produced in November 1983. It reportedly will be updated quarterly. Listings are alphabetically indexed and cross-indexed by Zip Code.

The directory is available for $4.95 per copy from The Computer Task Force, P. O. Box 275, Cedar Park, Texas 78613.

COMPUTER INDUSTRY

Tech innovation seen key in race for global market shares

As well as an impetus for cooperation between U.S., Japan

By Robert Batt
CW West Coast Bureau

SAN FRANCISCO — Companies that have done the best job of combining ideas, resources and people are likely to be the winners in the international high-technology arena, according to speakers at a conference here recently for U.S. and Japanese executives.

Takeo Kondo, president of Mitsubishi International Corp., was one of the speakers at the conference on "Japan and U.S.: Cooperating in High Tech" sponsored by the Japan External Trade Organization and The Conference Board, Inc. He said the development of technology requires an international perspective.

"Matching innovation to the need for innovation, assessing the impact of new technological breakthroughs and finding commercial applications in new and established industries are, in fact, international issues, and they impact crucially on the competition for global market shares," Kondo said.

The dazzling advances in technology in the U.S. and Japan have increased both the opportunities for cooperation between the two countries and the forms that such cooperation may take, according to Kondo.

As examples of this cooperation, he cited the formation of a joint venture in Japan among Mitsubishi, IBM Japan and a Japanese software-oriented venture firm to develop and market hardware and software. Also, he added, Mitsubishi recently acquired equity in Microrim, a Bellevue, Wash.-based software house, and forged a linkup between the U.S. firm and a Japanese software developer, with a view ultimately towards marketing its products in Japan.

Kondo

"Still another vehicle for cooperation in high tech is the practice of importing equipment under OEM," according to Kondo. "For example, an advanced office automation system developed by an American manufacturer might be enhanced by a piece of equipment that could be better produced in Japan or elsewhere. As the newly industrialized countries become more technologically advanced, we should see more such arrangements on a multilateral scale."

Erich Bloch, vice-president of corporate technical personnel development at IBM, stressed the value of cooperative research between the two countries.

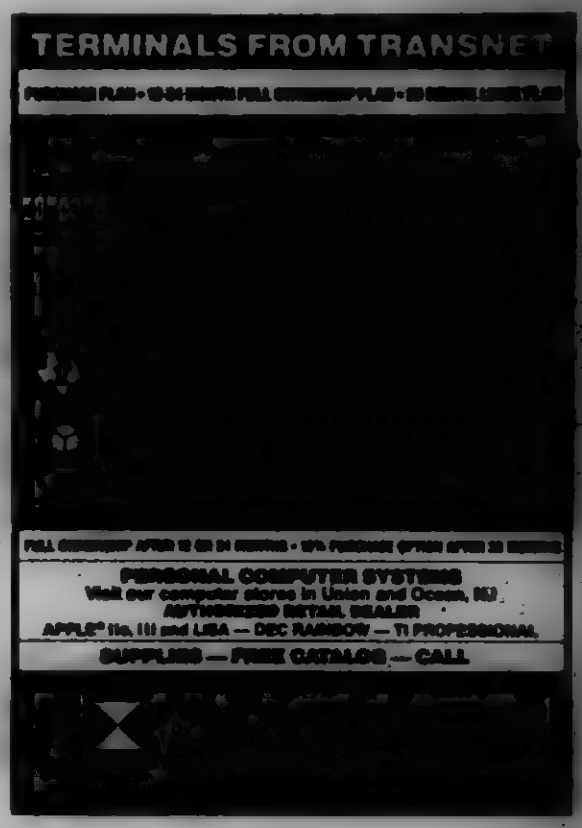
Cooperation, he contended, will not stifle competition, but rather will promote it by bolstering the fabric of high-technology industries. "Those who can translate research into products quickly and effectively will reap the benefits of cooperative research," he said.

Bloch, who is also chairman of Semiconductor Research Corp., warned his audience that the U.S. is being outspent by Japan in semiconductors. "Our research and development in the U.S. is much more dispersed than it is among our trading partners. In Japan and Europe, R&D is much more focused in areas such as computers and semiconductors."

Bloch said there needs to be an even-handed approach toward cooperative research, and he warned that the controversy now raging over Japan's proposals to change its software copyright laws [CW, March 19] is an example of something that could "throw cooperative research under a cloud."

The economic controversies between the two countries were also noted by another speaker — Tadashi Sasaki, senior executive vice-president at Sharp Corp. Japanese and U.S. talents complement one another, he maintained, and it should be easy for the two countries to work together to improve their collective performance.

"However, there are numerous political and economic obstacles which will be overcome only by great effort. In particular, our governments must adhere to the precepts of free trade, and we must continue to hold high-level meetings across a broad spectrum of issues if we are to bridge our differences," he concluded.



Victor weighing proposal

By Patricia Keefe
CW Staff

SCOTTS VALLEY, Calif. — Having decided to sell "substantially all" of the assets of its computer business, Victor Technologies, Inc. is considering a proposal for its European distributor to acquire worldwide manufacturing rights to Victor computer products.

The financially troubled Victor recently became the third micro maker in a six-month period to file for protection from its creditors under Chapter 11 of the federal bankruptcy code. Victor's debt is estimated at over $100 million.

In a letter to the U.S. headquarters of the distributor, Applied Computer Techniques PLC (ACT) of Birmingham, England, Victor's board of directors reportedly indicated that it would consider submitting ACT's proposal for approval by all of the interested parties. Victor also said that proposal had the full support of its creditors committee, which is chaired by attorney Arnold Quittner, according to a spokesman for ACT (North America), Inc., ACT's U.S. subsidiary. The announcement is said to be the result of five weeks of negotiations.

Over the next few weeks, a detailed agreement is expected to be submitted for final approval to all the parties concerned prior to filing it with the federal Bankruptcy Court, ACT said. Victor's board also authorized its acting chief executive, its consultant and its bankruptcy counsel to clarify outstanding points and conclude negotiations, the spokesman said.

ACT's proposal would enable it to secure worldwide distribution rights, excluding the Americas. The assets to be acquired under the proposed agreement would consist primarily of stock and receivables.

In other business concerning Victor, Lotus Development Corp. last week announced it has discontinued its version of 1-2-3 for the Victor 9000. However, it will continue to fully service and support all Victor 9000 users who have purchased 1-2-3, a spokesman said.

in the words of our users.

"I'm intrigued by how easily my business ideas and innovations come to life through my Fortune 32:16."

—Richard Alan Dow, President
Dow Information Services, Hope, RI

FORTUNE SYSTEMS

A leader in UNIX-based commercial, multi-user systems.

101 Twin Dolphin Drive, Redwood City, CA 94065
For more information call 415/592-5140/Telex. 172-632

© 1984 Fortune Systems/UNIX is a trademark of Bell Labs

IBM boosts micro production, still lags behind demand

By Peter Bartelt
CW Staff

BOCA RATON, Fla. — IBM will exceed its personal computer production goals this year and still not catch up to demand, according to Philip D. Estridge, president of IBM's Entry Systems Division.

The company will more than triple production of the personal computer line of products — ramping up U.S. production from a rate of one unit coming off the assembly lines every 16 seconds to one unit every seven seconds, Estridge told almost 300 stock analysts gathered here recently.

Industry analysts had already expected IBM to ship two million units this year, and Estridge's comments seem to indicate an even greater volume. He also said IBM early in March began offering an IBM credit card for use at its retail product centers.

The all-day session at the Entry Systems Division headquarters and nearby production facilities was arranged for the New York Society of Stock Analysts and featured a tour of the Personal Computer and Personal Computer XT production lines that will be increasingly automated by this summer. Estridge said IBM will spend $500 million this year on expansion of the Entry Systems Division, equally divided among facilities for existing products, facilities for new products and new equipment.

Estridge said more Personal Computers were shipped for use within IBM divisions this year than were distributed for sale when it was first introduced in 1982. According to Allen Krowe, chief financial officer and senior vice-president of IBM, some 22,000 Personal Computers are presently in use in IBM divisions, and that figure should increase to 60,000 by the end of 1984. Krowe said IBM is confident Personal Computers will increase demand for large processors, because a majority of internally used micros are tied into large processors.

Estridge said he doesn't think the demand curve has even begun to appear at this point and noted that as each new Personal Computer product is introduced by IBM, demand soars. With the Personal Computer products, he said, "We're really doing old jobs today with these machines; the new jobs are just starting to emerge."

But while the Personal Computer and Personal Computer XT products can't keep up with demand, production of the recently introduced PCjr is already close to catching up with demand, Estridge said, adding to speculation that the PCjr is not doing well in the marketplace.

IBM, however, believes the low-end Personal Computer product — actually made under contract by Teledyne Corp. in Tennessee — is "uniquely" suited for home, school and work-at-home applications, Estridge said. Pointing to the wide array of third-party, add-on products available for the other Personal Computer products, Estridge said it is possible consumers at some point could enhance the PCjr to the level of the basic Personal Computer, but at a lower cost.

Commenting on IBM's strategy of establishing third-party distribution channels and relying on third-party components, Estridge said the job is too much for IBM. "Not only do we not have enough resources, we don't know how," he said.

YIPKON
The #1 Name For
WANG
Turnkey Systems

- MOST EXTENSIVE LINE OF SOFTWARE APPLICATIONS FOR WANG, VS, 2200 AND P.C.
- 8088 CO-PROCESSOR/ ADVANCED GRAPHIC BOARD FOR P.C.
- BEST TRADE-IN VALUE FOR YOUR 2200 OR VS TERMINALS WHEN YOU BUY A WANG PC WITH OUR SOFTWARE
- BEST PAYMENT TERMS, SERVICE AND DELIVERY

IMMEDIATE DELIVERY
20/40/80 MB FIXED/REMOVABLE DISK DRIVE FOR WANG PC

©Yipkon Business Systems
An Authorized WANG National System House

[illegible]
New York
1 World Trade Center, Suite 7957
New York, NY 10048 (212) 524-7729
[illegible]
4061 West Green Tree Road
Milwaukee, WI 53209 (414) 351-0088

IBM granted motion against Cybernex

SAN JOSE, Calif. — IBM recently was granted a motion in federal court for an injunction prohibiting Cybernex Ltd. from using alleged IBM trade secrets in the manufacture of thin-film recording heads.

Cybernex, which is headquartered here, immediately issued a statement maintaining the "relative handful" of items that are covered by the injunction will not materially affect the company's ability to manufacture thin-film heads.

According to William Klein, Cybernex's president, the "limited nature" of the injuction, relative to what IBM originally sought, justified the company's belief that the few similarities between its manufacturing process and that used by IBM "are coincidental — the results of the nature of the product itself and good engineering practice."

Cybernex said it had "opened its doors" to IBM engineers when IBM first expressed concern and that IBM had based its court action on the joint efforts examining the Cybernex processes. Cybernex said it didn't think IBM had acted in good faith.

In the words of our users.

"The Fortune 32:16 allows our BASIC programmers to access the power of Unix without being Unix specialists."

–Mike Andreoli, Sales Manager
Healner Data Services,
Software Developers

FORTUNE SYSTEMS

A leader in UNIX-based commercial, multi-user systems.

101 Twin Dolphin Drive, Redwood City, CA 94065
For more information call 415/592-5140/Telex. 172-632

1984 Fortune Systems/UNIX is a trademark of Bell Labs

Rixon, Lotus settle $10 million lawsuit

CAMBRIDGE, Mass. — Without admitting any wrongdoing, Rixon, Inc. recently agreed to several demands from Lotus Development Corp., thus settling a $10 million lawsuit that Lotus filed against Rixon two months ago.

Filed in U.S. District Court in Boston Jan. 31, the suit charged Rixon with making unauthorized copies of the Lotus 1-2-3 software program and related documentation and then distributing the copies to Rixon branch offices throughout the country.

Under the terms of the settlement, Rixon consented to the entry of a permanent injunction prohibiting it from making or using copies of the 1-2-3 program and related materials in the future. In addition, the data communications vendor agreed to pay Lotus an undisclosed amount of money as part of the settlement.

Rixon also agreed to investigate the allegation of copying and to return all its unauthorized copies of 1-2-3 disks and documentation.

Lotus President Mitchell Kapor said Rixon management had cooperated fully in investigating the allegations of copying activity.

The settlement "represents a major step in our effort to eliminate the software piracy problem," according to Kapor.

How 3 famous names got together to

SOLVE YOUR PROBLEMS OF INTELLIGENT MICRO TO MAINFRAME CONNECTION.

Get the answers you're looking for—with the VisiAnswer Software System from Informatics, the leader in mainframe to micro integration.

Informatics has teamed the best minds in the business to solve the problems of intelligent mainframe data access for microcomputer users. The VisiAnswer™ Software System is the breakthrough result of a unique team involving Informatics Corporate Micro Systems and VisiCorp™ products working with IBM® Personal Computers.

VisiAnswer solves the timely problems plaguing data processing professionals like you.

Available for use right now, the VisiAnswer Software System is the micro to mainframe system specifically designed to help you:

- Manage *and* control the integration of microcomputers with your current mainframe—right in *your* data processing department.
- Provide your company's micro end-users with access to specific mainframe data—without wading through unrelated information for hours.
- Maintain *security*/control of restricted portions of your corporation's data.
- Supply end-users access to *current "live" information*, instead of information that's historical and obsolete.
- Intelligently access *all* mainframe data, whether it's unique application data or part of a data base management system.

VisiAnswer makes your job easier and more efficient than ever.

With more and more managers and analysts in your company using desk-top computers these days, there's a tendency to improvise the way they obtain the data they need. That leaves the door wide open for mistakes and inaccurate information.

Now you can avoid these problems and maintain a high level of data processing efficiency for everyone who needs access to that data with the VisiAnswer Software System. It delivers intelligent solutions that make current mainframe data available to your end-users in an orderly fashion. That makes their jobs *and yours* easier and more accurate—something upper management will appreciate.

VisiAnswer was designed by the best minds in the business to fit your business.

You get Informatics' expertise in data access technology and mainframe system software... plus VisiCorp's expertise in user-friendly micro software. We chose the IBM Personal Computer for its leadership in delivering business solutions, and IBM chose us as a value-added remarketer.

This system works with *all* data bases on IBM mainframe systems. And your end-users will get data that is immediately usable with all Visi Series™ Products and other products utilizing the VisiCalc® file format.

Find out more about Informatics VisiAnswer system. Mail this coupon or call toll free today. See how VisiAnswer products can fit into your Personal Information Center as an integral part of your unique business strategy.

Get the facts on VisiAnswer—
the intelligent micro to mainframe connection.

Mail this coupon today or call toll free

1 800 227-3800 Ext. 911

(In Canada, call collect, 0 416 488-7192)

Informatics general corporation.
THE SOFTWARE ENGINEERS

VisiCalc is a U.S. Registered Trademark of VisiCorp.
U.S. Registered Trademark applications pending for VisiCorp, VisiSeries and VisiAnswer.

VisiAnswer Information Coupon

Mail to: Informatics, Free VisiAnswer Information,
P.O. Box 1452, Canoga Park, California 91304

I want to know how the VisiAnswer Software System can provide intelligent solutions to my micro to mainframe problems.

☐ I'd like to see the VisiAnswer Software System at work. Please contact me to arrange a free, no-obligation VisiAnswer demonstration.

☐ I'd like more information on your VisiAnswer Product. Please see that I get the full details, without cost or obligation.

Your Name _____ Title _____

Company Name _____ Phone No. (include area code) _____

Address _____

City _____ State _____ Zip _____

BIA CW1-AW

Attention to quality stressed for high-tech executives

By Robert Batt
CW West Coast Bureau

LOS ANGELES — High-technology companies are out of touch with both their own employees and their customers, a management consultant told some 400 high-tech chief executives and senior managers here recently.

Speaking at a conference on managerial excellence presented by the Southern California Technology Executives Network, Thomas Peters, president of the consulting firm Skunk Works, Inc. and coauthor of the book *In Search of Excellence*, said attention to mundane details is the secret to rapid productivity gains.

"The number one managerial shortfall in this country is managers who are out of touch with their own employees and customers. Technology companies are failing flat down when it comes to supplying total customer satisfaction. . . . Quality needs to become the strategic focus of high-tech organizations," he claimed.

The key to the long-term viability of high-technology concerns, Peters added, is not the people in the research and development center, but the person on the production line.

Sense of trust

Peters said it is essential to instill a sense of trust within a company. "If you insist on treating the people in your organization like children, do not be surprised when they respond that way," he told the executives.

Peters said there is a critical need to build the institutional skills that will lay the foundation for future rapid growth. For this to happen, he warned, a complete shift in the notion of leadership needs to take place.

"The only value of a chief executive is to pay attention to what is important. The leader in an organization should be a coach, a nurturer and an enthusiast," he stressed.

Also speaking at the conference, Floyd Kvamme, then-executive vice-president at Apple Computer, Inc., emphasized the critical relationship between vendors and management information systems (MIS) departments.

Referring to the dominance of IBM, he said, "It is important to position your competitors accurately. When it comes to large organizations, the prime vendor is not IBM; rather, it is the MIS department. You need, therefore, to be customer-compatible, not IBM-compatible, because you are in business to support your customer, and your customer is not IBM, it is the MIS department."

Kvamme said the chief executive should consider himself or herself the number one quality officer in the company. "The job of a chief executive is to create and establish the right set of issues for your company. Quality starts in your office, and you must get everyone in your organization to sign up," he added.

Allen Michels, chief executive officer at Convergent Technologies, Inc., stressed the need for risk-taking in establishing a high-technology venture. He said that a corporate leader needs to be willing to risk everything and be accountable for the collective failure of others, should that occur.

"Set impossible goals," he advised his audience. "If you can manage people effectively in the pursuit of impossible goals, it gives great strength and power to your organization."

Michels said that only by simplifying the communication process in an organization can such goals be achieved, so it is vital to keep a company simple and lean.

"Keep people focused on the goals. Focus on making decisions in key areas such as manufacturing, marketing, research and development and the collective set of managerial objectives and stick to the basics," he added.

ITT reports revenues down

NEW YORK — ITT Corp. announced recently that revenues were down 4.5% in 1983, compared with 1982, and that earnings were up 1.8% over the year-earlier figures after a restatement of earnings for the first three quarters of 1983 and for earlier periods.

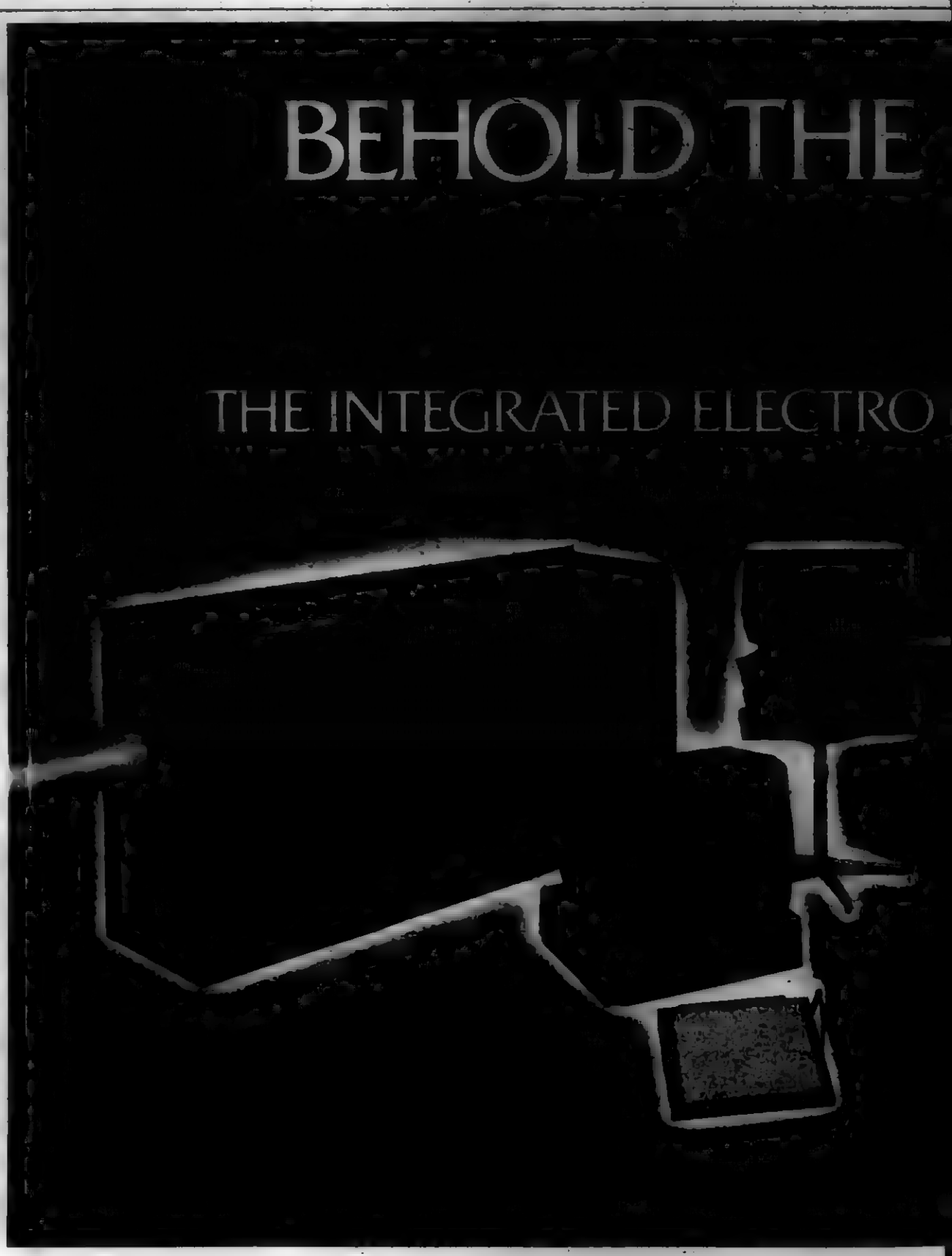
Earnings for the year were $675 million, or $4.50 per share, compared to the restated 1982 earnings of $663 million, or $4.47 per share, according to ITT.

Prior to the restatement, 1982 earnings had been reported at $703 million, or $4.75 per share.

Revenues for 1983 were $20.2 billion, down from $21.2 billion in 1982.

For the fourth quarter of 1983, ITT reported earnings of $278 million, or $1.86 per share, up 13.5% from the restated earnings for the comparable period in 1982, when earnings were $245 million, or $1.65 per share.

Prior to restatement, fourth-quarter 1982 earnings were $272 million, or $1.84 per share.



COMPUTER INDUSTRY

Akers lauds AT&T expertise at AEA conference

By Peter Bartolik
CW Staff

BOSTON — IBM may be big, but "the industry dwarfs us," company president John F. Akers said here recently in a brief but wide-ranging press conference at which he also acknowledged the technical expertise of potential rival AT&T.

Akers, named president in February 1983, held the press conference after delivering the keynote address to a seminar for industry executives sponsored by the American Electronics Association (AEA) Productivity and Quality Center.

Asked to comment on the impact of the AT&T divestiture on IBM, Akers said the divested operating companies "are becoming a source of distribution to us, just as they are becoming a source of distribution to other companies." But Akers said he doesn't believe that distribution channel will be major.

With speculation rampant in the industry these days about AT&T's expected move toward becoming a major information processing systems vendor, Akers delivered some unexpected kudos in the direction of the communications giant.

"AT&T has had a history of technology and products that is hard to argue with, and I expect that to continue," he said. "Unix is probably the most successful product for AT&T so far," Akers said, adding that he expects AT&T to deliver more products to the market.

When he was asked what IBM considers to be its major competition, Akers protested that "the industry is a very big industry . . . probably five times, six times IBM's size — the industry dwarfs us."

During his keynote address at the AEA seminar on "Productivity and Quality According to IBM and Hewlett-Packard," Akers said that four years ago the company found there was room for improvement in the quality of its products and took steps to focus quality improvement on the process of development and production.

He said the industry has a leadership challenge every day, but also has leadership responsibilities. "Society more and more demands quality in our products. . . . if we don't respond and respond well, society, it seems to me, will help us respond."

When it began its quality improvement project, IBM discovered it was "too often fixing quality products in our customers' offices at great expense to us and to them."

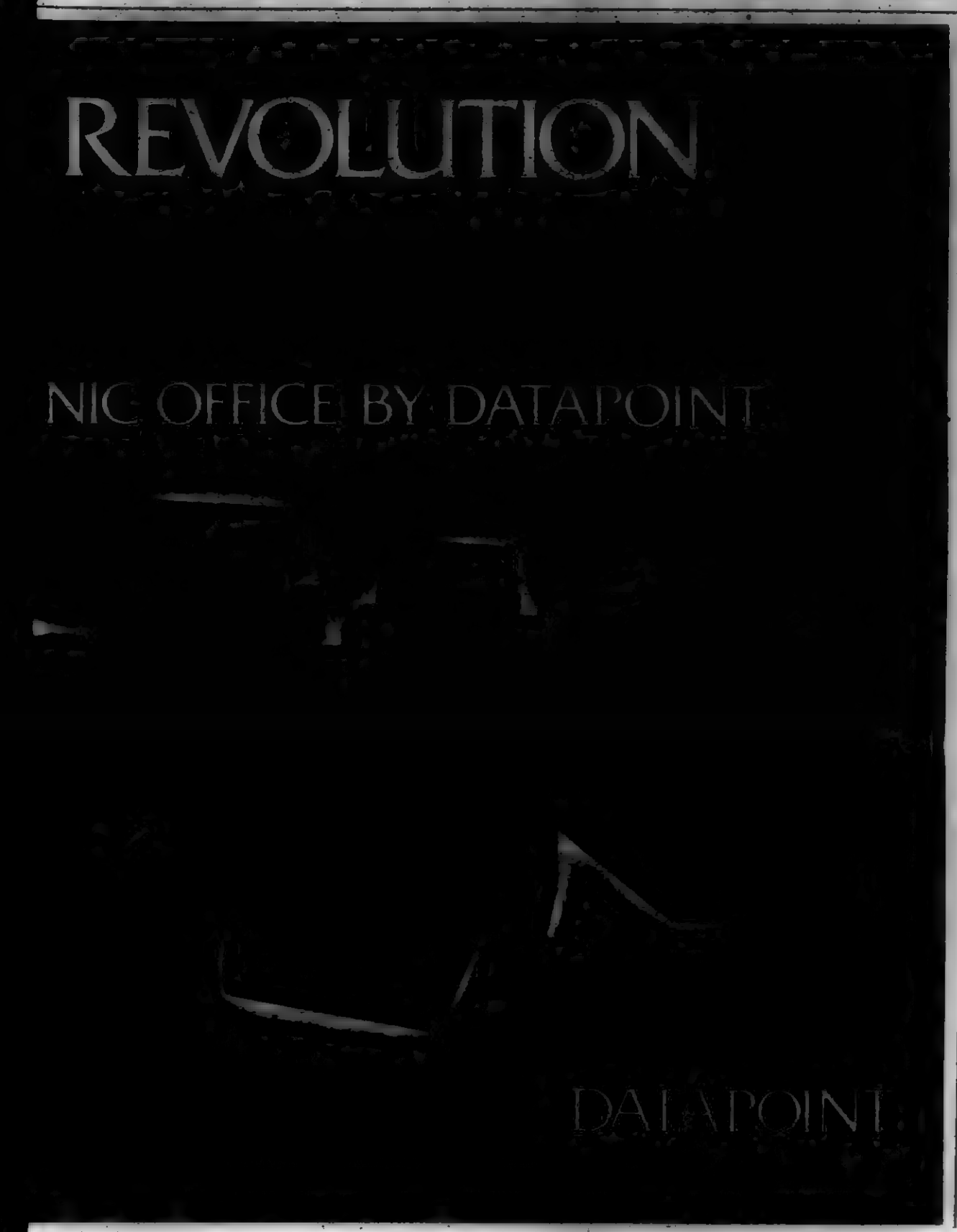
The company also realized, according to Akers, that it had become "too tolerant of defect levels," ramping up production levels to offset an expected number of defects and requiring its suppliers to deliver supplies at 95% defect-free levels, instead of seeking totally defect-free supplies.

Five tenets

Akers said IBM evolved its quality improvement plan around five tenets: management action and involvement, employee participation, focus on the job process, "no level of defect is acceptable," and quality improvement reduces total costs.

While nonacceptance of defects "certainly required within IBM a change in attitude," Akers pointed out that the company's "profit growth exceeded revenue growth at an increasing rate, and we know quality growth had something to do with that."

IBM implemented a product policy requiring the quality and reliability of new products at the time of general availability to be superior or at least as good as anything else on the market, Akers said. Releasing one processor, he said, required "four tries" before the repair action rate was lower than the older product it was replacing.



Cullinet to buy Insci system

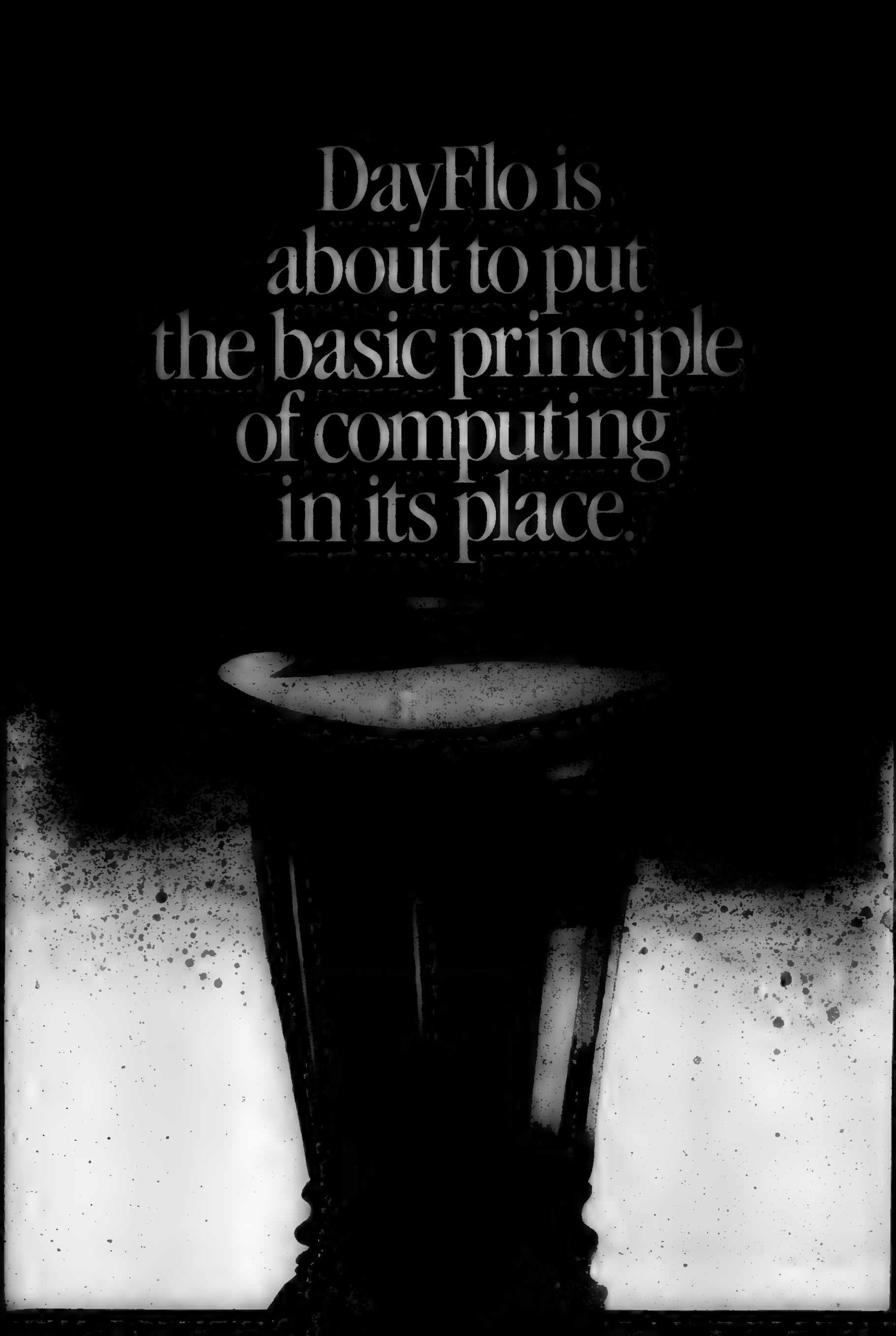
WESTWOOD, Mass. — Cullinet Software, Inc. said last week it has an agreement in principle with Information Science, Inc. (Insci) to acquire rights to Insci's IDMS-based Payroll/Personnel System.

The agreement, according to a Cullinet spokesman, provides for Cullinet to pay approximately $5 million plus royalties to Insci over a seven-year period for the system, related technology and Insci's IDMS current and prospective customer base. Insci's existing IDMS Payroll/Personnel accounts will be transferred to Cullinet for a $2.5 million payment.

Robert N. Goldman, president of Cullinet, said, "The addition of payroll and personnel software to our existing line will not only add important applications, but will also ensure the integration of these systems with our manufacturing and financial applications software."

Jody Dyer, president of Insci, said, "By transferring this product to Cullinet . . . Insci will be better positioned to continue to deliver outstanding products for other operating environments."

DayFlo is
about to put
the basic principle
of computing
in its place.



COMPUTER INDUSTRY

Boom times predicted for artificial vision industry

COTTAGE LINES
Bohdan Szuprowicz

Artificial vision consists of electro-optical systems that act as sensors and interpreters that can automatically identify specific patterns and trigger appropriate action of associated mechanisms or systems. No self-respecting robot can call itself "intelligent" anymore if it does not have a vision system that guides it to perform specific tasks in response to known but randomly occurring external factors.

Studies show that human beings acquire 83% of their knowledge through sight, 11% through hearing and the rest through the other senses. Since the world is built around us and for us, robots that can act like us can probably serve us best. This suggests that we must give them the best vision we can afford.

Artificial vision is not just a TV camera strapped to a mechanical arm that records images on tape. The system must be able to digitize the image instantaneously, compare it with specific patterns stored in its memory and decide whether it "sees" what it is supposed to see before it acts. Vision is important in automation and will become even more so as the factories of the future develop into flexible manufacturing centers.

Vision systems that depend on specialized software and are based on general-purpose computers can be made very flexible, but may also be too slow and cumbersome for many practical applications. New developments in very large-scale integration, microchip customization services and the use of laser beams open up new vistas for tailor-made embedded vision systems that are very fast, highly specialized and also cost-effective.

All these developments, on the eve of an expected robotics explosion during the mid-1980s, suggest boom times ahead for the fledgling artificial vision industry. The market is but a few years old and was estimated at only $40 million in 1983, but is expected to double during 1984.

Actually, robotic guidance accounts for only 20% of artificial vision consumption today. Straightforward inspection and measurement applications on the production line each claim 40%. But observers are confident that robots will become the largest consumers of artificial eyeballs in the very near future.

Applied Intelligent Systems is one new firm in this business which manufactures an artificial vision system that can inspect 10 integrated circuit microchips every second with 100% accuracy. This is the type of application with the greatest future, particularly as integrated circuits and assemblies become more complex. Electronic assembly automation, where numerous components must be identified, inspected, placed and reinspected several times, is an area ripe for artificial vision applications in the form of intelligent robots or specialized vision systems.

Other new firms that target electronics assembly include Machine Vision International, Control Automation and Intelledex, which manufactures specialized robots with vision for handling silicon wafers and magnetic disk reading head assembly.

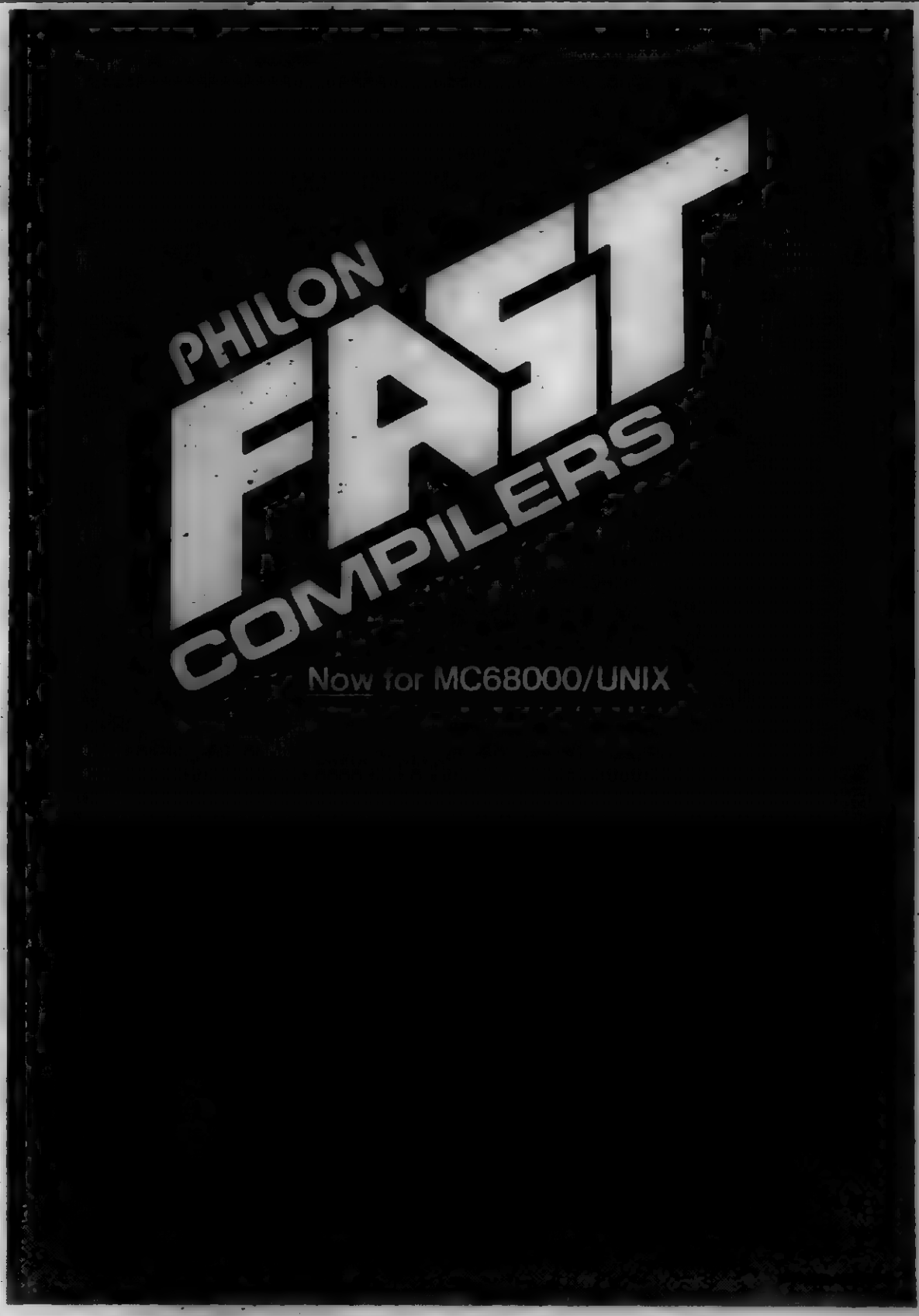
Integrated Automation is another start-up that is manufacturing robotic systems based on artificial vision concepts for factory automation. In late 1983, the company registered 2,250,000 shares of stock for sale to the public at a later date.

Several companies involved in artificial intelligence are also participating in the mechanical vision boom, because artificial intelligence methods are used in the pattern recognition software of artificial vision systems. Most prominent of these are Cognex, which makes devices for automatic reading and verification of labels; Machine Intelligence, a Stanford Research Institute spin-off that produces vision interpretation systems; and Octek, which is designing vision systems for computerized applications.

There are also a host of smaller firms — such as Diffracto, Electro-Optics Controls, Perception, Synthetic Vision Systems, View Engineering, and Vision Peripherals — that are providing a variety of products ranging from car door assembly inspection systems in automobile plants to just plain and simple consulting on artificial vision use.

Not to be forgotten are the companies that rely on vision for their products. These include such better known names as Automatix, Inc., Robotic Vision Systems and Object Recognition Systems, which specializes in automatic bin picking systems for robots.

Last but not least are the subsidiaries or divisions of large corporations such as Automatic Inspection Devices, owned by Owens-Illinois; General Electric Optoelectronic Systems; and Hitachi. Most other robot manufacturers are clearly developing into a new market for artificial vision suppliers, but if the field becomes too crowded, they may well continue to acquire and merge these operations into their own.



COMPUTER INDUSTRY

EXECUTIVE CHANGES

The Professional Services Management Association (PSMA), an organization of professional service firm executives, has appointed Donna Tobin as its first executive director.

In conjunction with this appointment, PSMA has established new offices at 1213 Prince St., Alexandria, Va. 22314.

■

Daniel McHale has been named president of Xiox Corp.

■

Thomas L. Chun has been elected vice-president, legal affairs, and secretary and **Lawrence W. McGraw** has been elected vice-president, marketing and service support, at Tandem Computers, Inc.

■

Duncan N. MacDonald has been appointed vice-president/general manager at Computer Storage Technology, Inc.

■

Ronald R. Riedesel has been named vice-president, strategic marketing, at Reference Technology, Inc.

■

William S. Martin has been named vice-president, planning and business development, for GTE Communication Systems.

■

Michael P. May, executive vice-president, treasurer and a director of Applied Communications, Inc., has been assigned additional responsibilities as chief operating officer.

■

Gary Morgenthaler has been promoted to president of Relational Technology, Inc.

■

Digital Equipment Corp. has promoted three senior managers to vice-president. They are **Rose Ann Giordano**, large systems marketing; **Robert C. Hughes**, business and systems marketing; and **John L. Sims**, business and office systems marketing.

■

Richard B. Gordinier has been named president and chief executive officer of Vault Corp.

■

Nikolaus Kampf has been promoted to vice-president of supervisory controls systems and **Gary Fuller** has been named vice-president of operations at Aydin Corp.'s Computer Systems Division.

■

David A. Campbell has been named chairman of the board of Computer Task Group, Inc. **John P. Courtney** has succeeded Campbell as president and chief operating officer.

■

Sanders Associates, Inc. has announced the following appointments: **Edward A. Miller**, executive vice-president; **James P. Woolnough**, president, Federal Systems Group, and senior vice-president; **Richard A. Read**, executive vice-president, Federal Systems Group; and **Jerry G. Sessler**, senior vice-president, Electronic Warfare Division.

■

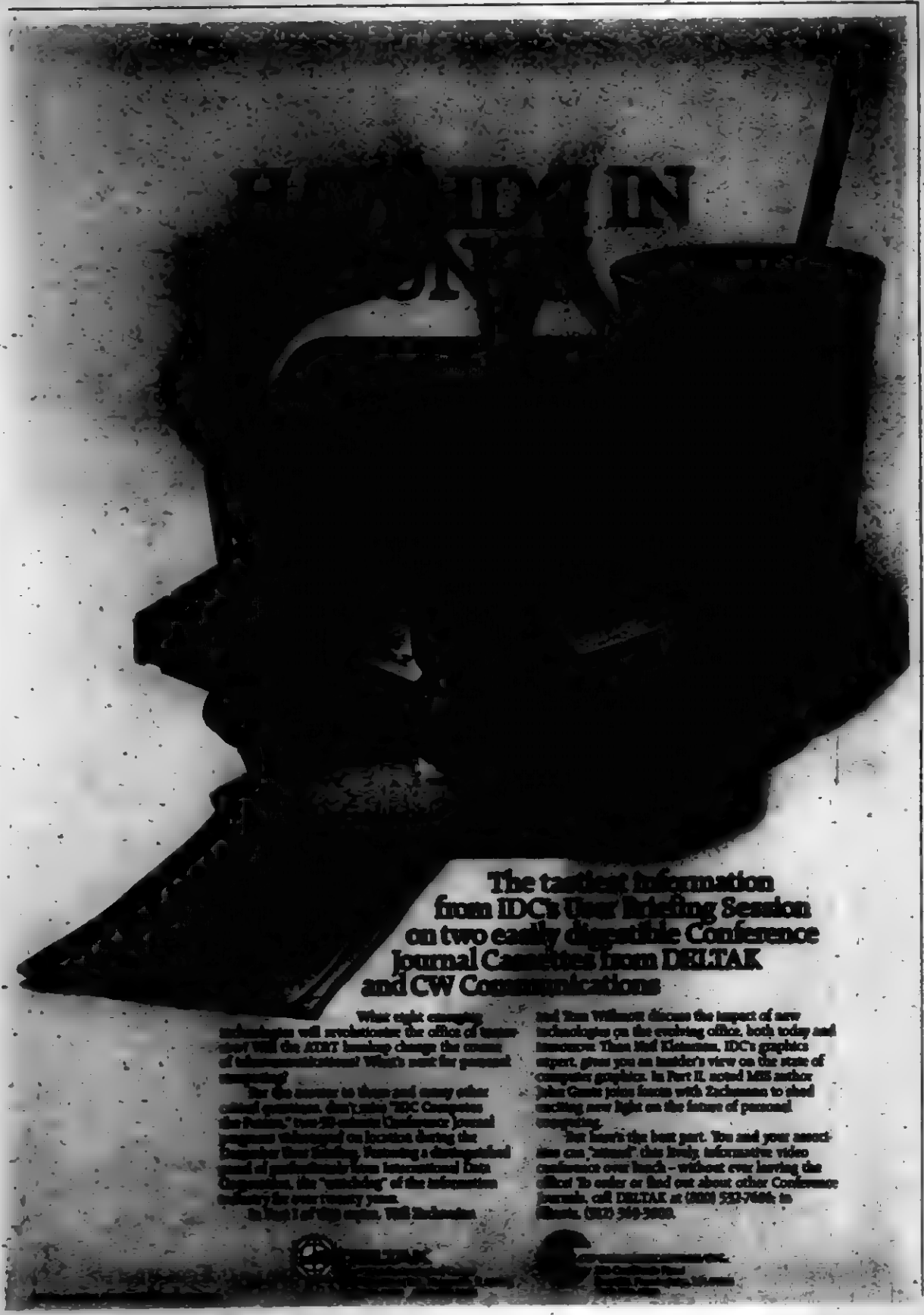
Dan E. Wright has joined Hogan Systems, Inc. as vice-president, applications software development.

■

Wayne Harvey has joined Oracle Corp. as director, corporate technical services.

■

Louis A. Kaplan has been named vice-president of human resources and **Lloyd Morgan** has been appointed vice-president of manufacturing at North Star Computers, Inc.



Compaq to cut micro prices

HOUSTON — In the wake of IBM's introduction of its Portable Personal Computer, Compaq Computer Corp. last week acknowledged plans to cut prices for its floppy disk-based portable micros.

A Compaq spokesman declined to discuss the size or the timing of the cuts. However, many dealers have slashed prices of the basic single-drive Compaq system from $2,995 to $2,495 and dropped prices for the basic dual-drive system from $3,495 to $2,995. The suggested price for the Compaq Plus, the vendor's hard disk portable system, is expected to remain stable at $4,995.

IBM introduced its portable micro in February with a suggested price of $2,795. It has not announced any plans for a hard disk version.

Kvamme joins venture firm

SAN FRANCISCO — E. Floyd Kvamme resigned recently from Apple Computer, Inc., where he had been executive vice-president of marketing, and subsequently joined Kleiner, Perkins, Caufield & Byers here as a general partner.

Formerly president of National Advanced Systems, Inc., Kvamme joined Apple in January 1983 and was responsible for worldwide marketing, sales, distribution and support of Apple's products.

Kleiner, Perkins, Caufield & Byers is a venture capital firm that specializes in high-tech firms. The firm has financed 85 companies, including Tandem Computers, Inc., Lotus Development Corp. and Compaq Computer Corp.

COMPUTER INDUSTRY

DEVELOPMENTS

Vector Graphics, Inc. has secured additional financing of $2,750,000 through a private placement of common stock at $1.50/share. The funds reportedly will be used to address working capital requirements.

■

Honeywell, Inc. and Formative Technologies, Inc. (Formtek) have signed a third-party service agreement. The contract calls for Honeywell's Customer Services Division to be the national service vendor for Formtek's computer-aided design workstations.

■

Lotus Development Corp. announced it is developing a Radio Shack TRS-80 Model 2000 version of its 1-2-3 integrated program, to be sold through Radio Shack Computer Centers. Shipments of this version of 1-2-3 will begin at midyear.

■

Data General Corp. and AT&T Information Systems, Inc. announced an agreement to develop a communications interface to enable DG's Comprehensive Electronic Office workstations and Desktop Generation systems to connect with Eclipse MV/Family systems through AT&T's Digital Multiplexer Interface Dimension System 85.

■

Aquix Advanced Systems Corp. acquired North American marketing rights to the multiuser microprocessor-based storage systems developed by Ehcot Computer Systems, Inc. The agreement also gives Aquix nonexclusive marketing rights for these systems throughout Central and South America as well as Europe.

■

Data General Corp. has formed a full-service marketing unit, which will focus on marketing peripheral equipment, software, terminals, low-end workstations, system upgrades and spare parts.

■

Digigraphic Systems Corp. has acquired the product marketing and manufacturing rights, as well as the customer base, of Magna Technologies, Inc. Terms of the agreement were not disclosed.

■

Computer Technology International (CTI) has signed a letter of intent with Datel Systems Corp. to provide management services for the New York City firm. The agreement will also provide CTI with an option to purchase controlling interest in Datel.

■

Digital Equipment Corp. and Dest Corp. reached an agreement to enable Decmate II users in small businesses and large organizations to add a high-accuracy optical character recognition capability to their offices. As part of Digital's agreement, Dest is also offering a format processor.

■

The Quarter-Inch Cartridge Drive Compatibility working group reached an agreement to develop proposed standards for the 100M-byte tape cartridge streamers at its next meeting on April 5-6.

■

Computervision Corp. and Prime Computer, Inc. announced an agreement under which Prime will purchase joint ownership of Revision 4 of the Medusa software package from Computervision. Both companies will be able to market Medusa worldwide as of June 1.

■

Genstar Corp. and Gather Computer Corp. have agreed to market jointly an integrated line of executive workstation software products. Designed to provide rapid access to diverse business information, the product line runs on office hardware manufactured by Convergent Technologies, Inc.

See SUPER page 109

AKERS from page 97

said.

Noting that IBM has grown at a faster rate than the industry overall for the past two years, Akers said, "I think the strategies that are the IBM strategies are working, and they are working well and continuing to pay off for our stockholders."

Akers

Akers cautioned against "Personal Computer myopia," noting that while the Personal Computer line of products has enjoyed great success, it is "still a relatively small, but fast-growing, part of IBM."

IBM's continued success depends on many business areas and industry segments, he said. "We fully expect large processors, storage devices, other workstations and office systems, telecommunications products, peripherals and software to carry their fair share of IBM growth," he added.

Software sales growth, according to Akers, will considerably outpace hardware sales growth over the long term. While software only accounted for 6% of total revenues in 1983, over a five-year period it has achieved a compound growth rate of 42%, he said.

IBM set very high goals for this year, according to Akers, and so far this year, the company is ahead of those goals. "We have been pretty busy so far [this year], and we will continue to be very busy with new products throughout the rest of 1984," he said.

FACE THE REAL COST OF DIVESTITURE!

Managing Complex, Multicarrier/Vendor Networks! Diagnosing Faults! Crossing Carrier Gateways! Interfacing Voice, Data and Telecom Equipment! Optimizing Hardware, Tariff and Software Opportunities!

Learn how at the new NETWORK MANAGEMENT TECHNICAL CONTROL Conference & Exposition

May 21-24 1984, Sheraton Washington Hotel, Washington, D.C.

Sponsored by the Communication Networks '84 Team

First program to ZERO IN on Divestitures' Operating Headaches — See new tech control and software solutions — Self diagnostic Modems & Components — Computer programs for network optimization, change and equipment management!

Learn at In-Depth Seminars May 21 & 22

Dr. Dinos Doll
Strategic Planning

Six other sessions on Net Diagnostics, Tech Control, PBX Interfaces, and more!

Choose from 40 "How-To" Conference Sessions May 23 & 24

Keynote Speaker:
Dr. Lee Selwyn

Case Histories - New Applications
Early Birds - Problem Solvers

Show Sponsors Include: Avant-Garde • Dynatech Data • General DataComm • Hekimian Labs • Racal-Milgo • Paradyne • Pulsecom Div., Harvey Hubbell Inc.

Exhibitors Include: Arus Corp., Datacom Management Sciences, Digilog, Digitech Industries, Infinet, Infotron, International Data Sciences, NEC America, Versa-Lite, and more!

Exhibits will be open: May 23, 9:30 - 5:00 and May 24, 9:30 - 4:00.

For Full Program Information Call 1-800-225-4698 (In Mass. 617-879-0700) or return the coupon below to Communication Networks — NM/TC, Box 880, Framingham, MA 01701

Please send Registration Information ☐ Please send Exhibit Information ☐

Register me for:

☐ Two-day In-Depth Sessions (May 21 & 22) $595

☐ NM/TC Conference (May 23 & 24) $295

☐ Four Day Full Program (May 21 - 24) $795

Name/Title _____

Company _____

Address _____

City/State/Zip _____

Telephone ( ) _____

FREE ADMISSION TO EXHIBITS FOR QUALIFIED BUSINESS & TELECOM PROFESSIONALS!

SUPER from page 107

Oki Semiconductor, Inc. announced the opening of its first design automation center in the U.S. The new design center is reducing turnaround time and costs.

■

The U.S. Bankruptcy Court has set April 11 for a confirmation hearing on the plan of reorganization filed by Threshold Technology, Inc., which has been operating under Chapter 11 since November 1982. The plan of reorganization includes an agreement with Siemens Capital Corp. for settlement of its claims, which represent 72% of Threshold's pre-Chapter 11 debt. Pending confirmation of the plan, company officials said that Threshold will seek funds from private and public sources.

Unidata Systems, Inc. announced that, effective March 9, Unidata will change its corporate name to Systems Assurance Corp. The company's Nasdaq trading symbol (formerly Udat) will become Syss.

■

Exeter Corp. announced an agreement to open a plant for the design, development, manufacture and marketing of computer peripherals in Coolock, Ireland, this fall.

■

Siemax Corp. announced the formation of Pedalogic, its new corporate data processing training division. Pedalogic will offer major corporations a full range of individually designed programmer, analyst and management courses.

■

Computer Consoles, Inc. (CCI) announced a distribution agreement with Standard Telephones & Cables Ltd. for CCI's office automation systems. The agreement is for $6 million over the next 18 months. Total value of the agreement, pending all options over a four-year period, is in excess of $63 million.

■

Storage Technology Corp. has chosen Storagetek as its new trademark, which will gradually replace STC. The company name, however, will not change.

■

Universal Supply, Inc. announced confirmation of its Chapter 11 plan of reorganization on March 1. The Canadian Commercial Bank agreed to provide the company with a new line of credit, enabling the company to resume normal operations. The new board of directors includes William M. Crilly, president; Douglas J. Lehrmann, vice-president of finance and administration; James M. Allen; Roy Queen of General Instrument Corp.; an unannounced representative of Canadian Commercial Bank; and a sixth board position to be shared by Paul C. Jain, vice-president of market and product development, and Arvind B. Patel, the original founder of the company.

■

Tymshare, Inc. has combined its Transaction Services Division and Telecheck Services, Inc. Division to form the Tymshare Payment Services (PMTS) organization. Jeffrey Baer, previously manager of Telecheck, has become a Tymshare vice-president and general manager of PMTS.

DEC from page 97

Those restrictions, effective Feb. 29, resulted in the renewal of DEC's bulk export license for only two months, rather than two years, and the requirement that DEC obtain individual export licenses before shipping computer equipment to the three named European nations.

A Commerce Department spokesman declined comment on the case, noting that "all information regarding a company and the Export Act is considered confidential."

DEC reportedly is the only company currently operating under the restrictions, although industry observers noted that several major companies are due for license renewals in the coming months.

DEC spokesman Richard Berube said that the Commerce Department may have taken its action because the November seizure of VAX-11 equipment in West Germany and Sweden occurred while the government was — and still is — considering tighter high-tech export controls.

The equipment confiscated in Europe included a VAX-11/782 dual processor that the government considers valuable for military applications and allegedly was intended for shipment to the Soviet Union. The equipment was returned to the U.S. and was impounded by the U.S. Customs Service.

The restrictions, according to Berube, also call for DEC to provide the government with details about all of its overseas customers for the VAX-11 family, including information about how those customers plan to use the equipment.

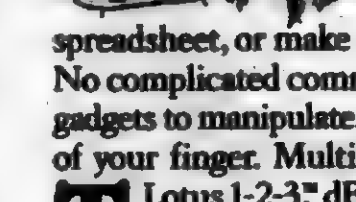
Berube said there is no reason to believe the restrictions will affect the company's earnings, and that, while the Commerce Department has sent some license applications back to DEC for further information, no licenses have been denied. He said the license process has taken about a week.

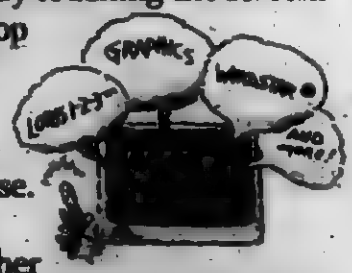
The company reportedly was surprised by the Commerce Department's actions because DEC had cooperated with federal agents in the November seizures. Published reports have suggested that the Commerce Department may have used against DEC some of the information the company had provided the department during the firm's cooperative efforts.

But Berube noted, "We want to continue to cooperate with Commerce because better export controls are in everyone's best interest."

Is your office operating at a crawl...

Maybe the one thing you need to get off the ground is the Touchscreen Personal Computer. The HEWLETT-PACKARD 150. Because it's no ordinary machine. Remember the first time you approached a personal computer? If it wasn't exactly love at first sight, it was probably because a lot of machines can be pretty intimidating. Especially for first-time users. We've made the Touchscreen Personal Computer so easy to use that people like to use it. Very simply, we've taken out the intimidation factor. We've made the new Touchscreen Personal Computer so easy to operate that even first-time users can use it. Which means they'll quickly grow to love it. For example, to select the software you want to use, just touch the screen. So whether you want to work with words, numbers or graphics, all you have to do to get started, is touch the screen. And once you get going, you can change a number in a spreadsheet, or make a chart for a presentation just by touching the screen. No complicated commands to remember. No desktop gadgets to manipulate. All that's required is the touch of your finger. MultiPlan,™ Graphics, WordStar,® Lotus 1-2-3,™ dBase II,™ VisiCalc® and a world of popular software become easier than ever to use.





The Touchscreen Personal Computer not only communicates with people. It communicates with other computers, too. Your people are your most valuable asset. But the more information they have at their fingertips, the more valuable they become. The Touchscreen Personal Computer delivers again.

Automatix report falsified

BILLERICA, Mass. — Automatix, Inc. said recently it dismissed an employee in its Paris office after auditors discovered a falsified purchase order and that related changes in accounting practices are expected to require a restating of 1983 quarterly reports and result in a loss for the year.

The company, a manufacturer of robotic systems, said its outside accountants, Price Waterhouse & Co., discovered the falsified purchase order during an audit of Automatix's 1983 results. The Paris employee, a manager, reportedly mistakenly booked an order that was actually a trial order and when asked to submit documents for the audit, decided to try and falsify a report.

While only one falsified purchase order was discovered, Price Waterhouse advised the company to alter its policy of revenue recognition by which sales are recorded.

"The company therefore expects that, to the extent that 1983 revenues are in fact reduced, in significant part the same transactions should be reflected as additional company revenues in 1984," a company spokesman said.

The company reportedly generated $2 million in sales activity during 1983, and the falsified report covered an amount of $120,000.

STRATEGY from page 97

than software vendors, and its strategy is aggressive pricing of high-functionality boxes.

Using a mixture of Personal Computer XT, 3270 Personal Computer, Personal Computer XT/370, portable computers and PCjr products, Big Blue is attempting to saturate the professional, administrative, scientific, production, data processing and secretarial work places, he claimed.

"IBM wants to wrap up the corporate account from the professional's office through the engineering center to the secretarial workplace, and today's product line is only the tip of the iceberg as far as IBM's technology is concerned," he said.

Smith predicted that Big Blue will introduce more proprietary technology into its workstation products. Its objective, he claimed, is to maintain control over access to the user's host computer and to use proprietary software and/or semiconductor devices for special functions.

Looking at possible future products from IBM, Smith forecast the emergence of a more sophisticated XT/370 workstation containing 0.4 million instructions per second and costing between $40,000 and $60,000.

"It will house IBM chips and in essence will be the 370 architecture on a desktop," he predicted.

Smith said he also expects to see the introduction of an intelligent secretarial workstation from IBM. Such a product, he contended, is immensely important to Big Blue's future office systems strategy.

The analyst also predicted that IBM will implement an "umbrella" software strategy to integrate diverse products and maintain compatibility with its existing PC-DOS base.

This, he maintained, will ensure a stable development environment for software vendors. "Unix is one of several operating systems that IBM will offer in an attempt to bridge users to its new type of 370 architecture," Smith claimed. However, "PC-DOS and VM are more strategic than Unix right now. It will be the 370 and its future derivates that are going to form the guts of IBM's workstation strategy."

Another speaker, Burton Grad, president of Burton Grad Associates, Inc., an Elmsford, N.Y.-based consulting firm, placed more emphasis on the importance of Unix to IBM.

The Bell Laboratories operating system, he asserted, offers a mechanism for providing a coherent strategy covering IBM's broad product lines.

"One possible scenario is that IBM will develop a coherent set of Unix systems covering everything from the Series/1 machine up through the 4300 range that would enable users to write applications as if these different systems really did talk to each other," Grad suggested.

Unfortunately, he added, it is too early for software service vendors to place their bets, and he advised them to sit tight and await IBM's announcements before committing to a particular course of action.

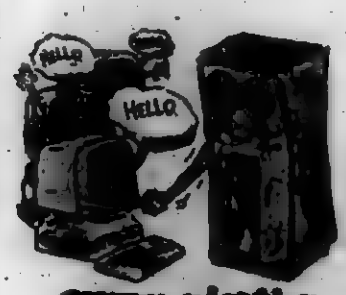
IBM from page 97

expected product is so late. He replied, "I suppose anything announced by IBM is either announced or a mystery. We were 'late' with the [Personal Computer] for many years, and nobody is talking about that."

Another interesting comment about local-area networks came from Entry Systems President Phillip D. Estridge, who said the Personal Computer cluster products are good communications devices, but, "We think it's not a [local-area network]. You'll find, however, that it's a lot of what you thought a [local-area network] was."

The comments by the IBM chiefs might be interpreted to mean that IBM's local-area network is going to be one expensive product for businesses to justify as an investment and that maybe a lot of people will be told they can do things a lot cheaper with the cluster products.

when it could be flying?



communication

The HP 150 is fully compatible with the big HP 3000 computers and, with the addition of our new 3278 communications capability, the 150 can talk to IBM® mainframes as well. Your people can call up data, work with it and send it back to the host computer. All this with the use of the keyboard. The HP 150 can also send electronic mail and operate a range of peripherals at workstations. Needless to say, this can really move things along. The Touchscreen Personal Computer is a Hewlett-Packard product. This, after all, could be the most important thing you need to know about it. Your professional reputation depends on the key decisions you make. Office automation is one of those decisions. You need to know and trust the company you go with. Hewlett-Packard's long-standing reputation for excellence is a given in the industry. And our service and support will make sure you aren't standing still when you should be flying. See the HP 150 at your local dealer or for information call (800) FOR-HPPC today. Find out how a personal computer with a sense of touch makes a lot of sense for your office.

TRUST

HP-150 as a Client:	
User Memory:	256K-640K bytes
Operating System:	MS-DOS 2.0
Microprocessor:	16-bit, 8088, 8MHz
Permanent Memory:	(ROM) 160K bytes
Diagnostics:	Powerup self testing
Display Screen:	Touch-sensitive, green phosphor; 80 characters x 27 lines; 9 x 14 character matrix; Upper and lower case; Simultaneous text and graphics capability; 500 x 512h graphics resolution; 1024 characters and symbols in ROM
Keyboard:	357 keys; 8-ft. cord attaches to system unit; 10-key numeric pad; 12 function keys (8 screen labeled)
Computer Size:	2.1 cu. ft. desk space
Communications:	2 RS-232 ports (Built-in) 19.2K (IEEE-488) (Built-in) IBM 3278 (SDLC, BSC); Up to 19,200 bits per second
Peripherals:	Choice of printers (including optional internal printer), plotters, 3.5" and 5¼" floppy drives (264KB formatted), Winchester hard discs (5 and 15 MB)
Suggested Retail Price:	$3,595.00

MultiPlan is a trademark of MicroSoft Inc. WordStar is a U.S. registered trademark of MicroPro. Lotus 1-2-3 is a trademark of Lotus Development Corp. Sidekick II is a trademark of Ashton-Tate. VisiCalc is a U.S. registered trademark of VisiCorp. IBM is a registered trademark of International Business Machines Inc.

Setting you free.
Hewlett-Packard Personal Computers

HEWLETT PACKARD

POSITION ANNOUNCEMENTS

Join The Team That Created The Elegant NS16000

An elegant approach led to a very elegant solution — National's NS16000 microprocessor and its product family. The revolutionary top-down architecture delivers 32-bit power, and memory management capabilities on par with the latest mainframes. The upward-compatibility will accommodate a shift from 16- to 32-bit hardware. In essence, the NS16000 performs more like a computer than a chip, and we think that's a very elegant package.

A "Software-Intensive" Effort.

The NS16000 microprocessor is the spring-board for an entire family of products currently being developed at National's Microprocessor Systems Division. The key to their success lies in the development of software that enhances the NS16000 family's performance, applicability, and elegance. From development through marketing, our "software-intensive" effort is rapidly gaining momentum as we develop demand-paged UNIX™ systems based on Berkeley 4.1bsd and 4.2bsd for National's NS16032 and NS32032 microprocessors. We are also working with Bell Labs to define a version of SYSTEM V, . . . ,etc, for NS16032 and NS32032. These developments are creating opportunities for software professionals with UNIX and IBM PC™ experience to join us in the following areas:

Compiler Development

You will be involved in developing compiler code optimizers for "C", Pascal, FORTRAN, etc, to take advantage of the NS16000 elegant architecture. Your background should include two to five years' experience in compiler development; UNIX experience is desirable.

UNIX Kernel Development

You will work on porting Berkeley 4.2bsd to NS16032 and NS32032 based microcomputer systems (including a popular PC configuration with NS16032 and NS32032 add on boards). Two to five years' experience in UNIX kernel development is desired.

The Rewards Of Elegance.

The elegance and power of the NS16000 will become evident as more software is developed for it. And those who develop that software will reap the rewards, personally and professionally. That's definitely something to think about if you're ready to take on the challenge of our opportunities.

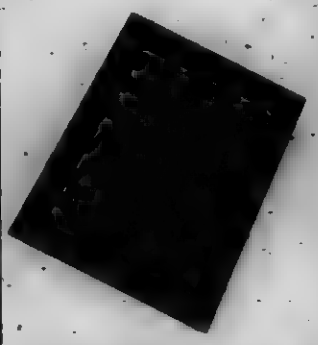
To learn more about National's Microprocessor Systems Division, send your resume to National Semiconductor, Dept. MS, P.O. Box 62499, Sunnyvale, CA 94088. We are an equal opportunity affirmative action employer. Principals only please.

NS16000

Elegance is everything.

[redacted] talk about your career

National Semiconductor



Yes, our track record is far better than most in the industry. No, we're not perfect; but our guarantee is:

"If, for whatever reasons within a specified time frame, you are not satisfied with a ROMAC® placement, we will honor our written guarantee."

We're that sure we can make the kind of placement for you that stays placed.

ROMAC®, the placement firm with a proven record of placement success in the data processing profession.

Meet with Success.

[redacted]

ROMAC.

[redacted]

CALIF. & UNIX®

Openings in a variety of areas and disciplines.

(714) 891-UNIX®

CPU COMPUTER PROFESSIONALS UNLIMITED, agency

[redacted]

®UNIX is a trademark of Bell Laboratories

Apply now for any of these 5,496 jobs paying $16,000 to $225,000

This special service is provided by CareerSystem free of charge and without obligation to applicants who feel they can qualify for the following positions with the companies listed below:

Data Processing: Programmers/Analysts/Operators (all levels); DOS; OS; IMS; TSO; MVS; MVT; IBM 3080; Senior Capacity Planner (EDP); Data Base Managers; Hardware/Software Development Engineers and Specialists; Data Communications Specialists and Engineers; Modem Design Engineers; PABX Switching Systems Designers; Multiplexor Design Engineers; Protocol Converter Design Engineers; Local Network Engineers; Product Engineers; Sales Engineers; Industrial Implementation Engineers; HVAC Design Engineers; Peripheral Systems Engineers; Digital Systems Design Engineers; Processor Microcode Specialists; Applications Software Consultants; Software Technical Writers; Electrical Engineers; Cryogenics; Optical Engineers; Aerospace Engineers; CMOS LSI Design Engineers; Mechanical Engineers; Propulsion Engineers; Tool Design Engineers; Materials Engineers; Component Engineers; LSI Bi-Polar Engineers; Quality Control/Reliability Engineers and Specialists; Diagnostics Specialists; Gear & Power Transmission Designers; Mechanical Designers; Accountants; Controllers; Group Actuaries; Compensation Specialists; Financial Analysts; Tax Analyst; Internal Auditors; Cost Accountants; Corporate Attorneys; Corporate Planners; Recruiters; Training and Development Specialists; Marketing Directors; Internal Designers; Architects; Design Analysts; Text Book Designers; Executive Editor; Senior Editors; Writer/Reporters; Retail Buyers; Assistant Buyers; Insurance Assistants; Individual Life Underwriters; A & H Underwriters and Claims Examiners; President/CEO; Administrative Assistants; College Grad Trainee; Design Automation Tool Specialists; Nozzle Design Specialists; Metallurgists; Electronics Technicians; Technicians. Sales Trainees; Sales Representatives; Sales Managers; Federal Marketing Specialist; Manufacturing Managers; Manufacturing Engineers; Management Interns; Store/Cashier Managers; Department/Area/Group Managers; Production Managers; Restaurant Managers; Product Marketing Managers; Hotel Resort: Director of Sales; Food & Beverage Director; Clinical Chemists; Certified Health Physicist; Office Managers; Publication Managers; Hotel Operations Managers; Construction Managers; CPU Managers; CAD/CAM; Logic Designers;

American Express / American National Insurance Co. / Alexander's / Auragen Systems Corp. / Data General Hartford Insurance Group / Nalco Chemical Co. / Microcurd Display Technology, Inc. / Canberra Industries, Inc. Harcourt Brace Jovanovich, Inc. / Florida Controls Corporation / Magic Chef, Inc. / Margate Resort / Marriott Corporation Perkin-Elmer Corp.-Optical Group / Pratt & Whitney / Thyssen-Bornemeszia, Inc. / Rockefeller Center Inc. Tandem Computers Inc. / TIE COMMUNICATIONS, INC. / Moore Systems, Inc. / UNC Resources / W. R. Grace & Co.

THE COMPANIES LISTED ABOVE now have 5,496 positions available for 1984, with salaries ranging from $16,000 to $225,000. Return this application, and the information you provide below will be matched by CareerSystem computers against the specifications outlined by the participating companies.

Details on all the positions that you match— plus a description of the companies offering the positions— will be mailed to you, so you can decide if you want to proceed with the interviews. Your application must be mailed to CareerSystem prior to May 21, 1984. All applicants will receive answers by return mail or telephone.

PLEASE PRINT CLEARLY IN THE SPACE PROVIDED FOR EACH ANSWER

NAME ..... ADDRESS .....

CITY ..... STATE ..... ZIP CODE ..... TELEPHONE (Include area code) .....

TO PROTECT YOUR PRIVACY, YOU DO NOT HAVE TO PROVIDE THE NAME OF YOUR CURRENT EMPLOYER, AND ONLY THE INFORMATION YOU PROVIDE BELOW WILL BE USED FOR COMPUTER-MATCHING. IF YOU DECIDE NOT TO ACCEPT THE POSITIONS THAT ARE OFFERED TO YOU, YOUR IDENTITY WILL NOT BE REVEALED.

ANNUAL SALARY: (YOU WILL BE MATCHED AGAINST JOBS PAYING THIS AMOUNT OR MORE PER YEAR) $ .....

RELOCATE: ☐ YES ☐ NO ☐ LOCATION PREFERENCES .....

EDUCATION: DEGREE(S) ..... YEAR(S) ..... MAJOR(S) ..... SCHOOL(S) .....

PRIMARY OCCUPATION: (For example, Finance, Engineering, etc.) ..... NUMBER OF YEARS .....

CURRENT JOB TITLE ..... CURRENT INDUSTRY .....

CURRENT JOB RESPONSIBILITIES .....

SPECIAL SKILLS: (For example, Foreign Language; CPA; FORTRAN; S.E.C., etc.) .....

GENERAL DESCRIPTION OF CURRENT EMPLOYER (For example, Major Manufacturer; Small Engineering Firm; etc.) .....

PREVIOUS EMPLOYER: (1) Company Name ..... DATE: (Month & Year) From ..... To .....

PREVIOUS JOB TITLE/RESPONSIBILITIES .....

PREVIOUS EMPLOYER: (2) Company Name ..... DATE: (Month & Year) From ..... To .....

PREVIOUS JOB TITLE/RESPONSIBILITIES .....

STATEMENT OF CAREER GOALS: .....

HOW SOON COULD YOU START A NEW POSITION? ☐ IMMEDIATELY ☐ 60 DAYS ☐ OTHER .....

I CERTIFY THAT THIS SUMMARY REPRESENTS MY PERSONAL EXPERIENCE AND INTEREST WB430

SIGNATURE ..... DATE .....

PERSONNEL RECRUITERS:
For details on how CareerSystem can help you fill your company's job requirements, just mail your business card to Mr. William E. Berry, or TELEPHONE: (305) 689-3337

Mail your application before May 21, 1984 to Mr. Dale H. Lewis, at:

CareerSystem

Corporate Service Division • Suite 602
1675 Palm Beach Lakes Blvd. • West Palm Beach, Florida 33401

© 1984 CAREERSYSTEM INC / A NATIONWIDE ELECTRONIC INFORMATION SUBSIDIARY OF GENERAL DATABASE TECHNOLOGY INC AND NOT AN EMPLOYMENT AGENCY

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

If you recognize quality as quickly as the KLA 2020, you're already reaching for your resume.

The KLA Model 2020 automatically completes macro test inspection of a wafer in about 5 seconds, and micro inspection in less than 1 second per field-of-view. That makes the 2020 a revolutionary process control tool for wafer printed VLSI circuits.

Despite its impact, the 2020 is simply the latest in a long line of exciting inspection equipment from KLA. We're the leader in automated image analysis, and listed by Inc. magazine as one of the fastest growing companies in the United States. Our employees also have an eye for quality — 80% of our original workers are still with us almost 8 years later. Consider these opportunities to join us.

Software Engineering Managers

Lead a group of 4-6 software engineers in developing software for our new automatic wafer inspection product. This system includes software for image processing and control based on 68000, our own bit slice and pipelined processors, and a multiprocessor control system. Requirements include a MS in EE/CS/Math and 6 years of software experience. Experience in Computervision/ image processing is preferred. Management experience is not necessary.

Software Engineers

You'll work on pattern recognition, automatic control, and algorithm development, using PASCAL, "C", microcode or assembly language for a variety of processors including 68000, 2900, 8031. Requirements include a BS in CS/EE/Math (MS preferred) and 2-4 years' software development background, high level language and assembler experience. Some hardware knowledge would be useful.

Applications Engineers

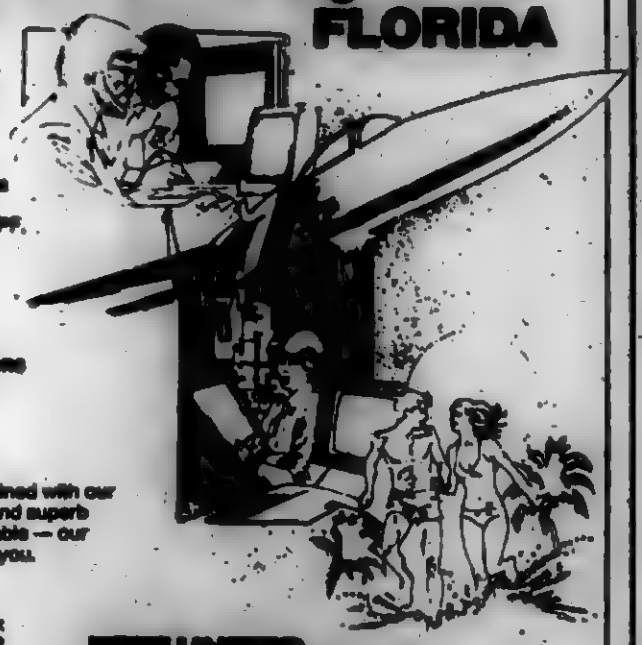
You'll join our new division, formed to develop a modular product line of pattern recognition and image processing systems. Your primary responsibility will be to apply image processing software techniques as well as provide technical support to customers, which involves developing and presenting proposals, performance specifications, cost estimates and schedules. You will also conceptualize, implement and demonstrate prototype designs, write and present technical papers, and support marketing and service documentation development. Requirements include a BS/MS in EE/CS/ Physics, and at least 4 years' experience as a process or manufacturing engineer in the semiconductor industry. You should be an aggressive, self-starting individual with an ability to understand and utilize various opto-mechanical components associated with image illumination and acquisition.

Take a look at KLA, the company with an eye for quality. We offer an excellent salary and benefits package that includes a company profit sharing and stock purchase plan. Please send your resume to: KLA Instruments Corporation, Attention: Terri Rose, 2051 Mission College Boulevard, Santa Clara, CA 95054. Or call, (408) 988-6100. We are an equal opportunity employer.

KLA
KLA Instruments Corporation

PROGRAMMER/ PROGRAMMER ANALYSTS

It's time to migrate to **FLORIDA**



PRATT & WHITNEY is seeking individuals with a Degree in Computer Science or related area and 2-5 years experience with COBOL, IBM JCL, MVS, TSO, SPF, IMS DB/DC on large IBM main frames in the following areas:

- Business Applications
- Data Center Applications
- Operations Analysis
- IMS Data Base
- Systems Programming

The opportunities we offer combined with our excellent South Florida climate and superb recreational facilities are unbeatable — our employees love it here — so will you.

Please send your resume to Professional Placement, P.O. Box 2691, West Palm Beach, FL 33402.

UNITED TECHNOLOGIES PRATT & WHITNEY

An Equal Opportunity Employer M/F

FACULTY POSITION

Lecturer in MIS (position number 204-10) for 1984-85 Academic Year. To teach DBMS, data communications, programming, systems analysis or small business systems. Ph.D. preferred, Master's plus experience considered. Resume and letter of application to: Dr. William L. Dull, Jr., Associate Dean, School of Business, University of Northern Colorado, Greeley, CO 80639. Application deadline: April 15, 1984. AA/EO Employer.

RESUMES

All Writing Needs

- Effective, professional
- For today's job seeker
- Free cover letter package
- Fast, reliable, confidential
- Creative & editorial services

FORD/YOUNG ENTERPRISES
P.O. Box 157
Villa Park, IL 60181
(312) 530-8818

CICS SYSTEMS PROGRAMMER

HAMMERMILL PAPER COMPANY, a leading producer of paper and allied products, has an immediate opportunity in its Erie Corporate Headquarters.

The successful candidate will have 3 - 5 years systems programming experience in an OS environment with a thorough knowledge of CICS implementation, internals, problem determination and resolution. Exposure to IMS, SMS, and on-line accounting monitors very helpful.

The incumbent would become a member of an expanding technical services department and would be coordinating the planning, installation, maintenance, tuning and support of a CICS environment.

Our current MIS environment consists of IBM 3033/3081 multi-CPU, shared DASD, VM/MVS operation with SMS, CICS, and OS/VS1. In addition, technical services supports Information Center products, i.e., FOCUS, ADRS, SAS, etc.

Our up-to-date facilities and equipment offer a stimulating work environment and an opportunity for career growth. If you are a qualified professional seeking a career change for the better and wish to participate in a superb internal working environment, you are invited to submit your credentials, including salary history and requirements, in strict confidence to: Mr. J. Michael Stephens, Manager, Corporate Staffing & Development/HAMMERMILL PAPER COMPANY/ P.O. Box 1660/Erie, PA 16533.

Hammermill Paper Company
Erie, Pennsylvania 16533

An Equal Opportunity Employer

SENIOR PROGRAMMER/ANALYST

Progressive medium sized manufacturing company has an immediate opening in information services department for a senior level programmer/analyst to design, develop and maintain systems necessary to support all business functions within the company.

Minimum 3 years heavy experience in COBOL in an on-line data base environment with specific experience in financial and/or manufacturing applications.

Prefer 4 year degree with major in computer science. IDMS/DC experience desired but not required. Salary DOE. Call or send resume to:

Dallas Industrial
P.O. Box 3128
Richland, TX 76053
(817) 589-6481

DATA BASE

CT. corp. expanding DB dept! Exp. w/data modeling, data arch, w/exposure to IMS, IDMS, or TOTAL. Sr. staff pos. leading to mgmt. To $40,000.

ROBERT HALF OF HARTFORD, INC.

111 Pearl St.
Hartford, CT 01606
(203) 278-7170
Personnel Consultants

JOIN US IN VERMONT NORDICA USA, INC.

has a unique opportunity available for an experienced

SENIOR PROGRAMMER/ANALYST

to join our staff at U.S. headquarters in Essex Junction, Vermont. We presently utilize DEC PDP-11 computers running RT-11/TSX operating systems using DIBOL/DBL. The ideal candidate will possess 3-5 years experience in analysis and programming in a structured data processing environment using an established systems design methodology and have a record of job success. Experience in Distribution and Financial applications a MUST. B.S. in Computer Science or equivalent experience required. Familiarity with MCBA software packages strongly desired.

Qualified individuals should submit resume, including salary requirements to:

NORDICA USA, INC.
Attention: John Fesshauer, D.P. Manager
6 Thompson Drive
Essex Junction, Vt. 05452

NO TELEPHONE CALLS, PLEASE

"Whatever It Takes."

Brian Bish began working for Cincom Systems in 1977 as a programmer. Initiative and sound thinking have served Brian well. Today he is a Cincom Technical Service Center Manager and an authority on the support and service of leading edge software products. From a recent interview here are Brian's thoughts on support, software and a career with Cincom Systems.

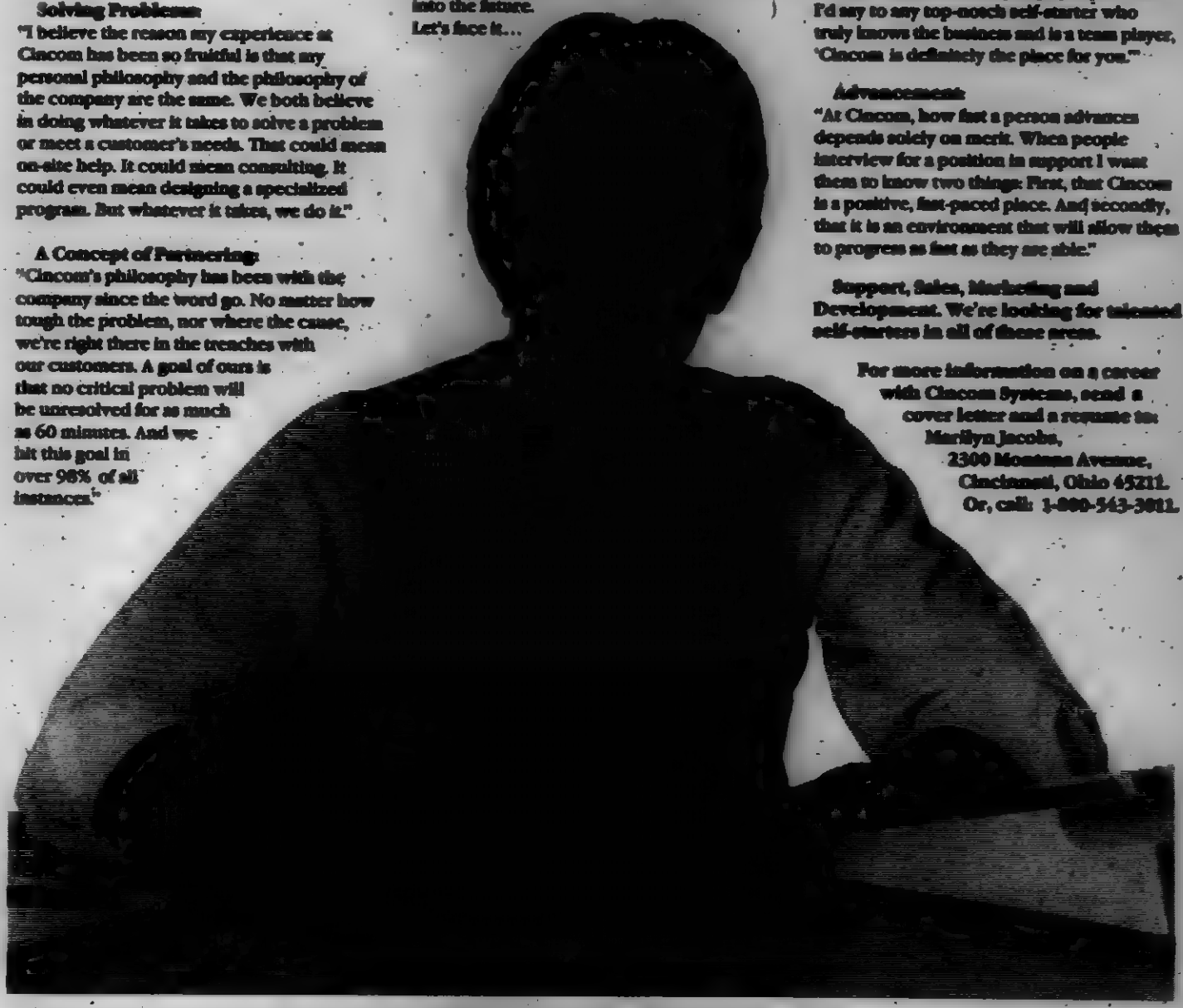
The Role Of Service And Support:
"Bottom line, the role of service and support is to help Cincom's customers become more successful. As our customers become more successful, Cincom becomes more successful."

Solving Problems:
"I believe the reason my experience at Cincom has been so fruitful is that my personal philosophy and the philosophy of the company are the same. We both believe in doing whatever it takes to solve a problem or meet a customer's needs. That could mean on-site help. It could mean consulting. It could even mean designing a specialized program. But whatever it takes, we do it."

A Concept of Partnering:
"Cincom's philosophy has been with the company since the word go. No matter how tough the problem, nor where the cause, we're right there in the trenches with our customers. A goal of ours is that no critical problem will be unresolved for as much as 60 minutes. And we hit this goal in over 98% of all instances."

Leading Edge Technologies:
"Support people are like anyone else in the computer business; they thrive on challenge and they want to work with the leading technology. TS/®, ULTRA™, MANTIS™, MRP5™, MANAGE USER SERIES™, PC CONTACT™...these are some of the newest and most advanced systems in the software industry. And these are the products our people are working with everyday. By working with challenging, leading edge products, people develop a strong personal commitment to leadership and to quality."

Excellence in Software Technology:
"To me, excellence in software means having the sense to look beyond the present and into the future.
Let's face it...



the computer business is changing as fast as any business ever has. Anticipating a customer's needs takes vision. In my opinion, no one else comes close to Cincom's vision. That's why we are producing the truly excellent software technologies in our field."

People:
"I don't know about other software vendors, but at Cincom some of the most talented people in the company work in support. They have to. We deal with Fortune 500 companies who are striving to advance the state-of-the-art. Often we work directly with the top DP person within the company. So, our people have to be of the same top-notch caliber to be effective. Leading edge companies need leading edge people. And, I'd say to any top-notch self-starter who truly knows the business and is a team player, 'Cincom is definitely the place for you.'"

Advancement:
"At Cincom, how fast a person advances depends solely on merit. When people interview for a position in support I want them to know two things: First, that Cincom is a positive, fast-paced place. And secondly, that it is an environment that will allow them to progress as fast as they are able."

Support, Sales, Marketing and Development. We're looking for talented self-starters in all of these areas.

For more information on a career with Cincom Systems, send a cover letter and a resume to: Marilyn Jacobs, 2300 Montana Avenue, Cincinnati, Ohio 45211. Or, call: 1-800-543-3011.

An Equal Opportunity Employer

Cincom Systems

Excellence in Software Technology.

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

What do CAD/CAM GRAPHICS PASCAL Professional Computers Networking and MDSI Have in Common?

YOUR FUTURE

MANUFACTURING DATA SYSTEMS INCORPORATED

Schlumberger

We are an international data processing software, research, development and consulting firm with 72 branches worldwide.

Four of our rapidly expanding branches are looking for more of the finest, most dedicated and imaginative people they can find. If you have the ability to become one of the leaders in your field, call or send your resume today.

THE SEARCH GOES ON

Jacksonville
IMS DB/DC
CICS
IDMS
IDSII
BURROUGHS
DEC VAX
TANDEM

[illegible]
6821 Southpoint Drive N.
Suite 221
Jacksonville, FL 32216
904/739-2722

Houston
PL1 IMS DB or DC
NCR Criterion
HP 3000 Systems Programmer
IDMS ADSO

Steve B. Coffman
8330 Katy Freeway
Suite 211
Houston, TX 77024
713/468-8677

Baltimore
CICS
IMS DB/DC
CAD/CAM
IDMS
PCS Patient Care System
IBM SYS 38

Robert Milner
9160 Red Branch Road
Suite E-1
Columbia, MD 21045
301/730-2002

New York
IDMS
ADSO
CICS
IMS DB/DC
MVS Systems Programmer
NOMAD
RAMIS

Pam Hite
1133 Avenue of the Americas
Suite 3122
New York, NY 10036
212/221-7270

CAP GEMINI DASD
PEOPLE/PRODUCTS/RESULTS

Data Processing

HOME BANKING VIDEO TEX/ATM

Programmers Systems Analysts

Gesco is a major computer service and software development company servicing the financial industry. In the past 5 years, we have grown 5 times in size and we project a similar growth over the next 5 years.

Gesco is currently implementing a major EFT system using ACI's SOFTWARE to include bill payment, electronic mail, information display and financial transactions. The EFT hardware is a TANDEM based (non-stop ID system with microcomputers being used as the remote access client terminal.

Currently we are seeking SYSTEMS ANALYSTS with a minimum of 3 years experience including large systems feasibility studies and the development of detailed logical and physical system design. Experience in project leadership and utilization of a System Development Methodology highly desirable.

AND we are now seeking PROGRAMMER ANALYSTS with a minimum of 2 years TANDEM experience using TAL, ENSCRIBE and PATHWAY. Additionally, you should have DATA COM experience with SDLC and BiSync protocols. Experience with ATM large IBM mainframes and project management is a strong plus.

Fresno is just three hours away from the San Francisco Bay area and offers an outstanding educational system, climate and AFFORDABLE housing and relocation. We offer a competitive salary and benefits package.

TO BECOME A MEMBER OF OUR HOME BANKING/ VIDEO TEX PROJECT TEAM, immediately contact:

A.J. Newberne

Outside California call: (209) 224-6373
Inside California call: 1-800-221-3368

gesco corporation

DATA PROCESSING OPPORTUNITIES

Continued company expansion requires the addition of new professionals to our Data Processing Department. We're looking for people attracted to a dynamic manufacturing environment. Current system is IBM 3083-E16.

MANUFACTURING PROGRAMMER/ANALYST
Job #PLC-389

Responsible for analysis, design and programming of company manufacturing systems. Requires 2 years experience in MRP, MPS and inventory control applications. Knowledge of VSAM, CICS, COBOL or ASSEMBLER, DOS/VSE preferred.

APPLICATION PROGRAMMER/ANALYST
Job #PLC-388

To replace a transfer to our new Computer Services group, this position is involved with varied applications. Performs analysis, design and programming activities. Requires 2 years IBM experience with COBOL, CICS, VSAM.

Consider what Valmont offers:

GROWTH...new challenges, business opportunities lie ahead. Valmont is a company engaged in industries as diverse as transmission structures to computer services. Our 1983 sales were 194MM. We're a Fortune 1000 company and world's leading manufacturer of center pivot irrigation equipment but also produce and market lighting standards, transmission structures, tubing, financial services, insurance products, and a newly formed computer services business.

COMPETITIVE COMPENSATION..."comprehensive" best describes our package which includes employee savings program, insurance (medical, life and dental), retirement, educational reimbursement, internal job bid, paid holidays and vacation, modern cafeteria, plus relocation assistance. We recognize and reward our employee's contributions through a supportive performance appraisal and salary review program.

MODERN FACILITIES...exceptionally comfortable, quiet and modern surroundings designed to maximize productivity.

VARIED APPLICATION...manufacturing, marketing, accounting, finance, human resources, engineering, insurance, to name a few. Opportunity to develop many skills in varied applications.

If you're interested in pursuing a career with a rapidly expanding and diversified company, we invite you to take the next step. Write or submit your resume with salary requirements to: Vanessa Brown (Please refer to Job #)

VALMONT INDUSTRIES, INC.
Highway 275
Valley, NE 68064
(Just 15 miles west of Omaha)
An Equal Opportunity/Affirmative Action Employer

VALMONT

Data Processing

NORTHROP ADVANCED SYSTEMS DIVISION...

THE FUTURISTS

(Southern California)

The futurists of Northrop's Advanced Systems Division in Southern California are directing their computer skills beyond the present and into the next century of aerospace. If you've got the ability and desire to glimpse the future in your discipline, you can participate side by side with the finest minds in the aircraft industry within our newest facility in Pico Rivera. Examine the opportunities listed below and join the futurists.

Network Communications

Need individuals with experience in maintenance and installation of computer hardware in a large IBM environment. Assignments involve troubleshooting problem hardware, designing hardware networks, assessment of comprehensive plans for installation of computer hardware and actual installation of various types of standard and graphic devices and minicomputers for business and scientific applications. Knowledge of ASYNC, BISYNC and SNA/SDLC protocols is expected.

Capacity Planners

Performance and tuning systems programmers with experience in tuning I. O. configurations job mix with heavy MVS. Familiarity with reporting techniques, graphical representation and SAS, as well as performance experience with Omegamon, SMF and RMF is required.

IMS Systems Programmers

Must have thorough knowledge of the IBM installation procedures for program products and other software that relates to IMS. Knowledge of ACB, PCB and complete SYSGEN process is required. Successful candidates will provide assistance to programming personnel related to procedures and policies of IMS.

Network Design Specialists

Must be experienced in design and analysis of 3705 FEP, and 3274 CU's in various configurations using SNA in a large IBM environment running JES 2 VTAM/TCAM. A working knowledge of ASYNC, BISYNC and SDLC diagnostic equipment in extensive on-going data testing and hardware feasibility studies.

Sr. ILS Systems Analysts (Scientific)

Must be capable of developing information systems requirements as well as estimating and documenting scientific oriented computer applications. Requires experience with a variety of modeling applications such as: maintenance data, maintainability, reliability, availability, cycle cost, etc. Must have 5 or more years recent military aerospace experience in one or more of the above. A BS/MS degree is preferred.

Data Base Analysts/Designers

Several new positions are available including Data Base Design, MP and BMP processing support, DB, traditional IMS and newer relational, DB, products, IBM Data Dictionary automation and support, IMS Control Block (DBD, PSB, ACB) Generation. Other opportunities include the responsibility of evaluating DBMS related software, develop recommendations for advanced technical processing to upper management, as well as provide assistance to End Users, Requirements Planners, Systems and Programming Analysis and other DP duties. Experience in IMS Data Base Administration and/or design with a background in IMS on-line and/or Batch Message Processing required.

Data Processing Equipment Configuration Specialists

Your responsibilities will include equipment evaluation, acquisition recommendations, configuration design, installation planning, terminal and control unit installations, site facilities planning, and equipment and facilities inventory tracking.

Computer Systems Technical Writer

Will develop documentation required for the development and implementation of business and scientific systems and models. Will ensure that all documentation is of high quality, meets commercial/military standards, reflects actual procedures/practices and is completed on schedule. Must have excellent oral and written communication skills. A BS/BA degree preferred. Previous ILS aerospace experience a plus.

Business Systems Programmers/Analysts

Will analyze and formulate system design solutions by coordinating with analysts and user personnel. IBM hardware must have IMS experience with emphasis in IMS DB/DC, COBOL, and other related software, ILS and Mark V experience a plus.

Responsibilities include designing, coding, testing, and implementing interactive business systems. Will work closely with requirements planners and system users. Requires a working knowledge of IMS, DB/DC, COBOL, and system design disciplines. Experience with Engineering and/or Manufacturing systems, and programming development productivity aids are a plus.

Systems Analysts

Will assist users of data processing systems and services (i.e. engineering, manufacturing, finance) in establishing and planning for systems requirements and in converting to the use of data processing systems. You will work closely with users in developing objectives for improving systems and in identifying potential of computers for resolving problems or meeting objectives as well as perform liaison between user and data processing organization during systems development and installation. You will assist in training of user personnel in system procedures.

Qualified applicants should have analytical and systems design experience (preferably in an aerospace environment) in one or more of the following areas:

Engineering

- Modeling and simulation, finite element analysis using NASTRAN for avionics and structures.
- On-line systems for administration (drawing/change control, specifications, structures).
- Computer Aided Design and lofting (CAD/CAM) for interactive graphics.

Manufacturing

- Manufacturing Engineering — Manufacturing Engineering applications, tooling, production planning.
- Industrial Engineering — Major instances, computation and data manipulation. MIL-STD 1567 & 1528
- Operations Control — Labor and tracking data collection, shop floor control, inventory management, automated warehouse, capacity planning, scheduling.
- Materiel — Materiel control procurement and materiel accounting.
- Facilities and Transportation — Request tracking, inventory, vehicle dispatch and tracking, equipment maintenance.

Finance

- Cash Management and Accounting — Payroll, general ledger, budgets and accounts payable
- Controller — Manufacturing technology as applied to controller, IMS, TSO and FORTRAN applications/development.

Selected candidates will receive excellent salaries and a wide variety of benefits. Please send your resume and salary history to:

Dave Coffey • Employment Office • Dept. 935
P.O. Box 1138 • Pico Rivera, CA 90660-0977

U.S. CITIZENSHIP REQUIRED • Equal Opportunity Employer M/F/H

NORTHROP

Making Advanced Technology Work --

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

EDP Professionals

Middle South Services has one of the South's largest data processing centers serving one of the nation's largest power systems. Middle South Utilities, our parent company, is a major electric utility. Our hardware environment includes two IBM 3081s, and IBM 4341 and Tandem mini 16s. If you are a career-minded EDP professional, we have the following opportunities available:

(MVS) SYSTEMS PROGRAMMER We currently have an opening for a Systems Programmer with 2+ years experience in MVS operating systems. You will install, monitor, help problem solve, tune and assist in the installation of MVS/XA systems migration.

ANALYST/PROGRAMMERS (APPLICATIONS) Several positions are currently open for experienced IMS DB/DC Analyst Programmers. Experience with COBOL or PL-1 in plant maintenance or business applications is needed.

PLANNING ANALYST Will possess broad knowledge of new systems, hardware and software capabilities, applications development and analysis, and equipment evaluation technique. Requires understanding of computer cost studies, equipment configurations and timing out of systems. Experience in capacity planning or corporate utilization of personal computers is a plus. Additional assignments possible in areas of capacity planning, risk analysis, contingency or long range planning.

ANALYST PROGRAMMER You will use your 3 years of data processing experience along with your experience on the IBM Personal Computer to take on the responsibility of supporting our corporate PC objectives. You will assist and train the PC users, you will do hardware and software justification, configuration planning, installation, and problem diagnosis. This position requires good working knowledge of the IBM Personal Computer along with 3 years programming experience.

REAL-TIME SYSTEMS ASSOCIATE ANALYST Requires a minimum of 3 years of real-time computer system experience preferably in the electric utility industry with emphasis on power system operations and computer system operating systems. A thorough knowledge of design and programming methodology with experience on large real-time computer systems is desirable. Requires BS in Computer Science, Math or Electrical Engineering or the equivalent. Additionally, experience in computer applications as applied to system software and data base management programs is required.

Due to our size and scope of operation, we offer access for advancement, career stability and an excellent salary with major benefits. For more information, call our number below or to apply directly, send your confidential resume to Byron Heath or Richard Jackson, MIDDLE SOUTH SERVICES, INC., P.O. BOX 61000, NEW ORLEANS, LA 70161.

1-800-231-4481
In Louisiana, call collect (504) 569-4060.

MIDDLE SOUTH SERVICES INC.
An Equal Opportunity Employer M/F

GENERAL EMPLOYMENT ENTERPRISES, INC.

Data Processing Divisions

A network of Professionals To Service your Local or Relocation Career Desires.

SENIOR SOFTWARE ENGINEER
$40,000-$55,000
Be involved in sophisticated operating systems enhancements! Proficiency at UNIX/KERNEL level needed plus experience in 16/32 micros. Staff management is just a step away!

PROJECT LEADER QUALITY ASSURANCE
$35,000-$40,000
Have a lead in software development! Capitalize on your ADA, "C" and PASCAL on a VAX 750, 780. Be involved in database design, and simulation to process data for statistic analysis.

SOFTWARE ENGINEER FOR PROJECT MANAGEMENT
$30,000-$40,000
Top opportunity in the design and development of software for automatic test equipment. Capitalize on your VAX/VMS 730 - 780-05 internals. Develop software in PASCAL and ASSEMBLER.

SENIOR CLIENT FIELD REPRESENTATIVE
$35,000-$38,000
Variety plus opportunity for the person familiar with COBOL and IBM mainframes! Be the corporate troubleshooter involved with analysis and applications! There's project leader potential just around the corner!

NETWORK ANALYST COMMUNICATIONS DIVISION
$32,000-$38,000
Corporate liaison for implementation of X.25 networks. Deal with client management. Be in charge of orientation for users and support personnel. Ideal for the person who likes action!

A LEARNING EXPERIENCE SYSTEMS PROGRAMMER
$25,000-$40,000
There's a wealth of opportunity to learn a variety of IBM software! Build your expanding career horizon on your IMS DB/DC or your CICS! Management is here.

FINANCIAL SPECIALIST HOGAN PROGRAMMER
$28,000-$40,000
Be right in the middle of "Hands on" activity! Be involved with installation and modification of a HOGAN software package. Be in line to move to programmer analyst! Exposure to IBM 3033 OS/MVS with IMS ideal!

DATA COMMUNICATIONS MANAGER
$30,000-$40,000
Provide direct managerial support involving the design, installation of data communications equipment. Knowledge in banking area and electronics systems are good background!

MIS SUPPORT TO PROGRAMMING DIRECTOR
$30,000-$40,000
Large mainframe background coupled with management skills are the keys! Get involved in a systems environment in a manufacturing atmosphere! Rapid advancement for the "take charge" individual on the move.

FINANCIAL SYSTEMS SPECIALIST
$30,000-$35,000
An elite spot with the corporate manager of financial systems analysis. Be in on the design, implementation and installation of new systems. Use E.I.S., JDL, RAMIS and SAS languages.

V.P. OF SOFTWARE CORPORATE INNER CIRCLE
$70,000-$100,000
Ideal for the individual with multi faceted exposure on their rise through the ranks in data processing! Your current strong position in top management in MIS is an excellent qualifier.

MVS SYSTEMS PROGRAMMING
$30,000-$35,000
Five releasing opportunities that will broaden your career horizons! Move in as technical support and be in charge of the MVS systems! Take the step!

"THINK TANK" RESEARCH/DEVELOPMENT
$30,000-$35,000
Be a part of the corporate research team. Capitalize on your PLI and PASCAL real time! Be involved with total development of telecommunication applications. Key management here.

COMPUTER SCIENTIST
$30,000-$40,000
A unique opportunity for the creative thinker with DEC RSX/1TM hardware! Be involved in computer simulation and video graphics development for telecommunications! Major languages FORTRAN and MACRO! A management plum!

FAR WEST

Phoenix, AZ 85012
3443 N. Central Ave
602/265-7900

Huntington Beach, CA 92648
2130 Main Street
714/960-2431

Los Angeles, CA 90010
3699 Wilshire Blvd
213/386-4630

Palo Alto, CA 94303
2471 E. Bayshore Rd
415/494-3441

San Francisco, CA 94111
444 Market Street
415/981-6440

San Francisco, CA 94105
One Market Plaza
415/495-0511

Woodland Hills, CA 91367
5630 Variel
818/704-4600

San Jose, CA 95128
1950 The Alameda
408/288-8780

Woodland Hills, CA 91367
5630 Variel
213/703-6016

CENTRAL AND MIDDLE WEST

Columbus, OH 43215
88 E. Broad St.
614/228-5192

Indianapolis, IN 46204
5 E. Market St.
317/636-2261

Chicago, IL 60606
150 S. Wacker Dr. Ste 600
312/346-7001

St. Louis, MO 63101
720 Olive Street
314/231-7400

Naperville, IL 60540
350 W. Shuman Blvd
312/357-8005

Chicago, IL 60606
150 S. Wacker Dr. Ste 512
312/782-1924

Louisville, KY 40207
Executive Park #616
502/897-5347

Detroit, MI 48226
1200 Sixth St.
313/963-8470

Chicago, IL 60606
150 S. Wacker Dr. Ste 775
312/782-6062

Independence, OH 44131
6100 Rockside Woods Blvd
216/524-4444

Arlington Heights, IL 60005
85 W. Algonquin Rd
312/364-9450

NORTHEAST

Boston, MA 02116
545 Boylston St
617/267-9119

Philadelphia, PA 19103
8 Penn Ctr. Plaza
215/564-3101

Philadelphia, PA 19102
3 Penn Ctr. Plaza
215/569-3228

SOUTHWEST

Dallas, TX 75229
8300 Douglas
214/363-7379

Dallas, TX 75206
8350 N. Central Exp.
214/987-0762

Dallas, TX 75201
Plaza of Americas
214/742-1117

Houston, TX 77056
1235 N. Loop West
713/861-8586

Houston, TX 77074
8300 Bissonnet
713/777-8200

CANADA

Hamilton, ONT. L8P-1H2
100 King - Stelco Towers
416/527-9201

Etobicoke, ONT. M9C-4Z5
One Eva Road
416/622-8118

General Employment Enterprises, Inc.
Corporate Offices 150 S. Wacker Dr. Chicago, IL 60606
Listed on American Stock Exchange

Vice President Sales and Marketing

Fiber Optic Communications

Artel Communications Corporation is a young, fast-growing company seeking a professional, experienced individual to head up its expanding marketing and sales activities. We require a record of successes in a high tech industry, preferably computer communications and telecommunications. This is a unique, ground floor opportunity with a publicly traded, profitable manufacturer of fiber optics communications systems for CAD/CAM, process control and telecommunications.

Please send resume in strict confidence to Elizabeth Witko,
Artel Communications Corporation,
P.O. Box 100, Worcester, MA 01602.
An equal opportunity employer.

ARTEL

COMPUTER/OPERATIONS MANAGER

Director, Administrative Information Systems

George Mason University, the State University of Northern Virginia is recruiting for a senior computer management professional as Director, Administrative Information Systems. In take a leadership role in a sophisticated computing environment. This incumbent will supervise a staff of over 20 computer professionals, control an annual operating budget of over 1.2 million dollars, manage operations of a sophisticated network of terminals, microcomputers and mainframes (currently two Honeywell-Push and SEMS) as well as lead in the development of the University's Administrative Systems. This position reports to the University's Assistant Senior Vice President for Computing and Information Systems. Salary range $31,000-$37,000 plus fringe benefits. Applicants must have significant management experience in a computer center environment. A graduate degree in computer science, information systems or a related field for equivalent experience) and administrative experience in a college/university setting are desirable. Send cover letter and resume to:

Personnel Office
George Mason University
4400 University Drive
Fairfax, VA 22030

By April 6, 1984. GMU is an AA/EOE employer.

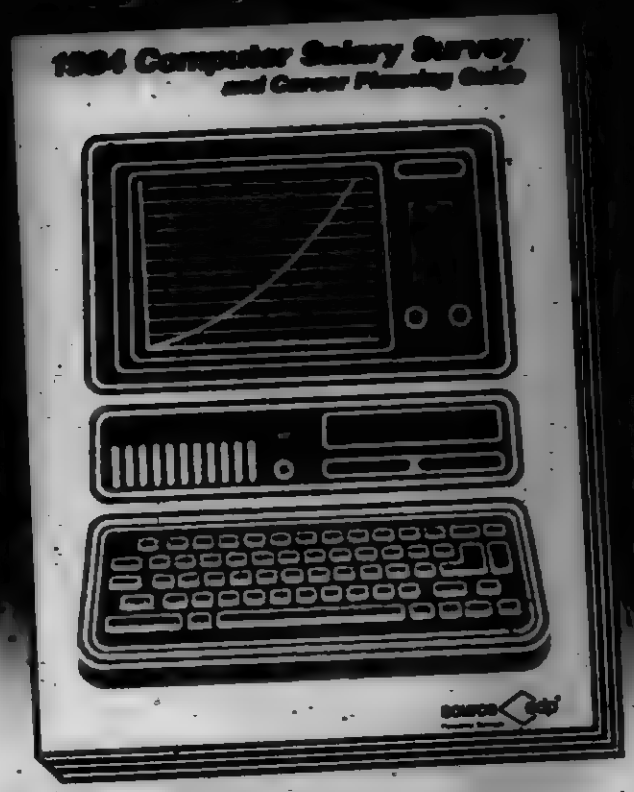
COMPUTER SCIENCE FACULTY POSITIONS EAST TENNESSEE STATE UNIVERSITY

Several tenure-track faculty positions in the Department of Computer and Information Sciences. Duties include teaching broad range of undergraduate courses, research, and professional service. Rank and salary depend upon qualifications. Ph.D. in Computer Science or Information Science preferred. M.S. with experience will be considered. Send vita and references to

Personnel Office, ETSU,
Johnson City, TN 37614.

Positions are available August 15, 1984. Review of applications will begin immediately and continue until positions are filled. Equal Opportunity/Affirmative Action Employer.

Free!



New 1984 Salary Data

No doubt, during 1983, you knew that many firms took a hard line on awarding salary increases—or, in some cases, even enacted across-the-board cuts.

Yet, on the other hand, did you know that salaries for *some* computer professionals *soared* right on through the uncertain business outlook?

Computer salaries are up.

The new, *1984 Computer Salary Survey and Career Planning Guide* is based on contacts with more than 44,000 computer professionals and 35,000 organizations. Not only are salary averages for fifty-eight positions reviewed (including ten new ones), but high and low compensation ranges are also provided.

Included are positions in programming, software, systems design, data base/data communications, Edp auditing, operations, computer sales, marketing, marketing support and management.

In addition, the new Survey details seven ways to maximize your chances of getting ahead through a proven, seven-step system that has helped thousands of computer professionals advance their careers.

Free to computer professionals.

The new 32-page Survey is available to you without charge. Since 1966, this annual report has helped approximately a quarter of a million computer professionals understand current trends in technology and compensation, realize how and where they fit in-and what they need to do to reach their full potential.

You owe it to yourself—especially if most of your career lies ahead—to call or write today.

Call today for your complimentary copy.

Call the Source Edp office nearest you for a free copy of our new 32-page report. We'll mail a copy to you in strict confidence, without obligation.

If unable to call, write:

Source Edp
Department CBS
P.O. Box 7000
Mountain View, CA 94039

When writing, please include your title.

source edp®
Personnel Services

The world's largest recruiting firm devoted exclusively to the computer profession.

Source Edp offices

United States
Alabama
Birmingham 205/933-5745
Arizona
Phoenix 602/279-1010
Tucson 602/795-0375
California
Northern
Mountain View 415/968-4010
Sacramento 916/448-3470
San Francisco 415/434-2610
Walnut Creek 415/945-1010
Southern
Fullerton 714/738-1313
Irvine 714/833-1735
Los Angeles/Downtown 213/688-0941
Los Angeles/South Bay 213/640-7660
Los Angeles/West 213/203-8111
San Diego 619/231-1600
San Fernando Valley 818/781-4660
Colorado
Denver 303/773-5700
Connecticut
Danbury 203/797-2660
Hartford 203/522-4660
New Haven 203/787-4665
Springfield 413/736-4063
Stamford 203/967-4660
Stratford 203/375-7240
Waterbury 203/574-8699
District of Columbia
Washington D.C. 202/659-6660
Florida
Fort Lauderdale 305/491-0145
Jacksonville 904/396-1660
Miami 305/624-3636
Georgia
Atlanta/Downtown 404/588-0300
Atlanta/North 404/993-0300
Illinois
Chicago/E. Loop 312/861-0770
Chicago/W. Loop 312/346-1280
Oak Brook 312/986-0422
Rolling Meadows 312/392-0344
Indiana
Fort Wayne 219/432-7353
Indianapolis 317/631-2660
Iowa
Des Moines 515/243-0191
Kansas
Overland Park 913/469-6665
Wichita 316/689-1021
Kentucky
Louisville 502/581-9600
Louisiana
Baton Rouge 504/924-7183
New Orleans 504/581-9060
Maryland
Baltimore 301/727-4060
Greenbelt 301/441-8700
Towson 301/321-7044
Massachusetts
Boston 617/482-7613
Burlington 617/273-5180
Wellesley 617/237-3133
Michigan
Detroit 313/259-7807
Grand Rapids 616/459-8539
Lansing 517/484-4561
Southfield 313/352-8520
Troy 313/362-0070
Minnesota
Minneapolis
West 612/544-3660
Downtown 612/332-6460
St. Paul 612/227-6160
Missouri
Kansas City 816/474-5500
St. Louis 314/569-3500
Nebraska
Omaha 402/391-7700
New Hampshire
Nashua 603/881-4567
New Jersey
Cherry Hill 609/424-2400
Edison 201/494-2000
Morristown 201/267-3660
Princeton 201/452-8000
Princeton 609/683-7377
Somerset 201/469-6444
Somerville 201/526-4660
New Mexico
Albuquerque 505/247-4979
New York
Albany 518/459-3500
Buffalo 716/856-4660
New York City
Grand Central 212/697-6911
Penn Station 212/736-7440
Wall Street 212/952-6500
Rochester 716/546-5570
Syosset, L.I. 516/364-4500
Syracuse 315/422-2411
White Plains 914/997-1400
North Carolina
Charlotte 704/554-1677
Greensboro 919/379-1155
Raleigh 919/847-7500
Winston-Salem 919/724-0500
Ohio
Akron 216/762-1150
Cincinnati 513/769-5500
Cleveland 216/771-5570
Columbus 614/221-2270
Dayton 513/461-4660
Toledo 419/842-3351
Oklahoma
Oklahoma City 405/728-7410
Tulsa 918/599-7700
Oregon
Portland 503/224-3100
Pennsylvania
King of Prussia 215/265-7500
Philadelphia 215/665-1717
Pittsburgh 412/261-5540
Rhode Island
Providence 401/751-5500
South Carolina
Columbia 803/256-7400
Greenville 803/271-7044
Tennessee
Nashville 615/259-4555
Texas
Austin 512/479-0700
Dallas
Central 214/954-1100
North 214/387-1600
Fort Worth 817/332-5570
Houston
Downtown 713/751-0100
Galleria/Post Oak 713/439-0500
San Antonio 512/340-5252
Utah
Salt Lake City 801/532-5500
Virginia
McLean 703/734-9240
Washington
Seattle 206/464-5400
Spokane 509/838-3377
Wisconsin
Green Bay 414/432-1100
Madison 608/251-5100
Milwaukee 414/277-0545
Canada
Ontario
Toronto
Don Mills 416/429-6720
Downtown 416/365-1125
Mississauga 416/848-8844

SYSTEMS PROGRAMMERS

.....are in demand
.....are interviewing
.....are being hired

$25,000-$40,000

We are a nationally ranked recruiting company (among the top 10 in our industry). We are recognized by our clients for representing top quality professionals with experience in large scale IBM installations. (1 yr. exper. minimum) Our client companies retain us (never cost to you) to provide qualified candidates for their specific job openings. All fees, interview costs and relocation expenses are paid by the company clients.

We urgently need to fill current openings for Systems Programmers in:

Dallas	Atlanta
Tampa Bay	Ft. Lauderdale
Jacksonville	Nashville/Memphis
Raleigh/Durham	Orlando
	Richmond/Roanoke

Please send resume or call collect

Steve Stevenson, Partner

Jim King and Associates

1948 Gulf Life Tower/Jacksonville, Florida 32207
(904) 396-7371

Data Processing

ACP PROFESSIONALS

ASCI is a professional organization serving the Data Processing community with a commitment to excellence, unique to the Computer Service Field. We are seeking professionals with the following skills:

* ACP Applications
* ACP Internals
* CCP
* Coverage

We offer a competitive salary with paid overtime, excellent benefit package and relocation assistance. For further information pertaining to our organization, positions and possible Flight Benefits, please call collect (913) 268-8600 or send your resume in strict confidence to:

ASCI
Attn: Personnel
10620 W. 64th St.
Shawnee, KS 66203

Equal Opportunity Employer

VICE PRESIDENT OF SALES

We are a leader in a segment of the data communications industry and have grown over 400% in the past five years. Our Connecticut-based, high technology engineering and manufacturing firm is seeking a sales executive experienced with data communications and selling large systems to major accounts.

Candidate should possess a proven track record and be capable of directing and motivating an expanding national sales organization. Planning, budgeting, leadership and organizational capabilities are a must.

This is an outstanding opportunity to join a management team who is committed to maintaining their leadership position through hard work and a commitment to excellence.

If you possess these qualifications, send your resume with earnings history in confidence to:

CW-B4589
Computerworld
Box 880
Framingham, MA 01701

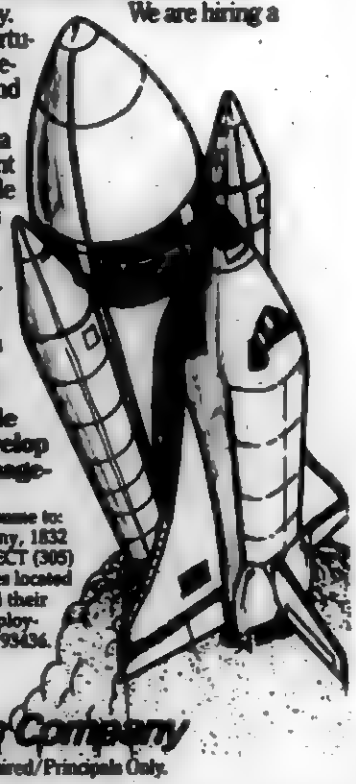
POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

COMPUTER PROFESSIONALS

With Current Experience In Applications Software, OS/SW, Communications Networks, Compilers, DBMS and Development Tools.

We are now assuming our responsibilities as the Shuttle Processing Contractor for NASA at the Kennedy Space Center, Florida and the U.S. Air Force at Vandenburg Air Force Base, California. This six year contract (with options to fifteen years) will provide you with a secure opportunity to join the team of professionals like yourself who are making a significant contribution in the manned space program.

If you are an experienced computer professional whose goal is more challenging and rewarding work in a state-of-the-art environment, look to Lockheed Space Operations Company. We are hiring a number of professionals, like you, to fill opportunities involving the development and enhancement of: Applications Software (Real-time and Interactive), Operating Systems Software, Communications Networks, Compilers, Data Base Management Systems and Development Tools. You will be working on the Space Shuttle Launch Processing Systems (LPS), which is a highly distributed network of over 300 MODCOMP Super Mini Computers and a large number of Honeywell 6000's with over 3.5 billion bytes of mass storage. Some of these opportunities will involve a three month program to become familiar with the entire LPS and the space system unique OS/SW.



We also have opportunities available for MIS Applications professionals to develop a wide variety of on line Data Base Management Systems.

For immediate consideration call or send your resume to: Donald C. Quirk, Lockheed Space Operations Company, 1832 Garden Street, Titusville, Florida 32782. CALL COLLECT (305) 268-4870. Candidates who wish to pursue opportunities located at Vandenburg Air Force Base, California should send their resume to: Lockheed Space Operations Company, Employment Office, 1100 West Laurel Avenue, Lompoc, CA, 93436.

Lockheed
Space Operations Company

An Equal Opportunity Employer/U.S. Citizenship Required/Principals Only.

WE'LL MATCH YOUR SALARY. RAISE IT. AND, GIVE YOU TIME AND A HALF FOR OVERTIME.

Allen Services knows top-notch programmers and analysts are a sure bet to the success of our national contract consulting business. So we up the ante in salaries and benefits to get the qualified consultants we need to satisfy our consulting contracts.

• Paid vacations and holidays • Health and life insurance • Dental insurance • Per diem allowance • Between project pay • 6-month merit reviews • Technical challenge • Professional growth • Constant up-grading of skills • Excellent salaries • Superior benefits....

Don't gamble with your career. Deal yourself a winning hand with Allen. Call us today 800-543-7583. In Ohio, call collect 513-890-1200. (SUBCONTRACTORS WELCOME)

ALLEN SERVICES COMPANY

A DIVISION OF CBA COMPUTER, INC.
212 West National Rd., Vandalia, OH 45377

Tektronix Systems Programmers Are Making A Good Idea Better

Join us for an outstanding opportunity in the ideal living environment of Oregon. Our experienced Systems Programmers are involved in generating new codes, making improvements and making bug fixes to UNIX™ kernel, device drivers, commands, utilities, and network programs. Our primary focus is on the 4.2 BSD enhancements.

The individuals we're seeking must possess leadership potential in a UNIX™ environment, be highly skilled as a C programmer, have in-depth knowledge of UNIX™ internals, VAX and PDP-11 architectures, along with related peripherals. An advanced degree is preferable, but the equivalent in related experience is acceptable.

Tektronix is a Fortune 500 company that provides its professionals with competitive salaries, valuable benefits that include profit sharing, health and dental insurance, and liberal educational assistance. Oregon offers a natural unspoiled beauty, affordable housing, and unsurpassed outdoor recreation. All things considered, our future may coincide perfectly with yours. For immediate consideration, please send your resume to Michele Goza, MS 46-943, Tektronix, Inc., P.O. Box 500, ALI1, Beaverton, OR 97077.

We are an equal opportunity employer m/f/h.

UNIX is a TM of Bell Laboratories.

Tektronix
COMMITTED TO EXCELLENCE

COMPUTER PROGRAMMING INSTRUCTOR

Central Ohio Technical College is searching for a Computer Programming Instructor. This position is a tenure-track appointment. Position responsibilities include instruction, curriculum development, and student advisement. A minimum of a bachelor's degree is required; a master's degree is preferred, although appropriate academic or work experience may be substituted for the master's degree. Minimum experience and competency with data communications in business applications are also desired. Hardware in use is a PDP 11/70 running RSTS/E.

COTC, an autonomous 2-year technical college shares a 185 acre campus with The Ohio State University at Newark.

Salary for the 9-month position will be $18,000 to $21,600 depending on degree held and experience.

To insure consideration, please forward a resume and letter of application postmarked by April 13, 1984 to:

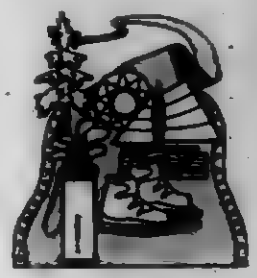
Personnel Coordinator
Central Ohio Technical College
University Drive
Newark, OH 43055

COTC is an EEO/AA Employer.

DATA PROCESSING EXECUTIVE

Minnesota Protective Life Insurance Company, a rapidly growing life insurance company, based in suburban Minneapolis, is seeking a highly qualified individual to manage its home office data processing department. This executive position, which should lead to Vice Presidency, is responsible for both data processing and for expanding the current Lilz/70 systems to accommodate the company's future growth. Applicant must have an excellent familiarity with life insurance operations and possess an extensive E.D.P. background including systems programming. Experience with Lilz/70 or equivalent application software conversion and operations is mandatory. This position offers an excellent starting salary and fringe benefits as well as a modern, comfortable suburban working environment. The growth potential of this position is limited only by the individuals energy and creativity. Interested parties should send resume to:

A. J. Yobi
Senior Vice President and Treasurer
Minnesota Protective Life Insurance Company
7801 Flying Cloud Drive
Eden Prairie, MN 55344



Watch your career evolve with the seasons

COMPUTER PROFESSIONALS

Just as the ever-changing seasons offer plentiful recreational options to the residents of our part of Southeastern Michigan, the stimulating variety of project work you will find at MIS will interest and challenge you.

We are a growing computer consulting company with a 15 year track record, providing professional support to a wide range of firms on a project basis. We offer an ideal-sized environment with more involvement and room for growth than is possible at a large company. Current requirements include:

- PL/1 or COBOL IMS DB/DC
- COBOL TSO/SPF/CICS
- TECH SUPPORT/SERIES I
- VSE/CMS
- IBM Systems Programmer
- FORTRAN/PASCAL/FMS/POS/RSX 11-M or VAX/VMS

Advance your technical skills and broaden your experience with us. We can offer you job stability, a generous salary and excellent benefits (including relocation reimbursement).

It's time to reach out for more. Make your change to MIS. For further details about current openings, call Personnel Recruitment or send resume to:

M.I.S. INTERNATIONAL, INC.
Corporate Office
24955 Southfield Road
Southfield, MI 48075

(313) 552-0550
(800) 521-2144

Equal Opportunity Employer

MIS INTERNATIONAL INC.

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

NCR PROGRAMMERS

Miami Lakes

We're one of South Florida's major data processing service bureaus providing services to large numbers of Savings and Loan Clients.

Due to internal promotions and growth, we're seeking experienced Programmers with working knowledge of NCR NEAT 3 and COBOL language.

The successful candidate will possess a minimum of 1 year programming experience in bank/savings and loan applications such as DDA, ATM, Savings, loan tracking, and general ledger systems. A Bachelor's Degree in Computer Science or related field is preferred.

We offer an exceptional compensation and benefit program plus the opportunity to excel professionally and grow with a strong financial organization.

Please send resume in confidence to Personnel Manager, 8881 S.W. 107th Avenue, Miami, FL 33176.

FIRST FLORIDA FINANCIAL INVESTMENT, INC.

Subsidiary of FINANCIAL FEDERAL SAVINGS & LOAN ASSOCIATION

IDMS

System Software Developers

Network Data Base Systems is a full-service consulting and software company specializing in providing support for organizations using Cullinet's IDMS software. Our services include consulting, on-site training programs, and software products for the IDMS DB/DC environment.

We currently have openings in our San Francisco office for system software developers. Qualified candidates will possess an in-depth understanding of IDMS DB/DC internals and good Assembler language skills. Relocation to the San Francisco Bay Area will be required.

Network Data Base Systems offers a first-rate benefits package for our employees that includes a stock option plan. For consideration, call or send resume to:

JOSEPH R. DeMARTINO
NETWORK DATA BASE SYSTEMS, INC.
350 BRIDGE PARKWAY
REDWOOD CITY, CA 94065
(415) 592-9210

No agencies please.

NDBS

You Decide.

If you want opportunity and challenge, the choice is Tandem's Software Development Team.

We pioneered the field of fault-tolerant computing. And, with our new TXP™ system, we've taken on-line transaction processing further than anyone had imagined.

As careers go, however, what makes Tandem different—and, we believe, better—is that we support the notion that the essence of success in our business is founded in opportunity and challenge for each of us.

Data Base Management

Relational Data Base Management

Requires 3+ years' experience in relational data base management systems development to contribute to a new project, and an understanding of query processing, various data access methods, data description and data manipulation concepts. Implementation experience with architectural design and distributed DBMS.

Application Development Tools

Design/implement high-level application development tools in the areas of application specification and generation, non-procedural language design, human engineering and ergonomics.

Diagnostic Technical Leader

Design/specify the maintenance and diagnostic architecture, design methodology and diagnostic tests for support of distributed fault-tolerant systems. MSCS/MSEE and previous project management experience desirable.

Quality Assurance

Software Product Quality

Experience in the design/implementation of quality computer systems. Use your analytical and creative abilities to influence product design, implement test tools and develop regression test libraries in data base management, operating systems, data communications and compilers.

QA Tech Leader

Lead a group building quality into new system software. Write test programs, design a regression test system and develop a release control library system. Sound knowledge of data base management software, software reliability and operating systems.

Operating Systems

Positions involve detail design, implementation and debugging skills, substantial operating systems development experience, and excellent writing and verbal skills:

Disk Access Method and Transaction Management

High-level design skills. Experience with file systems, access methods, device independent I/O, locking, failure recovery, transaction management.

Data Communications

Develop and enhance software from link level protocols to access methods. Projects involve LAN, ADCCP, SNA, SDLC, HDLC, X.25 and networking.

Processor Microcode

Design and develop processor instruction set and I/O channel microcode, participate in microarchitecture definition. Requires 3+ years' experience developing instruction set firmware or related hardware design.

Call Joy Mar COLLECT at (408) 725-5097 for more details about these positions, and about our 6-week paid sabbaticals. Or send your résumé to her attention, Tandem Computers Inc., Dept. 3/1, 19333 Vallco Parkway, Cupertino, CA 95014. We are an equal opportunity employer.

Principals only, please.

TANDEM

Makers of TXP,™ the most powerful on-line computer in business today.

™Trademark of Tandem Computers Inc.

$80,000/YR. — CICS PROGRAMMING

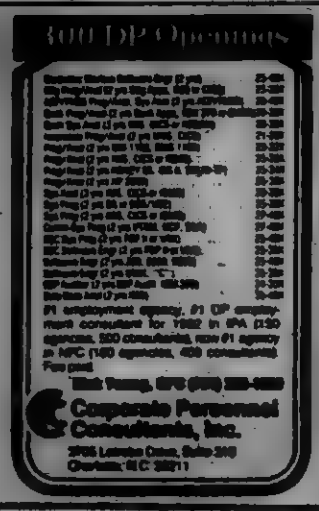
Acquire one of the most demanded & rewarding programming skills in months instead of years. A complete & guaranteed guide to CICS Command Level Programming. It's based on CICS latest release 1.6, written in COBOL, with tested examples on VS/COBOL. Broad-base 2nd edition, completely updated in here orders, hardcover, over 700 pages. Shows you how to use all CICS commands, 15 complete CICS programs explained, all major CICS functions. Covers: Interactive Debug, Add, Update, Delete, Browsing, Multi-record display/update, Print Shell, Abnormal, or step-wise report, Message Routing, Screen Formatting, VSAM Alternate Index design, setup and handling, Dynamic table manipulation, Audit Trail collection and more.

It's hard to believe the learning can be so easy until you try it. In hours you can start creating basic output. In days, you can start writing Pseudo Conversational CICS programs. It's not your learning curve at least in half; many programmers report even greater saving. Some CICS techniques are especially hard. When you're stuck for the hundred problems, you'll be thankful you have this book. All CICS techniques and problem areas are thoroughly covered. You'll find the topics on Protection shared handling, Test system debugging, Dump reading, Trace table usage, CSDF monitor, CSMT, CSNT commands, CICS internal tables setup & effects on application programs, Terminal Paging commands, complete procedures to install a CICS transaction and more. Why spend hours searching for the right techniques — when this book gives them to you already written.

Consulting will be the trend of the 80's for CICS due to great shortage of experienced CICS programmers. An average CICS contract programmer makes $30k-$40/hr. Some CICS consultants even make $100/hr (1040 Determination). Become one on CICS projects is very rewarding. A typical 10-person CICS project can make $10,000-$20,000 each week. This book contains 71 pages of tips on consulting that have to market your services, locate the right clients, write a proposal, resolve problem, quote the right prices to land consulting firms and draw a contract agreement without a lawyer. Written proposal & sample contract agreement are included for your convenience.

How much is this book worth to you? It's hard to say until you try it. That's why we want you to use it for 10 days. If you're not completely satisfied, simply return it at our expense for a prompt full refund. Fair enough? Thousands of copies have been sold. Over 90% of programmers who bought this book are satisfied with it. See how much time it saves you. How it leads you to the gold mines of programming. This book will pay for itself over and over, year after year. Act out now. Send $34.95 for 1, $59.95 ea. for 2, $27.95 ea. for 3, $55.95 ea. for 4 & over (plus $2.00/copy for P&H) in stock or M.O. to: CCG Online Systems, P.O. Box 78755, Dallas, TX 75378. Allow 1 to 2 weeks for delivery.

300 DP Openings



#1 employment agency. #1 DP employment consultant for 1982 in IPA (130 agencies, 500 consultants), now #1 agency in NFC (160 agencies, 400 consultants). Fee paid.

Bob Young, EVP (919) 333-4888

Corporate Personnel Consultants, Inc.
3735 Latrobe Drive, Suite 240
Charlotte, NC 28211

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

COLORADO OPPORTUNITIES

Come to the High Country

Due to the aggressive plans of our Western Operations, which are located just North of Denver, we are searching for degreed data processing professionals for the following:

VAX SOFTWARE SYSTEMS ANALYST—
2 or more years experience with VAX-VMS background interfacing with VAX 11/730 and 11/750 equipment.

IBM APPLICATIONS ANALYST—
5 or more years experience with CICS and DL/1 or IMS. IBM 303X operating DOS/VSE.

SOFTWARE SYSTEMS ANALYST—
3 or more years software experience. Strong familiarity with DOS/VSE, VSE libraries, JCL and systems utilities.

SOFTWARE MANAGERS —
10 or more years of experience with VAX 11/780 and IBM 3031/3033 operating with DOS/VSE.

Our Data Processing organization is small enough to encourage active interface with your associates and to allow high visibility for your accomplishments, yet we offer the strong stability of a rapidly growing Fortune 500 company.

Ball Corporation's aggressive manufacturing operations offers strong professional growth potential and the opportunity to work on a variety of challenging projects for our Technical Products and Metal Containers manufacturing groups. We offer excellent pay, benefits and working conditions. For immediate consideration, send your resume and salary history, in confidence, or call Collect.

Ball Corporation

J.L. Winslow
Ball Corporation
345 S. High Street
Muncie, IN 47302
(317) 747-6200

Systems Analyst/ Programmer

Overseas Employment Kwajalein, Marshall Islands

Global Associates, an international base operations and support services company has an immediate need for a Systems Analyst/Programmer.

Will be responsible for maintenance of current software applications primarily in the areas of supply and plant property. Will develop systems and programs as required as well as updating and maintaining existing programs. Interfaces with user departments to determine current and future needs. Other duties include training operations staff and programmers.

Qualified candidates shall have a Computer Science degree or equivalent experience, plus five years of systems analysis/programming. ANSI COBOL experience required. CDC 6400 and Scope 3.4/NOS Operating System experience desired but not essential.

Kwajalein offers an opportunity to enjoy sailing, fishing, scuba diving, golf and many other amenities. We offer annual paid vacation with transportation to point-of-hire and an opportunity for overseas U.S. Tax Exclusion. Bachelor and/or family housing are provided at no cost. The Kwajalein Schools are fully accredited, K-12. U.S. Citizenship is required.

Interested candidates should forward resume to:

Kathy Ringwood
Global Associates, Dept. 470,
P.O. Box 12156
Oakland, CA 94604-2156

Global Associates

An Equal Opportunity Employer.

CICS/VTAM SYSTEMS PROGRAMMERS

Major S.E. corporation headquartered in Atlanta an affiliated with Alabama, Georgia, Gulf and Mississippi power companies, has the following positions available:

CICS SYSTEMS PROGRAMMER

- Experienced with BAL and CICS internals
- Install and maintain CICS
- Performance measurement and tuning
- Knowledge of SMP and problem determination

VTAM SYSTEMS PROGRAMMER

- Knowledge of data communications protocols
- Knowledge of IBM 3705 and NCP
- Knowledge of VTAM, NCCF, NPDA
- Knowledge of SMP
- Problem determination

We offer competitive salaries and excellent benefits package. Please forward resume with salary history, in confidence, to:

Personnel Department

SOUTHERN COMPANY SERVICES, INC.
64 Perimeter Center East
Atlanta, GA 30346

An Equal Opportunity Employer M/F

Southern Company Services
the southern electric system

MANAGER-COMPUTER CENTER
SYSTEMS PROGRAMMER
NOVA UNIVERSITY
Fort Lauderdale, Florida

Applicants for position of Manager should have the following qualifications in an academic computing environment:

- Minimum of 3 years supervisory and managerial experience.
- Experience with the design and development of data base management systems.
- Knowledge of financial/administrative systems.
- Experience with telecommunication networks.
- Good communication and interpersonal skills.

Applicants for the position of Systems Programmer should have the following qualifications:

- Minimum of 2 years systems programming experience.
- Knowledge of VAX/VMS.
- Knowledge of telecommunication networks and communication protocols.
- Experience with "C" and UNIX highly desirable.

Salary commensurate with experience and qualifications. Send resume ASAP to:

Nova University
Personnel Department (CW)
College Avenue
Fort Lauderdale, FL 33314

Affirmative Action/Equal Opportunity Employer

IBM EXPANSION
FAST - TRACK
IBM PROFESSIONALS

- Developers - mid-level
- Sr. Analysts - project leadership
- ANAL/PROG - COBOL 74, DBMS
- ANAL/PROG - BASIC

- PAID RELOCATION
- CAREER PLANNING
- OUTSTANDING BENEFITS
- HIGHLY PROFITABLE FORTUNE 500
- MODERATE SUNBELT CLIMATE

C.B. Wade
Manager, IBM Recruiting
Service Merchandise Co.
P.O. Box 24600
Nashville, TN 37202-4600

EOE M/F/H/V

ACADEMIC COMPUTING

Responsible for management of VAX 11/750, PDP 11/44 with UNIX, interactive terminals, telecommunications, microcomputers, and faculty consulting services. Minimum: Masters degree or equivalent and 3 years experience in academic computing. Salary: $27-$31,000. Send letter, resume and 3 references postmarked by April 13, 1984 to:

Ms. Janet Hansen
Provost's Office
Northeastern Illinois University
5500 North St. Louis Avenue
Chicago, IL 60625

AA/EOE

COBOL PROGRAMMER

2 to 5 years COBOL experience in a VOS environment. Data base experience a definite plus. Enjoy a stable position with a growing shop in a comfortable university town. Salary negotiable. Send resume and salary history to:

Director of
Employee Relations
P.O. Box 1289
Jonesboro, AR 72403

EOE/M/F/H

DATA PROCESSING SUPERVISOR

If you've been planning a career move that will put you on a professional team in a fast paced environment where there is plenty of potential, here is the opportunity you've been looking for. We have an excellent career opportunity for a degreed individual with 7 to 10 years supervisory experience in a data processing shop with a minimum of 2 years on System 38. Successful communication and strong management skills are a must. Solid data communications experience is a plus. We are a leading manufacturer located in the Southwest and offer a competitive salary and an outstanding benefits package. For immediate consideration forward your resume with salary history, in confidence, to:

CW-84093
COMPUTERWORLD
BOX 880
FRAMINGHAM, MA 01701

Equal Opportunity Employer, M/F

TANDEM

Expertise?

Call or send resume to:
Mr. Neil J. Owrutsky
Director, Information Services

ENTRE

1951 Kidwell Drive, Suite 400
Vienna, VA 22180
(703) 556-0600

UNIX*/C

$25,000 to $50,000
APPLICATIONS & SYSTEMS
Over 200 Openings Nationwide
Client co's pay all fees
Call or send resume
in confidence to:

J. ROGERS ASSOC
(609) 386-8484
123 Franklin Corner Rd-Dept C-D
Lawrenceville, NJ 08648

* UNIX is a trademark of Bell Labs

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

Pacific Northwest

Telecommunications Analyst/ Programmer

Redac/1
Communications Expertise

Weyerhaeuser, a major international forest products corporation, has an exciting opportunity for a data communications professional as a Senior Telecommunications Analyst/Programmer. Based in Seattle, Washington, at the corporate Pacific Rim headquarters, this individual will support over 200 IBM and Honeywell terminals throughout the Pacific Rim world. Up to 30% travel is required.

The responsibilities of this individual include the development of new software for a wide variety of telecommunications and hardware applications, the installation of telecommunications systems, worldwide support of the Honeywell System base, and vendor interfacing.

To qualify you should have a degree in Computer Science or Mathematics and a minimum of three years Redac/1 SDL and CP experience. Excellent written and verbal skills are essential. You should have a track record of quality software development, hands-on experience in communication protocols (HASP/JC, SDLC/VTAM, X.25/X.28), be able to work under minimal supervision and accept the challenge of working with computer and communications hardware.

Join us in Seattle and become a part of a dynamic company! Send if you are the self-motivated individual we are looking for this unique opportunity, you are invited to send your resume and salary requirements to: Peter Hovland, Weyerhaeuser Company, The Weyerhaeuser Building, Seattle, WA 98371. Or call Peter Hovland at (206) 447-4000. We offer a competitive compensation and benefits package. Relocation assistance provided.

Equal Opportunity Employer M/F

WESTIN

INSURANCE DATA PROCESSING PROFESSIONALS

CONSULTANTS ANALYSTS

The Life Insurance Company of Virginia has executive openings for individuals who are eager to keep pace with the fast growing computer industry in insurance applications.

LOV's Information Systems Division currently processes life, health, and group insurance and annuities applications in a large IBM mainframe environment featuring LIFE-COMM and CAPS software packages. Data General minicomputer and microcomputer hardware and software support home office and field office automation requirements. Local and remote communications have been designed to complete the integrated LOV network.

We are proud of our accomplishments and invite you to consider joining our growing organization of data processing professionals. These opportunities carry attractive compensation with exceptional, excellent working conditions, and other fine benefits.

If you are interested in significant challenge, forward your resume, with current salary, to: Richard P. Johnson, Senior Personnel Associate, Life Insurance Company of Virginia, 6610 West Broad Street, Richmond, Virginia 23230. Principals only please.

LIFE OF VIRGINIA.

A Member of CONTINENTAL GROUP
Packaging
Forest Products
Insurance
Energy

An Equal Opportunity Employer

Accountemps puts the pro in edp PROductivity.

There's no longer a reason for data processing work to fall behind—Accountemps professionals are available on a moment's notice. Specialists in systems analysis, programming, computer operations, data entry and even word processing.

Accountemps specialists are the ideal solution when work starts to pile up—when employees are sick or on vacation—or when specific projects must be completed quickly and cost effectively. And because they're slightly over-qualified, they need little or no orientation. They get right to work and finish the job right the first time—and quickly too.

A call to any one of 80 offices in the United States, Canada and Great Britain will bring you the help you need immediately—for a day, a week, a month or longer—whenever you need them—evenings or weekends.

accountemps.
Rent an Expert...

© 1984 Robert Half International Inc. All offices independently owned and operated.

DATA PROCESSING

We are searching for experienced, enthusiastic individuals who wish to contribute to an active, progressive data processing team. If you are self-motivated, career-oriented, and possess the following qualifications, we would like to hear from you.

SYSTEM PROGRAMMER

Applicants should have 2-3 years experience in System Programming and degree in Computer Science. Will have primary responsibility for the implementation, table generation, table maintenance, and tuning of multiple IBM CICS/VS data communications environments. Must have knowledge of VM/SP and DOS/VSE operating systems. Hardware environment consists of 4341-12 and 4381-2.

Excellent benefits and salary. Send resume and salary history to:

Attn: Personnel Department
(NO TELEPHONE INQUIRIES, PLEASE)

Liggett & Myers Tobacco Co.

P.O. Box 1572, Durham, NC 27702

An Equal Opportunity Employer

MANAGER TECHNICAL SERVICES MILWAUKEE PUBLIC SCHOOLS

Note: The Milwaukee Public Schools has an approved affirmative action goal established for this position. Qualified minorities, women and handicapped individuals are encouraged to apply.

The Manager of Technical Services is responsible for planning, controlling and directing the activities of System Programming, Computer Operations and Office Services function of the Milwaukee Public Schools Information Systems. Requires a Bachelor's degree in Computer Science, Business Administration or Engineering and 5 years experience in data processing, three years of which must have been in a supervisory capacity. Salary range $1-45K, plus excellent benefits. Send resume or call for application information.

Timothy J. Van Someren
(414) 278-3372
Rm 109, City Personnel
Room 706
CITY HALL
200 E. Wells St.
Milwaukee, WI 53202

An Affirmative Action Employer

Programmer/ Analyst

PL/1, DL/1, CICS Proficiency

Major division of the A.C. Nielsen Company, located along the foothills of Colorado, is seeking an individual with demonstrated competence in PL/1, DL/1 and command level CICS for major development projects.

If you meet this criteria and wish to expand your technical skills, we will interview you at our expense. We offer a marvelous location and challenging work in a technically exciting environment: IBM 3081K, MVS/XA, IMS, over 50 GIGA Bytes of on-line storage and international data communication network.

Qualified applicants please forward resume or personal letter with salary requirements to:

Shirley Chambliss
Director of Human Resources

Nielsen Neodata

Neodata Services
P.O. Box 4000
Boulder, Colorado 80302

An Equal Opportunity Employer M/F

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

If you're a software professional, you probably would prefer to:

- ☑ Build systems software rather than just use it.
- ☑ Work in a technical environment which offers unlimited professional growth and opportunity.
- ☑ Interact on a regular basis with the industry's recognized leaders in software development.

SYSTEMS PROGRAMMERS

Princeton, NJ & Dallas, TX

SOFTWARE SUPPORT

Software Support positions require a thorough understanding of MVS and/or DOS/VSE and BAL programming skills. Exposure to data bases is preferred.

SOFTWARE DEVELOPMENT

Requirements for these positions include at least 2 years operating systems experience using IBM BAL in any of the following environments: MVS/VSE, DOS/VSE and VM. Experience with telecommunications, data base and transaction processing systems would be a significant plus.

"C" LANGUAGE PROGRAMMERS

Software Development & Project Management Positions

Princeton, NJ

These are exceptional opportunities to participate in newly created task groups responsible for the design and implementation of software for the IBM PC. Qualifications include:

- Minimum 2 years "C" language
- IBM PC and/or IBM Assembler Programming a plus
- Project Management positions require 2-3 years prior management experience.

Applied Data Research offers continued opportunities for career development, a comprehensive benefits package and a salary fully commensurate with your experience and potential. For consideration, please forward your resume or call Gary Johnson, (201) 874-9000, APPLIED DATA RESEARCH, INC., Route 206 & Orchard Road, CN-8, Princeton, NJ 08540.

APPLIED DATA RESEARCH

An equal opportunity employer

Engineers–
BS Engineering, Computer Science, Math

MANAGERS
- CAD/CAM
- Computer Systems

The Opportunities

General Electric in St. Petersburg, Florida offers key management roles for professionals qualified as:

CAD/CAM Project Manager

To prepare CAD/CAM plans by integrating department needs and counseling users of computerized systems as to proper equipment to perform CAD/CAM tasks.

Requires a BS in Engineering, Computer Science or Math and a knowledge of manufacturing and design functions with concentration on CAD/CAM techniques/systems.

Computer Systems Manager

Provide leadership and development of techniques for management of ADP facilities and resources.

Requires a BS in Engineering, Computer Science or Math and experience in programming, systems design, ADP hardware planning and acquisitions.

Applicants must be U.S. citizens.

Contact

Send resume, including salary history, to: General Electric Company, Neutron Devices Department, P.O. Box 11508, Ref. 48-N, St. Petersburg, Fla., 33733.

An Equal Opportunity Employer

SIEMENS

Today's Journey Will Take You Into Tomorrow's Technology.

We're a world leader in Laser Printer Technology. We're not looking for followers. We got where we are today by seeking out those special minds who can show us the fastest, most effective ways to reach beyond tomorrow.

SOFTWARE SUPPORT ENGINEER

In this position you will provide systems level support to OEM customers and their end users in the 3800 software support area; provide customer training; seminars and workshops; develop sales tools; assist in presentations; handle demos and benchmarks. You will also assist in diagnosis of problems related to non-impact printer operation.

Individual should have specified knowledge of MVS and JES 2/3 from a systems and user point of view. Understand the IBM 3800 support software on a systems and applications level for 3800 Mod 1 and Mod 3. Should be skilled in working with the available IBM diagnostic software tools and the IBM 360/370 I/O interface concept. Experience with IBM operating systems and the related user interfaces totalling a minimum of 5 years. Should have experience with IBM assembler language. System programmer background helpful. Must be willing to travel as job requires.

Siemens offers a full benefits package which includes dental, savings plan, excellent working conditions and the opportunity to continue to grow with an international electronics leader. Please send resume with salary history to: Mr. Michael Kurz, Siemens Communication Systems, Inc., 240 East Palais Road, Anaheim, CA 92805. We are an equal opportunity employer m/f/h.

Siemens: Committed to Quality Communications.

1,000 SUNBELT OPENINGS

D.P. - ROBERT MONTGOMERY

Prog. Anal. (3 yrs H-P & COBOL)	to $28,000 NC location
Prog. Anal. (3 yrs Mfg. CICS & COBOL)	to $28,000 NC location
Prog. Anal. (3 yrs banking IMS & COBOL)	to 29,000 VA location
Sys. Prog. (3 yrs MVS or IMS)	to $40,000 SC location
Sys. Prog. (3 yrs NCP & VTAM)	to $40,000 FL location
Sys. Anal. (3 yrs ins. appl. & COBOL)	to $35,000 TN location

ENGINEERING - MIKE HUNTER

Systems Engineer (C3I)	to 70,000
Software Mgr's (Communications)	to $65,000
Software Supv. (Telephony)	to $60,000
Sr. Software Engr's (Unix-DEC or INTEL)	to $55,000
Software Engr's (Microprocessor)	to $50,000

Fox-Morris is the nations largest corporate owned co. with over 150 offices located throughout the nation. For a clear understanding of our clients needs call 919/872-5040 or send resume to:

FOX MORRIS ASSOCIATES
[illegible] Poplarwood Court
Raleigh NC 27626

THE BEST YET - CONNECTICUT

Several leading Connecticut employers have significant career opportunities for experienced data processing personnel. All positions feature excellent benefit programs. Connecticut's quality of life is among the best nationally, having fine schools, reasonable taxes and housing, and many cultural/recreational offerings.

Communications Analyst
NCP/VTAM
To $42,000
Major Retailer

Programmer/Analyst
PL-1/IBM
To $38,000
Leading Specialty Retailer

Programmer/Analyst
Supervisor Environment
To $36,000
Fortune 200

For information on these and other exciting career opportunities, call Dennis Wry or Lynn Mess collect at (203) 278-6049 or send your resume to:

RJS ASSOCIATES
941 Anytown Street
Hartford, CT 06103

MARK IV/V
Systems and Programming Pros

- Are you a good analyst/technician?
- Do you like to meet people?
- Do you like a variety of environments?
- Are you self motivated?

We are the nation's foremost MARK IV-MARK V consulting group and we have opportunities for experienced programmers and analysts skilled in design and development of MARK IV/V systems. Permanent full time positions are available in the following areas; please send a resume or call us collect:

BOSTON/CONNECTICUT
-MARK IV/V Programmer/Analysts
IMS DB/DC and ADF a plus
STEVE GORMAN
Mid New England
Software Services, Inc.
Jamrey Bldg. Rt 101A
Amherst, NH 03031
(603) 882-8234

DALLAS/HOUSTON
-Senior MARK IV/MARK V Analysts
IMS DB/DC and ADF a plus
JACK HEMPSTEAD
Mid Southwest
Software Services, Inc.
200 Chisholm Place
Plano, Texas 75075
(214) 578-8551

L.A./S.F./SEATTLE
-MARK IV/V Programmer/Analysts
NOMAD2 for San Francisco
TONY LAMBA
Mid Western
Software Services, Inc.
50 West Hillcrest Drive
Thousand Oaks, CA 91360
(805) 497-8975

NEW YORK/NEW JERSEY
-MARK IV/V Programmer/Analysts
PL1 and IMS a plus
JIM DORR
Mid Midwest
Software Services, Inc.
61 North Maple Avenue
Ridgewood, N.J. 07450
(201) 444-8600

Our very competitive salaries are enhanced by bonuses, medical, life and long term disability insurance, full tuition refund, and a liberal expense policy. Relocation assistance available.

NOTE: Additional considerations made to those who are capable of extended or frequent travel.

Experience in other Fourth Generation type languages such as NOMAD, RAMIS II or FOCUS would also be of interest for New York/New Jersey.

IONA COLLEGE, a Liberal Arts College located 20 miles from N.Y.C. has 4 full-time tenure-track faculty positions in Computer & Information Science, as well as several adjunct positions available for Fall 1984. Rank dependent upon qualifications and previous experience.

Ph.D. in computer science or closely related field preferred. M.S. in computer science with appropriate industrial experience and work toward doctorate will be considered.

Degree programs offered by the C.I.S. Department include a B.S. in Computer Science, B.A. in Computer & Information Systems, Masters in Computer Science and a Masters in Educational Computing. Knowledge in several areas including Programming Languages (PL/1, BASIC, PASCAL, LOGO, etc.), Operating Systems, Computer Applications in Education, Computer Application in Business, Architecture of Micros and Minicomputers, etc. is highly desirable.

Send curriculum vitae to:

ANTONY S. HALAPAS, CHAIRMAN
Computer & Information Sciences Department
Iona College
715 North Avenue
New Rochelle, N.Y. 10801

IONA COLLEGE

Applications should be received by April 30, 1984. Closing day may be extended if positions are not filled by this date.

Iona College is an Equal Opportunity Affirmative Action Employer

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

Potential for Advancement

SYSTEMS ANALYSTS

Immediate openings for Systems Analysts with Insurance computer rating or installment billing experience. These positions are located in the Rhode Island Home Office of a national P&C insurer.

A college degree is required and 3 years' minimum experience in programming and system design. Good analytical and verbal communication skills are required. Experience with PMS is a plus.

Environment: IBM 4341, hosting a national distributed data communications network. It operates under DOS/VSE, CICS, SNA/VTAM, and ICCF. Also, 8140 under DPPX and personal computers.

We offer liberal compensation and benefit programs.

Please submit resume, including salary requirements, to: Chris Curtis, Human Resource Department.

Providence Washington Insurance Company

TECH SVCS. DIRECTOR

Very profitable $ billion org. currently seeking a proven mgr. to oversee the DBA & tech support depts. IBM multi-CPU OS/MVS IMS DBDC environ. Oppty. to manage the tech. growth of a fast-paced co. $58,000.

IMS DBA

Fortune 500 firm seeks DBA to do all planning, design and implementation for start-up division. IBM 3033X OS/MVS IMS-DBDC environ. Unique oppty. to design an integrated DB/DB framework. $40,000.

ROBERT HALF of Boston, Inc.

100 Summer Street
Boston, MA 02110
(617) 423-1200
Personnel Consultants

IN SAN FRANCISCO ...
IT'S SPRING YEAR ROUND!

DATA PROCESSING PROFESSIONALS skilled in Main Frames, Mids or Micros, DATA BASE or ON-LINE SYSTEMS consider a move to the beautiful SAN FRANCISCO BAY AREA.

Career opportunities offering CHALLENGE, GROWTH and REWARDS

LOGICAL OPTIONS

Personnel Agency Est. 1970
One Market Plaza, Spear Tower, Suite 2004
San Francisco, CA 94105 (415) 777-2000

INFORMATION SYSTEMS GROUP

Imagine

life in the fast-or-slow-as-you-make-it lane.

Then do more than imagine. Experience it. At Motorola's Semiconductor Products Sector — the world leader in the Research/Development and Manufacture of microelectronic components and systems. We're creating the trend-setting technology of tomorrow. In a location that is close to ideal — Phoenix, Arizona. Offering the recreational and cultural options you deserve . . . minus the crowds and chaos you'd expect in such a booming metropolitan area.

Reap the professional rewards of a career tailored to individual pursuits. And the personal rewards of a lifestyle that moves at your own pace. Openings are available in the following areas:

Business Programmer Analyst — Design, develop and maintain appropriate programs utilizing TSO, MVS and VM/CMS. BSCS or equivalent experience required. Previous experience in the electronics industry a plus.

IMS Programmer Analyst — Develop and maintain IMS database and data communication applications in support of a worldwide, on-line business system. BSCS required, with 3 or more years experience plus a thorough working knowledge of COBOL, IMS and TSO.

Tandem Programmer/Analyst — Develop and maintain manufacturing applications on Tandem computing equipment. Requires BSCS or equivalent background, plus 3 or more years COBOL experience, preferably in an on-line manufacturing environment.

Mark IV Programmer/Analyst — Develop and maintain personnel applications on large IBM mainframes utilizing TSO, CMS and SPF. BSCS or equivalent background, plus 3 or more years Mark IV programming experience required.

International MIS Manager — Assignment in Hong Kong or Seoul, Korea involves the implementation of common software developed in the U.S., tailored to meet the manufacturing and financial systems needs of the Seoul or Hong Kong operation.

What could be . . . is.
At Motorola's Semiconductor Products Sector. A company creating the future. And providing a solid foundation for your personal and professional pursuits. Join us. Call Mike Yount, at (602) 994-6503, collect, or send your resume to:

MOTOROLA, INC.
Semiconductor Products Sector
1140 S. Priest Drive, Dept. CW86,
Tempe, AZ 85281

MOTOROLA INC.
Semiconductor Products Sector
An Equal Opportunity/Affirmative Action Employer

What could be...is.

Arizona/California/Texas/Colorado/Florida/Boston

SCIENTIFIC OR BUSINESS PROGRAMMERS

All fees and relocation paid. $20-40,000

If you have a BSEE, BSCS, BS in Mathematics or Physics or equivalent, we need you right now.
For Businesses: OS/DOS/IMS/CICS/MVS/JES Prog/Anal/Systems/Data Base. All large scale installations.
For Scientific: experience in the computer, communications, semiconductor, or aerospace/defense industries.
Your name, resume, and present employer will not be given out without your permission.
For sincere personal service, please send a confidential resume to:
Don Pullman (602) 274-6969
PULLMAN PERSONNEL
3600 North Central Ave., Suite 900, Phoenix, Arizona 85012

ROCKY MOUNTAIN OR NATIONAL

Data Base Designers ..... IDMS, IMS, DB/DC, ADABASE
Programmers/Analysts ..... Graphics, DOD, Telecom, Business
Systems-Anal/Prog ..... IBM, DEC, HP, PRIME, CDC, TANDEM

Software Engineers ..... Aerospace, Telecom, Data Acquisition
Software Test EE's ..... ATE, Diagnostics, S/W Specs, IV & V
S/W Systems Develop. ..... 8 & 16 Bit MPU's, C & UNIX, LAN

Contact: Margo Nolte

Career Marketing Associates
7100 E. Belleview #208
Englewood, CO 80111
(303) 779-6660

PROJECT LEADER/
MARKETING SYSTEMS

Industry leader has an immediate need for a project leader of marketing systems. Need right-caliber degreed individual with a minimum of 5 years in data processing. Previous marketing systems development and supervision is required, and a working knowledge of SAS, FOCUS, or PPS. Minimum location. Salary to 30K, excellent benefits plus bonus potential.

PROJECT LEADER/
RESTAURANT SYSTEMS

Exceptional company has created a new position due to continued commitment to point of sale development. Extremely highly visible position requiring 3-5 years programming experience and 1 year as a project leader or in a lead position. Need outstanding strong communication and people skills and good knowledge of point of sale. Retail or restaurant background ideal. Minimum location. Salary to 35K plus bonus potential.

SENIOR INFORMATION
CENTER ANALYST

Blue chip corporation has created new, highly visible opportunity. Requires exceptional BS/MS/MBA educational degree in database and mainframe computer systems with 3 years experience. Need strong background in training of non-DP personnel, developing training programs, and computer based training. Also requires knowledge of SAS or FOCUS. Must have outstanding people and communication skills. Salary to 40K plus excellent benefits and bonus potential. Minimum location.

FEE PAID.
ALL INQUIRIES
STRICTLY CONFIDENTIAL

SPECTRUM SEARCH
1900 N. ARGOSY
WICHITA, KS 67226

MAJOR ARAB BANK

BUSINESS SYSTEMS ANALYSTS
PROJECT MANAGERS

Expanding commercial bank needs persons with experience in implementing new systems and project planning/management. Friendly, shirtsleeve environment. Location is Bahrain in the Arabian Gulf, a cosmopolitan, progressive country.

A generous, tax-free salary, bonus, travel, and housing package will be offered. Two-year contract with extension possible. Successful candidates will have experience in implementing new computer systems in user departments, developing project plans, and managing bank projects.

Interviews will be held in May at Columbia, S.C., Tampa, Washington and New York City. Airmail resume and salary history to:

Thomas J. Thirkell
Assistant General Manager
Bank of Bahrain & Kuwait
P.O. Box 597
Manama, Bahrain

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

SYSTEMS PROFESSIONALS

Especially for systems professionals, American Express is an outstanding company to work for.

If you can imagine the amount of data capture and transactions we handle, you'll understand why we are one of the world's leaders in using computer systems, and have the impressive capabilities you'd prefer to work with.

Be where people, systems and service aren't just something we talk about, they continue to be the foundation of our business.

- **IMS APPLICATIONS PROGRAMMER ANALYSTS**
  (FORT LAUDERDALE, PHOENIX, SALT LAKE CITY)

  Positions require a minimum of 2 years OS COBOL applications programming experience in an IBM compatible environment utilizing JCL, MVS TSO and IMS batch and/or on-line applications.

  Senior and lead positions require 4-6 years programming experience, including systems analysis and design in an IMS environment.

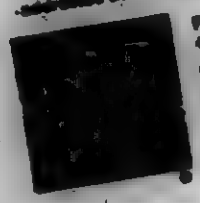
- **SOFTWARE PROGRAMMER**
  (SALT LAKE CITY)

  You will evaluate software needed to support our varied hardware configurations. You must have 2-5 years experience as a systems programmer and IBM internal knowledge that includes SMP, VTAM, MVS, NCP, assembler and TSO, RACF.

- **CAPACITY PLANNING/ PERFORMANCE ANALYSTS**
  (SALT LAKE CITY)

  We require MVS/SP 1.3 experience with a strong SAS background and knowledge of SMF/RFM data processing. Familiarity with BEST/1, BAL is helpful. Your analytical, statistical and communication skills should be strong.

All of our data processing environments are excellent, and so are our compensation and benefits programs. Please specify which position you are applying for and include a salary history with your resume. Send to one of the following addresses based on your location preference.



Ft. Lauderdale, Florida 33318
4720 North State Road 7

Phoenix, Arizona 85062
P.O. Box 13761

Salt Lake City, Utah 84104-4758
4315 South 2700 West

We are an equal opportunity employer m/f/h/v

We are an international data processing software, research, development and consulting firm with 72 branches worldwide.

Our four western region branch managers

are looking for more of the finest, most dedicated and imaginative people they can find. If you have the ability to become one of the leaders in your field, call or send your resume today.

Los Angeles
IDMS
ADSO
CICS
IMS DB/DC
CULPRIT
ALGOL/FORTRAN

David Morgan
22010 S. Wilmington Ave.
Suite 301
Carson, CA 90745
213/549-8970

San Francisco
VM or MVS SYSTEMS SOFTWARE
SNA Telecommunications
COBOL IMS/CICS
IMS DBA
NCP/VTAM
ACP/PARS

David Cutler
1633 Bayshore Hwy.
Suite 237
Burlingame, CA 94010
415/692-6050

Portland
OS/MVS
CICS
IMS DB/DC
UNIVAC 1100 P/A

LaVelle Bay
700 N.E. Multnomah
Suite 1420
Portland, OR 97232
503/231-8184

Seattle
CICS
IMS OS/MVS
IMS DB/DC
HONEYWELL GCOS8
PICK SYSTEMS
COBOL P/A

David Gantt
33400 13th Place South
Suite 209
Federal Way, WA 98003
206/838-3660

CAP GEMINI DASD
PEOPLE/PRODUCTS/RESULTS

MANAGER
ACADEMIC USER SERVICES
RHODE ISLAND COLLEGE

The Rhode Island College Computer Center has an opening for a Manager of User Services. This individual will be responsible for providing and managing user services for members of the academic community at the college. These services include training and consulting for faculty and students, responsible documentation systems, and interfacing with academic departments on the use of the computer in instruction and research. Systems include an IBM 4341 (MVS/VM), PDP 11/70 (RSTS/E), VAX 11/750 (VMS) and IBM PC clones. Requires a Master's (MS) preferred in Computer Science or a related field; 4 years of experience gained through employment in a computer center as an academic programmer/consultant or equivalent experience. Knowledge of statistical packages (SAS/SPSS), JCL, several programming languages and experience in technical writing important. Supporting salary competitive and dependent upon qualifications. Attractive fringe benefits. APPLICATIONS MUST BE RECEIVED BY 4 PM ON APRIL 6, 1984. Submit letter of application with resume to the Office of Personnel Services, Rhode Island College, 600 Mount Pleasant Avenue, Providence, RI 02908 Attn: Director Computer Center.

An Affirmative Action/Equal Opportunity Employer

COMPUTER CENTER DIRECTOR
DENISON UNIVERSITY

Position open July 1, 1984 or as soon thereafter as possible. Responsible for planning and directing overall activity of the college computer center in providing instructional and administrative computer services to a liberal arts college. Ultimate responsibility for design of physical computer system, allocation of computer services and training of staff.

Denison has strong commitment to academic computing, operates a current VAX 780 computing system, shortly to be upgraded to VAX Cluster. Over 100 terminals connected to system plus distributive microprocessors dedicated to word processing. Information processing environment includes distributed processing and networking of all information systems over next few years.

Seek person with supervisory experience in mainframe, minicomputers, data processing, including data based management and applications design.

Reports to Provost. Letter of application, resume, transcripts and list of references by April 23, 1984 to Dr. Linda F. Rodenhouse, Provost, Denison University, Granville, OH 43023.

Denison is an Equal Opportunity/Affirmative Action Employer.

COMPUTER SYSTEMS PROGRAMMER
RIVERSIDE, CALIFORNIA

Two years post high school education leading to computer science. Two years experience as a data processor programmer/analyst or three years experience in analyzing, programming and coding problem. Experience with large computers and experience with COBOL, CICS, ALGOL, RDS, and ECAP highly desirable. Salary $2,284.00 to $2,852.27 monthly. Overtime 7/10/84. Personnel, Riverside County Superintendent of Schools, 3939 13th Street, Riverside, CA 92502, (714) 788-6393.

An Equal Opportunity Affirmative Action Employer

Data Communications Administrator

Sundstrand, a Fortune 500 company, has an immediate opening in our corporate offices for a Data Communications Administrator.

As a multi-division corporation with plant sites nationwide, Sundstrand needs an experienced college-degreed professional to plan, design and monitor the performance of our data communications network. You will put your knowledge and skills directly to work as you provide consultation to our divisions and assist them with technical expertise in the planning and implementation of their equipment from private lines and modems to data terminals or mini-computers.

If you have a college degree in computer science or a related business area and at least three years' experience in data communications, then you will find this job rewarding with many career opportunities.

Sundstrand offers a competitive salary and a solid benefit package. To be considered for this challenging position in a growth-oriented company, please send your resume and salary history in confidence to:

Kathi Handee
Sundstrand Corporation
4747 Harrison Avenue
P.O. Box 7002
Rockford, IL 61125-7002

An Equal Opportunity Employer

DIRECTOR OF COMPUTING SERVICES

St. Lawrence University has an immediate opening for a Director of Computing Services. This position includes responsibility for all administrative and academic computing on campus. The ideal candidate is a seasoned manager with good planning and communication skills and has a strong background in financial systems. An advanced degree is preferred.

St. Lawrence is a selective liberal arts college founded in 1856 and located between the Adirondack Park and the St. Lawrence Seaway. A commitment to computing in the liberal arts, a new IBM 4341 with over seventy 3278 terminals, and significant changes in administrative computing has created an exciting environment. Compensation is competitive.

Send resume and references to the Director of Personnel Services, St. Lawrence University, Canton, N.Y. 13617.

An Affirmative Action/Equal Opportunity Employer M/F/H/V

APPLICATIONS PROGRAMMER/ANALYST

Fruehauf Corporation is looking for applications software professionals who want to be part of large-scale, data base, on-line systems development. Qualified individuals should have 3 or more years' experience using COBOL. Finance industry background is a plus. Honeywell large systems experience is preferred with JCL, TSS, COBOL, IDS-II, and DM-IV TP.

Position offers an attractive salary plus a complete benefit package. For immediate consideration, send resume and salary requirements to:

Personnel Manager
FRUEHAUF CORPORATION
10900 Harper
Detroit, MI 48232

An Equal Opportunity Employer

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

PROJECT LEADER

Project Management in Scientific Systems/Data Communications

The Scientific Systems Division, as a part of SOHIO's Cleveland Data Center, functions in a total demand environment, providing solutions to the scientific user community for scientific, engineering and mathematical problems.

We're offering a unique opportunity to lead exciting projects in the innovative use of leading edge technology. For example, we are now designing a HYPERCHANNEL communications network which provides intelligent data transfer between VAX and PRIME minicomputers, Control Data mainframe, CRAY and Control Data super computers.

The experienced professional we seek must be thoroughly knowledgeable in the scientific computing environment. You should have an MS in Computer Science, Physical Science or Engineering. We also prefer that your background includes planning communications configurations for Control Data computing systems, familiarity with Cyber 200 machines, and strong leadership capabilities.

You will lead a project task force of highly qualified technical professionals, with primary responsibility for developing requirements, selecting vendors, planning and implementing solutions to user needs.

This high visibility position offers opportunities for close working relationships with systems and user management and potential for career advancement. SOHIO offers a highly competitive salary reflecting your individual experience, an excellent benefits package, and a working environment suited to personal and professional growth. Our comprehensive relocation package for new hires includes all normal moving expenses. Homeowners also qualify for mortgage interest differential allowance, third party home purchase and other features typically restricted to internal transfers.

Take the first step in joining one of the nation's most successful business entities by sending your resume detailing your education, experience and abilities in strictest confidence to:

Ms. Jean Hellich, Senior Executive Recruiter
THE STANDARD OIL COMPANY (Ohio)
1424 Midland Building — 623CW • Cleveland, Ohio 44115
An Equal Opportunity Employer M/F/H/V
NO THIRD PARTY INQUIRIES, PLEASE.
"Help us Help to Assure America's Energy Future"

SOHIO

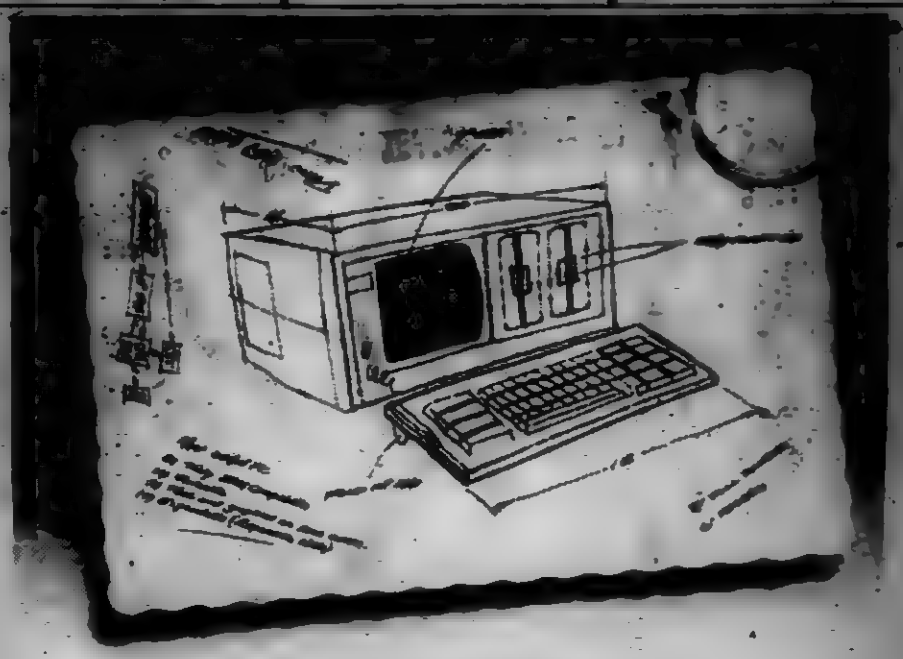
PROGRAMMER/ANALYST

SYSTEM/38

Fast growing company in rural country setting needs experienced programmer/analyst for development of manufacturing & retail distribution systems. The successful candidate will have 1 or more years hands on System/38 and 5 or more years Data Processing application development experience. Principles only please.

Please send resume and salary requirements to:
MIS Director

RENOVATOR'S SUPPLY, INC.
MILLERS FALLS, MA 01349



SOFTWARE PROFESSIONALS

Draw on your imagination

Consider a career with the most successful new company in the history of American business

COMPAQ® Computer Corporation broke away from the pack with its portable COMPAQ computer and made business history. Then came COMPAQ PLUS™. Now you have an opportunity to join this front-running company and share the excitement.

The challenge couldn't be more stimulating. You'll have all the encouragement, independence and resources you need to develop your ideas.

COMPAQ. Simply a better place to work.

Software Engineers

Positions involve the design, development, and testing of personal computer software. Typical software projects include hardware-software interfaces, operating systems, hardware diagnostics, and applications software. Candidates must have a BSEE or BSCS degree with 2 or more years experience programming and at least 2 years of these working with personal computer software. Experience in "C" and 8086 Assembly Language preferred.

Software Specialists

Positions involve the design and development of structured software tests aimed at improving the reliability of personal computer systems and applications software. Candidates must have a BSEE or BSCS degree with 5 or more years experience programming and at least 2 years of these working with software quality assurance and/or software testing. Experience in "C" and 8086 Assembly Language preferred.

Software Business Support

Challenging positions involve working with leading software and hardware companies in the personal computer industry to provide technical support and to maintain business relationships. Candidates must have a bachelors degree and at least 2 or more years experience with personal computer software support of software support.

COMPAQ Computer Corporation offers an excellent salary and benefits package with stock options available to all employees.

If you are looking for a challenging position with a rapidly growing personal computer manufacturer, and you meet the above requirements, submit a summary of earnings and professional history in confidence to:

Robert W. Harper
COMPAQ Computer Corporation
Dept. CW326
20333 FM 149
Houston, TX 77070

COMPAQ Computer Corporation is an Equal Opportunity Employer

COMPAQ COMPUTER CORPORATION

S/36 MANAGER
NORTH MINNESOTA

Industry leading firm in great fishing area seeks senior data processing manager to direct activities of growing firm running all financial and mfg applications. Strong design background required. Job #6886. FEE PAID.

MARK DAVID
JOHN MILLER
ROBERT HALF
3636 IDS Center
Minneapolis, MN 55402
(612) 338-0001

DATA LINK

COME TO NEW ENGLAND
and see what we have to offer!

New England has skiing, sailing, mountains, beaches, a Center and true atmosphere, and a professional climate that is very exciting! I.e., P/A's, S/P's, SW Eng's with experience in PDP, INTEL, HONEYWELL, IBM, WANG, A UNIX, C and graphics background is also available.

Send us your resume or call, and let DATA LINK introduce you to New England.

Our list of client companies is endless, and all fees, interviews and relocation expenses are paid by our clients.

DATA LINK
National Recruiting Consultants
Exeter Professional Building
Hampton Road, Exeter, NH 03833
(603) 772-5488

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

Software Systems Engineers
Software Development Engineers

If you want to build a new software division capable of providing total life cycle support...

Harris Can Make It Happen

If you want an aggressive entrepreneurial setting—then the Software Operation of Harris Government Information Systems Division could be the place for you. We are developing and using state-of-the-art methodologies, and have the opportunities for you to achieve the recognition you deserve. Positions are available in our Florida, Colorado Springs, and Washington D.C./Baltimore facilities. Requirements: BS in CS, EE or related technical disciplines. MS or PhD desirable. Experience in the government contracting environment helpful.

SOFTWARE SYSTEMS ENGINEERS
System-level design experience desired in some of the following: C³I Systems, Large Scale Databases, Local and Wide-Area Networks, Real-Time Data Acquisition, Interactive Graphics, Modeling and Simulation, Man-Machine Interface, Advanced Software Methodologies and Software Tool Development. Experience desired with Requirements Analysis Languages, Subsystem Definition, Proposal Preparation and Software Costing Models.

SOFTWARE DEVELOPMENT ENGINEERS
Experience sought in the design and implementation of software using structured languages (and programming techniques) including PASCAL, "C," ADA, FORTRAN 77 with DEC, DATA GENERAL, or HARRIS 800/500 Systems. Exposure to modern design methodology (such as PDLs) and structured development (team concept/structured walkthroughs) of medium to large scale software systems desired.

We are part of the Fortune 200 Harris Corporation, Florida's largest industrial employer. We offer an excellent compensation and benefits package, a formal merit review program, and outstanding advancement opportunities.

If you feel that your present position doesn't offer the kind of challenge and recognition you really want, call Julian D. Kaufmann, COLLECT, Monday thru Friday, 8 am-5 pm, EST at (305) 676-6467, for more information. Or send a resume to his attention at Harris GISD— Software Operations, Dept. CW, 150 Wickham Road, Melbourne, Florida 32901-1132. For further information after business hours, call 1-800-327-8552.

U.S. CITIZENSHIP REQUIRED.
SBI MAY BE REQUIRED.
An equal opportunity employer M/F/H/V

HARRIS
IF IT'S HAPPENING IN ELECTRONICS, IT'S HAPPENING AT HARRIS.

PROGRAMMER/ANALYST

SENIOR PROGRAMMER/ANALYST

Are you a Programmer/Analyst with ambitions of moving up but find your career path blocked? Come to Armour Handicrafts where promotional opportunities abound.

Armour Handicrafts is a major subsidiary of a Fortune 100 company located in Northeastern Pennsylvania with easy access to New York City, Philadelphia and the Pocono Mountains. We are currently in need of a Senior Programmer/Analyst to be responsible for systems in vital functional areas such as inventory, personnel and/or payroll.

Candidates will need 3-5 years experience on IBM System 36 and a working knowledge of CL, DFU and RPG. Modification, user support and implemented systems experience are necessary.

We offer an excellent salary based upon qualifications, company paid benefits, and endless opportunities for advancement. Send resume with salary history or call:

BRUCE LEVY

ARMOUR HANDICRAFTS
Jaycee Drive
Hopewell Industrial Park
Hazleton, PA 18201

Equal Opportunity Employer

MANAGER OF HOSPITAL COMPUTING

The University of Nebraska Hospital and Clinic is presently recruiting for a Manager of the Hospital Computing Group. Individual will be responsible for the overall delivery of consultative, development and delivery of computing services. Requirements are a bachelor's degree in computer science or related field (master's degree preferred), minimum of 8 years experience in information systems and good communications skills with strong history of project development and implementation experience. Specific areas of study preferred are: computer science, mathematics, industrial and/or management engineering, health services administration and biomedical computing. Qualified applicants should submit a letter of introduction and resume to:

University of Nebraska Medical Center
Dept. of Human Resources
818 S. 42nd Street
Omaha, Neb. 68105

Equal Opportunity Employer M/F/H/V

TECH SUPPORT SUPVR.

Supv. Sys. Prog. in IBM 4341 Group 2 Dos/VSE under VM environ. Strong CICS knowl. req. w/DL1 expertise a plus. 150 terminal network supporting local/remote installations. Outstanding benefits. Salary: High Thirties.

ROBERT HALF
OF PROVIDENCE, INC.
76 Westminster St.
Suite 800
Providence, RI 02903
(401) 274-3700
Personnel Consultants

DP POSITIONS SEATTLE/PORTLAND

MVS. Sr. Systems Programmer $40K
Sr. IMS Systems Prog. 40K
Systems Performance data base consultant to applications group.
Sr. Programmer/Analyst 35K
Financial app. CICS/DL1 on-line interactive.
Programmer/Analyst 30K
CICS/DL1 or VS/AM on-line dev.
Sr. PIA IMS applications dev ..... to 40K
Data Admin. Analyst ..... to 40K
data resources mgmt level DP design.

Please forward resume immediately to:

HOUSER, MARTIN MORRIS & ASSOC.
(206) 453-2700
0-00010, 10400-112th Ave. N.E.
Bellevue, WA 98004

TEACHING POSITION DOANE COLLEGE

A strong, midwestern liberal arts college seeks a committed teacher for a developing computer science curriculum. Masters minimum with appropriate experience, plus strong interest in teaching undergraduates. Attractive salary. Proximity to Lincoln and the state university. April 20 closing date. Contact

Don Ziegler, Dean,
Doane College,
Crete, NE 68333.

Equal opportunity/affirmative action employer.

ADMINISTRATIVE SYSTEMS COORDINATOR
Portland State University

Portland State University invites nominations and applications for the position of Administrative Systems Coordinator. The position is responsible for the coordination of University administrative systems, including the Student Information System, requiring the use of data processing.

Minimum qualifications include a baccalaureate degree, and five years of experience as a systems analyst or specialist in administrative systems. Applicants should have demonstrated excellent communication and analytical skills, and an understanding of systems in a complex organization.

The position is available on or after July 1, 1984. The salary level is negotiable depending upon educational preparation and experience.

Closing date for applications is May 4, 1984. Nominations and applications should be sent to:

R.M. Edelgarten
Interim Vice President for Planning and Administration
P.O. Box 751
Portland State University
Portland, OR 97207

Portland State University is an Equal Opportunity Affirmative Action Employer. Qualified minorities, women and members of other protected groups are encouraged to apply.

THE RESUME SYNDROME

19 of 20 Resumes end up in somebody's wastebasket. If you want your resume to be the 1 in 20 that gets results, send $5.00 for our booklet, "How to Write A Resume." To receive a FREE COPY, attach a copy of this ad to your resume and mail it to us U.S.A. only.

SYSTEMS PROG

Join a growing team within an international financial concern. Career minded indiv. must possess background from a DOS/VSE environment; knldg JCL. Assembler language & 1+ yrs CICS experience. $30,000 FEE PAID

ROBERT HALF
OF [illegible]
[illegible]
New York, N.Y. 10022
212-421-6000 (Agency)

REGIONAL MANAGERS/ SALES PEOPLE

Dallas/Houston, Chicago, and New York City area

Genesys Software Systems Inc. has excellent opportunities for you to expand your software sales career. We are an established, successful and rapidly growing leader in Human Resource Management Systems. We have several positions open within our sales department due to our expanding plans for 1984.

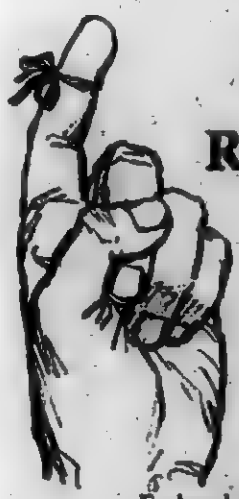
We are looking for selling Regional Managers who have at least 3 years experience managing and selling in a software environment. In addition, we would like to hire Sales Representatives with at least 2 years sales experience. Applicants for both positions should possess experience selling to top management and MIS professionals. Experience in a Human Resource environment would give a candidate a strong advantage.

As part of our expanding marketing support, we have an opening for an Assistant Seminar Coordinator to help conduct our seminars. This position will be staffed from our Chicago or Los Angeles office. This person should possess expertise in giving on-line product demonstrations to Fortune 500 executives. The ideal candidate will have at least 1 year of sales experience and will be available for extensive travel.

Our product is a state-of-the-art on-line Human Resource System encompassing Payroll, Personnel and Benefits packages. If you are interested in a career with unlimited earnings potential, as well as selling the best product on the market, then call Norman Sucher, Vice President of Sales at 617-686-6400. Your opportunity to join a sales team and be part of a company that supports you with extensive telemarketing, sales administration and product support staff is only a phone call away! If you can't phone, then send your resume to his attention at 20 Ballard Way, Lawrence, Massachusetts 01843.

Genesys
SOFTWARE SYSTEMS, INC.

An Equal Opportunity Employer



Just A Reminder!

Federal DP Expo

Computerworld will be distributing the April 16, 1984 issue from our booth. In order to take advantage of this increased distribution

Reserve space Now

Classified Advertising Deadline is Friday, April 6th

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

617-879-0700 1-800-343-6474

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

mis professionals

FMC Corporation Ordnance Division has long been the world's leading manufacturer of military tracked vehicles. The Information Resources group is expanding and wishes to invite talented Information Systems professionals who are ready to advance their careers, to join our staff.

sr. systems analysts & systems analysts IBM 3081

Positions require experience in IBM 3081, MVS, IMS environment, 3-10 years' data processing and 1 year COBOL programming background, and large mainframe data base management systems knowledge.

sr. programmer analysts & programmer analysts IBM 3081

Positions require experience in IBM 3081, MVS, with 3-10 years' COBOL programming background in an IMS environment, and knowledge of ISO, SPF, OS, JCL and utilities.

sr. data base analyst IMS

Position requires 3-4 years of IMS DBA experience with a minimum of 2 years' prior experience in an IMS COBOL environment. Should be experienced in: IMS logical and physical data-base design, performance tuning and monitoring of IMS applications systems, and all phases of DC applications development.

engineering systems consultants

The qualified candidates will have knowledge of, and "hands-on" experience in, network specification, design and analysis between CADDS, VAX and PDP 11. You must be able to provide integration for CAE, CAD, CAM and CIM. Responsibilities will include planning, monitoring and executing defined areas of Technical Computing. BSME, BSEE, BSCS or related degrees required; MBA desirable.

FMC offers an excellent salary and a comprehensive benefits package. For immediate consideration, please send your resume to FMC Corporation Ordnance Division, 1107 Coleman Avenue, Box 1201, Dept. 03-9-37, San Jose, CA 95108, Attn: Jerry Olson. We are an equal opportunity employer. U.S. citizenship or permanent residency is required.

The Performance Professionals

FMC

Marketing Communications... Key To Our Business Success

We Make Information Work

General Electric Information Services Company provides software solutions that are the heart of today's information services industry. We maintain the world's largest commercially available teleprocessing network and are pioneers in the integration of applications software, data processing and communications technology. The GE Marketing Communications experts significantly contribute to the success of our business.

Manager, Product Communications

A highly visible position with complete responsibility for the planning, development, implementation and budgeting of product marketing communications programs that reflect business objectives and marketing strategies. Direct the activities of a staff of communications specialists to establish a balanced program that uses an integrated mix of communication elements and manage the use of outside suppliers. You should have a minimum of 8 years of progressive experience in a key communications role with responsibility for promoting high technology products, including program management and budget preparation and control experience; a sound background in the selection and management of external sources, solid writing and presentation skills. Advanced degree in communications or marketing preferred.

Sr. Product Communications Specialist

Will be responsible for overall marketing communications planning and implementation for several of our major products. This will involve planning, strategizing, and the effective utilization of advertising and sales promotion, collateral materials, audio-visual media and trade shows, with full budget responsibility. Your background should include 3-5 years' sales promotion experience in data processing or a related technical industry. Good writing skills and demonstrated experience working with advertising agencies, design studios and other outside suppliers is preferred.

Sr. Press Relations Specialist

Coordinate and implement GE Information Services trade and business press relations activities. As a significant contributor to our marketing communications business, you will plan and implement press relation projects, interface with all levels of company personnel in development of press relations material, and represent our business in the implementation of those projects. The successful candidate should have 7 or more years' experience in writing and editing press releases and feature articles, demonstrated success in working with the data processing media and general business press, and the development and implementation of media relations plans and projects in a high technology industry. Experience with special events planning and management and audio-visual techniques is a strong plus.

Our Future And Yours

Our strong marketing communications program supports the major role we play in business information solutions. If you are interested in learning more about the rewards of being a GE Information Services employee, send your resume and salary requirements to: **Professional Recruiting (M-6362), General Electric Information Services Company, 401 North Washington Street, Rockville, Maryland 20850.**

GE INFORMATION SERVICES

General Electric Information Services Company, U.S.A.

An Equal Opportunity Employer

WANTED: SOFTWARE SUPPORT HEAVY WEIGHT

Continued strong acceptance of our systems software products worldwide has created an immediate need for a Software Support Engineer.

The successful candidate will have 3-5 years progressive experience maintaining, modifying, and supporting MVS systems software. Strong Assembler Language skills, and a thorough knowledge of OS/VS JCL is also required. Current experience with MVS/XA, TSO Dialogue Manager, ROSCOE, VM/CMS and COBOL would also be a plus.

This is a key position, with responsibilities for worldwide product support. You will also be responsible for identifying, designing, and implementing enhancement that keeps our product at the leading edge of large system technology. Your contributions will be highly visible in our small company, high growth environment.

For immediate consideration, call or send your resume to:

Doug Stevlin
(408) 554-8121

TriangleSoftwareCo.

4040 Stevens Creek Boulevard,
Suite 108
San Jose, CA 95129

COMPUTER SALES CONSULTANT

High commission income potential showing businesses in your area how to save on all aspects of their IBM computer operation. Call Mr. Lee.

(800) 554-8888
In AK, HI, GA
Call Collect
(404) 955-5851

Data Processing Professionals

The Professionals, a leading Northern California consulting firm, currently has several contract positions available to accomodate our expanding client base. If you are experienced in the following areas, send us your resume.

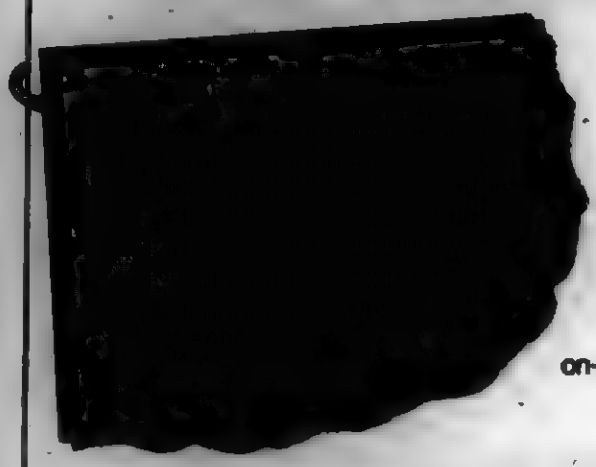
- IBM/CICS/DOS
- COBOL/VS/CMS
- IMS
- ASSEMBLER
- Networking
- HP 3000
- Banking Applications
- PC/DOS/XENIX/UNIX
- VAX/VMS/Cobol

The Professionals
Attn: Jackie Autry
COMPUTER MANAGEMENT CONSULTANTS, INC.
235 Montgomery Street, Suite 1427, San Francisco, CA 94104
(415) 397-7516

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

WE WANT WETWARE

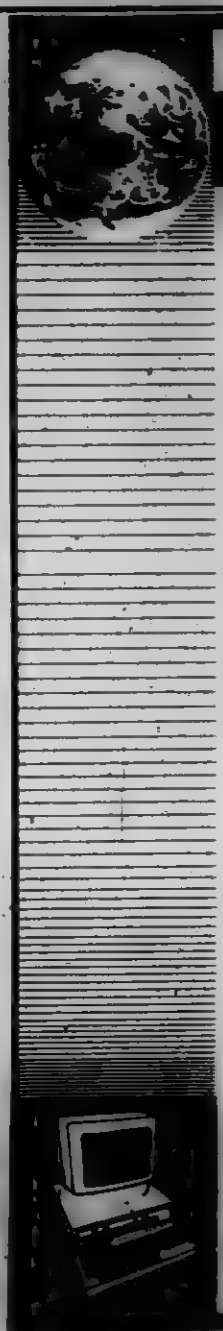
FOR OUR DATA PROCESSING CLIENTS.



CompuSearch, a division of Management Recruiters, serves the nation's top companies and they demand the best DP specialists to fill their job openings. In turn, they offer positions with meaningful challenge, on-going training and defined promotional paths.

Call toll free 1-800-227-3800, Ext. 7017

COMPU SEARCH®



enter the world of

olivetti

Where Walkmans Women And Toys Choose!

SOFTWARE DEVELOPMENT MANAGER
PC SYSTEMS

Olivetti has built an international reputation for excellence, from our corporate headquarters in Italy to our Advanced Technology Center in Cupertino. We support a $2.4 billion business in office equipment and information systems. Our advanced Technology Center is currently concentrating on the most dynamic area of information systems technology. If you are a seasoned professional with PC systems development experience, we encourage you to share in the evolution of our new personal computer. Enter the world of Olivetti!

We are looking for a uniquely qualified individual to technically and administratively manage our Personal Computer Systems Software Development Group. In this capacity, you will supervise and direct a group of 8 to 10 engineers involved with developing and porting various operating systems to our personal computer. This will include overseeing graphics, utilities and driver routine development. You must possess extensive experience with and knowledge of PC systems, as well as a familiarity with 8088 and Z8000 microprocessors, UNIX, and various other operating systems such as MS-DOS and CP/M-86. Technical project leader or supervisory experience and good interpersonal and communications skills are also required. An MS degree in Computer Science is preferred.

Enter the world of Olivetti—and share in world-wide technological achievement within a supportive Cupertino environment. We'll offer you a competitive salary and a complete benefits package, which includes four weeks paid time off. To apply, please send your resume to Professional Employment, Department 14, Olivetti ATC, Inc., 10430 South De Anza Blvd., Cupertino, CA 95014. EOE

HP 3000

San Francisco Bay Area

Our clients have Sr. Analyst/Programmer/Team Leader positions open that have 4+ years experience in design and implementation of business systems using COBOL, IMAGE. $30-40K plus good benefits. Call collect or send resume to:

GENTRY INC.
Personnel Services
430 40th Street
Oakland, CA 94609
(415) 547-6134

Academic Programmer

Multi-talented person to work effectively in fluid and arts environment. Main role: working with faculty and students to encourage wise use of small college's growing computer facilities. Important aspects of position: Supervising student systems programmers, assisting Director with Manager in supervision of DEC VAX 11/780 systems with CEDIAL, systems programming, documentation, and teaching one section of Intro Computer Science or equivalent. Experience with DEC systems, Pascal, Fortran, telecommunications, networking, natural Dialog, and graphics are plusses. Review of applications begins April 30th. Send resumes to: George Silver, Director of Computing, Earlham College, Richmond, IN 47374. AA/EOE.

Marketing Mgr., German, 45, full P & L responsibility in present job, proven success in various segments of the computer market, specifically in establishing and expanding sales organizations, seeks new, exciting challenge, e.g. introduction of new hard- or software products. Reply to:

CW-84501
Computerworld, Box 880
Framingham, MA 01701

DATA PROCESSING MANAGER

Rapidly-growing firm with $150mm annual sales seeks DP Manager. Position reports to top management and oversees staff of 14. Systems include PJE to IBM 3083 and 3081, CICS/VS, COBOL, and major point-of-sale/inventory control programs. Requirements include 5 years in systems development/programming, 2 years of which were supervisory. Degree or equivalent experience also req. Full benefits, relocation assistance, and strong salary in $37K to $50K range. Submit resume and current salary data to:

Personnel Department
Home Color and Liquor Control
1918 SE Hulman
Anderson, IN 46017

Equal Opportunity Employer

FIELD ENGINEERS

Dataserv Computer Maintenance is expanding nationwide. We now have immediate openings in major cities and will be adding more in the near future.

These are key positions and provide excellent opportunities that will lead to further promotion in a fast growing company. Excellent compensation plan and good fringe benefits for experienced individuals. Your potential for personal advancement with a $100 million plus company is the greatest right now as we expand.

We now have an immediate opening in:

Omaha, Nebraska - Customer Service Representative required for a large data center with IBM 3033 Mainframe. Experience on 3420's, 3350's and printers essential.

Dataserv will soon have additional opportunities for field engineers and technical specialists in several other major cities throughout the United States. If you are considering a change in employment, contact Dataserv for a review of what we have to offer.

For immediate consideration and more information call Toll Free — 800-328-6729 or send your resume to: Bev Walters, Dataserv Computer Maintenance, Inc., P.O. Box 3003, Hopkins, MN 55343. We are an equal opportunity employer and all inquiries are considered confidential.

dataserv

HIRING?

More computer people read Computerworld than any other newspaper in the United States - more than half a million computer people every week. And, among our 529,650 readers at user organizations, about half claim to look at recruitment ads at least every other week (only a small percentage say they never look at recruitment ads). No wonder Computerworld carries more recruitment ads for computer people than any other publication. To place your ad or to get a rate card with complete details on Computerworld Classifieds, call or write:

Classified Advertising
Computerworld
Box 880
Framingham, MA 01701
1-800-343-6474 617-879-0700

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

GROW IN A RARE ENVIRONMENT

EDP PROFESSIONALS

If you're a top flight, top 10% achiever in your profession, here's an opportunity to work with the innovative leader in the New England financial community.

A structured analysis and project management philosophy, where you can participate in every project phase, forms the foundation of the systems development process at Bank of Boston. We have openings for professionals with 1-8 years of experience in:

- **Systems Development.** You will work with IBM 3033, 3081, MVS, FOCUS, TSO/SPF, IDMS DB/DC, MSA and UCC applications packages and a host of additional specialized packages.
- **Systems Research.** Projects will involve Wang OIS Office Systems, IBM, Apple, Wang, DEC, TRS-80 and Compaq PCs.
- **Telecommunications.** We'll give you project design and implementation exposure to both SNA-3705, and LAN pack switching, x.25, communications technology.

Bank of Boston offers the comprehensive benefits program you deserve. Join us now while we develop major new projects in an expanding industry—changes that require the best minds in EDP. If you are that top 10% individual, and you seek real challenge and career flexibility, write to Thomas Matera, Bank of Boston, P.O. Box 1976–C, Boston, MA 02105.

BANK OF BOSTON

An Equal Opportunity Employer M/F. ©1984 The First National Bank of Boston

IDMS

SPECTRUM TECHNOLOGY, INC. a leading DATA BASE consulting firm is seeking a senior IDMS consultant. The successful candidate will have extensive experience with the following:

- **IDMS DB/DC**
- **IDD**
- **ADS/O**

SPECTRUM is expanding it's presence in the IDMS MARKETPLACE. This lead technical person will provide direction for this endeavor. Project management and training are possible areas of increased involvement. This person will also play a role in our expanding efforts in the relational data base field.

SPECTRUM also has opportunities for IMS Consultants in both our Florham Park, New Jersey and Orlando, Florida locations.

Interested candidates should call TOM CLEARY, at (201)-966-8510 or send a resume to:

Spectrum TECHNOLOGY, INC.
246 COLUMBIA TPKE., P.O. BOX 430
FLORHAM PARK, N.J. 07932

Equal Opportunity Employer M/F

Codex Communicates Success.

For over 20 years, Codex has communicated success. In data communications. In computer networking. In career opportunity. You can be an essential contributor to our continued success. Join us in one of the following positions.

Principal Support Engineer

You will be responsible for both pre-and post-sales support of the T1 Mux, to insure total customer satisfaction with advanced Codex communications solutions. To qualify, you should have a BSEE plus a minimum of 5 years of sales support experience. An in-depth knowledge of T1 Carriers, PBX interfaces, product design and data communications systems problems is essential. Excellent communications and interpersonal skills are a must.
Contact Paul Johnson.

Manager—Systems Integration & Applications

You will manage the day-to-day department operations, both technical and administrative, of the Systems Integration and Applications group. The group's primary function is to insure the technical integrity of communication systems that meet specific customer needs. The engineers in this group have responsibility for the design, integration, installation, and acceptance of major communication systems; pre- and post-sales, engineering support (consulting); and custom engineering of systems products or specials. Minimum of 5 years of applicable experience in the telecommunications/data communications field which must include at least 3 years of managerial experience.
Contact Paul Johnson.

Engineer—Systems Integration & Applications

You will provide the engineering support necessary to successfully integrate and install major communication systems. Individual has opportunity to provide pre- and post-sales engineering support, and design and support customer specials (RPQs). Individual will primarily work in conjunction with a project engineer. Minimum of 3 years experience in the telecommunications/data communications environment. BS in Engineering/Computer Science or equivalent in years of experience. Knowledge of protocols; exposure to datacomm applications, field service or application engineering experience a plus, but not necessary.
Contact Paul Johnson.

Principal Software Engineer

You will work with Codex professionals in the development and enhancement of communications software for network processors. Specific duties include coding programs and tools in "C" and Assembler languages, performance benchmarking and analysis of UNIX™ operating systems and working with users to ensure the optimum performance of internal communications software. To qualify, you must have a BSCS or its equivalent, plus at least 7 years of programming experience utilizing a high level language (e.g. PASCAL). An in-depth knowledge of UNIX™, "C" Language, and proper coding and documentation techniques is essential.
Contact Bob Lippman.

Please forward your resume to CODEX CORPORATION, Dept. 288-336, P.O. Box 567, Canton, MA 02021, to the attention of the appropriate individual.

codex
A Subsidiary of MOTOROLA INC.

An Equal Opportunity/Affirmative Action Employer (M/F)

"Unix is a trademark of Bell Laboratories.

DIRECTOR OF ACADEMIC COMPUTING

St. John's University/College of St. Benedict, catholic liberal arts institutions, are seeking applications for the position of Director of Academic Computing—a joint position for the 2 schools. Position reports to the Vice President of Academic Affairs. Responsibilities include directing diverse computer applications, developing faculty computer applications, developing and implementation of a 5 year plan of computer use on the 2 campuses. Minimum of bachelors degree, teaching experience and demonstrated management and communications skills desirable. Forward resume and credentials to: Director of Personnel, St. John's University, Collegeville, MN 56321. Applications received after April 30, 1984 cannot be guaranteed consideration. Women & minorities are encouraged to apply.

The Computer Services Areas at Central Missouri State University has immediate openings for two System Programming Positions.

System Programmer II:
BS in Computer Science or equivalent curriculum required. At least four years of system programming experience. Specific knowledge of DOS/VSE, CICS/VS, DLA, and VM/SP installation and maintenance required.

System Programmer I:
Minimum of two year data processing degree required. Minimum of two years experience as System Programmer. Specific working knowledge of DOS/VSE and VM/SP required.

Send current resume by March 30th to: Central Missouri State University, Personnel Office, Admin. Bldg., Rm. 106, Warrensburg, MO 64093

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

Sohio

Discover Sohio in Dallas, Texas

Opportunities exist in our Geophysical Systems Development staff for individuals with experience in seismic systems development to develop state of the art seismic processing systems in a DEC VAX 11/780 - CRAY IS/X-MP environment.

The successful candidates will work within a structured analysis and design project team environment to provide seismic systems development support for the Geophysical Research and Development staff at Sohio's Technology Data Center in Dallas.

CRAY Software Optimizing Analyst

BS (MS preferred) in computer science, math, physics or geophysics with at least 2 years' code optimization experience on CRAY IS/X-MP systems is required. Experience with DEC systems (VAX-11/750, VAX-11/780) and FORTRAN '77 is preferred. Previous experience with seismic software development and geophysical signal processing is desirable.

Individuals should have interpersonal skills to effectively interact with Sohio's Geophysical R&D staff. Project management skills helpful.

It's time to consider joining the Sohio adventure where the compensation package, including benefits, is outstanding. The opportunity for visability is unequaled and — to top it off — Sohio has one of the best relocation programs in the industry. To find out more, send your resume, complete with salary history to: Dan Allman, SOHIO PETROLEUM COMPANY, Dept. D078, 5420 LBJ Freeway, Suite 800, Two Lincoln Centre, Dallas, Texas 75240.

Equal Opportunity Employer M/F/H/V.
Principals Only Please!

Your search leads to Sohio SOHIO

Technical Support Manager

Our client, an international service organization, seeks a seasoned professional for this challenging position. Responsibilities include the development of new programs for technical problem-solving and decision support. A background in VM or MVS operating systems is preferred. TSO is a plus. IBM, DEC and WANG environment. Full relocation package available. First years earnings to $60,000.

Project Leader

Our client, a growing New England-based firm, is seeking an individual with leadership potential for this key position. A take-charge attitude and a solid COBOL background, preferably in a DOS/VSE environment, are required. Responsibilities will include all new on-line developments in the manufacturing area. IDMS training will be provided if necessary. Full relocation package available. First years earnings to $35,000.

Fortune Personnel Consultants of Nashua
305 W. Hollis Street, Dept. C
Nashua, New Hampshire 03062
(603) 880-1900
All Company Paid Fees

NATIONAL ACCOUNT SALES MANAGER

Develop and implement national marketing plan to sell software to other computer manufacturers, system integrators and software developers. Requires previous computer sales experience, preferably with large accounts and understanding of communications and the retail computer marketplace are a plus. Send resume to: IBM/Basic Four Business Products, PO Box 9308, Albuquerque, NM 87119, Attn: VAR Marketing, 256-527.

IBM/Basic Four Business Products

MANAGER COMPUTER OPERATIONS

Fortune 500 Blue Chip Company opportunity growth position for professional with four plus yrs exp in management of computer operations. In charge IBM multi-main frame environment. Will supervise a staff of 30. Previous experience in networking preferred. Comprehensive compensation package. Salary 40-50K plus incentive plan. Fee paid. Contact Jay Reece or Ms Neyhouse at 513-224-0808.

Announcement by
ROBERT HALF, INC.
P.O. Box 799 MinCity Station
Dayton, OH 45402
Personnel Consultants

ACADEMIC COMPUTING OPPORTUNITIES

Academic Computing Services at the University of Delaware invites applications and nominations for two management positions: Assistant Director and Manager of Technical Services. The positions are available immediately.

The University of Delaware is embarking on major enhancements to academic computing: installation of an IBM 3081D running VM/CMS, additional hardware to augment the current UNIX service on two VAX 11/780s and two VAX 11/750s, development of microcomputer use and additional staff for Academic Computing Services. These changes are part of a plan to provide computing as an integral part of all academic programs at the University, both in research and instruction.

The two persons sought will provide leadership in providing a good computing software and hardware environment for the academic program. In addition, the two persons will assist with the orderly transition from the current equipment to the new.

The Assistant Director will work with the Director and Managers to formulate policies for the new VM/CMS service and to formulate a coherent, campus-wide approach to computing with mainframes and microcomputers. Networking to support such an integrated service and the development of personal workstations with UNIX and VM/CMS are two important parts of this campus-wide plan.

Candidates for Assistant Director should have the equivalent of a Ph.D. with 3 to 4 years related experience or a Master's degree with over 5 years related experience. Course work must be in a related field. Experience in a management capacity and experience in instructional or research computing is required. Candidates should possess strong communication skills.

The Manager of Technical Services will be responsible for the detailed planning and delivery of operating system support for VM/CMS and UNIX as data communication services. A major responsibility will be the development of staff to support these efforts. There are currently nine persons in this group and several new positions are to be added.

Candidates for Manager of Technical Services should have 3 to 5 years experience in operating systems or communications support, preferably in an academic computing environment. A Master's degree or equivalent is required as are strong management and technical skills. VM/CMS experience is highly desirable.

Resumes and the names of three references should be sent by April 13, 1984 to Ms. Jane S. Cashman, Director, Academic Computing Services, UNIVERSITY OF DELAWARE, 005 Smith Hall, Newark, DE 19716.

The University of Delaware is an
Affirmative Action/Equal Opportunity Employer

COMPUTERWORLD CLASSIFIEDS WORK!

- POSITION ANNOUNCEMENTS
- BUY SELL SWAP
- SOFTWARE
- SOFTWARE WANTED
- TIME & SERVICES
- REAL ESTATE
- BUSINESS OPPORTUNITIES
- SEMINARS/CONFERENCES
- BIDS AND PROPOSALS

It's easy to advertise in COMPUTERWORLD. If you don't have an advertising agency to supply us with copy, layout and order, or camera ready mechanical, stat or film negative of your ad, just call one of our ad-takers at 1-800-343-6474. They will be glad to take your ad and typeset it in available fonts at no extra charge. If you have lengthy ads that require logos and artwork, just send a clean typewritten copy of your ad to the classified advertising department at Computerworld (telecopier service is available); note the ad size you want; and, if you want your company logo to appear in your ad, please be sure to include a camera-ready copy with you insertion order. You should also supply any special borders, headlines and artwork that you want in your ad. Our Art Department will follow your suggested layout as closely as possible if you wish to send one.

To reserve space for your ad, or if you'd like more information on Classified advertising in COMPUTERWORLD, call or mail your advertisement to us.

Computerworld
375 Cochituate Road
Box 880
Framingham, MA 01701

800-343-6474
Telecopier service - (617) 879-0700

These positions pay up to $60K base salary per year tax free. Our 2 year contract includes 45 days annual vacation, free housing, medical, subsistence and local transportation allowance. Minimum 18 days holiday time and one paid trip home per year are also included. Married status will be considered. The General Organization for Social Insurance (GOSI) has immediate urgent openings for:

Data Base Administrators

Minimum 5 years experience on ADABAS running on IBM 4341 and 3083, MVS and complete TP monitor.

Systems Programmers

Minimum 5 years experience on IBM 4341 and 3083 to be converted from VS1 to MVS/VTAM.

Send your resume or call Will Gordon

Al-Khaleej Computers & Electronics Systems
C/O Intertech Corporation
2 W. Potomac Pkwy.
Williamsport, MD 21795
(301) 223-8400

Candidates interested in other positions in Saudi Arabia should send their resumes for numerous other opportunities currently available.

Equal Opportunity Employer

DATA ADMINISTRATOR

One immediate vacancy in a growing multi-computer environment found with the typical metropolitan congestion of Southern California.

Requires 5 years in data base administration and 3 years experience in standards and procedures or quality assurance. Data base applications must be on at least one DBMS of the following: IBM: MODEL 204 (preferred), IDMS; DATACOMDBC; ADABAS; or other licensed for DBMS's. HP: IMAGE (preferred), TOTAL. Data or other licensed for DBMS's. Most candidates will have experience in both IBM and HP DBMS's. Salary $30-35K DOQ. Apply immediately.

COUNTY OF VENTURA
PERSONNEL DEPT.
800 South Victoria Avenue
Ventura, CA 93009
AA/EOE (805) 654-2961

Contract Programmers

Computervision, a national software contract services company, has continuing needs for Programmers and Software Engineers with any of these backgrounds:

- Motorola Assembly Language
- DEC VAX/VMS or RSX-11/M/M+
- ATE/ATLAS Programmers
- Telephony/Telecommunications Appls.
- UNIX Applications Interests

Rates $35-$45 per hour and many Benefits Nationwide.

Call or send resume to:

Computervision
13601 Preston Road, Suite 300
Dallas, TX 75240
(214) 669-6321

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

COMPUTER POWER GROUP PTY LTD

CONTRACTS IN AUSTRALIA
- MODEL 204 DBMS -

Computer Power Group, agent for the Model 204 Data Base Management System, is looking for a range of computing professionals for one year assignments in Australia. Essential qualifications are that the candidates should have at least 12 months experience in the use of M204 and that they are available to commence work in Australia within the next 3-6 months.

The jobs are with Australia's Federal Department of Social Security which has recently ordered 7 large Amdahl mainframes and more than 400 Wang VS processors. This equipment will support a state-of-the-art system making innovative use of Model 204.

The assignments are in Canberra which is Australia's national Capital, a modern city of 250,000 people. Living conditions are attractive. Canberra is only 2 hours by car from mountains which provide good trout fishing in the summer and skiing in the winter. Canberra is also only 2 hours by car from Australia's east coast and the Pacific Ocean.

Remuneration for the assignments ranges from $A30,000 to $A50,000, depending on skills and experience, which compares with the national average income of about $17,000.

Our need is urgent and one of our consultants will be conducting interviews in the U.S. at the end of March, beginning of April.

If you are interested in one of these assignments please call our U.S. office on 214-556-2930.

CONTRACT ASSIGNMENTS IN SYDNEY AUSTRALIA

Experienced 'HOGAN' analyst/programmers required for 12 month minimum contracts. HOGAN experience essential, flexible start dates. Return air fares, etc.

KAPITI FOREIGN EXCHANGE SYSTEM

Analyst/programmer required. Immediate start, 6-12 month assignment. 'Kapiti' experience essential.

JOINT VENTURE

Combining the best of both worlds.

Based in Central London, Computastaff Limited are one of the largest British, independently owned consultancies specialising in the recruitment of contract and permanent data processing personnel.

Working on behalf of blue-chip clients, we currently have 15 sales personnel employing more than 200 consultants worldwide, with our success being reflected in billings in excess of $7 million. To meet our objectives in the medium term, we are looking to expand our international contract activities by establishing a compatible and mutually beneficial link or partnership with a similar consultancy or agency operation based in New York or on the Eastern Seaboard. In forming such a relationship we envisage a split profit/overhead arrangement subject to individual requirements.

Priority will be given to such organisation which can demonstrate a combination of professionalism, market knowledge and growth potential.

To explore this exciting opportunity, principals only should apply to:

COMPUTASTAFF

Christopher Gibbs (Director),
Computastaff Limited, Livingstone House, 11 Carteret Street,
London, SW1H 9DJ, England.
Telephone: 011 44 222 6722. Telex: 894364.

SOFTWARE

Spokane

WE'RE CHANGING THE PACE OF BANKING!!!

ISC Systems Corporation, the leader in microprocessor-based terminal systems for the financial industry, has outstanding opportunities for SOFTWARE PROFESSIONALS to join our expanding Spokane Operation.

We are seeking:

SOFTWARE ENGINEERS with 2-4 years' microprocessor experience preferrably in assembly language. You must have a BSCS or a BSEE.

BANKING SPECIALISTS with 4+ years' experience on credit systems, deposit systems, commercial lending systems and branch banking administration. BSCS/BSEE.

SOFTWARE INSTRUCTORS with 2-4 years' experience developing and presenting technical courses to technical people. You must have software experience. BSCS/BSEE.

FIRMWARE ENGINEERS with 2-5 years' direct firmware experience for disc controllers. Microprocessor experience required; assembler preferred. BSCS/BSEE.

SOFTWARE DEVELOPMENT ENGINEERS with 5-7 years' microprocessor experience with operating systems, networks, data communications, languages and file-server applications. BSCS/BSEE.

If you are interested and qualified, call TOLL FREE to schedule your interview:

1-800-541-2300

Or, send your resume immediately to: **BILL BAUMANN,**

ISC SYSTEMS CORPORATION
P.O. Box TAF C-8
Spokane, WA 99220
equal opportunity employer

WASHINGTON D.C.

DBA

Rapidly growing Fortune 100 service company seeks outstanding IMS Manager. Five years of hands-on database experience using IBM 3083 with MVS required. Degree preferred. $40K.

ROBERT HALF
OF WASHINGTON, INC.
7316 Wisconsin Ave., Ste 401
Washington, D.C. 20014
(301) 656-1601

FACULTY POSITION

Georgetown University, an undergraduate university of approximately 1400 students, affiliated with the Lutheran Church in America, invites applications for a faculty position teaching undergraduate courses in computer science and mathematics. Doctorate preferred but others may apply. Strength in computer science is essential. Academic rank will be Assistant Professor, unless credentials are unusually strong. Salary is competitive and dependent upon qualifications. Position begins September 1984. Women and minority applicants are especially encouraged.

Candidates should send resumes plus three letters of reference by April 4, 1984 to Dr. Frank Rancer, Dean of Arts and Sciences, Georgetown University, Pennsylvania, PA 17578. An Equal Opportunity, Affirmative Action Employer.

INSURANCE SYSTEMS
Sun Belt Locations

Our clients have many immediate needs for experienced insurance data processing professionals.

Opportunities include:

- Programmers
  ALC, COBOL, CICS
- Systems Designers
  Life-Comm, Life/70, Large Systems Design
- Consultants
  Heavy Life Investment with travel

Interview and relocation expenses paid.

For details, call collect or mail resume to:

Don Blevins Associates
3565 Piedmont Road
Suite 105-J
Atlanta, GA 30305
(404) 449-6011

Computer Systems Analyst - To design and implement computer systems through analysis of customers requirements for mailing, subscription fulfillment, accounts receivables, advertising and marketing; guiding and instructing console operations and programmer personnel. Basic 40 hour week, 8:30 am to 5:30 pm, salary $12.66 per hour. Required, 6 years college, Master's Degree in Computer Science. Send resume to MESC, 7310 Woodward Ave. Room 415, Detroit, MI 48202. Reference #8884. Employer paid ad.

SUNBELT * HIGH TECH
MICRO-MINI S.W.
$30K to $60K

Data Com, Telecom, SCADA, Graphics, CAD/CAM, Oils. Auto – op. systems, appl. dev. tools, util. supp. – C, PASCAL, ASSEMBLER, FORTRAN – P/A's, S/P's, SW. Eng's, Prod. Leaders.

Call Collect 214-638-1821
Sally Klug, CPC
KING COMPUTER SEARCH
9221 LBJ Freeway, Suite 248
Dallas, Texas 75243

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

SOFTWARE ENGINEERS

UNIX*, C, PDP11, M68000

Opportunities in Rochester, New York and Reston, Virginia

Computer Consoles Inc. designs, develops, manufactures, markets, and services a variety of minicomputer-based fault-tolerant information systems. Headquartered in Rochester, New York, we have all the cultural and educational advantages of a large metropolitan area as well as the ambience and scenic beauty of a small, relaxed town. Our new Office Systems Group is located in lovely northern Virginian Fairfax County just minutes away from our nation's capitol.

CCI currently has immediate opportunities for:

GROUP LEADERS/SOFTWARE ENGINEERS

You'll be responsible for the design and implementation of data base applications and utilities, or fault-tolerant operating system development including development of a multiprocessor UNIX-compatible transaction processing system.

We prefer a technical degree plus a minimum of 2 years' experience. Knowledge of C, UNIX, and data structures plus experience with data bases in a minicomputer Real Time or on-line environment and/or OS internals are also desired. U.S. citizenship or permanent residence is a must.

*UNIX is a trademark of Bell Labs

We offer opportunities for growth plus attractive compensation and benefits including relocation.

For immediate confidential consideration, please forward your resume including salary history to the location of interest to you.

CCI COMPUTER CONSOLES INCORPORATED

S.C. Hoskins
Computer Consoles, Inc.
97 Humboldt Street
Rochester, New York 14609

G.C. Alimonda
Computer Consoles, Inc.
1750 Reston Avenue
Reston, Virginia 22090

Equal Opportunity Employer M/F/H/V

SENIOR ENGINEER

VAX Systems Support

The Engineering Computer Center, serving both our Fairchild Space and Fairchild Communications & Electronics divisions, has a wide spectrum of capabilities supporting over 300 engineers.

We have an opening for a Senior Engineer whose activities will include assisting and supporting engineers in usage/problems with the VAX, hardware/software maintenance, system programming as needed, VAX system training, system/network performance tuning, communications support, assistance with system planning, development and daily operation of the Center.

The successful candidate should have a BS in Computer Science plus 3-5 years' experience using FORTRAN, MACRO, and/or PASCAL. 1-2 years of VAX system management experience is highly desirable.

We offer competitive starting salaries and excellent company benefits that include paid life and health insurance plans, educational assistance, stock plan, retirement, etc. Please forward your resume, including salary requirements, to Professional Employment, Fairchild Industries, Mailstop A-24, 20301 Century Blvd., Germantown, MD 20874-1181, Dept. CW-15.

FAIRCHILD INDUSTRIES

An Equal Opportunity Employer

It's Your Move.

TRW Information Services Division offers growth-oriented career opportunities and a chance to make the move you've always wanted to make. Imagine Southern California. . . long sunlit beaches with cliff-top views. . . plus mountain resorts . . . the wide open splendor of wind swept deserts. . . all just a breeze away from TRW ISD, nestled in the heart of beautiful Orange County. Now is the time to make the move to a land where dreams are lived to the fullest, with a company that values and rewards the talent you bring. Consider these opportunities with the leader in computer based information services.

Senior Programmer Analysts

Requires five years of large scale IBM programming experience in either ALC/BAL or COBOL. Must be able to work in a new development environment taking a project from the design stage through implementation. Structured design and programming methodologies desirable.

You will work in a modern environment with the latest in state-of-the-art hardware and software: IBM 303X's, MVS/XA, TSO/SPF, CICS and the largest IMS data base in the U.S.!

We offer competitive salaries, outstanding benefits and a complete relocation package. Send your resume today. . . and come express yourself. Tomorrow is taking shape at a company called TRW.

Deanne St. John
TRW-ISD
505 City Parkway
W, Suite 106C
Orange, CA 92668

TRW

Equal Opportunity Employer

SYSTEMS PROGRAMMER

An outstanding opportunity exists for an individual who possesses a strong background in DOS/VSE, DMS, CICS, COBOL & 4341, to work in a new installation with tremendous growth potential.

Knowledge of VM is a plus. The successful applicant will have the opportunity to learn a variety of state-of-the-art software products such as PROFS, SQL, ADRS, APLICS, GEDIM, etc. In an "INFORMATION CENTER" environment. The individual we seek must be responsible, self motivated, eager to work and learn and possess very good working habits.

We offer a competitive starting salary PLUS an outstanding benefits package. Interested applicants should submit their resumes and salary requirements to:

COUNTY OF ATLANTIC
OFFICE OF PERSONNEL
1335 ATLANTIC AVENUE
SUITE 600
ATLANTIC CITY, N.J. 08401

We are an equal opportunity employer, M/F

We are seeking persons to fill positions in three different areas of expertise. Each position requires a minimum of five years of programming experience as well as specific knowledge as listed.

Systems Programmers: VM, DOS/VSE and/or VS1

Programmer/Analysts: ADABAS, COMPLETE and/or NATURAL, programming and experience at Installing Financial Packages

Programmer/Analysts: BASIC and BASIC on a HP3000

Programmer/Analysts: COBOL, RPG and/or CICS

If you are interested in either full time employment or a contractor arrangement, please send your resume to:

GUNTEN SYSTEMS, INC.
4414 CENTERVIEW, SUITE 340
SAN ANTONIO, TEXAS 78228

SYSTEMS ANALYST/ PROGRAMMER, SR.

- Analyses procedures & problems relating to ACP systems. Provides programming & systems design support throughout development of new subsystems. Specifically responsible for Communications Control Program & data communication protocols, including Synchronous Link Control & Airlines Line Control. Must have experience with network terminal interchanges. B.S. Computer Science + 2 years exp. OR 4 years combination education & experience + 2 years experience. $34,500 Per Year. Send cv & resume to Box # CW-84592, Computerworld, Box 880, Framingham, MA 01701.

PROGRAMMERS
PROGRAMMER/ANALYSTS
SOFTWARE ENGINEERS

BELCAN CORPORATION is seeking experienced Programmers, Programmer/Analysts and Software Engineers to work on contract assignments in the Midwest. Individuals must have experience with 1 or more of the following hardware: IBM, Honeywell, Prime, Wang, Gould, and the following software: COBOL, PL/1, and ASSEMBLY.

Please mail resume to:

Raymond Belcan
BELCAN CORPORATION
P.O. Box 46177
Cincinnati, Ohio 45246
or call: 1-800-543-4648
In Ohio: (513) 891-0972
Equal Opportunity Employer

PROGRAMMER/ANALYSTS

SIMPLY INCREDIBLE OPPORTUNITIES

are waiting for you at CHI-CHI's

Join the fastest growing, full-service restaurant chain in the U.S.A. We are looking for experienced programmer analysts. One year + System 38 RPG III. Additional experience in System 3/34/36 RPG II will be a plus.

If you have this experience coupled with a strong business sense and a desire to take charge of a project and see it through to the finish, we want you.

- Salary commensurate with experience.
- Excellent benefits.
- Degree preferred, but experience counts.

Send resume to:
Art Schmitt, Ph.D.
Director of Human Resources
CHI-CHI's
P.O. Box 32338, 10982 Shelbyville Rd.
Louisville, KY. 40232

There's No Time For DOWNTIME!

So while the industry works on your system's problems, let us work on your business problems. Advertise in—

COMPUTERWORLD CLASSIFIEDS!

One insertion will let a potential audience of over a half a million readers know what you are looking for or have to offer. Whether you are looking to recruit computer professionals, want to buy, sell or lease equipment, have computer time or services to offer, or software packages to sell, and more, Computerworld Classifieds will help you get a lot of exposure and get things done faster.

The open line rate is $6.15 per line and there is a minimum size of 1 column by 2" at a cost of $256.20. We can accomodate up to 5 columns and depth measurement increases by half inch increments.

Ads may be mailed in, clearly typewritten, with a letter stating the size desired and the issue in which it is to be run. Our team of adtakers will take ads that require no artwork or borders over the phone. We also provide telecopier service.

Any borders, logos, or artwork should be sent in with your ad and must be dark and clear enough to be reproduced.

Computerworld comes out every Monday and our deadline for receiving ads is 10 days (or six working days) prior to the issue date desired.

First time advertisers must send payment along with their first ad.

Our mailing address is:

Classified Advertising
Computerworld
Box 880
375 Cochituate Rd.
Framingham, MA01701

800 343-6474
(617) 879-0700

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 709 FRAMINGHAM, MA 01701

postage will be paid by

CIRCULATION DEPARTMENT

COMPUTERWORLD

375 Cochituate Road, Rte. 30
Box 897
Framingham, MA 01701-9985

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

DATABASE ANALYST

Tesoro Petroleum Corporation is a multi-billion dollar integrated natural resource company engaged in various segments of the energy industry including refining; marketing and transportation of crude oil supplies; leasing of oilfield service equipment; contract drilling of oil and gas wells, exploration, development and production of crude oil and natural gas.

We are currently seeking a Database Analyst, for our Management Information Systems Department headquartered in San Antonio, Texas.

The position has been created by the company's recent commitment to using ADABAS, NATURAL, COM-PLETE, and CICS in a large IBM main frame environment. Responsibilities will include maintaining the availability and integrity of the ADABAS data bases. Other responsibilities will be to enable TESORO to realize the full benefits of using a 4th generation language and data base technology.

A BS or BA degree, preferably in Computer Sciences or Business, is required plus a minimum of 3 years relevant data processing/database design experience. Excellent communication skills, experience with database design methodology is necessary. Knowledge of ADABAS internals and NATURAL programming is required with knowledge of COM-PLETE helpful.

We offer excellent salary, benefits, relocation and career opportunity.

If you meet the above requirements, send your resume in strictest confidence to:

Steven L. Varga
Manager, Employment and Development

TESORO PETROLEUM CORPORATION
Equal Opportunity Employer M/F/H/V

TESORO

8700 Tesoro Drive
San Antonio,
Texas 78286

Sohio

Geophysical Software Professionals

Discover Sohio in Dallas, Texas

Opportunities exist in our Geophysical Systems Development staff for individuals with experience in seismic systems development to develop state of the art seismic processing systems in a DEC VAX 11/780 - CRAY IS/X-MP environment.

The successful candidates will work within a structured analysis and design project team environment to provide seismic systems development support for the Geophysical Research and Development staff at Sohio's Technology Data Center in Dallas.

Geophysical Systems Analyst

Requires expertise in using structured analysis and design techniques to analyze, design, specify and test state of the art seismic systems for Sohio's aggressive exploration programs.

Minimum 3 years' experience in seismic software development including time series analysis or geophysical signal processing is required.

Individuals should have above average skills in interpersonal relations, written and oral communication. Project management skills are also desirable.

Geophysical Data Base Analyst

Requires expertise in using structured analysis and design techniques to analyze, design, specify and test geophysical data base management systems for use with state of the art seismic interpretation systems.

BS or MS degree in computer science, math or related field is required. Minimum 3 years' training and experience in the analysis, design, specification and testing of software systems under a structured environment is required.

Individuals should have above average skills in interpersonal relations, written and oral communications. Project management skills are desirable.

All positions require familiarity with FORTRAN '77. Experience with DEC (VAX-11/750 & VAX 11/780) and CRAY IS/X-MP systems is desirable. DEC assembler, DEC systems internals, data base management systems, graphics software and hardware experience is preferred.

It's time to consider joining the Sohio adventure where the compensation package, including benefits, is outstanding. The opportunity for visability is unequaled, and to top it off, Sohio has one of the best relocation programs in the industry. To find out more, send your resume, complete with salary history, to Dan Allmen, SOHIO PETROLEUM COMPANY, Dept. D072, 5420 LBJ Freeway, Suite 800, Two Lincoln Centre, Dallas, Texas 75240.

Equal Opportunity Employer M/F/H/V.
Principals Only Please!

Your search leads to Sohio

SOHIO

New Challenges, Outstanding Rewards.

OSI's automated wafer inspection stations are the best available, offering advanced technology, high performance and reliability, and superior quality. The success of our product line is boosting our growth dramatically, creating new challenges for engineering professionals who can contribute and share in our exceptional future. Grow with OSI as we expand into new product areas, and discover the personal and professional rewards we offer to those who help shape our future.

Software Engineer

You will work with the design group and be responsible for new and current products. You must have a working knowledge of assembly language of Intel based systems and a BSEE or equivalent experience.

OSI offers a people oriented corporate culture along with outstanding compensation and a benefits package which includes stock purchase plans, profit sharing and full medical/dental/life insurances.

Discover the challenges, along with the outstanding rewards at OSI. Send your resume in confidence to Lydia Giles, Dept. CSE, Optical Specialties Inc., 4261 Technology Drive, Fremont, CA 94538. We are an equal opportunity employer.

OSI Optical Specialties Inc.

DATA PROCESSING PROFESSIONALS

DATA RESOURCE CORPORATION, headquartered in Atlanta, is a leader in quality Contract Programming and Consulting. Our growth in the Southeast and Southpost has created opportunities for versatile Professionals with state-of-the-art skills in Programming and Systems Design.

We are seeking individuals who desire to work in various stimulating Data Processing environments. MIS and CICS skills are of special interest, as are the abilities to travel or relocate.

We offer you competitive salaries and comprehensive benefits programs, including bonuses and profit sharing, and overtime pay. If you are searching for a growth opportunity with a dynamic and progressive company with a Management team that "puts people first", then DRC is your answer.

For immediate consideration, send resume to 3281 Buckeye Rd., Suite 103, Atlanta, GA 30341, or call BECKY FINLEY or JIM BARRETT at 404-455-7288, or toll free:

1-800-241-6962

DRC

EOE

Business Systems Planning

The Information Network Services Group of Computer Sciences Corporation has an immediate need within its Commercial Contract Services organization for an experienced senior professional in Business Systems Planning. Position requires relocation OR extensive travel to Rochester, New York.

Will interface directly with our Customers' senior management in strategy development for Business Systems Planning Process. Develop business reasons and objectives for BSP tailored to the Customers' requirements. Act as a coordinator in all BSP activity, educating top management in the merits of BSP. Past experience requires executive level sales interface with Fortune 500 companies in consulting services, products and methodologies. Must have thorough knowledge of IBM's BSP methods.

For further information and/or immediate consideration, contact Dick Gunn: 800-232-3272; (in California 213-615-0311, Ext. 64) or if you prefer, send your resume, including salary history, in confidence to:

CSC
COMPUTER SCIENCES CORPORATION
INFORMATION NETWORK SERVICES GROUP
2100 East Grand Avenue
El Segundo, California 90245
Equal Opportunity Employer

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

Kodak

Software engineers. The time is now.

Computers play a vital and ever-increasing role in every step of production at Kodak. And we need skilled professionals who want to share in the challenges and rewards of technological leadership.

We're looking for talented software and computer engineers with a BS or MS and technical experience in minicomputer and microprocessor systems used in the development of software for real-time equipment control. Assignments may involve design of software systems for products or manufacturing control; programming mini- and/or microcomputers; integrating computer software and hardware into complex electromechanical systems; and quality assurance of computer programs.

Kodak also has opportunities for electrical engineers in the areas of design and development, video, test, systems and optical engineering.

We offer competitive salaries, liberal benefits, and opportunities for individual contribution and growth. Positions are available now. If you have the necessary skills and drive to meet the challenge of working for a corporation in the forefront of technology, send your resume today.

Personnel Resources
Dept. DCPW
Eastman Kodak Company
Rochester, NY 14650

Kodak. The right place. The right time.
An equal opportunity employer

EMPLOYMENT SERVICE FOR
PROGRAMMERS AND ANALYSTS
National Openings With Client Companies
and Through Affiliated Agencies

Scientific and commercial applications • Software development and systems programming • Telecommunications • Control systems • Computer engineering • Computer marketing and support

Call or send resume or rough notes of objectives: salary, location restrictions, education and experience (including computers, models, operating systems and languages) to either one of our locations. Our client companies pay all of our fees. We guide, you decide.

RSVP SERVICES, Dept. C
Suite 709, One Cherry Hill Mall
Cherry Hill, New Jersey 08002
(609) 667-4488

RSVP SERVICES, Dept. C
Suite 211, Dublin Hall
1777 Walton Rd., Blue Bell, PA 19422
(215) 629-0995

From outside New Jersey, call toll-free 800-257-8190

RSVP SERVICES
Employment Agents for Computer Professionals

LOOKING?

Find the job you want in Computerworld's classifieds. No other publication carries as many ads for computer professionals as Computerworld, so no other publication can give you as wide a choice of jobs, salary and location as Computerworld. You can even try a "Position Wanted" ad to look for exactly what you want, where you want.

Be sure you look over our recruitment ads every week, so you don't miss the opportunity that's just right for you.

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY
375 Cochituate Road, Framingham, MA 01701 (617) 879-0700

BUY - SELL - SWAP

IPS Information Processing Systems Inc

TELEPHONE (201) 262-9500 Telex: 642-197

System/34 12MX/64MB Printer 3262LPM 3995, P/Mls. Sale/Lease

Sale/Lease 4341's Models K, L, M - GRP 1 & 2 Lease Term - 1 Yr or Longer

Control Units 3880 - B13 3880 - D13 Avail. March 1984 Sale/Lease

Controllers 3880 3803 3274 3276 Immediate Delivery

DASD 3380 3375 3370 3350 3344 3310 Immediate Delivery

Tape Drives 3420 3430 3410 3803 Immediate Delivery

Display Stations 3278 3279 3178 3277 Immediate Delivery

Printers 4245 3262 3289 3211 1403 3262 3289 - 2 3287 3203

Computer Marketing Inc.
P.O. Box 5265 Philadelphia, PA 19126

WANG
Authorized Wang Dealer
PC/Wang Writer Discounts
Immediate Delivery
Call For Full Catalog
Don Fuller
1-800-621-7733 1-215-659-6259
WANG

WANG WORD PROCESSORS AT THOUSANDS OFF!
Guaranteed, remanufactured WPS 20, WPS 30 and Wangwriters available for immediate delivery. You don't pay a cent till Wang installs and places equipment under service contract. 10-day return privilege. Buy, Lease, Rent
For Free Info and fast response call toll-free
1-800-321-2986
ELECTRONIC OFFICE EXCHANGE, INC.
Dept. SCICWD • Box 7287 • Ann Arbor, MI 48107

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

PCM
Pioneer Computer Marketing
214/343-2904

BUY - SELL LEASE
- All IBM Systems
- Peripherals
- Tapes
- Disks

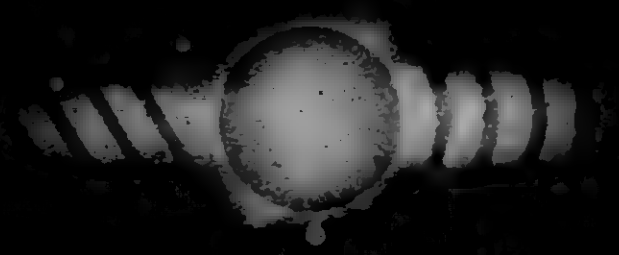
SERIES/1
- Systems
- Features
- Peripherals

SYSTEM 34
- CPU
- Peripherals
- Upgrades

PIONEER COMPUTER MARKETING
11440 Pagemill Road
Dallas, Texas 75243
214/343-2904

SYSTEMS
4341 4331
38 36 34
32 3
BUY • SELL • LEASE
COMPUTER BROKERS, INC.
2978 SHELBY ST.
MEMPHIS, TENNESSEE
CB
TOLL-FREE
800-238-6405
901-372-2622
PERIPHERALS
3203 3370
327X 3411
3350 3420
MEMBER ASSOCIATION OF COMPUTER DEALERS

COMDISCO
A Commitment To Excellence
IBM PROC... PERIPHERA...
...Full-Service ...sing



NPA
SYSTEMS INC.
SPECIALIZING IN:
PURCHASE SALE, TRADE, LEASE, RENT, AND SERVICE OF
Data General EQUIPMENT

10,000 SQ. FT. WAREHOUSE FULLY STOCKED
701 OATES AVENUE HOLBROOK N.Y. 11741
TELEX # 510 222 0662
(516) 467-2500

IBM UNIT RECORD EQUIPMENT

SALE OR LEASE
IBM UNIT RECORD MACHINES
026—029—082—083—084
085—087—088—129—514
519—548—557
NEW & USED
DISK PACKS—DATA MODULES
2316—3336(1)—3336(11)—3348(70)
MAG. TAPE-DISKETTES
Every Item Guaranteed
Highest Prices Paid for Used Packs & Modules
THOMAS COMPUTER CORPORATION

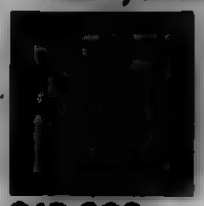
*** * * * DEC * * * ***
BUY—SELL—LEASE—TRADE—CONSIGN
SYSTEMS — PROCESSORS — OPTIONS
PERIPHERAL — MODULES — MEMORY
— SPARES —
NATIONAL COMPUTER EXCHANGE
(800) 624-9299
600 North Lunar Avenue, Brea, CA 92621
TWX: 910-596-1499 (714) 990-5988

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

DISK DRIVES • CONTROLLERS • PERIPHERALS • MEDIA

WANG • DEC

National authorized CDC OEM-Distributor (for Controllers and Media) offers *New Equipment*, fully warranted for 90 days:

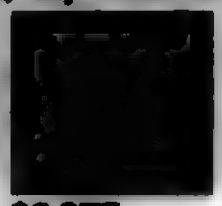


$12,900

CDC Model 9766 (300 Mb.) WANG Models 2285V-2 and 2285 (288 Mb.) DEC Model RM05 (205.1 Mb.)

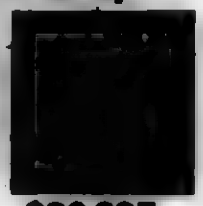
$7,750

CDC Model 9762 (80 Mb.) WANG Model 2285V-1 (75 Megabytes). DEC Model RM03 (67.1 Mb.)



$8,875

CDC Model 9448 (66 Mb.) WANG Model 2280-3 (80.4 Mb.) WANG Module 2280 V-3, 6380 (80 Mb.) DEC Model RM07 (80.4 Mb.)



$20,825

CDC Model 9775 (676 Mb.) WANG Model 2285 V-3 (640 Megabytes). DEC Model 3—RM05 6s (512.2 Mb.)

ERST

INTERNATIONAL CORPORATION

535 Lafayette Street, New York, NY 10012

ERST is the leading dealer in pre-owned WANG equipment—2200, VS, WP (CPUs, Terminals, IOPs, Controllers, Printers, Memory Upgrades).

Must first give us a call . . . Toll Free 1-800-FOR-ERST . . . In NY. 212-431-1100

FOR DEC
CALL SCHERERS

SCHERERS SCHERERS SCHERERS

BRAND NEW CPU's:

11/23-BC	11/23+ 256 KB	$ 4,500.
11/23-BE	11/23+ 512 KB	$ 5,000.
11/34A-YE	11/34A-256 KB	$ 7,000.
11/44-DA	One MB Rack Mount	$25,400.
11X44-FA	New Class A	$26,000.

11/24-AC	5 1/2"	256 KB	$10,000.
11/24-CC	5 1/2"	1 MB	$ 9,900.
11/24-BC	10 1/2"	256 KB	$11,000.
11/24-DC	10 1/2"	1 MB	$11,250.

SCHERERS

6146 SCHERERS PLACE
DUBLIN, OHIO 43017
(614) 889-6810

USED CPU's:
11/02, 11/03,
11/04, 11/05,
11/10, 11/34A,
11/44, 11/70

IBM 3178 leasing

Flexible lease terms available
12, 24, 36 or 48 months

Hartford Computer Group

800-323-6355

PEARL HAS IBM 3741's

and we have System 34, System 36 and System 38 and a large inventory of CPU's, CRT's and printers. Call us about our flexible lease plans for buying, selling, leasing, renting and purchase/leaseback.

Call Dave Allen or Shirley Shreeve.

Pearl Computer Division

P.O. Box 24026 • 4717 Centennial Blvd.
Nashville, TN 37202 (615) 383-8703

We Buy & Sell
DEC
Systems
Components

igital
omputer
esale

call:713
445-0082

600 Kenrick Sty C22
Houston, Tx 77060

IBM
3270

NORWEST

Computer Company, Inc.

34 • 36 • 38
4331 • 4341

System/34 Upgrades Disk—any increment Memory—any increment • Diskette—2D or magazine • All Features • IBM Maintenance Guaranteed • IMMEDIATE AVAILABILITY

214/991-2911
4255 LBJ Freeway Suite 211 Dallas TX 75234

EL CAMINO RESOURCES LTD.

offers:

4381-M2
DELIVERY POSITIONS AVAILABLE

early MARCH
APRIL
MAY
JUNE

(213) 986-2411

4827 N. Sepulveda Blvd.
Sherman Oaks, CA 91403

RESULTS

Whether you're buying, selling, swapping, hiring or looking, you get results from Computerworld classifieds.

Maybe that's why Computerworld gets more classified advertising than all the other computer publications put together!

OVERSTOCKED SALE (New)

DEC	DG
VT125-AA	D210
Graphics Terminals	Terminals
List $3,800.	List $1,060.
Our Price $3,000.	Our Price $800.

Call Command Computer Services Inc.
(212) 244-6600

DATA GENERAL SPECIALISTS
FOR
Surplus New & Used Equipment & Systems
with full depot repair facilities.
CALL US
WE TAKE THE TIME.
- WE CARE -
JM Associates
691 W. Chapel Avenue
Cherry Hill, NJ 08002
609-663-1115

IBM
5110 5120
3741 3742
DATAMASTER
1255-MICR
SYSTEM 3
34 36 38 32 28
All Models/All Peripherals
BUY SELL LEASE
• Private Display Stations
• Diskettes & Ribbons Available
• Trade-Ins
• Full Maintenance Contracts
Call Today for Quotation
(615) 366-6505
SOUTHERN DATA SYSTEMS
Nashville, Tennessee

HP
1000
3000
TELEX 756927
encore
(213) 452-8117

HOW TO SAVE $30,000 PER MONTH ON A 3083 LEASE.

Lease the same 3083 that IBM leases for over $92,000 per month from Randolph—for less than $62,000 per month. That adds up to savings of $1,440,000 over a four-year lease period. If you're renting an older machine, Randolph may save you even more—and you'll get about four times the throughput in the bargain.

WHEN IS THE BEST TIME TO TALK TO RANDOLPH ABOUT LEASING A 3083?

Now—because Randolph has 3083's available for 4th quarter delivery. But it's never too late, even if you already have a machine installed. Whatever your situation, we can tailor a lease that will fit your exact needs and let you start saving money right away.

TALK TO RANDOLPH NOW.

We can solve problems like these, and more . . .
Stuck with a lease on your old machine?
We'll sublease it, and provide a new lease on a 3083.
Own a 3083 but need cash?
Sell your machine to Randolph, and we'll lease it back to you.
Machine installed on a rental basis?
We'll show you how to end the lease and install a new 3083. Any termination charges can be folded into your new Randolph 3083 lease.

LEASING COMPUTERS IS OUR ONLY BUSINESS.

At Randolph, our people have an average of 18 years in the DP industry . . . from 360's to 3081's. They know all about alternative financing to be sure, but they also know their way around a DP department and the hardware in it.

WE LEASE MORE THAN 3083's.

Whatever your needs, now is the time to talk to Randolph. We provide leases for IBM 303X, 4300 and 3081 systems and peripherals—disks, tapes—as well as 3083's.

UNIQUE FINANCIAL STABILITY.

We're an important part of one of the nation's oldest and leading financial institutions . . . The First National Bank of Boston. 19 years in computer leasing gives added assurance that Randolph will continue as the leader in the computer leasing industry . . . continue to live up to the terms and conditions of our agreements . . . provide upgrades . . . fulfill all of our commitments.

LET RANDOLPH HELP YOU SAVE $30,000 PER MONTH.

We can solve a lot of problems for you, and save you money, too. Talk to Randolph now . . . call Joseph B. Kelly, Jr., Executive Vice President, 800-243-5307.

537 Steamboat Road
Greenwich, Connecticut 06830
203 661-4200 • 800 243-5307

Randolph

A MEMBER OF COMPUTER DEALERS & LESSORS ASSOCIATION RANDOLPH COMPUTER CORPORATION A subsidiary of THE FIRST NATIONAL BANK OF BOSTON BANK OF BOSTON

BUY • SELL • LEASE
SERIES-1
S/34 • S/36 • S/38
4300
S/23 S/32 5110-20
Tape-Disk-Printers-Tubes
AMCOM
CORPORATION
5200 W 73RD ST - MINNEAPOLIS MN 55435
(612)835-4737
CALL TOLL FREE
800-328-7723

FORSYTHE
McARTHUR ASSOCIATES, INC.
DEALER / LESSOR OF IBM
Computers and Peripherals
FOUNDED 1971
Home Office
Chicago
919 North Michigan Avenue
Chicago, Illinois 60611
312 943-3770
Branch Offices
Atlanta 404 953-9457
Milwaukee 414 765-9544
CDLR

DATA GENERAL
Hanson Data Systems

We've Got Your Number
S/34
ALL MODELS
QUICK DELIVERIES
SERIES 1
CONFIGURED TO YOUR NEEDS
S/36
ATTRACTIVE LEASE RATES
S/38
NEW & USED MACHINES
5110/5120
NEW LOW PRICES
PERIPHERALS
CRT'S, PRINTERS, DISK, TAPE, MODEMS
CARLYN
COMPUTER SYSTEMS
8100-G Braddock Road Annandale, VA 22003
"CALL COLLECT" (703) 642-1950

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

Control Data **SERIES I SPECIAL** IBM

126MB Removable Drives . . $12,900
Diskette Drives . . . . . $ 1,495
Printers & Displays

New or Used
Immediate Delivery

4956 Processors
4967 200MB Disk Drives
All Peripheral & Features

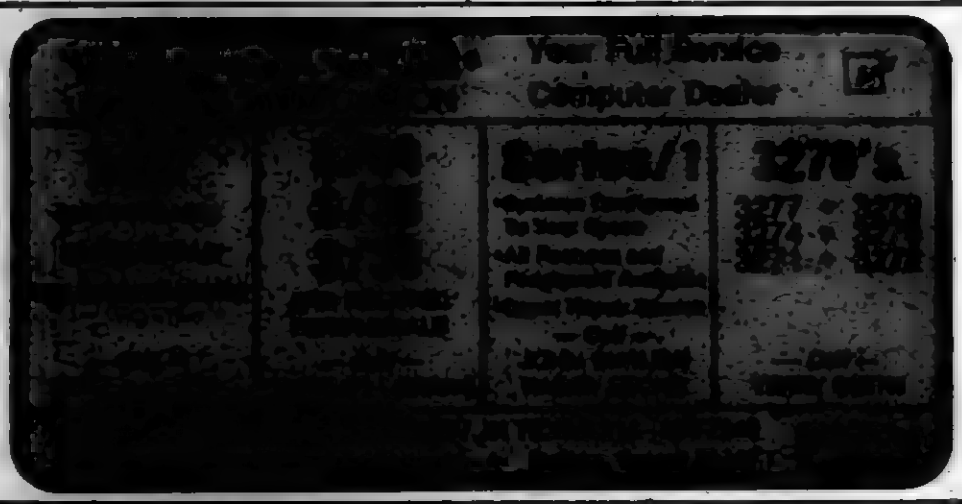
Check us out for DEC

11X44 $23,000 ☐ RL02-AK $2,300 ☐ 11/23 Any Config.
VAX 750 $43,000 ☐ VAX 780 $131,000

All immediate and guaranteed, Everything from 11/23 to VAX

DATAWARE SYSTEMS LEASE

800-221-6318 30 Bay St. S.I. N.Y. 10301 (212) 447-4911
TELEX 429364/TWX 710588-8736



WE BUY...SELL...LEASE...
Systems 34/36/38/4300

- Financial Advantage Is Yours Through CPU
- New Or Previous-Owner Processors Available
- Immediate Delivery
- IBM Maintenance
- Create Cash Flow With CPU Purchase/Lease-Back

Call 503/222-2226 Collect

CPU Sales & Leasing, Inc.
3477 Northwest Yeon • Portland, Oregon 97210

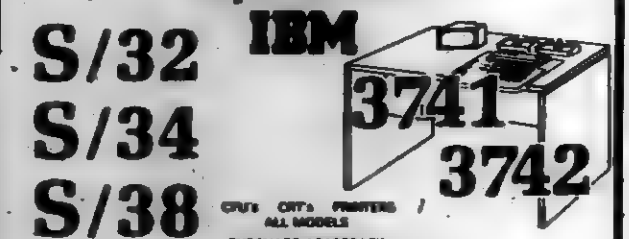
CPU

MEMBER AMERICAN SOCIETY OF COMPUTER DEALERS

Buy - Sell - Lease

S/32
S/34
S/38

IBM 3741 3742



CPU's CRT's PRINTERS ALL MODELS

PURCHASE/LEASEBACK
SHORT & LONG TERM LEASES

CMA

Computer Marketing of America, Inc.
P.O. Box 71
639 Bryan Street
Old Hickory, Tennessee 37138

1-800-251-2670
In Tennessee: 615-847-4931

DEC
New and Used in Stock

COMPUTERS

Rainbow 100
DECmate I and II
Pro 350
Micro 11
WD 211
11/23 +
11/24
11/44

CRTS

VT101-AA VT102-AA
VT100-AA VT102-WA

PRINTERS

LA 34
LA 100
LQP5E

Command Data
PHONE 205/942-3156

Command Data Incorporated
165 West Valley Avenue
Suite 105
Birmingham, Alabama 35209

NEW AND USED EQUIPMENT FOR SALE BY END USER
DATA GENERAL

7) GP5A 20 MB DISKS 12000
6) 6079 20 MB SUBSYSTEMS 3000
1) 6099 12.5 MB DISK W/FLOPPY 2000
2) 6165 20 MB DISCS (NEW) 5000
2) 6165 20 MB DISCS 4000
1) 6027D 15 MB DISK (NEW) 4000
2) 6027 20 MB DISK CNTRS 700
2) 6060H NOVA 4C 5 SLOT 64 KB CPU 1295
1) 6079A 1 BAY INDUSTRIAL CABINET WITH AIR CONDITIONER (NEW) 4,400
1) 16798 1 BAY INDUSTRIAL CABINET WITH HEAT EXCHANGER (NEW) 2,800
1) NOVA 4X 5 SLOT 128 KB 15 MB DISK W/FLOPPY & ULM 5 BOARD 10,500
1) NOVA 4X 5 SLOT 128 KB 12.5 MB DISK W/FLOPPY & ULM 5 BOARD 9,000
1) 6079 LP2 PRINTER 950
1) 6085 LP2 SUBSYSTEM 1100
1) 6180 LP5 PRINTER (NEW) 1650
1) 6181 LP2 SUBSYSTEM (NEW) 2200
4) 4014/4094 LP2 CONTROLLERS 500
1) 4227B 4 LINE ASYNC MUX 300
2) 5466 A/B 16 20 MA DTR BOARDS 100
1) 1144A 1 BAY CABINET 600

MODEMS & TERMINALS

2) ADM3A LEAR SIEGLER 375
2) ADM5 LEAR SIEGLER TERMINALS 350

CONTACT: ROBERT FULWILER 214-258-0614

MEMORY BOARDS

LSI/11	64KB	$1695
VAX 11/780	2MB	$4300
ECLIPSE	1MB	$5700
NOVA 4	1MB	$4800

Call For Others
Now 100% Compatible

SELLING?

Sell your product or service in COMPUTERWORLD Classifieds.

More than half a million active computer people read COMPUTERWORLD each week. That means:

- **YOU can reach them efficiently in COMPUTERWORLD Classifieds.**
- **YOU can find buyers for discs and DEC's, terminals and timesharing, software, System 370's, and more.**
- **YOU can join the THOUSANDS OF ADVERTISERS who use our classifieds because they get RESULTS.**

To place your ad, or to get a rate card with complete details on COMPUTERWORLD Classifieds, call or write:

Classified Advertising
COMPUTERWORLD
P.O. Box 880
Framingham, MA 01701

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

CMI

AMERICA'S LEADING SPECIALIST SERVING THE USED MARKET

Absecon, NJ (609) 646-7262
Atlanta, GA (404) 268-7942
Boston, MA (617) 367-6795
Chicago, IL (312) 893-2780
Dallas, TX (214) 386-6666
Encino, CA (818) 788-0113
Houston, TX (713) 780-7456
Lebanon, TN (615) 449-6633
Miami, FL (305) 442-2988
Newport Beach, CA (714) 752-8448
New York, NY (212) 349-6718
Tampa, FL (813) 273-0026
Frankfurt, Germany Telex: 414881 LCO D
Montreal, Quebec (514) 871-1121
Nyon, Switzerland Telex: 27288 CMI CH
Paris, France Telex: 613910 CMI FR
Toronto, Ontario (416) 842-3665
(416) 868-6100
Vancouver, B.C. (604) 685-6186
Windsor, Ontario (519) 973-3810

CMI FINANCIAL SERVICES GROUP
2000 Telegraph Rd., P.O. Box 2026
Bloomfield Hills, MI 48303-2026
(313) 456-0000

CMI

A Torchmark Company
2000 Telegraph Rd., P.O. Box 2026
Bloomfield Hills, MI 48303-2026
TWX/TELEX: 810-232-1967 CMI CORP. TRMI
(313) 456-0000
CMI 4300 Series Hotline Number: 800-331-4300

3081-D16 Sale or Lease

3081-K24 Sale or Lease

For Sale/Lease **4381** 1st Quarter Delivery

3033 All Models

Now **Series 1** with Data Operating System "Unix" † on the Series 1 IBM Master VM/ † TM Trademark of Bell Laboratories

3350's Available Now On a Short Term Lease 3370 3375 3380

3800-A6 Available Now **4700** Banking Equipment Buy/Sell/Lease

3725 Lease Financing Available For your System or Ours 2,3,4 or 5 Year Terms

3800 LEASE FINANCING Model 1's Immediate Delivery Model 3's Lease Financing Available-Any Term 3800-3 3211-1 & 3211-1 3800-3 4245-1

Tapes Immediate Delivery 3803-3420 Buy/Sell/Lease

Wanted **4341-M2 4341-L01** Call Now

3278, 3279 3277, 3276 Terminals All Models Immediate Availability

3705-3704 Available for Immediate Delivery Sale or Lease

3705/3725 Model 7 & 8 Available Now New - Used **3705/3725** 2, 3, 4 or 5 Year Terms Lower rates than ICC **3705's** Available Now - Sale or Lease

Series 1/O All IBM Peripherals Any Used Configuration CDC Peripherals Available Tape Backup $4,000.00 CDC Disk Subsystem Components NEC/Fujitsu Buy/Sell/Lease

---

BUY · SELL · LEASE · TRADE

PURCHASE LEASEBACK · RENTAL CREDITS

SYSTEM 32's, 34's, 38's

4300's All Peripherals

303X's and Peripherals

360's, 370's All Peripherals and I/O

3270's CRT'S, Printers & Controllers

MCC

(214) 258-0541
TWX 910-860-9285
METROPLEX COMPUTER COMPANY, INC.
300 Decker Dr., Suite 100
Irving, Texas 75062
Dedicated to Service With Integrity

DSI

WE BUY SELL & LEASE!

BURROUGHS

Discover the DSI alternative.

800-641-5215

All equipment available immediately and guaranteed for Burroughs Maintenance.

DSI Serving the Burroughs Community Worldwide
2480 W. Alameda Ave., Denver, CO 80223 (303) 922 8331
TWX 910 931 0483

DEC

RENT • BUY • UPGRADE • SELL

PDP, 11/05, 11/04, 11/23, 11/24, 11/34, 11/44, 11/70, VAX/730, VAX/750, VAX/780

SYSTEMS • OPTIONS • SUPPLIES

11/04	128K, Dual RL02, SE11-A, Dual H9642 (new)	$14,995
11/34 +	256KB, Dual RL02, SDV11-C, VT102, Operator (new)	$16,500
11/70	512KB MOS, LA36 (new)	CALL
VAX/750	1MB, RA60, RL02, VT05 Scanner (new)	CALL

Customized Configurations—Call With Your Request.

In Stock		Specials		In Stock	
11/04-BC (new)	$11,350	M8011-YB (new)	$4,195		
SB11-A (unused)	$ 495	MSV78-CA (new)	$4,195		
SMFB-AD (new)	$ 2,495	MSV78-DC (new)	$5,995		
SMF11-DA (new)	$ 995	RA70S (new)	$2,995		
SE11-F (new)	$ 3,150	SMX11-EA (new)	$2,295		
RS642 (new)	$ 1,395	RL211-AK (new)	$5,495		
KT24 (new)	$ 795	SMA01-AA (new)	Call		
LP11-WA (unused)	$ 2,495	VT103-AA (new)	$ 495		

BROOKVALE
800-645-1167 NY

No charge to tell the DG world

what equipment you have to sell or buy.

500,000 CONTACTS

800-843-2047

CPR:RESALE 800-325-2317 California
1630 Fourteenth Street
Santa Monica, CA 90404

Buy • Sell • Lease

SERIES 1 S/34 S/38 4300 S/370 5110 S/23

XERXES COMPUTER SALES
1050 Hampton Square, Suite 200
Minneapolis, Minnesota 55420
800-328-3004/612-339-3042

SALE CYBEREX UPS EQUIPMENT
(Uninterruptible Power Systems)

Two 75 KVA 415 HZ Units
One 150 KVA 60 HZ Unit

Used intermittently for less than two years
Vendor maintenance records available

Contact:
Mr. Terry Watkins, Director, Corporate Purchasing
THE SHERWIN-WILLIAMS COMPANY
101 Prospect Avenue • 1134 Midland Building
Cleveland, Ohio 44115 • Phone — 216/566-2581

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

SYSTEM/34
SYSTEM/36
SYSTEM/38
SERIES/1

ON-1

ECONOCOM

• BUYS • SELLS
• LEASES

- QUICK DELIVERY
- COMPETITIVE PRICING
- FLEXIBLE FINANCING
- TRADE-INS ACCEPTED
- PROFESSIONAL SERVICE
- SHORT-TERM LEASING
- LONG-TERM LEASING
- PERIPHERAL LEASING
- TAKE-OUTS DONE
- MAINTENANCE GUARANTEE
- NEW OR USED

FIND IT FAST IN OUR FAMOUS COMPUTER MARKET ADVISOR
SEND US YOUR BUSINESS CARD AND WE WILL SEND YOU A FREE COPY.

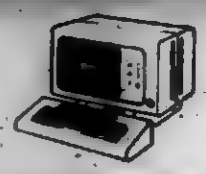
CALL TOLL FREE
800-238-3098

ECONOMIC COMPUTER SALES, INC.
945 CROSSOVER LANE • P.O. BOX 34987 • MEMPHIS, TENNESSEE 38134 • (901) 767-6130

BUY SELL LEASE

SYS/34 SYS/36

- IMMEDIATE DELIVERY
- GUARANTEED M/A
- SHORT TERM RENTALS
- PERIPHERALS
- FEATURES-UPGRADES



MARION
84 KENNEDY STREET
HACKENSACK, N. J. 07602

(201) 343-4554
(203) 758-2409
(412) 864-8611

IBM SYSTEM 23 DATAMASTER
New & Used
- Processors
- Fixed Disks
- Printers

Contact: Nancy Smith
(702) 322-6207
NCL, INC

For Sale
IBM 3033/U16
Features:
12 Channels
(2) 4850
(2) 3868
(1) 6850
For More Information
Call Ron Davee
(503) 225-4942

The nationwide market - a call away!

DEC/DG

SYSTEMS/PARTS/PERIPHERALS
NEW/USED/SURPLUS • DISCOUNT PRICES
Since 1977! Buy, Sell, Trade and Broker.

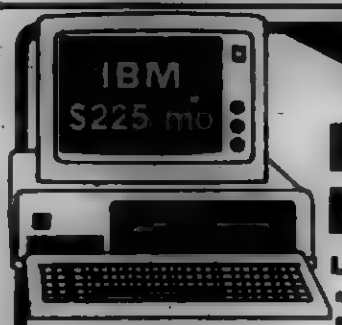
PHIL	BRYAN	JENNIFER
DG	11-VAX	8-LSI

CALL TODAY - (305) 392-2005
TELEX 568-670

thomas business systems, inc.
4301 Oak Circle - Unit 11 Boca Raton, Florida 33431

3033 U12-SN 20362
With 3850 Extended Channels and 3 Data Streaming Channels. Available June 1984 On a 2 Year Lease
Call (201) 777-9092

Want to Buy
5291, 5251, 5256 Defective Planar Boards
$100 each
For Details Call
(915) 692-9141
Russell Sullivan
Computech



Attention Corp. Execs!

PC Leasing!

Lowest Financing Rates
- Apple • Wang
- DEC • IBM
- Columbia • Eagle
- Compaq • HP
- 1, 2, 3 year terms
- Low 8.5% financing
- Direct purchase available

Complete IBM PC with:
Princeton Graphics HX12 monitor/Epson FX80 printer
As low as $225* per month
XT $325* per month
*For 2 year lease

Call Today - (212) 986-2233
COMLEASE CORPORATION
230 Park Avenue, NY, NY 10017

Inflation Fighters
Quality & Savings
Slightly used. Money Back Guarantee. Full Reels. All External Labels Removed. Guaranteed for use at 800 BPI through 6250 BPI.

2400' Reel	$4.95 ea.
1200' Reel	$4.25 ea.
600' Reel	$3.50 ea.

All Tapes with Hanging Seals
We pay freight on orders over 200 tapes. All orders shipped within 48 hours.
Call or Write
Computer Tape Mart
44A Seabro Avenue
N. Amityville, New York 11701
(516) 842-8512

Hardware, software, problems, people, pricing, ethics litigation, communication, macros, minis and micros.

We like to make an issue of it.

C.D. SMITH & ASSOCIATES, INC.
DEC computer systems & options
12905 East Freeway, Suite 318
Houston, Texas 77015
(713) 451-3112
TELEX 76-2547

DEC

WE ARE BUYING: VAX 11/780

WE ARE SELLING:

MS780-DC	8,000	TP780-BA (New)	8,000
MS780-CA	4,000	11/044-FA	CALL
MS780-DC	8,000	11/780-FA	CALL
DS780-AA	8,000	11/780-KA	CALL
FP11-A(New)	1,000	MS780-BC	35,000
DS11-E	2,500	11/044-YB(New)	4,000

If you want on our Mailing List, call Yolanda (713) 451-3112.

IBM
Series/1 • S/34 • S/36
S/38 • 4300
5110 - 5120 • S/32
BUY • SELL • LEASE
All models, systems & peripherals
AVAILABLE NOW!
Ask about our 72 hour upgrades

(408) 425-7333
SOURCE
DATA PRODUCTS INC

IN STOCK!
Fujitsu Eagle
with cabinet, cables, slides & terminator:
$13,000
New Fujitsu SP 360
80 character per second, letter quality printer:
Introductory Special - $2,000
MANDERS
303-693-3035
2771 S. Jasper • Aurora, CO 80013

STC
TAPE/DISK
BUY • SELL • LEASE
(408) 432-3677

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

TexCom

WE BUY • SELL • LEASE

JOIN THE MANY FORTUNE 500 COMPANIES THAT UTILIZE IBM EQUIPMENT FROM TEXCOM . . . THE IBM SPECIALISTS

SERIES 1

- All features and peripherals
- We buy, sell or trade
- Convenient leases available

1331 1311 • 1361 1331

- We buy, sell or lease
- Two, three, four year leases

WE'VE GOT IBM PERIPHERALS

3803	3380	3350	3211
3420	3880	3370	3811
3375	3340	3203	3262

IBM S/34 — 36 — 38

- All upgrades available now
- One, two, three year leases
- We'll take S/34 trade-ins.
- All models and peripherals

WE'VE GOT ALL IBM PRINTERS AND TERMINALS PLUS 3864 MODEMS NOW.

FOR SALE OR LEASE

IBM PC-XT'S
256K, COLOR MONITOR
AND GRAPHICS PRINTER.

Call Toll Free: 1-800-833-9119

SAN ANTONIO (512) 349-9956
MEMPHIS (901) 756-7055
HOUSTON (713) 890-8714

BSI CDI AEL

SYSTEM 34 SYSTEM 38

IBM AT A SAVINGS!

SYSTEM 36

Contact Datacomp and find out how much you can save...
Call Toll Free
800/323-3289

Lease Plans

datacomp leasing & service group

Compare Before You Lease!

Chicago 312/322-1200
New York 201/467-9696
Los Angeles 714/871-3911

■ 3 A-1 Dun & Bradstreet rating ■ 2500 Satisfied Customers ■ IBM Knowledgeable Professionals ■ Satisfaction Guaranteed

---

data3 computer corporation

IBM PROCESSORS/PERIPHERALS

GSD DPD

• BUY • SELL • LEASE • SUBLEASE •

- All Peripherals
- Special Features
- Upgrades
- Flexible Leases
- On-time Delivery
- Purchase/Leaseback

COLA 1-800-328-[illegible]

WE'RE NUMBER 1 FOR SERIES/1

Computer Options, Inc. is a major remarketer of both new and used IBM SERIES/1's and related peripherals. We offer your firm the option of purchase or a variety of custom leasing programs for your hardware acquisitions. Call us toll-free for more information.

AVAILABLE NOW FOR IMMEDIATE INSTALLATION

4955-F	4964-001
4955-E	4973-2
4959-A	4974-001
4962-2	4975-2L
4963-64A	1310

ALSO AVAILABLE-SYSTEMS 34 & 38

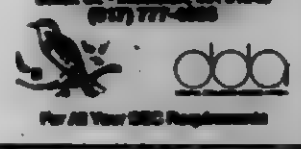
Call toll-free 800-328-5718

(In Minnesota, 612-544-[illegible])

COMPUTER OPTIONS, INC.
"the best option"
1660 South Highway 100
Minneapolis, MN 55416

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

FOR SALE
DEC EQUIPMENT



HARTFORD COMPUTER GROUP, INC.

4381-P02
3279-02C

Ships July 6, 1984

For Sale or Lease

(312) 364-0505
Ask For Dan Jackson

BUSINESS OPPORTUNITY

OPPORTUNITY DOESN'T KNOCK ANYMORE.

IT BEEPS.

The microcomputer revolution is well upon us. And as a result, so is the demand for the necessary software.

The Software Place has been designed to meet this demand. As one of the finest sources of business and personal software, now expanding in selected markets across the nation, The Software Place is part of a retail segment that analysts project will more than double in sales each year to $2.9 billion by 1988.

And you can be a part of it.

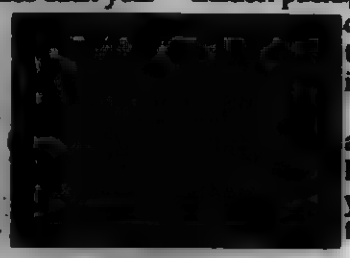
Franchise opportunities are now available to qualified individuals with $50,000 liquid capital plus additional financing.

Our comprehensive program will take you from site selection through store opening and beyond, including ongoing technical support, advertising and more.

We'll even help you prepare a business plan.

For full details, give us a call to find out how you can obtain our complete information package, including our videotape. But do it now.

Because when an opportunity like this beeps, you can't afford to knock around.



THE SOFTWARE PLACE™

8708 North MoPac Blvd, Suite 165 · Austin, Texas 78759 512 343-0414

BUYING?

Whether you're looking for big computers little computers, terminals, printers, software, time sharing or services, you'll find it in *Computerworld* classifieds.

Pages of ads every week, with everything from Discs to DEC's from time sharing to terminals, and software for every size computer system.

You'll find what you need in *Computerworld* classifieds.

Call 800-343-6474 (or 617-879-0700) for more information

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY
375 Cochituate Road, Box 880, Framingham, MA 01701/(617) 879-0700

The Bulletin Board

BASIC FOUR

For Sale
BASIC FOUR SYSTEM 610
Complete
Call (313) 354-3361

T I

[illegible]
Quantity Discounts Avail.
Mr. Carr

WANG

Pssst...
WANG USERS.....
HAVE YOU HEARD ABOUT THE GROUP OF FORMER WANG EMPLOYEES IN ATLANTA WHO BUY & SELL USED WANG EQUIPMENT AND PLUG COMPATIBLES?
LC.A. (404) 577-4288 or 1-800-241-5189

BUY - SELL
MVP/LVP - OIS - VS - PC
SYSTEMS IN INVENTORY
VS/80 - MVP - WPS30
AND PERIPHERALS
2246C - 2246R - 5536-4

For Sale
4 286MB WANG DISK DRIVE
Under WANG Maintenance
16K Each Immediate Delivery
Call (516) 625-2600

DATA GENERAL

DESKTOP COMPUTERS
D210's, D211's, D410's & D460's
2MB Mem for MV/4000 & MV/10000
Desktop Printers
[illegible]
Xerox Software Inc.

NEW DG CRT's
D-210 $795
D-211 $845
D-410 $1295
D-460 $1395
Desktops 10% to 20% Off List
Any & All DG Cables in Stock
We Will Not Be Undersold On Any New or Used DG Equipment
Factory Data Systems
(818) 597-2999

MV 8000/6000 2 Mb Memory
MV 10000/4000 2 Mb Memory
8656 256 Kb Eclipse Memory
D211 CRTs $625
6053 CRTs $800
6045 10 Mb Disk $2000
6081 192 Mb Disk $13000
MV 8000 System ..... Call
C-350 1 Mb System $18000
Nova 4S CPU 64 K $3500
Nova 3D CPU 128 Kb $2800
DG Compatibles (New)
Supports All DG Series CPUs
1600/6250 BPI Tape Unit ..... Call
6061X Disk Drives ..... Call
616X Disk Drives ..... Call
International
Computing Systems Co.
(612) 941-2941

DATA GENERAL

DATA GENERAL M600
[illegible]
Paula Pinelli
Vision Incorporated
(818) 884-4888

HONEYWELL

LEVEL 6 & DPS 6 EQUIPMENT
Refurbished Like Fabulon
[illegible]
New (Never Used) Disk Drives
CDU 9116 16MB
8F & 9N CMD ..... $5,500 Ea.
Woodlands Computer Services Ltd.
(817) 530-4550

HONEYWELL DPS6/40
512K CPU
80 MB Disk (8F + 1R)
1-300 LPM Printer
1600 BPI Tape & Controller
5-7981 CRTs
Additional Appro 6/140A
Buy Our Equity and Take Over Last 12 Months of PMV Operating Lease
(818) 334-8767

DEC

VAX 11/730

For Immediate Delivery
1 MB MOS Memory
LA12
DMF32
VMS 3.5
RUA80
RL02
CALL TODAY:
(703) 841-5634

VAX
RESOURCE ACCOUNTING
$1200.00 U.S.
ON LINE-MENU DRIVEN
DISK ACCTG-MGMT REPORTS
Virtual Computing
Calgary, Alta., Canada T3R6C0
(403)246-7440

DEC NEW & USED
BUY — SELL — EXCHANGE
Systems • Processors • Memory
Options • Peripherals • Modules
LAKEWOOD COMPUTER CORP.
[illegible]
(408)296-2545

PDP-11/24 SYSTEM
64KB Memory, 4-RL02s, CZ-11 16 Ports, TS-11 1600 BPI Tape, RSTS/E Version 8.0, BASIC+2, DATATRIEVE, All documentation, Under DEC Maintenance, Asking $60,000.
Business Research Corp., Boston
(617) 787-6000
J. Ball or B. Doherty

DEC
PDP 11/34A
3 RK07-EA
4-VT100's
1 LP11-VA
CALL
(800) 669-1121 Ext 276

DEC 11/03 System
With 32KB, RXV11-BA, Cabinet, LA36 Printer.
$1,975
Call Ray
(617) 275-6606

DEC

DEC BARGAINS

11/44A CPU Bd.	$1,595
11/44 KE44-A "Chip"	$2,375
4A-CF780 Spares Kit	$5,600
SDV11-AA	$495
DR780-AA	$3,400
DZ11 MUX Bd.	$1,125
DZ32-B	$1,675
FP11A	$1,195
IX11-A	$1,795
IX11-B	$2,475
IX911-P	$350
MS11-MB	$1,175
MS780-DC	$4,995
MS780-FD	$2,995
MSV11-PK	$975
MSV11-PL	$1,275
RLV11	$975
VAX 1MB MS780-CA	$2,995
VAX 1MB MS780-CA	$2,995

Call Ray
at CEI, Inc.
(617) 275-6606

DEC & PRIME SPECIALS
- MS780-FD Avail Now $3,900
- MS780-E Upgrade Kit $19,900
- 1144-DA Now $34,900
- VT101-AA Now $995
- RM80-AA $6,500
- PDP 11/70 128KB Core Memory KB11-C Call
- RM03-AA $5,500
- RM02 Now $8,200
- CDC 9766 300MB $6,500
- Dataprinter 1000LPM Band Printer $4,400
- VAX 780 1/4MB MS210 5749
- LP14-CA $6,000
- LA36 $600
- Prime Computer Systems Available Upon Request
- Emulex Controllers Available

SEVCO INC.
(617) 435-6930
(617) 435-6331

HEWLETT PACKARD

BUY • SELL • TRADE
[illegible]
NEW YORK COMPUTER EXCHANGE
(518)782-6603 (800)345-6100

BUY & SELL
1000 & 3000
Systems • Components
WESTERN DATA SALES, INC.
(213) 373-6463

Buy-Sell-Lease
HP3000 3X, III, 4X
and related peripherals
Call Carol
CSU INDUSTRIES, Inc.
516-239-4310

NEW HEWLETT-PACKARD
Overstocked
[illegible]
Carol Rondero 7208A
Data Products/Sales, Inc.
Mr. Van der Kooy
(800) 282-1100
(305) 297-2000

HP7978A TAPE DRIVE
ONLY USED 9 MONTHS
List $44,400.00
OUR PRICE $22,000.00
AVAILABLE IMMEDIATLEY
CALL (619) 353-0410

HEWLETT PACKARD

HP3000

BUY/SELL/TRADE/LEASE
Complete Systems
Processors • Peripherals • Parts
ConAm Corporation
Santa Monica, California
(310) 458-8843 (800) 848-4884

DISK DRIVES AND PACKS

13 DISK PACKS CDC
Model 848-29
$50. Each
(614) 279-6696

QANTEL

Must Sell
Like New
Qantel 950
12 Meg Drive, 40K
(3) 4012 CRTs
Centronics 702 Printer
Spare Cables & Disk Packs
(408) 940-5535

IBM

4341-L10

W/1870, 4MB
Now $75,000.
Or Best Offer
Call (214) 991-2911

Fall SALE (All Upgrades & Systems)
64 Meg Upgrade ($/34)
6/04 ($/34) 37,000
1400 ($ To 9 Per $/34)
Magazine For $/34
Sales ([illegible]) WANTED
5381-001 $/34 & $/38
Available Now At A Great Price!
DATABARD (310)539-7000
3000 Fairmont Rd., Atlanta, GA 30327

4341-L2

With 1601 and
Memory Upgrades
Available June 1
JBI Associates, Inc.
(303) 988-0620

The University of Missouri - Columbia will accept SEALED BIDS until 9:00 A.M., Tuesday, April 17, 1994, for the Sale of Used IBM System 32 Computer, Located at KOMU-TV Station, Highway 63 South, University of Missouri - Columbia, Columbia, Missouri. For more information contact Mr. William Rogers, KOMU-TV Station, telephone (314) 449-1122.

SYSTEM 34
128K, 64MB
Workstation Expansion Feature
MLDA With 3 Lines
5211 Printer
Under IBM Maintenance
$22,000.
Call Ray Sear
Wheeling City Materials
(304) 442-4501

IBM

SYSTEM/34 SALE
*** CPUs ***
[illegible]
*** Printers ***
[illegible]
*** CRTs ***
5251-011 $1,695.
Also Available All Disk and Feature Upgrades. System 38's Available. Trade In Your System 34.
(212) 279-1717

SYSTEM 36's
Available Now
With Our Total Solution Accounting Software and Financing Arrangements.
Executive Technology Data Systems
Dallas, TX
(214) 960-1888
Detroit, MI
(313) 668-8778
Madison, WI
(608) 271-6688
Reading, PA
(215) 374-8778
Trumbull, CT
(203) 377-6557

BY OWNER
3411-9 Tape Drive
System 3/12, DPF, Async
1403 Model 2 Printer
3340 Disk Drives
3741 Attached
5471 Console
5-3370 Modules
All Above IBM Maintained
All Manuals & System Pack
Lasco Check Signer Mod. 1722
Best Offer Takes All
George E. Pere Co.
Contact Fred Collier
(513) 661-6111 ext. 89

PRINT TRAINS
IBM 1416 & 3216
Bought - Sold - Lease
Repaired - Reconditioned
COMPU-ACT COMPANY, INC.
(513) 858-6401

Buy • Sell • Lease
IBM
Cougar Computer Corp.
Suite 219
[illegible]
Euclid, OH 44132
(216) 261-3600

SYSTEMS 34/36/38
Short Term Rental
$/34
1-800-LEASPAK
In TX (817) 268-0023

Buy ... Sell....Lease
IBM MICR
3890 - 1419
(813) 722-4534

For Sale By Owner
IBM S/34 E35
1 5211-02 Line Printer
1 5256-03 Dot Matrix Printer
3 5251-11 Terms W/Cable Thru
Marine Terminals Corp.
Jon Brooks (415) 989-6576

4341-L1 Now - [illegible]/Month
4381-P2 5MB - [illegible]/Month
3278-2 Qty. Now - [illegible]/Month
Syscomp
(813) 799-4316

IBM

S/34 and S/36
Upgrades
Available Immediately
Midland Financial
1-800-328-9569
(312) 559-7171

Lease a New
S/36
256K/200MB
Available Now
$600 per month
800-328-7729

IBM MODEL 3742
Available Immediately
Clearance
Wiedemore Systems
Call Gary
1-800-638-6795

For Sale
IBM SYSTEM 34's
Any Model or Configuration
Available Within 30 Days
Eligible For IBM Maintenance
Call Pat
(913) 888-6311 ext. 6

For Sale By User
SERIES 1
Model 4952E With 256K
84 Meg Disk 4955/954A
Diskette Magazine Drive 4966
4-Line Async Comm 2699/2699
1-Line Bisync 2974
Call Jim
(818) 597-7185

SYSTEM 36
A11 • A12 • B13
Under IBM List
Short or Long Term Rental
Midland Financial
1-800-328-9569
(312) 559-7171

IBM System 23
[illegible]
Available Now - $15,000
800-328-7729

BURROUGHS

BUY SELL LEASE
All Systems & Peripherals
AVAILABLE
- B1800 Sys
- B1855 Sys
- B80s
- B900s
(Configured To Your System.)
- Wang 300 Terminals
- 300 Terminals model 105 & 110
- TD830s, MT850s, MT880s
- 300 & 307 Style Disk Drives
- Various Tape Sub-systems
- Memory Upgrades
- Printers 2260 & 5040 Styles

Guaranteed Bottom Dollar. Depot Maintenance Available.
COMPUTER PROVIDERS
(818) 240-7870
(Monitor #304)

BURROUGHS B-900
9 5402-10 10.0 MB Fixed Disk
5402-22 4.0 MB Cartridge Drive
A 5248 300 LPM Printer
3-TD 831s, 3-MT 883s, 3-MT886s, 40 2.4 MB Disk Cartridges
ALL or PART - BEST OFFER(s)
(218)829-2139

More Bulletin Board on the next page.

The Bulletin Board

MISC.

MICON 600

PORT SELECTORS

2400 BAUD QUAD CARDS

CALL TODAY:

(703) 841-5634

Buy • Sell • Lease
• Short Term Rentals •

DATAPOINT

FOR SALE

2460	Disks	$1,100.
2200	Adapters	$200.
6600	CRT's	$1,200.
1000	Systems	$1,000.
2270	2200 Controller	$2,700.
2200	165 CPS Printer	$1,200.
6600	Arc Proc. 2200	$2,000.
6600	Controllers	$1,200.
2201	Controllers	$600.

24 HOUR DELIVERY

Cougar Computer Corp.
(216) 261-2660

TANDEM

4184 (600 Meg) Disk Drives
Cables and Packs
NEW and USED

Tombit Computer Systems
(314) 337-4212
Telex 05-824059

Make Offer

3600 Feet of Raised Access Floor

(2) 20 Ton Data Air Mark IV By Superior Air, Humidifiers and Air Conditioners
All in Top Shape
Call (416) 789-1848

MISC.

BUY - SELL - LEASE

TANDEM

Redwood Capital Corp.
P.O. Box 751
Palo Alto, CA 94302
(415) 921-3605

FOR SALE

1 Datagraphix, Mini-Autowan Microfilm Recorder, A155 Autoplus Processor, and Data Master Microfiche 1060 Duplicator. Also 6 Microfiche Viewers and 1 Datagraphix 1600 DL Readout Printer. Contact: Hall L. Sharp at PDIC, Box 7547, Midland, TX 79705, or phone (915) 697-1951.

MISC. SYSTEMS

MICRODATA Series 800/

512K 800 Memory
128 MB Winchester Disk
P300 Line Printer
45 IPS/1600 BPI Tape
(24) Ports
(2) Prism Terminals
2nd Line Printer Controller

Available Immediately

(216) 461-5506

Micro to Mainframe
Transmit DOS Direct
"NATIVELINX"
3270 - 2780/3780
Dealer, Quantity, Educational Discount
Viking Associates
(303) 832-7004

MISC. SYSTEMS

Datapoint

NEW - USED - REPAIR
BUY - SELL - LEASE

COOPERATIVE SALES OF HARDWARE & SOFTWARE

TNS, Data Services
18 Maiden Lane
New York City, NY 10038
(212) 349-5140

MODEMS

4 RACAL-MILGO

4800 BPS Sync
Model MPS-48
Call L. Slattery
(314) 291-6330

PRIME

PRIME

LARGE SELECTION OF USED PRIME COMPUTER SYSTEMS ...SAVINGS TO 50%

Peripherals also available:
Memories-Disk Drives-Controllers
Modems-Terminals-Printers

Int SOLUTIONS
...For Mid-size Shops
A DATAMATION SERVICES, INC., COMPANY
3001 EAST CAMPBELL AVE.
PHOENIX, ARIZONA 85016
(602) 957-0800
ASK FOR DON OR MATT

ORDER FORM

COMPUTERWORLD BULLETIN BOARD

Issue Date: Ads can be accepted up until the Monday preceding the issue desired. Computerworld comes out every Monday.

Classifications: Most ads will be classified according to the brand of equipment that is being bought or sold. These classifications include Burroughs, Data General, Digital/DEC, Hewlett Packard, Honeywell, IBM, NCR, Sperry Univac, Salvage, Terminals, Misc. Systems and Miscellaneous.

Copy: Copy sent in via the mail or telecopier (telecopier extensions are 410 and 451) should be clearly typewritten. Ads may be given over the phone to our team of ad takers. The standard size is 1 column by 1 inch deep. These units may be combined to form larger sized ads. Describe the equipment very briefly, give the price and the name of the person to contact. All ads will be set up using a standard format. No borders or logos are allowed.

Cost: The price for each standard unit is $130.00 (One unit minimum and no fractional units allowed.) There are no agency commissions and no quantity discounts.

Billing: Once you've written your ad, send (or call) it in with your name and address for billing purposes and we'll run it. (If your company has never advertised with us before, we request a check with your order.)

Date(s): _____

Signature: _____

Name: _____

Title: _____

Company: _____

Address: _____

Telephone: _____

Send this form to:

COMPUTERWORLD BULLETIN BOARD

375 Cochituate Road, Box 880,
Framingham, MA 01701

617-879-0700 800-343-6474

SOFTWARE FOR SALE

IBM SYSTEM 34-36

- ENGINEERING DATA BASE
- WORK IN PROCESS DATA BASE
- MASTER PRODUCTION SCHEDULE
- MATERIAL REQUIREMENTS
- PRIORITY DISPATCH
- CAPACITY REQUIREMENTS
- STANDARD PRODUCT COSTING
- JOB/INVENTORY COSTING
- ON LINE INTERACTIVE
- FORMAL PURCHASING SYSTEM

MANUFACTURING SOLUTIONS
& SYSTEMS
S CALHOUN ROAD
BROOKFIELD WISC 53005
414-786-1172

Manufacturing Inventory Control for the IBM-PC

OCC MANUFACTURING INVENTORY CONTROL offers integrated control of finished goods, subassemblies, and component inventories and costs through a multilevel Bill of Material Processor with optional interfaces to OCC ORDER ENTRY AND ACCOUNTS RECEIVABLE

OCC SOFTWARE

OCCUPATIONAL COMPUTING COMPANY
22311 VENTURA BOULEVARD, #123
WOODLAND HILLS, CALIFORNIA 91364
(818) 999-1919

Elegant Software

for IBM S/34, 36 and 38

General Accounting	Payroll/Personnel
Financial Reporting	Property & Equipment
Accounts Receivable	Report Writer
Accounts Payable	Oil & Gas
Order Processing	All Systems are:
Inventory Management	RPG II/RPG III
Sales Analysis	Data Base
Job Cost	Interactive

J.B. Edwards & Company
4940 South Syracuse Street/Suite 5800
Denver, CO 80237
303/773 3732

Dallas — 214/ 458 0536
Houston — 713/ 880 8276
Northern California — 415/ 697 7764
Southern California — 714/751 5902

CS SOFTWARE

VAX
PDP-11

Payroll • • Job Cost
General Ledger • • Fixed Assets
Accounts Receivable • • Accounts Payable
Inventory • • Order Entry
Client Writeup

Compu-Share

3824 - 50th St. • Lubbock, TX 79413 (806) 792-3785

Sell Your Software in the Classified Pages of Computerworld

Call 800-343-6474 (or 617-879-0700) for more info.

Researching all your options will show you that your best source is COMPUTERWORLD

SOFTWARE WANTED

Turn Your Efforts into $$$

Wanted: Software. Successful software company seeking additional products to market. Must run on IBM mainframes or PCM's. Prefer programmer/operations productivity aids. If you have written a program and you need an international company to market it for you, send an abstract of the product to:

Triangle Software Company

J. Zips, Triangle Software
3245 Stevens Creek Blvd.
Suite 109
San Jose, CA 95129
(408) 554-9121.

SOFTWARE FOR SALE

More IBM System/38 Users Are Choosing RTC Systems.

For technically superior software in a wide range of Financial, Manufacturing, Distribution and Management Business Systems.

The International Software Developers.

RTC Systems, Inc.

49 Plain Street
North Attleboro, MA 02760
(617) 695-5005

SOFTWARE FOR SALE

SOFTWARE FOR SALE

CONTROL/38

GL/38 GENERAL LEDGER
EXEC/38 FINANCIAL ANALYSIS
AP/38 ACCOUNTS PAYABLE
PPF/38 PROFIT PLANNING AND FORECASTING
ICCS/38 INTEGRATED COST CONTROL
PO/38 PURCHASE ORDER
AR/38 ACCOUNTS RECEIVABLE
FA/38 FIXED ASSETS
SC/38 STANDARD COST

Computerworld

CLASSIFIEDS:
Our business is to help you improve yours--
via programmers, analysts, engineers, terminals, printers, software packages, computer time, computer services, office space, advertising for seminars & conferences, business opportunities, etc...*AND ...*
...exposure to an audience of over half a million readers nationwide...
...EVERY Week.

TIME & SERVICES

COMMERCIAL DATA PROCESSING

4341-2 370/168-3

DB-DOS-VM/CMS
CICS-ROSCOE
REMOTE JOB ENTRY
CICS DEVELOPMENT
CUSTOMIZED SOFTWARE
XEROX LASER PRINTING

Contact Greg Gorab
(201) 777-3464
15 MINUTES FROM LINCOLN TUNNEL
ONE PASSAIC STREET
WOOD RIDGE, N.J. 07075

*Sperry 1100/80 Center
*Mapper *UNIS
*TIP/CMS *DMS/DPS
Time Sharing
On-Line Manufacturing Systems
On-Line Financial Systems
"Hot Site" Back-Up Service
Pack-Load & Direct Mail Processing
Contact: Mr. Lloyd Sweet
(215) 337-4150

SDS
STANDARD DATA SERVICES Inc.
771 Fifth Avenue
King of Prussia, PA 19406

VAX 11/780 AND PDP-11 DEVELOPMENT TIME

NO KILOCORE-TICK CHARGES / NO CPU CHARGES

Omnicomputer

$7/$14

RSTS/E VMS

PER HOUR CONNECT TIME

BUDGET BYTES™ 212-944-9230

Omnicomputer, Inc.
1430 Broadway, New York, N.Y. 10018

Tell everybody about the

TIME & SERVICES

you have to offer...
...in the
Classified pages of
COMPUTERWORLD.

To place your ad, send all materials to:

COMPUTERWORLD CLASSIFIEDS

Box 880,
375 Cochituate Road,
Framingham, MA 01701.

or call:
1-800-343-6474
(in Mass., (617) 879-0700)

COMPUTER TIME

3033-U
4341-2
TSO/CMS
CICS/IMS
Call Pat Holmes
(201) 930-9561
(212) 921-8855

VAX/VMS TIMESHARE

5c

$2 PER HOUR CONNECT TIME
ONE MB DISK STORAGE INCLUDED
AVAILABLE NATIONWIDE VIA TELENET
LEASE-A-PORT™ WITH 10 MB DISK & NO CPU OR CONNECT CHARGES FOR $600 PER MONTH

TYMSHARE CORPORATION

ICOTECH
Innovative Computer Techniques

COMPUTER SERVICES
IBM 3081 DEC-10

-Remote Job Entry -Online Processing
-Batch Processing -Timesharing
-Optical Mark Reading -Laser Printing

COMPUTER OUTPUT MICROFILM

-Datagraphix Mini Auto-Cine
-Datagraphix Documaster
-3270 SPF Capability
-Free Testing

Route 202
Raritan, NJ 08869
201-526-6100
Contact: Joyce Bagenske

CLASSIFIED ADVERTISING ORDER FORM

Computerworld's Classifieds work.

Issues Dates: Ad closing is every Friday, 10 days prior to issue date.

Sections: Please be sure to specify the section you want: Time and Services, Software for Sale, Position Announcements and Buy/Sell/Swap. (Available upon request: Software Wanted, Business Opportunities and Real Estate).

Copy: We'll typeset your ad at no extra charge. Please attach CLEAN typewritten copy. Figure about 25 words to a column inch, not including headlines.

Costs: Our rates are $126.10 per column inch. (A column is 2" wide.) Minimum size is two column inches (2" wide by 2" deep) and costs $252.20 per insertion. Extra space is available in half-inch increments and costs $64.05. Box numbers are $15.00 extra.

Billing: If you're a first-time advertiser, (or if you have not established an account with us,) WE MUST HAVE YOUR PAYMENT IN ADVANCE.

Ad size desired: _____ columns wide by _____ inches deep.

Issue Date(s): _____

Section: _____

Signature: _____

Name: _____

Company: _____

Title: _____

Address: _____

Telephone: _____

Send this form to:

COMPUTERWORLD

CLASSIFIED ADVERTISING,

375 Cochituate Road, Box 880,
Framingham, MA 01701

Foreign Editorial/ Sales Offices

England: Terry Cartwright, EEC Publications, 196-200 Balls Pond Rd., London N1 4AQ. Phone: 01-359-3525, Telex: (851) 894085 (Computer Management, Computer Business Europe only).

Euen Ross, Bill Dunlop, Stephen Thomas, Beere Hobson Assoc., 345 Goswell Rd., Islington, London EC1V FHN. Phone: 01278 3415/6 (reps for all CWCI publications except Computer Management and Computer Business Europe).

W. Germany: Eckhard Utpadel, CW Publikationens, Friedrichstrasse 31, 8000 Munich 40. Phone: (089) 38172-0. Telex: 5215360.

France: Axel Labiola, Le Monde Informatique, 185 Avenue Charles De Gaulle, 92200 Neuilly Sur Seine, Paris. Phone: 758.14.14, Telex: 613234 F.

Japan: Mr. Shuji Mizuguchi, Computerworld Japan, 7-4 Shintomi 1-Chome, Chuo-ku, Tokyo 104. Phone: (03) 551-3982, Telex: 252-4217 (Computerworld Japan only).

H. Kajiama, Tokyo Representative Group, Yamaguchi Bldg., 2-12-9 Kanda Jimbo-cho, Chiyoda-ku, Tokyo 101, Phone: (03) 230-4117/8, Telex: J26860 (reps for all CWCI publications except Computerworld Japan).

Australia: Alan Power, Computerworld Pty. Ltd., 37-43 Alexander Street, Crows Nest, NSW, 2065. Phone: (02) 4395133, Telex: AA74752 COMWOR.

Brazil: Eric Hippeau, Data News, Computerworld do Brazil, Servicos e Publicacoes Ltda., Rua Alcindo Guanabara, 25/10th Floor 20031 Rio de Janeiro, RJ Brazil. Phone: (021) 240-8225. Telex: 2130838(WORD BR).

Mexico: Richard Small, Computerworld de Mexico, Oaxaca 21-2, Colonia Roma, Mexico City 7 D.F. Phone: (905) 514-4218, (905) 514-6309. Telex: 1771300 ACHAME, 1777809 ACHAME.

Spain: Neil Kelley, Computerworld/Espana, Grevina, 13, Madrid 4. Phone: 231-23-85; 231-23-86; 231-23-88. Telex: 47894(CW E).

Denmark: Preben Engell, Computerworld/Denmark, Gammel Strand 50, 1202 Copenhagen K. Phone: 01-1234-11. Telex: 27566 cwdan.

Sweden: Bengt Mannaldt, Nova Media, Nova Media AB, Vertavagen 55, 11536 Stockholm. Phone: 08-234260. Telex: 8106069 NOMACW.

The Netherlands: Johannes A. Wiveet, Mgr. Dir., Computerworld Benelux, Van Eeghenstraat 84, 1071 GK Amsterdam. Phone: 020-648426. Telex: (844) 18242.

Italy: Daniele Comboni, Gruppo Editoriale Jackson, s.r.l, Via Rossilini 12, 20124 Milano.

Argentina: Ruben Argento, Gen. Mgr., Computerworld Argentina, Av. Belgrano 406-Piso 9, CP 1092 Buenos Aires. Phone: 34-6583/6584.

Norway: Mr. Per Benedjord, Editor, CW Norge A/S, Hovfrivelen 43, P.O. Box 2862, Toeyen, Oslo 8. Phone: 2/647725. Telex: (856) 76476

Singapore: Mr. David Naido, General Manager, Asia Computerworld, Pte. Ltd., 11-08/11-10 Goldhill Plaza, Newton Road, Singapore. Phone: 250-444. Telex: (786) RS 37003

Saudi Arabia: Mr. Omar Dussuki, General Manager, Saudi Computerworld, P.O. Box 5455, Jeddah. Phone: 6678918/6650380. Telex: (928) 401205.

ADVERTISERS INDEX

ABP 28
Aberdeen Case Corp. 83
American Software, Inc. SR/24
American Telephone & Telegraph 77-79
Applied Digital Data 71
Applied Information Development 14
ASK SR/8
A.S.T. Research 80
Avocet ID/20
Automation News SR/12

John Bell Company 97
BGS Systems Inc. 89
BSC Software SR/26
Boeing Computer SR/15
Bourgeois Corp. 70

Cap Gemini/DASD 70
CGA Software 26
Chrysalis SR/4-SR/5
CMI Corp. ID/20
Codex Corp. 45,47
Communication Sciences, Inc. 86
Computer Concepts 67
Computer Corporation of America 60-61
Computer Technology Group 16
Computerland 66
Conserv Corporation SR/20
Concord Data Systems SR/10
Context MBA 74
Control Concepts ID/22
Compsys & Lybrand 24
Corvalis 64
CPX ID/6
Creative Output, Inc. SR/22
Cromemco Inc. 58-59
CRWTH ID/20
Cullinet 9
CW EMS 90
CW Norway SR/22
CW Office Automation 82
CW Supplement 91

D & B Computing Services 73
Data Access 51,76
Data Processing ID/2
Data Rentals-Sales 89
Datagraph 100-102
Datagroducts 98
Datamerik 11
Datasphere 6
Daylle 104
DCMI SR/6
DEC/ITPC 96-97
Delrek 106
Digital Communications Associates 94-95
Digital Source, Inc. 82
D.J.C. Corp. ID/21
Dysan 30

Electrohome ID/4-ID/5
Esprit Systems 12-13
Exide Electronics 72
Exxon Office Systems ID/19

F & A Systems 69
Florida Software SR/11
Fortune Systems 85,99,100
Four Phase Systems ID/14-ID/15
FSD Consulting Corp. SR/19
Fusion Products ID/3

General Electric 61
Gestcom ID/14
Goal Systems International ID/26
Group Operations SR/13

Hewlett Packard SR/28-SR/29,98,100-103

IBM 40-41
ICOT SR/12
Infodata Systems 28
Information ID/3,101
Information Science, Inc. 62-63
Innovation Data Processing 7
Innovative Electronics ID/11
Interface Group 80
International Software Technology 30

Lee Data Corp. 96
LexiMAN 33
Leland Computer Services 32
Levi, Ray & Shoup 17
Local Data 69

3M 34
Macro 4 Inc. 10
Madic SR/14
Management Decision Systems 44,SR/30-SR/31
Martin Marietta ID/7,SR/31
MCBA 15
McCormack & Dodge ID/29
MDS Systems SR/30-SR/31
Megatech Corp. 42
Micro Data Base 22
MicroAge 86
MicroFrame 68
MSA 94-95,104

New Generation Software 29
Northern Telecom 36-37
NMTC 107

Obiidata ID/26
On-Line Software 48,ID/2

Pure Research ID/7
Parallax Systems 56
Perkin Elmer SR/16-SR/17
Pilkington 105
Prelude Inc. 38
Precision Business Systems 92
Professional Computer Resources SR/7
Pro-Source ID/23

Radio Shack ID/11
Relational Technology 31
Remex 93
Rexon ID/16

SAS Institute 20-21
S.P. Sharp Associates 24
Signal Technology 18,14
Software A G 66
Software International ID/20-ID/21
The Software Place 33
Software Technology 26
Spectrographics SR/15
Sperry Corp. 27
Stratus Computer 39
Syncsort 3
Sysod 25
Systems Software Inc. SR/27

Teletype Corp. 35
Televideo 55,48
Term-Tronics 63
Time, Inc. 60
Tone Software 52
Transnet Corp. 54
Trax Software 8

Ungermann-Bass 12
Unimet 84
U.S.L. Data Systems ID/8

VCA ID/10
Vision Software 65
VM Software 65

Walker Interactive ID/18
Wall Data Inc. ID/32
Wang Laboratories SR/23
Westin Hotels 64
Wolfe Computer ID/6

Xerox Corp. 4,ID/15

Yipkon Business Systems 100

Zebeta ID/24
Zenith Data Systems 81

This index is provided as an additional service. The publisher does not assume any liability for errors or omissions.

Computerworld Sales Offices

Vice-President/Sales/Donald E. Pagan
Director/National Sales/Edward P. Marshall
Manager/Marketing & Sales Operations/Kathy Doyle
COMPUTERWORLD, 375 Cochituate Road, Box 880,
Framingham, MA 01701
(617) 879-0700

BOSTON SALES OFFICE (617) 879-0700
Northern Regional Director/Chris Lee
Senior District Manager/Jim McCann, Ronald Masters,
Joyce Donovan, Michael F. Kelleher
Sales Assistant/Alice Langley
COMPUTERWORLD, 375 Cochituate Road, Box 880,
Framingham, MA 01701

CHICAGO SALES OFFICE (312) 827-4433
District Manager/Walter Kossack, Rose Gentles
Sales Assistant/Joan F. Brodnicki
Northern Regional Director/Chris Lee
COMPUTERWORLD, 2000 South River Road, Suite 304,
Des Plaines, IL 60018

NEW YORK SALES OFFICE (201) 967-1990
Eastern Regional Director/Michael J. Masterson
Senior District Manager/Doug Cheney
District Managers/Ray Costin, Joan Daly, Fred La Sayla
Sales Assistant/Dale M. Peterna
COMPUTERWORLD, Pegasus Plaza I,
148 Route 17, North, Paramus, NJ 07652

LOS ANGELES SALES OFFICE (714) 261-1250
Senior District Manager/Bob Hubbard
District Manager/Sandy Hedgecock

Western Regional Director/William J. Healey
COMPUTERWORLD, 18208 Bay Park Circle, Suite 240,
Irvine, CA 92714

SAN FRANCISCO SALES OFFICE (415) 421-7280
Western Regional Director/William J. Healey
Senior District Manager/Stacy Mileno
District Managers/Thaddeus Pierson, Brent Chamberlain
Account Manager, Classified/Kevin Beckham
COMPUTERWORLD, 333 Broadway, Suite 33,
San Francisco, CA 94133

ATLANTA SALES OFFICE (404) 394-0709
District Manager/Jeffrey Mantick
Eastern Regional Director/Michael J. Masterson
COMPUTERWORLD, 1400 Peeler Road, Suite D,
Atlanta, GA 30338

CLASSIFIED ADVERTISING (617) 879-0700
Al Dorrill,
COMPUTERWORLD, 375 Cochituate Road, Box 880,
Framingham, MA 01701

CW INTERNATIONAL MARKETING SERVICES
General Manager/Elaine La Monaglia
COMPUTERWORLD, 375 Cochituate Road, Box 880,
Framingham, MA 01701
(617) 879-0700
Manager, West Coast/Peter Crockett
COMPUTERWORLD, 1020 Marsh Rd.,
Menlo Park, CA 94025
(415) 328-8084

CW COMMUNICATIONS/INC.
Board Chairman/Publisher
Patrick J. McGovern
President
W. Walter Boyd
Senior Vice-President
Lee Vidmar

Group VP-Communication Services, Jack Edmonston. Group VP-Circulation, Margaret Phalen. VP-Marketing, Donald E. Pagan. VP-Finance, William P. Murphy. VP-Editorial, John Wilmerding.

Computerworld Headquarters: 375 Cochituate Road, P.O. Box 880, Framingham, MA 01701
Phone: (617) 879-0700, Telex: 95-1130.

SALES — Vice-President, Donald E. Pagan. National Director, Edward P. Marshall. Corporate Advertising Administrator, Frank Collins. Manager/Marketing & Sales Operations, Kathy Doyle. Display Advertising Supervisor, Anne Hadley. Display Advertising, Deborah Bryer, Pam Valentinas, Carolyn Maddalone, Cindy Chaloux, Mary Waddell. Classified Operations Manager, Cynthia Delany.

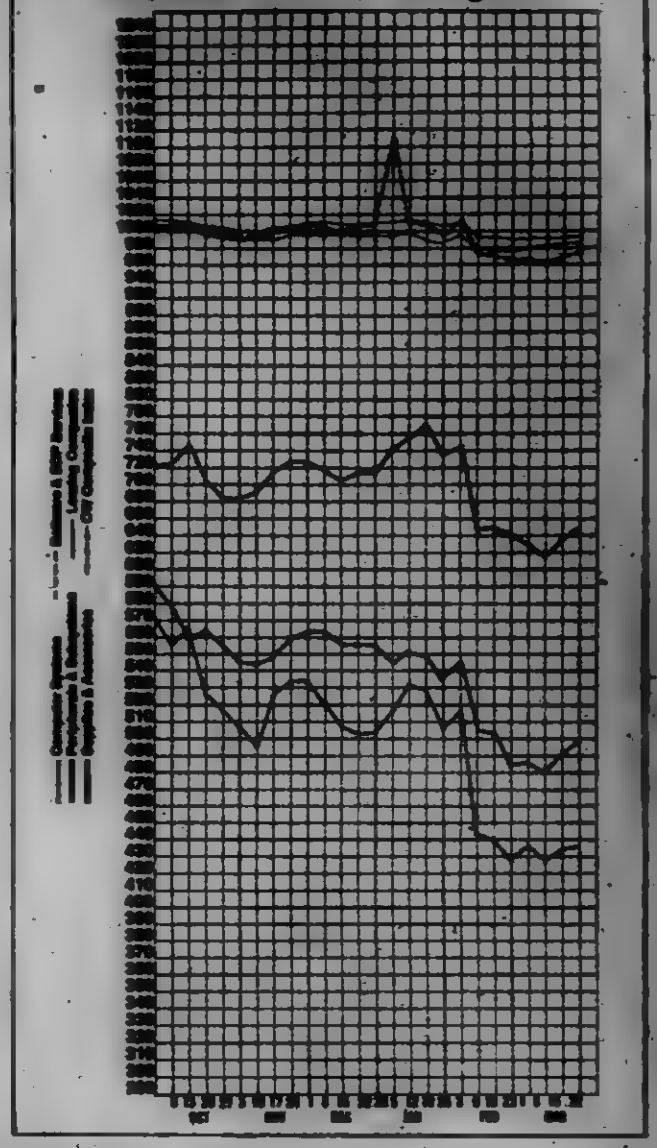
COMMUNICATION SERVICES — Group Vice-President, Jack Edmonston. Director Research, Validyia Dawson. Sales Promotion Director, Liz Johnson.

PRODUCTION — Production Director, Peter Hahn. Production Manager, Marlene Elliot. Paste-Up Manager, Trish Gaudette. Systems Manager, Tom Flinn. Typesetting Manager, Carol Polack. Art Director, Tom Monahan. Graphic Designer, Mark Ring.

CIRCULATION — Group Vice-President, Margaret Phalen. Circulation Manager, Jane Duxbury. Fulfillment Manager, Maureen Burke.

Computerworld (ISSN 0010-4841) is published on 35 non-consecutive issues (single issue Nov. 25, National Entry Rate, 300 Rock Rd., Ann Arbor, Mich. 48103. Phone (313) 761-4700. Computerworld publishes weekly except the second week in December, when it publishes two issues, and the last week in December, when it does not publish. Subscription rates: $1 per copy; $75 per year in the U.S.; $150 per year outside the U.S. Application to mail at second-class postage rates is pending at Framingham, MA 01701 and at additional mailing offices. POSTMASTER: Send address changes to Computerworld, P.O. Box 2044, Marion, OH 43305. Subscriber customer service: (800) 669-1002. Computerworld publishes news and information for computer professionals. Reproduction of material appearing in Computerworld is forbidden without written permission. Reprints (minimum 500 copies) and permission to reprint may be purchased from Computerworld Reprint Management System at (800) 767-1271 or (617) 873-6436. Computerworld's Publication Info is available from Publication Mgmt. for subscription information.

Computerworld Stock Trading Index



Computerworld Stock Trading Summary

CLOSING PRICES TUESDAY, MARCH 29, 1994

All statistics compiled, computed and formatted by TRADE QUOTES, INC. Cambridge, Mass. 02138

COMPUTER SYSTEMS

	1993-94 RANGE	CLOSE	NET CHANGE	WEEK PCT CHANGE
ALPHA MICROSYSTEMS	11- 3	4 1/8	+1/8	+3.1
ALTOS COMPUTER SYST	9- 3	3 1/8	- 1/8	-3.8
APPLE COMP	14- 7	8 1/4	+ 1/4	+3.1
APPLE COMPUTER INC	19- 8	9	- 1/8	-1.3
AT&T	58- 37	37	+ 1/8	+0.3
BURROUGHS CORP	85- 62	63 1/4	+ 1/4	+0.4
COMPUTER AUTOMATION	4- 1	1	- 1/16	-3.0
COMPUTER CONSOLES	9- 3	3	+ 1/8	+4.3
CONTROL DATA CORP	21- 12	12 1/2	- 1/2	-3.8
CONVERGENT TECHNOL	19- 11	11 1/8	+ 3/8	+3.5
CRAY RESEARCH INC	35- 25	25 1/2	+ 3/8	+1.5
DATA GENERAL CORP	15- 8	8	+ 1/8	+1.6
DATAPOINT CORP	11- 3	3	+ 1/8	-1.6
DIGITAL EQUIPMENT	135- 95	96 3/4	+ 3/8	+0.3
EXCEL INC	9- 5	5	+ 1/8	+2.3
ELECTRONIC ASSOC.	19- 15	15 3/8	+ 1/8	+2.3
FLOATING POINT SYST	15- 9	12	+ 1/8	+10.2
FONSONIC	22- 17	20 1/4	+ 1/8	-0.6
GENERAL AUTOMATION	3- 1	1 3/8	0	0.0
GRID INC	20- 6	20	+ 3/8	+1.2
HARRIS CORP	55- 41	52 3/8	+ 1/4	+0.5
HEWLETT-PACKARD CO	55- 45	52 3/8	+ 3/8	+1.0
HONEYWELL INC	51- 38	38	+ 7/8	+1.6
IBM	97-120	114 3/4	-3 3/4	+2.7
IPL SYSTEMS INC	4- 1	4	+ 1/8	+3.1
IVAN-CON INC	13- 3	13 1/8	+ 1/8	+0.4
MASSBUS CORP SYSTS	1- 1	3/8	0	0.0
MANAGEMENT ASSIST	35- 21	29 3/8	+1 1/8	+3.9
MATRONICS ELECTRONI	17- 8	8 1/8	- 3/8	-4.4
MODULAR COMPUTER SYS	9- 5	7 1/4	- 3/8	-7.9
NORTHERN DATA SCI	14- 10	10 1/2	+ 1/8	-1.1
MOTOROLA INC	69- 48	112 1/2	+1 3/8	+1.4
NAT'L SEMICONDUCTOR	15- 8	10	- 3/4	-4.8
NBI INC	39- 21	18 3/4	-1 3/4	-4.1
NCR	70-126	112 1/2	+1 1/8	+1.0
PERKIN-ELMER	17- 37	38	-1	-2.6
PRIME COMPUTER INC	11- 30	16 3/4	- 1/8	-0.6
SPERRY CORP	21- 30	62 1/2	+1 3/8	+2.3
TANDEM COMPUTERS INC	14- 40	23 3/4	+1 1/8	-0.2
TANDY CORP	24- 38	30	+1 1/8	+3.9
TELEVIDEO SYSTEMS	11- 4	4 1/2	+3 1/4	-20.0
TELXON CORP	8- 10	8	- 1/2	-5.2
TEXAS INSTRUMENTS	71-178	134 3/8	+2 3/8	+1.7
ULTIMATE CORP	9- 24	17 1/2	+1	+6.0
VECTOR GRAPHICS INC	3- 1	1 5/8	- 1/8	-7.1
WANG LABS "B"	13- 40	38 3/4	+ 5/8	+2.2
WANG LABS "A"	11- 40	38 3/8	+ 5/8	+2.2
XEROX CORP	39- 82	81 1/8	+ 5/8	+1.5

LEASING COMPANIES

BOOTHE FINANCIAL CP	11- 42	20 1/2	-1	-2.4
COMDISCO INC	7- 42	14 1/4	- 1/8	-0.8
CONTINENTAL INFO SYS	9- 18	7 1/4	+ 1/4	+3.5
IPF INC	8- 19	13 5/8	+ 1/2	+3.8
SELECTRON INC	13- 21	13 1/4	- 1/4	-1.8
WITE LEASING	16- 47	30 1/2	+ 7/8	+2.8

COMPONENTS

ADVANCED MICRO DEV	13- 37	23 3/4	- 1/8	-0.4
ADV'D SEMICONDUCTOR	12- 38	38	0	0.0
ANALOG DEVICES INC	18- 62	31 7/8	+3/8	+2.8
ANALOGIC CORP	15- 27	12	+ 1/8	+0.8
APPLIED MAGNETICS CP	13- 37	17 7/8	+1	+6.8
TERADYNE	14- 38	38	+ 3/4	+2.0

EXCHG: N=NEW YORK; A=AMERICAN; P=PACIFIC; B=BOSTON; I=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
W-T-C PRICES ARE BID PRICES AS OF 5 P.M. ON LAST DAY
(1) TO NEAREST DOLLAR

SOFTWARE & EDP SERVICES

ADVANCED COMP TECH	7- 0	3 1/8	+ 1/2	+19.1
ADVANCED SYSTEMS INC	9- 22	25 3/8	+ 3/8	+1.2
ADS COMPUTERS INC	1- 0	1 3/8	0	0.0
AMERICAN SOFTWARE	24- 21	17	- 1/4	-1.4
AMICORP INC	6- 23	4 3/4	+ 1/4	+5.6
ANALYSTS INTL CORP	9- 20	7	0	0.0
APPLIED DATA RES.	8- 37	37	0	0.0
ASK COMPUTER SYSTEMS	9- 21	14 3/4	- 1/4	-1.6
AUTOMATRIX CORP INC	1- 7	1 3/8	0	0.0
AUTOMATIC DATA PROC	23- 44	32 1/4	-1 1/2	-4.4
CBA COMPUTER ASSOC	9- 17	16 1/4	+ 1/4	+2.5
COMPUTER ASSOC INT'L	9- 38	38 3/4	0	0.0
COMPUTER HORIZONS	9- 30	11 3/4	+ 1/2	+4.4
COMPUTER NETWORK	6- 10	8 1/8	+ 1/2	+7.9
COMPUTER SCIENCES	11- 22	14 1/8	+ 1/2	+3.8
COMPUTER TASK GROUP	6- 22	23	+ 1/2	+2.2
COMPUTER VISION INC	3- 22	4 1/4	+ 1/2	+3.4
COMPUTRONE SYSTEMS	9- 28	8	+ 1/4	+4.2
CONCEPTU CORP	7- 20	8 1/2	+ 1/4	+4.2
CONSULTEC	7- 16	8 1/2	+ 3/4	+4.6
COLLINET SOFTWARE	12- 26	21 3/8	+ 7/8	+3.0
CYCORE SYSTEMS INC	9- 27	19 3/4	+ 1/4	+1.4
ELECTRONIC DATA SYST	34- 42	38 3/4	+ 7/8	+2.3
HORAN SYSTEMS INC.	14- 37	15 1/2	+ 1/4	+1.9
GENERAL ELECTRIC CO	49- 88	83	+ 7/8	+1.0
GTE CORP	38- 46	37 7/8	+ 1/8	+0.3
INFORMATICS INC	10- 24	10 1/2	- 1/8	-1.2
INFOTRON SYSTEMS COR	25- 63	32 3/4	+3	+10.0
KEANE ASSOCIATES	4- 15	7 3/4	0	0.0
LOGICON	9- 31	22 1/4	-1 1/8	-7.7
MCI COMMUNICATIONS	9- 34	9 7/8	+ 3/8	+4.0
MENT SCI ANSR INC	8- 30	15 1/2	+ 1/2	+3.1
MATHEMATICAL APP GRP	9- 22	9 1/2	0	0.0
MICOM SYSTEMS INC	23- 38	25	+2 3/4	+9.2
MICRO-MEDED CP	9- 22	12 3/4	+ 1/2	+4.0
NATIONAL DATA CORP	9- 38	17 3/4	+ 1/2	+2.8
ON-LINE SOFTWARE INT	9- 27	8	- 1/2	-5.8
OMNIPHIC SYSTEMS	9- 21	12 1/4	- 1/2	-1.0
PLANNING RESEARCH	11- 31	15 1/2	- 1/2	-3.0
POLICY MGMT SYSTS CP	11- 31	23 1/2	+ 3/4	+3.3
PROGRAMMING & SYS	1- 6	3	0	0.0
REYNOLDS & REYNOLD	17- 33	20 3/4	+1	+5.0
RLI CORP	11- 26	10 1/4	+ 1/4	+1.3
SHARED MEDICAL SYST	13- 35	33 3/4	+ 1/4	+0.3
SCIENTIFIC COMPUTERS	9- 16	8 1/4	- 1/4	-2.9
SOFTWARE AG	9- 17	12 3/8	0	0.0
TYMSHARE INC	12- 30	23 3/8	+ 3/8	+1.5
UCCEL CORP	9- 18	13 3/8	+ 1/4	+1.9
UNIX CORP	7- 17	8 1/4	0	0.0

PERIPHERALS & SUBSYSTEMS

AM INTERNATIONAL	9- 7	3 1/4	- 1/4	-7.1
ANDERSON JACOBSON	7- 25	8 3/8	- 3/8	-4.2
AUTO-TROL TECHNOLOGY	7- 23	10 1/2	- 3/8	-3.8
BANCTEC INC	7- 33	8 3/4	0	0.0
DATAPOINT INT'L	4- 13	6 3/8	- 1/8	-1.9
DELTA-BENGEN & DES	1- 20	20	+1 3/8	+8.0
CANNON CORP	1- 6	3 3/8	0	0.0
CENTRONICS DATA CORP	9- 38	11 3/8	-1 1/8	-9.0
OPTEC CORP	4- 12	8 1/4	- 3/8	-4.3
CORNETRONICS	3- 10	8	0	0.0
COMPUTER DEVICES INC	4- 11	3/4	-	-7.7
COMPUTER TRANSCEIVER	3- 12	3 3/8	- 1/8	-2.0
COMPUTERVISION CORP	10- 23	11	+1 3/8	+0.0
COMRAC CORP	10- 20	10 1/8	- 1/8	-1.2
DATAPRODUCTS CORP	10- 41	23 3/8	- 1/8	-0.8
DATARAM CORP	5- 12	8	- 3/8	-4.6
DATA SWITCH CORP	13- 41	30	- 1/2	-2.4
DATUM INC	2- 17	8 1/8	+ 3/8	+0.2
DECISION DATA COMPUT	3- 10	3 1/8	- 1/8	-3.8
DIGITEL-S. (NYPTI)	9- 28	28 3/4	- 1/4	-0.8
ELECTRONIC M & M	9- 11	8 1/2	+ 1/8	+1.8
EMBATA, INC	10- 16	16 3/4	-1	-5.9
EVANS & SUTHERLAND	17- 30	18 1/2	+ 3/4	+4.2
GANDALF TECHNOLOGIES	9- 22	11	+ 1/8	-2.2
GEN'L DATA COMM IND	16- 33	27 1/4	- 1/4	-0.9
GREAT SOUTHWEST MAG	1- 0	7/8	0	0.0
HAZELTINE CORP	9- 24	23 1/2	+ 3/4	+3.3
ILOT CORP	1- 10	9 7/8	- 1/8	-1.3
INFORMATION INTL INC	10- 32	13	+ 1/8	+0.8
INFORMATION RETRIEV	9- 17	8 1/8	+ 1/8	+3.1
INTEL CORP	66- 60	58 5/8	+ 1/8	+0.2
IPL SYSTEMS INC	6- 14	6 3/4	+ 1/8	+1.8
LUNDY ELECTRONICS	7- 15	8 3/4	0	0.0
MEGADATA CORP	9- 15	10	- 1/4	-2.3
MSI DATA CORP	10- 37	15 3/8	+ 7/8	+0.9
MUSTANG CORP	9- 23	23 1/4	- 3/4	-3.9
NETWORK SYSTEMS CORP	9- 24	24	+ 3/8	+1.6
NO AMERICAN PHILIPS	67- 78	67 3/4	-1 3/4	-2.5
NORTHERN TELECOM LTD	22- 48	38 1/4	- 1/8	-0.3
OMNEX	1- 5	1	- 1/8	-9.0
PARADYNE CORP	13- 30	15 5/8	-1 3/8	-12.0
PRIMTA CORP	7- 14	12 1/8	+ 1/8	+1.0
PHOENIX AMERICAN INC	7- 17	8 3/8	+ 1/8	+0.9
PLESSEY CO (ADR)	28- 41	23 7/8	+ 7/8	+3.8
PRINTRONIX INC	29- 34	29 3/4	+2 1/2	+10.7
RANTEX CORP	9- 28	8 1/2	0	0.0
RAYTHEON CO	37- 88	88 1/2	- 3/4	-2.0
RECOGNITION EQUIP	9- 17	12 3/8	+1	+0.0
ROLM CORP	39- 69	35 3/8	+ 1/2	+1.3
SANDERS ASSOCIATES	28-130	38	- 1/4	-0.6
SCAN DATA	1- 3	3/8	0	0.0
SCAN-TRON CORP	12- 18	14	- 1/2	-3.4
SCIENTIFIC ATLANTA	11- 23	11 1/8	- 3/8	-3.2
STORAGE TECHNOLOGY	15- 32	32	- 1/2	-1.5
SYLEX DATATRONICS	3- 12	3 1/8	+ 1/8	+4.0
SYSTEMS & COMP TECH	20- 28	24 3/4	-1 3/4	-7.0
T BAR INC	7- 17	8 5/8	0	0.0
TRG PRODUCTS CO	9- 28	24 1/4	+1 1/8	+4.8
TANDON CORP	12- 28	14	+ 3/4	+5.6
TEC INC	9- 12	8 7/8	+ 3/8	+4.4
TEKTRONIX INC	38- 67	58	- 1/2	-0.8
TELXON	9- 32	21 7/8	0	0.0
TERADATA SYSTEMS CP	9- 17	8 1/8	- 7/8	-10.2
TYMPLEX INC	9- 28	16 1/2	+ 1/2	+3.1
VISUAL TECHNOLOGY	6- 28	11 1/8	-1 1/8	-10.0
AMERICAN BUS PHONE	9- 33	28 1/8	+ 1/8	+0.2
BARRY WRIGHT	15- 28	17	+1	+6.0
DUPLEX PRODUCTS INC	12- 27	24	0	0.0
DARIS BUS. PHONE	6- 18	28 1/8	+ 3/8	+3.6
JW COMPANY	68- 88	78	+ 1/8	+0.2
MODEM CORP LTD	30- 42	37 1/4	- 1/4	-0.6
STANDARD REGISTER	11- 24	24	+ 1/8	+0.6
WALLACE BUS PHONE	11- 19	18 7/8	+ 1/8	+0.8

Only MSA software makes your mainframe work 100 times better

1. Now MSA's Executive Peachpak™ II software links personal computers to the mainframe. So you can...

2. Use your PC to access all your MSA mainframe systems, from General Ledger to Manufacturing.

3. Access entire mainframe files, so you can work with large amounts of information at one time.

4. Get HELP if you need it, with a built-in feature that guides you through the system.

5. Choose the exact mainframe information you need, as much as you need, in the form you need.

6. Use it with Peachtree Software, 1-2-3™ from Lotus, DIF™ VisiCalc™ or other micro software.

7. Enjoy a real-time environment, no waiting for processing.

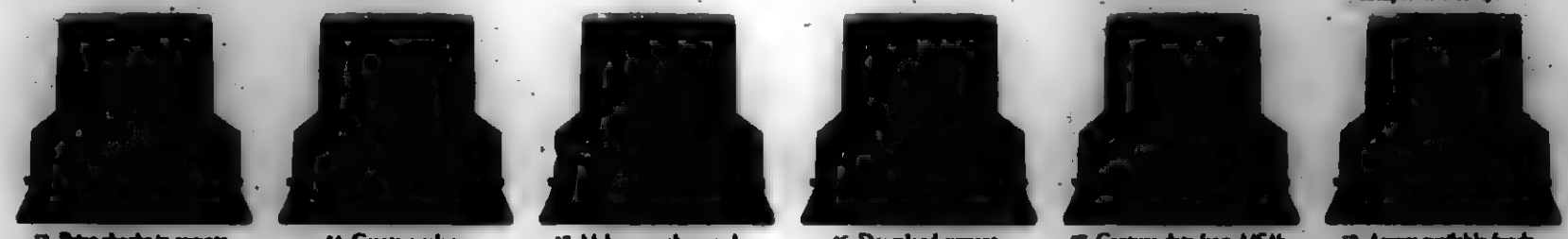
8. Allow only authorized personnel access to the mainframe, due to built-in security.

9. Get database-to-database transfer with Database Sharing.

10. Use over 20 predefined applications from MSA. For example...

11. Use PeachLink™ to download information from both MSA and non-MSA online mainframe systems.

12. Download vendor history from MSA's Accounts Payable System and use PeachCalc™ to do comparative analysis.



13. Print checks in remote locations from mainframe Accounts Payable data.

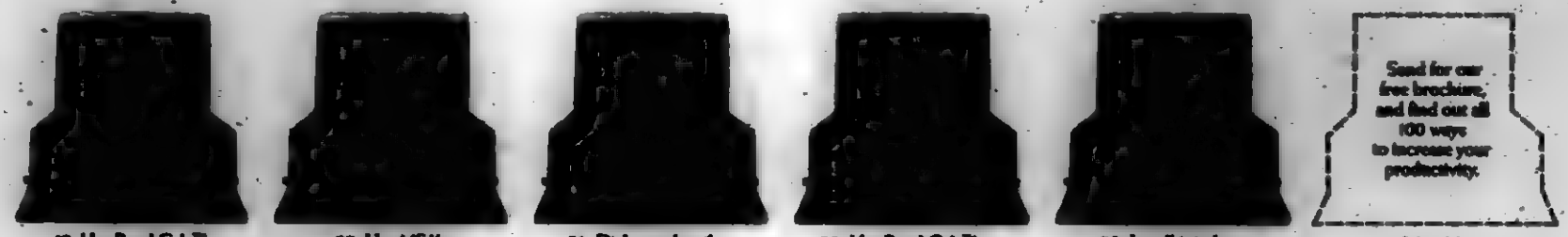
14. Create a salary administration worksheet on a PC using MSA's Payroll/ Personnel System.

15. Make a purchase order adjustment without leaving your workstation.

16. Download current balances from General Ledger to graph actual vs. planned.

17. Capture data from MSA's Fixed Assets System, use PeachCalc™ to create a lease amortization model.

18. Access available funds data in MSA's Budgetary Control System...



19. Use PeachCalc™ to project expenditures through year-end.

20. Use MSA's Manufacturing System data to produce cost/margin analysis with PeachCalc™

21. Dial up subscriber databases to access current credit information for customers...

22. Use PeachCalc™ to analyze information, set credit and update your mainframe Accounts Receivable data.

23. Install it in less than one hour.

24. -100.

Backlogs? Rush requests? Now they're a thing of the past.

MSA's new Executive Peachpak II links your company's personal computers directly to your mainframe. So executives can get to vital information without waiting for print-outs.

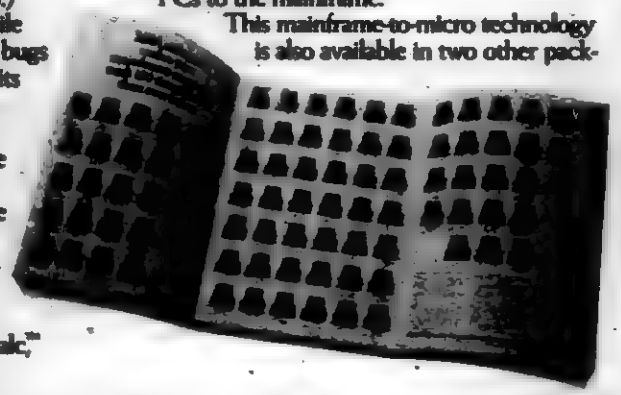
Best of all, this hot new technology is available from MSA *right now.* (In fact, it's already installed and working for companies across the country.)

MSA is the mainframe-to-micro leader. While other companies are still trying to work the bugs out of their initial offerings, MSA already has its second successful mainframe-to-micro product: Executive Peachpak II.

It offers such advanced features as Database Sharing, MSA's database-to-database transfer technology that lets you get all the mainframe information you need instantly.

And a Universal Interface with most micro-software packages including Peachtree Software, 1-2-3™ from Lotus, and VisiCalc.™

Executive Peachpak II also includes PeachCalc,™ an electronic spreadsheet. A Business Graphics System for color charts and other graphics. Telecommunications that let personal computers talk to each other—or link to resources such as Dow Jones News/Retrieval.® PeachText,™ complete report production system that lets executives edit and footnote reports. A List Manager for organization. And PeachLink,™ the software that links your PCs to the mainframe.



This mainframe-to-micro technology is also available in two other packages: Administrative Peachpak, which includes comprehensive word processing functions. And Graphics Peachpak, for color graphs and charts.

All include PeachLink.™ And all are backed by the service and support MSA is so famous for.

This revolutionary new link means you can now deal with one software company that supplies all the advanced mainframe systems your company needs. All the software for your personal computers through our Peachtree Software Company. And the software that links them together.

Talk to MSA about new Executive Peachpak II. And see how much more you could be getting from your mainframe. Call Robert Carpenter at (404) 239-2000, or write to Management Science America, Inc., 3445 Peachtree Road, N.E., Atlanta, Georgia 30326.

MSA
The Software Company

MSA makes the mainframe link to personal computers a reality

Executive Peachpak II and PeachLink are trademarks of Management Science America, Inc. PeachCalc and PeachText are trademarks of Peachtree Software, Inc., and MSA company. DIF is a trademark of Software Arts, Inc. 1-2-3 is a trademark of Lotus Development Corp. VisiCalc is a trademark of VisiCorp, Inc. Dow Jones News/Retrieval is a registered trademark of Dow Jones & Company, Inc.

VOL 18
ISSUE 14
AP 2 1984
UMI

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

COMPUTERWORLD

$2.00 A COPY; $44/YEAR | APRIL 2, 1984 | VOL. XVIII, NO. 14

NCR
Celebrating the Future

NCR turns 100
But it's far from being a senior citizen/**77**

In Depth
What's available in liability insurance/**Follows page 64**

The fourth generation
It's moving into the mainstream, says Focus creator Gerald Cohen/**17**

CW
N14810GUIVYMUIVYM FCWB
UNIVERSITY MICROFILMS
SERIAL PUBLICATIONS
300 N ZEEB RD
ANN ARBOR MI 48106

NEWSPAPER

AT&T takes on the computer market

Unwraps five superminis, multiuser micro, local net, PC Interface

By John Dix
CW Staff

NEW YORK — AT&T made its long-expected entry into the computer industry last week with the commercial introduction of a family of Unix-based 32-bit processors that includes a multiuser microcomputer and five superminis.

Announced along with the 3B processor family at a press conference here last Tuesday were Ethernet-type local-area network interfaces and an interface that reportedly enables interaction between the Unix environment of the AT&T supermicro and micros that run under PC-DOS, the operating system for IBM's Personal Computer.

The 3B processors are not for everyone. Noting that they lack AT&T-supplied or supported applications software, Robert J. Casale, president of marketing and sales for AT&T Information Systems, Inc., said the processors' target markets are value-added resellers and large users that want to shoulder the responsibility for applications development and/or procurement.

Addressing the applications void, Casale pointed out that more than 90 companies market 300 commercially available Unix applications packages. However, it is unclear how many of the packages are compatible with the System V version of Unix bundled into all of the new AT&T processors.

In a nutshell, the products unveiled last week by AT&T include:

■ The 3B20 line of superminis, available in three configurations: the single-processor 3B20S, the attached processor 3B20A and the dual-processor 3B20D. The systems range in price from $230,000 to $340,000. *Story on page 8.*

■ The 3B5 mid-range superminis, which are said to be optimized for Unix and range in price from $57,000 to $73,000. The two models in the 3B5 line, the 3B5/100 and 3B5/200, are based on AT&T Technology Systems Group's 32-bit WE 32000 microprocessor, developed by AT&T's Bell Laboratories, and use 256K-byte random-access memory chips. *Story on page 8.*

■ The 3B2/300, a $9,950 multiuser microcomputer that is also based on the WE 32000. The 3B2/300 uses 256K-byte RAM chips, has a 10M-byte Winchester disk and can reportedly support up to 18 users. *Story on page 9.*

■ Two Ethernet-compatible local-area network interfaces. One is a three-board AT&T set for the 3B20 and 3B5 superminis that uses a WE 32000 and costs $7,000. The second is a $3,000, single-board interface that uses an Intel Corp./Seeq Technologies, Inc. chip set for the 3B2/300. *Story on page 9.*

■ The hardware/software PC Interface. The PC interface enables the 3B2/300 to act as a host in a star network of IBM Personal Computers and compatible microcomputers running under PC-DOS, IBM's version of Microsoft, Inc.'s MS-DOS operating system; allows files to be transferred between machines using PC-DOS and those running Unix; enables the micros to act as Unix terminals; and allows the micros to communicate with each other. The price of the PC Interface will not be announced until the third quarter, when the product will be available for shipment, according to AT&T.

While together these products represent what Casale claimed is the broadest range of initial product offerings ever made by a

See AT&T page 8

Wang brings out top-of-the-line supermini

By Tom Henkel
CW Staff

LOWELL, Mass. — Wang Laboratories, Inc. last week announced its largest processor to date, an addition to its VS line of 32-bit superminicomputers that is said to offer users three times the internal performance of the former top-of-the-line VS 100.

The VS 300 is compatible with systems software and application programs developed on Wang's VS 25, VS 45, VS 85, VS 90 and VS 100 systems.

The new supermini features a pipelined central processor that reportedly can perform three functions at one time. In one 120-nsec cycle, Wang claimed, the CPU can simultaneously execute an instruction, decode a second instruction and fetch a third instruction.

Industry watchers had expected the announcement of the VS 300 for some time. Craig Symons, a financial analyst with Gartner Group, Inc. of Stamford, Conn., explained last week that Wang needed a high-end processor to compete with similar systems offered by its competitors, such as Data General Corp.'s MV/10000 and Prime Computer, Inc.'s 9950. It also needed a powerful supermini that could be used as a vehicle for connecting corporate microcomputers, Symons added, observing that the VS 300 appears to offer the potential for such applications.

The VS 300 features 4M to 16M bytes of main memory and a 32K-byte cache memory. A dedicated, buffered Memory Control Unit relieves the processor and I/O subsystem from the task of managing memory requests, the vendor said.

The system can execute up to 255 concurrent user tasks; up to 192 workstations and printers can be attached to it. The VS 300 uses an enhanced version of Wang's VS operating system that is compatible with existing word processing, DP and communications software, according to a

See WANG page 10

TOP OF THE NEWS

AT&T and Wang Laboratories, Inc. rang up with the major hardware news last week, but National Advanced Systems, Inc. was also on the line. It answered IBM's 3080 X series announcements with price cuts and memory expansions for its high-end AS/9000 mainframes. **Page 2.** Sperry Corp., meanwhile, said it will be holding a press conference today to introduce what it refers to as the industry's first fourth-generation language micros for stand-alone use or mainframe connection. **Page 4.**

■

Ashton-Tate was among the software vendors that called in major announcements last week. Its introduction of an integrated microcomputer software package called Framework pits the company directly against Lotus Development Corp. **Page 5.** In addition, Data General Corp. brought out what it claimed is the first large-scale financial management package integrated with an office automation system. **Page 6.** Artificial Intelligence Corp. introduced two versions of Intellect that provide an interface to IBM's SQL/DS. **Page 10.**

■

How long will your data communications bills stay the same? Maybe until June 13. Maybe not. There's been a lot of action at the Federal Communications Commission lately. **Page 4.**

■

For large users, the office automation marketplace is maturing more rapidly than expected, a major survey reported last week. **Page 6.**

■

The Department of Defense has been empowered to review export licenses for computers and other high-technology items to noncommunist countries suspected of being shipment points to Eastern bloc nations. **Page 14.**

We apologize if your *Computerworld* arrived late this week. The blizzard that hit the East Coast last Thursday knocked out the lines supplying CW's Framingham, Mass., offices with power, bringing down the text editing system used to create and typeset the newspaper. As a result, publication of the paper was delayed for one day.

AS/9000 prices cut, memory hiked

By Jeffry Stooker
CW West Coast Bureau

MOUNTAIN VIEW, Calif. — National Advanced Systems Corp. (NAS) last week trimmed the prices of two of its AS/9000 series mainframes by 8% and 10% and expanded the machines' main memory by 16M bytes. Similar expansions of internal storage were also announced for two other members of the NAS 9000 family of IBM-compatible processors.

In a related move, NAS cut the 9000 line's maintenance prices by 5% to 27%.

Together, the main memory enhancements and the cuts in both purchase prices and maintenance expenses constitute the first stage of NAS' reply to IBM's recent 3080 X family upgrade [CW, Feb. 27]. The second phase of that response is expected to come early next month with the expansion of NAS' 8000 family of IBM-compatible CPUs, industry sources said.

NAS last week also disclosed its revised timetable for testing and delivering IBM's Extended Architecture (XA) for the 9000 series. Testing of XA will start this year during the second quarter both here and in Japan, with shipments of XA upgrade kits scheduled to begin reaching 9000 series users during the third quarter.

Originally, NAS had intended to start making XA available to users of the 9000 family during the second quarter of this year. But snags in IBM's own XA shipment schedule forced NAS to delay its delivery dates by one quarter, according to Mitch Schoch, director of NAS' North American systems marketing.

XA is also slated to be added to one of the 9000 family's sister products, NAS' AS/8000 mainframe line, which made its debut last year. In fact, 8000 series users will begin to receive their XA upgrade kits during the fourth quarter, Schoch said.

NAS' latest mainframe pricing moves apply both to the company's 9060 and 9080 processors, whose purchase prices the vendor has pared by 10% and 8%, respectively. As a result, a basic 9060 now sells for $2.7 million, compared with $4.5 million for a comparably configured 9080.

As part of the same announcement last week, NAS expanded from 48M to 64M bytes the main memory capacity of both the 9060 and 9070. The enhancement has left the two machines equal in internal storage to the 9000 family's top-of-the-line member, the 9080, whose maximum capacity of 64M bytes remains unchanged.

Elsewhere in the 9000 series, NAS boosted from 32M to 48M bytes the main memory of the product line's two low-end models, the 9040 and 9050.

In yet another announcement, the vendor trimmed the 9000 series' maintenance prices by 14.6% for the 9040, 14.7% for the 9050, 17.7% for the 9060, 15% for the 9070 and 26.5% for the 9080. Each of these price cuts refers only to the five models' basic configurations, Schoch noted. The exact amount of the maintenance price cuts varies with the machines' main memory and channel capacities.

In any event, the change in NAS' pricing structure has cut the monthly maintenance charges for the 9000's five minimum configurations to $4,821 for the 9040, $5,724 for the 9050, $6,662 for the 9060, $8,790 for the 9070 and $10,437 for the 9080.

NAS' announcement of price cuts and memory enhancements comes only about a month after IBM's announcement of six additions to its 3080 X family of large-scale processors. Introduced during the week of Feb. 20, the six machines reportedly provide 5% to 14% greater performance than the 3083, 3081 and 3084 models they replace.

Both the price reductions and memory enhancements for the 9000 family machines take effect immediately, according to NAS, which is based at 800 E. Middlefield Road, Mountain View, Calif. 94042.

Reaction to 3480: It may not replace 3420

By James Connolly
CW Staff

Possible savings in time, space and energy sparked IBM users' interest in the long-awaited IBM 3480 tape drive, but that interest doesn't ensure that the cartridge system will replace IBM 3420-type drives in a year, seven years or ever, users and industry observers indicated in interviews last week.

"Anything that saves us space, power and cooling is interesting. Anything that increases the speed with which 3380 [disk drives] can be dumped is interesting. But the change in media means we have to be careful about jumping in too fast," said Laura Gregory, vice-president for technical management at Bank of America in San Francisco.

Moreover, she added, "From what I've seen, it doesn't look like the price comparison is going to be as favorable as we would like."

Richard Wagner, manager of technical services, operations and communications for the Lycoming Division of Avco, Inc. in Stratford, Conn., said his initial reaction "is that finally, after all we have been hearing, the announcement has been made."

"We are definitely interested in the speed of the new system," Wagner said. "The other thing of interest to us is the footprint. Like other people, we are interested in getting more square footage in the machine room. Every square foot that we save puts off the time that we go to the company and ask to expand."

Gregory, Wagner, other users and consultants commented on the 3480 in the days following IBM's March 22 announcement that the high-end tape system will be available in early 1985 to replace the 11-year-old 3420 drives [CW, March 26].

The 3480 features a 3M byte/sec data transfer rate, which more than doubles the 1.25M byte/sec rate of the 3420, and the use of 18 recording tracks on the ½-in. chromium dioxide tape, resulting in a sixfold recording density increase, from 6,250 to 38K byte/in. Utilizing a 4- by 5-in. cartridge rather than a 10½-in. reel, the 3480 was designed to save tape storage space and to use 60% less computer room space than the 3420.

The 3480's Data Facility Hierarchical Storage Manager, Version 2, relieves the host computer of the job of transferring data from disk to tape and allows the computer to just instruct the disk to unload data. That feature is intended to free the host for other tasks.

After examining the 3480's specs, Tom Baker, second vice-president for data processing at Guardian Life Insurance in New York, said, "With the advent of the high-capacity disk and the large data center, it takes a lot of time to back up a 3380. Even though we only back up data that was altered during the day, we think that perhaps it could save us a couple of hours a night."

However, the surveyed users, who run IBM 3081 and 3083 mainframes as well as other systems, said they still wanted to learn more about the 3480s before committing to buy any of them.

At an IBM users group meeting in Atlanta at the time of the announcement, consultant Hugh R. Green, director of IBM large market services for The Gartner Group in Stamford, Conn., said some attendees saw the tape being used in a start/stop role, rather than a data stream role. He noted the product can only reach its full potential in a data stream role, particularly for organizations with large archival operations.

But Green also noted that the scheduled first quarter of 1985 delivery date "is not the strongest indicator" that the product will be readily available to buyers. Green expects the 3480 announcement to force IBM competitors, particularly Storage Technology Corp., to offer cartridge systems even if they have reel-to-reel devices that can match some of the 3480's performance figures.

An observer of the tape market, Don Collier, general manager of the "Freeman Reports" in Santa Barbara, Calif., observed that the 3480's introduction "certainly ensures a healthy future for magnetic tape and rejuvenates the high-end tape market in particular." He said the tape, thin-film heads and cartridge design "will break loose the logjam" that has held back OEMs and plug-compatible manufacturers who have awaited the IBM announcement before releasing their own tape systems.

However, he noted that 3420-type systems "will be around for many years to come" because it is too expensive for large users to transfer their "500,000 reels of tape" to cartridges. He predicted that the gradual transition to the newer product will start with buyers of new systems using 3480s and with established shops buying 3480s for use with new applications and using 3420s with existing applications.

Collier sees the 3480's strong points as its 60% cut in space and power requirements and twentyfold increase in data integrity.

NEWS SUMMARY

Sperry Corp. is slated to unveil what it terms the first fourth-generation-language micros for stand-alone use or mainframe connection/4

Rates for dial-up and private-line service may rise June 13. Then again, they may rise tomorrow/4

Data General Corp. announced what it claimed is the first large-scale financial management package integrated with an office automation system/4

Ashton-Tate last week marched into the integrated applications software arena, pitting a package called Framework against Lotus Development Corp.'s Symphony/5

A major survey indicates that the office automation market is maturing more rapidly than expected/6

Artificial Intelligence Corp. has introduced versions of Intellect that interface to IBM's SQL/DS under VM/SP and DOS/VSE/10

Half of the companies polled by a recruiting firm plan second-quarter DP hiring/13

CW at Pulse: Attendees debate whether Panaphic Systems, Inc.'s Easytrieve-Plus spells the end of Easytrieve . . . A user tells how Panaphic's Gener/ol took on Cincom Systems, Inc.'s Mantis and won/12-13.

The Reagan administration gave the Department of Defense the power to review export licenses for high-technology items to noncommunist countries/14

A report suggests that many studies that associate VDTs with health risks are based on inadequate research methods/15

Interview with Gerald Celeen: Fourth-generation language technology/17

Planning for the office building of the future must include input from information systems managers, a study warns/19

The image of the computer in the mass media has become more benevolent — but not more realistic, says an organization devoted to researching the impact of technological change on society/22

The National Crime Prevention Council plans to establish a computerized crime prevention center/25

International Report/18
Calendar/31

IN DEPTH

Liability insurance/Follows page 64
A simple measure/ID/10

EDITORIAL/32
SOFTWARE & SERVICES/39
COMMUNICATIONS/55
SYSTEMS & PERIPHERALS/59
MICROCOMPUTERS/65
COMPUTER INDUSTRY/77

ADR® WARE™

ADR/IDEAL™

More than just a 4th generation language. It's the only complete 4th generation system integrated with a relational DBMS, which lets you develop applications for high volume production, from the simplest to most complex.

We've taken state of the art to a new state: Easy and Available.
Before you make a software decision, call ADR (201) 874-9000.
Or fill out and mail in the coupon.

☐ Please send me more information about ADR WARE.
☐ Please send me information about ADR seminars.

APPLIED DATA RESEARCH INC.
Route 206 & Orchard Road, CN-8, Princeton, NJ 08540

Name_____
Position_____
Company_____
Address_____
City_____ State_____ Zip_____
Phone Number_____
Computer Equipment_____

ADR® WARE™
From idea to application, we get you there faster.

Sperry to offer 'fourth-generation-language micros'

NEW YORK — Sperry Corp. Computer Systems today is expected to introduce here what it termed the industry's first fourth-generation-language microcomputers for either stand-alone use or mainframe connection.

Sperry's Mapper 5 and Mapper 6 microprocessors, the first of a new line of desktop microcomputers, bring the company's Mapper mainframe application development software down to the chip level, said Dewaine Osman, vice-president of the company's Americas Division. Osman said the starting price for the multiuser system is under $40,000. More detailed information was not available at press time.

As stand-alone desktop systems, the Mapper microprocessors become "personal data processing departments" for middle managers and administrative people, Sperry said. They feature color graphics, message sending and related office functions, searches, sorts, merges and arithmetic computations.

The Mapper 5 was designed for Sperry environments and links to Sperry mainframes. The Mapper 6, available for "a slight increase in cost," offers the additional ability to link with IBM mainframes, a spokesman said.

Mainframe-based Mapper data can be updated and shared downline at the workstation level, extracted for local use or executed by remote command, Sperry said. The systems can support up to 16 Sperry UTS display stations or the Sperry Personal Computer, the firm said.

The systems' basic configuration is said to feature an 8-MHz Motorola, Inc. 68000 microprocessor with a discrete virtual memory management unit for virtual address translation. Up to 30 processes are supported, each with a maximum private virtual address space of 4M bytes, Sperry said.

The cabinet housing the processor also houses a 5¼-in., 655K-byte floppy disk drive, a peripheral interface for Mapper mass storage and backup subsystems, an asynchronous port, three dual RS-232 synchronous ports to handle UTS terminals and the Sperry Personal Computer and three more RS-232 synchronous ports to support micro-to-micro and micro-to-mainframe communications.

A mass storage and backup subsystem consists of a fixed disk controller, a 28.5M-byte fixed disk drive, a 45M-byte streaming tape unit or two fixed drives with a total of 57M bytes of storage.

Sperry Computer Systems can be reached through P.O. Box 500, Blue Bell, Pa. 19424.

Private-line, dial-up rates to rise June 13 — or April 3

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — How long data communications users will continue to pay current dial-up and private-line rates was a key question here last week.

The Federal Communications Commission last week ordered AT&T and the nation's local telephone companies to continue until June 13 their present division of revenue contracts, which govern the rates now being paid by the nation's communications users. Without FCC action, the contracts would have expired tomorrow, April 3.

However, Bell Atlantic — one of the seven regional telephone holding companies created by AT&T's divestiture of its operating companies — last week asked U.S. District Court Judge Harold H. Greene to cancel the contracts tomorrow.

If Greene complies with that request, tariffs that incorporate the FCC's new access charge plan would go into effect immediately. Those tariffs charge sharply higher rates for most dial-up and private-line services.

Bell Atlantic contends that continuing the division of revenue contracts is illegal because the decree settling the U.S. vs. AT&T antitrust case against AT&T said, "tariffed access charges shall be the exclusive means for the former Bell telephone companies to receive compensation for exchange access service following divestiture."

Greene, who presided at the U.S. vs. AT&T trial and is now overseeing the settlement, agreed late last year to defer this provision for three months — from Jan. 1, the date on which divestiture officially took place, to April 3 — to give the FCC more time to analyze the access charge-based tariffs that had been submitted by AT&T and the local telephone companies. But at the time Greene granted this delay, he said he was assuming that "the arrangement between AT&T and the operating companies ... will expire in April 1984."

Last week, Larry Povich, an FCC policy spokesman, said that under the commission's rules, the pending tariffs can be deferred until June 13. "Judge Greene has absolutely no jurisdiction in this area," he added.

According to Bell Atlantic, the commission delayed the new exchange access tariffs not for the stated reason — that they weren't sufficiently cost-justified — but "as an accommodation to AT&T's alleged financial condition," refering to an emergency petition filed Feb. 27 by AT&T that requested delay of the new access charge plan and, hence, of the pending tariffs.

AT&T's major concern is that the latest revision of that plan, which defers the residential and single-line user surcharge and revises the fees which competing other common carriers must pay for local exchange access, will increase its costs drastically and result in a substantial revenue loss.

AT&T wants the commission to raise the other common carriers' access charges and lower the former Bell operating companies' authorized rate of return. That rate currently is 12.75%. AT&T proposed a return of 11% to 12%.

If the commission accepts the phone company's proposal, AT&T said it would lower its own rate to the same level authorized for the former Bell operating companies, even if this requires reducing present rates.

In last week's order, the commission announced that it would investigate the need for changing the 12.75% rate of return.

AT&T to drop Accunet Packet Service prices, offer lower speed

By Bryan Wilkins
CW Washington Bureau

WASHINGTON, D.C. — AT&T Communications has filed a tariff to decrease prices as well as offer a lower transmission speed option for its Accunet Packet Service. The changes will become effective May 5 if they are approved by the Federal Communications Commission.

Accunet is currently available at 9,600 and 56K bit/sec. AT&T's request for 4,800 bit/sec service marks the first time the carrier will offer this transmission speed option for data transmission. AT&T hopes this will make packet-switching more attractive to businesses that do not require high-speed transmission rates.

Accunet Packet Service, initially offered last June as the Basic Packet Switching Service, has not met with great customer demand, AT&T Information Systems, Inc. officials admitted. They are trying to expand its attraction by tailoring it to specific market segments, such as insurance firms and the automotive industry.

The newly filed tariffs for Accunet Packet Service reflect monthly charges as well as per-packet charges, AT&T Communications said. For instance, the monthly port charge for 56K bit/sec transmission would drop to $950 from the current rate of $1,200. The monthly port charge for 9,600 bit/sec service would be $550, down from the current $850. The proposed 4,800 bit/sec service would cost $420/mo.

Under the new tariff, filed March 23, the kilopacket rate for every 1,000 packets would be 75 cents instead of $1.35. This rate covers the first 4,000 kilopackets transmitted during normal business hours; the second 4,000 kilopackets would cost 70 cents per kilopacket, and the third set of kilopackets would cost 65 cents per kilopacket. Every kilopacket beyond 12,000 would cost 60 cents.

Transmission rates during nonbusiness hours would be a uniform 30 cents per kilopacket.

A new feature of the service proposed in the tariffs would permit customers to share trunk lines accessing one of the three existing packet-switch nodes already made by AT&T.

AT&T Communications said that the sharing of trunk lines will permit as many as 1,000 data terminals to be addressed on a single access line and up to 511 different messages to be transmitted simultaneously over one access line.

An access line connecting an Accunet Packet Service customer to the AT&T packet switch, as well as the equipment needed to convert terminal data into packets for transmission and deconversion at the receiving end, will have to be obtained by the customer.

Second-class postage paid at Framingham, Mass., and additional mailing offices. *Computerworld (ISSN-0010-4841) is published weekly, except: January (6 issues), February (5 issues), March (5 issues), April (7 issues), May (5 issues), June (7 issues), July (6 issues), August (6 issues), September (6 issues), October (7 issues), November (6 issues), December (6 issues) and a single combined issue for the last week in December and the first week in January by CW Communications/ Inc., Box 880, 375 Cochituate Road, Framingham, Mass. 01701.*

Copyright 1984 by CW Communications/Inc. All rights reserved.

Computerworld can be purchased on 35 mm microform through University Microfilm Int. Periodical Entry Dept., 300 Zeeb Rd., Ann Arbor, Mich. 48106. Phone (313) 761-4700: *Computerworld* is indexed: write to Circulation Dept. for subscription information.

PHOTOCOPY RIGHTS: permission to photocopy for internal or personal; use or the internal or personal use of specific clients is granted by CW Communications for libraries and other users registered with the Copyright Clearance Center (CCC), provided that the base fee of $3.00 per copy of the article, plus $.50 per page is paid directly to Copyright Clearance Center, 21 Congress Street, Salem, MA 01970.

Permission to photocopy does not extend to contributed articles followed by this symbol. ‡

Special requests should be addressed to Nancy M. Shannon, CW Communications/Inc. Box 880, 375 Cochituate Rd., Framingham, MA 01701. ISSN 0010-4841/82 $3.00 + $.50

$2.00 a copy: U.S. — $44 a year; Canada, Central & So. America — $110 a year; Europe — $165 a year; all other countries — $245 a year (airmail service). Four weeks notice is required for change of address. Please allow six weeks for new subscription service to begin.

ABC ABP mcc

POSTMASTER: Send Form 3579 (Change of Address) to Computerworld, Circulation Dept., Box 880, 375 Cochituate Road, Framingham, Mass. 01701.

Ashton-Tate pits package against Lotus 'Symphony'

By David Myers
CW New York Bureau

NEW YORK — Ashton-Tate last week marched into the integrated applications software arena to battle Lotus Development Corp., signaling the start of a clash between two microcomputer software titans.

At a news conference here, Ashton-Tate unveiled a software package integrating spreadsheet, word processing, graphics and data base capabilities with an "outline," or "electronic table of contents," utility for organizing manuscripts made up of text, graphs and columnar charts.

The package, called Framework for its use of "frames," or windows, is expected to go head to head against Lotus' recently announced Symphony product (CW, Feb. 20). Framework, which requires 256K bytes of random-access memory and two disk drives, will sell for $695, the same price as Symphony, and is expected to be available on the same date, July 2.

David Cole, Ashton-Tate's president, said Framework will initially be available on the IBM Personal Computer and compatible machines, but may be adapted for other hardware manufacturers.

Robert Carr, Framework's product manager, said the package can manage 3,000 10-item data base records, 200 pages of text and 20,000 spreadsheet entries. It can also access the operating system through one window.

Although the Ashton-Tate product does not include Symphony's communications capability, data from the package can be transmitted over phone lines via the operating system window, Carr said. Framework can be coupled with Ashton-Tate's Dbase II software as well as Lotus' Lotus 1-2-3 package and other Ascii files.

The word processing part of the package was described as similar to Microsoft, Inc.'s Word.

Framework also comes with a 140-function programming language, which Carr described as "Basic- or Pascal-like." Even so, Ashton-Tate said Framework is aimed at first-time users.

While the initial reaction to Framework was enthusiastic, it was muted by what many perceived as massive marketing obstacles confronting Ashton-Tate. "It seems Lotus already has the IBM market pretty much sewn up," said Michael Killen, president of San Jose, Calif.-based Strategic, Inc. "I would not want to go head to head with those guys right now."

Ashton-Tate is headquartered at 10150 W. Jefferson Blvd., Culver City, Calif. 90230.

DG gives CEO finance support

WESTBORO, Mass. — Data General Corp. last week introduced what it described as the first large-scale financial management software package integrated with an office automation system.

DG's Comprehensive Financial Operations (CFO) package provides real-time control over finances in an organization while supporting distributed accounting functions in multiple remote locations. CFO is compatible with DG's Comprehensive Electronic Office (CEO) system, which runs on DG's 32-bit Eclipse MV series superminicomputers under AOS/VS.

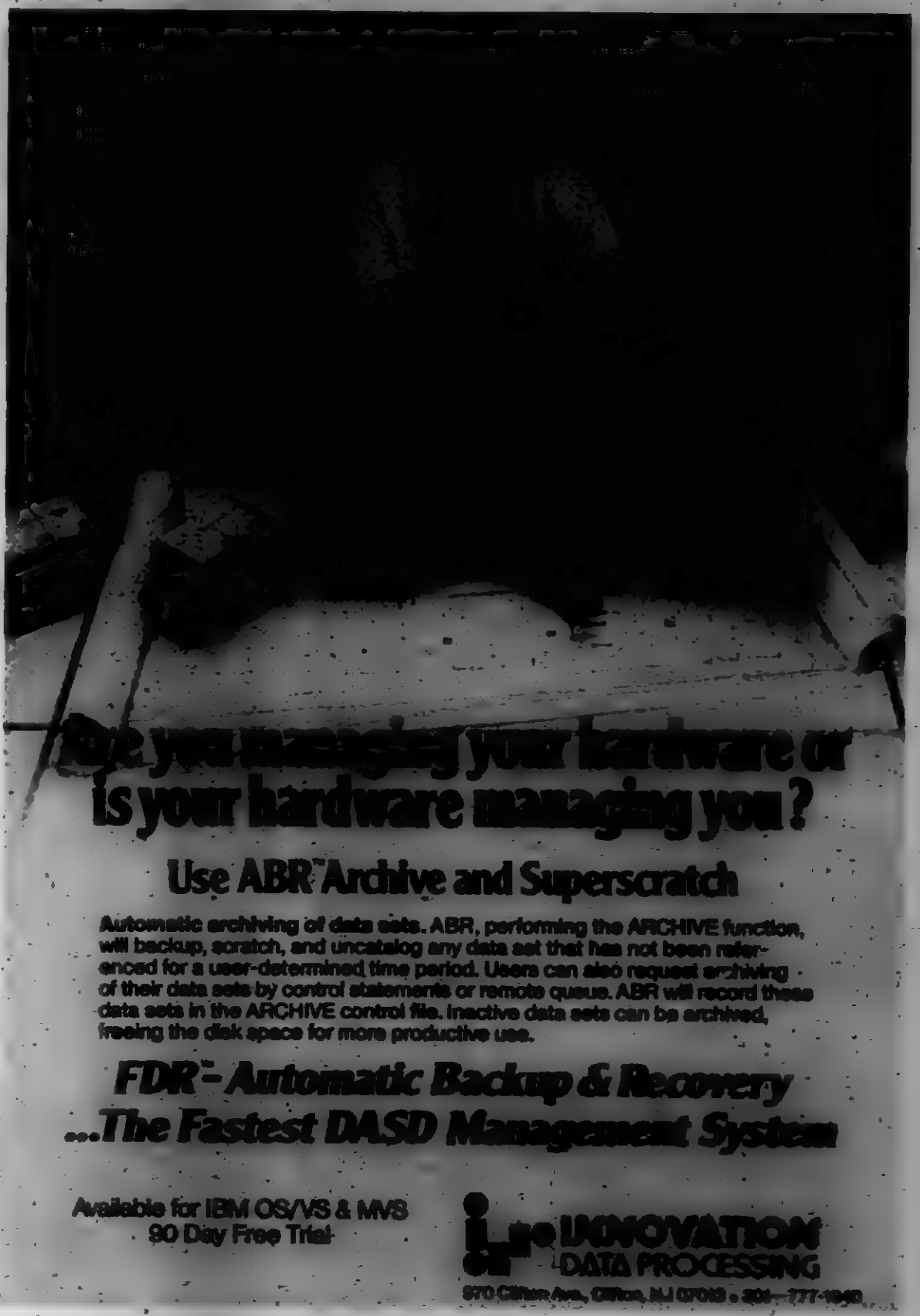
CFO consists of five modules that can be utilized separately or together. The modules — general ledger and financial control ($48,000), accounts payable ($34,000), purchase order ($38,500), materials management ($32,500) and accounts receivable and credit management ($48,000) — are said to share files interactively.

The CEO office automation system consists of CEO Word Processing; CEO Information Management, including electronic mail, filing and administrative support capabilities; and CEO Decision Support. Both CEO and CFO utilize DG's Infos II file management software.

A spokeswoman said CFO incorporates a layered design that keeps hardware and system software functioning separately from the accounting modules.

Six "personalizers" integrated with the five modules allow users to create, maintain and enhance the standard financial applications. The personalizers include a screen builder that enables users to custom-design system screens; a report builder for user-definition of report parameters; an inquirer feature that is said to provide real-time, interactive display of system information; a validator that allows users to define valid data entering the system; a documenter that ensures that essential documentation stays in real-time synchronization; and a table manager that allows users to update any table or data base used by CFO.

DG's Information Systems Division is located at 4400 Computer Drive, Westboro, Mass. 01581.



NEWS

User survey: OA more mature than expected

By John Gallant
CW Staff

NEW YORK — Nearly 60% of the nation's largest corporations already have strategic policies governing the acquisition and use of office automation equipment, and that number is expected to rise to almost 85% by 1986, according to a survey released here last week.

The survey — *The Office Automation Challenge: American Business Responds* — combined responses from individuals responsible for planning and purchasing office systems within 834 U.S. businesses, including nearly half the Fortune 500 Industrial and Fortune 500 Service corporations. The study revealed an OA marketplace maturing more rapidly than expected, according to its sponsor, The Omni Group Ltd.

A significantly lower number of small and medium-size companies — firms with fewer than 100 workers — currently have strategic OA policies, the study found. However, it predicted a dramatic increase in that number by 1985, when over 55% of the small and medium-size firms are expected to have OA policies in place.

"Clearly, the most important finding of this survey is that the office automation marketplace is as mature as it is," said Randy J. Goldfield, president of The Omni Group. "Many people believe that OA is a new frontier, but that isn't the case. The study revealed that an area once handled by the office manager or the purchasing department is becoming more professionalized and specialized."

The task of developing OA policies falls on different shoulders based on company size, the survey showed. Among the Fortune 500 group, interdepartmental committees and individual departments with OA responsibility were most commonly drafted as policymakers. Company presidents and office managers often bore the yoke of decision-making within the smaller firms, and, in all but a few organizations, the users of office systems were rarely a factor in policy formation.

But while they may not be a critical component of the policy-making process, users can at least rest easier about keeping their jobs in the face of growing office automation. Staff reduction is the least important factor in the acquisition of OA equipment regardless of company size, the survey indicated. Increased processing speed, reduced transaction costs and equipment compatibility carried significantly more weight in office systems decisions among the corporations surveyed.

Nonetheless, personnel concerns remain a factor in the growth of OA. The survey showed that 72% of the Fortune 500 firms see the avoidance of staff increases as an important factor in purchasing office systems.

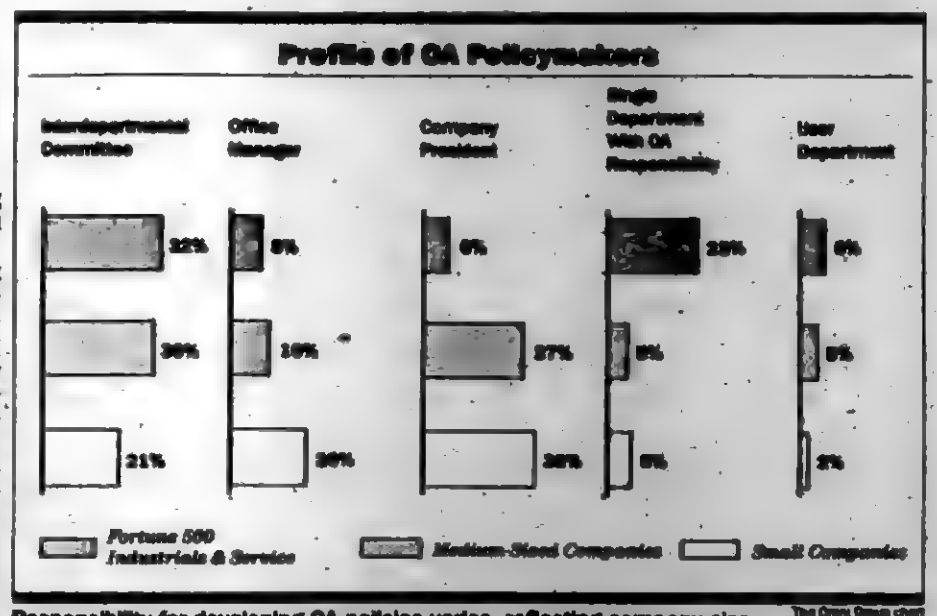
The importance of minimizing staff increases is borne out for small and medium-size companies also, with the survey indicating figures for that group similar to those for the larger organizations (63% and 61%, respectively).

Where are U.S. firms buying the word processors and microcomputers that make up their office systems? Purchasing directly from the manufacturer is the preferred route for word processing equipment, especially among the larger firms. And, although the figures are smaller, direct purchases of micros outweigh retail sales by a two-to-one margin, according to the study.

Respondents listed service, discounts, training and help in long-range planning as the major benefits of dealing directly with the manufacturer.

"The strong preference to buy direct indicates corporations want more than they think retail stores can provide," Goldfield said. Conducted in late 1983, the survey was underwritten by 12 information technology and service companies, including AT&T Information Systems, Inc.; Exxon Office Systems Co.; Hewlett-Packard Co.; Lanier Business Products, Inc.; Syntrex, Inc.; Tymshare, Inc.; Xerox Corp.; Datapoint Corp.; and Philips Information Systems, Inc.

Copies of the survey summary can be obtained free from The Omni Group, 115 E. 57th St., New York, N.Y. 10022.



Responsibility for developing OA policies varies, reflecting company size. The Omni Group chart

Some of most touted OA applications not catching on

NEW YORK — Some of the most highly touted office automation applications have yet to be embraced by corporate users, according to a survey released here last week by The Omni Group Ltd.

The survey indicates, for example, that electronic communications is seen as a key application of office systems by less than one-fifth of the nation's largest corporations, and the figure dips below the 10% level for small and medium-size firms. Similarly, graphics applications were mentioned as an important OA application only infrequently across companies of all sizes.

Data analysis, including the use of spreadsheets, projection and modeling packages, is by far the most important application of office systems among managers and professionals, the survey found. Among support staff, word processing is the most important OA function. Data processing, including transaction processing tasks such as order entry and inventory control, ranked as the second most important application across both types of workers.

One of the most important findings in this area, according to Dr. Warren Waldbrand, director of research for The Omni Group, is that data processing applications — though still ranked second — were seen as a more important use of office systems among small and medium-size U.S. corporations compared with their larger counterparts.

TSO USERS
Poor Response Time?
High Paging Rates?
Improve your TSO
performance
with FSE+

Compare these features:

- Up to 50% less overhead than SPF
- Full-Screen Editor (LRECL up to 4096)
- Data Set Manager (Controls TSO files)
- JES Sysout Previewer (Direct from JES Spool)
- File listing facility (LRECL up to 32760)
- Programmable function keys
- Split-Screen facility (Two fully-active screens)
- Customer-defined exit facility (Controls all FSE+ functions)
- FSE+ tuning parameters (Optimize performance)
- Structured menus for new users
- Command oriented for experienced users
- MVS 3.8, SP and XA support
- Free trial period

Call or write for details
Applied Software, Inc. 840 U.S. Highway #1, Suite 250
P.O. Box 13027
North Palm Beach, FL 33408 (305) 626-4818

Boom in local nets expected

NEW YORK — Local-area networks will "proliferate substantially in major market segments" over the next two years, becoming the "most volatile area" of the office automation marketplace.

That is one of the findings of *The Office Automation Challenge: American Business Responds* survey released last week by The Omni Group Ltd. The study indicates that more than 40% of the Fortune 500 Industrial and Service companies currently use some form of local-area networks, and that by 1985, that figure is expected to rise to 72%.

The survey shows that a significantly lower number of small and medium-size firms currently employ local-area networks, but the anticipated growth rate in these markets is "enormous." The study did not question respondents as to how extensive they expect their use of local-area networks to be in the future, nor did it ask whether they plan to purchase or develop in-house their local-area networks.

Dr. Warren Waldbrand, research director for The Omni Group, added, "To say that nearly 75% of the Fortune 500 companies will have local-area networks by 1985 certainly doesn't mean that 75% of the people who work in those companies will be tied together through one."

Added Randy J. Goldfield, president of The Omni Group: "It is clear from this study that respondents have a good understanding of word processing equipment and personal computers. But there is a lot of confusion as to the linkage between these tools."

QUICK!

Name the fastest VM dump restore, and the fastest VM sort program.

(SYBACK & SyncSort CMS. What took you so long?)

Call (201) 568-9700.

Meet our super-sonic systems.

syncsort INC.

If you didn't choose SYBACK and SyncSort CMS as the fastest in their categories, *do not* go directly to jail. But read this very, very carefully.

SYBACK, our fast dump restore for VM systems, and SyncSort CMS, the only high-technology sort for VM/CMS, represent a great technological leap forward. No other programs of their type can provide all three of the following positive advantages:

(1) THE FASTEST VM PERFORMANCE: SYBACK and SyncSort CMS make data move like greased lightning. Compared to their "competitors," these programs can save a tremendous amount of computer resources:

- **50% in Elapsed Time;**
- **45% in VTime;**
- **55% in TTime;**
- **75% in SIOs.**

These savings are the result of our exclusive Fluid Buffering Technique (FBT). First developed in OS and DOS sorting, we've now extended the benefits of FBT to VM backups and sorts.

(2) THE BEST VM PRODUCTIVITY: SYBACK and SyncSort CMS have tremendous operational flexibility and user friendliness. They're rich in features designed to reduce human intervention in backup and sorting:

- **SYBACK**—Automatic backup based on CP directory • Stand-alone restore capability • Incremental backup facility • Catalog of backup operations • Multi-tasking and execution under CMS • Interactive command processing • Standard-label tape support • Callable by user programs • DASD to DASD conversion and copying. Much, much more.

- **SyncSort CMS**—Sorts CMS, SAM (OS or DOS), or VSAM files • Can be invoked from COBOL, PL/1 or BAL programs • Dynamically allocates disk space • Selects relevant records for sorting • Reformats records on output • Performs summaries of designated numeric fields • Produces reports with pagination, headings and dates • Can often produce simple reports in one day rather than, say, five. Much more, too.

(3) THE FINEST TECHNICAL SERVICE: Our Technical Service specialist are experts in their individual fields. You can count on fast, efficient, courteous service in both backup or sorting operations. More than 85% of all user requests for service are resolved within 24 hours.

CAVEAT EMPTOR: As with all performance software programs, the best way to find out what SYBACK and SyncSort CMS can do is to benchmark them yourself against your present programs.

That should help you make up your mind *fast!*

Syncsort Incorporated 560 Sylvan Ave., Englewood Cliffs, N.J. 07632

AT&T offers two sets of Unix-based superminis

By John Dix
and Tom Henkel
CW Staff

NEW YORK — AT&T brought out its first commercially available computers here last week, unveiling a family of superminicomputers that has been adopted from its large telephone switching systems along with a line of mid-range superminis based on newer technology developed by Bell Laboratories and cast in silicon by what used to be Western Electric Corp.

Available immediately, both sets of superminis in the so-called 3B processor family — the high-end 3B20 and the mid-range 3B5 — have a 32-bit architecture and come bundled with the Unix System V operating system.

The 3B20 superminis are built on a processor that the former Western Electric has employed in its large Electronic Switching Systems for some time. Using bit-sliced, bipolar chip technology and 64K-byte random-access memory chips, the 3B20 is available in three models, the 3B20S, 3B20A and 3B20D.

Pushing the systems' purported reliability, AT&T claimed that all 3B systems will experience only 10 minutes of downtime per year.

The 3B20S is a single-processor supermini that is touted as being nearly twice as reliable as other commercial computers and capable of withstanding temperature ranges of 32 F to 122 F. Supporting up to 100 users, the 3B20S performs at a rate of roughly one million instructions per second.

The $230,000 uniprocessor comes with 2M bytes of internal memory, a 300M-byte, removable-media disk drive, a 16K bit/in. tape drive, eight asynchronous ports, a CRT and a printer.

AT&T claims that 550 Model 3B20S superminis are presently being used by the former Bell operating companies to support office automation programs and data processing tasks.

With the addition of a growth module, the 3B20S can be upgraded to the 3B20A, an attached-processor system. The 3B20A costs 30% more than the single-processor system, but offers nearly double the performance of the 3B20S, supporting a maximum of 150 to 180 users. The 3B20A has 4M bytes of main memory, but otherwise, at $330,000, comes with the same peripherals as the uniprocessor.

The A model uses parallel processing, with both processors performing operating system calls independently, AT&T Technologies said. The 3B20A is the only system in the 3B20 product group that is not presently used within AT&T or any of the former Bell operating companies.

The top of the 3B20 line is the 3B20D, although neither 3B20S nor 3B20A users can upgrade to this system. The D model is a dual-processor supermini intended for transaction processing applications such as banking and financial services. It can stay on-line during maintenance, software updates and system administration, AT&T Technologies said.

The performance of the 3B20D system is similar to that of the uniprocessor 3B20S because one of the two processors is kept as a hot standby and not used unless the other processor falters.

A 3B20D uses the same processors and peripherals as the attached processor 3B20A, but comes with a 340M-byte disk and costs $340,000.

The 3B5 family of mid-range superminis announced last week by AT&T Technologies includes the 3B5/100 and 3B5/200, which bracket Digital Equipment Corp.'s VAX-11/750 in terms of performance.

Both systems use AT&T Technology Systems Group's WE·32000 32-bit microprocessor and that manufacturer's 256K-byte random-access memory chips.

The 3B5/100 is said to support a maximum of 30 users and the 3B5/200 a maximum of 60 users. As with the 3B20 series, neither of the 3B5 computers has special air conditioning or power requirements. Diagnostics are firmware-based and are automatically executed when the system is turned on, AT&T reported.

A basic 1M-byte 3B5/100 costs $57,000 with a 48M-byte hard disk, an asynchronous interface and an 8K-byte cache memory.

A 2M-byte 3B5/200 with an I/O accelerator and extended bus as well as the 48M-byte disk, asynchronous interface and 8K-byte cache memory runs for $73,000.

AT&T'S NEW PROCESSORS

System / Characteristics	3B20S	3B20A	3B20D
Relative Performance[1]	80	95	95
Mips[2]	1	1.8	1.8
Memory Size in Bytes (Minimum-Maximum)	4M-12M	4M-12M	4M-16M
Purchase Price[3] (Memory Size)	$230,000	$330,000	$340,000
Lease Price (Lease Term)	None	None	None
Machine Cycle Time (Nsec)	Not Available	Not Available	Not Available
Channels (Minimum-Maximum)	3-16	Not Available	Not Available
Cache (Buffer) Size	8K	12K	16K
Bus Architecture	Yes	Yes	Yes
Price per 1M Byte Of Main Memory	$4,900	$4,900	$4,900[4]

1. CW estimates based on vendor-supplied information. Relative performance ratings are based on an IBM 370/158-3 equaling 45. These numbers are designed to put the processor into perspective with other systems; they do not constitute a buyer's guide. All systems are not alike; they use different operating systems, instruction sets and architectures and, therefore, cannot be directly compared. In addition, actual relative performance may vary with the application, peripherals and software.
2. CW estimates.
3. For a basic configuration.
4. For a dual-processor configuration, users must install memory in 2M-byte increments, which cost $8,900.

CW Chart

SOME MAJOR COMPETITORS OF AT&T'S 3B20 PROCESSORS

System / Characteristics	Data General Corp. MV/8000 II	Data General Corp. MV/10000	Digital Equipment Corp. VAX-11/750	Digital Equipment Corp. VAX-11/780	IBM 4361-5	IBM 4341-12	IBM 4361-1
Relative Performance[1]	71	138	40	62	66	75	100
Mips[2]	1.2	2.5	.72	1.08	1.14	1.2	2.1
Memory Size in Bytes (Minimum-Maximum)	1M-8M	1M-16M	512K-8M	512K-8M	2M-12M	2M-16M	4M-16M
Purchase Price (Memory Size)	$128,250[3] (1M)	$211,070[3] (2M)	$84,900[4] (1M)	$184,000[4] (2M)	$200,000[4] (2M)	$500,000[4] (2M)	$370,000[4] (4M)
Lease Price (Lease Term)	None	None	None	$None	$3,800 (5 Year)	$21,650 (2 Year)	$7,030 (5 Year)
Machine Cycle Time (Nsec)	220	140	320	200	100 (Per 4 bytes)	115-230	68 (Per 4 bytes)
Channels (Minimum-Maximum)	2	3	1-5	1-8	3-6	6	6-12
Cache (Buffer) Size	16K	16K	4K	8K	16K	16K	8K
Bus Architecture?	Yes	Yes	Yes	Yes	Yes	No	No
Price per 1M Byte Of Main Memory	$4,900	$4,900	$4,900	$4,700	$7,500	$15,000	$10,000

1. CW estimates based on vendor-supplied information. Relative performance ratings are based on an IBM 370/158-3 equaling 45. These numbers are designed to put the processor into perspective with other systems; they do not constitute a buyer's guide. All systems are not alike; they use different operating systems, instruction sets and architectures and, therefore, cannot be directly compared. In addition, actual relative performance may vary with the application, peripherals and software.
2. Vendor claims.
3. For the processor with disk and tape units, system software and console.
4. Includes processor, console, power supply, systems software and a minimum tape and disk configuration.
5. For the processor only.

CW Chart

Many vendors offer systems that compete in the same general performance range as AT&T's new processors; the above chart includes representative models from three of the top vendors in the high-end superminicomputer market. For a more complete listing of superminis, see *Computerworld's* annual Hardware Roundup [CW, Aug. 8].

AT&T from page 1

vendor, David C. Moschella, an industry analyst with International Data Corp. of Framingham, Mass., noted that AT&T's market entrance will have a "limited effect because it is not yet addressing the end-user market.

"While it is clear AT&T will eventually address that market," Moschella said, it will not do so until it has competitive office software products.

"High tech, high price" is how David L. Terrie, director of office systems research at The Yankee Group of Boston, summed up the announcement. AT&T and its products are "not in the price/performance range of any of its competition, including [Digital Equipment Corp.]," Terrie said.

An AT&T spokeswoman said that AT&T intends to discount the products according to industry standards.

AIM appoints two new board members

CHICAGO — The Association of Information Managers (AIM) has appointed two new board members, Glenn Dean and David Martin.

Dean is marketing director of Data Line Service Co. of Covina, Calif. Martin is executive vice-president of the Provident Bank of Maryland in Baltimore.

AIM is a national professional organization that provides management and technical skills to individuals who plan, develop, implement and operate automated support systems. It is based at Suite 2221, 111 E. Wacker Drive, Chicago, Ill. 60601.

AT&T's 32-bit supermicro a multiuser, desktop unit

By Eric Bender
CW Staff

NEW YORK — AT&T Technologies, Inc.'s 3B2/300 supermicro, unveiled here last week, is a 32-bit desktop system with a base price of $9,960. Based on AT&T's proprietary WE 32000 microprocessor and running under the Unix System V operating system, the 3B2 can act as a powerful single-user system or support up to 18 users.

Jack Scanlon, vice-president of AT&T's Computer Systems Division, noted that the 3B2 offers performance comparable to minicomputers available a few years back and said he expects the new system to have a major impact on the multiuser desktop market. He predicted initial sales would be for computer-aided design and manufacturing, engineering tasks and small business uses.

The 3B2, now shipping to first customers, is housed in a compact desktop unit and weighs about 30 lb. The system features 512K bytes of random-access memory (expandable to 2M bytes), a single 720K-byte floppy disk drive and a 10M- or 32M-byte hard disk drive. The base price of $9,960 does not include terminals.

Add-on components include automatic dial/answer facilities, draft-quality dot matrix printers, a letter-quality printer and plug-in cards.

The 3B2 is said to be fully compatible with the other 3B products introduced here last week and to connect with them via AT&T's new 3BNet local-area network, also announced last week (story at right). AT&T said that when its PC Interface is offered, in the third quarter, the supermicro will be able to function as a Unix host for personal computers.

Several industry analysts commented favorably on the 3B2's price and performance characteristics, speculating that the AT&T label will help sales because buyers will not be worried about AT&T's staying power. Most suggested that the system would not compete directly against current IBM offerings, but instead against minicomputers and supermicros from Digital Equipment Corp., Data General Corp. and others.

"The 3B2 seems reasonably close to our product line," said James Campbell, president of Fortune Systems Corp., a supplier of multiuser Unix-based systems built around the Motorola, Inc. 68000 chip. However, AT&T's new systems will be "a very powerful endorsement" for Unix-based systems from other vendors, Campbell said.

President of Altos Computer Systems, Inc., David Hanna, said, "We expected the announcement, and I'm delighted. A lot more application code will be developed for Unix now that AT&T has blessed it with hardware."

AT&T's Scanlon claimed that during the last year, AT&T's strong push behind Unix System V has moved it beyond "academics and technical gurus" to acceptance as an industry-standard operating system.

However, observers generally agreed that the new AT&T machines still will be short on application software. "There's a requirement for broad-based applications from AT&T," said George Colony, president of Cambridge, Mass.-based Forrester Research, Inc. Colony predicted that sales will be slow until AT&T offers "office automation products, Unix tool kits and maybe some vertical applications."

Many observers expect AT&T to launch other lower end microcomputers later this year, and the "300" designation on the new system was seen supporting that expectation. "If there's one thing missing in this announcement, it's a personal computer," Colony said.

AT&T local net quintuples throughput of Ethernets

By Phil Hirsch
CW Washington Bureau

NEW YORK — A high-speed, Ethernet-compatible local-area network was unwrapped here last week by AT&T Technologies, Inc.

Dubbed 3BNet, it has five times the throughput of Ethernet-type local-area networks already on the market, while stealing significantly fewer processing cycles from attached host processors, according to Vice-President Jack Scanlon, who heads the company's Computer Systems Division.

Scanlon said 3BNet is available immediately to value-added resellers and users capable of developing the related application and interface software. Value-added resellers, which include many of the recently divested Bell operating companies, will add application and interface software, and possibly additional hardware, to the new network to meet the needs of specific types of users.

The main applications of 3BNet, Scanlon said, are computer-to-com-

See 3BNET page 10

■ BDS / Dataproducts Plug-Compatible Printers
■ Built for Handling Continuous High-Volume Output

IBM · DEC · HP
BURROUGHS

BDS

■ Since 1975, the Largest Independent Supplier of Plug-Compatible Printer Systems
■ Over 5,000 Systems Installed
■ Complete Line of High Quality Daisy Wheel, Matrix and Band Printers. 55 CPS to 2000 LPM
■ 30-50% Savings
■ Quick Delivery (30 Days or Less)
■ Reliability Built-In (BDS Controllers and Interfaces)
■ Low Maintenance Cost
■ TRW Nationwide Service
■ Price Includes Installation and 90 Days Parts and Labor Warranty

I would like more information on plug-compatible printers
☐ 55 CPS Daisy Wheel Printer
☐ 80-300 CPS Matrix Printer
☐ 300-2000 LPM Band Printers

Name
Title
Company
Address
City State Zip
Phone ( )

(415) 964-2115

BDS Corporation
000 Rhode Ave.
Mountain View, CA 00000

U.K. (730) 000000 Australia (00) 000-0000

'Intellect' tied to SQL/DS under VM/SP, DOS/VSE

By John Gallant
CW Staff

WALTHAM, Mass. — Artificial Intelligence Corp. (AIC) last week announced two additional versions of its Intellect natural-language query system. The new versions reportedly provide an interface to data bases maintained by IBM's SQL/DS under the VM/SP and DOS/VSE operating systems.

According to AIC, the newest versions of Intellect were designed to enable users to query SQL/DS data bases under VM/SP using CMS or DOS/VSE with IBM's CICS teleprocessing monitor. An optional interface to IBM's Presentation Graphics Facility (PGF), which allows users to produce a variety of charts and graphs, is also available with both versions of Intellect.

The Intellect natural-language query system gives users the capability to access, retrieve and display information resident on an IBM mainframe in conversational English using a flexible lexicon that can be updated and customized to suit unique environments, an AIC spokesman said. Intellect's lexicon consists of over 400 common English words and phrases that apply to all data bases defined by the user, he said.

The latest versions of Intellect are intended to enhance the software's usefulness as an information center tool, AIC said. In June, IBM announced that it would market Intellect for its DOS/VSE, MVS and VM environments — a move that industry analysts viewed at the time as an attempt to beef up the offerings for the industry giant's strongly marketed information center concept [CW, June 20].

The AIC spokesman said that in its information center role, Intellect acts as a front-end supervisor to a variety of data base, statistical analysis, graphics and spreadsheet packages available for the IBM Personal Computer and compatible microcomputers. AIC claims to have installed more than 200 copies of Intellect in the mainframe arena in the past two years.

AIC said the new versions of Intellect offer a number of built-in features, such as the capability to handle European-format date reporting and new documentation. The documentation includes an Intellect reference card outlining the software's processes, commands and capabilities and the "Guide to Implementing Intellect," which covers planning, resource scheduling, application selection and user training.

The new versions, dubbed Intellect DOS/SQL/CICS and Intellect VM/SQL/CMS, are available immediately. Intellect DOS/SQL/CICS is priced at $49,500, and Intellect VM/SQL/CMS is priced at $69,500. The PGF option is priced at $15,000.

AIC is based at 100 Fifth Ave., Waltham, Mass. 02254.

3BNET from page 9

puter file transfer and similar jobs that require large quantities of information to be moved quickly. An AT&T Technologies spokesman added that its major use, aside from offices, will be in engineering, computer-aided design and manufacturing and factory automation.

Two 3BNet interfaces are available. One is a $7,000 three-card set for AT&T's newly announced 3B20 and 3B5 superminicomputers; the second is a $3,000 single-card interface for AT&T's 3B2/300 supermicro.

"3BNet's major advantage over existing networks is that it is intelligent and self-maintaining. All the protocol, flow control and maintenance overhead is deloaded from the connected host computers," Scanlon said. The result is that 3BNet requires "a fraction of the host computer load" needed by competing Ethernet-type systems.

Scanlon added that 3BNet's throughput, end-to-end, between application programs in attached host computers is about 500K bit/sec. He claimed this is five times greater than the throughput provided by competing contention-based local-area networks.

The new AT&T network accommodates any computer or other terminal device that supports Levels 0 and 1 of the IEEE 802 Ethernet specification, the spokesman said. Through attached host processors, it can be linked to other networks, including Datakit, a lower speed, wider area network introduced earlier this year by AT&T Technologies.

A "rich set" of higher level protocols — up to Level 7 of the International Standards Organization's Open Systems Interconnection model — is available to 3BNet users, the spokesman reported, adding that "some software modifications" at the host level may be necessary before non-3B computers can work on the 3BNet. He explained that AT&T has enhanced the IEEE Ethernet specification in some respects. Notably, the user can employ packets up to 4,000 bytes long rather than the 1,500 bytes specified by the IEEE 802 committee.

According to the 3BNet specifications released by AT&T Technologies, the coaxial cable-based network has a 10M-bit transfer rate. The maximum coaxial segment length is 500 meters, and up to 100 taps are permissible per segment.

WANG from page 1

vendor spokesman.

Up to 20G bytes of data can be stored on disk drives attached to the VS 300. This is possible by attaching varying combinations of up to 32 disk units. These include two disk drives announced by Wang along with the VS 300: a 340M-byte fixed media disk drive with a data transfer rate of 2M byte/sec and a 76M-byte removable media disk drive with a data transfer rate of 1.2M byte/sec.

Up to 15-microprocessor-driven I/O controllers can be used to direct workstations, printers, tape drives, disk drives, the firm's Wangnet local-area network and telecommunications links. By offloading peripheral control functions from the CPU to the I/O controllers, internal throughput of the CPU is improved, the Wang spokesman said.

Further, the VS 300 is available with a floating-point accelerator designed to improve throughput in scientific applications using Fortran, Basic or PL/I programming languages, the firm said.

The VS 300 can be equipped with an optional battery backup device that offers the user power for up to 90 seconds after a power failure. Diagnostic features for the supermini are incorporated into a Support Control Unit, which allows the user to perform both local and remote diagnostics. Remote diagnostics can be carried out over a switched network, Wang said.

The VS 300 will be available next January. A basic configuration, including a CPU with 4M bytes of main memory, the enhanced release of the VS operating system, console, workstation, serial I/O controller and assembler, costs $170,000. The 364M-byte disk drive costs $28,000, and the 76M-byte removable media disk unit costs $12,000. The optional floating-point accelerator costs $10,000, and the optional battery backup unit is priced at $7,000.

Wang announced the VS 300 from its corporate headquarters at One Industrial Ave., Lowell, Mass. 01851.

/ RENT • LEASE • PURCHASE DEC SYSTEMS / RENT • LEASE • PURCHASE DEC SYSTEMS / RENT • LEASE • PURCHASE DEC SYSTEMS /

NEWS

Half of firms polled plan second-quarter DP hiring

By Edward Warner
CW Staff

CLEVELAND — Half of the companies polled by a recruiting firm in a national survey plan to hire new data processing staff during the second quarter, and only 5% plan to reduce their staffs.

The quarterly survey, which polled executives with DP hiring responsibility in 424 firms, was conducted by local branches of Management Recruiters International, Inc.'s Compusearch Division. Compusearch's first-quarter survey indicated that 55% of respondents planned to hire.

The survey did not, however, ask how many people each of the respondents was planning to hire during the coming quarter.

Compusearch director Marc Blessing attributed the survey's indication of growth in DP hiring to what he called a changed perception on the part of top corporate managers, a change that, he said, came in part because of the competitive edge data processing gave their firms in the recent recession.

"I think [the survey] reflects the direction that data processing is headed in," Blessing said. "It reflects the surface benefit of data processing and that data processing is no longer considered an overhead expense, but an investment in the company."

More proliferation

Blessing also credited the proliferation of microcomputers in offices with encouraging DP hiring and said demand exists for data processing staffers who can manage the coming transition to office automation.

Blessing noted that the survey showed the greatest hiring growth in the New England and Middle Atlantic states, where 70% of the executives surveyed expected to hire new data processing staff.

'[The survey] reflects . . . that data processing is no longer . . . an overhead expense.' — Marc Blessing, Compusearch.

But, he added, "There are tremendous opportunities throughout the country."

The Southwest region, an area including Texas, Oklahoma, Arkansas and Louisiana, had the poll's lowest level, with 26% of surveyed executives planning to hire.

Blessing blamed this on that area's economic dependence on oil and gas prices.

Asked in the latest survey whether they would be willing to work two to three days at home using computer equipment that would link them with their offices, 36% of the executives surveyed said they favored the idea, and 48% opposed it.

The survey focused on data processing executives in all industries. When DP executives working only in the data processing industry were asked if they favored working at home, 52% favored the idea.

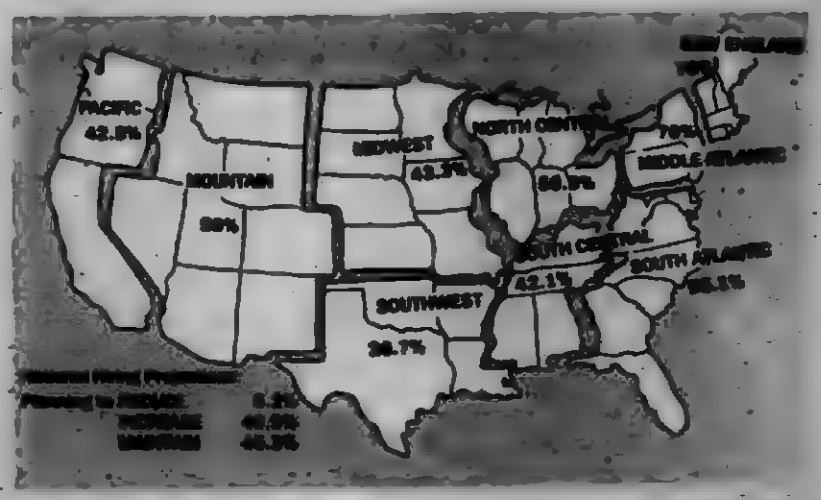
Introverted nature

Blessing said the favorable responses might result from what he called the introverted nature of many data processing workers and their high level of task-orientation.

The survey is the 11th in a series of quarterly polls taken by Compusearch. The surveys have previously shown a high degree of accuracy, compared with later government reports, according to Management Recruiters International spokeswoman Nancy Valent.

"We've seen a parallel between what we're doing and what's happening out there," she said.

Copies of the survey are available at no charge from Management Recruiters International, located at 1015 Euclid Ave., Cleveland, Ohio 44115.



Compusearch Inc.

Second-quarter 1984 hiring projections for data processing staffs are listed as regional percentages of companies planning to increase staff size.

Source code control is only one step in software configuration management.

Softool's Change and Configuration Control (CCC™) takes you all the way to *full* configuration control!

CCC automates: Management of changes and configurations, control over who makes what type of changes and where, tracking of trouble reports, reconstruction of previous versions, management reports, archiving, and all the remaining "steps" to total configuration control.

CCC is interactive and friendly. It supports all programming languages, and comes with on-line tutorials.

Available now! Over 1000 Softool products are installed worldwide.

CCC is supported on the DEC VAX, DG MV, Gould S.E.L., Honeywell 6000 (Level 66 and DPS 8), HP 9000, and IBM 370, 30XX and 43XX computers.

There is more. CCC is a stand-alone component of SOFTOOL®. An integrated Programming Environment (PE™) is also available.

If you want true configuration control, where all components of a given release can be managed as a unit, there is only one choice: CCC.

Call for more details or a hands-on demonstration.

See us at booth #1002, Depot, Boston, April 3-6

Softool Corporation
340 S. Kellogg Ave. • Goleta, California 93117
(805) 964-0560 • Telex 658334

VMSECURE

"With VMSECURE we can extend resources to *all* of our users without the worry of a breach in security."

VMSECURE—A resource access control, directory management, and disk space management system for the VM environment.

- Provides resource access control while extending function to end users
- Permits optional decentralization of disk space management
- Performs directory management functions 10 to 100 times faster than traditional methods
- Offers full-screen support
- Requires no mods to CP or CMS
- Protects sensitive data with the NBS Data Encryption Standard

703-821-8886

VM Software Inc.

Name _____
Title _____ Company _____
Address _____
City _____ State _____ Zip _____
Phone _____ CPU _____
2070 Chain Bridge Road Suite 355 Vienna VA 22180

Will Easytrieve-Plus prove a minus for current users?

CW AT PULSE

By Paul Gillin
CW Staff

NEW YORK — What does the introduction of Easytrieve-Plus mean for current users of Pansophic Systems, Inc.'s popular Easytrieve software?

That was a question some users were trying to answer at the Pansophic Users Learning and Sharing Exchange (Pulse) meeting held here last week.

The users questioned Pansophic's somewhat ambiguous announcement of Easytrieve-Plus in January. Although billed as an enhancement to Easytrieve, the product is basically a renamed version of Pro/Grammar, a programming productivity language introduced by Pansophic in February 1982. Pansophic announced that Easytrieve customers would receive Easytrieve-Plus as a maintenance enhancement and that Pro/Grammar would no longer be offered as a separate product.

The announcement "totally confused us," said William Remski, a DP auditor at General Motors Corp. in Detroit. "I'm always skeptical of something being given away for nothing. We were also told Pro/Grammar was not an end-user product, and I think the information center is the way of the future. We figured Pansophic was gravitating away from the end user."

With several hundred users now conversant in Easytrieve, GM feared that the Pansophic announcement would require massive retraining. "The logic structures in Easytrieve-Plus and Easytrieve are entirely different," Remski observed.

Dale Scheer, administrator of corporate audit at GM, added that "there have got to be a lot of programs that are incompatible with Easytrieve-Plus. We were told there were no plans to make that conversion easy." As a result, Remski noted, "We've got to stay with Easytrieve."

Steve Miehe, a team leader at Life Investors, Inc., a Cedar Rapids, Iowa-based insurance company, agreed. "I don't think [Easytrieve and Easytrieve-Plus] are similar at all," he said. Miehe added that he believes Pansophic should provide a compatibility mode that allows the new version to run existing Easytrieve programs. "I think Pansophic is expecting Easytrieve to die," he said, "but I think they'll be surprised at how long it hangs on."

However, Pansophic's president and chief operating officer, David Eskra, said the company believes migration to Easytrieve-Plus "is in the best interests of all users. The more you wanted to do with Easytrieve, the harder it became," he explained.

Eskra admitted that no conversion aids will be provided to allow users to move Easytrieve code to the new product. But he said that the command and logic structures of Easytrieve-Plus are "about 85% similar" to those of Easytrieve and that migration is not a major chore.

"Of course, we will continue to support Easytrieve," Eskra said. Migration to Easytrieve-Plus "will be made more desirable by the addition of attractive enhancements to the new product." But he added, "We can't continue to enhance Easytrieve." While Pansophic will still support the old product, it will cut back on Easytrieve training unless customers indicate that training is still needed. "We're not like IBM in that we announce new products and then kill off old products," he said.

Cobol becoming a casualty of insurance firm's productivity tool

CW AT PULSE

By Paul Gillin
CW Staff

NEW YORK — A batch programming productivity tool is in such widespread use at a Cedar Rapids, Iowa, insurance company that "as an unofficial rule, if someone wants to write in Cobol, he has to have a pretty good reason," a team leader in the DP shop said here last week.

Life Investors, Inc. uses Pansophic Systems, Inc.'s Easytrieve-Plus (formerly Pro/Grammar) for about 75% of its batch programming, according to Steven Miehe, the team leader. Miehe was interviewed at the Pansophic Users Learning and Sharing Exchange (Pulse) conference here.

Life Investors recently converted from Burroughs Corp. equipment to IBM hardware and now runs an IBM 3033 mainframe under IBM's MVS operating system with Vsam files, TSO and ISPF (Interactive System Productivity Facility) and between 50 and 75 on-line terminals. Other Pansophic products in use at Life Investors include Easytrieve, MIS/OL (Management Information Systems/On-Line), Panaudit and Panvalet.

Investors Life acquired Easytrieve-Plus early last year as part of its conversion. The company is now installing several major applications packages. While most of the systems programming staff is working on conversion and installation, those who are writing new code primarily use Easytrieve, MIS/OL and Easytrieve-Plus, Miehe said.

Miehe, who has been an assembly language and Cobol programmer and data base administrator, said Easytrieve-Plus is one of the few tools he has seen that does not sacrifice flexibility for productivity, although he noted that programs that require extensive customization can probably be done about as quickly in Cobol.

"You do have to adjust the operation of your shop somewhat," he said. "Whereas in the past you had to write up report layouts or spec sheets, we now use a lot of standard reports. If the user wants a report to [meet] exact specifications, he has to be ready to pay for the extra time."

Standard reports can be generated in as little as five minutes, he said, and unlike Cobol, Easytrieve-Plus can be used by some end users. "We started by giving Easytrieve to users and keeping Easytrieve-Plus for ourselves," he recalled, "but we found quickly that sophisticated users wanted to do things that could be better done in Easytrieve-Plus. We actually have some end users writing more Easytrieve-Plus code than our DP people."

However, Miehe added that he has used Easytrieve-Plus for some complex coding. For example, he wrote one production release application that is used in moving an application to production. The software enables the programmer to specify program calls and other resources used by the application and then builds a set of JCL and a history file to prepare the program for production. The code is used by operations to move the application into production.

The software, which formerly would have been written in Cobol or assembler, was written entirely in Easytrieve-Plus, Miehe said.

Easytrieve-Plus offers several improvements over Cobol, according to Miehe. An automatic input feature runs through program logic every time a file is read, eliminating worries about end-of-file coding. The report writer is more powerful than Easytrieve's, and the product includes "some very sophisticated match/merge type of logic." All work files and reports go out to a single IBM OS data set, saving JCL, and Easytrieve-Plus has a facility that allows multiple job steps to be performed within a program.

Miehe noted that unlike Easytrieve, Easytrieve-Plus uses a structured programming language that is similar to PL/I. Calls to subroutines from packaged applications can be placed within Easytrieve-Plus code, and the software offers the flexibility to create both executable code and object code modules, simplifying testing, he said.

All this adds up to as much as a 75% cost savings by programming in Easytrieve-Plus rather than Cobol, Miehe said.

"Some programmers believe they can write faster in Cobol — and that may be true on the first program," he said. "But I haven't gone back to Cobol since we've had Easytrieve-Plus."

IBM selects
Management Decision Systems
as value added remarketer
for IBM 4300
with
EXPRESS.

IBM has selected Management Decision Systems, with its industry-standard decision support software EXPRESS, as a Value Added Remarketer for IBM's 4300 computer family. The agreement enables Management Decision Systems to package its powerful decision support software with IBM's 4300 series. Now, it is easier than ever before for major corporations to meet the increasingly critical need for integrated planning and analysis.

Offering you the total decision support solution, Management Decision Systems' EXPRESS combines data base management with extensive analysis, reporting, graphics, and statistics capabilities. Backed by quality installation, training, and customer support services, EXPRESS meets all your needs for applications development and micro-mainframe integration.

With this new agreement, there has never been a better time to use the best available information technologies as your unique strategic weapon in today's world of data overload. Put the power of the IBM 4300 and Management Decision Systems on your side — and develop the winning edge.

Management Decision Systems + IBM 4300 = the total decision support solution.

For more information on what this agreement can mean for you, contact:

Walter E. Lankau, Jr.
Vice President, Sales and Marketing
Management Decision Systems, Inc.
200 Fifth Avenue
Waltham, Massachusetts 02254
(617) 890-1100

EXPRESS® is a registered trademark of Management Decision Systems, Inc.
IBM® is a registered trademark of International Business Machines Corp.

IBM Value Added Remarketer

Management
Decision Systems, Inc.

Pansophic's Gener/ol outbenches Cincom's Mantis

CW AT PULSE

By Paul Gillin
CW Staff

NEW YORK — In a test that few DP shops can afford to emulate, Pansophic Systems, Inc.'s Gener/ol application development system took on Cincom Systems, Inc.'s comparable Mantis software and won.

The two products were pitted against each other by Amer-Cal, Inc. of Arlington Heights, Ill., a $3.5 million service bureau that includes separate divisions for office services; letter, label and list processing; data processing; and software support. In a session at the Pansophic Users Learning and Sharing Exchange (Pulse) conference here last week, Amer-Cal Vice-President Lonnie Lanzer described the process that led to the benchmark and Amer-Cal's subsequent decision to write all its new on-line applications in Gener/ol.

Exponential growth has led Amer-Cal to upgrade its CPU capacity seven times in the last four years, Lanzer said. The company now runs two IBM 4341 processors under IBM's DOS/VSE and VM/SP operating systems with 16 dedicated communications lines and 185 on-line terminals at customer sites nationwide.

When Amer-Cal upgraded to 4300 series CPUs five years ago, it decided to use application development systems instead of Cobol in order to bypass traditional development cycles and long coding times. Such traditional approaches tend to frustrate the development effort by forcing the user to decide what he doesn't like about an application only after it has been written, Lanzer said.

CW Photo by P. Gillin
Lanzer

Amer-Cal considered some of the most popular application development systems before choosing Mantis in 1980. Early experiences were overwhelmingly successful, Lanzer said. For example, an on-line order entry system that had 70 on-line and 125 batch programs using 17 IBM Isam files was converted from Cobol to Mantis in just 10 man-weeks. The original application had taken 39 man-months to write.

Mantis was also used extensively for prototyping. In four years, Amer-Cal has written over 6,500 on-line Mantis programs.

With daily on-line usage growing from 2,500 transactions in 1980 to 40,000 transactions in 1983, however, the company was constantly on the lookout for new productivity tools, Lanzer stated. Last November, Amer-Cal selected Gener/ol, its first Pansophic product, to benchmark against Mantis.

Gener/ol offers identical features for naming conventions, program function and size, screen design layout, help aids and menu-driven execution. "But that's where the comparison ends," Lanzer said.

The application selected for benchmarking was a high-volume accounts receivable system containing a menu for 13 different functions and multiple versions of the program to suit different users. In both the data entry and display functions, the programs handle multiple pages of a screen and 34 different client entries. In the data entry program, all fields must be validated and, when keying errors are detected, all error fields must be highlighted. In the display program, the records displayed are retrieved, sorted into a different sequence and stacked before display.

Amer-Cal wrote both programs using the most efficient code it could create, Lanzer said. The result was a 30% to 50% reduction in CPU execution time for the Gener/ol version of the application over a "mirror image" written in Mantis.

Specifically, Gener/ol required 207 program lines for data entry and 71 program lines for display with sort compared to Mantis figures of 334 and 201 lines, respectively. Response time for data entry, including validation, adding records to client batch and updating batch totals, was 90 seconds compared to 121 seconds for Mantis. Response time for the display function was seven seconds in Gener/ol, 17 in Mantis.

Another major Gener/ol benefit was seen in reduced I/Os, largely as a result of Gener/ol's ability to read forward and backward and its sort feature, which eliminated the need to build a work file and read it back, Lanzer said. A typical data entry procedure required 82 I/Os in Gener/ol vs. 211 in Mantis. A display function consumed 53 I/Os against 233 in Mantis.

In all, Lanzer claimed, "Gener/ol has everything Mantis has plus additional features and large performance improvements." Some of the additional features she found most helpful were generation of compiled code, sort facilities, array handling, backward reading of IBM Vsam files, unrestricted program size and redefinition of data between numeric and nonnumeric fields.

"For the first time in four years, we can anticipate our CPU power needs remaining stable for more than a few months," Lanzer stated. In addition to committing all new, on-line development to Gener/ol in the future, Amer-Cal has elected to rewrite a major piece of Mantis-developed software for the copier dealer industry in Gener/ol. The application, which includes over 500 programs, is slated to be finished in July and will be done by a team of only three programmers.

Series/1 user migrates via 3033

CW AT PULSE

By Paul Gillin
CW Staff

NEW YORK — Going from an IBM Series/1 minicomputer to an IBM 4341 by way of an IBM 3033 mainframe may seem a roundabout way of doing things. But Hohenberg Bros. Co. of Memphis, Tenn., had little choice when it made that conversion two years ago.

Hohenberg's Series/1 was seriously overloaded with more than 500 programs, according to David M. Deutsch, a systems programmer. What was worse was that the programs were written entirely in IBM's EDL, which is unique to the Series/1. And none of the Hohenberg programmers was fluent in another common business programming language.

Hohenberg decided to handle the conversion from the Series/1's EDX operating system to the 4341's DOS/VSE operating system using the 3033 corporate mainframe under the OS operating system at the headquarters of its parent company, Cargill, Inc., in Minneapolis. The conversion also entailed rewriting the Hohenberg program library in PL/I.

In an interview at the Pansophic Users Learning and Sharing Exchange (Pulse) meet held here last week, Deutsch described why the convoluted tactic made good business sense and how Pansophic Systems, Inc.'s PAN No. 1 utility of its Panvalet library management software enabled Hohenberg to save money.

Fortunately, Cargill had a staff of programmers who were conversant in both EDL and PL/I. Between the time that the 4341 was ordered and the time it was delivered, Hohenberg shipped about 375 EDL programs to Minneapolis, where seven programmers analyzed and rewrote them in PL/I on the 3033. The programs were then stored in a Panvalet library on the 3033.

The 4341 was delivered to Cargill in April 1982. Deutsch explained that the decision to deliver there rather than Hohenberg was made because it was cheaper to run the conversion at corporate headquarters than to fly a team of programmers to Memphis. Although only about three-quarters of the program library had been converted at the time of delivery, Hohenberg decided to finish the rewrite on the 3033 and then dump the whole library onto the 4341 at once.

The transfer was accomplished by dumping the Panvalet source library to tape and executing PAN No. 1, inserting PAN No. 1 control cards as "bookends" around the programs to act as delimiters. The control cards, in turn, are recognized by IBM's DTS/Util, a utility that runs under IBM's ICCF (Interactive Computing and Control Facility) on the 4341.

Deutsch said that without the use of the two library utilities, Hohenberg would have had to rekey about 34.5 million characters of code into the 4341. Realistically, such a process would have cost a minimum of $20,000, he said.

Ever wish there were about five more of you?

Multiply programmer productivity with the Programming Environment (PE™) from Softool.

With PE you compose substantial portions of an application program from prefabricated code, and produce finished software that is fully checked out, documented and standardized!

Many *PROVEN* tools. PE is an integrated set of proven software tools that literally multiplies programmer effectiveness. It is like having another programming staff . . . on-line! Tools available include: structured languages, source code auditor, source code documenter, interface documenter, error detectors, libraries of prefabricated code, testing aids, tracing aids, optimizers, flow analyzers, conversion tools . . . and much more.

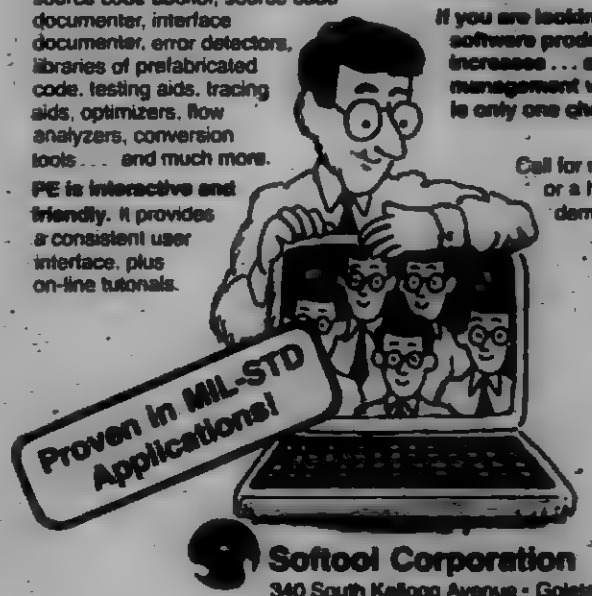
PE is interactive and friendly. It provides a consistent user interface, plus on-line tutorials.

PE supports both FORTRAN and COBOL.

Available now. Over 1000 Softool products are installed worldwide. PE is supported on the DEC VAX, DG MV, Gould S.E.L., Honeywell 6000 (Level 66 and DPS 8), HP 9000, and IBM 370, 30XX and 43XX computers.

There is more. PE is a stand-alone component of SOFTOOL®. A complete Change and Configuration Control Environment (CCC™) is also available.

If you are looking for true software productivity increases . . . and for management visibility, there is only one choice: SOFTOOL.



Call for more details or a hands-on demonstration.

Softool Corporation
340 South Kellogg Avenue • Goleta, California 93117
(805) 964-0560 • Telex 658334
See us at booth #1662, Dexpo, Boston, April 3-6

NEWS

Reagan gives DOD power to review computer exports

By Bryan Wilkins
CW Washington Bureau

WASHINGTON, D.C. — President Reagan has given the U.S. Department of Defense (DOD) the power to review exports of computers, test equipment and microchip manufacturing parts to 12 noncommunist countries widely suspected of being shipment points to the Eastern bloc.

The decision to give the review power to DOD has prompted concern from American computer manufacturers of the products affected, who fear that delays in obtaining export approval will mean lost sales to foreign competitors. The American Electronics Association said it was "disappointed" by the action.

The six commodity categories that will be subjected to DOD review if an exporter seeks to ship them to any of the 12 countries are:

- Machinery and equipment for the manufacture of electronic equipment, components and materials and related test gear. This includes semiconductor manufacturing items, software, lasers and digitally controlled automated equipment.
- Electronic measuring, calibrating, counting, testing and time interval equipment, whether or not it incorporates frequency standards. This category also includes digital test instruments with user-accessible programming capability.
- Electronic computers, including those that have been "ruggedized" for military purposes, and data communications switching gear such as packet switches.
- Computers equipped with CRT terminals, not including printers and paper readers that run at speeds less than 2,500 char./sec. This category does not include peripherals that contain their own microprocessor controls.
- Silicon compounds used in chip manufacture.
- Crystal sapphire substrates, which are also used in chip production.

Undersecretary of Commerce for International Trade Lionel Olmer has predicted that the DOD review will triple the review work load for DOD, which was already reviewing all exports to communist countries.

The U.S. Department of Commerce declined to reveal the 12 countries singled out for the license review, but officials confirmed the countries include Switzerland, Austria, Sweden, Finland, Liechtenstein, South Africa, India, Hong Kong and Singapore.

The Reagan order does not give DOD review power over distribution licenses issued to companies for a broad group of products. Instead, DOD will initially review only individual export licenses.

However, the order does state that DOD will have the power to review distribution licenses in the future if it proves it can efficiently administer the review of the individual licenses.

Meanwhile, a House-Senate conference last week began hammering out the differences between two bills authorizing the renewal of the Export Administration Act, which was due to expire last Friday.

Calif. execs sentenced for trying to smuggle disk equipment to Bulgaria

By James Connolly
CW Staff

LOS ANGELES — The owner of a California firm has begun serving a three-year federal prison term after pleading guilty to charges that he tried to ship $750,000 worth of computer disk manufacturing equipment to Bulgaria.

Edward F. King, owner of Printemps Corp. of Yorba Linda, Calif., was sentenced and fined $20,000 by U.S. District Judge Lawrence T. Lydick here last month after King pleaded guilty to charges of conspiracy and illegal exportation. Printemps' chief financial officer, Louis R. Klements, pleaded guilty to conspiracy and was placed on probation for five years and fined $5,000.

According to a federal prosecutor, Printemps shipped two disk polishing devices to Bulgaria and tried to ship two coating devices in 1982 and 1983. King allegedly acted as a go-between and bought the equipment from a California manufacturer at the request of two Bulgarians and Hendrik Wasmoeth of the Netherlands. Wasmoeth and the Bulgarians were indicted with King and Klements in November 1983, but are believed to be outside the U.S.

Assistant U.S. Attorney William F. Fahey told the court King was employed as a consultant by Wasmoeth on behalf of the Bulgarians in their attempts to buy the equipment from a firm here. The equipment was to be used to build a computer manufacturing plant in Bulgaria, Fahey said.

When the company here failed to obtain export licenses, Fahey said, King decided to obtain the equipment himself. He shipped the first two pieces of equipment through Holland to Bulgaria in 1982. The coating equipment was seized by U.S. Customs agents at Los Angeles Executive Airport in January 1983.

Fahey charged that King's agreement called for him to ship $750,000 worth of equipment and said that the equipment was "licensable by the Commerce Department." He said Printemps failed to obtain the appropriate licenses.

"King's motive was clear: greed," Fahey said at the sentencing. "The equipment was obviously something the Bulgarians were very interested in and willing to pay top dollar for." Fahey said King's conduct was "designed to aid the Soviet bloc country in balancing the technological scales with the U.S."

POWER TOOLS VAX PBS

■ SOFTKEY
Customize your keyboard. Redefine any key or gold sequence as a string of up to 2000 characters. Recall and edit the last 10 lines of command or program input.

■ PHOTO
Photograph and playback your terminal session. Document bugs; create mail and handouts.

■ SPY
Watch other users with or without their knowledge; real-time or recording mode. Give demos from remote sites!

■ ADVISOR
Assist other users by entering commands or program input from another terminal. Great for remote training and problem diagnosis.

For more information on these and other products call or write to:

PRECISION BUSINESS SYSTEMS

Abuser Unfriendly™

C.H. Systems presents Sherlock, Esq.™, a dial-back access authenticator. Combined with your Hayes Smartmodem™, Sherlock, Esq.™ poses a formidable barrier against hackers, thieves, spies and any other unauthorized persons. Simple to install and operate. Sherlock, Esq.™ is truly user friendly and . . . abuser unfriendly.

See us at Booth no. 1543
COMDEX/Winter '84

It's Elementary!

C.H. SYSTEMS

8533 WEST SUNSET BLVD., SUITE 106 ● LOS ANGELES, CA 90069 ● PHONE (213) 854-3536

Hayes, ||, and Smartmodem are registered trademarks of Hayes Microcomputer Products, Inc.
C.H. Systems is not affiliated with Hayes Microcomputer Products, Inc.

Report slams studies linking VDTs, health risks

By Lynn Haber
CW Staff

SANTA MONICA, Calif. — Contrary to recent reports that video display terminals are health hazards, a study released here by The Koffler Group claims there is no scientific evidence that VDTs pose any threat to the health or safety of users.

"The VDT Health Debate and the Importance of Research Methods" reviews six VDT-related studies. They include two by the National Institute for Occupational Safety and Health (Niosh); one by Dr. Arthur Frank and the Newspaper Guild; a study by Starr, Thompson and Shute of Bell Telephone operators; a report by the Canyon Research Group, Inc.; a study by DeGroot and Kamphius done with telephone information operators in Denmark; and a report by the National Research Council.

Those studies were selected because they have received significant press attention and caused a lot of "sensationalism," according to the author of The Koffler Group's report, Dr. Karen Kessel. Kessel is editor of "The Office Systems Ergonomics Report" — published by Koffler — and vice-president of research for the company.

"When I went back to look at some of those studies, to my horror I discovered they were terrible. They were not responsible, and you couldn't derive anything from them," Kessel said in a recent telephone interview. Kessel, whose academic background is in experimental psychology, cited as an example a 1981 Niosh study. "This study was basically done at the request of the unions, which already felt that there was a VDT problem. So, in other words, they were loading the dice.

"The researchers went into a situation where there was excellent reason to believe that people were already reacting negatively due to computers, but nobody knows why. There could have been a million variables that could have accounted for that, everything from the unions wanting more power to who knows what."

Niosh response

Contacted for her comments on the Koffler report, Barbara Cohen, one of the researchers involved in the Niosh study, said the health hazard evaluation was initiated by a consortium of five unions. "Any employee, any union, can request a health hazard evaluation if they feel there's a health hazard in their work place," Cohen said. "The mission of Niosh, as a government agency under the [Department of Health and Human Services], is to assure safe working conditions for every man and woman in the U.S."

She added, "Most people that know the government know Niosh's work [and] know that it is a neutral agency. It must be a neutral agency to do the studies."

Another recent study Kessel targeted in her report was "Effects on Health Following Occupational Exposure to VDTs," carried out by Dr. Arthur L. Frank with the Newspaper Guild. According to Kessel, this study was so bad "that it made the Niosh studies look wonderful."

Kessel said she was "actually quite angry after reading that study because that is exactly the kind of sensationalism that everybody hears about. Nobody I know reading the newspapers would be hearing the other side of the coin. That study, in my opinion, was so bad [that] not only can't you derive anything from it, but the researcher was terribly irresponsible. . . . If you can't do science right, then don't do it at all."

Among Kessel's 16 complaints against the Frank report were her contentions that Frank discussed VDT radiation testing in his study, yet never actually investigated it; that he used union members both as subjects and as volunteers to collect data; and that he used a "classic case of a biased sample."

A question of participation

"Frank said that only 40% of those who could have participated in the study actually did so. My question is, 'What were the other 60% doing?' Just on that alone, we could throw out his study," Kessel said.

Frank, currently a professor and chairman of the Department of Preventative Medicine and Environmental Health at the University of Kentucky College of Medicine, said in a telephone interview that his study reached no conclusions. It simply reported data and suggested, based on that data, that more research needs to be done on various subjects, according to Frank.

"The study states that this was a hypothesis-generating study," he noted. "I said at the outset that I wasn't looking to prove anything. I was looking for possible associations that needed to be followed up — that's what a hypothesis-generating study means."

Findings and problems reported

The questionnaire used in the study, according to Frank, was developed while he worked at New York's Mt. Sinai hospital in collaboration with behavioral scientists, occupational physicians and eye doctors after reviewing related literature. "Not only did I report my findings, but I reported what the potential problems of the study were."

Was there a potential for bias in the study? Replied Frank: "Because we didn't get the distribution that one would have expected — that one would have anticipated — then there is some bias. But I think our statements in the paper reflect that and that we were aware of that."

Copies of the review are available for $35 each from The Koffler Group, which can be reached at Suite 200, 3029 Wilshire Blvd., Santa Monica, Calif. 90403.

Editor of report critical of press coverage of VDT health studies

SANTA MONICA, Calif. — A report recently released here suggests that negative health and safety reports regarding VDTs have been enhanced by press coverage.

Moreover, the negative reports have been marked by poor scientific research methods, a problem compounded by the trade press, which "often treats ergonomics as a sensational issue or fad," charged the "Office Systems Ergonomics Report," edited by Karen Kessel. "Many articles contain blatant errors and misconceptions that are treated implicitly as fact and then perpetuated by decision makers, many of whom should know not to base decisions on what they read in the press."

Kessel is author of "The VDT Health Debate and the Importance of Research Methods" carried in the newsletter. She acknowledged her outspokenness on the VDT health research issue in a recent telephone interview and cited additional reports which she said support her views on VDT research.

"One study that was excellent that I did report on was done by Starr, Thomson & Shute for AT&T Bell Laboratories. Now there's the difference between good research and bad research," Kessel maintained. "These guys used appropriate controls. They were attempting to eliminate all kinds of biases, all kinds of controls that it's normally difficult to control for."

According to Kessel, the Bell study found no health differences between VDT users and "paper people," workers who do the same task as VDT users, but use traditional office equipment in their work.

Another report, by Jayne M. Schurick, Martin G. Helander and Patricia A. Billingsley of The Canyon Research Group, Inc., which examined about 64 studies done in the VDT area and is also covered in the Kessel report, also concluded that the studies were poor, according to Kessel.

"I believe that ergonomics is important. I believe that you need ergonomics. I do not believe that the problems that have been attributed to VDTs have any foundation in fact," Kessel concluded.

Here are a few good reasons why you should make Local Data your protocol converter company.

Local Data's comprehensive line of local and remote protocol converters have been used around the world to make async-to-IBM communications simple and economical.

DATALYNX™/3274.
DataLynx™/3274 remote async ASCII protocol converter supports SNA/SDLC or BSC protocols. 80 types of ASCII async terminals can emulate IBM 3278 display stations. RS-232C ASCII async printers can emulate IBM 328X printers.

DATALYNX™/3780.
DataLynx™/3780 async ASCII-to-IBM 3780, 2780, 2770 and 3741 protocol converter supports EBCDIC BSC protocol on one channel and async ASCII devices on the other two channels. Features include transparency, mini/micro support and free file transfer program.

INTERLYNX™/3278.
InterLynx™/3278 allows the attachment of low-cost ASCII CRT terminals or p.c.'s to 3274/3276/4701 and 45XX integrated adaptor Type "A" coax ports. InterLynx/3278 enables the user to use async CRT's on IBM systems and switch to async applications under terminal control.

FILELYNX™/3278.
For micro-mainframe file transfers.

INTERLYNX™/3287.
InterLynx™/3287 allows attachment of ASCII printers to IBM Type "A" coax ports or 3274/3276/4701 controller and 4321/4331 CPU's.

SNA LU1 SCS and LU3 capability are standard with the InterLynx/3287. Features include parallel and serial ports and front panel set-up.

For more information call today.

Local Data

Local Data
"Your Lynx to IBM."

"In your development center, ADS/OnLine will increase productivity and reduce your company's applications backlog." —Don Heitzmann*

**Don Heitzmann is Cullinet's Director of System Software Development. Don joined Cullinet seven years ago. His early efforts were in design and development of IDMS-DC and he is now responsible for the complete IDMS database product line. Don is a graduate of Princeton University with a B.S. in Electrical Engineering and a Masters in Architecture.*

Using ADS/OnLine Cullinet created the best applications software ever built.

The Application Development System, Cullinet's fourth generation language, became available in 1981. ADS/OnLine was the key element in our database software system needed to address the application software business in a whole new way.

We set out to develop advanced financial and manufacturing applications; applications designed in the 1980's all built using this fourth generation language. Today, Cullinet offers the finest financial and manufacturing applications available, featuring both horizontal and vertical integration. Horizontal integration means that all applications share a common database so redundancies and inconsistencies are eliminated. Vertical integration means all applications are built using ADS/OnLine and advanced database technology so they are easier to install, tailor and maintain.

Using ADS/OnLine, we developed advanced applications much faster than if we used traditional methods. In your development center, ADS/OnLine can increase productivity and reduce your company's backlog.

ADS/OnLine eliminates up to 70% of the lines of code in a typical COBOL program. This can result in a dramatic increase in programmer productivity. In addition, ADS/OnLine is easily learned by COBOL programmers, so your programming staff can become more productive in less time.

Applications can be built more efficiently with ADS/OnLine because it is a non-procedural language. The developer simply paints the screens on a terminal and fills in the blanks to define the applications program. Plus, automatic editing and automatic error handling detect input errors with no code written at all. And the complete integration of ADS/OnLine, with all Cullinet Database facilities, not only ensures control over the application development function, but also guarantees the performance necessary to run these applications in day-to-day operations.

ADS/OnLine has been a key to our success in applications software. It could do the same for you in establishing new information systems and eliminating your applications backlog in the 1980's and 1990's.

Attend a comprehensive seminar explaining this advanced fourth generation language and Cullinet's other database software products. To participate in one of the 700 Cullinet seminars scheduled internationally, send in the coupon or call 1-800-225-9930. In MA, 617-329-7700.

IDMS/R Seminar cities and dates

City & State	Date	City & State	Date	City & State	Date
Albuquerque, NM	May 2	Dallas, TX	May 15	Orlando, FL	May 24
Anchorage, AK	May 23	Des Moines, IA	May 16	Ottawa, ON	May 8
Appleton, WI	April 12	Detroit, MI	May 23	Phoenix, AZ	April 12
Atlanta, GA	May 15	Greenville, SC	May 24	Pittsburgh, PA	May 16
Atlantic City, NJ	May 10	Harrisburg, PA	May 8	Portland, ME	May 15
Battlecreek, MI	May 15	Hartford, CT	May 9	Quebec City, PQ	May 17
Boston, MA	May 23	Houston, TX	May 10	Richmond, VA	May 16
Boston/ Danvers, MA	May 3	Indianapolis, IN	May 8	St. Louis, MO	April 11
		Jacksonville, FL	May 1	San Antonio, TX	May 16
Bridgeport/ New Haven, CT	May 22	Kansas City, MO	May 2	San Diego, CA	May 8
		Los Angeles, CA	May 1	San Jose, CA	May 15
Calgary, AB	May 23	Louisville, KY	May 10	Springfield, IL	May 17
Charlotte, NC	May 10	Lubbock, TX	May 1	Toledo, OH	April 11
Cheyenne, WY	May 22	Lynchburg, VA	May 17	Toronto, ON	May 17
Chicago, IL	May 3	Miami, FL	May 17	Tulsa, OK	May 22
Cincinnati, OH	May 14	Milwaukee, WI	May 1	Valley Forge, PA	May 17
Cleveland, OH	May 24	Morristown, NJ	May 8	Waco, TX	May 15
Colorado Springs, CO	May 16	Nashville, TN	May 3	Washington, DC	May 9
Columbia, SC	April 12	New Orleans, LA	May 24	Wilmington, DE	May 22
Columbus, OH	May 2	New York, NY	May 15		

Computer_____

Name/Title_____

Company/Department_____

Address_____

City_____

State_____ Zip_____

Phone ( )_____

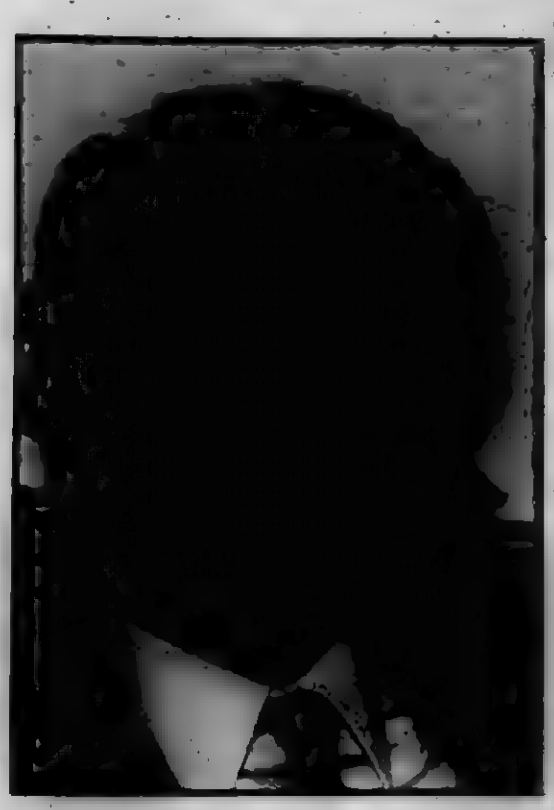
Mail to: Cullinet Software, Inc., 400 Blue Hill Drive, Westwood, MA 02090-2198 Attn: Corporate Meetings

Cullinet Software products are designed to run on IBM 360/370, 30XX or 43XX or plug-compatible computers.

CW 48

Database: Cullinet

© 1984 Cullinet Software, Inc., 400 Blue Hill Drive, Westwood, MA 02090-2198



The fourth generation moves into the mainstream

An interview with Focus creator Gerald Cohen

After years of only limited acceptance, fourth-generation languages are becoming a mainstay in many large data processing installations. But the debate continues over whether they are yet efficient and powerful enough to take on the burden of high-throughput production applications.

One of the most successful fourth-generation languages is Information Builders, Inc.'s Focus. Now nine years old, Focus claims a base of more than 1,200 installations and more than 100,000 users. Last year it became the first major fourth-generation language to be ported to the IBM Personal Computer.

Information Builders President and founder Gerald Cohen has more than 20 years of experience in language design. Previously he was vice-president of Mathematica Products Group, Inc., where he designed the original Ramis language, which is now one of Focus' major competitors.

Cohen was interviewed recently at Computerworld's offices by CW Senior Editor/Software Paul Gillin.

Q "Fourth-generation language" has become a buzzword. Please define it and differentiate it from "application generation."

Fourth-generation procedural and nonprocedural languages are used to generate applications rather than general procedural languages such as Cobol and PL/1. The difference is that their objective is a very large order of magnitude improvement in the speed with which a person can construct and perform a significant data processing function. I almost can't differentiate them from application generation.

Q In recent product literature, you emphasize decision support functions within Focus. Is this a change from earlier years?

I think it's a reactive circumstance. Sixty-five percent of our users are still doing traditional application development in Focus. When IBM introduced the information center, it was just an extra market for us. Only a third of our applications are in information centers.

Q Fourth-generation languages have been dogged by the image that they're not suitable for large-scale production applications. Is there any validity to that criticism?

Yes and no, but this is a moving target. What couldn't be done two years ago might be done today. But not all fourth-generation languages are the same. Some can't handle it, and that tends to tar the industry. It's not necessarily size that's the issue, sometimes it's logical complexity. We can do very complex applications and notions which are difficult to handle even in common programming languages.

It is true that computer resources are more heavily used by fourth-generation languages. But the most serious problem we find is that when users start using a fourth-generation language, they find that where previously they served 50 or 100 users, they can now service 300 users. We have sites that have 1,000 users. . . . We're working on the area of internal efficiency; that's one of our long-term goals. But the nexus of the problem is that you now have 1,000 potential users, and if they use it at the same time, you've got a dilemma. The information center generally is on another piece of hardware because of that. That's why IBM is so into [the information center concept].

Q So you're willing to pay the hardware price?

I don't think it's a significant hardware price. I contend that in many situations, a fourth-generation language is as efficient as if you wrote in another language.

You've got to recognize that most information systems have a built-in element of change. If you factor in the amount of time it takes to compile, test and link these systems vs. doing it in a changing Focus system, I'm not sure the computer resources are more. Sure, in a flat-out run we might lose that. But I'm saying the total measurement is not accurate.

Q In large installations, what sort of guidelines do you give DP management for what the end users can and cannot do?

Companies that go into new tools have to reorganize the way they go about delivering applications. Previously, they had a rule book that laid out the steps they were going to take. With the advent of tools such as Focus, these organizations are rewriting that method. They're looking, perhaps, for a quick preliminary study, followed the next day by a prototype system, followed by sample outputs, followed by sort of an evolutionary development.

These organizations also have to decide what set of tools to use for an application. If an application has a lot of change, clearly you go to the new tool. If the application is relatively static, one possibly should invest in a Cobol program.

Q For vendors such as yourself who have sold to the mainframe market for years, what impact will the personal computer have?

One of the reasons we jumped into the micro area so fast is that success sometimes is our customers' undoing. You can't service 1,000 users on one computer. The only solution is to distribute that computer power.

The trend today on micros is toward larger memory. We're going to single-user mainframes. When that happens, we want to divide the processing so you do some on each.

Q What sorts of problems does this present?

The No. 1 problem today is communication with the mainframe. It's a mess. IBM generally sets the standards in most things, but they don't set it in communications.

The major problem that has to be solved is a generalized way to communicate through either a central processor or to each other. We don't think the local-area networks are here yet, and we don't think the proper method of linking micros to mainframes is here yet.

Q What is going to be that breakthrough?

I think the breakthrough will be the setting down of a standard. Then all the vendors can concentrate on doing it better.

Q What are the relative advantages of micro-based application builders?

The micro has a degree of ease and intimacy that doesn't exist on the mainframe. The micro has really changed our perception of how we ought to be dealing with users. That lesson is influencing our mainframe development too. Since we introduced PC/Focus, we've changed the entire feel of the mainframe product to be more like a micro-based product.

Q Why has the mainframe software market been so quiet the last couple of years?

One reason is that IBM is a great dampener. They claim they're going to be in all sectors of the market. Consequently, there have been very few major product introductions in the mainframe market.

Another reason is that customers want service. In the mainframe marketplace, the entry fee is no longer just an author who writes a product. People want vertically integrated companies that will provide them with the tools and the services for using those tools.

Q Is there really any opportunity for a small company to enter the large system software market any more?

Yes, with utility-type products that don't require the support. But [with] any product that requires support, we're past the point that a start-up company is going to be in the running.

Q That gives the users a more limited choice. They're stuck with you.

Yes, but we're stuck with them also, in the sense that our major activity is in improving customer support services. In some respects, it's a great benefit to the DP organizations we deal with. They're getting stronger organizations that give them better service.

Q What kind of competition have you been encountering from application generators?

The application generators such as [Cincom Systems, Inc.'s] Mantis and [Oxford Software Corp.'s] UFO will generally be used in a CICS type of environment. The emphasis is mostly on data capture and file updating and not on the use of the data after that. We won't do that quite as well as them, but we will do not only data capture, but also a sophisticated job of reporting from that data. If your problem has a lot of logical complexity, you just can't do it in a UFO or a Mantis. We'll coexist very nicely with them.

Q What new capabilities are most often demanded by your users?

We're being pulled in several directions simultaneously. On one end, friendly facilities for the new users are being demanded.

On the other end, we're being pushed for facilities that [handle extremely exotic situations, such as how to calculate when a piece of data is missing].

NEWS

INTERNATIONAL REPORT
CW International News Network

AUSTRALIA

MILSONS POINT — Burroughs Corp. has reportedly surprised the banking industry here by beating both Hogan Systems, Inc. and Anacomp Australia, Inc. out of a plum contract with the State Bank of New South Wales. The $7 million order is said to have been won on the merits of Burroughs' Banking Information Software and the company's ability to provide its own hardware.

■

CROWS NEST — In response to McCormack & Dodge Corp.'s announcement of a real-time, on-line integrated financial system called Millennium:SDT [CW, Feb. 13], an Australian software vendor is claiming it leads McCormack & Dodge, Software International Corp. and MSA, Inc. with a system it has been selling for five years. The EDP Department Pty. Ltd. boasts three users of its real-time integrated Financial Management System (FMS), which was designed for large Burroughs Corp. systems.

■

MELBOURNE — Nixdorf Computer Pty. Ltd.'s pricing and "positive attitude" reportedly helped it beat out IBM for a significant contract here from the Roy Morgan Research Center Pty. Ltd. According to Peter Gant, senior executive at Morgan, "The Nixdorf staff was far more willing to help us," so his company ordered roughly $600,000 worth of Nixdorf Dual 8890 systems to replace its aging IBM 370 line.

■

MILSONS POINT — An Australian Department of Defense contract valued at over $1 million was awarded to Techway Pty. Ltd., the Australian distributor for Elxsi International Co. The department's Aeronautical Research Laboratory will become the first Australian user of the high-speed Elxsi multiprocessor.

BRAZIL

RIO DE JANEIRO — The Brazilian Society for Scientific Progress, comprised mainly of computer scientists and engineers, has launched a campaign to reserve the Brazilian market exclusively for Brazilian vendors. The current Department of Informatics policy in favor of market reservation is coming under debate in Congress in April, the opening of the Brazilian legislative year.

CHINA

GUANGTONG — Aihua Electronic Co. Ltd. has established a microcomputer production line to assemble and test Altos Computer Systems, Inc.'s 586 series of multiuser, multitasking 16-bit microcomputers. Aihua is the second Chinese company to import Altos systems. The first was the Shaoguan Radio Factory, which has been importing hundreds of Altos 586 kits for domestic assembly and sale.

FINLAND

HELSINKI — Nokia Data defeated some 80 foreign competitors to pull down the biggest export contract ever won by this country's information technology industry. The company's 16-bit Nokia PC microcomputer has been selected by telecommunications giant Northern Telecom, Inc. for its office automation and small business system product line, which will reportedly also include an extensive network of minicomputers and digital telephone exchanges. Production of the Nokia PC is expected to rise to 20,000 units annually, double the present level. The 16-bit Nokia PC features an Intel Corp. 80186 microprocessor and a 15-in. display screen. Northern Telecom plans initially to market the system in Europe, with emphasis on the UK and West Germany.

FRANCE

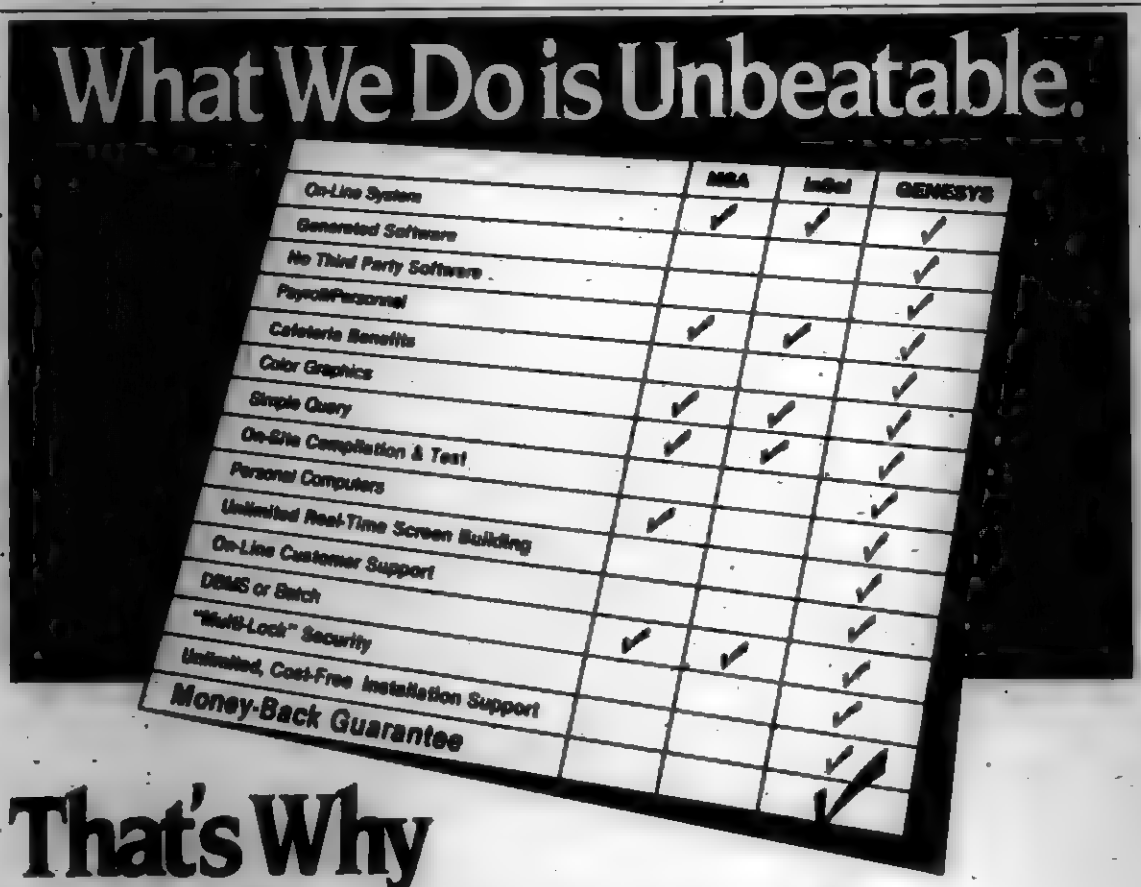
PARIS — The newly consolidated group Bull, which is comprised of CII-Honeywell Bull, Bull-Sems and Transac, has reported combined revenues of almost $1.4 billion, an increase of 21% over last year. The growth was attributed to the companies' accelerated development of distributed data processing and office automation products, which are said to be compatible with other vendors' products. Bull has a total work force of 26,000 people in some 70 countries.

JAPAN

TOKYO — Nippon Electric Co. Ltd. has announced two microprocessors slated for delivery in June. The 8-bit V20 and the 16-bit V30 are based on Cmos technology and are said to be compatible with systems based on Intel Corp. 8086 microprocessors. The products feature a dual data bus configuration, according to the vendor.

■

TOKYO — Hitachi, Ltd. has enhanced the main memory of its M-220 series of mainframes and unveiled an 8-in. 620M-byte version of its relational data base system RDB1. The M-220's main memory was extended from 8M bytes to 16M bytes by using 256K-byte random-access memory chips, according to the vendor spokesman.



That's Why We Fully Guarantee it!

Only One Human Resource Management System is good enough to be fully guaranteed. Genesys'. Our own people developed all of our software and systems. Our own people will also install our system, compiling and testing all our programs for you. Then our people will stand behind their work with a no-strings, money-back guarantee.

Genesys is simply unbeatable. Most Human Resource Systems contain the raw data you need for management reports, government compliance and to let you know "Is she promotable?". But you have to do a lot of work preparing data to get the information you want because they've added third party software.

Not so with Genesys. All our software is completely integrated and menu-driven. No matter what you need to know about Payroll, Personnel or Cafeteria Benefits, it's easy to get precisely the information in exactly the format you want. Just one keystroke gives you selective search, decision support, PC integration and color graphics. Real-time, from any office, anywhere in the country. With by far the tightest, most flexible security available.

We're so confident you'll be successful with Genesys we'll give an unconditional guarantee. How can you beat that? If you'd like more information on the Genesys HRMS or would like to attend an Executive Seminar near you, call Norman Bushee at (617) 685-5400.

APRIL SEMINAR SCHEDULE

April 3 – Charlotte, NC
April 4 – Raleigh, NC
April 5 – Tampa, FL
April 10 – Vancouver, BC
April 10 – Buffalo, NY
April 11 – San Jose, CA
April 11 – Rochester, NY
April 12 – Syracuse, NY
April 12 – Riverside, CA
April 17 – Providence, RI
April 18 – New Haven, CT
April 18 – Oklahoma City, OK
April 19 – Albany, NY
April 19 – Tulsa, OK
April 24 – Chicago, IL
April 25 – Minneapolis, MN
April 26 – Bettendorf, IA

Genesys
SOFTWARE SYSTEMS INC

For The State Of The Art In HRMS
LOOK TO GENESYS FIRST!

Genesys, 20 Ballard Way, Lawrence, MA 01843
Please send me information on:
☐ Genesys Seminars ☐ Payroll Accounting
☐ Personnel Administration
☐ Benefits Management
Name _____
Title _____
Company _____
Telephone _____
Street _____
City _____ State _____ Zip _____
IBM Hardware _____

NEWS

Report urges DP managers to aid in designing offices

By James Connolly
CW Staff

BOULDER, Colo. — Information systems managers need to play a greater role at the planning stages if the office building of the future is truly to be an "intelligent building," according to a report recently released here.

The report warned that plans for new construction and reconstruction must allow for computer-related factors such as miles of cabling, lighting that will not cause CRT screen glare, decentralized air conditioning and constantly changing office layouts.

"The Orbit Study," completed in the UK last year and reprinted here by Cross Information Co., urged that building designers consult at the earliest stages with information systems managers and make greater use of electrical and mechanical engineers.

The study of how 10 organizations used information technology focused on technology's direct impacts — such as cabling, heat and space — and the indirect impacts — for example, how information technology means flexibility in working hours and locations.

Variety of interests

"Above all, the effects of information technology vary depending on whose interests are involved," the report observed. "What suits the manager may not please the worker. What catches the fancy of the architect may not recommend itself to the ergonomist. . . . So many interests are involved that conflict is inevitable."

The report also noted that most of the technology that will have the greatest impact on office design over the next 10 years already exists and that "futuristic developments" are likely to affect only a minority of organizations.

Within 10 years, one out of three office workers could be equipped with electronic workstations, meaning there will be more equipment in the office, the report said. It added that soon the growth of support systems will leave office buildings with only 50% usable space for office workers.

It also emphasized that rapidly changing business environments will decentralize or kill many established companies and create many start-up companies, which means frequent changes will be made in office buildings' space allocation, services and interior design. Few office buildings will have a single tenant, and those companies that are sole occupants are likely to need communications capabilities with satellite offices.

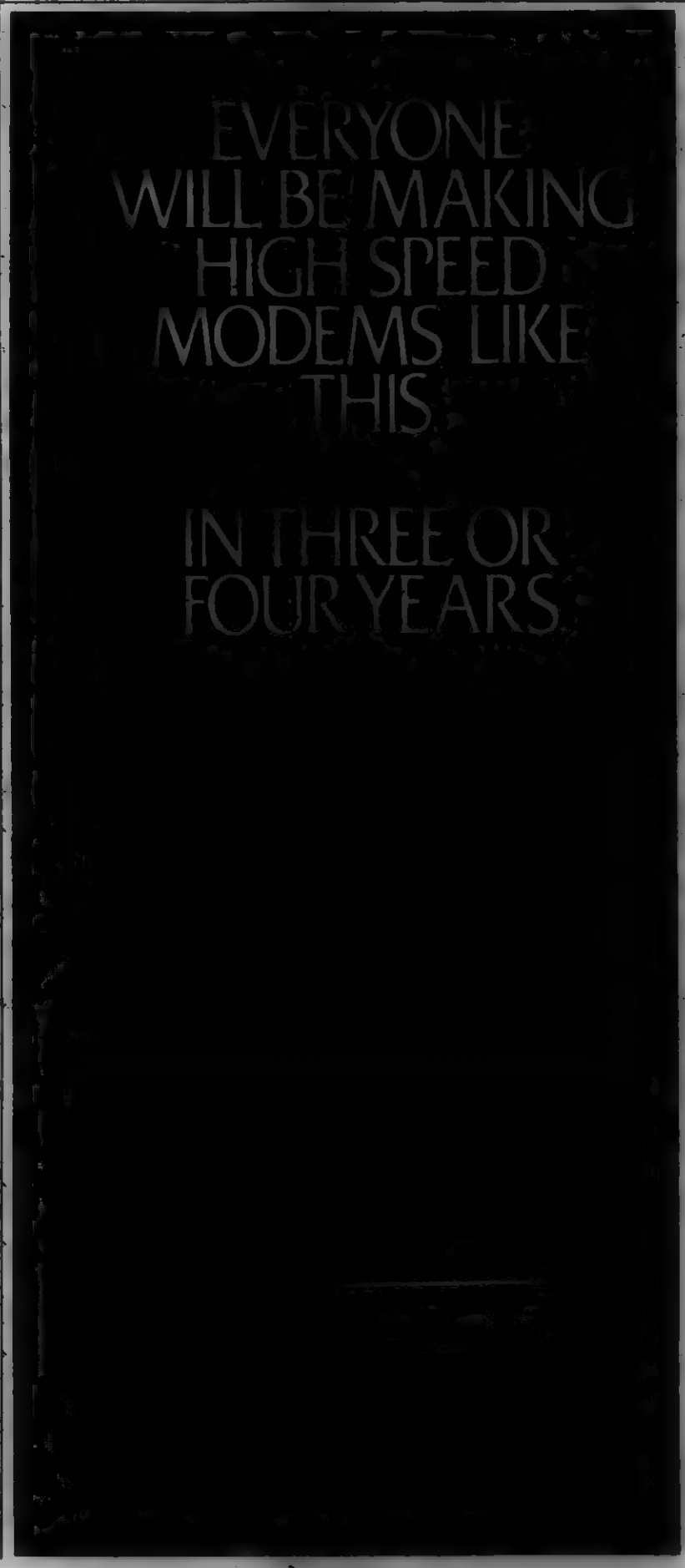
The report recommended that designers allow for cellular space allocation, rather than open offices, and increased space for support and ancillary services. Designs should also allow for dispersed rather than centralized computer rooms and the appropriate floor load levels, according to the report.

It also recommended large, dispersed vertical ducts, which would take up at least 2% of available floor area, to separate power, telephone and signal cable.

Air conditioning capacity should be expandable, which will mean greater demand for servicing access and a subsequent minimum floor-to-ceiling height of 2.8 meters.

According to the report, buildings with the ability to handle information technology will be easier to let in a tight market, while "marginal buildings" will lose their value within five years if they aren't renovated. It also said that new and refurbished buildings might be easier to market as shells, with the services and interior scenery fitted to customer specifications.

The 108-page "Orbit Summary Report" is available for $400 from Cross Information, Suite B, 934 Pearl, Boulder, Colo. 80302.



How did Codex come up with the 2600 Series, a new generation of modems running at speeds from 4800 to 16,800 bps that's so much more advanced than the competition?

By designing a revolutionary VLSI-based signal processing architecture teamed with the powerful Motorola MC68000 microprocessor.

A design that incorporates a unique Adaptive Rate System, which continuously adjusts the transmission speed of the Codex 2660 to the maximum rate the line will support. Allowing you to optimize throughput all the way up to 16,800 bps, without having to lift a finger.

A design that ensures data reliability with Trellis Code Modulation (TCM)—a significant advancement over uncoded modulation techniques in common use today.

In multipoint applications, the Codex 2640 can even handle mixed 9600, 7200 and 4800 bps inbound rates. So each drop can operate independently at maximum speed and efficiency.

Of course, with the Codex 2600 Series, network control is standard. So you can monitor line and modem performance from the front panel or from a central Codex DNCS system. Plus there's an optional downline-loading feature that lets you conveniently modify or enhance the functionality of remote, unattended modems.

The Codex 2600 Series.

In three or four years, our competitors will probably have modems just like them.

If you'd rather not wait, contact Codex today. We'll send you detailed information about these 2600 features and more. Much more.

Call 1-800-821-7700 Ext. 666. Or write: Codex Corporation, Dept. 707-66, 20 Cabot Boulevard, Mansfield, MA 02048.

codex
A MOTOROLA COMPANY

© 1984 Codex Corporation.

"First Chicago is launching a whole world of new banking services with ***Tandem NonStop Computer Systems.***"

At The First National Bank of Chicago, providing responsive on-line financial services for our customers is a major corporate priority. An important part of that commitment is the global implementation of core applications on Tandem NonStop Computer Systems.

Utilizing common data base structure on systems distributed throughout the world provides immediately useable information uniquely suited to internal reporting and accounting. Included are such sensitive items as foreign exchange and money market transactions, loan contracts and SWIFT transfers. We call this system F.I.R.S.T. (First Chicago International Real-time System for Transactions).

Tandem systems also support our installed and expanding consumer and commercial funds transfer, balance reporting, and cash management systems, which move billions of dollars for our customers daily. Our Cash Station ATM switch is an excellent example. The modular nature of the Tandem solution enables us to sustain and improve quality by adding such capabilities incrementally, where and when they're needed.

The Tandem systems are on-line in sixteen financial capitals around the world. And they are very reliable. We continue to be impressed with the systems, the support and with our employees' enthusiastic acceptance. They are helping us improve customer service.

The NonStop System. The only computer on the market today that can provide an integrated network of up to 255 processor systems, supporting thousands of terminals in an on-line, transaction-based environment.

Tandem. Fully supported by worldwide sales, training, service and manufacturing organization.

For more information on the Tandem application at First Chicago and a copy of our brochure, "Solutions in Banking," contact your local sales office or Tandem Computers Incorporated, 19333 Vallco Parkway, Cupertino, California 95014, U.S.A. Toll Free 800-482-6336

TANDEM

NonStop Transaction Processing

NEWS

He tracks mass media's changing image of computers

By John Gallant
CW Staff

CAMBRIDGE, Mass. — Beneath the image of the computer in mass media is an underlying fear of technology and the people who control it, according to David Goodstein.

"There is a basic fear that is always reflected in visualizations of the computer in films and television. That fear is the centralization of authority in the person of the specialist who can control this fantastic tool. People who don't understand computers are afraid of them and of those who program them."

Goodstein is the director of the Technopolis Foundation, an organization devoted to researching the impact of technological change on society. The group is exploring that topic via its film series entitled *Thinking Machines: Images of the Computer in Mass Media*, at the Cambridge Institute for the Arts and Sciences here.

"Twenty years ago, when computers required almost an entire building to support them, it did not seem very likely that within our lifetimes they would become part of our mass culture," Goodstein said in a recent interview. "But the computer has come to portray technology in mass media, and technology has a bipolar image, depending on the political and economic climate. In rough times, technology is portrayed as a monster. In better times, technology is the benevolent savior."

Goodstein said computers have customarily been portrayed as massive, complex machines, usually under the power of a lone — often mad — creator or completely beyond mankind's control. The image is evident, he observed, in such films as *Alphaville* by Jean Luc Goddard, George Lucas' early work entitled *THX-1138* and Stanley Kubrick's striking *2001: A Space Odyssey*.

Another theme woven throughout early images of the computer is that of the "hacker's girlfriend." Explained Goodstein, "That's where the programmer falls in love with the computer, or the computer falls for the programmer and creates all sorts of problems. That was a perfect visualization of what computers were seen as in the 1950s and '60s. Those were the days when hackers were not yet culture heroes, and programmers were regarded as peculiar and almost a part of the machines they were so obsessed with."

'Blinking and smoking'

In their starring roles, computers have also exhibited some interesting, though not very accurate, features. "Tape drives and blinking lights are the two great images of the computer in mass media. They are the visible manifestations of computing machinery, though not really typical of most installations. These machines also could perform a number of rather specialized peripheral functions like spitting out sparks and emitting smoke."

Is the computer's image in mass media changing? Goodstein said yes, but not necessarily for the better.

"The image has become more benevolent, but not much more realistic. The computer is a standard fixture in a number of television series, like *Knight Rider* and *Automan*, where it is even portrayed as a superhero. But it's still the image of the blinking lights, and that's not how it is. People don't quite know how to portray computers because there's nothing really to look at."

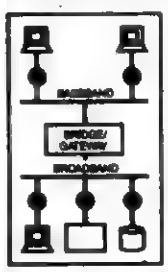
The image of those who control computers has undergone a drastic revision, however. "The new theme is that of the Whiz Kids. The 1980s have made the hackers culture heroes, and we have the media to thank for that. No matter how powerful it is, IBM was never going to make heroes out of data processing people. That runs against the corporate grain."

LAN.
THE DECISION TO WAIT AND SEE JUST PAID OFF.

Now there is a company that can satisfy your LAN needs both today and ten years from today. A company with flexible solutions backed by over 20 years of networking experience.

Codex.

In the 4000 Series LAN, we offer a system that lets you configure and control the precise mix of LAN technologies that suit your company needs.



A system, for example, that lets you combine a broadband backbone for data, video and voice applications, and less expensive Ethernet baseband feeders to support individual work areas.

A system that supports a wide array of industry standard interfaces. So you can connect practically any vendor's equipment.

Later, when your needs for internetworking and network management expand, those needs can best be met by the company that has literally written the book on adaptive routing, network management, protocol intervention, and statistical multiplexing.

Codex.

We just made the decision to get into local area networking a safe decision to make.

For more information, call 1-800-821-7700, ext. 879. Or write: Codex Corporation, Dept. 707-79, 20 Cabot Boulevard, Mansfield, MA 02048.

codex
A MOTOROLA COMPANY

© 1984 Codex Corporation.

MSA has more realtime systems than you can count on both hands...

...and they're all designed to work together perfectly

...based command information retrieval

...integrated ...our next three ...ducing realtime ...3. And solved the ...d with realtime, ...control, ...ery. The result: ...ly tuned, highly ...ms.

...ve you a software ...ved. Nobody can ...between realtime ...

...fers a true

MSA Realtime Mainframe Systems	
1. General Ledger	8. Foreign Exchange
2. Accounts Payable	9. Forecasting & Modeling
3. Accounts Receivable	10. Manufacturing
4. Budgetary Control	11. Personnel
5. Project Tracking	12. Fixed Assets (Available for delivery December 1984)
6. Payroll	
7. Order Processing	

borderless environment like INFORMATION QUICK.™ This new capability lets you use plain English commands for fast and easy retrieval of information and interactive online report writing. Make the most of realtime. Get INFORMATION QUICK. Ask your MSA representative for details.

MSA

The Software Company

Management Science America, Inc.
3445 Peachtree Road, NE, Atlanta, GA 30326

National Crime Prevention computer center set to open

By David Gross
CW Staff

WASHINGTON, D.C. — The National Crime Prevention Council is establishing a computerized system to help police departments, citizen groups and others seek information on crime prevention programs.

The council has enlisted the support of the U.S. Department of Justice, several private, nonprofit foundations and Digital Equipment Corp. in developing the Crime Prevention Center, which organizers say will be the first such program in the nation.

"This is absolutely a ground-breaking effort in the whole area of crime prevention," said Jean O'Neil, assistant program manager for the council. The system is scheduled to begin operating in July.

Made up of some 90 members representing local and state governments and law enforcement agencies . . . the council is probably the nation's largest repository of information about local crime prevention programs . . . It administers the [coalition's] campaign, which features a trench-coated dog named McGruff and the slogan, 'Take a Bite Out of Crime.'

Made up of some 90 members representing local and state governments, law enforcement agencies, organized labor, business and civic groups, the council is probably the nation's largest repository of information about local crime prevention programs, such as neighborhood watch, officials said. It administers the Crime Prevention Coalition's national campaign, which features a trench-coated dog named McGruff and the slogan, "Take a Bite Out of Crime."

The council has been receiving an increasing number of requests for information. "By utilizing current computer technology, the center will meet one of the most pressing needs in today's crime prevention field — the need for specific and detailed information on programs that work," said Assistant Attorney General Lois H. Herrington.

Up until now, O'Neil said, the council has relied on paper records and staff members' powers of recall to respond to requests for information. That procedure is slow and consumes too much staff time, she said.

With a computerized system, the council hopes to respond more quickly and accurately to requests for information about crime prevention programs. The data bases will be used to establish nationwide information about crime prevention programs, identify successful programs and help local groups contact promising projects in their region.

"The council is a very small organization, yet it has the potential to help a large number of people," O'Neil said. "Without these systems, we can't help these people."

Sometime in the future, she said, the data base may be made accessible through remote terminals and a dial-up communications network. An $8,600 grant from DEC was used to fund partially the purchase of DEC hardware and software. The council purchased two Decmate II business systems, including two 10M-byte Winchester disks; word processing software; an LQP02 letter-quality printer and an LP-100 dot matrix printer. The center also obtained Condor Computer Corp.'s Condor 3 data base management software.

Other private contributors to the program are the Edna McConnell Clark Foundation, the Florence V. Burden Foundation and the Hyde & Watson Foundation.

Labor department, union settle on six-month test period for robot

PITTSBURGH — A grievance filed with the Federal Labor Relations Authority was withdrawn recently after a federal agency here agreed to a union demand that it address the human side of automation.

The grievance was filed last July by Local 644 of the American Federation of Government Employees to protest the replacement of four nonunion, unskilled laboratory workers by a robot at the Labor Department's Mine Safety and Health Administration (MSHA) [CW, Nov. 28].

According to the president of the local, Richard Clougherty, the complaint charged the Labor Department with failing to inform the union that the robot would be installed and sought to secure the employment rights of the four workers, who, Clougherty claimed, had been reassigned busywork.

Bargaining table

After the complaint was filed, "management came to us," Clougherty said, and agreed to sit down at the bargaining table.

As a result, MSHA has agreed to a six-month test period for the robot, which is used to test dust samples from mines, a job that Clougherty called "dirty and terrible."

During the six-month test period, no employees will be affected.

Negotiating options

If a decision is made to keep the robot, management has agreed to negotiate with the union the future of any displaced workers.

Options include retraining and transferring workers to another government facility.

Clougherty is convinced the union won. "Our intent all along was to protect the rights of these workers, not to stop technology," he maintained.

A Balans® chair is ergonomically designed to let you sit naturally at a computer workstation. In fact, it has become one of the most popular workstation chairs in the country. It helps improve your posture and relieve other strain and pressure that normal sitting puts on your back and neck.

This specially designed Balans Original by Westnofa is a "Limited Edition" model. It features a black Norwegian wood frame and black, heavy-duty wool seat and leg supports. It is the only Balans Original available in a "high tech" look.

Where else would you expect to find a "Limited Edition" Balans Original than The Back Store.™

Choose from the "Limited Edition" Balans Original or other popular colors, each specially priced at $198 including shipping and handling charges to anywhere in the Continental USA.

☐ All Black, "Limited Edition" ☐ Natural frame, brown seat
☐ Natural frame, beige seat

☐ Enclosed is my check or M.O. for _____
☐ Please charge to my MasterCard or Visa

Account No. _____ Exp. Date _____

Name _____

Address _____

City _____ State _____ Zip _____

Signature _____

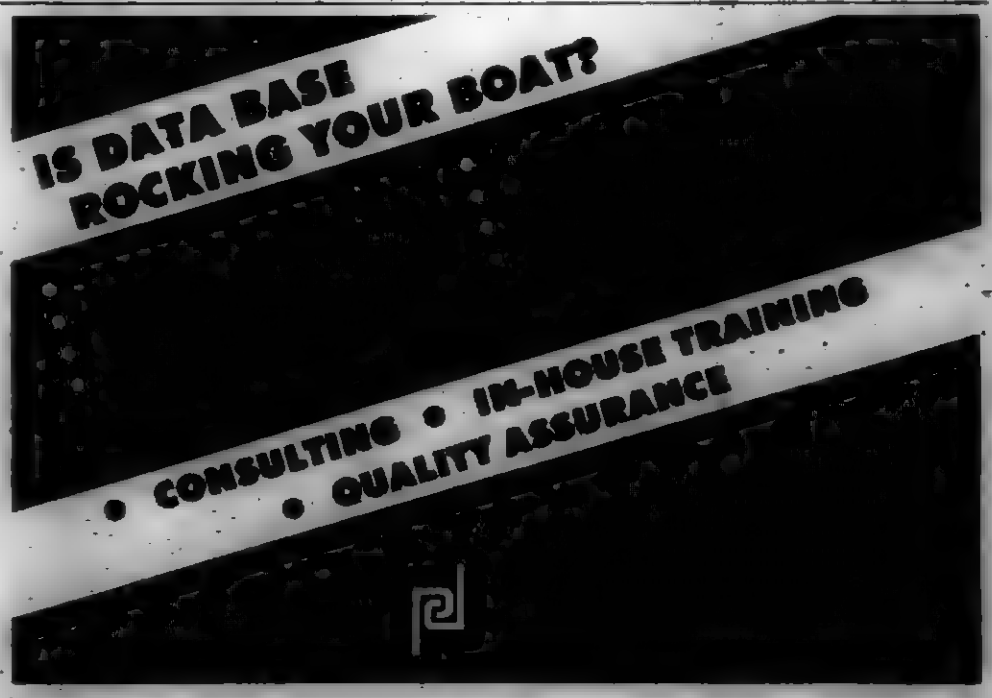
MA residents add 5% sales tax

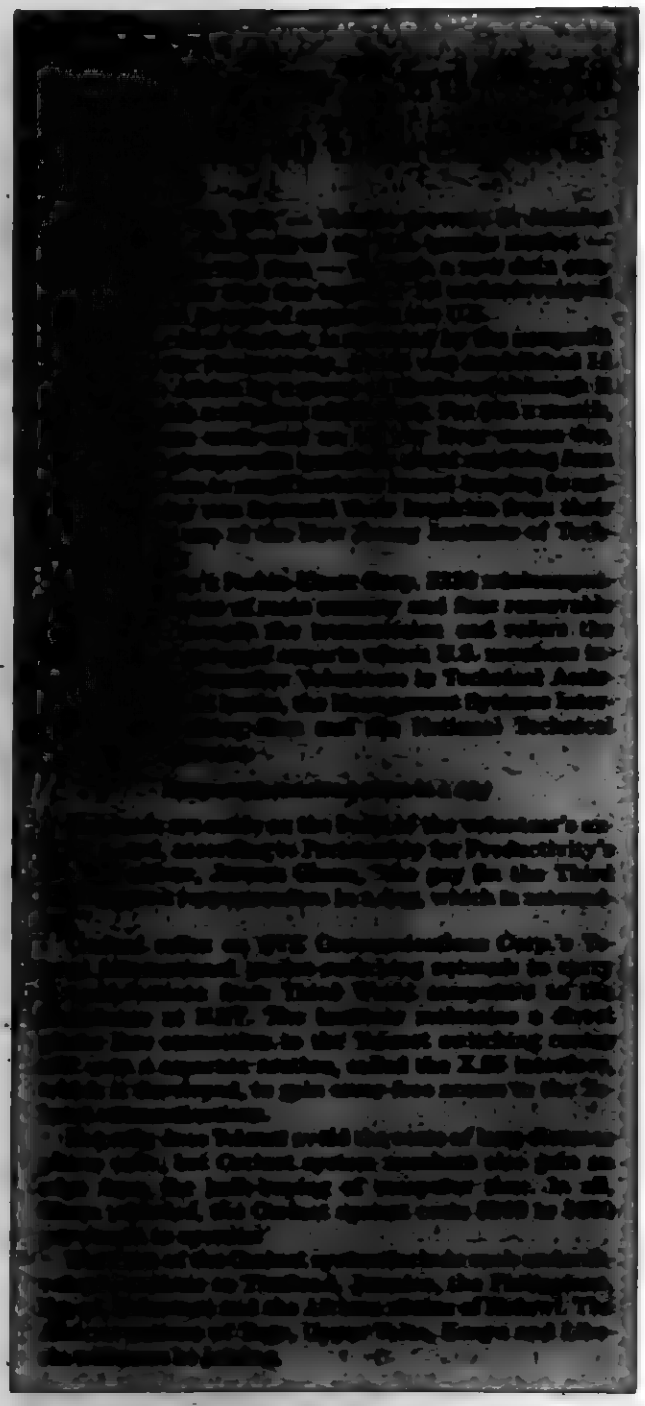
We make your back feel better.

THE BACK STORE™

33 Highland Ave, Needham, MA 02194 (617) 449-6100
© 1984—THE BACK STORE™ Needham, MA

CD





'Electronic Peace Corps' dream of Virginia author

By Edward Warner
CW Staff

If David Rothman's dream someday becomes reality, an engineer in a Third World nation could get his calculations for a hydroelectric dam checked by an expert in the U.S. — using a system that would transmit the data for about $1.

Rothman's dream is an adjunct to the U.S. Peace Corps that he calls the Electronic Peace Corps, which would link the computers of Third World nations to those of experts in the U.S. and provide referrals of Third World questions to expert volunteers in the U.S. The Electronic Peace Corps would rely on the advances taking place in international data transmission, especially packet-switching technology, but like the Peace Corps itself, its goal would be to promote Third World self-sufficiency.

Rothman, an Arlington, Va., author of computer books, said his plan for an Electronic Peace Corps arose from discussions on Third World communications with science fiction novelist Arthur C. Clarke, who is helping to organize a high-tech training center in Sri Lanka.

Rothman's ideas may not be so farfetched. Already, a 14-year-old international aid organization has begun operating a similar service, called Carinet, for 10 Third World nations, most of them in Africa (see related story).

Rothman, however, envisions the Electronic Peace Corps as a federally-funded effort, one that would give "the U.S. more bang for the buck on its foreign aid [spending]" by allowing Peace Corps workers and overseas representatives of the U.S. Agency for International Development (AID) to get accurate answers to local problems.

Using lap-size portable computers, those AID workers could link with U.S. computers to get market projections before farmers plant crops. They could also give a local doctor expert advice on a difficult case or help with the establishment of food distribution networks.

Peace Corps spokeswoman Mary Mead, however, questioned the widespread applicability of an Electronic Peace Corps in the Third World because "in a lot of those places, there isn't even electricity." But she added, "I don't mean to suggest that it's a bad idea," pointing out that the agency has taken no official position on the proposal.

Rothman, though, claimed that the elite of Third World nations — the people with whom U.S. experts would work — have access to telephones and, hence, international communications. The big need in the Third World, he said, is for small computers and, more importantly,

The Electronic Peace Corps would rely on the advances taking place in international data transmission . . . to promote Third World self-sufficiency.

the installation of packet-switching equipment, which dramatically reduces the cost of data transmission to rates as low as $1 per 1,000 words.

Right now, "the problem is the phone bill. Telex can be awfully expensive, too. And the mail takes forever," Rothman said.

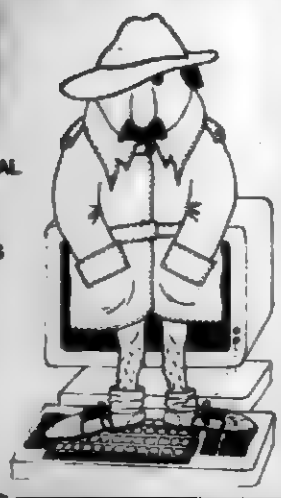
As a result, he continued the doctors, engineers and planners in the Third World are reluctant to take their problem cases to the experts in the U.S. That's too bad, Rothman said, because there are many experts in the U.S. who have already shown an interest in lending their knowledge toward solving Third World problems. A nonprofit group called Volunteers in Technical Assistance has, with AID funding, gathered a group of 5,000 volunteers who offer advice on everything from communications to soap making.

A good place for the U.S. to try out an Electronic Peace Corps, Rothman said, would be Sri Lanka, where, he estimated, introduction of packet switching would cost between $20,000 and $25,000. That, he added, is roughly the price of paying and providing for two Peace Corps workers annually.

Naren Chitty, a counselor at the Sri Lankan embassy in Washington, D.C., agreed. "We applaud the concept," he said. "We don't see any electronic imperialism in it."

Chitty said he felt political considerations would not be an issue, at least for Sri Lanka, because "technology is potentially neutral." He said an Electronic Peace Corps would greatly help the educated members of his nation's work force become involved with high technology.

ANNOUNCING
FLASHER



★ ENHANCES OUTPUT RETRIEVAL USING SPF/ISPF
★ MENU SELECTION TO VIEW, DELETE, AND REQUEUE JOBS ON JES SPOOL
★ USES SPF/ISPF BROWSE DIRECTLY AGAINST JOBS IN JES SPOOL
★ 10 - 20 TIMES FASTER RETRIEVAL THAN SPF 3.0
★ WORKS WITH HELD OR NON - HELD DATASETS
★ ALLOWS DISPLAY OF SYSLOG
★ IBM MVS OR MVS/XA WITH JES2 OR JES3
★ FULLY SUPPORTED

SPECIAL PRICES IN EFFECT
FREE 30 DAY TRIAL
JES 2 FPL $2500.
12 MONTH LEASE $99/MO
JES 3 FPL $5500.
12 MONTH LEASE $199/MO

TONE
SoftwareCorp.
1735 S. Brookhurst (714) 991-4460
Anaheim, CA 92804 Telex 181592

Need general accounting software for IBM System/38?

We've simply solved your problem.

LAWSON ASSOCIATES has solved it with the first general accounting software specifically designed for IBM System/38. Not merely compatible, but state-of-the-art to fully utilize your computer's capabilities. Compare. You won't find a total software solution like it anywhere else.

DESIGN FEATURES: They include: on line systems using data base management; menu driven, user friendly programs written in RPGIII, the System/38 language; and integrated modules. Their benefits: ease of installation and use, plus maximum employee productivity.

INTEGRATED MODULES: Those available include: General Ledger and Report Writer/Accounts Payable/Accounts Receivable/Fixed Assets/Payroll/Personnel/Purchase Order/Order Entry/Inventory Control

SERVICE FEATURES: Fully documented and supported. Onsite training and implementation. One year warranty. Available now for immediate installation.

For more information, please call or write:
Lawson Associates, 2021 East Hennepin Ave., Minneapolis, MN 55413
(612) 379-2633

LAWSON ASSOCIATES
WE SIMPLY SOLVE PROBLEMS

IBM and DEC Merger Announced

Term-Tronics Creates With the Power to Join

In the beginning the Computer Universe was a lonely place. There was IBM and only IBM. Then others entered the field, major competitors such as DEC. Today, each of these Computer Age Titans commands an impressive following.

But because no one has a monopoly on desirability, there arose a knowledgeable user population which sought the best of both worlds. To serve this astute and growing audience, Term-Tronics was born.

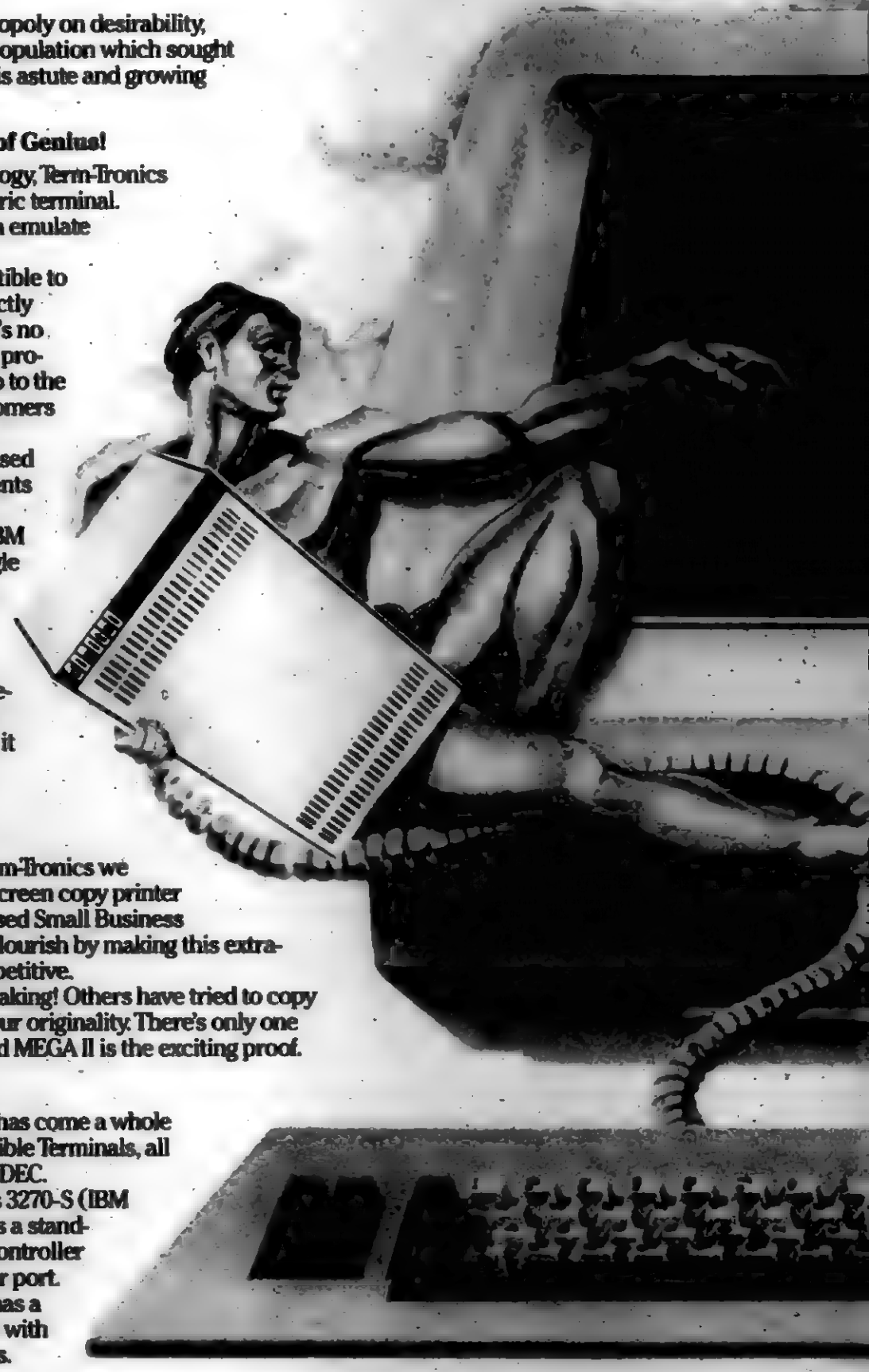
Multi-Host Capability -- a Stroke of Genius!

Utilizing breakthrough technology, Term-Tronics created MEGA II, the first truly generic terminal. With a single keystroke, the unit can emulate IBM or DEC.

MEGA II is coaxial plug-compatible to IBM 3278* and 3178* and plugs directly into IBM's 3274* controller. So there's no longer a need to be concerned with protocol incompatibilities. That adds up to the kind of peace of mind that has customers walking on clouds.

What's more, MEGA II can be used in either local or remote environments with SNA or BSC communications.

Incredibly, MEGA II emulates IBM 3278 Models 2 through 5 with a single keystroke. The multi-host MEGA II is DEC VT-100* compatible. It also can emulate other asynchronous terminals simply by loading new emulations into the terminal via telephone, and all in 10 minutes or less! Another heavenly advantage is that it requires no additional equipment.



Putting the Finishing Touches on the Masterpiece

But we didn't stop there. At Term-Tronics we went on to add support for a local screen copy printer and an RS232C port for a CP/M® based Small Business Computer. Then we finished with a flourish by making this extraordinary unit remarkably cost competitive.

The results have been earth-shaking! Others have tried to copy our achievements but they lacked our originality. There's only one Master of Data Communications and MEGA II is the exciting proof.

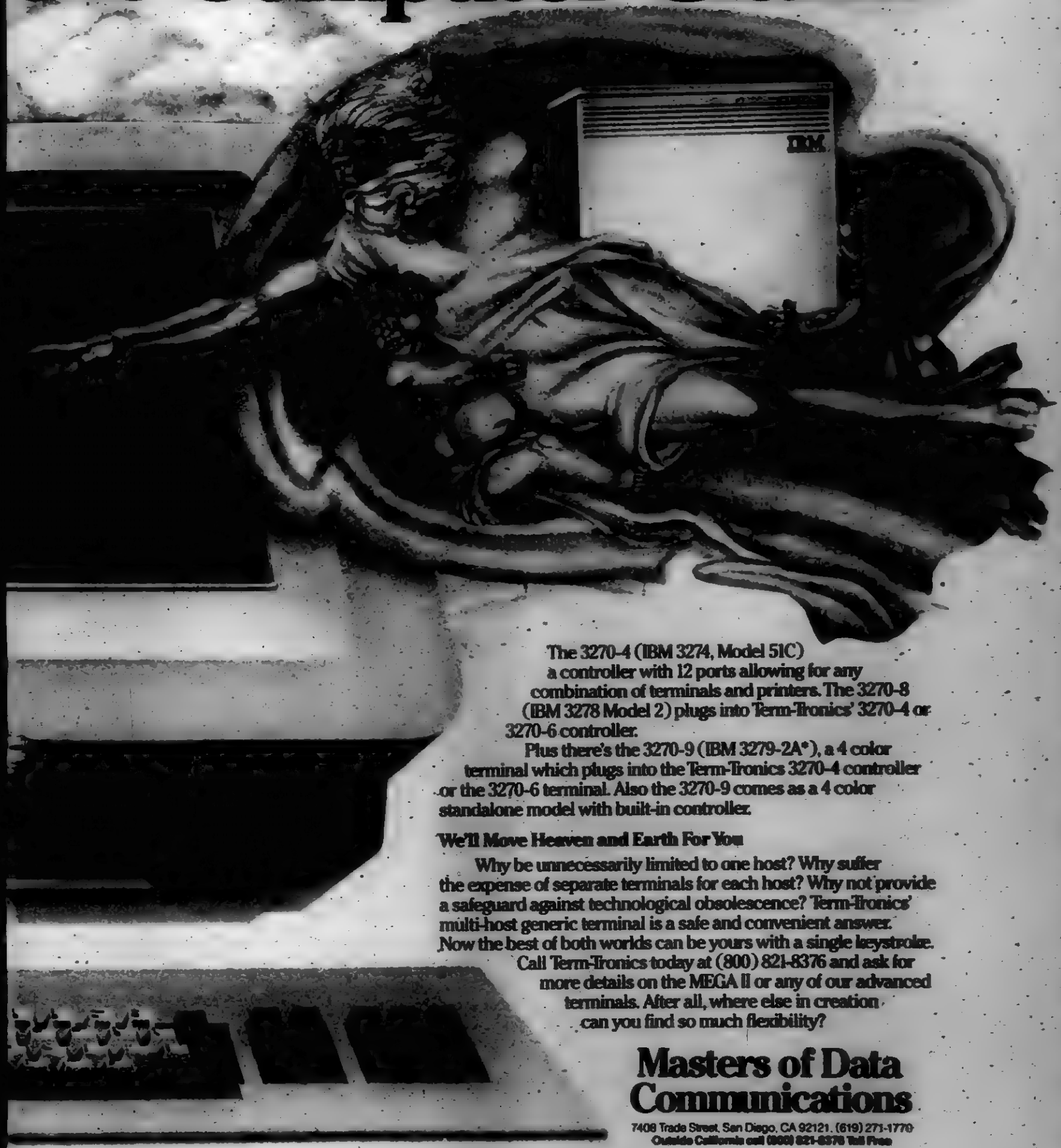
The Golden Age of Terminals

From the same creative minds has come a whole series of remote BSC mode Compatible Terminals, all of which can be upgraded to talk to DEC.

These include the Term-Tronics 3270-S (IBM 3275* or 3276* compatible) which is a stand-alone terminal featuring a built-in controller and a separately addressable printer port. The 3270-6 (IBM 3276) which also has a built-in controller and can interface with 3 additional terminals and 4 printers.

Term-Tronics

a Multi-Host Terminal the Computer Giants.



The 3270-4 (IBM 3274, Model 51C) a controller with 12 ports allowing for any combination of terminals and printers. The 3270-8 (IBM 3278 Model 2) plugs into Term-Tronics' 3270-4 or 3270-6 controller.

Plus there's the 3270-9 (IBM 3279-2A*), a 4 color terminal which plugs into the Term-Tronics 3270-4 controller or the 3270-6 terminal. Also the 3270-9 comes as a 4 color standalone model with built-in controller.

We'll Move Heaven and Earth For You

Why be unnecessarily limited to one host? Why suffer the expense of separate terminals for each host? Why not provide a safeguard against technological obsolescence? Term-Tronics' multi-host generic terminal is a safe and convenient answer. Now the best of both worlds can be yours with a single keystroke.

Call Term-Tronics today at (800) 821-8376 and ask for more details on the MEGA II or any of our advanced terminals. After all, where else in creation can you find so much flexibility?

Masters of Data Communications

7408 Trade Street, San Diego, CA 92121. (619) 271-1770
Outside California call (800) 821-8376 Toll Free

Incorporated

*Subject to trademark claims

NEWS

Yes, SAS can handle large production applications

By Fred [illegible]
CW Staff

HOLLYWOOD BEACH, Fla. — Can large-scale production applications be built using SAS Institute, Inc.'s line of SAS software products? The answer to that question is a resounding "yes," according to Judith H. Mopsik, program director at CRI, Inc. in Bethesda, Md.

Mopsik

Speaking to a large crowd at the SAS Users' Group International (Sugi '84) meeting here recently, Mopsik told how a team of seven programmers working part time built a 50,000-line application for the Bureau of Labor Statistics almost entirely in SAS. The application is an important part of the statistics used to compute the Consumer Price Index, she said.

The application took a total of two years to create, but coding, testing, integration and transition into production took only 12 months, Mopsik said.

The application is modular, maintainable and easy to modify, with changes appearing transparent to the user, she added. It includes built-in test and verification procedures, including a routine that analyzes log statements and prints out those procedures that are consuming the most CPU time. It also has facilities to produce custom reports and transaction files to update the data base, she noted.

The application was developed with heavy dependence on the system development life cycle approach, Mopsik said. SAS was used in nearly every phase of development, including requirements analysis, the writing of system specifications, systems design, program design and coding, prototyping, unit testing, system testing and documentation.

In the analysis phase, SAS was used to produce sample frequencies and statistics to present to users. "We can show users we understand what they want, and they gain confidence in us," Mopsik said.

SAS was used regularly in structured design and analysis to create process descriptions that were eventually translated into SAS procedures and data sets. "Data flow elements were later used as variables throughout the system design," Mopsik said. "Users can review the variables, and the data flow diagrams can translate easily into a systems design. We could take the data steps and the procedural steps and match them to the functional specifications."

The system had to be modular to ease updates and maintenance. Although many users do not believe SAS lends itself to modularity, Mopsik noted that "routines like subroutine calls and pass parameters can be done using the macro facility.

"Once you begin to understand the macro facility, you can begin to do many things you thought could only be done in traditional programming languages," she said.

As part of the procedure of translating systems design to programming specifications, the group formulated programming conventions. For example, a macro command was always preceded by two underscores and an array by one underscore. Every DO . . . END statement was also required to contain a comment field.

"I don't want to take anybody's creativity away, but we have to realize that this is a volatile industry, and we have to have some standards," Mopsik said. "It's better to spend your time solving the problem."

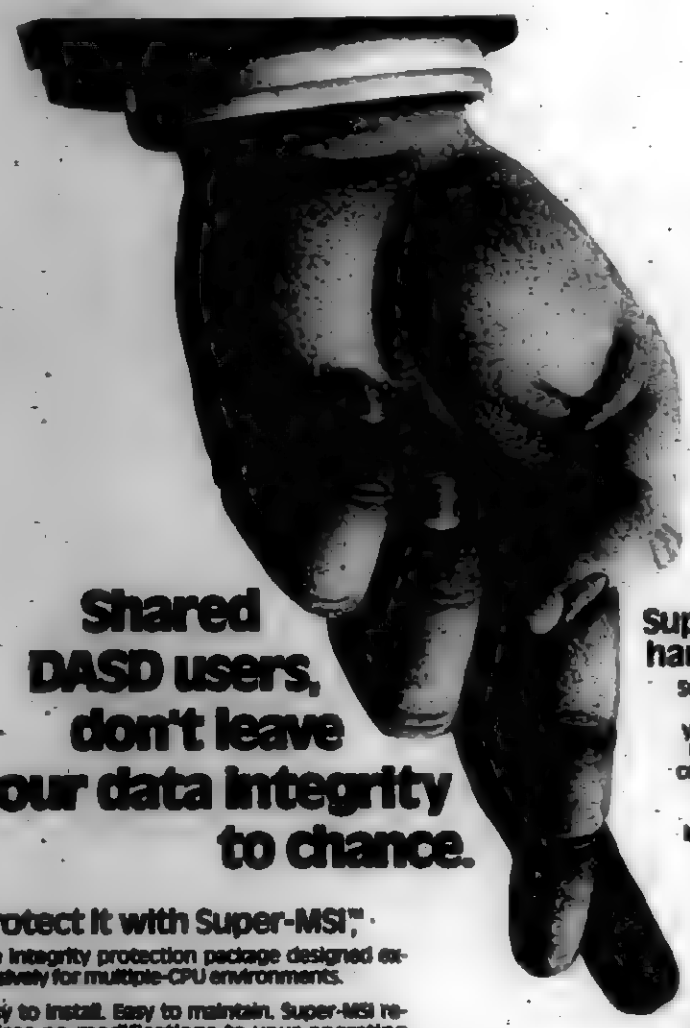
Program flowcharts were created with extensive use of structured walk-throughs and peer review to avoid duplication of coding effort. The fact that a detailed system design already existed enabled the senior programmer/analysts to turn the routine programming over to junior staff.

The group then began prototyping and benchmarking to identify potential weaknesses in the system. "An SAS prototype can be tested and coded quickly," Mopsik remarked. She said the software's "Proc" statements provide good facilities to produce interim reports and screens. "You can also easily create new variable structures because these aren't embedded in SAS."

The staff also used the "Proc" statement frequently in unit testing by embedding it in programs and conditionally printing both before and after testing. Test reports and subset selections were printed for user signoff during the test period. "As soon as you're ready to go into production, you can just go in with a text editor and delete the test prints," she said.

System testing was made easier by use of the "Proc" statements, which allowed users to verify sample reports and statistics before the code was put into production.

If the system development life cycle method is followed carefully throughout design and coding, documentation is a breeze, Mopsik commented. "You have system design and flowcharts, you automatically have usage instructions for system-level macros, and you have SAS coding conventions," she noted.



Shared DASD users, don't leave your data integrity to chance.

Protect it with Super-MSI™,
the integrity protection package designed exclusively for multiple-CPU environments.

Easy to install. Easy to maintain. Super-MSI requires no modifications to your operating system and can be implemented in an active system in as little as ten minutes—assuring complete data integrity from the moment it is installed.

Super-MSI guarantees data integrity.

No complicated job scheduling. No elaborate control schemes. No software changes. Super-MSI spans inter-system activity to give "unified system" integrity to your entire multi-system complex.

Super-MSI preserves integrity under MVS, MVS-SE, MVS-SP, SVS, MVT, VS1 and MFT systems.

Super-MSI prevents data destruction.

Inadvertent modification, simultaneous access . . . Super-MSI stops the damaging data abuses that multiply in a multi-systems environment. Prevents the errors that can so easily occur—and too often go undetected—when users operate in a multi-systems complex.

Super-MSI eliminates hardware RESERVEs.

Super-MSI completely protects your data integrity and frees your systems of RESERVEs and RESERVE lock-outs. Super-MSI converts selective RESERVEs to logical controls that securely protect your data without inhibiting system throughput.

Super-MSI does more.

As part of the CGA family of single-image software for multiple-CPU sites, Super-MSI works together with MSM®, our Multiple Systems Manager which manages tape and disk storage devices and GCD®, our Global Console Director which consolidates consoles, cutting costs and streamlining operations. The result is a unified single system image that is transparent, flexible and powerful. Use them together or in any combination. CGA's multiple systems software is a must for large users.

More than 1,000 CGA single-image software packages are in use around the world, preserving data integrity and helping multiple-CPU sites hum like they're supposed to. Call today. Set up a free trial of Super-MSI, GCD or MSM.

Speak software. Talk to CGA.

800-237-2057

cga

CGA Software Products Group
960 Holmdel Road
Holmdel, NJ 07733

CALENDAR

WEEK OF APRIL 15

APRIL 20, NEW YORK — Advanced PC-DOS 3.0. Contact: Center for Advanced Data Processing, Inc., Suite 402, 450 Seventh Ave., New York, N.Y. 10123.

WEEK OF APRIL 22

APRIL 23, CHICAGO — Making the Transition from SPSS to SPSS-X. Contact: SPSS, Inc., 444 N. Michigan Ave., Chicago, Ill. 60611.

APRIL 23, NEW YORK — Introduction to the IBM PC. Contact: Center for Data Processing, Inc., Suite 402, 450 Seventh Ave., New York, N.Y. 10123.

APRIL 23, NEW YORK — Word Processing with Wordstar. Contact: Center for Advanced Data Processing, Inc., Suite 402, 450 Seventh Ave., New York, N.Y. 10123.

APRIL 23-25, NEW YORK — The Micro-Mainframe Connection. Contact: Technology Transfer Institute, 741 10th St., Santa Monica, Calif. 90402.

APRIL 23-25, BOSTON — DOS/VSE Internals, Debugging and Problems. Contact: Goal Systems International, Inc., 5455 N. High St., Columbus, Ohio 43214.

APRIL 23-25, BOSTON — SNA. Contact: Technology Transfer Institute, 741 10th St., Santa Monica, Calif. 90402.

APRIL 23-25, PHILADELPHIA — Data Analysis. Contact: QED Information Sciences, Inc., QED Plaza, P.O. Box 181, Wellesley, Mass. 02181.

APRIL 23-25, BOSTON — Implementation of Data Base Systems. Contact: Technology Transfer Institute, 741 10th St., Santa Monica, Calif. 90402.

APRIL 23-25, ATLANTA — Communications Workshop. Contact: Advanced Technology Systems, Inc., 302 Research Drive, Norcross, Ga. 30092.

APRIL 23-26, WASHINGTON, D.C. — Software Quality Assurance: A Management Systems Approach. Contact: The George Washington University, Washington, D.C. 20052.

APRIL 23-27, LOS ANGELES — Advanced Systems Analysis. Contact: Association for Systems Management, 24587 Bagley Road, Cleveland, Ohio 44138.

APRIL 23-27, NEW YORK — CICS Internal Architecture. Contact: Syscd, One Park Ave., New York, N.Y. 10016.

APRIL 23-27, BALTIMORE — Structured Cobol. Contact: Advanced Technology Systems, Inc., 302 Research Drive, Norcross, Ga. 30092.

APRIL 23-27, LOS ANGELES — Structured Design and Structured Programming. Contact: Infosci, Inc., Box 7117, Menlo Park, Calif. 94026. Also being held April 30-May 4 in Washington, D.C.

APRIL 23-27, PHILADELPHIA — Auditing in the Contemporary Computer Environment. Contact: EDP Auditors Foundation, 373 S. Schmale Road, Carol Stream, Ill. 60187.

APRIL 23-27, ANAHEIM, CALIF. — Structured Analysis and Design Workshop. Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036. Also being held April 23-27 in Boston and Louisville, Ky.

APRIL 23-27, WASHINGTON, D.C. — Unix for the DP Professional. Contact: Webco Industries, Inc., P.O. Box 15505, 3513 Washington Ave., Alexandria, Va. 22309.

APRIL 23-27, WASHINGTON, D.C. — Structured Design Workshop. Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

APRIL 23-27, OAKBROOK, CALIF. — DBS Systems Management. Contact: Institute for Software Engineering, 510 Oakmead Pkwy., Sunnyvale, Calif. 94086.

APRIL 23-27, KANSAS CITY, MO. — Structured Program Design/Maintenance. Contact: Georganna Carson, Ken Orr and Associates, Inc., 1725 Gage Blvd., Topeka, Kan. 66604.

APRIL 23-27, HOUSTON — Structured Analysis and Design Techniques. Contact: Learmonth & Burchett Management Systems, Inc., Suite 405, 2900 N. Loop W., Houston, Texas 77092.

APRIL 23-27, ATLANTA — Systems Workshop II. Contact: Ware Associates, 38 Main St., Hudson, Mass. 01749.

APRIL 23-27, TORONTO — Systems Analysis. Contact: QED Information Sciences, Inc., QED Plaza, P.O. Box 181, Wellesley, Mass. 02181.

APRIL 23-27, NEW YORK — Structured Programming Workshop. Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

APRIL 23-27, BOSTON — CICS Command Level. Contact: QED Information Sciences, Inc., QED Plaza, P.O. Box 181, Wellesley, Mass. 02181.

APRIL 24, BOSTON — Computer Basics for Non-computer People. Contact: The American Center, P.O. Box 21179, Sarasota, Fla. 33583. Also being held April 25 in Providence, R.I.

APRIL 24, NEW YORK — Spreadsheets Using Lotus 1-2-3. Contact: Center for Advanced Data Processing, Inc., Suite 402, 450 Seventh Ave., New York, N.Y. 10123. Also being held April 25 in New York.

APRIL 24, CHICAGO — Report Writing With SPSS-X. Contact: SPSS, Inc., 444 N. Michigan Ave., Chicago, Ill. 60611.

APRIL 24, NEW YORK — Advanced Wordstar (Spellstar and Mail/Merge). Contact: Center for Advanced Data Processing, Inc., Suite 402, 450 Seventh Ave., New York, N.Y. 10123.

APRIL 24-25, NEW YORK — Comped Career Conference for Data Processing Professionals. Contact: Comped Technical Corp., Inc., 10 E. 21st St., New York, N.Y. 10010.

APRIL 24-25, SAN FRANCISCO — Personal Computers/Software. Contact: The Yankee Group, 89 Broad St., Boston, Mass. 02110.

APRIL 24-25, NEW YORK — International Communications Products, Technology and Regulation. Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

APRIL 24-25, WASHINGTON, D.C. — The Second Telecommunications Pricing Institute: After Divestiture. Contact: Executive Enterprises, Inc., 33 W. 60th St., New York, N.Y. 10023.

APRIL 24-25, BOSTON — DP Documentation. Contact: QED Information Sciences, Inc., QED Plaza, P.O. Box 181, Wellesley, Mass. 02181.

APRIL 24-26, BERKELEY, CALIF. — Microprocessor Background for Management Personnel. Contact: Public Information Office, University Extension, University of California Berkeley, 2223 Fulton St., Berkeley, Calif. 94720.

APRIL 24-26, BOSTON — Data Communications Concepts. Contact: Suzane Gallart, Memorex Customer Education, M/S 03-16, 3393 Octavius Drive, Santa Clara, Calif. 95051.

APRIL 24-26, PHILADELPHIA — Screen Design. Contact: QED Information Sciences, Inc., QED Plaza, P.O. Box 181, Wellesley, Mass. 02181.

APRIL 24-26, TEANECK, N.J. — Data Communications Concepts. Contact: QED Information Sciences, Inc., QED Plaza, P.O. Box 181, Wellesley, Mass. 02181.

APRIL 24-27, WASHINGTON, D.C. — National Data Base and the Fourth-Generation Language Symposium. Contact: Digital Consulting Associates, 330 Salem St., Wakefield, Mass. 01880.

APRIL 24-27, WASHINGTON, D.C. — Hands-On Unix Workshop. Contact: Integrated Computer Systems, P.O. Box 45405, 6305 Arizona Place, Los Angeles, Calif. 90045.

APRIL 24-27, TOKYO — Computer Graphics Tokyo 1984. Contact: Executive Travel, MSP, Inc., Suite 22, 1801 E. 79th St., Bloomington, Minn. 55420.

APRIL 24-27, WASHINGTON, D.C. — Hands-On Microprocessor Workshop. Contact: Integrated Computer Systems, P.O. Box 45405, 6305 Arizona Place, Los Angeles, Calif. 90045.

APRIL 24-27, WASHINGTON, D.C. — Microprocessor Software, Hardware and Interfacing. Contact: Integrated Computer Systems, P.O. Box 45405, 6305 Arizona Place, Los Angeles, Calif. 90045.

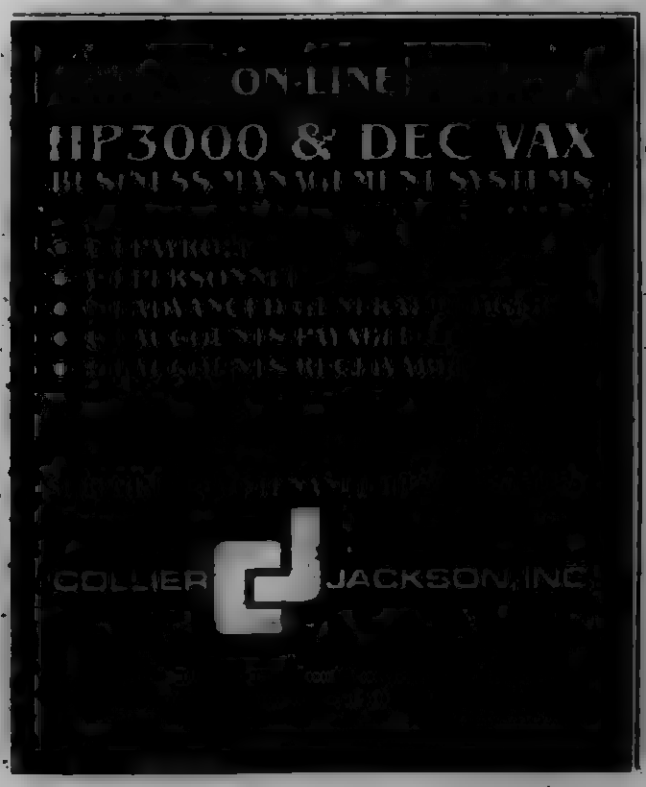
APRIL 25, WELLESLEY, MASS. — Computer Crime Detection and Prevention. Contact: Dr. Sanford Sherizen, Data Security Systems, Inc., 5 Keane Terrace, Natick, Mass. 01760.

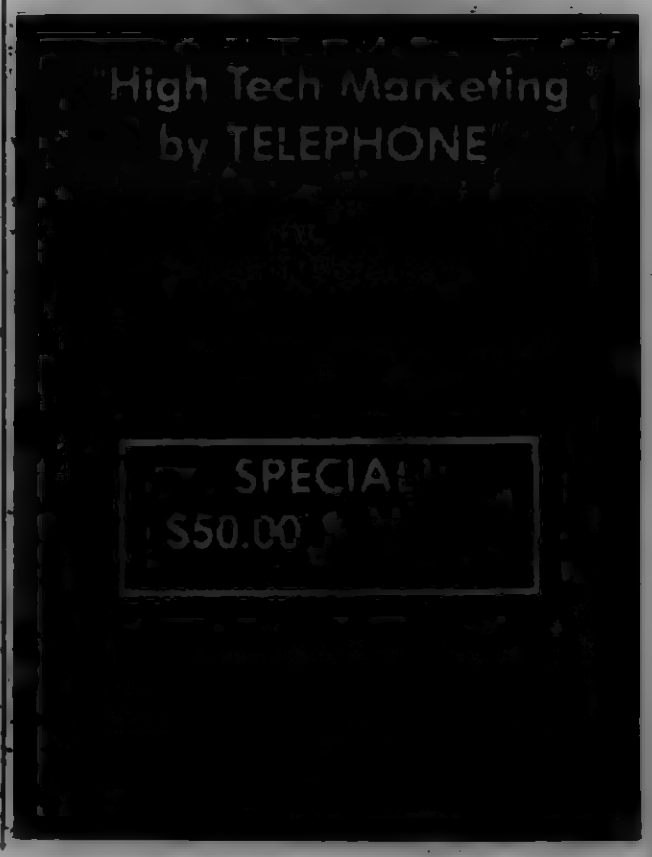
APRIL 25, NEW YORK — Introduction to Dbase II. Contact: Center for Advanced Data Processing, Inc., Suite 402, 450 Seventh Ave., New York, N.Y. 10123.

APRIL 25-26, CHICAGO — Financial Analysis for Telecommunications Equipment Acquisition. Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

APRIL 26-27, PHILADELPHIA — Data Base Design. Contact: QED Information Sciences, Inc., QED Plaza, P.O. Box 181, Wellesley, Mass. 02181.

APRIL 27, NEW YORK — PC Communications. Contact: Center for Advanced Professional Education, Suite 110, 1820 E. Garry St., Santa Ana, Calif. 92705.





EDITORIAL

AT&T move leaves questions

AT&T may have answered some questions on Wall Street with its announcement last week of a range of processing and communications products. But the presentation did little to answer the big question: Does the telecommunications giant have the capabilities to become a major player in the data processing equipment market?

In some respects, the unveiling of AT&T's products was impressive. In other respects, however, it left many doubts that AT&T, with one wing free of the shackles of government regulation, can duplicate IBM's dynamic technological and marketing strides.

Not surprisingly, AT&T's lineup seems to offer the most potential in the area of communications. The offering of its Unix V operating system on each product level, from the low-end to the high-end, provides possibilities for efficient and less expensive uploading and downloading among various products. Similarly, the reported ability to interface Microsoft, Inc. MS-DOS-based microcomputers to the AT&T 3B2/300 supermicro — and, one would assume, to other AT&T products down the road — must be attractive to decision makers who have invested capital in the IBM Personal Computer and look-alikes.

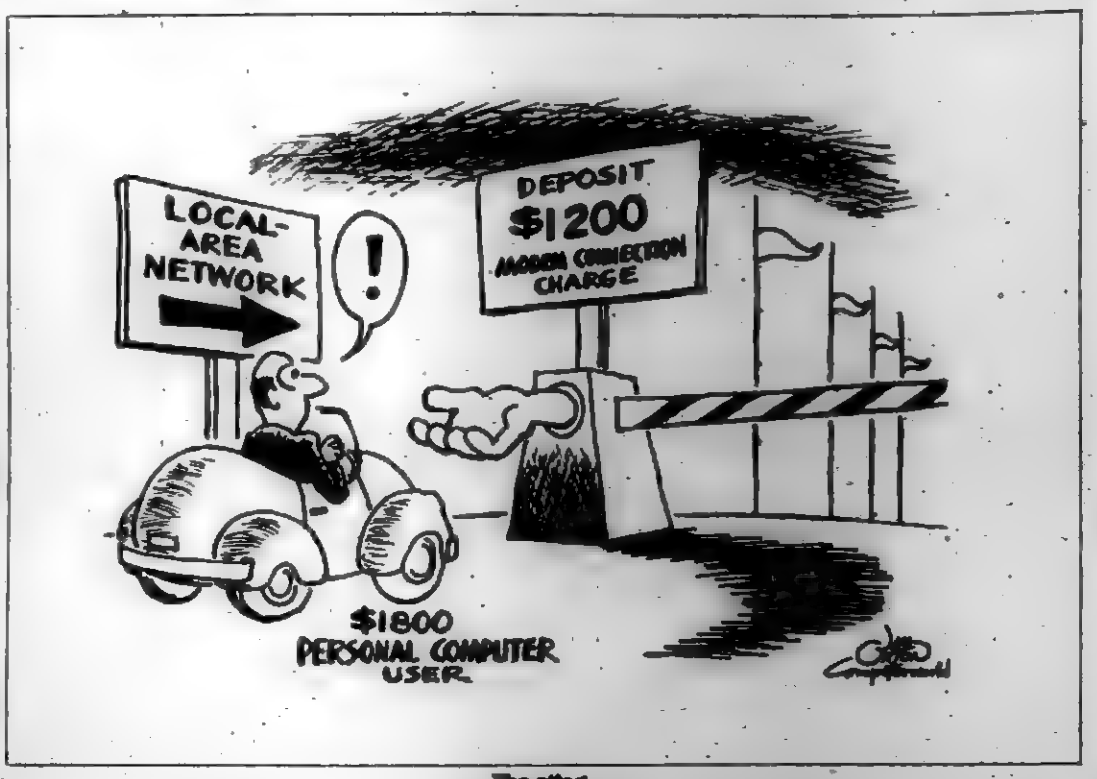
On the other hand, the DP world is probably going to be quite underwhelmed by AT&T's offerings in the supermini arena. There is little that appears to be technologically new, or even slightly advanced, among AT&T's superminis. It's questionable whether the world needs another imitator of Digital Equipment Corp., which itself is expected momentarily to announce a new high-end product.

Then there is the question of a viable line of mainframe products. Will AT&T enter this still very crucial equipment area, or has it instead drawn a line over which it will not step? To compete effectively against IBM, there are those who believe AT&T has to enter the mainframe market and complete its product hierarchy.

Another area of concern is that AT&T appears to have opted in great measure for the value-added remarketer route to bring its superminis to the market, for the time being, anyway. That's fine for addressing vertical markets, but it hardly has an immediate impact on the general-purpose computing market. This route ignores the question of whether AT&T can actually compete with IBM's renowned marketing forces on DP turf.

AT&T's 3B2/300 supermicro is an attractive product and stirs interest in future micro offerings. But it's just a matter of time before a flood of multiuser, supermicro/mini offerings appears from many vendors.

It almost seems that AT&T's strategy is one of depending on the acceptance of Unix to drive acceptance of AT&T hardware. Given the extent of interest in Unix at the present time, that may be a good strategy, but it would also seem to be a strategy with some risks — unless AT&T comes up with a potent hardware strategy or networking breakthrough to carry Unix to further heights.



The sting

LETTERS

Yes, Cbema may be biased, but it's in support of open trade

I agree with Charles P. Lecht's comments in his article "U.S. computer industry: 1984" (CW, Jan. 9) that reducing electronics trade with Japan would have severe and negative consequences for both the consumer and technological advances. Unfortunately, he identifies the Computer and Business Equipment Manufacturers Association (Cbema) as being in favor of trade restrictions.

Nothing could be further from the truth. Our long record of support for "free trade" measures stands as our clear defense. We may, as Lecht charges, be "biased," but it's in support of open trade, including imports of goods from Japanese companies, many of whose subsidiaries are our members. We're certainly not opposed.

Vico E. Henriques
President
Cbema
Washington, D.C.

Understanding all the hoopla surrounding CRT-related hazards

Having been in data processing for many years and utilizing CRTs for many hours at a time, I never paid very much attention to the hoopla about CRT-related hazards and ill effects. I had never had any problems. Of course, when I think of it now, I never spent more than a few hours at each sitting.

Recently, my partner and I were developing a computer-based training course for a client. We started spending eight to 15 hours straight, inputting and testing the course. After just a few days of this rigorous schedule, we began experiencing backaches and eyestrain.

Now I pay attention to all the articles on VDT use.

Kathy Tolkan
Educational consultant
Educational Horizons, Inc.
Dallas, Texas

COMPUTERWORLD

Editor
John C. Wildmarch

Executive Editor
Rita Shoor

Managing Editor
Bill Laberis

Assistant Managing Editor
Cheryl M. Gallo

Senior Editors:
Software
Paul Gillin
Communications
John Dix
Phil Hirsch
Systems
Tom Henkel
Industry
Peter Bartalo
Features
George Harrar

Design Editor
Marjorie Magowan

International Editor
Susan Blakeney

Associate Features Editor
Barbara Van Scoyoc

Assistant Features Editor
Elizabeth Morse

Special Reports Editor
Donovan White

Staff Writers:
James Connolly
John Gallant
Lynn Haber
Patricia Keefe
Paul Korzeniowski
David Olmos
Edward Warner

Correspondents:
New York
David Myers
Suite 7G
401 East 80th St.
New York, N.Y. 10021
212/570-2135
Washington, D.C.
Bureau Chief: Jake Kirchner
Correspondent: Bryan Wilkins
445 National Press Building
529 14th St., N.W.
Washington, D.C. 20045
202/347-6718

West Coast
Bureau Chief: Jeffry Beeler
Correspondent: Robert Batt
1020 Marsh Rd.
Menlo Park, Calif. 94025
415/328-8084

Chief Copy Editor
Kathie Gow

Assistant Chief Copy Editor
Charlotte Ziems

Copy Editors:
Becky Bakshe
Dave Bradford
Bruce Caine
Deborah Fickling
Deborah Scadutto-Hjm
Thomas Schmidt

Assistant to the Editor
June Fedig

Editorial Assistants:
Lorraine Brion
Mary DeChristofaro

Joyce Fiala
Contributing Editor
Education
J. Daniel Couger
Human Communication
Jack Stone
Technical Topics
Larry Long
Telecommunications
Thomas Madron
The Data Center
John P. Murray
Leader on Science
Charles P. Lecht
Special Publications
Computerworld Extra!
George Harrar, Editor
Computerworld on Campus
Bruce Heard, Editor
Computerworld On
Ann Dooley, Editor
Computerworld Buyer's Guide
Marcia Stankevitch, Editor

Main Editorial Office: Box 880, 375 Cochituate Road, Framingham, MA 01701, 617/879-0700

Computerworld is a member of the CW Communications/inc. group, the world's largest publisher of computer-related information. The group publishes 92 computer publications in 19 major countries. Nine million people read one or more of the group's publications each month. Members of the group include: Argentina's Computerworld/Argentina; Australia's Australian Computerworld, Australian Micro Computerworld, Australian PC World and Directions; Brazil's Datashow and Microbrasil; China's China Computerworld; Denmark's Computerworld Danmark and Microbrasil; Finland's Mikro; France's Le Monde Informatique, Golden (Apple) and OPC (IBM); Germany's Computerwoche, Microcomputerwelt, PC Welt, Software Markt, CW Editor/Developer, Computer Business and Commodore Magazine; Italy's Computerworld Italia; Japan's Computerworld Japan and Pasoo Committee; Mexico's Computerworld Mexico and CompuMundo; Netherland's Computerworld Benelux and Microbits; Norway's Computerworld Norge and MikroData; Saudi Arabia's Saudi Computerworld; Singapore's The Asian Computerworld; Spain's Computerworld Espana and Mundo Electronico; Sweden's Computersweden, Mikro Datorn and Min Hemdator; the UK's Computer Management and Computer Business Europe; the U.S.' Computerworld, Hot CoCo, InCider, Inside80, J., MacWorld, MICRO MARKETWORLD, Microcomputing, PC World, PCJr. World, Run, 73 Magazine and SunWorld.

VIEWPOINT

'The Federation': Year Two

LIGHT
ON SCIENCE
Charles P. Lecht

"Call me a techno-romantic, a sci-fi nut, but I found myself thinking that, by Jupiter, there I was attending the first meeting of 'The Federation' as it would be instantly recognized by 'trekkies' everywhere" — " 'The Federation': Year One" (CW, Sept. 19).

It wasn't easy to get to Salishan Lodge in Gleneden, Ore., on Monday, March 12. For one thing, airplane traffic throughout the country was disrupted by wintry storms. Devil-may-care comments from fatalistic passengers on the final approach to Portland, Ore., betrayed the strain of those who flew across America to get there; overemotional reunions with luggage confirmed it. In comparison, the subsequent drive of some hundred miles along a blustery coastline at night to reach Salishan seemed an anticlimactic, almost ethereal, experience.

You get the idea: One really had to love science to justify going to the Oregonian winter hinterlands to join a hundred-plus blustery American and foreign scientists attending a conference titled "Experiences in Applying Parallel Processors to Scientific Computation" — everyone there did.

Organized by two of our nation's leading scientific research centers, Los Alamos National Laboratory (LANL) and Lawrence Livermore National Laboratories (LLNL), both under the U.S. Department of Energy, the conference was opened by Bill Buzbee of LANL, who exercised flawless leadership in corralling its attendees into the hall before 8 a.m. for Tuesday's opener (Buzbee's a Ph.D. mathematician/scientist from Rising Star, Texas, where corrallin' comes more naturally than talkin').

Buzbee was helped by George Michael of LLNL, whose spirited enthusiasm for supercomputer happenings derives from long and wizened experience in their development and usage.

These supercomputer superstars and their colleagues deserve our praise and admiration for the diligent and serious (but definitely not humorless) manner they exhibited in attending to the conference agenda: No one sloughed off.

The conference's attendees included scientists representing such prestigious government organizations as Sandia, the National Aeronautics and Space Administration and the U.S. Ballistic Research Laboratory; premiere high-technology companies such as IBM, Cray Research, Inc., Control Data Corp., Microelectronics Computer Co., Intel Corp., Goodyear Research, Fairchild Camera & Instrument Corp., Denelcor, Star and Elexi; universities like the University of Oregon, New York University, the University of California, University of Illinois, Stanford University, Cornell University and University of Michigan; and foreign organizations such as Fujitsu Ltd., Nippon Electric Corp., the European Center for Medium Range Forecasts and so on. Even the White House and *Scientific American* were represented.

Megaflopsniks, megalipsniks

The conference provided an opportunity for our supercomputer scientists, whom I call megaflopsniks and megalipsniks, to share their experiences in making and using the most powerful scientific calculating and decision-making devices known to man. (A megaflops is a million floating point operations per second; a megalips is a million logical inferences per second.) Newly emerging systems are producing gigaflops and gigalips (a billion floating point operations per second and a billion logical inferences per second, respectively) speeds, although no one has reached 10 billion yet, and almost all now operate in the mega range.

You might naturally wonder why in the world anyone would need to do, say, 10 billion operations per second — that's roughly equivalent to the rate we would achieve if all the people on Earth operated desk calculators at 2½ calculations per second (floating point, to boot).

Since some calculations on even 10 gigaflops machines may take hours, for example, in computing meteorological forecasts, the idea of the entire world's population thusly consumed to achieve the same results only begins to suggest the magnitude of computation in just one system to which we aspire. Many are required to solve the scores of problems facing our megaflopsniks and megalipsniks as they apply their skills in fields like meteorology, genetics, nuclear, space, robotics, you name it, all problems of very practical consequence to us all. Let's face it: Massive problems require powerful computers for their solutions and powerful brains of the human variety, too.

While there was no shortage of the latter at Salishan Lodge, the very fact of our convening was in itself testimony to a serious shortage in computer systems powerful enough to carry out the vital computations we must perform to handle the problems facing our scientists. The conference explored how to get more power from our largest scientific research systems, such as Cray Research's Cray X-MP, by creating networked clusters of these to work on a single problem by attacking its constituent parts in parallel to obtain results faster and/or otherwise unobtainable by a single processor.

Concept of granularity

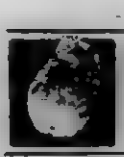
To help provide us with the impression that we can begin to understand why so many computations must be performed in finding the solutions to the problems addressed by these scientists, I offer the concept of granularity as it relates to perception in our physical world. The supercomputer is, thus, not unlike our vision-aiding micro/telescope in bringing the otherwise unseeable into focus. The finer the granularity of the lens, the more effective our instruments become. And the finer we subdivide their spatial targets, learning all we can about each subdivision, the more we know of the whole.

So may we conceptually apply granularity in our supercomputer world. For better focus of our "supertool's" powers in piercing the unknown, we subdivide its problem-space into grids of ever-diminishing unit size to learn all we can about each. Overriding in our motivation to do this is our quest for temporal stability and completeness of formulas — both essential to obtaining results in any experiment. Unfortunately, subdividing a space into ever-smaller units and computing the same amount of data for each creates exponentially growing and, ultimately, massive volumes of data.

The formulas being dealt with frequently address problems in which almost infinitesimal changes in time may bring about the need for the formulas' massiest reconstitutions. The degree to which these mathematical equations can remain stable over time — in application to a particular physical situation — brings tremendous returns in almost all aspects of problem solving: speed, easier mathematics and so on. This kind of "divide to

See VIEW page 34

Eulogy for a defunct systems firm



HUMAN
CONNECTION
Jack Stone

The following ran several days in *The Washington Post* classified pages under "Auctions": "To satisfy the creditors of the bankrupt Balance Computers organization, an auction will be held to sell off its assets . . . including a wide range of personal computers, software and accessories."

Pupil: Why didn't Balance make it? On appearances, at least, it had everything going its way, offering a variety of personal systems at the retail level plus what was reputed to be fairly decent staff support. Although it had some branch offices, it seemed to be expanding in a sensible way.

Master: In analyzing business failures, you must always remember that the real reasons may be those far afield from what you might think, reasons such as personality clashes, reneges by investors, criminality and so on, none of which we are aware of in this case.

But if history is any guide, we can presume that the classic retailing problem developed at Balance, wherein the cost of sales greatly exceeded projected product and service revenues, whereupon cash flow problems developed, and creditors pressured the company into liquidation.

Pupil: Then why doesn't IBM have difficulties in its retail operations? Everybody knows it has enormous overhead, especially very well-paid staffs in both its development and marketing facilities. Doesn't it have the same kind of problems?

Master: Ah, you have fallen into the trap of drawing conclusions on surface appearances and not delving into all the available facts. Indeed, IBM advertises at the retail level, and, of course, IBM operates its own product centers. But because of IBM's policy shifts for the Personal Computer product line — divulging technology secrets to software developers and selling its machines to other retailers at a discount — it should be more properly characterized as a hardware wholesaler than as a retailer.

As a first consequence, its costs of software development are relatively small compared with manufacturers who have built their own in-house staffs. In fact, IBM's staff does very little original Personal Computer software development; instead, it functions primarily as a software systems tester who selects, validates and assures standards conformity of the best software products around.

As a second consequence, and perhaps even more important, the bulk of the Personal Computer marketing costs is borne by the independent retailers who service the public, which I define to be home users and small business customers. You must also appreciate that the vast majority of the sales of IBM Personal Computers are made by IBM salesmen in their traditional marketplace: large organizations, such as the Fortune 5,000, educational institutions and government agencies, who typically buy in large, sometimes extravagant, quantities. In conclusion, IBM's overall cost of sales of IBM Personal Computers are made by IBM retail sales price is fairly low when compared with the independent retailer who services accounts that buy in small quantities.

In other words, when measured in terms of profitability, the major market for Personal Computers at the current time and in the near term is in the large organizations, where it has traditionally been for the computer industry.

In contrast, retailing computers — or any product for that matter — to the public results in a much narrower profit margin. Therefore, a national firm with an established business base and many branch offices that offers a broad range of products probably has the best chance of success in this marketplace, although there is always room for newcomers with a better retailing idea and the wherewithal to follow through with it. Obviously, Balance management thought it had such an idea, but the business didn't work out the way they planned it.

VIEWPOINT

TWO from page 33

conquer" approach to providing, say, the forces at any point in time, at any location in a medium caused by explosive, aerodynamic, mutative growth and other such change presents us with the need for massive memories to contain the data for deeply subdivided media and, of course, massively powerful processing equipment to handle it.

By cleverly organizing the mathematical equations and decision-making processes that relate to the proper solution of these equations so that parts may be worked on by one or more uniprocessors in parallel (that is, simultaneously), it has been found that for just about all classes of problems, computations so executed provide us with resultant power that is greater than that represented by the simple addition of the individual powers of the parallel processor's constituent parts.

On the surface, this presents us with the paradox of the whole being greater than the sum of its parts; organization, of course, makes the difference. Employing parallelism in doing anything gets it done faster.

Yet another type of organization is of importance, too. There seems to be power multiplying relationships between the physical form of these electrical/metallurgical/chemical devices and the manner and form of the mathematical expression of the problems they are to solve.

It is easy to relate arrays of processors to matrices perhaps, but what about polynomial equations that are worked on by clusters of processors whose physical organization literally portrays an embodiment of the topological forms of such equations, as if these were being written in a new, weird script by giants from whose pens flow equations in media composed of transistors, capacitors, circuits, boards, steel and cable.

This is the first in a three-part series.

Leckt is chairman of Leckt Sciences, Inc., a New York-based think tank specializing in computer and communications technologies.

The $95,000 coupon.

Mail this and save $95,000 on your next Plug-Compatible Business System.

It's true.

What our new USX44 gives you for $267,000, you'd have to pay $362,000 for from IBM.

This includes hardware, operating software and installation (within 30 days). You get additional virtual storage and separation of on-line, batch and test workloads. All with the insurance of a fail-soft system.

How do we do it? By having the USX44's duplex processor CPU's custom-built exclusively for us, while its Disk, Tape and Printer components are all made by Storage Technology Corporation. Which happens to be our parent company.

And because we're a single-source-supplier, you always have just one single number to call for hardware maintenance and software support: The Global-Ultimacc 24-hour/7-day Hot Line.

What's the bottom line? When you're about to outgrow your present system, you can either spend a lot more money than you have to, or you can talk to us.

We're making some claim here: More power for less money. Can you afford not to call us on it?

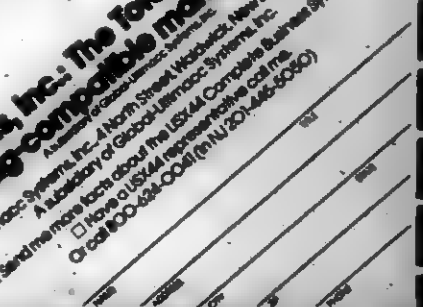
Our number is 800-624-0041. In NJ, call 201-445-5050.

Ultimacc Systems, Inc.: The Total System supplier for the plug-compatible marketplace.

A division of Global-Ultimacc Systems, Inc.
A subsidiary of Global-Ultimacc Systems, Inc.

TO: Ultimacc Systems, Inc., 4 North Street, Waldwick, New Jersey 07463
A subsidiary of Global-Ultimacc Systems, Inc.

☐ Send me more facts about the USX44 Complete Business System.
☐ Have a USX44 representative call me.
Or call 800-624-0041 (in NJ 201-445-5050)



LETTER

What about those who didn't comment?

While reading Ken Moyer's In Depth article, "A report from Vienna: Which way Cobol?" [CW, March 12], I was stirred to action by the comments attributed to Jerry Garfunkel, noted lecturer and educator on Cobol and other languages.

Garfunkel wants us to believe that since 100,000 people didn't oppose the draft standard, that they must agree. Perhaps he would also have us believe that since 100,000 drunk drivers didn't have accidents, drinking and driving are a good mix.

I'm also struck by the thought that a draft standard that gets just slightly more than 6% of comments in favor should be on very shaky ground. What about the 100,000 who didn't submit comments? I didn't submit any comments. I've been involved with Cobol as a user for most of Cobol's life, starting with the 1401 implementation of the language and its two-hour or longer compiles. I served a few years on Codasyl on what was then called the "Programming Language Committee." At the time that Ansi-74 was out for comments, I wrote most of the comments submitted by Burroughs Corp. Like most other comments, they were ignored.

Of the 100,000, many didn't think comments would be taken seriously; most are unaware of the contents of the draft standard; and very few would know where to send comments. Now that's a breeding ground for apathy..

I firmly believe in the necessity of growth and progress for the continued life of Cobol. Without such progress, we'd still have "PICTORIAL" and "IF condition AND ALSO IF condition . . ." Unfortunately, Ansi "standards" have included untried syntax and semantics and omitted some excellent language concepts because Codasyl wears blinders.

The 100,000 did not vote "yes" any more than the seven abstentions in the article voted "no."

Chris Coddington
Sandy, Utah

UNIX. An ideal has been realized.

Some say UNIX is the operating system of the future. We say, why wait till then? Because you can get it right now on a full range of HP computer systems.

Yes. It's running on our MC68000-based machines and our powerful 32-bit systems, so you can pick the right computer for the job.

And since our HP-UX operating system is an enhanced version of the industry-standard UNIX operating system, you can take advantage of the growing array of applications software available. You can also use the extra features of HP-UX, such as graphics and networking.

The UNIX operating system is only one of the high-powered operating systems we offer. And we put our full service organization behind all of them. We're ready to answer questions and to work with both end users and OEMs to find the best solution for any particular application.

There's never been a better time. Let HP help bring your computing ideal to reality. Sound interesting? Call your local HP sales office right now about the UNIX operating system. Or write to Hewlett-Packard, Attn. Pat Welch, Dept. 003194, 19447 Pruneridge Ave., Cupertino, CA 95014. In Europe, contact Henk van Lammeren, Hewlett-Packard, Nederlands B.V., Dept.003194, P.O. Box 529, 1180 AM Amstelveen, The Netherlands.

Productivity. Not promises.

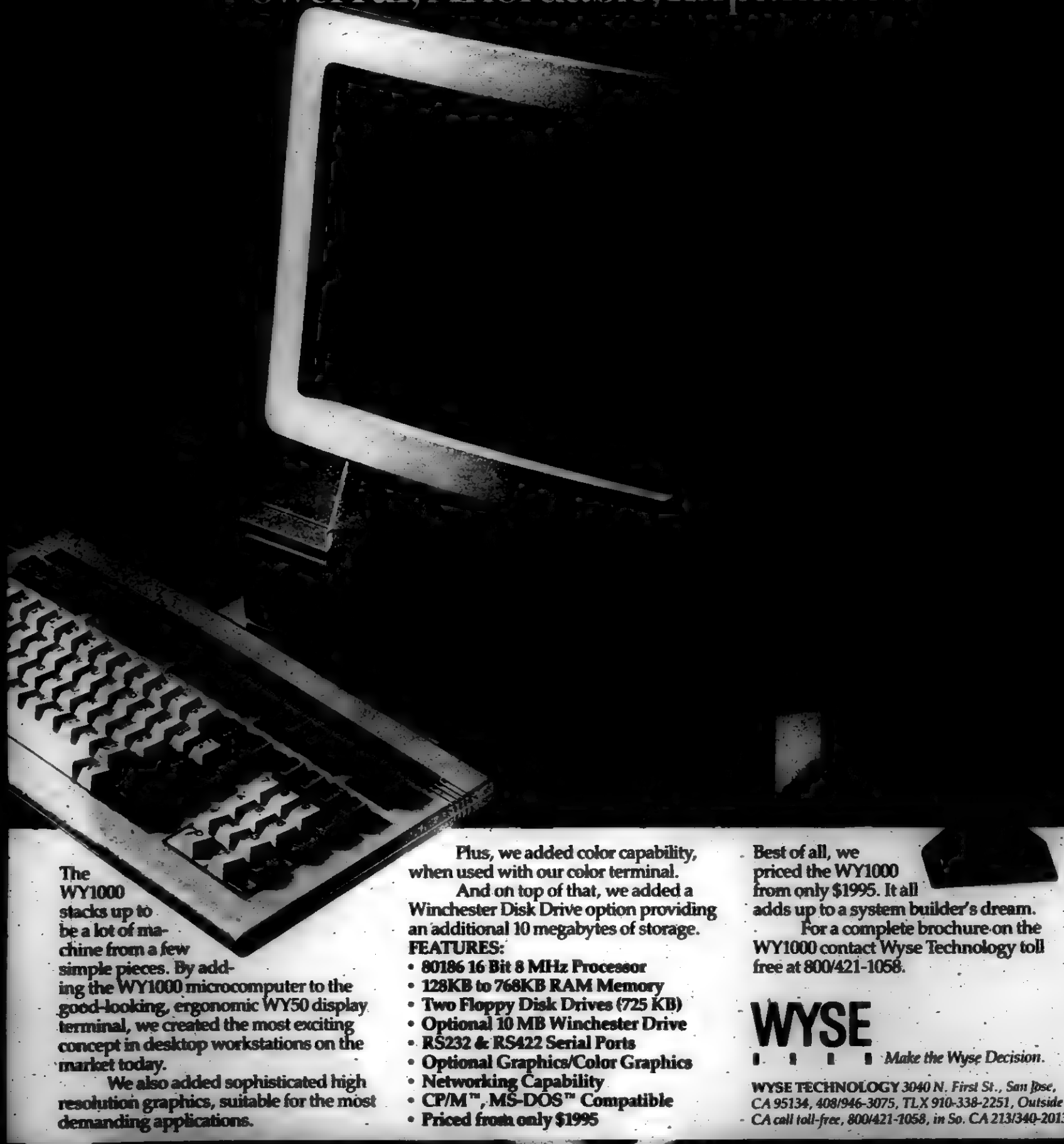
HEWLETT PACKARD

UNIX is a trademark of AT&T Bell Laboratories.

The New WY1000 Microcomputer

BUILDING BLOCKS

Powerful, Affordable, Expandable



The WY1000 stacks up to be a lot of machine from a few simple pieces. By adding the WY1000 microcomputer to the good-looking, ergonomic WY50 display terminal, we created the most exciting concept in desktop workstations on the market today.

We also added sophisticated high resolution graphics, suitable for the most demanding applications.

Plus, we added color capability, when used with our color terminal.

And on top of that, we added a Winchester Disk Drive option providing an additional 10 megabytes of storage.

FEATURES:

- **80186 16 Bit 8 MHz Processor**
- **128KB to 768KB RAM Memory**
- **Two Floppy Disk Drives (725 KB)**
- **Optional 10 MB Winchester Drive**
- **RS232 & RS422 Serial Ports**
- **Optional Graphics/Color Graphics**
- **Networking Capability**
- **CP/M™, MS-DOS™ Compatible**
- **Priced from only $1995**

Best of all, we priced the WY1000 from only $1995. It all adds up to a system builder's dream.

For a complete brochure on the WY1000 contact Wyse Technology toll free at 800/421-1058.

WYSE

Make the Wyse Decision.

WYSE TECHNOLOGY *3040 N. First St., San Jose, CA 95134, 408/946-3075, TLX 910-338-2251, Outside CA call toll-free, 800/421-1058, in So. CA 213/340-2013.*

SOFTWARE & SERVICES

Firm tries SAS/OR in R&D conversion project

FIRST USER

By Paul Gillin
CW Staff

HOLLYWOOD BEACH, Fla. — A company that relies heavily on research and development for its competitive edge cannot afford to waste time on projects that may take years to turn a profit.

With that in mind, Ciba-Geigy Corp. recently undertook a project to convert its 10-year-old, Fortran-based R&D planning model running in batch to something that was interactive, easier to modify and maintain and able to produce more flexible output.

In so doing, the company became the first user of SAS Institute, Inc.'s SAS/Operations Research (SAS/OR), a product that uses linear programming and Critical Path Method procedures to schedule activities that make up a project life cycle. Ciba-Geigy already employed most of the SAS product line, and SAS/OR seemed ideal for the application, according to Patricia Hermes of the operations research department in management services.

Interviewed here last week during the SAS Users Group International (Sugi '84) meeting, Hermes said she is using SAS/OR to build a model that will use Critical Path Method to model life cycles and project their profitability. The project won't be completed until later this year, but Hermes said initial indications are that development will proceed smoothly.

The application will be used by a small

See SAS/OR page 48

■ Perfectionist persistence pays off for one SAS user/46

■ Tandem Computers, Inc. and MIS Information Systems, Inc. join forces to market software for Non Stop processors/46

■ Info Tech's DSS team debuts at SAS Users Group International Conference/48

INSIDE

Systems Software/46
Productivity Aids/46
Application Packages/46
Training/51

Avatar TC3278 gets micro-to-mainframe link ability

HOPKINTON, Mass. — Avatar Technologies, Inc. has enhanced its TC3278 Terminal Converter to provide microcomputer-to-mainframe link capabilities.

The additional software reportedly gives the TC3278 micro-mainframe file transfer capabilities in IBM CMS, TSO and CICS environments using DOS/MV, OS/MVS or VM/370 operating systems. IBM files are accessible to all TC3278 units as a shared data base, providing users with shared data resources through the existing IBM 3270 terminal network without the installation of a local-area network.

The TC3278, which connects coaxially between the terminal and the IBM 3274/76 cluster controller, offers both a nonintrusive line mode, allowing direct connection to the host, and a local mode for file transfer, personal computing and software terminal connection to the host. Connected to the cluster controller, the TC3278 is compatible with IBM Binary Synchronous Communications and Systems Network Architecture/Synchronous Data Link Control environments.

Included are Basic; Microsoft, Inc.'s MS-DOS; Digital Research, Inc.'s CP/M; Micropro International Corp.'s Wordstar; Sorcim Corp.'s Supercalc; and other utilities, the vendor said.

Prices for the file transfer software are a one-time charge of $500 for the IBM host environment and $200 for software for each TC3278 from Avatar, 99 South St., Hopkinton, Mass. 01748.

Steps to take in designing a subject data base

OUTLINE
William H. Inmon

In this second part of a two-part series, William Inmon discusses special steps that must be taken in designing a subject data base for a decision support environment.

Although availability and performance are worthwhile objectives in the decision-support environment, they are not the issues that they are in the operational environment. Instead, the issues in the decision support environment are the consistency of data, the applicability of data and the refinement and replacement of data.

The consistency of data in the subject data base environment becomes an issue because it is common to extract data from subject data bases, refine and analyze the data and then combine the data with other data bases. Then the data may be extracted again, reanalyzed and so forth. After two or three generations of extraction and analysis, the relation of the data to the subject data base begins to be clouded.

This ambiguity can be minimized by extracting data only from the subject data base. Second- and third-generation (and thereafter) extractions are not allowed. They must be directly derived from the subject data base.

Data applicability

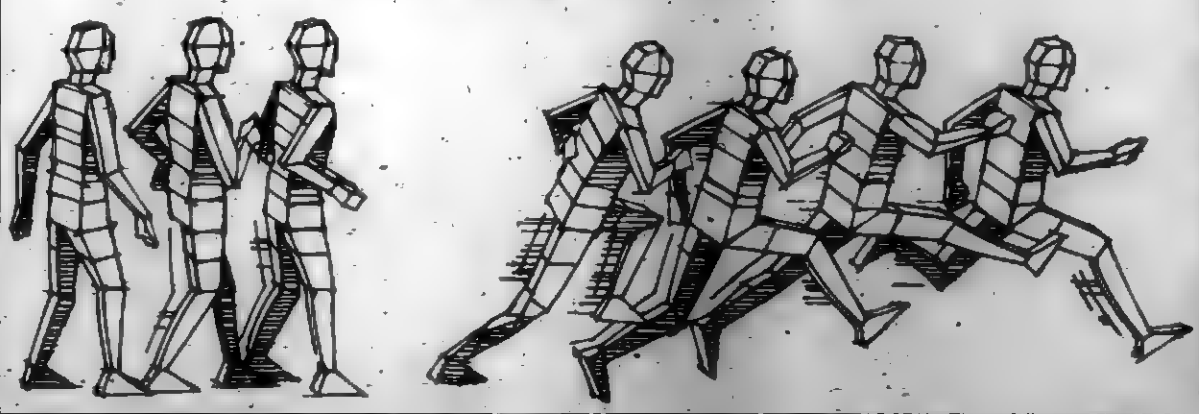
Data applicability within subject data bases occurs when a subject data base exists, but is unable to be related to other subject data bases or to be used for more than limited purposes.

As an example, an accounts subject data base exists, but is unable to be

See DATA page 51

MVS/VS1 Users

Improve Response Time!



PMO
Reduces disk busy, channel busy and CPU utilization to dramatically improve response time and system turnaround!

Quick-Fetch
Gain virtual storage constraint relief and improve response time automatically!

Duquesne Systems, Inc.
2 Allegheny Ctr., Pittsburgh, PA 15212
Call our Marketing Department:
1-800-323-2600
Inside PA: 412-323-2600

SAS User Feedback Award winner takes activist stance

HOLLYWOOD BEACH, Fla. — Valued user or nitpicker? H. Mark Bercov says he is both. A senior systems analyst at Gulf Canada, Ltd. in Calgary, Alberta, Bercov has probably called SAS Institute, Inc. 100 times in the last year to suggest enhancements or to ask questions about SAS products. Such persistence earned him the SAS User Feedback Award presented recently at the SAS Users Group International (Sugi '84) conference held here recently.

Bercov is responsible for SAS support for the DP department and about 200 users at Gulf Canada. He also codes SAS programs primarily in the engineering and planning section of the department. Bercov's activity as a SAS user emerged in part from a disagreement with company policy. The company uses a variety of software productivity products including SAS; Inseo, Inc.'s Tell-a-graf and Disspla; and Information Builders, Inc.'s Focus product.

"I think we're making a mistake because we're asking users and developers to learn several protocols and conventions," he said. "I think the company should standardize on one product, and my choice is SAS."

As reasons, he cited SAS's "moderately good" graphics and data storage capabilities and "very good" data manipulation and full screen features. He added that SAS is also "relatively bug free, and that's very important to the end user."

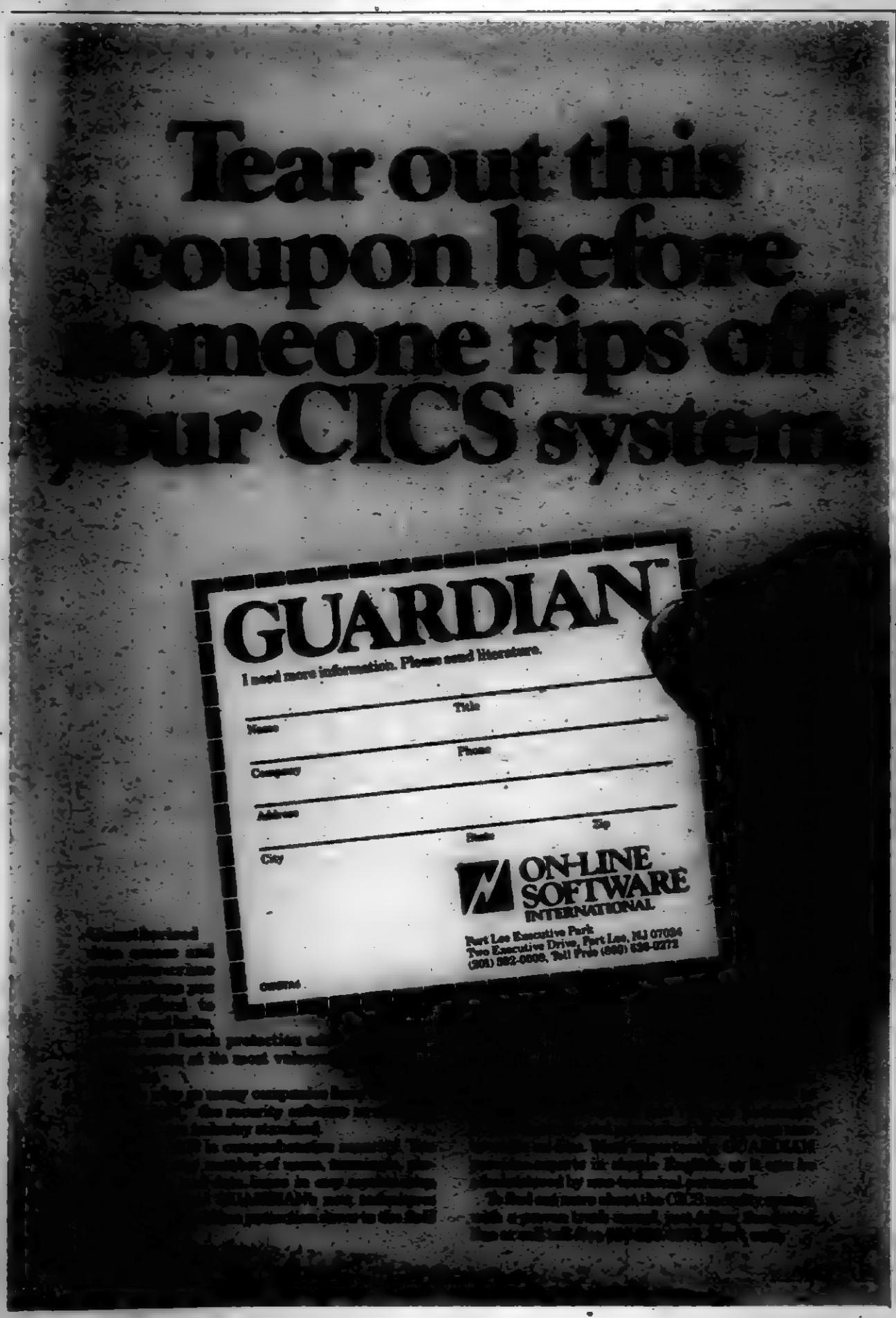
In light of his faith in the product, Bercov commented that "we as users have a responsibility to attempt to communicate what we want done with the product and where it's weak." In that capacity, he acts as a funnel for suggestions from users to the institute. Among the suggestions he submitted in the past year were a request for multiple graphs on a page in SAS/Graph and procedures for saving macro facilities before log off. "I use my judgment, of course," Bercov noted. "Some users have asked for a full inverted list data base in SAS. In general, I don't ask for things that are ridiculous."

'Stubborn perfectionist'

However, Bercov does characterize himself as "a nitpicker, a stubborn perfectionist." In previous jobs, he has been equally active in voicing complaints and suggestions to vendors. Some vendors, like Honeywell, Inc., have been receptive to his comments, while others, like Digital Equipment Corp., have been less responsive. SAS, he said, accepts his frequent calls with a good-natured protest. He added that SAS has implemented more of his suggestions than any other vendor.

But Bercov admitted that he is unusual in his activism. "People responsible for other products in the shop don't feel the same way I do," he said. He wishes more users were as vocal. "You have to have the guts to write a letter or telephone the company," he said. "I'm quite confident they'll receive suggestions very well."

Bercov pointed out that a user can't expect to make enlightened recommendations all the time. "I make a bunch of dumb suggestions, but that doesn't upset me," he said. Asked if he ever worried about becoming a nuisance, he responded, "I don't worry about being a pain. That's SAS' problem, not mine."



©Sperry Corporation, 1982

A sure cure for the problem of information bottleneck.

Programming backlog is the source of the problem. Eliminate it, and you eliminate the bottleneck.

Which is precisely what Sperry has done with the MAPPER™ System.

With MAPPER, you work with the computer directly. You ask questions in plain English. And you get immediate answers.

And if the information you get raises other questions, you can ask them right away. With no delay for programming. Or reprogramming.

MAPPER is that powerful. It allows you to manipulate information in almost any way you want. And, interesting to note, it can even help your programmers become more productive.

AN AFFORDABLE SYSTEM.

You don't have to be a large company to have a MAPPER System. MAPPER can be scaled to the real and present needs of just about any size company. The cost of a MAPPER System makes it practical for even a department within a company to own its own system. Or you can time-share through a Sperry service bureau.

What you get for your money is a whole new order of efficiency in your day-to-day management tasks. Because you'll have the information you need right at your fingertips. Literally.

SEEING IS BELIEVING.

We've made some promises here that may sound extravagant. But if anything, our claims are on the conservative side. And to prove it, we offer you the opportunity to see a demonstration of MAPPER at work.

800-547-8362

But first, you might want to look over our MAPPER brochure. A copy is yours for the asking. Call toll-Free: 800-547-8362 (9 a.m. to 5 p.m. E.S.T.). Or send us the coupon.

MAPPER SYSTEM

Sperry Corporation
Computer Systems
Department 100
P.O. Box 500
Blue Bell, PA 19424

Please send me a brochure on the MAPPER System.

Name_____

Title_____

Company_____

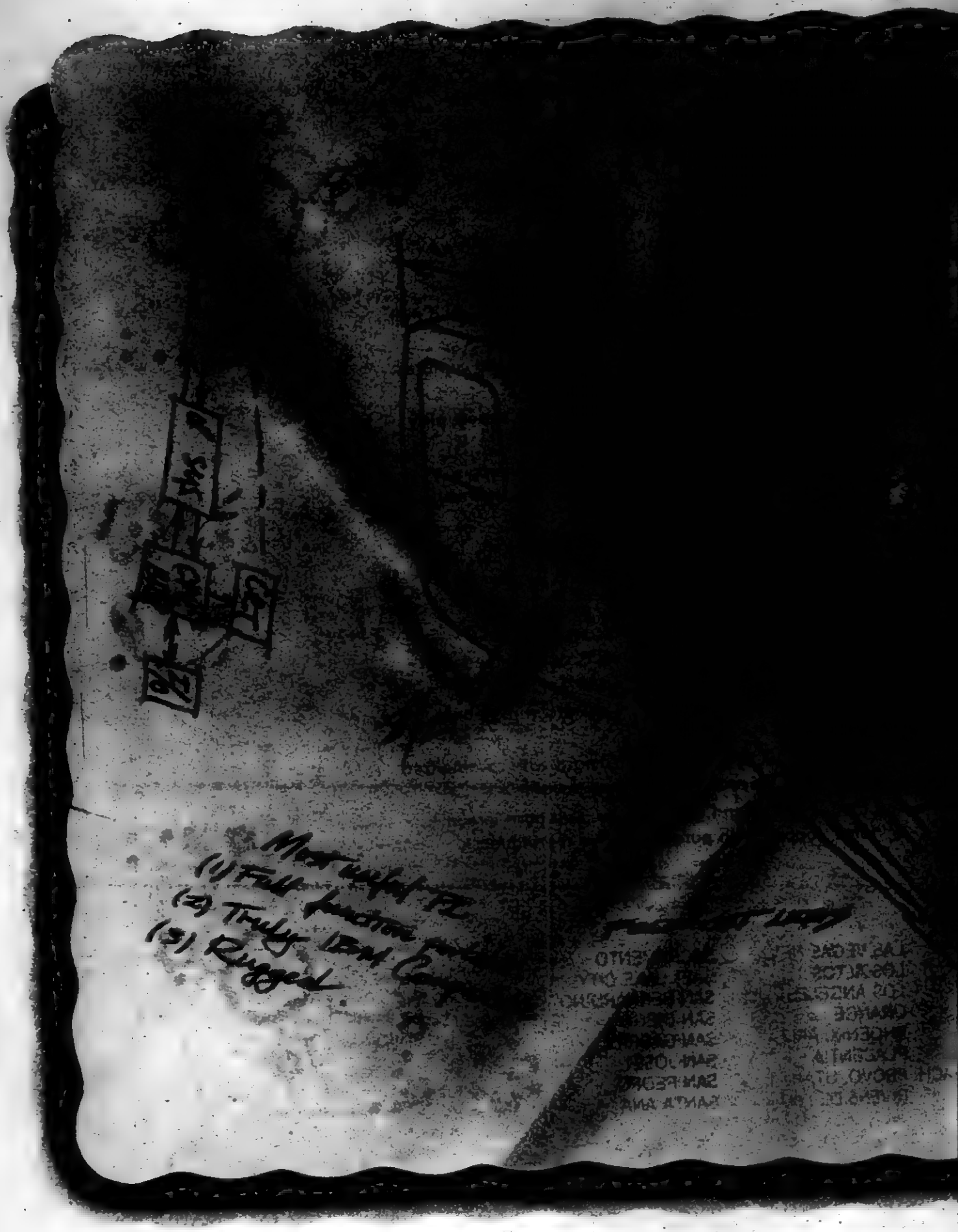
Address_____

City_____ State_____ ZIP_____

Telephone_____

We understand how important it is to listen.

SPERRY



A picture worth $111,000,000.

Not long ago, three businessmen met in a coffee shop to talk about an idea for a new personal computer. They made a rough design on the back of a place mat.

A lot of companies were already making personal computers, but they thought theirs just might work better.

The next year, they sold $111 million worth of their new computers, the COMPAQ® Portable and the COMPAQ PLUS™. No company in America had ever grown that fast. Why?

Simply because they offer, in a rugged, portable package, more capability than most other PC's. They're truly IBM®-compatible, so all the most productive software runs as is. They display high-resolution text *and* graphics on the same screen. And they grow. Expansion slots take IBM-compatible boards, and a kit converts the COMPAQ Portable into the COMPAQ PLUS with its integrated ten-megabyte disk drive.

How does the future look? We look at it this way: If we came this far on the back of a place mat, just think of what we can do now.

For the location of your nearest Authorized Dealer, call 1-800-231-0900.

©1984 COMPAQ Computer Corporation. COMPAQ® is a Registered Trademark and COMPAQ PLUS™ is a Trademark of COMPAQ Computer Corporation. IBM® is a Registered Trademark of International Business Machines Corporation.

COMPAQ®

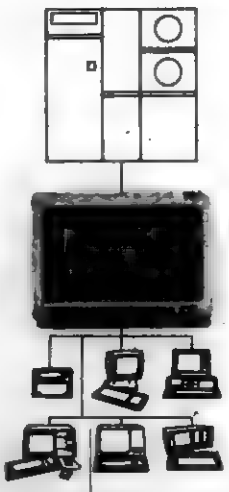
It simply works better.

EVERYONE WHO WANTS TO USE THE COMPANY MAINFRAME RAISE YOUR HAND.

Introducing power to the people.

Better known as the Data Pipeline™ from Intel.

It's based on our iDIS™ Database Information System. A powerful, integrated package of hardware and software with multi-user capability built right in. And now, through iDIS, just about any pc or terminal can easily share data with just about any mainframe.



Our Data Pipeline™ allows practically any pc to share data with practically any mainframe.

With the iDIS Pipeline, you'll be able to establish and manage your pc-to-mainframe connections in a way never before possible. Yet you'll still be able to offer department users a fair degree of independence. Since iDIS comes with all the software they need. Starting with the Xenix® operating system, built around a relational DBMS. Plus the Multiplan® spreadsheet, word processing, electronic mail, and a forms/menu development tool.

The iDIS Pipeline is powerful, too. Each one will handle 5 full-time users, or between 12 and 15 on dial-up. And you can even network with other iDIS systems. But you're always in control. You decide which data are accessible, and extract only those to your iDIS system. Users then access their data sets from iDIS's hard disk.

Actually, using the iDIS Pipeline is a lot like giving users their own little mainframe.

Which is a lot better than giving them yours.

It's also a lot cheaper.

Less than half the cost of a direct pc-to-mainframe connection.

It's also fully supported and serviced from one responsive source. Us. Best of all, it's available now.

For more information about how our iDIS Data Pipeline can help you manage the revolution in your office, call us at 800-538-1876; in California, 800-672-1833. Or write Intel, Lit. Dept. H-18, 3065 Bowers Ave., Santa Clara, CA 95051.

Of course, if you're undecided about what to do you can always ask for a show of hands…

intel

** According to the Gartner Group, who took the time to figure out all the hidden costs, each direct pc-to-mainframe connection costs approximately $22,000. Xenix® and Multiplan are trademarks of Microsoft Corporation. © 1986 Intel Corporation.

SOFTWARE & SERVICES

Tandem, MIS Information Systems sign market pact

CUPERTINO, Calif. — Tandem Computers, Inc. and Santa Clara, Calif.-based MIS Information Systems, Inc. have announced an agreement to market jointly the MIS Batch software system.

Under the terms of the agreement, a Tandem spokeswoman said, MIS Information Systems will license MIS Batch directly to Tandem Non Stop supermini/computer users and will provide support and service for the system.

MIS Batch reportedly schedules and manages the execution of batch-oriented programs on Non Stop systems.

The software is said to operate in a fault-tolerant mode to ensure reliable execution of tasks on a single Non Stop processor or across networks of Non Stop systems. MIS Batch reportedly also allows users to display the status of all batch jobs in process, and it provides a complete log of activities.

The package is also said to share system resources with on-line transaction processing applications as required.

MIS Batch is compatible with existing applications that run under Tandem Non Stop system software products, the spokeswoman said. MIS Batch licenses for $18,600 for the first system and $9,300 for each additional system.

More information is available from Tandem Computers, 19333 Vallco Pkwy., Cupertino, Calif. 95014.

SYSTEMS SOFTWARE

COMPUTER ASSOCIATES INTERNATIONAL, INC.
CA-Jasper/JA Release 2.1

Computer Associates International, Inc. has introduced an enhanced version of its performance evaluation software that reportedly includes more than 100 new reports on system activity, utilization and performance for IBM OS/MVS installations.

CA-Jasper/JA Release 2.1 features more than 130 reports covering computer performance and utilization, the vendor said. In addition, 27 trend graphs are provided on a monthly basis for planning purposes. The graphs give an historical view of the past year and an automatic projection for the next six months for areas such as work load turnaround time, idle time, paging rate and TSO usage.

Regular monthly reports include system summary graphs, typical job profiles, significant changes, TSO summaries, printer forms usage, job class summaries, disk utilization graphs, tape utilization graphs, system trends and production summary graphs.

A three-year lease for CA-Jasper/JA Release 2.1 is priced at $17,000.

Computer Associates International, 125 Jericho Tnpk., Jericho, N.Y. 11753.

AUTOVATIVE COMPUTER EXTENSIONS, INC.
Graphics printing support

Autovative Computer Extensions, Inc. has announced the addition of IBM 3287 graphics printer support to its ACX-PM Printer Manager for IBM's VM/SP operating system.

Users of SAS Institute, Inc.'s SAS/Graph Release 79.6 or higher and IBM's Graphical Data Display Manager can spool and manage graphics output as well as text output through the added graphics printing support, a vendor spokesman said. According to the vendor, users can set and alter spool file characteristics and purge, forward space and back space print files.

ACX-PM Printer Manager requires VM/SP Release 2 or higher. Its first-year license fee is $5,000.

Autovative Computer Extensions, Suite B, 5120 Belmont Road, Downers Grove, Ill. 60515.

COMPUTRONICS, INC.
Enhancements to AMLC Status

Computronics, Inc. has announced an enhanced version of its AMLC Status software for Prime Computer, Inc. superminicomputer systems.

The enhanced version reportedly features a command that summarizes the current configuration of each Prime asynchronous multiline controller (AMLC) line on the system.

The enhanced software reportedly also includes the capability to display system idle time for any user. The software involves a change to the Prime operating system, Primos. Source code for the change is provided with the order, a vendor spokesman said.

Prices for AMLC Status start at $250, the vendor said.

Computronics, 130 N. Ash, Wood Dale, Ill. 60191.

DATASTREAM COMMUNICATIONS, INC.
Software options

Datastream Communications, Inc. has announced four software options for its 874 Systems Network Architecture (SNA) controller for remote IBM 3270 network operations.

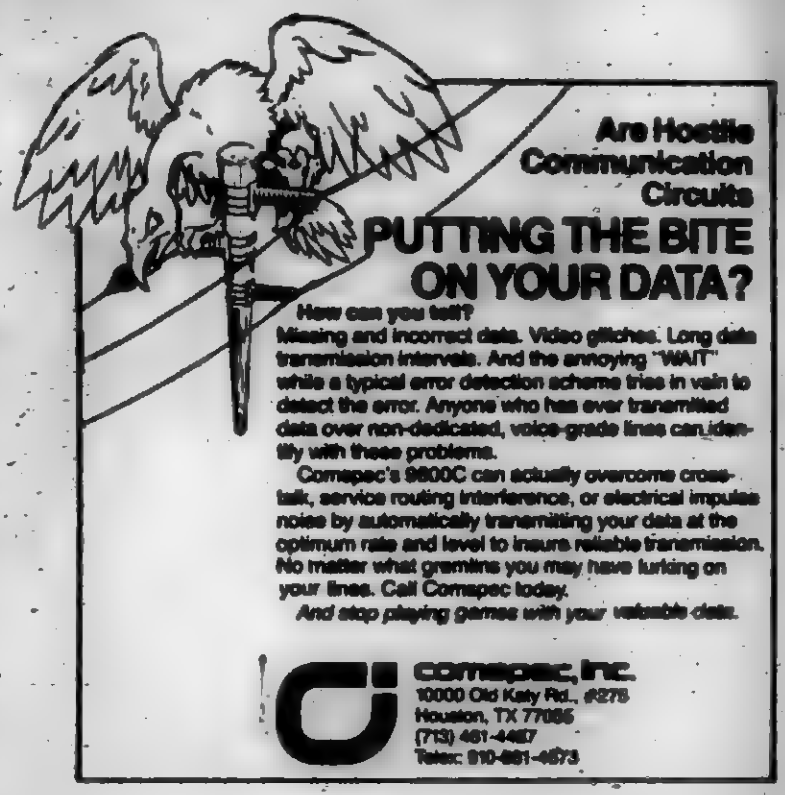
The options, which reportedly widen the scope of 3270 access and user integration, include CRT Attached Printer Support (Caps), which allows a serial printer attached to a CRT or personal computer to access the IBM host computer via a single connection to the Datastream controller.

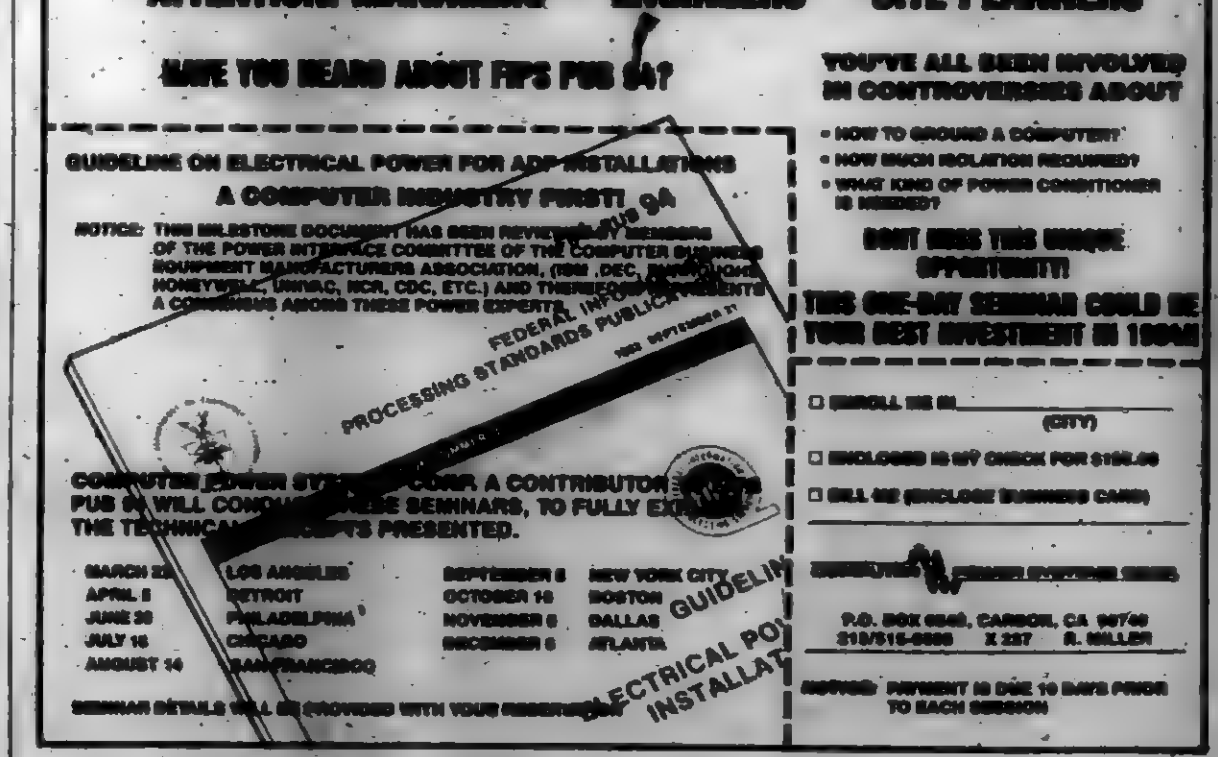
Another option, the Multiple Session feature, reportedly allows a terminal user to maintain two or more sessions with the host from the same terminal. A graphics option allows selected Ascii-compatible terminals, including Datastream's Display Stations, to perform graphics processing on a host running SAS Institute, Inc.'s SAS/Graph package.

A Keyboard Printer feature allows interactive access to 3270 applications with the application-oriented keyboard printers frequently used in time-sharing or remote locations, according to the vendor.

The options are $100 each per system.

Continued on page 66





SOFTWARE & SERVICES

Continued from page 45

tem. System pricing will vary depending on the base system's number of ports and system memory expansion required for multiple sessions and caps, the vendor said.

Datastream Communications, 2520 Mission College Blvd., Santa Clara, Calif. 95050.

PRODUCTIVITY AIDS

ADVANCED TECHNOLOGY INTERNATIONAL, INC.
Super PDL

Advanced Technology International, Inc. has introduced a software design program for use with Digital Equipment Corp. VAX-11 superminis under the VMS operating system.

Super PDL features a structured design language, design analysis facilities and full documentation capabilities, according to a vendor spokesman. The menu-driven software is said to include a full screen structured editor to create, update and modify module definitions and descriptions and abstract data type definitions.

The software reportedly can be used simultaneously by designers working on discrete parts of the same project. Design analysis is provided by a consistency processor that alerts the user to possible design inconsistencies, the spokesman said.

Super PDL is priced at $15,000.

Advanced Technology International, 350 Fifth Ave., New York, N.Y. 10018.

APPLICATION PACKAGES

SOFT PRO SYSTEMS, INC.
Fixed asset package

Soft Pro Systems, Inc. has announced the fixed asset package for users of Wang Laboratories, Inc.'s VS systems.

The system was designed to allow the Wang VS computer to assist in asset management. It provides for information for asset acquisitions, transfers, retirements and adjustments; protects the annual depreciation expenses for the life of the asset, uses the actual depreciation method or a simulated depreciation method; and produces a summary report showing the current depreciation of all assets before reporting to the Internal Revenue Service. A second report produces a facsimile of the IRS Form 4562 (depreciation and amortization). Several versions of each report may be produced.

The system is priced at $2,000, the vendor said.

Soft Pro Systems, 4121 MacDonald Ave., Richmond, Calif. 94805.

DATAPLOTTING SERVICES, INC.
D-Pict/Meta

Dataplotting Services, Inc. has introduced a utility program called D-Pict/Meta, which is said to aid graphics composition.

The program is said to allow several charts or graphs to be positioned at one time in a display that can be transferred to paper, overhead transparency film or 35mm slides. D-Pict/Meta reportedly allows graphics components to be shifted, scaled, rotated and windowed in any order so that users may experiment with designs.

D-Pict/Meta is available for three groups of computers, all at prices effective April 1. It is available for the Prime Computer, Inc. Model 9950 and Data General Corp. Eclipse MV/10000 at $3,500. It is available for the Digital Equipment Corp. VAX-11/750 and VAX-11/780, Prime Models 450 through 850 and the DG Eclipse MV/8000 at $2,500. It is also available for DEC's VAX-11/725 and VAX-11/730, Prime's Model 2250 and DG's Eclipse MV/4000 for $1,500.

Dataplotting Services, 235

SOFTWARE & SERVICES

Duncan Mill Road, Don Mills, Ont., Canada M3B 3K9.

EXECUTIVE TECHNOLOGY DATA SYSTEMS, INC.
Payroll system

Executive Technology Data Systems, Inc. (ETDS) has announced a payroll system for the IBM System/34 and System/36 that reportedly offers custom-designed checks, multicompany and multistate processing, multiple pay rates per employee and job cost and departmental allocations.

According to the vendor, the system integrates with either the ETDS general ledger system or its accounting system. It can be used for multiple payroll cycles, and payroll reimbursement can be included with the payroll check.

The system runs under IBM's SSP operating system.

The payroll system is priced at $2,900.

ETDS, Suite 108, 26104 Orchard Lake Road, Farmington Hills, Mich. 48018.

STRATUS COMPUTER, INC.
MCBA software

Stratus Computer, Inc. has announced the availability of a set of accounting application packages for its Stratus/32 continuous processing superminicomputer system.

Manufactured by MCBA, Inc., the MCBA accounting package consists of five programs. The central application is general ledger, which can be used in conjunction with the accounts receivable, accounts payable and payroll applications. The package also includes order entry and billing, which interfaces with the accounts receivable application.

A permanent license for each program is priced at $8,000.

Stratus Computer, 17 Strathmore Road, Natick, Mass. 01760.

DATATREND, INC.
Datacalc Version 3

Datatrend, Inc. has announced Datacalc Version 3, an electronic spreadsheet for use with Digital Equipment Corp.'s Datasystems.

Datacalc Version 3's features include columns and rows that can be sorted in ascending or descending order or moved to new locations; an automatic consolidation feature that allows for consolidation of several spreadsheets into one; on-line Help capabilities; and a "find and replace" capability, the vendor said.

New function and display formats include hidden columns, negatives in parentheses and blank on zero. Other new functions include table lookup, weighted average and loan payment calculation.

Datacalc Version 3 is priced at $495 for DEC's RT-11 operating system and $1,795 for the VAX/VMS operating system.

Datatrend, 395 Ironwood Drive, Salt Lake City, Utah 84115.

DIGITAL EQUIPMENT CORP.
Advanced Legal Software

Digital Equipment Corp. has announced that a law practice management application package is now available for its Decmate II business computer.

Advanced Legal Software is said to enable lawyers to perform time and billing, trust accounting, financial reporting and calendar and docket control. The package is targeted to offices containing up to 20 staff attorneys, a vendor spokesman said.

Continued on page 51

NEW LIFE FOR 1401 PROGRAMS

CS-TRAN converts your 1401 object programs to COBOL for the mainframe or mini of your choice.

CS-TRAN is the only translator that accepts your object programs, patches and all, yet allows you to include actual COBOL paragraph names and record definitions.

If you'd like more details about new life for your 1401 programs just call or write Ryan Sandberg.

C-S Computer Systems Inc.
200 South Main Street, P.O. Box 306
Maryville, NJ 08535 • 201-535-8989

BIM-EDIT vs. IBM ICCF:

Higher productivity is the better deal.

When you compare program editor capabilities, there's no comparison between BIM-EDIT and ICCF. BIM-EDIT has more than 25 features that ICCF can't match. Time-saving, productive features like:

- fast, automatic recovery after CICS failure
- much less virtual and real storage required
- library backup without interrupting on-line users
- concurrent library member addition and deletion from batch and on-line
- immediate logoff from any point, including mid-edit session
- logon returns immediately to logoff point and status
- log session maintained per user of commands and responses
- line block group commands — copy, move, delete (cc-cc, mm-mm, dd-dd)
- easy switching between concurrent edit and display sessions
- access to all system commands from any screen or session
- high-speed, highly functional, POWER spool queue access
- spool access, edit, other session types, all use same scrolling commands
- multiple commands for one or multiple sessions may be entered at any time regardless of session type or position
- may end an edit session without permanently effecting the member
- hierarchical library directory structure
- edit lines up to 256 characters wide
- support for 3270 models 2, 3, 4, and 5
- dynamic adjustment of screen size support
- exit routines
- member name length up to 32 characters
- access control by sub-library, member, or access type
- Help screens
- implied objects of commands (uses last referenced member name)
- library directory always in alphabetical order

Compare the features. Compare the price ($4000 purchase, $2000 yearly, or $800 monthly). You'll agree, the higher productivity of BIM-EDIT is the better deal.

BIM has more than a dozen other VOS/VSE system software products, also performs systems programming consulting, and provides computer time services on a 4331-2 system.

BIM B I MOYLE ASSOCIATES, INC. 512-833-2885
5708 Lincoln Drive Telex 297 883 (BIM UR)
Minneapolis, MN 55436

900 GUEST ROOMS AND COMPLETE MEETING FACILITIES IN HOUSTON'S GALLERIA.

Surround your meeting with the excitement of the spectacular Galleria. A city of 250 shops under glass, where excellence in dining, recreation, shopping and entertainment are side by side with Houston's most complete meeting environment.

Only The Westin Galleria and The Westin Oaks offer the world's largest lobby under one roof. 980 guest rooms and suites, 32 meeting rooms in a range of sizes, three ballrooms, an exhibition hall, professional in-house catering and audio-visual services. An adjoining health and sports facility has a jogging track and heated outdoor pools.

Hold your next business meeting in Five Diamond award-winning luxury, at surprisingly competitive rates. The Westin Hotels of Houston. Excellence, in the heart of the Galleria.

Please call, 713-960-8100, and ask for the Director of Sales.
The Westin Oaks, 5011 Westheimer, The Westin Galleria, 5060 West Alabama, Houston, Texas.

THE WESTIN OAKS
THE WESTIN GALLERIA
Houston
In Dallas, stay at The Westin Hotel, Galleria.

Decision support offered based on SAS software

FIRST LOOK

HOLLYWOOD BEACH, Fla. — Four decision support products based on SAS Institute, Inc.'s SAS software were unveiled by Info Tech at the recent SAS Users Group International Conference.

Among the four is DS/QL, a query and retrieval language similar to IBM's SQL that is said to combine SQL-like relational features with SAS manipulation capabilities. Features of the nonprocedural language, Info Tech said, include English-like queries using SELECT ... FROM ... WHERE expressions; retrieval of data using both the SQL and SAS languages; unlimited nesting of queries; improved data access; display statements; and compatibility with Info Tech's Decision Support/Data Base Facility (DS/DB) SAS data base enhancement, also announced last week.

Any combination of SAS steps and procedures may be used with any combination of DS/QL queries and display statements, according to an Info Tech spokesman. The product costs $4,500 for a first-year license, with an annual renewal fee of $900.

Manipulating big data bases

According to Info Tech, DS/DB is appropriate for manipulating multirelation data bases that are too large for SAS to handle. DS/DB provides direct-access facilities for SAS data sets and, when compared with similar SAS facilities, reduces disk I/Os and CPU time required to retrieve observations on large-scale SAS data sets, the spokesman claimed.

The product's SAS Data Set Cluster is a collection of three SAS data sets that define the target data set and the key variables used to subset the data. The Proc DB Build statement is an SAS procedure to create data set clusters. The Proc DB Search is an SAS procedure to select observations from an SAS data set cluster using random-access techniques and query optimization.

DS/DB is priced at $6,000 for the first year, with an annual renewal fee of $1,200.

The third product announced last week, DS/GEN, is a set of interactive system definition, generation and evolution tools for the development, installation and maintenance of decision support applications.

DS/GEN can be used to define data bases using a data dictionary; create an interface for the data collection phase; organize information from the data dictionary to create data bases; create design and analysis documentation; load, update and maintain the decision support system (DSS) data base; and prototype with automatic restructuring of the DSS data base during migration or enhancement. It costs $7,500 for the first year, $1,500 for an annual renewal.

The final product, Decision Support Dialog Manager (DS/DM), is a menu-driven system that allows a nontechnical user to perform functions of data management and analysis and system management using full screen IBM Interactive System Productivity Facility panels. The user does not have to learn operating system or terminal commands, IBM JCL or SAS programs, the spokesman claimed.

The product is available for $9,500 for the first year and $1,800 for each subsequent year. Package prices are also available for combinations of the products from Info Tech, which can be reached through P.O. Box 14545, Gainesville, Fla. 32604.

SAS/OR from page 39

group of R&D scientists in Ciba-Geigy's agricultural products division. Each user will be prompted by the system to build a data base of estimated completion times and cost variables for different parts of a project.

The program will rely upon statistical capabilities within SAS to relate the elements of the data base and come up with an orderly flow of events through the life cycle. In order to model a proposed project, the R&D scientist answers a series of screen prompts interactively, filling in about 150 variable components that go into making up that project's life cycle. All screens are being built using SAS' Full Screen Product, Hermes said.

The output will be in the form of a Critical Path Method schedule showing the start and stop dates for the project and the completion times for each component. The planning model will also produce a set of financial figures showing the effect of different cost and pricing variables on project profitability. The financial routines will probably be written in either SAS' new FS Calc spreadsheet product, Execucom, Inc.'s Interactive Financial Planning System or in standard SAS code, Hermes said.

Because the application is on-line, variables can be changed and the model rerun to test the effect of different scenarios, much like a "what-if" financial model.

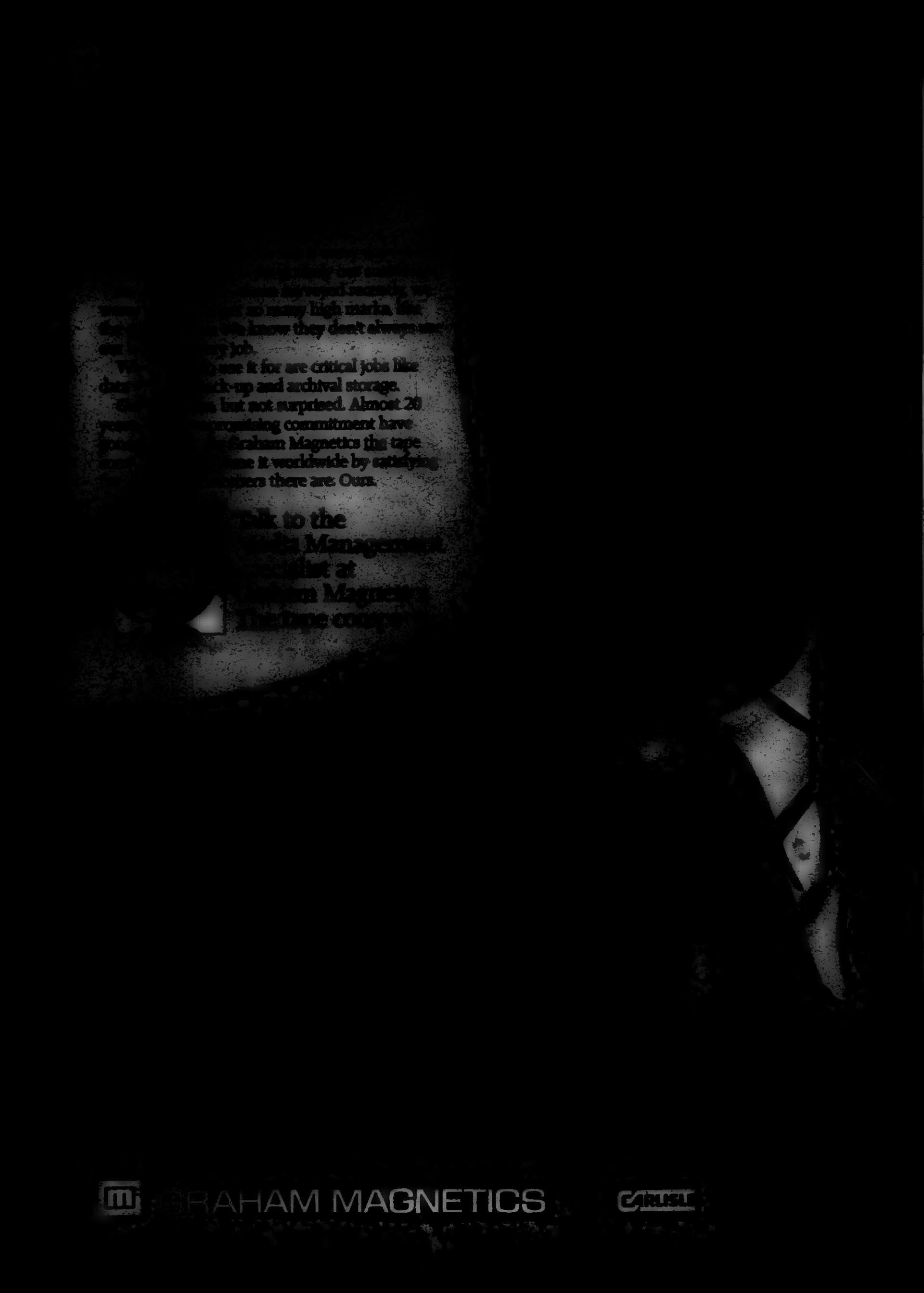
The application will even run a series of models based upon a set of costing figures chosen at random and clustered around the cost estimates. "The basic question it answers is, 'Is this the best way to spend our money?' " Hermes said. "It tells — before the project starts — if the investment is worth it."

Hermes said she recommended SAS/OR for the project largely because of its compatibility with the entire SAS line. In addition, the product is "very easy to use," she said. "I wrote a basic [Critical Path Method] routine in about two hours.

"Every new SAS product follows the old rules," Hermes noted. "Also, your output is in the form of an SAS data set, which you can then manipulate to your satisfaction. In most cases, the user isn't happy with a canned data set."

The product also uses a command structure similar to other SAS products and allows SAS routines to be embedded in SAS/OR code.

SYSTEMS FOR DP MANAGEMENT


GRAHAM MAGNETICS
CARLISLE

SOFTWARE & SERVICES

Continued from page 67

The software, manufactured by Advanced Legal Software, Inc., features password protection, five types of fee categories, multiple billing rates and both monthly and deferred billing arrangements.

The software is available now for $2,195.

DEC, 146 Main St., Maynard, Mass. 01754.

SPSS, INC.; MCMASTER UNIVERSITY
SPSS-X Information Analysis System

SPSS, Inc. and McMaster University of Hamilton, Ontario, have introduced versions of the SPSS-X Information Analysis System software for the Hewlett-Packard Co. HP 9000 microcomputer and the SCSS Conversational System software for the HP 3000 superminicomputer.

SPSS-X contains file handling and reporting facilities and includes more than 40 statistical procedures to organize, summarize and display data, according to a vendor spokeswoman.

SPSS-X on the HP 9000 reportedly accommodates nested or hierarchical files such as those found on the U.S. Bureau of the Census data tapes, enabling users to use census data for applications in marketing research or demographic analysis, the spokeswoman said.

A first-year commercial license for SPSS-X costs $6,000, according to the spokeswoman, with annual renewals available for a price of $4,500.

SCSS, a conversational and interactive version of SPSS-X, is an integrated, stand-alone system for data analysis and information management. It is said to feature a number of statistical capabilities, such as univariate statistics, cross-tabulations, t-tests, scatter plots, correlations and factor analysis.

SCSS for the HP 3000 is priced at $6,000 for a first-year license and $4,000 each year for renewals.

SPSS, 444 N. Michigan Ave., Chicago, Ill. 60611.

TRAINING

ETA INTERNATIONAL
Video education courses

ETA International has announced a video education course covering the joint use of Cullinet Software, Inc.'s IDMS data base management system and IBM's CICS teleprocessing monitor in application programming and execution.

The course is comprised of five video sessions, including video graphics, examples, narrative text and reinforcing exercises. Among the areas covered in the course are the IDMS/CICS problem program environment, terminology, program coding and compilation techniques.

The course costs $3,500.

The vendor also introduced a second video course that addresses the systems design, programming and run-time of applications using Cullinet's Applications Control Facility. The course is priced at $4,000.

ETA International, 7 Wells Ave., Newton, Mass. 02159.

DATA from page 39

related to a marketing data base. It is easy to say that the data modeler should have recognized the relationship and should have designed the relationship into the system from the outset, but not all relationships are cost-effective to maintain.

The modeler may well have recognized the relationship, but the occurrence in which the relationship is used is so obscure that creating and maintaining the relationship is not cost-effective. Therefore, data may well exist in a subject data base that is unable to be applied to other subject data bases.

The final issue of subject data bases is refinement and replacement of data.

Oftentimes, subject data bases are accessed and data stripped off.

The data that is stripped is then analyzed separately, perhaps by reordering or resummarizing.

The result is a refinement of the data that is useful to at least one user.

While this refinement is a worthwhile activity and represents a new and valid view of the data, there are several problems.

Several problems

It is very difficult to make the refinement available to other users. For example, a user extracts data from the mainframe environment into the personal computer environment.

There the extracted data is refined and analyzed and produces meaningful results for the user. The problem is: How does the user make the refined data available to other users?

Replacing it in the subject data base is not an answer in most cases, because the refined data now represents a different view of the data. Creating a new data base is not the answer because the new data base most likely is redundant with the subject data base.

So, there is no easy answer for the issues of refinement and replacement.

Careful implementation

While subject data bases unquestionably are a worthwhile objective in the integration of systems, they must be carefully implemented.

If the result of the modeling effort that produced the subject data bases is not extended into the realm of tangible data bases, then there is no purpose in modeling systems.

The implementation of subject data bases is especially relevant to the on-line and decision support environments.

Centralization of data, implemented improperly, hinders on-line performance and availability.

Centralization of data must be carefully implemented to achieve data consistency, data applicability and data refinement.

Inmon, a director at Coopers & Lybrand in Denver, is a noted author on the subject of data base design and a regular contributor to Software.

CAN YOU HELP US FIND THIS HEWLETT-PACKARD EQUIPMENT?

We want to buy the following Hewlett-Packard equipment, new or used, and have exhausted known sources:

HP 3480D *Digital Voltmeter, preferably with Options 001 and 004.*

HP 3484A *Multifunction unit, preferably with Options 041, 042, and 043.*

HP 5321B-K21 *Digital clock.*

HP 5327B *Timer/Counter/DVM, preferably with Options H31, 004, and 011.*

HP 10542A *Remote programming interface cable.*

If you have any or all of this equipment which we might buy, please call:
R. A. Arens, (314) 925-5983.
Or write:
R. A. Arens, Dept. S411, Building 98,
McDonnell Douglas Astronautics Company, Box 516, St. Louis, MO 63166.

MCDONNELL DOUGLAS

DEC TO IBM SNA

Now available...full SNA capability for your DEC computer! Comboard/SNA gives your terminals access to IBM interactive applications. Data can be transfered between systems transparently, all in the complete fully supported package, from Software Results.

Comboard/SNA is a proven and reliable, single-board, 256KB communications computer that plugs into your DEC Unibus. Teamed with Comboard software, the system is a cost-effective solution to troublesome SNA communications problems.

Comboard/SNA allows your DEC to emulate an IBM PU Type 2 communications node. You have a full gateway into your SNA without the trouble of passing through a secondary network.

For further information, fill in the coupon below or call Software Results... the leader in DEC to IBM communications.

SOFTWARE RESULTS CORPORATION
Call Toll-free
1-800-SRC-DATA

OUR PRODUCTS COME STANDARD EQUIPMENT:

You're involved in deciding who handles your company's communication and information management needs.

And you're hearing a lot of talk about information processing. Communications networking. Systems management. And the like.

But you don't hear enough about good old-fashioned service. Which is a critical omission.

At AT&T Information Systems, we know that it takes first-rate professional service for your system to do what it's supposed to do. Which is to help you and your people make the right decisions at the right time.

Service is our most important product.

Our Account Executives aren't just trained in our business—they're trained in yours.

They'll work as your partners. Determining your needs. Developing a plan to help you meet them. Making sure that everything they recommend will help your company run even better than it's running now.

Our Technical Consultants will work closely with the Account Executive to design and implement a system that's right for your company.

And our Systems Technicians will not only take care of maintenance and repair, they'll work with the Technical Consultants—helping you change and expand your system when the time comes.

A century of service.

After more than 100 years of serving our customers, AT&T has developed the most

WITH THE FOLLOWING

experienced and professional service staff in the business.

No matter where you're located, we'll be there to work with you, with more service centers than anyone else.

The fact is, we have more trained service specialists than some of our competitors have total employees. And this service—before, during, and after the sale—is as much a part of what we offer as our products.

A full line of products.

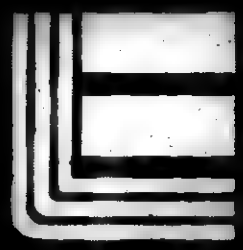
We have a complete line of products and systems that can be custom-fit to your company. Everything from a dependable small-business phone system to the most sophisticated, fully integrated communication and information management system in the industry.

In short, AT&T has all the equipment your company needs to make the right decisions. As well as a commitment to service that's second to none.

If you'd like to know more about how AT&T Information Systems can serve your company, call 1-800-247-7000.

WHEN YOU'VE GOT TO BE RIGHT.

AT&T
Information Systems



EQUITABLE LIFE
LEASING CORPORATION

OFFERS

OPERATING & TAX PRICED LEASES

FOR:

Data General

IBM

digital

PRIME

HEWLETT PACKARD

WANG

EQUITABLE LIFE
LEASING CORPORATION

For more information call any of the offices listed below

Detroit
Minneapolis
Pittsburgh
Houston
New York
Portland
Kansas City
Orlando
St. Louis
Los Angeles
Philadelphia
Salt Lake City
Milwaukee
Phoenix
San Francisco
Seattle
Washington D.C.

CORPORATE HEADQUARTERS

1984 Office Automation Conference, L.A. Convention Center, February 20-22, 1984

COMMUNICATIONS

DATA STREAM
John Dix
CW Senior Editor

AT&T releases interface option

AT&T Information Systems, Inc. recently proposed a private branch exchange (PBX)/computer interface that is significant in its design similarities with international standards efforts, but that presently lacks the support of other switch manufacturers needed to make it important for here-and-now problems.

Much of that support has already been pledged to the Computer-to-PBX Interface (CPI) developed last year by Northern Telecom, Inc. and Digital Equipment Corp. and proposed as a standard to the Electronic Industry Association.

The two proposals, which are incompatible, specify the type of control signaling and data formats used to connect a PBX to a computer via the domestic telephony standard 1.54M bit/sec trunk interface.

As the first effort to standardize the interface, the Northern Telecom/DEC duo gained a lot of early support, including the endorsement of Rolm Corp., Mitel, Inc. and Intecom, Inc. and commitment from Wang Laboratories, Inc., Data General Corp. and Prime Computer, Inc. Northern Telecom claimed that 50 CPI licenses have been granted so far.

But now that AT&T has released specifications for its Digital Multiplexed Interface (DMI), some computer vendors seem more than willing to hedge all bets by endorsing both proposals, as Wang and DG have done.

See AT&T page 58

Bank contracts Rolm hardware

To replace existing systems in over 700 branches

By John Dix
CW Staff

SANTA CLARA, Calif. — In evidence of the fact that data handling capabilities still play second fiddle to vanilla-voice capabilities for private branch exchanges (PBX), a large bank here said that it has no immediate plans to switch data with the new systems it is installing.

Rolm Corp. announced last week a major contract with Bank of America National Trust and Savings Association to replace existing communications systems in more than 700 branch locations and regional centers in California.

The deal, valued at $15-$19 million, calls for Rolm to install switching equipment — its own PBXs and some key systems procured by Rolm from outside sources — in each of the bank's locations to replace existing Centrex services and a few small Northern Telecom, Inc. switches. So equipped, each location will then be tied into the bank's statewide Electronic Tandem Network.

James J. Sobczak, Bank of America's vice-president of telecommunications services, said that roughly half of the bank locations would install key systems while the other half would be putting in Rolm CBXs, including Rolm's recently introduced CBX-II.

He estimated that, on the average, the key system installations would support up to 20 users, and the CBX-II sites would have 80-100 lines. All told, the entire system will reportedly support 25,000 telephones.

Interestingly, Sobczak said that the bank has no immediate plans to use the PBXs in the new system to switch data, although he doesn't preclude that the need may materialize. Instead, voice management considerations have led to the decision to install the switching hardware.

See PBX page 58

Lemcom device targets small SNA users

Supports remote 3270s without 3705, 3725

PHOENIX — Lemcom Systems, Inc. recently introduced a device that enables smaller users of IBM Systems Network Architecture (SNA) who don't have a 3705 or 3725 communications processor to support remote 3270s.

The Virtual Local Controller (VLC) reportedly supports all features of both dial-in and dedicated Synchronous Data Link Control 3270s by making them appear to a host system as local SNA 3270s.

Teleprocessing software is therefore not required. Remote SNA 3270s are configured as if they were connected to an IBM 3705 with a network control program. Application programs require no modification and run under standard Vtam, the vendor reported.

Line speeds up to 56K bit/sec are supported by the device, which is said to be modular for ease of maintenance. The VLC provides internal diagnostics, an on-line tracing capability and a dial-up connection to a service center permitting remote configuration, system diagnosis and software updating.

Prices start at $15,973 and vary depending upon configuration.

Lemcom Systems is located at 2104 W. Peoria Ave., Phoenix, Ariz. 85029.

- T-Bar Inc. announces a matrix switch that supports the 256K bit/sec channel speed of IBM's 3725 front-end processor/56
- Local Data, Inc. has unveiled a protocol converter that enables IBM 3178/3278s to emulate RS-232C asynchronous devices/56
- Metapath, Inc. unveils a data switch to interconnect RS-232 devices/56

INSIDE

Voice/Data Communications/56
Protocol Converters/56
Multiplexers/Modems/56
Local-Area Networks/56

Speaker outlines key factors for selecting local-area nets

By Phil Hirsch
CW Washington Bureau

LAS VEGAS — Two key considerations in selecting a local-area network are determining whether the application can tolerate transmission delay and deciding how much and how variable the delay can be.

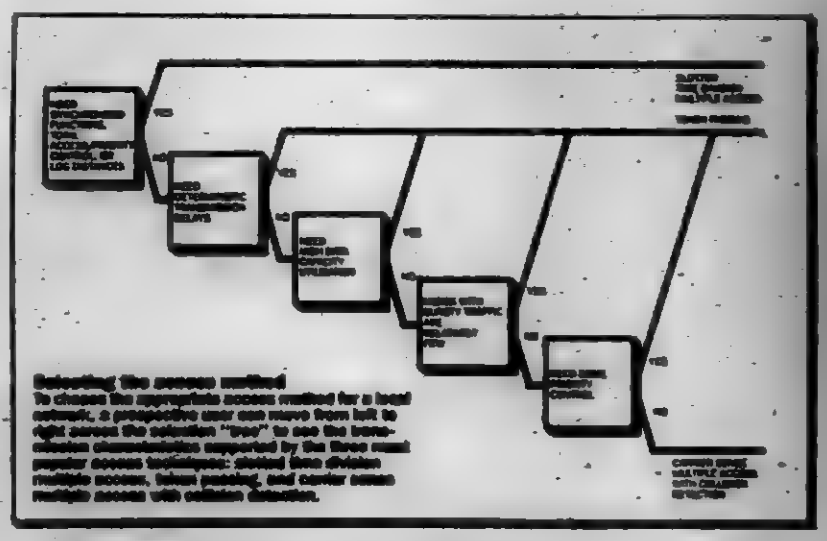
So said Howard Frank, consultant and president of network designer Contel Information Systems, Inc., who spoke at the recent Interface '84 conference here.

Frank explained that if no delay is allowable, a dedicated channel scheme employing frequency, time or space division access is a likely option. If some delay can be accepted, but it cannot vary — often the case in synchronous data transmission — a polled access scheme like token passing would be more suitable. Where delay can be variable, contention-based systems such as carrier-sense multiple access might be employed.

The final choice of access method depends on a number of other considerations, Frank said. For example, dedicated channels are wasteful if the traffic is bursty and the terminal population is large. Polling schemes encourage high throughput by preventing message collisions, but as the number of users grows, the time and expense of managing the access allocation process also grow.

Contention-based systems sidestep this management problem, and schemes for minimizing interference among contending terminals are available. But if the network serves many terminals and contention is frequent, throughput can be reduced drastically, Frank said.

Frank presented a diagram (see figure) showing the main factors to consider in choosing among dedicated, polled and contention-based access schemes. A second diagram (see page 56) showed that the choice of transmission medium — twisted pair, baseband or broadband coaxial cable — depends mainly on distance, the desired bit rate and the amount of voice and video in the traffic mix.



Selecting the access method
To choose the appropriate access method for a local network, a prospective user can move from left to right across the selection "tree" to see the transmission characteristics supported by the three most popular access techniques: slotted time division multiple access, token passing, and carrier sense multiple access with collision detection.

One of Frank's major points was that because transmission media, access methods and topologies are well defined, the two biggest problems with local-area networks are internetwork management and managing communications between remote terminals and host-resident communications control or application software.

Because "standards" in this area are proprietary, Frank explained, incompatibility will tend to persist as a problem.

Another complication Frank noted is that the interface connecting a terminal to the local-area network bus, ring or loop may contain all, some or none of the logic needed to implement internetwork and terminal-host protocols. Thus, the user cannot determine just by comparing prices whether a particular interface — usually referred to as a bus interface unit or

See NETWORK page 56

YOU CAN ADD A SECOND IBM® 3270 PERIPHERAL IN MINUTES.

Now you can take any existing coaxial cable in use with a single controller and DOUBLE the cable's capacity immediately. Every cable that is installed can now drive two devices. That's right, TWO peripherals running over ONE cable. We call it the "Coaxial Doubler™".
One Doubler connects two ports of the controller to the shared cable. The other Doubler connects the shared cable to two peripherals.

A real breakthrough! The Coaxial Doubler, our littlest multiplexer, requires no external power connections and comes with a five year warranty. Installation time? Five minutes.
We're so sure you'll like the Doubler that on an introductory basis we'll send you a $490 Doubler pair on a no risk, 30 day, trial.
Call: 1-800-342-5986
or write us at once.
See us at COMDEX/Winter Booth #540

Fibronics International Inc.
fiberoptic communications

325 Stevens Street
Hyannis, MA 02601
(617) 778-0700 Telex 951297

IBM is a registered trademark of the International Business Machines Corporation.

COMMUNICATIONS

VOICE/DATA COMMUNICATIONS

T-BAR, INC.
Wideband VSM

T-Bar, Inc. has announced the Wideband Virtual Switch Matrix (VSM) data communications switch, which supports the 256K-bit data rate line cards of IBM's 3725 front-end processor. The Wideband VSM supports digital data rates up to 300K bit/sec.

The matrix switch allows up to 128 attached terminals or devices to be connected simultaneously to 128 data communications equipment ports in any configuration.

The switch is said to be compatible with CCITT V.35, AT&T's Dataphone Digital Service and X.21 as an option.

The modularity of the switch will reportedly allow switch expansion even when on-line. A typical 32 by 32 switch is priced at $56,000.

T-Bar, 141 Danbury Road, P.O. Box T, Wilton, Conn. 06897.

PROTOCOL CONVERTERS

LOCAL DATA, INC.
Versalynx/3278

Local Data, Inc. has introduced a protocol converter that allows IBM 3178 and 3278 displays to emulate a variety of Ascii terminals.

The Versalynx/3278 provides the synchronous IBM terminals with an interface to RS-232C asynchronous ports in addition to their normal coaxial cable connection to an IBM controller.

IBM display users can switch between the IBM control unit and an external Ascii system, access dial-up computer services using autodial modems and access IBM control units on a dial-up basis using conventional facilities or through a voice/data private branch exchange. The price is $695.

Local Data, 2701 Toledo St., Torrance, Calif. 90503

MULTIPLEXERS/MODEMS

MICROCOM, INC.
8X/1200

Microcom, Inc. has announced the 8X/1200, a 1,200 bit/sec error-correcting modem. The modem reportedly enables communication between dissimilar devices that use the Microcom Networking Protocol.

The modem operates at both 300 and 1,200 bit/sec. Attached devices may operate at user-selectable speeds different from that of the modem. An autodial/autoanswer feature stores up to nine telephone numbers, a company spokesman said.

A stand-alone model is priced at $800.

Microcom, 1400A Providence Highway, Norwood, Ma. 02062.

LOCAL-AREA NETWORKS

METAPATH, INC.
Robin

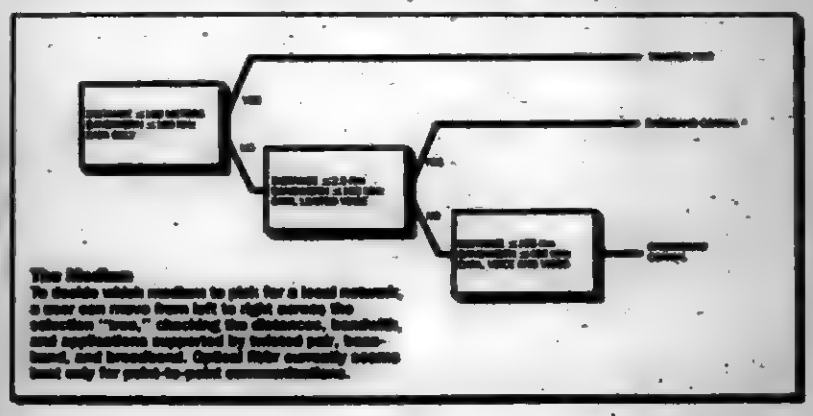
Metapath, Inc. has introduced the Robin, a microprocessor-controlled desktop data switch which it claims permits any RS-232 device to communicate with any other RS-232 device.

The product can reportedly link dissimilar personal and mainframe computers, terminals and peripherals in a local-area network while eliminating centralized controllers, switches and print servers.

Up to 225 switches can be installed on one coaxial cable with 900 serial ports and 225 parallel ports. A bridging feature allows multiple Robin networks to be connected over any distance.

The signaling rate is 2M bit/sec with a maximum aggregate user data rate of 1.8M bit/sec. Single quantity price is $1,950, according to a spokesman for the vendor.

Metapath, 73 Lincoln Centre Drive, Foster City, Calif. 94404.



The Medium
To decide which medium to pick for a local network, a user can move from left to right across the selection "tree," checking the distances, bandwidth, and applications supported by twisted pair, baseband, and broadband. Optical fiber currently seems best only for point-to-point communications.

NETWORK from page 85

media access unit — is a good buy, Frank said.

To avoid the pitfalls, he advised users to define their requirements before choosing their local-area network. He also said the user should assume that whichever local-area network he acquires will have to be modified, both initially and over time.

The technical capability of the supplier is, therefore, important, particularly where adequate in-house support is not available.

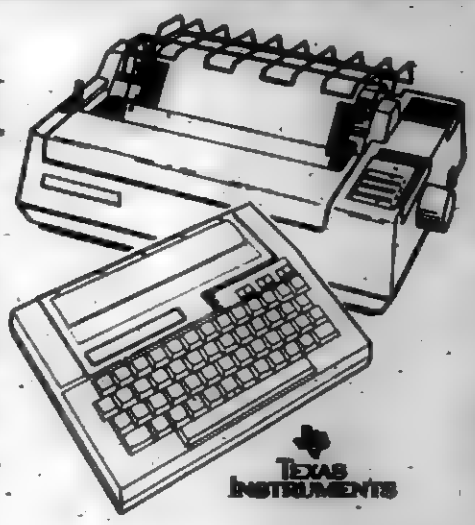
David
Recommends Texas Instruments

David Jamison Carlyle Recommends the New Generation of Printers from Texas Instruments.

Texas Instruments 850
The 850 micro printer is the first in a family of high performance matrix printers. Featuring speed (150 CPS), quality printing and graphics, plus PC compatibility, the 850 is a price performance leader with the same reliability that has made the Omni 800* series printers the standard in offices around the world.

Texas Instruments 707
The newest edition to the Silent 700 series, TI's 707 *Portable* Data Terminal uses state of the art printing and communications technology to give you all the functions needed to do business in or out of the office.

TI Printers from DJC—The Leader in Peripheral Distribution.

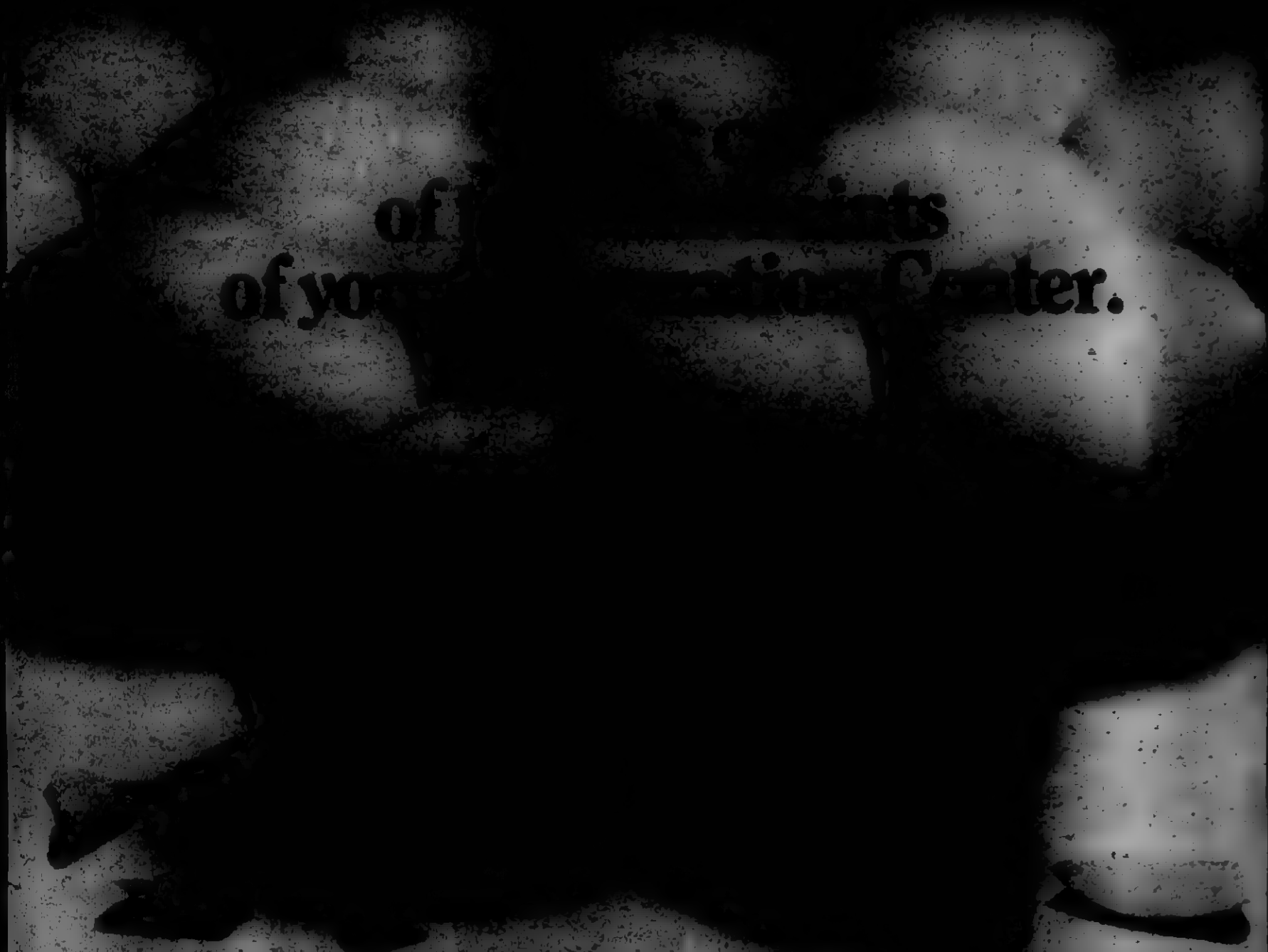


TEXAS INSTRUMENTS

THE DAVID JAMISON CARLYLE CORPORATION
5700 Buckingham Parkway
Culver City, CA 90230

New Jersey (201) 785-6002
(609) 596-3023
Illinois (312) 706-4400
Texas (713) 721-4307
Colorado (303) 436-9000
Hawaii (808) 531-5326
California:
San Francisco (415) 254-6500
(800) 227-2630
Los Angeles (213) 410-9858
(800) 421-3060
Irvine (714) 851-3911
Florida:
Orlando (800) 432-1905
(800) 221-6000

DJC
THE DAVID JAMISON CARLYLE CORPORATION



Announcing the birth of the *Personal* Information Center™— a new concept in intelligent data access for your company's end users. And you're invited to a FREE, half-day Seminar to learn all about this innovative *first* from Informatics.

At this free Seminar you'll see how the *Personal* Information Center can help you:

- Manage and control the confusing proliferation of hardware and software in your Information Center.
- Integrate your Information Center with today's mainstream DP and IBM® Personal Computer tools.

But that's only the beginning. At the Seminar there will be a lively discussion of such vital Information Center issues as...

- Selecting appropriate hardware and software for your users' needs.
- Offering immediate versus deferred processing.
- Using production data bases or duplicating files.
- Balancing unlimited data access with system security concerns.

The Seminar will also address the entire issue of the micro-mainframe connection, and many more topics of immediate interest to data professionals like you.

Plus, we will introduce Informatics up-to-the-minute solutions to your Information Center needs, including reporting and inquiry systems and micro-mainframe integration tools.

The *free* Personal Information Center Seminar is being offered in or near your city. But attendance is limited. So, mail the coupon or call toll free today to reserve your place at this valuable *free Seminar.*

Pre-register for the *free* Personal Information Center Seminar and get a free bonus. We'll send you a reprint of the *Computerworld* article, "The Micro/Mainframe Link," by Merritt Lutz.

Mail this coupon or call toll free...

1 800 227-3800 Ext. 911

Informatics general corporation

THE SOFTWARE ENGINEERS

YES. I'd like to learn more about the Personal Information Center and how it fits my unique business strategy. And, please send me a free reprint "The Micro/Mainframe Link," too.

☐ Please enroll me in the free seminar. Please schedule a half-day, full-service seminar at a specific location and time. I understand that there is no cost or obligation.

☐ Atlanta	April 24	☐ Detroit	May 3	☐ New York	May 3
☐ Boston	May 4	☐ Houston	April 27	☐ Philadelphia	May 1
☐ Chicago	April 27	☐ Los Angeles	April 26	☐ Toronto	May 3
☐ Dallas	April 25	☐ Montreal	May 1	☐ Vancouver	May 16
				☐ Washington, D.C.	May 9

☐ I cannot attend a seminar, but please send me more information on the Personal Information Center.

Name _____ Title _____

Company Name _____ Phone Number _____ (include area code)

Address _____

City _____ State _____ Zip _____

Mail this coupon for information, Free Personal Information Center Seminar, P.O. Box 1452, Canoga Park, CA 91304 CW-SD

PBX from page 85

Rolm reports that the configuration will be optimized to take advantage of least-cost routing, the process by which the switch selects the least costly manner of switching each call, for example via a Wats or private line.

Additionally, a charge-back system will be implemented whereby "call-costing data will be used to allocate expenses to cost centers," Rolm reported.

The company also said that it has "committed to establish a data base solely for Bank of America that will be used by both Rolm and the bank for ongoing system service and project management."

A centralized "trouble-shooting" center will be formed to receive and process self-diagnostic data from each bank, Rolm said.

AT&T from page 85

It remains to be seen if the PBX manufacturers that have pledged support to CPI will follow suit, and only time will tell which camp the rest of the industry will fall in behind.

If AT&T Information Systems is not able to sway the support of other important PBX manufacturers or at least entreat them to support both interfaces, its efforts will be crimped. This is because AT&T Information Systems' interface only works with the company's digital PBX, the Dimension System 85, of which only a few hundred have been installed.

On the other hand, Henry Thelossen, Northern Telecom's director of product line management, estimated that the universe for the CPI interface — which includes the installed base of switches from Northern Telecom, Rolm, Mitel and Intecom — is 20,000 sites.

But industry support seems to be CPI's single strongest suit, and the industry is just beginning to study the new AT&T Information Systems interface. Dick Moley, Rolm vice-president of marketing, reported that Rolm is now evaluating DMI and said that when the decision to support CPI was made, it was the only game in town.

If, upon study, Rolm and the other PBX manufacturers find appealing in DMI what Hewlett-Packard Co. did, those pledged to CPI might start singing a different tune.

HP, once a CPI supporter, has changed its allegiance to AT&T Information Systems because of design similarities between DMI and international standards efforts. Bob Coackley, section manager for telenetworks at HP, said that CPI was previously supported because it was the only thing going at the time.

As outlined by Coackley and others, Northern Telecom/DEC's CPI proposal subdivides a 1.54M bit/sec channel into 24 56K bit/sec channels. Each of these channels has in-band signaling, which is achieved by using the least important bit in every byte to carry for signal information. This reduces the usable byte size to seven bits and limits channel speeds to 56K bit/sec.

Common channel

AT&T Information Systems' DMI, on the other hand, uses a common channel signaling technique, whereby signal information from each of 23 individual channels is multiplexed into a single 24th channel.

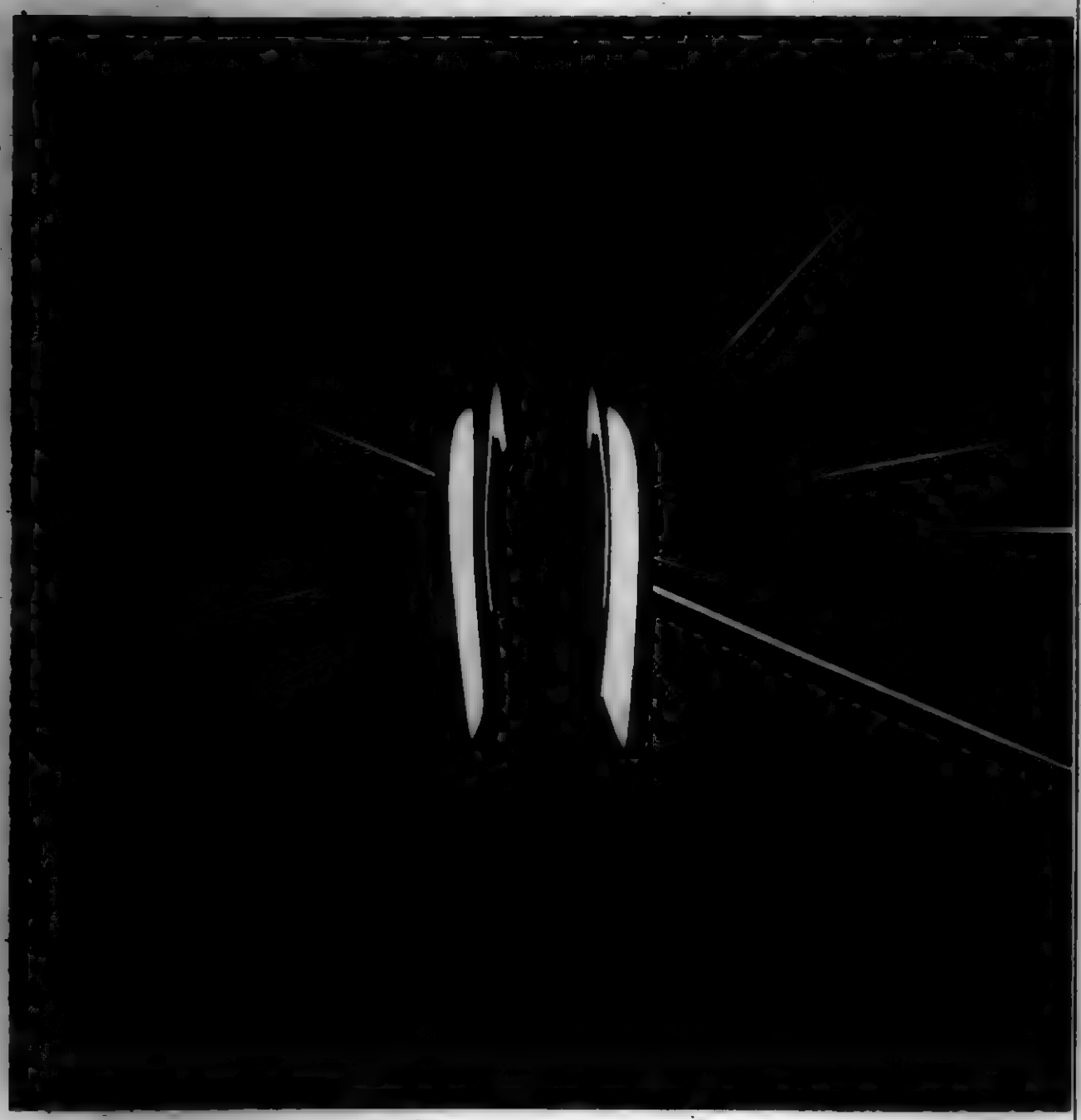
This is important for two reasons: It enables the use of eight-bit bytes and channel speeds of 64K bit/sec; and, according to Jim Day, director of systems engineering at AT&T Information Systems laboratories, it makes the interface look "virtually the same as a [PBX DS1] trunk interface."

Common channel signaling is probably most important because it is the approach being studied by the ITT Consultant Committee for use as an interface standard in the Integrated Services Digital Networks (ISDN) effort.

That part of ISDN that specifies a PBX/computer interface standard is expected by most to be established within two years.

"CPI does not give us a logical stepping stone to ISDN," Coackley said. "DMI does."

This makes HP's interface design efforts somewhat "future-proof," he continued. "We won't have to discard interfaces as we move to ISDN."



When we thread the needle, communication costs less.

The 3M Videodata® Broadband System carries thousands of messages on a single cable. It's an information utility that's cutting communication costs for 250 companies worldwide.

One cable is threaded through a factory or any spreadout institution. Up to 10,000 information sources can be connected. Computers, word processors, TV monitors and more can handle data simultaneously and never interfere with each other.

Our system can cut installation and expansion costs in half compared with the cost of routing and re-routing conventional two-wire hookups.

Hearing the needs of the information age has helped 3M pioneer over 600 products for the voice, video and data communication field. We make everything from computer diskettes to high-speed translators that put computer data on microfilm.

And it all began by listening.

3M hears you...

For your free brochure on 3M's voice, video, and data products plus all other 3M products, write: Dept. 053104/3M, P.O. Box 22002, Robbinsdale, MN 55422.

Name_____

Address_____

City_____ State____ Zip____

Or call toll-free: 1-800-328-4327.

©1984, 3M

3M

SYSTEMS & PERIPHERALS

IBM unveils CRT versions

RYE BROOK, N.Y. — IBM has announced two prepackaged versions of its 3279 color and 3280 monochrome CRT terminals, which are said to offer users the ability to adapt the units to various keyboard configurations.

Called the 3179 and 3180, the units are said to occupy 30% less space, are 35% lighter and use 20% to 50% less power than earlier 3270 series terminals. In addition, the units come with what IBM said are the most frequently ordered options on 3278 and 3279 terminals.

Among these is a modifiable keyboard with layouts that can be defined by the user. This, IBM said, can be useful for users in organizations that have varied keyboard requirements, such as airline scheduling or inventory control applications. The feature allows users to customize one basic unit instead of placing orders for special keyboard arrangements.

A spokesman said the 3179 and 3180 can be used in place of most of the 3270 line. The 3270 series terminals will still be offered, however.

Using a 3274 or 3276 control unit, the 3179 color monitor can be used with the 8100 distributed processing system. It can also be attached to any IBM mainframe designed to operate under 370-era systems software. Examples of such systems include the 4300 line and the 3080 series of processors, IBM said.

The 3180 uses a 15-in. screen and comes in two models. The Model 1 can be used in the same environment as the 3179. The Model 2 can be attached directly or through a 5294 remote-control unit to IBM's smaller System/38 and System/36 processors, the firm said.

The 3179, which uses a 14-in. screen, and the 3180 Model 1 cost $2,295. The 3180 Model 2 costs $2,195. Shipments of the 3179 began this month. Deliveries of the 3180 Model 1 will begin in May, and the 3180 Model 2 will be available in June.

IBM announced the terminals through its Information Systems Group, located at 900 King St., Rye Brook, N.Y. 10573.

HP plotter touts automatic paper feed

PALO ALTO, Calif. — Hewlett-Packard Co. has announced what it reports is the first graphics plotter with automatic cut-sheet paper feed and a measurement-plotting instrument for laboratory graphics.

Designed to allow business, engineering, science and manufacturing users to produce up to 99 copies of multicolor charts, the HP 7550A is an 11- by 17-in. plotter featuring 31½ in./sec plot speed and 6g acceleration.

According to the company, the plotter includes a replot feature that draws up to 99 copies of an original graph without rerunning the program.

It can reportedly be used as a source of hard-copy graphics in the computer room, for viewing sections of larger plots in computer-aided design and manufacturing, in engineering and science laboratories, as a peripheral in business applications and in production for generating unattended plots for automatic test systems and for process control.

The 6g acceleration reportedly can cut plotting time in half, compared with the standard 2g rate. The plotter features an LCD and front-panel function keys that replace the hard-switch settings used on other plotters.

It allows use of fiber-tip, roller-ball and liquid-ink pens in eight-pen carousels and use of 20 international character sets in two fonts.

The unit features an addressable resolution of .025mm and a mechanical resolution of .006mm and uses a single serial

See PLOTTER page 64

Burroughs airs configurations for its B1900

DETROIT — Burroughs Corp. has introduced two packaged models of its B1900 series of small business systems, called the B1900 Business Partner (B1900-BP) and the B1900 CMS.

The B1900-BP is a single-processor configuration that includes the necessary hardware and systems software to form an applications development system. Included in the package is Burroughs' logic and information network compiler. The packaged system, including a B1965 CPU, 1M byte of main memory, a microprocessor-controlled I/O subsystem, a Burroughs ET100 terminal, a 650 line/min printer and a 130M-byte disk drive, costs $122,000, Burroughs said.

The B1900 CMS configuration features object code compatibility with applications developed on other Burroughs systems using the firm's CMS operating system, including the B80, B90, B800 and B1900.

The basic configuration of the B1900 CMS includes a 6-MHz central processor with 8K bytes of cache memory. A minimum main memory configuration of 512K bytes, which is expandable to 2M bytes, is offered.

Also included is a 130M-byte, removable-pack disk drive, an I/O subsystem controller, a communications processor, dual-line adapter, terminal and line printer. The base configuration costs $70,000, the vendor said.

The latest two models are also said to incorporate features not available on the original B1900, announced last October. Among these are an integrated diagnostic subsystem called Burroughs On-Line Test and a remote-access capability.

Burroughs made the announcement at its corporate headquarters, which is located in Burroughs Place, Detroit, Mich. 48232.

INSIDE

Turnkey Systems/66
Data Storage/66
Terminals/62
Graphics Systems/62
Board-Level Devices/62

Japanese sparking supercomputer competition with U.S.

By James Connolly
CW Staff

Much has been said about the government-sponsored efforts by the Japanese to develop a new generation of computer systems set to equal or surpass the capabilities of those offered by U.S. manufacturers. Most of the Japanese development efforts have been centered on two general fronts: supercomputers and artificial intelligence processing systems.

HITACHI

Now in the third year of a 10-year development project, the Japanese have been able to show concrete results to their research. Three of the leading Japanese computer makers have announced supercomputers which appear to compete with Cray Research, Inc., Control Data Corp.'s spin-off ETA Systems, Inc. and Denelcor, Inc. — all leading U.S. manufacturers.

Details of the Japanese supercomputers are still fuzzy. But industry watchers report that in recent months, the first supercomputers produced by Hitachi Ltd. and Fujitsu Ltd. have been installed at test sites. A third Japanese manufacturer, Nippon Electric Corp. (NEC), expects to deliver its first supercomputer in early 1985.

NEC

The Japanese companies have promoted their high-end machines as providing optimum performance levels ranging from 500M floating-point operations per second (Flops) to 1.3G Flops, significantly faster than the 100M- to 800M-Flops performance range claimed by the U.S. manufacturers. While the U.S. supercomputer makers have vowed to develop a 1G-Flops processor by 1987, some researchers are skeptical that the Japanese processors can achieve their performance claims. And few researchers have had the opportunity to run benchmarks on the Japanese systems.

One of the big differences between the Japanese supercomputer vendors and the U.S. manufacturers is that the three Japanese firms are offering machines which are still basically experimental. The three major U.S. manufacturers all have installed systems. Long-time supercomputer maker Cray Research has installed nearly 70 processors since 1976. CDC claims it has installed 22 processors, and Denelcor has installed six.

FUJITSU

Benchmarks run on the Fujitsu VP-200 and VP-100 and the Hitachi S-810/20 showed the three machines generally exceeding the performance of the fastest American-built machines, the Cray XMP and the CDC Cyber 205, according to consultant Dr. Sydney Fernbach of the San Jose, Calif., area. Fernbach based his opinion on benchmarks recently run by supercomputer experts from the Lawrence Livermore Laboratory in Livermore, Calif., and the U.S. Navy Postgraduate School in Monterey, Calif.

In the Livermore Laboratory benchmark, a Cray XMP single processor performed at 53M Flops, while the VP-100 was rated at 80M Flops and the VP-200 at 131M Flops, Fernbach reported.

In the Navy Postgraduate School's benchmarks, the Fujitsu machines ran "a little faster than the Cray," Fernbach said.

Announced in 1982, the VP-100 has been installed at the University of Nagoya and is being installed at the University of Kyoto. The higher performance VP-200 apparently hasn't been installed outside of Fujitsu facilities, Fernbach observed.

Hitachi's S-810/20 at the University of Tokyo became operational in December, he said.

He added that less is known about the Hitachi machines, other than the fact that the S-810/20 did

See JAPAN page 64

SYSTEMS & PERIPHERALS

TURNKEY SYSTEMS

ELECTRONIC REALTY ASSOCIATES, INC.
ERA Command

Electronic Realty Associates, Inc. (ERA) has announced a professional real estate management computer system that reportedly combines word processing, financial spreadsheet and a real estate brokerage management system with multiuser and remote capabilities.

ERA Command is built around a Control Data Corp. CPU, which features the Intel Corp. 8086 16-bit microprocessor. Standard memory is 512K bytes, expandable to 1M byte. All memory has byte parity error detection, ERA said, and a proprietary memory management system allows separate control of each 4K-byte block of memory.

A variety of peripherals may be used with the system, including double-density, 5¼-in. floppy disk drives, hard disk drives and magnetic tape. The operating system is Microsoft, Inc.'s Xenix.

Software provided in the basic ERA Command system includes Microsoft's Multiplan financial spreadsheet, which provides financial management, a 63-col., 255-row accounting system and some forecasting capabilities; the Altos Computer Systems, Inc. Horizon word processing system, which includes a 40,000-word spelling checker and mail/merge capabilities; and the ERA Real Estate Blueprint for Success real estate management program.

Blueprint tracks listings and runs mortgage qualifying data for prospects, calculates individual and average days on market, analyzes salability of individual and overall listings, tracks individual and overall agent performance, handles office projections and analyzes short- and long-term trends.

Basic ERA Command hardware includes CDC's CPU, terminal and keyboard, 727-40 daisywheel printer, cables and starter kit. Optional equipment includes a tractor feed for printers, additional terminals, printers, tape drive and modems.

The cost of the basic ERA Command system is $10,500; lease arrangements are also available.

Electronic Realty Associates, 4900 College Blvd., P.O. Box 2974, Shawnee Mission, Kan. 66201.

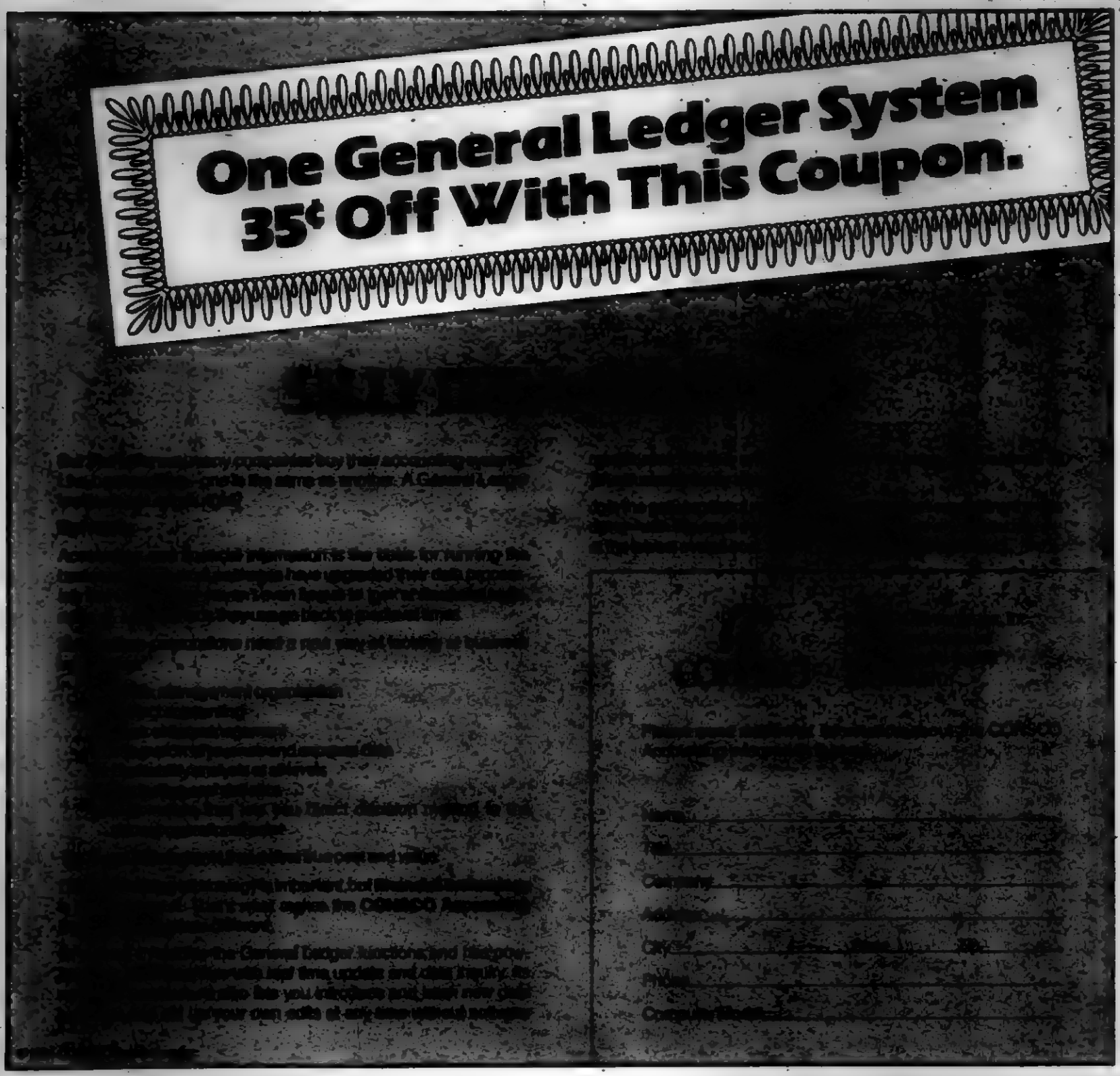
SUMMAGRAPHICS CORP.
Enhancements to Icon

Summagraphics Corp. has announced it has enhanced its Icon Series computer-aided design (CAD) system to incorporate the use of color-raster graphics. The Icon Series reportedly is for use in printed-circuit board, architectural, engineering and construction design.

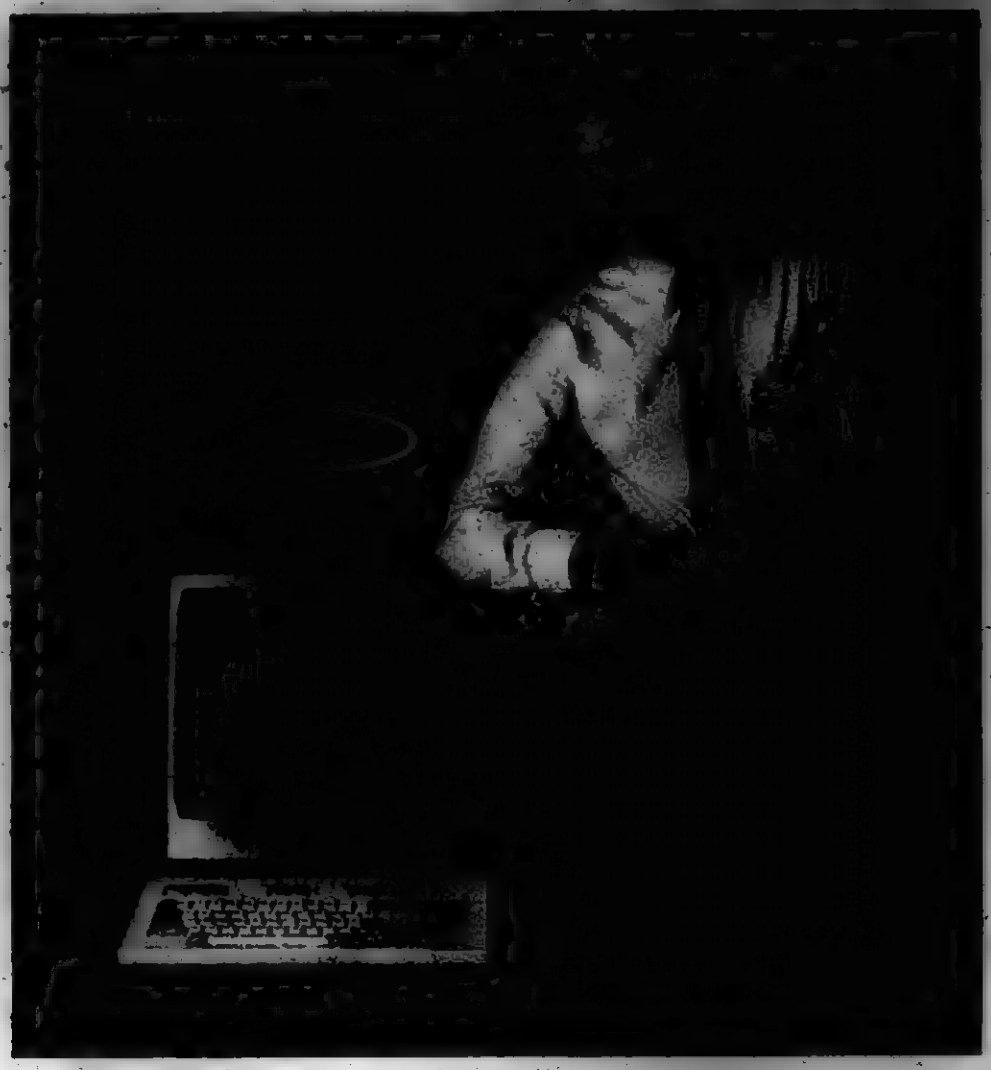
Icon Series software is said to permit users to preview, create, edit, store and recall graphics at a workstation. The Icon Series workstations are said to be self-contained and to incorporate an integral digitizer with menus and two tilt-and-swivel monitors.

The Icon Series CAD system is available for the Data General Corp.

Continued on page 92



HOW THE TERMINALS THAT GIVE YOU SO FEW PROBLEMS CAN WIND UP GIVING YOU NONE AT ALL.



While we at Teletype Corporation like to talk about our terminals' remarkable record for reliability, we have to admit that every once in a while you just might have a problem with one.

But if you contract with Teletype's Product Service Organization, getting good service is no problem at all. That's because no one can service our full line of CRTs and teleprinters as well as our service technicians. Each one of them is a company-trained, job tested professional who must continually meet our expectations—and yours.

Help is never more than a phone call away since our technicians are on-call 24 hours a day, 7 days a week. And with our network of 100 offices nationwide, we're able to provide fast response time, even to remote areas. You can contract with us for response times as low as 2 hours, or less, as your needs dictate.

But at Teletype, we feel there's something more important than fast response time. And that's fast restoral. So when our technicians call on you, they'll have the necessary test equipment and original Teletype® parts to get your terminals up and running in no time flat.

We'll even help solve problems before they occur with scheduled preventative maintenance. You can also choose our installation service option that includes everything from getting your terminals on-line to user orientation. It's all a part of our Full Service Maintenance Agreement.

So to keep your problems from becoming big problems, write Teletype Corporation Product Service Organization, 2330 Eastern Ave., Dept. 2800-A Elk Grove Village, IL 60007. Or call toll free at 800-323-4226, ext. 300. (In Illinois, 1 800 942-4192, ext. 300.)

TELETYPE: VALUE SETS US APART.

©1984. Teletype Corporation.
"Teletype" is a registered trademark and service mark of Teletype Corporation.

Official Sponsor of the 1984 Olympic Games

AT&T
Teletype Corporation

VAX™

The most comprehensive Project Management System is *now available* for *immediate installation* on *your* VAX.

APECS/8000™
WITH TRUE RELATIONAL DBMS

From ADP's over 1,000 client-years of experience in Project Management Computing.

CALL NOW
1-800-521-3166
Ask for Glenn Gurnley.

ADP
Network Services

VAX is a trademark of Digital Equipment Corporation

WHAT TO LOOK FOR IN ON-SITE TRAINING

With all the technical training options around today, it's hard to figure out which company will offer the most professional, reliable on-site training. Here's Sys-Ed's checklist of key benefits that will make your training investment really pay off.

ARE THESE BENEFITS INCLUDED?	SYS-ED	OTHERS
• Qualified training consultant for needs analysis and skills inventory?	YES	NO
• Comprehensive, coordinated curricula of CICS, IMS, VSAM, TSO ISPF or MVS JCL training?	YES	NO
• Complete range of training for the IBM environment, including IDMS, DATACOM, ADABAS and FOCUS?	YES	NO
• Ongoing technical support?	YES	NO
• Satisfaction guarantee?	YES	NO
• Additional charge for customized training?	NO	YES
• Thousands of solid references?	YOU BET	?

If you ask other training companies the answers to these tough questions, you'll probably make the decision thousands of decision-makers like yourself made: to get your training from The Computer Education Professionals at Sys-Ed.

Write Sys-Ed or call 212-889-3386 for more information about the range of on-site course options. By the way, we also offer public, regional and consortium courses.

____ Tell me about your on-site training.
____ I'd like a schedule of your public courses in my area.
✓ Be sure to let me know about the Sys-Ed Multi-Course Discount and your Satisfaction Guarantee!

Name Company
Address City/State/Zip
Phone Number

SYS-ED.
The computer education professionals

One Park Avenue, New York, NY 10016 212-889-3386
New York • Chicago • Dallas • San Francisco • Los Angeles

SYSTEMS & PERIPHERALS

Continued from page 90

Desktop Generation computers. A four-workstation, black-and-white monitor configuration costs $149,000. A four-workstation color monitor configuration is available for $180,000.

Summagraphics, 777 State St. Extension, P.O. Box 781, Fairfield, Conn. 06430.

DATA STORAGE

COMPUPRO SYSTEMS, INC.
Disk 1A

Compupro Systems, Inc. has introduced a floppy disk controller that utilizes direct memory access (DMA) arbitration to handle any combination of up to four 8-in. or 5¼-in. drives.

Disk 1A is based on a third-generation, large-scale integration floppy disk controller chip and is designed for high-level industrial, commercial and scientific microcomputer systems, the company said.

Disk 1A provides for 24-bit DMA addressing across 64K-byte boundaries, with data transfer throughout to 16M-byte memory. The product supports IBM 3740 single-density formats or System/34 double-density soft-sectored formats. Its price is $695.

Compupro Systems, 3506 Breakwater Court, Hayward, Calif. 94545.

JUPITER SYSTEMS
J18, F84, F474 disk drives

Jupiter Systems has introduced a series of disk drives designed to increase the storage for the J12, the vendor's high-speed graphics workstation.

According to the vendor, the J18, F84 and F474 Winchester drives offer 15M bytes, 67.4M bytes and 352M bytes of formatted capacity, respectively, providing the local mass memory needed for solids modeling and image processing applications. The local memory of the Motorola, Inc. 68000-based Jupiter 12 reportedly can be expanded from 256K bytes to 4M bytes.

Two of the J18 disks can be mounted within the J12 cabinet, while the larger models form a separate module. Prices range from $3,000 to $20,000. The disks are available for immediate delivery.

Jupiter Systems, 2126 Sixth St., Berkeley, Calif. 94710.

TERMINALS

MEAD-HATCHER, INC.
2022LP, 2025LP CRT workstations

Mead-Hatcher, Inc. has announced the addition of two models to its Ergo-mate line of CRT workstations.

The 2022LP accepts keyboards up to 22 in. in width, while the 2025LP accepts (word processing) keyboards up to 25 in. in width. Either can be used with existing furniture or mounted on a custom support stand to provide an ergonomically correct stand-alone workstation, the vendor said.

Both models have CRT platforms 2½-in. high. The price for the 2022LP is $115; the 2025LP is $125.

Mead-Hatcher, 752 Military Road, Buffalo, N.Y. 14216.

TERMINAL DATA CORP.
Videomate VMT-1010

Terminal Data Corp. has announced a high-resolution, raster-scan display module designed as a building block for high-resolution image display terminals.

The Videomate VMT-1010 is said to be a full-page, high-resolution raster scan, 15-in. monitor offering flicker-free images of documents, raster graphics and other high-resolution or high-density raster scanned data.

The single-quantity price is $1,740, while the OEM, 1,000-unit price is $695. It is available now.

Terminal Data, 21221 Oxnard St., Woodland Hills, Calif. 91367.

GRAPHICS SYSTEMS

ADVENT SYSTEMS, INC.
Formula One

Advent Systems, Inc. has introduced a microcomputer-based graphics workstation that allows users to create camera-ready documents using as many as 1,500 different characters and symbols.

Called Formula One, the system features a high-resolution, full-page screen with 65 to 128 line/page and up to 250 char./line, plus a 1-mil (one-thousandth of an inch) precision printer with user-selectable draft, memo, letter or typeset quality printing at speeds ranging from 20 to 390 char./sec.

According to the company, the images on the screen, which may contain combinations of up to 1,500 different characters, scientific symbols or a mix of text and graphics, are duplicated exactly on the printed page.

Both the display and printer can access up to 16 different fonts, each containing 96 characters or symbols.

Formula One can be used with most 16-bit microprocessors operating under either Digital Research, Inc.'s CP/M 86 or Microsoft, Inc.'s MS-DOS. The display/printer station plus the image processing software is priced at $9,995 in single quantities.

Advent Systems, 400 Amherst St., Nashua, N.H. 03063.

BOARD-LEVEL DEVICES

GENERAL ELECTRIC CO.
CCM3 communications module

General Electric Co. has announced the CCM3 communications module for its Series Six line of programmable controllers.

The CCM3 allows interfacing to Fisher Controls' Provox instrumentation systems via Fisher's type DH6005 programmable controller interface unit. Up to eight GE Series Six controllers can be connected to a programmable controller interface unit. A total of 64 registers of data (either analog or discrete values) can be communicated to the Fisher unit from the Series Six controllers, the vendor said.

The Fisher system can also change values in the Series Six controllers. Available in April, the CCM3 is priced at $1,500, according to a company spokesman.

GE, Programmable Control Department, P.O. Box 8106, Charlottesville, Va. 22906.

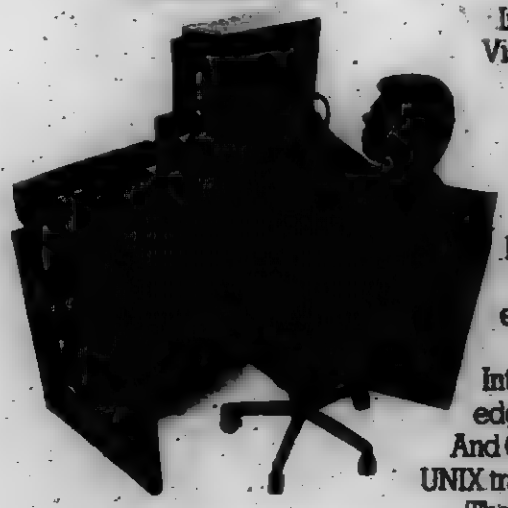
THE LONG & SHORT OF NEW UNIX™ INTERACTIVE VIDEO TRAINING.

Independent study results show that student recall and retention improve up to 26.3% with interactive video.

Users report reductions of 40-66% in training time with interactive video.

What way to train UNIX is the best way to train UNIX? Live classroom instruction? Passive video? Or interactive video?

Studies show there is no faster, more effective, training method than interactive video.



Introducing the first UNIX Videodisc Training Curriculum. Vision.

It combines the power of the computer, the speed of a laser disc and the personality of live classroom instruction. Vision Interactive Videodisc Training captures and holds a student's interest in a way no other medium can.

Students learn by doing. So they learn faster, comprehend better and retain information longer. They spend less time away from the job. And are more productive once they return.

Because Vision training is targeted, you can choose just the Courses you need for your employees. And students learn only what they need to know to do the job. Now.

What's more, Vision was developed by Interactive Training Systems, the acknowledged leader in interactive video training. And Computer Technology Group, a leader in UNIX training.

The result? UNIX training so fast, so effective and so affordable, we back it with a full 30-Day Money-Back Guarantee.

Plus, if you lease all three Vision Curriculum courses for one year, we'll give you the use of an IBM PC, laser videodisc player, color monitor and Interactive Training System Controller. Absolutely Free.

Take advantage of our Free Introductory Offer. Send in the attached coupon. Or call us at 1-800-227-1127. Don't wait too long; you'll get caught short.

FREE INTRODUCTORY OFFER!

☐ Please have a representative contact me immediately.

☐ Please send me more information about Vision, the UNIX Interactive Video Training Curriculum.

Name _____

Company _____

Title _____

Address _____

City _____ State _____ Zip _____

Telephone _____

UNIX is a Trademark of Bell Laboratories

Interactive Training Systems, Inc.
4 Cambridge Center, Cambridge, MA 02142

PLOTTER from page 58

computer port.

The HP 7550A is priced at $3,900 and can be delivered four to six weeks after receipt of order.

The company's measurement plotting system is the HP 7090A, which is designed to combine the benefits of digital plotters, waveform and X-Y recorders and data acquisition systems into a single laboratory graphics device.

As a low-frequency waveform recorder, the HP 7090A reportedly provides 1K words by 12 bits of buffer memory and a 30K sample/sec analog-to-digital converter on each channel. Slew response is said to be 3 kHz.

As an analog X-Y recorder, it is said to offer three high-sensitivity, high common-mode rejection rate inputs for X-Y or Y-T recording, 41,000 calibrated sensitivity ranges and zero offsets, 2g constant acceleration and 50 in./sec slewing speed.

According to the company, it also can perform as a plotter when connected to a controller or smart instrument. It includes 42 HP-GL graphics language instructions and draws at 29½ in./sec, the company said.

Output can be plotted on 11- by 17-in. paper and 8½- by 11-in. paper and transparency film. As a component in a data acquisition system, it reportedly can send data to a controller at a streaming rate of up to 250 sample/sec.

Available six weeks after receipt of order, the HP 7090A is priced at $4,400. More information is available from HP, located at 1820 Embarcadero Road, Palo Alto, Calif. 94303.

JAPAN from page 59

perform in the area of 100M Flops, faster than the American machines, but slower than Fujitsu's.

"It's still pretty good performance. I didn't expect Hitachi to be at a lower level than Fujitsu, but it is still premature to say that one machine is superior to the other," Fernbach said.

He also stressed that with software modifications, the Cray XMP was able to reach 100M Flops in a later test.

Peak performance

Still a year away from production, the NEC SX-2 supercomputer is billed as being capable of 1.3G Flops and the NEC SX-1 supercomputer at 570M Flops. Hitachi claims a peak performance of 630M Flops for the S-810/20 and 315M Flops for the S-810/10. Fujitsu claims a peak of 500M Flops for the VP-200 and 250M Flops for the VP-100.

While the Japanese manufacturers are marketing their supercomputers in Japan now, or in the NEC case planning to market them, it may be several years before they are sold in the U.S., reported Dr. John Riganati, chief of computer systems for the National Bureau of Standards.

He noted that each of the three Japanese companies claims to have a one-third share of the Japanese supercomputer market, estimated at 100 potential installations.

Fernbach noted Fujitsu, said to be negotiating with Amdahl Corp. regarding an American supercomputer distribution network, may use that type of agreement to beat Hitachi to the American marketplace.

Riganati said the Japanese products appear to be on schedule and added, "They appear to be producible. They aren't made with the hard, custom wiring that Cray had to go through."

Riganati said, "In general, the machines appear to do considerably better than anything in the American marketplace today. But I would not say the Japanese are ahead. They have built machines, which have to be taken seriously, using state-of-the-art technology."

Advantage in software

Riganati and Fernbach concurred that two of the advantages that the Japanese hold are in the area of software and that the machines are IBM-compatible.

They noted that Cray founder Seymour Cray, who is working on what are expected to be faster successors to the XMP and Cray 1, limited the company's market by relying on customers to develop their own software.

But Cray and ETA Systems, which traditionally has offered more standardized software than Cray, don't offer IBM compatibility. For the Japanese, IBM compatibility means the ability to rely on an IBM mainframe as a front-end machine, using standard IBM software.

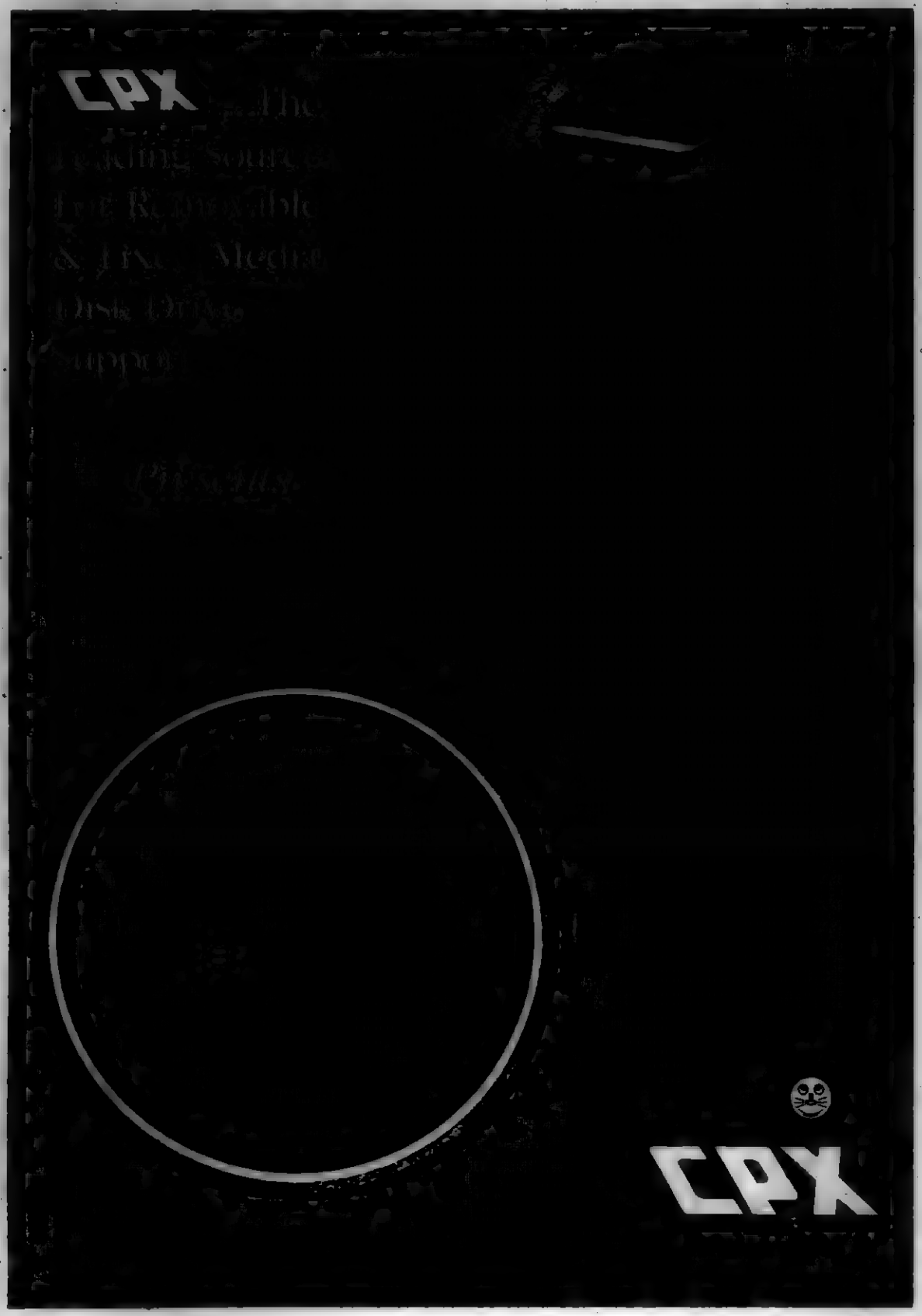
Riganati and Fernbach noted that the compatibility feature may make Japanese supercomputers more attractive to IBM shops such as businesses, rather than just government agencies or researchers. That compatibility may speed IBM's move into the supercomputer market, Riganati said, adding that IBM has a significant 15% to 20% scientific base.

The industry observers also said the Japanese companies, particularly Fujitsu, appear to have made better use of software in the vector portion of the processors.

"They were able to go in and put in better vectorizing routines than we have done," Fernbach said, noting that some of the Fujitsu edge came from its researchers' work at the University of Illinois, work that he said American companies failed to use to full advantage.

What remains unknown, however, is how the Japanese supercomputers will be priced in the U.S.

Riganati and Fernbach said they expected the systems to be "in the ballpark" with their American competitors. That would mean prices in the range of $15 million to $20 million, depending upon the configuration, according to Fernbach.



IN DEPTH

ILLUSTRATED BY RICHARD TERHART

Third-party liability insurance: protection in case of computer error

By Paul Cottrell and Barry D. Weiss

All computer-age businesses can apply a three-step management program to insure properly the risks they face. Such a program will often include consultation with computer-knowledgeable legal counsel, risk management consultants and underwriters.

Step 1 is to define the risks. For example, programmers, systems analysts and other design-oriented professionals may face negligence or malpractice claims if a program malfunction causes injury to either their clients or third parties. The case law in this area is still extremely unsettled, but even unfounded claims can require substantial defense costs.

As the standards of professional practice for these computer specialists become better defined, injured parties will try to hold these specialists to a higher "professional" standard of care — much like doctors, accountants, architects and lawyers. Hardware and software manufacturers face possible product liability claims as well as contract-based claims from dissatisfied or injured users or third parties. Again, much of the case law in this area is unsettled, but the incidence of user suits is well documented. NCR Corp., for example, was found liable in a number of multimillion-dollar user suits.

Few insurance brokers appreciate the new and unusual risks accompanying computer use. Nevertheless, armed with a rudimentary understanding of policies available as well as the risks to cover, the DP manager or vendor can now find adequate coverage to ensure financial survival.

Step 2 is risk reduction. Risk reduction is the attempt to minimize the risk that your enterprise will bear should a loss occur. It has two parts. First, wherever possible, allocate the foreseeable risks through contractual risk-shifting devices. In the vendor-user area, the now common disclaimers of warranty may effectively place certain risks entirely on the user.

Vendors should beware, however, that courts have been extremely sympathetic to the claims of unsophisticated purchasers who sue a vendor whom they allegedly relied upon for expertise. Again, NCR has been held liable in many instances even though it sold equipment under contracts with express disclaimers of warranty.

If a court finds that a disclaimer was not truly part of the bargain, it may not enforce it. Likewise, indemnity or "hold-harmless" clauses can be used. However, as with disclaimers, caution is advised because many courts will not enforce broad indemnity clauses. Users must also be aware of the many risks they face when contracting for a system purchase. For example, sophisticated purchasers of software will insist on a source code escrow deposit to cover the risk that the vendor will not be able to honor its maintenance or updating agreements.

The second part of the risk reduction process is to minimize the damage potential of risks that cannot be allocated to others. For example, duplication of important data media and off-site storage of the duplicates will greatly minimize the damage potential of injury to the on-site media.

Minimize damage potential

The second part of the risk reduction process is to minimize the damage potential of risks that cannot be allocated to others. For example, duplication of important data media and off-site storage of the duplicates will greatly minimize the damage potential of injury to the on-site media.

Step 3 in the risk management program is to make contingency plans for those risks that cannot be shifted to others or completely eliminated through risk reduction planning. These contingency plans must provide for the financial stability of the enterprise in the event of loss. Such planning will almost always include some forms of insurance. The planning may also provide that those to whom you have contractually shifted certain risks will, in turn, provide adequate insurance for the contractual liability that they have assumed.

This is a very conservative approach, but it does give greater assurance that injured third parties will have an insurance fund from which to satisfy potential claims. If they do not, and the primary third-party defendant has insufficient resources, the risk shifting entity may be the only "deep pocket" to which a claimant can look. For example, the fact that a programmer agrees to indemnify a software house against any claims for negligence brought by third-party purchasers will be of little value when the programmer goes bankrupt. But if the programmer has insurance to cover the risks for which he agreed to indemnify, then the software house is assured of adequate financial protection.

As to your own financial planning, larger entities may prefer to set up in-house self-insurance plans. However, such planning requires a high degree of sophistication, resources and, usually, outside risk consultants. Most enterprises will seek various forms of insurance to protect the company's assets.

There are several different forms of insurance on the market today. Some companies offer comprehensive data processing insurance; others offer "errors and omissions" or computer "malpractice" policies. They are being issued by firms such as Shand, Morahan & Co. of Evanston, Ill., St. Paul Fire & Marine Insurance Co., The National Union Fire Insurance Co. of Pittsburgh (a subsidiary of American International Group) and The Chubb Corp. In each instance, these policies are similar in that they define the risk insured so as to provide coverage where traditional policies would not.

To date, there does not appear to be any published court opinion construing the coverage language of this new generation of policies. Nonetheless, there is a fast-growing market.

Common coverage problems

Even as the insurance market begins to recognize and to respond to the peculiar needs of the computer industry, there are still many specialized perils where it is difficult to acquire coverage. And even where coverage is available, there is little uniformity in language among the various policies on the market. Moreover, few brokers appreciate the new and unusual risks accompanying computer use. Nevertheless, armed with a rudimentary understanding of the insurance policies available, as well as the risks he needs to cover, the contemporary DP manager, vendor or professional can now find adequate coverage to insure his financial survival.

The current market for computer insurance (often referred to as

"electronic data processing insurance") includes several different kinds of coverage. Property insurance (often called first-party insurance) covers the direct physical losses resulting from fire, flood or other physical peril. Most home owners policies, for example, will cover a home computer if it is not used primarily for business purposes. If it is, you must look to the specialized market for computers where companies such as Chubb, St. Paul Fire and Marine and Central offer coverage. However, a home owners' policy will not cover loss due to power surges.

Finally, another specialized insurance market is now developing: coverage for unauthorized computer access. This area is being spearheaded by Shand, Morahan & Co. Here, the traditional coverage labels begin to break down since the unauthorized access policy offered by Shand includes both property coverage and liability coverage.

Liability insurance (also called third-party insurance) covers claims brought against the insured by third parties. Liability insurance traditionally breaks down into two subgroups — comprehensive general liability (CGL) coverage and professional liability coverage (the latter often referred to as "errors and omissions," or E&O, insurance).

History and structure

The reasons for this breakdown have to do with the history and structure of the insurance industry and the actuarial differences between the various risks covered. CGL policies are typically written for businesses to provide coverage for ordinary lawsuits (for example, someone slips and falls on the premises), and specific peril insurance can be added on where needed (for example, a manufacturer will add products liability coverage). Broadly speaking, E&O coverage arose to protect professional service concerns such as architects, accountants and lawyers.

Obviously, only certain businesses need certain coverages. An auto repair shop, for example, doesn't need E&O coverage. But there are questions peculiar to the computer industry that have not been clearly resolved, and there is confusion in the insurance market where some of the same risks are addressed both by policies labeled as CGL as well as some labeled E&O. The problem emphasizes the need for DP managers to review carefully the actual insurance language rather than rely on more labels. The DP manager should be aware of these potential problem areas when reviewing individual policies in any of these categories.

Finally, the coverage question is made more complicated by the attempts of some companies to blend or integrate separate coverages into a comprehensive insurance package. For example, St. Paul is offering an "integrated" policy package that includes property, CGL and E&O coverage.

Property coverage

Property or first-party coverage is the traditional insurance that any individual or firm might purchase to provide financial reimbursement for property loss. DP risk managers must consider property coverage for computer hardware, peripherals, software programs, data and storage media. Most traditional property policies do not cover "intangibles" such as software and data. Specialized DP property policies do cover these items. Companies writing in this area include St. Paul, Chubb, Central and Aetna Life and Casualty Co.

While this new generation of policies has been specially written for computers, a careful review of policy definitions is still recommended for any given DP facility because the perils that are insured and the exclusions will vary. For example, timesharing and service bureau DP facilities that process data for others may need property coverage not only for loss to their own data but also for their client's data. This risk, of course, is a liability risk that may also be covered by CGL or E&O. But traditional CGL policies exclude "contractual liability" coverage. Again, a careful review of coverage language with your broker is essential.

Once definitional coverage issues are resolved, users must cope with valuation problems. It is difficult (and sometimes impossible) to determine the "value" of certain electronic data. For example, what is the value of time records in the computerized billing system of an accounting firm whose revenues are based on an hourly fee basis? Is it the cost of reproducing those records or the dollar value of the billings lost?

Most DP policies will only cover reproduction costs unless you "value" your data in your policy and obtain specific dollar coverage. A special endorsement to the policy for "valuable papers" may be needed. DP property policies also make available such traditional coverages as accounts receivable endorsements, business interruption insurance and additional (or extra) expense coverage (the additional expense being the cost of recreating the records).

One final word about coverage issues: Careful review of what risks are covered under a property policy is crucial. Insurers generally offer two basic modes of property risk protection packages: first, "defined risk" policies, which only cover the specific risks mentioned; and second, "all-risk" or "blanket" protection, which covers any risk except those specifically excluded. Understandably, insurers charge a lower premium for defined risk coverage. However, many DP insureds have learned the hard way that the traditional

(Continued on ID/6)

FACE THE REAL COST OF DIVESTITURE!

Managing Complex, Multicarrier/Vendor Networks! Diagnosing Faults! Crossing Carrier Gateways! Interfacing Voice, Data and Telecom Equipment! Optimizing Hardware, Tariff and Software Opportunities!

Learn how at the new NETWORK MANAGEMENT TECHNICAL CONTROL Conference & Exposition

May 21-24 1984, Sheraton Washington Hotel, Washington, D.C.

Sponsored by the Communication Networks '84 Team

First program to ZERO IN on Divestitures' Operating Headaches — See new tech control and software solutions — Self diagnostic Modems & Components — Computer programs for network optimization, change and equipment management!

Learn at In-Depth Seminars May 21 & 22

Dr. Dixon Doll
Strategic Planning

Six other sessions on Net Diagnostics, Tech Control, PBX Interfaces, and more!

Choose from 40 "How-To" Conference Sessions May 23 & 24

Keynote Speaker:
Dr. Lee Selwyn

Case Histories - New Applications
Early Birds - Problem Solvers

Show Sponsors Include: Avant-Garde • Dynatech Data • General DataComm • Hekimian Labs • Racal-Milgo • Paradyne • Pulsecom Div., Harvey Hubbell Inc.

Exhibitors Include: Arus Corp., Datacom Management Sciences, Digilog, Digitech Industries, Infinet, Intotron, International Data Sciences, NEC America, Versa-Lite, and more!

Exhibits will be open: May 23, 9:30 - 5:00 and May 24, 9:30 - 4:00.

For Full Program Information Call 1-800-225-4698 (In Mass. 617-879-0700) or return the coupon below to Communication Networks — NM/TC, Box 880, Framingham, MA 01701

Please send Registration Information ☐ Please send Exhibit Information ☐

Register me for:

☐ Two-day In-Depth Sessions (May 21 & 22) $595

☐ NM/TC Conference (May 23 & 24) $295

☐ Four Day Full Program (May 21 - 24) $795

Name/Title _____
Company _____
Address _____
City/State/Zip _____
Telephone ( ) _____

FREE ADMISSION TO EXHIBITS FOR QUALIFIED BUSINESS & TELECOM PROFESSIONALS!

Applied Health Care v. Minicomputer

In a recent case dealing with computer risk insurance, Applied Health Care Systems, Inc. brought suit against Minicomputer Technology, Inc. Applied Health sought recovery of $1.5 million in damages stemming from Minicomputer's introduction of a faulty controller into Applied Health's data processing system.

Applied Health was in the business of providing processing services to health care facilities in Chicago. These facilities used Applied Health's system for storing and retrieving patient care and billing records.

Under an oral contract with Applied Health, Minicomputer Technology, a California corporation, had installed four controllers in Applied Health's in-house data processing system in April 1980.

When the system failed and substantial receivables were lost, Applied Health lost many of its customers and was eventually forced to terminate its business operations. Applied Health sued Minicomputer on the grounds that the controllers were defective. Specifically, it was alleged that a wiring connection caused the malfunction leading to random losses of customer billing and patient care information.

Minicomputer manufactured, marketed and sold both hardware and software products. In the suit brought by Applied Health, Minicomputer was subject to a claim based on a hardware component.

CGL policy

When sued, Minicomputer tendered the defense of Applied Health's claim to its insurance carrier, Centennial Insurance Co., under a Comprehensive General Liability (CGL) policy issued by Centennial to Minicomputer. CGL coverage is a standard policy coverage that all business entities secure to protect themselves for the defense and payment of claims by third parties, that is, parties other than the insured and insurance company. These policies were designed to provide coverage for liability exposure arising from personal or bodily injury and tangible property damage.

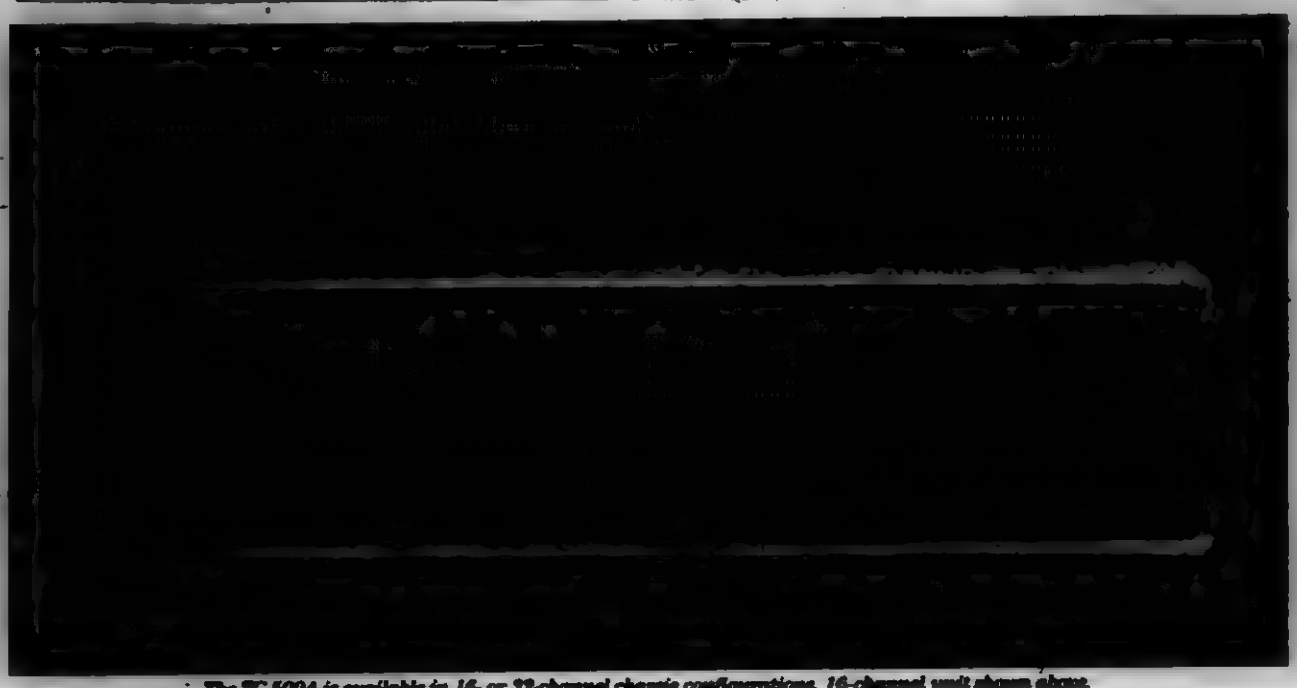
Centennial declined to accept Minicomputer's tender of defense because, in its opinion, loss of computer data was not an injury to *tangible* property. The CGL policy's definition of property damage was as follows:

- Physical injury to or destruction of tangible property which occurs during the policy period, including the loss of use thereof at any time resulting therefrom, or
- Loss of use of tangible property which has not been physically injured or destroyed, provided such loss of use is caused by an occurrence during the policy period.

Centennial argued that coverage under its CGL policy did not apply because the allegedly faulty controllers did not cause "property damage" since information stored in a computer data base is not "tangible property."

Centennial also asserted that even if "property damage" had occurred, the loss would not be covered because of its CGL Policy Exclusion *(m)*. That exclusion provided that the insurance coverage would not extend:

- *(m)* to loss of use of tangible property which has not been physically injured or destroyed resulting from:
- A delay in or lack of performance by or on behalf of the named insured of any contract or agreement, or
- The failure of the named insured's products or



The TC-500A is available in 16- or 32-channel chassis configurations. 16-channel unit shown above.

COMDESIGN INTELLIGENT STATISTICAL MULTIPLEXERS:

MORE FEATURES FOR YOUR COMMUNICATIONS DOLLAR

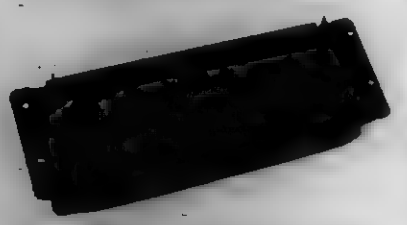
An attractive price and a long list of features make ComDesign's TC-500A Intelligent Statistical Multiplexer a great value. In fact, it would be hard to beat this multiplexer for data concentration, error control and throughput.

But that's not all.

The advanced intelligence of the TC-500A also gives you the complete system control you would expect only from an expensive network processor.

IT'S FLEXIBLE

Compatible with virtually any host computer, the TC-500A can connect up to 32 terminals, printers, personal computers, or other CPU's over one phone line.* With all the performance of a direct connection. Just select the exact channel configuration you need. The TC-500A supports all popular speeds, flow control conventions, and special character formats.



The TC-500A's unique firmware module, Flexpak, permits easy in-the-field software upgrades and access to latest ComDesign software releases.

Free application engineering and support is available to all customers from ComDesign's highly-qualified "data comm doctors."

EASY TO USE

The TC-500A is also surprisingly user-friendly. For starters, you never have to flip DIP switches or figure out complicated codes. As a matter of fact, the TC-500A is menu driven, in plain English. All commands are simply entered via the convenient front panel or through the supervisory CRT.

A NETWORK CONTROL CENTER TOO

The TC-500A's multiple microprocessor based architecture makes it powerful enough for network control and management functions. From either end of the network, you can monitor and test the entire system or its individual components, perform complete reconfiguration or change any operating parameter.

And, should anything ever go wrong, the TC-500A's extensive self-diagnostic capabilities make it easy to pinpoint the problem and effect immediate corrective action.

Add it all up, and we think you will agree, that the TC-500A will give you more for today's *and* tomorrow's communications dollar.

For complete information, write to us at ComDesign, Inc., 751 South Kellogg Ave, Goleta, CA 93117 or better yet call us **toll-free.**

(800) 235-6935

(800) 368-8092 in CA

ComDesign

*Expandable to 32 asynchronous and 4 synchronous.

See us at Dexpo East in Boston, Booth #739.

A case study of liability insurance

work performed by or on behalf of the named insured to meet the level of performance, quality, fitness or durability warranted or represented by the named insured.

Both the exclusion and the CGL policy definition of "property damage" were (and still are) standard clauses in comprehensive general liability policies issued by most major insurance carriers. But, as demonstrated here, this standard language is inadequate for computer-related risks.

Using these two arguments, Centennial informed Minicomputer that it would neither defend Minicomputer against Applied Health's lawsuit nor pay any settlement or judgment should Minicomputer settle or be found liable to Applied Health. Centennial also filed a separate declaratory lawsuit asking a federal court to rule that it had properly denied coverage and that it had no duty to defend or indemnify Minicomputer.

But the federal trial court ruled that Centennial had to defend and indemnify Minicomputer. Centennial appealed this ruling, and while the appellate court held that Centennial did have a duty to defend Minicomputer in the Applied Health litigation, the question as to whether the CGL carrier had a *duty to pay* for any judgment entered could not be decided until trial.

A jury would then determine the nature of the damages and thereby indirectly determine whether the claim was within the coverage perimeter of the CGL policy.

The Centennial case illustrates some of the risks that businesses bear whenever they fail to provide appropriate coverage for data processing liability exposure. For example, the customers of Applied Health ran the risk that their receivables would be destroyed by a faulty computer or program.

Applied Health ran the risk that it would be sued by its customers if it used a defective computer or computer program. And, of course, Minicomputer ran the risk that it would be sued by its customers, and it also ran the risk of incurring legal fees in suing its insurance carrier over the scope of its coverage. Without adequate insurance coverage, these entities have substantial liability exposure. Indeed, Applied Health was allegedly forced out of business.

Liability carriers ordinarily assume two duties. First, the carrier agrees to defend any covered lawsuit filed against the insured. Second, the carrier agrees that if the insured is found liable, the carrier will pay or indemnify the insured for any damage judgment or settlement.

Inadequate insurance coverage exposes businesses to substantial legal defense costs plus uninsured or potentially uninsured contingent liabilities. The carrier's duty to pay, of course, does not become effective until the underlying lawsuit is resolved (a process that may take several years). The carrier's duty to defend protects the insured from the risk of catastrophic legal expense, irrespective of whether the claim is meritorious. The duty to defend and the duty to indemnify or pay are altogether separate obligations.

Returning to our case example, Minicomputer was fortunate that the court held that California law governed the duty-to-defend question. Under California law, the insurer's duty to defend goes beyond the "four corners" of the complaint. A court will also consider any allegations that might have been made under the circumstances.

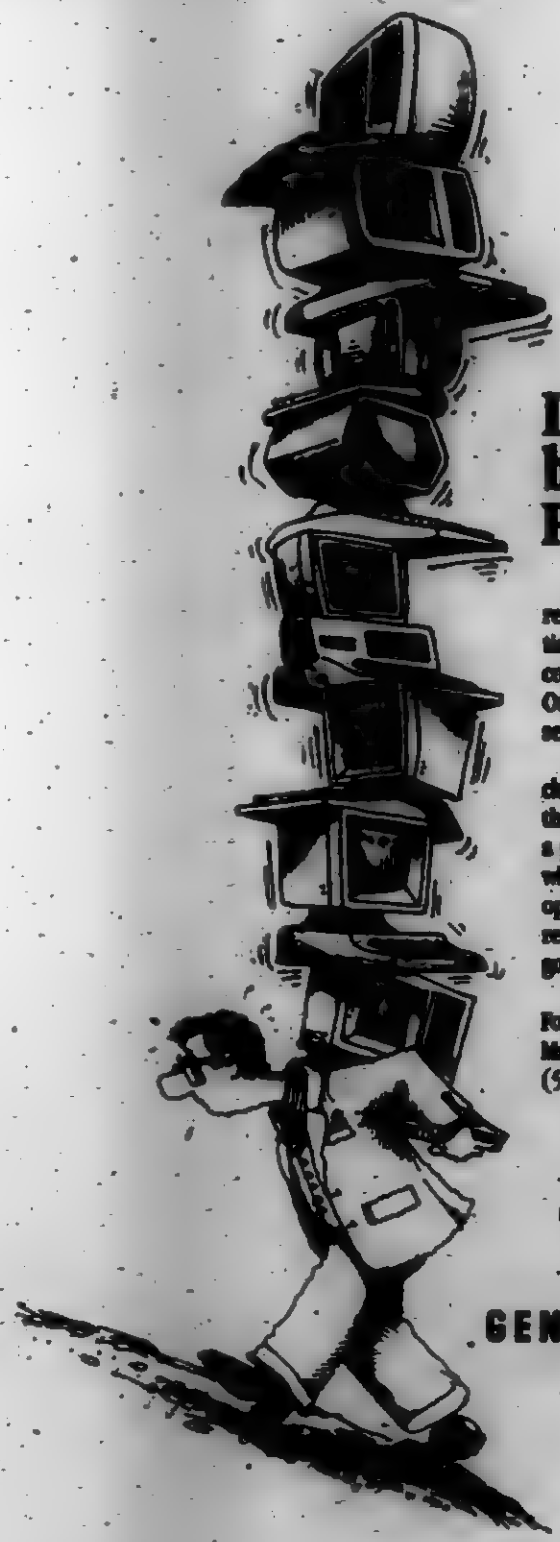
Accordingly, Centennial was obligated to defend Minicomputer against Applied Health even though Applied Health had not actually alleged "tangible property" damage in its complaint, since such a loss might have been alleged given the other material allegations.

Contingent Liability

Even though the court's ruling meant that Minicomputer had coverage for its defense costs, Minicomputer still faced considerable exposure. Since Centennial's duty to indemnify or pay Minicomputer for any judgment in favor of Applied Health could not be resolved until the underlying suit had ended, Minicomputer still carried a potentially uninsured contingent liability. Minicomputer was also stuck paying its own costs litigating the duty-to-defend question against Centennial.

Had California law not applied to the case so that Centennial would not even have a duty to defend, then Minicomputer would have had even greater exposure. Under Illinois law, for example, an insurer's duty to defend is narrower.

Regardless of what state law governed all of Minicomputer's risk could have been eliminated with proper insurance coverage. As it was, Minicomputer's CGL policy language did not clearly cover the risks Minicomputer faced.



Let us bear your PC burden.

General Electric now offers relief for busy managers of information systems: complete service for your company's personal business computers. On-site right where they are, or at GE service centers from coast to coast.

With GE as your service source, you choose any one of several service options that's best for you. For example, we have a program that provides you with a loaner while your PC is at our service center. If you opt for on-site contract servict, we can respond fast, day or night, if something goes wrong.

So take a load off your shoulders. For more information, call Rob Rackowski, Manager—National P.C. Service Sales, (518) 385-4092.

Put GE on your PC.

General Electric Company
Instrumentation & Computer Services Dept.
1 River Road, Building 6, Room 208
Schenectady, NY 12345

GENERAL ELECTRIC

(Continued from ID/3)

risks that were "defined" have not anticipated the susceptibility of delicate hardware and software to such risks as power supply malfunctions (such as power surge) and atmospheric or environmental conditions.

Sophisticated DP risk managers can now identify the reasonably foreseeable DP risks and manage such risks through a combination of physical controls — such as surge suppressors and environmental control systems — and defined coverages. Although most of the new-generation computer policies are written on an alleged "all-risk" basis, the exclusions must be examined carefully.

St. Paul, for example, will generally only cover certain mechanical and electrical breakdown risks if you implement proper physical controls. Physical controls ranging from Halon or carbon dioxide discharge systems to complex disaster recovery plans are, at the least, recommended components of a comprehensive risk management plan. These controls will likely decrease the actuarial risk for your facility and thus yield significantly lower premiums to insure your property.

Liability coverage

Liability coverage contains definitional problems similar to those contained in the property line. First, any business entity should have CGL. The question is whether the firm's current CGL coverage is adequate and, if not, whether a different type of policy should be procured.

The traditional coverage provided by the old form CGL policies is inadequate for data processing users because of the problems illustrated in the Centennial Insurance Co. decision (see related story on ID/4). The decision showed that since the traditional CGL coverage language is keyed to "physical injury to or destruction of tangible property," it may not provide coverage for claims arising from loss of data or injuries due to defective software design. Newer policies, such as those issued by St. Paul, Chubb and Shand, address this problem by redefining the coverage.

There are three basic analyses to be reviewed regarding any liability insurance policy. First, how is coverage defined (for example, tangible or intangible, claims-made or occurrence basis). Second, what do the exclusions take away (no coverage for punitive damages or claims based on securities violations). Third, what are the limits of coverage (for example, catastrophic losses may not be insurable, and the insured's risk manager must devise a plan to manage catastrophic losses).

Common coverage questions

Is it a claims-made or occurrence policy? Traditionally, both CGL and E&O policies were written on an "occurrence" basis. This meant that the liability carrier would cover any lawsuit that resulted from an "error" that "occurred" during the policy period (usually one year with the possibility of annual renewals). But as the courts kept expanding the potential liability of manufacturers and others so that they might be held liable today for "errors" committed 20 years ago, the insurance carriers turned more and more to a new type of policy — the "claims-made" policy.

Roughly speaking, this policy only insures you against claims actually made against you during the policy period no matter when the error giving rise to the claim took place. To the carriers, this new claims-made insurance allowed their actuaries to predict their loss potential better. With the long "tail" of exposure inherent with occurrence policies (and the ever-expanding liability imposed by American jurisprudence), the insurance industry simply could not properly plan its own financial risks.

Today, nearly all business computer coverage is written on a claims-made basis. Accordingly, even if your company dissolves or is acquired by others, you may need to provide for insurance coverage some years after if your prior coverage was on a claims-made basis.

Application forms

Another common coverage problem concerns the insurance application. Given the newness of these coverages (and the lack of any substantial loss experience), the carriers are understandably nervous about the risks they are assuming. Indeed, this probably accounts for the fact that there are only a handful of carriers in the market. Accordingly, the applications for these policies are usually lengthy and quite detailed. But it is absolutely essential to give accurate information on these application forms. Any misinformation, even if inadvertent, might be used by the carrier later on to disclaim liability. The law on this issue varies greatly from state to state, so it is wise to review carefully your data input.

The duty to defend and the duty to pay a loss are the two primary duties of a liability carrier under an insurance policy. The duty to defend is uniformly construed to be much broader than the duty to pay. In other words, you may be sued on two counts, but only one count asserts liability of the type insured by your policy.

The carrier will most likely defend the entire lawsuit, but it will do so under a reservation of its right to deny any duty to pay the loss if you are found liable under the count that is not covered. This is a standard practice in the industry; it is perfectly legal and proper so that there is little that you can do about it. You should only be aware of it. In most instances, if there is any merit to the

THE ENCRYPTOR™
Data Security at An Affordable Price

If your microcomputer data looks like this, it's not secure.

Your confidential reports, client or customer files, and other critical business information can be tampered with or stolen.

With THE ENCRYPTOR™ products, your data looks like this — and it's totally secure.

Only individuals with Encryptor keywords can process your data.

Please send me information about The Encryptor™ products. I'm particularly interested in:

☐ Stand-alone micro application
☐ Micro-to-micro application
☐ Micro-to-mainframe application
☐ Total system application

Name
Title
Organization
Address
City
State Zip
Telephone ( )

Futurex Security Systems™
A Division of Jones Futurex™ Inc.
9780 Fair Oaks Boulevard
Fair Oaks,CA 95628

By physically transforming data, THE ENCRYPTOR™ products provide complete protection for stored or transmitted information. They eliminate unauthorized access, manipulation, or theft of such confidential information as:

- Corporate trade secrets
- Customer or client files
- Electronic fund transfers
- Personnel records

THE ENCRYPTOR™ products are reliable, high-speed devices that can be applied to micro-to-mainframe, micro-to-micro, and stand-alone micro configurations. They comply with the national Data Encryption Standard (DES) and allow for implementation of Message Authentication Code (MAC) for electronic fund transfers.

THE ENCRYPTOR™ products offer the easy-to-use, cost effective solution to your data security problems. For more information, return the coupon or call Futurex Security Systems™ at 800-251-5112 (800-251-5111 inside California).

FUTUREX™

Futurex Security Systems™
9700 Fair Oaks Boulevard
Fair Oaks,CA 95628
(916) 966-8838

A Division of Jones Futurex™ Inc.

CW 3/84

claimant's position, the carrier will reach a settlement prior to judgment as to any count, and the reservation issue never becomes a problem.

Many other coverage problems have already been discussed in another context. For example, with property insurance, you want to know what perils are covered: Is power surge loss covered?

Those problems can also arise in terms of liability insurance: Will the liability policy cover claims made against you for loss through power surge of data in your computer, which is vital to a third-party client? If the power surge had nothing to do with any "negligent act, error or omission" on your part (this is the standard E&O coverage language), is it covered?

Uninsurable risks

There are some risks that are simply uninsurable — either by law or because there is no market. Punitive damages, for example, are now held to be uninsurable as a matter of law in many states. Damages in law courts are basically of two types — compensatory and punitive. Compensatory damages are insurable, and these are the damages meant to recompense the claimant for the actual loss he suffered.

On the other hand, punitive damages are meant to punish you, the defendant, for some repugnant intentional act.

The imposition of such damages has nothing to do with compensation to the injured plaintiff. To the plaintiff, it is a windfall. In Illinois, for example, punitive damages are not insurable no matter what the policy language says.

Furthermore, many policies exclude such coverage (for example, Lloyd's, St. Paul's and Shand's unauthorized access policy).

Even though the concept of a deductible is common, make sure you understand whether the deductible applies to defense costs. Some policies have a high deductible. Of course, if you are defending a claim that has little merit, this may not be a problem unless the deductible applies to defense costs. Sometimes this item is buried in a separate and convoluted section defining "claims expenses," in which the deductible clause itself merely gives a seemingly innocuous reference to "claims expenses."

Attorneys' fees today are high. And the fees likely to result from sophisticated litigation over the esoterica of computer programming (particularly where there is little or nothing in the casebooks to help guide the court) may in themselves be a catastrophic loss.

Common exclusions

There are several common exclusions in almost every liability policy. Usually the carrier will not cover liability that you assume by contract (for example, Lloyd's and Shand). This, of course, points to the other side of the coin regarding the first two steps of the risk management plan outlined earlier.

Any good risk management plan must provide for the continuing review of all contracts to make you understand the risks you have assumed by contract. Hold-harmless clauses and indemnity agreements pervade today's business world (in effect, everyone is trying to pass the buck).

Some of these assumptions of risk will be covered by traditional CGL policies (clauses in building lease agreements, for example, are often covered by CGL policies); most others are not. You may need to seek separate contractual liability endorsements for your basic CGL policy or find some other means to plan for the risk of loss you have assumed.

Other common exclusions include patent and copyright infringement (Shand), dishonest or fraudulent acts (St. Paul, Lloyd's) and preparation of tax returns or balance sheets (Lloyd's — of course, this might be covered by an accountant's E&O policy).

The exclusion for fraudulent acts is especially important for systems vendors. Vendors typically disclaim warranties in their standard contracts, but disgruntled users can avoid contractual limitations if they prevail on a fraud theory. Courts in some states, particularly California, have adopted relatively lenient standards for proving fraud in computer contract cases. Insurance cannot help vendors deal with this potential liability.

Typical limits

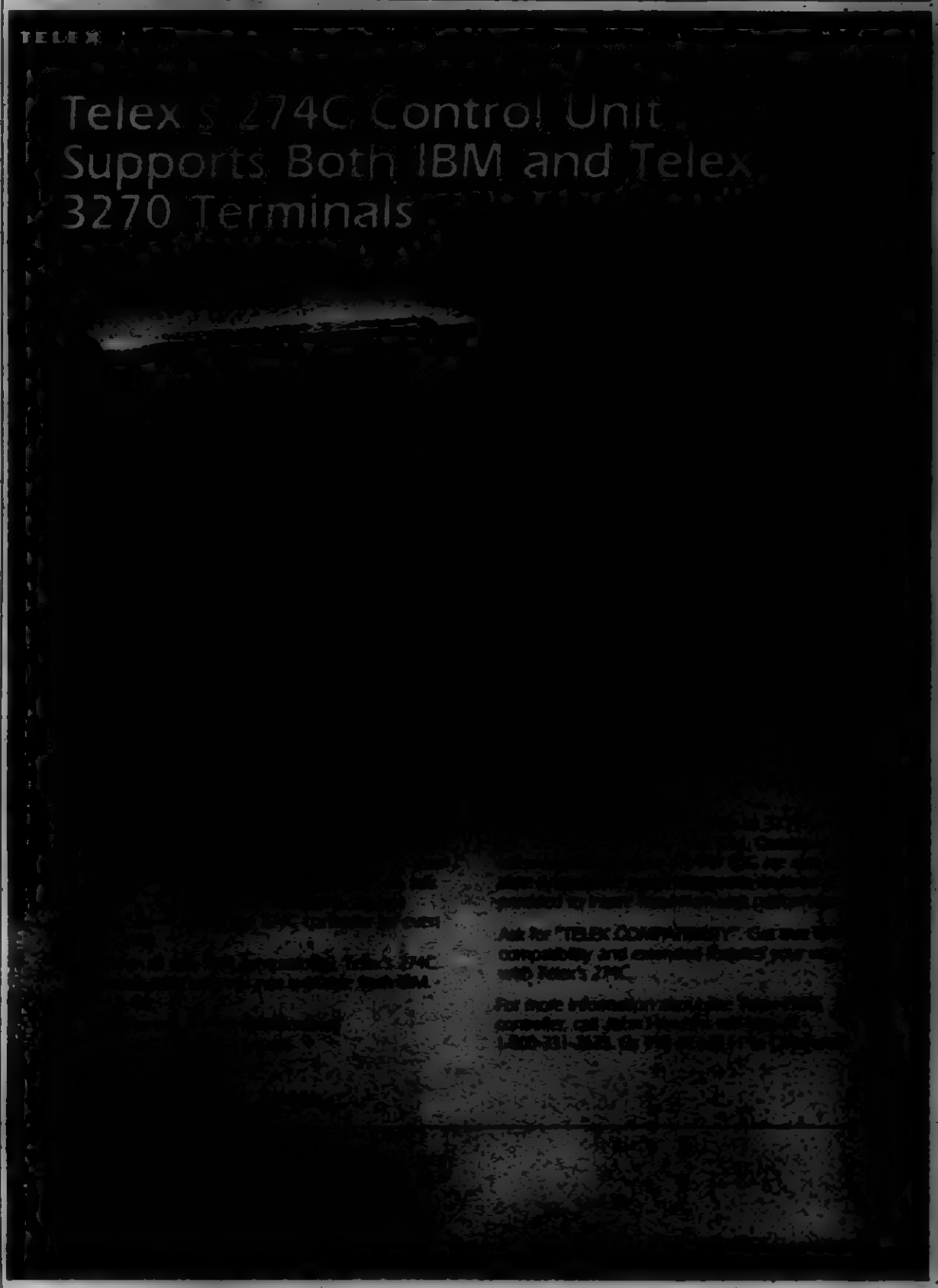
There are really no "typical limits" in this new field. You must decide what is appropriate. Consultation with experienced brokers or risk management consultants will provide you with a fairly good understanding of the amount of insurance you need.

Obviously, the risk of exposure to costly liability claims is a hazard that all of those in the industry bear — both producers and users. To manage this risk, some planning and allowance for financial coverage must be addressed. For very large companies, self-insurance or risk retention programs may be the answer. However, for the vast bulk of those faced with this exposure, prudent business acumen dictates that insurance coverage be sought.

About the author

Paul Cottrell is an attorney with the law firm of Fohrman Lurie Shiler & Simon, Ltd. in Chicago. He concentrates in the areas of litigation, insurance and risk management.

Barry D. Weiss, also an attorney with Fohrman Lurie Shiler & Simon, specializes in computer law and litigation.



Account Balances of all Washington Banks
SOURCE: Washington Statistical Review
COMMERCIAL PEAKSHIFT PROJECT
Source: San Diego Gas & Electric
Load Management Program
RESIDENTIAL PEAKSHIFT PROJECT
FOR THE MONTH OF AUGUST
Source: San Diego Gas & Electric
Load Management Program

SAS/GRAPH, Tektronix 4105 and 4695...

Your Low-Cost Graphics Solution

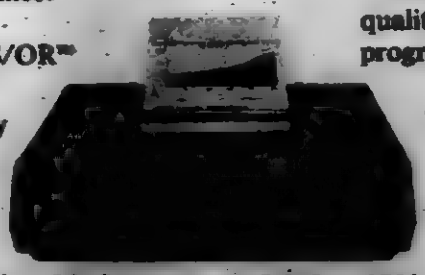
Since its beginnings, SAS Institute Inc. has provided you a "state of the art" software system. Now the Institute and Tektronix, Inc. give you a low-cost graphics solution—SAS/GRAPH,™ the Tektronix 4105 and 4695.

With SAS/GRAPH, you can produce sophisticated charts, plots, maps and three-dimensional displays with just a few simple statements. SAS/GRAPH can help you analyze data and results, and discover trends. Then you can add colors, titles, footnotes, company logos and other information to present your results to others.

What's more, SAS/GRAPH is integrated with the SAS System, so you can:

- use the data management, statistical analysis and report writing tools in SAS®
- enhance your forecasts and financial reports produced with SAS/ETS™
- clarify your data entry, editing and spreadsheet applications in SAS/FSP™
- graph planning schedules produced in SAS/OR™
- display data accessed with SAS/IMS-DL/I.™

SAS/GRAPH lets you preview your display on one device, then replay it on another without re-analyzing your facts and figures. The new Tektronix 4105 Computer Display Terminal gives you the perfect tool for previewing your display. It's fast, easy to use and reliable. A "joy disk" built into the keyboard of the Tek 4105 allows you to move the cursor easily. You can communicate with the host system without interfering with the display on your screen. A special option lets you position the display at or near your eye level or tilt the display up or down, right or left.



At $3995, the Tek 4105 puts high-quality, color graphics at your fingertips.

When you're ready to print your display, push a button on the Tek 4105 keyboard. Hard copy is quickly produced on the new Tektronix 4695 Color Graphics Copier. You can use roll or sheet paper, or make transparencies. It's your's for just $1595.

In VAX™ environments, SAS/GRAPH and Tektronix communicate via asynchronous ASCII protocol. In IBM environments, the new Tektronix 4970 SNA/SDLC Cluster Controller allows for easy host interfacing of up to four graphics devices.

SAS/GRAPH, the Tektronix 4105 and 4695—high-quality graphics for less than the cost of a new programmer.

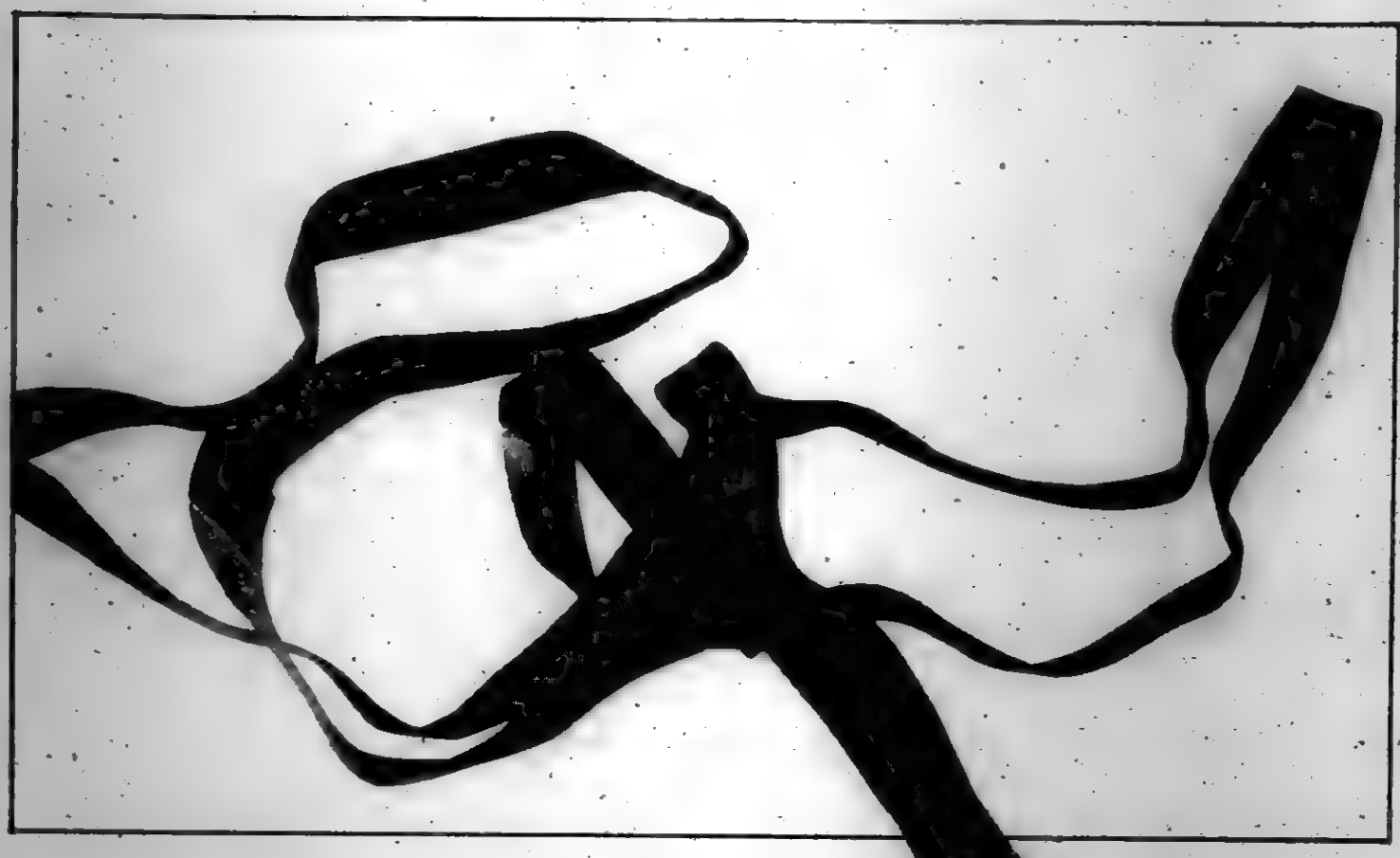
To learn more about SAS/GRAPH, call or write SAS Institute Inc., Box 8000, SAS Circle, Cary, NC 27511-8000. Telephone (919) 467-8000. Telex 802505.

For information on the Tek 4105 and 4695, call or write Tektronix, Inc., PO Box 1700, Portland, OR 97208. Telephone (800) 547-1512. In Oregon: (800) 452-1877. Telex 910-467-8708.

SAS saves time.

SAS is the registered trademark of SAS Institute Inc., Cary, NC, USA. SAS/GRAPH, SAS/ETS, SAS/FSP, SAS/OR and SAS/IMS-DL/I are trademarks of SAS Institute Inc.
VAX is the trademark of Digital Equipment Corporation.
Copyright © 1983 by SAS Institute Inc.

IN DEPTH



A simple measure of software complexity

By Lem O. Ejiogu

Every science must have its own method of investigation built on a sound foundation that is empirical, justifiable and verifiable. Software metrics, too, can benefit from this principle. A complex aggregate of tools, ideas, methodologies, programming languages and varieties of applications go into the development, design, manufacture and maintenance of software. The combinations impose another level of complexity on software.

Despite the amalgam of thoughts and practices, it is possible to select some significant variables to model a measure of software complexity that can be simple, empirical, verifiable and generally applicable.

Scientific investigations traditionally concentrate on critical factors surrounding a phenomenon and build a theory on them. For instance, the tree is used to abstract certain properties of natural relationships, as in genealogy, chain reactions or organizational personnel structures. In software engineering, the tree models data structures and control structures. In a sense, it empirically describes the thing we do.

This time-honored mathematical tradition of modeling with a tree will be extended here first to reveal some attributes of software structure and then to derive a simple model for measuring software complexity. Unlike its counterparts, this model will be applicable to every piece of

What software engineering needs is a metric that can appeal to all software practitioners, irrespective of programming environment or educational background.

software, new or existing. In a nutshell, we have a tool to measure the complexity of every piece of code, large or small.

Software complexity is the first consideration in measuring programmer productivity. Beyond it come other software measures such as structuredness, correctness and reliability.

Conventional measures of software complexity have so far proved unsatisfactory, and many have unsound logical foundations. One of them, lines of code (LOC), is generally discredited. It is biased in favor of programmers who do not optimize their codes. The other, Halstead's Software Science (actually a variation of LOC), does not give the practitioner any intuitive notion of complexity, structuredness, correctness or reliability; nor of whether software is structured or not. In addition, many of its formulas are founded on unproved assumptions.

The Cyclomatic Complexity Measure relies on graphs of software modules. The graphs, also devoid of structured foundations, can become cumbersome for large systems. This measure, too, has received a very limited application.

Empirical studies in the natural sciences have demonstrated that a proper and rational description of a phenomenon can be best approached through abstracting its natural properties or behaviors rather than imposing artificial attributes that might be the product of incomplete human observations. The model advocated here will, unlike its counterparts, be above bias. It is indeed universal, because not only does it apply to every piece of software, it can be used anywhere by anyone who works in software development.

In addition, the model is very easy to compute and may even be automated. Only three variables drawn from the attributes of the tree need be multiplied and the inverse/reciprocal taken. The reason for this reciprocal again follows from the natural property of the phenomenon called complexity. As the size of a system grows, our ability to comprehend its parts diminishes greatly; this growth and its impact on us are inverses to each other. We interpret this experience as the degree of complexity that the system imposes on us.

In the familiar mathematical language of limits, we say that our measure tends to zero as the size gets very large (or tends to infinity). Therefore, this reciprocal expresses our experience naturally and realistically.

But first, in order to avoid any ambiguity or confusion, we remind the reader that there are at least five categories of software complexity:

1. Structural complexity has to do with the natural expression of the topological relationships of a system's components. This theme will be explored here. Structural complexity is more than just the effects of control paths; it is the global attribute of every software module.

2. Computational complexity concerns the relative difficulty of accomplishing arithmetic/logical computations of algorithms on data. This complexity is not an immediate attribute of software, but of algorithms.

3. Logical complexity has to do with the relative difficulty of logical decisions or flows and branches within a system. This is a diminutive or localized structural complexity.

4. Conceptual complexity has to do with the psychological perception or the relative difficulty of undertaking or completing a system; one may also include diversity of human and material resources.

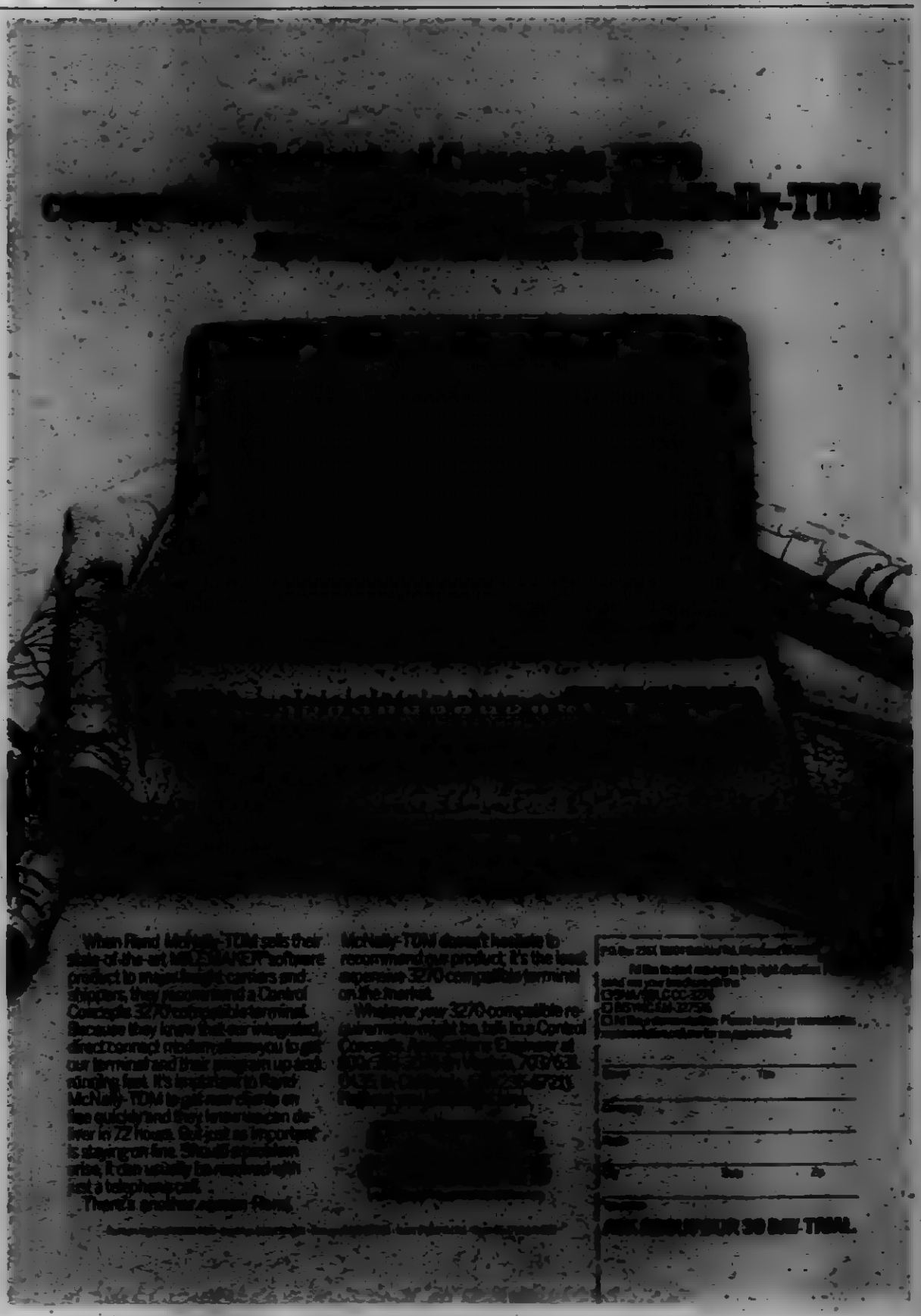
5. Textual complexity has to do with the static analysis of (program) source texts; this condition influences readability. The number N of potential programmer's errors varies as the number W of mental discriminations. Halstead used this psychological assumption to establish the relation $N = k W^{4/3}$, where k is a proportionality constant.

The model advocated here will, unlike its counterparts, be above bias. It is indeed universal, because not only does it apply to every piece of software, it can be used anywhere by anyone who works in software development.

With this preamble, we shall draw our notion of structural complexity from that of Pierre Teilhard de Chardin as the quality a "thing possesses of being composed (a) of a larger number of elements, which are (b) more tightly organized among themselves. In this sense, an atom is more complex than an electron, a molecule more complex than an atom. . . ." The concepts "number of elements" and "tightly organized" can be expressed in a tree structure.

Failure to qualify software complexity as structural, computational or logical will only aggravate the current confusion about what to measure or count.

Some researchers confuse software complexity and software structuredness. Some even treat structuredness as a subattribute of complexity. On the contrary, the two topics are distinct except that complexity affects structuredness. As a subject of its own, like computational complexity, software structuredness is a problem of design — it is defined at design while structural



complexity is "absolute" with a system. It is the relation of conglomerates of thoughts expressing the functional composition of the system. Structuredness is measured differently, though using the same design blueprint as for structural complexity.

An advanced understanding of structuredness based on formalized metrics holds the key to what is meant by "well-structured." Beyond, it offers us another model comparison of software productivity. We can independently verify the work of the designer.

But a potential reason for the choice of the tree as an abstracting mechanism, besides its place in mathematical tradition, is the meaning of its nodes. A node ordinarily represents an aggregate of thought.

Failure to identify completely all the nodes of a system's tree or even carefully or completely refine them is a major cause of software hazards — sporadic failures, frequent need for maintenance, prolonged and unsatisfying testing, stubborn and agonizing debugging and delayed, costly delivery.

Essentially, it represents a unit of activities or functions. In this way, a node is a central idea for processing data; it enables us to concentrate on a particular activity while postponing or "ignoring" others temporarily, only to return to them, one at a time, after "satisfactorily" completing the current node of activity.

But more important for purposes of control and management, the picture of a pattern of nodes is easy to remember in contrast to masses of lines of code or operators and operands. Such a picture gives us a sense of the structure of a system or object. The human mind remembers regular patterns or events better than amorphous or unorganized masses.

Our natural powers to handle complexity are limited, and the mind actually handles information one piece at a time. The practice of concentrating on one node before going to another is strongly emphasized by the advocates of structured programming. These ideas of modeling software metrics based on the hierarchical tree of nodes originated from my recent research in structured programming. They are a consequence of the structured revolution.

It seems that we have resigned ourselves to a complacency of structured coding, structured design and structured analysis, using chief programmer teams and walk-throughs. The true consequences of structured programming have yet to be revealed through intensive research. One such consequence is the set of empirical structure metrics (including an unbiased formula for programmer productivity) that would enable us advance and control software productivity, thus creditably earning the prestige of software engineering. Without effective metrics, software engineering lacks the technical discipline due it. The discovery and availability of effective software metrics are crucial for measures of programmer productivity.

It is false reasoning that "any method" is better than none. On the contrary, a poor method has the potential to blind or demoralize the creative search for an effective method. This is the possible impact of the several conventional unsound metrics now being used as measures of programmer productivity — from lines of code to function points; from counts of operators and operands to the hypothetical "on the scale of X," where X may be 10 or 30 or 911.

It is remarkable that although software science claims to measure algorithmic or computational complexity, it actually measures textual complexity, which has nothing whatsoever to do with programming effort, since it does not measure the complexity of computing associated with the operators and operands. It merely counts them; it does not explain how bugs are related to operators or how to use its formulas to verify a design or coding.

Of course, the controversy still rages over what to count — a defect inherited from unsound definition. This misconception of its advocates is misleading because the ability to read (and, hence, identify operators and operands) is not the ability to analyze or design or code a program. The latter are some of the factors that concern programmer productivity. Readability is less significant (except for maintenance) since a non-programmer can read a program; it is no wonder some researchers are using these formulas of software science to study English texts or computational linguistics.

One further benefit of the tree-node methodology is its refinability. A node as an aggregate of thoughts or activities can be refined to uncover its elementary members or subunits. This refinement can be carried out repeatedly so that eventually, the ultimate monadic functions (lowest-level units of activities) are identified in their succession of details.

Failure to identify completely all the nodes of a system's tree or even carefully or completely refine them is a major cause of software hazards — sporadic failures, frequent need for maintenance, prolonged and

THE SOFTWARE SHUFFLE ENDS.

You have better things to do than to run from one computer show to another searching for your software needs.

INFO/Software puts an end to all the running around.

INFO/Software is the complete, across-the-board Show for business software. Exclusively software. Especially for corporate executives.

No matter what kind of software you want, or what kinds of hardware you have, you can go to one Show to see, test and compare the entire spectrum of applications and operating systems.

Mainframe software. Minicomputer software. Microcomputer software. And software services.

Your program will be easy to find, thanks to INFO/Software's unique Software Information Center. Just tell the attendant what kind of program or business system you want, and the model of your computer. In moments, you'll get a printout listing the names, booth locations and product descriptions of INFO/Software exhibitors who have the programs and services that meet your needs.

Alongside the most complete software Show will be the best source for managerial solutions to your complex software problems: the INFO/Software Conference.

Software News Editor, Ed Bride is Conference Chairman and the roster of Conference Advisors includes some of the best minds in the computer industry:

Dr. John H. Bennett,
Corporate Director,
United Technologies

Bruce Coleman,
President,
Informatics General Corporation

Frank Dodge,
President,
McCormack & Dodge Corporation

Ray Epich,
Vice President/MIS,
Northwest Industries

Dave Ferris,
Software Industry Consultant

Martin A. Goetz,
Vice President,
Applied Data Research, Inc.

Gilbert H. Hoxie,
Chairman,
Context Management Systems

John Imlay,
Chairman,
Management Science America, Inc.

James Magee,
Partner,
Arthur Andersen

Alan Perlman,
MIS Manager,
Northwest Industries

Larry Welke,
President,
International Computer Programs, Inc.

They'll be speaking on the most relevant, most timely, most important topics that affect executive's business software decisions. Topics like "Micro-to-mainframe: access vs. security"... "Integrated mainframe applications: what do they mean to the end user?"... "Information Center Operation"... "Business Graphics"... "Overseas Operations: selecting software"... plus a software CEO Panel Discussion and more. The INFO/Conference will, of course, cover the entire spectrum of mainframe, mini, and microcomputer software, operating systems and applications.

So end the software shuffle. Come to INFO/Software. The one Show that brings all your software needs together.

For further information contact:
Clapp & Poliak (A Cahners Exposition Group Company) 708 Third Avenue, New York, N.Y. 10017
Telephone 212-661-8010 Telex 12-6185 Cable CLAPPOLIAK NYK

After April 1, 1984
999 Summer Street, P.O. Box 3833, Stamford, CT 06905
Telephone 203-964-0000
Telex 649400 CAHEX WU STD

mentifying testing, stubborn and agonizing debugging and delayed and costly delivery.

What is more reassuring is that a well-known principle does exist for carrying out and verifying this process of refinability: the principle of inequivalence. It is common experience that the software activities of UPDATE, VALIDATE and READ are inequivalent. Each belongs to a distinct equivalence class of activities and is, therefore, representable as a node.

The most useful aspect of the model of software complexity offered here is its feedback effect on software productivity. The practice of using LOC leads to redundant coding, besides giving a false sense of largeness. By our new definition, any (average) practitioner can independently verify the measure obtained; that is, the nodes approach can rationally lead us to justify and verify the things we do. For any system, we can identify and qualify each unit of thought.

This feedback effect has some psychological, practical results. How can a software metric help us understand and produce better software? There are several answers to this question. Among them is effective control — manifesting itself best in complete refinement of nodes. The ultimate purpose of hierarchical refinement is to identify *all* the sequences of details (functions and nodes). With this measure of complexity, a walk-through session can gain added importance. There, a design blueprint will be verified for completeness of refinement, as well as for correctness of requirements specifications against the corresponding code blueprint. Each algorithm of each node may be further isolated and verified.

This is disciplined control of productivity. When these metric influences are considered for design applications, software productivity will be enhanced. The practice at some centers of compliminting a volume table of contents (Vtoc) with flowchart or decision table methodologies is a signal that the target system has not been completely refined.

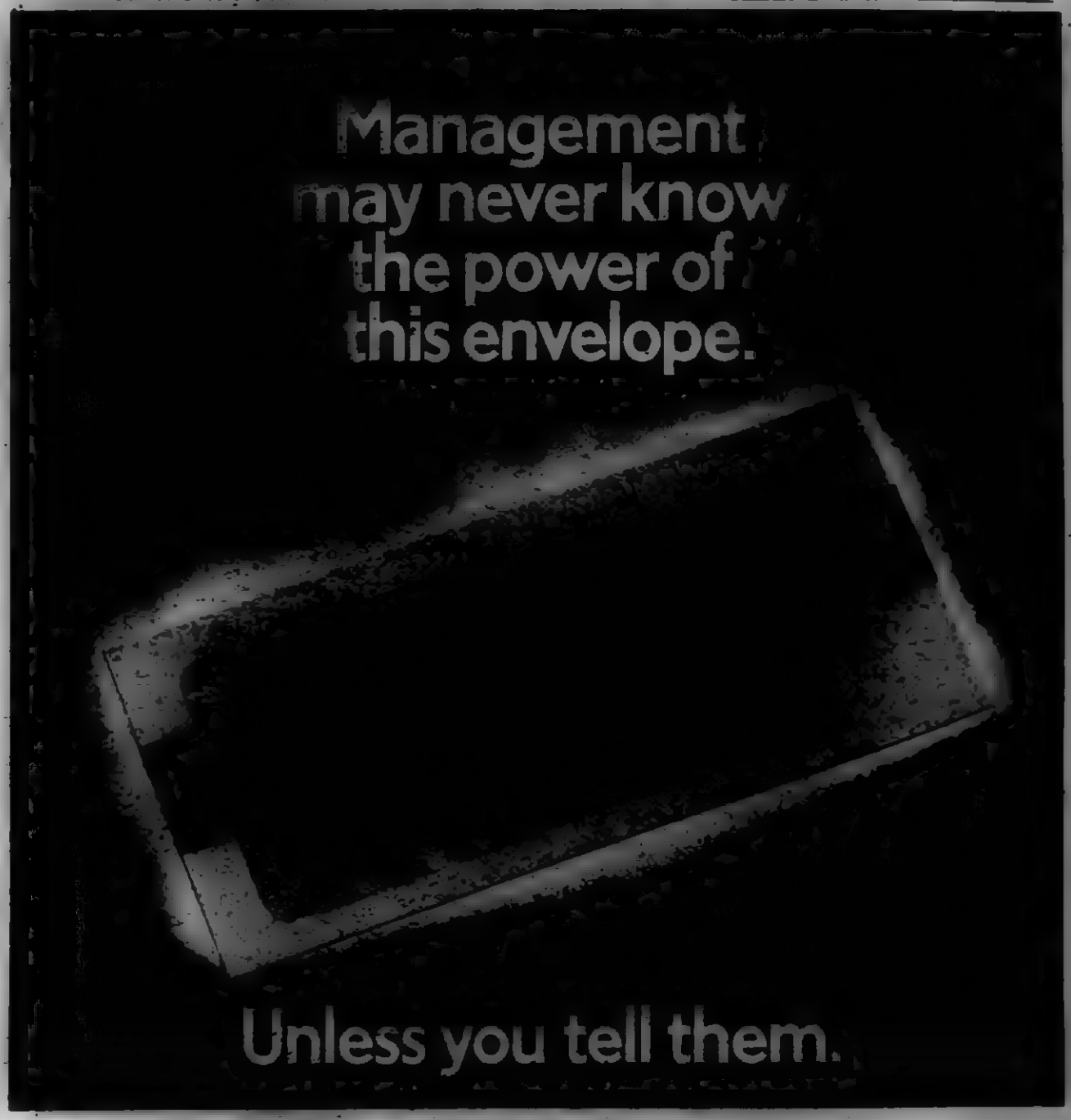
In addition, this metric can provide rich information about the quality of software design. In particular, it will enable us to gain confidence about how well-structured the software design is. A simple test of a well-structured design is to have the derived blueprint correspond node-for-node with the generated blueprint of the same system.

But a more critical feedback effect is cost control. It can be argued that software cost is strongly influenced by some modes of complexity, especially structural and computational, and less significantly by logical and conceptual. The use of LOC is very crude, at best, since software size is determined by structural complexity.

Just as the cost of an electronic device is the sum of the costs of its constituent components rather than of masses of wires and resistors and capacitors, so also may software cost be seen as the sum of costs of its constituent nodes, rather than of masses of LOC or operators and operands. The number of nodes depends on the variables: Level, L, explosion number, E, and monadicity, M. For instance, the cost of an UPDATE/VALIDATE node can be established on the bases of number of refined nodes and their corresponding I/O elements.

When this principle is thoroughly grasped, the malaise that currently grips software forecasting will

By our new definition, any average practitioner can independently verify the measure obtained; that is, the nodes approach can rationally lead us to justify and verify the things we do. For any system, we can identify and qualify each unit of thought.



You don't have to tell management how easy it is to implement *E-COM* service. That can be your secret. Tell them instead about the power of an E-COM service mailing. How letters can be sent right from the company computer. How the Postal Service prints, folds, inserts, seals and delivers these letters for you. How the distinctive blue envelopes of E-COM service lend visibility and impact to your mailing.

Since you're the one who gets E-COM service up and running, you have three options—all of them easy. First, you can write the system interface yourself. It takes about a day, and Postal Service consultants are standing by to give you any help you need. Second, you can buy a dedicated interface from a third-party vendor. Third, you can access E-COM service through an independent communications carrier, without bringing the system in-house at all.

As part of the D.P. department, you're in a unique position to tell your management about the power of E-COM service. So find out more. Send us the coupon you see here. You may never again get so much credit for so little work.

*Electronic Computer Originated Mail

For more information on E-COM service mail this coupon to: J-I
U.S. Postal Service
E-COM service, P.O. Box 23990
Washington, DC 20026-9989
Or dial toll-free 1-800-842-9000 Ext. 300

Name_____
Title/Position_____
Company/Organization_____
Street Address_____
City, State, ZIP Code_____

E·COM
DELIVERS IMPACT.

IN DEPTH/A SIMPLE MEASURE

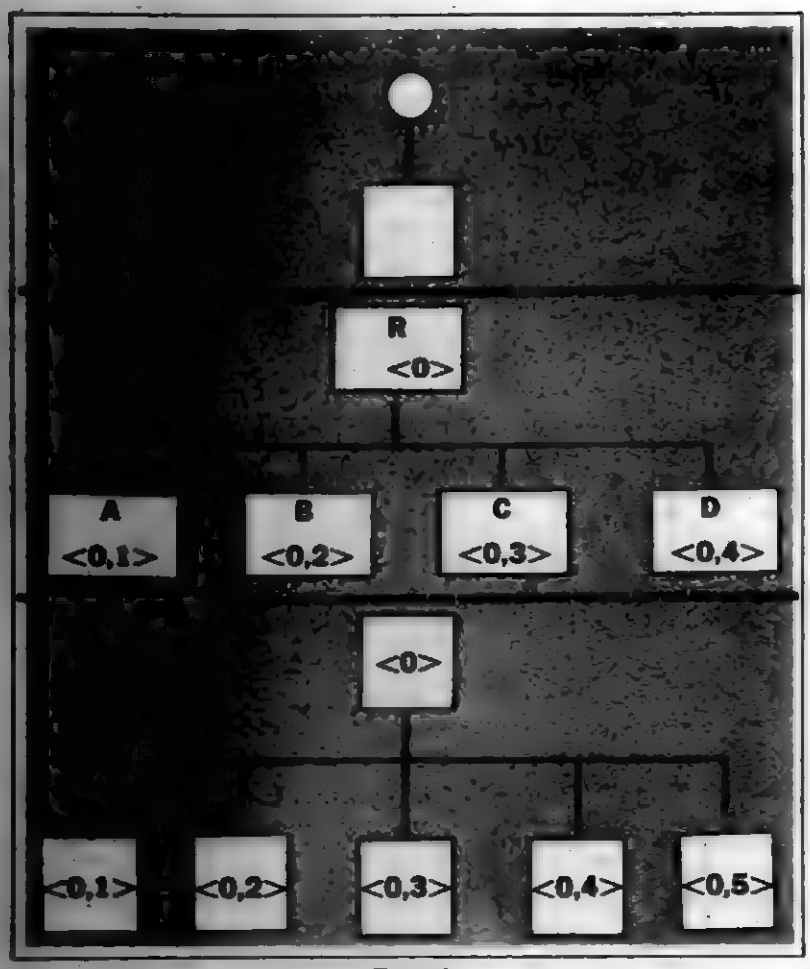


Figure 1

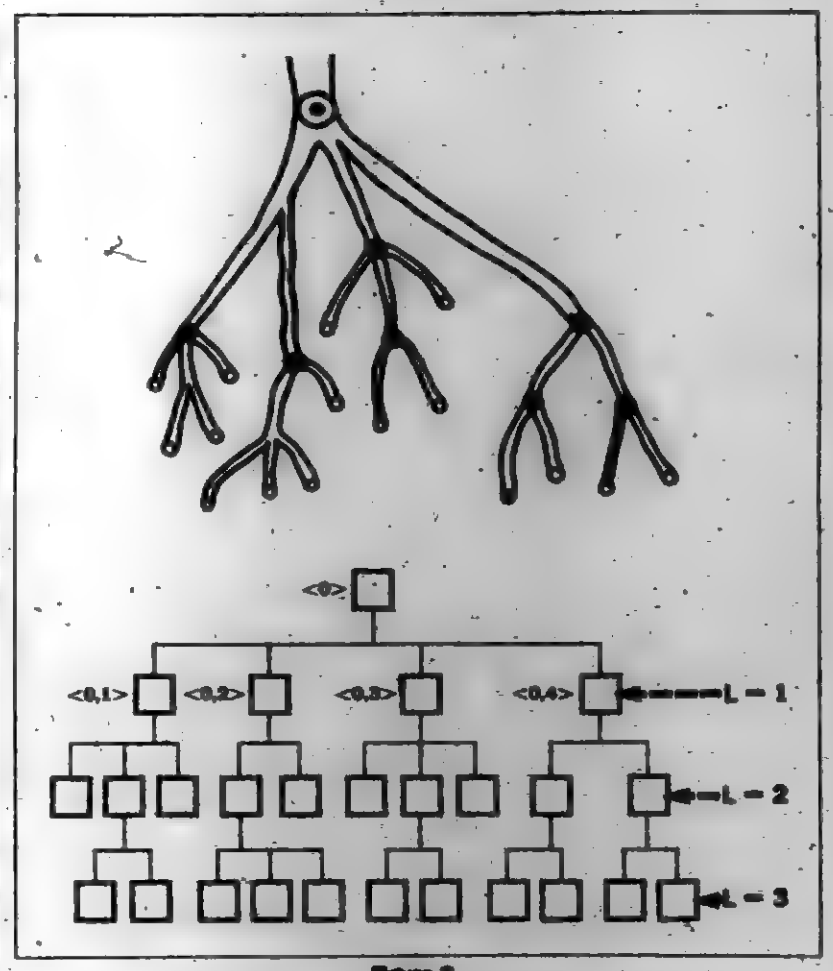
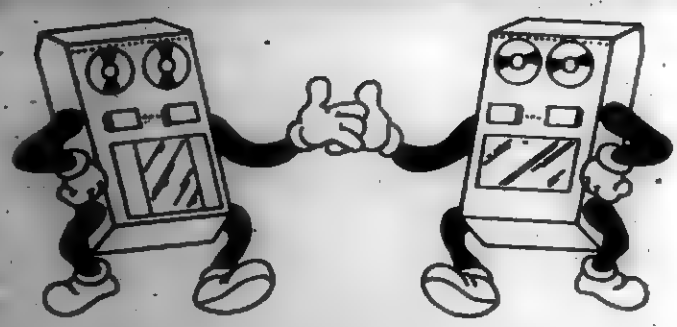


Figure 2

OUR SWITCHES MAKE YOUR IBM SYSTEMS WORK LIKE A TEAM!



If you have more than one IBM or plug compatible processor, Digital can help you get the most for your hardware investment. Our switches allow you to achieve backup and peripheral configuration flexibility at a fraction of the cost you're probably thinking.

Whether you have two processors or more, Digital has a switch to suit your requirements.

- Model 4101 The lowest priced matrix switch on the market.
- Model 3421 The only manually operated channel switch in the industry.
- Model 3455 A remote controlled channel switch designed for underfloor installation.

DIGITAL CONTROLS

2979 Orchard Run Road • Dayton, Ohio 45449 U.S.A. • (513) 435-5455
Dallas 214-669-0099 New York 201-585-9416

*Registered Trademark

gradually fade away. For then, we can experimentally construct hypotheses using our new software structure about the potential size and cost of a software project (in development) against some background of tentative estimate of nodes and corresponding cost assignments — perhaps emulating the methods of the Simplex algorithm. This technique can be used at the start of a project, whereas in current practice, no technique exists for software forecasting until after coding.

In this simple model for software (structural) complexity, three attributes of a tree structure are used for abstraction:

1. L — level, or the maximum of the heights of nodes above the root node. L measures the reality of deep nesting of nodes.

2. E — explosion number, or effect of rotation of branches of the root node. E measures the circumorthogonal "weight" of complexity. The explosion number we use is the sum of all nodes at level 1; and these nodes are the immediate twins of the root node.

3. M — monadicity or totality of leaves of a tree (signifying the intensity of refinement). The leaves are the only nodes without explosion numbers. M is summed through all explosion numbers. M measures the "bushiness" of the tree (system). In order to count a node exactly once, we constrain M = 1 at L = 1.

From applications experience, as the level increases (tall tree), the more complex the system and hence more difficult to design or code. The same psychological effect is experienced with E, the number of branches of the root (these are the nodes at level L = 1). Monadicity, a measure of "bushiness," imposes on us a similar effect.

These three effects in a sense multiply our intuitive feeling of complexity. Therefore, we interpret this sense of complexity as:

Image of software complexity, C = L x E x M.

Finally, using the ideas of reciprocal discussed above, we define (in terms of degrees) the "complexity" imposed on us by the system as:

Degree of software complexity, $D_c = 1/C$.

Simplicity is the strength of comprehension.

A good metric must somehow describe what it measures; it must give us an intuitive feeling of the object being measured.

A critical asset of this methodology is the lack of ambiguity about what to measure or count. When a design blueprint is used for measure, the nodes are explicit; but when a code blueprint of a system is used for measure, the nodes are implicit. However, they can be derived explicitly. For instance, in the Ada programming language, the following are qualified nodes at their various points of description: PROCEDURE, PACKAGE, SUBROUTINE, FUNCTION and so on. For Cobol, the Procedure Division is the root node; other nodes are section name and paragraph name. Each programming language has its own "tokens" of nodes. Moreover, for each module, we can sketch a blueprint of them. In neither language is data structure a candidate node, since the data structures are variously associated with the nodes as input and output elements.

For a software design generated or produced according to function decomposition methodology, the

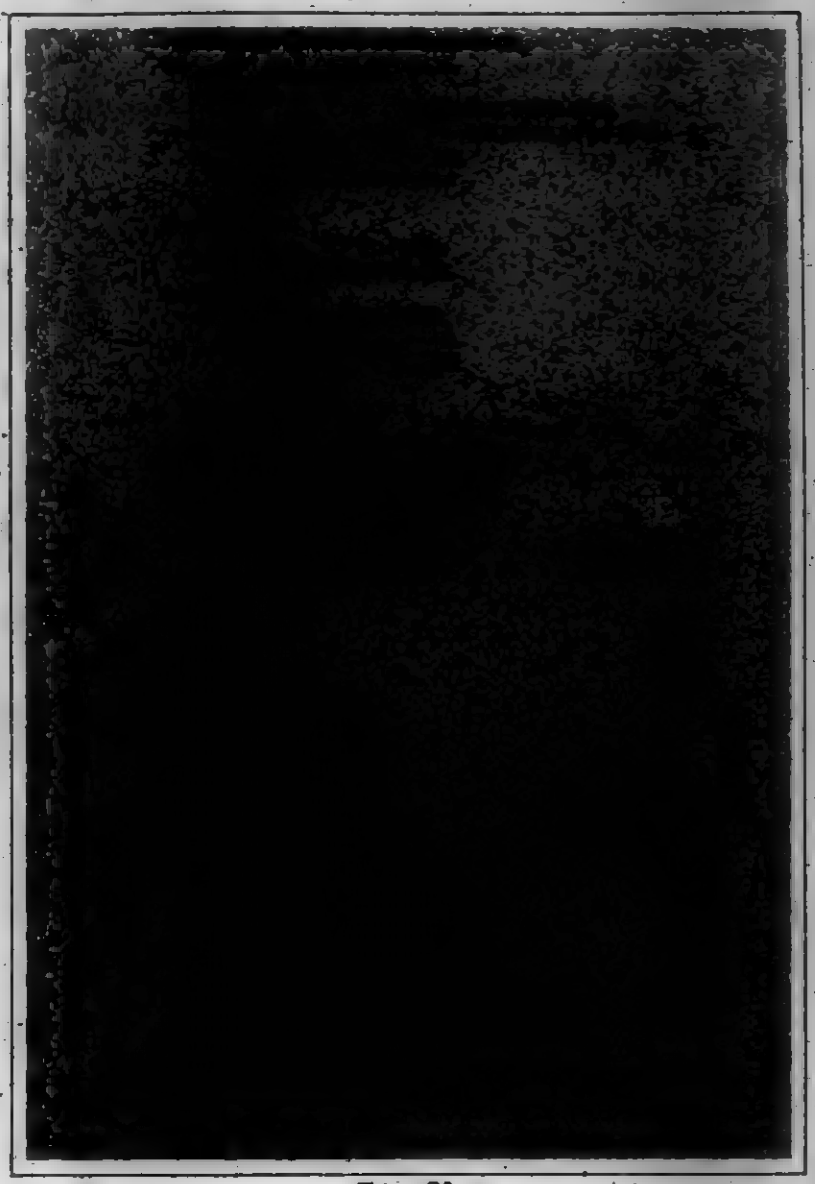


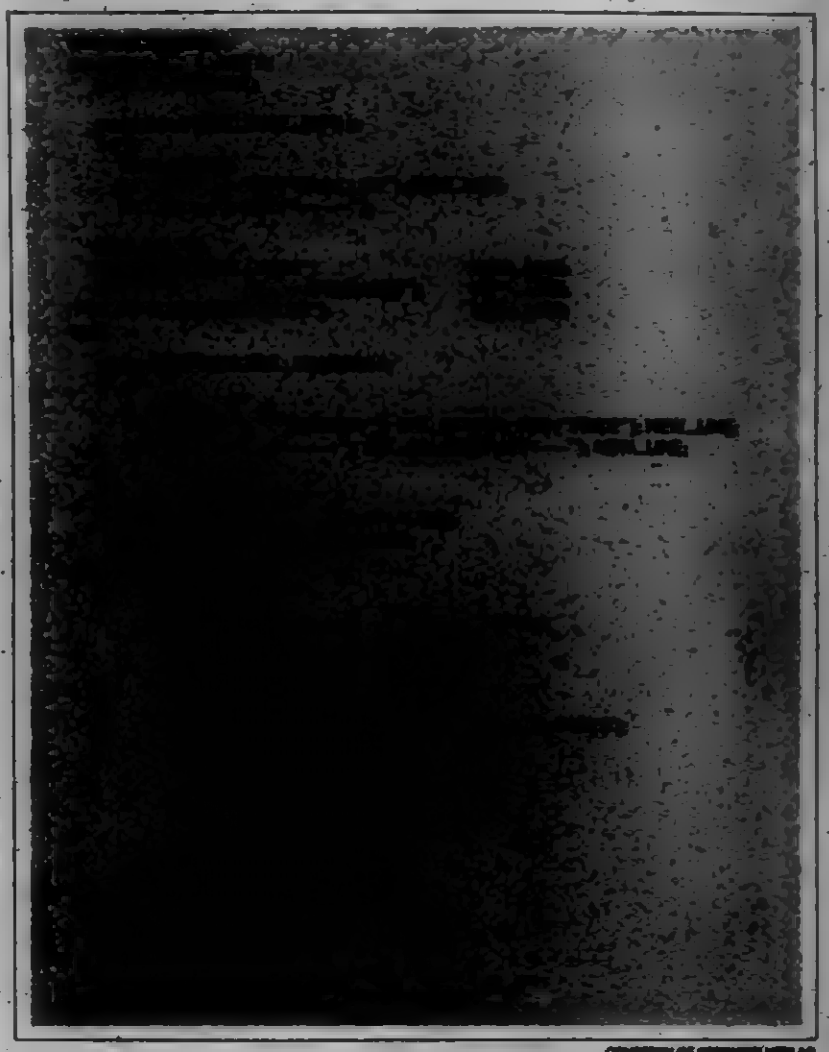
Figure 3A

nodes are easy to identify on the design blueprint or similarly. On the other hand, for other methodologies and including existing software, we can derive a blueprint of tree hierarchy of nodes as follows: Plot the pattern of nodes using the tips described above [Ada, Cobol and so on] by following the PROCEDURE CALLS or nestings of PERFORM labels.

In essence, if in a certain PROCEDURE CALL or PERFORM paragraph there is a PROCEDURE CALL or PERFORM statement, then the latter is plotted as a child node of the former PROCEDURE CALL or PERFORM paragraph. In this way, the plot shows how the system was refined at design and how it presently operates. Each PROCEDURE CALL or PERFORM paragraph is treated as a single-entry/single-exit path. But the code blueprint can justify or refute the adherence to this structured principle. This is another feedback effect of this measure. For example, an EXIT-in-the-MIDDLE degrades structuredness.

Finally, apply the above simple formula to the derived design blueprint to compute the degree of complexity by counting L, E and M, respectively. In this way, we can measure the structural complexity of every piece of software as well as

Figure 3B



COURTESY OF BYTE/MCGRAW-HILL

Figure 4

compare two or more pieces.

This formula is unbiased, consistent, verifiable and invariant. Like structured programming, it does not depend on any programming language or computing environment or design methodology. Besides, it is simple and easy to use for both programmers and managers alike, and it does not require paperwork as do other methodologies for measuring programmer productivity. Its unequivocal elegance is that besides giving us a picture of what is measured, it is exactly based on what we do and not on how we are disposed.

An effective metric has other desirable qualities, especially for software engineering. A good metric must somehow describe what it measures; it must give us an intuitive feeling of the object being measured. This intuitive feeling comes from the perception of the nature of the object — more specifically, its structure. In other words, we must first understand the structure of the entity being measured. There is no way to measure anarchy.

But a more profound desirable attribute of an effective metric is the potential for comparison. If, for instance, a metric measures distance, it must permit us to confirm that Boston is farther from Chicago than Buffalo. If it measures electric power, it must show consistently that over the same time interval, a steel manufacturing plant consumes more power than a candy store. The metric proposed here for software complexity satisfies this comparison criterion because the total number of nodes, N, depends on L, E and M. Any variation in any factor reflects on D_e. Therefore, we can compare two or more pieces of software.

Furthermore, the metric enables us to know equivalent (or isomorphic) systems, irrespective of their types of application or programming language. Two systems are isomorphic if they have the same number of nodes per corresponding (levelwise) parent. A metric that does not guarantee formal comparison is simply useless.

If two pieces of software differ in structural aggregation, the costs associated with them also differ in economic evaluation. Software costs remain a critical driving force for research into software metrics. Such metrics must, therefore, have the intrinsic potential for comparing software. The potential for comparison is mutually associated with the need for universalism of application.

Those metrics founded on structured programming principles have the best hope of universal acceptance since structured programming is independent of programming languages and environments. Its basic principles are invariant.

We shall give two categories of examples — one using the original hierarchical tree (design) blueprints; and the other (examples 3 through 5) the derived hierarchical tree (from code) blueprint.

Example 1. One-level tree. Let us consider three different cases.

Case A (Figure 1A): The tree has only one node. L = E = M = 1. Therefore, C = 1 and $D_e = 1/C = 1$. This is a very rare case, showing the least complexity.

Case B (Figure 1B): The tree has four nodes. L = 1; E = 4; M = 1 (by constraint; this approach avoids counting any node twice for E and M). Therefore, C = 1 x 4 x 1 = 4; and $D_e = 1/4 = 2.5 \times 10^{-1}$.

Case C (Figure 1C): The tree has five nodes. Thus, L = 1; E = 5; M =

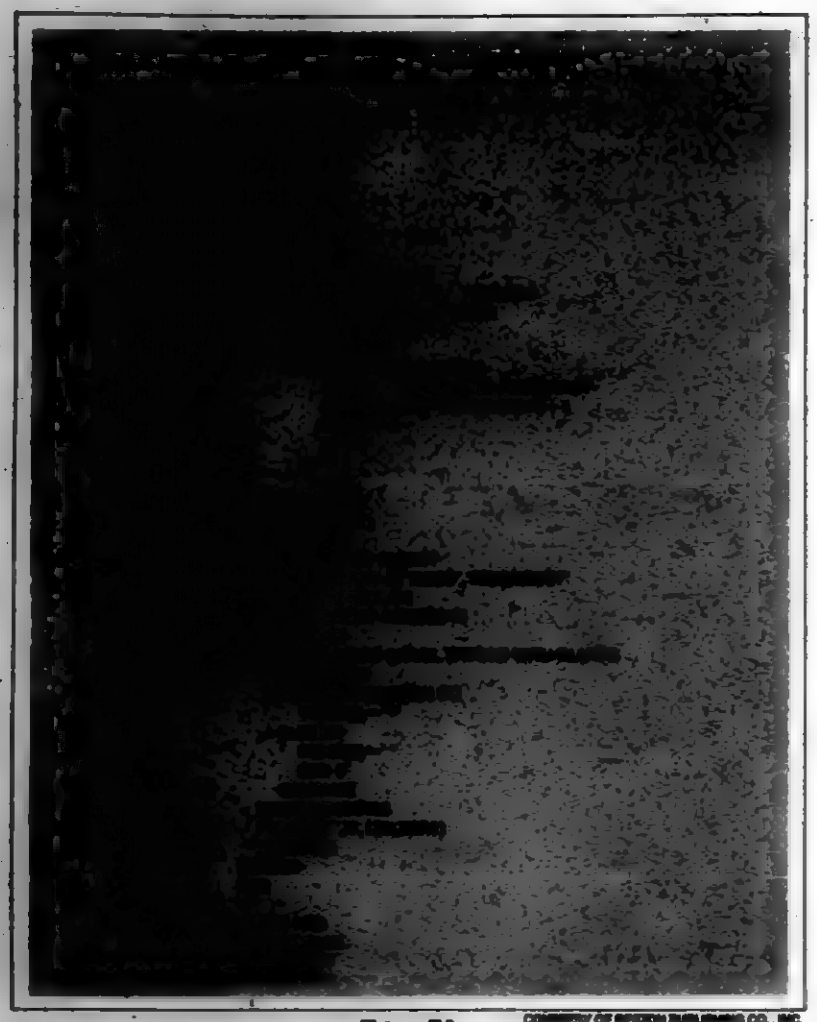


Figure 5A

COURTESY OF PRENTICE PUBLISHING CO., INC.

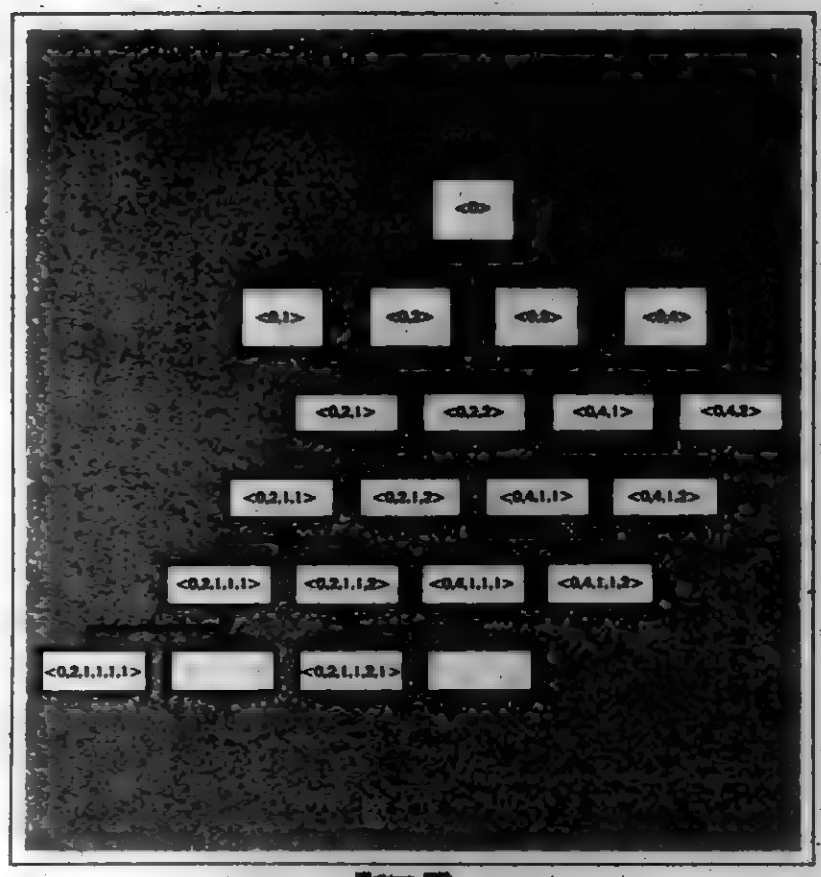


Figure 5B

1. Therefore, C = 1 x 5 x 1 = 5; and $D_c = 1/5 = 2 \times 10^{-1}$.

Example 2. Multilevel tree. In Figure 2, L = 3, E = 4 and M = 4 + 4 + 4 + 4 = 16. Therefore, C = 3 x 4 x 16 = 192 and $D_c = 1/192 = 5.208 \times 10^{-3}$.

The only practical hint for deriving hierarchical trees from code blueprints is a fair adherence to good structured coding and breaks in boundaries of thought as expressed in the statement instructions.

Example 3: Derived tree of a Cobol module. In this example, only the structure labels and key control instructions are excerpted (Figure 3A). The derived hierarchical tree is Figure 3B.

Using the formula, L = 3, E = 5 and M = (2) + (3) + (4) + (5) = 14. Therefore, C = 3 x 5 x 14 = 210; and $D_c = 1/210 = 4.76 \times 10^{-3}$.

Example 4: Derived tree of an Ada module. The structure of Ada modules is a classic style of node abstraction. Procedure, package, function, subprogram, task and so on are valid candidates for nodes. Essentially, the tree representative of the Ada module is simply a natural derivative of the generated hierarchical abstraction, provided it is properly logically organized.

Figure 4 is a sample Ada module (from *Ada Programming, an Introduction*, by Henry Ledgard, 1981), and Figure 1B is its equivalent derived tree. Notice each procedure with its begin-end constitutes a node; also, the first declaration of procedure (PRICE_LIST) is the root node to these other procedures. The annotated nodes are, by procedure:

<0>: Root node, R = PRICE_LIST.

<0,1>: Explosion No. 1, A = PRINT_TITLE_INFO.

<0,2>: Explosion No. 2, B = PRINT_COL_HEADERS.

<0,3>: Explosion No. 3, C = PRINT_PRICES.

<0,4>: Explosion No. 4, D = MAIN_PROGRAM.

Since the derived tree is as in Figure 1B, D_c is as computed in Example 1, Case B. This is another feedback effect, this time obtained from the principle of isomorphism. The design (if possible, derived) blueprints of two or more modules or systems have the same structural form, irrespective of the type of application (including programming languages).

Note: In some modules, each maximal subtree may be refined into other child subtrees. In this case, the complexity grows, but the computational formula remains invariant.

Example 5: Structured Fortran. Fortran, much criticized for inflexibility to structuredness, can nevertheless benefit from this new philosophy. The derived hierarchical tree in Figure 5B is based on a coded example from Figure 5A (*Fundamentals of Structured Programming Using Fortran With SF/K and WATFIV-S*, by R.C. Holt and N.P. Hume, 1977).

The key words: DO, IF, DOWHILE, PRINT, READ, WRITE and so on are the abstracted nodes.

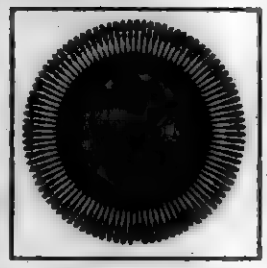
A useful aid to identifying twins from the same parent node is to use correct structure coding — all twins are aligned on the same column, assuming well-structured coding. This technique also applies to many other scientific languages. This is one more example of feedback from this metric philosophy — an improvement over structured coding. From Figure 5B, the following measures are true: L = 5; E = 4; M = 0 + (6) + 0 + (4) = 10. Therefore, C = 5 x 4 x 10 = 200; $D_c = 1/200 = 5.0 \times 10^{-3}$.

About the author

Lew O. Ejiogu is a consultant and researcher with special interest in structured programming and software metrics. He has developed and introduced four original metrics for software engineering. Ejiogu is the author of Effective Structured Programming, *published by Petrocelli Books, Inc. in Princeton, N.J. Presently, he is writing a text titled* Software Engineering: Design and Discipline. *He is the director of the consulting firm Lemcomm Softgram in Chicago.*

Mighty write.

This is the word processing printer built to survive the rigors of the office. Our heavy duty DP-Series daisywheels whisk out crisp, letter-perfect documents – hour after hour, month after month – without a whimper. Call your printer distributor. Or contact Dataproducts at (213) 887-3924, 6200 Canoga Avenue, Woodland Hills, CA 91365. In Europe, 196-198 High Street, Egham, Surrey, TW 20 9HL England.



Dataproducts Daisywheel Printers

MICROCOMPUTERS

Omninet goes low-cost

SAN JOSE, Calif. — Corvus Systems, Inc. has introduced two product lines designed to create lower cost versions of its Omninet local-area network for personal computers.

Omninet is the most popular micro local-area network, according to Corvus, which claims an installed base of more than 7,500 networks serving over 70,000 computers and peripherals.

Corvus' new Omnishare network product allows an IBM Personal Computer or Personal Computer XT hard disk drive to emulate a Corvus disk system and create an inexpensive Omninet. The firm's new Omnidrive Winchester drives, expected to replace most of the Corvus line of hard disk drives, include built-in local-area network interfaces.

Omnishare permits users to decide how much space on the Personal Computer XT disk will be dedicated to the host computer's stand-alone applications and how much space will be shared by other Personal Computers and XTs on the network, Corvus said. The emulator program runs as a background task on the host computer, allowing an application program to be run in the foreground.

Omnishare features most characteristics of a standard Omninet, except that disk storage is limited to that of a single XT, according to Corvus. The Omnishare package, selling for $795, consists of emulation and Constellation II software, an XT transporter card, Omninet cable and a manual. Shipments are expected to begin next month.

The firm said its new 5¼-in. Winchester drives "are the first disk drives designed specifically for use with a net-

See CORVUS page 76

Compupro adds system

HAYWARD, Calif. — Compupro, Inc. has announced System 816/F, a multiuser Intel Corp. 80286-based system that Compupro claims is twice as fast as those based on Intel 8086 and Motorola, Inc. 68000 chips.

The system features Intel's 80286 and 80287 microprocessors, 512K bytes of random-access memory (expandable to 1M byte), 12 serial ports, one Centronics Data Computer Corp. printer port, one parallel port, 1.5M bytes of hard disk storage and Digital Research, Inc.'s CP/M 86 and MP/M 86 operating systems. System 816/F costs $14,995, and first shipments begin this month.

Initially, the company is targeting sales to firms developing products for 80286-based systems. "The system will be used primarily for the development of new systems," said William Godbout, Compupro's president.

The company plans to add Unix capabilities to the product. "Currently, there isn't a version of Unix for the 80286," Godbout said. "It's a chicken-or-egg situation. Software companies need hardware to develop the operating system, and hardware companies need the software for their machines.

"When Digital Research develops Unix 5, sometime later in the year, we will offer it to our users," Godbout added.

System 816/F can easily support 10 users, according to the vendor. "One could go above that depending on the system needs, but it will not support 25 users," Godbout said. Users can tie stand-alone CP/M machines into the system.

Godbout estimated that the company will sell about 1,000 systems this year.

INSIDE

Printers/Plotters/76
Board-Level Devices/76
Auxiliary Equipment/76
Software/76

Electronic mail net lets micro managers share data

By Edward Warner
CW Staff

BOSTON — The Micro Manager's Association (MMA), a 225-member group based here, last month went on-line with its Executive Communication Network (ECN), an electronic mail system that will allow members to share information about microcomputers.

The ECN will provide users with an electronic mailbox and access to a general bulletin board and a special bulletin board covering their particular industry, according to MMA founder Marty Butler. Users will reach the ECN through their microcomputers and post their questions about micros, peripherals, local-area networks and micro software on the appropriate bulletin board. They will receive responses from others on the network via their electronic mailbox.

The ECN, which costs $150 annually to join, fits the MMA's purpose of "preventing people from having to reinvent the wheel" by letting managers working with micros share their knowledge, Butler said. Most MMA members, he noted, are known as vice-presidents for information systems or MIS directors, not as microcomputer managers, but they still are responsible for integration and management of the small computers in their firms.

Butler, a former software salesman, formed MMA in July 1983. The group now includes members from 85 Fortune 500 corporations, he said.

The Boston chapter, the largest, has no dues, but derives its funding from sponsoring conferences and from the ECN membership fee. Branches of the association also exist in New York and Los Angeles. The New York chapter has annual dues of $24, and the Los Angeles chapter charges $2 per meeting, Butler said. A Detroit chapter also is being formed.

The MMA is planning its first national conference, "Microforum '84," for June 14 in New York. The meeting, he said, will bring micro hardware and software vendors face-to-face with a panel of users representing the finance and insurance industries. "We want to let [vendors] know where the Fortune 500 stands on data

See MMA page 76

MICRO BITS/THOMAS MADRON

Should you buy a multiuser system or a local-area network?

When multiple microcomputer workstations with resource sharing are required, should we buy a multiuser system or link several micros with a local-area network? No answer to this question is completely satisfying, but there are some issues we can consider.

There are two main types of multiuser systems. One consists of a relatively powerful micro supported with a multiuser operating system, such as Unix, which allows concurrent access by more than one user. Alternatively, several single-user micros — each on a single board — can be packaged together with a single hard disk and related support services in a centralized system accessed through multiple terminals.

The alternative to these methods is to link several single-user microcomputers with a local-area network, one that allows a high degree of connectivity among nodes with limited geographic scope. One example is Ethernet, originally developed by Xerox Corp. and currently marketed by several manufacturers.

Frequently, the impetus for the acquisition of either a multiuser micro system or a network of micros is the need for several workers to share data, communicate through electronic mail or make more effective use of high-cost peripherals.

Impinging on the decision, especially in a large organization, are requirements for access to central computing facilities or integration in a larger network. Problems to be confronted include response time; the presence or absence of a single point of failure; and the impact of a failure on the system, centralized or decentralized support and cost.

In a recent report, Strategic, Inc. of San Jose, Calif., gave the allegedly higher cost of several micros supported by a local-area network as a reason for choosing a multiuser, multiprocessor system. Strategic quite rightly pointed out that an IBM Personal Computer/local-area network solution is not the only one that should be considered.

However, the recent introduction of the Personal Computer Cluster Program suggests the conceptual direction being taken by IBM. Certainly other micro manufacturers are making local-area networks available. Meanwhile, independent makers of these nets are scrambling for the micro market.

The local-area network marketplace includes baseband manufacturers (such as Corvus Systems, Inc., Datapoint Corp. and Xerox) and broadband manufacturers (such as 3M Corp. and Sytek, Inc.), with broadband suppliers in something of a catch-up race. All of these manufacturers either have personal computer products in place or are attempting to get such products out the door. The broadband local-area networks are especially appropriate in large organizations where the problem is connecting not only micros but minis, mainframes, terminals and a variety of other devices.

To clarify the local-area networks multiuser issue, we must remember two reasons why large organizations acquire micros: to boost productivity and to reduce reliance and resource consumption on central mainframes.

When micros are fully distributed, they should not only lead to pro-

See BITS page 76

Programming tools unleashed for Intel-based systems

NORWOOD, Mass. — Four programming tools designed for use in Intel Corp.'s 8086/8088-based systems running under Microsoft, Inc.'s MS-DOS, IBM's PC-DOS and Digital Research, Inc.'s CP/M 86 have been introduced by Phoenix Software Associates Ltd. The packages reportedly include a full screen text editor, a dynamic debugger, an object module linkage editor and a library manager.

P-Mate86 is a full screen, single-keystroke editor with automatic disk buffering for backward and forward paging; 10 auxiliary buffers that can be edited individually or used as scratch pads for cut-and-paste operations; horizontal scrolling for editing lines up to 250 characters long and a macro command language, according to the vendor.

P-Mate86 also offers automatic word wrap, text formatting, global or local setting of margins and tab stops and indents and can be configured for most popular video terminals or memory-mapped displays, the company said.

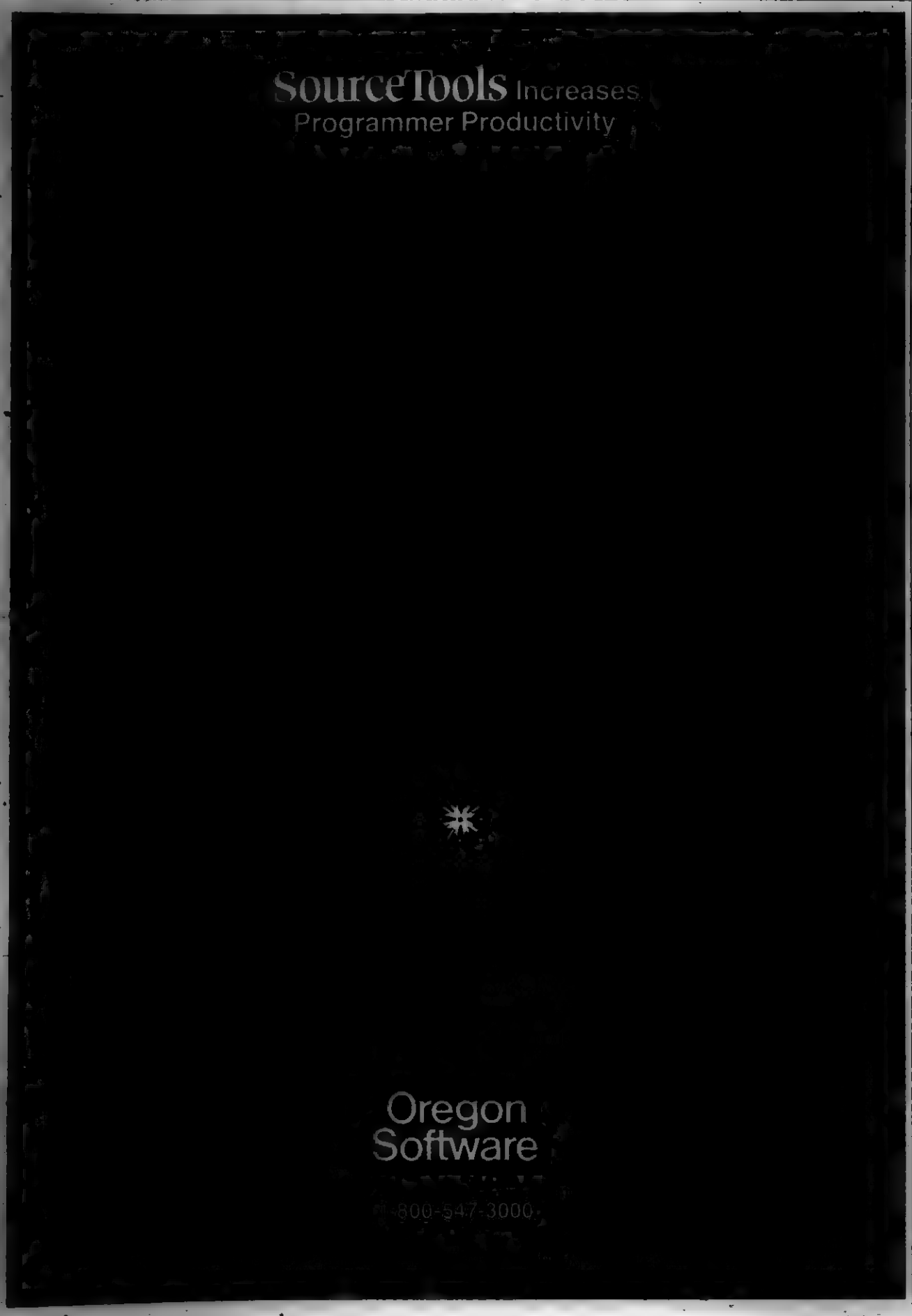
P-Fix86, Phoenix Software's symbolic debugger for MS-DOS, features windowed full screen display, in-line assembler and test evaluation at break points. The debugger can load the map produced by the P-Link86 linkage editor and uses the symbols and line numbers within the program under test. It is said to allow the data display to be interchanged with the screen of the program under test and provides windows for program data and file examination.

P-Link86 is a linkage editor that handles output from Microsoft and IBM compilers and assemblers, as well as others such as Lattice, Inc. or Computer Innovations, Inc.'s C. Overlays may be specified, with no modification to the applications program, to reduce program memory requirements and may be combined into one or more disk files, the company said.

P-Lib86, an object library manager included as part of the P-Link86 package, handles libraries built according to the Intel or Microsoft format. P-Lib86 can build libraries from scratch, delete modules from existing libraries, merge libraries and produce cross-reference listings, the company said.

Prices for the Phoenix software programming tools are P-Mate86, $225; P-Fix86, $245; P-Link86 (including P-Lib86), $395; and P-Lib86, $125.

More information is available from Phoenix Software Associates at Suite 260, 1420 Providence Highway, Norwood, Mass. 02062.



Etherseries enhanced, price cut

MOUNTAIN VIEW, Calif. — 3Com Corp. has announced one price reduction and two enhancements to products in its Etherseries.

The price of Etherlink, the company's Ethernet interface and user software for personal computers, has been reduced from $950 to $795.

Ethershare software now supports a single IBM Personal Computer as both a network server and workstation; a dedicated server is no longer necessary.

A new Etherstart product, a chip that is inserted onto a networking board, permits an IBM Personal Computer to function on the network without a local disk drive and controller.

The Ethershare software is priced at $595; the Etherstart chip costs $100. All products are available immediately, the company said.

More information is available from 3Com, P.O. Box 7390, 1390 Shorebird Way, Mountain View, Calif. 94039.

IF YOU MISS CW OFFICE AUTOMATION IN THE NEXT THREE MONTHS, LOOK AT THE ISSUES YOU'LL BE MISSING.

JUNE.

Microcomputers.
How they've changed the workplace.
What's new in networks, security, and micro-to-mainframe links.
Closes May 4.

AUGUST.

Applications Software.
A look at the real issues.
Productivity. User-friendly vs. ease-of-use. Plus plenty of product reviews.
Closes July 6.

OCTOBER.

Workstations. We explain the alternatives to microcomputers, addressing important topics like cost-effectiveness, compatibility and upgrades.
Closes August 31.

Office Automation is ideal both for the advertiser and the reader. Because each one offers focused, in-depth information in the area of office automation.

Readers always want to catch up on what's hot and what's not in their particular specialty. And find out what the vendors have to offer.

As an advertiser, you won't want to miss the opportunity to tell them.

Maybe that's why our OA is so popular.

Everyone wins.

For more information, or to reserve your space in any of our upcoming issues, simply call the sales office nearest you. Or fill out and return the coupon to Ed Marecki, National Sales Director, Computerworld, 375 Cochituate Road, Box 880, Framingham, MA 01701.

To: Ed Marecki, *National Sales Director*
CW Communications/Inc., Box 880, Framingham, MA 01701
Please send me advertising information on: ☐ *Workstations.* ☐ *Applications Software.* ☐ *Microcomputers.*
☐ *Please have a sales representative call me.*

Name _____
Title _____
Company _____
Address _____
City _____ State _____ Zip _____
Telephone _____
OA

Computerworld
OFFICE AUTOMATION

Sales offices.

BOSTON: 375 Cochituate Road, Box 880, Framingham, MA 01701 (617) 879-0700; CHICAGO: 2600 South River Road, Suite 304, Des Plaines, IL 60018 (312) 827-4433; NEW YORK: Paramus Plaza I, 140 Route 17 North, Paramus, NJ 07652 (201) 967-1350; ATLANTA: 1853 Peeler Road, Suite D, Atlanta, GA 30338 (404) 394-0758; SAN FRANCISCO: 300 Broadway, Suite 20, San Francisco, CA 94133 (415) 421-7330; LOS ANGELES: 18008 Sky Park Circle, Suite 260, Irvine, CA 92714 (714) 261-1230.

TI options allow Professional to talk to IBM CPUs

By Paul Kunsmanwski
CW Staff

HOUSTON — Introducing optional communications products that allow its Professional microcomputer to talk to IBM mainframes, Texas Instruments, Inc. hopes to loosen the stranglehold that the IBM Personal Computer holds on the Fortune 1,000 market. "The Professional has been designed to work in IBM's sizable installed base," said Jerry Rycaj, Professional product marketing manager.

Last month, Texas Instruments announced Professional enhancements that include a coaxial interface for IBM 3278 and 3279 display terminal emulation, a 3270 Systems Network Architecture software package to mimic IBM 3276 display stations and a 3101 terminal emulation package.

IBM communication protocols will play a key role in future product developments, according to Steve Beverian, product manager for the Professional. "We will develop products to emulate other 3200 series products," he added.

The company is selling the communications products through retail, value-added reseller and direct sales channels. "Most of our retailers have a direct sales force calling on large accounts," Rycaj said. "Our [value-added resellers] target specific vertical markets."

Rycaj listed three reasons why a large company would buy the Professional rather than the IBM Personal Computer: better graphics, a well-designed keyboard and easy expansion capability. "The Professional uses the same chassis for expansion, something that the IBM Personal Computer does not do," he noted.

Rycaj claimed that a number of large companies have signed volume purchase agreements with Texas Instruments, but refused to list specific customers.

SYSTEMS

KAYPRO CORP.
Kaypro 2 price cut

Kaypro Corp. has announced that the price for the Kaypro 2 has been cut from $1,595 to $1,295.

The Kaypro 2 features two double-density disk drives with 400K bytes of storage; a 9-in., 80-col. by 24-line screen; Zilog, Inc.'s Z80 microprocessor; and Digital Research, Inc.'s CP/M operating system, the vendor said. The microcomputer bundles Perfect Software, Inc.'s Perfect Word, Perfect Filer and Perfect Calc software. Users can have Micropro International's Wordstar word processing program instead of Perfect Word.

Kaypro, 533 Stevens Ave., Solana Beach, Calif. 92075.

PERTEC COMPUTER CORP.
Model 4210

Pertec Computer Corp. has introduced Model 4210, a microcomputer that uses Pick & Associates, Inc.'s Pick operating system. The system runs Pertec's Sabre software, a series of application packages designed for Pick.

Model 4210 features 256K bytes of random-access memory (RAM), a 10M-byte hard disk, a Motorola, Inc. 68000 microprocessor, four serial ports and an 800K-byte floppy disk drive.

Options include upgrading to a multiuser Model 4220, 1M byte of RAM, 80M bytes of Winchester disk storage, 12 serial ports and a streaming cartridge tape drive, according to the vendor. Model 4210 reportedly can be part of a 36-device network.

Model 4210 costs $9,400.

Pertec Computer, 17118 Armstrong Ave., Irvine, Calif. 92713.

POLYMORPHIC SYSTEMS, INC.
Poly 8/16

Polymorphic Systems, Inc. has announced a single-user, dual-processor microcomputer that utilizes Intel Corp.'s 80186 microprocessor and Digital Research, Inc.'s Concurrent CP/M 86 operating system.

A spokesman said Polymorphic's Poly 8/16 micro features a two-board set that includes an 8-bit Zilog, Inc. Z80 processor with 64K-byte random-access memory (RAM) running Digital Research's CP/M 80 on the system master card, plus a 16-bit 80186 with 256K-byte RAM running the multitasking Concurrent CP/M 86 on the slave board.

The Poly 8/16 micro includes the Z80 master card

Continued on page 70

COMPUTER MARKETING EXECUTIVES

Qualified leads cost you less than $25 each, delivered to your showroom at:

COMPUTER TECHNOLOGY CENTER

CALL US TODAY

SAMPLE SHOWROOM NOW OPEN

1925 W. Olympic Blvd. • Los Angeles, CA 90015 • (213) 385-5118

ATTENTION COPICS USERS

A truly on-line, integrated Receiving, Quality and Material Control System replaces the COPICS Field Developed Receiving Module.

In addition to updating your MRP, Purchasing and Inventory Control data bases, this powerful system, RQMCS, features:

- Automatic Back Out
- Flexibility
- Only One Data Base
- Total Audit Trail
- Quality Control
- On-Line Updating
- Posting Options
- No Conversion

RQMCS users are enthusiastic about the system's processing speed and the immediate control it has provided for their entire receiving operation. For more information call:

(404) 998-3500

LELAND INC
COMPUTER SERVICES
3601 DUNWOODY PLACE, SUITE 146, ATLANTA, GA. 30338

Our Word Is A Promise

GROW YOUR OWN CICS PROGRAMMERS.

The CICS programmers you need may already be working for you—because SysEd training makes even non-CICS programmers immediately productive in a CICS environment.

SysEd's challenging, "hands-on" training lets you upgrade your present programming staff, and saves the time, effort and expense of hiring new personnel.

Our experienced instructors specialize in using real-life programs and design problems. Whether the course is Command Level, Macro Level, Internals, Application Design or VSAM, we encourage students to bring in their own projects to enhance the workshop sessions.

Courses can be held at your company on your computer or at SysEd's fully-equipped classroom/computer facilities in New York City, Chicago, San Francisco and Dallas.

For information, call Dave Shapiro (212) 889-3366.

SYS-ED

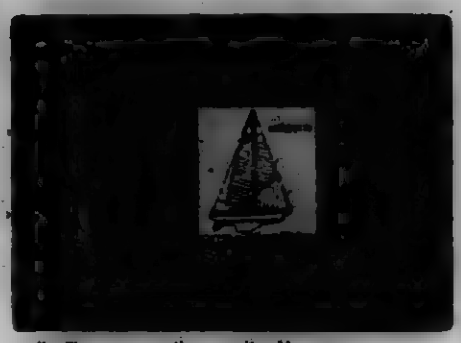
ONE PARK AVENUE, NEW YORK, NY 10016 • (212) 889-3366

AFTER 35 YEARS AS HIS EMPLOYER, TELL HIM ABOUT DIRECT DEPOSIT AS A FRIEND.

Direct Deposit lets retiring employees send their Social Security straight to their checking or savings account. For free materials, write to: Dept. of the Treasury, Direct Deposit –D3, Annex I, PB-1100, Washington, D.C. 20226.

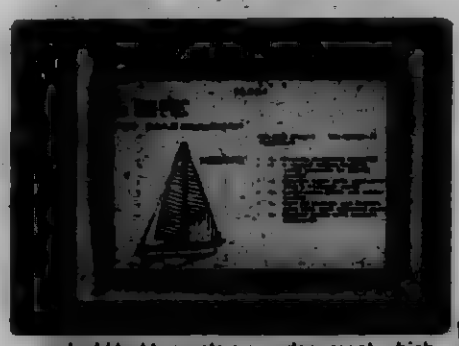
The first professional computer that looks at information the way you do.

Place any document under the scanner, push a button and in seconds...

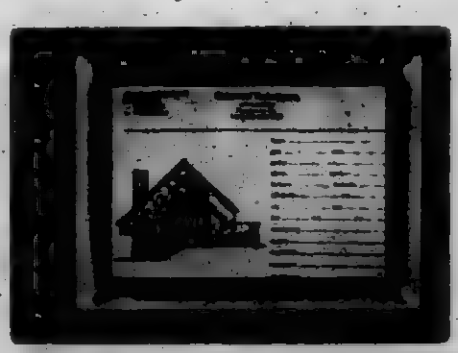


...it will appear on the monitor. You can store the whole document or isolate just part of it.

You can relocate any section...

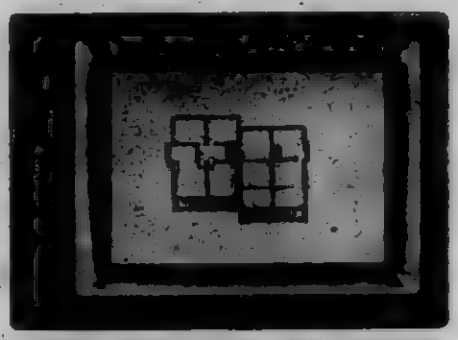


...and add text to create a new document, which can be printed or stored.

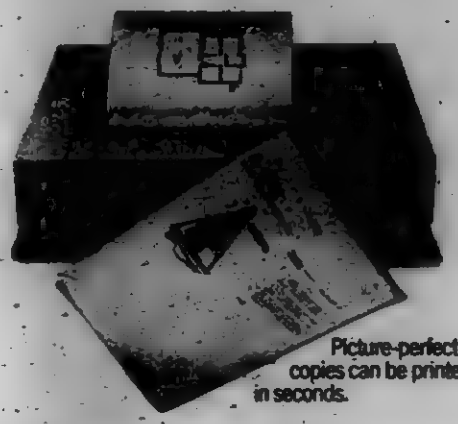


Filling out forms is a snap. Just place a form under the scanner...

...and fill in the blanks and update your database. Use the cursor (under "floor plan")...



...to bring up other image or data files associated with the original document.



Picture-perfect copies can be printed in seconds.

If you're in business, you get a lot of information exactly the way you're getting it right now.

From a piece of paper.

And a lot of time and money goes into managing that information.

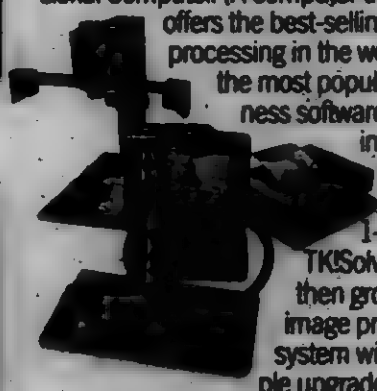
But now Wang is introducing a computer that can help you manage that information even better:

The Wang PIC™ image processing system.

With the Wang PIC, business information can be scanned, displayed, edited, filed, printed, and sent anywhere in the world. Documents can be enlarged, reduced, landscaped, and contrasted. All from one desk-top computer.

The Wang PIC can communicate with other Wang computers and even most mainframes.

And you can start with a Wang Professional Computer. (A computer that already offers the best-selling word processing in the world and the most popular business software—including Visi On,™ Lotus 1-2-3,® and TK!Solver.™) And then grow to an image processing system with a simple upgrade.



If you would like a demonstration of The Wang PIC image processing system, call 1-800-225-9264. Or write to: Wang Laboratories, Inc., Business Executive Center, One Industrial Avenue, Lowell, MA 01851.

But do it today.

Because this is one new product you don't want to overlook.

WANG

The Office Automation Computer People.

CW27

©1984 Wang Laboratories, Inc.
PIC is a trademark of Wang Laboratories, Inc.
Visi On is a trademark of VisiCorp. Lotus 1-2-3 is a registered trademark of Lotus Development Corp. TK!Solver is a trademark of Software Arts, Inc.

MICROCOMPUTERS

Continued from page 68

and 80186 slave card with RAM on an S-100 motherboard, one half-height, 5¼-in. floppy disk drive with 800K bytes storage, four RS-232C/RS-423 serial ports, two parallel ports, an adjustable terminal with 14-in. monochrome display and detached keyboard. Prices for the Poly 8/16 start at $4,495.

Polymorphic Systems, 460 Ward Drive, Santa Barbara, Calif. 93111.

PRINTERS/PLOTTERS/PERIPHERALS

INFORUNNER CORP.
Riteman printers

Inforunner Corp. has announced four dot matrix, bidirectional, logic-seeking printers.

The Riteman line of printers are portable and fit in standard 3-in. briefcases, according to the company.

The Riteman Plus prints 120 char./sec in 66 character modes and is compatible with the Epson America, Inc. MX-80FT, according to the vendor.

The Riteman Blue Plus prints 140 char./sec in 128 character modes and is compatible with IBM's Graphics Printer, Epson RX-80FT and Epson MX-80FT software, a spokesman said.

It reportedly prints in elite pitch mode and is equipped with quiet mode and proportional spacing.

The Riteman II is designed to print 160 char./sec in 256 programmable character modes with Epson FX-80 software compatibility. In addition, it has an 8K-byte buffer, quiet mode and proportional spacing, the spokesman said.

The Riteman 15 Printer features a 15-in. carriage and adjustable tractor feed. It is said to print 160 char./sec in 256 programmable character modes and to offer Epson FX-100 software compatibility, the vendor said.

Available now, the Riteman Plus is priced at $399. The Riteman Blue Plus is scheduled for March availability at a price of $499. The Riteman II is scheduled for April availability at $599. The Riteman 15 is scheduled for availability in March at $799, according to the vendor.

Inforunner, 1621 Stanford St., Santa Monica, Calif. 90404.

Now add NCR Service to the reasons for choosing Florida Data's OSP Line

world's fastest, most versatile matrix printers

Triple mode capability: DP, WP, Optional Graphics

Triple paper path: auto cut sheet, continuous, hand

Patented MSE (Magnetic Stored Energy) printhead

NCR is a Registered Service Mark

There was already enough reason. But now you can buy OSP with the added assurance of nationwide NCR service. You'll rarely need them, but if you ever do they'll be there in two shakes.

OSP means "Office System Printers." And it means everything you need in just one high performance machine: data processing at 600 cps, word processing at 100-150 cps, with graphics and down line load capability. It's a whole new way to go.

Call (305) 259-4700 or mail coupon for details

Florida Data Corporation
6000 John Rodes Blvd.,
Melbourne, FL 32935

Yes, send me information on your OSP 120 and 130 matrix printers.

NAME
TITLE
COMPANY
ADDRESS
CITY, STATE, ZIP

FLORIDA DATA

BOARD-LEVEL DEVICES

INTEGRATED SOLUTIONS, INC.
CPU, memory card

Integrated Solutions, Inc., has introduced a VME bus-compatible, Motorola, Inc. 68000/680101-based CPU and memory card. The CPU reportedly allows up to 16M bytes of physical memory to run with no wait states at 12 MHz.

The CPU also features two programmable serial ports, one with modem control. The memory management unit is said to support an 8M-byte logical process and up to 16M bytes of physical memory.

The CPU is available for $2,200, and the memory card is available for $1,695, with 512K bytes of memory, according to the vendor. Discounts are reportedly available for quantity purchases.

Integrated Solutions, 1350 Dell Ave., Campbell, Calif. 95008.

AUXILIARY EQUIPMENT

DEMCO ELECTRONICS
Graphics Tool Kit

Demco Electronics has announced the Graphics Tool Kit, which is said to be a complete hardware and software package for interactive graphics generation.

A vendor spokesman said the system is compatible with all Apple Computer, Inc. Apple II and compatible microcomputers, with output to a dot matrix printer. The proprietary hardware allows users to design on a movable screen with resolution of 640 horizontal dots by 768 vertical lines.

The main software package of the Graphics Tool Kit is menu-driven, and it manipulates vector shapes, displays fonts, draws lines and plots points.

The spokesman said the system can generate graphs, charts, sheet music, floor plans, circuit diagrams, parts layouts, logic diagrams, mechanical drawings, stylized logos and lettering.

The Graphics Tool Kit costs $495.

Demco Electronics, 10516 Greenleaf Ave., Inglewood, Calif. 90304.

SOFTWARE

KEY SOLUTIONS, INC.
Databurst

Key Solutions, Inc. has introduced Databurst, an IBM Personal Computer program generator with a full screen processor.

According to the vendor, the Databurst option enables programmers to expand and test Basic programs using the interpreter, then compile them with no changes. The compiler support is loaded into memory once and becomes an extension of the operating system.

Because it is no longer hosted by Basic, the compiler support reportedly simplifies interprogram communication.

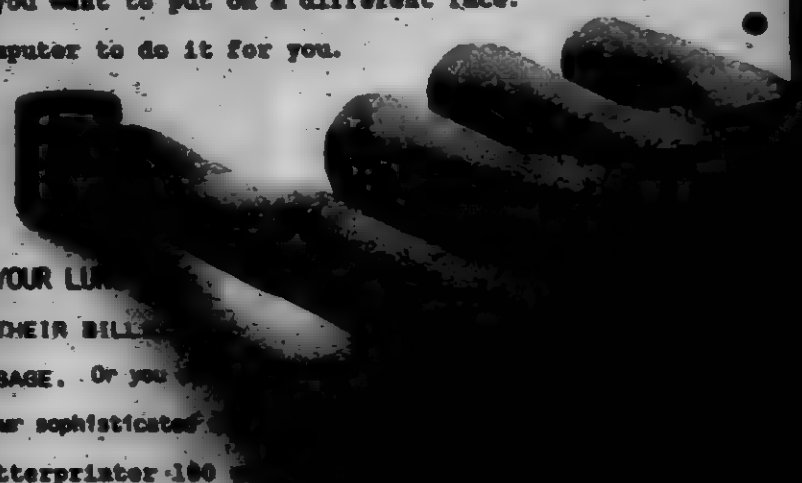
Databurst is priced at $225. The Databurst compiler option is available for $40, the vendor said.

Key Solutions, P.O. Box 2297, Santa Clara, Calif. 95055.

See TOOLS page 72

Change your face with one finger.

Now there's a printer that lets you express yourself.
It's the Letterprinter 100, from Digital.
When you're feeling very professional and business-like,
then it looks just like this.
In fact, this is an actual printout. It's great for word processing.
You can send a nice polite letter to your most important client.
But there may be times when you want to put on a different face.
You can program your host computer to do it for you.
Or you can do it yourself.
Simply by pushing a button.



YOU CAN SHOUT AT THE TOP OF YOUR LU
TELL THEM THEY'D BETTER PAY THEIR BILL
OR ELSE. THEY'LL GET THE MESSAGE. Or you
be elegant. Impress people with your sophisticated
But back to business. The Letterprinter 100
you all of the typefaces on this page. If you
see one you like, we'll customize one for you.
The Letterprinter 100 also gives you full graphics
capabilities. Plus three printing settings: one for
letter quality, one for graphics, and a high speed one
gives you draft-quality documents in only 10 seconds.
So face it. Why buy an ordinary printer when you can express
yourself just by lifting a finger?
See the Letterprinter 100. It's just one of the family of
printers Digital offers, including a daisy wheel printer, the
LQP02, and a low cost Personal Printer, the LA50. Call
1-800-DIGITAL, extension 700, for the distributor nearest you.
Or write Digital Equipment Corporation, Terminals Product Group,
2 Mt. Royal Avenue, UP01-5, Marlboro, MA 01752.

digital

TOOLS from page 70

AUTODESK, INC.
Autocad enhancement

Autodesk, Inc. has enhanced its Autocad software for precision drawing applications on microcomputers. The Autocad program reportedly permits users to perform many functions of computer-aided design.

The enhanced Autocad program reportedly includes a break command to permit partial deletion of drawing elements, a freehand sketch mode and alternate arc/circle specifications.

Autocad runs on the IBM Personal Computer and Personal Computer XT; the Victor Technologies, Inc. Series 9000; the Zenith Data Systems Z100; the NEC Information Systems, Inc. APC; the Eagle Computer, Inc. Eagle Personal Computer and 1600 models; Digital Microsystems, Inc. models 100 and 100 Plus; Texas Instruments, Inc. Professional; Digital Equipment Corp. Rainbow; and Compaq Computer Corp. Compaq.

Autocad is available for $1,800 in a basic package and for $1,500 in a package that includes advanced drafting extensions, according to the vendor.

Autodesk, Suite B20, 150 Shoreline Highway, Mill Valley, Calif. 94941.

A+ SOFTWARE, INC.
Under-Control; Gantt-It

A+ Software, Inc. has announced two software programs for file management and project control for IBM Personal Computers or Personal Computer XTs operating under IBM's PC-DOS or Microsoft, Inc.'s MS-DOS operating systems.

Under-Control is a file management program that reportedly features automatic entry screen generation, sorting, report writing, record selection and totaling functions.

Gantt-It, a project control and cost allocation program, is an optional extension of Under-Control. It reportedly features task tracking and cost allocation. With Gantt-it, charts can be printed up to 999 characters wide.

Under-Control sells for $125. Gantt-It and Under-Control together cost $195.

A+ Software, 16 Academy Drive, Shenendehowa, N.Y. 12158.

CONCEPT OMEGA CORP.
Word Concept

Concept Omega Corp. has introduced Word Concept, a multiuser word processing program that runs under Microsoft, Inc.'s MS-DOS and Xenix, Unix and Scientific Management Corp.'s Thoroughbred operating systems.

Word Concept features menu-driven input, on-line help screens, full screen editing and function key control, the vendor said.

The program is written in Microsoft's Business Basic, supports three IBM Personal Computers and interfaces with any program using Business Basic, according to the vendor.

Word Concept costs $495.

Concept Omega, P.O. Box 6701, Bridgewater, N.J. 08807.

LEADING EDGE PRODUCTS, INC.
Mail List Manager

Leading Edge Products, Inc. has announced the addition of an integrated Mail List Manager to its Word Processing software.

The package adds advanced personalized document capability to the Word Processing package, as well as the ability to select a group of records.

The Word Processing package was designed for use with the Leading Edge Personal Computer, the IBM Personal Computer or Personal Computer XT and other compatibles.

Available this spring, Word Processing with Integrated Mail List Manager is priced at $495, according to the vendor.

Leading Edge Products, 55 Providence Highway, Norwood, Mass. 02062.

SOFTWARE DIGEST, INC.
The Ratings Book

Software Digest, Inc. has published the first edition of *The Ratings Book*, a series of publications comparing and rating various microcomputer programs, with each issue focusing on a single category of software.

This initial offering is an evaluation of 30 word processing programs written for

Continued on page 76

THE TRUTH ABOUT SOFTWARE

If you are an IBM PC user, or are about to become one, be careful!

Many programs promoted as "user-friendly" are anything but friendly. Their instructions are hard to follow and hard to remember—and they may require hours and hours to master.

That's too bad, because there are a few really good programs which can make your life a lot easier and improve your productivity.

Why then are so many of the troublesome programs sold every day to new users?

Because of the lack of reliable, comparative information. Dealers, experts, long-time users and reviewers have good intentions, but their advice is usually based on experience with a limited number of programs. They may recommend the best program they know, but not necessarily the best one available.

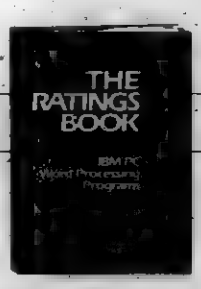
THERE'S A BETTER WAY.

If you could, you would test all the competing programs for yourself. You would take the time to compare each and every one in many different ways. And when you were finished you would really know the score.

But you'd have to spend thousands of dollars and months of your time to do that.

Or you can simply get THE RATINGS BOOK. And all the answers will be at your fingertips.

THE TRUTH ABOUT SOFTWARE.



Software Digest, Inc.
One Wynnewood Road
Wynnewood, PA 19096

Send me THE RATINGS BOOK for the categories indicated below, at $14.95 plus $1.80 postage and handling for each volume.

- ☐ IBM PC Word Processing Programs
- ☐ IBM PC Database & File Management Programs
- ☐ IBM PC Spreadsheet Programs *(May)**
- ☐ IBM PC Graphics Programs *(June)**
- ☐ IBM PC Time & Project Management Programs *(July)**

☐ Put me on the mailing list to receive notices of future volumes rating ☐ IBM PC Software ☐ Apple IIe and Macintosh software

Mr./Mrs./Ms. _____
PLEASE PRINT CLEARLY

Company (if any) _____

Address _____

City, State, Zip _____

☐ Payment Enclosed ☐ MasterCard ☐ Visa ☐ American Express

Credit Card No. _____ Exp. Date _____

Signature _____

OR

*Credit card orders will be billed as the books are shipped, not in advance.

THE TRUTH ABOUT SOFTWARE.

Software Digest, Inc.
One Wynnewood Road
Wynnewood, PA 19096

Send me THE RATINGS BOOK for the categories indicated below, at $14.95 plus $1.80 postage and handling for each volume.

- ☐ IBM PC Word Processing Programs
- ☐ IBM PC Database & File Management Programs
- ☐ IBM PC Spreadsheet Programs *(May)**
- ☐ IBM PC Graphics Programs *(June)**
- ☐ IBM PC Time & Project Management Programs *(July)**

☐ Put me on the mailing list to receive notices of future volumes rating ☐ IBM PC Software ☐ Apple IIe and Macintosh software

Mr./Mrs./Ms. _____
PLEASE PRINT CLEARLY

Company (if any) _____

Address _____

City, State, Zip _____

☐ Payment Enclosed ☐ MasterCard ☐ Visa ☐ American Express

Credit Card No. _____ Exp. Date _____

Signature _____

OR

*Credit card orders will be billed as the books are shipped, not in advance.

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY CARD

FIRST CLASS PERMIT NO. 526 WYNNEWOOD, PA

POSTAGE WILL BE PAID BY ADDRESSEE

Software Digest
One Wynnewood Road
Wynnewood, PA 19096

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY CARD

FIRST CLASS PERMIT NO. 526 WYNNEWOOD, PA

POSTAGE WILL BE PAID BY ADDRESSEE

Software Digest
One Wynnewood Road
Wynnewood, PA 19096

MICROCOMPUTERS

Continued from page 78

the IBM Personal Computer.

In addition to numerical ratings based on multiple testing, the book also contains 30 comparative ratings charts, summaries of the test results for each program and 180 screen pictures.

The Ratings Book: IBM PC Word Processing Programs costs $14.95.

Software Digest, One Wynnewood Road, Wynnewood, Pa. 19096.

NBI, INC.
Three software packages for Onyx 2000

NBI, Inc. has announced three business software programs for its Onyx 2000 Personal Computing Work Station.

The programs — Microsoft, Inc.'s Multiplan electronic spreadsheet and Gwbasic programming language and Ashton-Tate's Dbase II data base management system — are being offered as a clustered package that enables operators to share a program library, according to a spokesman.

The Onyx 2000 workstation features a standard 128K bytes of user memory, a 14-in. screen for text and graphics display and Microsoft MS-DOS compatibility.

Prices for the software vary, depending on the configuration of the system and the combination of software packages. The base price of the Onyx 2000 is $2,995.

NBI, P.O. Box 9001, Boulder, Colo. 80301.

TRILLIAN COMPUTER CORP.
Shell for Lotus 1-2-3

Trillian Computer Corp. has introduced a program said to permit its Visuall software to run in conjunction with Lotus Development Corp.'s Lotus 1-2-3 spreadsheet program.

The interface program, called a shell, reportedly permits Lotus 1-2-3 users to use Visuall, which displays a window-menu of commands to guide new users and allow them to operate their applications software at the task rather than command level.

Trillian's Lotus 1-2-3 shell is available for $49.95. A shell for Micropro International Corp.'s Wordstar program is also available for $49.95. Visuall costs $99.95.

Trillian Computer, P.O. Box 451, Los Gatos, Calif. 95031

TEXAS INSTRUMENTS, INC.
Multimate

Texas Instruments, Inc. has announced its own version of Software Systems' Multimate word processor software designed for the TI Professional computer.

According to the vendor, the package includes features such as Merge Function, a Spell/Checker Corrector with an 80,000-word dictionary and the ability to perform keystroke procedures and conversion capabilities for file integration.

Available April 1, Multimate has a suggested retail price of $495.

TI, P.O. Box 402430, Dallas, Texas 75240.

DATA MANAGEMENT ASSOCIATES, INC.
Magic MPS

Data Management Associates, Inc. has introduced a programming language called Magic MPS which it claims improves programmer productivity by up to 10 times.

Magic MPS maintains traditional language philosophies to create application programs without the need of a run-time package, a spokesman said.

Magic MPS/80, for all Digital Research, Inc. CP/M systems, is priced at $795. Magic MPS/86, for CP/M 86 and Microsoft, Inc. MS-DOS systems, is priced at $995.

Data Management Associates, P.O. Box 4340, Wilmington, Del. 19807.

LOGICAL SYSTEMS, INC.
Assembler source code

Logical Systems, Inc. has introduced assembler source code for the firm's LS-DOS/TRSDOS 6.2X operating system.

The publication is titled "The Source" and is published in three bound volumes: "The System," "The Libraries" and "The Utilities," the vendor said.

Each volume is available for $99, or $249 for the complete set, with delivery set for June.

Logical Systems, 8970 N. 55th St., Milwaukee, Wis. 53223.

See TOOLS page 76

RATINGS YOU CAN RELY ON.

The National Software Testing Center was established by Software Digest to do all the work for you, using a unique new evaluation system.

Concentrating on one category of software at a time, the best-selling and the newest programs are put through an extensive series of realistic tests.

Each program is tested exactly the same way. Not just once, but *ten times*—by ten different testers with varied levels of experience.

The scores of these testers are averaged, and the final ratings are determined mathematically.

This method cuts through inflated claims, spots programs that can cause you grief, and steers you straight to the software that works best.

CONVENIENT. QUICK. COMPREHENSIVE.

The results are presented graphically in THE RATINGS BOOK—with a minimum of words—so you can instantly see how competing programs stack up against each other in eight important ways:

- Ease of Start-up
- Ease of Learning
- Ease of Use
- Error Handling
- Performance
- Versatility
- Overall Evaluation
- Value for Money

Each volume is dedicated to a single category of software and contains a wealth of information—including comparative specification charts and screen shots showing how competing programs display the same data—to help you select software that will best meet *your* needs.

BOTTOM-LINE ANSWERS. READY NOW.

The first volume covers IBM PC word processing programs. The second covers IBM PC database management programs. Volumes for other categories of IBM PC and Apple Software will be issued soon.

Volumes 1 and 2 are now available at bookstores. Or you can order directly by phone or mail. The cost is only $14.95 per volume—far less than you would spend on one disappointing program.

THE RATINGS BOOK will give you the power to avoid software frustration. And the objective, comparative information you need to make personal and business computing a pleasure.

Because all software is not created equal.

FOR FASTEST SERVICE ON CREDIT CARD ORDERS, PHONE TOLL-FREE 24 HOURS A DAY, 7 DAYS A WEEK:
1-800-345-8500 (Ask for Ext. 79)

Published by Software Digest, Inc., Wynnewood, PA 19096
The National Software Testing Center™

TOOLS from page 75

EYRING RESEARCH INSTITUTE, INC.
Pdos Pascal

Eyring Research Institute, Inc. has introduced a multiple-pass Pascal compiler that generates assembler text for Motorola, Inc.'s MC68000 microprocessor.

Pdos Pascal is designed as a superset of the International Standards Organization standard to allow for systems programming with Pdos, a vendor spokesman said.

Since native code is generated with Pdos Pascal, faster program execution is possible for real-time applications, according to the spokesman.

Pdos Pascal is said to enhance the multitasking facilities of Pdos by allowing for subtasks within each Pascal program.

Pdos Pascal can be ported to any 68000-based microcomputer and is available on the Motorola VME/10 and the Sage Computer Technology, Inc. Sage 2 and Sage 4 microcomputers, according to the spokesman for the vendor.

The Pdos Pascal program is priced at $550, the vendor said.

Eyring Research Institute, 1455 W. 820 North, Provo, Utah 84601.

CORVUS from page 65

work of microcomputers and offer improvements of up to 40% in throughput." The built-in network disk server circuitry can save users nearly $1,000, Corvus stated.

Omnidrive systems will be offered with 5.5M-, 11.1M-, 16.6M- and 45.1M-byte formatted storage capacity, with suggested prices of $1,995, $2,495, $3,195 and $4,995, respectively. (These prices exclude the Constellation II net-work software, which sells at $395 for Apple Computer, Inc. micros and $495 for other models.) The systems will be available this month for personal computers from Apple, Corvus, Digital Equipment Corp., IBM, Texas Instruments, Inc. and Zenith Data Systems Corp.

Corvus is located at 2100 Corvus Drive, San Jose, Calif. 95124.

MMA from page 66

bases [and] micros and hopefully stimulate the imagination of the vendors," he said.

The ECN is based on a Zenith Data Systems Corp. Z100 microcomputer. Users can access the system with any microcomputer with a modem and appropriate communications software, Butler said. He expressed hopes the ECN will eventually link the membership for teleconferencing. An organizational newsletter is also being considered, he said.

Further information on MMA membership is available from the Micro Manager's Association, located at 80 Boylston St., Boston, Mass. 02116.

NETS from page 65

ductivity improvements, they also should create a group of more computer-literate employees, ultimately requiring less support than would be the case with even a small centralized system.

But if instead of a micro on a person's desk there is only a terminal into a "central" multiuser micro system, then only the level of centralization has been reduced — not centralization itself.

The system may not be as remote as the organization's mainframe, but it requires many of the same support elements: maintenance, back-up, programming support and a host of related services. Yet the multiuser micro is likely to be in an organizational environment without any of the support provided by a central mainframe facility. At the same time, there is little incentive for users to learn any more about the workings of the multiuser micro than they do about the central mainframe system.

Thus, from an organizational perspective, the multiuser micro may end up having all the disadvantages of the central mainframe system with none of the advantages.

The initial cost of a local-area network may indeed be somewhat higher than a multiuser system supporting the same number of users. The other considerations discussed, however, may prove more important than entry costs.

RAMIS II MAKES YOUR INFORMATION CENTER A GREAT PLACE FOR PEOPLE.

RAMIS II's complete solution is the most effective way to multiply the productivity and satisfaction of your end users and your Information Center staff. Today, RAMIS II means success at hundreds of Information Centers around the world.

POWER AND SIMPLICITY FOR END USERS

RAMIS II provides everything users need for maximum productivity. Its powerful report writer, relational database and language, full-color business graphics, SAS® interface, and many other capabilities meet the most advanced decision support needs. And, with our new RAMLink, IT series, and RAMIS II/PC software, end users have the ideal solution for mainframes and personal computers.

RAMIS II English comprehension extends the power of your Information Center to a multitude of new computer users. Through advanced knowledge-based technology, even people who've never been on speaking terms with a computer can ask questions, obtain answers, and create reports in only a few minutes using everyday English.

EFFICIENCY AND RELIABILITY FOR SUPPORT STAFF

Our complete solution lets your existing staff support many more users by dramatically reducing the number of products you need. And RAMIS II makes your support job easier with built-in computer-based training plus facilities to monitor and control usage.

RAMIS II delivers the performance and reliability needed to tackle even the largest decision support tasks with confidence. In fact, because RAMIS II is also a complete application development system, single-user systems can evolve smoothly into full-fledged applications.

SAS® is a registered trademark of SAS Institute, Inc.

RAMIS® II... THE LEADER BY DESIGN

Boston (617) 267-6924 Chicago (312) 670-9730 Dallas (214) 788-1936 Houston (713) 688-8697 Los Angeles (213) 670-6662 New York (212) 986-6877 Princeton (609) 799-2000 San Francisco (415) 461-6515 Washington, DC (202) 484-5725 Brazil (021) 429429 Europe (3) 222300 Hanover Area (5431) 418881 Calgary (403) 290-0440 Hamburg (40221) 10251 Hong Kong 5-439710 Johannesburg 27 11) 788-1096 Singapore (0999) 929-7223 London (01) 200 3681 Milan (2) 546-8090 Montevideo (2) 980700 Ottawa (613) 236-0585 Perth (3) 328 61 71 Santiago (2) 31054 Singapore 273 9255 Stockholm (8) 526720 Sydney (02) 923 1677 Tel Aviv (052) 76944 Toronto (416) 671-3272

MATHEMATICA PRODUCTS GROUP

A MARTIN MARIETTA DATA SYSTEMS COMPANY
P.O. Box 2392
Princeton, NJ
08540

LISTEN TO OUR USERS

Send for our free guide, "Why Information Centers Succeed." It contains practical suggestions for success from RAMIS II Information Center staffs of organizations like yours. Organizations that have found that RAMIS II, the real leader in complete software for business, is the sure way to make an Information Center a great place for everyone.

To get your copy, contact your local Mathematica office, call toll free (800) 257-5171, or return the coupon below.

MATHEMATICA PRODUCTS GROUP
P.O. Box 2392 Princeton, NJ 08540

Please send me a free copy of "Why Information Centers Succeed."

Name
Title
Company
Address
Telephone
Computer Operating System

CW 4/2

COMPUTER INDUSTRY

Metamorphosis marks NCR's centennial

By Peter Bartelik
CW Staff

Marking its centennial this year, NCR Corp. is, in a sense, the grandfather of the information processing industry, and until recently, many people did regard it as a very senior citizen — old and tired, slow and plodding. But in 1983, NCR broke out of its cocoon, building on changes implemented over the past decade to release a slew of new products and pursue new endeavors.

Now NCR proudly proclaims it is "Celebrating the Future." That future is to be based on a relatively new management team, new products and, perhaps most important, new ideas.

For 90 years, NCR was the National Cash Register company, completely dominating U.S. and international markets with its electromechanical cash registers, found in just about every corner store in the country, and accounting machines. But it lost its hold on that market with the proliferation of electronic competitors.

In 1973, William S. Anderson was tapped from the company's Far East operations and focused the company's goals on the information processing business it had begun in the late 1950s. In 1976, Anderson lured Charles E. Exley Jr. away from a successful 22-year career at Burroughs Corp. to become president of NCR and Anderson's heir apparent. Last year, Exley was named chief executive officer in anticipation of Anderson's coming retirement this year, and the passing of the purple coincides with a renewed vigor at the company.

NCR
Celebrating the Future

The company never had many problems with turning a profit, but it did have problems keeping up with the revenue growth in the information industry, growing in the low single digits and bottoming out at 3% in 1982, while other players grew at a rate averaging about 14%. Coming out of the recession last year, NCR boosted revenues by 6%; this year, spurred by new products and the economic recovery, NCR is expected to post revenue growth of 15% or better.

"Good growth this year will not demonstrate that we have learned how to be a very high-growth company, because it is coming off two severe years of recession in our industry," Exley said during a recent interview. "The key to my way of thinking is that we have to be constantly exploring new opportunities and new applications of the products that we specialize in, and we have to be prepared to offer, to apply the things we know how to build to new markets regularly. That is something that in our history we have not done. We have brought new technology to the same markets, but we have not addressed new markets. So the way we're going to do that is we are going to be successful in addressing new market opportunities."

The company has targeted a staggering number of opportunities it hopes to ex-

See NCR page 78

Computervision Corp. expresses surprise at the amount of damages being sought by Perkin Elmer Corp. in a lawsuit over a long-standing patent dispute/81

INSIDE

- Two public opinion researchers warn that election-year industrial policies being developed by the two major political parties may be rejected by voters if those policies seem to be government intervention rather than government-business cooperation/78
- Delayed installations are cited as one reason why Rolm Corp.'s quarterly revenues will not meet Wall Street expectations/80
- Members of Lotus Development Corp.'s advanced development group start up Prelude Development Corp. and agree to license artificial intelligence products to their former company/84
- Ashton-Tate reports revenues and profits in 1983 were both up more than 200% over the previous year/82

AT&T lacks DP strategy, Adapso told

CW AT ADAPSO

By Robert Batt
CW West Coast Bureau

DALLAS — The lack of a clear-cut strategy will make it very tough for AT&T to compete against IBM in the computer services industry, the Association of Data Processing Service Organizations, Inc. (Adapso) was told here recently.

Speaking at Adapso's 60th Management Conference, Esther Dyson, president of Edventure Holdings, Inc., a New York-based consulting firm, said AT&T will have a hard time competing in an unfamiliar marketing environment.

"AT&T does not have a clear strategy in sectors such as local-area networks, and it is going to be a lot tougher for it to enter the market as a new company and give the users the perception that it has a single unified approach."

Dyson told Adapso members that IBM can get away without a clear strategy in some areas of its business because it has operated in this market for a long time. But for AT&T to do so will be much harder.

AT&T, Dyson said, is very much in a "trial and error" mode, and users should not expect too many drastic moves from the company in the near future.

Commenting on AT&T's Unix operating system, Dyson said the company relinquished market control of Unix by creating it with open systems compatibility.

"Unix no longer belongs to AT&T except legally and financially. In reality, it belongs to the industry, and AT&T will need to find some other means of reaping value-added rewards," Dyson said.

IBM, she claimed, would not have an-

See AT&T page 95

CDC buys access to wafer technology

By Peter Bartelik
CW Staff

MINNEAPOLIS — Trilogy Ltd., which in recent weeks has announced problems and changes in the development of its wafer-scale semiconductor technology, has granted access to that technology to Control Data Corp. in exchange for $2 million and future royalties.

The agreement was announced last week in a joint statement issued by CDC President Robert M. Price and Trilogy Chairman Gene M. Amdahl. Unlike previous corporate licensees, CDC did not purchase an equity position in the company.

CDC is the third major U.S. computer vendor to invest in the Trilogy project. Digital Equipment Corp. and Sperry Corp. separately invested a total of $68 million for equity positions in Trilogy of 9% and 15%, respectively, and for license to use the technology. The Bull conglomerate of France, formerly CII-Honeywell Bull, also invested a smaller sum.

Trilogy's wafer-scale product purportedly will pack the capacity of 100 integrated circuits onto a 2¼-in. wafer. However, Trilogy early this year announced it experienced problems with the final metalization process of the wafer, which caused the device to short out [CW, Jan. 23]. Earlier this month, Trilogy announced it had solved that problem, but had decided to simplify the design process to make it more adaptable to other vendors' products [CW, March 12].

The IBM-compatible, high-range mainframe that Trilogy plans to develop based on the wafer-scale technology was also redesigned as a dyadic, or dual-processor, configuration because the semiconductor

See WAFER page 95

M&D, ABC agree on settlement of G/L Plus issue

By John Gallant
CW Staff

NATICK, Mass. — McCormack & Dodge Corp. (M&D) and ABC Management Systems, Inc. have ended a long-standing legal dispute involving international sales of M&D's G/L Plus general ledger package.

In an agreement reached March 22, ABC Management Systems granted M&D unrestricted worldwide rights for past and future sales of the ABC Management report writer system as a subsystem within the G/L Plus package. The agreement, which was announced in a brief statement issued by the firms, also resolves all legal claims against M&D by the Bellingham, Wash.-based ABC Management.

The agreement effectively dissolves an injunction imposed last year [CW, Dec. 5] by a Superior Court judge in Whatcom County, Wash., that blocked M&D from selling the G/L Plus package outside the U.S. with the ABC Management report writer. The injunction was based on the court's finding that M&D had violated a domestic marketing agreement with ABC Management by selling an enhanced version of its report writer under the name of Financial Analysis System (Fast) to international clients as a subsystem of G/L Plus.

As a result of the joint settlement, M&D is also relieved of $2.5 million in damages awarded to ABC Management on the basis of that suit. Spokesmen from both companies declined to comment on details of the settlement, such as the specifics of the marketing agreement for the report writer software, except to say that M&D is now "free to sell the ABC product anywhere it chooses."

The settlement also casts a shadow over the recently announced agreement between M&D and Software International, Inc. (SI), which gave M&D international

See M&D page 95

NCR making good on commitment to new product lines

In 1982, NCR Corp. shareholders were told every major product line would be replaced by new generation products within 36 months, and the plan seems to be ahead of schedule.

At the low end of its information processing line, the company has brought out "professional class" personal computer products and will introduce an IBM-compatible micro later this year, according to William F. Buster, executive vice-president of the development and production group.

The Tower, a 16-bit, Unix-based multiuser system, was introduced last year, and this year the I-Tower, using RM/Cobol, was introduced to replace the I-9020. Also last year, the company introduced the 9300 with twice the power of the I-9020; several new versions of the high-end 8600 series were added. Similar developments have taken place in the retail and financial divisions.

About the only product unchanged to date is the 8500, and Buster said pointedly, "You can look at the calendar and see when we will carry that out."

Mark Bell, a researcher with Framingham, Mass.-based International Data Corp., said the Tower appears to have done relatively well in the marketplace. The products ranging from the 8200 to the 9200 had become outdated, but NCR is bringing out new products to use a major resource in software written for that outdated family, Bell said.

Wafers prepared for plasma etching at NCR's Colorado Springs facility.

Charles E. Exley Jr., NCR chief executive officer, expressed his commitment to developing mainframe technology, and Buster noted the company is committed to providing customers with the ability to migrate to all levels of processing power. But Bell and Jonathan Fram, an analyst with Paine Webber, Mitchell Hutchins, Inc., pointed out that NCR traditionally has focused on transaction processing that does not require the vast power needed for scientific processing.

"NCR traditionally has produced what were called special-purpose processors," Fram said. "Special purpose has now become the norm. They have the most realistic view of the mainframe market of any of the Bunch." Bell said NCR will provide high-range products for its customers to migrate to, but will focus on middle-range products for revenue growth.

NCR has also quietly built up its merchant semiconductor presence. Of its total semiconductor production, from three facilities, 70% is sold externally, NCR said. The firm recently signed an OEM agreement to provide Honeywell, Inc. with the NCR/32 and is working with Ford Motor Co. for special-purpose chips to be used in automobiles. Fram said the firm will announce two new mainframes, and at least one will use NCR chips.

NCR, while not at the level of Intel Corp. or Motorola, Inc., will have "important leverage" with available 32-bit chips when demand saps the supplies of the major semiconductor manufacturers, Bell said. "They are developing their own technology, and they are beginning to understand the marketplace better," he added.

NCR from page 77

plot, some based on traditional strengths, but some completely departing from tradition.

In 1979, NCR acquired Comten, Inc., now named NCR Comten, a developer of IBM-compatible front-end processors and other communications equipment; in 1980, it acquired Applied Digital Data Systems, Inc., a supplier of VDTs; in 1981, the Office Systems Division was established to address office automation, and a microelectronics development and marketing organization was also added; and last year, NCR Telecommunications Services, Inc. was established to sell excess capacity on NCR's own switching network.

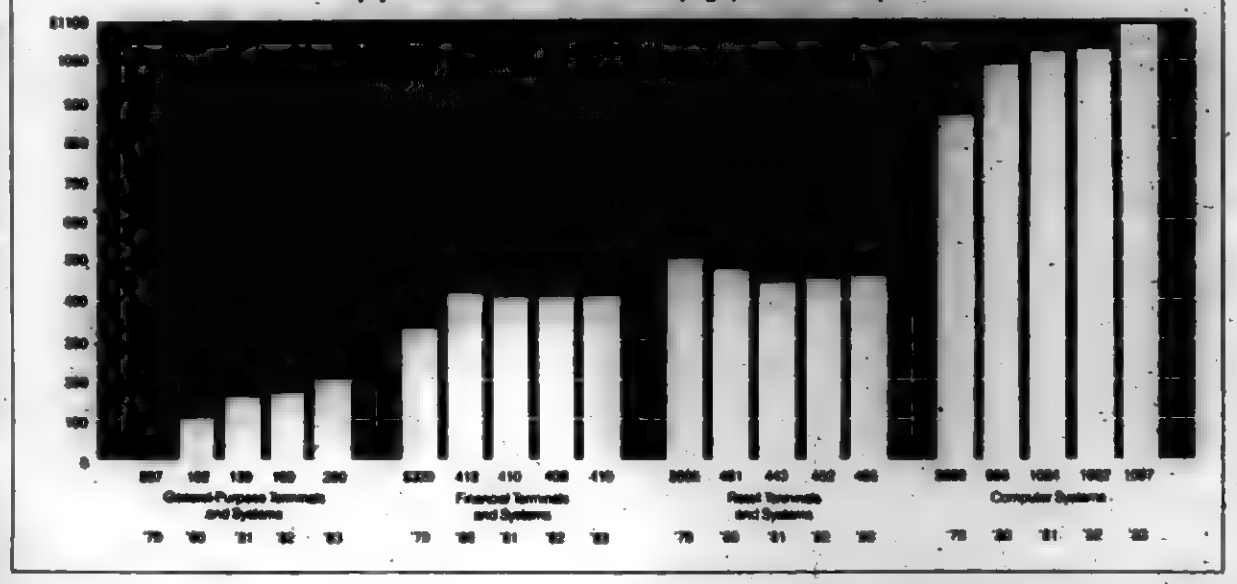
Joint ventures

The company has also established several joint ventures to develop electronics funds transfer systems from banks to point of sale and is working on similar technology for consumer self-service terminals.

Jonathan Fram, an analyst with Paine Webber, Mitchell Hutchins, Inc., observed, "They're after a large number of niches; but you've got to qualify that — they're after a large number of growing niches." Fram said of all the so-called Bunch companies, he is most optimistic about NCR's viability.

A corporate reorganization marked an infusion of the entrepreneurial spirit into an old company. "We are not attempting to orchestrate, at any level of detail from the top, what the product strategies are of these various elements," Exley said. "We have set forward areas of specialty, we have a generally agreed on technology strategy, and within that very broad compass, these units are the driving force of the business."

According to Donald J. Herman, executive vice-president over the integrated business units, "We run this company with what we call light supervision, and we're able to say to those units, 'It's your business, and you run them.'"



The NCR Tower 1632 and the 9300, both introduced last year and both designed for general applications, highlight the new way of doing things at NCR. The Tower, initially released to the OEM market, was packaged mostly from a variety of existing products from other vendors. NCR does not intend "to reinvent the wheel," according to William F. Buster, executive vice-president for the development and production units, and will purchase components and peripherals from other vendors when it seems prudent. The 9300's proprietary 32-bit very large-scale integration chip set is seen by the company as a jump forward in technology and was recently sold on an OEM basis to Honeywell, Inc. and will probably be marketed to other vendors over the coming year.

Exley

With the growth in the product line has come growth in the sales organization: NCR last year announced it would hire 500 new people for its marketing force, and executives said recently the last of the new hires are completing training.

NCR executives bitterly resent, privately at least, the adverse publicity generated by the fraud lawsuit brought against the company by The Glovertorium, Inc. and similar cases filed by NCR customers alleging misrepresentation of product capabilities. The Glovertorium won a $2.3 million court judgment on claims NCR sold it a System 8200 minicomputer and software package that allegedly never functioned at better than 20% of its warranted capability.

Manuel Garcia, who oversees all marketing operations, pointed out recently that all the lawsuits date back more than five years, "when I think people expected more than technology could give them. I think that affected every [vendor]," and involved a small percentage of customers.

But the company has taken steps to ensure that no misunderstandings occur. Sales personnel are told to make sure the customer understands what he is buying, sales managers are expected to question the salesman on what was sold, and customers receive letters from headquarters detailing the terms of the understanding, according to Garcia, so "if he received anything different from [the sales person told him], he has the opportunity to say he understood differently."

Garcia said the company places a premium on customer satisfaction, because NCR needs goodwill to survive in the information industry. "We don't have any place else to go," he said. "That [industry] is all we're in, and we don't intend to get into anything else."

The changes undertaken over the past few years seem to have gained great favor with lower level executives in production, support and training divisions around the area. One executive who was formerly employed at Wang Laboratories, Inc. recalled that when a headhunter contacted him about joining NCR, he immediately dismissed the idea of joining a declining mainframe vendor. After being convinced to meet with a senior executive, he said he got caught up in the plans under development and signed on.

COMPUTER INDUSTRY

NCR's reorganization encourages entrepreneurship

DAYTON, Ohio — NCR Corp. last year was reorganized to establish semiautonomous units. This, according to NCR executives, has spurred an entrepreneurial spirit within the century-old organization and will be the driving force for the company's future.

When Charles E. Exley Jr., who came to NCR after a 22-year career at Burroughs Corp., was appointed chief executive officer, the board of directors also created the office of the chief executive, with three executive vice-presidents appointed to oversee the reorganized entities.

Herman

William F. Buster, who spent 16 years with Burroughs before joining NCR in 1971, heads the Development and Production Units, composed of divisions for Data Entry Systems, General-Purpose Systems, Financial Systems, Retail Systems and Microelectronics.

Manuel Garcia, another former Burroughs man who jumped ship just before Exley, is head of the marketing units, including an Independent Marketing Organization to develop contracts with OEM firms.

Garcia

Donald J. Herman, founder of the organization that eventually became NCR Comten, Inc., was tapped as head of the Integrated Business Units, which include Comten, Applied Digital Data Systems, Inc., Office Systems, TSI, Inc., a Micrographics Division and, presumably, any future acquisitions.

Herman recalled that William S. Anderson, the outgoing chairman, and Exley visited him in Florida. Exley "wanted a marketer, he wanted a technologist, and he wanted a businessman. He asked me to join as the businessman."

Several NCR employees told *Computerworld* that the three act as a committee, with any one of them able to make a quick decision when needed.

Buster

NCR executives readily agree the present organization produces some duplication — for example, three divisions market terminals — and divisions even compete against each other in some respects.

Exley explained the strategy: "The integrated units and the development and production units are relatively self-contained units in the sense that those divisions don't depend on anybody else for the success of what they have to offer. So the driving force from a product program standpoint is in each of those major divisions."

While NCR's own Microelectronics Division supplies its proprietary NCR/32 32-bit very large-scale integration chip set for the 9300 50-lb "mainframe" introduced last year, Exley said the other divisions will not be directed to buy NCR microelectronics if they believe other vendors have better products.

Jonathan Pram, an industry analyst with Paine Webber, Mitchell Hutchins, Inc., said the organization "is a bit of a mess," but "the company [is] realizing the degree of uncertainty in the industry."

The lack of rigidity in the organization allows the company to react to the dynamic changes in the information processing industry, he added.

NCR president airs his opinions on mainframe market dynamics

NCR

Charles E. Exley Jr., NCR Corp. president and chief executive officer, was recently interviewed by Peter Bartolik, Computerworld senior editor of Computer Industry. Excerpted below are his views of the mainframe market dynamics that have produced greater power at lower costs.

Q You have demonstrated that hardware costs for large processors are coming down, and you intend to bring them down further. Yes we do.

Q How will you generate future revenues from that area if you make the equipment so inexpensive? Is it going to be in services, software or just selling more machines?

Well, services and software, of course, are an important part of our revenue base, and software revenues are growing far more strongly than hardware revenues, but I believe these dramatic continuing price reductions will be offset by the increase in Mips [millions of instructions per second] that we ship.

Q So as you deliver more power, that will spur a demand for even more power?

That's right. That's what I believe. I also think that the mainframe market, which has been a relatively quiet market now for some years, will benefit and become much more lively a market by further substantial cost reductions.

A problem in the mainframe market is that really there isn't anything very new on the market; even the latest releases are just a circuit-enhanced version of the same old thing. So it's not surprising that there's not a lot of action in that particular market at the present time. But I think that there will continue to be very sizable opportunities in the mainframe area; it will not be as dynamic an area as small computers, because the economics for certain kinds of jobs are overwhelmingly in favor of the smaller machines.

But there are several kinds of functions that only a large mainframe can perform. For example, the two basic things are the maintenance of a big file, which for some reason somebody decided they need to maintain at a central point; and the second thing is network control — as more and more of these terminal subsystems and small computers get interconnected, the whole process of network control becomes a very important area. And it seems to be an accepted fact today in the marketplace that that's done by a host computer, a big one. So we think the mainframe market is going to continue to be a good market for as far ahead as we can see into the future, but it does need a technology breakthrough of the kind that we have not had, really, since the first integrated-circuit machines.

Now it's our hope if we succeed, as we aim to, in bringing out the first very large-scale [integration] technology machine, that we will have made that kind of step improvement in cost/performance. And, of course, there are other considerations, such as continuous service, such as the fact that there is something inherently wrong in the process of many years standing of upgrading to a higher level of performance by rolling out the old machine and rolling in the new one. There ought to be a better way of adding Mips than that, and we're going to see if we can't come up with [that] product.

Q You mean just keep the box, but switch. . . .

Just keep adding slices of power. That is everyone's ideal. Can we find a way to do that? If we could do that, I think we'd have a real breakthrough product.

Voters want industrial policy to stress cooperation, pollsters say

By John Gallant
CW Washington Bureau

WASHINGTON, D.C. — Election year industrial policies now being planned by the two major political parties may be rejected by voters if the policies are perceived as government intervention rather than business-government cooperation, according to two public opinion researchers.

"Americans deeply believe, at least ideologically, in free enterprise, and they are instinctively wary of the government's role in the economy," William Schneider, polling consultant to the *National Journal*, told a recent conference on future policies for basic and high-technology industries.

Kevin Phillips, president of American Political Research Corp., agreed with Schneider on the public's skepticism about the government's ability to manage the economy efficiently. But, he said, the public is frustrated about the seeming difficulty U.S. firms are having in maintaining international competitiveness. As a result, he said, "the American people are extremely protectionist."

Political geography

Phillips further suggested that public acceptance of industrial policy prescriptions will increase if the economy worsens as the year progresses. He also said the issue turns on "political geography." Government actions to bolster basic industries and promote high tech will play better in the industrial Northeast and Midwest, as well as in the textile producing areas off the South.

In general, he said, most voters favor actions to enhance research and development, increase international trade, promote management-labor cooperation and support technical education.

But, Phillips said, the public will support business-government-labor cooperation only if it is not mandated. Or, as he put it, "Cooperation yes; coercion no."

Schneider, addressing that same point, told the conference, sponsored by The Government Research Corp. and several computer and electronics industries associations, "the American public does favor . . . a partnership between government and business . . . to solve specific social problems on an ad hoc basis."

But, he said, "elevating government involvement in a marketplace as a system . . . is clearly going too far."

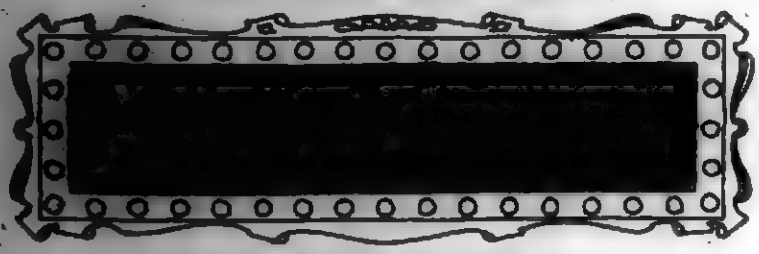
Government planning strikes Americans as a very bad idea, according to Schneider. "They like the chaos. They like the ad hoc nature of government intervention as we now have it. Don't turn it into a system."

The Democrats and the Republicans will be able to sell voters on specific remedies for specific problems, he concluded, so long as the parties can persuade the public that the measures do not portend increased politicization of the economy.

Discussing various academic theories that hold the government should or can effectively develop industrial policies for allocating resources among competing U.S. business sectors, Schneider said, "I don't think the public is going to buy it."

THE HIGH-TECH KICKOFF FOR '84

Norm DeNardi Presents



Thursday, April 19, 1984 • Hours: 12:00 to 6:00 PM
4290 El Camino Real, Palo Alto, CA

Be a part of the industry and meet today's leaders and tomorrow's innovators at the California Computer Show one-day exhibition.

A unique showcase of high technology products specifically designed to attract OEMs, sophisticated end users, dealers, and distributors.

Featuring the latest hardware and software trends, the California Computer Show highlights:

- Computers
- Engineering workstations
- Electrostatic Printers
- Graphics Systems
- Networks
- Disk Systems
- UNIX and other Software Development Tools
- Leading Peripheral Manufacturers

The California Computer Show merges the technical disciplines: corporate issues; technical considerations; industry trends, and promises for the future.

JOIN TODAY'S LEADERS AND TOMORROW'S INNOVATORS AT THE CALIFORNIA COMPUTER SHOW.

NDN

Norm De Nardi Enterprises

280 So. San Antonio Rd., Los Altos CA, 94022 (415) 941-8440

Asian Computerworld reaches the fastest growing computer market in the world.

Introducing *Asian Computerworld.*

Asian Computerworld is *Computerworld's* sister publication covering the Southeast Asian marketplace. The editorial (written in English) keeps company executives, computer users, potential users and people in the computer industry up-to-date.

Southeast Asia is considered the fastest growing computer market in the world with a total value of $1.8 billion and annual growth rates for small business systems and micros over 50%. The average annual growth rate is approximately 30%.

Asian Computerworld is published in Singapore and printed twice a month on Thursdays. The total circulation is 8,000. And the geographical distribution is as follows; Hong Kong, Singapore, Philippines, Malaysia, Indonesia and Thailand.

CW International Marketing Services makes it easy for you to advertise in countries all around the computer world. For more information on *Asian Computerworld,* just fill out and return the coupon below.

Please send me more information on:
☐ *Asian Computerworld.* ☐ Your other publications.

Name _____
Title _____
Company _____
Address _____
City _____ State _____ Zip _____

Diana La Mungia
Global Manager
International Marketing Services
CW COMMUNICATIONS/INC.
375 Cochituate Road
Framingham, MA 01701

Adapso to try cooperation to solve dispute with CPAs

CW AT ADAPSO

By Robert Batt
CW West Coast Bureau

DALLAS — The Association of Data Processing Service Organizations, Inc. (Adapso) is negotiating with some of its rivals from the Big Eight accounting firms in an attempt to end a long-standing dispute.

Adapso said it is now trying the tack of cooperation rather than confrontation after failing in a recent attempt [CW, Dec. 5] to persuade the Securities and Exchange Commission (SEC) to rule on the propriety of certified public accounting (CPA) firms selling DP services to companies that they also audit.

In an interview at Adapso's 60th Management Conference here recently, Douglas Jerger, chairman of Adapso's CPA Relations Committee, said the organization has held a series of meetings with representatives from Arthur Andersen & Co., Coopers & Lybrand and Peat, Marwick, Mitchell & Co. to resolve the controversy over DP services. "Talks about talks" are going on with some of the other firms, Jerger added.

Providing DP services comprises the bulk of revenues for many of Adapso's 575 members, and in the past, some have threatened court action against individual Big Eight firms.

For several years, Adapso has carried on a crusade against the CPA firms, charging that an independent auditor cannot be truly independent, as is required by law, if the data processing systems used to prepare a client's financial statements are developed by that same auditing company.

Jerger characterized the change of direction as a victory of sorts for Adapso. "It was always the intention of the CPA Relations Committee to establish a dialogue with the accounting firms. We now have that dialogue, and we hope the relationship will blossom and that we can coexist in a way that is beneficial to all of us," he said.

Jerger said there are benefits to cooperation between the two sides that were not perceived 18 months ago, and this has slowed the pace of possible litigation.

"This is not a simple, clear-cut issue. It is one that is difficult to handle in a way that is fair and straightforward, and as we talk, the positions of the respective parties are changing as they come to appreciate the other guy's point of view," he added.

Jerger, however, denied that Adapso has totally abandoned its attempts to outlaw CPA firms from the DP services arena. Rather, he said, such action was on hold, and Adapso is retaining the option to challenge the recent SEC ruling in the courts.

At the same time, he continued, Adapso is setting up a research project to survey companies and interview financial and management information systems executives in an attempt to gather data about the participation of CPA firms in DP services.

The object of the project is to discover the impact of "management advisory services" within the major auditing firms, he said. "We want to base our decisions on real information and bring this episode to its conclusion," he added.

Co-founder leaves Vector Graphic

THOUSAND OAKS, Calif. — Vector Graphic, Inc. announced recently that Lore Harp, co-founder of the company, has resigned as president and chief executive officer and as a director of the company.

Bernard Horn, 46, formerly sales and marketing vice-president of the Xerox Corp. Printing Systems Division, has been appointed to the position of president and chief executive officer, according to a company spokesman.

Vector Graphic enjoyed early success in the microcomputer market, but has seen its financial situation deteriorate as the IBM Personal Computer soared to the top of the marketplace.

Jean Delcage, chairman of the board of the company, said in a statement at the time of the announcement, "We realize the difficulties of being a strong, long-term contender in the microcomputer industry, but we are extremely pleased to have made some major steps in the past four months."

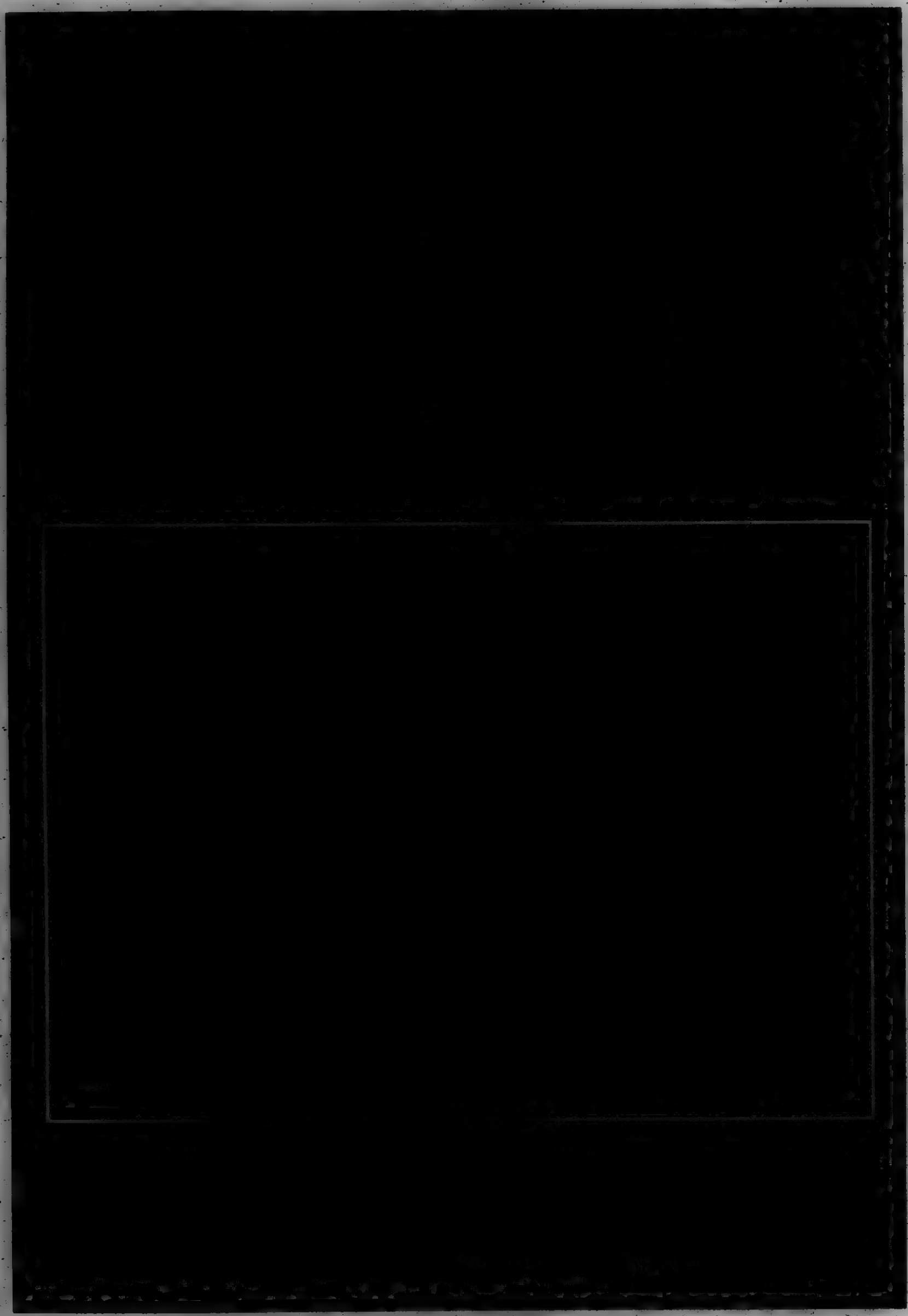
Vector Graphic recently announced a new desktop computer that claims to be two to 10 times faster than IBM's Personal Computer and in recent months obtained financing totaling $4.7 million.

Delays limit Rolm revenue growth

SANTA CLARA, Calif. — Rolm Corp. recently announced it expects revenues for the third quarter will be only slightly above the second quarter, due to delays in installations.

M. Kenneth Oshman, president, said the "delays are due to some construction slippages at customer sites; difficulties in obtaining central office facilities and some product shipment delays."

The company posted revenues of $166 million during the second quarter, and stock analysts had predicted third-quarter revenues ranging from $175 million to $180 million.



Stuff it to JES

Give your CICS, DISPRINT and IMS reports to JES
The Dynamic Report System provides a bridge between on-line systems and the JES report queues. Instead of burdening CICS and IMS with printing, move it to JES and gain performance along with centralized report distribution. Let JES account for, archive and distribute reports to 327X printers, local printers, PCs, plotters, microfilm devices and 5210s.

And Let JES Distribute Your 328X Reports
VPS, the VTAM/TCAM Printer Support subsystem places 3270/328X printers, PCs, plotters, 5210s, and word processors directly under JES. These non-dedicated devices become JES NJE print stations. VPS expands JES's local and remote hardcopy alternatives as it reduces real network costs and complexity. Ask our 400 users and their 20,000 printers.

Levi, Ray & Shoup, Inc.
P.O. Box 12250 • Dallas, TX 75225
DALLAS (214) 358-6032 • TELEX 73-4364

New from Interactive Systems/3M:

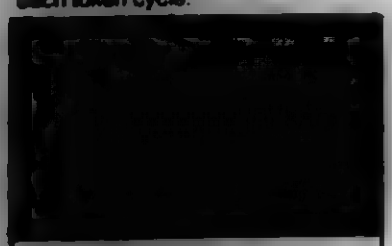
The first high-speed broadband local-area network that guards against data crashes.

If you've been thinking of investing in a contention network, consider this: How do you guard against data crashes during times of heavy system use?

Answer: You don't, because contention schemes simply don't provide any kind of data insurance.

Fortunately, there is a new type of network that does protect against data loss. It's called 3M Videodata® LAN/1. And it's the first intelligent broadband local-area network that's designed to get data through on time, no matter how much traffic is on the cable.

Videodata® LAN/1: The efficiency of token-passing plus the proven flexibility and expandability of broadband.
Token-passing networks eliminate contention troubles and data crashes by passing an electronic "token" from terminal to terminal. When a terminal has to transmit, it grabs the token and sends data packets to the receiving device. Receipt is acknowledged and the token is automatically released to continue its rounds. Because the system assigns a network entry address to each user, everyone has an opportunity to send data during each token cycle.



Because Videodata LAN/1 is a broadband system, dedicated channels can be used for full-motion video applications such as CAD/CAM and teleconferencing. These video signals are kept entirely separate from digital traffic on the network's token-passing channels.

So far, so good. But most token-passing networks are baseband systems, meaning that terminals must share a common channel as they would in a typical contention network. This can limit speed and capacity in some applications.

LAN/1 overcomes this possible limitation by combining token-passing with a proven *broadband* technology that allows many channels to be put on a single cable. The payoff: higher channel speeds, ranging up to 2.5 MB/s over a maximum seven-mile radius, with terminal data rates of up to 19.2 KB/s. Plus a capacity of up to 10,000 devices to allow plenty of room for future expansion.

In the Videodata LAN/1 network, messages can be sent from any terminal to any other without going through the host processor. Network Interface Units (NIUs) connect digital devices to mechanical taps (shown as small circles) on the main coaxial cable. A Network Monitoring Unit, or NMU, keeps a statistical record of network performance.

Self-monitoring, with a printed record of network performance.
LAN/1 gives statistical proof of its own performance in printed form, thanks to a microcomputer-based Network Monitoring Unit (NMU). This unit, which also helps in routine maintenance and troubleshooting, may be used for remote monitoring as well.

Separate channels for voice, video, and graphics. Plus the ability to work in point-to-point applications.
Because LAN/1 is a broadband network, channels can be set aside for real-time voice, video, and high-speed graphics. This can be done without compromising digital traffic capacity.

LAN/1's broadband design also permits flexibility in network architecture, so that it can be used in high-speed point-to-point applications which can't be served efficiently with contention systems.

Other benefits include full transparency, an automatic shut-off feature to keep any one terminal from capturing the token, and compatibility with both dumb and intelligent terminals. The list of features goes on and on.

For the full story on the new Videodata LAN/1 network from Interactive Systems/3M, call 800-328-1684 toll free. (In Minnesota, 800-792-1072.) Or mail the coupon.

Mail to: Interactive Systems/3M CW-4-2
P.O. Box 33600
3M Center
St. Paul, MN 55133

☐ Please send details on your new Videodata LAN/1 intelligent network.
☐ Please have a representative call.

Name
Title
Company
Phone ( )
Address
City
State ZIP

3M hears you...

3M

COMPUTER INDUSTRY

Links seen as tip of iceberg

In untapped mart for productivity tools

CW AT ADAPSO

By Robert Batt
CW West Coast Bureau

DALLAS — The micro-to-mainframe link represents just the tip of the iceberg in a largely untapped market for productivity tools, according to John Landry, senior vice-president for McCormack & Dodge Corp.

Speaking at the 60th Management Conference of the Association of Data Processing Service Organizations, Inc. recently, Landry said the current frenzy over micro-mainframe links is obscuring a sense of personal computer productivity and application software waiting to surface in the Fortune 2000 marketplace.

Landry told a conference session that a great many link vendors will emerge over the next few years, but link software distribution will be dominated by the current front-running mainframe software suppliers.

The total software company of 1985, he said, will have the following characteristics:

- Mainframe applications in areas such as financial services, human resources and manufacturing.
- Mainframe development tools.
- Micro-mainframe links.
- Personal computer productivity tools and micro applications.

Selling "total solutions" will require personal computer application software integration with front-running mainframe applications packages.

These front-end extensions, he said, will include data entry and editing facilities, functionally compatible front ends, concurrent processing and fully functional micro applications interfaced to mainframe applications.

"Links could become the loss leaders used to capture customers into a mainframe and micro proprietary software architecture," he suggested.

Also speaking at the session, Jeffrey Walker, chairman of Walker Interactive Products, Inc., a San Francisco-based software company, claimed micro-mainframe links are very immature when it comes to addressing the needs of the marketplace.

The links, he contended, contain artificial restrictions, are often based on IBM 3270 technology with its inherent limitations and do not address the total problem from the end user's point of view.

"The problem for micro-mainframe links is in trying to handle a wide variety of different software that is available to end users who often choose their packages on the basis of personal bias rather than corporate standards," he said.

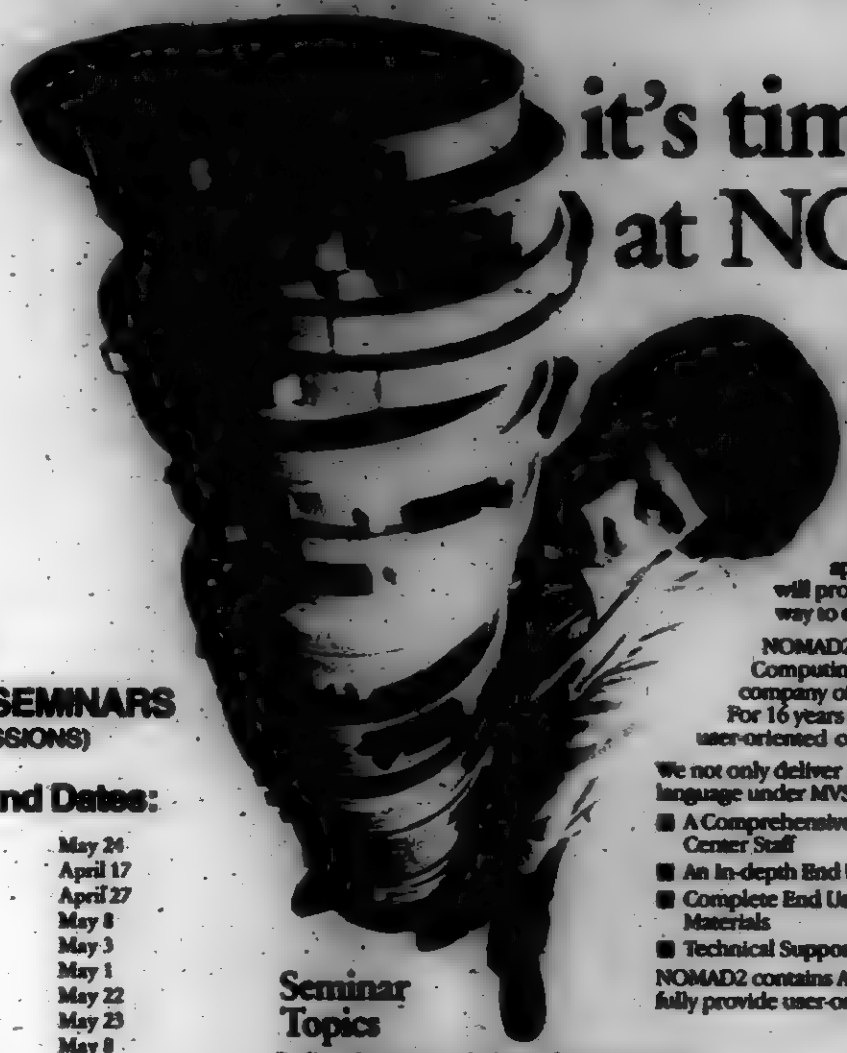
The real problem in micro-mainframe links, Walker added, is a human engineering problem rather than a technology problem.

"The software that runs on the mainframe should be able to run on micros. Personal computing is the goal because it is what the end user wants. Personal computing should therefore be available, no matter what the hardware," he argued.

Vaughan Merlyn, president of Merlyn Corp., commented on the shift in power away from the data processing department and toward end users that micro-mainframe links afford.

"Micros are growing up to become mainframes, and the distinction between the two is blurring. As a result, the decision-making power is shifting from the DP department to the end user, and many mainframe vendors are not at all equipped to deal with this change," he said.

If delivering user-oriented computing is getting you down...



it's time to look at NOMAD2!

Delivering user-oriented computing can be a tricky business. If it's your objective to satisfy the user community in your organization, it's time to speak to the experts. We'll share our experience with you at our FREE NOMAD2 Seminars.

Whether you're interested in an Information Center, Development Center, end-user computing or just quick applications development, our seminars will provide you with a closer look at the best way to deliver user-oriented computing.

NOMAD2 is a unique product created by D&B Computing Services, the information services company of The Dun & Bradstreet Corporation. For 16 years we have been delivering value added user-oriented computing services.

We not only deliver NOMAD2, the premier fourth generation language under MVS and VM, but also provide . . .

- A Comprehensive Training Program for Your Information Center Staff
- An In-depth End User Training Program
- Complete End User Documentation and Training Materials
- Technical Support for Your Information Center Staff

NOMAD2 contains ALL the components you need to successfully provide user-oriented computing services.

FREE
NOMAD2 SEMINARS
(HALF DAY SESSIONS)

Location and Dates:

Atlanta, GA	May 24
Austin, TX	April 17
Boston, MA	April 27
Chicago, IL	May 8
Cincinnati, OH	May 3
Cleveland, OH	May 1
Columbus, OH	May 22
Dallas, TX	May 23
Denver, CO	May 8
Des Moines, IA	May 16
Detroit, MI	May 2
Elizabeth, NJ	May 16
Harrisburg, PA	April 12
Hartford, CT	April 26
Houston, TX	May 24
Indianapolis, IN	May 17
Kansas City, MO	April 24
Los Angeles, CA	May 3
Louisville, KY	May 10
Miami, FL	May 22
Montreal, Canada	May 4
New York, NY	April 19
Oklahoma City, OK	April 25
Omaha, NE	May 15
Philadelphia, PA	May 17
Pittsburgh, PA	May 9
Portland, OR	May 9
Rochester, NY	May 16
San Francisco, CA	May 1
Seattle, WA	May 10
St. Louis, MO	April 26
Stamford, CT	May 4
Toledo, OH	May 23
Toronto, Canada	May 9

®NOMAD2 is a registered trademark of D&B Computing Services, Inc.
©Copyright 1984 D&B Computing Services, Inc. All Rights Reserved.

Seminar Topics

Delivering User-Oriented Computing

■ Information Centers vs. Development Centers ■ The "Ideal" Environment ■ User Profiles ■ Delivery Strategies ■ User Training and Support ■ Microcomputer Strategies

NOMAD2: On-Line Application Development

See the "reality" of user-oriented computing with NOMAD2. Watch us build and dynamically modify a NOMAD2 application on-line. We'll build a data base structure, load data, generate reports and graphics, modify the data base and much more.

If delivering user-oriented computing is your objective, it's time to take a closer look at NOMAD2.

NOMAD2 . . . Experience is the difference

D&B Computing Services

■ A Service of The Dun & Bradstreet Corporation

Please fill out the attached registration form and return it to:

Roger Cox
D&B Computing Services
187 Danbury Road
Wilton, CT 06897.
or call Roger Cox at (205) 762-2511

☐ Please reserve _____ seat(s) at your *FREE* NOMAD2 SEMINAR to be given in

(City) _____

on (Date) _____

☐ Please send NOMAD2 materials.

Name _____ Position _____

Company _____

Address _____

City _____ State _____ Zip _____

Telephone _____

Exec urges financial services to meet human needs

CW at Adapso

By Robert Batz
CW West Coast Bureau

DALLAS — "The financial services landscape is littered with innovations that consumers do not want. In this business, you do not necessarily get a gold star for being out in front with a leading-edge technology."

That was the message delivered here recently by Garland Cupp, executive vice-president of the American Express Travel Related Services Co., Inc., to some 500 computer services executives attending the Association of Data Processing Service Organizations, Inc.'s (Adapso) 60th Management Conference.

In a keynote address on "The Role of Technology in the Financial Services Industry," Cupp said it is the customers, not the technologists, who will determine the future use of computer systems by financial institutions.

Cupp sees three issues as key to adapting computer-related technology to the financial services industry successfully — hardware, software and the human dimension. The last is by far the toughest, he said.

Customers will decide

"Customers will decide the technology they want. They will make the trade-offs between efficiency and privacy, cost and convenience. This makes it very difficult for vendors to lay out strategic and tactical goals," he said.

According to Cupp, two possibilities are open to the financial services high-tech supplier:

- A supermarket approach, in which the supplier appears as all things to all people.
- A boutique approach, in which the service supplier aims at specific market niches.

Making the choice, he added, is risky: "The dilemma is how to manage these enormous sets of uncertainties. You must do something, since a 'do nothing' stand will certainly fail. Timing is everything."

Cupp said it is important to be well prepared in both hardware and software, where the technology already exists to do the job that customers want.

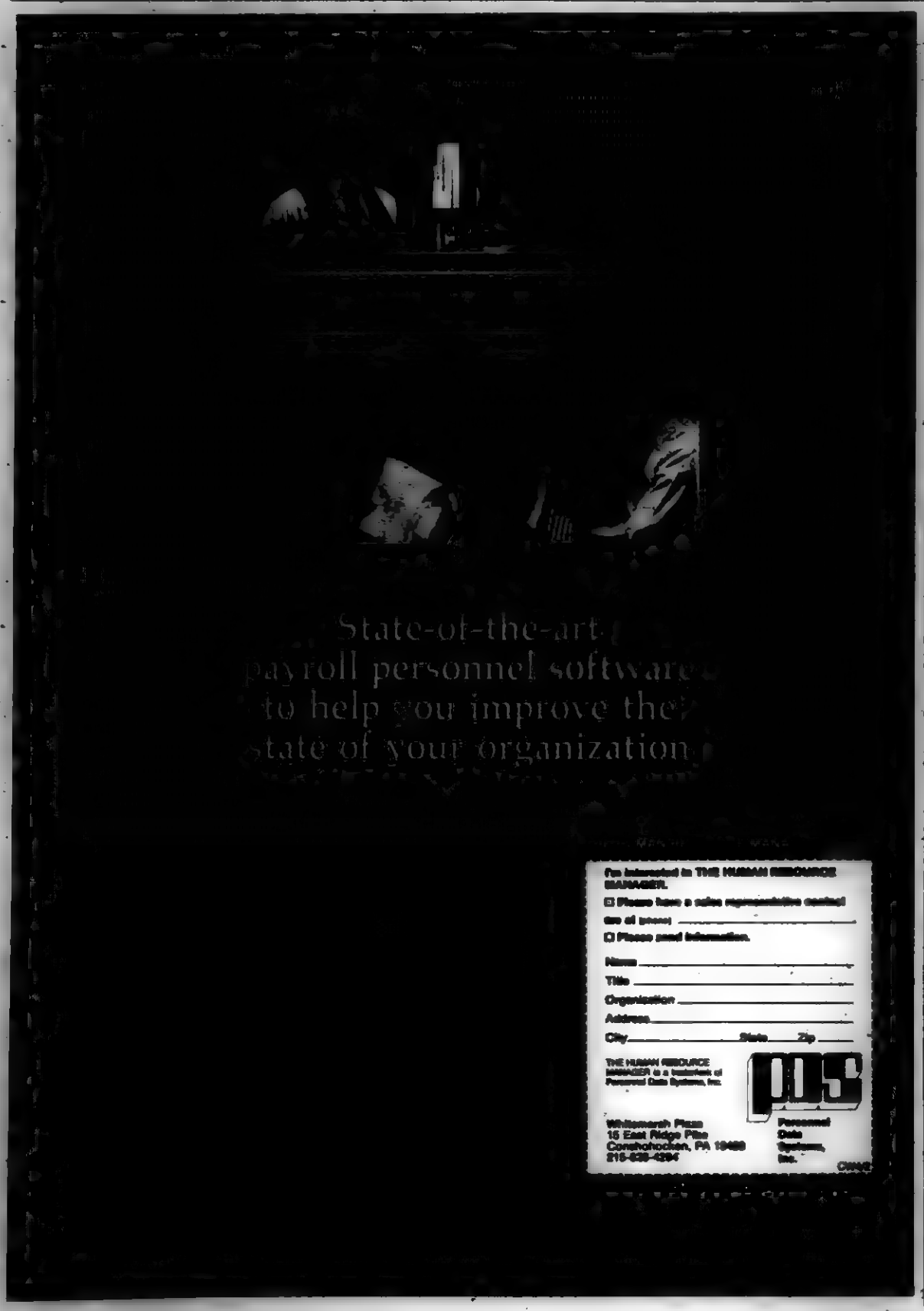
Flexible strategy

A flexible strategy is vital for a high-tech supplier to move in whatever way the human dimension element takes it, he declared. "Technology has given us unprecedented options. We are currently in a period of experimentation which reflects the confusions and dilemmas of our technological age. The key to the success of financial services companies is how well they understand the human dimension."

Cupp reminded his audience that the human dimension of applying technology to the financial sector must also take government actions into account.

The financial services industry, he complained, is operating under antiquated laws that were drawn up 50 years ago and are not meant for a high-technology world.

"These laws must be reformed if we are to remove artificial restrictions. Rules that stand in the way of innovation must be modified," he concluded.



Prelude, Lotus agree to AI licensing pact

CAMBRIDGE, Mass. — Lotus Development Corp. has announced a licensing agreement with Prelude Development Corp., a start-up artificial intelligence software firm.

Under the agreement, Prelude, which was founded by a former Lotus employee, will license AI software technology to Lotus, which plans to market products incorporating the technology within 18 to 24 months.

"This agreement permits Lotus to stay abreast of and involved with the latest developments in productivity technology without sacrificing its own short- and medium-term research focus," said Lotus President Mitchell Kapor.

Prelude President and founder Peter Gabel, who recently resigned from his position as manager of the Advanced Development Group at Lotus, added that development work will move ahead faster and further with Prelude operating as an independent entity.

Gabel is joined by another Lotus Advanced Development Group employee, Paul Weiss, now vice-president of research and development at Prelude.

The start-up reportedly will develop a family of productivity products based on intelligent data bases to be introduced in the spring of 1985.

COMPUTER INDUSTRY

Accountant: Software R&D costs should be capitalized

Speaking to attendees of Adapso's 60th Management Conference

DALLAS — Software development cost accounting should be changed to allow developers to capitalize those costs and show them as assets, a senior partner in a Big Eight accounting firm told the Association of Data Processing Service Organizations, Inc. (Adapso) recently.

Speaking at Adapso's 60th Management Conference, Francis J. O'Brien of Arthur Young and Co. said present accounting practices for software development "will make the going increasingly rough for the software industry."

Under a 1974 ruling by the Financial Accounting Standards Board (Fasb), software companies are forced to treat costs as current research and development expenses rather than capitalizing them and showing them as assets on balance sheets, O'Brien said.

"As a result, [software companies] will encounter more and more difficulty in borrowing the funds they need for future products because they cannot put their assets on their balance sheet," he said.

O'Brien said the building of software development involves using a known technology to achieve a known end, while traditionally defined R&D involves many uncertainties.

Some software companies, according to O'Brien, have circumvented the problem by acquiring software development from others.

These moves may "be unduly expensive and thus ill-advised in that the only reason they are made is to allow the purchaser to show the product as an asset and avoid the current charge to earnings," according to O'Brien.

O'Brien urged the Fasb to solve the problem by approving a recently submitted recommendation from a joint task force of the American Institute of Certified Public Accountants and Adapso.

National Semi registers third-quarter profit of $15.4 million

SANTA CLARA, Calif. — National Semiconductor Corp. recently announced a third-quarter profit of $15.4 million, compared to a loss of $12.6 million during the corresponding period one year ago, as sales climbed $121.1 million over the same period.

For the first three quarters of fiscal year 1983, National Semiconductor posted sales revenues of $1.2 billion compared to $350.6 million last year, producing a profit of $39.5 million, or 47 cents per share, compared to a net loss of $31.9 million in the first three quarters of fiscal year 1982.

Charles E. Sporck, National Semi president and chief executive officer, said the improvement of more than $54.8 million in pretax profits compared to the third quarter a year ago and the $99.2 million improvement on a year-to-date basis were due primarily to sharply improved operating performances in the components segment.

Pretax charge

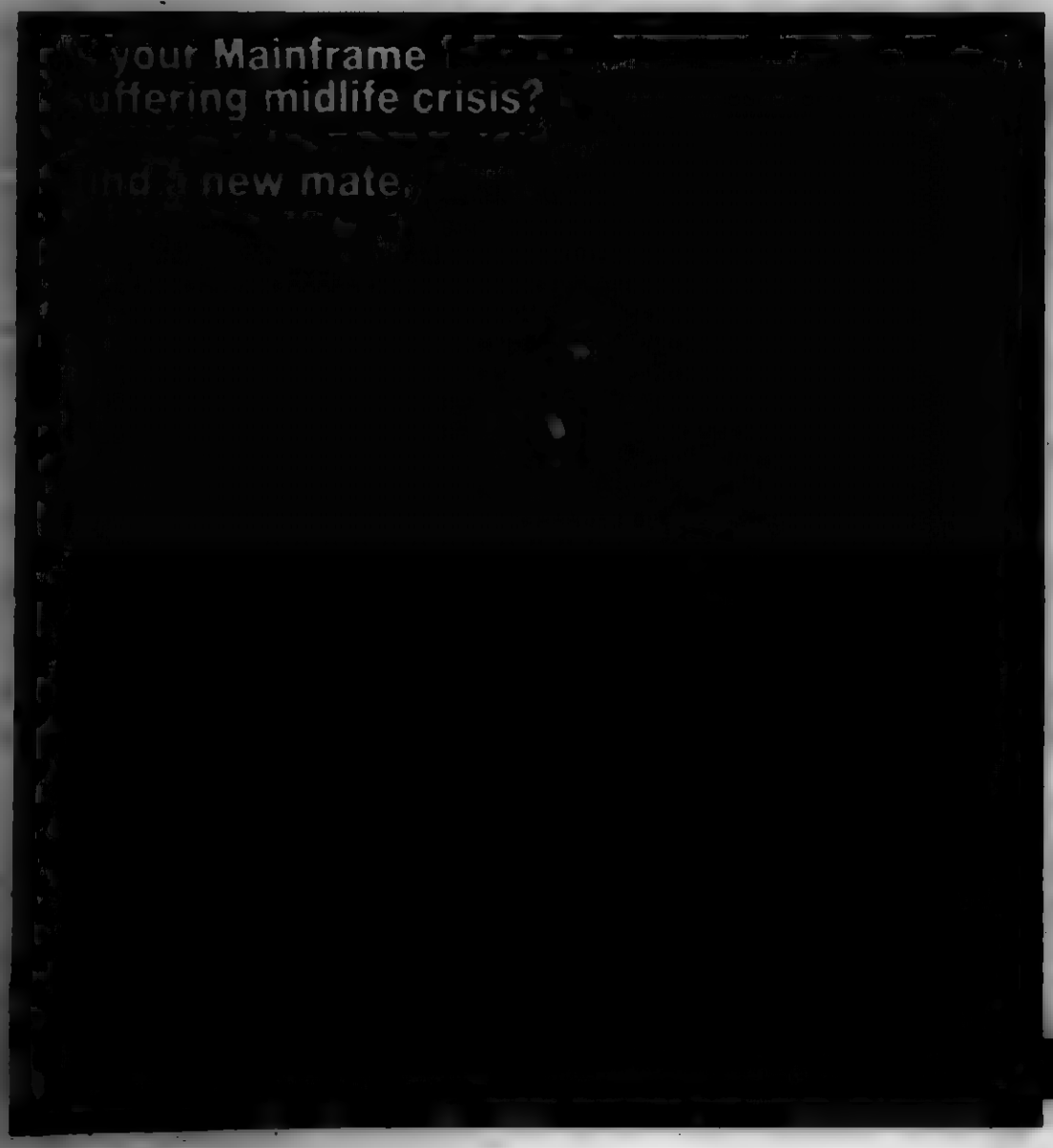
Also, results for the third quarter of fiscal 1983 included a $9 million pretax charge related to the closing of the medium systems computer manufacturing facility in San Diego, the vendor said.

"Overall, we've established a quarterly record for order rates," Sporck maintained, adding that the key to this achievement was the Semiconductor Division's 68% increase in order rates from the same period a year ago.

Effective at the start of the quarter, National changed its depreciation method for newly acquired machinery and equipment from the double-declining balance method to the 150% declining balance method. However, the change did not have a material impact on third-quarter or year-to-date earnings or earnings per share, according to a spokesman for the company.

Just after the close of the quarter, National Semi and the federal government reached agreement to dispose of liabilities arising from a grand jury probe into National's testing and certification of military microcircuits supplied between 1978 and mid-1981.

The company agreed to pay the government $1.76 million. According to Sporck, provision was made in fiscal year 1982 for this matter. As a result, the settlement did not have a material effect on the company's financial results for the quarter.



Now Attachmate-3270 adds multiple Mainframe windows to your IBM Personal Computer.

Attachmate's coax interface board can bring out the best in your existing mainframe.

When connected to your mainframe, your IBM Personal Computer can be as many as four 3278 terminals. You can work up to seven different programs and display each in a separate window.

Not one Not two But more windows

Looks just like a new IBM-3270 PC, doesn't it?

What's more:

- *Attachmate-3270 provides more mainframe security—only you have the key.*
- *You can coax connect to all existing 3270 control units and use in-place Bisync and SNA networks.*
- *You can share those high speed 3270 printers to save money, time, workspace.*
- *You can transfer files and share data with your mainframe and other PC's as well as access 3270 printer data to print, process, send or save.*
- *And, as a bonus, Attachmate's single-slot board can expand your memory by 256K bytes.*

What's less:

- *The price. Attachmate-3270 gives your mainframe and PC all of this new life—compatibility, flexibility, function and immediate delivery for less than $1,000. For more facts:*

Attachmate Corporation, (206) 644-4010, 3241-118th S.E., Bellevue, WA 98005. Dept. CW6

Name_____

Title_____ Company_____

Address_____ City_____

State_____ Zip_____ Phone_____

The Mating Call: 1 800 IBM-MATE

Attach mate

NEW CICS Abend-AID PRODUCT ANNOUNCEMENT

Abend-AID/CICS is a powerful software tool that transfers the burden of debugging CICS transaction abends from the programmer to the computer.

Abend-AID/CICS analyzes transaction abends, determines the cause and tells the programmer—What Happened, Why it Happened and Where it Happened. It also provides immediately On-Line the necessary supporting data in a concise, easy-to-use format.

Saves Programmer Time

- ☐ Complete, easy to understand diagnostics. Pinpoints the cause of the abend. Presents all the data needed to solve the abend. Immediate access On-Line through CICS, TSO/SPF or CMS. The region does not have to be active to view Abend-AID/CICS output.

Reduces Production Downtime

- ☐ Since Abend-AID/CICS is only invoked at the time of the abend it can be used both in test and production. Minimum overhead allows Abend-AID/CICS to work for all regions. Works instantly for all programs old and new. No recompiling. No programmer action required.

Greater Management Control

- ☐ An Abend Activity report can be viewed at any time to give you an up-to-the-minute picture of region abend activity. Report provides transaction code, terminal, abend code, program name and date/time information for all abends.

Greater Flexibility

- ☐ Exception tables enable you to choose desired output—or suppress output based on transaction code, terminal, abend code or any combination. Customized diagnostic modules can be created for user exits and specialized abend codes.

FREE 30 Day Product Evaluation

For additional Product Information or to arrange for your FREE 30 Day Product Evaluation call today.
800-521-9353 (In Canada or Michigan 313-540-0400)
or return the coupon below to Compuware, Systems Software Division, 32100 Telegraph Road, Birmingham, Michigan 48010.

I want the computer to work for me. Please Send:
- ☐ Additional Abend-AID/CICS Product Information
- ☐ Additional Information on Free 30 Day Product Evaluation.

Name _____ Title _____
Company _____
Address _____
City _____ State _____ Zip _____
Phone _____ Operating System _____

ABENDABENDABEND
ABENDABENDABEND
ABENDABENDABEND
ABENDABENDABEND
ABENDABENDABEND
ABENDABENDABEND
ABENDABENDABEND
4id

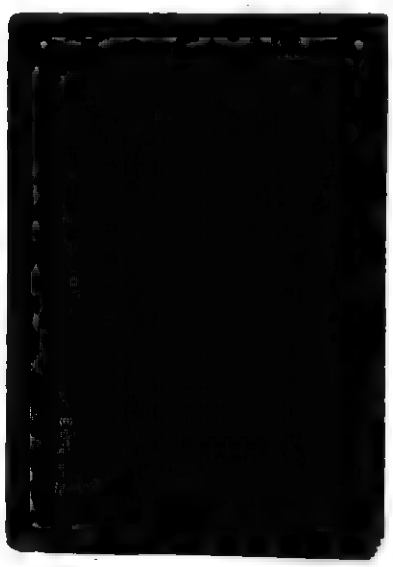
COMPUWARE

Corporate Headquarters
32100 Telegraph Road
Birmingham, Michigan 48010
(313) 540-0400

International Offices: New South Wales, AUSTRALIA Phone (61-2) 816-1177 / Luton, Bedfordshire, ENGLAND Phone (44-582) 28-453 / Paris, FRANCE Phone (33-1)6284-1300 / Milano, ITALY Phone (02) 3452074 / Herzliya, ISRAEL Phone (972-52) 38912 / Tokyo, JAPAN Phone (81-3) 479-1600 / Oslo, NORWAY Phone (47-2) 36-2870 / Bryanston, SOUTH AFRICA Phone (27-11) 787-3600 / Hamburg, W. GERMANY Phone (49-40) 23-3251

APRIL 30.

Micros
in big
business.
A look at all the different ways micros are changing the work environment.
Closes April 13.



MAY 28.

Software
Productivity
Packages.
We tell our readers all we can about software and services designed to benefit the DP manager and his technicians.
Closes May 11.

JUNE 25.

Graphics
Systems.
Here's where we focus on the latest technologies, techniques and applications in computer graphics.
Closes June 8.

IF YOU'RE NOT IN COMPUTERWORLD'S NEXT THREE SPECIAL REPORTS, LOOK AT THE ISSUES YOU'LL BE MISSING.

Computerworld's special report issues are ideal both for the advertiser and the reader. Because each one offers focused, in-depth information.

Readers always want to catch up on what's hot and what's not in their particular specialty. And find out what the vendors have to offer.

As an advertiser, you won't want to miss the opportunity to tell them.

Maybe that's why our special reports are so popular.

Everyone wins.

For more information, or to reserve your space in any of our upcoming issues, simply call the sales office nearest you. Or fill out and return the coupon to Ed Marecki, National Sales Director, Computerworld, 375 Cochituate Road, Box 880, Framingham, MA 01701.

To: Ed Marecki, *National Sales Director*
CW Communications/Inc., Box 880, Framingham, MA 01701
Please send me advertising information on: ☐ *Graphics Systems.*
☐ *Micros in big business.* ☐ *Software Productivity Packages.*
☐ *Please have a sales representative call me.*

Name _____
Title _____
Company _____
Address _____
City _____ State _____ Zip _____
Telephone _____
SA

COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Sales offices:

BOSTON: 375 Cochituate Road, Box 880, Framingham, MA 01701 (617) 879-0700; CHICAGO: 2600 South River Road, Suite 304, Des Plaines, IL 60018 (312) 827-4433; NEW YORK: Paramus Plaza I, 140 Route 17 North, Paramus, NJ 07652 (201) 967-1350; ATLANTA: 1853 Peeler Road, Suite D, Atlanta, GA 30338 (404) 394-0758; SAN FRANCISCO: 300 Broadway, Suite 20, San Francisco, CA 94133 (415) 421-7330; LOS ANGELES: 18008 Sky Park Circle, Suite 260, Irvine, CA 92714 (714) 261-1230.

COMPUTER INDUSTRY

Computervision held liable in PE patent suit

Has attached qualification to its financial statements pending suit's outcome

BEDFORD, Mass. — Computervision Corp. has attached a "qualification" to its 1981, 1982 and 1983 financial statements pending the outcome of a $40 million patent infringement suit brought by Perkin-Elmer Corp.

"The qualification doesn't really pertain to the case or to the amount, and as soon as the case is settled or adjudicated in some manner, that qualification will be removed," said Computervision spokesman F. James Carr.

PE brought the suit against Computervision before a San Francisco federal court in 1977. U.S. District Judge William H. Orrick is expected to rule soon on PE's request for $40 million in damages and interest. Orrick recently concluded a hearing on damages after the 9th U.S. Circuit Court of Appeals reversed a jury verdict that was in Computervision's favor.

Liable for damages

That reversal left Computervision liable for damages relating to its former Cobilt Division's infringement on PE's patents for the Micralign projection mask aligner, a product designed to align masks with wafers and the design patterns embedded on them.

Computervision, which is appealing the circuit court decision, and its auditors, Price Waterhouse & Co., issued the qualification March 23, 1984, and emphasized that the litigation has no impact on its current operations.

For the year ending December 31, 1983, Computervision reported $35.3 million in earnings on revenues of $400 million.

At the same time, Computervision complained that it was surprised that PE asked for $40 million in damages and said that the companies had discussed a much lower settlement. "We were thinking more in a range like 10% of that," Carr said.

PE unaware of negotiations

A PE spokesman responded that company officials were "aware of no such negotiations."

Computervision sold its Cobilt Division to Applied Materials, Inc. in 1981.

Until enjoined by the court, Cobilt produced a CA 3000 semiconductor projection alignment system designed to compete with the Micralign.

Eagle expects revenues loss

LOS GATOS, Calif. — Eagle Computer, Inc. said recently it expects losses ranging from $7 million to $9 million for the quarter ended March 31, partly due to a recent settlement whereby the company agreed to drop a microcomputer Basic I/O System (Bios) alleged to be an infringement on an IBM copyright.

Eagle said it expects sharply reduced revenues for the quarter will result from delays in converting to a new Bios and from write-downs to be taken on certain assets.

In accordance with the terms of the IBM settlement, Eagle ceased shipping micros with the contested Bios on March 6 and began shipments of the new Bios on March 23.

The suit was filed and settled the same day in February when IBM charged Eagle had copied substantial portions of IBM's Bios that is used in the IBM Personal Computer.

Eagle said it experienced an unexpected drop in orders as a result of the conversion. The company also said it was forced to delay announcement of a new microcomputer product that had been expected to contribute to third-quarter revenues.

Software AG airs profits rise

RESTON, Va. — Software AG Systems, Inc. recently reported third-quarter profits of $1.6 million, or 27 cents per share, compared with a loss of $253,000, or four cents per share, in the third quarter of 1983.

Revenue for the third quarter ended Feb. 29 was $10.5 million, compared with $7.6 million in the corresponding period a year earlier.

The third-quarter loss in 1983 reflected a $810,000 deficit resulting from a $1.5 million settlement of litigation with Mini-Technology, Inc.

For the nine-month period just ended, the company reported revenue of $29 million and profits of $4 million, or 66 cents per share, compared with revenue of $21.1 million and profits of $266,000, or four cents per share, during the comparable period in fiscal year 1983.

Nearly Nine Million Computer-Involved People Around the World Rely on Our Publications For the News They Need.

We're CW Communications/Inc.; the world's largest publisher of computer-related newspapers and magazines. And wherever you go in the computer world, you'll find computer-involved professionals reading—and relying on—our publications. With highly trained and experienced editorial staffs all over the world, our publications give readers the best and most up-to-date information available in this rapidly changing industry.

Around the world:

We publish, co-publish or provide editorial services to the leading computer publications in the world, including publications in all of the following countries:

Scandinavia—Denmark, Sweden, Norway, Finland
Western Europe—West Germany, United Kingdom, France, Italy, Spain, Greece, the Netherlands.
The Mid-East—Kuwait, Saudi Arabia.
Asia/Africa—People's Republic of China, Korea, Japan, Singapore, Southeast Asia, South Africa, India.
The Southern Pacific—Australia.
Central and South America—Mexico, Brazil, Argentina, Chile.

In the United States:

In the world's largest computer market, we publish a whole series of publications that cover different aspects of the industry. Our largest publication, with more than half-a-million readers every week, is *Computerworld*, a weekly newspaper aimed primarily at larger computer users. Its companion publications include *Computerworld Office Automation*, *Computerworld on Communications* and a series of *Buyer's Guides* covering all major segments of the industry.

In addition, we publish *MICRO MARKETWORLD* for dealers, distributors, retailers and others involved in the microcomputer marketplace. For microcomputer users, we publish *Infoworld*, *Microcomputing*, *PC World*, *MacWorld*, *jr*, *80 Micro*, *InCider*, *Run*, and *Hot CoCo*.

No one in the world publishes more computer information for more people in more countries than we do. And we'd be happy to give you more information on any of our publications. Just send a telex to our U.S. offices, attention CW International Marketing Services, (telex #95-1153) or write us at the address below.

CW COMMUNICATIONS/INC.

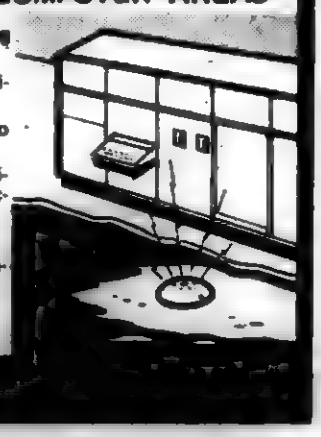
AVOID DOWNTIME!
WATER ALERT
. . . FOR COMPUTER AREAS

Warns you of water leakage in sub-floor wiring areas.

- Produces a loud, intermittent alarm when activated by presence of water.
- Completely self-contained . . . no wiring, no connections.
- Early water detection (1/64" water film activates alarm) provides maximum time for corrective action.
- 24 hour per day monitoring.
- Options include remote indicator, remote flashing light, and automatic telephone dialer.

8 Models from $59 - $110

Call or write for complete information.



Dorlen Products

COMPUTER INDUSTRY

Victor OKs European offer to buy its micro business

SCOTTS VALLEY, Calif. — Victor Technologies, Inc.'s board of directors has approved an offer from its European distributor, Applied Computer Techniques PLC (ACT), to purchase Victor's microcomputer business [CW, March 26].

Although the financially troubled micro maker's debt is estimated at $100 million, it said the purchase price "will amount to substantially less" than its $75 million in unsecured debt. Efforts to reach representatives of ACT and Victor's creditor committee for comment were unsuccessful. The terms of the agreement were not disclosed.

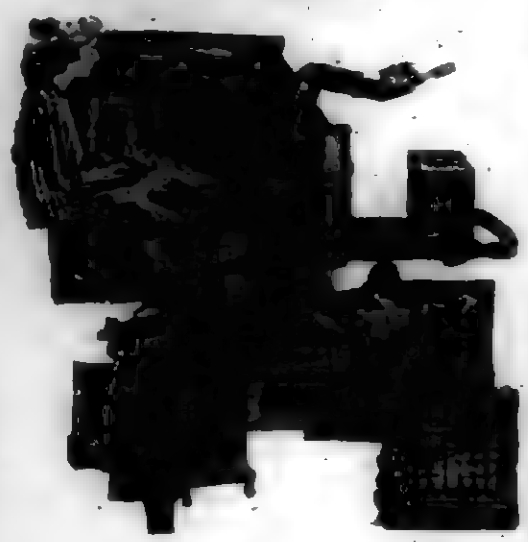
Under the proposal offered by the Birmingham, England-based distributor, Victor said it will retain distribution rights for North America and South America for Victor microcomputer products to be made by ACT.

Victor's recent filing for protection from its creditors under Chapter 11 of the Federal Bankruptcy Act made it the third micro maker in a six-month period to do so. Acceptance of ACT's bid is "subject to a definitive agreement and the approval of a bankruptcy court," a spokeswoman for Victor said.

IS THERE A FUTURE IN YOUR FACTORY?

Industrial Renewal

A new era of industrial renewal is sweeping across the manufacturing landscape. Manufacturing pursuits are back on the front burner. Companies are gearing up to regain lost markets and become competitive on a new global scale.



The Manufacturing Information Network

Manufacturing is rapidly becoming an information intensive business. Allocation of resources — what's needed, how, much, by whom, when and where — will be a crucial element in the success — or failure — of the manufacturing effort. New and automated production systems will be keyed into the manufacturing information network. And at the heart of this new working environment is the computer. Computer integrated manufacturing will usher in a new industrial revolution. Product reliability and quality are dramatically enhanced. Scrap and rework are minimized. And the improvements in overall productivity yield a maximum return on your investment.

Linkage and Systems Integration

The new dawn of manufacturing will not be realized by installing a few robots or numerically controlled machine tools. Even the latest systems approach to manufacturing will be rendered ineffective if the machines on the factory floor are not up to the job. The key to the future is linkage...linkage of the information vital to the manufacturing process with the computer driven production equipment designed to do the job. Not just one job. But the jobs that will be determined by today's and tomorrow's markets. After all, that's what flexible manufacturing is all about.

Beyond the Dream.... The Future is Now

You've heard what's happening in manufacturing: materials requirements planning; just-in-time inventory systems; FMS; Robotics; Automatic Guided Vehicle Systems; AS/RS; CAD/CAM and more.

BUT WHERE DO YOU GO TO FIND OUT MORE ABOUT THE FACTORY OF THE FUTURE?

IT'S ALL HERE...

AMS 84

ADVANCED MANUFACTURING SYSTEMS EXPOSITION & CONFERENCE

McCORMICK PLACE, CHICAGO

JUNE 12-14, 1984

You're just one step away from finding out more about the factory of the future... Take that step today!

Return this coupon for special Reduced-Rate Show Registration Cards, Advance Conference Program and complete information on AMS 84. Or call 212-370-1100.

I want to save time and money. Send _____ Reduced-Rate Show Registration Cards and _____ Conference Programs.

Name _____

Title _____

Company _____

Division _____

Address _____

City _____ State _____ Zip _____

AMS 84
CLAPP & POLIAK, A Cahners Exposition Group Company
999 Summer Street, P.O. Box 3833, Stamford, CT 06905

Revenues up at Ashton-Tate

CULVER CITY, Calif. — Ashton-Tate, Inc., the microcomputer software and book publisher located here, recently announced that annual profits and revenues both were up more than 200% over restated figures for fiscal year 1982.

For the year ended Jan. 31, Ashton-Tate reported revenues of $39.8 million, up 297% from the $10 million experienced in 1982.

Profits for 1983 were $6.2 million, or 78 cents per share, for the publisher, up 266% from the $1.7 million, or 23 cents per share, experienced in 1982.

Figures for 1982 and the first six calendar months of 1983 were restated to reflect divestiture of two divisions and the acquisition of product rights.

In the fourth quarter of fiscal year 1983, the company had revenues of $13.5 million and profits of $1.7 million, or 20 cents per share.

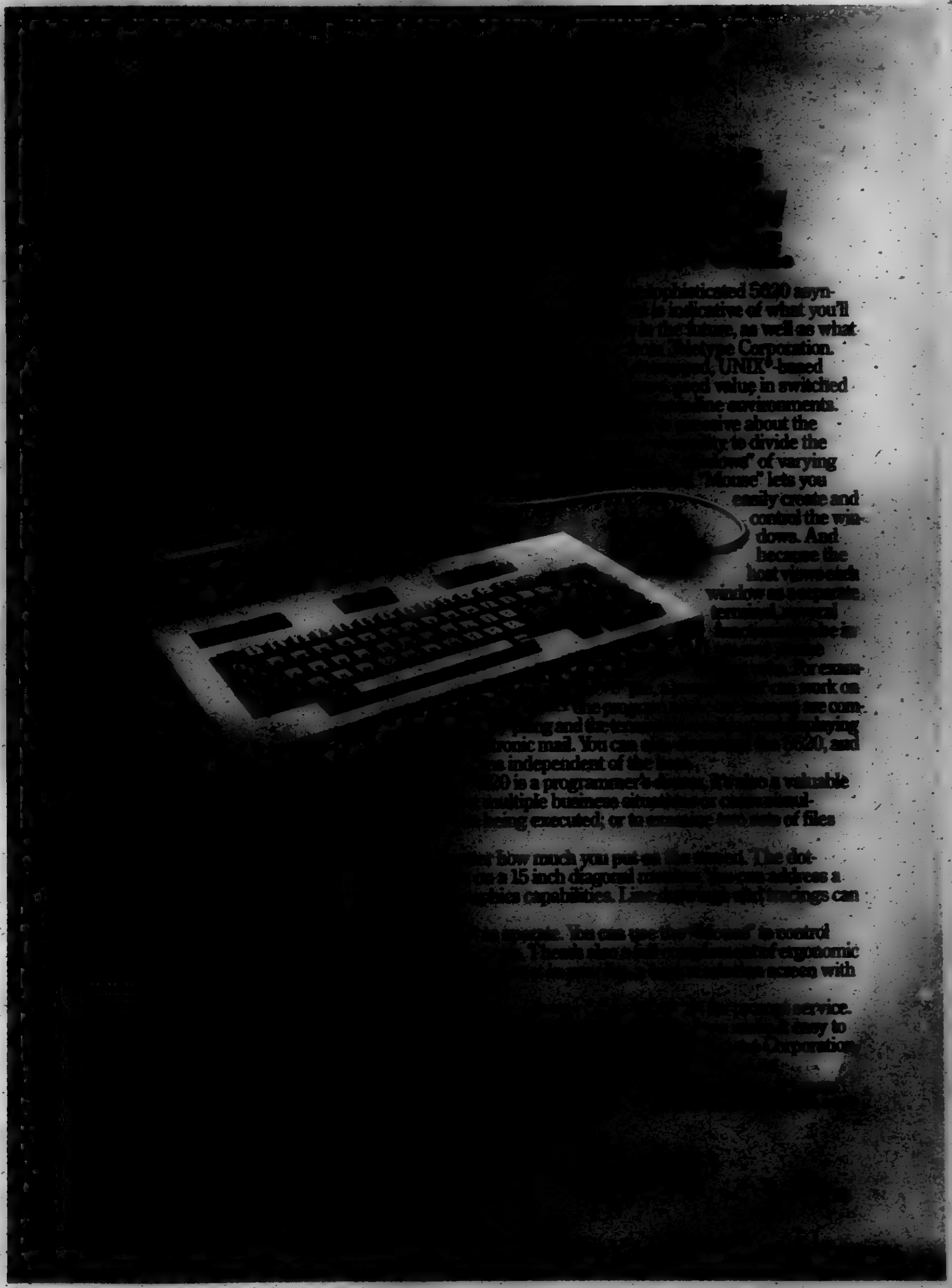
Commenting on the success of Ashton-Tate, David Cole, president and chief executive officer, said the microcomputer data base software vendor expects "record sales and earnings for this year, largely through the introduction of new, but related, products."

Cancer Institute seeks vendors

BETHESDA, Md. — The National Cancer Institute (NCI) is seeking computer utility vendors to provide information on cancer treatment to community-based physicians with office or personal computer systems through its PDQ data base systems.

Currently available only through National Library of Medicine Medlars centers, PDQ provides health professionals nationwide with information about the prognosis and accepted treatment options for specific cancers and treatment protocols.

Additional information can be obtained through NCI PDQ, Room 11A49, Building 31, National Institutes of Health, Bethesda, Md. 20205.



sticated 5620 asyn-
is indicative of what you'll
the future, as well as what
Teletype Corporation.
UNIX®-based
value in switched
ne environments.
ve about the
to divide the
dows" of varying
Mouse" lets you
easily create and
control the win-
dows. And
because the
host views each
window as a separate
command
be as
or exam-
can work on
use com-
ronic mail. You can
a independent of the
20 is a programmer's
multiple business
being executed; or to
how much you put on the
a 15 inch diagonal
tion capabilities.
gs can
. You can
to control
ergonomic
screen with
service.
easy to
Corporation

COMPUTER INDUSTRY

MODELS AND BUILDS

Computer Task Group, Inc. has reported revenues of $64.1 million and earnings of $1.4 million for the year ended December 1983. Earnings per share for 1983 were 75 cents, compared with 62 cents from 1982.

■

Televideo Systems, Inc. has reported an increase in sales of 11% for the first fiscal quarter of 1984. Sales totaled $43.2 million, up from $38.9 million last year. Net income gained 17% to $5.7 million from $4.9 million for the period.

■

Microstar Systems Corp. reported a net loss of $3.6 million for the fourth quarter, compared with net income in the corresponding period a year earlier of $619,000, or 8 cents per share. Sales rose to $6.1 million from $5.8 million in 1982. For 1983, a net loss of $3.7 million was reported, compared with 1982 net income of $1.5 million. Sales were $20.1 million, up from $19.2 million in 1982.

■

Computer Synergy, Inc. has filed a registration statement with the Securities and Exchange Commission covering the public offering of 645,000 shares of common stock. The company will issue and offer for public sale 575,000 shares, and 70,000 shares will be sold by existing shareholders. The public offering will take place in mid-April.

■

LTX Corp. announced results for the second quarter ending Jan. 31. Sales were $19.3 million, compared with $12.8 million for the corresponding period a year earlier. Net income was $1.2 million, or 16 cents per share. Sales for the first six months ended Jan. 31 were $34.4 million, an increase of 50% over sales of $22.9 million in the prior year; six-month earnings were $2.1 million, or 28 cents per share, compared with $930,000, or 14 cents per share, for the earlier period.

■

Amistar Corp. has filed a registration statement with the Securities and Exchange Commission for public offering of 1.3 million shares of common stock. The offering is to be made in April by an underwriting group managed by L.F. Rothschild, Unterberg, Towbin.

■

Science Management Corp. announced sales for 1983 of $68.9 million and a net loss of $1.1 million, or 49 cents per share. In the fourth quarter, sales increased to $21.9 million with a net loss of $519,000, or 20 cents per share.

■

Wyle Laboratories reported sales increased 61% for the fourth quarter to $84.7 million from $52.7 million in 1982. Net income for the quarter was $2.5 million, or 34 cents per share, compared with a net loss of $300,000 in 1982's fourth quarter. Sales for fiscal year 1983 were $293.6 million, up 41% from 1982. Preliminary net income for the year was $7.1 million, or $1.05 per share, compared with 1982's net loss of $3.1 million.

SUPERMICROS

MCC Industries has joined the Microelectronics and Computer Technology Corp. (MCC) joint research venture. MCC was launched in 1983 to conduct long-range, advanced research.

■

Harris Corp.'s Government Systems Sector has announced completion of a

Continued on page 97

IBM/36 INFO CENTER. TODAY!

PC

Call or write for details on FUSION/36 Information Center. Includes integrated retrieval processor (report/queries) personal database and IBM PC interface to S/36 ^en.

FUSION

(415) 461-4760

100 LARKSPUR LC. #204
LARKSPUR, CA 94939
TELEX 17000

The Northern Telecom system: A benchmark in batch processing that keeps getting better.

Northern Telecom batch processing systems have proven themselves, in more than a decade of use in a variety of applications, to be among the most reliable, practical, cost-effective systems ever developed. They deliver more throughput per dollar than any competitive system.

Now, as solid evidence of our commitment to batch processing, we're improving these already-successful systems for even more productivity. For instance, we're introducing a new high-speed band printer with changeable type. Operating now with IBM's SNA, we've also added new, low-cost distributed data processing capabilities for more system versatility, and to provide for future growth toward the integrated office.

We're back

COMPUTER INDUSTRY

M&D from page 77

marketing rights to SI's The System report writer software [CW, Feb. 20]. Software International's report writer is similar to the Fast system, and the joint marketing arrangement was clearly intended to allow M&D to circumvent the injunction against international sales of G/L Plus with a Fast-like subsystem.

In an interview with Computerworld, ABC Management President Vernon W. Ruskin said he was "pleased the two firms could reach an amicable settlement of the dispute."

M&D Chairman James M. McCormack said in prepared remarks that the agreement is "in the best interests of our international customers, agents, employees and prospects" and that it "places no restrictions on [M&D's] ability to market and support G/L Plus domestically or internationally."

The statements were in sharp contrast to remarks made earlier by McCormack, who said M&D pursued the SI deal when it "became clear after extensive negotiations that there was no interest from ABC Management in a reasonable settlement" of the dispute. At the time, Ruskin countered by saying that M&D was not "negotiating seriously" in the matter.

WAFER from page 77

design changes made the originally planned uniprocessor too slow. The mainframe's first shipments were rescheduled for mid-1986.

A CDC spokesman declined to reveal if the Trilogy changes had any impact on CDC's decision to license the semiconductor technology.

The spokesman also declined any comment on when CDC hopes to use Trilogy's technology in CDC products.

In prepared statements, CDC's Price said that "Trilogy's pace-setting development of wafer-scale integration clearly has the promise of providing even higher standards of performance and reliability to [CDC's] top-end processors.

"In addition, the manufacturing cost projections for systems using this technology gives us confidence that [CDC] will continue to be the cost-performance leader in high-end scientific processors well into the '90s," he said.

Trilogy's Amdahl said CDC's purchase of rights to the wafer-scale technology "provides continuing evidence of its applicability across a wide range of applications beyond [Trilogy's] use in our present large-scale IBM-compatible developments."

AT&T from page 77

nounced a port for Unix if it genuinely believed that the operating system still belonged to its rival, AT&T.

On a related topic, Dyson claimed the data communications market will remain confused for some time because of the unpredictable behavior of the recently divested Bell operating companies.

"These [former Bell operating companies] promise a lot, but they don't necessarily deliver. From the point of view of Adapso members, to have someone flailing around in the marketplace can be more dangerous than a well-mannered competitor that knows what it is doing," she said.

Dyson said the important question for computer services companies is whether the former Bell operating companies will buy software or hire away people.

"Initially, they will buy your software, but the [former Bell operating companies] do not have the people they require to compete effectively, and in the long run, they will try to lure your people away."

Also speaking at the session, Jack Bucter, executive director of planning for AT&T Technologies, agreed that the firm has yet to adopt a clear-cut strategy in data communications. He added that the market is still emerging and, so, AT&T is at no great competitive disadvantage. He outlined four distribution channels through which AT&T Technologies intends to bring solutions to its customers: internal and end-user sales forces, independent software vendors, value-added resellers and retail distributors.

The AT&T executive stressed that no one vendor can develop solutions to meet all the problems of its business customers.

Your processing may be remote. but Northern Telecom service is on the spot.

With service and maintenance professionals located at 157 cities nationwide, we're able to provide prompt response to your call for service. How fast? Two hours in major metropolitan areas; four hours in most other areas of the country. And our multi-year maintenance agreements guarantee continuing, low-cost operation of your Northern Telecom system.

If your system lease expires within the next six months, *now* is the time to find out more about batch processing from Northern Telecom.

Time-proven performance with long-term savings.

Northern Telecom's aggressive pricing is more proof of our commitment to batch. Our discount structure offers long-term savings on multi-year leases. And at renewal time, you can save even more with discounts up to 30%.

Call our toll-free number: 800-331-3113. Or write Northern Telecom, Mail Station T-240, P.O. Box 1222, Minneapolis, Minnesota 55440. We'll show you how we can tailor a batch system to your specific needs. And save you money, too.

nt northern telecom

ing batch!

4,500 Users Said They'd Like Us To Put EASYTRIEVE On-Line . . .

We Gave Them All New, Powerful EASYTRIEVE PLUS™

Evolutionary EASYTRIEVE PLUS is the next generation in software technology, created in direct response to user enhancement requests. In one comprehensive package, EASYTRIEVE PLUS offers generalized information retrieval, data analysis, a query and application language, and on-line development capabilities under CMS, TSO, or CICS.

Like its well-known predecessor, EASYTRIEVE PLUS comes complete with the award-winning documentation, meticulous service, and user group support that made Pansophic the premier name in systems software.

Call us today for a demonstration . . . and introduce yourself to a software legend in its own time.

PANSOPHIC®

(800) 323-7335

Pansophic Systems, Inc., 709 Enterprise Drive, Oak Brook, Illinois 60521. In Illinois, call (312) 986-6000.

COMPUTER INDUSTRY

Continued from page 36

high-speed, integrated-circuit fabrication facility for processing circuits with submicron minimum feature sizes.

■

Unidex Corp. of America has announced its entry into satellite television and communications and has appointed Guy C. Davis to head the company's new Satellite Technology Group for the U.S. and Canada.

■

Stratus Computer, Inc. announced it has received a contract from **Lockheed Electronics Co.** for a network of fault-tolerant computers. Lockheed was recently selected to modernize and automate the Republic of China's air traffic control system. The Lockheed system will include a distributed network of a dozen Stratus/32 Continuous Processing Systems.

■

John A. Venator has been named executive director of the Data Processing Management Association.

■

Visa International has authorized France's **Carte Bleue** to issue a Visa card containing a computer chip in the card's top blue band. The board's approval will permit Carte Bleue to use Visa cards as part of a 10,000-card pilot test of the memory card — often referred to as the "smart card."

■

Microelectronics Business International (MBI) has completed funding to establish **Advanced Semiconductor Engineering** of Taiwan. The financing to fund the $18 million project was arranged through Citibank of Taiwan. MBI also negotiated the purchase of an existing 100,000-sq ft manufacturing facility in the Nantze Export Processing Zone.

MERGERS AND ACQUISITIONS

SFE Technologies, San Fernando, Calif., has announced that it has acquired **Orchard Electronics, Inc.**, which is headquartered in Concord, N.C. According to SFE, Orchard was acquired for cash and will be operated as a wholly owned subsidiary of SFE.

■

Teradyne, Inc., Boston, announced recently its acquisition of the Burlington Division of **Scientific Atlanta, Inc.**, Burlington, Mass. The division now becomes part of Teradyne's component test group, which is under the direction of Vice-President James Prestridge.

■

Infoworks Corp., Nashville, announced it has become a subsidiary of **Innovision, Union Planters Corp.**, Memphis. Terms of the merger were not available.

■

Information General Corp., Woodland Hills, Calif., and **Cyma Corp.** announced that both companies have terminated talks concerning possible acquisition. According to Informatics' President Bruce T. Coleman, the companies could not reach agreement on terms of the proposed acquisition.

■

Spectravideo, Inc., New York, has reached an agreement with **Bondwell Holding Ltd.**, Hong Kong, subject to satisfactory arrangements with its creditors, for Bondwell to acquire the controlling interest in Spectravideo. A condition of the agreement, it was announced, is the restructuring of approximately $2.6 million of Spectravideo debt.

■

Kaufman Data Communications, Inc., Mountain View, Calif., is the new name for **Kaufman Research Manufacturing., Inc.**, which has been acquired by **Orange Nassau Electronics, Inc.**, Tempe, Ariz. Terms of the acquisition were not available.

■

Ultimate Computer Services, Denville, N.J., and **ADL Enterprises** announced a merger of the two firms. The combined company will be known as Ultimate Computer Services. Terms of the merger were not available.

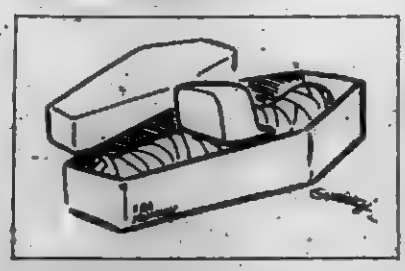
AT&T joins Cbema group

WASHINGTON, D.C. — The executive committee of the Computer and Business Equipment Manufacturers Association (Cbema) recently approved a membership application submitted by AT&T.

"AT&T is the first major telecommunications provider to join Cbema," said Vico Henriques, Cbema president. "Their membership reflects the merging of interests between the major components of the industry and will allow the industry to speak with a more unified voice on domestic and international issues."

Cbema is an association composed of 40 companies that manufacture and sell computer and business equipment hardware, software, telecommunications, services and supplies.

Henriques said he expects AT&T representatives to the association to offer new insights and perspectives on Cbema's major issues.



Announcing

The one-stop, international advertising service for micro marketers.

You'll reach microcomputer buyers all over the world with *Computerworld*'s International Marketing Services (CWIMS). Because we have the microcomputer market *covered* with an international network of publications. And what a market!

As the need for computerization in government, industry and educational systems all over the world becomes more acute, countries look to the cost-effective, adaptable microcomputer to bring them into the computer age. This means a very lucrative market for the U.S. micro marketer, since international product demand exceeds product supply.

Now, with the help of *Computerworld*'s International Marketing Services, you can advertise in 15 magazines devoted exclusively to supplying information to microcomputer users in: Australia *(MicroWorld, PC World)*, Brazil *(MicroMundo)*, Denmark *(Micro Verden)*, Finland *(Mikro)*, France *(Golden, PC World)*, Japan *(PersoCom World)*, Norway *(Mikro Data)*, Sweden *(MickoDatorn, Min Hemdator)*, Spain *(Micro Sistemas)*, The Netherlands *(Micro/Info)*, West Germany *(Micro-Computerwelt, PC Welt)*. And, your advertising message can reach buyers of microcomputer products and services around the world through special micro sections in any of our 40 publications in 25 countries.

Act now—and take advantage of this international demand for microcomputer products. Whether you want to test the market—or locate a distributor or representative—our publications will put you in touch with the right people around the microcomputer world.

For more information on getting international micro coverage, call Diana La Muraglia, General Manager, International Marketing Services, toll-free, at 800-343-6474. In Massachusetts, call 617-879-0700 or return the coupon below.

CW COMMUNICATIONS/INC.

Diana La Muraglia, General Manager
International Marketing Services
CW Communications/Inc.
375 Cochituate Road, Box 880
Framingham, MA 01701

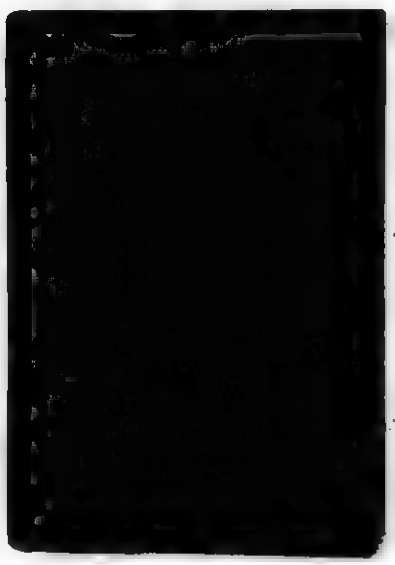
Please send me information on:
☐ Your microcomputer publications ☐ Your other foreign publications

Name _____ Title _____
Company _____
Address _____
City _____ State _____ Zip _____

IF YOU MISS CW ON COMMUNICATIONS IN THE NEXT THREE MONTHS, LOOK AT THE ISSUES YOU'LL BE MISSING.

JUNE.

Bypass. Bypassing the local loops provided by the Bell Operating Companies has become rampant with the availability of alternative technologies. See what this means to both big, regional operating conglomerates and smaller, non-Bell Operating Companies—all in the June issue.
Closes May 4.



JULY.

AT&T update.
Who are the winners and who are the losers after more than six months of deregulation?
Closes June 1.

AUGUST.

This issue will look at various teleconferencing technologies—including full motion video, freeze frame, electronic blackboards and computer conferencing. The cost-effectiveness of teleconferencing technology will be examined, plus information on private and public facilities—all in the August issue.
Closes June 29.

On Communications is ideal both for the advertiser and the reader. Because each one offers focused, in-depth information on areas of interest within communications.

Readers always want to catch up on what's hot and what's not in their particular specialty. And find out what the vendors have to offer.

As an advertiser, you won't want to miss the opportunity to tell them.

Maybe that's why our On Communications is becoming more popular every day.

Because everyone wins.

For more information, or to reserve your space in any of our upcoming issues, simply call the sales office nearest you. Or fill out and return the coupon to Ed Marecki, National Sales Director, Computerworld, 375 Cochituate Road, Box 880, Framingham, MA 01701.

To: Ed Marecki, *National Sales Director*
CW Communications/Inc., Box 880, Framingham, MA 01701

Please send me advertising information on: ☐ *AT&T update.*
☐ *Bypass.* ☐ *Teleconferencing.*
☐ *Please have a sales representative call me.*

Name _____
Title _____
Company _____
Address _____
City _____ State _____ Zip _____
Telephone _____
OC

Computerworld
On Communications

Sales offices.

BOSTON: 375 Cochituate Road, Box 880, Framingham, MA 01701 (617) 879-0700; CHICAGO: 2600 South River Road, Suite 304, Des Plaines, IL 60018 (312) 827-4433; NEW YORK: Paramus Plaza I, 140 Route 17 North, Paramus, NJ 07652 (201) 967-1350; ATLANTA: 1853 Peeler Road, Suite D, Atlanta, GA 30338 (404) 394-0758; SAN FRANCISCO: 300 Broadway, Suite 20, San Francisco, CA 94133 (415) 421-7330; LOS ANGELES: 18008 Sky Park Circle, Suite 260, Irvine, CA 92714 (714) 261-1230.

POSITION ANNOUNCEMENTS

COMPUTER POSITIONS

COFL, part of the State University of New York and located in the beautiful Finger Lakes region, is currently planning an expansion of its computer curriculum, services, and facilities (presently exploring building a new technology center). COFL (enrollment FT: 1975, PT: 1977) operates a PRIME 750 and 2655 computer network to support many academic programs.

DIRECTOR ACADEMIC COMPUTER CENTER

Director will develop and administer all academic computer services required to support a community college's instructional program. Responsibilities include supervising technical and support staff, evaluating hardware/software, preparing/administering budget, and assisting faculty in effective use of computers in instruction.

Minimum of Bachelors degree (Masters degree preferred) in Computer Science or related field, and three years experience in programming, systems analysis, and computer systems administration (mini and micro). Experience in teaching and computer-assisted instruction desired.

Twelve-month, renewable contract, $24,000 - $30,000 annual salary, good fringe benefits. Additional compensation for part-time teaching.

FACULTY POSITION IN COMPUTER SCIENCE

Faculty member will teach courses in the Associate in Science in Computer Science degree program, including assembler, data structures, and related microcomputer courses. Responsibilities include advisement of Computer Science students and liaison with four-year transfer institutions.

Masters degree in Computer Science preferred, Masters degree in related area with appropriate Computer Science background acceptable. Teaching experience necessary.

Continuing appointment position. Assistant Professor rank, $20,000 range. Additional compensation for evening and summer school instruction.

FACULTY POSITION IN DATA PROCESSING

Faculty member will teach courses in the Associate in Applied Science in Data Processing degree program, including introductory courses, programming courses, and systems analysis and design. Responsibilities include student advisement, and curriculum revision to insure continued successful student placement.

Masters degree preferred, Bachelors degree required. Significant teaching experience and experience in business data processing environment required.

Continuing appointment position. Assistant Professor rank, $20,000 range. Additional compensation for evening and summer school instruction.

Send letter of application, resume, and three letters of reference by April 27, 1984 to: Personnel Office, Community College of the Finger Lakes, Canandaigua, New York 14424. EEO/AA.

"NATIONWIDE"

COMMUNICATIONS GROUP

STRATEGIC PLANNING
data/voice integration
microwave/satellite

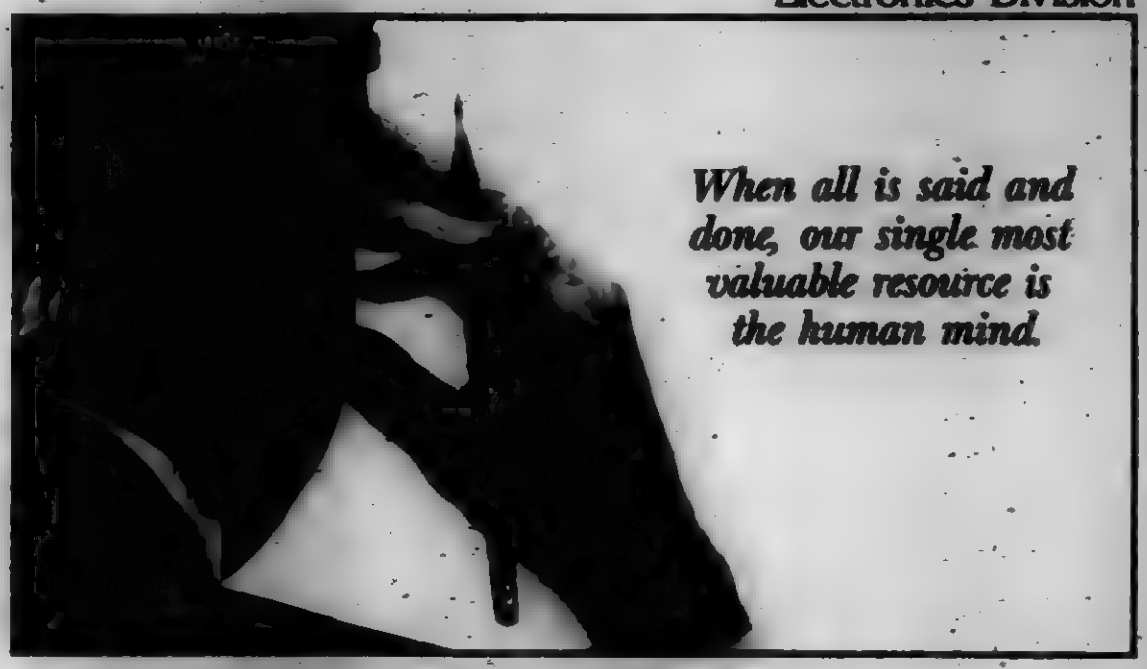
COMPUTER SCIENCE GROUP

MVS & DEC Oper. Systems
MORTGAGE/FINANCIAL Systems
IBM/SECRO Oper. Systems
UNIX/"C" Applic. & Syst.

fortune

PERSONNEL CONSULTANTS
17744 Skypark Circle, #220
Irvine, California 92714
(714) 754-0100

Electronics Division



When all is said and done, our single most valuable resource is the human mind.

You can't be satisfied with taking the easy road. Those that are never rise to the top, and we have room for only the very best. You have to have an unusually active and effective mind to be at Northrop's Electronics Division, because we don't deal in ordinary things. Over a wide range of current projects, we're doing some of the most exciting work in the history of electronics. The steps we're taking now will lead us into the next century.

We're one of the fastest growing divisions of Northrop, and we're looking for exciting people with exciting ideas. If you're looking for responsibility, we'll give you all you can handle. We'll recognize you for your achievements and contributions – and we'll see that you are rewarded. You're important to us. After all, our single most valuable resource is the human mind.

We have openings in the following disciplines. You owe it to yourself to look into them.

SOFTWARE ENGINEERS
Software Systems Analyst
Software Engineers
Systems Software
System Design

For the above four positions, contact Marie Wike.

DESIGN & DEVELOPMENT ENGINEERS
Transfer/Flake Programmers
Microprocessor Design Engineer

For the above two positions, contact Wayne Harris.

ATE ENGINEERS
ATE Systems Software Engineers
Automated Test Development Engineers
ATE Software Engineers

For the above three positions, contact Mark Totta.

If you have experience in these areas, call (213) 777-1776 collect or send your resume and salary history to the individual listed under the appropriate discipline.

Professional Employment
Dept. CW 4-2 M1/2827
2301 West 120th Street
Hawthorne, CA 90250

U.S. CITIZENSHIP REQUIRED
Equal Opportunity Employer M/F/H

You can make a difference.

NORTHROP
Making advanced technology work.

PROGRAMMER/ANALYST

Large medical center in northeast Ohio is recruiting for an experienced programmer/analyst for its progressive and growing Data Processing department. Responsibilities for this challenging position include business and/or patient care applications using state of the art technology (4341, 3370, 3279, 3270, CICS, COBOL, VSAM, DOS/VSE, DL/1, PL/1, VM, PROFS, SQL, PCS/ADS, GDDM). Background should include experience in a number of these areas and Systems Analysis. A minimum of 2 years experience required; degree in computer technology or related field preferred. Hospital experience is an added plus. We offer a competitive salary and an excellent benefits package. Qualified individuals send resume to:

Personnel Department
ST. ELIZABETH HOSPITAL MEDICAL CENTER
1044 Belmont Avenue
Youngstown, OH 44501
(216) 746-7211 Ext. 2666
An Equal Opportunity Employer

NEW ENGLAND EDP OPPORTUNITIES

Outstanding opportunities exist in New England for Project Leaders, Systems Programmers, Business Analysts, Programmer/Analysts, Software Engineers with two plus years experience.

Experience "quality of life" while achieving your career goals. Call or write today in total confidence.

KUEBLER ASSOCIATES

Data Processing Division
Executive Office Center
Two Monument Square
Portland, ME 04101
(207) 774-0180

PROGRAMMING

TRANSAMERICA AIRLINES, an international carrier, headquartered in Oakland, California, has 2 immediate openings.

SENIOR APPLICATION PROGRAMMER

Requires: 3 years recent COBOL experience in UNIVAC 1100 environment. Prefer experience with DMS and TIP.

DATA BASE PROGRAMMER/ANALYST

Requires: 2-3 years UNIVAC 1100 experience and a working knowledge of DMS and GUP 1100. Position reports to DBA.

We offer excellent benefits including Board Flight privileges. Salary commensurate with experience. To apply send resume and salary history to:

S.J. Williams
Transamerica Airlines
P.O. Box 2854
Airport Station
Oakland, CA 94614
EOE M/F/H

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

Sohio

Discover Sohio in Dallas, Texas

Opportunities exist in our Geophysical Systems Development staff for individuals with experience in seismic systems development to develop state of the art seismic processing systems in a DEC VAX 11/780 - CRAY IS/X-MP environment.

The successful candidates will work within a structured analysis and design project team environment to provide seismic systems development support for the Geophysical Research and Development staff at Sohio's Technology Data Center in Dallas.

CRAY Software Optimizing Analyst

BS (MS preferred) in computer science, math, physics or geophysics with at least 2 years' code optimization experience on CRAY IS/X-MP systems is required. Experience with DEC systems (VAX-11/750, VAX-11/780) and FORTRAN '77 is preferred. Previous experience with seismic software development and geophysical signal processing is desirable.

Individuals should have interpersonal skills to effectively interact with Sohio's Geophysical R&D staff. Project management skills helpful.

It's time to consider joining the Sohio adventure where the compensation package, including benefits, is outstanding. The opportunity for visability is unequaled and — to top it off — Sohio has one of the best relocation programs in the industry. To find out more, send your resume, complete with salary history to: Dan Allman, SOHIO PETROLEUM COMPANY, Dept. D078, 5420 LBJ Freeway, Suite 800, Two Lincoln Centre, Dallas, Texas 75240.

Equal Opportunity Employer M/F/H/V. Principals Only Please!

Your search leads to Sohio

SOHIO

We are an international data processing software, research, development and consulting firm with 72 branches worldwide. Our four western region branch managers are looking for more of the finest, most dedicated and imaginative people they can find. If you have the ability to become one of the leaders in your field, call or send your resume today.

THE SEARCH GROUP

Los Angeles	San Francisco	Portland	Seattle
JDMS ADSO CICS IMS DB/DC CULPRIT ALGOL/FORTRAN	VM or MVS SYSTEMS SOFTWARE SNA Telecommunications COBOL IMS/CICS IMS DBA NCP/VTAM ACP/PARS	OS/MVS CICS IMS DB/DC UNIVAC 1100 P/A	CICS IMS OS/MVS IMS DB/DC HONEYWELL GECOS PICK SYSTEMS COBOL P/A
David Morgan 22010 S. Wilmington Ave. Suite 101 Carson, CA 90745 213/549-8970	David Cutler 1633 Bayshore Hwy. Suite 237 Burlingame, CA 94010 415/692-6060	LaVelle Day 700 N.E. Multnomah Suite 1429 Portland, OR 97232 503/231-4114	David Gantt 33430 13th Place South Suite 200 Federal Way, WA 98003 206/838-3600

CAP GEMINI DASD
PEOPLE/PRODUCTS/RESULTS

ADMINISTRATIVE COMPUTING

[illegible] University is searching for an Associate Director for Administrative Computing, which is a continuing 12-month contract position within the department of Computing Services. A master's degree is preferred [illegible]'s degree required in computer science, management information systems, business administration or related fields. Successful applicant will have five years experience in computing or data processing with [illegible] leadership responsibilities and at least [illegible] years experience in higher education. The responsibilities include planning, budgeting, developing policy and procedures, and directing the Administrative Computing unit of Computing Services. Staff includes programmers, analysts, data base analysts, and information and office systems specialists. Computing environment includes a large IBM mainframe, VAX/UNIX, IMS, CICS, and related hardware/software to support on-line applications throughout the University. Send resume, official transcripts, and three references to Dr. Dennis L. Weaver, Director, University Computing Services, Ball State University, Muncie, IN 47306. Position will be open until filled, but will begin operation on April 15, 1984. Ball State University is state-supported and is located in Muncie, a city of over 80,000 approximately 60 miles northeast of Indianapolis. Excellent fringe benefits and salary commensurate to candidate's experience. Ball State University practices equal opportunity in education and employment.

EDP INCORPORATED

Our Clients need you!

Analysts Programmers Tech Specialists

Let us help you connect with outstanding career opportunities in the *SOUTHEAST*

Our clients have many challenging positions available.

Send your resume today, before your position is filled. All fees paid by our client companies.

EDP INCORPORATED
Suite 305, Fairview Place One
Charlotte, NC 28210
704/554-1101

SCIENTIFIC LABORATORY AUTOMATION SPECIALISTS

Program Resources, Inc. is seeking senior technical leaders, analysts and programmers to staff state-of-the-art systems and application development projects in laboratory automation to support pharmaceutical research, instrumentation and laboratory data management. Positions require a minimum of 3-5 years experience on mini and minicomputers. Chemical engineering or other scientific background or degree also required. Experience with DEC 11/70 and VAX systems, IBM PC technology, and robust CRT/MS applications a plus.

We offer excellent salaries and comprehensive benefits. For immediate consideration send resume and salary history to:

Program Resources, Inc.
765 Giddings Avenue
Suite 204
Annapolis, MD 21401
Attn: Personnel

SYSTEMS SUPERVISOR FOR DEC VAX 11/780 SYSTEM

Mayo Clinic is seeking an individual with experience on a VAX 11/780 or 11/750 operating under VMS and UNIX. The person hired to fill this position will function in a scientific research computer environment which supports such areas as CAD/CAM/CAT simulation and modeling applications. Working with 10 computer professionals responsibilities will include: operating systems software maintenance, integration of special hardware devices into the VAX system, continual upgrading of hardware system, system performance monitoring and tuning, group instruction and assistance with system, software characteristics, and participation in the development and implementation of research application programs. The individual will interface with outside vendors, field maintenance personnel, and internal and external user's groups.

Mayo Clinic with 800 staff physicians, 800 physicians in residency training programs, 700 students and other allied health educational programs, and 5800 paramedical personnel provides an exciting environment for the professional in this position. Mayo also provides an attractive compensation package including an outstanding personal security and benefits program.

Interested and qualified candidates should send a resume to:

A.W. Bigbee
Personnel Section
MAYO CLINIC
200 1st Street S.W.
Rochester, Minnesota 55905

We Are An Equal Opportunity Employer

PROGRAMMER/ANALYST

SYSTEM/38

Fast growing company in rural country setting needs experienced programmer/analyst for development of manufacturing & retail distribution systems. The successful candidate will have 1 or more years hands on System/38 and 5 or more years Data Processing application development experience. Principles only please.

Please send resume and salary requirements to:
MIS Director

RENOVATOR'S SUPPLY, INC.
MILLERS FALLS, MA 01349

MVS SYSTEMS PROGRAMMER

The MIS Department of Geisinger Systems Services is seeking a MVS Systems Programmer to become part of our team. We are located in central Pennsylvania and provide computer support to a multi-corporation system.

The individual we seek will have a strong background in MVS/SP/JES2 and specific experience in performance evaluation, tuning and DASD management. You will be responsible for: operating systems maintenance and tuning; systems software development and troubleshooting; implementation and enforcement of operating standards and procedures; and all other related areas of systems performance tuning, upgrade or maintenance. Experience in evaluating and implementing tape and DASD management packages and other packaged system software is preferred.

We offer an excellent salary and benefit program in a progressive environment for technical and professional growth. Individuals interested in this opportunity should submit a current resume and salary requirements to:

GEISINGER SYSTEMS SERVICES
HUMAN RESOURCES
23-10 SP
Danville, PA 17822

Equal Opportunity Employer, M/F

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

MANAGER OF TECHNICAL SERVICES

Enjoy challenge plus stability at our suburban Washington, D.C. computer facility

This is a new opening which carries responsibility for planning and controlling the activities of the technical services staff in maintaining IBM 303X Mainframes and 370X telecommunications software. You will also be expected to provide responsive technical support for system development programming, computer operations and user groups.

Prerequisites include one year management/supervisory experience in a technical services area and at least four years in MVS/JES2 System generation-/maintenance, TSO/SPF and CICS telecommunications network software support and trouble shooting. Should also have working knowledge of VSAM OS/JCL and IBM utilities, database management software and hardware and software evaluation. Degree in CS or business related field acceptable.

For immediate consideration forward your resume in confidence to Frank Isemann:

CHAMBER OF COMMERCE OF THE UNITED STATES
4948 Nicholson Court
Kensington, MD 20895
An Equal Opportunity Employer M/F

SYSTEMS ANALYSTS AND PROGRAMMERS FOR SUNBELT LOCATIONS

Job dissatisfaction, unemployment, and frustration are the biggest obstacles to overcome to achieve one's career goals. Every day new career opportunities pass us by because we are unaware of their existence. Let us keep you abreast of what your true value is in the market place. Absolutely no obligation, please call or write Keith Fulton, CPC, Data Processing Specialist.

Dunhill
OF CHARLOTTE, INC.
6401 Carnet Road, Suite 107
Charlotte, North Carolina 28211
800-438-5912
(NC Call)
(704) 542-5918

THE LEADER IN ARRAY PROCESSING TECHNOLOGY...

FLOATING POINT SYSTEMS, INC. offers opportunities in the leading edge of professional achievement. As the world leader in the design and manufacture of array processors, we are setting the pace for high-speed algorithm execution with the parallel architecture of our products. We are seeking applicants for immediate openings as:

- **CAE System Administrator**
  Administer an APOLLO operating system devoted to CAE design. Some systems software and tools development also involved. Requires BSCS or equivalent, and operating systems experience.
- **Applications Software Engineers**
  Will design and implement scientific and engineering applications software. Requires BSCS in Math or equivalent, and familiarity with assembly language coding and microcomputer architectures; a background in numerical analysis and/or signal processing is desirable.
- **Senior Diagnostic Designer**
  Will coordinate and provide technical leadership for new product diagnostics development. Requires BSCS/BSEE or equivalent, and previous diagnostics design and development from conception to manufacturing integration.
- **Diagnostic Designers**
  Will design, code, and document software diagnostics for new product development. Requires BSCS/BSEE or equivalent; experience in hardware testing and/or Motorola 68000 or 6809 is desirable.
- **Senior Software Development Engineers**
  Will develop and enhance system communications between array processors and host operating systems. Requires BSCS or equivalent; operating systems internals and I/O device driver experience preferred.
- **Computer Scientists**
  Will perform PDS support. Requires BSCS or equivalent, and experience in PDS development. VAX, APOLLO, or IBM experience preferred.

  Will perform operating system support. Requires BSCS or equivalent. APOLLO, VAX/VMS, IBM/CMS, or IBM/MVS experience preferred.

  Will design and develop software for new product development. Requires BSCS or equivalent. PASCAL or MODULA-2; compiler construction or graphics experience preferred.

Besides an excellent compensation and benefits package, your opportunity to work within a creative company is further enhanced by our location in metropolitan Portland, Oregon. The clean, green beauty of the Pacific Northwest surrounds us and the Cascade Mountains and the Pacific Ocean are nearby. Outdoor activities are year-round, the climate is always invigorating no matter what the season, and the cultural events are plentiful in the Rose City.

If you want to join a company with exciting challenges, we welcome your resume and salary history: FLOATING POINT SYSTEMS, INC., P.O. BOX 23489 CWI-19, PORTLAND, OREGON 97223. If you have questions, please call BOB CLAY at 1-800-547-8437.

FLOATING POINT SYSTEMS, INC.

We are an equal opportunity employer.

Software Professionals

Genasys Corporation has been providing software services to federal, state and commercial clients for over 15 years. A number of new opportunities are now available in Washington, D.C., and Orlando and Tallahassee, Florida. The requirements are described below:

ORLANDO:
A per diem is offered for Programmer/Analysts and Systems Analysts with a minimum of one year of experience with IMS DB/DC or Model 204 and COBOL.

TALLAHASSEE:
Programmer/Analysts with a minimum of one year of experience with DMS 1100, DPS and COBOL.

WASHINGTON, D.C.:
Programmer/Analysts with a minimum of one year of experience with IMS DB/DC and PL/1; CICS (Command Level) with COBOL; or IBM Series 1 EDX/EDL.

Genasys offers an excellent benefits program including 3 weeks vacation, health/life insurance, and tuition reimbursement. For immediate consideration, please send your resume to:

Marcus Rogerson

GENASYS CORPORATION
11820 Parklawn Drive
Rockville, Maryland 20852
An Equal Opportunity Employer

PHILADELPHIA

We have been retained to recruit exclusively for a MidAtlantic Fortune 100 mfgr offering HARRISBURG TV OPPTYS, PAID RELOCATION & TOP BENEFITS. Our client seeks:

ASSOC DIRECTOR OF MIS to $55,000
BROAD-BASED APPS
MBA or MS/CompSci w/ LOGISCALE IBM hdware/sftware, solid analysis design skills & ability to market EDP to user depts. Also reqd are fine-tuned interpersonal skills. Database or Multi-Project mgmt exp +.

SYSTEMS CONSULTANT to $45,000
MANUFACTURING APPS
Degreed pro w/LOGISCALE IBM hdware/sftware & mfg mfg sys-especially exp DEVELOPING MFP SYS. Excell commun skills a must. Project mgmt, Database ideal.

ROBERT HALF
OF PHILADELPHIA, INC.
2000 Market St., Suite 700
Philadelphia, PA 19103
(215) 568-4580

D.P. Contractors

Top Rates - Bonuses

Talk with us about the benefits of being an EXPERT in the field of CONTRACT-ING/CONSULTING. We will review with you the range of challenging and high paying assignments available in New England, Washington, D.C., Florida and throughout the Southeast. Call (617) 237-1777 (Boston) or (703) 790-0660 (Washington, D.C.).

the EXPERTS

11 River Street, Wellesley, MA 02181
8911 Richmond Highway, Suite 209
Alexandria, VA 22309

Software Engineers

We are Structural Dynamics Research Corporation, SDRC, an international engineering consulting and computer software firm.

Openings exist for dynamic individuals to assume roles of technical leadership in the design and implementation of User Interface Development Systems and User Interface Management Systems. The successful candidates will design and implement these software systems on in-house DEC and IBM mini and mainframe computers using the C programming language.

This development process requires significant skills in computer science disciplines relating to software tools and operating system design and interfacing. Openings exist for:

- Software tools designer. Design and implement a screen manager and text editor concentrating on Human Engineering and Graphics.
- Operating Systems Specialist. Design and implement machine independent operating system interfaces concentrating on concurrency issues and device independence.

These positions are best filled by people with these qualifications:

- Experience in operating systems, real time programming, compiler development, or forms interfaces
- Experience in the development of large interactive applications
- Experience in or interest in computer graphics
- Familiarity with relational database concepts
- Graduate work in Computer Science or equivalent experience

SDRC offers a stimulating and challenging career opportunity, professional growth and excellent company paid employee benefits.

Please send your resume and salary history to:
Ms. Bales
2000 Eastman Drive
Milford, Ohio 45150
an equal opportunity employer

SDRC
Structural Dynamics Research Corporation

INTRODUCING CARI

The System That Matches Job Candidates To Openings Via GE Teleprocessing Network.

The New Idea That Puts You In The Right Place, At The Right Time, For The Right Job.

CARI Does It Fast—Here's How
CARI is a cooperative effort with General Electric Information Services. Utilizing their teleprocessing network, CARI puts your qualifications in front of America's top corporations.

CARI enters your Candidate Profile into the CARI System. Then, it is available to employers nationally. Employers with openings for key positions enter their specific job requirements into the CARI System. When the job calls for the qualifications you possess, you get the call—***directly from the employer.***

Trust CARI To Keep It Confidential
CARI automatically screens your present employer and parent company from seeing your name and profile. Potential employers call you directly. There's no middleman involved.

What's More—It's Free
CARI performs this valuable service to you, for absolutely nothing. CARI's corporate clients assume the entire cost.

Get In The Right Place Today
Complete and return the coupon. We'll send you a CARI Candidate Profile Summary. That's all it takes. CARI will tell you regularly how many companies have seen your profile. You can also update the qualifications at any time.

Start moving to the best job you can find.

Call Toll Free 1-800-221-5635

CARI is a data base and telecommunications service—NOT an employment agency.

CARI
Computer Assisted Recruitment International, Inc.

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

MAKE THE CARI CONNECTION TO JOBS LIKE THESE.

TECHNICAL SPECIALISTS
Data base, data communications, telecommunications, minis, micros, systems software and application software technical skills required. Degree in Computer Science or Engineering and good interpersonal skills necessary.

ANSI/TYMLSX SOFTWARE SPECIALISTS
Will develop, design and implement micro computer software. Bachelor's degree in Computer Science and/or Accounting (15-20 hours in each) and high SAT's/ACT's required.

PROJECT MANAGERS
Provide project management support and consultation in the inception, development, design and implementation of major projects and management systems. Qualifications include 5 years experience in systems analysis, good communication and business and technical problem solving skills. Bachelor's degree required. Master's preferred.

SENIOR PROGRAMMER/SENIOR PROGRAMMER ANALYSTS
Provide support for the development of major new CICS applications. Candidates must have 3 years experience in COBOL and CICS programming in a large IBM mainframe environment.

SYSTEMS ANALYSTS
Work with multiple users in an on-line environment. Responsibilities include installation, new release and testing of INQUIRE systems on 3081 and 3033 hardware. Three years experience with COBOL, PL1, and TSO/INQUIRE, CICS/INQUIRE and 2 years user friendly language experience essential.

SENIOR TECHNICAL ANALYSTS
Support user telecommunication projects and interface personal computers with word processors. Responsibilities include hardware and software selection, development of PC communication architecture, training, debugging and vendor interfaces. Candidates will have a technical degree and minimum 4-6 years related experience.

SENIOR SYSTEMS ANALYSTS
Assume an expanding role in a corporate MIS operation. Candidates will have 5-8 years related systems experience to include 3 years COBOL, IDMS and 2 years with user friendly languages.

TECHNICAL SPECIALIST
Initiate and support a variety of program products in an MVS/JES3 environment. Heavy involvement with top secret security package. Strong BAL programming and design skills, previous installation and support experience required. B.S. in Computer Science or equivalent experience.

PROGRAMMER/ANALYST
Must have 2-4 years experience COBOL, SPF, TSO, HIPO, OS/JCL. Will write programs specifications and code programs.

TECHNICAL PROGRAMMER
Support Network Control, activate and monitor on-line performance, circuit and equipment operation and supervise operators on a large network. Prefer 2 years experience operating a large network, knowledge of VTAM, CICS, 3705's, NCCE, NPDA and problem diagnostic/resolution. TSO and JCL a plus.

SENIOR SYSTEMS PROGRAMMING TELEPROCESSING SYSTEMS
Working with IBM 3081 hardware and an MVS system with an SNA network, positions provide systems programming support for telecommunications software and test processing products. Bachelor's degree in Computer Science or equivalent, and 2 years software experience utilizing CICS or VTAM in an IBM environment required.

SOFTWARE RECOVERY COORDINATOR
Prepare, test and maintain documentation and procedures to assure recoverability of critical software resources. Provide technical leadership for IPC Disaster Recovery Coordinators, and disaster recovery exercises. Requires working knowledge of MVS and program products, and good communication skills. Expertise in BAL, JCL, PROCS and system libraries required. Disaster recovery experience a plus.

MANAGER HARDWARE/SOFTWARE
Requires good knowledge of hardware/software involving real time control and data communication systems. Should have assembly language, C and operating systems interface. Hardware familiarity with both 8 and 16 bit processors.

PROGRAMMER/ANALYST
Position requires minimum of 3 years DEC VAX hardware, FMS software experience. On-line systems exposure. COBOL experience required, along with several years programming and systems analysis.

DATA PROCESSING MANAGER
Experience with System 34 required. Large mainframe exposure helpful. Applications include financial and manufacturing (MAPICS); some programming experience on System 34 necessary. Prior supervisory experience required.

SR. PROGRAMMER ANALYST
Must have at least 3 years of BAL experience using IBM hardware in an OS environment. Heavy user contact.

SR. SYSTEMS ANALYST
Must have 3 years experience programming; COBOL, and/or SAS. ReadyCode, FOCUS, microcomputer familiarity a plus. Will support corporate users with programming and analysis on one-time planning and research oriented projects. Will be DP liaison of users in projects from microcomputer to 4th generation language applications.

SYSTEMS PROGRAMMER
At least 3 years experience using COBOL, TSO, OS/VS JCL and IBM utilities. CICS and/or data base and VSAM a plus. Will provide programming support and batch programming assignments within a Big Ticket Merchandising System and a Promotional Reporting System, with some on-line exposure. At least 2 years experience using VSAM.

PROGRAMMER ANALYST
At least 2 years experience COBOL, SPF, TSO, HIPO, OS/JCL. Will write programs specifications and code programs.

SYSTEMS PROGRAMMER
At least 2 years programming; COBOL, JCL, Utilities and independent "research" analyst for your own efforts. TSO, SPF required; Operations a plus. Will support and develop programs in Batch Credit. Possibly minimal travel.

SR. SYSTEMS PROGRAMMER
Experience with documentation and procedures in Software areas, proficient in BAL and a working knowledge of MVS and related Software functions. Must be able to deal with all levels of management on a technical basis. Responsible for all systems software aspects of disaster recover-at all IPC's.

SYSTEMS PROGRAMMER
Experience working on IBM PC Apple, micro hardware and communications, along with mainframe programming are a plus. Will serve as consultant in MicroComputer Center assisting users with problems as well as assist in hardware and software evaluation and give seminars to the user community on micro products.

SR. SYSTEMS PROGRAMMER
Responsible for all software preparation, maintenance and testing of Disaster Recovery procedures and documentation. Requires BS in Computer Science or equivalent, strong BAL, working knowledge of MVS and related software functions. Strong communication skills and extensive experience with software documentation and procedures essential.

MVS SYSTEMS SOFTWARE PROGRAMMER
Will be responsible for and must have experience in installation and maintenance of MVS JES3 and related program products. Strong BAL, MVS SMP, and I/OSYSGEN experience required.

SR. PROGRAMMER ANALYST
Troubleshooter and programmer for production and enhancements with multiple user interface and large IMS data base. Four years experience using COBOL, TSO, OS/VS, JCL and IBM Utilities. IMS and CICS a plus. Initiative and problem solving skills a must. Bachelor's in Computer Science or equivalent preferred.

OPERATING SYSTEMS
Coordinate installation and modification of JES2 software on large scale IBMs in an MVS/SP shop moving towards MVS/XA. Minimum 6 years senior MVS Systems programming experience, with 3 years involving JES2 internal code and IBM/MVS software experience essential. Some applications require knowledge of time sharing/decision support systems and integration of VAX technologies.

SR. SYSTEMS ANALYST – FINANCIAL SYSTEMS
Research, design, develop and support modifications in large system Sales Audit area. Two years each of programming, development and research experience with heavy user interface skills required. IMS or CICS knowledge preferred. TSO, SPF, COBOL, BAL, JCL programming skills required.

SR. PROGRAMMER ANALYST
Must have at least 3 years COBOL-COMMAND level CICS experience using IBM hardware in an OS environment. Heavy user contact.

PROJECT LEADER – HUMAN RESOURCES SYSTEMS
Lead, plan and organize the technical team in the design, development and installation of a large HR system. Your experience must include large system/IMS data base design, JCL, DL/1 and hands-on IBM IMS Utilities. CICS and previous experience in benefits, payroll and personnel applications a plus.

ASSOCIATE TECHNICAL SPECIALIST
At least 4 years IMS Application Programming and Technical Programming expertise in IMS and CICS and 2 years System Software Programming experience. Familiar with IBM software maintenance procedures and the reorganization of data bases including the creation of REORG-PROCS. ASSEMBLER & IBM DBRC Product helpful.

PROJECT LEADER
Direct and document team of programmer/analysts in development of MIS Financial/Credit systems based on user requirements. Requires programmer/analysts with 3-7 years experience using COBOL, BAL, JCL and IBM Utilities, plus 2 years as project leader. Operations experience and knowledge of TPF, TSO, TOP-Secret, Panvalet, PAC II or PC70 desired.

SR. SYSTEMS ANALYSTS
Direct and develop "Top Secret" security data base and train personnel in its use. Requires knowledge of data security software, and minimum 3 years experience in systems analysis, design, programming, testing and debugging, plus TSO and SPF experience. Good communication and interpersonal skills necessary.

Please send me a CARI Candidate Profile Summary.

NAME

ADDRESS

CITY STATE ZIP

Return to: CARI, Dept. 035, 1901 Woodfield Road, Schaumburg, IL 60195

Call Toll Free 1-800-221-5635

If the perfect Data Processing job for you isn't listed here, it's not because we don't have the job, it's because we don't have the room. Send the coupon anyway.

We want to help.

HAS THE COMPUTER PROGRAM FOR YOU

If you're not accomplishing your career goals, let us put you in the right environment. DP executive departments of client companies are continually looking for programmers/DP professionals who want to remain state of the art.

NATIONWIDE OPPORTUNITIES

Lisp/C Programmer	to $55K
HDM Specific Software Analyst	to $50K
HDM III Programmer, DB/DTP	to $50K
BUR Heavy ECP Project Leader	to $50K
BUR Tech Support (Texas)	to $50K
IBM CICS, On-line Sys Mgr, Irvine	to $50K
IBM Sys Progr Obtain CICS Vstor	to $50K
IBM PA, OS/VS, CICS VS/AS Cobol	to $50K
IBM Prog Desktop Administrator	to $50K
IBM PA, OS/VS, JCL Cobol	to $50K

To become part of the organization that's #1, contact the DP Division below.

Bryant Bureau
DP Division
4200 S. Tamiami Trail, S-400
Sarasota, FL 33581
(813) 957-0707

UAI
ANALYST/SENIOR ANALYST/ GROUP LEADER

UAI Technology, a Research Triangle Park based software development and research firm is seeking qualified computer programming and management personnel.

Positions are available at the analyst, senior analyst and group leader levels. The analyst candidate will have 1-3 years programming experience in FORTRAN. The senior analyst candidate will have 4 or more years experience including substantial independent development work. The group leader will in addition to the requirements for senior analyst, have managerial experience in scheduling, software development and/or database management.

All positions require a B.S. or B.A. degree. IBM OS/MVS, TSO, JCL are helpful.

The salary and benefit packages of the organization are significantly better than those of other similar companies.

UAI Technology, through its subsidiaries and associated entities has more than 70% of the nation's largest 150 banks as clients. Its areas of expertise include cash management, financial consulting and bank operations.

The company has grown at a compound annual rate of more than 70% per year over the last five years. If you love your future in doing exciting and innovative work in an outstanding professional environment, send your resume to:

Pascal Johnson
Vice President
UAI Technology, Inc.
4020 Pleasant Rd., Suite 110
Durham, NC 27705

UAI Technology is an Equal Opportunity Employer.

IMS DBA

Fortune 500 org. seeks motivated DBA to do all planning, design & implem. for start-up div. IBM OS/MVS IMS DB-DC shop combining state-of-the-art tech. & dynamic mgmt. team. Will design integrated DBMS from scratch in this pivotal role. $40,000+

COBOL/ BANKING/BAL

This exciting, fast-track BOSTON bank is one of the industry leaders. IBM OS/MVS, CICS, COBOL, BAL environ. w/prof. mgmt. team. You'll be involved w/IMCR, DDA, consmr. loans & item processing areas interfacing w/users & upper lvl. mgmt. $34,000.

ROBERT HALF
OF BOSTON, INC.
100 Summer Street
Boston, MA 02110
(617) 423-1360
Personnel Consultants

FACULTY POSITIONS IN BUSINESS COMPUTER INFORMATION SYSTEMS

The Computer Information Systems Department welcomes applications for faculty positions available September 4, 1984. Masters in Business preferred (will consider Bachelors degree with extensive business and teaching experience). Several years of recent experience in business systems analysis and programming is required. College teaching experience desirable. Requires strong interest in undergraduate instruction and ability to teach courses in several of the following areas: Systems Analysis, Programming Languages, Telecommunications, and Data Base Management. Rank and salary will depend upon qualifications and experience. Salary range $21,000-$34,000 for 9 month academic year. Send complete resume to:

Dr. Robert J. Trocki, Head, Computer Information Systems, Ferris State College, Big Rapids, MI 49307.

AFFIRMATIVE ACTION/ EQUAL OPPORTUNITY EMPLOYER

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

We didn't get to be first... by being third-rate!

National Computer Associates is number one in size and in the quality of its personnel consultants. We are the nation's largest network of independently owned firms specializing in the placement of computer professionals. When you come to us you'll have the assurance of knowing that you've made the best possible choice.

Come in. Call. Or mail your resume to the firm nearest to you. Company clients assume our fees.

ALABAMA: BM Limited
2200 Parkview Street Suite 1601 C
Atlanta Georgia 30303 (404) 521-0040
ARIZONA: Robert Haven and Co Inc
North Brook Park Suite One 181 Bedford Street
Lexington Massachusetts 02173 (617) 861-1020
CALIFORNIA: Thos Harris & Associates
600 N Wacker Drive Suite 1700
Chicago Illinois 60606 (312) 977-0300
CALIFORNIA: Michael Thomas Inc
511 Wilcox Bridge Road Suite 201
Worthington Ohio 43085 (614) 846-0333
DALLAS: Datapro Personnel Consultants
12720 Abbotsford Suite 320
Dallas Texas 75230 (214) 661-8600
DENVER: Electronic Systems Personnel Inc
2600 Travis Center Suite 2500
Southfield Michigan 48075 (313) 353-3600
FLORIDA: Data Sciences Personnel Inc
P O Box 6577
Hollywood Florida 33081 (305) 434-8112
HARTFORD: Dataworks Inc
360 Asylum Avenue
Hartford Connecticut 06103 (203) 549-4540
HOUSTON: Career Consultants Inc
7500 Beech Post Box
Houston Texas 77066 (713) 520-1100
INDIANAPOLIS: Computer Personnel Services Inc
107 S Pennsylvania
Indianapolis Indiana 46204 (317) 634-6710
KANSAS CITY: D P Career Associates
9400 Ward Suite 302
Shawnee Mission Kansas 66202 (913) 236-6366
LOS ANGELES: Sagamor Resources Inc
Personnel Service
17141 Ventura Boulevard Suite 209
Encino California 91316 (213) 986-6466
MILWAUKEE: EDP Consultants Inc
7332 West State Street Suite 2
Milwaukee Wisconsin 53213 (414) 475-0877
MINNEAPOLIS: Hardware Systems Personnel
850 Twin City Federal Tower 121 S 8th St
Minneapolis Minnesota 55402 (612) 338-6710
NEW JERSEY: Systems Search
50 Woodbury Avenue
Woodbury New Jersey 07043 (201) 701-0400
NEW YORK: Data Associates Inc
7 Dey Street Suite 410
New York New York 10007 (212) 227-7370
NEW YORK UPSTATE:
CPA Associates Personnel Inc
2530 James Street
Syracuse New York 13206 (315) 463-5225
NORTH CAROLINA: DataMasters
Div of TeleService Inc P O Box 6966
Greensboro North Carolina 27405
(919) 373-1451
PHILADELPHIA: Systems Personnel Inc
115 West State Street
Media Pennsylvania 19063 (215) 566-6660
PHOENIX: Professional Career Consultants
4529 North 17th Street Suite H101
Phoenix Arizona 85016 (602) 274-0866
SAN FRANCISCO: The Computer Resources Group Inc
Agency 303 Sacramento Street
San Francisco California 94111 (415) 398-3535
SEATTLE: Heuser Martin Morris & Associates
1040 116th Avenue N E
Bellevue Washington 98004 (206) 453-2700
WASHINGTON D.C.: ESP Systems Corporation
844 Lanterbrook Drive
Silver Spring Maryland 20902 (301) 649-8171

Call the NCA firm nearest to you for Salary Survey and Relocation Information.

National Computer Associates

Data Processing

This Progressive Midwestern Bank Has... A Growing Number of Data Processing Opportunities

We are a $5 billion bank, located on a leading Midwestern city. Our large scale IBM environment includes an extensive on-line network, and we're aggressively moving towards integrated systems. Outstanding career opportunities currently exist in the following areas:

DATA RESOURCES MANAGER

In this key position you will have the opportunity to manage both the Data Base Administration and Data Administration activities utilizing IBM's IMS DBMS. Supervising a staff of 10, you will also direct our migration to data base and provide leadership for data base projects. Strong communication skills and a proven track record, with at least 4 years managing a data resource department is required. Banking or financial experience considered important.

SYSTEMS ARCHITECT

You will be responsible for establishing long-term information systems architectural goals and workable plans to meet the established objectives. You must be able to interact with development teams and provide design guidance. IMS DBMS design knowledge is desirable. A high level global view of financial systems is also important. Experience evaluating vendor application software is a plus.

INFORMATION SYSTEMS STRATEGIC PLANNER

In this high visibility position, you will develop a strategic information systems plan based on our corporate business plan. The self-motivated, results-oriented individual we seek must have financial industry experience with at least 2 years in information systems planning. Excellent communication and organizational skills are essential.

These positions offer personal, professional, and financial growth opportunities. We offer relocation assistance, excellent benefits, and a salary commensurate with experience. If you would like to be a part of our growing team of computer professionals, you should forward your resume including salary history in confidence to:

CW-B 4194, Computerworld, Box 880, Framingham, MA 01701

An Equal Opportunity Employer

Senior Programmer/Analyst

Small data processing shop is looking for top notch, career minded individual. Join a progressive, rapidly growing Louisville, Kentucky based firm.

Duties include the analysis, design, programming and testing of new and existing financial and management information systems.

Qualified candidates will have a minimum of five (5) years Cobol experience some of which will be on a mini computer using data base structures in on-line applications. HP3000 experience is a definite plus. Send resume and salary requirements to:

Chad Wilson
NTS Development Company
10172 Linn Station Road
Louisville, KY 40223

PROJECT MANAGER DISTRIBUTION SYSTEMS

Entre' Computer Centers, Inc., America's fastest growing franchisor of retail computer centers, is seeking a seasoned Data Processing professional with proven project management skills to lead the implementation of our sophisticated on-line distribution systems.

Your qualifications must include top notch organizational, leadership and interpersonal skills; an in-depth understanding of customer service, order processing, and inventory control systems; and a strong systems analysis and design background. An understanding of accounting concepts and systems and prior exposure to TANDEM computers would be definite pluses.

This position offers outstanding professional compensation and an exceptional growth opportunity in a fast-paced, dynamic environment. Our corporate headquarters are conveniently located in Northern Virginia with easy access to the Nation's Capital.

To pursue this opportunity further, call or send your resume with salary history to:

Mr. Neil J. Comstock
Director, Information Services

ENTRE

1951 Kidwell Drive
Vienna, Va. 22180
(703) 556-0660

Sorry, no entry level positions are available at this time.

It's Your Move.

TRW Information Services Division offers growth-oriented career opportunities and a chance to make the move you've always wanted to make. Imagine Southern California . . . long sunlit beaches with cliff-top views . . . plus mountain resorts . . . the wide open splendor of wind swept deserts . . . all just a breeze away from TRW ISD, nestled in the heart of beautiful Orange County. Now is the time to make the move to a land where dreams are lived to the fullest, with a company that values and rewards the talent you bring. Consider these opportunities with the leader in computer based information services.

Senior Programmer Analysts

Requires five years of large scale IBM programming experience in either ALC/BAL or COBOL. Must be able to work in a new development environment taking a project from the design stage through implementation. Structured design and programming methodologies desirable.

You will work in a modern environment with the latest in state-of-the-art hardware and software: IBM 30XX's, MVS/XA, TSO/SPF, CICS and the largest IMS data base in the U.S.!

We offer competitive salaries, outstanding benefits and a complete relocation package. Send your resume today . . . and come express yourself. Tomorrow is taking shape at a company called TRW.

Deanne St. John
TRW-ISD
505 City Parkway
W, Suite 1600
Orange, CA 92668

TRW

Equal Opportunity Employer

FACULTY POSITION

Albright College is continuing to invite applications for a new faculty position in Computer Science. Candidates must be qualified in two or more of the following areas: assembly and machine language, operating systems, data base theory, computer organization, theory of programming languages. Doctorate in computer science or a closely related area preferred, but masters degree will be considered; relevant professional or industrial experience desirable. Strong commitment to undergraduate teaching in a liberal arts college and excellent communication skills are mandatory.

Computer Science at Albright is an established major field of study based on ACM Curriculum '78 recommendations. The college curriculum includes a broad general studies program and emphasizes critical thinking and communicative skills.

Position available September 1984. Send resume by April 30 to: Mrs. Dorea McClelland, Department of Mathematics and Computer Science, Albright College, P.O. Box 516, Reading, PA 19603.

Albright College is an Equal Opportunity/Affirmative Action Employer

---

SYSTEMS PROGRAMMER

Needed by the UMR Campus Computer Center to install, maintain, and modify computer operating system and applications software and provide related technical assistance to computer center programming staff, faculty, and students. A bachelor's degree in Computer Science or an equivalent combination of education and experience from which comparable knowledge and abilities can be acquired, plus 2-3 years programming experience with computers in Assembler language and at least one higher level programming language is required. In-depth knowledge of and systems programming experience on IBM 4341 systems VM/VMS, and thorough knowledge of JCL, and systems programming experience on OS/VS1 system is desired. Experience with interactive computer graphics hardware and software systems, with Tektronix and IBM terminals and IBM workstations, including drafting and computer-aided design systems (AD 2000, CADAM, CAEDS, CATIA) is desired. Salary range: $14,238 - $22,000. Excellent fringe benefits, including Educational Assistance. Deadline for receipt of completed applications: April 13, 1984. For application forms, contact: Personnel Services, 0-1 Parker Hall, University of Missouri-Rolla, Rolla, MO 65401, or call (314) 341-4201. UMR is an affirmative action/equal opportunity employer.

ROCKY MOUNTAIN OR NATIONAL

Data Base Designers ..... IDMS, IMS, DB/DC, ADABASE
Programmers/Analysts..... Graphics, DOD, Telecom, Business
Systems-Anal/Prog ..... IBM, DEC, HP, PRIME, CDC, TANDEM

Software Engineers..... Aerospace, Telecom, Data Acquisition
Software Test EE's..... ATE, Diagnostics, S/W Specs, IV & V
S/W Systems Develop. ..... 8 & 16 bit MPU's, C & UNIX, LAN

Contact: Margo Kelly

Career Marketing Associates
7100 E. Belleview #208
Englewood, CO 80111
(303) 779-0990

Contract Programmers

Computerworx, a national software contract services company, has continuing needs for Programmers and Software Engineers with any of these backgrounds:

(1) DEC VAX/VMS, Pascal Language, Radio Communications Application. 6-12 month duration, $33-40 rate. Upstate New York.

(2) Pending California Contract. "C" Language, UNIX OS, Communications Switching System Applications. 6 month minimum duration, $35-40 rate.

Call or send resume to:

Computerworx
13901 Midlothian Road, Suite 200
Dallas, TX 75234
(214) 620-2991

DATA PROCESSING/ INFORMATION SYSTEMS

Tenure track position, Northern Michigan University. Requirements: Ph.D. DBA. COBOL Systems Analysis Design, Data Base Management. Rank: Assistant Associate Professor. Salary: Competitive. Apply: Dr. Brian Gnauck, Head Department of Management, Northern Michigan University, Marquette, Michigan 49855. Northern Michigan University is an Equal Opportunity Affirmative Action Employer.

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

COMPUTER POWER GROUP PTY LTD

HOGAN

CONTRACTS IN AUSTRALIA

Computer Power, Australia's leading software house and representatives for the Hogan Banking Systems in Australia, need Analyst/Programmers now for 12 month contracts.

Location will be Sydney, one of the world's most beautiful cities, where the sunshine and beaches can enhance the quality of your lifestyle.

Return airfares are included in the contract and working visas and accommodation will be arranged on your behalf. Start dates are flexible.

If you have experience in Programming, Systems Programming or Analysis of HOGAN Systems, then call Computer Power or send resume.

Computer Power representatives will be in Dallas to conduct confidential interviews and finalise contracts.

Call Moray Robertson on this number now (214) 556-2930 or telex Australia: AA 70977 Setay or send your resume to:

MORAY ROBERTSON
COMPUTER POWER
5215 North O'Connor
2nd Floor
Irving, Texas 75039

Sohio

Geophysical Software Professionals

Discover Sohio in Dallas, Texas

Opportunities exist in our Geophysical Systems Development staff for individuals with experience in seismic systems development to develop state of the art seismic processing systems in a DEC VAX 11/780 - CRAY IS/X-MP environment.

The successful candidates will work within a structured analysis and design project team environment to provide seismic systems development support for the Geophysical Research and Development staff at Sohio's Technology Data Center in Dallas.

Geophysical Systems Analyst

Requires expertise in using structured analysis and design techniques to analyze, design, specify and test state of the art seismic systems for Sohio's aggressive exploration programs.

Minimum 3 years' experience in seismic software development including time series analysis or geophysical signal processing is required.

Individuals should have above average skills in interpersonal relations, written and oral communication. Project management skills are also desirable.

Geophysical Data Base Analyst

Requires expertise in using structured analysis and design techniques to analyze, design, specify and test geophysical data base management systems for use with state of the art seismic interpretation systems.

BS or MS degree in computer science, math or related field is required. Minimum 3 years' training and experience in the analysis, design, specification and testing of software systems under a structured environment is required.

Individuals should have above average skills in interpersonal relations, written and oral communications. Project management skills are desirable.

All positions require familiarity with FORTRAN 77. Experience with DEC (VAX-11/750 & VAX 11/780) and CRAY IS/X-MP systems is desirable. DEC assembler, DEC systems internals, data base management systems, graphics software and hardware experience is preferred.

It's time to consider joining the Sohio adventure where the compensation package, including benefits, is outstanding. The opportunity for visability is unequaled, and to top it off, Sohio has one of the best relocation programs in the industry. To find out more, send your resume, complete with salary history, to Dan Allman, SOHIO PETROLEUM COMPANY, Dept. D072, 5420 LBJ Freeway, Suite 800, Two Lincoln Centre, Dallas, Texas 75240.

Equal Opportunity Employer M/F/H/V.
Principals Only Please!

Your search leads to Sohio

SOHIO

SYSTEMS PERFORMANCE ANALYST

CIGNA Corporation, one of the nation's leading providers of insurance and financial services, offers three (3) large 308X complexes running MVS, VM, XA and a nationwide network of 8100 distributed processors. There are three (3) openings for Systems Performance Analysts with at least five (5) years of data processing experience, including:

- Performance Evaluation, Measurement and Tuning.
- Capacity Planning
- Simulation and Analytical Modeling.

Consideration will also be given to candidates with systems programming experience with MVS, VM, and/or 8100 DPPX in a large scale or distributed processing IBM environment.

Responsibilities will include evaluation of application design, architecture evaluation, capacity sizing, predicting systems performance, and performance tuning of multiple large-scale systems and/or complex of distributed 8100s.

Qualified applicants should forward a resume; including appropriate salary data to: Ms. Joanne Bintliff, **CIGNA Corporation**, 401 White Horse Road, Voorhees Township, NJ 08043. We are an Equal Opportunity Employer.

CIGNA

DP POSITIONS SEATTLE/PORTLAND

MVS, Sr. Systems Programmer $40K
Sr. IMS Systems Prog. 40K
Systems Performance-data base consultant to applications group.
Sr. Programmer/Analyst 35K
Financial app. CICS/DL1 on-line interactive.
Programmer/Analyst 30K
CICS/DL1 or VSAM on-line dev.
Sr. PIA IMS applications dev. ..... to 40K
Data Admin. Analyst ..... to 40K
data resources mgmt local DP design.

Please forward resume immediately to:

HOUSER, MARTIN MORRIS & ASSOC.
(206) 453-2700
C-03015, 10400-116th Ave. N.E.
Bellevue, WA 98004

WASHINGTON, D.C.

VM/CMS

Do you really know VM/CMS? Have you two years or more experience with SAS, SPSS, FOCUS, or other packages? Virginia data center is seeking an expert! $31K

ROBERT HALF
OF WASHINGTON, D.C.
7316 Wisconsin Ave. Ste 401
Washington, D.C. 20014
(301) 986-9600

Senior Systems Analyst/ Project Manager

- *Country Community North of San Francisco*
- *Profitable $70 Million High-Tech Company and Growing*

OCLI, the world leader in thin film manufacturing, is looking for a seasoned professional to join its dynamic data processing team located in scenic Santa Rosa, just an hour's drive north of San Francisco.

The qualified candidate will have 8-10 years' professional systems analysis and programming experience, with at least 3-5 years' as DP professional working with MAPICS on a System 38 in a manufacturing environment. Heavy project management skills and RPG III program application design skills are required. Prefer BS in Business, Computer Science or Engineering.

Please forward your resume, in confidence, to: Employment Manager, OCLI, 2789 Northpoint Parkway, Santa Rosa, CA 95407-7397. Equal Opportunity Employment is our Pledge and Practice. U.S. Citizenship required.

For the light years ahead.

OCLI
Optical Coating Laboratory, Inc.

Bank of America...

For Data Processing Professionals who let their imaginations SOAR

At Bank of America in San Francisco, you'll find a sophisticated environment offering cost and product competitive banking and financial services, as well as a place where you'll need more than intelligence, communication skills and technical knowledge. With us you'll use your ability to look at things in new ways...to recognize the issues and tradeoffs...and you'll use your flexibility in making the changes dictated by an increasingly complex marketplace.

Our Retail Information & Processing Services Division plays a corporate wide role in several areas of data processing, communications, office automation, and related technologies. Its various branches are responsible for many new products in the financial services industry.

As a Bank of America Data Processing Professional, you'll work with some of the latest hardware, in a wide range of computer languages and data communications applications. A partial listing of our environment includes: IBM, TANDEM AMDAHL, PDP-11, MVS/XA, JES3, TSO/SPF, VM/CMS, IMS FASTPATH, MSC, ADF, BTS III, SNA, ACF/VTAM/MSNF, ACF/NCP, TPNS, LAN's VTAM, IMS DB/DC, COBOL, ASSEMBLER.

If you have 2 or more years' data processing experience in the technologies we utilize, you can apply by filling out the application below:

Critical Positions
Call our Toll-Free 24 hour BofA HOTLINE
1 (800) 821-7700, X614

Tandem Professionals
- Tandem NonStop Pathways
- IBM MVS/XA
- Analysis & Design experience
- Structured Techniques
- IMS Development experience
- COBOL

Job #1

Data Base Designers
- 8+ years' DP experience
- Strong DP Administration experience
- IMS DB/DC + VSAM
- IMS Debugging
- IMS Control Block Generation

Job #2

Telecommunications/Office Automation
- Data Network Design/Evaluation
- VTAM Systems Programming
- Mini-Micro Evaluation Technology
- LAN's, IBM/SNA
- Tandem Systems Programming: TAL, ENVOY, PATHWAY
- Network Quality Control/ Implementation

Job #3

IMS Programmer/Analyst
- IBM MVS/XA, TSO/SPF, VSAM
- IMS DB/DC On-line Development experience
- Structured Analysis & Design
- COBOL

Job #4

Large Scale Applications Development
- Structured Methodologies
- Structured ANS COBOL/ Structured Analysis/Design
- Cycle Sort/Bulk Filing/ Item Processing
- Data Base, Data Communications and Applications
- Check Sorter, Stock Transfer, and Demand Deposit experience
- Systems IBM/MVS/XA, TSO/SPF
- IBM Assembler Language Coding & Design experience

Job #5

Systems Programming
- Operating System Development: MVS/XA, VM/SP, VM/XA
- Systems Software Internals: IMS DB/DC-FASTPATH, JES3
- IMS utility design
- Assembler Language Programming
- Change Management Strategies
- VSAM Support

Job #6

Mini-Computer Operations/ Software Implementation
- Knowledge/Experience with DEC & Tandem HW/SW and Operating Systems
- Analytical Skills
- NIM, VPS, TIS, VHB
- IMS Externals, VM, MVS Externals/Internals, IMS FASTPATH
- Assembler Programming, Software Design & Development
- Technical Writing Skills
- Teleprocessing Systems Software, Utilizing Products like ACF VTAM, ACF/NCP, BTAM, NCCF and NPDA
- HW-IBM 3081, 3033, 370, 360
- SW-IMS-DB/DC, ADF, BTS, MVS/XA
- Languages-COBOL, IBM Assembler
- Assess/Resolve Problems Quickly

Job #7

Also available: IMS Systems Programming; VTAM/NCP Systems Programming for Los Angeles Area. Job #8.

Capacity Planning/ Performance Tuning

- Hardware capacity planning for IMS, VM, MVS environments
- Critical application tuning
- Measurement/Modelling: BEST1, SAS, CAPTURE/MVS, RMF/SMF, VMAP, SMART, IMS monitors

Job #9

Financial Planning & Control

- 5-7 years' finance and planning experience
- MBA in accounting/finance desirable
- Understanding of financial reporting and trend analysis

Job #10

ACP/TPF Programmers/ Analysts

- VM/CMS development techniques
- Assembler/Sabretalk
- Operators, coverage programmers (locations in Los Angeles and San Francisco)

Job #11

End User Computing

- IBM PC, WANG, NOMAD, MARK IV, RAMIS, FOCUS VM/VPCSS
- Knowledge of: equipment acquisition and installation procedures
- Requirements analysis and research, specification design, problem resolution and teaching experience.
- Excellent interpersonal and client interface skills

Job #12

Systems Writer

- Will research, write and edit text
- Will prepare or direct the preparation of graphics
- Coordinate reviews and prepare publication specifications as well as arrange for printing
- English degree with at least two years' technical writing experience

Job #13

Operations Manager

- Provide structure, liaison and direction to all operational activities
- Responsible through the matrixed organization to ensure that the user's service level needs are met
- Telecommunications management experience
- Capability to deal with senior management and effectively influence decisions

Job #14

Project Manager

- Effectively manage a technical support organization responsible for the creation and maintenance of production procedures and associated documentation for all applications executed
- Minimum of 3 years' DP management experience
- Extensive technical experience in computer operations or applications programming

Job #15

Systems Analyst & Sr. Systems Analyst

- Provide written procedures for operations to provide first level problem analysis and recovery
- Shift flexibility needed
- Experience with computer operations, job execution, software implementation
- Good written and verbal communications skills
- Provide recovery for commonly occurring failures
- Senior position requires above plus 5-10 years' experience

Job #16

Systems Consultant

- Major responsibility will be change implementation, planning & tracking
- Strong background in Data Communication hardware/ software Architectures and operations in a large network environment

Job #17

IMS Systems Programming

- Systems Development and Support: IMS DB/DC, FASTPATH, MSC
- Systems Software Development: Automated Debugging, Automated Operator Interface, Recovery and Restart Aids
- Application Utility Development, Data Base Randomizers, Space Management Tools, Application Front Ends.

Job #18

At Bank of America, we offer salaries commensurate with experience and ability, and a comprehensive benefits package including relocation assistance. To respond, we invite you to call, send in our mini-application, or send resume outlining position of interest, job number, and salary history to: Bank of America, Dept. 3228-0328A, 1455 Market Street, San Francisco, CA 94103. An equal opportunity employer, m/f/h/v.

Bank of America NT&SA

Name _____ Phone: Home _____ Other _____

Address _____

Hardware background _____ Software background _____

Languages: Primary _____ Secondary _____ Other _____

Current/Last position _____ Company _____ Salary Requirements _____

Are you applying for a specific position? If so, please designate job # and position _____

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

Senior Data Base Analyst

If you'd like to work in an achievement-oriented environment where the spirit of innovation is thriving...

Make it happen with Harris

Harris, Florida's largest industrial employer, is a Fortune 200 corporation, with sales of $1.8 billion. And the Semiconductor Sector alone, accounts for $200 million in annual sales. In fact, we are one of the twelve largest suppliers of integrated circuits in the United States.

At Harris, we've always believed that the best way to develop cutting-edge, innovative products is to encourage, recognize and reward individual achievement. And we'll continue to do just that, by providing an environment which fosters both vitality and unlimited growth potential.

To support the growth of the entire Semiconductor Sector, we're seeking a Senior Data Base Analyst. In this key position, you'll design physical data bases to implement the logical design in support of informations systems development and operations plans. Responsibilities will also include: insuring the integrity, availability, and efficient performance of division data bases; assisting in capacity planning; and providing training for users of data base software.

To qualify for this outstanding opportunity, you should be proficient in physical data base design, IDMS compilers and utilities, IDMS operation and internals, IDMS data dictionary capabilities and operation, TSO/SPF, OS/MVS JCL, COBOL and BAL programming languages. In addition, you should have a working knowledge of Cullinet development and productivity tools, as well as personal computer data base software and OS/MVS operating system concepts.

A BS and 4 years' IDMS data base experience is required. A Masters degree is preferred.

Harris Semiconductor offers an excellent compensation/benefits package, a formal merit review program and the opportunity to work in beautiful Melbourne, Florida. Located on Florida's high-tech Space Coast, Melbourne offers you and your family a delightful year-round climate, affordable housing and a variety of recreation.

For immediate consideration, please call Dick Langlar COLLECT at 305-724-7413, between the hours of 8 am - 5 pm, EST. Or send your resume to his attention at Harris Semiconductor, Dept.CW14, P.O. Box 883, Melbourne, Florida 32901.

We are an equal opportunity employer M/F/H/V.

HARRIS

IF IT'S HAPPENING IN ELECTRONICS, IT'S HAPPENING AT HARRIS.

...IS... FLORIDA

Move up to consulting status in the exciting, fast growing ... prestigious consulting firm is looking for EDP Professionals ... following areas:

COBOL	EDL	ATM
FORTRAN	FOCUS	MVS
PL/1	SAS	UNIX
ASSEMBLER	CICS	IDX
C	NATURAL	IMS DB/DC
ADF	RAMIS	

Send resume with salary history to:
Mr. Fred J. Pawlaczyk
Corporate Technical Director

SOFTWARE SERVICES OF FLORIDA INC.
A subsidiary of
ORBITRON INTERNATIONAL INC.

PARAGON CROSSING SUITE 124 11300 4TH STREET NORTH ST. PETERSBURG, FLORIDA 33704 (813) 577-1476

SYSTEMS ANALYST COMPUTER PROGRAMMER ANALYST FOR STUDENT RECORD/ REGISTRATION SYSTEMS

Selected candidate will participate in the implementation and maintenance of an on-line student information system. Must be skilled in the preparation of specifications for programmers and user offices, be able to perform method and procedural analysis, estimate resource requirements, and participate in the development of plans and schedules.

Technical experience with IMS DB/DC, OS JCL, COBOL, ENDTYPEVE and PANVALET preferred.

Bachelor's Degree with Business and/or Computer Science emphasis.

Benefits include fee waivers for college courses, tuition promotion policy, generous vacation and holiday schedules, insurance and retirement.

Send resumes to:
UNIVERSITY OF TENNESSEE
EMPLOYMENT SERVICES
934 VOLUNTEER BLVD.
KNOXVILLE, TN 37996

UTK is an EEO/Executive Action/ Title IX/Section 504 Employer.

Deadline for applications 1 May 1984.

DP BANK OPPORTUNITIES

$25-40,000

Numerous Southeast banks offer challenging career opportunities for Data Processing Professionals with ATM, BRANCH AUTOMATION, PRODUCT DEVELOPMENT, REGIONAL AND NATIONAL SWITCH, and other banking experience. i.e., TRUST, DDA, CONSUMER AND RETAIL. These clients are state-of-the-art IBM, IMS DB/DC, CICS, users with a variety of product development aids. To inquire confidentially about these and other positions available, send resume to Larry Stone or call (704) 375-0800.

FOX-MORRIS
212 S. Tryon St./Suite 1300
Charlotte, NC 28281

SYSTEMS ANALYST/ PROGRAMMER

Assists the Hopi Tribe in planned implementation of automated systems from startup to full-scale operation. Incumbent's time is initially spent in systems analysis work requiring user training and education and involves major systems design. Qualified candidate must be proficient in the use of a major programming language and possess 5 years of major computer systems analysis and programming experience.

Northeastern Arizona is semi-arid, high desert with warm summers and mild winters. Tribal headquarters are close to the Grand Canyon, Canyon de Chelly, the Painted Desert and other beautiful geologic formations. The area is rich in native culture, history and archeology.

Compensation depends upon experience and includes medium housing provided at low cost. Applicants with ability to adapt to changing environments and who are interested in a challenging position, requiring patience, mobility and a sincere interest in both working and learning in a unique rural environment should send a resume and references to:

THE HOPI TRIBE
Personnel Department
P.O. Box 123
Kykotsmovi, Arizona
86039

THE UNIVERSITY OF ASTON IN BIRMINGHAM

Computer Centre

Lecturerships in Computing and Information Technology.

As a result of continued developments in Computer Science and Information Technology generally, we are seeking to attract young people of exceptional promise for a small number of new appointments. The successful candidates will be required to undertake research and to contribute to the Centre's Teaching Programme.

Ideal candidates would have a higher degree preferably in Computer Science and special experience in either:

(a) Database and Information Systems
(b) Computer Architecture or
(c) Intelligent Knowledge-based Systems

Initial salary will be within and up to the maximum of the range £7,190 to £14,125 per annum. Appointments will commence as soon as possible and will be made for a fixed-term of three years initially with the possibility of renewal or subsequent transfer to a continuing appointment.

Application forms and further particulars may be obtained from the staff officer (Quoting ref:384/244), University of Aston in Birmingham, Gosta Green, Birmingham B4 7ET England (Tel: 21 359 3611 ext. 4984).

Closing date for the receipt of applications is April 27, 1984.

Growth Opportunities
For Data Processing Professionals

Holiday Inns, Inc. is shaping the future of the hospitality industry. Due to our continued success, we have on-going and immediate needs for dynamic professionals in the following areas:

ACP/TPF

Senior ACP Programmer—Must have minimum 5 years of system and programming development experience with large scale teleprocessing systems oriented toward the solution of business problems, of which no less than 3 years should be in an ACP environment.

SYSTEMS DEVELOPMENT

Programmer Analysts—3-5 years experience including systems analysis; proficiency in COBOL and either Data Base or CICS applications. TI-990 experience desired.

Senior Programmer Analyst—Minimum of 5 years experience including systems analysis, system design, COBOL, CICS and Data Base applications; and project leadership. Previous experience in a payroll/personnel environment a definite plus.

Both positions require knowledge of IBM mainframes, OS JCL and TSO/SPF.

The Memphis area affords a moderate cost-of-living, mild but seasonal climate and a vast array of cultural and recreational activities. Our worldwide headquarters provides a working environment conducive to personal and professional growth and achievement.

We offer excellent compensation, competitive employee benefit packages and an educational assistance plan. If qualified and interested, send your resume in strict confidence to: HOLIDAY INNS, INC. - Recruiting and Selection/JC, 3796 Lamar Avenue, Memphis, TN 38195.

Holiday Inn

FACULTY POSITIONS WESTARK COMMUNITY COLLEGE

Full time faculty positions are available which will start on June 4, 1984 and also on August 24, 1984. Bachelor's degree required, Master's preferred in Business Data Processing, Computer Science or related field. Competitive salaries offered with liberal benefits available. To apply, write or call: Director of Personnel/EEO, Westark Community College, P.O. Box 3649, Ft. Smith, AR 72913. AC 501-785-4941. Equal Opportunity Employer.

DIRECTOR COMPUTER SERVICES

Two-year community college, located at the foot of the Big Horn Mountains, is accepting applications for Director of Computer Services. Responsible for all Academic (Harris 1000) and Administrative (Microdata 1600) computer systems within the college. Bachelor's degree (Master's preferred) in computer science, information systems or related area. Computer center/services management experience. Direct inquiries to: Personnel Office, Sheridan College, Sheridan, Wyoming, 82801. Application deadline: April 30, 1984. An Equal Opportunity Employer.

RESEARCH ASSISTANT/ SOFTWARE DEVELOPER

Responsible for analysis, requirements, specifications, design, implementation, test, documentation, maintenance and management of large software systems. Apply existing software engineering techniques into the development of large software system. Coding of software systems in the following computer languages: ADA, Basic, Cobol, Fortran, Pascal and Assembler. Knowledge of computer construction, ADA programming, VAX 11/780, Apollo Ins. Master's degree in Computer Science. $17,100 per annum. 40 hr/wk. Send resume to Georgia Department of Labor, Job Service Center, 1 Peachtree Street, Atlanta, GA 30303. Control Number 0481488.

COLLEGE OF THE VIRGIN ISLANDS

Instructor, Assistant or Associate Professor of Data Processing (part-time basis). Ph.D. in information systems, computer science or related fields desirable. Master's degree in information systems and teaching experience acceptable; industry experience desirable. Must be qualified to teach at least two of the following: COBOL and/or RPG programming, systems analysis and design, information organization and processing, operating systems, or computer hardware and communications. Salary negotiable commensurate $30,726 to $39,150 plus benefits. Address letter of application, resume and three letters of recommendation, by March 31, to: Chairperson, Business Administration Division, College of the Virgin Islands, St. Thomas, VI 00802. Equal Opportunity/Affirmative Action Employer.

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

CLEVELAND
THE NORTH COAST OF AMERICA

Cleveland is the nation's best kept secret. Anyone who has lived here knows it is a city with much to offer. Four beautiful seasons, parks and bountiful recreation facilities, plus cultural activities including the symphony, ballet, opera and live theatre. Our midwestern lifestyle offers friendly neighborhoods at affordable prices.

Leaseway Transportation has been headquartered in Cleveland since it was founded, over 80 years ago. With revenues of over $1.3 billion, Leaseway stands out as a major employer with outstanding career opportunities, especially for systems professionals.

Our new data center is equipped with an IBM 3083BX/4341 complex running under OS/MVS and a dual processor Sperry 1100/72 system. Distributed systems include Prime, HP and Four-Phase. Extensive use is made of database architecture in systems design with development work performed on-line and supported by a fourth generation language.

If you are degreed and have broad business and systems project experience, Leaseway wants to hear from you. IBM and transportation industry knowledge are preferred. Expansion of our corporate capabilities has created the need for:

*** SR. PROGRAMMER/ANALYSTS**
*** SR. SYSTEMS ANALYSTS**

Please send your resume and salary requirements to Debra Miller at:

Leaseway Transportation
3700 Park East Drive
Cleveland, OH 44122

An Equal Opportunity Employer M/F

SYSTEMS PROGRAMMERS

Do you feel "terminally ill" in your present position?

If all you do all day is "talk" to machines, maybe it's time to make a change. . .to cga.

Cure your problem with an exciting new career at CGA. If you're comfortable working with people and enjoy the challenge of systems software development, please read on.

CGA Software Products Group is one of the largest systems software companies in the U.S. We're dedicated to the development and support of state-of-the-art systems software products.

Work directly with our clients, in product support and assist them with any problems or questions that may arise. A minimum of 2 years experience with MVS BCP internals is essential as is good communications skills and the ability to deal professionally with people of all levels. Knowledge of multiple CPU related software, preferably MSI, MSM or GCD would be a major asset. Some travel to SHARE, CMG and GUIDE meetings is also necessary.

You will find that being a member of our team is highly rewarding. We offer a superior salary and benefits package including profit sharing, major medical/life/health/dental insurance, tuition reimbursement, and relocation assistance.

Why waste time, call Chris Blum collect at (201) 946-7660 to arrange an immediate interview, or send him your resume in complete confidence.

Specialists in the Software Industry

cga Software Products Group

960 Holmdel Road, Holmdel, New Jersey 07733

An Equal Opportunity Employer M/F

High Tech '84 Opportunities
$30,000-$65,000+

The coast-to-coast Fox-Morris recruitment network has placed thousands of hi-tech executives in key positions with leading companies during more than two decades. Client companies pay all employment expenses. A few examples of choice 1984 opportunities include:

SR. COMPUTER SW DESIGNER to $50K. Degree. Solid bkgd in peripheral sys & interfaces for DEC equip. POSITION LH-4-1-C

ADABAS SYSTEMS MGR. to $50K. IBM internals & op syst dvlpmt for progressive telecommun fdr. POSITION JC-4-2-C

MGR. DATA BASE, $45K+. DBA to initiate data base & train staff & users in DB concepts. Fortune 100 div. Mid-Atl. POSITION HG-4-3-C

SYSTEMS DESIGN, $35-45K. Analyze large-scale real-time computer H/W & S/W environ. Develop new concepts tech. for leading edge info architectures. POSITION AT-4-1-C

DATA BASE ADMINISTRATOR to $42K. Design/implement IMS DB/DC system for large Mid-Atl financial institution. POSITION JC-4-1-C

BUSINESS SYSTEMS CONSULTANT, $40K. Budget planning, inventory control, distribution & order processing. Strong user interface skills. POSITION LS-4-1-C

INFO SYSTEMS AUDITOR to $40K. Major growth corp./DC area. Help pace new system dvlpmt & emerging technologies. POSITION GN-4-1-C

SOFTWARE ENGR. to $40K. S/W design to support product dvlpmt. Work w/ "C" Pascal, Assembler language. Need microprocessor 68000 & 8086/Z80. POSITION AT-4-2-C

ROBOTICS SOFTWARE DEVELOPER to $40K. BSEE or CS w/3+ yrs real-time control exp. UNIX, "C", 68000 HW or SW bkgd. POSITION LH-4-2-C

OP SYSTEM & COMPILERS, $36K. Software engrs. to design new operating systems & computers using assembler. Growth co. POSITION HG-4-2-C

FORTRAN OR PL-1 to $36K. Banking systems software co. expansion. Need programmer/analysts w/strong technical skills. POSITION HG-4-1-C

BUSINESS SYSTEMS ANALYST. Sales/mktg systems exp. Know COBOL. On-line systems design/implementation. POSITION LS-4-2-C

For direct, confidential access to our national client network, call or send resume to Karyn Davis at our Fox-Morris corporate headquarters:

Old York & Rydal Rds., Jenkintown, PA 19046 (215-576-4884)

FOX-MORRIS
personnel consultants

atlanta • baltimore • boston • charlotte • cincinnati • cleveland
dallas • houston • mclean, va • new york • norfolk • orange county, ca
philadelphia • pittsburgh • princeton • raleigh • san francisco

COMPUTER CENTER DIRECTOR DENISON UNIVERSITY

Position open July 1, 1984 or as soon thereafter as possible. Responsible for planning and directing overall activity of the college computer center in providing instructional and administrative computer services to a liberal arts college. Ultimate responsibility for design of physical computer system, allocation of computer services and training of staff.

Denison has strong commitment to academic computing, operates a central VAX 780 computing system, shortly to be upgraded to VAX Cluster. Over 100 terminals connected to system plus distributive micro-processors dedicated to word processing. Information processing architecture includes distributed processing and networking of all information facilities over next few years.

Seek person with supervisory experience in networking, microcomputers, data processing, including data based management and applications design.

Reports to Provost. Letter of application, resume, transcripts and list of references by April 23, 1984 to Dr. Louis F. Bodenheimer, Provost, Denison University, Granville, OH 43023.

Denison is an Equal Opportunity/Affirmative Action Employer.

CAD/CAM engineer

FMC Corporation's Central Engineering Laboratories is a multidiscipline research center chartered to provide technical services and identify new product opportunities for the construction, defense, food, material handling and petroleum business of FMC.

We are seeking a Mechanical Engineer familiar with CAD/CAM systems who wants to become part of our corporate CAD/CAM support group. This position will be responsible for installing and maintaining CAD/CAM software and providing user training and guidance on the application of software. Additional responsibilities will include providing support with problem resolution by fault isolation and correction; determining, specifying and implementing enhancements and extensions.

This position requires a BSME or equivalent and 2-3 years FORTRAN programming experience. An understanding of engineering applications for CAD and CAM, knowledge of VAX/VMS systems, and the ability to work with large FORTRAN programs is also required.

We offer an excellent salary and benefit package as well as challenging project assignments. For confidential consideration, submit resume or call: Ms. V. Payne, (408) 289-3433, FMC Corporation, Central Engineering Laboratories, 1185 Coleman Avenue, Santa Clara, CA 95052. We are an equal opportunity employer m/f.

FMC

SAN DIEGO
Openings in O/S, Compilers, Graphics, ADA, UNIX.
CALL (619) 484-8818
CPU COMPUTER PROFESSIONALS UNLIMITED, agency OF SAN DIEGO
10770 Scripps Center Drive
Ste 205, San Diego, CA 92131
Agency fee(s) not invited.

IN SAN FRANCISCO ...
IT'S SPRING YEAR ROUND!
DATA PROCESSING PROFESSIONALS skilled in Main Frames, Minis or Micros, DATA BASE or ON-LINE SYSTEMS consider a move to the beautiful SAN FRANCISCO BAY AREA.
Career opportunities offering CHALLENGE, GROWTH and REWARDS
LOGICAL OPTIONS
Employment Agency Inc. 1972
One Market Plaza, Spear Tower, Suite #2044
San Francisco, CA 94105 • (415) 777-3555

We are currently recruiting for:
PROGRAMMERS, P/A, SP, SA, DBA's
If we have not called you yet:
(1) We do not know who you are;
(2) Or no one has recommended you yet.
If you have one year of experience or more and want to work in N.C., S.C., VA, TN or GA call one of our D.P. Recruiters collect:
Jan Shelton, CPC
"THE EP FIRM"
PERSONNEL PLACEMENT, INC.
227-D Hoffman Bldg Rd.
Greensboro, NC 27410
(919) 854-0021
Our client companies pay all of your fees, interview and relocation expenses.

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

Technical Marketing Support

APPLICATIONS SPECIALISTS

TALON COMPUTERS, INC.

Talon Computers, a rapidly emerging computer manufacturer, is seeking highly motivated individuals who possess the rare combination of technical expertise and customer relations skills. As a member of our matrix marketing team, you will be responsible for pre-sales support, technical presentations and internal/external systems training.

Opportunities are currently available in the following areas:

PROFESSIONAL DATA PROCESSING
Office Automation
Accounting
MIS
Word Processing

DATA-DRIVEN
AI
Pattern Recognition
Data Analysis
Database Mgmt. Systems

AUTOMATION & CONTROL
ATE
Robotics
NC Machines
Factory Automation

COMMUNICATIONS
Networking
Front-end Processors
Line Switching Equipment

ENGINEERING & SCIENTIFIC
CAD
Energy Logging
Flight Simulation

To qualify, you must have a minimum of 4 years experience in software and hardware applications in one or more of the above disciplines and at least 1 year's experience in customer support (ideally with large OEM accounts). Extensive travel will be required. Appropriate educational background a must. UNIX* background will be considered a plus.

*UNIX is a trademark of ATT Bell Laboratories

Talon offers an outstanding total compensation package as well as an exceptional organizational environment to demonstrate your skills. Interested individuals are invited to submit their resumes and salary requirements in confidence, to: Rick Sclao, Personnel Manager

TALON COMPUTERS, INC.
525 Julie Rivers Road, Suite 190
Sugar Land, Texas 77478/713-240-4040
An equal opportunity employer M/F

DATA PROCESSING OPPORTUNITIES

Our client is a growing $240,000,000 manufacturer that is the dominant force in its industry with both domestic and foreign operations.

Does your education and experience qualify you for the position of....

—SYSTEMS & PROGRAMMING MANAGER
—SENIOR PROGRAMMER ANALYST

Are you experienced in large scale systems, distributive processing and state-of-the-art Honeywell hardware?

Would you be attracted by a thriving community with excellent schools, outdoor recreation, many cultural outlets and continuing educational opportunities?

In addition to a competitive salary and base benefit programs, this client offers profit sharing programs, stock ownership programs, educational assistance and an excellent relocation package.

If this sounds like the opportunity you've been hoping for, send a complete resume, including salary history to:

Ron Stoll
RON STOLL & ASSOCIATES
420 S. Fourth St.
Elkhart, IN 46516

If you would prefer to talk to me about these positions, call COLLECT:

(219) 522-2366 - (M/F 8AM-5PM)
or
(219) 259-4073 - (Weekends)
An Equal Opportunity Employer M/F

CICS PROGRAMMERS & ANALYSTS

We have several opportunities in the Carolinas for Programmers and Analysts experienced with CICS in either the OS or DOS environment. Our client companies include small and large end-users, located in both urban and rural areas. A minimum of one year of professional experience is required. Knowledge of DL/I is a definite plus.

For additional information regarding these opportunities, call Mr. Lee Martin:

(804) 490-3888 or
Forward Resume to:

Fortune
Personnel Consultants
of Virginia Beach
519 South Independence Blvd.
Virginia Beach, VA 23462

PENSACOLA JUNIOR COLLEGE
SYSTEMS PROGRAMMER
DUAL 88000 SHOP

Minimum qualifications: Graduation from an accredited four year college or university and three years of progressively responsible experience in Senior Systems analysis and programming work; majority must have been in systems programming. Progressively responsible experience as described above may be substituted on a year for year basis for the required education. Prefer familiarity with a large scale Burroughs Computer and experience with DCALGOL, NDL II, MCP. Desired experience includes: DMALGOL, SYSTEM 7, IMF II, CANDE, GEMCOS. Salary range: $27,141 - $36,383. Application deadline: May 2, 1984. Position number 348. Request for an official application should be sent to: Douglas Duncan, Director of Personnel, Pensacola Junior College, 1000 College Blvd., Pensacola, FL 32504.

PJC - An Equal Opportunity Institution

COMPUTER SYSTEMS MANAGER

LAVALCO, an innovative energy hardware wholesaler and marketing company seeks a results-oriented individual to manage and maintain business applications on an Ultimate/Honeywell System. The ideal candidate will be an accomplished MIS professional with 3-5 years PICK operating and programming experience in business data management. Responsibilities include supervising all aspects of EDP operations, assisting maintenance of financial, inventory control, purchasing, sales order entry, invoicing and other general business applications along with necessary systems support. The individual must combine management, technical and communications skills and be self-motivated. We offer a competitive salary and fringe benefits. Please send resume with salary history in confidence to:

Personnel
LAVALCO
P.O. Box 9984
Shreveport, LA 71135-9984

FLORIDA

PROGRAMMERS
20 New Positions

We are starting a major development project for an industry leader where you will have an opportunity to realize full potential of your creative abilities. You will be trained in the latest data base & data communications technologies. If you have 2+ yrs. of COBOL in an ON-LINE environment, call:

COMPUTERPEOPLE
(813) 888-8135
5726 N. Hoover Blvd., Suite 204
Tampa, Florida 33614
We Serve Computer Professionals
- Exclusively -
And That's Important To YOU!

SR. PROG./ ANALYST

If you have 1+ yrs. w/OS/MVS or DOS/VSE & exposure to CICS or DL 1 plus seek challenging new devel. oppty's., you qualify for these exciting growth oppty's. in CT. mfg. hi-tech & fin'l. co's. To $30,000.

ROBERT HALF
OF HARTFORD, INC.
111 Pearl St.
Hartford, CT 01603
(203) 278-7170
Personnel Consultants

COMPUTER SCIENCE

- Faculty positions available August 1984, to teach FORTRAN, COBOL, RPG, BASIC, or Computer Operations. Baccalaureate Degree required, preferably in Computer Science or Business. Send letter of application, resume and names, addresses, and telephone numbers of three professional references to:

Personnel Services (3H),
Williamsport Area Community College, 1005 West Third Street,
Williamsport, PA 17701.
EOE/AA

REAL-TIME SOFTWARE ENGINEERS

TANO CORPORATION, a leader in the design and manufacture of computer-based automation control systems, seeks career-oriented individuals to fill immediate openings.

SR SYSTEMS/SYSTEMS SPECIALISTS
ADA PROGRAMMERS

Responsibilities involve the design, documentation and implementation of distributed microprocessor systems for real-time monitoring and control. Experience with Ada, Motorola 68000, and distributed processing is a definite plus.

SR PROGRAMMERS

Candidates must possess relevant degree and real-time software; Fortran and/or Assembler experience in an RSX-11M, VAX, or SEL/GOULD environment in the area of process or supervisory control, or energy management.

TANO CORPORATION offers an excellent compensation and benefit package, including 100% company paid medical insurance, incentive plan and pension trust. Please telephone or submit confidential resume, to:

Professional Recruitment
1-800-624-8366

TANO
TANO CORPORATION
4361 Pedia Court West
New Orleans, Louisiana 70129
Principals Only
Equal Opportunity Employer M/F

WANTED

System 38 Programmer must have minimum 2 years experience RPG. Carpet manufacturers experience helpful. Send resume to:

Aldon Industries
C/O Jim Mullins
P.O. Box 12527
Calhoun, GA 30701

OVERSEAS
Immediate Hire
OPERATORS/ANALYSTS
for Intergraph
VAX-11/780 System

Petroleum Engineers/Reservoir Exploration/Production Geo/ TelCom Engineers.

Reply to: Dorothy Plumb, P.E.
PROFESSIONAL PERSONNEL CONSULTANTS
P.O. Box 23786
Tampa, FL 33623
or call COLLECT: (813) 877-7008

SENIOR PROGRAMMER

Senior Programmer at Bemidji State University for administrative systems programming. Seeking candidates with 2 to 3 years programming experience with COBOL and Univac 1100/80 computer systems, and familiarity with Univac SCL, TIP, and Demand environments. Experience with Data General MV or DEC VAX systems is desirable. Bemidji State University is located in the forest/lake area of north central Minnesota, approximately 250 miles northwest of Minneapolis/St. Paul. Contact BSU Personnel Office, Bemidji, MN 56601, (218) 755-3886 by April 15, 1984.

PROGRAMMER. Analyze, design, implement & maintain export inventory control system using Hewlett-Packard 3000 Computer System. 1 yr or 1 yr related exp (programming) req'd. Must have: Bach. degree-computer sci. Must know COBOL, SPL, HP3000, IMAGE, QUERY, KSAM, MPE, OS. $26,000/yr to work 40 hrs/5 days/week. Send resume to: The Titan Industrial Corp., 745 Fifth Ave., NYC, 10151, Attn: Steve Lum.

— SUNBELT CAREERS —
PIA's, S/P's, SW ENG's

Our clients need your experience in CICS, NIS, IDMS, S/36, PC's, HP 1000/3000, ALC, RSX-11M, VAX/VMS, UNIX, C

Hundreds of openings nationally easily searchable on our DEC PDP11/44

Call to inquire or send resume today. Our 15th year as recruiters.

TOLL FREE
800-334-4229
In NC (919)484-4101

P.O. BOX 35825
FAYETTEVILLE, N.C. 28303

MAS CONSULTANTS

Consulting group of a Big 8 CPA firm has an urgent need for individuals with systems backgrounds. Also have needs for people with health care, manufacturing or technical specialties. Salaries open.

ROMAC.
4410 IDS Center
Minneapolis, MN 55402
612-339-6136

MOVE $$$ SOUTH NOW!

Our computer can help you get here or stay here. Four YEATS lines; 13 years' experience; 270 affiliated offices; 300+ current job orders; 2000+ company clients from Virginia to Texas to Florida! Send resume to:

DATA RESOURCES, USA
Division of Landmark Personnel Resources
P.O. Box 13720
Pensacola, Florida 32590-1370
CALL TOLL FREE 800-874-8407
In FLORIDA (904) 434-8291 COLLECT

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

[redacted]

THE DYNAMIC CONTROL CAREER ADVANTAGE

[redacted]

EXPERIENCE IT!

Experience the revolutionary potential we've created for comprehensive data processing systems geared to total hospital and patient-care management.

Experience state-of-the-art IBM System 38 and optimum computer applications for cost-effective, in-house, on-line hospital and financial use.

Experience the advantages of record-breaking growth, advanced professional challenges, and the chance to work with some of the most talented people in the industry.

PROGRAMMERS/PROGRAMMER ANALYSTS

Make the most of your experience in RPG II on System/3, System/34 or RPG III on System/38 in an interactive on-line environment. A minimum of one year experience required. Positions available in Development, Installations and Pharmacy. In addition, we are also actively recruiting for:

CUSTOMER SUPPORT ...Flexible Work Schedule

As a professional in Customer Support you'll enjoy the opportunity to adjust your working schedule to your personal and professional needs. Standard shifts are available in addition to 3 and 4 day a week schedules. Be a "troubleshooter" and interact with our clients from problem definition to solution. A variety of career paths are available and the ability to gain exposure to multiple product lines within Dynamic Control. A minimum of one year experience in RPG II on System/3, System/34 or RPG III on System/38 in an interactive on-line environment is required. Knowledge of MUMPS language and CADO systems a plus.

CODELOADER APPLICATIONS UPGRADE SPECIALIST

Two positions currently exist within our Systems Development Division for an experienced S/38 operator interested in learning RPG III, interfacing with our clients and traveling throughout the nation. 1+ years S/38 operations experience and familiarity with S/38 data base concepts, basic programming and test procedures required.

We offer an outstanding benefits package, internal technical training, a nationally competitive salary structure and excellent opportunities to further your professional advancement. For immediate consideration, please call Patrick Stroup, TOLL FREE, 1-[redacted], inside Florida call COLLECT, ([redacted], or send your resume to: Personnel Department, [redacted], Winter Park, FL [redacted].

Dynamic Control

A division of Travenol Laboratories, Inc

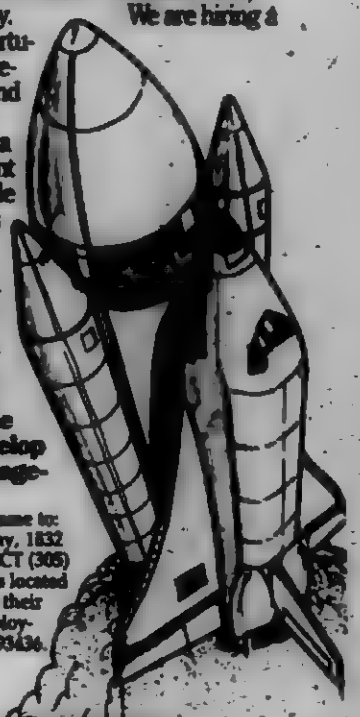
An Equal Opportunity Employer M/F

COMPUTER PROFESSIONALS

With Current Experience In Applications Software, OS/SW, Communications Networks, Compilers, DBMS and Development Tools.

We are now assuming our responsibilities as the Shuttle Processing Contractor for NASA at the Kennedy Space Center, Florida and the U.S. Air Force at Vandenburg Air Force Base, California. This six year contract (with options to fifteen years) will provide you with a secure opportunity to join the team of professionals like yourself who are making a significant contribution in the manned space program.

If you are an experienced computer professional whose goal is more challenging and rewarding work in a state-of-the-art environment, look to Lockheed Space Operations Company. We are hiring a number of professionals, like you, to fill opportunities involving the development and enhancement of: Applications Software (Real-time and Interactive), Operating Systems Software, Communications Networks, Compilers, Data Base Management Systems and Development Tools. You will be working on the Space Shuttle Launch Processing Systems (LPS), which is a highly distributed network of over 300 MODCOMP Super Mini Computers and a large number of Honeywell 6000's with over 3.5 billion bytes of mass storage. Some of these opportunities will involve a three month program to become familiar with the entire LPS and the space system unique OS/SW.



We also have opportunities available for MIS Applications professionals to develop a wide variety of on line Data Base Management Systems.

For immediate consideration call or send your resume to: Donald C. Quirk, Lockheed Space Operations Company, 1832 Garden Street, Titusville, Florida 32592. CALL COLLECT (305) 268-4070. Candidates who wish to pursue opportunities located at Vandenburg Air Force Base, California should send their resume to: Lockheed Space Operations Company, Employment Office, 1160 West Laurel Avenue, Lompoc, CA, 93436.

Lockheed
Space Operations Company

An Equal Opportunity Employer/U.S. Citizenship Required/Principals Only.

COMPUTER SPECIALIST

SIMPLY INCREDIBLE OPPORTUNITIES

are waiting for you at CHI-CHI's

Join the fastest growing, full-service restaurant chain in the U.S.A. We are looking for experienced IBM personal computer specialist.

- Electronic spread sheet experience.
- Basic programming experience.
- Project oriented.
- User training experience.
- Salary commensurate with experience.
- Excellent benefits.

Send resume to:
Art Schmitt, Ph.D.
Director of Human Resources
CHI-CHI's
P.O. Box 32338, 10002 Shelbyville Rd.
Louisville, KY. 40232

ASSISTANT IN ENGINEERING

The University of Florida, College of Engineering, invites applications for the position of Assistant in Engineering. The primary responsibilities are managing and instructional facilities for CAD/CAM, primarily for teaching CADAM and related program packages to users of this facility. The facility is based on an IBM 4341, Model 12 computer system running the VM operating system; primary applications programs supported are CADAM, CATIA and CAEDS. The operating systems software is separately maintained; the duties of the incumbent of this position are to oversee user training and to aid users with application program problems.

Candidates must have a Master's degree in a relevant engineering field, or a Bachelor's degree in a relevant engineering field plus equivalent experience. Also the candidate must have recent experience with the particular hardware and software systems outlined above, as well as teaching experience using this system. The University of Florida is an equal opportunity, affirmative action employer.

Applications or resumes should be directed to Dr. M.J. Chanton, Chairman, Search Committee, College of Engineering, University of Florida, Gainesville, FL 32611.

Application deadline is May 15, 1984.

Verbatim

Programmer/ Analyst

Verbatim leads the world market for magnetic storage media products. One reason is our people. We hire the best, and we give them every opportunity to advance, with semi-annual reviews.

We have an opportunity in our MIS team for an experienced Programmer/Analyst to maintain and support our Payroll and Personnel Systems in our HP3000 environment. If you have 3 years directly related experience, you will handle paycheck generation, tax updates, W-2 forms and other year-end reports, and automatic deposit processing. Extensive knowledge of COBOL, system utilities, programming methods and payroll procedures required. Strong written and oral communication skills essential.

Verbatim benefits are among the best, including profit sharing, stock purchase plan, and paid sabbatical leave. Please send your resume to Professional Employment, Dept. RH-CW, Verbatim Corporation, 335 Soquel Way, Sunnyvale, CA 94086. An equal opportunity employer.

FOR ACHIEVERS ONLY

INTERMEDIATE to SENIOR LEVELS

- Software Development Mgr
- Technical Support Specialist
- Data Base Administration
- Voice/Data Communications
- Office Automation
- Microprocessor Software
- Systems & Programming Mgr
- EDP Audit/Security
- Systems Planning
- Manufacturing Systems

DEC, HONEYWELL, IBM, NCR, UNIVAC

BRUCE A. MONTVILLE
Managing Partner

EXECUTIVE 2100
National Recruiting Consultants
([redacted])

TOLL FREE
1-(800) 258-7329

COMPUTER PARK, P.O. BOX [redacted]
HAMPTON, NH [redacted]

Niagara University, New York
Computer and Information Sciences

Niagara University is accepting applications for a tenure track position beginning August 1984 at the assistant or associate professor level. A doctorate is desired, masters required, in computer and information systems or related area. Demonstrated teaching competence and business/industry experience are required. Duties include teaching undergraduate and professional courses in software systems, systems analysis and design, data bases, communications networking, and microcomputer and small business systems. Send resume, transcripts, and names/addresses of three references to:

Director of Computer and Information Sciences
Niagara University
Niagara University, NY 14109

Niagara University is an Equal Opportunity Affirmative Action Employer

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

DATA PROCESSING

New Jersey

TIRED OF A ROUTINE ENVIRONMENT?
WE'VE GOT THE ANSWER TO YOUR PROBLEM!

Toys "R" Us is experiencing tremendous growth which is creating a constant need for new applications and services within our data processing department. Our current domestic operations are expanding rapidly and our new Kids "R" Us Division has aggressive growth plans. In addition, we are moving into the international market-place with plans to begin operations in Canada, Great Britain and Singapore within the next two years.

Virtually nothing will be routine in our D/P Department for the foreseeable future. We are constantly being challenged with new and stimulating projects and we are in the process of dramatically increasing the professional D/P staff at our headquarters. We presently need a number of individuals in each of the following areas:

Project Leaders Applications Software

Experienced in mainframe applications. Must be able to lead development and implementation of on-line computer software. Management experience and demonstrable, significant development experience is necessary.

COBOL Programmer/Analysts

Experienced in a wide range of application software. Applicants must have a good working knowledge of COBOL and data base management systems.

P.O.S. Field Coordinators

Experienced in low voltage wiring, test equipment and communication devices. Will entail approximately 30% travel.

If you have had problems with boredom, you won't find it boring here. If you are looking for a company that will challenge your skills regularly-this is your kind of opportunity. You'll find our salaries competitive and our benefits package outstanding. Send your resume, salary history and requirements in confidence to:

Director of Human Resources (DP)

TOYS 'R US

395 West Passaic Street
Rochelle Park, New Jersey
07662

Equal Opportunity Employer M/F

SYSTEM PROGRAMMER

To support the expansion of our communication network, we seek a Senior System Programmer who has strong knowledge and experience in the data communications area. This position requires 3 years NDM, VTAM STAM and 3705 NCP experience. Responsibilities include maintenance for NDM, DOS/VSE. We are now using 4331. We will go to 4361 this year and are planning to go to 4381 within 2 years.

We offer excellent company paid benefits including all-group insurance.

Send resume with salary history to:

American Isuzu Motors Inc.

P.O. Box 2208
City of Industry, CA 91746
Attn: Personnel Dept.

Principals Only
NO TELEPHONE CALLS PLEASE
Equal Opportunity Employer M/F

ISUZU

UNIX + C LANGUAGE
$35,000 - $50,000

Advanced Programming Resources, Inc., a dynamic growth oriented Contract Services organization specializing in Consulting Systems Design and Programming Development, has an immediate need for seasoned Software Engineers.

Must have a degree in Computer Science or Electrical Engineering, 2 or more years programming experience using "C" Language, PASCAL, or PL/1, UNIX Operating System. Working knowledge of Network Protocol and multiprocessor systems helpful. Knowledge of VAX or other mini computers required.

APR provides above average benefits and compensation. If you feel you want to join the leader, please send your resume' in confidence to:

APR

ADVANCED PROGRAMMING RESOURCES, INC.
8000 North High Street • Worthington, Ohio 43085 • 614/888-3666

"An Equal Opportunity Employer"

SYSTEMS MANAGER

Denison University has an immediate requirement for a Systems Manager. Responsible for operations, software installation, hardware maintenance, systems integration of college's computing facilities and supervision of staff (6).

Denison operates a VAX 11/780 system consisting of 8 MB of memory and 1600 MB of disk storage, over 128 time sharing terminals and 20 remote word processing systems. Plans include immediate upgrade to VAX Cluster, Networking, and support of micro-processors.

The most attractive candidate will have extensive knowledge of VAX/VMS, programming skills in macro, and understanding of communications, hardware, and micro computing systems.

Competitive salary and staff benefits in an attractive community. Please send resume, including references and salary requirements to: Dr. Jeffrey S. Jobert, Director, Computer Center, Denison University, Granville, OH 43023 by April 30, 1984.

Equal opportunity/affirmative action employer

DATA BASE ADMINISTRATOR

Colonial Life and Accident Insurance Company, a national growth oriented company, based in Columbia, South Carolina, has an immediate need for a manager of its data base administration area. Applicants should possess the following:

- Management Experience
- IMS DB/DC
- IBM Data Dictionary
- Knowledge of IMS Performance Tuning
- Strong Interpersonal and Organizational Skills

Our company offers excellent benefits and working conditions. Applicants should send detailed resume with salary requirements to:

Personnel Department
Colonial Life and Accident
Insurance Company
P.O. Box 1365
Columbia, SC 29202

An Equal Opportunity Employer

HOGAN

PROJECT LEADERS with HOGAN experience who have supervised 5 or more people and enjoy heavy travel first three months.

DDA	50K Plus Bonus
TDA	50K Plus Bonus
RPM	50K Plus Bonus

Loan-Guru Type-to learn and install HOGAN modules. Pay as above.

PROGRAMMERS with 2 or more years HOGAN application experience needed. Salary DOE.

Call Collect or Mail Resume:
Executive Consultants
Hogan Specialist
1600 Fairfield Suite 102
Shreveport, LA 71101
(318) 226-1000

NORTH ADAMS STATE COLLEGE COMPUTER SCIENCE DEPARTMENT

Applications are invited for two full time tenure track and one full time academic year replacement faculty positions beginning September 1984. Positions involve teaching upper and lower division undergraduate courses and for developing courses in an expanding curriculum. Primarily we offer upper division courses in software systems, information systems, and scientific systems, along with an expanded core curriculum. An M.S. in Computer Sciences is required with a Ph.D. preferred. NASC is a state supported liberal arts college with 2,600 students located in the beautiful Berkshire Mountains. This department has six full time faculty with access to CDC Cyber/170 and a variety of microcomputers. Applications should be sent to the Personnel Office, North Adams State College, North Adams, MA 01247 by April 11, 1984. An EEO/AA Employer.

Systems Marketing Manager

Team International, a leading management and MIS Consultant in the Middle East with eight offices throughout the Arab Countries, has immediate openings for Senior Systems Consultant/System Marketing Manager. The applicant is expected to have a minimum of 10-12 years experience in mainstream data processing, plus experience in system management, client support or system marketing. He should be able to participate in consulting studies at client locations, and guide large MIS projects during their initial stages. A graduate degree in a relevant discipline is required. Please send detailed CV to:

Team International
Dr. Sherif Hanny
2 Ismail Fahmy Street
5th Quarter
Heliopolis, Cairo - Egypt

SYSTEMS ANALYST IN-HOUSE CONSULTANT

Join the expanding DP dept of this exciting fast-paced brokerage firm. 3+ yrs solid FORTRAN programming/analysis skills necessary. Super career opportunity.

$48,000 FEE PAID

ROBERT HALF
Robert Half International, Inc.
522 Fifth Avenue
New York, N.Y. 10036
212-221-0866 (Agency)

UNIX*/C

$25,000 to $60,000
APPLICATIONS & SYSTEMS
Over 300 Openings Nationwide
Client co's pay all fees
Call or send resume
In confidence to:
J. ROGERS ASSOC
(609) 896-8484
129 Franklin Corner Rd-Dept C-D
Lawrenceville, NJ 08648

*UNIX is a trademark of Bell Labs

Computer Science faculty opening

to begin in September 1984. While preference will be given to holders of a Computer Science degree, the minimum requirement is a Master's degree in a related field. The position requires a broad general background in the computer field, with extensive experience in more than one of the following: COBOL, FORTRAN, statistical applications (SPSS), Pascal or assembly language. Also desirable are teaching experience and a special area of competence in computer architecture, operating systems, theory of programming languages, data communications, theoretical computing, or data structures. Salary dependent on qualifications. Closing date is April 15, 1984, or until the position is filled. Apply with resume to: Dr. Lois Y. Bryant, Computer Science Department, State University College, Geneseo, New York 14454 (716) 245-5231. AA/EOE.

WEST COAST CORRESPONDENT

Computerworld has an opening in our busy West Coast bureau for an experienced correspondent.

As one of three writers based in our Menlo Park office, you will be responsible for producing usable copy as required each week. You will report to the West Coast Bureau Chief who will assign you to cover stories that take place or originate on the West Coast. You will support the news gathering activities of existing bureau personnel, particularly in the coverage of stories of interest to computer industry vendors and top data processing executives.

You'll cover press conferences, new product announcements, major meetings and other newsworthy events as directed by the West Coast Bureau Chief or the Managing Editor. You will be expected to meet deadlines established by the West Coast Bureau Chief.

In addition, you'll conduct telephone and personal interviews with industry figures and DP executives on a wide range of technical or business topics of interest to our readership. Some travel is required.

To qualify, you should possess a strong journalistic instinct, be able to write quickly and accurately for weekly deadlines and, most important, have demonstrated professional news reporting and writing skills. Familiarity with computer technology, companies, trends and products is a definite plus.

Computerworld is the number one trade publication in the U.S., and we're growing bigger every year. We offer pleasant working conditions in modern offices, a comprehensive medical/dental/vision plan, profit sharing and an attractive compensation plan.

To apply, send your resume, samples and salary history to:

Jeffrey Stecker
West Coast Bureau Chief
Computerworld
1020 Menlo Rd.
Menlo Park, CA 94025

No phone calls, please.

Martin Marietta Aerospace

Software Systems Analyst

Martin Marietta Aerospace, NASA's prime contractor for the Space Shuttle External Fuel Tank, has an immediate opening at their Michoud Assembly Facility in suburban East New Orleans for a Software Systems Analyst.

You must be experienced in systems design to provide transaction of database security with contemporary knowledge of software security. A BAMS is required as well as 5-8 years of experience.

Candidates interested in learning more about these opportunities at Martin Marietta should forward resumes including salary history to: Martin Marietta Aerospace, Attn: Denver Glaeser, Dept. CW-42, P.O. Box 29304, New Orleans, LA 70189. We are an equal opportunity employer, m/f/h.

MARTIN MARIETTA

TECHNICAL SERVICES POSITION

Administrative Data Processing Center activities to search for Systems Programmer. Duties include generation and maintenance of OS-VS1 operating system, TOTAL data base management system, and ENVIRON/1 teleprocessing system on an IBM 4341. Qualifications: 4 year degree with relevant course work and IBM systems programming experience preferred or 2 year degree with at least 2 years IBM systems programming experience or at least 3 years valid IBM systems programming experience considered. Salary Range: $19,848 - $30,888. Send letter of application, resume and three letters of reference to Dr. Gerald Bisbey, 207 Gilchrist Hall, University of Northern Iowa, Cedar Falls, IA 50614. Applications will be received until the position is filled. Screening will begin April 20, 1984. EEO/AA.

NH - MAINE
DP PROFESSIONALS

We have numerous clients seeking qualified people with experience in COBOL, RPG, DOS or OS. Financial and manufacturing applications. All vendors considered. Excellent salary, benefits and relocation plans.

Fee paid. Reply in confidence to:

ROGERS AND SEYMOUR
CONSULTANTS
94 Auburn St. - Portland, Me. 04103

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

CAD/CAM at Tektronix: Computer-Integrated Manufacturing

Join the Tektronix team renowned for implementing progressive change in manufacturing. Our Mechanical Components Computer-Integrated Manufacturing (CIM) group offers an unparalleled environment for your software expertise.

Software Engineer

Provide programming support and system manager services for CIM systems running on DEC 11/780, 11/750, 11/34 and 11/24. You will enhance existing and develop new CAM/CAD software for CIM projects, including networking to IMAS and MAS II DNC, as well as DDN and Applicon. Your in-depth DEC VMS and RSX knowledge and fluency in FORTRAN, MACROLL, PL/1 will be important qualifications. BS/MS in Computer Science or equivalent required, with experience in system services and run-time libraries, as well as knowledge of Hyperchannel networking. Familiarity with manufacturing methods a strong asset.

Located in Beaverton, in the heart of Oregon's beautiful Willamette Valley, Tektronix offers an unmatched work environment and the recognition your skills deserve.

For further details, contact Blanche DeVita at (503) 627-6122. Or send her your resume in care of Tektronix, Inc., YS-505, P.O. Box 500, Beaverton, OR 97077.

Equal opportunity employer.

Tektronix
COMMITTED TO EXCELLENCE

VM - SPECIALISTS FOR ASSIGNMENT IN GERMANY

We are the Software Service Subsidiary of a leading world-wide electronics company. With our large-scale computers we are one of the most promising PCM-Suppliers in Europe.

We are looking for several committed and enthusiastic VM-Senior-Specialists for our headquarters in Southern West Germany for the support of VM/SP and HPO and related software products. The work entails the installation and maintenance of VM-System Software Products.

If you have a minimum of 5 years experience in VM-System Programming and Debugging, including experience in Assembler language coding, you will qualify for one of these rewarding opportunities.

We will keep your know-how of IBM-Software Technology up-to-date by offering systematic in-house training programs. Should you be interested in this top-professional task, which also includes contact with customers, you can expect a high level of responsibility with an excellent and competitive salary. Relocation assistance will be provided.

If you are prepared to make a commitment, please send your resume in confidence as soon as possible to our Steinbach & Vollmer-Agency (Code CM.70) Attention: Mrs. Maurer.

In May, interviews will be held in San Francisco.

Steinbach & Vollmer GmbH
Personalberatung

Nikolaistraße 1
8000 München 80
Tel. (089) 4705067
Telex: 05216445
Germany

DPS RECRUITMENT SPECIALIST

Large Boston-located corporation currently seeking an individual who possesses several years of successfully demonstrated employment recruitment experience within the data processing environment. Extensive knowledge of data processing and the various levels of professional competency highly necessary. This DPS Recruiter must have superior human relations skills and outstanding oral/written communicative skills to effectively interact and communicate with DPS Management and Professionals at all levels, as well as all prospective hires and external contacts. The ability to quickly acquire a good basic understanding of the company's organizational structure, and good knowledge of personnel policies and procedures, Federal and State laws regarding employment practices absolutely necessary. Local travel and very limited out-of-town travel will be required to accomplish recruitment needs.

The incumbent will recruit, interview and refer data processing professional applicants for employment. Develops local and national contacts with employment agencies specializing in data processing placement, and selected colleges and universities throughout the United States. Coordinates DPS participation in Job Fairs. Recommends and implements special data processing "professional" recruitment campaigns, and promotes DPS' "Equal Employment Opportunity" goals.

This position will provide an excellent opportunity for personal and professional growth. Complete fringe benefits package and starting salary of : $25,000-30,000.

Qualified applicants are encouraged to forward resumes (please include salary requirements and salary history).

Reply to CW-B4096
Computerworld
Box 880
Framingham, MA 01701

We Are An Equal Opportunity/Affirmative Action Employer

HOGAN UMBRELLA SUPPORT MANAGER

Responsible for all applications and programming activities pertaining to Hogan Umbrella Support System. The area Manager plans, directs and controls the development, installation and maintenance of programs within the Hogan Umbrella Systems area.

Must have 4 year degree in Computer Science or equivalent, 4 years data processing experience, Hogan Umbrella maintenance experience to include DDA, TDA, PROPHET, ODS, SPS, and previous project management experience. Must have working knowledge of COBOL, Assembler, CICS, UTILITIES, MVS/OS, TSO, ROSCOE/LIBRARIAN, OS JCL/UTILITIES, check sorting and SCI Macro language. Salary $30,000. Send resume to:

FLORIDA FEDERAL
P.O. Box 1689
St. Petersburg, FL 33701
Equal Opportunity Employer M/F

SAUDI ARABIA

Immediate Openings

International engineering firm has single status positions on a life support O & M contract supporting the U.S. Corps of Engineers in Riyadh, Saudia Arabia.

PROGRAMMER
(Fortran IV)

Degree in Computer Science with at least 3 years' experience programming using FORTRAN IV required. Experience in supply management systems desired. Must be familiar with operating systems of PRIME computer and have the ability to work independently and interface with end-users.

U.S. Citizenship Required.

Please send resume to Dept. R-666.

PACIFIC ARCHITECTS AND ENGINEERS, INCORPORATED
1111 W. 6th Street
Los Angeles, CA 90017
Equal Opportunity Employer M/F

SUNBELT *IMS*

California to Florida

Immediate need for application and software IMS, CICS, IDMS, RAMIS, TOTAL and ADABAS professionals. Coast to coast coverage. Contact us now and make harsh winters a memory! Relocation assistance available.

Call Collect or Send Resume.

SUPERIOR RESOURCES
Personnel Services - Employer Retained
17141 Ventura Blvd. #220
Encino (Los Angeles) CA 91316
(213) 986-1400
Member National Computer Assoc.
Offices Nationwide

DATA PROCESSING

We are searching for experienced, enthusiastic individuals who wish to contribute to an active, progressive data processing team. If you are self-motivated, career-oriented, and possess the following qualifications, we would like to hear from you.

SYSTEM PROGRAMMER

Applicants should have 2-3 years experience in System Programming and degree in Computer Science. Will have primary responsibility for the implementation, table generation, table maintenance, and tuning of multiple IBM CICS/VS data communications environments. Must have knowledge of VM/SP and DOS/VSE operating systems. Hardware environment consists of 4341-12 and 4381-2.

Excellent benefits and salary. Send resume and salary history to:

Attn: Personnel Department
(NO TELEPHONE INQUIRIES, PLEASE)

Liggett & Myers Tobacco Co.
P.O. Box 1572, Durham, NC 27702
An Equal Opportunity Employer

FLORIDA CONNECTION

All Expenses Paid
Our clients, in urgent need of your expertise will pay all your expenses in relocating you to an area of Sun & Fun, no State Tax. Average Temperature 75°

TELECOMMUNICATION PROGRAMMERS
PROGRAMMER ANALYSTS
SYSTEMS ANALYSTS
SYSTEMS PROGRAMMERS
DATA BASE ANALYSTS

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

DATA PROCESSING and SYSTEMS OPPORTUNITIES

Southern California

TRW Financial and Data Services Division offers you the opportunity to further your career in pleasant surroundings. We are currently seeking qualified individuals for the following positions:

PERFORMANCE ANALYST

To do performance measurement on MVS triplex computer configuration with shared DASD, IMS and TSO, and CAD/CAM application performance measurement. Reports design and implementation for performance tracking. Requires minimum BS in Computer Science or Math and 5 years performance/capacity analysis.

LOCAL AREA NETWORK ANALYST

To work with team on interface technology with IBM network. Must be knowledgeable in MVS and network performance, capacity planning. Strong working knowledge of MVS internals and the VTAM interface to SNA Communications network. BSEE or Computer Science and 5 years experience.

PRIME APPLICATIONS PROGRAMMER

To design, develop and maintain accounting applications in COBOL. Coordinates and monitors the usage of Prime 750 System. Requires minimum BS Accounting or Computer Science and 3 years Prime experience with COBOL.

MVS SYSTEMS PROGRAMMER

To work in the IBM Operating Systems Section. Primary responsibility will be to support the MVS Operating System installed on an IBM 3081. Should have strong background in MVS/370 and MVS/XA. Degree in Computer Science or equivalent and 5 years operating systems experience is required.

TRW offers excellent salaries and an outstanding "cafeteria-style" benefits plan that includes medical/dental/vision care, flexible working hours, a year-end shutdown, and a relocation package. For immediate consideration, send your resume in confidence to:

Bob Chambers
TRW Financial and
Data Services Division
Bldg. E1/Room 4020
One Space Park
Redondo Beach, CA 90278

TRW

U.S. Citizenship Required
Equal Opportunity Employer

PROGRAMMER

Local firm has opening requiring a Programmer I.D. #2917455 to assist in development of a systems software product using IBM assembly language.

The specific product under development is the European version of the DASD management software and requires knowledge of the European IBM data processing environment.

Candidates must also possess (1) at least 5 years of experience in IBM DOS/VSE(E) operating systems, (2) at least 5 years experience in IBM DOS assembly language, (3) in depth knowledge of DASD management software and in particular the particular product in consideration.

Salary will be $3,100 per month with full company benefits. Qualified candidates should send resumes in confidence to Job Service of Florida, 3421 Lawton Road, Orlando, FL 32803.

Ad paid by an Equal Employment Opportunity Employer

SYSTEMS SUPPORT SUPERVISOR

THE UNIVERSITY OF ALABAMA COLLEGE OF COMMERCE AND BUSINESS ADMINISTRATION

The Systems Support Supervisor will manage the C & BA microcomputer classroom and laboratory facilities and provide direct computer based systems support to C & BA faculty. The systems support supervisor will be responsible for the maintenance of databases and assisting faculty in the use of these data and supporting software. The Systems Support Supervisor will serve as a liaison person with the University Computer Center User Service Group. Minimum of a BS degree in an appropriate field with at least 1 year's experience as manager of a computer facility. Comparable background may be considered. Salary $20,000-$25,000 depending upon qualifications. Send resume to Dr. Edward M. Smith, Associate Dean, P.O. Box J, University, AL 35486. The University of Alabama is an affirmative action/equal opportunity employer.

EPSILON DATABASE INTERNATIONAL

Looking for work Down Under? Let Epsilon lead you to the perfect position in the South Pacific.

Hundreds of executive, professional and technical jobs are currently available in your field – Epsilon can tell you where. For your free brochure, write to:

Epsilon Database International
2111-M/CPW 30th Street
Boulder, CO 80306

EPSILON HAS DONE THE FOOTWORK FOR YOU

University of North Dakota Center for Aerospace Science

Immediate opening for a research faculty position. Will be responsible for the operation of the Center's research computer facility. Position requires a BS in Computer Science and 4-5 years experience or an MS with 2-3 years experience, preferably with Perkin-Elmer Computer Systems, both hardware and software. Managerial experience also required. Will be responsible for overseeing maintenance and operation of computer and peripherals and resolving conflicts in user requirements. Send resume to John D. Odegard, Center for Aerospace Sciences, Box 8216, University Station, Grand Forks, ND 58202. An equal opportunity employer.

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

PRIME/IBM SYSTEMS PROGRAMMER

KNOW PRIMOS INFO?
WANT TO LEARN MVS?

Blue Cross & Blue Shield of Delaware is seeking an individual with in-depth knowledge of the PRIME "50" series of computers, PRIMOS, INFO, who is interested in becoming an IBM Systems Programmer. We will train you on IBM while you help us support PRIME 450. We are a state-of-the-art shop in a new suburban facility just off I-95 (no city wage tax, no parking expenses). Our current hardware environment is IBM 3083, 3380 Disc and 3725 communications. Current software includes MVS/SP, IMS DB/DC, CICS, TSO/SPF, ROSCOE, ACF/VTAM, ACF/NCP, etc.

In addition to a superior salary schedule we provide excellent benefits and attractive working conditions. If you feel you meet the criteria listed above send resume and salary history to:

David B. Maguire
Manager of Staffing

BLUE CROSS BLUE SHIELD
of Delaware
801 W. 14th St. Wilmington, DE 19899

An Equal Opportunity Employer m/f

COMPUTER SCIENCE FACULTY

Walters State Community College, in East Tennessee seeks full time (9 month contract) Computer Science faculty member. Incumbent may be considered for assignment as area supervisor for Computer Science technology program. Computer equipment includes DEC VAX 11/780, HP3000 II, and various microcomputers. Preference will be given to candidates with three or more years experience and a master's degree in Computer Science or related field. Forward resume and letter of interest prior to May 4, 1984 to: Director, Personnel Services, Walters State Community College, Morristown, TN 37814. AA EEO Employer.

MAINE

We have specialized in data processing professional placement in Maine for almost a fifth of a century. If you qualify for positions in the $25-40,000 range, please contact us in total confidence. Our clients pay our fees and provide relocation assistance.

ROMAC
477 Congress St.
Portland, Maine 04101
(207) 773-4748

SYSTEM AND APPLICATION PROGRAMMER

We are a leading Chicago real estate firm seeking an individual with 3 years experience in IBM 4331 or 4341 DOS/VSE, CICS systems. Our small DP division offers you a creative environment.

Please contact P. Heffner, Baird and Warner, 115 South Lasalle Street, Chicago, IL 60603, (312) 368-5864.

IBM 38

Programmers, Programmer Analysts and Systems Analysts—Let us update you on the rapidly changing IBM 38 market coast-to-coast. To confidentially explore exciting new career opportunities, rush a resume or call Gary Repetto, CPC.

ALBUQUERQUE INC
1717 Louisiana NE, Dept. C
Albuquerque, NM 87110
(505) 265-1971
Confidentiality Employer Assured

EMPLOYMENT SERVICE FOR PROGRAMMERS AND ANALYSTS

National Openings With Client Companies and Through Affiliated Agencies

Scientific and commercial applications • Software development and systems programming • Telecommunications • Control systems • Computer engineering • Computer marketing and support

Call or send resume or rough notes of objectives: salary, location restrictions, education and experience (including computers, models, operating systems and languages) to either one of our locations. Our client companies pay all of our fees. We guide, you decide.

RSVP SERVICES, Dept. C
Suite 709, One Cherry Hill Mall
Cherry Hill, New Jersey 08002
(609) 667-4488

RSVP SERVICES, Dept. C
Suite 211, Dublin Hall
1777 Walton Rd., Blue Bell, PA 19422
(215) 629-0585

From outside New Jersey, call toll-free 800-257-0181

RSVP SERVICES
Employment Agents for Computer Professionals

DALLAS

MAIN-SYSTEMS SOFTWARE
DOS/VSE...SP/XA

Local client, growing fast, needs "silent sleeve" mgr to turn/support VSE on 4341 and lead them to MVS in 86. Total authority with full commitment to continue growth. To $44K.

2720 Stemmons Frwy., 12677
Dallas, TX 75207. (214) 637-4360
DATA PROCESSING CAREERS ...

Give us your resume

We'll give YOU San Francisco!

Some people come to sail on the Bay, some to ski in the Sierras, and some to snorkle in Santa Cruz. But the professional climate is the real reason, and every bit as exciting.

There's nobody better qualified than CRG to introduce you to San Francisco. We've been here longer—over 10 years—know everyone in EDP worth knowing, and our list of client companies reads like the Who's Who of the business world.

Send your resume today, or call. All fees, interview, and relocation expenses are paid by our clients.

Computer Resources Group, Inc.
[illegible] Sacramento St., San Francisco, CA 94111
[illegible] or 2000 Powell St., Suite [illegible], CA 94608,
(415) 727-1020

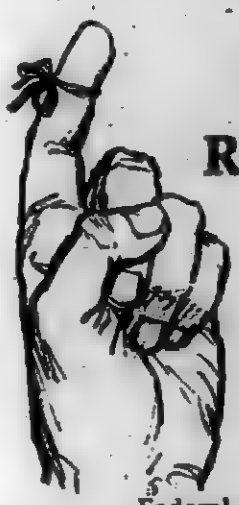
CRG AFFILIATES IN 27 MAJOR U.S. CITIES National Computer Associates

An employer-retained professional placement service

COMPUTER SCIENCE FACULTY POSITIONS

MS or PhD in Computer Science/Software Engineering or PhD in related area with significant computer science experience. Two needed to teach undergraduate courses in newly developing Software Engineering Program. Applicants should be able to teach some combination of the following: FORTRAN, PASCAL, PL/1, C, Algorithm Design, Data Structures, Systems Architecture, Hardware, Computer Design, Computer Graphics, Artificial Intelligence and Software Engineering. Rank and salary will depend upon credentials and experience. Please send letter of application, vita resume, letters of support and official transcripts or placement dossier to:

Dr. John Botsello, Academic Dean
Daniel Webster College
University Drive
Nashua, New Hampshire 03063



Just A Reminder!

Federal DP Expo

Computerworld will be distributing the April 16, 1984 issue from our booth. In order to take advantage of this increased distribution

Reserve space Now

Classified Advertising Deadline is Friday, April 6th

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

617-879-0700 1-800-343-6474

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

3033 ... CICS/VS ... SYSGEN® ... BAL ... ATM ... PL1 ... IMS/DB DC ... ON-Line ... OS/MVS ... LIFE-70 ... ANS Cobol ... DATA-COMS ... Large Scale IBM ... HOGAN ... 4341 ... ADABAS ... Assembler ... JES II ... Internals ... 3033 ... IDMS ... DL-1 ... SAS.

We select our company clients, choosing those with top state-of-the-art installations, good growth potential, liberal benefit programs, and -- most important -- strong support for professional growth and intrinsic job satisfaction of employees. Our need is for SYSTEMS PROGRAMMERS, especially those with heavy MVS experience. There is NEVER A COST TO YOU.

PROJECT LEADER - HEAVY MVS/XA	$OPEN
SR. SYSTEMS PROG. - MVS	$OPEN
SOFTWARE SPECIALIST - MVS	$OPEN
IMS DC SYSTEMS PROG	TO $42K
MVS/SP JES2 SYS PROG	TO $36K

SEND YOUR RESUME TODAY TO STEVE STEVENSON, PARTNER

Jim King and Associates

1940 Gulf Life Tower/Jacksonville, Florida 32207
(904) 399-7371

We are an international data processing software, research, development and consulting firm with 72 branches worldwide.

Four of our rapidly expanding branches are looking for more of the finest, most dedicated and imaginative people they can find. If you have the ability to become one of the leaders in your field, call or send your resume today.

Jacksonville	Houston	Baltimore	New York
IMS DB/DC	PL1 IMS DB or DC	CICS	IDMS
CICS	NCR Criterion	IMS DB/DC	ADSO
IDMS	HP 3000 Systems Programmer	CAD/CAM	CICS
IDSII	IDMS ADSO	IDMS	IMS DB/DC
BURROUGHS		PCS Patient Care System	MVS Systems Programmer
DEC VAX		IBM SYS 38	NOMAD
TANDEM			RAMIS

Bill Diner
6621 Southpoint Drive N.
Suite 221
Jacksonville, FL 32216
904/739-2722

Steve B. Coffman
8530 Katy Freeway
Suite 211
Houston, TX 77024
713/468-0677

Robert Miner
9160 Red Branch Road
Suite E-1
Columbia, MD 21045
301/730-2092

Pam Hite
1133 Avenue of the Americas
Suite 3122
New York, NY 10036
212/221-7270

CAP GEMINI DASD
PEOPLE/PRODUCTS/RESULTS

COMPUTER POSITIONS

SYSTEMS PROGRAMMERS
PROGRAMMER/ANALYSTS.
PROGRAMMERS

THE NATIONAL FINANCE CENTER
U.S. DEPT. OF AGRICULTURE

Located at Midwest in East New Orleans has permanent positions available in the following areas: DATA BASE support for dual IOMS/CV's running on IBM-370/168 and IBM-4341; computer systems analysis and programming; systems software; ADP security and standards. Salary commensurate with experience. Forty hour work week with flexible hours. Full Civil Service benefits and job security. Applicants must meet qualification requirements as published by the Office of Personnel Management.

Applications from employees with current U.S. Civil Service status are welcome.

Applications may be obtained by contacting:

Ms. Josie Glowacki (CW)
Personnel Office
P.O. Box 60,000
New Orleans, LA 70160
(504) 255-6550

EQUAL OPPORTUNITY EMPLOYER M/F/H

PROGRAMMER

We have an immediate opening for a programmer with a minimum of 2 years of COBOL and Assembler experience. Responsibilities will include maintenance and development of our Medicare Part A system. Experience with IBM 4341 DOS/VSE, VM/CMS is preferred, but not required. Please send resume to:

Manager of Systems and Programming
Blue Cross and Blue Shield of Wyoming
P.O. Box 2266
Cheyenne, WY 82003

RESUMES

All Writing Needs

- Effective, professional
- For today's job seeker
- Free cover letter package
- Fast, reliable, confidential
- Creative & editorial services

FORD/YOUNG ENTERPRISES
P.O. Box 157
Villa Park, IL 60181
(312) 530-6818

TANDEM

Expertise?

Call or send resume to:
Mr. Neil J. Owrutsky
Director, Information Services

ENTRE

1951 Kidwell Drive, Suite 400
Vienna, VA 22180
(703) 556-0600

BUY - SELL - SWAP

DEC

RENT • BUY • UPGRADE • SELL

PDP, 11/03, 11/04, 11/23, 11/24, 11/34, 11/44, 11/70, VAX/730, VAX/750, VAX/780

SYSTEMS • OPTIONS • SUPPLIES

11/24	128, Dual RL02, DZ11-A, Dual H9642 (new)	$24,895
11/23+	256KB, Dual RL02, DZV11-C, VT103, Spares (new)	$18,289
11/70	512KB MOS, LA36 (used)	CALL
VAX/750	1MB, RUA82, RL02, VMS Balance (new)	CALL

Customized Configurations—Call With Your Request.

In Stock		Specials		In Stock	
11/04-BC (new)	$11,289		DZ11-PS (new)	$4,195	
DZ11-A (unused)	$ 495		MS750-CA (new)	$4,195	
DMF32-AB (new)	$ 3,495		[35750-DC (new)	$5,995	
DUP11-DA (new)	$ 695		RH750 (used)	$2,895	
DZ11-F (used)	$ 3,195		RX211-EA (used)	$2,695	
H9642 (new)	$ 1,295		RL211-AK (new)	$5,495	
KT24 (new)	$ 795		RUA81-AA (new)	Call	
LP11-WA (unused)	$ 3,495		VT52-AA (used)	$ 495	

BROOKVALE ASSOCIATES
800-645-1167 NY: (516) 273-7777

SERIES I SPECIAL

Control Data
126MB Removable Drives . . $12,900
Diskette Drives . . . . . $ 1,495
Printers & Displays

New or Used
Immediate Delivery

IBM
4956 Processors
4967 200MB Disk Drives
All Peripheral & Features

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

"A COMPUTER LEASING COMPANY'S FINANCIAL STABILITY IS VITAL."

We said that in 1973, when Randolph became a subsidiary of The First National Bank of Boston . . . and we say it again, because it is still true and even more important today.

As an important part of The First National Bank of Boston, one of the nation's oldest and leading financial institutions, Randolph has a built-in financial stability that continues to be unique in the third-party computer leasing industry.

LEASING COMPUTERS IS OUR ONLY BUSINESS.

Randolph specializes in leases for IBM 3081, 303X and 4300 computer systems and peripherals . . . firm evidence that we plan to perpetuate our computer leasing activity.

Our people have an average of 18 years experience in the DP industry . . . from 360's to 3081's. They know all about alternative financing to be sure, but they also know their way around a DP department and the hardware in it.

WE SPECIALIZE IN SOLVING PROBLEMS.

Machine installed on a rental basis? Long wait for delivery? Stuck with a lease on your old machine? Own a 3081 but need cash? Whatever your problem, we can tailor a lease that will fit your exact needs and let you start saving money right away.

SAVE $80,000 EVERY MONTH FOR THE NEXT 5 YEARS.

You can lease the same 3081 that IBM rents for more than $180,000 per month from Randolph for less than $100,000 per month. If you're renting an older machine, we can save you even more—and you'll get about 4 times the throughput in the bargain.

WHEN IS THE BEST TIME TO TALK TO RANDOLPH?

The sooner the better. But it's never too late, even if you already have a machine installed.

Our 19 years in computer leasing gives added assurance that Randolph will continue as the leader in the computer leasing industry . . . continue to live up to the terms and conditions of our agreements . . . provide upgrades . . . fulfill all of our commitments.

LET RANDOLPH HELP YOU GET THE SYSTEM YOU NEED NOW, *NOW.*

We've already done it for many of the Fortune 500 companies . . . and we can do it for you. Call Joseph S. Kelly, Jr., Executive Vice President, **800-243-5367**

537 Steamboat Road
Greenwich, Connecticut 06830
203 661-4200

Randolph

A MEMBER OF COMPUTER LEASING & SERVICES ASSOCIATION **RANDOLPH COMPUTER CORPORATION** A subsidiary of THE FIRST NATIONAL BANK OF BOSTON **BANK OF BOSTON**

IBM
Series/1 • S/34 • S/36
S/38 • 4300
5110 - 5120 • S/32
MAY • MAR • APR
All models, systems & peripherals
AVAILABLE NOW!!!
Ask about our 72 hour upgrade.

(408) 425-7333
SOURCE
DATA PRODUCTS INC

EL CAMINO RESOURCES LTD.
offers:
For Sale
3369 A's B's (qty) now
3880-01 4/15/84
3370 A2/B2 60 days
Lease only
3380 AA4, B04 now
3880-03 now
Call: Mel Kleiman
(818) 888-3411
4827 N. Sepulveda Blvd.
Sherman Oaks, CA 91403
We also buy equipment.

IBM SYSTEM 23 DATAMASTER
New & Used
• Processors
• Fixed Disks
• Printers
Contact: Nancy Smith
(702) 322-6207
NCL, INC

Want to Buy
5291, 5251, 5256 Defective Planar Boards
$100 each
For Details Call
(915) 692-9141
Russell Sullivan
Computech

CW-1

SYSTEM/34
SYSTEM/36
SYSTEM/38
SERIES/1

SPECIAL!
Series 1 4957
w/1300 Feature at
40% List
Call Wayne Garrison

FIND IT FAST IN OUR FAMOUS COMPUTER MARKET ADVISOR
SEND US YOUR BUSINESS CARD AND WE WILL SEND YOU A FREE COPY.

ECONOCOM
• BUYS • SELLS
• LEASES
• QUICK DELIVERY
• COMPETITIVE PRICING
• FLEXIBLE FINANCING
• TRADE-INS ACCEPTED
• PROFESSIONAL SERVICE
• SHORT-TERM LEASING
• LONG-TERM LEASING
• PERIPHERAL LEASING
• TAKE-OUTS DONE
• MAINTENANCE GUARANTEE
• NEW OR USED

CALL TOLL FREE
800-238-3098

ECONOMIC COMPUTER SALES, INC.
445 CROSSOVER LANE • P.O. BOX 24687 • MEMPHIS, TENNESSEE 38124 • 901-767-9130

DEC
New and Used in Stock

COMPUTERS
Rainbow 100
DECmate I and II
Pro 350
Micro 11
WD 211
11/23 +
11/24
11/44

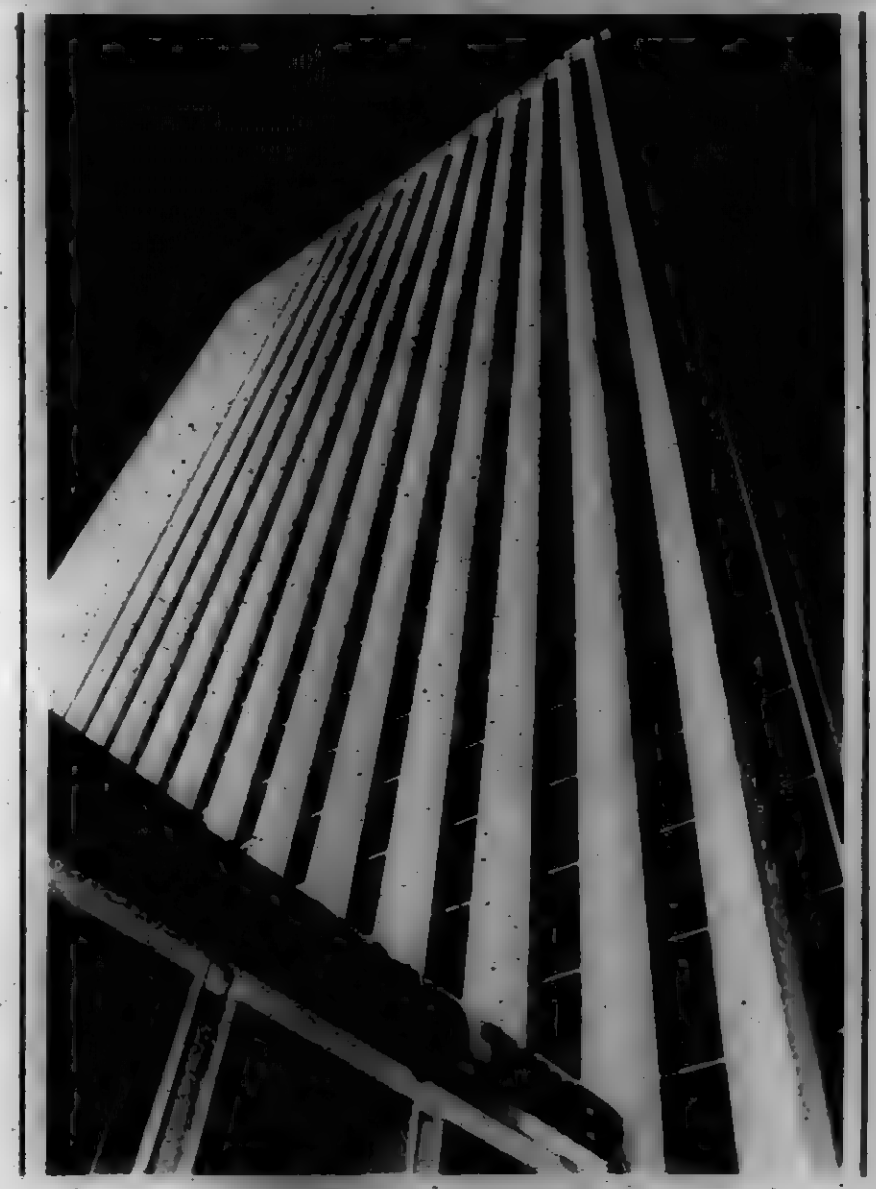
CRTS
VT101-AA VT102-AA
VT100-AA VT102-WA

PRINTERS
LA 34
LA 100
LQPSE

Command Data
PHONE 205/942-3156
Command Data Incorporated
185 West Valley Avenue
Suite 105
Birmingham, Alabama 35209

For Lease
4341-L2 W/1670
3278-A2 W/4634
3880-1 W/8170
Available May 1, 1984
Short or Long Term Lease
It Associates Inc.
1423 Upland
Houston, TX 77043
(713) 973-1500

FOR SALE
Dual CPU Cyber 170-730, w/262K CM, 20 peripheral processors, ECS Coupler.
Make Offer
Contact:
Paul Svacina
(303) 790-3191



When you lease equipment, make sure it comes with a good name behind it.

With the rapidly changing and improving technology of your industry, it's not always easy to keep your company's system up to date. And it's important to make sure you get the best advice, the best service, and the best financing available.

At Greyhound Computer Corporation, we've been leasing, servicing, refurbishing, maintaining and providing financing for computer and other equipment for over 20 years. And we have the resources and the knowledge to help you customize your equipment-leasing requirements. We can also assist you with the financing.

Whether you want to lease or purchase your equipment, look for the name with the kind of strength you need behind it: Greyhound.

Regional Offices

Mike Coate Eastern Regional Headquarters	**(617) 272-8110**
Dave Hyland Western Regional Headquarters	**(415) 283-8900**
John O'Shea Central Regional Headquarters	**(312) 789-9100**
Ron Gell Southern Regional Headquarters	**(512) 451-0121**

Sales Offices in:

Atlanta, Austin, Boston, Chicago, Dallas, Houston, Los Angeles, New York, Philadelphia, Phoenix, Pittsburgh, San Francisco

GREYHOUND COMPUTER CORPORATION

A subsidiary of The Greyhound Corporation

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

One-stop computer leasing.

The Total Computer Company...

Available Immediately
IBM Mainframes
IBM Peripherals

Hartford Computer Group

800-323-6355
or 312-364-0505

IBM SYSTEM 34
Buy
Sell
UPGRADES
Lowest Prices
Call Collect:
404-252-7480
DATAMARC
S/1
S/38

STC
TAPE/DISK
BUY • SELL • LEASE
(408) 241-3677

HARTFORD COMPUTER GROUP, INC.
4381-P02
3279-02C
Ships July 6, 1984
For Sale or Lease
(312) 364-0505
Ask For Dan Jackson

FOR SALE
DECITEK MODEL 262D8
PAPER TAPE READERS
TWO YEARS OLD
EXCELLENT CONDITION
FIVE AVAILABLE
BEST OFFER
CONTACT RANDY SPRUYT
MC-GRAW HILL INC.
1221 AVE. OF THE AMERICAS
NEW YORK, NEW YORK 10020
212-512-3060

11/730 For Sale
11/730 With 1 Mb; LA120; R80; RL02; DMF32; VMS
One Year Old
In DEC Perfect Condition
$29,000
(617) 777-4666

LEASE • PURCHASE • SELL

IBM SYSTEMS

- *Purchase-Lease Back*
- *Customized Leasing*
- *Upgrade Flexibility*
- *All models and peripherals*

612-941-0510

WINTHROP
FINANCIAL CORPORATION
computer sales & leasing division

6400 Flying Cloud Drive • Eden Prairie, Minnesota 55344 • 612/941-0510

Buy•Sell•Lease
SERIES 1
S/34 S/38
4300 S/[illegible]
5110 S/23
XERXES
COMPUTER SALES
1614 Harmon Place, Suite 210
Minneapolis, Minnesota 55403
800-328-3884/612-339-3042

IBM
3270

Find a computer in Cleveland, or a disk drive in Detroit.
Right here in Computerworld's Classifieds

CMI

AMERICA'S LEADING SPECIALIST SERVING THE USED MARKET

REGIONAL MARKETING OFFICES

Absecon, NJ (609) 645-7282
Atlanta, GA (404) 256-7942
Boston, MA (617) 367-5755
Chicago, IL (312) 693-2790
Dallas, TX (214) 385-0606
Encino, CA (818) 789-0113
Houston, TX (713) 780-7459
Lebanon, TN (615) 449-6633
Miami, FL (305) 442-2966
Newport Beach, CA (714) 752-8443
New York, NY (212) 349-0716
Tampa, FL (813) 273-9028
Frankfurt, Germany Telex: 414561 LCO D
Montreal, Quebec (514) 671-1121
Nyon, Switzerland Telex: 27209 CMI CH.
Paris, France Telex: 613910 CMI FR
Toronto, Ontario (416) 842-3065 (416) 863-9100
Vancouver, B.C. (604) 685-5186
Windsor, Ontario (519) 973-3910

CMI FINANCIAL SERVICES GROUP
2800 Telegraph Rd., P.O. Box 2026, Bloomfield Hills, MI 48303-2026
(313) 456-0000

CMI

A Torchmark Company
2800 Telegraph Rd., P.O. Box 2026, Bloomfield Hills, MI 48303-2026
TWX/TELEX: 810-232-1667 CMI CORP. TRMI
(313) 456-0000
CMI 4300 Series Hotline Numbers 800-331-4300 Member CDLA

3081-D16
Sale or Lease

3081-K24
Sale or Lease

For Sale/Lease
4381
1st Quarter Delivery

3033
All Models

New
Series 1
with
Serix Operating System
"Unix" ™ on the Series 1
IBM Master VAR
™ Trademark of Bell Laboratories

3350's
Available Now
On a Short Term Lease
3370 · 3375 · 3380

3690-A6
Available Now
4700
Banking Equipment
Buy/Sell/Lease

3725
Lease Financing Available
For your System or Ours
2,3,4 or 5 Year Terms

3800
LASER PRINTERS
Model 1's Immediate Delivery
Model 3's Lease Financing
Available-Any Term
3203-5 3211-1 & 3811-1
3262-5 4245-1

Tapes
Immediate Delivery
3803-3420
Buy/Sell/Lease

Wanted
4341-M2
4341-L01
Call Now

3278, 3279
3277, 3276
Terminals
All Models
Immediate Availability

3705-3704
Available for
Immediate Delivery
Sale or Lease

SYSTEM 38
Previously Owned Models 7 & 8
Available Now
Long & Short Term Leases
8130's
For Stand Alone Word Processing
Available now-Sale or Lease
Want To Buy All
Your Peripherals-Available

Series 1 I/O
All IBM Peripherals
Any Used Configuration
CDC Fixed/Removable Disks
Tape Back-up $4995.00
CDC/Datasouth/Printronics
NEC/Printers
Buy/Sell/Lease

SYSTEM 36
2, 3, 4 or 5 Year Terms
Lower rates than ICC
SYSTEM 34
Great Prices Sale or Lease
Want to buy
8331-11 & 12, 8360, 8320,
3262, 5224, 8251-1

3725's, 3705's Terminals... Centron DPL Leases from the Front End Out.

We understand the value of a flexible lease to accommodate your changing environment. Centron DPL offers tailored lease terms with professional support.

- Highly Flexible Leases
- Upgrade and Feature Investments
- Customer Engineers
- Tax-Exempt Finance Programs

Lease your network hardware from the company that understands communications.

Centron DPL Company
7480 West 78th Street
Minneapolis, Minnesota 55435
Call Toll Free: 1-800/532-7882
In Minn. Call: 612/944-9161
Talk with us about your other IBM hardware needs IBM

BUY · SELL · LEASE

SERIES-1
S/34 • S/36 • S/38
4300

S/23 S/32 5110-20
Tape-Disk-Printers-Tubes

AMCOM
5280 W 73RD ST - MINNEAPOLIS MN 55435
(612)835-4737

CALL TOLL FREE
800-328-7723

We've Got Your Number

S/34
ALL MODELS
QUICK DELIVERIES

SERIES 1
CONFIGURED TO
YOUR NEEDS

S/36
ATTRACTIVE LEASE RATES

S/38
NEW & USED MACHINES

5110/5120
NEW LOW PRICES

PERIPHERALS
CRT'S, PRINTERS, DISK, TAPE, MODEMS

CARLYN
COMPUTER SYSTEMS
8105-G Beckham Road Annandale, VA 22003
"CALL COLLECT" (703) 642-1950

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

BUY·SELL·LEASE

SERIES/1

SAVE ON NEW OR USED
OVER 2000 CUSTOMERS

S/38
4331
4341
4361
4381

ALL RELATED PERIPHERALS
SHORT/LONG TERM LEASES

S/34

SEE OUR NEW PRICES

S/36

SHORT/LONG TERM LEASES

3083
3081

LEVERAGED LEASES

3350	3370	3340
3360	3375	3344
3411	3420	3430
3278	3274	3276

Call toll-free 800-328-5718
(in Minnesota, 612-544-8660)

COMPUTER OPTIONS, INC.
"the best option"
1660 South Highway 100
Minneapolis, MN 55416

The nationwide market - a call away!

DEC/DG

SYSTEMS/PARTS/PERIPHERALS
NEW/USED/SURPLUS • DISCOUNT PRICES
Since 1977! Buy, Sell, Trade and Broker.

PHIL	BRYAN	JENNIFER
DG	11-VAX	8-LSI

CALL TODAY - (305) 392-2005
TELEX 568-670

thomas business systems, inc.
4301 Oak Circle - Unit 11 Boca Raton, Florida 33431

DEC EQUIPMENT AT THE LOWEST PRICES-NATIONWIDE!!

CALL TOLL FREE 800-328-7000
In Minnesota (612) 894-4020 • TELEX 291084

MIDWEST SYSTEMS, INC.
12117 Riverwood Drive, Burnsville, Minnesota 55337

Buy - Sell - Lease

S/32
S/34
S/38

IBM 3741 3742

CPU's CRT's PRINTERS
ALL MODELS
PURCHASE/LEASEBACK
SHORT & LONG TERM LEASES

CMA

Computer Marketing of America, Inc.
P.O. Box 71
610 Bryan Street
Old Hickory, Tennessee 37138

1-800-251-2670
In Tennessee: 615-847-4031

We Buy & Sell
DEC
Systems
Components

Digital Computer Resale

call:713 445-0082
600 Kenrick Ste C22
Houston, Tx 77060

DATA GENERAL

Hanson Data Systems

P.O. Box 27 Southboro, MA 01772

BUYING?

Whether you're looking for big computers little computers, terminals, printers, software, time sharing or services, you'll find it in Computerworld classifieds.

Pages of ads every week, with everything from Discs to DEC's from time sharing to terminals, and software for every size computer system.

You'll find what you need in Computerworld classifieds.

Call 800-343-6474 (or 617-879-0700) for more information

Inflation Fighters

Quality & Savings

Slightly used, Money Back Guarantee. Full Reels, All External Labels Removed Guaranteed for use at 800 BPI through 6250 BPI.

2400' Reel	$4.95 ea.
1200' Reel	$4.25 ea.
600' Reel	$3.50 ea.

All Tapes with Hanging Seals

We pay freight on orders over 200 tapes.
All orders shipped within 48 hours.
Call or Write

Computer Tape Mart
44A Seabro Avenue
N. Amityville, New York 11701
[516] 842-8512

CDC DISK DRIVES

Quantity 5
Model 9775
Purchase Price: $9,950.

Combined Systems Technology
950 Office Park Road
Des Moines, IA 50265
(515) 223-0505
Ask For Tim

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

PCM

Pioneer Computer Marketing
214/343-2804

BUY - SELL LEASE
- All IBM Systems
- Peripherals
- Tapes
- Disks

SERIES/1
- Systems
- Features
- Peripherals

SYSTEM 34
- CPU
- Peripherals
- Upgrades

PIONEER COMPUTER MARKETING
11446 Pagemill Road
Dallas, Texas 75243
214/343-2804

SYSTEMS
4341 4331
38 36 34
32 3
BUY • SELL • LEASE
COMPUTER BROKERS, INC.
2978 SHELBY ST.
MEMPHIS, TENNESSEE

CB

TOLL-FREE
800-238-6405
901-372-2622
PERIPHERALS
3203 3370
327X 3411
3350 3420

asco

What makes Dataserv a world leader in the IBM marketplace?

Customer satisfaction.

Over 65% of Dataserv's business comes from previous customers or customer referrals.

Ω dataserv

NPA
SYSTEMS INC.

SPECIALIZING IN:
PURCHASE SALE, TRADE, LEASE, RENT, AND SERVICE OF
Data General EQUIPMENT

(516) 467-2500

IBM UNIT RECORD EQUIPMENT
DISK PACKS DATAMODULES TAPES DISKETTES

SALE OR LEASE

IBM UNIT RECORD MACHINES
026—029—082—083—084
085—087—088—129—514
519—548—557

NEW & USED DISK PACKS—DATA MODULES
2316—3336(1)—3336(11)—3348(70)
MAG. TAPE-DISKETTES
Every Item Guaranteed

Highest Prices Paid for Used Packs & Modules

THOMAS COMPUTER CORPORATION

★ ★ ★ ★ **DEC** ★ ★ ★ ★

BUY—SELL—LEASE—TRADE—CONSIGN
SYSTEMS — PROCESSORS — OPTIONS
PERIPHERAL — MODULES — MEMORY
— SPARES —

NATIONAL COMPUTER EXCHANGE
(800) 624-9299
600 North Lunar Avenue, Brea, CA 92621
TWX: 910-596-1499 (714) 990-5988

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

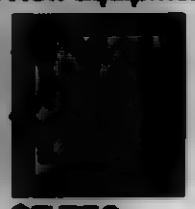
DISK DRIVES · CONTROLLERS · PERIPHERALS · MEDIA

WANG · DEC

National authorized CDC OEM-Distributor (for Controllers and Media) offers *New Equipment*, fully warranted for 90 days:

$12,900

CDC Model 9766 (300 Mb.) WANG Models 2285V–2, and 4586 (600 Mb.) DEC Model RM03 (666.1 Mb.)

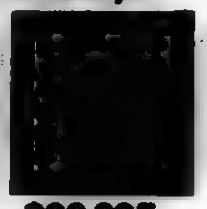


$7,750

CDC Model 9762 (80 Mb.) WANG Model 2285V–1 (75 Megabytes), DEC Model RM03 (67.1 Mb.)

$8,875

CDC Model 9448 (85 Mb.) WANG Model 2280–3 (80.4 Mb.) WANG Models 2280 V–3, 6580 (80 Mb.) DEC Model RM07 (83.4 Mb.)



$20,825

CDC Model 9775 (675 Mb.) WANG Model 2285 V–3 (840 Megabytes), DEC Model 2–RM05 6s (512.2 Mb.)

ERST

INTERNATIONAL CORPORATION

225 Lafayette Street, New York, NY 10012

ERST is the leading dealer in pre-owned WANG equipment – 2200, VS, WP (CPUs, Terminals, IOPs, Controllers, Printers, Memory Upgrades).

Next time give us a call . . . Toll Free **1-800-FOR-ERST** . . . In NY. **212-431-1100**

---

ceres announces hardware made easy

- *Easy to buy– most IBM products available immediately*
- *Easy to lease– FAS 13 Operating Leases IBM S/34, S/38, S/36, 4300, 308X*
- *Easy to rent– IBM 5224, 5225, 5291, 5251, 3278, 3178, 3279, 3287*
- *Easy to sell or trade in– best deals in town.*

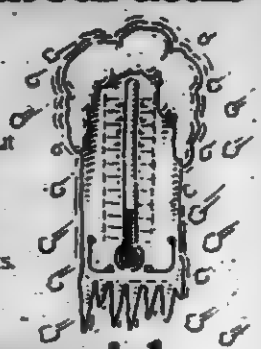
Come to Ceres for all your computer needs. Call (212) 279-4467 in New York; (713) 627-7117 in Houston.

Do it today.

ceres capital corporation

MEMBER AMERICAN SOCIETY OF COMPUTER DEALERS

Minnesota's temperatures may cool off, but our deals never do.



If you're buying, selling or leasing IBM equipment, call us about the following: S/23, S/34, S/36, S/38 and Series I. We handle system upgrades and related peripherals. We feature flexible lease options and month-to-month rental agreements. **1-800-328-9599.** (In Minnesota, 612-559-7171).

Midland Financial

12800 Industrial Park Blvd., Minneapolis, MN 55441

FRONTIER COMPUTER CORPORATION — Your Full Service Computer Dealer

DPD	S/34 S/36 S/38	Series/1	3270's
• Mainframes • Peripherals • Communications — Call — FRED HANNEN	& RELATED PERIPHERALS — Call — RICHARD LORANG	• Systems Configured To Your Specs • All Features and Peripherals Available • Depot Repair Service — Call — JOHN BURLEW RANDY STONE	3277 • 3278 3274 • 3276 3271 • 3272 — Call — TERRY SMITH

DALLAS: 214 - 350-7243 • HOUSTON: 713 - 550-7366
OUTSIDE TEXAS TOLL FREE 800 - 527-8438

4373 South Westmoreland, Dallas, Texas 75237 • 16151 Calamway, Suite 100, Houston, Texas 77084

No charge to tell the DG world

what equipment you have to sell or buy.

500,000 CONTACTS

800-843-2047

CPR:RESALE 800-368-8317 California

1630 Fourteenth Street, Santa Monica, CA 90404

EL CAMINO RESOURCES LTD.

offers:

For Sale

4361 M02/P02	5B4 & 6B4
4361 M01/P01	7127/84
4341 P12	6/1/84
4341 M02	4B4 6B4 7B4
4341 Memory	6B4

Call: Mel Kleiman
(818) 986-3611
4827 N. Sepulveda Blvd.
Sherman Oaks, CA 91403
We also buy equipment.

IN STOCK!

Fujitsu Eagle

with cabinet, cables, slides & terminator:

$13,000

New Fujitsu SP 380

80 character per second, letter quality printer.

Introductory Special - $2,000

MANDERS BUSINESS SOLUTIONS INC.

303-693-3035

2771 S. Jasper • Aurora, CO 80013

When buying, selling or leasing computer equipment, there's a *great deal* to be gained by advertising in

- BUY
- SELL
- SWAP

Call COMPUTERWORLD's Classified Dept now at 1-800-343-6474 or (in Mass.) 617-879-0700 for the details.

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

IBM

5110 5120
3741 3742
DATAMASTER

1255 MICR

SYSTEMS
34 36 38 32 23
All Associated Peripherals

BUY SELL LEASE

- Printers, Display Stations
- Upgrades & Features/Add-ons
- Trades/Takes
- IBM Maintenance Guaranteed

Call Today for Quotation
(615) 352-6565

SOUTHERN DATA SYSTEMS
Nashville, Tennessee

IBM
SYSTEM/34
S/3 • S/32 • S/38
5291 • 5251
3741 • 3742

BUY • SELL • LEASE
REFURBISHED • RECONFIGURATED
SHORT-TERM LEASES
PURCHASE/LEASEBACK

Tennecom
MARKETING INCORPORATED
210 SPACE PARK NORTH
P.O. BOX 248
GOODLETTSVILLE (NASHVILLE)
TENNESSEE 37072

800-422-1004
IN TENNESSEE CALL: (615) 859-3872

DSI

WE BUY SELL & LEASE!

BURROUGHS

Discover the DSI alternative.

800-641-5215
All equipment available immediately and guaranteed for Burroughs Maintenance

DSI Serving the Burroughs Community Worldwide
2480 W Alameda Ave, Denver CO 80223 (303) 922 8331
TWX 910 931 0483

COMDISCO

A Commitment To Excellence

IBM PROCESSORS IBM PERIPHERALS

3081 3830
3083 3880
3033 3380 AA4
4341 3803-2
3420-4
4341 4381 3705 3706
4381 3178 3278
4331 2 4361 3890
Amdahl 3800 3211 3203

The Leader In Full-Service Leasing

PEARL HAS IBM SYSTEMS
34, 36, 38

and we have a large inventory of IBM 3741's, CPU's, CRT's and printers. We buy, sell, lease, rent and purchase/leaseback IBM Systems.

Call John Spight or Ken Warren
Pearl Computer Division
•P.O. Box 24026 •4717 Centennial Blvd.
Nashville, TN 37202 (615) 383-8703

System/34
128K/64MB
Printer 300LPM
9600, P/Mo.
Sale/Lease

Sale/Lease
4341's
Models K, L, M - GRP 1 & 2
Lease Term -
1 Yr or Longer

Control Units
3880 - B13
3880 - D13
Avail. March 1984
Sale/Lease

Controllers
3880 3803
3274 3276
Immediate Delivery

DASD
3380 3375 3370
3350 3344 3310
Immediate Delivery

Tape Drives
3420 3430
3410 3803
Immediate Delivery

Display Stations
3278 3279
3178 3277
Immediate Delivery

Printers
4245 3262 3289
3211 1403 3262
3289 3287 4245

CDLA
Computer Marketing Inc
P O Box 5265 Philadelphia PA 19125

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

TexCom

WE BUY • SELL • LEASE

JOIN THE MANY FORTUNE 500 COMPANIES THAT UTILIZE IBM EQUIPMENT FROM TEXCOM . . . THE IBM SPECIALISTS

SERIES I

- All features and peripherals
- We buy, sell or trade
- Convenient leases available

1831 1811 • 1861 1881

- We buy, sell or lease
- Two, three, four year leases

WE'VE GOT IBM PERIPHERALS

3803	3380	3350	3211
3420	3880	3370	3811
3375	3340	3203	3262

IBM S 34 — 36 — 38

- All upgrades available now
- One, two, three year leases
- We'll take S/34 trade-ins.
- All models and peripherals

WE'VE GOT ALL IBM PRINTERS AND TERMINALS PLUS 3864 MODEMS NOW.

FOR SALE OR LEASE

IBM PC-XT'S
256K, COLOR MONITOR
AND GRAPHICS PRINTER.

Call Toll Free: 1-800-833-9119

SAN ANTONIO (512) 349-9966
MEMPHIS (901) 756-7058
HOUSTON (713) 690-8714

Your Texas Computer Connection

Computer equipment at big savings.
Everything from PC's to Mainframes.
214/258-0541

Metroplex Computer Company, Inc.
320 Decker Drive, Suite 180 • Irving, Texas 75038 • TLX 75-9774

Digital Brokers, Inc.

P.O. Box 81498/Atlanta, Georgia 30366/(404) 441-8780

COMPANY PRESIDENT JIM MOORE invites you to try our services.
We specialize in:

SALES • PURCHASE
BROKERAGE • LEASING

- Digital Equipment Corporation
- Plug Compatibles
- Depot Repair Center

FOR SALE
DEC PDP 11/34A

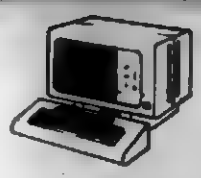
256 KB, 2 RK06 Drives With Controller, 29 RK06 Disc Packs, 1 BA11K, 1 DL-11, Tall Cabinet, Power Supply & Cables. Was Under DEC Maintenance. Available Now.

Call Tom Byrne
312-593-5700

We'll keep you up to date week, after week, after week, after week, after week.

BUY — SELL — LEASE
SYS/34 SYS/36

- IMMEDIATE DELIVERY
- GUARANTEED M/A
- SHORT TERM RENTALS
- PERIPHERALS
- FEATURES-UPGRADES



MARION
84 KENNEDY STREET
HACKENSACK, N. J. 07602

(201) 343-4554
(203) 758-2409
(412) 864-6611

You can get information on buying or leasing
IBM 34-36-38
as fast as you can dial
1/800/LEAS-PAK.
In Texas call 817/268-0023.

Up to 50% Savings

LPI

LEAS PAK INTERNATIONAL

P.O. Box 759 • Hurst, TX 76053 • 817/268-0023

Send for our free products and services brochure:

Name _____
Address _____
City _____ State _____ Zip _____
Phone _____

Limited System/36 deliveries, new displays and printers in stock. We want to buy your owned or rental cradle equipment.

Qantel !! Qantel !!
finally!
QT-3

Qantel Users Now Have A Low Cost Alternative.

IDC QT3 terminal is 100% hardware and software compatible with the Qantel VDT video terminal and is significantly lower in price! The ergonomic design of the QT3 makes it a handsome addition to today's modern office environment and is engineered with your comfort and ease of operation in mind.

INTERNATIONAL DATA COMMUNICATIONS, INC.
2911 "T" CLOVERDALE AVENUE
CONCORD, CA 94518 / (415) 798-1468

FORSYTHE
McARTHUR ASSOCIATES, INC.

DEALER / LESSOR OF IBM
Computers and Peripherals

FOUNDED 1971

Home Office
Chicago
219 North Michigan Avenue
Chicago, Illinois 60611
312 943-3770

Branch Offices
Atlanta 404 953-9457
Milwaukee 414 785-0644

CDLA

11/780 For Sale

11/780 With 2 Mb; TE16;
2 Fuji Eagles;
Emulex LA120; VMS
One Year Old
In DEC Perfect Condition
$145,000

(817) 777-4886

FOR SALE
HARRIS
SUPERMINI
SYSTEM H-100

384KB Memory, 80MB Disc, 600 LPM Printer, 12 Terminal Ports, 1 Sync Port, Virtual Memory Op Syst.

Contact Dave at
COMTRAX INC.
(513) 563-8888

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

HP 1000 3000

TELEX 756827
encore
(213) 452-0117

WANG WORD PROCESSORS
AT THOUSANDS OFF!
Guaranteed, remanufactured WPS 20, WPS 30 and Wangwriters available for immediate delivery. You don't pay a cent till Wang installs and places equipment under service contract. 15-day return privilege. Buy, Lease, Rent!
For Free info and fast response call toll-free:
1-800-321-2986
ELECTRONIC OFFICE EXCHANGE, INC.
Dept. SCICWD • Box 7337 • Ann Arbor, MI 48107

FOR SALE
AVAILABLE IMMEDIATELY

UNIVAC 1110 SYSTEMS 60 Hz
2 x 3023-99 + 1 x 3023 - 00

1 x 3025 - 00 I/O
2 x 4013 - 99 CONSOL
8 x 7015 - 00 8 x 32 K
3 x F1331 - 00 MEM EXP
4 x 7013 - 81 4 x 131 K
1 x 2516 - 00 SPU
4 x 0963 - 00 MAI
5 x 5033 - 99 DISC CONTR.
28 x 8440 - 00 DISC DRIVE
8 x F1482 - 00 QUAL ACC D4AL
5 x F1324 - 02 SPI
2 x 5017 - 00 UNIS. 12/16 CONTR.
2 x 0961 - 99 MSA
2 x F1324 - 02 SPI
17 x 0862 - 04 UNIS 16
2 x F0937 - 01 DUAL DENS.
2 x F0826 - 06 9-TR NRZI
2 x C/SP UNITS WITH SYNC/ ASYNC LINES MAINTAINED BY UNIVAC

SURPLUS
FFV ARLMATERIEL AB
SWEDEN
Stockholm, Enköpingsvägen 14, Box 8201, S-171 08 Solna, Sweden.
Contact: Jan Lundmark, Telephone +46 8 27 25 70. Telex 12158 ffvac s.

C.D. SMITH & ASSOCIATES, INC.
DEC computer systems & options
13905 East Freeway, Suite 310
Houston, Texas 77015
(713) 451-3112
TELEX 76-2547

DEC

WE ARE BUYING: VAX 11/780

WE ARE SELLING:

MS780-CC	5,500	TS05-BA (Rev.)	5,500
MS780-CA	4,500	11/44-FA	Call
MS780-CC	5,000	11/780-FA	Call
DW780-AA	5,500	11/780-KA	Call
RP11-A(R=)	41,500	MS780-EC	35,575
DZ11-E	2,500	11/05A-TE(Rev.)	5,500

If you want on our Mailing List, call Valerie (713) 451-3112.

REAL ESTATE

WANTED: MAINFRAME COMPUTER FACILITY
Need within 90 days a mainframe computer facility equipped with adequate power, HVAC, fire protection, etc. Need approx 10K sq ft raised floor. East Coast (mid-Atlantic preferred) location. Please reply with particulars. All responses acknowledged.
Reply to CW-Basel
Computerworld
Box 880
Framingham, MA 01701

The Bulletin Board
Buy • Sell • Lease Buy • Sell • Lease Buy • Sell • Lease Buy • Sell • Lease

T I

For Sale By Owner
TI 990, MODEL 4
128KB Memory, 10MB Disk
3 Mod 911 Terminals
Call Dan Humphries
(503) 684-2874

WANG

Pssst...
WANG USERS.....
HAVE YOU HEARD ABOUT THE GROUP OF FORMER WANG EMPLOYEES IN ATLANTA WHO BUY & SELL USED WANG EQUIPMENT AND PLUG COMPATIBLES?
LC.A. (404) 977-4366 or
1-800-241-3159

NEW 288MB WANG COMPATIBLE DISK DRIVE $8900.
Several VS80's with 2246C's, Mods and Band Printer, Tape Drive.
(2) MVP, 80MB Disk and Workstations.
CALL FOR QUOTE
Basic Systems
(209) 665-3656

MISC. SYSTEMS

Micro to Mainframe
Transmit DOS Direct
"NATIVELINX"
3270 - 2780/3780
Dealer, Quantity, Educational Discount
Viking Associates
(303) 632-7004

HONEYWELL

LEVEL 6 & DPS 6 EQUIPMENT
Refurbished Line Printers
FRU6103 240 LPM, 96 Char.... $4,125.
FRU6104 300 LPM, 64 Char.... $4,725.
FRU6106 600 LPM, 64 Char.... $6,525.
New (Never Used) Disk Drives
CDU 9716 10MB
(8F & 5R) CMD ..... $3,200 Ea.
Boudreaux Computer Services Ltd.
(617) 369-4699

HONEYWELL DPS6/45
512K CPU
80 MB Disk (67 + 13)
1-300 LPM Printer
1600 BPI Tape & Controller
2-7801 CRTs
Available Approx 5/1/84
Buy Our Equity and
Take Over Last 12 Months
of FMV Operating Lease
(216) 234-8727

DATA GENERAL

MV 8000/8000 2 Mb Memory
MV 10000/4000 2 Mb Memory
8656 256 Kb Eclipse Memory
D211 CRTs $625
6053 CRTs $600
6045 10 Mb Disk $2000
6061 192 Mb Disk $13000
MV 8000 System ..... Call
C-350 1 Mb System $16000
Nova 4S CPU 64 K $3500
Nova 3D CPU 128 Kb $2800
DG Compatibles (New)
Supports All DG Series CPUs
1600/6250 BPI Tape Unit ..... Call
6061X Disk Drives ..... Call
616X Disk Drives ..... Call
International
Computing Systems Co.
(612) 941-2941

DESKTOP COMPUTERS
D210's, D211's, D410's & D461's
2MB More for MV/4000 & MV/10000
Desktop Printers
8230 35-MB Disk System
6061, 6038, 6135 Tape Drives
6191 147MB Disk System
1MB Memory for C/150
Axiom Electronics Inc.
(301) 220-0100

Desktop Generation
10, 20, 30 Immediate Delivery
Systems, Software, Service
Copley Management
(617) 227-3402

QANTEL

QANTEL SYSTEM 990
System Includes 7.5 Processor, 64K Memory, 1 Video Display, 1 150 CPS Matrix Printer, 8 + 8 Disk Drive (12 MB). $10,000 or Best Offer.
Contact Calvin Miller
(215) 576-4010

PRIME

PRIME
LARGE SELECTION OF USED PRIME COMPUTER SYSTEMS ...SAVINGS TO 50%
Peripherals also available:
Magnetic-Disk Drive-Controllers
Medium-Terminals-Printers
1st SOURCE
...Your Alternate Source
A DATAMATION SERVICES, INC., COMPANY
2001 EAST CAMPBELL AVE.
PHOENIX, ARIZONA 85016
(602) 957-0999
ASK FOR DON OR MATT

MISC.

MICOM 600
PORT SELECTORS
2400 BAUD
QUAD CARDS
CALL TODAY:
(703) 841-5634

BUY - SELL - LEASE
DATAPOINT
HARDWARE & SOFTWARE
-Turnkey Systems -FMS Software
On-Line Accounting
(713) 529-6613

TANDEM
4104 (300 Meg) Disk Drives
Cables and Packs
NEW and USED
Terabit Computer Systems
(514) 337-4212
Telex 05-824058

MISC.

We buy and sell new and used related gear. Immediate delivery from our warehouse in Westwood, New Jersey with quality installation. We are now also able to serve any of your needs in Europe and Scandinavia from our office in Helsinki. For further information write or call Pascal Computer Peers, Inc., 6 Sullivan Street, Westwood, NJ 07675, (201) 666-6800, telex number 13-6878.

Buy • Sell • Lease
• Short Term Rentals •
DATAPOINT
FOR SALE
(2) 4020 MS Sharp
(2) 4020 128K Processor
(20) 2200 CRTs
(1) 8001 Disk Expansion
(1) 8006 300LPM Printer
(1) 9375 Disc Expansion
(2) 9001 128K Processors
(1) 9004 Tape Drive
(20) 8402 Keyboards
Plus Misc. Memory Boards
AVAIL IMMEDIATELY
Cougar Computer Corp.
(216) 261-3660

More Bulletin Board on the next page.

The Bulletin Board

Buy • Sell • Lease Buy • Sell • Lease Buy • Sell • Lease Buy • Sell • Lease

IBM

SYSTEM/34 SALE

*** CPUs ***
5340-C02 $6,500.
5340-C03 $9,000.
5340-D01 $12,500.
5340-D02 $16,000.
5340-E02 $27,000.

*** Printers ***
5211-002 $4,500.
5256-001 $12,000.

*** CRTs ***
5251-011 $1,250.

Also Available All Disk and Feature Upgrades. System 23's Available. Trade Your System 34.

(212) 279-1717

SYSTEM 36's
Available Now
With Our Total Solution Accounting Software and Financing Arrangements.
Executive Technology Data Systems
Dallas, TX
(214) 358-1000
Detroit, MI
(313) 885-0770
Oklahoma, OK
(405) 271-6000
Reading, PA
(215) 374-5770
Trumbull, CT
(203) 377-3007

PRINT TRAINS
IBM 1416 & 3216
Bought - Sold - Lease
Repaired - Reconditioned
CENTRA-ACT COMPANY, INC.
(913) 888-8491

Buy • Sell • Lease IBM
Cougar Computer Corp.
Suite 219
29800 Euclid Office Plaza
Euclid, OH 44132
(216) 261-3600

4341-L1 New - $275,000/each
4341-P2 3281 - $12,000/each
3278-2 Qty. Here - $350/each
Syscomp
(913) 799-4310

4341-L10
W/1870, 4MB
Now $75,000.
Or Best Offer
Call (214) 991-2911

The University of Missouri - Columbia, will accept SEALED BIDS, until 8:00 A.M., Tuesday, April 17, 1984, for the Sale of Used IBM System 32 Computer, located at KOMU-TV Station, Highway 63 South, University of Missouri - Columbia, Columbia, Missouri. For more information contact Mr. William Rogers, KOMU-TV Station, telephone (314) 449-1132.

$130-A21
For Sale
Never Installed. Not a dealer or broker.
Call Al Dec
517-636-4656

Wanted
4341-M2
June 84
For Sale
SYSTEM 34-D23
2 Comm Lines
Call Tested
(201) 666-6133

WANTED
IBM OS/6
Prefer with communications.
(201) 239-1005

IBM

For Sale By Owner
IBM SYSTEM/34 E35
With 1 3211 Mod 2 Line Printer
1 Magazine Drive
Also Available
3251 Terminals
IBM Maintenance Guaranteed
Available 5/1/84
The Data Corporation
Robert Daly
(215) 674-5888

Available Now
4331-K2
Short Term Lease OK
Call Norman Burger
(203) 661-1500

WANTED
4331
Call Bill Hegan
(914) 238-9631

Buy .....Sell..... Lease
IBM MICR
3890 - 1419
1255 - 3694
(813) 722-4534

WANTED
IBM 3088-01
Multisystem Channel Communication
Buy, Lease or Sublease
Contact Jim Bailey
(904) 350-7506

Used
S/36 **B24**
Below IBM List
Great Lakes Computer Corp.
(216) 331-8885

SALE/LEASE
S/36
B23 & B24
Call Ron Gibb
(914) 238-9631

FOR SALE
SYSTEM/34
MODEL E24
$10,299
AVAILABLE IN MAY
(617) 426-6530 EXT. 216

SALE
S/34 **E35**
FOB New Jersey Now
Call Louis Felder
(914) 238-9631

SERIES/1
4955-F03 512K
4963 Disks 192Mb
4967 PCS 16 Audio Lines
3660 SDLC 3664 Sdlc
Diskette & Tape Drives
Other Peripherals
1 Year Old Available Now
Call Jerry (800) 241-6512

4341-L2
With 1601 and Memory Upgrades
Available June 1
JBI Associates, Inc.
(303) 986-0820

S/34 Sale or Lease
5340-E34 128K/44MB/20
$10,000 or $500 p/mo
Avail: Immediately
Std for IBM maint.
Call: Barnie Gast
(215) 783-1019

IBM

IBM SYSTEM/34
CPU Model F35
3262 Printer Attachment
Workstation Expansion
One Communication Line
IBM Maintenance
$80,000 or Best Offer
MORSER CONSTRUCTION, INC.
Tom Mitchell
419-334-3601

IBM S/34 Mod E34
1 Communications Line
Diskette Magazine Drive
(617) 222-9234
Paul Waterman

I B M
for sale
2
3864 Modem's Model 1
$3,000 ea.
Contact Geo Solomon
(214) 572-4336

SYSTEM/36 LEASES
Less Than IBM
A12 $600.
A32 $1,040.
D83 $1,460.
Immediate Delivery
Flexible Terms
Call Toll Free
1-800-631-6992
In Texas Call
(512) 822-9992 Collect

For Sale
IBM SYSTEM 34's
Any Model or Configuration
Disk and Memory Upgrades
Available Within 30 Days
Eligible For IBM Maintenance
Call Pat
(913) 362-3911 ext. 5

FOR LEASE
4381 P02
June Delivery
3370 A2's, B2's
Immediate
(212) 279-4467 (713) 627-7117

DEC

DEC BARGAINS

11/84A CPU Set	$1,595
11/44 KE44-A "CIS"	$2,975
4A-C2780 Spares Kit	$9,800
BDV11-AA	$485
DR780-AA	$8,400
DZ11 MUX Brd.	$1,125
DZ32-A	$2,175
DZ32-S	$1,870
FP11A	$1,185
KX11-A	$1,785
KX11-B	$2,675
KW11-P	$330
MS11-MB	$1,175
MS780-DC	$4,850
MS780-FD	$2,995
MSV11-PK	$675
MSV11-PL	$1,275
RLV11	$975
VAX 1MB MS730-CA	$2,995
VAX 1MB MS750-CA	$2,995

Call Ray
at QEI, Inc.
(617) 275-6900

DEC 11/03 System
With 32KB, RXV11-BA, Cabinet, LA36 Printer.
$1,975
Call Ray
(617) 275-6900

BUY • SELL • TRADE

1170 Sys.	LA120-DA	RH780
DL11-W	M7258	RM03-AA
DMC11	MS812	RM03-C
DR11-B	MK11-BE	RP04/5-C
DZ11-B	MK11-DE	RP05-P
DZ11-E	RH70	TE16 Mstr.

NEW YORK COMPUTER EXCHANGE
(518)752-4466 (800)845-6180

DEC

DEC & PRIME SPECIALS

- MS780-FD Avail Now $3,900
- MS780-E 64K Chip Memory Upgrade Kit $18,900
- 1144-DA New $24,800
- VT101-AA New $975
- RM80-AA $8,500
- PDP 11/70 CPU Core Memory KB11-C Call
- RM03-AA New $5,500
- MS750 $3,395
- CDC 9766 300MB $8,500
- Dataprinter 1000LPM Band Printer $4,000
- VAX 780 1/4MB MB210 $749
- LP14-DA $8,900
- LA36 Unused $900
- Prime Computer Systems Available Upon Request
- Emulex Controllers Available

SEVCO INC.
(617) 435-6936
(617) 435-6331

VAX 11/730
For Immediate Delivery
1 MB MOS Memory
LA12
DMF32
VMS 3.5
RUA80
RL02
CALL TODAY:
(703) 841-5634

DEC NEW & USED
BUY — SELL — EXCHANGE
Systems • Processors • Memory
Options • Peripherals • Modules
LAKEWOOD COMPUTER CORP.
2032-B Saller St., Santa Clara, CA 95050
(408)296-2545

DEC

We Buy and Sell DEC Systems and Components. Wanted: VAX and 11/70 Processors.
Alphabyte
590 S. State College Blvd.
Fullerton, CA 92631
(714) 680-6511

DEC VAX 11/780 SYSTEMS
For Sale
Corporate DP Consolidation Allows For Sale of Excess Equipment. Includes: 4 MB Memory, Floating FT., 2 RP07 Disks, 1 RM80 Disk, 1 RA60 Disk, 2 TU78 Tape Drives, 4 DZ11-E 16 Channel MUX. Also Have VT100 CRTs And LA120 Printers. Will Sell as Pkg. or Separately. Contact: Jim Elliott at (213) 726-0333.

HEWLETT PACKARD

HP3000
BUY!BUY!BUY!BUY!BUY!
SELL!SELL!SELL!SELL!
RENT!RENT!RENT!RENT!
LEASE!LEASE!LEASE!
HP3000!HP3000!HP3000
Complete Systems
Processors • Peripherals • Parts
ConAm Corporation
Santa Monica, California
(213) 458-2643 (800) 643-4664

HEWLETT PACKARD
1000 • 2000 •3000
SYSTEMS & PERIPHERALS
BUY & SELL WORLDWIDE
EURODATA, INC.
(613)725-6466
Tlx: 053-3525

HEWLETT PACKARD

Buy-Sell-Lease
HP3000 3X, III, 4X
and related peripherals
Call Carol
CSU INDUSTRIES, Inc.
516-239-4316

HP7978A TAPE DRIVE
ONLY USED 9 MONTHS
List $44,400.00
OUR PRICE $22,000.00
AVAILABLE IMMEDIATLEY
CALL (619) 353-0410

BURROUGHS

BUY SELL LEASE
All Systems & Peripherals
AVAILABLE
• B1955 Sys • B1935 Sys
• B900s • B900s
(Configured To Your Specs.)
• Wang 300 Terminals
• 600 Terminals model 105 & 110
• TD830s, MT980s, MT985s
• 500 & 307 Style Disk Drives
• Various Tape Sub-systems
• Memory Upgrades
• Printers 9248 & 9449 Styles
Guaranteed Burroughs Maint. Depot Maintenance Available
COMPUTER PROVISIONS
(216) 248-7878
(Member ADP)

BUY • SELL • LEASE
B1700 • B1800 • B1900
(Custom Config. Install. Avail.)
B30 through B7900
205/207/225/235 Disk
9348/47/48 Printers
Mag Tape Subsystems
TD830 • MT980 • SPO • Datasaver
TU/CC/CPTT Terminals
Installation & DEPOT M/A Available
UPP Corp. (312) 279-1199

ORDER FORM

COMPUTERWORLD BULLETIN BOARD

Issue Date: Ads can be accepted up until the Monday preceding the issue desired. Computerworld comes out every Monday.

Classifications: Most ads will be classified according to the brand of equipment that is being bought or sold. These classifications include Burroughs, Data General, Digital/DEC, Hewlett Packard, Honeywell, IBM, NCR, Sperry Univac, Salvage, Terminals, Misc. Systems and Miscellaneous.

Copy: Copy sent in via the mail or telecopier (telecopier extensions are 416 and 451) should be clearly typewritten. Ads may be given over the phone to our ad takers. The standard size is 1 column by 1 inch deep. These units may be combined to form larger sized ads. Describe the equipment very briefly, give the price and the name of the person to contact. All ads will be set up using a standard format. No borders or logos are allowed.

Cost: The price for each standard unit is $130.00 (One unit minimum and no fractional units allowed.) There are no agency commissions and no quantity discounts.

Billing: Once you've written your ad, send (or call) it in with your name and address for billing purposes and we'll run it. (If your company has never advertised with us before, we request a check with your order.)

Date(s): _____

Signature: _____

Name: _____

Title: _____

Company: _____

Address: _____

Telephone: _____

Send this form to:

COMPUTERWORLD BULLETIN BOARD
375 Cochituate Road, Box 880,
Framingham, MA 01701

617-879-0700 800-343-6474

SOFTWARE FOR SALE

Sell Your Software in the Classified Pages of Computerworld

Call 800-343-6474 (or 617-879-0700) for more information

Elegant Software

for IBM S/34, 36 and 38

General Accounting	Payroll/Personnel
Financial Reporting	Property & Equipment
Accounts Receivable	Report Writer
Accounts Payable	Oil & Gas
Order Processing	All Systems inc:
Inventory Management	RPG II/RPG III
Sales Analysis	Data Base
Job Cost	Interactive

J.D. Edwards & Company
3640 South Syracuse Street/Suite 5500
Denver, CO 80237
303/773-3732

Dallas — 214/458-0636
Houston — 713/680-5275
Northern California — 415/967-7784
Southern California — 714/751-5902

CODE BANK

S/38 Program Generator

For only $950, CODEBANK gives you a source code library system that becomes a self-customized program generator. You easily enter, change and retrieve code modules. By linking these modules together, CODEBANK can generate up to 80% of any new programs you build, and eliminate most bugs. It comes ready to use with 7 database programs and 100 modules.

For FREE User Guide, CALL TOLL FREE 1-800-328-1000 Ext. 125

HELP/38

A Division of Advanced Circuits

More IBM System/38 Users Are Choosing RTC Systems.

For technically superior software in a wide range of Financial, Manufacturing, Distribution and Management Business Systems.

The International Software Developers.

RTC Systems, Inc.
49 Plain Street
North Attleboro, MA 02760
(617) 695-5005

Specializing in IBM System/38

FRIEDMAN & ASSOCIATES INC

111 Wyndcroft Road
Deerfield, Illinois 60015
(312) 948-7160

Totally on-line order entry, complete manufacturing systems, MRP with on-line net change

Fixed price software, including customizing, conversion, training, installation

We make it work!

EQUIP YOURSELF IN THE CLASSIFIED PAGES OF COMPUTERWORLD

SOFTWARE CONVERSION SOLUTIONS

Datawave provides the software translation system for your complex conversion problems. Over 15 years of conversion experience has resulted in thousands of satisfied customers, worldwide.

- [illegible] to [illegible]
- [illegible] / SPS to [illegible]
- [illegible] / TRAN to [illegible]
- RAL / ALC to [illegible]
- DOS / ALC to OS / ALC
- PL/1 to [illegible]
- SPS / SPS II to [illegible]
- SPS / SPS II to PL/1

Datawave offers services & software to meet your needs. For more information, call or write today.

The Conversion Software People

Datawave, Inc.
2565 Elmwood Avenue
Buffalo, New York 14217
Phone (716) 876-8722
TELEX 91519

TIME & SERVICES

*Sperry 1100/60 Center
*Hasper *UNIS
*TIP/CMS *DMS/OPS
Time Sharing
On-Line Manufacturing Systems
On-Line Financial Systems
"Hot Site" Back-Up Service
Peak-Load & Direct Mail Processing
Contact: Mr. Lloyd Brown
(215) 337-4155

SDS
STANDARD DATA SERVICES INC.
771 Fifth Avenue
King of Prussia, PA 19406

COMPUTER TIME RENTAL

IBM 4331
DOS/VSE - ICCS
All Shifts Available
3370 Disk, 3420 Tape
Dual/Density
1403-N1,
3540 Reader/Punch
Reasonable Rates
Contact: Al Pavao
Psychometric Data Services
(212) 697-1411

COMPUTER TIME & TIMESHARING

- We are time brokers.
- IBM timesharing our specialty.
- Also RJE & batch time.

Call John Rudder at
Computer Reserves, Inc.
(201) 666-5700

VAX TIME

VAX 11/750 VMS

Available Nationwide Via Tymnet/Our Network Or Yours

- FORTRAN, Datatrieve, FMS, Macro
- Polytransfer Communications With Your Micro
- Off Line Printing
- Disk/Tape Storage
- Systems, Programming & Customer Service Available
- VAX Conversion Assistance

$14. PER HOUR CONNECT TIME

Port Leasing With 10 Mb Disk $900. Per Month

ICS
1-800-237-8133

NORWOOD COMPUTER SERVICES
Franklin Square, New York
4341 DOS/VSE - CICS/ICCF/VSAM

- Computer Time - All Shifts
  Batch or CICS
  Technical Support Available
- Consulting Services
  Specializing in CICS Applications
- Communication Network
  Satellite and Telex Link

Contact Hank Piscioli
(516) 352-1947

COMMERCIAL DATA PROCESSING

4341-2 370/158-3

OS-DOS-VM/CMS
CICS-ROSCOE
REMOTE JOB ENTRY
CICS DEVELOPMENT
CUSTOMIZED SOFTWARE
XEROX LASER PRINTING

Contact Greg Gorab
(201) 777-3454
13 MINUTES FROM LINCOLN TUNNEL
ONE PASSAIC STREET,
WOOD RIDGE, N.J. 07075

VAX/VMS TIMESHARE

5¢

$2 PER HOUR CONNECT TIME
ONE MB DISK STORAGE INCLUDED
AVAILABLE NATIONWIDE
VIA TELENET
LEASE-A-PORT™ WITH 10 MB DISK
& NO CPU OR CONNECT CHARGES
FOR $800 PER MONTH

MIDCOM CORPORATION

(714) 699-6070

DEPOT COMPUTER REPAIRS

DEC-DG-IBM PC
ALL BOARDS
1-2 WEEK TURNAROUND
90 DAY WARRANTY
MEMORIES
POWER SUPPLIES
ANY MANUFACTURER

DATA CENTER SERVICES

TWO [illegible]

BURNS

Rent Terminals or Time in the Classified Pages of Computerworld.

Call 800-343-6474 (or 617-879-0700) for more information

COMPUTER TIME

3033-U
4341-2
TSO/CMS
CICS/IMS

Call Pat Holmes
(201) 930-9561
(212) 921-8855

VAX 11/780 AND PDP-11 DEVELOPMENT TIME

NO KILOCORE TICK CHARGES / NO CPU CHARGES

Omnicomputer

$7/$14

RSTS/E VMS

PER HOUR CONNECT TIME

BUDGET BYTES™ 212-944-9230

Omnicomputer, Inc.
1430 Broadway, New York, N.Y. 10018

CLASSIFIED ADVERTISING ORDER FORM

Computerworld's Classifieds work.

Issue Dates: Ad closing is every Friday, 10 days prior to issue date.

Sections: Please be sure to specify the section you want: Time and Services, Software for Sale, Position Announcements and Buy/Sell/Swap. (Available upon request: Software Wanted, Business Opportunities and Real Estate).

Copy: We'll typeset your ad at no extra charge. Please attach CLEAN typewritten copy. Figure about 25 words to a column inch, not including headlines.

Cost: Our rates are $126.10 per column inch. (A column is 2" wide.) Minimum size is two column inches (2" wide by 2" deep) and costs $256.20 per insertion. Extra space is available in half-inch increments and costs $64.05. Box numbers are $15.00 extra.

Billing: If you're a first-time advertiser, (or if you have not established an account with us,) WE MUST HAVE YOUR PAYMENT IN ADVANCE.

Ad size desired: _____ columns wide by _____ inches deep.

Issue Date(s): _____

Section: _____

Signature: _____

Name: _____

Company: _____

Title: _____

Address: _____

Telephone: _____

Send this form to:

COMPUTERWORLD

CLASSIFIED ADVERTISING,

375 Cochituate Road, Box 880,
Framingham, MA 01701

Foreign Editorial/ Sales Offices

England: Terry Cartwright, EEC Publications, 198-200 Belle Pond Rd., London N! 4AQ. Phone: 01-359-3525, Telex: (851) 894085 (Computer Management, Computer Business Europe only).

Euan Ross, Bill Dunlop, Stephen Thomas, Beere Hobson Assoc., 345 Goswell Rd., Islington, London EC1V FHN. Phone: 01278 3415/6 (reps for all CWCI publications except Computer Management and Computer Business Europe).

W. Germany: Eckhard Utpadel, CW Publikationens, Friedrichstrasse 31, 8000 Munich 40. Phone: (089) 38172-0. Telex: 5215350.

France: Axel Leblois, Le Monde Informatique, 185 Avenue Charles De Gaulle, 92200 Neuilly Sur Seine, Paris. Phone: 758.14.14. Telex: 613234 F.

Japan: Mr. Shuji Mizuguchi, Computerworld Japan, 7-4 Shintomi 1-Chome, Chuo-ku, Tokyo 104. Phone: (03) 551-3682, Telex: 252-4217 (Computerworld Japan only).

H. Kajiama, Tokyo Representative Group, Yamaguchi Bldg., 2-12-9 Kanda Jimbo-cho, Chiyoda-ku, Tokyo 101. Phone: (03) 230-4117/8, Telex: J26860 (reps for all CWCI publications except Computerworld Japan).

Australia: Alan Power, Computerworld Pty. Ltd., 37-43 Alexander Street, Crows Nest, NSW 2065. Phone: (02) 4395133, Telex: AA74752 COMWOR.

Brazil: Eric Hippeau, Data News, Computerworld do Brazil, Servicos e Publicacoes Ltda., Rua Alcindo Guanabara, 25/10th Floor 20031 Rio de Janeiro, RJ Brazil. Phone: (021) 240-8225. Telex: 2130838(WORD BR).

Mexico: Richard Small, Computerworld de Mexico, Oaxaca 21-2, Colonia Roma, Mexico City 7 D.F. Phone: (905) 514-4218, (905) 514-6309. Telex: 1771300 ACHAME, 1777809 ACHAME.

Spain: Neil Kelley, Computerworld/Espana, Grevina, 13, Madrid 4. Phone: 231-23-85; 231-23-88; 231-23-89. Telex: 47894(CW E).

Denmark: Preben Engell, Computerworld/Denmark, Gammel Strand 50, 1202 Copenhagen K. Phone: 01-1234-11. Telex: 27566 cwden.

Sweden: Bengt Mannfeldt, Nova Media, Nova Media AB, Vartavagen 55, 11536 Stockholm. Phone: 08-234280. Telex: 8105099 NOVACW.

The Netherlands: Johannes A. Witvoet, Mgr. Dir., Computerworld Benelux, Van Eeghenstraat 84, 1071 GK Amsterdam. Phone: 020-646428. Telex: (844) 18242.

Italy: Daniele Comboni, Gruppo Editoriale Jackson, s.r.l., Via Rosellini 12, 20124 Milano.

Argentina: Ruben Argento, Gen. Mgr., Computerworld Argentina, Av. Belgrano 406-Piso 9, CP 1092 Buenos Aires. Phone: 34-5583/5584.

Norway: Mr. Per Bamrud, Editor, CW Norge A/S, Hovinveien 43, P.O. Box 2662, Toeyen, Oslo 6. Phone: 2/647725. Telex: (856) 76476

Singapore: Mr. David Naidu, General Manager, Asia Computerworld, Pte. Ltd., 11-08/11-10 Goldhill Plaza, Newton Road, Singapore. Phone: 250-444. Telex: (786) RS 37003

Saudi Arabia: Mr. Omar Dusuki, General Manager, Saudi Computerworld, P.O. Box 5455, Jeddah. Phone: 6675916/6650380. Telex: (928) 401205.

ADVERTISERS INDEX

Ad Council 68
ADP 62
ADR 3
American Telephone & Telegraph 52-53,88-89
1984 AMS 92
Applied Software 6
Attachmate 86

The Back Store 26
BDS Computer Corp. 9
BGS Systems 49
B I Moyle Associates, Inc. 48

Candle Corp. 85
CGA Software 30
C.G. Systems 14
Codex Corp. 19,22
Collier Jackson, Inc. 31
Comdesign ID/4
Comdisco 81
Compaq 42-43
Computer Power Systems 45
Computer Technology 66
Compuware 87
Comspec 45
Conaco 60
Control Concepts ID/11
CPX 64
CS Computer 47
Cullinet 16
CW Asian 80
CWCI 91
CW DES 97
CW Office Automation 67
CW On Communications 96
CW Supplement 90

D & B Computing Services 83
Dataproducts ID/16
DEC/upg 71
Norm DeNardi 80
Digital Controls Corp. ID/14
D.J.C. Corp. 66
Durlen Products 92
Duquesne Systems 39

Equitable Life 54

Fibronics 56
Florida Data Corp. 70
Fusion Products 94

General Electric ID/6
Genesys Software 18
Global Ultimacc 34
Graham Magnetics 50

Hewlett-Packard 36-37

Info Software ID/12
Infodata Systems 35
Informatics 57
Innovation Data Processing 5
Intel 44
Interactive Training Systems 63

Jones Futurex ID/6

J.W. Lampl, Inc. 46
Lawson Associates 26
Leland Computer Service 68
Levi, Ray & Shoup 83
Local Data 15

3M Company 58,82
Management Decision Systems 12
Mathematica 76
McCormack & Dodge 130
McDonnell Douglas 51
MicroFrame ID/2
MSA 23,24

NMTC ID/3
Northern Telecom 46-47,94-95

On-Line Software 40
Oregon Software 66

Panaophic Systems 93
Performance Development Corp. 25
Personal Data 84
Peterson 31
Precision Business Systems 14

SAS Institute ID/8-ID/9
Softool 11,13
Software Digest 72-75
Software Results 51
Sperry Corp. 41
Syncsort 7
Syscd 62,68

Tandem Computers 20-21
Teletype Corp. 61,93
Telex ID/7
Term Tronics 27-29
Tone Software 26

Up-Time Systems 10
US Postal Service ID/13

Viking Software 10
VM Software, Inc. 11

Wang Laboratories 60
Westin Hotels 48
Wyse Technology 38

This index is provided as an additional service. The publisher does not assume any liability for errors or omissions.

Computerworld Sales Offices

Vice-President/Sales/Donald E. Fagan
Director/National Sales/Edward P. Marcotti
Manager/Marketing & Sales Operations/Kathy Doyle
COMPUTERWORLD, 375 Cochituate Road, Box 880,
Framingham, MA 01701
(617) 879-0700

BOSTON SALES OFFICE (617) 879-0700
Northern Regional Director/Chris Lee
District Managers/Jim McClure, Ronald Masters,
Jayne Donovan, Michael F. Hollister
Sales Assistant/Alice Langley
COMPUTERWORLD, 375 Cochituate Road, Box 880,
Framingham, MA 01701

CHICAGO SALES OFFICE (312) 827-4433
District Managers/Arthur Kossack, Russ Gaches
Sales Assistant/Joan F. Broderick
Northern Regional Director/Chris Lee
COMPUTERWORLD, 2600 South River Road, Suite 304,
Des Plaines, IL 60018

NEW YORK SALES OFFICE (201) 967-1350
Eastern Regional Director/Michael J. Masters
Senior District Manager/Doug Cheney
District Managers/Ray Costin, Joan Daly, Fred Lo Sapio
Sales Assistant/Dale M. Paterno
COMPUTERWORLD, Paramus Plaza I,
140 Route 17, North, Paramus, NJ 07652

LOS ANGELES SALES OFFICE (714) 261-1230
Senior District Manager/Bob Hubbard
District Manager/Dennis Hockswender
Western Regional Director/William J. Healey
COMPUTERWORLD, 18009 Sky Park Circle, Suite 280,
Irvine, CA 92714

SAN FRANCISCO SALES OFFICE (415) 421-7230
Western Regional Director/William J. Healey
Senior District Manager/Barry Milano
District Managers/Theodore Pierson, Ernest Chamberlain
Account Manager, Classified/Nicole Boothman
COMPUTERWORLD, 300 Broadway, Suite 20,
San Francisco, CA 94133

ATLANTA SALES OFFICE (404) 394-0758
District Manager/Jeffrey Mostack
Eastern Regional Director/Michael J. Masters
COMPUTERWORLD, 1629 Pedar Road, Suite D,
Atlanta, GA 30338

CLASSIFIED ADVERTISING (617) 879-0700
Al DeMilo
COMPUTERWORLD, 375 Cochituate Road, Box 880,
Framingham, MA 01701

CW INTERNATIONAL MARKETING SERVICES
General Manager/Diane Le Mongle
COMPUTERWORLD, 375 Cochituate Road, Box 880,
Framingham, MA 01701
(617) 879-0700
Manager, West Coast/Peter Crockett
COMPUTERWORLD, 1060 Marsh Rd.,
Menlo Park, CA 94025
(415) 328-8084

CW COMMUNICATIONS/INC.
Board Chairman/Publisher
Patrick J. McGovern
President
W. Walter Boyd
Senior Vice-President
Lee Vidmar

Group VP-Communication Services, Jack Edmonston. Group VP-Circulation, Margaret Pinton.
VP-Marketing, Donald E. Fagan. VP-Finance, William P. Murphy. VP-Editorial, John Wilkinson.

Computerworld Headquarters: 375 Cochituate Road, P.O. Box 880, Framingham, MA 01701
Phone: (617) 879-0700, Telex: 95-1153.

SALES Vice-President, Donald E. Fagan. National Director, Edward P. Marcotti. Corporate Advertising Administrator, Frank Collins. Manager/Marketing & Sales Operations, Kathy Doyle.
Display Advertising Supervisor, Anne Hadley.
Display Advertising, Deborah Styer, Pam Valentines, Carolyn Meadows, Cindy Chaines, Mary Waddick. Classified Operations Manager, Cynthia Delony.

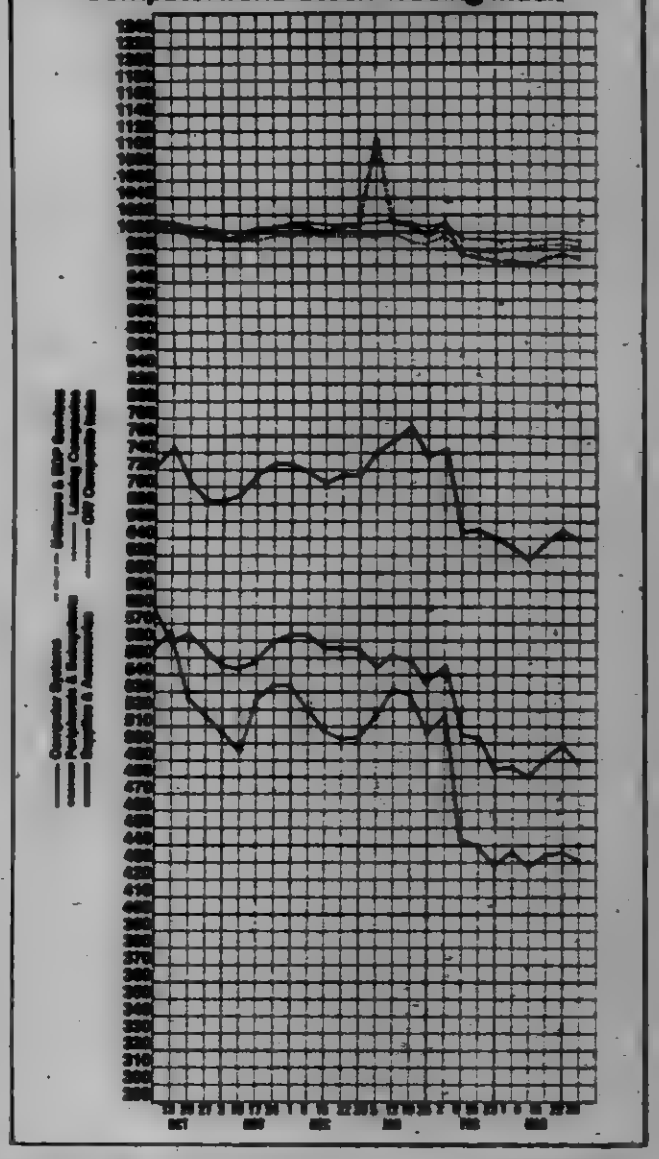
COMMUNICATION SERVICES Group Vice-President, Jack Edmonston. Director Research, Kathryn Dinneen. Sales Promotion Director, Liz Johnson.

PRODUCTION Production Director, Peter Hoim. Production Manager, Marlene Stillel. Paste-Up Manager, Trish Gaudette. Systems Manager, Tom Pilsi. Typesetting Manager, Carol Polach. Art Director, Tom Monahan. Graphic Designer, Hank Fling.

CIRCULATION Group Vice-President, Margaret Pinton. Circulation Manager, Jane Dosberg. Fulfillment Manager, Maureen Burke.

Computerworld (ISSN 0010-4841) is published on 35 mm microfilm through University Microfilms Int., Periodical Entry Dept., 300 Zeeb Rd., Ann Arbor, Mich. 48106. Phone (313) 761-4700. Computerworld is indexed daily in Circulation Dept. for subscription information.

Computerworld Stock Trading Index



Computerworld Stock Trading Summary

All statistics compiled computed and formatted by TRADE QUOTES, INC Cambridge, Mass. 02139

CLOSING PRICES-WEDNESDAY, MARCH 28, 1984

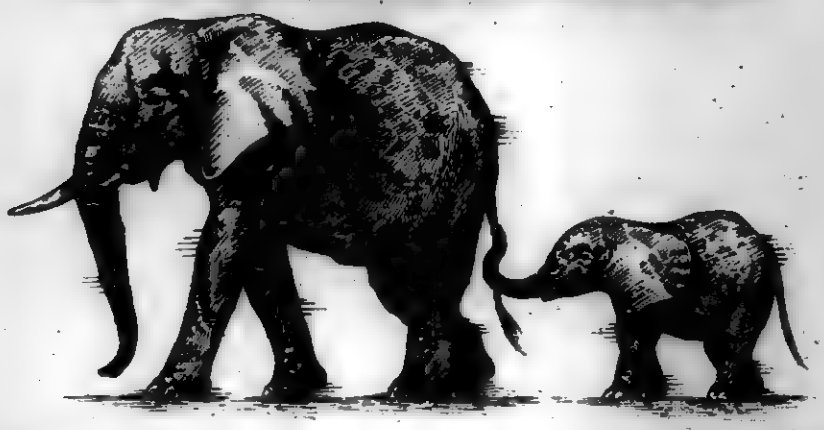
	1983-84 RANGE	CLOSE	WEEK CHANGE	WEEK PCT CHANGE
COMPUTER SYSTEMS				
ALPHA MICROSYSTEMS	11- 26	15	- 1/4	-1.6
ALTOS COMPUTER SYST	6- 28	11 1/2	- 3/4	-6.1
AMDAHL CORP	24- 59	34 1/2	-2 3/4	-28.3
APPLE COMPUTER INC	139- 63	23 3/4	- 1/2	-1.6
AT&T	58- 76	58 3/4	+ 1/4	-7.3
BURROUGHS CORP	29- 38	38 3/8	+1 1/8	+3.2
COMPUTER AUTOMATION	9- 17	7 3/4	- 1/4	-3.1
COMPUTER CONSOLES	9- 28	16 7/8	- 1/8	-0.7
CONTROL DATA CORP	23- 62	39 1/4	+ 3/4	+2.0
CONVERGENT TECHNOL	14- 41	28 1/2	- 3/4	-2.6
DAY OPERATOR INC	3- 9	4 1/2	- 3/4	-8.0
DATA GENERAL CORP	19- 48	38 1/2	- 1/2	-1.9
DATAPOINT CORP	11- 26	23 1/8	+1 1/8	+5.7
DIGITAL EQUIPMENT	63- 132	84 7/8	+ 1/4	+0.3
EECO INC	8- 18	16 3/4	- 1/4	-1.4
ELECTRONIC ASSOC.	8- 15	9 7/8	+ 1/8	+2.1
FLOATING POINT SYST	13- 41	28 1/8	+1 1/8	+3.2
FOXBORO	23- 47	30 3/4	+ 1/2	+1.6
GENERAL AUTOMATION	3- 10	10 3/8	- 1/4	-2.3
GOULD INC	30- 44	28 5/8	- 3/8	-1.3
HARRIS CORP	20- 51	36 1/8	+ 1/2	+1.4
HEWLETT-PACKARD CO	72- 96	86 7/8	- 1/2	-1.3
HONEYWELL INC	35- 69	57	+1	+1.7
IBM	97-134	119 3/8	+ 3/8	+0.3
IPL SYSTEMS INC	4- 14	4 3/4	0	0.0
K/A COM INC	13- 30	15 1/8	0	0.0
MICROTECH COMP SYSTS	1- 5	3/8	0	0.0
MANAGEMENT ASSIST	7- 20	13	- 5/8	-2.8
MATSUSHITA ELEC(ADR)	67- 88	69	+6 3/8	+6.4
MODULAR COMPUTER SYS	6- 10	6 3/4	- 1/2	-6.9
NORAND DATA SCI	14- 19	18	- 1/2	-2.7
MOTOROLA INC	82-148	117 1/2	+2	+1.7
NAT'L SEMICONDUCTOR	13- 64	14 3/8	+ 3/8	+2.6
NBI INC	16- 51	18 7/8	+ 1/8	+0.6
NCR	38-138	113	- 1/2	-0.4
PERKIN-ELMER	17- 37	27 3/4	- 1/4	-0.8
PRIME COMPUTER INC	11- 30	17 1/2	+1 1/8	+6.8
SPERRY CORP	21- 39	32	- 1/2	-1.5
TANDEM COMPUTERS INC	14- 60	31 1/2	-2 1/4	-6.6
TANDY CORP	21- 62	30 3/4	-3 1/4	-9.5
TELEVIDEO SYSTEMS	11- 41	14 1/2	0	0.0
TELTRON CORP	6- 38	8 3/4	- 1/4	-2.7
TEXAS INSTRUMENTS	74-170	148	+6 3/8	+3.9
ULTIMATE CORP	8- 20	19 3/8	+ 1/8	+0.7
VECTOR GRAPHICS INC	7- 16	13 3/4	+ 1/8	+7.8
WANG LABS "B"	13- 43	21	-1 3/4	-8.0
WANG LABS "C"	11- 43	21 1/2	-1 1/8	-5.0
XEROX CORP	30- 82	42 1/4	+1 1/8	+2.7
LEADING COMPANIES				
BOOTHE FINANCIAL CP	11- 48	46 1/2	+1	+2.2
CONDUCO INC	7- 42	13 1/2	- 3/4	-5.2
CONTINENTAL INFO SYS	7- 18	7	- 1/4	-3.4
DPF INC	8- 15	12 3/4	- 7/8	-6.4
DELECTRON INC	13- 23	13 1/4	0	0.0
U.S. LEASING	19- 47	38 3/8	-1 1/8	-2.8
COMPANIES				
ADVANCED MICRO DEV	13- 37	28 5/8	- 1/8	-0.4
ADV'D SEMICONDUCTOR	12- 38	25	-1	-3.8
ANALOG DEVICES INC	16- 42	36 3/8	- 1/2	-1.3
ANALOGIC CORP	15- 37	19 3/4	+1 3/4	+9.7
APPLIED MAGNETICS CP	13- 37	18 1/4	- 3/4	-3.9
TERADYNE	14- 38	28 1/4	+ 1/4	+0.8

EXCH: N-NEW YORK; A-AMERICAN; P-PACIFIC; B-BOSTON; I-NATIONAL; M-MIDWEST; O-OVER-THE-COUNTER
B-I-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

	1983-84 RANGE	CLOSE	WEEK CHANGE	WEEK PCT CHANGE
SOFTWARE & EDP SERVICES				
ADVANCED COMP TECH	7- 8	3	- 1/8	-7.5
ADVANCED SYSTEMS INC	9- 22	17 3/4	+1 1/8	+6.7
ADS COMPUTERS INC	7- 22	20 1/2	+1 1/8	+6.7
AMERICAN SOFTWARE	16- 22	17	0	0.0
ANACOMP INC	4- 12	6 1/8	- 1/2	+10.5
ANALYSTS INTL CORP	6- 22	8 1/4	- 3/8	-10.7
APPLIED DATA RES.	6- 37	23 3/4	- 1/4	-1.0
ASK COMPUTER SYSTEMS	8- 31	18 1/2	- 1/4	-1.5
ASTRONAUTE CORP ENS	1- 9	1 7/8	0	0.0
AUTOMATIC DATA PROC	21- 44	32 3/4	+ 1/2	+1.9
CAM COMPUTER ASSOC	9- 17	10 1/8	- 1/8	-1.2
COMPUTER ASSOC INT'L	6- 33	30 1/8	- 1/2	-2.0
COMPUTER ASSOCIATES	6- 28	19 1/8	-1 1/2	+12.7
COMPUTER NETWORK	4- 10	8	- 1/8	-2.0
COMPUTER SCIENCES	11- 22	15	+ 7/8	+6.1
COMPUTER TASK GROUP	6- 22	13 1/2	- 1/2	+3.8
COMPUTER VISION	2- 22	7 1/8	-1	+16.8
COMPUTING SYSTEMS	9- 28	9 3/4	- 1/8	-1.1
COMSERV CORP	5- 20	9 1/2	0	0.0
COMSHARE	7- 16	9 1/8	- 3/8	-4.0
DALLTECH SOFTWARE	12- 28	22 1/2	+1 1/8	+5.3
CYCARE SYSTEMS INC	9- 23	16 3/4	0	0.0
ELECTRONIC DATA SYST	10- 42	28 3/4	+2	+7.4
HORAN SYSTEMS INC	14- 27	18 3/4	- 3/4	-3.9
GENERAL ELECTRIC CO	48- 68	58 1/8	+1 5/8	+2.9
GTE CORP	32- 53	42 1/8	+1 1/4	+3.0
INFORMATICS INC	15- 36	19 5/8	- 1/8	-0.6
INFOTRON SYSTEMS COR	23- 43	30 1/2	-2 1/4	-6.8
KEANE ASSOCIATES	6- 15	7 1/4	- 1/2	-6.4
LOGICON	9- 24	21 5/8	- 5/8	-2.8
MCI COMMUNICATIONS	8- 20	8 7/8	0	0.0
MGMT SCI AMER INC	6- 22	10 1/2	-1	-8.7
MATHEMATICAL APP GRP	6- 20	8 1/2	0	0.0
MICRO SYSTEMS INC	25- 89	38	-1	-2.5
MICHIES-HERBERT CP	9- 21	11 1/2	+ 3/4	+17.0
NATIONAL DATA CORP	9- 22	17 3/8	- 3/8	-2.1
ON-LINE SOFTWARE INT	5- 27	8	-1	-11.1
PANSOPHIC SYSTEMS	6- 26	13 3/4	- 1/2	-4.0
PLANNING RESEARCH	9- 21	12 3/8	-1 1/8	-7.7
POLICY MGMT SYSTS CP	15- 38	24	-1 1/2	-5.9
PERIPHERALS & SUBSYSTEMS				
PERMANENCE & SYS	1- 6	4 3/4	- 1/4	-5.0
REYNOLDS & REYNOLD	17- 33	30	-1 3/4	-5.5
REX CORP	11- 21	17	-1 1/4	-6.8
SHARED MEDICAL SYST	15- 43	34 1/8	-1 3/8	-3.9
SCIENTIFIC COMPUTERS	6- 14	8 1/8	0	0.0
SOFTWARE AG	9- 17	10	+ 3/8	+3.9
TYMSHARE INC	12- 30	24 3/8	0	0.0
UNB CORP	9- 18	13	- 3/8	-2.8
WANG CORP	7- 17	10 1/2	+1 1/8	+12.0

	1983-84 RANGE	CLOSE	WEEK CHANGE	WEEK PCT CHANGE
COMPUTER SERVICES INC	7- 21	7/8	- 1/8	-12.5
COMPUTER TRANSACTIONS	3- 12	3 1/4	- 1/8	-3.7
COMPUTERVISION CORP	15- 31	24 7/8	- 1/8	-0.5
COMRAC CORP	14- 38	15	-1 1/4	-7.8
DATAPRODUCTS CORP	15- 31	20 1/2	- 1/2	-2.4
DATARAM CORP	9- 16	9 3/8	+ 3/8	+4.3
DATA SWITCH CORP	12- 21	15	0	0.0
DATUM INC	12- 27	17 7/8	- 1/8	-0.6
DECISION DATA COMPUT	3- 10	10 1/2	+1 3/8	+15.0
DIGITAL SOLUTIONS	3- 11	5 1/8	- 1/8	-2.4
ELECTRONIC M & D	9- 15	9 1/8	- 1/8	-1.3
EMULEX INC	15- 36	18 1/8	- 1/2	-2.6
EVANS & SUTHERLAND	17- 36	17 1/8	-2 1/8	-11.0
GENERAL TECHNOLOGIES	9- 22	11	0	0.0
GEN'L DATA COMM IND	8- 33	8 1/8	+1	+8.0
GREAT SOUTHWEST IND	6- 9	7/8	0	0.0
HEWLETT-PKD CORP	7- 31	24 3/8	- 3/8	-1.5
ICOT CORP	3- 10	4 1/2	- 3/8	-7.7
INFORMATION INTL INC	15- 31	21 3/8	- 1/8	-0.5
INFORMATION SCIENCE	9- 17	9 3/8	- 1/8	-1.3
INTEL CORP	11- 48	38 1/2	- 1/8	-0.3
IPL SYSTEMS INC	4- 14	4 3/4	0	0.0
LANDY ELECTRONICS	7- 13	9 1/2	- 1/2	-5.0
MAGNETIC CONT	9- 17	13 1/2	- 1/2	-3.6
MDI DATA CORP	5- 20	10 1/8	0	0.0
MORAIN CORP	9- 25	22	-2 3/4	-10.0
NETWORK SYSTEMS CORP	9- 30	29 1/8	- 1/8	-0.4
NV AMERICAN PHILIPS	47- 78	68 7/8	- 1/8	-0.2
NORTHERN TELECOM LTD	22- 48	33	- 1/8	-0.3
OMRON	1- 6	1/4	0	0.0
PANAVISE CORP	13- 34	15 3/8	- 1/8	-0.8
PERMIC CORP	7- 18	8	- 1/8	-1.5
PHOENIX AMERICAN INC	7- 17	9 1/2	- 1/8	-1.3
PLESSEY CO (ADR)	28- 41	34 1/8	+ 3/8	+1.1
POINTROBIE INC	20- 38	23 1/2	-2 1/8	-8.3
RAMTEK CORP	3- 8	3 1/2	0	0.0
RAYTHEON CO	30- 68	39 3/8	- 7/8	-2.2
RECOGNITION EQUIP	9- 28	13 3/8	+1 3/8	+13.0
ROLM CORP	39- 68	36 1/4	-2 1/8	-5.5
SANDERS ASSOCIATES	20-126	37	-6	-8.1
SCAN DATA	1- 3	3/8	0	0.0
SCAN-TRON CORP	12- 18	18	0	0.0
SCIENTIFIC ATLANTA	16- 23	18 1/2	- 3/8	-2.0
SYCOR INC TECHNOLOGY	11- 33	16 3/4	- 1/4	-1.4
SYKES DATATRONICS	2- 5	3 1/8	- 1/8	-3.8
SYSTEMS & COMP TECH	24- 38	32 3/4	- 1/4	-0.7
T BAR INC	7- 17	8 1/8	- 3/8	-4.4
TAB PRODUCTS CO	8- 32	23 7/8	- 3/8	-1.5
TRIANGLE CORP	3- 10	3 1/4	- 3/8	-5.5
TSC INC	8- 12	9 7/8	0	0.0
TEXTRONIX INC	34- 67	50 1/4	+3 1/4	+7.2
TYLER	9- 22	21 3/8	- 1/8	-0.5
TERMATA SYSTEMS CP	9- 17	9 3/8	- 3/8	-3.9
TIMEPLEX INC	7- 29	17	- 1/2	-2.9
VISUAL TECHNOLOGY	9- 28	10 1/4	- 1/8	-0.8
SUPPLIES & ACCESSORIES				
AMERICAN BUS PHONE	7- 23	10 7/8	- 3/8	-3.3
BARRY WRIGHT	13- 23	18	- 1/8	-0.6
DUPLEX PRODUCTS INC	12- 23	13 3/4	- 1/4	-1.8
EXMIS BUS. FORMS	6- 20	13 3/8	- 1/8	-0.9
3M COMPANY	49- 80	78 1/2	+1 1/2	+1.9
MOORE CORP LTD	28- 51	38 1/2	- 3/8	-0.9
STANDARD REGISTER	11- 28	28 3/4	- 3/8	-1.3
WALLACE BUS FORMS	11- 28	27	- 1/8	-0.4

WHEN IT COMES TO LINKING PC's TO MAINFRAMES, ONE COMPANY IS A MILLENNIUM AHEAD.



You don't have to look hard to see why McCormack & Dodge has linked more PC's to more mainframes than any other business software vendor.

It's a classic case of a superior product leading to superior sales.

To begin with, our link does more than just link. It works like you do. Selectively. Analytically. And in real time—so that company decision-makers always have the freshest, latest data available. Current and accurate up to the second you display it on your PC screen.

If you've tried out other PC links, you'll notice the M&D difference the moment you start downloading information from the mainframe to your desk. For example, you'll see that you can access all applications, no matter who designed them—not just those designed by McCormack & Dodge. And you'll discover the ease of working with a system that lets you pinpoint and selectively summon exactly the portion of data you need.

Once you've called the data down to your PC, the Lotus 1-2-3 software in our link lets you crunch numbers backwards, forwards, up and down—anywhere your mind wants to take them. You can instantly construct detailed spreadsheets. You create brilliant color graphs.

And the moment you finish massaging the data to your liking, our link lets you shoot it back to the mainframe (assuming you have the proper security clearance). You do it yourself on the spot—in real time. Without keyboard operators or programmers. So the entire company has the benefit of the latest information immediately. Not days later.

The M&D PC link is one of several products in our highly acclaimed Millennium family of borderless business software. When you compare the entire Millennium concept to anything else claiming "total integration," you'll see that M&D isn't just out-linking the competition. We're out-thinking them.

WHEN YOU THINK ABOUT TOMORROW, MILLENNIUM MAKES SENSE TODAY.

McCormack & Dodge

a company of The Dun & Bradstreet Corporation

McCormack & Dodge Corporation, 1225 Worcester Road, Natick, MA 01760
Sales and Support offices throughout North and South America, Europe, Asia, Australia and Africa. 800-343-0325. Telex: 710-325-0329

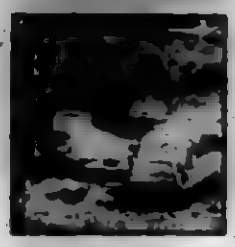
VOL 18
ISSUE 15
AP 9 1984
UMI

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

COMPUTERWORLD

$2.00 A COPY; $44/YEAR | APRIL 9, 1984 | VOL. XVIII, NO. 15

Spotlight
Microprocessor chips/15



Out like a lion
How DP managers coped with March's raging end/14

In Depth
IBM's data base strategy/
Follows Page 32

C
M148106U1VYMUIVYM FCMB
UNIVERSITY MICROFILMS
SERIAL PUBLICATIONS
300 N ZEEB RD
ANN ARBOR MI 48106

NEWSPAPER

DEC introduces its first relational DBMS

By John Gallant
CW Staff

NEW YORK — Digital Equipment Corp. turned over the first cards in its relational data base management system hand when it held a press conference here last week to introduce two packages for its VAX line of processors.

The company also unveiled the VAX-11/785, a mid-life kicker for its high-end VAX-11 supermini series, and launched its first attempt at breaking into the videotex market, with a $25,000 software package called VAX VTX (stories on page 6).

The VAX RDB/VMS and VAX RDB/ELN packages are the first to be announced in DEC's planned line of relational DBMS products, a spokeswoman said. They run on the entire line of VAX processors, ranging from the high-end VAX-11/785 down to the Microvax I.

VAX RDB/VMS reportedly runs on all VMS-based computers and is an integrated component of DEC's VAX information architecture. The VAX RDB/ELN package was developed for small and mid-size VAX processors in the dedicated or distributed DEC VAX/ELN execution environment; it is targeted at dedicated applications requiring time-critical data manipulation and analysis.

See DEC page 7

IBM moves to mitigate compatibility snags

By John Dix
CW Staff

IBM last week announced a barrage of products aimed at mitigating the problem of incompatibility among its low-end computer systems, then rounded out the announcements with the introduction of a low-end System/36.

While industry watchers heralded as important various aspects of the multifaceted announcement (stories on page 8), almost all agreed that the most significant were the products targeted at integrating IBM's low-end systems — particularly the Personal Computer — with larger systems.

In announcing the integration products, IBM was "coming through on a promise of a couple of years ago to tie together its low-end products," said Harry Edelson, a vice-president with First Boston, Inc., a New York investment firm. "This adds utility to all of its low-end products."

Gordon Casey, vice-president of the Drexel, Burnham and Lambert Group, another New York-based investment house, said the basic thrust of the announcement was to "continue to fill in the gaps for existing customers with [IBM] 5520s, Displaywriters and [Personal Computers]."

See IBM page 8

TOP OF THE NEWS

If you're among the 14,000 or 17,000 waiting for Wats, 800, private-line or other special services, there may be hope. AT&T just reassigned 1,000 employees to tackle the backlog. Page 2.

■

The "KGB Relief Act of 1985" is what the U.S. Commissioner of Customs called the House of Representatives' proposed renewal of the Export Administration Act. Page 4.

■

A federal grand jury last week indicted two U.S. and several foreign firms for allegedly shipping equipment made by Digital Equipment Corp. and Hewlett-Packard Co. to the Soviets. Page 5.

■

The insurgent stockholder who just won four of the 10 seats on Management Assistance, Inc.'s board told *Computerworld* last week that his goal is to sell the $376 million company and force its chairman out of office. Page 9.

■

Software that covers the full scope of lending activities has been announced for users of IBM processors by Hogan Systems, Inc. Page 77.

■

In hardware news, Nixdorf Computer Corp. announced a high-end addition to its 8870 line of general business computers, and Four-Phase Systems, Inc. launched a 32-bit, Unix-based office system. Page 101.

■

A portable micro that features a hard disk and compatibility with the IBM Personal Computer has been introduced by Corona Data Systems, Inc. Page 117.

■

IRS having budget problems as tax day draws near

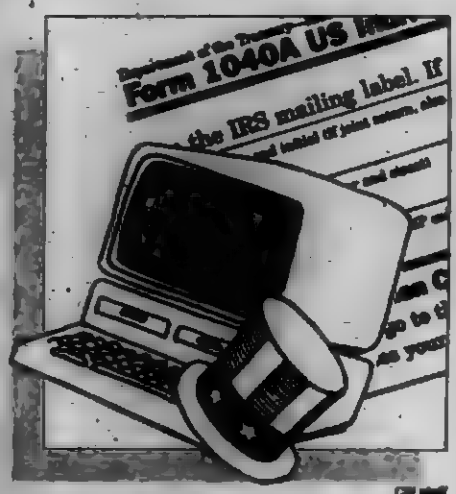
By Bryan Wilkins
CW Washington Bureau

WASHINGTON, D.C. — The U.S. Congress wants to give the Internal Revenue Service what it's asking for in the form of computers to beef up its revenue collection, but the Reagan budget planners are seeking to take it away.

Originally, the IRS sought $129 million in automated data processing modernization for the fiscal year starting in October. The Office of Management and Budget, the executive agency responsible for the budget revisions, cut that figure to $60 million, prompting howls of concern.

In a letter last January to Secretary of the Treasury Donald Regan, IRS Commissioner Roscoe Egger bemoaned the projected cuts in the IRS budget. "At a minimum," Egger told Regan, "the cuts will cripple the progress already made."

Egger said the IRS, in the midst of a five-year system replacement schedule, could not carry out its functions without a minimum of $104 million for DP upgrades. But OMB was not convinced. It restored



some funds, but only $14 million, so the IRS now has a budget of $64 million for DP modernization.

Rep. Doug Barnard Jr. (D-Ga.), chairman of the House of Representatives Subcommittee on Commerce, Consumer and Monetary Affairs, which oversees the IRS, charged recently that the budget cutbacks called for by OMB will result in lost tax revenues. Barnard said $3 billion that should be collected by the IRS will not be collected because of the cutbacks in the IRS computer modernization program. Instead of collecting about $36.8 billion in revenue in fiscal 1985, according to Barnard, the IRS will collect only $33.8 billion.

"We can only deduce that, in fact, the IRS will be crippled in its tax collection functions," commented Dean Scott, a staff official of the subcommittee. "Computer matching will be set back, and the fact that [the IRS] will be collecting 200 million new information documents as a result of new legal requirements probably means they will need greater operator resources."

Congress has been ready to appropriate money toward the modernization of the IRS' returns processing, in view of the massive projections of uncollected revenues from the so-called underground econ-

See IRS page 4

AT&T trying to cut backlog

Reassigns 1,000 employees

By John Blau
CW Staff

NEW YORK — AT&T Communications reassigned 1,000 employees last week in an effort to tackle the backlog beast that has been plaguing its order-processing procedures and causing installation delays for its Wats, 800, private-line and other special services.

By the middle of last month, 16,000 to 17,000 special service orders (including private-line orders) were backlogged, a company spokesman said. This equates with a month's worth of work — meaning that if the company stopped taking orders and focused on the backlog alone, it would take a month to catch up.

Similarly, 30,000 orders for Wats and 800 service — representing two weeks' worth of work — have been pushed to the back burner.

The spokesman predicted that the Wats/800 backlog would be dried up within the next couple of months, but would not venture a guess when orders for special services would be filled. The backlogs vary because Wats/800 services involve only one network point of contact, whereas point-to-point and multipoint private lines must be engineered through to other locations, typically requiring the coordination of at least two telephone operating companies.

In a formal response to an inquiry from the Federal Communications Commission, AT&T corporate vice-president Dan Culkin recently wrote that the company would address the service delay problems by bolstering its "provisioning process." This process begins when an order is taken and includes the time it takes to engineer the requested service and install the actual line.

The 1,000 reassigned personnel are being employed at the front end of this process, the spokesman said. To back them up, Culkin told the FCC that AT&T's computer system (comprising roughly 40 systems) would be made available on an extended basis.

Last week, the AT&T computer system became operational 16 hours a day, five days a week and six hours on Saturday, the spokesman said.

User horror stories

Meanwhile, user horror stories continue to mount.

Allen Dyer of CWT Specialty Stores in Providence, R.I., said that when he tried to place an order for a 2,400 bit/sec Dataphone Digital Service (DDS) line, he was given the runaround between New York and Boston, only to learn that his records presumably had been destroyed.

But Dyer sees light at the end of the tunnel. After going through seven account representatives in January, CWT Specialties was assigned a representative who did a lot of leg work to rectify the problem, and the quoted installation date for its 2,400 bit/sec DDS circuit was reduced from 83 days to 62 days.

Another user, Doug Jackson of Linclay Corp., a real estate developer, was told his four-point DDS circuit would be installed in 57 working days. Eighty days later, there was still no sign of an installation crew.

Dyer, Jackson and others experiencing lengthy installation delay problems will be happy to hear there is a toll-free number customers can call to complain. To verify that number — 1-800-222-0400 — for publication, *Computerworld* gave it a try.

It was never answered.

AT&T asks FCC for looser rein; cites drop in business as reason

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — Contending that it has lost nearly four million customers to competitors in the last three years, AT&T last week asked for less regulation of its activities by the Federal Communications Commission.

Reduced regulation will lead to lower rates, more customer choice and faster introduction of new technology, said Al Partoll, executive vice-president of AT&T Communications, Inc. He added that because of AT&T's divestiture, the company has greatly reduced assets, no longer controls local exchange facilities, lacks the monopoly market power of the former Bell system and, therefore, doesn't need to be regulated as much as its predecessor.

Specifically, AT&T Communications wants to offer new services without having to submit extensive cost information and wait for the commission to review it — a process that may take several months. The company also wants to construct new facilities without getting the commission's prior approval and to earn a return on its investment that is determined by the market rather than the FCC.

AT&T's request came as part of its reply to an FCC notice of inquiry of last October regarding long-term regulation of AT&T's domestic interstate phone service.

AT&T Communications estimated that its "direct expenditures alone resulting from regulation may reach $250 million per year." Partoll pointed out that it took the FCC 103 days to approve AT&T's proposals for optional calling plans; because of that delay, he said, the company's competitors were able to get to the market first with plans of their own.

The International Communications Association (ICA), a users group representing several of the nation's largest companies, also submitted comments to the FCC's notice of inquiry. In essence, the ICA claimed the FCC should continue regulating AT&T as long as the company has significant market power.

This regulation, the ICA added, should not come at considerable expense to AT&T, as such expenses will be passed on to users.

NEWS SUMMARY

The House of Representatives' proposed renewal of the Export Administration Act poses a threat to Operation Exodus, says the U.S. Commissioner of Customs/4

Equipped with portable computers, IRS field agents in Worcester, Mass., will begin calling on taxpayers to complete audits/4

Two U.S. and several foreign firms have been indicted for allegedly shipping sophisticated Hewlett-Packard Co. and Digital Equipment Corp. equipment to the Soviets/5

Digital Equipment Corp. has announced the VAX-11/785, which boasts up to 50% more performance than the older VAX-11/780 at a 15% higher cost/6

Digital Equipment Corp.'s move into the relational data base management system arena signals renewed focus on software in general and on the information center in particular/7

IBM last week issued a barrage of products, most aimed at linking its Personal Computers to larger IBM machines. The company also brought out a low-end System/36/8

Stockholder Asher Edelman won a proxy fight with Management Assistance, Inc. and vows to oust company chairman Raymond Kurshan/9

Senior managers' expectations of quickly mastering microcomputers should be tempered, attendees at a forum sponsored by Future Computing, Inc. last week in Dallas were told/10

Microcomputer-to-mainframe computer links have a long way to go to meet user needs, according to analysts and vendors at the Fortune 1,000 Personal Computer Market Forum/10

CW at the Electronic Funds Transfer Association Conventions: Attendees were told to move personal computers out of banks' back offices into positions where they can serve as marketing tools . . . Limits need to be set on access to computerized funds transfers . . . The divestiture of AT&T will translate into skyrocketing communications rates and poorer service for users of bank and retail electronic funds transfer nets, the conference-goers were told/11-13

DP managers tell how they braved the storms that ravaged the East Coast as March ended/14

A federal appeals court in San Francisco has reinstated charges against three defendants who allegedly tried to sell stolen IBM systems technology to Tokyo-based Hitachi Ltd./16

Product Spotlight: Microprocessors — the heart of the micro revolution/15

Massachusetts Gov. Michael Dukakis is slated to present the state legislature with a computer crime bill that is being hailed as one of the nation's most comprehensive pieces of legislation/19

Modem technology has entered the 1984 Summer Olympics/24

A major U.S. soft drink company will use a microcomputer network when it hosts up to 1,000 guests daily at next summer's Olympic Games/25

A Mississippi state court has ordered the state to sell for $400 a computerized mailing list for which the state had wanted to charge $85,000/26

Not for those whose reading tastes lean toward private eye potboilers, Computer Literacy is a bookstore that caters exclusively to MIS professionals and microelectronics designers/32

Three people who have been charged with conspiracy to trade securities in New York allegedly used word processing equipment to break into a law firm's confidential computerized files/33

DP trainers who do not plan strategically for the implementation of computer-based training will likely lose their ability to control, manage and adapt to this change in instruction, an assistant vice-president of a Los Angeles bank warns/34

If you're wondering whether to implement computer-based training on micros or mainframes, maybe you should just sit back and wait for micro-mainframe integration/35

An Atlanta bank is wooing wealthy customers by using a data base management program to provide highly personalized service/37

A paper trading firm's custom software package helps it manage daily operations and accommodate a 50% volume increase/43

A group of community colleges is preparing its students for the job market by replacing an obsolete remote job entry terminal system with an interactive, on-line system/44

A software package is helping a publishing company ensure that subscribers remain on the circulation list/45

A chemical manufacturer has developed a cost-effective computer-assisted retrieval system for use in its home office/49

Washington Update/18
International Report/23
Turnaround Time/31
Calendar/64

IN DEPTH

Pick steps out/Follows page 32
IBM's data base strategy/ID/9
Turnaround management/ID/31
Organizational change/ID/43

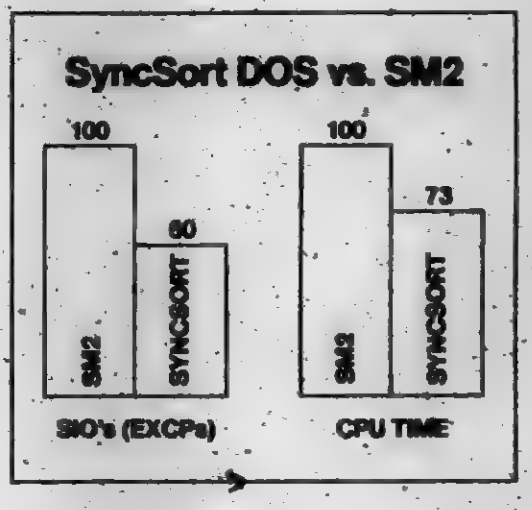
EDITORIAL/66
SOFTWARE & SERVICES/77
COMMUNICATIONS/93
SYSTEMS & PERIPHERALS/101
MICROCOMPUTERS/117
COMPUTER INDUSTRY/135

IN-LAWS

Smile, IBM. New SyncSort DOS is the perfect mate for your 4300 series!

Call (201) 568-9700.

Meet our new DOS/VS(E) release.



High performance computer without high performance sort program like bride without groom—expectation without fulfillment.

—Old Chinese Proverb.

* * * *

You say you just got this brand-new 4300 ? It's got big blue eyes, great price-performance curves and nifty disk drives? Now you're thinking about marrying it to IBM's 5746-SM2 sort program?

Well, don't do it pardner! The groom is definitely too old for the bride. Like IBM's other DOS sorts, SM2 is a hangover from an older generation of sorting technology.

There's only one sort around that's really fit for the hand of a glamorous new 4300 computer. And that's the latest release of SyncSort DOS. It's perfect for DOS/VS(E) and its new Fixed Block Architecture and VSAM type of data. Here's what SyncSort DOS can bring to the marriage:

1. BETTER PERFORMANCE. The first release of SyncSort DOS—back in 1978—incorporated many of the breakthroughs we made in OS sorting. Since then, in numerous releases, we've steadily cut the amount of resources that go into sorting. The new release carries on that old family tradition. Compared to SM2, SyncSort uses up to 50% less CPU Time and up to 70% fewer SIOs.

2. BETTER PROGRAMMER PRODUCTIVITY. SyncSort DOS has a host of features to cut the amount of programming time that goes into applications. You can often reduce the amount of time required for simple reports from five programmer days to one programmer day simply by using these features. They can:

- select relevant records;
- perform summaries on designated numeric fields;
- reformat records on output;
- insert character strings;
- convert numeric data to printable characters (including editing);
- produce reports divided into logical pages with headings, pagination and dating—and much more.

3. BETTER CUSTOMER SERVICE. We have the smartest Tech Service people in the business and the best and fastest service. About 85% of all requests for service are resolved within 24 hours. Try us and find out for yourself.

So if you'd like to match that phenomenal new computer with the perfect mate, give us a call. We'll send over one of our matchmakers to give you a personal demonstration.

Once you've seen SyncSort DOS in action, we don't think it'll be long before you call us with a familiar request: "Play it again, VSAM!"

syncsort INC.

Syncsort Incorporated 560 Sylvan Ave., Englewood Cliffs, N.J. 07632

Customs chief blasts House version of Export Act

By Patricia Keefe
CW Staff

BOSTON — The Bonker Bill, the House of Representatives' proposed version of the Export Administration Act, is best characterized as the "1929 Relief Act of 1963," charged the U.S. Commissioner of Customs, who recently asserted "it would be a disaster if it ever became law."

Commissioner William von Raab made those remarks here before the Symposium on the Transfer of Technology in the International Marketplace, which was sponsored here recently by the Federal Bar Association.

The Bonker bill, named for Rep. Don Bonker (D-Wash.), would "virtually strip customs of its authority to inspect export shipments except under very special circumstances," von Raab charged.

"I have spoken out against the bill many times and have stated my alarm and distress at the prospect of such legislation," he said, adding that "those of us who see the dangers inherent in the theft of our critical technology are pulling for the Senate bill [to renew the Export Administration Act, which expired last September]." A House-Senate conference two weeks ago began hammering out the differences between the two bills.

Customs favors the Senate bill because it would allow customs to continue with Operation Exodus, a program that has resulted in hundreds of arrests and convictions for illegal technology exports. "Those of us who are pledged to protecting America's technological superiority see Exodus as a practical solution," von Raab said. "We believe in keeping our guard up. We believe that Exodus is a wise precaution in a dangerous world."

Operation Exodus is especially important today, he said, because the latest technology tends to be developed in the civilian sector, where it is not protected by national security laws. As a result, this technology is much more accessible to the Soviets and their American recruits, he said.

Further, many of the latest products are both easy to smuggle and very valuable, according to von Raab. With an estimated 300 weapons systems on Soviet drawing boards requiring U.S. technological know-how, "we can expect [the Soviets] to come shopping."

Suggesting that the overall intent of the Bonker bill is to speed trade without restriction, von Raab asked that it be done in such a way that it does not limit the authority of the government or customs to stop the theft of technology goods and secrets. "We are serious about helping manufacturers avoid unnecessary delays in exporting their high-technology products," he said.

Von Raab claimed that while industry is not happy about any delays caused by customs' inspection program, "they are just as anxious as we are to keep the Soviet Union from getting their hands on American technology."

Stressing that this is the only aim of Operation Exodus, von Raab said that "if in the process we cause some inconvenience, it seems to me a small price to pay." He claimed that only 2% of export shipments suffer any delay and that the people most affected by the delays, the manufacturers, seem to agree that the delays are necessary.

IRS from page 1

ency as well as unreported income contributing to the federal budget deficit.

In recent years, Congress has passed laws, such as the Tax Equity and Fiscal Responsibility Act, which require employers and financial institutions to file information on individuals that was not required before. The IRS will process this additional information for the first time this spring as individual tax returns start flowing into the 10 IRS service centers scattered across the country. The information from employers and financial institutions was due at the agency Feb. 28.

Since 1978, computerized matching of the information filed by individuals and employers has been carried out by the IRS. However, there has been little matching of information filed on 1099s, which carry interest and dividend information with individual tax returns. This year, however, a large percentage of 1099 information filed on magnetic tapes or disks will face a computer match.

The major problem that has faced the IRS has been inaccurate information filed by either the employer or the individual, mainly the taxpayer's identification number. Correcting this information takes time, according to the IRS. Fourteen months elapse from the time the data is first filed to the time a case of underreported or incorrect tax return information is uncovered. It then takes 12 months more before the regional center completes action on a case.

The General Accounting Office, the investigative arm of Congress, wrote a report on the state of computer technology at the IRS and concluded that substantial additional resources will be needed for the IRS to process the increased work load.

The projected budget cuts slated by OMB have prompted congressional concern that the IRS will not be able to crack down on tax cheats or use the new information returns. However, an OMB spokesman said the IRS will receive a budget increase in fiscal 1985. An IRS spokesman confirmed this, noting the increase for fiscal 1985 was $205 million.

IRS field agents showing up for audits with portables

By Paul Gillin
CW Staff

WORCESTER, Mass. — Internal Revenue Service field agents here are hopeful that replacing calculators with portable computers will hasten the slow, arduous auditing process.

"An audit can take as long as four hours," said John D. Johnson, director of the IRS' Boston district, which includes New England and part of New York. "The use of portable computers will cut that time considerably."

The Worcester field office is serving as a test site for a possible nationwide implementation of portable computers. If the experiment is successful, portable computers will become standard equipment for 12,000 IRS field agents next year.

Field test

A dozen field agents in the Worcester office and four agents in Worcester's suboffice in Springfield, Mass., will take part in the test.

Agents will load taxpayer records from the Boston district's central files, stored on a Zilog, Inc. 8000 minicomputer in Andover, Mass., into the portables. Agents will then walk into a taxpayer's office, place the portable on a desk and use spreadsheet and financial analysis programs to review 1982 and 1983 tax bills.

"A lot of our work is done with spreadsheets," Johnson said. "Sometimes an agent would forget a number or a formula. Rather than recompile the figures, he may not correct the mistake. This system will make agents more efficient."

The Boston district will decide by April 15 the type of portable computer to be used.

"We have looked at more than 100 portable computers," Johnson said. "We require one that is truly portable. One of the field agents weighs only 90 pounds, and she has to be able to carry the equipment."

Johnson listed ease of use as a second requirement. "One vendor took almost half an hour to set up his equipment," he recalled. "We are not interested in that type of microcomputer."

The machine must be powerful enough to run software packages such as Lotus Development Corp.'s 1-2-3. "We require at least 256K [bytes of random-access memory]," Johnson said.

Once the portables are delivered, "we will leave the agents alone and let them develop applications for six months," Johnson said. One trained technician will be in the Worcester office to connect wires, answer questions and solve problems.

Gain expected

The IRS is expecting a significant productivity gain from the portables. A similar program by the inspector general's office of the U.S. Department of Transportation in 1983 yielded a 20% to 25% productivity gain, Johnson said.

In addition to using microcomputers in the field, the Boston district is using them to advance employees' computer literacy.

Six months ago, the Boston district instituted a voluntary course in which employees receive self-study manuals and Texas Instruments, Inc.'s 994/A micros. "Rather than pay $800 for a Basic course, we spend $8 for a manual," said Robert Pontbriant, the Boston district's data service chief.

Response to the course has been overwhelming, according to Johnson. Approximately 500 employees have completed the course; each receives a certificate at an award ceremony and can receive college credit for taking the course.

To pass the course, an employee must write a program that improves IRS productivity. A number of programs are used in IRS offices throughout the country. "One of the employees wrote a 1,000-line program for calculating a special tax class," Johnson said.

"Agents had requested that program for years. With the volume of work the data processing department had, the program was never completed. Word of the program spread to other offices, which now use the program," he said.

Second-class postage paid at Framingham, Mass., and additional mailing offices. *Computerworld (ISSN-0010-4841) is published weekly, except: January (6 issues), February (5 issues), March (5 issues), April (7 issues), May (5 issues), June (7 issues), July (5 issues), August (5 issues), September (5 issues), October (7 issues), November (5 issues), December (5 issues) and a single combined issue for the last week in December and the first week in January by CW Communications/ Inc., Box 880, 375 Cochituate Road, Framingham, Mass. 01701.*

Copyright 1984 by CW Communications/Inc. All rights reserved.

Computerworld can be purchased on 35 mm microform through University Microfilm Int. Periodical Entry Dept., 300 Zeeb Rd., Ann Arbor, Mich. 48106. Phone (313) 761-4700. *Computerworld* is indexed: write to Circulation Dept. for subscription information.

PHOTOCOPY RIGHTS: permission to photocopy for internal or personal; use or the internal or personal use of specific clients is granted by CW Communications for libraries and other users registered with the Copyright Clearance Center (CCC), provided that the base fee of $3.00 per copy of the article, plus $.50 per page is paid directly to Copyright Clearance Center, 21 Congress Street, Salem, MA 01970.

Permission to photocopy does not extend to contributed articles followed by this symbol. ‡

Special requests should be addressed to Nancy M. Sharvon, CW Communications/Inc. Box 880, 375 Cochituate Rd., Framingham, MA 01701. ISSN 0010-4841/82 $3.00 + $.50

$2.00 a copy; U.S. — $44 a year; Canada, Central & So. America — $110 a year; Europe — $165 a year; all other countries — $245 a year (airmail service). Four weeks notice is required for change of address. Please allow six weeks for new subscription service to begin.

ABP mcc

POSTMASTER: Send Form 3579 (Change of Address) to Computerworld, Circulation Dept., Box 880, 375 Cochituate Road, Framingham, Mass. 01701.

NEWS

Indictments charge illegal DP shipments to Soviets

By Edward Warner
CW Staff

BOSTON — A 22-count indictment handed up by a federal grand jury in Boston last week charged several U.S. and foreign firms and businessmen with shipping millions of dollars of sophisticated computer equipment to the Soviet Union in violation of trade restrictions.

Only two U.S. citizens are among the 11 companies and individuals indicted. They are Albert C. Beeson Jr., vice-president and contract administrator of MLPI Business Systems, Inc. of Phoenix and R. Paul Boucher, president and owner of Young Sales and Service, Inc. of Nashua, N.H. Both firms were also indicted.

The indictment alleges that the two firms took part in a conspiracy in which computers and related equipment were shipped to the Soviet Union and East Germany via Canada and Switzerland during 1981 and 1982.

Among the equipment listed as having been shipped are seven Digital Equipment Corp. PDP-11/34 and PDP-11/44 minicomputers and a group of nine DEC PDP-11/04 and PDP-11/34 machines.

Also said to have been shipped by the indicted are four Hewlett-Packard Co. 9825T desktop computers, which the company said are primarily used in manufacturing; six Digi-Data Corp. tape transport systems; six DEC computer interfaces; a Data General Corp. CPU board; and other equipment.

MLPI denial

In a prepared statement, MLPI Business Systems called the indictment "publicity and politically motivated." The firm said that it had cooperated fully with the federal investigators and that none of its officers "was guilty of any wrongdoing, whatsoever."

The statement also claimed the firm had no financial involvement in the alleged exports and that an export agreement existed solely between DEC and MLPI-Canada, its Canadian subsidiary, which was also indicted.

The indictment claims that two men, Detter Enderlein and Fred Schiavo, acting through two Swiss firms, Semitec AG and Elsaut AG (each half-owned by Schiavo and both indicted), ordered the U.S.-made computers and equipment from two Canadian firms, MLPI-Canada and Eurodata, Inc., which was also indicted. Enderlein and Schiavo also are alleged to have arranged transportation of the equipment from West Germany and Switzerland, where it had been sent by the Canadian firms, to East Germany and the USSR.

Eurodata's president and owner, Leslie Klein, was arrested at Miami International Airport April 2, shortly after the indictment was turned over to federal prosecutors.

The computers and equipment sent to the Soviets, the indictment states, are on the Commerce Department's Commodity Control List of products that cannot be shipped to the USSR and Soviet bloc nations. Items from that list cannot be shipped outside the U.S. without a valid export license, unless the products are destined for use in Canada. They cannot be shipped out of Canada without a U.S. re-export license, which the Canadian firms are charged with failing to obtain.

The indictment also claims that several of the conspirators filed false statements claiming the equipment being exported was only for Canadian use and that Boucher filed a false Shipper's Export Declaration with the U.S. Customs Service.

Also named in the indictment are MPLI-Canada executives Ray McLellan and Olivier DuPaul. McLellan, the firm's order administration manager, and DuPaul, branch manager of one of the firm's offices, are alleged to have ordered five computer systems from DEC in 1981 that were later re-exported from Canada to Schiavo and Enderlein. They are also alleged to have misrepresented the destination of the nine PDP-11/04 and PDP-11/34 computers, knowing that the computers were destined for the Soviets.

An HP spokesman said his firm sold four HP 9825T computers to Young Sales and Service in late 1981 and early 1982 after the firm met HP's requirements to prove that it was an OEM vendor. Young was to write software for the computers, the spokesman said, but when HP learned that no software was being written by the company, it ceased doing business with Young when its contract expired in June 1982.

When Young later placed another order with HP, this time for eight 9825Ts, the order was turned down, the HP spokesman added. A spokesman for DEC, meanwhile, said his firm requires OEMs to undergo "a very intricate process" to prove their authenticity. He declined to comment further.

The case is being prosecuted in Massachusetts, where most of the equipment is said to have originated, primarily from DEC and HP. Neither of the case's two federal prosecutors could be contacted despite repeated attempts.

FREE SEMINARS

VM DATA AND OPERATIONS MANAGEMENT

If you have a VM Information Center, you can't afford to miss the free seminars sponsored by VM Software Inc.

VMSI is the leader in systems software products for VM. We are committed to building quality system products to meet your growing needs without modifications to CP or CMS. Our products have been installed by 43 of the Fortune 50, as well as in 23 different countries.

At this free seminar, learn how these products can make your data center run more efficiently:

- **VMACCOUNT:** System accounting, reporting, and capacity management system for the VM environment.
- **VMARCHIVE:** Archival storage and retrieval system for online and offline storage of CMS files.
- **VMBACKUP:** Backup and restore system for CMS and non CMS minidisks using full or incremental dumps.
- **VMSCHEDULE:** Complete scheduling and monitoring system for end users.
- **VMSECURE:** Directory management, disk space management, and resource access control for VM systems.
- **VMTAPE:** Comprehensive tape drive and tape volume management for VM.

As an added incentive to attend, VMSI offers a discount on products you purchase within sixty days of the seminar. We will reduce the license fee by $1000 for an individual product, or $2000 for the full integrated product line.

Don't miss this chance to improve your VM data center while saving your company money. Register today for the seminar in your area by completing and returning the coupon below.

703-821-8886

VM Software Inc.

VM System Management Seminars

_____ Atlanta, GA	April 24	_____ Boston, MA	May 10
_____ Tampa, FL	April 25	_____ Toronto, Ontario	May 11
_____ New Orleans, LA	April 26	_____ City of Commerce, CA	May 14
_____ Pittsburgh, PA	May 1	_____ San Francisco, CA	May 15
_____ Columbus, OH	May 2	_____ Seattle, WA	May 16
_____ Chicago, IL	May 3	_____ Portland, OR	May 17
_____ St. Paul, MN	May 4	_____ Dallas, TX	May 22
_____ Philadelphia, PA	May 8	_____ Houston, TX	May 23
_____ New York, NY	May 9	_____ Baltimore, MD	May 24

Name _____

Title _____

Company _____

Address _____

City _____ State _____

ZIP _____ Phone (_____) _____

CPU Manufacturer _____ Model _____

2070 Chain Bridge Road, Suite 355, Vienna, Va. 22180

DEC high-end VAX adds 30% to 50% more power

By Tom Henkel
CW Staff

NEW YORK — In an apparent response to the tidal wave of recently announced superminicomputers from its competitors, Digital Equipment Corp. last week splashed back with a high-end addition to its VAX-11 line. The VAX-11/785 unit offers 30% to 50% more performance than the older Model 780 and carries a 15% higher price tag.

The performance of the high-end VAX-11 — unwrapped last week at the same press conference at which DEC unwrapped its own relational data base management system for the VAX line (story on page 1) — was attributed by DEC to faster Schottky CPU circuits, the quadrupling of cache memory capacity to 32K bytes and the addition of an optional floating-point accelerator.

The machine sports a 133-nsec processor cycle time, which is one-third faster than the Model 780's 200-nsec processor cycle time. The improved performance, DEC said, means the 785 can perform better than the 780 in computer-aided design and manufacturing and educational, technical and commercial time-sharing applications.

Instruction microcode

Instruction microcode for the VAX-11/785 is stored in random-access memory; in the 780, it was located in read-only memory. This change, DEC said, makes it easier to make microcode updates while also increasing CPU performance.

Furthermore, the console memory capability of the 785 is 48K bytes; the 780's maximum is 16K bytes. This increase on the 785 improves console performance for system monitoring and error reporting and also makes maintenance easier, DEC claimed.

By utilizing specialized synchronization circuitry, the VAX-11/785 can use the same Synchronous Backplane Interconnect interfaces, controllers and peripheral equipment of smaller VAX series processors. In addition, according to Bruce A. Ryan, manager of the VAX product marketing group, users of the 780 processor can field-upgrade to the 785 for $91,200. A field-upgrade kit, including the optional floating-point accelerator, costs $95,000.

Runs both VMS, Ultrix-32

Ryan also noted that the 785 can run both the VMS and Ultrix-32 operating systems (Ultrix-32 is DEC's version of Unix).

The optional floating-point accelerator, the FP785, is said to enhance by an average of 47% the processor's performance in compute-intensive applications. The floating-point processor uses the same technology and internal timing as the VAX-11/785 and costs $14,000.

With first customer shipments slated for September, a base configuration of a VAX-11/785 processor with 2M bytes of main memory, cabinetry and a VMS operating system license costs $195,000.

A preconfigured system designed to use DEC's All-in-1 office automation software costs $322,735. That configuration includes 6M bytes of main memory, a 456M-byte disk drive, magnetic tape drive, four Decmate II small business systems with word processing software, licenses for VMS, the All-In-1 office menu, VAX Decmail and the DECDX/VMS communications package (which facilitates communications with the Decmate II).

A fully configured system that operates in DEC's Vaxcluster multiprocessing environment costs $399,000. That configuration includes 8M bytes of memory, a console, VMS, 1.2G bytes of fixed disk storage, DEC Unibus cabinetry and a magnetic tape drive.

DEC is headquartered in Maynard, Mass. 01754.

DIGITAL EQUIPMENT CORP.

System Characteristics	VAX-11/730	VAX-11/750	VAX-11/780	VAX-11/785
Relative Performance[1]	20	40	62	86
Mips[2]	.36	.72	1.06	1.4
Memory Size in Bytes (Minimum-Maximum)	1M-5M	512K-8M	512K-32M	2M-32M
Purchase Price[3] (Memory Size)	$21,500 (1M)	$47,000 (1M)	$145,000 (2M)	$195,000 (2M)
Lease Price (Lease Term)	None	None	None	None
Machine Cycle Time (Nsec)	810	320	200	133
Channels (Minimum-Maximum)	1	1-5	1-8	1-8
Cache (Buffer) Size	None	4K	8K	32K
Bus Architecture	Yes	Yes	Yes	Yes
Price per 1M Byte Of Main Memory	$4,900	$4,900	$4,500[4]	$4,500[4]

1. CW estimates based on vendor-supplied information. Relative performance ratings are based on an IBM 370/158-3 equaling 45. These numbers are designed to put the processor into perspective with other systems; they do not constitute a buyer's guide. All systems are not alike; they use different operating systems, instruction sets and architectures and, therefore, cannot be directly compared. In addition, actual relative performance may vary with the application, peripherals and software.
2. Vendor claims.
3. For a basic configuration consisting of 2M bytes of main memory, power supply, cabinetry and a VMS operating system license.
4. Memory upgrades are available in a minimum 2M-byte configuration for $9,000.

CW Chart

Newest VAX garners more punches than praise

By Tom Henkel
CW Staff

Digital Equipment Corp. last week received more jabs than praise for its newly announced VAX-11/785 superminicomputer.

Comments at DEC's product announcement last week in New York and on the floor of Dexpo East 84, a conference for DEC users in Boston, ranged from "too little, too late" to "a nonannouncement."

The new processor was a letdown for many who expected DEC to unveil the long-awaited Venus, a high-end successor to the VAX-11/780, which DEC still promises to announce sometime this year. Instead, DEC appeared satisifed to share the dimmer corner of the the limelight with AT&T's line of VAX-class processors, announced two weeks ago [CW, April 2], and IBM's new low-end System/36, announced last week (story on page 8).

Despite any disappointment it may have engendered, the announcement of the VAX-11/785 did give capacity-starved users of the VAX-11/780 an upgrade option. DEC claims the 785 offers 30% to 50% more performance than the 780. Previously, to get that kind of performance enhancement, DEC users basically had to switch to another vendor's system, such as IBM's 4300 line.

And many VAX users have been switching to the 4300 over the past few months, according to Sonny Monoesson, president of American Computer Group, Inc., a Boston firm that deals in used DEC hardware. Monoesson said he knows DEC is losing high-end VAX users to IBM because that is how he makes a living — buying up used VAX processors. Monoesson claims the market for used VAXs has been brisk.

But other industry watchers contend that the VAX line is selling well. In fact, one analyst said DEC is beating IBM in the mid-range processor market.

If DEC is indeed satisfied with sales of the 780, why would it jeopardize that market by offering a new processor that will not be available until at least September? According to Stephen A. Levine, the president of TEC Computer Systems, Inc., a Newton, Mass., DEC distributor, DEC had to announce the 785 to appease its current installed base of 780 users.

But is the 785 really a good deal for existing users? In material presented to the press and industry analysts at New York's Windows on the World restaurant last week, DEC stated that the 785 costs about 15% more than the 780. That 15% appears to apply only to fully configured systems. The purchase price for a base configuration is $195,000, about 35% greater than the $145,000 purchase price for a similarly configured 780, noted Dave Moschella, an industry watcher with International Data Corp. in Framingham, Mass.

For current users of VAX-11/780s, there is a charge of better than $90,000 to field-upgrade to the 785. While that is certainly less costly, not to mention less disruptive, than migrating to IBM's 4300 line, Moschella noted it still appears to represent the same price curve that has always been offered on the VAX line.

Not anxious for early orders?

DEC does appear anxious to chalk up early orders for the VAX-11/785. The spokesman admitted DEC is offering a discount on 780-to-785 upgrade kits to users willing to purchase 780 processors by the end of June. The spokesman said he was not sure how much a discount is being offered, but industry sources say the upgrade kit is being discounted about $40,000.

In remarks at the New York announcement, however, DEC President Kenneth Olsen stated, "We're not going to give the company away by lowering our prices too quickly." That remark prompted some industry watchers to speculate that DEC announced the 785 purely to get more mileage out of the current VAX line-up before the Venus announcement. But other analysts, like IDC's Moschella, think Venus may offer so much more performance than the 780 that some users will not be able to justify buying it.

In any case, the VAX-11/785 will not be available until at least September, and, a DEC spokesman said, the 780-to-785 upgrade kits will not be available for an indefinite time after that. That has industry watchers puzzled. If DEC is set to announce the high-end Venus by the end of the year, they ask, why announce a slightly more powerful version of the 780 that probably will not be available for volume shipments until about the same time as the Venus announcement?

Videotex software fits VAX-11

NEW YORK — Digital Equipment Corp. last week unwrapped videotex software for the VAX-11 series of superminicomputers running under its VMS operating system.

Dubbed VAX VTX, the package reportedly can be incorporated with DEC's All-In-1 office menu system and supports the company's VT100 and VT200 CRT terminals, VT100-compatible terminals and the entire line of DEC microcomputers.

VAX VTX is comprised of three components, a spokesman said, including terminal control/concentrator software and data base access and update software.

The spokesman said VAX VTX is also compatible with DEC's Decnet communications software. It can be used as part of the All-In-1 office information system and can be called from the All-In-1 menu.

VAX VTX is expected to be available in June and will license for $25,000, according to the spokesman. DEC is headquartered in Maynard, Mass. 01754.

NEWS

RDB gets mixed greeting

John Gallant
and Paul Gillin
CW Staff

Digital Equipment Corp.'s first foray into the relational data base management system (DBMS) arena signals a renewed emphasis on software in general and the information center in particular. However, broad market acceptance of the new products is less than certain.

That was the reaction of industry watchers contacted by *Computerworld* following DEC's introduction last week of the VAX RDB/VMS and VAX RDB/ELN software for the VAX-11 series processors.

The announcement signals DEC's commitment to the information center, according to Shaku Atre, president of Atre International Consultants in Rye, N.Y. "DEC now has a large VAX, Unix, a local-area network and personal computers," Atre said. "But it has needed something to sit on the VAX that is easy to retrieve from. DEC is trying to make it attractive to buy a complete system."

But Atre also noted that DEC "has not shown a great deal of enthusiasm about its software products" in the past. "DEC may have to convince people that it is serious about this."

Missing details

Skepticism centered on DEC's failure to provide many technical details about the RDB software. "A lot remains to be seen," said Dr. George Schussel, president of Digital Consulting Associates, Inc. in Wakefield, Mass. "If this software is more complex and comprehensive than other systems on the market, then it will be embraced by DP managers. If not, it may be more of an information center tool."

"The announcement touched briefly on some of the system's capabilities, but there was no real discussion of the user interfaces," said Gary Morgenthaler, president of Relational Technology, Inc., which markets the Ingres relational DBMS. "It's not clear what additional software users will need to make the system functional."

According to Dan Nolan, president of Heuristic Developments, Inc., DEC users will adopt a "wait-and-see" attitude toward the new products. "DEC will push these products heavily, but I think most customers will sit back and watch," he said. "People are reluctant to accept new disciplines."

Announced as supporting distributed data bases, the DBMS could be a piece in DEC's plans to give its mainframe users a place to migrate, according to Ann Morley, senior software consultant at International Data Corp. in Framingham, Mass. "They have to convince Decsystem-10 and 20 users to migrate to VAX clusters rather than to the IBM 30 series," she said.

However, Ronald G. Ross, editor of the "Data Base Newsletter," doubted that distributed data bases are feasible yet. "Every vendor making relational noise is claiming to support distributed data processing," Ross said, "but I'm not sure they'll follow up on that with a truly distributed data base. I'm not convinced either that a lot of people are willing to go the distributed data base route."

Industry analysts also split on the impact of DEC's announcement on established relational DBMS contenders, such as Oracle Corp.'s Oracle, Relational Technology's Ingres and Cincom Systems, Inc.'s Ultra. "It's clear that many current DEC user companies will prefer DEC's own system over others, and that will hurt," Schussel said.

"I hope the others will tighten up their acts as a result of this," Nolan said.

"But I'm afraid they'll attack DEC at the print-shop level. They will minimize whatever capabilities the DEC systems have, but they should be moving toward more R&D," Nolan added.

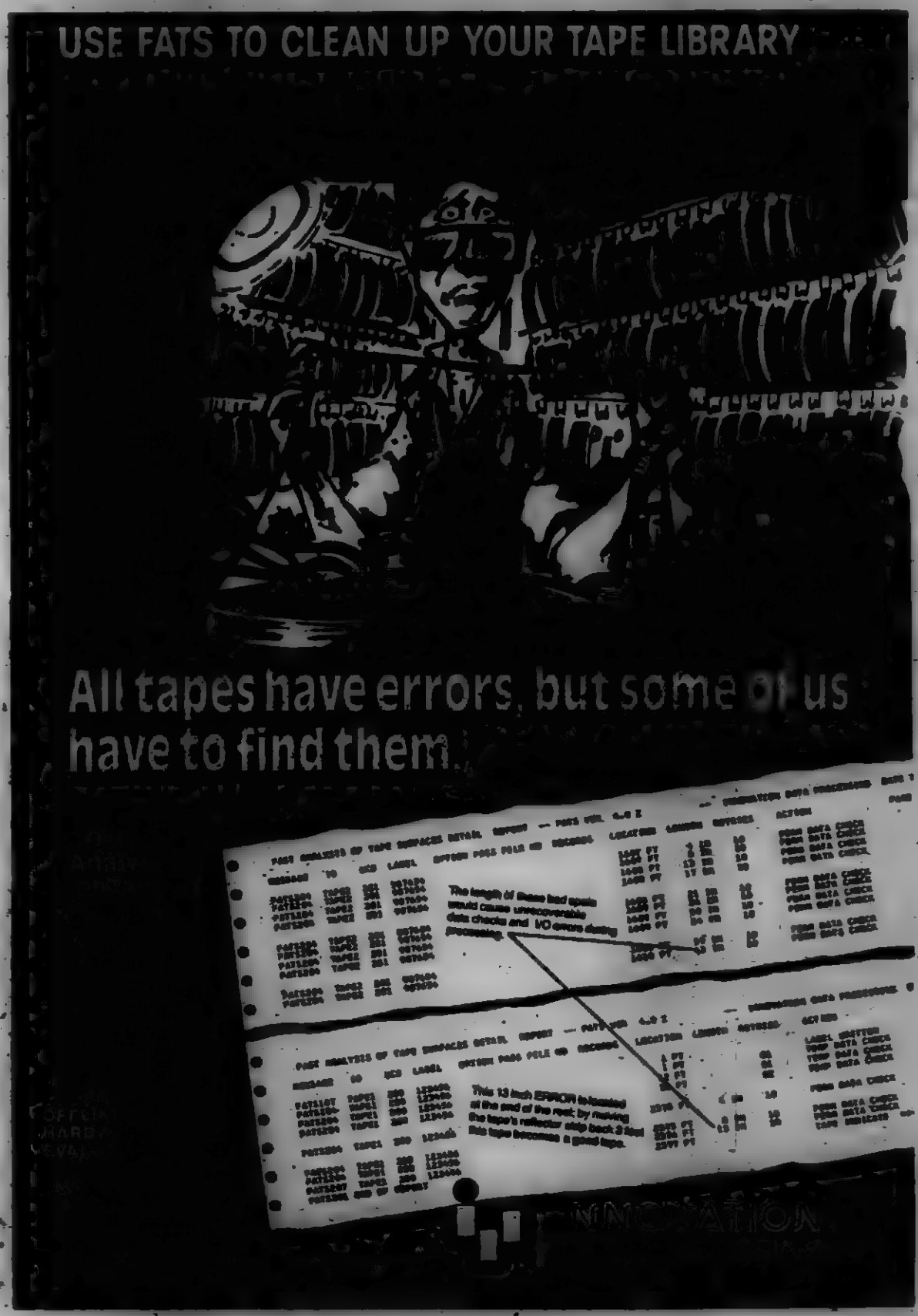
DEC from page 1

The two DBMS use the Digital Standard Relational Interface as a common application interface, allowing application programs written for either system to access data managed by the other, the spokeswoman noted. They also enable users to retrieve and update information transparently from remote systems using Decnet communications links. With the Decnet facilities, application programs can run on one system, while data can reside on any other VAX system in the network.

Both VAX RDB/VMS and VAX RDB/ELN are said to offer an interactive query language to aid data manipulation and debugging of application program logic. The packages also feature a data definition language for definition and central storage of data descriptions, data validation functions to ensure conformity to predefined parameters, transaction recovery features and contention arbitration to handle simultaneous attempts to access the same data.

In addition, VAX RDB/VMS reportedly adds security features to those provided by the VMS operating system, and it provides what the spokeswoman described as long-term journaling to preserve data integrity in the event of application or system malfunction.

Development license fees are $9,000 for VAX RDB/VMS and $7,500 for VAX RDB/ELN. VAX RDB/ELN will be available in June, VAX RDB/VMS in August from DEC, headquartered in Maynard, Mass. 01754.



IBM issues products to tie its micros, larger systems

By Mike Bucalyn
CW Staff

NEW YORK — IBM last week issued a barrage of new products, most aimed at linking its Personal Computers with larger IBM machines.

The introductions "just about turn the [Personal Computer] into a new system," claimed Philip Estridge, president of IBM's Entry Systems Division. "They take the [Personal Computer] into the mainstream of IBM's office strategy."

Among the new offerings unveiled at a press conference here:

■ The Professional Office System/Personal Computer Connection (Profs/PC²). Profs/PC² extends selected Profs functions to the IBM Personal Computer, Personal Computer XT, 3270 Personal Computer, Personal Computer XT/370 and Portable Personal Computer. It allows users to transfer Profs incoming mail and other business information to Personal Computers for stand-alone processing; the results can be sent from the micros back to Profs for processing or distribution to other Profs users, IBM said. Available in June, the program will cost $200.

■ Transfer facility programs that connect the System/36 or the System/38 with the Personal Computer, Personal Computer XT or Portable Personal Computer. The programs allow the micros to both download and upload files to and from the larger machines, said H. Mitchell Watson Jr., president of IBM's System Products division.

Two transfer facilities will be available next month, one for the System/36 and the other for the System/38. Each costs $960.

■ The Displaywrite series of text processing software programs for the Personal Computer, Personal Computer XT, Portable Personal Computer and 3270-PC. Similar to the Textpack 4 program, which runs on the IBM Displaywriter, Displaywrite 2 includes a spelling checker with about 100,000 words; it costs $299. Displaycomm BSC is a Binary Synchronous Communications program enabling Personal Computers, Personal Computer XTs and Portable Personal Computers to send Displaywrite 2 documents to other suitably equipped Personal Computers, Displaywriters and host computers; it carries a $375 price tag. Both programs are available this month.

■ IBM 8100 information system support for the Displaywrite 2 program running on a Personal Computer or Personal Computer XT. Attached to an 8100 local or remote loop and operating under Displaywrite 2, Personal Computer workstations can exchange documents with the larger system, according to the company. The support is available under the 8100 DPCX/DOSF Release 4 and DPPX/SP Release 2.

■ An attachment kit that connects the Displaywriter and the Personal Computer, Portable Personal Computer, Personal Computer XT or PCjr. The attachment allows transfer of documents and files between a Displaywriter and a single Personal Computer. The setup also permits a Displaywriter to connect with the IBM Personal Computer Cluster, using a Personal Computer as an interface. The kit is expected to be offered in August at a cost of $495.

■ IBM 5218 letter-quality printer support for up to four Personal Computers or Personal Computer XTs. A printer attachment package (with cable and printer-driver program) will cost $220; the printer-sharing device will cost $625. Both will be available next month.

■ An enhanced version of the 5520/Personal Computer Attachment Program, which provides support for the Personal Computer, Personal Computer XT, 3270-PC, XT/370 and Portable Personal Computer. The Version 3 program will cost $384, and an attachment kit (with program, adapter and cable) will cost $1,113. The program is expected to be available in the third quarter.

■ The PC/Videotex program, which permits a Personal Computer, Personal Computer XT or PCjr to be used as a videotex terminal. Cost for Personal Computer and Personal Computer XT versions is $250. It is scheduled to be sold in October.

■ The PCwriter, a text processing program supported by the Personal Computer, Personal Computer XT and Portable Personal Computer. PCwriter is scheduled to be offered this month at a cost of $190.

IBM's Information Systems Group is based at 900 King St., Rye Brook, N.Y. 10573.

IBM last week released this graphic interpretation of how its microcomputers, workstations and peripherals can be integrated into larger system configurations. The graph highlights both the diversity of connections and the ubiquity of the IBM Personal Computer.

The dotted lines show document-transfer capabilities that IBM intends to establish, but has not yet released as products.

"DWS" indicates IBM's Displaywriter word processing system; "PC" stands for the Personal Computer; the 6670 is IBM's information distribution system; and the S9000 is a laboratory-oriented microcomputer.

The 5253, 3101, 3104, 3170 series, 3180, 3270 series, 3640, 3080 and 8775 are display stations; the 4250 is a printer; the 3290 is a plasma-panel display station; the Scanmaster is an image processor; the 5291 and 5292 are color display stations; and the 5080 is a raster display terminal.

Latest System/36 handles 86 terminals, fits under desk

NEW YORK — IBM last week introduced a low-end model of its System/36 small business system that handles up to 86 terminals and fits under a desk.

The new System/36 Model 5362 provides "the same system throughput as a full System/36" at a 38% lower entry price, said H. Mitchell Watson Jr., president of IBM's System Products Division, at a press conference held here last week to announce the system. The system is for both new and experienced customers who do not need all the storage capacity or devices available with a standard System/36 Model 5360.

The Model 5362 runs all System/36 programs without recompiling and uses most System/36 printers and displays, according to IBM. It plugs into a standard grounded 110V wall socket and handles up to 22 local workstations and 64 remote units.

The system, scheduled to begin shipping next month, comes with 128K bytes of random-access memory (RAM), expandable to 512K bytes; up to 120M bytes of disk storage; and a 1.2M-byte diskette drive. It can accept up to four communications lines and operate in networks using Systems Network Architecture/Synchronous Data Link Control, Binary Synchronous Communications or X.25 packet-switched protocols.

The biggest difference between the 5360 and the 5362 is the amount of storage available, IBM said. The top-of-the-line version of the 5360 features 1M byte of RAM and 800M bytes of disk storage. The top-of-the-line 5362 offers 512K bytes of RAM and 120M bytes of storage.

Four models of the 5362 are available: the A01, with 30M bytes of disk storage and a starting price of $13,000; the A02, with 60M bytes of storage and an $18,000 price tag; the A03, with 90M bytes of storage for $24,000; and the A04, with 120M bytes of storage and a $28,000 price.

A basic configuration, with 128K bytes of RAM , 30M bytes of disk storage, display terminal, printer and System/36 System Support Program operating system, will cost $23,510.

Maintenance charges for the new system are substantially less than for the 5360, IBM said. The monthly fee for the starting 5362 unit is $60; the starting 5360 costs $96 a month.

IBM Credit Corp. will offer term lease and installment payment financing, with term leases starting at $253 a month for a five-year lease of the lowest priced 5362.

In conjunction with last week's announcement of the System/36 Model 5362, IBM also lowered one-time charges for selected features available in the System/36 System Support Program.

More information is available from IBM's Information Systems Group, 900 King St., Rye Brook, N.Y. 10573.

IBM from page 1

Reiterating that sentiment, George Colony, president of Forrester Research, Inc. in Cambridge, Mass., said that he believes the most significant part of the announcement is the new capability to exchange files and documents between Personal Computers and other systems.

"The real trick for IBM," Colony explained, "is to keep the [Personal Computer] as an 'open' machine for third-party software developers and pull it under data processing to link it to higher level systems. I think it is doing this successfully."

Additionally, Colony believes the announcements give the 5520 a "new lease on life." While the days of the 5520 as a shared-logic word processing system may be limited, Colony sees the 5520 being adopted as a Personal Computer controller.

If that does not keep the 5520 from going under, it might eventually fall prey to the Personal Computer, a fate that, according to Drexel's Casey, also awaits the Displaywriter now that Displaywriter software is available for the IBM micro.

Turning to the "Baby 36," IBM's newly announced low-end System/36, analysts were universally impressed by the unit's low price and compatibility with applications software developed for other processors in that product family.

Skip Bushee, executive vice-president of Infocorp, a research organization in Cupertino, Calif., said the major advantage of the new system is its $24,000 price tag and its compatibility with System/32, System/34 and high-end System/36 applications. "You used to have to spend $50,000 for a system that could play all those applications," Bushee noted.

Shareholder wins proxy fight, vows to oust MAI chief

By David Myers
CW New York Bureau

NEW YORK — Insurgent stockholder Asher B. Edelman has won his bitter proxy fight with Management Assistance, Inc. (MAI), nailing down four seats on MAI's 10-member board of directors and vowing to oust Raymond P. Kurshan, chairman and president of the minicomputer maker and computer services firm.

By a vote of 3.9 million shares to 1.9 million, Edelman's slate of directors — Raymond French, Clark Mandigo, Charles P. Stevenson and himself — was elected at the MAI annual meeting on March 14, it was disclosed last week. Edelman, whose combine now holds 12.8% of MAI's stock, told *Computerworld* last week that the group's goals are to sell the $376 million company and force Kurshan out of office.

"We want to do everything possible to make this company work for its shareholders. Neither [Kurshan] nor his work fits that description. Raymond Kurshan is a total autocrat and without talent," Edelman said.

Not confident of ouster

However, Edelman said he is not confident of being able to oust Kurshan. "Confidence implies hubris, and that is not my motive," Edelman said.

Reached at MAI offices here, Kurshan said he has no intention of stepping down. The 13-year company president and his management team captured "a fair share of the independent shareholder vote" once the Edelman group's votes were subtracted, according to Kurshan.

"I don't know how that could have happened," Edelman said, pointing out that his group holds slightly more than 900,000 shares. "If you take those out, the vote was 3:2 instead of 4:2."

Nevertheless, Kurshan insisted he did not consider the lost proxy battle "a personal repudiation of my efforts."

Kurshan's management team had waged a fierce and at times mudslinging campaign against Edelman, raising questions about Edelman's experience in the computer industry and detailing his legal brushes with the Securities and Exchange Commission.

By contrast, Edelman's campaign was low-key. In proxy materials, he asked shareholders' votes to bring about "a change in management's direction" and "emphasize [MAI's] maintenance and service business," perhaps even dropping manufacture of the Basic Four line of minicomputers. Edelman also criticized management salaries.

Edelman, French, Mandigo and Stevenson will be invited to serve on MAI committees "so they can form better judgments about the company," Kurshan said. "They have lacked an understanding of this company. Their comments and criticisms have been inappropriate."

Talking with prospective buyers

Both Kurshan and Edelman said they are in discussion with several prospective buyers or merger partners.

Edelman said he is talking with computer industry firms and added that MAI could either be sold "lock, stock and barrel" or be divided into manufacturing and service halves to be sold to two separate buyers.

Kurshan insisted he had concluded "several months before Mr. Edelman came upon the scene" that MAI needed to find a "suitable merger partner" in order to halt two straight years of losses. MAI lost $3.4 million in 1983. However, Kurshan said his discussions with likely purchasers have not gone beyond the stage of exchanging information. "We are not negotiating with anyone," he said.

The proxy election will wind up costing MAI over $5 million, Kurshan said, resulting in an anticipated loss for the company's second quarter ended March 31, according to Kurshan. Without the proxy battle expenses, second-quarter income would have surpassed last year's, he added.

Court upholds tariff delay

WASHINGTON, D.C. — Bell Atlantic's effort to force early implementation of new, higher tariffs has been shot down, at least for now.

Bell Atlantic, one of the seven regional Bell operating companies created when the Bell system was broken up Jan. 1, asked U.S. District Court Judge Harold Greene on March 26 to bar the Federal Communications Commission from delaying the tariffs any longer. They had been scheduled to become effective April 3, a date about to be changed to June 13 [CW, April 2]. Bell Atlantic also requested an immediate court hearing.

Greene denied the latter request and put off a final decision until he has reviewed comments from interested parties. As a result, final action will be delayed several days. Meanwhile, the new tariffs have been deferred until June 13.

Do you have some questions about VSAM file handling in COBOL?
Then here's the book for you...

VSAM for the COBOL Programmer

If you have to work with VSAM files and you're unsure of what you need to know about them, then you should get a copy of *VSAM for the COBOL Programmer*. Just as its title implies, this practical, how-to guide will teach you all the basics of handling VSAM files in COBOL.

The first chapter is an introduction to VSAM. It talks about VSAM's advantages ...and drawbacks...and introduces you to the common terms you'll need to know before you can continue.

Chapters 2 and 3 are the meat of the book because they cover VSAM key-sequenced files. Key-sequenced files are equivalent to ISAM files on a non-VSAM system, and they make up about 95% of all VSAM files.

Chapter 2, then, explains the COBOL elements you need to know for key-sequenced files. And it gives in-depth coverage to handling the errors that can occur when an I/O statement is executed for a VSAM file. In addition, it tells you how to code the OS JCL you need for COBOL programs that use VSAM files ...and why the JCL is so much simpler than it is for ISAM files.

Chapter 3 covers IDCAMS, the Access-Methods-Services program. This is the utility program you must use to set up disk space for a VSAM file before you can even create the file in a COBOL program. In addition to learning how to set up file space, you'll learn how to use IDCAMS to: copy, print, and rename VSAM files; load a VSAM file from a non-VSAM file; and list and maintain a VSAM catalog.

Once you've mastered the material in chapters 2 and 3, you can quickly go through chapters 4 and 5. They cover the COBOL, JCL, and IDCAMS considerations for entry-sequenced and relative-record VSAM files. These are equivalent to sequential and relative files on non-VSAM systems.

Throughout chapters 2-5, the learning is geared toward the OS user. But chapter 6 is devoted to the DOS user. It presents all the variations you need to know about if you're working on a DOS system. So here, you'll learn how the COBOL code, the JCL, and the IDCAMS statements differ from OS. And I think you'll be surprised at how few differences there are.

In short, then, by the end of the book you'll have a thorough grasp of what you need to know to write COBOL programs for VSAM files.

2 reasons why this book is effective

1. The author of this book, Doug Lowe, selected the content based on an analysis of what a COBOL programmer needs to know about VSAM. That means this book contains everything of use to the average COBOL programmer and very little that isn't. It also means you can learn significant VSAM skills...and find the answers to your VSAM questions...in a minimum of time.

(By the way, this book does not cover dynamic access or alternate indexing. Alternate indexing will be covered in *CICS for the COBOL Programmer: Part 2*, due out at the end of the year.)

2. Perhaps the most important feature of this book is that it contains plenty of examples, so you always see just what the author is talking about. Examples like:

- COBOL listings for file-creation, update, and print programs
- summaries of the codes that can occur in the FILE STATUS field after an I/O statement has been executed ...along with recommendations on what action to take when an I/O error occurs
- DOS and OS JCL for running VSAM COBOL programs
- IDCAMS statements for creating, printing, copying, and renaming VSAM files
- JCL for using the ISAM interface program supplied by IBM

There are over 50 illustrations in all, designed to help you learn about VSAM ...and to serve as models when you're coding VSAM jobs on your own.

So why wait?

If you're not sure of all the answers when it comes to VSAM file handling in COBOL, get a copy of *VSAM for the COBOL Programmer* right away. I think you'll be surprised at how much knowledge you can get for $15.

Our unlimited guarantee

You must be satisfied. If you ever feel our books aren't effective, you can return them for a full refund...no matter how many you buy, no matter how long you've had them.

To order, call 1-800-221-5528 / In California, call 1-800-221-5527 (9 to 4 Pacific Std. Time)

OR Mail the coupon below

Interested in other aspects of COBOL training?

Then take a look at a two-part course called *Structured ANS COBOL*. Part 1, designed for the complete beginner, teaches a professional subset of COBOL that gets the student writing programs for sequential files right away. Part 2 covers advanced subjects like table handling using SET and SEARCH, subprogram linkage, the COPY library, indexed file handling, and the sort/merge feature. Both books present practical methods for developing *structured* programs, so they can be used independently as well as in a set.

Mike Murach & Associates, Inc.
4222 West Alamos, Suite 101
Fresno, CA 93711 • 209-275-3335

Mike Murach & Assoc., Inc., 4222 W. Alamos, Suite 101, Fresno, CA 93711 V1/3

Dear Mike: Please send me the books indicated below. They must teach me the COBOL subjects I want to learn, or I'll return them at any time for a full refund.

_____ VSAM for the COBOL Programmer, 150 pages, $15
_____ Structured ANS COBOL, Part 1: A Course for Novices, 498 pages, $20
_____ Structured ANS COBOL, Part 2: An Advanced Course, 458 pages, $20

☐ Bill me the appropriate price plus shipping and handling (and sales tax in California).
☐ Charge my _____ Visa _____ MasterCard:
Card number _____ Valid thru (mo/yr) _____
Cardowner's signature _____ (not valid without signature)
☐ I want to SAVE shipping and handling charges. Here's my check or money order for full payment. Calif. residents, please add 6% sales tax to your order total. (Offer valid in U.S.)

Name & Title _____
Company (if any) _____
Address _____
City, State, Zip _____

Benefits of micros come slowly, managers warned

Fortune 1,000 conference-goers urged to practice skills at home

By Paul Hawaniewicz
CW Staff

DALLAS — Senior managers' hopes of quickly reaping the benefits of microcomputers have to be tempered, Thomas Samson, partner at Arthur Young and Co., warned here last week at the Fortune 1,000 Personal Computer Market Forum sponsored by Future Computing, Inc.

"Time is the most precious item that a senior manager has," according to Samson, whose firm trains senior managers in the use of personal computers. "He wants instant gratification when he sits down and uses a microcomputer."

But he doesn't receive it. Samson estimates that it takes at least 20 hours before a senior manager becomes proficient working with a software program.

"It's like flying," Samson noted. "A pilot takes 30 hours of ground instruction before he steps into the cockpit. It takes 60 to 100 hours before one becomes really productive with a software package."

This period can be shortened if the manager brings the microcomputer home. "The best time for users to learn is at home for a few hours at night or during the weekend," Samson said. "I urge companies to invest in portables and encourage employees to take them home." Senior managers are turning to microcomputers to facilitate the analysis of corporate data. Before the advent of personal computers, these managers were frustrated at the data processing department's attempts to build corporate information pipelines, according to Samson, who said that "few of these pipelines were successful."

> *'I urge companies to invest in portables and encourage employees to take them home.'* — Thomas Samson, partner at Arthur Young and Co.

Managers look to microcomputers as the new messiahs for providing these information pipelines. "Vendors and data processing managers claimed that hooking mainframes and microcomputers for data analysis is an easy process," Samson stated.

However, senior managers become frustrated at the steps needed to find and load useful data. "Data is stored in a manner a technician can understand, but the manager cannot easily use," Samson said. "There are only a handful of ways that data can be manipulated. It takes time to complete the process — time that senior managers do not have."

Samson is not impressed with manufacturers' recent claims of products designed for ease of use. "[Apple Computer, Inc.'s] Macintosh will help first-time users become acquainted with the machine," Samson explained. "But time is spent mastering the functionality of a specific program. The Macintosh will not solve that problem."

Micro-mainframe links not yet seen satisfying users

By Paul Hawaniewicz
CW Staff

DALLAS — Companies supplying microcomputer-to-mainframe communication links are responsible for providing the security features needed to ensure data integrity.

So claimed James Black, director of advanced concepts at University Computing Corp., who spoke here last week at the Fortune 1,000 Personal Computer Market Forum sponsored by Future Computing, Inc.

Current links do not limit access of data to authorized personnel or ensure that data updated on a microcomputer is transferred back to the mainframe, according to Black.

Inadequate security features were one of many micro-to-mainframe link shortcomings that analysts here noted. "Companies are announcing but not delivering products," Black stated. "We have hardware [and] software, and now we have vaporware that disappears when you try to find it."

In addition, manufacturers are announcing links with very limited capability, according to Don New, president of Phase Information Machines Corp. "Most of the current links access only the vendor's mainframe package," New said. "The product is designed to protect the company's market share and not to help the end user."

Besides limited capabilities, the links are difficult to manipulate, one user claimed. "Vendors claim that hooking microcomputers to mainframes is easy," said Thomas Samson, partner at Arthur Young and Co. He claimed that data as currently stored is understood by the technician, but is not easily used by the manager.

One vendor advocated the emergence of easy-to-use links. "The link should be mundane and work as easily as a telephone," said David Clark, director of consulting at Execucom Systems Corp.

But providing an easy-to-use link is not all that is required. "The problem is not user-friendliness but user-effectiveness," Black said. "The product can be very friendly, but if it doesn't help productivity, it will not be used."

Productivity can be increased if the link works with any microcomputer or mainframe program. "One link should provide a gateway to all data," Black said. "It shouldn't matter if users work with Lotus [Development Corp.'s] 1-2-3 or any other program."

Differing data formats hinder the development of that type of link. "There just aren't any standards for data formats," New said.

Since mainframes and micros grew in different eras, format differences are significant. "Mainframe applications were designed more than a decade ago," New said. "We have to retrofit mainframe data so that the microcomputer can use it."

Retrofitting these applications will take time. "We should attack the problem by building on what is already there," Clark said. "We should design simple links, be satisfied with quick, small wins and use that experience to build more complete links."

AT&T to request waiver for subdivision

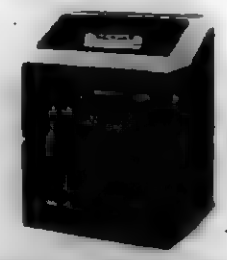
WASHINGTON, D.C. — AT&T plans to ask the Federal Communications Commission soon for a waiver of the Second Computer Inquiry decision that would allow a newly created subdivision to market transmission service and terminal equipment on a bundled basis to the federal government, a spokeswoman said last week.

The new entity, set up within AT&T Technologies, Inc., would install and maintain whatever it sold.

The idea was vigorously opposed by the company's competitors, who insist that if the waiver is granted, it will enable AT&T to underprice other bidders by offering the transmission services at below-cost rates. That would force users of AT&T's regulated services to make up the difference, explained John Morgan, general manager of government systems for the Bell Atlantic telephone companies.

A major reason for adopting Computer Decision II, he added, was to prevent such cross-subsidies.

Dataproducts
The Printer Company



BAND PRINTERS TO 2000 LPM, DOT MATRIX, GRAPHICS, LETTER QUALITY

CRTs — PRINTERS — DATACOMM — PC's
SALES • MAINTENANCE • LEASING

DSI Digital Source, Inc.

CA So Cal (213) 889-9393, (714) 540-2332, Bay Area (408) 946-1300
Colo (303) 573-5153, Mich (313) 264-4500, Ill (312) 640-7955
D.C. (301) 258-8888, Balt (301) 363-7393, So East (404) 458-2800

VAX SPREADSHEET WITH GRAPHICS

GRAPHIC OUTLOOK combines an electronic spreadsheet with full business graphics. GRAPHIC OUTLOOK interfaces to your DISSPLA®, SAS®, DI/3000®, or IMSL® graphics software. Or you can license it complete with its own graphic software. Our 30 day demonstration tape includes the full spreadsheet with graphics.

— Horizontal and vertical bar charts, pie diagrams, line and scatter plots.
— Drives most popular graphics terminals and plotters.
— A 3-dimensional spreadsheet capability lets you link spreadsheets together.
— Reads and writes ASCII interface files.
— Journaling, sorting, cell labels, user-defined functions, cell edit.
— Special project scheduling functions.
— Extensive on-line help, and tutorials.
— With SPAWN command, communicates interactively with user-written programs that update worksheet values.
— Over 60 built-in mathematical, scientific, financial, statistical, and worksheet manipulation functions.
— Low resolution graphics provides bar charts and line drawings on VT100-type terminals.

Graphic Outlook™

Sierra Mountain Computing
1006 Cambridge Dr., Santa Barbara, CA 93111
(805) 964-9101

DISSPLA is a registered trademark of ISSCO
DI/3000 is a registered trademark of Precision Visuals Inc
VAX is a trademark of Digital Equipment Corporation

Turn micros into marketing tools, bankers urged

Premium placed on the delivery of customer services

CW AT EFTA

By James Connolly
CW Staff

ORLANDO, Fla. — Personal computers are tools that bankers can use not only in back rooms for accounting purposes, but in the lobbies to provide direct services to customers, the Electronic Funds Transfer Association Convention (Efta) was told here last week.

"What the customer wants is a responsive bank. The front-line staff can't just be order takers," said Wayne Nystrom, president of Infoware Corp. of Nashville. "Customers want answers. McDonalds [Corp.] has a higher level of customer service on a national basis than do banks."

Nystrom and consultant Wayne Johnson, director of the accounting firm of Deloitte, Haskins & Sells of Atlanta, said that personal computers mean increased productivity and profitability for banks, organizations that traditionally have been slow to accept new technologies.

Three-quarters of U.S. banks are now using microcomputers in addition to mainframes, minicomputers or service bureaus for their data processing needs, Nystrom said. The micro can be a fun training aid, as well as a "valuable starting point for the delivery of services," he added.

Applications cited

Among the applications that Nystrom cited were customized individual retirement account projections, financial planning for upscale customers and cash management for businesses.

He singled out banks in Milwaukee and Louisville, Ky., where bankers have thrown out service manuals in favor of personal computers that show customers what they offer and that help officers steer customers away from passbooks.

"They are small uses, perhaps, but they are very important signals to what the future holds for microcomputers," Nystrom said. He expects further uses for personal computers to include more home banking, including transfer of securities.

Telling attendees that they would find their own applications as they began using computers, Nystrom advised, "You've got to get your hands on a personal computer and play with it."

He recommended starting with pilot installations.

The advantages to personal computers include immediate implementation, high rewards for a low-risk investment and a broad range of uses and benefits, he said.

Johnson said the use of computers as marketing tools should include computer-based learning for employees, electronic consulting such as funds management and expert systems and artificial intelligence as decision-making aids.

Software now at beta test sites can help microcomputers operate as expert systems in tasks such as credit evaluation and employee evaluation, Johnson said.

At the artificial intelligence level, computers feature robotics as automatic teller machines, can replace loan officers in reviewing credit applications, can provide funds settlement and can provide delinquency follow-up.

But, he warned the bankers, "You've got to be on your guard that you don't spend so much time looking at the keyboard that you lose contact with the task at hand.

"Some people get so hung up on the computer that they lose the ability to operate independently."

Nystrom

CW photo by J. Connolly

What do top computer professionals usually say when we tell them about our unique, completely portable software?

"Show me!"

And actually we are not surprised. After all it took us 5 years to figure out how to do it. And now that we've gotten over that hurdle our biggest problem has been convincing people that Tominy's* completely-portable application development system really works.

Tominy allows you to develop completely portable application programs which can be used without modification on micros as well as mainframes and everything in between. That means no more costly and unproductive time spent in developing special systems to fit individual computers. With Tominy one size fits all.

We have such confidence in the system that we offer it with a 90 day no questions asked money back guarantee.

Because it is not possible to tell you here everything our portable application development system does, we have ready to send you a kit that not only offers detailed information on how the system operates but also shows how it is presently being used to increase productivity and reduce costs in over 1000 installations nationwide, including 25 of the Fortune 500 companies. It's yours free for the asking if you send in the coupon or call (513) 984-6605.

We are sure that after reading it Tominy will make a believer out of you too.

Tominy
Once is finally enough.

*Tominy's completely portable application development system is presently available for IBM's PC, System/34, System/36, Series/1, 43XX, 3000, 370xxx, DEC VAX/VMS systems, UNIX and XENIX operating systems

☐ I'd like to be convinced. Send me your information kit.
☐ Have a representative call.

NAME (PLEASE PRINT)
TITLE
COMPANY
ADDRESS
CITY STATE
ZIP
( )
TELEPHONE

Mail to: TOMINY Inc.
Dept. B
4221 Malsbary Rd., Bld. #1
Cincinnati, Ohio 45242

88-CW-4-4

NEWS

Limits must be set on access to EFT, attendees told

CW at EFTA

By James Connolly
CW Staff

ORLANDO, Fla. — The computer does not know right from wrong, so limits must be set on who uses computerized funds transfers and how they use them, warned speakers at the Electronic Funds Transfer Association Convention (Efta) here last week.

The keys to funds transfer security are identification, ensuring that the proper person is accessing the network; and transaction limits, keeping potential losses to a minimum if there is a successful fraud, warned bank security consultant George H. Warfel Sr. of Warfel Associates of Menlo Park, Calif.

Sharing the podium with Warfel was Howard G. Johnson Sr., partner at Price Waterhouse & Co. of New York, who added that senior bank officials seldom understand or want to understand "hackers." He said bank managers erroneously picture hackers as home computer users equally interested in stealing CATV signals and accessing bank computers.

Johnson cited a survey of bank and retail officials, who listed security as the No. 9 concern when building point-of-sale networks. They ranked marketing and consumer acceptance first and second.

Johnson and Warfel noted that software can prevent many of the security problems associated with funds transfers and that physical security controls are relatively easy to conceptualize and execute. Noting the changes in the banking industry in recent years, as banks moved away from being 10 a.m.-to-3 p.m. businesses with transactions controlled by customers' signatures, Warfel emphasized that the use of personal identification numbers and passwords have left bank computers ignorant of who is using the system.

Technological developments and deregulation have extended the "window" in which a bank once operated, which means the bank often may be transferring more money than it has in assets, Warfel said.

Risk involvement

He said that not all EFT activity involves significant risk. Risk is determined by a combination of dollar amount, frequency of occurrence, randomness in time and dollar value and the question of whether funds are being issued to a person.

Using those factors, he concluded that telephone bill paying is a low-risk transaction in that it usually occurs at the same time each month and that the amounts involved are usually predictable.

Other low-risk transactions include preauthorized payments and automated teller machines and direct deposits, he said. At the other end of the scale are wire transfers and foreign exchanges, which are highly risky. Warfel said those transactions are random in time and value, involve large sums of money and seldom involve personal contact.

To combat fraud in the high-risk transactions, Warfel urged that banks and networks adhere to caps in their transfers, not allowing transfers after a fixed percentage of assets has been paid out until replacement funds are received. He also recommended that networks use uniform procedures to identify recipients of wired funds and criticized government regulators who, he said, do not understand the banking business and the technologies it uses.

Control over retail EFT nets seen slipping away from U.S. banks

By James Connolly
CW Staff

ORLANDO, Fla. — Retailers have the chance to steal control from banks over such consumer-oriented electronic funds services as point-of-sale (POS) terminals and bill paying, according to the president of Electronic Banking, Inc. of Atlanta.

Speaking at the Electronic Funds Transfer Association Convention here last week, Allen H. Lipis said that gasoline retailers and supermarkets will want their own — not bank-owned — POS terminals and that major nonbanking corporations are likely to control electronic funds transfer (EFT) networks as consumer-oriented services mature.

"EFT services won't mature until the late 1980s, if not the 1990s, and banking won't be the dominant force," he said. Lipis noted that only 4% of the more than 500 conventioneers were senior bank managers. "Why doesn't EFT have the attention of senior bank management? Maybe

See CONTROL page 13

The world's most advanced personal computer

It all depends on how you look at it.
As a powerful standalone, the Wang Professional Computer offers data, voice, and image processing. And Wang word processing, the world's standard. It can support Wang Office, the most comprehensive office automation software in the industry. And it supports the most popular business software available today.

Wang
© 1984 Wang Laboratories, Inc.

Test new technology to cure AT&T breakup ills, users told

CW AT EFTA

By [illegible]
CW Staff

ORLANDO, Fla. — The AT&T divestiture means skyrocketing rates and poorer service for the operators of bank and retail electronic funds transfer networks. These users can best cope with divestiture by experimenting with new technologies, taking active roles in telephone rate-setting proceedings and getting the most out of their own systems.

So said telecommunications consultant Alfred Natali of East Hanover, N.J., who spoke at last week's Electronic Funds Transfer Association Convention (Efta) here.

Natali told the network managers attending the conference that telephone costs will continue to rise as users deal with both AT&T and the seven divested Bell operating companies.

He noted that some rates have already more than tripled while other new charges, such as a $35 per month charge for carrying data rather than voice communications, have been added.

EFT networks dealing with AT&T and the divested operating companies may encounter extensive service delays, Natali added. Those delays may include waits of up to 100 days for installation of a private line, a key to the operation of a funds transfer network.

While the consultant offered suggestions for coping with divestiture, he warned that even those steps don't assure lower telephone bills. "Experiment with new technologies," he said, acknowledging that those technologies are capital-intensive.

Even with new technologies or with the use of alternative carriers, such as MCI Communications Corp. and GTE Sprint, the networks still must pay for private lines at the network terminals.

Those private lines, according to Natali, have been targeted for rate increases while residential service and private branch exchanges have benefitted.

Another kink in the new technologies is the lack of uniformity.

"You don't know in advance where the points are going to fail when designing a network, so you have to use a uniform medium. And — guess what — the only ones who have that are the telephone companies," Natali said.

Convention attendees commented that they, too, have noticed difficulties since the January divestiture. "The basic change we have seen is in the service. It has gone downhill," said Richard J. Troidl, administrative vice-president for computer services at Empire of America in Tonawanda, N.Y.

CONTROL from page 12

they have found that the profitability is not what they hoped," he observed.

Lipis predicted that private business also will take control of the automated clearinghouses traditionally dominated by the Federal Reserve Bank and that a key to operating such ventures will be the ability to settle accounts on a same-day basis.

Lipis noted that the growth of EFT services has usually involved a 15-year maturing process.

He cited the slow growth of telephone bill paying which, according to Lipis, is still five years from maturity, and the growth of automated teller machines (ATM), which reportedly have put only a 3% dent in check writing.

The nationwide, shared ATM networks that banks operate offer little long-term success, he contended, because they are expensive to operate and are difficult for the handful of potential customers to find while traveling.

The greater profit is to be found in automated bill paying, he maintained, adding that consumers write the majority of checks for that purpose.

At present, electronic bill paying's "only real market" is the microcomputer hobbyist, he said. He noted that the future for consumer-oriented electronic bill paying lies in a complex switching system, in which bill-paying home terminals are linked to creditors' systems.

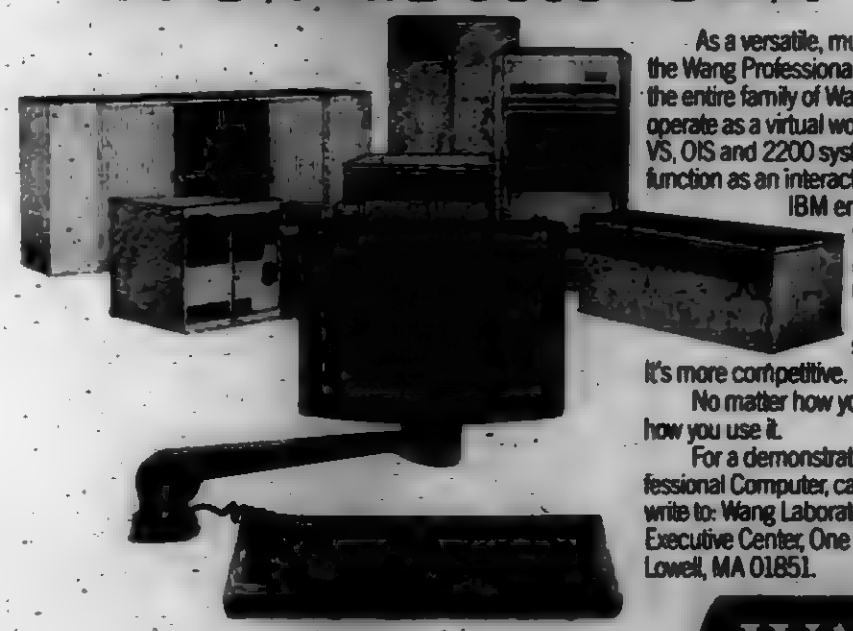
However, one area in which banks may find a market is in networking corporate bill paying, where companies such as Sears, Roebuck & Co. are already making inroads, he said.

Speaking with Lipis, author Martin Mayer of New York observed that the quality of Sears' 10-month-old corporate trade payments system may scare the Federal Reserve Bank.

Mayer blamed the Federal Reserve Bank for mishandling automated clearinghouses, which has set back U.S. EFT operations, particularly in areas such as direct payroll deposit. He noted that only 5% to 7% of U.S. payrolls are directly deposited, compared with 70% to 100% in some European countries.

But Mayer believes the banking industry is still strong enough to recapture the business it has lost to its competitors, particularly in the area of wholesale transactions rather than consumer-oriented EFTs.

just happens to be the world's most universal workstation.



As a versatile, multi-purpose workstation, the Wang Professional Computer can tie into the entire family of Wang products. It can operate as a virtual workstation on the Wang VS, OIS and 2200 systems. And it can even function as an interactive workstation in the IBM environment, either through remote communications or through local attachment.

The Wang Professional Computer. It's more competitive. It's more compatible.

No matter how you look at it. No matter how you use it.

For a demonstration of the Wang Professional Computer, call 1-800-225-9264. Or write to: Wang Laboratories, Inc., Business Executive Center, One Industrial Avenue, Lowell, MA 01851.

WANG

The Office Automation Computer People.

March storms test data center disaster recovery plans

DP managers cope with tornados, power spikes, electrical outages

By John Gallant
CW Staff

WASHINGTON, N.C. — Despite a killer tornado that raged across the countryside only five miles away, the data center at the National Spinning Co., Inc. here suffered only a momentary loss of power. But that was enough.

As one of Joseph Rose's staff members walked the 30 feet from his office to the computer room late in the evening of March 28, the lights flashed five times in rapid succession, and the data center's IBM Series/1 processor and two IBM Model 4963 disk drives went down — for good. For Rose, director of computer services for the $130 million yarn manufacturing company, it was the beginning of a DP nightmare and the first test of his disaster recovery plan.

He was not alone. While operations continued uninterrupted at most data centers contacted by *Computerworld*, other DP managers faced the uncertainties and the fears of equipment damage and data loss brought on by the winds and snow that ravaged East Coast states as March exited.

Though Rose was one of the few forced to implement disaster recovery plans, for National Spinning, having such a plan was critical. When National Spinning's processor and disk drives failed to come up automatically and manual restart attempts proved futile, Rose called on nearby IBM customer engineers for assistance.

After working most of the night, IBM personnel reluctantly conceded that both of the system's 64M-byte self-contained disks had, for unknown reasons, been destroyed. Inventory and manufacturing data vital to the company's 24-hour-a-day packing and shipping operations had been lost.

As replacement controller cards and disks were flown in from an IBM center in Greensboro, N.C., Rose set in motion a contingency plan to keep the packing lines running during the night. Inventory and shipping data were recorded manually, while packing slips and labels that would otherwise have been torn from the printers tied to the Series/1 were written up by hand.

Nearly a full day later, IBM service personnel had repaired the damaged equipment. Rose and his staff began initializing the disks and reloading data from backup diskettes created — fortunately — only two hours before the system failed. Information captured manually was then entered to bring the data files up to date after 36 grueling hours of downtime. Incredibly, no shipments were delayed.

"It was quite a learning experience," Rose said. "There were some minor flaws in our plan that cost us a few hours. Some small files, such as dates and report requests, weren't backed up properly and were lost irretrievably.

"Our manual contingency system worked fine, but there were little, nitty-gritty things that fell through the cracks because we hadn't practiced implementing the disaster plan."

In Needham Heights, Mass., MIS Director Lou Chiesa was in the midst of closing the financial books and preparing a payroll for the Ludlow Corp. early the afternoon of March 29, when the lights went out. The IBM 4341 mainframe in Ludlow's cold and darkened data center would be useless for the next two days, a situation that threatened to delay paychecks for some 3,000 workers.

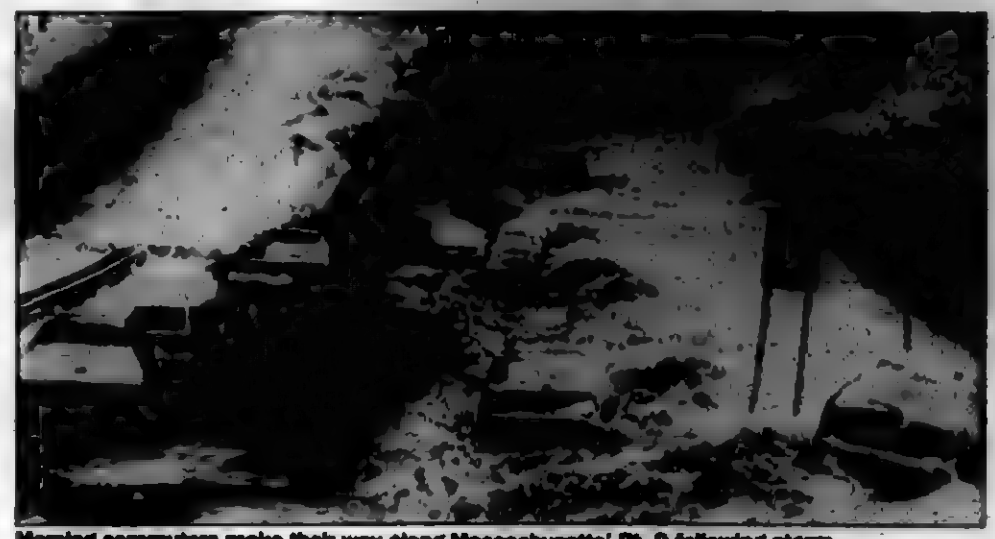
"It was a critical period for us," Chiesa said. "We had to assess how long the power outage would last. On Friday, [Boston Edison Co.] told us the power would be on Saturday. On Saturday, they told us it wouldn't be on until Sunday. We finally decided Saturday morning that we couldn't count on luck, and we put our emergency plan into action."

Chiesa is also MIS director for Ludlow's sister company, Grinnell Fire Protection Systems Co. in Providence, R.I. At 9 a.m. Saturday, he and his DP staff armed themselves with flashlights and retrieved backup payroll, operating system and applications program tapes from Ludlow's data center and transported them to Grinnell, nearly an hour away.

After 12 hours of preparation, Chiesa had implemented Ludlow's payroll system on Grinnell's IBM 3031 mainframe. When the first paychecks rolled off the system during a mock processing run, Chiesa's staff members applauded.

A short time later, power was restored to Needham Heights, allowing Ludlow to complete its financial closing and payroll processing at its own data center on schedule.

"It proved to be an excellent exercise," Chiesa said. "Both of the mainframes operate with DOS/VSE under VM, which makes the data transportable. It costs me an extra $10,000 a year to maintain VM, but in this instance it was worth it. It's also fortunate that I could commandeer the Grinnell system so easily.



Morning commuters make their way along Massachusetts' Rt. 9 following storm.

Faced with power spikes

About the time the lights went out in Needham Heights, Frank Smith was in a meeting with company officials to determine the best way to keep DP operations running smoothly in the face of repeated power spikes. Smith, senior vice-president of information systems for Shawmut Bank of Boston, was concerned about the electrical surges that had already interrupted processing on Shawmut's two IBM 3033 mainframes several times.

"In the midst of this meeting to determine whether to go on backup power," Smith said, "we hit another spike. We had already had five or six spikes, so this time we just stayed down. We went to our backup diesel generators and stayed on them all night until we were certain the power had smoothed out. We went back on regular electrical service at about 7 a.m. Friday."

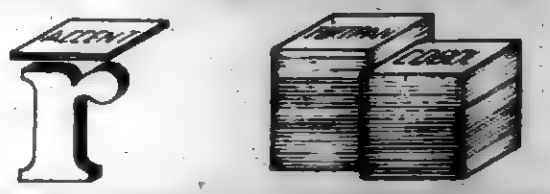
Smith said there was never any danger to equipment or data as a result of the power spikes. He estimated Shawmut lost only about 40 minutes of processing time during the transfer to and from backup power.

"I certainly wouldn't say it was a disaster. We simply wanted the assurance of a reliable power source. We ran normally all through the night."

Despite the flooding that washed across Manhattan's financial district at the height of the storm, New York data processing departments seemed largely spared any damage. Lower Manhattan's tight real estate market provided a measure of protection.

"We . . . have data centers in separate locations. That wasn't intended to provide us with backup, but that's how it works," Norbert Gottenberg, manager of information services at Lehman Brothers Kuhn Loeb, said.

ACCENT R CUTS CODE 80%!



More power for your DEC-10/20, VAX*

CUT CODE
ACCENT R can cut your code up to 80%. ACCENT R's 4th generation language incorporates a unique concept that models the various data processing components. These models result in 80% less code than required by FORTRAN or COBOL. Better yet, since ACCENT R is a compiler, you don't sacrifice efficiency.

SAVE TIME
Less code means less programming and debugging time. But that's not the only way ACCENT R can save you time. ACCENT R's powerful non-procedural language provides a complete range of commands so end users can easily add, change and delete data items. End users can even generate custom reports by simply answering a few questions.

CUT COSTS
Naturally if you save time, you save money. Programmers produce more applications in less time. End users generate their own reports and put less demand on the data processing professionals. And both programmers and end users are happier. Satisfied employees means less turnover. And, more timely information leads to more profitable decisions in today's fast paced business world.

SAVE YOUR SANITY
If you are one of the many people now using a DEC 10 or 20, but see a VAX in your future, rest easy. ACCENT R is migratable software. DEC 10/20 today, VAX tomorrow. A syntactically identical version makes migration easy, special pre-release pricing makes it affordable. Contact NIS for details.

*VAX is a trademark of DEC

For more information send to: 20370 Town Ctr. Lane, #150, Cupertino, CA 95014
408/257-7700

NATIONAL INFORMATION SYSTEMS, INC.

Name _____
Company _____
Address _____
_____
CPU _____ Phone _____

Microprocessors: the heart of the micro revolution

PRODUCT SPOTLIGHT

By Peter Bartelt
CW Staff

The lines of distinction among various types of processing hardware have narrowed in recent years as microelectronics technology has packed increasingly greater power into increasingly smaller boxes. This year and next, the differences between categories of processors seem likely to become even more obscure as very large-scale integration leads the microcomputer into the realm of the superminicomputer.

Literally at the heart of this ongoing revolution is the microprocessor, the tiny piece of silicon upon which engineers can now imprint as much circuitry as once filled room-size computers in the early days of data processing.

Starting with the 1972 introduction of Intel Corp.'s 4-bit 4004 and 8-bit 8008 chips, the microprocessor/microcomputer industry has evolved into a multibillion-dollar business. The total value of microcomputer systems sold to home and business is expected to capture more than 50% of the total information processing systems market by 1988, according to recent predictions by Infocorp, a California market research firm.

Microprocessor technology was introduced to the DP environment through the vehicle of the minicomputer, with mini vendors carving out a niche in the traditional mainframe market by offering smaller packages and lower prices. In mid-1977, Digital Equipment Corp. announced the PDP-8, based on a single chip. This year, DEC is expected to unveil what it has termed the "VAX-on-a-chip," which DEC President Kenneth Olsen told *Computerworld* late last year will have just about all the capability of a VAX-11/780 supermini.

While many hardware vendors have introduced their own microprocessors, it was merchant semiconductor vendors that fueled the 8-bit micro market. In the mid-1970s, Intel Corp.'s 8080 and 8085 chips and Zilog, Inc.'s Z80 and Z80A were sold to a variety of start-up micro companies. MOS Technology introduced its 6502 and spurred the continuing success stories of Apple Computer, Inc. and Commodore Business Machines, Inc. (Commodore later acquired MOS Technology).

Then, in 1981, IBM selected for its Personal Computer the Intel 8088 chip, which can internally process 16 bits of data, but transfers that data 8 bits at a time. The overwhelming success of the Personal Computer created unprecedented demand by other vendors seeking to make their new machines compatible with the burgeoning array of software being written for the IBM microcomputer.

Microprocessors

Model/ Manufacturer	Technology	Data bus (bits)	Internal Architecture (bits)
Z80/Zilog	NMOS	8	8
6502/MOS Technology	NMOS	8	8
68000/Intel	NMOS	8	8
8085/Intel	NMOS	8	8
8088/Intel	NMOS	8	16
8086/Intel	NMOS	16	16
Z8000/Zilog	NMOS	16	16
80186/Intel	NMOS II	16	16
80286/Intel	NMOS II	16	16
NS16032/National Semiconductor	NMOS	16	32
NS16000/National Semiconductor	NMOS	16	32
68000/Motorola	HMOS	16	32
68010/Motorola	HMOS	16	32
MC68020/National Semiconductor	HMOS	32	32
68020/Motorola	HMOS	32	32
Z80000/Zilog	HMOS	32	32
HP Precision Architecture/Hewlett-Packard	HMOS II	32	32
WE32000/AT&T Bell Labs	CMOS	32	32
iAPX/32/Intel	HMOS	32	32
80386/Intel	HMOS II	32	32

CW CHART

Intel became the provider of choice for hardware vendors seeking a true 16-bit chip — the 8086 — that both processes and transfers 16 bits of data at one time. Now Intel is trying to keep up with demand for the 80186 16-bit chip, which combines on one chip the 8086 design with peripheral and support functions. The company has also released the more powerful 80286 16-bit chip for multiuser applications; the 32-bit 80386 chip expected this year is reported to feature demand-paged virtual memory and on-line memory support of up to 4G bytes.

The other players

Besides Intel, there are currently three other leading players in the chip game: Motorola, Inc.; Zilog, Inc.; and National Semiconductor Corp.

Motorola introduced its 68000 family, providing 32-bit internal processing with 16-bit data transfer capabilities, in 1979. Apple selected the 68010 16/32 for Lisa, its highly touted but low-selling system. In January, however, Apple introduced the Macintosh with the same chip, and that product seems poised to ensure Motorola's position as chief challenger to the Intel products.

Motorola also has announced the MC68020 with 32-bit transfer and processing capability.

Although Zilog was a chief player in the 8-bit arena, its 16-bit Z8000 chip "just missed it," according to William F. Zachman, vice-president of International Data Corp., the Framingham, Mass.-based market research firm. Exxon, which acquired Zilog, "showed an incredible ability to turn gold into lead," Zachman added.

Zilog, however, has announced a 32-bit chip, the Z80,000, which it said will be available early next year with virtual memory implemented in hardware.

The other major player in the chip game, National Semiconductor Corp., is in the running in the 32-bit market, but "is unlikely to overtake the rest of the world," Zachman said. National Semi has a family of 16/32-bit chips and has also announced the NS32032 with 32-bit transfer and processing capability.

While Intel, Motorola, Zilog and National Semi are the best-known names in the chip game, other players seem poised to enter the action.

AT&T, for example, has a 32-bit microprocessor, the WE 32000 — formerly Bellmac 32000 — and recently announced a successor, the WE 32010. Although it is only used on AT&T Technologies' products at this time, it is something that has to be counted in, Zachman said.

See CHIPS page 16

Software developers look to users

While microprocessor vendors and microcomputer vendors debate the relative merits of particular chips, the software developer is more concerned about how many end users will be using a particular machine.

Software developers need an incentive to devote resources to a particular microprocessor, according to Camino Wilson, president of Lifetree Software, Inc. in Monterey, Calif., and author of the Volkswriter word processing package. The incentive can take the form of direct compensation from a microcomputer vendor or an ironclad market share of users who need application packages.

"We'll gamble," Wilson said, "on the [Apple Computer, Inc.] Macintosh; that's a reasonable gamble." In addition to the market potential of the Macintosh, Apple was very forthcoming in providing information on the hardware to developers, he said.

Writing software for more than one microprocessor "is pretty awful" because different versions of source code are needed for each model and there are few "mature compilers" available to ease the work load, Wilson said. When there is an existing market, he added, there are more tools available to the developer.

Developers who work in higher languages, such as Pascal and C, he said, find the task of working on more than one microprocessor easier than those who work in assembly language.

Chip vendors gird for 32-bit battle

By Peter Bartelt
CW Staff

While the 16-bit microprocessor market has barely had time to gel, semiconductor vendors are already aggressively positioning themselves to gain the dominant spot in the 32-bit microprocessor arena.

At Motorola, Inc., where the 16/32-bit 68000 seems destined to ride Apple Computer, Inc.'s Macintosh to success, the emphasis is now on upward mobility. Motorola has created a processor that, it maintained, can accommodate changing needs for on-board peripheral and support functions. "With the 68000 family, we took the tack that all code should be upward-compatible," James Farrell, manager of technical communications, said.

Motorola believes its principal 32-bit rival, Intel Corp., has made a strategic error by trying to design into new 16-bit chips some level of compatibility with the earlier 8080 and 8085 microprocessors.

At Zilog, Inc., where the highly successful Z80 was followed by a less successful Z8000, the emphasis is on on-board memory management, with virtual memory capabilities built into the chip. The company is also stressing ease of use; the chip can be adapted for fast or slow applications to meet particular needs, Peter Ashkin, advanced systems marketing director, claimed.

Ashkin believes the 8088 phenomenon — in which IBM's entry into personal computing created a dominating standard — is unlikely to recur in the 32-bit arena. Zilog expects that 90% of all applications packages for 32-bit microprocessors will be written in high-level language which, Ashkin pointed out, "makes [the applications packages] transportable" to competing microprocessors.

The introduction of 32-bit machines will revolutionize the market in 1985 as the entry of the Intel 8080 and Z80 did in 1975, Ashkin predicted. "We're not offering an incremental increase in performance; we're offering an order of magnitude increase in performance," he said, pointing out that 32-bit machines will be able to program for environments of up to 4G bytes of memory.

With each semiconductor vendor cramming more and more functions onto the microprocessor chip, the capacity for even greater integration still appears to be unreached.

Paul Penfield, a professor in MIT's electrical engineering and computer science department and head of MIT's microsystems program, said the limit to the density of microprocessor chips is about 100 million transistors. "We are now in the neighborhood of 100,000 transistors, a few hundred thousand in the most advanced chips."

Motorola's Farrell said some theories have been formulated about stacking or piling circuits on top of each other on a particular chip. "We're already seeing capacitors being put on edgewise," he noted.

Farrell sees a practical limit of four million to five million transistors for a single piece of silicon. "We're optimistic we can do that," he added.

Business schools to benefit from $25 million IBM grant

ARMONK, N.Y. — IBM has launched a $25 million grant program to coax business schools into beefing up instruction in information systems management.

Twelve graduate schools of business administration, to be selected next year, will be awarded five-year grants of $1 million each and will also receive about $1 million worth of IBM data processing machinery, Big Blue said in announcing the program last week.

"Our aim is to encourage business and management schools to develop more graduates who clearly understand the role information systems will play in coming years.

"We hope the schools will achieve that goal by improving the quality of instruction and expanding course offerings and research in [the information systems] field," John R. Opel, IBM chairman, said in a prepared statement.

IBM pointed out that the grant program is similar to a 1982 series of grants given to engineering schools to improve education in manufacturing engineering.

Judge reinstates charges

Against trio in IBM-Hitachi case

By Jeffry Beeler
CW West Coast Bureau

SAN FRANCISCO — Criminal charges have been reinstated against three defendants who allegedly participated in a conspiracy to steal proprietary IBM systems technology and transport it to Tokyo-based Hitachi Ltd.

Federal Judge Robert Aguilar abused his discretion in 1982 when he dismissed conspiracy charges against the trio, the Ninth U.S. Circuit Court of Appeals here concluded in a recent ruling.

The federal appellate court cited Aguilar's abuse as the reason behind its decision to reopen the case against Tabassom Ayazi, Raymond Cadet and Barry Saffaie.

All three were arrested and indicted in mid-1982 for allegedly trying to pass selected volumes of IBM's Adirondack Hardware Design Workbooks to Hitachi, one of Big Blue's chief Japanese competitors in the large-scale mainframe arena.

Bolstered Hitachi efforts

The confidential workbooks, which describe the architecture and other technical details of IBM's latest generation of CPUs, might have greatly bolstered Hitachi's efforts to compete in the mainframe field, according to federal prosecutors. But the desired workbooks never found their way into the Japanese vendor's hands.

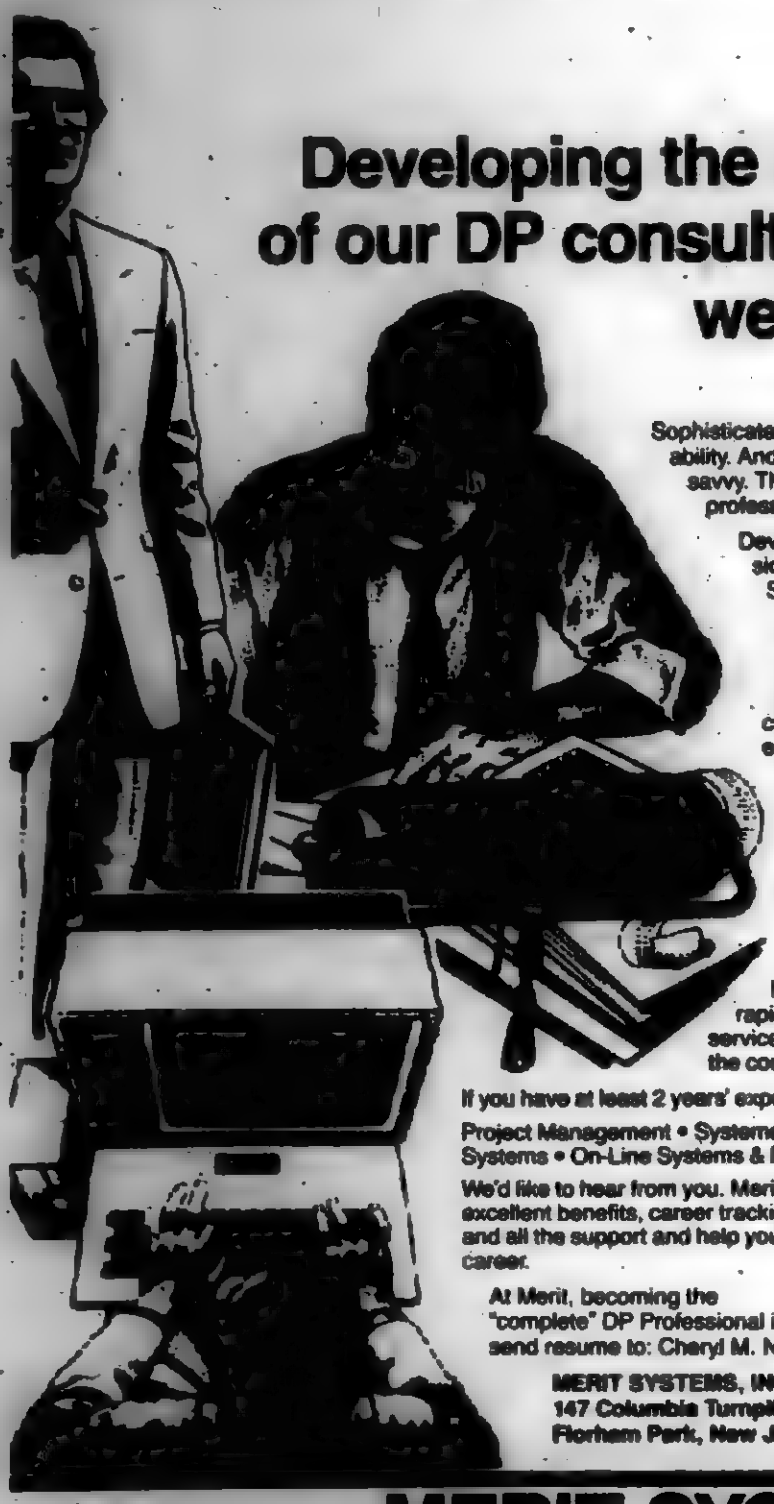
Instead, they were intercepted by federal law enforcement agents who allegedly bought the materials from the defendants while posing as electronics black marketers.

Seizure of the documents helped bring to light an alleged conspiracy that eventually resulted in indictments against Hitachi, Mitsubishi Electric Corp. and more than 20 of their employees or purported agents. Among the "sting" victims were Ayazi, an Iranian college student; Cadet, a former IBM engineer; and Saffaie, who previously worked for Hitachi's National Advanced Systems Corp. subsidiary in the U.S.

Most of the defendants, including Hitachi, pleaded guilty to the charges and received the maximum sentence under American law.

The indictments also prompted IBM to file a civil lawsuit against Hitachi, which settled the dispute out of court after agreeing to terms highly favorable to its American rival.

But the portion of the case dealing with Ayazi, Cadet and Saffaie was soon dismissed when the U.S. attorney's office here refused to furnish the defendants with case documents that purportedly might have aided them in their defense. The dismissal itself, however, was then overturned by the local U.S. appellate court, which faulted Aguilar for exceeding his judicial authority. As part of its ruling, the appeals court also endorsed the idea of requiring the prosecution to surrender its case documents to Aguilar and allow the federal judge to review their contents.



Developing the full potential of our DP consultants is what we're all about.

Sophisticated technical expertise. Acute analytical ability. And a keenly developed sense of business savvy. They're the traits coveted most in the DP profession. And in DP professionals as well.

Developing those three "prized" career dimensions to the fullest is what makes the Merit Systems' approach to consulting so unique.

Ours is a team approach to systems consulting...one that draws on your broad range of talents. At Merit, we're just as interested in the "bottom line" as our clients, and that means helping you develop expertise in business, management and other areas that complement your technical talent. As a Merit DP professional, you'll enjoy total consulting responsibility.

And that's the way Merit believes DP consulting should be.

We believe that our competitive edge is the direct result of career achievement. And our clients seem to agree. Perhaps, that's why Merit has grown so rapidly in the last few years and why we service such a wide variety of clients across the country.

If you have at least 2 years' experience in

Project Management • Systems Design & Development • DataBase Systems • On-Line Systems & Programming

We'd like to hear from you. Merit can offer you a very attractive salary, excellent benefits, career tracking and continuing education programs, and all the support and help you'll need to grow in every facet of your career.

At Merit, becoming the "complete" DP Professional is up to you. Call or send resume to: Cheryl M. New, (201) 377-3107

MERIT SYSTEMS, INC.
147 Columbia Turnpike, Suite 303
Florham Park, New Jersey 07932

MERIT SYSTEMS, INC.

DALLAS, TX; FLORHAM PK, NJ; GRAND RAPIDS, MI; HOUSTON, TX; LIVONIA, MI; TROY, MI.

Data Processing Professional Services

An Equal Opportunity Employer M/F

CHIPS from page 15

Intel, Motorola, Zilog, National Semi and AT&T probably will occupy just about all the competition that the market can bear, Zachman said.

There are others to watch, however. NCR Corp. produced its own 32-bit microprocessor and support chips, the NCR/32s, and has packaged them in the NCR 9300, a 50-lb machine said to have twice the power of the I-9020. The company has also signed an agreement for Honeywell, Inc. to use the chips.

Hewlett-Packard Co. has developed its own 32-bit chip, which it uses in its HP 9000 workstation. Also expected is the DEC VAX-on-a-chip.

IF YOU WANT THE BEST APPLICATIONS DEVELOPMENT TOOL, TALK TO THE PEOPLE WHO DEVELOP THE BEST APPLICATIONS.

Of all the applications development tools ever designed, only one has the proven success of our new Millennium SDT.

Because Millennium SDT was designed by McCormack & Dodge, a company with over a decade of proven success developing applications. Business applications used in over thirty countries. By the world's biggest and most demanding corporate clients.

M & D design teams have developed everything from accounts payable to payroll/personnel software. Recently, they've won industry acclaim for developing the only family of systems on the market with a genuinely borderless environment. The Millennium series.

What made the Millennium series possible was our discovery of Millennium SDT, a remarkable tool based on a remarkable truth: eighty percent of the functions in all applications are, in fact, generic. Which means that 80% are reusable.

This discovery allowed us to vastly simplify and accelerate our entire systems development process. Tasks that once took months suddenly took days. And we were able to bring a breakthrough product line to the marketplace well ahead of our competition.

If Millennium SDT revolutionised our systems development process, think of what it can do for yours. You'll make more efficient use of your data processing resources than you ever thought possible.

And just to give you an idea of how fast our applications development tool works, we've included your first application in this ad. All you do is find the dotted lines, fill in the requested information, mail the completed form, and wait for the postman to bring a packet of important information. And, if you're in a real hurry, call 1-800-343-0325.

Soon your backlog will begin to disappear. You'll be a Millennium ahead.

START WITH THIS APPLICATION.

Name and Title _____

Company _____

Address _____

City _____ State _____ Zip _____

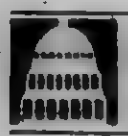
IBM Mainframe Model _____

WHEN YOU THINK ABOUT TOMORROW, MILLENNIUM MAKES SENSE TODAY.

McCormack & Dodge

a company of The Digital Equipment Corporation

McCormack & Dodge Corporation, 1225 Worcester Road, Natick, MA 01760
Sales and support offices throughout North and South America, Europe, Asia, Australia and Africa. 800-343-0325. Telex: 710-325-0329



WASHINGTON UPDATE
Jake Kirchner and Bryan Wilkins

IBM shooting suspect declared fit for trial

WASHINGTON, D.C. — Edward Thomas Mann, 39, a former IBM employee who drove his car into an IBM building and then opened fire with a machine gun, killing three people and wounding nine, is mentally competent to stand trial, a Maryland county circuit court judge has ruled.

The shooting incident took place in May 1982 at an IBM facility in a nearby Maryland suburb. Since that time, Mann has been undergoing psychiatric evaluation.

Initially, medical authorities determined Mann was not mentally competent to face charges, but since being placed on medication last October after assaulting his own doctors, he has subdued his delusions that IBM is involved in a conspiracy to take over the world, his psychiatrists said. Court-appointed psychiatrists previously determined the existence of the delusions.

A Maryland state psychiatrist told Montgomery County Circuit Court Judge William Miller that he is unsure whether Mann has actually improved as a result of the treatment or is bluffing in order to take his case to court. Miller set the trial for Sept. 24.

Smart card tech touted to House committee

WASHINGTON, D.C. — Smart card technology can provide a high level of security in on-line financial transactions, according to testimony recently presented to a House of Representatives subcommittee considering credit card and computer fraud legislation. The subcommittee is considering the Counterfeit Access Device and Computer Fraud and Abuse Act of 1984, legislation that would penalize persons using credit cards or computers for fraudulent purposes.

If smart cards were utilized, computer terminals and communications networks linking individuals with financial institutions would not have to rely on security systems; an embedded integrated circuit can reliably establish the authenticity of the card and the identity of its bearer, according to Stephen Weinstein, American Express Co.'s vice-president for technology strategy.

Weinstein, who is chairman of the American National Standards Institute working group on integrated-circuit cards, told the House Judiciary Subcommittee on Crime late last month that data from the transaction can be entered directly into the chip in the card, eliminating the need for a printer at the terminal. "Withdrawal of the card would 'depersonalize' the terminal, leaving no trace of the user's private codes and information and thus discouraging attempts at fraud by other users or by personnel maintaining the terminal," he said.

CAB posts plan to bar CRS bias by carriers

WASHINGTON, D.C. — The Civil Aeronautics Board (CAB) has issued a set of proposed regulations to ban bias in the computer reservations systems (CRS) that airlines provide travel agents.

The rules would mandate that schedules displayed on the CRS terminals give no preference to the flights of the carriers that provide the system and would regulate pricing of CRS services and other aspects of the relationships between travel agents, CRS providers and airlines that do not offer their own CRS services.

Most agents use the CRS services of American and United Airlines. Carriers without their own systems can, for a fee, have their schedules carried on existing systems. The CAB and the Justice Department concluded, after independent investigations, that there is merit to long-standing complaints that CRS providers have sometimes biased their systems in favor of their own schedules and in some cases made it prohibitively expensive for other airlines to obtain access to the systems.

The CAB asked for comments on its proposed rules and on a related proceeding to develop rules for specifying the way in which connecting flights are selected and arranged for display on CRS terminals. Comments on the two proposals are due April 26. Copies of the rules and more information can be obtained from either Robert D. Young or Samuel E. Whitehorn, Civil Aeronautics Board, 1825 Connecticut Ave. N.W., Washington, D.C. 20428.

Guide published for Cobol-80 users

LITCHFIELD, Conn. — Jerome Garfunkel Associates, Inc. has published a guide to the Cobol-80 programming language.

Among the listings in "The Cobol-80 Guide" are changed features from Cobol-74, all new reserved words and the obsolete language elements with explanations.

The guide also contains a skeleton format of Cobol-80, according to a spokesman for the publisher. One section of the guide discusses the future of Cobol and includes a list of features that eventually may be added to the language.

The guide costs $18.40.

"The Cobol-80 Guide" may be obtained from Jerome Garfunkel Associates, Inc., which is located at Cobble Court, Litchfield, Conn. 06759.

Manual out on Dbase II

ESTILL SPRINGS, Tenn. — Associated Technology Co. has published "Dbase II Coding Guide," a 46-page reference manual designed to help software departments in the formulation of microcomputer data base standards.

The guide provides a set of company standards and examples. The manual ensures top-down program construction, testable programs and easy maintenance, according to the vendor.

The guide sells for $22 from Associated Technology, which can be reached through Box 448, Estill Springs, Tenn. 37330.

ATTENTION COPICS USERS

A truly on-line, integrated Receiving, Quality and Material Control System replaces the COPICS Field Developed Receiving Module.

In addition to updating your MRP, Purchasing and Inventory Control data bases, this powerful system, RQMCS, features:

- Automatic Back Out
- Flexibility
- Only One Data Base
- Total Audit Trail
- Quality Control
- On-Line Updating
- Posting Options
- No Conversion

RQMCS users are enthusiastic about the system's processing speed and the immediate control it has provided for their entire receiving operation. For more information call:

(404) 998-3500

LELAND INC
COMPUTER SERVICES
8601 DUNWOODY PLACE, SUITE 146, ATLANTA, GA. 30338

Our Word Is A Promise

Think of us as the only TRUE TSO for VS1.

Because we are.

TONE 3

HIGH PERFORMANCE-LOW OVERHEAD

- Edit with full screen capability
- Interval reader job submit
- Output retrieval with RES support
- System maintenance
- Program development
- Data entry
- System debugging
- Text editing
- Performance monitoring support
- User command interface
- Interactive program execution
- Operations console support
- Dataset maintenance
- Catalog management
- Standard IBM TSO commands
- Enhanced 3270 usability
- Full ASCII terminal support
- No user swapping
- No TCAM
- No VS/2 overhead

TONE Software Corp.
1735 S. Brookhurst
Anaheim, CA 92804
(714) 991-9460 Telex 181592

The Solution.

Dial-Up 3270

LineMaster An intelligent device for dial-in access to your mainframe 3270 Bisync line. LineMaster is a communications watchdog which keeps a line in service until a user dials in.

- For any remote 3271/4/6 line—up to 19.2K baud.
- Compatible with any 3270 BiSync emulator including microcomputers.
- Connects between modem and mainframe.
- Installs in minutes.

$639.

Microframe, Inc.
205 Livingston Avenue
New Brunswick, NJ 08901
(201) 828-4499

Mass. governor to introduce strong computer crime bill

By John Gallant
CW Staff

BOSTON — Massachusetts Gov. Michael Dukakis is expected this week to present to the state legislature a computer crime bill that officials of the Bay State's high-technology companies are hailing as one of the nation's most comprehensive.

Drafted by Lt. Gov. John F. Kerry, the legislation is based on recommendations drawn from more than 600 users, computer security experts, educators and criminal justice and legal authorities. If it is passed, the state's hackers and computer criminals will face severe penalties and a restitution program that may include community service.

According to Jonathan Winer, counsel to Lt. Gov. Kerry, the bill creates two categories of computer fraud. It defines first-degree computer fraud as the accessing of any computer system to obtain goods and services illegally or to execute a scheme to defraud. Altering, destroying or preventing access to a computer system also falls within the realm of first-degree computer fraud, which would be punishable by a fine of up to $20,000 and a maximum five years in prison.

Second-degree fraud, targeted toward hackers, is defined simply as accessing a computer system or data base without authority and is punishable by fines of up to $5,000 in a one-year period.

The bill also includes civil provisions that would empower judges to impose injunctions on offenders before criminal proceedings are initiated. Those provisions would also make convicted violators liable for triple damages in subsequent civil suits brought by victims.

The bill's restitution plan would force offenders to reimburse victims, either financially or through a work program outlined by a judge.

According to Winer, the state legislature addressed the issue of computer crime last year by amending the state's larceny statute to include theft of electronic data — an effort that many legal and data processing experts felt was insufficient. "The legislature was ready to pass something more comprehensive last year, but there was no consensus in the high-tech industry.... I'm convinced that consensus exists this time," Winer noted, adding, "But this is a short legislative session filled with some very important issues. I can't guarantee passage this year."

Winer said the bill includes a unique definition of what constitutes a computer. As outlined, a computer is "any manufactured device which performs logical, arithmetic and memory functions."

"We really wrestled with the language so that users and judges would feel comfortable with it. We didn't limit the definition to only electronic devices because we wanted to include whatever technologies emerge in the future," Winer said.

Favorable response

The legislation received a highly favorable response recently when it was unveiled before the governor's Anti-Crime Council, a coalition of state district attorneys, judges, police and corrections authorities. At that meeting, attorneys and security officials from Massachusetts' high-tech firms gave their backing to the bill, which was described as the most far-reaching state legislation to date.

The bill "attacks computer crime on several different fronts, and it provides the victim with both criminal and civil relief. It addresses a concern that all manufacturers share, namely, that we don't want to see our products misused and abused," said Richard Guilmette, manager of corporate security and safety for Natick, Mass.-based Prime Computer, Inc.

Guilmette's views were echoed by Harvey Burstein, corporate director safety/security-staff attorney for Data General Corp. of Westboro, Mass. "This bill is much tougher and broader than laws in other states. Also, I think it provides a good model for federal efforts, most of which seem to be hanging in the lurch right now," Burstein said.

Government DP expo set for June

WASHINGTON, D.C. — Government Computer Expo '84, dedicated to end-user computing and microcomputers and their applications in government, will be held here June 26-29.

In addition to exhibits, the expo will feature a technical program of tutorials, briefings and workshops.

Session topics include "The Unix Operating System," "Technological Innovations," "Microcomputer Software Acquisition Management" and "Networks and Microcomputers."

Registration fees for the full conference are $385 (government) and $460 (industry). Further information is available from Government Computer Expo '84, 1620 Elton Road, Silver Spring, Md. 20903.

Words Alone Don't Describe The Lasergrafix 1200 Printer.

The QMS Lasergrafix 1200 is a breakthrough in electronic page printing. But words alone just don't describe it. Because QMS designed the Lasergrafix 1200 to do so much more than words. With a built in intelligent controller that takes simple print commands through your normal data stream. Built-in applications firmware eliminates the need for additional software—and frees your computer's resources for other work.

The difference is graphic—for all your business, scientific and individual printing needs. Create forms that have multiple typefaces and letters up to ten inches high—all on the same line. CAD/CAM. Bit mapped and vector graphics. Pie charts. Bar charts. Even barcodes. At a crisp resolution of 90,000 dots per square inch. With a printing speed of 12 pages per minute.

And, of course, letter quality word processing.

The Lasergrafix 1200 interfaces with just about any computer system. With versatility that lets you take business graphics to the limits of your imagination. Ask for a demonstration. You'll discover that the whisper-quiet performance of the Lasergrafix 1200 speaks softer than words.

And says a whole lot more.

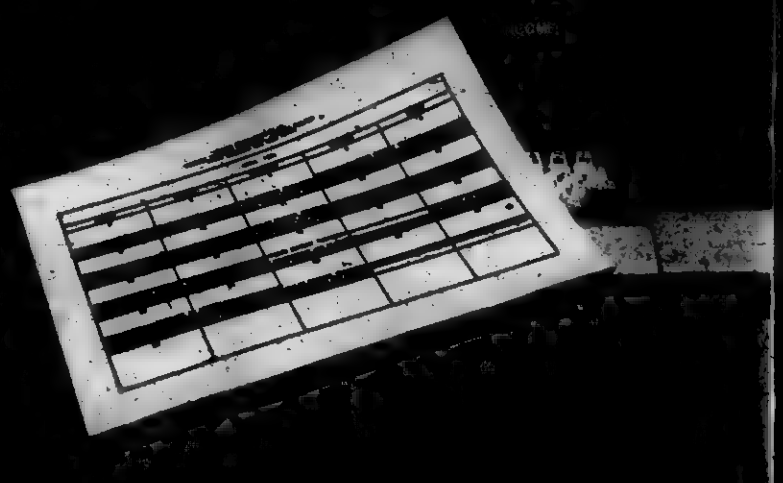
QMS®
QUALITY MICRO SYSTEMS, INC.
P.O. Box 81250 Mobile, AL 36689
Telephone (205)633-4300 Telex RCA 26 60 13
WHERE IMAGINATION LEADS

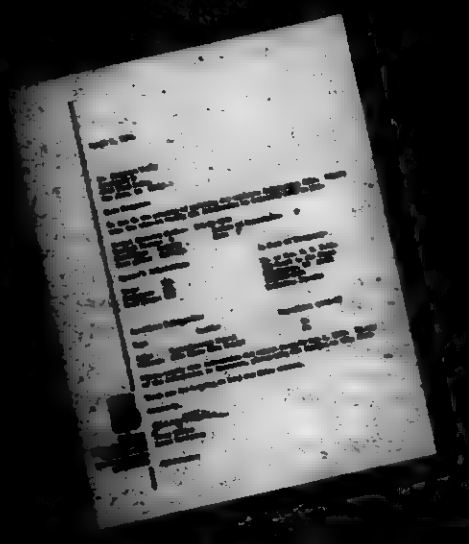
☐ Send me the Lasergrafix 1200 Information Packet, samples of mixed fonts, graphics and everything else it does.
☐ Please contact me to arrange a demonstration.

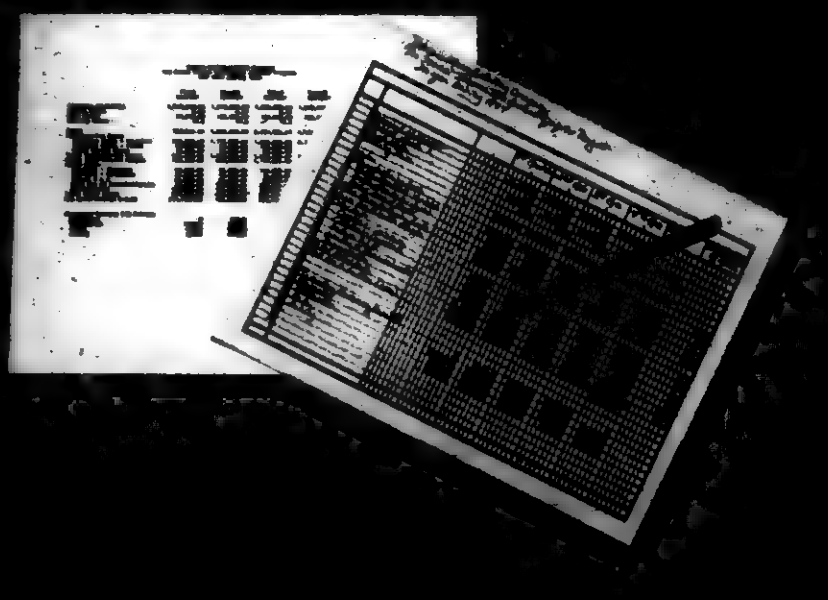
Name: _____ Title: _____
Company: _____
Address: _____
_____
Type of system you are now using: _____
Number of print workstations you are considering: _____
Prime applications for printer: _____

QUALITY MICRO SYSTEMS, INC.
P.O. Box 81250 · Mobile, AL 36689 CW

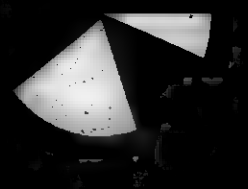
The SAS System. . .







The Solution for Your Information Center



☐ I want to learn more. Send me **The SAS Solution** packet.
☐ Have a sales representative call me today!

Please write your name and address below, or attach your business card.

Name _____

Title _____

Company _____

Address _____

City _____ State _____ ZIP _____

Hardware _____

Operating System _____

Telephone # (___) _____

SAS.

Only Lee Data's Universal Terminal System can satisfy all of your information processing needs... 3270, Async and personal computing.

Finally, there's a single, universal way to satisfy the individual information processing needs of all your people. From sales manager to accountant. From research to production. The Lee Data Universal Terminal System can do it all.

And our system is modular by design to provide you any or all of these cost-effective, problem-solving advantages:

3270-compatibility plus more

Combine complete 3270 system-compatibility with an innovative Lee Data design and you have a System that delivers greater convenience and flexibility.

Our System not only offers standard 3274-compatible local and remote control units, but now also provides combination local/remote controllers with a unique dual-host access capability.

In addition, you can choose from a full line of terminal capabilities, beginning with our cost-effective 3178-compatible display on up to our popular All-In-One Display which offers, in a single unit, four selectable screen sizes—including 132-column—a great advantage in program development, spread sheet applications and many others where flexibility is required.

3270-plus-Async: another cost-effective advantage

If your application needs currently find you switching between 3270 and VT100-style terminals to get the job done, Lee Data has a better way.

As part of our System, you can enjoy the further advantage of a 3270/Async capability that allows dynamic selection of 3270 and VT100 operating modes from a single Lee Data display. A simple command entered at the keyboard provides you access to applications running on an IBM CPU, non-IBM systems (such as DEC, H-P or Prime), as well as timesharing services. Another Lee Data solution to simplifying your company's terminal network.

And now integrated personal computing too

That's right! Now our System also includes a sophisticated personal computing package that can easily be integrated into an existing Lee Data 3270 system.

With our approach, you get continued interactive access to host-based files, plus all the advantages of professional business computing from the same Lee Data workstation.

Advanced features include a host file transfer capability, a single-board design, four standard system expansion slots and, of course, complete IBM-compatibility.

All these additional capabilities plus the same user-friendly Lee Data displays.

Plus these added benefits...

To any Lee Data System, add our unique Coax Eliminator products and realize additional savings of up to 85% in cabling costs alone.

Combine this with all the outstanding features already mentioned and you'll find a System offering everything you need for efficient, cost-effective operation.

Discover the advantages of our Universal Terminal System for yourself. For more information, call our system specialists toll free:

800/328-3998

Designers of innovative systems for the information worker

LEE DATA CORPORATION

7075 Flying Cloud Drive
Minneapolis, MN 55344
TWX 910-576-1690

NEWS

INTERNATIONAL REPORT
CW International News Network

AUSTRALIA

SYDNEY — An on-line credit management system developed for in-house use by Grace Bros. Pty. Ltd. here will be marketed by IBM Japan Ltd. With the help of IBM's Software Development and Support Center established in Sydney last year, Grace plans to seek additional markets for its software products in Europe and the U.S.

■

CROWS NEST — Australia is rumored to be the launchpad for the entry of ICL Co. into the market for Pick & Associates, Inc.'s Pick operating system. ICL reportedly plans the mid-year release of a Pick-based supermicrocomputer that, later in the year, will also be used to consolidate ICL's Unix thrust.

■

MELBOURNE — Following its recent deal to provide electronic funds transfer switching equipment to the State Bank of Victoria, Quadstar Corp. has lined up two more Australian customers and has laid plans to establish a subsidiary here. The two customers reportedly are a West Australian bank and a Victorian retailer.

BRAZIL

SAO PAULO — About 15,000 people were said to be on hand for Brazil's second annual Micro-Festival here two weeks ago. The event was comprised of both exhibits and sessions where market trends were discussed. The number of exhibitors reportedly increased 50% over last year.

CHINA

BEIJING — In 1983, both computer revenues and profits in China leaped 63% over the previous year, according to a recently released report. Sales of large and medium-scale systems increased by 64%, while microcomputer revenues jumped 130%, and the peripherals market increased a whopping 250%, the study said.

FRANCE

PARIS — France's Bull and Japan's Nippon Electric Co. Ltd. (NEC) will swap technology for a minimum of 10 years and integrate their respective product lines under the terms of a recently completed long-term agreement. At the same time, NEC penned a similar research and development agreement with the U.S.' Honeywell, Inc. The agreements call for the three companies to work together to integrate NEC's large-scale S1000 system and Honeywell's Gcos operating system software with Honeywell and Bull peripherals and communications systems. The system that results from these efforts is expected to be available in late 1985 or early 1986.

JAPAN

KANAGAWA — Marantz Japan, Inc. has alleged that vendors of Unix and Unix-related equipment have stolen the Unix trademark from Marantz. The maker of audio equipment said it registered "Unix" as the brand name for its radio cassette recorder in 1962. AT&T International Japan is expected to hand down the public opinion on this claim on April 5.

■

TOKYO — IBM Japan Ltd. posted 1983 revenues of $260 million and showed a growth rate of 36%. A spokesman for the company attributed IBM's good year to the success of the IBM 5500 Personal Computer and the IBM 3080 series. IBM Japan employed about 14,180 people as of year-end 1983.

NETHERLANDS

AMSTERDAM — Following IBM's European price cuts on its Personal Computer product line, many other vendors are following suit. Both Digital Equipment Corp. and Hewlett-Packard Co. have announced price cuts by as much as 25% on their small systems, according to sources.

■

AMSTERDAM — Philips Information Systems, Inc. has made moves to strengthen its position in the communications marketplace by announcing an office automation and communications software package. Philips also intends to integrate its Data Systems and Telecommunications divisions into one corporate entity and bring to market one strategic product: an IBM Personal Computer-compatible microcomputer. The system is rumored to be based on the Corona Data Systems Corp. microcomputer and will be manufactured by Philips' Canadian subsidiary, Micom.

WEST GERMANY

MUNICH — In an attempt to break IBM's market stronghold here, 12 major European vendors of information technology hammered out an agreement to introduce common standards for open data communications based on proposals from the International Standards Organization and the Consultative Committee on International Telephone & Telegraph. The manufacturers — AEG-Telefunken, Inc., Nixdorf Computer AG and Siemens AG from Germany; Bull, Generale D'Electricite and Thomson-Brandt from France; International Computer Ltd., ICL Co. and Plessey, Ltd. from the UK; Italy's Olivetti and Stet; and Philips Information Systems, Inc. of the Netherlands — declared their intention to put together a catalog of compatible telecommunications products by 1985.

■

FRANKFURT — A study group composed of DP managers and organizational specialists concluded that DP managers might be in trouble due to the influx of microcomputers in large companies. "DP managers who cannot get rid of their time-intensive

See [illegible] page 26

System glitch brings Chicago exchange trading to grinding halt

CHICAGO — Trading on 20 futures markets of the Chicago Mercantile Exchange was halted for 2¼ hours last month because of a computer malfunction which drastically slowed the system's response time.

The glitch was caused by a combined hardware and software failure, according to Douglas Skinner, manager of data processing operations for the exchange. Skinner declined to elaborate on the malfunction's cause. The exchange's data processing department has nine IBM Series/1 computers, which run software developed in-house.

The malfunction, which occurred at about 9:20 a.m. (CST) on March 16, reportedly brought delays of up to 20 seconds in the computers' posting of changing prices on the exchange's display board. Response time, usually only two seconds, is critical in trading, where points on a contract fluctuate in seconds and are worth as much as $25 each, according to Chicago Mercantile Exchange spokeswoman Pat Campbell.

Halted trading

The exchange halted trading from 9:35 a.m. to 12:05 p.m. (CST), by which time Skinner said the problem had been isolated and repaired. It was the first time since 1979 that trading had been halted on the exchange, Campbell said.

Volume on the Chicago Mercantile Exchange for March 16 totaled 151,466 contracts traded. On the previous Friday, 215,069 contracts changed hands.

Since trading continued at other U.S. mercantile exchanges, Chicago traders were unable to cope with rises and falls in futures contract prices during the trading halt. Campbell said traders suffered losses when they were unable to unload contracts which were dropping in price, but added that no accurate estimate could be made of the amount of traders' income lost since "every single contract is measured differently."

Al Kopin, president of Glass, Ginsburg, Ltd., a firm trading on the Chicago Mercantile Exchange, said no assessment had been made of his firm's losses, if any, and that it was unlikely such an assessment would be made. "It's always frustrating to have the market close down," he added.

ALUMINUM
Disc Pack Cases ● Mag Tape Reel Cases

See your local dealer, or call/write —
ALUMINUM CASE CO.
3333 W. 48th Pl. • Chicago, Illinois 60632 (312) 247-4911

Rent the new TeleVideo TS 1605 personal computer from USL Data Systems. Graphics-capable 14" CRT, parallel and serial ports, and two 320 K disk drives—all standard in an integrated package. Call us today for the office moment you.

USL Data Systems
A U.S. Leasing Company
USL Data Systems
2000 Campus Drive
San Mateo, CA 94403
800/227-6864
415/572-6800 (in California)

*Nobody offers more.

NEWS

High-speed telecommunications enters Olympic arena

By Jean Baker
Staff Writer

LOS ANGELES — What is becoming the 24th event in the Summer Olympics to be held here is the entry of modern, high-speed telecommunications technology in the Games.

Less than two years ago, the Los Angeles Olympic Organizing Committee (Laooc) was a handful of employees with nothing more sophisticated than electric typewriters. Today it is a planning organization made up of hundreds of employees utilizing $50 million worth of computers and other high-technology equipment.

AT&T Technologies, Inc., EMS, Motorola, Inc., Pacific Bell, Swiss Timing Ltd., Xerox Corp. and MCI Communications Corp. are the major technology suppliers in data processing and communications at this summer's Games. The technology will aid in recording and reporting the results of the Games' events for the approximately 50,000 Olympic family members, who include athletes, coaches, organizing staff and members of the media.

Some of the technological innovations in store for the Olympics include:

■ An AT&T-provided Electronic Messaging System (EMS) that will connect the Olympic Villages and sports venues from Santa Barbara to Fairbanks Ranch in San Diego County. In addition to the Laooc, others who will have access to the system include athletes, coaches and trainers; the press; the International Olympic Committee; and the individual national Olympic Committees.

The EMS will connect 60 Olympic sites within a 4,500-square-mile area. It includes 14 AT&T 3B20S supermini-computers; more than 160 Infotron Systems Corp. Model 782 network concentrators; 1,700 Teletype Corp. Model 5410 asynchronous terminals, which operate at full or half duplex at speeds up to 19.2K bit/sec; plus 300 printers.

■ MCI International is working with AT&T to allow telexes to be sent directly from EMS terminals through local computers and abroad. These will include foreign news stories composed on the EMS. MCI will also provide regular telex machines and printers at the press center for those who do not want to send their stories on the EMS.

■ Pacific Bell reportedly has moved up the installation of its fiber-optic digital light-wave system in Southern California, adding thousands of phone and data communications lines for the Olympics. The system will link all elements of the communications network, including radio paging and international telex services.

■ IBM is providing 300 Personal Computers, 190 Displaywriters — the computers used for ticketing, transportation and accommodations — and a voice messaging system (IBM's Audio Distribution System) accessible to people who speak 10 different languages (English, French, Spanish, German, Mandarin, Russian, Korean, Portuguese, Japanese and Arabic).

Again, the system will be accessible not only to the Laooc, but to everyone who is accredited to the Olympic Games.

■ Xerox will supply hundreds of copiers both for administrative needs and for immediate printout for the press at sports venues during the competition. The company is also supplying telecopiers and the printers for printing results.

■ Motorola is supplying 1,500 pagers with digital display capabilities of up to 160 characters and 1,500 pagers that signal with a beep when the wearer receives a call.

The company is also supplying more than 2,000 portable radios to support construction, medical services, sports, transportation and security operations before and during the Games. Some 300 mobile car radios are also being provided.

■ Swiss Timing created as the combined efforts of Omega and Longines in 1972, is providing the equipment to measure athletic performance and timing periods.

Mobile lab to monitor athletes' training efforts

COLORADO SPRINGS — A mobile laboratory with $60,000 worth of computer-based medical instrumentation on board will be utilized for the first time by the Los Angeles Olympic Organizing Committee for testing athletes on training effectiveness.

Moving away from previous testing procedures, which involved the use of stand-alone analyzers and manual processing of data, the automated testing devices on the mobile lab include a Gould, Inc. 9000IV pulmonary exercise lab and IM1000 computer monitor with supporting software, used for the observation and analysis of vital cardiopulmonary signs.

Gould, Inc. and the Gould Foundation have donated equipment and monetary support for the U.S. Olympic Committee Sports Medicine Mobile Laboratory.

The U.S. Olympic Committee Sports Medicine Mobile Laboratory

Lease the new GRID Compass Computer from USL Data Systems. True 16-bit processing and fully integrated software in a 10-pound package make the Compass the perfect combination of power and portability. Call us today for the office nearest you.

USL Data Systems
A US Leasing Company

USL Data Systems
2585 Campus Drive
San Mateo, CA 94403
800/227-9884
415/572-9999 (in California)

Relevantly effective systems.

In the words of our users.

"Our Fortune 32:16 paid for itself in the first six months. And the power of Unix is almost limitless."

—Allen Polson, President
Martek Corporation,
Barrington, RI

FORTUNE SYSTEMS

A leader in UNIX-based commercial, multi-user systems.

101 Twin Dolphin Drive, Redwood City, CA 94065
For more information call 415/592-5140/Telex 172-632

© 1984 Fortune Systems/UNIX is a trademark of Bell Labs

Micro network to host Coca-Cola's Olympics guests

By Lynn Haber
CW Staff

LOS ANGELES — To help accommodate more than 4,000 company guests with everything from hotel and transportation arrangements to dining and entertainment at this summer's Olympic Games, a major U.S. soft drink company will utilize a microcomputer network. Coca-Cola USA, the domestic soft drink division of the Coca-Cola Co. and the official Olympic soft drink supplier, will run what it has dubbed the Olympic System — three IBM Personal Computers and PC/Focus, a fourth-generation application generator and data base management system from Information Builders, Inc. — to ensure that all accommodations, tickets to Olympic and special events and ground transportation are ready for Coke guests the minute they check in at their hotels.

"Virtually every aspect of this hospitality effort will be supported by microcomputers," according to Bill Conner, Coca-Cola USA's Olympic System manager. "We'll use microcomputers to confirm hotel and ticket reservations, pin down transportation and send individual departments within our company their bills when the Olympics are over."

Expecting to host up to 1,000 guests daily at the summer games, Coca-Cola has booked more than 600 rooms at three major hotels. Five modes of transportation covering 20 different locations have to be scheduled per day. In addition, tickets have to be allocated and distributed for 28 Olympic events, with guests selecting the events of their choice from 350 different meets.

Added to this, dinners, parties and tours to local attractions must also be arranged.

To meet this challenge, Coca-Cola USA last fall formed a three-person Olympic systems team headed by an MIS manager, a systems analyst and a meeting services administrator. After discussing hardware options, the team narrowed down its options to three approaches: to use Coke's mainframe in Atlanta, to buy computer time from a California-based computer service company or to put a computer on-site.

"All three situations would have worked for us. We had problems with every one of them, but we simply weighed our choices against the problems we felt we could deal with most effectively," Conner said. "The ideal situation was to have a computer on-site, and that way it would be completely under our control.

"After evaluating the situation in terms of performance and dollars, we decided that we could design our system around the micros and simply add micros as the systems demand went up."

The evaluation of various software packages led the committee to select Information Builders' PC/Focus because of its versatility, Conner said, and also because many people at the company had previous experience with the mainframe version of the product. But, he added, "data base handling was the main reason why we chose it."

The Olympic System consists of five data bases that will be linked together through PC/Focus' Join facilities when necessary. The data bases cover orders, venues, accommodations and names and addresses. In addition, a transportation data base is being developed for each hotel to produce schedules of Olympic events, departure times, estimated arrival times and travel times.

To maintain, update and query the data around the clock, an IBM Personal Computer will be located at the concierge desk in the Sheraton Grande Hotel, the Coca-Cola USA Olympic headquarters. A second Personal Computer will be located at the ticket exchange window, also located at the hotel, and a third will be located at the hotel's executive offices. A fourth Personal Computer will be available as a backup. Each of the three active Personal Computers will be configured with a 10M-byte hard disk and 768K bytes of random-access memory.

Behind the scenes, an inventory reconciliation will be run nightly based on the data collected on the venue data base. Though no decision has yet been made, the Personal Computers may be physically linked with coaxial cables in a local-area network or they may function as three stand-alone systems.

The Personal Computers will be manned 24 hours a day. Data entry procedures have been designed with Information Builders' Fidel, a Focus screen-oriented data entry language, to produce menu-driven procedures with built-in interactive prompts. To make the system nearly fail-safe, there will be password protection for all critical programs. All programs will be transferred nightly onto floppy diskettes, and purges will be executed to keep the data bases clean and ready for the following day's activities.

In the event that all the Personal Computers are damaged by some accident or disaster, the system can run on a remote Coca-Cola mainframe computer that supports Focus through the PC/Focus Dial communications facility.

Seated in front of one of the four IBM Personal Computers that will be used by Coca-Cola USA at this summer's Olympic Games are some members of Coke's DP staff.

Coke's 'Robot' will greet the company's guests when they arrive for the Olympics.

In the words of our users.

"I'm intrigued by how easily my business ideas and innovations come to life through my Fortune 32:16."

—Richard Alan Dow, President
Dow Information Services, Hope, RI

FORTUNE SYSTEMS

A leader in UNIX-based commercial, multi-user systems.

101 Twin Dolphin Drive, Redwood City, CA 94065
For more information call 415/592-5140/Telex. 172-632

© 1984 Fortune Systems/UNIX is a trademark of Bell Labs.

Buy the Beehive ATL-004 ANSI standard smart terminal and get the perfect combination of price-performance and ergonomic design. The ATL-004 includes a low-profile keyboard and eight "soft function keys." A large 14" screen provides crisp reproduction and maximum viewer comfort. Call us today for the office nearest you.

USL Data Systems
A U S Leasing Company

USL Data Systems
2988 Campus Drive
San Mateo, CA 94403
800/227-9894
415/572-9800 (In California)

Nobody offers more.

Court makes state agency sell computerized list at cost

By Edward Wasserman
Staff

JACKSON, Miss. — A state court in Mississippi has told the state's Department of Public Safety to sell at cost — about $400 — a magnetic tape copy of its computerized mailing list of Mississippi's 1.8 million drivers. The state had wanted to charge the Mississippi Republican Party $25,000 for the list.

The Mississippi Republican Party had offered $500 for the list, which it wants for direct-mail campaigning. When the state turned down its offer, it brought suit.

Mississippi Assistant Attorney General Steve Kirchmayr said the state had previously been charging a rate for the driver's license list close to that charged by private mailing list firms. "Now," he said, "we've got the mailing list companies cursing us for putting them out of business."

Mississippi drivers have been complaining that the state provides the list at all, he said. This is probably because "people don't want to receive any mail, period."

Under the 1983 Mississippi Open Records Act, the list must be made available to anyone who wants to buy it. It includes each driver's name, home address, race, sex and date of birth.

Kirchmayr said the Open Records Act requires the state to provide the information on any of its public record lists for "the actual cost of reproduction."

The state, however, had been pricing the driver's license list based on the wording of an earlier act, which said that it could charge "a proper fee commensurate with the service rendered." That fee, he said, would have been $250, plus five cents per name.

"Our dilemma was which statute controls," he said.

'Bargain basement'

Kirchmayr called the at-cost offering of the list "a basement bargain" and said in the wake of the court ruling, several firms had already inquired about buying their own copies of the driver's license list.

He added that the court decision represents a sizable loss of revenue for the state's treasury, which received the revenue from previous sales of the list made at the going rate. Kirchmayr estimated that copying the list will cost no more than $400, possibly less.

Kirchmayr said that ruling will likely be appealed to the state supreme court, but that no appeal has yet been filed, nor has a copy of the list been produced for the state Republican Party. The list will be run on the party's computers to provide names and addresses for direct-mail campaigns, Mike Allred, general counsel of the Mississippi Republican Party, explained.

The party is particularly interested in cross-referencing the names of the state's drivers with those on the party's list of Mississippi registered voters.

By cross-referencing, the party will be able to single out those individuals who have not registered to vote and appeal to them by mail to do so, Allred said.

Allred does not see the party's purchase of the list as an invasion of privacy issue, because the state's Open Records Act specifies that such lists are public property.

The party, he said, has told the state it does not want the copy of the list it receives to contain any driver's license or Social Security numbers, which would allow cross-referencing with wider data bases.

"The only things we wanted were those things that were open," Allred said.

CAD/CAM guide out

ARLINGTON, Texas — The Office of Continuing Education at the University of Texas here has published a guide for managers who want to use visual aids during presentations about computer-aided design and manufacturing (CAD/CAM).

The 400-page *CAD/CAM Presentation Resource Guide* is a guide containing 8-in. by 11-in. overhead foils, which include topics on CAD/CAM graphics, group technology, computer-aided process planning and manufacturing management systems.

Priced at $125, the guide is available from the Office of Continuing Education, University of Texas at Arlington, Arlington, Texas 76019.

Data base growth covered in supplement

SANTA MONICA, Calif. — The number of on-line data bases worldwide broke the 2,000 mark recently, according to the winter 1984 supplement to the "Directory of Online Databases."

The supplement on data bases noted that 136 data bases came into use in the past three months, bringing the total to 2,014.

The growth in data bases, according to Carlos A. Cuadra, president of Cuadra Associates, Inc., the firm that publishes "Directory of Online Databases," is a result of the spread of personal computers and "the changing economics of electronic distribution," which permit data bases to be started without major financial investments.

The listed data bases are reportedly available from one or more of 300 on-line services worldwide.

The "Directory of Online Databases" is published quarterly.

A one-year subscription to "Directory of Online Databases" is $75, and a two-year subscription is $140.

More information on the directory is available from Cuadra Associates, which is located at Suite 305, 2001 Wilshire Blvd., Santa Monica, Calif. 90403.

DIGEST from page 23

daily routines and who consider themselves as concept strategists and business administrators won't be able to keep their positions in the long run," a spokesman from the study group maintained. Instead, DP managers should take immediate action to confront any problems with branches using microcomputers.

Whether you want to rent, lease, or buy, we have the financing options to fit your needs. We also stock a broad inventory of products, so you can have exactly the equipment you need without waiting. And we back up every shipment with total product support, including maintenance and prompt follow-up on any problems or questions.

If this sounds like the kind of service you want, call us today for the office nearest you.

USL Data Systems
A US Leasing Company

USL Data Systems
2988 Campus Drive
San Mateo
CA 94403
800/227-6884
415/572-6600
(in California)

Nobody offers more.

In the words of our users.

"The Fortune 32:16 allows our BASIC programmers to access the power of Unix without being Unix specialists."

—Mike Andreoli, Sales Manager
Heafner Data Services,
Software Developers

FORTUNE SYSTEMS

A leader in UNIX-based commercial, multi-user systems.

101 Twin Dolphin Drive, Redwood City, CA 94065
For more information call 415/592-5140/Telex, 172-632

1984 Fortune Systems/UNIX is a trademark of Bell Labs

IBM and DEC Merger Announced

Term-Tronics Creates With the Power to Join

In the beginning the Computer Universe was a lonely place. There was IBM and only IBM. Then others entered the field, major competitors such as DEC. Today, each of these Computer Age Titans commands an impressive following.

But because no one has a monopoly on desirability, there arose a knowledgeable user population which sought the best of both worlds. To serve this astute and growing audience, Term-Tronics was born.

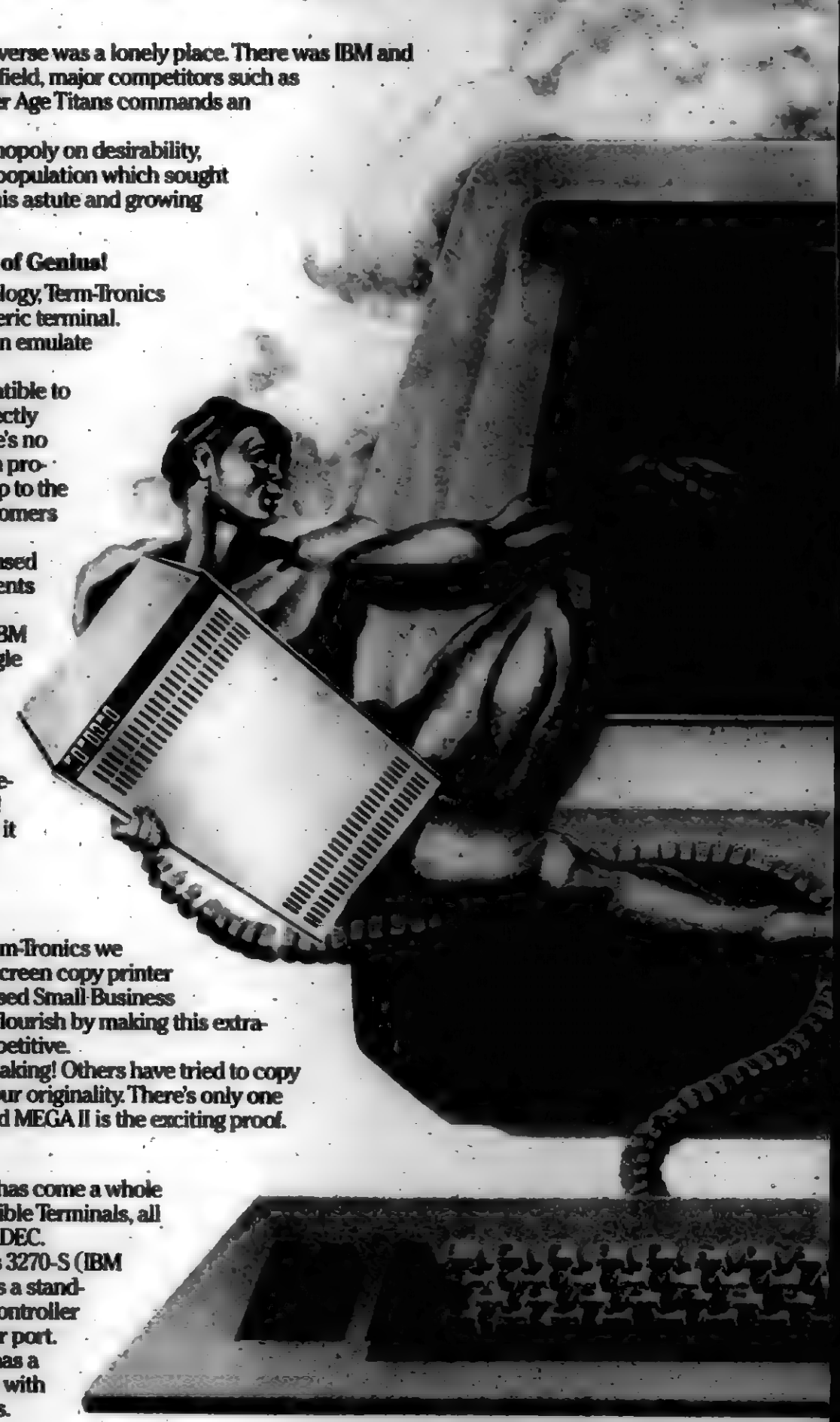
Multi-Host Capability — a Stroke of Genius!

Utilizing breakthrough technology, Term-Tronics created MEGA II, the first truly generic terminal. With a single keystroke, the unit can emulate IBM or DEC.

MEGA II is coaxial plug-compatible to IBM 3278* and 3178* and plugs directly into IBM's 3274* controller. So there's no longer a need to be concerned with protocol incompatibilities. That adds up to the kind of peace of mind that has customers walking on clouds.

What's more, MEGA II can be used in either local or remote environments with SNA or BSC communications.

Incredibly, MEGA II emulates IBM 3278 Models 2 through 5 with a single keystroke. The multi-host MEGA II is DEC VT-100* compatible. It also can emulate other asynchronous terminals simply by loading new emulations into the terminal via telephone, and all in 10 minutes or less! Another heavenly advantage is that it requires no additional equipment.



Putting the Finishing Touches on the Masterpiece

But we didn't stop there. At Term-Tronics we went on to add support for a local screen copy printer and an RS232C port for a CP/M® based Small-Business Computer. Then we finished with a flourish by making this extraordinary unit remarkably cost competitive.

The results have been earth-shaking! Others have tried to copy our achievements but they lacked our originality. There's only one Master of Data Communications and MEGA II is the exciting proof.

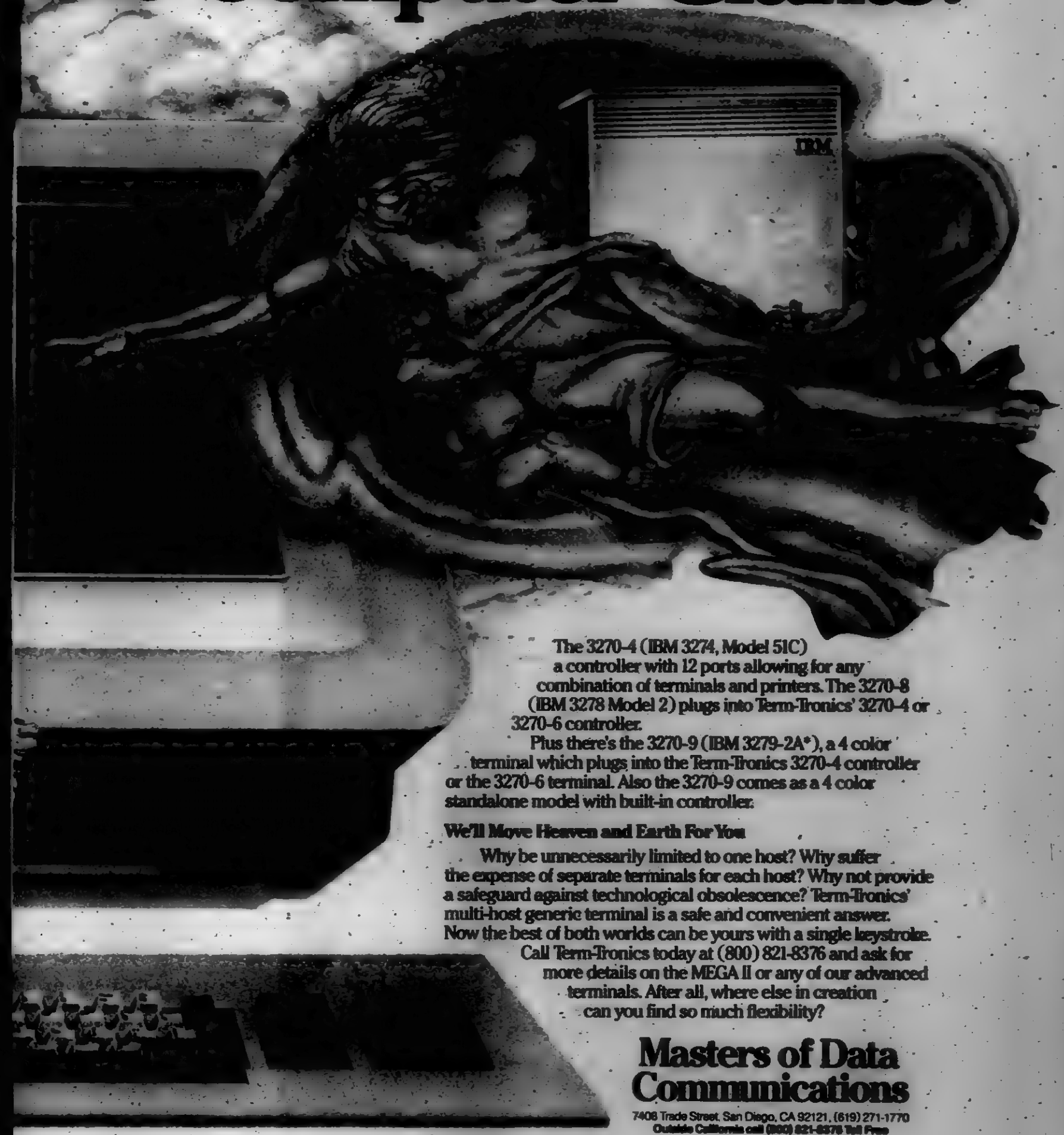
The Golden Age of Terminals

From the same creative minds has come a whole series of remote BSC mode Compatible Terminals, all of which can be upgraded to talk to DEC.

These include the Term-Tronics 3270-S (IBM 3275* or 3276* compatible) which is a stand-alone terminal featuring a built-in controller and a separately addressable printer port. The 3270-6 (IBM 3276) which also has a built-in controller and can interface with 3 additional terminals and 4 printers.

Term-Tronics

a Multi-Host Terminal the Computer Giants.



The 3270-4 (IBM 3274, Model 51C) a controller with 12 ports allowing for any combination of terminals and printers. The 3270-8 (IBM 3278 Model 2) plugs into Term-Tronics' 3270-4 or 3270-6 controller.

Plus there's the 3270-9 (IBM 3279-2A*), a 4 color terminal which plugs into the Term-Tronics 3270-4 controller or the 3270-6 terminal. Also the 3270-9 comes as a 4 color standalone model with built-in controller.

We'll Move Heaven and Earth For You

Why be unnecessarily limited to one host? Why suffer the expense of separate terminals for each host? Why not provide a safeguard against technological obsolescence? Term-Tronics' multi-host generic terminal is a safe and convenient answer. Now the best of both worlds can be yours with a single keystroke.

Call Term-Tronics today at (800) 821-8376 and ask for more details on the MEGA II or any of our advanced terminals. After all, where else in creation can you find so much flexibility?

Masters of Data Communications

7408 Trade Street, San Diego, CA 92121, (619) 271-1770
Outside California call (800) 821-8376 Toll Free

Incorporated

*Subject to trademark claims.

Meet to look at 'micro wars'

SAN FRANCISCO — The future of the microcomputer industry will be the focus of a conference here May 7-8, sponsored by International Data Corp. (IDC). The conference, titled "Micro Wars: Shape Up or Shake Out," will examine survival strategies for the coming market shakeout and offer predictions of who will be the winners.

Apple Computer, Inc. cofounder Steve Wozniak will deliver the keynote speech and reportedly will discuss the scope of the micro industry in the coming years.

Other speakers will be John Rehfeld, vice-president and general manager of Toshiba America, Inc.'s Information Systems Division, and Aaron Goldberg, research manager of IDC.

Registration for the conference is $695 for the first person from each organization and $595 for each additional person. More information is available from IDC through Box 955, 5 Speen St., Framingham, Mass. 01701.

Software conference seeks new committee members

STATEN ISLAND, N.Y. — The program committee of the Conference on Software Maintenance, to be held Nov. 11-13 in Washington, D.C., is seeking members to propose themes for sessions and other duties.

The Conference on Software Maintenance reportedly will bring together managers, software developers and researchers to discuss solutions to software maintenance problems. It is being sponsored by the Association for Women in Computing, the Data Processing Management Association (DPMA), the DPMA Special Interest Group on Software Engineering and the National Bureau of Standards.

Program committee members will help organize or conduct sessions or activities and, when possible, attend program committee meetings in Washington, D.C.

Those interested in applying for membership on the program committee should write to Nicholas Zvegintzov, 141 St. Marks Place, Staten Island, N.Y. 10301.

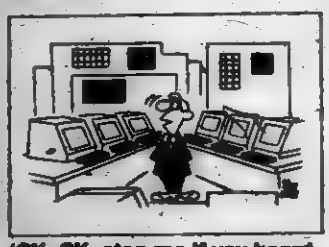
Rep. Zschau to keynote Avois meet

ARLINGTON, Va. — Rep. Ed Zschau, whose district includes much of California's Silicon Valley, will be the keynote speaker at the Voice Input/Output Systems Applications Conference '84, to be held Sept. 11-13 at the Marriott Crystal Gateway Hotel here.

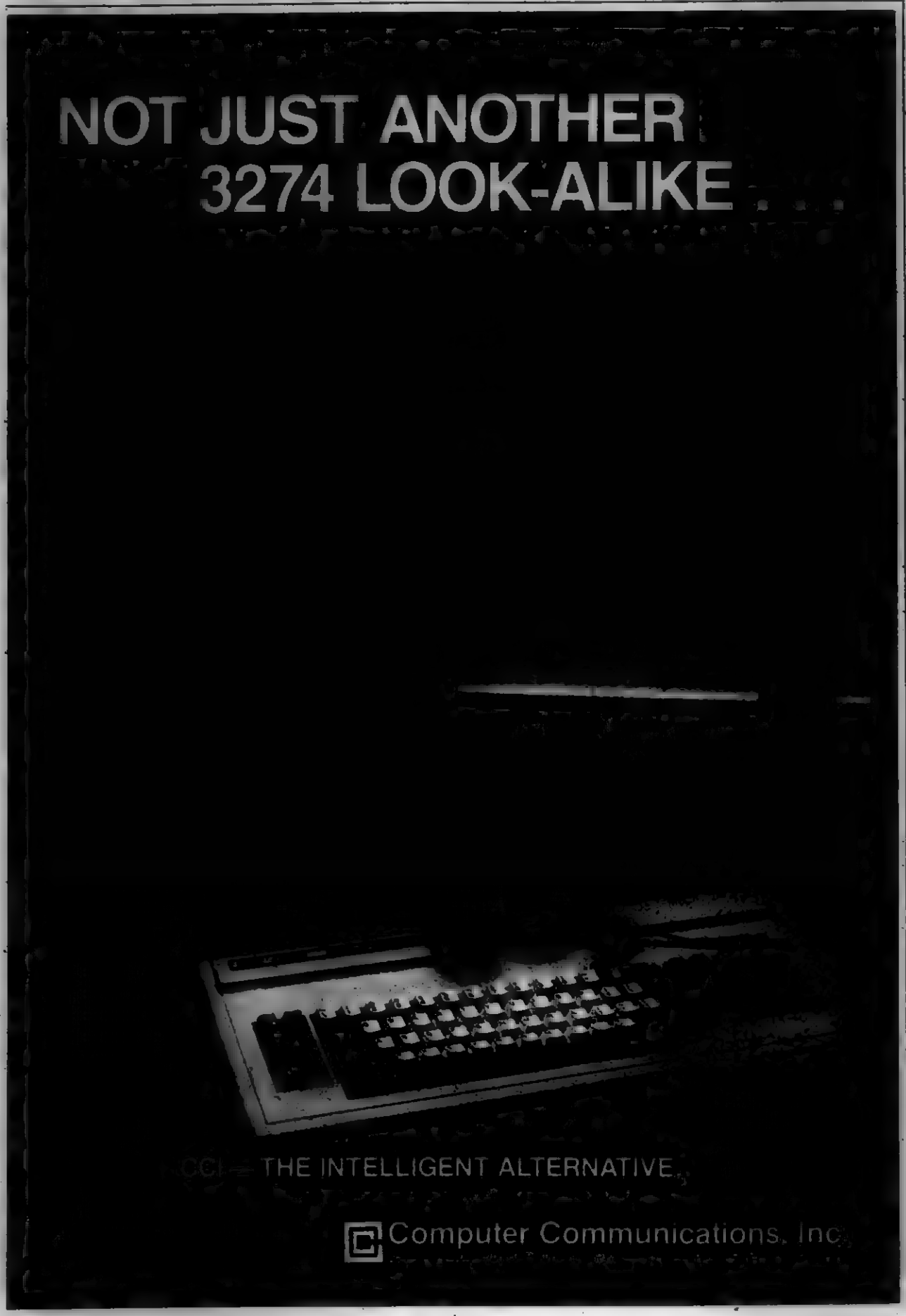
Zschau, chairman of the Republican Task Force on High Technology Initiatives, is a member of the House Committee on Foreign Affairs. He was founder and president of System Industries, Inc., an electronics firm, and has been chairman of the American Electronics Association.

According to the conference sponsor, the American Voice Input/Output Society (Avois), conference topics will include voice interaction with computers in medicine, aid to the disabled, office systems, design, process control and telecommunications.

Registration for the conference is $200 prior to Aug. 19 and $250 after that date. Additional information on the conference can be gained through Avois, P.O. Box 60940, Palo Alto, Calif. 94306.



'OK, OK, stop me if you heard this one!'



Are candid assessments of sales reps appropriate?

TURNAROUND TIME
Larry Long

Q For almost two years, I have been the initial contact person for all hardware vendors that want to sell us their products. By policy, all vendors are routed to me. We are a small company of 300 employees, but I still see six or seven vendors each month.

My job is to assess the compatibility of their products with existing hardware and our standards. Also, I feel some obligation to assess their knowledge of their products and their willingness to work with us toward a solution.

I'm disappointed in some of the sales representatives, especially those selling word processing equipment. They are quick to tell you what others don't have, but can't answer basic questions about the features of their own equipment.

Some ask, "How many do you want?" before assessing our most basic needs. Personally, I don't feel we should do business with these people.

When I inform one of our managers that someone will be calling on them, I usually give them my candid assessment of the sales rep's capability and interest. I do this because at least half of our managers have already been sold a bill of goods and bought hardware without regard to application. Do you feel my extra comments are appropriate?

A Since your company's management has such a bad track record for acquisition decisions, your comments are appropriate and probably appreciated, as long as they can be substantiated with fact and logical rationale.

However, it is not your place to pass judgment on a vendor because of vendor bias or a personality clash. If you continue to provide this bonus information, you should clear it with your boss.

Q I graduated with a computer science degree six months ago and took a job as a programmer. I just received my first performance review; my supervisor told me that I was doing excellent work and learning fast.

While everything seems to be going well on the surface, I may spend several days in front of the tube without coming up for air. I feel isolated and would prefer to do work that involves more personal interaction. I would like to stay in a computer-related career field, but not in programming. Can you suggest other positions that would give me more opportunities to work with people?

A Being a programmer does not necessarily imply the working life of a hermit. Quite the contrary — a programmer's isolation is more often than not self-imposed.

The most effective programmers have frequent interactions with members of their project or maintenance teams. Peer review and user input are integral to successful software development.

By not encouraging interaction with more senior programmers, it's apparent that your supervisor is not giving you proper direction. During the first year of employment, a programmer needs and deserves more guidance. Express your concerns to your supervisor.

Your decision to give up on programming is premature. Given the proper environment, programming offers opportunities for personal interaction and career challenge. I would recommend that you give yourself an opportunity to mature as a programmer (a minimum of two years). Then, armed with a valuable programming background, you can transfer to systems analysis, data base administration or any of a half dozen other computer career fields.

Q I have a degree in physics and am currently working in an online, data base environment as a programmer/analyst. I would like to get a bachelor's degree in computer science, but for family reasons this is not possible.

Is it possible to cover up this deficiency by taking some examinations in the field that are recognized in the employment market? Also, are there any recognized correspondence courses I can take to enhance my career prospects?

A There are no examinations that you can take that will significantly impact your employability. The Certificate in Data Processing and Certificate in Computer Programming, which require examinations, are among the most widely held and best known certifications, but they seldom affect hiring decisions.

I am not aware of any accredited degrees in computer science that can be earned by correspondence. Some trade schools offer correspondence courses but, in my opinion, you would be better off if you take full advantage of on-the-job training and internal education opportunities. Having a computer science or MIS degree provides an easier entree into the computer fields, but these degrees are not prerequisites for career advancement.

Long, president of Long and Associates, is a consultant, lecturer and author in the field of information services. If you have a question you'd like him to address, send it to Larry Long, Editorial Department, Computerworld, P.O. Box 880, Framingham, Mass. 01701.

DYNAPLAN™/DYNACALC™

1·2·3

FOR IBM MAINFRAMES

Join hundreds of VM/CMS and MVS/TSO users who have discovered that

DYNAPLAN™ does it all. . .

Database Interface
Color Graphics
Spreadsheet

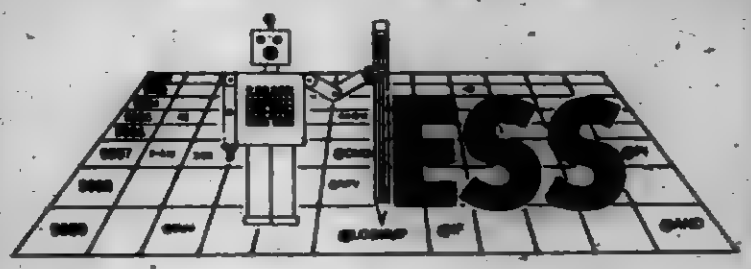
DYNAPLAN™ uses all the popular features of Lotus 1-2-3® and VisiCalc®.

For a free 30 day trial call (312) 525-6400

ChicagoSoft

738 N. LaSalle St.
Suite 2
Chicago, IL 60610

Dynaplan is a registered trademark of Dynasoft Corporation. Dynaplan was formerly called Dynacalc.
1-2-3 is a registered trademark of Lotus Corporation.
VisiCalc is a registered trademark of VisiCorp.



Electronic Spread Sheet for VM/CMS & MVS/TSO
- Not Just Another CALC -

Powerful - Spreadsheet size is limited only by available virtual storage: ESS easily handles spreadsheets with thousands of rows and/or columns.

Proven - Already in use at over 100 installations.

Compatible - ESS accepts the same commands as VisiCorp's VisiCalc® program for microcomputers. A person familiar with VisiCalc® can be using ESS productively in minutes. In addition, ESS can load and save files in VisiCalc® format.

High Performance - Assembler language code and sophisticated storage management techniques give you fast response, even with very large spreadsheets.

Easy to Install - Just load the ESS program. No additional program products or languages are required.

Cost Effective - ESS gives all your users access to personal computing capabilities for just $220 per month. Compare that to the cost of buying hundreds of microcomputers.

Questions? - For more information about ESS, or to arrange a 30-day free trial, call or write TRAX.

TRAX

TRAX Softworks, Inc.
[illegible] National Blvd., Suite [illegible]
Los Angeles, CA [illegible]
(213) 475-[illegible]

NEWS

Move over, Michener; store sells only high-tech books

By Jolley Greater
CW West Coast Bureau

SUNNYVALE, Calif. — Just as some electronics stores sell only hardware and others deal strictly in software, so Computer Literacy specializes in another valuable commodity: books.

But Computer Literacy is no ordinary bookstore. No tell-all memoirs by fading Hollywood movie queens crowd its display windows. No slick exercise manuals bearing the glossy likeness of Jane Fonda in leg warmers smile down from its shelves. Not even the best-selling tomes of James Michener or James Clavell beckon from the countertops.

As might be expected of a bookstore that sits smack in the middle of the world's densest concentration of high-tech vendors, Computer Literacy carries a highly selective inventory. Each of the estimated 15,000 volumes that form the establishment's current collection focuses on just one subject — computers.

Granted, works like *The Fundamentals of Digital Switching* or *High Output Management* probably lack the wide popular following of Harlequin romances or Mickey Spillane whodunits. Granted, the leaden-titled likes of *Designing Testable Logic Circuits* are probably a far cry from the average reader's idea of a good book to curl up with by the fireplace on a stormy night.

But for Computer Literacy's target audience — MIS professionals and electronics design engineers — such high-tech fare holds a powerful appeal and serves a vital purpose, according to store owner Dan Doernberg. In the fast-paced computer and microelectronics field, the need to keep abreast of the latest technological advances is constant and intense.

"We're not in a leisurely business," Doernberg said. "Companies are constantly telling us that they need additional information to help them develop new products because they're competing with five recent start-ups."

At a time when public interest in personal computing and other electronics matters is running at an all-time high, Computer Literacy is hardly the only bookstore to stock extensive collections of technological literature. But with a selection currently totaling about 5,000 titles, it boasts at least 10 times more electronics-related volumes than its general-interest competitors, Doernberg claimed.

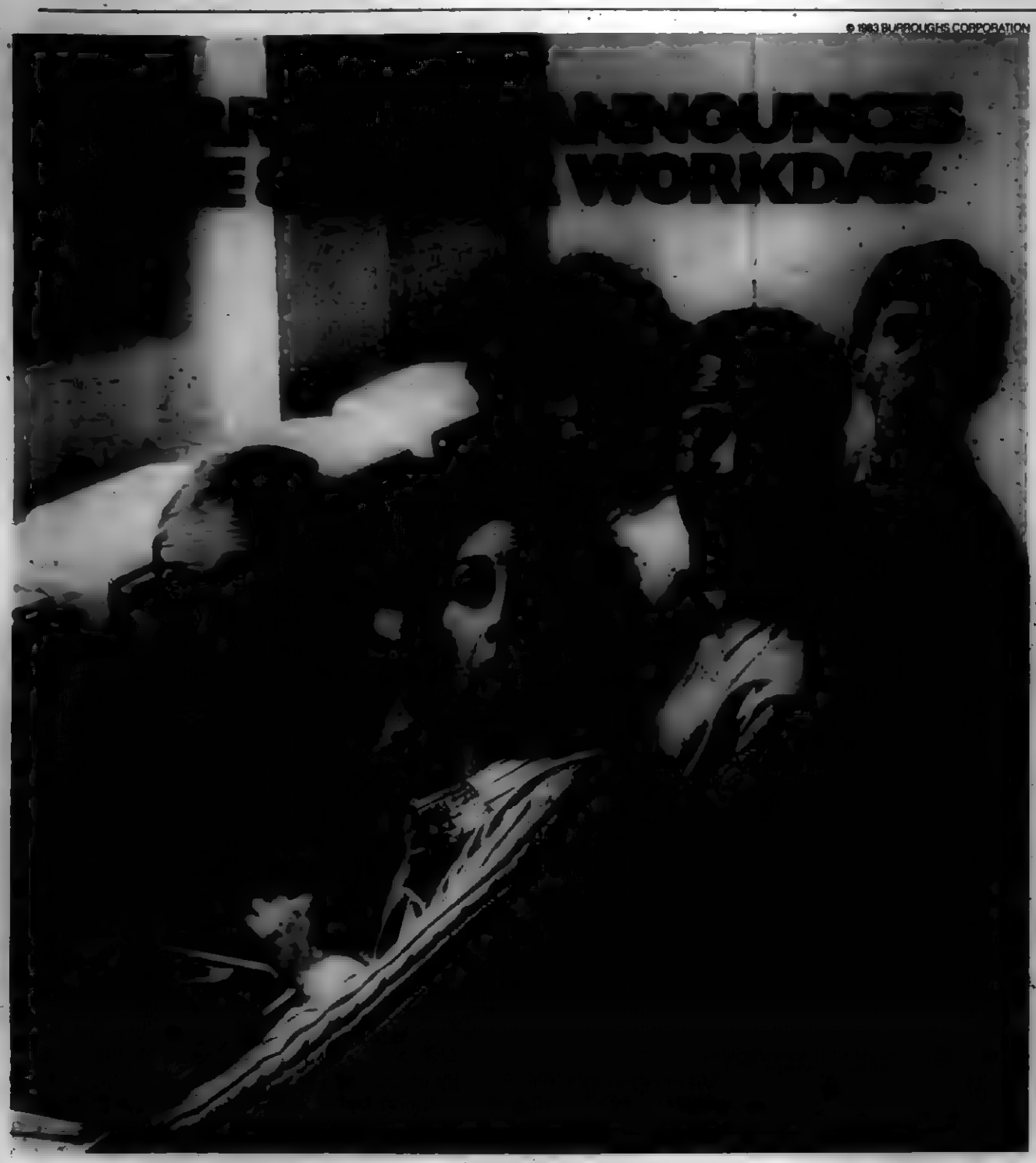
Targeting professionals

Although a handful of other bookstores may rival Doernberg's shop in the size of their computer-oriented collections, few, if any, of the competitors have any in-depth understanding of their products' contents. "Most of the stores that are going into computer books these days are aiming mainly at the consumer market," according to Computer Literacy's manager, Rachel Unkefer. "We, on the other hand, are interested only in serving the needs of technical professionals."

Doernberg agreed. "We're computer-book specialists," he said. "All we do is keep track of computer books. In addition, everyone in our store has a technical background. So when customers have only a general idea of what they're looking for, we can direct them to the right books."

When Computer Literacy first opened its doors for business over a year ago, it restricted its operations mainly to the surrounding Silicon Valley. Since then, however, the store's geographical market has gradually expanded, with the result that approximately 10% of its corporate sales go to customers outside California.

As the scope of the store's business has broadened, its customer base has steadily diversified to include a growing number of MIS professionals, who now account for roughly 35% to 40% of Computer Literacy's total sales.



Thanks to an ingenious productivity tool from Burroughs called the Logic and Information Network Compiler, or LINC, computer programmers can now increase their productivity as much as 10 times! (In some cases, even more.)

It's like getting an extra 72 hours of work in a day.

How is this possible?

The LINC software system automatically writes virtually all the coding programmers would have to do manually so it drastically reduces the time it takes to develop and implement even complex application systems. (It also simplifies program maintenance.)

Furthermore, LINC uses a new high-level language that defines problems in business terms, not computer terms, so important information can be easily created and managed.

And people can use LINC with very little training.

At Burroughs, productivity has always been a primary consideration, whether it's the technological innovation of our hardware or the advanced design of our software.

For more detailed information call 1-800-621-2020.

It may be the most productive phone call you'll ever make.

Burroughs

THE QUESTION ISN'T WHO'S BIGGER. IT'S WHO'S BETTER.

NEWS

Trio charged with using text system to crack law firm files

By Patricia Keefe
CW Staff

NEW YORK — An unemployed broker and two clerical employees of a prominent New York law firm have been charged with using word processing equipment to break into the law firm's confidential computerized files.

The trio was charged with conspiracy to trade securities following a year-long Securities and Exchange Commission investigation into allegations of insider trading based on the "misappropriation" of confidential, nonpublic information from the law firm of Skadden Arps Slate Meagher & Flom.

Instigated by the firm, the investigation is continuing, according to Assistant U.S. Attorney Andrew Levander, who would not comment on whether further charges are expected in the case.

Charged in the case are two Skadden Arps employees, Alfred Salvatore, a proofreader, and Steven Crow, an "expert computer word processing operator"; and Aaron L. Lerman, formerly employed by Prudential-Bache Securities. Crow allegedly broke electronic internal office codes and stole information on tender offers and corporate acquisition plans and passed that data on to "others," including Lerman, in exchange for a share of the profits gained — in one instance $60,000 — from illegal insider trading, Levander said, but he declined to identify or comment on the number of the others involved.

The scheme is alleged to have taken place over a period of little over a year.

The information concerned several companies that were recently taken over or were involved in a takeover battle, including Puritan Fashions Corp., Houston Natural Gas Corp. and U.S. Industries, Inc., Levander said.

Federal officials claim a fourth person, Steven Karanzalis, a broker with Paine Webber, Inc., traded stocks and options based on the information misappropriated from Skadden Arps.

Karanzalis formerly worked with Lerman at Prudential-Bache, according to the U.S. Attorney's office here.

Although a warrant was obtained to search his home, Karanzalis has not been charged with any offense. However, he is described in court documents as a co-conspirator.

Arraigned two weeks ago, Salvatore and Crow were released on $50,000 personal recognizance bond each, but remain under court supervision.

Lerman was also released on $50,000 personal recognizance bond, posted $500 bond and is under stricter court supervision, Levander said. Attorneys for the trio declined to comment.

ACR issues bibliography

PHOENIX — Applied Computer Research Inc. (ACR), has published its 10th annual bibliography of literature on data processing performance evaluation and management.

The bibliography is contained in the special March issue of the "EDP Performance Review" newsletter. The issue contains more than 500 entries citing literature published in 1983, including periodicals, books, conference reports and government documents.

The bibliography is classified by subject with cross-references and an author index. Each entry contains complete source data.

Copies of the March issue are available to nonsubscribers for $25 each from Applied Computer Research, Inc., P.O. Box 9280, Phoenix, Ariz. 85068.

THERE'S ONLY ONE UFO.

A lot of software suppliers are trying to fit into UFO's shoes these days. They'll try to tell you that their On-line Application Development Systems are as powerful...as proven...and as accepted as UFO. They'll try to persuade you that they can offer you UFO's dramatic reduction in the time and expense of developing your CICS and IMS/DC applications. That's what they'll try to tell you. But the revealing and indisputable fact that UFO now has more than 1,500 installations ...more than all other independent suppliers combined...is your absolute proof that there's only one UFO.

No other On-line Application Development System can match UFO's speed, performance and cost savings.

UFO helps you melt away your programming and maintenance backlogs by eliminating the prime source of inefficiency in the application development process...repetitive coding. Pre-programmed and pre-tested functions like..."add, update, copy, browse, and display"—are initiated by keying in simple commands. There's no complex new language to learn, no code to write. Even access to your DL/1 database requires no special database training. With UFO, all your programmers can quickly become CICS or IMS/DC application development specialists without extensive and expensive training.

Because UFO is a non-procedural system, the time required to initiate new programs is dramatically reduced. Your programmers are guided through the development process with a free-form screen PAINTing facility, data dictionary, menu assistance and help screens. Simple fill-in-the-blanks techniques focus activity on what's to be done, not how to do it. And applications can be developed interactively with end-users, permitting changes at the prototype stage for guaranteed end-user satisfaction.

If you're concerned about reducing the time and cost of developing, maintaining and securing on-line applications...call in the best. UFO...User Files On-Line...from Oxford.

OXFORD SOFTWARE CORPORATION
174 BOULEVARD/HASBROUCK HEIGHTS, NJ 07604/201 288-4515

☐ I'd like to schedule a UFO demo. Please call to set a date.
☐ Please send me literature on UFO and other Oxford Systems.

Name_____
Title_____
Company_____
Address_____
City_____ State_____
Zip_____ Phone ( )_____
CW

W.S.A. Outside North America, contact one of the following WSA companies: Europe—Austria 0222-3135-1854; Benelux (NL) 03408-61088; France 1-234-2184; Greece 01-6899-691; Italy 011-517618; United Kingdom 01-600-3578; West Germany 02161-67604; Scandinavia (Sweden) 08-761-7380; Middle East/N. Africa—Greece 01-6899-691; S. Africa—11-37-3040; Israel—4-258195; India—(Madras) 44-88110; Asia—Hong Kong 05-8885113; Japan (Nagoya) 052-211-6021; (Osaka) 06-445-7881; (Tokyo) 03-437-6021; Singapore 65-2883788; Australia—New South Wales 02-439-8477; South America—Brazil (Rio de Janeiro) 021-264-4379; (Sao Paulo) 011-258-1883.

NEWS

Strategic planning urged for implementation of CBT

By Patricia Keefe
CW Staff

CHICAGO — DP trainers who do not plan strategically for the implementation of computer-based training (CBT) will likely lose their ability to control, manage and adapt to this change in companywide instruction.

This warning was issued by Lorraine Shutman, an assistant vice-president at Security Pacific National Bank of Los Angeles at a recent conference here. Shutman, whose responsibilities include administering Security Pacific's CBT system, offered attendees a model for developing a CBT strategy for their company.

Strategy planning provides a framework for the coordination of strategic, administrative and operational plans to accomplish a prescribed aim, she explained.

Navigation course

Shutman reminded her audience that strategy planning is not a tool for overcoming obstacles one by one, but a long-term course of navigation from point A to point Z.

"Strategy planning demands that you think through the social, political, economic and technological factors that may affect your ability to accomplish your mission," Shutman said, breaking down those factors into a series of issue-based questions:

- *Social.* What must happen so that we may transition our trainees to a new delivery system for training?
- *Political.* Who owns CBT and how will it be implemented?
- *Economic.* What is in it for your organization?
- *Technological.* Is hardware and software available to do what you need done?

Plan for use

After performing needs assessment and data-gathering duties, planners need to develop a plan for use before and during CBT implementation, according to Shutman.

The plan should state the quality and texture of the business — that is, who you will interact with, who the team players and program authors are and what kind of control you will have on authors and quality.

The strategy must push the tactical plan for implementing CBT.

The strategy must also balance the overall scheme. "Is there an organizational need for a delivery vehicle for training?" Shutman asked.

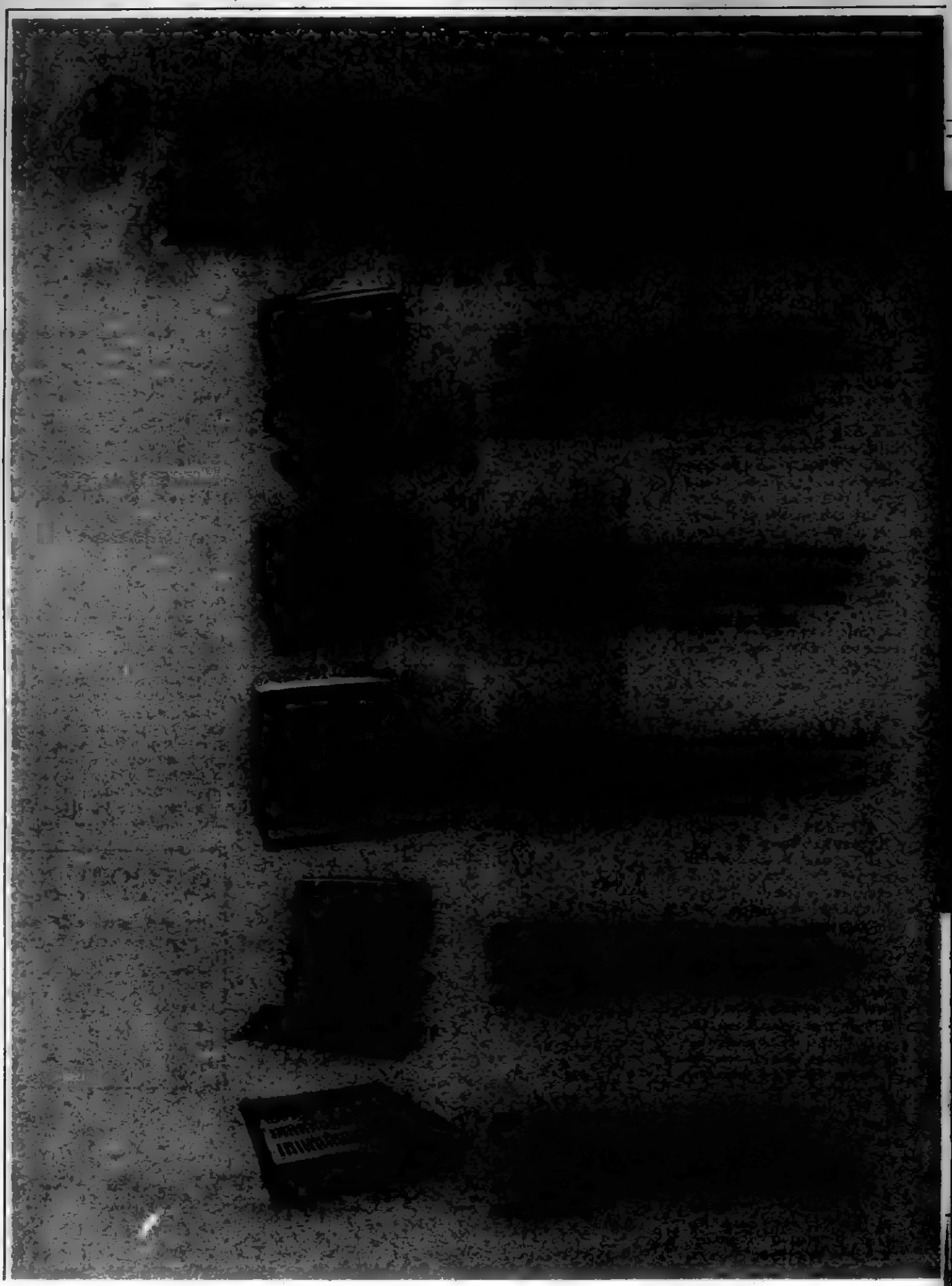
Product superiority must also be addressed, such as how to produce quality training while guaranteeing mastery, productivity and cost-effectiveness.

Perhaps most important of all, Shutman said, the plan must provide the mechanics for an understandable, unified method of presentation and communication — in other words, how to get management to buy in.

In summation, Shutman offered an outline of a five-year strategy for CBT implementation:

- *Assumptions.* The four factors addressed above.
- *Mission.* The prescribed aim or dream.
- *Rationale.* What makes your mission viable.
- *Strengths.* How CBT assists your organization in meeting its goals.
- *Weaknesses and threats.* What can block your progress to your prescribed aim and what threatens the implementation of CBT at your organization, respectively.
- *Objectives.* What you hope to accomplish within the context of your strategy plan.

Shutman — CW Photo by P. Keefe



NEWS

CBT planners told micro-mainframe link on the way

By Patricia Keefe
CW Staff

CHICAGO — If you are still agonizing over whether to implement computer-based training (CBT) on microcomputers or mainframes, you could just sit back and wait for integration to come to the rescue.

"Hold your horses and wait for micro-mainframe integration," urged Stephen Sankey, information center manager at the Bank of America, who spoke at a recent conference here. "There's a lot of [system integration] stuff about to be delivered."

Alone, each type of hardware has its drawbacks. Together, as parts of an integrated whole, the benefits of each virtually outweigh those limitations, Sankey said.

However, not all CBT planners can afford to wait for the integration of micros and mainframes to reach their firms, if it ever does.

Formerly manager of CBT at the bank, Sankey gave his audience the benefit of his own deliberations in this area, covering issues of cost, instruction, authoring and administration.

At first glance, it would seem that the firms that do not have a lot of money to spend would do well to turn to micro systems — the hardware, software and backup are relatively cheap, Sankey pointed out.

However, the cost of memory add-ons could prove expensive if the system does not provide hard disk storage.

Moreover, he added, 90% of the cost of CBT is wrapped up in authoring. How expensive the authoring is depends upon the specific needs of the user, not so much the hardware involved. Mainframes allow unlimited course size, easy sharing of data, student dialogue and system backup and recovery, as well as allowing external text to be brought in.

Micros provide ease of authoring in their own way by providing prompts, control over the machine, support of alternative media and elimination of the issue of resource competition, Sankey said.

Technical support

Turning to technical support, Sankey suggested users with limited technical backgrounds might find comfort in a mainframe-based CBT system that allows them to draw on the experience of the systems and mainframe support staff.

Support is not necessarily synonymous with user friendliness, however, and micros win that round with Sankey.

Powerful graphics, ease of use with video, fast response time and portability are some of the "friendly" issues that can raise student motivation, Sankey said.

Mainframes can provide a more powerful CBT system, which is important for users concerned with simulation (prototyping and CBT product support fields) and security issues. Powerful analysis of answers and answer trapping is also available on mainframes.

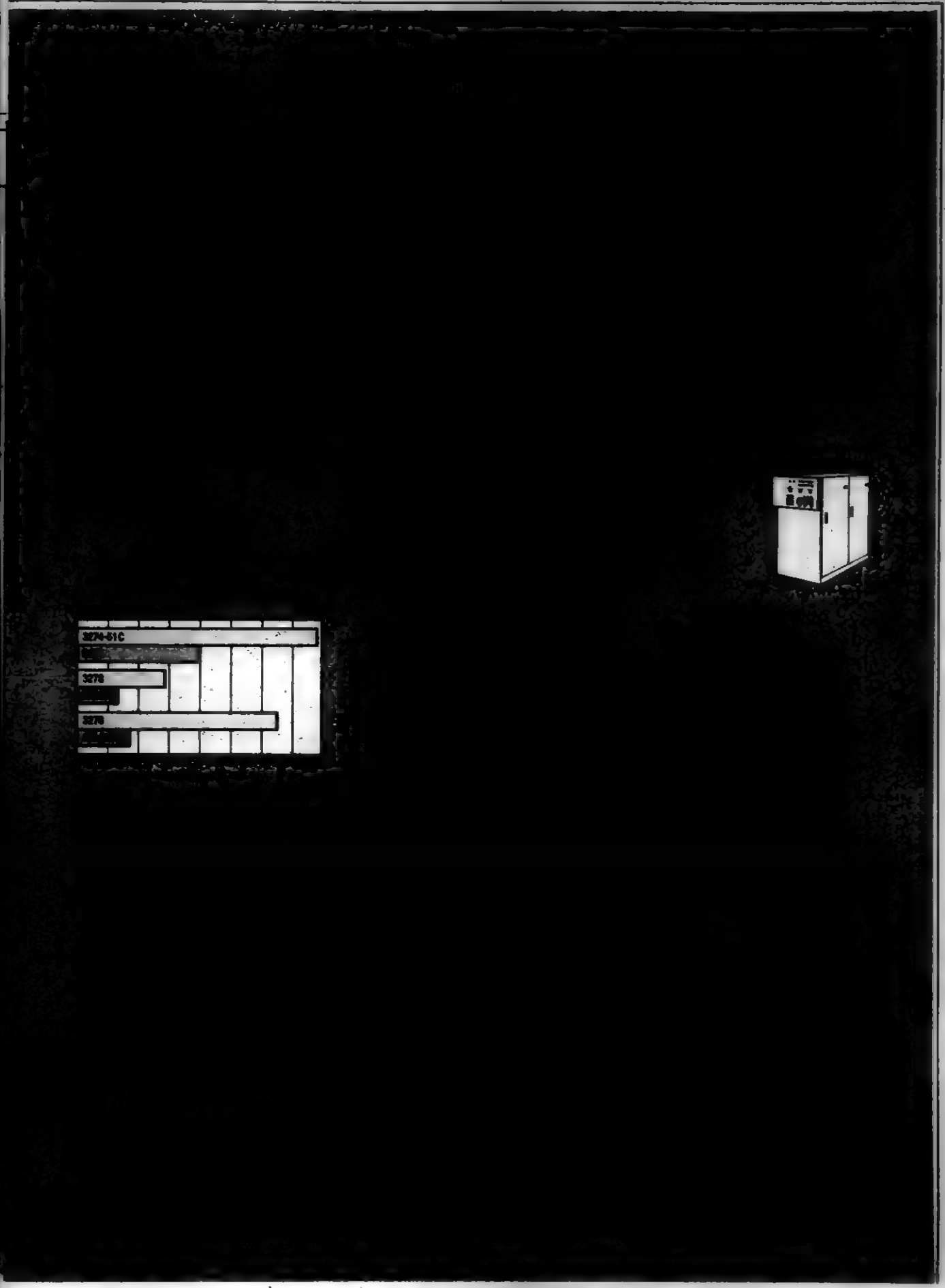
Administrative issues

Mainframes also seem to have an edge when it comes to administrative issues such as tracking, reporting, scheduling, courseware availability and actual training and support.

Micros are somewhat handicapped by the need for multiple diskettes, which affects the ability to centralize, distribute and schedule courses, according to Sankey.

The mainframe provides extensive data recording, remote distribution, high-volume printers and centralized data.

Moreover, compared with micro-based systems, mainframe-based CBT usually comes with extensive vendor support, a cadre of authors, users groups and CBT classes. Sankey found micros seriously lacking in these areas.



NEWS

More N.Y. hospitals to receive pediatric protocol system

By Lynn Haber
City Staff

NEW YORK — A pediatric protocol system that serves as an educational tool, aids in resource allocation and monitors patient care will be expanded to serve additional city hospitals here.

The system was first implemented at Kings County Hospital Center in Brooklyn in 1981 and afterwards at the Metropolitan Hospital Center in Manhattan. Implementation of the system at Coney Island Hospital in Brooklyn began last month and will begin at two other as-yet-undisclosed New York municipal hospitals at the end of this year.

The pediatric protocol system was jointly designed for the Municipal Hospital System of New York by the Fund for the City of New York and the New York City Health and Hospitals Corp. to provide two types of information: population and utilization data, which helps supervisory physicians get a perspective on their resources, and data that measures compliance or adherence to a set of pediatric health care guidelines.

Medical protocols are outlines of standard practice for the diagnosis and treatment of given illnesses. "Presently, the system deals with eight common pediatric problems, some of which include upper respiratory infections, sore throat, asthma and urinary tract infection. The guidelines are linked to a structured chart that the doctors fill out," explained Bruce Posner, MIS director for the Pediatric Protocol Project at the Fund for the City of New York. "The information from the chart is coded and entered into the computer, and it is the information on the chart that the computer compares with the guidelines. Reports are then produced which outline, in either aggregate form or on a case-specific basis, adherence to the guidelines."

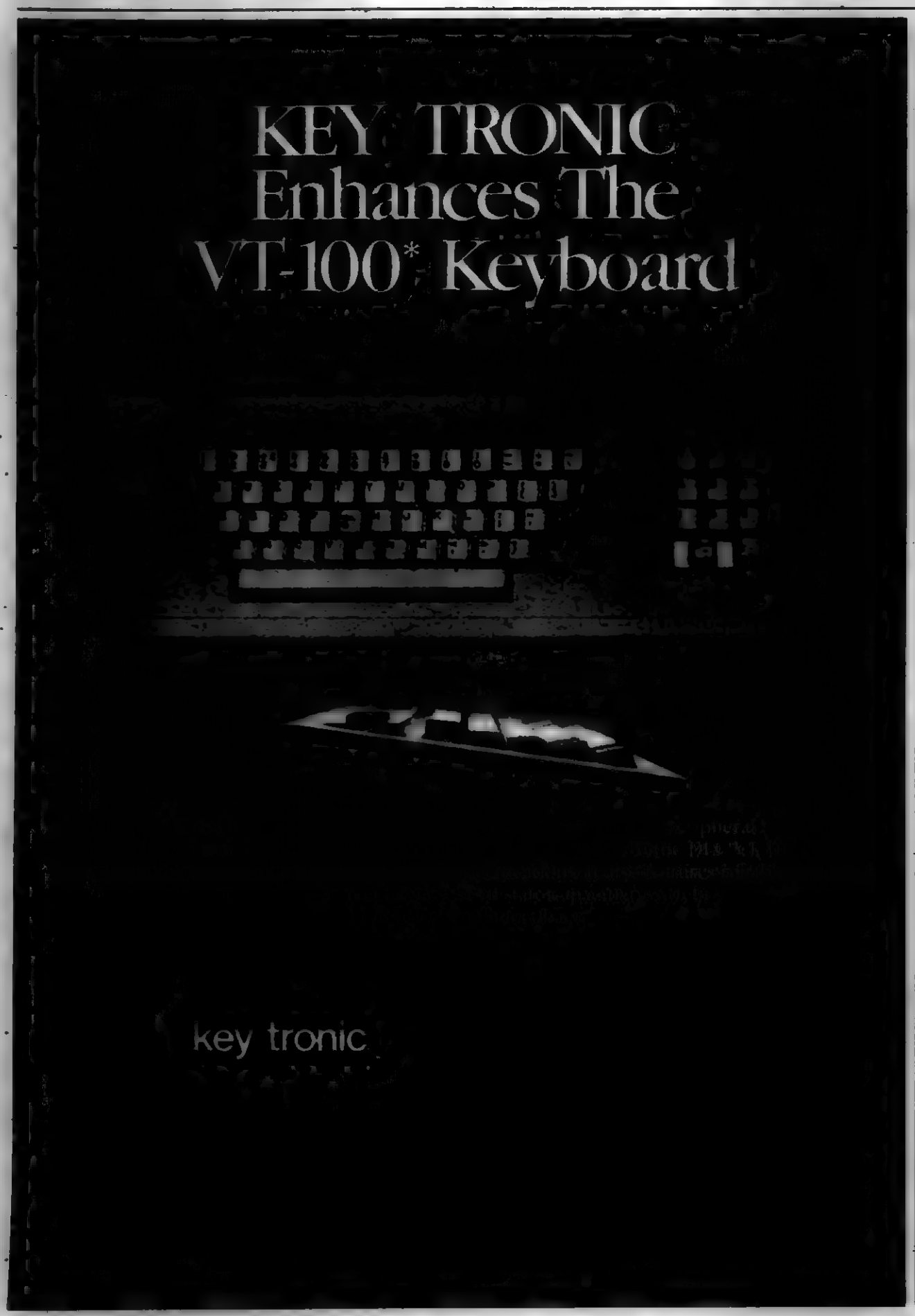
Supervisory physicians then use the reports to identify a particular issue that may need educational review. "Reports are useful to gauge compliance to the guidelines," Posner said, "but it is understood that in as many as 15% of the cases that the doctor sees, there may be a perfectly valid reason for departing from the guidelines. How the reports are interpreted is crucial."

The same computer system will be used by the additional hospitals to monitor pediatric care. The data processing department uses a 4M-byte Formation, Inc. F4000 processor running in an IBM VM/CMS and VS1 operating environment. Two full-time programmers, in addition to Posner, work on the project.

In its assignment to help city agencies improve productivity, the Fund for the City of New York, established in 1968 with a grant from the Ford Foundation, has additional projects under its belt. These are developed by the fund at the request of different service agencies to optimize or monitor areas that the agencies would otherwise have difficulty monitoring themselves.

For example, the fund recently finished an automated routing system for garbage collection trucks for the New York City Sanitation Department. "Until now, the sanitation department had to produce their routes manually and had no idea if those routes were optimum," Posner said. "Now, they have a computer system which enables them to test many alternative ways of routing and allows them to plug in different parameters so they can test, be more productive and know they're getting optimum routes."

Another computerized system that the fund helped create was a risk assessment system for the Department of Special Services for Children. The system generates reports that help track cases of child abuse and neglect and the allocation of resources.



NEWS

On-line data base helps bank woo wealthy depositors

Detailed personal information helps attract lucrative business

ATLANTA — The marketing department at a bank here is using an on-line data base as a way of competing with other financial institutions for the highly sought-after business of well-heeled customers.

The First National Bank of Atlanta last year established a new department whose employees use a special data base containing detailed personal information about a select group of customers. "The department was set up to serve the needs of the very affluent customers of the bank," said Margaret Anne Boone, a commercial officer in the bank's marketing department.

With the data base, department employees can quickly access information about the customer — everything from a spouse's name to the name of the country club to which the individual belongs. First National hopes that by providing more personalized service, it will attract more business from those customers.

Rapid information retrieval

"When one of this select group of customers has a request for banking services, our staff can rapidly retrieve a significant amount of information on this customer from the data files," according to Thomas Hills, group vice-president. "In addition, we can search for different types of information by any field of data in the information files."

For competitive purposes, the bank wanted to develop the data base as soon as possible. But the bank's IBM 3081, 3083 and 3033 mainframes were already carrying a heavy work load, and "our programmers were telling us that it would be way down the road before our data base was completed," Boone said.

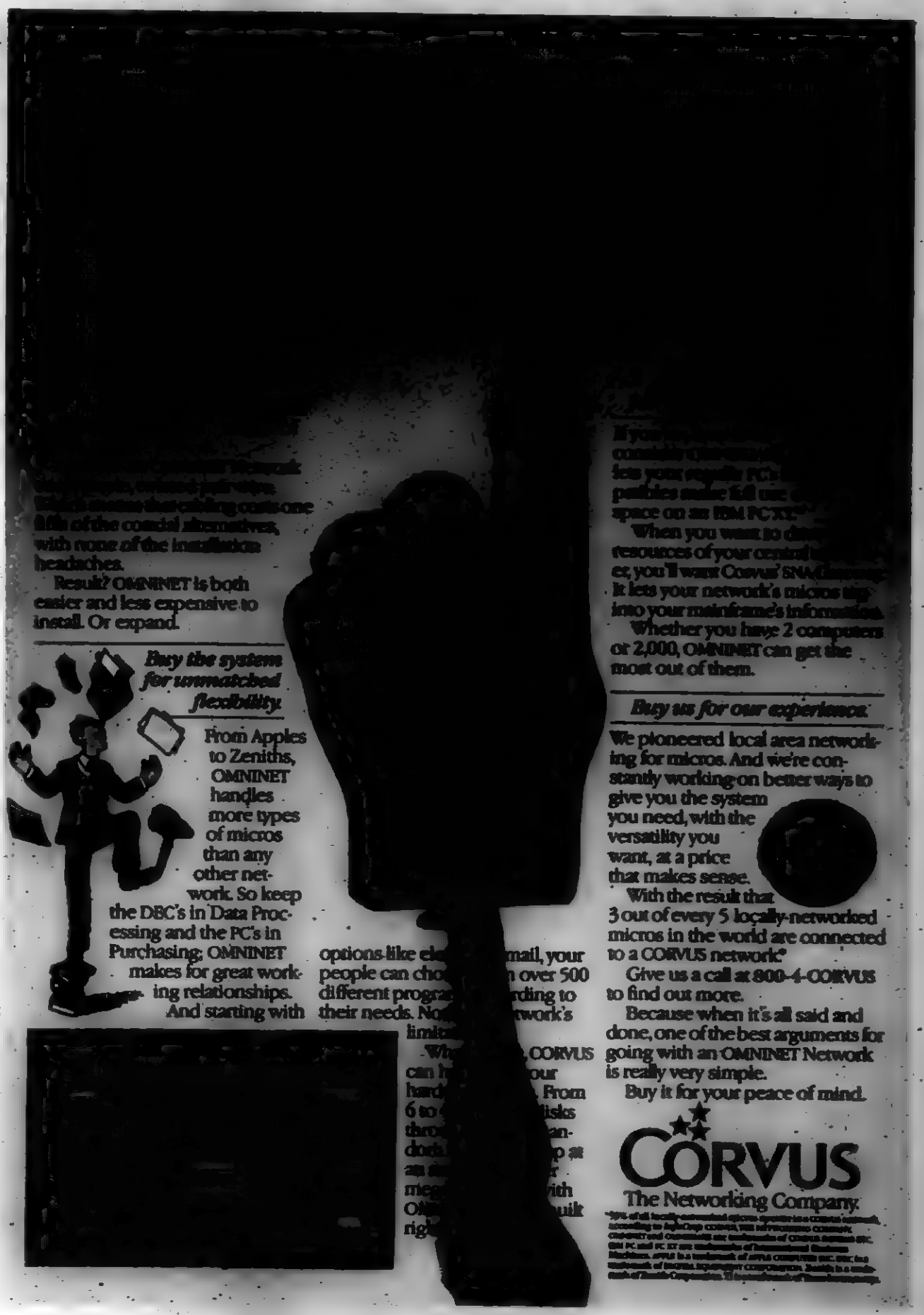
Bank officials briefly explored other alternatives to expedite the program, such as software packages and a time-sharing service. "We looked at a couple of things that really did not suit our needs," Boone said. The bank finally chose Quality Information Systems, Inc.'s Qtime data base management software.

"[Qtime] was the only thing that was presented to us that really suited our needs," according to Boone. "Their people walked in off the street, literally, and made a presentation. During that presentation, I made the determination that this was what we needed. They did not even know we were looking [for a data base management program]."

The data base resides on a pair of IBM Personal Computer XTs, with one floppy and one hard disk and 512K bytes of memory. The Personal Computer XTs are linked to each other by Orchid Technology, Inc.'s PC Net local-area network, according to Greg Barfield, the bank's DP manager.

Boone said the Qtime program proved to be easy to learn and use. That was an important consideration, she said, in a department where none of the employees — most of whom were part-time workers — had any previous computer background. "I have been able to sit down with the part-time workers, and in an hour they have had the ability to load information and work with it."

Eventually the bank would like to provide a terminal for each of the employees in the marketing department to access the data base. One approach now being examined is replacing the two Personal Computer XTs with six IBM Personal Computers tied by an Ethernet local-area network with a 70M-byte hard disk.



Managing a Constant Wave of Facts & Figures

Requires a Special Touch.

GE SOFTWARE INTERNATIONAL

Run With Us

with Software International Financial Applications Software

Dema conference/expo slated for Sept. 24-26

STAMFORD, Conn. — The Data Entry Management Association (Dema) has released its 1984 meeting schedule, which includes the Eighth Annual Dema Conference & Equipment Exposition, scheduled for Sept. 24-26 at the New Orleans Sheraton.

Also announced by Dema were three-day profesional growth seminars, slated this week, April 11-13, at the Sheraton Hotel in Seattle and April 30-May 2 at the Royal York in Toronto.

The seminars include "Essentials of Data Management," which includes Dema's Certification Program in Data Management; "Increasing Quality & Productivity in Your Data Entry Department"; and "New Directions for Information Management." The seminars each cost $485 for Dema members and $545 for non-members.

Dema is an association of information managers involved in both traditional and emerging methods of data entry, including key-to-disk, on-line and distributed processing; voice entry; portable and personal computers; and word processing. Dema can be reached through P.O. Box 16711, Stamford, Conn. 06905.

ABA establishes user groups

CHICAGO — Lawyers who use computers and applications software in their offices can now join several users groups set up by the American Bar Association's (ABA) Section of Economics of Law Practice.

The topic areas of users groups include IBM; Digital Equipment Corp.; Apple Computer, Inc.; Wang Laboratories, Inc.; the Radio Shack TRS-80; time and billing applications; substantive applications; and the CP/M operating system, the group sponsors said.

The groups were set up by the Economics Section's computer committee, which six times a year publishes "Network," a newsletter about computers and their office uses.

Only members of the ABA's Economics Section may join a users group.

Further information is available from Donna Spilis, Economics Section, American Bar Association, 1155 E. 60th St., Chicago, Ill. 60637.

Decision support meet set

NEW YORK — A two-day conference on "Decision Support Software: Personal Computer, Mainframe and Distributed Applications — A Managerial Perspective" is scheduled for May 21-22 here at the New York Hilton.

The conference will discuss end-user computing, distributed decision support, local-area networks, microcomputer policy, fourth-generation languages and artificial intelligence, according to the sponsor, Research and Planning, Inc. of Cambridge, Mass. Scheduled topics include impact of decision support systems on organizations, approaches to evaluating and selecting decision support software and communicating management information.

The conference costs $495.

Research and Planning is located at 215 First St., Cambridge, Mass. 02142.

NEWS

Manufacturing system ousts firm's in-house software

QUINCY, Ill. — After replacing its in-house software with a manufacturing software package, a maker of pumps, compressors and drilling equipment reported that it had increased production by 20%, cut overtime by 18% and eliminated parts shortages.

Headquartered here, the Gardner-Denver Divisions of Cooper Industries, Inc. have manufactured pumps and drilling equipment for mining, metals, energy, compressors for industrial and special applications since 1859. The divisions employ nearly 1,200 skilled workers here and in Sedalia and La Grange, Mo.

In 1979, officials realized that their in-house software running on Burroughs Corp. mainframes didn't meet their needs. They felt the system needed too much manual support, that customer orders had to be scheduled manually and that the system's material requirements planning feature didn't integrate with the existing system.

"There was too much overtime just to meet the orders. We realized the software and hardware we were using didn't meet our business needs. We had to change," said Ken Jones, manager of MIS.

A task force with representatives of various areas in the organization was formed to research the manufacturing software field. It decided in December 1980 to purchase Management Science America, Inc.'s (MSA) Manufacturing System. Jones said one reason for choosing MSA was its implementation approach, with up-front planning and involvement of employees from all areas of the company.

The company bought an IBM 4341 with an IBM OS environment to support the software. Dennis Lipscomb, an analyst in the Sedalia plant, was named project leader for the implementation in the two plants in Quincy and the pilot project in Sedalia.

The Sedalia employees were eager to help. "Gardner-Denver was going to have a class-A system and nothing less. The employees knew that if the plant succeeded, every individual succeeded," said Sedalia plant manager Don Bradley.

Phase I of the implementation began in January 1981, with the division analyzing its business to see how the software would work most effectively. Also, management and MSA provided educational and training opportunities to employees, and Gardner-Denver formalized its operating procedures and controls.

Gardner-Denver then began a cycle-counting program for its inventory. The result was that inventory accuracy rose from 67% to 97%.

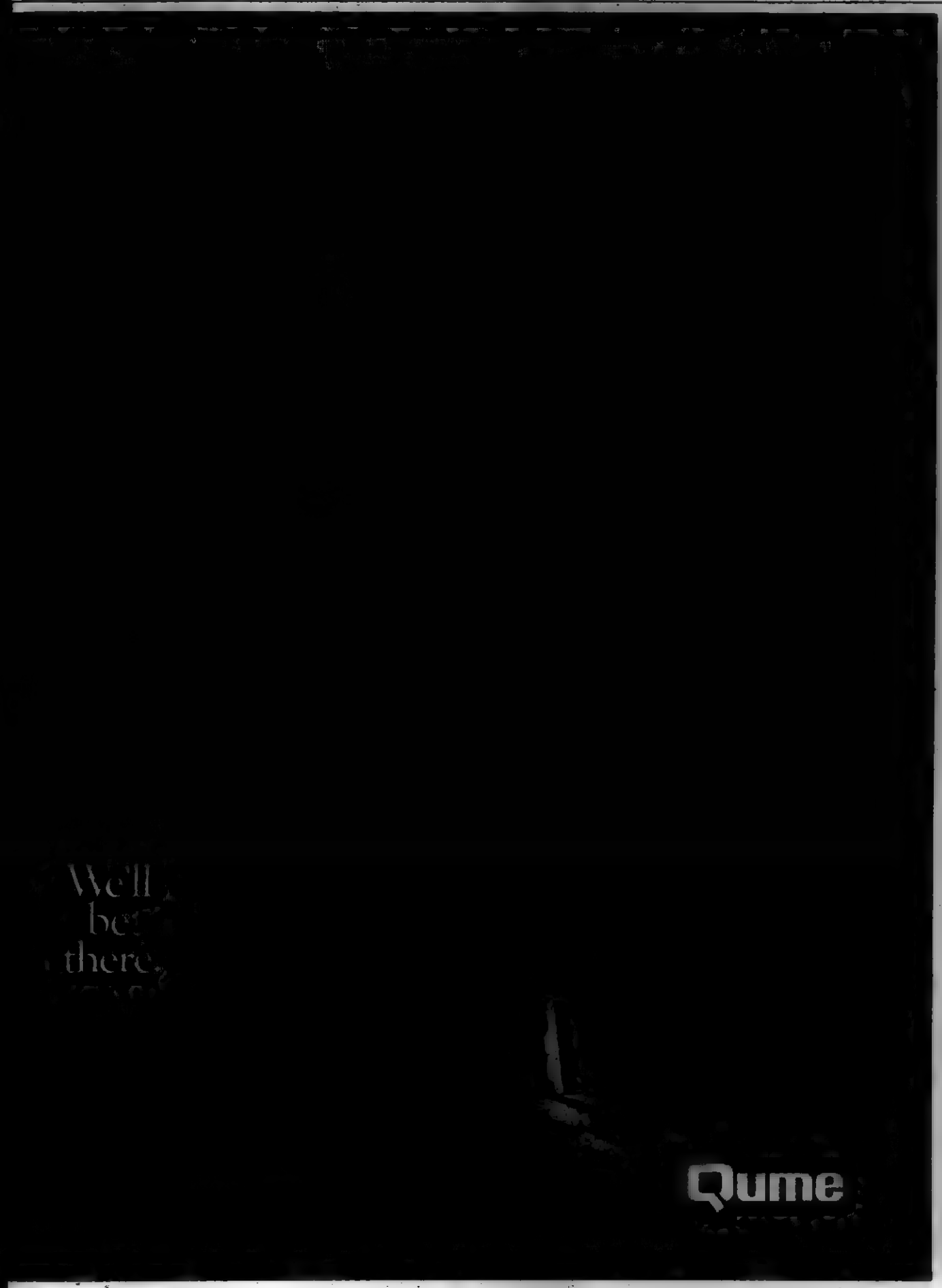
The inventory records helped to eliminate parts shortages, Bradley noted. He said that in the past, the final assembly department had required two or three days of notice to expedite parts on the shortage list. With the new system, inventory audits showed that parts shortages were no longer a problem.

"My only argument with MSA was over my shortage list. How would I know what was missing? But then I realized I didn't need one," said Bob Nagel, materials manager. The materials department now can plan its schedule up to a month in advance, giving Gardner-Denver the control it needed to implement the system.

All three plants implemented the first four modules — inventory records, manufacturing, master production scheduling and software control — by November 1982.

With the system, Gardner-Denver can create a master production schedule for employees to follow. Surprises and panic buying have been eliminated, and the purchasing department is no longer ordering parts already in the

See PUMPS page 62



Range of uses found for six-year-old financial system

DALLAS — Six years after installing a financial planning and modeling system for strategic planning, Dresser Industries, Inc. continues to find additional users of the program.

"In the six years that we've had the system, it has become a frequently used tool for anyone who wants to generate reports or manipulate rows and columns of numbers," said Bryant Kershaw, manager of planning systems in the Operations Research Department of Dresser, an energy products and services company here.

At first, the product was primarily used by strategic planners. As enhancements were added to the system, accountants and financial planners began using it. Kershaw estimates that 500 non-DP users around the company perform an average of some 25,000 executions on the system each month.

In 1977, Dresser evaluated a number of financial modeling and planning tools that would help eliminate the tedious work required in strategic planning. After a thorough review process, the company, which has two Amdahl Corp. 470V/8 and two IBM 3033 mainframes, chose CA-Autotab from Computer Associates in Jericho, N.Y.

"We wanted a program that would let planners think about planning," Kershaw said. "With CA-Autotab, they're able to use scenarios and options to find the best product and marketing combination. Doing that manually, especially with a three- or five-year forecast, requires a huge volume of data. The program saves a tremendous amount of time.

"It's especially good for modeling," he added, "because you can use up to 40 'what-if' situations, vary them within each model and still retain your original data." Moreover, "It's so simple that familiarity with computers or programming isn't necessary. . . . CA-Autotab is an English-language system."

In addition to working online, Kershaw noted, CA-Autotab can operate in a batch mode. "Once the model has been established with your rules and formulae, it completes your calculations."

Training for CA-Autotab does not require a great deal of time or effort. "We have trained close to 300 people in the last few years," Kershaw said. "A person becomes productive after only a half of a day of training."

Employees have readily accepted the product. "Anytime you can get a product which allows users to immediately see the benefits in time and money, then that product will go over well," Kershaw said. "I believe CA-Autotab was the first product we used that was truly user-oriented."

PUMPS from page 41

stockroom or sitting on the receiving dock.

"Upgrading our system has upgraded our ability to meet schedules. We don't have that month-end crunch, where everything cascades down to the last four or five days," Jones said.

He reported that the MSA Manufacturing System also has helped Gardner-Denver improve customer service. The company always had a reputation for prompt service, Bradley said, but employees had to work overtime to deliver 97% of its orders on time. Now, the company is provided that reliable service, but has reduced overtime by 18% in the machine shops.

"It was frustrating to have our priorities changed. We spent all our time starting jobs, instead of completing them. Now, we can plan and select jobs requiring the same machines and do those all at one time," Nagel said. "This not only has helped employee morale, but in just 6½ months, we increased our productivity level by almost 20%."

SIX REASONS WHY CINCOM'S MRPS IS THE SUPERIOR SOFTWARE SOLUTION TO YOUR MANUFACTURING CONTROL PROBLEMS.

Paper trader plants custom package to handle deals

NEW YORK — An accounting package is helping a paper trading company here handle its daily operations, while providing the capability to handle future growth.

Perry H. Koplik & Sons, Inc., a privately owned paper trading company here, serves as an agent, broker and trader in wood pulps, secondary fibers, newsprint, liner board and kraft paper. In 1981, it found itself seeking what is now a common goal: computerizing manual operating procedures with an emphasis on improving administrative efficiency.

Although traditional accounting software packages were readily available, the company discovered no one had developed software that could address the main thrust of its particular business needs. According to Edward Stein, Koplik's vice-president and chief financial officer, "Essentially, what we needed was a system that could provide the ability to continue handling an ever-increasing volume of transactions, as well as all the operational functions of the company."

The trade business is a complex one. Traders rarely, if ever, see the product they are handling; their function is to explore the market, bringing together buyers and sellers. A trader's success depends on being able to handle a wide variety of clients and to process volumes of vital data quickly. Accurate and up-to-date trading information is essential in an environment that changes constantly.

Hardware, software issues

Previous to its search for a turnkey system, Koplik & Sons ran invoices, purchase orders and statistics on an IBM 5110 running in batch mode. When it decided to automate a greater portion of the business, it had to consider both hardware and software issues. Although Koplik & Sons looked at other vendors' equipment, it chose Datapoint Corp. because of the "flexibility of its hardware and its growth opportunities," Stein said. For software, Koplik contracted in 1981 with Datamatics Management Services, Inc., which developed a custom system for the paper trader.

The hardware purchased includes 18 Datapoint 8220 data terminals; one 8600 application processor, two 3600 application processors and one 6220 application processor; a 4755 file processor; and two printers — a Model 9257 300 line/min dot matrix printer and a Model 9621 serial printer.

Martin Almquist, consulting director for Datamatics, said, "It is extremely important that the trader have a system that allows him to monitor the entire trading operation continuously, checking availability of goods, negotiating prices and terms and verifying the resulting arrangements."

The Trade Data Expediting (Tradex) system that Datamatics designed for Koplik is able to isolate the different variables of the trading operation and format a support program closely aligned with the actual way the trading business is conducted. Appropriately, it is a system centered around the "route sheet" concept. This sheet, now accessible through the CRT screen, integrates information about all the parties involved in the transaction: the customer, vendor and shipper. Previously, this information was handled manually, which resulted in a lot of paper shuffling that required a lot of time.

"The final result was not just a program, but a solution combining a fully integrated, on-line system to execute and monitor the entire trading business environment," Almquist said.

The Tradex system provides a cohesive operating routine that combines order processing, financial statements and management information reporting. It facili-

See PAPER page 44

1. High Performance
2. DBMS Integration
3. Unparalleled Portability
4. Modular Growth Path
5.
6. Cincom Systems Support & Service
800-543-3010
Cincom Systems

Colleges' on-line system preps students for job market

RICHMOND, Va. — A group of community colleges here is replacing an obsolete remote job entry terminal system with an interactive on-line system in order to provide students with the best possible preparation for the job market and to facilitate administrative reporting.

The installation of the on-line system is a two-phase project. The first phase, completed approximately six months ago, targets the academic population of the college system. The second phase, scheduled for completion in two years, targets the administration.

The Virginia Community College System (VCCS) is composed of 23 colleges in 33 locations. In the fall quarter of 1983, approximately 6,500 students were enrolled in a two-year data processing curriculum that awards an associate's degree in applied science. Almost 22,000 students were enrolled in some type of DP course.

For DP purposes, VCCS is divided into four regions. Each region has its own IBM 4341 mainframe that serves all the campus computer laboratories and communicates with a host 4341 located here.

Up to 12 IBM controllers communicate with or are locally attached to each regional 4341 — either 3274 controllers with up to 32 ports or 3276 controllers with a capacity of eight ports. The old system's batch terminals with printers are being phased out.

Charles Allen, VCCS' manager of operations and technical support, is coordinating the conversion from batch to on-line. In selecting an on-line system, Allen looked for performance of equipment. The academic network has approximately 600 Telex Computer Products, Inc. 178 and 278 terminals on all four systems. VCCS also purchased approximately 25 T-1800 dual-purpose printers from Printer Systems Corp. of Gaithersburg, Md.

"Having an on-line environment for instruction has exposed students to state-of-the-art methods and equipment," Allen said. "And that's essential preparation for the business world."

According to Allen, the academic network has been operationally sound since completion of installation about six months ago. The 4341, which currently has 12M bytes of memory, is scheduled to be increased to 16M bytes of memory in the near future, Allen said.

A network for administrative purposes will add another 4341 at each region, according to Allen. "We expect all campuses to be doing on-line registration when that system is in place," he said.

Computer Interruptus

Midnight. And you wish you would be left in the dark. But miles away in the DP Department, a misplaced DD override, an invalid concatenation, or some other equally obscure JCL error brought production to a standstill.

And when the system breaks down, it's you or your staff they call up. Which usually means getting up and getting down there. And after a night like that, how productive will the morning be?

What a waste. If you had the JCLCHECK™ program, you wouldn't have JCL errors, period. None. Zilch. Zero.

Because the JCLCHECK program can catch any and all JCL errors and give you complete, on-line JCL validation and concise error diagnostics. Plus complete documentation on a job stream or entire production system suitable for insertion in the run book. And it can operate under TSO, TONE, ROSCOE or CMS.

Imagine, with no more JCL errors, your programmers can finally concentrate on what you hired them for: writing programs.

So what are you waiting for? Send the coupon or call us at (408) 554-8121 for details. We'll show you how the JCLCHECK program can bring your error detection out of the dark ages, increase production, and eliminate applications backlog. And that'll put you in the spotlight.

© Copyright Triangle Software Company. JCLCHECK is a trademark of Triangle Software Company.

I'm frustrated and tired of JCL errors.
☐ Send me details on the JCLCHECK program.
☐ Have a representative call me.
NAME
TITLE
COMPANY
ADDRESS
CITY, STATE, ZIP
PHONE
OPERATING SYSTEM

Triangle Software Company
4340 Stevens Creek Blvd., Suite 108
San Jose, CA 95129

PAPER from page 43

tates the documentation of each step of the trading operation and uses this information to generate the data by which advantageous decisions can be made.

"The Tradex system gives on-line capabilities for operational needs as well as the ability to enter and handle diversified data, Stein said. "It is a viable system that provides management with an effective operational tool that results in better returns on investments."

The Tradex system includes not only routine administrative support programs, but also accounts payable and receivable. An integral part of it is the ability to maintain key variables having the most impact on the trader's profit margin — freight and tariff prices, terms, commission structures and time frames — and to report these activities accurately.

Rather than simply concentrating on accounting, Tradex provided the ability to have an on-line accounts payable, supplier, freight and expense payable system, which was essential to Koplik & Sons.

Package keeps publishers' subscriptions circulating

WHITE PLAINS, N.Y. — If you ever wondered what happened to the latest issue of your magazine or why your subscription was canceled without notice, then you can identify with the problems of publication circulation.

"Logistical headaches in publishing tend to settle in the circulation department," observed Doris Minsker, manager of fulfillment services for Knowledge Industry Publications, Inc. based here. Because Knowledge Industry requires accurate subscription lists to *Video User*, which has 18,500 subscribers, and to eight newsletters aimed at markets ranging from book publishing to computer software, the publishing company decided to automate its manual subscription record keeping.

"Previously, we would research customer questions manually," Minsker said. "We could spend a half hour looking for a piece of paper and then send out a duplicate subscription."

The company did not have an up-to-date subscription base. An outside service bureau batch processed subscription data. "We were at least two weeks behind keypunching data," Minsker said. "We had to print mailing labels in advance, or miss mailing deadlines. We never had an accurate picture of our subscription base."

After looking at several packages, the company purchased an $18,000 data management system developed by Vista Computer, Inc. of Elmsford, N.Y. The package runs on a Data General Corp. Eclipse superminicomputer.

The Vista system automatically tracks subscribers' names and addresses, subscription payments and terms. It also issues invoices, payment reminders and renewal notices. "We use the system to flag subscribers close to renewal and mail preprogrammed messages in advance," Minsker said. "It clearly improves our renewal rate."

The system helps to "qualify" the readership by tabulating responses to audit cards and identifying those readers who haven't responded to information requests. This information is vital because a magazine cannot earn income from a subscription until it is verified. The longer a subscription is unfulfilled, the more money the company loses.

"Since we qualify readers more quickly, the package speeds cash flow," Minsker said.

When subscribers now call for information, Minsker can provide accurate answers because the system uses on-line menus and a data base.

Enhancements to the original package create mailing labels and lists used for book promotions and circulation campaigns. Another enhancement produces reports for Audit Bureau of Circulation examinations.

ICCA sets conference

HOUSTON — Interconnections '84, the national conference of the Independent Computer Consultants Association (ICCA), will feature F.G. Rodgers, vice-president of marketing for IBM, and Ken Olson, founder and chief executive officer of Digital Equipment Corp., as speakers.

The conference will be held May 16-19 at the Galleria Marriott Hotel here. The ICCA is an association of approximately 3,000 independent computer consultants which is headquartered in St. Louis.

The registration fee for members is $150 before March 31 and $175 after that date. More information is available from Walter Ulrich Consulting, Suite 450, 2626 S. Loop W., Houston, Texas 77054.

All consultants look alike.

Until you start asking a few questions.

You need some answers. And that's the "moment of truth" that separates an On-Line Software International consultant from the rest.

Our people are seasoned professionals with years of specific on-line experience. Heavyweights, not juniors. And their individual expertise in CICS, IMS, operating systems and networking is reinforced by our unique communications and data base system. A network that lets each consultant tap the vast experience of our entire organization.

If you want to know more about how we can analyze and execute your project, call us or mail the coupon today. You'll get a prompt answer. The first of many. Call toll-free 800-526-0272 or in New Jersey 201-592-0009.

Please send information on your consulting services.

Name _____ Title _____

Company _____ Phone _____

Address _____

City _____ State _____ Zip _____

ON-LINE SOFTWARE INTERNATIONAL

Two Executive Drive
Fort Lee, NJ 07024

CWCL84

NEWS

OA system controls gas distributor's delivery, billing

MUSTANG, Okla. — An office automation system has helped one of the largest independent distributors of liquid propane gas in Oklahoma to gain control of its delivery and billing schedule, allowing it to pursue continuing growth.

Bernard Briscoe started Briscoe's LP Gas Service, Inc. 30 years ago. Today, the enterprise's annual revenues are approaching the $7 million mark. However, Briscoe's son-in-law and general manager, Randy Terrel, remembers that three years ago, booming growth placed management in the paradoxical position of contemplating the very survival of this family-owned enterprise.

Creating a classic case of "too much, too soon," the oil crisis in the mid-1970s proved to be something of a Pyrrhic victory to Briscoe. The sudden interest in drilling for petroleum fired an influx of roustabouts and wildcatter types to the Oklahoma City area. City zoning laws forced new trailer parks and mobile home sites to locate in outlying areas bereft of piped-in natural gas.

As a result, Briscoe's marketing base exploded, until it appeared the company might be getting in over its head. An arbitrarily chosen 21-day or 30-day delivery schedule, fuel deliveries until midnight and a manual billing process that also determined which customers were due for deliveries created havoc at Briscoe.

In addition, a Briscoe subsidiary that handled conversion of vehicles from petroleum to liquid propane was exceeding all expectations. At one time, it had a waiting list of more than 400 cars and trucks.

In the midst of that chaotic success in 1979, Briscoe and Terrel attended an industry trade show, where they heard of Dealers Management Services' Fuel Pak software, which was programmed to run on Wang Laboratories, Inc.'s 2200 MVP computer system. After the show, they began calling other Wang users in the business, as well as users of other computer systems.

The Wang systems already in place received uniformly high grades. "What really made up our minds to go with the Wang system were the reports we heard about the quality of the service," Terrel said. "We figured we could always get a computer and some software to do what we needed, but we wanted to make certain we went with a company that was willing to take us by the hand and lead us into this.

"It was important for us to get the best system we could find with the best backup and service available. In this respect, Wang got better recommendations than all the other computer companies put together."

The system, consisting of a 128K-byte Wang 2200 MVP processor, a 32M-byte fixed disk, a Model 2236 Data Entry terminal, a multiplexer, a printer controller, a 180 char./sec Model 2235 matrix printer, a 53.6M-byte Model 2280-2 fixed disk and four modems, went on-line in August 1980. Initially, Briscoe's office staff voiced some concern about the switch-over from a purely manual system to an automated office system.

"We'd never seen anything like this before, and we knew everything important to the company was on that machine. The feeling was if you pushed the wrong button, everything would be lost for good," Terrel said. "Now everyone is really comfortable with the computer."

The computer handles delivery scheduling by automatically using a degree-days figure to calculate how much fuel each customer is likely to have used the day before. Based on that consumption, delivery tickets are printed a week ahead of time for the drivers. Because the route men have become so much more efficient, the company was spared the expense (estimated at $450,000) of having to buy more trucks and hire extra drivers.

Controlling billing process

The computer system has also aided the billing process. Before the Wang 2200 MVP came on-line, customers who paid late had what amounted to a free ride. "When the Wang system came in," Terrel said, "we had it programmed to add an automatic interest rate of 1.5% per month on balances that are unpaid after 30 days. In no time at all, we found out that the money we were bringing in from the interest payments alone — money we were losing in the past — would more than pay for the cost of the computer in less than a year. It was kind of like getting the computer for free."

Moreover, Briscoe has been able to save almost $35,000 a year in salaries and benefits for site billing clerks by centralizing the billing operation in Mustang. This has also reduced billing errors by at least 75%.

The system has also simplified the process of reporting monthly sales to the state. "We used to have one clerk to figure this out by hand. That's all she would do for two weeks out of every month," Terrel said. "Now we just push a button on the 2200 MVP, and the machine prints out the complete record of all sales. We send the list to the state just the way it comes off the printer."

CONNECT

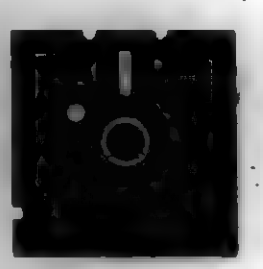
Finally CICS and Your PC Can Work Together!

PC Files: Spreadsheets, Word Processing, Databases, Graphics, User Applications

pcMAINFRAME™

Select, Browse, Condense, Average, Summarize

Mainframe Files: General Ledger, Budgets, Name/Address, Sales, Production, Etc.



pcMainframe makes them do what you have always wanted.

- Upload and Download File Transfer
- Powerful Data Selection and Summarization
- Automatic Formatting
  - Spreadsheets
  - Basic
  - Text
  - Programs
- Six Levels of Security
- Centralized Control
- Hard Copy and On Line Audit Trail

Install pcMAINFRAME TODAY for less than $5,000.
Call or Mail the coupon for information NOW!
(312) 565-2736

clSOFTWARE Group
Suite 1010
151 N. Michigan Ave.
Chicago, IL 60601
Please send me information regarding pcMainframe's free evaluation offer.

Name
Title
Company
Address
City/State/Zip
Telephone

Mobile terminals, host mini contain fuel firm's costs

SALT LAKE CITY — Mobile terminals in service trucks and a host minicomputer are helping a gas company hold down costs and provide better information to its customers.

Mountain Fuel Supply Co., with more than 220,000 customers throughout Salt Lake County, utilizes its radio-linked network to dispatch servicemen and to provide them with up-to-date information about their accounts.

An IBM Series/1 minicomputer linked to the fuel company's IBM 3081 mainframe can send information to an average of 65 service trucks in the field. That data is received by Motorola, Inc. D-1118A terminals equipped with Motorola VP100 printers installed next to the truck's driver's seat.

"We have IBM emulation on the control unit. The minicomputer talks to the terminals and printers in the field, and they access information off the host as if they were [IBM] 3270 terminals," explained John Child, Mountain Fuel's supervisor of distributed data processing. "We are able to provide the serviceman and the customer with any information that would be provided by a 3270 terminal in the office."

The system gives work orders to the service representative assigned to each neighborhood and monitors assignments to make sure no one is overbooked.

In one day, 4,500 calls

Cold snaps and the day after the first cold night of fall are usually hectic for the Mountain Fuel crews. That first cold night is when many people discover their furnaces' pilot lights are out. One day last winter the crews handled 4,500 calls.

Child reported that Mountain Fuel was the first utility to operate with the full system, with both terminals and printers in all trucks.

Servicemen receive their day's assignments at their area service centers in the morning. Those assignments, as well as emergency calls that come up during the day, are fed into the terminals by the Series/1. With a printout of their assignments, the individual servicemen can arrange their schedules as they see fit.

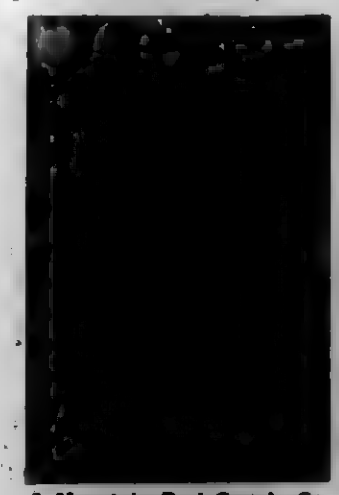
The system also tells the service representative who made the last service call to the assigned address what was done, when it was done and whether there are any other service calls, such as a disconnect or reconnect order, scheduled.

"Being able to assign servicemen automatically is only part of it. The real value is in being able to get at the customer data base. We have the ability to access information on a real-time basis, which helps the serviceman and also satisfies customers by giving them all of the information that they need from just one company employee. It stops duplication," Child said.

The terminals and the mini provide comparative billing information, with safeguards that bar servicemen from access accounts that aren't assigned to them.

"If while he is out there checking on a gas leak the customer says, 'How come

See FUEL, page 48



A Mountain Fuel Supply Co. representative checks a printout from the mobile printer in his service vehicle to check his next assignment.

A MINICOMPUTER NETWORK CAN INCREASE YOUR PRODUCTIVITY OR YOUR PHONE BILLS.

Most companies experience the same thing when they start tying remote terminals to their minicomputer.

Much higher phone bills.

But now there's an inexpensive solution to that costly problem: The new Codex 6002 Intelligent Network Processor.

This low-cost multiplexer will save you money even if you're using as few as two terminals. The 6002 boosts operating efficiency, reduces the number of needed lines and protects data from errors due to line disturbances. And it can handle any mix of up to 16 asychronous "terminals", including graphics terminals, word processors and personal computers from virtually any manufacturer.

Plus, only with the 6002 can you add asychronous equipment without worrying if your multiplexer is compatible or not. So not only will it save you money now, but also later as your network grows and grows.

The Codex 6002 Intelligent Network Processor. It's just one of our many products that enable minicomputer users to develop and efficiently manage a growing network.

To learn more about the 6002, call 1-800-821-7700, ext. 892. Or write: Codex Corporation, Dept. 707-92, 20 Cabot Boulevard, Mansfield, MA 02048.

codex

A MOTOROLA INC. Information Systems Group

© 1984 Codex Corporation

NEWS

Boscom to open in '85 with international high-tech forum

BOSTON — Boscom, the computer and communications marketplace on this city's renovated Commonwealth Pier, will officially open May 28, 1985, when it hosts the International Congress on Information and Office Management, an event that its organizers predict will bring together an estimated 5,000 professionals from more than 20 domestic and foreign professional associations.

When it becomes fully operational in mid-1985, the one-million-sq-ft Boscom facility will feature permanent showrooms and exhibition space, meeting rooms, videoconferencing facilities, hospitality centers and restaurants, according to a spokesman.

The steering committee for the International Congress on Information and Office Management held a teleconference in January to discuss seminar subjects and guest speakers.

Professional associations that make up the steering committee for the forum include the Administrative Management Society, the American Society of Association Executives, the Association of Legal Administrators, the Data Processing Management Association, the Institute of Administrative Management, the Society of Office Automation Professionals, Geyer-McAllister Publications, Inc. and the National Business Education Association.

Additional information on the office management conference can be obtained from Boscom, which is located at Commonwealth Pier, Boston, Mass. 02210.

FUEL from page 47

my bill is running twice as much as last year?' the serviceman can look up how much was used and is being used. He might find out that the bill is actually the same, or he might find that it is indeed higher. Then he can suggest what steps the person might take, such as insulating the attic," Child said.

The servicemen typically handle gas service connections and disconnections, gas leaks and emergency safety service on appliances.

As a security precaution, the servicemen logoff the system every time they leave their trucks.

The system has been operating for five years. "When we put it together five years ago, we were about the only ones doing it. I know other companies have tried it since with mixed success," Child added.

Quick payoff

"We figured it would take about four years to pay off. But it actually came in a little sooner." He noted that Mountain Fuel has an advantage over other companies in that it has to contend with no labor unions.

The Series/1, with an IBM EDX operating system and software written by Mountain Fuel's programmers, and the truck-mounted equipment cost $300,000. Child said it costs the company about $7,000 to add the terminal and printer to a truck.

Savings have come from the company's minimizing overtime costs, with the system providing better coordination of calls, and from avoiding increased staffing, as the same number of representatives are handling up to 30% more customers than five years ago.

Child said those service representatives took a "we'll see" attitude when the system was introduced. "Now they won't work without it."

He reported that the previous system required servicemen to radio their dispatchers if they needed service histories for an address and that the dispatcher then had to call up the account on a terminal.

"The system has probably done an even better job than we anticipated when we put it in," he concluded.

R&D had certain requirements that had to be met; manufacturing, accounting and marketing had others. Then microcomputers started showing up on desktops, with modems and printers here and there. Now you face the task of making it all work together. Sharing resources. Sharing information. And making more effective use of the information processing equipment you've already invested in.

NET/ONE LEAVES YOU IN CONTROL OF EQUIPMENT DECISIONS.

Net/One® is a general purpose communications system that turns equipment from different vendors into a fully functional, fast, powerful, information processing network. Because it can connect equipment from virtually any vendor, you remain free to choose equipment based on capability, rather than compatibility.

Off the shelf, Net/One supports industry-standard equipment interfaces—Async, Bisync, SDLC, through RS-232, V.35, RS-449 and IEEE-488 — as well as many high speed parallel interfaces. The list is expanding every month. But if you have special equipment that isn't in that list, Net/One is the only local area network that's fully programmable at every level so special interface protocols can be added now, or when you need them, later.

BROADBAND, BASEBAND, OR ANY COMBINATION THEREOF. YOU CALL THE SHOTS ON MEDIA, TOO.

Net/One is the only local communications system that gives you the option of broadband or baseband or a combination of both, with architecture that will allow you to add other media such as fiber optics in the near future.

YOU DON'T HAVE TO KNOW EXACTLY WHERE YOU'RE GOING TO BUY A NETWORK THAT WILL GET YOU THERE.

Everything about Net/One has been designed to respond to your needs, as they evolve, and to remain fully adaptable to evolving communications technology. System architecture is completely modular, so it can grow at the

Net/One turns the e
now into the netwo

Net/One is a registered trademark of Ungermann-Bass, Inc. © 1983 Ungermann-Bass, Inc.

NEWS

System helps firm keep track of employment records

WILMINGTON, Del. — Invention often is born of necessity. At least that is how the Human Relations Department of Hercules, Inc. developed a cost-effective computer-assisted retrieval system to store and retrieve employment records for its home office personnel.

As part of a major campaign to increase office productivity, Hercules, a chemical manufacturer based here, decided to install communications, energy and word processing equipment in its new headquarters building, four blocks from the firm's old headquarters. As part of the move, which took place last June, management mandated that anyone moving into the new building had to leave his paper files behind.

"We had talked about adopting microfilm for our personnel file for about five years," H. Lloyd Jennings, who was manager of Personnel Information Systems, said. "The relocation to the new building furnished us with the time and place to make the change."

Jennings decided on computer-assisted retrieval. But his file size and volume did not justify the installation of a dedicated mini or even the extra programming necessary to put the microfilm file's index on the company's IBM mainframe.

The only computer equipment available to him was the company's new Wang Laboratories, Inc. VS 100 word processing system. Jennings determined that the Wang system would be suitable for the microfilm index storage; only a little programming was necessary to protect the security of the index and to extract data from the mainframe.

The programming was handled by Jenning's then-assistant, Joan Maloney, and was done in Wang's Glossary language; employee names and Social Security numbers were extracted from the payroll program in the mainframe, saving several days of data entry time. This was done over telephone lines, and the whole process took about a week, Maloney said.

This information became the basic index for personnel files. As documents were microfilmed, their roll- and frame-number addresses were added to the index.

However, because the Wang file was limited to about 120 screens, the index had to be spread out over several files. To locate a particular file, an operator punches in the first letter of the name needed, and the program locates the correct file automatically, Maloney said.

Kodak microfilmer

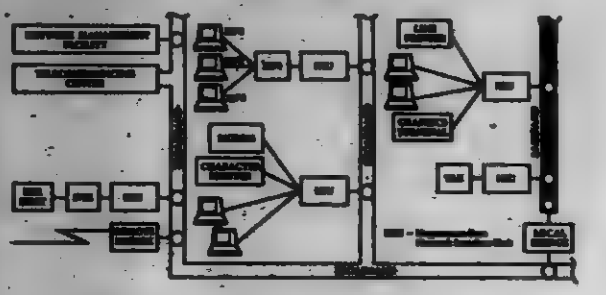
The choice of the micrographics equipment also was based on need and was narrowed down to Kodak Corp. Because the department receives only 50 to 75 documents a week for filming, a Kodak Starfile RV-3 microfilmer was selected. A more automated microfilmer would have been an expensive extravagance, according to Jennings.

An intelligent Kodak IMT-150 microimage terminal with built-in printing capabilities was installed last fall for retrieval of the document images created by the Starfile RV-3. It is automated for fast retrieval using the roll- and frame-number index stored on the word processing system and can store up to two dozen search requests. Paper copies of the images also are made in the microimage terminal for distribution to requesters.

"We complied with management's mandate by cutting our document storage space from 22 file cabinets occupying 64 square feet of floor space to 23 rolls of microfilm that fit into part of one file drawer," Jennings said. "We also get the advantages of computer-assisted retrieval at a budget price by using equipment that is already available and carefully matching new equipment to our needs."

same time and in the same direction you do. Regardless of the direction that turns out to be.

When separate divisions within a company or a campus need to share resources, one Net/One system can be bridged to others, and to remote networks. These bridges can interconnect baseband, broadband, or Net/One systems that include both. And like vendor independence and media independence, this bridging capability is available now from Ungermann-Bass.



NOW, THE IMPORTANT DIFFERENCE BETWEEN TALKING A GREAT NETWORK AND DELIVERING ONE.

We've been installing Net/One since July of 1980. Hundreds of our systems are already out there moving information for people like Control Data, Caltech, Fairchild, ITT, RCA, Boston University, U.S. Forest Service, and Ford Aerospace.

So we can do more than talk about what you need in a local area network. We can actually deliver one, now. And we can refer you to a long list of customers who are actually using one (or two or three) now.

Let's talk about how to turn the equipment you have, now—whatever it is—into the network you want, now. And the network that can take you wherever you want to go from here. Net/One.

Ungermann-Bass, Inc., 2560 Mission College Boulevard, Santa Clara, California 95050. Telephone (408) 496-0111.

Net/One from Ungermann-Bass

quipment you have
rk you want. Now.

AIM announces speakers for May 7 meet

ARLINGTON, Va. — The Associated Information Managers (AIM) has announced speakers to address this year's annual meeting, "Coping With Chaos: Information Management in a Rapidly Changing Environment," which will be held May 7-9 at the Hyatt Regency Crystal City here.

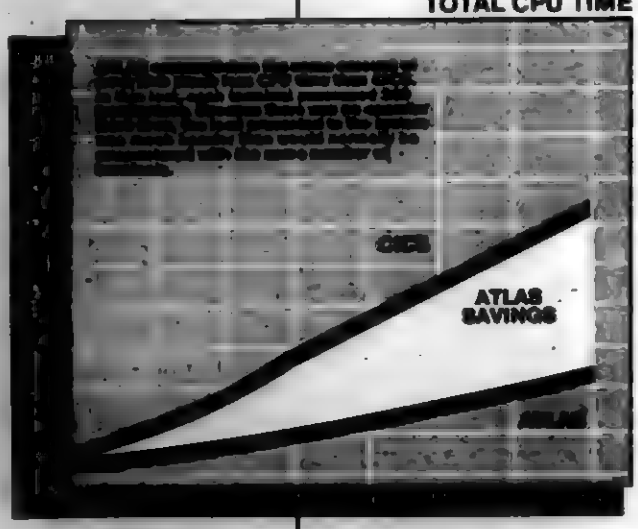
Representatives from the University of Southern California; Peat, Marwick Mitchell & Co.; Handy Associates; Blount, Inc.; King Research, Inc.; Maxima Corp.; American Equipment Lessors; Stauffer Chemical Co.; and Warner-Eddison Associates will speak.

Registration fees for the conference are $325 for members and $425 for nonmembers on or before April 2; registration fees after April 2 are $375 for members and $475 for nonmembers.

A one-day preconference program called "AIM University" will be held May 7 and will focus on implementing a business plan, managing human resources and information budgeting and evaluation. The fee for AIM University is $75 for members and $100 for nonmembers.

More information is available from Associated Information Managers, Suite 4706, 1776 E. Jefferson St., Rockville, Md. 20770.

IF YOU KNOW RAMIS II, YOU'LL UNDERSTAND WHY ATLAS™ BEATS CICS!



With the same combination of innovative technology and practical features that has made RAMIS II the leading fourth-generation language, Mathematica introduces ATLAS: a new high-performance data communications monitor.

Under test conditions, ATLAS supported eleven terminals with the same average response time as a single terminal under CICS.

CICS/VS is a registered trademark of International Business Machines Corp.

ATLAS PUTS YOU A GENERATION AHEAD

ATLAS inaugurates a whole new generation in data communications software. Because CICS and other traditional monitors were initially developed in the late 1960s and early 1970s, they incorporated functions like "pseudo-tasking" to compensate for deficiencies in the operating systems then in use. Today, those functions remain and they impose layers of overhead to burden your computer—unless you use ATLAS.

Designed for the 1980s and beyond, ATLAS is the first monitor to truly unlock the power of IBM's 4300 series computers and DOS/VSE operating system. The result is more productive application development, high reliability, and drastically reduced systems programming demands. But most of all, dramatically improved performance.

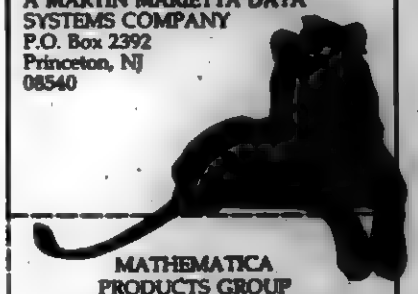
TEST ATLAS YOURSELF

In a recent test, ATLAS outperformed CICS/VS by more than 2 to 1 in both elapsed time and CPU time. And the heavier the load, the better ATLAS performed.

To find out exactly what the next generation in data communications can mean to your organization, try the ATLAS performance test on your computer. Whether you use ATLAS alone or together with RAMIS II, you will be able to support more terminals, improve response time, and get more work done in the rest of your DOS/VSE partitions.

To arrange a free trial or for more information, contact your local Mathematica office, call toll free (800) 257-5171, or return the coupon below.

MATHEMATICA PRODUCTS GROUP
A MARTIN MARIETTA DATA SYSTEMS COMPANY
P.O. Box 2392
Princeton, NJ
08540



MATHEMATICA
PRODUCTS GROUP
P.O. Box 2392, Princeton, NJ 08540

☐ I would like to try the ATLAS performance test.
☐ I would like additional ATLAS information.

Name
Title
Company
Address
City State Zip
Telephone
Computer Operating System

CW 4/9

RAMIS II AND ATLAS...THE LEADERS BY DESIGN

Boston (617) 267-9620 Chicago (312) 670-9710 Dallas (214) 788-1946 Houston (713) 850-0697 Los Angeles (213) 670-9662 New York (212) 986-9877 Princeton (609) 799-2600 San Francisco (415) 461-4315 St. Louis (314) 725-0366 Washington, DC (202) 686-5702 Basel (061) 429923 Bergen (5) 321300 Calgary (403) 290-0660 Heidelberg (06221) 14051 Hong Kong 5-435714 Johannesburg (011) 789 1888 Kingston (0509) 920-7223 London (01) 580 3681 Milan (02) 46-8080 Stockholm (8) 760780 Ottawa (613) 236-8616 Paris (1) 776 41 75 Santiago (2) 31016 Sao Paulo (11) 289-0877 Singapore 2378200 Stockholm (8) 328720 Sydney (02) 923 1677 Tel Aviv (052) 70360 Toronto (416) 671-2272

Afcom meet scheduled for May 30

LAS VEGAS — "Bridging the Gap Between Computer Operations and Systems Development" will be the topic of the keynote address at the fourth annual operations conference of the Association for Computer Operations Managers (Afcom), which will be held here May 30-June 1.

The keynote address will be given by Edward Roeske, author of *The Data Factory: Data Center Operations and Systems Development.* The conference agenda includes 11 sessions addressing areas of computer operations, such as disaster recovery planning, automated tape library systems and automated documentation.

In addition, according to Afcom, the conference will feature informal discussion groups and a trade show geared to operations concerns.

Registration fees for the fourth annual operations conference, which will be held at the Sahara Hotel, are $580 for Afcom members and $645 for all others.

More information is available from Afcom, which is located at Suite 201, 11501 Brookhurst, Garden Grove, Calif. 92640.

Meet to cover logistics software

WELLESLEY, Mass. — A conference on computer software applications in transportation and logistics management for company managers, software developers and researchers will be held here May 31-June 1 at Babson College.

Conducted by Babson's Office of Sponsored Research, the conference will provide a forum for the business, high-tech and academic communities to exchange ideas on problems related to using logistical software in management decision making.

Scheduled to speak are William McKenna of Ford Motor Co., Robert Camp of Xerox Corp., Yosef Sheffi of MIT and Stella Dafermis of Brown University.

Registration, due May 24, is $250, including meals and program materials.

More information is available from the Director of Sponsored Research, Babson College, Wellesley, Mass. 01257.

What three letters represent the most powerful on-line computer in business today?

TX

The most powerful on-line

Time was, the answer to the previous page was as easy as ABC.

But that was yesterday.

Today, the world of business computing is being introduced to a system featuring over two-and-a-half times the performance and twice the price/performance of its nearest competitor.

A versatile system. Able to compile the information of the largest corporations into a single relational data base. Instantaneously updated and fully available across the entire system.

An expandable and compatible system. Allowing the simple addition of future programs and equipment, without sacrificing past investments.

And most importantly, a system that won't let you down. Because its fault-tolerant design won't let itself down. Even if a major component fails.

This system isn't from IBM.

It's from Tandem.

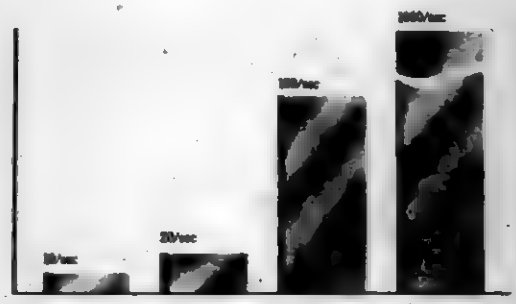
Introducing the NonStop TXP™ system.

TXP: 32-bit transaction processing.

The TXP system processes high volume loads faster and more economically than any other system. Executing over 100 transactions per second now and thousands of transactions in the near future.

It's built around multiple parallel 32-bit processors. Each addressing 16 MB of physical memory and over a gigabyte of virtual memory.

To help memory keep pace with that kind of processing, TXP pulls 64 bits on each memory access.



Our success can be summed up in a second.
Transactions per second. Numbers unsurpassed in the industry. On-line systems that fit your needs today. And tomorrow. With more processing power on the way.

The TXP system also features parallel data paths. Manipulating 32 bits of information in a single cycle, two 16-bit operations in the same cycle.

And TXP incorporates extensive pipelining, to process multiple instructions simultaneously. Each processor overlaps instructions in three levels: Fetching one, while preprocessing a second, while executing a third.

While helping TXP deliver full 32-bit power, for less.

Cache memory pays off in faster response times.

Cache memory is a high-speed data storage area between the processor and main memory. It lets the processor store more frequently used information closer. So it can get to it faster.

And our tests have shown that the TXP cache memory has a 98% "hit rate." Which means the requested data is virtually always nearby for fast access.

The result? Larger volumes of work can be processed in shorter amounts of time. Helping TXP to be even more productive.

Making cache memory pay big dividends.

A system you'll expand, not disband.

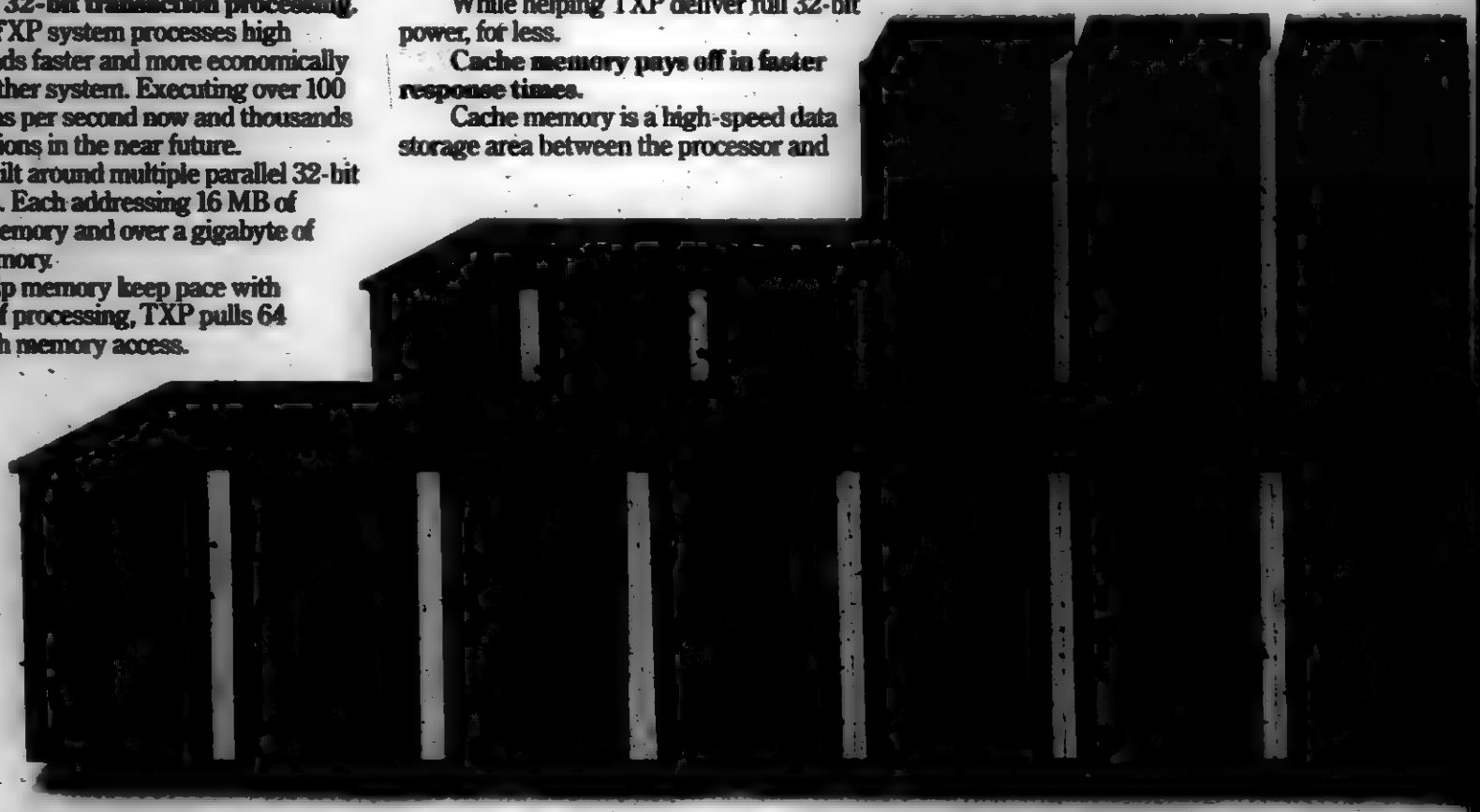
Most computer systems have very limited expandability. So if a company outgrows its computer's capacity, it usually means starting again from scratch.

Selecting and buying a larger and more expensive system.

Then reprogramming.

Then re-training.

Plus all the chaotic disruption and



XP

computer in business today.

massive loss of revenue that's unavoidable during the switch-over.

Not so with the TXP system.

It can expand from two to 16 processors. Increasing its power by a factor of eight.

That's more power than any of the largest mainframes.

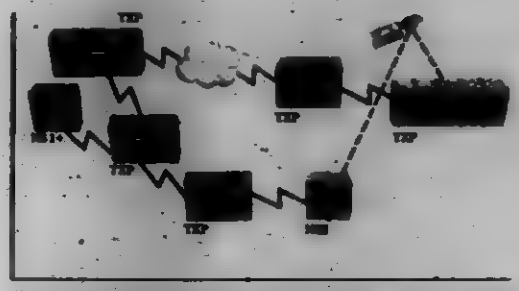
And the additional processors can be installed while TXP is running at full speed. No downtime. No reprogramming.

Still not enough power? Up to 14 TXP systems can be joined together by high-speed fiber optics. Linking the systems together as one computer with 224 processors.

But that still isn't the full potential of the TXP.

TXP systems at up to 255 sites can be joined in a worldwide network. Generating the power of over 4,000 processors.

And that gives TXP the most powerful on-line computer capacity in business.



The most powerful computer network in business today. *Users access a single unified global data base from any of thousands of terminals anywhere in the system.*

Expandability our competition wishes they could disband.

NonStop™ system compatibility from the people who started it all.

TXP can process more information and support more programs, users and devices than any other computer designed for on-line transaction processing.

Devices you most likely already have.

Even devices made by IBM.

But what if your company isn't quite ready for the TXP system's awesome power?

We suggest the Tandem NonStop II™ system. The second most powerful on-line computer in business today. The cost effective solution for medium to large corporations.

What if your company is somewhere between a Nonstop II and a TXP?

No problem. They can be combined. They can share the same data and programs. In fact, NonStop II and TXP processors can coexist in the same cabinets.

And what if your company needs even a smaller computer? We make a smaller computer. The Tandem NonStop 1+ system. Perfect for those low-volume sites where less processing power is needed.

Tandem literally wrote the book on NonStop™ transaction processing. That's because we introduced the first NonStop system.

Over eight years ago.

And for over eight straight years, despite attempts by others, we've continued to lead the industry.

Learn all about TXP, ASAP.

For complete literature, contact your local Tandem Sales Office.

Or write Tandem Computers Incorporated, 19333 Vallco Parkway, Cupertino, California 95014.

Or call us, toll-free. (800) 482-6336.

TXP is the most powerful on-line computer in business today.

Without question.

TANDEM

NonStop Transaction Processing

©1983 Tandem Computers Incorporated

Anatomy of an automation

Committee picks manufacturing control system

KENSINGTON, Conn. — You are a small manufacturer of large machine tools who is still scheduling and controlling manufacturing with pencil-and-paper methods. You know you need to automate your administrative systems. In order to improve the work flow through the factory, you are going to have to shorten lead times, reduce inventories and eliminate costly last-minute shortages.

The bottom line: You know you must install an electronic production control system right now.

But with the proliferation of minicomputers, microcomputers and mainframes, where do you turn?

To the uninitiated, the babble of bits and bytes is a language of confusion. But it is all part of the problem that faced Donald T. Benson, president of Goss & DeLeeuw Machine Co. here. Like any good executive, his solution was to form a committee, but this time the committee was different.

The committee consisted of only two people: John R. Abell, special assistant to the president and assistant secretary, and Ronald E. Kerner, a Goss & DeLeeuw toolmaker whose hobby was computers. Abell, who had 36 years' experience with the company, knew administrative requirements and manufacturing procedures intimately, and Kerner, who, while pursing his degree, had studied computer design and programming for 10 years and had built his own computer, provided the electronics background.

That balance of company experience and computer knowledge was complemented by the fact that two people working together, answering directly to the president, can accomplish more than a large group that is groping for leadership. The two have since become the company's data processing department, with Kerner moving from shop to office as DP coordinator.

"We were primarily looking for a manufacturing system. We didn't want to do any accounting at the outset," Kerner said. "We wanted a packaged, on-line, real-time interactive system that could be adapted to our company without too many changes. So while hardware was important to our decision, software was the determining factor."

One other factor was important. The two-man committee specified that both software and hardware be provided by the same vendor in order to keep the in-house DP group to a minimum. The committee recommended that the company should be willing to alter its forms and procedures to utilize the software in its present form, thereby minimizing the requirements for programmers.

Kerner drew up a flowchart showing the company's needs, and four of the 12 vendors with whom he and Abell talked had systems that could meet those needs with their own applications programs.

They determined that NCR Corp.'s Interactive Manufacturing Control System II (IMCS II) most closely fit the company's requirements. The NCR representative recommended that it be run on an NCR 8410 computer, which was the smallest and least costly of the 8400 series of computers. However, as Goss & DeLeeuw's computing needs increased, the 8410 could be upgraded with more memory and speed by adding circuit boards. Changes in the computer would be transparent to the programming.

Once the computer system was installed, the first activity was to build an inventory of all parts in stock, including data on cost, selling price and numbers, with about 7,000 active parts in stockroom inventory and several thousand in general plant inventory.

"Many of our field people knew parts by their existing numbers, so we wanted to keep them the same if possible," Abell said. "It was simple to adapt our existing part numbering system to the data processing system. We just picked them up, adding zeroes where necessary to fill them out to the five digits our program requires."

Completion of the item master file had an immediate effect on the customer service department. "We need to know parts availabilities and prices to answer the questions," said Pete Steffick, customer service manager. "When we used to get a telephone inquiry, we would run to the stockroom to check on immediate parts availability, then to the front office to

See NEEDS page 56

One of seven computer terminals on the system operated by Goss & DeLeeuw is located in the parts stockroom. The stockroom cycle counts active inventory. The most recent physical count was 99.4% accurate with the inventory report.

BECOME A VSAM EXPERT.

SysEd's new 5-day VSAM course will make you a VSAM expert. You'll not only learn how VSAM works, but *how to make it work well*, and what to do if things go wrong. Even if you're already using VSAM, you'll gain a better understanding of its capabilities and flexibility . . . like how to select among the options VSAM offers for configuring data sets, both batch and on-line.

Our hands-on case study instruction begins the very first day. You'll write and test three real-life programs and use Access Method Services on our own 4341/II computer. There are eight 3270 terminals dedicated to the class. You'll receive individual attention from our experienced teachers, and you'll want to bring your actual programming and debugging problems to class.

SysEd's VSAM course contains the most up-to-the-minute information available anywhere, including the latest features and capabilities of VSAM, and is in line with state-of-the-art hardware.

SysEd courses are held weekly and on weekends at our training centers in New York City, Chicago, San Francisco and Dallas. On-site courses at your own computer installation are also available. *Classes are limited.* For early enrollment or more information call Dave Shapiro (212) 889-3386.

SYS-ED™

ONE PARK AVENUE, NEW YORK, NY 10016 • (212) 889-3386

FAILURE TO READ THIS AD COULD BE HAZARDOUS TO YOUR WEALTH.

You already know the frustrations inherent to your job. It's time you heard about the rewards.

Your expertise has put you in a position to take advantage of an opportunity that not too many people have in their lifetime.

To be your own boss. To call your own shots. To control your own future.

And that's what we're offering you at The Software Place.

Perhaps the finest retail source of business and personal software now expanding in selected markets across the nation, The Software Place is part of a segment that analysts project will more than double in sales each year to $2.9 billion by 1988.

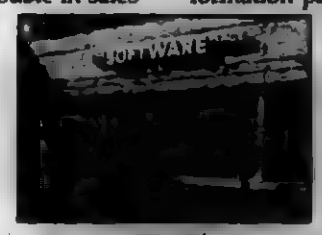
And you can be a part of it as an owner/manager of your own store.

Franchise opportunities are now available to qualified individuals with $50,000 liquid capital and the ability to obtain $110,000 additional financing.

In return, you'll receive one of the most comprehensive franchise programs in the industry. A program that analyzes your market area to determine the most advantageous site for your Software Place store and then goes on to take you through store opening and beyond. Including ongoing technical support that continues throughout the life of the store.

Give us a call. If you meet the requisites outlined in this ad, we'll send you our complete information package, including our videotaped presentation.

We think you'll find that it contains a wealth of information.



THE SOFTWARE PLACE™

8701 North MoPac Blvd, Suite 165 Austin, Texas 78759 512 343-0414

ADDS Viewpoint/Color from your point of view.

EVEN BOSSES NEED A LITTLE COLOR.

Right out of the box, the new ADDS Viewpoint/Color brings extra clarity and comprehension to any business application. Bosses like that.

They also will like the ergonomically designed detachable keyboard with its separate key cluster for numeric entry and cursor control. And the display screen which tilts from a minus 5° to a plus 15° and swivels a full 360° for comfortable viewing.

But should only a boss deserve color?

The full-featured ADDS Viewpoint/Color costs less than many monochrome terminals so there's no reason not to let color improve your communications company-wide. That makes nine good reasons to buy ADDS Viewpoint/Color terminals. Red, blue, green, yellow, cyan, magenta, white, black and price.

IT ALL ADDS UP.

ADDS
Applied Digital Data Systems Inc.
A Subsidiary of NCR Corporation
100 Marcus Blvd., Hauppauge, New York 11788

NEEDS from page 54

check prices. This all happened while the customer waited on the phone. One thing about it — all of that running around kept us in good physical shape."

Now that the inventory is available through a computer terminal on his desk, Steffick can be keying in parts numbers while he is talking to the customer. When the request is entered, the screen shows parts availabilities and prices, and Steffick can answer the customer's questions immediately.

"It saves a lot of time and effort and eliminates errors in pricing," he said. "If the system goes down, I have to go back to the old way, and I don't want to do that."

Next to go on the system were bills of materials.

"This is the critical cornerstone in our manufacturing system," Kerner said. "However, it's been a slow process getting the data base entered. Before we can enter any bill of materials, we need to clean it up — making sure all of the parts numbers are correct and all bills are properly structured and modularized."

A major problem is that almost every Goss & DeLeeuw machine is built to customer specifications; thus, almost every machine is custom designed. That means a great number of bills of materials — each with its own slight difference from the others — has to be checked and entered.

As the bills of materials are completed, the parts numbers are cross-indexed by the computer to compile a where-used listing. Now, engineers can cross-reference any parts number at any time. If the configuration of a part on any bill of materials should be changed, the engineering department can immediately check all other bills of materials in which that part is used to determine how the change affects the entire line of products. All of this information is available either on the terminal screen or on a paper printout.

Data on all of the items in the inventory and bills of materials can be retrieved by parts number. However, Kerner also has developed programming to retrieve the data by generic key words, using a natural-language program.

Automation of bills of materials has speeded machine specification for the engineering department, Kerner noted. It formerly took about one-half day to find and check out the bill of materials for a new machine order. Now, it takes 15 minutes.

Order processing, one of the earliest IMCS II modules to be installed, has been adapted to two different types of orders: parts orders, which are handled by the customer service department, and machine orders, usually handled by the office of the president.

Parts orders, when keyed into the computer, are sent to the stockroom computer terminal. When the parts are picked and packed, an acknowledgment is sent to the computer, which then prints shipping documents and labels. The day after shipment is made, the computer prints the invoices.

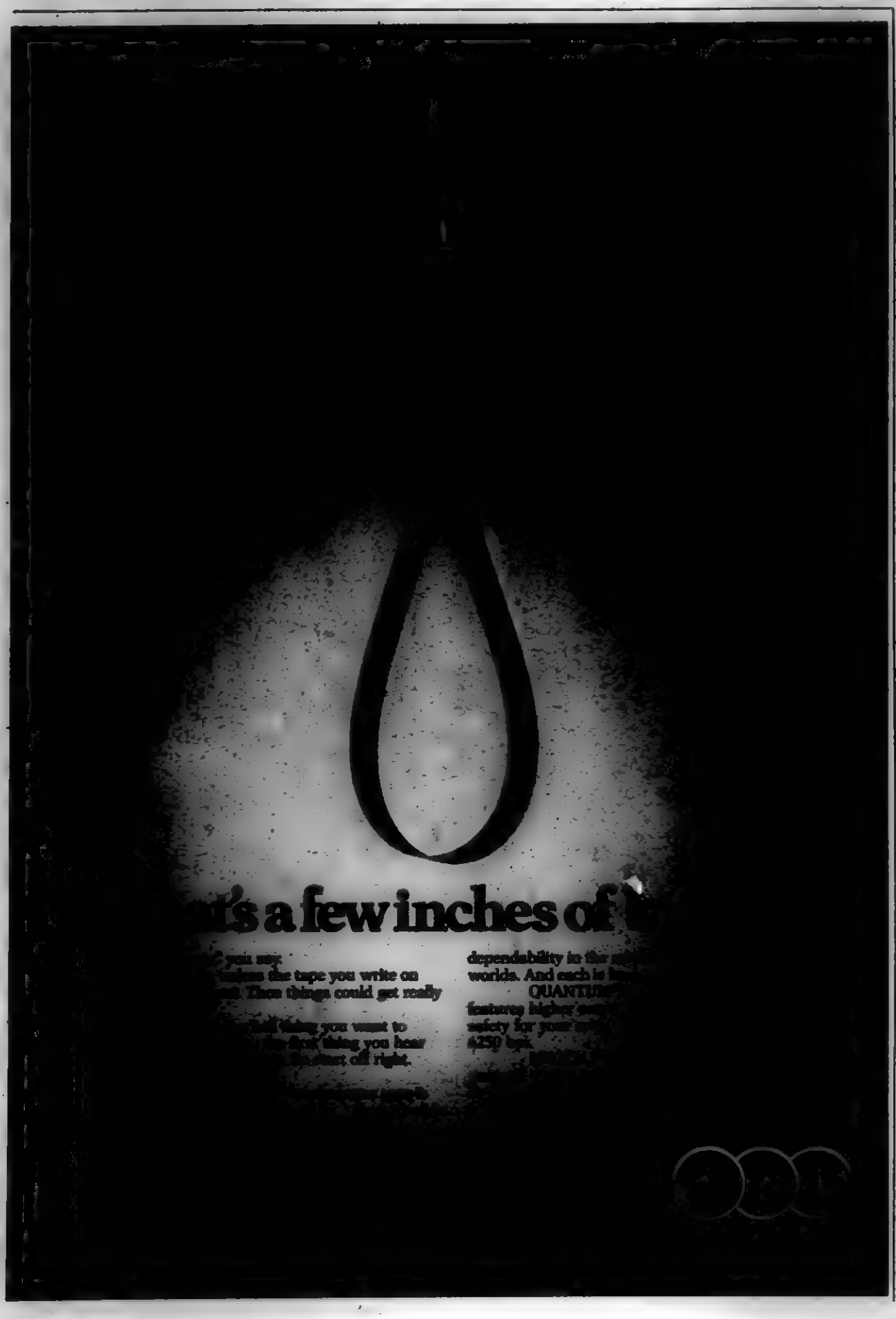
Time savings

"Because it's so automatic, the order processing program has saved huge amounts of time," Abell said. "With partial shipments, we used to type the information eight or nine times. Now, we only enter it once and let the computer do the rest."

New machine orders are configured directly from the customer's purchase order onto a computer-prepared machine specification sheet. This becomes the bill of materials for that specific customer's machine. A shop order is generated from which the computer will order parts, prepare pick lists, issue shortage lists, prepare shop orders and eventually ship and bill.

"To date, we only have three of the seven modules of IMCS II up and running," Kerner said. "Our slowdown was caused by our own need to correct and update all bills of materials."

Five terminals were originally installed for the computer system: a master terminal in the DP department, a second unit shared by customer service and engineering, a third terminal in the order entry department, a fourth in the factory production control department and the fifth unit in the stockroom. Since then, two more terminals have been added.



NEWS

Manufacturing system helps firm control growth

STOUGHTON, Mass. — Vansetti Systems, Inc., a Mass.-based high-technology firm, last fall shipped its first $200,000 laser inspector to Texas Instruments, Inc., where it is used to identify and repair solder defects in printed-circuit boards. The shipment represented years of product development for the growing firm, and the investment is already paying dividends — Vansetti's sales went from $1.7 million in 1982 to $2.6 million last year.

The company added 15 employees in 1983 and now has a payroll of 75. As much as these numbers indicate a positive future for the company, they foreshadow a problem common to rapidly expanding firms: Could Vansetti's managers control this growth?

The 15-year-old firm, located here in a 25,000-sq-ft plant, anticipated this need well in advance, and early in 1983, Vansetti hired a financial analyst to choose a computerized control system for both production and accounting requirements.

The manual reporting procedures then in use were slowing down manufacture and sale of the company's industrial temperature control devices, as well as its Laser/Inspect product, a combined laser and infrared detector that eliminates visual inspection of printed-circuit boards. Vansetti incorporates state-of-the-art infrared radiation, fiber-optic and laser technologies to manufacture these electronic controls, which range in price from $3,000 to over $200,000.

Increase efficiency

Michael Dostoomian joined Vansetti a year ago as financial analyst and systems manager with specific instructions to select a computer system that would increase the efficiency of the company's manufacturing and financial reporting operations.

After a selection process that began last fall with 14 firms, Vansetti selected the FM/3000 productivity system developed by Computer Solutions, Inc. of Burlington, Mass.

The financial, manufacturing and inventory control system combines Hewlett-Packard Co. HP 3000 minicomputers with Computer Solutions-developed productivity software.

Vansetti expects complete pay back of the $110,000 system in less than three years. "Previously, we were facing an eventual increase in our staff of at least four people at an annual cost of $60,000," he said. Dostoomian estimates that within a year two employees would have been added to the accounting department, another salesman and another person for inventory control.

He decided the best approach to automating Vansetti's production and accounting procedures was to coordinate a number of the company's operations. He reviewed each department's needs, developed a request for proposal addressing those needs and then held a tour for vendors.

Vendors submitted responses to a series of yes or no questions from each department as to whether a particular service could be provided. After reviewing the 14 proposals with various department heads, they narrowed down the list of vendors to three finalists. Before making a final decision, Vansetti officials visited a number of sites where the three systems were in use.

The software programs of FM/3000 are menu-driven and include financial and manufacturing functions, such as general ledger, accounts payable, accounts receivable, materials requirements planning and inventory control.

Noting the company's expansion of on-hand and on-order inventory, Dostoomian said control of parts inventory for the company's products is critical to on-time client delivery.

When You Need Computer Equipment Moved!

Rely On Experts

- One-Day Pick-up and Delivery
- Specially Equipped Radio Dispatched Trucks
- Competitive Rates
- Air Freight Handling
- Warehouse Facilities
- Full Insurance Coverage

Serving Southern California Since 1970

For more details, call toll-free:
(800) 821-5270
U.S. except Calif.
(800) 521-5537
California

Southern California Delivery Service Computer Transportation, Inc.
2914 E. 49th Street, Los Angeles, CA 90058

One-Two Punch!

Charles River Data Systems OEM super microcomputers just keep leapfrogging the competition. Now it's a knockout combination of operating systems: UNIX System V on one hand, and real-time UNOS on the other.

UNIX System V for Development

Derived from AT&T-licensed UNIX System V, our new UN/System V includes a full set of UNIX development tools, Bell license, Berkeley extensions, access to UNIX application programs, and support for Fortran, RM/COBOL, C, Pascal, BASIC, and Unify relational database.

UNOS for Real-Time/Run-Time

UNOS, our proprietary UNIX-compatible operating system, has real-time capabilities that UNIX can't offer. Capabilities, like eventcount synchronization, priority scheduling, and enhanced file system reliability, that are essential in industrial and scientific applications. And application programs written using UN/System V run under UNOS without modification and without a UNIX license, a saving that OEMs can pass on to customers.

Plus 32-Bit Power

UN/System V and UNOS run on our Universe 68 family of computers. They are true super micros, with a 32-bit, 12.5MHz 68000 processor, a second 68000 front-end processor, 32-bit 4Kb cache, 32-bit bus, up to 5Mb of 32-bit RAM, high-capacity disk drives, and 1.25 MIPS performance. Quantity-one OEM prices start under $10,000.

For more on UN/System V, UNOS, and Universe 68 computers, return coupon to Charles River Data Systems, 983 Concord St., Framingham, MA 01701. Or call (617) 626-1000.

☐ Send me technical information. CRM-6
☐ Have a sales representative call.
Name
Company
Address
City State ZIP
Telephone

CHARLES RIVER DATA SYSTEMS

*UNOS is a trademark of Charles River Data Systems. UNIX is a trademark of Bell Laboratories. Unify is a trademark of Unify Corporation. RM/COBOL is a trademark of Ryan McFarland.

PBX seminar set for May 2-3

NEW YORK — A two-day seminar on "Office PBXs: Crucial User Issues in Voice and Data Integration" will be held May 2-3 at the Plaza Hotel here by Probe Research, Inc.

The seminar will focus on communications standards, wiring the facility, shared tenant services and influence on industry structure.

The seminar registration fee is $795 for each attendee and $695 for each additional registrant from the same organization.

More information is available from Probe Research, Box 590, Morristown, N.J. 07960.

OA users' views topic of Syntopican XII

Scheduled for July 17-21 at Chicago's McCormick Place

CHICAGO — User viewpoints on office automation will be the focus of the Syntopican XII conference, which will be held at McCormick Place here July 17-21.

The conference, which is sponsored by the Association of Information Systems Professionals (Aisp), will have as its theme "Communicating Information: People, Systems, Networks."

According to the sponsor of the conference, the conference is designed to give attendees a closer look at the theory and practice of office automation.

During the "User Applications and Perspectives" session, Henry C. Ancona, manager of office and information systems marketing for Digital Equipment Corp., will speak on "The Payoff in OA and Personal Computing."

Ed Odisho, a senior systems analyst for the National Aeronautics and Space Administration, will moderate a panel on "Implementing Integrated Office Information Systems" at the conference.

In addition to this, a forum titled "Realizing Automation: User Views on Vendor Integration" will be moderated by Jean Green Dorsey, deputy director of MIS for the city of New York.

Three case studies in systems communications and compatibility will be presented at the Aisp-sponsored conference by Carolyn Giovannini, director of office automation for the New Jersey State Department of Community Affairs.

Registration fees for Syntopican XII are $275 for Aisp members and $350 for others.

Aisp Conference Services is located at 1015 N. York Road, Willow Grove, Pa. 19090.

CONDOR
on-line programming that reaches new heights in productivity

To get the most from your IBM mainframe, you need CONDOR – a reliable, easy-to-use, high-performance system that soars above the rest through improved programmer productivity and low resource consumption. CONDOR's highly efficient processing methods and I/O facility improve system response time and can substantially expand the capacity of your CPU while minimizing personnel requirements.

You can write and edit programs with CONDOR and submit them for compile or execution. You can view and modify data from input and output queues, release or cancel jobs, and spool output to local and remote printers.

CONDOR's built-in library management system automatically reorganizes as you process for optimum conservation of disk space. In addition to offering stringent security against unauthorized access and supporting multiple versions, it provides detailed audit reports and program cross-referencing – both batch and on-line.

Boosting productivity even more, CONDOR's own high-level interactive programming language lets you create programs and JCL in a fraction of the time required with other languages. And a powerful set of interactive utilities makes system maintenance a breeze.

CONDOR operates standalone or as a task under CICS and the other major TP monitors to give you total flexibility, and it supports DOS/VS(E) and MVS operating systems for versatility and upgrading capabilities.

No wonder respondents to a recent Datapro survey rated CONDOR tops in reliability, efficiency, ease of use, ease of installation, support, and realized financial savings.

So for a system that out-performs the others and gives you complete control of all your data processing, choose CONDOR. Call for a free trial. You'll be glad you made the right choice.

For more information contact Phoenix Computer Corporation, 11949 Jefferson Boulevard, Culver City, California 90230. Toll-free (800) 255-5049 or (213) 827-4500 in California.

CONDOR

Graphics group seeks students to help at meet

ANAHEIM, Calif. — The National Computer Graphics Association is looking for student volunteers for its annual conference, which will be held at the Anaheim Convention Center here May 13-17.

Volunteers are needed to answer phones, assist registrants, monitor sessions, deliver messages and assist with light clerical work. In return, the organization offers benefits packages that may include, depending on the amount of work performed, free registration to tutorials and technical sessions and admission to the exhibition.

More information is available from the National Computer Graphics Association, Suite 601, 8401 Arlington Blvd., Fairfax, Va. 22031.

AI symposium to begin Aug. 6 at university

AUSTIN, Texas — Artificial intelligence will be the subject of a national conference to be held here Aug. 6-10 at the University of Texas by the American Association for Artificial Intelligence (AAAI) and the university's departments of mathematics and computer sciences.

The conference will feature seminars, exhibits and panel discussions to examine the latest developments in the field.

Sessions on social, philosophical and economic issues influencing artificial intelligence in the U.S. and abroad will also be offered at the conference.

Prior to June 18, conference registration fees are $100 for AAAI members, $140 for nonmembers. Prior to July 18, registration fees are $130 for members and $165 for nonmembers.

Further information is available from AAAI, which is located at 445 Burgess Drive, Menlo Park, Calif. 94025.

NEWS

Radar parts builder goes on-line to track shop floor

EL SEGUNDO, Calif. — A Hughes Aircraft Co. radar parts manufacturing division here found it needed something better than radar to keep track of its parts.

Hughes' Radar Systems Group's manufacturing division turned to an on-line shop floor control system based on a Tandem Computers, Inc. Non Stop II system with Epic Computer Products, Inc. Data Collection Equipment terminals and controllers to provide information about each manufacturing part to be used in the production of radar systems for the U.S. armed forces F-14, F-15 and F-18 jet fighters.

The considerable task of integrating the Tandem system into the Epic data collection front end and IBM IMS data base manager was accomplished relatively quickly, according to Kenneth Dalgleish, head of user training in publications and development.

Dalgleish noted that a complete Cobol rewrite of some existing software and much new software was required to enable the Tandem system to transfer data between the shop floor and the IMS system on the existing IBM mainframe. Despite the size of the job, the Tandem Non Stop II system, with 8M bytes of main memory and 900M bytes on disk, was installed in November 1982 and was operational two months later.

Nonstop service

Dalgleish said that the automated shop floor control system is in service seven days a week, 24 hours a day, making the fault tolerance of the Tandem Non Stop architecture a critical feature of the data collection operation.

Hughes Aircraft's shop floor control system is used for several data collection applications to improve scheduling and manufacturing control. It also provides cumulative data needed for strategic planning on the IMS system in the Radar Systems Group's manufacturing division.

Dispatchers and assembly line workers can track the location of all parts throughout the factory, while managers use the data on a cumulative basis for weekly planning reports. Because information about every part in the manufacturing process — from the time a part is ordered to the time it leaves the shop — is now constantly available to shop floor people, managers are better able to prevent the production of defective parts.

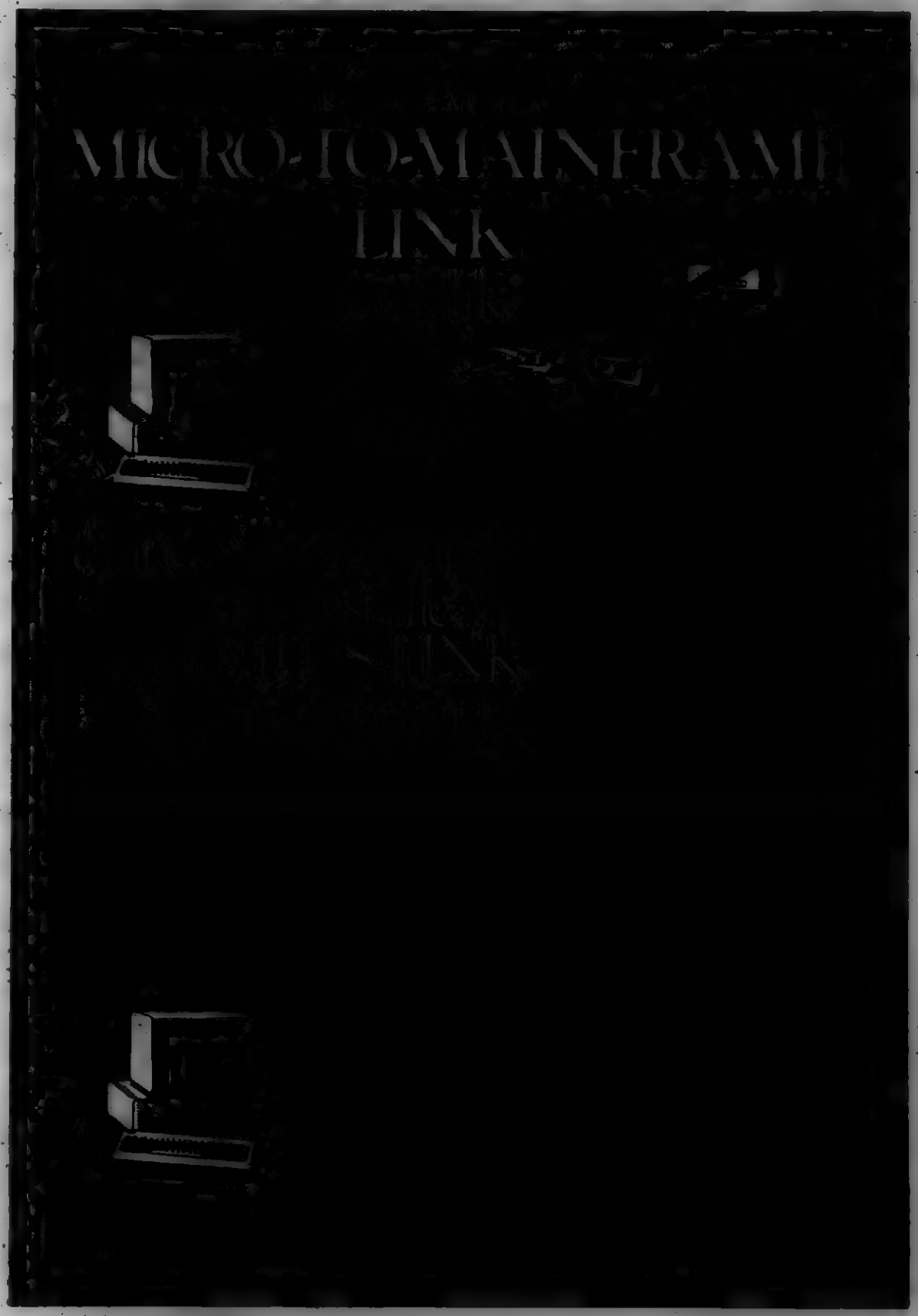
By improving the shop floor control program through increased knowledge of each part, either on the assembly line or in the fabrication process, managers also can improve the company's material requirements planning (MRP) to monitor and control the manufacturing process.

Operators who used to move parts — antennas, receivers, transmitters, power supplies or programmable computers — through the radar system production line press a function key on their terminals to access an assembly mode. Employees enter their names and the identification numbers of the parts to be moved within the factory. Using Epic's bar code wand reader, they can scan a menu of specific factory assembly locations. Information is transferred to the terminal, and the operator then physically moves the part to the desired location.

Assembly workers and dispatchers can input data into any of 90 terminals on the shop floor and then send this data through communications lines to a system control unit, which formats the transactions and forwards them to the Tandem system. The shop floor control system tracks the location of all tools on loan to the shop floor from the central warehouse. It also monitors employees' hours by scanning badges.

Because most contracts for producing radar systems are negotiated with the federal government, Hughes must record accurate information on itemized labor costs for hourly employees. Within a five-year period, the Radar Systems Group expects to integrate a network of 900 terminals to improve monitoring, quality control testing and any necessary rework to manufactured parts, Dalgleish said.

The group plans to expand the system's data communications capabilities so that the Operating Systems Department, which handles business systems applications, can send data to and receive data from the Computer-Aided Manufacturing (CAM) Department, which controls all the design and test data bases as they enter manufacturing from Radar Systems Engineering Design divisions. A second Tandem Non Stop II node currently resides in the CAM Department.



NEWS

Order processing system ties Toyota dealers worldwide

NAGOYA, Japan — Success brings problems peculiar to itself. Having gained a competitive position in the worldwide automobile market, Toyota Motor Sales U.S.A., Inc. here found that it needed to exert itself to maintain its place. With spare-parts stock levels on the increase and with an expanding worldwide customer service network, Toyota was in need of an order processing system accessible to Toyota branches and dealers throughout the world.

Major factors that Toyota's management considered were the requirement to reduce the time and cost of data captire and the need to simplify the processing of invoices. A computer-based, international order service system was needed.

Working closely with Toyota's Data Systems Department, General Electric Information Services Co. (Geisco) provided an international order service system that allows Toyota's branches on every continent to use a worldwide teleprocessing network for ordering spare parts and new vehicles directly from corporate headquarters in Japan.

Two of the companies involved are Toyota Germany, with its headquarters in Cologne, West Germany, and Ernst Frey oHG, Toyota's agent in Austria, with its head office in Vienna.

Supplies 1,000 dealers

More than 300 people work in the West German branch of Toyota, with departments for training, new vehicle marketing, customer service, administration and the central spare-parts store, which supplies spares to some 1,000 dealers located throughout West Germany. In total, 65,000 parts are held in inventory ready for immediate delivery to stores.

"Our larger authorized dealers, with their own spare-parts centers, are supplied with terminals that they use to send us the correct details when ordering spares," said Gunter Kirberg, head of operations and data processing for the West German branch. "Our own data processing department combines this information with details from our smaller dealers, and the parts needed are automatically booked out of the warehouses. Spares are dispatched the same day."

The current store's inventory is the basis on which the orders are compiled, and once the details have been entered into the local system, the orders are sent through Geisco's Mark III teleprocessing network. Ordering covers several thousand parts each month. In the other direction, order confirmations and invoices are received from Nagoya through the system.

A recent enhancement to the spares ordering system was the inclusion of new vehicle ordering. Previously, new vehicles were ordered via telefax, and advice notes from the works in Japan did not indicate the chassis numbers. Shipping notices now include the chassis numbers and are transmitted over the Mark III network. As Toyota handles about 5,000 vehicles every month, this part of the system is concerned with allocating vehicles to specific orders and entering the details on the local records.

"We now have totally accurate data handling and confirmation, and we have eliminated the errors that arose in the manual system," Kirberg said. The data is also more useful because it is more up to date, and the ordering process has also been simplified, he said.

'Useful extension'

"I think the system is a useful extension of our internal data processing resources and consider it to be especially important to the overall efficiency of our business," Kirberg concluded.

Because the spare-parts order entry system was already in use in West Germany, it was possible to expand it to include Austria without having to develop a completely new system. Frey, chief importer for Austria of Toyota and Bridgestone products, has its headquarters in Vienna and is currently the focal point for 200 appointed dealers throughout Austria.

The central stock of spares is housed in a modern, three-story warehouse, which covers an area of 48,000 square feet and holds 45,000 different items. Four thousand orders comprising some 30,000 items are handled every month. The volume of items and the amount of information involved eventually burst the seams of Frey's old ordering system.

Previous practice was to compile the proposed monthly spares order and then feed the order into the local data processing system, after which the orders themselves were airmailed to Toyota headquarters in Japan.

With the central data input and processing system in Nagoya, this meant that national organizations would receive acknowledgements and order confirmations about 12 weeks later, together with invoices, a reject list and a list of all technical modifications.

Long turnaround time

This long turnaround time on order acknowledgements was caused by the order data being sent monthly to Nagoya by mail for further processing. The information was then sent on a monthly schedule back to Vienna after additional data processing took place.

The uncertain time lag in the order scheduling and the consequent need for high stock levels led Frey to participate in the order processing system developed by Toyota and Geisco.

The orders submitted by dealers are now collected at the Vienna headquarters. The information is then entered and transmitted via the Geisco teleprocessing network to Toyota's Nagoya headquarters for further processing, with no need to send orders physically.

COMPATIBLE CRT DATAPOINT COMPATIBLE CRT DATAPOINT

A CRT COMPATIBLE WITH DATAPOINT SYSTEMS

FOR ONLY $995*

SIMPLY AMAZING!

INTRODUCING KIE-3682
THE INTELLIGENT CHOICE

Today the intelligent Datapoint® user is demanding the KIE-3682. Why?. . .Because of the performance, economy and the service. Some of the standard features of the KIE-3682 are self diagnostics upon power up, printing from the screen directly to a serial printer, and displaying all control codes passed to the terminal. The KIE-3682 recognizes all DATABUS® software commands, and also enables the user to take advantage of Datapoint's® 5 function keys. An on site service contract is available through Western Union. The KIE-3682 carries a full 12 month factory warranty.

With all of the performance, economy and service, you can see why the intelligent Datapoint® user relies on the KIE-3682. Call today for more information, and be sure to ask about our 30 day, no risk plan.

KENNEWICK INDUSTRIAL
DATA PROCESSING DIVISION

113 EAST COLUMBIA DR.
KENNEWICK, WA 99336
509/582-5156

Datapoint and DATABUS are trademarks of the Datapoint Corporation.

DATAPOINT COMPATIBLE CRT DATAPOINT COMPATIBLE CRT DATAPOINT COMPATIBLE CRT

You'll never have to begin at the beginning again.

Introducing The Masters.

The world's only series of reusable software for application program development.

The Masters are the very first—and the only—integrated series of reusable software productivity tools which support the entire applications software development cycle.

The development of the Masters is based on the fact that only 20 per cent of any given program is application-specific. Approximately 60 percent of each program is comprised of logic structures common to all programs, and the remaining 20 percent of any given program is comprised of generic—or non-application-specific—functions.

The Masters automatically generate these common program functions throughout the program's life cycle.

The result. The Masters automate up to 80% of the program development process. And cut development costs by 80% while increasing productivity by up to 400%.

Unheard of? Yes. But not for long.

Now available in the Masters series are:

PrograMaster System

The PrograMaster System exploits the fact that application program functions are repetitive. These functions are organized and easily accessible to the developer so that they may be used to produce new application software.

PrograMaster™ produces this software in structured, documented COBOL source code for IBM OS or DOS batch processing environments. PrograMaster/OL™ integrates the screen functions of PrograMaster/SG™ and builds complete source IMS DB/DC™ COBOL on-line applications. Integrating the reusable portions of systems so that the entire application can be produced from standard structured designs, logic structures, program modules and source code.

Imagine. Between 60 and 100 percent of the code needed to develop the new application is provided by the PrograMaster system. You'll receive a fully structured, documented COBOL source program. Complete and tested.

Further, program quality improves due to highly structured, efficient code. And testing new programs becomes a predictable, manageable process.

PrograMaster/SG™

PrograMaster/SG is the screen generator portion of the program. It simplifies the design and coding of screens used in on-line applications. Through a simple painting process, screens are created in minutes. Automatically.

ManageMaster™

ManageMaster gives management the control it needs with data processing. ManageMaster lets you control the libraries of both your batch and on-line systems. It updates you on changes in the programs, monitors and cross-references files, and provides an extensive documentation system of the source code library.

With ManageMaster, you have the control you need right where you need it. At your fingertips.

Add it all up and you can improve productivity 15 percent in the design phase, 100 percent in the implementation phase, and 150 percent or more in the maintenance phase.

And also give programmers and analysts the freedom to spend more time on the creative aspects of development, and give MIS and data processing managers greater control over the methods by which application programs are implemented and maintained.

There's a whole lot more we can tell you about our unique Masters series. Information that you can't afford to be without. All you have to do is fill out and mail the coupon. Or call 617-924-0052.

I never want to begin at the beginning again.
Tell me more about the Masters.

Name_____

Title_____

Company_____

Address_____

City_____

State_____ Zip_____

Mail to: Director of Sales
Master Software, Inc.
42 Pleasant Street
Watertown, MA 02172

Master Software

The world's first fully reusable software company.

PrograMaster, TM PrograMaster/OL, TM PrograMaster/SG, TM and ManageMaster™ are trademarks of Master Software, Inc.
IMS DB/DC™ is a trademark of International Business Machines Corp.

MVS training offered

NAPERVILLE, Ill. — Deltak, Inc. has introduced three training series for applications programmers, systems programmers and data processing managers who work with MVS.

"The Impact of MVS/XA," a two-course video series, covers enhancements to the MVS/SP operating system as introduced with MVS/SP Version 2 (MVS/XA) and describes four project phases for moving to MVS/XA.

The second multimedia course, "MVS/SP Catalogues," is for applications programmers, system programmers and other individuals who will be creating and updating MVS/SP catalogues.

The five-unit "MVS/SP-JES2" multimedia training course explains how to respond to hardware and software errors, prepare for and perform an initial program load, handle special IPL and system dump procedures and monitor mass storage, according to Deltak.

The courses are available for an average rental of $50 to $125 a month per course, depending on volume.

Courses also are available for purchase at $1,750 each. More information is available from Deltak, Inc., East/West Technological Center, 1751 W. Diehl Road, Naperville, Ill. 60566.

Local nets for micros subject of summer seminar in six cities

MINNEAPOLIS — "Personal Computer Local Networks," a two-day seminar sponsored by Architecture Technology Corp. here, will be held in six cities in June and July.

The seminar will discuss techniques and issues for connecting and installing networks and software, the sponsor said.

Software and important trends will also be explored, according to the sponsor.

The seminar will be held in Chicago, June 4-5; Minneapolis, June 6-7; Washington, D.C., June 13-14; San Diego, June 18-19; Boston, June 28-29; and San Francisco, July 11-12.

The seminar costs $645, the sponsor said.

Architecture Technology Corp. can be reached through P.O. Box 24344, Minneapolis, Minn. 55424.

Booklet details product entries, market changes

PENNSAUKEN, N.J. — Auerbach Publishers, Inc. has launched a newsletter, "Datagram," that will be available free of charge to subscribers of the company's *Microworld*, *Data World* and *Electronic Office* publications.

The purpose of the newsletter is to give subscribers "up-to-the-minute coverage of new products or significant changes and improvements" in the computer industry, according to a company spokesman. The six-page newsletter will be published "as often as necessary" to cover major announcements in the industry.

Datagram will include critical evaluations of hardware and software products, the spokesman said. The newsletter also can be accessed through Newsnet, Inc.'s Newsnet online information retrieval service.

More information is available from Auerbach Publishers, Inc., 6560 N. Park Drive, Pennsauken, N.J. 08109.

Handbook on local nets to be revised

MINNEAPOLIS — The 1984 revised edition of Architecture Technology Corp.'s *Localnetter Designer's Handbook* will be available in late April. The 550-page handbook will consist of local network product summaries, design issue summaries and design guidelines, along with a special section on IBM.

This year's edition of the handbook will cost $65 ($80 outside the U.S.) if ordered by March 15. Orders after that date will be priced at $77 each ($93 outside the U.S.).

The price of the 1983 edition after the discount-buying deadline was $65. The handbook is available from Architecture Technology Corp., P.O. Box 24344, Minneapolis, Minn. 55424.

A growth market.

The kids of today are the real growth market of tomorrow. They are the doctors and nurses, the engineers and scientists, the teachers and journalists, the leaders who will create tomorrow's prosperity.

It will take your company's help to assure these children a first-rate college education because today colleges are having a hard time coping with the high costs of learning.

Invest in the future of America by giving to the college of your choice.

You'll be making an investment in the leading growth market of America. And you couldn't ask for a better investment than that.

Send for our free booklet: "Guidelines – How to Develop an Effective Program of Corporate Support for Higher Education." Write CFAE, 680 Fifth Avenue, New York, NY 10019.

Invest in the future of America. Give to the college of your choice.

AID TO HIGHER EDUCATION CAMPAIGN
BUSINESS PRESS AD NO. AHE-1667-83–7" x 10" [110 Screen]
Volunteer Agency: Doyle Dane Bernbach, Inc., Volunteer Coordinator: Michael E. G. Kirby, Xerox Corp.

BP-8-83

Shrimp processor's system stresses fast turnaround

BRUNSWICK, Ga. — Between the time a shrimper hauls in his nets and the moment a chef serves a shrimp cocktail delicacy, a metamorphosis takes place in the seafood industry. Frozen seafood processors such as King Shrimp Co., based here, utilize basic process-manufacturing techniques similar to other food companies. The raw seafood is received, graded out to size, prepared, processed, packaged, frozen and stored.

Because shrimp and other seafood are more perishable than most foods, the U.S. Food and Drug Administration has set strict standards on the processing of seafood. No more than 20 minutes is allowed for seafood to remain off ice during processing. This short lead time forces King Shrimp and other food processing companies to plan for fast inventory turnaround. When a company such as King Shrimp processes 40,000 pounds of perishable seafood a day in a highly dynamic processing environment, efficient materials control is essential. The problem most food processing companies have, according to Robert M. Duncan, manufacturing resources planning (MRP) project manager for King Shrimp, is that the "commonly accepted bill of material has a foreign flavor."

King Shrimp does not manufacture discrete items into subassemblies and assemblies, as do the discrete manufacturers. Instead, as pounds of raw material flow down fixed production lines, several manufacturing processes can be performed. This means that for the bill of material to be useful to King Shrimp or any food processor, it must do more than just tie discrete items together — it must also tie processes together.

Like many companies, King Shrimp had built its automated information system piece by piece, without any long-range plan. This approach limited the ability of King Shrimp's DP department to support the continued growth of the company. An inflexible system design, untimely reporting due to batch processing and the use of an IBM System/3 Model 12 computer became serious problems.

In 1980, King Shrimp management established an organization that was responsible for overcoming these problems and providing the company with an information system to support expected growth. The project was named Oasis, for One Accurate Simple Information System.

The Oasis project team chose Martin Marietta Data Systems, Inc.'s online MAS manufacturing control system, with a Hewlett-Packard Co. HP 3000 computer as the base, for a solution called the by-product bill of materials.

The by-product bill can specify an unlimited number of output items from a production work order, regardless of the number of input components. Every task in the by-product bill of materials grades and inspects for uniformity of the seafood products; nonuniform materials for one seafood product will be processed for another product. Thus, one lot of shrimp may be processed into six by-products.

Planning for by-products makes obsolete the standard processing philosophy, "If the produced item is not what was intended, rework it or scrap it." Unlike scrap, the by-product can have a greater value than the intended primary product. To King Shrimp, the only zero-valued scrap are the shrimp shells; almost everything else is a usable, valuable by-product. In simple terms, Duncan said, the bottom-line benefit of planning for by-product materials is, "If you don't plan for them, they're a liability — if you do plan for them, they're an asset."

Employees at King Shrimp work to meet their 20-minute processing time limit.

CALENDAR

WEEK OF APRIL 22

APRIL 25-27, COLUMBUS, OHIO — Data Communications Systems. Contact: Center for Advanced Professional Education, Suite 110, 1820 E. Garry St., Santa Ana, Calif. 92705.

APRIL 25-27, SAN FRANCISCO — Data Base Management Systems: A Comparative Analysis of General-Purpose Systems. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

APRIL 25-27, BALTIMORE — Local-Area Networks. Contact: Center for Advanced Professional Education, Suite 110, 1820 E. Garry St., Santa Ana, Calif. 92705.

APRIL 25-27, BOSTON — Computer Awareness: Basic Concepts, Capabilities and Terminology. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

APRIL 25-27, NEW BRUNSWICK, N.J. — Network Communications Protocols. Contact: Center for Advanced Professional Education, Suite 110, 1820 E. Garry St., Santa Ana, Calif. 92705.

APRIL 25-27, CHICAGO — Computer Operations: Effective Production Scheduling and Control. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

APRIL 25-27, SAN FRANCISCO — Personal Computers and Networking. Contact: Center for Advanced Professional Education, Suite 110, 1820 E. Garry St., Santa Ana, Calif. 92705.

APRIL 25-27, ORLANDO, FLA. — PC Introduction. Contact: Harris Education Center, 6220 S. Orange Blossom Trail, Orlando, Fla. 32809.

APRIL 26, CLEVELAND — A Rational Approach to Relational and Decision Support Systems. Contact: Lynn Kolenich, Coopers & Lybrand, 2800 National City Center, Cleveland, Ohio 44114. Also being held April 27 in Boston.

APRIL 26-27, DENVER — Data Communications: Advanced Concepts, Products and Services. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

APRIL 26-27, SAN FRANCISCO — Computer Networks: Protocols, Standards and Capabilities. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

APRIL 26-27, BOSTON — Business Aspects of Data Communications. Contact: The American Institute for Professional Education, Carnegie Building, 100 Kings Road, Madison, N.J. 07940.

WEEK OF APRIL 29

APRIL 29-MAY 2, PHOENIX — Personal Computing: Productivity Tool for Business. Contact: Diane Testa, International Data Corp., 5 Speen St., Framingham, Mass. 01701.

APRIL 29-MAY 2, SAN FRANCISCO — The 1984 North American Society for Corporate Planning (NASCP) Conference: "From Steel to Silicon." Contact: NASCP, P.O. Box 1288, 300 Arcade Sq., Dayton, Ohio 45402.

APRIL 29-MAY 2, CLEVELAND — Association for Systems Management (ASM) Annual Conference. Contact: Richard B. McCafrey, ASM, 24587 Bagley Road, Cleveland, Ohio 44138.

APRIL 29-MAY 3, SAN DIEGO — Electronic Printing Systems/Directions in Digital Imaging Conference. Contact: Dunn Technology, Inc., 759 E. Vista Way, Vista, Calif. 92083.

APRIL 29-MAY 4, ARLINGTON, VA. — The International Society for Optical Engineering (Spie) Technical Symposium East 1984 and Instrument Exhibit. Contact: Spie, P.O. Box 10, Bellingham, Wash. 98227.

APRIL 30, PHILADELPHIA — Custom Software Systems for Rehab Facilities. Contact: Management Information Systems, National Easter Seal Society, 2023 W. Ogden Ave., Chicago, Ill. 60612.

APRIL 30, NEW YORK — Introduction to the IBM PC. Contact: Center for Advanced Data Processing, Inc., Suite 402, 450 Seventh Ave., New York, N.Y. 10123.

We wrote the book on portability. In nine different languages.

	8080/8085/Z80 CP/M MP/M II	8086/8088/8185 CP/M-86 Concurrent CP/M™	8086/8088 IBM PC DOS	8086/8088 MS DOS	MC-68000 CP/M-68K
FORTRAN-77		✓	✓	✓	TBA
C BASIC Compiler	✓	✓	✓	✓	✓
Pascal/MT+	✓	✓	✓	✓	✓
Level II COBOL	✓	✓	✓	✓	TBA
PL/I	✓	✓	✓	✓	TBA
C		✓	✓	✓	✓
Assembler Plus Tools	✓	✓	✓	✓	TBA
Access Manager	✓	✓	✓	✓	TBA
Display Manager	✓	✓	✓	✓	TBA
micro/SPF		✓	✓	✓	
COBOL Animator	✓	✓	✓	✓	TBA
Personal BASIC		✓			TBA
Dr. Logo		✓	TBA		

NEWS

APRIL 30, NEW YORK — Strategies for the Successful Acquisition and Control of Microcomputers. Contact: The Datamation Institute, Suite 415, 850 Boylston St., Chestnut Hill, Mass. 02167.

APRIL 30-MAY 1, COSTA MESA, CALIF. — Ethernet II. Contact: Center for Advanced Professional Education, Suite 110, 1820 E. Garry St., Santa Ana, Calif. 92705.

APRIL 30-MAY 1, NEW YORK — Getting the Most out of VM/VSE. Contact: Technitran, Box 10212, 72 Cummings Point Road, Stamford, Conn. 06904.

APRIL 30-MAY 2, HONOLULU — Personal Computers and Networking. Contact: Center for Advanced Professional Education, Suite 110, 1820 E. Garry St., Santa Ana, Calif. 92705.

APRIL 30-MAY 2, NEW YORK — Telecommunications Management: Equipment Planning, Selection and Use. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

APRIL 30-MAY 2, LOS ANGELES — Introduction to Telecommunications. Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

APRIL 30-MAY 4, CHICAGO — CICS Macro-Level Programming. Contact: Syscd, One Park Ave., New York, N.Y. 10016.

MAY 1, NEW YORK — Micro-PCB. Contact: Evaluation and Planning Systems, Inc., Suite 1540, 110 Plaza, New York, N.Y. 10119. Also being held May 9 in Philadelphia.

MAY 1-2, ANN ARBOR, MICH. — Telecommunications Management in the Post-Divestiture World. Contact: Marilyn Chasteen, The DMW Group, Inc., 2020 Hogback Road, Ann Arbor, Mich. 48104.

MAY 1-2, COSTA MESA, CALIF. — Implementing Voice Technology. Contact: Patti Restaino, Votan, 4487 Technology Drive, Fremont, Calif. 94538.

MAY 1-2, NEW YORK — Personal Computers: A Hands-On Experience. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

MAY 1-3, CARY, N.C. — SAS Macro Language Course. Contact: SAS Institute, Inc., P.O. Box 8000, Cary, N.C. 27511.

MAY 1-3, SAN FRANCISCO — SAS Basic Course. Contact: SAS Institute, Inc., P.O. Box 8000, Cary, N.C. 27511. Also being held May 2-4 in New York.

MAY 1-3, SALT LAKE CITY — 1984 and Beyond: Managing Change in Tomorrow's Telecommunications Environment. Contact: U.S. Telephone Association, Suite 1201, 1801 K St. N.W., Washington, D.C. 20006.

MAY 1-4, SAN DIEGO — Microprocessor Software, Hardware and Interfacing. Contact: Ruth Dordick, Integrated Computer Systems, P.O. Box 45404, 6305 Arizona Place, Los Angeles, Calif. 90045. Also being held May 15-18 in Phoenix.

MAY 1-4, ATLANTA — Structured Cobol. Contact: Advanced Technology Systems, Inc., P.O. Box 6900, Norcross, Ga. 30091.

MAY 1-4, SAN DIEGO — Defining Software Requirements, Specifications and Tests. Contact: Ruth Dordick, Integrated Computer Systems, P.O. Box 45404, 6305 Arizona Place, Los Angeles, Calif. 90045.

MAY 1-4, NEW YORK — TSO/ISPF. Contact: Syscd, One Park Ave., New York, N.Y. 10016.

MAY 1-4, SAN DIEGO — Computer Network Design and Protocols. Contact: Ruth Dordick, Integrated Computer Systems, P.O. Box 45405, 6305 Arizona Place, Los Angeles, Calif. 90045. Also being held May 15-18 in Phoenix.

MAY 1-4, SAN DIEGO — The 1984 Spring Hogan Systems Users Group. Contact: Fred Saar, First Interstate Bank of Arizona, P.O. Box 29551, Phoenix, Ariz. 85038.

MAY 1-4, WASHINGTON, D.C. — Designing with 16-Bit Micros. Contact: Ruth Dordick, Integrated Computer Systems, P.O. Box 45405, 6305 Arizona Place, Los Angeles, Calif. 90045.

MAY 1-4, LOS ANGELES — Implementing Local-Area Networks. Contact: Ruth Dordick, Integrated Computer Systems, P.O. Box 45405, 6305 Arizona Place, Los Angeles, Calif. 90045.

MAY 1-4, WASHINGTON, D.C. — Structured Design and Programming. Contact: Ruth Dordick, Integrated Computer Sys-

See page 67

To every software developer who'd written off portability as an impossible dream, Digital Research humbly announces a few monumental breakthroughs.

We not only offer languages that are portable from 8 to 16 to the 32-bit chips of the future, they're portable across all popular operating systems, too. What's more, we supply the broadest range of quality languages and development tools available today. And will tomorrow.

So rest assured. Whether you design applications at a major corporation, plan to become a major corporation or just qualify as a hobbyist, you only have to write it once.

Simply pick the Digital Research language that's right for you. From Personal BASIC™ to Digital Research FORTRAN-77.™ The newest member of our remarkable family.

To complement languages, we offer a complete workshop of development tools. Our Display Manager™ and Access Manager™ simplify the design of screen displays and data bases. So you spend less time and effort.

If you write in COBOL, our Animator™ source level debugger will get your software running in record time.

And for programmers skilled with IBM mainframe SPF, we offer micro/SPF.™ An editor that helps turn your invaluable experience into valuable new software applications.

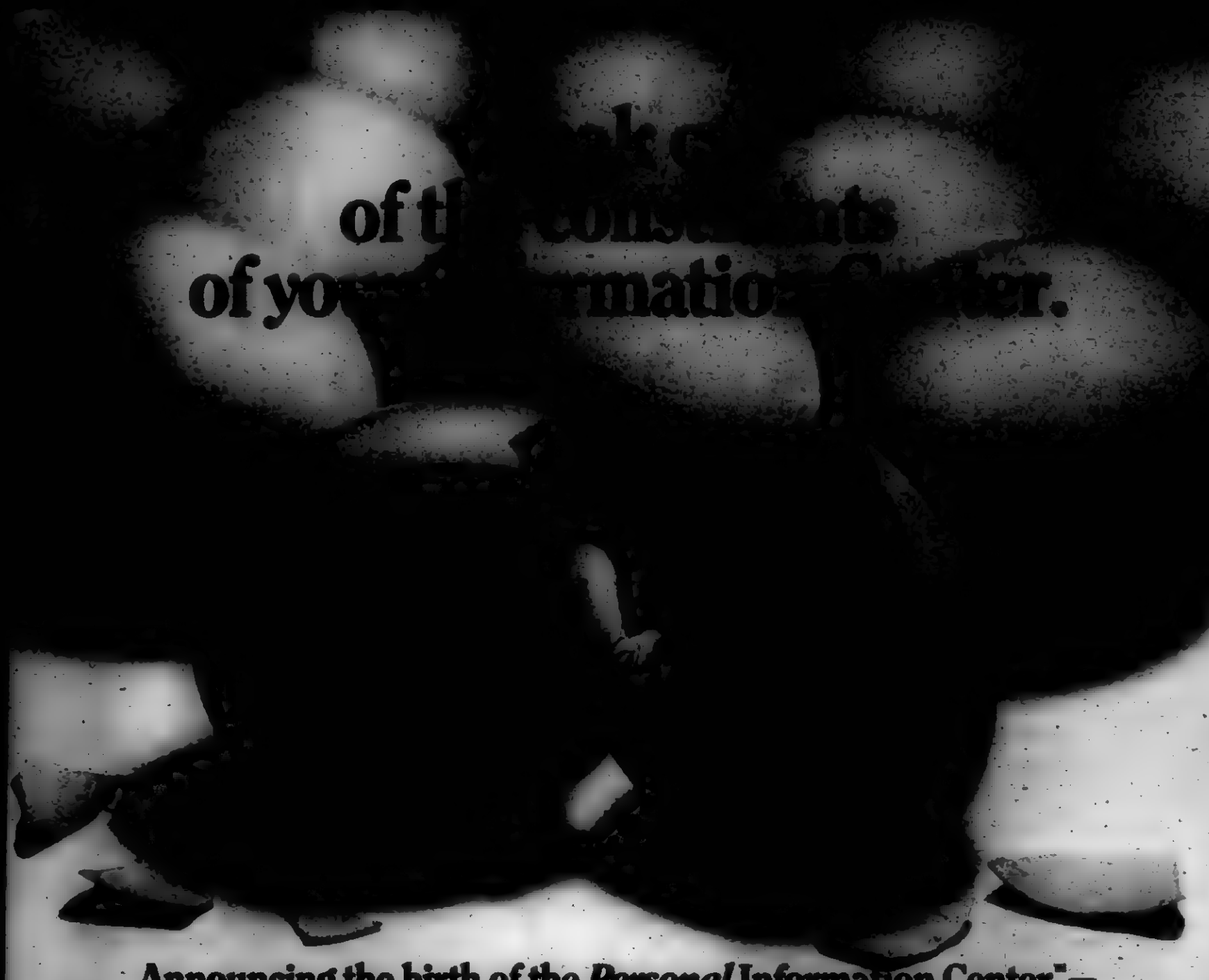
At Digital Research, we work as hard for you after the sale as we do to get the sale. With backup like quality documentation, software updates and a phone line to our technical support team.

With so much productivity and service to draw on, it's small wonder IBM chose our languages for its IBM® PC, XT and the new IBM 3270/PC.

For more information, call your IBM representative. Or, for the Digital Research retailer nearest you, call 800-227-1617, ext. 400. In California, 800-772-3545, ext. 400.

DIGITAL RESEARCH

micro/SPF is a trademark of Pfister Systems, Inc. Animator and Level II COBOL are trademarks of Micro Focus Ltd. IBM is a registered trademark of International Business Machines Corporation. The Digital Research logo and products are either trademarks or registered trademarks of Digital Research Inc. ©1984 Digital Research Inc. All rights reserved.



Announcing the birth of the *Personal* Information Center™— a new concept in intelligent data access for your company's end users. And you're invited to a FREE, half-day Seminar to learn all about this innovative *first* from Informatics.

At this free Seminar you'll see how the *Personal* Information Center can help you:

- Manage and control the confusing proliferation of hardware and software in your Information Center.
- Integrate your Information Center with today's mainstream DP and IBM® Personal Computer tools.

But that's only the beginning. At the Seminar there will be a lively discussion of such vital Information Center issues as...

- Selecting appropriate hardware and software for your users' needs.
- Offering immediate versus deferred processing.
- Using production data bases or duplicating files.
- Balancing unlimited data access with system security concerns.

The Seminar will also address the entire issue of the micro-mainframe connection, and many more topics of immediate interest to data professionals like you.

Plus, we will introduce Informatics up-to-the-minute solutions to your Information Center needs, including reporting and inquiry systems and micro-mainframe integration tools.

The *free* Personal Information Center Seminar is being offered in or near your city. But attendance is limited. So, mail the coupon or call toll free today to reserve your place at this valuable *free* Seminar.

Pre-register for the *free* Personal Information Center Seminar and get a free bonus. We'll send you a reprint of the *Computerworld* article, "The Micro/Mainframe Link," by Merritt Lutz.

Mail this coupon or call toll free...

1 800 227-3800 Ext. 911

In Canada, call collect 416 449-7100

informatics general corporation

THE SOFTWARE ENGINEERS

YES. I'd like to learn more about the Personal Information Center and how it fits my unique business strategy. And, please send me a free reprint "The Micro/Mainframe Link," Inc.

☐ Please enroll me in the free seminar. I have indicated below (check one) the city I'm most likely to attend. I understand that there is no cost or obligation.

☐ Atlanta	April 24	☐ Detroit	May 3	☐ New York	May 3
☐ Boston	May 4	☐ Houston	April 27	☐ Philadelphia	May 1
☐ Chicago	April 27	☐ Los Angeles	April 24	☐ Toronto	May 3
☐ Dallas	April 25	☐ Portland	May 9	☐ Vancouver	May 10
				☐ Washington, D.C.	May 8

☐ I cannot attend a seminar, but please send me more information on the Personal Information Center.

Name _____ Title _____

Company Name _____ Phone Number _____ (include area code)

Address _____

City _____ State _____ Zip _____

Mail this coupon to: Informatics, Free Personal Information Center Seminar, P.O. Box 1452, Canoga Park, CA 91304 CW-BE

NEWS

MAY from page 66

tems, P.O. Box 45405, 6305 Arizona Place, Los Angeles, Calif. 90045. Also being held May 15-18 in Los Angeles.

MAY 1-4, PALO ALTO — **Programming in C: A Hands-On Experience.** Contact: Ruth Dordick, Integrated Computer Systems, P.O. Box 45405, 6305 Arizona Place, Los Angeles, Calif. 90045. Also being held May 15-18 in Palo Alto, Calif.

MAY 1-4, CHERRY HILL, N.J. — **Distributed Processing, Mini and Microcomputer Implementations.** Contact: Ruth Dordick, Integrated Computer Systems, P.O. Box 45405, 6305 Arizona Place, Los Angeles, Calif. 90045. Also being held May 8-11 in Los Angeles.

MAY 2-3, ROSEMONT, ILL. — **The 1984 Computer Security Conference: Mini/Micro Computer Security.** Contact: SKK, Inc., 10400 W. Higgins Road, Rosemont, Ill. 60018.

MAY 2-3, NEW YORK — **Frost & Sullivan Conference: Networking Personal Computers.** Contact: Ginny Kania, Frost & Sullivan, 106 Fulton St., New York, N.Y. 10038.

MAY 2-3, NEW YORK — **How to Prepare a Strategic Plan for Office Automation.** Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

MAY 2-4, WASHINGTON, D.C. — **Data Base Management Systems: Concepts and Guidelines.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

MAY 2-4, WASHINGTON, D.C. — **Network Design.** Contact: Systems Technology Forum, 9000 Fern Park Drive, Burke, Va. 22015.

MAY 2-4, SAN FRANCISCO — **SAS Processing Course.** Contact: SAS Institute, Inc., P.O. Box 8000, Cary, N.C. 27511.

MAY 2-4, DEARBORN, MICH. — **Industrial Robotics, Flexible Manufacturing and Product Design for Automation Hands-On Workshop.** Contact: The University of Michigan-Dearborn, Graduate Study Center and Extension Service, 4901 Evergreen Road, Dearborn, Mich. 48128.

MAY 2-4, CHICAGO — **Project Management: A Practical Approach.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

MAY 3-4, SAN FRANCISCO — **Association of Small Systems Users Exposition (ASSU) 1984.** Contact: ASSU, William Zimmerman, Williams & Lane, Inc., 1077 Eastshore Highway, Berkeley, Calif. 94710.

MAY 3-4, SAN FRANCISCO — **Fourth-Generation Systems and Language.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

MAY 4-7, LAS VEGAS — **Society of Telecommunications Consultants 1984 Spring Conference.** Contact: Society of Telecommunications Consultants, Suite 1410, One Rockefeller Plaza, New York, N.Y. 10020.

MAY 5-6, CHICAGO — **CICS Command-Level Intensive.** Contact: Syscd, One Park Ave., New York, N.Y. 10016.

WEEK OF MAY 6

MAY 6-8, MONTEREY, CALIF. — **Document-Based Optical Mass-Memory Systems.** Contact: Institute for Graphic Communication, 375 Commonwealth Ave., Boston, Mass. 02115.

MAY 6-9, TAMPA, FLA. — **Communications Expo 1984.** Contact: Latcom, Inc., 4135 Laguna St., Coral Gables, Fla. 33146.

MAY 7, CHICAGO — **Dbase II.** Contact: Software Institute of America, 8 Windsor St., Andover, Mass. 01810.

MAY 7-8, BOSTON — **Computer Networks: Protocols, Standards and Compatibility.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

MAY 7-8, WASHINGTON, D.C. — **Satellite Technology Seminar.** Contact: Vicki Schellase, Phillips Publishing, Inc., Suite 1200N, 7315 Wisconsin Ave., Bethesda, Md. 20814.

MAY 7-9, PARSIPPANY, N.J. — **Vsam in Cobol.** Contact: Chubb Institute, P.O. Box 342, 3 Sylvan Way, Parsippany, N.J. 07054.

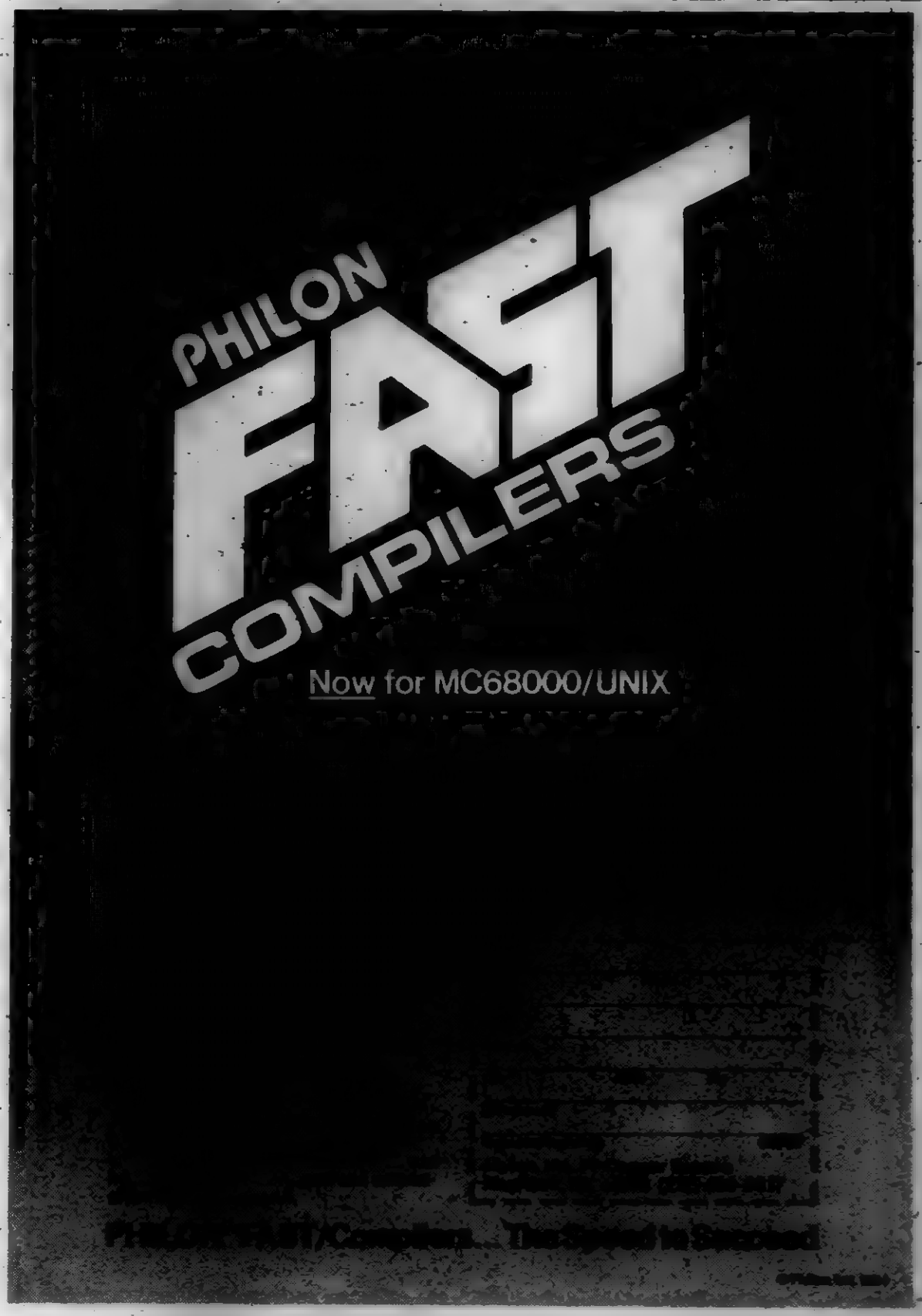
Uptime

Provide 24 hour CICS access

CICS Dynamic File Allocation is a must for effective CICS scheduling. It is the gateway to non-stop, round-the-clock CICS systems. It eliminates batch update constraints. It guarantees bullet proof restarts. It allows you and your batch jobs to add and remove CICS files at will, without disrupting your user community.

NETEC

Netec International, Inc.
P.O. Box 19539 • Dallas, TX 75219
214 224-2948 • Telex 80-4294



EDITORIAL

Political football out of bounds

The political football known as export control was kicked out of bounds by President Reagan's recent order giving the U.S. Department of Defense selective export license review of high-technology shipments to many of our allies [CW, April 2].

National security interests notwithstanding, that sort of control clearly should not reside in the hands of military strategists. In this case, the proper bureau is the U.S. Department of Commerce or, because of the poor job Commerce has done in this area in the past, the U.S. Customs Service.

The military will take too parochial a view in deciding the propriety of export license applications, likely assuming a conservative posture that does not always recognize the legitimate concerns and needs of U.S. manufacturers, not to mention the needs of our allies. Defense has in the past demonstrated a knack for ignoring such legitimate concerns. Consider, for example, 1981, when it stonewalled efforts of U.S. manufacturers to sell pipeline equipment to the Soviets for a line that would carry oil to Western Europe.

But the real problem at hand is not direct Defense intervention into trade matters. The real problem is congressional policy or, to be more specific, its absence. In this year, as in other election years, Congress remains a house conveniently divided on several key issues, one being the renewal of the Export Administration Act, which governs exportation of potentially strategic products and materials.

In effect, the president has seized an opportunity presented by the ongoing differences between the House and Senate to ensure that sensitive U.S. high technology stays out of the hands of the Eastern bloc. The president, no doubt, garnered more support for his order with several recent arrests of individuals trying to smuggle computers and computer-making equipment into the East.

Computerworld has always maintained that shipments of computers that can be plugged into military applications should be restricted. But shipments to whom? Our allies? And who or what agency should decide what needs to be restricted?

By this Friday, April 13, the House and Senate are supposed to hammer out the differences between their versions of the Export Administration Act. The compromise — if, indeed, one is reached (the Export Administration Act expired last September) — must somehow straddle the fine line between protection of our technology and protection of our commercial interests.

Both the House and Senate versions of the Export Administration Act recognize that it is futile to place strict export controls on goods that are readily available from non-U.S. sources. But a key difference between the two bills is the Senate's inclusion of a greater Defense role in the review of export licenses.

Not only will congressional passage of this feature lead to more costly delays for license approvals, but it will also place too much control in the wrong hands. Defense's track record in matters such as these speaks for itself.

LETTERS

Cartoon is entertaining, but it places Fortune under wrong light

The cartoon alongside the article "Reorganization seen way of life for micro makers" [CW, Feb. 13], featuring a crocodile ascending toward five computer companies, is entertaining but, at least in one significant sense, incorrect.

Fortune Systems Corp. does not belong in the group of hapless, soon-to-be-devoured computer companies any more than any of the most established companies in the business does. We at Fortune do not spend our days outrunning creditors for several good reasons. To begin with, there is little company debt. As of Dec. 31, we had over $53 million in our bank accounts, and we have adopted a strongly conservative fiscal policy at the company.

In addition, Fortune is committed to a strong product program and currently assigns over 15% of annual revenues to research and development of our products. Our customer base is solid and growing fast.

We understand that the perception of Fortune's misfortunes has in recent months outrun the reality of the situation, and we are correcting those impressions.

We seem to be succeeding in correcting the impressions: Industry analysts and the trade press are now seeing the error of including Fortune as a member of the unlucky group.

James S. Campbell
President
Fortune Systems Corp.

Computerworld welcomes letters from its readers. Preference will be given to typed, double-spaced letters of 150 words or less; they may be edited for the purposes of clarity and brevity.

Letters should be addressed to Editor, Computerworld, Box 880, 375 Cochituate Road, Framingham, Mass. 01701.

COMPUTERWORLD

Editor: John C. Wilmarth
Executive Editor: Rita Shaw
Managing Editor: Bill Laberis
Assistant Managing Editor: Cheryl M. Gallo

Senior Editors: Software: Paul Gillin; Communications: John Dix, Phil Hirsch; Systems: Tom Henkel; Microcomputers: Eric Bender; Industry: Peter Bonish; Features: George Hayes; Design Editor: Marjorie Magowan; International Editor: Susan Blakeney; Associate Features Editor: Barbara Van Scoyoc; Assistant Features Editor: Elizabeth Morse; Special Reports Editor: Donovan White

Staff Writers: James Connolly, John Gallant, Lynn Haber, Patricia Keefe, Paul Korzeniowski, David Olmos, Edward Warner

Correspondents: New York: David Myers, Suite 7G, 401 East 60th St., New York, N.Y. 10021, 212/570-2135; Washington, D.C. Bureau Chief: Jules Kirchner, Correspondent: Bryan Wilkins, 445 National Press Building, 529 14th St., N.W., Washington, D.C. 20045, 202/347-5718; West Coast Bureau Chief: Jeffry Beeler, Correspondent: Robert Batt, 1060 Marsh Rd., Menlo Park, Calif. 94025, 415/328-6084

Chief Copy Editor: Kathie Gow
Assistant Chief Copy Editor: Charlotte Zirnis
Copy Editors: Becky Batcha, Dave Bouffard, Bruce Crane, Deborah Fickling, Deborah Scadutto-Horn, Thomas Schmidt
Assistant to the Editor: June Fellig
Editorial Assistants: Lorraine Brien, Mary DeCristoforo

Joyce Furia
Contributors: Education: J. Daniel Couger; Human Computing: Jack Stone; Transnational Wire: Larry Long; Microcomputers: Thomas Madron; The Data Center: John P. Murray; Local on Software: Charles P. Lecht
Special Publications: Computerworld Extra!: George Hamer, Editor; Computerworld on Communications: Bruce Hoard, Editor; Computerworld Oil: Ann Dooley, Editor; Computerworld Buyer's Guides: Marcia Blumenthal, Editor

Main Editorial Office: Box 880, 375 Cochituate Road, Framingham, MA 01701 617/879-0700

Computerworld is a member of the CW Communications/inc. group, the world's largest publisher of computer-related information. The group publishes 52 computer publications in 19 major countries. Nine million people read one or more of the group's publications each month. Members of the group include: Argentina's *Computerworld Argentina*; Australia's *Australia Computerworld, Australian Micro Computerworld, Australian PC World and Directories*; Brazil's *Datalndusa and MicroMundo*; China's *China Computerworld*; Denmark's *Computerworld Denmark and MicroMarket*; Finland's *Mikro*; France's *Le Monde Informatique, Golden (Apple) and CPC (IBM)*; Germany's *Computerwoche, Microcomputerwelt, PC Welt, Software Markt, CW Edition/Service, Computer Business and Commodore Magazine*; Italy's *Computerworld Italia*; Japan's *Computerworld Japan and Focus Comwlrld*; Mexico's *Computerworld Mexico and CompuMundo*; Netherland's *Computerworld Benelux and MicroWorld*; Norway's *Computerworld Norge and MikroData*; Saudi Arabia's *Saudi Computerworld*; Singapore's *The Asian Computerworld*; Spain's *Computerworld Espana and Micro Sistemas*; Sweden's *ComputerSweden, Mikro Datam and Att Hemdator*; the UK's *Computer Management and Computer Business Europe*; the U.S.' *Computerworld, Hot CoCo, In-Cider, InfoWorld, Jr., MacWorld, MICRO MARKETWORLD, Microcomputing, PC World, PC Jr. World, Run, 73 Magazine and 80 Micro.*

VIEWPOINT

MIS and a state-of-the-art environment

THE DATA CENTER
John P. Murray

The use of available technology, both hardware and software, to snowplow MIS concerns, the installation and subsequent aggressive use of data base management systems, of fourth-generation programming languages and information centers are not only valid concepts, they are necessary if MIS is to realize its potential.

While the benefits that can be obtained from the effective, aggressive use of state-of-the-art technology are many, moving to that environment and maintaining that environment are time-consuming, frustrating and, of course, expensive propositions.

In spite of these considerations, the continuous pursuit of a state-of-the-art environment is not only a most desirable goal, but also a necessary one. The eventual success or failure of the organization may rest upon the determination of the organization's MIS management to move to and then to maintain the state-of-the-art environment.

Indeed, in some organizations, this will be a massive task; in some organizations, it may be too late to make the transition successfully. It is hard to say what the future holds for such organizations, but difficult times are bound to be ahead.

These situations are usually the result of failure in several areas. Organizations do not overnight fall into situations in which they become captives of obsolete technology and practices. They come to such circumstances as a result of indifference and neglect on the part of MIS management and, to varying degrees, the organization's senior management.

MIS managers should be criticized for failure to move the organization to a state-of-the-art environment, but senior management must also accept some of the responsibility, particularly in those instances in which they have been indifferent to the needs and the potential of MIS. MIS must work to build a state-of-the-art case; senior management should listen and should support the effort.

Sooner or later, the issue of the expense associated with the development of the state of the art will arise. Moving to a state-of-the-art MIS environment is not and probably never will be inexpensive. However, there are options available, some of which are less expensive than others. It is as true with these considerations as it is with anything else that while in most cases you get no more than what you are willing to pay for, you can, as a number of organizations have discovered, get much less than you pay for. So use caution when considering the various options.

The process of movement to a state-of-the-art environment should begin with the development of a plan that assesses the current level of information processing technology within the organization and then lays out a course to reach the desired state-of-the-art level. The most ambitious, practical plan is the one that should be pushed. However, lower cost contingency plans should also be developed for consideration in the event cost becomes a paramount issue.

Employers working through Nova . . . have cut their costs dramatically. . . . Also, feedback from the employers to the college helps make the academic program more responsive to the needs of the workplace.

The best approach is to press for the ultimate plan; if that cannot be attained, go for the next level.

Beginning with the assumption that the best solution will not be approved is not a positive method to use to gain a state-of-the-art position; you never know what will happen until you try. MIS should press for whatever plan it feels is best for the organization. Cost should be a secondary issue if the results justify the expense.

The proposed state-of-the-art plan that is presented to the organization's senior management should be as comprehensive as possible. The plan must be realistic. The goals identified in the plan must be attainable. The plan itself should be developed on a phased basis; everything cannot be done at once. The use of a phased approach will reduce the pressure, and it will also help spread the cost over a longer term.

The temptation to engage in game playing, not to own up to all the known costs because of a fear of rejection, must be resisted. Of course, as progress is made, as the technology changes, unanticipated costs may arise. Such costs can be dealt with as they arise. The practice of hiding or ignoring known costs is not the way to sell the state-of-the-art venture.

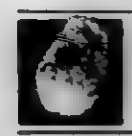
There is a definite advantage to developing the state-of-the-art plan in a comprehensive, factual manner and in addressing the issue of expense at the onset. As progress is made, the issue of the cost is almost certain to arise. Being able to go back to the original plan to demonstrate that these costs were considered and included and that the issue of cost has been handled in a candid and consistent manner not only helps increase the MIS manager's comfort level, but also adds to the credibility of MIS.

MIS management must become aware of the urgency of bringing its organization to a reasonable state-of-the-art status. It must do the best it can to impress upon senior management the correctness of such an effort. In addition, the issue of the funding of the effort must be addressed. The ultimate decision, of course, rests with senior management. That decision must be made with full knowledge of the probable costs involved.

Considering the vast number of organizations that have little in the way of state-of-the-art processing and have no plans to do anything, this is an issue that will gain increasing attention in the future. The potential in many organizations is great; those who have responsibility for the information processing function should act now to get the effort under way. The funding of the effort must be addressed and resolved so the work can begin. ‡

Murray is director of management information services for Bayovac Corp., Madison, Wis., and author of Management Information Systems as a Corporate Resource, *published by Dow Jones-Irwin.*

Work/study course nurtures budding DPers



HUMAN CONNECTION
Jack Stone

Information processing centers are rapidly becoming recruitment nightmares, if not reaching a crisis level. Experienced professionals cost an arm and a leg, and there is no guarantee they will easily integrate into the current teams after coming on board. Combing campuses for juniors is very expensive, as is the inevitable follow-up training, and all too frequently, the recruitees are rejected after the trial period. The process tends to put a drain on resources, especially on the patience of the senior DP staff. There has to be a better way.

One approach that seems to be working well is that taken by Northern Virginia Community College (Nova), Alexandria, Va., where cooperative education programs in data processing — perhaps better known as work/study — operate in full swing at each of its five campuses.

The basic idea behind the program is the integration of academic work with on-the-job training. However, Nova has to an exceptional degree refined the concept:

- The college refers candidates for entry-level positions ranging from systems analysts to systems programmers and from data base managers to programmer/operators.
- The college prepares its students with a basic understanding and skills in all major programming languages.
- Various education patterns are offered: two students taking turns in a single full-time position; one student in part-time employment and part-time college; and a combination of the two.

Many advantages accrue to employers who participate with the college. For one thing, a continuous supply of temporary employees is available, most of whom can qualify for permanent status. In fact, a high percentage of students has been offered and has accepted full-time work with participating employers. Moreover, the employer can select employment candidates whose educational backgrounds meet specific requirements.

Employers working through Nova . . . have cut their costs dramatically. . . . Also, feedback from the employers to the college helps make the academic program more responsive to the needs of the workplace.

Employers working through Nova, rather than handling recruitment and training on their own, have cut their costs dramatically, because Nova handles the initial recruitment and training and refers candidates only after careful screening. Also, feedback from the employers to the college helps make the academic program more responsive to the needs of the workplace.

One of the major reasons for the success of the program is that employers must make a strong, but not unreasonable, commitment. They must recognize that the on-the-job segment of the program is intended to meet educational goals primarily and business goals secondarily. As a consequence, the employer must provide job experiences whose goals are closely coordinated with those of the academic program. To help assure the commitment, a program coordinator from the employer's staff is assigned the responsibility for student supervision and evaluation. In addition, the student must receive a salary commensurate with others in similar situations who perform similar tasks.

Nova presented a survey with impressive data: recruitment yield, that is, persons hired vs. those offered jobs, was 13 times greater for cooperative education students than for recent college graduates. Employers rated work performance of cooperative education students about comparable to that of college graduates, yet recruitment costs were about one-tenth as much. ‡

THE WAY SOME TERMINALS TAKE OVER AN OFFICE, YOU'D THINK THEY OWNED IT.

Of course, you can't blame the display terminals themselves for being big and overbearing. Most were designed to work in the not-so-crowded office of the past.

Today, things are different. You've got a lot more people and a lot more work stations. But not a lot more room.

That's exactly why we created our unassuming little 1700 monochrome display.

The 1700 couldn't crowd a person's desk if it wanted to. Its footprint is a tiny 13 x 12 inches (24% smaller than our biggest competitor's 3178).

The unassuming ITT Courier 1700 display.

Its keyboard is smaller, too—to give your operators extra elbow room.

And its smaller price gives relief to an upper management constantly being squeezed into financial corners.

Yet, even with its tiny price, our 1700 has some immensely valuable features.

Things like a high-resolution screen just as readable as a full-size 3270 screen. Diagnostics to save you troubleshooting time. Plus a head that tilts and swivels for the best possible viewing angle.

Still, the most valuable feature of our 1700 display is the small impact it has on a person's desk. And, in today's office, that can be a big comfort.

Contact your nearest ITT Courier Representative. Or call the ITT Courier Sales Support Department at 1-800-528-1400, toll-free.

ITT
COURIER

VIEWPOINT

Implementing contingency disaster/recovery planning

READER'S PLATFORM
Alvin Arnal

In relatively few years, the phrase "contingency disaster/recovery planning" has acquired a meaning in information processing center management. Security and disaster planning personnel and departments have increased in number at an almost phenomenal rate during the past few years. Although in many instances contingency disaster/recovery planners hardly embrace all the things that are required to be done, contingency disaster/recovery planning has so implanted itself in people's minds that it seems to be recognized by officials in industry and government as an acceptable requirement and as a necessity of everyday business.

Yet with all the recognition and acceptance of the necessity to protect vital records and computer systems, management pays little but lip service to the implementation of a contingency disaster/recovery program.

The nature of computer systems and installations varies substantially between companies and government agencies. The organization structure, and the management charter under which the computer operation and utilization operates, has an important influence on the types of security and data protection programs that are undertaken. Furthermore, the procedures and operating personnel have a direct effect on limiting or increasing the degree of complexity of the security and disaster planning activity.

What exactly is the field of contingency disaster/recovery planning? Where does it fit into the total picture of computer operations and information processing? Who is responsible for the concept, organization, design and implementation of the plan and for monitoring the plan? What does the person responsible for the program do?

First, contingency disaster/recovery planning is a top-down/bottom-up responsibility. The development of a program requires substantial support on all levels of management, that is, recognition of the problem; provision of the economic and physical resources that will enable the project to be undertaken and followed through to a conclusion; and maintenance support in monitoring and testing the plan at reasonable intervals.

Why should management be concerned about the continuity of operation of a data processing center? The answer is dependency, total and complete dependency on the capability of computer operations to perform continuously to provide daily information processing in virtually every phase of business activity — the very survival of our modern corporate structures and governmental operations dedicated to our national security. What company or government agency can return to manual operations?

Management must be involved in deciding, doing and evaluating the things to be done to protect this vital asset.

'At-risk' posture

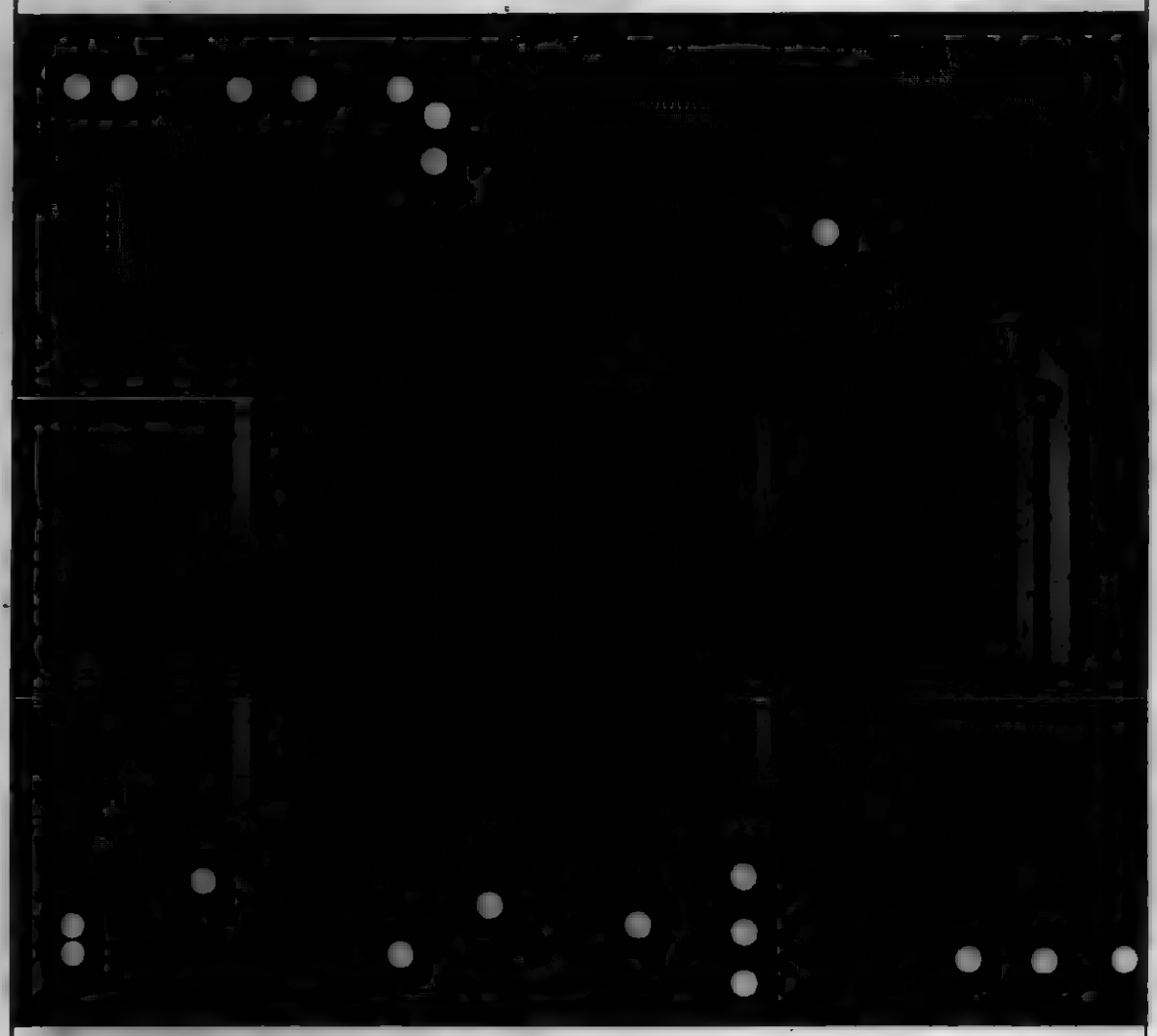
Disasters, natural or man-made, pervade the computer installation every hour of every day. What executive in today's modern business environment will accept the risk of losing his company's data base or operating system? If executives and government officials accept the fact that computer operations are the core of their survival, then why, with the capability of doing something about its protection, do they continue to accept an "at-risk posture?"

There is no magic formula or potion that, once applied, will insulate critical and sensitive computer systems from disaster. Yet it is possible to provide for, implement and manage a system that will eliminate or mitigate the potential hazards and vulnerability or, in the event of a catastrophe, provide for recovery within a reasonable and acceptable period without jeopardizing the survival of the company.

Some guidelines for contingency planning are:

- **What must be done.** This includes planning, management policy-making, establishing work objectives, identifying all user departments and operations and determining necessary servicing goals of various departments.
- **When it must be done.** Contingency planning should be done immediately. Establish the critical requirements, list and review priorities, and see that they conform to management's needs. Then program the results.
- **Who must do it.** Management must delegate authority and coordinate the work being performed. Establish the functional relationships between user departments.
- **How is the job to be done.** Develop all of the parameters, systems, procedures, methods, qualitative goals and standards.
- **What is needed to do the job.** Management must apply its efforts and financial and personal resources

TIME



Making yourself memorable.

You don't have to be a giant in the industry to attain a leadership position. Just having your name among the leaders can make a noticeable difference.

Your advertising presence in TIME Magazine can do more than gain you the attention and interest of the business community. It can position you among the major companies who already know the value of reaching greater numbers of purchasing influentials with greater visibility.

TIME's audience offers you both selectivity and reach – with the right demographic and geographic patterns for increasing your share of market as well as building awareness within the business and financial communities, and among your dealers. Being in the world's foremost news magazine puts you in the main arena. And TIME has specific demographic and geographic editions to accommodate your budget and implement your marketing strategy.

Your reputation is probably the most important element in your continued growth. Now that you're making a name for yourself in the industry, perhaps it's time to make more of your name.

To learn more about how you can use TIME and its various editions, call Charles Craig at (212) 841-2831.

TIME

Get more out of it.

©1984 Time Inc.

VIEWPOINT

to ensure a satisfactory conclusion to the project.

■ Get the job done. Procrastination is a company's worst enemy. If all of the above is implemented, the time, effort and financial resources must be applied immediately.

■ Does what has been done make sense. Is the plan that is developed practical? Can it be implemented?

■ Is the plan complete. Can the plan be tested? Will it work?

■ Can the plan be improved. Can the plan be modified in any significant way?

■ Management must support the plan on a continual basis. The plan must get support throughout its development and after it is completed.

Approaching contingency disaster/recovery planning is no different from any other business planning activity. It involves the analysis of corporate policies, procedures, requirements, forms and equipment applied to the protection, security and maintenance of continuity of the data processing or information system.

Other corporate functions — production, marketing, finance, purchasing, industrial relations, employee protection and safety — all have objectives, and the objectives lead to plans.

Then why not contingency disaster/recovery planning for the very heart and soul of the company?

Evolutionary nature

Contingency disaster/recovery systems and plans are evolutionary in nature. As the system changes, expands and decentralizes, so does the need for new concepts and new approaches.

In light of the revolutionary nature of the computer industry, contingency disaster/recovery planning works on the system function itself and its evolutionary cycle.

The first phase of contingency disaster/recovery planning should start the day the first piece of DP equipment enters the administrative planning and control scene.

At that moment, management should recognize and introduce the planning and controls necessary to protect this precious environment. Unfortunately, management is sometimes more anxious to play with this environment than to determine how it could be hurt by it.

The second phase occurs when the corporate user community determines that it could benefit from this multifaceted benefactor. Again, sometimes the toy-like aspect of it all, rather than procedures planning and forward thinking on an organizational level, becomes important; possible future problems are overlooked or ignored.

As the enterprise continues to grow, organizing the procedures to solve the problems becomes more complex. The consequence is the constant increase in DP demands without attendance to the potential vulnerability of the system. As often happens in such a situation, the work loan increases, diminishing the availability of time on the part of operating supervisors and managers to address themselves to the growing problem. The decision is to abandon even a part-time planning procedure in favor of no planning at all.

The third cycle of abandonment comes at a time when it is important to enter the fourth phase — procrastination — in favor of establishing and applying company economic and personnel resources to expand the DP operation.

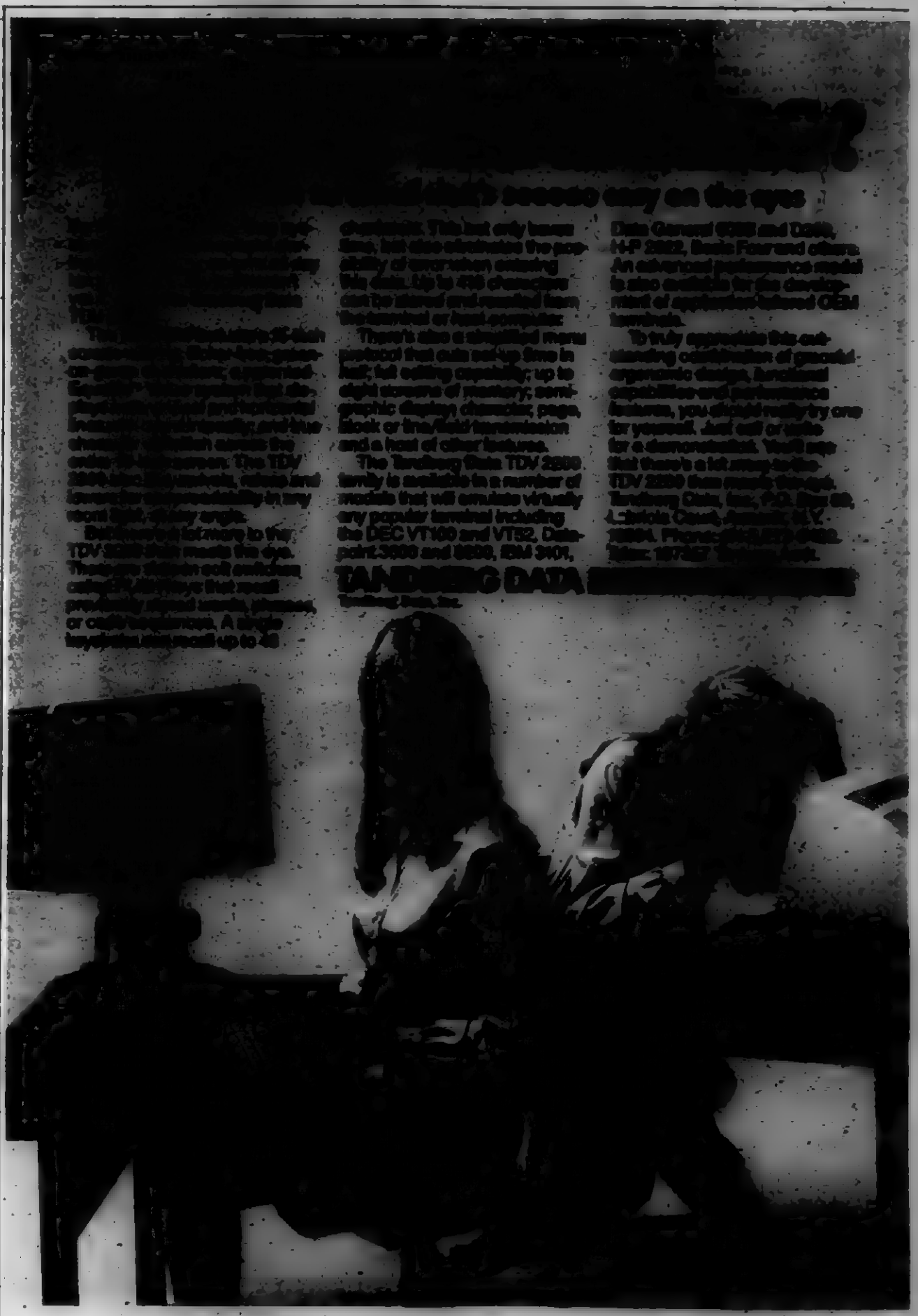
The final cycle is then set in place: the introduction of outside consultants. Again, issues of vulnerability are ignored.

The long-range information handling system plan can be achieved by applying new equipment and new technology to the solution of the data processing operation.

But the planning and design of improved MIS and data processing operations cannot be considered solely in terms of equipment, technology and mathematical techniques.

There is no alternative to not improving a company's information system. But management must address itself to the issues that will protect, secure, preserve and maintain the continuity of DP and corporate operations. ‡

Arnett is president of Dialog Consultants, a division of Vault Management Corp., located in Garden City, N.Y.



VIEWPOINT

Mumps 1983 needs second look

READER'S PLATFORM
Charles Volkstorf

Standard Mumps, a general-purpose programming language, is undergoing its five-year American National Standards Institute (Ansi) revision. As a member of the canvas list, I am responsible for voting on the acceptance of the new standard, titled Draft Ansi X11.1-1983.

Since Mumps' original standardization in 1977, the Mumps Development Committee has taken two polls (in 1977 and 1980) of Mumps users and vendors. Both polls showed that the top two deficiencies of Mumps are a lack of parameter passing and block structuring. Parameter passing allows programmers to interface independently written programs without concern for variable name conflicts. Block structuring allows one to declare and access sections of code in a modular fashion. Both capabilities are almost universally available in other programming languages. Mumps 1983 includes neither.

Altogether, 14 changes were made to Mumps. Ten are simple conveniences, and two others round out the language's capabilities. The other two changes to Mumps, $ORDER and SET $PIECE, are significant additions to the language.

Nonnegative integers

Subscripts (keys to direct-access files) in 1977 Mumps are nonnegative integers (0,1,2,3, . . .). $NEXT is used to read all records with given subscript values. A value of -1 indicates the end of file. Mumps 1983 allows free-text subscripts, which would include -1. To detect the end of file, a new function, $ORDER, has been added, which performs the same functions as $NEXT, but with the empty string (zero length) as the end-of-file indicator.

Having two features that perform almost the same function confuses the issue. The existing function, $NEXT, is discarded as deadwood, while a new function, $ORDER, "is strongly encouraged in place of $NEXT." It would be simpler to use $NEXT as is. How to do this best depends on what subscripts are allowed to occur.

Here the Mumps Development Committee is inconsistent. Page I-20 refers to "negative numeric subscript values," while Page III-2 states that subscripts are "nonnegative only." In practice, negative subscripts (keys) are rarely used. Furthermore, if ever needed, they can be avoided by adding a large number to the value to convert it to a positive number before using it as a subscript. The Mumps Development Committee already limits subscripts to no more than 31 printable characters. Negative subscripts could likewise be disallowed.

Without negative subscripts, we could use $NEXT as is. We could also allow the empty string to be a subscript. Then we could compile free-text field value statistics without having to make a special check for the empty string. Programmers sometimes overlook this until the program aborts when the empty string is first encountered.

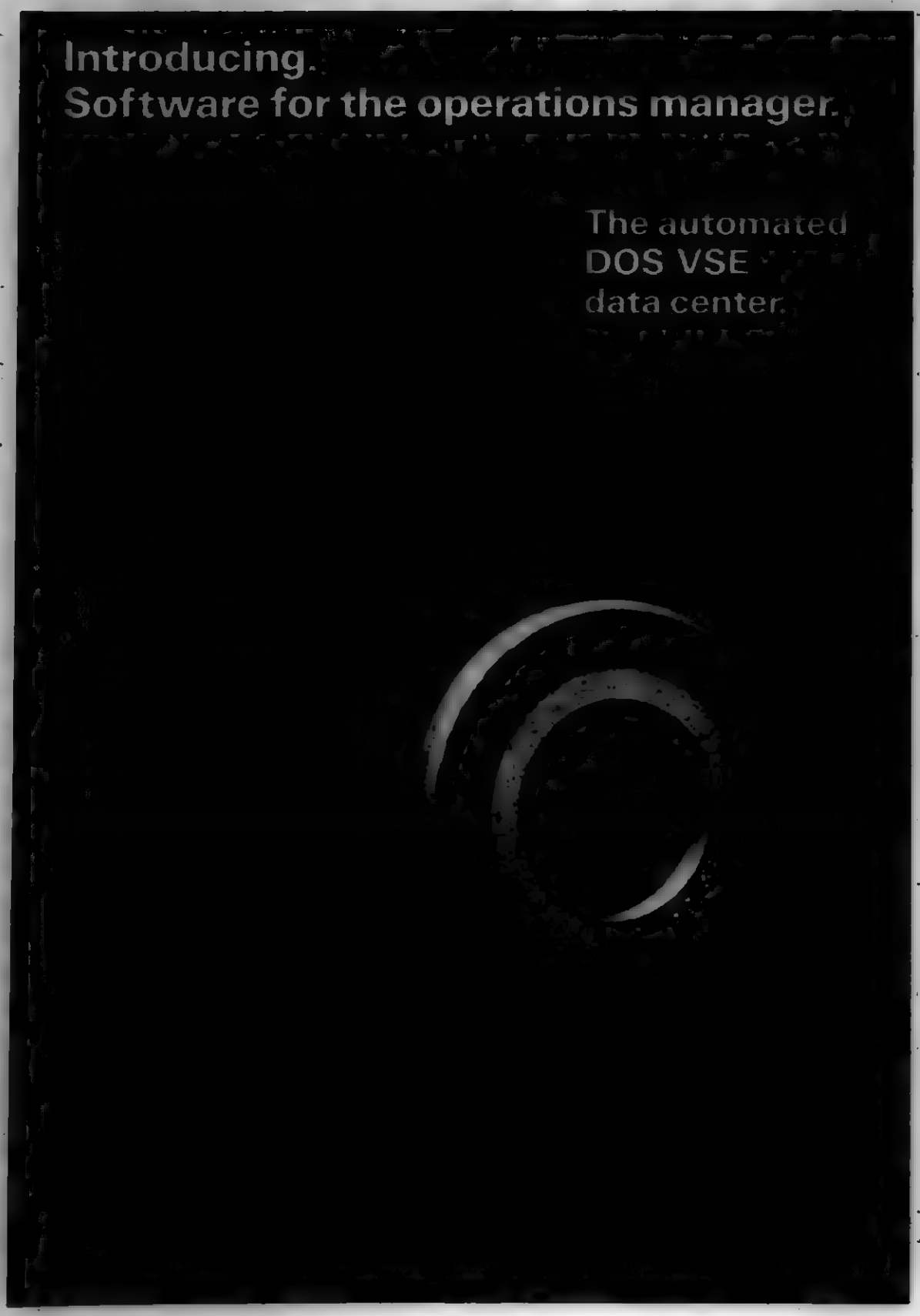
The subscript ordering scheme could also be better defined. Currently, the order is: empty string, numbers, other strings. The empty string could remain with the other strings to simplify the order: numbers, other strings.

If we do allow negative subscripts, we can still continue to use $NEXT as is. $NEXT is not actually ambiguous. When we reach -1, if the prior subscript precedes -1 and -1 is a defined subscript, then we have reached subscript -1. Otherwise, we have reached the end of file.

Alternately, we could declare, with a new command, that the end-of-file indicator for $NEXT is the empty string. We would do this just once, at the beginning of any application package, and use $NEXT throughout instead of $ORDER.

Mumps allows multiple fields to be concatenated together into one value so that they may be stored and retrieved in one file access. To allow us to change easily a single field stored this way, the syntax SET $PIECE has been introduced. However, it uses functions and arguments in a manner that does not occur anywhere else in Mumps. It is very legible because it is in the Cobol style of having an arbitrary sequence of reserved words and expressions for each construct. However, Mumps consists of a small set of well-chosen functions and operators that can be combined to perform complex operations.

The capabilities of SET $PIECE can be provided with a normal Mumps function that returns the new value after one field is changed. Simply adding another argument to $PIECE would accomplish this. This would be more general than SET $PIECE, as we could use this function in conjunction with the existing functions and operators. We could even pad fields with arbitrary characters. In 1977, the representative from Massachusetts General Hospital in Boston (where Mumps originated) identified two uses for alternate padding values: "a string of dashes" and



VIEWPOINT

"a string of alternating dashes and spaces."

This would also generally be more efficient in terms of disks. Typically, the user identifies an item, then enters new values for one or more of its fields. In this case, SET $PIECE retrieves the existing fields, alters one, then stores them back into the file. A new function would determine the new value, then store it into the file, making only one file reference instead of two.

Furthermore, SET $PIECE specifies that references to files that are not defined will use an empty string for their value. This principle is useful in tallying statistics in which the first occurrence of a value is assumed to have a total of zero without initializing it beforehand. However, SET $PIECE is changing a single field value. If the file entry is missing, it will initialize all other field values to empty strings. It should abort and be fixed.

Shorter expressions

Many of the changes to Mumps debated by the Mumps Development Committee serve only to shorten frequently used expressions.

Rather than shrinking the syntax of each reference to concatenation or $PIECE, we can make Mumps even more concise and efficient by combining multiple occurrences of these operations into one. A new function, for example, $KONCATENATE, could concatenate its arguments together. Similarly, allowing multiple piece (field) numbers in $PIECE would allow us to move several fields at once into individual program variables. (Both the piece numbers and variable names could be separated by, say, a dollar sign.) We would then be manipulating sets of values, which mathematicians call "tuples."

We could also use tuples to retrieve an interval of subscripts from a file. Then we could move sets of field values back and forth between files, local arrays and individual program variables. Using the Mumps FOR loop, we could cycle through these values, providing another solution to the $NEXT/$ORDER problem. Using the WRITE command, programmers could examine selected local arrays.

This would encourage programmers to use sets of variable names, such as NAME, DR and DEPT, rather than array references, such as P(1), P(2) and P(3), which are now easier to use, but harder to understand.

What other sets would make useful tuples? We can answer this by examining loops in existing programs to determine what sets of values programmers manipulate. To do so, I wrote a Mumps program to list out every loop in a given program and ran it against two major systems. Altogether, 414,365 characters were examined, containing 2,038 loops, one loop per 203 characters of code. These loops were manually classified. A total of 10 types of loops were detected: reads (36%), file subscripts (24%), sequential lists (13%), local array subscripts (12%), fixed sets of values (3%), string pieces (3%), sequential search (3%), fixed numeric intervals (2%), from/to intervals (1%) and individual characters (1%).

The Mumps FOR loop handles 26% of these, while the tuple proposal handles 36%, leaving the 38% READ loops.

A READ loop performs no initializing or incrementing. It only reads a value from a terminal, repeating until no more input is entered. The Mumps QUIT command terminates a FOR loop, so all we need is a FOR with no argument to loop until we QUIT, due to there being no more input. Then all 10 types of loops could be easily represented without using GOTO.

The WHILE command is useful in eliminating the GOTO command in such structured languages as Algol and Pascal. However, it eliminates only the GOTO. We still must initialize, increment and check for the end of the loop. The tuple construct, in contrast, performs all of these chores for the programmer.

It is also the case that the algorithms and data structures being utilized in a number of popular implementations of Mumps could be improved.

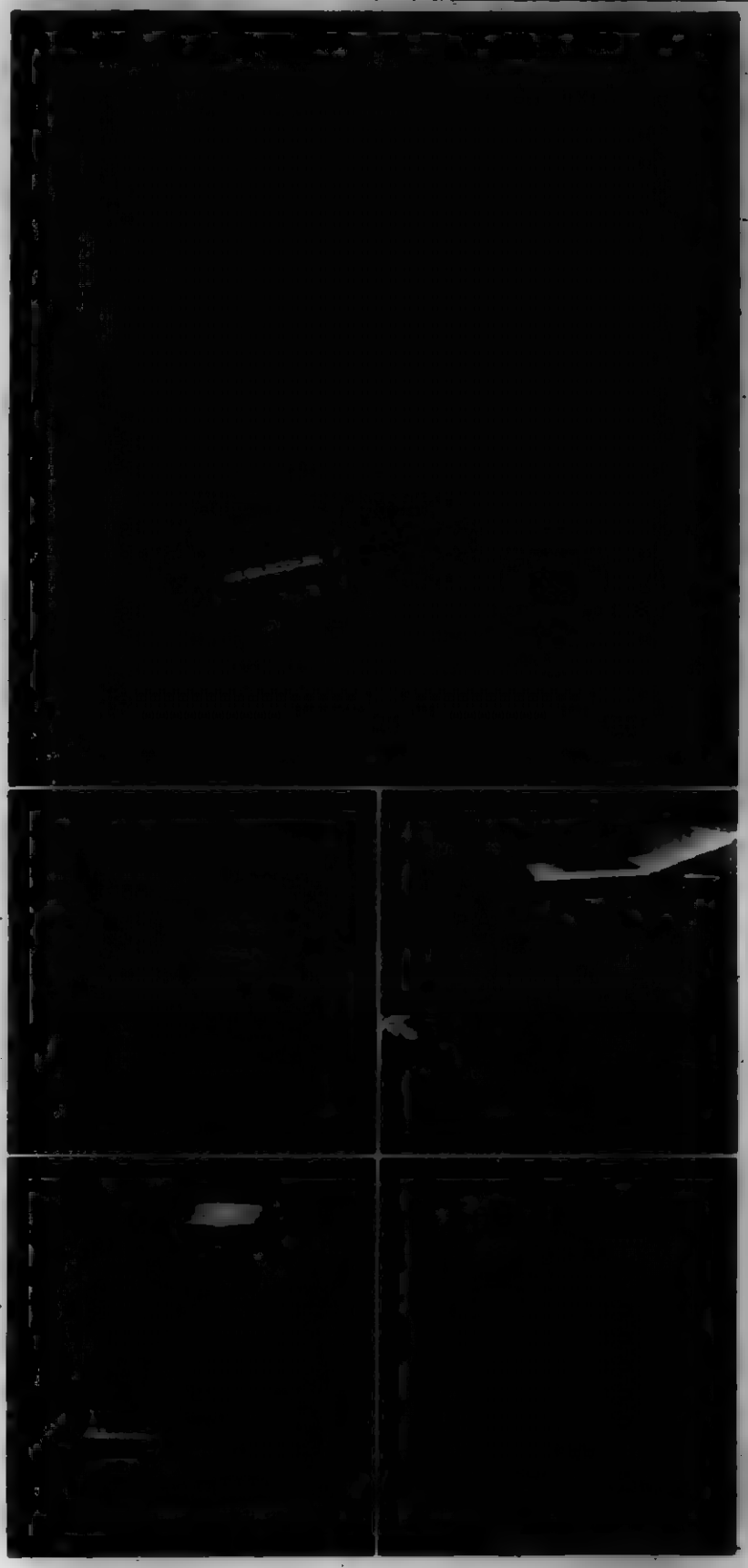
Integer subscripts (72% of all subscripts, by my own tally) could be stored two digits per byte, instead of one. A disk set should process independently of the program initiating it to allow the program to continue simultaneously. The disk queue should be processed in the order of the blocks on the disk, rather than in the random order in which the requests occur, to eliminate most of the seek time. Each disk drive should have its own queue to allow all drives to be active simultaneously. Mumps should be totally compiled, except for the .6% that is execution and indirection, rather than semicompiling all of it.

A thorough examination of 1977 Mumps, 1983 Mumps and the deliberations of the Mumps Development Committee shows the following:

- The top concerns of users and vendors, parameter passing and block structuring, are still missing from 1983 Mumps.
- For the changes being made to Mumps, alternate approaches that are simpler, more general and more efficient should be considered.
- The document itself (Draft Ansi X11.1-1983) should be examined closely for inconsistencies and erroneous definitions. Examples of each Mumps construct and the intended result should be given to rectify ambiguities and implementors' misinterpretations.

It is clear that the proposed revision to Mumps should be withdrawn and further studied. ‡

Volkstorf is vice-president of Computational Policy, Inc. in Boston.



The $745 Freedom™ 200. No other advanced VDT gives you more, for less.

The Freedom 200 gives you more user-relevant functions and optimized ergonomic features than any other advanced VDT. You get 106 keys, clustered for maximum user efficiency.

Plus 47 programmable keys (94 functions available with shift) for a host of applications.

Plus 11 cursor control keys, including tab by word for easy editing.

Plus TeleVideo® 950 and Lear Siegler ADM 31 emulation.

Plus user-definable scrolling regions, with selectable smooth scroll rates.

Plus split-screen capability.

Plus 128 ASCII characters, with 86 extended graphic characters for sophisticated screen creation.

Plus non-embedded attributes (both visual and data entry).

Plus double-high/double-wide characters.

Plus flexible non-volatile set-up modes, full page or status line, to easily configure your terminal exactly the way you want it.

Plus programmable answerback message for enhanced security.

Plus programmable screen time-out, to prolong the life of your screen.

Plus an amber screen option.

Plus easy serviceability and space for add-on boards.

Plus 8 foreign character sets.

Plus two pages of standard memory in emulation modes in addition to one-page memory in native mode with additional memory optional.

Plus a six-month warranty and comprehensive third-party service.

Plus more.

To find out more, contact your local Liberty dealer or distributor.

Or call Liberty direct. (415) 543-7000.

No other VDT gives you more, for less.

See us at COMDEX in Atlanta. Booth 3432, West Hall.

LIBERTY

© 1984 Liberty Electronics.

TeleVideo 950 is a trademark of TeleVideo Systems, Inc. ADM 31 is a trademark of Lear Siegler, Inc.

VIEWPOINT

Personal computers changing perception of office work

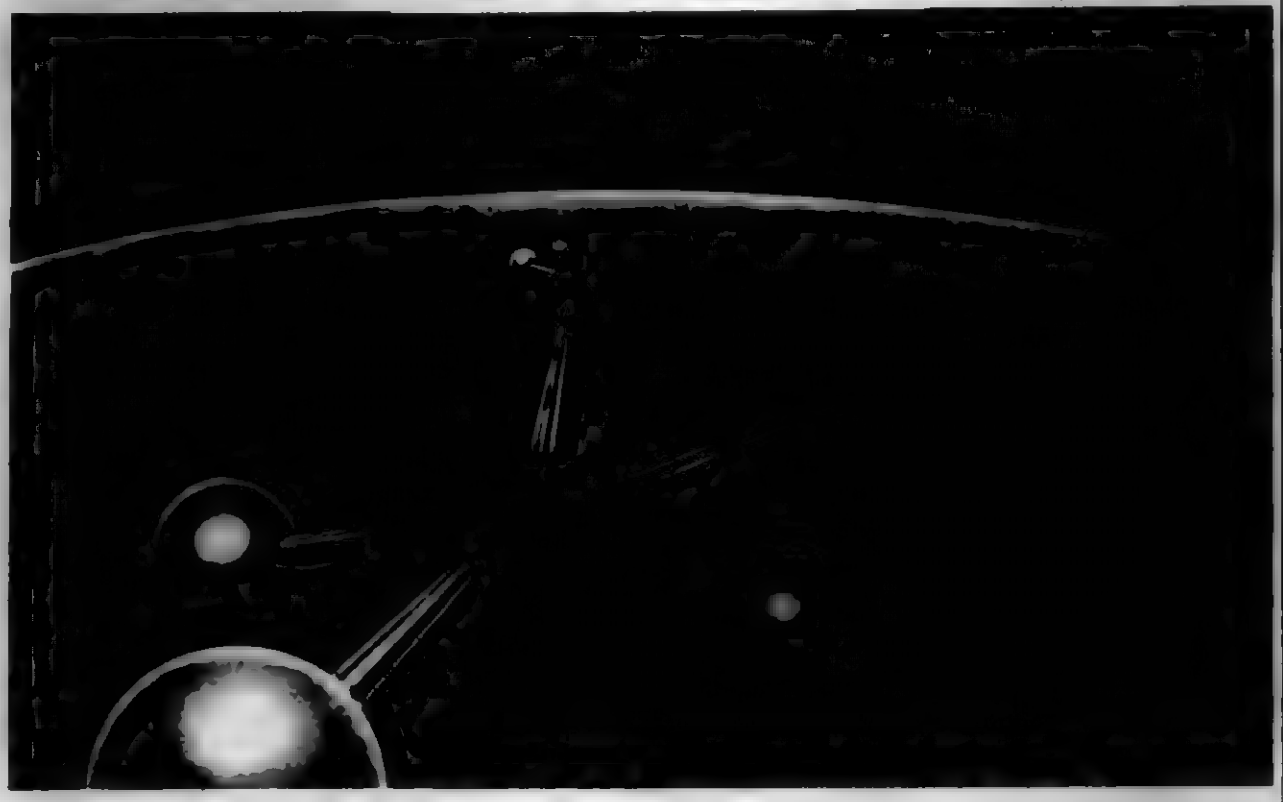
LETTERS

The remarks made by David Kearns, in the article "OA efforts lack focus, Xerox chief charges" [CW, Feb. 27], reminded me of that classic headline: "Pot calls kettle black."

Office automation vendors and their customers have found it mutually advantageous to preserve the conventional notion of the office as a place where people handle information. Both sides have benefited from limiting changes to a succession of modest improvements in discrete aids for paper-oriented and manpower-dependent office functions. Buyers of OA have thus been enabled to maintain or expand their work force — the traditional measure of power and prestige. Sellers have been able to build an apparently reliable long-term market for their products. This situation seems unlikely to persist much longer, however.

Personal computers, especially in their portable form, are changing the perception and the performance of what is usually classified as office work. People, paper, place, procedures, communications and information assume different priorities and relationships in the new working arrangements that are beginning to evolve. Such an environment demands the design and assembly of customised systems that are readily adaptable to changes in personnel and goals. How long before this reformulation of practices has a significant impact on the current approach to OA? The answer depends on whether established producers and users elect to resist change or promote it.

Brian Leibert-Francis
Falls Church, Va.



Statistical Multiplexers From Paradyne

Paradyne's series of Intelligent Networking Multiplexers is now a family of network solutions. With User Switching and Auto Rerouting, hundreds, even thousands of your employees and customers can depend on your network.

User Switching For Efficient Communications. To be productive you need computer resources. User Switching provides a way for users to tap into the variety of your company's resources, regardless of where those computer resources are in the network. Paradyne's DCX multiplexers find the most efficient communications path to each computer.

Auto Rerouting Means Increased Productivity. Auto rerouting maintains the connection to the computer and insures user productivity in the face of degraded telco lines. When a link fails, DCX automatically looks for alternate routes in the network to reroute communications traffic, insuring continued productivity.

Advanced Networking Diagnostics. Paradyne offers the most advanced networking diagnostics in today's market. Both data and controls can be viewed to and from any channel in the network. Problems at a remote site can be isolated and diagnosed through DCX, quickly and easily.

Productivity and Efficiency. Another Paradyne systems solution. If you would like to know more about Paradyne's Series of Intelligent Networking Multiplexers call **1-800-482-3333**. We'll answer your questions and give you the location of the Paradyne sales office nearest you.

DCX 815...four or eight channels. **DCX 825**...four to 32 channels. **DCX 840**...240 channel data networking exchange. **DCX 850**...240 channel intelligent networking processor. **DCX 861**...four or eight channel statistical multiplexer with an integrated 9,600 bps modem. **DCX 871**...four to 32 channels with integrated 9,600 bps modem. And **Paradyne's NEW T1 Multiplexer**...combining the channel capacity of T1 facilities with the versatility and networking capabilities of the DCX product line.

Meeting the Communications Challenge of the 80's

paradyne

Paradyne Corporation P.O. Box 1347
8550 Ulmerton Road, Largo, FL 33540

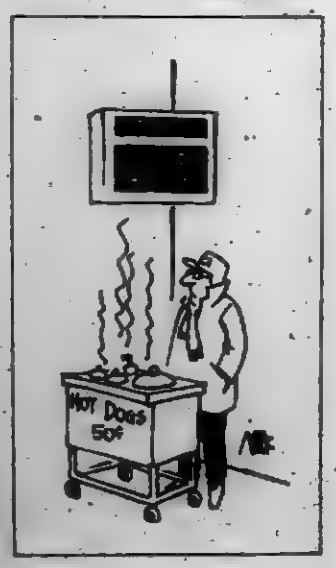
Solution already given

The article "The problem you may not know you have" [CW, Feb. 13] on the programming problems that will be encountered in the year 2000 stated that the issue has attracted little industry attention. However, an excellent solution to the problem appeared less than two years ago in *Computerworld* itself.

In a letter published in *Computerworld's* Sept. 27, 1982 issue, Richard L. Conner suggested using an absolute date in data base files that could easily be converted to month/day/year format when the date is to be displayed or printed. The two conversion algorithms discussed by Conner were written in Fortran by H.F. Fliegel and T.C. Van Flandern and were published in the October 1968 issue of *Communications of the Association for Computing Machinery*. This absolute or serial method of reckoning dates is widely known to astronomers, especially those specializing in celestial mechanics and time determination (one of the authors, Van Flandern, is on the staff of the U.S. Naval Observatory in Washington, D.C.).

The absolute date method is simple, ingenious and free of charge.

James E. Plieger
Herndon, Va.



SOFTWARE & SERVICES

Loans processing system out for IBM CPUs

By Paul Gillin
CW Staff

DALLAS — Hogan Systems, Inc. last week announced for IBM mainframes the Integrated Loans Processing System which, it said, covers the full scope of lending activities from original application to final disposition.

The system uses common data bases, processing routines and operating procedures and is fully integrated with the Hogan Deposit Systems, Prophet Customer Management System, On-line Delivery System and Hogan Collection System. The Integrated Loans Processing System also generates transactions for direct entry to a general ledger, the vendor said.

Modules are included for tracking loan applications, loan accounting and servicing, secondary marketing, collateral control, commitments, investor accounting and reporting and charged-off loans. Support is provided for multicompany, multioffice environments with the ability to define different options for each branch.

User-defined control information includes variable factors, processing routines and report and transaction definitions. The system satisfies all federal requirements and can be modified through Hogan's maintenance service to accommodate changing requirements.

The software can accomplish daily processing using a random approach that processes only loans that have seen activity rather than reading files sequentially, the vendor said. On-line operation is offered as well as batch processing and combinations of the two. Conversion to the new software can be carried out gradually.

Automated loan origination allows the terms of each loan to be entered on-line with changeable parameters, Hogan claimed. When data on a new loan is entered, the system automatically submits subsequent screens for that particular loan type.

The loans-in-process feature provides loan application status reports and on-line inquiries and highlights overdue documents, verifications and appraisals. It also automatically prints documents associated with different types of loans.

Other modules include a borrower system, which contains profiles on each borrower; a collateral system with a common data base; a payee system that tracks funds recipients; an investor servicing system with a common data base; standard reporting features; standard processing functions; and a variety of common computations.

The total system includes 771 programs, 243 batch and 66 on-line reports, nearly 2,400 total librarian members, 46 hierarchical data bases and 54 sequential data bases. It licenses for $500,000.

Hogan is located at 5060 Spectrum Drive, Dallas, Texas 75248.

INSIDE
Systems Software/76
Productivity Aids/76
Application Packages/78
DBMS/80
Languages/80
Remote Computing Services/80

SOFTLINE/LAYNE R. ALEXANDER

Cutting project management risks

The traditional role of the project manager — having responsibility for a project, with little or no authority — is risky business. A person assuming the job of project manager risks his personal image and career as well as the careers of all associated with the project. This article will discuss two methods that are effective in limiting the risks associated with being a project manager. These are called the performance contract and planning horizons.

The performance contract is simply an explicit agreement of what the project manager and the user and management expect from each other and how they are going to work together. Though it is usually verbal, it should be committed to writing. Why not call it a working agreement? The word "contract" is useful in two ways. First, it calls attention to the need for specific actions in the relationship between the project manager and the rest of the organization. Second, the legal connotations of the word are applicable to the project manager's situation.

Contracts contain two basic elements that apply to the project manager's relationships: mutual consent and valid consideration. With mutual consent, both parties enter the agreement of their own choosing and are not coerced into working together. Valid consideration is the exchange of considerations between both parties. It is common for the user and management to express their needs and wants, but the project manager also has needs and wants that must be considered. These include:

- Access to people and information relevant to the project.
- Time to do the job properly.
- Resources to deliver a quality system in the time frame desired.

The performance contract for a project manager contains an integrated project plan, which specifies the resources and time required to deliver a system of specified quality and the assumptions

See PROJECT page 92

Spreadsheets get link to CPU data

WAYNE, Pa. — Unicalc Corp. has announced a data selection utility that reportedly allows users of microcomputer-based electronic spreadsheets to access data on IBM mainframe printed reports.

Dubbed Dif-Maker, the software is said to operate on any mainframe print file and convert the file into Software Arts, Inc.'s Data Interchange Format (DIF). The DIF formatting permits the interchange of data between micro spreadsheet packages such as Visicorp's Visicalc, Lotus Development Corp.'s Lotus 1-2-3, Microsoft, Inc.'s Multiplan and Sorcim Corp.'s Supercalc.

Dif-Maker reportedly enables a user to select data from any mainframe printed report by indicating the pages of the report to be used and assigning the print positions to columns on a spreadsheet.

Dif-Maker is written in Ansi Cobol and operates on IBM's MVS, MVS/XA or DOS/VSE operating systems. It is available now, priced at $2,500 for an on-site license.

Unicalc is located at Two Academy Lane, Wayne, Pa. 19087.

Generic coding: giving text files portability across systems

By Steven A. Brown
and Dana Messecher
Special to CW

Computers have a substantial contribution to make in simplifying and speeding up the process of document production. But the industry has suffered from a lack of industrywide standards. Text files created for one system cannot be composed on another system because they contain, along with the text, system-specific markup coding. This coding describes to the system the typographic attributes of each section of a document — type size, typeface, page width, distance between lines, indents and so on.

The issue of making text files portable is generally referred to as generic coding, or gencode. This refers to any nonambiguous method of tagging document elements according to their intellectual, rather than typographic, attributes. The distinction is important. According to the philosophy of generic coding, for example, a document section might be marked for emphasis, but never for italics. This concept is vital to the gencode approach.

A generic coding scheme might work as follows. When a publication is entered into the data base, it could be broken into its composite data elements and each element tagged. For example, every paragraph might be preceded by "<P>," and every table by "<T>". Sections to be emphasized could be marked "<E>," with "<END>" designating the end of the section. Quotes could be preceded by "<Q>." But, consistent with the principles of gencode, quotation marks themselves would never be tagged.

The next step would be to write markup coding formats that correspond to your tagging scheme. Each tag would call a format. This is where the link between intellectual elements and their typographic attributes would be made.

The "official body" of generic coding is the Graphic Communications Association. After more than 15 years of effort, it has come up with a proposed Ansi/X3J6 standard.

After throwing out many approaches as being too restrictive, the committee agreed to standardize a language for describing rules for recognizing tags. The proposed Ansi/X3J6 standard is not a standardized markup language, standardized tagging scheme or set of rules for recognizing tags. It is simply a "metalanguage" that describes how to describe tags. The standard does contain a mechanism for registering document tagging schemes in order to encourage further standardization.

Prepress systems can be divided into two approaches — interactive and batch. Interactive systems show the user a close facsimile of the finished page. These systems are much appreciated by those who deal with custom pages. Interactive systems do not make decisions themselves — they put type into place and let the operator do the thinking.

Batch systems do not show finished type during input. Instead, they take complete text files and compose them into finished pages. A good batch pagination system will

See [illegible] page 92

SOFTWARE & SERVICES

SYSTEMS SOFTWARE

SOFTWORKS, INC.
VIO Plus

Softworks, Inc. has introduced VIO Plus (Vsam I/O Plus), an IBM Vsam utility that is said to reduce unnecessary I/O operations.

The VIO Plus utility reportedly improves system performance by reducing I/O operations, thus reducing CPU. time, disk/channel activity and elapsed time. Elapsed time savings range up to 75%, a spokesman said.

The cost for VIO Plus is $12,500. A 36-month lease plan is available at $538 per month.

Softworks, 7700 Old Branch Ave., Clinton, Md. 20735.

APPLIED INFORMATION DEVELOPMENT, INC.
Version 2.0 of JCLWTR

Applied Information Development, Inc. has introduced Version 2.0 of its JCLWTR System Software product.

The product, designed to manage the retrieval and storage of JCL Sysout listings, eliminates printing and filing of JCL listings and supports Datagraphix, Inc.'s Microcom and Kodak Corp.'s Komstar interface to computer-output microfilm (COM), plus an off-line interface for COM service bureaus, the company said.

The new version includes generic retrieval by subsystem; automatic scan of JES (Job Entry Subsystem) messages for exceptional conditions; an expanded exit facility; support for IBM's Roscoe and TSO/SPF interfaces; expanded microfiche control; improved customization features; and support for IBM's JES 3. JCLWTR is priced at $7,500 for a one-time license fee.

Applied Information Development, 823 Commerce Drive, Oak Brook, Ill. 60521.

JMS SOFTWARE, INC.
DYLOG/TCT

JMS Software, Inc. has introduced a software product that reportedly reduces the static storage requirements of the IBM CICS Terminal Control Table (TCT) by allocating only the storage capacity needed for terminals actually in use.

The product, Dylog/TCT, reportedly reduces the storage needs on the CICS/VS region in large terminal networks by 1M byte or more. It also reportedly eliminates the need to bring the CICS region down when reconfiguring the network.

Dylog/TCT is said to operate on any IBM computer that supports CICS and operates within any CICS/VS region using release 1.5 or later. Dylog/TCT is leased for a one-time fee of $16,500 for IBM OS systems and $11,500 for IBM DOS systems, on a single CPU basis.

JMS Software, Suite 7967, One World Trade Center, New York, N.Y. 10048.

GREENE SOFTWARE
Queue/36

Greene Software has introduced Queue/36 for IBM System/36 users.

According to the vendor, Queue establishes an auxiliary batch job queue that allows user jobs to run independently of and concurrent with jobs in the System Job Queue.

No modifications are required with Queue/36. Users have control of their job's position in the queue, status, start time, execution priority and completion messages through interactive screens. A one-time license fee for the product is $295 per CPU.

Greene Software, P.O. Box 89, Victor, N.Y. 14564.

PRODUCTIVITY AIDS

MARATHON SOFTWARE AND SERVICES, INC.
Mudsam on UFO/CICS

Marathon Software and Services, Inc. has announced its UFO Documentation System and More (Mudsam) for users of Oxford Software Corp.'s UFO/CICS software on IBM mainframes.

The software produces a system documentation index for UFO programs and generates multiple listings of program components in a single pass. It also flags program code that wastes memory and response time.

Mudsam is available for UFO/CCS releases 2.4, 2.4.1,

HAVE YOU BEEN BLIND COMPUTER WITH THE

NEC's Advanced Personal Computer offers the sharpest color graphics of any personal computer.

NEC's Advanced Personal Computer offers the widest range of quality graphics.

One reason the APC is better is that it lets you do more kinds of graphics than any other personal computer.

In fact, it gives you the kind of graphics you'd expect only from a much more expensive computer.

With the APC, you can produce color transparencies, color slides, or output to a variety of printers and plotters.

You can even do Computer Aided Design (CAD).

Our screen is graphically better.

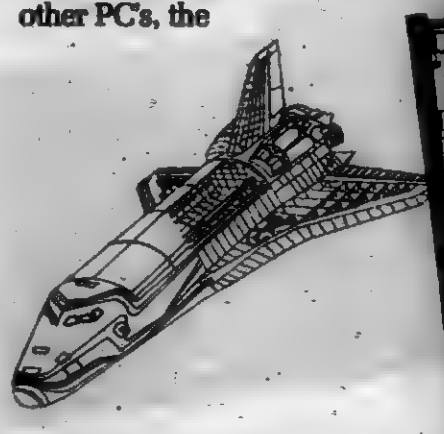
Seeing is believing. And one look at our color screen will prove it's the best.

But it's no accident. It starts with the NEC 7220 graphics processor, the most advanced graphic chip available.

Then, unlike other PC's, the

Graphics are being used more and more by businesses every day. They give companies a clearer picture of their place in the market. They make for more effective presentations. And with slides and color transparencies, they can let a room full of people see the same thing at once. Although most people see the value of graphics, very few are aware of the personal computer that lets them create the best color graphics.

It's the Advanced Personal Computer from NEC.



This slide was produced from the screen using Videograph™ software, an inexpensive Screen Shooter™, and Polachrome™ 35mm film, in less than 5 minutes. For less than $1.00!

Context MBA is a trademark of Context Management Systems, Inc. Graphwriter is a trademark of Graphic Communications, Inc. Graphplan is a trademark of Chang Labs, Inc.

2.4.2..It is priced at $500.

Marathon Software and Services, 145 Porter Ave., Bergenfield, N.J. 07621.

APPLICATION PACKAGES

PLYCOM SERVICES, INC.
Fixed Assets System

Plycom Services, Inc. has announced the Fixed Asset System for use with Digital Equipment Corp.'s VAX-11 processors under DEC's VMS operating system.

A spokesman said the Fixed Asset System features screen-formatted data entry, on-line file maintenance, an edit log of all master file changes and automated period and year-end closing procedures. A variety of reports allow reporting of depreciation, acquisitions, disposals, transfers and audits.

The spokesman said the system can handle up to three complete sets of books for internal, state and federal reporting and can accommodate multicompany or multidivision corporate structures. It is written in VAX Basic using standard file and data structures. Prices for the system range from $1,500 to $14,000.

Plycom Services, Suite 150, 4242 Piedras E., San Antonio, Texas 78228.

DATA DESIGN ASSOCIATES, INC.
Financial systems for IBM IMS/DC

Data Design Associates, Inc. has announced versions of its general ledger, accounts payable/purchase control and fixed-asset accounting systems for the IBM IMS/DC environment.

According to the vendor, the versions provide on-line processing capability for IBM 370 series users, running under IBM's OS operating system. The system also runs under IBM's CICS.

The IMS/DC on-line version of the general ledger system is priced from $87,000, the accounts payable/purchase control system starts at $57,000, and the fixed-asset accounting system starts at $49,000.

Design Data Associates, 1279 Oakmead Pkwy., Sunnyvale, Calif. 94086.

COMPINFO, INC.
Moneypack

Compinfo, Inc. has introduced a portfolio management system called Moneypack for use on the Wang Laboratories, Inc. VS series of computers. Moneypack is said to be an on-line, interactive package that integrates trading, accounting performance and appraisal functions.

Among Moneypack's features are tax reporting, including tax lots going long-term; management retrieval; cross-referencing; trade entry; trading; and billing, the vendor said.

Moneypack is reportedly menu-driven and includes an on-line help feature. Security is available at both the functional level, for reports and screens, and the individual account level.

Moneypack is available in a price range from $40,000 to $60,000, depending on options.

Compinfo, 1500 Broadway, New York, N.Y. 10023.

MINCRON SBC CORP.
Hardgoods Distribution System

Mincron SBC Corp. has introduced a software package designed for wholesale distributors that use an IBM System/38 mainframe.

The Hardgoods Distribution System handles accounts payable, accounts receivable, order processing, inventory control, purchasing and sales analysis, a spokesman said. The package's menu-driven design is said to consolidate functions to enable a user to handle cash or credit sales, deliveries or will-calls and exchanges or back orders from the same screen. Orders can be entered by using the manufacturer's product number or the company's generic code or by passing a wand over the bar code printed next to each product in the company's catalog, the spokesman said.

The modules allow all product codes, the chart of accounts, branch codes, three-level stock locations, salesman codes and sales territories to be user-defined.

The modules are grouped in three ways — financial, purchasing and distribution — with prices ranging from $25,000 to $50,000. Dis-

Continued on page 86

TO THE PERSONAL BEST COLOR GRAPHICS?

Context MBA® runs in high resolution color on the APC. But it can only run in one color on the color monitor of the leading brand.

APC graphics option has its own dedicated memory, so there's never a tradeoff between color and resolution.

Software will make you a big-time producer.

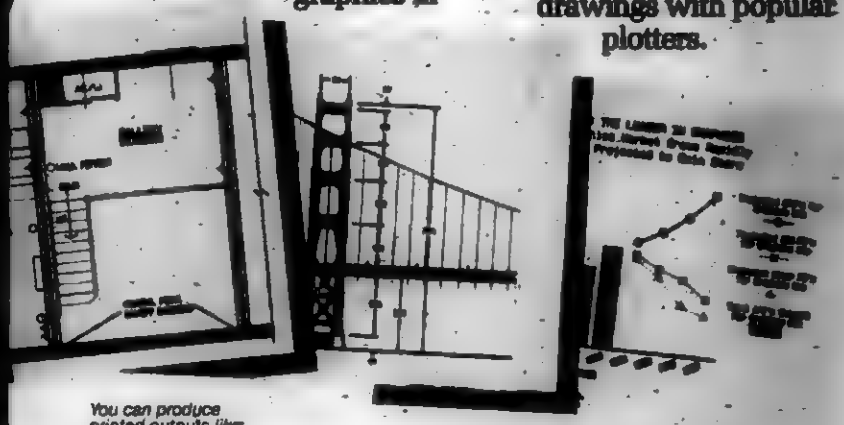
Better hardware alone isn't enough. You also need better software. And NEC provides that, too.

Take Graphplan™ for example. Graphplan can take spreadsheet format data and produce customized business graphics on paper. Instantly.

Graphwriter™ will let you produce professional color graphics in over 20 different formats. Then turn them into transparencies or hard copies using the most popular pen plotters.

Videograph™ makes creating free-form color images for slide presentations easy and inexpensive.

Autocad™ lets architects, engineers and designers create sophisticated graphics and designs, then produce precise drawings with popular plotters.

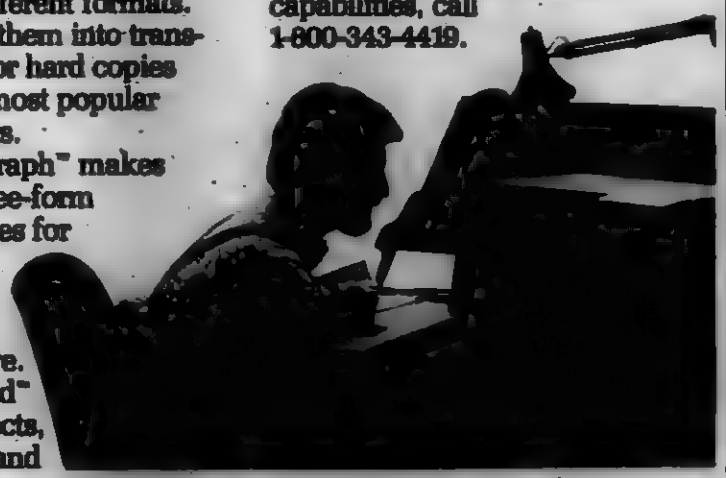


You can produce printed outputs like these with the APC.

This software combined with the APC hardware will give you the best graphics you can get on any personal computer.

For the complete picture, call NEC.

For product literature on any of NEC's APC graphics capabilities, call 1-800-343-4419.



Designers can use Autocad™ to make the design process faster and easier.

In Massachusetts, call 1-617-264-8635.

And find out why more and more graphics users with vision are saying "NEC and me."

NEC AND ME

NEC Information Systems, Inc.
1414 Mass. Ave.
Boxborough, MA
01719

Screen Shooter is a trademark of NEC. Polachroma is a trademark of Polaroid. Videograph is a trademark of Xynetics. Autocad is a trademark of Auto Desk, Inc.

SOFTWARE & SERVICES

Continued from page 79

counts are available for purchase of the full package, the vendor said.

Mincron SBC, Suite 2810, 350 Fifth Ave., New York, N.Y. 10118.

LLOYD BUSH
Simple Basic; Model version

Lloyd Bush has announced that its Simple Basic personal computing software is now available for Prime Computer, Inc. computers and Digital Equipment Corp. VAX-11 and Rainbow computers.

Also announced was a new version of Model, Lloyd Bush's planning and analysis system, for the Hewlett-Packard Co. HP 3000.

Simple Basic products, which come with a built-in full screen prompter, were designed to help overcome the initial anxieties of the personal computing novice, the vendor said. Simple Basic is said to be an implementation of the Model Decision Support application building language.

Simple Basics Budgeteer costs $6,900 for most DEC and Prime hardware, $3,500 for Prime P2250s and P250s and $595 for DEC Rainbows. The Generalist costs $4,900 for most DEC and Prime models, $2,500 for P2250s and P250s and $395 for Rainbows. Prices for the VAX-11/730 begin at $2,500.

As an introductory offer, any Simple Basics order received by July 23 will receive a 20% discount.

A Simple Basics product line for the HP 150, reportedly upwardly compatible to Model on the HP 3000, is priced from $395 to $995. New release pricing of Model (starting at $9,000) is available until Aug. 24, with discounts of 30% to 50% and a free HP Image interface for large configuration orders.

Lloyd Bush, 165 William St., New York, N.Y. 10038.

MCBA, INC.
General Ledger

MCBA, Inc. has announced a general ledger package written in Cobol for Digital Equipment Corp. VAX-11 processors.

The MCBA package, called General Ledger, reportedly offers a built-in report generator and allows adjustments to future and prior periods to be made. It is also said to allow account inquiries via terminals and to permit consolidation of statements from multiple companies.

The product is licensed for the following DEC systems at the following prices: Micro VAX-11, $2,000; VAX-11/730, $3,000; and VAX-11/750 and VAX-11/780, $4,000.

MCBA, 3441 Honolulu Ave., Montrose, Calif. 91020.

WESTMORELAND SYSTEMS, INC.
Enhancements to Calendar Scheduling System

Westmoreland Systems, Inc. has enhanced its Calendar Scheduling System for the IBM System/36. The enhancements reportedly include the addition of reminder dates and messages and the addition of help text to aid users.

The Calendar Scheduling System reportedly maintains and prints a tickler file and schedules appointments and messages by date and user. It can be used to track group projects for individual scheduling and is priced at $300.

Westmoreland Systems, Suite I, 226 Park Ave. N., P.O. Box 2726, Winter Park, Fla. 32790.

PAYMENT SERVICES GROUP
Continuous Information Exchange

Payment Services Group has introduced a software system that reportedly provides electronic cash management and funds transfer services between banks, corporations and the Automated Clearing House.

The system, called the Continuous Information Exchange (CIX), reportedly operates in a manner similar to a time-sharing system with settlement capability and is said to provide a bridge between traditional paper transaction processing and electronic processing.

Operating in either on-line or batch mode, CIX reportedly permits corporate treasurers or credit managers to access data on the bank's mainframe to conduct fund transfers. CIX runs on IBM 4300, 370 and 30 series computers.

The CIX software is priced at $60,000 for batch-mode operation. Additional software to conduct on-line operations is priced at $30,000.

Payment Services Group, 230 E. Main St., Branford, Conn. 06405.

CHASE DECISION SYSTEMS
Bankplan2

Chase Decision Systems has introduced a strategic planning software program for banks that operates on a variety of IBM or compatible mainframes under IBM's VM/CMS operating system.

Bankplan2 reportedly can simulate the financial effects of an acquisition, using either purchase or pooling methods of accounting. The package is for banks considering the financial impact of alternative investment strategies, deal structures, regulatory policies and economic conditions before making an acquisition decision, a vendor spokesman said.

The software simulates the combination of two bank holding companies, two commercial banks or a bank holding company and a commercial bank, the spokesman said.

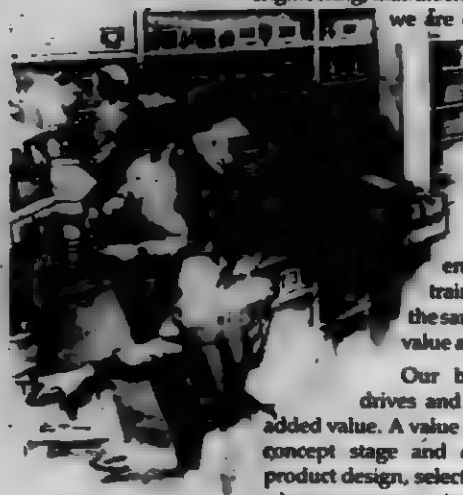
A permanent license for Bankplan2 is priced at $25,000; a monthly lease also is available.

Chase Decision Systems, 1000 Massachusetts Ave., Cambridge, Mass. 02138.

Now is the Time to Take a Look at

FUJITSU

In today's information revolution there is one company well worth watching. A company which brings experience and expertise to the development, manufacture, marketing and support of OEM and consumer computer peripheral products in America. That company is the Storage and Peripheral Products Group of Fujitsu America. And through continued expansion of engineering, manufacturing and marketing facilities in the United States, we are dedicated to sustain our position of delivering products of unequaled quality and value.



The Group's presence in the United States market has been solidified through our commitment to quality. A commitment which begins with our employees and is carried through to product design, manufacturing and support.

Wherever you look in the Group you will see people serving your needs. Whether it's engineers developing a timely product or specially trained service representatives, their goals remain the same; to insure the product they deliver offers added value and is of the finest quality.

Our broad line of disk drives and printers all deliver added value. A value that is built-in at the concept stage and carried through in product design, selection of raw materials and components, and consistent workmanship at the assembly line. This added value and the myriad quality checks that every product must pass, translates into industry standards for reliability and product performance.

At Fujitsu we will always strive to be your first choice. The one choice where you can be sure that commitments to superior product quality, added value and outstanding service help to facilitate your future growth.

Now is the time to take a look at Fujitsu. With tomorrow right around the corner, there is no better time than today.

For more information contact Fujitsu America, Storage and Peripheral Products Group, 3055 Orchard Drive, San Jose, CA 95134, 408-946-8777.

STORAGE AND PERIPHERAL PRODUCTS GROUP

We add more Value to take You Further.

FUJITSU

SOFTWARE & SERVICES

INTERACTICS, INC.
Home Builders

Interactics, Inc. has announced a software package for home construction firms that runs on Prime Computer, Inc. 50 series computers.

Home Builders reportedly offers cash forecasting, "what-if" job estimating, loan control, budget control with variance tracking, cost and control by building stage, purchasing, general ledger, accounts payable and complete audit control. Written in standard Cobol, the on-line package provides hard-copy reporting as well as real-time inquiry functions.

Home Builders costs $19,000 for a perpetual object code license; the source code is optional and is priced at $19,000.

Interactics, 7303 Marisol Drive, Houston, Texas 77083.

OAK SOFTWARE, INC.
Interface to Ecom

Oak Software, Inc. has announced that its Word Processing System for the IBM System/34, System/36 and System/38 has been enhanced to provide an interface with the U.S. Postal Service's Electronic Computer Oriented Mail (Ecom) system.

With the Ecom feature, a spokesman said, users can create messages using text entered and stored as a regular document in the Word Processing System and can use addresses entered and stored in the system's Customer File for destination addresses.

Also, the feature allows users to use a user-created file in the Ecom format for destination addresses and to key destination addresses on-line in the Ecom format.

The Word Processing System sells for $2,500 for the System/34 and System/36 and $3,500 for the System/38. The Ecom feature is priced at an additional $500.

Oak Software, Suite 215, 300 S. Duncan Ave., Clearwater, Fla. 33515.

3M CO.
Crimestat

A report generator for police applications has been announced by 3M Co. for use with its Micrapoint II hard-disk micrographic filing system. Called Crimestat, the software automatically prints uniform crime reports onto Federal Bureau of Investigation forms.

The Crimestat software reportedly is able to predict the number of calls a police agency will receive in the coming month by using an algorithm with a margin of error of 10% or less to interpret the previous month's projection. A date report feature reportedly prints a call rate history by district for any day of any month, including the average number of calls per day for that month.

Crimestat is also said to be able to produce on demand a current list of wanted persons, including juveniles and those wanted for questioning, and wanted vehicles. It licenses for $4,809.

3M, P.O. Box 33600, St. Paul, Minn. 55133.

IBM
3680 restaurant management program

IBM has introduced a restaurant management program for use with its point-of-sale terminals. The program is designed for use with IBM Model 3680 programmable store system equipment, including the IBM Model 3684 point-of-sale terminal/controller unit and the IBM Model 3683 point-of-sale terminal.

It reportedly can generate 23 reports, including sales, labor costs, menus and food and beverage inventory. It is capable of either standalone use or network connection.

The 3680 program provides payroll information in automated form for processing by payroll departments. Information recorded includes employee time and attendance, tips and up to four job codes for employees whose work involves multiple wage rates, a spokeswoman said.

Sixteen different menus reportedly can be stored in the 3680, with two in use at a time, enabling the system to automatically process orders entered by servers. The program can track 99 raw products and provide reports based on predetermined usage of each product.

A one-time license fee for the 3680 restaurant program is $1,000. It will be available in April 1984.

IBM, 900 King St., Rye Brook, N.Y. 10573.

DESK TOP FINANCIAL SOLUTIONS, INC.
DT/FPS for VS

Desk Top Financial Solutions, Inc. has announced a version of its Desk Top/Financial Planning System (DT/FPS) for Wang Laboratories, Inc. VS series of small business computers.

The Wang VS version of DT/FPS is fully compatible with currently installed Wang OIS systems.

DT/FPS for VS systems reportedly supports data bases as large as 500 columns by 100,000 lines. It also allows concurrent manipulation of several data bases for consolidation and selective extraction of data.

DT/FPS operates with VS workstations with 32K bytes of memory. It requires 700K bytes of disk storage and is written in Wang VS Basic. Price ranges from $4,750 to $9,500.

Desk Top Financial Solutions, 407 Main St., Spotswood, N.J. 08884.

CAE SYSTEMS, INC.
Hilo-2 on CAE 2000

CAE Systems, Inc. has announced the Gemrad, Inc. Hilo-2 high-speed

Continued on page 84

DAISYWHEEL • DOT MATRIX • THERMAL

FUJITSU PRINTERS

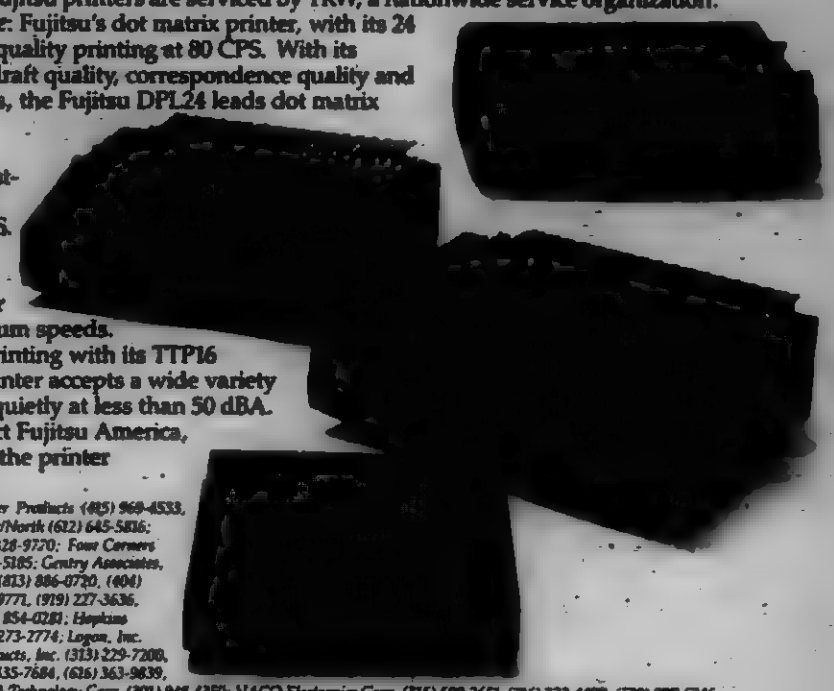
You can't buy more Performance for the Price.

Finally, there is a full line of quality printers available to meet a variety of needs. And all from a single manufacturer... FUJITSU. From dependable dot matrix printing to advanced thermal printing, you can't buy more performance for the price.

Quality That's Built In: Fujitsu quality is built into every printer manufactured. That quality translates into high reliability (MTBF), versatile print capability, low maintenance, low noise, and high speeds. And Fujitsu printers are serviced by TRW, a nationwide service organization.

A Complete Printer Line: Fujitsu's dot matrix printer, with its 24 wire head, offers letter quality printing at 80 CPS. With its ability to also produce draft quality, correspondence quality and high resolution graphics, the Fujitsu DPL24 leads dot matrix technology.

In daisy technology, Fujitsu's SP830 is the fastest letter quality printer in the industry at 80 CPS. Fujitsu's SP320 daisywheel printer also provides cost effective letter quality printing at medium speeds. Fujitsu offers thermal printing with its TTP16 printer. The low-cost printer accepts a wide variety of papers and operates quietly at less than 50 dBA.



Call Us Today: Contact Fujitsu America, Inc., at 408-946-8777 for the printer distributor nearest you.

DISTRIBUTORS: Algonm Computer Products (415) 969-4533, (714) 535-3630, (206) 453-1136; Dytec/North (612) 645-5816; Allen Edwards Associates, Inc. (213) 328-9770; Four Corners Technology (602) 998-4440, (505) 821-5185; Gentry Associates, Inc. (305) 859-7457, (305) 791-8405, (813) 886-0720, (404) 998-2828, (504) 367-3975, (205) 534-9771, (919) 227-3636, (803) 772-6786, (901) 683-8072, (615) 854-0281; Hopkins Associates, Inc. (215) 828-7191, (201) 273-2774; Logon, Inc. (201) 646-9222; Lowry Computer Products, Inc. (313) 229-7200, (216) 398-9200, (614) 451-7494, (513) 435-7684, (616) 363-9839, (412) 922-5110, (502) 561-5629; MESA Technology Corp. (301) 948-4350; NACO Electronics Corp. (315) 699-2651, (716) 223-4490, (508) 895-6246; Peak Distributors, Inc., An affiliate of Dytec/Central (312) 394-3380, (414) 784-9686, (317) 247-1336, (319) 363-9377; R³ Marketing, Inc. (801) 298-2631, (303) 455-5360; S&S Electronics, (617) 458-4000, (802) 658-0000, (203) 878-6980, (800) 243-2776; USDATA (214) 680-9900, (502) 454-3579, (713) 681-0200, (918) 622-8740.

PERIPHERAL PRODUCTS DIVISION

Quality Lives

FUJITSU

Hewlett-Packa surge in office

Introducing the Person

The principle is simple. Boost the productivity of individual PCs. Your people, your department, even your entire company will follow suit.

The first boost occurred when we introduced the touchscreen HP 150 as an office and managerial workstation. This made personal computing so much easier and faster that individual productivity soared.

Now the Personal Productivity Center combines the flexibility of the HP 150 with the power of our HP 3000 family of distributed computer systems.

You can shape each Productivity Center just the way you want it by adding other office and computing products from our extensive range.

You can link managerial and secretarial work stations. Create impressive presentations, merging business graphics and word processing. Store them on large disc files. And print them out on laser printers and color plotters.

Your PCs also grow more productive by increasing the range of software they can run. In addition to leading PC programs like 1-2-3™ from Lotus™ and popular word processing packages, they can use HP 3000 business software like our exclusive DeskManager. This combines electronic mail, quick memo

rd touches off a productivity.

al Productivity Center.

writing, personal filing and calendar functions. And each PC can access data processing systems and large corporate data bases.

Personal Productivity Centers can communicate with similar networks in other parts of your company, as well as your mainframes. Each system can expand to handle more than 100 workstations. And you can grow without involving your programmers in any software conversion.

So if PCs alone are making your people more productive, just wait till you see them all working together. And you can see them right now by calling your local HP sales office listed in the white pages. Or write for complete information to: Hewlett-Packard, Dept. 03191, 19447 Pruneridge Avenue, Cupertino, CA 95014. In Europe, contact Henk van Lammeren, Hewlett-Packard, P.O. Box 529, 1180 AM Amstelveen, The Netherlands.

It could turn your whole company into a productivity center.

Productivity. Not promises.

HEWLETT PACKARD

1-2-3 and Lotus are trademarks of Lotus Development Corporation.

SOFTWARE & SERVICES

Continued from page 81

universal logic design simulator on its Apollo Computer, Inc.-based CAE 2000 computer-aided engineering workstation.

Hilo-2 is a tool for integrated board design, design verification, structural and functional modeling, detailed timing analysis, fast fault simulation and test validation. It can be used for designing chips, boards, modules or complete systems. It costs between $15,000 and $20,000.

CAE Systems, 1333 Bordeaux Drive, Sunnyvale, Calif. 94089.

SHOPPING CENTER COMPUTER SYSTEMS, INC.
Infocenter

Shopping Center Computer Systems, Inc. has announced Infocenter, a set of products for shopping center developers and managers.

The set offers accounting functions such as general ledger, financial reporting, accounts payable and payroll. The tenant accounts receivable system offers options for lease escalations, common area maintenance charges, dun letters and retail sales analysis.

Infocenter runs on Applied Digital Data Systems, Inc.'s Mentor business computers. Costs range from $9,500 to $23,500 for the complete package.

Shopping Center Computer Systems, Suite 255, 10900 Sunset Drive, Miami, Fla. 33173.

RADIAN CORP.
CPS-1

Radian Corp. has announced its CPS-1 contour plotting software on Digital Equipment Corp. VAX-11-based graphics systems sold by Intergraph Corp.

According to a spokesman for the vendor, the system was designed for geological mapping applications, allowing Intergraph computer-assisted design and manufacturing systems to create contour maps for oil/energy exploration and other specialized seismic applications.

The two versions of the contouring software include a standard version as well as a fault-contouring version.

The price of CPS-1 software on the Intergraph systems begins at $24,000, according to the spokesman for Radian.

Radian, P.O. Box 9948, 8501 Mopac Blvd., Austin, Texas 78766.

3270 Networking: No More No Man's LAN.

Imagine. 3270 Processing. Integrated Personal Computing. Local Area Networking. And SNA Compatibility. In One System.

Imagine a system that successfully settles the uncharted territory of 3270 local networking—that "no man's LAN" of unlinked and unrealized potential.

Imagine a system that delivers the power of 3270 processing, and the flexibility to build two local area networks from a single controller. Imagine being able to attach up to 120 devices to that controller. Or attaching four distinct controllers—and multiple coaxial links of up to 10,000 feet each—to any of those LANs.

Imagine the economies of a system that handles that networking with standard 3270 coax. That requires no commitment to special architectures or non-standard LAN technologies. And that, thanks to a multi-drop, station-to-station design, can eliminate thousands of feet of new coax.

Of course, such a system would have SNA compatibility. But it would also have a set of capabilities to dramatically increase throughput, while reducing hardware and support cost in *any* environment. Capabilities like multi-host and multi-personality support, application and address switching, and system printing.

This system would have multi-user personal computing "built into" the network—allowing you to assign true 16-bit computing power, maintain overall MIS control and share expensive disks and printers.

Such a system would boast an intelligent display station that displays a mastery of ergonomic and aesthetic design. With multi-screen formats, anti-glare screen, low-profile keyboard, and a tilt-and-swivel pedestal with the smallest footprint in the industry. Such a system would also include a full line of printers.

Imagine. 3270 processing. IBM-compatible personal computing. Versatile, economical, powerful local area networking. In one system.

Braegen has imagined just such a system. They have designed it. Built it. And called it the ELAN™ System.

If such a system sparks your imagination, give us a call. We know the feeling. The Braegen Corporation, 525 Los Coches Street, Milpitas, CA 95035 (408) 945-8150; TWX: 910-338-7332

Braegen. Where Networks Better

BRÆGEN

™ELAN is a trademark of The Braegen Corporation.

PRODUCTIVE SOFTWARE PRODUCTS
EFS Financial Calculator

Productive Software Products has begun marketing a financial software program for IBM System/36 users.

The Executive Financial Software (EFS) financial calculator program reportedly can perform calculator functions, percentage functions, amortization schedules, depreciation schedules, investment analysis of cash flow, interest calculations, lease analysis and bond analysis.

According to the vendor, EFS allows the program to ask "what-if" questions on various financial calculations. It also enables the user to switch calculations without re-entry of factors. EFS is available for $250.

Productive Software Products, 10857 Reading Road, Cincinnati, Ohio 45241.

CALIFORNIA INTERACTIVE COMPUTING, INC.
Permanent Disability Rating System

California Interactive Computing, Inc. has introduced the Permanent Disability Rating System, designed to determine permanent disability benefits for workers' compensation.

The package calculates permanent disability rating tables from a program module to facilitate the rating function and determine disability benefits, the vendor said. The system quantifies the elements of the rating and includes an override function that allows injection of subjective judgments into the rating process.

The system runs on Pick & Associates, Inc.'s Pick operating system on a variety of computers, including Honeywell, Inc.'s Level 6 Ultimate, the IBM Series 1 and 4300 series and any Prime Computer, Inc. Information series. It is priced at $11,000, the vendor said.

California Interactive Computing, 12517 Chandler Blvd., North Hollywood, Calif. 91607.

TECHNICON DATA SYSTEMS CORP.
Materials Management

Technicon Data Systems Corp. has announced inventory control for hospitals using the Wang Laboratories, Inc. VS series of processors.

Materials Management can function in a stand-alone mode or can be integrated with Technicon's Medical Information System software. It is said to increase efficiency for hospitals' inventory, purchasing, receiving and accounts payable departments through interactive files updated from many sources and shared with other files. Updated information reflects inventory levels at all points in the inventory cycle, the vendor said, and is available on-screen to all users.

A series of standard reports are included. Automatic purchase order generation and automatic general ledger and accounts payable interfaces are also included. Materials Management is priced at $125,000 on Wang VS80 and higher systems.

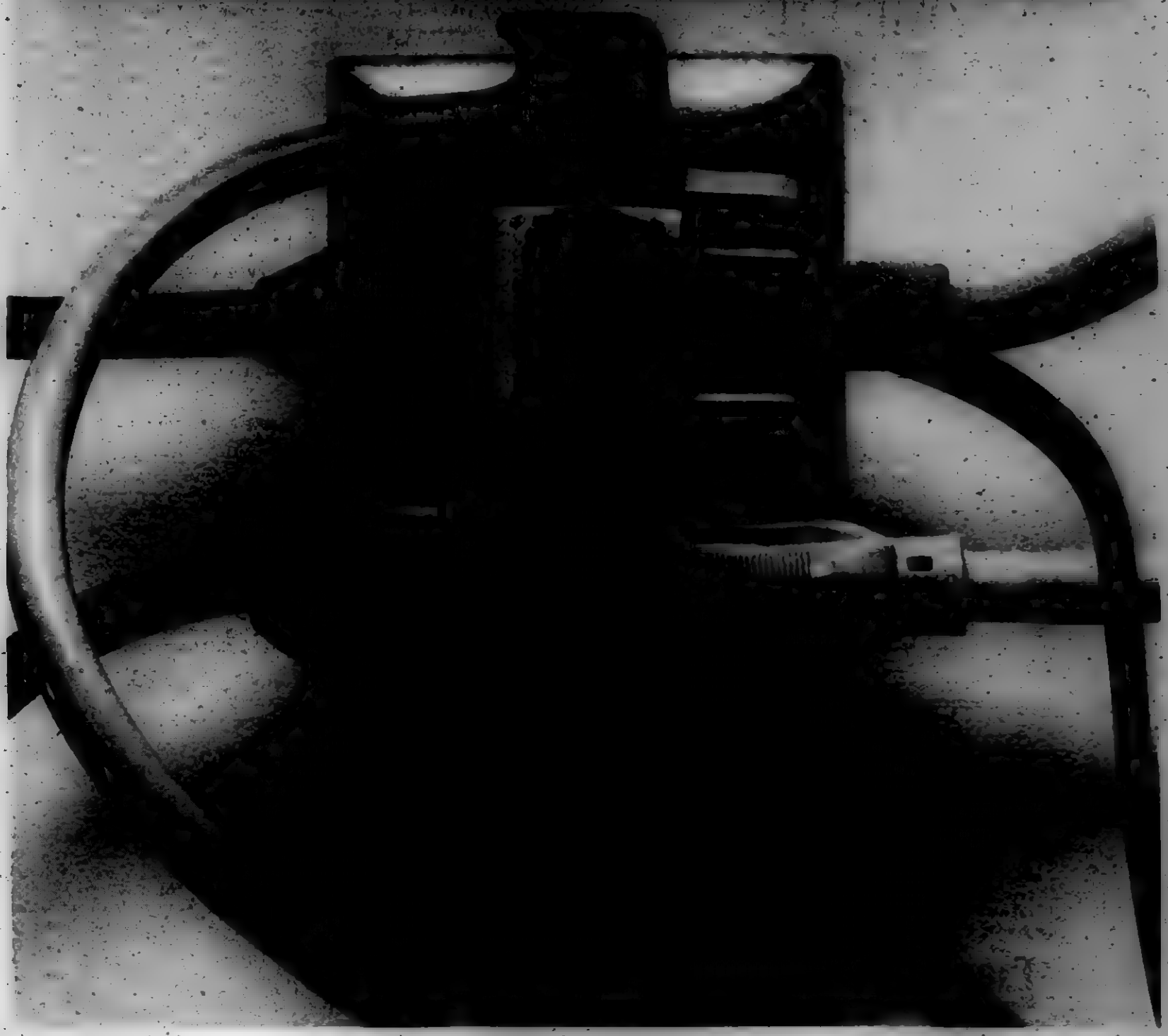
Technicon Data Systems, 5885 Glenridge Drive, Atlanta, Ga. 30328.

SYSTEM DEVELOPMENT CORP.
Interface translator programs

The Stardyne Division of System Development Corp. has announced

Continued on page 86

LEAVE PAPER AND PHOTOGRAPHICS OUT OF YOUR OFFICE AUTOMATION PLANS.



When most companies move into office automation, the first thing they do is plug in a computer and some peripheral equipment.

That's smart. But unfortunately that's also where they stop, leaving some unfilled opportunities for improving their office procedures.

Take filing for instance. While computers are good for storing data, they can't store the documents you must keep for evidentiary purposes.

That's where the 3M micrographic concept of file management can help. Micrographics is the use of microfilm instead of paper to store and retrieve important documents.

With one of our computer-assisted retrieval systems, for example, you can bring your filing system up to speed with the rest of your automated office. By making files easier to retrieve and virtually eliminating lost documents. All while reducing the space you now devote to document storage.

3M even offers a wide range of software programs to link its micrographic equipment to the computer system you may already have.

The result is a system that not only improves the efficiency of workers, but saves your company time, space and money.

Find out how micrographics can fit into your office automation plans and give you more control of your files. Call 1-800-328-1684 (1-800-792-1072 in Minnesota or 1-800-268-9055, Operator 13 in Canada) or return the coupon for a free booklet.

GET CONTROL. GET FILE MANAGEMENT.
Part of the 3M Orchestrated Office.

Name_____

Company_____

Title_____

Phone_____

Address_____

City_____

State_____ Zip_____

For a free booklet send to G. Collins, File Management Systems, Office Systems Division/3M, 3M Center, Building 218-2N, St. Paul, MN 55144. COW 2H

3M hears you...

3M

900 GUEST ROOMS AND COMPLETE MEETING FACILITIES IN HOUSTON'S GALLERIA.

Surround your meeting with the excitement of the spectacular Galleria. A city of 250 shops under glass, where excellence in dining, recreation, shopping and entertainment are side by side with Houston's most complete meeting environment.

Only The Westin Galleria and The Westin Oaks offer the world's largest lobby under one roof. 900 guest rooms and suites, 32 meeting rooms in a range of sizes, three ballrooms, an exhibition hall, professional in-house catering and audio-visual services. An adjoining health and sports facility has a jogging track and heated outdoor pools.

Hold your next business meeting in Five Diamond award-winning luxury, at *surprisingly competitive rates*. The Westin Hotels of Houston. Excellence, in the heart of the Galleria.

Please call, 713-960-8100, and ask for the Director of Sales. The Westin Oaks, 5011 Westheimer, The Westin Galleria, 5060 West Alabama, Houston, Texas.

THE WESTIN OAKS
THE WESTIN GALLERIA
Houston
In Dallas, stay at The Westin Hotel, Galleria.

4-5-6™

When you need IBM mainframe applications with the capabilities of popular micro products, your next step should be to join over 150 companies that have already licensed software from Parallax Systems.

ExecuCalc™
Electronic spreadsheets for 3270 terminals

ExecuPlot™
Color business graphics for 3270 terminals

Training
On-site classes in ExecuCalc, ExecuPlot, Lotus 1-2-3, VisiCalc, VisiPlot, and SuperCalc are available.

Distribute your micro and mainframe application activity, and provide training for both, with software and services from Parallax Systems.

Interfaces via CICS, GDDM, TP2, and SNF filters.
Perpetual licenses $2000 per product. 30-day trial.

Parallax

Parallax Systems, Inc.
[illegible] Street • New York, New York 10041
212-[illegible]

ExecuCalc, ExecuPlot, and 4-5-6 are trademarks of Parallax Systems Inc.; Lotus is a registered trademark of Lotus Development Corp.; 1-2-3 is a trademark of Lotus Development Corp.; VisiCalc is a registered trademark of VisiCorp; VisiPlot is a trademark of VisiCorp; SuperCalc is a registered trademark of Sorcim Corporation; CNF is a trademark of Software Arts, Inc.

SOFTWARE & SERVICES

Continued from page 84

interface translator programs that tie together the company's Structural Analysis System and PDA Engineering, Inc.'s Patran-G.

The two translators provide three conversion options: conversion of geometry and static loadings contained on the Patran-G Neutral File to Stardyne input data, conversion of existing Stardyne input data files to Patran-G Neutral Files and conversion of the Stardyne-generated output results file to a Patran-G Neutral Results File to allow Patran-G to post-process apalysis results, the vendor said.

The programs are written in Fortran 77 and can be used on Control Data Corp.'s Cyber and Cray Research, Inc. mainframes; minicomputers such as Digital Equipment Corp.'s VAX-11/780 or Data General Corp.'s MV series; and microcomputers such as those made by Apollo Computer, Inc. The price is $1,500.

Stardyne Division, System Development, Suite 3001, 360 N. Sepulveda Blvd., El Segundo, Calif. 90245.

INFO PROJECTIONS, INC.
Info System Plus

Info Projections, Inc. has announced Info System Plus, a modular mail-order processing package dedicated to interpreting market trends.

The system is menu-driven and is available for installation on the IBM System/34 and 36. Some of the product's applications include on-line order processing, on-line customer service, inventory and back-order control, sales and media analysis, list maintenance, returns system, physical inventory system and hold system, the vendor said.

The package provides custom format for invoices, back-order cards, list maintenance and four-up labels. The price is $24,000.

Info Projections, P.O. Box 3369, Evergreen, Colo. 80439.

SHLAES & YOUNG INFORMATION SYSTEMS, INC.
Creams and Ream enhancements

Shlaes & Young Information Systems, Inc. has announced a series of enhancements to its real estate software systems for the Wang Laboratories, Inc. 2200 series minicomputers.

The vendor said the enhancements to the Comprehensive Real Estate Asset Management System (Creams) and the Real Estate Analytical Models (Ream) packages were designed to improve ease of use, add analytical capabilities, provide additional reporting capabilities and respond to changes in the way leases are written on commercial properties.

Menus were redesigned to reduce their number and to permit movement through the systems with fewer keystrokes. The packages now also offer the user a choice of tenant-by-tenant market rent data entry or a global creation or update facility.

The Creams package is priced at $36,000, and the Ream package is priced at $9,000.

Shlaes & Young Information Systems, 405 N. Wabash Ave., Chicago, Ill. 60611.

ADAGE, INC.
INTERMETRICS, INC.
Sphere-3000

Adage, Inc. and Intermetrics, Inc. have announced a three-dimensional, molecular display package for use with Adage 3000 Color Raster Systems on Digital Equipment Corp. PDP-11 and VAX-11 series processors.

Sphere-3000 reportedly is organized as a Fortran-callable set of subroutines providing real-time display of color, three-dimensional, space-filling models of complex molecules up to 700 atoms. It is said to include full hidden-surface removal, shading, clipping and joystick-controllable rotation and pan and zoom functions. Initial object license price for Sphere-3000 is $20,000. Source license price is $75,000.

Adage, One Fortune Drive, Billerica, Mass. 01821.

WEISS ASSOCIATES, INC.
DIF added to Venture

Weiss Associates, Inc. has announced the addition of a Software Arts, Inc. Data Interchange Format (DIF) file interface to its Venture business planning software.

The addition of DIF file support reportedly enables Venture users to move their data from Venture to other programs that also support DIF files. Once the data is moved to another program, the user can make changes and transfer some or all of the changed data back into Venture.

The Venture program with the new DIF file facility costs $495. It operates on IBM's Personal Computer, Personal Computer XT and compatible systems.

Weiss Associates, 187 Michael Drive, Red Bank, N.J. 07701.

SUPEREX BUSINESS SOFTWARE
Energy Accountant

Superex Business Software (SBS) has announced a package that tracks energy conservation efforts and operates on IBM Personal Computers or compatible systems.

The Energy Accountant reportedly takes two to five minutes of work to enter and produce reports. It accommodates any fuel sources; normalizes for weather, facility size and changes in energy systems; prorates fuel and utility bills to monthly consumption; develops energy targets based on past performance; and can handle up to 75 buildings on floppy disk and 200 buildings on hard disk.

Priced at $1,000, the system includes a variety of management reports and problem-alerting features.

SBS, 151 Ludlow St., Yonkers, N.Y. 10705.

SUMMAGRAPHICS CORP.
Parpac

Summagraphics Corp. has introduced a printed-circuit board design automation package called Parpac for use on its computer-aided design (CAD) systems.

Parpac is reportedly capable of automatically placing digital and analog components, pin arrays, chip carriers and discrete components. It also can reportedly override the automatic placement at any point to preplace certain components manually or interactively.

The product also is said to be able to produce net error and spare element lists, parts lists and connector summaries. It also reportedly includes complete documentation capabilities to produce fabrication and as-

Continued on page 92

BGS SYSTEMS FOR DP MANAGEMENT

SOFTWARE & SERVICES

Continued from page 96

sembly drawings, drill schedules, silkscreens and solder masks.

Parpac is available for the Summagraphics Icon Series CAD system and for the firm's Summadraft hardware at a base price of $40,000.

Summagraphics, P.O. Box 781, 777 State St. Ext., Fairfield, Conn. 06430.

INTERNATIONAL TECHNOLOGY MARKETING, INC.
CAD/CAM service

International Technology Marketing, Inc. (ITM) has announced a service that provides in-depth information on the computer-assisted design and manufacturing (CAD/CAM) industry.

According to ITM, the service helps companies track industry trends and growth and provides financial and technical product data for more than 50 CAD/CAM system, hardware and software vendors.

Subscriptions to the service include unlimited use of the vendor's telephone information service, an annual report with interim supplements and a three-day seminar.

Corporate annual subscriptions are available at a cost of $12,000. Secondary company annual subscriptions cost $6,000 each.

ITM, 120 Cedar St., Wellesley Hills, Mass. 02181.

THE BRIDGE, INC.
Release 2.1 of Trak

The Bridge, Inc. has enhanced its Trak on-line project management system for IBM mainframes to include an additional level of security, a new project subdivision, the ability to create new projects and activities by copying existing data and extended capabilities for automatically calculating costs.

The new security allows project leaders to create projects and perform maintenance but prevents them from maintaining tables. An intermediate level called Phase has been added between project and task. Phase records and totals are automatically generated and maintained. When new projects are created by copying an existing project, all estimated and actual costs are automatically zeroed, and activities can be copied to create the activity codes for a new department. Estimated task costs are now automatically calculated. If the estimated costs for a task are left blank, Trak is said to multiply estimated hours by a responsible employee's rate.

The software costs $9,500 on IBM's DOS operating system and $16,500 on IBM's MVS operating system.

The Bridge, 199 California Drive, Millbrae, Calif. 94030.

DATA BASE MANAGEMENT SERVICES

VISTA COMPUTER, INC.
Datascan enhancement

Vista Computer, Inc. has enhanced its Datascan data base software to include a cross-tabulation feature that reportedly permits users to create singularly changeable and individualized cross-tabulations.

The cross-tabulation feature is said to permit creation of comparative tables from any subset of the data base with no need to work with the entire data base.

The enhancement can reportedly deal with 250,000 records and hundreds of data fields. It is available for $20,000 for Data General Corp. Nova and Eclipse series processors and $25,000 for DG's MV series computers under AOS/VS.

Vista Computer, 85 Executive Blvd., Elmsford, N.Y. 10523.

NDX CORP.
Createbase

NDX Corp. has announced a new price schedule, including some decreases, for perpetual licenses of its Createbase data base management software. It also has established a monthly rental plan to introduce Createbase.

The new prices for perpetual licenses of the Createbase software, listed with the systems on which the product runs, are: Sperry Corp. Univac 1100/40, 1100/60, 1100/70, $35,000; Univac 1100/80, $45,000; Control Data Corp. Cyber 176 and 875, $50,000; CDC Cyber 175 and 170/750, $35,000; Cyber 170/760, $40,000; IBM 4341 series, $25,000; 3080 series,

SOFTWARE & SERVICES

$45,000; 3030 series, $35,000; Hewlett-Packard Co. HP 3000 System 3, $10,000, and HP 3000/64, $20,000; Wicat Systems, Inc. System 150, $2,500; Systems 200 and 220, $5,000; Cray Research, Inc. 1/M, $75,000, and X-MP, $95,000.

Perpetual licenses are available for Tandem Computer, Inc. Non Stop and Non Stop II computers, with pricing based on their number of CPUs. Prices begin at $15,000 for two CPUs and range to $60,000 for 16 CPUs. Monthly rentals of Creatabase range from a low of $150, for use on a Wicat 150, to a high of $4,750, for a Cray X-MP, the vendor said.

NDX, 8360 Greensboro Drive, McLean, Va. 22102.

SIGNAL TECHNOLOGY, INC.
Smartstar 30-day trial

Signal Technology, Inc. is offering 30-day trial packages and dial-in demonstrations of its Smartstar integrated data management software. Smartstar reportedly consists of two fourth-generation software productivity tools, Smartdesign and Smartquery.

Smartdesign is the system's applications designer and Smartquery is the fourth-generation query program for execution of those applications, according to the vendor. The Smartstar software will reportedly run on any Digital Equipment Corp. computer under the VMS operating system.

The 30-day trial package for Smartstar is available for $300 and includes a set of documentation, a nine-track magnetic tape and demonstration materials for VAX/VMS 3.1. The price of the trial package will reportedly be refunded if Smartstar is purchased within 60 days. The Smartstar dial-in demonstration is available over phone lines from the vender's computer system.

Smartstar is available for the following computers at the following prices: VAX-11/730, $4,000; VAX-11/750, $5,600; VAX-11/780, $7,000; and VAX-11/782, $7,000.

Signal Technology, 5951 Encina Road, Goleta, Calif. 93117.

VALUE COMPUTING, INC.
IDMS Accounting Subsystem

Value Computing, Inc. has announced the IDMS Accounting Subsystem, which produces performance and accounting reports and provides utilization statistics for users of Cullinet Software, Inc.'s IDMS data base management system.

The system reportedly extracts data from the IDMS log and reports IDMS internal task and transaction activity, external run units for batch programs and for tasks executing in another region and terminal activity. It includes an interface to Value's Comput-a-Charge data center accounting and billing system.

The system runs on the IBM 370, 30 series and 4300 series processors under IBM's DOS/VSE, VS-1 and MVS operating systems, according to the vendor.

The purchase price is $5,000. A 12-month lease is available for $460 per month.

Value Computing, 498 N. Kings Highway, Cherry Hill, N.J. 08034.

LANGUAGES

CLARITY CONCEPT SYSTEMS CO.
Enforcer I

Clarity Concept Systems Co. has introduced Enforcer I, which is said to help data processing departments eliminate the practice of speed coding.

Speed coding, according to the vendor, occurs when programmers use too many abbreviations and too few comments in their programming. Enforcer I reportedly consists of on-site instruction provided by the vendor and a program that checks the work of programmers to warn them against speed coding as they work.

The software is said to operate during programming without interfering with the programming's progress. The software reportedly will operate on any system that supports Cobol.

Enforcer I licenses for $9,600 per year, including software and orientation instruction. For installations outside New York, users must provide travel expenses

Continued on page 90

Lear Siegler
Quality and Reliability You Trust. High Touch™ Style You'll Prefer.

This new generation of Lear Siegler video display terminals brings elegant High Touch™ style to our American Dream Machine (ADM™) tradition. The family features three new ergonomic terminals designed to meet the needs of OEMs and end users alike: the ADM 11, the ADM 12 and the ADM 24E.

Here is a whole new way for terminals to relate to people. Dozens of little touches add up to the convenience and comfort of High Touch.

For example, we put the power "on/off" switch and contrast control knob in front where they're easy to reach.

The monitor not only tilts and swivels, it stops positively in almost any position.

The clean, crisp display features a large character matrix on an easy-to-read green or amber non-glare screen–made even easier to read by the hooded bezel. Screens are available in 12" or 14" sizes.

You get the best in style and ergonomics, plus all the outstanding performance features you'd expect from Lear Siegler (see chart).

Lear Siegler High Touch terminals are backed by the broadest network of full service centers anywhere, serving 3000 cities nationwide. And they're made in America–designed, engineered, manufactured and shipped from Anaheim, California to provide you with the best local support.

Place your order today by calling your local Authorized Distributor or, for quantities in excess of 500 units, your Regional OEM Sales Office.

Lear Siegler's new VersaPrint™ 500 Series printers combine with Lear Siegler video display terminals for hard copy output.

Low-profile, tapered, DIN-standard keyboards with Selectric layout feature logical key groupings and adjustable tilt for comfort and efficiency. ADM 11 shown above.

	ADM 11 Conversational	ADM 12 Editing	ADM 24E Host Programmable
Programmable Function Keys	4 (Shiftable to 8)	16 (Shiftable to 32)	16 (Shiftable to 32)
Non-Volatile Function Keys	Optional	Standard	Standard
Function Key Legends on 25th Line	From Host	From Host	Standard Non-Volatile
No. of Pages of Display Memory	1	2	2 or 4
Display Memory Configurations (Plus 25th Message/Status Line)	24 Lines by 80 Characters	(2) 24 x 80 or (1) 48 x 80 or (1) 24 x 158	User Definable up to 96 x 80
Scrolling	Standard Scrolling	Smooth, Jump or Horizontal Scrolling Split Screen	Smooth or Jump Scroll Split Screen
Transmission Mode	Conversation Mode	Conversation or Block Mode	Conversation or Block Mode
Editing	Limited	Full Editing & Protected Fields	Full Editing & Protected Fields
Visual Attributes: Reduced Intensity, Blink, Blank and Reverse Video. Underline also on ADM 12 and ADM 24E	3 Embedded 4 Non-Embedded	4 Embedded, 1 Non-Embedded or All Non-Embedded, plus Full Screen Reverse Video	5 Embedded, 1 Non-Embedded or All Non-Embedded, plus Full Screen Reverse Video and Highlight
OEM Flexibility	Modifiable Set-Up Characteristics	Modifiable Set-Up Characteristics & Personality	Modifiable Set-Up Characteristics. Add to Program in ROM or Down-Line Load in RAM (96K ROM or RAM. Up to 222K Display Available) Room for additional Logic Boards.
Terminal Compatibility	ADM 3A, ADM 5, ADDS Viewpoint & Regent 25, Hazeltine 1400, 1420 & 1500, DEC VT-52	ADM 3A, ADM 5, ADM 31, ADM 32	ADM 3A, ADM 5, ADM 31, ADM, 32, ADM 42

Call Lear Siegler at **800/532-7373** for the phone number of an authorized distributor near you: Advanced Technology · Continental Resources · The Datastore · Data Systems Marketing · David Jamieson Carlyle, Inc. · Digital Source · Dytec/South · Gentry Associates · Hall-Mark Electronics · Inland Associates · Kierulff Electronics · M/A Com Absathon, Inc · Marva Data Services · M.T.I. · National Computer Communications · Pioneer (Standard, Harvey, Gaithersburg) · ZM Corp. · Wyle Electronics

Distributor Sales & Service: Boston *(617) 456-8228* · Chicago *(312) 279-7710* · Houston *(713) 780-9440* · Los Angeles *(714) 778-1010, ext. 219* · Philadelphia *(215) 245-4000* · San Francisco *(415) 828-8941* · England *(04867) 80666* · From the states of CT, DE, MA, MD, NJ, RI, VA and WV *(800) 523-5253.*

OEM Sales: Chicago *(312) 279-5259* · Houston *(713) 780-2505* · Los Angeles *(714) 778-1010, ext. 332* · New York *(516) 549-6941* · San Francisco *(415) 828-8941* · England *(04867) 80666*

LEAR SIEGLER, INC.
DATA PRODUCTS DIVISION

901 E. Ball Road, Anaheim, CA 92805 (714) 774-1010

© 1984 Lear Siegler, Inc.

Selectric is a registered Trademark of IBM. Viewpoint and Regent are registered Trademarks of Applied Digital Data Systems, Inc. VT-52 is a registered Trademark of Digital Equipment Corporation.

SOFTWARE & SERVICES

Continued from page 89

for a Clarity Concept Systems instructor.

Clarity Concept Systems, 14 Washington Place, New York, N.Y. 10003.

HARRIS CORP.
Harris C; VHIL

The Computer Systems Division of Harris Corp. has announced the addition of Harris C, a compiler for the C programming language, and VHIL (VOS Harris Implementation Language), an added-function C enhancement. Both are available for use on Harris superminicomputers.

A full implementation of the C language, Harris C is said to be compatible with other C compilers. Designed for extensive porting ability, Harris C reportedly performs record I/O, the Harris VOS I/O and byte-stream I/O.

The shared common-area interface on Harris C permits it to operate with Fortran on the same data, according to the company. Using this interface, programs can be written in both languages.

Other features include error checking and automatic error recovery, data checking and debugging.

Offered with Harris C for further program development uses, Harris' VHIL compiler is an extended version that is said to provide a friendlier programming environment than standard C compilers.

Harris C and VHIL compilers are available together for $7,500, with a monthly maintenance fee of $55.

Harris Computer Systems Division, 3101 W. Cypress Creek Road, Fort Lauderdale, Fla. 33309.

TOWER SOFTWARE, INC.
Sleuth

Tower Software, Inc. has introduced Sleuth, a debugging package for Cobol users on Hewlett-Packard Co. HP 3000 systems.

According to the vendor, Sleuth creates a running audit trail in an easy-to-read format. It can be displayed on a screen or printed.

Sleuth sells for $1,500 for a long-term license. Demonstration kits are available.

Tower Software, 338 15th Place, Manhattan Beach, Calif. 90266.

TARTAN LABORATORIES, INC.
C and Modula-2 compilers

Tartan Laboratories, Inc. has announced C and Modula-2 language compilers for Digital Equipment Corp. VAX-11 processors and National Semiconductor Corp. 16032-based Unix systems.

The compilers are said to provide optimized code while allowing program portability across architectures. The compilers' error diagnostics not only provide a line number and cryptic phrase for an error message, but also display the incorrect line and the ones surrounding it for context, point to the error and explain the problem and how the compiler attempts to recover from it, a vendor spokesman said.

Each compiler reportedly incorporates a tool called the Production Quality Compiler. This takes machine and language definitions and produces a compiler for specific languages on specific machines, the spokesman said.

The C and Modula-2 versions for VAX/Unix systems are priced at $2,000. Versions for 16032-based Unix systems are priced at $1,000 each.

Tartan Laboratories, 477 Melwood Ave., Pittsburgh, Pa. 15213.

SIGNETICS CORP.
C cross-compiler

Signetics Corp. has announced a C language cross-compiler that allows routines written in C to be combined or linked with routines written in the Signetics SC68000 macro assembler.

A vendor spokesman said the cross-compiler is designed for system engineers developing products based upon Signetics' SC68000 16- and 32-bit microprocessor family. The cross-compiler reportedly allows users to create programs in the most appropriate language and to manipulate hardware via the program's linking capability.

The system is said to conform to Version 7 of Unix C and to produce assembler code.

The operating environment is based upon any Digital Equipment Corp. VAX-11 processor.

The Signetics C programming language cross-compiler is available immediately at $3,400, including the C cross-compiler and the SC68000 macro assembler on ½-in. magnetic tape.

Signetics, P.O. Box 409, 811 E. Arques Ave., Sunnyvale, Calif. 94086.

REMOTE COMPUTING SERVICES

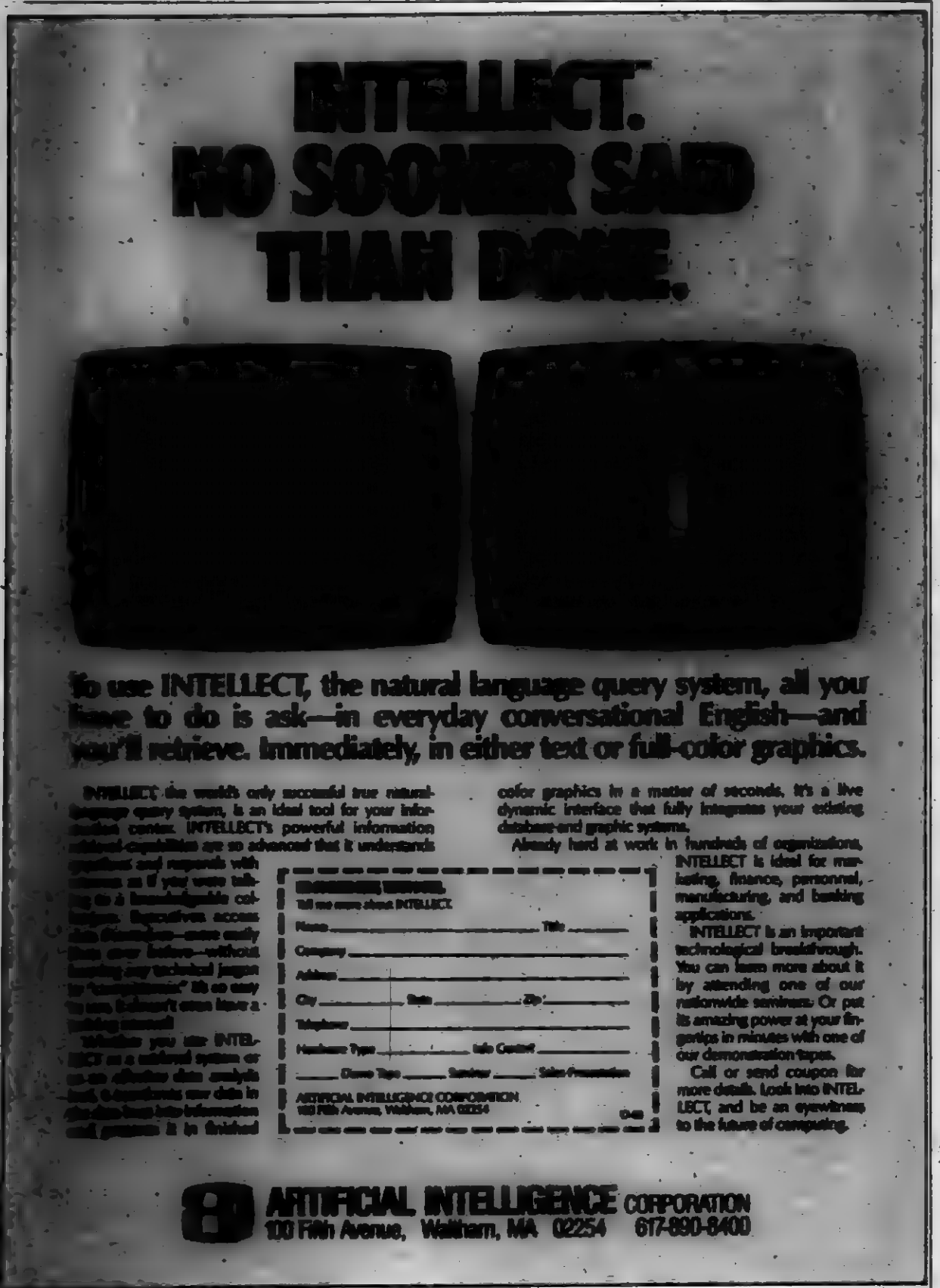
GENERAL ELECTRIC INFORMATION SERVICES CO.
Financial planning from Cali

General Electric Information Services Co. (Geisco) has announced that it will market financial planning software from Cali Computer Systems, Inc.

The Cali software reportedly includes a financial aid planning program and other Cali personal financial planning programs. The software will be downloaded to subscribers via the GE Mark III worldwide teleprocessing network and will be updated as enhancements are produced.

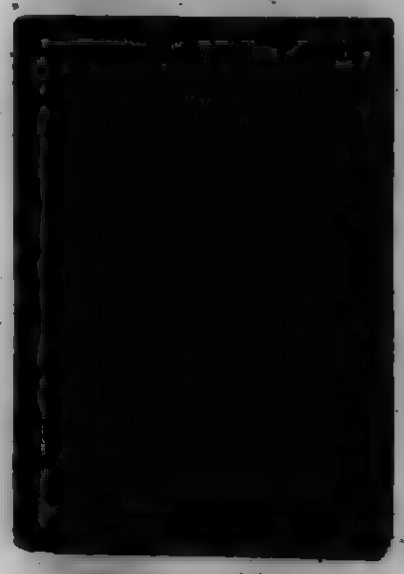
The Cali financial planning software runs on IBM Personal Computers and compatible machines. Subscriptions are available for $500 per machine per month, with a minimum order of 20 required.

Geisco, 401 N. Washington St., Rockville, Md. 20850.



APRIL 30.

Micros
in big
business.
A look at all the different ways micros are changing the work environment.
Closes April 13.



MAY 28.

Software
Productivity
Packages.
We tell our readers all we can about software and services designed to benefit the DP manager and his technicians.
Closes May 11.

JUNE 25.

Graphics
Systems.
Here's where we focus on the latest technologies, techniques and applications in computer graphics.
Closes June 8.

IF YOU'RE NOT IN COMPUTERWORLD'S NEXT THREE SPECIAL REPORTS, LOOK AT THE ISSUES YOU'LL BE MISSING.

Computerworld's special report issues are ideal both for the advertiser and the reader. Because each one offers focused, in-depth information.

Readers always want to catch up on what's hot and what's not in their particular specialty. And find out what the vendors have to offer.

As an advertiser, you won't want to miss the opportunity to tell them.

Maybe that's why our special reports are so popular.

Everyone wins.

For more information, or to reserve your space in any of our upcoming issues, simply call the sales office nearest you. Or fill out and return the coupon to Ed Marecki, National Sales Director, Computerworld, 375 Cochituate Road, Box 880, Framingham, MA 01701.

To: Ed Marecki, *National Sales Director*
CW Communications/Inc., Box 880, Framingham, MA 01701
Please send me advertising information on: ☐ *Graphics Systems.*
☐ *Micros in big business.* ☐ *Software Productivity Packages.*
☐ *Please have a sales representative call me.*

Name _____
Title _____
Company _____
Address _____
City _____ State _____ Zip _____
Telephone _____
SA

COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Sales offices.

BOSTON: 375 Cochituate Road, Box 880, Framingham, MA 01701 (617) 879-0700; CHICAGO: 2600 South River Road, Suite 304, Des Plaines, IL 60018 (312) 827-4433; NEW YORK: Paramus Plaza I, 140 Route 17 North, Paramus, NJ 07652 (201) 967-1350; ATLANTA: 1853 Peeler Road, Suite D, Atlanta, GA 30338 (404) 394-0758; SAN FRANCISCO: 380 Broadway, Suite 28, San Francisco, CA 94133 (415) 421-7330; LOS ANGELES: 18008 Sky Park Circle, Suite 260, Irvine, CA 92714 (714) 261-1230.

Computerworld/Espana makes talking to the Spanish computer market easy.

Spain has become a major and fast-growing market for U.S. exporters. There are currently 4,000 general purpose computers at 3,000 sites in Spain at an installed value of $2.2 billion. In addition, there are more than 11,000 office computers in operation. Industry revenues are increasing 20% to 30% yearly contributing to Spain's GNP growth of 9% annually for the last three years. To meet this growing demand for DP equipment, products and services, computer professionals read *Computerworld/Espana* when they look to buy. *Computerworld/Espana* is the only EDP newspaper serving the Spanish data processing market. Modeled after its sister publication *Computerworld*, it is a weekly tabloid with the most up-to-the-minute information for DP professionals and users who need to keep informed on the fastest growing industry in the area. And now, *Computerworld/Espana* makes its mailing list of 9000 EDP and MIS executives available for rental. This is a unique opportunity to test your product or service in this burgeoning market.

For further information on advertising in *Computerworld/Espana* or its mailing list, just fill out the coupon below.

Elena La Perugia, Manager
International Marketing Services
CW Communications/Inc.
375 Cochituate Road, Box 880
Framingham, MA 01701
(617) 879-0700

CW COMMUNICATIONS/INC.
Publishers of *Computerworld* and other leading computer publications around the world.

Please send me more information on
☐ *Computerworld/Espana* ☐ Your other foreign publications

Name _____ Title _____
Company _____
Address _____
City _____ State _____ Zip _____

INTRODUCING YOUR NEW NIGHT SHIFT.

BiComM-3700 lets your personal computer communicate with a mainframe even when you're asleep. Telephone costs are lower. Mainframe time is cheaper. And how many people can reckon to use your computer at 2:00 AM?

[illegible]

The BiComM-3700 communications package emulates the popular 2780/3780 series of RJE stations, with many added features. You can prepare a simple command file to direct it's operation when no one is around. Of course, you can also transfer files in an interactive, menu-driven mode day or night.

[illegible]

You'll be able to sleep soundly because BiComM-3700 uses the BISYNC communications protocol—tried, tested and proven effective for over fifteen years. It contains powerful error detection features to insure that your data arrives safely and securely, writing a complete time-stamped record of everything it does.

[illegible]

Your new night shift works faster than others because it can communicate at speeds up to 19,200 baud, and up to 9600 baud over dial-up, voice grade telephone lines using standard modems. That means no extra costs are incurred for specially treated lines. When you arrive the next morning you'll already have a big head start on the day's activities.

BiComM-3700

Put your night shift to work for you tonight!

Packaged Solutions
INCORPORATED

[illegible] BISYNC communications for IBM Mainframes, BiSynchronous and many RS232 equipments. Available now at list prices starting at $695.

[illegible] Packaged Solutions, Inc. One Washington Quadrangle, Suite 3CW, Melville, New York 11747, USA (516) 753-1049. TELEX 144654.

The BiComM-3700 was developed by Wilcox Systems Inc.

SOFTWARE & SERVICES

GENCODE from page 77

have the ability to "learn" document styles, then compose them with no operator intervention. It takes longer on a batch system to set up the initial job of a series than it does on an interactive system. But once the style has been learned, a batch system will compose subsequent jobs with little assistance from the operator. Batch systems are good for directories, technical documentation and financial and legal documents.

Batch systems are clearly the choice for composing generically coded text files. Recall that document elements, such as paragraphs, tables and emphasis points, are coded for their intellectual, not typographic, attributes. It makes far more sense to have the computer go through the document and make it look the way it should (batch approach) than to have a human operator go through the document page by page (interactive system).

To maintain the integrity of the gencode approach, a prepress system must not require manual intervention. This spells disaster in a gencode system for a number of reasons.

Suppose the style dictates a maximum of three consecutive hyphenated lines. After composition, a proofreader notices a paragraph with four consecutive hyphens. Since the system has no provision to allow the user to specify the maximum number of hyphens, the job must be called up on the screen and a hard line ending code inserted.

We now have several problems. First, we have coded a typographic parameter into the text file that is philosophically incompatible with gencode. Second, we now have system-specific markup coding in the file, so it is no longer portable, which defeats the purpose of gencode. Third, if text is added later and the job precomposed, many of the lines following the additional text will break differently than they did before. Yet a break will automatically occur wherever the hard line break code has been inserted.

Prepress system attributes

This is only one of hundreds of stylistic parameters that may have to be specified before a complex document will paginate correctly with no manual intervention. As a result, a prepress system that can build pages without manual intervention must have two attributes.

The first is a markup language that can specify the entire spectrum of stylistic considerations. These include provisions for automatically generated headers, footers, footnotes and more.

The system also must have powerful formatting capabilities. These are necessary to make the link between tags and markup coding. Ideally, they should include in-stream processing capabilities that will manipulate text, automatically call formats, perform logical operations and so on. The importance of avoiding manual intervention cannot be overemphasized.

Brown is president of Datalogics, Inc. in Chicago and a member of the board of directors of the Graphic Communications Association.

Moucher is Datalogics' director of marketing.

PROJECT from page 77

that went into that plan. As with any contract, both parties must fulfill their obligations if the agreement is to work.

The second method for limiting high risk in project management is the use of the phase-limited commitment based on planning horizons. One of the functions of the project manager is to predict the future: what and when things will happen on the project.

It is not unusual for a data processing project manager to be given a big project assignment that will extend far into the future. It is the foolish project manager who pretends that one can accurately predict the end of the project. In these cases, the project manager should only predict the portion of the project that can be planned with reasonable accuracy. The appropriate length of time for the project manager to plan is known as the planning horizon.

Determination of what is the appropriate planning horizon depends on the definition of the organizational environment and the nature of the project. The project manager should consider three factors when selecting a planning horizon:

- The stability of the organization.
- The precision of the project definition.
- The complexity of the project.

The stability of the organization is reflected by the frequency of reorganizations and reassignments, the employee turnover rate and the frequency in which the organization's priorities change. A planning horizon should also take into consideration how clearly defined the project's scope and objectives are. Another factor affecting the appropriate length of a planning horizon is the complexity of the project itself. The more complex a project is, the greater the risk tends to be for the entire organization, thus the greater the risk for planning the project. For more complex projects, a shorter planning horizon is appropriate.

Usually, a project manager will select a planning horizon that coincides with the phases of the system development life cycle. This concept of planning only part of a big project is known as rolling project management or phase-limited project management. The wise project manager only commits what can be reasonably planned, thus making a phase-limited commitment to management.

The concepts of the performance contract and a phase-limited commitment can help the project manager minimize the risks associated with the position. The performance contract clearly defines the responsibilities of the project manager, the user and the organization's management. The contract approach makes it easier to define where pressure should be put in order to complete the project. The phase-limited commitment of a project manager commits only to those activities which can be reasonably planned and managed. With a clearer picture of responsibilities and obligations, project managers can more easily complete their jobs.

Alexander is a consultant with The Plagman Group, Inc. in New York. The Plagman Group is a regular contributor to Softline.

IN DEPTH

Pick steps out

Comparing Pick to Unix is a nice way to start a religious war. Both have extremely loyal followings who are quick to rush to the defense of their systems. Both products also have definite, nonoverlapping strengths and weaknesses.

By Rick Cook

The operating system *Business Week* called "the computer industry's best-kept secret" won't be a secret much longer.

More than a decade after its first implementation, the Pick operating system is beginning to attract attention outside a small fraternity of devotees. And Pick Systems, Inc., the company founded by Dick Pick to promote his brainchild, is getting ready to move the product into a much larger arena.

The company will attempt to go head to head against AT&T's Unix in the mini and micro worlds and to gain more visibility and credibility in the mainframe area.

In the time that Pick has been available, it has gained a considerable underground reputation as a system for business applications. Some observers see parallels between Pick's present-day cult status and vocally loyal following and Unix's situation just before it burst into public consciousness.

In its latest effort to broaden its market appeal, Pick Systems announced a release called Pick Open Architecture; developed a coprocessor called the Vulture to speed up the system on minis and high-end micros; and brought out the system for $495 on the IBM Personal Computer XT, the hard-disk version of that machine. The company is also mapping its first major advertising campaign and planning an educational and documentation program to make Pick more accessible and easier to use. To finance all this, Pick Systems is looking for outside capital for the first time and hopes to make an announce-

ment on that score in the next 60 days.

Basic space

Pick is a multiuser, virtual memory operating system with a built-in relational data base with a dictionary file structure. It has an English-like nonprocedural query language, a considerably extended compiled version of Basic, a stored-procedure language and a number of other high-level features. The system is optimized for business and management applications rather than scientific, engineering or systems development use.

In Pick, almost all of the details of hardware and file handling are hidden from the users and programmers. The system concentrates attention on the data and the relations among data. There are no fixed file or record lengths, for example, and files and records automatically expand or contract as data is added.

One area in which Pick excels, according to supporters, is in generating the kind of special reports that are the bane of most DP operations. Access, the Pick query language, is reportedly easy enough to use that a manager can start making his own queries with just a couple of hours' training.

To the user, it appears that the data is kept in a single mass. Relations are defined by means of items in special files called dictionaries, and they can be changed at will. To see how this works, consider the problem of converting a system from five-digit to nine-digit Zip Codes. With Pick, the task is easy. The dictionary item defining Zip Code can be called up and changed from a five-character field to a nine-character one in less than a minute. Since all dictionary items can be defined by name, the item would probably be called "zip.code."

In a well-designed data structure under Pick, the change need be made only once, because there is only one dictionary entry for Zip Code. All of the programs and procedures that use Zip Codes will reference that entry. Of course, if the user needs to maintain both five-digit and nine-digit codes, that can be done, too. The programmer would create a new dictionary item for nine-digit Zip Codes and indicate which addresses need which codes. Since each user has his own dictionary, the Zip Code size can be different for different users.

One area in which Pick excels, according to its supporters, is in generating the kind of special reports that are the bane of most DP operations. Access, the Pick query language, is easy enough to use that a manager can reportedly start making his own queries with just a couple of hours of training. Alternatively, even junior members of the data processing staff can produce complex reports quickly.

"Generally, we can get a report back to a manager within a couple of hours," says Brad Holland, a systems analyst at the Nichols Institute, a medical laboratory in San Juan Capistrano, Calif. "Some take longer, but the original analysis of the file structure that was done for our system doesn't take full advantage of Pick. Generally, in the event of a special request, we can get back to them at the latest the next day." The institute uses Pick on its Microdata Corp. 6000 and 8000 minicomputers.

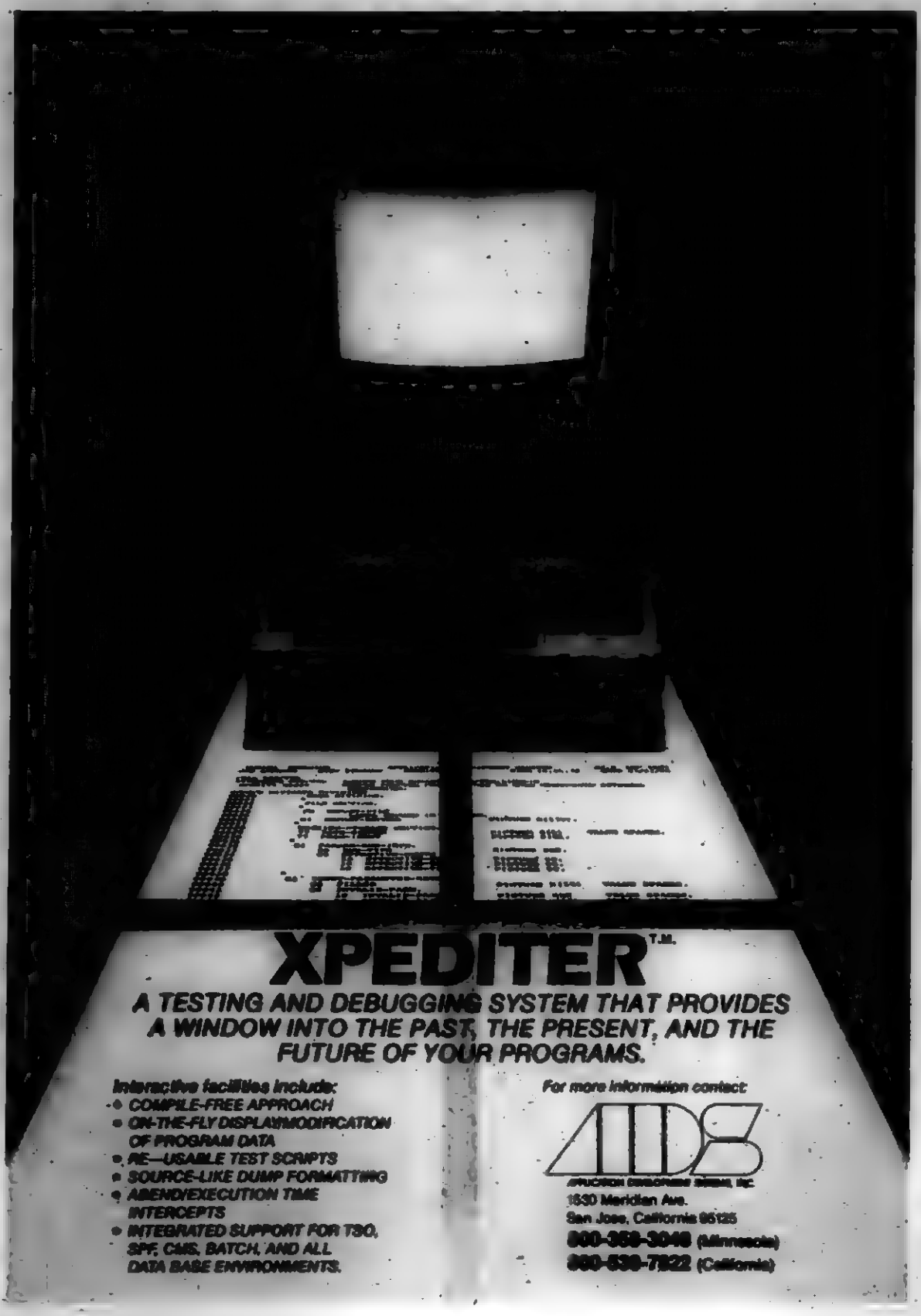
Complex series of commands can be created, named and stored as procedures, or "procs," to be called and used as needed. With the appropriate procs, even relatively naive users can perform complicated operations as easily as simple ones.

Pick dictionaries also allow users and programmers to define synonyms for dictionary items. If the user feels more comfortable calling something "electric bill" instead of "utilities," it is the work of a minute to define the terms as synonyms. This situation applies to the commands in Access as well. For the user, "list" can become "show me," or whatever. Words can also be defined as throwaways, to be ignored by Access.

This flexibility leads some users to set up their own simple form of natural language processing by replacing items and commands in their dictionary with their own words. More important, the English-like structure of the language and the ability to concentrate on the data rather than the system encourages free-ranging searches in the data base. A user can start with a general idea and follow where it leads, refining it with successive commands.

Structurally, Pick is a virtual machine entirely implemented in software or firmware. Even the memory management unit for the virtual memory is a construct. The Pick virtual machine has its own pseudo assembly language, which is rich in commands needed for data management. It also has about 600 instructions — one of the reasons that not many people try to write in Pick assembler.

The virtual machine is hooked to the hardware through a software module called the monitor. The first Pick implementations were on minicomputers, with the operating system in firmware. On microcomput-



Presenting the Stratus Office Solution™ (SOS). It Will Integrate Your Collection of Information-hungry IBM PCs into a Fault Tolerant Office System.

Somehow the personal computer revolution has become your personal problem, hasn't it? They're lined up with their IBM™ PCs demanding access…access to the corporate data files …access to shared data and hardware…

To compound the problem, the IBM PCs represent, for many of these users, their very first relationship with a computer of any kind.

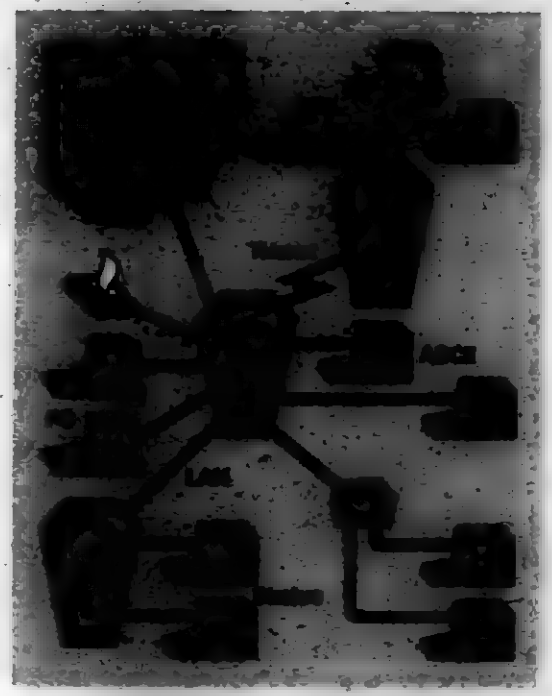
You need a solution right now and it has to be comprehensive and so easy to understand that even your neophytes will be in high gear on day one. And if they're going to depend on it, it should be fault tolerant. What you need is the Stratus Office Solution (SOS).

SOS Combines Comprehensive Software and Fault Tolerant Hardware

Stratus is the company that made its mark with its hardware-based fault tolerant super-mini. Now it is offering a turn-key software package built around this super-mini that is made to order for companies with an IBM host and from 20 to several thousand independent IBM PCs and/or 3270 and/or conventional terminals.

Here's a quick look at what you get with SOS (without having to write a single program):

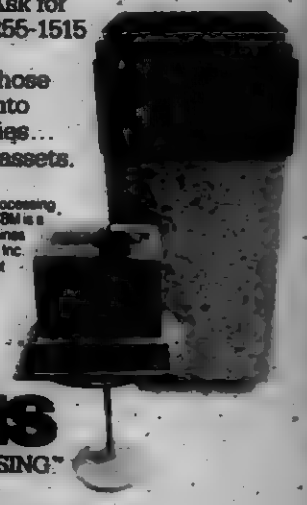
- ❑ Controlled IBM PC access to mainframe data
- ❑ Data exchange between IBM PCs



- ❑ Data conversion to 1-2-3™ and VisiCalc™ formats
- ❑ Electronic mail at IBM PC, 3270, or ASCII terminals
- ❑ Word processing on IBM PCs using WordStar,™ or MultiMate™ (a Wang-like word processing package)
- ❑ Text conversion from WordStar and MultiMate formats
- ❑ Stratus Word processing
- ❑ Shared access to Stratus printers and disks
- ❑ Calendar management at IBM PC, 3270, or ASCII terminals

SOS lets your collection of isolated PCs become part of an integrated, electronic office system. And unlike any other office system in the world, it is based on fault tolerant Stratus/32 hardware that provides continuous availability and transparent networking. Not only can you count on it to work well, you can count on it to always work.

Call Stratus today. Ask for Keith Johnson: 1-800-255-1515 or in Massachusetts: 1-617-653-1466. Turn those "personal" problems into personal success stories… and instant company assets.



Stratus Office Solution and Continuous Processing are trademarks of Stratus Computer, Inc. IBM is a trademark of International Business Machines Corp. VisiCalc is a trademark of VisiCorp, Inc. 1-2-3 is a trademark of Lotus Development Corporation. WordStar is a trademark of MicroPro International. MultiMate is a trademark of Software Systems, Inc.

Stratus
CONTINUOUS PROCESSING™

Now that the world relies on computers it needs a computer it can rely on.

era, the system is in software.

The setup is complex, and getting it running efficiently on a new machine takes some doing. On the other hand, once it is running, it will run any Pick software. Because of the virtual machine design, all computers appear to be exactly the same machine to a Pick application. Programs written on a multiuser micro under Pick will normally run on a mainframe with Pick and vice-versa.

Divergence with Unix

In this respect, Pick is the opposite of Unix, as Pick supporters like to point out. Unix is a highly portable operating system, but it exists in a number of flavors, and applications written for one version of Unix won't always run on another version. There is basically only one version of Pick, so while porting Pick is more work, applications load and go.

Perhaps Pick's most serious deficiency is in communications capability, particularly when compared with Unix. Users are limited in designing distributed-type systems.

"As Pick is portable across the hardware, we look at which hardware suits each installation and put in the same software everywhere," notes Zamir Hassan, director of information systems for Greenman Brothers, Inc., the parent company for several chains of wholesale distributors and toy and sporting goods stores with locations from Texas to New England. Hassan says the software is being developed at the company's Farmingdale, N.Y., headquarters on a Honeywell, Inc. Level 6 minicomputer with the assurance that it will run on everything from an IBM 4300 down.

Like many users, Hassan also praises the ease of applications development with Pick: "Pick Basic has a lot of power in it. The main programming language is not really Basic, I would call it very close to Pascal. If you are comparing it with Cobol, 10 pages of Cobol could be put in maybe 200 lines of code in Pick Basic. It's very easy to produce applications programs."

Because applications development is so easy, several microcomputer companies, such as Altos Computer Systems, Inc., offer Pick in addition to Unix for their multiuser systems.

According to Bob Boseman, director of marketing at Altos, the company offers Pick in special sales situations. "You always have some customers with unique needs and you have to have a fundamental tool kit to provide unique solutions." Boseman says Altos doesn't push Pick widely because "we are afraid of our dealers having to worry about too much."

Communications lacking

Perhaps Pick's most serious deficiency is in communications capability, particularly when compared with Unix.

"The basic thing available is standard 3780/2780 capacity," Hassan says. "That's the best you can do right now, and it limits you in designing a distributed-type system."

Pick also lacks floating-point ability. Holland says that is the reason the Nichols Institute uses another system to handle the data reduction of its laboratory tests and Pick for business functions.

"Pick is great for business, but it would be nice to run the processes of the company on Pick, too," he says.

Other common complaints about Pick are the lack of a high-level language besides Pick Basic and the fact that the system is not multitasking in the sense that Unix is. Each terminal can run only one thing at a time instead of several tasks at once, the way Unix can.

Open Architecture

Pick Systems' response to all this is Open Architecture, a series of enhancements for Pick which will offer multitasking, floating-point arithmetic, better communications and a number of other features. It also offers a 20% to 25% performance improvement, the company says. The package was formally announced at Pick Spectrum, the annual Pick get-together, last February, and it is supposed to be completely implemented in the next 18 months.

"That is the basis for the future," says Wayne Wahlenmeier, Pick Systems' vice-president of marketing. "We're opening ourselves up more and more to additional things."

Pick sees Open Architecture as a further generalization of the concepts of the operating system. "In the most simplistic terms, what Open Architecture is all about is generalizing that underlying operating system to where it is not just suited to run our system, but it can run anything — like [Microsoft, Inc.'s] MS-DOS or Cobol."

"It's the culmination of a 20-year project," Pick says, "and I'm willing now to say there is better underlying architecture for a multiuser time-sharing system than what you're looking at now." He adds that when Open Architecture and the associated tools are completed over the next year to 18 months, he will be ready to move on to new things.

Open Architecture was designed to make it easy to add other features to the system as it is developed. Among those Dick Pick wants to add are artificial intelligence features.

"If you look at what we have today, it is generalized information management. You can abstract information from the real world and

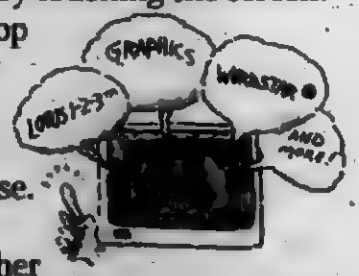
Is your office operating at a crawl...

Maybe the one thing you need to get off the ground is the Touchscreen Personal Computer. The HEWLETT-PACKARD 150. Because it's no ordinary machine. Remember the first time you approached a personal computer? If it wasn't exactly love at first sight, it was probably because a lot of machines can be pretty intimidating. Especially for first-time users.

HP 150

We've made the Touchscreen Personal Computer so easy to use that people like to use it. Very simply, we've taken out the intimidation factor. We've made the new Touchscreen Personal Computer so easy to operate that even first-time users can use it. Which means they'll quickly grow to love it.

For example, to select the software you want to use, just touch the screen. So whether you want to work with words, numbers or graphics, all you have to do to get started, is touch the screen. And once you get going, you can change a number in a spreadsheet, or make a chart for a presentation just by touching the screen. No complicated commands to remember. No desktop gadgets to manipulate. All that's required is the touch of your finger. MultiPlan,™ Graphics, WordStar,® Lotus 1-2-3,™ dBase II,™ VisiCalc® and a world of popular software become easier than ever to use.



The Touchscreen Personal Computer not only communicates with people. It communicates with other computers, too. Your people are your most valuable asset. But the more information they have at their fingertips, the more valuable they become. The Touchscreen Personal Computer delivers again.

structure it in the computer. The next big thing is what I call generalized decision management, where I can come up with some kind of a structure with which I can describe how decisions are made in terms of a man-machine interaction."

Pick also wants to add voice recognition. He points out that after the initial analysis of the waveform to get the phonemes, a process that can be handled by a dedicated microprocessor, the rest of the problem is a matter of data management.

From Girls to Pick

The basis for the Pick operating system as it exists today is the structure that Dick Pick and his co-workers developed in the mid-1960s for TRW on an Army project called Generalized Information Retrieval Language and System (Girls, later General Information Management [GIM]). The Army was looking for some method of managing the information flow in complex projects, specifically the Cheyenne helicopter.

The basis for the Pick operating system as it exists today is the structure that Dick Pick and his co-workers developed in the mid-1960s for TRW on an Army project called Generalized Information Retrieval Language and System (Girls, later General Information Management [GIM]).

The system that Girls/GIM came up (and which Pick later refined) used a paper machine optimized for information management. As much as possible, the hardware details were to be handled by the machine rather than the user, leaving the user free to concentrate on the data. The Girls/GIM project implemented this paper machine as a virtual machine on an IBM 360.

"In terms of the general concept of data management and the kinds of tools, it was complete. Now we're just trying to get in all the things we conceived of 20 years ago," Pick says.

The Cheyenne proved to be unmanageable, but it launched Pick on the path he has followed ever since. "I've spent the last 20 years trying to disprove the old saying that if you build a better mousetrap, the world will beat a path to your door," he says of his and his company's career.

After the Army project ended, Pick acquired the rights to the system and set out to develop it to meet his conception. In 1973, it appeared on Microdata minicomputers as the Reality system. Pick eventually left to market the system elsewhere. A lawsuit over the rights to the operating system was finally settled out of court in 1981. That suit was one of the reasons Pick has remained relatively unknown.

Another thing that helped keep Pick a secret was the penchant of Pick licensees to market the system under different names. In addition to Reality, Pick is known as Ultimate on Honeywell Level 6 machines and Adds Mentor on Adds/NCR minis. While the lawsuit was active, Pick Systems encouraged this kind of proprietary nomenclature.

Pick's licensing agreements were also stringent and expensive. The one-time license fee to implement Pick was $1.1 million — a provision that has since been considerably modified. Because of the system's complexity, ports were, and still are, done in-house at Pick Systems. This situation ensured that everyone's version of Pick was software-compatible, but it limited the number of systems that could be supported.

Although Pick applications are highly portable, the operating system itself is not, at least not compared with Unix or other operating systems written in high-level languages. To make Pick operate efficiently, parts of the code must be optimized for each new processor, and that takes time. Even though a new implementation involves rewriting only about 5% of the code in the system, the company estimates it takes about nine months to bring Pick up on a new processor. For an implementation on a new machine using a microprocessor that already supports Pick, the time is cut in half.

Until recently, Dick Pick has had the reputation of being more interested in refining the system than in selling it. "Up until now, selling has been a reaction — we'd answer the telephone," says Barbara Young of Pick's marketing efforts. "Now we're actually calling people."

"It wasn't until the later part of 1981 that we really started to expand," says Wahlenmeier, "so we're really only in our second year of formal growth."

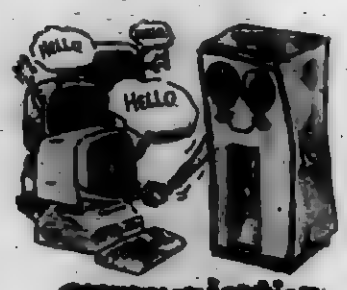
In 1982, the company became more aggressive. Pick Systems started long-range market planning and began to promote itself in the DP and business communities.

Between 1972 and 1981, according to Wahlenmeier, the company only did five implementations of Pick. In 1982, "once the company was released from the stigma of the lawsuit," it did five more implementations and added eight in 1983.

Most of these implementations have been on high-end multiuser microcomputer systems, where Pick's ease of use and software portability are major assets. Among the micro

(Continued on ID/8)

when it could be flying?



The HP 150 is fully compatible with the big HP 3000 computers and, with the addition of our new 3278 communications capability, the 150 can talk to IBM* mainframes as well. Your people can call up data, work with it and send it back to the host computer. All this with the use of the keyboard. The HP 150 can also send electronic mail and operate a range of peripherals at workstations. Needless to say, this can really move things along. The Touchscreen Personal Computer is a Hewlett-Packard product. This, after all, could be the most important thing you need to know about it. Your professional reputation depends on the key decisions you make. Office automation is one of those decisions. You need to know and trust the company you go with. Hewlett-Packard's long-standing reputation for excellence is a given in the industry. And our service and support will make sure you aren't standing still when you should be flying. See the HP 150 at your local dealer or for information call (800) FOR-HPPC today. Find out how a personal computer with a sense of touch makes a lot of sense for your office.

communication

TRUST

HP-150 at a Glance:	
User Memory:	256K-640K bytes
Operating System:	MS-DOS 2.0
Microprocessor:	16-bit, 8088, 8MHz
Permanent Memory:	(ROM) 160K bytes
Diagnostics:	Power-on self testing
Display Screen:	Touch-activated, green phosphor 80 characters x 27 lines 9 x 14 character matrix Upper and lower case Simultaneous text and graphics capability 390v x 512h graphics resolution 1024 characters and symbols in ROM
Keyboard:	107 keys, 6-ft. cord attaches to system unit, 10-key numeric pad, 12 function keys (8 screen labeled)
Compact Size:	2.1 sq. ft. desk space
Communications:	2 RS-232 ports (Built-in) HP-IB (IEEE-488) (Built-in) IBM 3278 (SDLC, BSC). Up to 19,200 bits per second
Peripherals:	Choice of printers (including optional internal printer), plotters, 3.5" and 5¼" floppy drives (264KB formatted), Winchester hard discs (5 and 15 MB)
Suggested Retail Price:	$3,995.00

MultiPlan is a trademark of MicroSoft Inc.
WordStar is a U.S. registered trademark of MicroPro.
Lotus 1-2-3 is a trademark of Lotus Development Corp.
dBase II is a trademark of Ashton-Tate.
VisiCalc is a U.S. registered trademark of VisiCorp.
IBM is a registered trademark of International Business Machines Inc.

Setting you free.
Hewlett-Packard Personal Computers

HEWLETT PACKARD

PG02409 2021

'We've always been oriented to on-line processing'

By Dick Pick

Pick was conceived 20 years ago with the recognition that for the simple data management tool required, a new logic was also required. We proceeded to define and then implement a rather sophisticated relational data base model. Our entire system was built upon this model and still is today.

Each datum you store in Pick is actually an "item," or, if you insist, a "record," and like items or records, they are stored together as a set in a file. For example, employee records, accounting transactions — and programs created with Pick/Basic — are all stored as items in some file. Pick/Basic is intended as an easy-to-use high-level programming language and has Pascal-like power.

The way most other computer systems organize and process data has not changed logically since Herman Hollerith invented the card tabulators for the 1890 census. With Hollerith's process, sorted transactions are processed against a sorted master file to produce an updated master file and then an associated report.

That's not so with us. We've always been oriented to on-line data processing. With Pick, a transaction is captured when it happens. With a single entry, it is processed immediately, and that includes updating multiple files on multiple systems. Errors are corrected then and there and that's the end of it. Twenty years ago, I believe primarily as a result of hardware price/performance and reliability limitations, this approach was considered radical.

Our initial appeal was to entrepreneurs or strong-willed managers running small to medium-size businesses — people after solutions and not afraid to try something new. Marketing and selling were left to our licensees.

Surprisingly, this "single entry" concept is still considered radical today, especially among many of my professional data processing colleagues.

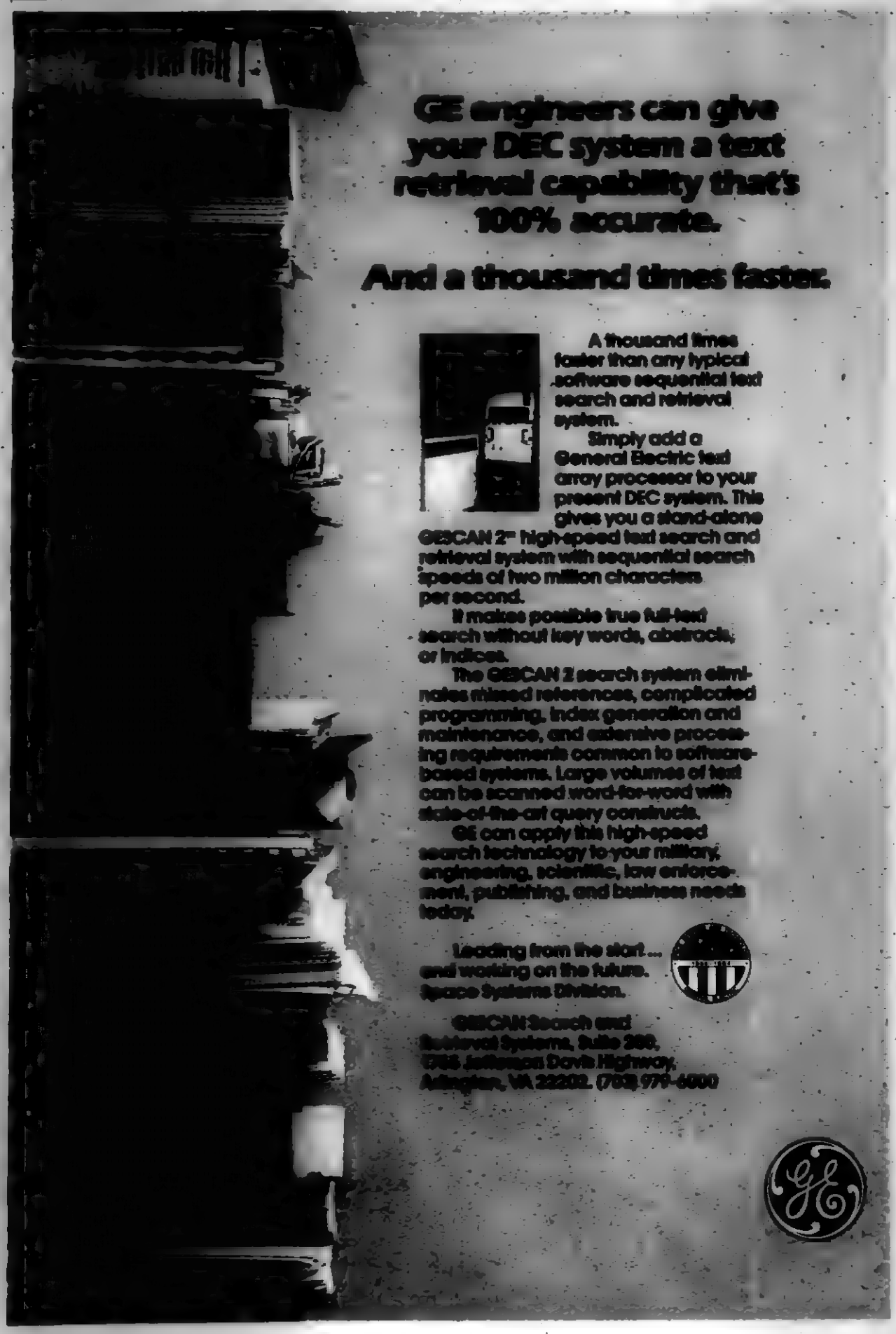
Our initial appeal was to entrepreneurs or strong-willed managers running small to medium-size businesses — people after solutions and not afraid to try something new. Marketing and selling was left to our licensees. And, as might be expected of a technical person, I devoted our resources to making the product better.

In spite of ourselves, we are gaining recognition and converts, even from the elitist ranks. And what is still most important to me, we have made the product better.

Pick with Open Architecture represents the most significant milestone in our history. We feel it will gain us up-scale market penetration at an increasing rate.

Concurrently, we've introduced multiuser, virtual memory computing to IBM Personal Computers with the Pick PC-XT software. We now cover a broad spectrum of IBM systems including Personal Computers, Series/1s and 4300 mainframes. We believe it's truly significant to span the IBM product line with a uniform operating system. Even IBM does not have a single operating system that spans its own product line.

I have spent 20 years leading the development of our system and its concepts. I like to consider these years as "tool building."



Dynamic mainframe looking for suitable personal mate.

If you speak or want to learn IFPS, we could make beautiful decisions together. P.S. Let's meet at the Information Center.

In the past, the hardest thing about financial planning was planning how to do it. That was until Execucom introduced IFPS. IFPS makes problem solving and decision making a lot easier. The tangle of technical details is avoided. And managers are able to master it in a very short time.

Now, financial planners have an opportunity to extend the power of IFPS Decision Support Software to their personal computers, an incredible advantage over any other Decision Support System available.

See Your Mainframe And Personal Computer Work Together At The Information Center.

When IFPS/Personal™ is linked to your mainframe through the Corporate Information Center, the reach of financial planning software is extended throughout your entire organization. You can easily and quickly transfer models and data between your mainframe and desktop computers and solve these models on either end.

You can share and consolidate individual models, reports and data files. You can create them all on your Personal Computer and process them on your mainframe. And IFPS is compatible with the leading general ledger, database and statistics software packages used by corporations.

Do All Your Planning And Modeling In English.

Thanks to the non-procedural language used in both IFPS and IFPS/Personal, you do not have to be a computer expert to build sophisticated models. Or to understand those that other people construct.

Receive The Most Comprehensive Computer Software Training And Service Program Available.

Not only a fact, but a promise. We have developed a support program that offers mainframe-level support on IFPS/Personal. It includes expert technical support for installation, superb documentation, comprehensive training programs, HotLine support, specialized consulting, periodic product enhancements and user associations. We believe that state-of-the-art technology deserves state-of-the-art service.

If the personals ad above looks like it may have been written by your lonely mainframe, call or write Execucom immediately and we'll tell you how you can get it an IFPS/Personal mate. If your mainframe doesn't have IFPS yet, call or write us today and we'll help you make your decision. Execucom Systems Corporation, 3410 Far West Boulevard, Austin, Texas 78731. Call 1-800-531-5038 or in Texas or Canada, call 512-346-4990.

EXECUCOM

IFPS, IFPS/Personal are registered trademarks of Execucom Systems Corporation.

IN DEPTH/PICK STEPS OUT

(Continued from ID/5)

manufacturers now offering Pick are Altos, Datamedia Corp., General Automation, Inc. and Pertec Computer Corp. Pick is also available on some IBM machines. Pick Systems sees its market as business computers, from large micros to mainframes. "We don't appeal at all to hobbyists, nor do we target the scientific area," Wahlenmeier says.

Given that determination not to appeal to hobbyists, Pick's $495 price for its Personal Computer XT implementation looks a little odd. For less than $500, Pick offers a relational DBMS with an English-like query language, an extended version of compiled Basic and a virtual-memory operating system. And the Pick implementation allows partitioning of disk space, so other operating systems, such as PC-DOS, can be run as well.

By contrast, the officially sanctioned version of Unix will cost $900, and the most respected relational DBMS for micros lists for about $750.

On the other hand, as a marketing ploy, Pick's price may be the neatest gimmick since the Captain Midnight secret decoder ring hooked an entire generation of kids into drinking Ovaltine.

Dick Pick says the aim is to "get an attractively priced product out into this boiling personal computer marketplace where people can really start using it."

As the company sees it, Pick's biggest problem right now is visibility. Selling a full implementation for less than $500 is going to build a lot of visibility. At that price, many data processing professionals or business people with access to a Personal Computer XT could afford to experiment.

Paying for it

All these projects — particularly the Personal Computer version of Pick — are going to put new strains on the company. This will be the first time the company has moved into the fiercely competitive world of selling software to end users. Until now, all the training and most of the user documentation were handled by the licensees.

There is also the possibility that Pick will cut a deal with a major manufacturer to market the product on that firm's micros. Dick Pick and his executives say they are talking to IBM, but that so far nothing has materialized.

After years of internally financed growth, the company is going after some form of outside funds. So far, Wahlenmeier says, nothing has been finalized. However, he said the company hopes to have something nailed down in the next 60 days.

Pick vs. Unix

Comparing Pick to Unix is a nice way to start a religious war. Both have extremely loyal followings who are quick to rush to the defense of their systems. Both products also have definite, nonoverlapping strengths and weaknesses.

Broadly, Pick may be superior for applications portability, business applications and managerial-type computing. Unix is regarded as better for operating system portability, multitasking, communications and scientific and engineering programming. Even Dick Pick admits that for scientific work, Unix has the edge.

In a business environment, Pick has the advantage of being designed for it from the ground up, whereas Unix is being brought over from the scientific, engineering and academic worlds.

In a business environment, Pick has the advantage of being designed for it from the ground up, whereas Unix is being brought over from the scientific, engineering and academic worlds. For example, Pick has file and record locking as an inherent part of the system. Only some of the other versions of Unix do.

On the other hand, many more people are familiar with Unix. Most computer science graduates in the U.S. have had at least some exposure to Unix, while almost all the Pick people are working in industry and learned it on the job. Of course, Unix has the weight of AT&T and a host of other companies behind it. Those companies have the money for advertising, promotion and training.

Finally, Unix has a considerable intellectual head start on Pick. It has been touted as the minicomputer and micro operating system of the future for several years.

Still, the people at Pick Systems are confident they can carve themselves a substantial place in the market. "We see Pick becoming more of a standard operating system offering from a multiplicity of vendors," Wahlenmeier says.

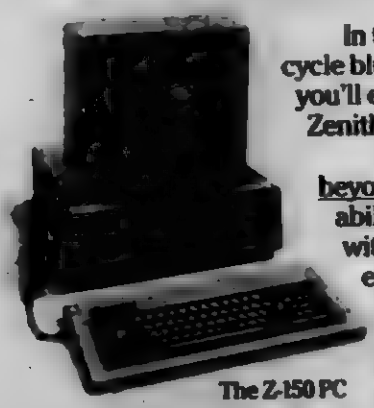
Dick Pick likes that idea, but his personal goals are somewhat different. "I'm going to be happy if I can keep making the system better and better," he says. "That's always been my driving force."

About the author

Rick Cook is a computer journalist based in Phoenix. His work has been published in Microcomputing *and* Infoworld, *and he is a columnist on the subject of compatibility in the micro world for* New In Computing *and* Computer Decisions. *Cook specializes in microcomputer operating systems and general high-technology issues.*

Go beyond equipment compatibility.
Reach for total performance.

The Zenith Z-100 PC's.



In the brutal rhythm of the time trial, something clicks: cyclist and cycle blur into one, and sprint toward total performance. And, in your office, you'll experience that same kind of oneness with our new IBM-compatible Zenith PC's.

Their enhanced features actually take you beyond IBM compatibility. Like internal expandability that allows you to add peripherals without adding size. Storage that can expand up to 11 megabytes. The ability to run virtually all software designed for the IBM PC. And a detached keyboard with a "smarter" key layout for added convenience.

The Z-150 PC

The portable Z-160 PC

Reach for total performance with the desktop and portable Z-100 PC's: call 1-800-842-9000, ext. 1, for the name of your nearest Zenith dealer.

For the Zenith Data Systems Dealer nearest you call
1-800-842-9000 Ext. 1.

ZENITH | data systems
THE QUALITY GOES IN BEFORE THE NAME GOES ON

© Zenith Data Systems

IN DEPTH

DB2 complementing IMS

IBM's data base strategy for tomorrow

By Paul E. Hessinger

IBM's current marketing theme for its large system architecture products is "the evolution continues."

In the data base area, IMS represented IBM's only complete data base/data communications resource for more than a decade. As the DP community's understanding of data base-oriented information systems evolved, new requirements were set for effective data base management system (DBMS) implementations. Other data base software vendors moved rapidly into the fourth generation with relational capabilities and integrated software architectures. "Evolution" was neither a guideline nor a constraint for companies like Cullinet Software, Inc. and Applied Data Research, Inc. (ADR).

With IBM's new relational DBMS, the evolution of large system data base/data communications capabilities finally has moved beyond IMS. As IBM's architecture for a fourth-generation data base environment is studied, the marketing theme is evident. IMS remains the workhorse. Database 2 (DB2) emerges as a component of the evolving data base architectures from IBM.

Consider these common data base-oriented questions for a medium-size to large systems environment using or considering IBM data base and data communications products:

- Has your installation taken IMS to the limit

With DB2, IBM's announced relational DBMS, the evolution of large system data base/data communications capabilities finally is moving beyond IMS. IBM's marketing theme becomes clear: IMS remains the workhorse; DB2 appears as a component of the evolving data base architecture.

of its capabilities?

Are development personnel being overrun with requests from end users for variations on reporting capabilities driven by IMS data base systems?

Has the information center concept provided a gateway for non-IBM software products that end users can employ but which need access to data "locked up" in hierarchical data structures?

Are you looking at the architecture of other vendors' data base software products attempting to determine if they represent an alternative to your current environment?

Is your installation considering a data base effort for the first time and are you finding it difficult to ignore all the horror stories about IMS, not to mention the lack of relational data base capabilities and fourth-generation user-friendly tools from IBM?

In the back of your mind are you thinking that just maybe IBM does have an architecture for large data base systems in place and that it is just appearing a piece at a time?

Part I. IBM's emerging fourth-generation data base architecture.

The third-generation concept suffered from too simple a view of the corporate data base, as well as from unreasonable expectations for a single piece of software — the DBMS. As a data base effort got under way, only a small percentage of corporate data resources was under the DBMS' control.

The majority of organizations that were attracted to the potential benefits of a data base approach began the implementation effort with a very simple blueprint in mind. The overall objective of the data base project would be the development of the "corporate data base" — all of the data necessary for business information processing requirements stored with minimal redundancy, to promote consistency, and maximum interrelationships, to promote sharing of data between different business operations and users.

The data base would conceptually support a variety of primarily operational information processing systems. The DBMS was the critical link between applications and data. Early DBMS implementations did not consider information retrieval and decision support capabilities to any significant degree. Most pioneers in the implementation of data base technology felt strongly that a DBMS would provide extensive control and sharing of data and dramatically improve the accuracy and timeliness of application development. These ideas can be referred to as the third-generation blueprint for a data base environment.

This third-generation concept suffered from too simple a view of the corporate data base, as well as from unreasonable expectations for a single piece of software — the DBMS. As a data base effort got under way, only a small percentage of overall corporate data resources was under the control of the DBMS. Other automated non-DBMS files (Vsam and sequential files) as well as nonautomated data were often ignored as potential sources of data redundancy and inconsistencies.

In addition, these other components of the corporate data base represented valuable sources of data for satisfying a variety of information processing applications. But if the data was not required for a specific application being developed under control of the DBMS, it was not considered in the data base design process. As a result, the DBMS apparently was not providing enhanced availability of data.

Following are the most common problems associated with third-generation DBMS:

- There was a lack of understanding about the overall format and usage of data.
- Synchronous Data Link Control (SDLC) was not modified to incorporate data base design techniques and technology (for example, data dictionary).
- Data base programming was complex. Programmers need to know a great deal about a data base in order to navigate through it to access required data.
- There was a lack of organizational responsibility for the data base effort from management and a technical perspective.

As more end users became involved in satisfying their own processing requirements, a conventional DBMS such as IMS was pressed to the limit of its capabilities.

A final evolution of the third-generation blueprint saw the emergence of new DBMS-oriented tools designed for the rapidly growing category of end-user-driven information retrieval applications. These types of applications involved rapid access to data in sequences or formats not previously anticipated by a data base design process.

The use of dictionaries and data modeling techniques helped to uncover some of these requirements, but when it came time to provide access to the data, conventional DBMS often could not support the requirement in a timely manner even if the data was physically present in

ADD TO AND TO

To add markets as well as profits to your business, add Zaisan to your system.

The ES.1 voice/data workstation offers single-key access to simultaneous voice, data or text. With the touch of a button, users can also access internal and external databases, PBX functions and electronic mail.

The ES.1 is also upgradeable. So you can add application and communication software to tailor the ES.1 to the individual information needs of your users. Which can add sales to your business.

Another plus is the price. And the wide range of service options.

Add these all up and you'll see the formula for success is rather elementary. Add Zaisan.

ZAISAN

13910 Champion Forest Drive. Houston, Texas 77069. 713.580.6191. *The new direction in business communications.*

GET THE WORD ABOUT TRANSACTION PROCESSING. IT'S IN THE BOOK.

In our free 82-page book, "SYNAPSE TRANSACTION PROCESSING: SYSTEM OVERVIEW." And it's a revelation. To non-technical management, technical management, and staff alike.

It spells out how to accelerate development and minimize maintenance of high-performance, fault-tolerant, online transaction-processing systems.

It also discusses miracles: how to get dazzling performance from a Relational DBMS and how to expand a transaction-processing system online under power.

It reveals how to provide fault tolerance without redundant hardware and without programming. How to use a system-wide dictionary to standardize and control all definitions and relationships. How to completely automate database integrity, concurrency and recovery.

It's all there. Chapter and verse. Even a comprehensive index. To get your copy, simply mail the coupon or give us a call at (408) 946-3191. And let there be enlightenment.

Synapse Computer Corporation

To: Synapse Computer Corporation,
Corporate Communications Department C2,
801 Buckeye Court, Milpitas, CA 95035.

Please send me your free, 82-page bible on transaction processing.

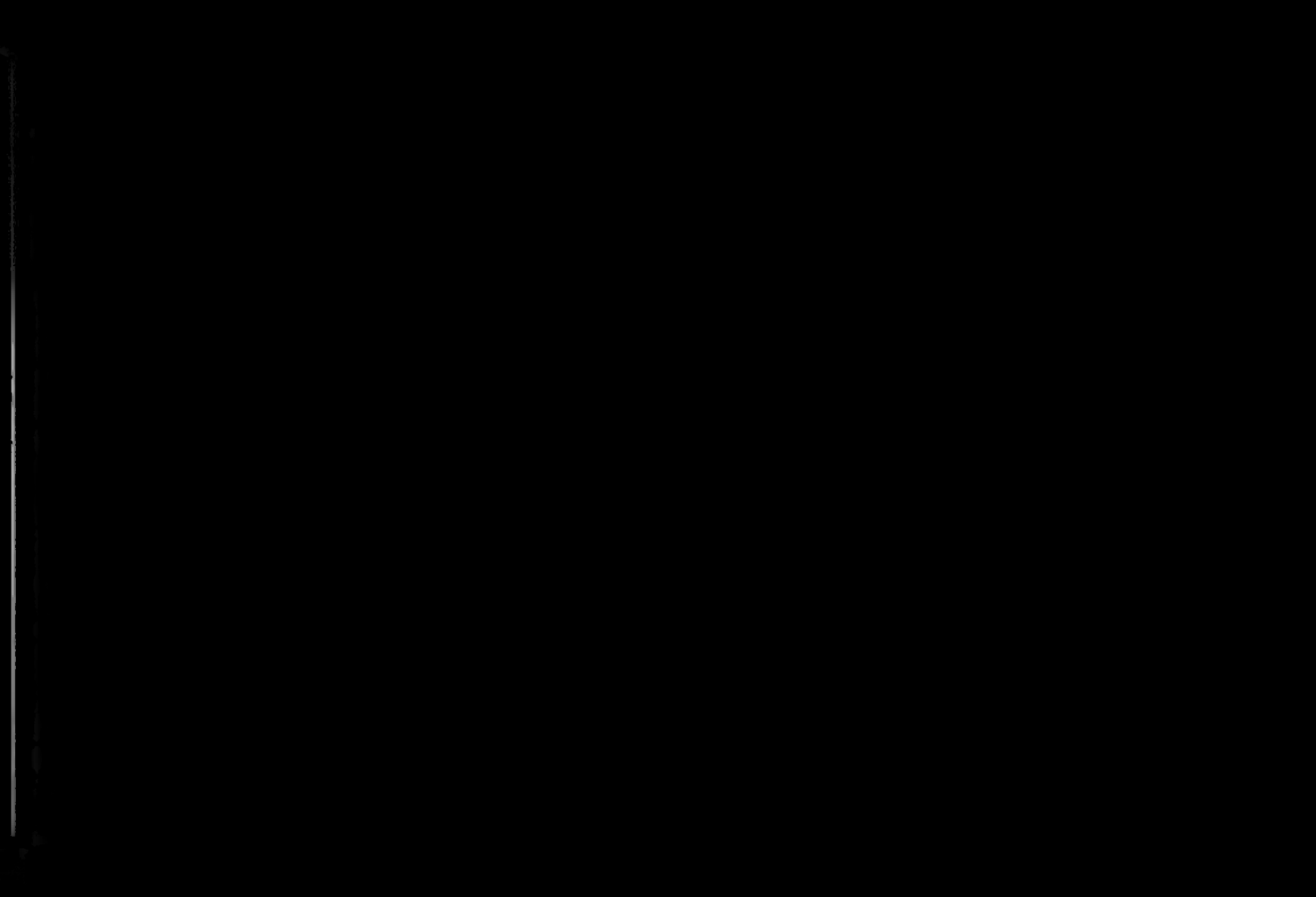
Name _____ Phone _____

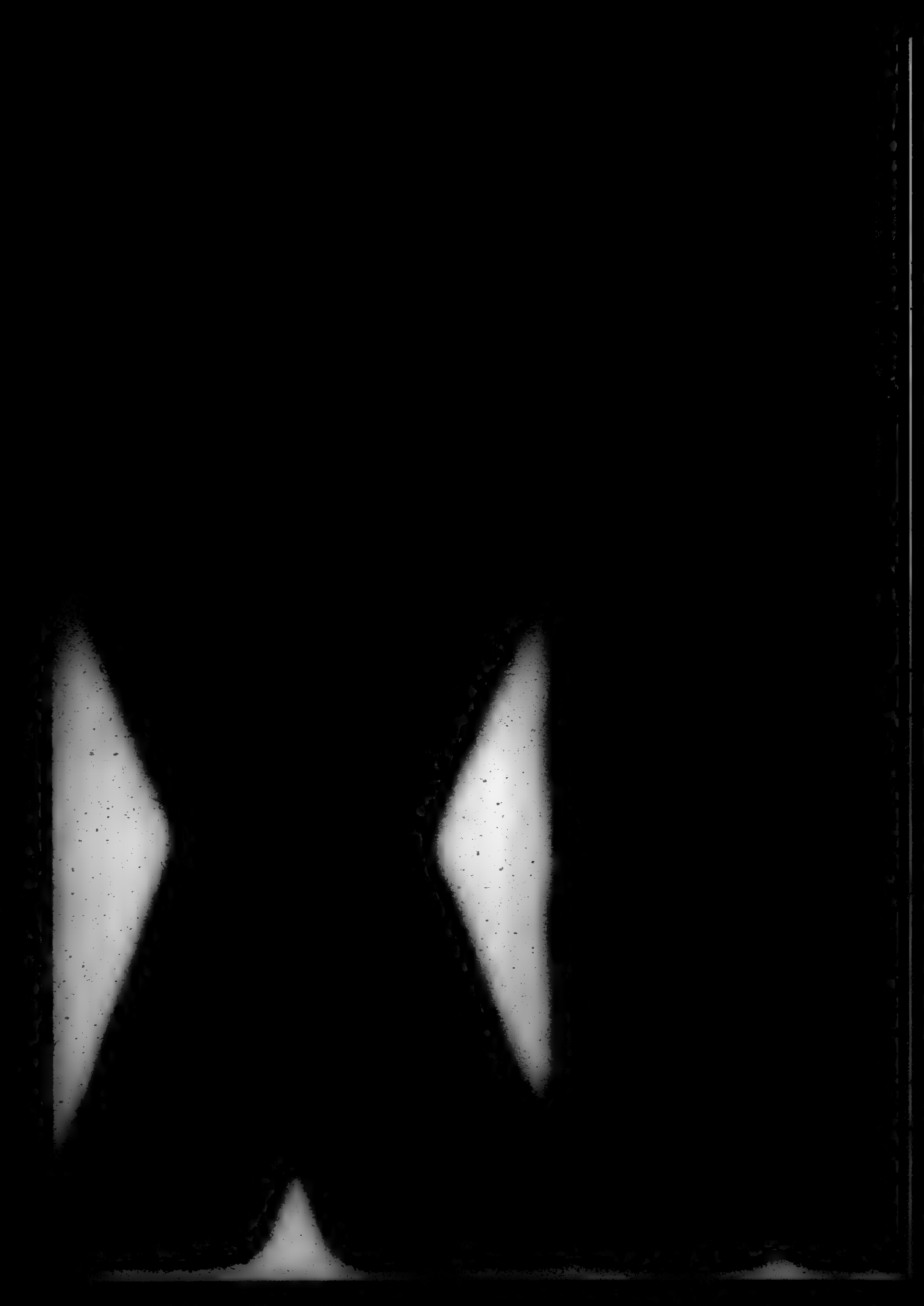
Title _____ Company _____

Address _____

City _____ State _____ Zip _____

© 1988 Synapse Computer Corporation.





"Graham's Epoch 400 develops fewer read/write errors; its quality is second to none."

When it comes to evaluating computer tape, the experts—those who use it every day—are not shrinking violets. Particularly our customers.

So when we had them surveyed recently, we were gratified to get so many high marks, like the quote above. We know they don't always use our tape for every job.

What they do use it for are critical jobs like data transfer, back-up and archival storage.

Gratified? Yes, but not surprised. Almost 20 years of uncompromising commitment have gone into making Graham Magnetics the tape company. We've done it worldwide by satisfying the toughest customers there are. Ours.

Talk to the Media Management Specialist at Graham Magnetics The tape company.

GRAHAM MAGNETICS

CARLISLE

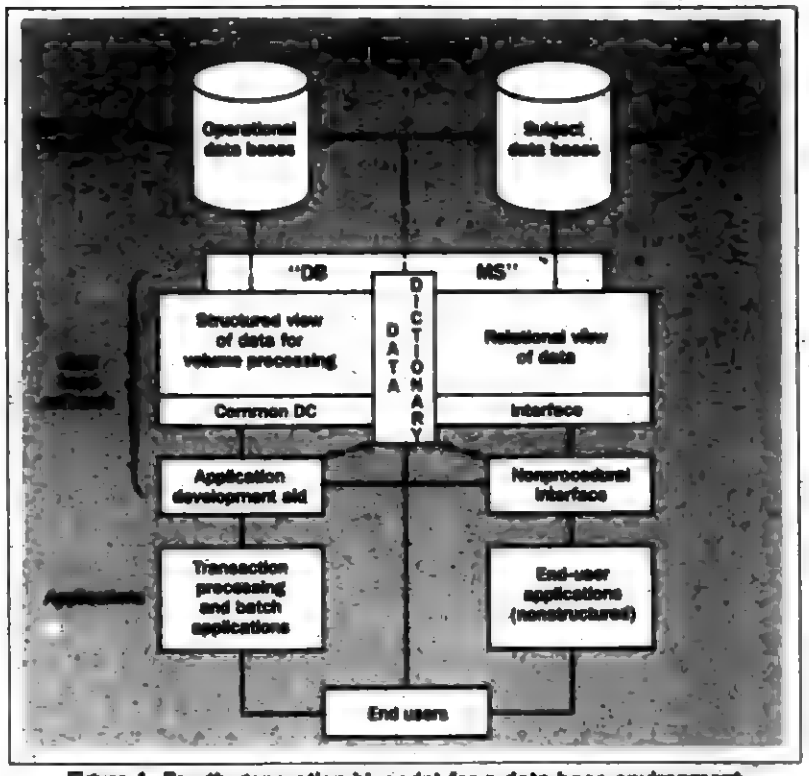


Figure 1. Fourth-generation blueprint for a data base environment

a component of the DBMS.

With this as a brief review, the fourth-generation blueprint for a data base environment begins to unfold (see Figure 1).

IBM's implementation

In the case of IMS, required data was often embedded in a maze of hierarchies, logical relationships and secondary indexes. An end user simply wanted access to data. Data base administration (DBA) personnel could utilize IMS DB's powerful capabilities to build access paths to required data, but they had to be concerned with the performance implications for operational systems accessing the same data.

What the users of IMS experienced was fairly typical of the experience many organizations had in attempting to implement the data base concept. In the case of an IMS DB/DC software configuration, emerging end-user information processing tasks seemed to highlight the "shortcomings" of IMS — and reinforce the need for relational data base capabilities.

IBM's recent direction (IMS 1.2 and 1.3) with its DB/DC products addressed primarily performance issues. Until recently, only *statements* of direction addressed the end-user data base issue.

As the third-generation blueprint was evolving, powerful non-IBM software such as Cullinet's IDMS became established as data base implementation vehicles. IBM, along with its major IMS users, began to migrate IMS into the fourth generation. Many doubted that the migration would be successful if IMS was a key component.

IBM responded to third-generation data base issues not with a replacement for IMS, as many gurus predicted, but with an array of complementary products (see Figure 2). (At one 1979 seminar, a leading IBM watcher predicted the end of IMS by 1980. A standing ovation followed. Tar and feathers almost befell me as I addressed the attendees and suggested that IMS really did work.)

The Application Development Facility (ADF, now ADF II) was introduced by IBM to address productivity of application development. The DB/DC dictionary was promoted as a DBA tool to assist in the design and control of IMS data base structures. As the pressure grew to support end-user-driven applications that utilized *information*-oriented data files — subject data base — a variety of IBM software products came into use, including ADRS-II and Query by Example (QBE). And, as a first indication of IBM's direction with fourth-generation tools, Structured Query Language/Data System (SQL/DS) appeared in 1981. (Unfortunately for MVS environments, SQL was a DOS-only product.)

Move to fourth generation

As a wider variety of data base applications appeared, new requirements were placed upon conventional DBMS. In addition to control and sharing of data and improved development productivity, a full-function DBMS had to provide for:

- Extensive data integrity and security.
- Integrated and automated recovery and restart facilities.
- Dynamic data definition capabilities.
- Utilities that can execute concurrently with application processing of data bases to facilitate continuous operation of the overall data base system.
- Opportunities to take advantage of operating system facilities and hardware architecture (for example, microcode) for physical processing of data.
- Very large data bases.

To be successful, DB2 will have to provide these facilities.

Release 1.2 of IMS in 1981 and Release 1.3 in 1983 have been dedicated almost exclusively to improved internal performance and capabilities consistent with these new requirements for large operational transaction processing data base systems. Among the features were data base recovery control, fast path enhancements, the IMS resource lock manager, multiple systems couplings, data sharing and better utilization of MVS facilities such as the Common Services Area (CSA). These enhancements to IMS strengthened

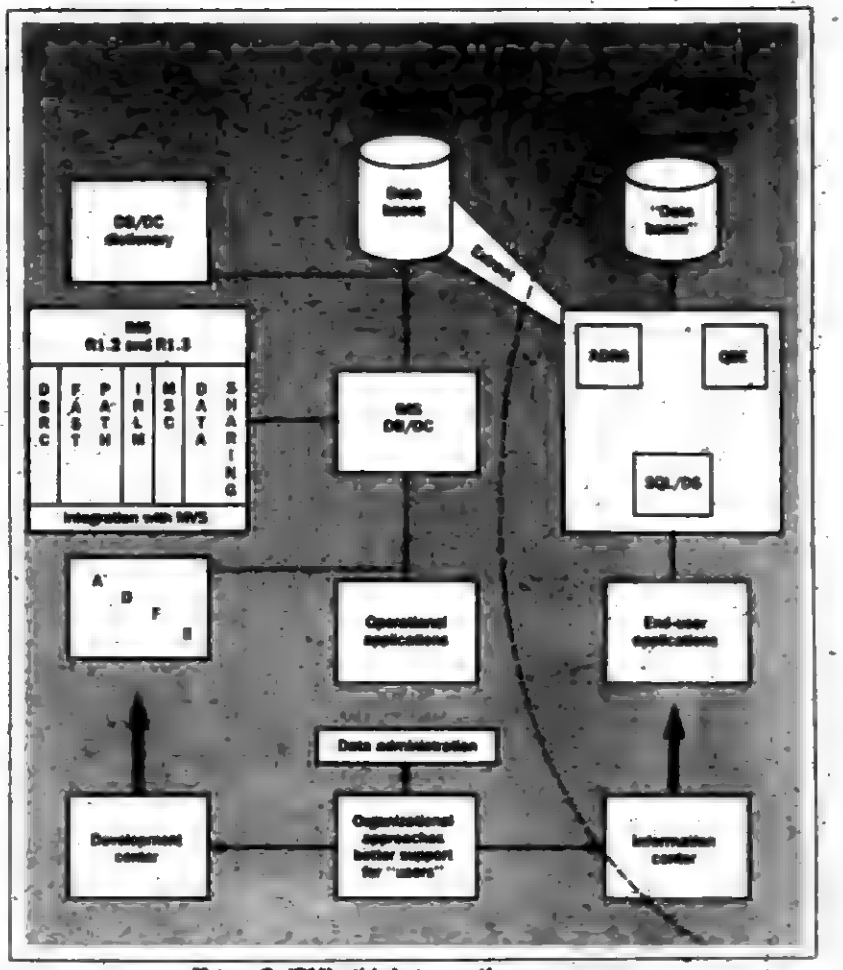
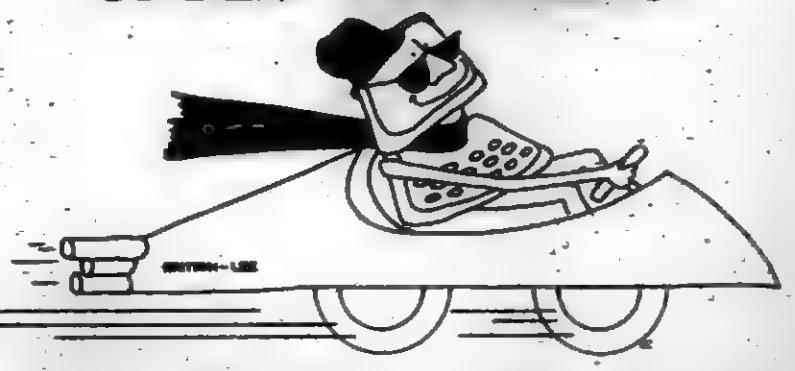


Figure 2. IBM's third-generation response

OMNIBASE™/IDM™ BREAKS VAX™ RELATIONAL SPEED BARRIERS



Signal Technology's OMNIBASE software driving Britton-Lee's IDM database machine is breaking records because it:

- Off-loads your VAX
- Has a much faster user response than software-only relational DBMS
- Dramatically increases productivity
- Has streamlined application development

Name _____
Title _____
Company _____
Address _____
City _____ State _____ Zip _____
Phone ( ) _____

SEND COUPON NOW FOR COMPLETE DETAILS!

STI Signal Technology, Inc.
5961 Encina Road, Goleta, CA 93117 (805) 683-3771
TWX 910-334-3471

IDM is a trademark of Britton-Lee Inc.
VAX is a trademark of Digital Equipment Corporation.

CCA EMACS

The most complete screen editor available for Unix[1] and VAX/VMS[2].

CCA EMACS from Computer Corporation of America has the greatest combination of power, speed, and functionality of any text editor available for Unix or VAX/VMS. With close to 400 built-in commands, CCA EMACS allows virtually any editing task to be accomplished in just a few keystrokes, including tasks that would be difficult or impossible to do using other editors. In addition, a set of more than 60 predefined variables allows each user to customize CCA EMACS to meet various application needs and user styles. All of these features are supported by a full online documentation package that can assist the user at any point, giving information that ranges from the definition of a single command to manual pages that contain complete explanations of major CCA EMACS features.

Operating Environment

Runs on Berkeley Unix (4.1BSD and 4.2BSD), Bell Unix (System III and System V), and VAX/VMS. Requires 500 K of address space.

Price

Prices for a full source license range from $350 to $2400. Contact CCA for further details.

For More Information Contact

Computer Corporation of America, Four Cambridge Center, Cambridge, MA 02142
(617) 492-8860

OEM inquiries are encouraged.
(1) Unix is a trademark of Bell Laboratories.
(2) Vax and VMS are trademarks of Digital Equipment Corporation.

Cut Information Retrieval Down To Size

...with BRS/SEARCH— the Software That Comes in Mainframe, Micro and Mini Sizes.

BRS/SEARCH, the same information retrieval software that runs one of the world's largest online database systems is now available for your mainframe, mini, or micro computer.

BRS/SEARCH gives you instant access to all your own information, regardless of its length or format. Many powerful, easy-to-use features developed through millions of online searches have made BRS/SEARCH the system of choice among information professionals.

BRS/SEARCH runs on IBM and compatible mainframes, as well as 16 and 32 bit mini and micro computers. And because the search query language is the same no matter what size computer, you can use it on a variety of systems without any additional training.

For more information about these three new sizes of database software, call toll free: (800) 833-4707; in New York State (800) 553-5566. Or write BRS Software Sales Support, 1200 Rte. 7, Latham, N.Y. 12110. Dealer and OEM inquiries invited.

BRS SEARCH SOFTWARE
An ITG Company

CW 4/84

I'd like to know how to cut my information retrieval problems down to size. I am interested in SEARCH for the following systems:

Mainframe: .....
Mini: .....
Micro: .....

☐ Please have a salesman call.
☐ Send me more information.

NAME _____
COMPANY _____
ADDRESS _____
CITY _____ STATE _____ ZIP _____
PHONE ( ) _____

IN DEPTH/DATA BASE STRATEGY

For an effective migration to IBM's fourth-generation architecture, the operating environment of DB2 will have to take advantage of existing facilities for the integration between the old and the new. IMS will remain a key component of IBM's data base strategy.

its ability to support large systems as effectively as possible in terms of design alternative and processing efficiency.

Unfortunately, from IBM's perspective, these enhancements accentuated the lack of nonprocedural/relational data base facilities for end users' information retrieval and reporting applications which would peacefully coexist with IMS DB/DC applications. IBM seemed entrenched with IMS and appeared to fall behind other data base architectures.

In looking at the facilities of DB2 and related products, the interrelationship between existing IMS systems and new DB2 systems is a key issue.

1. How will the data in hierarchical IMS data bases provide a source of data for relational data bases?
2. How will two separate DBMS *jointly* provide the capabilities essential for a full-function fourth-generation DBMS — automated recovery/restart facilities, for example?
3. Will one type of application (production vs. end user) have access to the other DBMS' data? Will the distinction between production and end-user applications begin to fade away?
4. Finally, will the interfaces between DBA, development staffs and end user be implemented in such a way that the DBMS system will become transparent?

For an effective migration to IBM's fourth-generation architecture, the operating environment of DB2 will have to take advantage of existing facilities for the integration between the old and the new. IMS will remain a key component of IBM's data base strategy.

Part II. DB2 architecture and basic capabilities.

In examining the architecture and capabilities of DB2, there are four items to be addressed:

1. Relationship to IBM large systems architecture (MVS/XA and 3080 series).
2. Terminology and structure for DB2's relational model.
3. DBMS features of DB2.
4. Interfaces to DB2 for data definition, data manipulation and data control.

1. Relationship to XA.

From the outset, it is important to understand that DB2 was designed as a full-function DBMS for the MVS 370 and XA environment (see Figure 3). All too often, "relational data base" conjures up an image of powerful end-user query languages without the need for all "that complex DBMS stuff" (recovery/restart, load utilities and so on). With an image such as this in mind, someone interested in DB2 might not get past Page 2 of the IBM general information manual. Much of that description focuses on "large system architecture" and its relationship to DB2. The next few paragraphs will attempt a painless summary of important technical data about DB2 and its relationship to other strategic IBM products such as MVS and IMS/VS.

DB2 operates as a formal subsystem of MVS. It was designed to take advantage of the architecture of 3080 series processors and MVS/XA. It is difficult to separate one from the other. MVS/XA will exercise 31-bit addressing to take full advantage of the processing power and memory capacity of 3080 series CPUs.

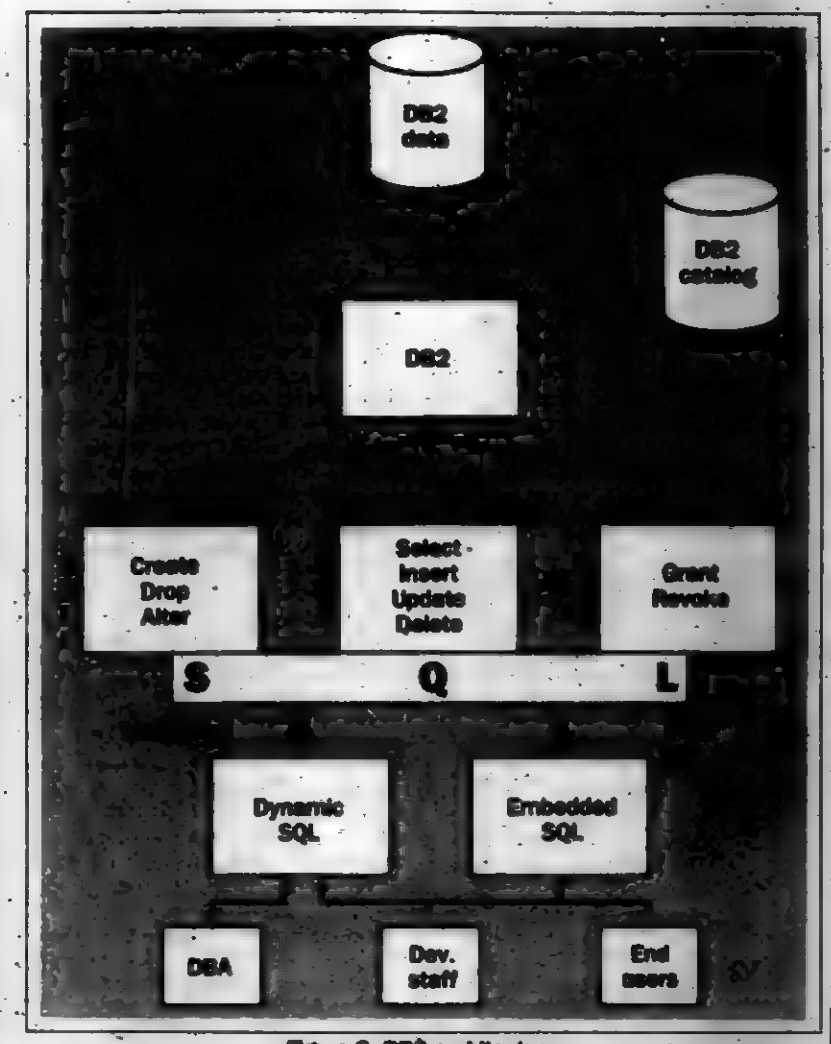


Figure 3. DB2 architecture

At the current high end of this series (3084Q), a simple image CPU complex can provide:

- Up to 2G bytes of main memory.
- Up to approximately 25 million instructions per second (Mips).
- Up to 48 I/O channels, with aggregate transfer rates of 140M byte/sec (allowing 70% channel utilization).

With the dyadic architecture of the 3081 and 3084, up to four CPUs will operate under the control of a single SCP — MVS/XA.

MVS/XA is clearly a key to the effective utilization of a 3080 series complex. However, while much has been made of the above statistics and 31-bit addressing, other features of XA provide powerful support for the data base systems architecture of DB2 and IMS. Two of these, which many IBMers consider to be the most significant aspects of XA, are cross memory services and the dynamic channel subsystem.

Cross memory services provide the ability for two or more MVS subsystems to utilize the same control block of code which has been located in CSA. An example of this in DB2 architecture is the IMS resource lock manager, which IMS also uses. The power and capacity of an MVS/XA 3080 series complex is significant in and of itself. With subtle capabilities, such as cross memory services, the throughput potential becomes even more significant.

The dynamic channel subsystem of XA also offers significant throughput improvement for any subsystem with heavy I/O activity.

Clearly, large data base systems will involve potentially high volumes of data transfer between main memory and direct-access storage devices (Dasd). Aggregate channel transfer rates appear powerful enough on their own. But it is not always transfer rate that determines I/O performance. Contention for a specific access path to a Dasd volume can seriously degrade I/O efficiency.

Currently, when a subsystem issues a start channel command for I/O, MVS will select an access path to the data volume required. When the physical I/O has been completed, that *same* path must be used to return the data to MVS. But a "channel busy" condition could result if a second I/O request had been sent down the same channel.

For this reason, IBM would always recommend that storage be arranged so that channel utilization never exceeded 30% to minimize channel contention. With XA, the subsystem will dynamically select available channels for physical data transfer. The same channel that issued the request does *not* have to be used for the transfer. For this reason, channel utilizations of 70% are feasible. (Currently, the dynamic channel subsystem is limited to 3380 Dasd.)

Clearly, XA provides a solid base for DB2 in terms of CPU and I/O

TESTED THE SAME TO PERFORM THE SAME.

Infoextend remanufactured heads perform "like-new," because we test them the same as new heads. We perform load force, attitude, gap alignment (X-Y calibration), microscopic visual inspections, and full testing of electrical parameters—all to the original OEM specifications.

Infoextend Products are part of Information Magnetics, your assurance that your disc heads will be remanufactured to the highest performance standards—"like-new."

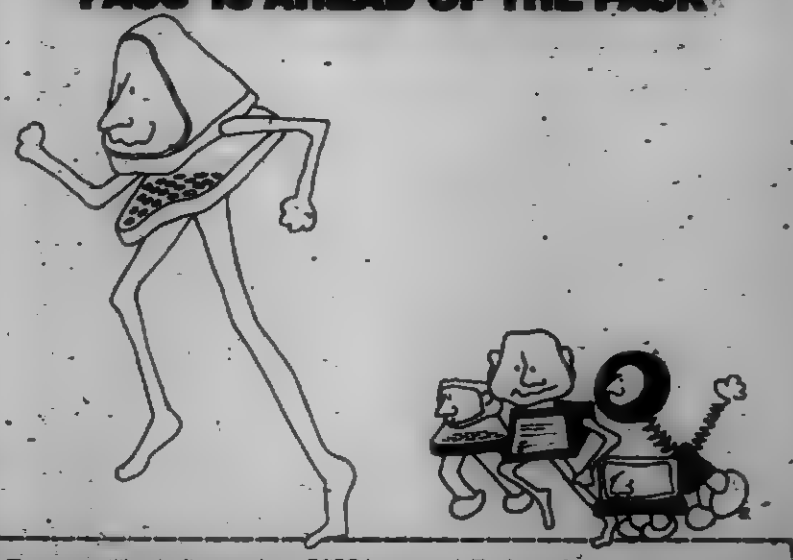
Call (800) 468-2000 for the name of the distributor near you.

INFOEXTEND PRODUCTS

Infoextend Products are made by Information Magnetics Caribe Inc.

©1983 Information Magnetics Corp.

FOR VAX™ RESOURCE ACCOUNTING, PACS™ IS AHEAD OF THE PACK



The competition isn't even close. PACS is so good, it's the only resource accounting package in DEC's™ EAS library. Here's why:

- Flexible billing algorithms
- User budgeting and port speed accounting
- EZLOG™ for true 3-level reporting by account, project and user

Name _____
Title _____
Company _____
Address _____
City _____ State _____ Zip _____
Phone ( ) _____

SEND COUPON NOW FOR COMPLETE DETAILS ON ALL THE PACS BENEFITS

STI Signal Technology, Inc.
5951 Encina Road, Goleta, CA 93117 (805) 683-3771 Outside California call toll-free (800) 235-0787
TWX 910-334-3471

VAX and DEC are trademarks of Digital Equipment Corporation.

performance. It is a definite possibility that until the supporting features of XA and the 3080 series were available, IBM did not feel that DB2 implementation was feasible.

2. DB2's relational model.

Turning now to DB2 itself, the following material will discuss the logical and physical representation of data in DB2 data bases. The following are the structural components of DB2's implementation of the relational model: tables, views, indexes, table spaces, storage groups and data bases.

A brief definition of each of these will be provided. In general, a relational data base is one that users perceive as a collection of tables, a table being a two-dimensional representation of columns of data. Each column represents a certain domain or field type. Rows of data represent a specific occurrence of each field in the various columns. Rows are similar to our concept of a record in a flat file.

A *personnel data base*, for example, might have an employee table and a department table. Individual tables can have common domains, such as department number. This is the basis for associations between tables and for various information/user views of the data in the tables.

Tables are logical data structures. There are no predefined relationships as in a network or hierarchical structure. The data in the table is the basis for relationships. The relationships are managed completely and, in most cases, transparently by DB2.

The beauty and power of DB2 is that the use of an index is completely transparent to users and almost, so far, to technicians. DB2 indexes are based upon values of data in one or more columns. Programs or users accessing data never explicitly specify indexes; they are used only by DB2.

To summarize, a table in DB2 is a named data object consisting of a specific number of columns and some number of unordered rows.

Not every user of a specific table will need to see each column in that table. DB2 provides for different views of tables. For example, a user of the employee table might only need to see employee number and name.

Once a view has been defined, it can be used by DB2's data management language just as a table would be. A view has three important features as a means of representing data in DB2 data bases:

a) Protecting sensitive data from unauthorized users. For example, the salary column in the employee table would be available only to payroll personnel.

b) Further reducing the complexity of data representation. A user sees only what is required.

c) Reducing data redundancy. A user can access a piece of data without creating a separate physical storage unit for that data.

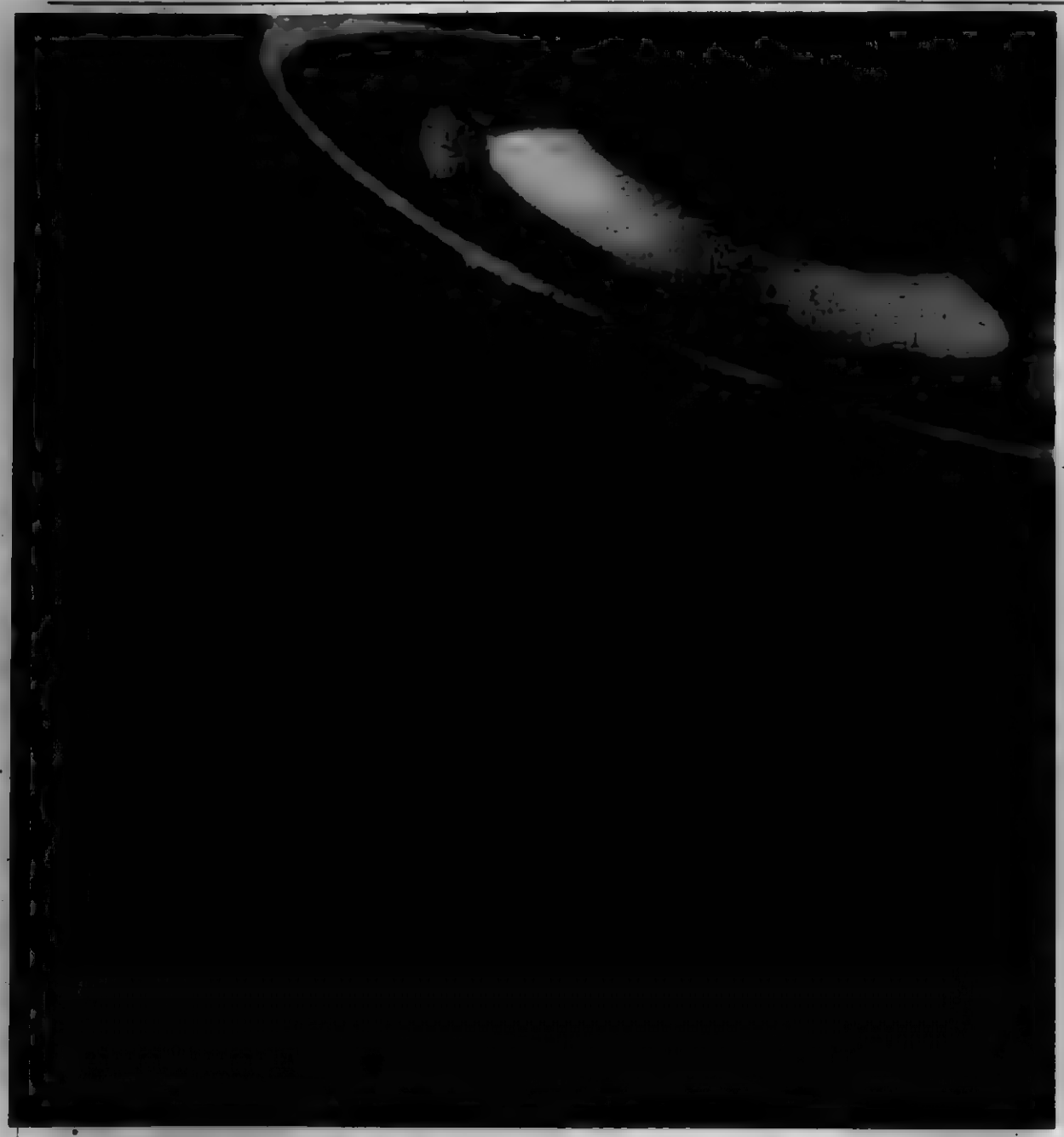
If you are at all familiar with the relational model, you will recall that it is based upon three operations, which provide for all data manipulation activities: SELECT, PROJECT and JOIN. A subsequent section of this article will examine DB2's DML-SQL. But in the context of DB2 views, it should be pointed out that views make powerful use of the relational join capability. The join operation will permit the creation of a view that involves two or more tables. A join operation uses a field which is a column in two or more different tables. Based upon the contents of a common field, a relational join can create a view that contains data selected from two tables. The views are based on user-defined requirements for the data.

Relational data base has always had a mystique associated with it. Management and users are attracted to the simplicity of the table concept, but are skeptical that anything in DP can be that simple. Technicians are intrigued by the power of the technology. To be able to perform an operation like the join just mentioned without five sorts, three merges, four copies and miscellaneous utilities may offend the die-hard progammer and threaten the job security of a few others, but for the most part it will leave most wondering how it all functions.

Random access to data in file-oriented and early data base-oriented systems has been accomplished by keys. A key represents an access path to records based upon one (or more) field. Isam, Vsam, network and hierarchical data structures all employ one or more indexes to permit random access to data.

As you proceed into a summary of DB2's use of indexes, you might begin to think, "Here comes the catch. Someone is going to have to build some pretty fancy indexes in order for tables and views, as defined, to really work." The beauty and power of DB2 is that the use of an index is *completely* transparent to users and almost, so far, to technicians.

The discussion of an index begins the transition from logical to physical representation of data. DB2 indexes are based upon the values of data in one or more columns. Programs or users accessing data never explicitly specify indexes; they are used only by DB2.



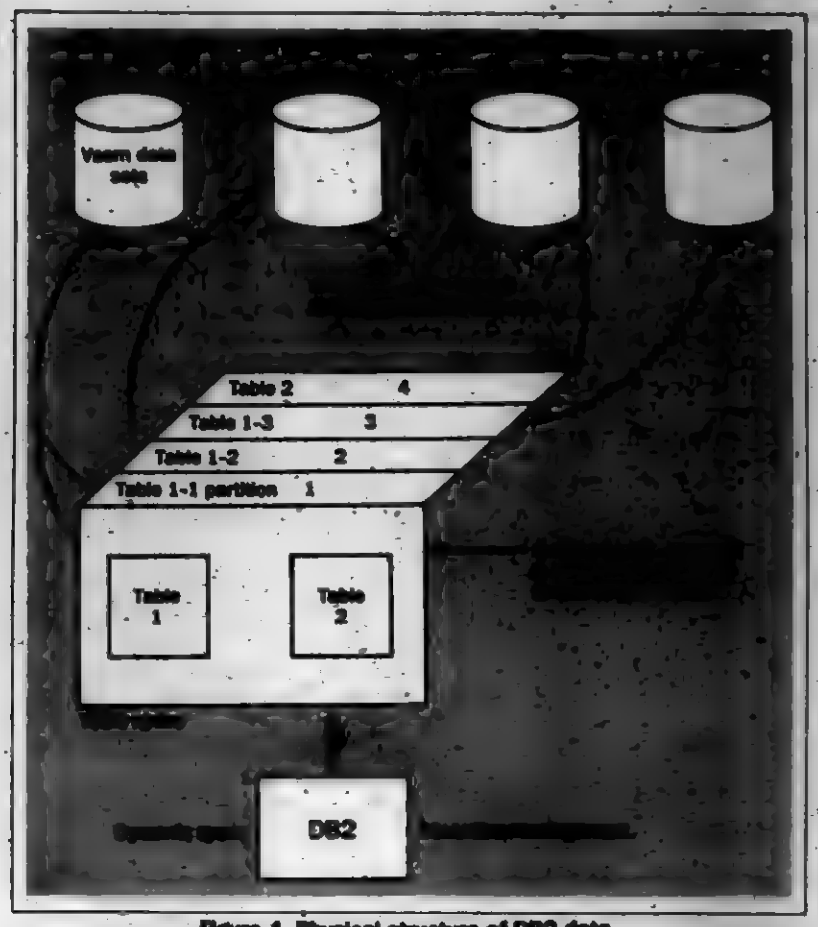


Figure 4. Physical structure of DB2 data

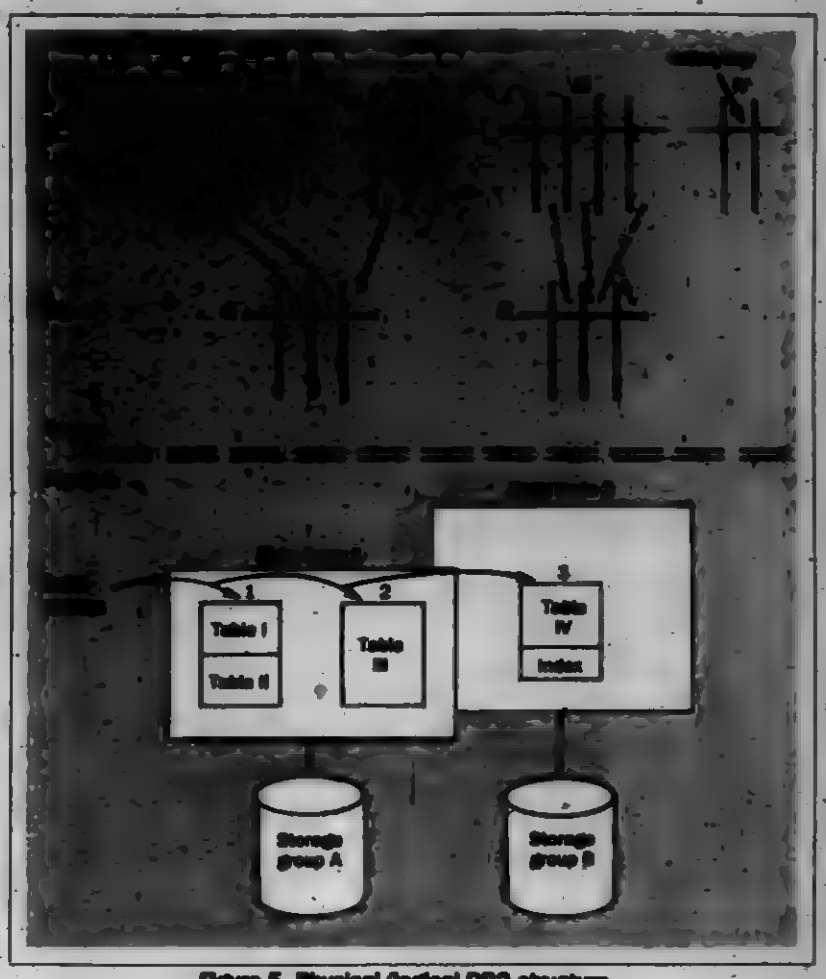


Figure 5. Physical/logical DB2 structure

When you request access to a table, DB2 looks at what indexes are available and uses the appropriate one to retrieve your data. If no index is specified, DB2 will scan a table sequentially. Indexes are primarily a performance tool. DB2 can function without them.

DB2 indexes can be unique or non-unique. A unique index forces uniqueness on the values in the table being indexed. DB2 indexes can also be used for clustering. A cluster index determines the physical order in which rows will be stored; it can be used to store data the way it would be most frequently accessed. The full power of DB2 becomes clear as the dynamic nature of an index is employed to improve accessibility.

In relational data base management and data base in general, "binding" refers to the establishment of the physical access path to data. As DB2 processing is taking place, it is entirely possible that an index to a table might be deleted, say by a DBA for performance reasons. Suppose that an application issued a SQL SELECT command that was bound to that index. DB2 will detect that the index has been dropped and will automatically invoke the bind process to select an alternate access path.

When you request access to a table, DB2 looks at what indexes are available and uses the appropriate one to retrieve your data. If no index is specified, DB2 will scan a table sequentially. Indexes are primarily a performance tool. DB2 can function without them.

To conclude a look at the terminology for and structure of DB2's relational model, we will define the objects for physical representation of data.

A table space is an address space divided into one or more pages of equal size supported by one or more Vsam data sets. One or more tables are stored in a table space.

An important architectural point: In DB2, a table space is the *recoverable structure*. DB2 can support very large tables as a table space can be up to 64 billion bytes of data. However, recovery of such a large space could degrade performance. Structurally, DB2 overcomes this problem by providing partitioned table spaces.

Partitions are established on the basis of ranges of data values. For example, an employee table could be partitioned based upon ranges of employee numbers.

Partitions within a table space can be recovered and reorganized independently. Partitioning also allows data to be stored on different device types — for example, active data on faster devices. This is accomplished by assigning partitions to different storage groups — the next physical component of DB2's relational model.

As the physical structure of DB2 data is presented (see Figure 4), it must be emphasized that DB2 dynamically manages the physical components, such as table spaces and storage groups.

DB2 users and DP support personnel need not be concerned with defining MVS data sets. One or more storage groups are defined at DB2 installation time and are assigned to Dasd volumes. DB2 then invokes access method services functions of the data facility portion of MVS to define, extend and delete physical data

DATATRIEVE'S BEST FRIEND IS SMARTSTAR™

SMARTSTAR 4th generation data management software gives VAX™ Datatrieve a friendly forms-based user interface. Here's how:

- Supports all Datatrieve data-types
- Allows up to 31 overlapped window applications
- Adds, changes and deletes records with easy keypad commands
- Performs queries without special query language

Name_____
Title_____
Company_____
Address_____
City_____ State_____ Zip_____
Phone_____

SEND COUPON NOW FOR COMPLETE DETAILS AND JOIN THE 4TH GENERATION.

STI Signal Technology, Inc.
5951 Encina Road, Goleta, CA 93117 (805) 683-3771 Outside California call toll-free (800) 235-0787
TWX 910-334-3471 VAX and Datatrieve are trademarks of Digital Equipment Corporation. COMX

sets within the storage groups.

DB2 automatically allocates space within a storage group as it is required by table spaces as tables are processed by DB2 users. To control access further, a table can be assigned to a specific Vsam data set. If no assignment is made, DB2 handles it dynamically.

The final component of DB2's physical structure is a data base. Unfortunately, IBM's use of the term may cause some confusion. "Data base" is often used as a unidimensional entity. A corporation is building *the* data base: a single storage area for *all* corporate data. This is a very good concept, but as the first portion of this article pointed out, the concept has evolved to the point where the data base is viewed as multidimensional. DB2's use of the term reflects this view. (For example, the relationship of DB2 data bases and IMS data bases requires a multidimensional view of a corporate data base managed by IBM DBMS software.)

"Data base" is often used as a unidimensional entity. A corporation is building the data base: a single storage area for all corporate data. However, the concept has evolved to the point where the data base is viewed as multidimensional. DB2's use of the term reflects this view.

A DB2 data base is a named collection of table spaces and, by logical extension, tables, views and indexes. The data base is an operational tool. Data bases may be started and stopped independently. The DPA will put related tables in table spaces that are members of the same DB2 data base.

To summarize DB2's relational model (see Figure 5):

- A table is the basic object for logically representing data.
- A view provides alternate representations of one or more tables.
- Physically, table spaces contain one or more tables.
- Data bases are defined to contain one or more table spaces.
- Table spaces are assigned to storage groups which are collections of Dasd Vsam data set volumes.
- An index can be defined to optimize access to a table. The index is stored in the table space for that table.

All of this logical and physical information is stored in the DB2 catalog. The catalog is itself a series of tables which DB2 uses to control processing of DB2 data. With proper authorization, a user, for example a data base designer, can access the catalog as if it were a table. In this way, the catalog is a powerful data-dictionary-type facility for the DB2 system. For example, data in the catalog could be used to determine information stored pertaining to employees in the various tables within a personnel data base.

3. Features of DB2.

To summarize the other important features of DB2:

- Dynamic allocation and management of Dasd.
- Simple structures for logical presentation of data.
- Dynamic navigation and access path selection. (Consistent with the concept of fourth-generation and nonprocedural languages, users specify what they want, not how to get it).
- Self-contained automated logging and recovery (automated to IMS interfaces for these facilities).
- On-line utilities for continuous operation.
- Integrated data definition language (DDL), data management language (DML) and data control language (DCL).

4. Interfaces to DB2.

An overview of the architecture and capabilities of DB2 would be incomplete without a brief discussion of SQL — DB2's DML *and* DDL *and* DCL.

SQL is the external interface to DB2 for data definition, data manipulation and data control. As such, the acronym, SQL, is a little misleading. It is much more than a query language. SQL presents a straightforward command language. It is also a compact set of basic commands:

CREATE, DROP and ALTER for the DDL.

SELECT, INSERT, UPDATE, DELETE for the DML.

GRANT, REVOKE for the DCL.

For the tabular data structures DB2 manages in its relational model, the DDL is used initially to create the columns that define the data content of the table. As noted earlier, allocation of Dasd space and other physical tasks are automatically handled by DB2. A DBA would use DB2 utilities to load a table. Other objects (indexes, views and so on) are also created, as needed, by the DDL commands of SQL. Once created, the table is ready for access.

Through the DML, SQL in a single statement can access:

- One or more columns from a row.
- One or more columns from multiple rows of a single table.
- One or more columns from multiple rows of multiple tables.
- One or more columns calculated from other columns.

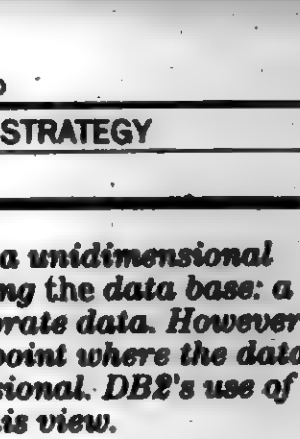
For sensitive data and general control of access to DB2 data and the

For DOS/VSE Console Control

REMOTE BEATS LOCAL

FAQS/XP™ Console Control Shown To Be Convenient In Large And Small Shops.

RESPONSE TIME, THROUGHPUT DRAMATICALLY IMPROVED



WORKS WITH JCLMAN/XP

Some Companies Operate CPU's In Other States with FAQS/XP™

FAQS/XP is a practical system for any on-line installation. It is one of the Extended Productivity Systems from Goal Systems International and is available for a free trial. For more information, call Goal Systems toll free today at

800-848-4640 (in Ohio 800-628-4640).

Goal Systems

Goal Systems International Inc.
8455 N. High Street
Columbus, Ohio 43214-1186
Phone (614) 888-1775

© 1984, Goal Systems International Inc.

LOCAL DP EXPO.

DB2 catalog, the DCL commands are used to grant and revoke authorized access.

SQL commands can be interactively processed through a variety of interfaces, which will be discussed in an overview of DB2's operating environment. Dynamic SQL commands are almost identical in syntax to SQL commands embedded in standard application programs. Embedded SQL permits transaction processing and batch application programs written in Cobol, PL/I, Fortran and Assembler to access DB2 data and non-DB2 data (for example, IMS DB or Vsam).

The basic intent of this article is to provide you with an overall feeling for DB2's architecture and capabilities. It would be very easy and interesting to delve into the details of any one of the components of DB2, particularly SQL. Unfortunately, that is beyond the scope of this perspective. A brief look at two commonly used SQL commands — CREATE and SELECT — must suffice for now. The following example assumes that a user has logged on to TSO/ISPF under the user ID, PRH. (A subsequent section will discuss the specific facilities for DB2/SQL interfaces in an MVS operating environment [TSO/ISPF and so on].)

The user wants to create a table with three columns: date, client and city. The CREATE command would look like this:

```
CREATE TABLE SCHEDULE
(Date    Char (6),
 Client  Char (20)
 City    Char (3));
```

(SQL commands and keywords are underlined.) The result is stored in the DB2 catalog as PRH.SCHEDULE.

Once data has been loaded into the table, the user could retrieve data using the SELECT command.

The SELECT command has a simple syntax.

```
SELECT   column-names
FROM     table name
WHERE    data meets specified conditions
```

For the schedule table, an example:

```
SELECT   *
FROM     Schedule
WHERE    Date > 830905 and
         < 840101
```

Basically, the user is asking for all columns of data in the table to be returned (the *) for the rows that meet the data criteria specified in the WHERE clause. Specific columns could be retrieved by naming each one required in the SELECT clause. There are many additional features of each command, but they all use the same basic syntax.

Summary: DB2 capabilities

In summary, SQL is a high-level, nonnavigational language for data definition, manipulation and control. It is the interface to DB2.

People often ask, "Isn't DB2 just an MVS version of the DOS/VSE and VM/SP product — SQL/DS?"

The preceding sections of this article have discussed the architecture and capabilities of DB2. This discussion established DB2 as a full-function DBMS. SQL is a key component of DB2 — and it is just that, a component.

The SQL/DS (data system) product announced in 1981 and first released in 1982 for DOS/VSE and subsequently VM environments was IBM's first "official" move into relational facilities. "Official" must be qualified, because as early as 1978 a relational product, QBE, was available as an installed user program (IUP). It was developed by IBM personnel for the VM environment. Apparently, it was never intended for widespread use. It was not even included in "Data Systems" discussions by IBM marketing personnel.

Two points are worth noting. First, the SQL component of DB2 is broadly compatible with the SQL/DS facility. Second, the SQL/DS product is not a complete DBMS when compared with DB2. The products announced in conjunction with DB2 will also support the DOS/VSE and VM environments.

DB2 is really an umbrella for IBM's emerging data base architecture in each of its processing environments. This is particularly important relative to VM, which is itself emerging as a strategic product that provides powerful supplements to both DOS/VSE and MVS configurations.

DB2 operating environment

As this article presents DB2's operating environment, two related products will be discussed: the Query Management Facility (QMF) and the Data Extract Facility (DXT), which provide interfaces between various data system products and between each operating environment and the various relational facilities of DB2 and SQL/DS.

DB2 was designed to operate in an MVS environment for relational data base management. It will employ standard data handling facilities of MVS — access method services, for example. DB2 data sets are modified Vsam data sets that cannot be accessed through IDCAMS facilities. But the same MVS code is used for I/O processing.

The operating environment for DB2 and related products can be approached from the "user's" view. In this case, user must mean DBA personnel, responsible for managing the data base environment; application development personnel, involved in the development of operational applications; and end users satisfying their own information processing requirements as well as utilizing transaction processing applications.

MVS was designed to support a variety of application types: batch for operational processing as well as technical support activity (for example, systems programming); interactive for application development and

FACE THE REAL COST OF DIVESTITURE!

Managing Complex, Multicarrier/Vendor Networks! Diagnosing Faults! Crossing Carrier Gateways! Interfacing Voice, Data and Telecom Equipment! Optimizing Hardware, Tariff and Software Opportunities!

Learn how at the new NETWORK MANAGEMENT TECHNICAL CONTROL Conference & Exposition

May 21-24 1984, Sheraton Washington Hotel, Washington, D.C.

Sponsored by the Communication Networks '84 Team

First program to ZERO IN on Divestitures' Operating Headaches — See new tech control and software solutions — Self diagnostic Modems & Components — Computer programs for network optimization, change and equipment management!

Learn at In-Depth Seminars May 21 & 22

Dr. Dixon Doll
Strategic Planning

Six other sessions on Net Diagnostics, Tech Control, PBX Interfaces, and more!

Choose from 40 "How-To" Conference Sessions May 23 & 24

Keynote Speaker:
Dr. Lee Selwyn

Case Histories - New Applications
Early Birds - Problem Solvers

Show Sponsors Include: Avant-Garde • Dynatech Data • General DataComm • Hekimian Labs • Racal-Milgo • Paradyne • Pulsecom Div., Harvey Hubbell Inc.

Exhibitors Include: Arus Corp., Datacom Management Sciences, Digilog, Digitech Industries, Infinet, Infotron, International Data Sciences, NEC America, Versa-Lite, and more!

Exhibits will be open: May 23, 9:30 - 5:00 and May 24, 9:30 - 4:00.

For Full Program Information Call 1-800-225-4698 (In Mass. 617-879-0700) or return the coupon below to Communication Networks — NM/TC, Box 880, Framingham, MA 01701

Please send Registration Information ☐ Please send Exhibit Information ☐

Register me for:

☐ Two-day In-Depth Sessions (May 21 & 22) $595

☐ NM/TC Conference (May 23 & 24) $295

☐ Four Day Full Program (May 21 - 24) $795

Name/Title _____
Company _____
Address _____
City/State/Zip _____
Telephone ( ) _____

FREE ADMISSION TO EXHIBITS FOR QUALIFIED BUSINESS & TELECOM PROFESSIONALS!

utility functions; on-line transactions for inquiry update processing; and end-user-oriented information retrieval and reporting systems. The various users will interact with one or more of these application types in a typical MVS configuration.

For DB2, TSO/ISPF is the primary interface for all but on-line transaction processing. Dialogue manager facilities are used to provide menu-driven panels for access to SQL and DB2 processing. A standard component of DB2, DB2I, provides interactive support for the DBA and development personnel.

The DB2I menu illustrates the facilities available to:

- Submit and test SQL statements which application developers will embed in application programs or to create tables — through the SPUFI facility (SQL Processor Using File Input).
- Develop SQL portions of application programs.
- Invoke SQL and DB2 commands and utilities.

Standard TSO/ISPF facilities such as on-line Help are available.

Either IMS DC or CICS, or both, will be used to support on-line transaction processing. The applications will process data from IMS DB data bases (IMS DC and CICS), and CICS applications can also access Vsam files.

Cobol and PL/I application programs for transaction processing can also process DB2 data. This is accomplished by embedding SQL statements in standard source code. A slightly different compilation process must be followed, because conventional compilers will not recognize SQL.

Cobol and PL/I application programs for transaction processing can also process DB2 data. This is accomplished by embedding SQL statements in standard source code. A slightly different compilation process must be followed, because conventional compilers will not recognise SQL. DB2I is used to "precompile" (see Figure 6 on ID/26) the SQL statements and create an access module stored in the DB2 catalog, which is "called" at execution time. This is facilitated through an attach facility for IMS DC and CICS code, which is provided to interface each product to DB2. You must be at IMS 1.3 and CICS 1.6 to utilise this feature.

While IMS and CICS applications can access both IMS and DB2 data, DB2 applications can only access DB2 data. The interface between DB2 and IMS DC or CICS is not limited to the application program. Other critical processing activities, such as recovery/rollback, will be coordinated by DB2 for data within its domain and for IMS DB data accessed through IMS DC or CICS.

DB2 has been designed for use in operational applications as well as end-user-oriented applications. DB2I provides the primary interface through TSO/ISPF for conventional application development, including IMS and CICS on-line programs which have SQL statements embedded.

DB2 provides the precompiler mentioned above. This precompilation creates a modified version of the application program. This version then is used in a normal compile link edit process, resulting in an object module which, at execution time, will issue a call for the data base request module, which has undergone a "binding." This process is also controlled through DB2I facilities.

The BIND creates an entry in the DB2 catalog and in an internal data set called application plans. This is a control structure used by DB2 to process SQL statements as they are executed. The plan identifies the data to be accessed, where it is and how to get to it. As mentioned earlier, if the internal structure of tables and so on changes, DB2 automatically re-creates the output of the BIND process.

While DB2I is fine for DP personnel, it does not provide an adequate interface to end users.

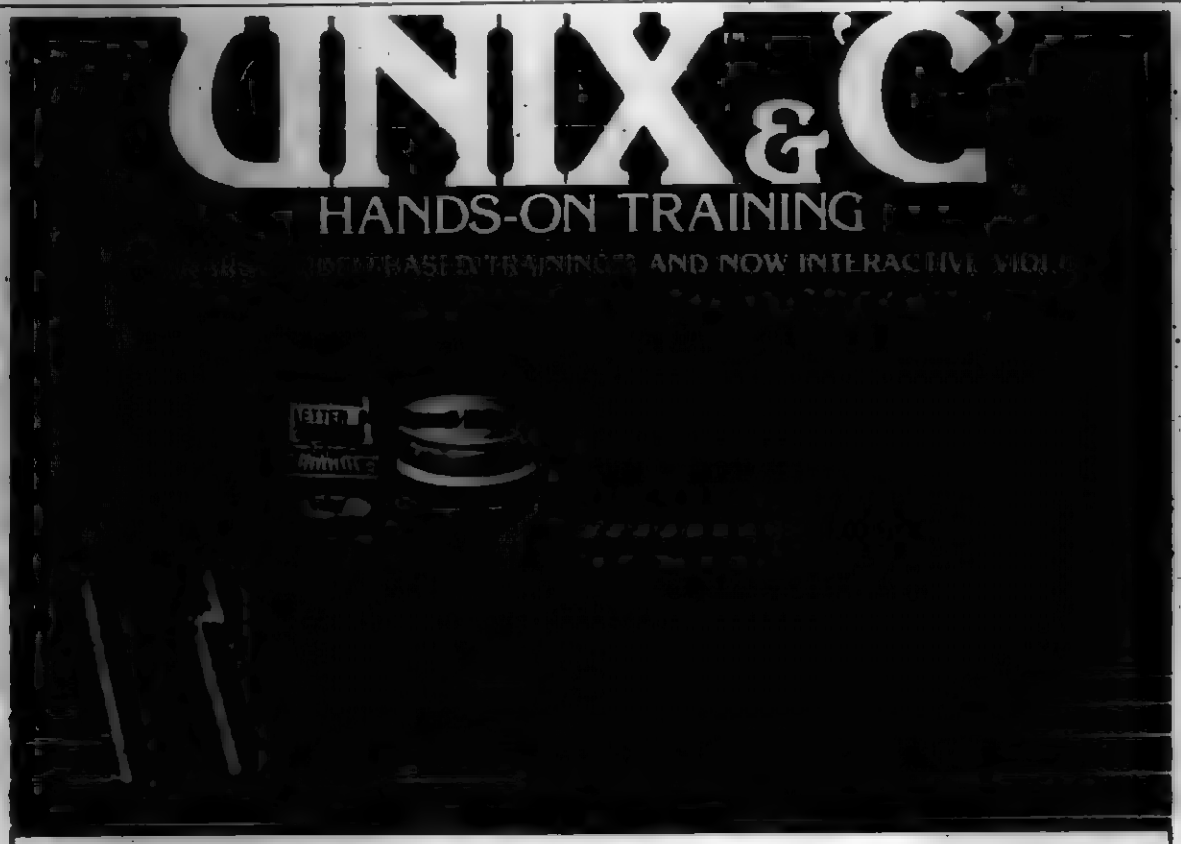
To provide an effective end-user interface, the Query Management Facility (QMF) was developed to support DB2.

QMF was designed for ad hoc query and reporting requirements. It operates as a series of dialogue manager panels under the control of TSO.

QMF provides access to DB2 data through SQL and QBE. SQL provides an English-like command language for accessing data in tables, while QBE provides a graphic representation of tables available and provides an example of the output desired. (Many large IBM installations have "played" with QBE over the past five years. It suffered from two major problems: It lacked support from within IBM and operated in a VM environment.)

Many people in the data base world have long viewed QBE as an elegant, yet effective, data base tool. Its appearance in the DB2 architecture is an example of one of the many subtle strengths the architecture represents. In one sense, DB2 is a home for the "wayward child," which is how QBE was viewed for some time.

The format of a QMF panel used to enter a SQL command demonstrates that it is a relatively effective end-



Select your training medium according to the type of training you prefer and the number of people to be trained.

VIDEO-BASED TRAINING. The Computer Technology Group's Video-Based Training integrates professionally developed and produced video and text material, as well as hands-on exercises, into complete training programs.

Our courses are produced with the highest standards of video quality, applying the latest techniques of instructional design including the use of computer graphics and animation techniques to compress learning time. The students' time is not wasted with the "camera at the back of the classroom" or "chalk talk" approach which is so inefficient, and often ineffective, in transferring skills.

Our Video-Based Training courses are completely self-contained, including the hardware-independent hands-on exercises. All you need is a video cassette player.

COURSE	Number of Modules: Video-Based	Interactive
Computers at Work	15	
UNIX—An Executive Perspective	1	
UNIX Overview	6	6
UNIX Fundamentals	15	15
'C' Language Programming	16	16

INTERACTIVE VIDEODISC TRAINING. Our new UNIX Videodisc Training Curriculum combines the benefits of our Video-Based Training with the flexibility of microcomputer access. Designed as a one-on-one tutor, our interactive system assesses the training needs of each student and dynamically tailors the training to his/her specific needs, thus eliminating redundant training. Through engaging exercises and interactive video, we are able to increase student comprehension while reducing training time.

Developed by the Computer Technology Group and Interactive Training Systems, the curriculum uses the latest laser videodisc technology—including IBM PC, color monitor and Interactive Training System Controller.

PUBLIC AND IN-HOUSE SEMINARS. Both public and in-house seminars are offered on a wide variety of UNIX and 'C' Language subjects, including:

UNIX Overview • UNIX Fundamentals for Non-Programmers • UNIX Fundamentals for Programmers • Shell as a Command Language • 'C' Language Programming • Shell Programming • Using Advanced UNIX Commands • UNIX Internals • UNIX Administration • Advanced 'C' Programming Workshop • Advanced 'C' Programming Under UNIX • Berkeley UNIX Fundamentals and "csh" Shell.

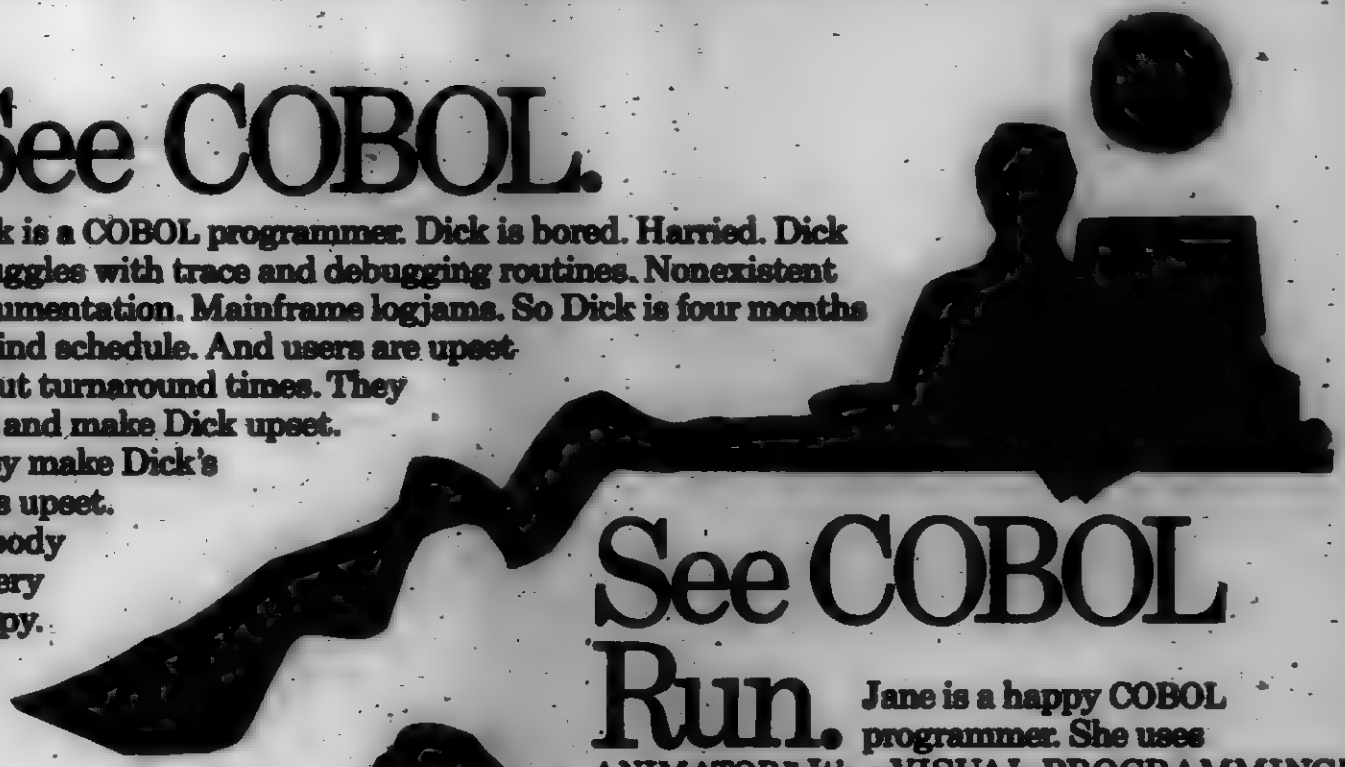
UNIX is a Trademark of Bell Laboratories

Call toll-free: (800) 323-UNIX
or in IL (312) 987-4082
310 S. Michigan Ave., Chicago, IL 60604

COMPUTER TECHNOLOGY GROUP
Telecourses, Inc.

See COBOL.

Dick is a COBOL programmer. Dick is bored. Harried. Dick struggles with trace and debugging routines. Nonexistent documentation. Mainframe logjams. So Dick is four months behind schedule. And users are upset about turnaround times. They yell and make Dick upset. They make Dick's boss upset. Nobody is very happy.



See COBOL Run.

Jane is a happy COBOL programmer. She uses ANIMATOR.™ It's a VISUAL PROGRAMMING™ aid for MICRO FOCUS™ LEVEL II COBOL.™ It runs on a micro. It makes child's play of mainframe test and maintenance chores.

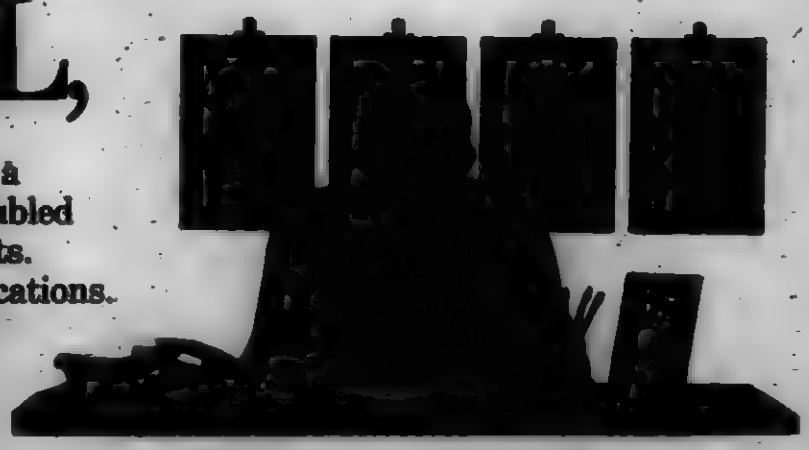
With ANIMATOR Jane sees a picture of the program explaining itself. In live action. In real time. In COBOL source code. ANIMATOR tracks the program's exact execution path. Including subroutine branches.

Jane can have the program run fast. Or slow. Or stop. With one key. This makes it easy to spot problems. Insert fixes. Set breakpoints. Instantly.

Jane's programs sometimes win awards. Yet she always meets schedules. Jane's boss likes this about Jane. Because he doesn't like users to yell at him.

Run, COBOL, Run.

This DP manager got a bonus. Because he doubled productivity. Cleared backlogs. Cut costs. Boosted morale. Produced terrific applications. Quickly. Put control and prestige back into the central DP function. And nobody yells at him anymore. All thanks to ANIMATOR.



See ANIMATOR now.

Let Micro Focus put your DP shop on the fast track.

ANIMATOR runs with MICRO FOCUS LEVEL II COBOL for compatibility with ANSI '74 High Level COBOL implementations. A mainframe-micro communications link is recommended for downloading mainframe programs.

© 1984 Micro Focus Inc. All Rights Reserved.
LEVEL II COBOL, ANIMATOR, VISUAL PROGRAMMING, MICRO FOCUS and the MICRO FOCUS Logo are trademarks of Micro Focus Ltd.

Write for more information.
Or call (415) 856-4161. Right now.

MICRO FOCUS™

2465 East Bayshore Rd., Suite 400, Palo Alto, CA 94303
I'd like more information

Name_____ Title_____
Company_____ Phone_____
Address_____
City_____ State____ Zip_____

See us at
FEDERAL DP EXPO.–BOOTH #536

A network of Honeywell computers to improve customer service.

When Metropolitan says they stand by you—believe them.

One way to upgrade customer service is to do more to help the sales representatives responsible for that service.

So the Metropolitan Insurance Companies are installing over 1000 Honeywell DPS 6/40 small computers in their personal insurance offices throughout the U.S. and Canada.

By decentralizing computerized sales support functions, Metropolitan is giving its sales representatives instant access to data that once took days to get.

For instance, they can now obtain sales illustrations and price quotes and process service transactions just by going to a terminal.

The system also helps reps by maintaining their policyholder files and generating quality sales letters and timely reminders for client calls. What's more, Metropolitan's managers benefit by being able to measure sales against objectives more easily. The system is a strong decision support tool. Indeed, its word processing, electronic mail, and other office automation capabilities will go a long way toward speeding operations and decreasing paperwork overall.

The Metropolitan Insurance Companies chose the DPS 6/40 for its reliability, expansion capability, ease of use, and the quality of support available from Honeywell. They also liked its combination of price/performance, local processing power, and communications.

Metropolitan has always been dedicated to the best possible customer service.

We think it's a wise policy.

For more information on how Honeywell computers can help solve your problems, call 800-328-5111, Ext. 2705. (In Minnesota, call collect, 612-870-2142, Ext. 2705) or write Honeywell Inquiry Center, MS 440, 200 Smith Street, Waltham, MA 02154.

Together, we can find the answers.

Honeywell

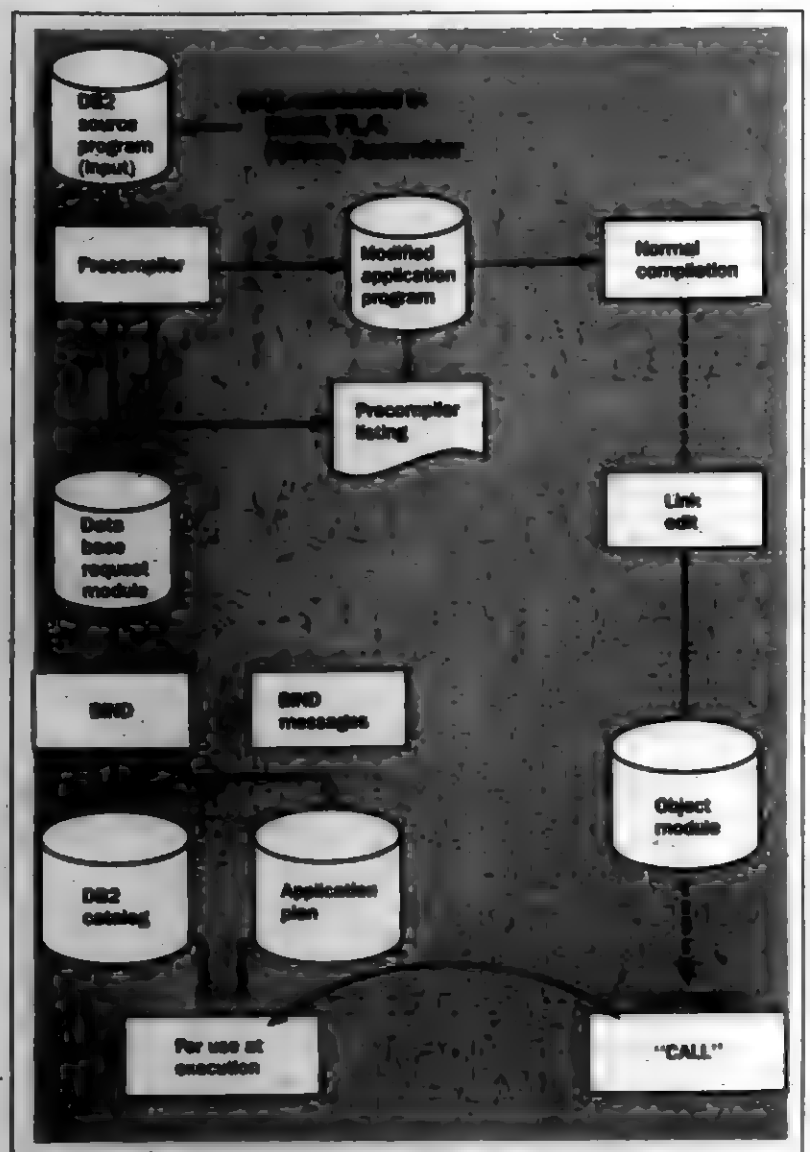


Figure 6. Conventional application development with DB2

user facility. PF keys are used to assist the user in entering the command and reviewing the resulting output.

QMF can be used to develop procedures that will be run frequently. These procedures are stored in TSO data sets and can be executed at the required time through other QMF commands. This is very similar to the CLISTS which we commonly used in TSO and VM/CMS environments. QMF was clearly designed for an information center environment; professional DP personnel would assist users in developing more complex procedures using QMF facilities.

Figure 7. Data systems products for IBM processing environments

One other product will complete this overview of DB2's operating environment. The Data Extract Facility (DXT) addresses the issue of accessibility to data in a mature IMS installation. IMS data bases will contain vast amounts of data at different levels of detail. This data represents the basis for high-level information requirements which DB2 will be used to address. In addition, a typical installation might have a significant number of Vsam files which also contain valuable data.

Some DB2 data bases will be developed "from scratch." But in other cases, IMS and Vsam data will be the source of data for new DB2 systems. DXT was designed to provide extraction capabilities from IMS DB data bases, Vsam files or sequential files. The extracted data is then used by the DB2 load utility to populate DB2 tables.

DXT runs as a batch application that can be initiated through TSO. When IMS data is involved, interfaces to the DB/DC dictionary assist in the preparation of PSBs required for extracting DL/1 data. By the way, this is the only area where interfaces to the DB/DC dictionary product have been defined for DB1 and its complementary facilities (QMF, DXT).

There are interactive facilities available to assist in the preparation of input specifications to DXT. For example, shipped with the QMF product will be a series of data extract dialogues which allow a user to generate and send an extract request to DXT.

In an MVS environment, then, there are a series of subsystems that will be operating to provide DB/DC processing capabilities: TSO/ISPF for interactive, DB2 for relational DBMS, IMS DB/DC and/or CICS for transaction processing and a number of other subsystems for batch tasks such as DXT.

DB2I and QMF enhance interactive access to DB2 facilities for DP and end-user personnel and operate under the control of TSO/ISPF. Attach facilities in IMS DC and CICS provide access to DB2 data from transaction processing applications.

The powerful cross memory services capability of MVS/XA facilitates efficient intersubsystem communication.

The last two components of DB2's operating environment just discussed are also used in VM configurations.

QMF would run in a CMS machine to support SQL/DS applications. SQL/DS would provide access to SQL data. Each would occupy a separate VM machine. DXT will provide data to populate SQL/DS data bases.

Data in SQL/DS could be unloaded with SQL/DS utilities and loaded into DB2 with load utilities. DXT is not required for this.

Several times recently the question has come up, "What about going in the other direction — taking data from DB2 and loading it into other formats?" This may prove to be necessary, but right now there aren't any facilities available to assist in such a transfer; DXT is strictly unidirectional.

To maintain compatibility between various operating environments, QMF is also available for DOS/VSE installations in support of the SQL/DS product (see Figure 7).

From an operating environment perspective, DB2 for MVS installations clearly fits into a fourth-generation architecture for data processing. IBM's approach had to provide carefully for integration between DB2 and other strategic products such as IMS. On the surface, at least, it appears that IBM's architecture is a significant evolution, more so than anything we have seen from IBM in the data base area since IMS was first announced. It remains to be seen whether the continuing evolution will be fast enough for large MVS installations.

Three questions remain to be addressed in this overview of DB2:

ATTENTION: MANAGERS — ENGINEERS — SITE PLANNERS

HAVE YOU HEARD ABOUT FIPS PUB 94?

GUIDELINE ON ELECTRICAL POWER FOR ADP INSTALLATIONS

A COMPUTER INDUSTRY FIRST! FIPS PUB 94

NOTICE: THIS MILESTONE DOCUMENT HAS BEEN REVIEWED BY MEMBERS OF THE POWER INTERFACE COMMITTEE OF THE COMPUTER BUSINESS EQUIPMENT MANUFACTURERS ASSOCIATION, (IBM, DEC, BURROUGHS, HONEYWELL, UNIVAC, NCR, CDC, ETC.) AND THEREFORE REPRESENTS A CONSENSUS AMONG THESE POWER EXPERTS.

FEDERAL INFORMATION PROCESSING STANDARDS PUBLICATION 94

1982 SEPTEMBER 27

COMPUTER POWER SYSTEMS CORP. A CONTRIBUTOR TO FIPS PUB 94 WILL CONDUCT THESE SEMINARS, TO FULLY EXPLAIN THE TECHNICAL CONCEPTS PRESENTED.

MARCH 26	LOS ANGELES	SEPTEMBER 6	NEW YORK CITY
APRIL 5	DETROIT	OCTOBER 18	BOSTON
JUNE 20	PHILADELPHIA	NOVEMBER 8	DALLAS
JULY 18	CHICAGO	DECEMBER 6	ATLANTA
AUGUST 14	SAN FRANCISCO		

SEMINAR DETAILS WILL BE PROVIDED WITH YOUR RESERVATION

ELECTRICAL POWER GUIDELINES FOR COMPUTER INSTALLATIONS

YOU'VE ALL BEEN INVOLVED IN CONTROVERSIES ABOUT

- HOW TO GROUND A COMPUTER?
- HOW MUCH ISOLATION REQUIRED?
- WHAT KIND OF POWER CONDITIONER IS NEEDED?

DON'T MISS THIS UNIQUE OPPORTUNITY!

THIS ONE-DAY SEMINAR COULD BE YOUR BEST INVESTMENT IN 1984!!

☐ ENROLL ME IN _____ (CITY)

☐ ENCLOSED IS MY CHECK FOR $195.00

☐ BILL ME (ENCLOSE BUSINESS CARD)

COMPUTER POWER SYSTEMS CORP.

P.O. BOX 6340, CARSON, CA 90749
213/515-6566 X 237 R. MILLER

NOTICE: PAYMENT IS DUE 10 DAYS PRIOR TO EACH SESSION

1. Does DB2 provide us with any insights into the future direction of other IBM products?

2. Overall, what are the strengths and weaknesses of DB2 as a product and as the architecture for a data base environment which DB2 represents?

3. How does DB2 compare with other data base architectures?

In a macro view of IBM's large system configuration, MVS/XA and the 3080 series are clearly an endorsement of a high-volume, centralized architecture for corporate information systems. That DB2 has been so tightly woven into the fabric of an MVS-TSO-IMS environment is an indication that these are the products that form the foundation for an operationally oriented DP capability for a major business enterprise.

DB2 is significant because it begins a pattern that will intensify in years ahead. The facilities of MVS-TSO-IMS will become much more transparent to all but systems programming personnel. Even clearer is the fact that without the powerful 3080 series, neither DB2 and the data base architecture it represents nor the architecture of "XA" itself would be feasible.

Resource integration

A simple example summarizes the integration between hardware and software resources that will provide efficient high-volume processing using the facilities discussed above. The integration between MVS, TSO, IMS and DB2 will permit alternatives in the implementation of efficient applications.

DB2 data bases will become quite large. The architecture of the tables will permit 64-billion-byte structures. The I/O capabilities of XA and the channel rates on a 3080 series machine will support large data files adequately. Suppose that extremely quick response times are required for large data bases. The architecture of XA and the capacity and speed of a 3080 series machine permit several alternative implementation techniques:

- With up to 2G bytes of main memory, a large data base could be stored in main memory.
- To avoid degradation of overall performance, DB2 could let XA handle the paging of memory for a table in storage without the requirements for repeated physical I/Os to the DB2 data bases.

Alternatively, the large table could be partitioned within DB2 to provide efficient access to high-volume components of an overall data base.

The support for DB2 and related products in the VM environment clearly indicates that the once stabilized SCP has now become a key element in large system architecture. While components of DB2's overall architecture (DXT and QMF) are available for VM, a fully integrated DB/DC system does not exist for a VM environment. This environment is properly focused on end-user interactive computing. DB2 is a step in this direction. Therefore, it would not be surprising if DB2 were available as a VM product before too long.

DOS/VSE appears to be an intermediate product. There are strong indications that IBM will encourage DOS installations to migrate to MVS in the next two to three years. DOS will be supported, but not significantly enhanced. Rather than a DOS version of XA, we can expect to see a subset of MVS/XA available for smaller systems. In this fashion, DB2 will become available to 4300-class installations that would otherwise be excluded from a complete relational DBMS from IBM.

What about the only other SCP still in use in larger IBM environments, VS/1? At a recent meeting with IBM personnel, an IBM product planner was asked what IBM intended to do with VS/1. His response: "We intend to stabilize it." The questioner pursued: "What does that mean?" The response: "We are going to shoot it!"

Clearly, the lack of mention of VS/1 in DB2 indicates that VS/1 has a very limited life expectancy as a supported product.

It probably goes without saying at this point, but IMS/VS is here to stay. Future enhancements will continue to strengthen its internal architecture and performance. IBM has plans for at least

BUSINESS SENSE

INTRODUCING THE DIABLO SERIES 36 PRINTER:

The sensible professional printer, this daisywheel offers more performance for less money than any other printer in its class. Performance like 35 characters per second. Performance like 4000 hours mean time between repairs. A range of options and accessories includes sheet feeders, forms tractors and a library of 100 printwheels.

And Diablo's unique API (All Purpose Interface) lets Series 36 play with all the most popular PC's (including IBM's). But perhaps the most sensible thing about Series 36 is its price. At $1595 suggested retail, Series 36 is a lot more printer for a lot less money than the competition. And that just makes sense.

To find out where you can see Series 36 and the other fine Diablo products call 800-556-1234 ext. 186. In California call 800-441-2345 ext. 186. Diablo Systems Inc., Fremont, California. A Xerox company.

Diablo Printers

three more releases of IMS, taking us out into the 1987 timeframe.

The following are the high-level strengths and weaknesses of DB2 and the overall architecture it represents:

DB2 strengths:

- The integration of DB2 internals with XA and large processor architecture. Result: a solid foundation for efficient processing.
- Complete implementation of the relational model, not just a "fancy" query language.
- Ability to supply data for structured and end-user application requirements as a result of IMS-DB2 interfaces.
- Compatibility across operating system environments. While DB2 itself is not available for DOS/VSE or VM configurations, DB2 demonstrates IBM's attempt to provide a broadly compatible architecture for DB/DC processing in MVS, DOS and VM environments using common data system products.
- For DP personnel (DBA and developers) the interactive facilities employ the dialogue manager of ISPF.

DB2 weaknesses:

- Availability. DB2 itself will not be available until the third quarter of this year. QMF and DXT will be available for VM in the second quarter.
- The lack of an integrated application development system (such as Ideal from ADR or AD6/O from Cullinet) for use by data processing personnel in the construction of transaction processing applications which will use DB2 data.
- The lack of an interface to ADF II, although IBM's statement of direction indicates one will be forthcoming.
- The lack of a comprehensive dictionary facility integrated with all DB/DC products.
- Confusing signals from IBM. For example, IBM has endorsed Artificial Intelligence Corp.'s (AIC) Intellect. This AI-based English language-oriented information management system is at the leading edge of technology, perhaps ahead of its time. But little or no direction has been provided by IBM to determine when DB2 would be more appropriate than Intellect and vice versa. (Note: In the context of IBM's overall data base strategy, the endorsement must be viewed as a definite strength. But relative to DB2, it clouds the evaluation of the product.)
- Continued reliance on the micro software "cottage" industry to develop products for the IBM Personal Computer. What about an extension of DB2 for the Personal Computer? Or will "desktop mainframes" (XT/370) provide the necessary access to DB2?

Apple Computer, Inc.'s Lisa has floundered a bit, at least partially because of a lack of mainframe data base interface facilities.

Cullinet, with the "Information Data Base" concept, extends IDMS architecture to the PC.

DB2 with its announced capabilities does not directly address the Personal Computer environment. This is a major consideration, if not a significant weakness, in IBM's architecture.

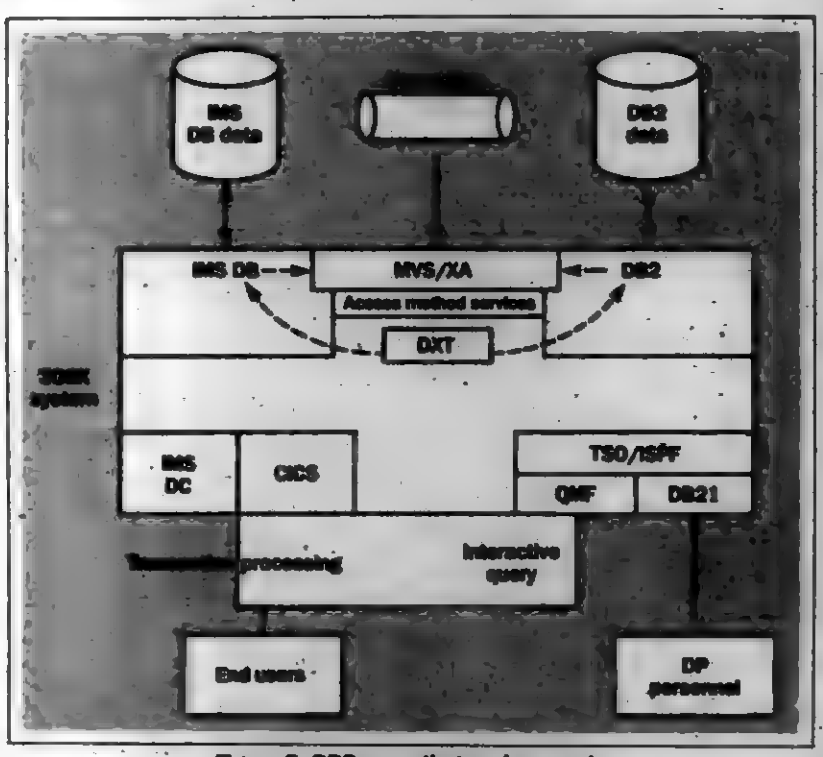


Figure 8. DB2 operating environment

DB2 vs. other architectures

Overall, it appears that the weaknesses overwhelm the strengths. However, each item will be weighted as DB2 is evaluated for a specific environment. As a specific end-user tool, DB2 will probably not fare well in competitive evaluations with Information Builders, Inc.'s Focus or AIC's Intellect, to name just two. As a complete implementation "engine," DB2 will receive stiff competition from ADR and Cullinet, among

CAP GEMINI DASD Presents

LAMOND ON IBM

San Francisco
The Westin Miyako
May 2–4, 1984

Washington, DC
The Sheraton International
Conference Center
May 7–9, 1984

Fred Lamond, internationally esteemed researcher and strategic-planning authority, thinks and speaks IBM. From the user's perspective.

More than 2,500 DP decision makers in 19 cities worldwide have already profited from his insightful and constructive analysis of IBM.

Lamond's intensive three-day seminar (12 sessions) discusses current and projected IBM policies. Products. Applications. Trends (including IBM PC).

Emphasis is on cost-effective alternatives to IBM recommended growth and migration paths. Designed to help you examine options and reduce the cost of doing business with Big Blue.

Call now for your free Seminar brochure, (800) 558-5148, in Wisconsin (414) 355-3405, or write:

CAP GEMINI DASD™
9045 North Deerwood Drive
Milwaukee, WI 53223

CEU ACCREDITED

Environments which are user friendly produce friendly users. Make a friend!

How to stop the grumbling

MANAGER SOFTWARE PRODUCTS' CONTROLMANAGER™ rids your users of the never ending task of having to learn how to interact with yet another software product. It enables them to match the functionality of a software product with their specific requirements, while at the same time removing the need for them to become "system" knowledgeable.

Meet the MANAGER family

CONTROLMANAGER is truly integrated and being a member of MSP's MANAGER Family, is totally dictionary driven. CONTROLMANAGER is initially available exclusively for the other members of the MANAGER Family. These include DATAMANAGER® the data and information resource management system, DESIGNMANAGER,™ the logical data base design and information modeling system and SOURCEMANAGER,™ the Cobol application development system.

Interface with user

CONTROLMANAGER is the interactive interface between the person, the machine and the software. It provides automatic navigation for the user to get where he wants to be. It is simply and logically tailorable.

Let's get together

Find out how CONTROLMANAGER can help you make friends with your users.

Send the coupon today or call (617) 863 5800 (Telex 710 326 0431).

Send me more information about MANAGER SOFTWARE PRODUCTS' family of integrated, dictionary-driven products:
☐ CONTROLMANAGER ☐ DESIGNMANAGER
☐ DATAMANAGER ☐ SOURCEMANAGER

Name _____ Title _____
Company _____
Address _____
City/State/ZIP Code _____
Telephone Number ( ) _____
Send coupon to MANAGER SOFTWARE PRODUCTS INC.
131 Hartwell Ave., Lexington, MA 02173-3126.
Or call (617) 863 5800 Telex 710 326 0431 CM/CW/4-0

msp
MANAGER SOFTWARE PRODUCTS INC

Offices worldwide: Amsterdam, Boston, Canada, Italy, Japan, Scandinavia, Spain, Switzerland/Austria, U.K./Eire, U.S.A., West Germany.

DATAMANAGER is a registered trademark of MSP's, Inc.

From

, to

Nobody puts ideas on paper so many ways.

If you're using your printer with a personal computer, you probably need one that can handle a variety of functions.

At the same time, the price should be in line with the computer itself. Low.

The pint-sized Dataproducts printer in the picture costs about as much as one good software package.

It prints spreadsheets, graphics and illustrations, labels, multi-part forms—even letters that look like they were typed.

But let's say you're running a big computer and it's hundred-page reports you need. Pronto. Or documents by the millions.

The printer on the right finishes a full computer printout page in less time than it takes to sneeze. At 2,000 lines a minute, it prints much faster than you can see. Three shifts a day. Year after year.

In between these two special-duty Dataproducts printers are whole families of other Dataproducts printers—daisywheel printers, non-impact printers, high-security printers for the government, and more.

In fact, we make more different kinds of computer printers than any other independent printer company in the world.

Very likely we make one that fits your needs exactly.

Write us at 6200 Canoga Avenue, Woodland Hills, CA 91365. Or phone (818) 887-3924. In Europe, 136-138 High Street, Egham, Surrey, TW 20 9HL England.

Dataproducts computer printers.

others. As a complement to IMS data base systems, DB2 will enter any evaluation with a sizable advantage, represented by the strengths listed above.

From a purist (technical) viewpoint, such as that of a data base software engineer, DB2 does not represent a perfect architecture. From a competitive viewpoint, Cullinet, ADR, Computer Corp. of America and Software AG each possess an architecture that has superior components in relationship to DB2 and to one another.

From a management viewpoint, a simple perspective may be the most pragmatic. If an organization is committed to IMS — face it, many of the Fortune 100 are — then DB2 is a very acceptable alternative. If an organization has the luxury, for whatever reason, of moving beyond IMS and away from IBM products, then the architecture of the vendors mentioned above should be the primary alternatives.

In the long run, the parallel DBMS architecture IBM is promoting with IMS and DB2 is very viable. In the short term, Cullinet, with its fully integrated relational/network architecture, will dominate the data base software marketplace and rightfully so. But the potential power of IDMS/R *cannot* be used as evidence of DB2's weakness. Both are powerful in their own right.

Implementation guidelines

Following are several general guidelines that an installation can follow in considering the implementation of DB2:

- Relative to MVS, a pragmatic approach suggests you should establish an XA environment *before* installing DB2.
- If you must install DB2 in MVS/370, be sure you are not constrained in virtual memory. DB2 would accentuate that problem, perhaps bringing your system to its knees.
- If you are an existing IMS installation, begin the process of analyzing the overall architecture for "subject data bases" as they relate to the data currently handled by IMS. In other words, start planning *now* for a migration to DB2.
- If you are *not* an IMS installation, do not necessarily feel the need to consider implementing DB2 *and* IMS. If your focus will be on end-user-driven applications, DB2 could be sufficient.
- Overall, ensure that your installation is fully aware and utilizing the facilities represented by products such as ISPF, which are key in IBM's large system architecture. This will ease the transition to DB2.

Do not lose sight of the fact that any data base tool is just that: a vehicle that will help move your organization in a certain direction. With "data base" as a conceptual framework, the direction is toward integrated, efficient, accurate and timely information processing systems. Data base software technology is the vehicle. Data base-oriented methodologies for the planning, design and development of applications will chart the course the vehicle will navigate.

In an important sense, DB2's technical shortcomings, which this article has directly and indirectly presented, must not be exaggerated. This is not to defend IBM; it neither wants nor needs such defense. More important, for an organization committed to the direction stated above, DB2 represents another opportunity to deal with the issues which, if properly addressed, *will* chart the course toward a fourth-generation data base environment:

1. Defining information system requirements that are consistent with business objectives — strategic, data-oriented systems planning.
2. Managing data as a corporate resource — data administration.
3. Implementing programs designed to establish an overall data architecture for information systems.
4. Designing systems — from mainframe to micro, from end user to batch operations — that utilize the objectives of the data base concept as guidelines for effective information processing.
5. Selecting data base software tools that suit the business environment *and* information processing requirements of an enterprise.

All too often, an organization undertakes a data base implementation effort from the bottom up (starting with issue No. 5, *perhaps* No. 4, very seldom even considering 3 through 1.)

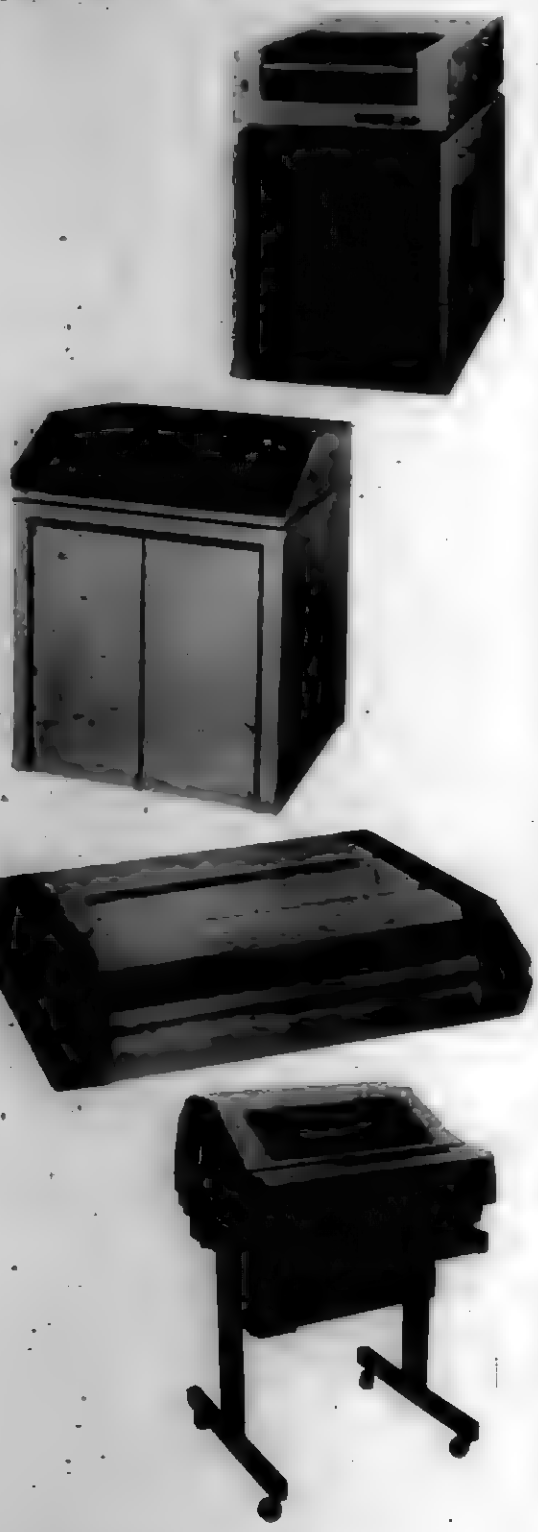
For an organization committed to mainstream IBM technology, DB2 *is* a powerful alternative for fourth-generation data base software. For *any* organization, an evaluation of DB2 is an opportunity to define a blueprint for a fourth-generation data base environment. Any particular blueprint must blend strategies, methodologies and technologies for the implementation of the data base concept. DB2, as a product, addresses only the third component. But as an overall architecture from IBM, it encourages us to deal with the other two.

About the author

Paul R. Hessinger is director of Advanced Technology Research for Computer Task Group, Inc. in Buffalo, N.Y. He is responsible for research in mainstream information systems technologies. He focuses primarily on the current product strategies and future evolution of products from major software vendors, particularly IBM.

Hessinger has been with Computer Task Group for nine years. Prior to becoming director of research, he was project manager for large-scale IMS/VS DB/DC development projects.

CONTINENTAL RESOURCES
We deliver what you need.



We've got Subsystems!

Need a printer, disk drive, or data communication multiplexer? Continental Resources can deliver what you need. Continental specializes in state-of-the-art plug-compatible peripherals for nearly every mainframe environment. Products from industry leaders such as Data Products, Genicom, CDC, Emulex, and C.I.E. Terminals (CITOH).

Printers with speeds ranging from 45 Characters Per Second to 2000 Lines Per Minute. Disk drives with storage capacities of 80, 160, 300, and 600 megabytes. We can even supply interface cables, data transfer switches, and a host of other communication devices to ensure you of a totally integrated system.

Continental's Subsystems group can provide you with the most up-to-date components available — plus professional assistance to ensure proper system integration. We also offer complete technical support and service, competitive pricing, and rapid order turnaround. We're certain to have what you need — when you need it.

Selection. Support. Service. That's what you get when you buy from Continental.

Products of almost every description from virtually every industry leader. Whatever your equipment requirements, we can deliver what you need.

But Continental doesn't just offer great selection. We provide a total support package unmatched in the industry. Our nine offices provide sales, technical, and service support backed by more than 20 years experience. You're assured of the most informative, professional assistance available — before and after your purchase. And Continental even supplies complete on-site service.

Not ready to buy? Continental offers a host of rental and leasing options. One is sure to meet your needs.

And, if you're not sure of what you need, our specialists will assist in evaluating your needs and recommend the right system for you — as well as compatible software and supplies. Ribbons, printwheels, and paper — even complete work stations.

So give us a call the next time you need computer equipment. Continental Resources. We deliver what you need.

CONTINENTAL RESOURCES, INC.
175 Middlesex Turnpike, Bedford, MA 01730 (617) 275-0850

Boston Area (617) 275-0850
New York, NY (212) 695-3206
Northern NJ Area (201) 654-6900
Philadelphia Area (609) 234-5100
Chicago Area (312) 860-5991
Baltimore-Washington DC (301) 948-4310
San Francisco Area (408) 727-9870
Los Angeles Area (213) 636-0454

IN DEPTH

Turnaround management

With turnaround management, a team of two to four highly qualified managers steps into key managerial posts within and atop the client company's data processing organization. The team's foremost objective is to turn around or reposition the DP organization so that it can move forward in aggressive support of the business.

By Joseph E. Izzo

Stuck with a problem data processing department? Let's get rid of the data processing manager!

No matter that he's working his tail off, never having learned how to say no to user requests. No matter that he's the kind of individual who seldom whimpers, even when his requisition for just one more programmer/analyst is turned down. No matter that he runs a business nearly as complex and demanding as the company it serves and that he may be tremendously overworked and underpaid.

Someone's got to take the rap for that three-year development backlog, that unforeseen 70% jump in hardware acquisition cost, the growing number of service complaints. We need a scapegoat, so let it be him.

Let me not imply that said manager is always without sin. He will, in fact, quite often lack the business skills to complement his technical know-how. To protect his domain, he may resort to high-tech jargon. He may even exude a holier-than-thou attitude. Maybe he should be let go.

In most cases though, the malfunctioning of in-house data processing organizations can be traced to more than one cause — often to a convolution of factors both trivial and significant. Terminating the silhouetted target is usually too simple a solution for a problem this complex.

Let's say that a serious problem does exist. This shouldn't surprise us because computers, despite their enormous propagation, still represent a comparatively adolescent technology and one for which economic use poses many as yet unanswered questions. How should the computer be applied? How should it be controlled? How should cost and benefit be measured to ensure a

fair return? Few corporations have recognized that ascertaining valid answers to such questions may be absolutely prerequisite to development of a responsive data processing resource. Problems, therefore, are not that uncommon.

Available solutions — whether that means fixing a capability gone catastrophically awry or simply creating an environment in which an ailing service will flourish — are comparatively few and exhibit varying degrees of success.

We've found, for example, that the role of the sit-by-your-side consultant seldom carries sufficient authority to overcome the inertia of a major problem. A more drastic approach — that of selling off the existing capability to a facility management outfit — carries with it some more obvious worries.

This kind of attitude shift is not achieved overnight. When turnaround management is called for, it demands a considerable management commitment. In fact, it can easily take as long as a year or more to overcome initial resistance.

"I had considered facilities management as a solution," one manager told us, "until I recognized that many of the very factors that fueled our information processing dilemma would very likely reconfront us when it came time to buy back the capability."

The remaining solution is what The JIA Management Group, Inc. calls "turnaround management." Under this concept, which we believe is unique, a team of two to four highly qualified managers literally steps into and assumes key managerial posts within and atop the client company's data processing organization.

These managers offer an average of 25 years of experience in business, computer technology and data processing management. And they come to the client company armed with systems and procedures, largely proprietary, that have been validated by repeated application.

The team's foremost objective is to turn around quickly or reposition the DP organization so that it can move forward in aggressive support of the business. Of course, that positioning must be accomplished in such a way that the department not only performs well during the turnaround team's residency, but also becomes sufficiently well organized, staffed, educated and motivated that a high level of service continues long after its departure.

A secondary objective is to reinforce strongly the credentials and acceptance of the data processing staff by adding to the staff's technical qualifications a familiarity with the principles of business planning and priorities as they might be viewed by the firm's executive offices — in short, giving data processing a business focus. Typically, the team leader, acting as department head and establishing an empathetic interface with the firm's user organizations, is the chief instrument of this achievement.

How well turnaround management can work was demonstrated a few years back at the Lincoln Telephone & Telegraph Co. in Lincoln, Neb. Lincoln Telephone is a utility whose data processing shop — despite the best of intentions — lacked the ability to implement the modern-day, online systems so necessary to customer service improvements. Yet after about 12 months of a turnaround management contract, the department proved its ability to design and develop major software systems, and the firm's customer service record improved dramatically.

So taken with its success, Lincoln Telephone recommended the concept to a major Midwest producer of high-fidelity equipment. The company hired JIA to turn around a data processing department that, despite some 50 people and millions of dollars worth of computer hardware, simply was not functioning.

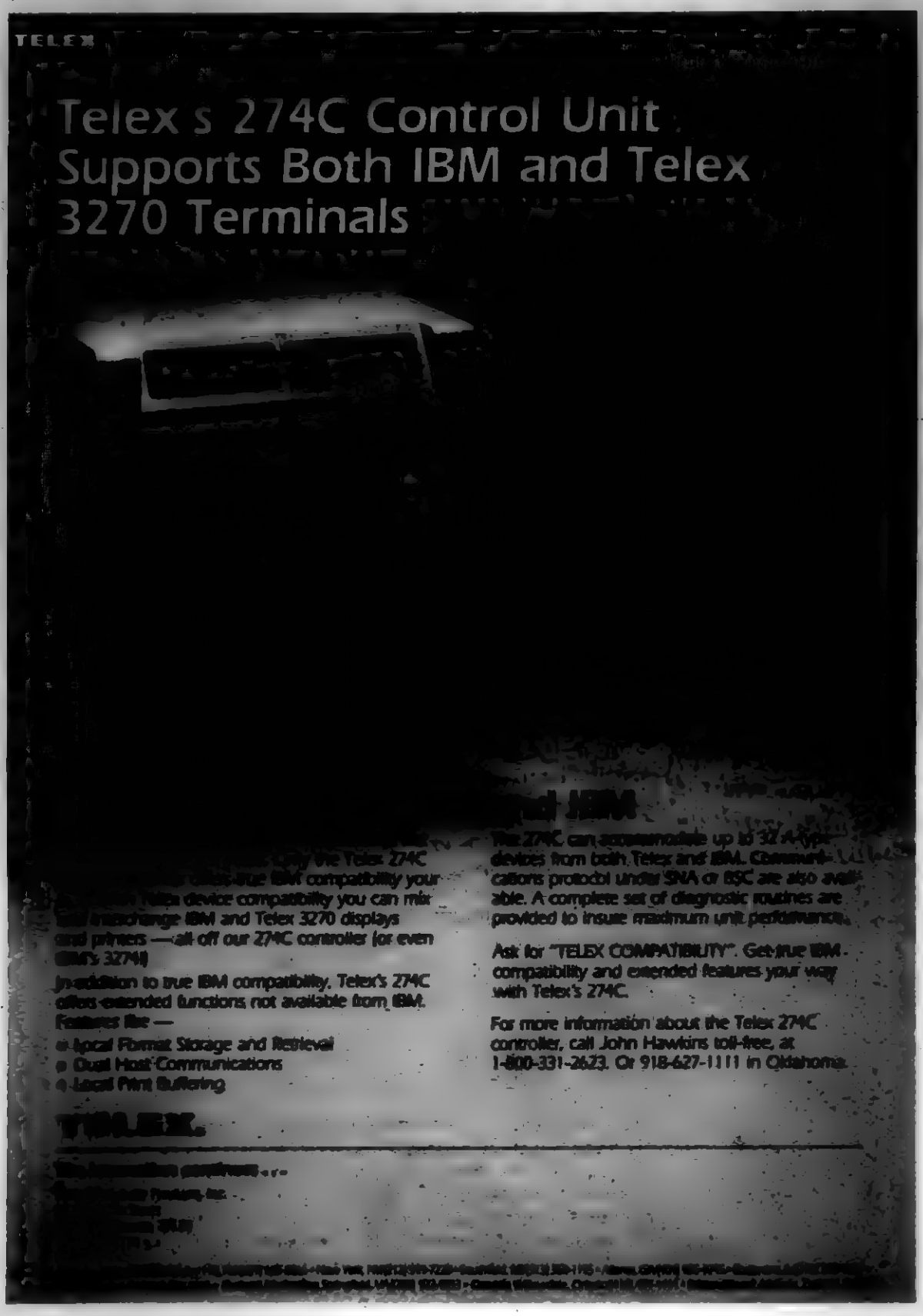
When the turnaround was complete approximately 14 months later, JIA consultants had replaced themselves with a qualified internal management team, had instituted a major training program for the entire staff and had installed the company's first set of data processing standards and procedures covering everything from proposal format to quality assurance requirements.

One of the client firm's key executives found a changed company attitude. "When JIA arrived," he reported, "everyone in our company hated the DP department. It was not reliable, it fouled up and the like.

"By contrast, the department has now gained the confidence of our organization," he added. "Now there's dependability and good communications."

Not an overnight solution

This kind of attitude shift is not achieved overnight. When turnaround management is called for, it demands a considerable management commitment. In fact, it can easily take as long as a year or more to overcome initial resistance, to educate the staff and to install new ideas, policies and procedures, while simultaneously maintaining and upgrading day-to-day operations. The greatest results are usually reaped toward the end of the contract, long after the JIA consultants are gone.



At last, a system with a head for numbers, an eye for pictures, and a mind of its own.

Introducing the Kodak KAR-4000 information system. Take the processing power of a stand-alone computer. Add a "photographic memory" to access original document images. Top it off with comprehensive, one-source software and service.

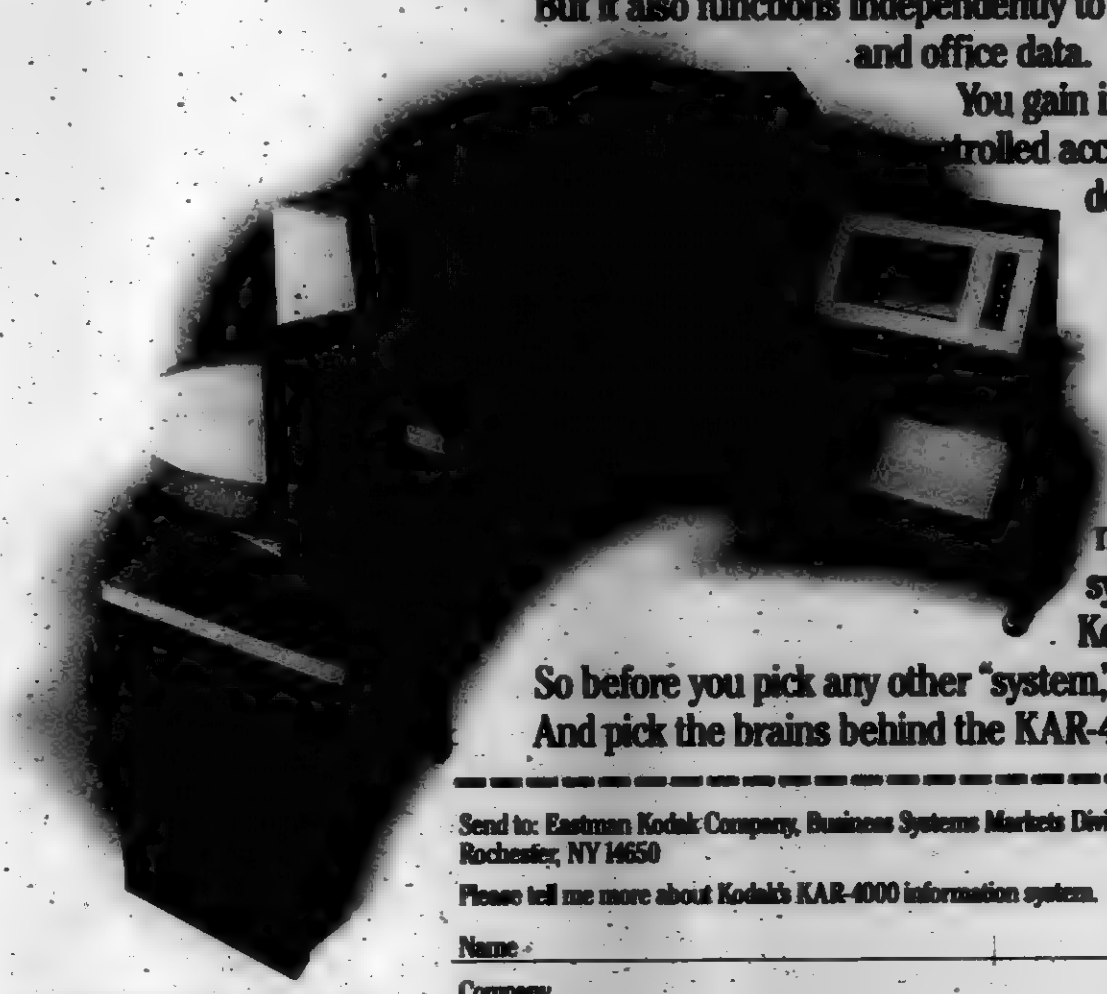
The result: a Kodak KAR-4000 information system.

It outperforms any other computer-assisted retrieval system. But it also functions independently to process both documents and office data.

You gain independent computer-controlled access to on-line data and documents. Without the staggering expense of on-line computer storage.

You even gain independence from service—all components in the KAR-4000 system are serviced by Kodak.

So before you pick any other "system," send in the coupon. And pick the brains behind the KAR-4000 information system.



The Kodak KAR-4000 information system. It gives the computer a photographic memory.

Kodak

© Eastman Kodak Company, 1983

Send to: Eastman Kodak Company, Business Systems Markets Division, Dept. DP4549
Rochester, NY 14650

Please tell me more about Kodak's KAR-4000 information system.

Name _____

Company _____

Address _____

City _____

State _____ ZIP _____

Please answer the following:

1. How many incoming documents per day do you process? ☐ 1000-2000 ☐ 2000-5000 ☐ Over 5000

2. How many documents do you normally retrieve each day? ☐ Less than 10 ☐ 10-25 ☐ Over 25

Turnaround management can also be effective on a more limited scale. In many instances, these same methods are applied to a single unit or function within the larger DP department: to systems development, to operations, to quality assurance or to business systems planning, for example.

One of the country's largest suppliers of private-label cheese had such a need. In this instance, the client's growth required major hardware additions coupled with state-of-the-art software and a new, more sophisticated operating environment. The operations staff, then about 30 people, couldn't meet the challenge and probably faced termination if an alternative solution could not be found.

Beginning with an effectiveness review, a JIA team of two individuals tackled the development of a data center operations improvement plan that ultimately established project request procedures, planning methodology and system turnover procedures among its several facets. The team also set up the documented methods to automate tape library management, automate software production and test, establish a viable recovery and restart procedure and implement other needed operational improvements. JIA also played a key role in procurement of a major software package.

Management involvement

True and lasting success of turnaround management almost invariably demands one very significant ingredient — the direct involvement of executive management: first to establish objectives for its data processing resource and then to monitor and control the operation to ensure continued attainment of the desired cost-benefit ratio and other goals.

Classically, top executives have more or less ignored data processing as they would never ignore engineering, marketing or finance — in many cases, simply because of uneasiness in dealing with the unfamiliar technology, compounded at times by the problems of technicians' jargon or aloofness. Yet in working with more than 100 client companies, we've learned that these executives can overcome this distance and learn to make correct decisions about data processing through the vehicle of the executive policy committee.

Properly framed, the data processing executive policy committee is not a discussion group, but a decision-making body made up of the firm's senior executives. Acting much as a corporation's board of directors does in serving and guiding the corporation, this group sets the data processing objectives and policies, appoints the top DP executives and approves their organizational structure, analyzes service responsiveness and reviews — for potential returns — major development projects and other proposed expenditures.

Believing that performance of the executive policy committee would depend largely on the quality of information on which it must act, JIA developed a number of innovative standards for reports and proposals to go before the committee. For proposed expenditures, the committee receives a document known as a decision package, which has proven to work primarily because it presents its case in business language rather than computer terminology. It also demands that the corporate user for whom the development is proposed participate fully in formulating the proposal.

Bergen Brunswig, a JIA client and a distributor of pharmaceutical and health-care products, had been heavily involved in data processing for many years, even operating a computerized inventory control system since 1955. Yet the company's president, Robert H. Martini, and other senior executives felt that until they had established the DP policy committee, they lacked the ability to manage or control the service properly.

"It seems easy to manage other parts of the business," Martini said, "but DP was always a mystical area."

As evidence of committee effectiveness, Bergen Brunswig has since reported about a 50% cut in backlog of DP projects from approximately 20 staff-years at $40,000 per year to about two staff-years . And the firm credits the committee with a drop in DP turnover from 35% to 8% in a single quarter.

Start-up situations

For the company that believes the best cure is prevention, JIA offers a start-up management service that employs many of the same principles of turnaround management. As with the turnaround service, the concepts can be applied to an entire DP department or just a new unit within the department.

In the typical situation (much like the separate case history of the Angeles Corp.), the client used outside services but reached the point where the bureau no longer seemed the most cost-effective or timely answer to data processing needs. In such a start-up, JIA can shoulder the entire burden, beginning with preparation of a detailed strategy plan for the changeover.

Subsequent functions include the actual hardware and software selection process, effecting the transfer from the service bureau, installing necessary standards and procedures, setting up an executive policy committee, designing the computer center, managing it until all the wrinkles are out and finally selecting and training the staff to replace JIA.

JIA's role in starting up a brand new unit within an existing data

(Continued on ID/36)

Give your PC some exciting new personalities.

Our EtherGuide™ seminar-on-a-diskette will show you how.

...assistant, secretary, messenger, meeting planner, graphic artist, author, financial analyst, executive, and friend.

You'll be able to reach out to colleagues with electronic mail, using our award-winning EtherMail®. Share data bases, printers and plotters, while running hundreds of leading programs such as 1-2-3® from Lotus®, WordStar® MultiMate®, dBase II® and Multiplan®.

Our EtherSeries hardware and software packages make the industry-standard Ethernet available, and introduce the same easy to use, low cost, high performance networks. You don't have to be a PC or a server either. Or buy a disk for every PC to find out you've even more power.

...and most compatibles, such as COMPAQ,® TeleVideo® and Eagle.®

So find out how easy it is to get into personal networking. Send in the coupon and a check for $10—that's $10 off the usual $20 price. Or just check the box for complete information on how to do your personal best.

3Com
the personal networking people

Personal Networking
from EtherSeries

How the management contract works

The management contract is one way of quickly repositioning a data processing department and developing it into a professional, high-performance organization in a short period of time. This is accomplished by placing a JIA data processing management team in the department on a temporary basis to "turn around" the performance of the organization. During its tenure, the team's major responsibilities are:

■ To effect a quick turnaround in the performance of a data processing organization.

■ To develop within the client company a strong, reliable, enduring professional data processing organization, which includes finding the training replacements for the temporary management team.

■ To install methods and practices for ensuring an ongoing, quality organization with appropriate management reporting and control.

In bringing about the turnaround of a data processing organization, the management contract has some basic advantages over the more conventional methods of hiring a new management team or promoting managers from within.

The motivation is different. Under a management contract, the goal is to develop a lean but strong organization. Since the outside management team is there for only a relatively short period of time, the interest and focus is to put in place only what is needed; there is no tendency to build an "empire."

The contract management team had no personal ties to existing members of the organization and, therefore, can be objective in evaluating an individual's performance.

The JIA staff is experienced in working as a team to accomplish major DP objectives. In contrast, if a new manager is hired, it may take a minimum of six months before he can form and test a team that can move aggressively forward.

Many of the professional methods and practices required to effectively operate a data processing organization exist within JIA and have been tested and implemented in many organizations.

Therefore, the cost and time required to develop these methods and practices is minimized.

With a management contract, the team's success is measured by its ability to make the required changes on schedule and to select managers who will maintain a high level of performance for the organization in the future. There should be no need for outside management assistance when the management contract is completed.

A management contract is not designed to provide "hatchet men," but to serve as a means of enhancing the skills of in-house talent. Individuals will be replaced only in those cases in which capabilities are below acceptable standards.

Situation dictates size

Based on the size of the data processing installation, the number of JIA managers at the beginning of a management contract will range from 2¼ to five, depending on the complexity of the situation. The contract's duration could be eight to 14 months. The time period is specified at the beginning of the engagement.

A brief scenario follows. For purposes of illustration, we will assume the requirement is for four members of the JIA management staff and the duration of the contract is 12 months.

During the first three to four months, four JIA team members would be assigned to the client site. At the conclusion of that period, one member will be replaced by a trained internal DP staff member, bringing the number down to three. At about the sixth month, an additional member of the JIA staff would be replaced by another staff member. At approximately the ninth month, the third member of the JIA staff would be replaced. The remaining JIA staff person would leave at the end of the 12th month.

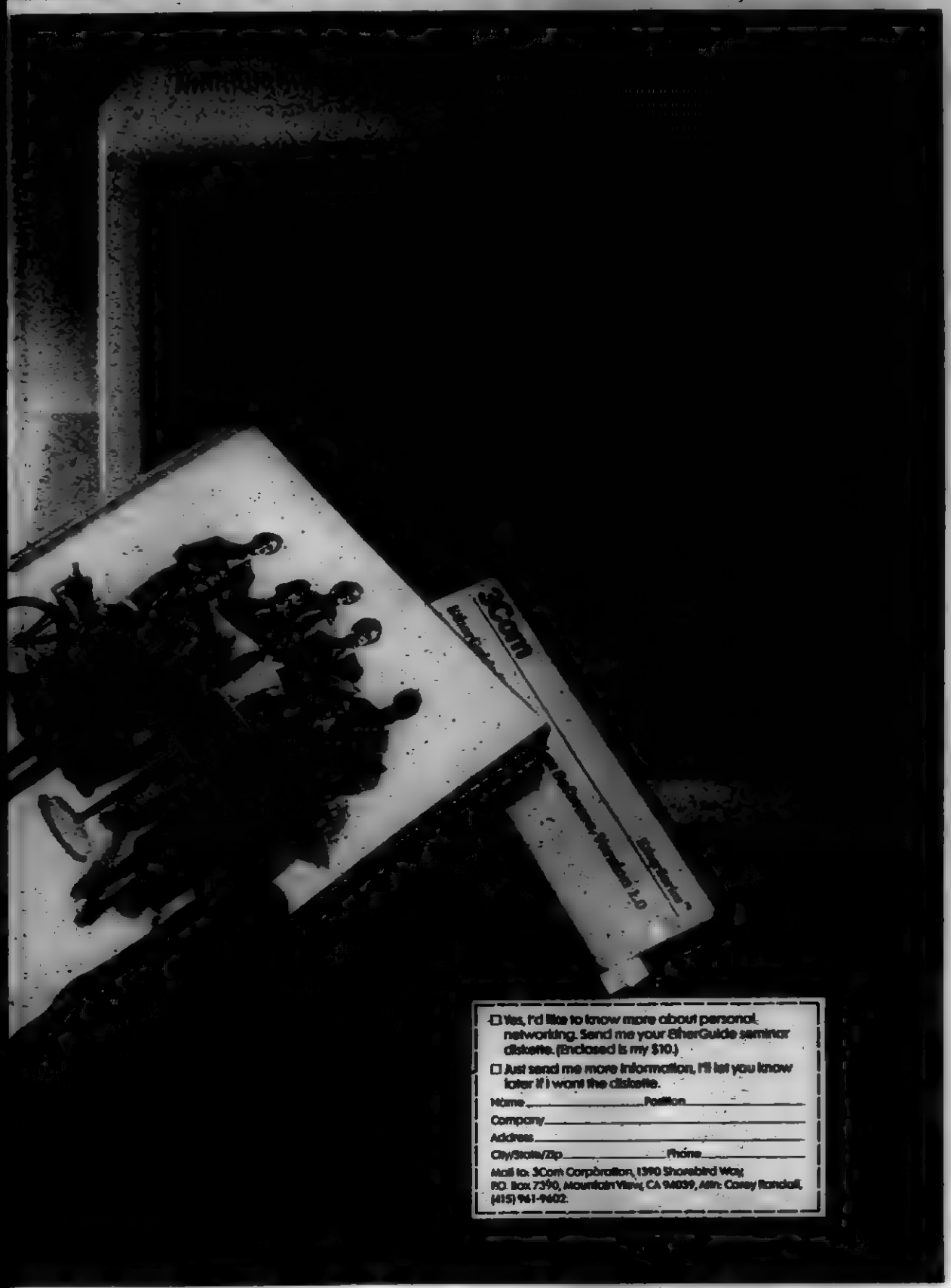
This approach allows for the gradual shift from a JIA-managed organization back to a client-managed organization. The JIA management team brings about this shift and effects change while managing the daily activities of the organization.

Several other general features of the JIA management contract include:

■ The JIA staffing levels are reviewed formally each quarter to determine if reduction of JIA staff can be accelerated. An increase in JIA staff should never be considered since this defeats the purpose of the contract; the goal is to develop the people internally.

■ The contract can be canceled at any time, with 30 days' notice.

■ JIA will assume all responsibility for managing data processing within the client's policies and guidelines and report directly to the executive in charge. Outside advice and counsel will be provided to the contract management team by JIA executive management.



☐ Yes, I'd like to know more about personal networking. Send me your EtherGuide seminar diskette. (Enclosed is my $10.)

☐ Just send me more information. I'll let you know later if I want the diskette.

Name _____ Position _____

Company _____

Address _____

City/State/Zip _____ Phone _____

Mail to: 3Com Corporation, 1390 Shorebird Way, P.O. Box 7390, Mountain View, CA 94039, Attn: Corey Randall, (415) 961-9602.

(Continued from ID/34)

processing department is normally much more limited in scope. At Bergen Brunswig, JIA helped establish two new units — business systems planning and quality assurance — in addition to formation of the firm's executive policy committee.

For the most part, JIA's clients are firms undergoing a key transition of some sort — entering an exciting growth period, experiencing a product demand that's difficult to satisfy, reconsidering basic objectives or market strategies or even retrenching for one reason or another. In most cases, the transition demands samurai performance by data processing.

When it comes to developing specific solutions to the firm's problems, JIA consultants have been successful almost entirely because they are in a position to apply a vast amount of directly related experience and can do so in an objective way.

Experience level

For example, attaining improved personnel performance requires a well-stocked armory of reliable cause-and-effect experiences. From their work with many other clients, they know the results of adding people, adjusting salaries, reorganizing the department or units within it or even terminating people. And their actions are convincingly objective because their finite "reign" allows them a dispassionate, detached view.

Moreover, their limited time in power demands that replacements be certifiable before that date. To ensure that happens, they begin to inform and educate the entire staff from the first day. Their initial objective is to alleviate the natural trepidation that occurs on arrival. A carefully orchestrated presentation, open to all DP personnel from managers to keypunch operators, explains precisely why they are there, what they propose to do and how long it should take.

Within the subsequent few weeks, the consultants conduct question-and-answer sessions with smaller groups. At one time or another, they talk privately with each individual about his goals and how they might best be achieved.

The consultants are always concerned about developing each staff member to his highest potential in line with the individual's goals. Naturally, those individual wishes sometimes conflict with the client's aims, making changes imperative. At worst, and this has applied to some department heads, it may be suggested that the employee seek another job.

Most often, however, shifting the person to a different function within the organization is the better solution and often benefits the employee directly. For example, switching a middle manager from programming to quality assurance exposes that individual to a new overview of the system development cycle and the tools and techniques by which the cycle is best managed. That person then ends up with a depth of business experience to complement his technical qualifications.

Most often, shifting the person to a different function within the organization is the better solution and often benefits the employee directly.

To illustrate more specifically the firm's approaches to real problems, several brief case histories follow. Studies of the Lincoln Telephone & Telegraph Co. and Itel Corp. demonstrate the approach to turnaround management. A look at the Angeles Corp. shows how start-up management was accomplished.

Lincoln Telephone

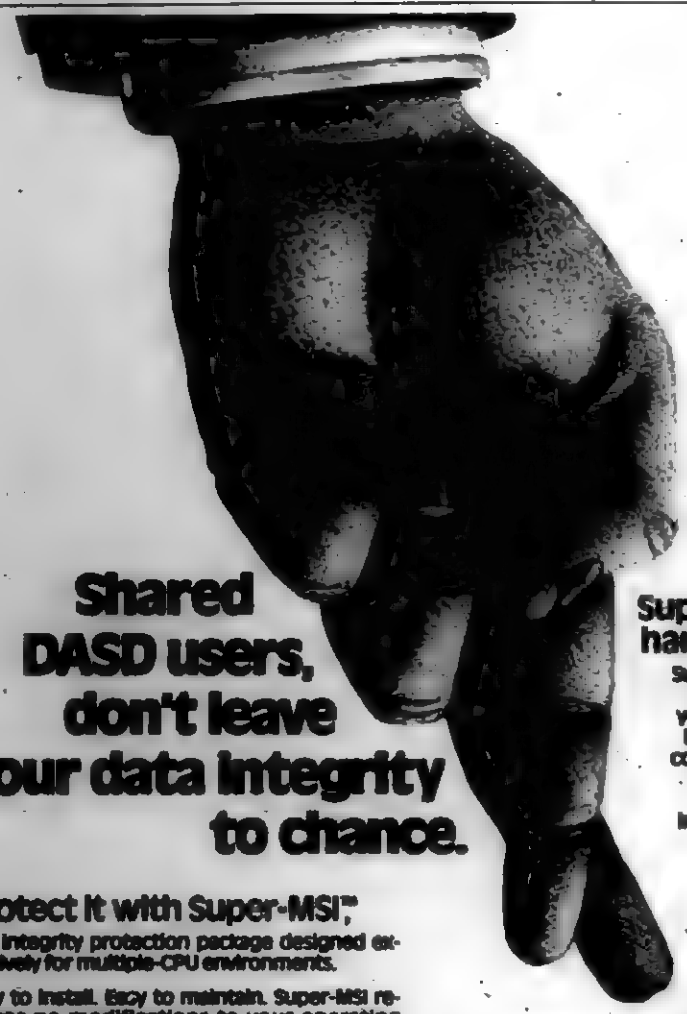
About 80 years of age, the Lincoln Telephone & Telegraph Co. of Lincoln, Neb., is a sparkling example of Middle America's catch-up infatuation with contemporary data processing technology.

Here is a medium-size utility that offers local and long-distance services to 22 counties in southeastern Nebraska. Here's a regional firm that serves some 190,000 customers and 360,000 instruments. Here's a company whose data processing organization progressed in just a few years from operation of a semiarchaic batch-oriented accounting system to modern-day, on-line processing of customer and stockholder records, toll settlements (a major source of income) and sophisticated business management tasks from what-if modeling to inventory control.

Yet in 1977, the DP outlook could not have appeared less promising. Lincoln Telephone's management — including Vice-President and Controller Laurence Connealy — had earlier recognized that the company's accelerating growth was demanding new and better ways to handle customer orders. "At that time," Connealy told us, "it took 3½ days to install service from the time a customer placed an order."

That was unacceptable to a firm that prided itself on service improvements and hold-the-line costs. So it attempted — starting in 1975 — to develop and implement a new computer-based order processing and billing system it called Cars (for Customer Automated Records System). It anticipated that Cars would be followed by other major DP developments.

But things didn't go according to plan. Off the beaten path and reflecting a somewhat provincial understanding of DP technology, the DP staff at Lincoln spent some 60



Shared DASD users, don't leave your data integrity to chance.

Protect it with Super-MSI™,
the integrity protection package designed exclusively for multiple-CPU environments.

Easy to install. Easy to maintain. Super-MSI requires no modifications to your operating system and can be implemented in an active system in as little as ten minutes—assuring complete data integrity from the moment it is installed.

Super-MSI guarantees data integrity.

No complicated job scheduling. No elaborate control schemes. No software changes. Super-MSI spans inter-system activity to give "unified system" integrity to your entire multi-system complex.

Super-MSI preserves integrity under MVS, MVS-SE, MVS-SP, SVS, MVT, VS1 and MFT systems.

Super-MSI prevents data destruction.

Inadvertant modification, simultaneous access ... Super-MSI stops the damaging data abuses that multiply in a multi-systems environment. Prevents the errors that can so easily occur—and too often go undetected—when users operate in a multi-systems complex.

Super-MSI eliminates hardware RESERVEs.

Super-MSI completely protects your data integrity and frees your systems of RESERVEs and RESERVE lock-outs. Super-MSI converts selective RESERVEs to logical controls that securely protect your data without inhibiting system throughput.

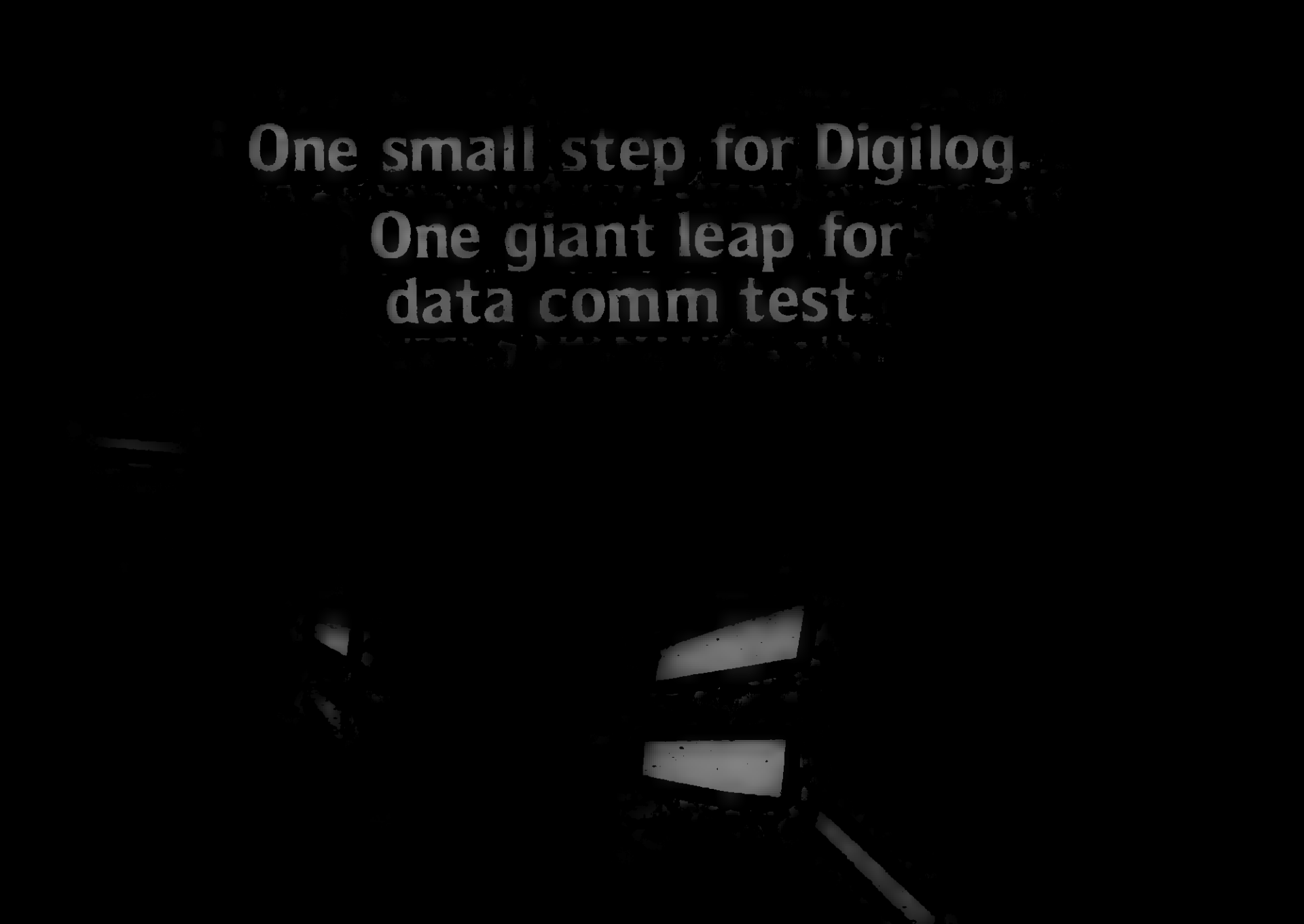
Super-MSI does more.

As part of the CGA family of single-image software for multiple-CPU sites, Super-MSI works together with MSM®, our Multiple Systems Manager which manages tape and disk storage devices and GCD®, our Global Console Director which consolidates consoles, cutting costs and streamlining operations. The result is a unified single system image that is transparent, flexible and powerful. Use them together or in any combination. CGA's multiple systems software is a must for large users.

More than 1,000 CGA single-image software packages are in use around the world, preserving data integrity and helping multiple-CPU sites hum like they're supposed to. Call today. Set up a free trial of Super-MSI, GCD or MSM.

Speak software. Talk to CGA.
800-237-2057

cga
CGA Software Products Group
960 Holmdel Road
Holmdel, NJ 07733



New family of automatic protocol analyzers interpret and isolate the error source for you

Meet the New Digilog 200, 400, 600, and 800 . . . four revolutionary diagnostic analyzers that can actually describe in plain English what is happening on your data lines.

Until now, analyzers more or less just displayed the data or the protocol. You had to do all the interpreting. . . and figure out the error source yourself.

Now the new Digilog analyzers can decode and interpret the protocol for you. Isolate faults automatically. Exactly. Even statistically analyze performance on your data lines.

Compare the new Digilog technology with anything else. Suddenly, we're a generation ahead of them all.

Digilog 200, automates data comm testing

Now, first time users can perform like experts. And seasoned professionals can do more . . . faster.

The Digilog 200 sets up automatically. Decodes protocols automatically. Analyzes protocols automatically. Tests devices automatically. And, of course, identifies the faults automatically. Sound easy to use? It is.

And, for flexibility, the Digilog 200 has just about any capability you can think of— EE PROM packs for program or data storage, remote control, typewriter-like keyboard, full programming, menu driven traps and triggers, CRT, help screens, six BERT tests, interface breakout, printer output, etc.

Digilog 400 and Digilog 600 For even greater sophistication

Here the emphasis shifts toward versatility, power and higher speed . . . up to 72K bits/second.

You get more programming power, bigger CRTs, built-in 3½" micro disks, soft function keys, graphics, protocol simulation plus all the features of the 200.

Digilog 800, the new technology

Meet the world's first protocol/performance analyzer.

Use the 800 to conquer the toughest data comm problems. Debug software programs. Improve the performance of your network.

The Digilog 800 offers you every conceivable diagnostic capability. Including fully selective and bit image recording, full protocol simulation, automatic protocol analysis through level 3 (X.25, SNA, etc.), and speeds to 256K bits/second.

The Digilog 800 also gives you on-line color graphics, internal 10 megabyte disk with selective logging and comprehensive statistical analysis with reports.
Nothing else comes close.

Digilog is out in front

Want to see what the new generation of Digilog analyzers can do for you? Call now for a demonstration (215) 628-4530.

Digilog Inc., Network Control Division
1370 Welsh Rd, Montgomeryville, PA 18936

DIGILOG
NETWORK CONTROL DIVISION

man-months in system development, forecast the need for an additional 60 and was finally judged short on system design know-how.

Desperate to solve the growing problem, Lincoln Telephone executive management considered its alternatives: the turnkey development of Cars by an outside firm, commitment to a five-year facilities management contract or simply extensive recruiting and training. The facilities management contract — under which both equipment and data processing staff would be legally absorbed by the contractor — was a drastic solution, but it looked like a front-runner in responsiveness.

"Although the facilities management approach seemed to be a good bet, it also featured some significant drawbacks," Connealy admitted. As he now recalls it, the dominant negatives were potential cost growth, lack of guarantees on return of the capability at contract termination and the utility's definite distaste for the idea of sandwiching a separate corporate entity between the utility and its customers.

Interestingly enough, while the JIA team had termination authority, no firings were found necessary. Even the displaced manager moved into a newly created quality assurance slot.

Lincoln Telephone had heard of JIA and the turnaround management concept. It agreed to a one-year management services contract, with provisions for both cancellation and extension.

The contract's comprehensive work plan addressed the identified problems, called for the immediate insertion of qualified data processing management, defined a program to upgrade its employees and supervisors and specified month-by-month deliverables by which the utility could monitor and control the effort.

Connealy's recall is a bit more vivid. "JIA brought in five managers to run our shop. They moved our people aside temporarily, wrote standards, set up a project control system, prepared a personnel assessment and training plan and began a national search for a new DP manager."

Interestingly enough, while the JIA team had termination authority, no firings were found necessary. Even the displaced manager moved into a newly created quality assurance slot.

Steering committee

JIA also introduced Lincoln Telephone to the concept of the executive steering committee. According to Connealy, this group of top-level executives still meets quarterly to review DP status and proposals.

From the JIA viewpoint, the effort represented a repositioning of the data processing department and the turnaround of an intolerable situation. When the consultants went in, DP facilities could almost have been described as chaotic. Salaries lagged behind the industry, and morale was low.

When JIA left, about five years of learning had been jammed into one year; each employee had a prescribed route to education and advancement. And executive management had begun to understand and pay attention to the data processing operation.

Lincoln Telephone also whipped the order processing problem. With Cars, more than 50% of Lincoln Telephone's service orders are actually filled the day the order is received or, in the case of orders placed late in the day, within 24 hours.

Itel Corp.

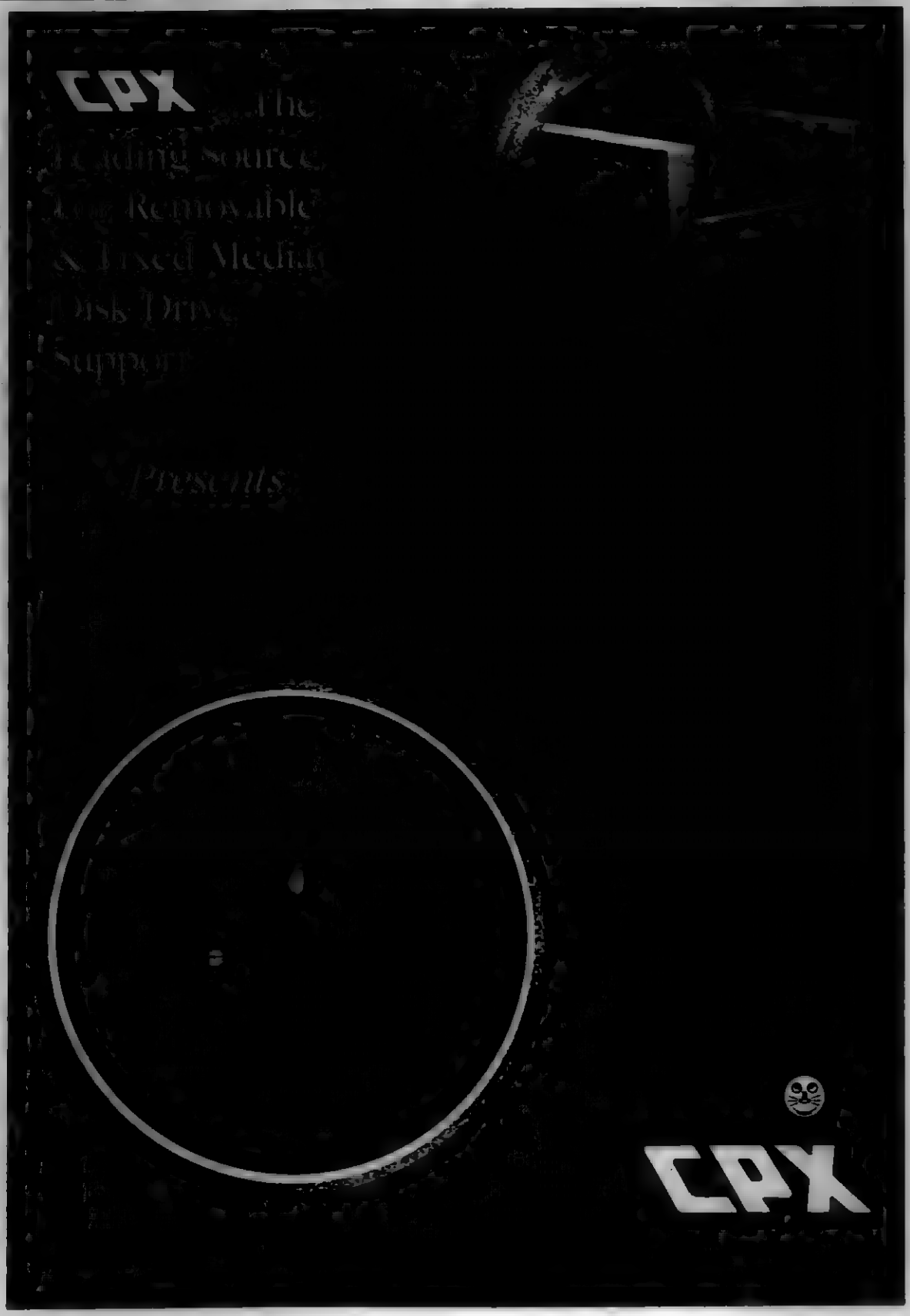
Founded in 1967, San Francisco's Itel Corp. flourished in the next decade, earning Wall Street's favor for the booming revenue from the firm's equipment-leasing business — most notably in the leasing of low-cost alternatives to IBM computers.

But 1979 saw the company stagger enormously as IBM dropped some of its prices, making much of Itel's line uncompetitive. The company lost more than $400 million that year. In January 1981, it entered Chapter 11 bankruptcy.

Today, less than three years later, Itel has gained a new notoriety — this time for the apparent speed at which it has begun to recover. It has pared the number of business units from nearly 30 to only two — container leasing and rail-car operations. It cut its work force from 7,000 to 900.

Itel has installed what is considered to be a unique bankruptcy information support system — a data processing system that has, according to Itel management, contributed so much to the recovery process that it has already been marketed to at least three other Chapter 11 businesses.

However, getting that data processing system in gear was a struggle. JIA was eventually called in. William Twomey, selected to preside over the firm during the later phases of reorganization, saw the basic problem as one of politics. "When we cut back our management staff in the fall of 1982, I — being the vice-president of finance and administration at that time — inherited several departments, including the Corporate Information Systems [CIS] Department. Unfortunately, the manager of the department held strong opinions of his own about the development and sale of the Chapter 11



Introducing APS/IMS

40% Improvement in Productivity Without the "Black Box."

Introducing APS/IMS—the only application productivity system designed specifically to meet the complex needs of the IMS Development Center.

Looking For Productivity Tools?

If you're an IMS user and looking at productivity improving tools, be careful. Most products on the market today have taken a "black box" generator approach to productivity improvement. You may be looking at one right now. While these tools can be fine for putting up simple things fast in a low-volume environment, they fall apart when subjected to the complex application, performance and maintenance issues of the IMS world.

Introducing APS/IMS— The Source-Based, Layered Solution

APS/IMS is the application productivity system that, for the first time, offers a strategic solution for the IMS Development Center. Unlike "black box" productivity tools, APS/IMS offers a source-based, layered solution for IMS users.

Source-based means that APS is engineered to be compatible with your existing source-level interfaces and requires no run-time overhead. With APS, you don't have to adopt a new language or a new design methodology.

The five APS components are housed in a layered architecture. The APS layered approach uniquely addresses the different technical skill levels within your organization as well as the broad range of application development and maintenance requirements you face:

- **Screen Painter**—engineered for end-users, designers and programmers. Using the painter, designers can interactively define screens at their 3270 or PC workstations. After screens are painted, APS will generate MFS, BMS, working storage and hard copy documentation.
- **Command Level Support System**—designed for COBOL programmers and requires no IMS knowledge. Through the use of powerful DB and DC Command Sets in a Structured COBOL programming environment, this facility allows programmers with no IMS experience to write comprehensive batch, DB and online applications.
- **Macro Level Interface**—leverages the skills of senior programmers and analysts who know IMS. This subsystem provides a macro language that enables senior technicians to extend, modify and control the Command Level environment. This additional productivity layer allows senior technicians to control systems performance and integrity without being forced to "exit" to the native IMS level.
- **Data Description Interface**—reads your existing IMS data base descriptions (whether or not you use a dictionary) and automatically provides information about the data base structure to APS/IMS.
- **APS Precompiler**—combines the outputs of the other APS components and generates native COBOL, IMS source. The APS Precompiler traps coding errors, validates IMS calls and adds no run-time overhead.

Increases Productivity By 40%

The productivity gains of these five components benefit every phase of the application life cycle—from initial design through maintenance programming.

Because of the APS layered architecture, you choose the productivity and performance ratios you need based on the specific application requirements at hand. No other product offers you this degree of control.

To date, APS users are reporting design, coding and test savings of 25% to 40% over traditional methods—with savings of 50% during the maintenance phase.

Call Today For More Information

APS/IMS can begin immediately to address your IMS Development Center requirements without forcing you to sacrifice the control and flexibility you need. With APS/IMS, there is no "black box" and there are no traps.

If you think the other productivity systems you've looked at compare to APS/IMS, look again. Before it's too late.

Call now for more information. If timing is critical, ask about the *FAST TRACK* evaluation process. We'll be happy to show you how APS/IMS can address your IMS productivity needs.

YES, I am interested in APS/IMS.
☐ Tell me about the *FAST TRACK* evaluation.
☐ Contact me for a product presentation.
☐ Please send me more information.

*Name*_____

*Title*_____

*Organization*_____

*Address*_____

*City*_____ *State*_____

*Phone*_____ *Zip*_____

SAGE SYSTEMS INC.

3200 Monroe Street • Rockville, MD 20852 • 301/231-8686

Call 800/638-8703 Today

APS is available for users of IMS DB/DC; CICS, DL/I;CICS/IDMS; and CICS/VSAM. APS operates under TSO, CMS and CICS or on the IBM PC in a programmer workstation mode.

Recognizing that the CIS manager's threat could have widespread impact on the struggling company, Twomey backed his own hand by planning, with JIA, for emergency management services. Sure enough, three key CIS employees quit, giving only two weeks notice.

software and threatened to quit."

Recognizing that the CIS manager's threat could have widespread impact on the struggling company, Twomey backed his own hand by planning, with JIA, for emergency management services. Sure enough, in a power play, three key CIS employees — including the manager — quit, giving only two weeks notice.

The task facing JIA was unusual in that the Chapter 11 reporting requirements were monumental. Itel was dealing with more than 50,000 creditors and shareholders. The reorganization involved 24,000 separate claims and more than 3,000 executory contracts.

Periodic documentation ordered by the bankruptcy court included statement of assets, statement of liabilities, statement of executory contracts and statement of affairs, also known as Information Schedule 1.

The computer was used to maintain a claims register, to handle mailings to the creditors and shareholders, to call for and tabulate votes on the reorganization plan and even to distribute newly issued stocks and bonds.

Primary tasks

JIA's primary tasks were to see the computer operation resume without a hitch, to improve service to the remaining operating companies, to develop an information systems strategic plan and to develop a business plan for the marketing of computer services to bankruptcy customers.

Another significant contribution by JIA has been a major reorganization of CIS. As recently as June 1983, the two operating companies and corporate headquarters were each serviced by a more or less independent section within CIS. Each group did its own development work, with a high probability of duplicated effort.

Under a department reorganization, all users are served by a unified group that offers several important new functions. A quality assurance and administration group, a business systems planning office and a customer support group were added. The small increase in total head count also accounts for a technical group concerned with network control.

In response to JIA recommendations, Itel formed a four-man executive steering committee that will soon begin to oversee CIS operations and proposed improvements.

Angeles Corp.

The Angeles Corp. is a nationwide financial services organization. Based in Los Angeles and employing about 275 people, it acts as general partner to a number of limited partnerships, investing primarily in real estate developments and motion picture productions. It also manages pension and profit-sharing funds for other corporations and for educational institutions.

As perhaps the best measure of the firm's recent success, the past three years have seen its combined investments in stocks, bonds

More people in your position choose ASK.

After all the sales hype, analyses and benchmarks, the choice of a manufacturing system often comes down to a gesture of faith.

Don't make it blindly.

First consider why ASK inspires the confidence of more MIS professionals. (And why customer referral has made us the biggest in our field.)

Then consider this. Our MANMAN® software integrates manufacturing and financial operations more completely. So you'll never find yourself at a staff meeting accounting for your lack of cost accounting. Or your choice of a system.

Then consider the best part. You can fully implement MANMAN on a VAX or HP 3000 in under a year. So the information burden shifts from your shoulders sooner. And smoother. Because with our comprehensive training and documentation, your users quickly learn to help themselves to all the information they need.

Find out firsthand why more people choose ASK. Contact Carol Singh at (415) 969-4442 or 730 Distel Drive, Los Altos, California 94022. Get a customer referral. Then call and ask someone in your position about MANMAN.

What you hear will answer your every prayer.

ASK

THE PEOPLE WHO KNOW MANUFACTURING.

VAX is a registered trademark of Digital Equipment Corporation.

© 1983 ASK Computer Systems Inc.

The CPT Solution that talks with mainframes in an important new way:

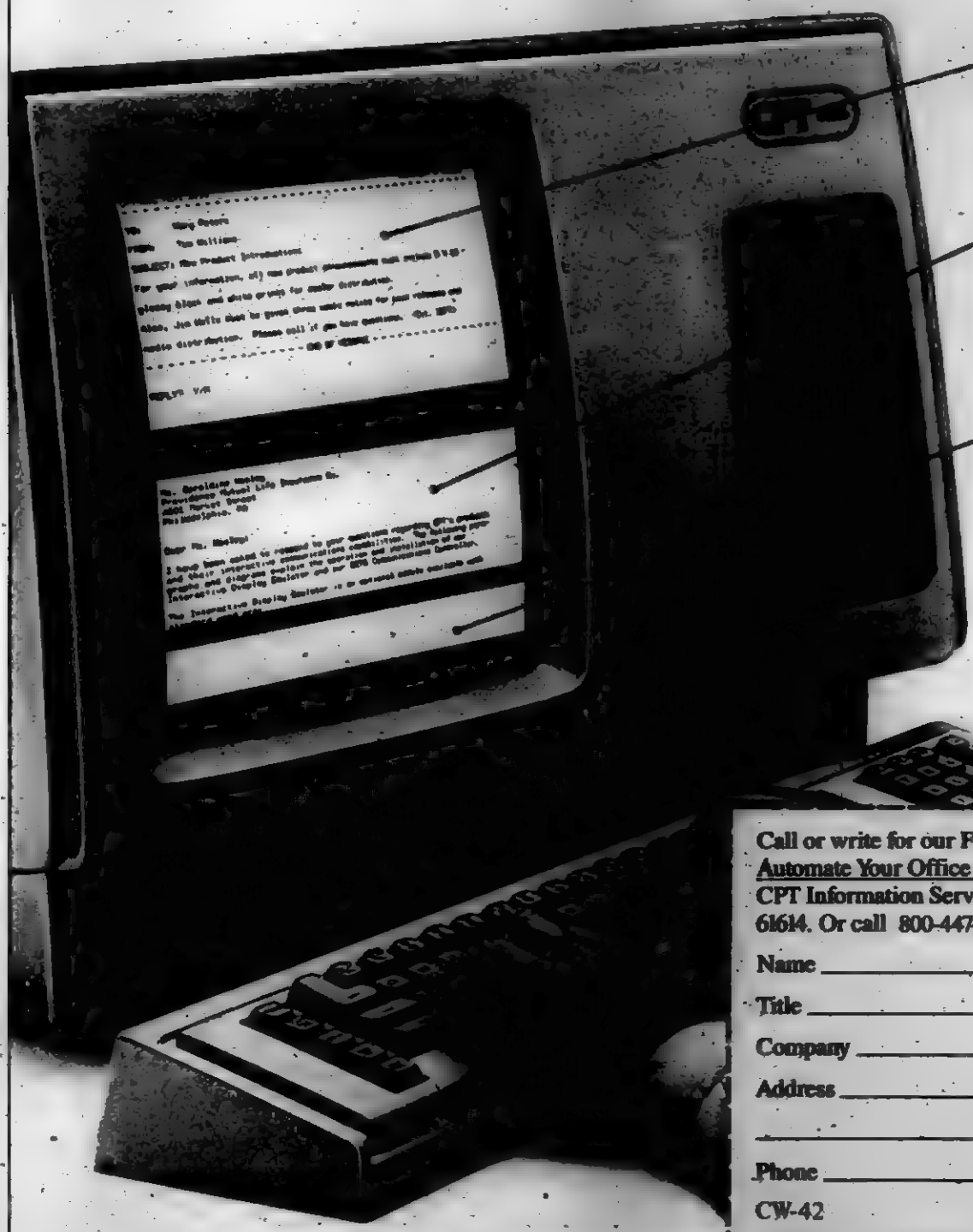
CPT solves the costly, cumbersome problem of separate data terminals and word processors at individual workstations.

An exclusive software breakthrough enables one CPT system to perform both functions. On the same screen. At the same time. We call it the CPT Interactive Display Emulator (IDE).

With this new CPT solution, an operator can transfer data processing information from a host computer (top window) directly to a word processing document-in-progress (middle window). Or vice versa. With just two keystrokes.

In addition, an optional CPT SNA communications controller can link up to 7 CPT systems together as part of an IBM 3270 network.

A few toll-free keystrokes on your telephone will bring you more information. And open some important new windows on the future.



Interactive Communications Window
A full 24-line by 80-column screen that displays information direct from a host computer.

Independent CPT Word Processing Window
A half-page display of the same CPT word processing that's earned a place on the Datapro Honor Roll for the last three years.

Word Processing Preview
Another standard CPT word processing feature. It lets you preview other pages in a document, or scan an entirely different document, without interrupting work in progress.

Specifications are subject to change at the discretion of CPT Corporation.

Call or write for our FREE 28-page booklet, How to Automate Your Office – One Step at a Time.™ Mail to CPT Information Service, P.O. Box 3900, Peoria, Illinois 61614. Or call 800-447-4700.

Name _____

Title _____

Company _____

Address _____

_____

Phone _____

CW-42

Office automation you can't outgrow

CPT.

On Angeles' behalf, the JIA team — which varied from two to five people during the contract period — evaluated equipment (eventually recommending an IBM System/38), centralized available DP resources and established a systems development methodology.

and other financial instruments soar to $2 billion from an already healthy $500 million.

Needed unified facility

But, according to Angeles President William H. Elliott, the firm had until recently been somewhat hampered by the lack of a professional, unified data processing facility.

"We were spending a good bit of money on service bureaus," Elliott said, "not too effectively, I might add. To keep up with our growth rate, we needed to significantly enhance our systems capabilities.

"I'm a great believer in systems," Elliott maintained. "And I'm convinced that data processing should be looked upon as a management tool, not simply an accounting tool."

Considered alternatives

The need for significant improvement led Angeles to the JIA group, but not before it considered a number of alternatives ranging from big-name consultants to equipment manufacturers.

"We were offered plenty of 'free' advice," Elliott recalled, also noting that most such advice usually proves costly in the long run.

"We needed a sophisticated data center, with plenty of growth potential, and knew that we faced a painful, extremely challenging job because we were starting two or three years later than we should have."

JIA started to work early in 1980, beginning with development of a strategic data processing plan. On Angeles' behalf, the JIA team — which varied from two to five people during the contract period — evaluated equipment (eventually recommending a System/38 IBM minicomputer), centralized all the available DP resources and established a system development methodology.

Cost of the new facility ran to about $2 million.

The software task was one of implementing existing applications on the firm's new hardware and designing new applications. JIA also provided an extensive amount of training for the in-house staff.

As it does in the majority of instances, JIA also recommended and helped to implement an executive steering committee by which Angeles management can monitor and control the new centralized function.

About the author

Joseph E. Izzo is president of JIA Management Group, Inc., a Santa Monica, Calif.-based management consulting firm specializing in data processing.

SCIENCE/SCOPE

NASA's Project Galileo may provide clues to the origins of the solar system when it explores the planet Jupiter later this decade. Project Galileo is scheduled to be launched from the space shuttle in May 1986 and arrive at the giant planet in August 1988. The mission consists of two spacecraft. One is an orbiter that will circle Jupiter for 20 months. The other is a Hughes Aircraft Company-built probe that will plunge into the planet's brightly colored clouds and relay data about the atmosphere. The probe is expected to operate for about 50 minutes before succumbing to temperatures of thousands of degrees, limited battery capacity, and pressures up to 10 times that of Earth's at sea level. Because some scientists believe that Jupiter's atmosphere is a sample of the original material from which stars are formed, the probe's findings will be closely studied.

A prototype electronic map developed for the U.S. Air Force makes map reading as simple as pushing a button. The Airborne Electronic Terrain Map System stores digitized terrain data to provide a moving, color-coded computer map of the area over which an aircraft is flying. The map can be projected on standard color or black-and-white cockpit displays or on the head-up display. Like paper charts, the Hughes map can show the aircraft's actual position or be "unfolded" electronically to let the pilot look ahead. It can be presented in a shaded relief plan view, much like a standard paper chart, or in a perspective view as though the pilot were looking at terrain ahead of the aircraft. Tactical symbols can be selectively added to reduce clutter and improve display readability.

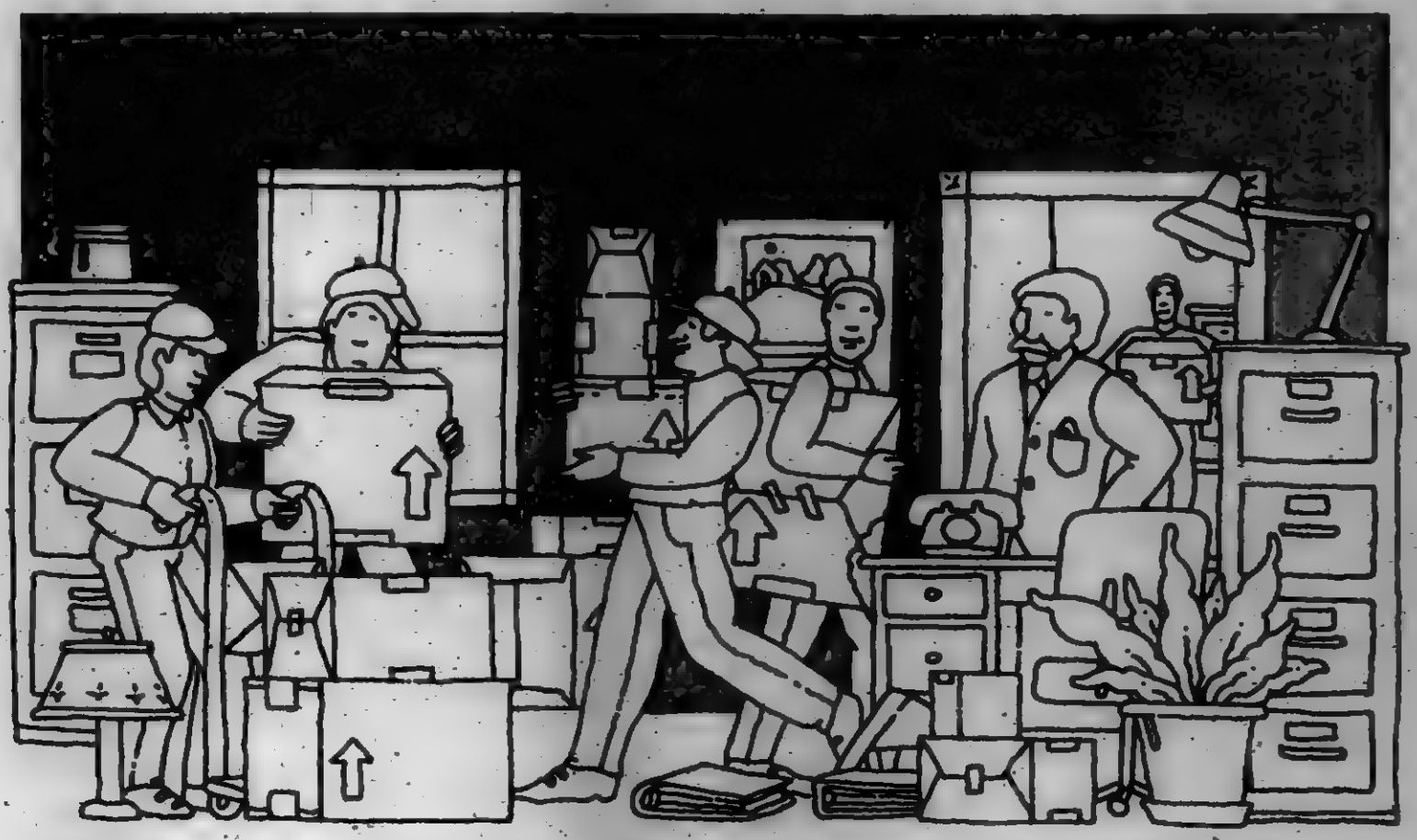
Extremely sensitive high-speed photodetectors, key components in microwave fiber-optic communications links, have been fabricated by Hughes research scientists. The devices are gallium arsenide Schottky barrier type photodetectors. They have demonstrated a flat frequency response to at least 20 GHz and have the potential to approach millimeter wavelengths. They also have quantum efficiencies as high as 70%, roughly a 2 to 5 db improvement over existing high-speed detectors.

Two broadband gallium arsenide field-effect transistors, operating in the 13- to 15-GHz frequency range, have been introduced by Hughes for use in satellite communications. The new single-cell and dual-cell power transistor chips are mounted on internally matched chip carriers and are guaranteed to operate in a 50-ohm system over a full 2-GHz bandwidth with no additional matching. The chip carriers are compatible with 25-mil alumina microstrip circuits and have 25x1-mil gold ribbon leads. The single-cell device is rated at 0.5 watt minimum output; the dual-cell at 1.25 watt minimum. Highest output is from 14.0 to 14.5 GHz.

Hughes is seeking engineers to develop advanced systems and components for weather and communications satellites, plus the Galileo Jupiter Probe. Openings are in applications software development, data processing, digital subsystems test, microwave/RF circuit design, power supply circuit design, component engineering, GaAs design, digital communications, signal processing, spacecraft antenna design, system integration test and evaluation, and TELCO interconnection. Send resume to Ray Bevacqua, Hughes Space & Communications, Dept. S3, Bldg. S/41, M.S. A300, P.O. Box 92919, Los Angeles, CA 90009. Equal opportunity employer.

HUGHES
HUGHES AIRCRAFT COMPANY

IN DEPTH



OA forcing organizational change

By Leon Jackson

Most large companies are in the midst of planning for office automation, and yet they often overlook significant organizational issues. Resolving these issues usually involves political and cultural factors, the kind that cannot be handled by middle management. Top management should be involved in directing the office automation planning process.

Before the full benefits of office automation tools can be achieved, an organization must change in two distinct ways: first, in the "supplier" organization, which is the group responsible for implementing and managing office automation facilities, and second, in the user organizations.

Although fully integrated office automation systems are not yet available, many of the component pieces are now being purchased and implemented. To avoid risking this investment, most large organizations should plan now for fully integrated systems. These systems will combine the technologies of data processing, office systems and telecommunications.

Since fully integrated systems will eventually affect the majority of white-collar workers, human factors issues cannot be overemphasized. Education and training are vital. Physical offices will also change as the new technologies are implemented, thus bringing the building facilities' organization into the process.

There are very few large organizations in which data processing, office systems and telecommunications report to an individual below the level of chief operating officer or chief executive officer.

Data processing is often the responsibility of

The new streamlined organizations will benefit from a reduction in clerical and administrative chores that all levels below executives have to perform. We will all spend much less time searching for information and for people.

the chief financial officer. Office systems have developed under many vice-presidents of administration. Telecommunications functions are often split, with data communications in the data processing department and voice communications in some other area.

Training, with the exception of data processing personnel, is usually the responsibility of human resource departments. For a large organization to implement an effective integrated office automation system, all of these functions need to be brought together under a single executive.

These functions are not independent of each other. They are all part of information management, which is an area of growing importance as companies recognize that they are now in the information age.

Data processing people developed their own languages and set themselves up as high priests of data; they separated themselves from the user in order to maintain the integrity of the data.

Outdated distinctions

The distinctions between data, text and voice are a legacy. Data processing was kept separate from the other two because of the high level of technical skill required to program and operate computers.

Data processing people developed their own languages and set themselves up as high priests of data; they separated themselves from the user in order to maintain the integrity of the data.

In the office environment, word processors grew up as extensions of typewriters managed by office administration personnel, who were very often independent of data processing. The voice communications area, based upon its history of regulated service, maintained its own individuality with little connection to the other forms of information.

Changed environment

How different things are today. Microcomputers are proliferating throughout the organization at an incredible pace, following on the earlier, though less dramatic, success of on-line computing. Data processing people, who initially resisted the personal computer, now recognize its importance as a way to extend the capability of the computer to the user.

Word processors have been extended in capability: first to allow communications between word processors and then to add data processing capabilities leading to the first multifunctional systems.

Data communications systems have developed to allow high-speed data transfer between devices. In the area of local-area networks, they can respond to the ever-increasing needs of communicating terminals.

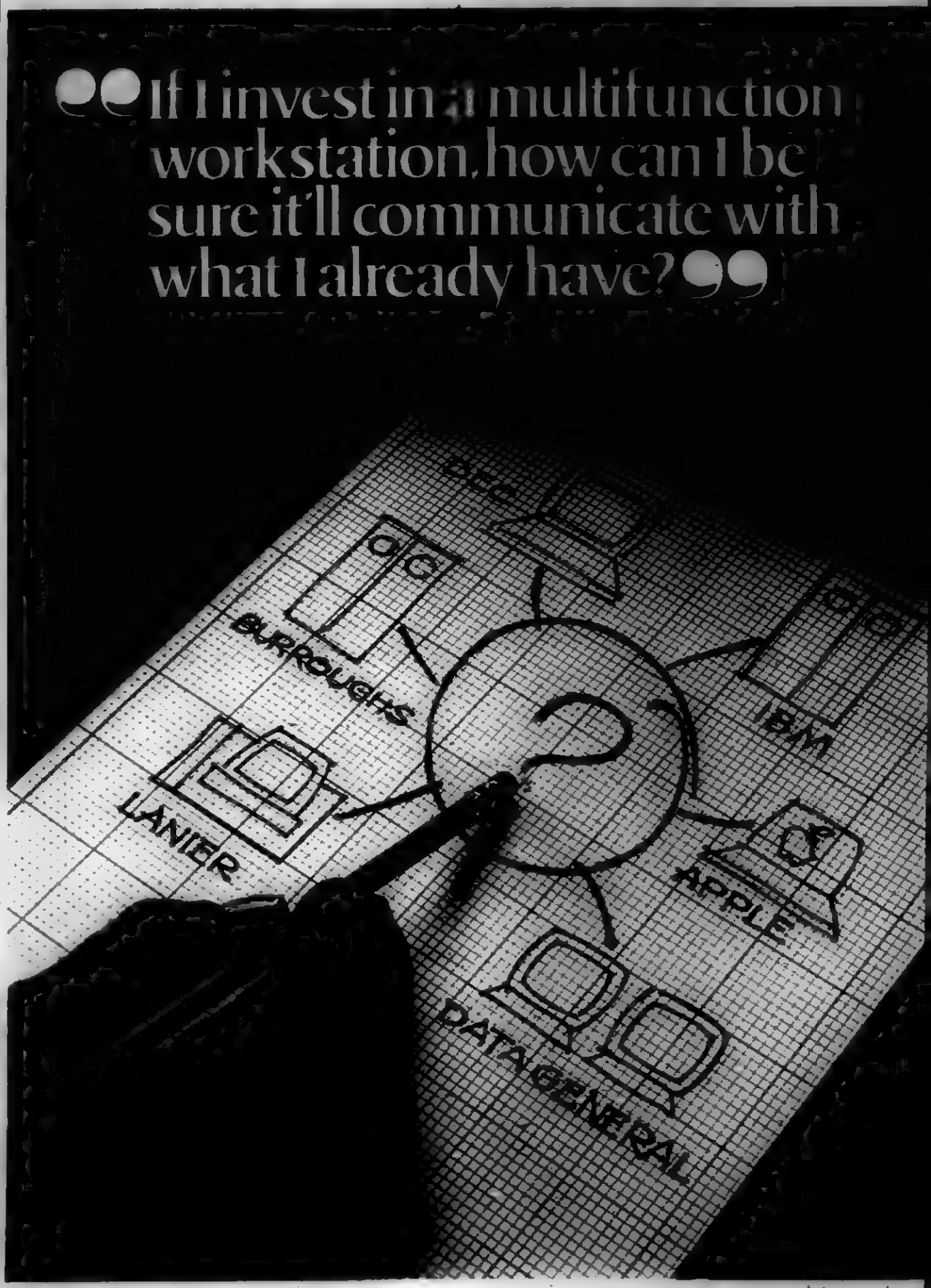
In the telephone area, the private branch exchange switch is now a fully integrated voice data system; no longer can it be considered as independent of data processing and office systems.

The establishment of an information management organization is the only way to coordinate the activities of these information management functions.

It is a difficult task to restructure an organization. Top management must be convinced of its importance. Justifying comprehensive office automation systems is difficult.

During the planning process, companies try to project the amount of hard-dollar savings. Other justifications include productivity improvements and strategic implications.

"If I invest in a multifunction workstation, how can I be sure it'll communicate with what I already have?"



IBM/38 MAPICs UNMUZZLED!

Call or write for details on FUSION/4 Media-Independent Retrieval/Query/Report Processor.

NEW! IBM PC program interface supports Lotus 1-2-3, Visicalc, SuperCalc and more.

FUSION

(415) 461-4760

LARKSPUR, CA 94939

TELEX 176689

One solution is to establish a new organization to handle all the information management aspects. The title for the head of this new department would be chief information officer or information resource manager.

A major goal is to demonstrate to senior management the importance of office automation to the future of the organization. Unless management is convinced of the value of improved information access and communication, it will not support the type of organizational changes necessary.

Political implications

There are considerable political implications. For example, which should be the surviving organization? Should it be one of the present organizations, such as data processing or office administration? In some organizations, the political difficulties have been so great that the responsibility has been given to the human resource department.

One solution is to establish a new organization to handle all the information management aspects. The title for the head of this new department would be chief information officer or information resource manager.

Another important question concerns to whom this new organization should report. Traditionally, it would report to the chief financial officer, but a strong case can be made for establishing this position at the executive level, directly reporting to the chief operating officer. If this is done, then a clear message is given to everyone in the corporation of the importance of information management.

The new organization has advantages that go beyond the implementation and management of the integrated office automation system. Many large corporations have diverse and autonomous business units that reserve for themselves major decisions on equipment purchase and systems architecture.

The information management organization should provide a strong leadership role to set standards by which all parts of the corporation can implement systems, while at the same time providing compatibility for communications and information transfer.

The central organization should also be responsible for listing preferred vendors, providing education and training, determining justification criteria and ensuring information security and integrity. The leadership and management skills required to cover such a wide range of issues can only be handled by a well-focused organization supported by top management.

User organizations

Office automation provides a set of tools to improve the effectiveness of people performing office-related work. Ultimately, this will apply to all levels of the organization, from senior executives to clerical employees. Initially, clerical and professional employees will benefit, followed by managers and then executives. These tools will provide significant improvements in the following areas:

- Access to information of all types, such as personal, departmental, divisional, corporate and external.
- Communication of documents, messages and data.

Northern Telecom's information processing products have the communications capability you need.

The 500 Family

Besides being compatible with each other, Northern Telecom's 503 desktop computer and 565 and 585 information processing systems communicate effectively with a multitude of mainframes, including IBM, Burroughs and CDC. They also talk to other minis such as DEC, Hewlett-Packard and Data General. Not to mention word processors such as Lanier, and even micros such as TRS-80 and Apple.

This means you'll have more flexibility—and more control over your information system. Even if more and more personal computers are becoming a part of it. Our 500 family supports the CP/M® operating system software, so employees can have the personal computing capabilities they want, while your company keeps the organizational unity it needs.

At the same time it's running CP/M, the family can also be running its own unusually powerful operating system which is compatible across the whole 500 line. It permits a unique approach to multitasking—with a few simple keystrokes, up to 16 tasks can be performed simultaneously on the same terminal. Data processing, personal computing, spread sheets, word processing, information management, electronic mail, whatever task needs to be done can be done at the same time. An incredible timesaver.

All in all, the 500 series is quite a family. Versatile, reliable and a perfect example of Northern Telecom's OPEN World® commitment to compatibility. Northern Telecom is a world leader in digital technology and we're using this expertise to make sure our products fit comfortably into a multivendor world.

For more information, call 800-621-6476 (in Illinois 800-572-6724), or write to Northern Telecom Inc., P.O. Box 10934, Chicago, IL 60610.

That's what we're here for.

nt northern telecom

®Trademark of Digital Research Inc. ®Trademark of Northern Telecom Limited

Manufacturers of Computer and Business Equipment

Triple Your Sales

Learn how by writing for free information from The Computer and Business Equipment Manufacturers Association, a non profit organization.

Write to or call
CBEMA
Helga Sayadian—Dept. C
311 First St., N.W.
Washington, D.C. 20001
202-737-8888

■ Document generation, storage and retrieval.

■ Personal computing at the user's desk.

■ Personal management tools.

These tools will be used in various ways by different levels of the organization, but they will all improve the way information is accessed, processed, communicated, stored and retrieved.

Technology allows us to improve the effectiveness of these information management functions and, therefore, to reconsider the way the organization is structured once the technological tools are implemented.

Sole purpose

In all organizations, there are departments that exist solely for the storage and retrieval of information. An example of this is a department that stores information on the Environmental Protection Agency rules and how they are implemented in each state.

The individuals who work in this department do not process or analyze the information; they act merely as custodians and retrievers of the information upon request. Once the technology is available to provide this information, these people can be reassigned.

Another example concerns the answer to the question, "What does your department do?" In many cases, the response is to describe the process that the individuals go through, rather than describing the actual work product of that department.

People in offices think in terms of processes rather than a product. Yet each department has at least one product that is provided to another department. An example might be an engineering department's products, which are provided to manufacturing engineering in the form of drawings, part lists, test specifications and component specifications.

Classical approach

The classical approach to automation is to automate the process by which these products are produced, rather than to go to the internal customer, the user of the product, and ask him how the product could be improved. Then, by working with the engineering department and encouraging it to produce a better product, the productivity of that department can be improved in a real sense.

Concentrating upon the process could, on the other hand, lead the engineering department to produce a bad product more effectively. The processes should be changed, often requiring organizational changes.

An even more significant example is the potential effect on middle management. We hear constantly about how much more efficient Japanese companies are. There is always talk about reducing middle-management bureaucracy in order to improve efficiency. Office automation tools provide a mechanism for doing just that.

Vertical structure

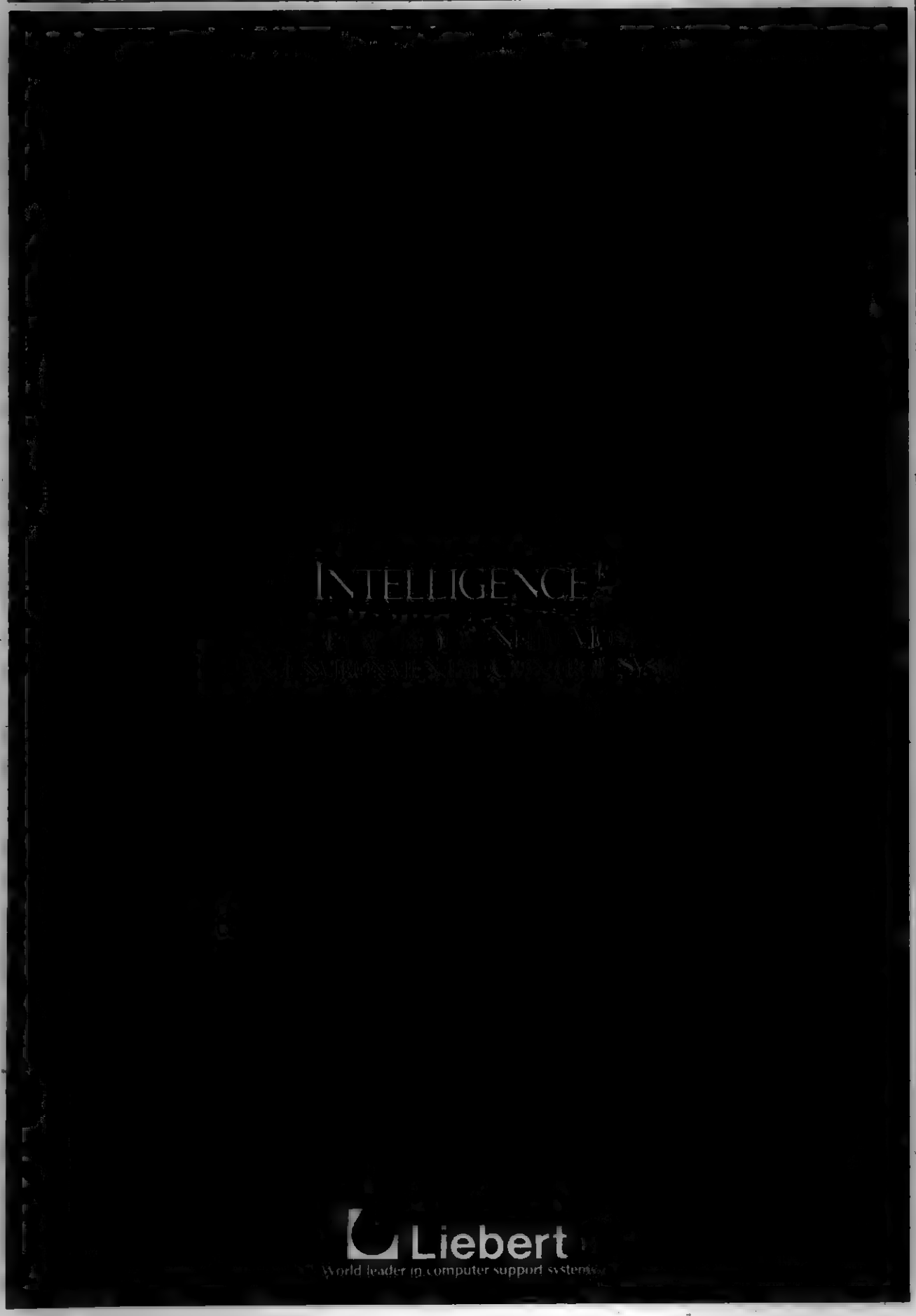
If you consider a typical organization chart in a large structured and bureaucratic organization, you readily notice the vertical nature of the structure. Let us consider Manager A who has a whole series of people reporting to him to support the office information functions for which he is responsible. Manager B also has a vertical structure reporting to him to handle his area of responsibility.

If an individual working deep down in Manager A's department needs information from a peer in Manager B's department, he may have some informal method of obtaining that information by telephoning or meeting with his source.

However, if he is to use this information officially, he is required to pass his request up the ladder to Manager A, who requests the information from Manager B. Manager B sends the instruction out to the source, who responds up the ladder to his manager. Manager B reviews and approves the information and hands it to Manager A, who will then send it down his chain of command to the person who requested it.

This sounds ridiculous, but in many cases this process is absolutely necessary if the information is to be reliable and approved within the structure of the organization.

Now consider the same



The Star of Team Xerox.

XEROX

The Star 8010 professional workstation has always been known as a computer of dazzling capabilities, especially in its graphics, information processing and document preparation.

Team Xerox

But what some people may not know is that the Star is also the key element in Team Xerox, a system of office machines designed to work together like a team.

When part of an Ethernet network, the Star can work with a wide array of word processors, mainframes, personal and business computers, printers, electronic mail and file services, facsimile terminals, communicating Memorywriters, other networks and, of course, other Stars. It also provides 3270 and TTY emulation.

Its full 17" bit-mapped screen lets you view two full pages simultaneously and open up to six documents at a time without covering up a previous document.

It's also the only workstation that can create and print documents in more than a dozen languages, including Russian and, for the first time, Japanese (Katakana, Hiragana and Kanji).

While other workstations may use Xerox innovations like the mouse, icons, windows, property sheets and combined text and graphics, the Star simply does more with them.

For example, the Star's extensive software is fully integrated, to allow you to work with text and graphics simultaneously. You can draw a flowchart right in the middle of a full page of text without having to resort to a separate program and limited buffer "scratchpad" or "clipboard."

In terms of capabilities, ease of use and overall value, the Star would have to be considered the stellar workstation in the industry.

situation once an effective office automation system has been implemented. The information will be contained in a data base. Access to the information will be limited to those people who have the authority for its use.

It will not be placed in the data base until it has the approval of Manager B. Manager A knows that if his employee uses this information then it has gone through all the validation procedures specified by Manager B's department.

Thus, corporate departments can access information from business units. On the other hand, business units can have access to corporate human resource policies without going through extensive chains of command.

If it is necessary for one business unit in a diversified corporation to enter the market in a foreign country, then it will be possible for the vice-president of marketing to learn the extent of involvement of other business units already doing business in that country.

This information will further improve communication between departments that today are somewhat artificially separated.

The new streamlined organizations will benefit from a reduction in clerical and administrative chores that all levels below executives have to perform. We will all spend much less time searching for information and for people. The number of meetings called purely for information-gathering or progress-reporting purposes will be drastically reduced. We will go a long way toward eliminating telephone-tag problems.

Managers will have more time to make decisions and for planning. Professionals will have more creative time to process information and to evaluate the results of their work. More time will lead to more thoughtful analysis, better planning and better information for making decisions.

Clerical people will be provided with the necessary tools to support professionals, managers and executives in meaningful ways that improve "management-clerical team" effectiveness and make the clerical job more interesting and valuable.

Different organizations

Clearly, fast-growing or changing organizations will benefit more quickly from the implementation of office automation systems. They can use office automation tools to help them build an organization to meet strategic goals.

A current example of a rapidly changing industry is the financial services industry, in which banks, stockbrokers, insurance companies and major retailers are making extensive use of office automation technologies in the battle for market share.

Major manufacturing companies, recovering from the recent recession, are implementing office automation tools in an effort to keep their organizations lean as the economy improves.

Even some of the more staid and conservative industries are finding significant advantages to office automation. Electrical utilities now under severe pressure because of criticism of their atomic power stations are using office automation tools to ensure accuracy of reporting information to regulatory bodies. Commodity chemical companies are using these modern technologies to improve their competitive positions by placing terminals directly in customers' locations for on-line ordering and expediting services. Even government departments under extreme pressure to be more efficient and economical are making use of office automation technologies to reduce their manpower.

The rate at which the technologies are implemented will vary from industry to industry; however, the common factor that runs through them all concerns the changes that must take place within their organizations for them to benefit from the use of these technologies. Companies that plan for such changes will reap their benefits much faster.

About the author

Leon Jackson is a senior staff associate with the management consulting firm Arthur D. Little, Inc., located in Cambridge, Mass.

WHEN THERE'S NO CHOOSING, CHOOSE ICOT.

More personal computers. More workstations. More remote locations.

Everyone seems to be demanding *more* of your 3270 network. And management says, "Do it—but do it for less."

It's a tough spot to be in, unless you know about ICOT's Virtual Terminal System™ protocol converters. In place in your network, they deliver the compatibility everyone wants and the economy and flexibility you need.

You can make inexpensive asynchronous terminals and printers compatible with your BSC or SNA/SDLC network. A single terminal can access multiple applications and multiple hosts. And personal computers can be included easily in your network. All without expensive software modifications.

You have the flexibility of either dial-up or leased-line communications, letting you choose the option that's least expensive for your situation. Plus the option of adding ICOT's value-enhanced 3270 lookalike terminals.

It can all be done easily. Economically. With a built-in flexibility that makes future expansion fast and simple.

And when you use ICOT's protocol converters, we back them up with our expert installation, service and engineering support.

Now you don't have to choose between expansion and economy. Just choose ICOT. To find out more about the ICOT Virtual Terminal System, call or write:

ICOT Corporation
830 Maude Avenue, P.O. Box 7248
Mountain View, CA 94039
(415) 964-4635
TWX 910-379-6479

COMMUNICATIONS

DATA STREAM
John Dix
Old Senior Editor

AT&T's 'Gazelle' expected in May

According to the grapevine, May 1 is the tentative date for the first showing of the "Gazelle," AT&T Information Systems, Inc.'s second digital private branch exchange (PBX), although a company spokesman said that date may be a bit premature.

The new switch, to be officially known as the System 75, will be the little brother to the Dimension System 85, AT&T's first digital switch, announced at the beginning of last year. It will be compatible with that switch, but, significantly, it is believed that the System 75 will have a different architecture.

The System 75 is rumored to be a single-cabinet switch capable of supporting 400 lines, as compared to the System 85, which, when not interconnected with other System 85 modules, supports 1,000 lines.

When it is first revealed, it is expected that the System 75 will lack some of the networking features of the larger switch. In particular, it is believed that initially the System 75 will only be able to work as an end point in an Electronic Tandem Network (ETN).

If this proves to be true, it would mean, for example, that an ETN configured with a System 85 in Philadelphia and linked with another one in San Francisco could not be passed through a System 75 in Chicago. Instead, the mid-continent PBX would have to be tied into the network through one of the switches on the coast.

But more important than rumored announcement dates and the fact that the new PBX might initially lack some networking capabilities are the architectural differences between the forthcoming switch and the existing System 85.

The expectations of a new architecture have, in fact, caused some users to hedge on the System 85, wondering if AT&T really intends to build its future on that architecture.

Manfred Zerbe, director of communications services at Colgate-Palmolive Co., said recently that AT&T Informa-

See AT&T page 99

Doelz unveils concentrator

Claims to solve common networking problems

IRVINE, Calif. — Doelz Networks, Inc. recently unveiled a multipoint concentrator switch that reportedly eliminates traditional networking problems associated with differing architectures, gateway approaches, installation requirements, network management, network diagnostics and network maintenance.

Elite One, touted as the first product in a family of data communications networking systems, is said to embody the architecture and technology that will be used in forthcoming products.

Elite One supports all traditional networking transmission media, including both analog and digital lines, at speeds up to 72K bit/sec. Data is transmitted and managed over continuous bidirectional transmission paths that are independent of transmission media, attached devices and their protocols. User ports accept multiple concurrent asynchronous, synchronous, Systems Network Architecture, Synchronous Data Link Control and X.25 protocols, the vendor reported.

According to Frank T. Conners, president and chief executive officer of the company, Elite One will enable users to operate a single network, instead of multiple networks, for varying types of traffic (for example, batch or interactive) and/or varying types of vendor-specific hardware.

"The form of the data, its protocols, the transmission media it will travel across and the system it was generated on should not be the deciding factor in network design," Conners said. "Our technology is suitable for all data communication networking requirements."

A single Elite One switching node can accommodate up to 32 users' ports with either asynchronous or synchronous protocols. Each Elite One can address up to 60 nodes.

Networks are created by tying together two nodes to form a single network link or by interconnecting a series of network links, the vendor reported. Several functions are said to be performed simultaneously: virtual switching, data traffic management, data priority, data packaging and overall network management.

Conners said that a user-programmable, multiple-priority scheme enables interactive and batch traffic to be intermixed on the network. This is achieved with a traffic optimization algorithm that gauges the priority of communicated traffic and en-

See ELITE page 99

Message system lets *Newsweek* eye more late-breaking news

NEW YORK — Messages are moving to and from the headquarters of *Newsweek* magazine here with greater speed and fewer foul-ups with the recent installation of a $1.5 million computer-based message-switch system, reported Bob Monterola, Newsweek, Inc.'s director of data communications.

The message switch translates the communications protocols of reports and queries coming from the magazine's 21 bureaus, mostly via teletypewriter, into the protocol used by headquarters. It also uses its store-and-forward capacity to send outgoing messages in bundles at high speed to save on long-distance charges.

The switch, installed early in January, handles most of the magazine's asynchronous data communications and, because of modifications, several bisynchronous links as well. It carries the majority of *Newsweek*'s telegrams, TWXs, telex messages and direct-dial data transmissions. It also converts protocols and meets the communications software needs of ITT, RCA Corp. and all international record carriers, Monterola said.

When it is fully phased in, the switch will link all of the magazine's New York editors directly with the bureaus via their Atex, Inc. text editing terminals. That connection will eliminate the need for bureau writers to have their reports rekeyed into a Teletype machine prior to transmission to New York.

"We were starting to die with all of those old Teletypes," Monterola said.

Bypassing the Teletypes will also eliminate the need for couriers to carry messages directly to each of the magazine's 10 floors of offices. With a circulation of three million, *Newsweek* employs more than 400 editors and reporters.

See NEWSWEEK page 99

Modems, data service units, terminal out from Paradyne

LARGO, Fla. — Paradyne Corp. has announced six new communications products, including three modems, two data service units and an asynchronous terminal.

The MP-192 SM is a voice-grade, 19.2K bit/sec modem with an integral, full-feature statistical multiplexer. The modem reportedly provides eight or 16 channels of statistical multiplexing with up to a 2:1 concentration ratio resulting in aggregate speeds up to 38,400 bit/sec in most applications. Its price is $16,900 with the eight-port, integrated statistical multiplexer and $18,900 with the 16-port statistical multiplexer.

The Challenger 144 is a 14,400 bit/sec modem based on a single circuit card. Its price is $4,800.

The LDM-100 is a full-duplex, limited-distance modem for unloaded, four-wire metallic circuits. Synchronous data rates from 1,800 to 19,200 bit/sec as well as asynchronous data rates between 2,400 and 9,600 bit/sec are supported. Its price is $1,100.

The DS-500 and DS-556 are data service units for use with AT&T's Dataphone Digital Service. The DS-500 accommodates data rates of 2,400, 4,800 and 9,600 bit/sec, and the DS-556 operates at 56K bit/sec. The DS-500 is priced at $895, and the DS-556 costs $1,095.

The 7811 is an asynchronous terminal that transmits data over an RS-232 asynchronous link at selectable rates from 300 to 19.2K bit/sec. Features include ergonomic design; tilt-and-swivel terminal; and a 12-in., nonglare, high-contrast CRT. It is priced at $695. Paradyne can be reached through P.O. Box 1347, 8550 Ulmerton Road, Largo, Fla. 33540.

INSIDE

Voice/Data Communications/94
Multiplexers/Modems/94
Local-Area Networks/98
Auxiliary Equipment/98

COMMUNICATIONS

Ark Electronic unveils host of products

MELBOURNE, Fla. — Paradyne Corp. subsidiary Ark Electronic Products, Inc. recently announced a number of new products, including a multiplexer, two programmable interface units and a port-sharing device.

The Octamux-1 is a time-division multiplexer that reportedly connects clusters of eight nonintelligent, unbuffered terminals to their associated computer, remote concentrator, polling controller or similar device with a single, four-wire unshielded cable.

The product eliminates interface cables for clusters of terminals located up to 1 km (about 3,300 ft) from their physical port. Its price is $650.

The ICA-2 and ICA-4 are programmable communications interface units that perform speed, code and protocol conversion.

The ICA-2 is based on a Zilog, Inc. Z80 microprocessor and is available with a multiple-purpose, 4K-byte buffer, which provides the user switch-selected combinations of speed, parity and flow control and conversion between asynchronous and synchronous protocols and Ascii/Baudot codes, the vendor said. The device can be programmed by the user to meet specific applications.

The ICA-4 uses an Intel Corp. 8086 with 128K bytes of random-access memory. It can support up to 12 serial asynchronous, synchronous, Binary Synchronous Communications, High-Level Data Link Control or Synchronous Data Link Control I/O channels. Potential user-programmed applications include: protocol conversion, multiplexing, terminal emulation for dumb terminals, serial and parallel printer protocol and/or data conversion, a company spokesman said.

The price for the ICA-2 is $720; the ICA-4 costs $2,450.

The MSD-4 is a new device that is said to provide modem or port sharing in polled or half-duplex data nets.

The product operates at 14 different data rates up to 19.2K bit/sec, including all the common speeds of synchronous modems and terminals. It offers a 4-bit buffer combined with an internal/external clock option on each port, which supplies error-free handling of speed differences between any two differently clocked devices for any block length of data, the vendor said. This reportedly permits a mix of local terminals and remote multidrop lines to share the same computer port.

The price is $795.

Ark Electronic Products is located at 325 W. Hibiscus Blvd., Melbourne, Fla. 32901.

VOICE/DATA COMMUNICATIONS

TELESAVER, INC.
Quick Call 2000

Telesaver, Inc. has announced the Quick Call 2000 autodialer featuring speed dial, memory storage and retrieval and least-cost routing.

With the autodialer, one to 24 users can access alternative long-distance services by dialing only two- and three-digit numbers. The system operates with single-line telephones, key systems and private branch exchanges and works with AT&T and other common carriers as well as international calls, the vendor said.

Features of the product include the ability to store and speed-dial up to 250 local and long-distance numbers; the ability to determine which subscribed common carrier offers the least expensive service for a particular call; the ability to redial a call until completed, with information entered one time only by the user; and a cost accounting feature for billing by person, department, cost center or client, according to a company spokesman. The price for a one-line unit is $455.

Telesaver, 30 Gwynns Mill Court, Owings Mills, Md. 21117.

MULTIPLEXERS/ MODEMS

LOCKHEED-GEORGIA CO.
Data Sentry

The Getex Division of Lockheed-Georgia Co. has introduced Data Sentry, a modem that can reportedly prevent data theft and other security breaches of personal, mini and mainframe computer systems without requiring encryption or changes in systems programming.

The asynchronous modem operates full duplex at 300 or 1,200 bit/sec and has autodial, autoanswer, autospeed and autoparity selection. Terminal interface is a standard RS-232C cable. The telephone interface is a single telephone number drop with an RJ-11C connection. The price is $895.

Lockheed-Georgia, Dept. 8402, Zone 18, Marietta, Ga. 30063.

COHERENT COMMUNICATIONS SYSTEMS CORP.
SPM-94B

Coherent Communications Systems Corp. has introduced the SPM-94B simultaneous voice and data dial-up modem, a device that enables a full duplex, 300 bit/sec asynchronous data stream to be carried simultaneously on a switched telephone line carrying a voice conversation.

A telephone line and local telephone set are plugged into the unit's dual RJ-11C telephone input jacks,

Continued on page 96

YOU CAN ADD A SECOND IBM® 3270 PERIPHERAL IN MINUTES.

Now you can take any existing coaxial cable in use with a single controller and DOUBLE the cable's capacity immediately. Every cable that is installed can now drive two devices. That's right, TWO peripherals running over ONE cable. We call it the "Coaxial Doubler™".
One Doubler connects two ports of the controller to the shared cable. The other Doubler connects the shared cable to two peripherals.

A real breakthrough! The Coaxial Doubler, our littlest multiplexer, requires no external power connections and comes with a five year warranty. Installation time? Five minutes.
We're so sure you'll like the Doubler that on an introductory basis we'll send you a $490 Doubler pair on a no risk, 30 day, trial.
Call: 1-800-342-5986
or write us at once.

Fibronics International Inc.
fiberoptic communications

325 Stevens Street
Hyannis, MA 02601
(617) 778-0700 Telex 951297

IBM is a registered trademark of the International Business Machine Corporation.

David
Recommends The Diablo 630 Series

David Jamison Carlyle recommends the Diablo 630 Series.

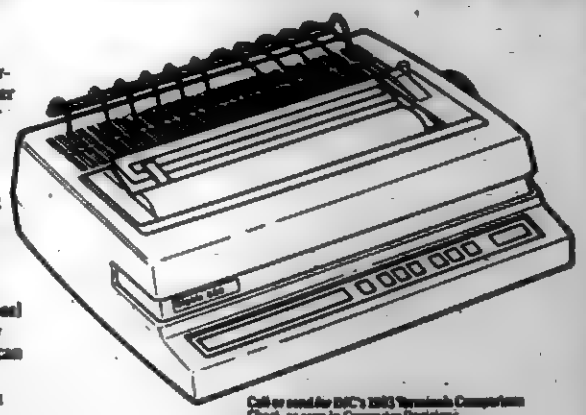
The most versatile line of daisy wheel printers for serious business applications.

630 API—The API's unique all purpose interface makes this 40 cps printer compatible with almost any computer you can name.

630 ECS—All the features of the 630 API plus the ability to print 192 fully formed characters and construct hundreds more. Perfect for scientific, financial, legal and other applications where special symbols and text are needed.

630 ECS/IBM—The only daisy wheel on the market that can truly print any character or symbol that the IBM PC can display.

Diablo from DJC, the first name in peripheral distribution.



Call or send for DJC's 1983 Terminals Comparison Chart, as seen in Computer Decisions.

THE DAVID JAMISON CARLYLE CORPORATION
5700 Buckingham Parkway
Culver City, CA 90230
New Jersey (201) 788-8882
(800) 526-2823
Illinois (312) 790-4446
Texas (713) 721-4367
Colorado (303) 420-9888
Hawaii (808) 531-5136
California:
San Francisco (415) 284-8520
(800) 227-3610
Los Angeles (213) 410-9250
(800) 421-3468
Irvine (714) 863-0611
Florida:
Orlando (305) 859-1566
(800) 321-0888

DJC
THE DAVID JAMISON CARLYLE CORPORATION

Soup up your Volkswriter.

Everybody knows Volkswriter, the word processing software package that's become synonymous with high performance. Now, there's a way to get even higher mileage out of your Volkswriter. Hook it up to a Dataproducts P Series dot matrix color printer.

The versatile P Series translates the executive class, word processing capabilities of the Volkswriter into brilliant full color charts, graphs and text. It delivers a full page of text quality print in nothing flat while its sheet feeder automatically prevents loading hassles. And the P Series uses pin feed or plain paper and has the brains to fill every appropriate line with crisp, sharp copy, even if it has to justify to do it. And the P Series color printer has dual speed capability for correspondence quality output for the Volkswriter's many word processing applications and high speed output for draft and spreadsheets.

The Dataproducts P Series color printer. Think of us as a supercharger for your Volkswriter.

For more information go to your nearest computer store and ask about the Dataproducts P Series color printer, or call Dataproducts, 1-800-258-1386.

Dataproducts computer printers

Nobody puts ideas on paper so many ways.

Volkswriter is a registered trademark of LIFETREE SOFTWARE, INC.

ree:
Digital
e,

SE
G."

COMMUNICATIONS

Continued from page 94

and a data terminal is connected to the modem via an RS-232C/CCITT V.24 interface.

Once a dialed connection is made, an on-line button is pushed to initiate transmission.

Typical applications of the SFM-948 include electronic blackboards, teleconferencing, field-service communications, help lines for data or word processing systems and business and personal computer networks, according to the vendor.

Five front-panel LED indicators monitor the operation of the unit for system diagnostics, the vendor said. The price is $570.

Coherent Communications Systems, 60 Commerce Drive, Hauppauge, N.Y. 11788.

KINEX CORP.
2400/FDX

Kinex Corp. has announced the 2400/FDX modem intended for full duplex synchronous and asynchronous data transmission at rates of 1,200 and 2,400 bit/sec over two-wire switched or leased lines.

Standard features of the modem include automatic answer/disconnect, automatic rate recognition, transmission status and line signal quality indicators plus internal and remote-controlled digital loopback testing. The price is $1,695.

Kinex, 6950 Bryan Dairy Road, Largo, Fla. 33543.

LOCAL-AREA NETWORKS

ABLE COMPUTER
Easyway/ET

Able Computer has announced Easyway/ET, an Ethernet network controller for Digital Equipment Corp. Unibus PDP-11 and VAX computer systems.

Compatible with IEEE 802.3/Ethernet networks and TCP/IP protocols, the latest product in the Able Computer Easyway line consists of two modules: a Host Protocol Processor (HPP) and a Communications Adapter Board (CAB).

The two modules combined make one complete controller. The HPP module contains the Unibus interface, data line interface and TCP/IP protocols. The CAB provides the data link and physical layer protocol to the 802.3/Ethernet network. It mounts on the HPP as a plug-in module.

Easyway/ET software device drivers are provided for the DEC VMS and RSX operating systems. Supporting layers one through four on the network architecture, Easyway/ET off-loads the host CPU.

The price of Easyway/ET is $7,200. The product will be available for shipment in mid-summer.

Able Computer, 1732 Reynolds Ave., Irvine, Calif. 92714.

CONCORD DATA SYSTEMS, INC.
Token/Net

Concord Data Systems, Inc. has announced its Token/Net local-area network, which the company said is the industry's first local network to meet the IEEE 802.4 token-passing standard approved last September.

The product uses the token-passing access method and a broadband, CATV-type physical medium.

The price is $500 to $850 per port, depending on configuration. A four-port box costs $3,485; a 10-port box costs $5,500.

Concord Data Systems, 303 Bear Hill Road, Waltham, Mass. 02154.

AUXILIARY EQUIPMENT

XYPLEX, INC.
Optical-fiber link for Xyplex

Xyplex, Inc. has announced the addition of optical-fiber transmission capabilities to the Xyplex system, which allow the user to link various coaxial cable segments together with optical-fiber cable.

Coaxial systems in buildings within a 1 km area can be connected using the optical cable. The physical configuration of the link is a point-to-point cable with a coaxial-to-fiber interface unit at each end. Multiple interface units can reside on any coaxial cable segment, according to a company spokesman.

The price is $3,200.

Xyplex, 100 Domino Drive, Concord, Mass. 01742.

AVANT-GARDE COMPUTING, INC.
Net/Guard

Avant-Garde Computing, Inc. announced recently the Net/Guard system to monitor and control access by personal computers to central networks, data bases and computers.

The product reportedly connects any dial-up device to the network, regardless of protocol, and controls access to data bases and applications through use of multilevel passwords. The system monitors, measures and analyzes current and historical status, performance and utilization of dial-up devices attached to the network.

Net/Guard provides three types of alerts to network operators: security, equipment failure and time-threshold alerts. Consisting of front-end processor interfaces, system control unit, user interfaces, modems, analog patch panel, color monitor, printer, disk storage and tape backup, prices for the system begin at $200,000, according to the company.

Avant-Garde Computing, 2091 Springdale Road, Cherry Hill, N.J. 08003.

NOW CCA'S MODEL 204 DBMS CAN DO SOMETHING EVERY EXECUTIVE CAN APPRECIATE.

COMMUNICATIONS

Timeplex protocol converters debut

Timeplex, Inc. has announced Tru/Blu, a line of protocol converters that offer networking ability to personal computers, multiple hosts and mixed computer types.

The series, comprised of four protocol converters, reportedly performs conversions between synchronous Ebcdic and asynchronous Ascii data characters, between different speeds and between coaxial cable and RS-232 interfaces. They also perform switching functions that permit one terminal or printer to work with two or more host computers of different kinds, according to the vendor.

The four protocol converters and their features include:

■ Tru/Blu 74 — which emulates an IBM 3274 terminal cluster controller, has 10 RS-232 ports supporting up to nine Ascii terminals (each with one individually addressable printer) and up to two synchronous lines connecting to one or two IBM 3705 front-end processors. Prices start at $3,900.

■ Tru/Blu 78 — which allows a personal computer or asynchronous terminal to switch between full screen emulation of an IBM 3278 terminal, via a coaxial cable, and a minicomputer or modem. The device costs $1,695.

■ Tru/Blu 87 — adapts an Ascii printer (RS-232 serial or Centronics Data Computer Corp. parallel) to the coaxial cable of the 3274 cluster controller and emulates the IBM 3287 and 3289 printers. The price is $1,975.

■ Tru/Blu 80 — emulates IBM 2780, 2780, 2770 and 3741 (bisynchronous) protocols using an asynchronous terminal and an Ascii printer. It supports remote job entry or batch terminal functions and, in reverse, allows an asynchronous minicomputer to emulate an IBM host to drive peripherals such as a laser printer. The device costs $1,595.

Timeplex is located at 400 Chestnut Ridge Road, Woodcliff Lake, N.J. 07675.

TALK SENSE TO THE IBM PC.

Introducing PC/204, a link that lets PC users turn mainframe data into spreadsheets effortlessly.

PC/204, the newest productivity tool from Computer Corporation of America, is a powerful, efficient, easy-to-use software link between IBM personal computers and mainframes. It effectively answers the pressing problem of how to let corporate managers take full advantage of today's personal computers for making decisions, while also giving them access to the corporate database in a format they can use.

First, PC/204 guides PC users as they browse through the MODEL 204 database. Then it extracts the data they need and converts it into meaningful management information for spreadsheet analysis. Lotus 1-2-3 for example. And PC/204 does all that automatically. Without the PC user having to understand anything about mainframe technology.

If you aren't already using Lotus 1-2-3, we can supply it along with PC/204. Or you can use any current IBM PC business package.

While PC/204 is helping business managers, it's also helping MIS directors.

PC/204 uses the power and intelligence of the personal computer for increasing the overall efficiency of an application.

For one thing, it improves performance of the mainframe by offloading some of the processing to the PC, while reducing PC users' response time. It also makes communication between the PC and the mainframe more efficient.

What about security and control? PC/204 provides individual management views of the corporate database while still allowing PC users access to all the information they need.

PC/204 is the latest reason to get MODEL 204 DBMS which has been so highly rated for performance and programmer productivity.

For more information or to arrange for a demonstration of PC/204's capabilities, simply return the coupon or write to us on your letterhead.

Computer Corporation of America

Yes, please tell me more about: ( ) PC/204 ( ) MODEL 204 DBMS
( ) Send me a brochure.
( ) Send me info on free DBMS seminars, or call our seminar coordinator.

NAME _____ TITLE _____
COMPANY _____
ADDRESS _____
CITY _____
STATE _____ ZIP _____
TELEPHONE _____
Operating System: ( ) MVS ( ) DOS ( ) CMS ( ) Other: _____

Computer Corporation of America
Four Cambridge Center, Cambridge, MA 02142 (617) 492-8860 CW 4/9 PC

CCA's Executive DBMS Seminar Schedule

April		St. Louis	Apr. 18	June	
Albany	Apr. 26	Washington, D.C.	Apr. 4	Albuquerque	June 14
Anchorage	Apr. 12	May		Boston	June 14
Boston	Apr. 12	Atlanta	May 15	Buffalo	June 5
Cleveland	Apr. 19	Austin	May 10	Chicago	June 14
Dayton	Apr. 26	Baltimore	May 15	Denver	June 21
Little Rock	Apr. 5	Charlotte	May 8	Hartford	June 21
New Orleans	Apr. 5	Cincinnati	May 2	Nashville	June 5
Norfolk	Apr. 10	Ft. Worth	May 3	New York	June 21
Philadelphia	Apr. 3	Harrisburg	May 2	Oklahoma City	June 7
Phoenix	Apr. 19	Milwaukee	May 3	Omaha	June 7
Princeton	Apr. 10	Orange City	May 24	Philadelphia	June 5
Raleigh	Apr. 10	Pittsburgh	May 8	Pittsburgh	June 19
San Diego	Apr. 12	Santa Clara	May 24	Rochester	June 28
				Syracuse	June 27
				Washington, D.C.	June 12

NEWSWEEK from page 88

Newsweek's News Editor Stuart Seidel said the message switch will get "the right messages to the right people in the *Newsweek* organization much faster than we can do it now, with fewer errors and far less [frenzy]."

Editor-in-Chief Richard Smith, meanwhile, said the system's increased speed "means we can include more late-breaking news in each issue."

The message switch also opens the way for *Newsweek* to create a totally paperless communications path over which reports could travel from the outside bureaus to the editors in New York to the magazine's photocomposition equipment, according to Monterola.

But, he added, such sophistication is still about a year away and requires that the magazine buy at least 50% more Atex terminals and conduct further training.

"We'll never operate totally paperless," Monterola said. The Perma-Net message switch from Progressive Systems, Inc. is linked, via a Perma-Net communications line controller, to a fault-tolerant Tandem Computer, Inc. Nonstop II system, which stores the messages prior to transmission. It was the inclusion of the Tandem that was the big factor in *Newsweek*'s choice of the Perma-Net message switch, Monterola said.

Additional factors, he said, were that the vendor was local and that it was doing an installation of the same equipment at another New York magazine while under consideration for *Newsweek*'s contract.

ELITE from page 83

sures that the most urgent data is passed on first.

End-to-end error control is activated during all transmission over the virtual path, and it can be switched off, on a port-to-port basis, where it might interfere with error-control methods external to the network, the vendor claimed.

Prices for an eight-port unit start at $4,500, with deliveries 30 days after receipt of order.

Doric Networks, 18581 Teller Ave., Irvine, Calif. 92715.

AT&T from page 83

tion Systems has not convinced him that the System 85 architecture is here to stay. He is reserving his judgment until the System 75 can be evaluated.

He should get his chance soon.

If that announcement date pans out, AT&T Information Systems might be able to deliver a few of the systems by year end, which may correspond with deliveries of some System 85s.

So-called "due dates" on the System 85 have been long since that switch was first introduced. Today, stated delivery on a new order for a System 85 Release 1 is 30 to 35 weeks, an AT&T spokesman said. Customers ordering Release 2 of that switch are being quoted delivery dates of Jan. 1, 1985.

The spokesman attributed the delays to market demand for the product. Due dates are expected to shorten as AT&T Technology gears up production, the results of which are expected to become evident by the third quarter of this year.

IF YOU MISS CW OFFICE AUTOMATION IN THE NEXT SIX MONTHS, LOOK AT THE ISSUES YOU'LL BE MISSING.

JUNE.

Microcomputers.
How they've changed the workplace.
What's new in networks, security, and micro-to-mainframe links.
Closes May 4.

AUGUST.

Applications Software.
A look at the real issues.
Productivity. User-friendly vs. ease-of-use. Plus plenty of product reviews.
Closes July 6.

OCTOBER.

Workstations. We explain the alternatives to microcomputers, addressing important topics like cost-effectiveness, compatibility and upgrades.
Closes August 31.

Office Automation is ideal both for the advertiser and the reader. Because each one offers focused, in-depth information in the area of office automation.

Readers always want to catch up on what's hot and what's not in their particular specialty. And find out what the vendors have to offer.

As an advertiser, you won't want to miss the opportunity to tell them.

Maybe that's why our OA is so popular.

Everyone wins.

For more information, or to reserve your space in any of our upcoming issues, simply call the sales office nearest you. Or fill out and return the coupon to Ed Marecki, National Sales Director, Computerworld, 375 Cochituate Road, Box 880, Framingham, MA 01701.

To: Ed Marecki, *National Sales Director*
CW Communications/Inc., Box 880, Framingham, MA 01701
Please send me advertising information on: ☐ *Workstations.* ☐ *Applications Software.* ☐ *Microcomputers.*
☐ *Please have a sales representative call me.*

Name _____
Title _____
Company _____
Address _____
City _____ State _____ Zip _____
Telephone _____
OA

Computerworld
OFFICE AUTOMATION

Sales offices.

BOSTON: 375 Cochituate Road, Box 880, Framingham, MA 01701 (617) 879-0700; CHICAGO: 2600 South River Road, Suite 304, Des Plaines, IL 60018 (312) 827-4433; NEW YORK: Paramus Plaza I, 140 Route 17 North, Paramus, NJ 07652 (201) 967-1350; ATLANTA: 1853 Peeler Road, Suite D, Atlanta, GA 30338 (404) 394-0758; SAN FRANCISCO: 300 Broadway, Suite 20, San Francisco, CA 94133 (415) 421-7330; LOS ANGELES: 18008 Sky Park Circle, Suite 260, Irvine, CA 92714 (714) 261-1230.

SYSTEMS & PERIPHERALS

Four-Phase launches 32-bit office info line

By Jeffry Beeler
CW West Coast Bureau

CUPERTINO, Calif. — Four-Phase Systems, Inc. has expanded its business focus with the introduction of a 32-bit office information computer line that reportedly combines an industry-standard microprocessor with the Unix System V operating system.

Like the existing Four-Phase product family it complements, the 6000 series is said to be targeted at the company's traditional user base — the clerical sector of the office automation field.

But unlike its sister systems, the 6000 family is also optimized for additional office personnel, including managers and secretaries, according to Four-Phase Senior Vice-President Edgar Vance.

So, with the advent of its 6000 systems line, the vendor in effect has broadened the scope of its office automation activities, Vance said.

The 6000 series announcement also coincides with a reorganization and enlargement of Four-Phase's service and support operation, which recently relocated from Silicon Valley to Dallas and acquired an additional 400 employees, he added.

Built around a 32-bit Motorola, Inc. 68010 microprocessor, the 6000 series will be sold primarily to end-user organizations. It consists of two models — the 6300 and 6600. The 6300 supports one to eight concurrent users, in contrast to the 6600, which accommodates as many as 16 terminals per application processor, according to a company source.

At present, the 6600 supports just one application processor, for a maximum capacity of 16 simultaneous users. In the future, however, Four-Phase intends to upgrade the system to accommodate up to eight such processors, Vance

See 6000 page 115

Nixdorf adds high-end unit to 8870 systems

WALTHAM, Mass. — Nixdorf Computer Corp. has announced a high-end addition to its 8870 general business systems.

Called the 8870 Model 65, the unit was designed for business applications similar to those performed by the firm's smaller 8870 processors, the 8870 Model 35 and Model 55.

The Model 65 features 512K bytes of internal memory, a hardware arithmetic unit and a 264M-byte Winchester disk drive. Disk storage can be expanded in the field to 396M bytes by adding a 132M-byte fixed disk unit, the vendor said.

Main memory can be expanded to 1M byte by adding memory expansion boards available in 256K- and 512K-byte capacities.

The Model 65 utilizes Version 5.0 of Nixdorf's Niros operating system. Niros 5.0 has a maximum file size of 66M bytes on the 8870 series, according to the company. The operating system also is said to feature a system logbook that records significant activities, such as performance statistics of the hardware and software.

The Model 65 display workstation is a microprocessor-controlled video display, which, with Niros 5.0, acts as a multiplexer for up to three slave devices, including up to two printers, that can be controlled without connection to the CPU, according to the company.

The workstation features a terminal with a 2,000-char. amber display, a low-profile keyboard and two degrees of display intensity control. The keyboard includes a standard typewriter keyboard, a 10-key adding machine keyboard and 15 programmable function keys.

The Model 65 reportedly is available with Nixdorf's Com-

See NIXDORF page 116

DataGeneral

Data General Corp. announced it will market an array processor developed by International Imaging Systems. The unit operates with DG's Eclipse MV line of superminicomputers/**104**

■ Royal Business Machines, Inc. announced a laser printer that can operate with a variety of popular system interfaces/**104**

INSIDE

Terminals/107
Graphics Systems/108
Power Supplies/110
Board-Level Devices/110
Auxiliary Equipment/112

Will IBM's 4300 take over as top DDP CPU?

By Tom Henkel
CW Staff

MEDFORD, N.Y. — IBM's recently announced 4361 and 4381 processors have taken over as the premier distributed data processing (DDP) systems offered by the firm.

That is the opinion of a market research firm here, which stated the 4361 and 4381 hardware, coupled with software enhancements such as a cross-system program generator, makes the latest 4300 series processors ideal for DDP.

While other industry analysts are convinced IBM's 8100 line is still the top DDP system (see related article), Applied Management Services Corp. (AMS) said IBM has made an about-face in its 4300 systems strategy.

"Prior to [the 4361 and 4381] announcement [CW, Sept. 26], IBM had stressed mainframe processing, while portraying DDP as inefficient, uncontrollable and costly. It is apparent that IBM sees DDP as being the most important component of its future growth," the report noted.

What makes the 4361 and 4381 more efficient distributed processors?

First, the report said, technological improvements offered by the two new processors boost internal performance and offer users a more attractive price/performance ratio. For example, the older low-end 4331 processors offer internal performance of about .3 million instruction/sec (Mips). The 4361 offers internal performance of about 1 Mips. Likewise, the 4381 offers about 3 Mips compared to 1.8 Mips in the older 4341 processors.

The performance improvements were made possible by an air-cooled, very large-scale integration, bipolar chip. For example, the report said, the chips used in the 4361 are four times more powerful than those used in the earlier 4331. Further, high-speed buffers and parallel data paths also serve to boost performance.

Two operating system enhancements also make the 4361 and 4381 more attractive in a DDP environment. IBM made a statement of intent to support its Systems Network Architecture on the 4300's VM operating system. This move, the report said, is aimed at supporting interactive

See IBM page 115

Added features seen keeping 8100 in DDP, local net market

SHOP TALK
William Ackerman

Controversy and confusion have surrounded the IBM 8100 distributed processor since it was first delivered in 1979. To make things worse, until 1982, much of the 8100 software, particularly the DPPX operating system, was plagued with stability and performance problems. These two factors helped earn the 8100 a negative reputation, which persists today. In fact, articles about the 8100 in the U.S. and European trade press have often included predictions from industry analysts of the 8100's impending demise.

With 8100 sales figures far below projections and with considerable opposition within IBM from 4300 groups, IBM was considering discontinuation of the 8100 project in the early months of 1982. Since it had just consolidated its development efforts in the small systems area, IBM formed a task force to evaluate the possibility of reducing the burden of supporting so many small systems (Series/1, System/34, 36 and 38, 5280, 5520, 4300 and 8100).

IBM finally decided not only to keep the 8100 project alive, but also to commit additional funds to help make the 8100 a successful product. Reports indicate that IBM budgeted $100 million per year and a development staff of 600 to 700 individuals (most located in the Kingston, N.Y., area) to develop products for the 8100 line.

IBM's decision to continue funding the 8100 project was influenced by several factors:

- IBM had invested $300 million to develop the 8100.
- A significant number of IBM's largest customers had installed 8100 systems.
- Almost all of DPPX's technical problems had been eliminated.
- Orders for the 8100 systems had suddenly increased.

As would be expected with a development effort of this size, many new 8100 hardware and software products have been announced recently. These include 8130-BXX, 8150-AXX, 8150-BXX, 8102, DPCX/DOSF Release 4, DPPX/SP Release 2, Personal Computer loop adapter and so forth.

IBM's main marketing thrust for the 8100 continues to emphasize its strengths as a host-managed distributed data processing system. However, recent announcements indicate a new role for the 8100 — that of a local-area network controller for intelligent workstations

See 8100 page 112

Four-Phase is helping more than 2,000 DP managers win the productivity game.

Now it's your turn.

It's easy to win the distributed information processing game when you play it with the Series 4000 from Four-Phase. The Series 4000 is an integrated, growth-oriented system designed to communicate within your IBM environment. No other vendor gives you so many functions for so many years at such affordable prices. In the distributed processing arena, that's the way to score points with both end-users and top management.

You win the DDP games with software.

Four-Phase provides one of the most impressive and complete collections of software ever offered from one company. Our packages make integrating Four-Phase computers remarkably easy. And guarantee a logical growth path for years to come. Here's just a sample of what we provide:

Interactive processing: VISION®—For creating custom applications from order entry to transaction processing. It provides a high level of functionality that can be used in any distributed environment. And VISION is easier and faster to program than COBOL.

Word processing: FOREWORD®—Our powerful shared-logic word processing system allows text to be entered, stored, edited, distributed and printed.

Graphics—For business graphics, the Graphics Management System (GMS/IV) gives you an easy way to condense and conceptually present data that's easily understood by decision makers.

COBOL—Industry standard COBOL is used to write programs for handling keyboard-entered data and general batch processing.

When they want PC's, we've got them.

If your end-users are like most these days, they're clamoring for their own personal computers. We play that game, too. Because at the flick of a switch, our multifunction terminals suddenly become stand-alone PC's. So now you can give your users the distributed processing capabilities they need, AND the personal computers they want. All in one integrated system.

The action starts with the Multifunction Executive.

The key to the Series 4000 game plan is the Four-Phase Multifunction Executive (MFE). This unique and powerful control program monitors each multifunction terminal in your system. Its ability to run multiple software programs allows your users to perform 16 different tasks from any terminal on the system. And each of your users can access all of our software packages with one keystroke. You get maximum distributed processing capability and control.

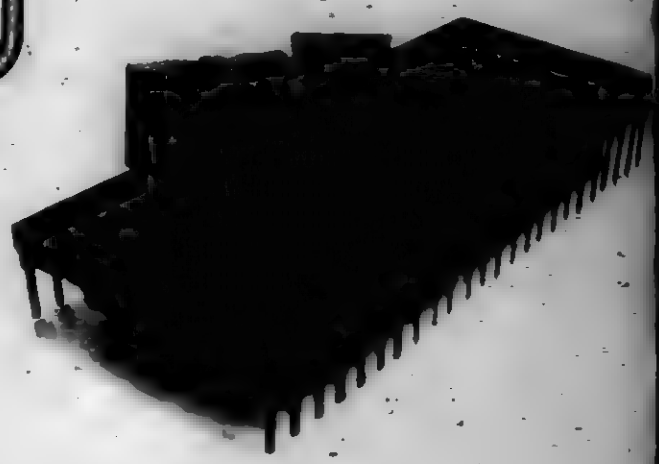
Plus, MFE dynamically allocates selected peripherals so that each device can be used by more than one program. The result—MFE eliminates the need for multiple processors, duplicate terminals and other peripheral devices at installations that require concurrent execution of software.

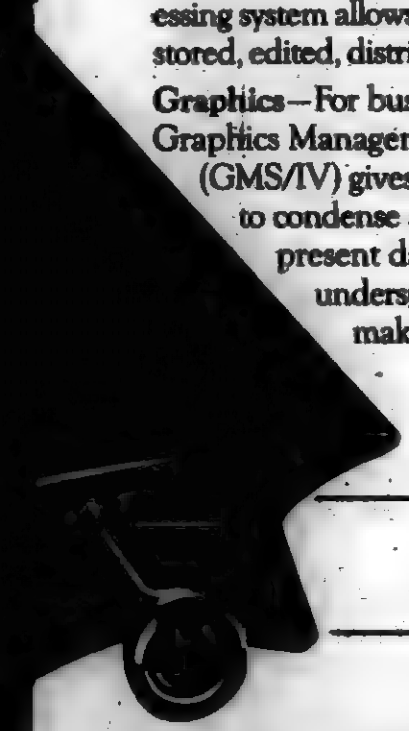
[illegible]

Four-Phase was the first company to introduce the integrated approach to multifunction distributed processing. Today, there are more than 15,000 installed Series 4000 systems, helping people like you manage the information needs of over 150,000 end-users. And every machine is backed by our Customer Support Operation and over 1,000 field service people to provide continuing support and reliability at every level.

Four-Phase customers have been winning the DDP game for years. You can, too. To find out how, call us today at 1-800-529-6050, ext. 1599. In Arizona, call 1-800-352-0458, ext. 1599. For a free poster of this illustration, write to us at 10700 North De Anza Blvd., M/S 52-6A9, Dept. P., Cupertino, CA 95014.

VISION, FOREWORD and Multifunction Executive are registered trademarks of Four-Phase Systems, Inc. MOTOROLA and Ⓜ are registered trademarks of Motorola, Inc. Four-Phase and the Four-Phase logotype are registered trademarks of Four-Phase Systems, Inc. GMS/IV is a trademark of Four-Phase Systems, Inc.





MOTOROLA INC.
Information Systems Group

Four-Phase Systems
The Office Automation Company

VM/SP Graphics Users

Tired of playing roulette with your graphics environment?

SAS/GRAPH™ and GDDM users can now spool and manage graphic printouts through the **ACX-PM™ Printer Manager** as if they were normal listings. Remove dependence on operators, decrease printer contention, and increase user control. ACX-PM supports 3287 graphic printers for both text and graphic printing.

SAS/GRAPH is a trademark of SAS Institute Inc.
©1984 ACX

ACX®
Automotive Computer Extensions, Inc.
5120 Belmont Road, Suite B
Downers Grove, Illinois 60515

or for faster access, (312) 971-1505.

SYSTEMS & PERIPHERALS

DG to offer array processors with Eclipse MV superminis

WESTBORO, Mass. — Data General Corp. has announced that it is marketing International Imaging Systems array processors and software with its Eclipse MV superminicomputers.

Under the marketing agreement, the Model 75 Image Processor and System 575 Image Processing Software are available on the Eclipse MV line.

The Model 75 is a general-purpose image array processor designed to implement a variety of image processing algorithms, according to the vendor.

The System 575 application software is said to include capabilities for satellite data analysis, medical image reconstruction, geologic and environmental mapping and nondestructive testing.

Model 75 is priced at approximately $50,000 and the System 575 at about $12,000, depending upon application requirements.

Additional information is available from DG's Technical Products Division, which is located at 4400 Computer Drive, Westboro, Mass. 01580.

PICK UP WHERE IBM LEAVES OFF.

Portable or desktop, you're way ahead when you pick up CORONA PC™ Because we give you everything you've ever wanted in an IBM[1]-compatible PC and more. For a great deal less.

COMPATIBLE AND MORE.

Our systems run all software that conforms to IBM PC programming standards. And the most popular software does.

We deliver twice the memory, with room for eight times as much.

We deliver a fast-access 320K floppy drive, a communication port and an improved IBM PC keyboard with indicator lights.

Our systems include high-resolution monitors (12" desktop, 9" portable) for crisper, cleaner displays, and both have built-in high-resolution graphics (640 x 325).

You get a complete system, ready to go to work.

MORE VERSATILITY.

With all the necessary features built into the main unit, the four expansion slots can be used for your special needs. For example, color or our optional 10MB hard disk.

MORE SPEED.

Our RAM-disk software gives you temporary disk-type storage that works many times faster than disks.

PLUS SOFTWARE.

Our systems come with the operating system: MS-DOS.[2] A programming language: GW BASIC.[2] A training course: PC Tutor.[3] A professional word processor: MultiMate.[4] Plus DOS utilities and demonstration programs. Or you can get the p-System[5] from N.C.I. and write or run portable Pascal packages.

ALL FOR A GREAT DEAL LESS.

Even with all the extra features and performance, our systems still cost significantly less than the equivalent IBM PC.

Drop by your nearest CORONA PC dealer for a very convincing demonstration. Or contact us at 31324 Via Colinas, Westlake Village, CA 91361. (213) 991-1144 or (800) 621-6746 toll-free. Telex 658212 WSLK, in Europe 76066 CDS NL.

©Corona Data Systems 1983. 1. TM International Business Machines. 2. TM Microsoft. 3. TM Comprehensive Software Support. 4. TM Software Systems. 5. TM University of California.

corona™ data systems, inc.

Laser printer out for office

WINDSOR, Conn. — Royal Business Machines, Inc. has announced an electronic laser printer said to produce up to 20 letter-size or legal-size pages per minute for office or data processing uses.

The 2800, designed for operation in an office environment, prints 23 fonts and character sizes ranging from eight to 24 points, according to the vendor. Maximum on-line font memory is eight character sets in operator-changeable cartridges, with 126 characters per set.

The printer reportedly accepts 500 sheets of 16- to 24-lb standard bond paper, as well as letterhead, colored papers and address labels. An optional 1,500-sheet cassette is available.

The 2800 is targeted toward users who want to decentralise mainframe computer printing operations by placing units directly in offices, rather than in a printer room or data processing center.

The printer provides graphics flexibility with a choice of type styles, type sizes, reverses and line spacing for creation of charts, graphs, customized business forms and logotypes, the vendor said.

It features a 240- by 240-dot matrix that gives 57,600 dot/in. The printer uses Ascii character codes and has built-in interfaces, including Centronics Data Computer Corp. and Qume Corp. Sprint 3 parallel interfaces and EIA RS-232C asynchronous and standard IBM bisynchronous 2770, 2780, 3770 and 3780.

Scheduled for delivery in the first week of July, the 2800 costs $19,500. It also is available on a rental basis.

Information is available from Royal Business Machines, located at 800 Day Hill Road, Windsor, Conn. 06095.

Capable COBOL.

For over twenty years, COBOL has proved it can handle the most awesome data handling requirements of the business world.

And Microsoft® COBOL brings this power to the MS™-DOS environment in an even more flexible version. It's the ideal choice for transporting and adapting the thousands of mainframe and minicomputer programs now on the market.

Microsoft COBOL was designed after the ANSI COBOL standard. Its quality and performance has been fully certified by the GSA.

Microsoft COBOL includes a complete set of file handling facilities including support for sequential, line sequential, relative and B+ tree indexed sequential (ISAM) files.

MICROSOFT.
The High Performance Software

The advanced screen handling features and compatible with Data General,® make it easy to create forms and menus for interactive user programs. Direct cursor positioning, highlighting, automatic format conversion, projected fields, and automatic field skip are just some of the capabilities.

An interactive source code debugging tool allows you to step through your program in symbolic form. There is no need to wade through object code and addresses in memory to see what is going on. It's a complete development package.

Applications developed with the compiler can be distributed without a runtime support charge.

Like all Microsoft languages, the standard linking interface makes it easy to combine assembly language subroutines.

Call 800-426-9400 to order the capable COBOL. $700.*

In Washington State, call 206-828-8088. Ask for operator F4, who will rush you your order, send you more information, or give you the name of your nearest dealer to see Microsoft COBOL in action.

*Price exclusive of handling and Washington State sales tax

Microsoft is a registered trademark and MS is a trademark of Microsoft Corporation.
Data General is a registered trademark of Data General Corporation.

Micro-to-mainframe:

Before you settle for a simplistic solution, ask a few serious questions.

Choosing a micro-to-mainframe communications system is no game.

So before you toy around with "easy" solutions, ask some serious questions.

Will this product support full IBM Terminal Emulation?

Make sure the system can emulate remote batch and interactive IBM terminal systems.

Does the company offer a variety of products?

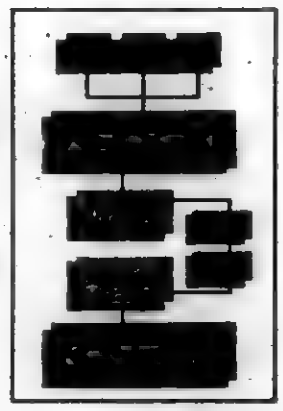
You should have your choice of stand-alone front-end processors, IBM PC or XT boards, or an OEM board. All ready to run on the most popular operating systems.

Can I get fast answers to my questions?

Insist on toll-free access to qualified service personnel before and *after* the sale.

What if I need a quick analysis of a problem?

Ask if the manufacturer has a Communications Test Center for product testing over public phone lines. And find out if the system has internal diagnostics.



Suppose something goes wrong with the unit?

The company should offer a 30 day money-back guarantee and a 12 month warranty that includes a free replacement unit.

What about future product development?

Make sure the products you're going to need soon will be available soon.

Who am I dealing with anyway?

How long have they been in business? The longer, the better.

How much is all this going to cost?

Here's a point of reference: Our own DataTalker product line will give you all the capabilities and services just described for as little as $695. Complete. If you'd like to know more, contact our Marketing Support Group at 1-800-321-7785.

Providing Data Communications Solutions

Winterhalter, Incorporated
3853 Research Park Drive
P.O. Box 2180, Ann Arbor, MI 48106
313/662-2002 800-321-7785.
TWX 810-223-2423
TELEX 234-216

DataTalker™

By Winterhalter, Incorporated

Winterhalter, Incorporated has been providing data communications solutions to major manufacturers of microcomputers and word processors since 1978. Our DataTalker front-end processors and PC boards are used by companies around the world, from start-up manufacturers to the Fortune 1000.

See us at
COMDEX™/Spring '84
May 22-25, 1984
Georgia World Congress Center,
Atlanta Apparel Mart,
Atlanta Merchandise Mart,
Atlanta, Georgia

NASDAQ SYMBOL: WINT.

SYSTEMS & PERIPHERALS

TERMINALS

MYSTIC VALLEY ENGINEERING, INC.
Annunciator Terminal

Mystic Valley Engineering, Inc. has announced a graphics terminal designed to allow industrial users to draw characters up to three inches high using a single Ascii code.

The Annunciator Terminal can be used on a stand-alone basis or, if major plotting is desired, with Mystic Valley's Ugraph format development software on the Digital Equipment Corp. PDP-11 minicomputer under DEC's RT-11 operating system. It uses a standard RS-232 channel, the vendor said.

The terminal is said to construct messages in a combination of eight colors, with letters up to three inches high and a blinking feature. It reportedly stores up to 96 full screen formats in permanent memory.

According to the company, Ugraph allows formats to be designed using a stored library of standard objects, as well as special, user-defined library objects. The terminal format is said to be nonvolatile and capable of being modified on-line.

A message terminal-level configuration is priced at $4,395, a low-resolution graphics system at $4,700 and a high-resolution graphics system at $6,200. Ugraph is priced at $2,995 for object code.

Mystic Valley Engineering, Suite 3600, 400 W. Cummings Park, Woburn, Mass. 01801.

I-O MARKETING
I-O 1191

I-O Marketing has announced a twin-axial, plug-compatible display station designed as an alternative to the IBM 5251/11 and 5291 workstations with the IBM System/34, 36 and 38 processors.

The I-O 1191 reportedly features an IBM 5251/11 character set, autoscreen dimming, high-resolution screen with interlaced refresh and screen dump to the RS-232C serial printer port. It is said to come with built-in help screens and diagnostics. Its 14-in. nonglare screen is designed to tilt 28 degrees and swivel 360 degrees.

A printer port option permits interface with any RS-232 asynchronous Ascii serial interface printer. The port reportedly can be configured to emulate an IBM 5224, 5225 or 5256 printer.

The display station is priced at $1,595, and the printer port at $395, the vendor said.

I-O Marketing, 3647 W. 1987 S., Salt Lake City, Utah 84104.

AMPEX CORP.
Ampex D175 DP; D175 PR

Ampex Corp. has announced special emulations for Datapoint Corp. and Prime Computer, Inc. video display terminals.

The Ampex D175 DP terminal reportedly performs most of the functions of the Datapoint Model 3601 and 8200 Rev 1 terminals, while making available to the user additional features that are standard in the Ampex D175.

The Ampex D175 PR is said to provide an alternative to the Prime Model PST100 terminal. Both systems are available from Ampex distributors, who also offer a software installer that automatically changes terminal tables in the Prime operating system.

The Ampex D175 DP and D175 PR each cost $995.

Ampex, 401 Broadway, Redwood City, Calif. 94063.

TELETYPE CORP.
Model 5410

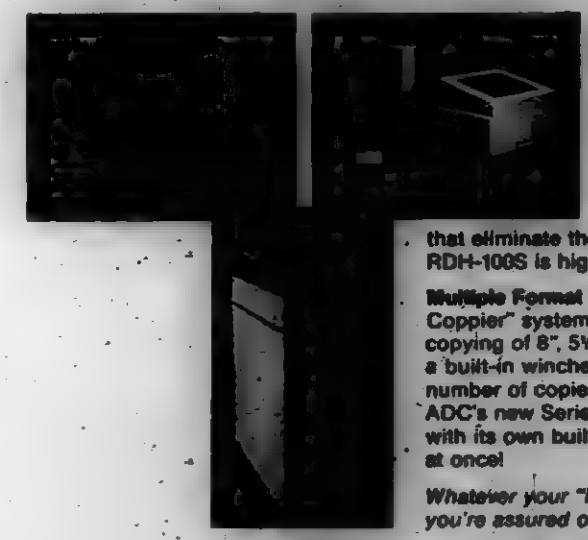
Teletype Corp. has introduced the Model 5410 asynchronous terminal, a telecommunications terminal with an optional modem/dialer.

According to the vendor, the modem/dialer operates at either 300 or 1,200 bit/sec and is compatible with the Bell 212A modem. It provides intelligent functionality through autodial and automatic logon features. Users can preset three autodial keys, each of which can access its own CPU or time-sharing service.

It features an 80- or 132-col. display screen, with display in either white, green or amber. The entire screen can be put into reverse video mode, and a screen saver feature blanks out the screen if no keys are depressed within

Continued on page 126

RDH-100S ADC's standard-setting disk handling peripheral that allows any computer to mass-produce diskette copies!



Now PC-to-minicomputer users can easily make either multiple 8" or 5¼" "floppie coppies"—and convert the RDH-100S from one to another in under 4 minutes!

Single-Format Software Developers, System Integrators and Large Distributed System Users: Your computer can get the added capability of "Floppie Coppier™" with the simple RS232 interface of ADC's high-performance Robotic Disk Handler—Model 100S. Automatically loading and unloading up to 100 diskettes without operator intervention, the RDH-100S uses patented gentle fingers that eliminate the disk destruction risk of other, not-so-sophisticated handlers. The RDH-100S is highly reliable, too—over 4000 hours MTBF and only 0.5 hours MTTR!

Multiple Format Users: ADC offers you both low-volume and high-volume "Floppie Coppier" systems to choose from—the IC-455 controls simultaneous dual sided copying of 8", 5¼" and 3½" diskettes. ADC's IC-475 loads all your floppy data into a built-in winchester which can then direct the RDH-100S to produce the desired number of copies for each successive floppy. And for high-volume production, ADC's new Series 4000 can control up to 16 simultaneous diskette handlers—each with its own built-in RDH—and you can copy both sides of double-sided diskettes at once!

Whatever your "Floppie Coppier" needs, ADC has the system to suit you—and you're assured of high-speed efficient duplication with the Robotic Disk Handler!

APPLIED DATA COMMUNICATIONS

14272 Chambers Road, Tustin, CA 92680
(714) 731-9000

First and still foremost in media duplication and test technology

SYSTEMS & PERIPHERALS

Continued from page 107

an hour's time.

The terminal sells for $915, the vendor said.

Teletype, 5555 Touhy Ave., Skokie, Ill. 60077.

LIBERTY ELECTRONICS CO.
Freedom 110

Liberty Electronics Co. has announced a low-end, smart video display terminal, the Freedom 110.

The Freedom 110 features tilt-and-swivel styling; a detached, 94-key, European DIN-standard keyboard with numeric key pad; and a non-glare, green-phosphor display.

Standard features include a 24-row by 80-col. display with user-accessible 25th status line, 10 programmable, nonvolatile function keys and flexible full-page or status-line setup modes.

The Freedom 110 sells for $595, with quantity discounts available.

Liberty Electronics, 625 Third St., San Francisco, Calif. 94107.

FALCO DATA PRODUCTS, INC.
Fame-2 enhancements

Falco Data Products, Inc. has announced an enhanced version of its Fame-2 CRT terminal.

The terminal is said to include as standard features a 14-in. green-phosphor screen and 132 col. of data. Those features had previously been options. Options now include an amber screen.

The terminal continues to feature 20 user-programmable function keys, and it has room in nonvolatile memory for up to 1,000 char. It also features transparent print mode, split screen, underline, reverse video, blinking and blanking.

The enhanced terminal is scheduled for April shipment.

It is priced at $795.

Falco Data Products, 1250 Lawrence Station Road, Sunnyvale, Calif. 94089.

COMPUTER DESIGN & APPLICATIONS, INC.
Deltapro

Computer Design & Applications, Inc. (CDA) has announced a tabletop workstation for processing and viewing image data in medical, scientific and engineering applications.

Deltapro is said to provide retrieval, manipulation and evaluation of image data in the fields of nuclear magnetic resonance, ultrasound, planetary geology, commercial printing, earth satellite resources and geophysical exploration.

It was designed to be attached to Maxdelta, CDA's imaging system, which uses a Digital Equipment Corp. VAX-11 superminicomputer.

Deltapro is said to use a CDA MSP-3000 array processor with the VAX-11 and a color raster display system.

According to the company, the array processor's architecture allows it to perform specialized matrix-oriented arithmetic operations. It is said to transfer image data only once over the DEC Unibus, which gives Deltapro processing access to data from the centralized data base.

The 2M-byte, local-display refresh memory is expandable to 8M bytes to store, process and display images of frame sizes from 32^2 to 512^2.

The terminal is said to display images, curves, text and overlay information in 4,096 colors and 256 gray levels on a 13-in. monitor with a display resolution of 512 by 480 pixels.

Deltapro uses CDA's imaging command language Medici.

Now available, Deltapro is priced at $47,000 for the 2M-byte version and $75,000 for the 8M-byte version.

CDA, 411 Waverly Oaks Road, Waltham, Mass. 02154.

MASSCOMP
Workstation 500 addition

Masscomp has announced the addition of a dual-terminal, single-processor workstation to its Workstation 500 family of Unix-based products.

The dual system includes two independently functioning color or monochrome raster displays running on a single 32-bit CPU. According to the company, each display has a dedicated microprocessor that generates its own graphics images while freeing the CPU to run computer-aided design, engineering, scientific and technical applications programs.

It is said to enhance applications such as solids modeling, very large-scale integration design, simulation and numerical analysis.

The company claims that the dual-display configuration reduces the per-display price by up to 40% in comparison to the single-user Workstation 500.

The Workstation 500 products are said to be compatible with the company's MC-500, a 32-bit, Unix-based superminicomputer.

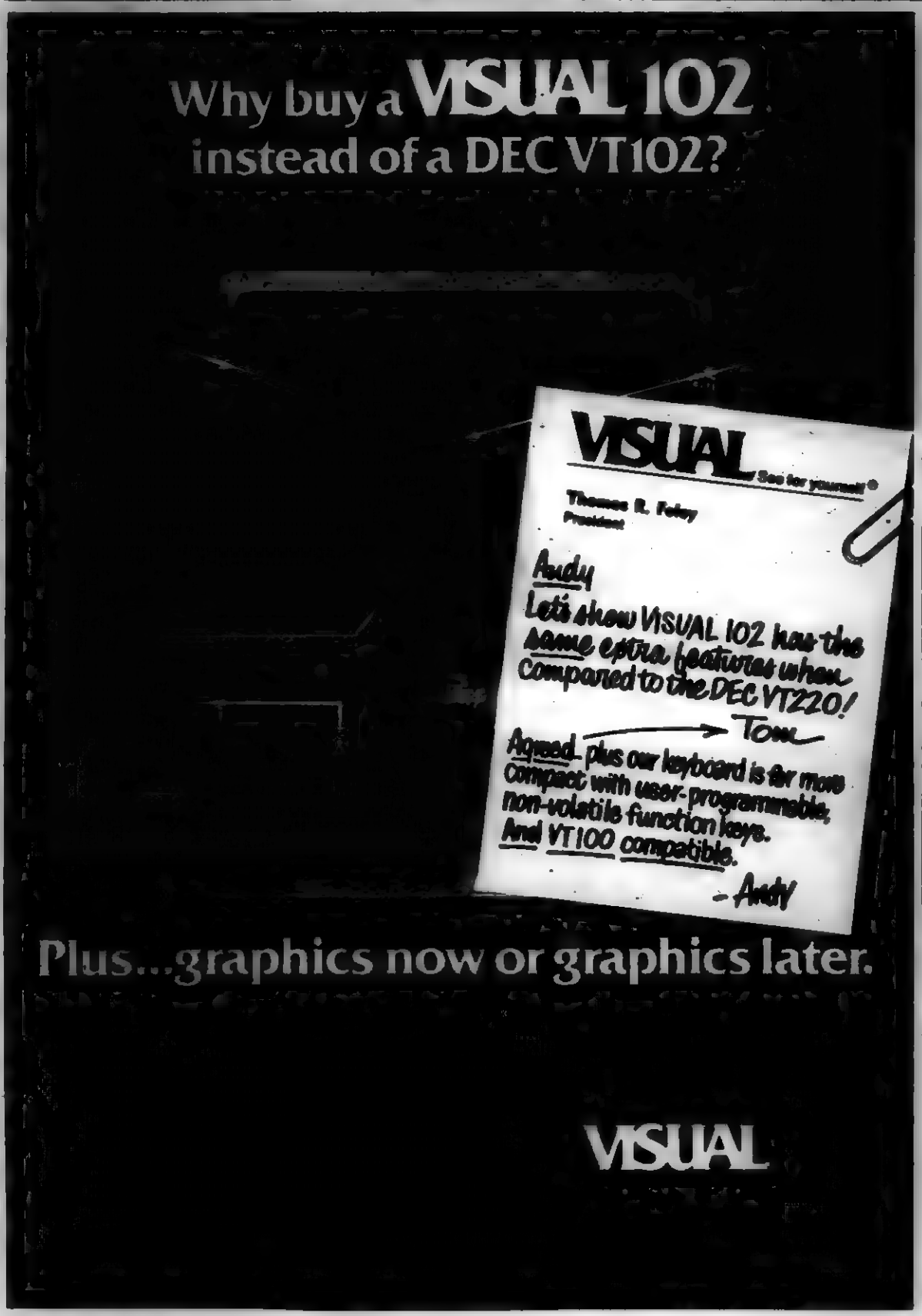
The dual-user workstation supports two Masscomp 19-in. raster graphics displays in monochrome or color. Each display has a dedicated graphics processor with a 128K-byte program store and can be located up to 150 feet from the host.

The system uses Masscomp's RTU, a real-time, virtual memory Unix operating system.

A typical dual-user Workstation 500 system with CPU, 1M byte of error-correcting memory, the Unix operating system with C and Fortran compilers and a dual, 19-in., 1,024-by 1,024-pixel monochrome graphics display costs $11,370 per workstation display in quantities of 100. A similar system with twin 19-in., 832-by 600-pixel color displays costs $15,270 per display in quantities of 100.

Masscomp, One Technology Park, Westford, Mass. 01886.

See TERMINALS, page 109



SYSTEMS & PERIPHERALS

TERMINAL from page 108

SYNTREX, INC.
Places

Syntrex, Inc. has announced an office workstation designed to allow concurrent tasking using multiple windows.

Called Places, the unit is said to allow the user to communicate with a mainframe through one window while editing or doing document merge or other tasks in another window. The workstation can communicate with the IBM 370 and 4300, Hewlett-Packard Co. and Digital Equipment Corp. mainframes.

Places consists of a screen and keyboard with the Intel Corp. 186 processor and 384K-byte internal memory. The standard storage module is a 10M-byte mini-Winchester.

It is priced at $7,500 with a removable keyboard and $9,190 with an electronic typewriter. Delivery is scheduled for April.

Syntrex, 246 Industrial Way W., Eatontown, N.J. 07724.

GRAPHICS SYSTEMS

RAMTEK CORP.
9460; 9465 display systems

Ramtek Corp. has introduced medium-resolution versions of its 9460 and 9465 graphics and imaging display system.

According to the vendor, the products are for users who want high-performance graphics processing, but don't require high resolution — specifically, for markets where an image background is displayed with a graphics overlay.

The 9460 and 9465 medium- and high-resolution systems are compatible with each other, as well as with Ramtek's earlier 9400 and 9450 display systems, the company said.

The 9460 and 9465 are configured with either the Motorola, Inc. MC68000- or Zilog, Inc. Z80-based controllers. The MC68000 models include 240K bytes of random-access memory (RAM), while the Z80 systems have 12K bytes of user RAM,

Continued on page 110

To all reps: Price changes on following items effective immediately: No. 10-11A, 10-13A, 10-AL.

Chris: The latest offer looks better, although it's still not what we were hoping for. Try for another compromise.

Just got the word from Gary. Increased our share by 6%. If trend holds, we'll pass competition by third quarter!

Smartcom II communications software, currently available for IBM PC, DEC Rainbow 100, Xerox 820-II and Kaypro II.

Smartmodem 1200 for all computers with an RS-232C interface; Smartmodem 1200B plug-in board for the IBM PC.

Microcomputer communications? Get control of the situation with Hayes.

Microcomputer communications can present the DP/MIS staff with a tangle of mis-matched hardware, user-hostile software, and a situation that can quickly get out of hand.

Hayes can help you avert that chaos, with a telecomputing system designed expressly for microcomputers.

A system so advanced, it's downright simple. Economical. And requires no handholding from you.

Hayes. The computer's telephone. Our Smartmodem 300™ and Smartmodem 1200™ connect to any desktop computer with an RS-232C port. They operate with rotary dial, Touch-Tone® and key-set telephone systems. At full or half duplex. And both feature self-test capabilities, as well as indicator lights and built-in speakers for monitoring calls.

The lower-priced Smartmodem 300 is ideal for local data swaps and communicates at 300 bps. A built-in speed selector on Smartmodem 1200 automatically detects transmission speeds (110, 300 or 1200 bps).

Smartmodem 1200B™ is also available as a plug-in board for IBM® Personal Computers. And Hayes manufactures the Micromodem IIe® for Apple® II, III, IIe and Apple Plus computers, as well. It comes packaged with Smartcom I™ communications software.

Speaking of software, more programs are written for Hayes modems than for any other. And that impressive list includes our own incomparable communications software.

Smartcom II™ Complete, menu-driven software for the IBM PC, DEC Rainbow 100,™ Xerox 820-II™ and Kaypro II.™ Even first-time communicators will find success with Smartcom II. Screen prompts guide users in the simple steps it takes to create, send, receive, list, edit, name and re-name files.

Tasks like simultaneously receiving, printing and storing data—completely unattended—are easily managed with Smartcom II, because it takes full advantage of Smartmodem's capabilities.

The program reduces lengthy dial-up and log-on sequences to a single keystroke. It stores communications parameters for 25 remote systems.

Plus, there's an on-line help feature that explains prompts, messages and parameters.

Our reputation speaks for itself. Hayes has five years of solid leadership in the microcomputer industry. Nationwide availability through retail computer stores. Trouble-free factory service and call-in assistance. A limited two-year warranty on all hardware. And the most efficient telecomputing system available. Anywhere.

If you're involved in linking micros or setting standards for configurations, remember this. Everything your people need to know about communications can be summed up in one word: Hayes.

Hayes® Hayes Microcomputer Products, Inc., 5923 Peachtree Industrial Blvd., Norcross, GA 30092. 404/441-1617.

Hayes is a registered trademark of Hayes Microcomputer Products, Inc.
Smartmodem 300, Smartmodem 1200, Smartmodem 1200B, Smartcom I and Smartcom II are trademarks of Hayes Microcomputer Products, Inc.
Touch-Tone is a registered service mark of American Telephone and Telegraph.
IBM is a registered trademark of International Business Machines Corp.
Apple is a registered trademark of Apple Computer, Inc.
DEC, Rainbow 100 is a trademark of Digital Equipment Corporation.
Xerox 820-II is a trademark of Xerox Corporation.
Kaypro II is a trademark of Non-Linear Systems.
Z80 is a trademark of Zilog, Inc.
©1984 Hayes Microcomputer Products, Inc.

Smartmodem Specifications
Low-Speed Data Formats (Smartmodem 1200 and Smartmodem 300): Serial, binary, asynchronous; 7 or 8 data bits; 1 or 2 stop bits; odd, even or no parity (0-300 bps).
High-Speed Data Format (Smartmodem 1200): Serial, binary, asynchronous; 7 data bits; 1 or 2 stop bits; odd, even, or fixed parity or 8 data bits; 1 or 2 stop bits; no parity (1200 bps).
Dialing Capability: Touch-Tone® and rotary dial pulse dialing. Command buffer 40 characters.
Commands (unnecessary with Smartcom II software): A: Intermediate answer. A/: Repeat last command. C: Transparency Carrier. D: Dial command, including complete dialing, waiting for second dial tone, auto-dialing and other functions. E: Local echo. F: Full/half duplex. H: Switch hook. M: Audio monitor. O: On-Line. P: Pulse dialing. Q: Quiet mode. R: Reverse originate/answer mode. S: If "Set" command; speed, change code character, number of rings to answer on, etc. S?: Check operational parameters shown. T: Touch-Tone dialing. V: Verbal result codes.
Result Codes (can be suppressed): Hook; 40DE: Command line; nCommand: Carrier detected; 2Ring: Phone is ringing; 3No Carrier: Carrier lost or never heard; 4Error: Error in command line; 5Connect 1200: Carrier detected at 1200 bps (Smartmodem 1200 only).
Audio Monitor: Two-inch speaker with volume control.
Rear Panel: On-off switch, power jack, RS-232C connector, modular phone jack connectors, volume control.
Operation: Full or half duplex.
Data Rates: 0-300 bps and 1200 bps for Smartmodem 1200; 0-300 bps for Smartmodem 300.
Interface: RS-232C.
Intelligence: Z80™ microprocessor with 4K bytes control program for Smartmodem 1200; Z0 microprocessor with 2K bytes control program for Smartmodem 300.
Modem Capability: Bell System 103 or 212A compatible originate or answer mode for Smartmodem 1200; Bell System 103 compatible originate or answer mode for Smartmodem 300; Smarte Signaling; —Online for Smartmodem 1200; —Online for Smartmodem 300.
Transmit Levels: —6dBm.
Registration: FCC registered for direct connect to the nationwide phone system. Connects with modular jacks (RJ11C, RJ12C, RJ13C, RJ14C, RJ25C).
Power Supply: U.L. listed 117VAC, 60Hz, 15.5VAC output.
Size: 1.5" x 5.5" x 9.0"

SYSTEMS & PERIPHERALS

Continued from page 109

optionally expandable to 256K bytes.

Configuration options include 1,280- by 1,024-pixel or 640- by 512-pixel resolution.

Prices for the 9465 start at $10,450 for medium resolution and at $11,250 for high resolution. For the 9460, prices start at $19,300 (medium) and $20,100 (high).

Ramtek, 2211 Lawson Lane, Santa Clara, Calif. 95050.

RASTER TECHNOLOGIES, INC.
Model One/80 enhancement

Raster Technologies, Inc. has announced an enhancement that is designed to allow its Model One/80 graphics system to switch from 60-Hz noninterlaced refresh rates to 30-Hz interlaced refresh rates.

The Model One/80 was designed for mechanical and electric computer-aided design, simulation, modeling and geophysical applications.

The enhancement allows designers and other users to perform prototype development work on a less expensive 30-Hz interlaced monitor, while actual production units can use the high-performance 60-Hz noninterlaced refresh rates, the vendor said.

According to a spokesman for the vendor, the feature will allow the use of 30-Hz color hard-copy devices in a system with a 60-Hz. noninterlaced monitor.

The enhanced version of the Model One/80 system is scheduled for delivery this month.

The enhancements will not affect the price, which starts at $20,000, the spokesman said.

Raster Technologies, 9 Executive Park Drive, North Billerica, Mass. 01862.

POWER SUPPLIES

DATA TRANSLATION, INC.
DT6700 modules

Data Translation, Inc. has announced five plug-in input modules as part of its DT6700 family of solid-state, isolated signal conditioning products.

The modules are said to provide input protection, isolation, amplification and filtering of sensor signals while producing analog outputs compatible with most industrial process instrumentation, including 12-bit data acquisition systems.

The recently announced products are the Model DT6703 isolated resistance temperature detector (RTD) analog input module, designed to accommodate a two- or three-wire 100-ohm RTD device; the Model DT6704 isolated bridge completion analog input module, designed to accommodate a two- or three-wire resistive transducer; the Model DT6711 isolated analog signal conditioning input module; the Model DT6712 isolated analog signal conditioning input module; and the DT6718 1-kHz isolated tachometer frequency-to-voltage input module.

Prices are $250 each for the DT6703, DT6704 and DT6718; $235 for the DT6711; and $240 for the DT6712.

Data Translation, 100 Locke Drive, Marlboro, Mass. 01752.

BOARD-LEVEL DEVICES

EVENTIDE, INC.
WKBP-16 board

Eventide, Inc. has announced a 1M-byte memory board with 256K-bit chips for the Hewlett-Packard Co. Series 200 desktop computers.

The WKBP-16 board is designed to provide four times the memory density of previously available boards, according to Eventide.

The board is intended for use with the HP 9816, 9826 and 9836 computers, providing extra memory without expansion interfaces.

The board is available, priced at $4,200. Quantity discounts are available.

Eventide, One Alsan Way, Little Ferry, N.J. 07643.

AVIV CORP.
Aviv Models 505A and 505B

Aviv Corp. has announced two tape controllers for Intel Corp. Multibus-compatible computers.

The Aviv Model TFC 505A and 505B are ½-in. tape controllers for start/stop drives

Continued on page 112

"The office automation I bought for everyone in the corporation doesn't incorporate everyone."

Exxon stops the shock...with fully integrated office automation for everyone in the corporation.

Introducing the Exxon Business Support System.

An office automation system that can't support everyone in your corporation can lead to some very shocking experiences.

The right power to the right people

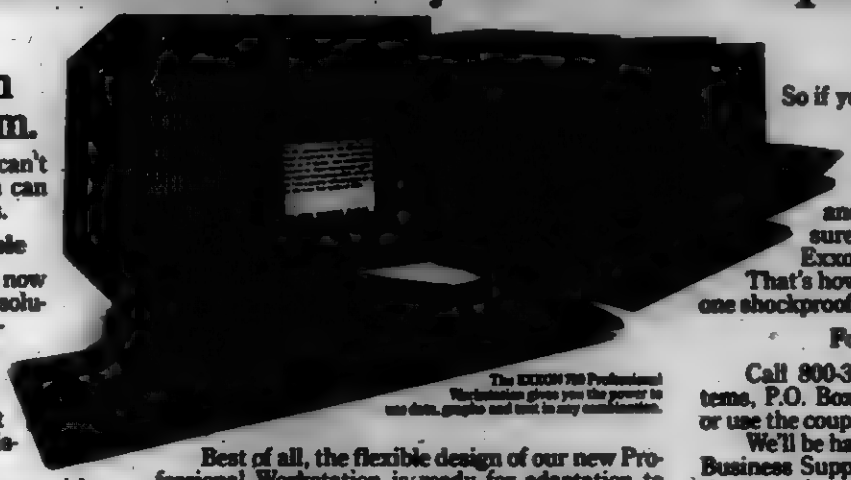
That's why Exxon Office Systems now offers more practical office automation solutions that help everyone in the corporation to be more productive. With the Business Support System, Exxon extends its fully integrated line of office automation products to support managers, professionals, and administrators, as well as secretarial staff.

Exxon puts it together for everyone with a fully integrated system — with full communications flexibility that lets you access outside data bases and interact with most mainframe computers. Without the complications. Without the shock.

Office automation for those who shape the corporation

The Exxon Business Support System features the new EXXON 750 Professional Workstation, specifically designed with powerful, integrated software that lets you move instantly from text to graphics to data processing — without changing programs.

You can divide the high resolution bit-map display into several windows and work in a number of functions simultaneously. You can shift information from one window to another. You can preview the page layout, and produce an integrated text/graphics document on our quiet EXXON 965 Ink Jet Printer. Or on a color plotter.



The EXXON 750 Professional Workstation gives you the power to use data, graphics and text in any combination.

Best of all, the flexible design of our new Professional Workstation is ready for adaptation to the most popular operating systems and network interfaces.

Tying everyone together

At the core of the Business Support System is the EXXON 8400 Series controller. With its UNIX*-based operating system, it can integrate all levels of workstations to share information and programs. Everyone can keep track of schedules and meetings with time management and calendaring functions, whether their workstation is an EXXON 500 Series Information Processor or a new EXXON 750 Professional Workstation. And everyone can send and receive messages easily with transparent electronic mail.

An expandable, shockproof family

Exxon protects your office automation investment by making every workstation — from the EXXON 500 Series to the new EXXON 750 Professional Workstation — fully expandable and upgradeable.

So if you've already begun an Exxon system, the latest Exxon advances are completely compatible with our current product line.

And with our worldwide sales and service organization, you can be sure that when you need assistance, Exxon will be there.

That's how Exxon incorporates everyone—in one shockproof family.

For more information

Call 800-327-6666, write Exxon Office Systems, P.O. Box 10184, Stamford, CT 06904-2184, or use the coupon below.

We'll be happy to demonstrate how the Exxon Business Support System can help your corporation move into the future ... without the shock.

*UNIX is a registered trademark of Bell Labs.

Exxon Office Systems COW 04 09
P.O. Box 10184, Stamford, CT 06904-2184

☐ Please send me more information about the Exxon Business Support System.

☐ Please have your representative call.

Name _____

Title _____

Company _____

Address _____

City _____ State _____ Zip _____

Telephone _____

800-327-6666 (In CT, 800-942-2525)

EXXON OFFICE SYSTEMS

The future...without the shock.

SYSTEMS & PERIPHERALS

Continued from page 110

with group-coded recording of 6,250 bit/in. The TFC 505A was designed to operate with the Storage Technology Corp. 125 in./sec Model 1965/35 drive and the TFC 505B to operate with the STC 50 in./sec Model 3930 drive.

Both controllers reportedly are built on a single board and comply to the IEEE-796 Multibus standard.

The controllers are said to be compatible with the Aviv multiport system, a feature designed to allow up to six central processors to share tape drives.

Available 30 days after receipt of order, the controllers are priced starting at $2,950, according to the vendor.

Aviv, 36 Cummings Park, Woburn, Mass. 01801.

AUXILIARY EQUIPMENT

INTERNATIONAL INFORMATION MANAGEMENT CONGRESS

Record Management Technology

The International Information Management Congress (IMC) has announced a training program designed to instruct employees in storing and retrieving manual files and computer memory.

The program, Record Management Technology, includes 297 color slides and a 52-page book, the vendor said.

Topics include records storage and retrieval, reprographics, micrographics and records management trends.

The training program costs $350.

IMC, Publication Sales, P.O. Box 24404, Bethesda, Md. 20817.

TEXAS INSTRUMENTS, INC.

Nubus

Texas Instruments, Inc. has announced that it is licensing its 32-bit Nubus technology to commercial and noncommercial users.

Designed at MIT, Nubus is a 10-MHz synchronous bus that reportedly provides a 37.5M byte/sec bandwidth and a processor-independent, memory-mapped architecture.

Nubus licenses to commercial users for a one-time $2,000 fee. Noncommercial licenses are available for $200.

Texas Instruments, Data Systems Group, 17881 Cartwright Road, Irvine, Calif. 92714.

SIX IBMs ALL IN ONE CIE

It's like getting five IBM terminals free.

In a CIE-7800, you get plug compatibility with the IBM 3178 and all five models of the 3278 series. Yet, a multi-model CIE-7800 costs less than any single one of those IBM terminals.

Both smaller and bigger at the same time

What meets the desktop is a far more compact terminal, too. The CIE-7800 is 40% smaller than any IBM.

But, through the ingenuity of CIE/ACM design, what meets the eye is a screen over one-third larger than IBM's.

The CIE monitor also rotates and has an upward tilt of from 0 to 20 degrees for adjustable viewing. And it weighs less than 20 pounds, so it's easily moved. It's user-friendly to the *nth* degree.

22 keyboards

The detached, low profile keyboard has an 87-key IBM compatible layout. And it can be user-configured into any of nearly two dozen U.S. and international keyboards, all of which give you a continuous adjustment angle of from six to 11 degrees.

Alternate DEC® and HP 2622 personalities

The CIE-7800 is available with *concurrent* alternate personalities. With a single command, you can switch to DEC VT100,® or HP 2622, or IBM 3101-3104, or IBM 3275/3276-2 (bisynch single station), while still retaining IBM 3178/3278 compatibility. No other terminal is as versatile. Not one.

New CIE-7850 "add-in" intelligence

The new CIE-7850 is more than just an add-on. It's an add-in. As shown below on our screen, you simply plug the 7850 into the Coax-A line between the controller and terminal to give you access to both on-line mainframe processing power and local intelligence.

The CIE-7850 conducts concurrent operations in either 3178/3278 or its local intelligence mode, which is *100% IBM PC compatible.*

To learn more, just contact ACM, Inc., Suite 540, 3857 Birch Street, Newport Beach, Ca. 92660. Or call toll free 1-800-854-5959. In California, call 1-800-432-3687.

CIE/ON ELECTRONICS/ACM

®DEC and DEC VT100 are Registered Trademarks of Digital Equipment Corp.
©1984 C. Itoh Electronics, Inc.

8100 from page 101

such as IBM Personal Computers. The 8100's local-area network is a twisted-pair Synchronous Data Link Control (SDLC) loop that utilizes a token passing technique similar to the IEEE 802 standard. There are approximately 30,000 8100 local-area nets installed throughout the world.

Among the capabilities that IBM is emphasizing for the 8100 as a local-area network controller are:

■ Connectivity: Most SDLC, bisynchronous and asynchronous devices can be connected to the 8100. Of particular interest is the new interface for attaching the IBM Personal Computer to the 8100's local-area network. Personal Computers attached to the 8100 can access 8100 applications as well as host applications. 8100s can also be peer-connected to other 8100s.

■ Shared disk storage: Intelligent workstations attached to the IBM 8100 can utilize the 8100's disk drive for backup and sharing data. Bidirectional file transfer is supported for IBM Personal Computers and Displaywriters. With the announcement of the IBM 8102 I/O unit, over 1G byte of disk storage is available.

■ Print management: Intelligent workstations attached to an 8100 system can direct workstation data to 8100 printers. The 8100 operating system provides tools for managing multiple printers and print queues. This eliminates the need for each workstation to have its own printer, which reduces the cost of each workstation and allows higher quality and more reliable 8100 printers to be used.

■ Continuous operation: The recently announced 8150-B processor consists of multiple CPUs, data channels and memory banks that allow the 8100 to continue operating (in a degraded mode) in the event of a failure. In addition, the DPPX operating system can automatically maintain multiple copies of a disk volume so that the system can continue to operate if a drive crashes.

■ Programmability: Among the high-level languages supported by the 8100 are: Cobol, PL/I, Fortran and APL. Applications written using IBM's cross-systems product can execute on the 8100 as well as on a host system under CICS, SSX, TSO or CMS. An 8100 data base manager is also available.

■ Processor range: IBM offers 21 different models of 8100 processors, ranging in power from about .2 million instruction/sec (Mips) to over 1.3 Mips and providing support for clusters of a few up to a few hundred workstations.

■ Centralized control: The attachment of any kind of intelligent workstation to any kind of network can be viewed as distributed data processing (DDP). One important factor in the success of a DDP network is central control. The same capabilities that are utilized to manage 8100 networks from a central site can also be used to manage 8100-attached workstations.

■ Systems Network Architecture (SNA) integration: SNA is used in the connection of workstations to the 8100 and in the connection of 8100s to other 8100s and host computers. The 8100 can be viewed as an integration of local-area and wide-area networks into the SNA environment.

IBM clearly intends to exploit

See 8100 page 115

TELEVIDEO MULTI-USER COMPUTERS.
TO EACH HIS OWN.

If you've had your share of sharing a personal computer, TeleVideo® Multi-User Computers mean the end of the line. From two users to 16, and even more, our systems offer the expandability and power to meet your growing needs.

OUR SYSTEMS GROW WITH YOUR BUSINESS.
And with TeleVideo it's easy, inexpensive and controllable. You can add users to the sytems with plug-in simplicity, when and where you need to. Secretaries and bosses can all share the same system without sharing the same computer. And by simply adding to your system as your business grows, your original investment is always protected.

3,000 SOFTWARE PROGRAMS AND MAINFRAME COMMUNICATION.
Our systems support industry standard software, so you'll have access to nearly 3,000 very productive programs. And by emulating IBM® 3270 and 3780 terminals with additional TeleVideo software, you can even communicate with IBM mainframes.

However large or small your business, or department, TeleVideo offers a variety of multi-user computers that offer each user all the conveniences of a personal computer. And all the power of a computer network.

THE LOWEST COST PER USER.
The all-in-one system that's the one for all, the TS 804 is completely integrated into a single desktop enclosure. The system can support up to four users and a wide selection of peripherals. And it's all available for the lowest cost-per-user on the market: under $1500.

TO EACH HIS OWN PROCESSOR.
A powerful desktop micro computer system, the TS 806 offers all the conveniences of the TS 804 and even more throughput. With the ability to provide true multi-user capabilities for up to six stations, any combination of TeleVideo 8 and 16-bit personal computers can be supported by the TS 806.

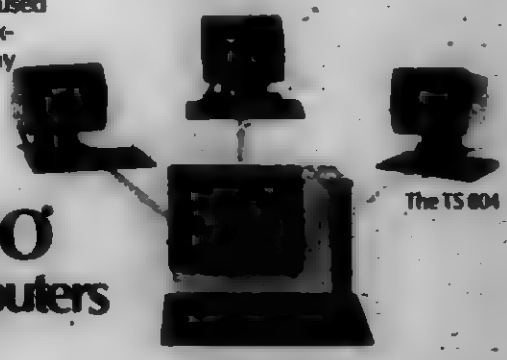
UP TO 16 USERS AND 16-BITS.
Up to 16 workstations can be used with the TS 816, creating a flexible multi-tasking system. Any combination of 8 and 16-bit personal computers can be supported, with or without local storage.

THE WORLD'S LEADING MANUFACTURER.
TeleVideo is the leader in multi-user computers and the number one independent manufacturer of terminals. And from systems to peripherals to service and support, only TeleVideo offers you the convenience of a single-vendor solution.

For more information, call 800-538-8725 (in California, 800-345-8008).

TeleVideo Multi-User Computers. To each his own.

The TS 816: Up to 16 users



The TS 804

TeleVideo
Multi-User Computers

IBM is a registered trademark of International Business Machines Corp.

©TeleVideo Systems, Inc.

WE SPARKED
THE REVOLUTION.

NIXDORF from page 101

et application software package, which features financial accounting, order processing, inventory control, production control, fixed assets, purchase orders, cost accounting, word processing and a report generator.

Peripherals and software are said to be compatible with other systems in the 8870 family.

The price for a Model 65 with 512K bytes of memory, hardware arithmetic unit, 264M-byte hard disk storage, a 300 line/min printer and four terminals is $92,700, according to the vendor.

It is available for delivery 90 days after order.

More information is available from Nixdorf, which is located at 300 Third Ave., Waltham, Mass. 02154.

8100 from page 112

these strengths to extend the 8100 into the local-area network market. The 8100 may meet its stiffest competition from other IBM products that support the IBM Personal Computer. IBM is expected to continue developing the 8100 as a host for intelligent workstations in SNA networks controlled from a central site.

IBM's efforts to turn the 8100 around may be paying off. It is estimated that IBM has now sold over $1 billion of 8100 hardware and software. Postnatal complications are not unusual — the infancy of the 8100 has been no exception.

Ackerman, a longtime 8100 supporter, is president of DPX, Inc., a Cupertino, Calif., consulting firm specializing in the 8100.

IBM from page 101

computing on the 4300. In addition, IBM announced that its latest top-of-the-line operating system, MVS/XA, will be supported on the 4381.

This, the report said, offers 4300 users functions heretofore only available in the larger 3080 series of processors. In addition, users of the 4361 processor can now directly attach IBM Displaywriters and Personal Computers to their systems, the report noted.

One of the most significant boosts IBM gave the 4361 and 4381 for DDP applications was the availability of cross-system program generators, which enable a programmer to write applications for IBM 8100, 4300 and 3080 series processors simultaneously.

The report noted that IBM's cross-system products make it easier to transfer applications between the 8100's DPPX/SP operating system, MVS/TSO and the VM operating systems. The report speculated that IBM will soon announce a product that will provide a similar capability between the 4300 and the System/36 processor.

Lastly, the report noted that a series of migration aids allowing users of the smaller System/34 processors to switch applications to 4300 processors using the SSX/VXE operating system may be further indication of IBM's intent to develop the 4300 line into the premiere DDP system.

The report, called "IBM 4361/4381 Processors In-Depth Report," costs $85 from AMS through Box 350, Medford, N.Y. 11763.

6000 from page 101

said.

Both members of the 6000 family are aimed mainly at Fortune 1,000 companies and fall into basically the same performance class as the IBM 8100, System/36 and System/38, according to Four-Phase Senior Vice-President Tony Yates.

The two office automation models are also said to be software-compatible down to the object-code level.

Because they run under a Unix-derived operating system that supports demand-paged virtual memory, the 6000 series systems already boast a large library of prewritten application packages, according to Four-Phase Product Marketing Director Roger Breding.

Buffering the two systems' users from their control program is Four-Phase's proprietary Unix shell known as Uniview, which reportedly permits up to eight screen windows to be displayed simultaneously. Information can be electronically exchanged between any of the eight windows, a company source said.

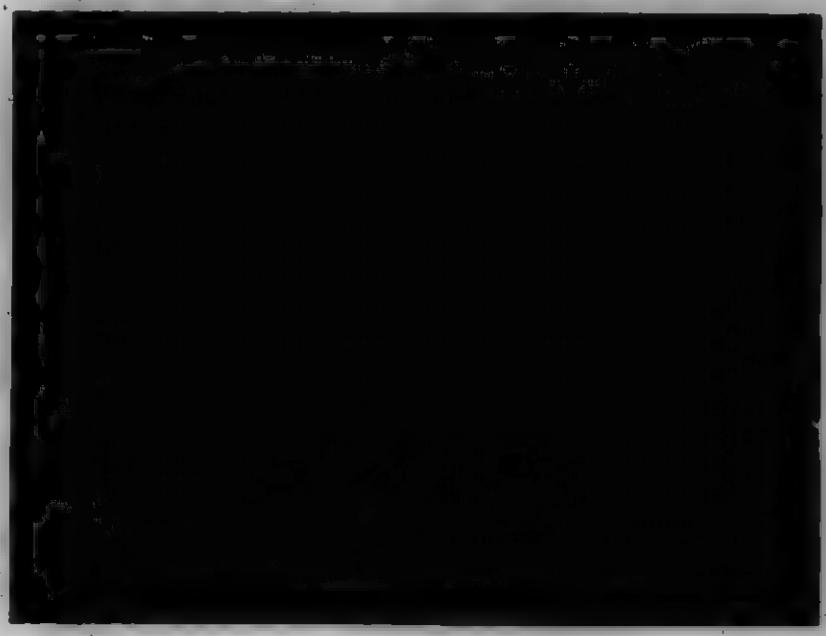
The 6300 and 6600 also support an assortment of programming languages including Cobol, Basic, Pascal, C and Sibol, the latter of which makes the 6000 series machines compatible with applications written under Digital Equipment Corp.'s Dibol.

In addition, the two models reportedly accommodate Oracle Corp.'s Oracle data base management system and various communications protocols like 2780/3780 bisynchronous, 3770 remote job entry and 3270 Systems Network Architecture.

A 6300 system configured with two workstations, a 20M-byte disk module, a 1M-byte main memory and a character printer costs $15,181. A 6600 configuration, with a 1.5M-byte memory, 74M bytes of disk storage and eight workstations sells for $70,650.

Shipments of both systems begin immediately from Four-Phase at 10700 N. De Anza Blvd., Cupertino, Calif. 95014.

"dBASE II helps keep us on our toes."



Robert Hubert
Marketing Director
The Boston Ballet

"The Boston Ballet was a company in search of a computer when I joined the organization earlier this year. And, after discovering that a large computer system was being considered, I urged a smaller, more sensible first step.

"Since almost no one at The Boston Ballet had any previous computer experience, I strongly recommended the purchase of a microcomputer and dBASE II.

"dBASE II, the relational database management system from Ashton-Tate, would give the people in the Company the time and the opportunity to get used to computing before bringing in a larger, more expensive system later on.

"dBASE II is a command-driven, highly flexible system that can be used for a great variety of applications ranging from very simple to highly complex."

A premier performer from Day One.

"dBASE II manages our extensive season subscriber mailings; keeps track of all our advertising insertions, costs and efficiency; and makes project time management a snap. We are now making plans to use dBASE II in handling the special promotions and manpower analyses critical to our day-to-day management.

"dBASE II made an immediate and sizeable impact on the efficiency of our operation."

The real kicker.

"Recently, we hired a custom systems house to develop a long-range computer program for The Boston Ballet. Without prejudice, they came back and said the new system should be based on dBASE II."

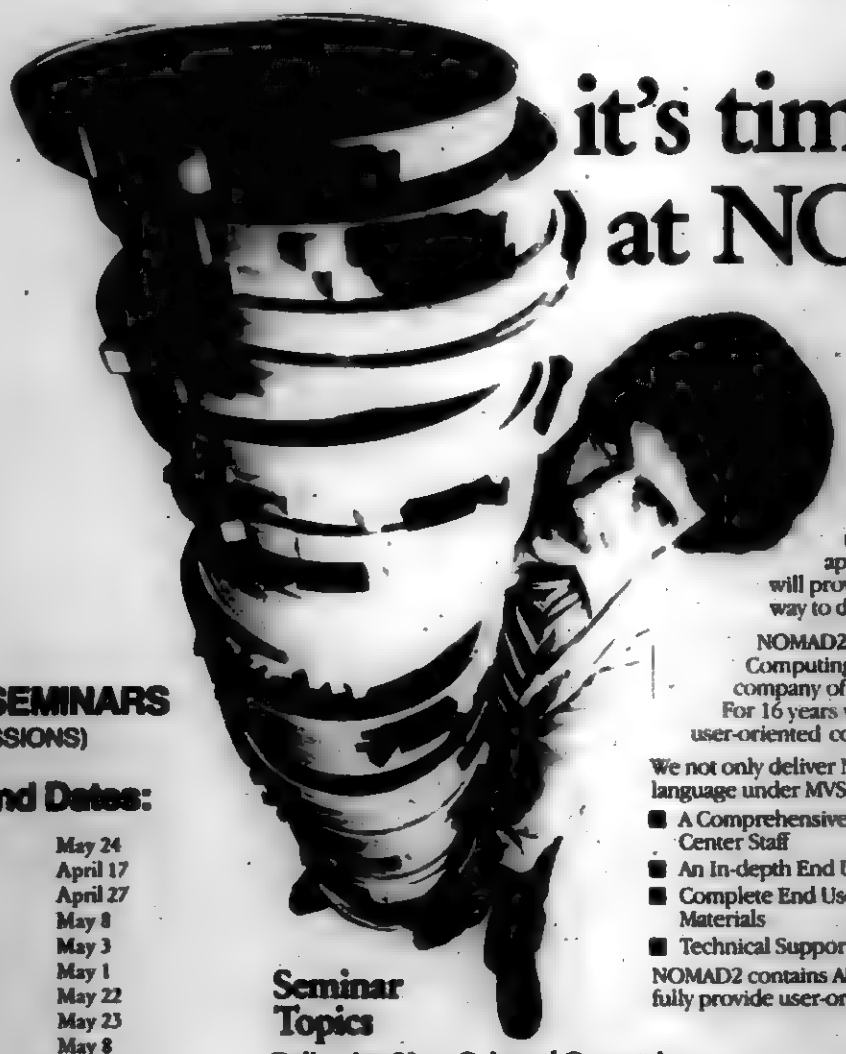
dBASE II can provide you with virtuoso performance, regardless of your application.

For more about dBASE II, contact Ashton-Tate today. 10150 West Jefferson Boulevard, Culver City, CA 90230. (800) 437-4329, ext. 217. In Colorado (303) 799-4900. In the U.K. (0908) 568866.

ASHTON-TATE

dBASE II is a registered trademark of Ashton-Tate.
Suggested retail price for dBASE II is $700.
© Ashton-Tate 1984

If delivering user-oriented computing is getting you down...



it's time to look at NOMAD2!

Delivering user-oriented computing can be a tricky business. If it's your objective to satisfy the user community in your organization, it's time to speak to the experts. We'll share our experience with you at our FREE NOMAD2 Seminars.

Whether you're interested in an Information Center, Development Center, end-user computing or just quick applications development, our seminars will provide you with a closer look at the best way to deliver user-oriented computing.

NOMAD2 is a unique product created by D&B Computing Services, the information services company of The Dun & Bradstreet Corporation. For 16 years we have been delivering value added user-oriented computing services.

We not only deliver NOMAD2, the premier fourth generation language under MVS and VM, but also provide . . .

- A Comprehensive Training Program for Your Information Center Staff
- An In-depth End User Training Program
- Complete End User Documentation and Training Materials
- Technical Support for Your Information Center Staff

NOMAD2 contains ALL the components you need to successfully provide user-oriented computing services.

FREE
NOMAD2 SEMINARS
(HALF DAY SESSIONS)

Location and Dates:

Atlanta, GA	May 24
Austin, TX	April 17
Boston, MA	April 27
Chicago, IL	May 8
Cincinnati, OH	May 3
Cleveland, OH	May 1
Columbus, OH	May 22
Dallas, TX	May 23
Denver, CO	May 8
Des Moines, IA	May 16
Detroit, MI	May 2
Elizabeth, NJ	May 16
Harrisburg, PA	April 12
Hartford, CT	April 26
Houston, TX	May 24
Indianapolis, IN	May 17
Kansas City, MO	April 24
Los Angeles, CA	May 3
Louisville, KY	May 10
Miami, FL	May 22
Montreal, Canada	May 4
New York, NY	April 19
Oklahoma City, OK	April 25
Omaha, NE	May 15
Philadelphia, PA	May 17
Pittsburgh, PA	May 9
Portland, OR	May 9
Rochester, NY	May 14
San Francisco, CA	May 1
Seattle, WA	May 10
St. Louis, MO	April 26
Stamford, CT	May 4
Toledo, OH	May 23
Toronto, Canada	May 9

Seminar Topics

Delivering User-Oriented Computing

■ Information Centers vs. Development Centers ■ The "Ideal" Environment ■ User Profiles ■ Delivery Strategies ■ User Training and Support ■ Microcomputer Strategies

NOMAD2: On-Line Application Development

See the "reality" of user-oriented computing with NOMAD2. Watch us build and dynamically modify a NOMAD2 application on-line. We'll build a data base structure, load data, generate reports and graphics, modify the data base and much more.

If delivering user-oriented computing is your objective, it's time to take a closer look at NOMAD2.

NOMAD2 . . . Experience the difference

D&B Computing Services

a company of The Dun & Bradstreet Corporation

Please fill out the attached registration form and return it to:

Roger Cox
D&B Computing Services
187 Danbury Road
Wilton, CT 06897
or call Roger Cox at (203) 762-2511

☐ Please reserve _____ seat(s) at your *FREE* NOMAD2 SEMINAR to be given in

(City) _____

on (Date) _____

☐ Please send NOMAD2 materials.

Name _____ Position _____

Company _____

Address _____

City _____ State _____ Zip _____

Telephone _____

®NOMAD2 is a registered trademark of D&B Computing Services, Inc.
©Copyright 1984 D&B Computing Services, Inc. All Rights Reserved.

MICROCOMPUTERS

SMALL TALK
Eric Bender
CW Senior Editor

AT&T vague on micro plans

Late last month, as AT&T finally unwrapped its first commercial computer offerings — a line of 32-bit systems ranging from a desktop supermicro to a fault-tolerant supermini — the announcements struck many industry analysts as short on technical details.

"It's very typical that AT&T did not release much technical information," noted Brian Boyle of Gnostic Concepts, Inc. in Menlo Park, Calif. Boyle suggested that AT&T's attitude is that "you don't have to worry about details — we're the phone company."

AT&T was vaguest about its new PC interface, a hardware/software combination designed to connect the 3B2/300 supermicro with personal computers. Unlike the other products, the interface was not on display, and its pricing was not released. The interface is not scheduled to ship until the third quarter.

When available, the interface will allow multiple personal computer users to share files on the central 3B2 and to share the 3B2's peripherals, according to AT&T. The personal computers also will be able to function as Unix terminals, the firm said. The PC interface will connect through one of three communications options: an RS-232 port, an Otninet or an Ethernet.

Personal computers represent "an installed base we want to serve," said Jack Scanlon, AT&T's vice-president for computer systems, and the PC interface is "a bridge between Unix and personal computers."

See AT&T page 133

Corona adds hard-disk portable to IBM-compatible micro line

By Paul Kerzenkowski
CW Staff

WESTGATE VILLAGE, Calif. — Hoping to stay one step ahead of IBM, Corona Data Systems, Inc. has added Corona PPCXT, a hard disk portable personal computer, to its line of IBM Personal Computer-compatible microcomputers.

"The PPCXT addresses user requirements for greater disk storage and offers a host of standard features and expansion capabilities that make it a cost-effective alternative to the IBM Personal Computer, Personal Computer XT and other IBM compatibles," said Lawrence Lotito, vice-president of marketing and strategic planning at Corona.

PPCXT features a 10M-byte hard disk, an Intel Corp. 8088 microprocessor, 256K bytes of random-access memory expandable to 512K bytes, a 9-in. amber monitor, graphics resolution of 640 pixels by 325 pixels, an RS-232C serial port, a Centronics Data Computer Corp.-compatible parallel port and four expansion slots. The portable costs $4,595 and weighs 33 lb.

Software bundled with the system includes Microsoft, Inc.'s GW Basic, Software Systems, Inc.'s Multimate word processing package and Comprehensive Software Support, Inc.'s PC Tutor, an online study of basic microcomputer functions.

Docutel Olivetti Corp. has acted as an OEM for Corona's desktops and portable floppy disk computers. "Currently, Olivetti has not ordered the hard disk portable," said Ken Morris, Corona's director of corporate communications. "But we expect them to order it soon."

Docutel Olivetti has not ordered PPCXT because the company has not seen it. "We use Corona's hard disk desktop, but we haven't seen the hard disk portable yet," said George Christiansson, product manag-

See CORONA page 130

DSS 'Optionware' boasts ease of use

By Paul Kerzenkowski
CW Staff

HARTFORD, Conn. — Ian Boyd, president of DSS Development Corp., identified ease of use as the chief reason why many managers do not use microcomputers.

"The industry hasn't grasped that nothing is easy to use if it takes several hours or days to create something useful," Boyd said. "Maybe the industry should adopt a new standard — easy to make useful. The user does not want to buy a HeathKit to build a radio. He wants the radio."

DSS' first product, Optionware, a series of 52 added functions for Lotus Development Corp.'s Lotus 1-2-3, is limited to five commands: enter, review, display, print and graph, Boyd said.

Optionware uses a standard menu and procedure for all modules, which include balance sheet history, regional sales performance, department budgets, sales call reports, fixed asset history and monthly calendar.

"There are some instances where we save a user 320 keystrokes," Boyd said. "The average number of keystrokes each module saves a user is 140."

Users can switch from any Optionware function into Lotus 1-2-3. "A user does not sacrifice any Lotus capability," Boyd said.

"National accounts will be a major market for us," he said. "We are working with two major insurance companies in the Hartford area and tailoring the product for

See EASY page 130

INSIDE

Systems/118
Printers/Plotters/122
Board-Level Devices/122
Auxiliary Equipment/122
Software/122

POS system helps Remington shave delays in stock turnover

BRIDGEPORT, Conn. — With a blizzard of some 200,000 sales tickets pouring in annually from 29 regional sales centers, Remington Products, Inc., the electric shaver maker, was snowed under with paperwork. Worse, stock turnover was slowed because of the delay in inventory tracking.

But that was all before the company turned to a point-of-sale (POS) system that translates handwritten sales tickets into data that can be understood by computers. The system uses Microped, Inc. Micropad data entry terminals, clipboard-size units with a pressure-sensitive writing surface. Clerks in the company's sales centers continue to use paper sales tickets, but the Micropads on which they write the tickets digitize the information and transmit it on a cable connection to their store's Altos Computer Systems, Inc. Model 515 microcomputer, which stores an exact copy of each sales ticket transmitted to it that day.

Those sales tickets are pulled each night, via a modem, by the company's two Altos 8000-10 processors at Remington headquarters here. The headquarters' computers record the sales tickets and return a detailed sales report to each sales center's microcomputer by the time the store's manager opens for business the next morning.

Since conversion to the electronic system, clerks in the regional centers are writing sales tickets that have fewer errors and take less time to complete, according to Remington's data processing manager Jack Welsh.

Welsh said the firm is out from under a load of paperwork that once cost 8 cents per sales ticket to process.

The Microped system still provides both the customer and the store with a paper copy of the sales ticket, but the Bridgeport headquarters no longer needs to have those forms manually keyed into its computer system, a process that Welsh said caused delays of several days in ticket processing and opened the potential for data entry errors.

"This is one [situation] where the cost justification really came through," Welsh said.

Getting to that point, Welsh admitted, took some doing. The company considered 84 different vendors of POS equipment, companies offering everything from key entry to bar-code reader technology. Remington chose the Micropads over key pad and bar-code reader equipment because the Micropads required a good deal less software to be developed in-house before the system could come on-line.

Because the Remington sales centers service as well as sell the company's products, a system that kept the paper sales tickets was useful because "we wanted to give the consumers information on what we had done [for repairs] and to get their name and address," Lee Feist, Remington's president of retail service operations, said.

Once Micropads were chosen, they were installed on an experimental basis in three Remington sales centers. The Micropads were supported at that time by a small Motorola, Inc. computer system that Welsh said could only support two Micropads per store. When the experiment proved successful, the company decided each store would need up to four Micropads and switched to Altos computers because "we just couldn't wait for Motorola's multiuser system to come out," according to Welsh.

The Altos system was also selected because each store's space limitations required that its computer be located in a shaver-repair area, where the equipment would have to withstand the clouds of hair dust produced by shaver cleaning. The Altos computers were recommended by Microped, Inc. as being able to survive in that environment, Welsh said.

Sales clerks fill out sales tickets by placing the form on the Micropad and printing the needed information into each of its boxes, using a ball-point pen or a pencil. Depending on which of the several "start" boxes is

See POS page 134

Apple Access 3270 debuts

CUPERTINO, Calif. — Apple Computer, Inc. has introduced data communications software that is said to allow Apple III personal computers to communicate with all mainframes, minicomputers and personal computers that support IBM 3270 communications.

Called Apple Access 3270, the product works with an Apple Cluster Controller or an Appleline coaxial attachment to emulate an IBM 3278 Model 2 terminal, according to the vendor.

Access 3270 provides Apple III users with a variety of data communications capabilities including text file transfer, on-line data entry, inquiry and response, electronic mail and remote data base access, the firm said.

Apple said that program features include support of data transmission rates from 110 to 9,600 bit/sec; customized Help screens; a comprehensive command file that provides autodial, autologon and unattended operation capabilities; 3278 keyboard emulation and communications options; and the ability to filter control characters to or from the host, the vendor said.

The product is available now for $150.

Apple is located at 20525 Mariani Ave., Cupertino, Calif. 95014.

SYSTEMS

JONOS INTERNATIONAL, INC.
Hard disk portable computer

Jonos International, Inc. has announced C2600, a hard disk portable computer.

The portable features a 3½-in. floppy disk drive, a Zilog, Inc. Z80 microprocessor, 128K bytes of random-access memory, a 10M-byte hard disk and Digital Research, Inc.'s CP/M Plus operating system, the vendor said. C2600 is equipped with two RS-232 serial ports, a parallel port, three expansion slots and a 9-in. CRT, according to the vendor.

C2600 costs $5,695.

Jonos International, 1835 Dawns Way, Fullerton, Calif. 92631.

SCIENTIFIC MICRO SYSTEMS, INC.
MDX-11

Scientific Micro Systems, Inc. (SMS) has announced the MDX-11, a Digital Equipment Corp. LSI-11-type microcomputer system. The MDX-11 reportedly features a 40M-byte Winchester disk drive with an average access time of 45 msec.

The system contains a DEC Q-bus backplane, designed to be configured with the LSI-11/23 or LSI-11/73 CPUs and memory and interface modules. The quad-size backplane reportedly can accommodate up to eight dual-height Q-bus cards to provide extra functions such as graphics, communications interfaces and additional memory.

The 35-lb desktop microcomputer includes an 8-in. floppy disk drive for backup and software updating that supports DEC and IBM formats and stores 1.2M byte per disk. The floppy and Winchester drives operate with the SMS FWD0106 disk controller, which operates in either a DEC-RX02-compatible mode or an extended mode that provides additional commands for read/write of the fixed disk and data transfer operations, the vendor said.

The MDX-11 is said to feature compatibility with existing SMS systems and DEC operating systems that include RT-11, RSX-11M and RSX-11M-Plus. According to the company, the S & H Computer, Inc. TSX-Plus operating system makes the MDX-11 particularly useful for small business applications.

Available now, the system is priced at $10,600.

Scientific Micro Systems, 777 E. Middlefield Road, Mountain View, Calif. 94043.

SAGE COMPUTERS, INC.
Unbundled software

Sage Computers, Inc. has lowered the price of its Model II and Model IV multiuser supermicrocomputers by unbundling three programs: Pascal, 68000 assembler language and Timberline Systems, Inc. spreadsheet.

Sage Models II and IV feature 256K bytes of random-access memory (expandable to 512K bytes); Motorola, Inc. 68000 microprocessors; the P-system operating system; Pascal; Word7, Inc.'s word processing software; and Teletalker, Inc. communications software, the vendor said. Sage II is equipped with one or two 640K-byte floppy disk drives. Sage IV has a 12M-byte hard disk and one 640K-byte floppy disk drive.

Prices for the two models range from $3,200 to $7,300.

Sage Computers, 4906 Energy Way, Reno, Nev. 89502.

AMERICAN COMPUTER GROUP, INC.
Quickplan

American Computer Group, Inc. has introduced a system designed for project management using the IBM Personal Computer XT.

Quickplan is a display and report writer that is said to permit a manager to customize specific data on specialized reports. The program's graphics provide the capability to draw network logic charts.

The vendor is offering the software as part of a package built around an IBM Personal Computer

Continued on page 122

Nearly Nine Million Computer-Involved People Around the World Rely on Our Publications For the News They Need.

We're CW Communications/Inc.; the world's largest publisher of computer-related newspapers and magazines. And wherever you go in the computer world, you'll find computer-involved professionals reading—and relying on—our publications. With highly trained and experienced editorial staffs all over the world, our publications give readers the best and most up-to-date information available in this rapidly changing industry.

Around the world:

We publish, co-publish or provide editorial services to the leading computer publications in the world, including publications in all of the following countries:
Scandinavia—Denmark, Sweden, Norway, Finland
Western Europe—West Germany, United Kingdom, France, Italy, Spain, Greece, the Netherlands.
The Mid-East—Kuwait, Saudi Arabia.
Asia/Africa—People's Republic of China, Korea, Japan, Singapore, Southeast Asia, South Africa, India.
The Southern Pacific—Australia.
Central and South America—Mexico, Brazil, Argentina, Chile.

In the United States:

In the world's largest computer market, we publish a whole series of publications that cover different aspects of the industry. Our largest publication, with more than half-a-million readers every week, is *Computerworld*, a weekly newspaper aimed primarily at larger computer users. Its companion publications include *Computerworld Office Automation*, *Computerworld on Communications* and a series of *Buyer's Guides* covering all major segments of the industry.

In addition, we publish *MICRO MARKETWORLD* for dealers, distributors, retailers and others involved in the microcomputer marketplace. For microcomputer users, we publish *Infoworld*, *Microcomputing*, *PC World*, *MacWorld*, *jr*, *80 Micro*, *inCider*, *Run*, and *Hot CoCo*.

No one in the world publishes more computer information for more people in more countries than we do. And we'd be happy to give you more information on any of our publications. Just send a telex to our U.S. offices, attention CW International Marketing Services, (telex #95-1152) or write us at the address below.

CW COMMUNICATIONS/INC.
375 Cochituate Road, Box 880, Framingham, MA 01701
(617) 879-0700

1-2-3 from Lotus. Maybe the best way to look out for number one is to go with number one.

But don't just take our word for it.

Take the word of the experts. *The New York Times* heralded 1-2-3 as "the wave of the future in business software." *Software News* said, "1-2-3 has more capabilities than any other program in its class." And in 1983, 1-2-3 from Lotus was named a "Product of the Year" by both *Fortune* and *Info-World*.

It's the difference between getting by and getting ahead.

What can 1-2-3 do for you? What it's already done for hundreds of thousands of PC users. Give you a proven business software that can dramatically increase productivity for you and everyone in your company.

After all, when it comes to looking out for number one, going with number one is the only way to go.

The best way to find out what 1-2-3 can do for you is to visit your local computer store. Or call 1-800-343-5414 (In Massachusetts call 617-492-7870).

Lotus
The hardest working software in the world.™

1-2-3 [illegible]

And it's been [illegible] almost from day [illegible] February of 1983, 1-2-3 [illegible] consistently been at [illegible] the software best sellers [illegible]

And it's the best selling [illegible] software in the world, for [illegible] good reason. It's the very best [illegible] PC software.

The PC software that [illegible] simply does more.

1-2-3 gives you the most powerful productivity software available today. An analytical tool that combines spreadsheet, graphics and information management into one incredibly fast, easy-to-use package.

With 1-2-3, you can analyze, interpret and report information in seconds with just the touch of a key.

And because it's all one program, you not only work faster and smoother, you work smarter.

And so does your PC.

1-2-3 and Lotus are trademarks of Lotus Development Corporation. *Based on Sales&, Software Best Selling Software Lists, issues covering the month of February 1983 and week of April 25, 1983, respectively.

UNIX™. An ideal has been realized.

Some say UNIX is the operating system of the future. We say, why wait till then? Because you can get it right now on a full range of HP computer systems.

Yes. It's running on our MC68000-based machines and our powerful 32-bit systems, so you can pick the right computer for the job.

And since our HP-UX operating system is an enhanced version of the industry-standard UNIX operating system, you can take advantage of the growing array of applications software available. You can also use the extra features of HP-UX, such as graphics and networking.

The UNIX operating system is only one of the high-powered operating systems we offer. And we put our full service organization behind all of them. We're ready to answer questions and to work with both end users and OEMs to find the best solution for any particular application.

There's never been a better time. Let HP help bring your computing ideal to reality. Sound interesting? Call your local HP sales office right now about the UNIX operating system. Or write to Hewlett-Packard, Attn. Pat Welch, Dept. 003194, 19447 Pruneridge Ave., Cupertino, CA 95014. In Europe, contact Henk van Lammeren, Hewlett-Packard, Nederlands B.V., Dept.003194, P.O. Box 529, 1180 AM Amstelveen, The Netherlands.

Productivity. Not promises.

HEWLETT PACKARD

UNIX is a trademark of AT&T Bell Laboratories.

MICROCOMPUTERS

Continued from page 118

XT. The basic package consists of an XT with a monochrome monitor, 512K bytes of memory, a 10M-byte hard disk, an asynchronous adapter, a 128K- to 260K-byte diskette, a graphics printer, IBM DOS 2.0 and Quickplan. Prices start at $7,727. Prices for a color version start at $8,061.

American Computer Group, P.O. Box 68, Kenmore Station, Boston, Mass. 02215.

STEP ENGINEERING
PC7

Step Engineering has announced PC7, a turnkey engineering workstation based on the IBM Personal Computer.

PC7 links the Step-7 firmware integration test system, an engineering firmware and software package, with the IBM Personal Computer. The workstation can define bit-slice designs, assemble programs, format object code and debug micro code.

PC7 is priced from $10,000.

Step Engineering, 757 Pastoria, Sunnyvale, Calif. 94068.

PRINTERS/PLOTTERS/PERIPHERALS

SWINTEC CORP.
Compumate 2100

Swintec Corp. has announced the Compumate 2100, described as a letter-quality daisywheel printer.

Compumate 2100 is said to feature both parallel and serial ports, interchangeable daisywheels, underscoring, bold and shadow printing, superscripts and subscripts. It is a logic-seeking printer with a typical speed of approximately 20 char./sec.

The printer is compatible with a variety of microcomputer systems, the vendor said.

The Compumate 2100 printer is priced at $649.

Swintec, P.O. Box 421, 23 Poplar St., East Rutherford, N.J. 07073.

Martec Associates, Inc.
CP80/1

Martec Associates, Inc. has introduced CP80/1, an 80-col. dot matrix printer.

CP80/1 features friction tractor and adjustable tractor, plus Ascii character, italic and alphanumeric fonts, the vendor said. A software package enables CP80/1 to emulate an IBM 5152002 graphics printer, according to the vendor.

CP80/1's interface is compatible with Apple Computer, Inc., IBM and Radio Shack personal computers.

The printer costs $330.

Martec Associates, PPP Division, 1510 Jarvis Ave., Elk Grove Village, Ill. 60007.

BOARD-LEVEL DEVICES

GVC, INC.
GVC-16

GVC, Inc. has introduced a demand-paged, virtual memory multiprocessor board that uses National Semiconductor Corp.'s 16032 32-bit microprocessor.

GVC-16 features 10-MHz speed, 512K bytes of dual-ported memory with byte parity (expandable to 2M bytes), 32K bytes of erasable programmable read-only memory and compatibility with Intel Corp.'s Multibus, the vendor said.

GVC-16 costs $3,295.

GVC, 222 Third St., Cambridge, Mass. 02142.

AUXILIARY EQUIPMENT

SYNETIX, INC.
PC-Handler

Synetix, Inc. has introduced the PC-Handler, a peripheral said to link up to four IBM Personal Computers in a shared-resources network.

The product enables users to cut costs by sharing a printer, modem, hard disk or other peripheral. It offers two serial ports, four IBM-compatible parallel ports, a clock and calendar, spooling capability and disk emulation, Synetix said.

The product is offered with 64K bytes of memory, expandable to 512K bytes.

The PC-Handler is priced at $795.

Synetix, 10635 N.E. 38th Place, Kirkland, Wash. 98033

BMH CO., INC.
Addtrace 1

BMH Co., Inc. has introduced Addtrace 1, a microprocessor machine language programming and troubleshooting aid.

Addtrace 1 monitors an address bus, enabling the user to trace the path of a program, the vendor said. The product allows observation of pulse duration and timing relationships with up to six control signals for each digit selected over full 64K-byte memory sections.

Addtrace 1 costs $199.50.

BMH, 224 Vassar St., Reno, Nev. 89502.

SOFTWARE

UNIFY CORP.
Unify

Unify Corp. has announced that Unify, its relational data base management system, is available for Apple Computer, Inc.'s Lisa 2.

The program features application development tools, such as Sequel 2,

If you're looking for a UPS system that will fit into small spaces, Exide Electronics has exactly what you need. The Exide Electronics Series 1000 UPS.

The fact is, many "small" UPS systems aren't really that small in size, especially when you consider the power they offer. And even if they could fit into available space they may not blend well with your environment.

Not the Series 1000 UPS. It packs a lot of power (3KVA) into a neat, space saving package. It's designed to fit *and* blend into the workplace. It's also designed to fit into your budget because in addition to its small size we gave it a small price (under $6,000).

Another nice thing about the Series 1000 UPS is its speedy delivery. If you need one right away you won't have to wait a month or even a week. It'll be on its way to you within 24 hours. And the Series 1000 will soon be available in 1.5KVA and 5KVA.

The Exide Electronics Series 1000 UPS. It's what small UPS systems should have been in the first place.

To: Exide Electronics, c/o Richard Weil,
PO Box 58189, Raleigh, NC 27658
☐ Please send us more information on the Series 1000 UPS.
☐ Please have a salesman call.
Name _____
Title _____
Company _____
Address _____
City _____
State _____ Zip _____
Telephone _____

EXIDE ELECTRONICS

P.O. Box 58189, Raleigh, NC 27658; 919/872-3020, TWX 510-928-0598
In Canada, 5200 Dixie Rd., Suite 20, Mississauga, Ontario L4W1E4

Weights listed are approximate and include smallest, standard battery (Slate, 15 min; Topaz, 20 min; Exide Electronics, 5 min) according to published literature of the manufacturer available at time of ad preparation. Battery size and weight may vary depending on system requirements. Illustrations show typical configurations and are scaled based on smallest, standard system configuration and battery dimensions according to published literature of manufacturer available at time of ad preparation. Battery housing of system may vary depending on system requirements.

MICROCOMPUTERS

C and RM Cobol interfaces; form generation capability; a query-by-form feature; and report generation and security features, the vendor said.

Unify requires 256K bytes of random-access memory, a 5M-byte hard disk and a version of Unix that works on the Lisa.

The package costs $1,995.

Unify, 9570 S.W. Barber Road, Portland, Ore. 97219.

ALLOY COMPUTER PRODUCTS, INC.
TIP-Six

Alloy Computer Products, Inc. has enhanced the software that operates its PC Backup tape cartridge backup system. The enhancement, called TIP-Six, will be bundled in with all new models of PC Backup.

According to the vendor, the 16-bit TIP-Six provides automatic subdirectory backup, date and time stamping of files and selective backup based on file names.

PC Backup runs under IBM's PC-DOS and Digital Research, Inc.'s CP/M 86 operating systems. TIP-Six will be available free of charge to TIP-Four-based PC Backup users who purchased their systems this year prior to the introduction of TIP-Six. Users of PC Backup models purchased over the last three to four years will be able to upgrade to TIP-Six at a cost of $50.

Alloy Computer Products, 100 Pennsylvania Ave., Framingham, Mass. 01701.

INTERNATIONAL ELECTRONIC MACHINERY, INC.
Fortran-77 compiler

International Electronic Machinery, Inc. has introduced a Fortran-77 compiler for Hewlett-Packard Co. Series 200 desktop computers.

According to the vendor, the product was developed for the HP 9816, 9826 and 9836 computers.

The compiler is priced at $1,200 in the U.S. and Canada and $1,500 elsewhere.

International Electronic Machinery, P.O. Box 1818, Fort Collins, Colo. 80522.

ASPECT
GL/M

Aspect has announced the Graphics Language for Microcomputers (GL/M) for the IBM Personal Computer.

With GL/M, users can create customized graphics on a variety of daisywheel and dot matrix printers.

GL/M comes in 5¼-in. or 8-in. formats for Digital Research, Inc. CP/M and CP/M 86 and IBM PC-DOS operating systems. Any Diablo Systems, Inc.-compatible daisywheel printer can be used.

GL/M is priced at $195, the vendor said.

Aspect, 167 Worcester St., Wellesley, Mass. 02181.

FUTURE COMPUTING, INC.
Software Perspectives 84

Future Computing, Inc. has announced Software Perspectives 84, a portfolio of reports, newsletters and industry forums focusing on the office personal computer software marketplace.

The portfolio includes five specialized monthly newsletters, including "Softwareviews," "Officeviews," "Homeviews," "Retailviews" and "Technologyviews." Each 16-page issue focuses on a key segment of the personal computer industry, the vendor said.

The package also includes access to Officebase, an inquiry service, and two reports, *Office Personal Computers: A Market Overview* and *Office Personal Computers: Software.*

Software Perspectives 84 is priced at $7,500 till June 1, after which the price increases to $9,000.

Future Computing, 800 Canyon Creek Center, Richardson, Texas. 75080.

SMOKE SIGNAL BROADCASTING, INC.
CCSM

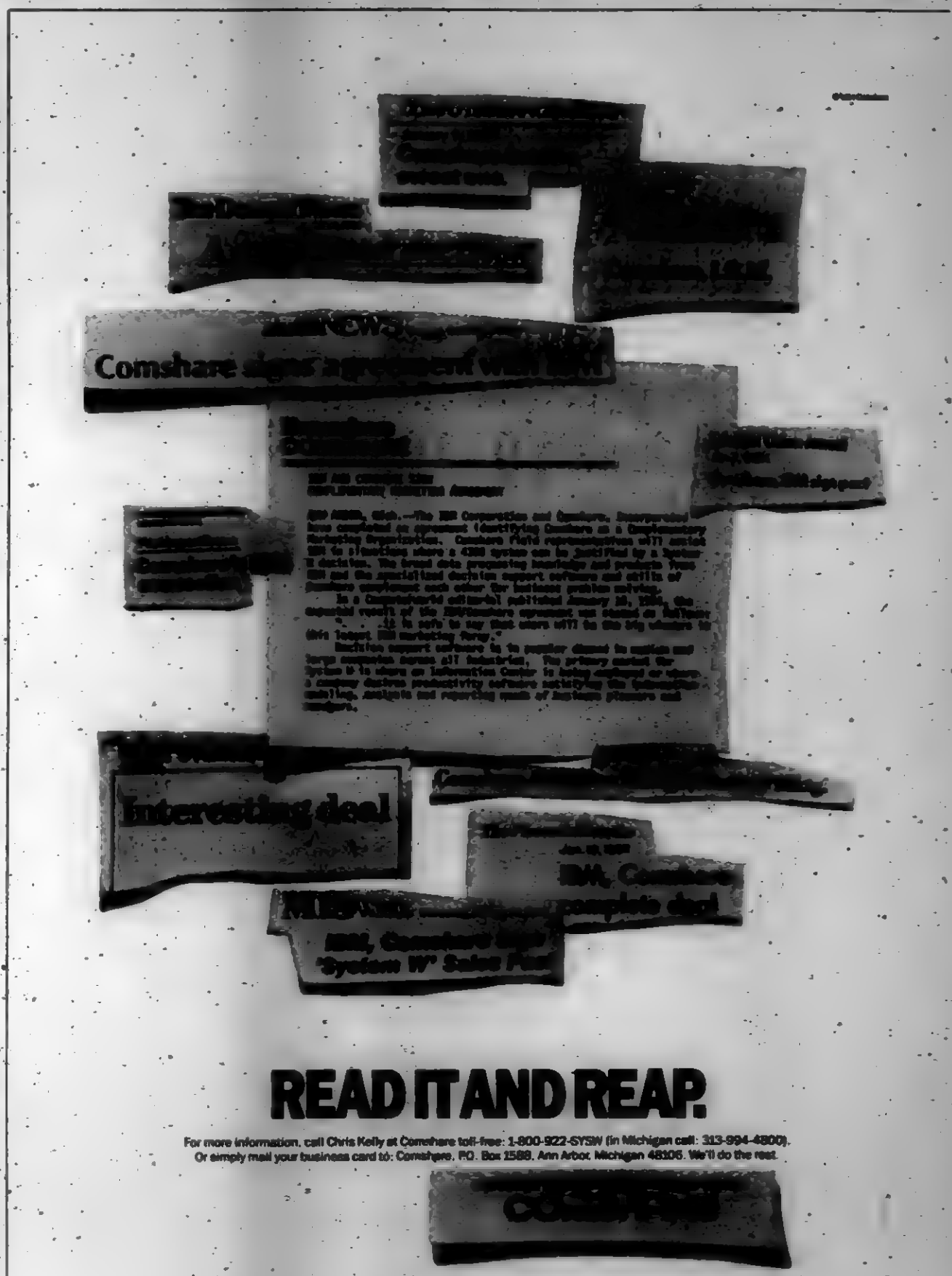
Smoke Signal Broadcasting, Inc. has announced that Comp Consultants Standard Mumps (CCSM) is available for its entire line of high-performance, multiuser, multitasking microcomputers.

The price for CCSM is $800, according to a vendor spokesman.

A complete system from Smoke Signal with one terminal, 16 I/O ports and 40M bytes of disk storage is priced under $13,500, according to the spokesman.

Smoke Signal, 31336 Via Colinas, Westlake Village, Calif. 91362.

See TRENDS page 124



MICROCOMPUTERS

TOOLS from page 123

MICRO SOFTWARE ASSOCIATES, INC.
Practicalc II

Micro Software Associates, Inc. has announced Practicalc II, a spreadsheet that runs on Apple Computer, Inc.'s Apple II+ and Apple IIe. Practicalc features word processing capabilities, advanced editing, variable column width and upper- and lowercase entry. The program features alphanumeric search and sorting, prompts for entry during calculation and printing of list formulas.

Practicalc II costs $69.95

Micro Software Associates, The Silk Mill, 44 Oak St., Newton Upper Falls, Mass. 02164.

DA-TECH CORP.
DA-6502B

Da-Tech Corp. has announced DA-6502B, a circuit emulator that facilitates software development for microcomputers using Moss Technology, Inc. 6502 microprocessors.

The system supports applications such as breadboard debugging, software debugging, production testing, training and field service, the vendor said. The emulator can perform read and write diagnostics on any preselected range of user random-access memory (RAM), provide a minimum check sum on user memory space and download diagnostic code from the emulator to user RAM.

DA-6502B costs $595.

Da-Tech, 92 Steamwhistle Drive, Ivyland, Pa. 18974.

WYSE TECHNOLOGY, INC.
Wyseword on WY-300

Wyse Technology, Inc. has announced that its firmware package Wyseword will now run on its WY-300 color display station.

It is said to simplify the keyboard operation of Micropro International Corp.'s Wordstar by reducing multiple keystroke commands, allowing the use of all editing keys.

The WY-300 display station features an 80-col., high-resolution, eight-color display and contains a soft character generator that allows up to 256 custom symbols to be loaded from the host computer. It also includes a predefined set of symbols that are stored permanently in read-only memory, which are loaded into the soft character generator automatically upon power-up, according to the vendor.

The WY-300 and Wyseword are priced at $1,295 and $100, respectively.

Wyse Technology, 3040 N. First St., San Jose, Calif. 95134.

MICRO ARCHITECT, INC.
IOAS-3

Micro Architect, Inc. has introduced an Integrated Office Automation System (IOAS) for the IBM Personal Computer, Personal Computer XT and compatibles.

According to the vendor, the IOAS-3 consists of a data base manager, a word processor and a spreadsheet. The system requires 128K bytes of memory and any version of the IBM PC-DOS. It is available in three versions: IBM Personal Computer XT, PCjr with monitors and PCjr with TV display. Both monochrome and color monitors are supported.

The IOAS-3 is priced at $199. A demonstration diskette is available at a cost of $15 for the Personal Computer XT version and $9 for the IBM PCjr monitor version.

Micro Architect, 6 Great Pine Ave., Burlington, Mass. 01803.

CENTERPOINT COMPUTER APPLICATIONS
Sign-Plot

Centerpoint Computer Applications has introduced a plotter program for the IBM Personal Computer that allows the user to produce six different letter font styles as well as custom fonts and symbols.

Called Sign-Plot, the program includes upper- and lowercase characters, punctuation and numbers in each font style as well as vertical and horizontal positioning of text.

Sign-Plot is designed to drive a variety of pen plotters, including models from Hewlett-Packard Co.; Houston Instruments; Enter Computer, Inc.; Amdek; Strobe, Inc.; Mannesman Tally Corp.; Apple Computer, Inc.; and California Computer Products, Inc. It requires 128K bytes of memory and two disk drives. Sign-Plot is priced at $149.

Centerpoint, 500 N. Michigan Ave., Chicago, Ill. 60611.

DATAPRO RESEARCH CORP.
Software directories

Datapro Research Corp. has introduced three new software directories.

The three directories are for Apple Computer, Inc.'s Apple II, II+, IIe and III; the IBM Personal Computer, Personal Computer XT and compatible systems; and a Digital Research, Inc. CP/M guide to software for more than 130 different microcomputer systems compatible with CP/M.

Each directory is priced at $19.95.

Datapro Research, 1805 Underwood Blvd., Delran, N.J. 08075.

LOGICAL SOFTWARE, INC.
Menulogic

Logical Software, Inc. has introduced Menulogic, a software product that allows users of the IBM Personal Computer to custom-design full screen menus.

According to the vendor, menus can be created using the full Ascii character set, including graphics characters with color, intensity and blinking.

If you sell large systems software — quick — what will all your prospects be doing on June 20, 1984?

They'll be looking through a great new reference guide to software vendors — the *Computerworld Buyer's Guide to Large System Software* being published on June 20. And you'll definitely want to be there.

Look at what the Buyer's Guide gives you:

You get a large audience with heavy purchasing responsibilities — more than 114,000 paid *Computerworld* subscribers in the U.S. These subscribers are concentrated in the large professional computer-using organizations that control 84% of DP/MIS spending in 1983 — $72.2 billion. And research shows these subscribers have a significant degree of purchase decision influence — ask your Buyer's Guide sales representative to show you the *Computerworld* reader profile for details.

Look at what the Buyer's Guide gives buyers:

They get a one-source, comprehensive listing of purchase information about applications, DBMS, and systems and utility software for use with mainstream data processing systems. They get two kinds of listings — vendor listings and product offerings. And, they get a whole range of feature articles and tutorials covering new technology, large system software trends and buying techniques.

Now that you know where software buyers are going to go next June, you can arrange to be there with an ad for your product or service — right when they're researching vendors! Ad deadline is May 4. To reserve space in this issue, call one of the sales offices listed below or call Ed Marecki, National Sales Director or Kevin McPherson, Product Manager.

To: Ed Marecki, National Sales Director.
CW Communications
Box 880
Framingham, MA 01701

☐ Please send me advertising information for Buyer's Guides.
☐ Please have a sales representative call me.

Name _____
Title _____
Company _____
Address _____
City _____ State ____ Zip ____
Telephone _____
BGS/84

COMPUTERWORLD BUYER'S GUIDE

Sales Offices
BOSTON/Chris Lee, Bill Cadigan, Alice Longley (617) 879-0700
CHICAGO/Chris Lee, Bill Cadigan, Jean Broderick (312) 827-4433
NEW YORK/Mike Masters, Tom Flynn, Gale M. Paterno (201) 967-1350
ATLANTA/Mike Masters, Tom Flynn (404) 394-0758
SAN FRANCISCO/Bill Healey, Beverly Rans (415) 421-7330
LOS ANGELES/Bill Healey, Ruth Gordon (714) 261-1230

MICROCOMPUTERS

Menulogic runs under IBM's PC-DOS 1.1 or 2.0 or the USCD P-system, requires 64K bytes of random-access memory and uses either monochrome or color display.

Menulogic, on diskette with a user's manual, is priced at $45.

Logical Software, 15731 Dalesport Circle, Dallas, Texas 75248.

DATA GENERAL CORP.
DBC to market Friday!, Dbase II

Data General Corp. has announced it will market two Ashton-Tate programs, Friday! and Dbase II, for use on its Desktop Generation computers.

Friday! is an electronic file management system said to provide integrated file capability. Dbase II is a relational data base management system.

Friday! is being offered by Data General for $295, in a Microsoft, Inc. MS-DOS version only. Dbase II is being offered in MS-DOS and Digital Research, Inc. CP/M 86 versions, both priced at $695.

DG, 4400 Computer Drive, Westboro, Mass. 01580.

ARTEMIS SYSTEMS, INC.
Metalogic

Artemis Systems, Inc. has announced Metalogic, a three-dimensional graphics program for users of the Apple Computer, Inc. Apple II+ and Apple IIe microcomputers.

A vendor spokeswoman said Metalogic is a set of ampersand commands that interface Basic programs to Sublogic Corp.'s A2-3D2 interpreter system to produce three-dimensional color graphics. By embedding "&" statements in a regular Basic program, individual objects or complex animated scenes can be generated.

The system requirements are the Sublogic A2-3D2 interpreter, Apple II+ with 16K-byte random-access memory card or Apple IIe and Apple DOS 3.3 operating system.

Metalogic is priced at $75 separately, or $180 for Metalogic plus the complete A2-3D2 graphics package.

Artemis Systems, 41 Parkview Drive, Millburn, N.J. 07041.

COMPUCORP
Level E Omega

Compucorp has announced Level E Omega, the latest version of its Omega office automation software for Compucorp's 600 and 700 series processors, in stand-alone or local-area network configurations.

The vendor said 14 improvements and 11 new features have been included with Level E Omega. The package includes word processing, mathematical calculations, forms creation, data entry, index access and data base management functions.

The enhancements and additions reportedly include an instant page format feature that can restructure an entire document even when only one page is format-changed, the ability to edit independent columns of text with right justification and proportional spacing and a phonetic speller feature that will search for a word after allowing the operator to spell the word phonetically, according to the vendor.

The standard Level E Omega package is priced at $650 for each stand-alone processor, according to a spokesman. Compucorp also charges a software license fee of $595 for each new retail customer.

Compucorp, 3211 Michigan Ave., Santa Monica, Calif. 90404.

SMC SOFTWARE SYSTEMS
Thoroughbred/OS

SMC Software Systems, a division of Science Management Corp., has announced the availability of Thoroughbred/OS on the IBM Personal Computer XT.

The vendor said the new software will allow users of the IBM computer, as well as other computers that support Microsoft, Inc.'s MS-DOS or PC-DOS, to run all business applications programs written in Basic Four Corp.'s Business Basic. The retail price of the software is $795.

SMC Software Systems, 1011 Rt. 22, Bridgewater, N.J. 08807.

SCHUHARDT SOFTWARE SYSTEMS, INC.
Intesoft series

Schuhardt Software Systems, Inc. has introduced the Intesoft series, a system for the IBM Personal Computer that allows office automation software packages to be used as independent modules or as an integrated system, according to the vendor.

The components of the Intesoft series are the Intenate, an integration and application management system, and Inteword, a word processing system. Intevate, an interactive applications generator, will be available by June. Intenate costs $249, Inteword is $295, and Intevate will be $249.

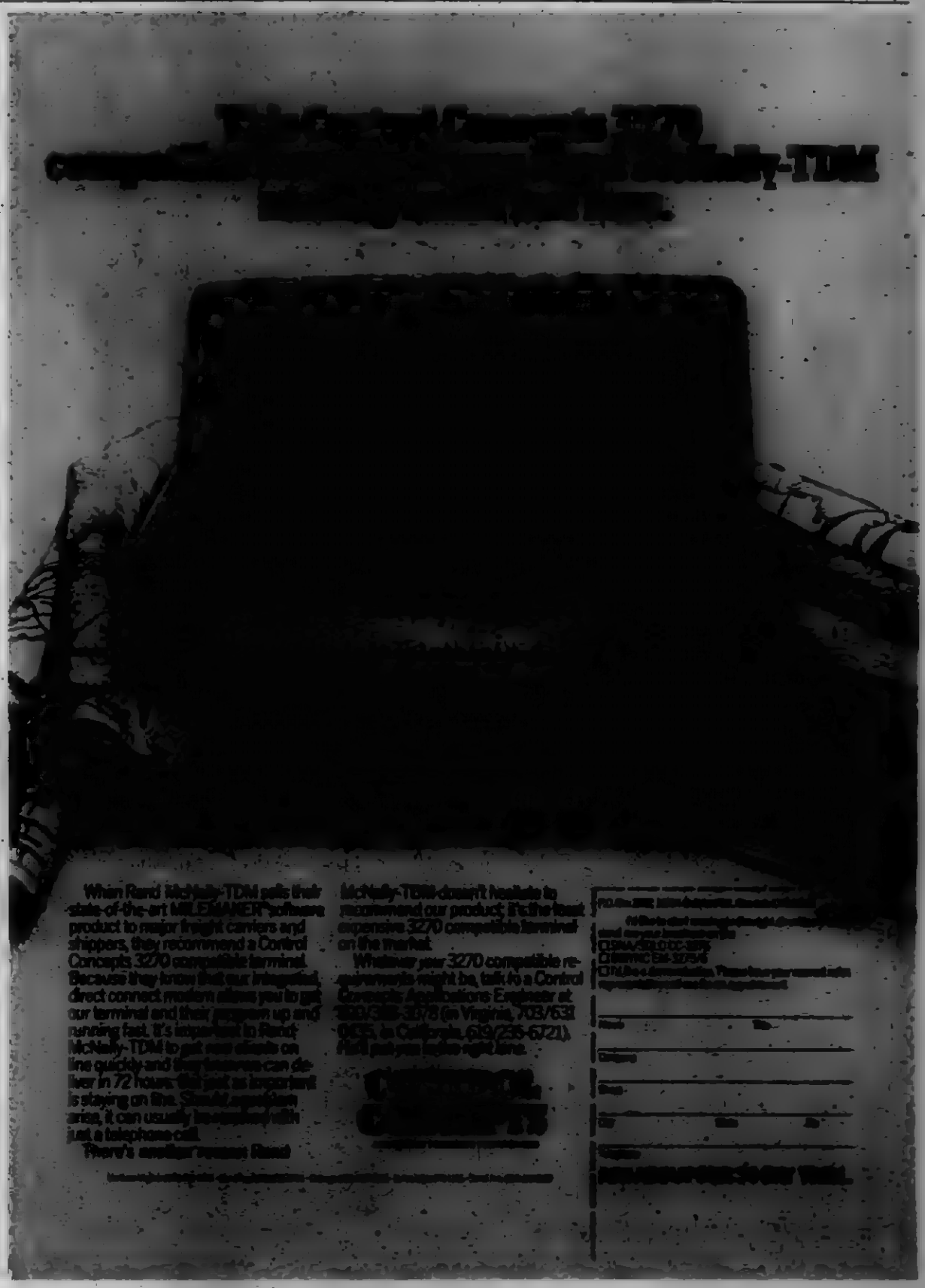
Schuhardt Software Systems, 515 Northgate Drive, San Rafael, Calif. 94903.

KRONOS, INC.
IBM PC Terminal Emulator, High Level Communications Interface, File Transfer, Host Emulator

Kronos, Inc. has introduced four software modules designed to facilitate the integration of the vendor's Timekeepers product, a stand-alone dedicated microcomputer for time accounting use.

One module, the IBM PC Terminal Emulator, provides emulation capabilities for users who prefer to use an IBM Personal Computer instead of a local video terminal with the Timekeepers unit. Use of a Personal Computer reportedly enables the user to write the time and attendance data in the Timekeepers' memory to diskette for permanent storage.

Continued on page 126



MICROCOMPUTERS

Continued from page 126

The High-Level Communications Interface module is said to provide programmers with a library of communications routines that implements the vendor's error-protected protocol.

The File Transfer package reportedly allows the user to transfer employee data from multiple remote Timekeepers to an IBM Personal Computer at a central location via telephone lines using the error-protected protocol.

The IBM PC Host Emulator module is a menu-driven program said to allow users to access reports available from Timekeepers. The software prompts users by asking them what function they would like to perform, then accesses its own programs automatically to perform the task.

IBM PC Terminal Emulator is priced at $180. High-Level Communications Interface costs $360. File Transfer, which includes the terminal emulator and communications interface modules, costs $540. The IBM PC Host Emulator, including the three other modules, costs $720.

Kronos, 62 Fourth Ave., Waltham, Mass. 02154.

ENERTRONICS RESEARCH, INC.
Energraphics version

Enertronics Research, Inc. has introduced a new version of Energraphics, a graphics software package that combines business graphics, statistical analysis, drawing functions, word processing, symbol and font generation, presentation and three-dimensional plotting of surfaces.

The vendor said the new version allows for rotation and movement of entire regions of the screen, providing 1,000-times zoom magnification.

Energraphics runs on the IBM Personal Computer and Personal Computer XT and compatibles. It requires 128K bytes of random-access memory and an adapter board. It costs $360 and is $450 with the plotter.

Enertronics Research, Suite 207, 150 N. Meramec St., St. Louis, Mo. 63105.

FORTE DATA SYSTEMS, INC.
Forte-Call

Forte Data Systems, Inc. has announced Forte-Call, a software package to tie remote personal computers and terminals into an organization's mainframe-based network.

The vendor said Forte-Call requires an IBM Personal Computer or Personal Computer XT equipped with either of Forte's 3270 emulation boards: Forte PJ or Forte PC78-2. The boards allow the computer to emulate an IBM 3278 or 3279 terminal when linked to an IBM mainframe.

Forte-Call is software-based and requires no additional hardware to operate. It is priced at $295.

Forte Data Systems, 1500 Norman Ave., Santa Clara, Calif. 95050.

STAFF COMPUTER TECHNOLOGY CORP.
The Key

Staff Computer Technology Corp. has introduced a computer security device that reportedly can be used with any computer with an RS-232 serial port.

The Key is a hardware module designed to prevent software piracy, a vendor spokesman said. The interactions of The Key and the software are used to form inquiry/response pairs. The use of many inquiry/response pairs reportedly enhances the security.

The Key sells for $210 each in quantities from one to 99 and for $195 in quantities of 100 or more, the spokesman said.

Staff Computer Technology, P.O. Drawer B, Del Mar, Calif. 92014.

MYCROFT LABS, INC.
Compat

Mycroft Labs, Inc. has introduced Compat, a utility that allows an Otrona Corp. Attache portable microcomputer to copy files to and from various manufacturers' 5¼-in. disk formats.

The utility allows the user to copy from Otrona to another implemented manufacturer's format, copy to Otrona format from another manufacturer's format and copy between two non-Otrona formats.

Compat reads the following implemented MS-DOS or PC-DOS 5¼-in. diskette formats: single-sided, 8-sector; single-sided, 9-sector; double-sided, 8-sector; double-sided, 9-sector.

The list price of Compat for the Otrona Attache is $195, which includes a program disk and a reference manual.

Mycroft Labs, P.O. Box 6045, Tallahassee, Fla. 32314.

AXELSOFT
Cross/file

Axelsoft, a software division of Axel Johnson Corp., has announced Cross/file, a combination file editor/reformatter.

Cross/file eliminates the need to retype information into standard personal computer application programs from external sources (such as mainframe computers, incompatible microcomputers and commercial data bases), according to the vendor.

Axelsoft said that with Cross/file, the user can pick up any information displayed on the screen. Type of file format becomes irrelevant, the company said, and any kind of communication protocol can be used as long as the communication program is able to store standard Ascii files on disk.

Cross/file was designed to allow the use of data from other computers as input to standard spreadsheet, data base, business graphics or word processing programs. It is available in Microsoft, Inc.'s MS-DOS and Digi-

MICROCOMPUTERS

tal Research, Inc.'s CP/M 80 and 86 versions. It is compatible with Visicorp's Visicalc, Lotus Development Corp.'s 1-2-3, Microsoft's Multiplan and several other application programs, according to Axxisoft.

The program can be used with the IBM Personal Computer and Personal Computer XT, the Digital Equipment Corp. Rainbow, the Wang Laboratories, Inc. Professional Computer, the Panasonic Co. Personal Computer or the Ericsson Step/one.

Cross/file is priced at $195, the vendor said.

Axxisoft, Axel Johnson, 666 Howard St., San Francisco, Calif. 94105.

JMI SOFTWARE CONSULTANTS, INC.
Bastoc 1.4

JMI Software Consultants, Inc. has introduced a new version of Bastoc, a software tool that provides Basic facilities on Unix and other systems supporting C compilers.

The vendor said Bastoc 1.4 translates programs written in one of several varieties of Basic to C language. It also now supports the complete Microsoft, Inc. Disk Basic dialect.

Binary versions are available for the IBM Personal Computer (PC-DOS, Co-Idris), the Radio Shack TRS-80/16 (Xenix), Idris on the Digital Equipment Corp. PDP-11 and Motorola, Inc. MC68000, Unix Versions 6 and 7 on the PDP-11 and the Apple Computer, Inc. Lisa (Uniplus). Any system supporting a standard C compiler is a potential host for Bastoc. Single-quantity price for Bastoc 1.4 is $350.

JMI Software Consultants, 1422 Easton Road, Roslyn, Pa. 19001.

THE SANTA CRUZ OPERATION, INC.
Xenix for Lisa 2

The Santa Cruz Operation, Inc. has announced that it will offer Microsoft, Inc.'s Xenix operating system for use on the Apple Computer, Inc. Lisa 2 microcomputer.

Other Xenix-compatible applications packages offered include the Multiplan Electronic Worksheet, the Uniplex word processing system, the Informix relational data base management system, Level II Cobol and the Forms 2 and Animator Cobol development tools, the vendor said.

The Xenix operating system is available for $795. The company also offers the Xenix Software Development System for $595, the Xenix Test Processing System for $495 or all three systems for $1,495.

The Santa Cruz Operation, P.O. Box 1900, 500 Chestnut St., Santa Cruz, Calif. 95061.

CLEAR SYSTEMS
Calendar/1

Clear Systems' Calendar/1, a program that prints or displays calendars of events in a standard, graphics monthly format, is now available for the IBM Personal Computer operating under PC-DOS or compatible systems.

Calendar/1 can be used as an appointment book and production schedule for one or many people and/or tasks. Multiple calendars are kept separate or can be merged into a master calendar. Files of annual events can be automatically merged with files of one-time-only events.

In addition, calendars can be tailored to the needs of the individual or organization by means of a parameter file that gives the user control over all options and defaults, including size, format and printer characteristics, the company added.

Calendar/1 is priced at $95.

Clear Systems, Suite 404, 309 Santa Monica Blvd., Santa Monica, Calif. 90401.

SYSTEM/Z, INC.
Basic/z enhancement

System/z, Inc. has announced a new version of its Basic/z compiler.

The enhanced compiler offers file locking, record locking and support for multiple devices, the vendor said. The compiler supports cursor positioning, screen attributes, input masking, screen editing of console input at run time, alphanumeric labels, user-defined functions and a program editor that tests syntax as the user types, according to the vendor.

It works with Digital Research, Inc.'s CP/M, MP/M II, CP/M 80 and CP/M 86 and Musys Corp.'s Turbodos operating systems and costs $345.

System/z, P.O. Box 11, Richton Park, Ill. 60471.

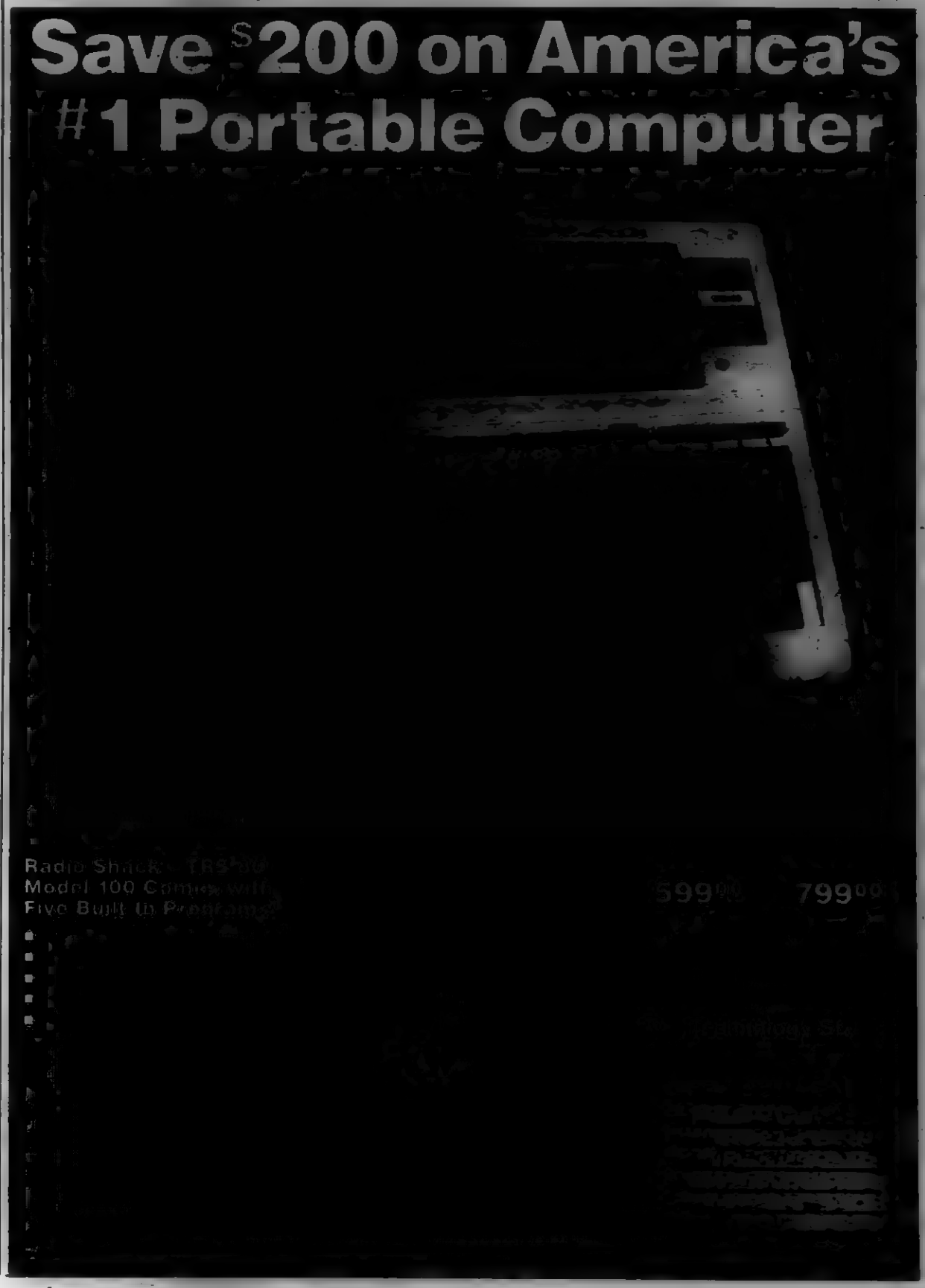
DIVERSIFIED DATA RESOURCES, INC.
Acom; Acomft; Acomhft

Diversified Data Resources, Inc. has announced the Acom program, which reportedly provides error-free data transfer from personal computer to personal computer or from personal computer to host mainframe. According to the vendor, Acom transmission is error-free, even if a line is dropped, a plug pulled or a modem jarred during file transfer. Three versions of Acom are available.

Acom, a terminal emulator with no file transfer capability, allows an IBM Personal Computer or Personal Computer XT to emulate IBM 3277, 3278 or 3279 terminals. No protocol converter is required to allow an IBM Personal Computer XT to emulate a Digital Equipment Corp. VT52 or VT100 terminal, the vendor said.

Acomft permits an IBM Personal Computer XT to transmit files to another IBM Personal Computer XT, according to a spokesman for Diversified Data Resources. Acomhft is said to be the mainframe software required for Acomft to transmit or receive Vsam, Isam or SAM files to or from an IBM or compatible

Continued on page 130



Shopping for intelligent terminals needn't be a compromise between price and performance. Consider the standards of the Ovation™ 1041 and 1051.

Both terminals feature low-profile, detached keyboards with soft set-up and non-volatile RAM. User-programmable function keys. 14-key numeric pads. User-selectable keyclick, capacitance switches and screen-saver features to name a few.

Naturally, the VDTs swivel and tilt at a finger's touch. 12-inch non-glare video displays are standard (15-inch displays are available too).

Add two industry standard communication ports, standard VT™-132/VT™-220, or custom emulations and 128 ASCII characters. Plus a broad range of graphics characters to cover the most demanding applications.

But the Ovation 1051 goes even further.

It also includes an 80 or 132 column display providing high resolution characters. Variable speed smooth scrolling. 16 user-programmable function keys (32 with shift). 256 graphics characters. Standard 32 Kbytes of RAM that can be upgraded to 64K.

There's more.

The Ovation Series™ features a broad range of custom options. Like custom functionality, firmware, keycaps, colors, even a private label option.

All things considered, you won't find better terminal values no matter where you shop.

To find out more about the Ovation 1041 and 1051, call your local Zentec sales office today.

Zentec Corporation · 2400 Walsh Avenue · Santa Clara, CA 95050 · (408) 727-7662
Zentec Sales Offices:
San Francisco · (408) 727-7662 **Los Angeles** · (213) 822-0278
Chicago · (312) 692-2240 **Boston** · (617) 890-7915
Philadelphia · (609) 983-3078 **Dallas** · (214) 690-9265
Fort Lauderdale · (305) 684-8898 **Atlanta** · (404) 956-0311
London · (011) 44-990-23377 or 26879

™Ovation and Ovation Series are trademarks of Zentec Corporation.
™VT is a trademark of Digital Equipment Corporation.
© 1984 Zentec Corporation.

ZENTEC

MICROCOMPUTERS

Continued from page 127

host CPU. Acom, Acomft and Acomhft costs $120, $240 and $3,000, respectively.

Diversified Data, Suite 7, 35 Mitchell Blvd., San Rafael, Calif. 94903.

CHAMPS, INC.
Champs/A and Champs/E

Two programs designed to standardize information handling and print reports for athletic and activity office administrators have been introduced by Champs, Inc.

Champs/A categorizes information for scheduling, calendars and contracts. Champs/E provides a system for maintaining up to 25 items of student information. They are written for Apple Computer, Inc. and Radio Shack TRS-80 micros. Prices are $395 each; a 5% discount applies when buying both.

Champs, P.O. Box 24054, Apple Valley, Minn. 55124.

GRAPHIC COMMUNICATIONS, INC.
Graphwriter

Graphic Communications, Inc. has introduced Graphwriter, a graphics software package for creation of 35mm slides which supports Polaroid Corp.'s Palette 35mm slide producer.

According to the vendor, Graphwriter produces graphs and charts for business presentations and reports. The package includes 24 different format programs, capable of producing over 50 graphs.

The product is available for the IBM Personal Computer and the Digital Equipment Corp. Rainbow under the Softech Microsystems, Inc. P-system.

Graphics Communications is offering the Graphwriter combination set — normally $595 — and the Polaroid Palette Image Recorder — $1500 — for $1895.

Graphic Communications, 900 Fifth Ave., Waltham, Mass. 02154.

INNOVATIVE SOFTWARE
Total Information Management IV

Innovative Software has announced Total Information Management (TIM) IV, an enhanced version of its data base manager program for the IBM Personal Computer and compatibles.

The vendor said the major enhancements to TIM IV allow transfer of data among files while performing calculations and/or accumulating totals in a separate but related file.

TIM IV runs under PC-DOS on IBM Personal Computers and under Microsoft Inc.'s MD-DOS on compatibles, requiring 128K bytes of random-access memory (RAM) and two disk drives. It also runs under Digital Research, Inc.'s CP/M and MP/M with two disk drives and 64K bytes of RAM. It costs $495.

Innovative Software, No. 380, 9300 W. 110th St., Overland Park, Kan. 66210.

INNOVATIVE SOFTWARE
Fast Graphs Version 2.0

Innovative Software has announced Version 2.0 of Fast Graphs, a package for IBM's Personal Computer.

The vendor said Version 2.0 enhancements include smoother curves and a plotting speed five times faster than the earlier version.

Fast Graphs can plot four different charts on one sheet of paper, with the combined use of up to 16 patterns and eight colors, three character

Continued on page 131

THE PRINTER TO PICK WHEN THE PACE QUICKENS.

It's happening all over the PC and micro worlds.

You're getting hit with a ton of increased throughput requirements. Your applications are generating a deluge of paper. You need more printer speed. A lot more.

You're also looking for more professional-looking presentations so you need better print quality. A lot better.

Who's got the best of both worlds for you?

Okidata's Pacemark 2350 and 2410 dot matrix printers.

They'll not only help you *keep* pace with your world, they'll help you set new and exciting ones. In print speed. In print quality. And in vastly increased compatibility and capability.

Take throughput. The 2350 and 2410 can quickly get you out of the waiting game to where you're *really* cranking it out. And with flexibility, too: up to 5 pages per minute.

But wait. Cranking *what* out, you may ask? A single, restrictive printing mode? No way. The 2410 can give you DP, draft, and a correspondence quality that truly rivals the daisywheel.

And the 2350 and 2410 can both print at up to 350 cps. While producing 120 to 420 lines a minute for you. With bidirectional printing and short line seeking logic. And both high speed horizontal and vertical slew.

PC COMPATIBILITY.
SOFTWARE COMPATIBILITY.

The 2350 and 2410 use industry standard interfaces making them hardware compatible with most mini and microsystems on the market today. In addition, they are supported on the menus of most of the important software being offered to microsystem users like Visicalc, Lotus 1, 2, 3, DBASE 2, Peachtree 500 and General Ledger, MultiMate WP, Wordstar, etcetera, etcetera.

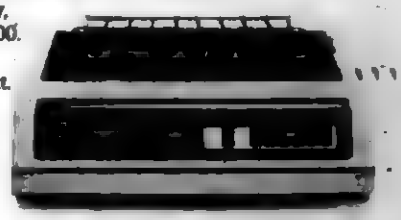
But wait, there's more. Like an outstanding all points addressable graphics capability with 144 x 144 dots per inch resolution.

Two color printing for highlighting. Down line loadable font sets for flexibility. Subscripts and superscripts so your scientific and technical usage won't bog down. Six-part forms handling. The capability to print 132 columns on eight-inch paper using 17.1 characters per inch to save paper costs and make output easier to handle.

And—so that you can depend on getting all that good stuff, all the time—a mean time between failure of 2200 hours. A mean time to repair of only 30 minutes. An average printhead life of 500,000,000 characters. And an industry low warranty claim rate of less than 2%.

No doubt about it, the quicker the pace at your place, the more you need Pacemark from our place. For more information, call toll free 1-800-OKIDATA.

In New Jersey, 609-235-2600.
Or write OKIDATA, Mt. Laurel, NJ 08054.



OKIDATA
an OKI AMERICA company

We're keeping pace with your business.

EASY
from page 117

their use. If any company buys 300 copies of a module, we will work with it to tailor the module to its needs."

Communications capability will be added when Lotus' Symphony is released.

The first 32 applications will be available in April; 20 additional applications will be ready by June, according to Boyd. "By the end of the year, there will be 200 functions available," he claimed.

Each Optionware module costs $300 from DSS Development, located at Corporate Place, 4 Barnard Lane, Bloomfield, Conn. 06002.

CORONA
from page 117

er for personal computers at Docutel Olivetti. Christianson estimated that Docutel Olivetti has sold 5,000 Corona IBM-compatible computers since the OEM agreement last November.

Corona plans initial PPCXT shipments this month.

Continued from page 130

sizes for explanatory text and the use of footnotes.

Fast Graphs can be used with data from Visicorp's Visicalc;. Microsoft, Inc.'s Multiplan; Lotus Development Corp.'s Lotus 1-2-3; Sorcim Corp.'s Supercalc; or Innovative Software's Fast Facts and TIM IV. It is available for the IBM Personal Computer and compatibles, running under PC-DOS with two disk drives or hard disk, 128K bytes of random-access memory, a graphics interface card or monochrome card and monochrome monitor. Version 2.0 costs $350.

Innovative Software, No. 360, 9300 W. 110th St., Overland Park, Kan. 66210.

GENERAL ELECTRIC INFORMATION SERVICES CO.

Merlin application software

The General Electric Information Services Co. has announced that it will market over 40 microcomputer-based banking applications programs from Micro-Sharing, a new division of Merlin Information Systems, Inc.

The software will be sold on a subscription basis to large, regional banks, which will in turn remarket the software on a monthly subscription basis to smaller banks, according to the vendor. The arrangement would permit smaller banks to use the Merlin Information Systems banking software without paying the usual purchase price of more than $30,000 for the product.

The software will be downloaded to subscribing regional banks via the GE Mark III teleprocessing network and will run on IBM Personal Computers and Personal Computer-compatible machines.

Subscriptions are priced at $250 per month, with a minimum order of 20 per institution required.

GE Information Services, 401 N. Washington St., Rockville, Md. 20850.

DATANEX, INC.

Barr/Hasp

Datanex, Inc. has introduced Barr/Hasp, a communications package for the IBM Personal Computer.

The product, oriented to high-speed, bulk transfer of data, has remote job entry (RJE) capabilities. Barr/Hasp can move periodic transaction batches, RJE jobs, programs, messages, object files and executable files. An unattended mode allows the IBM micro to pick up or deliver information to a remote computer. Barr/Hasp costs $890 and includes a synchronous interface board.

Datanex, P.O. Box 1758, Eugene, Ore. 97440.

SOLUTIONS BY EXAMPLE, INC.

PC Speak enhancements

Solutions by Example, Inc. has enhanced PC Speak, a software package that allows blind users to work with the IBM Personal Computer.

The software works with a text-to-speech synthesizer. PC Speak will verbalize all data on a screen, or the user can select words or lines with a cursor. The software can be used with programming languages such as Basic or Pascal and software packages such as Lotus Development Corp.'s Lotus 1-2-3.

PC Speak runs under Microsoft Inc.'s MS-DOS and needs 64K bytes of random-access memory, a parallel or serial adapter and a text-to-speech synthesizer.

PC Speak costs $395.

Solutions by Example, Box 307, New Town Branch, Boston, Mass. 02258

ADVANCED DATA INSTITUTE, INC.

Genie

Advanced Data Institute, Inc. (ADI) has introduced Genie, a set of routines that allow programmers to develop applications that use ADI's Aladin data base.

Genie features initialization and holding of data base access paths, reading, updating and deleting of records and full or partial searches with wild cards, the vendor said. The utility reads or displays full or partial records, is menu-driven and includes data base interface operations and utility procedures, ADI said.

Genie costs $500 and works with Microsoft, Inc.'s MS-DOS or Softech Microsystems, Inc.'s P-system.

ADI, 1215 Howe Ave., Sacramento, Calif. 95825

APPLIED MICROSYSTEMS, INC.

PC-Profs Version 1.2

Applied Microsystems, Inc. has introduced PC-Profs Version 1.2, an IBM Personal Computer-based interface to the IBM mainframe Professional Office System (Profs).

The new system includes support of both the color graphics adapter and the monochrome monitor adapter and the ability to import and export Personal Computer text files into Profs notes and documents. All users of older versions of PC-Profs will be upgraded at no charge.

According to the vendor, PC-Profs provides an electronic office for user interaction. Pictures are selected on the screen to perform actions analogous to conventional office fixtures such as in/out trays, a file cabinet, a waste basket and a pad of paper.

The program requires 256K bytes of random-access memory and runs under VM with the mainframe and PC-DOS 1.0, 2.0 or 2.1 for the Personal Computer.

The product is available for $295 per copy. A demonstration diskette sells for $10.

Applied Microsystems, P.O. Box 832, Roswell, Ga. 30077.

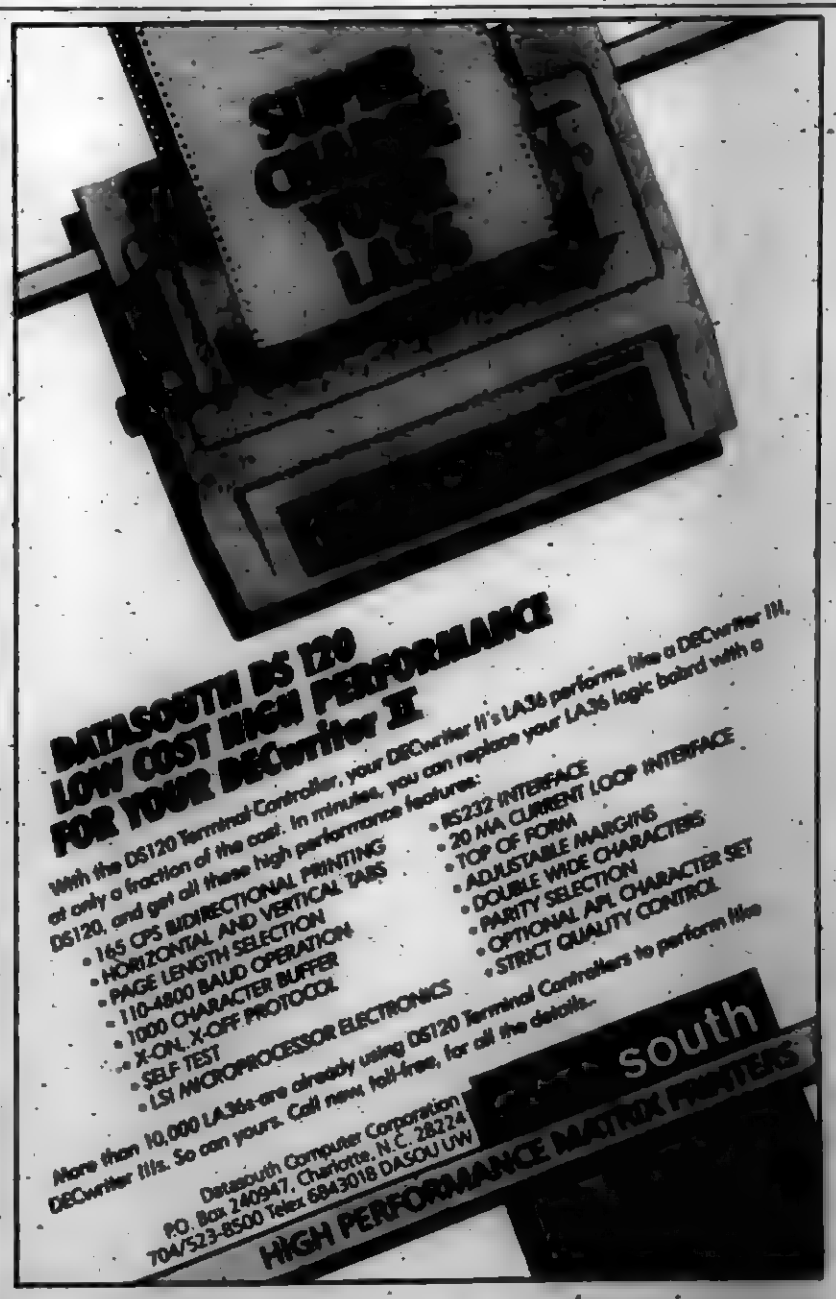
LIFEBOAT ASSOCIATES, INC.

Enhanced version of Lattice C

Lifeboat Associates, Inc. has enhanced its Lattice C compiler to support Microsoft, Inc.'s MS-DOS 2.0 operating system.

The enhanced version enables pro-

Continued on page 132



The Auto-Dial VA 212PA

Get 'em while they last!

MTI has the Racal-Vadic 212 PA modem in stock.

- Operates at 1200 and 0 to 300 bps.
- Built-in automatic dialer.
- Non-volatile memory stores 15 phone numbers of up to 31 digits each.
- "Talks" in English to terminal operator.
- Up to 26 user-programmable options are stored in modem memory, and can be keyed in from the front panel.
- Calls can be originated or answered from terminal keyboard or modem front panel.

MTI is an authorized distributor for Racal-Vadic, so we get their latest equipment first. We are the one source for all the terminals, peripherals, systems, applications expertise and service you'll ever need. At great prices, whether you lease, buy or rent. Call us today.

New York: 516/621-6200, 212/767-0677, 518/449-5969
Outside N.Y.S.: 800/645-6530
New Jersey: 201/227-5552
Ohio: 216/464-6688

mti

Applications Specialists & Distributors, New York, New Jersey and Ohio. DEC, Intel, Texas Instruments, Datapoducts, Lear Siegler, Diablo, Qume, C.Itoh, Intecolor, Racal-Vadic, MICOM, Vanzi, Develcom, U.S. Design Dig.Eng., Cipher, Protocol Comp., MicroPro, Microsoft, Polygon, Select.

MICROCOMPUTERS

Continued from page 131

grams to use MS-DOS' tree-structured directory to organize large numbers of files and provide file access to other directories, the vendor said. The compiler allows users to address 1M byte of storage with an Intel Corp. 8088 or 8086 microprocessor. Lattice C costs $500.

Lifeboat Associates, Dept. C, 1651 Third Ave., New York, N.Y. 10028.

MOTOROLA, INC.
System V/68

Motorola, Inc. has announced System V/68, a version of AT&T's Unix System Five operating system for Motorola's 68000 microprocessors.

System V/68 is the first Unix port that AT&T has developed jointly with an outside source, according to Motorola. Motorola plans to provide source code updates, maintenance and support of the operating system.

Source and object codes are available for $2,000 each, plus media charges.

Motorola, P.O. Box 20912, Phoenix, Ariz. 85036.

DATAVIZ, INC.
Oneshot

Dataviz, Inc. has introduced Oneshot, a productivity tool enhancer.

Oneshot takes data from mainframes, public access systems, other microcomputers and time-sharing systems and transfers it to an IBM Personal Computer or compatible machine. The data can be in the form of reports, queries, data files or any information arriving via communications products, Dataviz said.

Oneshot learns how to read/interpret data and recognizes headers, footers, separators, subtotals and other nondata, Dataviz said. It identifies data by the position of columns and format (text or numeric) and is priced under $200.

Dataviz, P.O. Box 1319, Norwalk, Conn. 06856.

CHAS-MOORE, INC.
XT-Driver

Chas-Moore, Inc. has introduced XT-Driver, a menu and security system that is designed for the IBM Personal Computer XT and IBM Personal Computer-compatible hard disk systems.

Users are assigned one password and a security code, Chas-Moore said. The information builds the user's menu and provides access to applications according to the user's security code level. The XT-Driver is said to provide menus containing popular applications and to allow users to build their own menus.

Other features include a log system for tracking user access, a programmable calculator, a directory manager, a message center and PC-DOS support menus that are said to aid users in the execution of certain commands, according to a spokesman for Chas-More.

The price of the basic menu and security system is $80, the spokesman said.

Chas-Moore, 3104 Jackie Center, Bakersfield, Calif. 93309.

PRENTICE-HALL, INC.
VCN Execuvision

Prentice-Hall, Inc. has introduced VCN Execuvision, a presentation graphics program for use with the IBM Personal Computer.

The product is menu-driven and makes it easy for novice computer users to make slides for presentation, according to the vendor.

The program was designed for use on the IBM Personal Computer with two disk drives, the IBM Color/Graphics Board and color monitor, Prentice-Hall said. VCN Execuvision is said to run under MS-DOS 1.1 and to require 128K bytes of memory.

Highlights of the program include a choice of 10 text fonts with rescaling and color options; foreground and background colors; "electronic scissors"; run-time options; speed variations for animation/motion techniques; and a variety of hard-copy printing styles, the firm said.

The program sells for $395.

Prentice-Hall, 200 Old Tappan Road, Old Tappan, N.J. 07675.

LOGSYS, INC.
Business Modeller

Logsys, Inc. has announced Business Modeller, an electronic spreadsheet that runs on Digital Equipment Corp.'s VAX-11 series superminicomputers, PDP-11 series minicomputers and the Professional 300 series microcomputers.

Users can track payrolls, sales bonuses, loan repayments, key account purchases and research data, according to the vendor. Features include maximum and minimum average of a list, sum and count of list items, table lookup and choice and logic expressions.

Prices range from $650 to $2,500, depending on the installation.

Logsys, Suite 1408, 116 John St., New York, N.Y. 10038.

ANALYSIS TECHNOLOGY, INC.
Data Analyst

Analysis Technology, Inc. has announced Data Analyst, a software encryption service for market research and survey companies using IBM Personal Computers.

Data Analyst encrypts floppy disks so that users can manipulate statistical data but not access personal information, the vendor said. Data Analyst consists of a software package that allows the user to define which fields should be protected and a service which encrypts diskettes mailed to the company, according to the vendor.

Diskettes are returned within 48 hours, the vendor said.

The software package costs $5,000. Each encoded diskette costs $75, Analysis said.

Analysis Technology, Suite F.P.O., Box 1070, 234 Pearl St., Boulder, Colo. 80306.

APPLIED SOFTWARE TECHNOLOGY, INC.
Enhanced Versaform

Applied Software Technology, Inc. has enhanced Versaform, a data base

$61/mo.*

*1 yr. lease.

Lease TI's new 855 dual-mode printer from MTI with on-site service for only $61 per month.

- 150 cps draft-quality mode, 35 cps letter-quality.
- Front-loading font modules act as electronic daisy-wheels for letter-quality printing.
- Change font styles at the touch of a button.
- Both serial and parallel interfaces are standard.
- Prints raster graphics.
- Small, lightweight and quiet for office environment.

MTI is an authorized distributor of Texas Instruments' full line of portable terminals, matrix printers and Professional Computers. Whether you lease, buy or rent our equipment, you'll find MTI is the one source for all the terminals, peripherals, systems, applications expertise and service you'll ever need. At great prices. Call us.

New York: 516/621-6200, 212/767-0677, 518/449-5959
Outside N.Y.S.: 800/645-6530
New Jersey: 201/227-5552
Ohio: 216/464-6688

mti

TEXAS INSTRUMENTS

Applications Specialists & Distributors, New York, New Jersey and Ohio.
DEC, Intel, Texas Instruments, Dataproducts, Lear Siegler, Diablo, Esprit C.Itoh, Intecolor, Racal-Vadic, MICOM, Ventel, Develcon, U.S. Design Dig.Eng., Cipher, Protocol Comp., MicroPro, Microsoft, Polygon, Select.

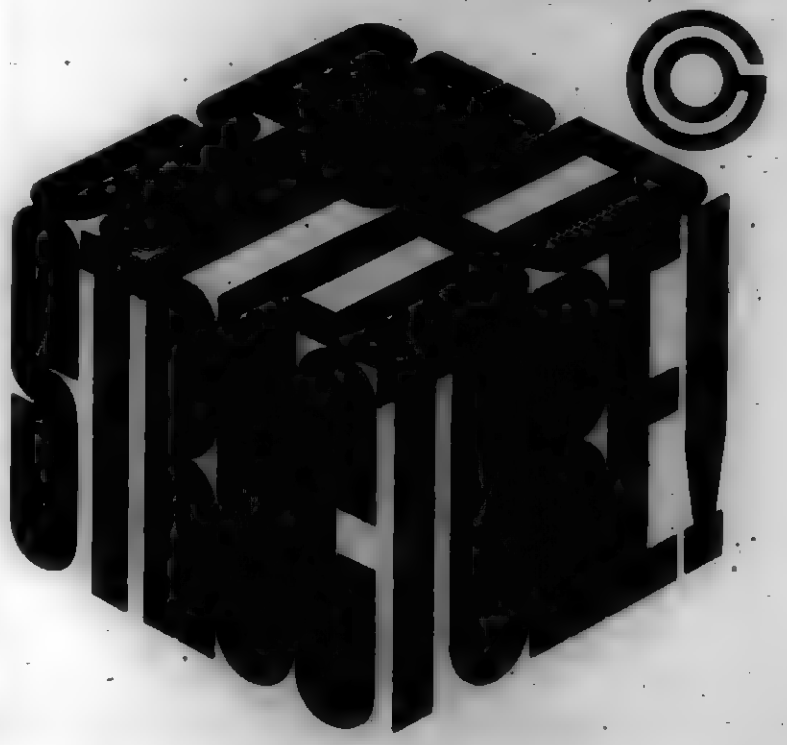
Turns Spaghetti Code COBOL Into Structured COBOL Automatically

SUPERSTRUCTURE takes your unstructured COBOL programs and automatically produces structured COBOL programs that are easy to understand and maintain.

SUPERSTRUCTURE provides a simple and cost effective alternative to manually rewriting those structured programs that are a maintenance nightmare. Of course you can't believe it. Let us prove SUPERSTRUCTURE works, using your programs at your location. SUPERSTRUCTURE—the breakthrough you've been waiting for.

Call today: Marketing Director—SUPERSTRUCTURE.

Group Operations, Incorporated
1110 Vermont Avenue, N.W.
Washington, D.C. 20005
(202) 887-5420
Offices in Boston, Cleveland, Dallas, Los Angeles, and New York



management system for Digital Equipment Corp.'s Rainbow microcomputers.

Versaform allows the user to design form-oriented records and includes data entry checking and automatic calculation capabilities, the vendor said. Preprinted forms may be filed from screen data with stored instructions, according to the vendor.

Versaform requires 256K bytes of random-access memory and costs $380.

Applied Software Technology, 170 Knowles Drive, Los Gatos, Calif. 95030.

MICROCOMPUTER SPECIALIST, INC.
Ontime Calendar Manager

Microcomputer Specialist, Inc. has introduced Ontime Calendar Manager, a calendar management and appointment scheduling package for the IBM Personal Computer.

Users can view calendars, print schedules, search for available times, enter activities, maintain facility log books, schedule activities for groups, create tickler files and leave messages for co-workers, according to the vendor. Ontime Calendar Manager integrates with Information Unlimited Software, Inc.'s Easybusiness software series, the vendor said.

The product runs under IBM PC-DOS or Microsoft, Inc.'s MS-DOS, according to Microcomputer Specialist.

Ontime Calendar Manager costs $199.

Microcomputer Specialist, 18 Lyman St., Westboro, Mass. 01591.

GUARDIAN AUTOMATED SYSTEMS, INC.
Legal Office Software

Guardian Automated Systems, Inc. has introduced a Legal Office Software package made up of four modules all written in C language for Unix-based operating systems.

The Legal Accounting module reportedly permits time and billing record keeping, trust accounting and accounts payable recording, Guardian said. The Case Management and the Scheduler modules, respectively, track litigation and automate the office's calendar, according to the vendor. The Unicorn/DB module reportedly is a data base management program for customized reporting.

The four modules run on the Fortune Systems Corp. Fortune 32/16 computer. They are priced as follows: Legal Acounting, $2,500; Case Management, $2,000; Scheduler, $150; and Unicorn/DB, $295.

Guardian Automated Systems, Suite 600, Liberty Bank Building, 420 Main St., Buffalo, N.Y. 14202.

INDEX TECHNOLOGY CORP.
Excelerator

Index Technology Corp. has announced a package designed to assist systems analysts in design, organization and documentation.

The Excelerator package is an integrated, menu-driven system that combines graphics, data dictionary and word processing capabilities for the IBM Personal Computer XT, according to the vendor.

Users can utilize Excelerator's document preparation facility to produce specification documents for review, Index said. The package's Excelerator Dictionary is said to store all objects, connections, text, data elements and records to assure consistency and accuracy in design. Up to 10 levels of graphs can be linked together in the dictionary for explosion and sequencing diagrams.

Prices for Excelerator begin at $9,500, which includes the software on 5¼-in. diskettes, documentation, keyboard template, 128K-byte memory expansion board, graphics board and Microsoft, Inc.'s Mouse and Word packages.

Index Technology, Five Cambridge Center, Cambridge, Mass. 02142.

LANGUAGE PROCESSORS, INC.
LPI-Cobol; LPI-RPG-II; LPI-Pascal; LPI-C; LPI-PL/I; LPI-Basic

Language Processors, Inc. (LPI) has announced a line of high-level language compilers that reportedly allow users to mix subprograms written in different languages into a single program.

The compilers — LPI-Cobol, LPI-RPG-II, LPI-Pascal, LPI-C, LPI-PL/I and LPI-Basic — are designed for computer manufacturers whose systems use the Motorola, Inc. MC68000 microprocessor and the Unix operating system, a vendor spokesman said. The Cobol, RPG-II, Pascal and C compilers are immediately available, according to Language Processors. The PL/I compiler reportedly will be available mid-1984, the Basic compiler in late 1984.

The compilers are priced at $50,000 each, according to the LPI spokesman.

LPI, 400-1 Totten Pond Road, Waltham, Mass. 02154.

AT&T from page 117

But whose personal computers? Is the giant firm planning to launch its own models?

"Of course they will, if they go into the office market, which we all think they will," said Everett Meserve, an analyst with Arthur D. Little, Inc. in Cambridge, Mass. "It's inevitable."

AT&T in 'a quandary'

The need for a personal computer product places AT&T in "a quandary, the same quandary that IBM has with endorsing Unix," Boyle commented. "They have to do it, but they'd like to postpone it as long as possible."

Robert Casale, president of marketing and sales for AT&T Information Systems, said last month's announcements "have no direct bearing on our agreements with Convergent Technologies, Inc." Casale later added that products from that deal are expected to ship this year.

AT&T and Convergent have released no details on those forthcoming products, but Convergent is widely expected by industry analysts to supply a version of its N-Gen workstation built around an Intel Corp. 80186 chip.

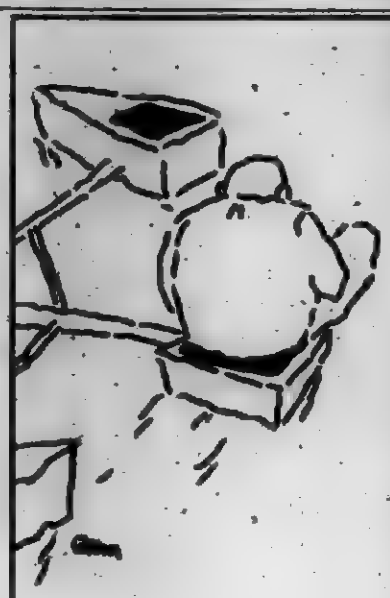
The Santa Clara, Calif.-based vendor began shipping N-Gens to other OEMs last year, but has acknowledged production delays.

Lower end misses to debut?

George Colony, president of Forrester Research, Inc. in Cambridge, Mass., predicted that AT&T also will introduce lower end microcomputers.

"These could be made by Japanese companies, Corona [Data Systems, Inc.], Eagle [Computer, Inc.] or Olivetti [Corp.]," Colony said. "I know AT&T has talked to all of these."

Of course, Colony admitted, AT&T has plenty of other potential suppliers for any machines it chooses to offer.



ANOTHER IBM 3274/76 USER AT THE HELM.

SORT OF.

The alternatives in printers for the IBM 3274/76 user could be categorized, basically, into two separate areas:

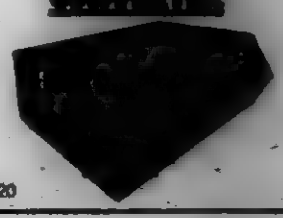
Take it, or leave it.

The AGILE 5287 Printer Protocol Converter allows you the intelligent alternative of a printer to suit your specific application. The flexibility to choose high speed printers, plotters, dot matrix, daisy wheel or even laser printers, provides you with the system control you intended. Pass the word; you're back in command.

Installation of the AGILE 5287 is simple. Its industry proven reliability, achieved through the 5287's built-in diagnostics, is backed by a full one-year warranty and a 30-day money back guarantee.

The AGILE 5287—call us for all the information necessary to make the choice.

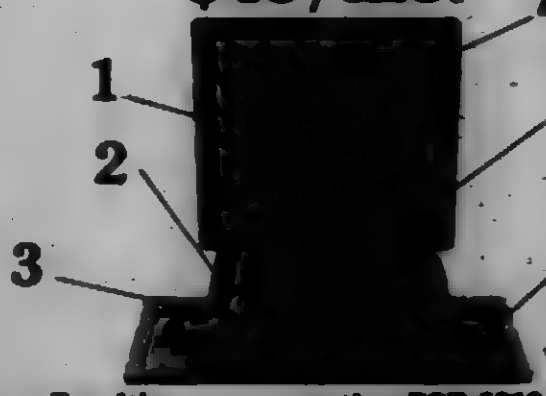
After all, nobody likes to be taken for a ride.



AGILE

4041 Pike Lane, Concord, CA 94520 (415) 825-8220

$45/mo.*



*1 yr. lease

Lease Esprit's new-generation ESP 6310 from MTI with one-site service for only $45 per month.

1. Extensive emulations and display attributes with line drawing capability and smooth scroll.
2. Small footprint saves space.
3. 22 non-volatile programmable function keys.
4. Large 14", high resolution, high contrast, non-glare green phosphor screen.
5. Tilt and swivel display provides operator comfort.
6. Low-profile sculptured DIN standard keyboard with numeric pad, non-reflective surfaces.

MTI is an authorized distributor for Esprit Systems, so we get their latest equipment first. Like this new terminal that offers so much more for so much less than its competition. Whether you lease, buy or rent our equipment, you'll find MTI is the one source for all the terminals, peripherals, systems, applications expertise and service you'll ever need. And our prices are hard to beat. Call MTI today.

New York: 516/621-6200, 212/767-8677, 518/449-5959
Outside N.Y.S.: 800/645-6530
New Jersey: 201/227-5552
Ohio: 216/464-6688

mti

Application Specialists & Distributors, New York, New Jersey and Ohio. DEC, Intel, Texas Instruments, Datapoint, Lear Siegler, Diablo, Basic C, Ithaca, Intecolor, Ramtek Vumic, MICOM, Vantel, Dowdeen, U.S. Design Dig. Eng., Cipher, Protocol Comp., MicroPro, Microsoft, Polygon, Telest.

MICRO BITS/THOMAS W. MADRON

Market still not geared toward organizations' different micro uses

Microcomputers have different uses in large and small organizations, and the market has not yet sorted itself out on the differing needs of the two kinds of organizations.

The most significant difference is that in large organizations micros are employed as personal productivity improvement tools for white-collar staff, while in small organizations the main objective is to meet the organization's operational goals. A person in a small business may also use a micro to improve personal productivity, but that may not be a sufficient reason for acquiring the machine.

In the late 1970s, micros were designed primarily for hobbyists and others interested in the micro qua micro. Very soon after it became clear that micros could be used for serious computing, machines and associated software were marketed to small businesses. By early 1982 it was becoming clear that the major market for micros in the mid-1980s would be large businesses, industries, government and education.

In small businesses, a microcomputer may be used for general data processing in the same way that a large organization would depend on its mainframe.

Hence, in the late 1970s the large microcomputer manufacturers almost always offered a general-purpose accounting package. But in a large organization, centralized business accounting will be run on a mainframe computer, and the micro probably will act as a terminal to that system.

With the newer 16-bit machines (which might be called the machines of the large corporations), software emphasis has been placed on word processing, spreadsheets and personal data management programs. The rationale behind this approach is that the micro in a large organization will be employed as a personal workstation rather than for general data processing.

Nowhere is the difference in uses of microcomputers more different for large and small organizations than in the need for communications.

Many applications in small businesses, for example, will probably not need to communicate with another computer. Indeed, there may be only one micro in-house. If communications are needed, the micro will often be used only occasionally, perhaps to contact a national information utility such as Dow Jones & Co.'s News/Retrieval Service or Source Telecomputing Corp.'s The Source.

But a large organization, which may buy hundreds or thousands of micros, will make a major mistake if its micros cannot communicate with its mainframe computer system.

As small blends into large, these scenarios may change, of course. If we have five or 10 micros in an office, in either a large or small organization, there may also be the need for a local-area network.

Local-area networks can support thousands of connections, but some are designed for smaller numbers of devices (up to 64 or 256, for example).

POS from page 117

checked, the form can be used several ways: as a sales ticket, a manager's key form, an inventory or a daily revenue report.

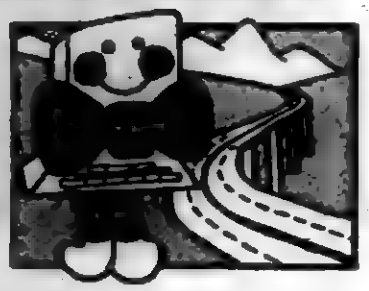
As the data is entered, the store's computer shows how it is reading the data via the Micropad's 40-character LED display screen. The screen also displays answers to the sales clerk's calculations on the form and flashes the name of each part being sold or ordered as its parts number is entered.

Should an error or misinterpreted symbol be displayed, the clerk can immediately correct it on the form, a feature that Welsh said has caused the accuracy of sales data to rise considerably.

Once the transaction is completed, the data is stored on a diskette, and managers can at any time access their store's system to gain up-to-the-minute sales information, such as total sales for the day and month, including commissions, for each of their sales clerks.

The sales clerks were given a half-hour training session on the Micropads. Although they must be careful about printing neatly — a slanted 1 can easily become a slash sign — the clerks are able to complete the forms in less time than when they were working without Micropads, Welsh said.

Advertise in the largest computer market in Europe — Germany — and reach well over 155,000 people.



The German computer market is the largest in Europe and the third largest in the world. It has over $11 billion in installed general purpose computers. The fastest growing segment of the German computer market is the microcomputer, with an installed value of $283 million. There were 10,000 IBM PC's sold in 1983 and another 30,000 units including IBM PCjr's are expected to be installed by the end of 1984.

You can reach the DP/MIS market, the PC market, the microcomputer market or the computer retailing market with our four German publications; *Computerwoche, PC Welt, Microcomputerwelt* and *Computer Business*.

Computerwoche is Computerworld's sister publication for the German EDP/MIS market. With a circulation of 30,000, *Computerwoche* reaches the important decision makers in medium to large computer-using organizations throughout the country.

We cover the microcomputer market with our microcomputer publication — *MicroComputerwelt*. Every month, *MicroComputerwelt* circulates to 65,000 German microcomputer professionals in the business, science and education fields.

PC Welt is our monthly publication specifically designed for IBM PC users. *PC Welt*'s total distribution is 50,000 and it is being sold at newsstands throughout Germany.

Computer Business, modeled after MICRO MARKETWORLD in the United States, covers all channels of distribution in the computer industry. *Computer Business*, circulates to 10,000 key decision makers with bulk-buying responsibility.

CW International Marketing Services makes it easy for you to advertise in countries all around the computer world. For more information on any or all of our four German publications just fill out and return the coupon below.

Dana La Mastra
Account Manager
International Marketing Services
CW Communications/Germany Inc.
375 Cochituate Road
Framingham, MA 01701

Please send me more information on:
☐ *Computerwoche* ☐ *PC Welt* ☐ *Microcomputerwelt*
☐ *Computer Business* ☐ Your other publications
Name of each part being sold or ordered as its parts number is entered. —
Title
Company
Address
City State Zip

TUBES

Puts you in touch one with another and another... and another... and another...

Up to 12 Different Systems with the Touch of a PF Key

...Now That's a Switch.

With no "logoff/logon" or "reset/dial" required and without "losing place" when transferring across systems, the TUBES user accesses up to 12 different systems, one with another and another... and back again, all with one finger (PF Key).

Each user has a unique, installation-defined MENU screen. It details all of the user-permitted facilities or systems. Each system is associated with a 3270 PF Key. When depressed, it immediately connects the user to the system.

It's like having a terminal for each system permanently linked to one of the online facilities. TUBES also provides absolute access security.

No Obligation TUBES Evaluation. To access your TUBES no obligation evaluation package, touch these ten keys: 800-223-0414. In NJ, 201-895-4800. Or clip your business card to a copy of this ad and send it to:

macro 4 inc. Systems Software
Millbrook Plaza, Mt. Freedom, NJ 07970

MACRO 4—SPECIALISTS IN IBM SOFTWARE SINCE 1968

Other Products: SYSTEM ACCOUNTING • VSAM TUNE • LOGOUT/MULTILOG • BOOST • DUMPMASTER/DUMPMASTER ON-LINE • CICSPRINT • CICS AIDS

COMPUTER INDUSTRY

INDUSTRY INSIGHT
Peter Bartolik
CW Senior Editor

AT&T's shot at DP may end up a dud

AT&T fired off its shot heard round the world, but there remain many doubts about whether the communications giant can revolutionize the information processing industry.

Declining, at least temporarily, to enter the mainframe business, AT&T appears to have hitched its star to the success of its own Unix operating system.

Unix, it would seem, is the only product with the potential for bringing AT&T's hardware lineup to a position of dominance in the market.

To some people, the micro-to-supermini batting order unveiled recently by AT&T appears in many respects to be designed to battle with Digital Equipment Corp.'s cadre of machines. But DEC has a 10-year head start.

AT&T said its equipment will be available initially through value-added remarketers and to large-scale users who have the capabilities, time and resources to develop their own application packages. This, indeed, was the manner in which DEC cemented its market share; but, again, DEC has had several years during which third parties developed software that is now readily available.

Therefore, the key to hardware success for AT&T has to rest in the success of Unix. Unix in various releases has been available for years and has won a following in the academic market, and, reportedly, there are some 300 applications now available for Unix operating systems.

But while the operating system has generated much excitement in the computing community in recent months, the jury is still out as to whether it has the functionality and ease of use to stave off

See UNIX page 156

Used computers seen safe bets

Big Blue security blanket covers buyers' risks

By F. Peter Model
Special to CW

First in a two-part series

Many businessmen avoid the used computer market because they suspect it's like the used car racket. They couldn't be more off base.

The used car market isn't dominated by one company; the used computer market is. No car maker would dream of providing open-ended maintenance to second-generation owners; IBM does.

Without that Big Blue security blanket, there wouldn't — couldn't — be a used computer market. An overwhelming 97% of the $7 billion business written by the 235 member firms of the Computer Dealers and Lessors Association (CDLA) is for IBM equipment.

Not only is there more IBM equipment than anything else, but IBM alone provides "cradle to grave" protection: As long as one of its computers performs according to published specs, IBM will maintain it.

Today, "fixing up" a computer is almost entirely cosmetic. Malfunctioning chips are replaced in seconds; circuit boards in minutes. Nor does internal machinery wear out because the computer's lower power generates little destructive heat, and most computers exist in climate-controlled environments.

The CDLA — comprised of third-party lessors, dealers and brokers — all of whom traffic in both new and used equipment — is aware of how many businessmen feel about entering the secondary market. Under Executive Director James F. Benton, it is starting to wage a low-key image campaign that stresses that the aftermarket is no different from the over-the-counter stock market.

Svend E. Hartmann, a New York dealer who also publishes one of the industry's price guides, said the aftermarket is a "risky business," but its members are "intrinsically decent fellows."

Dealers who can't depend on IBM's maintenance security blanket — remarketers specializing in Digital Equipment Corp., Data General Corp. and other makes

See MART page 156

Booming demand for semi parts causing headaches for small manufacturers

By Robert Batt
CW West Coast Bureau

MENLO PARK, Calif. — The booming demand for semiconductor components is causing massive headaches for many of the nation's medium and small computer manufacturers.

With chip manufacturers such as Intel Corp., Motorola Semiconductor Products, Inc. and National Semiconductor Corp. sold out completely on many of their products through 1984, even industry giants such as IBM reportedly are not able to get all the components they need.

At Convergent Technologies, Inc. of Santa Clara, Calif., production of the new N-Gen workstation has been hit by the shortage of Intel's latest 80186 chip, according to Nathan Teichholtz, director of marketing. Because of this, N-Gen is reported to be six months behind schedule.

N-Gen proving critical factor

The N-Gen system is a critical factor in Convergent's drive to replace its older line of desktop computer products, and so any delays can be serious for a company already suffering from a decline in earnings.

"The effect of the delays is that many of our larger customers who were winding down their previous generation of products in anticipation of new models from us are now going to have to wait longer than we would wish," Teichholtz said.

Chips in heavy demand include Intel's standard 8086 product and the 8048/8051 line of microcontroller chips; 64K-byte dynamic random-access memory (RAM) systems; transistor-to-transistor logic chips;

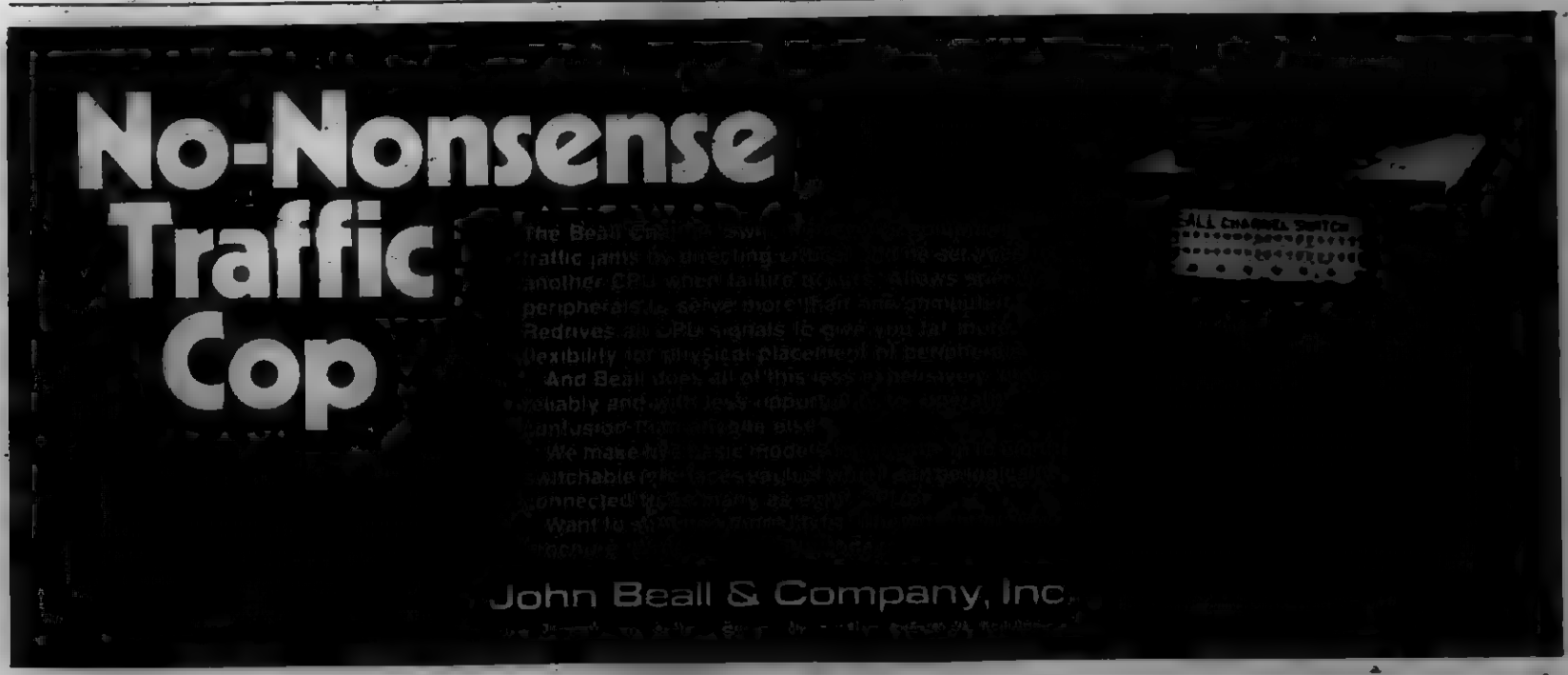
See SEMI page 152

MAGNUSON COMPUTER SYSTEMS

Magnuson Computer Systems, Inc. files its reorganization plan one year after declaring itself bankrupt, and a Storage Technology Corp. subsidiary will acquire Magnuson's assets if the bankruptcy court agrees/**136**

INSIDE

- U.S. Sen. Paul Tsongas (D-Mass.) blasts the Reagan administration's policies on regulation of U.S. high-tech exports/**139**
- IBM's UK subsidiary caused a stir when it informed dealers the U.S. has to OK the transfer of U.S.-made computer equipment, even when it's staying within UK borders/**141**
- General Electric Information Services Co. and McDonnell Douglas Automation Co. are vying for a contract to establish an electronic funds transfer system for banks nationwide to transfer institutional funds/**142**

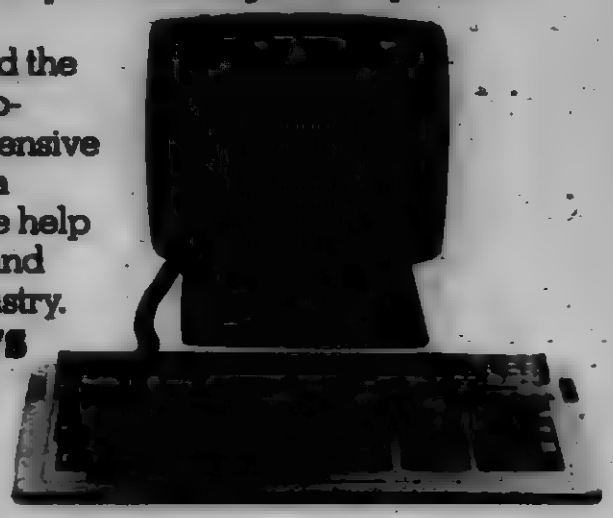


WITH DATA GENERAL YOUR COMPUTER WON'T BE ABANDONED AT YOUR DOORSTEP.

DATA GENERAL SERVICE—THERE WHEN YOU NEED IT

Some computer companies will sell you their bright new systems—and then disappear.

Not Data General. We understand the service and support needs of the automated business office. Our Comprehensive Electronic Office (CEO™) gives you a system that will run smoothly with the help of one of the most complete service and maintenance plans in the entire industry.



A SERVICE PROGRAM THAT'S RIGHT FOR YOU

Whatever the size of your office system, its locations, or hours of operation, there's a Data General service program designed to meet your needs.

With our "Enhanced Response Program," you'll have a service engineer on your site within 2 hours—24 hours a day, 7 days a week. Or choose our "On Call Service," in which a service engineer responds within 4 hours—Monday through Friday, between 8AM and 6PM.

With the 32-bit ECLIPSE® MV Family of computers, you can choose an uptime guarantee from 96% to 99%. Remote Assistance is also available to help you maintain high performance levels while saving time and money.

And, with our new DESKTOP GENERATION™, select from 16 service programs—the widest range of options for any desktop on the market. These programs will help increase productivity and keep maintenance convenient.

ALWAYS NEAR YOUR OFFICE

Data General has experience with large and small companies that have both local and distributed office environments. Whether you have one office, or a worldwide network, service is always nearby with Data General's 250 offices.

TOTAL SUPPORT FOR HARDWARE AND SOFTWARE

Data General's service organization will be your one source for handling both hardware and software problems. Our service engineers undergo extensive training every year. They'll know your system—no matter how new it is.

CALL NOW

To learn how Data General's Field Engineering Services can keep you a generation ahead, call **1-800-343-8842.** In Massachusetts, call **1-800-451-1014.** Or write Data General Service, 50 Maple Street, M.S. 05 G, Milford, MA 01757.

Data General
a Generation ahead.

CEO and DESKTOP GENERATION are trademarks, and ECLIPSE is a registered trademark of Data General Corporation, Westboro, MA 01580.

Magnuson files proposed plan of reorganization

SAN JOSE, Calif. — A little more than one year after filing for protection under Chapter 11 of the Federal Bankruptcy Act, Magnuson Computer Systems, Inc. recently filed a proposed plan of reorganization that would result in its assets being acquired by a subsidiary of Storage Technology Corp.

Under the proposed reorganization plan filed in Federal Bankruptcy Court here March 30, all assets other than approximately $2.2 million in cash will be acquired by Global-Ultimacc Systems, Inc., a private company formed in February and a 66%-owned subsidiary of Storage Technology.

Magnuson, a manufacturer of IBM 4300-compatible computers, declared itself bankrupt early last year [CW, March 14, 1983], blaming its woes partly on steep price cuts made by IBM for the 4300.

The reorganization plan calls for payment to general creditors of a total of slightly less than $1 million cash in settlement for all unsecured claims allowed by the bankruptcy court; holders of unsecured claims will have the option of receiving 50% of allowed claims or $500, whichever is less. The reorganization would also cancel all outstanding shares of Magnuson stock.

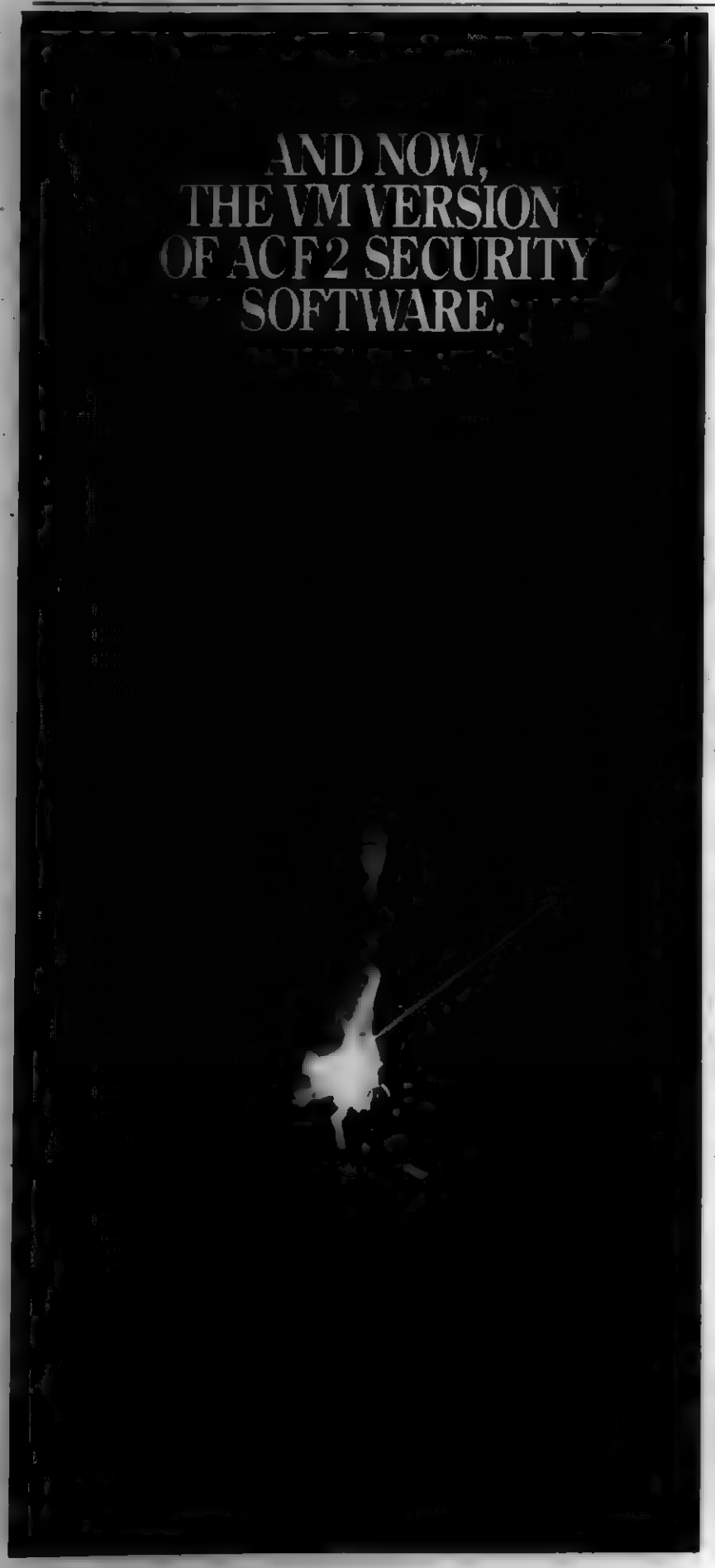
All of Magnuson's assets in excess of approximately $2.2 million cash for unsecured creditor claims and priority payments (such as payroll and taxes) would be acquired by Global-Ultimacc in exchange for shares of its stock. All of the Global-Ultimacc shares received in that transaction would be distributed to the private investor group, which holds substantially all of Magnuson's secured debt and a majority of its equity securities.

If the recently filed proposed disclosure statement is approved by the court, the plan will be submitted to creditors for their approval in approximately 30 days.

Market analysts attributed the slow demise of Magnuson over the last three years to a combination of factors. Those factors included both management shortcomings and intense competition in the IBM marketplace.

The company's search for a possible merger or acquisition partner began in 1982 as the computer manufacturer's assets continued to decline.

During the two years prior to seeking refuge in Chapter 11, Magnuson had lost approximately $57 million dollars.



With *innovative* and *non-traditional* Access Control Facility software, ACF2, VM users can sleep a lot better.

Because with ACF2/VM, all data is protected by default. We call this Implicit Security.

Implicit Security means you have unparalleled protection against unauthorized disclosure, modification and destruction of data.

It means you have control of the data residing in your system.

It means you have the ability to control access to other user-defined system resources.

It means you decide exactly what is to be made available and to whom, assuring you that liability and responsibility reside specifically with those in charge of data.

And there's more.

Combining ACF2/VM with ACF2/MVS or ACF2/VS1 provides the unique capability of one common access control discipline across VM, MVS, and VS1 systems.

We knew you'd like that.

You'll also like the initial controls: User Logon to both VM and CMS, user links to mini-disks, CP Attach and OS data set controls, and CMS file security controls over facilities which create, erase, read, write, rename and copy those files.

Naturally enough, there's more to the intelligence of ACF2/VM. So for further information, please write or telephone Mr. Shawn McLaren, direct: (415) 941-4558.

He'll be glad to tell you about a security software system that offers you a very bright future, indeed.

The Cambridge Systems Group

24275 Elise, Los Altos Hills, CA 94022, U.S.A.
(415) 941-4558 • Telex 357437

Conference for resellers set for May

WASHINGTON, D.C. — Telestrategies, Inc. will hold a conference and exhibition here May 21-23 on "Value-Added Resale: Survival Strategies for 1984 and Beyond."

The conference will address how resellers can enhance their chances for success by implementing survival strategies to diversify the business. The exhibition will showcase telecommunications technology and service alternatives such as customer billing, electronic mail and voice store-and-forward services.

The registration fee is $1,095 for the three-day program. More information is available from Telestrategies at Suite 102, 6842 Elm St., McLean, Va. 22101.

COMPUTER INDUSTRY

Tsongas: Tight export controls will harm U.S. high-tech trade

By David Glenn
CW Staff

BOSTON — U.S. Sen. Paul Tsongas (D-Mass.) recently criticized the Reagan administration's efforts to tighten export controls for high-technology companies, saying such restrictions will seriously damage the nation's ability to compete in the international marketplace.

Tsongas predicted that the free trade argument being sounded by the high-tech industry and others will eventually prevail in the U.S. Congress over the administration's concerns about national security.

The senator's remarks came at the Symposium on the Transfer of Technology in the International Marketplace, a two-day conference here sponsored by the Federal Bar Association. Tsongas is a member of the Senate Foreign Relations Committee, Small Business Committee and Natural Resources Committee.

Tsongas warned that the U.S. is experiencing a rapid decline in its competitive trade posture. "If we don't begin to view high technology as the kind of steel and auto industries of the future and address them the way [those industries] should have been addressed back in the '60s, then states like mine, which are now high-technology-dependent, will know the kind of decline we knew when I was growing up."

Tsongas questioned the administration's contention that tougher export controls are necessary to help halt the illegal flow to the Soviet Union of U.S. technology, some of which could be used for military purposes. He noted that the administration's main arguments for favoring export restrictions involve defense-related concerns.

He said it is interesting that the administration can argue, on the one hand, that the Soviets have achieved military superiority over the U.S. and claim, on the other hand, that access to U.S. technology will allow the Soviets to catch up militarily.

Tsongas contended, as have computer manufacturers, that many high-tech goods restricted by the U.S. are readily available elsewhere in the world. "It seems to me the U.S. is going to have to decide once and for all whether it wants to be a serious international competitor," he said.

The senator said he is pleased with the House version of the Export Administration Act and does not expect sharp differences between the House and Senate bills. He added, however, that the bill could fall prey to administration pressures or be lost in the shuffle of this election year.

Tsongas urged high-tech company officials to let Washington, D.C., legislators know about their concerns over export controls. "There's no constituency pushing for rationality. All the constituencies we hear from are basically those spooked by the Soviets."

HANDS-ON PC TRAINING
LOTUS 1-2-3™ — dBASE II™
ADVANCED dBASE II™
NETWORKING PC's
PC BASIC FOR DPers
WEEKLY PUBLIC SEMINARS
or INHOUSE ANYWHERE
CALL (714) 832-8717 PST
Personal Computer Management Associates
11928 N. Eartham Street, Orange, CA 92669

CHECKING INTO ELECTRONIC MAIL?

Brand "A" One-time fee $37,500*
Brand "B" One-time fee $5,000*
Brand "C" One-time fee $20,000*
Brand "D" One-time fee $7,000*
Brand "E" One-time fee $40,000*
WIZARD MAIL One-time fee $885.00

CHECK HERE AND SAVE TIME & MONEY!

* Prices shown are a selection of E-Mail systems for mainframes as listed in Data Sources 1st Qtr. 1984

E-MAIL
Computer Based Message System
VALUE EVALUATION CHART*

Item					
No min trial period					
Money back guarantee					
Easy and friendly to use					
"Hot line" support					
Easy one-day installation					
TTY support					
Proper operating system					
Distribution by name					
Allow alternate spellings of name					
Allow name duplications					
Optional hard-copy printing					
Allow non-terminal users					
Excellent documentation					
Priced under $1,000 (or)					
Integration module to in-house applications					
Broadcast capability					
Distribution lists					
Calendars & schedules					
"Folder file" capability					
Store/recall feature					
Excellent security					
Audible and visual notification of incoming mail					
Source cobol code provided					
From a large established company					
Unlimited network size					
Daily statistics of use					
See status of mail sent					
Reread old mail					
Display file copies of mail sent					
Resource efficient					
Unlimited size of mail messages					
Re-routing with comments					
Ability to see all users by name, location, or operator ID					
Send mail by name, not by site					
Message priorities (urgent/routine)					
Message classes (confidential)					
Display in order sent					
Consistent screen format					

WIZARDMAIL®
Requires IBM, Amdahl, Hitachi, Fujitsu, Itel, Trilogy, Magnuson, Gould, Perkin-Elmer, Siemens, Honeywell, Univac, Burroughs, NCR, Control Data, Prime, Wang, Data General, Tandem, Stratus, Tandy, Apple, Cromemco, Altos, Compaq, Corvus, Televideo, Zenith, Osborne, Kaypro, Morrow, Vector Graphic, Ampro, Sanyo, Sharp, Epson, Toshiba, Panasonic, Hewlett-Packard, Digital Equipment

IF YOU MISS CW ON COMMUNICATIONS, LOOK AT THE ISSUES YOU'LL BE MISSING.

JUNE.

Bypass. Bypassing the local loops provided by the Bell Operating Companies has become rampant with the availability of alternative technologies. See what this means to both big, regional operating conglomerates and smaller, non-Bell Operating Companies—all in the June issue.
Closes May 4.

JULY.

AT&T update.
Who are the winners and who are the losers after more than six months of deregulation?
Closes June 1.

AUGUST.

This issue will look at various teleconferencing technologies—including full motion video, freeze frame, electronic blackboards and computer conferencing. The cost-effectiveness of teleconferencing technology will be examined, plus information on private and public facilities—all in the August issue.
Closes June 29.

On Communications is ideal both for the advertiser and the reader. Because each one offers focused, in-depth information on areas of interest within communications.

Readers always want to catch up on what's hot and what's not in their particular specialty. And find out what the vendors have to offer.

As an advertiser, you won't want to miss the opportunity to tell them.

Maybe that's why our On Communications is becoming more popular every day.

Because everyone wins.

For more information, or to reserve your space in any of our upcoming issues, simply call the sales office nearest you. Or fill out and return the coupon to Ed Marecki, National Sales Director, Computerworld, 375 Cochituate Road, Box 880, Framingham, MA 01701.

To: Ed Marecki, *National Sales Director*
CW Communications/Inc., Box 880, Framingham, MA 01701

Please send me advertising information on: ☐ *AT&T update.*
☐ *Bypass.* ☐ *Teleconferencing.*
☐ *Please have a sales representative call me.*

Name _____

Title _____

Company _____

Address _____

City _____ State _____ Zip _____

Telephone _____

OC

Computerworld
On Communications

Sales offices:

BOSTON: 375 Cochituate Road, Box 880, Framingham, MA 01701 (617) 879-0700; CHICAGO: 2600 South River Road, Suite 304, Des Plaines, IL 60018 (312) 827-4433; NEW YORK: Paramus Plaza I, 140 Route 17 North, Paramus, NJ 07652 (201) 967-1350; ATLANTA: 1853 Peeler Road, Suite D, Atlanta, GA 30338 (404) 394-0758; SAN FRANCISCO: 300 Broadway, Suite 20, San Francisco, CA 94133 (415) 421-7330; LOS ANGELES: 18008 Sky Park Circle, Suite 260, Irvine, CA 92714 (714) 261-1230.

COMPUTER INDUSTRY

Directive to IBM's UK lessors seen as U.S. interference

By Ron Neff
Special to CW‡

LONDON — Leasing companies and their customers holding U.S.-made computer equipment must obtain the approval of U.S. officials before they can transfer that equipment to others within this country, IBM United Kingdom, Ltd. informed customers recently in a letter that has been interpreted as an attempt by the U.S. government to enforce its own rules in other countries.

The letter went on to remind IBM customers here, "As you are aware, transactions within the United Kingdom involving 'advanced systems' are also subject to the obtaining of U.S. export license approval. Such transactions include not only the initial installation of a new machine with a user, but also any subsequent dealings or transfers in such machines (at least while they remain an 'advanced system')."

Sent to the 30 major UK leasing companies dealing in IBM systems, the letter included as advanced systems: the 3033, 3042, 3062, 3081, 3083 and 3084, the 3838 and the 4381 Model Group 2.

The letter went on to say that transfers between users of any machines listed would require prior U.S. Commerce Department expert licensing and that applications could take three months to be processed.

Norman Tebbit, secretary of state for Trade & Industry, declared, "That is quite clearly an attempt by the U.S. government to impose its laws within the United Kingdom."

There is a belief within the UK leasing industry that the issue has come up at this time in part because the U.S. Export Administration Act is up for renewal, and there are considerable pressures in Washington, D.C., to make the rules stronger.

The list that IBM uses in the letter includes the 3033, which is now technologically obsolete. Whether or not they have ended up in the Eastern bloc, a number of such systems, and others on the list, are said to have been resold here without any notification.

Mike Dudley, a senior executive with Capital Leasing, said, "Once we have sold a system to a user, we cannot impose conditions and police them on its resale." He believes that few of the leasing industry's — or IBM's — customers in the UK bother about these so-called procedures or resale. He points out, however, that any exports would be covered by UK legislation, and applications would have to be made to the British government. The IBM letter noted all such exports "are also licensable" by a UK government agency.

Parry Mitchel, chairman of United Leasing, one of the larger UK leasing companies, said IBM would not issue such a letter without the prompting of Washington and called it "an attempt by the U.S. government to impose its laws within the United Kingdom. And that, of course, is contrary to international law."

Mitchel issued some pointed guidance to IBM UK, saying, "Unless this problem is resolved ... it's going to be extremely bad for their business."

Fake Apples barred from U.S.

WASHINGTON, D.C. — The International Trade Commission (ITC) recently barred the import of Apple Computer, Inc. Apple II and Apple IIe look-alikes, whether or not they contain an internal operating system, unless importers post a 200% duty tax on the value of the product.

President Reagan now has 60 days to accept or reject the findings of the commission.

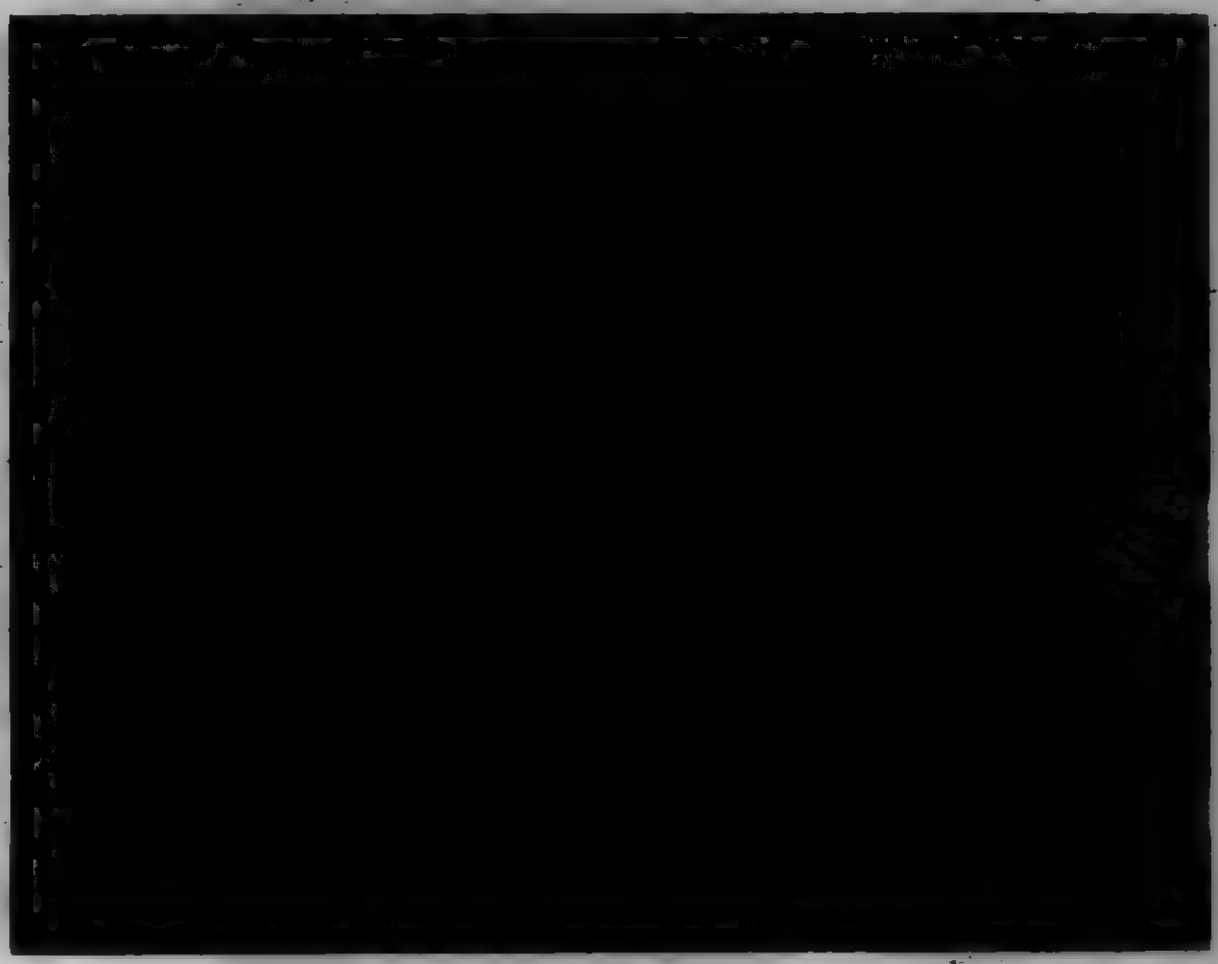
"We concur that the infringing imports have a tendency to substantially injure the domestic [computer] industry," the report said. "It is clear from the record that numerous [parties] are attempting to sell, and are selling, infringing computers in the U.S. under circumstances that indicate they are likely to be successful."

The ITC also noted that the Apple look-alikes are selling at prices much lower than Apple products, ranging from $300 to $400 per unit. U.S. Customs Service officials report that they have seized about 3,000 computers being sold as Apples.

The ITC determined that both Apple patents and software copyrights were being violated by the imports. The commission went further than expected when it expanded the order to bar imports "that have motherboards substantially similar to the Apple motherboards.

"To avoid evasion of our order, it excludes from entry computers and components [without read-only memory] which can be shown to be associated with imports," the ITC said.

Apple originally filed a complaint charging at least 15 foreign-based concerns, most of them located in Taiwan and Hong Kong, with manufacturing Apple look-alikes. Only two parties named by Apple appeared at the investigative hearing conducted by the ITC.



StorageMaster™
Media is Here!

Now you can buy flexible disks with a five year warranty from Control Data.

A lot of companies make diskettes. But Control Data also makes disk drives. In fact, we're the leading independent supplier of disk drives to computer manufacturers.

Now we've put our expertise into a truly superior line: StorageMaster diskettes from Control Data.

You can choose from a complete line of premium 8" and 5.25" diskettes in single or double densities, single or double-sided. And each diskette is 100% certified and backed by a 5 year warranty. So you can depend on them to perform for years to come.

Look for StorageMaster diskettes at your local computer store or ask for them from your computer supplies distributor.

Or give us a call toll-free at 1-800/328-6207 (in Minnesota call 612/835-8065) and we'll tell you where to find StorageMaster diskettes.

CONTROL DATA

Nacha narrows EFT search to Geisco, McAuto

By David Simon
CW Staff

WASHINGTON, D.C. — A National Automated Clearing House Association (Nacha) task force has narrowed its search for a private processor of institutional electronic funds transfers (EFT) to two vendors — General Electric Information Services Co. (Geisco) and McDonnell Douglas Automation Co. (McAuto).

The task force is investigating how the nation's 31 regional automated clearing houses might switch from the Federal Reserve System to a private processor for financial institution payments.

The regional associations supervise the processing of corporate and consumer electronic fund transactions, which are sent through member banks and participating companies.

These transactions typically include preauthorized payments, such as automatic payroll deposits; interest, dividends, pensions and annuity payments; and payments of mortgages, installment loans, insurance premiums and utility bills.

The selection of Geisco and McAuto completed the first phase of Nacha's evaluation of proposals from eight companies, including IBM, Mastercard International, NCR Corp. and Visa U.S.A., Inc. A second phase of the selection process involves evaluating the Geisco and McAuto plans and deciding how they fit in with Nacha's overall objectives, according to Merrill Miller, Nacha vice-president and senior vice-president of California First Bank in San Diego.

Miller said the task force could recommend to the automated clearinghouses either a regional or national approach. Under a regional plan, it would be up to the individual associations to decide whether to replace the Federal Reserve with a private vendor. Automated clearinghouse groups in Arizona, Hawaii and New York have already taken such a step, Miller said.

A second approach would be to develop a single private vendor to provide EFT for the regional associations.

In seeking an alternative to the Federal Reserve, Nacha hopes to point the way toward lower costs and better service for the automated clearinghouses, according to Gary Singer, secretary/treasurer for Nacha. He said the group is particularly interested in moving toward an all-electronic delivery service, something the Federal Reserve is presently unable to provide. "We're trying to provide a flexible and efficient automated clearinghouse environment," he added.

"There is one national processor [the Fed] now," Miller said. "If you look at any other aspect of banking [such as check clearing], there are many service providers." A more competitive environment, he added, "is very healthful in terms of refining, developing and enhancing the service."

The Geisco and McAuto plans were outlined in March at the annual Nacha conference in New Orleans. Geisco proposed a nationwide automated clearinghouse service that would use its existing Mark 3000 IBM-based processing service and its Mark III network, company officials said.

McAuto also is proposing a national electronic payment delivery system called the Financial Users Nationwide Distribution and Settlement. The McAuto bid, part of a joint effort with the First National Bank of Chicago, is said to feature full electronic transfer and the capability to service both small and large financial institutions, a company spokesman said.

Both vendors agree that the Nacha recommendation is potentially very lucrative.

The task force will meet this month to evaluate further the two vendors' offers. The group hopes to make a recommendation by the end of June, Singer said.

Intel to build plant in Ariz.

SANTA CLARA, Calif. — Intel Corp. announced recently it will build its first major semiconductor component and assembly plant in the U.S. in Chandler, Ariz.

Construction of the 200,000-sq-ft plant will begin this year, and the facility will open in the second half of 1985, the company said.

Intel's other major assembly plants are located in Malaysia, the Philippines and Barbados.

The company also announced recently it will build its ninth wafer fabrication plant in Rio Rancho, N.M.

Gordon E. Moore, chairman and chief executive officer of Intel, said the Chandler plant will be a cost-effective component assembly plant "because the assembly process is becoming increasingly automated and, therefore, less labor intensive."

Intel said it expects to spend more than $200 million on new facilities and equipment this year.

Finally, the definitive for reaching today's data communications

It's called ANI™—Advanced Network Integration. From Infotron.

ANI is a definitive path for network growth and management that's reflected in a family of data communications products and services.

It gives you something you haven't had before—the means to plan and implement a data communications network based on long-term strategy.

ANI covers everything we make—from simple modems to stat muxes, to high-speed muxes, to network concentrators, to intelligent data switching systems.

ANI also includes everything we do. Systems engineering, from technical support to turnkey operations. Installation. Training. Telephone consultation and dialup online diagnostics. And worldwide field service.

Growth.
ANI products grow with you.

They're based on an architecture that's simple to expand and upgrade.

Because ANI products can be expanded both in size and function, they're easily integrated into larger, more complex networks. They grow with you instead of becoming obsolete.

Flexibility.
ANI products are versatile.

They can accommodate computers and terminals with almost any combination of protocols and speeds.

And because of their modular structure, ANI products will accommodate bridges to other networks, and gateways to public and private resources.

COMPUTER INDUSTRY

STC to remain silent on lawsuits, seek single hearing

By Peter Bartelik
CW Staff

SAN FRANCISCO — Storage Technology Corp. (STC) said recently it will not comment outside the courtroom on the mounting lawsuits filed by investors in its canceled mainframe project, but an attorney who filed one of the suits said STC will seek to have all the suits heard by one federal judge here.

Ronald B. Weinel, STC vice-president for investor relations, said recently the company will "just go on through the normal course of litigation, and we will just not make any public comment on them."

A total of six suits claiming misrepresentation and fraud by STC have reportedly been filed in various federal jurisdictions, although STC would not definitely confirm that. Weinel said he couldn't be sure of the exact number.

According to Chicago attorney Donald E. Egan, who filed the first suit [CW, Feb. 13], a class action suit brought by investor Michael Abelson, six suits are definitely pending in federal courts in San Francisco, Denver and Tampa, Fla.

The suits have been filed on behalf of Class A and Class B investors in Storage Technology Partners, a limited partnership through which STC raised in excess of $60 million to fund development of an IBM-compatible mainframe computer, which it subsequently canceled earlier this year [CW, Feb. 6]. All the suits reportedly charge to some degree that STC misrepresented the success it was having in developing the mainframe.

According to the suit filed by Egan, the partnership sold 5,000 units at $10,000 per share to 300 Class A investors for a total of $50 million between 1981 and 1983. In mid-1983, the partnership offered 2,000 units of Class B shares at $10,000 per share, and 180 investors paid approximately $10.6 million.

Egan said he is aware of — in addition to the class action suit filed by him regarding Class B investors — two individual suits filed by Class A investors in Denver, a class action suit for Class B investors filed in Tampa, an individual suit for Class A investors filed in San Francisco and, the most recent, a class action suit for Class A investors filed in San Francisco.

Egan said it is his understanding STC will file motions to bring all the cases under the jurisdiction of one judge in federal court in San Francisco. STC has not yet filed any answering brief to the charges, and "we've agreed to give them additional time," Egan said.

Commenting on his request that treble damages be awarded investors under terms of the federal Racketeer-Influenced and Corrupt Organizations Act (Rico), Egan said use of Rico is becoming "a very popular and vocal tool" in civil suits, although it was originally designed for use against organized crime figures.

Honeywell sets pact with NEC

MINNEAPOLIS — Honeywell, Inc. and NEC Corp. recently concluded definitive proceedings formalizing an agreement reached in principle last year to combine Honeywell's operating system with NEC's S1000 hardware system. It was also announced that CII-Honeywell Bull of France has signed a similar agreement in principle with NEC.

Honeywell and NEC announced last October [CW, Oct. 31] the decision to realign their business strategies. NEC essentially grew under Honeywell's wing and was granted Japanese rights to Honeywell technology in 1962, but the relationship began to erode in 1980.

Early last year [CW, Feb. 14, 1983] it appeared the two vendors were competing against each other when General Electric Information Services Co. (Geisco) announced that its network of Honeywell DPS 8 computers would be upgraded with NEC's S1000 mainframe, rather than with Honeywell's announced DPS 88/81 machine.

Still in contention

Kathy Tunnheim, spokeswoman for Honeywell, said Geisco has not yet announced final results of its "runoff" and that Honeywell remains in contention. Contrary to reports, she added, either vendor's machines selected by Geisco will run under Geisco's own Mark III operating system.

Honeywell said it would not dispute overseas reports that NEC will supply 150 of the S1000 machines to Honeywell.

Honeywell said the agreements provide for the three companies to work together to integrate NEC's S1000 large-scale processor with Honeywell's Gcos operating software, peripherals and communications system.

The S1000 system will be available to Honeywell late in 1985 and to CII-Honeywell Bull in 1986, Tunnheim said.

path
and tomorrow's —
objectives.

Management.
Management and control are vital to the operation of large, widely-dispersed networks.

ANI products give you the tools for monitoring activities, gathering statistics and keeping informed of events as they occur. From a central point, networks can be configured to meet changing requirements and provide diagnostics for solving problems.

Regardless of network size or complexity, ANI provides complete accountability for network operation.

We're Infotron. We wrote the book on data communications and networking. It's yours for the asking.

For your free copy and for information on ANI products, use the coupon, or call toll-free: 1-800-345-4636.

INFOTRON SYSTEMS

Infotron Systems Corporation,
9 North Olney Avenue, Cherry Hill, N.J. 08003,
or call toll-free 1-800-345-4636.

Please send me more information about ANI™, plus a free copy of *Making It Through the Maze of Data Communications.*

CW 4/9

Name_____

Title_____

Company_____

Address_____

City_____ State_____ Zip_____

Telephone_____

Infotron communications networking. First in performance and reliability.

The Bull Group to establish Bull Peripheral in Calif.

To spark developmental capability for Bull in U.S.

SUNNYVALE, Calif. — A subsidiary of CII-Honeywell Bull, Cynthia Peripheral Corp., announced recently The Bull Group will establish Bull Peripheral here to initiate a developmental capability for Bull in the U.S.

Bull Peripheral, composed of groups of senior technical staff from the France-based computer manufacturer, will concentrate on magnetic printers and rigid disk drives and will plan and develop leading-edge products for downstream marketing in the U.S. and Europe.

The French complement in the U.S. will number a half-dozen employees over the first year and will be housed in a new 10,000-sq-ft addition to the present Cynthia Peripheral located here.

Cynthia Peripheral said the new group will grow to a more comprehensive Bull presence in the U.S., leading to assembly and test operations. The Silicon Valley area reportedly was selected because of its reputation as one of the leading research and development areas in the world.

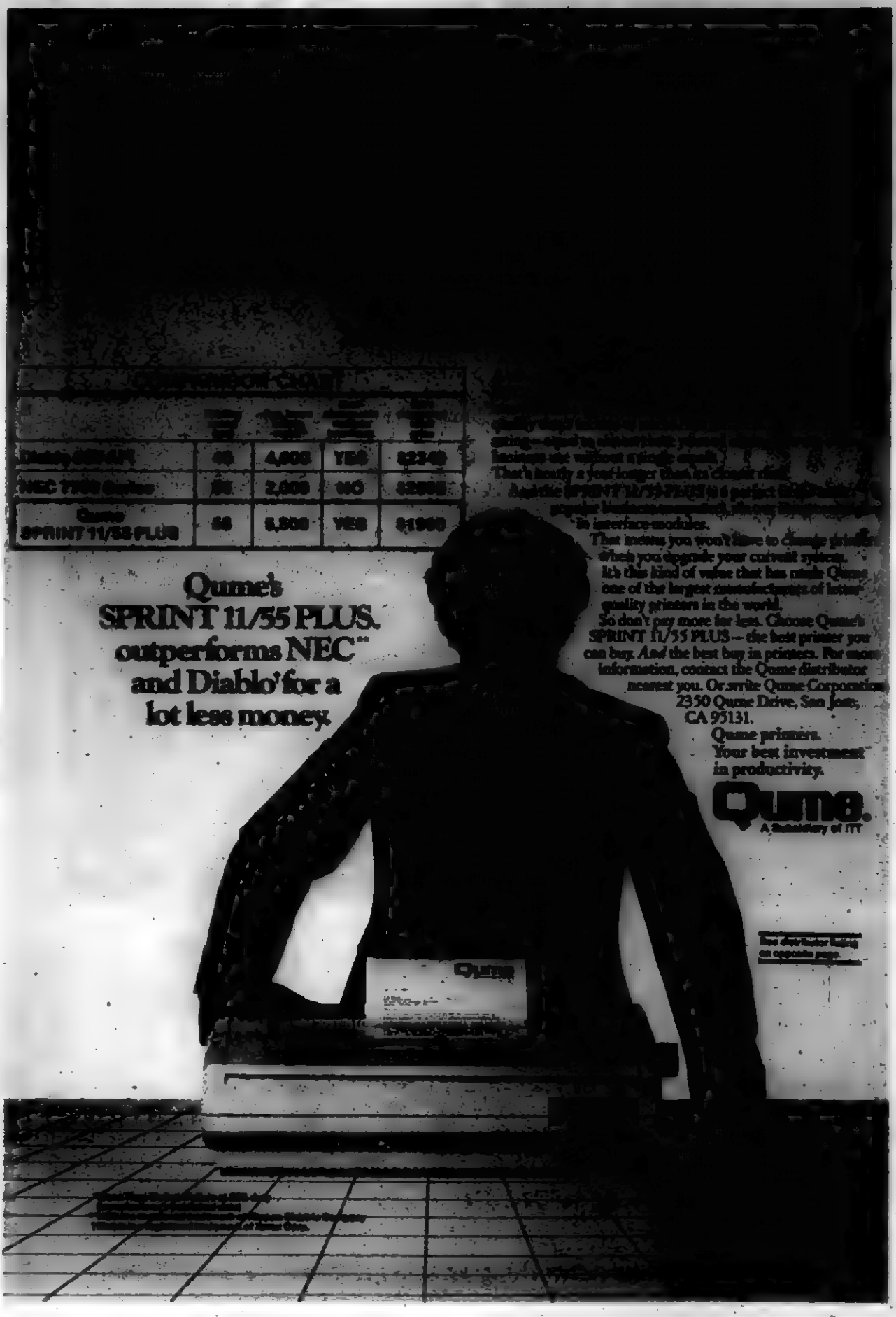
The Bull Group is said to be the leading French manufacturer of computers, with revenues last year of nearly $1.5 billion. Cynthia Peripheral is responsible for all Bull OEM peripheral sales, marketing and customer support activities throughout North America.

For your best investment in printers.
Call your nearest Qume distributor today.

United States:
American Calculator & Computer
(205) 933-2344—AL
Alamo Electronics
(206) 643-9092—WA
Anacomp (206) 881-1113—CA, UT, WA
Anthem Systems (415) 342-9182—CA
Bohlig & Associates (612) 922-7011—MN
Butler Associates (617) 964-5270—CT, MA
Byte Industries
(800) 972-5948 (CA Only)
(800) 227-2070 (Outside CA)
David Jamison Carlyle
(213) 410-9250—CA, CO, HI, IL, NJ, TX
Computers & Peripherals Int.
(315) 476-6664—NY
The Datastore (609) 779-0200—NJ
Equipment Resources (404) 955-0313—GA
Future Information Systems
(212) 732-3905—NYC
Gentry Associates
(305) 859-7450—FL, GA, LA, NC, SC, TN
Inland Associates (913) 764-7977—KS
InterACT Computer Systems
(704) 254-1948—FL, GA, NC
Kierulff Electronics
(800) 338-5811—AZ, CA, CO, CT, FL, GA, MA MD, MN, MO, NC, NJ, OH, OK, TX, UT, WA, WI
MA/COM-Alanthus Data
(301) 770-1150—MD
Microamerica Distributing
(800) 431-7660 (MA Only)
(800) 343-4411(Outside MA)—CA, MA, TX
Midwest Microcomputers (419) 782-1115—OH
National Computers Syndicate
(312) 459-8400—IL, MN
Pacific Mountain States
(800) 272-3222—CA, WA
P&R Associates
(308) 371-4140—CO, UT
PCA Microsystems (512) 654-4711—TX
PCS, Inc. (214) 247-6946—TX
Pioneer Electronics
(301) 921-0660—AL, FL, GA, MD, NC, PA
Polygon Industries
(504) 834-7658—LA
Printer Warehouse (213) 829-6483—(CA Only)
(800) 245-6812—(Outside CA)
R.C. Data (408) 946-3600—CA
Radar Communications (212) 245-5509—NYC
Schweber
(800) 645-3040—AL, CA, CT, FL, GA, IA, IL, MA, MD, MI, MN, NJ, NY, OH, OK, PA, TX, WI
Southern Microcomputer
(305) 621-4237—FL
Tek-Aids Industries
(312) 670-7400—IL, PA, TX
Terminal Rentals (714) 832-2414—CA
Terminals Unlimited
(800) 336-0423—24 Locations
Bloom (516) 483-9700—NY
Unitex (512) 451-0251—TX
Western New York Computer
(716) 381-4120—NY

Canada:
Abacus Data Services
(416) 677-9555—Ontario
Datamax (416) 781-9135—Ontario, Quebec
DataTech Systems
(604) 479-7117—Alberta, BC, Ontario
Data Terminal Mart
(416) 677-0184—Alberta, BC, Nova Scotia, Ontario, Quebec
Future Electronics
(416) 697-7710—Alberta, BC, Ontario, Quebec
Micro Distributing (604) 941-0622—BC
Princeton Data (416) 977-1711—Ontario

Qume.
A Subsidiary of ITT



intodata :

Videotex venture to target home user as future client

OUTSIDE LINES
Bohdan Szuprowicz

Videotex, sometimes called "the electronic library," has received a lot of publicity in recent weeks, topped by the announcement that CBS, Inc., IBM and Sears Roebuck & Co. have ganged up in a joint venture to take over the business. To some industry observers, this means that videotex has finally arrived, but others are not so sure.

The new venture is not in a hurry to offer any services for several years to come. What is significant, however, is the fact that it will be specifically targeting the home computer user as its future client, apparently at about half the cost of what current videotex suppliers are charging. Also, by providing access for any personal computer — whether from the IBM stable or not — the enterprise plans to eliminate the otherwise costly terminal that videotex users must buy or rent today to use the service. This will guarantee the group a multimillion subscriber base potential.

In its present form, videotex is basically an interactive information service using telephone lines or CATV distribution channels to connect a television set or a special terminal to a data base of general or specialized information. Subscribers must pay as much as $600 for the terminal or television set adapter, and they are facing user fees on the order of $15 per month plus telephone connect charges.

Videotex services of this type display mostly previously published material, while the interactive feature provides guidance through the data bases not unlike an index in a library. If the user wants to manipulate such data or perform transactions based on information acquired from various data bases, he must, more often than not, still revert to manual routines of filling out forms, signing checks, licking stamps and going to the bank.

There are at present over 5,000 data bases of all kinds available online, and individual videotex suppliers provide their subscribers with access to one or more such data bases.

Nevertheless, after several years of heavy promotion in over 20 countries, videotex has failed to capture the imagination of the masses, and most suppliers are still trying to discover how many customers are willing to pay for access to information that is otherwise available at a fraction of the cost. So far, no one seems to have discovered the magic formula that brings the price of home videotex services into balance with benefits to subscribers and costs of the operators.

Focus on business

As a result, videotex suppliers have been concentrating on business markets in recent years, peddling transaction-oriented information data bases containing specific facts such as prices, names, addresses and stock quotations that provide a competitive edge to the end user. This is not to say that the home consumer has been forgotten in the shuffle, but it is clear that until the content of videotex services is more appealing, the home videotex user will not embrace such a service on a massive scale.

What also keeps the videotex promoters searching for the magic content formula are the optimistic projections of huge videotex markets in the future, some of which envisage up to 30 million households in North America using videotex by the mid-1990s, when it will become a $30 billion industry.

Recent estimates by Predicasts, Inc. put videotex revenues at about $100 million in 1983, growing at over 100% per year and expected to reach $2 billion as early as 1987. Other forecasts are even more optimistic, predicting as much as $7 billion in revenues in 1987 and up to $10 billion by 1990. But others still do not see that market expanding anywhere near as fast and do not believe it will reach more than $500 million by 1992. These huge discrepancies only underscore the lack of real track record data in this emerging industry.

The entry of CBS, IBM and Sears in a joint venture, however, points to some new directions being taken in the battle to win the home videotex consumer. These are probably best understood when you analyze the operations of the three constituent companies; they offer valuable clues to present and future videotex competition.

Banks and mail-order shopping houses are among the most powerful supporters of videotex because they see it as a means to automate their "front office" activities in an increasingly competitive environment. Sears is, in fact, in both these businesses because it is the largest mail-order house and owns Allstate Insurance Co., Dean Witter Financial Services investment brokers

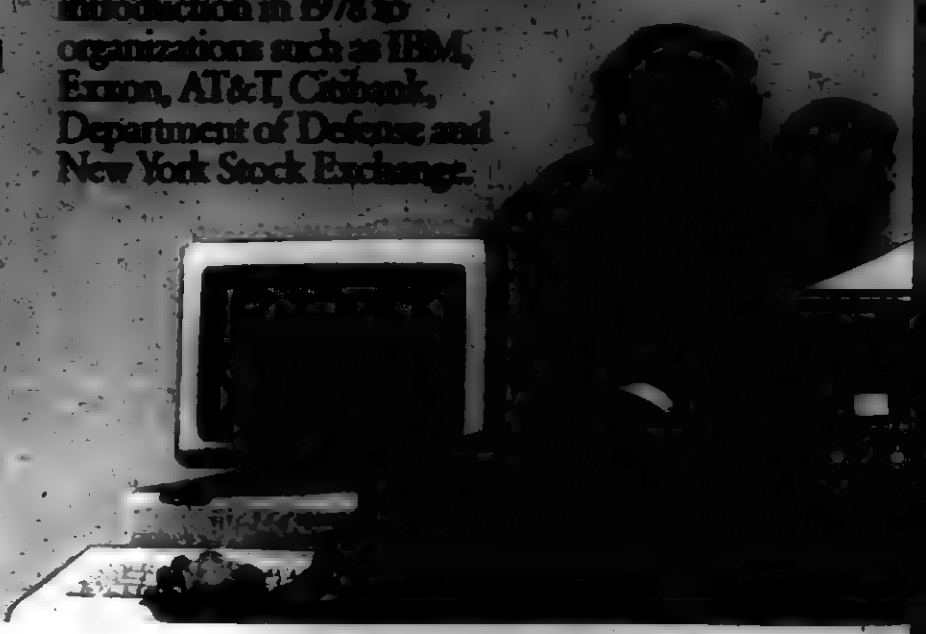
See VIDEOTEX page 152

Electrohome's EDP-57 is the proven and accepted way to project monochrome terminals for group presentations, training sessions and sales meetings.

No other projection system today can work with so many computer terminals!

- Fast, easy set-up by non-technical people.
- Adjustable for flat or curved, front or rear screen projection.
- Interfaces available for over 150 terminals.
- Lightweight and portable; easily moved from room to room.

Thousands of Electrohome EDP projectors have been sold since its introduction in 1978 to organizations such as IBM, Exxon, AT&T, Citibank, Department of Defense and New York Stock Exchange.



COMPUTER INDUSTRY

Former Xerox exec finds advantages to small firm

By Steve E. Owen
Special to CW‡

It's been almost a watchword to most of us growing up that the preferred course is to finish college and get hooked up with one of the big corporations. They offer stability, security and benefits that are often out of reach for employees of smaller firms.

Therefore, it came as something of a shock to my friends and associates, after years of working my way up corporate laddess with two of the largest and best known firms in the world, that I left all that behind to take a position with a small firm. A firm, by the way, that's in direct competition with IBM and Xerox Corp., my former employers.

Granted, the move took me from a mere vice-presidency at Xerox to the positions of president, chief executive officer and member of the board of directors at Western Data Systems, Inc. (WDS). It was not a desire for titles or some personal ambition, however, that helped me decide to make the change. After all, in a business as volatile as computer software and hardware, there is a certain amount of risk involved in such a career switch.

The truth is, there are major advantages that a smaller company has over a larger company. Not the least of the advantages is the opportunity to once again serve customers and not just the stockholders.

That doesn't mean that corporate officers at large companies don't care about their customers — just that priorities are different. When a company has huge capital investments in a particular line of hardware, for instance, its officers have to be constantly cognizant of that fact.

In a small company, the ability — even the necessity — of being responsive to the needs of customers is more highly developed. Customers and products are direct, tangible items with which every person is involved.

Employees are there to see the company grow, to satisfy a market need, not simply to collect a paycheck. There is an excitement, a sense of urgency about the business that is often lacking in larger organizations. There is a flexibility for innovation and change, with no bureaucracy to buck.

In a small company, you can provide 10 improvements to the customer in the time it takes just to get one change approved by an industry giant. A case that speaks to all of the above ideas is that of Western Data Systems itself.

WDS has built its reputation in the field of software development and marketing with an integrated manufacturing and financial system. It's an excellent job shop and manufacturing system, but it had lacked features that one client, heavily involved in government contract work, absolutely had to have.

The upshot was that the company was able to develop a system to meet that client's specific needs. It was able to devote the manpower to bring the whole of the company's resources to bear on the solution of one client's problem.

As a result, a new product was developed that speaks to the specific needs of a hitherto untapped market in the manufacturing industry.

With only two or three layers of top-to-bottom management with which to consult, the decision could be made quickly to take the risk involved in tackling a project like the one outlined. Picture, if you will, trying to get approval of this type of undertaking through the 15 or so layers that exist in huge organizations. You're looking at decisions made in millenia, not hours.

True, the small company makes mistakes sometimes, but progress comes from action, not discussion.

This brings us to another point. In bigger companies, markets are examined and targeted, and products are devised to fit them. The process is backwards, and the solutions devised often fail to anticipate needs that become apparent only by direct customer experience.

Smaller companies tend to reinvest earnings to products and services, not overhead resulting from a massive support structure.

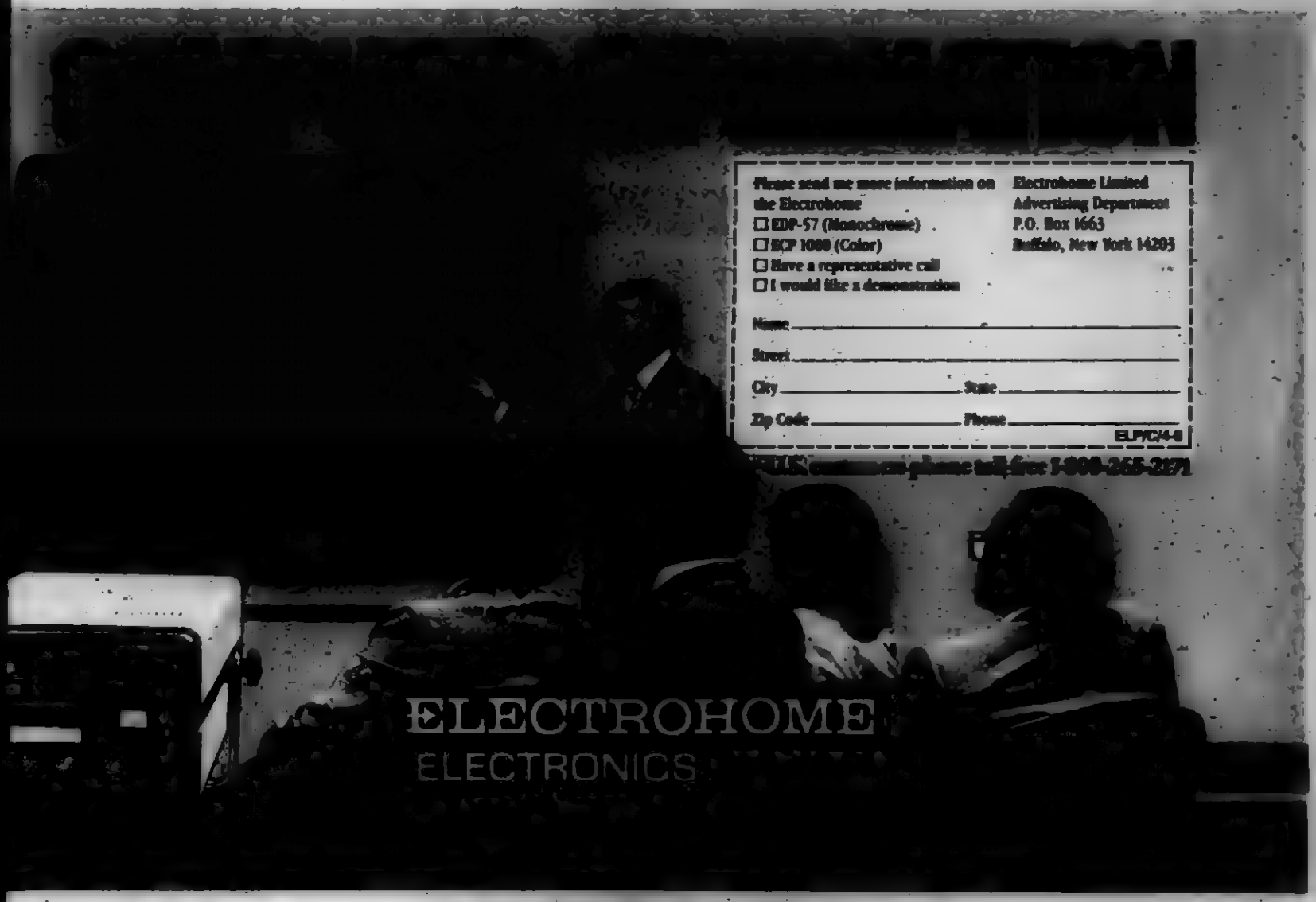
The case of Texas Instruments, Inc.'s sudden pullout from the home computer market illustrates this point. According to news reports at the time, a multimillion dollar advertising campaign was already under way and couldn't be stopped, despite the fact that the computers were going for a song at every discount house and computer store in the country. Possibly the decision was made to continue the campaign just to deplete the warehouse stock, but it's hard to believe it was cost-effective on that basis.

Granted, TI will survive, while a setback like that might have destroyed a company with more limited resources. On the other hand, the smaller outfit would probably have been unable to make such an overcommitment.

In summation, it must be granted that giving up the security and the resources available in a large company is no easy thing. I'm not saying that big is bad, at all. There are disadvantages to being with a small firm that some may feel I've glossed over.

Small isn't for everyone, it's true, but the feeling of excitement, of being able to respond to customer needs in a tremendous industry, is right for me.

Owen is president, chief executive officer and member of the board of Western Data Systems, headquartered in Calabasas, Calif. Previously he was vice-president of planning, development and product marketing for Xerox Computer Services.



See us at NCGA Show - Booth 1808

RCA Service realigns its communications business

CHERRY HILL, N.J. — RCA Service Co. announced recently a reorganization of its commercial communications businesses in a move designed to offer a new level of service to business customers.

The reorganization combines the company's existing data services business with a new automated business communications organization in a single division under the direction of Earle A. Malm II, formerly the division vice-president of telephone systems and data services.

The telephone systems business will now report to Raymond J. Sokolowski, division vice-president of consumer and commercial services, according to a spokesman for RCA Services, a division of RCA.

Malm said the company's "new thrust focuses on developing systems for businesses that have complex data and voice communications requirements. We are investing in the future while building on [RCA] Service Co.'s extensive distribution and service network.

"With our planned investments in automated business communications, we intend to offer systems designed to solve specific customer-application problems. And we will support those systems with high-quality user training, documentation and service," he said.

The reorganization will not affect RCA's telephone systems customers, Sokolowski said.

But the company reportedly plans a more regional structure in managing the sales force and intends to transfer the majority of sales and support personnel into regional offices and existing branches.

ONE OF THE BEST BRAND NAME PRINTERS HAS A BRAND NEW NAME.

GENICOM

The General Electric 3000 family of printers has become an industry leading product. But now, this popular printer series has a new name, because the Data Communication Products Department of GE is now an independently owned company called Genicom.

At Genicom today, we offer the same complete line of printers we offered while a part of General Electric. We have the same facilities, the same nationwide service network, and the same corps of experienced employees...only the name has changed.

Above all, Genicom offers you the same reliable product quality you've come to expect from us over the years. Our Genicom 3000 printers feature outstanding performance for end-users as well as superior flexibility for many OEM's, distributors, retailers and dealers. There are 3000 models with speeds from 40 to over 400 cps. Single or dual mode printing. Type quality from EDP to NLQ. Multi-color printing. Graphics. Selectable type fonts, American craftsmanship and more. There are even 3000 family printers for personal computers...ideal for business needs.

We're proud of the excellent brand reputation we established under General Electric. But now we're going to make a new name for ourselves by bringing you more innovations, and more of the reliable quality you've always found in each of our products.

Genicom Corporation, One General Electric Drive, Dept. M331, Waynesboro, VA 22980. In Virginia, call 1-703-949-1170.

GENICOM

For the solution to your printing needs call

TOLL FREE 1-800-437-7468

Comsat mulls SBS pullout

WASHINGTON, D.C. — Satellite Business Systems (SBS), the joint satellite network venture, may be in the process of losing one of its founding partners.

Communications Satellite Corp. (Comsat) recently confirmed rumors that it is thinking of cutting its losses in the business that was formed with IBM and Aetna Life & Casualty Co. as partners by reducing or selling its interest in the venture.

SBS has reported losses of more than $120 million in each of its three years since it was founded.

In a related development, American Information Technology, one of the seven regional telephone companies, said it had signed a five-year agreement with an SBS subsidiary, SBS Real Estate Communications Corp., to provide communications equipment and services worth a reported $130 million.

Nata to get gear orders

WASHINGTON, D.C. — The Bell Atlantic telephone companies have agreed to process all equipment service orders through the North American Telecommunications Association (Nata).

Nata is the trade association of the competitive telecommunications equipment industry, representing more than 600 non-Bell manufacturers, suppliers and vendors.

According to Nata, the agreement was designed to help the divested Bell operating companies facilitate the installation of business telephone equipment while ensuring that customers of competitive equipment vendors are not discriminated against in receiving those services.

Now you don't have to be rich to be powerful.

Riches and power don't always go together. Take Plexus, for instance. The world's most powerful UNIX*-based supermicros.

Powerful because multiple processors share the UNIX load. So processing power is distributed to where it does the most good.

Terminal I/O. Disk I/O. Data communications. And, of course, data processing.

Our unique architecture also lets us bring you the world's first UNIX Network Operating System (NOS). So you can combine Plexus systems in an Ethernet network for even more power.

NOS gives you real time, continuous access to files. From anywhere in the network.

Files are also updated on the same basis. So everyone in the network works with up-to-the-minute data. Automatically.

No waiting for file transfers. And that's a decided improvement over everything else that's out there.

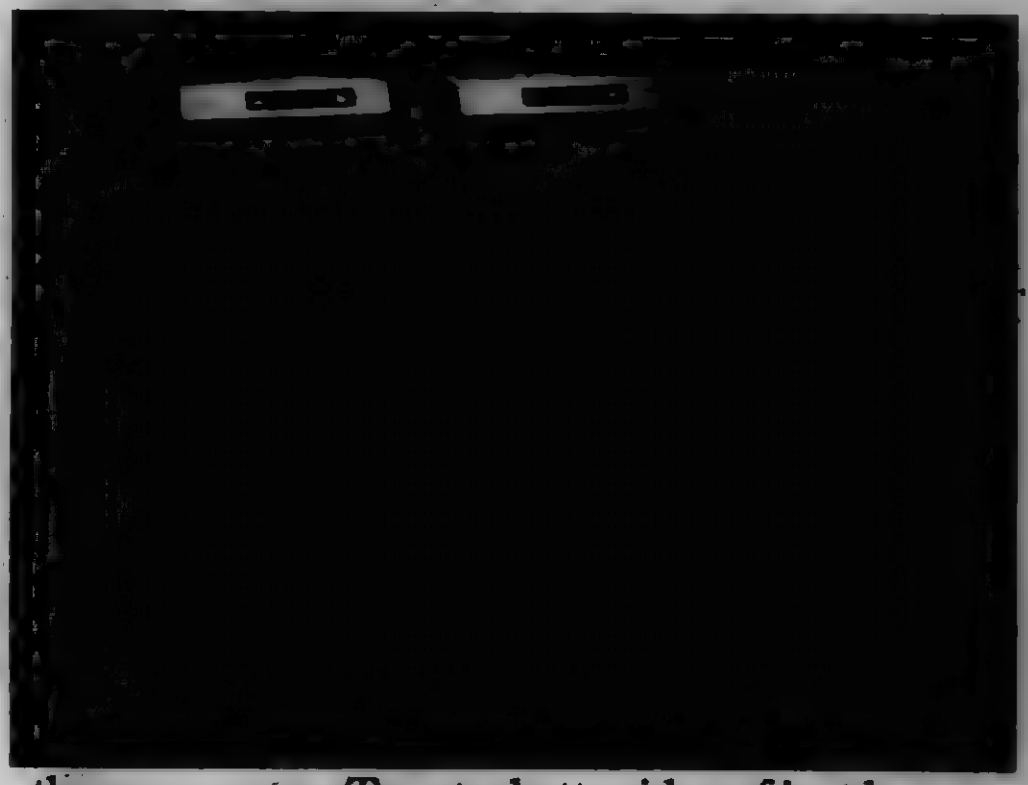
You also get to save money on powerful UNIX-based software, including COBOL, FORTRAN, Pascal, BASIC, and C. Database management and word processing, too. As well as hundreds of third party UNIX packages.

Plus our own software and maintenance support. And even a software referral service for your OEM programs.

Does all this make us expensive?

Absolutely not.

In fact, Plexus systems cost thousands of dollars less than the minicomputers we outperform.



To get a better idea of just how good that performance is, come get a demonstration. Call *800-528-6050*, ext. *1444*. In Arizona, *800-352-0458*, ext. *1444*. Or write Ralph Mele at Plexus Computers, Inc., 2230 Martin Avenue, Santa Clara, CA 95050.

You see? You don't have to be rich to be powerful. Just smart.

PLEXUS

Built for speed.

© Plexus Computers, Inc., 1983
*UNIX is a trademark of Bell Laboratories.

COMPUTER INDUSTRY

EXECUTIVE CORNER

C.M. Chung has been elected president and chief operating officer of General Instrument Corp.

■

Mitsubishi Electronics America has named four new executive vice-presidents. They are **Ric Fechtman**, administrative and operations group; **Yoshiro Kitada**, electronics and communications group; **Hiro Taniguchi**, semiconductor division; and **Rempei Tsuchiya**, assistant to the president.

■

Daniel A. Hesse has been appointed chief executive officer at Devox Communications Corp.

■

Russell J. Hit has been appointed vice-president of operations at Sun Microsystems, Inc.

■

Richard H. Lassier has resigned as executive vice-president and a director of Raster Systems Corp.

■

Angelo V. Cappuccio has joined California Devices, Inc. as chief financial officer.

■

Informatics General Corp. has announced the following appointments in the Financial and Insurance Systems Group: **M.L. Bradley**, group vice-president; **Terry D. Jung**, vice-president, finance and administration; and **William L. Altes**, vice-president of sales. **Stanley A. Alekna** has been promoted to vice-president/general manager of the company's Life Insurance Systems Division.

■

James G. Warner has been named vice-president of Cortex Corp.

■

Arthur J. Schneider has been named vice-president, advanced technology, in the computer systems operations of Sperry Corp.

■

John Molitor has been named president and chief operating officer of BKW, Inc.

■

David C. Fries has been appointed president and elected a director of Ibis Systems, Inc.

■

Robert A. Halab has been appointed chief financial officer of Tymshare, Inc.

■

Carole Morton has been named president of Dylakor, Inc.

■

Roger Gower has been named president of Qume Corp., succeeding **David Sen-Lin Lee**, founder of Qume, who has been named a vice-president of ITT and head of ITT's Business Information Systems Group.

■

Peter A. Davis has been elected president of Open Systems, Inc., the microcomputer division of University Computing Co.

■

Stephen G. Jerritts, president of Lee Data Corp., has been elected to the additional office of chief executive officer, succeeding company founder **John M. Lee**. Lee will remain chairman of the board of directors. **Wayne A. Zachike** has been elected vice-president, corporate controller and treasurer of the company.

■

Jim M. Smaha has been promoted to vice-president and general manager of the semiconductor division of National Semiconductor Corp.

■

Robert W. Casey has been named vice-president, international, at The Ultimate Corp.

■

John J. Christman has been named corporate vice-president and general manager of the data products division of Facit, Inc.

■

Ronald W. Braniff has been appointed president of ASK Computer Systems, Inc. **Sandra Kurtzig**, founder and former president of ASK, continues as chief executive officer and chairman of the board.

■

Scott McNealy has been appointed president and chief operating officer of Sun Microsystems, Inc.

■

Terry D. Cardor, president of Reynolds & Reynolds Co., has been named chief executive officer following the resignation of **E.F. Strasser**. Strasser will remain chairman of the board. **Budd L. Tipple** has been named senior vice-president and chief operating officer.

■

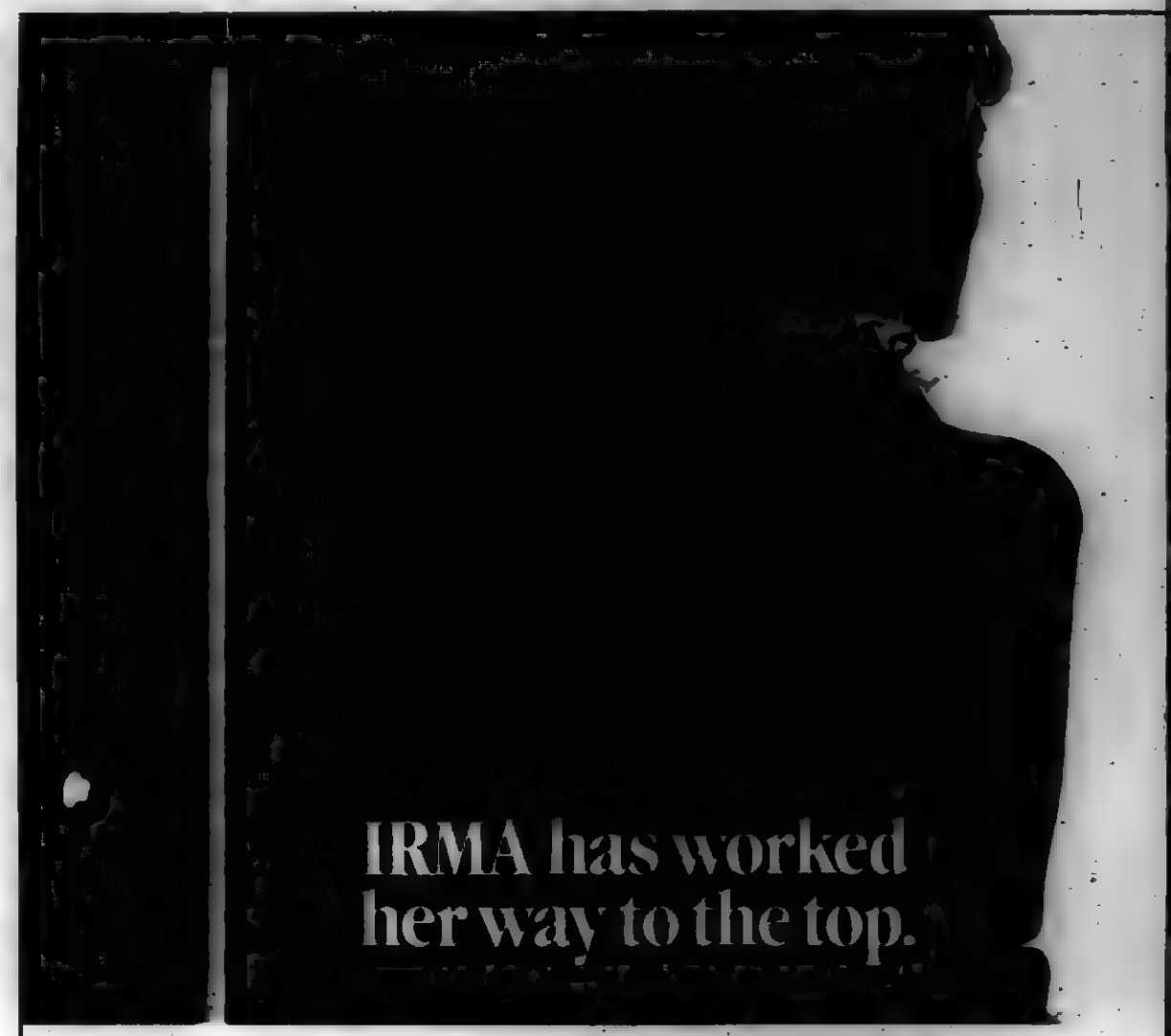
Richard Kemp has been appointed chief operating officer and general manager of Wordplex Corp.

Amdahl income seen down in '84

SUNNYVALE, Calif. — Amdahl Corp. announced recently it expects first-quarter 1984 income to be less than experienced during the comparable period one year ago.

According to John C. Lewis, Amdahl president, "The results of our European operations will be below expectation for the first quarter. This is mainly caused by 580 processor installation deferrals in favor of models and features which will commence volume shipment in the third quarter and by the negative effect on earnings of foreign exchange rates as compared to a year ago."

In the first quarter of 1983, Amdahl earned $7.4 million, or 12 cents per share, on revenues of $171.6 million. Analysts generally expected some increase for the first quarter of this year.



She's Director of Decision Support, the leader in IBM 3270 mainframe/PC networks.

IRMA is taking charge! Her performance in over 25,000 IBM 3270 mainframe/PC installations has made her the industry's leading Decision Support Interface.™ Why? Because IRMA works. Easily and economically, IRMA's on the job giving PC users mainframe data access, selection, storage and communication back to the mainframe.

She's more capable than ever.

IRMA is a printed circuit board that slips into any available IBM PC/PC XT slot and attaches via coaxial cable to a 3270 controller. She's as easy to work with as the PC itself and provides standard text file transfer software

IBM PC and IBM PC XT are trademarks of International Business Machines Corporation. Apple Lisa is a trademark of Apple Computer, Inc.
DEC Rainbow is a trademark of Digital Equipment Corporation.

COMPUTER INDUSTRY

HP exec reveals Personal Productivity Center concept

By Robert Bolt
CW West Coast Bureau

LOS ANGELES — "The office will be the backbone of all our computer activities over the next four to five years," a Hewlett-Packard Co. executive said here recently while announcing a strategy to market integrated office automation systems based around microcomputer networking.

Edward McCracken, general manager of HP's Business Development Group, announced the company's Personal Productivity Center concept at a press conference during the 1984 Office Automation Conference, sponsored by the American Federation of Information Processing Societies, Inc.

McCracken said HP will center its office automation marketing efforts on systems integrating the HP 3000 distributed processing system, interactive office software and the HP 150 touch-screen personal computer.

HP officials said the concept will provide office professionals, support people and clerical staff with word processing, personal file, graphics, spreadsheet analysis and data processing capabilities.

McCracken said the Personal Productivity Center is HP's response to swiftly merging markets for data processing, personal computing, office automation, word processing and networking capabilities.

The integrated market, he said, will create a need for a departmental work-group computer that will effectively manage a network of personal computers and office workstations handling both data processing and office applications, such as word processing and electronic mail.

"By tightly integrating the functions of personal computers, secretarial workstations, departmental computers and office software, we believe we can serve a market which is expected to reach $23 billion by 1988," McCracken asserted.

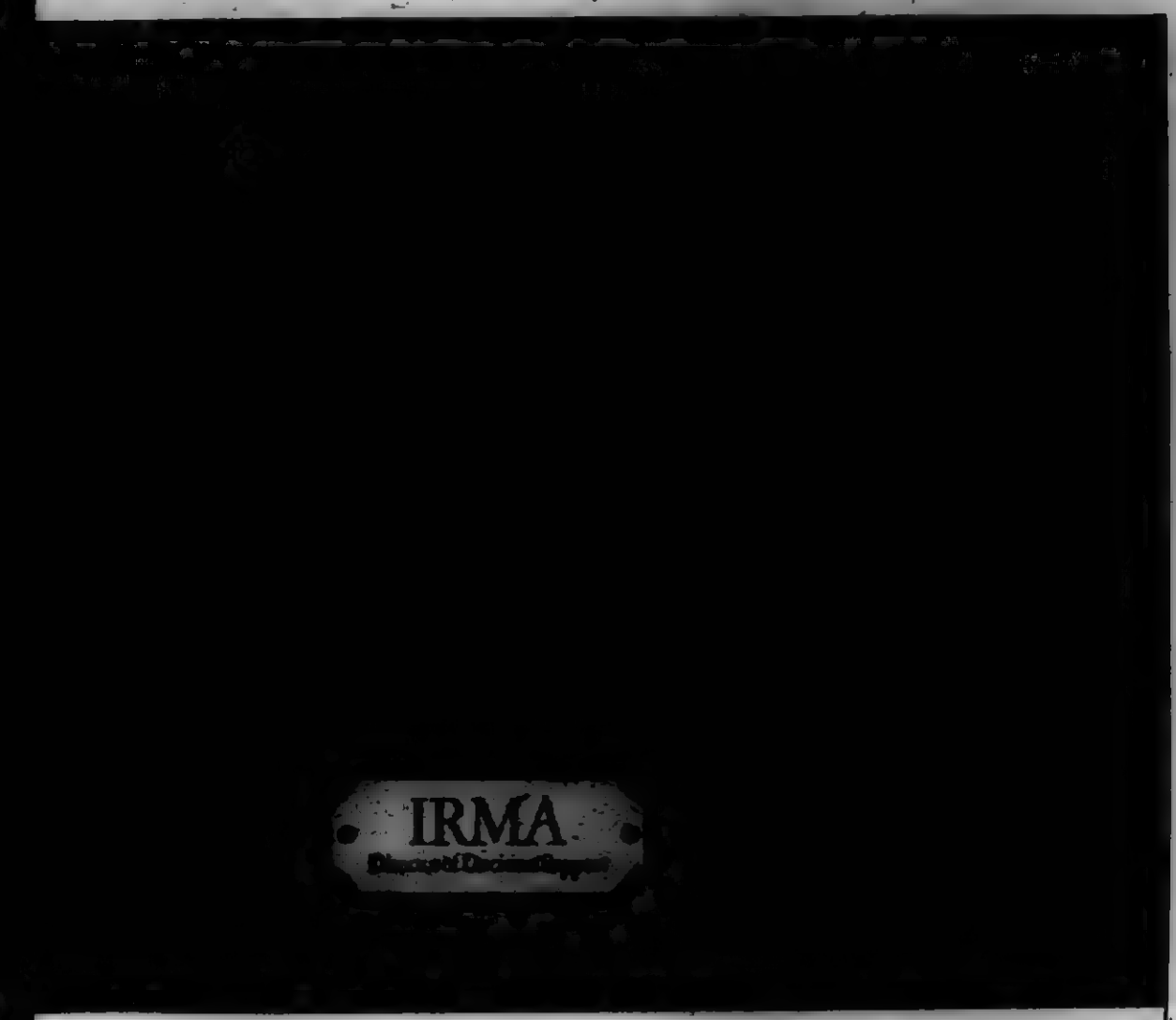
The company intends to provide applications access, data access, resource sharing, communications services and information management to users of both personal computers and MIS.

"The concept of the Personal Productivity Center lets personal computer users, who have developed individual applications on their personal computers, also take advantage of the more powerful data bases or office software on larger computers," McCracken explained.

HP officials said a small Personal Productivity Center might consist of several HP 150 touch-screen personal computers used as managerial workstations, HP 2626 secretarial workstations, an HP 3000 business computer and various office software.

Larger Personal Productivity Centers could link more than 100 personal computers or workstations in a single HP 3000-based network.

Embracing the concept of open architecture, company officials announced that in the future conversion capabilities between HP's word processing software and other key WP products will be provided. One example, they noted, is the current development of an interchange facility between HP Word and Wang Laboratories, Inc. products.



for VM/CMS and MVS/TSO mainframe environments, in addition to optional APL Terminal Emulation.

She's got more to offer.

Other IRMA products give you more ways to build cost-effective IBM 3270 and IBM PC-based decision support networks.

IRMALINE™ is the first coaxial link between 3270 networks and remote personal computers, including the IBM PC/PC XT, the Apple Lisa, the DEC Rainbow and others.

IRMALETTE,™ the Asynchronous Interface, lets you run the same IRMA software in your remote personal computer that you run in the office.

So connect with success. With IRMA products from DCA. Call 1-800-241-IRMA.

Connect with success.

dca
Digital Communications Associates, Inc.

IRMA, IRMALINE, IRMALETTE and Decision Support Interface are trademarks of Digital Communications Associates, Inc.
©1984 Digital Communications Associates, Inc., 303 Technology Park, Norcross, GA 30092. (404) 448-1400, TLX 261575 DCAATL.

5¢ NICKELS AND DIMES

Analogic Corp.'s reported sales for the second quarter ended Jan. 31 were $36.5 million. Net income increased 39% to $4.9 million, or 27 cents per share, from $3.5 million, or 21 cents per share, in 1982.

■

Lanier, Inc.'s reported revenues for the year were $54.2 million, down 13% from 1982. Earnings per share of 37 cents were up 19% from the fourth quarter of 1982.

■

American Software, Inc. reported revenues for the third quarter of fiscal 1984 were $6.2 million, up 37% from 1983. Net earnings increased $1.3 million, or 33 cents per share, up 41% from $960,000, or 23 cents per share.

■

Applied Data Research, Inc.'s reported revenues for 1983 were $89 million, an increase of 30% over 1982. Income was $12 million compared with $8.3 million, a 43% increase. Net earnings for 1983 were $6.9 million, or $1.45 per share, compared with $4.7 million, or $1.16 per share, in 1982.

■

Schnucks Software Systems, Inc. approved a 2,000-for-one split of the company's common stock, increasing the company's authorized shares to 2,400,000. The split will be effective to shareholders March 30, and shares will be distributed April 16.

■

Scarborough Systems, Inc. has obtained private equity financing of $6 million from an investment group. The financing group was assembled and coordinated by Alex Brown & Sons and by Morgens, Waterfall & Vintiadis.

SHORTSHEETS

Educom Computer Literacy Project has been awarded a $50,000 Exxon Education Foundation grant to support activities during 1984.

■

Cobe Laboratories, Inc. has entered negotiations with IBM for the possible purchase of a portion of assets of IBM's Biomedical Systems.

■

Data General Corp. has expanded its software development environment marketing program by appointing Redm Corp. as the marketing representative for Ada Work Environment.

VIDEOTEX from page 146

and Coldwell Banker Commercial Group, a nationwide commercial real estate broker firm. All of these operations could vastly improve their sales and productivity through transactional videotex services because they deal mostly in transmitting information.

IBM is also eminently suited to provide the hardware and software linking the ubiquitous IBM Personal Computer and other personal computers into sophisticated data bases that will also provide priceless real-time consumption and demand patterns to product and service suppliers that will cooperate with such a conglomerate.

CBS, on the other hand, can provide the customized entertainment content for such networks to take some of the boredom out of the more mundane videotex applications. There have been suggestions of interactive soap operas, for example, where subscribers get an opportunity to influence the unfolding story by voting to kill a particularly nasty character or to play the latest video games delivered electronically to their homes for a tryout.

For the individual investor, however, videotex does not appear to offer any unusual investment opportunities. Videotex services require huge resources, and other such ventures as Dow Jones & Co.'s News/Retrieval Service, Times Mirror Co.'s Videotex America, AT&T and Knight-Ridder, Inc.'s Viewdate and others are being introduced by large corporations or even larger joint consortia.

SEMI from page 135

erasable programmable read-only memory device; and the F245 microprocessor from Fairchild Camera & Instrument Corp.

Most computer manufacturers have adopted a multisupplier strategy in order to secure the parts they need. Altos Computer Systems, Inc., for instance, uses five U.S. vendors and three overseas manufacturers to supply itself with the 750,000 chips a month, including 100,000 dynamic RAMs, used in the production of its range of 8-bit and 16-bit small business computers.

"We have seen a definite lengthening of lead times, and over the last two months, we have been forced to obtain an increasing number of devices from distributors — up to 15% of our total supply — which means we are paying premium prices on those parts," Gary Strewter, vice-president of manufacturing at Altos, commented.

David Cochran, vice-president of quality, reliability and technology at Xebec Corp., a San Jose, Calif.-based manufacturer of hard disk drives and controllers, said prices are rising dramatically. "The spot market has increased tremendously, with a several dollar premium paid for those hard-to-get parts that have to be procured now to fill system deliveries," he claimed.

Exorbitant prices

Cochran said prices have already become exorbitant, with contracts made six months ago being ignored by semiconductor vendors in favor of renegotiated or more lucrative contracts.

According to Dick Rathman, vice-president of engineering at Durango Systems, Inc., a Silicon Valley-based small systems manufacturer, the rise in prices for large-scale integrated processor parts (from approximately 15 cents a piece in 1982 to over $1.40 a piece today) is typical of what is happening in the marketplace.

"Because of the shortages, we are having to carry excess inventory and pay premium prices to ensure we get what we need. With the larger semiconductor vendors, most of the chips are already allocated, which means we cannot ramp up production even if we wanted to," he said.

William Strauss, vice-president at Integrated Circuit Engineering Corp., a Scottsdale, Ariz.-based market research firm, predicted bankruptcies, particularly in the personal computer market: "There will be companies that cannot ship their computer products because of the lack of chips. The question is how long can they hold up without sufficient supplies? Those who survive may well be those who can afford to pay the expensive prices demanded and who can afford to ship their products at a loss for a while."

TIME
Your Most Precious Resource

In any business, time is money! This is especially true when dealing with Data Communication Networks where system performance and RESPONSE TIME is critical to the user.

Degradation of system performance (responsiveness) is inevitable as customer work loads increase. Installing faster, more sophisticated hardware is a popular but temporary solution. It is only a matter of time until the problem reappears.

Questronics offers a solution through statistical performance analysis of your system. Over seventy-five categories of line utilization and response time information can be generated in eleven different reports (hard copy and/or data based).

Questronics model CPA/7 is setting the standard in the industry by providing vital performance statistics in the areas of:

- •User/System Response Time
- •Network Transmission Time
- •Line Utilization
- •Polling Counts
- •Character Transmission Counts
- •Poll List Wrap Time
- •Transmission Errors
- •Histograms
- •Host Resident Time
- •Alarm Conditions

Utilizing this information, DataCom managers can then make the crucial decisions necessary to fine tune and balance the network. Each line may also be further refined to greater efficiency, enabling planning and projection for new growth.

Call Questronics and discuss your situation. We'll give you straight answers.

SEE US AT BOOTH #1000
INTERFACE '84

Answers through Analysis
QUESTRONICS INC.
3985 South West Temple, #5 • Salt Lake City, Utah 84115 • (801) 262-6923 • TWX 910-925-4000

"IDMS/R represents a major advance in database technology."

Dave Litwack*

Because IDMS/R is the first relational DBMS designed for both the DP professional and the end user.

IDMS/R is not only a relational database management system, but a particularly powerful one. IDMS was made relational by removing all pointers and allowing the user to define data as tables and providing the traditional relational operators such as selects, projects and joins. The major benefit of a relational DBMS is the capacity to develop applications faster because the developer does not have to be concerned with the database design. IDMS/R provides this and much more.

For example, the Automatic System Facility (ASF) of IDMS/R is a major advance over fourth generation languages. The ASF is so comprehensive and easy to use that all a user need do, to develop an application, is define a relational record. The Automatic System Facility dynamically generates all necessary supporting structures including data definitions, screen formats, application processing logic, and documentation. So, the developer can witness the application being produced, literally, in seconds. This capability makes IDMS/R the perfect system for the end user.

Data processing professionals can use the ASF to help develop production applications. The ASF can be used to build a prototype that can be enhanced, using Cullinet's fourth generation language, ADS/OnLine, into a complex production application. But, when they build a complex high volume application using IDMS/R, DP professionals require outstanding performance. Typically, 5% of the data relationships (joins) in any application are accessed 95% of the time. With IDMS/R, they can simply change these relationships to predefined joins and benefit from a dramatic boost in performance. We call it Relational Fastpath. Relational Fastpath makes IDMS/R a unique DBMS and a perfect system for DP professionals' system development needs.

In addition, IDMS/R has the most sophisticated back-up and recovery capability of any DBMS, full integration with personal computers and is also integrated with Cullinet's complete line of financial and manufacturing applications.

In summary, IDMS/R was designed to satisfy the requirements of those who want to develop applications faster and those who have the responsibility of processing them.

For further information, attend a Cullinet Seminar. Mail the attached coupon or call Cullinet at 1-800-225-9930 (in Massachusetts, 617-329-7700).

*David Litwack is Cullinet's Vice President of Product Development. Mr. Litwack has contributed significantly to the many technical advances Cullinet has achieved in database software products, including IDMS/R. Mr. Litwack joined Cullinet in 1976. He is a Cum Laude graduate of Brandeis University and holds a Masters in Computer Science from Boston University.

IDMS/R Seminar cities and dates

City & State	Date	City & State	Date	City & State	Date
Albany, NY	June 12	Fairfield, NJ	June 7	Ottawa, ON	May 8
Albuquerque, NM	May 2	Ft. Worth, TX	June 12	Ottawa, ON	June 5
Anchorage, AK	May 23	Grand Rapids, MI	June 7	Phoenix, AZ	April 12
Appleton, WI	April 12	Greenville, SC	May 24	Pittsburgh, PA	May 16
Atlanta, GA	May 15	Harrisburg, PA	May 8	Portland, ME	May 15
Atlantic City, NJ	May 10	Hartford, CT	May 9	Quebec City, PQ	May 17
Austin, TX	May 31	Houston, TX	May 10	Regina, SK	June 13
Baltimore, MD	June 5	Indianapolis, IN	May 8	Richmond, VA	May 16
Battlecreek, MI	May 15	Jacksonville, FL	May 1	Sacramento, CA	June 5
Boston, MA	May 23	Kansas City, MO	May 2	St. Louis, MO	April 11
Boston/Danvers, MA	May 3	Knoxville, TN	June 13	San Antonio, TX	May 16
Bridgeport/ New Haven, CT	May 22	Lincoln, NE	June 7	San Diego, CA	May 8
		Los Angeles, CA	May 1	San Francisco, CA	May 24
Calgary, AB	May 23	Louisville, KY	May 10	San Jose, CA	May 15
Charlotte, NC	May 10	Lubbock, TX	May 1	Seattle, WA	June 12
Cheyenne, WY	May 22	Lynchburg, VA	May 17	Springfield, IL	May 17
Chicago, IL	May 3	Miami, FL	May 17	Tampa, FL	June 6
Chicago, IL	June 12	Milwaukee, WI	May 1	Toledo, OH	April 11
Cincinnati, OH	May 14	Milwaukee, WI	June 14	Toronto, ON	May 17
Cleveland, OH	May 24	Morristown, NJ	May 8	Tulsa, OK	May 22
Colorado Springs, CO	May 16	Nashville, TN	May 3	Valley Forge, PA	May 17
Columbia, SC	April 12	New Orleans, LA	May 24	Waco, TX	May 15
Columbus, OH	May 2	New York, NY	May 15	Washington, DC	May 9
Dallas, TX	May 15	New York/Rye, NY	June 12	Wichita, KS	June 6
Denver, CO	June 13	Norfolk, VA	June 14	Wilmington, DE	May 22
Des Moines, IA	May 16	Omaha, NE	June 13	Winnipeg, MB	June 12
Detroit, MI	May 23	Orlando, FL	May 24	Worcester, MA	May 24

I'd like to attend your seminar on _____ (date) in _____ (city)

Computer _____

Name/Title _____

Name/Title _____

Company/Department _____

Address _____

City _____ State _____ Zip _____

Phone ( ) _____

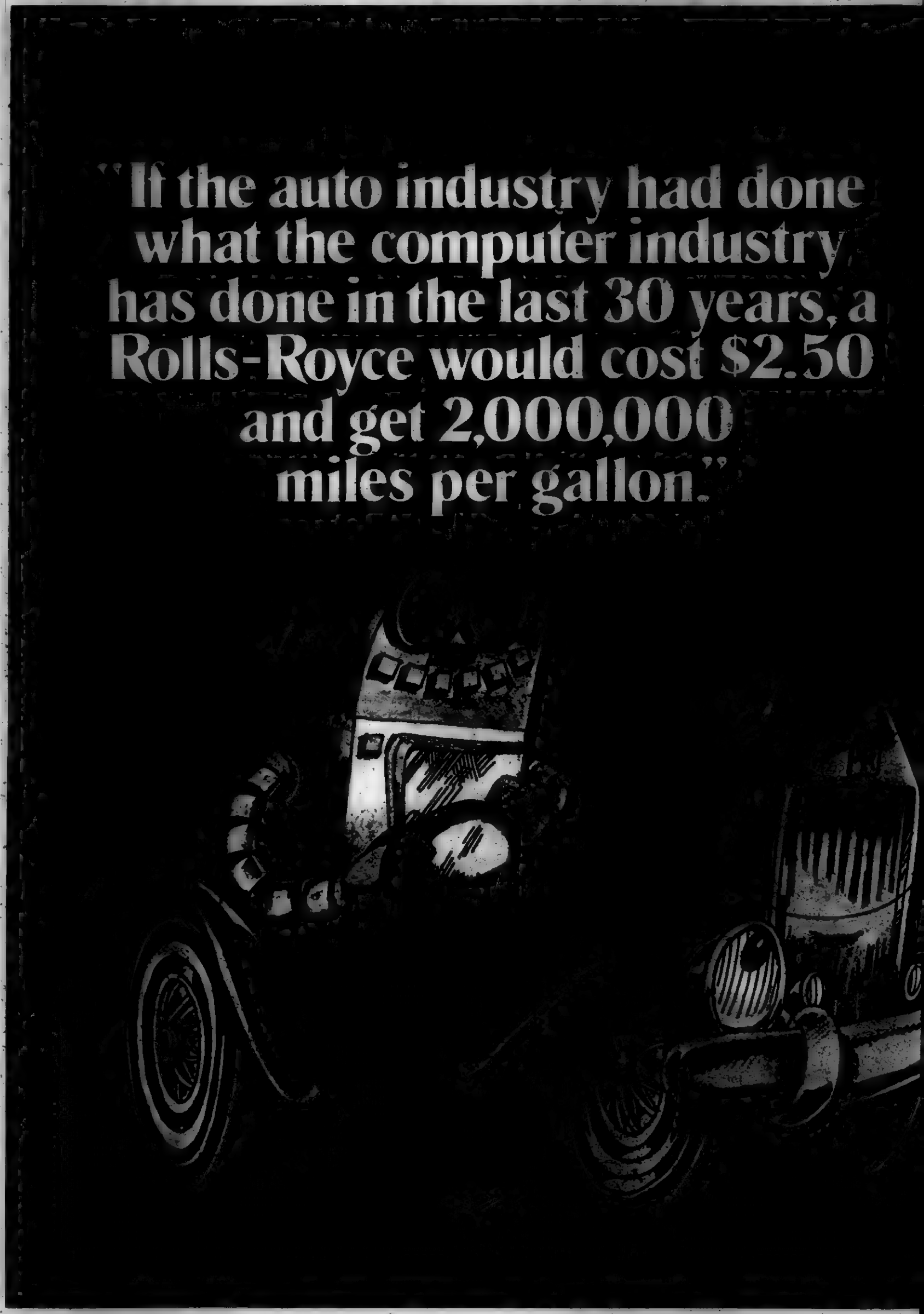
Mail to: Cullinet Software, Inc., 400 Blue Hill Drive, Westwood, MA 02090-2198 ATTN: Corporate Meetings

Cullinet Software products are designed to run on IBM 360/370, 30XX or 43XX or plug-compatible computers. 4a ow

Database: Cullinet

© 1984 Cullinet Software, Inc., 400 Blue Hill Drive, Westwood, MA 02090-2198

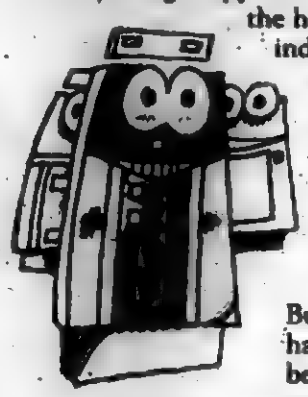
"If the auto industry had done what the computer industry has done in the last 30 years, a Rolls-Royce would cost $2.50 and get 2,000,000 miles per gallon."



Computers aren't just an industry, they're a revolution in the way mankind operates. And no one covers this revolution better than we do!

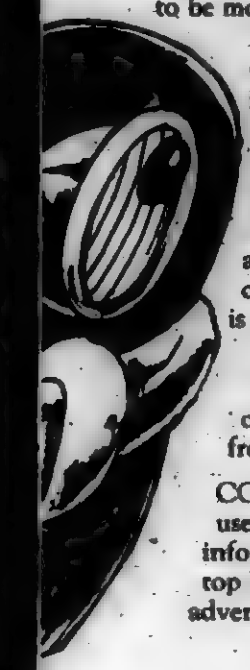
We are CW Communications/Inc. and despite our youth (only 15 years) we're the world's largest publisher of newspapers and magazines for computer people all over the world.

Most of our publications are weekly newspapers, because so many things happen so rapidly in the computer business (as the headline quote from a prominent industry executive makes so clear). In only thirty years the industry has gone from the development of the giant Eniac system, through the tube-powered, water-cooled Univac I (the world's first business computer), to the incredibly cheap, battery-powered microprocessor.



But as unbelievable as the last 30 years have been, the next 30 will probably be even more incredible. In the next two years alone, the installed power of general purpose computer systems will grow almost as much as it did in the previous 16 years. And the supercomputers of the 90's will transfer data at a rate several hundred times faster than even today's speedy computers! It's hard to remember this is real science, not fiction.

This extraordinary increase in efficiency has led to a rapid expansion in computer use, as human ingenuity finds more and more applications for these powerful tools. So the market for computer products and services has turned out to be more elastic than most observers had thought.



Worldwide expenditures are currently at $90 Billion, and growing by 20% a year.

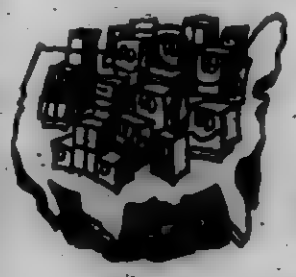
A constant flow of new products; rapid changes in technology; more and more new applications; and large and growing expenditures. It's an industry with a strong need for current, complete and accurate information. Which is where we come in.

Our oldest publication is COMPUTERWORLD, a weekly newspaper with a growing all-paid circulation in excess of 120,000 (quite an increase from our modest 7,500 in 1967).

COMPUTERWORLD serves America's computer users with the consumer-oriented, objective information they need. And it has become America's top business/professional publication, measured by advertising revenue.

ISO WORLD is our semi-monthly publication for retailers, dealers, distributors and other independent sales organizations (ISOs) in the resellers marketplace. This is a relatively new marketplace which has grown up around the minicomputer and microcomputer, and which shows every sign of very rapid growth for at least the next decade.

The latest phenomenon of the computer industry is personal and desk-top computers and we're covering it with our newest publication, INFOWORLD and PC WORLD. INFOWORLD is a weekly newspaper for all micro users and it features complete software and hardware reviews, while PC WORLD is a monthly magazine devoted to users of the IBM PC and compatibles.



The United States alone accounts for nearly half of the worldwide computer market, but billions of dollars are spent by foreign computer people for American-made computers and computer products. And our publications penetrate those marketplaces, too.

We are publishers of newspapers and magazines in the following markets: Australasia, West Germany, United Kingdom, The People's Republic of China, Japan, Brazil, Mexico, France, Spain and Denmark.

And we provide U.S. advertising representation and editorial services to publications in the following countries: Italy, Greece, The Netherlands, Sweden, Argentina, Chile, Southeast Asia and Kuwait.

Our International Marketing Services Department can give you one-stop advertising service for any or all of these publications — including translation and production services. We'll even bill you in U.S. dollars, so it's easy as advertising in U.S. publications.

Computing is an exciting industry, with a unique need for information. And the publications we produce provide that information to nearly two million computer-involved people around the world. They are excellent vehicles for reaching these people with your advertising message, and we'd be happy to give you more information on any of them. Just call or write, Don Fagan, Vice President, Sales.

CW COMMUNICATIONS/INC.

375 Cochituate Road, Box 880
Framingham, MA 01701 (617) 879-0700

COMPUTER INDUSTRY

MART from page 135

— have a harder row to hoe in winning consumer confidence. "We have to be a little more giving, more flexible, in extending our 'consumer protection' coverage," according to Chuck Newman of Newman Computer Exchange, Inc., a DEC aftermarketer based in Ann Arbor, Mich.

What has helped legitimize the business even more, Newman said recently, is the emergence of a slew of price-trend reporting services.

Since most of the blue book publishers also happen to be used computer dealers, a caveat emptor seems to be in order: Charlie C. Greco, director of Financial Information Planning with International Data Corp., an industry analysis firm in Framingham, Mass., said, "I would suggest deducting at least seven points going in, and on top of that, question the availability of the product."

Forearmed with price information, the careful shopper should know precisely what he wants, according to Ken Bosomworth of International Resource Development, Inc. of Norwalk, Conn., another industry analyst. "Virgins should stay clear of the used market, but then most do," he added. "First-time users need the support systems that only the manufacturer can provide."

Dealers shy away from giving advice. "We don't want customers to buy on our say-so and then discover it doesn't meet their needs," Newman pointed out. Added CDLA President Rick Forsythe, "I think of us as soybean traders who've never seen the farm."

IBM still an influence

While IBM may no longer own the equipment, it still influences the asking price. "The secondary market lives permanently in the shadow of IBM," Forsythe admitted.

Steve Deixler of Princeton Computer recalled when IBM, a few years ago, announced price cuts for its 3350 disk drive in anticipation of introducing the more advanced Model 3380. The aftermarket became glutted with the earlier model, and prices plunged precipitously. Then IBM encountered some production problems, and the 3380 debut was delayed, so 3350 prices shot up. Then the 3380 began coming on stream, and prices plunged once more, now down to 20% of what IBM had discounted it to. "It's a yo-yo that can drive you bananas," Deixler complained.

It also troubles some dealers that IBM will refurbish turned-in equipment and reintroduce it to its primary market as brand new.

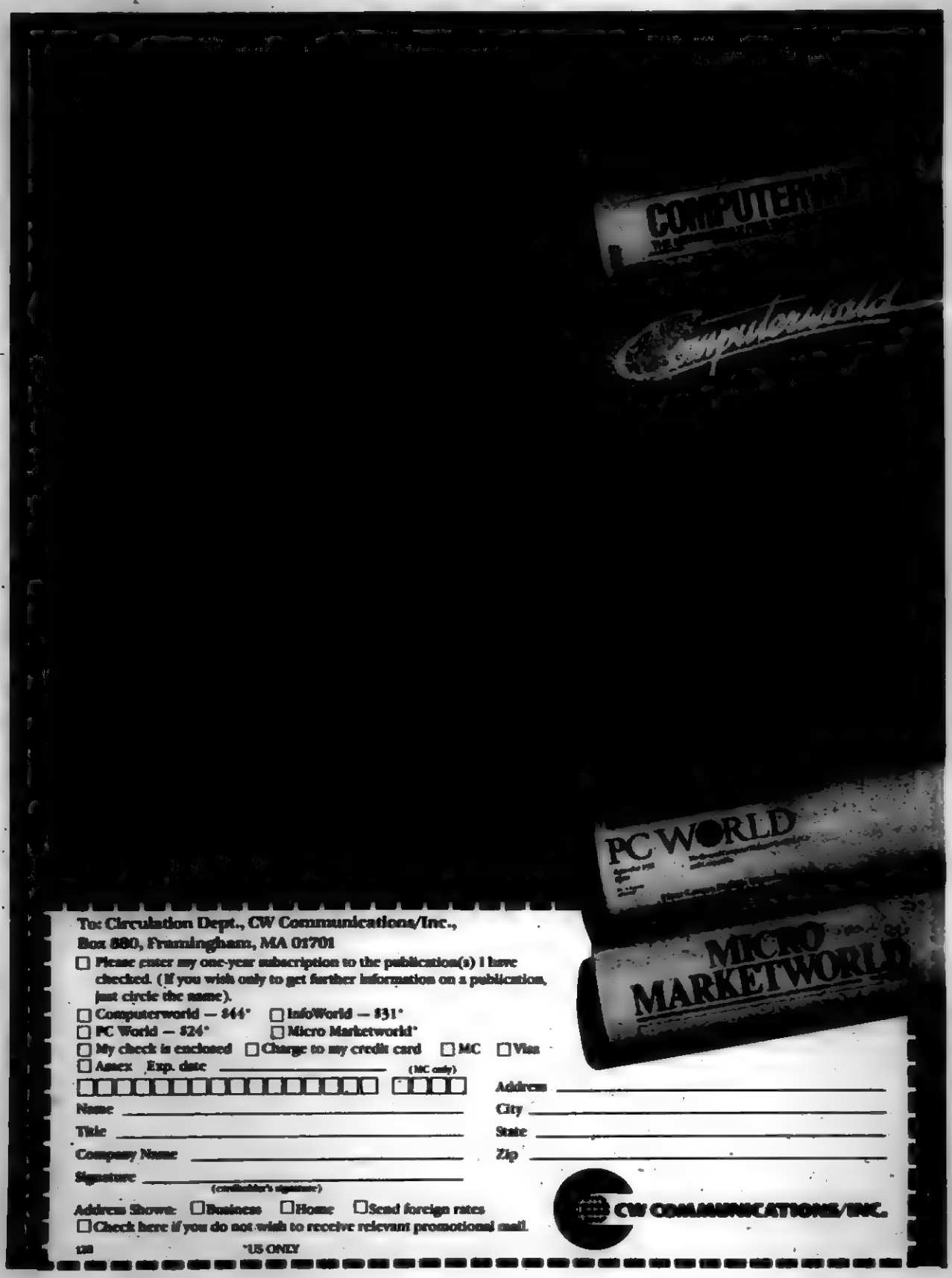
If there is such a thing as an "average" savings to be realized by tapping the secondary market, the consensus seems to be anywhere from 15% to 20%. It makes no difference whether the equipment is actually used or still fresh in the box.

On an individual basis, of course, savings can be enormous. It's still possible to pick up an IBM 3031 or 3033 disk drive for as much as 98% off — or two points short of a giveaway.

And that's really the biggest reason for going to the aftermarket; not just to pick up a bargain, but to get immediate delivery when the manufacturer smiles patronizingly and tells you it can't be done.

Next week: Big Blue's Credit Corp. has aftermarket dealers nervous.

Model is a former editor and contributor to several publications and is a public relations consultant to government and industry.



UNIX from page 135

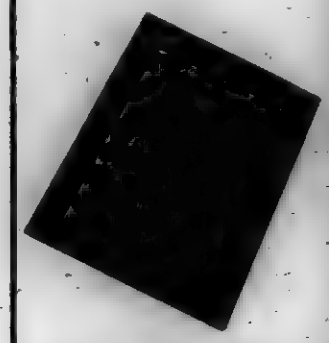
future operating systems from other vendors. Consequently, the jury will remain out for a while as to whether AT&T can become a key player in the information processing marketplace.

■

Storage Technology Corp. (STC) said recently it is studying IBM's recent announcement of the 3480 tape subsystem. STC said it has developed the technology "needed to move in several directions"; move it must, and rapidly, in a focused direction.

For STC to leapfrog IBM, the obvious direction would be rapid development of its optical storage subsystem technology. Pure archive application is one thing, but what is really needed to leap ahead is a cost-effective means of reusing optical storage disks.

POSITION ANNOUNCEMENTS



Yes, our track record is far better than most in the industry. No, we're not perfect; but our guarantee is:

"If, for whatever reasons within a specified time frame, you are not satisfied with a ROMAC® placement, we will honor our written guarantee."

We're that sure we can make the kind of placement for you that stays placed.

ROMAC®, the placement firm with a proven record of placement success in the data processing profession.

Meet with Success.

CONNECTICUT
140 Sherman St.
Fairfield 06430
203-255-9145
One Financial Plaza
Hartford 06103
203-525-0877

FLORIDA
888 W. Cypress Creek Rd.
Ft. Lauderdale 33309
305-938-0811
One Tampa City Center
Tampa 33602
813-228-0327

GEORGIA
3340 Peachtree Rd., NE
Atlanta 30326
404-231-3535

MAINE
477 Congress St.
Portland 04101
207-773-4799

MARYLAND
20 So. Charles St.
Baltimore 21201
301-625-0400

MASSACHUSETTS
125 High St.
Boston 02110
617-482-6616
One Newton Exec. Park
Newton 02162
617-964-4910

MINNESOTA
4440 IDS Center
Minneapolis 55402
612-333-0126

NEW JERSEY
S. Rt. 17
Paramus 07652
201-845-7440

NEW YORK
One Steuben Place
Albany 12207
518-463-8446
69 Lakefront Blvd
Buffalo 14202
716-853-4283
One Marine Midland Plz
Rochester 14604
716-232-6610

NORTH CAROLINA
2000 W. First St.
Winston-Salem 27104
919-725-7033

OHIO
668 Euclid City Bank Bldg.
Cleveland 44114
216-771-4822
150 E. Broad St.
Columbus 43215
614-221-7077
111 W. First St.
Dayton 45402
513-461-1373

PENNSYLVANIA
1700 Market St.
Philadelphia 19103
215-569-4610

RHODE ISLAND
1150 New London Ave.
Cranston 02920
401-463-7600

WASHINGTON D.C. AREA
1600 Wilson Blvd.
Arlington, VA 22209
703-525-5160

ROMAC.
Resume & Association • Personnel Consultants

CODEX

Microprocessor Engineering
Digital Logic Design
Custom VLSI
Software Design
Enhancements
Technical Product
Marketing
Communications
Protocols
Customer Applications
Support
Network Integration

At The Gateway To America's Technology Highway.

Codex Corporation, a division of Motorola's Information System's Group, has been at the gateway of America's networking and communications technologies for over two decades.

And as the need for fast, efficient, reliable transfer of information becomes increasingly critical, more and more companies worldwide are turning to Codex today for both proven and innovative solutions.

From modems, LANs, network processors, resource sharing and integrated network management and control systems, Codex has the technologies and opportunities for engineers and technical managers to transform their energy and expertise into outstanding products...and careers.

Codex will also put you at the Gateway to America's Technology Highway. Our suburban Boston facilities are located only minutes from Route 128, America's most exciting technological center. And convenient to the area's famous educational, cultural and 4-seasons recreational resources.

Make Codex your gateway to a better career. Please direct your resume and a letter outlining your career interests to Bob Lippman, CODEX CORPORATION, Dept. 200-409, P.O. Box 507, Canton, MA 02021.

codex
A MOTOROLA INC. Information Systems Group
An Equal Opportunity/Affirmative Action Employer M/F/H

NEW ENGLAND

Spring in New England...As the Snow Melts, and the Flowers Bloom, Career Advancement Opportunities are Blossoming Like Never Before. Over Fifteen Years of Professional Placement Experience in 5 Key New England Cities Keeps us in Touch with the Regions most Dynamic Positions. Our Clients Range from Fortune 100 Firms in Major Cities to Small Shops in Quiet Country Settings, and Offer Challenge, Competitive Salaries, and a Full Range of Benefits (Most Include Co. Paid Re-Location). Special Needs Include: DEC VAX w/BASIC + 2, IBM DTB, 30 (Over 20 Openings at any Given Time) IBM MAINFRAMES OS & DOS w/CICS. According to Leading Trade Journals New England is the Fastest Growing Data Processing Region in the U.S.A.

DATA POSITIONS
POSITIONS, INC., 117 Park Avenue, Suite 201, West Springfield, MA 01089
or Call Collect Bill Mallory (413) 781-3412

CALIF. & CICS
+ Openings in IMS, IDMS, MVS/VM Sys. Programmers
(714) 891-1244
CPU COMPUTER PROFESSIONALS UNLIMITED, agency
7411 Garden Grove Blvd.
Bus. D, Garden Grove, CA 92641

DATA LINK
COME TO NEW ENGLAND
and see what we have to offer!

New England has skiing, sailing, mountains, beaches, a Courier and New atmosphere, and a professional climate that is very exciting; i.e., PIA's, SIP's, SW Eng's with experience in PDP, INTEL, HONEYWELL, IBM, WANG, A LINIX, C and graphics background is also desirable.

Send us your resume or call, and let DATA LINK introduce you to New England.

Our list of client companies is endless, and all fees, interviews and relocation expenses are paid by our clients.

DATA LINK
National Recruiting Consultants
Exeter Professional Building
Hampton Road, Exeter, NH 03833
(603) 772-5400

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

Kodak

Software engineers. The time is now.

Computers play a vital and ever-increasing role in every step of production at Kodak. And we need skilled professionals who want to share in the challenges and rewards of technological leadership.

We're looking for talented software and computer engineers with a BS or MS and technical experience in minicomputer and microprocessor systems used in the development of software for real-time equipment control. Assignments may involve design of software systems for products or manufacturing control; programming mini- and/or microcomputers; integrating computer software and hardware into complex electromechanical systems; and quality assurance of computer programs.

Kodak also has opportunities for electrical engineers in the areas of design and development, video, test, systems and optical engineering.

We offer competitive salaries, liberal benefits, and opportunities for individual contribution and growth. Positions are available now. If you have the necessary skills and drive to meet the challenge of working for a corporation in the forefront of technology, send your resume today.

Personnel Resources
Dept. DCPW
Eastman Kodak Company
Rochester, NY 14650

Kodak. The right place. The right time.
An equal opportunity employer

BankEast

MANAGER COMPUTER OPERATIONS

We are a $580 million multi-bank holding company headquartered in Manchester, New Hampshire. The consolidation of our statewide data center has created the need for a take-charge individual to oversee the computer operating and control analysis staff.

Expanding from an IBM 4341 to IBM 4381 we seek a qualified candidate with experience on IBM/DOS equipment who is adept at managing round the clock operations. Background in banking environment a definite plus.

Challenge and exciting opportunities await you with this progressive organization. Competitive salary and comprehensive benefits package.

Send resume indicating current earnings to:

BankEast
Personnel Department
One Wall Street, Manchester, NH 03105

An Equal Opportunity Employer

Data Processing

COLORADO SPRINGS

Colorado Interstate Gas Company is a pioneer in the long distance transmission of natural gas. Based in Colorado Springs, we're a subsidiary of the Coastal Corporation.

SYSTEM SOFTWARE ANALYST

We have an immediate opening for an individual with at least two years experience in MVS Systems Software. You will have a key role opportunity in a medium size shop to help migrate to an IBM 4381 with 3380's, running with MVS/SP, VSAM, JES2/NJE, ACF NCP/VTAM, CICS, and ADABAS. Your experience will include CICS and one or more of the above mentioned areas.

For immediate consideration, please send your detailed resume including salary requirements, in confidence, to COLORADO INTERSTATE GAS COMPANY, Employment Department, Section 283-A, P.O. Box 1087, Colorado Springs, CO 80944. We are an equal opportunity employer m/f/h/v.

Colorado Interstate Gas Company
A Subsidiary of The Coastal Corporation

SOFTWARE ENGINEERS

INSYSTEC is developing futuristic products with a high degree of software sophistication for the automated office. We offer not only a high tech work environment, but also a beautiful Central Florida location with a desirable climate year 'round.

We are seeking skilled software professionals to work in areas such as applications, text processing, graphics and operating systems. These positions involve software development on advanced multiprocessor architectures using MC68000 and 8086/88's.

Candidates must have 3 or more years experience in the development of systems software with assembly language or "C" language background. Exposure to NAPLPS or VDI/VDM is desirable.

Qualified applicants, please send a resume with salary history, to:

INSYSTEC

INSYSTEC, INC.
Attn: Elaine Martin, Personnel
480 N. Lakemont Avenue
Winter Park, FL 32792
An Equal Opportunity Employer

Great Things Are Happening In Our NATION'S CAPITAL

And, if you're an experienced computer professional, the Washington, D.C. area can do great things for your career. This region is one of the top four technical centers in the U.S. ... and is growing rapidly. Many top companies are moving to Washington ... and a wide spectrum of computer/engineering opportunities are available with these and other firms.

No one knows the Washington job market better than Hunter Search. And, because of our extensive list of clients an 8 year track record of successful technical placement, we can find you a career that is both personally and professionally rewarding.

Look to a leader in technical placement - Call us COLLECT at (703) 354-8700. Or send your resume to:

HUNTER SEARCH
7630 Little River Turnpike
Suite 202
Annandale, VA 22003-2619

Representing equal opportunity employers.

OPPORTUNITY IS WAITING FOR YOU

We are a respected services organization that provides a wide variety of professional services in the fields of engineering and data processing. We are expanding our "Computer Services" group significantly, and are looking for qualified personnel to develop and run our business operations.

We have targeted 6 growth areas in the United States as start up situations and need capable individuals that are prepared to deal with the challenges associated with being new at the local level yet seasoned on a national basis.

Staff Requirements Include:

- Branch & Sales Manager Will be responsible for developing client service engagements, market research and planning, branch administration, training, and supervision of staff with full P & L reporting responsibility.
- Staff Sales Specialist Will be responsible for all sales activities on a day to day basis to include pre and post sales support functions. Will work with Branch Manager on development of local market penetration sales plan.
- Staff Recruiting Specialist Will have direct responsibility for identification, interviewing and hiring of professional services support staff.

Successful candidates will not only have the necessary expertise we seek, but the ability and creativity to apply their backgrounds to a start up environment.

For the right people we are offering competitive salaries and MBO oriented bonuses. Please write us today and include your resume with relevant credentials and salary history.

NESCO DESIGN GROUP
COMPUTER SERVICES DIVISION
19261 Villaview Road
Cleveland, Ohio 44119

FACULTY POSITIONS WESTARK COMMUNITY COLLEGE

Full time faculty positions are available which will start on June 4, 1984 and also on August 24, 1984. Bachelor's degree required, Master's preferred in Business Data Processing, Computer Science or related field. Competitive salaries offered with liberal benefits available. To apply, write or call: Director of Personnel/EEO, Westark Community College, P.O. Box 3649, Ft. Smith, AR 72913. AC 501-785-4241. Equal Opportunity Employer.

ACP/TPF PROGRAMMER/ANALYST

VISA, an independent, worldwide organization located in a campus-like setting, 25 miles south of San Francisco, seeks highly motivated individuals, who have a keen vision of the future and an aptitude for achievement in our Systems Development Division.

We seek your current experience as an ACP/TPF Systems Programmer/Analyst and/or PARS or Financial Applications in an ACP/TPF environment.

Our environment demands integrity and self-esteem from highly motivated individuals whose talents and performances require minimal supervision.

We offer a productive and congenial working atmosphere, competitive salaries, excellent benefits, and the opportunity to work with other leaders who feel the rewards have been worth the challenge.

Interested individuals please send your resume in confidence to Dick Carini or Malcolm Drake, VISA - Systems Development, P.O. Box 8999, San Francisco, CA 94128. An Equal Opportunity Employer.

VISA®

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

ROBERT HALF

EDP OPPORTUNITIES COAST TO COAST

Robert Half, staffed by EDP professionals for EDP professionals with 80 offices throughout the U.S., Canada & Great Britain, is the largest network of personnel consultants in the Data Processing field. And its establishment in 1948 also makes Robert Half the oldest. One call and you can search the local, national and international markets. All fees are paid by client companies, of course. The following is a partial listing of opportunities and locations:

DAYTON

SENIOR PIA

Join this expanding data processing staff. Your key to an interview is 2+ yrs IBM, COBOL & CICS and strong promotability. Company wishes to train and promote into data communications. Must be top-notch technician with good communication skills. $30,000

Jay Steese
ROBERT HALF
of Dayton, Inc.
Box 758 MidCity Station
Dayton, OH 45402
(513) 294-6666

NEW ORLEANS

ANALYST PROGRAMMER

3 yrs on-line & batch exp COBOL & RPG II programming on IBM mainframe, DOS/VSE. Retail, data comm & mini expertise are pluses. $30,000

SR EDP AUDITORS

Several secure & aggressive firms seek CISA, CPA or MBA with 1 yr auditing & 2 yrs EDP audit exp w/data center reviews of fin'l systems. To $40,000

CONSULTANT PIA's

2-4 yrs IBM mainframe, IMS or CICS. All positions offer state-of-the-art exposure. 12 to 18 month assignments. Superb benefit pkg. To $32,000

ROBERT HALF
of New Orleans
PO Box 57629
New Orleans, LA 70157
(504) 836-4296

KANSAS CITY

ANALYST

VAX expertise qualifies to join this rapidly expanding systems development group. Be in charge of design and implementation of new systems. Quick movement into technical management.

Salary to low $40's

SENIOR SYSTEMS PROGRAMMER

Premiere state of the art MVS shop seeks senior systems programmer to orchestrate their movement to XA. Strong MVS skills required with desire to move into technical management.

Salary to low $40's

George Waterman
ROBERT HALF
of Kansas City
127 W. 10th
Kansas City, MO 64105
(816) 474-4663

ALBUQUERQUE

PROG/ANALYST

Excellent growth position with expanding IBM large scale shop. COBOL, CICS. Financial applications. Salary$22,500

Dick Starnes
ROBERT HALF
of New Mexico
PO BOX 3339
Albuquerque, NM 87190
(505) 884-4627

AUSTIN

LIFE INSURANCE EXPERTS

COBOL or Assembler language IBM mainframe exp. Multiple openings. To $35,000

SYSTEMS PROGRAMMERS

OS/MVS or DOS/VSE exp. CICS, VTAM, NCP and VM a big plus. To $40,000

ROBERT HALF
of Austin, Inc.
400 E. Anderson #206
Austin, TX 78752
(512) 836-0668

SAN ANTONIO

DP MGR

Degree req'd. Must possess Sys 34 RPG II, fin'l appl exp with above average people skills. Shop is converting to Sys 38 within year. Exceptional bonus and participation oppty for the "right" candidate. North Texas location.$35,000 + Bonus

CONSULTANT

Degree req'd. Must have Big 8 consultant micro/mini exp. Apple are MRP, Fin'l and Banking. Co needs people with image/attitude/motivation. Dept is expanding from 5 to 20. Excellent growth/benefits. $40,000 + Bonus

PROGRAMMER ANALYST

Degree req'd in CS or Math. 3 + yrs exp in IBM shop, prefer DOS. Business appls in mfg env't— moving into CAD/CAM Robotics within 18 months. Solid fast track co. $22-28,000

All positions above and many more are in Texas where "Long Necks," "Armadillos" and the "Cotton Eyed Joe" call home.

Bob Baldauf
ROBERT HALF
of San Antonio, Inc.
6243 I H 10 West,
Suite 600
San Antonio, TX 78201
1-800-531-5462
In TX dial (512) 736-3467

NEW YORK

SYSTEMS PROGRAMMER

Prestigious legal firm has an opportunity for the innovative and self-motivated professional with 5+ years technical background to be in-house consultant. The qualified candidate should come from DOS/VSE (Power) IBM 4300 environment with CICS/VS, ACF/VTAM. Expand your career with this most prominent organization. Fee Paid $50,000

ROBERT HALF
of New York, Inc.
522 Fifth Avenue
New York, NY 10036
(212) 221-0808

SAN FRANCISCO

SYSTEMS CONSULTANT

North Bay firm seeks 9+ years prgmg, sys analysis and project lead. IBM S/36 ideal. Marketing/financial appls. Will relocate.

Hi $30's to mid $40's

MANUFACTURING ANALYST

Peninsula firm seeks knowledge of factory financial flow to design acctg system. Know at least one high level language. Excellent writing/communication skills. FOCUS a plus. Report writing and training exper preferred. Will relocate. $35,000 mid/pt

LEAD PROGRAMMER/ SYSTEMS ANALYST

South Bay firm seeks 8-12 years software developer w/IBM 4341 or HP 3000. MVS/IMS and modeling exper preferred. Will relocate. $50K?

MANAGEMENT CONSULTANT

Firm in NYC and Washington DC seeks 5+ yrs line management, info systems. Must have advanced degree. Consulting in banking/manufacturing a big plus. Business development. MBA highly desirable. Will relocate. To $120,000

VM SYSTEMS PROGRAMMER

Peninsula firm seeks IBM Assembler w/DBMS and 5+ years VM sys prgmg to develop support software. Good presentation skills. Will relocate $40,000 max

Patricia Brown
ROBERT HALF
of Northern California
111 Pine St., 15th Floor
San Francisco, CA 94111
(415) 434-1900

PACIFIC NORTHWEST

MVS SYSTEMS PROGRAMMER

Seattle company seeks systems programmer with 2+ years IBM MVS or IMS operating systems experience. Opportunity for move into management of technical area.

Low to mid $30's

CONSULTANT

Spokane software development firm seeks individual with 4+ years DP and extensive RPG II programming experience. Must have strong analytical skills and experience designing financial systems. Will have total account responsibility for major client. Some travel. $30-40,000

COBOL PIA

Seattle company seeks individual with 2+ years COBOL programming experience in IBM OS MVS environment. IMS and financial industry experience helpful. Excellent opportunity for those seeking state-of-the-art data base exposure and opportunity for rapid advancement. To low $30's

RPG III PIA

Ketchikan establishment seeks PIA with 2+ years programming experience, including 1 year using RPG III on IBM S/38.

High $20's

Marijo Petersen
ROBERT HALF
of Seattle, Inc.
600 University St. #2300
Seattle, WA 98101
(206) 624-6600

WASHINGTON

DATAPOINT

Do you know Deadbud? Have you programmed in COBOL? Yes! Then live in VA Hunt Country and grow with this dynamic co. $30,000

ROBERT HALF
of Washington
7316 Wisconsin Avenue
Washington, DC 20814
(301) 652-1600

MILWAUKEE

DATA BASE ADMINISTRATOR

Fortune 500 firm seeks knowledgeable IMS pro to head technical DB staff. Will be integrating the data dictionary & taking control of DB area. Requires sound background in IMS DB/DC. $30-40,000

SR SYSTEMS ANALYST

Huge financial services firm is seeking to upgrade its staff with systems heavyweight. Requires 5+ years progressive design & analysis experience. Must have current skills in IBM MVS environment. Data base a plus. $35-43,000

Brian Krueger or
Dick Bird
ROBERT HALF
of Wisconsin
777 E. Wisconsin Ave.
Milwaukee, WI 53202
(414)271-HALF(271-4253)

BOSTON

TECH SVCS MGR

Expanding fin'l svcs org seeks proven mgr to lead MVS & DATA/VOICE comm staff. IBM 308X, 43XX CICS, DBMS & mini/micro environ. Exceptional oppty w/one of Boston's most progressive & stable firms. $60,000

IMS TEAM LDR

Expanding $ billion co searching for top-notch proj ldr. You should have strong IBM OS/COBOL IMS DB-DC skills w/proj devel exp. This exciting oppty will be a springboard to your career. $35,000

OS/MVS SYS PROG

Tech challenge & upward mobility await the skilled internals specialist. This prestigious fin'l svc firm offers IBM OS/MVS IMS BAL environ. If you thrive on tech challenge, call now & discuss your career plans. $37,000

ROBERT HALF
of Boston, Inc.
160 Summer Street
Boston, MA 02110
(617) 423-1660

HARTFORD

REINSURANCE PROJ MGR

Growing fin'l svc org seeks proj mgr to assume total resp for all reinsurance sys devel. PIC reins a plus. Strong mgmt and tech skills req'd. To $40,000 + bonus

DATA BASE

CT corp expanding DB dept! Exp w/data modeling, data arch w/exposure to IMS, IDMS or TOTAL. Sr staff pos leading to mgmt. To $40,000

TECH MGR

CT oppty for IBM tech-trained indiv to direct data base, CICS perf group. Must have exc mgmt bkgrd in MVS environ. To $52,000

SYS ENGINEER

So New Eng hi-tech client seeks exp'd DEC/VAX, PDP 11/44 w/VMS or RSX 11 M sys eng 3 yrs + exp. Mgr & eng oriented applications. To $40,000

SYS PROG

Outstanding oppty in a sub hi-tech CT co for OS/MVS, JES3 trained sys prog. VM & SNP bkgrd a plus. Exc benefits & great potential. To $40,000

ROBERT HALF
of Hartford, Inc.
111 Pearl St.
Hartford, CT 01603
(203) 278-7178

BUFFALO

PROG/ANALYST MGR SYS-34/36/38

Expanding mkt in Cent & W NYS is causing sev of our clients to search for exp pros in their SYS-34/36 & 38 data ctrs. Focus is on RPG II & RPG III experts w/mfg or dist bkgrd. 2 yr degree + min 2 yrs exp. Very solid co's w/excellent long-term potential. To $40,000

ROBERT HALF
of Buffalo, Inc.
1310 Liberty Bldg.
420 Main St.
Buffalo, NY 14202
(716) 842-0091

ST. LOUIS

SR SYSTEMS PROG — IDMS

Financial background desirable. Major St. Louis-based service org seeks individual experienced in IDMS applications and internals. Excellent benefits go with this exceptional opportunity in a dynamic organization! To $40,000

OS/MVS COBOL PROGRAMMER

Several openings for COBOL programmers with 2+ years experience in business applications. Pluses are strengths in JCL, TSO/SPF, and any IMS exposure. Excellent opportunity! To $30,000

IMS TECH MANAGER

St. Louis-based financial firm seeks individual with technical background, prior systems programming with heavy IMS support duties. Start earning what you're worth! Will support IMS, including internals and performance tuning. Small group to work with too! $40,000

PROGRAMMER/ ANALYST

Major financial institution seeks an experienced BAL programmer. Exposure to UCC Super MICR and 3600 software are major pluses. Excellent fringe benefits package and opportunity to advance into management. Salary depends on experience.

Randy Pace or
Warner Coffman
ROBERT HALF
of St. Louis
7733 Forsyth Blvd.
St. Louis, MO 63105
(314) 727-1666

SOUTHERN CALIFORNIA

PROGRAMMERS/ SYSTEMS 38

Leading systems-38 shop here in So Cal needs your RPG III experience. This position is open & budgeted NOW. To $35,000

Bill Claxton
ROBERT HALF
of LA
3600 Wilshire, #2000
Los Angeles, CA 90010
(213) 386-6805

MINNEAPOLIS

PROGRAMMER/ ANALYST HONEYWELL

Billion Dollar Service firm with clients worldwide, headquartered Minneapolis, has great need for Programmer/Analyst in international area. Applications design, testing and support. Req's 2+ yrs HONEYWELL DPS-6, DPS-8 experience a plus. Call on Job #5003. Salary to $30,000

John Miller or
Mark David
ROBERT HALF
of Minneapolis
3600 IDS Center
Minneapolis, MN 55402
(612) 338-0091

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

TWARE ENGINEER/COMPUTER SCIENTIST
TRICAL ENGINEER MECHANICAL ENGINEER

GROWTH CAREERS IN OPTICAL STORAGE

3M has a major commitment to development and production of optical recording media. This growth area has created immediate openings for experienced engineers or recent graduates with advanced degrees.

SOFTWARE ENGINEER/ COMPUTER SCIENTIST

Will be responsible for design, coding and testing software for real-time process control and data acquisition in a distributed processing environment. Initial assignment will be as lead person for the automation of a large thin film deposition system. This system includes data base management of test results for use by non-programmers. We will require a degree (BS-PhD EE, Physics, Computer Science) plus experience and/or knowledge of PDP-11 and/or VAX/VMS.

ELECTRICAL ENGINEER

Will design and implement high-speed digital systems for optical media testing. Projects will include a high throughput production test system to test optical disks with hundreds of megabites capacity. Analog design is also included. We require a BS-PhD EE with broad experience which includes magnetic recording and/or communications.

MECHANICAL ENGINEER

Will design and build components and subsystems for large scale vacuum deposition systems, process development systems, and robotics for clean-room material handling. We require a BSME with knowledge of robotics and experience in vacuum systems technology.

All positions are located at our research center in St. Paul, MN. Compensation and benefits plan are highly competitive.

For confidential consideration, send your resume to:

Jerry C. Baugher
Staffing and Employee Resources/3M
3M Center
St. Paul, Minnesota 55144

An Equal Opportunity Employer M/F/H/V No Agencies Please

3M

COME GROW WITH US IN ORLANDO

At our huge IBM data center (2 3084's, 3 3033's, 1 4341, and 1 4361) in beautiful Orlando, Florida, over 900 talented people provide commercial data processing services to users across the country. We have a number of immediate position openings, including:

TELECOMMUNICATIONS ANALYST
with solid experience using ACF, VTAM or TCAM, NCP, and 3705 or 3725. MSNF would be a plus.

TELECOMMUNICATIONS ANALYST
with strong background in COMTEN network communications.

SR. SYSTEMS PROGRAMMER - PROGRAM PRODUCTS
with significant experience in MVS operating systems internals and in performing modifications to MVS. Must know SMP, assembler, maintenance and documentation procedures.

IMS SYSTEMS PROGRAMMER
able to read and debug IMS software problems and apply maintenance to the IMS system. Must know assembler, SMP and data base recovery.

DATA COMMUNICATIONS CONSULTANT
with solid experience in fiber optics, network models, local area networks.

GRAPHICS APPLICATIONS PROGRAMMER
with experience in FORTRAN on 3D graphic systems preferably in architectural engineering environment.

NC PROGRAMMER
who has a good background using APT in an IBM support environment.

CAD/CAM APPLICATIONS SPECIALIST
using FORTRAN on VAX equipment. Will have heavy customer interface.

If you believe you are qualified for and are interested in any of these positions, we want to hear from you. We can offer you an excellent salary, superb benefits, complete relocation, and an outstanding future. Please mail your resume, in confidence, or call (305) 896-7417 (collect).

Bob Marsh

MARTIN MARIETTA DATA SYSTEMS
Post Office Box 13385-A, MP-357
Orlando, Florida 32859-0385

An Equal Opportunity Employer M/F/H/V

MARTIN MARIETTA

PROGRAMMER/ANALYST
SYSTEM/38

Fast growing company in rural country setting needs experienced programmer/analyst for development of manufacturing & retail distribution systems. The successful candidate will have 1 or more years hands on System/38 and 5 or more years Data Processing application development experience. Principles only please.

Please send resume and salary requirements to:
MIS Director

RENOVATOR'S SUPPLY, INC.
MILLERS FALLS, MA 01349

SYSTEMS AND DATA PROCESSING MANAGER

To manage Dane County's Systems and Data Processing Division in Madison, Wisc having a full scope operation including an IBM 4381 DOS/VSE system. Must have 3 years experience managing a full scope data processing operation having application programming, systems analysis, data control, data entry, computer operations and technical support including systems programming or 6 years project leader/supervisory experience in either the application programming, computer operations programming or systems analysis functions preferably within a full scope operation (combinations of the above experience will be considered). Experience must have involved use of an IBM 4341 or comparable mainframe. Further requires a Bachelors degree or its training and experience equivalency in computer science or related fields.

Annual salary of $32,532 with merit increases $38,616. Excellent benefit plan including county paid comprehensive health and dental insurances, county paid pension plan, disability insurance, longevity pay of 3%-11% of gross salary, deferred annuity plan and other highly competitive benefits.

Candidates must file an official Dane County employment application prior to 4:00 pm, Monday, April 30, 1984 (late applications will not be accepted) official application forms and job description available from the Dane County Personnel Office, Room 104, City-County Building, 210 Monona Avenue, Madison, WI 53709, or phone 608/266-4123. Dane County as an AA/EEO employer encourages qualified candidates to apply regardless of their race, sex, handicapped or other non-job related factors.

Dane County Civil Service

IMS or VAX BASIC
North Florida
PL/1 + IMS - Texas

This 38 yr. old programming firm is seeking software professionals for new systems development.

Mr. Carroll Satterfield
SCIENCE MANAGEMENT CORP.
11211 Katy Freey., #140
Houston, TX 77079
(713) 573-2600

NORTHERN CALIFORNIA
Central Valley

Systems Programmer — $30-35K
DVELBED, SMP, VTAM

Systems Programmer — to 35K
DOS/VS-E, VM

Systems Programmer — $30-35K
DOS/VS-E, VM/SP, CICS/VS

Systems Programmer — to 35K
IMS/DBDC, CICS, IMS

Programmer/Analyst — $25-30K
Honeywell DPS 6/45, COBOL

GEM BAUMER & ASSOCIATES
Executive Recruiting Agency
[illegible]
Sacramento, CA 95825
(916)481-6141

PROGRAMMER

Immediate opening for an individual to develop hospital information system, "user interface" software which will function in conjunction with a data base management system (VAX 11/780 DBMS) PASCAL language and some assembly language programming. Requires Bachelor's degree in Science or Engineering and a minimum of 1-2 years experience with a digital equipment corporation (DEC) computer operating system, and a background in either FORTRAN, PASCAL, C, or PL-1 programming. VAX VMX data base and structured programming experience a plus. We offer a competitive starting salary and an excellent fringe benefits package. To apply for this position, send resume with salary requirements to: Mary Herold, Personnel Department. We will respond only to those applicants whose background meet our requirements. No phone calls, please.

FOX CHASE CANCER CENTER
7701 Burholme Ave.
Phila., PA 19111
Equal Opportunity Employer

Programming

SOFTWARE ENGINEER
"C" S/370

Candle Corporation, a multinational high technology company and developer of OMEGAMON®, is seeking a key individual to assume a lead role in the development of advanced software using the C language in an IBM mainframe, mini, and micro environment.

The ideal candidate will have in-depth C language programming skills (in any environment), as well as significant systems programming and software development experience on IBM mainframes using IBM 370 Assembly Language, preferably in an MVS, CICS, and/or VM environment.

You must have had significant programming experience in both C and IBM 370 Assembly Language to qualify. Experience with other structured languages such as PL/1 or Pascal is a plus. Strong preference will be given to candidates having in-depth knowledge (internals) of MVS, CICS or VM.

This is an opportunity to be a key contributor to the development of innovative software products in a dynamic and rapidly growing software firm.

Candle offers an excellent compensation and benefits portfolio. For consideration, please send your resume with salary history to:

Joel Prescott
[illegible]
Los Angeles, CA [illegible]

Equal Opportunity Employer

!Candle

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

We want

SEs EXPERIENCING ORIGINALITY!

We want to hire systems engineers. Ones who don't seem to think like everyone else. Or anyone else. At Storage Technology, we encourage this kind of originality. That's one way we've become a leader in data storage systems and technology. If you've been experiencing some originality lately, and enjoying it, perhaps you should consider enjoying these other experiences you can have with us.

Experience freedom.

Freedom to be a self starter. To be responsible. The freedom that lets you call your accounts "yours." At Storage Technology, you can experience as much freedom as you can handle.

Experience listening.

The kind of listening that takes your ideas, suggestions and problems seriously. We're experienced listeners. We'll listen to anything you have to say about our business. We're also good at applying what we've heard.

Experience trust.

Trust in your knowledge and experience, your decisions, your dedication. We take great pride in trusting our systems engineers. That's because the difference between a good operating system and a great operating system can be a simple matter of trust. And we like great operating systems.

Experience participation.

Participation in major marketing decisions, customer account decisions and decisions about where this data processing industry should head next. Our systems engineers continually help us make these kinds of decisions. They're involved. Why? Because we need their experience.

Experience creativity.

The kind of creativity that makes your job extra worthwhile. The kind that puts your mind to work. We think all systems engineers should be creative. And imaginative when solving problems or enhancing systems. We accept creativity as an everyday part of your job.

Experience at Storage Technology don't end here. We are a Fortune 500 company. The world's leading independent supplier of high performance data storage systems and technology. Storage Technology provides exceptional benefits packages which include health, dental and life insurance, stock purchase, profit sharing and more.

We currently have openings for systems engineers experiencing originality in the following cities:

Milwaukee, Manhattan, East Meadow, L.I., Boston, Philadelphia, Hartford, Detroit, Cincinnati, Pittsburgh, Chicago, Washington D.C., St. Louis, Little Rock, Memphis, Kansas City, Austin, Los Angeles, San Francisco, Seattle and Summit, N.J.

To experience more information about these or future openings send your resume to Fred Moore, MD 3K, Storage Technology Corporation, 2270 South 88th Street, Louisville, Colorado 80028.

Storage Technology is an Equal Opportunity Employer.

StorageTek

Every Day, Engineers at E-Systems Garland Division Are Taking Technology Where It Has Never Been Before... Turning SCIENCEFICTION into SCIENCEFACT.

E-SYSTEMS

The Company.

E-Systems Garland Division is renowned for its products' and systems' technical excellence and quality.

E-Systems Garland Division provides an atmosphere that promotes talent and personal growth. We attract the highest caliber of talent and our employees demand an environment that expands expertise into excellence.

Our people know that every day there are new technical challenges to meet and to solve.

The Benefit.

We promote a Program of Human Resources of advanced thinking that includes... Flexible Employee Benefits (FLEXCOMP) and an Employee Stock Ownership Plan.

If joining E-Systems in Dallas means a move, our unique Relocation Center will help you. Our personalized relocation program even includes dual career assistance.

As Dallas offers a quality lifestyle, so E-Systems offers a quality working environment – *warm and open* – where career pathing is taken seriously.

Our Needs. Software Specialists.

With a BS or MS in Computer Science, Math or Electrical Engineering using IBM ALC, FORTRAN/VS, FORTRAN 77, or GOULD SEL assembly languages, you can qualify for an opportunity with a long term project involving

- mainframe and configurations using the latest hardware/software technology
- combining complex algorithm development
- extensive equipment interfaces in support of real-time processing

ScienceFact.

ScienceFact means variety, enormous technical challenge, and responsibility.

If you have the talent, we will give you everything you *really* want in a career. You are invited to help us turn ScienceFiction into ScienceFact by contacting **Ann Olson**, E-Systems, Inc., Garland Division, P.O. Box 660023, Dept. 41, Dallas, Texas 75266-9983.

E-SYSTEMS
The problem solvers.

An Equal Opportunity Employer. M/F. V. H.
U.S. Citizenship Required.

Dunhill Means Experienced Systems Programmers, Analysts & Programmers

At Dunhill of Charlotte our only business is finding the right people for the job. We represent many of the largest and most respected corporations across the country. That's why we can offer the busy data processing professional the opportunity to explore the job market without doing any more than simply sending us a resume.

We are not asking you to make any commitment. There is never a fee with Dunhill of Charlotte, and all matters are held in strict confidence. What more could you ask for? We will also keep you up to date on industry trends and current salary ranges in the DP area.

Keep your career running in high-gear by letting Dunhill of Charlotte find the opportunity you have been searching for as a professional. We want to go to work for you today! We specialize in the placement of experienced Programmers, Analysts and Systems Programmers in the Carolinas and throughout the beautiful Southeast and Southwest. Give us a call now, or send your resume to:

Keith Reichle, CPC
Data Processing Consultant
6401 CARMEL ROAD
SUITE 107
CHARLOTTE, NC 28226
1-800-438-2843
In North Carolina call collect (704) 542-9012

Dunhill Of Charlotte, Inc.

An Equal Opportunity Employer M/F

DP POSITIONS SEATTLE/PORTLAND

MVS, Sr. Systems Programmer $40K
Sr. CAS Systems Prog. $35K
Systems Professional to date base consultant to applications group.
Sr. Programmer/Analyst $30K
Financial app. COBOL/1 online transaction.
Programmer/Analyst $25K
COBOL/1 or VSAM exclusive.
Sr. PSA DBS applications/data ..... to $35K
Data Admin. Analyst ..... to $30K
data warehouse. Rigid hard DP design.
Please forward resume immediately to:

ROGER, MARTIN HOWE & ASSOC.
(206) 453-8700
6-CW-84, 1000 Puget Mill Bldg.
Seattle, WA 98101

COMPUTER PROGRAMMING, SYSTEMS AND ENGINEERING PROFESSIONALS

National employment resources at your service. Through our screened and selected employment affiliates, we'll get your resume to employers with applicable job openings in your targeted geographic areas. Openings for systems software and all kinds of applications programmers and analysts, EDP marketing and support reps, hardware and software engineers, EDP technical writers, etc. A quick and easy way to cover the job market. No fee, contract or obligation.

At least two years of professional experience required. U.S. citizens and permanent residents only. Send one resume along with current and desired salary, desired location and a summary of your computer hardware and software experience to:

NATIONAL CONTACT NETWORK, INC.
Ref. CW, 3100 West Chapel Avenue
Cherry Hill, N.J. 08002 / (609) 667-4080

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

EDP Professionals

Middle South Services has one of the South's largest data processing centers serving one of the nation's largest power systems. Middle South Utilities, our parent company, is a major electric utility. Our hardware environment includes two IBM 3081s, and IBM 4341 and Tandem mini 16s. If you are a career-minded EDP professional, we have the following opportunities available:

(MVS) SYSTEMS PROGRAMMER With at least 2-plus years experience in MVS operating systems to install, monitor, help problem-solve, tune and assist in the installation of MVS/XA systems migration.

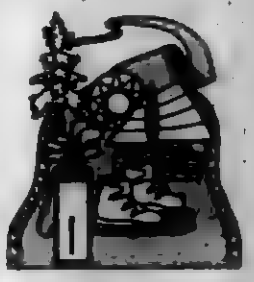
ANALYST PROGRAMMERS (SCIENTIFIC) Requires previous experience in scientific applications with a sound knowledge of PL-1 or Fortran. Computer applications development with exposure to a VM operating system would be helpful.

ANALYST/PROGRAMMERS (APPLICATIONS)
Several positions are currently open for experienced IMS DB/DC Analyst Programmers. Experience with COBOL or PL-1 in plant maintenance or business applications is needed.

Due to our size and scope of operation, we offer access for advancement, career stability and an excellent salary with major benefits. For more information, call our number below or to apply directly, send your confidential resume to Byron Heath or Richard Jackson, MIDDLE SOUTH SERVICES, INC., P.O. BOX 61000, NEW ORLEANS, LA 70161.

1-800-231-4481
In Louisiana, call collect (504) 569-4000.

MIDDLE SOUTH SERVICES INC.
An Equal Opportunity Employer M/F



Watch your career evolve with the seasons

COMPUTER PROFESSIONALS

Just as the ever-changing seasons offer plentiful recreational options to the residents of our part of Southeastern Michigan, the stimulating variety of project work you will find at MIS will interest and challenge you.

We are a growing computer consulting company with a 15 year track record, providing professional support to a wide range of firms on a project basis. We offer an ideal-sized environment with more involvement and room for growth than is possible at a large company. Current requirements include:

- PL/1 or COBOL IMS DB/DC
- COBOL TSO/SPF/CICS
- TECH SUPPORT/SERIES I
- VM/CMS
- IBM Systems Programmer
- FORTRAN/PASCAL/PMS/PDP/RSX 11-M or VAX/VMS

Advance your technical skills and broaden your experience with us. We can offer you job stability, a generous salary and excellent benefits (including relocation reimbursement).

It's time to reach out for more. Make your change to MIS. For further details about current openings, call Personnel Recruitment or send resume to:

M.I.S. INTERNATIONAL, INC.
Corporate Office
24455 Southfield Road
Southfield, MI 48075

(313) 552-0550
(800) 521-2144

Equal Opportunity Employer

MIS INTERNATIONAL INC

REAL-TIME SOFTWARE ENGINEERS

TANO CORPORATION, a leader in the design and manufacture of computer-based automation control systems, seeks career-oriented individuals to fill immediate openings.

SR SYSTEMS/SYSTEMS SPECIALISTS
ADA PROGRAMMERS

Responsibilities involve the design, documentation and implementation of distributed microprocessor systems for real-time monitoring and control. Experience with Ada, Motorola 68000, and distributed processing is a definite plus.

SR PROGRAMMERS

Candidates must possess relevant degree and real-time software; Fortran and/or Assembler experience in an RSX-11M, VAX, or SEL/GOULD environment in the area of process or supervisory control, or energy management.

TANO CORPORATION offers an excellent compensation and benefit package, including 100% company paid medical insurance, incentive plan and pension trust. Please telephone or submit confidential resume, to:

Professional Recruitment
1-800-324-0355

TANO

TANO CORPORATION
4201 Pecos Court West
New Orleans, Louisiana 70129
Principals Only
Equal Opportunity Employer M/F

300 DP Openings

#1 employment agency, #1 DP employment consultant for 1982 in IPA (150 agencies, 500 consultants), now #1 agency in NFC (100 agencies, 400 consultants). Fee paid.

Mark Young, EPS (704) 366-1355

Corporate Personnel Consultants, Inc.
3701 Latrobe Drive, Suite 210
Charlotte, N.C. 28211

WANG PROGRAMMER ANALYST

We are a fast growth, mid-town Manhattan office automation firm seeking a high-energy DP professional to ride our fast track. This hands-on position, with management potential within one year, entails:

- Choosing and installing systems in BASIC and T.O.M.
- Tailoring packages to suit clients' requirements
- Working with principals on future hardware and software direction for W/P and timesharing
- Designing financial applications

Salary and opportunities will above average for this key player position.

If you have good business knowledge and 3-6 years programming, preferably Wang 2200, Basic-2 (P/C, T.O.M., W/P a plus), send resume and salary requirements to:

OFFICE EXPRESS
212 Fifth Ave, suite 1410
New York, N.Y. 10010

$80,000/YR. — CICS PROGRAMMING

Acquire one of the most demanded & rewarding programming skills in existence today and only a...

SM

IBM DIVISION
FAST - TRACK
MIS PROFESSIONALS

- PROGRAMMERS - mid-level
- SR. ANALYSTS - project leader(s)
- ANALYSTS - COBOL 74, DRMS
- ANALYSTS - BASIC

PAID RELOCATION
CAREER PLANNING
OUTSTANDING BENEFITS
HIGHLY PROFITABLE FORTUNE 500
MODERATE SUNBELT CLIMATE

C.R. Wade
Manager, MIS Recruiting
Service Merchandise Co.
P.O. Box 24600
Nashville, TN 37202-4600

EOE M/F/H

FLORIDA GOLD COAST
NCR

PROGRAMMER/ANALYSTS
PROJECT LEADER'S
NCR - NEAT III - LEVELS 1 & 2

3-5 YRS EXP 25-30K
BANKING OR SERVICE ORGANIZATION BACKGROUND PREFERRED

SUSI-TECH, INC.
7061 West Commercial Blvd.
Fort Lauderdale, FL 33319
Call David Yancy, VP
For Immediate Consideration
(305) 726-4575

All Positions Fee Paid

Systems Analyst

Analyzes business procedures and problems to refine and convert to programmable form for electronic data processing. Includes studying the problems and needs of corporate divisions, designing of software systems, i.e. computer programs to solve problems, implement program into hardware recommended for the company's use. Would be on call for troubleshooting or maintenance or modification of program after final. M.S. in Computer Science required, plus 2 years experience. Must be familiar with Vax-11/780, PDP-11/70 and IBM (MVS). Must know "C" and Cobol and have ability to implement computers and data bases. $30,000/yr. 8-5 M-F, 40 hrs/wk. Submit resume to DARD Corporation, 3131 S. Vaughn Way #139, Aurora, CO 80014, Attn: Chuck Spring.

Contract Programmers

Computervision, a national software contract service company, has continuing needs for Programmers and Software Engineers with any of these backgrounds:
(1) DEC VAX/VMS, Pascal Language, Radio Communications Application, 6-12 months duration, $35-40 rate, Upstate New York.
(2) Pending, California Contract, "C" Language, Unix OS, Communications Switching System Applications, 6 month minimum duration, $35-40 rate.
(3) Intel 8086/286, PL/M-86, iOS-86, Real-Time Multi-Tasking process control software development, 1-11/2 year contract, Upstate New York.

Call or send resume to:
Computervision
1800 Alexander Bell, Suite 300
Dallas, TX 75206
(214) 669-8871

CONTRACT PROGRAMMER/ANALYSTS

For consulting firm in Charlottesville, Virginia. Individuals only. Business or industrial experience required on HP3000 or VAX Systems, in COBOL, FORTRAN or Pascal. Quality of life unbeatable in beautiful Blue Ridge mountain area. Send resumes to 310 East Main Street, Charlottesville, Virginia 22901.

Free!

New 1984 Salary Data

No doubt, during 1983, you knew that many firms took a hard line on awarding salary increases—or, in some cases, even enacted across-the-board cuts.

Yet, on the other hand, did you know that salaries for *some* computer professionals *soared* right on through the uncertain business outlook?

Computer salaries are up.

The new, *1984 Computer Salary Survey and Career Planning Guide* is based on contacts with more than 44,000 computer professionals and 35,000 organizations. Not only are salary averages for fifty-eight positions reviewed (including ten new ones), but high and low compensation ranges are also provided.

Included are positions in programming, software, systems design, data base/data communications, Edp auditing, operations, computer sales, marketing, marketing support and management.

In addition, the new Survey details seven ways to maximize your chances of getting ahead through a proven, seven-step system that has helped thousands of computer professionals advance their careers.

Free to computer professionals.

The new 32-page Survey is available to you without charge. Since 1966, this annual report has helped approximately a quarter of a million computer professionals understand current trends in technology and compensation, realize how and where they fit in and what they need to do to reach their full potential.

You owe it to yourself—especially if most of your career lies ahead—to call or write today.

Call today for your complimentary copy.

Call the Source Edp office nearest you for a free copy of our new 32-page report. We'll mail a copy to you in strict confidence, without obligation.

If unable to call, write:

Source Edp
Department C86
P.O. Box 7100
Mountain View, CA 94039

When writing, please include your title.

source edp®

Personnel Services

The world's largest recruiting firm devoted exclusively to the computer profession.

Source Edp offices

United States	
Alabama	
Birmingham	205/933-9745
Arizona	
Phoenix	602/279-1010
Tucson	602/792-1275
California	
Northern	
Mountain View	415/968-9340
Sacramento	916/448-3470
San Francisco	415/434-2610
Walnut Creek	415/945-1915
Southern	
Fullerton	714/738-1310
Irvine	714/660-1750
Los Angeles Downtown	213/688-6501
Los Angeles South Bay	213/540-7990
Los Angeles/West	213/820-8111
San Diego	619/231-1600
San Fernando Valley	818/781-4200
Colorado	
Denver	303/770-5700
Connecticut	
Danbury	203-797-0300
Hartford	203/522-4900
New Haven	203/787-4885
Stamford	203/967-4888
Stratford	203/375-7340
Waterbury	203/574-8888
District of Columbia	
Washington D.C.	202/659-6600
Florida	
Fort Lauderdale	305/491-0140
Jacksonville	904/355-1600
Miami	305/591-6888
Georgia	
Atlanta/Downtown	404/659-6500
Atlanta/North	404/955-5555
Illinois	
Chicago/E. Loop	312/861-0770
Chicago/W. Loop	312/346-1300
Oak Brook	312/986-8480
Rolling Meadows	312/392-9344
Indiana	
Fort Wayne	219/489-7300
Indianapolis	317/631-6666
Iowa	
Des Moines	515/243-0191
Kansas	
Overland Park	913/888-8885
Wichita	316/688-1481
Kentucky	
Louisville	502/581-9900
Louisiana	
Baton Rouge	504/924-7100
New Orleans	504/581-6000
Maryland	
Baltimore	301/727-4666
Greenbelt	301/441-8700
Towson	301/321-7844
Massachusetts	
Boston	617/482-7613
Burlington	617/273-6100
Springfield	413/739-4003
Wellesley	617/237-3130
Michigan	
Detroit	313/259-7007
Grand Rapids	616/459-8538
Lansing	517/484-4361
Southfield	313/353-6666
Troy	313/362-0370
Minnesota	
Minneapolis West	612/544-3666
Minneapolis Downtown	612/332-6469
St. Paul	612/227-6100
Missouri	
Kansas City	816/474-5566
St. Louis	314/993-5999
Nebraska	
Omaha	402/346-5700
New Hampshire	
Nashua	603/889-4247
New Jersey	
Cherry Hill	609/488-6666
Edison	201/494-8800
Morristown	201/267-3232
Paramus	201/845-3600
Princeton	609/452-7277
Somerset	201/469-9444
Somerville	201/526-6000
New Mexico	
Albuquerque	505/837-4270
New York	
Albany	518/459-5566
Buffalo	716/856-5800
New York City	
Grand Central	212/557-6311
Penn Station	212/736-7445
Wall Street	212/962-6666
Rochester	716/383-3570
Syracuse, LI	516/364-0007
Syracuse	315-422-2411
White Plains	914/694-4488
North Carolina	
Charlotte	704/552-6277
Greensboro	919/379-1135
Raleigh	919/847-7555
Winston-Salem	919/724-6830
Ohio	
Akron	216/535-1199
Cincinnati	513/769-6000
Cleveland	216/771-3070
Columbus	614/294-5800
Dayton	513/461-4666
Toledo	419/243-8001
Oklahoma	
Oklahoma City	405/722-7410
Tulsa	918/599-7700
Oregon	
Portland	503/620-0160
Pennsylvania	
King of Prussia	215/265-7300
Philadelphia	215/496-1717
Pittsburgh	412/281-6540
Rhode Island	
Providence	401/751-6666
South Carolina	
Columbia	803/256-7446
Greenville	803/271-7044
Tennessee	
Nashville	615/259-6666
Texas	
Austin	512/479-0728
Dallas	
Central	214/954-1166
North	214/387-1600
Fort Worth	817/332-6500
Houston	
Downtown	713/751-0100
Galleria/Post Oak	713/439-0300
San Antonio	512/342-6388
Utah	
Salt Lake City	801/359-3900
Virginia	
McLean	703/734-9010
Washington	
Seattle	206/454-3400
Spokane	509/838-7077
Wisconsin	
Green Bay	414/468-1184
Madison	608/251-0104
Milwaukee	414/277-0545
Canada	
Calgary	
Toronto	
Don Mills	416/445-6788
Downtown	416/595-1135
Mississauga	416/848-3544

I B M

SYSTEMS PROGRAMMERS
PROGRAMMERS - ANALYSTS

The positions below reflect a portion of the active openings for which we are recruiting. They are with Fortune 500 and large regional firms across the country, with many openings in the Southeast.

TECH. SUPPORT
Systems Programmer OS/MVS-GENS $30-45K
Systems Programmer - VM GURU $30-44K

BANKING
Sr. Systems Analyst - Hogan-Cash Mgmt. $25-36K
Programmer/Analyst CICS (COMMAND & MACRO) $22-36K

INSURANCE -
Systems Analyst 5/7 yrs COBOL-IMS/VS, CICS/VS $28-40K
Programmer/Analyst 3/5 yrs COBOL-CICS/VS-LIFE 70 $22-32K

MANUFACTURING
Senior Analyst OS/MVS COBOL - Mfg apps. $30-40K
Programmer/Analyst OS/MVS IMS/VS - Mfg apps $26-34K

Client companies assume all fees - including interviewing and relocation costs. Installations are "State of the Art" and offer excellent career path progression. Forward your resume now or call collect for additional information.

"Steve" Stevenson, Partner
Jim King and Associates

1940 Gulf Life Tower/Jacksonville, Florida 32207
(904) 396-7371

FLORIDA OPPORTUNITIES

Richard P. Rita, a multi-office organization with 13 years experience in Data Processing personnel has outstanding opportunities for qualified individuals in state-of-the-art environments throughout Florida. We currently have openings for: Systems Managers, Project Leaders, Programmers & Systems Analysts, Tech Support and Communications. Positions are in large IBM installations. Salaries range from $20-40K depending upon background and qualifications. All fees, interview and relocation expenses are paid by our client companies.

Now is the time to take advantage of the growth opportunities and your choice of locations - advantages of sunny Florida. Contact:

Tony Wells
RICHARD P. RITA
(813) 877-8703
4348 West Gandy Blvd.
Suite 100
Tampa, FL 33611

data processing

SOFTWARE TECHNICAL WRITER

Spokane, WA

ISC Systems Corporation, the leader in microprocessor-based terminal systems for the financial industry, has an outstanding opportunity for a Software Technical Writer.

To qualify for this position, you must have a BS in computer science, math or electrical engineering, plus three years practical experience in software engineering or its equivalent and two to three years experience as a writer.

This position researches, writes, edits and coordinates the production of manuals for ISC software products, including both user-level manuals and programmers reference manuals.

ISC offers an excellent salary and comprehensive benefits package. If you are interested and qualified, send your resume to: B.J. Miller, ISC Systems Corporation, P.O. Box TRF C-8, Spokane, WA 99220. ISC is an equal opportunity employer.

ISC SYSTEMS CORPORATION
THE COMPUTER FOR SUCCESS
ISC

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

UNIX* Operating System Software Specialist

An advisory role—with a mountain view

You're the expert.

You eat, sleep and dream UNIX.

And, what's more, knowing it 'cold' means you can lead others to better software solutions based on its unique qualities.

Digital invites you to join them in Colorado, where your special talents will make you an immediate key contributor.

Yes, Colorado.

You can enjoy not only an advisory role — but wide open spaces, unraveled mountain paths, fast snow and good fishing.

We're looking for UNIX operating systems specialist to head up a new consulting effort. You step in and provide problem solving help and technical guidance to Digital Software Specialists.

And we want you to get involved with the client directly — see them if necessary to resolve problems.

The requirements are stringent. You must have 3+ years experience using the UNIX operating systems and its associated tools — and a substantial background as a UNIX operating system manager or exposure to UNIX operating system internals, preferably Berkeley UNIX operating system. 3+ years experience using "C" language is also required.

Of course, strong customer relations skills are critical as are good written and verbal communications skills.

If you want to see the 'great outdoors' one more time, contact S. Chamberlain, Digital Equipment Corporation, Dept. 0401 3804, 4405 N. Chestnut Street, Colorado Springs, Colorado 80907.

We are an affirmative action employer.

*UNIX is a trademark of AT&T Bell Laboratories.

People and Technology. PERFECT INTERACTION

digital

If you are looking for a high visibility opportunity with respect technology, a quality working environment and recognition for your relatively autonomous work, plus a competitive compensation package and benefits that may surprise you, CONSIDER:

RADIOLOGY AT HUP

Since its founding as the nation's first teaching hospital, The Hospital of the University of Pennsylvania has given birth to new technologies and treatment modalities which have become the cornerstone of established practice for subsequent generations of health care professionals. Our Radiology Department figured prominently in dynamic innovative technological applications.

MANAGER, ADMINISTRATIVE AND CLINICAL COMPUTER SYSTEMS

The Department of Radiology is seeking a computer professional experienced in organizational information management to direct, control and plan for the Management and Clinical Computer Systems in Radiology. Demonstrated supervisory skills, systems and applications programming experience in a state-of-the-art DEC environment required. VMS, MUMPS and networking experience strongly preferred. MS Engineering, Computer Science, Math or equivalent will be a real plus, though your BS and heavy pertinent experience may qualify.

SYSTEMS PROGRAMMER

BS Computer Science, two years systems and applications programming on DEC, one year data base management required. Your RSTS/E, BASIC-PLUS and MUMPS experience, particularly with health care applications will be a super plus.

Forward your resume with salary history and requirements to Laurent G. Hahn, HUP Recruitment, 3400 Spruce Street, Philadelphia, PA 19104. An equal opportunity employer, M/F/H.

HUP HOSPITAL OF THE UNIVERSITY OF PENNSYLVANIA

We are expanding the staff of our computer systems department which has created three immediate openings.

Application Manager

You will oversee the development and installation of software modifications to our Atex system which is used for text processing, advertising tracking and billing. Your responsibilities will include working with user departments in developing personal computer applications, especially financial data collection. You should have programmer/analyst experience with a PDP-11 or VAX installation using Macro-11 or Pascal. Atex experience preferred; accounting/billing system experience a big plus.

Atex Advertising System Specialist

You will be an advertising system support person for our systems group. Your responsibilities will include assisting users of our Atex advertising/billing system with reports, format writing and training. Atex experience preferred, familiarity with advertising procedures a must.

Personal Computer Support Specialist

You will work with our growing number of in-house personal computer users who are using mostly DEC Rainbows. Your full-time responsibility will be to assist these users with spreadsheets, word processing, answer questions and training. Experience with PC's required and a willingness to work with a variety of user requests.

To apply for any of the above, send your resume or a detailed letter, including salary requirement, to Tom Pike, Corporate Systems Manager, CW Communications, Box 880, Framingham, MA 01701. No phone calls, please.

We are the world's largest publisher of computer-related newspapers and magazines, including *Computerworld* and more than three dozen other publications around the world. We offer pleasant working conditions in modern offices adjacent to the Mass Pike, excellent benefits including dental and optical and profit-sharing. We are an equal opportunity employer.

CW COMMUNICATIONS/INC.

LEAD PROGRAMMER/ANALYST - CICS

McCormick & Company, a Fortune 500 company and a world leader in the manufacturing and marketing of seasonings, flavorings and specialty food products has an opportunity on its Systems Development Staff for a Lead CICS Programmer/Analyst. This position is responsible for leading development projects, providing training and technical direction to the staff, and designing and writing on-line application programs.

The individual we are seeking should possess eight years of progressively responsible experience as a programmer/analyst of which at least the last four years have been spent programming under Command Level CICS. A thorough knowledge of OS/JCL is required. Familiarity with VSAM, IMS, structured COBOL, TSO/SPF and SDF would be a real plus. A college degree or working toward one is desirable.

We have two IBM mainframes running under MVS/SP 1 with a nationwide communications network operating under CICS supporting over 200 terminals plus several remote minicomputers and RJE stations.

We offer an excellent compensation and benefits package including relocation assistance. If you are looking for a company which encourages technical career growth, send your resume with salary history in confidence to:

Michael Trustey
Manager, Human Relations
Management Services Division
McCormick & Company Incorporated
414 Light Street
Baltimore, MD 21202

AN EQUAL OPPORTUNITY EMPLOYER M/F/H

FACULTY POSITION

Albright College is continuing to invite applications for a new faculty position in Computer Science. Candidates must be qualified in two or more of the following areas: assembly and machine language, operating systems, data base theory, computer organization, theory of programming languages. Doctorate in computer science or a closely related area preferred, but masters degree will be considered; relevant professional or industrial experience desirable. Strong commitment to undergraduate teaching in a liberal arts college and excellent communication skills are mandatory.

Computer Science at Albright is an established major field of study based on ACM Curriculum '78 recommendations. The college curriculum includes a broad general studies program and emphasizes critical thinking and communicative skills.

Position available September 1984. Send resume by April 30 to: Mrs. Donna McClelland, Department of Mathematics and Computer Science, Albright College, P.O. Box 516, Reading, PA 19603.

Albright College is an Equal Opportunity/ Affirmative Action Employer

DATABASE APPLICATIONS PROGRAMMER

Staff position for development and support of statistical database applications in collaborative efforts of the Department of Statistical Consulting and Computer Science. Duties will include design and coding of new applications; maintenance and enhancement of existing management information systems; documentation of applications packages; advising and assisting users. Provides opportunity to work in an academic environment, to help develop management tools, and to gain experience in analyzing nonstandard requirements and developing workable solutions. Interest in working closely with users essential. Professional programming experience required. Database and PL/I experience especially helpful. Bachelor's degree preferred. Multiple application helpful.

Applicants should send resume, statement of professional goals, and names of references to the address below. No agencies.

Prof. P.G. Hoel
Room 39-466
Massachusetts Institute of Technology
77 Massachusetts Avenue
Cambridge, MA 02139

MIT is an equal opportunity/ affirmative action employer

DATA BASE CONSULTANT

UNUSUAL OPPORTUNITY

DBD Systems, Inc., a world-wide leader in data base consulting and education, offers this career opportunity to highly qualified professionals. Data base design and systems development experience utilizing ADABAS, IDMS, or IMS/VS is essential. Education experience, and ability to communicate effectively, both verbally and in writing, is a definite plus.

Compensation will reflect experience, with exceptional benefits in addition. Please call COLLECT, (516) 678-1447, OR send resume in confidence to:

DBD SYSTEMS, INC.
100 North Centre Avenue
Rockville Centre, NY 11570

AD SPACE For Sale

Call 1-800-343-6474
(in Mass.) (617) 879-0700

or send materials to:

COMPUTERWORLD Classifieds
Box 880
375 Cochituate Road
Framingham, MA 01701

ATLANTA BANKING POSITIONS

$35,000 to $60,000

Need several Programmer/Analysts, Senior Analysts, and Team Leaders for Wall Street. Relocation Expenses Paid.

Send resume to:

Jim Heard
EDP Consultants, Inc.
2067 Buckor Hill Road,
Suite 304
Marietta, Georgia 30062
404-971-7261

The City Colleges of Chicago, Program for the Military-Europe is seeking applicants for its full-time faculty. Bachelor's Degree in Data Processing or Computer Science is preferred. Teaching experience is required. Must be able to teach two or more of the following languages: COBOL, FORTRAN, PASCAL, BASIC, ASSEMBLER or other languages. The City Colleges of Chicago is an Equal Opportunity Employer. Send credentials and resume to:

HQ USAFE/DPPED
City Colleges of Chicago
Attention: Academic Affairs
APO New York 09633

Data Processing

DATA PROCESSING DIRECTOR

Parsons Hospital, a 400-bed dual hospital system, seeks a Director of Data Processing. Requires advanced degree in Computer Science or related field, previous hospital experience, experience with IBM 4341, 5 years managerial experience, knowledge of medical information systems, and knowledge of DRG's and prospective payment. Send resume and detailed salary history/requirements to: Carolyn Wood, Parsons Hospital/HSD Dept., 2815 N. Cascade, Colorado Springs, CO 80907. Equal Opportunity Employer.

FACULTY POSITION

East Central University invites applications for a tenure track faculty position in the Computer Science Department. The salary is attractive and summer teaching is available. Since the University is committed to the development of an excellent department of Computer Science, preference will be given to applicants with expertise in state of the art applications and theory. May 9 is the closing date for applications but the job will remain open until filled. Send resume and direct inquiries to: Jim Hamilton, East Central University, Ada, OK 74820, (405) 332-8000 ext. 465. *An Equal Opportunity/ Affirmative Action Title IX, Section 504 Employer.*

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

Our Way Is Working

Stimulating challenges in one of the world's most exciting industries can be yours with Northwest Orient airlines.

Major new applications and systems development efforts offer a broad range of applications for our sophisticated and multi-processor Univac 1100/80 site. New systems are being developed in such areas as general ledger, human resources, flight crew management, aircraft forecasting, passenger and cargo revenue accounting, automated check-in, and flight planning. If you have 2 or more years of experience in one of the following areas we are interested in talking with you:

APPLICATIONS PROGRAMMERS

Candidates should hold a degree in computer science, management information systems or quantitative methods, plus expertise in COBOL, FORTRAN and/or MAPPER. Experience in a Univac 1100 environment and DMS 1100 or similar data base management system is a plus.

SYSTEMS PROGRAMMERS

Openings now available for experienced personnel at various levels including: performance analysis, data communications, interrupts, and operations.

If you are seeking to put your knowledge to practical use in a demanding industry, Northwest offers an atmosphere of close interaction between user departments and management, and a team approach to development. Our competitive salaries and fully paid company benefits — including free travel — are backed by 35 years of continuous profitability.

The World is Going Our Way. To learn more call (612) 726-2226 for an application. Or send your resume in confidence to M.V. Johnson.

Engineering Beyond Reality

Over 50 years ago LINK was born when a young visionary, Ed Link, designed a system to teach pilots to fly without leaving the ground. His pioneering discovery was the brainchild of what has become the billion dollar flight simulation industry. Today, LINK remains in first place; designing and developing custom, computer-controlled flight simulation equipment for NASA and the military that goes beyond state-of-the-art.

At our facilities we can duplicate every aspect of the aerospace scenario in detail so realistic it goes beyond reality; all through the technological "magic" of microprocessors, lasers and G-seat motion systems. Our VISUAL Laser Image Generator, the first laser beam training simulation system, scans a model board that dramatically alters the aerospace environment while simultaneously recreating the sights of full-scale reality in miniature.

Link's history of "firsts" has resulted in many on-going contracts which means long-term, secure careers for talented engineering professionals.

TELEMETRY EXPERTS

RESPONSIBILITIES: Will perform system engineering trade-offs for telemetry and network systems. Produce design specifications and requirements documentation. Integrate design into a total simulator product.

REQUIREMENTS: Bachelor's Degree in related discipline. Strong background in telemetry and network systems in simulation. Requires exposure to TDRS, NASCOM and Air Force RTS systems and hardware. Knowledge of simulation techniques and programming in hardware solutions. Capable of integrating hardware/software and document design and requirements to applicable military standards. Must have 2 to 10 years related experience.

COMPUTER SYSTEMS ENGINEERS

RESPONSIBILITIES: Perform systems engineering to satisfy simulation performance requirements for computational system.

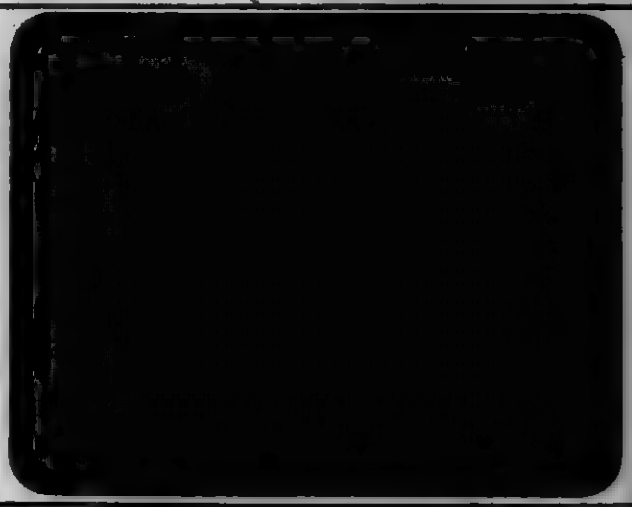
REQUIREMENTS: Decomposition, analysis, allocation • Interface review • Preliminary design • Integration and verification planning • Process walk throughs, design reviews, code and test audits • Overall responsibility for the technical performance of simulators. Experience: • BSCS plus 6 or more years experience. • FORTRAN and Assembly language proficiency • Real time, multi-tasking operating system experience • Flight hardware integration experience is a plus. • Ability to travel.

As the industry innovators in flight simulation, we can offer excellent salaries, comprehensive benefits and a promise of another 50 years of technical "firsts." To start your career with LINK, please send a detailed resume including salary history in confidence to: Patricia Records, Department 653-9426. Link Flight Simulation Division, 2224 Bay Area Blvd., Houston, Texas 77058. An Equal Opportunity Employer M/F/H/V.

U.S. CITIZENSHIP REQUIRED

Link

LINK: Where Simulation Goes Beyond Reality.



MANAGER-COMPUTER CENTER
SYSTEMS PROGRAMMER
NOVA UNIVERSITY
Fort Lauderdale, Florida

Applicants for position of Manager should have the following qualifications in an academic computing environment:

- Minimum of 3 years supervisory and managerial experience.
- Experience with the design and development of data base management systems.
- Knowledge of [illegible] systems.
- Experience with telecommunications networks.
- Good communication and interpersonal skills.

Applicants for the position of Systems Programmer should have the following qualifications:

- Minimum of 2 years systems programming experience.
- Knowledge of VAX/VMS.
- Knowledge of telecommunications networks and communications protocols.
- Experience with "C" and UNIX highly desirable.

Salary commensurate with experience and qualifications. Send resume ASAP to:

Nova University
Personnel Department (CW)
College Avenue
Fort Lauderdale, FL 33314

Affirmative Action/Equal Opportunity Employer

S.P. - ROBERT MONTGOMERY

Prog. Anal. (3 yrs H/P & COBOL)	to $35,000 NC location
Prog. Anal. (3 yrs Mfg. CICS & COBOL)	to $30,000 NC location
Prog. Anal. (3 yrs banking BAL/A COBOL)	to 29,000 VA location
Sys. Progs. (3 yrs MVS or IMS)	to $40,000 SC location
Sys. Progs. (3 yrs NCP & VTAM)	to $40,000 FL location
Sys. Anal. (3 yrs bus. appl. & COBOL)	to $35,000 TN location

[illegible] - MIKE HUNTER

Systems Engineer	(C3I) to 70,000
Software Mgr's (Communications)	to 65,000
Software Supv.	(Telephony) to 60,000
Sr. Software Eng's	(Unix-DEC or INTEL) to 55,000
Software Eng's (Microprocessor)	to 50,000

Fee-Matrix is the nations largest corporate owned co. with over 100 offices located throughout the nation. For a clear understanding of our clients needs call 919/870-5940 or send resume to:

[illegible]

TANDEM

Expertise?

Call or send resume to:
Mr. Neil J. Cerutsky
Director, Information Services

[illegible]

1951 Kidwell Drive, Suite 400
Vienna, VA 22180
(703) 556-0600

computer services manager

FMC Central Engineering Laboratories is an interactive, multidisciplinary research center chartered to provide technical services and identify new product opportunities for the defense, petroleum and specialized machinery divisions of FMC.

A unique opportunity exists for a Computer Services Manager to guide and direct the activities of the Computer Services department which supports our research laboratory in the areas of MIS, technical computing and office automation. Your specific responsibilities will include supervising the operations of each support department, determining the best utilization of existing and new hardware and participating in the Technical Computing Steering Committee for planning and implementation of our strategic objectives.

The successful candidate will have a B.S./M.S. in Computer Science or Engineering and be experienced in managing a department of similar scope. A thorough knowledge of DEC equipment and up-to-date familiarity with technical computing software, IBM MIS Systems and office automation options and systems are required. Strong interpersonal skills are essential to work effectively with your client, user community.

FMC offers competitive salaries and excellent benefits. For confidential consideration, please submit resume or call: Ms. V. Payne, (408) 289-3433, FMC Corporation, Central Engineering Laboratories, 1185 Coleman Avenue, Santa Clara, CA 95052. We are an equal opportunity employer m/f.

FMC

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

IBM 4381 Database Administrator

The Royal Oman Police is an expanding and progressive Force with wide ranging responsibilities including Customs and Immigration. Micros, Minis and Word Processors are already in use and an IBM 4381 is due for delivery in July.

The newly expanded Computer Department has a vacancy for a Database Administrator. Applicants for this post must have a minimum of 8 years IBM experience of which at least 3 years must have been as a Database Designer or Database Administrator in an online realtime IMS/CICS environment. Applicants must have been responsible for the design and implementation of at least one large and complex IMS/CICS database.

This appointment is offered on contract terms of service for an initial period of 2 years. Conditions of service include tax-free annual emoluments of the equivalent of approximately U.S.$34,067/- at the current rate of exchange, and normal benefits associated with working overseas including furnished air-conditioned family accommodation, car and medical treatment, with 60 days leave per annum and an end of contract benefit equivalent to 25% of the basic salary.

Applications with detailed curriculum vitae attached should be forwarded, not later than 20 April, 1984 to:

Inspector General of Police and Customs, Attn: Assistant Inspector General (P), C/O Gregg International, P.O. Box 11618, Kansas City, MO 64138.

Aircraft Division

COMPUTER SYSTEMS ENGINEERING

At Northrop Aircraft Division, Computer Systems Engineering is a small group of Senior Analysts who are planning the systems architecture that will support the division through the end of this century. This is a select group whose size and influence is such that each individual member's contribution will make a definite impact on the division's operations. We are currently seeking senior specialists in Network Configuration Planning who can address systems that run from multi-mainframe area networks to mini/micro distributed processing.

Aircraft Division Data Processing is one of several information resource management teams that daily support the phenomenal growth of Northrop's Southern California Divisions. Interested candidates should forward resume and salary requirements to:

Mr. Cris Cristina
Engineering & Administrative Employment
Dept. 1222/80 NDP-CW 38631
P.O. Box 2282
Hawthorne, CA 90250

Equal Opportunity Employer M/F/H
Proof of U.S. Citizenship Required

You can make a difference.

NORTHROP
Making advanced technology work

EDP Pro's

Get in with a company going places.

At AP Telecomputing Corporation, our track record speaks for itself. With a 300% growth rate in 1983 and a projected 200% increase in 1984, the opportunities for career advancement in this totally DP-oriented organization are significant for people looking to stretch their talents.

We have major commitments to the continued development of proprietary software for use in both manufacturing and financial markets. We are therefore seeking the right career-minded DP professionals to join our dynamic team.

EDP GENERALIST—8-12 years DP experience with significant exposure to hardware/software management and/or applications development.

PROJECT MANAGERS—3-5 years experience as project, systems or programming manager.

SR. PROGRAMMER ANALYSTS—4+ years experience in applications development with high technical proficiency in COBOL.

PROGRAMMER/PROGRAMMER ANALYSTS—2-5 years experience in applications development using COBOL.

In addition to brand new Corporate facilities, we are able to offer excellent salary and benefit packages.

To arrange a local interview, please call John Dedrick, (305) 832-3799 or send your resume with salary history to: AP TELECOMPUTING CORPORATION, P.O. Box 2891, West Palm Beach, FL 33402. Equal Opportunity Employer, m/f.

AP TELECOMPUTING CORPORATION

NATIONAL OPENINGS

TECHNICAL WRITERS

SOFTWARE
SYSTEMS—Oper. Sys., Lang. & Prog. to $40K.
APPLICATIONS—Application & "How-To" to $35K.
MANAGERS
MGR., Software Pubs. to $45K.
MGR., Editing/Prod., (on-line oper.) to $45K

Please call MICHAEL BUNN at 609-424-2660 or send resume to:
The Executive Mews
Bldg. B-37, 1500 E. Marlton Pike
Cherry Hill, NJ 08003
All placements are direct career opportunities.
Fees paid by client co.

DATA BASE ANALYST

ADVANCE YOUR CAREER WITH A DYNAMIC LEADER

As an expanding retail organization serving the Southern United States, we are offering a career opportunity at our corporate computer center located on Florida's West Coast for an experienced Data Base Analyst.

Candidate should have 3 or more years of IMS DB/DC experience in data base design, use of IMS utilities and support IMS application development. Knowledge of IBM's data dictionary would be helpful. Good communication skills are a must.

We offer both professional rewards and personal satisfaction as you work with state-of-the-art equipment in pleasant surroundings. Competitive compensation and benefit package included. Send complete resume, including salary history to:

Headquarters Employment Manager

ECKERD

ECKERD DRUG COMPANY
P.O. Box 4689
Clearwater, FL 33518

MEMBER NYSE EOE M/F

INSTRUCTOR
OR ASSISTANT PROFESSOR
OF COMPUTER SCIENCE
IN EDUCATION

Illinois State College has a faculty position available in Computer Science in Education. Qualifications: Bachelor's degree (Master's preferred) in Computer Science or equivalent; college level teaching experience using microcomputers required; experience in introducing microcomputers successfully; non-teaching professional experience utilizing IBM mainframe computers. Duties include: teaching of microcomputer-based courses such as BASIC, PASCAL, COBOL, FORTRAN and Introduction to Computer Science; will direct the operation of the Micro-computer Laboratory and the microcomputer-equipped teaching facility. This is a full-time tenure track position; rank and salary based on experience and academic preparation. Excellent fringe benefits. Starting date: July 1, 1984.

Send letter of application and resume with three letters of reference by May 1, 1984 to:

Mrs. Dorothy Ingold
Employment Manager
Illinois State College
2020 Lindale Avenue
St. Louis, MO 63103
AN EQUAL OPPORTUNITY/
AFFIRMATIVE ACTION EMPLOYER

Arizona/California/Texas/Colorado/Florida/Boston

SCIENTIFIC OR BUSINESS PROGRAMMERS

All fees and relocation paid. $20-40,000

If you have a BSEE, BSCS, BS in Mathematics or Physics or equivalent, we need you right now.
For Business: OS/DOS/IMS/CICS/MVS/JES Prog/Anal/Systems/Data Base. All large scale installations.
For Scientific: experience in the computer, communications, semiconductor, or aerospace/defense industries.
Your name, resume, and present employer will not be given out without your permission.
For sincere personal service, please send a confidential resume to:
Dan Pullman (602) 274-6969
PULLMAN PERSONNEL
2953 North Central Ave., Suite 555, Phoenix, Arizona 85012

HAMAD GENERAL HOSPITAL, invites qualified candidates for the post of

- DIRECTOR OF DATA PROCESSING -

The selected candidate should possess a master degree in Computer Science with at least five years experience in which 2 years in a hospital setting. Knowledge of spoken Arabic language is essential.

The Director will be responsible for the development of policies and procedures, long range planning of systems, coordination of programming and the acquisition and installation of hardware and software systems.

The selected candidate will enjoy generous fringe benefit package i.e., 60 days paid leave per year, Air ticket for employee, wife and up to 3 eligible children up to the age of 18 years, transport allowance of QRs 600/- per month, furnished family accommodation and contracts for a period of 3 years.

Please send complete C.V. with contact telephone number to:

DIRECTOR OF PERSONNEL AFFAIRS
Hamad General Hospital
P.O. Box 3050
Doha, State of Qatar
Arabian Gulf

COMPUTER SCIENCE FACULTY POSITION

Purdue University Calumet invites applications for a tenure track appointment in Computer Science. Applicants should currently hold, or have successfully completed all requirements but, the PhD in Computer Science. Rank and salary are open, and will depend on qualifications.

Duties include the teaching of upper level undergraduate CS courses leading to the Bachelor of Science degree, and providing leadership in planning for the expansion of our offerings and facilities.

Purdue University Calumet is situated on a suburban campus in Hammond, Indiana, about 45 minutes from downtown Chicago. There is significant opportunity for involvement with local industry and research laboratories.

Please send vitae and the names of three references by May 15, 1984 to:

Douglas B. McCarthy, Head
Department of Mathematical Sciences
Purdue University Calumet
Hammond, IN 46323
Telephone (219) 844-0520, ext. 373

Purdue University Calumet is an Equal Opportunity/Affirmative Action employer.

SUN, SAND AND OPPORTUNITY

A major Florida financial institution with growth opportunities needs Programmer Analysts and Senior Programmer Analysts with IBM 3000, OS/MVS, COBOL and/or Assembler and/or CICS experience. Knowledge of HOGAN, Florida Software, ODA, LOANS, MBA or MICR helpful. Salary to mid-30's, excellent benefits and relo. Send resume or call:

Management Recruiters of St. Pete
7697 4th Street North, Suite 207
St. Petersburg, FL 33702
(813) 577-6116

YANDEM PROGRAMMERS FLORIDA GOLD COAST

Grand floor opportunity to develop applications in billing, accounting, customer service, and other on-line areas for NETWORK I, Florida's largest long-distance phone company. Fast moving, hard-working, congenial shop where results are rewarded. All positions require a minimum of three solid years of COBOL (5 or more is preferred), with at least two years on Tandem G4 or T16 using Pathway and TMF. Other mid experience will be considered. Salary is open.

Send resume and salary requirements to:

C. Johnson
NETWORK I, INC.
3500 S. Ocean Drive
Hollywood, FL 33019

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

Data Processing

Develop Your Future At Candle Corporation...

CANDLE CORPORATION is a multi-national, high technology company and developer of OMEGAMON®. We have several exciting opportunities for qualified individuals to join our expanding team of professionals:

Sr. MVS Software Developers

If you have a desire to get away from SMP installs and third shift system outages that interrupt your sleep or want career advancement without getting into management, then build your future by developing quality systems software at Candle. Qualified applicants will have strong IBM Assembler programming skills and good knowledge of the internals and performance considerations of the MVS operating system. This position also exists in our New York office.

CICS Internals

We need experienced CICS Programmers. Experience should include 3-5 years, assembler language programming in an MVS environment and a good working knowledge of CICS/VS architecture and internals. Additional experience with performance tuning systems a plus.

Technical Support Specialists

We're seeking support specialists to be the technical interface between Candle and its customers. Requirements include extensive knowledge of MVS and either IMS or CICS operating systems experience. Knowledge of performance and tuning concepts also desired along with excellent communication and presentation skills. This position also exists in our New York and San Jose offices.

CANDLE offers an excellent compensation and benefits portfolio as well as an opportunity to work with some of the top software professionals in the world. Please contact Joel Prescott or send resume to:

Candle Corporation
10000 Wilshire Boulevard
Suite 2404
Los Angeles, CA 90024
(213) 478-8277

Equal Opportunity Employer

!Candle·

Software Engineers

We are Structural Dynamics Research Corporation, SDRC, an international engineering consulting and computer software firm.

Openings exist for dynamic individuals to assume roles of technical leadership in the design and implementation of User Interface Development Systems and User Interface Management Systems. The successful candidates will design and implement these software systems on in-house DEC and IBM mini and mainframe computers using the C programming language.

This development process requires significant skills in computer science disciplines relating to software tools and operating system design and interfacing. Openings exist for:

- Software tools designer. Design and implement a screen manager and text editor concentrating on Human Engineering and Graphics.
- Operating Systems Specialist. Design and implement machine independent operating system interfaces concentrating on concurrency issues and device independence.

These positions are best filled by people with these qualifications:

- Experience in operating systems, real time programming, compiler development, or forms interfaces
- Experience in the development of large interactive applications
- Experience in or interest in computer graphics
- Familiarity with relational database concepts
- Graduate work in Computer Science or equivalent experience

SDRC offers a stimulating and challenging career opportunity, professional growth and excellent company paid employee benefits.

Please send your resume and salary history to:
Ms. Bales
2000 Eastman Drive
Milford, Ohio 45150
an equal opportunity employer

SDRC
Structural Dynamics Research Corporation

COMPUTER PROFESSIONALS

With Current Experience In Applications Software, OS/SW, Communications Networks, Compilers, DBMS and Development Tools.

We are now assuming our responsibilities as the Shuttle Processing Contractor for NASA at the Kennedy Space Center, Florida and the U.S. Air Force at Vandenburg Air Force Base, California. This six year contract (with options to fifteen years) will provide you with a secure opportunity to join the team of professionals like yourself who are making a significant contribution in the manned space program.

If you are an experienced computer professional whose goal is more challenging and rewarding work in a state-of-the-art environment, look to Lockheed Space Operations Company. We are hiring a number of professionals, like you, to fill opportunities involving the development and enhancement of: Applications Software (Real-time and Interactive), Operating Systems Software, Communications Networks, Compilers, Data Base Management Systems and Development Tools. You will be working on the Space Shuttle Launch Processing Systems (LPS), which is a highly distributed network of over 300 MODCOMP Super Mini Computers and a large number of Honeywell 6000's with over 3.5 billion bytes of mass storage. Some of these opportunities will involve a three month program to become familiar with the entire LPS and the space system unique OS/SW.

We also have opportunities available for MIS Applications professionals to develop a wide variety of on line Data Base Management Systems.

For immediate consideration call or send your resume to: Donald C. Quirk, Lockheed Space Operations Company, 1832 Garden Street, Titusville, Florida 32592. CALL COLLECT (305) 268-4070. Candidates who wish to pursue opportunities located at Vandenburg Air Force Base, California should send their resume to: Lockheed Space Operations Company, Employment Office, 1100 West Laurel Avenue, Lompoc, CA, 93436.

Lockheed
Space Operations Company

An Equal Opportunity Employer/U.S. Citizenship Required/Principals Only

Senior Programmer Analyst

We are seeking a Programmer Analyst with proven work experience in designing and coding COBOL programs and generating program specifications for major systems.

This individual will participate in development and support of sophisticated medicare related DB, DC data processing applications systems. Must be well versed in COBOL. On line data base systems development helpful. Health data systems experience preferred. DOS and work with IBM 4341 system helpful.

Competitive benefit and salary programs. To apply please send resume, in confidence, to:

Personnel Manager
BLUE CROSS OF IDAHO HEALTH SERVICE
P.O. Box 7408
Boise, Idaho 83707

*Equal Opportunity Employer

RESUMES
All Writing Needs
- Effective, professional
- For today's job seeker
- Free cover letter package
- Fast, reliable, confidential
- Creative & editorial services

FORD/YOUNG ENTERPRISES
P.O. Box 157
Villa Park, IL 60181
(312) 530-6818

CLEVELAND
THE NORTH COAST OF AMERICA

Cleveland is the nation's best kept secret. Anyone who has lived here knows it is a city with much to offer. Four beautiful seasons, parks and bountiful recreation facilities, plus cultural activities including the symphony, ballet, opera and live theatre. Our midwestern lifestyle offers friendly neighborhoods at affordable prices.

Leaseway Transportation has been headquartered in Cleveland since it was founded, over 80 years ago. With revenues of over $1.3 billion, Leaseway stands out as a major employer with outstanding career opportunities, especially for systems professionals.

Our new data center is equipped with an IBM 3083EX/4341 complex running under OS/MVS and a dual processor Sperry 1100/72 system. Distributed systems include Prime, HP and Four-Phase. Extensive use is made of database architecture in systems design with development work performed on-line and supported by a fourth generation language.

If you are degreed and have broad business and systems project experience, Leaseway wants to hear from you. IBM and transportation industry knowledge are preferred. Expansion of our corporate capabilities has created the need for:

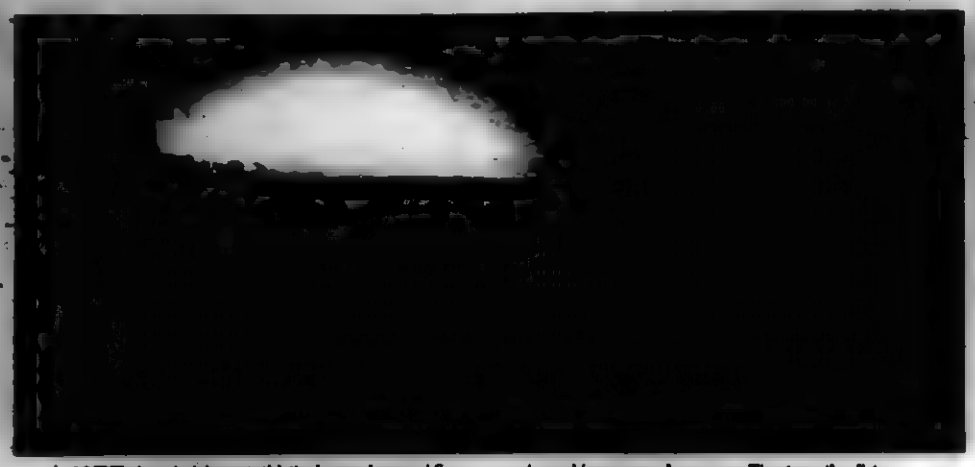
- **SR. PROGRAMMER/ANALYSTS**
- **SR. SYSTEMS ANALYSTS**

Please send your resume and salary requirements to Debra Miller at:

Leaseway Transportation
3700 Park East Drive
Cleveland, OH 44122

An Equal Opportunity Employer M/F

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS



* NIKE, America's largest athletic shoe and apparel firm, has opportunities for skilled computer professionals who are the best in their field.

We are looking for experienced, successful individuals, currently working with Sperry 1100 Systems. People developing business systems using COBOL, DMS 1100, QLP and/or MAPPER.

As one of the Northwest's largest computer operations, we're seeking men and women willing to go the distance in a mobile, rapidly changing environment.

Want to be on the leading edge of technology? Join us.

NIKE, Inc. 3900 S.W. Murray Blvd. Beaverton, Oregon 97005. Contact Paul Phillips.

NIKE

NIKE is an Equal Opportunity Employer — Beaverton, Oregon

Data Processing

Look to Litton

INFORMATION SYSTEMS PROGRAMMER/ANALYST

Litton Data Systems is a worldwide leader in defense-related high technology products and services. As we look towards the future of military electronic systems, we see ourselves in a constant growth pattern with many new and innovative projects on the horizon.

The Information Systems Programmer/Analyst candidate must have 5 years of experience in COBOL programming with 3 of those years as an Analyst. Must also have 3 years of IMS on-line experience. Background in either Engineering or Manufacturing is preferred.

This position offers the selected candidate both challenge and growth potential. For immediate consideration, please send your resume to:

Jim Robertson
Department 387
Staffing & Placement
8000 Woodley Ave.
Van Nuys, CA 91406

DATA Litton SYSTEMS

Principals Only
Equal Opportunity Employer
U.S. Citizenship Required

Manager Network Control

RCA Cylix continues to be one of the fastest growing and most successful satellite communications networks in the industry. This rapid growth has afforded many communications professionals the opportunity to pursue career goals within the company. We currently have the need for a Manager - Network Control.

You will be responsible for managerial functions which direct the Controllers in both day-to-day and special case operation of the Network Control Center and assure maximum reliability of the network and high quality service to the customer. Minimum 5 years experience in network management and troubleshooting problems such as line, modem, hardware and software. Knowledge of poll select, SDLC and 3270 bisync protocols needed. BSEE or Computer Science preferred.

As an independent subsidiary of RCA, we can offer the backing of an industry leader while maintaining an atmosphere that encourages individual efforts. For confidential consideration, please forward your resume and salary history to: Personnel, Employment Representative, 660 Ridge Lake Boulevard, Memphis, TN 38119.

RCA Cylix Communications Network

We are an affirmative action employer.

DATA PROCESSING CONSULTANT

St. Louis, Missouri, consulting firm is seeking a person with at least four years experience in programming and design using BASIC, COBOL, TSO/SPF, IMS, DPSS, PANVALET, IMAGE, V/3000, and KSAM. Hardware experience must include IBM 370 with OS/JCL and HP 3000 with MPE IV. 40 hour week, salary $23,000 per annum. Excellent company benefits. Resumes only. Refer to #983668.

Job Services
895 Washington
St. Louis, MO 63101
Attn.: J. Carroll

SUNBELT *IMS*

California to Florida

Immediate need for application and software IMS, CICS, IDMS, RAMIS, TOTAL and ADABAS professionals. Coast to coast coverage. Contact us now and make hands on/short & mid-term Relocation assistance available.

Call Collect or Send Resume

SUPERIOR RESOURCES

Personnel Services - Employer Paid Fee

17141 Ventura Blvd. #200
Encino (Los Angeles) CA 91316
(213) 995-0400

Member National Computer Assoc. Offices Nationwide

MANAGEMENT OPPORTUNITY

MINICOMPUTERS
DATABASE
ON-LINE
NETWORK

Growth oriented organization requires first level manager to direct systems development in the above environment.

The opportunities for growth are technical and managerial. Honeywell experience a plus.

Send resume with salary requirements to:

Manager, Human Resources
HOME OWNERS WARRANTY CORP.
2000 L STREET N.W.
WASHINGTON, D.C. 20036

EOE — M/F/V/H

IMS PROGRAMMERS

San Francisco Bay Area

Come be part of AFS...a leading software company servicing the financial industry since 1969! Our focus is on financial, investment and network services/software solutions for information management.

NEW GROWTH OPPORTUNITIES exist for experienced IMS DB/DC Programmers with COBOL and/or PL1 to participate in the development of a major real-time financial system. Minimum 2 years hands-on IMS experience required.

An additional opportunity exists for a Data Base Analyst with 5 years IMS utilities and IMS data base design and implementation experience. Some data dictionary experience desirable. PL1 background a definite plus.

Excellent salaries, benefits and exceptional professional growth opportunities.

Qualified candidates please CALL Adeline Ribble at (415) 574-4940 COLLECT or submit resume with salary history to Director/Human Resources, Applied Financial Systems, 951 Mariners Island Blvd., San Mateo, CA 94404. Principals only, please. Candidates must be willing to relocate to SF Bay Area. We are an equal opportunity employer.

AFS·SUNDATA™

MIS DIRECTOR

We are a major transportation oriented firm and are seeking an experienced individual for our corporate staff. The person we need is a self starter who is capable of designing and implementing systems and guiding our MIS function. The successful candidate will have a minimum of several years experience in programming and operations, an RPG II background and the ability to interface with both senior and line management. We have an IBM System 38 and we plan to expand its applications and the role of MIS. This position will have overall systems responsibility and we require someone with a hands on approach. We offer an excellent compensation/benefits package and a solid future. Qualified individuals should forward resume, including salary history and requirements to Joseph M. Wilson, Director of Personnel, Yellow Freight Sys., 2 Brookfield Drive, Brentwood, MO 63144.

DATA SYSTEMS MANAGER

Provides technical management and direction to the Police Department's data processing efforts, utilizing maintenance and advanced system applications. Develops automated systems to monitor and evaluate the department human allocations and provides management information to all department managers. Requires BS in computer science, business administration or related field; 5 years of progressively responsible experience in the development and implementation of automated data processing systems to include police information systems, two years of which must have been in a supervisory capacity; or an equivalent combination of education and experience. Polygraph exam will be administered. Salary $2777 - 3618. A City application will be mailed upon receipt of resume and must be returned by May 4, 1984 to City of Colorado Springs, Dept. of Personnel, Attn: Data Systems Manager, P.O. Box 1575, Colorado Springs, CO 80901.

We are an equal opportunity/affirmative action employer

HIRING?

More computer people read Computerworld than any other newspaper in the United States - more than half a million computer people every week.

And, among our 529,650 readers at user organizations about half claim to look at recruitment ads at least every other week (only a small percentage say they never look at recruitment ads).

No wonder Computerworld carries more recruitment ads for computer people than any other publication.

To place your ad or to get a rate card with complete details on Computerworld Classifieds, call or write:

Classified Advertising

Box 880
Framingham, MA 01701
617-879-0700

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

ENGINEERS

Product Manager

A future to be optimistic about.

You'll have much to be optimistic about in this senior level opportunity at NCR's Scripps Ranch facility.

There's our strong marketing, evidenced by our introduction last year of more data processing products than any high tech company with a major international organization. We have an atmosphere that inspires and encourages personal achievements. Plus, you'll have the opportunity to achieve and be rewarded well with a good salary, numerous benefits, and chances for further career advancement.

Your duties and responsibilities will be comprehensive, too.

Concentrating on day-to-day interfacing and support of marketing and sales groups, you'll be strongly involved in all product management tasks. From sales training support to direct sales support. Product and marketing strategies along with forecasting, pricing and financial planning. Plus, participation in all product presentations as well as development and release of corporate and consumer materials.

To successfully handle these accountabilities, you must have 10 years product management experience with a minimum of 3 years direct sales experience in computer systems and products. You'll need outstanding analytical and communication skills. And, we require a BS or BA degree in Business, Marketing or Computer Science.

Join us in time to celebrate the optimism of our Centennial. For immediate, confidential consideration, send your resume and salary history to: **Systems Engineering — Scripps Ranch, 9900 Old Grove Road, San Diego, CA 92131. Attn: Sharon Jordan.**

NCR

1884-1984
Celebrating the future

An Equal Opportunity Employer

BUSINESS PROGRAMMER/ANALYST SYSTEMS ANALYST

Your skills are unique. So are we.

As a computer professional, your skills in the application of advanced system designs are a unique asset in today's fast-paced business environment. At Ciber, we're also unique. We're a growing, innovative consulting firm that provides applications development services to diverse customers nationwide.

If you're an individual with a minimum 3 years experience as a Programmer, Programmer Analyst, or Systems Analyst, consider a future with Ciber. We offer a challenging career where your technical know-how can be put to use in a diverse assignments with clients in various industries.

Our projects are development-oriented, so you'll be involved in analysis, programming, implementation and documentation with emphasis towards IDMS, IMS, CICS and other software packages. With us, you'll also gain the kind of recognition and visibility found only with a company where opportunities are still taking shape - a company like Ciber. We have opportunities in Atlanta, Chicago, Dallas, Denver, Detroit, Houston, Phoenix, Sacramento and St. Louis. If qualified and interested in becoming a Ciber professional, call collect or send your resume to:

• Atlanta • Chicago
• Dallas • Denver
• Detroit • Houston
• Phoenix • Sacramento
• St. Louis

Ciber
Personnel Department
67 E. Weldon, Suite 121
Phoenix, Arizona 85012
(602) 234-0411

An Equal Opportunity Employer M/F

CIBER

SYSTEMS ANALYST

We are seeking a bright and responsible person with 4-7 years **FORTRAN, PASCAL** and/or **COBOL** experience to be part of our exciting and dynamic organization. Individuals with experience in database management systems and **VAX VMS** or **RSX 11M** a plus.

Consolidated Group, Inc. is a nationally respected administrator of top quality group insurance programs for small employers.

We offer a stimulating, fast-paced environment that searches for growth. We also offer a competitive salary and comprehensive benefit package including life, medical and dental plans, tuition and day care reimbursement along with other services and programs.

Please send your resume to Joan Goldfracht, Personnel Administrator.

CONSOLIDATED GROUP, INC.

Pleasant Street Connector, Framingham, MA 01701
An Equal Opportunity Employer M/F

Research Design - Consultant

Academic Computing is seeking applicants for a continuing 12 month-contract Research Design Consultant. An earned doctorate is preferred with a specialization in the application of statistical methods to research problems and 2 or more years experience in providing statistical consultation for researchers possessing a wide range of statistical skills. Applicants should have experience with commonly used statistical packages (SAS, SPSS, MINITAB, ETC.) and computer skills. Responsibilities include providing research design consultation and data processing assistance for faculty and graduate level students. Position open until filled but will begin selection on May 1, 1984. Send resume, cover letter/letter, and name of 3 references to Dr. William Verbrugge, Associate Director for Academic Computing, University Computing Services, Ball State University, Muncie, Indiana 47306.

Ball State University practices Equal Opportunity in Education and Employment.

Systems Marketing Manager

Team International, a leading management and MIS Consultant in the Middle East with eight offices throughout the Arab Countries, has immediate openings for Senior Systems Consultants/System Marketing Manager. The applicant is expected to have a minimum of 10-12 years experience in mainframe data processing, plus experience in system management, client support or systems marketing. He should be able to perform conceptual studies of client requirements, and guide large MIS projects during their initial stages. A graduate degree in a relevant discipline is preferred. Please send detailed CV to:

Team International
Dr. Sherif Hanny
- 2 Ismail Fahmy Street
6th Quarter
Heliopolis, Cairo - Egypt

COMPUTER SCIENCE FACULTY POSITIONS

MS or PhD in Computer Science/Software Engineering or PhD in related area with significant computer science experience. Two needed to teach undergraduate courses in newly developing Software Engineering Program. Applicants should be able to teach some combination of the following: FORTRAN, PASCAL, PL/1, C, Algorithm Design, Data Structures, Systems Architecture, Hardware, Computer Design, Computer Graphics, Artificial Intelligence and Software Engineering. Rank and salary will depend upon credentials and experience. Please send letter of application, vita, names, letters of support and official transcripts or placement director to:

Dr. John Sangster, Academic Dean
Daniel Webster College
Nashua Airport
Nashua, New Hampshire 03063

Professional Master's Degree Computer and Information Science

Advance your career in information systems through Dartmouth's distinctive professional program. Our two-year program is designed to equip you to take a leading role in planning, designing, and developing effective business solutions to business problems.

In the CIS Program, you will study current methodologies for planning, analysis, and design; strategies and issues in the management of information systems; business organization; project management; database systems; networks and distributed processing; professional communication. Learn from guest lectures by practicing managers of information systems, case studies, and professionals-in-residence. An internship is required of each student.

If you have previous experience in the computing field but want to be equipped to assume more responsibility and leadership, consider joining us next year. For more information, write: Program in Computer and Information Science, Dept. C, Nathan Smith Building, Hanover, NH 03755.

Dartmouth College

Arizona Opportunity

Arizona's largest data processing services company is growing at the rate of 50% a year. This growth has created an immediate need for a

Director of System Development

Systems include VAX and online for:
- Market Research/Statistical Analysis
- Health Care Services Administration
- Financial Systems
- Mailing Services

The successful candidate must possess:
- proven track record of defining, forecasting and completing large developmental projects within time & financial budgets
- the ability to interface with senior management of client companies
- the ability to participate as a member of the corporate planning team
- strong business systems analysis ability
- product planning experience

Submit resume and salary history to:

Vice President of Operations PMS Corp.
2269 West Desert Cove Avenue
Phoenix, Arizona 85029

EMPLOYMENT SERVICE FOR PROGRAMMERS AND ANALYSTS

National Openings With Client Companies
and Through Affiliated Agencies

Scientific and commercial applications • Software development and systems programming • Telecommunications • Control systems • Computer engineering • Computer marketing and support

Call or send resume or rough notes of objectives, salary, location restrictions, education and experience (including computers, models, operating systems and languages) to either one of our locations. Our client companies pay all of our fees. We guide, you decide.

RSVP SERVICES, Dept. C
Suite 700, One Cherry Hill Mall
Cherry Hill, New Jersey 08002
(609) 667-4488

RSVP SERVICES, Dept. C
Suite 211, Dublin Hall
1777 Walton Rd., Blue Bell, PA 19422
(215) 629-0585

From outside New Jersey, call toll-free 800-225-0191

RSVP SERVICES
Employment Agents for Computer Professionals

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

FIELD ENGINEERS

Dataserv Computer Maintenance is expanding nationwide. We now have immediate openings in major cities and will be adding more in the near future.

These are key positions and provide excellent opportunities that will lead to further promotion in a fast growing company. Excellent compensation and good fringe benefits for experienced individuals. Your potential for personal advancement with a $100 million plus company is the greatest right now as we expand.

INDIANAPOLIS, IN - Field Engineers. Immediate openings for people with experience on IBM 3653 Point of Sale Terminals.

JACKSONVILLE, FLA - Field Engineer. Immediate opening for experienced Field Engineer for support of IBM 3200 Terminal Equipment.

OMAHA, NB - Field Engineer. Immediate opening for an experienced Field Engineer to service and maintain IBM large mainframe equipment, terminals and peripherals.

Dataserv will soon have additional opportunities for field engineers and technical specialists in several other major cities throughout the United States. If you are considering a change in employment, contact Dataserv for a review of what we have to offer.

For immediate consideration and more information call Toll Free - 800-328-6729 or send your resume to: Bev Walters, Dataserv Computer Maintenance, Inc., P.O. Box 3003, Hopkins, MN 55343. We are an equal opportunity employer and all inquiries are considered confidential.

dataserv

Direct Marketing Data Services, Inc.
Manhattan

We are one of the fastest growing companies in today's $14 billion direct mail industry...and have done it through our network of capabilities. Serving the largest mailers and information users, our services primarily match, select or eliminate names in a structured, high production environment. To do this, we have a versatile (three tier) powerful computer line-up: IBM 3083 through WANG VS. Achieving this state-of-the-art precision and personalization at low operating cost is our everyday standard. Yet sustaining such growth and professionalism requires high caliber individuals, as these three opportunities indicate:

Director - Data Processing Vice Presidential potential - compensation OPEN. Take charge immediately of facilities, operations and programming. Close there are to hand, plan the consolidation of multiple sites into one integrated location. Direct the addition of a new medium-sized mainframe that you and your team will install, staff and operate. This top position requires at least five years of operative DP experience, with 2-3 years at a management level. Must be able to direct all programming and demonstrate the skills necessary to evaluate, acquire and integrate new hardware. Position reports to the President.

BAL Programmer/Analyst $30K range This lead position requires Assembler language for new system programming (60% of effort) and maintenance of present programs (40%). There is great satisfaction in successfully programming in our fastest, high output system, dealing with the largest files in all direct mail. This position will develop program specifications, code and test programs, then document and implement. Two years of applicable experience needed with the opportunity provided for future training and supervisory experience.

Executive Sales Vice Presidential Potential. Generous immediate compensation with unlimited earnings potential. Start by taking over house accounts then add your own contacts for your greatest earnings potential ever, in this highly professional environment. Must understand and communicate in proposals, the marketing and pricing of database services, duplication information and elimination, demographic and geographic information services and delivery improvement systems. To be considered, your present compensation must already exceed $25K and still be growing. Send your resume and current earnings, in full confidence, to: President, Direct Marketing Data Services, Inc., 225 Hudson Street, New York, N.Y. 10013. Besides a challenging environment and upward opportunities, our firm offers a wide range of benefits, including life, hospital, major medical and dental insurances, along with paid vacation, medical leave and holidays. We are an Equal Opportunity Employer.

Technical Support Manager

Technical Support Manager required to direct the systems programming section in a COMTEN to UNIVAC connection and provide technical leadership and coordination for the data center and applications development section.

MVS Systems Programmer

MVS Systems Programmer required with experience in installing SMP/E along with TSO/E, VTAM and CICS.

Please send resume along with salary history and requirements to:

Aeroflex Industries Co.
C/O Personnel Department
P.O. Box 1289
Galveston, TX 77550

Relocation Only Must Apply EOE M/F

CONSULTANTS to $350/DAY

$60,000

PER ANNUM

NYC/NJ/CT

Call or forward resume to:

PRESIDENT CONSULTANTS CORP.
55 MADISON AVENUE
New York, NY 10016

(212) 684-6666

POSITION ANNOUNCEMENTS

DATA BASE SYSTEMS MANAGER

New Mexico State University seeks a person with a minimum of two years in-depth, hands-on experience in DBMS work to develop and implement such an environment. Experience is preferred in CCA's Model 204, ADABAS, or other relational DBMS systems and should be supported by a total of six years overall experience in administrative data processing. Position provides a unique opportunity to join and lead team already experienced in On-Line systems in payroll/personnel and student records. Masters degree is suggested but a B.A. or B.S. degree is acceptable with additional experience. Salary: $32,000-$36,000. Liberal fringe benefits including 22 days annual leave per year. NMSU has excellent computer related degree programs. NMSU has a Data Center with two major computers, an AMDAHL 470 V/8 and V/6. It is an MVS/JES 3 environment with VM/CMS for interactive services. Almost all administrative systems On-Line. Interested candidates send resume to: Dr. Joseph R. Beck, Director of Computer Center, Box 3AT, New Mexico State University, Las Cruces, NM 88003. Deadline for applications: April 30,1984. NMSU is An Equal Opportunity/Affirmative Action Employer.

COMPUTER CENTER DIRECTOR

Mary Baldwin College, a liberal arts college for women in the heart of the Shenandoah Valley of Virginia, is accepting applications for the Director of the Computer Center. This hands-on director is responsible for planning and implementing all computer services on campus, both academic and administrative. Strong technical administrative and communications skills required. Should have experience in data processing management in multi-task, multi-user academic environment. COBOL, FORTRAN, Pascal, microcomputer applications, management information systems. Send letter and resume to Dr. Lewis Ashurst, Computer Search Committee, Mary Baldwin College, Staunton, VA 24401 by May 1.

COMPUTER SCIENCE/ MATHEMATICS

Tenure line, teaching calculus-math sequence (through differential equations), and/or computer science courses and an occasional remedial course. Master's degree and college level teaching experience preferred, community college background helpful. Send letter of interest and resume by April 20 to Dr. Carol Lucey, Chairman, Division of Applied Sciences and Mathematics, Jamestown Community College, Jamestown, NY 14701. JCC is firmly and fully committed to the principles of affirmative action and equal opportunity and will extend itself to see that these policies are fulfilled.

SYSTEM PROGRAMMER

Nation-wide Photocomposition and Pre-press Service Bureau needs assembler language system programmer. Five years experience with two years at PDP-11 realtime system level. Understanding of hardware and/or ATEX system a plus. Washington, DC area. Send resume with salary history and requirements in confidence to:

Personnel Department
Publishers Services Int'l
2400 N Street N W
Washington, DC 20037

Equal Opportunity Employer

COMPUTER SCIENCE INSTRUCTOR

Master's degree with 2 or more years experience. If interested, please apply to:

Personnel Department
DAYTONA BEACH COMMUNITY COLLEGE
P.O. Box 1111
Daytona Beach, FL 32015

An Equal Opportunity Employer

ATTN: IBM TRAINED C.E.'s

HTS needs Customer engineers with IBM training and a minimum of 3-5 years experience in the following locations: Chicago, Pittsburgh, Cleveland, Akron. Exceptional compensation, complete benefits package. Send resume and salary requirements to:

Hartford Technical Services
355 Belmont Drive
Wood Dale, IL 60191
1-800-323-6355

COMPUTERWORLD CLASSIFIEDS WORK!

- POSITION ANNOUNCEMENTS
- BUY SELL SWAP
- SOFTWARE
- SOFTWARE WANTED
- TIME & SERVICES
- REAL ESTATE
- BUSINESS OPPORTUNITIES
- SEMINARS/CONFERENCES
- BIDS AND PROPOSALS

It's easy to advertise in COMPUTERWORLD. If you don't have an advertising agency to supply us with copy, layout and order, or camera ready mechanical, stat or film negative of your ad, just call one of our ad-takers at 1-800-343-6474. They will be glad to take your ad and typeset it in available fonts at no extra charge. If you have lengthy ads that require logos and artwork, just send a clean typewritten copy of your ad to the classified advertising department at COMPUTERWORLD (telecopier service is available); note the ad size you want; and, if you want your company logo to appear in your ad, please be sure to include a camera-ready copy with your insertion order. You should also supply any special borders, headlines and artwork that you want in your ad. Our Art Department will follow your suggested layout as closely as possible if you wish to send one.

Ad closing is every Friday, 6 working days prior to issue date.

Rates: Open rate is $128.10 per column inch. Columns are 2" wide. Minimum ad size is 2 column inches (1 column wide by 2 inches deep), and costs $256.20 per insertion. Additional space is available in half inch increments. Some sample sizes and costs are shown.

1 col X 4" - $ 512.40
2 cols X 4" -$1024.80
2 cols X 5" -$1281.00
2 cols X 8" -$2049.60

Discounts are available when you run more than 35 column inches of advertising in a year anywhere in Computerworld. Box Numbers are available, $15 per insertion.

To reserve space for your ad, or if you'd like more information on Classified advertising in COMPUTERWORLD, call our office nearest you.

Boston - (617) 879-0700
or (800) 343-6474
New York - (201) 967-1350
Chicago - (312) 827-4433
San Francisco - (415) 421-7330
Los Angeles - (714) 556-6400
Atlanta - (404) 394-6758

TELECOPIER SERVICE - (617) 879-0700 or (800) 343-6474 ext. 451 or 410

Cynthia J. Delany, Classified Operations Manager

BUY - SELL - SWAP

Pioneer Computer Marketing
214/343-2904

BUY - SELL
LEASE
- All IBM Systems
- Peripherals
- Tapes
- Disks

SERIES/1
- Systems
- Features
- Peripherals

SYSTEM 34
- CPU
- Peripherals
- Upgrades

PIONEER COMPUTER MARKETING
11448 Pagemill Road
Dallas, Texas 75243
214/343-2904

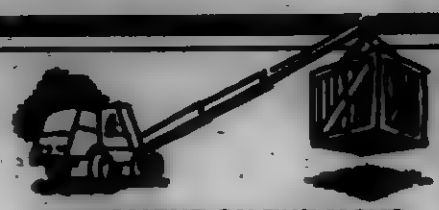
BUY · SELL · LEASE
SERIES-1
S/34 • S/36 • S/38
4300
S/23 S/32 5110-20
Tape-Disk-Printers-Tubes
AMCOM CORPORATION
5300 W 73RD ST · MINNEAPOLIS MN 55435
(612)835-4737
CALL TOLL FREE
800-328-7723

RANDOLPH'S APPROACH TO COMPUTER LEASING... AND WHY IT WORKS.

Started in 1964, Randolph has been saving its customers 30% to 70% of their DP hardware dollars . . .

And we *know* leasing is still the most financially attractive method of acquiring computer equipment at low cost without draining working capital.

But we learned early that the dollar-and-cents approach to computer leasing is only part of a company's concern. Equally important are: prompt installation . . . dependable servicing . . . flexible upgrade capabilities . . . and full support services. Our commitment to *this* approach is the key to satisfied customers . . . and our success.



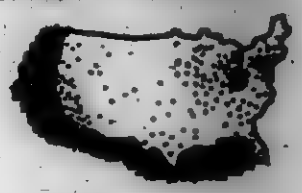
EQUIPMENT ON THE MOVE
We have under management IBM computers with an original cost of over one-half billion dollars . . . and we're adding to this investment to meet the changing needs of our customers. Whether it's an IBM 3081 or 4300 system, additional tape drives, disk storage, printers or other peripherals, our equipment inventory is available to meet your company's requirements. Even hard-to-get machines are sought out and acquired for Randolph customers.

BUT . . . SERVICE MAKES THE DIFFERENCE
The real story behind Randolph's success is our approach to customer support services. To keep computer operations running smoothly and efficiently, these support services have proven to be valuable assets to our customers' D.P. operations.

Continuous IBM Maintenance Program
Manufacturer's service is available day or night, seven days a week, to insure optimal use of your system.

On-Going Technical Support
Randolph's technical staff is on call to help you reconfigure your system to meet changing data processing requirements.

Active Remarketing Division
We assure maximum return on your investment in computer equipment which you no longer use.



RANDOLPH . . . COAST TO COAST
We presently serve customers in over 300 cities and towns from Maine to Hawaii.

MEMBER OF THE FIRST NATIONAL BOSTON FAMILY
In 1972, The First National Bank of Boston purchased our S/360 leasing business, and we became a wholly-owned subsidiary.

With the Bank's financial capabilities behind us, Randolph customers benefit even more from the combined efforts of the best computer leasing and financing people in the United States.

HOW ABOUT YOU?
If your company is not presently leasing computer equipment from Randolph, you'll be interested in our new brochure outlining our special customer support services, and important facts on how we can reduce your computer costs. Call Joseph B. Kelly, Jr., Executive Vice President, 800-243-5307.

537 Steamboat Road
Greenwich, Connecticut 06830
(203) 661-4200 (800) 243-5307

Randolph

A MEMBER OF COMPUTER DEALERS & LESSORS ASSOCIATION RANDOLPH COMPUTER CORPORATION A subsidiary of THE FIRST NATIONAL BANK OF BOSTON BANK OF BOSTON

WANG WORD PROCESSORS AT THOUSANDS OFF!
Guaranteed, remanufactured WPS 20, WPS 30 and Wangwriters available for immediate delivery. You don't pay a cent till Wang installs and places equipment under service contract. 15-day return privilege. Buy. Lease. Rent!
For Free Info and fast response call toll-free:
1-800-321-2986
ELECTRONIC OFFICE EXCHANGE, INC.
Dept. SC3CWD • Box 7037 • Ann Arbor, MI 48107

DATA GENERAL
Hanson Data Systems

FORSYTHE McARTHUR ASSOCIATES, INC.
DEALER / LESSOR OF IBM Computers and Peripherals
Home Office
Chicago
919 North Michigan Avenue
Chicago Illinois 60611
312 943-3770
Branch Offices
Atlanta 404 953-9457
Milwaukee 414 783-8944
CDA

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

TexCom

WE BUY • SELL • LEASE

JOIN THE MANY FORTUNE 500 COMPANIES THAT UTILIZE IBM EQUIPMENT FROM TEXCOM . . . THE IBM SPECIALISTS

SERIES 1

- All features and peripherals
- We buy, sell or trade
- Convenient leases available

1331 1311 • 1361 1381

- We buy, sell or lease
- Two, three, four year leases

WE'VE GOT IBM PERIPHERALS

3803	3380	3350	3211
3420	3880	3370	3811
3375	3340	3203	3262

IBM S/34 — 36 — 38

- All upgrades available now
- One, two, three year leases
- We'll take 3/34 trade-ins.
- All models and peripherals

WE'VE GOT ALL IBM PRINTERS AND TERMINALS PLUS 3864 MODEMS NOW.

FOR SALE OR LEASE

IBM PC-XT'S
256K, COLOR MONITOR
AND GRAPHICS PRINTER.

Call Toll Free: 1-800-833-9119

SAN ANTONIO (512) 349-9986
MEMPHIS (901) 756-7055
HOUSTON (713) 890-8714

Your Texas Computer Connection

Computer equipment at big savings.
Everything from PC's to Mainframes.
214/258-0541

Metroplex Computer Company, Inc.
320 Decker Drive, Suite 180 • Irving, Texas 75038 • TLX 75-9774

Will BUY...SELL...LEASE...
Systems 34/36/38/4300

- Financial Advantage Is Yours Through CPU
- New Or Previous-Owner Processors Available
- Immediate Delivery
- IBM Maintenance
- Create Cash Flow With CPU Purchase/Lease-Back

Call 503/222-2226 Collect

CPU Sales & Leasing, Inc.
3477 Northwest Yeon • Portland, Oregon 97210

CPU

AMERICAN SOCIETY OF COMPUTER DEALERS

EL CAMINO

For Sale Now	3178 C30	(qty)
	3178 C40	(qty)
	3274 A61	(2)
	3274 D41	(2)
	3278-02	(qty)
For Sale	4345-1	now
	3211/3811	now
	3203-05	484 864
	3267-02	now
	3363-2	30 days

Call: Mel Kleinman (818) 988-5811
4927 N. Sepulveda Blvd.
Sherman Oaks, CA 91403
We also buy equipment.

C.D. SMITH & ASSOCIATES, INC.
DEC computer systems & options
12905 East Freeway, Suite 318
Houston, Texas 77015
(713) 451-3112
TELEX 76-5547

DEC

WE ARE BUYING: VAX 11/780

WE ARE SELLING:

MS780-DC	4,500	TS05-SA (New)	3,500
MS780-CA	4,000	11/44-FA	Call
MS780-DC	5,000	11/780-FA	Call
DW780-AA	5,500	11/780-KA	Call
FP11-A(New)	1,500	MS780-BC	$5,975
DZ11-E	2,500	11/44A-VB(New)	4,500

If you want on our Mailing List, call Valerie (713) 451-3112.

FOR SALE
Perkin-Elmer 3250
With 2MB memory
8-Line Comm Mux
2 80mb discs
300 LPM printer
Reply to CW-B4697
Computerworld
Box 880
Framingham, MA 01701

Wanted
RAYTHEON PTS 1200 & 100
Disk Subsystems, Controllers, VDT's, etc.
DIABLO 44B DRIVES
(312) 953-1555
Dan Eremenchuk

data3 Computer corporation
IBM PROCESSORS/PERIPHERALS

GSD | DPD

• BUY • SELL • LEASE • SUBLEASE •

4331/4341

TAPE

Flexible Leases
On-time Delivery
Purchase/Leaseback

Inflation Fighters
Quality & Savings
Slightly used. Money Back Guarantee. Full Reels. All External Labels Removed. Guaranteed for use at 800 BPI through 6250 BPI.

2400' Reel $4.95 ea.
1200' Reel $4.25 ea.
600' Reel $3.50 ea.

All Tapes with Hanging Seals
We pay freight on orders over 200 tapes. All orders shipped within 48 hours.
Call or Write
Computer Tape Mart
44A Seabro Avenue
N. Amityville, New York 11701
(516) 842-8612

11/730 For Sale
11/730 With 1 Mb; LA120; R80; RL02; DMF32; VMS
One Year Old
In DEC Perfect Condition
$29,000
(617) 777-4886

COMPUTERWORLD

You want your business to keep moving ahead, right?

Then you need quick, time-saving solutions to your personnel and equipment problems. Classified advertising in the #1 trade publication for the computer industry is the obvious way to get them...

...Classified Advertising in COMPUTERWORLD.

Our classifications include Position Announcements, Buy Sell Swap, Software for Sale, Time & Services, Business Opportunities, Real Estate and the Bulletin Board (the ideal, low-cost way to sell pieces of computer equipment).

If you are looking to hire computer professionals or to buy or sell equipment, contact us at 1-800-343-6474 or, in Massachusetts, call 617-879-0700. Our mailing address is COMPUTERWORLD, 375 Cochituate Road, Box 880, Framingham, MA 01701.

It's about the biggest step forward you can take toward solving your business problems.

Move ahead with COMPUTERWORLD.

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

SYSTEMS
4341 4331
38 36 34
32 3
BUY • SELL • LEASE
COMPUTER BROKERS, INC.
2978 SHELBY ST.
MEMPHIS, TENNESSEE
CB
TOLL-FREE
800-238-8406
901-372-2822
PERIPHERALS
3203 3370
327X 3411
3350 3420

IBM
5119 5120
3741 3742
DATAMASTER
1255 MICR
SYSTEMS
34 36 38 32 23
All Associated Peripherals
BUY SELL LEASE
• Printers • Display Stations
• Controllers & Feature Adapters
• Tapes • Disk
• High Maintenance Guaranteed
Call Today for Quotation
(615) 352-8565
SOUTHERN DATA SYSTEMS
Nashville, Tennessee

DSI
WE BUY SELL & LEASE!
BURROUGHS
Discover the DSI alternative.
800-641-5215
All equipment available immediately and guaranteed for Burroughs Maintenance.
DSI Serving the Burroughs Community Worldwide
2480 W. Alameda Ave., Denver, CO 80223 (303) 922 8331
TWX 910 931 0483

COMDISCO
A Commitment To Excellence
IBM PROCESSORS IBM PERIPHERALS
The Leader in Full-Service Leasing

IBM UNIT RECORD EQUIPMENT
SALE OR LEASE
IBM UNIT RECORD MACHINES
026—029—082—083—084
085—087—088—129—514
519—548—557
NEW & USED
DISK PACKS—DATA MODULES
2316—3330(1)—3336(11)—3348(70)
MAG. TAPE-DISKETTES
Every Item Guaranteed
Highest Prices Paid for Used Packs & Modules
THOMAS COMPUTER CORPORATION

System/34
Printer
Sale/Lease
Control Units
4341's
Sale/Lease
Controllers
3880 3803
3274 3276
Immediate Delivery
Tape Drives
3420 3430
3410 3800
Immediate Delivery
DASD
3380 3375 3370
3350 3344 3310
Immediate Delivery
Display Stations
3278 3279
3178 3277
Immediate Delivery
Printers
3211
COMPUTER MARKETING INC.

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

SERIES I SPECIAL

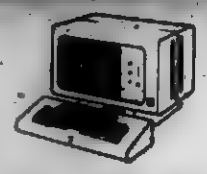
Control Data
126MB Removable Drives . . $12,900
Diskette Drives . . . . . $ 1,495
Printers & Displays

New or Used
Immediate Delivery

IBM
4956 Processors
4967 200MB Disk Drives
All Peripheral & Features

BUY SELL LEASE
SYS/34 SYS/36

- IMMEDIATE DELIVERY
- GUARANTEED M/A
- SHORT TERM RENTALS
- PERIPHERALS
- FEATURES-UPGRADES



MARION
84 KENNEDY STREET
HACKENSACK, N. J. 07602

(201) 343-4554
(203) 758-2489
(412) 864-6611

11/780 For Sale
11/780 With 2 Mb; TE16; 2 Full Eagles; Emulex LA120; VMS
One Year Old
In DEC Perfect Condition
$145,000

(617) 777-4666

FIBEROPTIC MODEMS & MULTIPLEXERS
Special Pricing - Limited Qty
Now Full 1 Yr Warranty
FAI, Async Fiberoptic Data Link. $995.
(DC to 19200pd)
FSI, Sync Fiberoptic Data Link. $995.
(19 Speeds to 2048pd)
FXS, Mux & Data Link,(8 each Async, $1995.
DC to 38Kbps Inputs)
Terminated Cables Available.
Contact: Inside Sales
Randall Data, Inc.
1010 S. Noel Ave.
Wheeling, IL 60090
(312) 541-6060

The nationwide market - a call away!

DEC/DG

SYSTEMS/PARTS/PERIPHERALS
NEW/USED/SURPLUS • DISCOUNT PRICES
Since 1977! Buy, Sell, Trade and Broker.

PHIL	BRYAN	JENNIFER
DG	11-VAX	8-LSI

CALL TODAY - (305) 392-2005
TELEX 568-670

thomas business systems, inc.
4301 Oak Circle - Unit 11 Boca Raton, Florida 33431

- BUY
- SELL
- SWAP

Well-Equipped To Serve You In Buying Or Selling

- HARDWARE
- SOFTWARE
- COMPUTER TIME & SERVICES

Over 500,000 computer people read COMPUTERWORLD every week.
So placing an advertisement with us is going to help you take care of your computer-related business.... very quickly.

Call 1-800-343-6474
(in Mass.) 617-879-0700

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY
375 Cochituate Road, Box 880, Framingham, MA 01701 (617) 879-0700

FOR DEC CALL GRAPHIC LET'S GET

VT125-AA VT100 w/Graphics $2,745.
VT1XX-CB VT125 Kit $1,455.
VT240's w/Country Kit $1,650.

WE CAN DELIVER NOW!!

P.S.: VT100-AA now $1,295.

SCHERERS
6145 SCHERERS PLACE
DUBLIN, OHIO 43017
(614) 889-0810

SCHERERS SCHERERS

FOR SALE
3033-U16
ALL IBM MEMORY
AVAILABLE: MAY, 1984
WILL RECONFIGURE
ALL 3033 FEATURE UPGRADES
INCLUDING
S-U
AND
N-U
MODEL UPGRADES
CONTACT: DALE HAUGER
MAJOR COMPUTER INCORPORATED
10237 Yellow Circle Drive
Minnetonka, MN 55343
(612) 933-8000

DATA GENERAL SPECIALISTS
FOR
Surplus New & Used Equipment & Systems
with full depot repair facilities.
CALL US
WE TAKE THE TIME.
- WE CARE -
JM Associates
901 W. Chapel Avenue
Cherry Hill, NJ 08002
609-663-1115

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

HP

TELEX 756927
encore
(213) 482-9117

DEC
New and Used
in Stock

COMPUTERS
Rainbow 100
DECmate I and II
Pro 350
Micro 11
WD 211
11/23 +
11/24
11/44

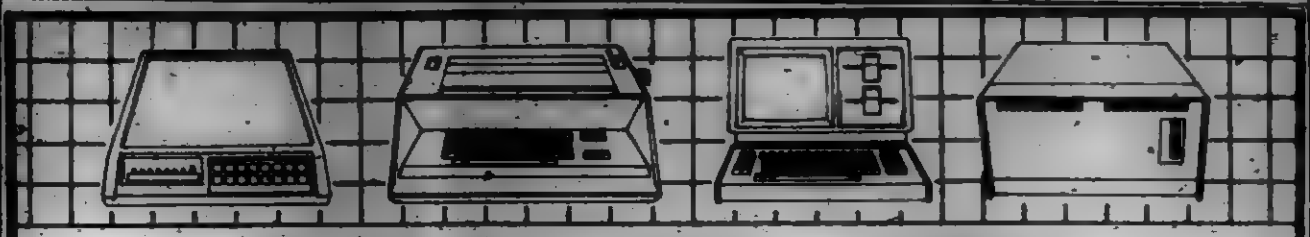
CRTS
VT101-AA VT102-AA
VT100-AA VT102-WA

PRINTERS
LA 34
LA 100
LOPSE

Command Data
PHONE 205/942-3158
Command Data Incorporated
100 West Valley Avenue
Suite 105
Birmingham, Alabama 35209

NPA
SYSTEMS INC.
SPECIALIZING IN:
PURCHASE
SALE, TRADE
LEASE, RENT
AND SERVICE OF
Data General
EQUIPMENT
761 COATES AVENUE HOLBROOK N Y 11741
TELEX # 516 222 0882
(516) 467-2500

IBM
3270



Used Equipment Sale!

This quality used equipment, as part of our Leasing Inventory, has been expertly maintained and reconditioned before sale. For details, or to order, phone the nearest Inventory Center listed below.

MULTIPLEXERS		
MICOM	401	$150- 250
	812	200- 300
	814GTX/TACT	1100-1300
	818	950-1050
	818GTX/TACT	1800-1900
	8116	1400-1500
	8814/48	2400-2500
PORTABLE PRINTERS		
CTSI	4000	$600-1650
	4080	400- 850
VIDEO DISPLAYS		
ADDS	Regent 25	$200- 800
	Regent 40	200- 600
	Regent 40VT	400- 500
	Regent 60	350- 850
	Regent 100	175- 550
	Regent 100VT	300- 400
	Regent 200	200- 750
	Regent 520	200- 250
	Regent 580	200- 300
	Regent 920	300- 800
ECS	4006 Burroughs	$800- 900
Emulog	53	$400- 500
IBM	3101-20	$1150-1250
TeleVideo	910	$550- 850
	912	350- 400
	912C	300- 600
	920	400- 700
	920C	300- 700
	925	450- 700
	970	750-1000

MODEMS		
Avanti	2200 LADS	$200- 300
General DataComm	201-7	$500- 675
	208	600- 850
Prentice/ Livermore	768	$ 50- 125
	STAR	75- 200
Racal-Vadic	103A	$150- 250
	305	25- 100
	317	25- 100
	325	75- 125
	355	175- 270
	801	250- 350
	831	250- 350
	871A	75- 90
	1601	35- 75
	2010	125- 175
	3405/1601	100- 650
	3413	400- 600
	3415/1601	30- 150
	3434	200- 400
	3455	125- 450
PERSONAL COMPUTERS		
Apple II Starter		$1150-1350
Apple II E		1350-1500
STORAGE TERMINALS		
MFE	2500	$250- 350

☐ Atlanta (404) 452-4926 ☐ Chicago (312) 780-2994 ☐ Detroit (313) 285-6700
☐ Houston (713) 741-9646 ☐ Los Angeles (213) 642-5317
☐ New York (201) 227-7900 ☐ Schenectady (518) 783-4650

*Prices range due to equipment condition. All prices F.O.B. point of shipment. Quantities are limited, subject to prior sale. No implied warranty of merchantability or fitness for purpose. See Seller's terms of sale (copy available upon request) for limitations and conditions. Not all equipment available in all locations.

GENERAL ELECTRIC

ATTENTION TO DETAIL...
ALL OF OUR IBM EQUIPMENT IS:
Tested/Audited/Refurbished

SERIES 1 ✇ *New or Used. CDC Peripherals—New or Used. Most I/O in Stock. Features Sold Separately;* ***SYSTEM 34*** ✇ *48 Hour Upgrades. CRT's and Printers in Stock. Any System—14 Day Delivery;* ***SYSTEM 38*** ✇ *581's in Stock. Memory, Communications, Tape, Disk, CRT's.* ***SYSTEM 36*** ✇ *Trade In Your Sys/34 Operating Leases;* ***4300*** ✇ *3380, 3370, 3420, 3350, 3375, 3430, 3278, 3276, 3274;* ***5110*** ✇ *S/23's and 5120's in Stock;* ***P.O.S.*** ✇ *5265's a Specialty. Upgrades/Downgrades, Short-Term Leases.* ***3600/4700*** ✇ *Banking;* ***LEASING*** ✇ *Xerxes offers a complete range of financial services including leverage leases, operating leases and short-term rental;* ***MAINTENANCE*** ✇ *nu maintenance at a discount. We use a combination of our engineers and mvx—call for details. Attention to detail means smooth installation and full support.*

XERXES COMPUTER SALES
1614 Harmon Place, Minneapolis, MN 55403
800/328-3884, 612/339-3042

We've Got
Your Number

S/34
ALL MODELS
QUICK DELIVERIES

SERIES 1
CONFIGURED TO
YOUR NEEDS

S/36
ATTRACTIVE LEASE RATES

S/38
NEW & USED MACHINES

5110/5120
NEW LOW PRICES

PERIPHERALS
CRT'S...PRINTERS...DISK...TAPE...MODEMS

CARLYN
COMPUTER SYSTEMS
8180-G Sheldon Road Annandale, VA 22003
"CALL COLLECT" (703) 642-1950

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

IPS Information Processing Systems Inc.

4341
3083
Wanted to Purchase
3380
3033
3033 M
For Lease March, 1984
Printers Available
800-1
3211/3811
3203-5
Immediate Delivery
4331
Immediate Delivery
Call Frank Campagna
Wanted to P Purchase Used
338
Any Delivery

TELEPHONE: (201) 262-9500 Telex: 642-197

DEC EQUIPMENT AT THE LOWEST PRICES-NATIONWIDE!!

CALL TOLL FREE 800-328-7000
In Minnesota (612) 894-4020 • TELEX 291084
MIDWEST SYSTEMS, INC.
12117 Riverwood Drive, Burnsville, Minnesota 55337

Check us out ✓ for DEC

11X44 $23,000 ☐ RL02-AK $2,300 ☐ 11/23 Any Config.
VAX 750 $43,000 ☐ VAX 780 $131,000
All immediate and guaranteed. Everything from 11/23 to VAX
DATAWARE SYSTEMS LEASE
800-221-6318 30 Bay St S.I. N.Y. 10301 (212) 447-4911
TELEX 429394/TWX 710588-6736

MEMORY BOARDS
LSI/11 8KB $1995
VAX 11/780 2MB $4300
ECLIPSE 8KB $5700
NOVA 4 8KB $4600
Call For Others
Now 100% Compatible

IN STOCK!
Fujitsu Eagle
with cabinet, cables, slides & terminator:
$13,000
New Fujitsu SP 380
80 character per second, letter quality printer:
Introductory Special - $2,000
MANDREL
303-693-3035
2771 S. Jasper • Aurora, CO 80013

Buy/Sell/Lease
SWITCHING
IBM 2914/3814
Locom LCM-500
T-bar 3915/3916
DataSwitch 1000
Bell BCS-3/BCS-6
Digital Ind 3403/4101
Jack McAuliffe
4265 LBJ Freeway #219
Dallas, TX 75234
214-661-3981

STC
TAPE/DISK

Want to Buy
5291, 5251, 5256
Defective Planar Boards
$100 each
For Details Call
(915) 682-9141
Russell Sullivan
Computech

SELLING?

Sell your product or service in Computerworld classifieds.

Join the thousands of advertisers who use our classifieds because they get results.

You can find buyers for discs and DEC's, terminals and timesharing, software and System 370's.

More than half a million active computer people read Computerworld each week, and you can reach them efficiently in Computerworld classifieds.

To place your ad, or to get a rate card with complete details on Computerworld Classifieds, call or write:

Classified Advertising
Computerworld
P.O. Box 880
Framingham, MA 01701
1-800-343-6474
617-879-0700

CMI

AMERICA'S LEADING SPECIALIST SERVING THE USED MARKET

Absecon, NJ (609) 645-7282
Atlanta, GA (404) 256-7943
Boston, MA (617) 367-5755
Chicago, IL (312) 893-2780
Dallas, TX (214) 386-0606
Encino, CA (818) 788-0113
Houston, TX (713) 780-7456
Lebanon, TN (615) 449-6833
Miami, FL (305) 442-2566
Newport Beach, CA (714) 752-6443
New York, NY (212) 349-0718
Tampa, FL (813) 273-8028
Frankfurt, Germany Telex: 414691 LCO D
Montreal, Quebec (514) 871-1121
Nyon, Switzerland Telex: 27200 CMI CH
Paris, France Telex: 613910 CMI FR
Toronto, Ontario (416) 842-3066
(416) 863-6100
Vancouver, B.C. (604) 685-6186
Windsor, Ontario (519) 973-3010

CMI FINANCIAL SERVICES GROUP
2800 Telegraph Rd., P.O. Box 2026
Bloomfield Hills, MI 48303-2026
(313) 456-0000

CMI

A Torchmark Company
2800 Telegraph Rd., P.O. Box 2026
Bloomfield Hills, MI 48303-2026
TWX/TELEX: 810-232-1667 CMI CORP. TRAN
(313) 456-0000
CMI 4300 Series Hotline Number: 800-321-4300

3081-D16 Sale or Lease

3081-K24 Sale or Lease

For Sale/Lease **4381** 1st Quarter Delivery

3033 All Models

Now **Series 1** with Serk Operating System "Unix" on the Series 1 IBM Master VAR

3350's Available Now On a Short Term Lease 3370 3375 3380

3880-A6 Available Now **4700** Banking Equipment Buy/Sell/Lease

3725 Lease Financing Available For your System or Ours 2,3,4 or 5 Year Terms

3800 LASER PRINTERS Model 1's Immediate Delivery Model 3's Lease Financing Available-Any Term 3800-3 3211-1 & 3811-1 3262-3 4245-1

Tapes Immediate Delivery **3803-3420** Buy/Sell/Lease

Wanted **4341-M2** **4341-L01** Call Now

3276, 3278 3277, 3279 Terminals All Models Immediate Availability

3705-3704 Available for Immediate Delivery Sale or Lease

SYSTEM 38 Model 7 & 8 Available Now New - Used **SYSTEM 36** 2, 3, 4 or 5 Year Terms Lower rates than ICC **3705** Available Now - Sale or Lease

Series 1 /O All IBM Peripherals Any Used Configuration CICC Panel/Removable Disks Tape Strings 6250BPI Disk/Tape Subsystems RECP/Vision Buy/Sell/Lease

---

3725's, 3705's Terminals... Centron DPL Leases from the Front End Out.

We understand the value of a flexible lease to accommodate your changing environment. Centron DPL offers tailored lease terms with professional support.

- 3725 Delivery Positions
- Highly Flexible Leases
- Upgrade and Feature Inventories
- Customer Engineers
- Tax-Exempt Finance Programs

Lease your network hardware from the company that understands communications.

Centron DPL Company
7480 West 78th Street Minneapolis, Minnesota 55435
Call Toll-Free 1-800-532-7532 In Minnesota Call (612) 944-8161
In the Southeast Call (305) 657-0077
Talk with us about your other IBM hardware needs. GSA

IBM SYSTEM/38 MODEL 581

3203-5
3370 A11
3411-2

Complete System Available Now For Sale or Lease

Datacomp Leasing & Service Group

907 North Elm
Hinsdale, IL 60521
(312) 323-1200
Toll Free
1-800-323-3289

DEC

RENT • BUY • UPGRADE • SELL

PDP, 11/03, 11/04, 11/23, 11/24, 11/34, 11/44, 11/70, VAX/730, VAX/750, VAX/780

SYSTEMS • OPTIONS • SUPPLIES

11/34 16KB, Dual RLO2, DZ11-A, Dual 1600 BPI (new)	$9,995
11/23+ 256KB, Dual RLO2, DZV11-C, VT102, Remote Input	$10,399
11/70 512KB MOS, LA36 (new)	CALL
VAX/750 1MB, RA60A, RL02, VMS System (new)	CALL

Customized Configurations—Call With Your Request.

In Stock		Specials	In Stock
11/34-BC (new)	$11,350	MS11-PD (new)	$4,195
DZ11-A (unused)	$ 495	MS750-CA (new)	$4,195
DSP32-AB (new)	$ 2,495	MS750-DC (new)	$5,850
DUP11-DA (new)	$ 995	RA730 (sealed)	$2,895
DZ11-F (new)	$ 3,195	RK311-EA (new)	$2,495
1600 BPI (new)	$ 1,350	RL211-AK (new)	$3,495
KT24 (new)	$ 795	RM80-AA (new)	Call
LP11-WA (unused)	$ 2,495	VT102-AA (new)	$ 495

BROOKVALE
800-645-1167 NY (516)

PEARL HAS IBM 3741's

and we have System 34, System 36 and System 38 and a large inventory of CPU's, CRT's and printers. Call us about our flexible lease plans for buying, selling, leasing, renting and purchase/leaseback.

Call Dave Allen or Shirley Shreeve.

Pearl Computer Division
•P.O. Box 24026 •4717 Centennial Blvd.
Nashville, TN 37202 **(615) 383-8703**

IBM
Series/1 • S/34 • S/36
S/38 • 4300
5110 - 5120 • S/32
BUY • SELL • LEASE
All models, systems & peripherals AVAILABLE NOW!
Ask about our 72 hour upgrades

(408) 425-7333
SOURCE DATA PRODUCTS INC

No charge to tell the DG world

what equipment you have to sell or buy.

500,000 CONTACTS

800-843-2047

CPR•RESALE 800-538-8347 California
1938 Fourteenth Street Santa Monica, CA 90404

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

CW-1

SYSTEM/34
SYSTEM/36
SYSTEM/38
SERIES/1

ECONOCOM
• BUYS • SELLS
• LEASES
• QUICK DELIVERY
• COMPETITIVE PRICING
• FLEXIBLE FINANCING
• TRADE-INS ACCEPTED
• PROFESSIONAL SERVICE
• SHORT-TERM LEASING
• LONG-TERM LEASING
• PERIPHERAL LEASING
• TAKE-OUTS DONE
• MAINTENANCE GUARANTEE
• NEW OR USED.

(SPECIAL) Series 1 4987 w/1300 Features at 40% List Call Wayne Garrison

FIND IT FAST IN OUR FAMOUS COMPUTER MARKET ADVISOR
SEND US YOUR BUSINESS CARD AND WE WILL SEND YOU A FREE COPY.

CALL TOLL FREE
800-238-3098

ECONOMIC COMPUTER SALES, INC.
845 CROSSOVER LANE • P.O. BOX 24687 • MEMPHIS, TENNESSEE 38124 • 901-767-0139

IBM 3178 leasing

Flexible lease terms available
12, 24, 36 or 48 months

Hartford Computer Group

800 323-6355

PREMIER Your Full Service Computer Dealer

S/34	Series/1	3270's
S/36		
S/38		
— Call — RICHARD LORANG	— Call — TERRY SMITH	

Buy - Sell - Lease

S/32
S/34
S/38

IBM 3741 3742

CPU's CRT's PRINTERS ALL MODELS

PURCHASE/LEASEBACK
SHORT & LONG TERM LEASES

CMA

Computer Marketing of America, Inc.
P.O. Box 71
636 Bryan Street
Old Hickory, Tennessee 37138

1-800-251-2670
In Tennessee: 615-847-4831

EL CAMINO COMPUTER LEASING

offers:
For Sale
4361 M02/P02 5B4 & 6B4
4361 M01/P01 7B7/B4
4341 P12 B1/B4
4341 M02 4B4 6B4 7B4
4341 Memory 6B4

Call: Mel Kleinman
(818) 986-3411
4927 N. Sepulveda Blvd.
Sherman Oaks, CA 91403
We also buy equipment.

BUYING?

Whether you're looking for big computers little computers, terminals, printers, software, time sharing or services, you'll find it in *Computerworld* classifieds.

Pages of ads every week, with everything from Discs to DEC's from time sharing to terminals, and software for every size computer system.

You'll find what you need in *Computerworld* classifieds.

Call 800-343-6474 (or 617-879-0700) for more information

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY
375 Cochituate Road, Box 880, Framingham, MA 01701/(617) 879-0700

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

WANG

The Professional Computer

PC 003 S

Base unit (128K) with dual diskette drives, keyboard, MS/DOS operating system and interpretive BASIC. Monochrome monitor card and monitor. Optional hardware, accessories, systems and software available.

from $3,225

Word Processing Equipment

Includes installation and 90-day warranty/maintenance

WANG WPS S, Model 3 . . . . . $3,725
WANG WPS 20 . . . . . $4,725
Includes master system and archive diskette, workstation, 35 CPS letter quality printer, and software.
WANG WPS 30 (Shown Above) $7,850
Includes master archive diskette, 10 Mb. disk drive, workstation, 35 CPS letter quality printer, and software.

Optional Peripherals	WPS S	WPS 20	WPS 30
Workstations	—	$945	$945
Printers	$1,435	$2,500	$2,500
Wide Carriage Printers	—	$3,500	$3,500
Twin Sheet Feeders	$1,150	$1,150	$1,150
Form Tractor Feeder	$300	$300	$300

Printers—VS/WP/OIS

WANG No.	Description	Special Price*
5533	120 CPS 12 Pitch Matrix	$2,275
5535	180 CPS 10 Pitch Matrix	$2,925
5574	600 LPM Band Matrix	$8,625

*For a limited time only

Includes installation, stand, and 90-day warranty/maintenance

All equipment is eligible for service agreement with WANG Labs, Inc. ERST is the leading dealer in pre-owned WANG equipment: 2200, VS, WP (CPUs, Terminals, IOPs, Controllers, Printers, Memory Upgrades). Rental and leasing prices quoted on request.

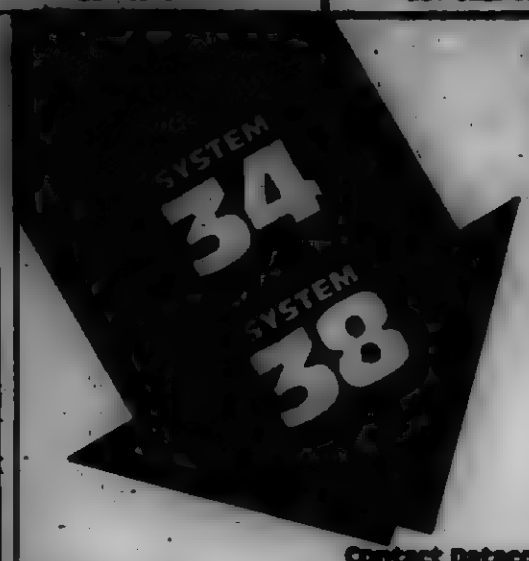
Next time, give us a call.
Toll Free: 1-800-FOR-ERST
In NY: 212-431-1100

ERST
INTERNATIONAL CORPORATION
225 Lafayette Street, New York, NY 10012

*** * * * DEC * * * ***

BUY—SELL—LEASE—TRADE—CONSIGN
SYSTEMS — PROCESSORS — OPTIONS
PERIPHERAL — MODULES — MEMORY
— SPARES —

NATIONAL COMPUTER EXCHANGE
(800) 624-9299
600 North Lunar Avenue, Brea, CA 92621
TWX: 910-596-1499 (714) 990-5988



IBM AT A SAVINGS!

Contact Datacomp and find out how much you can save...
Call Toll Free
800/323-3289

datacomp leasing & service group

Chicago 312/328-1200
New York 201/487-8686
Los Angeles 714/671-8911

■ 3 A-1 Dun & Bradstreet rating ■ 2500 Satisfied Customers ■ IBM Knowledgeable Professionals ■ Satisfaction Guaranteed

---

We Buy & Sell
DEC
Systems
Components

igital
omputer
esale

call:713
445-0082
600 Kenrick Ste C22
Houston, Tx 77060

OVERSTOCKED SALE (New)

DEC	DG
VT125-AA	D210
Graphics Terminals	Terminals
List $3,800.	List $1,060.
Our Price $2,750.	Our Price $750.

Call Command Computer Services Inc.
(212) 244-8600

BIDS & PROPOSALS

Department of Housing Preservation and Development Request For Proposals

The Department of Housing Preservation and Development is seeking proposals for a capacity and management review of its batch data processing operation.

Request for proposals may be picked up between 9 am and 5 pm at HPD/Office of Operations, 100 Gold Street, Room 9082, New York, NY 10038.

Requirements for the bidders conference to be held on Wednesday, April 25, 1984 at 3 pm are set forth in the request for proposals and must be honored. The deadline for submission is 5 pm, May 11, 1984 and must be accompanied by a refundable check or money order payable to the Commissioner of HPD in the amount of $1,000. For further information call, (212) 566-6841.

AUCTIONS

PUBLIC AUCTION
BANKRUPTCY SALE:
UNITED STATES BANKRUPTCY COURT
SOUTHERN DISTRICT OF NEW YORK
Re: SUE BRETT INC Debtor Case #83B1170 (BL)
GEORGE LEONTIS & CO., INC
AUCTIONEERS
SELL THURS., APRIL 19, 1984 AT 10:30 A.M.
At 1400 BROADWAY, NEW YORK CITY
COMPLETE
IBM SYSTEM 3 COMPUTER
8418 PROCESSING UNIT; 3348 DISK STORAGE UNIT; 1304A DISK STORAGE UNIT; 3277 OPERATORS TERMINAL CONSOLE MODEL 1; (8) 3277 OPERATORS TERMINAL CONSOLE MODEL 2; (2) 5496 KEY PUNCH UNITS; 1403 PRINTER w/1403 CONTROL UNIT; (8) 70 DATA MODULES; 16922 DOCUMENT VIEWER; 454 OSCILLOSCOPE
ALSO ORBITRAN POE SHREDDER COMPUTER
INSPECTION: 9 A.M. MORNING OF SALE
TERMS: CASH OR CERTIFIED BANK CHECK
AUCTIONEERS TELEPHONE: (212) 563-6969

REAL ESTATE

FOR LEASE
TURNKEY DATA CENTER
- 2 YEARS OLD

May include
existing IBM mainframe and peripherals.

Data Center includes:
- Computer Room
- Tape Library
- Communications Room
- Power Room
- Printer Room
- 5 offices off of Computer Room
- 10 offices outside Computer Room available.
- Halon, Rollins Fire/Security System.

For more information, please contact:
GLOBAL MARINE INC.
Dick Hudson (713) 954-5877

The Bulletin Board

Buy • Sell • Lease Buy • Sell • Lease

BURROUGHS

BUY SELL LEASE
All Systems & Peripherals
AVAILABLE
• B1000 Sys • B1900 Sys
• B700 • B800
(Configured To Your System.)
• Wang 200 Terminals
• 300 Terminals and/or 103 & 113
• Printers, all kinds, all sizes
• Disk & Mag Tape Subsystems
• Network Upgrades
• Memory Upgrades
• Printers, 2000 & 1200 lpm
Guaranteed Savings to Users.
Expert Maintenance Available.
COMPUTER PROVIDERS
(713) 240-7979
Houston, TX

IBM

SYSTEM/34 SALE
*** CPUs ***
5340-C02 $9,995
5340-C03 $8,995
5340-D02 $12,995
5340-D03 $14,995
5340-E02 $17,995
*** Printers ***
5211-001 $4,995
5256-001 $12,995
*** CRTs ***
5251-011 $1,695
Also Available All Disk and Feature Upgrades. System 23's Available. Trade In Your System 34.
(212) 370-1717

SYSTEM 36's
Available Now
With Our Total Solution Accounting Software and Financing Arrangements.
Executive Technology Data Systems
Dallas, TX (214) 233-1660
Detroit, MI (313) 559-5770
Madison, WI (608) 271-6000
Reading, PA (215) 374-8770
Trumbull, CT (203) 377-9007

FOR SALE BY OWNER
IBM S/34 F35
256K MEMORY, 128 MB DISK, 1 COMMUNICATIONS LINE & EIA ADAPTER, WORKSTATION EXPANSION - FEATURE - 4900
$22,000 - OFFER
(303-759-6600)
RAY MUELLER

PRINT TRAINS
IBM 1416 & 3216
Bought - Sold - Lease
Repaired - Reconditioned
COMPU-ACT COMPANY, INC.
(216) 666-6621

Buy • Sell • Lease
IBM
Cougar Computer Corp.
Suite 219
2800 Euclid Office Plaza
Euclid, OH 44132
(216) 261-3600

4341-L10
W/1670, 4MB
Now $75,000.
Or Best Offer
Call (214) 991-2911

IBM

FOR SALE (All Upgrades & Systems)
64 Ring Upgrade ($/34)
6/34 (64K/4Rings) 67,500
128K (8 To 7 For $/34)
Maximizer For $/34
System 1 (1250) $44,000
(5251-001) $400 & $100
Available Now At A Great Price!
DATAMARC (404)491-7455
3665 Pleasant Hill, Atlanta, GA 30340

3378s
A02s & B02s
A12s & B12s
(212) 279-4467
(713) 627-7117

Buy .....Sell..... Lease
IBM MICR
3890 - 1419
1255 - 3694
(813) 733-4934

SYSTEMS 34/36/38
Short Term Rental
S/34
1-800-LEASPAK
In TX (817) 268-6023

SALE/LEASE
4331-L2
3262-1
Available Now
FOB Colorado
Call Bill Hagen
(614) 236-6531

3083
2 or 3 Year Lease
June or July Availability
Jim Concle
(619) 584-6963

IBM SYSTEM 34
MODEL F36
256K, 100 MB
Single Line Communications
5211-002 Printer
$27,000.
FOB Pittsburgh
Available April 15
(412) 563-4918

SALE/LEASE
S/36
B23 & B24
Call Ron Gibb
(914) 238-9631

4341-L2
With 1601 and
Memory Upgrades
Available June 1
JEN Associates, Inc.
(303) 988-0820

5225s, 5224s
5291s & 5251s
Rentals Available
Short Or Long Term
(212) 279-4467
(713) 627-7117

FOR SALE
SYSTEM/34
MODEL E24
$10,299
AVAILABLE IN MAY
(617) 426-8530 EXT. 216

INTEL FAST DRUM
MODEL 3605-A
Features: 4800-3, 12MB Storage, 8171 2 Channel Switch. Standard UM warranty reserves the right to reject any bids. Technical questions: Keith Zandt (513) 427-2775. Questions on bid: John Ryder (419) 697-3991. Minimum bid $75,000.

IBM

Fox Computer Sales, Inc.
Buy • Sell • Rent • Lease
Datapoint • IBM
Teletype
W.T.B.: Used Equipment
195 Alpha Drive
Cleveland, OH 44143
(216) 449-6366

FOR SALE USED
IBM EQUIPMENT
2 1419
1 1403N1
1 3211 Model 2
2 3640
1 3644
Contact Larry Pounds
or Richard Gardner
(201) 666-6868

Wanted By End User
IBM S/23
5322 or 5324 (128K) and
also 5242 Printer.
Call Bob Davis
(203) 346-9632

IBM EQUIPMENT FOR SALE
Available Immediately
3 Ea. 3211-11 With Cable Thru $1,875
2 Ea. 5251-12 Single Cluster $4,850
3 Ea. 3262 001 Printer $12,850
3 Ea. 3286 Mod 2 Printer $8,950
Guaranteed For IBM Maintenance
(216) 666-6666
Add Per Pell Mellagro

4361-P2 $/36 - $15,000/month
4341-L2/M2 7/10 - 50%
3278-2 Qty. Now - $564/month
Syscomp
(813) 799-4310

SYSTEM/36 LEASES
A12 $630./mo.
A22 $1,045./mo.
B23 $1,450./mo.
Immed. Del. - Flex. Terms
1-800-531-5962
(512) 822-8582 In Texas

DEC

DEC BARGAINS

11/34A CPU Sbt	$1,595
11/44 KE44-A "CIS"	$2,975
4A-C780 System Kit	$6,800
BDV11-AA	$495
DR780-AA	$9,400
DZ11 MUX Bd.	$1,125
DZ32-A	$2,175
DZ32-S	$1,570
FP11A	$1,185
KK11-A	$1,785
KK11-S	$2,675
KW11-W	$680
MS11-MB	$1,175
MS780-DC	$4,000
MSV11-PK	$675
MSV11-PL	$1,275
RLV11	$675
VAX 1MB MS780-CA	$2,995
VAX 1MB MS780-CA	$2,995

Call Ray
at QEI, Inc.
(617) 275-6900

DEC NEW & USED
BUY — SELL — EXCHANGE
Systems • Processors • Memory
Options • Peripherals • Modules
LAKEWOOD COMPUTER CORP.
2854-B Bilby Rd. Belle Rive, IN 46168
(800)266-2848

DEC VAX 11/780 SYSTEMS
For Sale
Corporate DP Consolidation Allows For Sale of Entire Equipment, In-cluding: 4 MB Memory, Floating PT., 2 RP07 Disks, 1 RS3400 Disk, 1 RS3400 Disk, 2 TU78 Tape Drives, 4 DZ11-E 16 Channel MUX. Also Have VT100 CRTs And LA120 Printers. Will Sell as Pkg. or Separately. Contact: Jim Elmore at (213) 775-6555.

DEC

BUY • SELL • TRADE

1170 Sys.	LA120-DA	RX750
DL11-W	M7309	RS800-AA
DMC11	M8012	RS800-C
DR11-B	M8011-BE	RP04/6-C
DZ11-B	M8011-CE	RP06-F
DZ11-E	RX70	TE16 Mstr.

NEW YORK COMPUTER EXCHANGE
(518)782-6688 (800)845-5180

DEC EQUIPMENT

PDP11/70	TE16/RM03
VAX11/780	TU77/RP07
DW780-AA	TU80-AA
11/34A-BC	LA100-DA
LA180-ZA	LA120-DA

Access International
Glen Penniman
(617) 267-4851

DEC 11/03 System
With 32KB, RXV11-BA,
Cabinet, LA36 Printer.
$1,975
Call Ray
(617) 275-6900

WANG

Pssssst...
WANG USERS.....
HAVE YOU HEARD ABOUT THE GROUP OF FORMER WANG EMPLOYEES IN ATLANTA WHO BUY & SELL USED WANG EQUIPMENT AND PLUG COMPATIBLES?
LC.A. (404) 977-4566 or
1-800-241-3188

BUY - SELL
MVP/LVP • OIS • VS • PC
SYSTEMS IN INVENTORY
VS/80 • MVP • WP830
AMD PERIPHERALS
2246C - 2246R - 5536-4
GENERAL EQUIPMENT MARKETING
CORP.
(800) 277-4000

HEWLETT PACKARD

HP3000
BUYBUYBUYBUYBUY
SELLSELLSELLSELL
RENTRENTRENTRENT
LEASELEASELEASE
HP3000/HP3000/HP3000
Complete Systems
Processors • Peripherals • Parts
ConAm Corporation
Santa Monica, California
(213) 458-2643 (800) 648-4664

BUY & SELL
1000 & 3000
Systems • Components
WESTERN DATA SALES, INC.
(213) 373-6463

Buy-Sell-Lease
HP3000 3X, III, 4X
and related peripherals
Call Carol
CSU INDUSTRIES, Inc.
516-239-4316

NEW HEWLETT-PACKARD
Guaranteed
2601B
2602A
2648
Card Readers 7289A
Data Records/Sales, Inc.
Mr. von der Kooy
Jacksonville FL (904) 262-3120
Melbourne FL (305) 267-4860

HEWLETT PACKARD

For Sale
HP1000 F SERIES
CPU, 400LPM Printer, 5MB, 2-120MB Disks, All Comm. Attachments, Graphics Hardware, Halgan Software.
(713) 648-4141
C.P. Brookland

HP/NEW
30% Off List
7221 C Plotter
9872 C Plotter
2631 B Printer
& Extended Keyboard
9836 A CRT
Data Records/Sales, Inc.
Bob van der Kooy (305) 267-4860
Steven Beaver (404) 421-4560

HP/USED
2631 A 9885
2608 91750
2648 A 12000
HPIB Card Converter
7221 C 9450
Data Records/Sales, Inc.
Bob van der Kooy (305) 267-4860
Steven Beaver (404) 421-4560

SPERRY UNIVAC

SYSTEM 80 MOD 3
(1) 768K CPU
(1) 8417 Fixed Disk 120MB
(1) 8419 Removable Disk 75MB
(2) 8422 Manual Diskettes
(1) 600 LPM Printer
(2) UTS 20 Workstations
Call 215-695-3800

TI

USED TEXAS INSTRUMENTS
745 9900
743 9900
748 9900
733 ASR
Quantity Discounts Avail.
Data Records/Sales, Inc.
Mr. von der Kooy
Jacksonville FL (904) 262-3120
Melbourne FL (305) 267-4860

DATA GENERAL

MV 8000/6000 2 Mb Memory
MV 10000/4000 2 Mb Memory
8656 288 Kb Eclipse Memory
D211 CRTs $495
6053 CRTs $800
6045 10 Mb Disk $22000
6051 192 Mb Disk $13000
MV 8000 System Call
C-350 1 Mb System $16000
Nova 4S CPU 64 K $3500
Nova 3D CPU 128 Kb $2900
DG Compatibles (New)
Supports All DG Series CPUs
1600/6250 BPI Tape Unit Call
6061X Disk Drives Call
615X Disk Drives Call
International
Computing Systems Co.
(612) 941-3941

Desktop
Generation
10, 20, 30 Immediate Delivery
Systems, Software, Service
Century Management
(617) 227-5402

NEW DG CRT's
D-210 $795 D-410 $1295
D-211 $945 D-460 $1595
Discounts 15% to 25% Off List
Any & All DG Cables In Stock
We Will Not Be Undersold On Any New or Used DG Equipment.
Nuevo Data Systems
(312) 887-8900

HONEYWELL

LEVEL 6 & DPS 8 EQUIPMENT
Refurbished Used Printers
PRU6128 240 LPM, 64 Char... $4,125
PRU6154 600 LPM, 64 Char... $4,725
PRU6180 600 LPM, 64 Char... $5,895
Mass Memory Board Disk Drives
CDC 9715 10MB
DP 8 DPS CMD ..... $5,500 Ea.
Goodman Computer Services Ltd.
(617) 935-4660

NCR

600 DISK UNITS
NCR Make, Avail. Immed.
Renewed Semiconductor Corp.
2 Northgate Park, Ste.201
Chattanooga, TN 37415
TWX (910)570-0600
We supply more NCR Computer Spare Parts Than Any Other Company, Except NCR!

PRIME

PRIME
LARGE SELECTION OF USED PRIME COMPUTER SYSTEMS ...SAVINGS TO 50%
Peripherals also available:
Memories-Disk Drives-Controllers
Modems-Terminals-Printers
1st SOLUTIONS
...Your Warranty Source
A DATAMATION SERVICES, INC., COMPANY
3001 EAST CAMPBELL AVE.
PHOENIX, ARIZONA 85016
(602) 957-0300
ASK FOR DON OR MATT

MISC.

We buy and sell new and used refurbishing. Immediate delivery from our warehouses in Westwood, New Jersey with quality installation. We are now also able to serve any of your needs in Europe and Scandinavia from our offices in Helsinki. For further information write or call Roland Computer Plans, Inc., 6 Sullivan Road, Westwood, NJ 07675, (201) 666-6655, telex number 13-6976.

Buy • Sell • Lease
• Short Term Rentals •
DATAPOINT
FOR SALE
(2) 4650 Mid System
(2) 6350 128K Processor
(20) 8600 CRTs
(1) 9881 Disk Extension
(1) 9885 300LPM Printer
(1) 9875 Disk Extension
(4) 9881 128K Processors
(1) 9864 Tape Drive
(20) 9462 Multiports
Plus Misc. Memory Boards
AVAIL IMMEDIATELY
Cougar Computer Corp.
(216) 261-3600

For Sale
New WICAT S185
512K, MCS, Tape, Floppy,
& 15MB Winchester
Barnet Academy
Lisle, IL 60532
(312) 969-6550

Wanted To Buy
Used
National Computer Systems
NCR 7250 or NCR 7270
Optical Mark Reader
Please telephone or write to:
Clyde Wilson
Monmouth Intermediate School District
44001 Garfield Road
Mt. Clemens, MI 48044
(313) 263-8900

SOFTWARE FOR SALE

More IBM System/38 Users Are Choosing RTC Systems.

For technically superior software in a wide range of Financial, Manufacturing, Distribution and Management Business Systems.

The International Software Developers.

RTC Systems, Inc.

49 Plain Street
North Attleboro, MA 02760
(617) 695-8008

Elegant Software
for IBM S/34, 36 and 38

General Accounting	Payroll/Personnel
Financial Reporting	Property & Equipment
Accounts Receivable	Report Writer
Accounts Payable	Oil & Gas
Order Processing	All Systems use:
Inventory Management	RPG II/RPG III
Sales Analysis	Data Base
Job Cost	Interactive

J.D. Edwards & Company
4940 South Syracuse Street/Suite 2000
Denver, CO 80237
303/773-3732

Dallas — 214/ 458 0668
Houston — 713/ 680 8278
Northern California — 415/ 697 7764
Southern California — 714/751 5882

CONTROL/38

GL/38 GENERAL LEDGER	EXEC/38 FINANCIAL ANALYSIS	AP/38 ACCOUNTS PAYABLE
PPF/38 PROFIT PLANNING AND FORECASTING	ICCS/38 INTEGRATED COST CONTROL	PO/38 PURCHASE ORDER
AR/38 ACCOUNTS RECEIVABLE	FA/38 FIXED ASSETS	SC/38 STANDARD COST

Analyze system and program performance on your
IBM SERIES/1
The Performance Analyzer for EDX systems measures and reports on resource utilization for single programs or complete systems.

M & A Computer Systems
30 Holiday Place #304
San Francisco, CA 94111
(415)434-3517

SERIES/1 SPECIALISTS

CS SOFTWARE

VAX
PDP-11

Payroll • • Job Cost
General Ledger • • Fixed Assets
Accounts Receivable • • Accounts Payable
Inventory • • Order Entry
Client Writeup

Compu-Share

3624 - 50th St. • Lubbock, TX 79413 (806) 792-3785

TIME & SERVICES

*Epoxy 1100/60 Cooler
*Mapper *UNIS
*TIP/CMS *DMS/DPS
Time Sharing
On-Line Manufacturing Systems
On-Line Financial Systems
"Hot Site" Back-Up Service
Peak-Load & Direct Mail Processing
Contact: Mr. Lloyd Brown
(215) 297-6100

SDS
*STARBOARD DATA SERVICES INC.
771 Fifth Avenue
King of Prussia, PA 19406

COMPUTER TIME

3033-U
4341-2
TSO/CMS
CICS/IMS
Call Pat Holmes
(201) 930-9561
(212) 921-8855

ICOTECH
Innovative Computer Techniques

COMPUTER SERVICES
IBM 3081 DEC-10

*Remote Job Entry -Online Processing
-Batch Processing -Timesharing
-Optical Mark Reading -Laser Printing

COMPUTER OUTPUT MICROFILM

-Datagraphix Mini Auto-Cows
-Datagraphix Datacorder
-6250 BPI Capability
-Free Testing

Route 202
Raritan, NJ 08869
201-534-9153
Contact: Joyce Bogenschutz

DATA PROCESSING SERVICES
Computer Time

AMDAHL 470/V8, 16 Mbytes

- MVS/SP
- ACF2
- SAS*
- CICS/VS
- ROSCOE
- SAS/GRAPH*

Plus a full complement of on-line and batch programmer productivity aids. Call Ria Ham, Vice President (704) 525-8810

NCC Network Computing Corporation
5301 77 Center Drive, Suite 40
Charlotte, NC 28210

*SAS and SAS/GRAPH are trademarks of SAS Institute Inc.

COMMERCIAL DATA PROCESSING

4341-2 370/168-3

OS-DOS-VM/CMS
CICS-ROSCOE
REMOTE JOB ENTRY
CICS DEVELOPMENT
CUSTOMIZED SOFTWARE
XEROX LASER PRINTING

Contact Greg Gorab
(201) 777-3464

*15 MINUTES FROM LINCOLN TUNNEL
ONE PASSAIC STREET
WOOD RIDGE, N.J. 07075

DATA CENTER SERVICES

TWO 3033-16

BURNS

VAX 11/780 AND PDP-11 DEVELOPMENT TIME

NO KILOCORE TICK CHARGES / NO CPU CHARGES

Omnicomputer

$7/$14
RSTS/E VMS

PER HOUR CONNECT TIME

BUDGET BYTES™ 212-944-8230

Omnicomputer, Inc.
1430 Broadway, New York, N.Y. 10018

VAX/VMS TIMESHARE

5¢

$2 PER HOUR CONNECT TIME
ONE MB DISK STORAGE INCLUDED
AVAILABLE NATIONWIDE VIA TELENET
LEASE-A-PORT™ WITH 10 MB DISK & NO CPU OR CONNECT CHARGES FOR $600 PER MONTH

DYNACOMP CORPORATION
(914) 359-4031
(212) 619-3600
(914) 359-6275

CLASSIFIED ADVERTISING ORDER FORM

Computerworld's Classifieds work.

Issues Dates: Ad copy is due by Friday, 10 days prior to issue date.

Sections: Please be sure to specify the section you want: Time and Services, Software for Sale, Position Announcements and Buy/Sell/Swap. (Available upon request: Software Wanted, Business Opportunities and Real Estate).

Copy: We'll typeset your ad at no extra charge. Please attach CLEAN typewritten copy. Figure about 35 words to a column inch, not including headlines.

Costs: Our rates are $128.10 per column inch. (A column is 2" wide.) Minimum size is two column inches (2" wide by 2" deep) and costs $256.20 per insertion. Extra space is available in half-inch increments and costs $64.05. Box numbers are $15.00 extra.

Billing: If you're a first-time advertiser, (or if you have not established an account with us,) WE MUST HAVE YOUR PAYMENT IN ADVANCE.

Ad size desired: _____ columns wide by _____ inches deep.

Issue Date(s): _____

Section: _____

Signature: _____

Name: _____

Company: _____

Title: _____

Address: _____

Telephone: _____

Send this form to:

COMPUTERWORLD

CLASSIFIED ADVERTISING,

375 Cochituate Road, Box 880,
Framingham, MA 01701

Foreign Editorial/ Sales Offices

England: Terry Cartwright, EEC Publications, 196-200 Balls Pond Rd., London N1 4AQ. Phone: 01-359-3525. Telex: (851) 894065 (Computer Management, Computer Business Europe only).

Euan Rose, Bill Dunlop, Stephen Thomas, Beare Hobson Assoc., 345 Goswell Rd., Islington, London EC1V FHN. Phone: 01278 3415/6 (reps for all CWCI publications except Computer Management and Computer Business Europe).

W. Germany: Eckhard Utpadel, CW Publikationens, Friedrichstrasse 31, 8000 Munich 40. Phone: (089) 38172-0. Telex: 5215360.

France: Axel Leblois, Le Monde Informatique, 185 Avenue Charles De Gaulle, 92200 Neuilly Sur Seine, Paris. Phone: 738.14.14. Telex: 613234 F.

Japan: Mr. Shuji Misaguchi, Computerworld Japan, 7-4 Shinkomi 1-Chome, Chuo-ku, Tokyo 104. Phone: (03) 551-3882, Telex: 252-4217 (Computerworld Japan only).

H. Kajiama, Tokyo Representative Group, Yaseguchi Bldg., 2-12-9 Kanda Jimbo-cho, Chiyoda-ku, Tokyo 101. Phone: (03) 230-4117/8, Telex: J26560 (reps for all CWCI publications except Computerworld Japan).

Australia: Alan Power, Computerworld Pty. Ltd., 37-43 Alexander Street, Crows Nest, NSW 2065. Phone: (02) 4395133, Telex: AA74752 COMWOR.

Brazil: Eric Happeau, Data News, Computerworld do Brazil, Servicos e Publicacoes Ltda., Rua Alcindo Guanabara, 25/10th Floor 20031 Rio de Janeiro, RJ Brazil. Phone: (021) 240-8225. Telex: 2130838(WORD BR).

Mexico: Richard Small, Computerworld de Mexico, Oaxaca 21-2, Colonia Roma, Mexico City 7 D.F. Phone: (905) 514-4218, (905) 514-6309. Telex: 1771300 ACHAME, 1777809 ACHAME.

Spain: Neil Kelley, Computerworld/Espana, Gravina, 13, Madrid 4. Phone: 231-23-86; 231-23-89; 231-23-88. Telex: 47894(CW E).

Denmark: Preben Engell, Computerworld/Danmark, Gammel Strand 50, 1202 Copenhagen K. Phone: 01-1234-11. Telex: 27585 cwdan.

Sweden: Bengt Mannfelt, Nova Media, Nova Media AB, Vartavagen 55, 11536 Stockholm. Phone: 08-234280. Telex: 8105099 NOMACW.

The Netherlands: Johannes A. Witvoet, Mgr. Dir., Computerworld Benelux, Van Eeghenstraat 84, 1071 GK Amsterdam. Phone: 020-646436. Telex: (844) 16242.

Italy: Daniele Comboni, Gruppo Editoriale Jackson, s.r.l., Via Rosellini 12, 20124 Milano.

Argentina: Ruben Argarate, Gen. Mgr., Computerworld Argentina, Av. Belgrano 406-Piso 9, CP 1092 Buenos Aires. Phone: 34-6583/6584.

Norway: Mr. Per Bjerkjord, Editor, CW Norge A/S, Hovinveien 43, P.O. Box 2852, Tonyen, Oslo 6. Phone: 2/647725. Telex: (856) 78476

Singapore: Mr. David Nakib, General Manager, Asia Computerworld, Pte. Ltd., 11-08/11-10 Goldhill Plaza, Newton Road, Singapore. Phone: 250-444. Telex: (789) RS 37009

Saudi Arabia: Mr. Omar Dunaid, General Manager, Saudi Computerworld, P.O. Box 5465, Jeddah. Phone: 6678918/6660380. Telex: (928) 401205.

ADVERTISERS INDEX

ADP 181
A-E Consult 16,ID/43
Agile 158
Aitchison Case Co. 22
American Telephone & Telegraph ID/12-ID/13
Application Development ID/3
Applied Data Communications 107
Applied Digital Data 83
Artificial Intelligence 28
Ashton-Tate 115
AST ID/40

John Basil & Associates 126
Bastian International 84-85
BBN Systems, Inc. 57
Bourgen Corp. 84
BRI ID/15
Burroughs 28

C Itoh 112
Cambridge Systems 128
Cap Gemini/ SESD ID/28
Cipher A ID/45
CGA Software ID/35
Cipher River Data 97
Chicago Soft 21
Cipher 42-43
CMI Corp. 110
Codex Corp. 47
Computer Communications, Inc. 89
Computer Corporation of America ID/16,30-33
Computer Facts Exchange ID/36
Computer Power Systems ID/36
Computer Technology Group ID/33
Conference 123
Confidential Resources ID/39
Control Concepts 135
Control Data Corp. 143
Corvallis 74
Cornish Data Systems 104
Corvus 27
CPT ID/41
Cullinet 102
CW Buyer's Guide 124
CWCI 118,186
CW Germany 184
CW Office Automation 109
CW On Communications 140
CW Radio Buyer 154-155
CW Spain 88
CW Supplement 83

D & B Computing Services 110
Data General 126-127
Datapoint 114
Datapro Research ID/39,40
Dataworth Computer 121
Datech 136
DEC/apx visi 90-97
Development Systems Corp. 46
Diablo Systems ID/37
Digilog ID/37
Digital Communications 180-181
Digital Research 84-85
Digital Source 10
D.J.C. Corp. 84
Eastman Kodak Co. ID/38
Electrohome 146-147
Emerson ID/7
Epic Electronics 122
Epson Office Systems 111

Fibronics 24
Fortune Systems 24,25,26
Four Phase 148-149
Fujitsu 80,81
Fusion Products ID/44

General Electric ID/8
Gestalt 146
Goal Systems ID/30
Graham Magnetics ID/14
Group Operations 128

Hayes Microcomputer 108
Hewlett-Packard 82-83,ID/4-ID/5,130-131
Honeywell Information Systems ID/34-ID/35
Hughes Aircraft ID/42

Ibec ID/42
Infinite Systems 142
Infomart ID/17
Information 66
Infotron 144-145
Innovation Data Processing 7
ITT Courier 70-71

Johnson Systems ID/10

Kennedy Industrial 60
Keytronic 26

Law Bingler 86-89
Lee Data Corp. 32
Leland Computer Service 18
Lifbert Corp. ID/46
Liberty Electronics 78
Lotus Development Corp. 119

M4 98
Macro 4, Inc. 134
Manager Software Products ID/29
Master Software 61
Mathematica 29
McCormack & Dodge 17
McDonnell Douglas 60
Measurex CTD 96
Merit Systems 16
Micro Focus ID/28
MicroFocus 12
Microsoft 103
MicroTempus 59
Micro-Term 45
Mike Murach & Associates, Inc. 9
MRA 104
MTI Systems Corp. 122,123,124

National Information Systems 14
NEC 78-79
Netex 67
NETC ID/31
Northern Telecom ID/44-ID/45

Oldata 120
On-Line Software 48
Oxford Software 99

Packaged Solution 60
Paradyne 76
Parallax Systems 54
Personal Computer Management Associates 139
Pilkington 67
Pinnacle Computer Corporation 52
Plexus Computer 140

Quality Micro Systems 10
Quantrodata 102
Qume 49-51,144

Radio Shack 137

Sage Systems ID/39
SAS Institute 30-31
Signal Technology, Inc. ID/16,ID/17,ID/19
Software International 36-39
The Software Plant 94
Southern California Delivery Service 57
Steel Mobile 120
Stone Mountain Computing 10
Stratus Computer ID/2
Synapse ID/11
Syntrex 8
Sysco 64

Tallberg Data 72
Tandem Computers 81-82
Televideo Systems 113
Telex ID/32
Term Tronics 97-99
3COM ID/34-ID/35
Time, Inc. 75
Timeby 11
Tone Software 10
Trax Softworks, Inc. 31
Triangle Software 44

Unpronoun Data 69-70
UNL Data Systems 52,54,55,56

Visual Technology 100
Vitt Software, Inc. 5

Wang Laboratories 12-13
Westin Hotels 56
Winterhalter Associates 106

Xenos Corp. ID/47

Zebra ID/33
Zenith Data Systems ID/2
Zentec 138-139

This index is provided as an additional service. The publisher does not assume any liability for errors or omissions.

Computerworld Sales Offices

Vice-President/Sales/Donald E. Pagan
Director/National Sales/Edward P. Mannelli
Manager/Marketing & Sales Operations/Kathy Doyle
COMPUTERWORLD, 375 Cochituate Road, Box 880,
Framingham, MA 01701
(617) 879-0700

BOSTON SALES OFFICE (617) 879-0700
Northern Regional Director/Chris Lee
District Managers/Jim McClure, Ronald Martin,
Joyce Sorensen, Michael F. Rutkauer
Sales Assistant/Allan Langley
COMPUTERWORLD, 375 Cochituate Road, Box 880,
Framingham, MA 01701

CHICAGO SALES OFFICE (312) 827-4433
District Managers/Arthur Heinrich, Russ Gresham
Sales Assistant/Joan F. Broderick
Northern Regional Director/Chris Lee
COMPUTERWORLD, 2600 South River Road, Suite 304,
Des Plaines, IL 60018

NEW YORK SALES OFFICE (201) 967-1460
Eastern Regional Director/Michael J. Masterson
Senior District Manager/Craig Cheney
District Managers/Ray Corbin, John Daly, Fred La Sapio
Sales Assistant/Bob M. Palermo
COMPUTERWORLD, Paramus Plaza I,
140 Route 17, North, Paramus, NJ 07652

LOS ANGELES SALES OFFICE (714) 261-1669
Senior District Manager/Bob Hubbard
District Manager/Sandy Hendrickson

Western Regional Director/William J. Hadley
COMPUTERWORLD, 18005 Sky Park Circle, Suite 260,
Irvine, CA 92714

SAN FRANCISCO SALES OFFICE (415) 421-7280
Western Regional Director/William J. Hadley
Senior District Manager/Barry Millons
District Managers/Theodore Pearson, Brent Chamberlain
Account Manager, Classified/Nicole Bostrandt
COMPUTERWORLD, 950 Brannan, Suite 20,
San Francisco, CA 94103

ATLANTA SALES OFFICE (404) 394-0756
District Manager/Jeffrey Mallett
Eastern Regional Director/Michael J. Masterson
COMPUTERWORLD, 1827 Powers Ferry Road, Suite D,
Atlanta, GA 30339

CLASSIFIED ADVERTISING (617) 879-0700
Al DeMilo
COMPUTERWORLD, 375 Cochituate Road, Box 880,
Framingham, MA 01701

CW INTERNATIONAL MARKETING SERVICES
General Manager/Claire La Mougne
COMPUTERWORLD, 375 Cochituate Road, Box 880,
Framingham, MA 01701
(617) 879-0700.
Manager, West Coast/Peter Cronkhite
COMPUTERWORLD, 1020 Menlo Rd.,
Menlo Park, CA 94025
(415) 328-8094

CW COMMUNICATIONS/INC.
Board Chairman/Publisher
Patrick J. McGovern
President
W. Walter Boyd
Senior Vice-President
Leo Valvor

Group VP-Communication Services, Jack Edmondson. Group VP-Circulation, Margaret Phalen. VP-Marketing, Donald E. Pagan. VP-Finance, William P. Murphy. VP-Editorial, John Wilkinson.

Computerworld Headquarters: 375 Cochituate Road, P.O. Box 880, Framingham, MA 01701
Phone: (617) 879-0700, Telex: 95-1153.

SALES: Vice-President, Donald E. Pagan. National Director, Edward P. Mannelli. Corporate Advertising Administrator, Frank Collins. Manager/Marketing & Sales Operations, Kathy Doyle.
Display Advertising Supervisor, Anne Hadley.
Display Advertising, Deborah Bryer, Pam Valvekens, Carolyn Manderson/Cindy Chelsea, Mary Vandick. Classified Operations Manager, Cynthia Delany.

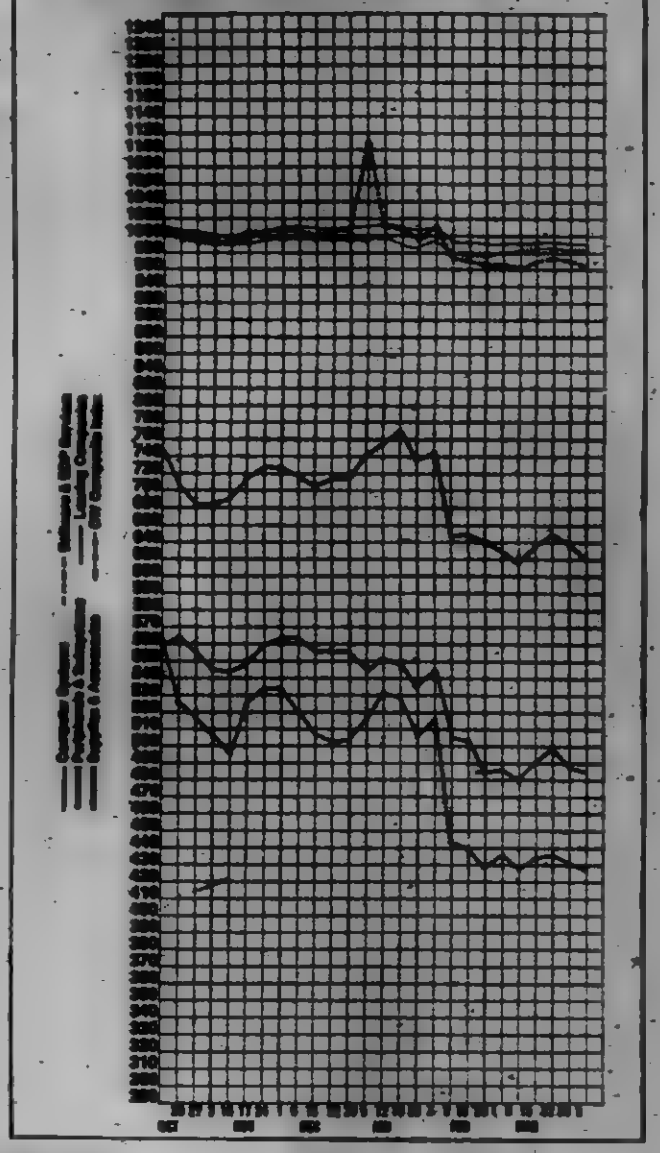
COMMUNICATION SERVICES: Group Vice-President, Jack Edmondson. Director Research, Kathryn Stinson. Sales Promotion Director, Liz Johnson.

PRODUCTION: Production Director, Peter Hahn. Production Manager, Marlene Small. Paste-Up Manager, Trish Gaudette. Systems Manager, Tom Flinn. Typesetting Manager, Carol Polish. Art Director, Tom Monahan. Graphic Designer, Hank Ring.

CIRCULATION: Group Vice-President, Margaret Phalen. Circulation Manager, Jane Dusbosq. Fulfillment Manager, Maureen Buhs.

Computerworld (ISSN 0010-4841) is published on 25 new calendar issues through University Microfilms Int., Periodical Entry Dept., 300 North Zeeb Rd., Ann Arbor, Mich. 48106. Phone: (313) 761-4700. Computerworld Indexed; refer to Circulation Dept. for subscription information.

Computerworld Stock Trading Index



Computerworld Stock Trading Summary

All statistics compiled, computed and formatted by TRADE QUOTES, INC. Cambridge, Mass. 02139

CLOSING PRICES WEDNESDAY, APRIL 4, 1984

	1983-84 RANGE (1)	CLOSE	NET CHANGE	%CHG
COMPUTER SYSTEMS				
O ALPHA MICROSYSTEMS	11- 3/4	11 3/4	+1 1/4	+11.9
O ALTOS COMPUTER SYST	9- 3/8	11 3/4	+1 1/4	+11.9
A APCOM CORP	1- 1/2	1 3/4	+1 1/8	+17.7
O APPLE COMPUTER INC	18- 5/8	24 1/2	+1	+4.8
A AT&T	59- 3/4	59 3/4	0	0.0
A BURROUGHS CORP	46- 1/4	50 1/8	- 1/8	-0.2
O COMPUTER AUTOMATION	9- 1/2	9	+ 1/4	+2.9
A COMPUTER CONSOLES	9- 1/2	10 3/4	- 1/8	-1.7
A CONTROL DATA CORP	31- 1/4	36	+2 1/4	+6.6
O CONVERGENT TECHNOL	9- 3/4	14	+1 1/2	+11.8
O CRAY RESEARCH INC	39- 1/2	63 7/8	+1 1/8	+1.8
A DATA GENERAL CORP.	19- 3/4	46 3/8	- 1/8	-0.2
A DATAPOINT CORP	11- 1/2	22 3/4	+ 1/2	+2.2
N DIGITAL EQUIPMENT	82- 1/2	97 1/4	-4 5/8	+0.0
A EDIX INC	9- 1/2	15 1/4	- 1/8	-0.8
N ELECTRONIC ASSOC.	3- 1/2	3 7/8	0	0.0
N FLOATING POINT SYST	19- 3/4	44 1/2	+ 3/4	+1.8
A FOXBORO	28- 1/4	42	+ 1/8	+0.3
O GENERAL AUTOMATION	4- 3/4	8 3/4	- 3/8	-4.1
A GRID INC	31- 1/4	38 3/8	-1	-2.5
N HARRIS CORP	30- 3/4	39 7/8	- 1/8	-0.3
N HEWLETT-PACKARD CO	33- 1/4	59 3/8	+ 1/4	+0.4
N HONEYWELL INC	39- 1/2	59 3/4	+ 1/4	+0.4
A IBM	77-134	111	+1 3/8	+1.2
O IPL SYSTEMS INC	1- 1/4	1	0	0.0
N K/A-CON INC	13- 1/2	14 1/4	- 7/8	-5.7
O MADISON COMP SYSTS	1-	3/8	0	0.0
N MANAGEMENT ASSIST	7- 1/2	23 7/8	+ 7/8	+3.8
O MATSUSHITA ELEC(ADR)	7- 1/2	60	+2 1/2	+4.3
N MODULAR COMPUTER SYS	5- 1/2	7 1/8	+ 1/2	+7.6
O NORTHERN DATA INC	10- 1/2	3 3/8	- 3/8	-9.7
A MOTOROLA INC	62- 1/4	112 3/8	- 3 7/8	-3.3
N NAT'L SEMICONDUCTOR	13- 1/2	13 3/4	- 3/8	-2.7
N NBI INC	10- 1/2	18 3/8	- 1/4	-1.3
A NCR	39-135	108 7/8	+1 1/8	+1.0
A PERKIN-ELMER	17- 3/4	27	+ 3/4	+2.9
O PRIME COMPUTER INC	11- 3/8	19 3/8	+ 7/8	+10.7
A SPERRY CORP	21- 3/8	38 7/8	+ 1/8	+0.3
O TANDEM COMPUTERS INC	14- 1/2	27	+1 1/2	+10.2
N TANDY CORP	31- 5/8	39 1/2	+2 3/8	+6.4
O TELEVIDEO SYSTEMS	11- 1/2	12 1/4	+1 1/4	+8.0
A TELXON CORP	9- 1/2	9 1/4	- 1/2	-5.1
N TEXAS INSTRUMENTS	71-178	134 3/8	+6 7/8	+5.1
A ULTIMATE CORP	9- 3/4	17 1/8	+ 1/8	+0.7
O VECTOR GRAPHICS INC	7- 1/4	14 1/8	+ 1/8	+0.1
A WANG LABS "B"	19- 1/2	24 3/8	+2 1/4	+0.2
A WANG LABS "C"	11- 1/2	22 1/2	-3	+00.0
N XEROX CORP	39- 1/2	60 5/8	+1 7/8	+0.4
LEASING COMPANIES				
O CREATIVE FINANCIAL CP	23- 1/2	38	-1 1/2	-3.7
N CONSISCO INC	7- 1/2	15 1/8	- 3/8	-2.4
O CONTINENTAL INFO SYS	7- 1/8	7	0	0.0
O DPF INC	11- 1/2	13 1/4	+ 1/2	+3.9
O SELECTRON INC	19- 1/2	42 3/4	- 1/2	-1.7
N U.S. LEASING	19- 1/2	34	+1 5/8	+5.0
COMPONENTS				
N ADVANCED MICRO DEV	19- 3/4	27 5/8	-2	-6.7
O ADV'D SEMICONDUCTOR	12- 1/8	23	0	0.0
N ANALOG DEVICES INC	36- 1/2	37 7/8	-3 1/2	-11.1
O ANALOGIC CORP	16- 1/4	18 1/2	-1 1/4	-6.3
N APPLIED MAGNETICS CP	19- 3/4	17 5/8	- 3/8	-2.1
O TERADYNE	14- 3/8	27 3/4	-4 1/2	-14.1

	1983-84 RANGE (1)	CLOSE	NET CHANGE	%CHG
SOFTWARE & SVC SERVICES				
O ADVANCED COMP TECH	6- 1/2	8	0	0.0
O ADVANCED SYSTEMS INC	6- 1/2	10 7/8	- 1/8	-1.0
O BGS SYSTEMS INC	11- 1/2	18 1/2	-1 1/2	-7.5
O AMERICAN SOFTWARE	10- 3/4	16 3/4	-1 1/4	-7.0
O AMACOMP INC	3- 1/2	3 1/2	- 1/8	-3.4
O ANALYSTS INTL CORP	8- 1/2	8 1/2	- 1/8	-1.4
O APPLIED DATA RES.	1- 1/2	1	- 1/4	-20.0
O ASK COMPUTER SYSTEMS	3- 1/2	11 1/2	+ 1/2	+4.5
O AUTOMATIVE CORP LND	1- 1/2	1 1/2	0	0.0
O AUTOMATIC DATA PROC	21- 3/4	32 1/8	- 1/8	-0.3
O BBN COMPUTER ASSOC	6- 1/2	7 1/2	- 1/8	-1.6
O COMPUTER ASSOC INT'L	8- 1/2	16 1/2	- 1/8	-0.7
O COMPUTER HORIZONS	7- 1/2	12 1/2	- 1/8	-1.0
O COMPUTER NETWORK	1- 1/2	2 1/2	0	0.0
O COMPUTER SCIENCES	11- 3/4	15	0	0.0
O COMPUTER TASK GROUP	2- 1/2	2 1/2	0	0.0
O COMPUTER UTILITIES	7- 1/2	7 1/4	0	0.0
O COMPUTONE SYSTEMS	2- 1/2	3 1/4	0	0.0
O COMSHARE CORP	7- 1/2	8 3/4	- 1/8	-1.4
O CORVUS	7- 1/2	8 3/4	- 1/8	-1.4
O CULLINET SOFTWARE	15- 1/2	23 3/4	- 1/8	-0.5
O CYCARE SYSTEMS INC	8- 1/2	16 1/2	- 1/8	-1.5
O ELECTRONIC DATA SYST	14- 1/2	28 1/2	- 1/8	-0.4
O HUMAN SYSTEMS INC	4- 1/2	5 1/2	- 1/8	-2.2
O GENERAL ELECTRIC CO	54- 1/2	63 3/4	- 1/8	-0.2
O GTE CORP	37- 1/2	37 1/8	- 1/8	-0.3
O INFORMATICS INC	15- 1/2	19 1/2	- 1/8	-0.6
O INFOTRON SYSTEMS COR	7- 1/2	18 3/4	+ 3/4	+4.2
O KEANE ASSOCIATES	7- 1/2	7 1/8	- 1/8	-1.7
O LOGICON	24- 1/2	36	- 1/8	-0.3
O MCI COMMUNICATIONS	3- 1/2	5 1/8	- 3/8	-6.8
O MANEY DCI AMER INC	1- 1/2	1 1/2	0	0.0
O MATHEMATICAL APP GRP	1- 1/2	1 1/2	0	0.0
O MICRO SYSTEMS INC	11- 1/2	16 3/8	- 1/8	-0.7
O MICRO-HARD CP	1- 1/2	2 1/2	- 1/8	-4.7
O NATIONAL DATA CORP	17- 1/2	17 5/8	+ 1/8	+0.7
O ON-LINE SOFTWARE INT	3- 1/2	12	+ 1/2	+00.0
O PANOPTIC SYSTEMS	1- 1/2	1 1/2	0	0.0
O PLANNING RESEARCH	1- 1/2	2 1/2	- 1/8	-4.7
O POLICY MGMT SYSTE CP	46- 1/2	38	0	0.0
O PROGRAMMING & SYS	1- 1/2	2 1/4	0	0.0
O REYNOLDS & REYNOLD	17- 1/2	22 3/4	- 1/4	-1.1
O SEI CORP	11- 1/2	18 3/8	- 1/8	-0.6
O SHARED MEDICAL SYST	37- 1/2	38 3/4	+1 1/8	+2.9
O SCIENTIFIC COMPUTERS	6- 1/2	8	0	0.0
O SOFTWARE AG	7- 1/2	13 7/8	- 7/8	-5.9
O TYMSHARE INC	13- 1/2	23	- 1/8	-0.5
O UNI CORP	7- 1/2	15 3/8	- 1/8	-0.8
O UNLY CORP	7- 1/2	10 7/8	- 1/8	-1.1
TYPEWRITERS & OFFICE				
O AM INTERNATIONAL	2- 1/2	3	- 1/8	-4.0
O ARDENTHY JACKSON	7- 1/2	8 3/4	- 1/8	-1.4
O AUTO-TROL TECHNOLOGY	8- 1/2	18 1/2	- 1/8	-0.6
O DIDACTED INC	7- 1/2	8 1/4	- 1/8	-1.5
O DOCUTEL OLIVETTI	4- 1/2	5 3/8	- 1/8	-2.3
O DOLLY,REMBERG & MEN	7- 1/2	10 3/8	- 1/8	-0.6
O CANDEX CORP	1- 1/4	1 3/8	0	0.0
O CENTRONICS DATA COMP	7- 1/2	7 1/2	0	0.0
O DATEC CORP	7- 1/2	7 7/8	0	0.0
O CONSITRONICS	7- 1/2	8 1/2	- 1/8	-1.4

	1983-84 RANGE (1)	CLOSE	NET CHANGE	%CHG
O COMPUTER DEVICES INC	3- 1/2	3 1/2	-	0.0
O COMPUTER TRANSISTOR	7- 1/2	8 3/4	- 1/8	-1.4
O COMPUTERVISION CORP	7- 1/2	8 1/2	- 1/8	-1.4
O COMTEC CORP	1- 1/2	1 1/2	- 1/8	-7.6
O DATAPRODUCTS CORP	7- 1/2	8 1/2	- 1/8	-1.4
O DATABOX CORP	3- 1/2	3 1/2	- 1/8	-3.4
O DATA SWITCH CORP	7- 1/2	8 1/2	- 1/8	-1.4
O DATUM INC	7- 1/2	8 1/2	- 1/8	-1.4
O DECISION DATA COMPUT	1- 1/2	1 1/2	- 1/8	-7.6
O DICOMED,OLIVETTI	7- 1/2	8 1/2	- 1/8	-1.4
O ELECTRONIC M & M	7- 1/2	8 1/2	- 1/8	-1.4
O GERBER, INC	7- 1/2	8 1/2	- 1/8	-1.4
O GYMNO & SUTHERLAND	7- 1/2	8 1/2	- 1/8	-1.4
O HARRIS TECHNOLOGIES	7- 1/2	8 1/2	- 1/8	-1.4
O KEN'L DATA COMP IND	7- 1/2	8 1/2	- 1/8	-1.4
O MIDAY SOUTHWEST IND	7- 1/2	8 1/2	- 1/8	-1.4
O MARKLYNE CORP	7- 1/2	8 1/2	- 1/8	-1.4
O ICOT CORP	7- 1/2	8 1/2	- 1/8	-1.4
O INFORMATION DATA INC	7- 1/2	8 1/2	- 1/8	-1.4
O INFORMATION SCIENCE	7- 1/2	8 1/2	- 1/8	-1.4
O INTEL CORP	7- 1/2	8 1/2	- 1/8	-1.4
O IPL SYSTEMS INC	7- 1/2	8 1/2	- 1/8	-1.4
O LOGNY ELECTRONICS	7- 1/2	8 1/2	- 1/8	-1.4
O MINNESOTA CORP	7- 1/2	8 1/2	- 1/8	-1.4
O NBI DATA CORP	7- 1/2	8 1/2	- 1/8	-1.4
O NORMAN CORP	7- 1/2	8 1/2	- 1/8	-1.4
O NETWORK SYSTEMS CORP	7- 1/2	8 1/2	- 1/8	-1.4
O NV AMERICAN PHILIPS	7- 1/2	8 1/2	- 1/8	-1.4
O NORTHERN TELECOM LTD	7- 1/2	8 1/2	- 1/8	-1.4
O OMEX	7- 1/2	8 1/2	- 1/8	-1.4
O PANDRIVE CORP	7- 1/2	8 1/2	- 1/8	-1.4
O PENRIL CORP	7- 1/2	8 1/2	- 1/8	-1.4
O PHOENIX AMERICAN INC	7- 1/2	8 1/2	- 1/8	-1.4
O PLESSEY CO (ADR)	7- 1/2	8 1/2	- 1/8	-1.4
O POINTHORIZ INC	7- 1/2	8 1/2	- 1/8	-1.4
O RANTER CORP	7- 1/2	8 1/2	- 1/8	-1.4
O RAYTHEON CO	7- 1/2	8 1/2	- 1/8	-1.4
O RECOMPUTER GROUP	7- 1/2	8 1/2	- 1/8	-1.4
O REMA CORP	7- 1/2	8 1/2	- 1/8	-1.4
O SHAMROCK ASSOCIATES	7- 1/2	8 1/2	- 1/8	-1.4
O SIGMA DATA	7- 1/2	8 1/2	- 1/8	-1.4
O SIGMA-TRON CORP	7- 1/2	8 1/2	- 1/8	-1.4
O SCIENTIFIC ATLANTA	7- 1/2	8 1/2	- 1/8	-1.4
O STORAGE TECHNOLOGY	7- 1/2	8 1/2	- 1/8	-1.4
O SYRUS DATATECHNICS	7- 1/2	8 1/2	- 1/8	-1.4
O SYSTEMS & COMP TECH	7- 1/2	8 1/2	- 1/8	-1.4
O T BAR INC	7- 1/2	8 1/2	- 1/8	-1.4
O TAB PRODUCTS CO	7- 1/2	8 1/2	- 1/8	-1.4
O TANDON CORP	7- 1/2	8 1/2	- 1/8	-1.4
O TDC INC	7- 1/2	8 1/2	- 1/8	-1.4
O TEKTRONIX INC	7- 1/2	8 1/2	- 1/8	-1.4
O TELEX	7- 1/2	8 1/2	- 1/8	-1.4
O TERADATA SYSTEMS CP	7- 1/2	8 1/2	- 1/8	-1.4
O TIMEPLEX INC	7- 1/2	8 1/2	- 1/8	-1.4
O VISUAL TECHNOLOGY	7- 1/2	8 1/2	- 1/8	-1.4
O WANG LABS "A"	7- 1/2	8 1/2	- 1/8	-1.4
O WANG LABS "B"	7- 1/2	8 1/2	- 1/8	-1.4
O WANG LABS "C"	7- 1/2	8 1/2	- 1/8	-1.4
O XEROX CORP	7- 1/2	8 1/2	- 1/8	-1.4
O ZENITH RADIO	7- 1/2	8 1/2	- 1/8	-1.4
O ZILOG INC	7- 1/2	8 1/2	- 1/8	-1.4
O ZYCAD CORP	7- 1/2	8 1/2	- 1/8	-1.4

EXCH: O=OTC N=NYSE A=AMERICAN P=PACIFIC B=BOSTON
I=NATIONAL M=MIDWEST O=OVER-THE-COUNTER
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

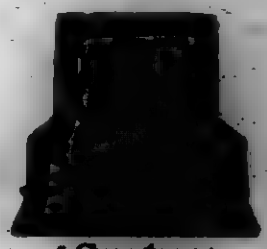
Only MSA software makes your mainframe work 100 times better

1. Now MSA's Executive Peachpak™ II software links personal computers to the mainframe. So you can...

2. Use your PC to access all your MSA mainframe systems, from General Ledger to Manufacturing.

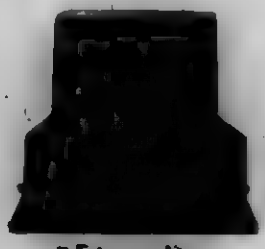
3. Access entire mainframe files, so you can work with large amounts of information at one time.

4. Get HELP if you need it, with a built-in feature that guides you through the system.



5. Choose the exact mainframe information you need, as much as you need, in the form you need.

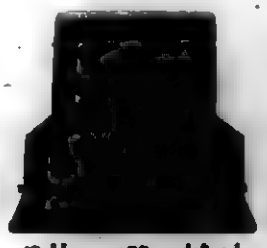
6. Use it with Peachtree Software, 1-2-3™ from Lotus, DIF,™ VisiCalc™ or other micro software.



7. Enjoy a real-time environment, no waiting for processing.

8. Allow only authorized personnel access to the mainframe, due to built-in security.

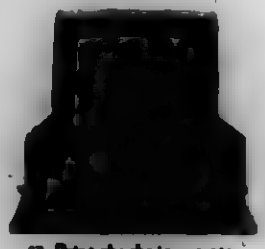
9. Get database-to-database transfer with Database Sharing.



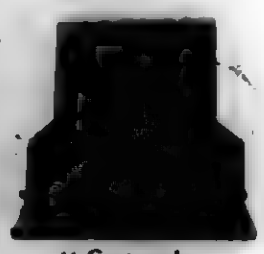
10. Use over 20 predefined applications from MSA. For example...

11. Use PeachLink™ to download information from both MSA and non-MSA online mainframe systems.

12. Download vendor history from MSA's Accounts Payable System and use PeachCalc™ to do comparative analysis.

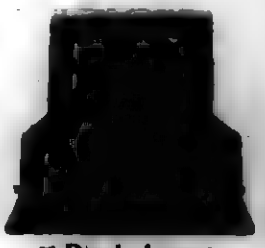


13. Print checks in remote locations from mainframe Accounts Payable data.

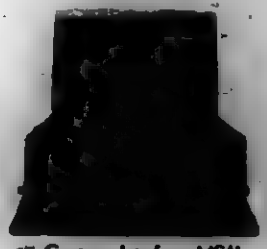


14. Create a salary administration worksheet on a PC using MSA's Payroll/ Personnel System.

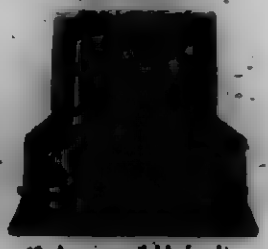
15. Make a purchase order adjustment without leaving your workstation.



16. Download current balances from General Ledger to graph actual vs. planned.

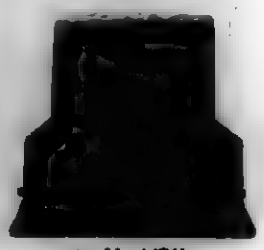


17. Capture data from MSA's Fixed Assets System, use PeachCalc™ to create a lease amortization model.

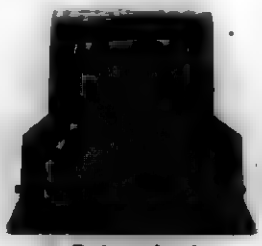


18. Access available funds data in MSA's Budgetary Control System...

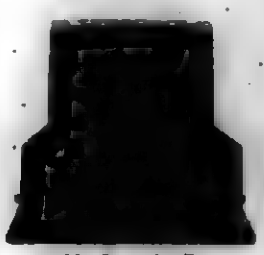
19. Use PeachCalc™ to project expenditures through year-end.



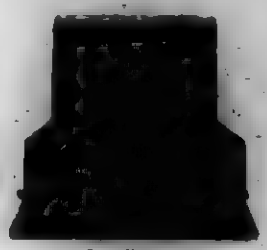
20. Use MSA's Manufacturing System data to produce cost/margin analysis with PeachCalc™



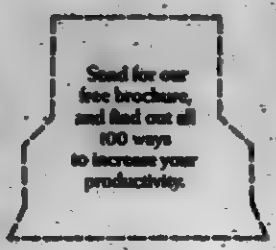
21. Dial up subscriber databases to access current credit information for customers...



22. Use PeachCalc™ to analyze information, set credit and update your mainframe Accounts Receivable data.



23. Install it in less than one hour.



24. -100.

Backlogs? Rush requests? Now they're a thing of the past.

MSA's new Executive Peachpak II links your company's personal computers directly to your mainframe. So executives can get to vital information without waiting for print-outs.

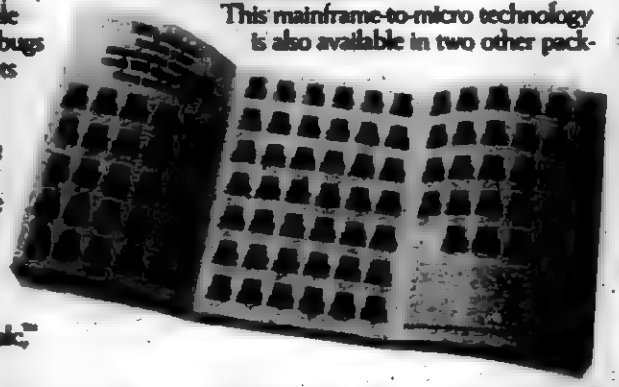
Best of all, this hot new technology is available from MSA *right now.* (In fact, it's already installed and working for companies across the country.)

MSA is the mainframe-to-micro leader. While other companies are still trying to work the bugs out of their initial offerings, MSA already has its second successful mainframe-to-micro product: Executive Peachpak II.

It offers such advanced features as Database Sharing, MSA's database-to-database transfer technology that lets you get all the mainframe information you need instantly.

And a Universal Interface with most microsoftware packages including Peachtree Software, 1-2-3™ from Lotus, and VisiCalc.™

Executive Peachpak II also includes PeachCalc,™ an electronic spreadsheet. A Business Graphics System for color charts and other graphics. Telecommunications that let personal computers talk to each other—or link to resources such as Dow Jones News/Retrieval.® PeachText,™ complete report production system that lets executives edit and footnote reports. A List Manager for organization. And PeachLink,™ the software that links your PCs to the mainframe.



This mainframe-to-micro technology is also available in two other packages: Administrative Peachpak, which includes comprehensive word processing functions. And Graphics Peachpak, for color graphs and charts.

All include PeachLink.™ And all are backed by the service and support MSA is so famous for.

This revolutionary new link means you can now deal with one software company that supplies all the advanced mainframe systems your company needs. All the software for your personal computers through our Peachtree Software Company. And the software that links them together.

Talk to MSA about new Executive Peachpak II. And see how much more you could be getting from your mainframe. Call Robert Carpenter at (404) 239-2000, or write to Management Science America, Inc., 3445 Peachtree Road, N.E., Atlanta, Georgia 30326.

MSA

The Software Company

MSA makes the mainframe link to personal computers a reality

Executive Peachpak II and PeachLink are trademarks of Management Science America, Inc. PeachCalc and PeachText are trademarks of Peachtree Software, Inc., and MSA company. DIF is a trademark of Software Arts, Inc. 1-2-3 is a trademark of Lotus Development Corp. VisiCalc is a trademark of VisiCorp, Inc. Dow Jones News/Retrieval is a registered trademark of Dow Jones & Company, Inc.

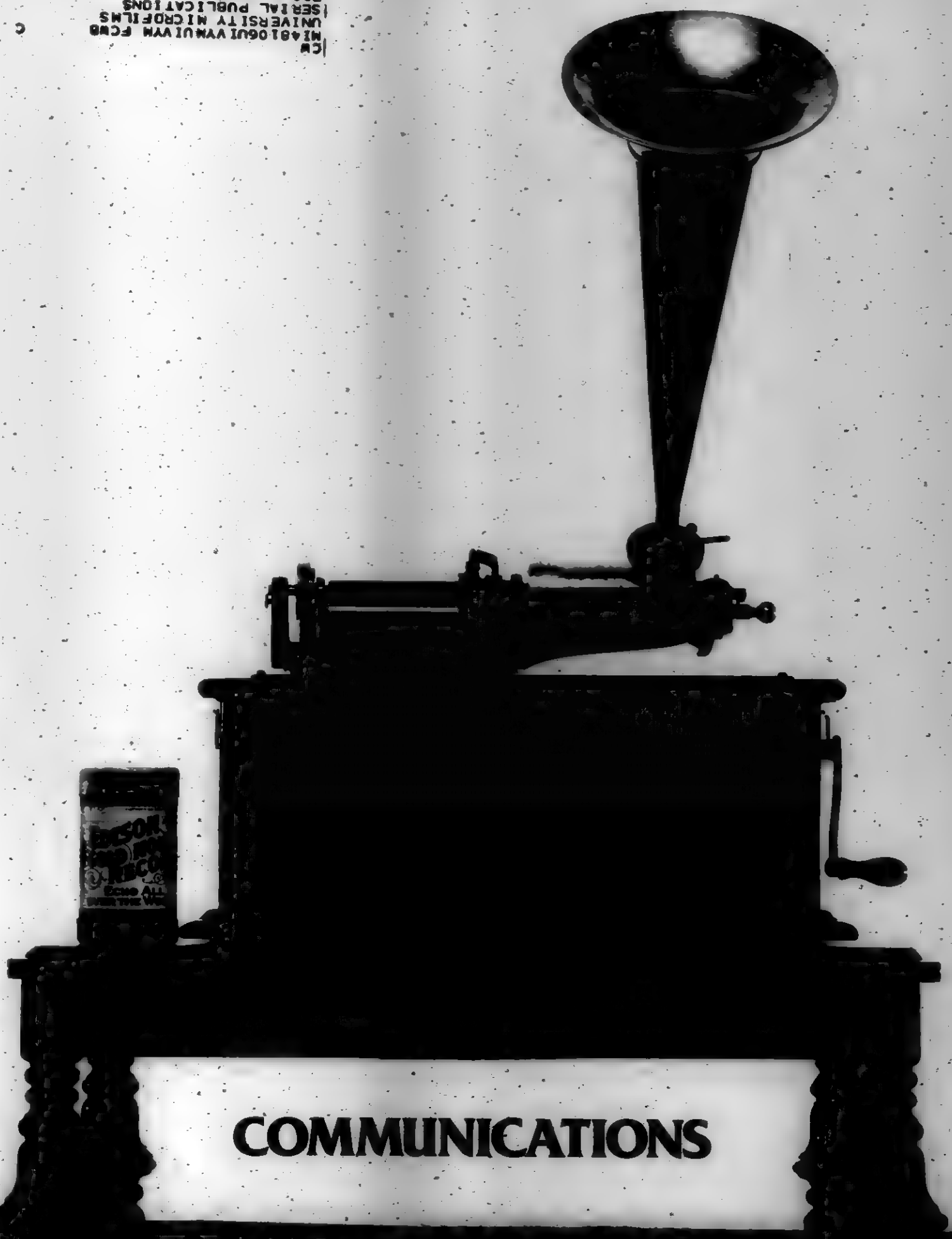
VOL 18
ISSUE 15A
AP 11 1984
UMI

Computerworld

APRIL 11, 1984
VOL. 18, NO. 15A

OFFICE AUTOMATION

CW
MI48106UI VYMUIVYM FCWB
UNIVERSITY MICROFILMS
SERIAL PUBLICATIONS
300 N ZEEB RD
ANN ARBOR MI 48106



COMMUNICATIONS

1893. Architects discover up is better than out.

The proposition is easy enough to grasp. When space is at a premium, build skyward.

That's why Wright Line designed its PC WorkCenter to take up more vertical space and less horizontal. Let's face it, few offices embracing personal computers today were designed to accommodate an additional piece of substantial furniture.

Designed particularly for IBM Personal Computer Systems, our PC WorkCenter takes as little as 18″ × 24″ of floor space. Believe it or not, that's less space than your average office chair takes.

Our vertical ergonomic design provides for more efficient and convenient access to all computer components. The unit's storage capacity accommodates software manuals, diskettes and supplies, so every thing you need is all in one place. There's virtually no disruption to your normal work habitat.

As for security, just roll down the locking tambour door for overnight protection against theft and unauthorized use.

1984. IBM PC users discover up is better than out.

An internal cable management system protects against wire damage while leaving nothing underfoot. The master switch with circuit breaker allows you to activate the whole system with just the flick of a switch. And locking casters are ready to roll in seconds for shared use in other offices.

The PC WorkCenter is available in 50″ and 63″ heights, both well within acceptable height limits of contemporary office environments.

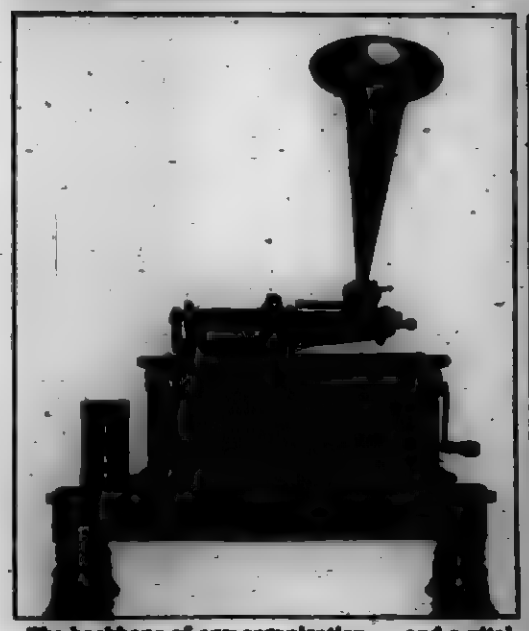
Wright Line has been supporting IBM for 50 years. First in the computer room, now throughout the office. And the way things are going, the sky's the limit.

For more information on our PC WorkCenter or for a complete catalog of PC support products, contact Wright Line, 160 Gold Star Blvd., Worcester, MA 01606.

Wright Line
A UNIT OF BARRY WRIGHT

IBM® is a trademark of International Business Machines Corporation

CONTENTS



The backbone of any organization — and a vital link to success — is communicating ideas, information and projections that come as a result of OA.
(Photo © 1984 Mort Rabinow)

COMPUTERWORLD

OA

CW COMMUNICATIONS/INC.
Box 880, 375 Cochituate Road,
Framingham, Mass. 01701

Board Chairman/Publisher Patrick J. McGovern
President W. Walter Boyd
Senior Vice President Leo Vidmar
Group VP-Communication Services Jack Schmeelzein
Group VP-Circulation Margaret Phelan
VP-Sales Donald E. Pagan
VP-Finance William P. Murphy
VP-Editorial John Whitmore

Special Focus Publications
Administrator Jenny Charlesworth

Editor Ann Dooley
Senior Writer Glenn Rifkin
Associate Editor Nancy Fleming
Art Director Tom Monahan
Production Director Peter Hahn
Production Manager Marlene Sibel
Typesetting Manager Carol Polack
Art Assistant Marina Benassi
Production Assistant Stephen DeLacy

Director/National Sales Edward P. Marcoski
Advertising Traffic Pam Valentinas

Second-class postage paid at Framingham, Mass., and additional mailing offices. Computerworld (ISSN-0010-4841) is published weekly, except: January (5 issues), February (5 issues), March (5 issues), April (7 issues), May (5 issues), June (7 issues), July (6 issues), August (5 issues), September (5 issues), October (7 issues), November (5 issues), December (6 issues) and a single combined issue the last week in December and the first week in January by CW Communications/Inc., Box 880, 375 Cochituate Road, Framingham, Mass. 01701.

Copyright 1984 by CW Communications/Inc. All rights reserved. Reproduction of material appearing in Computerworld and Computerworld OA is forbidden without written permission. Send all requests to Nancy Shannon.

Computerworld subscription prices: $2.00 a copy; U.S. — $44 a year; Canada, Central & So. America — $110 a year; Europe — $185 a year; all other countries — $345 a year (airmail service). Computerworld OA prices: $5.00 a copy; $12.00 a year. Four weeks notice is required for change of address. Please allow six weeks for new subscription service to begin.

Computerworld can be purchased on 35mm microfilm through University Microfilm Int., Periodical Entry Dept., 300 Zeeb Rd., Ann Arbor, Mich. 48106. Phone: (313) 761-4700. Computerworld is indexed; write to Circulation Dept. for subscription information.

PHOTOCOPY RIGHTS: permission to photocopy for internal or personal use or the internal or personal use of specific clients is granted by CW Communications for libraries and other users registered with the Copyright Clearance Center (CCC), provided that the base fee of $3.00 per copy of the article, plus $.50 per page is paid directly to Copyright Clearance Center, 21 Congress Street, Salem, MA 01970.

Permission to photocopy does not extend to unattributed articles followed by this symbol. †

POSTMASTER: Send Form 3579 (Change of Address) to Computerworld Circulation Dept., Box 880, 375 Cochituate Road, Framingham, MA 01701.

Computerworld OA is a member of the CW Communications/Inc. group, the world's largest publisher of computer-related information. The group publishes 82 computer publications in 19 major countries. Nine million people read one or more of the group's publications each month. Members of the group include: Argentina's Computerworld/Argentinan, Australia's Australia Computerworld, Australian Micro Computerworld, Australian PC World and Directories; Brazil's DataNews and MicroMundo; China's China Computerworld; Denmark's Computerworld Danmark and MicroWerden; Finland's Mikro; France's Le Monde Informatique, Golden (Apple) and OPC (IBM); Germany's Computerwoche, Microcomputerwelt, PC Welt, Softwarе Markt, CW Edition/Seminar, Computer Business and Commodore Magazine; Italy's Computerworld Italia; Japan's Computerworld Japan and Focus Computer World; Mexico's Computerworld Mexico and Computadoras; Netherland's Computerworld Benelux and Micro/Info; Norway's Computerworld Norge and MikroData; Saudi Arabia's Saudi Computerworld; Singapore's The Asian Computerworld; Spain's Computerworld Espanol and Micro Sistemas; Sweden's Computer Sweden, Mikro Datorn and Min Hemdator; the UK's Computer Management and Computer Business Europe; the U.S.' Computerworld, Hot CoCo, In-Cider, InfoWorld, Jr., MacWorld, MICRO MARKETWORLD, Microcomputing, PC World, PC Jr. World, Run, 73 Magazine and 80-Micro.

11
IT TAKES ALL KINDS...
By Robert L. Williams
Management style — everybody has one. Some, however, are more effective than others. Here's a look at several kinds of OA managers.

16
WINDOWS COME TO THE WORKSTATION
By Molly Upton
Windowing may give users freedom to manipulate data they have long awaited. But is it really what they need?

23
WHATEVER HAPPENED TO XEROX?
By Glenn Rifkin
Xerox contends it is a major player in the office. Industry experts wonder whether it's in the game at all.

27
NOTHING COULD BE FINER THAN OA IN CAROLINA
By Daroid R. Klauk
Here's how an OA user that made all the right moves still ended up with some surprises and, eventually, a successful OA system.

DEPARTMENTS

Editorial	2
Hammering It Out	6
Forum	8
News	9
Briefs	10
Q&A	69
Technology	70
Calendar	72

OAFOCUS

35
LOCAL-AREA NETWORKS
By David L. Terrie
Almost every business has a wiring problem. Read about what's happening as technology helps users ease that tangled web.

39
STRATEGIC PLANNING
By Dixon R. Doll
Strong telecommunications planning is needed to support the office automation environment in any organization. The postdivestiture confusion is leaving many OA planners in a dilemma.

43
PC NETWORKS
By Amy D. Wohl
The current driving force in OA is microcomputers, many of which are being bought to act as workstations. Is this really helping users? If so, what should they know to let micros work best for them?

49
PBX TECHNOLOGIES
By Angela MacRae
The most difficult problem of managing information systems is integrating and connecting installed and future systems and technologies. PBX may be the answer for many users. Find out if it's right for you.

52
THE PERFECT SPREADSHEET
By Thomas Zappia And Thomas O'Flaherty
Micro spreadsheets abound in the market, but their capabilities are still limited. Find out what's available now.

55
THE QUEST FOR COMPATIBILITY
By Glenn Rifkin
"IBM PC-compatible" means many things to many people; users are getting caught in the middle.

59
PICKING A WINNER
By Linda L. Winningham And Patricia Carrell
As data bases proliferate rapidly, choosing the right one can be a game of luck.

62
KENNEDY SPACE CENTER LAUNCHES OA
By Glenn Rifkin
Until recently, Kennedy Space Center office systems were planted firmly on the ground. Now it's charted an out-of-this-world OA system.

67
A NEW GENERATION OF SOFTWARE
By David A. Boucher
A new generation of software is being developed for the emerging 32-bit workstations. What is its current status and how will it help you?

EDITORIAL

The battle over CRT safety is heating up again. No matter how many times we're assured there is no radiation danger from these terminals, users and user groups remain unconvinced.

Bills pertaining to CRT safety have already been introduced in nine state legislatures this year, and two more will reportedly be introduced shortly. Lobbying on both sides of the issue should be intense, with union groups pitted against vendors and big business organizations. In addition to action on the state levels, the U.S. Congress's House Education and Labor Subcommittee on Health and Safety is studying CRT safety.

Although no study has produced scientific evidence that CRTs pose a serious health threat, individual complaints and a number of miscarriages or birth defects continue to be attributed to CRT use.

All parties seem able to agree that some physical ailments — backaches, eyestrain and stress — can be caused by terminal design or work area factors. A recent issue of the Harvard Medical School Health Letter estimated that more than half of all CRT operators suffer from eye irritations, focusing problems and fatigue. Job stress is compounded as operators try to keep pace with a constantly alert computer and to cope with the fact that often their performance is monitored by that same system.

The question of how dangerous CRTs can be will probably go unanswered for some years to come. Continued scientific evidence is needed before we can put the problem to rest one way or another. But we need to address some aspects of the issue now.

Some of the problems can be dealt with on a management level. Management should give more attention to employee needs and fears before computers are brought in. An unhappy, rebellious or physically uncomfortable employee is less productive than one who is satisfied with the working environment. Managers should also encourage better training and more employee involvement in the selection and application of computers. Adjusting the work area to the new needs of employees in an automated environment should be high on employers' priority lists.

Technology itself will help users as interfaces become more sophisticated and screen usage decreases. Voice interfaces may become a normal means of machine communication, thus eliminating many present-day ergonomic problems. Until that time, however, the emotional issues and questions of health and safety of CRT terminals need our attention.

LETTERS

WHERE'S OA?

Yes, I like *Computerworld OA* very much!

My division is currently engaged in a companywide implementation plan for office automation, and your publication provides valuable information to aid in this process.

In the past, I particularly looked forward to each week to the "Office Automation" section of *Computerworld*.

However, although CW OA is an excellent resource, its sporadic publication [six times yearly] would serve your readers best, as it has in the past, if it were an addendum to weekly OA news in CW.

Why, when the integration of data processing and office automation is becoming so critically important, have the editors of CW chosen to eliminate weekly coverage? I hope that either the weekly section will be reinstated or that your publisher will offer a weekly OA publication.

Lorraine A. Drake
Amalgamated Life Insurance Co.
New York, N.Y.

OA HIRING

I have just read "Hiring the Right People" [*Computerworld OA*, Feb. 15], which deals with the problem of finding the right people for office systems positions.

I very much agree with the comments of those quoted regarding the qualifications. However, although the thought of the article very much reflects the needs of the marketplace, it is not indicative of hiring practices on a wide basis.

I have first-hand knowledge of this because the ideal person, as described in the article, could have been me.

I have been seeking a new position for some time now and have found that the great majority of office automation positions do not go to those who possess the attributes mentioned. Instead, specifications for these include large mainframe experience, programming languages, systems development and perhaps data base experience.

After reading the article, I am wondering if I am looking in the wrong places. If that is the case, where might the "right place" be?

James F. Chiodo
Buffalo, N.Y.

TREASURE TROVE

The project team leader of our integrated office study, an outside consultant, was kind enough to give me a copy of your Feb. 15, 1984 issue. I found the magazine to be a treasure trove of information, much of which couldn't be more timely.

I would find it very interesting, however, to hear how you can possibly justify a $71 difference between domestic and Canadian subscription rates for your weekly publication, *Computerworld*.

Jane L. Goto
British Columbia Place
Vancouver, B.C., Canada

STANLEY

Do You Like OA?

If so, write and tell us. If not, tell us about that, too. Send comments to The Editor, *Computerworld OA*, Box 880, 375 Cochituate Road, Framingham, Mass. 01701.

You can also subscribe to OA for $12 a year by calling CW Circulation, 800-343-6474. CW subscribers will continue to receive issues as part of their subscriptions.

ADR® WARE™

ADR®/eMAIL™

The only electronic mail system that's so easy to use everyone can use it, from mail clerk to CEO.

We've taken state of the art to a new state: Easy and Available.
Before you make a software decision, call ADR (201) 874-9000.
Or fill out and mail in the coupon.

☐ Please send me more information about ADR WARE.
☐ Please send me information about ADR seminars.

APPLIED DATA RESEARCH INC.
Route 206 & Orchard Road, CN-8, Princeton, NJ 08540

Name_____
Position_____
Company_____
Address_____
City_____ State_____ Zip_____
Phone Number_____
Computer Equipment_____

ADR® WARE™
From idea to application, we get you there faster.

HERO BREAKS DOWN OFFICE WALLS.

MDS HERO TRANSFORMS ISOLATED WORKSTATIONS INTO NETWORKSTATIONS.

The personal computer is not all pluses. This modern miracle of speed and precision has created a kind of cubbyhole mentality. Isolated, self-protective pockets of valuable information, inaccessible to other computers or the rest of the organization.

How will your company move forward when its best thinking can't even move from office to office? Your company needs HEROS.

IN THE OFFICE, HERO UNITES AND CONQUERS.

HERO™ is the intelligent, desktop Networked Personal Computer from MDS. It does everything an ordinary personal computer can do. And lots that it can't. HERO can form interactive alliances with mainframes, trade information with other computers, make peace between departments and convert diversified knowledge into decision-making power.

HEROS LOOK GREAT IN BLUE.

HERO and IBM. Together, they're unbeatable. Mated with MDS SUPER 21™ Communications Processor, HERO slips comfortably into IBM SNA networks. It looks like Big Blue's 3270 SNA and 3776 remote-job-entry systems. And our MDS SUPER SNA™ option gets both on one communications link. Additionally, HERO runs MS-DOS software, as well as a fast-growing library of MDS software programs.

HEROS PLAY "SHOW AND TELL," NOT "HIDE AND SEEK."

HERO and SUPER 21 give you the power to liberate data from personal, departmental and corporate databases that used to play hard-to-get.

With INTELLIGENT 3270™ (an intelligence only MDS offers), your people can write their own programs and integrate them with data in the mainframe. HERO lets you access the database, extract information, process it, display it, update it and utilize it. Then return it or store it right at the workstation.

MDS HERO WILL MAKE A HERO OUT OF YOU.

With HERO and SUPER 21, what's been out of control will soon be under control. Yours. And your current investments in data processing will pay off even more handsomely. Instead of your system not working, it will be networking. Efficiently, effectively and economically.

Not just in the office, but throughout your entire organization.

Furthermore, MDS systems are planned for non-obsolescence. They're modular in design to accommodate future growth. So, like a hero, every MDS system is immortal.

TOGETHER, WE'LL MAKE HEROIC STRIDES.

MDS is a multidivisional, multinational corporation. We've grown by helping our customers to grow. We'd like to do the same for you. Not just in IBM country, but beyond.

Wherever you are, or want to be, we are. MDS offers service and support capability around the world. Around the clock.

Ask our customers about us. And give us a call. Dial **800-MDS-HERO.** Together, there's no barrier we can't break through.

MDS MOHAWK DATA SCIENCES

7 Century Drive, Parsippany, New Jersey 07054. And over 430 locations, worldwide.

MDS is a registered trademark and HERO, SUPER 21, INTELLIGENT 3270 and SUPER SNA are trademarks of Mohawk Data Sciences Corp. MS-DOS is a trademark of Microsoft, Inc.

OA FORUM

HAMMERING IT OUT

By Michael Hammer

"Hammering It Out" will be a regular feature in Computerworld OA *and will attempt to give readers a look at the lighter side of the developing world of OA.*

Mythology and ritual are mankinds's natural responses to forces that we do not understand. For example, primitive man's understanding of the awesome spectacles of volcanoes, earthquakes and the like was modest. He responded with intricate theories of angry gods with intestinal distress. Among the rituals intended to soothe the divine tummies were the sacrifice of maidens and the dismemberment of chickens.

Today, of course, we understand geological phenomena much better, and hardly anyone dismembers chickens any more. However, superstition still reigns in many areas of human endeavor, and the ritual response continues to operate. In particular, office automation is rife with this less-than-rational form of behavior.

I was reminded of this recently when a company asked me to review the corporate office survey it had just completed as part of its OA strategic planning process. (Also sometimes known as activity profiles or time distribution studies.) The company was most proud of this document and of the exhaustive data collection effort that led up to it.

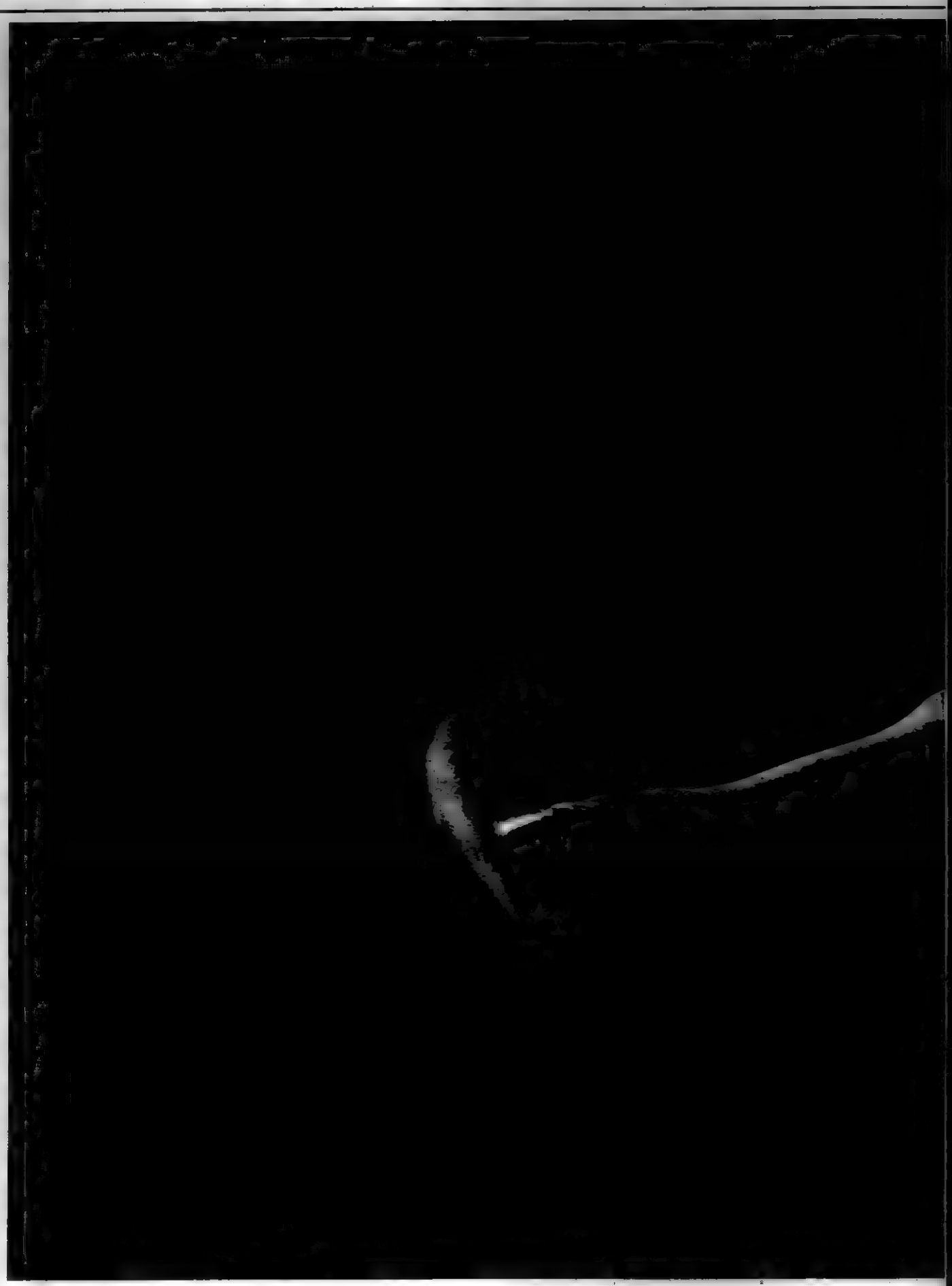
The survey was extremely thorough. It contained detailed analyses of how different classes of office workers spent their time, expressed in terms of a dozen or so activity classes — typing, filing, calculating and so on. They had even broken it down by location and organizational unit and had employed the latest in graphics technology to produce bar charts and other forms of supporting illustration.

The company was so pleased with the product that it would have been in bad taste to ask what the conclusions of the survey actually meant and what the company would do as a result of it. In reality, of course, the results of these surveys are almost entirely devoid of meaning.

If we determine that a typical manager spends 46% of his time in meetings, 22% producing documents, 18% in communication and so on, what have we really learned? Nothing at all. Is 46% too high or too low?

In truth, the office survey as currently practiced is largely an empty ritual, which many organizations perform in response to their confusion about OA. "When in doubt, count," is the order of the day.

Do the statistics tell us why the manager was in a meeting, what it was about and whether or not it was successful? They do not. Let us even suppose that we install an electronic office system that reduces the amount of time spent in meetings. Unless the laws of arithmetic have



OA FORUM

been repealed, the total time distribution must still equal 100%; on what basis do we say the new distribution is better than the old one?

The view of the office on which such surveys are based is obsolete and bankrupt. It is a child's-eye view of the office. When asked what daddy does in his office, my four-year old will describe my day in terms of typing, filing and talking on the phone. Nothing is literally wrong with her answer, but somehow it fails to capture the nuances of my work.

Hammer's Office Survey Form

Name of respondent.....

Percentage of time spent standing up .....

Percentage of time spent sitting down .....

I have recently developed my own abbreviated office survey form, which can be easily administered to any collection of office workers. It has the advantages of both completeness and brevity. Based on an exhaustive analysis of the results of this kind of survey, I have concluded that the typical office worker requires better shoes and chairs. I submit that my analysis is quite as useful as the more popular forms; neither gets at the real substance and content of an individual's work.

In truth, the office survey as currently practiced is largely an empty ritual, which many organizations perform in response to their confusion about OA. "When in doubt, count" is the order of the day. The office survey has all the appurtenances of ritual: an arcane vocabulary, obscure rites conducted with elaborate forms, lofty debates on theological minutiae (the relative efficacies of assorted questionnaires) and a cult of witch doctors blessing the entire enterprise. (These of course are the consulting firms, for whom office surveys are manna from heaven.) Alas, like most such rituals, this one is conducted more for its own sake than as a reasonable means to a worthwhile end. It makes us feel virtuous, efficient and productive, but it leads nowhere.

This is not to say that data collection has no place in the processes of office systems analysis or corporate OA planning. Of course it does. But data is meaningful only after one has an appreciation of an organization's business mission and business activities. Statistics about volumes of office activities need to be interpreted in the context of what an office is really all about. Ritual can never be substituted for insight and understanding.

Meanwhile, rumor has it that the San Andreas fault is about to let go. If you can spare a couple of chickens, let me know. OA

Hammer is president of Hammer and Co., Inc., a Cambridge, Mass., consulting firm that specializes in the strategic implications of new information technologies.

We'll be there

OA FORUM

EDUCATING THE EXECUTIVE

By Judith Wadness

The people in the corner offices need to understand the powers of microcomputers. They realize it; you realize it. Now how do you accomplish this goal?

Executive education is a sensitive and difficult task. It must confront the problem of helping the person in the corner office become knowledgeable about micros without making him look foolish and lose face. Without understanding the uses and benefits of micros, however, executives cannot be expect to approve the purchase of these machines.

The training must therefore be concise, present usable information quickly and also be cost-effective. Throughout the session, the executive will probably be analyzing the costs and benefits of the time spent, determining whether the training is worthwhile or wasteful in terms of executive time, trainer time and machine cost. Executives should leave each training session with an immediate understanding of the benefits to be attained.

Training sessions must be independent. Although we know real learning builds incrementally on previous sessions, executives cannot be depended upon to attend additional sessions. As a result, each session's objective must be clearly defined and the information presented must be independent of other training.

The following techniques have been successful in training executives:

• **One-on-one tutoring:** Many companies use this approach because they think executives expect (and need) individual attention. Given the right tutor for the executive's personality and style, this method can be effective.

Unfortunately, this type of training often turns into a demonstration rather than a hands-on learning experience. As a result, the executive doesn't become proficient or even comfortable with the machine.

• **Independent study packages:** Independent study packages are getting better, but they are limited to a handful of popular software packages or company-specific applications. If these packages are to be part of the training program, executives need only know how to insert the disk and turn on the machine to be able to train at their own pace and convenience.

• **Saturday sessions:** These sessions have proven to be among the most effective methods for training senior executives, who place a different value on their weekend time. The hook here is to invite the executives to bring their children or grandchildren and to gear the presentation to the kids. Introductory material can then be presented without insulting the executives.

The inexpensive games bought especially for the kids are used to get everyone familiar with the keyboard and comfortable with the machine. The executives forget their discomfort and unease when assisting their children. The older children even end up teaching the parents, and the two or four hours become a success for everyone.

• **Use of consultants:** Consultants can be used effectively to overcome superior-subordinate roles that are often obstacles to executive education. The knowledge that an outsider will be doing the training is often enough to encourage the executives and to ensure their attendance at the training sessions. The material can be presented in a nonthreatening manner and each session can be customized to the executive's needs and level.

• **External seminars.** The plethora of seminars geared to executive education is indicative of the widespread use of this approach. Similar to outside consultants, external seminars provide a safe environment for learning. However, they usually require at least a half-day commitment off site, a luxury many executives cannot afford.

The techniques discussed here can also be applied to other areas of executive training, such as the use of decision support systems or the electronic mail system. The important thing is to make sure the benefits are readily apparent to the executive being trained.

OA

Wadness is office automation specialist at Computer Partners, Inc., in Wellesley Hills, Mass.

ADDRESSING TOMORROW TODAY.

Imagine.

A remarkable new ZIP Code system for business mailers. So precise it can actually pinpoint specific streets, specific buildings. Even specific building floors.

That's the ZIP + 4 code.

Now imagine a computerized sorting system so advanced that it automatically reads the last line of the address off your envelope. Reducing sorting time while increasing sorting efficiency.

That's the Optical Character Reader (OCR).

EFFICIENCY.

Perhaps most amazing is the fact that both the ZIP + 4 program and our OCR's are already in place. Ready to bring technological efficiency to the mountainous task of moving 100 billion pieces of business mail per year.

But to deliver the future, we need your help.

Begin by being sure that the entire address on all your business mail is totally visible, legible and located properly. Your local post office can give you all the information you need.

ECONOMY.

Use of ZIP + 4 codes is voluntary. But by adopting them, you'll be rewarded in the form of more stable postal rates. In fact, when you meet the eligibility requirements, you can start saving postage right away.

If you're a First-Class mailer of 500 pieces or more who already presorts, you can save a half-cent per piece when you use ZIP + 4 codes. And that's on top of the three-cent discount for presorting.

If you're a First-Class mailer who doesn't presort but mails 250 pieces at a time, you can save nine-tenths of a cent per letter.

And no matter how many, or how few, pieces you mail, using ZIP + 4 codes can give you a cleaner, more efficient mailing list. Plus more consistent delivery.

COOPERATION.

Let us show you how you can put more zip in your mail service. Contact your local Postmaster or Customer Service Representative. And send yourself into the future.

© USPS 1989

COMPUTERWORLD READER QUIZ

YES	NO	
☐	☐	1. Is *Computerworld* on your desk every Monday morning?
☐	☐	2. Do you receive *Computerworld On Communications* and *Computerworld Office Automation* every other month?
☐	☐	3. Do you know about the latest job position announcements? (when you've still got time to send your resume)
☐	☐	4. Can you rely on *Computerworld Buyer's Guides** for product information? . . .
☐	☐	5. Do you know the very latest news in the computer field?

If you've answered **NO** to any of the above, you're probably reading someone else's issue of *Computerworld*. Don't you need your own? When you're a subscriber, we'll guarantee that *Computerworld* is on your desk every Monday morning. And, what's more, as part of your subscription, you'll receive all of our special-focus publications.

Now's your chance to say YES! Subscribe today for a full year of Computerworld at our special introductory rate of $39 (save $5 off the $44 annual subscription rate).

Complete Form On Reverse, Then Return In Attached Postage-Paid Envelope. Or Use Your Charge Card and Call TOLL-FREE: 1-800-343-5730.

☐ **Please enter my subscription (details on back)**

☐ **I'm already a subscriber, but I'd like you to change my:**

☐ address ☐ title
☐ industry ☐ other

My current mailing label is attached and I've filled in new information on the other side.

Put old label or label information here

COMPUTERWORLD

*U.S. Only

CW-138

Please send me COMPUTERWORLD for one year. RATES: United States ~~$44~~; Canada, Central & South America $110; Europe $165; All Other Countries $245 (Airmail Service)

Special Introductory Offer— Only $39.00 Save $5.00

☐ Check Enclosed
☐ Am Ex ☐ BA/Visa ☐ MC (MC Only - List four digits above your name)

If charge we must have cardholder's signature: _____ Expiration Date: _____

First Initial		Middle Initial		Surname	
Your Title					
Company Name					
Address					
City			State	Zip Code	

Address shown is:
☐ Business
☐ Home

☐ Check here if you do not wish to receive promotional mail from *Computerworld*.

☐ Check here if you're interested in receiving information on *Computerworld*'s Index.

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY
CIRCULATION DEPT. 375 Cochituate Road, Rte. 30, Box 897,
Framingham, MA 01701-9985

Detach here, moisten and seal envelope securely before mailing.

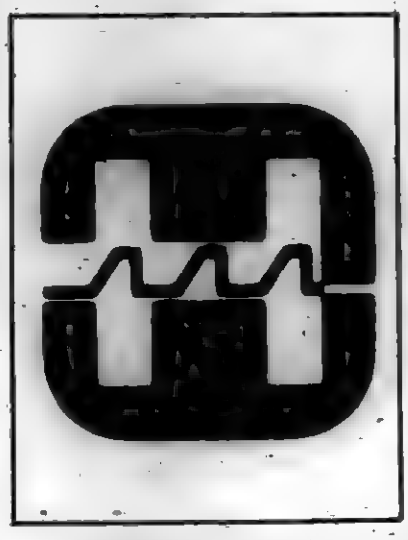
1. BUSINESS/INDUSTRY (Circle One)
End Users
10 Manufacturer (other than computer)
20 Finance/Insurance/Real Estate
30 Medicine/Law/Education
40 Wholesale/Retail Trade
50 Business Service (except DP)
60 Government—State/Federal/Local
65 Public Utility/Communication Systems/ Transportation
70 Mining/Construction/Petroleum/Refining
75 Other User _____
Vendors
80 Manufacturer of Computers, Computer-related Systems or Peripherals
85 Computer Service Bureau/Software/Planning/ Consulting
90 Computer/Peripheral Dealer/Distributor/Retailer
95 Other Vendor _____

2. OCCUPATION/FUNCTION (Circle One)
11 President/Owner/Partner/General Manager
12 VP/Assistant VP
13 Treasurer/Controller/Financial Officer
21 Director/Manager/Supervisor DP/MIS Services
22 Director/Manager of Operations/Planning/ Administrative Services
23 Systems Manager/Systems Analyst
31 Manager/Supervisor Programming
32 Programmer/Methods Analyst
35 OA/WP Director/Manager/Supervisor
38 Data Comm Network/Systems Mgmt
41 Engr/Scientific/R&D/Tech Mgmt
51 Mfg Sales Reps/Sales/Marketing Mgmt
60 Consulting Mgmt
70 Medical/Legal/Accounting Mgmt
80 Educator/Journalist/Librarian/Student
90 Other _____

3. COMPUTER INVOLVEMENT (Circle all that apply)
Types of equipment with which you are personally involved either as user, vendor or consultant
A. Mainframes/Superminis
B. Minicomputers/Small Business Computers
C. Microcomputers/Desktops
D. Communications Systems
E. Office Automation Systems

CW-138

NEWS



Which Way Did They Go?

MELBOURNE, Fla. — Harris Corp. recently found itself in a dilemma. Still in the final stages of development on its Series 9000 office systems offering, the company late last year acquired Lanier Business Products, Inc., the well-known office products manufacturer. Because Lanier had its own successful word processing product, the One-Step software package, and several new products on the way, Harris had to make a quick decision about what to do with the Series 9000.

Clearly, Harris couldn't bring out a product that would compete with Lanier's, so last month, despite more than three years' work and a reported $60 million in development costs, the Series 9000 was gone. According to Jack C. Davis, senior vice-president of Harris' Information Systems Division, the decision was very logical. "We simply didn't want two systems to work against each other."

In fact, the Series 9000 will not disappear completely. Harris announced plans to integrate the "best" features of the 9000 with Lanier's family of products, including the One-Step, the Lanier Business Processor 1000 and the Lanier Business System 5000.

Of the five pieces that made up the 9000 — the 9000 controller; the CRT; the operating system; the text processing software; and Harrisnet, the local-area network hardware and software — only the CRT and the text processing software were officially killed. Harrisnet, Davis said, would be established as a standard for all Harris/Lanier products.

Davis pointed out that the 9000 controller and operating system will form the nucleus of a new distributed data processing system for Harris. The ergonomic design of the 9000 will also be incorporated into other Harris products.

Although consultants agreed Harris had to make this move, the payoff is not so certain. According to Thomas Billadeau, it is doubtful the 9000 ever got into the beta-test stage; therefore, it would be difficult to determine what the "best" features of the 9000 are. "I've used the system and I wouldn't have any idea," he said.

Billadeau added that depending on Lanier for its entrance into office automation was unlikely to succeed for Harris. Lanier has been in turmoil since before the merger, and many of its key managers have left the company. "Harris is going to have to step in and get involved a lot sooner then they had thought. Any end user who commits to Lanier is just begging for trouble." In addition, he said, Harris has also not enhanced its own credibility, because this is the third time it has promised a system and not delivered.

Davis admitted that Harris wouldn't have made certain strategic moves had it known the merger was coming. He said the essential components of the 9000 are not being scrapped, and it was an "excellent opportunity" for a company to be able to choose between two good products (the 9000 and Lanier's System 5000) to offer its customers.

In This Corner . . .

WELLESLEY, Mass. — When Software Arts, Inc. and Visicorp signed a 1979 agreement to market Visicalc, the future for both companies was rosy. Daniel Bricklin and Robert Frankston, creators of the unique and innovative Visicalc, had founded Software Arts and wanted to be responsible for the development and enhancement of the product. They turned to Daniel Fylstra, president of Personal Software, Inc. to handle the marketing of the product.

Needless to say, Visicalc was at the forefront of the personal computer revolution. To date, it is reportedly the best-selling computer program in history.

Unfortunately, this Horatio Alger tale has taken an unhappy turn. With tough competition like Lotus 1-2-3 honing in on its market, Visicalc sales have dipped dramatically — from a high of nearly 40,000 units per month to just 5,700 per month in December. Now the two companies have locked horns in a law suit in which Visicorp sued Software Arts for $60 million in damages and Software Arts countersued.

Visicorp claimed Software Arts was more than a year late in delivering advanced versions of Visicalc and was spending its time developing another product called TK!Solver. Software Arts, in its countersuit, claimed Visicorp had failed to use its best efforts to maximize sales of Visicalc. Software Arts also asserted that it had terminated the agreement, that it is entitled to the return of all Visicalc trademark rights and that it intends to market Visicalc itself.

Last month, Software Arts began to market a $100 advanced version of Visicalc for the IBM PC. Visicorp also continues to sell the product. As usual, the end user gets to figure out what's going on.

Chapter 11, No. 3

SAN JOSE, Calif. — It might be the early signs of the long-awaited shakeout or just poorly managed companies ending up with the expected results. Whatever the reason, Victor Technologies, Inc. in February joined Osborne Computer Corp. and Computer Devices, Inc. as the third micro maker in six months to file Chapter 11 of the U.S Bankruptcy Code.

It was a long way down for Victor, whose president, Charles Peddle, was hoping to make his company the Number Three computer maker in the world by marketing the Victor 9000 desktop. The 9000 was reportedly a best-seller in Europe, but couldn't crack the market at home.

In filing Chapter 11, Victor claimed an estimated $70 million in unsecured debt. Three other units of Victor also filed Chapter 11 — Victor United, Inc.; the U.S. distribution subsidiary; and Victor Technologies International Sales Corp.

As part of the court-supervised restructuring, Victor terminated 300 employees in the U.S., leaving approximately 570 employees worldwide. Victor reached an agreement with its largest secured creditor, Security Pacific National Bank, under which the bank will finance "near-term manufacturing and distribution needs," a Victor spokeswoman said. Victor reportedly has suits pending from several other creditors.

CRT Controversy Continues . . .

Despite the consensus among vendors that CRT terminals are safe to use, the issue is far from settled. Congress and a number of state legislatures are gearing up for debate on CRT health hazards, while studies continue to emerge from many different venues supporting both sides of the issue.

In February, 9 to 5, the National Association of Working Women, released a study implicating CRT use with widespread health effects such as miscarriages, eyestrain, muscle pain and exhaustion. At the same time, The Koffler Group, a consulting group in Santa Monica, Calif., in its published review of CRT health research concluded that all prior research correlating CRT use and adverse health was either poorly conducted or biased.

While six to eight states are considering CRT legislation, the House Education and Labor Subcommittee on Health and Safety heard testimony in late February from a Syracuse, N.Y., insurance company clerical worker who linked her child's birth defects to CRT use. Her company, she said, "enslaved us to the new machinery and subjected us to health and safety hazards." The 9 to 5 study reported that a voluntary survey of 6,000 CRT operators (871 of whom responded) showed more than half experience eyestrain or muscle strain, and 45% reported pregnancies ending in miscarriage, stillbirth, early death of infant or birth defects.

In response to the report, Karen Nussbaum, executive director of 9 to 5, stepped up a national campaign that calls on concerned parties to take action on CRT health and safety issues.

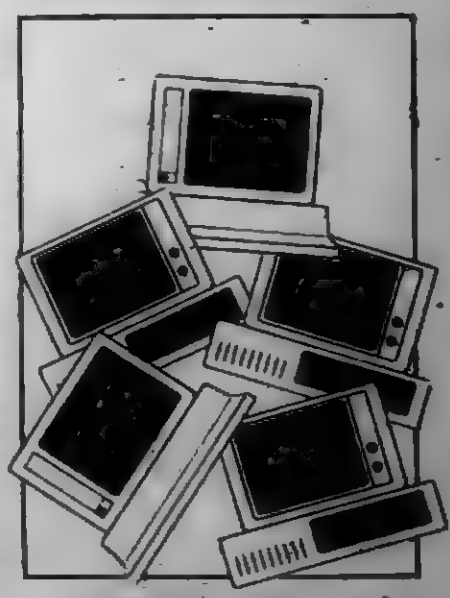
Not everyone agreed with 9 to 5, however. Karen Kessel, editor of the Koffler Group's "Office Systems Ergonomics Report," said any proposed CRT legislation was premature because of the lack of scientific data on the subject. Kessel, referring to much of the negative CRT research, said, "There's a lot of garbage out there." The research Kessel cites as the best in terms of scientific method, concludes that CRTs do not pose a health or safety threat to users.

As solid pieces of research, Kessel referred to a 1981 study by the National Institute for Occupational Safety and Health (Niosh) — which reported no evidence for CRT-caused eye problems — and a 1983 Bell Laboratories report in which no difference was found between the complaints of telephone operators using CRTs and those relying solely on hard copy.

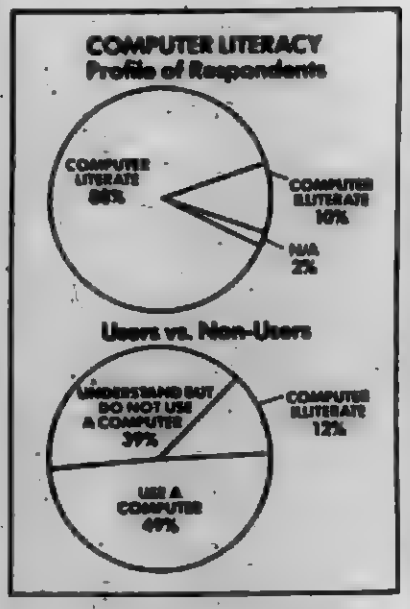
Kessel said publicity about recent reports of CRT health hazards have been unfortunate in that they are diverting attention from "real ergonomic issues." She called for more research on how CRTs are used and better-designed software so that tasks are made less monotonous.

Nussbaum said the most important part of her organization's recent study was finding 15 clusters of abnormally high incidences of health problems. She said that instances such as United Airlines' San Francisco reservation desk are being investigated.

"The problem won't be solved by the industry alone," Nussbaum said, and called for legislation to regulate the uses of CRTs "so that worker safety is protected."



OA NEWS



88% LITERATE

Computer literacy among white-collar office workers is already here and it isn't reserved for the young. According to a study sponsored by Exxon Office Systems Co. (and conducted by the Omni Group, Ltd., a New York consulting firm), 88% of white-collar workers are already computer literate. The study defined computer-literate people as those who either use and understand computers or who have a general understanding of how computers operate and what they can do.

The finding, the report stated, is in sharp contrast to the notion that managers and executives are computer illiterate. Of those polled, 49% use a computer and another 39% have either had "some training or are comfortable with their comprehension of a computer and its applications." The Exxon study also found identical percentages of computer users in the 31-to-40 and 41-to-50 age groups. A majority — 54% — of both groups use computers.

The study said 78% of those who use computers have a daily need for the machine. Among the more widely used OA applications were data base management, word processing, information services, statistical analysis and multiple address mailings.

Perhaps most enlightening was the study's finding that corporate representatives responsible for OA training "significantly underestimated the actual level of computer literacy among office workers and overestimated the degree of fear or other negative factors." The figures showed that representatives thought only 10% of managers knew how to operate a computer when, in fact, 67% of managers said they have this skill. The survey focused on both end users and corporate policy makers. For the end-user survey, 5,000 middle managers were contacted by mail, and 464 reportedly returned questionnaires. The corporate policy survey was conducted by phone with representatives from 100 Fortune 500 service companies. More information is available from Exxon Office Systems, 777 Long Ridge Road, Stamford, Conn. 06902.

PCs And Fortune 1000

CAMBRIDGE, Mass.— The Professional Automation Report from Forrester Research, Inc., a Cambridge, Mass., consulting and research firm, has taken an in-depth look at the IBM PC and its impact on corporate America — specifically, the Fortune 1000 companies. Forrester has concluded that the IBM PC dominates that market already with an estimated 45% of the installed base. By year-end 1986, it predicted, IBM could have well over two million PCs installed in the Fortune 1000.

Fortune 1000 will lead in professional computer networks, integration with existing mainframe/distributed processing equipment and bridging between different workstation types. In addition, the research firm said this community of users will become primary innovators in the use of next-generation software. The five imperatives that will govern professional computer acquisition in Fortune 1000 industries, according to Forrester, are:

- Compatibility with industry-standard software.
- Concordance with embedded systems.
- Ease of use.
- Organizational support: The professional computer must square with the "corporate information culture."
- Ability to fit with long-term strategy.

The Forrester report divided the professional computer market into three groups: IBM; systems challengers/potentials — Digital Equipment Corp., Hewlett-Packard Co., Wang Laboratories and so on; and stand-alone vendors.

According to the report, IBM will have 2.6 million PCs installed in the 1000 companies by 1988, with AT&T Information Services taking second place, DEC third place and Apple Computer, Inc., fourth. For more information contact Forrester Research, P.O. Box 1091, Cambridge, Mass. 02238.

Videotex Deal . . .

NEW YORK — The entry of IBM into a joint videotex venture with CBS and Sears, Roebuck & Co., may bring instant credibility to the videotex market, but not without some drawbacks, according to industry analysts. Although the deal will not produce tangible results for several years, IBM's entry is expected to exert an immediate influence on videotex producers already in the game.

Martin Lane, a consultant for Link Resources Corp. of New York, expects the videotex market to slow to a crawl until it becomes clear what IBM will do. The wait-and-see attitude may have a negative effect on IBM's major competitors, Knight-Ridder Newspapers and AT&T, whose collaborative venture, Viewtron in South Florida, is the only commercial videotex service in the U.S.

The IBM-Sears-CBS venture intends to send data to home computers instead of the dumb video-screen terminal Viewtron employs. IBM is hoping to cash in on its already widespread base of Personal Computers; Viewtron subscribers must buy AT&T's terminal, which costs $600 and can be used only for videotex.

This agreement marks a change in allegiance for CBS, which had hooked up with AT&T two years ago on a similar project. Sears is hoping to market its vast merchandise catalog and financial services products electronically; IBM hopes to use videotex to sell more home computers.

The videotex business projects tend to be a losing proposition initially, according to Lane. IBM, CBS and Sears have the financial capabilities to survive in the market, he said, but the history of joint ventures between corporate heavyweights does not contain many success stories. Whether the three giants, will succeed in the long haul remains to be seen.

BRIEFS

MAYNARD, Mass. — Digital Equipment Corp. and 3M Co. announced a joint program to develop a new worldwide standard for data interchange in the form of a compact half-inch storage tape cartridge.

Compactape is intended to serve as a secondary storage medium for disk drives in the 20M-byte to 200M-byte capacity range.

For more information, contact DEC, 125 Main St., Maynard, Mass. 01754.

SAN JOSE, Calif. — Visicorp, in a move calculated to expand its position in the windowing environment software market, has lowered the price of the Visi On Applications Manager from $495 to $95. The pricing move was made to "bring the performance and productivity gains offered by the Visi On to a broader base of end users," Visicorp said from 2895 Zanker Road, San Jose, Calif.

OMAHA, Neb. — A comprehensive directory of all 22,368 U.S. computer dealers is now available from American Business Directories, Inc. The spiral-bound book fits into a briefcase and is available for $369, from American Business Directories, Inc., 5639 S. 86th Circle, P.O. Box 27347, Omaha, Neb., 68127.

MENLO PARK, Calif. — The personal computer market for business establishments will peak during the next two years and then grow at a far slower rate than previously expected, according to a study by SRI International, Inc.

SRI also estimated that average annual growth from 1986-1990 will be only 5.4% and that by 1986, more than half the personal computer shipments to U.S. businesses will be replacements for older 8-bit and 16-bit gear.

The findings are part of a $400,000 research program on office automation applications done by SRI.

The entire study is available for $24,000 from SRI International, 333 Ravenswood Ave., Menlo Park, Calif., 94025.

TROY, Mich. — The American secretary loves office automation.

That was the finding of a recent survey, "People in the Electronic Office," which looked at the impact of OA on people in the office. The Kelly Services report indicated that 93% of secretaries surveyed are not only satisfied with being secretaries, but are also satisfied with their current positions.

Word processors and other electronic equipment are seen by 87% as opening up new opportunities for advancement.

The report is available at no charge from Kelly Services, 999 W. Big Beaver Road, Troy, Mich. 48084. OA

It Takes All Kinds...

BUT NOT ALL MANAGERS' STYLES ARE EQUALLY EFFECTIVE.

BY ROBERT L. WILLIAMS

Success is measured in many ways in today's world of business. Nevertheless, most office automation managers would agree that having solid support from top management, along with adequate staff and budget to allow the development and execution of aggressive plans, would constitute a strong start. This article examines some attributes that help a manager achieve these ends.

Any discussion of OA implementation typically involves several topics:

Technology, of course, leads the pack and probably always will; other factors like user training, cost-benefit analysis and start-up strategies also often enjoy the spotlight.

However, the issue of assuming the appropriate management style is usually kept relatively obscure — even though it, perhaps more than any other issue, determines the ultimate success in establishing and expanding OA in the organization.

Many OA managers encounter two kinds of delays while implementing their programs. The first is the basic failure of top management to understand and be committed to OA as a means to achieve business objectives. The second involves day-to-day operational

(Continued on Page 13)

THE MUSEUM OF MODERN ART/FILM STILLS ARCHIVE

Roadblocks to OA Implementation

Roadblocks to OA implementation occur in two significant areas: lack of commitment from top management and day-to-day operational difficulties. The manager who can recognize the issues involved in these two areas and who can respond to their challenges will find his job a lot easier.

Three common symptoms identify an inadequate commitment to OA by top management:

☐ No formal charter exists. There are no clear definitions of the goals and responsibilities of the OA resource group or its relationship with the DP and telecommunications functional areas. The latter point is particularly crucial because OA, DP and telecommunications together comprise the backbone of the information network; various degrees of paralysis result when their efforts do not completely complement each other.

☐ OA staffing decisions are inadequate. The assignment of personnel to the OA area is often opportunistic, if not haphazard. This tends to compromise both the size and talent of the OA resource group. As a result, the manager is spread too thin and cannot effectively apply his skills.

☐ Perceptions of cost-benefit are distorted. Many well-conceived OA programs are based upon intangible or soft-dollar savings. (Hard-dollar savings can be identified only when significant amounts are presently being spent on office support systems and services.) If key decision makers are reluctant to move forward without tangible cost-justification, exceptional opportunities may be lost.

The second reason for slow progress, day-to-day operational difficulties, has six distinct challenges associated with it:

- ***Obtaining cooperation from the user community.*** Without the proper input and support from the people being affected by OA, no recommendation has a chance.
- ***Projecting realistic benefits.*** With no standard method available, the most appropriate approach to justification is often unknown.
- ***Selling the concept of OA.*** The acceptance of proposed solutions depends largely on how the message is delivered. This is apparently more difficult for managers who come from a technical rather than a functional background.
- ***Establishing organizationwide policies.*** Due to the divergence of viewpoints and the frequent development of expertise within user groups, many OA managers are frustrated with their track records in setting uniform guidelines for the acquisition and use of OA systems.
- ***Dealing with vendors.*** Many OA managers feel that a great deal of pressure is exerted on them to observe preferences for certain vendors. This obviously is a delicate issue and requires continuous attention. The inability to stay abreast of developments in the rapidly changing marketplace is another source of deep concern.
- ***Dealing with change.*** Perhaps the most common on-going challenge is finding time to monitor and react to continually evolving technology, organization and reporting relationships as well as to changing user needs and expectations. The OA manager must frequently negotiate with new users on everything from revised job descriptions to hardware configurations. OA

WHY MORE BIG SYSTEM IBM® OWNERS ARE KEEPING UP, WITH SORBUS.

After all, like IBM, Sorbus provides on-site field engineers 7 days a week, 24 hours a day; a full preventive maintenance program and genuine IBM parts.

But unlike IBM, Sorbus will service virtually every peripheral in your system, IBM or not. For small equipment such as PCs, Sorbus offers the same high quality service, with turn-around so swift you'll be pleasantly surprised. And, Sorbus Service costs less.

No wonder Sorbus services more IBM systems than any other independent; maintains more than 150,000 machines for over 35,000 clients; has one of the fastest response times in the industry, and carries a parts inventory so large, we usually can fix your equipment right then and there.

So, if your operation includes one or more IBM PC, System/3, 34, 36, 38, 360, 370, 303X, or 4300 series, keep up with Sorbus: rated the #1 independent service company by computer professionals nine years in a row.

CALL COLLECT

215-296-5280 EASTERN REGION
314-532-3817 CENTRAL REGION
415-472-4770 WESTERN REGION

MAI Sorbus Service®

UPTIME IN NO TIME.
SORBUS FIXES COMPUTERS. FAST.

®Sorbus® is a registered trademark of Management Assistance Inc.

(Continued from Page 11)
difficulty (see "Roadblocks to OA," Page 12).

Roles available to the OA manager who seeks to overcome these roadblocks to success generally fall into one of four categories, which are are plotted on the Professional Personality Map shown in Figure 1 on Page 14.

The two dimensions represent motivating needs. The first is the need for control of the environment; the second, the need for interaction with people. Any pair of coordinates on the grid formed by the two axes falls into one of four quadrants, each of which represents a unique professional personality:

- ***The Doer*** has a high need for control of the environment and a low need for interaction with people. This person wants something to happen and wants it to occur according to his plans. However, the Doer is not overly concerned with whether other people are sold on the project.
- ***The Thinker*** has a low need for control of the environment and a low need for interaction with people. This person is satisfied with personal knowledge and preoccupied with designing the ideal system. The fact that no one appreciates the system and that it does not come to life puzzles the Thinker.
- ***The Adviser,*** with a low need for control of the environment and a high need for interaction with people, is rather passive and enjoys being asked for help. This person places great emphasis on how well his work is perceived, but very little emphasis on actual results.
- ***The Promoter*** has a high need for control of the environment and also has a high need for interaction with people. The Promoter actively seeks out new opportunities and is satisfied only when his ideas receive favorable acceptance and are fully implemented. This person devotes great effort to addressing all aspects of a project to ensure its success.

Every OA manager fits into one of the categories of the Professional Personality Map. More specific labels may be used to describe each role in the context of OA. The empiricist is a Doer. He likes the experimental approach, installing pilot project after pilot project and slowly growing a sophisticated and well-tested automation capability for the organization. The result is a slow but steady growth in the use of OA.

The technologist is a Thinker, concerned with OA hardware and software and the combination that will produce the ideal system. This quest typically ignores specific needs and desires of users.

The technologist is a Thinker. This person is concerned with OA hardware and software and the combination that will produce the ideal system. This quest typically ignores specific needs and desires of prospective users. The result is certain frustration, disappointment and resentment.

The consultant is an Adviser. Line managers are served only when they request assistance. The analysis is usually on tar-

Polaroid cuts the glare and cuts the price!

Introducing new Polaroid CP-50 Filters.
Some video-display filters improve contrast. Others reduce glare. The new Polaroid CP-50 does both. For under $50.

The CP-50 is a durable, lightweight, circular-polarizing filter that virtually eliminates glare. And is far more effective than non-polarizing filters for improving contrast.

The glaring problem.
Bright light from windows or overhead lamps reflects off your computer screen. So you squint, strain and shuffle in your seat to read the data.

Your eyes must constantly refocus between the reflections and the data. The result? Sore eyes, dizziness and headaches. You slow down. And you're not as productive as you could be.

The low-cost solution.
One way to cut glare is to change the lights, drapes and office furniture. But that's expensive. What's more, it does little to improve contrast. And most other filters simply reduce glare without really improving contrast.

Polaroid's CP-50 reduces glare and improves contrast. For less than $50.

There's a CP-50 for your color or monochrome display.
Polaroid CP-50 Filters come in sizes to fit most video displays. And you can mount the filter yourself in a couple of minutes. There are no holes to drill, no tools required.

*Suggested retail price.

Polaroid

Polaroid CP-50 Filters. The low-cost answer to a glaring problem.

For more information about Polaroid CP-50 Filters, and a list of dealers, mail to:
Polaroid Corporation
Polarizer Division
One Upland Road
Norwood, Massachusetts 02062
Or call toll-free in the continental U.S. 800-225-2770. In Massachusetts, call collect 617-762-1990.

Name _____
Title _____
Company _____
Address _____
City _____ State ____ Zip ____
Telephone _____
Computer/Word Processor Make and Model No. _____

"Polaroid" 1984 Polaroid Corporation

COA 4/11/84

get, but serious inconsistencies develop during the installation process. The result is slow progress toward automation and difficulty in getting departments to become standardized.

The entrepreneur is a Promoter. This person takes a marketing approach to the problem of spreading OA throughout the organization. He concentrates on actual user requirements while also focusing on the applications that promise the best return to the organization. The result is rapid movement and the maximum possible results from the resources allocated to OA.

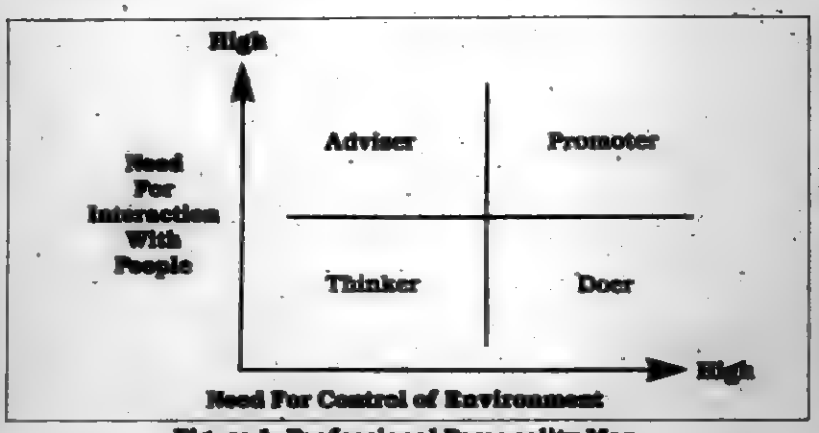


Figure 1. Professional Personality Map

The role of entrepreneur best positions the OA manager to remove those obstacles to success (described in "Roadblocks to OA Implementation" on Page 12) by recognizing the importance of people and their needs, as well as the organization's requirement for optimal cost-performance.

An entrepreneurial OA manager style has some key advantages.

First, it sells the concept of OA. Many people are still resistant to automation and have difficulty understanding how it can help them. The entrepreneurial OA manager puts substantial energy into educating top management and potential users, identifying underlying concerns and meeting objections with persuasive arguments and favorable facts.

Second, it facilitates organizationwide standards. The entrepreneurial OA manager takes an active role in promoting systems. This provides an excellent opportunity for large-scale planning and for installing compatible systems and procedures wherever automation goes.

The third key advantage of the entrepreneurial style is that it fosters innovative, results-oriented attitudes. An entrepreneurial OA manager will push his program forward at a good speed while keeping everything aligned with underlying business purposes.

Most OA managers would like to have top management's solid support and an adequate staff and budget to allow the development and execution of aggressive plans. The OA manager who wants to achieve that enviable position should demonstrate that the following descriptive statements apply to him:

- Able to handle conflict.
- Not afraid to make decisions.
- Cannot wait for the perfect solution.
- Sensitive to the human factor.
- Accepts limitations.
- Surfaces needs and develops practical transition strategies to meet them.
- Solves business problems.
- Develops trust and confidence.
- Stresses teamwork.
- Understands the change process.
- Attracts and retains competent staff.
- Knows when not to get involved.
- Expands knowledge of technology through effective delegation and vendor relationships.

Each of these attributes is associated with the entrepreneurial style. Given the typical roadblocks to success, they underscore the need to let that style pervade every aspect of the job. When this is done, the OA manager can feel sure he is contributing as much as possible to improve information management, enhance productivity and contain office support costs within the organization. OA

Williams is a manager in the Philadelphia office of Arthur Andersen & Co. and a member of the firm's core group of OA consultants.

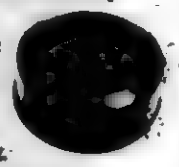
There's nothing special about this file.

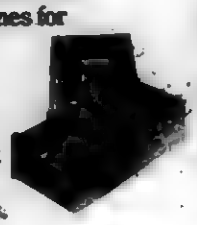
"The Anything File."

Why invest in a special file for card trays? And another for disk cartridges? And still another one for Mag tapes?

If your company is like most, the practical answer for you is Supreme's "Anything File"... Conserv-a-media.™ An ingeniously designed 36" cabinet for multi-media storage and retrieval, Conserv-a-media (The "Anything File") comes in heights of 59", 72" and 85" with adjustable interior components for total versatility.

In these handsome, quality-constructed easy-access units you can have your choice of almost any storage configuration. With hanger bars for tape-seal belts. With wire racks for disk cartridges. With roll-out shelves for disk packs or card trays. With roll-out shelves and rail dividers for cassettes and microforms. With stationary shelves for binders and manuals. With hanger bars for center hook filing of EDP printouts. With hanging frames for drop filing of all legal/letter size material. With pullout work surface shelves. And more.





It's the inventiveness you expect from the people who invented lateral filing in the first place.

Conserv-a-media by Supreme. What's special about it is that it's the best non-special file you can buy.

For full details and the name of a dealer near you, contact Advertising Department CW 4, Supreme Equipment & Systems Corp. 170 53rd St., Brooklyn, NY 11232. 212-492-7777.

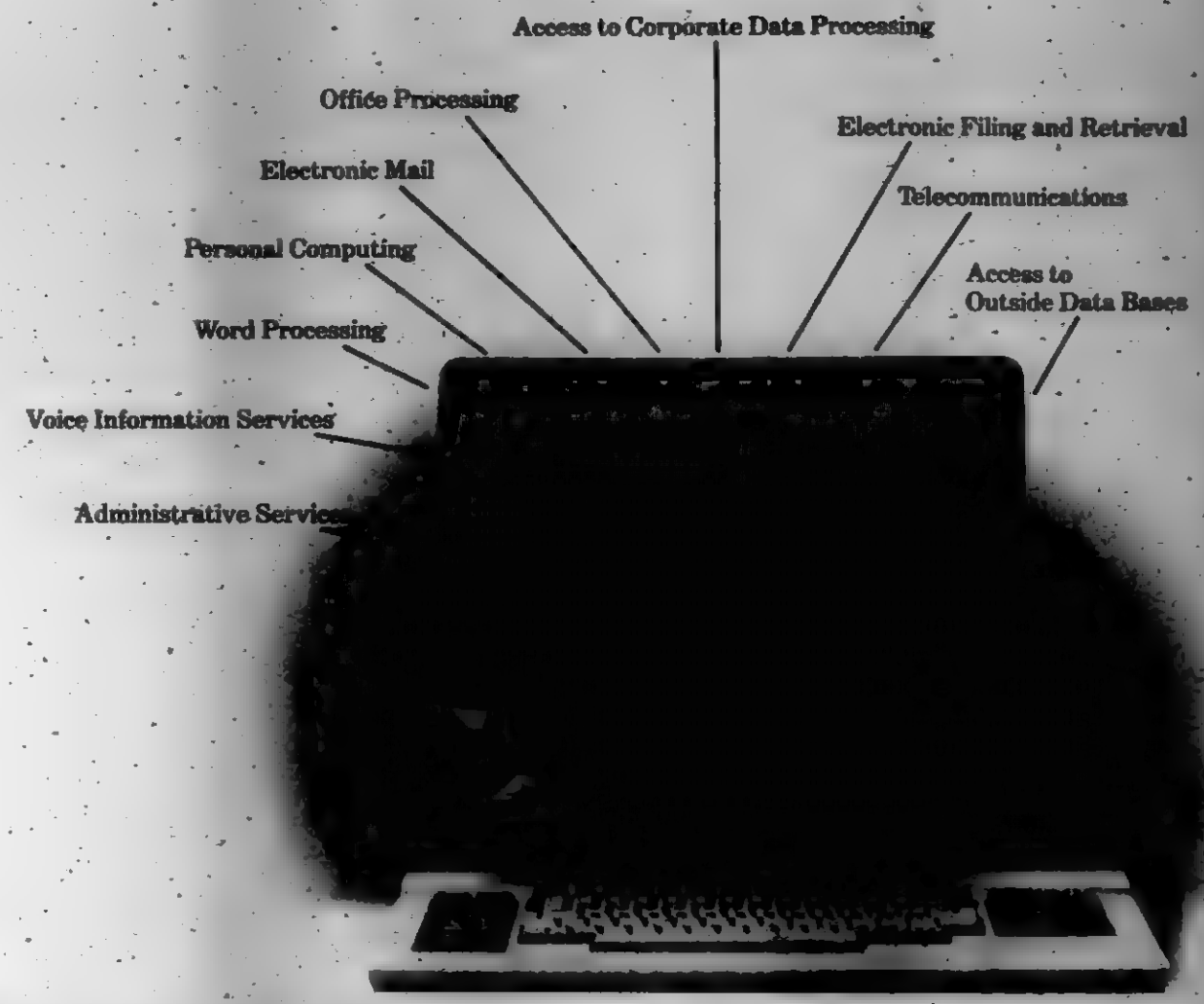
Supreme Equipment & Systems Corporation

Innovation is what makes Supreme supreme.

© 1984 SUPREME EQUIPMENT & SYSTEMS CORP.

SPERRYLINK™

OFFICE SYSTEM



Just about the only thing it won't do is brew your morning coffee.

SPERRYLINK. The one piece of equipment that can handle all your office automation needs.

It ties into the central computer for mainframe information and mainframe support.

It's a data processor when you need to handle data, a word processor when you need to handle words.

It's a personal computer for filing, retrieving, keeping your calendar, your time schedule, your memo board.

And it's a telecommunications terminal with electronic mail and digitized voice capabilities—your link to the outside world.

This is the SPERRYLINK System. A system beyond conventional ideas of office automation. Beyond words and numbers, voice and image.

It's the one system that finally brings it all together.

For more information call 800-547-8362, toll-free. Or write us. Sperry Corporation, Computer Systems, Department 100, P.O. Box 500, Blue Bell, PA 19424.

SPERRY

We understand how important it is to listen.

Windows Come To The Workstation

By Molly Upton

A mad rush toward modeless, multipurpose software for personal computers is now under way. When the dust settles, the real winners will be users who don't want to switch floppies constantly or dicker with operating system commands and different structures for different applications.

In the meantime, those making major buying decisions about software packages face a difficult process. A look at specific features follows; first, let's look at some global level trends — including windows and integrated packages. Everyone aspiring to be anyone in the packaged software business is touting an integrated system. "Integrated software" means a lot of things to a lot of people, but three hierarchical levels seem to stand out. In general, each level contains the characteristics of the previous levels:

- Data integration — data from one application can be transferred to another application.
- Command structure — the majority of the commands are constant throughout the range of applications.
- Modeless (or seamless) — functions previously done under different applications can be performed in one application. Integration of data and command structure are achieved as well. A central data base, from which all applications are structured, is generally required.

Environment software, which is divided into two types, provides hooks between the operating system below it and the applications software above it. The first type — Visi On, for example — requires new software to be written to its specifications; the second type — Quarterdeck's Desq falls into this category — accommodates existing software.

Multitasking or concurrency is one important trend which, although not yet pervasive, probably soon will be as the demand for background communications increases. Another strong trend is toward hot switches, as they are sometimes called, which make it easy for the user to suspend operations in one task, implement another and return to where he left off. Quarterdeck's Desq, Digital Research's Concurrent CP/M and Structured Systems Group's Windowmaster seem to be the principal providers of multitasking environments.

One word of caution must be raised about concurrent systems: Some of them seem to have a difficult time handling communications as an uninterrupted background task. Ouch!

Digital Research has indicated it will announce a product that lets MS-DOS run on top of Concurrent CP/M. Whoever thought the battle of the operating systems was over?

Open systems is really quite a

loose term. According to one meaning, it is an integrated package that accepts other packages' files (also known as import/export capability) via such means as the DIF format.

DIF is a file format standard, developed by Software Arts, to enable the transfer of data. All DIF files have two basic parts, one of which contains information about the file, the other the data itself.

In another meaning of open systems, the vendor of the environment — Visicorp, for example — makes available its specifications to other vendors to write programs that use the same user interface and also integrate data.

Artificial intelligence work being done in the Lisp language can be expected to be applied to mundane applications. The user will simply see easier to use applications that appear to function more or less the way he thinks they should.

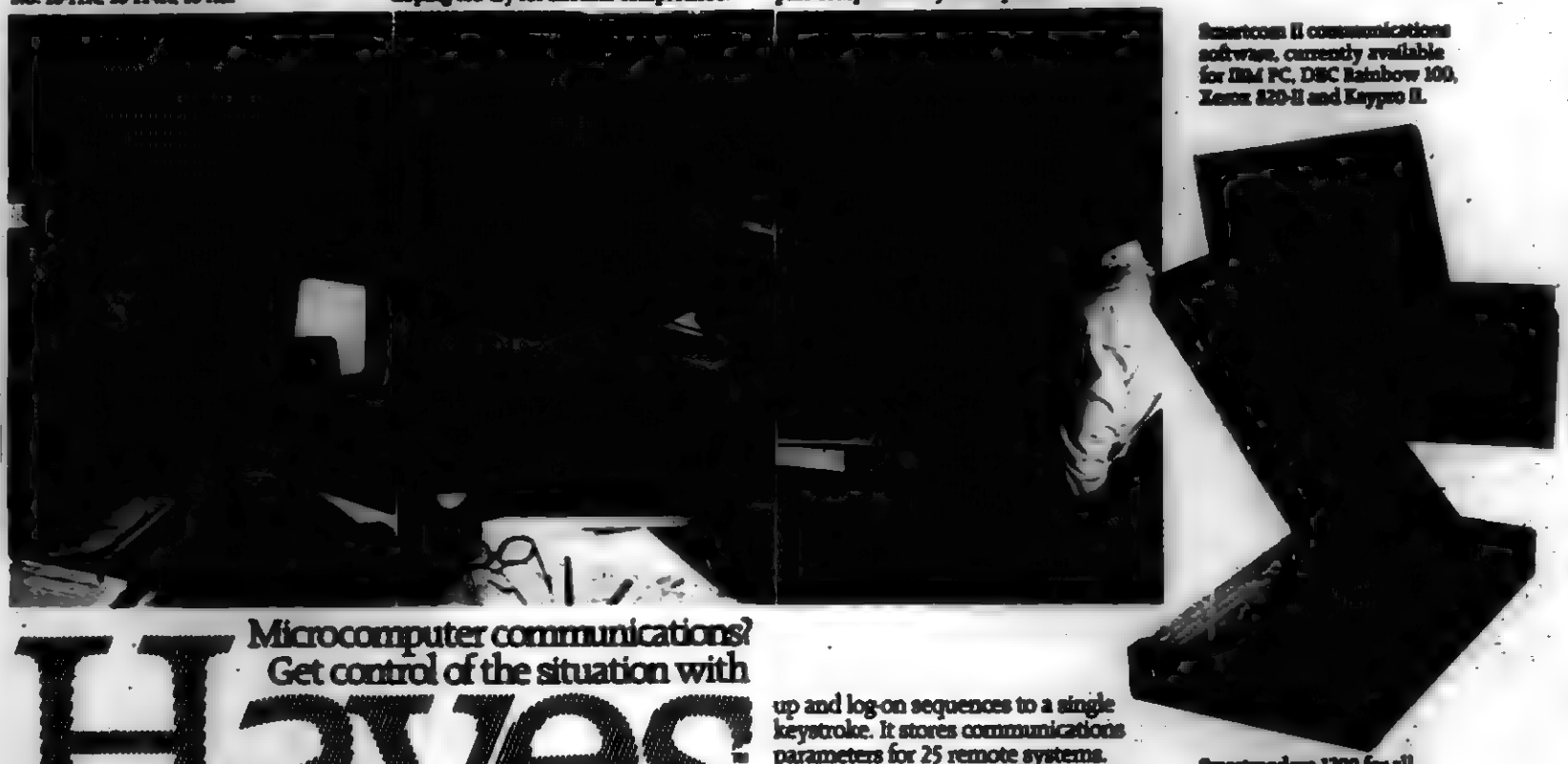
Intuitive systems are also creating a lot of discussion. Artificial intelligence work being done in the Lisp language can be expected to be applied to mundane applications. The user will simply see easier to use applications that appear to function more or less the way he thinks they should.

Goal seeking or the how-to-get (as well as what-if) spreadsheet is a feature being implemented.

To all reps: Price changes on following items effective immediately: No. 10-11A, 10-114A, 10-AL.

Chris: The latest offer looks better, although it's still not what we were hoping for. Try for another compromise.

Just got the word from Gary. Increased our share by 6%. If trend holds, we'll pass competition by third quarter!



Smartcom II communications software, currently available for IBM PC, DEC Rainbow 100, Xerox 820-II and Kaypro II.

Smartmodem 1200 for all computers with an RS-232C interface. Smartmodem 1200B plug-in board for the IBM PC.

Microcomputer communications? Get control of the situation with Hayes™

Microcomputer communications can present the DP/MIS staff with a tangle of mis-matched hardware, user-hostile software, and a situation that can quickly get out of hand.

Hayes can help you avert that chaos, with a telecomputing system designed expressly for microcomputers.

A system so advanced, it's downright simple. Economical. And requires no handholding from you.

Hayes. The computer's telephone. Our Smartmodem 300™ and Smartmodem 1200™ connect to any desktop computer with an RS-232C port. They operate with rotary dial, Touch-Tone® and key-set telephone systems. At full or half duplex. And both feature self-test capabilities, as well as indicator lights and built-in speakers for monitoring calls.

The lower-priced Smartmodem 300 is ideal for local data swaps and communicates at 300 bps. A built-in speed selector on Smartmodem 1200 automatically detects transmission speeds (110, 300 or 1200 bps).

Smartmodem 1200B™ is also available as a plug-in board for IBM® Personal Computers. And Hayes manufactures the Micromodem IIe® for Apple® II, III, IIe and Apple Plus computers, as well. It comes packaged with Smartcom I™ communications software.

Speaking of software, more programs are written for Hayes modems than for any other. And that impressive list includes our own incomparable communications software.

Smartcom II.™ Complete, menu-driven software for the IBM PC, DEC Rainbow 100,™ Xerox 820-II™ and Kaypro II.™ Even first-time communicators will find success with Smartcom II. Screen prompts guide users in the simple steps it takes to create, send, receive, list, edit, name and re-name files.

Tasks like simultaneously receiving, printing and storing data—completely unattended—are easily managed with Smartcom II, because it takes full advantage of Smartmodem's capabilities.

The program reduces lengthy dial-up and log-on sequences to a single keystroke. It stores communications parameters for 25 remote systems.

Plus, there's an on-line help feature that explains prompts, messages and parameters.

Our reputation speaks for itself. Hayes has five years of solid leadership in the microcomputer industry. Nationwide availability through retail computer stores. Trouble-free factory service and call-in assistance. A limited two-year warranty on all hardware. And the most efficient telecomputing system available. Anywhere.

If you're involved in linking micros or setting standards for configurations, remember this. Everything your people need to know about communications can be summed up in one word: Hayes.

Hayes®

Hayes Microcomputer Products, Inc., 5923 Peachtree Industrial Blvd., Norcross, GA 30092. 404/441-1617.

Smartmodem Specifications
Low Speed Data Formats (Smartmodem 1200 and Smartmodem 300) Serial, binary, asynchronous: 7 or 8 data bits; 1 or 2 stop bits; odd, even or no parity (0-300 bps).
High Speed Data Formats (Smartmodem 1200) Serial, binary, asynchronous: 7 data bits; 1 or 2 stop bits; odd, even, or fixed parity or 8 data bits; 1 or 2 stop bits; no parity (1200 bps).
Dialing Capability: Touch-Tone® and rotary-dial pulse dialing.
Command Buffer: 40 characters.
Commands (unnecessary with Smartcom II software): A: Immediate answer. A/: Repeat last command. C: Transmitter Carrier. D: Dial command, including simple dialing, waiting for second dial tone, auto-dialing and other features. E: Local echo. F: Full/half duplex. H: Switch hook. M: Audio monitor. O: On-Line. P: Pulse dialing. Q: Quiet mode. R: Reverse originate/answer mode. S: 17 "Set" commands speed, escape code character, number of rings to answer on, etc. Z: Clear operational parameters above. T: Touch-Tone dialing. V: Verbal result codes.
Result Codes: (can be suppressed with Q) OK; Command line ok. 1/Connect: Carrier detected. 2/Ring: Phone is ringing. 3/No Carrier: Carrier lost or never heard. 4/Error: Error in command line. 5/Connect 1200: Carrier detected at 1200 bps. (Smartmodem 1200 only.)
Audio Monitor: Two-inch speaker with volume control.
Rear Panel: On-off switch, power jack, RS-232C connector, modular phone jack connector, volume control.
Operation: Full or half duplex.
Data Rates: 0-300 bps and 1200 bps for Smartmodem 1200; 0-300 bps for Smartmodem 300.
Interface: RS-232C.
Intelligence: Z-80™ microprocessor with 4K byte control program for Smartmodem 1200; Z8 microprocessor with 2K byte control program for Smartmodem 300.
Telephone Capability: Bell System 103 or 212A compatible originate or answer mode for Smartmodem 1200; Bell System 103 compatible originate or answer mode for Smartmodem 300.
Receive Sensitivity: -9dBm for Smartmodem 1200; -6dBm for Smartmodem 300.
Transmit Level: -10dBm.
Registration: FCC registered for direct connect to the nationwide phone system. Connects with modular jacks RJ11W, RJ12C, RJ21W, RJ22C.
Power Needs: 11.5 Vdc @ 1.5 Amp. 117 Vac, 60Hz, 15.5 Vac output.
Size: 1.5" x 5.5" x 9.0"

Microcomputer Products, Inc. Smartmodem 300, Smartmodem 1200, Smartcom I and Smartcom II are trademarks of Hayes Microcomputer Products, Inc.
Touch-Tone is a registered service mark of American Telephone and Telegraph.
IBM is a registered trademark of International Business Machines Corp.
Apple is a registered trademark of Apple Computer, Inc.
DEC Rainbow 100 is a trademark of Digital Equipment Corporation.
Xerox 820-II is a trademark of Xerox Corporation.
Kaypro II is a trademark of Non-Linear Systems.
Z8 is a trademark of Zilog, Inc.
©1983 Hayes Microcomputer Products, Inc.

ARE YOU EXPECTING MIRACLES FROM YOUR COMPUTER?

Computers have solved a lot of problems around the office.

But because of their usefulness, sometimes it's easy to expect more from computers than they can possibly deliver.

For example, computers are good for storing data. But they can't store the documents you must keep for evidentiary purposes. And they can't make your old paper files more efficient.

But computers along with micrographics can. Micrographics is 3M's concept of file management that uses microfilm instead of paper to store and retrieve your important documents.

With one of our computer-assisted retrieval systems, for example, you can dramatically improve file retrieval time and virtually eliminate the problem of lost files. All in less space than you now devote to record storage.

The result is a system that not only improves the efficiency of workers, but saves your company time, space and money.

Find out how micrographics can fit into your office automation plans and give you more control of your files. Call 1-800-328-1684 (1-800-792-1072 in Minnesota or 1-800-268-9055, Operator 13 in Canada) or return the coupon for our free booklet. Because good as they are, computers can't do it alone.

GET CONTROL. GET FILE MANAGEMENT.
Part of the 3M Orchestrated Office.

Name_____

Company_____

Title_____

Phone_____

Address_____

City_____

State_____ Zip_____

For a free booklet send to G. Collins, File Management Systems, Office Systems Division/3M, 3M Center, Building 216-5N, St. Paul, MN 55144

CWA28

3M hears you...

3M

WINDOWS

Windowing is an extension of the operating system. With windowing, levels of capabilities differ according to vendor. Windowing may occur within an application, such as word processing, or among different applications. It may be single tasking, with one application actually running, or multitasking, with more than one application functioning simultaneously.

Some packages, like Microsoft Corp.'s Windows, offer the windowing capability alone; others, like Quarterdeck Software's DesqView, use windowing as a vehicle for other capabilities — in this case, data integration.

Windowing packages can be categorized according to two types of windows. In either case, the user selects the size of the window and calls up another application. Microsoft's Windows uses tiling, the approach used by Xerox Parc's Bravo editor. The software keeps the user's screen neat. In the second approach, windows overlap, as in Xerox Corp.'s Star, Visicorp's Visi On and Apple Computer, Inc.'s Macintosh.

In light of the trend toward modeless software, windowing is neither the last word nor a required facility for all software. However, it will always be necessary to look at two sources of text simultaneously, especially within an application such as WP, and this is best done with windows. Windows will be needed in systems that switch easily between local and remote programs.

Windows may not be necessary in the many cases where the sole function of windows is to help a user transfer data from one application to another in order to perform a different function — for example, spreadsheet data into a graph, or a graph into WP. With a modeless package, a user can start out in WP, do some spreadsheet work in the document and graph it without leaving the original document.

In an attempt to describe differences between his firm's environment software and other vendors' (read Microsoft) windowing managers, Dan Fylstra, Visicorp's chairman, maintained the following: Windows in and of themselves are not a panacea. They are a good vehicle for building better applications, but have little virtue in and of themselves. They do not automatically solve integration problems or make an application easier to use, he said.

Nevertheless, a number of windowing packages were announced recently and the rumor mill reports that IBM is expected to announce its own window manager shortly. If true, that could explain why Microsoft failed to sign up IBM as an OEM for its window manager. Such an IBM package is expected to be the advance guard of a move to make PC-DOS more proprietary — just when lots of vendors thought there was a market for MS-DOS hardware.

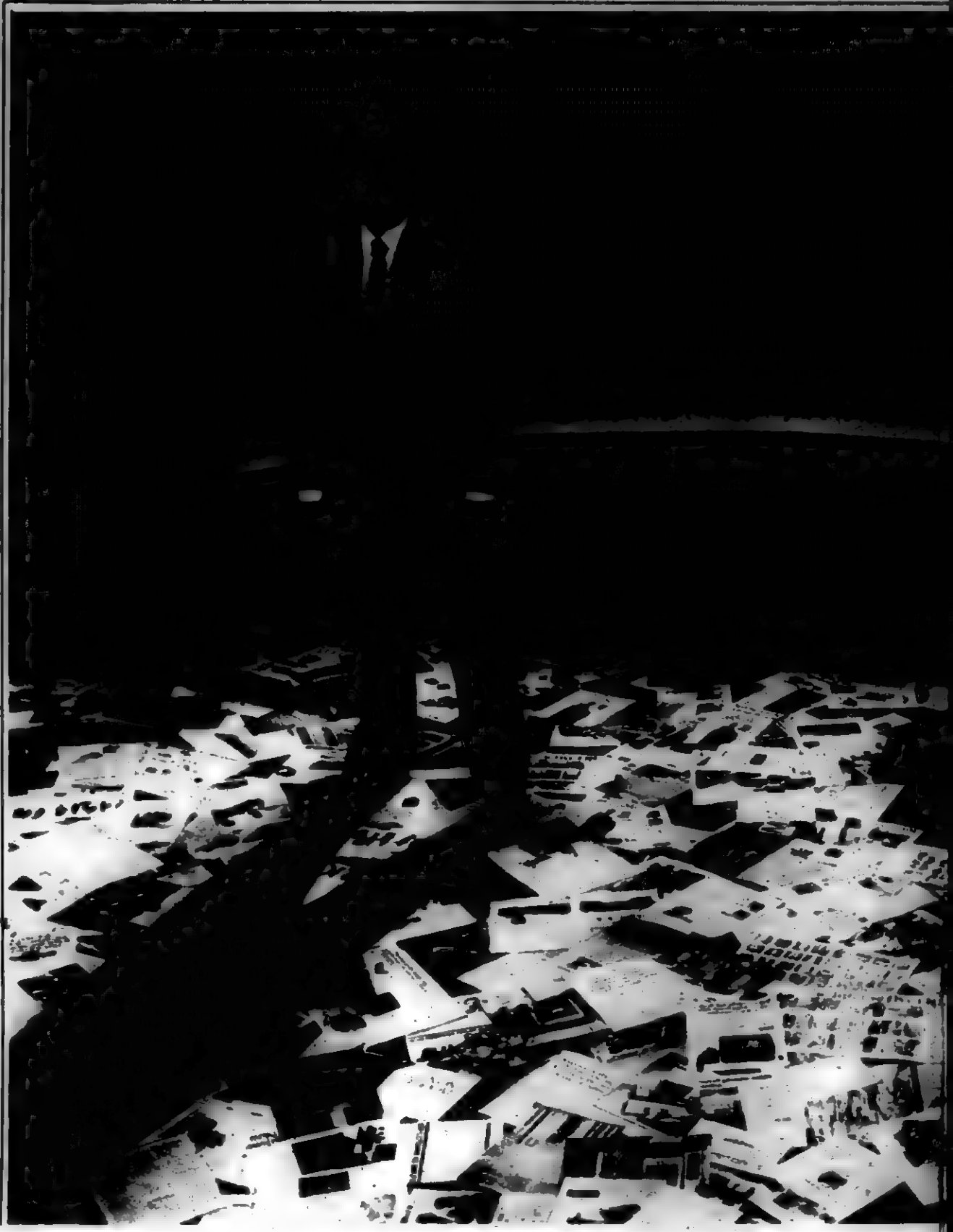
	VISI ON	MICROSOFT WINDOWS
HARDWARE	Hard disk 384K memory Bit-mapped screen Mouse graphics support	Two floppies 192K Bit-mapped screen Mouse graphics support
TYPE WINDOWS	Overlapping	Tiled
RUNS ON	XT, TT, Wang Compaq Plus Honeywell 6/10	23 Vendors, including Wang, TI, Compaq, HP, DG, DEC
CHANNELS	Retail and OEM	OEM only
AVAILABLE	Soon	2nd quarter '84
DEVELOPMENT SYSTEMS	VAX, 68000	Micro with MS-DOS

Figure 1. Comparison of Visi On and MS Windows

on newer packages. With goal seeking, a user inserts parameters — such as revenue over six months — and the program gives an example of the numbers needed to arrive at the target. Software Products International plans to ship this feature as part of its Open Access.

Linking can be either optional or fixed, depending on the package. With some integrated packages, the user has no choice: Figures in the spreadsheet are linked with the graph and so on. Some folks want a choice — Software Products International's Open Access, Ovation Technology's Ovation and Visicorp's Visi On offer it.

Macro capability, which is also known as stored user instructions, is similar in concept to the stored keystroke command facility on WP gear. It ranges in sophis-



tication from capturing steps to do a function within one application to programming the interaction of a number of applications. As Macros become easier to do, the user will not be aware he is programming.

In the investigation of integrated packages and environments, one key question users should ask is whether the product accommodates the transfer of existing data files into its applications (see Figure 2 on Page 22).

Visi On from Visicorp and *Windows* from Microsoft are both examples of software being written today for the hardware of tomorrow. Both companies like to demonstrate their products on Wang's Professional Computer because it has an 8086 instead of an 8088, and they are eagerly awaiting the widespread availability of the speedier Intel 186 and 286 processors.

Both products also offer applications developers an environment that will provide portability of software to other hardware running the same environment. In addition, Visicorp provides applications for its system; Microsoft does not. (See Figure 1.)

The interfaces are quite different. The Visi On screen features overlapping windows; across the bottom of the screen is a common list of commands including Help, Open, Close, Full, Frame, Options, Transfer and Stop. In addition, each application's window also carries its own line of its commands.

Unfortunately, when a window occupies less than a whole screen, all the commands are not visible and must be scrolled horizontally via the mouse. As they pass, they are highlighted in reverse (white on black), which is a bit strong visually. Pull-down windows, if not also icons, might provide a cleaner interface, and the screen is not as clean as that of a Lisa or Mac.

A relatively little-known fact about the first release of Visi On is that it does not allow transfer of graphs into a document. Also, Visicorp, which is offering applications to go with its Visi On environment, gets 10 lashes: Although it is now putting the DIF file transfer into Visi On, that wasn't originally among the specs.

That from a company that pioneered what has become a de facto standard!

The Visi On system shown in November had a few tender spots, which may have been cleaned up by now. Among its OEMs Visicorp has signed IBM, which will market Visi On and its applications under Visicorp's name.

Microsoft Windows is described as an extension to MS-DOS 2.0. It provides a window manager and graphics device interface and thus offers applications developers a virtual interface to bit-mapped screens and the use of a mouse. In addition, the package offers window capabilities, data exchange and user interface features, such as menus, icons and scroll bars.

Data transfer is done if participating programs find a common format and agree on a protocol. Initial data types include uninterpreted binary, Ascii text and Sylk files. Any MS-DOS application that doesn't address specific hardware will run, appearing through the windows. Other software that goes to the hardware level also runs, but without benefit of any capabilities of windows.

Applications available for Visi On include, in addition to the Visi On applications manager (environment), Visi On Calc, Visi On Word and Visi On Graph. Visi On Query, a relational data base manager, will be available in the first quarter. Current files from existing Visicorp applications can be transferred into the Visi On environment, and there is a full trade-in financial incentive to upgrade to the new applications.

About a month after shipping the product, Visicorp dropped the price of the applications manager from $495 to $95. Perhaps users can understand paying for applications, but think the ability to trade information among applications should not cost so much. Visicorp insists that the move was preplanned and that it intends to use this timeframe for aggressive penetration of the market before MS Windows hits the streets.

Visi On Graph costs $250 for line, pie, bar and area charts; Visi On Word is $375 and shows underlining, bold, italics, subscripts and justification and Visi On Query tables hold up to 65,000 records and can join up to five files. The interface to the data base is meant to resemble a spreadsheet and will sell for $375. Visi On Calc costs $395, and the mouse is priced at $250.

Visicorp doesn't really intend to be in the mouse business, and it is providing the RS-232 mouse

NOW THAT YOU'VE READ THROUGH THE MAZE OF ALL THESE COMPUTER ADS, READ WHY DIGITAL IS DIFFERENT.

DIFFERENT BECAUSE

DIFFERENT BECAUSE

DIFFERENT BECAUSE

CLIP THIS COUPON TO FIND OUT WHY DIGITAL IS DIFFERENT.

Please send me all the information I need to know about office automation.

SEND TO: Digital Equipment Corporation
Media Response Manager
200 Baker Avenue, Concord, MA 01742

OR CALL: 1-800-332-2220

NAME

TITLE

COMPANY

ADDRESS

CITY STATE ZIP

7083

digital

	Jack 2 Business Solutions	Ovation	Dayflo	Open Access SW Products International	Smart Data Innovative SW	Lotus Symphony	Corporate MBA Content
Price ($)	495	795	495	595	1,495	695	595
Min Memory(K)	128	256	256	256	128	320	256
Disks	2 Sup.	2 Sup.	hard	2 Sup.	2 Sup.	1 Sup.	2 Sup.
Modules	X	X	X				
Windows				X	X	X	X
Applications							
WP	X	X	X	X	X		X
Spread	X	X		X	X	X	X
Graphics	X	X		X	X	X	X
DBMS	X	X	X	X	X	X	X
Comm.		X		X			X
Time Mgt.				X			
Project Sched.							
Macros			No	Opt.	Opt.	No	
Auto. Linking	X	Possible	Possible				
Macro		X	X	X	X	X	X
Import/Export	DIF	DIF/ ASCII	text screen	DIF	DIF/ ASCII	DIF/ ASCII	DIF/ ASCII
Virtual Memory		X		X			X
Available	Jun	1st Q	Feb	Jun	Feb	3rdQ	1st Q

Figure 2. Integrated Software Packages on IBM PC

specifications to the peripheral industry. For output, the firm said it is working on a virtual device standard which will be printer independent with the addition of device drivers. It is shipping a library of 11 device drivers and has plans for more.

Visicorp has reported a backlog of about 30,000 Visi On products. The company has shipped over 1 million Visicorp products, with Visicalc accounting for more than 700,000 of these.

Desq from Quarterdeck, in contrast with Visi On and Windows, is a package for today's applications. Desq provides a portable computer user with an environment that allows files to be swapped from one application to another, stores user instructions, has a hot switch between applications and uses a mouse.

Desq does not offer common commands on the application level and thus is best for users addicted to various programs. The recommended memory is 512K bytes and a hard disk. Desq, like Microsoft's Windows, will accept Lotus files. The price is $399 for the multiple window product. Quarterdeck has signed contracts with NCR to market Desq on its Decisionmate and with Digital Equipment Corp. on its Rainbow.

Bill Gates, chairman of Microsoft, and Gary Pope, Quarterdeck's executive vice-president of software development took part in a happenstance thrust and parry session in the aisle at a recent conference. Gates seemed impressed and according to the rumor mill, he may be thinking of doing something in conjunction with Quarterdeck.

Lotus' 1-2-3 is probably the most popular integrated package, and ***Lotus ' Symphony*** package adds WP, communications and a beefed-up data base with forms and mail merge capabilities to the Lotus 1-2-3 features of business graphics and spreadsheet. Windows can be either tiled or overlapping, and there is a facility to exit to MS-DOS and then return to the same spot in Symphony. Lotus claims Symphony will support MS Windows and Desq and the 3270 PC environments and is thus able to swap information between Symphony and programs running under these environments. Symphony will be available in mid-1984 for $695.

Open Access from Software Products International (SPI) is a good example of an integrated package with common commands, and it may be a winner. The folks at SPI come from the University California San Diego (also embryo for UCSD Pascal), and SPI has been licensing software to manufacturers since 1979. Open Access is very quick and includes nice features like three-dimension graphics, multiple graphics on the screen simultaneously, goal seeking or how-to-get spreadsheet and optional linking.

All six modules can stand alone or be integrated. For example, the relational DBMS can join five files simultaneously; retrieve records based on 64 search conditions and then sort on 15 fields; and perform mail merge, among other tasks. The spreadsheet has virtual memory. In addition to the graphics, mentioned above, its other features are WP, communications and time management.

Handy pop-up special function windows such as help, search (list of files) and pocket calculator are easily invoked. The entire package, which costs $595 from SPI, San Diego, Calif., can run on either floppies or a hard-disk IBM PC system. It accepts DIF files and also Lotus files.

Other integrated packages exist in varying stages, but before buying them, users should ask the following questions:

- Is the level of function sufficient in the applications you plan to use? Many are not strong in one area or lack it altogether.
- Can you transfer your old files into it?
- Are the commands as well as the data integrated?
- If you need to use this package in conjunction with a mainframe, will that be possible?

Upton is editor of the "Office Automation Reporting Service" newsletter published by International Data Corp. (IDC), an information processing market research firm in Framingham, Mass. OA

MODELESS PACKAGES

Integrated packages aren't the last word. Modeless packages actually seem to be arriving.

Jack 2 from Business Solutions, Inc. of Kings Park, N.Y., runs on a 128K-byte IBM PC (or look-alike) with two floppies or an IBM XT with a supplemental installation package. It features automatic linking among four applications: WP, spreadsheet, data base manager and business graphics. All functions can be done on the same screen, which means a user doesn't need to exit from WP to do spreadsheet calculations and so on.

Jack 2 word processing can handle multiple columns of text on the same page and hide scratchpad or confidential information in the middle of the text. In the spreadsheet, users can call the cells by name. Currently, because it was designed to be printed by daisy wheel printers, the graph function is limited to bar charts. Icon-driven commands are displayed at the top of the screen. The price is $495.

Other packages include a report generator, at $250, which can calculate and count, and Utility, at $125, which transfers files between Jack 2, DIF and PC-DOS files.

Dayflo is another offering and comes from Dayflo, Inc. of Irvine, Calif. Dayflo runs on a hard-disk IBM (or look-alike) and performs functions such as WP and data base management. It is reportedly designed to work the way a manager does and accommodates "impulsive input" filing and retrieving information in a variety of ways. Future plans call for graphics, spreadsheet, project manager and other applications. Its price is $495.

Ovation from Ovation Technologies of Canton, Mass., is one of the first products touting a wide range of application functions performed within a universal environment. The company claims Ovation eliminates data swapping. It looks modeless to the user, who can perform spreadsheet functions and graphs while looking at his text screen. The package uses 30 common commands throughout all functions; new users should find it easier to get up and running than almost anything else on the market.

The proof of the pudding lies in the range of functionality within the five applications: WP, spreadsheet, graphics, information management and communications. Log graphs are reportedly possible, which may make this a first on multifunction system.

Ovation claims the system recognizes the form of data it is working on and acts appropriately. A macro capability exists, and the program also uses virtual memory. Ovation will be marketed with Tandy's newest product and seems to run very fast on an ordinary PC XT.

Ovation needs 256K bytes of memory and DOS 2.0 on either floppies or hard disk, but the latter is strongly recommended. The price is $795.

Aura from Softrend is yet another entry in the modeless arena. Based on menus, the package does include command bypass facilities, and its strong point is its macro instructions. A user can create his own main and sub menus and can also store instructions within an application to perform such tasks as select, sort and create a report. Aura looks as though it would be handy for the person who has to do repetitive tasks on different data.

Although Aura does not have goal seeking, it does zoom from a spreadsheet back to the source of a particular number. Its elements include information management, spreadsheet, business graphics and WP. The business graphics involves switching to bit-mapped mode and comes with prestored boxes, circles and so on. In addition, text can be different sizes.

Aura is priced at $495 from Softrend in Salem, N.H.

Whatever Happened To Xerox?

By Glenn Rifkin

It could simply be a matter of perception. Xerox Corp. views itself as a strong contender in the integrated office marketplace, but industry analysts are scratching their heads and wondering whether the giant corporation intends to stay in the business at all.

It could also be a case of great expectations. Yes, Xerox has a strong office presence with its copier/duplicators, laser printers and electronic typewriters. But why hasn't Xerox — the nation's 38th largest corporation, with $8.5 billion in revenues, more than 100,000 employees and a name so engrained in the office that it has become a verb (as in "to photocopy") — managed to parlay that power into becoming a dominant force in OA?

Three years ago, Xerox seemed poised to do just that. With its Ethernet local-area network as the first solid contender available in that market, the company made a flurry of announcements in 1981 for add-ons to the network, including its innovative 8010 Star workstation; the 820 personal computer; the Memorywriter family of electronic typewriters and a series of enhancements to Ethernet. The company also offered its 860 word processor for the network.

The Xerox strategy was to offer an integrated office solution based

on the Ethernet network, with the Star as the flagship product.

With its user-friendly mouse interface, icons, powerful integrated software, windows and high-resolution screen, the Star was the talk of the industry that year. Unfortunately, the talk didn't translate into dollars. With a $16,000 price tag, the Star faded quickly.

Since then, Xerox' quest for the office market has been quiet and unspectacular, to say the least. More than 5,000 Ethernet networks are installed and the specifications have been adopted as standards by the IEEE and in Europe. But of those 5,000 Ethernets, only 500 were installed by Xerox. The company made public its specifications when the product was introduced and many other vendors are selling Ethernet-like products. As Tom Elliott of the International Data Corp. (IDC) put it, "Reflected glory doesn't necessarily do anything for the bottom line."

The company hasn't introduced any innovative technology since 1981 (except enhancements to existing products). Although Xerox officials have expressed commitment to a strong personal computer offering for its customers, Robert Adams, president of Xerox Systems Group, admitted that no new product in that arena would be introduced in 1984.

Xerox has also seen several of its key office division leaders leave the company. It has reorganized the structure of these divisions several times in the last few years, culminating in the formation of the Xerox Systems Group under Adams in June 1983. Adams is now responsible for the three divisions, Printing Systems, Office Systems and Office Products, and for the Versatec and Kurzweil groups, two acquisitions which supply electrostatic plotters and data entry systems respectively.

Despite the apparent loss of momentum over the past three years, Xerox is sticking to its guns and its strategy. David T. Kearns, the company's president and chief executive officer, said, "We are committed to office automation. We have a broad line of products. We are doing well in some areas and not as well as we'd like in others. But we're proceeding."

Kearns pointed out that Xerox has been a pioneer with both Ethernet and the Star. He admitted that in 1981 "we may have made more of a flurry (of announcements) than we should have. We have not met the expectations of the numbers of installations we would have liked if you look at the objectives we had at the time. But we have a large number of networks installed worldwide of which we're very proud. They are with sophisticated users who know and understand systems and feel we are providing them with good service.

The Ethernet specifications have been adopted as standards by the IEEE and in Europe. But of the 5,000 Ethernets in place, Xerox installed only 500.

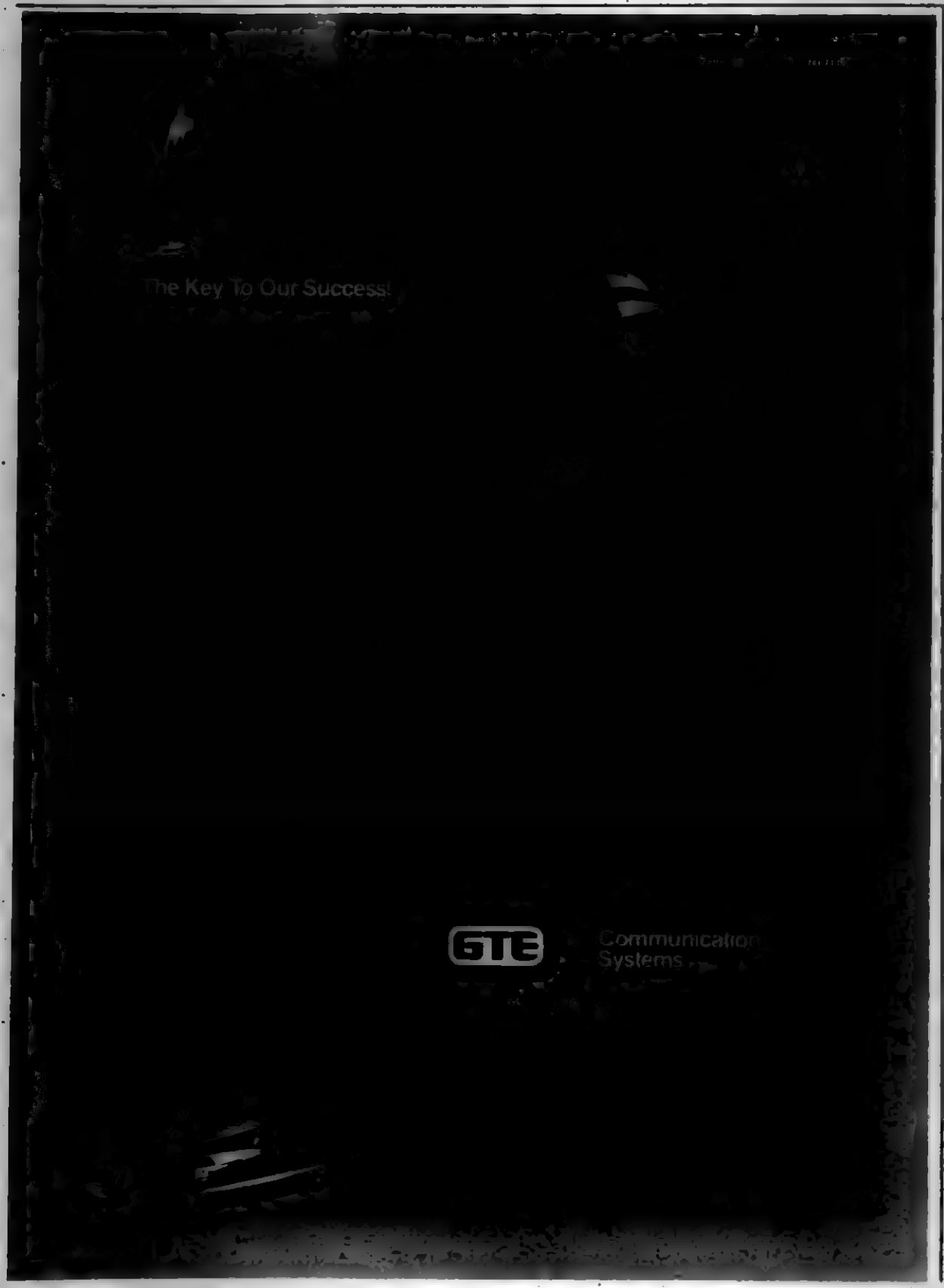
I wish we had twice as many as we currently have, but we're on the uptake in that area."

John Shoch, president of the Office Systems Division, believes that much of the negative attention Xerox has been getting lately can be credited to "people in the industry who help to perpetuate an incorrect impression based on old information."

Since 1981 the company has tended to take a "lower profile" as it built away at its system, according to Shoch, who said some Xerox customers are getting up to 500% improvement in productivity with these systems. "What we've been doing since the announcements is delivering the goods. When we work with a customer, we're trying to understand their complete work flow and have an office systems solution that has dramatic improvement in the way they run their business. We now have about 20 products on the workstation and server side, and a bunch more coming. We have pulled together more products working to solve office systems problems than anybody else in the business," he said.

Industry analysts, however, don't share Shoch's enthusiasm. Elliot of IDC pointed out that in 1983 Xerox had "an unusually nondescript year. It does not seem to be nearly the force to be reckoned with that it did even 18 months ago."

Cliff Lindsey, vice-president of office automation service for Dataquest, Inc. and a longtime Xerox watcher, added, "I'm disappointed that they haven't moved faster and taken advantage of the pioneering technology they in-



At last, a system with a head for numbers, an eye for pictures, and a mind of its own.

Introducing the Kodak KAR-4000 information system. Take the processing power of a stand-alone computer. Add a "photographic memory" to access original document images. Top it off with comprehensive, one-source software and service.

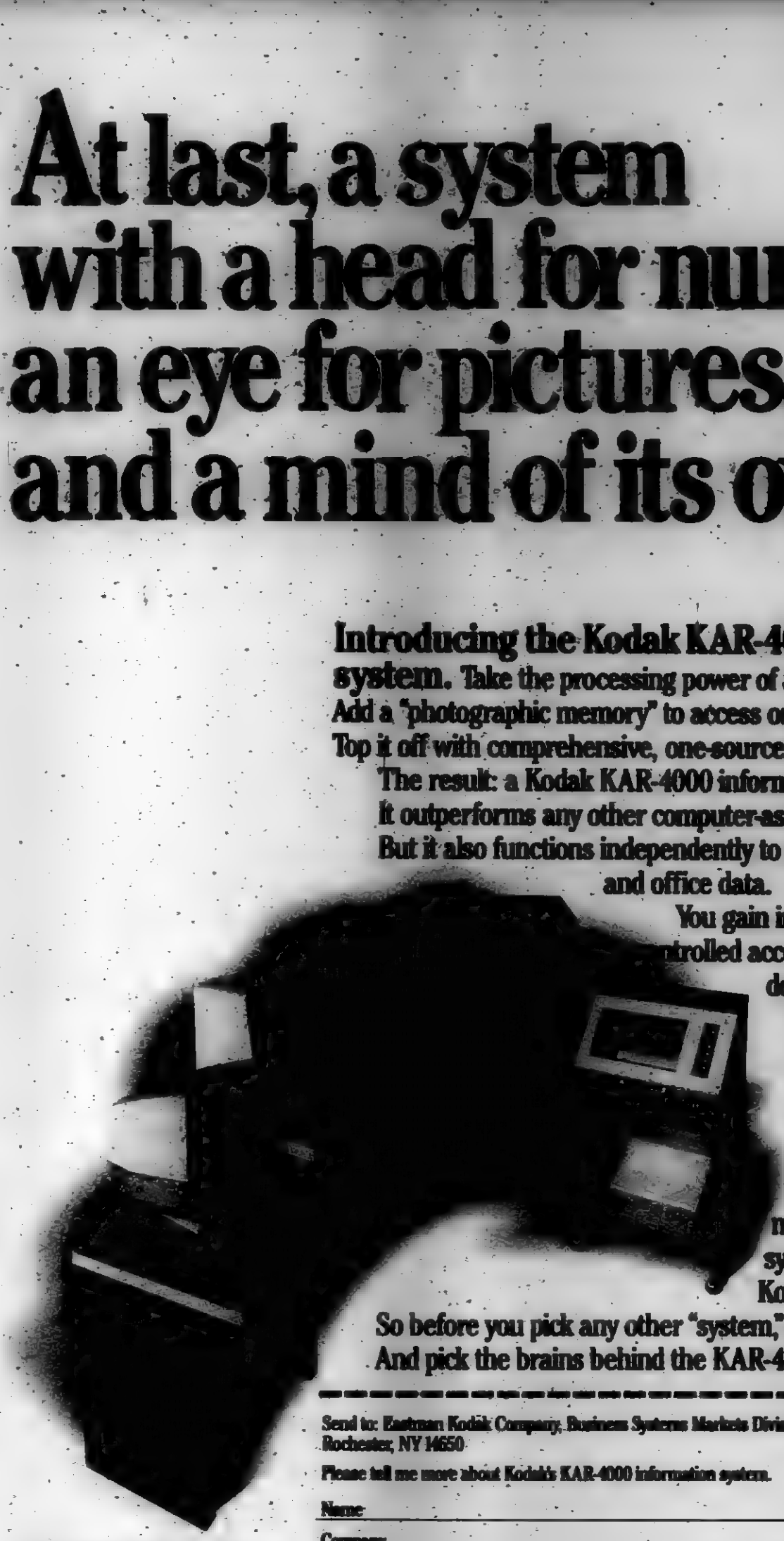
The result: a Kodak KAR-4000 information system.

It outperforms any other computer-assisted retrieval system. But it also functions independently to process both documents and office data.

You gain independent computer-controlled access to on-line data and documents. Without the staggering expense of on-line computer storage.

You even gain independence from service—all components in the KAR-4000 system are serviced by Kodak.

So before you pick any other "system," send in the coupon. And pick the brains behind the KAR-4000 information system.



The Kodak KAR-4000 information system. It gives the computer a photographic memory.

Kodak

© Eastman Kodak Company, 1983

Send to: Eastman Kodak Company, Business Systems Markets Division, Dept. DP0330
Rochester, NY 14650

Please tell me more about Kodak's KAR-4000 information system.

Name _____

Company _____

Address _____

City _____

State _____ ZIP _____

Please answer the following:

1. How many incoming documents per day do you process? ☐ 1000-2000 ☐ 2000-5000 ☐ Over 5000
2. How many documents do you normally retrieve each day? ☐ Less than 10 ☐ 10-25 ☐ Over 25

vented. I've been waiting for the past three years for them to capture a major market share and they simply haven't done it. The next 12 months will be extremely critical for them."

Although Xerox has been on schedule with its announced products since 1976, the marketing hasn't been on course, according to Lindsey. The industry thought Xerox would dominate the workstation market, but it hasn't lived up to expectations. The price/performance range of the Star was too steep for the mass market and represented a radical change for the office. "It required a lot of system analysis in the office to make it fit," he said, "and I didn't see Xerox doing a lot of that."

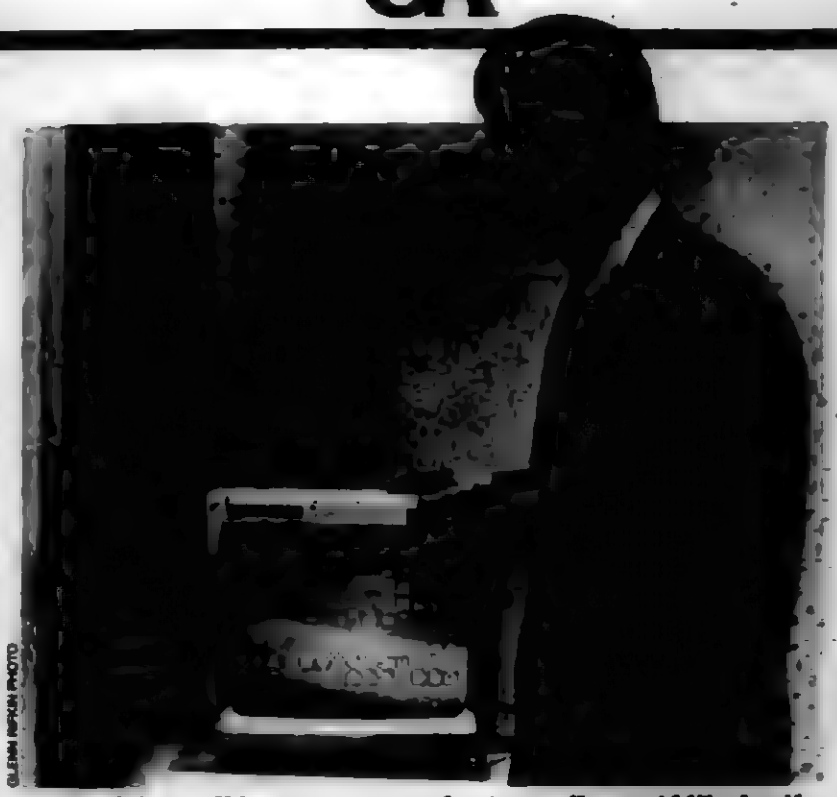
Xerox recently cut the price of the Star to $9,995 from its previous price tag and introduced a stand-alone version and remote version of the product. But according to Andria Rossi, a consultant with the Seybold Consulting Group, Inc., that may be "too little, too late." Apple Computer, Inc. now offers similar technology for significantly less money on both its Lisa and Macintosh microcomputers, and the Star is not innovative anymore. "The Star may have a chance if an organization has let Lisa in the door and then wants to move up to a more sophisticated system. But that isn't all that likely. Xerox just took too much time."

To Xerox, the Star has not been the failure that others have dubbed it. "We're selling Stars," Adams stated. "We may not be selling as many as we thought when we announced it, but we're selling them. They're going to people who are very heavy in the composition area; who need a very good screen and rapid response on a variety of functions. The processor on the Star is much faster than the Motorola 68000."

Xerox has admitted, though, that its workstation strategy needs attention, and the company claims to be addressing that issue. According to Adams, the company erred by introducing an eight-bit system (the 820) at the same time the industry was turning to the 16-bit PC. "We've been behind the power curve ever since," he said. Xerox tried to address that issue last May by introducing its 16/8 micro with both a Z80 and 8086 chip. The 16/8, not IBM-compatible, does little more than "keep them in the business," according to Lindsey.

Kearns stated firmly that Xerox must have a viable PC offering for its customers, but added that it will not take on Apple or IBM in the broad retail marketplace. "Our main focus is to have an attractive product for our customers to tie into their networks," he said.

Adams acknowledged that Xerox is at work on a new line of workstations, but would not say what to expect or when. But he did explain that in Xerox' opinion, OA is much more than just workstations. "It depends on where you are standing to look at the universe," Adams said.



"We're doing well in some areas and not as well as we'd like in others. But we're proceeding." — David T. Kearns, Xerox' president.

While IBM has led the way in data management and AT&T in voice management, Xerox has blazed a trail of its own in document management, according to Adams. He believes that document management is the third major subset of OA and it is in this baileywick that Xerox is dominant. With its impressive line of copier/duplicators, laser printers and Memorywriter typewriters, the Stamford, Conn.-based corporation will always have document management and composition "in its heartland."

"I think a good solid printer, electronic typewriter or facsimile device is as important to a good office automation system as a workstation," Adams said.

Indeed, Xerox remains dominant in the $11.5 billion copier/duplicator business and has placed more electronic laser printers worldwide than all of its competitors combined. Perhaps its major success story to date is the Memorywriter, which in just two years on the market has tied IBM for the lead in the electronic typewriter arena.

Analysts believe the Memorywriter, perhaps with screen/memory add-on and even PC software, could well be an entry point into offices for Xerox. "But it is hard to imagine an electronic typewriter being the entry point for selling an entire office system," stated Elliott.

The analysts are also concerned about Xerox' word processing offering, the 860, which was considered innovative when introduced in 1979, but is now considered out of step. "The 860 was pretty good when it came out, but it is due for the next generation," Lindsey said. "If they are after the word processing market, the 860 isn't enough," added Rossi.

In addition, there is the issue of IBM compatibility. Shoch pointed out that Xerox offers a number of ways to interoperate with the mainframe environment, specifically related to applications.

"We will have a series of announcements over the course of this year that expand our terminal capabilities and our RJE capabilities in the IBM world," he stated. "Our current product line supports the 3270 interfaces and asynchronous terminal interfaces. It has also not escaped our attention that the [Digital Equipment Corp.] VT100 would be a particularly valuable market."

Xerox is also committed to introducing the IBM PC onto the Ethernet network; reportedly working jointly with 3Com Corp. and Visicorp on that project. "We will integrate [the IBM PC] into our environment better than it gets integrated into its native environment," Shoch projected.

With its strength in networking and its niche markets, Xerox remains a force to be reckoned with. Adams' Systems Group generated $2 billion in revenues last year and, despite the argument over what is and is not OA, it provides significant financial support to a prolonged effort in the market.

Along with its financial soundness, Xerox has other resources at its disposal, according to Steven Abraham, an analyst with Price Waterhouse & Co. in Los Angeles. Abraham pointed to the Palo Alto Research Center (Parc), which was responsible for much of the trendsetting technology introduced by Xerox over the years and which continues to provide state-of-the-art research for Xerox.

Abraham acknowledged that Xerox has experienced internal marketing difficulties, but said that under Adams, those problems could well be solved. "Now that all the divisions are reporting to Adams, there should be a much clearer sense of marketing strategy. There's a tremendous internal commitment to solving these problems. People haven't seen a quick response at Xerox to the market changes, and that has justifiably brought about a negative view. But I'm optimistic. There's a lot of talent there."

Optimism, of course, does not guarantee success. Xerox has some serious catching up to do with major competitors like IBM and Wang Laboratories, Inc.; industry watchers, after years of disappointment, tend to be skeptical.

The company needs a lower priced, high-performance workstation — somewhere in the $5,000 price range — tied into Ethernet, both Lindsey and Rossi agreed. It also needs a state-of-art personal computer, and that machine must not get caught in the six- to nine-month time lag other Xerox products have found themselves in, according to Lindsey.

"We predicted in 1980 that if a vendor wanted to be a winner in the second half of the decade, it would have to infiltrate a large part of the market in the first half. That seems to be coming true. And for Xerox, that puts them in a critical time window. They don't have a large installed base out there and don't have a lot of time to get it," Lindsey said.

"I'd been holding out hope for them for a long time, but now I'm pessimistic. It's going to be slim pickings out there in the next five years. I'm just amazed at how little they've capitalized on some great technology," he noted.

Elliott of IDC added that Xerox' best strategy might be to focus on its strength in the imaging area and to produce high-quality, hard-copy output incorporating text and data. "This might mean that Xerox would find itself at the downstream end of the office information flow, formatting and printing information stored and manipulated by equipment from other vendors. This is not the most glamorous niche in the office of the future, but it is likely to be a profitable one," he said.

Xerox, however, has no intention of settling for a niche market. With a sales and service organization numbering 40,000 and a restructured marketing plan, the company has its sights set on the total office market.

Chairman Kearns admitted Xerox may have had too much of a "Xerox alone" strategy five or six years ago, but said that the company is on the right track now. He acknowledged that there is much training and restructuring to be done, but despite the cost and difficulty, "When you look at the basic organization we have versus anyone else except IBM, for us to take a back seat in this is absolutely not necessary."

Adams echoed those sentiments: "I believe we're in a long-distance race here and we're going to start looking at who will be the winner in 1990, not 1984. You don't want to get too far behind the leaders, but you also don't quit the race just because you find someone ahead of you." OA

Rifkin is senior writer at Computerworld OA.

Nothing Could Be Finer Than OA in Carolina

BY DAROLD R. KLAUK

No matter how much planning goes into an office automation project, it pays to prepare — if not for a disaster, at least for a changing environment.

Like many public and private organizations, the state of South Carolina found itself juggling a fluctuating economy and rising operating costs at the same time that it experienced a growth in demand for services. It became increasingly evident that the state needed a strategy to reduce operating costs and increase office worker productivity.

An OA pilot project was initiated to determine how much automated office technology could help us to achieve these objectives. One of the first steps in the pilot was a preimplementation study, which looked at the current work load of various offices, identified potential productivity areas and selected individuals to participate in the project.

Next, an ergonomics, or human factors, task force was formed, consisting of individuals with interdisciplinary skills needed to focus on users and their needs. They represented the areas of personnel, legal, management information systems (MIS), planning, training and human factors.

The group's first task was to issue a request for proposals (RFP) specifying the perceived functional needs of the selected office work force. The evaluation method did not use cost as the sole guideline. Several weighted criteria included functionality, support, cost, ergonomics, compatibility, expandability, reliability and documentation and training. Before a contract was awarded, a full-function demonstration was required, and all proposed software and hardware products had to be in current production.

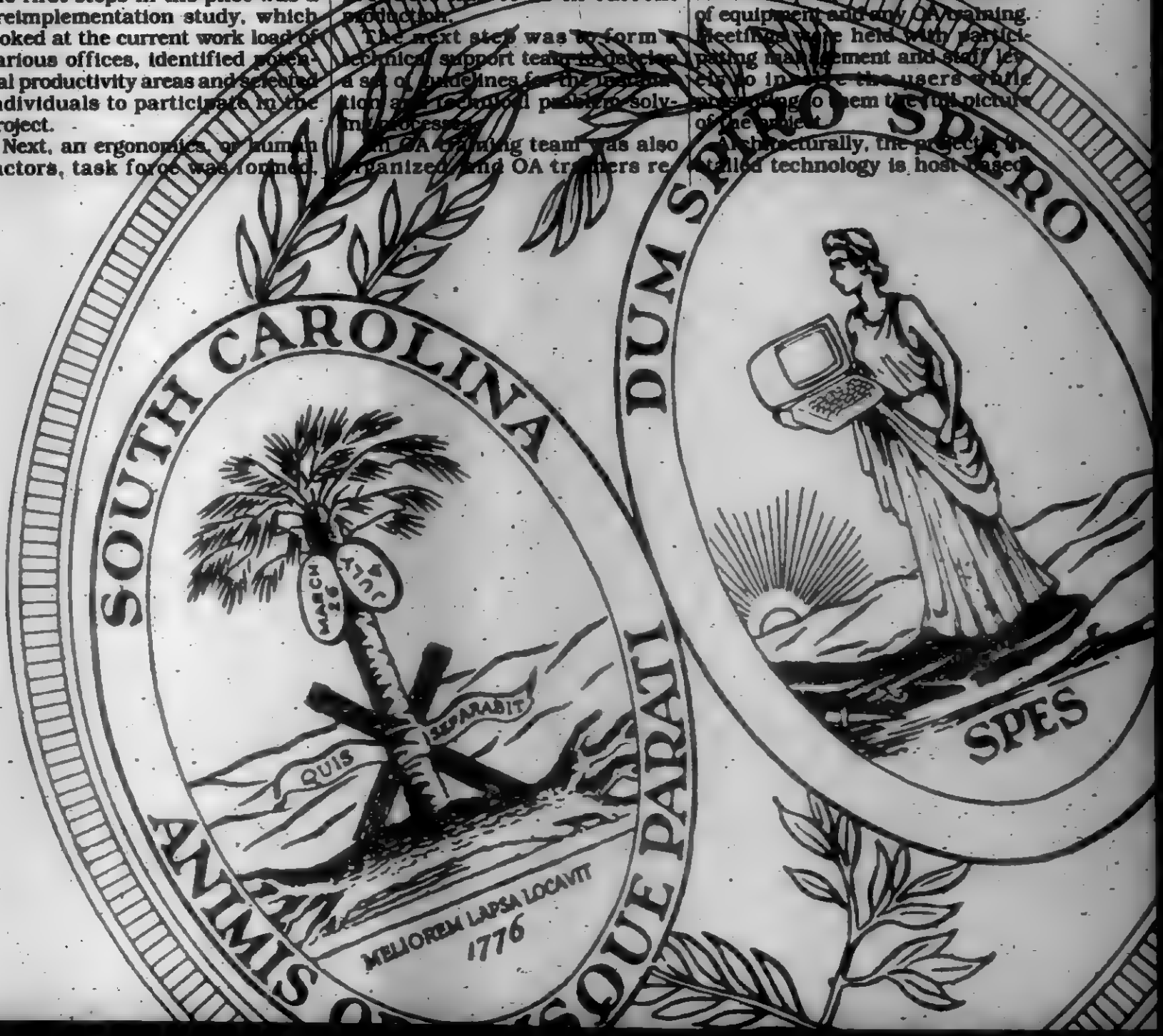
The next step was to form a technical support team to develop a set of guidelines for the [illegible] tion and technical problem-solving processes.

An OA training team was also organized, and OA trainers received in-depth training in each function that would eventually be taught to the end users. A self-paced training program was developed and a training center was specifically designed for and dedicated to the trainees.

The installation of the equipment and the institution of OA training were done in phases. A test group functioned as "guinea pigs" in all phases of training. This group represented various job skills from the clerical, technical and management office worker levels.

From the start, the OA program adopted a strong "people, not technology" philosophy. One result of this approach was the development of OA orientation seminars for users prior to the installation of equipment and any OA training. Meetings were held with participating management and staff levels to inform the users while [illegible] them the full picture of the project.

Architecturally, the project's [illegible] technology is host-based.



Hewlett-Packa surge in office

Introducing the Person

The principle is simple. Boost the productivity of individual PCs. Your people, your department, even your entire company will follow suit.

The first boost occurred when we introduced the touchscreen HP 150 as an office and managerial workstation. This made personal computing so much easier and faster that individual productivity soared.

Now the Personal Productivity Center combines the flexibility of the HP 150 with the power of our HP 3000 family of distributed computer systems.

You can shape each Productivity Center just the way you want it by adding other office and computing products from our extensive range.

You can link managerial and secretarial work stations. Create impressive presentations, merging business graphics and word processing. Store them on large disc files. And print them out on laser printers and color plotters.

Your PCs also grow more productive by increasing the range of software they can run. In addition to leading PC programs like 1-2-3™ from Lotus™ and popular word processing packages, they can use HP 3000 business software like our exclusive DeskManager. This combines electronic mail, quick memo

rd touches off a productivity.

al Productivity Center.

writing, personal filing and calendar functions. And each PC can access data processing systems and large corporate data bases.

Personal Productivity Centers can communicate with similar networks in other parts of your company, as well as your mainframes. Each system can expand to handle more than 100 workstations. And you can grow without involving your programmers in any software conversion.

So if PCs alone are making your people more productive, just wait till you see them all working together. And you can see them right now by calling your local HP sales office listed in the white pages. Or write for complete information to: Hewlett-Packard, Dept. 03191, 19447 Pruneridge Avenue, Cupertino, CA 95014. In Europe, contact Henk van Lammeren, Hewlett-Packard, P.O. Box 529, 1180 AM Amstelveen, The Netherlands.

It could turn your whole company into a productivity center.

Productivity. Not promises.

HEWLETT PACKARD

1-2-3 and Lotus are trademarks of Lotus Development Corporation.

BD03400

Now Wang gives you office automation on a platter.

Introducing Wang Office.

It's the kind of comprehensive office software and communications package only Wang could put together.

Because only Wang can bring you the most advanced electronic mail. Only Wang can bring you the newest in time and task management. Only Wang can bring you the industry's best word processing.

And only Wang can put all of this together with the world's most advanced communications in one flexible package—easy to put in place and virtually transparent to the user.

With Wang Office you can not only process information, you can send it to, or retrieve it from, any office, anywhere in the world.

Instantly. Wang Office.

Thirty years of commitment, innovation and technology.

Yours.

On a platter.

For more information on Wang Office, call 1-800-225-9264. Or write to: Wang Laboratories, Inc., Business Executive Center, One Industrial Avenue, Lowell, MA 01851.

WANG

The Office Automation Computer People.

COS

© 1984 Wang Laboratories, Inc.

minicomputers are located at three sites, with each processor attached, directly or remotely, to the host. For office functions, the host provides services for central storage, retrieval and distribution of documents and messages. Local processors provide text and records processing capabilities, office administrative functionality and access to a host computer using multifunction workstations.

The functions implemented and evaluated include electronic messaging, calendaring, document distribution, word processing and records processing as well as access to DP applications and resources at the host in the batch and interactive modes. Additional OA implementations have occurred in other offices using equipment compatible with that of the pilot project forming an OA network.

The project was not without problems and unknowns. Most notable was the state of constant change that occurs in most organizations and that in turn has an impact on the staff.

Because of the excellent planning effort, the implementation of the project progressed with a high degree of confidence that all elements were in place. Nevertheless, the project was not without its share of problems and unknowns. Most notable among these was the state of constant change that occurs in most organizations; these changes in turn have an impact on the work force. Reorganizations affect office workers' physical locations, job roles and tasks. Also, people retire, new workers are added and others move on to other employment. These factors directly affect the implementation of the project: installation schedules change as a result of equipment relocations; training schedules must be altered to accommodate new users. Users, project implementors and management should recognize that these changes are inevitable and they cause delays in a project's scheduled implementation. They also affect any preimplementation, baseline productivity measurements that were taken.

Another area in which problems can occur is in the installation of the equipment and cables. This installation should be done by experienced individuals, or at least under their guidance. In this stage of the implementation process, many unpredictable and frustrating problems may surface in such areas as fire code compliance, adequate power sources and proper electrical grounding, particularly in older buildings. Unless allowance is made for these problems, the impact on budgeting and scheduling could be substantial.

The other area in which problems arose was training. Planning efforts defined a strict requirement to meet end-user needs; the emphasis was on user training and support. Based upon experimentation with the test group, a set of courseware was assembled and optimized. The training process was changed to accommodate users in the following areas:

- Length of the course.
- Number and type of functions taught.
- Duration and timing of classroom sessions.
- Availability of equipment.
- Nonattendance at classroom sessions.

Each of these changes had a ripple effect on the total training program as schedules were juggled, causing delays in completing training.

Trained and back at their work places, users placed added demands on the OA team for handholding support. This additional support was necessary to assist users as they became more proficient in using the technology and applied it to automating existing manual office applications. At this stage, an office applications support group with adequate resources is required. Without it, the users' attitudes suffer, which affects their support of the project's goals.

In spite of the implementation difficulties, however, the pilot did have demonstrated successes. Recent probes into the affected offices indicate the installed OA technology has been well received. Productivity gains have been achieved, and cost-avoidance has been realized. In addition, the quality of both work product and work life has improved.

The project has provided the staff with learning experiences — both good and bad — as a pilot project should. One objective of the pilot was to test the OA waters and to use the lessons learned for future OA implementations. The progress to date seems to indicate that OA is indeed the means to do more work for less cost.

The very implementation of OA technology should be beneficial unless a major mistake is made in selection, installation, training or support. The degree of the project's success can be measured, for example, in terms of the number of user requests for more devices. Through word of mouth, the project will develop a reputation — good or bad.

Most certainly, the sophisticated word and records processing features have made it possible to produce documents and correspondence of better quality, faster and easier. Also, a few managers are now effectively generating their own correspondence, replacing paper and pencil with on-line electronic document creation.

Users' diversified application needs reinforced the original assumption that they should be provided with a single type of device — a multifunction workstation. This device provides access to automated office functions and DP applications. Cost-avoidance is achieved as the number, type and support of workstations are reduced.

Another of the successes was the move from a dedicated WP center environment to a local distribution of the text processing capabilities. Localizing the author/text-creator relationship has been extremely productive.

An intangible but real productivity benefit has been the improvement in office workers attitudes and motivation as a re-

Teach your IBM or Wang to read.

Or your CPT, Exxon, Lanier, NBI or Xerox. The compact Dest WorkLess Station™ lets you enter typewritten pages of different typestyles into your word processor automatically, without using the keyboard.

For immediate information and the name of your nearest dealer, call Mary Thorpe at (800) 538-7582. In Califor- nia, call (408) 946-7000.

Or fill out and mail the coupon to Dest Corporation, 2860 Zanker Road, San Jose, CA 95131.

The WorkLess Station. The first way to improve word processing.

DEST

My word processor is _____

NAME _____

COMPANY _____

ADDRESS _____

CITY _____ ST _____ PHONE _____

DEST and WorkLess Station are trademarks of Dest Corporation

China Computerworld 电脑

The only specialized computer publication written exclusively for the People's Republic of China (PRC).

The PRC is a huge country which now has a rapidly growing installed base of computers. And the future looks very bright for the Chinese EDP market.

Government plans call for extensive use of computers in the PRC's technological modernization, and annual EDP expenditures are expected to grow into the billions of dollars in the 80's.

A good deal of this money will be spent on foreign computer equipment and the purchase decision-makers for this equipment will be using *China Computerworld* to help them choose the products and the companies they need.

China Computerworld is a joint venture of the Fourth Ministry of Machine Building and CW Communications/Inc. Its 50,000 subscribers include the key government officials and computer managers who have EDP purchase decision authority.

China Computerworld is published on the fifth and twentieth of each month. Its tabloid newspaper format gives you a unique opportunity to introduce your products and services to this awakening giant of a marketplace.

CW International Marketing Services Department gives you one-stop advertising service in countries around the world. For more information about *China Computerworld* or any of our other foreign publications, just fill out the coupon below.

Diana La Muraglia, Manager, International Marketing Services
CW Communications, Inc.
375 Cochituate Road, Box 880, Framingham, MA 01701 • (617) 879-0700

Please send me more information on
☐ *China Computerworld* ☐ Your other foreign publications

Name _____
Title _____
Company _____
Address _____
City _____ State _____ Zip _____

CW COMMUNICATIONS/INC.
Publishers of Computerworld and other leading computer publications around the world

sult of being able to perform tasks more quickly, easily and effectively.

The following guidelines should be relevant and useful to those considering OA implementation:

Planning Phase:

- Initiate OA on a small scale. This not only minimizes risks, such as cost and disruption, but also provides options to explore multiple vendor capabilities without substantial investment and commitment to any one vendor.
- Consider leasing the equipment instead of purchasing it outright. This can help eliminate a locked-in committed feeling if a change in technology becomes necessary.
- Check existing office procedures for redundancies and bottlenecks. Procedural changes could bring about surprising results.

Place reasonable goals and expectations on the people and the project itself. Establish what you mean by a "successful" effort so you will know when it has (or has not) happened.

- Look carefully at each user's needs. One type of workstation will probably not fit all needs.
- Place reasonable goals and expectations on the people and the project itself. Establish what you mean by a "successful" effort so you will know when it has (or has not) happened.
- Don't lose sight of human factor issues — for example, proper placement of equipment in individual offices, CRT-type tables and proper chairs.
- Involve users early and give them decision-making tasks. Their attitudes will significantly affect the project's progress. Establish an OA steering committee.
- Don't allow the techies to run the show. Get a mix of users involved, each with voting power. Establish a users group.

Implementation Phase:

- Remain flexible as the implementation activities progress. Many factors will arise and have an impact on predefined planning and scheduling activities.
- Support end users' DP needs as well as their OA needs. Don't oversell OA functions; DP applications are still part of the office environment.
- Be cautious about introducing new technologies. Give end users ample time to adapt to new devices before you ask them to switch devices.
- Listen to the users' suggestions. They are the real-world users and your best source of knowledge on their jobs and needs.
- Continue giving office applications support to users. Over time, however, they will become quite self-sufficient.

Evaluation Phase:

- Establish standards wherever feasible. Examine the issues of functionality, connectivity, compatibility and control.
- Be prepared to present quantitative gains to management. Intangible benefits alone probably won't justify expansion of the current project or start-up of future ones.
- Document what you learn — both the successes and the problems — for future implementations and other implementors.

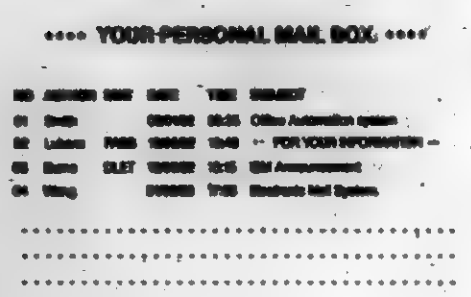
In summary, one of the original precepts about OA technology was that it would allow more work to be done for less cost. Indeed, more work can now be done and more information is now available than before the introduction of the OA technology. Initially, however, this comes at an additional cost. The return on investment cannot and should not be measured in the short term. Over time and with consideration for intangible as well as tangible benefits, the OA system will prove not only beneficial but also essential. OA

Klauk is an information resource manager for the office automation activities within the state government of South Carolina.

They offer PROFS under VM.

We offer TOSS under MVS, VS1, DOS/VS and DOS/VSE with CICS support.

Terminal Support
- 327 x CRTs.
- 327 x Printers.
- TTY.
- 3767
- PCs
- Display Writers.
- 8100/DOSF.
- 6670 and System Printer.



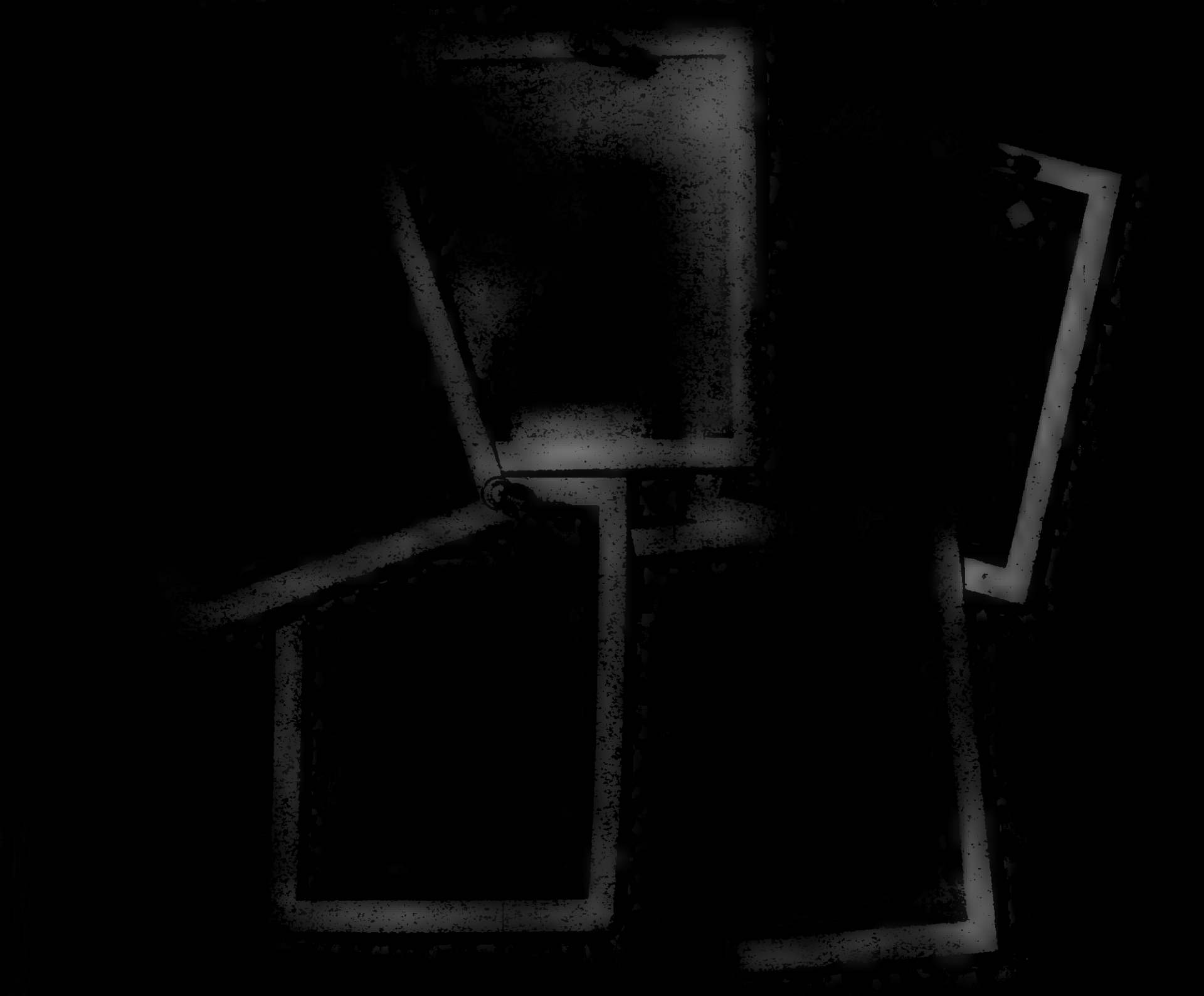
System Features
- Short Note Facility.
- Word Processing.
- Electronic Mail.
- Calendering.
- To Do List.
- Document Filing
- User Directory
- User Friendly Interface.

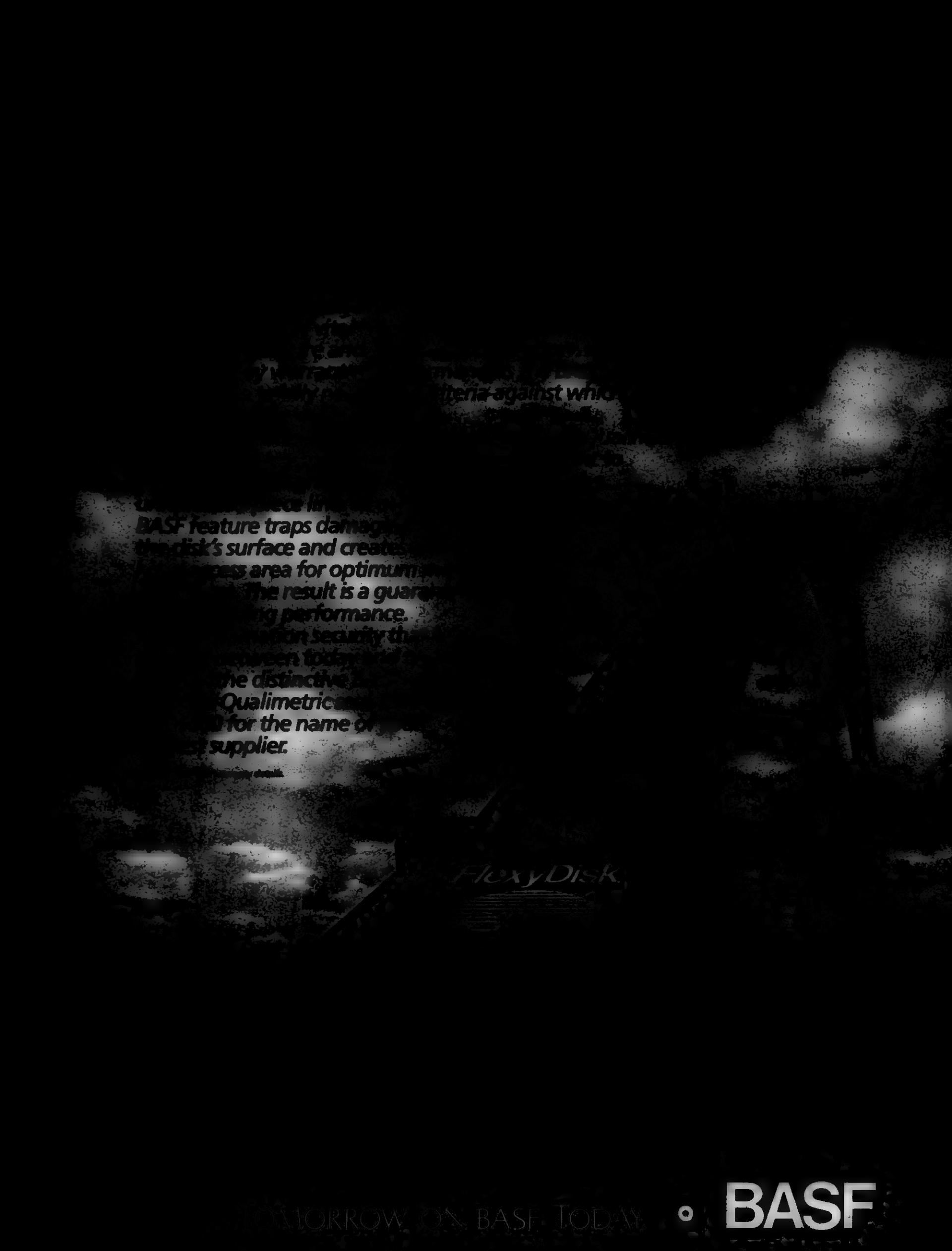
Proven System Performance
Over 5000 Users Spent 15% of a Single 3081-K CPU.

National Business Systems, Inc.

30 Tower Lane, Avon Park South, Avon, CT 06001 Tel: 203-677-8396
• In England, Shubrooks Design, Ltd. Nr. Chertsey, Surrey Tel: 9-328-66812
• In Israel, IBS, Ltd. Herzeliya, Pituach Tel: 052-70364

OA FOCUS: COMMUNICATIONS




FlexyDisk
BASF

LOCAL-AREA NETWORKS

By David L. Terrie

Interest in cable-based local-area networks stems from the simple fact that business has a wiring problem.

After the dense fog of bandwidths, access methods, topologies and media has been cleared away, cable-based local-area nets remain; potentially, they can provide flexible low-overhead networks, peripheral sharing and information sharing.

Desktop computers have advanced far beyond network supply lines of traditional distributed processing. Each user maintains his own data base, takes responsibility for his applications software disks, for backup and security and for archives when his hard disk is too full.

Furthermore, resource sharing (storage, peripherals, higher level processing and applications and communications facilities) has not existed.

Prices are falling fast for printers, mass storage and communications facilities, but the need for more sophisticated (and expensive) facilities is rising even faster.

Increasingly, users will want such facilities as laser printers, image scanners, presentation-quality color graphics output, mass storage, shared files and data bases, improved network management and sophisticated Systems Network Architecture links. Sharing these facilities will reduce their costs to the individual user, but it will still result in a significant net rise in the cost of computing for desktop computer users.

Local-area nets will not only facilitate access to sophisticated shared resources, they will enable increased architectural flexibility.

Along with facilitating access to sophisticated shared resources, local-area networks will enable increased architectural flexibility with respect to both processing and storage.

Of significant importance among these opportunities is the concept of the virtual desk. Wang Laboratories, Inc., for example, gives its Professional Computer users this capability on its VS systems, allowing the use of the VS hard disk as if it were resident in the workstations. This will soon be a standard feature for all system vendors' desktop computers. Storage will move back to center, including better back-up facilities, better data security, better data consistency and easier software updates.

The diskless desktop computer is what would have evolved had networks proliferated simultaneously with desktop computers. Processing power — but not necessarily storage — would have continued along its outward path to the workstation. (Datapoint Corp.'s Arcnet architecture is a singular example of this development). As it is, with desktop computing having first proliferated independently of the office systems architecture, desktop computers have not until recently been designed to be a compatible element (running proprietary software) of office systems.

Four basic workstation options will emerge:

- An intelligent terminal typified by IBM's 3270 family or Digital Equipment Corp.'s VT 100/200 family (that may take the form of a terminal phone like Rolm Corp.'s Cypruss or Northern Telecom, Inc.'s Displayphone).
- A diskless desktop computer utilizing a virtual disk at the file server and/or the utility processor level.
- A desktop computer with a local hard disk for added redundancy (in case of network failure) end performance.
- A full desktop computer with dual floppies or a floppy and a hard disk to allow full network independence and archiving capability.

A key proviso to make diskless desktop computer architecture feasible is a shared repository where the operating system and applications software reside. The best approach in the design of this facility may be to download the operating system when the workstation is turned on and for applications to be downloaded subsequently according to the user's stored profile.

If multiple standard and proprietary operating systems are available to the user, at power-up a standard menu can be downloaded that would ask for the user's ID and then provide a choice of profiles. Where possible, however,

SIEMENS

What separates our least cost routing from all the others?

Unlike other PABX manufacturers, Siemens gives you genuine cost-cutting control with Dynamic Multigroup Queuing, an exclusive, standard function of the least cost routing feature of our SATURN™ digital PABX systems.

Dynamic Multigroup Queuing automatically assures that calls will always be placed at the lowest possible costs. True "look back" capabilities enable our systems to expand the queue and seize the least expensive route (FX, SCC, WATS, DDD) available, improving trunking performance while lowering long distance costs by as much as 30 percent. No other company offers this money-saving advantage. But Siemens offers even more.

More capability...
For maximum cost efficiency.

There's quite a big difference in today's least cost routing systems. Some offer more capability than others. Siemens provides the most comprehensive LCR feature in the industry as a cost-saving standard function of SATURN systems. Our complete LCR package includes:

- 128,000 central office area code combinations with direct access to 3 SCC networks.
- Rotary dial area customers can now access SCCs through SATURN's ability to flip-flop from dial pulse to DTMF.
- Full digit number analysis—Lowers network costs, increases efficiency through analysis of entire digit number, as opposed to 3- or 6- digit analysis offered by other systems.
- Programmable search timer-controlled advance—Improves network efficiency by ensuring that optimal queuing time is attained before advancing to next trunk group.
- Day of week/Time of day control—Lowers network costs, improves service, and maximizes non-usage sensitive routes.
- Wide Band Tone Detection—Provides a wider range of frequencies to detect SCC dial tones. Insures digits will be accepted by the SCC. Simplifies complicated routing procedures. Improves speed and performance in network applications.
- Special service code routing—Removes service traffic from all but DDD routes. Prevents clogging of expensive routes with "no cost" calls, increasing network efficiency and lowering overall network costs.
- Digit Translation—Adds or deletes digits as necessary to complete calls via the selected route element.

Applied technology...
For improved communications management.

By applying field-proven technology to its digital telephone systems, Siemens automatically saves you money by controlling your telephone costs. Our advanced LCR is just one of the many standard features specifically engineered to make day-to-day business communications easier, more flexible, and more affordable.

For further information, or the name of the SATURN Gold Seal Dealer in your area, call 1-800-327-0638. (In Florida, Alaska, and Hawaii, (305) 994-8100 ext. 5330).
Siemens Communication Systems, Inc.
Office Systems Group
5500 Broken Sound Boulevard
Boca Raton, FL 33431.

Siemens.
Innovations in telecommunications for over a century.

the required operating system should be transparent to the user, who is primarily concerned with the application.

Though cost per connection will play an important role in the overall shape of the cable-based local-area network market, network software will play an equally significant role in the fortunes of individual vendors. At this stage in this very young market, hardware has been the name of the game. This stage is similar to that of the desktop computer market prior to the advent of the IBM PC and MS/DOS' dominance as the operating system for PC software developers.

However, when the bulk of the market settles down and adopts the IEEE 802 and other de facto standards, the differences between networks will largely be defined by software. Network software provides the functions above the physical and data link layers. Systems vendors, such as IBM, Wang and DEC, already provide network applications such as electronic mail and data access and security functions as parts of their systems software environment. But PC nets linking formerly single-user systems must provide these functions themselves.

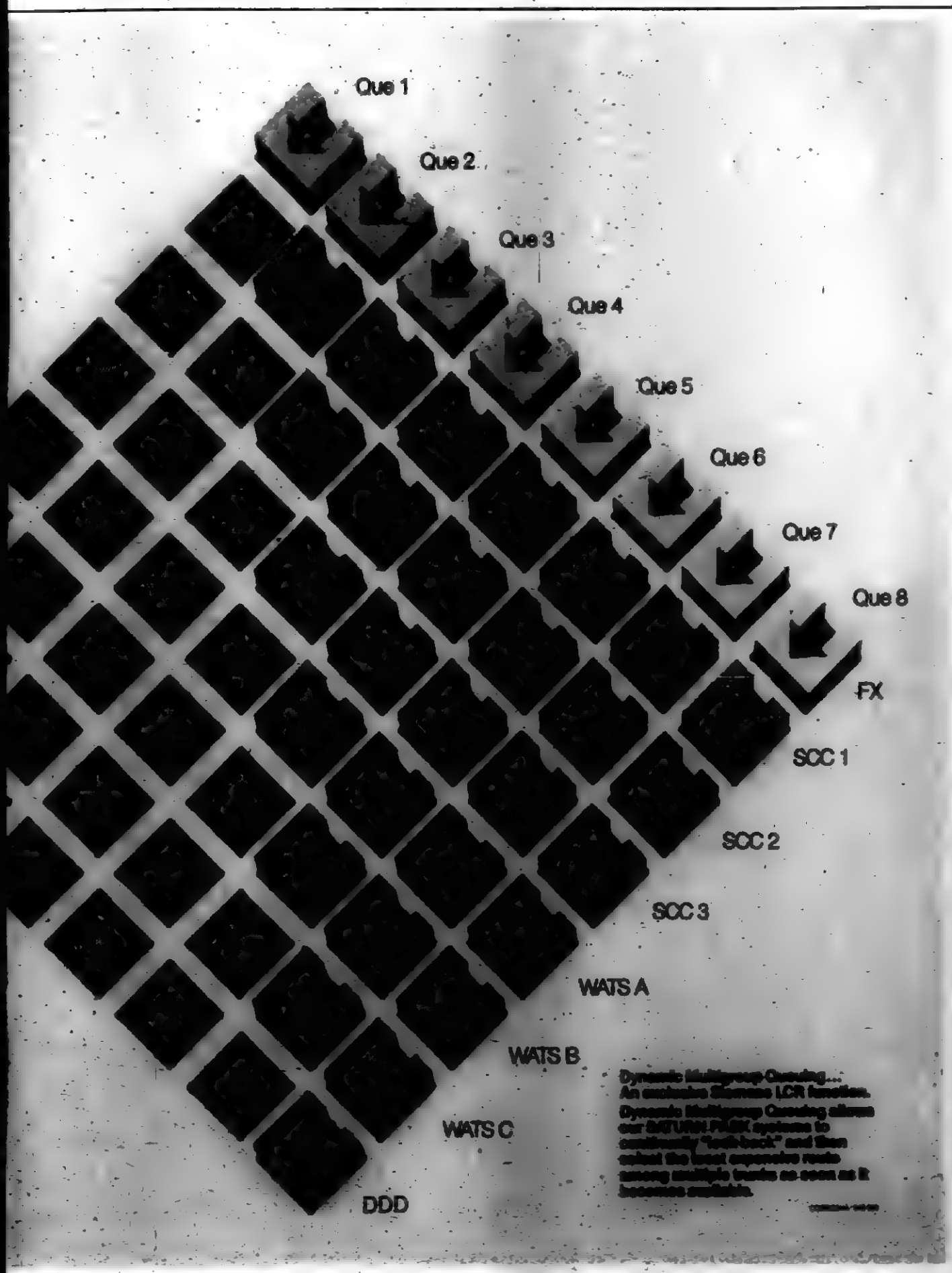
Here, as in the desktop computer market, ease of use and functionality are defined more by software than hardware, especially in the workstation environment. A local-area network should have at least the following software-based facilities:

- The file server allowing concurrent updates (or at least concurrent access), record locking and multiple levels of security.
- Print server software to spool print requests, so that print jobs can be queued on the print server. Further, multiple printers should be supported for letter quality, graphics (matrix and/or laser) and draft printing.
- Electronic mail software that stores a pointer in a file server. Any file should be sendable to individuals or broadcast lists. Users should be able to append comments and so on.
- Strong gateway and bridge facilities for internetwork communications.

One key benefit of incorporating a local-area network at the systems level is that systems no longer have to process routing and transport functions (as is the case in a point-to-point network). In the absence of a local-area network, these chores can be off-loaded with a communications processor. This, of course, is an expensive solution, especially since each node would require a front end. If a communications processor is not utilized, a portion of the nodes' processing resources must be partitioned to handle these chores, which leaves less processing power for running applications.

These facts say two things: No vendor will be able to provide cost-competitive solutions without using a local-area network in its systems architecture, and the market for communications processors will be dampened considerably (since only one node on a local-area network needs to attend to these chores).

On Page 38, some common user questions are answered.



Cost per connection will be important in the overall shape of the cable-based local net mart, but network software will be equally significant for individual vendor fortunes.

Some Common User Questions

Why consider a local-area network in the first place if a private branch exchange (PBX) can switch data with installed wiring?

For two reasons: First, the overhead efficiencies at the systems (mini and mainframe) level in a network architecture will be cut considerably by implementing a local-area network to replace a point-to-point network. Second, the 56K bit/sec maximum data rate for digital PBXs is not adequate for heavy file-transfer-oriented communications.

Users of transaction-oriented terminals and desktop computers with light file transfer requirements will be adequately served by a PBX. But many desktop computers and high-performance engineering workstations will be much better served by local-area networks offering 20 to 100 times the throughput. (A 1M-byte file would take less than a second on an Ethernet local-area network vs. a minimum of 20 seconds on a PBX.)

For these reasons, users should lean strongly toward implementing local-area nets for departments or work groups using desktop computers. Although not many users are communicating today, better software links to corporate data and growing user sophistication will result in a dramatic increase in users downloading files to their desktop computers.

I'm working out a corporate policy on local-area network implementation. What do you suggest?

There are two key elements here. First, should the policy attempt to control growth and implementation from the top (for example, the management information systems shop/systems environment) down, or should growth be monitored at the department level?

There are two separate (but not conflicting) goals to strive toward. The first is to solve end-user problems as cost-effectively as possible. One or two PC nets or departmental nets should be standardized on, and growth allowed to proceed as islands. In large sites where the host or satellite processor vendor offers a cost-effective solution, users should take advantage of it. However, third-party solutions will not create significant compatibility problems given strong bridge and gateway facilities.

The second goal should be to improve the efficiency of the systems network via a backbone. Implementing a local-area net to replace a point-to-point net may reduce overhead enough to make the freed-up applications processing pay for the implementation in a short period.

These two environments should then be merged as user requirements dictate. In the meantime, users will get the benefits of resource sharing (while still accessing corporate data via modems if necessary), and the network overhead will have been reduced considerably. Both steps will provide short-term benefits without creating long-term havoc.

How can a user be protected against having to rewire a building, given the difficulties in accurately predicting network capacity needs five or 10 years from now?

A tiered or hierarchical approach to networking may be the soundest strategy. It allows users to pull broadband or fiber-optic cable for the backbone, while opting for more cost-effective twisted pairs or baseband cabling in the workstation environment. This is, in fact, what IBM, Intel Corp. and several other vendors are pursuing.

The tiered approach has the following advantages:

- It simplifies network management and diagnostics by isolating performance and fault measurement to a small number of nodes.
- It limits the effects of network failure to a small group of users.
- It allows network administrators to design cost-effective solutions based on appropriate classes of service for departmental or application needs (a basically direct relationship exists between bandwidth and cost-per-connect).
- It allows users to implement local-area nets on an as-needed basis without jeopardizing the corporate networking plan's viability. Small, low-cost departmental local-area nets can be implemented individually and then strung together via a bridge to a backbone.
- The tiered approach will permit users to upgrade subnets or the backbone independently to enable use of the best available technology that may not be available from the systems vendor.

(Care should be taken in the design of the network that the majority of packets do not have to cross a bridge; these lines usually fall quite naturally along work group or departmental lines.)

What is the best approach to the issue of network topology?

Don't be enticed by the pretty pictures often seen in local-area network vendors' brochures. Notice that those buildings are empty. Yours won't be (unless you're constructing a new building). In an existing building, the conduits from a mini or other host to work areas are going to reflect the current star topology used. Because local-area networks offer both physical and logical configurations, many sites will find it best to use a physical star to segment a floor into quarters, fifths or whatever the layout dictates.

After this backbone has been laid, physical buses (or stars, in IBM's case) can be used to hook up the workstations in the area. Cable mass will have been reduced and connectivity increased.

Will it be possible to reuse existing cable plant?

Yes. Vendors (notably IBM) will use a "baluns" to adjust the impedence of installed cable for terminals to that of their local-area networks.

Are fiber-optic networks usable today? If not, should a user consider pulling fiber-optic cable anyway?

Vendors still haven't solved the problems associated with tapping optical fiber. Nevertheless, two things are certain: These problems will be solved in the next three to four years; second, fiber-optic networks will dominate the backbone market by the end of the decade.

For large networks requiring multiple channels, broadband is still the best choice. The primary exceptions to this rule will be at data centers requiring very high (over 20M bit/sec) data rates; campus environments; and in government, military or other applications requiring the security inherent in a light wave system.

Vendors such as Siecor and Ungermann-Bass, Inc. are using a physical star configuration for the backbone that allows fiber to be used as a backbone with connections at the ends only.

IBM's token ring backbone will probably also utilize a physical star topology for this reason. OA

Terrie is director of office systems research at The Yankee Group, a Boston-based market research and consulting firm.

"Before Soft-Switch," that is."

"I used to be difficult to share information at our company because our office equipment comes from different vendors. Consequently, when we needed a finished document, all of the information had to be re-keyed for the word processors.

"Not any more. Soft-Switch lets us exchange all of that information intact, with no document clean-up.

"Soft-Switch is a Document Control System from ITI, and it runs on our IBM mainframe. It permits documents created on one type of equipment to be used by other devices, regardless of the vendor (word processors, personal computers, printers, etc.).

"Soft-Switch gives us extensive edit level translation capabilities. It stores documents in libraries on the mainframe—no more hunting for diskettes for last year's reports. And routing is simple and efficient. Whether the document goes to storage at the mainframe, or to a device across the hall, or to 25 branch offices around the country, Soft-Switch requires just one command. Conveniently, the recipient gets the document directly from the mainframe. This is especially useful when you route across time zones.

"It's simple to install and doesn't need much maintenance. The staff likes it because it's easy to use, requires very little training, and just about eliminates document back-up.

"Soft-Switch supports both MVS and VM/CMS operating systems, and it's the first Document Control System that's fully compatible with IBM's DIA/DCA.

"Soft-Switch is available for most major OA equipment. And if you don't have a mainframe, you can still use Soft-Switch by time-sharing through CBInetwork Corporation.

"For years you've been hearing about 'integrated' offices. Well, now you really can integrate what you want, when you want—with Soft-Switch. Check it out. Call ITI."

iti Integrated Technologies, Inc.

... no Integrate Incinerate

200 North Warner Road
King of Prussia, PA 19406
(215) 768-9330 • TELEX: 466600

STRATEGIC PLANNING

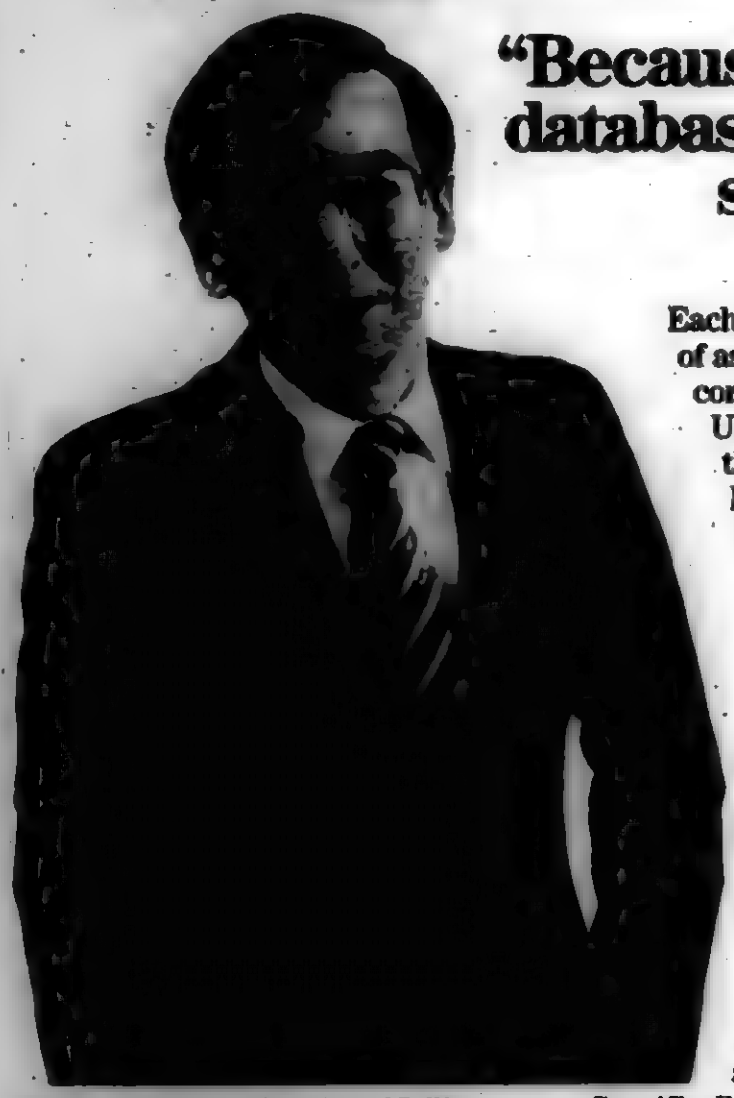
By Dixon R. Doll

The past two years of fast-changing technology and industry restructuring that have resulted from the AT&T divestiture have had quite a significant impact on most U.S. organizations.

Most companies now recognize that the time has come to apply formal planning methodologies.

These methodologies are based on the fundamental notion that business strategic planning is the principal process that feeds information systems planning, office automation and telecommunications strategic planning. Figure 1 on Page 41 portrays a common set of steps in developing prioritized actions or programs on which user organizations spend time, money and personnel resources. The output of the planning process can be simplistically viewed as a prioritized set of actions or programs that best meets the business needs of the user organization. It is clear from Figure 1 that telecommunica-

Why is Cullinet's information systems strategy creating so much interest?



"Because the strategy of integrating database, applications and decision support makes sense."

*Bob Goldman**

Each day, representatives of as many as eight major corporations from the United States and around the world visit Cullinet's headquarters. They are coming in increasing numbers because they've heard what Cullinet is doing in information systems technology. After the meetings, they are convinced that Cullinet's direction in information systems makes sense for their organizations. It is, in their opinion, the only coherent and intelligent approach available.

Specifically, this means the full integration of Cullinet's IDMS/R database management system, applications, including Manufacturing and Financial Software, and Decision Support Systems that link personal computers to the corporate mainframe.

In other words, a single source of software as opposed to the fragmented approach which has plagued the computer user in the past.

Often, these visitors return to our headquarters with the senior officers of their organization for an Executive Program. Senior management is interested to learn that there has been more progress made to deliver on the promise of computers for top managers during the past year than during the previous twenty. This promise of computing for top management is "knowing that they have a problem in time to take corrective action."

In order to fulfill that promise, the full integration of Database, Applications and Decision Support Systems is required. When management understands the importance of the integrated software solution, the result is a renewed enthusiasm by them for support of the information systems activities of their companies. They realize that their respective companies must put in place new information systems in order to compete or even survive in the future.

That, in the final analysis, is what Cullinet is about: providing a complete and integrated software solution for the 80's and 90's.

Call or write us for more information or attend a very informative seminar explaining this unparalleled software solution. To participate in one of the 700 Cullinet seminars scheduled internationally, send in the coupon or call 1-800-225-9930. In MA, 617-329-7700.

IDMS/R Seminar cities and dates:

City & State	Date	City & State	Date
Albuquerque, NM	May 2	Kansas City, MO	May 2
Anchorage, AK	May 23	Los Angeles, CA	May 1
Atlanta, GA	May 15	Louisville, KY	May 10
Atlantic City, NJ	May 10	Lubbock, TX	May 1
Austin, TX	May 31	Lynchburg, VA	May 17
Battle Creek, MI	May 15	Miami, FL	May 17
Boston, MA	May 29	Milwaukee, WI	May 1
Boston/Danvers, MA	May 3	Morristown, NJ	May 8
Bridgeport/ New Haven, CT	May 22	Nashville, TN	May 3
Calgary, AB	May 23	New Orleans, LA	May 24
Charlotte, NC	May 10	New York, NY	May 15
Cheyenne, WI	May 23	Orlando, FL	May 24
Chicago, IL	May 3	Ottawa, ON	May 8
Cincinnati, OH	May 14	Pittsburgh, PA	May 16
Cleveland, OH	May 24	Portland, ME	May 15
Colorado Springs, CO	May 16	Quebec City, PQ	May 17
Columbus, OH	May 2	Richmond, VA	May 16
Dallas, TX	May 15	San Antonio, TX	May 16
Des Moines, IA	May 16	San Diego, CA	May 8
Detroit, MI	May 22	San Jose, CA	May 15
Greenville, SC	May 24	Springfield, IL	May 17
Harrisburg, PA	May 8	Toronto, ON	May 17
Hartford, CT	May 9	Tulsa, OK	May 22
Houston, TX	May 10	Valley Forge, PA	May 17
Indianapolis, IN	May 8	Waco, TX	May 15
Jacksonville, FL	May 1	Washington, DC	May 9
		Wilmington, DE	May 22

Robert N. Goldman is President of Cullinet Software, Inc. Starting with the Company over ten years ago, Mr. Goldman has been intimately involved with the evolution of Cullinet's software architecture. In various roles, including Director of Software Development to Executive Vice President and in his current position as Chief Operating Officer, Mr. Goldman has been a key contributor to the product and strategic directions of the Company. He holds a Bachelor of Science Degree in Computer Science from Purdue University.

I'd like to attend your seminar on _____ Date

In _____ City

My Computer is _____

Name/Title _____

Name/Title _____

Company/Department _____

Address _____

City _____

State _____ Zip _____

Phone (___) _____

Mail to: Cullinet Software, Inc., 400 Blue Hill Drive, Westwood, MA 02090-2198, Attn: Corporate Meetings.

Cullinet Software products are designed to run on IBM 303/370, 30XX or 43XX or plug-compatible computers.

CSP-CA 4/28

Software: Cullinet

©1984 Cullinet Software, Inc., 400 Blue Hill Drive, Westwood, MA 02090-2198.

tions requirements exist as a direct result of two sets of needs. The first is the need to support other technology plans, including DP and OA. The second consists of specific business needs to increase productivity and profitability in ways that may not depend on information systems and OA per se.

The last 15 years has seen a rapidly exploding set of new applications for telecommunications coupled with industry deregulation and rapid technological change. This combination has dramatically increased top management and end-user awareness of innovative ways of using telecommunications services. Telecommunications organizations have moved through several distinct stages of sophistication in most customer organizations. In the late '60s and early '70s, they were generally relatively low-level organizations that did little or no planning and were mostly concerned with operational activities.

Now, however, the charter of the typical telecommunications organization has changed. It is normally charged with:

- Providing internal users services that are cheaper than the services publicly offered in the marketplace.
- Packaging technologies to provide new services that are important to the success of the business but unavailable in the public marketplace.

If the internal organization is unable to do either or both of these things, the telecommunications organization has little or no reason to exist. Many enterprises are fast recognizing the important opportunities associated with selling spare capacity noninternal networks, and with becoming, in effect, resellers or brokers of advanced telecommunications services. Numerous Fortune 500 companies have already entered the commercial market, reselling excess capacity in their networks to business users whose requirements overlap their own.

The successful telecommunications organization will recognize that it must, first and foremost, be a responsive service-providing organization. It must keep closely in synchrony with the business needs of the internal users, fast changing technology and various external factors. These external factors will include not only changing tariffs, political developments and standards, but other nontechnological factors — for example, the cost of business travel and jet fuel — that influence the costs of alternative ways of solving the business' problems.

Organizations are becoming increasingly aware of the need for broad thinking about different ways of solving business problems, especially in areas that involve new uses or expanded uses of telecommunications. Businesses are concerned about the flood of paper. They would like to move information around inside the enterprise and across enterprise boundaries. They would like selected access to information known to be stored in various files and data bases. They recognize that information movement can indeed take place in numerous ways, some of which don't involve the use of telecommunications services as we know them.

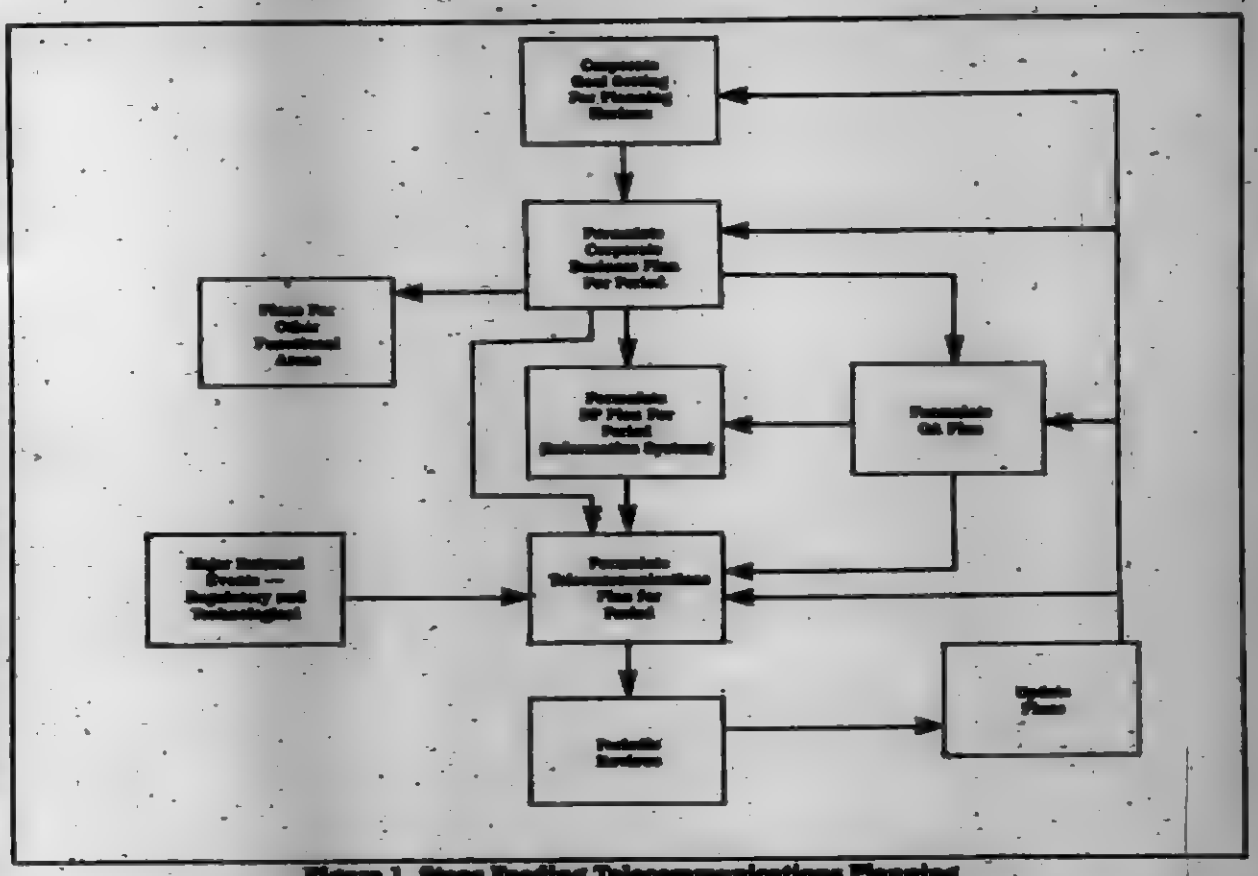


Figure 1. Steps Feeding Telecommunications Planning

They carefully investigate a variety of telecommunications-based and alternative methods for solving business problems. Among those methods are courier services, document distribution services and business travel, the soaring cost of which is a growing concern. For example, at a recent American Express seminar, John Reiner, senior vice-president, presented statistics indicating that American business travel costs soared from $35 billion per year in 1972 to $75 billion per year in 1982. His forecasts predict total business travel expenditures climbing to $124 billion by 1985 and $250 billion by 1990!

Growing concerns over productivity, soaring travel costs and the pressing need for better ways of solving problems have spawned considerable interest in teleconferencing as a principal ingredient in the strategic plan.

One way to determine the business needs to be supported is through a multifaceted program of interviews and questionnaires of executives, DP/information systems users and line managers. In all cases, the objective should be to identify areas in which better ways of using telecommunications technology could benefit the

HOT BUTTONS

- Excessive phone tag.
- Soaring travel costs and wear and tear on people.
- Obtaining access to necessary information.
- Inadequate document composition and distribution capability.
- Multiple independent wide-area networks.
- Excessive cabling costs for in-house networks.
- Multiple terminals required for accessing different applications.
- Restrictions of dedicated computer vendor network architectures.
- Inadequate support for dial-up terminals.
- Organizational structures (corporate vs. divisional).
- Networking extensions to customers and distributors.
- Electronic mail (text and voice) opportunities.
- Teleconferencing.
- Blocking vs. nonblocking switch.
- Use of satellites.
- Multivendor coordination — a nightmare.
- Network troubleshooting tools, techniques.
- Local-area networks.
- Centrex replacement plan.
- Phone system upgrade.
- Cost and performance optimization — existing and planned networks.
- Cost-allocation systems and procedures.
- Service-level goal setting (availability and response time).
- Service-level tracking and reporting.
- Network management and administration.
- Transborder data flow.
- Network support for PCs.
- Presentation-level protocol conversion.
- Private microwave and fiber-optic systems.
- Voice data integration (all levels).
- Synchronous data transmission through computerized branch exchange.
- Noncoded information device support.
- Public data network: economics; international accessibility; device support; bulk data transfer security; above-transport services.
- Vendor relationships: AT&T Information Systems vs. Bell Operating Cos.; end-to-end providers; other vendors.
- Resale carrier opportunities.
- Exploiting forthcoming T1 services.
- Multipoint data networks — what happens?
- Enhanced gateways and bridges: local-area net-to wide-area; inter-local-area net, inter-wide-area net.
- Opportunities for portable terminals, personal computers.
- Speech recognition opportunities.
- Lease vs. purchase telephone equipment.
- Other bypass technology opportunities.

enterprise. The interviews have several functions. They:

- Identify problems (real and perceived).
- Articulate changes in strategic business directions which must be supported by the telecommunications plan.
- Produce principal documents on which the plan itself must be based, namely, the prioritized list of key issues and supporting business requirements for the planning horizon.

Normally, the planning horizon consists of a five- to 10-year window. Actions, projects and programs slated for the next year are usually considered tactical. Complementary actions and directions scheduled for the remainder of the planning horizon can be viewed as the strategic piece of the directional plan.

Every organization will articulate its principal business needs differently, but several dozen typical key issues seem to show up in most companies as the principal areas of concern (see "Hot Buttons" on Page 41).

After these areas of concern have been defined, business requirements are summarized and presented to top management for their review. When the accuracy of these requirements has been established and a priority assigned to them, the next move can be taken. This consists of the all-important steps of identifying alternative solutions, evaluating them and ultimately selecting the preferred direction.

The best way to get from here to there (the objective of the strategic planning exercise) depends on the organization. It must clearly have a sense of vision about where it thinks it wants to be in office communications at the end of the planning horizon. Although enterprises vary in their descriptions of exactly where they wish to be in the future, most tend to agree that the general level of functionality and capability shown in Figure 2 is one they would like to work toward.

The plan must involve laying out a time-phased set of actions that can be taken to specifically bring about the general levels of functionality implied in Figure 2. This step will specify in detail the physical interconnections, services from common carriers, wide area networks, local-area networks, external network gateways and other levels of functionality required in a specific network plan for a particular user.

Now comes the most challenging and interesting activity in the entire strategic planning process. After the needs have been established, they can be laid out on a time line to establish a point of reference, based on existing network configurations. The planning exercise must define a series of paths for moving the enterprise from where it is today to where it wants to be in the future. The steps in the plan identify specific building block procurements and interconnections to be made across the plan's timeframe.

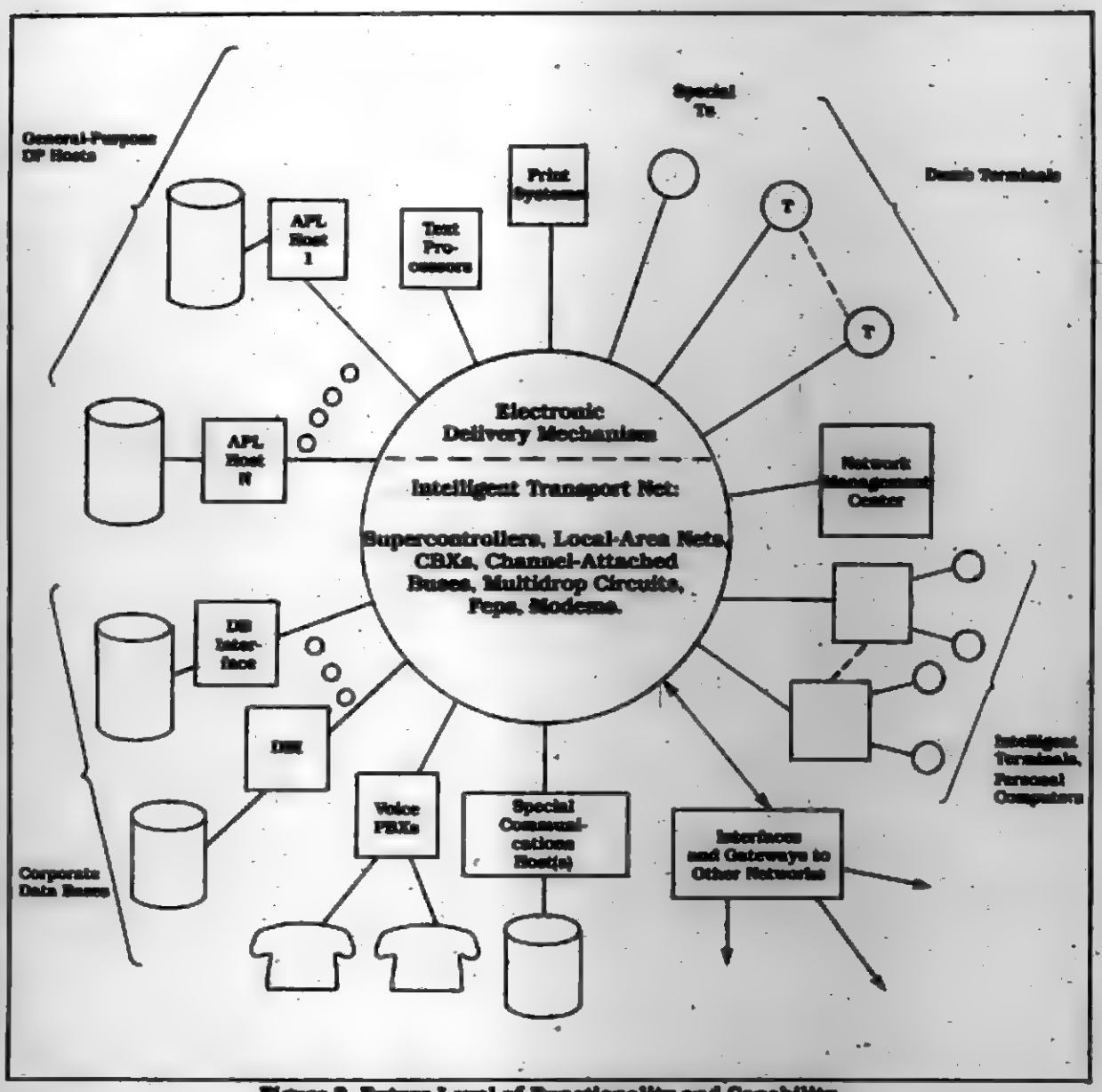


Figure 2. Future Level of Functionality and Capability

In developing a list of alternative networking strategies, planners must comprehensively and exhaustively evaluate a wide range of factors, including the wide proliferation of communications network service alternatives.

Constraints will exist as a result of equipment decisions in the areas of PBX, local-area networks, technologies, gateways to external network services and the selection of DP and OA vendor network architectures — for example, Systems Network Architecture, Decnet and DIA/DCA.

Priorities must be given to installing specific telecommunications technologies and applications. Alternative ways must be found to satisfy business needs through the development of realistic, time-phased actions (commonly called roadmaps) that enable the customer to move in the direction of its goal at the end of the planning horizon. A plan is not a single path on the roadmap. A plan recognizes the need for alternative courses of action and contingencies that may be necessary in the future as various external factors change.

The analysis of the strategic networking alternatives and the formulation of the specific steps in the plan then proceeds with a careful assessment of each alternative step along the various paths on the roadmap. Each potential step has certain associated cost implications, personnel and staffing requirements, functionality enhancements and constraints. Most important, each of the alternative paths and constituent steps will not only have an impact on one or more of the prioritized user needs in varying manners, it will also produce attendent risks to the enterprise if that step is taken.

The process of selecting an organization's best path involves a careful assessment of the advantages and disadvantages of each major alternative path identified at the beginning of the architectural definition step. The ultimate strategic plan will be the result of a highly artistic exercise of sorting through a bewildering array of complex options. The user must understand the consequences of making fundamental commitments to go in certain directions. For example, if major investments are made in new computerized telephone systems in conjunction with the opening of a new plant or facility, such equipment will create a natural potential hubbing site for enterprise telecommunications networking activity in that particular metropolitan area or region of the country for many years into the future.

Users must also make certain that the alternatives they are investigating provide adequate capacity and expansion characteristics. An expensive procurement today should not become out of date tomorrow because of technological obsolescence and adequate capacity or an inability to add new features and functions that might become important in the years ahead, long before the financial amortization of that system has been completed.

The final and perhaps most important aspect of evaluating alternative paths involves the need for performing formal financial comparisons of principal alternatives in the plan. In the final analysis, most enterprise strategic networking plans will be strongly influenced by a combination of factors including financial return on investment, flexibility, ability to remain competitive within an industry and — most important — to increase overall enterprise productivity and profitability. ◊ OA

Doll is president and chief executive officer of DMW Group, Inc., a research and consulting firm headquartered in Ann Arbor, Mich.

PC NETWORKS

By Amy D. Wohl

By the end of 1984, millions of personal computers — especially IBM-compatible personal computers — will have been delivered to office desktops.

Also by that time, far more personal computers will be in place in large companies than all the word processors ever delivered.

Who is buying these systems and for what purpose? How has their arrival in the office changed the notion of how we will computerize our front-office operations?

The office automation industry had a watershed year in 1983, when end users got bored with waiting for OA and started to act. Some customers planned for, ordered or even implemented substantial OA systems. But more customers ordered much larger numbers of personal computers as workstations, apparently confident that these workstations would eventually be the basis for office systems.

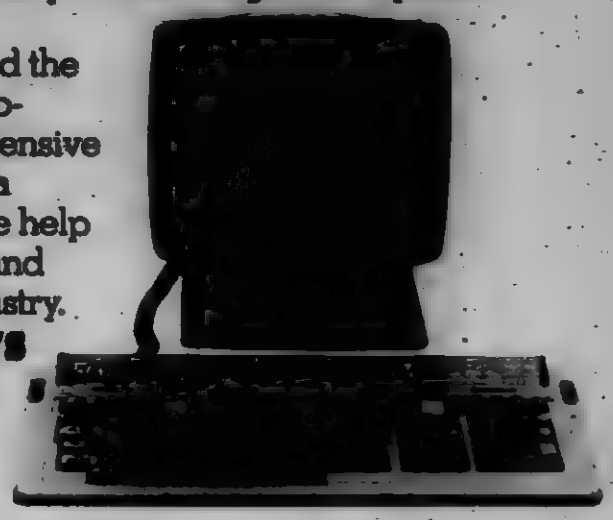
This represents a change both in what is happening (how much is being ordered when and by whom) and also

WITH DATA GENERAL YOUR COMPUTER WON'T BE ABANDONED AT YOUR DOORSTEP.

DATA GENERAL SERVICE—THERE WHEN YOU NEED IT

Some computer companies will sell you their bright new systems—and then disappear.

Not Data General. We understand the service and support needs of the automated business office. Our Comprehensive Electronic Office (CEO™) gives you a system that will run smoothly with the help of one of the most complete service and maintenance plans in the entire industry.



A SERVICE PROGRAM THAT'S RIGHT FOR YOU

Whatever the size of your office system, its locations, or hours of operation, there's a Data General service program designed to meet your needs.

With our "Enhanced Response Program," you'll have a service engineer on your site within 2 hours—24 hours a day, 7 days a week. Or choose our "On Call Service," in which a service engineer responds within 4 hours—Monday through Friday, between 8AM and 6PM.

With the 32-bit ECLIPSE® MV Family of computers, you can choose an uptime guarantee from 96% to 99%. Remote Assistance is also available to help you maintain high performance levels while saving time and money.

And, with our new DESKTOP GENERATION™, select from 16 service programs—the widest range of options for any desktop on the market. These programs will help increase productivity and keep maintenance convenient.

ALWAYS NEAR YOUR OFFICE

Data General has experience with large and small companies that have both local and distributed office environments. Whether you have one office, or a worldwide network, service is always nearby with Data General's 250 offices.

TOTAL SUPPORT FOR HARDWARE AND SOFTWARE

Data General's service organization will be your one source for handling both hardware and software problems. Our service engineers undergo extensive training every year. They'll know your system—no matter how new it is.

CALL NOW

To learn how Data General's Field Engineering Services can keep you a generation ahead, call **1-800-343-8842.** In Massachusetts, call **1-800-451-1014.** Or write Data General Service, 50 Maple Street, M.S. 05 G, Milford, MA 01757.

Data General
a Generation ahead.

CEO and DESKTOP GENERATION are trademarks, and ECLIPSE is a registered trademark of Data General Corporation, Westboro, MA 01580.

in the underlying assumptions customers must be making in their decision-making processes.

One new assumption is that functionality now offered or soon to be offered by the IBM-compatible class of personal computers is adequate for many office users.

Nearly every month, this class of users grows larger as more capable user-friendly software is offered — and, equally important, as more and more users dip their toes in the icy waters of computer literacy and find the water warmer than they expected.

This means two strong trends — more and better software and more and more educated or ready-to-be-educated users — are coming together and reinforcing one another. This does not mean we don't need better workstations, more software capability or easier-to-use systems — it just means our increasing skills and confidence and our increasing impatience to enhance our work tools have made us reluctant to wait.

Another new assumption is that users are actually designing systems to a new kind of model. This model, bottom-up systems design, contrasts strongly with the largely top-down system design users did in the past.

Until recently, users looked first to their DP environment and then to their data communications environment and its interconnected distributed DP (DDP) environment. At that point, the user decided what kind of OA to buy and largely decided between placing OA within the DDP environment or buying separate systems, generally from a different vendor. The OA system choice then determined the type of workstation the user got for his desktop. Top-down system design assumes upper layers determine or limit lower layer choice; as a result, the workstation was often just a predetermined item rather than something users had much say in selecting.

Top-down systems design also usually assumes a fair amount of bundling at the systems hardware, systems software, interconnection, workstation hardware and workstation software levels. Only rarely did systems involve many vendors — and those systems required sophisticated, self-reliant users who would do much systems integration work on their own.

Bottom-up system design is different. It depends upon two notions. First, the workstation and its software are independently useful. Second, workstations and standards for interconnecting workstations are well enough evolved that workstation choices can be made. Underlying assumptions are that systems for interconnection exist and that the workstation being selected will plug into the system.

This process is rather like the way we buy lamps today. Within the U.S., one may buy a lamp in the lamp store, the department store, the hardware store, the five-and-dime store or even at a garage sale. The buyer can still be confident that all lamps plug into all electrical outlets successfully.

Another new assumption is that users are actually designing systems to a new kind of model. This model, bottom-up systems design, contrasts strongly with the largely top-down systems design users did in the past.

But is this confidence justified in the office? No workstation standard has actually been formally accepted and neither has an interconnect standard. No standard has been proposed and accepted on a de jure — or, in the computer industry case, "de committee" — basis. However, a de facto standard for workstations is strongly in place. That de facto standard is currently IBM's PC-DOS and, more generally, its generic MS-DOS parent.

Before you suggest that MS-DOS is an inappropriate standard for user-friendly, highly functional desktop workstations, or that no such de facto standard exists, consider two facts:

- Sales of personal computers as workstations strongly exceed sales of high-end workstations — perhaps by a factor of 50:1 or more.
- More and more customers, particularly larger business orga-

nizations, state that MS-DOS or PC-DOS is their organizational personal computer standard.

A telephone survey of a number of very large business and governmental organizations recently showed that 88% of the organizations surveyed had standardized on MS-DOS (72% had standardized on PC-DOS). Those are impressive numbers — maybe even scary ones.

Some concern is justified that in an industry where technology is moving very fast, strong acceptance of a standard could act as an impediment to users' ability to react rapidly to new or enhanced offerings. Although they would be able to implement on a more stable and less chaotic basis, users might temporarily — or even forever — lose out on some interesting or useful offerings that for one reason or another fall outside the standard.

A telephone survey of a number of very large business and governmental organizations recently showed that 88% of the organizations surveyed had standardized on MS-DOS (72% on PC-DOS). Those are impressive, maybe even scary, numbers.

For that reason, it is pleasant to report that, partly as a result of IBM's endorsement of the Unix operating system environment for the PC XT with the PCIX announcement in January, an alternative operating system environment has been proposed and is now gaining some immediate and enthusiastic approval.

Perhaps the notion that more than one flower should bloom in the garden will catch on. If so, the more monolithic aspects of standardization — particularly the stifling effect standards can have in an infant arena — can be at least partially avoided.

Of course, in order to have a successful, multiflower garden, the colors — or in this case the operating systems environments — must not clash. We will therefore quickly need:

- The ability to access both operating systems and both types of software from the same machine and the ability to access any data set from either environment. In other words, crossing over will be a requirement.
- The ability to see both environments simultaneously, presumably through a windowing environment, but one of greater sophistication than those currently in the marketplace.
- The ability to feel confident that future products will either occur within the current operating systems standards — or the knowledge that adequate migration paths and the ability to reasonably coexist will be features of new product announcements from most vendors.

Basically, when users set off down the path of bottom-up systems design, they are attacking their business problems from first principles. The workstation solves some basic problems; the fact that it will later hook into a system and solve other problems (or prevent them) is a fragile hope rather than an absolute fact.

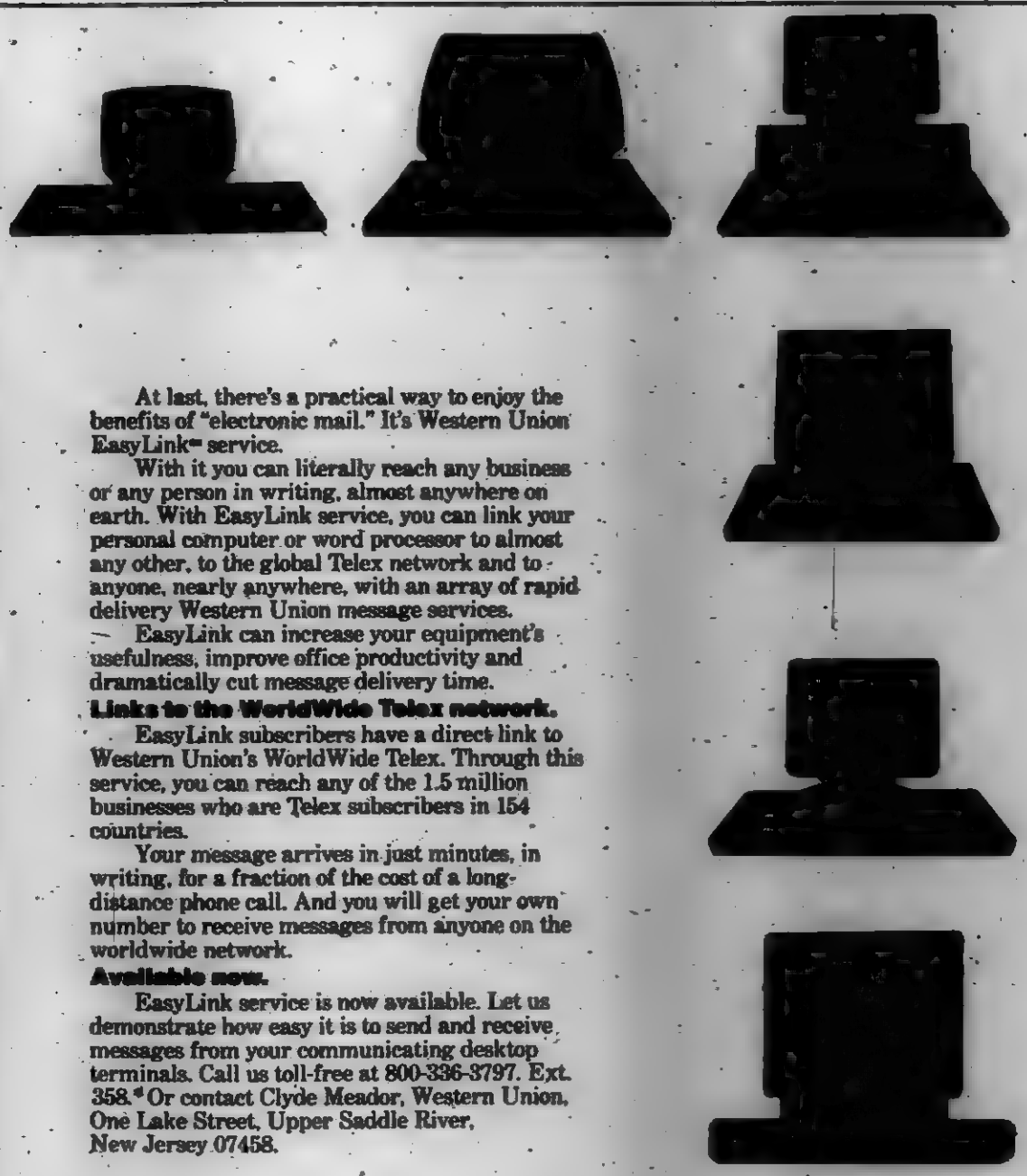
Nevertheless, many systems-level offerings are already available for the IBM class of personal computers. Some are even IBM offerings.

To summarize:

- The user can provide systems function by attaching the personal computers to a higher level system. Systems-level function might typically include electronic mail, file storage and sharing, device sharing and communications gatewaying to other systems.

For example, the IBM PC can be provided with systems-level function through attachment to the IBM 5520, the IBM 8100, the IBM 4300 (with VM and Profs) and the IBM MVS environment (with extended Systems Network Architecture and Disoss-PS). These are only the IBM options. A number of other OA vendors will permit IBM-compatible personal computers (often including their own product offerings) to function as office workstations on their systems.

- The user could attach to an IBM or third-party network. The first IBM network, the PC Cluster, has recently been announced, and at least two other IBM networks are expected in 1984. A number of third-party nets support IBM PCs and provide some systems-level functions mentioned above.
- It will probably be possible



At last, there's a practical way to enjoy the benefits of "electronic mail." It's Western Union EasyLink℠ service.

With it you can literally reach any business or any person in writing, almost anywhere on earth. With EasyLink service, you can link your personal computer or word processor to almost any other, to the global Telex network and to anyone, nearly anywhere, with an array of rapid delivery Western Union message services.

EasyLink can increase your equipment's usefulness, improve office productivity and dramatically cut message delivery time.

Links to the WorldWide Telex network.

EasyLink subscribers have a direct link to Western Union's WorldWide Telex. Through this service, you can reach any of the 1.5 million businesses who are Telex subscribers in 154 countries.

Your message arrives in just minutes, in writing, for a fraction of the cost of a long-distance phone call. And you will get your own number to receive messages from anyone on the worldwide network.

Available now.

EasyLink service is now available. Let us demonstrate how easy it is to send and receive messages from your communicating desktop terminals. Call us toll-free at 800-336-3797. Ext. 358.* Or contact Clyde Meador, Western Union, One Lake Street, Upper Saddle River, New Jersey 07458.

Western Union EasyLink service.

The easy way to link your computer to the world.

*In Virginia, call 703-442-8677. Ext. 358.

very soon to look at mainstream offerings that provide interconnection and systems-level support via the telephone system through the extension of digital private automated branch exchange (PABX) function. Such offerings will initially be through the use of telephone wiring and accessing the DP capability of the PABX, but soon the opposite alternative may show up — a local-area net that treats telephone function as an extension of other information processing capability.

Without interconnection and systems-level function, very little real OA will occur, particularly the synergistic effects that offer very high productivity paybacks. It should be noted that it is important to be able to add systems-level function readily.

Some systems-level function, particularly access to data bases, can be offered without making the personal computer population into its own network. Personal computers can simply access existing information systems through more simple communications hardware and software. Here, three things should be emphasized. The first is matching the user's installed DP environment, as well as the public data network access requirements. The second is permitting data to move freely between environments, not merely to be viewed from one environment to another.

The third and final factor is to make it as easy as possible for relatively naive users to access and use data. This process can take the form of making the interconnection transparent (let the system do it) or very friendly (English menus with no strange communications vocabulary to learn). It might also take the form of easing the access of data from a complex environment on another system (the workstation as a friendly filter).

If we assume that many of us will automate our offices (and our own personal desktops) with personal-computer-level products, it is fair to ask, "Are personal computers going to be adequately useful and adequately friendly?"

If the current success of the IBM PC and its friends and relations is any evidence, acceptance has already occurred with some of us. But for many others, much more is required. Some new product offerings emphasize trying to stretch the current personal computer into a friendlier, more robust machine. Peripherals upgrades (hard disks, better or different keyboards, more memory) can make the machine more pleasant and more useful, but they also make it more expensive. In fact, we seem to have approached a point of parity: A robust IBM PC XT is now about the same price as an advanced workstation with equivalent hardware and functionality (for example,

Some offerings emphasize trying to stretch the current PC into a friendlier, more robust machine. Peripherals upgrades can make the PC more pleasant and useful, but they also make it more expensive.

some Apple Computer, Inc. Lisa models, and the new Exxon Offices Systems Co. 750 Integrated Workstation). This should have a strong effect on the viable pricing of older and less powerful workstations which are still much more expensive.

A few workstations seem much more powerful on a price/performance basis; that is, their price and function taken together seem interesting. However, such products are generally not yet completed or entirely available. For instance, NBI, Inc.'s IWS seems very powerful in function (although still a bit pricey), but it's not yet really in delivery. The Apple Macintosh is so inexpensive and so hardware-robust it almost overcomes its lack of MS-DOS compatibility and its still small software library (three packages, Macwrite, Macpaint and Multiplan, at the time this article was written). Time and software may change the balance point here.

The future clearly holds a mixture of workstation products. A large part of that heady mix is sure to be personal computers. If we can work out the process that permits us to provide system-level function to these useful and relatively inexpensive workstations and a standard interconnect environment — or perhaps a choice of several — we will arrive at the automated office much sooner than we had dared to hope. OA

Wohl is president of Advanced Office Concepts Corp., a consulting firm based in Bala Cynwyd, Pa.

Now your IBM/PCs and mainframe can share information with each other.

Just share a little information with us.

OMNILINK™

OMNILINK software gives your IBM/PCs and mainframe an open channel of communications. So you can use your personal computers to get information from your mainframe or any other IBM/PC connected to your CICS system. OMNILINK lets you make decisions based upon more complete, up-to-date data. You can also use OMNILINK to send and receive all your messages, documents, and batch reports via your existing terminals, word processors or IBM/PCs.

To let you manipulate information on your PC, we've included a copy of OMNIMICRO software.

OMNIMICRO dramatically increases your IBM/PCs' capabilities. It lets you write your own programs on your PC using a simple non-technical language. You can also make queries in plain English. Just key in the information and format you want. OMNIMICRO will search the mainframe or other PCs and deliver the data to your PC. OMNIMICRO even gives PC users integrated word processing, spreadsheet and graphics capabilities.

To learn more about how your IBM/PCs and mainframe can share information, share a few facts with us. Mail the coupon, or call toll-free 800-526-0272.

Name _____ Title _____

Company _____ Phone _____

Address _____

City _____ State _____ Zip _____

ON-LINE SOFTWARE INTERNATIONAL
Fort Lee Executive Park
Two Executive Drive, Fort Lee, NJ 07024
(201) 592-0009, Toll Free (800) 526-0272

CWLCA4

PBX TECHNOLOGIES

By Angela MacRae

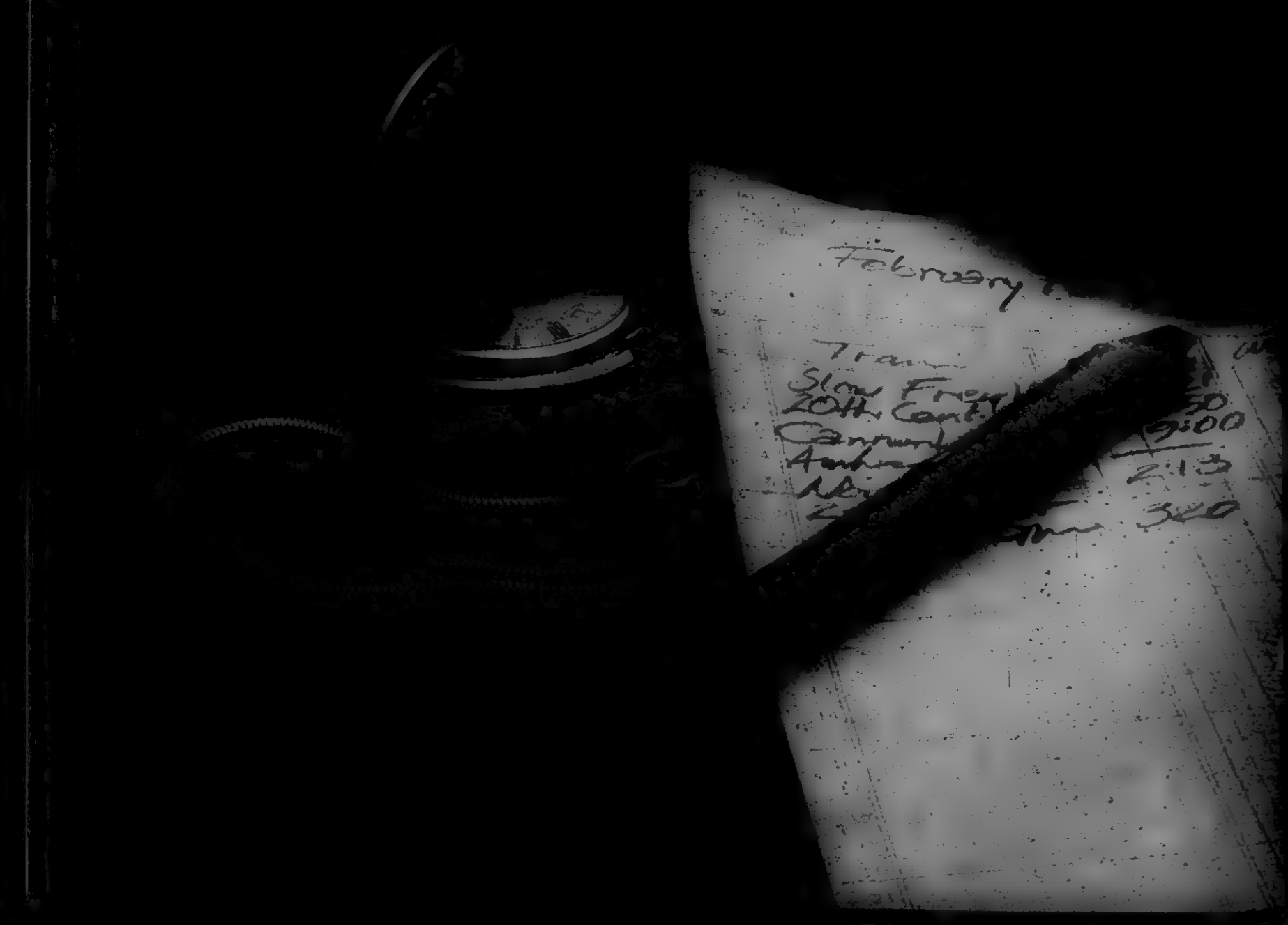
Within the past few years, vendors of data processing, telecommunications and office automation technology have been competing to supply multipurpose systems to the office.

Until quite recently, however, telecommunications vendors had not been very keen competitors in bringing integrated systems — those that handle voice, data, text and image — to the office environment.

Most telecommunications vendors now offer digital switches. The digital private branch exchange (PBX), with expanded switching and processing power under an enhanced architecture, can handle information in virtually any form over standard twisted-pair wiring.

While end users wait anxiously for a single workstation that combines the functions of all office equipment, telecommunications vendors are positioning their products to evolve into the vehicle of office communications in the information age.

The most pressing problem



in managing information is integrating and interconnecting the installed base of systems and devices in the office. The immediate challenge is to help businesses make the best use of their current equipment and prepare for the more powerful, more dispersed and more flexible systems of tomorrow.

Word processing and the proliferation of data terminals and personal computers throughout the office is making information handling an increasingly complex and even chaotic task. Electronic keyboards are connected to a variety of micros, minis and mainframes. Wiring systems connecting terminals are complex, and the languages in which these devices talk are so varied that communication is often difficult or impossible.

It's not uncommon to find a professional-level knowledge worker — an analyst in a large financial corporation, for example — with a number of devices on his desk: a 3270-type terminal to access mainframe applications, a dumb terminal connected to the corporation's electronic mail system and either an asynchronous Ascii-type terminal or a personal computer, if the higher cost can be justified.

At the same time, many other white-collar workers still do their jobs with the same tools used by generations of their predecessors: pencil, paper and telephone. Clearly, the widely proclaimed benefits of OA have been only partially realized.

This situation presents a perfect opportunity for vendors to address present and future applications simply by enhancing today's ubiquitous telephone set as an integrated voice and data workstation. What users need is a device installed via twisted-pair wiring that is a cost-effective alternative to both a telephone set and a separate data terminal. PBX vendors providing such a single device will have the competitive edge over DP and OA vendors installing separate devices and additional wiring systems.

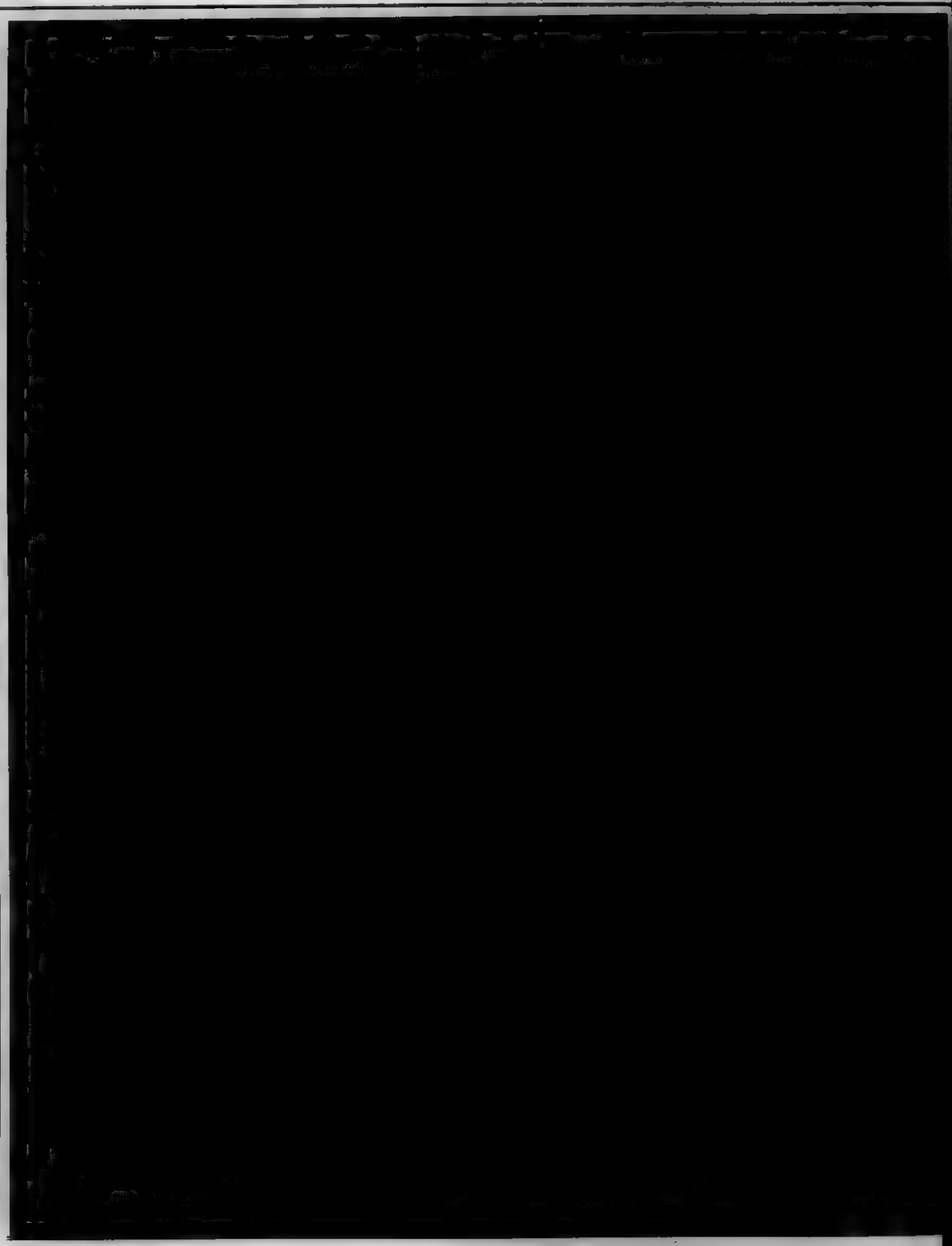
The PBX vendor follows tradition in bringing integrated compatible technology to the office. As the telecommunications industry evolved over the past century, it adhered to universally accepted standards. Hence, any approved system — regardless of where in the world it was produced or when it was developed — can function as an integral part of the communications network.

The more recent evolution of the DP and OA industries has been less orderly. PBX vendors are well-positioned to work with software specialists and organizations concerned with DP standards to provide products that will allow users of existing equipment to integrate and interconnect their hardware. In fact, vendors from all three industries are beginning to work together to set standards: Witness the trendsetting moves toward industry integration by Digital Equipment Corp. and Northern Telecom, Inc., and IBM and Rolm Corp.

The distinctions among telecommunications, DP and OA are blurring. They are blurring across applications and features. They are blurring among the various media. And they are blurring between devices, as single-function desktop telephones and terminals give way to a range of multifunction desktop devices combining voice and data. This merging of technologies will result ultimately in the development of a multipurpose system that handles voice, data, text and image. And this integrated system will derive from the evolution of PBX enhancements. The foundation for this evolution is already in place. The first generation of integrated voice and data terminals is giving way to more enhanced versions. The forthcoming applications on the PBX are well beyond the infancy stage. Although users have yet to see the first portable, attache-type terminal with associated telephone set, surely it is on the way.

PBX vendors are most experienced in the area of voice communications and only more recently in data communications. As a result, applications that evolve out of PBX technology will begin with enhancements to the voice-based service — for instance, conferencing and voice messaging. Integrating the services and media that the PBX can now switch digitally will be the first major change in software offerings. The add-on voice messaging system currently prevalent will be only one of many services offered as part of the PBX. Multimedia messaging — combining voice, text, data, graphics and image in one messaging envelope — will come with changes in software architecture.

The PBX' strong voice-switching capabilities provide for major developments in voice messaging systems and multimedia conferencing. The enhanced PBX will also handle and process multimedia documents — text, data, graphics, image and voice in a single document. On-line documents



can then be distributed much like electronic mail. Protocol converters will allow documents from dissimilar systems to be gathered into a common format for editing.

Combining multimedia documents will certainly increase efficiency and productivity. It will also greatly reduce the possibility of error when a document goes through a number of versions and then in turn is transformed from one medium of exchange to another and another — and back again. With integrated PBX-based document processing, a professional can key in the document or information, using support staff to edit the draft and do final formatting. The document then can be distributed directly to any number of remote locations in an organization by means of the enhanced PBX system.

In short, unlike the previous experience with OA, where separated services were offered through discrete systems, evolving PBX systems will offer a set of distinct yet interconnected services.

Several possibilities are presented by the evolution of enhanced PBX systems:

• Electronic filing for a multimedia system. The traditional tree-structure of filing systems for individuals, project groups and functional units will have the added complexity of filing required for different media. For example, voice compression techniques will be required for documents containing both text and voice information. Key factors in filing systems will be high flexibility with leads or pointers to information in different locations.

• Development and processing of interactive forms. Because of the PBX' messaging capabilities and use of the on-line PBX directory, performing these functions will be far more realistic than on OA systems. Automatic routing of a form to a predetermined list of recipients tracks the form. Automatic calculation and autogeneration of periodic reports from compiled forms will greatly improve efficiency.

• Integration and interconnection for PC users on two levels (the physical link and the applications accessed). Switching a PC to the outside world via the PBX requires the development of interface circuitry to the PC. Once done, however, the interface eliminates the expense and inconvenience of modems and RS-232/coax connections. The PC can communicate over twisted-pair wiring to the closest wall jack, like any telephone set attached to the PBX.

On the applications level, PBXs will be running popular microcomputer operating systems treated like another software application. This will allow PC users to execute programs centrally on the PBX-based configuration, and to have these PC applications integrated with other multimedia applications developed for the PBX. Thus, users who can access the PBX-based applications will also be able to use the PC applications without the expense normally associated with the typical stand-alone PC configuration.

• Speed, code and protocol conversion features (now offered via add-on black boxes) available as an integrated function of the switch. This will increase the efficiency and ease of integrating systems.

• Interfaces to other vendors' coax local-area networks and X.25 gateways to public and private networks. Autocall, auto-log-in and auto-service-select for remote processors will improve user processing power and access to other systems. Freedom to access and process information from many systems according to one's needs and schedule will surely enhance productivity, creativity and the general quality of working life, but these tasks are very much dependent on the operational simplicity of the system. The structure is in place, however, to provide a uniform interface across applications.

PBX evolution is not without its inherent problems. Numerous intermediate stages will take place in this evolution — for example, when an add-on service is integrated with the switch and users are obliged to wade through the complexities of the changeover.

The enhanced digital PBX will evolve into the communications hub of the office. It will bring to users enhanced multimedia communications solutions. The integration of media applications and the interconnection of various systems and devices are evolving realities. We will see more and more high-technology vendors delivering multipurpose systems and devices for the office as users demand more from technology.

The result will be an increased ability to access, process and manage information. And that will lead to increased profitability. CA

MacRae is manager, product application analysis, in the Integrated Office Systems unit of Northern Telecom, Inc., in Dallas, Texas.

Living with errors in computer communications is just another way to play Russian Roulette. Sooner or later something serious is bound to go wrong. Ask the major New York insurance broker where a one-digit miscommunication caused a $1,000,000 error in a client bill. Or the medical lab where a mistransmitted enzyme count came within minutes of costing a patient's life.

But now, Microcom™ introduces the Era 2 SX/1200,™ the stand-alone 1200 baud modem that provides 100% error-free data communications, and that's easy to operate and cost effective. Era 2 SX/1200 implements a machine-independent, error-correcting protocol, called MNP.™ MNP detects transmission errors between Era 2 modems caused by line interference or low quality telephone connections, and retransmits lost or incorrectly received data.

The new Era 2 SX/1200 is Bell 212A compatible, supports RS-232 devices, and can be rack mounted – a major space saving in large multiple installations. It can store up to nine telephone numbers of 36 digits each, with battery back-up. It has a simple, character-oriented command structure, with control of all modem functions from local devices.

All of the above comes for the remarkably low price of $599 – about $100 less than brands that can't deliver 100% error-free performance.

So call, right now, for toll-free information about the SX/1200. The number is 1-800-322-ERA2. We'll send you a complete brochure and spec sheets to show you how dangerous errors in communications are a thing of the past.

Only from Microcom.

Era 2

Microcom, Era 2 SX/1200, and MNP are trademarks of Microcom, Inc.

The Search For The Perfect Spreadsheet

By Thomas Zappia
and Thomas O'Flaherty

The evolution of spreadsheet software packages has created an interesting paradox: Many features that make spreadsheets attractive also limit their capabilities. With the increasing use of spreadsheets, these limitations will become more apparent. Users should acquaint themselves with both the power and the limitations of spreadsheets.

Spreadsheet packages exist for all types and sizes of computers — personal computers, minis and mainframes — but those designed specifically for personal computers have attracted the most attention. These packages tend to fall into three categories:

- Classic spreadsheets like Visicorp's Visicalc, Perfect Software, Inc.'s Perfect Calc and Microsoft Corp.'s Multiplan.
- Integrated packages, for example, Lotus Development Corp.'s 1-2-3 and Context Management System, Inc.'s MBA.
- Integrating software, such as Visicorp's Visi On and Quarterdeck's Desq.

Although early PC spreadsheet packages offered only a single function, later packages have combined more functions, such as data base management, word processing, graphics, telecommunications and windowing, around the basic spreadsheet.

It is easy to see that various combinations of the above features alone would result in quite a number of different products. If com-

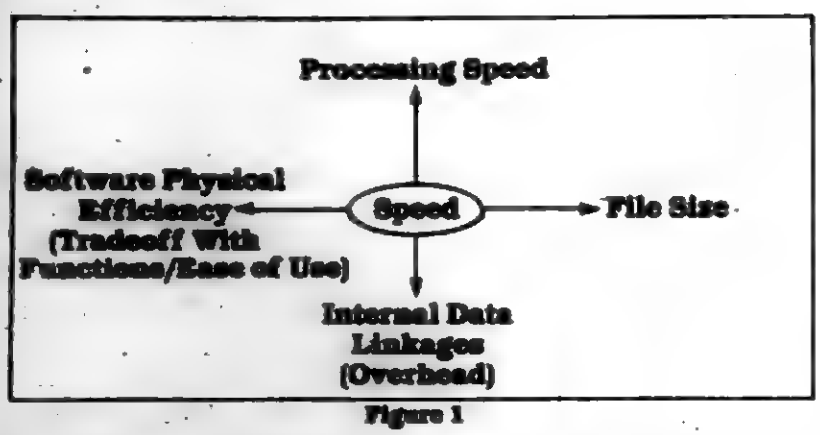


Figure 1

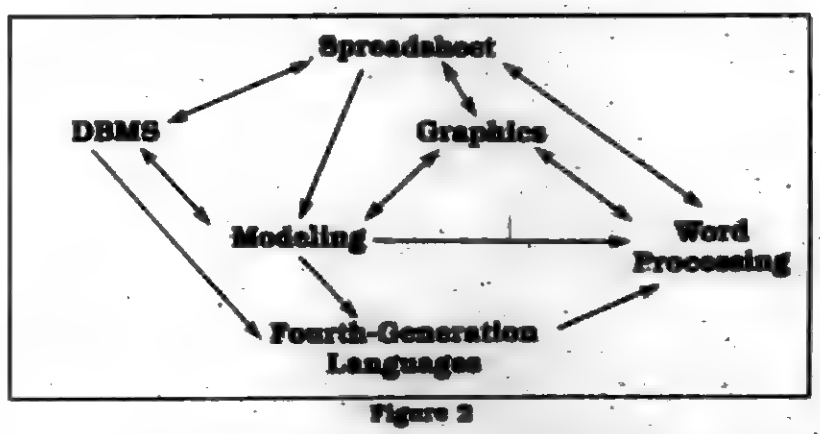


Figure 2

parisons are then made for each product's data base size, arithmetic functions, WP features or any other internal characteristics, the number of such products reaches into the hundreds.

In spite of the wide choices, however, for two reasons it is very unlikely that any single package will meet all of a user's needs. First, no package currently on the market offers all the above features; even after buying an integrated spreadsheet package, users are still left hanging. Visicalc, for example, offers only a spreadsheet; 1-2-3 provides spreadsheet, data base, graphics and WP; MBA provides spreadsheet, data base, graphics, WP and communications; Visi On offers windows, spreadsheets, data base, graphics and WP. Users who buy any of these packages for what they do offer could find themselves wanting the options the packages don't offer. This may not happen immediately, but it is likely to occur in the future when needs change and mature.

Second, regardless of the level of experience, the user will soon stretch each feature of the package to its limit. This tendency is most obvious in the spreadsheet's data capacity. Users quickly find the spreadsheet's capacity limited, particularly when compared with data base management systems.

One frustrating feature is the inability to separate data, modeling and reporting capabilities within a spreadsheet. For example, the relationships specified in the spreadsheet will operate only on the data within the spreadsheet. Those relationships cannot be applied to data residing elsewhere unless that data is reentered. Report generation is also limited to the existing structure of rows and columns of the spreadsheet. Very little flexibility exists to change a report after the spreadsheet has been set up. More problems are encountered when users run into a common business requirement — consolidating financial statements.

Many users are so amazed by the spreadsheet's capabilities that they overlook what may be an even more important consideration — data. These users build fairly sophisticated models and applications with spreadsheets; later they find that the data they need is not available or, if available, does not exist in the right form or in sufficient detail.

Emphasis has been placed primarily on what spreadsheets can do for the user, not on what the user and others must do before the spreadsheet can be utilized. Even when data is available and is in the proper format, the user must usually manually enter the data. Downloading data from existing corporate data bases (when this capability is available) often eases the problem of data availability and entry. However, it does so at the cost of forcing PC users to have a knowledge of existing mainframe systems' hardware architecture and data structures.

In addition, this concept of downloading data presents another area of concern. Spreadsheet packages continue to emphasize the benefits of integrated software with linked functions. A change made to data in the data base is immediately reflected in the spreadsheet and graphics. If a windowing capability is provided, the user can view the change in all three functions simultaneously. For now, these links are local to the particular user's personal computer. With the evolving micro-mainframe hookup, users will want these links to extend from the PC to the mainframe.

This capability will raise many questions about data integrity, security and control; most of these questions do not yet have satisfactory answers.

As discussed earlier, spreadsheets cannot meet all of a user's requirements, either because of lack of particular functions or because of the limitations of available functions. As a result, available functions are subject to misapplications — one admittedly extreme example is the use of a spreadsheet for word processing. Misapplication often occurs when users lack either the knowledge or availability of proper tools. The area of personal computers in general suffers from an overall lack of systems planning. One result of this vacuum is that users often cannot see the full range of their needs until after they purchase a spreadsheet package.

When users do gain some experience with spreadsheets, they tend to place much more importance on processing speed. They quickly become frustrated and annoyed at the length of time it takes to run spreadsheet models. Nevertheless, a clear tradeoff is made between integrated linked functions and processing speed (see Figure 1). The cause of this problem must be shared between the spreadsheet package, which is trying to provide more and more functional capabilities, and the inherent limitations of a fully exercised personal computer.

Spreadsheets provide sufficient capabilities to let users build fairly complex models. But when those models become more complex or are shared, the lack of any self-documenting capabilities within the spreadsheet will lead to confusion about what the model is doing. Other users will find it difficult to understand or to modify the model.

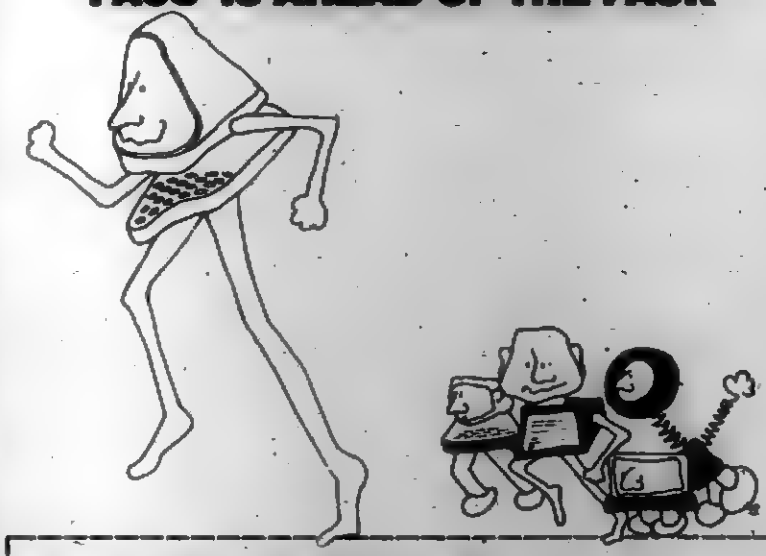
Despite all their shortcomings, spreadsheets have proven to be very powerful tools for business applications, particularly for ad hoc model building. PC spreadsheets provide excellent price performance, so long as users are aware of their limitations.

However, more experienced users can find more powerful tools in modeling packages, such as Express and IFPS; fourth-generation languages; downsized minicomputer packages; and the new supermicros (see Figure 2).

More powerful hardware — such as supermicros or 370s on a chip — may eventually ease some of the limitations, but they will not eliminate them. OA

Zappia is senior consultant and O'Flaherty is principal research consultant at Input, a consulting and research firm in Saddle Brook, N.J.

FOR VAX™ RESOURCE ACCOUNTING, PACS™ IS AHEAD OF THE PACK



The competition isn't even close. PACS is so good, it's the only resource accounting package in DEC's™ EAS library. Here's why:

- Flexible billing algorithms
- User budgeting and port speed accounting
- EZLOG™ for true 3-level reporting by account, project and user

Name _____
Title _____
Company _____
Address _____
City _____ State _____ Zip _____
Phone ( ) _____

SEND COUPON NOW FOR COMPLETE DETAILS ON ALL THE PACS BENEFITS

STI Signal Technology, Inc.
5951 Encina Road, Goleta, CA 93117 (805) 683-3771 Outside California call toll-free (800) 368-8787
TWX 910-334-3471

VAX and DEC are trademarks of Digital Equipment Corporation

The Quest For Compatibility

By Glenn Rifkin

The term "IBM PC-compatible" has recently become as much a warning signal as an enticement. "It's caveat emptor — let the buyer beware," Jack Karp, the Gartner Group's director of personal computing services, noted.

When the issue of IBM Personal Computer compatibility was first raised, a laundry list of features and functions were required before a machine got the stamp of approval.

Today, according to Future Computing, Inc. of Richardson, Texas, IBM PC compatibility, although it is a complicated issue, can be measured by one easy test: Does the machine in question run all software intended for the IBM PC right out of the box?

With an estimated 3,000-plus software programs available for the PC, the chances of any single machine being 100% PC-compatible are virtually nil. That, however, doesn't mean it's IBM or bust. A variety of personal computers on the market are close enough to provide a choice. It seems that compatible personal computers are becoming like bellybuttons: Everbody's got one.

For the corporate user, the issue is now twofold. The first question is to find out if the product is indeed PC-compatible and to what extent; the second question: Does it really matter?

Clearly, the IBM PC dominates the marketplace and has spawned an entire industry for third-party software developers. But industry analysts are not convinced the PC is the best offering around in terms of price and performance. Other major vendors have personal computer products with more power and versatility, comparable or better pricing and enough software offerings to satisfy most needs. What they don't have are three large blue letters that seem to spell automatic acceptance.

While the issue of PC compatibility has proven frustrating for some vendors, others are taking an "if you can't beat em, join em" approach. According to Ron Ward, executive vice-president of Future Computing of Richardson, Texas, more than 50 vendors claim to have products that are PC-compatible. Because none can legally be totally compatible, a testing center

at Future Computing has developed a set of conditions that must be met for real compatibility.

One basic requirement is that the machine run Microsoft, Inc.'s MS-DOS operating system. Unfortunately, running MS-DOS does not ensure compatibility. Many machines are functionally compatible — they use one of the Intel, Inc. 8088 or 8086 microprocessors and can read and write to IBM PC disks. But this again doesn't guarantee compatibility. Truly operational compatibility is tough to achieve and it comes in a specific form.

Future Computing asks three questions:

- Does the machine run, right off the shelf, software intended for the IBM PC?
- Can it use add-on boards designed for the PC?
- Can it use peripherals, such as modems and printers, designed for the PC?

Currently, five companies' products have passed Future Computing's tests: Compaq Computer Corp.'s Compaq Portable and Compaq Plus; the Columbia Data Products, Inc. MPC; the ITT Courier Terminals Systems, Inc. Xtra; Seequa Computer Corp.'s Chameleon; and Panasonic Co.'s Senior Partner. According to Ward, several other machines will probably make Future Computing's list, but are either still being tested or have yet to be tested. Among the probables are the Colby Research Industries, Inc.'s PC; Electro Design IMP-12; OSM Computer Corp.'s PC; Visual Computer, Inc.'s Visual Commuter; Televideo Systems, Inc.'s TPC-II; and Tava Corp.'s PC.

Several other companies believe they also belong on the list, but Ward pointed out that although some vendors believe they have achieved compatibility, they have fallen short in one area or another.

"Running one software program, such as Lotus 1-2-3, is not necessarily an accurate test," he explained. "For example, the Bytec Hyperion could run the spreadsheet portion of 1-2-3, but it could not handle the graphics."

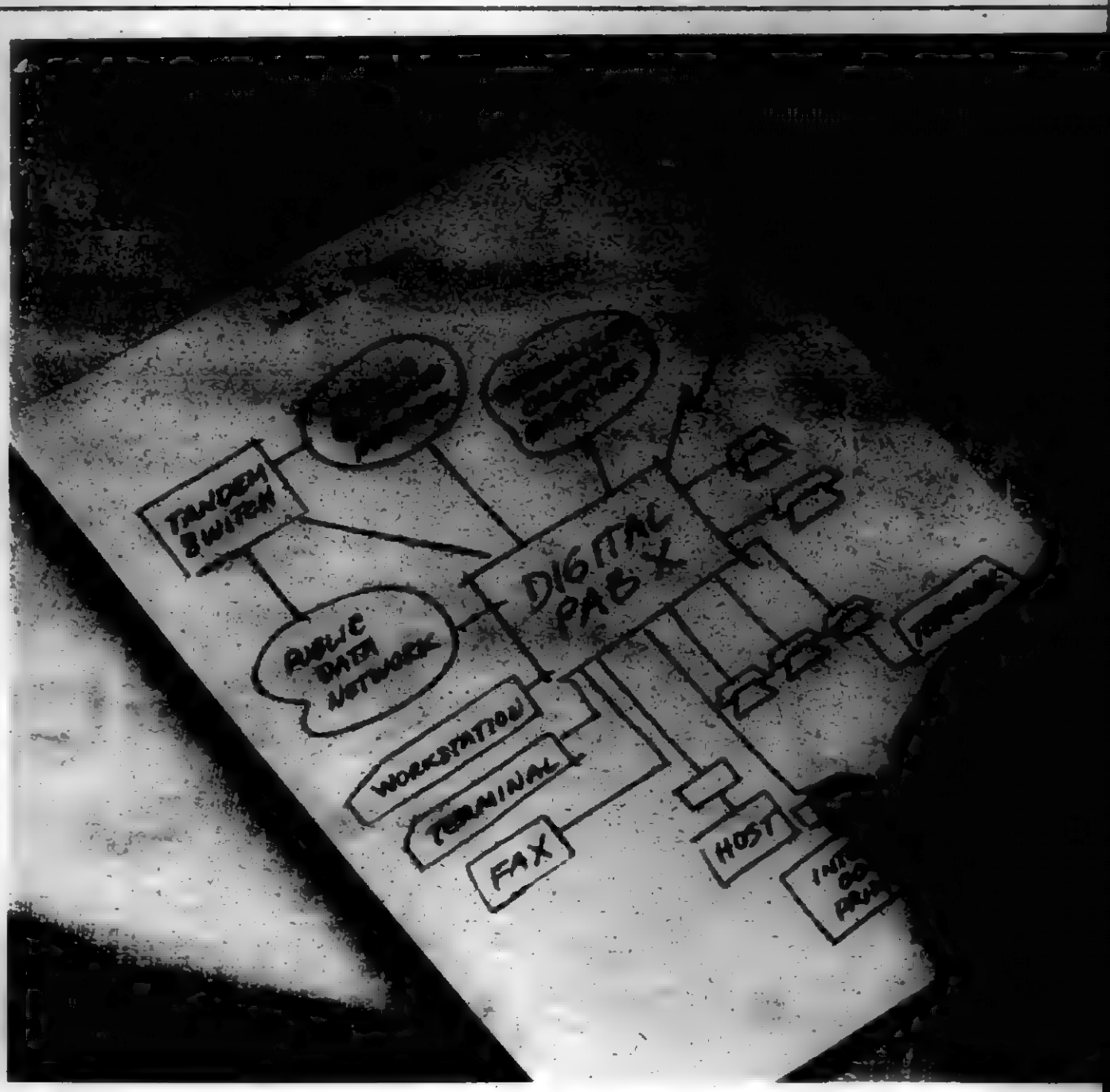
The key to the puzzle is the basic input/output system (Bios). Bios, a software layer built into the hardware, controls such functions as keyboard, video display, disk drives and other peripherals. IBM copyrighted its Bios; therefore, a compatible maker must create a Bios that essentially does the same thing but differently.

To further add to the confusion, PC-DOS, IBM's version of MS-DOS, was inadequate, according to Ward, because it did not provide a complete interface to the machine's hardware. As a result, third-party software developers had to circumvent the Bios to allow their products to handle certain fundamental commands like cursor control or copy protection.

What that means is that all software developed for the PC is tied inextricably to the PC hardware, Ward said, and "compatibles are heavily dependent on the PC architecture. That's why just running MS-DOS doesn't mean compatibility."

Several vendors have already had their hands slapped by IBM for copyright infringement on the Bios. Corona Data Systems, Inc., Eagle Computer, Inc. and Handwell Corp. have all agreed, in out-of-court settlements, to redesign their Bios. "IBM is not in the business of making its products easy to copy," Gartner Group's Karp said.

Despite the difficulties in achieving compatibility, new vendors keep trying. Within the last few months such manufacturers as Sperry Corp., Docutel/Olivetti Corp., North Star Computers, Inc., Kaypro Corp., Zenith Data Systems Corp. and a start-up company called Mind-



It used to take six different companies to build a communication system like this.

Now it only takes one.

set, Inc. have all announced IBM PC-compatible products. In hopes of grabbing a chunk of the market, all offer varying degrees of PC compatibility as well as additional features, such as more speed, memory, graphics and so on. Even those vendors that have been rebuked for copyright infringement have stuck to their game plans. Eagle reportedly never stopped shipping its product while it modified its Bios.

Of course, beyond the issue of legality, consultants question whether the degree of compatibility is all that crucial. According to Karp, "If it gets the job done, fine." He also noted, however, that it's important for buyers to become educated and know what they're getting involved in.

Ward added that several vendors have marketed products they actually believed to be compatible, but that, in fact, fell short. "End users weren't being defrauded; the vendors thought they had a compatible product, but they really lacked knowledge of what compatibility meant."

Another issue is how favorably the compatibles are being looked upon by the corporate world. Though Future Computing credited IBM PC compatibles with grabbing up to 40% of the personal computer market, it was not clear how much of that occurred in the Fortune 500 environs. According to Anne Mayfield, a senior analyst for Arthur D. Little, Inc., most corporations are opting for the IBM PC itself rather than going out on a limb with a "me-too" vendor.

Karp pointed out that the hotly debated shakeout among PC compatible makers may begin now that IBM appears to be getting "very aggressive" and is getting into many unregulated markets. IBM's unveiling of its portable PC as well as increased competition from the Japanese is expected to put tremendous pressure on the compatible vendors. Karp predicted that price cutting, which will be one way to combat IBM, will hurt the competition badly: "There's only a 10% to 15% profit margin on personal computers. As that gets squeezed, the profit margins must come down. That could mean trouble."

"End users weren't being defrauded; the vendors thought they had a compatible product, but they really lacked knowledge of what compatibility meant."

Seymour Merrin, president of Computerworks, a Westport, Conn., dealership, pointed out that among the key questions to be asked about PC compatibility is whether the vendor will even exist in a year or two. "That's no small matter," he stated. "I think the only one that will survive is Compaq."

Indeed, if Compaq is an example of what PC compatibility can mean, the market could literally be flooded. The two-year old Texas-based manufacturer-started shipping its Compaq portable just over a year ago and now is reportedly the fastest growing company in U.S. business history. With first-year sales of more than $110 million, Compaq "is the only company accepted by all major corporations as an IBM PC alternative," Merrin said.

A survey by Future Computing of 107 of the Fortune 1000 companies confirmed Merrin's assessment. The buying pattern showed IBM Number One and the Compaq Number Two. Merrin said he believes Compaq's success is due to several fea-

We've made complex telecommunications simple. As your single source for an entire system we will custom tailor it to your exact needs.

That means fast information flow for both voice and data and increased organizational efficiency. All of which can add up to savings in operating costs.

We provide all components from telephones, to terminals, to PABX's, to transmission equipment. And we offer the experience needed to build a system that will serve you effectively today and grow with you in the future.

Fully integrated data capability and advanced features will be available through easily implemented system upgrades. Just as important, we offer a service organization that will be there when you need them.

But our communication services don't stop at your office door. You can use GTE's Telenet public data network and Telemail electronic mail system to speed communications throughout the country. And GTE's Satellite Communications subsidiary can link your office to a satellite.

In a field as complex as telecommunications you'll find you can simplify your problems by dealing with the company that has it all.

For more information write Marketing Services, GTE Business Communication Systems Incorporated, 12502 Sunrise Valley Drive, Reston, VA 22096. In Canada, AEL Microtel Limited, 1211 Denison St., Markham, Ontario L3R 4B3.

We've simplified a complicated business.

GTE Business Communication Systems

tures it incorporates and which the PC doesn't have, including portability, a high-resolution, monochrome screen and a built-in graphics card.

Compaq, according to Ken Price, the company's director of corporate communications, does extensive testing of software on the market and has published a list of more than 600 packages that run on both the PC and the Compaq without modification. In addition, Compaq's strategy has been to let the retail dealers act as their sales organization. This act of faith has led to more than 1,000 dealers stocking the Compaq.

Although IBM recently unveiled its own portable version of the PC, Compaq is not overly concerned. Price said Compaq's strong relationship with the dealers and the Compaq price, which is below that of the PC portable, will insulate his product from serious harm.

Ward said he believed there will always be room for competing machines in the marketplace because the dealers, like everyone else, simply don't want to become totally dependent on IBM. He also predicted IBM would never overdistribute the PC and that would always leave a channel open to others.

The compatibility issue has not affected hardware makers alone, however. Software manufacturers have reaped the benefits of the PC's popularity, but have also had to confront the confusion themselves. Fallout from the Bios controversy has forced software developers to modify many of their programs for individual machines, a process that obviously favors the biggest selling hardware. Buyers often base their hardware decisions on the availability of software, and from a software perspective, riding IBM's coattails is a must.

Lotus Software, Inc., whose 1-2-3 program is often cited as a worthy test for PC compatibility, has reaped the benefits of IBM's popularity. Chris Morgan, Lotus' vice-president of communications, said the compatibility question "is really a hardware issue.

"We're interested in the most successful machines," Morgan explained. "We'll modify our programs for any new product that we feel is worthwhile. It would be nice if all machines had the same interfaces and drivers, but they don't. It's a fact of life. There are different degrees of compatibility, but we take full advantage of any machine that we write our software for."

Karp pointed out that delays in software modification for a particular machine average from six to nine months, and the fastest selling machines get the software first.

As was the case with 1-2-3, software developers often create their programs on the PC, which automatically makes it first in line, and then proceed to other machines.

Despite the PC's unquestioned success, rumors have abounded in the industry that IBM intends to move away from the MS-DOS environment and create a proprietary operating system. Nevertheless, analysts agree it is unlikely that IBM would forego the mountains of software and well-established channels of distribution in order to shut down a few competitors.

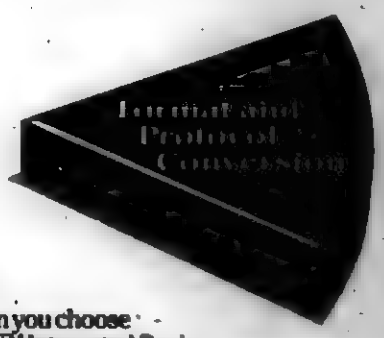
An IBM spokesperson stated that, although the company is always looking for ways to enhance its products, PC-DOS will remain part of the PC. Analysts such as Ward and Thomas Willmott, of the International Data Corp., view MS-DOS as an evolving system that will likely move toward more of a multiuser, multitasking environment. With IBM's impending local-area network on the way, a network interface for the PC will certainly be a requirement.

Much of what happens to MS-DOS could be a matter of the competition between Microsoft and Digital Research, Inc. (DRI). Willmott said he believes DRI, which created the 8-bit industry-standard CP/M operating system, is working on an umbrella operating system for multitasking and multiuser access that would allow MS-DOS to operate within it.

PC-DOS will remain somewhat stable on the PC because of the company's commitment to the PCjr, according to Karp, who predicted that in the long term, IBM will diversify its support of operating systems and possibly move to a proprietary one in which "guests" such as CP/M, Unix and others would work, along the lines of IBM's VM/CMS mainframe environment.

For now, most hardware vendors feel compelled to address the compatibility issue in one way or another. Apple Computer, Inc., for example, introduced its Macintosh computer with its own proprietary operating system. If Apple is successful, it might encourage more movement from IBM's sphere of influence. OA

Rifkin is senior writer at Computerworld OA.



When you choose the IBX™ Integrated Business Exchange from InteCom, you get some important advantages. Like format and protocol conversion. And a tremendous untapped potential for growth. Plus all the benefits of a time-tested system.

The IBX is the first fully integrated, absolutely non-blocking, digital voice/data switching system in the world. It's already operating in companies across the United States. And it's ready to link your multi-vendor systems and equipment into one efficient communications package. Through its unique architecture and a host of advanced features.

InteNet™ Packet Controllers, the IBX family of format and protocol conversion packages, connect certain dissimilar equipment. Establishing communications between word processing systems. Entering X.25 networks such as Telenet and Tymnet. Or emulating 3270 devices.

The IBX architecture also offers you completely non-blocking operation, at all ports, at no extra cost. Wideband LANmark™ local area networking for superspeed packet switching. Shared tenant service. And convenient voice messaging with InteMail℠. For cost efficiency, the system uses two-pair wiring and modern fiber optics.

Designed for up to 12,000 lines, the IBX switch can start as small as 250 lines. And it's already prepared to incorporate new applications, keeping pace with the industry and meeting your needs for years to come.

Invest in the IBX™ today and reserve vast resources for tomorrow.

The IBX communications system from InteCom. It's the indispensable business tool for the 80's and beyond, from the innovative leader in office technology. For complete details on an IBX investment, write or call: 1-800-INTE-800. In Texas, call 1-214-727-9141.

INTECOM INC.

Integrating Communications

601 InteCom Drive • Allen, Texas 75002 • 214/727-9141

© 1984 InteCom, Inc.

IBX, InteNet and LANmark are trademarks and InteMail a service mark of InteCom Inc.

Picking A Winner

THERE ARE SOME NEW PLAYERS IN THE INFORMATION GAME — PROVIDERS OF ON-LINE DATA BASES FOR MICROS.

By Linda L. Winningham and Patricia Carrell

If you manage or oversee personal computing, office automation or information center services within your firm, you are probably aware of the recent explosion of external or remote data bases. Although on-line-data base access is not yet as popular as some personal computing applications (such as word-processing, spreadsheets and financial analysis, for example), it is emerging as a powerful application that is catching the eye of many personal computer users.

End-user data bases are growing even more rapidly than data bases intended for use by intermediaries, such as librarians or staff analysts. What this means to information managers is that they should begin assessing the many issues raised by access to these external data bases.

Among the issues that managers will have to deal with are selection procedures for external data bases, communications software, downloading procedures, cost-control over multiple users of data base sources, training and integration of internal as well as external information.

This article will highlight a few recent data base introductions and will discuss emerging trends. As these newer offerings are described, it will become clear that managers should begin to focus attention on the external data base environment, from a standpoint of both organization and control.

In the year or so, the most significant happening within the data base industry has been the new crop of business services aimed at personal computer users (especially IBM PC users). The objective expressed by vendors of these newer services is to broaden the market for their existing data bases. These new services come from all segments of the data base industry — real-time quote vendors, such as Quotron and Bunker Rame Corp.; text-oriented vendors, such as Dialog Information Services, Inc. and Bibliographic Retrieval Systems (BRS); financial or analytically oriented vendors, such as Data Resources, Inc. and ADP Network Services, Inc.; and, finally, even consumer-oriented vendors like Compuserve, Inc. and Dow Jones News and Retrieval Service. These services all have some common attributes: more easily usable interfaces, more flexible pricing and distribution schemes and packaging that corresponds to the needs of specific business-user groups.

Among these newer services, Newsnet, Inc.'s Newsnet is one of the easiest to use. From its inception, according to Brian Raub, Newsnet's marketing director, the service was "specifically designed for the business executive." Although Newsnet contains the full text of 150 newsletters in 31 industry categories, the new user has to digest only a four-page system overview sheet before logging on. On-line menus are available, as is an 800-number customer-support service.

One Newsnet category is "Electronics and Computers," which contains *The Seybold Report on Professional Computing, Modem Notes, Mini/Micro Bulletin* and the *S. Klein Newsletter on Computer Graphics*. The "Office" category contains *Advanced Office Concepts and The Seybold Report on Office Systems*.

The primary users of Newsnet are middle to upper-level managers who subscribe to the service to stay on top of trends in their industries. They can monitor competitive activities — product introductions and plant closings, for example — for a fraction of the cost it would take to subscribe to all the publications covered within each industry category. They also subscribe because of Newsnet's Newsflash service, which automatically tags articles of interest to each user, according to predefined user profiles. Newsnet is available at a monthly minimum of $15. Hourly charges run between $24 and $48 during daytime hours, and at a $6 discount in the evening and on weekends.

Two new services from Dialog and BRS, although slightly more difficult to use, contain textual information similar to that of Newsnet. These services are Dialog's Knowledge Index and BRS' After Dark. The material contained in both services is abstracted, not full text, and is primarily from advertising-supported business periodicals. Both are subsets of their vendors' primary data base services and, as such, they are more difficult to learn. The Knowledge Index user, for example, must master search commands and Boolean operators. The training manual is about 60 pages long, and I spent an afternoon of study before attempting to use the system.

These services are available only during nonworking hours, but they are offered at a substantial cost savings in comparison with the parents' regular services. For example, information retrieved from the Microcomputer Index on Dialog's regular daytime service would cost $48 per hour, compared with $24 per hour on the Knowledge Index.

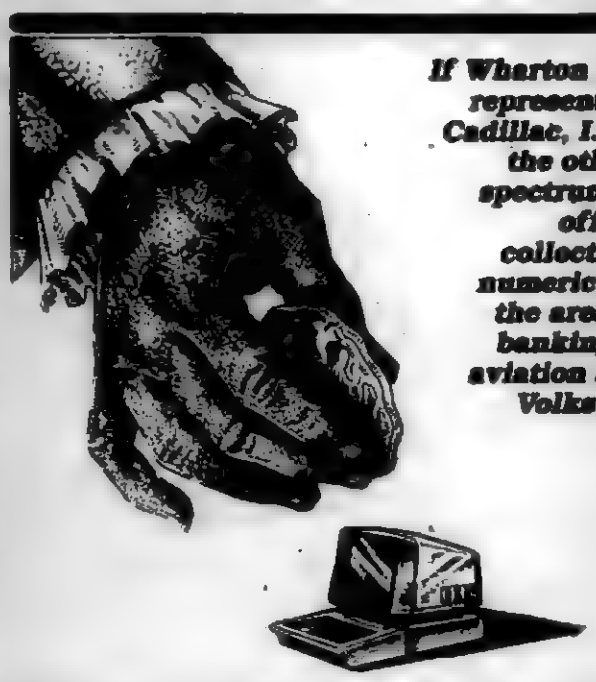
Because of the hours of availability and the relative difficulty of use, these two services appeal to serious after-hours business and professional researchers. Many medical professionals, for example, are among those who use BRS' After Dark service. In an effort to capture a larger chunk of the end-user market, both vendors have plans for daytime services.

Acting as catalysts for some of the newer financial and numeric data base services, popular spreadsheet packages such as Lotus Development Corp.'s 1-2-3 and Visicorp.'s Visicalc are playing a major role.

Staff analysts in corporate planning, finance, investment and economics departments created analytical reports before the thrust of personal computers. Often these reports were done on dedicated terminals hooked up to large time-sharing or remote computer service firms such as DRI, Chase Econometrics/Interactive Data Corp. and ADP. These services continue to be expensive and, although they provide powerful software capabilities, they take a long time to learn. Special retrieval and modeling languages must be mastered, for instance.

With personal computers and off-the-shelf spreadsheet software, these vendors are making their data more accessible to far greater numbers of users. Probably the best known of these newer offerings is Visilink, which was a joint development between DRI and Visicorp. Available on the Apple II and the IBM Personal Computer, Visilink facilitates downloading DRI's information into Visicalc worksheets. DRI has cleverly packaged its data for this new service into what it calls Datakits. Purchasing the $250 Visilink software diskette and specifying a credit card number for billing allows a user to select a Datakit from among a number of prepackaged data bases or to retrieve a user-specified Datakit.

One example of a prepackaged Datakit is the Automotive Analyzer, which sells for $40 and provides statistics for determining market share on the number of automobile engines installed, by number of cylinders, for each of the top four domestic manufacturers. Another is the Company Financial Analyzer, which for $25 provides an income statement, balance sheet and ratio analysis for a single company for eight years or eight quarters.



If Wharton Econometrics represents an industry Cadillac, I.P. Sharp is at the other end of the spectrum, claiming to offer the largest collection of on-line numeric data bases in the areas of finance, banking, economics, aviation and energy at Volkswagon prices.

With its Datakits, DRI is accomplishing two ends. First, it is chopping its vast data base holdings into smaller, vertically aligned segments. Second, it is shifting its pricing away from mammoth charges based on a confusing projection of on-line-time usage, CPU cycles and number of data units to a fixed price based solely on the amount of data accessed.

ADP Network Services offers Data Path, a similar kind of spreadsheet capability which is particularly attractive to personal computer users involved in merger and acquisition analysis. Data Path was announced in May and costs $235. Like Visilink, Data Path is a data-access software package that works in conjunction with Lotus' 1-2-3. It facilitates the downloading of data from ADP's huge reservoir of U.S. and international economic, corporate, financial and banking data into 1-2-3 spreadsheets. It is particularly attractive for merger and acquisition analysis because of its powerful financial software coupled with the Compustat data base, one of the most popular sources for detailed financial information.

Similar in nature to DRI's Datakits, Data Path's Application Library allows business analysts and forecasters to choose an appropriate spreadsheet or report format. The data does not come prespecified, however, as it does in the Datakits. This may not be a problem; analysts seldom have exactly the same analysis needs.

ADP's pricing scheme diverges from that of DRI's. Besides the cost of Data Path — which includes three diskettes and a training manual — a monthly minimum of $100 is charged for maintaining an account with ADP. The actual amount paid for accessing ADP's data bases can then be either charged on a pay-as-you-go basis or (primarily for large ADP clients) negotiated according to projected usage. Usage is calculated based on $.02 to $.25/datapoint, $15/hour, plus $.027/computer-resource unit.

The obvious advantage of DRI's pricing is the upfront knowledge of access charges before logging on.

Three other data base vendors, Wharton Econometrics Forecasting Associates, I.P. Sharp and Chase Econometrics/Interactive Data also compete in roughly the same financial, investment, economic planning and analysis area. Although their strategies differ, they are also realigning their data base services around the personal computer.

According to Ken Wing, Wharton Econometrics' marketing manager, that firm never wanted to be a large time-sharing firm. Accordingly, their data base access charges are part of an overall membership fee ranging from $10,000 to $25,000 per year, per service.

An example of a single service is the Quarterly Model Service, which provides forecasts of the U.S. economy. Besides access to data bases, the membership fee includes a certain number of days of on-site consulting, telephone access to Chase's staff economists and attendance at their Outlook seminars.

Because Wharton does not view its data bases as the mainstay of its business, it has chosen to adopt an extremely flexible distribution approach. Wharton will provide its data on computer tapes so that a client can load them onto an in-house computer; it will download its data onto a personal computer similar to the methods used by DRI and ADP described above; it will even provide its data on PC diskettes; and, of course, it continues to make its data available on a time-sharing basis.

If Wharton Econometrics represents an industry Cadillac in terms of offering a high price value-added service, I.P. Sharp is at the other end of the spectrum. That firm claims to offer the largest collection of on-line numeric data bases (more than 50 million time series) in the areas of finance, banking, economics, aviation and energy. Sharp offers all this data at Volkswagon prices, but includes little or no consulting. (DRI, ADP and Chase Econometrics/Interactive Data all offer consulting as part of their data base services.)

Micom, Sharp's personal computer offering, provides easy communications access to all Sharp's data bases. It allows the IBM PC to emulate a terminal for downloading. It then facilitates the transfer of the downloaded data into any spreadsheet package using the DIF format. (DIF, the format used by Visicorp, has become the de facto standard for spreadsheets).

Sharp's pricing, although it does not diverge from the industry norm of hourly-connect charges, is very reasonable. Only a few of its data bases involve royalty charges (charges which are extra, go beyond the hourly rate and are returned to the source publisher), and there are no subscription fees. The hourly rate is a fixed $60 for terminals operating at 30 characters per second and $120 for those operating at 120 characters per second.

Chase Econometric/Interactive Data offers PC Screen for downloading data into Lotus' 1-2-3 from its many financial and economic data bases. According to Pratt Harris, who is responsible for systems development at Chase, this offering will be enhanced in the future to allow for very flexible formatting. Chase is not assuming users will be happy with the fixed-format capabilities of standard spreadsheet packages (using Dif, for example) such as Lotus DIF 3, Visicalc and Multiplan. Instead, Chase believes users will want greater latitude in creating individualized reports from their data, and the firm is currently developing a capability for data format interchangeability.

These are only a very few of the many data base announcements that have zeroed in on the personal computer during the past year. Other new services of note from Dow Jones, Compuserve, The Source, Electronews, Mead Data Central, Disclosure and Compustat are beyond the scope of this article.

Lenn Bergstrom, vice-president at Real Decisions Corp., a Stamford, Conn.-based consulting firm, offered one way to make sense of these new services. The

external data bases of the '80s share many of the same characteristics with the computers of the '60s, according to Bergstrom. They are large, no one needs a whole one and they are incredibly expensive to maintain.

He predicted the following trends:

- Vendors will continue to recast their services in an attempt to capture their share of the rapidly expanding base of personal computer users.
- They will begin to stress their network capabilities by offering electronic mail and other value-added network services.
- They will develop more powerful, easier-to-use software.

Another way to look at data base trends was offered by Anne Caputo, a visiting assistant professor at The Catholic University of America and a Dialog trainer. Caputo pointed out the importance of ease of use to the future growth of end-user services. Most users cannot be expected to learn more than a few access methodologies or retrieval languages, she said, and industry consolidation will have to take place. The aim will be to make the user interface as transparent as possible. The possible result will be only a handful of very large vendors that provide common interfaces across their data base holdings.

Another trend that is clearly under way is that various data base vendors will be crossing traditional lines. So-called data base vendors, such as Dialog, will be moving into the domain of the numeric. The opposite will also be true; vendors like ADP can be expected to offer more in the way of textual services.

Full-text data bases, such as those offered by Newsnet, will also become more predominant. If managers are to use the services themselves, they want to be able to read the full text of articles retrieved, not just their abstracts. They certainly don't want to wait the several days currently required before an article is delivered.

As all these trends unfold, the message to managers of personal computing, office automation and information centers is that they will be subject to increased pressure from both users and upper management to become knowledgeable about these burgeoning data base services and to take control of them.

Information managers will need to assess, for instance, whether it is cost-efficient for all of their personal computer users to have individual passwords and separate subscriptions to each data base in use within their organization, or whether it makes more sense to download certain segments of data base offerings onto a mini for shared departmental use.

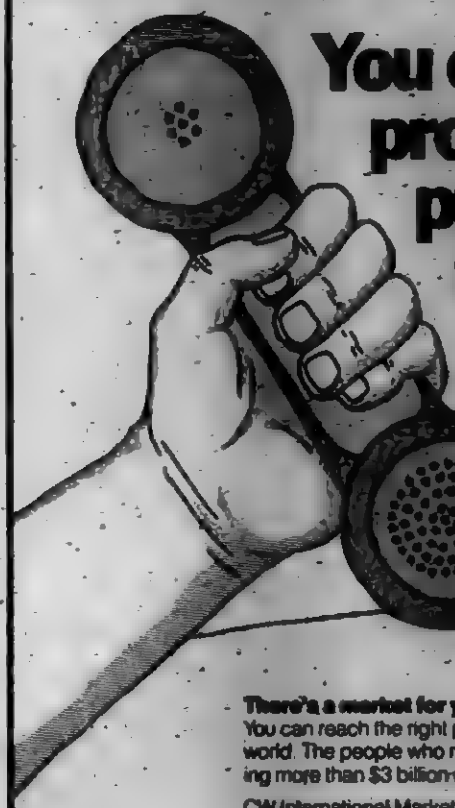
Another question will be who should decide which data bases are the most appropriate for in-house acquisition? In the future, it may not seem strange for corporate librarians to sit down with members of OA and management information systems departments to draw up a joint plan of a firm's external data base resources.

Finally, it seems clear that information managers should broaden their perspectives of information resources. They should recognize the value of integrating external data bases into their firms' existing management information systems. They should also begin to take an active role in assisting end users to take full advantage of these new data base services. OA

The message to managers of personal computing, OA and information centers is that they will be subject to increased pressure from both users and upper management to become knowledgeable about these services and to take control of them.

Winningham is president of Osprey Information Corp., a Princeton, N.J.-based consulting firm that specializes in the areas of personal computing and on-line data base access.

Carrell is an independent OA consultant in Wharton, N.J.



You can advertise your product in 40 computer publications in 25 foreign countries—with one phone call.

There's a market for your product abroad.
You can reach the right people in the major computer markets throughout the world. The people who make the buying decisions—in countries already importing more than $3 billion in computer hardware, software and supplies.

CW International Marketing Services gives you one, efficient source for direct contact with the leading local computer publications in the world's major computer markets. How can we do this for you? We have a wide network of editorial offices around the world and provide first hand marketing information to our clients. Plus, we have over 10 years experience in the publishing industry.

We're a division of CW Communications/Inc., publishers of *Computerworld* and the world's largest publisher of computer-related newspapers and magazines.

CW International Marketing Services makes it easy.
We'll translate your ads for you and give you production services to meet the specifications of any or all the newspapers and magazines we publish or represent—and—we'll even bill you in dollars. What's more, when you place your advertising through CWIMS, you save the V.A.T. (value-added tax). It's as easy as advertising in your local publications.

We'll even help you with market facts, and, in the case of the People's Republic of China, we can arrange for you to give product and marketing seminars there! You can run your ads in our periodicals in these countries:

*Argentina	*Denmark	*Italy	*Norway	*Saudi Arabia	*Sweden
*Australia	Finland	*Japan	*People's	South Africa	*The Netherlands
*Brazil	*France	Korea	Republic of	*Southeast Asia	*United Kingdom
Chile	Greece	*Mexico	China	*Spain	*West Germany
	India		Peru		

*Published or co-published by CW Communications Inc

For more information on how we can help you promote your product all over the world, send us the coupon below or call Diana La Muraglia toll-free at (800) 343-6474 or telex #95-1153. In Massachusetts, call (617) 879-0700.

CW COMMUNICATIONS/INC.

Diana La Muraglia, General Manager
International Marketing Services
CW COMMUNICATIONS / INC.
375 Cochituate Road, Box 880
Framingham, MA 01701, USA

Please send me rate cards and information on publications in the following countries:

Name _____ Title _____
Company _____
Address _____
City _____ State _____ Zip _____

PHOTO © 1984 GEORGE DILLON, JOHN SALAZZO

KENNEDY SPACE CENTER LAUNCHES OA

BY GLENN RIFKIN

The moment is historical. The sleek Space Shuttle *Challenger* glides in over the palm-dotted landscape and touches down on the Cape Canaveral runway. For the first time, the shuttle is landing at its launch site, marking one more leap forward in the U.S. space program.

In 1984 there will be no fewer than nine shuttle missions. Although several years behind schedule, the shuttle program is now reaching its potential. The days of regularly scheduled space flights (quite possibly with private citizens aboard) are apparently not far off.

The increased number of launches has turned Kennedy Space Center into a beehive of activity, busier than at any time since the Apollo moon missions of the 1960s. As shuttle missions proliferate, the 2,000 civil servants who populate the center need faster, more efficient information flow. With this in mind, the center has initiated an extensive office automation program, which promises to be no less complex to complete than a shuttle launch itself.

The National Aeronautics and Space Administration (Nasa) has been an innovator in computer usage since the space program got under way more than 25 years ago. In the early 1960s, Nasa brought in vast amounts of Honeywell, Inc. equipment, and that vendor has dominated launch-related computing ever since. As the space program heated up, particularly during the Apollo era, nonlaunch-related computing began to mushroom. Since then, diverse systems have popped up in every quarter of the facility for support of business and information services-type applications. Unfortunately, those systems have traditionally been stand-alone, noncompatible equipment that actually contributed to the paper flow.

What the space center would like to accomplish is simple enough: to eliminate, or at least control, the tidal wave of paper that washes over the 140,000-acre facility. The complexity and sensitivity of the work done at Cape Canaveral — combined with the everpresent government bureaucracy — have resulted in paperwork that traditionally has been a labyrinthian obstacle to space center workers. As Roy E. Lealman, manager of the Kennedy Data Management Systems Division (KDMS) put it, "During Apollo, we used to say that if all else failed, we could climb to the moon on our stacks of paper."

In addition, Nasa plans to keep the size of the center's civil service work force relatively stable and, with the pressure of increased launches, worker productivity has become a key issue.

Dallas K. Gillespie, deputy controller of the Kennedy Space Center and leader of the Office Automation Task Team (Oatt), was asked to look into productivity at the center and to "beef it up." It has become clear to Gillespie that newer and better computing tools are needed to support the effort.

"We are here to get the shuttle in the air," Gillespie pointed out. "We have to make use of these new tools or we won't be able to handle the work load. You can't launch 18 shuttles a year using pencils and paper."

"Each launch is unique," added Georgia Brock, project manager for OA. "With turnaround time decreasing, there is a need to move information faster to accommodate each vehicle. We're under a lot of pressure to do more, better."

To this end, the center established Oatt in early 1983 to create a comprehensive and structured OA policy for the center. Oatt will also, after thorough investigation, provide the data necessary for

Nasa to make recommendations on a single vendor to install a state-of-the-art, integrated OA system for the entire Kennedy Space Center operation.

Because of government regulations on procurement, the process of bringing in a vendor must be subject to open bidding. Although this process allows task team members to get a good view of what is on the market, it also considerably lengthens an already complicated procedure.

Cost-justification is a major consideration in the procurement process. The automators at the center found very few quantitative studies on cost-justification, Gillespie said, and they realize their proposals will be scrutinized on several levels up to that of the General Services Administration.

In January, Oatt sent an open invitation to vendors to show their products to the team. After they collect data on available systems and potential uses, a centerwide source evaluation board will look over the data and make recommendations to a Nasa selecting official in Washington, D.C., who will choose the vendor. Gillespie estimated implementation would begin sometime in late 1984 and would take 18 months to complete.

His goal is to eventually have 1,000 workstations in place around the center as a fully compatible system with communication linkups to data bases at the space center. He anticipated that all managers at the center would be tied into the network to some extent and that substantial numbers of them will have personal computers on their desks. Among the expected applications are electronic mail, scheduling and personal resource aids, a Kennedy Space Center automated decision support system, a center action tracking system and a centerwide menu support system.

Though the search for a single vendor-integrated system is only now being undertaken, Kennedy Space Center is no stranger to OA. The center has had widespread word processing systems since 1976 and personal computers have been used extensively for four years. There has been timesharing on a wide variety of minis and mainframes around the base. In addition, a major pilot program involving Datapoint, Inc. workstations and Northern Telecom, Inc. Displayphones was implemented in 1983 and has proven highly successful on the executive level.

The campus-like facility has also implemented a growing data communications network with local-area networks in place in several of the center's eight major buildings. According to Larry Grimes, senior systems engineer for communications, a large-scale integrated data network implemented in conjunction with the proposed OA system is in its final planning stages, and Kennedy Space Center foresees a state-of-the-art telecommunications system in place in the next two years.

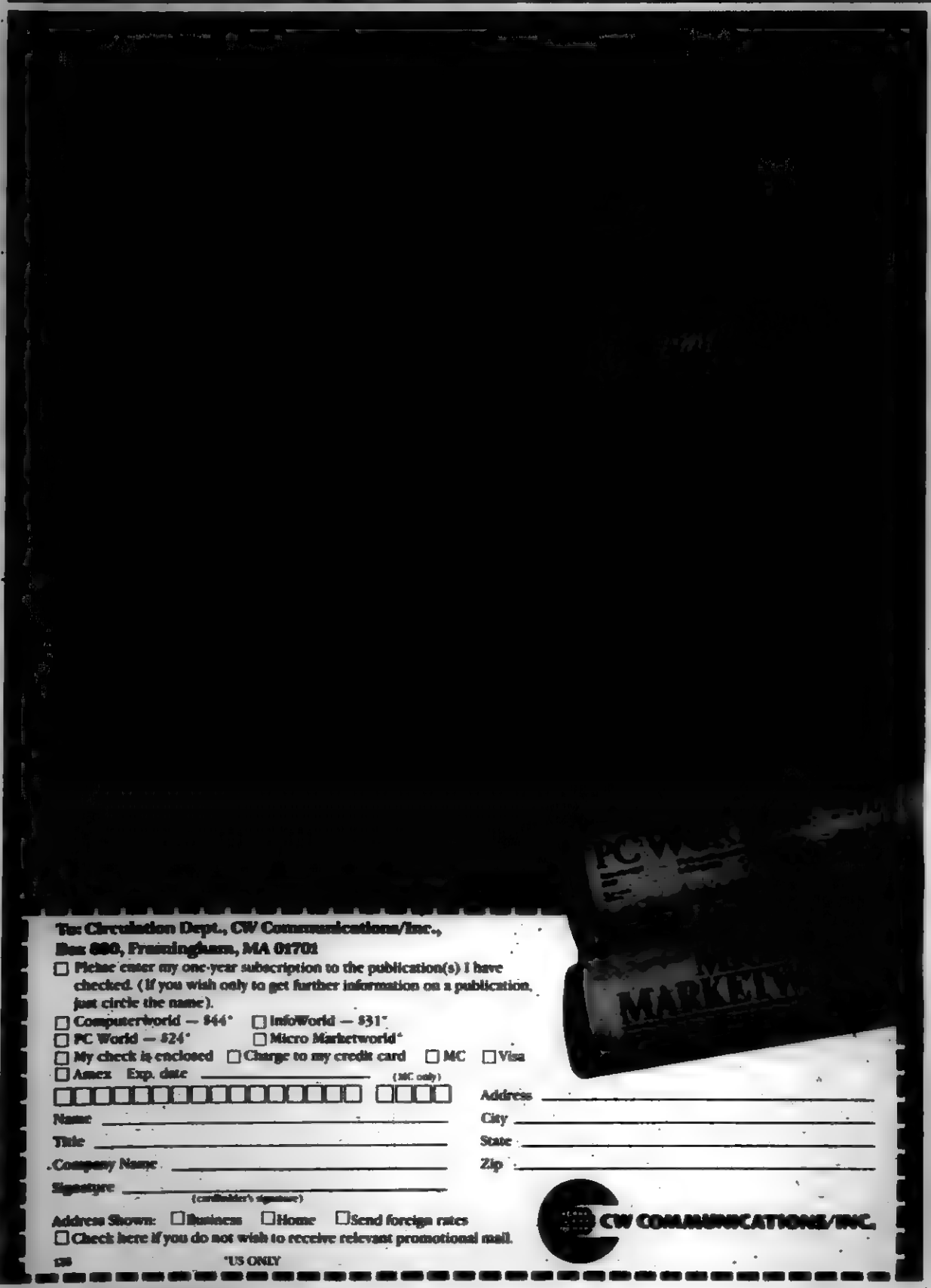
Besides Gillespie and Lealman, other key figures in automating the center facilities are Jim Akin, chief of the computer services division; Brock, an assistant to Akin; and Ed Odisho, a systems analyst in the Computer Services Division. Odisho was WP manager during the 1970s until WP ceased to be a separate function and began to merge with DP.

Odisho, who now serves as an internal consultant for acquiring OA equipment, said he has seen vast changes at the center in terms of information systems. Prior to 1976, office systems consisted of IBM Selectric typewriters and IBM mag-card machines. When the center opted for a CRT-based WP system, Odisho discovered an additional hurdle beyond that of finding a satisfactory system. Nestled on the mid-Florida coast, hard by the sleepy villages of Titusville and Cocoa Beach, Kennedy Space Center simply was too isolated to attract major vendors. A major requirement for any vendor the center chose would be close proximity in order to provide service and support.

As the cost of systems started to come down, much of the WP work was consolidated and, according to Odisho, the center found the advantages of WP could be applied to other tasks as well.

In 1980, Odisho decided that the personal computer would be the perfect solution for those who needed some word processing, but had other requirements as well. He brought in several vendors to demonstrate their wares and selected Commodore Business Machines, Inc. With more than 100 Commodores installed, Odisho then turned to Convergent Technologies, Inc. and began to install those in September 1982.

Though a small number of IBM Personal Computers, Digital Equipment Corp. Rainbows and others are on the base, Commodore and Convergent Technologies remain the most widespread. When the single OA vendor is brought in, that situation will undoubtedly change. But both Odisho and Gillespie agreed the economic value of the older



To: Circulation Dept., CW Communications/Inc.,
Box 880, Framingham, MA 01701

☐ Please enter my one-year subscription to the publication(s) I have checked. (If you wish only to get further information on a publication, just circle the name).

☐ Computerworld — $44* ☐ InfoWorld — $31*
☐ PC World — $24* ☐ Micro Marketworld*
☐ My check is enclosed ☐ Charge to my credit card ☐ MC ☐ Visa
☐ Amex Exp. date _____ (MC only)

☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐ ☐☐☐☐

Name _____ Address _____
Title _____ City _____
Company Name _____ State _____
Signature _____ Zip _____
(cardholder's signature)

Address Shown: ☐ Business ☐ Home ☐ Send foreign rates
☐ Check here if you do not wish to receive relevant promotional mail.

CW COMMUNICATIONS/INC.

128 *US ONLY

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 709 FRAMINGHAM, MA 01701

postage will be paid by

CIRCULATION DEPARTMENT

COMPUTERWORLD

375 Cochituate Road, Rte. 30
Box 897
Framingham, MA 01701-9985

systems will not disappear.

Odisho pointed out that the systems have already provided a payback over the years and that if a particular piece of hardware does not fit in to the overall OA plan, it can still be placed in a situation where it will meet a need. "We are of the opinion that economic life continues long after a system ceases to be technologically exciting. We keep moving equipment to the highest economic purpose it can serve," he said.

> ***"We are of the opinion that economic life continues long after a system ceases to be technologically exciting. We keep moving equipment to the highest economic purpose it can serve."***

The personal computers at the space center have served a number of functions in the non-launch-related realm. According to Odisho, many were acquired for word processing, but others have been used for accessing data bases, user programming, spreadsheet analysis, property tracking and as communications devices. Every personal computer purchase must be routed through Odisho's office for approval and must contain a positive statement as to need and cost-justification. Odisho has also set up a loan pool of portable computers including Osbornes and Radio Shack Corp.'s Model 100s for certain immediate utilities.

Though the approval process places some limits on what is brought in, the lack of a preferred vendor list has left the space center with a potpourri of information systems equipment that has made compatibility a mounting problem. Odisho pointed out that there are "clusters of compatibility," but, as Roy Lealman put it, "we have to get our act together on information systems at the center."

In fact, the lack of direction for these systems caused such serious problems for Lealman's KDMS group (akin to a management information systems [MIS] department) that he called for a moratorium on purchasing equipment. "I figured we'd be sorry we had so many different kinds of equipment all over the place," he stated. With Lealman spearheading the effort, Oatt was chartered in early 1983 to focus on the problem.

According to Jim Akin, the equipment in place is so diverse that a centerwide plan became necessary. "Our goal is to have a fully integrated OA system in place so that employees on all levels can have access to the data that will help them do their jobs better. We see OA as a means to improve productivity."

Lealman added, "We've had two monsters: MIS on one side and OA on the other. Now we're trying to erase the road that divides those two."

One of the first steps taken to accomplish that task was a recently completed Datapoint Corp. pilot initiated more than a year ago. The pilot, under the direction of Darwin Brown, a member of KDMS, was designed to provide a gateway for managers back to the center's automated management information systems.

After a parade of vendors displayed their equipment, Brown settled on Datapoint. At its zenith, the pilot had 24 workstations on the desks of executive secretaries around the center, including the director's office. On the executives' desks, hooked by modem to the Datapoint workstations, were Northern Telecom Displayphones. The systems are used for such applications as electronic mail, WP and spreadsheet analysis.

Initially, the pilot met with some resistance. Brown pointed out that accessing data bases requires training, and they "couldn't get the executives to stand still long enough to learn." Secretaries, who had been relatively untouched by the technology on the executive level, were also apprehensive.

To alleviate the problem, Oatt turned to Margaret Rosenberry, computer assistant and former executive secretary, to help familiarize the users with the systems. The secretaries, who were used to typewriters, encountered the dual problem of having to perform their jobs while learning a new technology, Rosenberry said. She formed a user's group and set up a "buddy system" in which the users would help each other out of crisis situations.

Oatt members are confident that when it comes time for overall implementation with a single OA vendor, the vendor will provide the necessary training. They don't think the technology will pose a threat to the workers at the space center.

"This is a technical organization," explained Georgia Brock. "Most of our managers are from the engineering world and are not standoffish when it comes to technology."

Although it didn't meet all his expectations, the Datapoint pilot has been very successful, Brown said. It has whetted a lot of appetites for OA and has gained the interest of many professionals and managers. The Kennedy Space Center plans to stick with Datapoint, he stated, but added that he realizes more is needed: "There simply isn't any single commercial system today that meets our requirements."

With that in mind, Oatt is assuming the vendor chosen to implement the overall OA plan will subcontract work to other vendors to solve specific needs. Oatt might, in fact, look to a systems integrator rather than a manufacturer to handle the implementation if such a bid is made.

Among the goals upon implementation is to allow access to the various data bases within the KDMS arena as well as data bases of the many contracting organizations that inhabit the space center (there are more than 12,000 contract workers at the base). These data bases will facilitate such needed applications as problem tracking, work control and modification management.

As the excitement builds for OA, interest has also increased in improved communications. Larry Grimes explained that planning for an overhaul of communications at the base began three years ago, and his group has been getting a sampling of user needs ever since. "We're like a small town here. We have users everywhere and office automation is drawing a lot of attention to telecommunications."

The center currently has a GTE private branch exchange and a Develcon, Inc. pure data switch in place. Grimes foresees the need for gateway switchers to handle the information flow from the local-area networks already in place in several buildings. He predicted 3,000 to 5,000 connections initially, with growth up to 10,000. The center is also installing a fiber-optics network, which Grimes said "is the wave of the future."

Coincidentally with the Kennedy Space Center's OA project, Nasa has begun developing an overall OA plan for the entire agency. A Strategic Office Automation Planning (Soap) committee has been formed with members coming from all the agency's centers. The committee meets once a week via teleconferencing to monitor what is transpiring. According to Akin, a member of that committee, a report is due out in May with overall recommendations.

Gillespie doesn't anticipate conflict with the agency. "We intend to make sure what we buy is compatible with what Nasa does. Conceivably, we'll have the best of both worlds."

Rifkin is senior writer for Computerworld OA. OA

Are your computers getting the "shock treatment"?

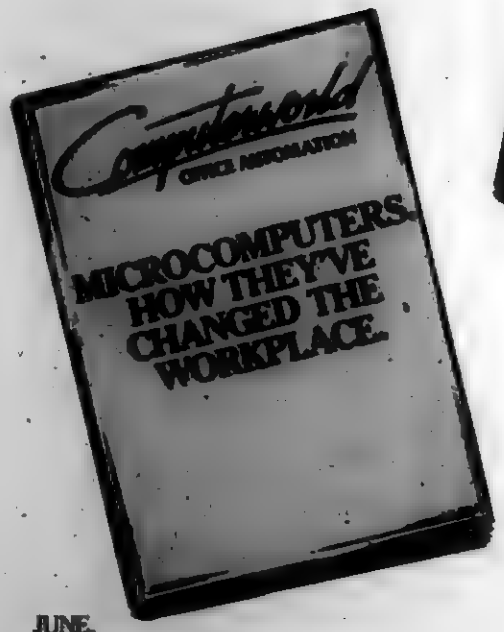
Static electricity, humidity and other environmental problems can cause all kinds of annoying disruptions to your computer or word processing work flow. And it's totally unnecessary! Liebert offers affordable solutions to all small computer environmental and power problems. Call 614/888-0246. We help make your computer investment pay off!

Liebert

World leader in computer support systems.

Liebert Corporation, 1050 Dearborn Drive, P.O. Box 29186, Columbus, Ohio 43229, 614/888-0246 Telex: 246526 LIEBERT WOOH

IF YOU MISS CW OFFICE AUTOMATION IN THE NEXT THREE MONTHS, LOOK AT THE ISSUES YOU'LL BE MISSING.



JUNE.

Microcomputers.
How they've changed
the workplace.
What's new in networks, security,
and micro-to-mainframe links.
Closes May 4.

AUGUST.

Applications Software.
A look at the real issues.
Productivity. User-friendly vs.
ease-of-use. Plus plenty of
product reviews.
Closes July 6.

OCTOBER.

Workstations. We explain the
alternatives to microcomputers,
addressing important topics like
cost-effectiveness, compatibility
and upgrades.
Closes August 31.

Office Automation is ideal both for the advertiser and the reader. Because each one offers focused, in-depth information in the area of office automation.

Readers always want to catch up on what's hot and what's not in their particular specialty. And find out what the vendors have to offer.

As an advertiser, you won't want to miss the opportunity to tell them.

Maybe that's why our OA is so popular.

Everyone wins.

For more information, or to reserve your space in any of our upcoming issues, simply call the sales office nearest you. Or fill out and return the coupon to Ed Marecki, National Sales Director, Computerworld, 375 Cochituate Road, Box 880, Framingham, MA 01701.

To: Ed Marecki, *National Sales Director*
CW Communications/Inc., Box 880, Framingham, MA 01701
Please send me advertising information on: ☐ *Workstations.*
☐ *Applications Software.* ☐ *Microcomputers.*
☐ *Please have a sales representative call me.*

Name _____

Title _____

Company _____

Address _____

City _____ State _____ Zip _____

Telephone _____

OA

Computerworld
OFFICE AUTOMATION

Sales offices.

BOSTON: 375 Cochituate Road, Box 880, Framingham, MA 01701 (617) 879-0700; CHICAGO: 2600 South River Road, Suite 304, Des Plaines, IL 60018 (312) 827-4433; NEW YORK: Paramus Plaza I, 140 Route 17 North, Paramus, NJ 07652 (201) 967-1350; ATLANTA: 1853 Peeler Road, Suite D, Atlanta, GA 30338 (404) 394-0758; SAN FRANCISCO: 300 Broadway, Suite 20, San Francisco, CA 94133 (415) 421-7330; LOS ANGELES: 18008 Sky Park Circle, Suite 260, Irvine, CA 92714 (714) 261-1230.

A New Generation Of Software

By David A. Boucher

Choosing office systems forces some tough decision making on users faced with the wide array of technologies now available, and those choices won't be getting any easier.

Hardware technology is an important element in the comparison of systems, but the decision should not be based on hardware considerations alone. A new generation of applications software with sophisticated features will be the driving force behind the automated office. Fully utilizing the power of the 32-bit workstations just beginning to move out of engineering environments and into the office, this generation of software goes far beyond simply performing more advanced analytical or number-crunching tasks.

A key software feature that will lead to increased utilization of office automation technology is an advanced user interface. This interface will enable users to work with the system in an intuitive way; it includes features such as mice, icons and windows.

For specific applications such as document production — which includes everything from client proposals and management reports to technical manuals — two other features will advance the use of office systems. The first, advanced text formatting capabilities, includes multi-font features and facilities for easily modifying the overall format of a document (for example, changing margins and indentations). The second feature consists of graphics capabilities fully integrated with text editing features, and it allows users to produce illustrated documents easily.

For a system to be truly easy to use, a number of features need to be built into the software technology. A feature rapidly growing in popularity is the mouse, a hand-held pointing device that enables the user to move the cursor on the screen without using the keyboard.

Icons are another increasingly important way of making software systems easy to use. Icons pictorially represent objects or functions; users select or operate them by pointing to them with the mouse-driven cursor, rather than through keyboard entry.

Advanced user interfaces also often use a window system. Windows are a way of organizing a CRT screen to allow simultaneous presentation of data from different applications. Windows also allow the overlaying of Help messages, command menus or other useful information on top of or next to the material a user is currently editing or examining.

However, a window system by itself is no guarantee that software is easy to use. It is essential that the windows be used properly by individual applications (such as text processing, graphics and spread sheet) available on the system. By working together with the specific applications packages to present related data and choices to the user, windows enable the user to operate efficiently in performing complex tasks.

Windows are particularly helpful in integrating text

with graphics. For example, a user can decide in the middle of preparing a report that he wants to add a bar chart to represent graphically the data presented in the text. He might call up a window that would appear over or next to his text, select the type of chart he wants to insert from a set of choices presented in the new window, then create that graph. When the graph or diagram is positioned correctly within the text, the window disappears.

Xerox Corp.'s Alto system, an internal project of the Xerox Palo Alto Research Center, represented a major step forward in advanced user interfaces. It attempted to give users multifront text and graphics capabilities through a set of simple and consistent commands. Out of this research came the Xerox Star System, the first commercially available OA product with a mouse/window/icon-based user interface.

The user interface design of the Star was largely successful, but newer generation systems just emerging have greater speed, responsiveness and — most important — substantial additional design advances to make them even easier to use.

Seeking to make fundamental advances in text editing and formatting technology, a group of researchers at MIT, led by Michael Hammer, undertook the Etude project. Etude was state-of-the-art research in developing an entirely new approach to using computer technology to produce documents, and it started with a fundamental change in perspective. Rather than focusing on merely editing lines of text and strings of characters, the Etude researchers looked into how the higher level structure of a document was used to present information most effectively, and they worked toward developing techniques to allow that structure to be modified easily. They focused on the entire format structure of a document, from the type fonts used to the paragraph margins, leading-line indentations and so on.

The Etude researchers developed more intuitive techniques for creating documents; their structured document editor represents a breakthrough in easy-to-use multifont text editing and formatting systems.

The structured document editor enables a user to modify the structure of individual components (for example, paragraphs, section headings and titles) easily and rapidly and to see the changes instantaneously.

Unlike standard text editors or even more advanced dedicated WP systems which permit extensive rearrangement of blocks of text, a structured document editor gives the user a much more global perspective and complete control over the entire document. For example, by issuing only one command, a user can change all section headings throughout a document to boldface.

The generation of commercial software surfacing today incorporates the breakthroughs in user interfaces achieved in the 1970s, using multiwindow environments and, often, pointing devices such as the mouse.

Other advanced features are also possible with the new hardware and software technology.

Transportability of software has freed software developers from dependence on a single hardware vendor. It will dramatically accelerate the rate at which new-generation software becomes available to improve OA systems.

Not only is this generation of software more responsive, but also it opens new creative outlets for users, such as the ability to produce documents that make use of the rhetorical value of multifont typography and the efficient presentation of data with graphics.

By means of these new options, users can think about the immediate visual impact of the documents — for example, the way the form of a graph will affect the reader's perception of the data. Many clerical people find an avenue for developing new skills that increase their value within a company as well as their personal productivity and accomplishment.

One major issue with new-generation systems — and one that particularly concerns management information systems (MIS) directors — is compatibility with existing equipment. If new technology is going to find a place in offices where a substantial base of older equipment already resides, software designers must provide special features for translation of data from external sources. In addition, they must also provide communications facilities that allow new equipment to be connected with older systems.

By means of heuristic programming techniques originally developed through research in artificial intelligence, facilities can be developed to allow communication with systems not specifically foreseen by the software developers. These facilities will further enhance the ability of a new system to fit into an environment populated by a variety of other equipment.

In years past, hardware from different vendors was largely incompatible from the software standpoint. Computer language implementations were frequently inconsistent; to achieve acceptable performance in spite of the limitations in the power of the hardware, programming often had to be done in machine-specific assembly language. More recently, software developers have been able to write sophisticated applications programs entirely in high-level languages that are consistent from machine to machine. This allows software transportability — the same program can be found on many different hardware systems, produced by a variety of manufacturers.

Transportability of software has freed software developers from dependence on a single hardware vendor and will in turn free the user from being tied to any one piece of equipment. Transportability also has a tremendously stimulating effect on the rate of software development in the industry; it will dramatically accelerate the rate at which new-generation software becomes available to improve OA systems.

One aspect of the new-generation of software stands out as being of primary importance for future applications: its ability to integrate and centralize in the office functions previously handled separately or even out-of-house — for example, producing documents with multifont text, graphics and diagrams. This software offers users many different approaches to graphics, from drawing a pie chart directly on the screen within the text, to using the mouse to draw user-defined diagrams. The user makes the important aesthetic decisions.

Therefore, the new-generation software not only increases productivity through faster and more efficient production of documents, but it also enhances the communication of information — which is what OA is all about.

This integrated software was made possible by the advent of more powerful desktop workstations — the 32-bit systems now sold by Sun Microsystems, Cadmus, Apollo Computer, Perq Systems and others. Software to fully utilize these advanced systems has been lagging.

The generation just emerging will open up a number of new applications, increasing productivity and communication. Among them will be decision support systems (such as natural language data base query and project scheduling programs), computer-aided design and expert systems using artificial intelligence techniques to provide sophisticated problem analysis.

Those on the leading edge of this technology will offer systems that enable users to work intuitively with their data, allowing them to prepare and analyze information quickly, easily and efficiently. OA

Boucher is the president and cofounder of Interleaf, Inc., a software company based in Cambridge, Mass.

NU DATA's Battery-Free
Dual LED Interface Tester

NEW!

MODEL 921-T3
EIA RS232C INTERFACE TESTER

• No batteries required • LED monitor requires as little as 0.5 ma • Dual LED, Bi-Color design • Bi-Color monitoring of 9 leads plus 1 strappable monitor • 1 pulse trap with selectable + or - triggering • Micro miniature switch lead programming • 22 large, easy to read LEDs • Rugged, design - Steel box • Low cost

ALSO INQUIRE ABOUT OUR OTHER PRODUCTS

NU DATA CORPORATION

OA Q&A

Tony Abbott is president of Commercial Software, Inc. of New York, an applications software firm with products geared to telecommunications management during postdivestiture. He is chairman of the Association of Data Processing Service Organizations (Adapso), Inc.'s dialog committee with AT&T and has kept an eye on problems facing telecommunications managers.

What are the key communications issues during divestiture?

For users, the era of the single-source telephone system is a thing of the past; a very simple procedure like ordering a new telephone is now complicated. For instance, when you order a phone from AT&T Information Services, the building wiring must be installed by a local operating company and perhaps you order a Wats line from AT&T Communication. The user has to coordinate all of these activities.

Productivity within the communications management group has been dramatically and adversely affected. The telecommunications manager also has a big people shortage problem; there aren't enough qualified people out there. In addition, the feasibility of delivering a high level of service to his organization is impaired because of the traditional vendor reponsibility problem. Whose problem is it? Who do I call? How do I get them to respond?

His other big problem is turmoil with rates, tariffs and pricing. Costs are unclear, and to gain control, large organizations must confront some unknowns that require a fair amount of analysis.

What about the technology? How is that being affected?

It's hard enough to to manage and control what's already in place, and divestiture hasn't helped. Some people are assimilating the new technology fairly well and are able to evaluate it, and others are not. Major changes had already occurred in telecommunications management with the arrival of voice-mail, electronic mail, teleconferencing and other equipment and services. Now the manager's energies have been diverted toward more day-to-day mundane issues and away from keeping pace with new offerings and how they might best fit into his organization.

How will all this affect OA?

I think you'll see AT&T announcing some computer processors that look very much like what Wang or IBM offers. Clearly, AT&T has an advantage — it knows how to deploy equipment throughout an organization very easily. It's also dealing with a buyer who has traditionally bought from AT&T. It may very well have a larger impact on OA than most people suspect. AT&T is having some problems getting its product out the door, but when it does, it will be based on some very current technology. I think it will be a major player.

What about software issues?

The telecommunications function is the most information-intensive job in a large organization. Every time someone picks up a phone, a record is created. To move a phone, you have to worry about a whole variety of records, not the least of which is the corporate directory.

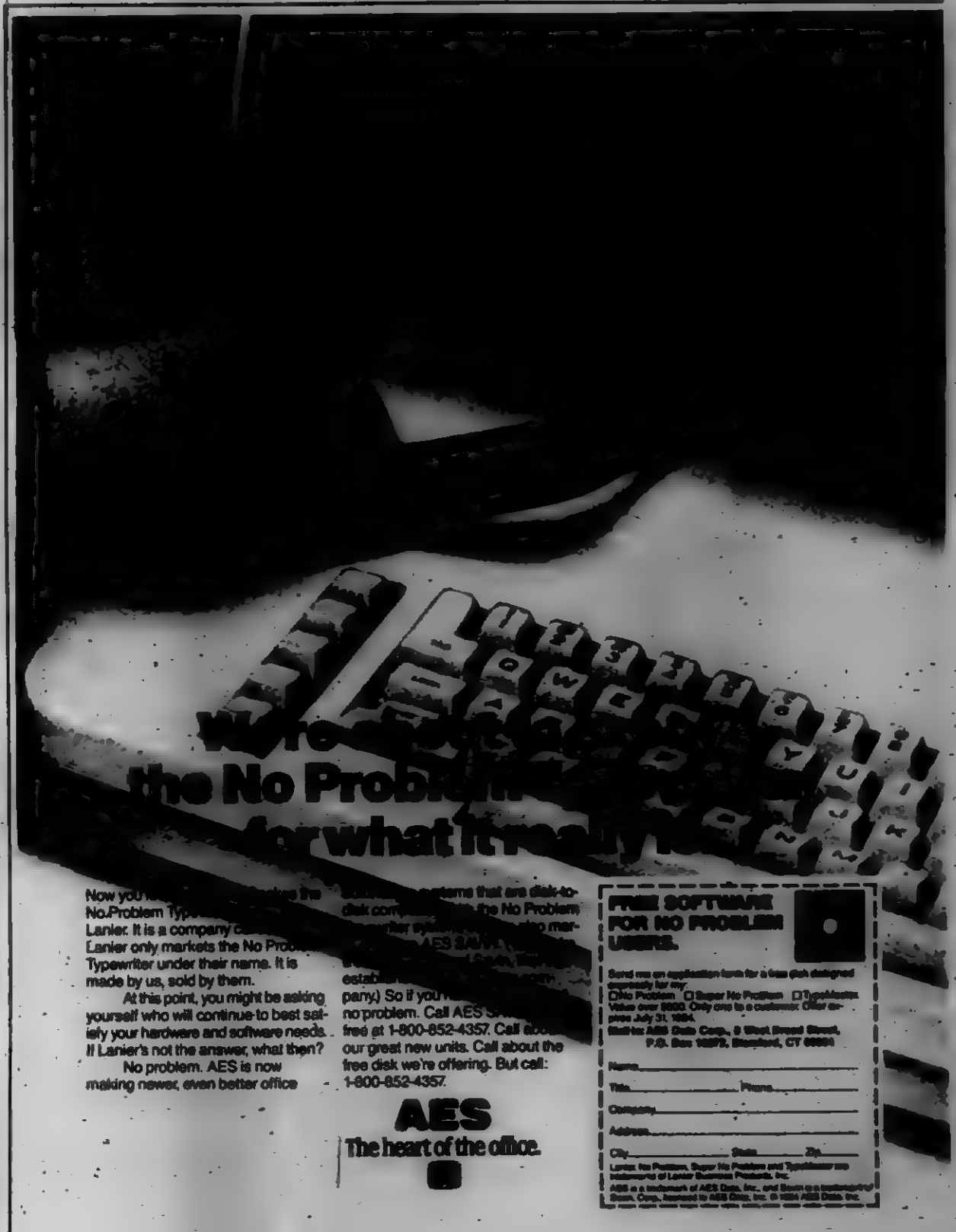
Keeping records on how things connect; charging users and making them aware of what's causing outside expenses to incur; improving the productivity of people dealing with outside vendors — these are important issues.

Have some of the changes you've seen surprised you?

When it became clear what the initial form would be after divestiture and that the Bell system was going to be broken up, we felt pretty sure it would create tremendous management problems. The task of managing telecommunications is so information-intensive we knew we would have a major opportunity to help. We think there's a billion-dollar market in telemanagement systems.

Telecommunications seems to have been a hardware-intensive business up to now. Will software take a larger role?

Software is going to become a big part of it, and telecommunications suppliers themselves will provide a lot of the standard protocol interfaces in the software that meets some of the communications requirements. OA



Now you
No Problem Typ
Lanier. It is a company
Lanier only markets the No Prob
Typewriter under their name. It is
made by us, sold by them.

At this point, you might be asking yourself who will continue to best satisfy your hardware and software needs. If Lanier's not the answer, what then?

No problem. AES is now making newer, even better office

systems that are disk-to-disk com the No Problem
AES
pany.) So if you
no problem. Call AES
free at 1-800-852-4357. Call
our great new units. Call about the free disk we're offering. But call: 1-800-852-4357.

AES
The heart of the office.

FREE SOFTWARE FOR NO PROBLEM USERS.

Send me an application form for a free disk designed expressly for my:
☐ No Problem ☐ Super No Problem ☐ Typestation
Value over $500. Only one to a customer. Offer expires July 31, 1984.
Mail to: AES Data Corp., 8 West Broad Street, P.O. Box 10972, Stamford, CT 06904

Name_____
Title_____ Phone_____
Company_____
Address_____
City_____ State_____ Zip_____

Lanier, No Problem, Super No Problem and Typestation are trademarks of Lanier Business Products, Inc.
AES is a trademark of AES Data, Inc., and Stamford is a trademark of Stamford Corp., licensed to AES Data, Inc. © 1984 AES Data, Inc.

OA TECHNOLOGY

BILLERICA, Mass.— The **Commterm, Inc.** EVX-1000 voice messaging system can now be integrated with the Northern Telecom, Inc. SL1-digital business communications system. The PBX integration reportedly provides SL-1 system users with automatic telephone answering capability, delivers a greeting in the person's own voice, stores the caller's message and notifies the called party through the use of a message-waiting lamp or tone. The called party can retrieve the stored message at any time from any push-button phone in the world.

The EVX-1000 has also been integrated with the Ericsson Information System ASB-900, designed for PBX integration, and the Plessey Co. Ltd IDX communications system. Subscriber costs are approximately $75 per user per year from Commterm, Inc., 900 Middlesex Turnpike, Building 5, Billerica, Mass. 01821.

CAMBRIDGE, Mass.— A multifunction IBM PC software package combining relational data base, presentation-quality business graphics, a spreadsheet, word processing and communications from one IBM PC to another or to a mainframe is being offered by **Mosaic Software, Inc.**

The package, called Integrated-6, reportedly allows information to be created and stored; analyzed; displayed graphically; combined and consolidated; transferred among modules or from one computer to another; and output in a variety of formats for presentation. It requires 256K bytes of memory.

Integrated-6 will be sold for $495 from Mosaic Software, Inc., 1972 Massachusetts Ave., Cambridge, Mass. 02140.

CUPERTINO, Calif.— **Apple Computer, Inc.** has announced Appleline, a coaxial attachment unit designed to connect Apple personal computers to an IBM or IBM-compatible network. Appleline connects the Macintosh, Lisa and Apple III to 3270 cluster controllers and reportedly allows the user to access information stored within the IBM mainframe network from local and remote environments.

Each Appleline supports one Apple computer and requires only minimal changes to the host software. The Appleline costs $1,295 from Apple Computer, Inc., 20525 Mariani Ave., Cupertino, Calif. 95014.

DELRAY BEACH, Fla.— The IBM Portable Personal Computer, a lighter and smaller version of the IBM PC, was introduced by **IBM.** The portable, priced at $2,795, will be available in limited quantities initially. It will feature 256K bytes of memory (expandable to 512K bytes), a built-in 9-in. amber monitor, a

IBM's Portable PC

360K-byte slimline diskette drive and adapter and a color/graphics monitor adapter. It reportedly weighs 30 lbs.

The product uses the 16-bit, Intel 8088 microprocessor with IBM's PC-DOS operating system.

IBM also introduced its Personal Computer Cluster program, which reportedly supports the connection of up to 64 IBM PCs. A Cluster Program license is required for each system, and IBM is offering a Five-Pack available with one program diskette, five publications and licenses permitting use of the program on five machines. A typical cluster might include five computers; with licenses, adapters and cable kits, such a configuration would cost $2,540 from an IBM Product Center.

For more information contact: IBM Entry Systems Division, P.O. Box 2989, Delray Beach, Fla. 33444.

IBM also unveiled a new version of its System 9000, the 9002 desktop computer, a Motorola 68000-based system that reportedly runs an optional Xenix operating system. The 9002, aimed at the engineering, scientific and business market, can operate as a stand-alone unit or, with Xenix, as a host supporting three attached terminals.

The 9002 has 128K bytes of random-access memory, expandable to 5.2M bytes. Up to four 10M-byte hard-disk drives, four 5¼-in. or 8-in. diskette drives and a system printer can also be added.

The 9002 will be priced at $6,495 for the system unit, display, keyboard and standard operating system. The Xenix operating system and its licensed programs will be available for a one-time license charge of $995. The system is scheduled for second quarter 1984 from IBM, 900 King St., Rye Brook, N.Y. 10573.

ANDOVER, Mass.— **Software International Corp.** unveiled a real-time link between its mainframe general ledger package and a variety of applications that run on the IBM PC.

The product, Smart Link, reportedly enables PC users to extend the data extraction and manipulation resources of the company's on-line General Ledger and Financial Reporting System at the micro level. The product is said to provide for on-line, real-time extraction of live data and does not use any batch processing mechanisms to create a shadow file accessed by the micro.

Smart Link is available for $2,995 per micro from Software International, One Tech Drive, Andover, Mass. 01810.

SANTA CLARA, Calif.— A fiber-optic, Ethernet-compatible local-area network, reportedly the industry's first, was announced by **Ungermann-Bass, Inc.** Called Fiber Optic Net/One, the product is an expansion of the company's existing baseband and broadband systems and reportedly has added advantages of optical fiber, such as noise immunity, secure transmissions and longer network distances.

Fiber Optic Net/One is available in single or multiple cable configurations and operates at a 10M bit/sec data rate. The cost of an entry-level system starts at approximately $25,000. A typical fiber-optic Net/One with 200 device interface ports would cost $135,000, Ungermann-Bass said from 2560 Mission College Blvd., Santa Clara, Calif. 95050.

BOSTON, Mass.— **Altertext, Inc.**, a developer and marketer of media conversion systems, unveiled the Altertext Communicator, an advanced protocol

The Altertext Communicator

converter that reportedly permits direct exchange of text, codes and commands among previously incompatible word processors, typesetting equipment and computers. The product translates all codes and format commands so that information can be retrieved on equipment from numerous vendors' products, including IBM PCs, Wang Laboratories, Inc. and Lanier Business Products, Inc. word processors and various other personal computers.

The system consists of a Z80 microprocessor with 64K bytes of memory, a 9-in. diagonal CRT and a detachable keyboard. Both asynchronous and bisynchronous interfaces can be used with the Altertext Communicator. The company also announced media conversion software programs for the Altertext Communicator. The Altertext Communicator is available for $7,500 from Altertext, 210 Lincoln St., Boston, Mass. 02111.

KING OF PRUSSIA, Pa.— **Integrated Technologies, Inc.** announced the expansion of its Soft-Switch Document Control System (DCS) to include support for IBM's Professional Office Support System (Profs). This reportedly allows users of diverse products such as Wang, Xerox Corp., NBI, Inc. and IBM personal computers to exchange revisable form documents with Profs users.

The interface to Soft-Switch for the Profs user is integrated with the standard Profs mail system. This allows Profs users to send revisable form documents to Soft-Switch-supported OA devices by executing ITI-supplied Profs commands. Soft-Switch automatically translates the Profs DCF format to the revisable form at the destination system.

The Soft-Switch interface for Profs is available for $10,000 from Integrated Technologies, Inc., 200 N. Warner Road, King of Prussia, Pa. 19406.

WESTBORO, Mass.— **Data General Corp.** has introduced a communications interface that reportedly permits direct communications between IBM mainframes and DG's Desktop Generation, Eclipse S/20 and Eclipse C/30 low-end processors. The product, the ISMC/2 is a two-channel front-end intelligent synchronous micro controller board that enables its processors to offload high-speed synchronous communications for more efficient file transfer and interactive communications. The product is available for $1,650.

DG also announced enhancements to its Comprehensive Electronic Office system (CEO) that reportedly let CEO offer portable hard-copy terminal access, Telex capability and an integrated typesetting function.

In addition, DG became the first office vendor to announce an agreement with one of the recently liberated AT&T operating companies. The agreement between DG and Pactel Communications Systems — a subsidiary of Pacific Telesis Group — calls for Pactel to offer DG's CEO system in their headquarters and sales offices in California.

For more information contact Data General, 4400 Computer Drive, Westboro, Mass. 01581.

STAMFORD, Conn.— **Exxon Office Systems Co.** announced the Exxon 750 Professional Workstation, which reportedly extends the Exxon Business Support System to executives, managers and professionals. The Exxon 750 reportedly can handle text editing, electronic spreadsheets and business graphics in multiple windows. It has a high-resolution, monochrome, bit-map display and

OA TECHNOLOGY

The Exxon 750

uses floppy and hard-disk storage with a main memory of 512K bytes. It will run both 8-bit and 16-bit applications software and permits the user to move back and forth from text to numeric and graphic operations without changing programs, the vendor said. Exxon has also announced support for MS-DOS for the product.

The Exxon 750 is an addition to Exxon Business Support System, which has at its core the Unix-based 8400 Series controller. The 750 will be available in the second quarter for $7,750 from Exxon Office Systems, 771 Long Ridge Road, Stamford, Conn. 06902.

SAN JOSE, Calif.— The Automatic Speech Exchange Network (Aspen), a voice message system, was introduced by **Octel Communications Corp.** Aspen, reportedly a compact, high-performance computer and disk system offers any business that uses a private branch exchange or Centrex the ability to exchange information via telephone without requiring simultaneous participation by the caller and receiver. The system offers the lowest cost per user of any high-performance voice message system on the market and is capable of interfacing with any PBX on the market, the vendor said.

Aspen includes automatic delivery of recorded messages to lists of people; message forwarding; the ability to edit messages, add comments and redirect messages; and delivery of messages at a prearranged time. The Aspen system will be available in June for $55,000 (for 100 to 200 users) from Octel, 1841 Zanker Road, San Jose, Calif. 95112.

CAMBRIDGE, Mass.— **Lotus Development Corp.** introduced Symphony, an all-in-one software package that claims to be the first complete business productivity tool offered for the desktop and portable microcomputer market. Symphony combines word processing, a data base with forms and mail merge capabilities, state-of-the-art communications, an advanced spreadsheet and business graphics. Symphony also offers windowing capabilities, which work in conjunction with all of the packages functions.

Symphony features WP with multiple documents on screen, and mail-merge capability; forms-oriented, multiple data base capability; communications that includes terminal emulation, asynchronous operations, point-to-point file transfer of any file; window management with simultaneous display of spreadsheets, documents, forms and graphs on screen.

Symphony requires a minimum of 320K bytes of random-access memory and is initially offered for $695; Lotus is offering current registered Lotus 1-2-3 users a credit for the full price of that program toward the purchase of Symphony. The company said it would continue to sell, service and support 1-2-3 for users who choose to stay with that product.

More information is available from Lotus Development Corp., 161 First St., Cambridge, Mass. 02142.

Lotus' Symphony

LOWELL, Mass.— **Wang Laboratories, Inc.** introduced the Wang OIS 60, a clustered information processor for small and medium-size businesses.

The product offers advanced word processing, a range of optional software applications, and networking capabilities. It has 33.5M bytes of fixed-disk memory supporting up to eight users and five peripheral devices such as communications facilities, printers and tape drives. Four of the workstations can be any standard OIS workstation, and four can be "internal" OIS devices with logic and memory housed within the master.

The OIS 60 will support up to 10 Wang printers, including the OIS-PTR20, a 20 char/sec daisy printer. The OIS 60 will also support the Wang Systems Networking for information processing between Wang systems over local- and wide-area networks.

The OIS 60, which includes work processing, utilities and advanced systems software, costs $9,000, from Wang, One Industrial Ave., Lowell, Mass. 01851.

MAYNARD, Mass.— **Digital Equipment Corp.** has announced a new video monitor with a touch screen interface. The monitor, called Dectouch, is a color graphics display unit that reportedly responds to a variety of input devices such as a finger, joystick, mouse, as well as a standard keyboard.

The VRTS1 Dectouch monitor

Dectouch

was designed for use with the Professional 350 Workstation.

The monitor, with connector panel and internal controller, is available for $3,295 from Digital Equipment Corp., 125 Main St., Maynard, Mass. 01754.

PALO ALTO, Calif.— A fast 11-in. by 17-in plotter featuring 31.5 in/sec plot speed and 6G acceleration has been introduced by **Hewlett-Packard Co.** The plotter, the HP 7550A, is available with automatic cut-sheet paper feed.

Other features include a liquid-crystal display with function keys for reporting plotter status and program messages.

The HP 7550A is available for $3,900 from HP, 3000 Hanover St., Palo Alto, Calif. 94304.

PALO ALTO, Calif.— **Xerox Corp.** has reduced the price of its current Star 8010 network workstation from $15,055 to $9,995. Xerox also announced two new models of the Star 8010 information system. The remote workstation, which can reportedly transfer information through a private branch exchange to an Ethernet network, is available for $9,995. The company also unveiled a stand-alone version of the Star, available for $8,995 from Xerox Office Systems Division, 3333 Coyote Hill Road, Palo Alto, Calif. 94304.

CUPERTINO, Calif.— **Tandem Computers, Inc.** has expanded its line of terminals with the introduction of the 6531 and 6532 models and has reduced the price of the existing 6530 terminal.

Tandem has enhanced the entire 6530 family of terminals with the introduction of voice recognition and 3270 emulation.

The 6531 is available for $2,100 and the 6532 for $1,950 Tandem Computers said from 19333 Vallco Parkway, Cupertino, Calif. 95014.

Do lightning storms "pull the plug" on your computer efficiency?

Electrical storms can cause "terminal paranoia" for small computer and word processing operators. And that causes some totally unnecessary work disruptions. A sensible solution is both available and affordable. Check out Liebert environmental control and power protection systems. Call 614/888-0246. We help make your computer investment pay off!

Liebert Corporation, 1050 Dearborn Drive, P.O. Box 29186, Columbus, Ohio 43229, 614/888-0246 Telex: 246055 LIEBERT WOON

CALENDAR

April 14-19, Dallas — **Computer Graphics '85.** Contact: The National Computer Graphics Association, 8401 Arlington Blvd., Suite 601, Fairfax, Va. 22031.

April 17-18, Washington, D.C. — **Second Annual Broadband Local Networks Forum.** Contact: Architecture Technology Corp., P.O. Box 24344, Minneapolis, Minn. 55424.

April 17-19, Atlanta — **Understanding Modern PBX Systems.** Also, May 8-10, New York; May 22-24, San Francisco. Contact: BCR Enterprises, Inc., 950 York Road, Hinsdale, Ill. 60521.

April 23, Chicago — **The End-User Revolution.** Also, April 30, Boston. Contact: Technology Transfer Institute, 741 10th St., Santa Monica, Calif. 90402.

April 23-25, New York — **The Micro-Mainframe Connection.** Contact: Technology Transfer Institute, 741 10th St., Santa Monica, Calif. 90402.

April 24-25, San Francisco — **Workspace '84.** Contact: Workspace '84, The Charles Yourd Co., 44 Montgomery St., Suite 500, San Francisco, Calif. 94104.

April 24-25, Minneapolis — **Local-Area Networks: Equipment and Systems.** Also, April 26-27, Phoenix; May 1-2, Raleigh; May 3-4, Boston; May 8-9, Washington, D.C.; May 10-11, San Francisco. Contact: Architecture Technology Corp., P.O. Box 24344, Minneapolis, Minn., 55424.

April 29-May 2, Phoenix — **Personal Computing: Productivity Tool for Business.** Contact: Laura Greenfield, Director, Marketing, International Data Corp., 5 Speen St., Framingham, Mass. 01701.

April 30-May 4, Boston — **The 1984 James Martin Seminar.** Contact: Technology Transfer Institute, 741 10th St., Santa Monica, Calif. 90402.

May 2-3, New York — **How to Prepare a Strategic Plan for Office Automation.** Also, June 13-14, San Francisco. Contact: BCR Enterprises, Inc., 950 York Road, Hinsdale, Ill. 60521.

May 7-8, San Francisco — **Micro Wars: Shape Up or Shake Out.** Contact: Laura Greenfield, Director, Marketing, International Data Corp., 5 Speen St., Framingham, Mass. 01701.

May 14-16, San Francisco — **Strategic Planning for Office Automation.** Contact: Technology Transfer Institute, 741 10th St., Santa Monica, Calif. 90402.

May 15, Washington, D.C. — **Executive Strategies for the Information Age.** Contact: Technology Transfer Institute, 741 10th St., Santa Monica, Calif. 90402.

May 21-22, New York — **Evaluating Decision Support Software: Personal Computer, Mainframe and Distributed Applications.** Contact: DSS Conference, 215 First St., Cambridge, Mass., 02142.

May 21-23, San Francisco — **Information Center Software Selection.** Contact: Technology Transfer Institute, 741 10th St., Santa Monica, Calif. 90402.

May 21-24, Washington, D.C. — **Network Management/Technical Control.** Contact: Communication Networks '84, Box 880, Framingham, Mass. 01701.

Computerworld Sales Offices

Donald E. Pagan, Vice-President/Sales. Edward P. Marecki, Director/National Sales. Frank Collins, Corporate Advertising Administrator. Kathy Doyle, Manager/Marketing & Sales Operations, Pam Valentinas, Special Publications Ad Coordinator. COMPUTERWORLD, 375 Cochituate Road, Box 880, Framingham, Mass. 01701. Phone: (617) 879-0700, Telex: 95-1153.

BOSTON SALES OFFICE: Chris Lee, Northern Regional Director. Jim McClure, Ronald Mastro, Jayne Donovan, Michael F. Kelleher, District Managers. Alice Longley, Sales Assistant. COMPUTERWORLD, 375 Cochituate Road, Box 880, Framingham, Mass. 01701. Phone: (617) 879-0700, Telex: 95-1153.

NEW YORK SALES OFFICE: Michael J. Mastera, Eastern Regional Director. Doug Cheney, Senior District Manager. Ray Corbin, Joan Daly, Fred LoSapio, District Managers. Gale M. Paterno, Sales Assistant. COMPUTERWORLD, Paramus Plaza I, 140 Route 17 North, Paramus, N.J. 07652. Phone: (201) 967-1350.

CHICAGO SALES OFFICE: Art Kamack, Russ Gerchos, District Managers. Jean F. Broderick, Sales Assistant. Chris Lee, Northern Regional Director. COMPUTERWORLD, 2600 South River Road, Suite 304, Des Plaines, Ill. 60018. Phone: (312) 827-4433.

LOS ANGELES SALES OFFICE: Bob Hubbard, Senior District Manager. Bernie Hockswender, District Manager. Beverly Raus, Account Coordinator. William J. Healey, Western Regional Director. COMPUTERWORLD, 18008 Skypark Circle, Suite 200, Irvine, Calif. 92714. Phone: (714) 261-1230.

SAN FRANCISCO SALES OFFICE: William J. Healey, Western Regional Director. Barry G. Milione, Senior District Manager. Theodora Franson, Ernest Chamberlain, District Managers. Ruth Gordon, Account Coordinator. Nicole Boothman, Recruitment Account Manager. COMPUTERWORLD, 300 Broadway, Suite 20, San Francisco, Calif. 94133, Phone: (415) 421-7330.

ATLANTA SALES OFFICE: Jeffrey Melnick, District Manager. Michael J. Mastera, Eastern Regional Director. COMPUTERWORLD, 1653 Peeler Road, Suite D, Atlanta, GA 30338, Phone: (404) 394-0756.

ADVERTISERS INDEX

AES Data Corp. 60
1-800-652-4357

Applied Data Research 8
201-874-9000

BASF 34
800-343-4600

Callinet 40
Seminar Center 800-225-9930, in MA 617-329-7700

CW China 31

CWCI 54,64

CW International 61

CW Office Automation 66

Data General 44-45
800-554-4343 oper 05A

DEC/Office Information Systems 20-21
800-332-2220

DEST Corp. 31
800-538-7582, in CA 408-946-7100

Eastman Kodak Co. 25

GTE Business Communications Sys. 56-57

GTE 24

Hayes Microcomputer Products, Inc. 18
414-441-1617

Hewlett-Packard 28-29

IntoCom, Inc. 58
214/727-9141;800-336-3797

Integrated Technologies, Inc. 38
215-768-9330

Leading Edge Products ..... Cover 4
800-343-6833, in MA 617-828-8150

Liebert Corporation 65,71
614-888-0246

Microcom 50-51
1-800-322-ERA2

Mohawk Data Sciences 4-5
800-MDS-HERO

National Business Systems 32
203-677-8396

NuData Corporation 68
201-842-5757

On-Line Software 48
201-592-0009, 800-526-0272

Polaroid 13
800-225-2770;in MASS.,617-782-1990

Qume Corporation 6-7
800-223-2479

Siemens Corporation 36-37
1-800-852-4357; in Florida, Alaska & Hawaii, (305)994-8100, ext 5330

Sorbus inc. 12
Collect-east 215-396-5280, central 314-532-8817, west 415-472-4770

Sperry Corp. 15
800-547-8362

Supreme Equipment 14

Televideo Terminals Corp. ..... Cover 3
(800)538-8725; in California (408)745-7760

3M 19
800-328-1684, in MN 800-792-1072, in CANADA 800-268-9055 oper 13

US Postal Service 8

Wang Laboratories 30
800-225-9264

Western Union 46-47

Wright Line ..... Cover 2

This index is provided as an additional service. The publisher does not assume any liability for errors or omissions.

CLEAR YOUR DESKS FOR THE PERSONAL TERMINAL BOOM.

Introducing a desktop revolution. The Personal Terminal™ from TeleVideo.® This smart terminal is no bigger than the in-basket it replaces. Yet it costs much less than a full-size terminal. And it will clearly simplify the way your company works.

Use it to send and receive electronic mail. Check inventory and sales figures from the corporate data base or tap into outside data services. The 9-inch screen is easy to read. The professional keyboard is easy to use. Standard features include two RS-232 ports and 7 function keys (shiftable to 14). An attached telephone is optional, as well as a 300 or 300/1200 baud internal modem which can autodial up to 28 phone numbers. For a more productive and cost-effective office environment, get in on TeleVideo's Personal Terminal revolution.

Call us at (800) 538-8725 for more information. (In California call (408) 745-7760) or contact your nearest TeleVideo office:

California/Santa Ana	(714) 476-0244
California/Sunnyvale	(408) 745-7760
Georgia/Atlanta	(404) 447-1231
Illinois/Chicago	(312) 397-5400
Massachusetts/Boston	(617) 890-3282
New York/New York	(516) 496-4777
Texas/Dallas	(214) 258-6776
Central Europe (The Netherlands)	(31) 2503-35444
Northern Europe (United Kingdom)	(44) 9-905-6464
Southern Europe (France)	(33) 1-686-4412

GET IN ON THE BOOM.™

TeleVideo® Terminals

TeleVideo Systems, Inc.

Service is available nationwide from General Electric Electronic Instrumentation and Computer Service Centers.

COMMAND OF THE LANGUAGE.

VOL 18
ISSUE 16
AP 16 1984
UMI

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

COMPUTERWORLD

$2.00 A COPY; $44/YEAR | APRIL 16, 1984 | VOL. XVIII, NO. 16

What's in a name?
How companies decide what to call themselves and their products/
Pages 8-9

In Depth
The tyranny of words/
Follows Page 64

TOP OF THE NEWS

Tomorrow will be a big day for Stratus Computer, Inc. The vendor is slated to announce two additions to its line of fault-tolerant superminis. Page 2.

■

Another old-line time-sharing firm is selling access to its teleprocessing network to fill the excess capacity left by the dwindling of the once-lucrative remote computing business. This time it's Gelsco. Page 4.

■

Digital Equipment Corp. began getting it all together last week when it announced products that more closely integrate its personal computers into its office systems environments. It also unveiled a new microcomputer. Page 4.

■

A bill that would make unauthorized access of medical records a federal crime gained endorsements during recent congressional hearings. Page 19.

■

If you're looking for a communications carrier, the ways that long-distance telephone carriers measure the duration of calls might be a more important consideration than those carriers' actual rates, a study suggests. Page 55.

■

Memories are made of this: a disk subsystem, mass storage controller and cartridge storage system, Control Data Corp. told users of its Cyber 170 Series 800 mainframes. Page 65.

■

Success is expensive, Data General Corp.'s president warned shortly after the company reported that it had more than doubled profits for its second quarter. Page 56.

■

NAS counters IBM's X models by expanding its 8000 series

By Jeffry Beeler
CW West Coast Bureau

MOUNTAIN VIEW, Calif. — National Advanced Systems, Inc. last week countered the recent announcement of IBM's 3080 X mainframes by introducing five intermediate and large-scale processors that reportedly offer up to 10% greater performance than their Big Blue equivalents at a 5% lower price.

Three of the additions to NAS' processor line — the 8042, 8052 and 8062 — correspond to IBM's recently announced 3083 Models EX, BX and JX, respectively. Rounding out last week's announcement were two other 8000 series newcomers: the 8022, which competes with IBM's 4381 Model Group 2, and the high-end 8082, which competes with the industry giant's 3081 Model KX.

Although neither the 8022 nor the 8082 has any 8000 series predecessors, the 8042, 8052 and 8062 will replace NAS' existing 8040, 8050 and 8060, respectively, according to the company's president, David Martin. Users of installed 8040s, 8050s and 8060s can upgrade their systems in the field at no cost and, in so doing, transform the machines into 8042s, 8052s and 8062s, respectively, Martin said.

In addition to providing 6% to 8% greater internal throughput than the 8000 series machines they replace, the 8042, 8052 and 8062 models boast a maintenance price tag that is approximately 11% lower, according to NAS' large systems marketing manager, Robert Ludwig.

Together, the maintenance price cuts and the introduction of the five 8000 series mainframes constitute the second half of NAS' re-

See NAS page 2

Survey uncovers ironic twist to spread of micros in Fortune 1,000 companies

By Jeffry Beeler
CW West Coast Bureau

LOS ANGELES — The suddenness with which personal computers burst on the scene caught many information systems managers by surprise and deprived them of a large measure of control, which they are now scrambling madly to regain.

Ironically, however, personal computers remain woefully underused within most big businesses — a problem with which MIS directors have only recently begun to come to grips.

These and similar conclusions highlight the results of a recent survey conducted by Management Science America, Inc., which asked Fortune 1,000 companies to describe their current microcomputer installations and predict how their personal computer purchases will change in the future.

The survey by the Atlanta-based software publisher also produced at least two other major findings:

■ Large corporations have begun only recently to buy small quantities of microcomputers for evaluation purposes and are now busily experimenting with the machines in an effort to find out whether their benefits truly outweigh their costs.

■ As the year progresses and as personal computers gradually prove their ability to yield a significant return on investment, purchases of microcomputer products in the big

See MSA page 4

FYI

Look before leaping, Juneau learns hard way

By Edward Warner
CW Staff

JUNEAU, Alaska — It was the kind of mistake that often happens in a home computer store. The customer does not know what he wants and ends up spending more than he should.

In this case, it happened on a bigger scale, and the price tag could reach $490,000.

That is what the city-borough of Juneau — with a $1.2 million data processing budget — could end up paying for continued use of its outside service bureau and a software needs assessment study by a local consulting firm. It will incur those unanticipated costs because its new in-house computer system, which was slated to go on-line in February, is unlikely to be on-line for another two years, according to DP director Jeannie Miller.

The Wang Laboratories, Inc. VS 90 minicomputer system and software, purchased for a total of $500,000, were expected to go on-line six months from installation. That, Miller admitted, was an unreasonable expectation. The computer is now in place, but the software, from S-Cubed, Inc., is being held back until it can be tailored to the city-borough's specific needs.

What are those needs? That is the hitch. Miller, who was not hired until after the implementation program was under way, said that no thorough assessment of software needs was ever made by the city-borough, a combined city-county form of government, when it dove headlong into the in-house computer project.

The problem, according to Miller, is that no one involved in the decision to convert to an in-house system knew all that much about data processing. She noted that prior to her arrival, the city-borough's DP department consisted of two data entry clerks working at terminals linked to the service bureau Systems Northwest, Inc.

Miller was quick to note that of the unstated $490,000 in costs, the $120,000 the city-borough expects to pay consultants David George and Associates for the needs assessment is the cost for a project the city should have undertaken in the first place. She admitted, however, that the $300,000 to $370,000 planned into her department's budget for the remainder of this and all of the 1984-85 fiscal year could be exceeded if the computer system does not come on-line until April 1985.

Miller refused to point a finger of blame at any individual or entity within the city-borough. "There isn't anybody to point to," she said. "The people who wanted this

See MILLER page 6

CM
MI 48106UIVMUIVM FCMB
UNIVERSITY MICROFILMS
SERIAL PUBLICATIONS
300 N ZEEB RD
ANN ARBOR MI 48106

NEWSPAPER

Stratus to extend its supermini line

By Tom Henshel
CW Staff

NATICK, Mass. — Stratus Computer, Inc. is scheduled to announce tomorrow two high-end additions to its Stratus/32 line of fault-tolerant superminicomputers.

While Stratus is calling the processors its Extended Architecture (XA) models, a spokesman said the term is not to be confused with IBM's MVS/XA operating system. Like the original Stratus/32 processor, which has been renamed the FT 200, the new XA 400 and XA 600 use the firm's VOS operating system.

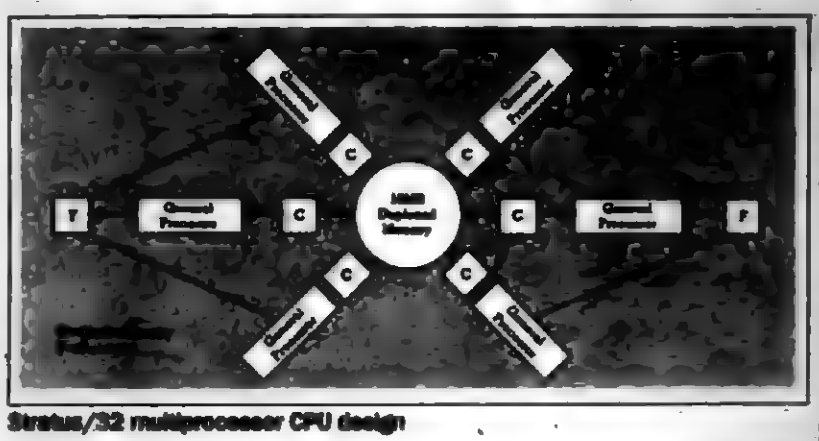
An enhanced version of VOS, Version 3.0, is being announced to support the XA 400 and XA 600. However, all applications developed for the FT 200 will run without modification on the newly announced machines, Stratus noted.

Use Motorola 68010

Unlike the FT 200, which uses the older Motorola, Inc. 68000 microprocessor, the XA 400 and XA 600 use Motorola's 68010 microprocessor. In addition, the XA 400 offers 3.1 times the internal performance of the FT 200, and the XA 600 offers 8.2 times the performance of the FT 200, according to Stratus' director of product marketing, Nicholas J. Bologna.

Current FT 200 users can field-upgrade to the XA 400, but not to the top-of-the-line XA 600. The reason, Bologna explained, is that in addition to using a different CPU board, the XA 600 offers twice as much main memory (up to 16M bytes) as the FT 200 and XA 400 and incorporates 48K bytes of cache memory. The FT 200 and XA 400 have a maximum 8M bytes of main memory and do not offer a cache memory.

The XA 400 has four internal CPUs, which can simultaneously execute instructions. The XA 600 has six internal CPUs. Both have redundant CPU boards, which perform the same operations in lockstep; if an error is detected in one CPU board, the system shuts it down, allowing the second CPU board to continue processing. As a result, Stratus claimed, the user will not experience performance degradation.



Stratus/32 multiprocessor CPU design

Purpose and prices

The Stratus/32 line was developed primarily to perform transaction processing applications, and, Bologna said, all three models have been geared to complement IBM mainframe environments.

For example, some financial users install Stratus/32 series processors as front-end processors in IBM-oriented automated teller machine applications.

Up to 32 Stratus/32 systems, in any combination, can be linked in a network with existing FT 200 systems by using the firm's Stratalink local-area network.

A basic XA 400 configuration, which costs $185,000 and is slated to be available in October, includes a 20-slot chassis, two multiprocessor CPUs, 4M bytes of duplexed main memory, two communications controllers, two disk controllers, a tape drive and systems software. It can be expanded to up to 8M bytes of duplexed main memory with up to 21G bytes of disk storage. Up to 128 workstations and up to three tape drives can be attached to the system.

The basic XA 600 configuration includes a 40-slot chassis, two multiprocessor CPUs with 48K bytes of cache memory, 8M bytes of duplexed main memory, two communications controllers, two disk controllers, a tape controller and tape drive and systems software. In addition, the XA 600 incorporates arithmetic processors, which are said to improve the unit's performance in compute-intensive applications.

The XA 600 can be configured with up to 16M bytes of duplexed main memory, 42G bytes of disk storage, 256 workstations and three tape drives. The basic configuration costs $270,000 and will be available in May, Stratus said.

An upgrade kit that allows FT 200 users to migrate to the XA 400 costs $45,000 until July 17. It will be priced at $64,000 after that date, Bologna said.

Stratus is located at 17 Strathmore Road, Natick, Mass. 01760.

NAS from page 1

ply to IBM's recent additions to its X model processors [CW, Feb. 27]. The first half occurred in late March, when NAS announced reductions in purchase prices and expansions in main memory for its existing AS/9000 line of large-scale processors.

NAS' two-stage response to IBM came hard on the heels of the industry giant's announcement of six X models for its 3083, 3081 and 3084 mainframe families. Although it boosts the 3080 line's performance by 5% to 14%, the IBM offering suffers from at least one serious shortcoming: Users of existing 3083, 3081 and 3084 systems are reportedly unable to upgrade the machines in the field to their X series equivalents.

No such barrier to field upgradability, however, applies to any of NAS' five new 8000 mainframes, Martin said.

In addition to offering a less wrenching migration path than the X series machines, the 8000 processors reportedly compare favorably to their IBM rivals in internal performance. The 8023, for example, at least equals the power of the 4381 Model Group 2 and, in some instances, outperforms its IBM counterpart by as much as 10%, Ludwig said, while the 8043 typically provides 10% greater throughput than the 3083 Model EX.

The 8053, 8063 and 8083, meanwhile, match the performance of their 3083 or 3081 equivalents, according to an NAS spokesman.

Intended primarily for remote, decentralized computing sites rather than for large corporate MIS facilities, the five members of NAS' 8000 line span three mainframe performance ranges, Martin said.

The 8023 is classified as an intermediate-scale processor and provides a migration path for 4381-class users who need additional capacity, but want to continue using comparatively old IBM operating systems, such as DOS/VSE.

The 8063, by contrast, qualifies as a true large-scale, dual-processing CPU, with performance exceeding 8 million instructions per second (Mips), and serves as a bridge to NAS' largest mainframe family, the 9000.

Together, the 8063 and 8023 bracket the 8043, 8053 and 8083 models, which NAS categorized as entry-level, large-scale machines with internal performance ranging from 4 to 8 Mips. The 8043, 8053 and 8063 define the boundary where users typically make the transition from DOS or VM to newer operating systems like MVS, Martin said.

As long as they remain at the 8023 or 8043 end of the mainframe performance spectrum, most users will probably be content to continue operating in relatively old software environments, such as DOS/VSE. But once they migrate to the 8053-class performance level or beyond, customers are usually forced to convert to MVS, Ludwig added.

All five members of the 8000 mainframe line expand to hold up to 32M bytes of main memory and 24 channels. The processors also support the 2K-byte, storage-protect key, which is reportedly necessary for accommodating older IBM operating systems like DOS/VSE, DOS, VM, VS1 and MVS 3.8.

A 4M-byte 8023 with eight channels costs $639,000, while the 8043, 8063 and 8083 sell for $1.26 million, $1.76 million and $2.25 million, respectively, in 8M-byte, eight-channel configurations. A 16M-byte 8083 with 16 channels costs $3.5 million.

Although the 8043 is available now, shipments of the 8023, 8053 and 8063 are not set to begin until the third, second and fourth quarters of this year, respectively. The 8083 is scheduled to be available during next year's first quarter.

NAS is located at 800 E. Middlefield Road, Mountain View, Calif. 94042.

NEWS SUMMARY

General Electric Information Services Co. is offering dial-up use of its 600-city telephone network/6

Digital Equipment Corp. introduced a host of products that integrate its Professional and Rainbow personal computers more closely into its office system environments/6

What's in a name? The manufacturers of large systems software explain how they and their products got their names/8-9

A battle between the Department of Defense and the Commerce Department over controlling microcomputer exports to the Soviets spilled into the open as Defense sought restrictions on commercially available equipment/11

A software development firm is suing auto rental giant Hertz Corp./12

A compromise to resolve the increasingly bitter battle over pending rates for dial-up and private-line service appears headed for the scrap heap/13

CW at ABA: The growth of home banking is linked to the proliferation of personal computers and, of equal importance, to the spread of modems. . . . There are no guarantees for profits in ATMs and POS terminals — at least in the early going — but they are destined to work in shared networks, the American Bankers Association Retail Banking Conference was told last week/14-15

CW at WP: The single-vendor approach to office equipment compatibility is becoming a thing of the past, members of Women in Information Processing were told/16

A local multiuser micro network has brought office automation to San Francisco's General Services Administration/18

A bill that makes unauthorized access to computerized medical records a federal crime gained support in recent congressional hearings/19

Investigators cleared a county data processing manager of wrongdoing in connection with his receipt of $6,750 for work that was done on the county computer/22

West Germany's Hannover Fair, a massive industrial trade show, hosted 750,000 visitors coming from 120 countries/24

Telecom Briefs/13
International Report/25
Calendar/26

IN DEPTH

The tyranny of words/Follows Page 64
From plan to budget/10/11

EDITORIAL/20
SOFTWARE & SERVICES/41
COMMUNICATIONS/55
SYSTEMS & PERIPHERALS/65
MICROCOMPUTERS/73
COMPUTER INDUSTRY/83

ADR® WARE™

ADR/IDEAL™

More than just a 4th generation language. It's the only complete 4th generation system integrated with a relational DBMS, which lets you develop applications for high volume production, from the simplest to most complex.

We've taken state of the art to a new state: Easy and Available.
Before you make a software decision, call ADR (201) 874-9000.
Or fill out and mail in the coupon.

ID

☐ Please send me more information about ADR WARE.
☐ Please send me information about ADR seminars.

APPLIED DATA RESEARCH INC.
Route 206 & Orchard Road, CN-8, Princeton, NJ 08540

Name_____
Position_____
Company_____
Address_____
City_____ State_____ Zip_____
Phone Number_____
Computer Equipment_____

ADR® WARE™
From idea to application, we get you there faster.

Geisco selling dial-up use of its T/S net

By David Myers
CW New York Bureau

NEW YORK — General Electric Information Services Co. (Geisco) last week went to the commercial end-user market offering dial-up use of its 600-city teleprocessing network.

In a related announcement, the company revealed it has entered into a joint marketing agreement with Wang Laboratories, Inc. for end-to-end document distribution to Wang personal computers via the Geisco Quik-Comm electronic mail service.

Geisco, which had been expected to make its network available to customers last year, introduced a value-added net for transmission, processing, storage and integration of data between privately owned computer installations within the U.S. It thus became one of a growing number of old-line time-sharing firms to sell access to its teleprocessing network as a way of filling excess capacity left by the dwindling of the once-lucrative remote computing business.

Christened Mark-Net, Geisco's data communications network will be unbundled from the company's 14-year-old Mark III packet-switching network and will combine satellite transmissions with 100,000 miles of land lines. However, the Rockville, Md.-based firm is aiming to construct an all-satellite system in order to integrate voice and data transmissions in a single shed on customers' property and to bypass anticipated access charges, according to Gerhard O. Mueller, engineering manager at Geisco.

Mueller admitted the all-satellite network represents Geisco's bid to make information networking profitable through "economies of scale." It is doubtful if any information services company has yet turned a profit through networking, according to industry analysts.

The value-added network announced last week will offer electronic mail and bulletin board software as well as error detection and retransmission, full redundancy and central site control of remote nodes, said Robert D. McCalley, general manager of Geisco's network operation. McCalley added that the net will support synchronous and asynchronous communications through either X.25 or asynchronous interfaces.

In addition, the information network will enable data communications between IBM hosts and 3270 terminal clusters or bisynchronous controllers at remote sites.

Support of IBM 2780 and 3780 remote job entry terminals as well as Systems Network Architecture and Synchronous Data Link Control is yet to come, McCalley said.

Microcomputers sold by IBM, Apple Computer, Inc. and Radio Shack can be hooked up to the network. Wang personal computers will be the next pieces of hardware expected to be able to plug in, McCalley said.

Geisco's remote computing services sales force will market the value-added network with the help of a number of "specialists," McCalley said. Observers noted Geisco's marketing strength with Fortune 1,000 firms, but questioned whether time-sharing sales representatives would be successful at selling a different technology and bundle of services.

The joint marketing agreement with Wang caught visitors to Geisco's news conference here last week by surprise. Under the agreement, sales reps from each firm will essentially recommend the other's product. Wang, however, has made known its intention to build an information network of its own under contract to Bolt Beranek and Newman, Inc. of Cambridge, Mass. [CW, Sept. 26].

On-Line exits applications market

By Paul Gillin
CW Staff

FORT LEE, N.J. — On-Line Software International, Inc. is immediately halting development and marketing of the Production and Inventory Optimization System (Pios), its manufacturing resource planning (MRP) software for IBM's CICS/DL/1 environment.

Introduced two years ago, Pios was On-Line's first departure from its traditional systems software focus. Billed as a modular manufacturing control system, the package consists of eight functional modules and sold for up to $300,000 for an entire system.

Pios is a version of an MRP product developed by Rath & Strong Systems Products, Inc. for Cullinet Software, Inc.'s IDMS data base management system. On-Line invested $1.5 million converting it to run in the CICS/DL/1 environment. The company has sold two complete Pios systems and one partial system.

On-Line President Jack Berdy said it became apparent in recent months that the staff commitment required to support the product was running far ahead of revenues from the product. "We didn't realize the support requirements for each sale," he said. "It was a draw on both talent and money. It takes so long to make a sale in the first place, and then customers want a lot of extra support after that."

Since all development costs have already been expensed, the decision to discontinue Pios will not affect the company's bottom line, he said. On-Line is negotiating maintenance contracts with existing customers, but maintenance will probably be picked up by Rath & Strong eventually, Berdy said.

The 18 On-Line employees who were assigned to Pios have all been reassigned within the company.

Berdy said he believes the MRP market is underpriced and is not yet mature enough to reap large profits.

He said On-Line has no plans to re-enter the applications market in the foreseeable future.

IBM first-quarter profits up 23%, hit $1.2 billion

ARMONK, N.Y. — IBM showed profits of $1.2 billion for its first quarter, up 23.1% over the $976 million reported in the year-ago period. Earnings per share were $1.97, up 21.6% from the 1983 quarter, the company announced last week.

Worldwide revenues for the quarter totaled $9.5 billion, up 15.7% from the $8.2 billion reported a year earlier. Revenues from sales grew 38.4% to $5.4 billion, while revenues from rentals decreased 26.2% to $1.9 billion. Revenues from services were $2.1 billion, up 25.8% from the $1.7 billion reported in the 1983 first quarter.

"Order activity for our products continues to grow at a strong pace," IBM Chairman John E. Opel said. "The growth spans the product line and is significantly above last year's levels."

Costs of sales, rentals, services and expenses were $7.5 billion, an increase of 16% from $6.5 billion a year ago.

MSA from page 1

business realm will steadily grow.

The purpose of the survey, which elicited about 500 responses, was to lay the information groundwork for the creation of MSA's Micro Distribution Division, according to the firm's senior vice-president, Howard Smith. Headquartered in this Southern California city, the division provides large corporations with personal computer application packages from multiple vendors.

Although micros are slowly gaining acceptance in the commercial world, big businesses have barely scratched the surface of the machines' potential usefulness. "Most large corporations use their personal computers for only about an hour a day and run only one application on the machines," Smith said.

Smith's conclusion is borne out by the survey, which shows that most Fortune 1,000 firms use their micros strictly for doing spreadsheets. The only other personal computer applications found to be significant in the study are office productivity, data base management and accounting.

Although many microcomputers may be able to justify their existence solely as spreadsheet generators, the machines are equally capable of serving in many other capacities as well. Moreover, the vast untapped potential of personal computers is slowly being recognized by top management, which is increasingly demanding that users squeeze as much information processing mileage from the products as possible, Smith said.

Toward that end, many Fortune 1,000 corporations are beginning to shed indifference to personal computing and are planning to increase their personal computer acquisitions incrementally. "Large companies are starting to feel a lot of pressure from their end users and are now trying to learn how microcomputers work in big organizations and determine whether they want to buy additional personal computers," Smith said.

The big business world's budding infatuation with micros is reflected in MSA's survey results, where 11% of the respondents indicated their intention to buy 100 to 500 personal computers this year, and another 11% indicated 50 to 100 units.

As the business sector's microcomputer population has grown, large corporations have shown an increased interest in justifying the machines' costs. A case in point is a large Northern California user company that recently evaluated the performance of its 50 to 100 personal computers and ultimately credited the products with cutting costs by $6 million, Smith said.

In other comments, the MSA senior vice-president described most MIS managers as woefully ignorant about microcomputers and their potential applications. "Many DP directors were unprepared for the personal computer field's explosive growth and have been standing on the sidelines [ever since]," he said. "By the time they turned around and realized what had happened, a lot of personal computers had already entered their companies, and they had simply lost control. Now many of them are at a complete loss to know what to do."

Second-class postage paid at Framingham, Mass., and additional mailing offices. *Computerworld* (ISSN-0010-4841) is published weekly, except: January (6 issues), February (5 issues), March (5 issues), April (7 issues), May (5 issues), June (7 issues), July (5 issues), August (5 issues), September (5 issues), October (7 issues), November (5 issues), December (5 issues) and a single combined issue for the last week in December and the first week in January by CW Communications/ Inc., Box 880, 375 Cochituate Road, Framingham, Mass. 01701.

Copyright 1984 by CW Communications/Inc. All rights reserved.

Computerworld can be purchased on 35 mm microform through University Microfilm Int. Periodical Entry Dept., 300 Zeeb Rd., Ann Arbor, Mich. 48106. Phone (313) 761-4700. *Computerworld* is indexed: write to Circulation Dept. for subscription information.

PHOTOCOPY RIGHTS: permission to photocopy for internal or personal use of specific clients is granted by CW Communications for libraries and other users registered with the Copyright Clearance Center (CCC), provided that the base fee of $3.00 per copy of the article, plus $.50 per page is paid directly to Copyright Clearance Center, 21 Congress Street, Salem, MA 01970.

Permission to photocopy does not extend to contributed articles followed by this symbol. $

Special requests should be addressed to Nancy M. Sharvion, CW Communications/Inc. Box 880, 375 Cochituate Rd., Framingham, MA 01701. ISSN 0010-4841/82 $3.00 + $.50

$2.00 a copy: U.S. — $44 a year; Canada, Central & So. America — $110 a year; Europe — $165 a year; all other countries — $245 a year (airmail service). Four weeks notice is required for change of address. Please allow six weeks for new subscription service to begin.

POSTMASTER: Send Form 3579 (Change of Address) to Computerworld, Circulation Dept., Box 880, 375 Cochituate Road, Framingham, Mass. 01701.

"SHOCKING!"

The Facts of Life About Maintenance and Documentation.

(And how SYDOC can change 'em!)

Call (201) 568-9700.

SYDOC:
Structured Documentation System

In keeping with our tradition of privding "all the DP news that fits," we present *Six Unexpurgated Facts About COBOL Maintenance and Documentation:*

1. Very few programmers—male of female—have ever established a meaningful relationship with documentation. What they produce is seldom very good—and it's almost never updated.

2. The result is a generation that might be called "Orphan COBOL Programs." They may have fathers. And they may have mothers. But birth certificates they have not got!

3. The rub comes when you try to update these orphans to meet the demands of the brave new world of DP. You can try to deduce the logic of such orphans by referring to the source code. But that's a slow and dangerous business. And your name had better be Sherlock Holmes.

4. Or you can simply ask the author of the program about the underlying logic. But guess what? He or she has just left for an exciting new job in Tahiti.

5. What you're probably left with is hand-drawn hierarchical charts—a long bus ride from structured programming techniques. And if you try to insert new code without understanding the logic, watch out. You'll probably introduce so many bugs you'll never be free of the exterminator!

6. The cost to society is high. It's been estimated that as much as 80% of your entire DP budget may be going into modifying complex COBOL programs!

WITH SYDOC YOU CAN SAY GOODBYE TO ALL THAT: SYDOC is not a sort but a new and exciting Structured Documentation System for OS/VS. It takes the responsibility for documentation out of the hands of programmers and puts it on the broad shoulders of the computer. SYDOC works three ways:

1. SYDOC IS GREAT FOR MAKING MODIFICATIONS: It works like an X-Ray. It analyzes existing programs and prints out charts that tell you everything you need to know about the program's logic, hierarchical structure, variables, and relationships between statements. You can quickly and safely pinpoint code to be changed. And you're far less likely to introduce bugs because you *know* the logic.

2. SYDOC IS GREAT FOR DOCUMENTING NEW BORNS: It tracks new programs and automatically produces first-rate structured documentation. You have an accurate and concise record of every program your staff develops. A record that can never be lured away by an executive recruiter.

3. SYDOC IS GREAT FOR MANAGERS: It permits you to establish uniform, structured-documentation standards and stick to them. You don't have to nag programmers about documentation. The ball is in the computer's court.

So if you'd like to reduce the size of your COBOL maintenance budget, give us a call. Dr. SYDOC will be glad to put you on his famous "Waste Watcher" diet!

SYDOC:
STRUCTURED DOCUMENTATION SYSTEM

syncsort INC.

Syncsort Incorporated 560 Sylvan Ave., Englewood Cliffs, N.J. 07632

DEC ties micros more tightly into office environment

By Ellis Booker
CW Staff

NEW YORK — Digital Equipment Corp. last week introduced a host of products here that it said enhance its Professional and Rainbow personal computers and integrate the micros more closely into that vendor's office system environments.

Highlighting the Professional side of the announcements were Decnet local-area networking for the Professional 350 and a software package for both the Professional 325 and 350 that brings many features of DEC's VAX/All-In-1 office automation software down to the desktop micro (story below).

On the Rainbow side of the announcements, DEC replaced its Rainbow 100 with a more powerful floppy disk version that will sell for the same price.

The firm also unveiled Binary Synchronous Communications packages enabling Rainbows to emulate IBM 2780/3780 and 3270 terminals (story below).

The announcements "expand Digital's office strategy to provide systems solutions at every level of an organization — personal, departmental and corporate — with the communications to tie those products together," the company said.

However, some industry analysts remarked that one remaining gap in the product line is a Decnet interface for the Rainbow, but DEC is expected to introduce this feature at a later date.

The new products will be on display this week as DEC begins a nine-city exhibition tour that will focus on its personal computers, microcomputers and terminals. The Spectrum '84 tour will open on April 18 in Dallas at Loew's Anatole, then move to Atlanta's Peachtree Plaza April 25-27; Houston's Albert Thomas Civic Center, April 30-May 3; Chicago's Conrad Hilton, May 8-10; the Salt Lake Palace in Salt Lake City, May 15-16; the Memorial Coliseum in Portland, Ore., May 18-19; San Francisco's Sheraton Palace, May 22-24; and St. Louis' Chase Park Plaza, May 30-31. The tour will make its final stop at the Meadowlands Hilton in the New York area on June 11-13.

Among offerings for the Pro: Ethernet local networking

NEW YORK — Digital Equipment Corp.'s introduction here last week of enhancements to its Professional 325 and 350 microcomputers represents "the most important product announcements since we began shipping the product," said Nathan Kalowski, Professional product group manager. Among those announcements were:

■ Ethernet-based local-area networking with Decnet, which allows the Professional 350 to act as a distributed workstation within the Digital Network Architecture, along with PDP-11 minicomputers and VAX-11 superminis.

The Professional previously offered file-structure compatibility with PDP-11s and VAX-11s, but links were primarily limited to data transfers. The Decnet connection gives the Professional full access to all resources on the network, Kalowski said.

Additionally, intensive processing functions can be handled locally, enabling host computers to handle data base operations more efficiently, DEC said.

The PRO/Decnet software, which runs on the Professional 350's 10M-byte Winchester disk, will cost $95 when it becomes available next month. The Digital Ethernet CTI Network Adapter network controller, also available in May, is priced at $895. The Digital Equipment Local Network Interconnect, which allows Ethernet-compatible devices to be grouped together up to 50 meters away from the network connection, is available now for $985.

■ The PRO/Office Workstation software package, which allows the Professional to function as a distributed workstation for the VAX/All-In-1 office automation package.

DEC's All-In-1 office information system is an applications software package that provides a range of integrated tools, such as document processing, electronic mail, calendars and decision support. The package will be ready next month for $950.

■ For videotex applications, two software packages that allow the Professional 350 to act as a North American Presentation-Level Protocol Syntax (NAPLPS) videotex terminal or as a stand-alone desktop videotex host.

PRO/NAPLPS works on the Professional's existing hardware and will be available next month at $195 for P/OS Version 1.7 systems. PRO/Videotex permits users to store a complete videotex data base on the Professional's hard disk drive, significantly reducing the communications costs associated with accessing a remote videotex host. PRO/Videotex will be available in May for $895 for P/OS Version 1.7 systems.

■ Version 2.0 of the P/OS operating system, with enhancements, including Decnet support. Version 2.0 now comes standard with both the Professional hardware and with Decnet software; it can be purchased separately for $250.

■ The Professional CTS-300 software system, which offers Dibol as a software development tool to business users. It is available for $995.

■ Engineering Systems Corp.'s Design Graphix/Executive computer-aided design and drafting software, available now for $595.

More information about these products is available from DEC in Maynard, Mass. 01754.

DEC's Model 100B heads string of Rainbow announcements

NEW YORK — Digital Equipment Corp. announced here last week that it is replacing its Rainbow 100 personal computer with the Rainbow 100B, a more powerful version of the floppy-disk-based microcomputer that will sell for the same price. The Rainbow 100B offers twice the base memory (128K bytes) and four times the expansion memory (768K bytes) of the Rainbow 100 and can be upgraded to accept a hard disk drive.

The Rainbow 100B is available now for $2,750, excluding keyboard and monitor. With keyboard and monitor, it costs about $3,500, said Robert Nusbaum, Rainbow marketing manager. An option that adds a 10M-byte hard disk to the Rainbow 100B, creating a Rainbow 100 Plus, will sell for $2,800.

In announcing the Rainbow 100B, DEC emphasized its plans to support existing Rainbow 100 users. In other Rainbow announcements, the company introduced:

■ An expansion of the Rainbow 100's memory, adding up to 768K bytes of random-access memory (RAM) for a total of 832K bytes. The company said 64K-byte boards cost $149; 256K-byte boards are priced at $695.

■ For a limited time, two systems based on the Rainbow 100, each featuring a 5M-byte hard disk drive and everything else included in a basic system except a monitor. A system with 128K bytes of RAM will sell for $3,995; a version with 256K bytes of RAM will be offered for $4,595.

■ The Gold Key Country Kit package, which allows the Rainbow 100B and 100 Plus to be used as VAX-11 terminals for the All-In-1 office information system. The package is available now for $245.

■ Poly-BSC/RJE and Poly-BSC/3270 Binary Synchronous Communications (BSC) programs, allowing Rainbows to emulate IBM 2780/3780 and 3270 terminals, respectively. Both are currently available, Poly-BSC/RJE for $500 and Poly-BSC/3270 for $595.

■ A Rainbow version of Digital Research, Inc.'s Concurrent CP/M, which allows up to four CP/M applications to run simultaneously. Most off-the-shelf CP/M applications "which are well-behaved and don't dive down to call the hardware directly" will run under Concurrent CP/M, Nusbaum said.

■ The availability for the Rainbow series of third-party application software now sold by DEC: Context Management Systems, Inc.'s Context MBA, priced at $695; Samna Corp.'s Samna Word II, $450; and Software Publishing Corp.'s PFS:File and PFS:Report, each offered for $140.

■ A Personal Presentation System, available under agreement with Polaroid Corp., which turns Rainbow screen graphics into 35mm color slides and prints "on your desk" for less than $1 a slide, Nusbaum said. The system costs about $7,200.

■ The Rainbow Remote Graphics Instruction Set (Regis) program, which permits Rainbow users to work with VAX-11-based and PDP-11-based graphics applications, available now for $175.

■ The Technical Character Set, a read-only-memory-based product for generating special characters. It is slated to be ready in June for $95.

More information about these products is available from DEC in Maynard, Mass. 01754.

CORRECTIONS

Due to a reporter's error, the story on Page 6 in the April 9 issue of *Computerworld* said the DEC high-end VAX adds 30% to 50% more power." According to Digital Equipment Corp.'s performance claims for the VAX-11/785, the system can actually operate 50% to 70% faster than the Model 780 in compute-intensive applications in both commercial and technical markets.

The story about the reinstatement of criminal charges against three defendants in a highly publicized trade-secrets theft case ["Judge reinstates charges," CW, April 9] incorrectly identified National Advanced Systems, Inc. (NAS) as a subsidiary of Tokyo-based Hitachi Ltd. NAS is owned by National Semiconductor Corp. and acquires its IBM-compatible mainframes from Hitachi.

"Software conference seeks new committee members" [CW, April 9] incorrectly stated that the Conference on Software Maintenance will be held Nov. 11-13, 1984. The conference is set for Nov. 11-13, 1985.

JUNEAU from page 1

wanted it very much and were very sincere."

She also refused to blame S-Qubed for the software delays, saying those delays are the city's fault and arise from its lack of certainty about its software needs. She speculated that the software purchased for the system is better suited for use with commercial applications and will have to be tailored for municipal uses.

Not everyone involved in the city-borough's government is so magnanimous, however. According to press accounts, one city-borough assemblyman chastised the city-borough's administrators and consultants, who reportedly recommended the system last year. "We were convinced our people were right — they were wrong," Assemblyman Hugh Grant told the *Juneau Empire*.

Miller could not say where the idea originated that a new, in-house system could be brought on-line in only six months.

She said she arrived on the job shortly after the decision was made and found "they [S-Qubed] were going to start dropping software on us. I just finally said that we've got to stop this."

infodata

What's in a name? Success, if a vendor is lucky

Makers of large systems software tell how they named their products

What's in a name? That which we call a rose
By any other name would smell as sweet.

— William Shakespeare
Romeo and Juliet

By John Gallant
CW Staff

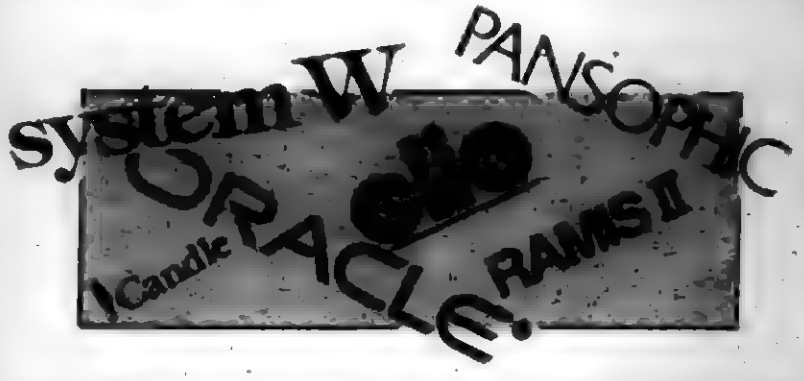
What's in a name, indeed. For the manufacturers of large systems software, whose product labels are carefully crafted to convey a lasting image or grab a prospective buyer's eye, a name can sometimes spell success for a package. And the stories behind the names are often as interesting as the names themselves.

"It's very difficult to come up with a name for a new product," said Richard Peres, head of marketing for ADR Corp.'s Adroit software. "You need a one-word name that people can easily identify with. But that word can't be too common, or people won't associate it with the product for very long.

"It should either be a name that says exactly what the product does or an adjective that describes the product or an acronym for a longer name."

Peres and colleague Barry Walter, product manager for Adroit, spent nearly four months mulling over names for the recently developed computer-based training course generator.

The duo was unhappy with the product name — Naturalwrite — that came with the package when it was acquired from CAI, Inc., so Walter went to the dictionary for assistance.



"He looked at every word that started with ADR in that book," Peres recalled, "and the best one was Adroit.

"It means 'skillful and clever,' which we feel is a good image for the package, and it also worked out to an acronym — the ADR On-line Interactive Training system. I didn't like it at first, and I spent a month trying to beat it, but I just couldn't."

Unfamiliar with the Wizard decision support system (DSS) and the Socrate data base management system (DBMS)? Those are the names under which two widely used software packages are marketed in Europe.

Their respective manufacturers, Comshare, Inc. and United Software Systems & Services Corp. (USSS), had hoped to use those names in the U.S., but were unable to do so because of possible copyright violations.

The products are better known here as the System W DSS and the Clio DBMS. "When the development project for System W began," said Comshare spokesman Larry Eilar, "we code-named the project W as a sort of front-end acronym for the 'World's Best Modeling System,' which was what we set out to make. When the software was ready to be marketed, we developed the name Wizard, but when problems arose with that, we settled on System W. Naturally we were disappointed, but the System W name seems to have worked out just fine."

When the first version of Clio was developed by Syseca, Inc. at the University of Grenoble in France, the DBMS was named in honor of the Greek philosopher Socrates. Finding that name already spoken for in the U.S., the company labeled the software Clio instead — a reference to the Greek goddess of memory, according to a spokesman for USSS, which supports and distributes the system here.

McCormack & Dodge Corp. (M&D) held a companywide contest to name what would later be known as the Millennium fourth-generation language system.

As a group of marketing strategists reviewed the contest entries, M&D Vice-President of Marketing Bob Weiler stood and listened. After a few moments, according to a spokesman, Weiler turned to the group and said, "We're talking about the future, aren't we? How about Millennium?" Despite all the other offerings, that name stuck.

Images of the future

Images of the future were also behind the name of Intel Corp.'s System 2000 DBMS, according to spokesman Dale Weisman. "System 2000 was developed by a company known as Management Research International, Inc., which Intel later acquired.

"While they were working on the product at their headquarters in Austin, Texas, a theater nearby was playing *2001: A Space Odyssey*. They came up with System 2000 to reflect the kind of advanced technology portrayed in the film."

There isn't always a logical explanation behind how a product is named, though, as the case of Bell Laboratories' Unix operating system illustrates. "About 14 years ago, Bell Labs was working on the Multics operating system with MIT," according to spokesman Ralph Dobriner. "We dropped out of that project because Ken Thompson, one of the co-developers of Unix, felt he could develop a simpler operating system. He came up with the name Unix as a pun on Multics, a play on words, even though the systems have nothing in common."

IMS VERSUS CICS
DO YOU KNOW THE DIFFERENCES?
Once, it was enough to know only CICS or only IMS. Today, the on-line world is expanding so that you can no longer afford not to know the capabilities of both.
The Educational Services Division of R.L. Rogers Consultants, Inc. now offers a comprehensive course to give you the critical information you need to compare these products and understand how each can work for you.
IMS VERSUS CICS: A DETAILED COMPARISON
This two-day seminar provides concise and practical information regarding technical and functional differences between IMS and CICS. Among the topics covered will be:
• Transaction Management/Flow
• Backup/Recovery
• Data Security/Integrity
• File/Database Management
• Operation (Commands)
• Applications Coding Differences
• Checkpoint/Restart
• IMS/CICS Workshop
The seminars will be presented in the following locations:
Los Angeles, CA — May 21 - 22
New York, NY — May 24 - 25
Dallas, TX — May 28 - 29
Chicago, IL — May 31 - June 1
ON-SITE PRESENTATIONS CAN BE ARRANGED
Please send the coupon below for more information or call Patrick Bowser at (212) 697-1460
ATTENTION MANAGERS: One-day seminar, with emphasis on the decision maker's perspective, also available. Check the box on the coupon for further information.
R.L. Rogers Consultants, Inc.
Suite 2B9
155 East 42nd Street
New York, NY 10163
Please send me additional information:
☐ IMS vs CICS
☐ Networks and International Standards
Name
Title
Company
Address
City
State
Zip
Telephone Number
Number of people interested
☐ Other course information

Sometimes a code name or project name sticks

When it finally comes time to market software after a long development effort, some manufacturers just cannot let go of the project name.

Take Oracle Corp.'s Oracle data base management system (DBMS). "In 1977, when we were still named Relational Software, Inc., we got a contract with a government agency to develop a relational DBMS," spokesman P. Michael Seashols recalled.

"The code name for that project was Oracle, and the founders of the company decided to stick with that name when the software was offered commercially," according to Seashols.

"In 1983, we changed the company name based on the wide product recognition Oracle had earned," Seashols went on to say.

Computer Corp. of America

A spokeswoman for Computer Corp. of America said that company's Model 204 DBMS, the offspring of a sponsored research program, was initially known as Model 101.

The numeric portion of that title was to change as the software underwent revisions on the road to becoming a commercially viable system.

When the package was released, Computer Corp. of America chose to retain the internal naming structure.

Mathematica Products Group

Originally developed as a marketing application program for Allied Chemical Co. in the mid-1960s, Mathematica Products Group's Ramis was an acronym for the Rapid Access Marketing Information System.

When the application later became a "full-blown product," according to Mathematica spokesman Paul Grabecheid, the company retained the Ramis acronym, simply replacing "Marketing" with "Management."

"In the mid-1970s, we completely rewrote the package to Version II, and it came to be known as Ramis II," Grabecheid said.

"Some people confuse the name with the Egyptian king Ramses, but it isn't quite that glamorous. It's nothing more than an acronym that few people remember today," according to Grabecheid.

Vendor names: Odd logic

The Cat's Pajamas, Pansophic Systems . . .

By Paul Gillin
CW Staff

From the sublime to the ridiculous, the names of software companies are often the result of a thought process that only a computer person can understand.

A mention surely must go to The Cat's Pajamas, a Berkeley, Calif.-based seller of software for the publishing industry. The small company got its name one night when its founder and president, Wayne Olson, was mulling over the idea with his four children.

"I told the kids I was going to start a software company. The kids wanted to know why it was called 'software,'" Olson said. "I said it was something that had to fit comfortably. One of my children said, 'Just like the cat's pajamas.'"

The unusual tag has caused some problems. "At the University of Nebraska, the purchasing people refused to issue a purchase order to a company named The Cat's Pajamas," Olson said. "We've also had some people call the company and think they've got a wrong number."

But Olson plans to keep the name. "I think it's memorable," he explained. "So many software companies are named Automation something or Service something that it all begins to sound the same."

Goal Systems International, Inc. sounds obvious enough, but "Goal" is actually an acronym for the last names of four Westinghouse Electric Corp. employees who in 1975 talked about starting their own company. Although the four eventually went their separate ways, Steve O'Donnell, the "O," liked the acronym enough to keep it as the name for his fledgling firm.

But the name has generated some misunderstanding. "People sometimes think it's a company that specializes in motivating people," O'Donnell said.

Pansophic Systems, Inc.'s name was chosen by founder and chief executive officer Joe Piscopo. "It comes from the Greek derivations 'pan' and 'soph,' which roughly translates to 'universal wisdom,'" a spokeswoman said. The company was founded in 1969.

Tower Systems, Inc. of Irvine, Calif., was named for a building. One day in 1975, Tower President J. Gregory Sicmon was talking with his lawyer about possible names for his newly established company. "Like all good decisions, this one was made in a bar," according to Greg Collins, vice-president of marketing and sales.

Sicmon and his lawyer had adjourned to a watering hole at the top of the Occidental Building in downtown Los Angeles. There, on the back of a napkin, Tower Systems was christened in honor of the building that housed the tavern.

Management Science America, Inc. started out as Management Science Atlanta, Inc., but as the company grew, so did the scope of its name. The change took place in 1971.

Candle Corp. draws its name from a slogan. The company was founded in 1977 with the motto, "innovators in illumination."

"It involves lighting the way for systems analysts and programmers into the mysteries of systems software," said spokesman Michael Olins.

Tone Software Corp., like many companies, was named for its flagship product. Introduced in 1974 and still on the market, the product is a utility that allows IBM's TSO to run under IBM's VS1 operating system. Combining the "T" from TSO and the "one" from VS1, Tone was born.

Today, Tone markets about a dozen products, but is still latched firmly onto its 10-year-old identity. "We

See NAMES, page 10

What makes a name work? Expert offers guidelines

By Paul Gillin
CW Staff

SAN FRANCISCO — What do Digital Equipment Corp.'s Rainbow, Software Publishing Corp.'s PFS series and Mathematica Products Group, Inc.'s Ramis software all have in common?

They're all poorly named products, according to an expert here.

Ira Bachrach has some very strong opinions about names. He is president of Namelab, Inc., a company that commands a good deal of respect and a lot of money for the names it formulates for products and companies.

Namelab earns up to $30,000 per name and boasts a list of over 120 clients, including many of the top consumer products companies, Bachrach said. Its client base of late has increasingly included computer and software companies.

See THE page 10

TAG from page 9

Namelab is painstakingly scientific in its approach. Its names are the result of months of psychological, linguistic and legal research. They are intended to hit a carefully targeted audience with a message that conveys emotions, experiences and images and does it in one or two syllables.

More importantly, the name must be memorable, according to Bachrach.

Bachrach gave a linguist's eye view of some popular computer industry names:

■ IBM Personal Computer: "Brilliant. They defined what the personal computer was."

■ Lotus Development Corp.'s Symphony: "Also brilliant. It conveys many things working together and implies intellectual superiority. In software, that's wonderful."

■ DEC Rainbow: "DEC decided this was a name that was going to make you smile. But it was so far away from their usual product names that I suspect a lot of buyers didn't see it as anything substantial."

■ The PFS series: "Absolutely silly. It's a good idea to [give continuity to your product names]. But it's mystical and not easy to understand."

■ Panaophic Systems, Inc.'s Easytrieve: "So simple and obvious that it makes the product seem trivial."

■ Ramis: "Moronic. It means 'rapid-access management information system,' but RAM means 'random-access memory,' and it's confusing."

■ Oxford Software Corp.'s UFO (User Files On-Line): "This is called an adapted metaphor. Unfortunately, the acronym UFO has nothing to do with software."

■ Musys Corp.'s Turbodos: "Ugh. [The turbo concept] is so obviously appropriated that it's not effective."

■ Cullinet Software, Inc.: "Pretty good."

■ Apple Computer, Inc.: "Very effective. It conveys simplicity."

Bachrach also described the thought behind some Namelab creations:

■ Compaq Computer Corp. (formerly Gateway Technology, Inc.): "We wanted a name which took command of the idea of portability. 'Pack' does this, and the letter 'q' conveys an advanced technical quality."

■ Datago Corp.: "This will be a chain of stores oriented toward high-volume sales of computers and communications. We think Datago communicates this volume nature."

NAMES from page 9

thought about changing it a couple of years back," said Gary Cooper, director of marketing, "but we'd been with it long enough that it was hard to change."

Although Software AG of North America, Inc. is a mouthful in itself, the name doesn't begin to compare to Software Aktien Gesellschaft, the title of the Darmstadt, West Germany, company from which the American counterpart was formed. Software AG President John Maguire considered numerous naming options when he founded his company in 1972. He elected to emulate the German firm because of the revered status the AG title carries in that country.

By the way, the name of the company's Adabas product is short for Adaptable Data Base System.

Networks from users' viewpoint focus of New York conference

NEW YORK — An in-depth, case-oriented approach to telecommunications networks will be the focus of "Networks: The User's Perspective," a conference that will be held at the Doral Inn here June 20-21 by the Institute for International Research.

The conference will feature Kailash Khanna, vice-president of corporate systems and technology for American Express Co., who will speak on the network installation at the company's new 51-story New York headquarters.

Roberta W. Frackman, vice-president of corporate telecommunications for Manufacturers Hanover Trust Co., will discuss that company's 10-year plan to integrate its domestic and international transmission facilities.

Steve LaPorte, manager of communications network services for Medtronics, Inc., is scheduled to speak on the topic of hardware and software purchasing in a multivendor environment, the conference sponsor said.

Chase Manhattan Bank Vice-President Harvey S. Hershkowitz will speak on the impact of the AT&T divestiture and will examine its effect on tariffs, network planning and control.

"Getting the Best Return on PBX Investments" will be the topic of Richard Mazzo, who is telecommunications vice-president for the American International Group.

The cost to attend the "Networks: The User's Perspective" conference is $695.

More information is available from the Institute for International Research, which is located at Suite 1105, 310 Madison Ave., New York, N.Y. 10017.

A Workable Disaster Plan Is No Longer A Nightmare

Are you prepared for the worst? Until recently, the development, implementation and testing of a workable DP disaster plan could have been a nightmare. That was before Disaster Plan/80. Presently in use at over 700 data centers throughout the United States, EDP Security's Disaster Plan/80 is the industry's most comprehensive and proven Automated Model Plan. If you're an MIS manager or DP professional considering implementing a disaster recovery plan, take the first step. This is one presentation you can't afford to miss!

If you're interested in ensuring that your firm will survive the destruction of your data center, attend the EDP Security presentation nearest you.

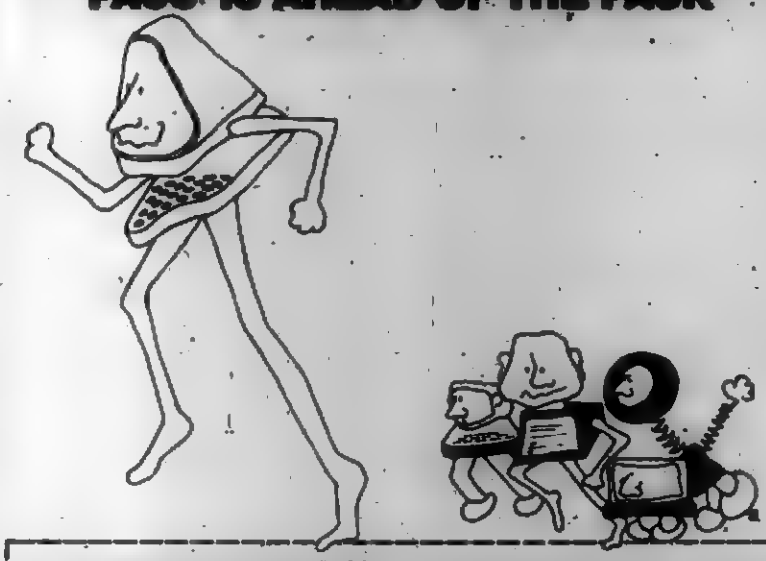
Mail coupon to EDP Security Inc., 181 West Street, Waltham, MA 02154, or call (617) 890-6666.

EDP SECURITY

☐ DALLAS May 9, 1984
☐ HOUSTON May 11, 1984
☐ CHICAGO May 14, 1984
☐ ST. LOUIS May 16, 1984
☐ KANSAS CITY May 18, 1984
☐ SEATTLE June 4, 1984
☐ SAN FRANCISCO June 6, 1984
☐ DENVER June 8, 1984

Name _____
Title _____
Company _____
Address _____
City _____ State _____ Zip _____
Phone _____
CPU _____

FOR VAX™ RESOURCE ACCOUNTING, PACS™ IS AHEAD OF THE PACK



The competition isn't even close. PACS is so good, it's the only resource accounting package in DEC's™ EAS library. Here's why:

- Flexible billing algorithms
- User budgeting and port speed accounting
- EZLOG™ for true 3-level reporting by account, project and user

Name _____
Title _____
Company _____
Address _____
City _____ State _____ Zip _____
Phone ( ) _____

SEND COUPON NOW FOR COMPLETE DETAILS ON ALL THE PACS BENEFITS.

STI Signal Technology, Inc.
5951 Encina Road, Goleta, CA 93117 (805) 683-3771 Outside California call toll-free (800) 235-6787
TWX 910-334-3471

VAX and DEC are trademarks of Digital Equipment Corporation

DOD, Commerce collide

Over control of micro exports to Soviets

By Bryan Wilkins
CW Washington Bureau

WASHINGTON, D.C. — With an Apple Computer, Inc. Apple II+ and a 256K-byte Grid Systems Corp. portable computer as witnesses, top officials of the U.S. Department of Defense (DOD) last week showed a Senate committee how commercially available systems have become critical to their battlefield management plans.

The Apple and Grid microcomputers have been deployed in the last two years with Nato forces in Europe, where they are performing battlefield functions such as strategic analyses and troop management decisions. "I cannot stress enough the extraordinary potential of the small computer on the battlefield," Richard Perle, assistant secretary of defense for policy, told the Senate Permanent Subcommittee on Investigations.

While DOD was recently given authority to review the export of computers to Western countries suspected of being shipment points to the Eastern bloc [CW, April 2], a messy interagency dispute has pitted the DOD against the Department of Commerce over the issue of controlling exports of small computers to the Soviet bloc. The interagency dispute broke into the open last December, as the U.S. met in Paris with its European allies and Japan at the Coordinating Committee for Multilateral Export Controls (Cocom).

Negotiations with Cocom

Cocom is the formal agency that the Western allies use to coordinate the transfer of technology to the Soviets through a formal licensing procedure. The U.S. negotiating team was forced to ask its allies for an extension of time while the U.S. government hammered out a formal position for presentation to Cocom this coming May on the issue of export controls on small computers. Last week, Perle told the Senate committee that the U.S. is currently negotiating within Cocom on the issue of small computer and electronic sales to the Soviets.

"Some people believe that because these machines are widely available on the open market, we shouldn't try to control the Soviet acquisition and [should] let it pass," Perle said. "We believe that a control regime can be established. . . . We seek to control the ease with which the Soviets can buy computers, especially like the Grid.

"We know we cannot put a hermetic seal around the Soviet Union," he added, "but we don't want them to be able to import them by the thousands."

Lionel Olmer, Assistant Secretary of Commerce for International Trade, told the committee that it is "a gross misstatement to suggest that the Soviets are technologically backward. They are producing 100% of their semiconductors used for military purposes and 45% for commercial uses." He agreed with Perle on the need to restrict exports of semiconductor manufacturing equipment to the Soviets.

"Volume controls are an issue when it comes to commercially available equipment," Olmer said. He added that he is optimistic that agreement could be reached with DOD on the dispute. However, Perle revealed during his testimony that there are differences of view even within his own agency on the extent of the controls needed over commercially available computers.

Large U.S. companies that manufacture computers that would be affected by the export controls have been putting pressure on the Reagan administration to ease up on the restrictions that have been coming down on export licenses in recent months.

Give Ada to USSR, he says

By Edward Weiner
CW Staff

NORWALK, Conn. — The U.S. should lift its embargo on shipments of sophisticated computer equipment to the Soviets and give them free training in the Ada language, which the Defense Department is now using to develop all its mission-critical applications.

Sound preposterous? Not if you want to save humanity from "World War Last," writes Steven B. Weissman in the April issue of the "Adadata Newsletter," which he edits.

According to Weissman, a nuclear war could be caused by a glitch or soft error in the Soviet Union's "all but obsolescent processors." A soft error occurs when natural radiation fools a computer into thinking an instruction has been input. "Our very lives," he wrote, "hang on the slim hope that either Russian computer environments are proofed against soft errors or that Soviet technicians know how to stop a launch in the face of a computer rebellion."

The article goes on to suggest that sales of computers to the Soviets will boost the domestic computer market and that sending the Soviets "a present of Ada" will "not only act as a sort of nuclear insurance policy, but will also help drive the domestic Ada market."

Is Weissman joking? Only in the article's tone, he said in a telephone interview last week. He's serious about the article's central idea, one he admitted he has heard no other person put forth. "It seems like an oddball idea," he said, "but it really isn't."

While humorous in tone, the article had a darker point to make — that, in Weissman's words, "thanks to automation, we know we can obliterate each other any time we want. Isn't it time we worked toward a point where we could at least trust each other's technology, if not each other?"

The basis for that trust, Weissman argued, could be the high reliability of the Ada language, developed for the Defense Department for military uses in a worldwide software competition. The language is so reliable it was named in January as the standard for all U.S. military computer systems, according to Adadata publisher Kenneth G. Bosomworth.

In an interview last week, Bosomworth said that Weissman was joking about selling any computer hardware to the Russians. "I'm not at all in favor of letting the Russians have more computer hardware than they already have," Bosomworth said.

But Weissman may not have been joking about offering the Ada language to the Soviets who, he wrote, are no further along in Ada development than we are. The language, a variant of Pascal, could be taught to Russian programmers and students by U.S. technicians, he wrote.

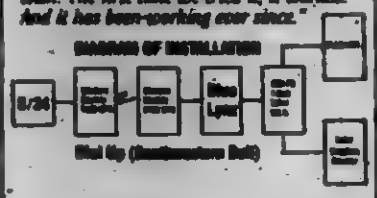
How Charles E. Ames Made The Micro To Mainframe Connection

You'd be hard pressed to find someone who keeps up with IBM's smaller systems better than Charles E. Ames does. He's president and editor of Basic Society News, an independent journal devoted to the subject.

When Charles found out about BLUE LYNX™ 5251 terminal emulation for the IBM Personal Computer, he saw an immediate answer for a pressing need.

"We were using a System/34 in Fort Worth, doing our programming in Dallas and driving 50 miles to Fort Worth to run them. Then driving 50 miles back to Dallas for more programming. This was happening three times a week. With Metroplex traffic being what it is, this was a real drag!"

BLUE LYNX was the economical way to eliminate the tiresome commute. *"Now with BLUE LYNX on our PC we just dial up the S/34 in Forth Worth any time we wish. The first time we tried it, it worked. And it has been working ever since."*



Charles conducted his own torture-test of the setup: *"We left the telephone line open for two weeks. That's seven days per week and 24 hours per day. We wanted to see if it would work. It did."*

Our terminal packages include:

3270 emulation with SNA/SDLC or Bi-synch, hardware and software package $630 complete or $1230 complete for SNA/SDLC *and* Bisynch, software selectable. *Available now.*

5251 emulation for S/34, S/36 and S/38 users, hardware and software package $630 complete. *Available now.*

VT100H – Asynchronous Communications and DEC VT emulation – $125
(requires IBM Asynchronous Adapter)

BLUE LYNX 3270 is a joint development of Software Systems, Inc. Jefferson City, Missouri & Techland
BLUE LYNX is a trademark of Techland Systems Inc 4/84

TECHLAND SYSTEMS INC.
(212) 684-7788
25 WATERSIDE PLAZA, NEW YORK, NY 10010

The Auto-Dial VA 212PA

Get 'em while they last!

MTI has the Racal-Vadic 212 PA modem in stock.

- Operates at 1200 and 0 to 300 bps.
- Built-in automatic dialer.
- Non-volatile memory stores 15 phone numbers of up to 31 digits each.
- "Talks" in English to terminal operator.
- Up to 26 user-programmable options are stored in modem memory, and can be keyed in from the front panel.
- Calls can be originated or answered from terminal keyboard or modem front panel.

MTI is an authorized distributor for Racal-Vadic, so we get their latest equipment first. We are the one source for all the terminals, peripherals, systems, applications expertise and service you'll ever need. At great prices, whether you lease, buy or rent. Call us today.

New York: 516/621-6200, 212/767-0677, 518/449-5959
Outside N.Y.S.: 800/645-6530
New Jersey: 201/227-5552
Ohio: 216/464-6688

mti

Applications Specialists & Distributors, New York, New Jersey and Ohio.
DEC, Intel, Texas Instruments, Dataproducts, Lear Siegler, Diablo, Rapid C.Rob, Intecolor, Racal-Vadic, MICOM, Ventel, Develcon, U.S. Design Dig.Eng., Cipher, Protocol Comp., MicroPro, Microsoft, Polygon, Select.

Software developer sues Hertz for program payment

By Edward Warner
CW Staff

NEW YORK — A software development firm is suing auto rental giant Hertz Corp., claiming that it put Hertz in the driver's seat of a custom-made terminal emulator program but was never paid for its service.

Filed late last month in New York Supreme Court by Micro/Macro, Inc., the suit asks $250,000 in compensation. It claims that Hertz requested Micro/Macro to develop the terminal emulator so that Hertz could replace its Lear Siegler, Inc. ADM-32 terminals with IBM Personal Computer XT microcomputers and Victor Technologies, Inc. 9000 microcomputers in its Fleet Rental Division offices across the country.

Micro/Macro produced the terminal emulator in a six-week crash effort, gave it to Hertz management and received its approval but no money, according to John Potye, Micro/Macro's vice-president for software service. "All they said was, 'That's nice,'" Potye said. "We performed the work to specifications in good faith, and Hertz just ignored its commitment."

Potye said he does not think Hertz ever put the emulator program into use. He speculated that Hertz lost interest in acquiring the emulator software when the executive who headed the project was transferred and his replacement "didn't want to go down that path."

Hertz's manager of public affairs, John Britton, said he hadn't seen the suit and that his firm would prefer "to answer charges in court and not in the press." He declined to comment further on the case.

Hertz had still not responded to the suit through its attorneys by early last week, Potye said, noting that the 30-day limit for such a response was drawing close. If the firm fails to respond, Potye said, the court could enter a default judgment against it.

Micro/Macro's manager of legal systems, Wayne Robertson, said that while he knows of no contract signed between the two firms, an exchange of letters had informed Hertz that Micro/Macro "does not do work on speculation." Potye said that approximately $65,000 was spent by Micro/Macro in developing the software and that its agreement with Hertz promised reimbursement for those development costs, plus $52,000 for licensing the software to the rental firm and $11,000 for support and services.

Introducing the new NCR COM Systems

Designed for people who thought they couldn't afford high-speed computer output.

A state-of-the-art COM system is now within your budget. And more than that, when you select the NCR 5310 or 5320, you'll enjoy the latest technology and the best value in COM systems.

Controlled by the versatile NCR Personal Computer, these two COM systems offer the most cost-effective methods of producing microfiche today.

Of course that NCR PC is only one of the reasons these COM systems are among the most advanced in the industry. For further proof, take a look at the other features you can have working for you:

- wet or dry film processing
- highly sophisticated camera system
- self-loading streaming tape drive
- optional console printer
- job statistics
- detailed diagnostics
- upgradable to NCR mini-computer COM systems.

Learn more about the affordable COM systems: the 5310 and 5320. Call or write NCR Micrographic Systems Division, 520 Logue Ave., Dept. 1650, Mountainview, CA 94043. 1-800-227-9964.

NCR
1884-1984
Celebrating the future

Security panel recommended

WASHINGTON, D.C. — A Congressional subcommittee has wrapped up hearings on computer and communications security and privacy by recommending the establishment of a national commission to investigate a range of computer-related problems.

The recommendation was one of several presented at a press conference last Wednesday by Rep. Dan Glickman (D-Kan.), chairman of the House Science and Technology Subcommittee on Transportation, Aviation and Materials, and Rep. Bill Carney (R-N.Y.), ranking subcommittee minority member.

The two congressmen, whose subcommittee has conducted a year-long investigation into computer security problems in the government and the private sector, released a report prepared by the Congressional Research Service of the Library of Congress. The report maintains that insufficient attention is paid by the federal government to the growing problems of computer crime, privacy and unauthorized access of data bases.

Commenting on the findings of the subcommittee, Glickman accused the government of paying "good lip service" to these issues without taking proper action to prevent what he called "catastrophes in this country waiting to happen both in and out of government."

Besides calling for a national commission, he listed several other steps to correct this situation:

- The Office of Management and Budget (OMB) should "provide a focus" for computer and telecommunications security and privacy activities within government, including the preparation of a manual to give agencies guidance in planning and implementing security measures.
- "An intensive [security] training effort is needed in this country for both computer users and security personnel. . . . The federal government ought to be involved in that, the National Science Foundation [and] universities."
- OMB should establish security data classification to protect sensitive computer data.
- The National Bureau of Standards should be given the resources to certify security methods and systems for government and private computer users.

Glickman said that if the administration does not adopt the national commission plan he will push the idea legislatively.

AT&T, communications users oppose rate compromise

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — A compromise to resolve the complex, increasingly bitter battle over pending rates for dial-up and private-line service appeared headed for the scrap heap last week after it was vigorously opposed by both AT&T and key communications user groups.

The proposal, which elicited comments from about 120 carriers, users and related organizations, was advanced last month by the National Exchange Carriers Association (Neca), which represents most of the nation's local telephone companies. The plan's key features include the following:

■ Rates for dial-up, long-distance service would be reduced 2% to 3%.

■ Pending tariffs covering switched local access services would become effective today, and pending tariffs for special access — local private lines — would become effective "as soon as possible."

■ AT&T would be allowed to increase its private-line rates 5% to 10% and its rates for 800 service 5% to 7%.

■ Local exchange carriers would be allowed to retain their existing 12.75% rate of return, subject to later adjustment.

The Neca proposal contains "elements that could ameliorate, in part, the problems that the pending access tariffs would create," AT&T said, but "it is evident that these changes could not restore AT&T's earnings to reasonable levels."

The International Communications Association (ICA), whose members include many of the nation's largest corporate communications users, charged that pending access tariffs contain a "windfall" worth "as much as $2 billion" to the exchange carriers.

Half comes from the allegedly excessive 12.75% rate of return that local carriers are currently allowed to earn on the circuits, switches and other facilities they use for local access service; the other half comes from assigning excessive costs — technically "revenue requirements" — to these services.

The ICA said the Federal Communications Commission should lower both. "Substantial reductions" would then be possible not only in the rates charged by exchange carriers, but also in the rates charged by AT&T Communications, Inc. and other long-distance carriers, the association said.

The Ad Hoc Telecommunications Users Committee, another big-company communications user group, said that Neca seems to "imply that so long as AT&T's financial position is improved, the switched access tariffs filed on March 15 and 19, 1984 should become effective." This represents "an outrageous disregard for the rights of users to pay only just and reasonable rates," the group added.

TELECOM BRIEFS

FCC guidelines hasten new private-line services

WASHINGTON, D.C. — Guidelines aimed at bringing new private-line services to market more quickly were adopted by the Federal Communications Commission last week.

The commission also decided that a carrier offering a volume-sensitive private-line service must make similar, lower volume versions of the same service available to avoid discriminating against some users. But the rates for each offering do not have to be based on fully distributed costs.

The new guidelines for private-line services require carriers to file tariffs containing "simple and easy-to-understand" rate structures, to group together similar service offerings and to use consistent definitions of rate elements and service functions.

The commission also decided not to reconsider its earlier ruling that a telephone carrier offering network channel terminating equipment must do so through a separate subsidiary unless it first obtains a waiver from the commission. Such equipment provides the terminal interface to Dataphone Digital Service and other wideband digital communication services.

Business surcharge gaining opposition in Congress

WASHINGTON, D.C. — Opposition to the monthly surcharge of $6/line on business communications users, scheduled to begin June 13, began building in Congress last week.

A recommendation calling on the Federal Communications Commission to defer the surcharge until June 30, 1985 was circulated among members of the Senate. It was drafted by Sens. David H. Pryor (D-Ark.) and Bob Kasten (R-Wis.).

A few days before the Senate recommendation surfaced, 175 members of the House of the Representatives sent a letter to FCC Chairman Mark Fowler asking for deferral of the surcharge until June 30, 1985. The letter was drafted by Ron Wyden (D-Ore.) and Larry Craig (R-Idaho). "It is clear," Wyden said, "that even if the surcharge reduces long-distance rates, only a few businessmen will benefit; for the vast majority, the vast bulk of their communication is local."

FCC ruling on free telex helps some, hinders others

WASHINGTON, D.C. — Letting prospective telex customers use terminals free of charge for three months is legitimate, but requiring a user to give a carrier all or some of his telex transmission business in exchange for a free terminal is illegal.

That's the gist of a ruling made early this month by the Federal Communications Commission's Common Carrier Bureau. As a result, TRT Telecommunications Corp. can continue to offer three-month free trials of its telex service. But Western Union International, Inc. and RCA Global Communications, Inc. must amend their offers, which require the user to guarantee the carrier a specified volume of telex business.

Such "tying" arrangements, the bureau explained, enable the carrier to cross-subsidize its costs of supplying terminals with revenue derived from transmission activities, which violates the Record Carrier Competition Act of 1981 and subsequent commission orders.

Justice believes FCC can loosen hold on AT&T

WASHINGTON, D.C. — The Justice Department believes Federal Communications Commission regulation of AT&T's rates and facilities can be lessened without increasing the carrier's ability to disadvantage its customers or competitors.

In a comment submitted to the commission early this month, the department said FCC rules requiring AT&T to obtain prior commission approval for new services and to submit extensive cost-support information allow "competitors to stifle innovation and use the regulatory process for competitive gain."

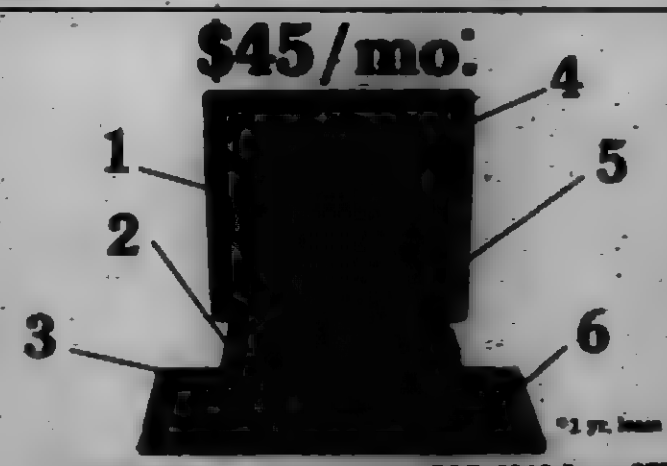
A better approach, Justice said, would be to let the new services begin and to monitor them afterward.

The department advocated a similar approach to rates. It recommended that the commission let tariffs be filed without cost-support information and make them effective 14 days later, subject to challenge by any party who can show that a tariff is unlawful or that "the harm from implementing the tariff outweighs the harm based on the unavailability of the service at the tariffed rates."

Rep. Dingell to USTA: Shift interstate costs to local users

WASHINGTON, D.C. — Shifting costs from interstate to local communications users is a better way of addressing the long-distance bypass problem than the Federal Communications Commission's approach, which involves imposing an access surcharge on all users of local exchange facilities, Rep. John Dingell (D-Mich.), chairman of the House telecommunications subcommittee, told a meeting here this month of the U.S. Telephone Association.

Dingell suggested reducing "the amount of joint and common fixed costs allocated to the interstate jurisdiction from its current level of approximately 25%."



*1 yr. lease

Lease Esprit's new-generation ESP 6210 from MTI with on-site service for only $45 per month.

1. Extensive emulations and display attributes with line drawing capability and smooth scroll.
2. Small footprint saves space.
3. 22 non-volatile programmable function keys.
4. Large 14", high resolution, high contrast, non-glare green phosphor screen.
5. Tilt and swivel display provides operator comfort.
6. Low-profile sculptured DIN standard keyboard with numeric pad, non-reflective surfaces.

MTI is an authorized distributor for Esprit Systems, so we get their latest equipment first. Like this new terminal that offers so much more for so much less than its competition. Whether you lease, buy or rent our equipment, you'll find MTI is the one source for all the terminals, peripherals, systems, applications expertise and service you'll ever need. And our prices are hard to beat. Call MTI today.

New York: 516/621-6200, 212/767-0677, 518/449-8989
Outside N.Y.S.: 800/645-6520
New Jersey: 201/227-5552
Ohio: 216/464-6468

mti

Applications Specialists & Distributors, New York, New Jersey and Ohio.
IBM, Intel, Texas Instruments, Datapoint Corp., Lear Siegler, Diablo, Hewlett-Packard, Interdata, Ramtek, MICOM, Versatel, Davidson, U.S. Design Systems, Cipher, National Comp., Microtek, Microsoft, Polygon, Select.

Growth of home banking linked to micro proliferation

CW AT ABA

By James Connolly
CW Staff

NEW YORK — Home banking will grow in the coming years, but only as the use of personal computers and home modems grows, according to speakers at the American Bankers Association (ABA) Retail Banking Conference here last week.

The industry observers also claimed that banks have a natural advantage over their competitors in the home banking battle. "We do have the customers already," noted Charles S. Forbes, vice-president of the electronic banking division at Chemical Bank in New York.

Joining Forbes in discussing the future of video banking was Arthur Hill, director of client services for CSP International, who predicted that the number of U.S. home computers will rise from 10 million at the end of 1984 to 60 million in 1990.

But since communications devices are key to services such as home banking, it will be equally important that the proliferation of modems for those computers rises from 5% this year to 20% by the end of the decade, he added.

Hill emphasized that while consumers will not buy personal computers just for video banking, video banking could give a person one more reason for buying a computer or one more use for an already owned computer.

Speeding the spread of home banking, according to Hill, is the agreement of manufacturers to standardize videotex communications — the North American Presentation-Level Protocol Standard. Further fueling this movement is the likelihood that modem prices will drop and that modems will be built into home computers.

According to Hill, one of the incentives for banks to move into electronic banking is reduced costs. It now costs $1.20 for a single bank teller transaction; Hill said that can be slashed to 18 cents for an automated teller machine (ATM) transaction once ATM transactions increase.

Hill and Forbes predicted that a vital part of video banking will be small business video banking, a service that Forbes said Chemical Bank plans to test in conjunction with its 5,000-user Pronto home banking system. Chemical Bank charges home users $12 per month for the right to use personal computers to pay bills, check account balances and do other basic banking electronically.

Those who will be competing with banks for the video banking dollar include current information providers such as Knight-Ridder Co., operators of a test videotex project; communications organizations such as AT&T; hardware manufacturers; data processing companies such as Automatic Data Processing, Inc.; retailers such as Sears Roebuck & Co.; and financial service companies such as Shearson/American Express, Inc. But the advantage that banks hold is that banks have established multiple relationships with their customers, as opposed to the single-faceted relationships on which competitors have focused, such as charge cards, Forbes said.

Accord reached on hacking bill

ALBANY, N.Y. — New York's attorney general expects the Empire State to become the 21st state in the union to make hacking a crime when a bipartisan bill is passed later this legislative session.

Attorney General Robert B. Abrams was joined by Brooklyn Assemblyman Melvin H. Miller, a Democrat, and State Sen. Ronald B. Stafford, a Republican from Plattsburgh, in announcing bipartisan accord on legislation making it a crime to break into computer systems via remote access.

"The computer is a fact of life in the '80s, and it has created a whole new area of crime. This bill is a very important weapon for prosecutors and the public," Abrams told reporters in announcing the accord.

Passage of the bill is considered certain; Miller and Stafford chair the Codes Committees in the two houses of the New York legislature. No computer crime bill could have hoped to get out of committee without their support.

If signed by Gov. Mario Cuomo, the law would make it a felony to break into computer memories and change or ruin the data contained therein.

Under the bill, a felony conviction would be punishable by up to four years in prison and a fine of $5,000.

New York State currently has no law prohibiting outsiders from breaking into computers through phone lines and remote terminals. Twenty other states have already passed laws to put a stop to hacking.

NEWS

ATM, POS nets don't guarantee instant savings: speaker

CW AT ABA

By Jeanne Connolly
CW Staff

NEW YORK — Shared automated teller machine (ATM) and point-of-sale (POS) terminal networks are inevitable, but do not assure banks of immediate savings, the American Bankers Association (ABA) Retail Banking Conference was told here last week.

The key to marketing such networks is not savings for an institution or a customer, but convenience, stressed Phillip A. Parker, president of First Virginia Services, Inc., owner of the Network Exchange in the Washington, D.C., area. "[POS] can provide convenience and should be marketed that way," Parker said, noting that computerized POS and ATM services allow residents of Washington, D.C., Maryland and Virginia to shop and bank in the surrounding jurisdictions, which previously had been impossible.

Banks must cut prices on electronic services at the early stages to help "create an environment that encourages use of the cards," Parker said. But, he added, "If you think you are going to get into [POS] to save money, forget it."

Speaking with Parker, Hugh J. Barrett, senior vice-president of First City Bank Corp. of Texas, Inc., added that the proliferation of electronic services will eventually bring down banks' costs to a point of economic returns. The speakers noted that a key issue to be decided in establishing networks is how costs are to be split among the bank that issues a debit or credit card, the merchant and the merchant's own bank. They agreed that, in the end, the customer will foot the bill.

However, the current question for banks is not whether they will share their ATM or POS systems, but with whom. It is unclear whether POS is accelerating awareness of the sharing issue or whether the interest in POS is a result of ATM sharing, Barrett noted.

The ATM environment is much more forgiving than POS, because if an ATM customer finds a terminal not working, he can move to another terminal; with POS, a merchant cannot afford to let a customer leave the store if the network is down, Barrett warned.

Barrett suggested that the ideal network for most institutions would be designed along the lines of the one in which his bank participates, the Pulse system. He said that when ATMs were growing in popularity, Texas passed a law requiring banks with ATMs to enter sharing agreements.

Both speakers noted that ATM proliferation is nearing the saturation point, where any degree of customer use will not pay for the ATM equipment and communications lines. But they claimed that POS is unlikely to reach such a point because such a high percentage of merchants already use electronic cash registers, which can make the transition to POS easier.

Arrests slow in export case

BOSTON — Only one arrest has been made so far in the case of the seven businessmen and four firms indicted by a federal grand jury here for allegedly shipping millions of dollars worth of sophisticated computers and equipment to the Soviet Union and East Germany in 1981 and 1982.

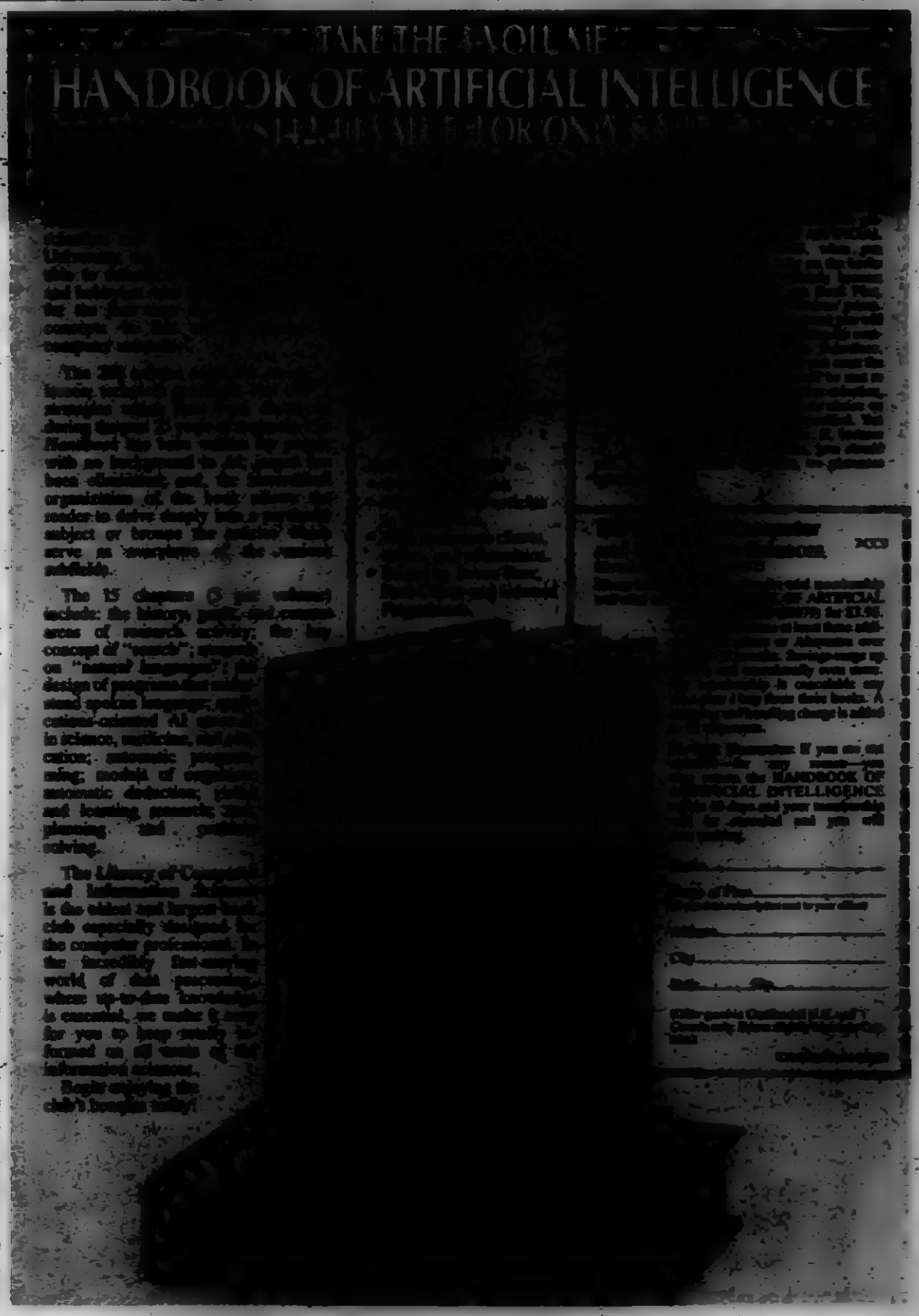
Leslie Klein, owner of the Canadian firm Eurodata, Inc., was released on $1.25 million bail after his arrest at Miami International Airport earlier this month. Klein claimed the indictment is faulty for charging him with, among other things, failure to obtain a re-export authorization from the U.S. Department of Commerce before shipping U.S.-made computer equipment from Canada to European nations.

"You don't need a re-export license when you ship to West Germany from Canada," Klein said in a telephone interview last week.

The indictment alleges that the computer hardware, most of it from Hewlett-Packard Co. and Digital Equipment Corp., was shipped from the U.S. to Canada, the only nation to which such equipment can travel without a U.S. export license, and from there to West Germany and Switzerland. It was then allegedly shipped on to East Germany and the Soviet Union [CW, April 9].

The two Americans charged in the indictment remain at large. They are Albert C. Besson Jr., vice-president and contract administrator of MLPT Systems, Inc. of Phoenix, and R. Paul Boucher, owner of Young Sales and Service, Inc. of Nashua, N.H.

Also named in the indictment are the two Europeans, Dieter Enderlein and Fred Schiavo.



NEWS

One-vendor approach to OA compatibility called old hat

By Lynn Weber
CW Staff

PHILADELPHIA — The single-vendor approach to office equipment compatibility is quickly becoming a thing of the past as users realize that compatibility is more a function of underlying equipment specifications than brand name, members of Women in Information Processing (WIP) were told here this month.

Speaking at Advance '84, the first annual international conference of WIP, Mark McElroy, a partner in the Wilmington, Del.-based consulting firm Traux, McElroy & Co., said that because many vendors protect "their proprietary domains," users have suffered the consequences associated with varying degrees of incompatibility.

CW photo by L. Weber
McElroy

"For many users, the approach to equipment compatibility was a single-vendor approach," McElroy said. "That meant confining equipment acquisition to a single brand." But after examining industry trends over the past five years, McElroy concluded that the single-vendor approach to compatibility is changing as the result of an evolution in industry standards that encompasses operating systems, applications software and even hardware.

McElroy based his premise on two underlying assumptions: First, that no one vendor in the office automation marketplace can provide all the solutions; and, second, that the method by which a company establishes compatibility in the office becomes the substance of that firm's OA strategic plan.

According to McElroy, the operating system is the most significant contribution to industry standards and the creation of compatibility.

"A generic operating system yields a generic programming language which yields generic application software which yields industry compatibility," he said.

So from now on, the underlying theme to the computer industry will be, according to McElroy, "standardization, not customization, as found in traditional minicomputer and word processing products."

In such a rapidly changing industry, where hardware is becoming a "throwaway" product due to short life span and obsolescence and where the value of user training with specific hardware is much greater than the hardware itself, standardization and the generic world become increasingly important, according to McElroy.

"In the generic world, investments in software training, operating systems and so on are protected by virtue of the ability to move software and data easily from one brand to another," he added.

Wohl outlines challenges facing women, strategies for growth

By Lynn Weber
CW Staff

PHILADELPHIA — "We work in an industry in which change is the only constant. Therefore, we must be flexible and adjust to that if we're to be successful."

Helping to set the theme for Advance '84, the international conference held here recently by Women in Information Processing (WIP), keynote speaker Amy Wohl outlined many of the challenges that women in the industry confront and presented strategies to meet professional opportunity and growth.

Wohl, president of Advanced Office Concepts Corp. in Bala-Cynwyd, Pa., addressed both personal and professional issues that women must overcome if they are to move ahead in their careers.

Two key elements to professional growth and advancement, Wohl said, are taking risks and accepting the possibility of failure. "Growing is trying those things you might be interested in, even if that means failing," she said. "There are many people who start businesses without knowing what the risks are."

She noted that it is important to realize that all business decisions are not going to be the right decisions, reminding her audience that "making mistakes is not failing."

How is success measured? Wohl pointed out that while one woman's definition of success is not necessarily the same as another woman's, in today's society money is one well-rooted indication of success. But, she added, it may not be a good way of measuring success.

Being successful both personally and professionally isn't a guaranteed lifetime ticket if the self-learning and growth process is stifled, Wohl cautioned her audience. "It is important to learn over time if what you're doing now is what you want to be doing later on," she said.

$61/mo.*

*1 yr. lease.

Lease TI's new 855 dual-mode printer from MTI with on-site service for only $61 per month.

- 150 cps draft-quality mode, 35 cps letter-quality.
- Front-loading font modules act as electronic daisy-wheels for letter-quality printing.
- Change font styles at the touch of a button.
- Both serial and parallel interfaces are standard.
- Prints raster graphics.
- Small, lightweight and quiet for office environment.

MTI is an authorized distributor of Texas Instruments' full line of portable terminals, matrix printers and Professional Computers. Whether you lease, buy or rent our equipment, you'll find MTI is the one source for all the terminals, peripherals, systems, applications expertise and service you'll ever need. At great prices. Call us.

New York: 516/621-6200, 212/767-0677, 518/449-5959
Outside N.Y.S.: 800/645-6530
New Jersey: 201/227-5552
Ohio: 216/464-6688

mti

TEXAS INSTRUMENTS

Applications Specialists & Distributors, New York, New Jersey and Ohio.
DEC, Intel, Texas Instruments, Datapreducts, Lear Siegler, Diablo, Epson, C.Itoh, Intercolor, Racal-Vadic, MICOM, Ventel, Develcon, U.S. Design, Dig.Eng., Cipher, Protocol Comp., MicroPro, Microsoft, Polygon, Select.

DOS/VSE and CICS/VS Frustration?

BIM gets it out of your system.

BIM presents a line of proven programs that maximize your system's capabilities, saving you time, labor and expense. These program products help get the most out of your system and people.

BIM-EDIT — the editor with more than 25 significant features that ICCF can't match.
BIMSPOOL — Prints output in POWER/VSE spooling queue on local or remote 3270 terminal printers. (Received ICP Million Dollar Award 1982).
BIMSPOON — On-Line to Batch Print Spooling. Prints data passed from CICS application programs into the POWER spooling queue.
BIM-PDQ — POWER Dynamic Queuing performance enhancement. Eliminates 66% of the I/O to heavily used POWER queue.
BIM-CDMS — Comprehensive problem analysis and display of operational CICS system.
BIMTEXT — Word processing, document composition system. Create formatted documents from free-form input.
BIMSWAP — Switch local 3270 BTAM terminals between multiple CICS partitions without special hardware or additional ports.
BIMCMPRS — CICS 3270 data compression system. Reduces response time for remote terminals significantly. Available for OS/VS1 and MVS also.
BIMP3270 — Comprehensive CRT screen image print facility. Copy to terminal printers or spool queue for system printer.
BIMSERV — On-line display of library directories and entries, VSAM Catalog entries, disk VTOC's, etc.
BIMDSLOG — Console Message File display. Used by computer operations and programmers.
BIMMONTR — DOS/VSE System Status, Performance Measurement, and POWER Queue display.
BIMDEVC — Displays Logical Unit assignments for physical devices, to resolve operational problems.
BIMSUBMT — On-line Job Edit and Submission facility.

BIM programs are cost-efficient, many less than $600, highest $4000. You can save even more with our group package offerings. Products are available on permanent, annual, or monthly leases, and shipped on a 30-day free trial basis. Product documentation is available on request.

BIM also performs systems programming consulting, with consultants based in Minneapolis and Washington, D.C. Computer time services are also available on our 4381-2 system, on-site or remote.

BIM
BIMOYLE ASSOCIATES, INC.
5789 Lincoln Drive
Minneapolis, MN 55436
612-933-2886
Telex 297 693 (BIM UR)

"In your development center, ADS/OnLine will increase productivity and reduce your company's applications backlog." —Don Heitzmann*

Using ADS/OnLine Cullinet created the best applications software ever built.

The Application Development System, Cullinet's fourth generation language, became available in 1981. ADS/OnLine was the key element in our database software system needed to address the application software business in a whole new way.

We set out to develop advanced financial and manufacturing applications; applications designed in the 1980's all built using this fourth generation language. Today, Cullinet offers the finest financial and manufacturing applications available, featuring both horizontal and vertical integration. Horizontal integration means that all applications share a common database so redundancies and inconsistencies are eliminated. Vertical integration means all applications are built using ADS/OnLine and advanced database technology so they are easier to install, tailor and maintain.

Using ADS/OnLine, we developed advanced applications much faster than if we used traditional methods. In your development center, ADS/OnLine can increase productivity and reduce your company's backlog.

ADS/OnLine eliminates up to 70% of the lines of code in a typical COBOL program. This can result in a dramatic increase in programmer productivity. In addition, ADS/OnLine is easily learned by COBOL programmers, so your programming staff can become more productive in less time.

Applications can be built more efficiently with ADS/OnLine because it is a non-procedural language. The developer simply paints the screens on a terminal and fills in the blanks to define the applications program. Plus, automatic editing and automatic error handling detect input errors with no code written at all. And the complete integration of ADS/OnLine, with all Cullinet Database facilities, not only ensures control over the application development function, but also guarantees the performance necessary to run these applications in day-to-day operations.

ADS/OnLine has been a key to our success in applications software. It could do the same for you in establishing new information systems and eliminating your applications backlog in the 1980's and 1990's.

Attend a comprehensive seminar explaining this advanced fourth generation language and Cullinet's other database software products. To participate in one of the 700 Cullinet seminars scheduled internationally, send in the coupon or call 1-800-225-9930. In MA, 617-329-7700.

Computer_____

Name/Title_____

Company/Department_____

Address_____

City_____

State_____ Zip_____

Phone ( )_____

Mail to: Cullinet Software, Inc., 400 Blue Hill Drive, Westwood, MA 02090-2198 Attn: Corporate Meetings

Cullinet Software products are designed to run on IBM 360/370, 30XX or 43XX or plug-compatible computers.

4/84 CW

**Don Heitzmann is Cullinet's Director of System Software Development. Don joined Cullinet seven years ago. His early efforts were in design and development of IDMS-DC and he is now responsible for the complete IDMS database product line. Don is a graduate of Princeton University with a B.S. in Electrical Engineering and a Masters in Architecture.*

IDMS/R Seminar cities and dates

City & State	Date	City & State	Date	City & State	Date
Albany, NY	June 12	Fairfield, NJ	June 7	Norfolk, VA	June 14
Albuquerque, NM	May 2	Ft. Worth, TX	June 12	Omaha, NE	June 13
Anchorage, AK	May 23	Grand Rapids, MI	June 7	Orlando, FL	May 24
Atlanta, GA	May 15	Greenville, SC	May 24	Ottawa, ON	June 6
Atlantic City, NJ	May 10	Harrisburg, PA	May 8	Pittsburgh, PA	May 16
Austin, TX	June 6	Hartford, CT	May 9	Portland, ME	May 15
Baltimore, MD	June 5	Houston, TX	May 10	Providence, RI	June 14
Battlecreek, MI	May 15	Indianapolis, IN	May 8	Quebec City, PQ	May 17
Boston, MA	May 23	Jacksonville, FL	May 1	Regina, SK	June 13
Boston/ Danvers, MA	May 3	Kansas City, MO	May 2	Richmond, VA	May 16
		Knoxville, TN	June 13	Sacramento, CA	June 5
Bridgeport/ New Haven, CT	May 22	Lincoln, NE	June 7	San Antonio, TX	May 16
		Los Angeles, CA	May 1	San Diego, CA	May 6
Calgary, AB	May 23	Louisville, KY	May 10	San Francisco, CA	May 24
Charlotte, NC	May 10	Lubbock, TX	May 1	San Jose, CA	May 15
Cheyenne, WY	May 22	Lynchburg, VA	May 17	Seattle, WA	June 12
Chicago, IL	May 3	Miami, FL	May 17	Springfield, IL	May 17
Chicago, IL	June 12	Milwaukee, WI	May 1	Tampa, FL	June 6
Cincinnati, OH	May 14	Milwaukee, WI	June 14	Toronto, ON	May 17
Cleveland, OH	May 24	Montreal, PQ	June 7	Tulsa, OK	May 22
Colorado Springs, CO	May 16	Morristown, NJ	May 8	Valley Forge, PA	May 17
		Nashville, TN	May 3	Waco, TX	May 15
Columbus, OH	May 2	New Orleans, LA	May 24	Washington, DC	May 9
Dallas, TX	May 15	New York, NY	May 15	Wichita, KS	June 6
Denver, CO	June 13	New York/ Long Island, NY	June 14	Wilmington, DE	May 22
Des Moines, IA	May 16			Winnipeg, MB	June 12
Detroit, MI	May 23	New York/Rye, NY	June 12	Worcester, MA	May 24

Database: Cullinet

© 1984 Cullinet Software, Inc., 400 Blue Hill Drive, Westwood, MA 02090-2198

Harris: Computers unnerve Americans

WASHINGTON, D.C. — Pollster Louis Harris warned Congress recently that while 45% of adult Americans claim to know how to use a computer, a big majority — 77% — are worried about threats that computers pose to their privacy.

These fears about privacy have grown substantially in the last five years, as the use of computers to maintain credit card accounts, monitor loans and administer credit has grown, Harris told the House Subcommittee on Government Information April 4.

"By a massive 84% to 15%, most people are convinced that it would be easy — no problem at all — to put together a file on them that contains their credit information, employment records, phone calls, where they have lived over the past 10 years, their buying habits, their payment records on debts and the trips they've taken," he said.

Fear information sharing

Harris said that the poll he took last fall showed that people fear institutions that possess personal information do not treat it confidentially and are inclined to share it with other institutions.

According to Harris, the public favors the enactment of laws by Congress to regulate the future use of computers. "This indicates once again that the people, in recognizing that restrictions on the use of computers are an important objective, are well ahead of their leaders in the precious subject of freedom and privacy in an open society."

Harris characterized the results of the poll as "startling, to say the least. They must be taken as a warning shot across the bow of the establishment in this country that the people are in a nononsense mood about the vast and sweeping changes they see coming."

Concerns questioned

While the public sentiment for privacy protection may be evident in the opinion polls, Rep. Glenn English (D-Okla.) wondered whether the concerns may only be "a mile wide and an inch deep."

English, who is the chairman of the subcommittee, said that the Harris poll should be viewed primarily as an early warning signal to Congress.

English went on to say that other members of Congress are not feeling any particular pressure to enact privacy protection laws despite the evidence of public support. "It's just not likely," he maintained.

Multiuser net proves successful

In GSA's four-state federal data coordination effort

By Robert Batt
CW West Coast Bureau

SAN FRANCISCO — The world of office automation has come to a major federal agency here with the successful implementation of a $450,000 local multiuser microcomputer network.

The network installed at the General Services Administration's (GSA) Office of Information Resource Management (OIRM) is made up of 80 workstations shared by senior managers, professionals, technical specialists and four senior secretaries. Connected by a Nestar Systems, Inc. local-area network, the workstations are used for word processing, calculating, electronic mail, filing information and the scheduling and controlling of meetings and projects.

A feasibility study, carried out before the project was launched, estimated that a 17% increase in productivity could be achieved by using such a network. A follow-up survey to estimate the actual productivity increases achieved by the local-area network is due to begin in May.

"The San Francisco project is the only one of its kind in the GSA at this time and was considered as a pilot project for the whole agency," said Edward Messerly, assistant regional administrator for the GSA. "Prior to this project, we didn't know anything about networking, and what we have learned has certainly helped us in shaping future projects."

The GSA acts as one of the major disseminators of information for federal government agencies. With a budget of about $45 million and an employment roster of about 650 people, the San Francisco office is responsible for coordinating information flow among federal agencies in four states — California, Arizona, Nevada and Hawaii, as well as GSA facilities in Guam.

Operates 55,000 telephones

The OIRM here operates 46 telephone switches and 55,000 telephones for government agencies. It also provides processing and software development services to different departments of the federal government, as well as two federal records centers containing national archives and income tax and historical records.

In setting up the local-area network, GSA requested bids from 150 vendors. Eleven responses were received, including one from Data General Corp., but in the end Nestar's Plan 4000 File Server was chosen because of its greater versatility, Messerly said.

"The criterion that determined our decision was not price competitiveness, but performance characteristics," he explained. "We wanted a network that could run data base management systems, word processing packages, electronic mail ... one in which we were not locked into the product development cycle of any one manufacturer. By being able to run off-the-shelf software, we have the choice of the greatest number of vendor packages."

The network, which was up and running by July, nine months after being conceived, had an initial configuration of 45 workstations. Each senior manager in OIRM was given an IBM Personal Computer with 256K bytes of random-access memory, a single floppy disk and 5M bytes of local hard disk.

The microcomputers were attached to a local network, which included a 137M-byte File Server, one print server with three dot matrix printers and a Xerox Corp. 2700 laser printer. The GSA system includes a central software library, with an Apple Computer, Inc. Apple IIe micro acting as a print screen and Epson America, Inc. FX 100 dot matrix printers attached.

Since the original network was installed, GSA has expanded it to include 80 users and has added an additional File Server and 10 IBM Personal Computers that act as shared workstations.

According to Nestar, the Plan 4000 system can support up to 255 workstations, which may consist of IBM micros, Apple IIs and Apple IIIs. The architecture is a baseband, token-passing network that uses Datapoint Corp.'s Arcnet protocols for the physical and data link layers, combined with Ethernet NS protocols for the network and transport layers. The system supports up to 548M bytes of disk storage with 137M-byte drives.

According to Messerly, the only real barrier in developing the network and increasing productivity is copyright-protected software, which he described as "a pain in the neck."

In the words of our users.

"The Fortune 32:16 was so easy to learn that I taught myself from the manual."

—Ronald Aubert
Aubert and Hannah, Real Estate Law, Los Angeles

FORTUNE SYSTEMS

A leader in UNIX-based commercial, multi-user systems.

1101 Twin Dolphin Drive, Redwood City, CA 94065
For more information call 415/592-5140/Telex. 172-632

• 1984 Fortune Systems/UNIX is a trademark of Bell Labs

DP EDUCATION

Public Offerings - San Francisco

Course	Dates	Cost
DL/I Application Programming	April 30 - May 2	$595
IMS/VS Data Communication Programming	May 3 - 4	$445
IMS/VS Message Format Service	May 14 - 16	$595
IMS/VS Dump Reading	May 17 - 18	$445
IMS/VS Data Base Design	June 11 - 15	$895

For more information, please call (203) 646-3264.

We make every bit count.

DBMI

Data Base Management, Inc.
1075 Tolland Turnpike
Manchester, CT 06040

NEWS

Bill to ban medical records access gains support

By Byron Wilkins
CW Washington Bureau

WASHINGTON, D.C. — A bill that would make the unauthorized access of medical records by electronic communications a federal crime gained support in recent hearings before Congress.

The bill specifies that "unauthorized direct access to individual medical records through a telecommunications device" would carry penalties ranging from six months in jail and/or a $1,000 fine to a five-year jail term and/or a $25,000 fine when the illegal access results in injury. It was proposed by Rep. Ron Wyden (D-Ore.).

Congressional concern for the privacy of medical records has been prompted by changes in the payment reimbursement system for Medicare that were ordered by federal regulations and will result in the creation of computerized medical information files that are believed to be vulnerable to unauthorized access and tampering.

Broad support for the legislation, H.R. 4954, surfaced in testimony April 6 before the U.S. House of Representatives Commerce Committee's Health Subcommittee. The American Medical Records Association told the subcommittee that the "increase in the amount of computerized health data, including data needed for immediate treatment decisions, the merging of clinical and financial data for billing under the prospective payment system and the development of large data banks all pose new threats to confidentiality in the health care system."

While the development of large computerized files containing an individual's medical and financial billing data are being pushed as a result of the new Prospective Payment System for Medicare required by government regulations, the merging of the two has just started to take place. Robert W. Coeburn, president of The Commons Management Group in Columbia, Md., which provides data processing services to hospitals and other health care clients, told the subcommittee that hospitals are more likely at the present time to have computerized only their billing systems. "Few as yet computerize, in full, the patient medical record," he said.

Detecting unauthorized access to confidential medical files poses a "significant potential problem" as hospitals rapidly develop computerized systems to handle data, Coeburn said. Most hospitals are instituting security systems restricting user entry, he noted, adding that existing security techniques such as passwords, computer callbacks and access monitoring logs should be adequate.

Coeburn supported the bill, but recommended that it be expanded to include all patient-specific data maintained in a health care setting, not just medical records.

A dissenting view on the need for legislation as specific as H.R. 4954 came from the National Institutes of Health. Dr. Arnold Pratt, director of its Division of Computer Research and Technology, told the subcommittee that the existing Privacy Act should be strengthened or that H.R. 4954 should be folded into other computer crime legislation now under congressional consideration.

Pratt is "concerned about moving ahead in this area on a piecemeal basis."

The American Hospital Association told the committee it strongly supports the bill, but said the penalties its calls for should distinguish between unauthorized access and misuse of the data.

The penalties outlined in the bill are established in a three-tier system. The first would set a maximum penalty at a six-month jail sentence with a $1,000 fine; the second tier for access and tampering with records would result in a one-year jail term and/or a $5,000 fine; and the third tier would set a five-year jail term and/or a $25,000 fine for access and tampering that result in injury to an individual.

Introducing
Software for the operations manager.

Book to detail micrographics

NEW ROCHELLE, N.Y. — The 1984-85 "International Micrographics Source Book," a nearly 400-page directory of micrographic services and equipment, will be published this summer, according to Microfilm Publishing, Inc.

The directory, which provides a keyword index, lists service companies and their services, storage centers and dealers, consultants and their specialties, micropublishers and their products and associations and their officers, as well as other organizations in the micrographics field.

The directory's prepublication price is $52; its postpublication price is $65. Quantity discounts are also available. The directory can be obtained from Microfilm Publishing through P.O. Box 313, Wykagyl Station, New Rochelle, N. Y. 10804.

Rockwell International eliminates order management paperwork and ships products faster with a Tandem NonStop computer System."

right on down the line to shipping. And, because the system is on-line, other departments have immediate access to this information as well. Accounting, for example, now generates invoices automatically, resulting in much improved cash flow. Manufacturing is saving $175,000 a year in internal freight charges due to the reorganization of ordering and shipping procedures, and the Group as a whole has been able to eliminate more than 300,000 reproduced documents a year. Other system benefits contributing to our improved

customer service include better control of backorders, more accurate pricing information and the ability to make detailed forecasts of market conditions for planning purposes. The net result is an operation that is helping us achieve some very significant gains in plant productivity.

The NonStop System.

Ideally suited to on-line transaction processing where continuous availability of up-to-the-second information is critical to your business.

Tandem. Fully supported by worldwide sales, training, service and manufacturing organizations.

For information on how a Tandem NonStop system can improve your productivity or your P/L statement, call your local sales office or Tandem Computers Incorporated, 19333 Vallco Parkway, Cupertino, California 95014, U.S.A. Toll Free 800-482-6336 or (408) 725-7500 in California.

TANDEM

NonStop Transaction Processing

County DP manager cleared of wrongdoing

By [illegible]
Staff Writer

JACKSON, Miss. — Pocketing almost $7,000 for producing town tax rolls on the county computer wasn't criminal conduct, according to police investigators who looked into the actions of Hinds County Data Processing Director Ray Palmertree.

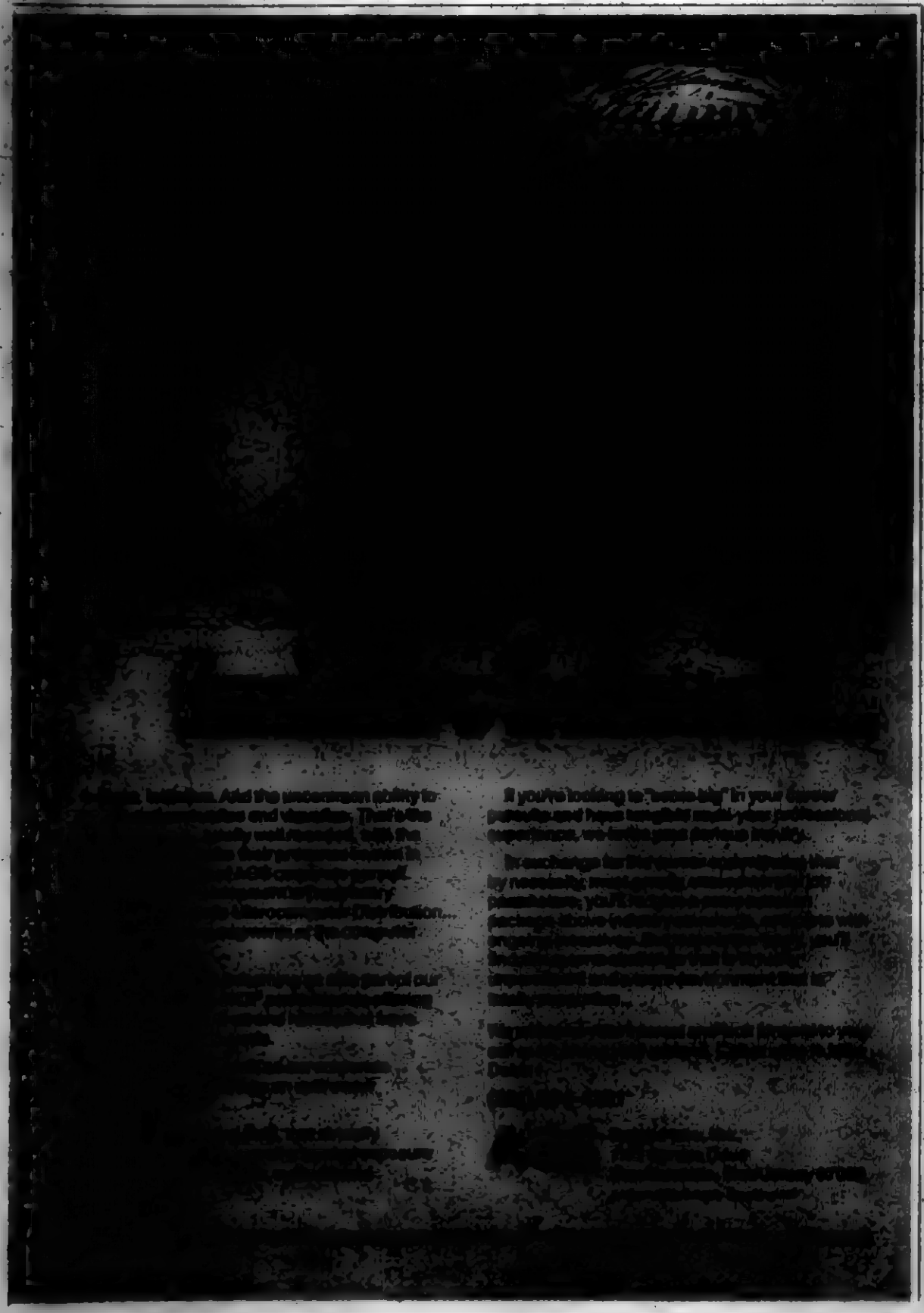
"I'm just glad it's over with," said Palmertree, who earlier admitted charging the town of Clinton $6,750 for processing the town tax rolls on Hinds County's Sperry Corp. 90/40 mainframe here [CW, Jan. 30].

Investigators from the sheriff's office and the district attorney's office told Palmertree and county supervisors last month that he had been cleared of criminal wrongdoing. The supervisors requested a probe after town officials questioned why they were paying to have their taxes processed while other towns received the same service free.

Palmertree, employed by the county since 1973, countered that his predecessor had a similar arrangement with Clinton and that the deal had been approved by county officials "back in the 1970s." He said he had performed the work on his own time.

Although investigators declined comment on the investigative report, the Jackson *Clarion-Ledger* reported that several former county officials had confirmed Palmertree's claims when interviewed by investigators. Those ex-officials reportedly said Palmertree and his predecessor were allowed to charge the town for services done on their own time because the county didn't have the personnel to process the rolls during regular working hours.

However, the report did not address the question of whether Clinton should continue to pay to have its tax rolls processed. "I expect that between now and July, when the tax rolls are filed, or at least by the end of the calendar year, they are going to do something about it," Palmertree said.



A/E Systems meet scheduled for June 4-7

BALTIMORE — A/E Systems '84, the fifth annual conference on automation and reprographics for design professionals, will be held June 4-7 at the Baltimore Convention Center. It is sponsored by "A/E Systems Report," a monthly newsletter targeting professional design firms.

Representatives from four computer-aided design (CAD) firms will discuss "The Inevitable Shakeout" in the CAD market: Dr. Malcolm Davies, vice-president and general manager, A,E & C Division, Calma Co.; John W. Hurd, vice-president, A-E-C Industry Marketing, Computervision Corp.; Robert E. Thurber, executive vice-president, Intergraph Corp.; and Robert Tiel, director of CAD and manufacturing marketing in IBM's National Accounts Division.

The registration fee for the conference is $145. More information is available from A/E Systems '84, P.O. Box 11316, Newington, Conn. 06111.

AI among topics of April 29 meet

TORONTO — The Association for Systems Management is holding its annual conference April 29 to May 2 at the Sheraton Center here.

Highlights of the conference will include a seminar on artificial intelligence led by E. Robert Keller of Renaissance International Corp. in Harvard, Mass.,; a tutorial on electronic mail led by George Sekely of Canadian Pacific, Ltd.; and a seminar on motivation and personnel value systems by Kay Kutchins of the University of Texas.

The registration fee is $395 for members and $495 for nonmembers. More information is available from the Association for Systems Management, 24587 Bagley Road, Cleveland, Ohio 44138.

IIE conference to run May 6-10

CHICAGO — A Software Swap, a demonstration and exchange of software programs, will be held during the Institute of Industrial Engineers' (IIE) 1984 Annual International Industrial Engineering Conference and Show at the Hyatt Regency O'Hare here. Slated for Tuesday, May 8, the swap is sponsored by IIE's Computer and Information Systems Division.

With "Engineering the Future" as the theme, the conference runs May 6-10 and will feature guest speakers, 130 education sessions, plant tours, workshops, a productivity management symposium, preconference seminars, an exhibit show, simulation lab and IIE business meetings.

Registration information is available from IIE, 25 Technology Park/Atlanta, Norcross, Ga. 30092.

The Philips 3000 Series. Future Included.

Building Blocks. The 3000 Series universal workstations. The vital building blocks in the Philips Information Systems Office Automation strategy. A strategy that assures you today's purchase won't become obsolete in the years ahead. We include the future by providing a migration path from electronic workstations, upward and outward to distributed processing, sophisticated local area networks, and beyond.

Versatility. The 3000 Series includes award-winning* word processing software recognized for ease of use and versatility. Each 3000 Series workstation functions as a word processor, a desktop computer using off-the-shelf programs, and a sophisticated telecommunications terminal including Miconet for Philips-to-Philips electronic mail, as well as asynch, bisynch, and 3276 emulation.

Resources. Our parent, N.V. Philips, a 16-billion-dollar multinational corporation, is the third largest corporation specializing in communications and electronics with 200 factories in over 100 countries and 300,000 employees worldwide.

We put the power of over one billion dollars in research behind our Office Automation systems. Technological firsts, from the original cassette recorder to the videodisc and digital optical recorder allow us to expand our Office Automation strategy in the future, while keeping compatibility intact.

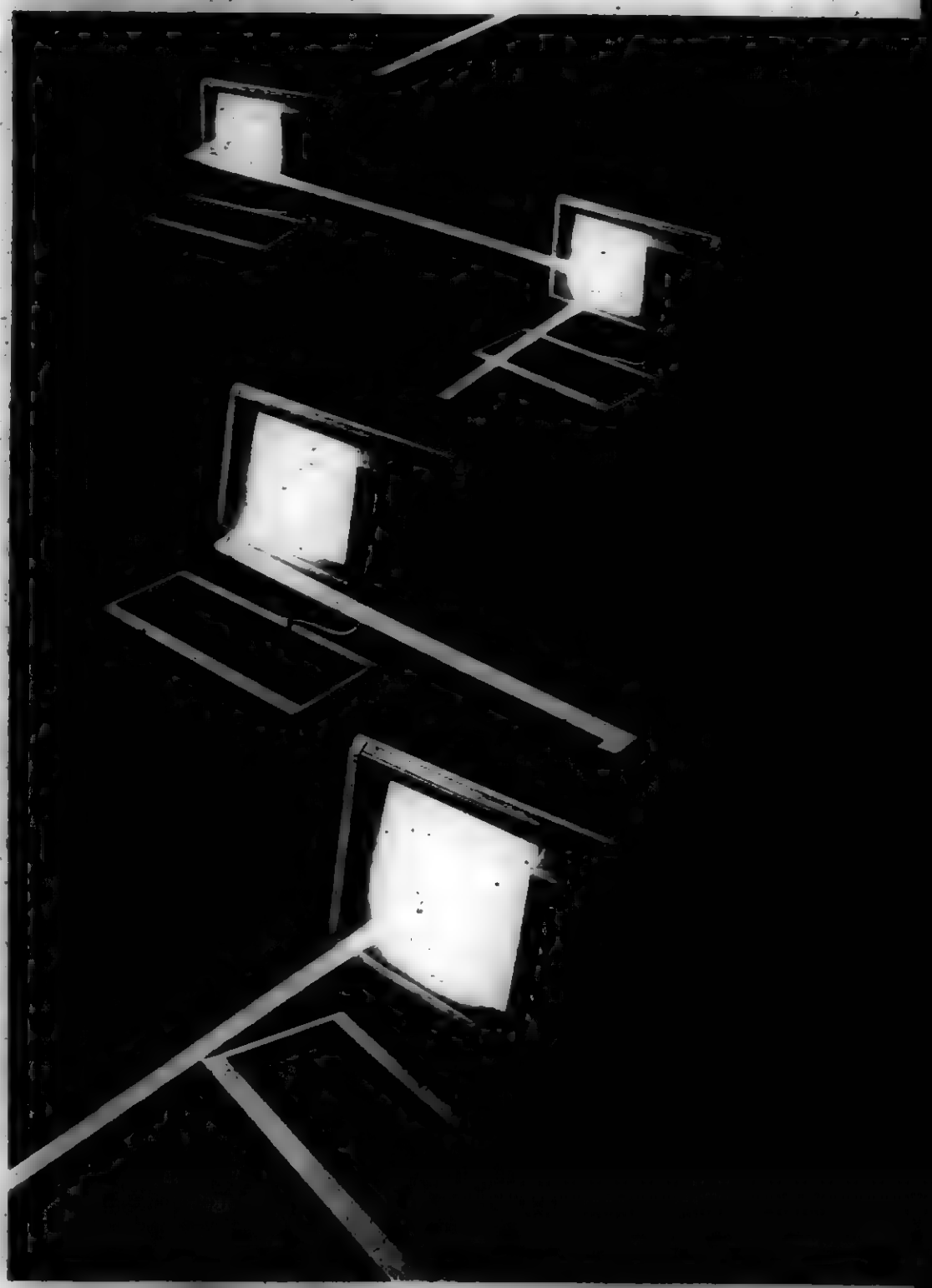
Support. All products in the Philips Office Automation strategy are backed with an extensive guarantee and comprehensive user training and service.

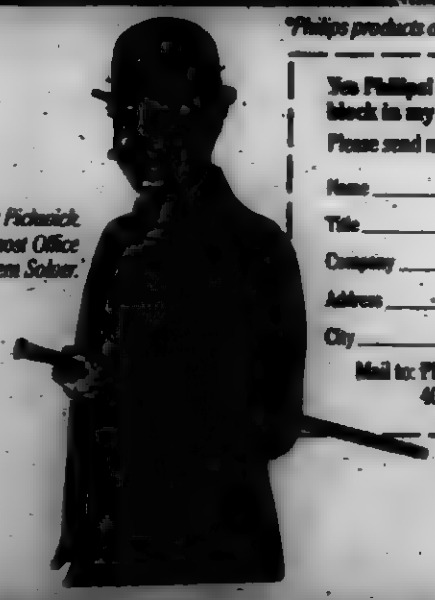
To find out more about making our 3000 Series the building block in your Office Automation future, call toll free 1-800-828-6211. In New York State 1-800-462-6432. Or, send the coupon below.

Helping you solve the mysteries of Office Automation.

PHILIPS INFORMATION SYSTEMS

PHILIPS





Alexander Pickwick. The World's Foremost Office Automation Problem Solver.

*Philips products are consistently rated at the top of the DataPro User Survey.

Yes Philips! I want to make your 3000 Series the building block in my Office Automation future.
Please send me further information on your Office Automation strategy.

Name _____

Title _____

Company _____

Address _____

City _____ State _____ Zip _____

Mail to: Philips Information Systems, Inc., Marketing Services, 4040 McEwen, Dallas, TX 75234

CW 0416

CW photos by S. Blakeney

Site of the Hannover Fair, Hannover, West Germany (above). Attendees examine vendors' newest gear at this industrial trade show (above and at right).

Germany's 'Fair of Fairs' opens

Hannover plays host to 120 countries

By Susan Blakeney
CW Staff

HANNOVER, West Germany — "The Fair of Fairs" is the name rightfully bestowed upon the Hannover Fair, the massive industrial trade show held here earlier this month.

The sprawling annual event spanned 10 million square feet across seven buildings and hosted 750,000 visitors, effectively doubling the population of this town. People traveled from some 120 countries to attend the fair and visit its 1,700-plus exhibits.

The fair was actually 10 trade shows rolled into one, representing such diverse manufacturing industries as office equipment, data processing, factory equipment and energy.

The largest portion of the show was devoted to information processing technology. Not only was the computer segment of the show the largest in size, but it was also the most popular. Its many exhibit halls were packed each morning.

One industrial equipment maker suggested that the fair was "really turning into a computer show. . . . Hardly anybody has visited our booth all day." When asked why his company came to the show at all, the manufacturer said, "If you don't show up, everybody thinks you've gone — as you say — Chapter 11."

The general atmosphere at the show was decidedly upbeat. The West German minister for economic affairs and transport for Lower Saxony, Brigit Breuel, best summed up the prevailing spirit at the show during her keynote address.

She explained, "A short while ago, it was fashionable to point to the allegedly overwhelming backwardness of Europe's economy." Breuel continued, "This we can disregard and apply our talents and strengths and really keep abreast of the competition. The signals to the world's economy are set on 'go.' "

In the words of our users.

"The Fortune System is very complete. It is easy to update and the programs are well-written."

—Ruth Roessler
Camera Graphics, North Hollywood, Calif.

FORTUNE SYSTEMS

A leader in UNIX-based commercial, multi-user systems.

101 Twin Dolphin Drive, Redwood City, CA 94065
For more information call 415/592-5140/Telex. 172-632

© 1984 Fortune Systems/UNIX is a trademark of Bell Labs

Your key to success
VSAM training at Chubb

Learn to use Access Method Services to create, load, delete, and list data sets and the COBOL coding required to process VSAM data sets.

Come join the group of satisfied clients at *Chubb Advanced Training Center*. Our VSAM in COBOL class is skill oriented. Emphasis is placed on the practical knowledge needed to be immediately productive. Informative lectures, comprehensive manuals and practical workshop assignments guarantee a solid understanding.

Classes are presented publicly in New Jersey, in-house and to regional training groups in a consortium format.

May 7—9 ... August 13—15

For more information on the courses offered by Chubb Advanced Training Center send for your free catalog or call (201) 285-9700.

CHUBB INSTITUTE
for COMPUTER TECHNOLOGY
8 Sylvan Way
Parsippany, N.J. 07054

NEWS

INTERNATIONAL REPORT
CW International News Network

AUSTRALIA

NORTH SYDNEY — The first installation of IBM's X models of 3080 mainframes is to be made at the Australian Gas Light Co. in early June. A second installation will follow shortly at Sydney County Council, the city's electrical utility.

■

SYDNEY — The Commonwealth Banking Corp. has veered from the path of other banks by selecting hardware and software from NCR Corp. instead of Tandem Computers, Inc. to run its electronic funds transfer system. In a deal worth more than $1.9 million, the Commonwealth has bought an NCR V-8575 dual processor, two NCR 721 communications processors and the electronic rental banking software package. The Commonwealth has also signed Mobil Oil Australia as the first retailer to use its point-of-sale system.

■

MELBOURNE — Wealthy Asian businessmen are seeking joint venture partnerships with Australian computer companies following a campaign by the Victorian Economic Development Corp. to encourage foreign investment in Australia. The corporation's efforts, in conjunction with those of the federal government's Department of Immigration and Ethnic Affairs, are aimed at attracting successful investors who have a minimum of $278,000 unencumbered capital to invest in Victorian business.

BRAZIL

BRASILIA — The National Security Council, which, in collaboration with the Department of Informatics, regulates activites in the information sector of the economy, is expected to present a proposal for a Brazilian information system to the national Congress. Not mentioned in the proposal is the current policy of market reservation, which reserves the Brazilian market exclusively for Brazilian vendors of minicomputers, microcomputers and peripherals.

■

RIO DE JANEIRO — Total sales of the Brazilian computer industry increased only 7% last year vs. 51% in 1982, according to figures released by the Brazilian Association of Computers and Peripherals. Until last year, the computer industry was thought to have escaped the economic problems affecting the rest of the country, but the industry's lackluster performance in 1983 indicated that this sector of the economy is apparently no more immune to economic crisis than any other.

CHINA

BEIJING — The computer maintenance center established here in January by Wang Laboratories, Inc. is providing its users with a variety of services, such as installation, maintenance and retailing of circuit boards. The center currently stocks about $100,000 worth of spare parts.

■

SHENGYANG — Shengyang Computing Institute, which is under the China Academy of Sciences, has developed a time-sharing operating system which the institute said is fully compatible with Unix. In addition to all standard commands and routine programs supported by Unix, the institute's Shenix also supports Fortran 77, C, Basic and Pascal.

■

BEIJING — Sixteen IBM 4341 processors, two IBM 3081s and two IBM 3083s sold to China last year are scheduled to be delivered in the second half of 1984.

FRANCE

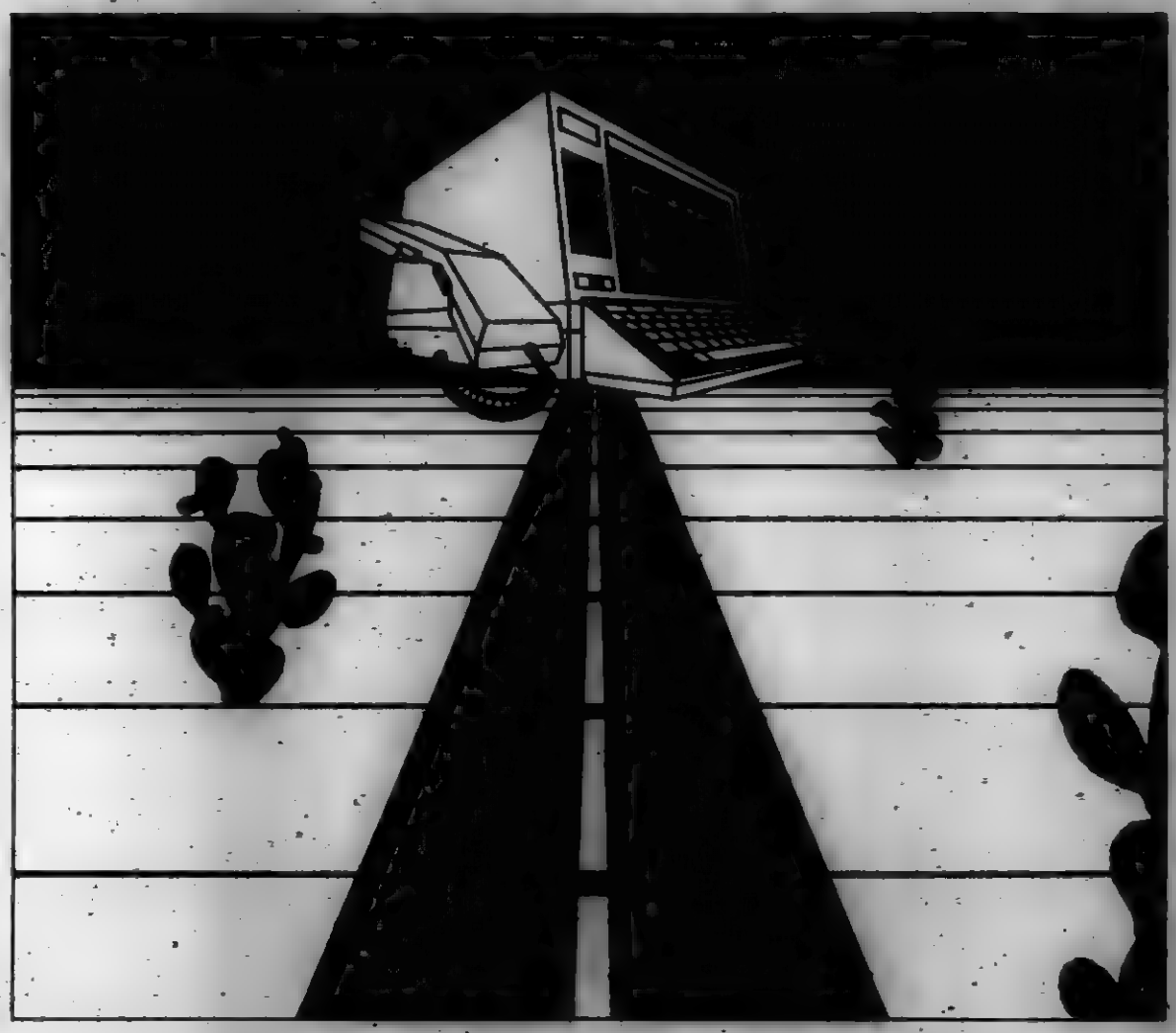
PARIS — Bull-Sems, the subsidiary of Group-Bull that manufactures and markets industrial and scientific data processing systems, has signed an agreement with Ridge Computers of Santa Clara, Calif., for technical, industrial and commercial cooperation. Bull-Sems, which will make a capital investment in Ridge and receive a seat on Ridge's board of directors, gains the right to produce the 32-bit Ridge 32 system in France at its plant at Echyrolles near Grenoble. Production will begin before the end of the year. The agreement also provides for the two companies to extend the 32-bit product line.

JAPAN

SINGAPORE — Syscon, a subsidiary of Kongsberg Corp. of Norway, has made the first Asian sale of its utility mapping system to the Public Utilities Board, which will use the system to keep a more accurate data base of its power lines, water and gas pipes. The sale is valued at $5 million.

PHILIPPINES

MANILA — Lack of data communications facilities and technical expertise have been major factors in the underutilization of computers in the Philippines, according to a study by the Philippine Computer Society. The study showed that not enough technical expertise is available to maximize the potential of installed hardware and that a lack of communications facilities is seriously hampering data transmission to users.



The Telecommunications Revolution is here.

At the International Communications Association 37th Annual Exposition. May 8–10, 1984. Las Vegas Convention Center. Las Vegas, Nevada.

Telecommunications is moving faster than ever before. The ICA Exposition presents the opportunity to see the premier showcase of telecommunications products and technologies.

Over 250 exhibitors will display the latest in voice and data communications, office automation and communications integration. If you purchase, recommend or use telecommunications products or services, this is an unprecedented opportunity to gain first-hand knowledge of this rapidly growing and changing field.

The ICA would like to extend its invitation to you. Just bring this ad to the Exposition and your admission is free.

Dates and Times:
May 8 & 9, 9:30 am to 6:00 pm
May 10, 9:30 am to 12:30 pm
Regular Admission: $10.00

ICA

For more information regarding the Exposition or ICA membership, call 800-ICA-INFO or 214-233-2000.

NEWS

CALENDAR

WEEK OF MAY 6

MAY 7, WASHINGTON, D.C. — **The Second National Conference on DP Software Maintenance Strategies and Opportunities.** Contact: U.S. Professional Development Institute Maintenance Conference, Department KLMNOPQRS, 1620 Elton Road, Silver Spring, Md. 20903.

MAY 7-9, SAN FRANCISCO — **International Data Corp. (IDC) Micro Guide Conference — Micro War: Shape Up or Shake Out.** Contact: IDC, 5 Speen St., Framingham, Mass. 01701.

MAY 7-9, BOSTON — **The Fundamentals of Data Communications.** Contact: American Management Associations, 135 W. 50th St., New York, N.Y. 10020.

MAY 7-9, LAS VEGAS — **The Annual International Communications Association Conference.** Contact: Norman Sefton, Duke University, 114A Tel-Com Building, Durham, N.C. 27706.

MAY 7-9, HOUSTON — **DOS/VSE Internals, Debugging and Problem Determination.** Contact: Goal Systems International, Inc., 5455 N. High St., Columbus, Ohio 43214.

MAY 7-9, NEW YORK — **Automating the Office: A Tactical Guide for Success.** Contact: American Management Associations, 135 W. 50th St., New York, N.Y. 10020.

MAY 7-9, PARSIPPANY, N.J. — **MVS Dump Debugging.** Contact: Chubb Institute, 8 Sylvan Way, Parsippany, N.J. 07054.

MAY 7-9, ARLINGTON, TEXAS — **Data Analysis.** Contact: QED Information Sciences, Inc., QED Plaza, P.O. Box 181, Wellesley, Mass. 02181.

MAY 7-9, CHICAGO — **Personal Computers: Strategies for Managing.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

MAY 7-9, DALLAS — **Capacity Management Forum.** Contact: Institute for Software Engineering, 510 Oakmead Pkwy., Sunnyvale, Calif. 94086.

MAY 7-9, WASHINGTON, D.C. — **Strategic Planning for Telecommunications.** Contact: Technology Transfer Institute, 741 10th St., Santa Monica, Calif. 90402.

MAY 7-9, WASHINGTON, D.C. — **Information Systems: Modeling, Analysis and Planning.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

MAY 7-9, ATLANTA — **Financial Analysis for Telecommunications Equipment Acquisition.** Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

MAY 7-9, SAN FRANCISCO — **Evaluating, Selecting and Using Computer Software Packages.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

MAY 7-9, NEW YORK — **Fundamentals of Data Processing for the Non-DP Executive.** Contact: American Management Associations, 135 W. 50th St., New York, N.Y. 10020.

MAY 7-9, SAN FRANCISCO — **Computer Performance Measurement and Capacity Planning: Tools and Techniques.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

MAY 7-9, WASHINGTON, D.C. — **Strategic Planning for Telecommunications.** Contact: Technology Transfer Institute, 741 10th St., Santa Monica, Calif. 90402.

MAY 7-9, SEATTLE — **Relational Data Bases.** Contact: Software Institute of America, Inc., 8 Windsor St., Andover, Mass. 01810.

MAY 7-9, CHICAGO — **Introduction to Office Automation: Concepts, Technology and Applications.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

MAY 7-9, DALLAS — **Office Automation: Technology and Integration.** Contact: Software Institute of America, Inc., 8 Windsor St., Andover, Mass. 01801. Also being held May 14-16 in Los Angeles.

MAY 7-9, WASHINGTON, D.C. — **Data Communications and Networking for Personal Computers.** Contact: Software Institute of America, Inc., 8 Windsor St., Andover, Mass. 01810.

MAY 7-11, ATLANTA — **C Language.** Contact: Advanced Technology Systems, Inc., 302 Research Drive, Norcross, Ga. 30092.

MAY 7-11, ANNAPOLIS, MD. — **How to Develop an Effective Long-Range Data Processing Plan.** Contact: Keston Associates, 11317 Old Club Road, Rockville, Md. 20852.

MAY 7-11, DAYTON, OHIO — **Quality Assurance and Testing Workshop.** Contact: Structured Methods, Inc., 7 W. 18th St., New York, N.Y. 10011.

MAY 7-11, SAN FRANCISCO — **Systems Workshop III.** Contact: Ware Associates, P.O. Box 948, Groton, Conn. 06340.

MAY 7-11, HOUSTON — **Structured Program Design/Maintenance.** Contact: Georganna Carson, Ken Orr and Associates, Inc., 1725 Gage Blvd., Topeka, Kan. 66604.

MAY 7-11, ORLANDO, FLA. — **IDMS-DB Programming Workshop.** Contact: Harris Education Center, 1025 W. Nasa Blvd., Melbourne, Fla. 32919.

MAY 7-11, CHICAGO — **Tutorials for Professional Development.** Contact: Association for Computing Machinery, 11 W. 42nd St., New York, N.Y. 10036.

MAY 7-11, TEANECK, N.J. — **Systems Analysis.** Contact: QED Information Sciences, Inc., QED Plaza, P.O. Box 181, Wellesley, Mass. 02181.

MAY 7-11, NEW YORK — **MVS JCL.** Contact: Syscd, One Park Ave., New York, N.Y. 10016.

MAY 7-11, LOS ANGELES — **Information Modeling Workshop.** Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

MAY 7-11, ST. LOUIS — **MVS Diagnostic Techniques.** Contact: Center for the Study of Data Processing, Campus Box 1141, Washington University, St. Louis, Mo. 63130.

MAY 7-11, HOUSTON — **Project Planning and Control Workshop.** Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

MAY 7-11, CHICAGO — **Structured Analysis/Design Workshop.** Contact: Structured Methods, Inc., 7 W. 18th St., New York, N.Y. 10011.

MAY 7-11, MEMPHIS — **Structured Analysis and System Specification Workshop.** Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036. Also being held May 14-18 in Atlanta.

MAY 7-11, WASHINGTON, D.C. — **Structured Analysis and Design Workshop.** Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036. Also being held May 14-18 in Pittsburgh.

MAY 7-11, NEW YORK — **Structured Design Workshop.** Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

MAY 7-11, CHICAGO — **Structured Design for Real-Time Systems.** Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036. Also being held May 14-18 in New York.

MAY 7-11, TORONTO — **CICS Command-Level.** Contact: QED Information Sciences, Inc., QED Plaza, P.O. Box 181, Wellesley, Mass. 02181.

MAY 7-11, BOSTON — **Systems Workshop II.** Contact: Ware Associates, P.O. Box 948, Groton, Conn. 06340.

MAY 7-18, ATLANTA — **CICS Command-Level: Evening Workshops.** Contact: Advanced Technology Systems, Inc., P.O. Box 6900, Norcross, Ga. 30091.

MAY 8-10, NEW YORK — **SAS Macro Language Course.** Contact: SAS Institute, Inc., P.O. Box 8000, Cary, N.C. 27511.

MAY 8-10, BOSTON — **Cost Benefit Analysis.** Contact: QED Information Sciences, Inc., QED Plaza, P.O. Box 181, Wellesley, Mass. 02181.

MAY 8-10, CARY, N.C. — **SAS for New Computer Users (OS) Course.** Contact: SAS Institute, Inc., P.O. Box 8000, Cary, N.C. 27511.

MAY 8-10, NEW YORK — **Understanding Modern PBX Systems.** Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

MAY 8-10, MONTREUX, SWITZERLAND — **Computer-Integrated Manufacturing.** Contact: Rhonda Gergsness, Computer-Aided Manufacturing International, Inc., Suite 1107, 611 Ryan Plaza Drive, Arlington, Texas 76011.

MAY 8-11, PALO ALTO, CALIF. — **Hands-On Unix Workshop.** Contact: Ruth Dordick, Integrated Computer Systems, P.O. Box 45405, 6305 Arizona Place, Los Angeles, Calif. 90045.

MAY 8-11, SAN DIEGO — **Hands-On Microprocessor Troubleshooting.** Contact: Ruth Dordick, Integrated Systems, P.O. Box 45405, 6305 Arizona Place, Los Angeles, Calif. 90045.

MAY 8-11, LOS ANGELES — **How to Manage Software Projects.** Contact: Ruth Dordick, Integrated Computer Systems, P.O. Box 45405, 6305 Arizona Place, Los Angeles, Calif. 90045.

MAY 9, NEW YORK — **Communications Network Design.** Contact: Center for Advanced Professional Education, Suite 110, 1820 E. Garry St., Santa Ana, Calif. 92705.

MAY 9-10, FRAMING-

In the words of our users.

"After months of researching computer systems, the Fortune 32:16 offered everything we needed."

—Sharon Quinn
Systems Manager, S.A.L. Management, Chicago, Ill.

FORTUNE SYSTEMS

A leader in UNIX-based commercial, multi-user systems.

101 Twin Dolphin Drive, Redwood City, CA 94065
For more information call 415/592-5140/Telex. 172-632

FSS Fortune Systems/UNIX are trademarks of Bell Labs

NEWS

HAM, MASS. — Effective DP Project Management. Contact: The Center for Management Development, Bryant College, Smithfield, R.I. 02917.

MAY 9-11, NEW YORK — Data Communications: An Introduction to Concepts and Systems. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

MAY 9-11, NEW YORK — SAS Processing Course. Contact: SAS Institute, Inc., P.O. Box 8000, Cary, N.C. 27511.

MAY 9-11, NEW YORK — Office Automation: Strategic Planning, Design and Implementation. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

MAY 9-11, NEW YORK — Financial Information Systems: Integrating Personal Computers. Contact: National Institute for Management Research, P.O. Box 3727, Santa Monica, Calif. 90403.

MAY 9-11, BOSTON — Data Communications for Microcomputers: Acquisition, Application and Implementation. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

MAY 9-11, BOSTON — Data Base Management Systems: Concepts and Guidelines. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

MAY 9-11, NEW YORK — Data Base Management Systems: A Comparative Analysis of General-Purpose Systems. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

MAY 10, NEW YORK — Dbase II. Contact: Software Institute of America, Inc., 8 Windsor St., Andover, Mass. 01810. Also being held May 14 in Washington, D.C.

MAY 10-11, ARLINGTON, TEXAS — Data Base Design. Contact: QED Information Sciences, Inc., QED Plaza, P.O. Box 181, Wellesley, Mass. 02181.

MAY 10-11, DALLAS — Micro/Personal Computer Operating Systems (Unix, Xenix, MS-DOS, CP/M). Contact: Software Institute of America, Inc., 8 Windsor St., Andover, Mass. 01810.

MAY 10-12, CHICAGO — Byte Computer Show. Contact: Interface Group, Inc., 300 First Ave., Needham, Mass. 02194.

MAY 11, NEW YORK — Lotus 1-2-3. Contact: Software Institute of America, Inc., 8 Windsor St., Andover, Mass. 01810.

WEEK OF MAY 13

MAY 13-16, WASHINGTON, D.C. — American Bankers Association Annual National Operations and Automation Conference. Contact: American Bankers Association, 1120 Connecticut Ave. N.W., Washington, D.C. 20036.

MAY 13-16, HALIFAX, NOVA SCOTIA — The Eighth Annual Conference for the Canadian Organization for Advancement of Computers in Health (Coach). Contact: Coach, 10504A 169th St., Edmonton, Alta., Canada T5P 3X6.

MAY 13-17, ANAHEIM, CALIF. — Computer Graphics 1984. Contact: National Computer Graphics Association, Suite 601, 8401 Arlington Blvd., Fairfax, Va. 22031.

MAY 14-15, CHICAGO — Local-Area Networks. Contact: Techtran, P.O. Box 10212, 72 Cummings Point Road, Stamford, Conn. 06904.

MAY 14-15, PHILADELPHIA — Micro vs. Mainframe. Contact: QED Information Sciences, Inc., QED Plaza, P.O. Box 181, Wellesley, Mass. 02181.

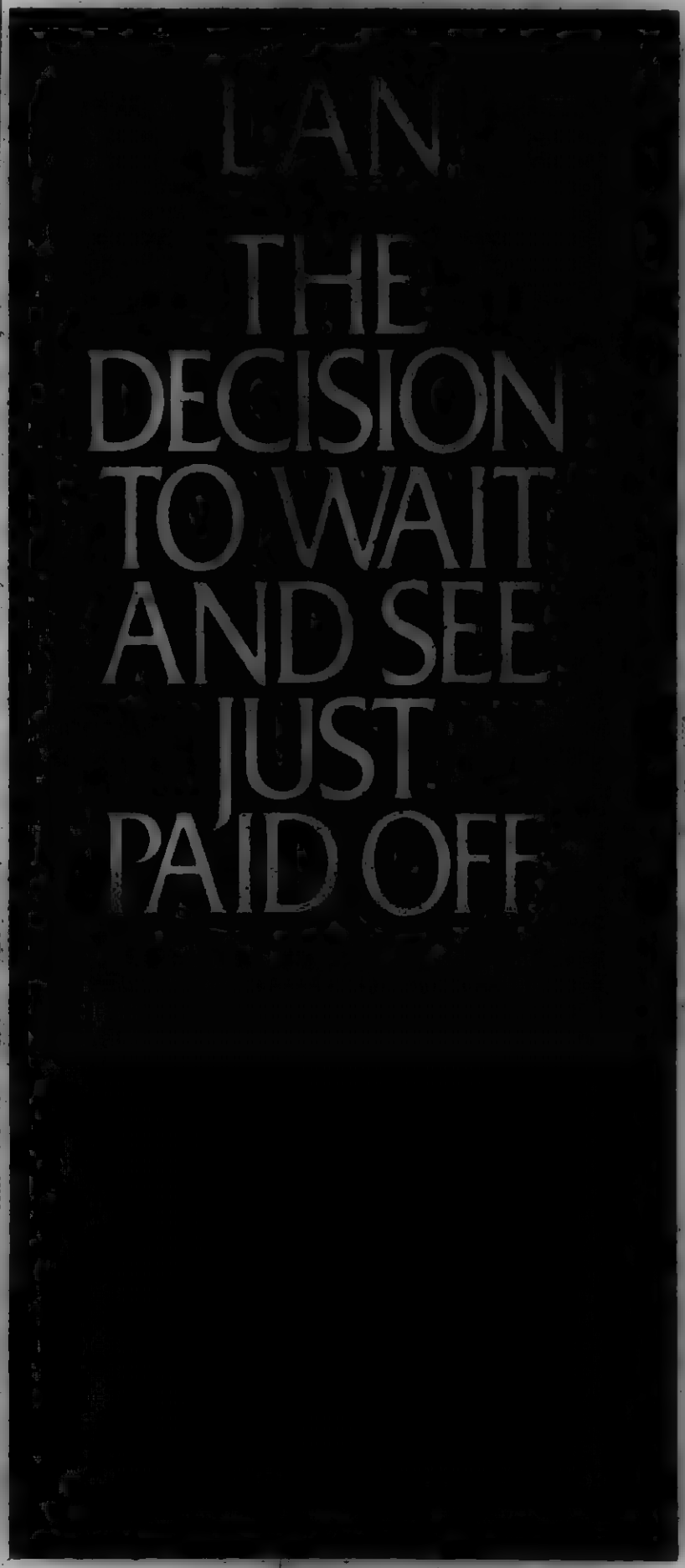
MAY 14-15, NEW YORK — Computer Networks: Protocols, Standards and Compatibility. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

MAY 14-15, BALTIMORE — CICS Table Management. Contact: Advanced Technology Systems, Inc., P.O. Box 6900, Norcross, Ga. 30091.

MAY 14-15, ARLINGTON, TEXAS — Systems Design. Contact: QED Information Sciences, Inc., QED Plaza, P.O. Box 181, Wellesley, Mass. 02181.

MAY 14-16, WASHINGTON, D.C. — Evolving to Electronic Banking. Contact: Technology Transfer Institute, 741 10th St., Santa Monica, Calif. 90402.

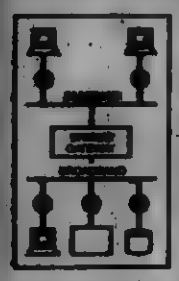
MAY 14-18, CHICAGO — CICS Internal Architecture. Contact: Syscd, One Park Ave., New York, N.Y. 10016.



Now there is a company that can satisfy your LAN needs both today and ten years from today. A company with flexible solutions backed by over 20 years of networking experience.

Codex.

In the 4000 Series LAN, we offer a system that lets you configure and control the precise mix of LAN technologies that suit your company needs.



A system, for example, that lets you combine a broadband backbone for data, video and voice applications, and less expensive Ethernet baseband feeders to support individual work areas.

A system that supports a wide array of industry standard interfaces. So you can connect practically any vendor's equipment.

Later, when your needs for internetworking and network management expand, those needs can best be met by the company that has literally written the book on adaptive routing, network management, protocol intervention, and statistical multiplexing.

Codex.

We just made the decision to get into local area networking a safe decision to make.

For more information, call 1-800-821-7700, ext. 879. Or write: Codex Corporation, Dept. 707-79, 20 Cabot Boulevard, Mansfield, MA 02048.

codex

© 1984 Codex Corporation

ATM boom seen linked to better security, user appeal

By James Connolly
CW Staff

ORLANDO, Fla. — The growth of automated teller machines (ATM) is linked to better security procedures and to making the machines more appealing to consumers, according to vendors who addressed the recent Electronic Funds Transfer Association Convention here.

The proliferation of ATMs has translated into a growth in the U.S. from four million transactions on 7,100 machines in 1978 to 3.4 billion transactions on 40,000 machines in 1983, reported James Leierzapf, vice-president for marketing at Diebold, Inc. Leierzapf said that about 35% of all U.S. bank customers now use ATMs, which have helped to change banks from a transaction orientation to a sales orientation as bank business moves off premises.

Leierzapf predicted that ATMs will spread throughout workplaces, convenience store/gas station combinations and supermarkets. However, he noted that high-traffic locations such as supermarkets will insist on greater reliability for the systems and that banks will want to save money by substituting withdrawal-only machines for full-service machines that require more maintenance.

Meanwhile, David Baker, Fujitsu Systems of America marketing support manager, warned that vendors must make ATM usage easier for the consumer if it is to rise above the 35% mark. "We have to generate a confidence level," he said.

He cited Fujitsu Ltd.'s ATM success in Japan, where the 13 major banks report that 70% of cash withdrawals and 40% of cash deposits are done through ATMs.

Tools that U.S. vendors should use to attract current nonusers include color graphics, touch screens, passbook handling, telephones for customers to seek help in operating the machines and cash handling, Baker recommended.

Christopher Williams, director of product marketing for Docutel/Olivetti Corp., said greater market penetration may be obtained by use of ATMs in the workplace. He noted that this concept essentially failed at one time, but that with the opportunity to link ATMs into networks, machines at work are making a comeback.

Robert Fagens, national network coordinator for NCR Corp., predicted that entire payrolls will be moved through ATMs in coming years and that the U.S. government would prefer to make its retirement, welfare and payroll payments through ATMs.

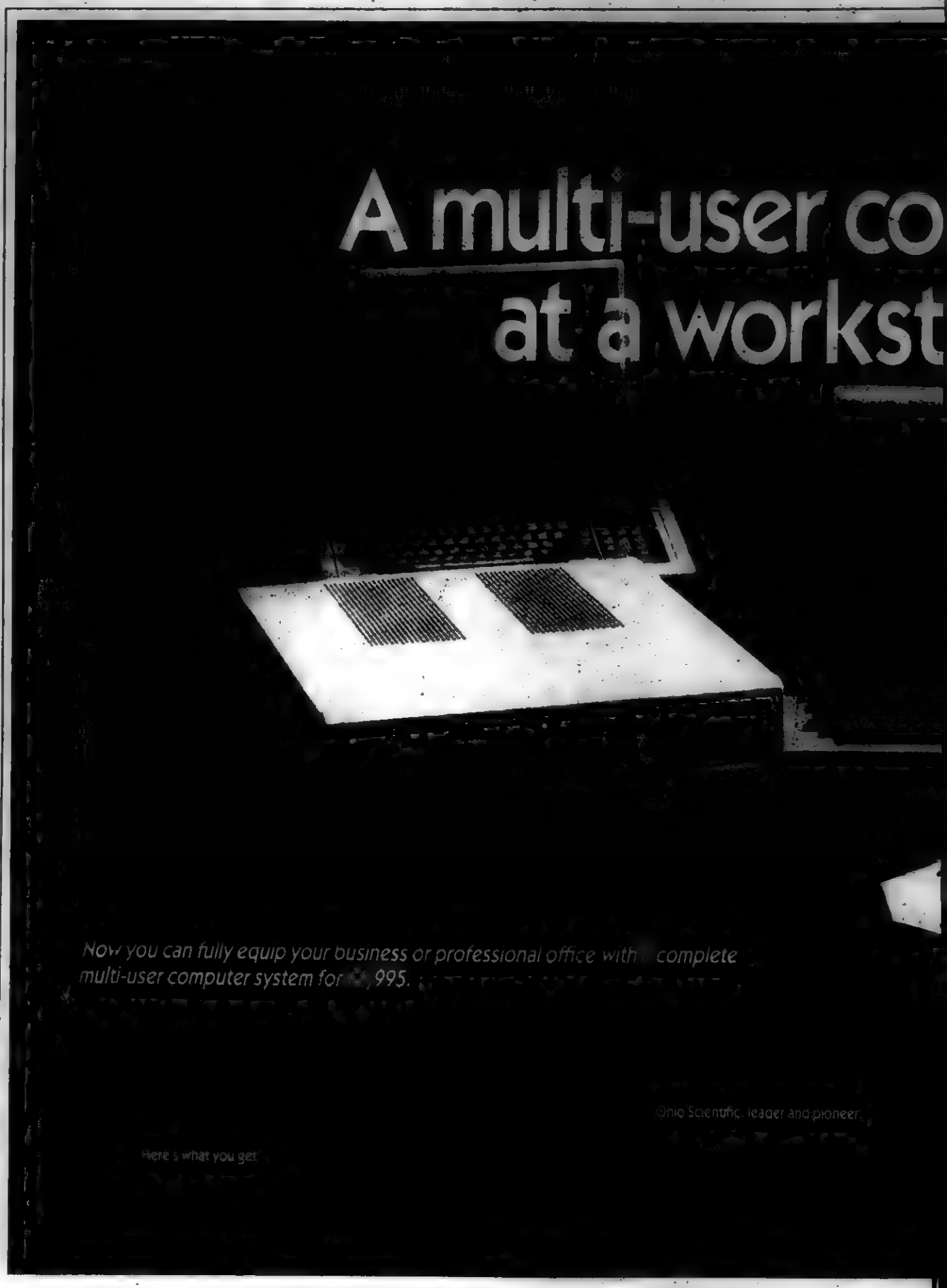
However, Fagens added that the government is awaiting tighter security measures before making a full commitment. Personal identification number systems are too unreliable for the government, and voice recognition systems are too expensive, Fagens said, adding that fingerprint identification systems are unlikely to see widespread ATM use.

IMC meet set for Oct. 2-4

SINGAPORE — The International Information Management Congress (IMC), Infomatics '84, is scheduled for Oct. 2-4 here. It will include seminars on information management and advanced micrographics, along with displays of state-of-the-art and advanced technology.

The Micrographics Society of Singapore will host the event at the Hyatt Regency Hotel in Singapore.

Registration fees are $350 until Aug. 15, $400 after Aug. 15 and $175 for one day. More information is available from IMC '84 through P.O. Box 34494, Bethesda, Md. 20817.



NEWS

Efta members cite prerequisites for business success

By James Connolly
CW Staff

ORLANDO, Fla. — Time, capital investment, more personal computers and a lot of marketing are prerequisites if electronic money systems are to be business — not just technical — successes.

That was a commonly shared view of the Electronic Funds Transfer Association (Efta) members, who met here recently for a four-day convention.

Several members also said they were surprised at how strongly retail chains feel about wresting the control of EFT networks away from banks.

"You kind of think of bankers as taking a leading role, but the retailers are very aggressive," said Joseph Pantone, vice-president for Money Access Center Operations at Philadelphia National Bank. "What they've been saying here is that they want us to give them what they want and not to worry about marketing, that they will take care of that and make it fly."

Pantone noted, however, that only large retailers such as Sears Roebuck & Co. and J.C. Penney have the capital to run their own networks with their own debit cards. He said that regional stores, like smaller banks, will still rely on major networks such as his bank's Major Access Center for most of their point-of-sale network communications.

While some of those smaller companies, whether retailers or gas station chains, may want their own networks, "when they look at the cost of establishing a network, they will change their minds," Pantone said.

Several attendees as well as speakers said the challenge for banks will be increasing customer usage of computerized transfers, such as automated teller machines (ATM), home banking and telephone bill-paying. Increasing that usage means strong marketing efforts, perhaps even more than many technically oriented EFT managers realize, observed two officials of Western Union Telegraph Co.

"The public is fickle, and a lot of people forget that. The public really hasn't found a need for these services," said John J. Durkin, Western Union's assistant vice-president for consumer operations. "I know that I personally am quite content writing 25 to 30 checks a month. I haven't felt the need for home banking."

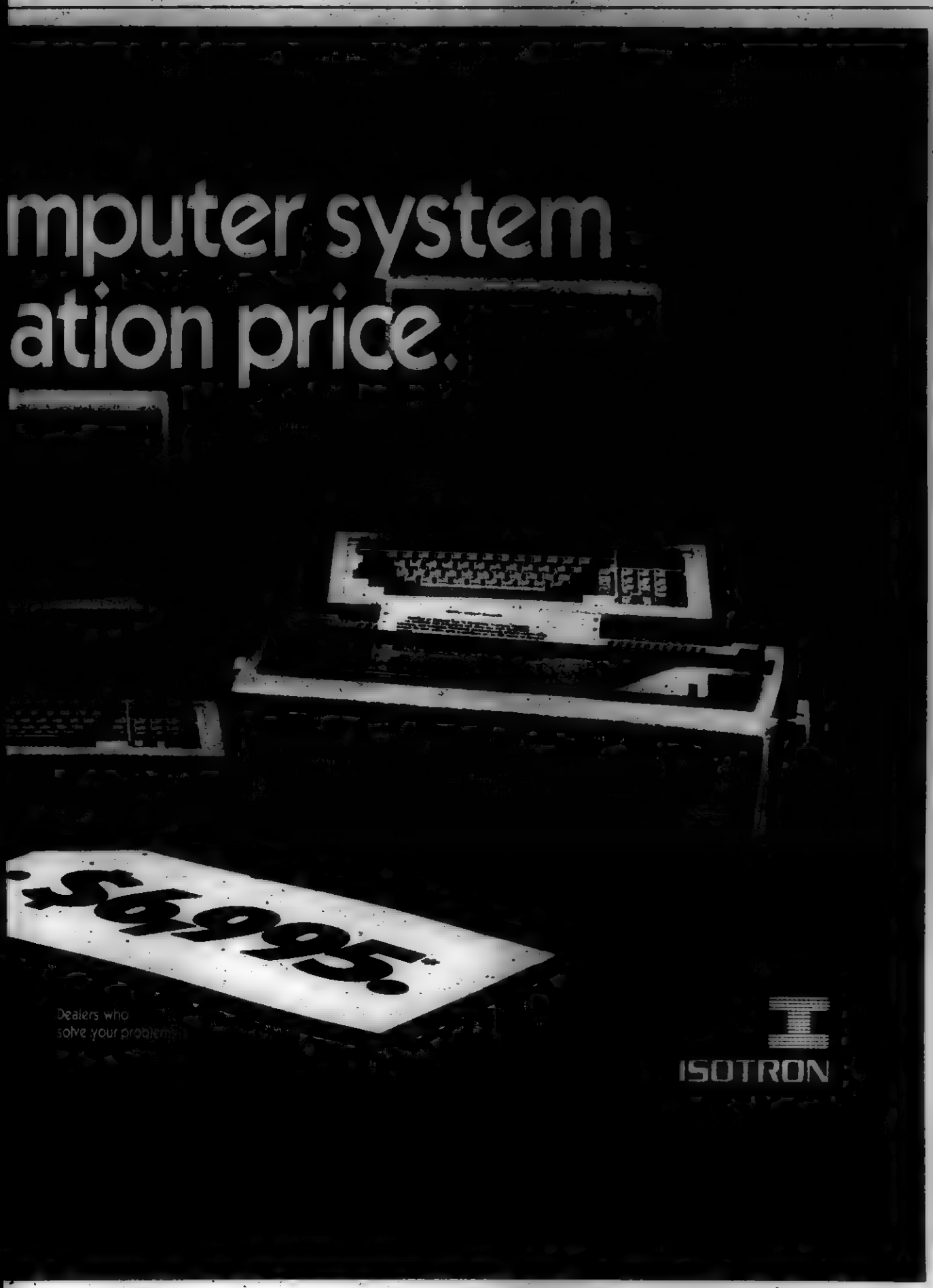
Market leader

Added Mary Ann Sprow, Western Union director of marketing for financial transfer services, "We were told here that technology drives the market. It doesn't. It leads the market." She cited as a misconception some EFT managers' view that the mere existence of a technology will lead customers to demand services.

Sprow linked the future of home banking to services such as videotext — which she said has shown little progress — and to the continued proliferation of home computers. But she and Durkin noted that even with the rapid growth of the personal computer market in recent years, it will take several years for home banking to become viable.

Home banking is another step in the progression that began with ATMs and continued with retail point-of-sale debit cards, now in the start-up phase, according to G. Henry Mundt, sales manager for Cirrus Systems, Inc. But, said Mundt, "I don't think anyone has made a business case for home banking. Maybe they will be able to five or seven years from now."

He, too, linked home banking to the spread of the personal computer, saying, "I think it's going to be that people will have a personal computer that they bought for things like keeping track of recipes, and home banking is going to be just one more thing they can use it for."



EDITORIAL

Eating the wounded

To have a winner in any fight, there must also be a loser. In the case of the bitter struggle for control of Management Assistance, Inc., the number of losers may vastly exceed those few winners who emerge from the dust of battle with fatter pocketbooks.

The victory of arbitrageur Asher Edelman and friends [CW, April 9] has already taken its toll on the health of a company that was hurting to start with. The expense to MAI of fighting the successful takeover attempt — more than $5 million — will translate into a quarterly loss. No doubt, that kind of money would have been better spent on items like research and development than on high-ticket lawyers, in vain no less.

But worse may be coming. MAI's Basic Four computer sales, which comprise more than half of the company's nearly $400 million annual revenues, could be seriously impacted by the cloud now hanging over MAI.

This is exactly what Edelman and friends want, because their plan is to sell off MAI's computer business and emphasize service and maintenance — or sell the entire company. In fact, selling the company is also what a beleaguered Raymond Kurshan, MAI president, intends to do.

This is not to say that Edelman's or Kurshan's intended direction for MAI is not the right one for the long-term vitality of the company and its shareholders. But what of the hundreds of MAI customers in the manufacturing and commercial sectors? Will the dividend of their customer loyalty be a line of machines that dies an early death for want of enhancements and new models?

Let's forget about customer loyalty for a moment and talk about proxy wars, a topic dominating an increasing number of corporate annual meetings at computer firms and others. Essentially, the idea is to parlay a minority stock holding, under 13% in Edelman's case, into de facto corporate control by gaining a majority on the board of directors. This is accomplished by soliciting proxies on behalf of "partnerships" controlled by the lead arbitrageur, such as Edelman, then convincing shareholders that the partnership has their best interests in mind.

But the interests any such partnership holds most dear are, of course, its own, and the rules by which both parties end up playing in such a battle echo the "All's fair in love and war" aphorism. Consider that when MAI filed suit against Edelman in January, seeking injunctive relief in the proxy fight, Edelman was already the subject of a year-old federal injunction obtained by the Securities and Exchange Commission. That injunction required Edelman to refrain from filing false and misleading documents with SEC, the result of Edelman's actions during a previous proxy fight in 1983 with Canal-Randolph Corp. Edelman countered with a suit of his own, charging Kurshan with publishing injurious statements about Edelman in two newspapers.

So what's all this mean? For one thing, the hostile takeover atmosphere is fostering several attempts to adopt antitakeover measures. Burroughs Corp. shareholders recently approved sweeping measures, such as staggering directors' terms and creating a new class of stock, to guard against hostile takeovers.

And why not? It's one thing if a company is being ridden into the ground by incompetent management. It's quite another when a group of takeover sharks swim unannounced into calm waters to practice what they do best — eating the wounded.

LETTERS

Where will middle manager be 10 to 15 years from now?

I was interested in the Special Report article "Middle managers feeling automation ax" [CW, March 26]. It seems to apply almost exclusively to factory automation.

I expect that in the next 10 to 15 years almost all middle managers in all phases — particularly those in larger firms — will no longer be needed. Most or all of the functions between lower levels and upper levels can and will be done by computers.

That leaves us with the question of what will happen to all of those middle managers.

When the smoke has cleared, the former middle manager class will have either fallen back to production level or will have grown to the top levels.

Wendell Clapp
Certified public accountant
East Wakefield, N.H.

Lesson to be learned: When does warranty begin?

We ran into a problem that might interest *Computerworld*'s readers. One of our remote sites had problems with its terminals, and we determined that the modems were at fault. We called the manufacturer, which informed us that both units would need to be serviced. We wanted to confirm that these units were still under warranty. Both modems were purchased July 1983, with a one-year warranty. We were informed that the warranty began on the date the board was completed by manufacturing. Both boards were dated August 1982. Since the modems had been sitting on the shelf for 11 months before we purchased them, we had essentially lost the warranty.

Kevin Telford
Technical support
Van Kampen Merritt, Inc.
Naperville, Ill.

COMPUTERWORLD

Editor
John C. Wildenstein

Executive Editor
Rita Shaw

Managing Editor
Bill Laberis

Assistant Managing Editor
Cheryl M. Gallo

Senior Editorial:
Software
Paul Gillin
Communications
John Dix
Phil Hirsch
Systems
Tom Henkel
Microcomputers
Eric Berdon
Industry
Peter Bochalis
Features
George Harris
Design Editor
Marjorie Magowan
International Editor
Susan Blakeney
Associate Features Editor
Barbara Van Scoyoc
Assistant Features Editor
Elizabeth Morse
Special Reports Editor
Donovan White

Staff Writers:
James Connolly
John Gallant
Lynn Haber
Patricia Keefe
Paul Korzeniowski
David Olmos
Edward Warner

Correspondents:
New York:
David Myers
Suite 7G
401 East 80th St.
New York, N.Y. 10021
212/570-2135
Washington, D.C.
Bureau Chief: Jules Kirchner
Correspondent: Bryan Wilkins
445 National Press Building
529 14th St., N.W.,
Washington, D.C. 20045
202/347-6718

West Coast
Bureau Chief: Jeffry Beeler
Correspondent: Robert Ball
1020 Marsh Rd.
Menlo Park, Calif. 94025
415/328-8084
Chief Copy Editor:
Kathie Gow
Assistant Chief Copy Editor:
Charlotte Ziems
Copy Editors:
Becky Batcha
Dave Bouffard
Bruce Crane
Deborah Fielding
Deborah Scaduto-Horn
Thomas Schmidt
Assistant to the Editor
June Fettig
Editorial Assistants:
Lorraine Brien
Mary DeCristofaro

Joyce Fuda
Communications
Sebastian
J. Daniel Couger
Roman Gumaer
Jack Stone
Terminals and Data
Larry Long
Minicomputers
Thomas Madron
The Data Center
John P. Murray
Local Systems
Charles P. Lecht
Special Publications
Computerworld Buyer's Guide
George Harris, Editor
Computerworld on Communications
Bruce Hoard, Editor
Computerworld OA
Ann Dooley, Editor
Computerworld Buyer's Guides
Marcia Stonehill, Editor

Main Editorial Office: Box 880, 375 Cochituate Road, Framingham, MA 01701 617/879-0700

Computerworld is a member of the CW Communications, Inc. group, the world's largest publisher of computer-related information. The group publishes 92 computer publications in 19 major countries. Nine million people read one or more of the group's publications each month. Members of the group include: Argentina's Computerworld Argentina; Australia's Australia Computerworld, Australian Micro Computerworld, Australian PC World and Directories; Brazil's DataNews and Micromundo; China's China Computerworld; Denmark's Computerworld Danmark and Microindex; Finland's Mikro; France's Le Monde Informatique, Golden (Apple) and OPC (IBM); Germany's Computerwoche, Microcomputerwelt, PC Welt, Software Markt, CW Editor/Services, Computer Business and Commodore Magazine; Italy's Computerworld Italia; Japan's Computerworld Japan and Focus Comtrend; Mexico's Computerworld Mexico and Computadoras; Netherland's Computerworld Benelux and Microbits; Norway's Computerworld Norge and MikroData; Saudi Arabia's Saudi Computerworld; Singapore's The Asian Computerworld; Spain's Computerworld Espana and Micro Sistemas; Sweden's ComputerSweden, Mikro Datorn and Alt-Hemdator; the UK's Computer Management and Computer Business Europe; the U.S.' Computerworld, Hot CoCo, In-Cider, Infoworld, J., MacWorld, MICRO MARKETWORLD, Mspcomputing, PC World, PC Jr. World, Run, 73 Magazine and 80-Micro.

VIEWPOINT

Superstar trek

LECHT
ON SCIENCE
Charles P. Lecht

Although the number of supercomputers in the U.S. is very small, our need for the powers engendered through their usage is very great. About 100 of the millions of computer systems in America's installed base can qualify as a supercomputer, and as a percentage of its if-sold value, they account for a dismal .1% or less. The elite group includes systems like Cray Research Inc.'s Cray X-MP, Denelcor, Inc.'s Heterogeneous Element Processor and Control Data Corp.'s 2XX systems.

It seems strange that there has been so little investment in the creation of supercomputer systems when the benefits of our doing so are so great. Perhaps the most overriding reason is the most obvious — very few companies can make them; too few people know how to use them.

But talk about return on investment! One better fighter plane design obtained through supercomputer usage can save American taxpayers many times the cost of its discovery — and priceless lives, too. The smallest improvements in safety in the peaceful uses of atomic energy will do no less; through the usage of supercomputers, calamities like Three Mile Island or worse could be avoided. And, unlike other capital layouts, the assets that produced the innovation — the supercomputer, its staff and facilities — remain as good as new, if not better, for the experience. Using the most conservative investment criteria applied by Wall Street's most cautious investors, a supercomputer is a super investment, maybe even better than a TV station or a satellite.

Investment opportunity

As you may surmise, I believe the competent supercomputer companies to be a great investment opportunity. The demand for more supercomputer facilities in government, education and just plain old big business will grow much faster than most analysts think. That the cost of these giants is, in comparison to today's large mainframes, high reflects, among other things, serious supply shortages. I've yet to attend a supercomputer meeting (or any other for that matter) at which anyone has ever convincingly demonstrated the contrary. The long waiting period for Cray's most advanced systems, CDC's underwriting of Electronic Technology Associates and the emergence of Microelectronics Computer Corp., Star Technologies, Inc., Elxsi Corp., Denelcor and other such developments confirm our belief in the commercial viability of supercomputer systems. Our government's deep involvement confirms our belief in their essentiality for our national health and welfare.

Even though a single system may cost four or five times that of today's widely used and largest commercial mainframes, its cost as a percentage of our gross national product has plunged over the past 20 years or so. The Univac Livermore Atomic Research Computer (Larc), yesteryear's superduper computer, costs $30 million dollars each — in 1960 dollars! If you had invested the cost of one Larc at 10% interest compounded per annum, it would have produced $300 million in today's dollars. In comparison, the cost of one Cray X-MP, say $8 million, is an astounding bargain without even considering that it would take thousands of Larcs to equal its megaflop performance.

The meeting held at Salishan Lodge, Gleneden Beach, Ore., was held to explore the means of extending today's supercomputer power through the application of parallel processor technologies, a stunt that, at its foundation, is motivated by shortages in the supercomputer power we need to address today's pressing problems. It is true that other factors, some limiting in the creation of improved performance very large-scale integrated chips and some emanating from the discovery of new computational techniques, would prompt us to investigate parallel processing methodologies anyway. But we know that the results achieved could never fully overcome the additional systems research, development and manufacturing of supercomputers needed to alleviate their shortage significantly. You cannot tie 25 cars together to make an all-purpose tractor-trailer. Anyway, it should come as no surprise that the biggest problems facing our scientific community simply are not solvable by any single method or by one that is well known.

The parallel processing conference at Salishan was an educational and exciting event. The assembled group included such supercomputer superstars as B. Smith of Denelcor, K. Batcher of Goodyear Research, A. Heller of IBM, K. Miura of Fujitsu Ltd. and many other stars known for fantastic achievements in science. The lectures were dynamic, and interest was very high. The intellectual friendship and honest discourse between the members of this group was a pleasure to observe. Experiences like these refresh and energize their participants' minds in a manner you might expect would occur on their emergence from a scientific sauna. Our Department of Energy deserves our praise for sponsoring this meaningful event.

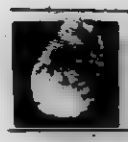
Upon return from the conference, I've had cause to think about America's supercomputer efforts in general and the struggle our senior scientists have had to get these moving, especially those in our government. This group, upon whose shoulders falls the responsibility of most supercomputer usage in America, is too often viewed by our nonscientist public as self-indulgent, if not downright sinful, in its dedication to a science, the tools of which are so expensive and abstract. To those government scientists who forfeited the possibility of ever achieving real wealth because of an unadulterated idealism expressed through persevering service to America and science, these views are particularly saddening. Our praise and encouragement is called for instead. That I find myself in the unaccustomed position of praising anything underscores the magnitude of my empathy with this group. Those of you who regularly read this column know that were the contrary the case, shyness wouldn't have prevented me from expressing it.

Government service in science

I worry about the future of our government service in science. The evident disparity between expense account reimbursements due employees of the government and those outside of it in attending any conference just begins to suggest the gap dividing public service scientists and their private sector cohorts in all areas of technology, from micro to macro systems. Had the Oregon conference been sponsored by private industry, it would have been held in Palm Springs, Calif. Salishan is for the summer. This gives us pause for reflection.

See THIS page 32

Word processing goals of aspiring writers



HUMAN
CONNECTION
Jack Stone

A few weeks ago, while instructing a class of non-DP professionals in office automation basics, I waxed on rather eloquently and in a prideful way about the capacity of my personal computer speller package to generate a form of a concordance, an alphalist of key words along with their frequencies of occurrence and the associated passages in which the words appeared. I mentioned that my package is early generational in the sense that the processing is automatic (except I am forced to use conventional word processing search techniques to identify the passages).

"Why would anyone care about how many times a particular word appears in some text?" a bright, but outspoken, student asked.

I didn't expect the question because I erroneously thought that everyone was aware of word and content analysis techniques. But I came through with this explanation: If one's material is restricted to routine business correspondence, engineering reports and studies or systems documentation, it is hard to make textual outpourings sparkle. However, if one has more creative leanings and is writing in areas less technically oriented, stylistics play a much more important role.

For example, a useful writing technique is the varied use of synonyms for significant words, an action that reduces repetition and thereby tends to intensify reader interest. It is the concordance that provides the data needed by the author to make the choices.

I went back to class and expanded the answer along these general lines: With the continuing and rapid hardware advances, coupled with dramatically falling costs — particularly mass storage costs — we must recognize that the software and data files floating around these days to aid writers are mere harbingers of things to come.

Capabilities, productivity tools

Some systems capabilities and productivity tools that writers could dearly use at their fingertips and that are not, I hope, idle fantasies, but will be practical and economically justifiable not too far down the technology road, are:

■ Multiple Spelling Lists. A range of optional, user-modifiable word lists supplied by vendors for speller programs that cover areas other than common English words, for example, foreign, geographical, scientific, engineering and biographical words and phrases plus a processing function that allows for temporary concatenation of multiple lists for a specific spelling task.

■ On-Line Dictionary. Impressive gains have already been made in this area, including hyphenation and homonym dictionaries; dictionary probes using wild-card letters to provide entries at the word level; and dictionary lookups to find words similar in spelling to a target word. The next step is the expansion of a word probed by the author into its complete dictionary entry. Information presented at various levels of detail would include: variant spellings and forms; alternative parts of speech and definitions; homographs; prefixes and suffixes; inflected forms; idiomatic phrases; and run-in forms.

■ On-Line Thesaurus. Synonyms and antonyms of the selected word with the detail expansion of the list into complete dictionary definitions.

■ On-Line Grammar Analyzer and Synthesizer. Automatic analysis of sentences and paragraphs to detect errors of structure and punctuation, plus the ability to synthesize alternative forms for the writer's perusal.

System needs to support these capabilities include: permanent storage; a very fast processor, such as a 32-bit plus; a multitasking operating system to perform time-consuming search and analysis tasks in background mode; and an extremely simple user interface to avoid frightening the non-DP-oriented professional writer away from the machine altogether.

Letters to Stone should be addressed to him at P.O. Box 33699, Washington, D.C. 20033.

VIEWPOINT

Relational vs. network/hierarchical DBMS

Examining the issue from a user's point of view

READER'S PLATFORM
Powel Crosley

As pointed out by E.F. Codd and C.J. Date in their Reader's Platform article "The real strengths of relational systems: Two experts review the performance issue" [CW, Feb. 6], the main contention in William H. Inmon's In Depth article "What price relational?" [CW, Nov. 28] is that "poor performance is, in fact, inherent to the relational environment." Codd and Date clarified several of Inmon's statements and primarily concentrated on identifying the strengths of relational systems at the machine and conceptual levels. As an applications developer and data base administrator, there were several practical considerations related to our use of a relational data base management system (DBMS).

Our primary application is an information system for commercial real estate investors accessing a 125M-byte data base using a Digital Equipment Corp. VAX-11/780 32-bit minicomputer. The nature of the commercial real estate investor demands that our application programs be user-friendly, user-flexible and fast. We achieve a high degree of user friendliness through a third-party, terminal-independent, forms management system. User flexibility and acceptable response time are achieved through our relational DBMS.

In his article, Inmon states that the expense of system flexibility is "having to search for data in diverse places."

If a relational query is properly constructed and the data base has been normalized with primary and secondary indexes, searching in diverse places is not a problem.

What may become a problem is retrieving from diverse locations, which can be minimized by using contiguous disk storage and/or spreading the data base over several physical devices. In fact, proper data base design and indexing can reduce some so-called "long-running" activities (for example, highest account balance from the payroll data base where accounts of executives are considered) to "short-running" activities.

In his comparison of demands on system resources, Inmon claims that the typical relational environment will queue short-running activities behind long-running activities. It appears that the assignment of system resources should be attributed to the machine operating system rather than the relational DBMS.

At our installation, on a heavily loaded CPU (greater than 95% utilization), there is no problem with long-running activities superceding short-running activities.

Assuming equal priorities, a simple indexed retrieval executes long before a full data base scan. Obviously, assigning a higher priority to the long-running activity will change the results somewhat, but even then the low-priority, short-running activity beats the long-running activity to completion.

Data base integrity

Another area in which Inmon is in error is his criticism concerning data base integrity. Any process that performs data-sensitive calculations should execute, as a matter of normal procedure, an exclusive lock on the table being utilized. This precludes the possibility of any mid-process change to the table that would invalidate the results. The fact that the results may be out of date because the next process updates the table is a scheduling problem, not a relational DBMS problem.

All DBMS packages deviate somewhat from the pure theoretical constructs on which they are based. Some of Inmon's theoretical concerns may be valid, and the reader should address Codd and Date's article to weigh those aspects further. From a pragmatic, user viewpoint, though, there is no performance penalty in the relational environment if the data base is properly designed and indexed, and applications are similarly optimal in their design. Our commercial real estate investors application would be unable to provide nearly as much user flexibility and speed in a network/hierarchical environment. ‡

Crosley is geographic information systems coordinator for Data Research and Applications, Inc. in Knoxville, Tenn.

TREK from page 31

All our talk about threats to the erosion of America's supercomputer superiority as emanating from abroad may cause us to overlook emerging threats at home inadvertently, for example, discouragement of our future supercomputer scientists from entering our government service — the same government to which the private supercomputer industry has been hawking its need for greater subsidization — by limiting their professional opportunities (as well as income). Sponsorship of congresses like Salishan can go a long way to alleviate this. In the past few years, our government has increased such sponsorship, but this alone will not be enough.

If someone is smart enough to work in the supercomputer field, he may be smart enough to deduce that our government scientists face work that is as demanding as any in the private sector, but is devoid of the stock options, profit sharing and comparable income potential available in our newly emerging supercomputer companies. It follows that with the demand for supercomputer professionals exceeding their supply, our government will find it tough sledding attracting and keeping new superstar supercomputer scientists, who will be inclined to trek to private industry. More incentives will be required, including public recognition for achievements of the kind given private sector scientists who make it big in industry. With our government's role in supercomputer development growing, we must take care to ensure that it has the scientific strength to succeed. Failure to do so will cause our falling behind in the world race to produce supercomputer power, not through improvements abroad, but decay at home.

This is the second in a three-part series.

Lecht is chairman of Lecht Sciences, Inc., a New York-based think tank specializing in computer and communications technologies.

CAN YOU HELP US FIND THIS HEWLETT-PACKARD EQUIPMENT?

We want to buy the following Hewlett-Packard equipment, new or used, and have exhausted known sources:

HP 3480D *Digital Voltmeter, preferably with Options 001 and 004.*

HP 3484A *Multifunction unit, preferably with Options 041, 042, and 043.*

HP 5321B-K21 *Digital clock.*

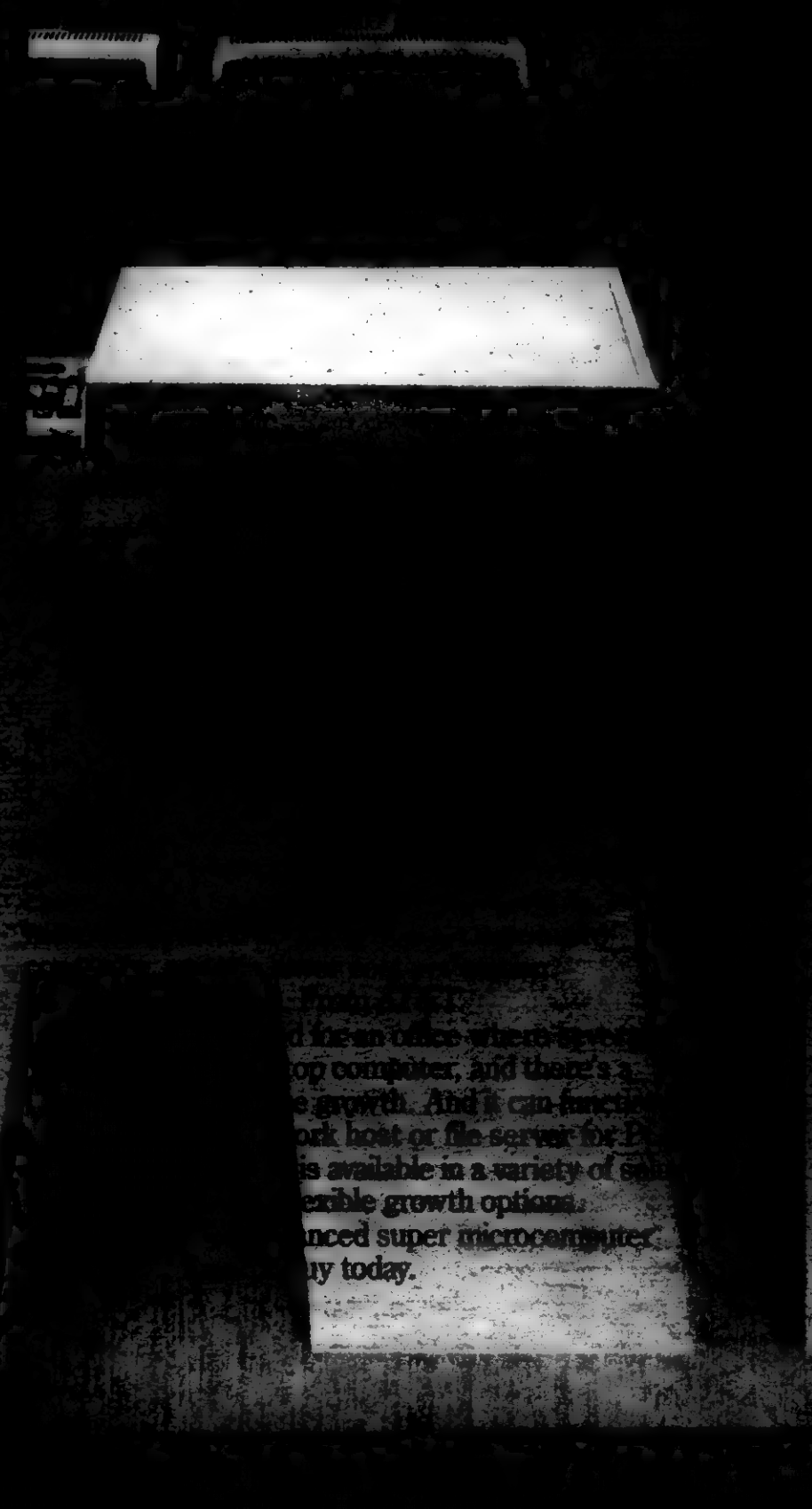
HP 5327B *Timer/Counter/DVM, preferably with Options H31, 004, and 011.*

HP 10542A *Remote programming interface cable.*

If you have any or all of this equipment which we might buy, please call:
R. A. Arens, (314) 925-5983.

Or write:
R. A. Arens, Dept. E411, Building 98,
McDonnell Douglas Astronautics Company, Box 516, St. Louis, MO 63166.

McDONNELL DOUGLAS



VIEWPOINT

DP management: coping with personality changes

READER'S PLATFORM
Jim Lowe

To be a good manager in the data processing world, one must have qualities that cannot be found in a textbook. The manager must gain experience through the years by being exposed to a great number of systems, computers and people.

The data processing manager sees and deals with a host of different personalities each day. Not only does he deal with the somewhat unusual personalities of technical people, but the data processing manager must also deal with changes in personalities that come from user departments, peers, upper management, vendors, sales representatives, customer engineers and headhunters.

In fact, personalities can cause one not to see the real issue at hand. In order to get around this problem, the manager must be able to deal with the employee by switching to the personality at hand, that is, each time the employee's personality changes, the manager must recognize the change and deal with the issue accordingly.

Daily personality changes are caused by many different reasons, including job stress, constant deadlines that must be met, personal matters and the lack of upward mobility in one's career.

The data processing department today is the nucleus of the company. The success of the data processing manager depends on how long he can keep the user departments happy, stay within budget, convince upper management to spend money for new hardware and software when needed, maintain a good technical staff and be able to bring systems in on time.

Underlying obstacles

All of the above deals with underlining obstacles — power failure, mistakes of computer operators, the unexpected resignation of a key technical person or a slowdown in development because of a psychological personality change in motivation of your development team — that might surface at any time. Such obstacles have a profound impact on the data processing manager. At this time, the manager must make adjustments and conduct maneuvers that will lead him to recover from the situation.

The goal of a manager in any profession is the same: to do the job that has been defined by the company. How he goes about this with the resources at his disposal will vary from manager to manager and company to company.

If he has the financial backing and the support of upper management, the manager's job becomes much easier, and the goal is more likely to be obtained. However, a variance in any one of these two crucial elements will cause problems.

A proper data processing department is expensive. In itself, the department is a service department. Its production efforts are hidden within the walls of a CPU. Therefore, the end product has far less to do with quantity than it does with the steps necessary to arrive at the results.

The true understanding of such efforts can only be known to people who work in the field of data processing or who have had extensive data processing training or education in the field of data processing. ‡

Lowe is information systems director at A.C. Transit in Oakland, Calif.

Computerworld welcomes opinion pieces from its readers. Submissions to the "Reader's Platform" column should be typed, double-spaced and no longer than six pages. Computerworld reserves the right to edit them for the purposes of clarity and brevity. Send them to Editor, Computerworld, Box 880, 375 Cochituate Road, Framingham, Mass. 01701.

'And now, I'm honored to introduce a man who was kind enough to interrupt his vacation to speak here today!'

UNIX® IS A DINOSAUR
CP/M® & MS-DOS™ ARE TOYS
MULTI SOLUTIONS PRESENTS
THE WORLD'S FIRST
4th GENERATION
OPERATING SYSTEM

A SERIOUS OPERATING SYSTEM
S1™
FOR TODAY AND TOMORROW

- PORTABLE
- MODULAR
- MULTIUSER
- MULTITASKING
- MULTI PROCESSING
- PARALLEL PROCESSING
- 64 CHARACTER NAMES
- 3 COMMAND PROCESSORS
- REAL TIME
- DISTRIBUTED PROCESSING
- HIERARCHICAL DIRECTORIES
- INDEXED FILES
- ISAM
- VSAM
- B-tree
- RECORD LOCKING
- SOURCE COMPATIBLE
- WINDOWING
- MEMORY MAPPED DISPLAYS
- FULL SCREEN MANAGEMENT
- FULL SCREEN EDITING
- FULL MEMORY MANAGEMENT
- VIRTUAL MEMORY
- SEMAPHORES & LOCKS
- EXTENSIVE UTILITIES
- AND MUCH, MUCH MORE

S1 IS THE ONLY OPERATING SYSTEM WORTHY OF THE TITLE:
"THE NEXT WORLD STANDARD."

ONLY S1 DOES IT ALL.
NO OTHER OPERATING SYSTEM COMES CLOSE. CUTS DEVELOPMENT TIME FROM MAN YEARS TO MAN MONTHS.

MULTI SOLUTIONS INC.
Multi Solutions, Inc.
Suite 207
123 Franklin Corner Rd.
Lawrenceville, N.J. 08648
609-896-4100 Telex: 821073

Please send for our FREE S1 Book or Call 609-896-4100

IN TIME, ONLY THE BEST WILL SURVIVE: S1

*Reg. Trademarks: CP/M of Digital Research; Unix of Bell Laboratories Trademarks: MS-DOS of Microsoft, Inc.

Introducing the world's first complete, self-contained, 16-bit portable computer system.

The Panasonic Sr. Partner with a built-in printer.

IBM PC Compatible Programs.

Over 60 Years of Dependability.

Panasonic
Industrial Company

Built-in Printer

A Complete System.

SOFTWARE & SERVICES

SOFTTALK
Paul Gillin
CW Senior Editor

'Gnosis' project addresses security

In a couple of years, the IBM mainframe operating system arena could begin to get crowded. Coming just a few months after Amdahl Corp.'s confirmation that it is working on an "alternative" to IBM's MVS operating system [CW, Dec. 19], Tymshare, Inc. has acknowledged that it too is planning a security-oriented operating system for the big machines.

Gnosis, as the project is code-named, attacks the soft underbelly that most operating systems expose in the security area. According to Norman Hardy, a senior scientist at Tymshare, conventional operating systems and security procedures still do not protect against unscrupulous programmers who can write hidden procedures into their code that bypasses conventional security. Gnosis is a "capability-based and object-supported" system that essentially shields programs and data from unauthorized access.

Gnosis will pose no threat to MVS, but Tymshare believes it could be popular with firms that provide on-line data bases or time-sharing and with large, multidivisional financial institutions. "This is oriented toward facilities where there are programmers with differing loyalties trying to work together," Hardy said. The product has been under development since 1976, but will probably not be available for another two years, he said. Price and packaging have not been determined.

The problem Gnosis is intended to address most often occurs with programs

See [illegible] page 53

Sensible software selection

Techniques offered to enhance the evaluation process

The following article first appeared in ICP Interface Administrative & Accounting, *copyright May 1983.*

By Royce Green
Special to CW

Approaches to software evaluation and selection range from extensive systematic processes to relying on consultants to simple guidelines. Regardless of the approach, however, a few commonsense techniques can strengthen the selection process.

Functions performed by software products affect areas and activities which are central to an operation. The critical nature of the functions and the activities that will be affected should dictate the degree of management participation in the selection process.

If a task force or selection committee is formed to evaluate software, people with the appropriate skills and backgrounds must be included. Additionally, each member of the committee should be given specific responsibility, authority and schedules.

Most software evaluation and selection processes involve some sort of specification development. A prerequisite to this is recognizing and understanding the requirements, including the requirements in the specifications.

For example, if specifications are developed solely on the assumption that a particular system is required, real needs and objectives may be overlooked. If specifications are developed with knowledge of the objectives to be addressed, the specifications will focus more clearly on real needs.

It's also best to avoid an "outside in" approach when developing product specifications, that is, making wish lists from

See SOFTWARE page 52

Green is vice-president of financial industries for the Applications Software Division at University Computing Co. in Dallas, Texas.

Ingres/VAX/VMS Version 3.0 boasts greater application generation ability

BERKELEY, Calif. — Relational Technology, Inc. (RTI) has extended the application generation capabilities of its Ingres data base management system (DBMS) in a new release due for shipment this summer.

Ingres/VAX/VMS Version 3.0 includes Applications-By-Forms+ (ABF+) and Query-By-Forms+ (QBF+), two additional tools in RTI's Visual Programming kit that are said virtually to eliminate coding in the creation of applications and query routines. The products are oriented toward end users and are based on fill-in-the-blank forms. Users reportedly can perform queries spanning multiple rows and tables and execute transaction-type query/updates twice as fast as in previous versions of Ingres.

ABF+ lets the user integrate and link modules developed with Ingres' forms editor, query-update tool, report generators and graphics subsystems without coding, an RTI spokesman said. The application is structured as a hierarchy of forms and menus called frames. Applications are built using the frames, and custom code can be inserted using RTI's Operations Specifications Language (OSL).

OSL allows data base access through Ingres' Quel query language and integrates it with forms control. The combination of ABF+ and OSL allows users to build command menus, designate conditional flow

See [illegible] page 52

- Oracle Corp. makes its relational DBMS available for new AT&T mini and Honeywell, Inc. processors/42
- Cincom Systems, Inc. enhances TIS package/42
- CFsoftware, Inc. enters micro-mainframe link arena with PCmainframe package/42
- Goal Systems International, Inc. package provides IBM CICS security/42

INSIDE

Systems Software/44
Application Packages/47
DBMS/48
Languages/50
Remote Computing Services/50
On-Line Data Bases/52

Study: AI may blossom soon if cultivated by commercial market

By Paul Gillin
CW Staff

CAMBRIDGE, Mass. — Artificial intelligence-based systems will become commercially viable sooner than is commonly predicted, growing to as much as a $1.3 billion market by 1988, according to a report recently released by Brattle Research Corp. However, *Artificial Intelligence Computers and Software: Technology and Market Trends* said that such rosy predictions could fall flat if the commercial market fails to invest in the technology.

The study pointed to the use of bit-mapped displays, mouses, windows, icons and object-based programming as technologies that have emerged from AI research and have already had a market impact. In addition, improving price-performance ratios will make Lisp-based processors viable in the near future. Lisp is likely to remain the standard language of AI, the survey stated. Lisp eliminates the need for separate operating systems, applications systems and data base management systems. The report predicted that the market for Lisp machines and pure AI applications will top $1 billion by 1988.

Dedicated Lisp hardware, such as Xerox Corp.'s Dandelion, Symbolics, Inc.'s 3600 and Lisp Machine, Inc.'s Lambda, are generally thought to be the best methods of organizing and presenting AI software; however, they are fairly expensive and of questionable reliability, the report said. Inexpensive 32-bit microprocessors may soon begin to support performance levels comparable to the dedicated machines, but, conversely, most lack adequate software.

There is a great deal of AI research now going on in academic institutions and in government. But this market could become saturated if commercial products do not emerge within a few years, the study said. The authors believe that the commercial success of AI interfaces could soon lead to the development of a breakthrough in a commercial product. But a number of barriers must be overcome first.

For one thing, the machines are comparatively expensive, according to the survey. Another factor is the shortage of programmers who are trained in the complex syntax of an AI language. A third barrier is confusion about what AI really is. Unrealistic expectations about AI's capabilities present the risk that management may overlook immediate opportunities in pursuit of unrealistic goals, the survey stated. A final barrier is the lack of marketing experience available in the AI community.

For now, AI workstations appear viable in three major areas, the study said. The first is as software development tools. AI workstations can improve programmer productivity by a factor of 30 compared to Cobol. The second area is in design, simulation and testing of complex systems and circuits. "This is the way the CAD/CAM [computer-assisted design and manufacturing] market evolved, and it is starting to happen in [the AI] market," the survey said.

Possibly the largest market will be in information management and decision support systems, in which Lisp machines can greatly automate data integration and manipulation. However, the report predicted that the amount of effort required to commercialize these products will make this one of the last markets to develop.

The survey puts forth a best-case and worst-case scenario for AI workstations. Should the technology stay in the domain of specialized research and development, sales will grow from $64.8 million in 1984 to $469 million in 1988. However, if a landmark commercial AI product does appear on the market, sales will grow from $97.5 million in 1984 to $1.3 billion in 1988.

The study costs $5,000 from Brattle Research, Athenaeum House, 215 First St., Cambridge, Mass. 02142.

CFsoftware unveils IBM micro-to-mainframe link

CHICAGO — CFsoftware, Inc. has announced a microcomputer-to-mainframe link package that reportedly connects IBM Personal Computers to IBM mainframes running IBM's CICS teleprocessing monitor.

A spokesman said the PCmainframe package features upload and download file transfer capabilities, data selection and summarization, automatic formatting for spreadsheets, data bases, text and binary data, six levels of security, centralized control and hard-copy and on-line audit trails.

The micro-mainframe link is said to download selected records and fields directly from mainframe files to an IBM Personal Computer, making the data available for use in most popular spreadsheet programs and other micro applications.

The vendor spokesman said many applications on the Personal Computer can share information contained in a central data base, and PCmainframe allows data created or modified on the micro to be uploaded to mainframe data files or special user libraries.

The package's uploading features reportedly also allow sharing of data between Personal Computers, storing of micro-created data for future retrieval and uploading to the mainframe without re-entry of data. Versions of PCmainframe operate under all current IBM operating systems that support CICS, including DOS/VSE, OS/VS1 and MVS, according to the vendor.

PCmainframe is priced at $4,500 per mainframe, including three Personal Computer packages. Each additional Personal Computer package is priced at $200 from CFsoftware, Suite 1010, 151 N. Michigan Ave., Chicago, Ill. 60601.

Oracle offers DBMS version for AT&T 3B20

MENLO PARK, Calif. — Oracle Corp. has introduced a version of its Oracle relational data base management system (DBMS) for AT&T's 3B20 minicomputer under Unix System V.

According to a spokesman, the transport of Oracle to the 3B20 under the Unix System V operating system required modification of only 4% of the software's more than 2,000 modules.

The Oracle relational DBMS is also compatible with IBM's SQL/DS.

Oracle features a set of software development tools, including a screen-oriented interactive application generator, a report writer, a document preparation system and an integrated data dictionary, the vendor said.

Oracle runs on a variety of hardware systems, including IBM mainframes, Digital Equipment Corp. VAX-11 and other minicomputers and a variety of microcomputers, the spokesman said.

The Oracle relational DBMS on the AT&T 3B20 minicomputer is priced at $48,000.

More information on the Oracle DBMS for the AT&T minicomputer is available from Oracle, which is located at 2710 Sand Hill Road, Menlo Park, Calif. 94025.

Cincom unleashes enhanced TIS DBMS

Said to improve Logical User View system

CINCINNATI — Cincom Systems, Inc. has announced an enhanced version of its TIS integrated relational data base management and application support system.

The enhancements to Release 1.5 of TIS reportedly improve the performance of the TIS Logical User View (LUV) system, which insulates programs and users from data structures. Features of Release 1.5 include automatic data integrity control, binding of logical views, global view capabilities, improved directory maintenance facilities and an on-line logical view test utility.

The enhanced version of TIS is said to allow a field within a view to be equated to any number of additional fields within the same view. When a program updates a field, all identical fields within the view are updated automatically by LUV, a spokesman said. In addition, performance improvements in the TIS DBMS component include record holding, "quiet" processing, "commit" overlap, searching the record-holding queue, buffer flushing, task dispatching and Event Control Block list binding.

The spokesman said that TIS uses between 18% and 26% less CPU time than Cincom's Total DBMS Version 8.1 when performing identical functions.

TIS Release 1.5 runs on IBM processors under IBM's DOS, OS and MVS operating systems. TIS with Cincom's Data Communications Support system can be purchased for $250,180 or leased for $10,424 monthly. TIS with IBM CICS support is priced at $180,780. Monthly leases are available for $7,532.

Cincom Systems is located at 2300 Montana Ave., Cincinnati, Ohio 45211.

Goal Systems' security system for IBM CICS touts adaptability to changing environments

COLUMBUS, Ohio — Goal Systems International, Inc. has announced an IBM CICS security system that can be customized and quickly modified to meet changing environments.

Alert/CICS provides security at the transaction, file, program and map levels, with definitions at the terminal, operator and system levels. Features include random generation and automatic distribution of passwords; security for IBM DL/1 data bases; security definitions by time of day and day of week; automatic clearing and sign-off of terminals after a specified period of time; and audit trail logging facilities, which can be displayed through both batch and on-line reports.

System resource security controls transactions and the inquiry and update of files. Terminal and operator resource security identifies who is using the system and controls and records any unauthorized activity, a spokesman said. User exits are provided to allow custom tailoring, the vendor said.

Available immediately, the product is priced at $12,180 for a permanent license or $305/mo for a three-year renewable license under IBM's OS operating system. Under IBM's DOS, the prices are $9,100 for a permanent license or $228/mo for a three-year renewable license.

More information is available from Goal Systems, located at 5455 N. High St., Columbus, Ohio 43214.

TSO USERS

Compare these features:

- Up to 50% less overhead than SPF
- Full-Screen Editor (LRECL up to 4096)
- Data Set Manager (Controls TSO files)
- JES Sysout Previewer (Direct from JES Spool)
- File listing facility (LRECL up to 32760)
- Programmable function keys
- Split-Screen facility (Two fully-active screens)
- Customer-defined exit facility (Controls all FSE+ functions)
- FSE+ tuning parameters (Optimize performance)
- Structured menus for new users
- Command oriented for experienced users
- MVS 3.8, SP and XA support
- Free trial period

Call or write for details
Applied Software, Inc. 840 U.S. Highway #1, Suite 250
P.O. Box 13027
North Palm Beach, FL 33408 (305) 626-4818

Honeywell licensed to market Oracle DBMS for DPS 6 series

WALTHAM, Mass. — Honeywell, Inc. and Oracle Corp. have signed a nonexclusive worldwide license agreement under which Honeywell will offer the Oracle relational data base management system (DBMS) on Honeywell's DPS 6 family of microcomputer, minicomputer and superminicomputer systems.

The agreement also contains provisions for Honeywell to market Oracle on its large-scale systems, including the DPS 7, DPS 8, Level/66, Level/68 and DPS 88 mainframes. A Honeywell spokesman said the DBMS probably would be made available on the large systems; however, the spokesman would not offer pricing or availability information on those models.

Oracle is compatible with IBM's SQL/DS query language and is capable of running on a wide range of hardware.

Software development tools.

Software development tools included with Oracle are a screen-oriented interactive application generator, report writer, document preparation system and integrated data dictionary, according to the vendor spokesman.

Final prices have not been set, but Oracle is expected to cost less than $1,000 on the microprocessor-based Honeywell systems and less than $25,000 on the superminis, the spokesman said.

More information is available from Honeywell, which is located at 200 Smith St., Waltham, Mass. 02154.

Coping with change with EPILOG/MVS

Before EPILOG/MVS, performance information was often hidden in piles of printouts and pages of reports.

With EPILOG/MVS, an Installation Performance Management System from Candle, you can find the answers to questions about MVS performance: user response…paging and swapping…the System Resource Manager (SRM)…I/O contention…tuning measures…hardware bottlenecks…and more.

The powerful Change Analysis feature of EPILOG/MVS will help you to better understand the results of system changes. For example, Figure 1 is an EPILOG/MVS display which shows that average TSO trivial response time was over five seconds for a one-week period. The main bottleneck was paging, shown by the WAIT FOR LOCAL PAGE value of 3.65 seconds (about 65% of response time). In other words, about 65% of TSO response time was caused by paging.

A high-speed paging device was then installed in order to improve TSO performance. Figure 2 is another EPILOG/MVS display which compares TSO response time before and after installing the high-speed paging device.

Note: Both displays were created in a matter of seconds, using simple commands that took less than a minute to enter.

If your data center has frequent hardware or software changes (new applications, more users, tuning measures, new operating system releases, CPU upgrades, more main memory, new disks, etc.), the Degradation Analysis feature of EPILOG/MVS can quickly and simply show you the impact

Figure 1. *EPILOG analysis of TSO trivial response time.*

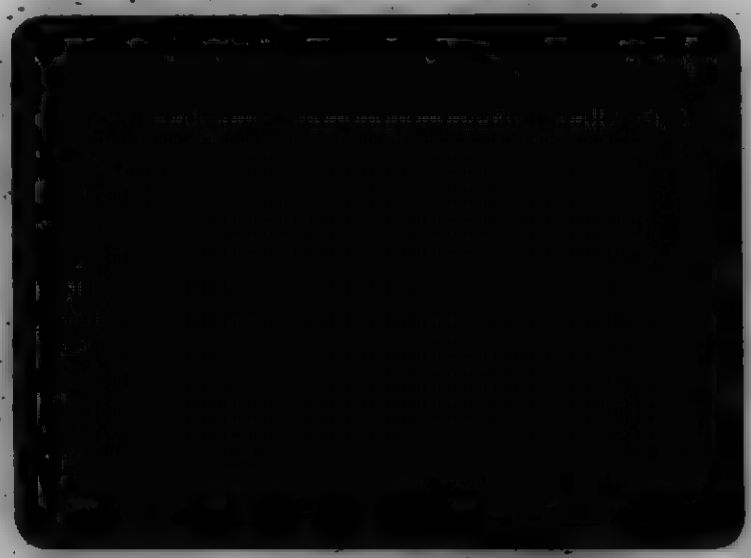


Figure 2. *EPILOG analysis of TSO trivial response time before and after installation of a high-speed paging device.*

of those changes on end-user service and its resource analysis can show you the effect on resources. In this way you can verify that your investment—in time or money or both—is producing the intended results. Or, if not, you can modify your actions and use EPILOG/MVS to check the results again.

Change—almost constant change—is becoming a way of life in a modern data center. With EPILOG/MVS you can be confident of achieving the results you want.

For more information, contact your Candle representative.

Candle

10660 Wilshire Blvd., Suite 2404
Los Angeles, California 90024
Phone 213-207-1400

☐ Please send me more information on EPILOG/MVS.

☐ Please enter my free subscription to the Candle Computer Report.

Name / Title

Company

Address

City/State/Zip

Phone

Candle

Dept. MI • 10660 Wilshire Blvd., Suite 2404 • Los Angeles, CA 90024

A-229

SOFTWARE & SERVICES

SYSTEMS SOFTWARE

GROUP OPERATIONS, INC.
Superstructure enhancements

Group Operations, Inc. has announced enhancements to its Superstructure package.

Superstructure is said to convert automatically "spaghetti" code Cobol into structured Cobol. The enhanced package now supports IBM CICS command-level and CICS macro-level and Cullinet Software, Inc. IDMS and IDMS/DC Cobol programs. The system is said to be a cost-effective alternative to rewriting manually unstructured programs.

Superstructure is available for IBM and compatible processors under all IBM OS and OS/VS operating systems. Superstructure prices range from $28,000 to $45,000.

Group Operations, Suite 800, 1110 Vermont Ave. N.W., Washington, D.C. 20005.

HONEYWELL, INC.
Syntax-Directed Editor

Honeywell, Inc. has introduced the Syntax-Directed Editor (SDE), which provides an interactive programming environment for writing, editing and executing Cobol source programs.

According to the vendor, the SDE supports the creation of Cobol 74 programs in Honeywell's Gcos 8 environment on its large-scale computer systems.

The shorthand method of the SDE reduces the amount of code that a programmer must enter and checks for format and syntax errors, the company said.

The release of the SDE for Cobol is set for July. It will be available for a monthly license fee of $225, with a minimum of 12 months.

Honeywell, P.O. Box 2000/A-79, Phoenix, Ariz. 85066.

RAXCO, INC.
Rabbit-6

Raxco, Inc. has introduced the Rabbit-6 image monitoring system designed for resource management on Digital Equipment Corp. VAX-11/750 and 11/780 computers.

With Rabbit-6, a system designer can locate high-resource consumption areas within a program, Raxco said. A histogram display indicates which routine and which lines in a routine are consuming excessive system resources by noting the amount of time spent in the various scheduling states and processor modes for sampled images. The system designer can then optimize the specified modules or subroutines to improve the program and system performance, the company explained.

Both the sampling rate and display parameter may be dynamically modified. Rabbit-6 does not require a sysgen or system modification, Raxco noted.

The Rabbit-6 image monitoring system is available for a purchase price of $3,995, plus options, or may be leased for $200/mo.

Raxco, 1370 Piccard Drive, Rockville, Md. 20850.

SPECIALIZED SOFTWARE, INC.
Table Management System

Specialized Software, Inc. has released an enhanced version of its Table Management System that operates on IBM mainframe computers using IBM's CICS or IMS/DC teleprocessing monitors.

This system is said to enable users to define files or tables with a simplified interactive procedure. Immediately after defining a file, the user can begin accessing it on-line with a generalized file maintenance program that allows add, change, delete and browse functions.

On-line file maintenance screens can also be customized by using the optional screen painting facility, which allows nontechnical users to design the appearance of the screen dynamically, the company said.

Initial license fee for the OS version is $25,000, with an additional $10,000 for the screen painting option. The DOS version is $15,000, plus $5,000 for screen painting.

Specialized Software, 207 Union St., South Natick, Mass. 01760.

JEFFREY J. SILDEN SOFTWARE
Laser, Tanfer and Filer

Jeffrey J. Silden Software has announced three pack-

The Northern Telecom system:
A benchmark in batch processing that keeps getting better.

Northern Telecom batch processing systems have proven themselves, in more than a decade of use in a variety of applications, to be among the most reliable, practical, cost-effective systems ever developed. They deliver more throughput per dollar than any competitive system.

Now, as solid evidence of our commitment to batch processing, we're improving these already-successful systems for even more productivity. For instance, we're introducing a new high-speed band printer with changeable type. Operating now with IBM's SNA, we've also added new, low-cost distributed data processing capabilities for more system versatility, and to provide for future growth toward the integrated office.

We're back

SOFTWARE & SERVICES

ages for IBM's System/34 minicomputer.

Laser reportedly traces, spots and corrects logical-device address errors interactively. It costs $185.

Tenfor allows the user to sign off idle terminals from the system console in less than five seconds, the vendor said.

Tenfor reportedly costs $185.

Pilot is said to provide users with the capability to vary off and on communications lines and/or terminals from a procedure.

Combining the power of Tenfor and Pilot allows dedicated procedures to be run completely unattended, eliminating the need for an overtime operator, the vendor claimed.

Pilot costs $225, the vendor said.

Jeffrey J. Sildon Software, Suite 100, 21500 Calif. St., Woodland Hills, Calif. 91367.

3M OFFICE SYSTEMS DIVISION
Document management packages

3M Office Systems Division has introduced two software packages for document retrieval and management for users of IBM 4900 systems.

One package reportedly is designed for the IBM 4900 with the IBM DOS/VSE operating system and IBM's CICS. The other package also utilizes the IBM 4300 and CICS, but requires IBM's OS/MVS operating system.

The vendor claimed that the software can reduce index and retrieval time by up to 90%, compared with conventional document-based programs. The speedier retrieval is made possible by a procedure in which a master record file is called up on a CRT screen. One keystroke then provides a list of all the documents associated with that master record, according to the vendor.

The packages are priced at $35,000.

3M Office Systems Division, P.O. Box 33600, St. Paul, Minn. 55133.

HONEYWELL, INC.
Multics Release 10.2

Honeywell, Inc. has introduced an update to its Multics operating system for the DPS 8M line of large-scale computers.

According to the vendor, features of the new release include a report writer and enhancements to the Fortran language processor and communications software.

An improvement to the video terminal manager helps simplify the ability to generate and interface menus. A new tutorial system has been added to assist new users with basic Multics functions.

Release 10.2 incorporates a report writer for the Logical Inquiry and Update System (Linus), which reportedly enables users to produce ad hoc or fully formatted reports from a relational database.

Multics is a bundled operating system with Honeywell mainframes.

Linus is available for $560 a month. The Multics Fortran language processor licenses for $200 a month.

The remainder of the enhancements are distributed free of charge as part of the Multics update.

Honeywell, P.O. Box 8000/A-79, Phoenix, Ariz. 85066.

CUSTOMIZED DATA SERVICES
The Disk Manager

Customized Data Services has introduced a file handling package, reportedly designed to minimize the amount of overallocated file space on hard disk devices, for use with IBM System/34 and System/36 small business computers.

The Disk Manager determines the user files and libraries resident on disk and calculates whether or not their space requirements have been allocated to achieve the maximum efficiency on their system, according to a spokesman.

All user files selected as overallocated, except those that the user specifies to be bypassed, are then rebuilt to reflect the most efficient use of disk for that data set.

The package, priced at $275, includes a starting clock function that reportedly allows the user to set a time for job initialization or to incorporate the job into any user procedure.

Customized Data Services, 1430 Olive St., St. Louis, Mo. 63103.

See SYSTEMS page 47

Your processing may be remote. but Northern Telecom service is on the spot.

With service and maintenance professionals located at 157 cities nationwide, we're able to provide prompt response to your call for service. How fast? Two hours in major metropolitan areas; four hours in most other areas of the country. And our multi-year maintenance agreements guarantee continuing, low-cost operation of your Northern Telecom system.

If your system lease expires within the next six months, *now* is the time to find out more about batch processing from Northern Telecom.

Time-proven performance with long-term savings.

Northern Telecom's aggressive pricing is more proof of our commitment to batch. Our discount structure offers long-term savings on multi-year leases. And at renewal time, you can save even more with discounts up to 30%.

Call our toll-free number: 800-331-3113. Or write Northern Telecom, Mail Station T-240, P.O. Box 1222, Minneapolis, Minnesota 55440. We'll show you how we can tailor a batch system to your specific needs. And save you money, too.

nt northern telecom

ing batch!

At Morgan Stanley,
software is like any other investment.
They judge it by the rate of return.

SOFTWARE & SERVICES

SYSTEMS from page 46

AIM TECHNOLOGY
Benchmark Suite II

Aim Technology has announced Benchmark Suite II, its second Unix benchmark product. The product is intended for multiple-purchase buyers to evaluate how various Unix systems perform in specific processing environments, according to the vendor.

Suite II is said to allow the evaluator to set parameters to weigh the benchmark for particular applications, such as word processing, spreadsheets, compiling and editing and computer-aided design. It can reportedly be used on any Unix system. The product consists of two programs written in C.

Suite II is available for $2,575.

Aim, Suite 190, 3333 Bowers Ave., Santa Clara, Calif. 95051.

ABLE COMPUTER, INC.
Easyway/E Decnet

Able Computer, Inc. has announced a software package that will allow its Easyway/E Unibus network controller to function as a valid device in either Digital Equipment Corp. Decnet or Parq Systems Ethernet local-area networks.

The Easyway/E Decnet interface package reportedly consists of an operating system driver to interface Decnet and non-Decnet users to Easyway/E and an application program to configure and initialize the device driver.

The Easyway/E itself reportedly connects DEC VAX-11 or PDP-11 computer systems to an Ethernet/IEEE 802.3 local-area network. It is said to contain the Unibus interface, data link layer interface and the transport protocol.

The Easyway/E interface software package is priced at $500 for the first VAX-11 and $250 for each additional VAX-11.

Able Computer, 1732 Reynolds Ave., Irvine, Calif. 92714.

ABLE COMPUTER, INC.
RSX-11M sysgen patch

Able Computer, Inc. has announced a sysgen patch to Digital Equipment Corp.'s RSX-11M operating system Version 4.1, which provides extended support for Able's Enable/34 controllers.

The patch streamlines usage and implements peripheral control features previously not available to users, a spokesman said. The new features include support for DEC's Decnet, device commons, connect to interrupts and cluster libraries.

The price for the software patch is $500.

Able Computer, 1732 Reynolds Ave., Irvine, Calif. 92714.

BOSTON SYSTEMS OFFICE
CY65XX

Boston Systems Office has introduced a cross-assembler that allows programmers to write for 65 series microprocessors while working on the Digital Equipment Corp. VAX-11, PDP-11 and Micro-11 computers.

The cross-assembler, called CY65XX, includes a high-speed linker and a librarian. The 65 series microprocessors — from Rockwell International Corp., Synertek, Inc. and NCR Corp. — are based on the 6502 microprocessor.

CY65XX also reportedly features commands that add more than 25 instructions to the standard 6502 instruction set. It is available for the DEC PDP-11 series and the Micro-11 in a price range from $1,000 to $2,000. It is also available for all DEC VAX-11 model computers for $2,000.

Boston Systems Office, 469 Moody St., Waltham, Mass. 02154.

APPLICATION PACKAGES

MEGATEK CORP.
Template Version 4.0

Megatek Corp. has announced Version 4.0 of its Template interactive graphics software system, which features an Escape interface.

Template is said to be a three-dimensional, computer-independent graphics and data display subroutine library that supports more than 125 graphics devices from dumb terminals to workstations on 32-bit or larger processors.

The subroutines can be used to create, display, modify and save graphics information for scientific and engineering applications, a spokesman said.

The new version of Template reportedly includes 24 user-callable routines.

Version 4.0 provides full upward compatibility for Template Version 3.0 applications programs, the vendor said.

It also includes the Escape interface, which enables users to access device-dependent features of a display device not supported by Template, and it offers user-defined segment clip boundaries, the vendor spokesman said.

Version 4.0 also allows enhanced device-independent display surface definition and provides logical file name support for user files and extended postprocessing capability, the vendor said.

For supermicrocomputers, the system is priced at $6,000; for minicomputers, it is priced at $25,000; and for mainframes, Template is priced at $32,000, according to a vendor spokesman.

Megatek, 9605 Scranton Road, San Diego, Calif. 92121.

See TOOLS page 49

Good news for companies that had to sacrifice quality for price!

On-Line Software will credit you 110% of the purchase price you paid for Computer Associates' E-Z Test when you upgrade to InterTest.®

It's no accident the industry has recognized InterTest® as the premium product for testing and debugging. On-Line Software has always been dedicated to maintaining high quality standards in the software industry. And we feel you shouldn't have to settle for anything less. So On-Line Software is giving you an opportunity to get the quality you want without losing out on the investment you already made. For a limited time, On-Line Software will credit you 110% of the purchase price paid for Computer Associates' E-Z Test towards your purchase of InterTest. To qualify for this offer you had to be an E-Z Test user prior to this advertisement and must purchase InterTest before May 31, 1984.

When you buy InterTest, you'll not only get the industry standard for CICS testing and debugging, but also a way to increase productivity by 46%*. Join the 1400 users of InterTest. Simply show us proof of purchase for your Computer Associates' package. You can even keep your copy of Computer Associates E-Z Test. We don't want it and quite frankly, we can't imagine who would.

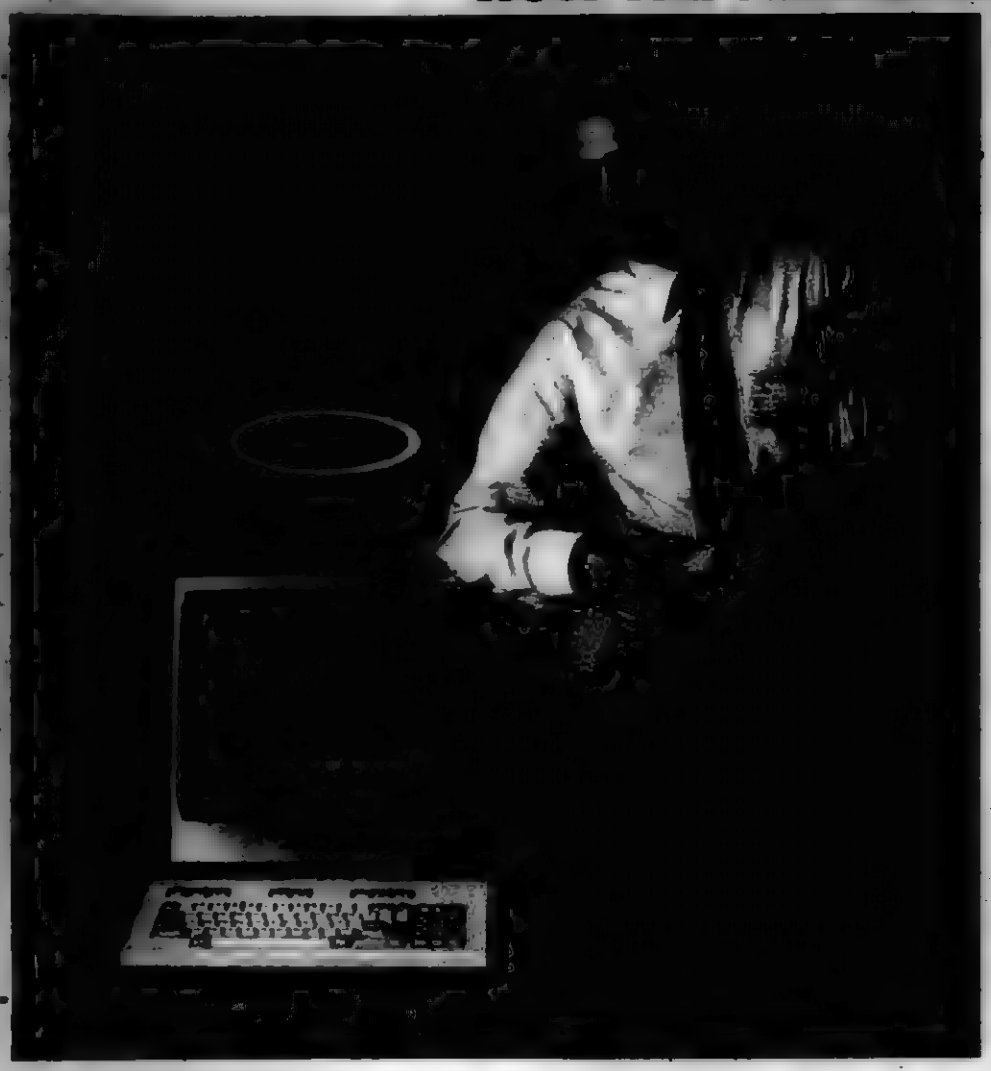
Contact On-Line Software International today at 800-526-0272, about InterTest. You'll be able to "fly" through CICS testing and you'll be traveling first class.

InterTest® from ON-LINE SOFTWARE INTERNATIONAL

Fort Lee Executive Park
Two Executive Drive
Fort Lee, New Jersey 07024
800-526-0272—201-592-0009
Telex: 135-595

*Based upon independent survey results.

HOW THE TERMINALS THAT GIVE YOU SO FEW PROBLEMS CAN WIND UP GIVING YOU NONE AT ALL.



While we at Teletype Corporation like to talk about our terminals' remarkable record for reliability, we have to admit that every once in a while you just might have a problem with one.

But if you contract with Teletype's Product Service Organization, getting good service is no problem at all. That's because no one can service our full line of CRTs and teleprinters as well as our service technicians. Each one of them is a company-trained, job tested professional who must continually meet our expectations—and yours.

Help is never more than a phone call away since our technicians are on-call 24 hours a day, 7 days a week. And with our network of 100 offices nationwide, we're able to provide fast response time, even to remote areas. You can contract with us for response times as low as 2 hours, or less, as your needs dictate.

But at Teletype, we feel there's something more important than fast response time. And that's fast restoral. So when our technicians call on you, they'll have the necessary test equipment and original Teletype® parts to get your terminals up and running in no time flat.

We'll even help solve problems before they occur with scheduled preventative maintenance. You can also choose our installation service option that includes everything from getting your terminals on-line to user orientation. It's all a part of our Full Service Maintenance Agreement.

So to keep your problems from becoming big problems, write Teletype Corporation Product Service Organization, 2330 Eastern Ave., Dept. 2800-A Elk Grove Village, IL 60007. Or call toll free at 800-323-4226, ext. 300. (In Illinois, 1 800 942-4192, ext. 300.)

TELETYPE: VALUE SETS US APART.

© 1984 Teletype Corporation.
"Teletype" is a registered trademark and service mark of Teletype Corporation.

AT&T
Teletype Corporation

TOOLS from page 47

ADP NETWORK SERVICES, INC.
Apecs/8000

ADP Network Services, Inc. has announced an integrated project management system for processors ranging from supermicrocomputers to mainframes under the Unix operating system.

The Apecs/8000 (ADP Project Evaluation and Control System) package is said to incorporate a relational data base management system (DBMS) that provides a collection of data drawn upon for all calculations, reports and graphs. The system includes earned value analysis, critical path analysis, application building techniques, work breakdown, organization structure consolidation and a range of data entry screens, report writing and graphics capabilities.

The package is said to summarize information to different levels of detail as defined by organization, work breakdown, accounting or other management structures. The results can be reported for analysis or displayed graphically to show status.

The mainframe version of Apecs/8000 is priced at $150,000.

ADP Network Services, 175 Jackson Plaza, Ann Arbor, Mich. 48106.

DATA PROCESSING DESIGN, INC.
IB Graph

Data Processing Design, Inc.'s (DPD) IB Graph, a menu-oriented business graphics software package for the Digital Equipment Corp. PDP-11 systems, is now available for use on DEC's VAX-11 computer systems.

IB Graph includes all the features in the previous DEC RSTS/E version, plus support of DEC VT200 terminals and the Tektronix, Inc. 4105 terminal and 4695 plotter, a spokesman said.

IB Graph is implemented in native mode using Macro-32 and VAX Basic for VAX/VMS. According to DPD, it can be used on any valid VAX/VMS configuration version 3.5 or later, with a working-set size of 200 pages and at least 2,000 free blocks of disk space.

With IB Graph, nontechnical users can create bar, line and pie charts on a variety of graphics output devices.

The price for IB Graph for users operating under VAX/VMS is $7,500 for the 11/730 and 11/725 and $9,500 for the 11/750 and 11/780. It is distributed on magnetic tape compatible with 9-track, 800- or 1,600-bit/in. drives and most DEC removable media disks.

Data Processing Design, 1400 N. Brasher, Anaheim, Calif. 92807.

THETA BUSINESS SYSTEMS
RSX upgrades

Theta Business Systems has released several upgraded versions of its RSX Accounting Packages for Digital Equipment Corp. RSX-11 operating systems.

The new features include added support for more than 10 terminals, faster times between screens and an option allowing the user to choose either the screen or the printer when creating reports. The printer can be spooled or not, allowing a printer to be directly attached to a terminal. These options are individually setable for each terminal when installing the system.

The accounting systems are all written in Pascal and include general ledger, accounts payable, order entry with inventory control, billing and files analysis and payroll. The new RSX releases are available for $1,495 per accounting system.

Also announced was a Digital Equipment Corp. VAX-11 Pascal version of the accounts payable, accounts receivable, general ledger and payroll systems. The software is priced at $2,500 per accounting system.

In addition, a Digital Research, Inc. CP/M 86 version of the Pascal Accounting Software has been released, configured for the IBM Personal Computer XT, the DEC Rainbow 100+ and other compatible microcomputer systems. All accounting packages are offered. The business packages have been priced at $595 per accounting system.

Theta Business Systems, Suite 106, 1110 Sonora Ave., Glendale, Calif. 91201.

DATA BASE MANAGEMENT SERVICES

MICHAELS, ROSS & COLE LTD.
MRC-Technician Release 2.0

Michaels, Ross & Cole Ltd. (MRC) has announced Release 2.0 of its MRC-Technician relational data base management system and productivity aid designed for the IBM System/36.

The vendor said MRC-Technician allows users to view and modify any information in the data base, regardless of how it is stored. It also allows users to create new physical files, reports and file maintenance programs and to download information to personal computers, MRC said.

Other features of MRC-Technician include help key documentation, menu-driven operation, multilevel security, multiple retrievals, relational file joining, single or multimember file capability, unlimited sequencing and total levels, Boolean selection criteria, summing and averaging at total levels, free format calculation definition, output device control and report modification.

Part of the modular MRC-Query series, the MRC-Technician module is

Continued on page 59

So you'd like to add the flexibility of a popular personal computer to the power of your WANG 2200. But you don't want to spend $10,000 to do it.

IF YOU OWN A WANG 2200, YOU JUST SAVED THOUSANDS OF DOLLARS.

What if you could get that personal computer – say an Apple IIe or an IBM XT – for thousands less than you'd expect to pay. Plus a hard disk and printer at no additional cost. And you could run just about any software package on the market today?

Interested? If you could get all of this and pay only $1,995, you'd be standing in a long line to buy one. Well, forget about that line. You've already got almost everthing you need. In fact, you *don't* need another computer...you *don't* need another hard disk...you *don't* need another printer...and you *surely don't* need to spend another $10,000.

All you need is Micro-Bridge 80, a plug-in board that allows any terminal on your WANG 2200 system to act like a CP/M-based personal computer. This revolutionary new product is the most economical way to expand your 2200 system without buying additional

computers and peripheral equipment. And it costs just a fraction of what you'd pay for a popular personal computer.

Choose the software that's best for you. With Micro-Bridge 80, you don't have to compromise any more. Now you can choose the software that works best for you...software that's easy to use or software with sophisticated features designed to fit your specific requirements. With over 2,000 CP/M programs to choose from, you can design a system that works for you. Powerful software applications that others have been using for years are now available to you. Like dBASE II™, Supercalc, WORDSTAR™, the Peachtree Accounting Series, and many, many others. And to get you started in the right direction, we've got a bonus for you.

Free CP/M operating system and Microsoft's Multiplan! Of course you get a copy of the CP/M operating system (Version 2.2). But that's not all. You also receive a copy of Microsoft's Multiplan spreadsheet. This best-selling, easy-to-use package was voted Software Of The Year by *Infoworld* magazine, which is why we include a copy of it with every Micro-Bridge 80...we want you to start off with the best.

Remember, CP/M 2.2 and Multiplan are included at *no extra charge* with your purchase of Micro-Bridge 80.

Communications made simple. Micro-Bridge 80 has two serial (RS-232) communication ports that make it easy to communicate with public data bases like The Source and CompuServe. It's not only easy, it's fast, because Micro-Bridge 80 communicates directly with on-line services. There's no need to tie up the Z200's CPU with communications protocols and log-on procedures.

Simple and easy to use. When you want to use CP/M, just type in a single command on your WANG terminal keyboard, and Micro-Bridge 80 turns control over to CP/M. That's all there is to it. And Micro-Bridge 80 doesn't interfere with normal WANG 2200 operations. In fact, on multi-user systems you can run CP/M at one terminal while someone else runs WANG software at another terminal on the system.

Easy to install. Anyone can install Micro-Bridge 80 easily in 15 minutes. No special tools are needed. No technical expertise. Simply remove the I/O panel cover of your 2200 and slip Micro-Bridge 80 into an empty slot. No other hardware alterations are necessary.

Order your Micro-Bridge 80 today and begin running CP/M software on your 2200 tomorrow.

Micro-Bridge 80 is not a promise for the future...it's fully tested and ready for shipment *today.*

Order your Micro-Bridge 80 package today and start using the CP/M software you've needed for years. For more information concerning Micro-Bridge 80, or for the location of the Micro-Bridge 80 dealer nearest you, just call us toll-free and ask for Micro-Bridge.

The entire Micro-Bridge 80 package sells for $1,995 and includes:

- Micro-Bridge 80 circuit board
- Installation & operating instructions
- CP/M 2.2 operating system
- Multiplan spreadsheet software
- 90 day limited warranty on parts & labor

‡Options hardware maintenance and warranty enhancement programs available. Ask for details when you call.

Micro-Bridge™ is a trademark of Computer Concepts Corporation. CP/M® is a registered trademark of Digital Research, Inc. / "MultiPlan" is a trademark of Microsoft, Inc. / "dBASE II" is a trademark of Ashton-Tate / IBM® is a registered trademark of International Business Machines Corporation / Wang® is a registered trademark of Wang Laboratories, Inc. / Tektronix® is a registered trademark of Tektronix Corporation.

MICRO-BRIDGE

1-800-255-6350

In Kansas and outside continental US call 913-541-0000

Developed by Computer Concepts Corporation
8375 Melrose Drive
Lenexa, Kansas 66214

SOFTWARE & SERVICES

Continued from page 49

priced at $1,140 per site per CPU. Multisite pricing is available.

Micheels, Rice & Cole, P.O. Box 4532, Oak Brook, Ill. 60521.

LANGUAGES

TARTAN LABORATORIES, INC.
C and Modula-2 compilers

Tartan Laboratories, Inc. has announced C and Modula-2 language compilers for Digital Equipment Corp. VAX-11 processors and National Semiconductor Corp. 16032-based Unix systems.

The compilers are said to provide optimized code while allowing program portability across different architectures.

The compilers' error diagnostics not only provide a line number and cryptic phrase for an error message, but also display the incorrect line and the ones surrounding it for context, point to the error and explain the problem and how the compiler attempts to recover from it, a vendor spokesman said.

Each compiler reportedly incorporates a tool called the Production Quality Compiler. This takes machine and language definitions and produces a compiler for specific languages on specific machines, the spokesman said.

The C and Modula-2 versions for VAX/Unix systems are priced at $2,000.

Versions for 16032-based Unix systems are priced at $1,000 each, the vendor said.

Tartan Laboratories, 477 Melwood Ave., Pittsburgh, Pa. 15213.

CLINE, INC.
CEnglish Compiler

CLine, Inc. has announced the CEnglish Compiler, a C language compiler for use with the company's CEnglish fourth-generation language under the Unix operating system.

According to a spokesman, the CEnglish Compiler is a stand-alone program that can be invoked through CLine's Application Workbench — a command-oriented development environment — or from a command line of the host operating system. The compiler provides for file and macro expansion, semantic and syntactic error checking and data typing with implicit conversion.

The spokesman said the default action of the CEnglish Compiler is to generate an executable version of a specified CEnglish source file, and the compiled C programs have the features of a standard C program, including speed and efficiency.

The microcomputer version of the CEnglish Compiler is priced at $300 for the first user. The minicomputer version is priced between $4,000 and $10,000, and the mainframe version is priced between $15,000 and $30,000, depending on the host processor.

CLine, Portsmouth Parade, Portsmouth, N.H. 03801.

SIGNETICS CORP.
C cross-compiler

Signetics Corp. has announced a C language cross-compiler that allows routines written in C to be combined or linked with routines written in the Signetics SC68000 macro assembler.

A vendor spokesman said the cross-compiler is designed for system engineers developing products based upon Signetics' SC68000 16- and 32-bit microprocessor family. The cross-compiler reportedly allows users to create programs in the most appropriate language and to manipulate hardware via the program's linking capability.

The system is said to conform to Version 7 of Unix C and to produce assembler code.

The operating environment is based upon any Digital Equipment Corp. VAX-11 processor.

The Signetics C programming language cross-compiler is available immediately at $3,400, including the C cross-compiler and the SC68000 macro assembler on ½-in. magnetic tape, the vendor said.

Signetics, P.O. Box 409, 811 E. Arques Ave., Sunnyvale, Calif. 94086.

REMOTE COMPUTING SERVICES

COMPUSERVE, INC.
TWA's Fare available

Compuserve, Inc. and Trans World Airlines (TWA) have announced that TWA's automated reservation system will now be available to subscribers of the Compuserve information service.

Fare includes flight schedules serving approximately 100,000 pairs of cities for every published airline schedule in the world, according to a spokesman.

Micro owners who subscribe to Compuserve can use the service to book reservations and arrange for tickets to be issued by a travel agency, through the mail or at any participating airline ticket office.

The reservation system will be available on both the vendor's Executive and Consumer Information Services beginning Oct. 1, the spokesman said. User costs are estimated to range from $20 to $40 per hour.

Compuserve, P.O. Box 20212, 5000 Arlington Centre Blvd., Columbus, Ohio 43220.

INFORMATICS GENERAL CORP.
Chargeback feature for Ordernet

Informatics General Corp. has announced a new feature for its Order-

Continued on page 82

MITRON'S STD 1600 Simplifies Data Transfer By Communicating Off-Line Tape-To-Tape

Mitron's STD 1600 provides an efficient method for sending and receiving data anywhere in the world. STD 1600s communicate with each other and with other companies' bisynchronous terminals and computers.

The STD 1600 solves machine compatibility problems. It transfers data reliably without mailing tapes. It can communicate off-line to relieve an overworked computer.

STD 1600s transfer data at speeds up to 56KB. Double-buffering eliminates delays caused by read/write cycle times.

The STD 1600 can be leased or purchased.

STD 1600 features:
- Easy-to-install
- Needs no software
- Data rates to 56KB
- RS-232 or V.35
- Dial-up or private line
- Multiplexers
- 800 or 1600 bpi
- 1200' or 2400' reel sizes
- Bisynchronous protocol
- Transparent or non-transparent
- Space compression
- Variable size records to 16K
- Labels and multiple files

STD 1600 options:
- Autodialing
- Asynchronous
- Code conversion
- Modem eliminator

Compare the price and performance of the STD 1600 with your present tape-to-tape system. Call Mitron to arrange a live test with your tapes.

Since 1969, Mitron's magnetic tape systems have been used in a wide variety of data communications applications. Let one of our Applications Engineers explain how you can connect the Mitron STD 1600 to your system or data communication network. Call 800-638-9665. (In Maryland, call 301-992-7700.)

MITRON
Systems Corporation
2000 Century Plaza, Columbia, MD 21044

SOFTWARE & SERVICES

Continued from page 80

ent service that reportedly permits electronic transmission of hospital chargeback reconciliations between pharmaceutical manufacturers and wholesalers.

The feature is designed to improve cash flow for wholesalers dealing with hospital customers who get discounted prices from manufacturers in exchange for volume purchases.

With Orderset, manufacturers can electronically transmit chargeback reconciliation in National Wholesale Druggists' Association-approved formats, and with a single transmission, one or more reconciliations can be sent to wholesalers, according to a spokesman.

The Orderset service is available at a cost of 1 cent per record sent or received.

Information General, 1651 Northwest Professional Plaza, Columbus, Ohio 43220.

LITTON SYSTEMS, INC.
Computer graphics service

Litton Systems, Inc.'s Mellonics Information Center has introduced a high-resolution business and presentation graphics service that supports IBM's Graphical Data Display Manager computer graphics programs for IBM mainframes.

The price of the service is based on computer resource units on the time-sharing network.

The standard rate for interactive work is $2.70 per computer resource unit, with lower rates available during off-peak hours, according to the vendor.

Mellonics Information Center, 6701 Variel Ave., Canoga Park, Calif. 91303.

ON-LINE DATA BASES

DATA RESOURCES, INC.
GML CORP.
Computer Specs

Data Resources, Inc. and GML Corp. have introduced software that reportedly enables users to access 11 data bases containing detailed technical specifications of computer industry products.

The Computer Specs data bases contain specifications, characteristics, prices and applications data on more than 1,600 computer hardware companies covering more than 7,000 products. The data bases also contain information from 1,200 producers about 6,000 microcomputer software packages, including prices, functions, markets, descriptions and hardware compatibility.

The data bases reportedly can be accessed through a local telephone number using the vendor's software, any microcomputer or Ascii-compatible terminal and a dial-up modem.

The hardware data bases include information on mainframe, minicomputer and microcomputer systems, disk units, printers, terminals and magnetic tape and cassette units.

The software needed to access the data bases is priced at $850.

Data Resources, 24 Hartwell Ave., Lexington, Mass. 02173.

INGRES from page 41

control between frames, transfer data between frames, manipulate the data in the fields of the form and trigger data base access.

QBF+ uses a full screen form that acts as a window into the data base and allows users to view, query and update data in multiple rows and tables at the same time. Previously, users could only view and manipulate one row at a time in a single table, the spokesman said. Users enter any combination of values and operators, and QBF+ automatically generates a Quel query to retrieve and display the data.

The new version also is said to double the speed of transaction-oriented applications by eliminating the overhead for queries that are repeated over the same data item and using a B-tree storage structure. The B-tree is the fifth access method incorporated into Ingres.

Version 3.0 is a free update to current users. A license for Ingres ranges from $20,000 to $40,000, depending on Digital Equipment Corp. VAX-11 CPU size.

RTI is headquartered at 2855 Telegraph Ave., Berkeley, Calif. 94705.

SOFTWARE from page 41

brochures and literature provided by vendors. Any vendor can supply a list of features that look like those found in other products. The important thing to remember is not whether a product has a particular feature, but how the feature addresses requirements.

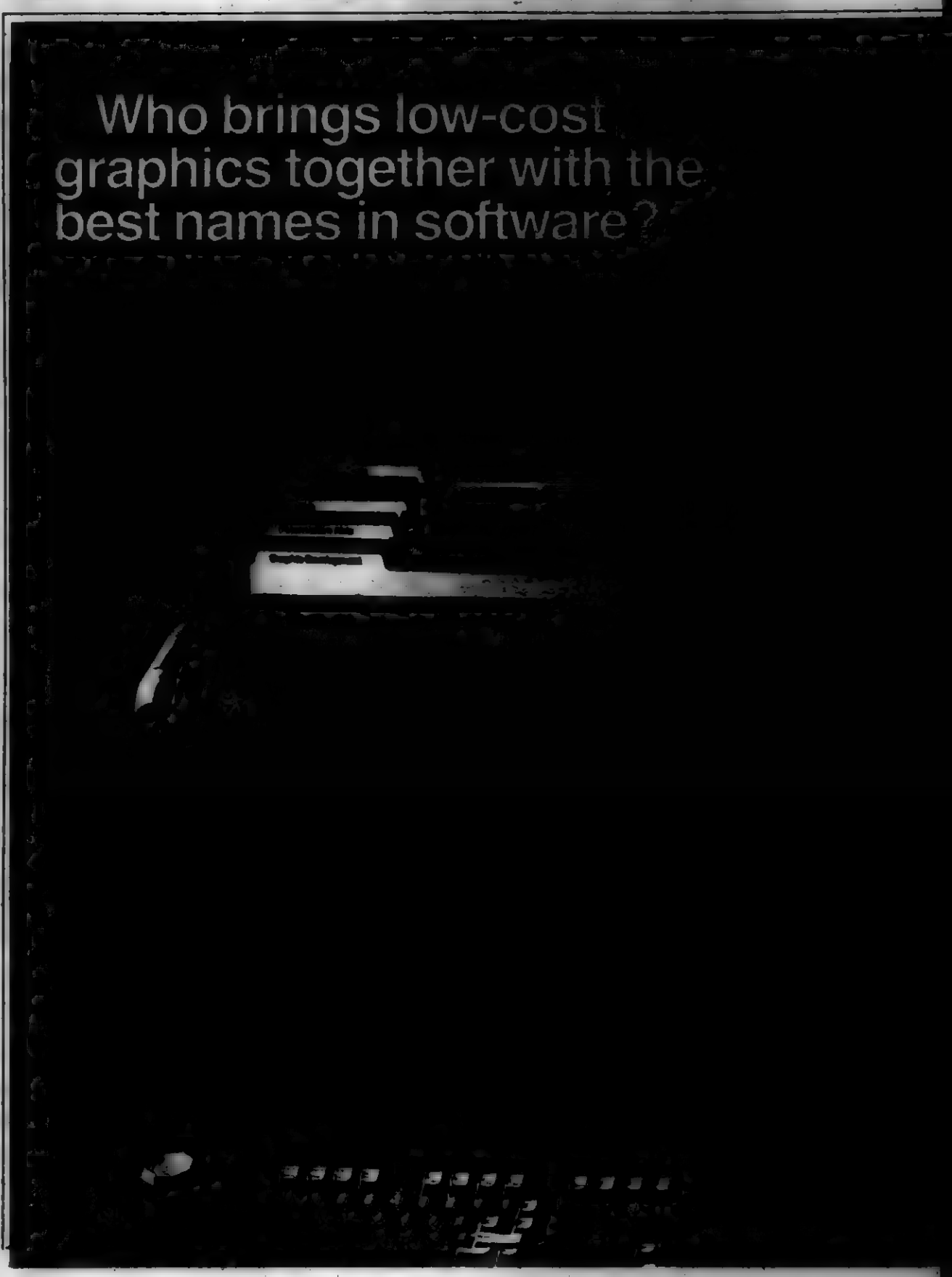
When dealing with vendors, it's necessary to find out not only what they offer but also why they offer what they do. Generally, vendors use formal presentations to explain product functions and capabilities. During these presentations, it is important to refer to a needs or requirements list and to use the list to pull information that is presented by the vendor into focus.

Two kinds of questions should be asked during a presentation: why questions and how questions. How questions are helpful in concept presentations. How does the product address this or that need? During a feature presentation, however, you should ask why the feature does what it does. This line of questioning guides vendor responses to the information needed.

If the vendor can't answer a ques-

See SOFTWARE page 53

Who brings low-cost graphics together with the best names in software?



SOFTWARE from page 52

tion during a presentation, don't assume that the answer is a negative one. He may simply be unable to respond correctly without research. Write unanswered questions down, and ask the vendor to get a specific answer by a later date.

Often evaluation and selection projects include interviewing current users to determine if the product and vendor perform as represented. When checking references, talk with the people involved in direct use of the product, but also be sure to talk with the person who has responsibility for the area in which the product is used. This provides the best overall view of the product and the vendor.

Also, when checking references, start with indirect questions rather than specific ones. Ask, for example, how the product handles a particular function rather than how a specific inquiry is made or report is generated. Often these indirect questions will uncover product/vendor advantages or disadvantages which may otherwise be overlooked.

Justifying an applications product is another consideration. Determine if the software can be justified through more than one approach — cost, productivity improvement and consistency with direction. Chances are it will be a good fit if you can justify it from more than one angle.

Developing a scenario of how an operation will function with the product installed is another useful step. Think through the functions performed by the product, the points where it interfaces with people and the likely impact on the organization. After developing this scenario, test it with the vendor to verify your understanding.

Finally, look at total product cost rather than product price. When supporting elements such as service, support and training are considered, the product which appears to cost the least may turn out to be the most expensive.

Acquisition of a major applications software product is an important decision. When making that decision, look beyond the product to the vendor that backs it. Who is the vendor? How does the vendor conduct business? What is the structure of the organization behind the product? What is the vendor's financial status?

GNOSIS from page 41

that are accessed by a large number of users, such as an editor, Hardy explained. Despite the sophisticated security procedures many businesses employ, the operating system is not impervious to a crafty programmer who can write routines to copy the contents of any file accessing the program.

"Every time you use an editor on a conventional system, you're copying your data to a place where anybody who wrote the editor can see it," he said. Of course, if the editor was purchased as a package, this is not a problem, but for shared utilities that use software written in-house, protection is scanty.

As a capability-based system, Gnosis can support sharing and isolation at the same time, Hardy said. Authority to access data can be parceled out to the programs on a very limited basis. "This allows programs to run independently so that they are dedicated to a particular user and particular files," he said. "You know that the only copy of the program is your copy." The system even allows such common areas as spooling queues to be bypassed.

Hardy said Gnosis' object orientation involved associating data with a fixed set of programs that can access it. Object-oriented systems include Apple Computer, Inc.'s Lisa or Xerox Corp.'s SmallTalk. Object programming ensures that programs and data can only be accessed through a single object, thus protecting against programmers writing hooks into the program and offering an easier audit trail.

Gnosis is not a new concept, Hardy noted. A similar technology is already employed on Plessey Co. Ltd.'s Plessey 250 computer, which is used primarily for communications switching. However, Tymshare believes the time is right for a high-security operating system. "The technology has been well known in the computer science field and is now viable in commercial applications," Hardy said.

Tektronix.

No graphics terminals connect you to better utility or applications software, or with a broader range of computers, than Tek's desktop 4100 Series terminals.

Among the dividends of Tek's long leadership in graphics are the scores of program development tools and powerful applications packages already on file and immediately compatible with most computers.

From analysis to reporting, cartography to CAD: compatible software helped make Tek's low-cost 4100 Series an immediate success.

Major software vendors like ISSCO, SAS, Precision Visuals and many others offer 4100 users flexibility in data analysis and presentation.

In more technical, engineering and scientific environments, users can take advantage of ANSYS,™ PATRAN-G,™ ANVIL-4000,™ GEO-MOD,™ Tek PLOT 10 Computer-Aided Drafting and Easy Graphing II.

Tek PLOT 10 graphics development software library is installed on more computers than any other in the world. It now includes the new international standard, GKS, and the Core based IGL, plus TCS, the nucleus for scores of specialized packages.

The 4100 Series lets you take full advantage of all these powerful software resources.

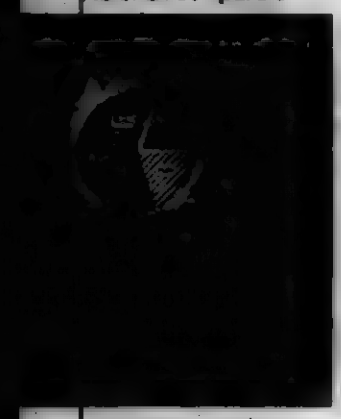
Fast, flexible, and priced fully equipped from just $3995, quantity one, the 4100 Series includes VT100 compatibility and ANSI X3.64 text editing right along with its exceptional graphics.

Choose from a range of resolution, segment memory and color capabilities, backed by performance unique to the price range — including a flicker-free 60 Hz non-interlaced display, 38.4K baud communications. And color manipulation by keyboard function keys.

The companion 4695 Color Graphics Copier now makes color copies practical.

It's a very quiet and reliable push-button easy desktop unit that doubles as an alphanumeric printer. Single quantity cost is just $1595.

Powerful graphics team with Tek 4695 color copies and transparencies for a complete desktop analysis and presentation system.



Presentations come alive with the communications impact of full color transparencies that can be produced in minutes.

Your Tek Sales Engineer can help you find the perfect software for your computer, your needs, and our graphics. For literature or the location of your local Tek sales office, call toll-free: 1-800-547-1512. In Oregon, 1-800-452-1877.

Call Tek

Tektronix
COMMITTED TO EXCELLENCE

RFP MANUAL
$29.95

Most dp libraries have books on contracting, leasing and even proposal writing. But, prior to these activities, you should issue an RFP. Dyna Systems now introduces the missing link...a manual on:

REQUESTS FOR PROPOSALS
Preparation Guidelines for
Data Processing Acquisitions

Our Manual defines the most important characteristics of Data Processing-oriented RFPs. The Manual dilineates a standard approach to the preparation and issuance of RFPs and is designed to improve the contractual process.

It teaches you to construct RFPs that clearly identify requirements for the purchase or lease of goods and/or services. To fully protect your company, you will learn how to address the following specific areas:

- Administrative Requirements
- Technical Requirements
- Business Requirements
- Legal and Insurance Requirements

Extensive check lists and over 80 examples of sample language provisions are provided to address various issues.

N.Y.S. residents add appropriate sales tax. Order direct from

DYNA SYSTEMS, Inc.
6 Danville Court, Greenlawn, N.Y. 11740

PROTECT YOUR COMPANY

NATIONAL'S DEC-COMPATIBLE VAX, UNIBUS & Q BUS MEMORY BOARDS.

National boards cost about 50% less and arrive 100% sooner.

COMMUNICATIONS

Study reveals chaos in long-distance billing

Consumer group investigates eight carriers

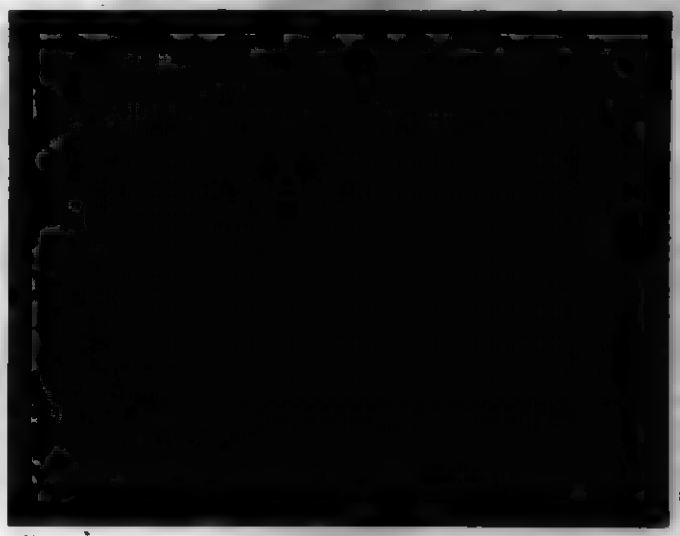
By Lynne Hefner
CW Staff

WASHINGTON, D.C. — A study conducted here recently concluded that the manner in which long-distance telephone carriers measure the duration of calls might be a more important consideration for would-be customers than those carriers' actual rates.

The findings, released recently by Consumers' Checkbook, a nonprofit consumer group based in Washington, D.C., and San Francisco, are part of a larger study that will be published this summer in a book called *The Complete Guide to Lower Phone Costs*.

According to Checkbook, the decision to release the conclusions of the study prior to publication of the completed book was prompted by the controversy sparked by recent customer lawsuits growing out of MCI Communications Corp.'s and GTE Sprint's billing practices [CW, Feb. 27].

The findings are based on a study conducted between September and November 1983, in which Checkbook made — or attempted — more than 2,000 calls on eight long-distance networks: AT&T's direct distance dialing, MCI, Sprint, ITT's Niteline, Western Union Co.'s Metrofone, Allnet Communications Services, Inc.'s Allnet, Telesaver and Satellite Business System's (SBS) Skyline.



According to the consumer organization, a portion of the calls were made in the evening billing period and another portion in the night/weekend period. Results might be different for calls made predominantly during daytime hours, to different destination cities or using different service options. But Checkbook claims that the findings have broad applicability. Each call was timed so that actual call duration could be compared to billed time. Checkbook reported that:

■ The Western Union Metrofone system billed for 32% of no answers, busy signals and other uncompleted calls. This included many calls the company couldn't place due to the busy conditions of its own switches.

■ ITT's Niteline did not charge the customer at all for any call that lasted 20 seconds or less.

■ Telesaver charged an average of 40 seconds per call in excess of the actual call length.

■ AT&T charged 20 seconds more than actual call length. But unlike the other companies, AT&T was accurate in tracking call connections; it charged for all completed calls and never charged for uncompleted ones.

■ Allnet charged for about four seconds more than actual call length.

■ SBS' Skyline had, by far, the most generous billing practices. It allowed the highest percentage of free calls; it billed for no uncompleted calls; and it often charged for substantially less than actual connect time. SBS has changed its billing system since the time of the test, but the consumer group expects SBS to remain the most generous of the studied companies.

The carriers' bills vary because of several factors, the consumer group said. First, all companies approximate the length of each call for billing purposes. Most round up to the next full minute, so a 10-second call, for example, is billed as a one-minute call, the group explained. Two of the studied companies — SBS and

See CHARGES page 84

INSIDE

Controllers/88
Voice/Data Communications/88
Multiplexers/Modems/88
Local-Area Networks/88
Test Equipment/88
Auxiliary Equipment/89

Voice/data/video transmission market seen ripe for CATV

SAN JOSE, Calif. — Two-way CATV could play a major role in the development of a universal communications system capable of simultaneously transmitting voice, data and video signals, a study recently released here reported.

The report, entitled "Two-Way Cable TV: Issues and Opportunities," from Strategic, Inc., suggested that the market for universal communications services is expected to be greater than the market for telephone services today. In fact, according to the researchers, the new system might well absorb telephone services as we know them.

Facing declining revenues and increasing costs, CATV operators are hoping to increase revenue by adding relatively low-cost, two-way communications dedicated to nonentertainment application. According to the research firm, CATV is driving hard to become the first supplier of universal broadband, integrated communications networks capable of simultaneously transmitting two-way voice, data and video signals.

In 1983 there were approximately 5,000 cable television systems servicing nearly 30 million subscribers in over 13,000 U.S. communities. This subscription level will generate $6.14 billion in revenues before year's end, the report said.

Since 1979, the number of subscribers has doubled, and this trend is expected to continue through the end of the decade. What is significant for CATV operators, the report points out, is that the current $6 million annual revenues represent only an 18% penetration by cable television in the top 20 U.S. television markets.

By the end of the decade, the total available market will have reached slightly over $24 billion. The increased penetration producing this fourfold growth in the market by the end of the decade will be fueled by new two-way services, the report suggested.

Like pay television services, these new two-way services will generate added sales above the basic 55-channel television service currently being supplied. Moreover, Strategic stated, these new sales will come from both households and businesses. Unlike current pay television service, new services will involve two-way trans-

See CATV page 84

TI announces Ethernet links

DALLAS — Texas Instruments, Inc. has unveiled hardware and software products to allow connection of the company's Business System series computers to Ethernet-type local-area networks.

The new products include the EI300 interface for the Business System 300 series; the EI990 interface for the Business System 600 and 800 series and DS990 models with the company's TIline bus structure; Distributed Network I/O (Dnio) 2.0 software; and Business System Access, a software package that enables TI Professional Computers to access Business System resources, a company spokesman said.

The EI300 interface, EI990 interface and Dnio 2.0 software will be available in August, with the Business System Access software package scheduled for release in September. The EI300 costs $2,950; the EI990 costs $2,950; the Dnio 2.0 software is priced at $3,500; and Business System Access costs $195, the vendor said.

Additional information can be obtained from TI Data Systems Group, which can be reached through P.O. Box 402430, Dallas, Texas 75240.

Dynatech offers bisynch-X.25 tie

ALEXANDRIA, Va. — Dynatech Packet Technology, Inc. has announced a packet assembler/disassembler that reportedly allows equipment operating with IBM's 3270 bisynchronous protocol to be interconnected via X.25 packet-switching networks.

The Protopadx.25 reportedly is capable of connecting up to 32 terminal devices in point-to-point or multidrop mode to one packet-switched line.

When operating in either switched or permanent virtual circuit mode, the Protopadx.25 also has the capability of multiplexing data calls at the logical channel level using the Canadian standard Datapac 3023 procedures, a vendor spokesman said.

Call setup is under the control of each connected 3270 device. A plain English command menu is available, via a teletypewriter-compatible diagnostic and configuration port, to set up poll tables and systems parameters, the spokesman said.

Protopadx.25 is available for $1,400.

Dynatech Packet Technology is located at 6464-G General Green Way, Alexandria, Va. 22312.

COMMUNICATIONS

COMMUNICATIONS CONTROLLERS

NCR Comten, Inc.
MAF/RHO

NCR Comten, Inc. has announced the Comten Multiple-Access Facility with Remote Host Option (MAF/RHO) for the company's 3600 communications processor systems.

The product allows IBM System Network Architecture (SNA) and bisynchronous 3270-type terminals in an IBM SNA or pre-SNA network to access non-IBM hosts. It also allows access to IBM hosts located in separate networks, the vendor said.

Polling and addressing of terminals for the host, error recovery and control function and alternate routing for remote nodes are all provided by the MAF/RHO. The product also is compatible with earlier releases of the company's multiple-access facility, a company spokesman said.

The price is $6,435.

NCR Comten, 2700 Snelling Ave. N., St. Paul, Minn. 55113.

VOICE/DATA COMMUNICATIONS

TELESAVER, INC.
Quick Call 2000

Telesaver, Inc. has announced the Quick Call 2000 autodialer featuring speed dial, memory storage and retrieval and least-cost routing.

With the autodialer, one to 24 users can access alternative long-distance services by dialing only two- and three-digit numbers. The system operates with single-line telephones, key systems and private branch exchanges and works with AT&T and other common carriers as well as international calls, the vendor said.

Features of the product include the ability to store and speed-dial up to 250 local and long-distance numbers; the ability to determine which subscribed common carrier offers the least expensive service for a particular call; the ability to redial a call until completed, with information entered one time only by the user; and a cost accounting feature for billing by person, department, cost center or client, the vendor said. The price for a one-line unit is $455.

Telesaver, 20 Gwynns Mill Court, Owings Mills, Md. 21117.

GATEWAY TELECOM
X25PC

Gateway Telecom has introduced an X.25 communications product to connect IBM Personal Computers with packet-switched networks. The product reportedly utilizes a multitasking operating system supporting up to 32 logical I/O channels.

The product, called the X25PC, also is said to implement the full CCITT X.25 recommendation for data transmission on packet-switched networks. The X25PC software reportedly will provide document exchange facilities on the Personal Computer. It includes an option card, a floppy disk and documentation.

The X25PC is available for $1,900.

Gateway Telecom, 853 Broadway, New York, N.Y. 10003.

MULTIPLEXERS/MODEMS

LOCKHEED-GEORGIA CO.
Data Sentry

The Getex Division of Lockheed-Georgia Co. has introduced Data Sentry, a modem that can reportedly prevent data theft and other security breaches of personal, mini and mainframe computer systems without requiring encryption or changes in systems programming.

The modem uses a call-up, callback and password sequence and offers all the telecommunications features of conventional intelligent modems, the vendor said.

The asynchronous modem operates full duplex at 300 or 1,200 bit/sec and has autodial, autoanswer, autospeed and autoparity selection. Terminal interface is a standard RS-232C cable. The telephone interface is a single telephone number drop with an RJ-11C connection.

The price is $895, according to the vendor.

Lockheed-Georgia, Department 8403, Zone 18, Marietta, Ga. 30063.

KINEX CORP.
2400/FDX

Kinex Corp. has announced the 2400/FDX modem intended for full-duplex synchronous and asynchronous data transmission at rates of 1,200 and 2,400 bit/sec over two-wire switched or leased lines.

Standard features of the modem reportedly include automatic answer/disconnect, automatic rate recognition, transmission status and line signal quality indicators plus internal and remote-controlled digital loopback testing.

The price is $1,695, the vendor said.

Kinex, 6960 Bryan Dairy Road, Largo, Fla. 33543.

HALCYON COMMUNICATIONS, INC.
4001A

Halcyon Communications, Inc. has introduced a statistical multiplexer that concentrates up to 32 channels over a single phone link.

The 4001A features expandability from four to 32 channels, supporting a mix of asynchronous traffic and half- and full-duplex synchronous data.

Speed selections range from 50 to 9,600 bit/sec, including autobaud, with speeds at each end of the channel selected independently, a company spokesman said.

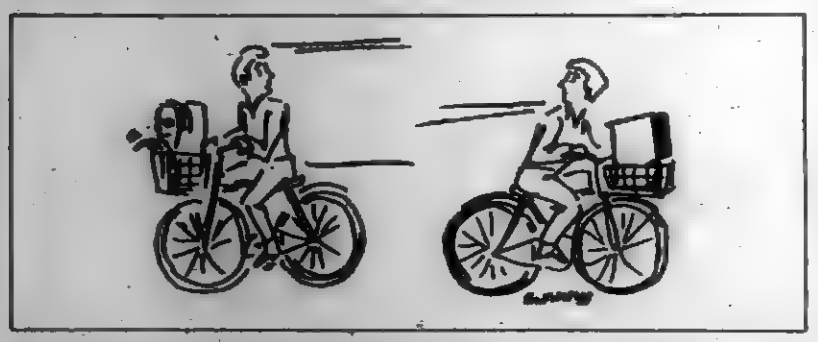
Asynchronous channels support all standard inband and outband flow controls, which can be independently selected at each end of the channel for traffic balancing throughout a point-to-point network, the vendor said.

Special flow control conventions are also supported, according to the vendor.

The price for a four-channel unit is $1,795; an eight-channel unit costs $2,595.

Halcyon Communications, 2121 Zanker Road, San Jose, Calif. 95131.

See [illegible] page 58



SOLVE YOUR NETWORK COMPATIBILITY PROBLEMS

The MC-80 is a versatile Micro-Processor Based Controller providing conversion between dissimilar data communications protocols. A low cost solution, the MC-80 allows a network to grow or change without making existing devices obsolete. Starting at **$1,445**

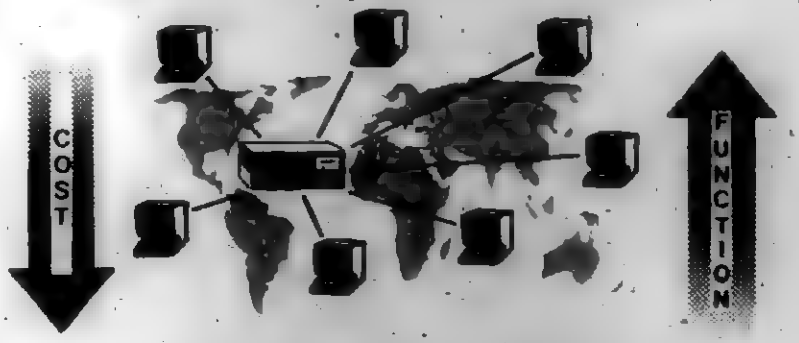
- IBM 2780/3780 BSC to Async ASCII Devices
- Burroughs Poll/Select TD/EIA to Async ASCII
- IBM 3270 BSC to Burroughs Poll/Select
- IBM 3270 BSC to Async ASCII Devices
- IBM 3270 BSC to NCR Poll/Select
- Special Applications
- SNA available 1984

Innovative Electronics

(305) 696-1944
1-800-327-3955

INNOVATIVE ELECTRONICS, INC. 4714 N.W. 165th St., Miami, FL 33014

Remote SDLC 3270's Appear As Local 3270's



With IBM Compatible Channel-Attached Controller

The Virtual Local Controller (VLC) can accommodate multiple lines while supporting all features of both dial-in and dedicated SDLC 3270s without a 3705 and without costly teleprocessing software. Avoid the NCP generation process. Simply generate your IBM system as if it has one or more SNA 3274 local controllers. The VLC does all the rest.

The VLC takes care of all transmission error detection and recovery. Internal diagnostics and powerful on-line trace capabilities are standard. Remote concentration and networking can be included. If desired, concurrent enhanced 270X/370X-EP emulation is available.

Although attaching to either a block or byte multiplexer channel, the programmable VLC is self-loaded, independently of the host. Installation is straightforward. On-site spares make maintenance easy.

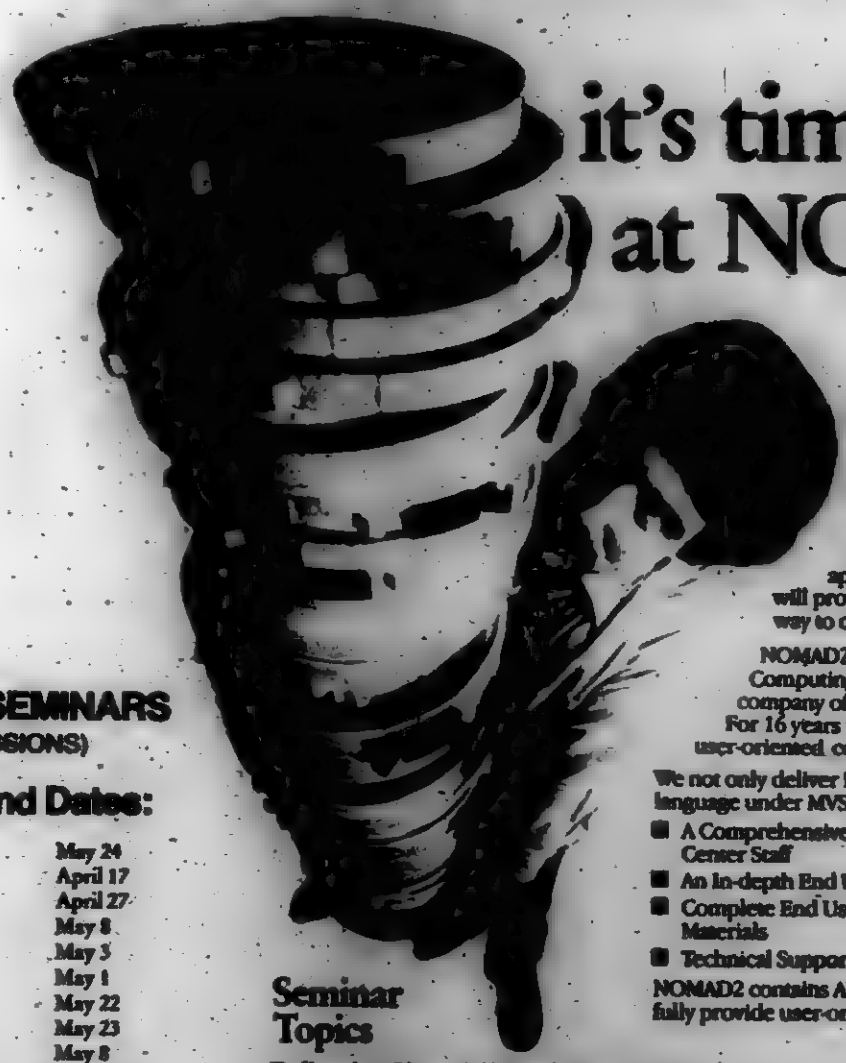
Since 1976, Lemcom Systems, Inc. has been a leading supplier of IBM compatible Front-End Processors and custom data communications products. Over six hundred users are already benefiting from our economical and reliable solutions to their needs.

The VLC is available for purchase or under flexible lease alternatives. Talk with us about how to simplify your entry into SNA data communications. Call or write today.

LEMCOM SYSTEMS INC

2104 W PEORIA AVENUE
PHOENIX, AZ 85029
(602) 944-1543

If delivering user-oriented computing is getting you down...



it's time to look at NOMAD2!

Delivering user-oriented computing can be a tricky business. If it's your objective to satisfy the user community in your organization, it's time to speak to the experts. We'll share our experience with you at our FREE NOMAD2 Seminars.

Whether you're interested in an Information Center, Development Center, end-user computing or just quick applications development, our seminars will provide you with a closer look at the best way to deliver user-oriented computing.

NOMAD2 is a unique product created by D&B Computing Services, the information services company of The Dun & Bradstreet Corporation. For 16 years we have been delivering value added user-oriented computing services.

We not only deliver NOMAD2, the premier fourth generation language under MVS and VM, but also provide . . .

- A Comprehensive Training Program for Your Information Center Staff
- An In-depth End User Training Program
- Complete End User Documentation and Training Materials
- Technical Support for Your Information Center Staff

NOMAD2 contains ALL the components you need to successfully provide user-oriented computing services.

FREE NOMAD2 SEMINARS
(HALF DAY SESSIONS)

Location and Dates:

Atlanta, GA	May 24
Austin, TX	April 17
Boston, MA	April 27
Chicago, IL	May 8
Cincinnati, OH	May 3
Cleveland, OH	May 1
Columbus, OH	May 22
Dallas, TX	May 23
Denver, CO	May 8
Des Moines, IA	May 16
Detroit, MI	May 2
Elizabeth, NJ	May 16
Harrisburg, PA	April 12
Hartford, CT	April 26
Houston, TX	May 24
Indianapolis, IN	May 17
Kansas City, MO	April 24
Los Angeles, CA	May 3
Louisville, KY	May 10
Miami, FL	May 22
Montreal, Canada	May 4
New York, NY	April 19
Oklahoma City, OK	April 25
Omaha, NE	May 15
Philadelphia, PA	May 17
Pittsburgh, PA	May 9
Portland, OR	May 9
Rochester, NY	May 16
San Francisco, CA	May 1
Seattle, WA	May 10
St. Louis, MO	April 26
Stamford, CT	May 4
Toledo, OH	May 23
Toronto, Canada	May 9

Seminar Topics

Delivering User-Oriented Computing

■ Information Centers vs. Development Centers ■ The "Ideal" Environment ■ User Profiles ■ Delivery Strategies ■ User Training and Support ■ Microcomputer Strategies

NOMAD2: On-Line Application Development

See the "reality" of user-oriented computing with NOMAD2. Watch us build and dynamically modify a NOMAD2 application on-line. We'll build a data base structure, load data, generate reports and graphics, modify the data base and much more.

If delivering user-oriented computing is your objective, it's time to take a closer look at NOMAD2.

NOMAD2 . . . Experience the difference

D&B Computing Services

A subsidiary of [illegible]

Please fill out the attached registration form and return it to:

Roger Cox
D&B Computing Services
187 Danbury Road
Wilton, CT 06897
or call Roger Cox at (203) 762-2511

☐ Please reserve _____ seat(s) at your *FREE* NOMAD2 SEMINAR to be given in

(City) _____

on (Date) _____

☐ Please send NOMAD2 materials.

Name _____ Position _____

Company _____

Address _____

City _____ State _____ Zip _____

Telephone _____

®NOMAD2 is a registered trademark of D&B Computing Services, Inc.
©Copyright 1984 D&B Computing Services, Inc. All Rights Reserved.

COMMUNICATIONS

MODEMS from page 55

DIGILOG, INC.
Modem Wrap Around Box, Model WRB/1

The Network Control Division of Digilog, Inc. has introduced the Modem Wrap Around Box, Model WRB/1, a remote-controlled data communications device that enables the testing of communications lines and local remote modems.

The product performs the following five tests: loopback (digital and analog); bit error rate; polling test; analog levels (transmit and receive); and self-test, the vendor said.

For four-wire, leased-line modems operating from 1,200 to 4,800 bit/sec, the secondary channel operates at 150 bit/sec. For 9,600 bit/sec modems, the secondary channel is set at 75 bit/sec.

Model WRB/1 costs $960.

Digilog Network Control Division, 1370 Welsh Road, Montgomeryville, Pa. 18936.

CODE-A-PHONE CORP.
Tel-A-Modem

Code-A-Phone Corp. has announced Tel-A-Modem, a two-line desk-type telephone that houses an intelligent modem and is said to be designed for both commercial and residential applications.

Tel-A-Modem features include 300 and 1,200 bit/sec data transmission rates, full-duplex operating mode, automatic answer and instant status indication.

Telephone features include audio-visual phone status, hold function for both lines, last-number automatic redial, nine-number memory automatic dialer and individual volume controls for ring signals and line monitor, the vendor said.

The price is $595.95.

Code-A-Phone, P.O. Box 5656, Portland, Ore. 97228

LOCAL-AREA NETWORKS

CONCORD DATA SYSTEMS, INC.
Token/Net

Concord Data Systems, Inc. has announced its Token/Net local-area network, which the company said is the industry's first local network to meet the IEEE 802.4 token-passing standard approved last September.

The product uses the token-passing access method and a broadband, CATV-type physical medium.

The price is $500 to $850 per port, depending on configuration. A four-port box costs $3,485; a 10-port box costs $5,500.

Concord Data Systems, 303 Bear Hill Road, Waltham, Mass. 02154.

ABLE COMPUTER
Easyway/ET

Able Computer has introduced a network controller that connects Digital Equipment Corp. Unibus-based PDP-11 and VAX-11 computers to Ethernet-type networks that are compatible with IEEE 802.3-specified protocols and TCP/IP protocols (the latter being the Department of Defense's Transmission Control Protocol/Internet Protocol.)

The controller, Easyway/ET, consists of two physical modules, a Host Protocol Processor (HPP) and a Communications Adapter Board (CAB). The HPP module contains the Unibus interface, and the CAB provides the data link and physical-layer protocol to the Ethernet network.

Easyway/ET software device drivers are provided for the DEC VMS and RSX operating systems.

Easyway/ET is available for $7,200.

Able Computer, 1732 Reynolds Ave., Irvine, Calif. 92714.

BRIDGE COMMUNICATIONS, INC.
CS/1-HSM

Bridge Communications, Inc. has introduced a new model of its Communications Server/1 that reportedly provides single-cable connection between a Digital Equipment Corp. VAX minicomputer and a Xerox Corp. Ethernet-type local-area network.

The CS/1-HSM high-speed multiplexed host interface system is a front-end processor connecting up to 48 terminal sessions from other nodes on an Ethernet to a VAX over a single high-speed serial line, a vendor spokesman said.

It reportedly consists of the vendor's CS/1 network interface system incorporating an HSM interface card linked via a single RS-422 cable to the vendor's hex-size Unibus host adaptor board inside the VAX.

The CS/1-HSM is priced at $16,500. Per-port connection costs begin at $350 for 48-terminal support.

Bridge Communications, 10440 Bubb Road, Cupertino, Calif. 95014.

CORVUS SYSTEMS, INC.
Omnishare

Corvus Systems, Inc. has introduced a product called Omnishare that is said to permit the fixed disk of an IBM Personal Computer XT to emulate a Corvus disk system. The modification reportedly permits the creation of a low-cost Corvus Omninet local-area network.

Omnishare allows users to decide how much space on an IBM fixed disk is to be used by the host computer and how much is to be shared, the vendor said.

The host computer reportedly may also use and manipulate the data in the common portion of the disk.

The product reportedly uses simple twisted-pair cabling and allows 64 computers or peripherals to operate together over distances up to 4,000 feet.

It is available from the vendor for $795, including the emulation software, an IBM Personal Computer XT transporter card, Omninet cable and manual.

Corvus Systems, 2160 Corvus Drive, San Jose, Calif. 95124.

TEST EQUIPMENT

HEWLETT-PACKARD CO.
Enhancements for 4955A

Hewlett-Packard Co. has announced enhancements for the 4955A protocol analyzer. According to a spokesman for the vendor, the enhancements include software and hardware to help increase a user's ability to solve data communications problems for international applications.

The enhancements include: the 18146A, a software applications accessory providing additional capability to decode and display the CCITT No. 7 common-channel signaling protocol; the HP 18145A remote testing pack that allows a high-end HP 4955A to talk to another 4955A at remote locations; and read-only memory changes and a software package that enable the 4955A to display in the Japanese katakana character set using JIS-8 data code.

The price of the HP 4955A protocol analyzer with Basic is $17,880. The HP 18145A remote testing pack is $500; the HP 18146A is $500; and JIS-8 data code costs $250.

HP, 1820 Embarcadero Road, Palo Alto, Calif. 94303.

GENERAL DATACOMM INDUSTRIES, INC.
NDC-40

General Datacomm Industries, Inc. has announced the NDC-40 diagnos-

Continued on page 93

ADF Users — Get A Grip!

Don't get carried away with ADF before you know how to use it right!

DKI's one week ADF class covers a wide variety of topics including: standards, procedures, usage guidelines, design methodology, coding techniques, testing, performance considerations and problem solving.

ADF Designers & Coders, Systems QA Personnel, DBA's, Performance Tuners and Project Managers will all benefit from attending our course.

Introducing *COMPUTERWORLD BENELUX*

Here's your chance to reach the Dutch computer community.

Computerworld Benelux is Computerworld's new sister publication in The Netherlands. We consider The Netherlands an exciting marketplace because 90% of the Dutch EDP equipment market is served by imports, and American manufacturers are presently the leading suppliers with 41% of the import market. More importantly, The Netherlands must increase EDP investments in order to maintain their competitive position in the world market.

The Netherlands ranks high in Western Europe for installed general purpose computers. And, according to figures from International Data Corporation, the world's leading information industry market research firm, it has an installed value of $1.7 billion. In 1983, an estimated $380 million was spent on purchases of computer and peripheral equipment. At the present time, there are 4,000 larger computers installed with a projected 15% annual increase.

Computerworld Benelux is circulated throughout The Netherlands, Belgium and Luxembourg to 20,000 key decision makers in middle and senior management in industrial and government organizations. The editorial focuses on the new developments in the local computer market, hardware and software applications, and company news.

CW International Marketing Services makes it easy for you to advertise in countries all around the computer world. For more information on *Computerworld Benelux*, just fill out and return the coupon below.

CW COMMUNICATIONS/INC.

Diana La Muraglia, General Manager
International Marketing Services
CW COMMUNICATIONS/INC.
375 Cochituate Road
Framingham, MA 01701

Please send me more information on:
☐ *Computerworld Benelux.* ☐ Your other publications.
Name _____
Title _____
Company _____
Address _____
City _____ State _____ Zip _____

Figure $50 a line for programming.

When people look at business computers, they sometimes overlook a crucial consideration: the price of writing and maintaining software.

But we didn't. When we designed the HP 3000 family, we created special productivity tools to reduce the high price of developing applications software. With dramatic results.

Many HP 3000 customers now use 1/5th the amount of code writing these programs, compared with using high-level applications language. Since the average program costs you about $50 a line to develop, you can see why EDP budgets go so much further on an HP 3000.

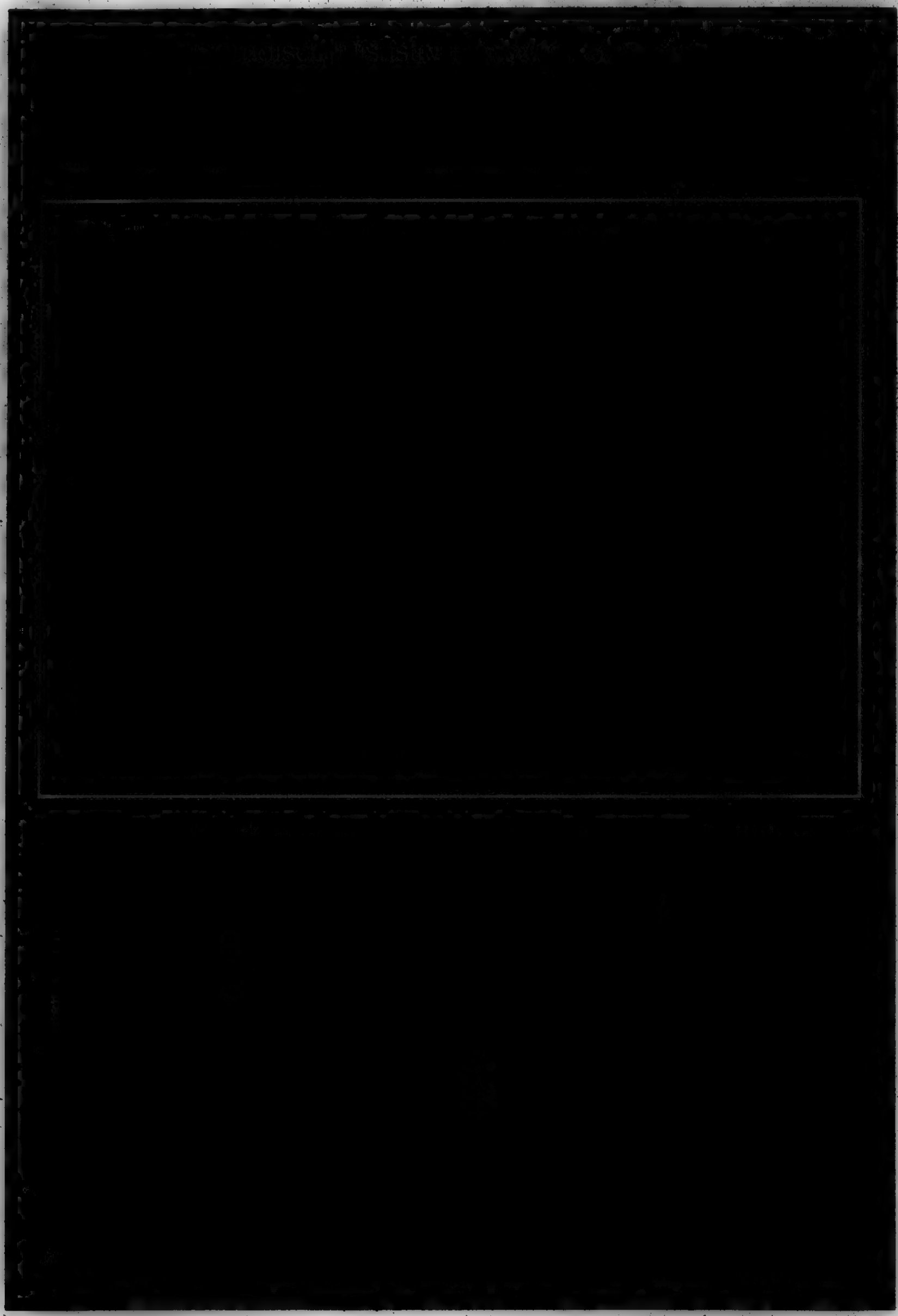
You can use our development tools with the entire HP 3000 family. And, as all four systems are fully compatible, you can run the same, identical programs on your small branch office computer and on the big system in your regional headquarters. Without spending a penny to rewrite code or recompile.

Now divide by five.

Features like these have helped many of our customers recoup the entire price of the hardware by cutting the time and effort involved in developing and maintaining the software.

So if you're looking for ways to lower your computing costs, take a look at the HP 3000. Call your local sales office listed in the white pages and ask a Business Computer Specialist about the HP 3000. Or write for more information to Tom Rappath, Hewlett-Packard, Dept. 03185, 19447 Pruneridge Avenue, Cupertino, CA 95014. In Europe, write to Henk van Lammeren, Hewlett-Packard Nederland B.V., Dept. 03185, P.O. Box 529, 1180 AM Amstelveen, The Netherlands.

HEWLETT PACKARD



COMMUNICATIONS

Continued from page 68

tic controller for the company's Netcon family of network management systems.

The product serves up to 64 multipoint lines and 1,024 diagnostic addresses, providing real-time reporting of network alarms in point-to point networks over analog, digital and wire link facilities, the vendor said.

This dual diskette-based controller reportedly comes standard with a color CRT console, accepts an optional printer and will support all current and planned Netcon hardware. The disk package is available in a self-contained shelf with two 600K-byte side-by side 8-in. floppy disk drives. The price is $16,000.

General Datacomm Industries, One Kennedy Ave., Danbury, Conn. 06810.

AUXILIARY EQUIPMENT

ASTROCOM CORP.
Dual 16 Squeezeplexer

Astrocom Corp. has announced the Dual 16 Squeezeplexer, a coaxial multiplexer that permits connection of up to 32 IBM 3270-type terminals and/or printers to a single coaxial cable.

The system consists of two 16-port devices in a rack-mounted unit. The Dual 16 operates in point-to-point, multidrop, star or a combination of these configurations, has individual channel diagnostic and fault/status indicator lights and provides up to 32 drops per 3274 controller, the vendor reported.

The price is $3,472.

Astrocom, 120 W. Plato Blvd., St. Paul, Minn. 55107.

PARADYNE CORP.
Info-Lock-1027

Paradyne Corp. has announced Info-Lock-1027, a data encryption device that uses the National Bureau of Standards Data Encryption Standard algorithm.

The product reportedly meets Federal Standard 1027 and will protect information transmitted over various communications media, including terrestrial, microwave or satellite facilities.

The device can be used with point-to-point or multipoint circuits, independent of the link protocol, the vendor reported. The device can be configured from the front panel for synchronous or asynchronous operation.

The price is $2,668.

Paradyne, 8550 Ulmerton Road, Largo, Fla. 33540.

CONTEMPORARY CONTROL SYSTEMS, INC.
Network control module

Contemporary Control Systems, Inc. has announced a network control module that provides standard bus users with an interface to Datapoint Corp.'s Arcnet local-area networks.

Individual 8571 modules provide users with transparent network operation, control and protocol in the passing of data within the Arcnet system. Arcnet networks reportedly support up to 255 nodes and data rates up to 2.5M bits.

The price is $495.

Contemporary Control Systems, 4840 Forest Ave., Downers Grove, Ill. 60515.

CONNECTICUT MICROCOMPUTER, INC.
Buster RGA

Connecticut Microcomputer, Inc. has introduced the Buster RGA, a microprocessor-based interface that enables up to 15 individually addressed IEEE-488 devices to be connected to a single RS-232 port.

Features of the interface serial port include switch-selectable bit/sec rates (300 to 19.2K) and switch-selectable parity and word length.

The RGA is compatible with service request, serial poll, parallel poll, remote/local, local lockout, device clear and device trigger interface functions.

The price is $695.

Connecticut Microcomputer, 36 Del Mar Drive, Brookfield, Conn. 06804.

tcc

It may become your favorite UNIX command.

TARTAN's C Compiler: compatibility across machines and highly optimized code—to save you resources. Superior error reporting, complete documentation, and responsive product support—to save you time.

tmc

It may become another favorite UNIX command.

TARTAN's Modula-2 Compiler: the language Pascal wishes it could be—structured syntax, separate compilation, concurrent processing support. With TARTAN's high quality performance, error handling, and support.

Your Favorite Compilers—
Save You Time and Resources

- **Optimized Code:** Fits more application on your machine; lets it execute faster. You'll get more work done with your present machines.
- **Superior Compile-time Diagnostics:** Minimizes recompilations. Locates errors precisely. Reduce the hours needed to produce a correct program.
- **Compatibility:** Keep up with a changing world. Mix languages in an application. Add new machines, and compile your existing programs correctly. TARTAN's technology produces compatible compilers without sacrificing optimization. Start with TARTAN compilers and grow with them—compatibly.
- **Complete Documentation:** Answers to the questions that always arise. Complete explanations and suggested actions for every compiler message. Your people adapt to TARTAN compilers quickly, and save time every day.
- **Responsive Product Support:** Your time is important. Take your questions and problems to our support service team. You get the answers when you need them.

TARTAN's compilers for C and Modula-2 for VAX/UNIX, DEC-20, and both 16000 and 68000 series computers. Additional machines and languages, including Ada, are coming. Ask us today about compiler suites.

TARTAN—
We're going to be your favorite software company.

VAX is a trademark of the Digital Equipment Corporation.
UNIX is a trademark of Bell Laboratories.

TARTAN

AUXILIARY from page 83

KAPTRON, INC.
WDM-01; WDD-02.

Kaptron, Inc. has introduced the Wavelength Division Multiplexer (WDM-01) and Demultiplexer (WDD-02).

The multiplexer combines light signals at two wavelengths from two input ports and delivers them to a single fiber output channel, and the demultiplexer separates the signals and delivers them to two output ports with minimal cross talk. The devices, which have specially coated mirrors, are 7/16-in. in diameter and 2.5-in. long. A pair costs $1,900.

Kaptron, 3460 W. Bayshore, Palo Alto, Calif. 94303.

Lineguard system enhanced

YOUNGSTOWN, Ohio — Western Datacom recently introduced an expanded Model 3060 Lineguard system designed to prevent unauthorized dial-up access to stored data.

According to the company, when a caller dials into the 3060, he is prompted for an access code. The caller is given 20 seconds and two chances to enter his code correctly. If the entry is incorrect, Lineguard will instruct the modem to disconnect and log an error. An optional monitor is also available to create an output log for either a printer or computer.

If the caller's code is verified, the device reportedly will call him back at a predetermined number. The user is informed if the callback can be placed immediately or if it must be queued for the next available line. The user then chooses to accept or reject callback.

An added feature of Lineguard is that group codes assigned to each user provide for least-cost routing, port contention and port selection. The device assures the same level of security normally limited to private lines, the company said.

The price of the Model 3060 Lineguard is $995 for rack-mounted installation.

Western Datacom is located at 5083 Market St., Youngstown, Ohio 44512.

Cut through teleprocessing tie-ups with WESTI.

WESTI—the Westinghouse Teleprocessing Interface—is an easy-to-use, comprehensive teleprocessing monitor that can help make telecommunications a joy instead of a burden.

WESTI gives you the system, terminal, printer, and applications control you need to provide all vital telecommunications functions. But even more importantly, if you're currently using the CICS telecommunications package, WESTI software can cut through system tie-ups to help improve response time and overall system efficiency.

WESTI's efficient task-dispatching mechanism manages all telecommunications functions in a full multi-thread, multi-task environment—with minimum memory requirements. So you don't waste valuable system resources. Using an optional converter, WESTI can run CICS command level programs so you don't have to write new ones to integrate WESTI into your telecommunications system. In fact, users find that because of WESTI's teleprocessing "shortcuts," it's often faster (and less expensive) to run their converted programs through WESTI than in native mode.

What's more, WESTI application programs may be written in any combination of Assembler, COBOL, PL/I, or RPG II. And personnel trained to use CICS don't have to start all over again to learn the WESTI system. They can simply add WESTI's short training program to what they already know.

WESTI can also use all Westinghouse interrelated productivity software like SPOOL-PRINT, VISUAL AIDS, SCEPTER, and MAIL-TRONIC, so it's expandable to meet your needs as they grow. And best of all, WESTI is top-ranked by users. A recent survey in Datamation magazine gave WESTI top marks in ease of use, reliability, and performance.

Telecommunications tie-ups can make your life miserable—and cost you money. Cut through those tie-ups with WESTI. For more information, contact your Westinghouse Management Systems Software representative, or write Westinghouse Electric Corporation, Management Systems Software, 777 Penn Center Blvd., Pittsburgh, PA 15235. Or call (412) 825-7000.

You can be sure...
if it's Westinghouse

CHARGES from page 55

Alinet — round up to the nearest tenth of a minute.

A second reason for variation in billing accuracy, according to Checkbook, is the difference in the various telephone companies' measurement capabilities. There are three telephone call measurement approaches: answer supervision, audio detection and guesswork.

The most precise approach to telephone measurement is answer supervision, which determines when a called party lifts the phone's receiver. AT&T has this capability; SBS has set it up on many of its routes; and a few other companies have it on some routes, but many calls on these carriers' systems cannot be measured by this approach, Checkbook reported.

An alternative approach used by telephone companies is the use of audio detection equipment, which "hears" a difference in sound when the called party lifts the phone.

Another approach used by carriers to measure calls involves timing. Ordinarily, carriers that rely on this method wait a specified amount of time, maybe 30 to 45 seconds, before a call is charged. But after that period, the caller may be charged even if the phone is still ringing.

The Complete Guide to Lower Phone Costs will be available for $6.95 from Washington Consumers' Checkbook, Suite 925, 806 15th St. N.W., Washington, D.C. 20005.

CATV from page 55

fer of digital data.

Besides the homeowner, to whom two-way cable services such as videotex, access to official airline guides, banking, burglary protection and sensors will be available, businesses like banks and large corporations will be the new breed of cable subscribers thanks to two-way cable capabilities, the reports stated.

These businesses, with offices scattered about in many different locations in a local geographic area, will continue hooking up their large computers at these different sites over high-speed channels on the cable. For the cable operator, adding data communications capability onto the entertainment network could be profitable with as few as ten subscribers, the researchers reported.

The report costs $3,000 and is available from Strategic through P.O. Box 9747, San Jose, Calif. 95157.

RATES from page 55

consumers and small and medium-size businesses to determine costs for the same calls on each of more than a dozen alternative long-distance networks.

Criteria included in the evaluation will be the rate periods during which the calls are made (day, evening or weekend), length of call, call origination and destination and volume of calls.

The projected cost for businesses using the rate service evaluation will be 2% to 3% of the company's annual telephone bill. A yearly one-time update will be offered to customers at a substantially lower fee.

Further information is available from Washington Consumers' Checkbook, Suite 925, 806 15th St. N.W., Washington, D.C. 20005.

IN DEPTH

The tyranny of words

While all technical writing departments appreciate the importance of verbal communication, few adequately value visual communication. No department should be without an art director. A technical manual that consists of a stack of pages spit out by a word processor is unfinished.

By Priscilla Burgess

Jack, a warehouse forklift driver, held up a plain blue notebook. It was a standard, three-ring binder containing perhaps 200 pages. Each page was dense with words. Jack thumbed through the pages and, looking up, said, "I'll never be able to use this computer."

Jack has discovered that between him and the computer is a huge barrier — the technical manual. In order to learn to use this new tool in his work, he will have to read and understand more words than he has dealt with in the last 10 years.

The technical writers who prepared this manual sincerely believed that they had done the best job possible. Because Jack and his co-workers are new to the technology, the writers were careful to provide extensive detail about the application as well as information about the operating system and file management. The manual had been checked by the programmers for technical accuracy and by a former English teacher for grammatical accuracy.

The gap between Jack's needs and the information provided by the computer company is a formidable one that is well recognized by computer companies, their customers and technical writers. As competition among those companies increases, customers look to see which system or which software will be easiest to learn to use. A good technical manual can be a company's most powerful selling tool.

Considering the amount of interest, energy and money invested in improving manuals, why are they still the albatross of the computer

IN DEPTH/THE TYRANNY OF WORDS

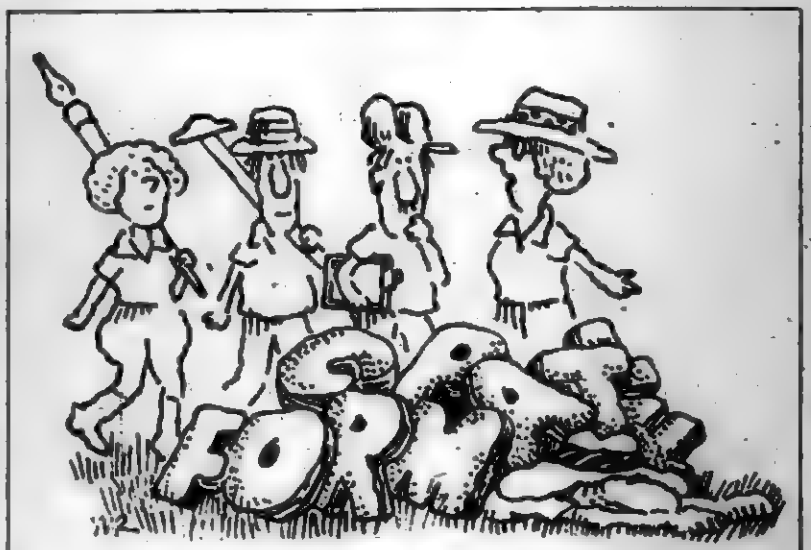
industry? A major clue is in the title of the people who produce them: technical writers. This title defines and restricts how the world thinks about communicating computer information — it is technical and it is written. Technical manuals are repositories of words — created by a joint effort of writers and technicians — that describe what a computer does, not how to use it.

Technical writers are perpetuating the approach started early on when only highly trained technicians were using computers. The kind of information they needed is very different from the kind of information the computer-naive user needs today.

In an effort to accommodate the new users, the technician-turned-writer is changing to the ex-English teacher and the former journalist. While the writing style has changed, the kind of information and the way it is presented have not. The computer industry appears to be committed to burying its users under an avalanche of meaningless words.

Not a writing exercise

We need to get out from under the words and look at communicating technical information in a different way. Putting together a technical manual should not be considered a writing exercise. It should begin with the idea of communication. The typical communication event consists of a sender, a message and a receiver. The goal, therefore, is to prepare a message that carries the information the sender wishes to send in a way that is optimally comprehensible to, and usable by, the receiver.



If the idea of communicating a message is kept in the fore, it is easier not to fall into the trap that the message must be confined to the written word. All of us gather information all day long from a variety of sources. When we learn to do something, like using a computer system, we may watch someone for a while, ask questions, read a bit and practice a lot. Rarely will anyone learn anything from only one source. And it's virtually impossible to learn a skill by reading a book.

First, we need to look at the people who produce the manuals — the source. Should the staff include other kinds of employees besides writers — such as visual communicators and researchers? And if so, how do they work together? Second, we need to look closely at the users — the receiver. Who are they, how do they work, how do they get the information they need? Third, we need to look at the way we present the information — the message. Should it always be written? What kind of information is really necessary? What should be written, what should be illustrated, what should be on the screen, and what should be told to the user?

A communication approach to preparing technical manuals draws upon theory, research and creative expression of various fields such as anthropology, psychology, communication research, art, education and consumer research. It was used to prepare a second manual for Jack and his fellow warehouse workers.

The source

When a company prepares a high-tech product for the marketplace, millions of dollars and a good deal of time are spent in research, development and manufacturing. Close to the day when the product is to make its debut, technical writers are given a small amount of time and an even smaller budget to prepare the instruction manual. Anyone who has worked in this industry is familiar with the last-minute panic and chaos of the writing staff.

This was the exact situation at the company that was preparing the inventory system for Jack's warehouse. Because of the size and complexity of the system, several years were spent in software development. Even though there was an effort to document the system as it was developed, the number of changes from the first specification to the final software delivery was so great that

DYNAPLAN™/DYNACALC™

1-2-3

FOR IBM MAINFRAMES

Join hundreds of VM/CMS and MVS/TSO users who have discovered that

DYNAPLAN™ does it all. . .

Database Interface
Color Graphics
Spreadsheet

DYNAPLAN™ uses all the popular features of Lotus 1-2-3® and VisiCalc®

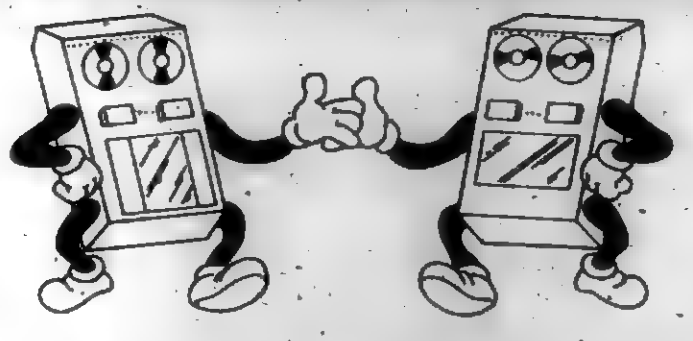
For a free 30 day trial call (312) 525-6400

ChicagoSoft

738 N. LaSalle St. Suite 2 Chicago, IL 60610

Dynaplan is a registered trademark of Dynacalc Corporation. Dynaplan was formerly called Dynacalc.
1-2-3 is a registered trademark of Lotus Corporation.
VisiCalc is a registered trademark of VisiCorp.

OUR SWITCHES MAKE YOUR IBM SYSTEMS WORK LIKE A TEAM!



If you have more than one IBM or plug compatible processor, Digital can help you get the most for your hardware investment. Our switches allow you to achieve backup and peripheral configuration flexibility at a fraction of the cost you're probably thinking.

Whether you have two processors or more, Digital has a switch to suit your requirements.

- Model 4101 The lowest priced matrix switch on the market.
- Model 3421 The only manually operated channel switch in the industry.
- Model 3403 A remote controlled channel switch designed for underfloor installation.

DIGITAL CONTROLS

2779 Orchard Run Road • Dayton, Ohio 45449 U.S.A. • (513) 435-5455
Dallas 214-669-0089 New York 201-585-9416

*Registered Trademark

original documentation was outdated.

During the development stage, technical writing projects were divided between the technical representatives and the marketing secretaries, occasionally assisted by technical writers. As the delivery date approached, the management started looking seriously for someone to prepare the manuals. As with virtually every other computer company, the qualifications they sought were a certain level of technical knowledge and a proved competence in writing.

Departmental structure

The typical structure of a technical writing department is a manager who has had experience as a technical writer and is frequently a former teacher. Under this manager are several writers with similar backgrounds, but perhaps not as much experience in the computer field. Usually, each writer is responsible for every aspect of one manual.

White space frequently causes anxiety in writers. If you give writers a blank piece of paper or a blank screen, they will fill it up, leaving about an inch of margin around the edges. This is a natural and proper thing for a writer to do. When writers produce a manual, they concentrate on what they know and do best — words.

It is hardly fair to expect people who have devoted their lives to words to suddenly, upon demand, provide illustrations, design page layouts, spec type and deal with printers. Nor is it reasonable to expect them to have made a study of audience analysis techniques so that they can design the manual based on researched needs. At the very least, if writers are expected to be competent in such a wide range of activities, they should be paid accordingly.

When professional artists are employed to design or illustrate manuals, writers have difficulty in figuring out what should be illustrated and what should be written. Left on their own, artists will frequently decorate rather than illustrate. The problem is not too bad when the product has a physical reality, such as a microcomputer. But when the product is software, how does one visualize millions of electrical impulses?

Computer companies do not necessarily staff a department with writers because they believe it is the best way to achieve their product. It is often simply because no one has offered a better alternative.

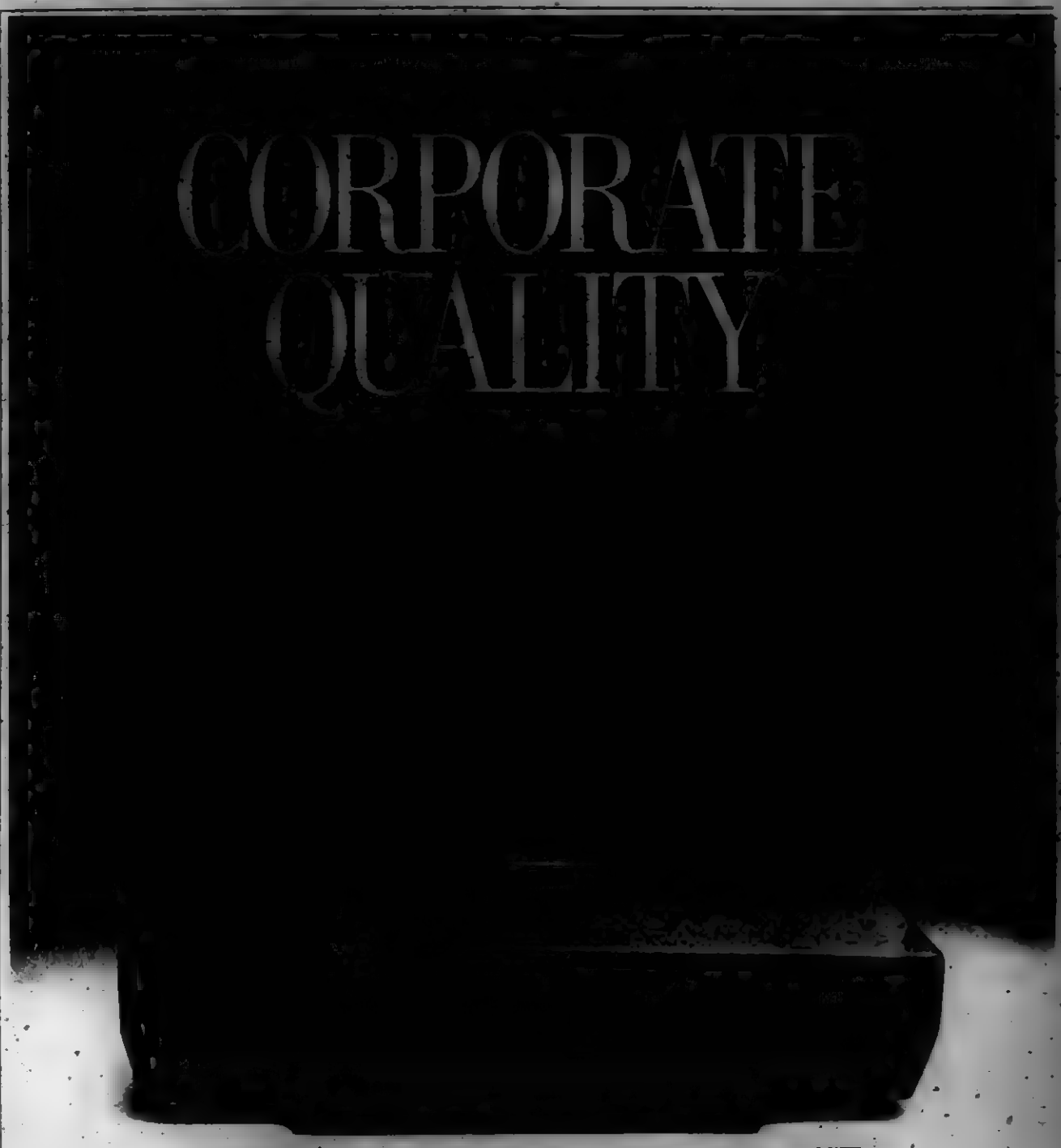
In order to get away from a tyranny of words, we need to restructure the organizational chart and pull in a few people who are not presently represented. The person in charge of producing user manuals needs to have a broader view of message design than is currently the case.

Different kinds of information needs to be communicated in different ways.

Experience with and knowledge of the users of all media, not just printed words, is highly desirable in a project director. If the project director is used to working with various kinds of artists, as well as writers, he will be better able to break a message down into appropriate words, pictures and media.

While all technical writing departments appreciate the importance of verbal communication, few adequately value visual communication. No department should be without an art director. A technical manual that consists of a stack of pages spit out by a

First, we need to look at the people who produce the manuals — the source. Should the staff include other kinds of employees besides writers — such as visual communicators and researchers? And if so, how do they work together?



CORRESPONDENCE QUALITY FOR THE CORPORATE WORLD OF THE IBM PC

Introducing the Diablo 32 CQ Correspondence Quality printer, perfectly matched to the IBM PC. It's a single printer that does everything. This remarkable dual speed machine delivers both high speed printing in draft mode and superior print quality in correspondence mode. The extended character set, combined with full graphics capability, lets you get the most from your IBM PC. And all at a surprisingly affordable price.

The Diablo 32CQ: quality you can see at the Diablo dealer nearest you. Call 800-556-1234 ext. 186. In California call 800-441-2345 ext. 186. Diablo Systems Inc., A Xerox Company, Fremont, California.

Diablo Printers

IBM® is a trademark of International Business Machines Inc.

Scribe supports laser printers

You've heard a lot about laser printers . . . high print quality, attractive fonts, fast, quiet, affordable. But you haven't heard a lot about software to support them.

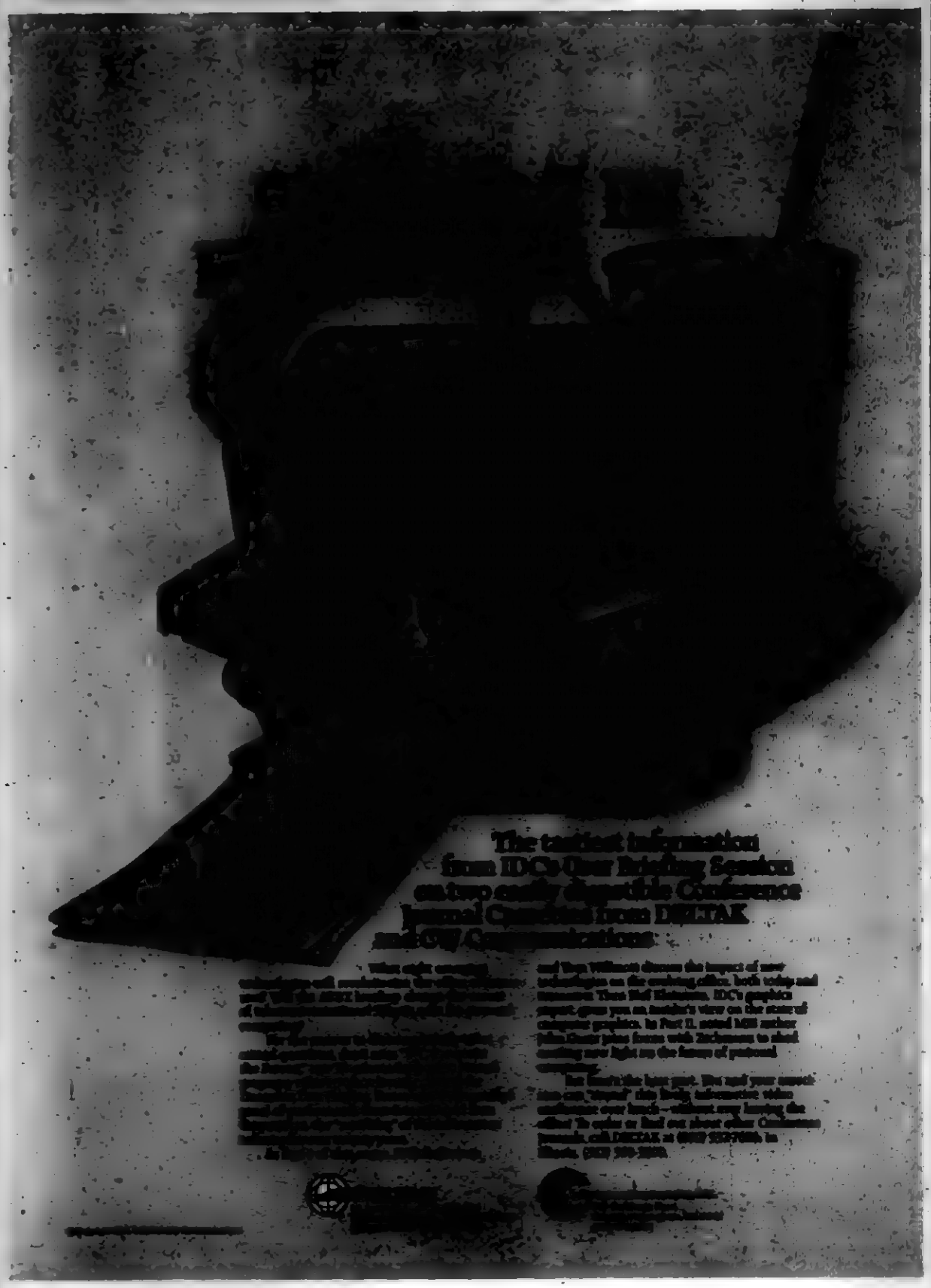
The Scribe Document Production System supports more laser printers than any other software. Laser printers like the Xerox 2700, 9700, 9790, the IMAGEN IMPRINT-10™, the Symbolics™ LGP-1, the CADO Lasergraphic 1200™, and soon the IBM 6670.

Buying a laser printer? No matter which one you choose, you'll get the most from it with Scribe.

For more information, contact:
UNILOGIC, Ltd.
160 North Craig Street
Pittsburgh, PA 15213
412-621-6277

Scribe document production software is available for DEC VAX, IBM, and VAX, Prime, IBM mainframes, the Apple and Sun workstations. "Scribe" is a registered trademark of UNILOGIC, Ltd.

UNILOGIC



IN DEPTH/THE TYRANNY OF WORDS

The title "Technical Writer" not only defines how the industry perceives this function; it also limits the way the rest of the world perceives it as well. People with research or media communication skills would probably not think to apply to technical writing departments.

word processor is unfinished.

Technical writers are often considered to be the in-house user advocates. They are consulted by programmers on problems of screen design and the construction of on-screen instructions and messages. And yet, many technical writers have never seen or spoken with the intended users. How is one to know the best way to construct a message if one knows nothing about the person who will receive it?

The last addition to the staff is the researcher. Before a project begins, a user-needs assessment and audience analysis must be done. Without this information, there is little hope of creating an effective and useful message. Throughout the development of the materials, the selection of visuals and instructions needs to be carefully tested to ensure that they are sufficient and accurate. At the end of the project, there needs to be an evaluation of the manual's overall effectiveness to guide the staff on future projects.

Where does one find these people? As things are today, they are not likely to be sitting in the personnel office. The title "Technical Writer" not only defines how the industry perceives this function, it also limits the way the rest of the world perceives it as well. People with research or media communication skills would probably not think to apply to technical writing departments.

Recruiting sources

The best source of these people would be advertising agencies that handle high-tech accounts. Several companies in California's Silicon Valley have already started the trend by hiring people who have extensive marketing backgrounds in promoting traditional consumer goods.

This assortment of skills — media experience, writing, art and research — does not necessarily represent four separate individuals. The staff that was brought together to create the manuals for the warehouse consisted of a project director, who had media skills as well as research ability; an illustrator; a design consultant, who also did the final editing; a technical writing trainee, who also did pasteup; and one genuine, experienced technical writer, who also did the final proofreading.

Rather than turning the entire project over to one writer, everyone worked on every manual, each person doing only what he did best.

The project director did the initial audience analysis and user-needs assessment. With this detailed information about the user, the project director and the design consultant outlined the basic approach. An illustrator was selected and called in to help prepare a formal presentation to the president of the company.

The writing was produced in several stages. The experienced technical writer prepared a technically accurate draft describing the workings of the system. Meanwhile, the project manager wrote a chapter as a sample of the writing style to be used. This chapter was then revised again by the design consultant. The novice writer was assigned to do the glossary and error messages and to edit the original technical draft.

While the writing was in progress, everyone participated in brainstorming sessions to come up with appropriate illustrations. All the way

IN DEPTH/THE TYRANNY OF WORDS

through the project, the illustrations and the copy were tested to be sure that they were communicating as planned.

The last stage of the project was production: page design and layout and printing. The novice writer, whose training had been in photography and graphics, was responsible for preparing the pages for the printer. The experienced technical writer did the final proofreading.

The success of any project has a lot to do with the variety of minds and talents of the people involved. Most important, however, is the concept of the integration of the work of several specialists, rather than expecting one person to be a generalist, trying to do all functions well.

The receiver

The second major part of preparing successful communication materials is a profound understanding of the user. How can we communicate with people if we know nothing about who they are or about the way they think, feel and learn?

At first glance, it seems overwhelming to try to understand the vast armies of people, growing daily, who are computer users. In dealing with any large audience, it is always easier to break it into segments. Users of high-tech products can be broken down into four segments: Captive positive, captive resistant, noncaptive positive and noncaptive resistant.

The captive positive user is one who must use a computer and wants to do so. An example would be someone who actively participates in the automating of his work. A captive resistant user is one who must use a computer to keep his job but isn't happy about doing so. A noncaptive positive user is one who doesn't have to use a computer but wants to, such as someone who buys a home computer. The noncaptive resistant user doesn't want or need to use a computer and, as a rule, will not be a target for communication materials.

Jack and his co-workers are a captive audience that has wavered between being positive and being resistant. On the one hand, they are resistant to changing the way they work and are concerned about their job security. On the other hand, they are a bit excited about learning to use a computer and want to support the warehouse manager, whom they like and respect.

At the beginning of any communication project, it is necessary to spend some time with the intended users to find out as much as possible about them. A formal approach to audience analysis, such as having people fill out questionnaires, can be costly and time-consuming. People will often say things in casual conversation that are too lengthy to write down. The project director decided to spend a week at the warehouse and gather the information by observation and casual conversation.

The "foreigners from Funnyvale" were fascinating objects of curiosity, and their presence broke up the routine of the warehouse. Curiosity about life in California was more powerful than any shyness, and there were as many questions asked as answered.

Learn by observation

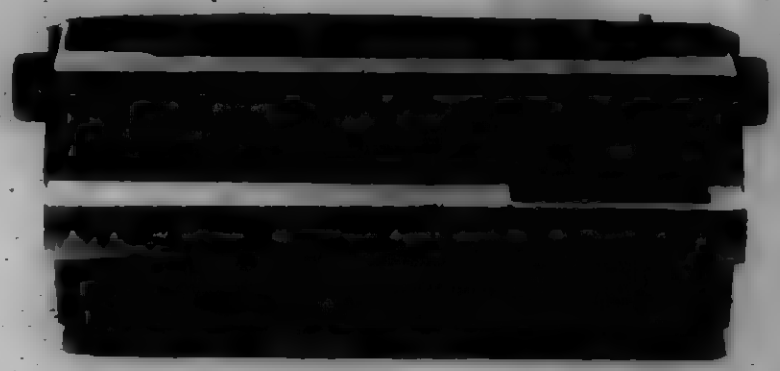
One can learn much by observation and a few casual questions. It is important for the person asking questions to explain how the information will be used. Usually, a direct approach is best; information is being gathered so that communication materials address the needs of the user.

The best way to gather the information is in naturally flowing conversation rather than going down a list of preworded questions. It is necessary to know in advance what kind of information is needed and to make sure that over the course of the time everything has been covered.

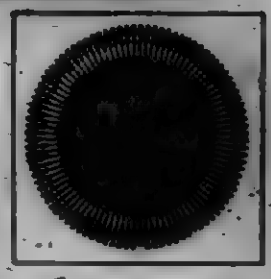
A skillful communicator will keep track of the words his audience uses to express itself and then incorporate this vocabulary into the final message. The same technique should be applied to visual communication as well. If the users depend upon TV for learning about their world, perhaps video may be a more effective training tool than a manual.

The result of the research was that, except for a few office workers, the audience was male, ranging in

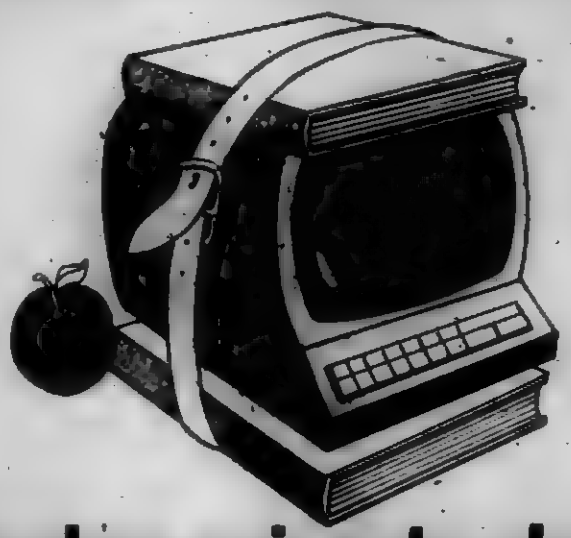
Heavy duty.



If you can't afford printer downtime, pick the ones designed to take all the punishment you can dish out and still keep printing. Our 35 and 55 character-per-second daisywheels print sheaves of crisp, sharp letters at doubletime, with never a moan or groan. Call your distributor. Or contact Dataproducts at (213) 887-3924, 6200 Canoga Avenue, Woodland Hills, CA 91365. In Europe, 136-138 High Street, Egham, Surrey, TW 20 9HL England.



Dataproducts Daisywheel Printers



Send your micros to school.

There's tremendous opportunity for sales of microcomputers, accessories and software to the educational market. You can enter that market through the school library door. The key to that door is SCHOOL LIBRARY JOURNAL.

School library media centers are a dynamic, growing market for computer products and technology. And they're the perfect place to introduce students to the hardware and software they'll be using today—and buying tomorrow.

SCHOOL LIBRARY JOURNAL is the leading professional publication of the people who buy computers for school libraries. Learn how you can reach them. Return the attached coupon today.

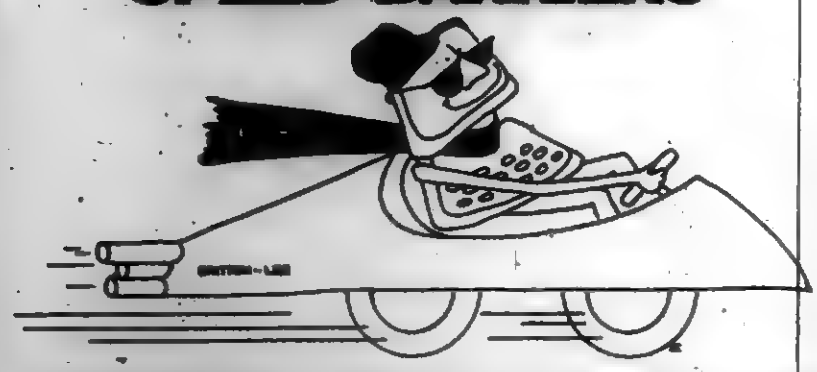
SCHOOL LIBRARY JOURNAL

Mail coupon to Ms. Carol Brissie, Research Manager
SCHOOL LIBRARY JOURNAL
205 East 42nd St., New York, N.Y. 10017

☐ Please tell me more about sending my micros to school.
☐ Please have a SCHOOL LIBRARY JOURNAL representative call me.

Name _____ Title _____
Company _____ Telephone _____
Address _____
City _____ State _____ Zip _____

OMNIBASE™/IDM™ BREAKS VAX™ RELATIONAL SPEED BARRIERS



Signal Technology's OMNIBASE software driving Britton-Lee's IDM database machine is breaking records because it:

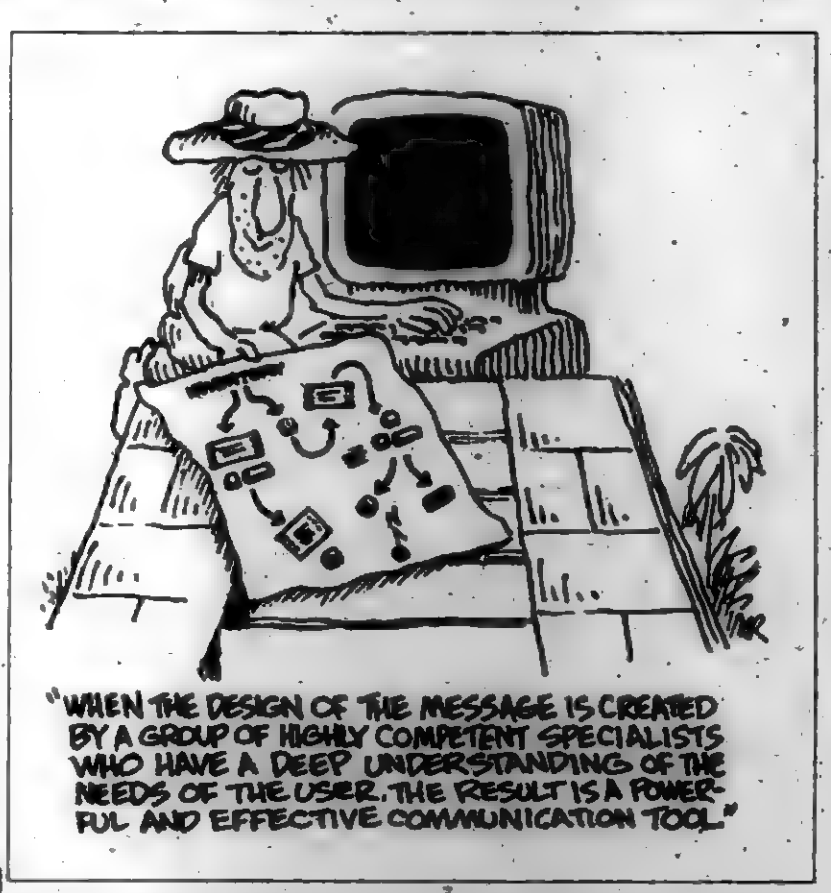
- Off-loads your VAX
- Has a much faster user response than software-only relational DBMS
- Dramatically increases productivity
- Has streamlined application development

Name_____
Title_____
Company_____
Address_____
City_____ State_____ Zip_____
Phone ( )

SEND COUPON NOW FOR COMPLETE DETAILS!

STi Signal Technology, Inc.
5951 Encina Road, Goleta, CA 93117 (805) 683-3771 Outside California call toll-free (800) 235-0781
TWX 910-334-3471

IDM is a trademark of Britton-Lee Inc.
VAX is a trademark of Digital Equipment Corporation.



age from about 30 to 55. They considered themselves professional warehouse workers and had no intention of doing any other kind of work. None had more than a high-school education, although some were seeing their children through college. There were several recent immigrants, but they had come from English-speaking countries.

These people enjoyed the outdoor life and spent much of their free time hunting, fishing and camping. They got most of their information about the world from TV and pictorial magazines. They were politically and socially conservative and considered using a keyboard of any type "women's work."

Besides gathering factual information about users, it is important to know how they feel about the new technology. The users' attitudes toward the computer affect how they will learn to use it. Often, the user manual represents the only physical reality of the software. If the manual is thick and wordy, then the user perceives the software as difficult and complex. Jack's initial reaction to the original manual is a perfect example of this. In reality, he would only be using a small portion of the system, which was eventually explained in a very small book.

Negative attitudes

Negative attitudes create an atmosphere in which no learning can take place. While communicators cannot control the events surrounding automation, being aware of the impact of attitudes on learning is important.

In preparing the materials from which users learn to operate their computers, it helps to be familiar with the way people learn. First, you must get their attention. Second, they must be able to understand the message. Third, they must then be able to perform the behavior you want them to learn. And last, they must be able to repeat the behavior.

The manual is very important in getting the users' attention. Attention can be attracted by preparing interesting-looking materials. This is often best achieved with nonverbal communication such as illustrations. Before a person will read a manual, which is a rational and deliberate action, something must attract the person's attention. This step is especially important when the target audience is personal computer owners looking for software to buy in a retail store.

The information presented must be couched in terms that are understandable to the users. Presenting too much information is just as much a barrier to learning as is too little. Using language or metaphors that are inappropriate to the audience will ensure communication failure.

The true test of the users' understanding of the information contained in the manual is how quickly

David
Recommends Texas Instruments

David Jamison Carlyle Recommends the New Generation of Printers from Texas Instruments.

Texas Instruments 850
The 850 micro printer is the first in a family of high performance matrix printers. Featuring speed (150 CPS), quality printing and graphics, plus PC compatibility, the 850 is a price performance leader with the same reliability that has made the Omni 800™ series printers the standard in offices around the world.

Texas Instruments 707
The newest edition to the Silent 700 series, TI's 707 *Portable* Data Terminal uses state of the art printing and communications technology to give you all the functions needed to do business in or out of the office.

TI Printers from DJC—The Leader in Peripheral Distribution.

TEXAS INSTRUMENTS

THE DAVID JAMISON CARLYLE CORPORATION
5700 Buckingham Parkway
Culver City, CA 90230

New Jersey (201) 780-4900
(800) 526-2823
Illinois (312) 790-4400
Texas (713) 721-4387
Colorado (303) 436-9500
Hawaii (808) 531-5135
California:
San Francisco (415) 254-9500
(800) 227-2610
Los Angeles (213) 410-9250
(800) 421-3900
Irvine (714) 851-0911
Florida:
Orlando (305) 629-1505
(800) 321-4000

DJC
THE DAVID JAMISON CARLYLE CORPORATION

IN DEPTH/THE TYRANNY OF WORDS

and easily they can use the computer. If, after reading the manual, the users cannot use the computer, then the manual doesn't work.

The last step in the learning process is the ability or desire to repeat the activity learned. If the user finds that performing is not rewarding, he will not continue to do it. This has happened to the home computer user who discovers that finding the information necessary to use the system is so unrewarding that it ends up gathering dust in a closet. Another example is the person who is afraid of being replaced by a computer at work. Economic survival is a powerfully motivating force. If a person thinks he will keep his job by not learning to use a computer, he may refuse to learn it.

Know your audience

This is a simple summary of a large body of research on human behavior. The more technical communicators know about their target audiences, the more effective their communication materials will be. Preparing training materials without this understanding is like trying to hit a target blindfolded.

When the design of the message is created by a group of highly competent specialists who have a deep understanding of the needs of the user, the result is a powerful and effective communication tool.

We need to move away from the dependence on a large book full of words that contains everything there is to know about the computer and its software. The assumption that the user will read the book from beginning to end before he uses the computer does not reflect the reality of the learning process.

Using a computer is something people do. They learn to use a computer the same way they learn other skills. Typically, people begin to learn by watching other people. They ask questions, read a bit and practice a lot. Keeping in mind a person's propensity for gathering bits and pieces of information from a variety of sources helps to break the big-book habit.

Designing any message involves a careful balance of words and pictures: of information that is presented verbally or that is best communicated visually; of information that is included or left out; or of information that needs to be repeated frequently or not at all.

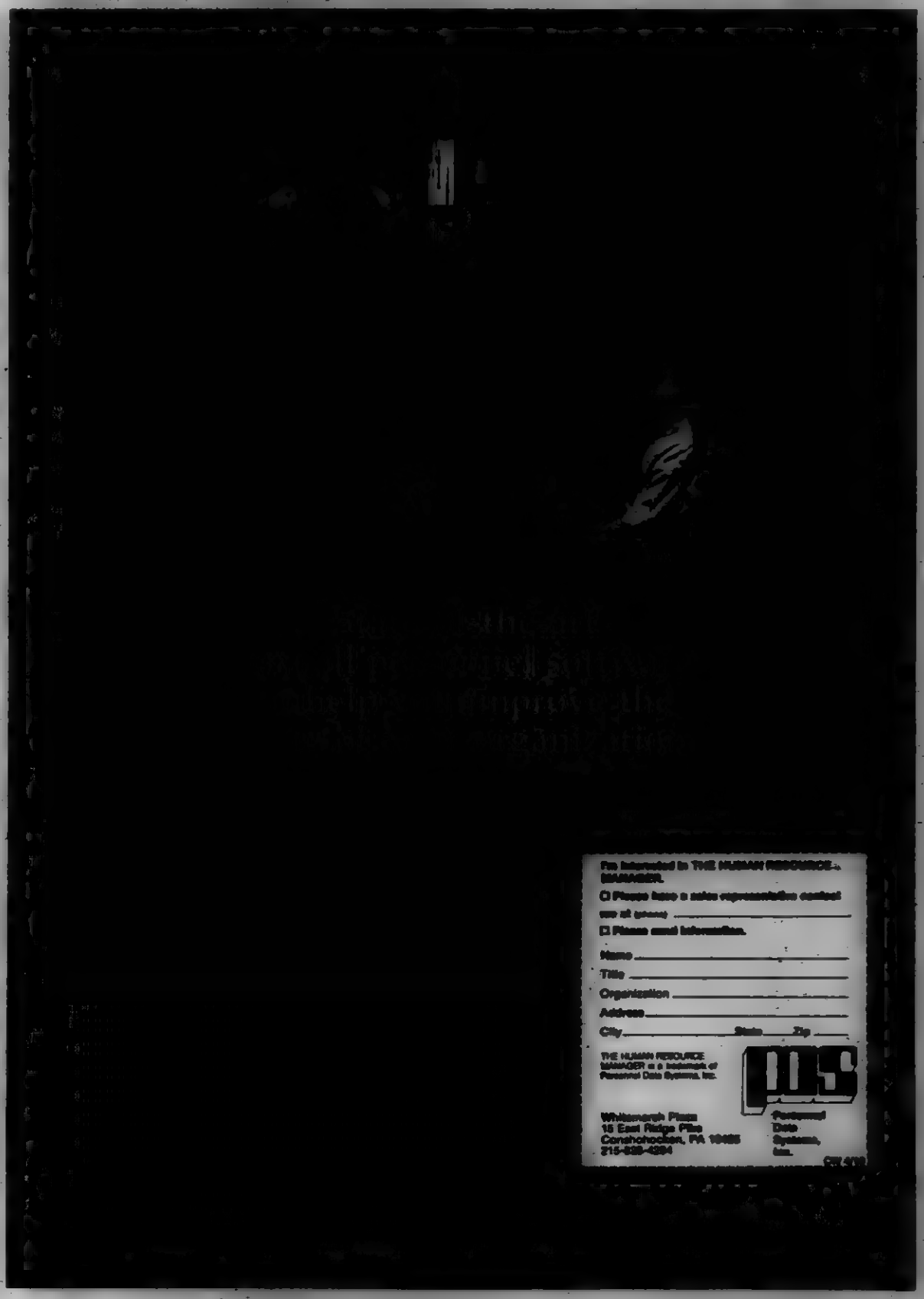
The medium into which the message is packaged has a lot to do with how people react to the message, how they feel about it and how well they learn it. Film, video, print and person-to-person communication present different kinds and quantities of information.

Film and video are similar in their production and the kind of information presented. They differ mostly in the size of the audience to which they can project. While detailed, step-by-step information cannot be remembered by viewing a film or video, they provide an excellent way to set attitudes and give general overview information.

Power of print

Print is by far the most powerful medium for transmitting detailed information. By restricting the message to words, however, technical manuals fall into the same trap as most textbooks — they are incredibly boring to read and require highly motivated readers to plow through them. While adults will put up with such literature, children won't, and, therefore, children's books provide us with examples of combining text with illustrations to transmit information.

Combining various media, such as film for general, introductory information; video for showing details of physical procedures, such as



Abacus Friendly Report Processor For IBM/38?

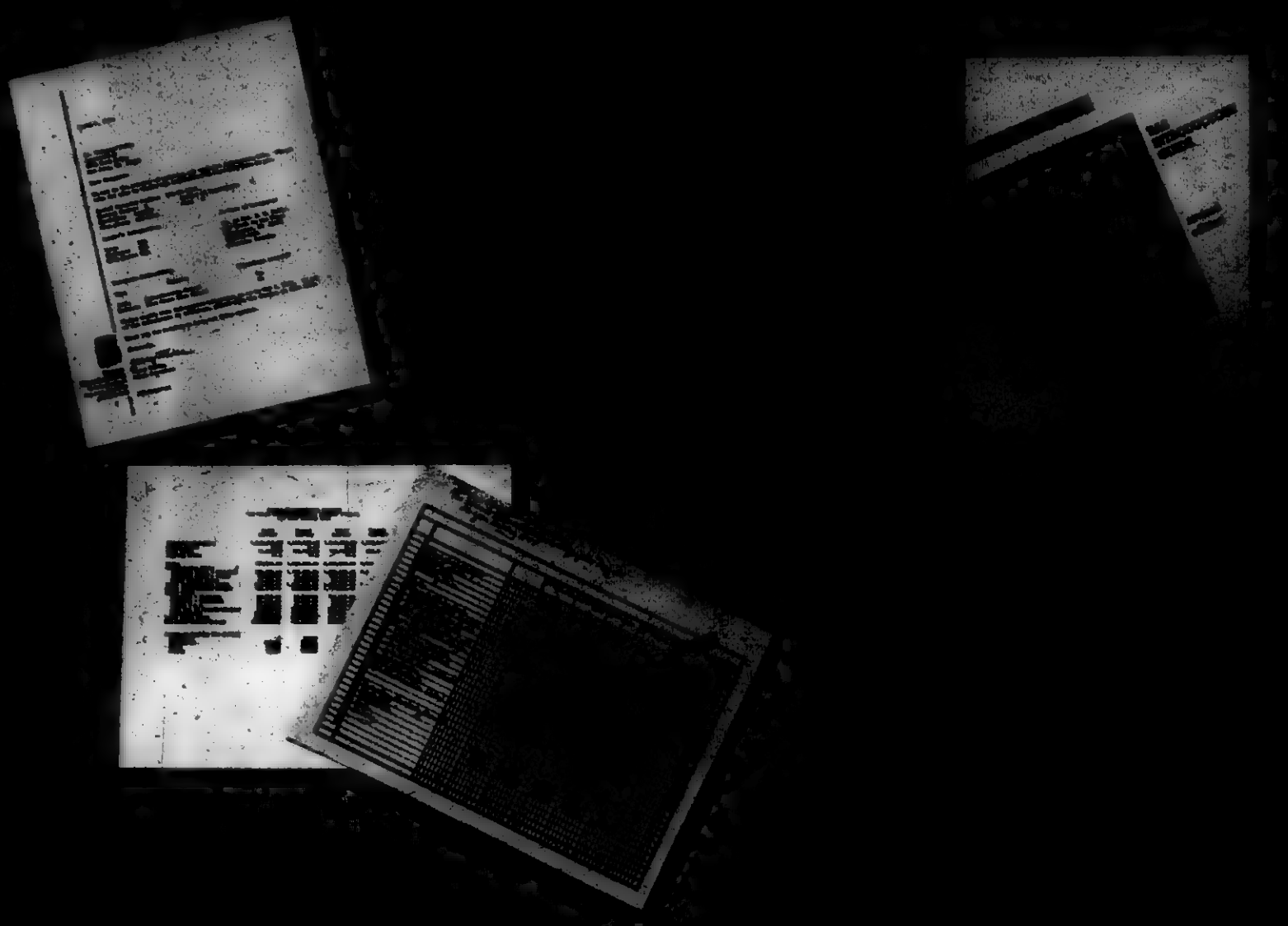
Managerial support software that is truly easy to use.

Call or write for more details on FUSION 4/38.

FUSION
PRODUCTS INTERNATIONAL

PO Box Fusion
Mill Valley, CA 94942
Telex 176089 FUSION

The SAS System



The Solution
Your Informat[illegible]ter

☐ I want to learn more. Send me The SAS Solution packet.
☐ Have a sales representative call me today!

Please write your name and address below, or attach your business card.

Name _____

Title _____

Company _____

Address _____

City _____ State _____ ZIP _____

Hardware _____

Operating System _____

Telephone # (___) _____

SAS.

loading tapes onto a computer; and print for details the user will refer to over and over again, with person-to-person involvement of trainers, is the most effective and powerful approach communicating technical information. This combination breaks the message into various forms over time and can deal with the changing needs of the users as they progress in their learning.

The organization of the content is best when it reflects the behavior of the user, rather than the behavior of the machine. Breaking down the information by task categories or procedures enables users to have only that information which applies directly to their work. If one is a receiving clerk, one does not need the shipping clerk's documentation.

Recognizing the different information needs of the novice and the experienced user is also important. Many manuals begin with assembly instructions and skills training that are not used after the first few days. Unfortunately, the pages remain to become a minor barrier to more frequently used instructions further back.

While endless amounts of energy have been devoted to the verbal messages of technical writing, virtually no attention has been paid to the visual messages. Most training materials are visually unappealing. In the case of the packaging and the manuals that come with retail software, the contents do not live up to the promise of the covers.

While words are certainly a good way to transmit information, to disregard the impact of good visual communication on learning is like trying to make a hot fudge sundae without the hot fudge sauce.

The packaging or the physical form of the message serves to attract the attention of the audience and to build attitudes toward the product. Once the attention has been captured and the initial reaction of the user is positive, the design of the pages guides the eye to the order and importance of the words and pictures on the page.

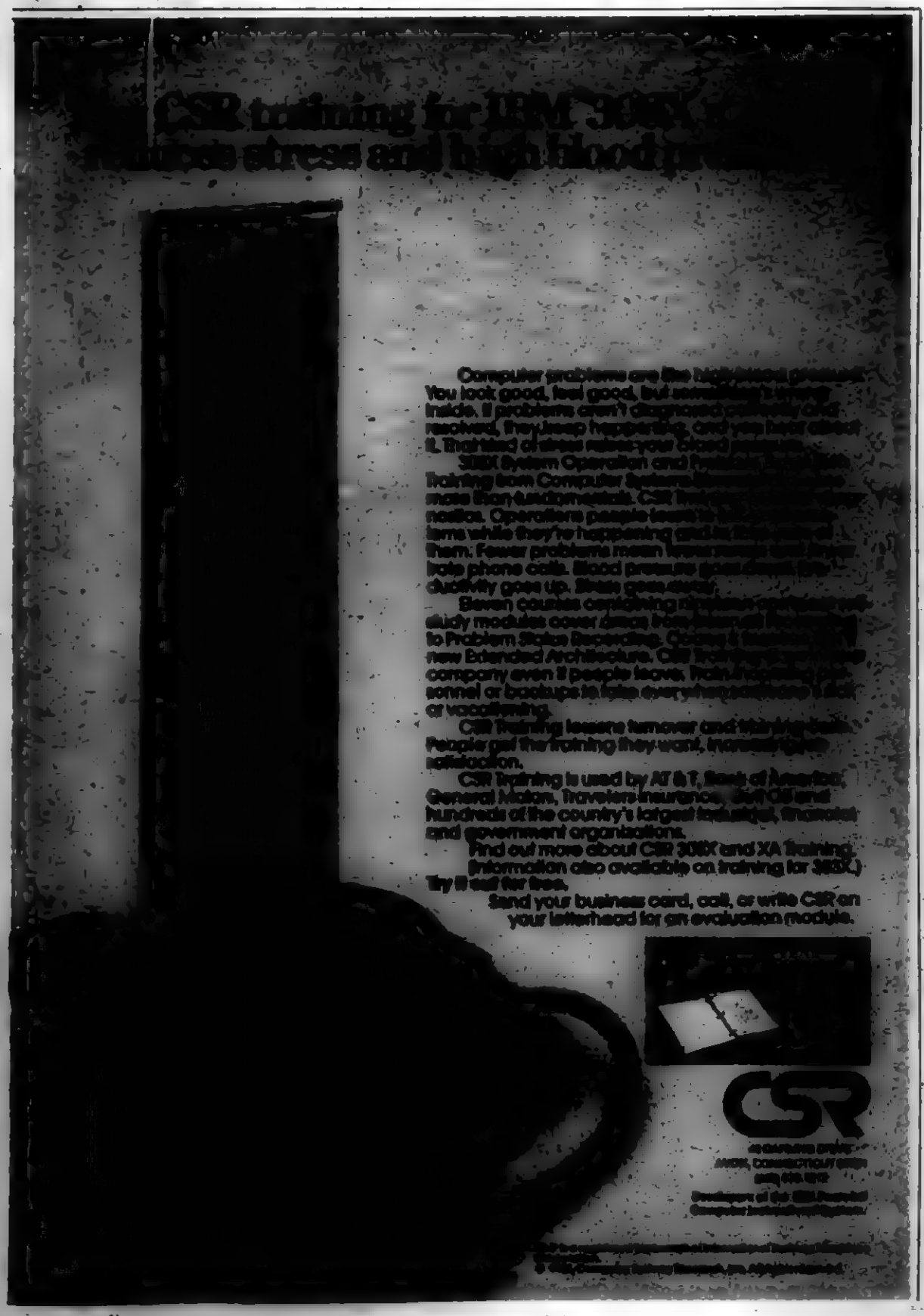
The proper use of illustration can eliminate pages of text and enhance the understanding of difficult and complex information.

On the other hand, illustrations added as decoration rather than as another expression of information become distracting noise, drawing the eye and the mind away from the communication process.

By combining the power of words with the power of pictures, the result is communication that is more effective than either alone.

By pulling together the information we have gathered about Jack and his needs, we can set up a structure from which to prepare communication materials for him. We have found out that Jack does not learn by spontaneously and enthusiastically reading 200 pages of text — indeed, who does? Jack prefers to see pictures and hear words. We know that he is somewhat discouraged by the apparent complexity of the new system, but given a chance, will go to great lengths to support his boss and the company for which he works.

The proper use of illustration can eliminate pages of text and enhance the understanding of complex information.



By pulling together the information we have gathered about Jack and his needs, we can set up a structure from which to prepare communication materials for him. We have found out that Jack does not learn by spontaneously and enthusiastically reading 200 pages of text — indeed, who does? Jack prefers to see pictures and hear words. We know that he is somewhat discouraged by the apparent complexity of the new system, but given a chance, will go to great lengths to support his boss and the company for which he works.

We know that Jack's first language is English and that his comprehension is good enough so that we don't have to make any special allowance for general information. However, because he has never used a computer before, unusual computer words and terms will need to be explained. We know that Jack is a man of action and the quicker he can use his computer the happier he will be about it.

Based on this, we created a manual that was the greatest possible contrast to the first manual Jack saw — a small, illustrated manual in the form of a comic book. Simple flowcharts illustrating his tasks replaced pages of text. The manual's size and humorous illustrations communicate the idea that the work is simple and might even be fun.

Although the manual looked different, it contained the same information as the larger book. The major difference was that we translated many pages of detailed directions into a few illustrated flowcharts. Each flowchart represented one entire type of job, showing all the steps and possible alternative actions Jack could take. This manual enabled him and his co-workers to use their system quickly and easily, with a minimum of assistance from the trainers.

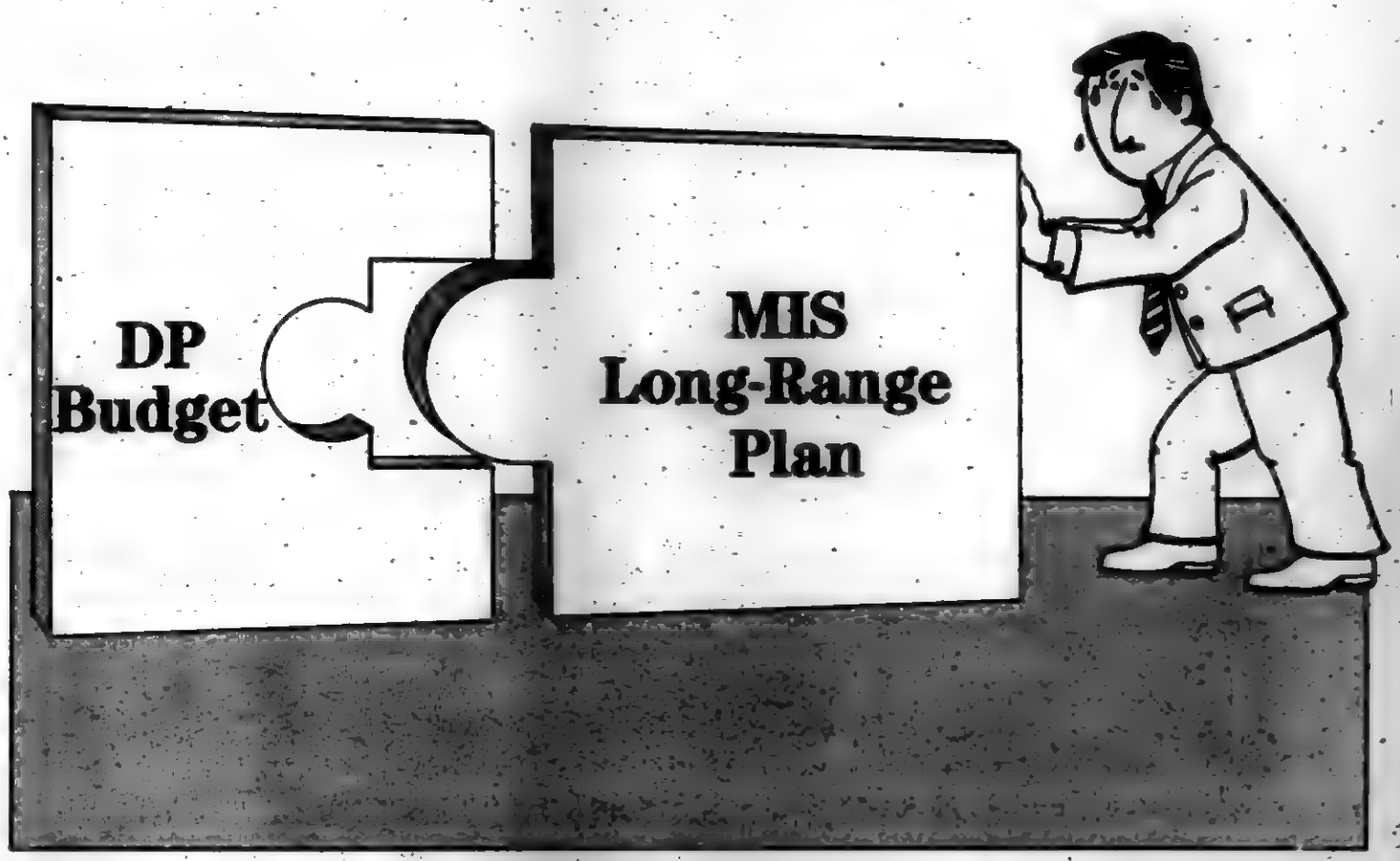
While we decided to produce a comic book, it is important to keep in mind that there are many different ways to communicate the same information to the same audience. When the audience changes, needs will be different and materials must be designed accordingly. Instead of being tied to an end product, a book full of words, if the focus is on the communication process, we can break the tyranny of words and start communicating.

About the author

Priscilla Burgess is a graduate student at Stanford University in communication research. While working on her degree, she has been consulting with high-tech companies on technical communication problems and teaching classes in technical writing. Burgess was formerly a manager of product communication for a Silicon Valley firm.

Mario Risso is an illustrator who lives and works in San Mateo, Calif.

IN DEPTH



Where it all begins: A budget that fits your plan

By Kenneth E. Phelan

The memorandum on your desk from the vice-president of finance informs you that next year's budget must be completed by the end of the month. He expects you to deliver a presentation to the steering committee to explain how requested expenditures are consistent with the strategic plan. Your immediate problem is to reduce the long-range goals and objectives to line items in the first year's budget.

The content and format of most strategic and tactical planning methodologies do not fit neatly into established budgeting practices. Most five- to 10-year strategic plans or three- to five-year tactical plans are documented in general terms. They list objectives, as well as business problems and opportunities. The plan may include briefs for proposed systems, along with estimates of costs and benefits. Implementation schedules are roughly sketched over a multiple-year calendar. The plan is organized by project rather than by the type of resources required.

Resource plans are essential to translating long-range plans into budgets. Even the more complete methodologies, however, do not generate resource requirements in enough detail to relate them to budget line items. To make the transition from long-range plan to annual budget, an operational (budget-year) plan must be formulated. Operational planning involves refining initial estimates in the long-range resource plan.

To develop an operational plan:

- Review and reassess the relative priorities of current and planned projects.
- Select specific projects for the near-term,

This past year's strategic planning efforts may have put you and your firm's top management on the same wavelength at last. Management may even agree to a five-year plan for revitalizing the systems department. The challenge now is to translate that plan into a first-year budget.

budget-year segment of the company's MIS long-range plan.

■ Rework the near-term segment for the upcoming fiscal year to achieve the appropriate level of detail for budgeting purposes.

After reviewing priorities and selecting the year's projects, a detailed estimate of required expenses should be developed for each one.

The monetary outlay to make progress toward the near-term segment of the MIS long-range plan represents incremental DP costs. Budgeting also encompasses two other dimensions: ongoing costs to maintain the status quo and unanticipated projects that are not parts of the plan but must be addressed as consequences of pressing regulatory or marketplace directives.

While the prior year's actual expenses provide an accurate basis for projecting ongoing costs for the upcoming year, it is obviously more difficult to ensure that adequate funding is set aside for unanticipated requirements. A useful technique is to define a contingency or research and development project category.

Experience with the unplanned project costs encountered over the previous several years should provide some guidance for determining the amount to allocate for contingency purposes.

All operating expenses, including those for ongoing, unanticipated and planned activities should be presented in a format that itemizes expenditures across six resource categories. The following framework can be used as a model for organizing and documenting a one-year DP operational plan in four sections.

Section I: Application systems agenda. This section should provide an in-depth discussion about each significant application system project for the upcoming fiscal year.

Projects of this nature include the study, design, programming, testing, documentation, training and installation of functional business systems and should be separated into three classifications of systems development effort:

■ Significant maintenance on existing systems.

■ Significant enhancements to existing systems.

■ Significant new systems development.

Narratives and exhibits should appear wherever appropriate for each of the following areas:

System description. This description should cover each system's expected capabilities and should explain how each system contributes toward solving business problems and/or capitalizing on opportunities. Each system should be clearly tied back to the MIS long-range plan to clarify and strengthen the justification for near-term funding and implementation.

Resource requirements. This subsection should project the costs required to implement each system and to sustain it as a part of ongoing operations. It should include an itemization of requisite resources and associated expenses for additional hardware, software, staffing, environmental facilities, supplies and administration, outside services and training.

Benefits summary. This comprehensive review of each project's anticipated tangible and intangible benefits should include supporting documentation that references relevant feasibility studies, reports, surveys, cost/benefit analyses and financial justifications.

Implementation schedule. The schedule should present estimates for major project milestones, such as anticipated start and completion dates for each system development phase.

Section II: Services and support agenda.

Projects covered in this section include installation, use and management of system control software or some other aspect of a data center's operational environment. Also included should

The TC-500A is available in 16- or 32-channel chassis configurations. 16-channel unit shown above.

COMDESIGN INTELLIGENT STATISTICAL MULTIPLEXERS:

MORE FEATURES FOR YOUR COMMUNICATIONS DOLLAR

An attractive price and a long list of features make ComDesign's TC-500A Intelligent Statistical Multiplexer a great value. In fact, it would be hard to beat this multiplexer for data concentration, error control and throughput.

But that's not all.

The advanced intelligence of the TC-500A also gives you the complete system control you would expect only from an expensive network processor.

IT'S FLEXIBLE

Compatible with virtually any host computer, the TC-500A can connect up to 32 terminals, printers, personal computers, or other CPU's over one phone line.* With all the performance of a direct connection. Just select the exact channel configuration you need. The TC-500A supports all popular speeds, flow control conventions, and special character formats.

The TC-500A's unique firmware module, Flexpak, permits easy in-the-field software upgrades and access to latest ComDesign software releases.

*Two synchronous or 20 asynchronous and 1 synchronous

Free application engineering and support is available to all customers from ComDesign's highly-qualified "data comm doctors."

EASY TO USE

The TC-500A is also surprisingly user-friendly. For starters, you never have to flip DIP switches or figure out complicated codes. As a matter of fact, the TC-500A is menu driven, in plain English. All commands are simply entered via the convenient front panel or through the supervisory CRT.

A NETWORK CONTROL CENTER TOO

The TC-500A's multiple microprocessor based architecture makes it powerful enough for network control and management functions. From either end of the network, you can monitor and test the entire system or its individual components, perform complete reconfiguration or change any operating parameter.

And, should anything ever go wrong, the TC-500A's extensive self-diagnostic capabilities make it easy to pinpoint the problem and effect immediate corrective action.

Add it all up, and we think you will agree, that the TC-500A will give you more for today's *and* tomorrow's communications dollar.

For complete information, write to us at ComDesign, Inc., 751 South Kellogg Ave, Goleta, CA 93117 or better yet call us toll-free.

(800) 235-6935

(800) 368-8092 in CA

ComDesign

FICS

- IFCP opens and closes CICS files using batch JCL
- ✓many other CSMT/CEMT functions
- ✓eliminate PAUSE statements
- ✓free 30-day trial period
- ✓$1250 one-time or $63 month

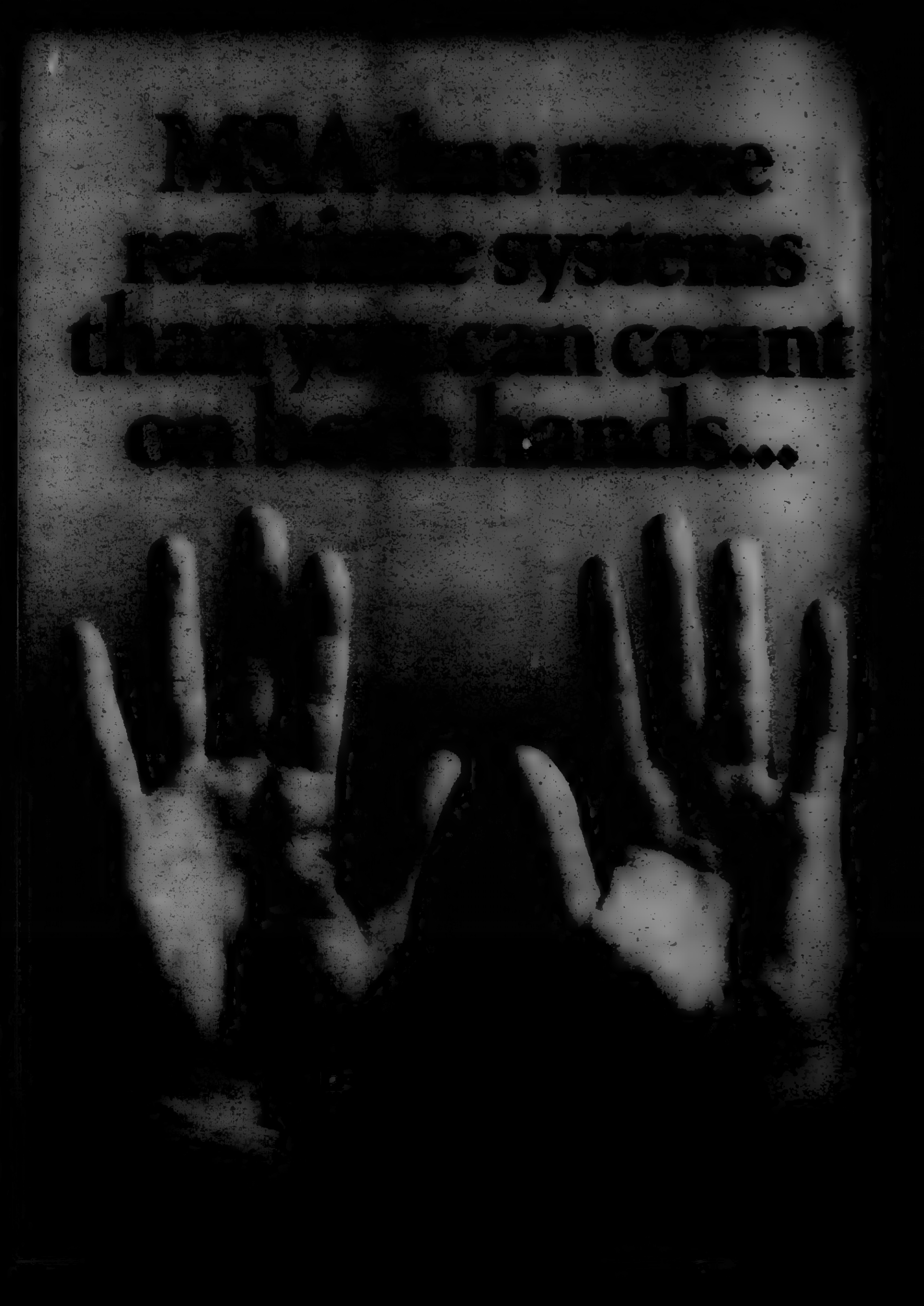
sds

A Division of J.W. Lemp, Inc.

5401 University Avenue N.E., Suite 308, Minneapolis, MN 55432

(612) 571-6000

MSA has more realtime systems than you can count on both hands...



...and they're all designed to work perfectly

information retrieval

...are integrated ...m our next three ...bined.

...producing realtime ...1978. And solved the ...associated with realtime, ...accounting control, ... security and recovery. The result: a full range of finely tuned, highly reliable realtime systems.

Nobody can give you a software product line this broad. Nobody can offer you a choice between realtime and online systems.

And nobody else offers a true

MSA Realtime Mainframe Systems	
1. General Ledger	8. Foreign Exchange
2. Accounts Payable	9. Forecasting & Modeling
3. Accounts Receivable	10. Manufacturing
4. Budgetary Control	11. Personnel
5. Project Tracking	12. Fixed Assets (Available for delivery December, 1984)
6. Payroll	
7. Order Processing	

borderless environment like INFORMATION QUICK.™ This new capability lets you use plain English commands for fast and easy retrieval of information and interactive online report writing. Make the most of realtime. Get INFORMATION QUICK. Ask your MSA representative for details.

MSA

The Software Company

Management Science America, Inc.
3445 Peachtree Road, NE, Atlanta, GA 30326

Sample resource subplans

be plans for disaster preparedness, security, project planning and control methodologies and standards and procedures.

Other projects to cover:

- Studies on alternative hardware, software or organizational architectures.
- Capacity measurement and projection.
- Operating system upgrades.
- Data base management system readiness.
- Data communications capabilities.
- Job accounting and user chargeback facilities.

Again, narratives and exhibits should appear as appropriate to address the same four topics cited in Section I.

Section III: Resource requirements summary. The various resources needed to implement the projects discussed in Sections I and II should be covered as a whole in this section. Rather than being examined on a project-by-project basis as in the above two sections, resource requirements for all of the year's identified projects should be assembled into categories and reported in resource subplans that clearly depict proposed changes across a yearly calendar as follows:

Hardware subplan. Indicate any anticipated noteworthy equipment configuration upgrades or replacements. Provide pertinent detail, if available, for:

- Types of equipment (CPU, memory, modems, controllers, direct-access storage device, tape and printer).
- Vendor.
- Target installation date.

MicroAge®

"THEY GAVE US THE BEST OF BOTH WORLDS"

...OWNERSHIP...AND THE STRENGTH OF AN INTERNATIONAL CORPORATION!"

"We wanted to offer Indianapolis something different: not just another computer store. The MicroAge idea of selling solutions really made sense to us...and with MicroAge, we're making it happen!"

"When we started in 1981, we had just three people working for us. Today, we're the largest computer store in Indiana. We've tripled our store to 7000 sq. ft. and increased our staff to 15."

"MicroAge...They're committed to excellence! The hardware shows it, the software shows it, the support for the store and customers shows it, and our solutions prove it!"

G. Michael Gonsior
Franchise Owner

D. Susan Wisely
Franchise Owner

Building your own professional computer sales organization with MicroAge requires an initial investment of $200,000 to $300,000, which includes $80,000 in liquid assets. Write to:

MicroAge®
COMPUTER STORES
"The Solution Store"®

1457 West Alameda • Tempe, Arizona 85282
(602) 968-3168

SPACE-SAVERS

From
WDM

Reduce your CRT and KEYBOARD workspace by 50%

BI-LEVEL CRT WORK STATION MODULE

Durable, versatile, user friendly BI-LEVEL WORK STATIONS available in a variety of configurations to accomodate major data centers, as well as, mini, micro, and pc users.

Further reduce your floor space with our new IBM 3274 CONTROLLER STACK MODULE.

Limited Dealer Programs Available.

For complete details call or write:

WESTERN DATA MEMORIES, INC.
1499 Bayshore Highway, Suite 203
Burlingame, CA 94010 (415) 697-7939

IN DEPTH/FROM PLAN TO BUDGET

■ Approximate costs (purchase prices, monthly rent and so forth).

Software subplan. List proposed acquisitions of proprietary or commercial software packages during the planning period. Provide pertinent detail, if available, for type of software, vendor, target installation date and approximate costs (license fees, monthly rent and so on).

Staffing subplan. Tally staffing requirements to reflect additional staffing through the planning period.

An examination of requirements in this area should produce projected monthly figures for skill type, number and employment costs (salaries, benefits, taxes, recruiting and so on) of people necessary to provide adequate data processing support and services and to develop, implement and maintain new application systems within prescribed target dates.

Environmental facilities, supplies and administration subplan. Determine likely significant changes to the physical site, supplies consumption or administrative expense as a consequence of working on the year's projects:

■ Fire suppression systems.

■ Normal and emergency electrical power.

■ Air-conditioning.

■ Physical security.

■ Office expansion.

Provide pertinent detail, if available, for the type of change, target date and approximate costs (purchase prices, monthly expenses and so on).

Outside services subplan. Indicate any expected noteworthy expenditures for data processing services to be supplied by concerns outside the company:

■ Consulting services.

■ Time-sharing activities.

■ Service bureau operations.

■ System analysis, design and programming.

■ Intercompany charges.

Provide pertinent detail, if available, for type of service, vendor, duration of service and approximate costs.

Training subplan. Improving the skills of data processing personnel to enable them to support project efforts implies training expense. For the skills that must be acquired, identify courses, costs and approximate travel allowance for each month in which training expense is anticipated.

A one-page synopsis should cover all the year's projects, cross-reference them to estimated costs in each of the six resource requirement categories and tally anticipated expenses by project.

Section IV: Resource allocation overview. This one-page synopsis should recap all the year's projects, cross-reference them to estimated costs in each of the six resource requirement categories and tally anticipated expenditures by project, as detailed in Sections I and II, and by category, as in Section III.

Appendices. Appendices should be included and referenced as deemed necessary to provide supporting detail when helpful.

Possible candidate topics include:

Pricing/reimbursement schedules. Data centers utilizing chargeback procedures can include current pricing schedules and a discussion of how full-cost reimbursement and/or accumulation of reserves is expected to be attained.

Feasibility studies, surveys, reports, special studies. A company also should provide any documentation that helps readers understand the plan. Examples include external studies and reports, internal feasibility studies or "white papers" to support specific recommendations.

After the operational plan is documented in this level of detail, transferring costs from each of the six resource subplans to budget worksheets is relatively simple. The task is streamlined by sorting budget line items according to the six resource requirement categories.

About the author

Kenneth E. Phelan is a senior consultant in the information systems consulting practice of Peat, Marwick, Mitchell & Co. in Minneapolis.

SourceTools Increases Programmer Productivity

Oregon Software

1-800-547-3000

SYSTEMS & PERIPHERALS

HARD TALK
Tom Hankel
CW News Editor

DEC, IBM race to grab limelight

The Keystone Kops are not dead. They're alive and well and working for Digital Equipment Corp. and IBM. The two firms are falling over themselves trying to rain on the other's parade.

On April 3, DEC scheduled a press conference in New York to announce its latest high-end VAX-11 processor, the 11/785. Held at the Windows on the World restaurant in lower Manhattan, the press conference was set to begin at 10 a.m. and segue into lunch at around 12:30 p.m.

Less than 24 hours before the DEC announcement, IBM sent invitations to its press conference, an announcement of a small System/36 and a rash of microcomputer-oriented software. That announcement was scheduled to begin at 1 p.m. at IBM's Madison Ave. office building (a good 30 traffic-ridden blocks away from the DEC announcement).

A coincidence? Don't bet on it. This is the second time IBM and DEC have scheduled press conferences at the same time. On Oct. 18, DEC held a press conference in Marlboro, Mass., to announce its Microvax system. About 48 hours prior to the announcement, IBM sent out invitations to its Manhattan press conference, scheduled for Oct 18. There, IBM announced the 3270 Personal Computer and the Personal Computer XT/370 plus about 30 unrelated products.

Strategy involved

Can it be the marketing wizards at IBM and DEC naturally choose the same day to announce their products? There is undoubtedly a strategy involved in picking the perfect date for a product announcement. Perhaps both DEC and IBM have honed that selection process down to such a science that they are driven to always pick the same day. Chances are, though, the marketing geniuses at both companies are so competitive they can't stand to see their competitor get an open shot at the limelight.

So which company is trying to step on the other company's toes? In both cases, DEC announced its press conference well in advance of IBM's. But in both instances, IBM announced many more, and more significant, products than DEC.

Did DEC get wind of pending IBM announcements and make a hurry-up attempt to steal part of the show? Or did IBM use its massive size to round up a bunch of products and announce them just to take away some of DEC's thunder?

Two possible reasons

In the April 3 case, DEC had not one, but two possible reasons for choosing that date for an announcement. C. Gordon Bell, the former vice-president of engineering for DEC, was slated to speak on what is going on inside DEC. The

See RAGE page 71

CDC unwraps storage products for Cyber 170 Series 800 line

By James Connolly
CW Staff

MINNEAPOLIS — Control Data Corp. has announced a 9.6G-byte disk subsystem, mass storage controller and 55G-byte cartridge storage system for its Cyber 170 Series 800 family of mainframes.

The CDC 895 Disk Storage Subsystem contains four independent disk spindles that provide a sectored capacity of 2.4G bytes each for a total of 9.6G bytes per subsystem. The spindles are stored in a single cabinet and feature fixed-head disk assemblies.

According to the company, the average disk seek time is 16 msec, providing improved response time and increased throughput over the existing CDC 885. The 895's 3M byte/sec burst-transfer rate is said to be twice as fast as that of the 885.

The 895 includes data interface and dual-access control for all of the disk spindles in a subsystem. The dual access was designed to allow for any two control units to transfer data simultaneously from any two of up to 16 spindles in a subsystem. It is said to feature thin-film read/write heads and a recording density of 12.2M bit/sq in.

The CDC 7165 mass storage controller features two independent control units, each providing a path for simultaneous transfer of data between peripheral processor channels and the 895. It was designed to control up to four 895s totaling 16 spindles.

The CDC 7990 Mass Storage System was designed as an extension to disk file storage subsystems and as an alternative to magnetic-tape storage. It features 175M-byte cartridges stored in a system of cells providing 5.1G bytes of storage per square foot of floor space. It includes a storage controller and storage module storing up to 55G bytes. Each controller can control

See CDC page 71

HP reduces prices of OA systems

PALO ALTO, Calif. — Hewlett-Packard Co. has announced price reductions ranging from 43% to 54% on three of its office automation systems and unveiled four preconfigured HP 3000s designed for office automation applications.

The prices of the HP 3000 packaged systems represent reductions ranging from $3,600 to $18,600 compared with their separately priced components, HP claimed.

In addition, HP is offering the following three office automation configurations at reduced cost:

- Four HP 150 personal computers with six software packages for $15,000.
- Four HP 2623A word processing and graphics terminals with five software packages for $15,000.
- Two HP 2623A word processing and graphics terminals, two HP 150 personal computers and nine software packages for $22,000.

The four specially configured HP 3000 systems include:

- HP 3000 Series 39 with 1M byte of main memory, a 65M-byte Winchester disk drive with integrated cartridge tape backup, two communications controllers and a terminal as a systems control console. The price is $38,974, an $18,600 reduction.
- HP 3000 Series 39 configured the same way, but with a 132M-byte disk. It is priced at $45,924.
- HP 3000 Series 42 with a 1M-byte main memory and with disk caching. It is priced at $62,424.

See HP page 71

Have a story about graphics?

Computerworld's June Special Report will take a look at graphics systems. We will look at graphics on mainframes and graphics on micros. We will look at why DP users are spending so much time and money to draw those pictures. We will find out who is using those pictures and how they are using them.

The Special Report will focus on graphics from business graphics to computer-aided design, from stand-alone microcomputers to integrated systems. Contributions to the Special Report should take one of two forms: a tutorial article discussing an issue or trend or a user application story outlining a particular firm's experience with a graphics system or package.

Articles must be typed, double-spaced and can range in length from four to six pages. Artwork such as charts, graphs and photographs is encouraged.

Authors should include a brief biogra-

See GRAPHICS page 71

TI enhances several CPU lines

DALLAS — Texas Instruments, Inc. has announced six additions to its Business System 600 and 800 series of small business systems and added three models to its 300A series computers.

The Business System 300A models are said to feature the addition of local-area network capability, ergonomically designed terminal enclosures and a 1M-byte main memory capacity.

The Business System 600 and 800 series models feature the addition of 9-in. Winchester WD900 subsystems with 133M-byte or 425M-byte formatted storage and ¼-in. streaming tape drive for backup.

The announced Business System 600 and 800 models use TI's standard Model 931 terminal and support the languages, communications and utilities supported by existing Business System 600 and 800 models.

The announced models are:

- The 600A with 512K- or 1M-byte

See TI page 71

- Lisp Machine, Inc. announced an office version of its LMI artificial intelligence processor/58

INSIDE

Processors/66
Data Storage/66
Terminals/68
Graphics Systems/68
Power Supplies/68
Board-Level Devices/68
Auxiliary Equipment/70

Lisp offers entry-level LMI Lambda

Artificial intelligence system for use in office environments

CULVER CITY, Calif. — Lisp Machine, Inc. has announced an entry-level version of its LMI Lambda artificial intelligence system for use in office environments.

LMI Lambda/S is based on the Lisp language and is intended for AI research and applications. It is equipped with a 32-bit Lisp processor and provides computing power similar to that of the full-size LMI Lambda in a package slightly larger than a two-drawer file cabinet, according to the company.

A special cooling fan and low-noise disk drive are said to help it fit into office automation and similar applications.

The product features a 160M-byte Winchester disk drive and a 12-slot card cage.

The LMI Lambda/S can be used as a stand-alone machine, offering the power of Lisp Machine's Lisp (extended Zetalisp) environment, or as a workstation on a local-area network using a rack-mount LMI Lambda or other host computer as a file server, the vendor said.

Lisp software supplied with the machine can confer Lisp-like attributes on non-Lisp file servers, which lets it add intelligence to traditional data bases.

According to the company, the LMI Lambda/S can be utilized by OEMs seeking a delivery vehicle for expert systems and other artificial intelligence applications packages intended for use in an office setting, as well as by software developers for program development.

The LMI Lambda/S, scheduled for deliveries in May, is priced at $66,500.

Lisp Machine is located at 3016 S. Sepulveda Blvd., Culver City, Calif. 90230.

FACE THE REAL COST OF DIVESTITURE!

Managing Complex, Multicarrier/Vendor Networks! Diagnosing Faults! Crossing Carrier Gateways! Interfacing Voice, Data and Telecom Equipment! Optimizing Hardware, Tariff and Software Opportunities!

Learn how at the new NETWORK MANAGEMENT TECHNICAL CONTROL Conference & Exposition

May 21-24 1984, Sheraton Washington Hotel, Washington, D.C.

Sponsored by the Communication Networks '84 Team

First program to ZERO IN on Divestitures' Operating Headaches — See new tech control and software solutions — Self diagnostic Modems & Components — Computer programs for network optimization, change and equipment management!

Learn at In-Depth Seminars May 21 & 22

Choose from 40 "How-To" Conference Sessions May 23 & 24

D. Doll R. Horvell D. Zatyko L. Selwyn J. Bridges J. King

Show Sponsors Include: Avant-Garde • Dynatech Data • General DataComm • Hekimian Labs • Racal-Milgo • Paradyne • Pulsecom Div., Harvey Hubbell Inc.

Exhibitors Include: Arus Corp., Datacomm Management Sciences, Data Switch, Digilog, Digital Equipment Corp., Digitech Industries, Infinet, Inlotron, International Data Sciences, NEC America, Plantronics/Wilcom, Versa-Lite Systems, and more!

Exhibits will be open: May 23, 9:30 - 5:00 and May 24, 9:30 - 4:00.

For Full Program Information Call 1-800-225-4698 (In Mass. 617-879-0700) or return the coupon below to Communication Networks — NM/TC, Box 880, Framingham, MA 01701

Please send Registration Information ☐ Please send Exhibit Information ☐

Register me for:

☐ Two-day In-Depth Sessions (May 21 & 22) $595

☐ NM/TC Conference (May 23 & 24) $295

☐ Four Day Full Program (May 21 - 24) $795

Name/Title _____

Company _____

Address _____

City/State/Zip _____

Telephone ( ) _____

FREE ADMISSION TO EXHIBITS FOR QUALIFIED BUSINESS & TELECOM PROFESSIONALS!

PROCESSORS

ARIEL CORP.
FFT 523

Ariel Corp. has announced the FFT 523, a single-card, fast Fourier transform (FFT) processor for the Hewlett-Packard Co. Series 200 desktop processors.

The FFT 523 plugs into a single backplane slot of the HP systems and performs FFTs by execution of a single program line in Basic or Pascal. Disk-based, machine-language driver routines provided with the 523 make the host-peripheral interface transparent to the user, the company said. Operating on 16-bit integer data, the FFT 523 is said to transform arrays of up to 1,024 complex points in a maximum of 9.2 msec. Two or more FFT processors can be installed in a single host for increased throughput, the company noted.

The FFT 523 is priced at $1,800 in single quantities, according to the vendor.

Ariel, 600 W. 116th St., New York, N.Y. 10027.

DATA STORAGE

CORVUS SYSTEMS, INC.
Omnidrive

Corvus Systems, Inc. has announced that it has included its Omninet local-area network interface in its line of Winchester disk drives. The Omnidrive disk drives reportedly also have no need for a dedicated disk server in network applications.

The Omnidrive disk drives use a 5 ¼-in. Winchester disk and replace most of the existing line of Corvus drives, according to the vendor. The drives will be available for the IBM Personal Computer and Personal Computer XT and the Corvus Systems Corvus Concept, Digital Equipment Corp. Rainbow 100, Apple Computer, Inc. Apple II, Texas Instruments, Inc. Professional and the Zenith Data Systems Z-100 computers.

The Omnidrive systems are available in the following storage capacities at the following prices: 5.5M bytes, $1,995; 11.1M bytes, $2,495; 16.6M bytes, $3,195; and 45.1M bytes, $4,995, according to the vendor.

Corvus Systems, 2100 Corvus Drive, San Jose, Calif. 95124.

IMPERIAL TECHNOLOGY, INC.
Megaram; Megastream

Imperial Technology, Inc. has announced its Megaram solid-state, nonrotating, disk emulating memory for the Digital Equipment Corp. VAX-11 series of computers. At the same time, the firm announced a streaming tape drive option for Megaram.

Megaram reportedly eliminates the rotational and head-positioning delays common to systems with rotating disks. It attaches to the Unibus of the VAX-11 processors and is said to be able to emulate either the RL01/RL02 series or the RK06/RK07 series of DEC disk drives.

The Megaram units are priced starting at $15,900 for the basic 2M-byte unit, and the cost increases by $4,500 for each additional 1M byte of

Continued on page 69

A Simple Plug For Datastream's New 5-in-1 Remote 3278 Terminal.

Anyway you look at it, the Datastream 878-15 is an extraordinary 3278 display station.

Look first at versatility. The 878-15 supports five screen sizes. IBM® 3278 Models 2 through 5. Plus DEC® VT100. So you can access any 3270 or minicomputer application from a single display station.

And all five screen sizes can be selected by the host. Or menu-selected by the operator.

Then take a look at the 878-15's sophisticated keyboard. It delivers complete 3278 functionality. And advanced 3290 features like 24 top row PF keys, an operator-definable 10-key pad and more. The 878-15 even offers a port for direct printer attachment.

The 878-15 features a standard 3278 keyboard plus 24 PF keys and an integral 10-key numeric pad. The 14" screen is available in green or amber phosphors.

And that brings us to the simple plug.

The 878-15 is designed for use with Datastream's BSC or SNA Remote Cluster Controllers, which allow the 878-15 to access its host or hosts over ordinary phone lines. All you have to do is plug it into a modem and dial in. Or connect it directly to the controller. Either way, you'll never see the expense of leased lines again.

Together, 878-15 and 178-2 Display Stations and our Remote Cluster Controllers make quite a team.

Offering advantages like sophisticated security. Remote diagnostics. Multiple concurrent sessions. Dual IBM host access. Minicomputer access. And communication with other peripheral devices.

If you're looking for flexible, reliable and inexpensive ways to extend your 3270 network, Datastream Display Stations and Remote Cluster Controllers are well worth looking into.

Call or write today. Datastream, 2520 Mission College Blvd., Santa Clara, CA 95050. (408) 986-8022. Outside CA, CALL TOLL FREE: 800-952-2500.

*IBM is a registered trademark of International Business Machines. *DEC is a registered trademark of Digital Equipment Corporation. ©1984 Datastream.

SYSTEMS & PERIPHERALS

Continued from page 66

storage up to 28M bytes.

Megastream, the tape drive option, is said to enable data stored in Megaram to be maintained in the event that ac power fails. The combination of Megastream and Megaram reportedly provides a nonvolatile, solid-state storage capability.

Megastream is housed in a 7-in., rack-mounted chassis and has a formatted capacity of 32M bytes on a removable ¼-in. tape cartridge.

Megastream is priced at $8,500.

Imperial Technology, 831 S. Douglas St., El Segundo, Calif. 90245.

TERMINALS

ANALOGIC CORP.
Linker 100

Analogic Corp. has announced a terminal that features serial communications with industrial monitor and control systems.

According to the vendor, Linker 100 can communicate with a remote host computer or with remote single intelligent peripherals from a central location via an RS-422 or RS-232C port.

Linker 100 is user-programmable for performing ramp/soak, cascade, ratio or custom algorithms.

The price for the single unit is $595, with delivery six weeks after receipt of order.

Analogic, Audubon Road, Wakefield, Mass. 01880.

NATIONAL COMPUTER COMMUNICATIONS CORP.
Tiny-Term

National Computer Communications Corp. has introduced a 14-lb CRT terminal that reportedly features an 80-col. by 25-line format.

Tiny-Term is said to feature a green-phosphor display, 14 programmable functions, two RS-232C ports and 128 graphics characters. An optional integral modem capable of storing up to 28 telephone numbers is available.

The asynchronous terminal has block-mode and full editing capabilities, the vendor said. It features up to 19.2K bit/sec communications speed.

Tiny-Term is priced at $450; the 300 bit/sec integral modem costs $395, and a 300/1,200 bit/sec modem option costs $595.

National Computer Communications, 260 West Ave., Stamford, Conn. 06904.

GRAPHICS SYSTEMS

MCDONNELL DOUGLAS AUTOMATION CO.
R-100T

McDonnell Douglas Automation Co. (McAuto) has announced a graphics workstation for its Place robotics cell design and simulation system. The R-100T is reportedly a tabletop version of the company's R-100 vector refresh display.

The terminal is said to be able to access Unigraphics, McAuto's computer-aided design and manufacturing system, to create cell geometry for Place. It is offered in black-and-white or color versions.

The R-100T is priced at $65,000 for black-and-white display and $73,000 for color display, prices which are said to be 40% lower than the R-100T's predecessor.

McAuto, P.O. Box 516, St. Louis, Mo. 63166.

POWER SUPPLIES

VIZ MANUFACTURING CO.
Model WP-29A

Viz Manufacturing Co.'s Test Equipment Division has introduced a variable-output, isolated ac power source, the Model WP-29A. The product reportedly provides ac output from 0V to 150V or 0A to 2.25A, continuous at 60Hz.

The WP-29A weighs 15 lb and is priced at $167.

Test Equipment Division, Viz Manufacturing, 335 E. Price St., Philadelphia, Pa. 19144.

BOARD-LEVEL DEVICES

EVENTIDE, INC.
WKBP-16 board

Eventide, Inc. has announced a 1M-byte memory board with 256K-bit chips for the Hewlett-Packard Co. Series 200 desktop computers.

The WKBP-16 board is designed to provide four times the memory density of previously available boards, according to Eventide.

The board is intended for use with the HP 9816, 9826 and 9836 computers, providing extra memory without expansion interfaces.

The board is available, priced at $4,200. Quantity discounts are available.

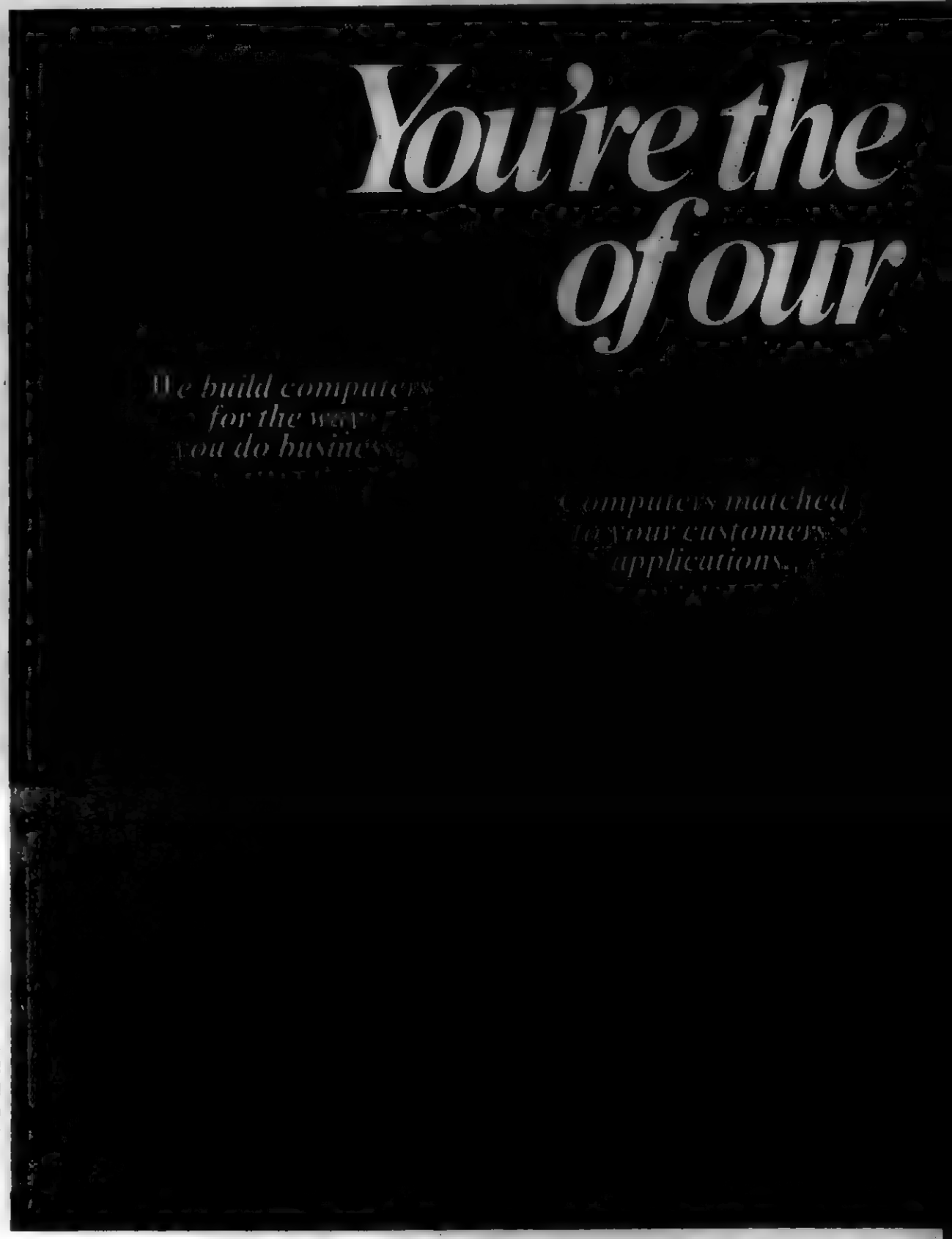
Eventide, One Alsan Way, Little Ferry, N.J. 07643.

ILC DATA DEVICE CORP.
BUS-64103

ILC Data Device Corp. has announced an MIL-STD-1553 Manchester II converter, BUS-64103, with encoding and decoding capabilities.

The BUS-64103 is said to include all functions for an interface between an MIL-STD-1553 serial multiplexer bus transceiver and an eight- or 16-bit parallel tristate highway.

Other features reportedly include encoder/decoder and dual-rank I/O registers; valid word, valid address



SYSTEMS & PERIPHERALS

and fault flags; and wraparound built-in test. It is packaged in a 1.1-in. by 1.7-in. hermetically sealed unit, the vendor said.

The BUS-64103 is priced at $450, with 90-day delivery.

ILC Data Device, 105 Wilbur Place, Bohemia, N.Y. 11716.

DATA-SUD SYSTEMS/U.S., INC. DSSE32RS

Data-Sud Systems/U.S., Inc. has announced a digital output board designed to be compatible with the VME bus and to provide the user with 32 isolated channels.

The DSSE32RS digital output board is said to feature hermetically sealed, double-contact, electromagnetic relays that are magnetically shielded and protected by a transient voltage suppressor. Output status is displayed on the front panel by eight LEDs, with display groupings selected by a four-position switch.

The board is priced at $695 and is available now.

Data-Sud Systems/U.S., 2219 S. 48th St., Tempe, Ariz. 85282.

CYBERCHRON CORP. CDM-82/23R

Cyberchron Corp. has introduced a 1M-byte memory card for Digital Equipment Corp.'s LSI-11 and Microvax I board-level products.

Based upon 64K-byte dynamic random-access memory, CDM-82/23R offers full byte parity, on-board software compatibility parity control and status registers, the vendor said. The board supports direct memory access protocols and has 22-bit addressing capability through 4M bytes, according to the vendor. The product reportedly uses delay-line timing, and its memory array is fully socketed.

CDM-82/23R costs $1,995.

Cyberchron, P.O. Box 196, Garrison, N.Y. 10524

INTEGRATED SOLUTIONS, INC. IS-68S

Integrated Solutions, Inc. has announced an integrated slave CPU on the Digital Equipment Corp. LSI-11 bus.

The IS-68S is based on the Motorola, Inc. 68000 microprocessor and was designed to coexist on the LSI-11 bus with either a host IS-68K board or with a DEC LSI-11/23, LSI-11/73 or Microvax. The dual-bus architecture of the card is said to permit all slaves to execute their own programs simultaneously at full speed without using the LSI-11 bus.

The card reportedly will operate at 12 MHz or with a 10-MHz option, with no wait states.

The IS-68S is priced at $2,695 for the 12-MHz version and $2,295 for the 10-MHz model. Quantity discounts are available.

Integrated Solutions, 2240 Lundy Ave., San Jose, Calif. 95131.

EMULEX CORP. SC7000

Emulex Corp. has announced a disk controller for connecting multiple multivendor disk drives to Digital Equipment Corp. VAX-11/750 and VAX-11/780 superminicomputers.

The SC7000 disk controller is said to utilize bipolar, bit-slice microprocessor technology. It is said to accommodate up to four physical (eight logical) industry-standard storage module drives or Winchester-type disk drives of 825M bytes or more capacity. It is also designed for serial data transfer rates of up to 1.5M byte/sec.

The controller is an extended-hex-size printed-circuit board that plugs into the bus of the VAX-11/750 via one of three available RH750 backplane slots or into one of two slots in the Emulex V-Master chassis, which installs in the VAX-11/780. According to the company, the controller is transparent to DEC software and diagnostics.

Delivery is 30 days after receipt of order. List price for the SC7000 is $8,950, with quantity discounts available.

Emulex, 3545 Harbor Blvd., P.O. Box 6725, Costa Mesa, Calif. 92626.

TIL SYSTEMS LTD. ZP1632

TIL Systems Ltd. has announced a 32-bit, multibus processor card designed by the Electrical Engineering Department of the University of Toronto. It reportedly features vectored interrupt support, 256K bytes of random-access memory, up to 128K bytes of read-only memory, two serial ports and a parallel port.

The board, the ZP1632, is reportedly built with several National Semiconductor Corp. components, including an NS16081 floating-point unit and an NS16062 main memory unit, which is said to implement a demand-paged virtual memory management architecture similar to that of the Digital Equipment Corp. VAX-11.

The ZP1632 is priced at $3,124..

TIL Systems, Suite 1100, 60 Yonge St., Toronto, Ont., Canada M5E 1H5.

SYSTECH CORP. VPC-2200

Systech Corp. has introduced the multibus VPC-200 Versatec, Inc. printer controller.

The product has a direct memory access, two-channel, multibus printer controller. One channel supports a Versatec, Inc. printer/plotter in either single-end or long lines differential mode. The second channel supports any standard compatible printer at rates up to 10,000 line/min, the vendor said.

The controller offers automatic printer selection. It also includes a

Continued on page 70

cornerstone business.

Software that speaks your customer's language.

SYSTEMS & PERIPHERALS

Continued from page 69

self-test feature, which does not require host software support, for the Versatec printer and for a Centronics Data Computer Corp./Dataproducts Corp. printer. A Unix driver is supplied with the controller to accelerate implementation on-site, a company spokesman said.

The price is $650.

Systech, 7630 Miramar Road, San Diego, Calif. 92126.

VOTAN, INC.
VSP1000; Voice Management System

Votan, Inc. has introduced a voice processor board that is said to incorporate voice recognition, speech compression and telephone interfacing facilities on a single board.

In addition, the company has announced the latest release of its Voice Management System, based on the new board, which provides eight simultaneous channels of voice I/O processing in a single chassis.

The VSP1000 voice processor board features continuous speech recognition, which reportedly allows an individual to speak to the unit in a normal conversational flow, without pauses between words. In addition, a word-spotting capability enables the system to pick out target words from a stream of normal conversation.

An option offered with the board is speaker-independent recognition, which the company claimed will recognize anyone's voice. It can understand a limited vocabulary without prior enrollment in the system. The digits zero through nine and the words "yes" and "no," as well as custom vocabularies, are available.

Other features of the VSP1000 include autoanswer, autodial and Touch-Tone encoding and decoding, plus the ability to operate over standard telephone lines. The board contains all the hardware necessary to service a voice channel under the control of a general-purpose system processor. The system processor may be any single-board, 8- or 16-bit CPU that interfaces with Intel Corp.'s Multibus.

The basic configuration consists of a 16-slot Multibus chassis, an Intel 8086-family system processor, 1M byte of random-access memory and one VSP1000 voice processor board per voice channel. Other hardware needed includes disk drives, a controller card and a CRT terminal.

The VSP1000 is available in single quantities for $2,500, with volume discounts available. The price for a standard, four-channel Voice Management System is $27,000; an eight-channel unit is $35,000. The speaker-independent recognition option is priced at $500 per four channels.

Votan, 4487 Technology Drive, Fremont, Calif. 94538.

AUXILIARY EQUIPMENT

INTERNATIONAL INFORMATION MANAGEMENT CONGRESS
Record Management Technology

The International Information Management Congress (IMC) has announced a training program designed to instruct employees in storing and retrieving manual files and computer memory.

The program, Record Management Technology, includes 297 color slides and a 52-page book, the vendor said.

Topics include records storage and retrieval, reprographics, micrographics and records management trends.

The training program costs $350.

IMC, Publication Sales, P.O. Box 34404, Bethesda, Md. 20817.

TEXAS INSTRUMENTS, INC.
Nubus

Texas Instruments, Inc. has announced that it is licensing its 32-bit Nubus technology to commercial and noncommercial users.

Designed at MIT, Nubus is a 10-MHz synchronous bus that reportedly provides a 37.5M byte/sec bandwidth and a processor-independent, memory-mapped architecture.

Nubus licenses to commercial users for a one-time $2,000 fee. Noncommercial licenses are available for $200.

Texas Instruments, Data Systems Group, 17891 Cartwright Road, Irvine, Calif. 92714.

MTI TECHNOLOGY CORP.
MTI 2200

MTI Technology Corp. has announced an exerciser designed to perform seven user-selected qualification tests automatically on floppy disk drives before they are used in a system.

The MTI 2200 reportedly can be used in the factory or in the field and will display results directly on an integral CRT terminal screen and optional thermal printer. It is menu-driven and has a Help function.

It reportedly features a nonvolatile, electronically erasable programmable read-only memory for short- or long-term storage.

The base price is $4,990, with quantity discounts. The optional thermal printer costs $290; an optional four-channel multiplexer, $475; and a 220V, 50Hz option, $75.

MTI Technology, 5950 Mandarin Ave., Goleta, Cal. 93117.

A.B. DICK CO.
Magna Dataped

A.B. Dick Co. has announced a slim-line numeric keyboard designed to enhance statistical applications of the firm's Magna information processing systems line.

The Magna Dataped connects to the main keyboard via a 24-in. flat

DayFlo announces a major revision of the fundamental law of computing.

SYSTEMS & PERIPHERALS

cable, allowing placement for left- or right-handed operation, according to the vendor.

It contains the 0 to 9 keys and special keys for typing and spreadsheet applications such as double zero, period, minus sign, enter, dollar sign, comma, tab, space, character correct and cursors, a spokesman said.

Available immediately, the Magna Datapad is priced at $400, according to the vendor spokesman.

A.B. Dick, 5700 W. Touhy Ave., Chicago, Ill. 60648.

KEYTEK INSTRUMENT CORP. Series 2000

Keytek Instrument Corp. has introduced a modular electrostatic discharge simulator group called the Series 2000.

According to the vendor, the simulators were designed to allow the user to define test configurations for both individual requirements and industry standards.

The Series 2000 allows customer selection of discharge networks for human-body simulation. It also provides tips to simulate tools or a human finger and current injectors to provide repeatable waveforms for diagnostic tests, according to the vendor.

Modules and accessories are available for separate simulations of the effect of predischarge corona, as well as both electric and magnetic fields, the vendor said.

Prices for the system start at $4,220.

Keytek Instrument, 12 Cambridge St., Cambridge, Mass. 01803.

TI from page 65

memory, a 931 terminal and a 128M-byte WD800 disk drive.

■ The 991A with 512K- or 1M-byte main memory, a 931 terminal and a 425M-byte WD800 disk drive.

■ The 990A with 512K bytes of main memory, two 931 terminals and a 1383-byte WD800 disk drive.

■ The 990B with 512K bytes of memory, two 931 terminals that operate in a fiber-optic mode and a 136M-byte WD800 disk drive.

■ The 991A with 512K bytes of memory, two 931 terminals and a 425M-byte WD800 drive.

■ The 991B with 512K bytes of memory, two 931 terminals that operate in a fiber-optic mode and a 425M-byte drive.

Scheduled for shipments in August, the Business System 600 and 800 series models range in price from $42,950 to $64,500.

The Business System 300A series is packaged in a 931 terminal enclosure with 256K bytes of memory on a single board and the capacity to expand to 1M byte with add-on boards.

The 300A processors can be incorporated into Ethernet local-area networks with Business System 600 and 800 series computers and desktop TI Professional and Portable Professional Computers.

The announced models are the Business System 352A, priced at $9,995; the 371A, at $15,500; and the 372A, at $17,900. Shipments are scheduled for April.

TI can be reached through Box 402430, Dallas, Texas 75240.

GRAPHICS from page 65

phy and a telephone number at which they can be reached.

The deadline for submissions to the Special Report is April 25. If you have a picture of computer graphics that you would like to draw and a picture's worth or so of words, send them or any questions to Donovan White, Special Reports Editor, *Computerworld*, 375 Cochituate Road, Box 880, Framingham, Mass. 01701.

HP from page 65

■ HP 3000 Series 42 with a 2M-byte main memory and 404M-byte disk. It costs $94,004.

The offer on both the office automation packages and the specially configured business computer systems is effective until July 31.

Further information is available from HP at 1820 Embarcadero Road, Palo Alto, Calif. 94303.

CDC from page 65

up to four modules.

All three products are scheduled for availability in the fourth quarter of this year.

The CDC 895 is priced at $93,710 or leases for $2,915/mo on a one-year lease and carries a monthly maintenance fee of $325. The CDC 7165 is priced at $72,130 and leases for $2,910/mo on a one-year plan. It has a monthly maintenance charge of $395. The CDC 7990 is priced at $460,000, plus cartridges, with a monthly maintenance fee of $3,460.

CDC is located at 8100 34th Ave. S., Minneapolis, Minn. 55417.

RACE from page 65

speech was to be the keynote address at the Decpo East 84 conference in Boston. DEC's New York press conference was scheduled to end minutes before Bell was supposed to begin speaking in Boston. But Bell wound up changing his topic at the last minute, finally giving a rehashed speech on fifth-generation computing. Another coincidence? Maybe. Perhaps there was a misunderstanding between Bell and the promoters of Decpo. Or, possibly, Bell decided it was pointless to make juicy comments about DEC if no one would be around to listen.

It is clear that a little competition goes a long way. The irony is that DEC and IBM should be above it.

Garbage in, garbage out.

Since computers were invented, the conventional wisdom has held that input that doesn't conform to the computer's highly structured needs will result in unintelligible output.

Which meant that you had to learn to think like a computer in order to use one.

Trouble is, the world isn't organized to suit computers. Data is never collected in the way you want to retrieve it. That's why traditional, rigidly structured databases often wind up hindering your work more than they help.

DayFlo offers a new approach to database management needs. It's a Fluid Format™ Personal Information Manager. Which means it approaches the world the same way you do: taking in unorganized data and organizing it into meaningful information.

DayFlo is a powerful tool for your IBM® PC XT. It accepts both structured and unstructured data. When you want to extract information, just type in the key words you're looking for. Instantly, DayFlo organizes the data according to your criteria. And reorganizes it according to new criteria whenever you wish.

Information from other programs, spreadsheets, word processing or accounting files, virtually any data in the system can be assimilated by DayFlo. And once the information is at hand, DayFlo lets you manipulate it at will to produce letters, memos, reports and much more. You can work at your computer the same way you work at your desk, even switching quickly from task to task, without ever losing your place.

DayFlo's concept is as simple as it is revolutionary. You no longer have to think for the computer. Instead, it can help you think better for yourself. Which leads, inevitably, to a brand-new version of computing's fundamental law.

DAYFLO Software™

Garbage in. Information out.

DayFlo, Inc., 2300 Michelson Dr., Bldg. 400, Irvine, CA 92715. Call Now: (800) 7DAYFLO (Outside CA), (800) CDAYFLO (CA Only)
DayFlo and Fluid Format are trademarks of DayFlo, Inc. © 1984 DayFlo Inc.

The first professional computer that looks at information the way you do.

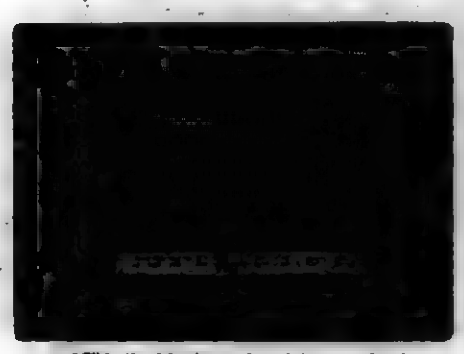
Place any document under the scanner, push a button and in seconds...

...it will appear on the monitor. You can store the whole document or isolate just part of it.

You can relocate any section...

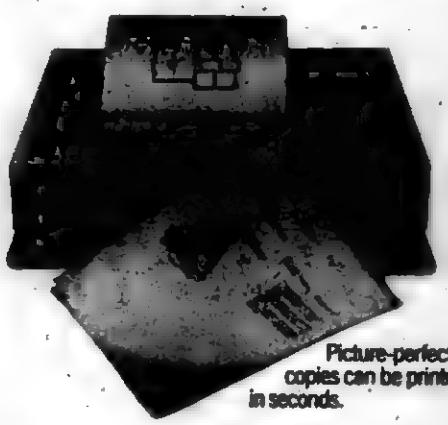
...and add text to create a new document, which can be printed or stored.

Filling out forms is a snap. Just place a form under the scanner...



...and fill in the blanks and update your database. Use the cursor (under "floor plan")...

...to bring up other image or data files associated with the original document.



Picture-perfect copies can be printed in seconds.

If you're in business, you get a lot of information exactly the way you're getting it right now.

From a piece of paper.

And a lot of time and money goes into managing that information.

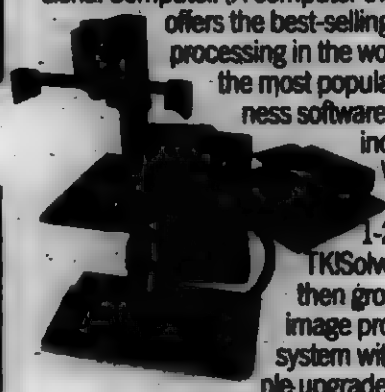
But now Wang is introducing a computer that can help you manage that information even better:

The Wang PIC™ image processing system.

With the Wang PIC, business information can be scanned, displayed, edited, filed, printed, and sent anywhere in the world. Documents can be enlarged, reduced, landscaped, and contrasted. All from one desk-top computer.

The Wang PIC can communicate with other Wang computers and even most mainframes.

And you can start with a Wang Professional Computer. (A computer that already offers the best-selling word processing in the world and the most popular business software—including Visi On,™ Lotus 1-2-3,® and TKISolver.™) And then grow to an image processing system with a simple upgrade.



If you would like a demonstration of The Wang PIC image processing system, call 1-800-225-9264. Or write to: Wang Laboratories, Inc., Business Executive Center, One Industrial Avenue, Lowell, MA 01851.

But do it today.

Because this is one new product you don't want to overlook.

WANG

The Office Automation Computer People.

©1984 Wang Laboratories, Inc.
PIC is a trademark of Wang Laboratories, Inc.
Visi On is a trademark of VisiCorp. Lotus 1-2-3 is a registered trademark of Lotus Development Corp. TKISolver is a trademark of Software Arts, Inc.

MICROCOMPUTERS

MICRO BITS
Thomas W. Madron

Two architectures seen for IBM nets

For months, industry analysts have been predicting that IBM shortly will announce two microcomputer-oriented local-area networks using two quite different topologies and two quite different communications media. As these rumors persist, it may be time for at least a generic description of the two local-area network approaches.

Rumor has it one announcement will cover a token passing ring local-area network using a chip set developed by Texas Instruments, Inc. The second rumor suggests a broadband (CATV technology) carrier-sense multiple access/collision detection (CSMA/CD) local-area net allegedly being developed by Sytek, Inc. of Mountain View, Calif.

Both token passing and CSMA/CD are local-area network access techniques that address the problem of collisions when two or more signals are present simultaneously on the communications medium.

Token passing is a collision-avoidance technique in which each station is polled and must itself pass the poll along. CSMA/CD is an access method that manages collisions of data packets when they occur. Token passing is employed most frequently with a ring topology, while CSMA/CD is most commonly found with a bus-structured local-area network. Either access method can exist on virtually any medium and with either baseband or broadband systems.

With a CSMA/CD system, collisions are assumed to be a normal operational occurrence. Every network device listens all the time, but defers transmitting if the cable is in use. But in a highly loaded CSMA/CD network, the periods of silence may be very short, resulting in many collisions, which reduces network throughput since many retransmissions are required.

In baseband systems such as Ethernet, collisions are detected by adding a dc bias to the signal and having all stations look for a dc level greater than that of a single transmitter. On a broadband system (which cannot pass dc signals), when the transmitter receives the reflection of the message, bit-by-bit comparison is accomplished. Any discrepancy is assumed to be the result of a collision, and the signal is retransmitted. Broadband examples using CSMA/CD are Localnet 20 from Sytek and Net/One by Ungermann-Bass, Inc.

Token passing, which is still used largely for ring topologies, became commercially available in 1983 on systems with bus structures. Each network device is polled, and as that polling is done, each station has an opportunity to transmit. The token is simply the location of the poll on a polling list. Polling need not

See MICS page 82

Thomas Madron is Manager of Computer Services at North Texas State University, Denton, Texas.

Price, more than support, influencing volume micro sales

By Paul Kassakowski
CW Staff

DALLAS — MIS departments seem willing to sacrifice microcomputer support for lower prices, according to industry analysts who spoke at the Fortune 1,000 Personal Computer Market Forum held here early this month.

"Last year marked a watershed point in the microcomputer industry," proclaimed Egil Juliussen, chairman of Future Computing, Inc., the forum sponsor. "It marks the shift from volume sales through retail channels to direct sales channels. IBM's direct sales force gained control of Personal Computer sales and increased its [large company] market share from 14% in 1982 to 44% in 1983."

'Last year marked a watershed point in the microcomputer industry.' — Egil Juliussen, Future Computing, Inc.

Price is the major factor driving volume purchasers toward direct sales, speakers agreed. To compete on price with direct sales forces, retailers are unbundling training and support.

"There's no such thing as a free lunch," stated Ed Ramos, president of Future Information Systems, Inc., a New York City dealer. "I can cut the hardware price for volume sales customers, but they will pay for training classes and support, which normally are free."

Direct sales may offer lower prices, but customers receive only pieces of a total system, said Anthony Morris, president of Morris Decision Systems. "A hardware vendor cannot provide a system solution," he said. "Morris puts the pieces together for its customers. Direct salesmen leave the customer with that task."

Fueling the distribution shift last year was MIS departments' increased involvement in determining microcomputer purchases. "Microcomputer purchasing decisions shifted from a bottom-up to a top-down orientation," Juliussen claimed.

A Future Computing survey of large

See SURVEY page 82

MIS slow to switch micro packages

By Paul Kassakowski
CW Staff

MIS departments take a slow, plodding approach to evaluating software in the rapidly changing microcomputer arena, managers recently told *Computerworld*. "Once a company has chosen microcomputer software packages, inertia sets in, and [the firm is] slow to switch to other programs," said Thomas Sampon, partner at Arthur Young & Co.

This inertia is deliberate, one MIS manager said. "Once a company has used a particular package for a period of time, a tremendous amount of training time has been invested," said Andrew Langlois, MIS director at Moore McCormack, Inc. in Stamford, Conn. "To justify retraining users on another package, it has to have more than additional bells and whistles, such as a nicer screen or a few additional functions. The package has to allow users to work more quickly, which increases the company's productivity."

Langlois' group waits a few months after a package is introduced before evaluation. "We wait until the hoopla and hype die down," Langlois said. "Often, a package is not as good as initially advertised."

Managers noted that companies learn of significant new packages in a variety of ways: subscribing to end-user magazines, trade magazines and software review services; attending computer shows and seminars hosted by computer dealers; and listening to users.

"Sometimes the initial interest comes

See MIS page 82

Fortune communications packages to integrate 32:16 with IBM, Wang

REDWOOD CITY, Calif. — As one step in an effort to boost compatibility with industry standards, Fortune Systems Corp. early this month introduced two communications packages aimed at integrating the firm's multiuser 32:16 microcomputers within IBM and Wang Laboratories, Inc. environments.

Fortune's new 3780 remote job entry Binary Synchronous Communications (BSC) software will permit 32:16 users to share IBM and any other 3780-supported mainframe resources, said Robert Ruebel, senior vice-president of marketing. The new software, said to permit transfer of either Ascii or Ebcdic data at speeds up to 9.6K bit/sec, is available now for $995.

The new Fortune-Wang software interface allows 32:16 users to exchange documents and interact with products in the Wang OIS environment, Ruebel said. The interface will carry a $595 price tag. Like the 3780 emulation package, it requires Fortune's optional BSC board.

Within larger firms, "our communications strategy is to be IBM-compatible," remarked Fortune President James Campbell. "We'll go with a local-area network when a de facto standard becomes clear."

Fortune's 32:16, based on the Motorola, Inc. 68000 and running the company's version of the Unix operating system, is sold to both small businesses and large organizations "looking for fairly classical word processing and office automation solutions," Ruebel said.

Unix "means safety" for large firms because of its portability, multiuser capability and built-in features, Ruebel said.

See FORTUNE page 80

- Micropro International Corp. unveils a 65,000-word spelling checker for Wordstar users/74
- Texas Instruments, Inc. announces a high-speed Basic compiler/74

INSIDE

Systems/78
Printers/Plotters/78
Board-Level Devices/78
Auxiliary Equipment/78
Software/78

Micropro introduces spelling checker

SAN RAFAEL, Calif. — Micropro International Corp. has introduced Correctstar, a 66,000-word spelling checker reportedly containing 99% of the most frequently used English words.

Automating the proofreading and correcting process, the product increases typing speed, a spokesman said.

"Now you can use the word you want, whether or not you know how to spell," said Donald Marro, vice-president of marketing.

Correctstar works with Micropro's Wordstar word processing package. To access Correctstar, users type "S" on Wordstar's opening menu, Micropro said. After suggesting a word, the user can correct the word as suggested, correct it globally, show the next or previous instance of the word, correct the word from the keyboard, add the word to a personal dictionary, bypass it one time, ignore the word or return to Wordstar, according to the vendor.

"The system is able to analyze words based on phonetic and linguistic principles and to recognize the patterns that characterize language," Marro said.

A user can create a personal dictionary of 1,500 words, which can include proper names or specific terms. When these names are used in later documents, Correctstar suggests misspellings, according to the vendor spokesman.

Correctstar requires 192K bytes of random-access memory and costs $195.

A version for the IBM Personal Computer is available now. Versions for Radio Shack's TRS-80 Model 2000, Digital Equipment Corp.'s Rainbow and Texas Instruments, Inc.'s Professional microcomputers will be added this month.

Additional information on Correctstar is available from Micropro International, which is located at 33 San Pablo Ave., San Rafael, Calif. 94903.

Direct micro said to be IBM-compatible

SANTA CLARA, Calif. — Direct, Inc. has introduced a personal computer for business uses said to be IBM Personal Computer-compatible and to emulate IBM 3270, 3278 and 3279 terminals and Hewlett-Packard Co. System 3000 terminals.

The Direct IPC features the Microsoft, Inc. MS-DOS 2.0 operating system, 128K bytes of internal memory, two floppy disk drives, two RS-232 asynchronous serial ports, one parallel printer port and five expansion slots, Direct said. Customizations can include memory expansion to 640K bytes, a color monitor with graphics and additional floppy disk drives.

The IPC's keyboard is said to be an improvement on the keyboard of the IBM Personal Computer because shift and return keys are in more familiar positions and LED indicators are used on the IPC's Caps and Num-lock keys to show status.

The computer's optional communications capabilities include emulation of the HP 2622A terminal, providing linkage with HP 3000 minicomputers, and IBM 3278 and 3279 coaxial interface support, permitting users to link directly to IBM 3274 or 3276 controllers. The latter option reportedly permits either Binary Synchronous Communications (BSC) or Systems Network Architecture/Synchronous Data Link Control (SNA/SDLC) host access depending on the controller's configuration. Options also allow the IPC to emulate IBM 3270 BSC or 3270 SNA/SDLC terminal communication.

"We feel we're more compatible with the IBM host environment than the IBM Personal Computer," commented Direct's vice-president of marketing, Homer Jamison.

In its basic version, the IPC comes with an amber monochrome monitor. A color graphics adapter and color monitor are also available. The basic IPC retails for $3,195. An IPC XD version, with a 10M-byte Winchester disk, 256K bytes of memory, one floppy disk drive and a monochrome monitor, is available for $5,195.

Direct is located at 4201 Burton Drive, Santa Clara, Calif. 95054.

TI unveils Basic compiler

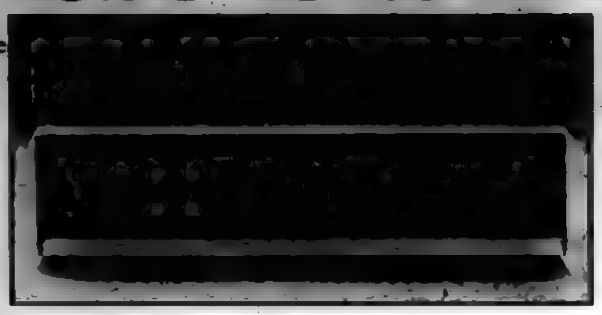
DALLAS — Texas Instruments, Inc. has introduced a high-speed MS-Basic compiler that the company said improves the performance of a Basic program as much as 120 times, with little or no modification.

The program runs on the TI Professional Computer and the TI Portable Professional Computer under Microsoft, Inc.'s MS-DOS 1.1 or 2.1 operating system.

The package is priced at $300, which includes a software diskette and a user's manual, the vendor spokesman said.

Texas Instruments can be reached through P.O. Box 402430, H-709, Dallas, Texas. 75240.

No other 3270 protocol converter can match all these features.



Since 1977, hundreds of companies all over the world including Bell Labs, Citicorp, ITT, Litton, Westinghouse—have used Local Data products to make IBM communications easy and inexpensive.

We believe the DataLynx™/3274 is the best price/performance 3270 protocol converter on the market.

So, before you buy any other protocol converter at any price, compare the DataLynx/3274 features first. Then decide.

- SNA/SDLC or BSC protocols supported. SNA is PU type 2.
- BSC for EBCDIC and ASCII.
- 16 bit, 8 MHZ Intel 8086-2 CPU.
- Auxiliary printer support allows each async port to have a separately addressable 3287 type printer. This feature enables dial users to combine CRT and print data over one dial-up line.
- 80 types of ASCII async display terminals can emulate IBM 3278 display stations, and ASCII async printers to emulate IBM 328X printers.
- Micro to main-frame support with our FileLynx™/3278 program for the IBM PC and PC compatibles supports terminal emulation and file transfer (upload/download).
- Hard copy KSR support with our "Paper/3278".
- Unique "paging" feature supports emulation of all models of the 3278 display station.
- Pseudo-transparency feature allows host application to transmit character and control codes to async terminal devices (e.g. graphics terminals, graph plotters, mini-computers, high-speed printers with down-loadable forms control units).
- "Compu" support for micro, mini and instrumentation computers as terminal devices.
- Dual host support.
- PROM cartridge for easy user upgrade of firmware.
- Powerful, friendly configurator mode, using menus to allow parameter definition for sync ports, logical units, async ports and terminal characteristics, including help utility.
- Configuration values saved in non-volatile EEPROM.
- Monitor mode displays current status of all ports and logical units.
- May be connected to a host directly (in modem eliminator mode), or via modems on a dedicated multipoint or point-to-point line (dial-up or dedicated), via RS-232C sync ports.
- Data rates to 19,200 bps (sync & async).
- Async ports may be configured for any of 15 fixed bit rates or "autobaud", with or without parity checking, and with a specified character format.
- Simple DTE/DCE change on all ports.
- Flow control on async ports may be configured for physical and/or logical signalling.
- Virtual device support enables reconnect of dial users independent of physical port.
- Security through dual level password protection.
- Emulation of standard 3278 keyboard functions is tailored for each supported terminal type.
- 25th status line emulation.
- SAS® graphics support.
- Base color support.
- 3278-5 (27 x 132 character screen) support on 9 channels with memory expansion option.
- LU configurator options provide support for various screen formats and printer page widths.
- Front panel includes 33 function status indicators.
- Self-test of channels, memory and firmware integrity is performed continually in background mode assisted by a "watchdog" timer.
- UL and FCC approved.

For more information about the remarkable DataLynx/3274 protocol converter, call or write today. And ask about our 30-day free trial program.

Local Data DATALYNX™/3274

SAS® is the registered trademark of SAS Institute, Inc.

Local Data
"Your Lynx to IBM."

LOCAL DATA • 2701 Toledo Street • Suite 706 • Torrance • CA • 90503 • Telephone (213) 320-7126 TLX 182518

MICROCOMPUTERS

SYSTEMS

ALLOY COMPUTER PRODUCTS, INC.
PC-Slave/16; Multinet enhancements

Alloy Computer Products, Inc. has announced a multiuser system, PC-Slave/16, and has enhanced its Multinet system.

PC-Slave/16, which uses an Intel Corp. 8088 microprocessor, fits in the expansion slot of an IBM Personal Computer and drives a dumb terminal without degrading host performance, the vendor said.

With Alloy's PC-Real-Time Networking Executive, 12 PC-Slave/16s reportedly can be linked inside an Alloy expansion unit. Each slave is capable of running Microsoft, Inc.'s MS-DOS 2.1 or Digital Research, Inc.'s CP/M 86 operating systems.

Prices for PC-Slave/16 range from $1,195 to approximately $17,000.

As a two-user system, Multinet includes a master microprocessor, two user processors, up to 102M bytes of Winchester disk storage, cartridge tape, floppy disk drive and the CP/M operating system, the vendor said.

Multinet can be expanded to include a maximum of 16 eight-user systems. Multinet can link microcomputers using Zilog, Inc. Z80B or Intel 8086 microprocessors, the vendor said. The system provides file updating, record updating, multiuser record locking and automatic print spooling, according to the vendor.

Multinet prices range from $12,995 to $104,000.

Alloy Computer Products, 100 Pennsylvania Ave., Framingham, Mass. 01701.

KAYPRO, INC.
Perfect Software replaced

Kaypro, Inc. has replaced the Perfect Software package software bundled with its Model 2, Model 4, Model 10 and Robie desktop personal computers with software from Micropro International Corp.

Model 2 now includes Micropro's Wordstar, Mailmerge, Calcstar, Datastar and Supersoft; Oasis Systems, Inc.'s Word Plus; Chang Laboratories, Inc.'s Profit Plan; Kaypro's Multiformat and Digital Research, Inc.'s CP/M operating system.

Model 4, Model 10 and Robie include Micropro's Wordstar, Mailmerge, Calcstar and Infostar (which includes Reportstar and Datastar); Oasis Systems' Word Plus; Kaypro's Supprterm and Multiformat; Chang Labs' Microplan; Ashton-Tate's Dbase II and "Dbase II for the First-Time User"; and Digital Research's CP/M operating system.

Kaypro, 533 Stevens Ave., Solana Beach, Calif. 92075.

COMPUTER SYSTEMS
IBM/Personal Computer-Graphics

Computer Systems has introduced the IBM/Personal Computer-Graphics system, a workstation that features three-dimensional modeling and graphics processing.

According to the vendor, the system combines computer-aided design and color graphics functions with the flexibility of a graphics workstation in either stand-alone or remote terminal modes.

The system features an IBM Personal Computer with 128K bytes of random-access memory, a color monitor, 400 char./sec matrix printer and two digitizers. It runs under IBM's PC-DOS operating system, and AT&T's Unix is optional.

The IBM Personal Computer-Graphics system is priced at $4,900.

Computer Systems, 28401 Harper Ave., St. Clair Shores, Mich. 48081.

PRINTERS/PLOTTERS/PERIPHERALS

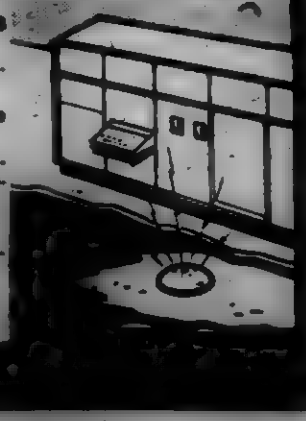
RADIO SHACK
DMP-110

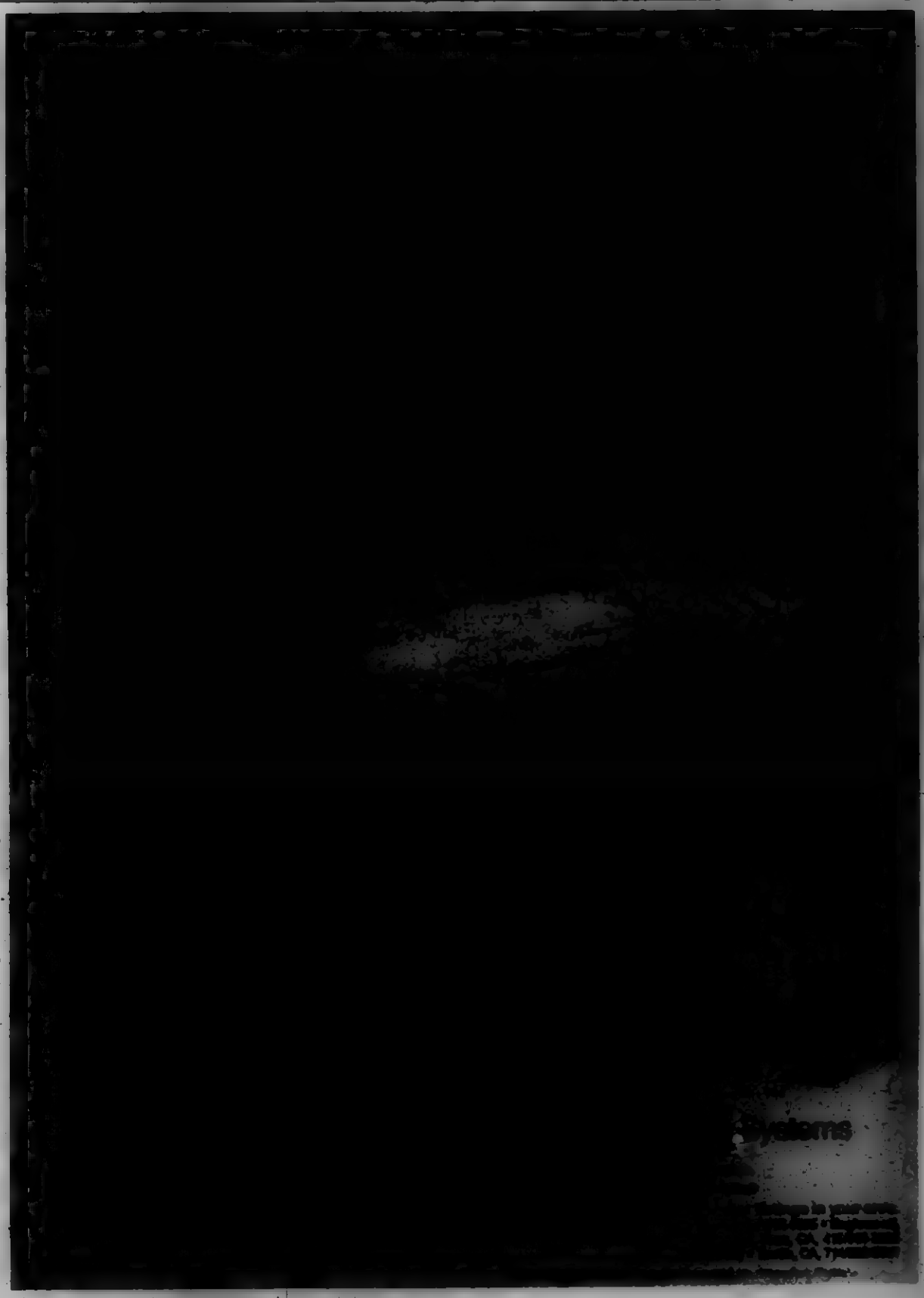
Radio Shack has introduced a dot-matrix printer for the TRS-80 microcomputer line that features three printing modes, including letter-qual-

Continued on page 76

AVOID DOWNTIME!
WATER *ALERT*
. . . FOR COMPUTER AREAS
Warns you of water leakage in sub-floor wiring areas.
- Produces a loud, intermittent alarm when activated by presence of water.
- Completely self-contained . . . no wiring, no connections.
- Early water detection (1/64" water film activates alarm) provides maximum time for corrective action.
- 24 hour per day monitoring.
- Options include remote indicator, remote flashing light, and automatic telephone dialer.

6 Models from $69 - $110
Call or write for complete information.
Dorlen Products





MICROCOMPUTERS

Continued from page 78

ity word processing, data processing and bit-image graphics.

The DMP-110 reportedly provides a variety of font styles, including a cursive italic and micro font, as well as fonts for correspondence and data processing. All fonts on the DMP-110 can be elongated, the company said, and the printer supports the use of underline.

The correspondence font prints at 10- or 12 char./in. or proportional spacing. In correspondence mode, the printer operates at 25 char./sec. Half-height printing, superscripts and subscripts can be achieved using the printer's micro font typestyle.

The data processing mode allows printing 10-, 12- or 17 char./in at speeds up to 50 char./sec in either standard, elite or condensed monospaced characters.

The DMP-110 may also be used to produce high-resolution, dot-addressable bit-image graphics, the company said.

The DMP-110 is priced at $299.95.

Radio Shack, 1800 One Tandy Center, Fort Worth, Texas 76102.

BOARD-LEVEL DEVICES

HEURIKON CORP.
HK68A versions

The Heurikon Corp. has introduced 512K-byte and 1M-byte versions of its HK68A microcomputer board. The HK68A, which plugs into a multibus, reportedly also features four to eight serial ports, 32K bytes of erasable programmable read-only memory, user programmable LEDs and dip switches and three programmable 16-bit counter/timer channels.

The increased memory of the HK68A reportedly allows it to run Unix programs without the need to add memory to the multibus.

The 512K-byte card is available for $4,465. The 1M-byte card is available for $5,465.

Heurikon, 3001 Latham Drive, Madison, Wis. 53713.

AUXILIARY EQUIPMENT

SPEECH PLUS, INC.
Calltext 5000

Speech Plus, Inc. has introduced an IBM Personal Computer-compatible text-to-speech converter and telephone interface board that is said to enable a user to access text data in voice through any Touch-Tone telephone.

The product, called Calltext 5000, is said to combine a telephone interface with Speech Plus' text-to-speech system to provide voice output with unlimited vocabulary for the Personal Computer. It can be programmed to answer a telephone, obtain text data from a host computer and supply text data in voice to the caller, the company said. It can also initiate calls, according to Speech Plus.

Other features of Calltext 5000 include compatibility with the IBM Personal Computer XT bus interface, conversion of serial Ascii English text to speech in real-time, ability to connect to a telephone network via a modular jack, autoanswer and autodial, on-board speaker amplification and RS-232 serial port.

The Calltext board is priced in single units at $2,700, including interface software.

Speech Plus, 461 N. Bernardo Ave., Mountain View, Calif. 94043.

RAINBOW TECHNOLOGIES, INC.
Software Sentinel

Rainbow Technologies, Inc. has announced a custom-coded hardware device designed to prevent users from running licensed software on more than one machine at a time.

Software Sentinel is intended for use by software developers who produce complex software for the IBM Personal Computer, Personal Computer XT and compatibles. The plug-in device is said to act as a security key that must be present before the software will operate.

Available now, the device costs approximately $50.

Rainbow Technologies, Box 7200, Costa Mesa, Calif. 92626.

SOFTWARE

LYTRON SYSTEMS, INC.
Lois

Lytron Systems, Inc. has introduced Lytronet Office Integration Software (Lois), a package that includes an operating environment, facility manager and DIF-to-Ascii data converter. Lois integrates different programs into a seamless operating environment and transfers data between applications, the vendor said.

Lois operates in four modes: single user; with Lytronnet (Lytron's local-area network); with other networks; and linked with a mainframe, the vendor said.

The program runs under IBM's PC-DOS or Microsoft, Inc.'s MS-DOS operating systems and costs $295, Lytron said.

Among the applications that run under Lois:

- Scratchpad, an electric notepad that can create, modify, distribute or file notes and memorandum, available for $60.
- Calendar, at $135, is a schedule planning program.
- File Cabinet, priced at $100, files, cross-indexes and retrieves information by file name, title, significant person, key word or date.
- Calculator, for $75, supports scientific notation, memory manipu-

Continued on page 79

Some data security methods work better than others.

TOP SECRET the state-of-the-art resource protection package for MVS works best of all.

TOP SECRET is data security at its best. Offering quick installation, phased implementation and comprehensive resource protection, TOP SECRET outdistances all other data security methods for total resource protection.

TOP SECRET immediately secures your most critical resources without impacting normal processing. Implement security with no delay and with absolutely no modifications to your operating system.

TOP SECRET is the only total resource protection package that offers comprehensive CICS security, including file and program control and protection down to the field level.

By using the Standard MVS Security Interface, TOP SECRET becomes an integral part of your operating system. Complete compatibility with all IBM and vendor products that use Standard Security is automatic and guaranteed, now and in the future.

TOP SECRET security comes with the same top-notch technical support that guarantees the quality and reliability of all CGA software products.

Protect your valuable data resources today. Join the MVS sites across the country that have considered every data security method and made the sure TOP SECRET choice.

Call for additional product information and your free trial.

800-237-3057

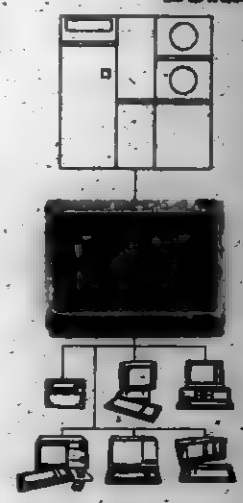
cga Software Products Group, Inc.
800-237-3057
CGA Software Products Group
960 Holmdel Road
Holmdel, NJ 07733

EVERYONE WHO WANTS TO USE THE COMPANY MAINFRAME RAISE YOUR HAND.

Introducing power to the people.

Better known as the Data Pipeline™ from Intel.

It's based on our iDIS™ Database Information System. A powerful, integrated package of hardware and software with multi-user capability built right in. And now, through iDIS, just about any pc or terminal can easily share data with just about any mainframe.



Our Data Pipeline™ allows practically any pc to share data with practically any mainframe.

With the iDIS Pipeline, you'll be able to establish and manage your pc-to-mainframe connections in a way never before possible. Yet you'll still be able to offer department users a fair degree of independence. Since iDIS comes with all the software they need. Starting with the Xenix® operating system, built around a relational DBMS. Plus the Multiplan® spreadsheet, word processing, electronic mail, and a forms/menu development tool.

The iDIS Pipeline is powerful, too. Each one will handle 5 full-time users, or between 12 and 15 on dial-up. And you can even network with other iDIS systems. But you're always in control. You decide which data are accessible, and extract only those to your iDIS system. Users then access their data sets from iDIS's hard disk.

Actually, using the iDIS Pipeline is a lot like giving users their own little mainframe.

Which is a lot better than giving them yours.

It's also a lot cheaper.

Less than half the cost of a direct pc-to-mainframe connection.

It's also fully supported and serviced from one responsive source. Us. Best of all, it's available now.

For more information about how our iDIS Data Pipeline can help you manage the revolution in your office, call us at 800-538-1876; in California, 800-672-1833. Or write Intel, Lit. Dept. H-18, 3065 Bowers Ave., Santa Clara, CA 95051.

Of course, if you're undecided about what to do you can always ask for a show of hands...

intel

According to the Gartner Group, who took the time to figure out all the hidden costs, each direct pc-to-mainframe connection costs approximately $22,000. Each. *Xenix and Multiplan are trademarks of Microsoft Corporation.* © 1986 Intel Corporation.

MICROCOMPUTERS

Continued from page 78

lation and financial modes.

■ Phone manager, which includes autodial capabilities, costs $150.

Lytron Systems, Building 2, 1675 N. 200 West, Provo, Utah 84604.

MICRO DATA BASE SYSTEMS, INC.
Knowledge Manager version

Micro Data Base Systems, Inc. has enhanced Knowledge Manager, an integrated information system for the IBM Personal Computer.

The new version reportedly performs calculations three times faster than earlier versions and integrates with three additional Micro Data Base Systems modules: Kgraph, Kpaint and Kmouse.

Knowledge Manager costs $500.

Micro Data Base Systems, P.O. Box 248, Lafayette, Ind. 47902.

CDEX CORP.
PC Expert

Cdex Corp. has introduced the PC Expert package, a computer-based training software package for the IBM Personal Computer.

The package consists of two training programs, "How to Use Your IBM PC" and "Cdex Training for DOS 2.0."

The first program helps users learn PC-DOS commands and special keys on the keyboard. It also introduces the user to operating systems such as Digital Research, Inc.'s CP/M and AT&T's Unix, as well as the Basic programming language and various types of applications software.

The second training program provides more comprehensive instruction in beginning and advanced PC-DOS commands. The program includes concepts, disk preparation and copying, file operation, structure directories, fixed disk systems and advanced DOS commands.

The PC Expert is priced at $139.95.

Cdex, 5050 El Camino Real, Los Altos, Calif. 94306.

DOW JONES INFORMATION SERVICES
Accounting Series

Dow Jones Information Services, a division of Dow Jones & Co., Inc., has introduced the three core modules of its seven-part Accounting Series. The software, for the IBM Personal Computer and Personal Computer XT, is said to support generally accepted accounting practices.

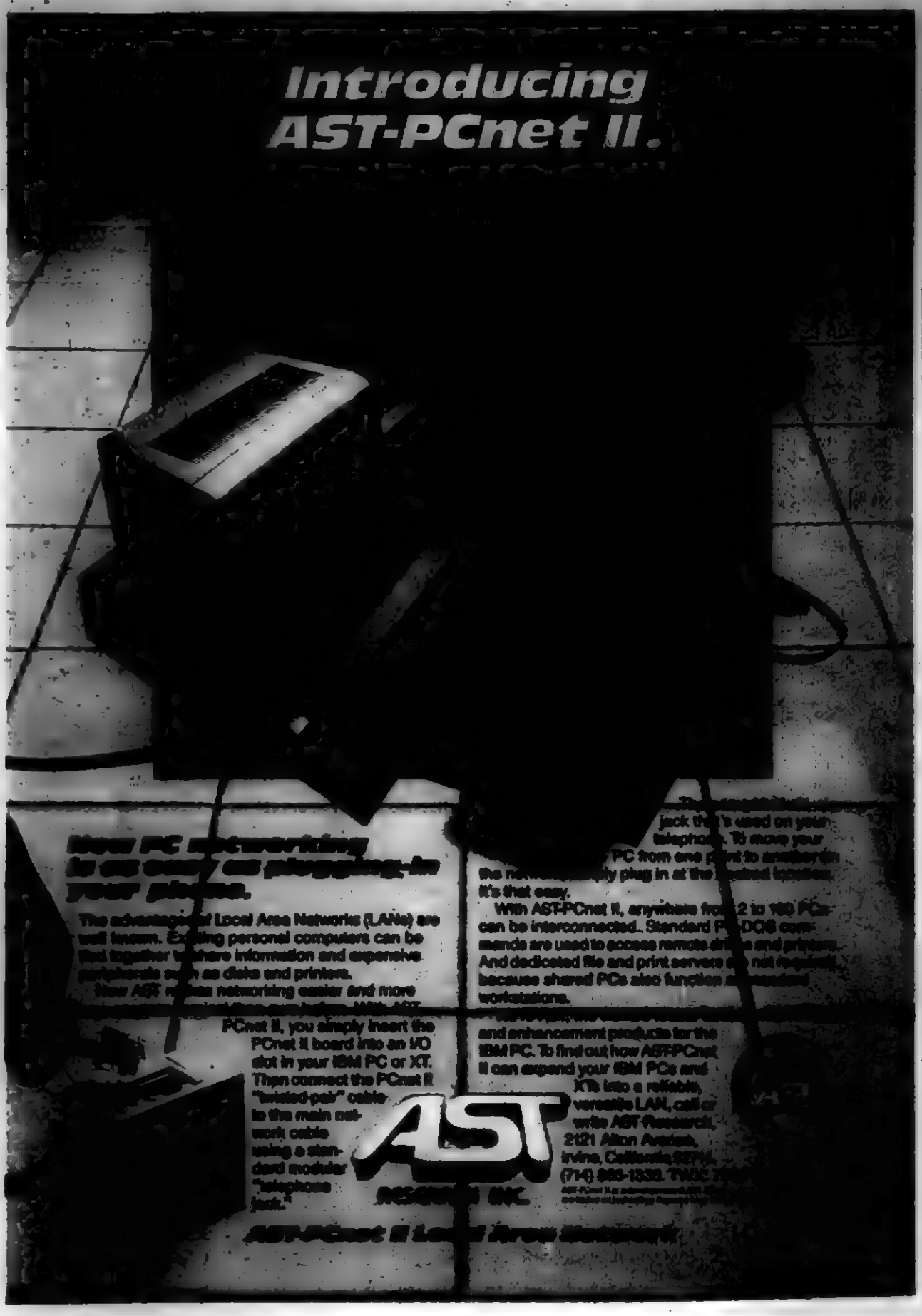
The core programs — general ledger, accounts payable and accounts receivable — each include a free customer training seminar developed by the Arthur Young accounting firm and one-year access to a toll-free hotline. The programs of the package reportedly are menu-driven, require a minimum of keystrokes and feature a word processing style editor.

The series is said to feature an automatic audit trail. Users are also said to be able to do "what-if" calculations using the series' pencil-posting capability.

The three core programs each cost $1,000, the vendor said.

Dow Jones Information Services, Rt. 1 and Ridge Road, South Brunswick, N.J. 08852.

See TOOLS page 80



NAMEWARE

ASYST
Stamford, CT
Voice/data telephones
(Formerly Digital Transactions)

COGNOS
Ottawa, ONT
Business/financial software
(Formerly Cluster Systems)

COMPAQ
Houston, TX
Portable computers
(Formerly Gateway Technology)

COMPUTONE
Oakland, CA
Business telephone systems
(Formerly Scott-Buttner)

DATAGO
New York, NY
Computer stores
(New venture of NYNEX)

DAYPLO
Costa Mesa, CA
Software for IBM PC
(Formerly Gilchrist Software)

ECRM
San Francisco, CA
Computer supplies
(New venture of Crown Zellerbach)

LIFESCAN
Mountain View, CA
Personal medical monitors
(New venture of Suntex-Intl)

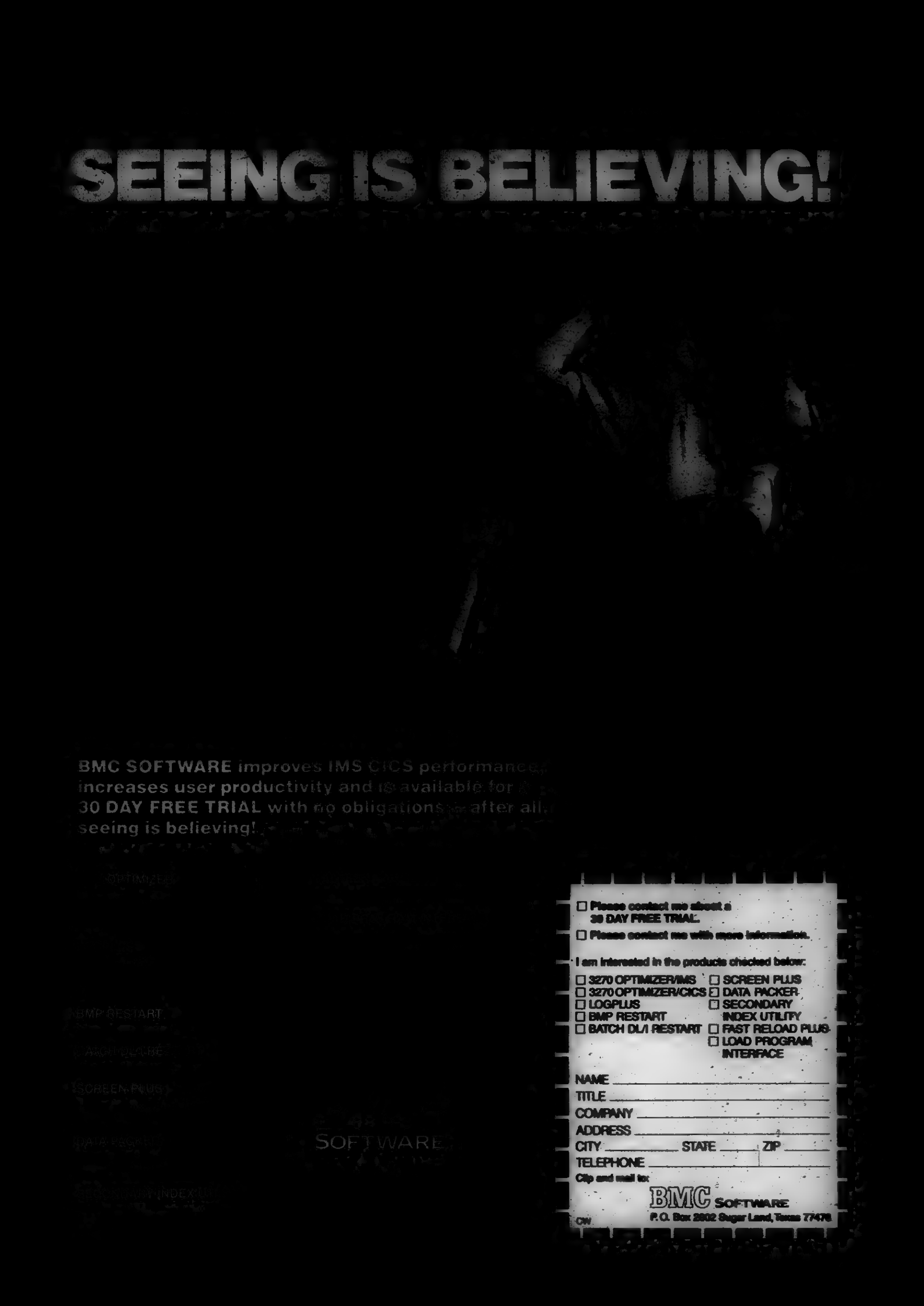
SUNSOFT
Sunnyvale, CA
Home computers
(Formerly NHB Computers)

BY NAMELAB

Contact us for free booklets on product and company name development.

NAMELAB, INC.
Name Development & Testing Laboratory
711 Marina Boulevard
San Francisco, CA 94123
415-563-1639.

SEEING IS BELIEVING!



BMC SOFTWARE improves IMS CICS performance, increases user productivity and is available for **30 DAY FREE TRIAL** with no obligations ... after all, seeing is believing!

OPTIMIZER

BMP RESTART

ARCHIVE/RE

SCREEN PLUS

DATA PACKER

SOFTWARE

INDEX UTI

☐ Please contact me about a 30 DAY FREE TRIAL.

☐ Please contact me with more information.

I am interested in the products checked below:

☐ 3270 OPTIMIZER/IMS
☐ 3270 OPTIMIZER/CICS
☐ LOGPLUS
☐ BMP RESTART
☐ BATCH DL/I RESTART
☐ SCREEN PLUS
☐ DATA PACKER
☐ SECONDARY INDEX UTILITY
☐ FAST RELOAD PLUS
☐ LOAD PROGRAM INTERFACE

NAME _____

TITLE _____

COMPANY _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

TELEPHONE _____

Clip and mail to:

BMC SOFTWARE

P.O. Box 2802 Sugar Land, Texas 77478

CW

TOOLS from page 78

VERTEX SYSTEMS
Xeno-Disk

Vertex Systems has announced the Xeno-Disk software conversion and production system for the IBM Personal Computer, Personal Computer XT and most compatible systems.

Xeno-Disk can read, write, format and duplicate nearly 60 different types of 5¼-in. double-density disk formats without additional hardware, Vertex said. In addition, 80-track formats reportedly can be supported with appropriate disk drives.

Running under IBM's PC-DOS or Microsoft, Inc.'s MS-DOS, Xeno-Disk modules are fully menu-driven, Vertex said.

Disk formats currently supported are said to include those of most popular computers running Digital Research, Inc. CP/M and CP/M 86, Radio Shack TRS-DOS 1.3, UCSD P-system, NEC Corp. NEC-DOS and European formats. Direct-disk format parameter input allows use of 40- and 80-track CP/M formats not currently available on the menu.

Vertex said optional utilities include 80Mate, a CP/M 80 emulator that simulates a CP/M 2.2 environment under PC-DOS or MS-DOS, and the 80Term terminal emulator, Vertex said.

Xeno-Disk is priced at $379.50. The 80Mate CP/M 80 emulator costs $99.50, and the 80Term terminal emulator costs $44.95.

Vertex Systems, 7950 W. 4th St., Los Angeles, Calif. 90048.

COSMOS, INC.
Revelation

Cosmos, Inc. has announced a relational data base management system for the IBM Personal Computer featuring compatibility with the Pick & Associates, Inc. Pick operating environment.

Revelation allows the user to develop a fourth-generation application and program generator that nonprogrammers can operate, according to the vendor. It also is said to provide communications so the IBM Personal Computer can move data, applications and programs up and down from the IBM Series/1, the Microdata Corp. Reality, the Evolution Computer Systems Corp. Evolution, the Applied Digital Data Systems, Inc. Addx Mentor, the Ultimate Corp. Ultimate and the Prime Computer, Inc. Information minicomputers.

Revelation is said to feature a file size limited only by disk size, record and field sizes variable up to 65,535 characters, user-assigned primary record keys, direct-access retrieval of records, report writer with multiple sort levels, a dynamic I/O buffer to reduce file accessing time, menu and command drive and a free-form English query language.

Revelation is designed to operate with IBM PC-DOS and Microsoft, Inc. MS-DOS and to utilize data and programs developed for those operating systems and Pick.

It is available for a one-time license fee of $950, including diskette and manuals.

Cosmos, 123 Furutree Drive W., Morton, Wash. 98356.

INDECES SERVICES
X-Cell 3.1

Indeces Services has announced X-Cell 3.1, a data management system for the IBM Personal Computer.

X-Cell features data entry, data retrieval, sorting, report generation, numeric generation and documentation generation, the vendor said.

X-Cell allows the user to define and allocate field space for any combination of alphanumeric and numeric entries, according to Indeces. X-Cell features search and sort capabilities that allow for inclusive and exclusive retrievals and sorts by 15 fields at a time, the vendor said.

X-Cell costs $175.

Indeces Services, 9 Pinecrest Drive, Taunton, Mass. 02780.

BLAISE COMPUTING, INC.
C View Manager; enhanced C Tools

Blaise Computing, Inc. has unveiled C View Manager and enhanced versions of its C Tools and C Tools 2. The software products run under IBM PC-DOS or Microsoft, Inc. MS-DOS.

C View Manager allows the system developer to design and save output screens, the vendor said. These screens can be recalled and displayed during a program run to inform the user about the program's status or to capture information, according to the vendor.

C View Manager works with Microsoft, Lifeboat Associates and Computer Innovations, Inc. C compilers. The product costs $275; source code for its C function library costs an additional $150.

C Tools reportedly possesses advanced string capabilities and the capability to access IBM Personal Computer hardware features, such as screen handling. It costs $125, the vendor said.

C Tools 2 works with PC-DOS 2.0, the vendor said. It costs $100.

Blaise Computing, 2034 Blake St., Berkeley, Calif. 94704.

See TOOLS page 82

FORTUNE from page 73

AT&T's introduction of Unix-based computer systems, meanwhile, is expected to prove a strong endorsement for the operating system. "The days of going out to find third-party [Unix] software developers are over," he maintained.

Fortune is located at 101 Twin Dolphin Drive, Redwood City, Calif. 94065.

We have a number of high performance communications controllers for Digital computers.

800-832-6277

and a number for them, too.

In fact, we have more microprogrammable, direct memory access communications controllers than anyone else.

So whether you need a controller for a VAX/VMS, UNIBUS PDP-11 or Q-BUS PDP-11 system, or to interface a public or private X.25 packet switching network, Digital has one that links with just about any computer.

Of course, you also get the full support of Digital, the world's second largest computer company.

Try our number. You'll find the human being on the other end every bit as intelligent as the communications controller we'll fix you up with.

digital™

NEW CICS Abend-AID

PRODUCT ANNOUNCEMENT

Abend-AID/CICS is a powerful software tool that transfers the burden of debugging CICS transaction abends from the programmer to the computer.

Abend-AID/CICS analyzes transaction abends, determines the cause and tells the programmer—What Happened, Why it Happened and Where it Happened. It also provides immediately On-Line the necessary supporting data in a concise, easy-to-use format.

Saves Programmer Time

☐ Complete, easy to understand diagnostics. Pinpoints the cause of the abend. Presents all the data needed to solve the abend. Immediate access On-Line through CICS, TSO/SPF or CMS. The region does not have to be active to view Abend-AID/CICS output.

Reduces Production Downtime

☐ Since Abend-AID/CICS is only invoked at the time of the abend it can be used both in test and production. Minimum overhead allows Abend-AID/CICS to work for all regions. Works instantly for all programs old and new. No recompiling. No programmer action required.

Greater Management Control

☐ An Abend Activity report can be viewed at any time to give you an up-to-the-minute picture of region abend activity. Report provides transaction code, terminal, abend code, program name and date/time information for all abends.

Greater Flexibility

☐ Exception tables enable you to choose desired output—or suppress output based on transaction code, terminal, abend code or any combination. Customized diagnostic modules can be created for user exits and specialized abend codes.

For additional Product Information or to arrange for your FREE 30 Day Product Evaluation call today.
800-521-9353 (In Canada or Michigan 313-540-0400)
or return the coupon below to Compuware, Systems Software Division, 32100 Telegraph Road, Birmingham, Michigan 48010.

I want the computer to work for me. Please Send:
☐ Additional Abend-AID/CICS Product Information
☐ Additional Information on Free 30 Day Product Evaluation.

Name _____ Title _____
Company _____
Address _____
City _____ State _____ Zip _____
Phone _____ Operating System _____

ABENDABENDABEND
ABENDABENDABE
ABENDABENDAB
ABENDABENDA
ABENDABEND
ABENDABEND
ABENDABEND

Aid

COMPUWARE

Corporate Headquarters
32100 Telegraph Road
Birmingham, Michigan 48010
(313) 540-0400

International Offices: New South Wales, AUSTRALIA Phone (61-2) 816-1177 / Luton, Bedfordshire, ENGLAND Phone (44-582) 28-463 / Paris, FRANCE Phone (33-1)624-1380 / Milano, ITALY Phone (02)-3452074 / Herzliya, ISRAEL Phone (972-52) 58912 / Tokyo, JAPAN Phone (81-3) 479-1600 / Oslo, NORWAY Phone (47-2) 56-5570 / Bryanston, SOUTH AFRICA Phone (27-11) 787-5600 / Hamburg, W. GERMANY Phone (49-40) 23-3251

TOOLS from page 80

PYRAMID DATA LTD.
Numbercruncher

Customized business software applications reportedly can be created and run on the Eagle Computer, Inc. Spirit portable computer and Eagle XL personal computer with a new release of the Numbercruncher series of software products from Pyramid Data Ltd.

The Numbercruncher system for Eagle portable and personal computers includes all the features of Numbercruncher products currently available for the IBM Personal Computer and compatibles, PCjr and the Radio Shack 2000 personal computer, a spokesman for the vendor said.

The series provides a fourth-generation language said to enable users to modify their software. Products available range from the Numbercruncher I system, which allows users to create spreadsheets and reports, to the Numbercruncher III, which provides features such as integrated relational data base management, the spokesman said.

Prices for the custom Numbercruncher series range from $99.95 for the Numbercruncher I to $695 for the Numbercruncher III, according to the vendor spokesman.

Pyramid Data, P.O. Box 10116, Santa Ana, Calif. 92711.

MIS from page 73

from users; other times it comes from the personal computer department," said G. M. Hughes, vice-president at Pfizer Pharmaceuticals, Inc. in New York. "Users learn of new packages as quickly as we do."

Users play a critical role in the review process, according to Langlois. "In addition to personnel dedicated to evaluating microcomputer softare, users who suggest packages volunteer to be guinea pigs," he said.

Evaluation involves give-and-take between the users suggesting a package and the microcomputer support team, said William O'Neil, director of microcomputing for The First Boston Capital Group, Inc. in Tarrytown, N.Y. "Often, department senior managers choose a package and then turn to the MIS department for approval," O'Neil said.

The personal computer department weighs the user's suggested package against packages already approved for corporate use, O'Neil said. "There are 340 word processing packages for the IBM Personal Computer. Obviously, we can't support every package that a user desires, so we limit support to three packages for each application, such as word processing.

"The program must be easy to use and have on-line Help functions," O'Neil added. "Most users will not spend any time reading the user manual."

Users wanting to add their program to the approved list must make a case for the software, according to Langlois. "The user must sell the new product's benefits to the personal computer department," he said.

O'Neil listed cost savings as the primary criterion. "We wanted to transfer work in our word processing pool from minicomputers to microcomputers," he said. "So we added [to the approved list of packages] one microcomputer word processing package that resembled the minicomputer system. Savings in training costs justified the addition." Hughes said that after the evaluation process, users respect the department's choices.

SURVEY from page 73

companies found that 82% had designated a department to manage personal computers. In 77% of those firms, MIS was the department. "The remaining 23% assigned corporate personal computer decisions to the word processing or communications department," Juliussen reported.

The survey identified two key considerations for choosing microcomputers: the viability of the manufacturer and the micro's ability to communicate with a mainframe.

"The factors in selling to Fortune 1,000 customers — access to the mainframe and established contacts — favor IBM," said John Barns, president of Microcraft Corp.

Future Computing's survey supported Barns' assertion. The survey showed the numbers of installed micros: 59% are IBM; 19% are Apple Computer, Inc. micros; 6% each are from Radio Shack and Hewlett-Packard Co.; and 4% are Wang Laboratories, Inc. systems.

IBM was listed as the first choice of 67% of the companies surveyed. "No preference" was the second choice, with 24%. HP, with 4%, was the only other manufacturer with a significant market percentage.

Among companies that had signed volume purchase agreements, IBM has signed 69% of the companies surveyed; Apple, 6%; and Wang, Radio Shack, HP and Digital Equipment Corp. each 5%, according to the survey.

Future Computing said that IBM's sales to large companies comprise 50% of its Personal Computer sales, as opposed to 40% at DEC and 66% at Wang. On the other hand, 15% of Apple's and 10% of Radio Shack's personal computer revenue were said to come from the large business market.

NETS from page 73

take place in a centralized fashion, because each node can pass the token along following a transmission.

Because there are no collisions, a token passing system's capacity may be accurately calculated, although a token passing scheme relies on all devices being serially polled, which implies its own set of problems.

A token passing scheme can degenerate under heavy loads, which are measured in terms of the number of connections, since the token must pass every node before returning to any given connection.

A rather heated controversy has risen between supporters of CSMA/CD and token passing systems, and both systems have advantages and disadvantages. At this writing, neither system is clearly superior.

With appropriate network management techniques, either system will prove adequate. From a managerial perspective, the real issue is whether the local-area network vendor's overall design philosophy can meet the buyer's system needs.

Because support for the schemes seems to be as much taste as engineering principle, affected even more by marketing prowess, it is not surprising that IBM may launch both technologies into the increasingly crowded local-area network field. The advantage to the industry is that with IBM's backing, some consistency may come out of the chaos of local-area networks now on the market. The disadvantage is that IBM will take yet another step toward total domination of the industry.

ON-LINE
HP3000 & DEC VAX
BUSINESS MANAGEMENT SYSTEMS
• CJ PAYROLL
• CJ PERSONNEL
• CJ ADVANCED GENERAL LEDGER
• CJ ACCOUNTS PAYABLE
• CJ ACCOUNTS RECEIVABLE
• CJ FIXED ASSETS
SUPPORT MAINTENANCE ENHANCEMENT
COLLIER JACKSON INC.

TSPRINT
SPOOL TO 328X
(Also 3262 and ASCII Printers)
VS1 and MVS
JES, JES2, and JES3
Local and Remote Printers
Control Printer Activity from ANY VTAM terminal using SPF-like Panels
Data Formatting Facility
BTAM and VTAM Support
Full FCB and UCS Support
No System Mods Required
Multiple Printers Run in a Single Address Space
Support For SCS Devices
SMF Accounting Records
Shares Printers With Other Applications
Worldwide Support
TONE Software Corp.
Free Trial
1775 S. Brookhurst, Anaheim, CA 92804
(714) 991-9400 Telex 181582

ATTENTION
COPICS USERS
A truly on-line, integrated Receiving, Quality and Material Control System replaces the COPICS Field Developed Receiving Module.
In addition to updating your MRP, Purchasing and Inventory Control data bases, this powerful system, RQMCS, features:
• Automatic Back Out
• Flexibility
• Only One Data Base
• Total Audit Trail
• Quality Control
• On-Line Updating
• Posting Options
• No Conversion
RQMCS users are enthusiastic about the system's processing speed and the immediate control it has provided for their entire receiving operation. For more information call:
(404) 998-3500
LELAND INC
COMPUTER SERVICES
3601 DUNWOODY PLACE, SUITE 146, ATLANTA, GA. 30338
Our Word Is A Promise

COMPUTER INDUSTRY

INDUSTRY INSIGHT
Peter Bartolik
CW News Editor

Seeing red hinders high-tech trade

A presidential administration that campaigned partly on the promises of encouraging free enterprise and reducing government regulation and paperwork appears totally committed to shackling the competitiveness of high-technology industries.

Recent actions by the Reagan administration are certain to reduce the ability of high-tech firms to compete in the international marketplace: Digital Equipment Corp., the apparent unwitting player in a very muddled smuggling case late last year, recently was told it would have to abide by more stringent export regulations [CW, March 26]; the Department of Defense was empowered to review high-tech exports to allies suspected of being diversion points to Eastern bloc nations [CW, April 2]; and attempts to enforce U.S. export regulations within the borders of other countries, such as the UK [CW, April 9], have raised hackles.

It is idiosyncratic of self-professed conservative politics that the first commandment of free enterprise is promptly ignored whenever the flag of the Red Threat is waved.

The Reagan administration, and any other U.S. administration, certainly has the right and the duty to ensure that war-adaptable advanced technology is kept from the hands of countries that express, by word or deed, enmity for this country.

But manipulating such fears to enact blanket restrictions accomplishes little, other than hampering the efforts by U.S. industry to assert its well-earned prominence as an international leader in trade and the commercial exploitation of technology. It is particularly grating when such a turn of events appears, at least

See DISTRICT page 97

CDLA wary of IBM Credit

Aftermarket a boon for firms seeking used CPUs

By F. Peter Model
Special to CW?

Second of two parts

During a meeting of the Computer Dealers & Lessors Association (CDLA) last fall, David A. Finley, president of IBM Credit Corp., told CDLA members Big Blue was not being predatory when it created the credit subsidiary two years earlier.

It proved to be a tough sell, and few CDLA members were in a mood to buy.

Under the John Opel regime, IBM concluded that its long-term growth objectives would be better served with a faster up-front payout on its huge investment in new computers; accordingly, it set up IBM Credit as a wholly owned subsidiary, headed by Finley, to raise new money from outside sources.

IBM, with its AAA public debt rating, had better access to outside financing, and IBM Credit quickly became the sixth-largest computer lessor. By retaining the investment tax credits on new machines, IBM Credit or its banking partners had access to better interest rates and could offer computer buyers better terms.

Look at the bright side, Finley told the dealers: The more new equipment IBM could sell, the more used equipment would have to flow out of the primary and into the secondary or aftermarket.

Privately, CDLA members found it hard to believe Finley's claim that IBM needs an orderly used market and wants nothing more than to coexist with used equipment dealers and lessors.

Not only are the CDLA dealers put out by reports that IBM Credit will pay bonuses to IBM field sales reps who steer leasing business its way, they're furious about talk of IBM paying them *commissions* and instituting a quota/goal program.

It's a no-win situation for dealers, perhaps, but not for businessmen who are looking for a good deal in used CPUs and peripherals. However, since most of the IBM Credit leases are for three to four years, the earliest the business community can expect the fallout of used, 1982-vintage computers to take place will be 1985.

Meanwhile, the pipelines are bulging. Over 33% of IBM's 1982 net earnings were

See CREDIT page 97

Worldwide intelligence organization targets U.S. technology, speaker says

By Patricia Keefe
CW Staff

BOSTON — U.S. high-technology companies and equipment are the prime targets of the "largest intelligence organization on earth," but government efforts to combat the Soviets are complicated by the fact that the high-tech industry is overwhelmingly in the civil domain, a ranking federal official lamented here recently.

Even worse, said Michael Marks, senior policy adviser to Undersecretary of State for Security Assistance, Science and Technology William Schneider Jr., there is evidence that Soviet efforts to acquire U.S. technology have become much more systematic and effective over the past 15 years.

"Western technology is the target of a massive, well-coordinated Soviet acquisition effort, orchestrated through legal and illegal methods and aimed at those technologies which promise the highest military payoff," said Marks, who delivered the keynote address here at the recent Symposium on the Transfer of Technology in the International Marketplace, sponsored by the Federal Bar Association. He cited a number of recent trends in Soviet activities:

■ Increasing priority is being given to dual-use commercial and emerging high technologies, perhaps indicating the military value placed upon them by the Soviet Union as well as their greater vulnerability to intelligence acquisition methods, Marks said.

See SOVIETS page 96

Data General

■ Data General Corp. reports profits for the second quarter were more than double those for the comparable period in 1983, but President Edson D. deCastro tells Wall Street analysts success is expensive and orders may ease off in the remainder of the year/**96**

INSIDE

■ U.S. data shows that imports of computer equipment have been growing faster than exports, according to the Computer and Business Equipment Manufacturers Association/**94**

■ Carlton Amdahl will step down from his position as vice-chairman and director of Trilogy, Ltd., and two new men are brought in to head up computer design activities/**92**

Instant Cure for Computer Indigestion

COMPUTER INDUSTRY

Rolm, Northern Telecom to supply NTT PBX systems

SANTA CLARA, Calif. — Nippon Telegraph and Telephone Public Corp. (NTT) recently selected Rolm Corp. and Northern Telecom, Inc. as suppliers of computer-controlled digital voice and data communications systems for NTT direct purchase and resale in the Japanese office automation market.

The contract award, Rolm said, is expected to result in revenues in the $10 million to $20 million range for 1984. The companies competed with established Japanese vendors, including Nippon Electric Co., Ltd.; Hitachi, Ltd.; and Fujitsu, Ltd., according to a spokesman for Rolm.

In early 1982, Rolm had been approved as a vendor of private branch exchanges (PBX) in Japan through an interconnect distributor. Rolm then became the first distributor of digital PBXs in Japan, as NTT had previously restricted the use of the devices.

According to a prepared statement, NTT said it intends to use the Rolm CBX system as the hub of information flow in an office/business environment. The equipment will be installed in medium-size to large offices, requiring 500 to 4,000 or more voice and data extensions, as the central controller for telephones, terminals, computers and facsimiles, NTT said.

According to Wolfgang Schwartz, vice-president and general manager of the Rolm International Telecommunications division, "With so many large Centrex-type systems existing in Japan today, that replacement market alone is huge."

Cbema says computer imports up

WASHINGTON, D.C. — U.S. imports of computers and business equipment grew four times faster than exports over the last three years, resulting in a steadily declining U.S. positive balance of trade, according to the Computer and Business Equipment Manufacturers Association (Cbema).

Cbema President Vico Henriques blamed the imbalance on the inflated dollar due to high interest rates and claimed the imbalance between the U.S. dollar and the Japanese yen gave Japanese manufacturers a 20% price advantage in the U.S.

The Cbema analysis, based on U.S. Bureau of the Census data, showed that while U.S. exports of computer equipment have risen at an average rate of 9% since 1981, they have been outpaced by imports, which have grown at an average rate of 36.8% since 1981. From 1982 to 1983, the Cbema analysis said, the positive balance of U.S. trade declined 12.6% percent from $6.62 billion to $5.79 billion.

Imports of data processing equipment from Japan reached $1.88 billion last year, an increase of 115% over 1982's $828 million.

Henriques said the downward trend in the U.S. positive balance of trade, a decline of 9% annually since 1981, showed a need for corrective U.S. trade policies. One change the government should make, he said, is to "rethink its proposed policies to place export control restrictions on microcomputers, an area in which the U.S. now is the leading exporter."

'There are days when I think AI can't come too soon.'

COMPUTER INDUSTRY

Fifth generation still 'creative dream,' says keynoter

By David Gosse
CW Staff

BOSTON — Despite some public relations hoopla, fifth-generation computer systems at this point in time remain "a creative dream and a vision of what computers can do," the former vice-president of engineering for Digital Equipment Corp. maintained last week.

In his keynote address at the annual Dexpo East '84 conference here, C. Gordon Bell, now chief technical officer for Encore Computer Corp., presented his own brief history of the evolution of the computer industry and speculated on future developments in store for fifth-generation systems.

Bell, the chief architect of DEC's PDP-11 minicomputer, joined Encore last July after more than 20 years at DEC.

The development of each new generation of computers, Bell said, has usually involved the convergence of several factors. Some key factors include need (often for national security purposes), a profit motive and technological and scientific innovation. "The interesting things about these generations is they're getting faster all the time," he added.

In Bell's opinion, today's systems are still part of the continued evolution of the third generation of computers. "We've been on a very long roll since the beginning of the integrated circuit."

He asserted that fifth-generation systems will likely result from continued technological evolution rather than from the "revolutionary" leap forward that some have suggested.

Bell said some discussion about the fifth generation has been nothing more than public relations hoopla. But, he added, "It's also, I think, a creative dream and a vision for what computers can do. And I think the Japanese have done an excellent thing in that regard."

Japanese challenge

Bell said the U.S. faces a considerable challenge from the Japanese in developing new technology. "I think the impressive thing is that they have goals and are focused on what they are doing; and they're getting results."

He suggested some goals the Japanese may have in their push to develop fifth-generation computers. Those benefits, he said, could include improving research techniques; learning knowledge engineering and artificial intelligence-based techniques; developing useful by-products; increasing parallelism; and repeating the success they have achieved with semiconductors and supercomputers.

Research in the U.S. on the next generation is very difficult, Bell said. There are still no prototypes developed, and universities and industries are poorly equipped for the research.

Bell summed up his view of the next generation. "I don't believe that revolution is what it will all be about," he said. "I think it will just be a matter of a tremendous amount of slow, very hard work."

NEW LIFE FOR 1401 PROGRAMS

CS-TRAN converts your 1401 object programs to COBOL, for the mainframe or mini of your choice.

CS-TRAN is the only translator that accepts your object programs, patches and all, yet allows you to include actual COBOL paragraph names and record definitions.

If you'd like more details about new life for your 1401 programs just call or write Russ Sandberg.

C-S Computer Systems Inc.
209 South Main Street, P.O. Box 358
Manville, NJ 08835 • 201-526-8600

Sales up, but shipments might not keep pace: DG chief

By David Myers
CW New York Bureau

NEW YORK — Data General Corp.'s equipment sales have boomed since striking a historical low last June, but Edson D. deCastro, president of the 16-year-old computer maker, recently said shipments may not keep up the pace for the rest of the year.

In his first speech to Wall Street stock analysts in five years, deCastro said DG equipment sales grew 17% from the first quarter of the year to the second, but he added that rising demand is forcing DG to shave its profit margins in order to ship its products on time.

He said DG's highest priority for the rest of 1984 "is meeting customer demand in a timely fashion."

Under questioning by analysts, deCastro said DG lead times had stretched to four months by the end of 1983, but have since been reduced to three months.

To boost manufacturing, deCastro said DG has shifted to heavier purchases of parts made outside the company "at somewhat higher costs." As a result, the computer vendor's profit margins have not ballooned as quickly or as large as its sales figures, according to deCastro. "Our fall from grace was more rapid than our return," the DG president said, referring to the way the firm's profit margins plummeted to zero in 1982's final quarter.

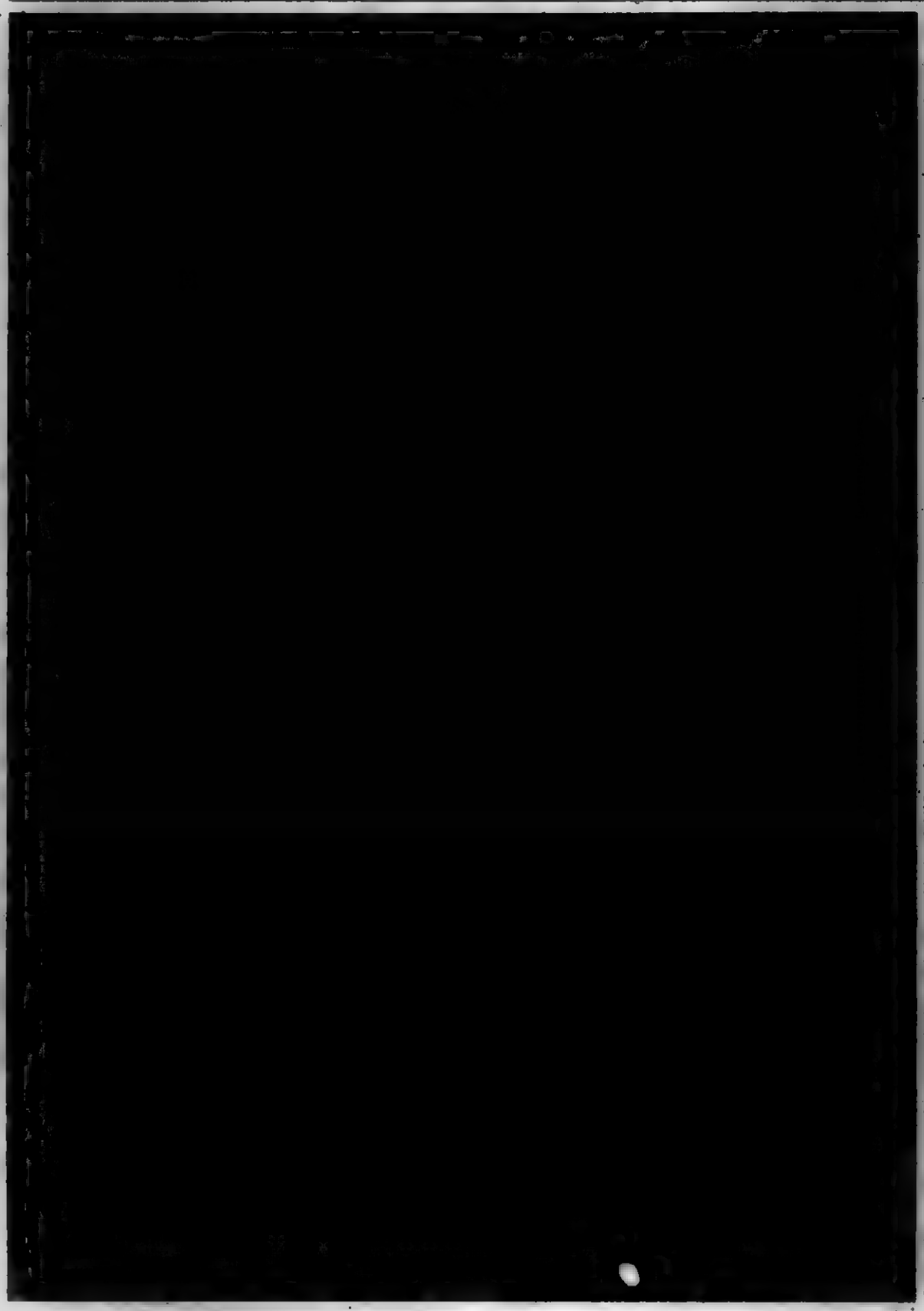
Noting that economists expect capital spending by durable goods manufacturers to rise through 1985, deCastro said DG expects demand for its three families of computers — the 32-bit MV series of superminis, the 16-bit Eclipse line and the microprocessor-based Desktop Generation of small machines — to grow through the next two years.

However, "the surge in shipments we achieved in the past two quarters may not be indicative of the next few quarters," deCastro warned the audience of stock watchers. "After all is said and done, this may result in little change in the earnings-per-share expectations for this fiscal year."

DG is now operating at a 7.3% margin of profit and expects to top 10% by year's end, deCastro said. "We might even be able to achieve margins above 15% at some time during the next few years," he said, but added that customer demands would make it unreasonable for the company to operate at that level for very long. DG is also expanding its manufacturing capabilities by spending $85 million on capital improvements this year, deCastro noted.

In reply to a question, deCastro said DG's goal this year is "to gain as much market share as we can." However, he went on to note that "we haven't seen anything to indicate that" DG is gaining share at the expense of its archrival Digital Equipment Corp.

Preceding deCastro to the podium, Robert C. Miller, the company's senior vice-president of the Business Products Group, said sales of the MV series of superminis would account for one-half of DG's sales this year.



Second quarter earnings at DG $12.6 million

WESTBORO, Mass. — Continuing its rebound from a three-year slump, Data General Corp. recently announced that profits for the second quarter ended March 10 more than doubled from the comparable quarter in fiscal year 1982.

Net earnings for the second quarter were $12.6 million, or 49 cents per share, compared with $5 million, or 21 cents per share, one year earlier. Revenues increased in the quarter to $229 million, up from $178.7 million in the second quarter of 1982.

It marked the third consecutive quarter in which sales and profits climbed, following a three-year decline in which annual profits slipped from a high of $54.6 million in 1980 to $23.1 million last year.

For the first two quarters of the current fiscal year, DG produced profits of $21.6 million, compared with $8.1 million in the first six months of last year.

One day after the financial report was issued, DG President Edson D. deCastro told the New York Society of Stock Analysts to expect little change in per-share earnings, because strong demand for products has caused the company to turn to outside parts suppliers, and the higher costs will cut into profit margin improvements.

The revenue growth of 27% experienced in the first six months of the fiscal year, $468 million compared with $368.4 million in the year-earlier period, may not hold up during the second half, deCastro said.

If you're not in *Computerworld's* next five special reports, look at the issues you'll be missing.

MAY 25
Software Productivity Packages
We'll tell our readers all about the software and services available to benefit DP managers and their technicians.
Closes May 11.

JUNE 25
Graphics Systems
If you have something to offer the graphics user, this is the place to be. We'll focus on the latest technologies, techniques, and applications.
Closes June 8.

JULY 2
NCC Preview issue
A detailed roundup of the vendors and products to see at the show (complete with booth numbers). Plus we'll take a look at the special attractions in Las Vegas.
Closes June 15.

JULY 9
NCC Show issue
We'll highlight *Data Pro's* yearly hardware survey. Readers always enjoy studying other user's candid ratings of systems and vendors.
Closes June 22.

JULY 16
NCC Wrap-up issue
Part 2 of *Data Pro's* hardware survey. Also, we'll let readers in on the major product announcements and happenings at the show.
Closes June 29.

For more information, or to reserve your space in any of our upcoming issues, call the sales office nearest you. Or fill out and return the coupon below to: Ed Marecki, National Sales Director, *Computerworld*, 375 Cochituate Road, Box 880, Framingham MA 01701. Do it today.

To: Ed Marecki, National Sales Director
CW Communications/Inc., Box 880,
Framingham MA 01701
Please send me advertising information on:
☐ *Software Productivity Packages.*
☐ *Graphics Systems.* ☐ *NCC Show issue.*
☐ *NCC Preview issue.* ☐ *NCC Wrap-up issue.*
☐ Please have a sales representative call me.

Name _____
Title _____
Company _____
Address _____
City _____ State ____ Zip _____
Telephone _____

COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Sales Offices

BOSTON: 375 Cochituate Road, Box 880, Framingham MA 01701, (617)879-0700; CHICAGO: 2600 South River Road, Suite 304, Des Plaines IL 60018, (312)827-4433; NEW YORK: Paramus Plaza I, 140 Route 17 North, Paramus NJ 07652, (201)967-1350; ATLANTA: 1853 Peeler Road, Suite D, Atlanta GA 30338, (404)394-0758; SAN FRANCISCO: 300 Broadway, Suite 20, San Francisco CA 94133, (415)421-7330; LOS ANGELES: 18808 Sky Park Circle, Suite 280, Irvine CA 92714, (714)261-1230.

Linear says National Semi suit deterrent to defections

By Peter Burrill
CW Staff

SANTA CLARA, Calif. — Charged by National Semiconductor Corp. with violating a 1982 settlement in a trade-secrets case, Linear Technologies Corp. recently claimed the charges are aimed at preventing further personnel defections from National Semi to Linear.

National Semi filed suit in Santa Clara Superior Court here late in March, charging that Linear had violated the terms of a confidential, out-of-court settlement that resolved charges filed against Linear in 1981. In its latest motion, National Semi has asked for punitive damages of $1 million and reimbursement of unspecified damages from alleged misappropriation of trade secrets.

Linear was founded in mid-1981 by Robert Swanson, formerly director of linear operations for National Semi, and an attorney for the young firm charged that the continuing court battle is a result of further employee defections.

Michael Ladra, an attorney with the Palo Alto, Calif., firm of Wilson, Sonsini, Goodrich and Rosati, told *Computerworld* that the previously confidential 1982 settlement included a prohibition against Linear's hiring additional National Semi employees and allowed National Semi a "one-time look" at Linear's manufacturing processes. Ladra said National Semi and Linear agreed to remove the confidential provision from the settlement as a result of the renewed court battle.

Linda Baker, spokeswoman for National Semi, declined to comment on the specific charges because of the confidentiality of the previous agreement.

She said the company is trying to open the previous agreement through the court process.

While the actual charges filed here recently by National Semi were sealed by court order, Ladra said Linear believes they were filed because Linear hired a regional sales manager away from National Semi. Ladra said the no-hiring ban expired last June, and Herb Wallack, the manager, left National Semi for Linear last December.

Ladra said the previous settlement did not determine the allegations of trade-secrets misappropriation and that it provided National Semi with the opportunity to examine Linear's processes, which was accomplished this past December. He said the inspection report cited "six minor items out of hundreds of different steps," but the inspector was not empowered to determine what, if anything, constituted a trade secret. Linear's position, Ladra said, is that any similarities between processes used by the two companies are a result of technology common to the industry.

Cases of this type rarely go to trial, Ladra said, but, he claimed, this case is a result of a vendetta by National Semi and may not be settled out of court.

Zilog files complaint against Xilinx

Charging misappropriation of trade secrets

By David Gross
CW Staff

SUNNYVALE, Calif. — Zilog, Inc. recently filed a lawsuit charging unfair competition, trade-secrets appropriation and breach of contract against Xilinx, Inc., a company formed in February by three former top Zilog executives.

The complaint, filed April 4 in the California Superior Court in Santa Clara County, centers on a product under development and names as defendants Xilinx of Los Gatos, Calif., and four former Zilog employees.

Three of the defendants are the co-founders of Xilinx: Bernard V. Vonderschmitt, formerly vice-president of Zilog's Components Division, now Xilinx's president; Ross H. Freeman, formerly director of integrated circuit engineering at Zilog, now vice-president of engineering at Xilinx; and James V. Barnett, formerly product line director at Zilog, now vice-president of marketing and sales at Xilinx. Also named as a defendant is William S. Carter who, in February, left his job as Zilog's director of integrated circuit design to join Xilinx.

The complaint, which primarily concerns an integrated circuit product under development at Xilinx, charges the defendants with "unfair competition, breach of fiduciary duty, wrongfully attempting to appropriate trade secrets and confidential information and breach of contract."

According to David J. Gueseman, Zilog's vice-president of marketing, the complaint centers on his company's claim that it has knowledge of Xilinx's plans to manufacture an integrated circuit product using Zilog trade secrets. He declined to comment on how Zilog knows about the Xilinx product.

Vonderschmitt denied Zilog's charges. "We are not designing and will not manufacture products that will in any way compete or have any relationship to products Zilog is making," he said after the suit was filed.

Vonderschmitt said his firm's product, which he described as an application-specific integrated circuit, uses a different process technology from Zilog's products.

"We interpret this suit primarily as a harassment to keep us from taking [Zilog] employees who are coming to Xilinx," Vonderschmitt said. He claimed that a lot of employees have left Zilog in the past 18 months, but not just to go to Xilinx.

Gueseman denied that the suit is intended to harass Xilinx. He confirmed that the company has lost some employees recently, but he added, "Our turnover rate is commensurate with the industry average of everyone here in Silicon Valley."

Zilog is asking the court for injunctive relief, an undisclosed amount in damages and punitive damages and payment of court costs.

Zilog, formed in 1975, manufactures microprocessors, microcomputers, peripheral support circuits and supermicrocomputer systems.

COMPUTER MARKETING EXECUTIVES

Qualified leads cost you less than $25 each, delivered to your showroom at:

COMPUTER TECHNOLOGY CENTER

CALL US TODAY

SAMPLE SHOWROOM NOW OPEN

1626 W. Olympic Blvd. • Los Angeles, CA 90015 • (213) 386-6118

Apple, Sony will share research

NEW YORK — Apple Computer, Inc. and Sony Corp. recently announced an agreement to share existing research on hard disk technology.

Under the terms of the agreement, Apple Computer will provide Sony with its existing research on hard disk technology, thereby enabling Sony to expand its product line of computer peripheral devices for the OEM market.

Other details of the pact were not disclosed by the two companies.

Both Apple Computer and Sony said, however, that they plan to use the research independently as a basis from which to develop future advanced hard disk drive products.

Sony currently supplies Apple Computer with 3½-in. micro floppy disk drives for use with its Macintosh and Lisa 2 series microcomputers.

DEC TO IBM SNA

Now available...full SNA capability for your DEC computer! Comboard/SNA gives your terminals access to IBM interactive applications. Data can be transfered between systems transparently, all in the complete fully supported package, from Software Results.

Comboard/SNA is a proven and reliable, single-board, 256KB communications computer that plugs into your DEC Unibus. Teamed with Comboard software, the system is a cost-effective solution to troublesome SNA communications problems.

Comboard/SNA allows your DEC to emulate an IBM PU Type 2 communications node. You have a full gateway into your SNA without the trouble of passing through a secondary network.

For further information, fill in the coupon below or call Software Results... the leader in DEC to IBM communications.

COMBOARD

SOFTWARE RESULTS CORPORATION

Call Toll-free

1-800-SRC-DATA

In Ohio call collect

Telex: 810-461 SRC DATA CI

One word from us could solve your PC service problems.

AMER

We've noticed that some words cause PC owners extreme anxiety. Words like "The disk drive blew..." "The data won't come up on the screen..." and "The printer won't print."

Service for a variety of systems.

Well, the next time words like that are echoing in your ears, just ask for Americare service from Xerox.

Unlike a lot of manufacturers and dealers, we don't restrict our repair service to one select brand. Instead, we service 22 of them, including 82 different models. From IBM PCs to Quadram boards. And from Amdek monitors to Okidata printers.

Repairs in 48 hours or less.

Our technicians undergo intensive training on the equipment we service. In fact, they probably know as much about servicing it as the people who made it.

And they work fast, so in most cases they can have your PC up and running

XEROX® and Americare™ are trademarks of XEROX CORPORATION.
IBM PC® and the IBM logo are registered trademarks of International Business Machines Corporation.
Quadram® is a registered trademark of Quadram Corporation.

XEROX

ICARE™

again in 48 hours or less.

Of course, you can't get it back fast if the parts aren't available. Which is why we're downright obsessive about keeping our parts department well stocked.

Americare has Xerox Service Centers that provide you with a nationwide support system. And to make service even easier, you can reach us through our network of over 3,000 authorized computer dealers.

Well stocked parts departments.

A nationwide support system.

In addition, we offer a choice of on-site, depot or pick-up and delivery service. Year-long service contracts or time and materials service agreements are available.

So call 800-238-2300 for the Americare dealer nearest you.

AMERICARE™
PC repair beyond compare from Xerox

It's the first thing to do when you're looking for the last word in service.

Shift seen from micro software to support charges

By Paul Hemmelweit
CW Staff

DALLAS — As sales of microcomputer software to Fortune 1,000 companies shift from retailers to the vendors' direct sales forces, MIS departments may be saddled with annual support charges for packages like Lotus Development Corp.'s Lotus 1-2-3.

That was the message delivered by industry analysts at the Fortune 1,000 Personal Computer Market Forum, a two-day event held here recently by Future Computing, Inc., a Richardson, Texas, market research firm. Future Computing estimated that direct sales of microcomputer software will grow from $120 million in 1984 to $800 million in 1989, increasing in market share from 14% to 44%.

"The major reason for the shift is price," explained Egil Juliussen, chairman of Future Computing. "Large companies are used to 40% discounts for volume purchases. They want to continue to buy products that way."

As volume purchases increase, cost-free support may decrease, according to analysts. "Support is expensive," Jonathan Hathaway, co-founder of ITM Corp., pointed out. "The burden is placed on vendors to have a full-time technician. It makes sense to charge the end user for support services."

Similar trade-offs

Analysts saw similar trade-offs when mainframe software was introduced 20 years ago. "Mainframe software companies began selling software without support," said Howard A. Smith, senior vice-president at Management Science America, Inc. (MSA). "Customers would complain that there were problems with the package, and the vendor ended up supporting the package in any case. Not charging for support was a no-win situation for the vendor."

According to Future Computing, few microcomputer software companies are equipped to handle large companies' needs for volume purchases. Volume purchases require direct sales staffs, and such staffs for micro software are small. Sizes range from Ashton-Tate's four-member staff to Visicorp's sales force of 20, according to Future Computing. Even Lotus, which Future Computing said generated half of its $64 million in revenues last year from sales to large companies, has only a 12-member direct sales staff.

Information Unlimited Software, which benefits from the sales staff of its parent company, Computer Associates, is an exception, with 100 salesmen directly selling its products.

Microcomputer software companies should beef up these staffs dramatically, according to analysts. "As microcomputer software companies' revenues approach $100 million, direct sales become cost-effective," John Downing, chairman of Publishing Technology, Inc. said. "Soon there will be a significant increase in their direct sales efforts."

MSA, originally a mainframe software company that already had a direct sales staff in place, is teaming with microcomputer software companies to supply microcomputer software to large companies. MSA is using part of its sales force to market products from 50 microcomputer companies. MSA provides companies with training, a limited number of software packages and support. Choosing software is the customer's responsibility [CW, Feb. 20].

"Mainframe companies like to buy from a central source," MSA's Smith said. "Since we have significant market penetration in the mainframe world, we will offer customers the convenience of central purchasing and the benefit of support."

But these benefits are expensive. Each customer must commit to an initial purchase of $10,000 worth of software and a yearly purchase of $100,000.

Trilogy's Amdahl to step down as vice-chairman, director in June

CUPERTINO, Calif. — Trilogy, Ltd. announced last week that Carlton Amdahl is stepping down as vice-chairman and director of the company effective June 1.

Carlton Amdahl, son of company founder and chairman Dr. Gene Amdahl, will continue to serve as a consultant to the company, a Trilogy spokesman said.

Prior to the formation of Trilogy, Carlton Amdahl had served with Magnuson Computer Systems, Inc.

Trilogy also announced that Paul McEnroe, previously director of IBM's Raleigh Development Laboratory, was appointed vice-president of engineering of Trilogy Systems Corp., where he will be responsible for all aspects of the firm's computer design, design automation development, computer center operations and machine technology development.

Appointed vice-president of computer development at Trilogy Systems Corp. was David Anderson, formerly vice-president of engineering with Computer Research Corp., a Storage Technology Corp. subsidiary, and previously with IBM.

Anderson will have responsibility for the overall coordination of Trilogy's computer design activities, according to the spokesman for the firm.

HCSI-P.C. Telemart suit settled

LAUREL, Md. — Hammarly Computer Services, Inc. (HCSI) settled a $10.9 million breach of contract suit against P.C. Telemart and Larry A. Stockett eight hours before the case was to go to trial last month.

An attorney representing HCSI, a firm specializing in electronic mail and micro data communications software, said cash and other considerations were part of the settlement.

The suit had been brought Oct. 17 by HCSI and charged Telemart with breach of contract, racketeering and violation of copyright. HCSI had spent nearly 10 months developing software for Telemart, but had not been paid, the attorney said.

Stockett has reportedly resigned as Telemart's chief executive officer.

When You Need
Computer Equipment Moved!
Rely On Experts
• One-Day Pick-up and Delivery
• Specially Equipped Radio Dispatched Trucks
• Competitive Rates
• Air Freight Handling
• Warehouse Facilities
• Full Insurance Coverage
Serving Southern California Since 1970
For more details, call toll-free:
(800) 821-5270
U.S. except Calif.
(800) 521-5537
California
Southern California Delivery Service Computer Transportation, Inc.
2914 E. 46th Street, Los Angeles, CA 90058

NEW COURSE ANNOUNCEMENT
SEND YOUR IMS PROBLEMS TO SCHOOL
Our instructors encourage students to bring actual programming assignments, debugging and/or design problems to class. Because they're committed to providing a real-life learning experience . . . experience that makes programmers immediately productive in an IMS environment.
Atre/SysEd courses, from Data Base Design, DB (DL/I) Application Programming, DC and Message Format Services Programming, and Utilities to advanced Recovery and Restart, are for highly motivated programmers who want to become IMS professionals and are willing to work hard. Our intensive training provides state-of-the-art instruction: a solid foundation in IMS fundamentals and insights into advanced material; extensive "hands-on" experience; and individual attention from highly qualified instructors.
Classes are held regularly at our fully equipped classroom/computer facilities in New York City and Chicago. Class size is limited, so applications are accepted on a first come first served basis. Customized course offerings are available for on-site sessions at company installations.
For more information, call David Shapiro (212) 889-3386.
ONE PARK AVENUE
NEW YORK, NY 10016
atre SYS-ED

COMPUTER INDUSTRY

U.S., foreign chip makers form trade statistics program

PARIS — Sixty-one semiconductor firms from the U.S., Europe and Japan meeting here recently formed the World Semiconductor Trade Statistics (WSTS) program.

The new program replaces the Semiconductor Trade Statistics Program, which started in the U.S. in 1976 under the auspices of the Semiconductor Industry Association (SIA) and was expanded in 1980 to include European manufacturers.

The program, reputed to be the first worldwide statistical reporting program for any industry, is designed to provide participating firms with timely data on product shipments to all markets in the world.

It will provide each member with a monthly report covering all major markets for 38 product lines, according to Jean Caillot, executive vice-president of Thomson International, who was elected to chair the WSTS.

According to the SIA, the agreement, reached with Japanese industry to participate with U.S. and European vendors in a global statistics program, follows an extended study by all parties and is based on a new charter for governance ratified at the recent meeting here.

The WSTS is sponsored by semiconductor trade associations from the respective regions — the SIA for the U.S., the European Electronics Components Association for Europe and the Electronic Industries Association for Japan. The program will continue to be administered by the SIA until an independent administration can be established, according to the SIA spokesman.

McAuto announces subsidiary

ST. LOUIS — McDonnell Douglas Automation Co. (McAuto) has formed a new subsidiary called Cimtek to market products for automated manufacturing.

Cimtek, an acronym for Computer-Integrated Manufacturing Technology, will focus on computer-aided manufacturing, computer-aided engineering, robotics, process planning, production planning and control and data base management.

Manufacturing industry products, chiefly computer-aided design and manufacturing systems, accounted for $65.6 million of McAuto's sales last year. This year, according to McAuto, the company expects that total to reach $100 million.

Last month, McAuto, after concluding an agreement to purchase Tymshare, Inc., announced a decision to form several single-industry businesses, the first being McDonnell Douglas Health Systems, Inc.

McAuto Senior Vice-President John J. Clancy will serve as president of Cimtek.

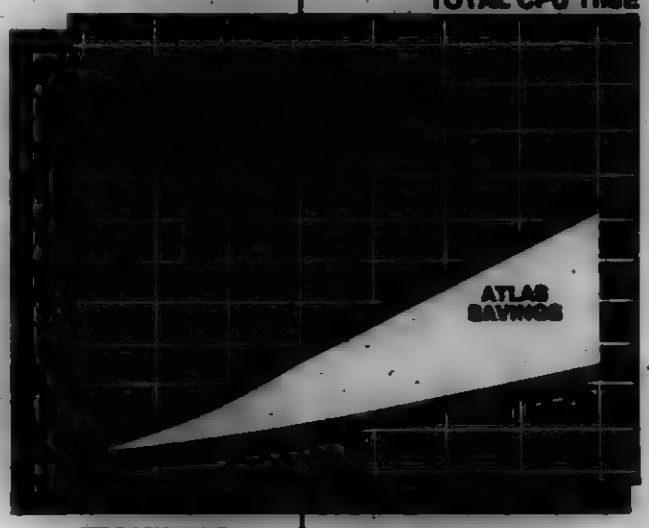
Monolithic revenues up

SANTA CLARA, Calif. — Monolithic Memories, Inc. recently reported second-quarter revenues of $40.1 million, an 87% gain over the corresponding quarter in 1983.

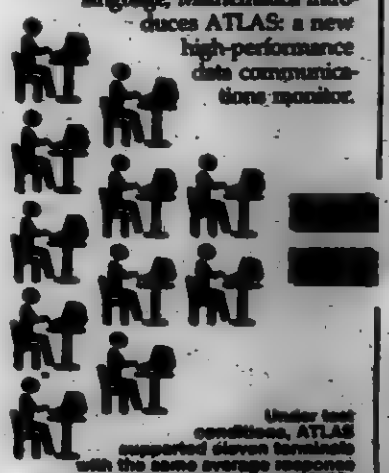
Profits for the second quarter ended March 18 were $5.5 million, or 29 cents per share, compared to profits of $862,000, or 5 cents per share, during the same period last year. The company said its second-quarter earnings were the largest of any 12-week period in the firm's history.

The company's sales during the first half of fiscal 1984 were $73.2 million, a 90% increase over the comparable period last year.

IF YOU KNOW RAMIS II, YOU'LL UNDERSTAND WHY ATLAS™ BEATS CICS!



With the same combination of innovative technology and practical features that has made RAMIS II the leading fourth-generation language, Mathematica introduces ATLAS: a new high-performance data communications monitor.



Under test conditions, ATLAS supported eleven terminals with the same average response time as a single terminal under CICS.

CICS/VS is a registered trademark of International Business Machines Corp.

ATLAS PUTS YOU A GENERATION AHEAD

ATLAS inaugurates a whole new generation in data communications software. Because CICS and other traditional monitors were initially developed in the late 1960s and early 1970s, they incorporated functions like "pseudo-tasking" to compensate for deficiencies in the operating systems then in use. Today, those functions remain and they impose layers of overhead to burden your computer—unless you use ATLAS.

Designed for the 1980s and beyond, ATLAS is the first monitor to truly unlock the power of IBM's 4300 series computers and DOS/VSE operating system. The result is more productive application development, high reliability, and dramatically reduced systems programming demands. But most of all, dramatically improved performance.

TEST ATLAS YOURSELF

In a recent test, ATLAS outperformed CICS/VS by more than 2 to 1 in both elapsed time and CPU time. And the heavier the load, the better ATLAS performed.

To find out exactly what the next generation in data communications can mean to your organization, try the ATLAS performance test on your computer. Whether you use ATLAS alone or together with RAMIS II, you will be able to support more terminals, improve response time, and get more work done in the rest of your DOS/VSE partitions.

To arrange a free trial or for more information, contact your local Mathematica office, call toll free (800) 257-5171, or return the coupon below.

MATHEMATICA PRODUCTS GROUP
A MARTIN MARIETTA DATA SYSTEMS COMPANY
P.O. Box 2392
Princeton, NJ
08540

MATHEMATICA
PRODUCTS GROUP
P.O. Box 2392, Princeton, NJ 08540

☐ I would like to try the ATLAS performance test.
☐ I would like additional ATLAS information.

Name
Title
Company
Address
City State Zip
Telephone
Computer Operating System

CW 4/16

RAMIS II AND ATLAS...THE LEADERS BY DESIGN

Boston (617) 237-9424 Chicago (312) 670-9720 Dallas (214) 788-7784 Houston (713) 850-0277 Los Angeles (213) 670-9761 New York (212) 986-9277 Princeton (609) 799-2600 San Francisco (415) 433-4515 St. Louis (314) 725-4666 Washington, DC (202) 484-5732 Basel (061) 224222 Bergen (5) 321300 Calgary (403) 265-6660 Heidelberg (06221) 14021 Hong Kong 5-420714 Johannesburg (011) 788-1855 Kingston (809) 929-7222 London (01) 200 2000 Milan (02) 345-3380 Stockholm (8) 98780 Ottawa (613) 238-8200 Paris (1) 776 61 71 Santiago (2) 31864 Sao Paulo (11) 220-0877 Singapore 2720120 Stockholm (8) 238120 Sydney (02) 922 2477 Tel Aviv (052) 72561 Toronto (416) 671-2272

COMPUTER INDUSTRY

[illegible]

Kenco, Inc. announced it has split its hospital division, Kenmed Hospital Systems, into two units: the Kenmed/IBM business unit and the Kenmed/Wang unit. The change is due to its recent agreements with IBM and Wang under which it will sell IBM hardware nationally and sell Wang hardware on the East Coast.

■

Sears Merchandise Group is increasing the number of Sears business systems centers; it plans to open 40 to 50 units this year. The first 10 will open in early April.

■

SATM Midwest, Inc., a subsidiary of ATM Network Management Corp.,

[illegible] AND ACQUISITIONS

IBM International Corp. of Sunnyvale, Calif., has acquired the microsystems and IBM-compatible memory product businesses of Intersil Systems, Inc., a subsidiary of General Electric Co. The acquisition was made for approximately $13 million.

■

Bemal Systems Corp., Washington, D.C., announced the acquisition of **Amdital**, a computer hardware/software firm. Terms of the sale were not available.

■

Zentec Corp. of Santa Clara, Calif., has sold the principal assets of **Shasta General Systems, Inc.** to **K-G Interests** of Houston. All of Shasta's inventory in hardware, software, software source code, object code and accounts receivable is included in the sale. The contract includes provisions for the new owner to provide service and support to Shasta dealers. Zentec ended its dealer distribution activities in early 1984 because the Shasta operation had not achieved its profit goals and had become a drain on the company's resources.

■

Perfectdata Corp. of Chatsworth, Calif., announced the acquisition of **International Data Automation, Ltd.**, London. The international operations of Perfectdata will now be under Perfectdata International. The acquisition is expected to increase the company's penetration of the European marketplace.

■

Dovetail Systems, Inc. of Sunnyvale, Calif., has purchased **Software Assistance** and market rights to several Software Assistance products for an undisclosed amount of cash and Dovetail stock. The products will continue to be marketed under the Software Assistance name, but with several major changes.

■

Bechtel Investments, Inc. of San Francisco, a subsidiary of Bechtel Group, Inc., announced it has acquired a substantial interest in **Data Securities International, Inc. (DSI)**. DSI provides a business security service for the software industry through a special type of escrow service that is known as proprietary deposit.

EFI announced an agreement to allow financial institutions throughout Illinois that are serviced by these companies to share automated teller machines.

■

Xemag has announced that the company headquarters will move to a new 16,000-sq-ft facility in Menlo Park, Calif., at the end of March. Xemag is a wholly owned subsidiary of Xidex Magnetics, Inc., manufacturers of flexible magnetic media.

■

Wyly Corp. announced that its **Open Systems, Inc.** microcomputer software subsidiary has been selected to provide the accounting software carried by the Nynex Corp. business computer systems retail stores in the New York and New England area.

The board of directors of the **American Electronics Association** has authorized formation of a new council in the state of Florida. The new council will be the 14th in the U.S. for the trade association, which serves the electronics and information technology industries.

■

The Ultimate Corp. and **Insurnet, Inc.** announced an agreement according to which Ultimate will provide Insurnet with more than 1,000 minicomputer systems over the next five years. The value of these systems, associated peripherals and spare parts is estimated to be $45 million. The Ultimate computer systems are also being used by Insurnet to support data communications services between insurance agencies and underwriter companies. Quotron Systems, Inc. will perform pre- and post-installation maintenance for Ultimate's Digital Equipment Corp.-based systems supplied under the agreement. Honeywell, Inc.'s national maintenance organization will continue to perform maintenance services for the larger Ultimate Honeywell-based computer systems.

■

Theodore G. Paper Jr., IBM vice-president, has been named president and chief executive officer of the joint videotex venture by CBS, Inc., IBM and Sears Roebuck & Co. The partnership was formed to develop a commercial videotex service that can be used by people with home and personal computers. The partners also announced the formation of a committee that will oversee operations of the new venture.

DON'T LET THE STEPS KILL YOU.

Take The Ramp. ROLM has perfected a breakthrough communications controller: The CBX II.

It's the centerpiece for a spectacular new ROLM® business telephone system—the fastest, most advanced way to manage voice and data in the world.

Instead of the typical stop-start steps of expansion, CBX II lets you grow smoothly, easily and very, very cost-effectively.

You can move up The Ramp from sixteen phones to more than ten thousand phones, terminals and personal computers. You can store and forward messages. You can monitor costs. You can have the least expensive long distance routes automatically, instantly. You can even network networks, from Dow Jones to the IBM Infonet. And we're plugged into

COMPUTER INDUSTRY

EXECUTIVE CORNER

Richard C. Schultz has been elected vice-president and comptroller of Perkin-Elmer Corp.

■

Harris Corp. has eliminated regional levels of management and announced the promotion of three regional directors in the customer support division. They are **Carleton Smith**, vice-president, Eastern operations; **David Fanning**, vice-president, Western operations; and **John Hammond**, director of division programs.

■

Donald D. Baron has been named vice-president of corporate manufacturing technology at Honeywell, Inc.

■

Thomas R. Brimer has been promoted to vice-president and general manager of Harris Corp.'s Interactive Products Division.

■

Dr. Hollis L. Caswell has been elected vice-president, special programs, at Burroughs Corp. Dr. Caswell was formerly with IBM, where he spent more than 25 years in various senior management positions.

■

A. B. Fopiak has been promoted to executive vice-president of Technology Information Products Corp.

■

William A. Hart, president and chief operating officer since August 1983 of Interdyne Co., will resign his responsibilities due to health reasons as soon as a successor has been found. Hart will continue to serve the company in a consulting capacity in the general management area.

■

James J. O'Connor has been named president of Telecom Plus of Southern New England, Inc.

■

John G. Dickerson has been named president of Stoneware, Inc.

■

Darrell Baldwin has been appointed president and chief operating officer of Philips Information Systems, Inc.

■

Dennis M. Feck, formerly the general manager at NCR Corp.'s engineering and manufacturing division at San Diego, has been named president, chief executive officer and chairman of the board at Saber Technology Corp.

■

Anthony J. Florence, formerly sales director with the North American Division of International Computers Ltd., has been appointed president of Precision Software, Inc.

■

Johann Tam, senior vice-president, engineering, has been named to the position of senior vice-president, advanced development, of Silicon Valley Group, Inc. (SVG). **Arthur G. Silver** has joined SVG as vice-president, engineering and development.

■

John A. Howe has been elected to senior vice-president and general manager of Wyly Corp.

■

Tayne M. Blam has been elected vice-president, corporate product development, of Mohawk Data Sciences Corp.

■

Charles D. Tillett has joined Lexicon Corp. as vice-president to implement an expansion of manufacturing.

■

Richard M. Wetnal has been named vice-president of engineering of the identification systems division of Data Card Corp.

■

Jack Rose has been named vice-president and general manager of Harris Corp.'s government electronic systems division.

■

Keith Sorensen has been appointed vice-president, software development, of Ramtek Corp.

■

J. Gerard Cregan has been named vice-president, manufacturing, of Raster Technologies, Inc. Cregan was a former employee of General Electric Co. **Derek Wilkes** has been named Raster's vice-president of programs and product engineering.

■

James R. Bloom has been appointed vice-president and general manager of the large computer products division of Honeywell, Inc. in Phoenix.

■

W. James McNerney Jr. has been named senior vice-president of General Electric Information Services Co. He will also serve as president of the GE Software Products Corp., Software International Corp. and Energy Enterprises.

■

Giovanni Pol has been elected as director and chief financial officer of Docutel/Olivetti Corp.

■

Anthony J. DePaul has been elected as chairman of the board and chief executive officer of Cogito Data Systems, Inc. **Don E. Ackerman** has resigned as Cogito's chairman, but remains a director.

■

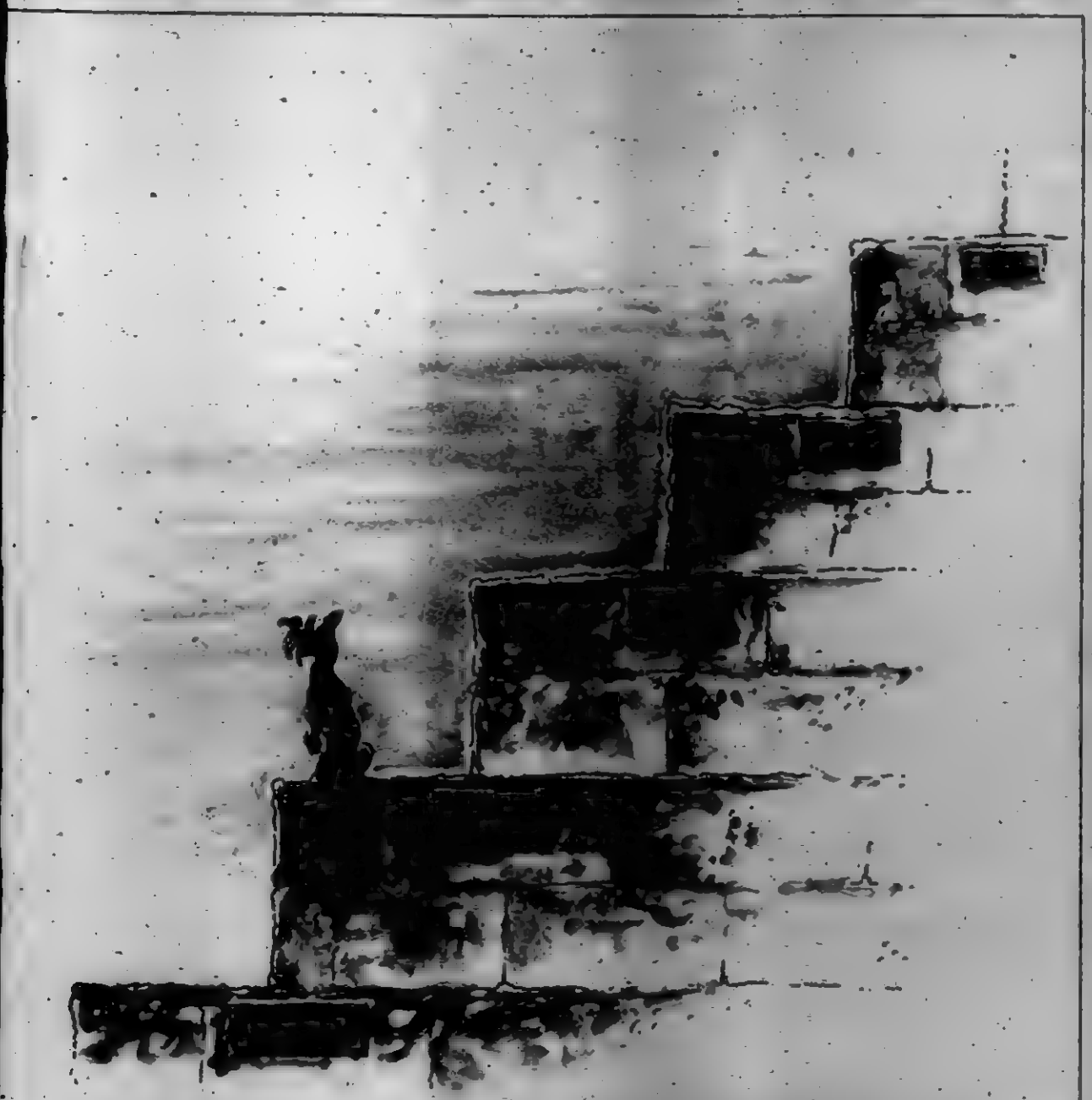
William T. Baker has been appointed president and chief executive officer of Island Graphics Corp.

■

Jeffrey L. Thwaite has been appointed president and chief executive officer of Zentec Corp.

■

Matthew A. Kenney has been appointed president and chief operating officer of Racal-Milgo, Inc. **Edwin J. Hilpert** has been promoted to executive vice-president of the firm and president of Racal-Milgo Government Systems, Inc. **Raymond P. Colucci** has been appointed president of Racal-Milgo's manufacturing division.



IBM and HP and DEC and Data General and the other movers and shakers to guarantee that we can take their new products and new systems in stride.

The CBX II is just the latest reason why ROLM is the choice of more than two-thirds of the *Fortune 500* companies, why more than fourteen thousand ROLM systems are up and running today.

When it's all said and done, the best thing about The Ramp is that it ends that recurring nightmare that you may be buying a business communications system that can't grow, can't change or has a big, gee whiz capability missing.

You can make your life a lot simpler. Just skip the steps and take The Ramp.

ROLM

4900 Old Ironsides Drive, M/S 626, Santa Clara, CA 95050 • 800-538-8154 (In Alaska, California and Hawaii, call 408-986-3026.)

Top priority given to stemming flow of tech to Soviets

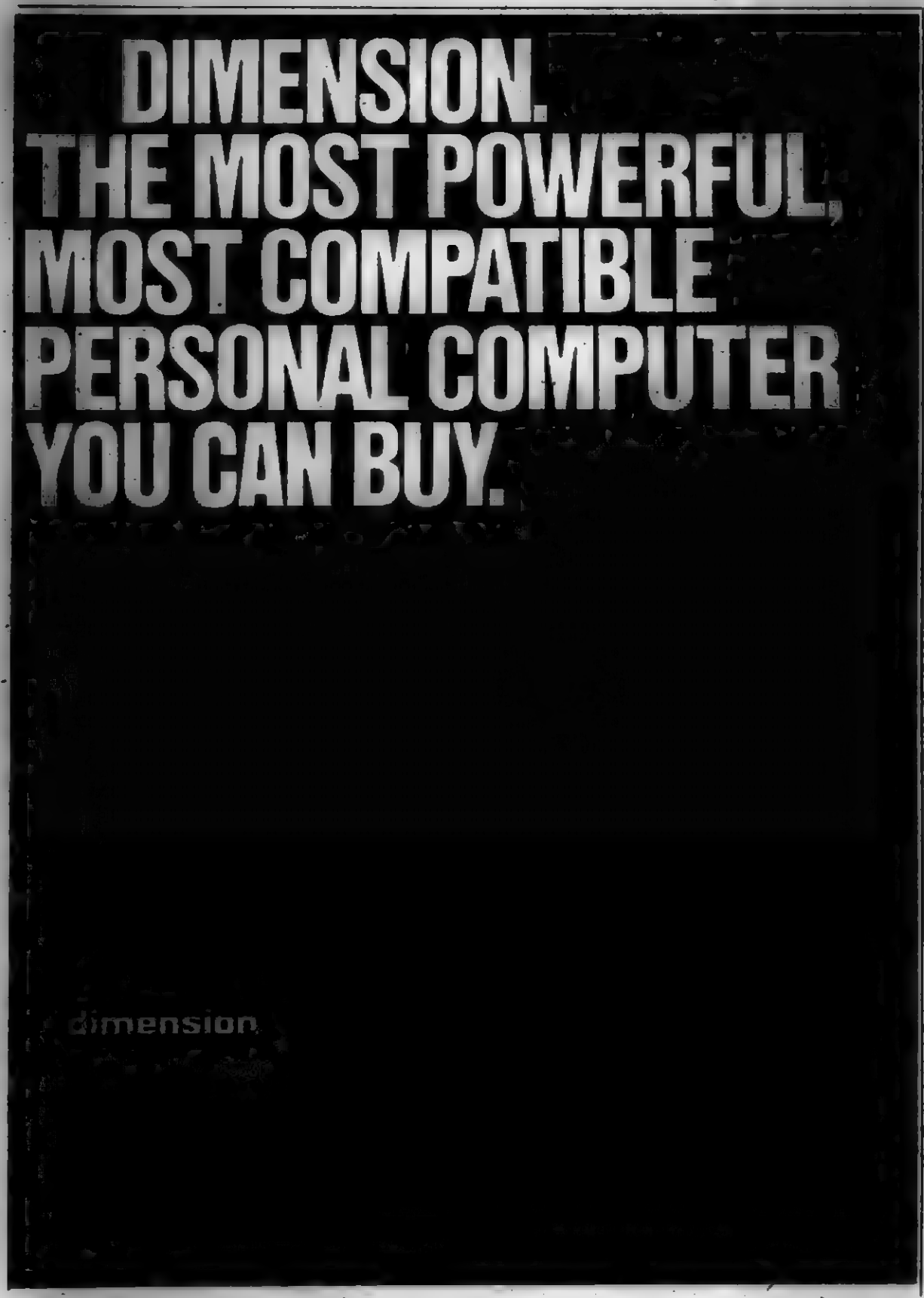
BOSTON — The Reagan administration has given top priority to fighting Soviet efforts to increase military power using "the fruits of Western technology," according to Michael Marks, a senior policy adviser on the staff of the Undersecretary of State for Security Assistance, Science and Technology.

Soviet efforts to date have saved them millions in research and development expenses while costing the West billions by forcing an accelerated pace of arms modernization, Marks contended in his keynote address here at the recent Symposium on the Transfer of Technology in the International Marketplace.

In an effort to "stem the flow" of strategic technology to the Soviets, an interagency organization was created in late 1982. Called the Senior Interagency Group (SIG) on the Transfer of Strategic Technology, it was created to bring all government agencies with strategic technology programs or interests together at a policy-making level to coordinate technology transfer activities, he said. The group is committed to strengthening another agency, the Coordinating Committee for Multiple Strategic Controls (Co-Com) and to drafting a comprehensive U.S. technology transfer policy for presidential decision.

According to Marks, SIG has resulted in a number of initiatives, including:

- Major bilateral dialogues with key high-tech allies, seeking enhanced government awareness of the technology transfer issue and a strengthening of their national export licensing and enforcement.
- Raising the intelligence priorities within allied intelligence agencies. "Of the approximately 80 expulsions or arrests of Soviet intelligence officers in 1983 in the industrial democracies, we believe more than half were involved in strategic technology collection," Marks said.
- Strengthening the U.S. visa mechanism by adopting a new policy of denying and restricting visas when there is evidence that the applicant intends to acquire controlled U.S. technology illegally.



SOVIETS from page 83

- Acquisitions of U.S. technology are being stepped up beyond U.S. borders.
- The role of Eastern European intelligence services has increased steadily since Western sanctions against the Soviet Union were initiated following "aggressive acts" in Afghanistan and Poland.
- Greater emphasis is being placed upon acquiring Western production technology and equipment, as opposed to end products. "This reflects the Soviet need to become self-sufficient and to increase the efficiency of large-volume production," Marks said. Much of this technology and equipment is subject to export controls, and its acquisition often is accomplished through intelligence-directed trade diversions, he added.
- Weapon-related acquisitions increasingly are more selective, focusing on critical components and materials necessary to achieve greater performance.

In short, according to Marks, the Soviets are determined and well-financed and are increasing their efforts. Yet because much of the targeted high technology lies within the civil rather than military domain, "the ability of the federal government to control the dissemination of this technology to the Soviet Union is vastly more difficult than controlling the critical technology of a generation ago," Marks said.

However, continuing cooperation between the government and the private sector is one way to fight the Soviet threat, Marks said. "With your goodwill and support, we will be able to manage our own technology losses and bring increasing pressure on our allies to conform their export policies to ours. Without your participation, we will . . . sell the rope to hang ourselves," Marks warned his audience.

'Quit saying you were replaced by a computer. All they did was move your desk!'

CREDIT from page 83

from "conversion sales" — rental customers buying on-site equipment, partly with accumulated "rental credits" (up to 50% of list price), at the end of their leases. Many then recoup by selling these goods to CDLA dealers. According to CDLA President Richard A. Forsythe, IBM's conversion business in the U.S. alone grew by 53% last year.

Why IBM is doing what it's doing should be obvious: 25 years after the consent decree that ordered IBM to sell its equipment instead of only leasing it, just 39% of Big Blue's customers are buying.

For growth-minded IBM, that's too slow a return on capital. Hence, OPM — other people's money — will ensure that IBM meets its stated growth projections without having to float another public issue.

In 1983, according to International Data Corp., a Framingham, Mass.-based research firm, the $22.6 billion (value shipped) U.S. computer market showed a 60:40 mix of general-purpose mainframes ($11.8 billion).

Over the next three years, the ratio will flip-flop, with minis and micros dominating. The big-box lessors will just have to adapt to change, said Adolph Monosson of Boston's American Used Computers, Inc.

The CDLA also looks upon depreciation schedules and the investment tax credit as means to move hardware into the hands of the user and is lobbying Congress for a faster depreciation schedule.

A trickier issue is how close CDLA members should get to the more aggressive IBM. Reportedly, IBM Credit has sought access to CDLA's information network to report computers coming off lease. According to CDLA Executive Director James F. Benton, "The ticklish question is this: Should the members allow their biggest single supplier to get onto their trading network?" Benton did not raise the issue of whether IBM Credit, as sixth-largest lessor, should be invited to join the CDLA.

RESTRICT from page 83

partially, to result from bureaucratic infighting.

Just about any commodity sold in international markets has some military value; grain, for instance, is vital to an army's food supply chain, but you won't find the Reagan administration reasserting a grain embargo in this election year.

The danger of restrictions on U.S. enterprise is that they harm the U.S. more than the Soviets; witness the embargo on equipment for the Soviet pipeline. Anything commercially available someplace in the world is obtainable by a government's intrepid agents. Trying to make acquisitions more difficult by restricting imports to allies merely serves to turn buyers to more dependable suppliers; in this case, perhaps; enhancing the attractiveness of Japan's vendors.

The conservative philosophy must come to grips with the inherent contradiction between free trade and fear of what the Communists can do with a piece of equipment. Rather than wasting efforts on attempts to block the Soviet bloc from catching up, it would seem much more lucrative to spend those efforts ensuring that the U.S. is always at least one step ahead.

Discrimination suit against IBM dropped

By Bryan Wilkins
CW Washington Bureau

BALTIMORE — A federal judge has thrown out a discrimination suit filed by black managers at IBM's Maryland data processing offices.

U.S. District Court Judge Norman Ramsey said in dismissing the suit on March 29 that there "is absolutely no evidence of any systematic pattern or practice of discrimination within IBM."

The ruling followed a lengthy court battle between the company and the Equal Employment Opportunity Commission (EEOC), which represented the employees.

Approximately 200 black managers and professional staff employed at nine IBM data processing facilities in the state charged that, during the mid- and late 1970s, they were lagging in promotions and job assignments compared with their white counterparts.

According to the suit, the black employees said that IBM conducted "performance appraisals" that contained racially discriminating evaluation standards.

IBM vigorously denied the charges and submitted statistical evidence to refute the employees' allegations.

In the proceedings before the EEOC, IBM submitted statistics showing that, between 1973 and 1981, the number of black managers in Maryland facilities increased from 59 to 145, or from 6.3% to 12.3% blacks in the work force.

The original class action suit was filed by the EEOC on behalf of the black IBM employees in 1980, after a complaint by one former employee, George Hunter, was expanded to include all blacks working at Maryland facilities.

However, the EEOC lawyer prosecuting the case said last year, as preparations for the trial were under way, that the facts of the case had been limited to the years between 1973 and 1981 for IBM employees in Maryland.

Announcing

The one-stop, international advertising service for micro marketers.

You'll reach microcomputer buyers all over the world with *Computerworld's* International Marketing Services (CWIMS). Because we have the microcomputer market *covered* with an international network of publications. And what a market!

As the need for computerization in government, industry and educational systems all over the world becomes more acute, countries look to the cost-effective, adaptable microcomputer to bring them into the computer age. This means a very lucrative market for the U.S. micro marketer, since international product demand exceeds product supply.

Now, with the help of *Computerworld's* International Marketing Services, you can advertise in 15 magazines devoted exclusively to supplying information to microcomputer users in: Australia *(MicroWorld, PC World)*, Brazil *(MicroMundo)*, Denmark *(Micro Verden)*, Finland *(Mikro)*, France *(Golden, PC World)*, Japan *(PersoCom World)*, Norway *(Mikro Data)*, Sweden *(MicroDatorn, Min Hemdator)*, Spain *(Micro Sistemas)*, The Netherlands *(MicroInfo)*, West Germany *(Micro-Computerwelt, PC Welt)*. And, your advertising message can reach buyers of microcomputer products and services around the world through special micro sections in any of our 40 publications in 25 countries.

Act now—and take advantage of this international demand for microcomputer products. Whether you want to test the market—or locate a distributor or representative—our publications will put you in touch with the right people around the microcomputer world.

For more information on getting international micro coverage, call Diana La Muraglia, General Manager, International Marketing Services, toll-free, at 800-343-6474. In Massachusetts, call 617-879-0700 or return the coupon below.

CW COMMUNICATIONS/INC.

Diana La Muraglia, General Manager
International Marketing Services
CW Communications/Inc.
375 Cochituate Road, Box 880
Framingham, MA 01701

Please send me information on:
☐ Your microcomputer publications ☐ Your other foreign publications

Name _____ Title _____
Company _____
Address _____
City _____ State _____ Zip _____

POSITION ANNOUNCEMENTS

Value Added Networking... a Major Commitment at GE Information Services

Today's GE Information Services

General Electric Information Services is introducing its Mark-Net™ value added network, which integrates communications and data processing technology to deliver computing solutions.

VAN Communications Consultants throughout the U.S.

If you're an experienced telecommunications services specialist, you could play a key role in the introduction and implementation of this major new product. As a VAN Communications Consultant, you will work closely with our established sales force to provide in-depth technical and sales assistance before, during and after the sale. To qualify, you should have a technical degree and several years experience in the data communication/networking field as a sales engineer, technical rep or consultant. Contact any of the addresses below regarding these positions.

VAN Product Planners at our Rockville, Md., headquarters

Your responsibilities will include market requirements, product definition, technical cross functional project management, pricing and costing for specific products, and customer support. You should have strong marketing and/or communications experience. Technical candidates should have an advanced degree and technical communications project management experience. In-house consulting experience is desirable. Marketing candidates should have an MBA, project management experience and business/marketing experience in the computer/communications industry. Contact our Rockville, Md., location regarding these positions.

Requirements

Knowledge of network architecture, asynch and bisynch protocols, protocol conversion, packet networks, X.25, IBM SNA, micros, and/or LAN/PBX is important, along with excellent verbal and written communications skills.

Our Future and You

Backed by the resources of General Electric Company, GE Information Services will play a major role in the future of business information solutions. Our highly competitive salaries are enhanced by our comprehensive employee benefits program. If you are ready to make the ultimate commitment to your career future, send your resume and salary requirements in confidence to: **Professional Staffing, (C-0401), General Electric Information Services Company**

- 401 North Washington Street, Rockville, Md. 20850
- 140 East Ridgewood Avenue, MACK Center III, Paramus, NJ 07652
- 614 Commerce Drive, Oak Brook, IL 60521
- Two Embarcadero, Suite 1750, San Francisco, CA 9411]

INFORMATION SERVICES

General Electric Information Services Company, U.S.A.

An Equal Opportunity Employer

LEAD SYSTEMS ANALYST

West Virginia Network for Educational Telecomputing has an immediate opening for a Lead Systems Analyst in the Administrative Services area.

The incumbent will serve as the backup to the Data Base Administrator and as the Project Leader for Accounting Systems. Responsibilities include, continued support for the database system (ADABAS), implementation and maintenance of new and existing accounting systems, and supervision of Systems Analyst and Programmers.

Requirements: BS, plus 6 years programming and analysis, one year as a project leader; significant background in systems analysis and design of financial systems and/or database administration, excellent oral and written communication skills.

Salary: Low 30's. Apply by May 1, 1984 to Mrs. Ricki Dulin, Personnel Officer, 837 Chestnut Ridge Road, Morgantown, WV 26505. Phone: (304) 293-5192. An Equal Opportunity Employer.

LYNDON STATE COLLEGE
LYNDONVILLE, VERMONT

Small state college (1,400 students) in beautiful northeastern Vermont seeks qualified faculty for appointments starting September 4, 1984. Ranks of instructor-associate professor determined on credentials and experience. Salary is negotiable with liberal fringe benefits.

FACULTY VACANCIES - Permanent part-time:

COMPUTER SCIENCE - Full-time, tenure-track position leading courses in ACM four-year program; knowledge of VAX 11/780 and UNIX preferred. Doctorate in Computer Science or related field required for tenure decision; MS and active pursuit of doctorate required for employment. Courses have VAX 11/780, time-share on VAX 11/785, 18-terminal lab, twenty additional work stations. Undergraduate program will begin third year this Fall.

MATHEMATICS OR COMPUTER SCIENCE - Full-time tenure-track position in Mathematics and programming; serve half-time as Coordinator Academic Computing Services for above facilities. Nine and one-half month position, duties from August 20 to June 1 each academic year. Doctorate in Mathematics, Computer Science or related field required for tenure decision; MS, experience in computer applications in other fields and ability to work with faculty required for employment.

Send letter of application, resume and letters of references for all the above positions by May 1, 1984 to Dr. Perry Viles, Acting Dean of Academic affairs, Lyndon State College, Lyndonville, VT 05851.

LYNDON STATE COLLEGE IS AN EQUAL OPPORTUNITY EMPLOYER

DIRECTOR OF DATA PROCESSING SERVICES

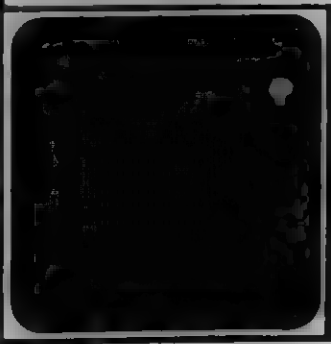
(Sedgwick County, Kansas)

Sedgwick County Data Processing provides service to both Sedgwick County and the City of Wichita, Kansas. This rapidly growing operation utilizes the most advanced program techniques, state-of-the-art hardware, and employs a highly trained professional staff. The director reporting directly to the County Administrator, directs the activities of 61 professional, technical and support staff, and manages a budget of $2.75 million.

To qualify, applicants should have a degree in computer science, business or public administration or related field and a history of successful data processing management. Starting pay is $43,013 to $47,313.

To apply send a letter of application and resume detailing your achievements to Mary Ann Mamoth, Personnel Director, SEDGWICK COUNTY PERSONNEL DEPT., 510 N. Main, Wichita, KS 67203.

Sedgwick County is an Equal Opportunity/Affirmative Action Employer.



Software Engineers Systems Analysts Programmers
$25,000-$55,000

Choice opportunities immediately available in Pennsylvania & national locations. BS, MS & PhD level positions. We have been placing DP professionals for 20 years, with many of the nation's leading companies.
All fees paid by client companies. Reply in strict confidence to Ann Scalese, Vice President.

WEIR PERSONNEL SERVICES, INC.
Box 1378, Reading, PA 19603
215-678-7812

IN SAN FRANCISCO ...
IT'S SPRING YEAR ROUND!

DATA PROCESSING PROFESSIONALS skilled in Main Frames, Minis or Micros, DATA BASE or ON-LINE SYSTEMS consider a move to the beautiful SAN FRANCISCO BAY AREA.
Career opportunities offering CHALLENGE, GROWTH and REWARDS

LOGICAL OPTIONS
Personnel Agency Est. 1976
One Market Plaza, Spear Tower, Suite #3914A
San Francisco, CA 94105 • (415) 777-3700

CALIF. & UNIX®

Openings in a variety of areas and disciplines.
(714) 891-UNIX®

CPU COMPUTER PROFESSIONALS UNLIMITED, agency
7911 Garden Grove Blvd.
Ste. D, Garden Grove, CA 92641

®UNIX is a trademark of Bell Laboratories

NORTHROP ADVANCED SYSTEMS DIVISION...

THE FUTURISTS

Southern California

DATA PROCESSING

The futurists of Northrop's Advanced Systems Division in Southern California are directing their computer skills beyond the present and into the next century of aerospace. If you've got the ability and desire to glimpse the future in your discipline, you can participate side by side with the finest minds in the aircraft industry within our newest facility in Pico Rivera. Examine the opportunities listed below and join the futurists.

Network Communications

Need individuals with experience in maintenance and installation of computer hardware in a large IBM environment. Assignments involve troubleshooting problem hardware, designing hardware networks, assessment of comprehensive plans for installation of computer hardware and actual installation of various types of standard and graphic devices and minicomputers for business and scientific applications. Knowledge of ASYNC, BISYNC and SNA/SDLC protocols is expected.

Capacity Planners

Performance and tuning systems programmers with experience in tuning J. O. configurations job mix with heavy MVS. Familiarity with reporting techniques, graphical representation and SAS, as well as performance experience with Omegamon, SMF and RMF is required.

IMS Systems Programmers

Must have thorough knowledge of the IBM installation procedures for program products and other software that relates to IMS. Knowledge of ACB, PCB and complete SYSGEN process is required. Successful candidates will provide assistance to programming personnel related to procedures and policies of IMS.

Network Design Specialists

Must be experienced in design and analysis of 3705 FEP, and 3274 CU's in various configurations using SNA in a large IBM environment running JES 2 VTAM/TCAM. A working knowledge of ASYNC, BISYNC and SDLC diagnostic equipment in extensive on-going data testing and hardware feasibility studies.

Sr. ILS Systems Analysts (Scientific)

Must be capable of developing information systems requirements as well as estimating and documenting scientific oriented computer applications. Requires experience with a variety of modeling applications such as: maintenance data, maintainability, reliability, availability, cycle cost, etc. Must have 5 or more years recent military aerospace experience in one or more of the above. A BS/MS degree is preferred.

Computer Systems Technical Writer

Will develop documentation required for the development and implementation of business and scientific systems and models. Will ensure that all documentation is of high quality, meets commercial/military standards, reflects actual procedures/practices and is completed on schedule. Must have excellent oral and written communication skills. A BS/BA degree preferred. Previous ILS aerospace experience a plus.

Business Systems Programmers/Analysts

Will analyze and formulate system design solutions by coordinating with analytical and user personnel. IBM hardware must have IMS experience with emphasis in IMS DB/DC, COBOL, and other related software. ILS and Mark V experience a plus.

Responsibilities include designing, coding, testing, and implementing interactive business systems. Will work closely with requirements and in converting to the use of data processing systems. Will develop objectives for improving systems and perform liaison between engineering users and the data processing organization. Will assist in training of engineering user personnel in systems procedures. Qualified applicants should have analytical and systems design experience which include the following:

Engineering Systems Analysts

Will assist engineering users of data processing systems and services in establishing and planning for engineering systems requirements and in converting to the use of data processing systems. Will develop objectives for improving systems and perform liaison between engineering users and the data processing organization. Will assist in training of engineering user personnel in systems procedures. Qualified applicants should have analytical and systems design experience which include one or more of the following areas:

- NASTRAN Modeling and Simulation, finite element analysis used for avionics and structure.
- On-Line Systems for administration (drawing/change control, specifications, structures)
- CAD/CAM Computer Aided Design and tooling for interactive graphics.

Manufacturing Systems Analysts

Will assist Manufacturing users of data processing systems and services in establishing and planning for manufacturing systems requirements and in converting to the use of data processing systems. Will develop objectives for improving systems and perform liaison between manufacturing users and the data processing organization. Will assist in training of manufacturing user personnel in systems procedures. Qualified applicants should have analytical and systems design experience which include one or more of the following areas:

- Manufacturing Engineering applications, tooling, production planning
- Industrial Engineering - major instances, computation and data manipulation, MIL-STD-1567 & 1528.
- Operations Control - Labor and tracking data collections, shop floor control, inventory management, automated warehouses, capacity planning, scheduling.
- Material Control Procurement and material planning.
- Facilities and Transportation - Request tracking, inventory, vehicle dispatch and tracking, equipment maintenance.

Financial Systems Analyst

Will assist financial users of data processing systems and services in establishing and planning for financial systems requirements and in converting to the use of data processing systems. Will develop objectives for improving systems and perform liaison between financial users and the data processing organization. Will assist in training of financial user personnel in systems procedures. Qualified applicants should have analytical and systems design experience which include one or both of the following areas:

- Cash Management and Accounting - payroll, general ledger, budgets and accounts payable.
- Controller - Manufacturing technology as applied to controller, IMS, TSO and FORTRAN applications/development.

Data Processing Equipment Configuration Specialists

Your responsibilities will include equipment evaluation, acquisition recommendations, configuration design, installation planning, terminal and control unit installations, site facilities planning, and equipment and facilities inventory tracking.

Data Base Analysts/Designers

Several new positions are available including Data Base Design, MP and SMP processing support, DB, traditional IMS and newer relational, DB, products, IBM Data Dictionary automation and support, IMS Control Block (DBD, PSB, ACB) Generation. Other opportunities include the responsibility of evaluating DMBS related software, develop recommendations for advanced technical processing to upper management, as well as provide assistance to End Users, Requirements Planners, Systems and Programming Analysis and other DP duties. Experience in IMS Data Base Administration and/or design with a background in IMS on-line and/or Batch Message Processing required.

Selected candidates will receive excellent salaries and a wide variety of benefits. Please send your resume and salary history to:

Dave Coffey • Employment Office • Dept. 964
P.O. Box 1138 • Pico Rivera, CA 90660-8977

U.S. CITIZENSHIP REQUIRED • Equal Opportunity Employer M/F/H

NORTHROP

Making Advanced Technology Work

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

WE WOULD LIKE TO CARRY YOU BACK TO "OLD VIRGINIA"...
CONTEL STYLE

We are Continental Page Engineers, Inc. of Vienna, Virginia. We are part of the 22,000 person Continental Telecom family. Continental Page Engineers is a provider of communications engineering and construction services to the Government Sector.

Located in pastoral Northern Virginia our country roads are home to many of the country's most respected high-tech engineering and consulting firms. Here you can experience a gentler life style with choices as varied as a walk along the Appalachian Trail or a scenic drive through the Shenandoah Valley. . . all still within easy reach of the museums and theatres of cosmopolitan Washington, D.C.

Since our acquisition by Continental in 1981 we have gone through an organizational metamorphosis—combining 35 years of international EFGI field expertise with the innovation and strength of CONTEL—an aggressive leader in the telecommunications field. As part of our technical enhancement program we are seeking creative contributors to help us rebuild our software development group. Current opportunities exist for:

— Director, Computer Applications and Software Development

This is a position for an individual with 8+ years experience in computer applications and in development of mini and/or micro computer software packages for engineering environments (including real-time operating systems). Three plus years management experience including responsibility for a technical support staff.

— Software Development Specialists

Candidates should be degreed and have a minimum of two years experience developing software (C, PASCAL, FORTRAN, Microcode and/or assembly languages) for DEC PDP-11 or VAX computers running RSX-11 M or UNIX operating systems.

— Systems Engineers

Individuals should be degreed and possess a minimum of five years experience designing real-time engineering systems, i.e., CAI and local and wide-area network applications. Interactive graphics experience is a plus.

Contel Page offers an excellent benefit package including medical, dental, life and AD&D and disability coverages, pension, stock option and participation plans.

Please send resume including salary history to:

Bev Cunningham
Continental Page Engineers, Inc.
801 Follin Lane
Vienna, Virginia 22180

CONTEL

Equal Opportunity Employer M/F/H/V

Join the Leader in Computer-Aided Engineering

Mentor Graphics Corporation is a pioneer in the development of advanced CAE workstations for circuit and/or digital systems design. Product innovation and excellence, combined with an aggressive marketing and business approach, have quickly brought us to the forefront of this exciting, new industry. In record time, we have captured the lead in U.S. sales and are emerging rapidly as the industry leader worldwide. Our exceptional growth creates the following outstanding opportunities:

Field Applications Engineers

You will be responsible for providing both pre- and post-sales applications engineering support to customers in these key territories. Your primary responsibilities will include product demonstrations, benchmarks and technical consultation. Positions are available in Baltimore, Boston, Chicago, Minneapolis, Orlando, Phoenix, St. Louis, San Jose and Seattle.

To qualify, you must have a successful background in sales support, a BSEE or equivalent and excellent problem-solving skills. Experience in circuit design, CAE/CAD or ATE systems, analysis tools and/or computer systems is preferred. The ideal candidate will also demonstrate a good understanding of computer operating systems and high-level programming languages. We offer an excellent base salary, plus additional incentives, including a bonus program.

Sales Engineers/ Account Managers

You will be responsible for generating new sales prospects and for aggressively developing and managing customer accounts in one of the following territories. We are looking for truly outstanding sales professionals who have consistently achieved or exceeded sales goals and who excel in the area of new account development. Positions are available in Baltimore, Boston, Dallas, Denver, Detroit, Phoenix, St. Louis, San Jose, Seattle and New Jersey.

Your credentials must include 3-5 years of demonstrated success selling CAE/CAD or ATE systems to the electronic design market, and a BSEE, or equivalent. We are prepared to offer an excellent base salary, an escalating commission plan with unlimited earnings potential, a car allowance plus additional incentives.

Design Engineers

We are looking for highly motivated and innovative software and/or hardware design engineers capable of making substantial contributions to advancing state-of-the-art CAE technology. A bachelor's or advanced degree in Electrical Engineering or Computer Science and knowledge of high-level programming languages are required. Several positions are available in our Portland, Oregon and Santa Clara, California offices. We are working in the following areas:

- CAD/CAM
- Simulation
- Analysis
- Computer Graphics
- VLSI Design

If you are interested in being considered for one of these unusually rewarding opportunities, please mail your resume and salary requirements to: **Barbara Elliott, MENTOR GRAPHICS CORPORATION, 8500 S.W. Creekside Place, Beaverton, OR 97005-7191. (503) 626-7000.**

Mentor

We are an Equal Opportunity Employer

TEAMWORK

THE FORCE THAT DRIVES DALMO VICTOR

Dalmo Victor's feats of technology in Digital Avionic Systems can only be accomplished by the combined efforts of a dedicated team of professionals.

These feats, which include the finest, most advanced EW Systems at work in the free world today, now encompass ground, sea and airborne digital radar systems, antenna design, microwaves, magnetic systems, lasers, infrared and optoelectronics.

Join forces with the Dalmo Victor Team

SOFTWARE DEVELOPMENT ENGINEERS

Senior & Intermediate level positions available for those interested in the development of complex real-time software packages for commercial and military avionics systems. Must be experienced in the development of structured software packages from specification through validation; familiarity with Data General Assembler and block structured HOL and 68/20 or C/3 (or equiv.) desirable.

ELECTRONIC DESIGN ENGINEERS

NEW OPPORTUNITIES, created by expanding programs and new business developments, exist for Senior & Intermediate level Hardware Design Engineers. As a member of our Design Group, you will play a lead role in the design and development of high speed processors for Airborne EW systems. BS/MSEE and at least 5-10 years computer hardware experience required plus familiarity with current technology in both analog and digital circuitry.

Please send resume including salary history, in confidence, to Professional Employment, Dept. CW-416, Dalmo Victor, 1515 Industrial Way, Belmont, CA 94002. (415) 594-2000. An Affirmative Action Employer. U.S. CITIZENSHIP REQUIRED. Individuals only apply.

DALMO VICTOR

PROGRAMMER

SENIOR PROGRAMMER ANALYST

The Fox Chase Cancer Center, a major biomedical research center located in NE Phila., seeks a talented self-motivated individual for our research computer center. Responsibilities include consulting and project work in a variety of areas including: data base management, graphics, data acquisition, communications, and image processing on DEC VAX and PDP-11 equipment. Excellent benefits and facilities. Send resume and salary requirements to:

JOE OSWIN
PERSONNEL DEPARTMENT
FOX CHASE CANCER CENTER
7701 Burholme Avenue
Phila., PA 19111
Equal Opportunity Employer

ACADEMIC SYSTEMS SOFTWARE SPECIALIST

Academic Computing Services at the University of Wisconsin-Eau Claire is looking for someone to work in the areas of operating systems maintenance and software development. Requirements include a Bachelor's degree in Computer Science, appropriate experience in systems software maintenance and design, and good communications skills. Monitoring, minicomputer and Honeywell Level 68 experience will be a plus. Eau Claire is a city of 60,000 in beautiful northwestern Wisconsin just 90 miles from the Twin Cities. The full time annual academic staff appointment begins as soon as possible. Salary is commensurate with training and experience, and competitive with the salary structure found in an academic environment. Applications, including a resume, transcripts and three letters of recommendation should be sent by May 1 to:

J. Michael Yoho, Director
Academic Computing Services
UW-Eau Claire
Eau Claire, WI 54701

The University is an equal opportunity affirmative action employer

EMPLOYMENT SERVICE FOR PROGRAMMERS AND ANALYSTS

National Openings With Client Companies and Through Affiliated Agencies

Scientific and commercial applications • Software development and systems programming • Telecommunications • Control systems • Computer engineering • Computer marketing and support

Call or send resume or rough notes of objectives, salary, location restrictions, education and experience (including computers, models, operating systems and languages) to either one of our locations. Our client companies pay all of our fees. We guide; you decide.

RSVP SERVICES, Dept. C
Suite 700, One Cherry Hill Mall
Cherry Hill, New Jersey 08002
(609) 667-4488

RSVP SERVICES, Dept. C
Suite 211, Dublin Hall
1777 Walton Rd., Blue Bell, PA 19422
(215) 629-0585

From outside New Jersey, call toll-free 800-257-8163.

RSVP SERVICES
Employment Agents for Computer Professionals

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

DATA PROCESSING PROFESSIONALS

DATA RESOURCE CORPORATION, headquartered in Atlanta, is a leader in quality Contract Programming and Consulting. Our growth in the Southeast and Southwest has created opportunities for versatile Professionals with state-of-the-art skills in Programming and Systems Design.

We are seeking individuals who desire to work in various stimulating Data Processing environments. IMS and CICS skills are of special interest, as are the abilities to travel or relocate.

We offer you competitive salaries and comprehensive benefits programs, including bonuses and profit sharing, and overtime pay. If you are searching for a growth opportunity with a dynamic and progressive company with a Management team that "puts people first", then DRC is your answer.

For immediate consideration, send resume to 3301 Buckeye Rd., Suite 103, Atlanta, GA 30341, or call BECKY FINLEY or JIM BARRETT at 404-455-7300, or toll free:

1-800-241-8962

DRC

EOE

DATABASE APPLICATIONS PROGRAMMER

Staff position for development and support of relational database applications in administrative offices of the Department of Electrical Engineering and Computer Science. Duties will include design and coding of new applications; maintenance and enhancement of existing management information systems; documentation of applications packages; advising and assisting users. Provides opportunity to work in an academic environment, to help develop management tools, and to gain experience in analyzing management requirements and developing computer solutions. Interest in working closely with users essential. Professional programming experience required. Dec Rdb/vms and PL/I experience especially helpful. Bachelor's degree preferred. Relative experience helpful.

Applicants should send resume, statement of professional goals, and names of references to the address below. No agencies.

Prof. R.G. Hamlet
Room 32-G25
Massachusetts Institute of Technology
77 Massachusetts Avenue
Cambridge, MA 02139

MIT is an equal opportunity/affirmative action employer.

DP POSITIONS SEATTLE/PORTLAND

MVS, Sr. Systems Programmer $40K
Sr. IMS Systems Prog. 40K
Systems Performance-data base consultant to applications group.
Sr. Programmer/Analyst 30K
Financial app. CICS/DL1 on line transaction.
Programmer/Analyst 28K
CICS/DL1 or VSAM on-line dev.
Sr. FIA IMS applications dev ..... to 40K
Data Admin. Analyst ..... to 40K
data resources mgmt local DP design.

Please forward resume immediately to:

HOUSER, MARTIN MORRIS & ASSOC.

(206) 453-2700

[illegible]
Bellevue, WA 98009

EDPeople.

For data processing brain-power think of EDPeople, a service of Robert Half.

Intelligent machines need intelligent people. And Robert Half has been finding these people since the computer revolution began.

We know the job market, and we know the right people to meet your EDP requirements.

Call any of Robert Half's 80 offices in the United States, Canada and Great Britain. We'd like to help you hire smart.

ROBERT HALF®
edp and financial personnel specialists.

© 1984 Robert Half International Inc. All offices independently owned and operated

SYSTEMS PROGRAMMERS
SYSTEMS PROGRAMMERS
SYSTEMS PROGRAMMERS
SYSTEMS PROGRAMMERS

4341...3031...3032...3033...3081...3083...3084...
MVS...OS/VS1...CICS/VS...IMS DB/DC...VM...CMS...

Our clients are complaining because we cannot find qualified systems programmers quickly enough. Florida Openings in Jacksonville, Orlando, Tampa, Miami, Melbourne. Southeast openings in NC, SC, GA, LA. Southwest - TX, AZ. West Coast - San Diego, San Francisco. We need:

MVS Project Leader $55-60K
MVS/XA 33-47K
OS MVS CICS 31-44K
VM/CMS 28-38K
IMS Data Base Admin 28-38K
CICS Perf Tuning 25-30K

We guarantee: 1) NEVER A CHARGE TO YOU - our company clients pay everything - fees, interview costs, relocation, etc. 2) STRICT CONFIDENTIALITY 3) PROFESSIONAL REPRESENTATION by JIM KING AND ASSOCIATES, a nationally ranked recruiter in the computer industry.

Please send your resume or call collect (904) 268-KING for:

"Steve" Stevenson, Partner

Jim King and Associates

1849 Gulf Life Tower/Jacksonville, Florida 32207
(904) 268-7371

HI-TECH MANUFACTURING Major Expansion

The MIS division of one of BOSTON'S leading manufacturing orgs. has asked Robert Half to identify experienced computer professionals for the following positions. Technology includes IBM OS/MVS COBOL IMS DB/DC. Applications include: Financial, Inventory, Manufacturing, Marketing, Sales.

Positions Include:

(1) Project Manager ..... to $49,000
(2) Sr. Systems Analysts ..... to $35,000
(3) Programmer Analysts ..... to $30,000

Preference given to those candidates with stable, progressive work records utilizing the above technologies in a manufacturing or related industry.

ROBERT HALF

100 Summer Street
Boston, MA 02110
(617) 423-1300
Personnel Consultants

TANDEM SYSTEMS PROGRAMMER ANALYST(S)

The NASD is a highly visible national association servicing and regulating the over-the-counter securities field. Continued rapid growth and the expansion of our systems operations have helped create this opportunity for an individual to provide technical support for a variety of applications.

Responsibilities include providing TAL software support, FATHWAY performance analysis and tuning, X-RAY analysis and systems load balancing, and user, application programmer and operator support. Additional functions will include new operating system release review and installation, package review and installation, and involvement with systems security, systems configuration, and Sysgen's. Qualified candidates will have at least 3 years of Tandem experience in the above areas and proficiency in TAL and SCOBOL. A related degree is preferred.

We are located in an attractive area of Washington D.C., and offer excellent salary and benefits including dental insurance and educational assistance. Take this opportunity to further you career development. Send resume with salary history in confidence to: Manager of Employment.

NASD

National Association of Securities Dealers, Inc.

1735 K Street N.W.
Washington, DC 20006
An Equal Opportunity Employer M/F

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

Software Systems Engineers
Software Development Engineers

If you want to build a new software division capable of providing total life cycle support...

Harris Can Make It Happen

If you want an aggressive entrepreneurial setting—then the Software Operation of Harris Government Information Systems Division could be the place for you. We are developing and using state-of-the-art methodologies, and have the opportunities for you to achieve the recognition you deserve. Positions are available in our Florida, Colorado Springs, and Washington D.C./Baltimore facilities. Requirements: BS in CS, EE or related technical disciplines. MS or PhD desirable. Experience in the government contracting environment helpful.

SOFTWARE SYSTEMS ENGINEERS
System-level design experience desired in some of the following: C³I Systems, Large Scale Databases, Local and Wide-Area Networks, Real-Time Data Acquisition, Interactive Graphics, Modeling and Simulation, Man-Machine Interface, Advanced Software Methodologies and Software Tool Development. Experience desired with Requirements Analysis Languages, Subsystem Definition, Proposal Preparation and Software Costing Models.

SOFTWARE DEVELOPMENT ENGINEERS
Experience sought in the design and implementation of software using structured languages (and programming techniques) including PASCAL, "C," ADA, FORTRAN 77 with DEC, DATA GENERAL, or HARRIS 800/500 Systems. Exposure to modern design methodology (such as PDLs) and structured development (team concept/structured walkthroughs) of medium to large scale software systems desired.

We are part of the Fortune 300 Harris Corporation, Florida's largest industrial employer. We offer an excellent compensation and benefits package, a formal merit review program, and outstanding advancement opportunities.

If you feel that your present position doesn't offer the kind of challenge and recognition you really want, call Julian D. Kaufmann, COLLECT, Monday thru Friday, 8 am-5 pm, EST at (305) 676-6467, for more information. Or send a resume to his attention at Harris GISD— Software Operations, Dept. CW, 150 Wickham Road, Melbourne, Florida 32901-1132. For further information after business hours, call 1-800-327-8552.

U.S. CITIZENSHIP REQUIRED.
SBI MAY BE REQUIRED.
An equal opportunity employer M/F/H/V

HARRIS
IF IT'S HAPPENING IN ELECTRONICS, IT'S HAPPENING AT HARRIS.

ACADEMIC USER SERVICES COORDINATOR.

RESPONSIBILITIES: Documentation; consult with faculty users; train and supervise student monitor/consultants; give short, extra-curricular courses on statistical packages, graphics, text processing and general computer use.
BACKGROUND: Experience in academic computing, mainframe and micro-processors; good interpersonal and communication skills; advanced degree in an academic discipline preferred.
COMPUTING SYSTEMS: DEC System 1091 serving both academic and administrative users with 64 on line terminals.
SALARY: Based on education and experience.
APPLICATIONS: Send resumes by May 1 to: Myron Curtis, Director, Computing Center, Bowdoin College, Brunswick, ME 04011.
EOE/AAE.

HOGAN CONSULTING

Well established consulting firm specializing in HOGAN systems is seeking Senior Consultants with a working knowledge of HOGAN products. Live wherever you want in the United States and enjoy being known as number one in your field. You will associate with others that have the same in depth knowledge of HOGAN systems that you do, take pride in their accomplishments, and have fun in the process. The compensation plan is very attractive and can be tailor made to your individual needs. There is significant travel involved but frequent trips home or elsewhere can be arranged. Please call collect:

Davidson Crown and Associates
(213) 822-6366

PHILADELPHIA

We have been retained to recruit exclusively for well known Philadelphia area corp offering exciting new project development openings. Paid relocation and excel benefits. Our client seeks:

SOFTWARE ENGINEERS TO $55,000
COMMUNICATIONS SOFTWARE

BSEE, CompSci, or Physics with several years software devel exp using either ASSEMBLY, FORTRAN, or PASCAL. Knldg data communications, networking, protocols regd. Graphics or military software exp ideal. Command and control systems exp a+. Intrvw NOW.

ROBERT HALF
OF PHILADELPHIA, INC.
3000 Market St., Suite 750
Philadelphia, PA 19104
(215) 382-4000

SENIOR SYSTEMS ANALYST ORLANDO, FLORIDA

The First, F.A., a Miles dollar financial institution is seeking an EDP professional with a minimum of five years experience in the NCR CLASS system, VRX operating system, and NEAT/3 LEVEL II.

If you have a BS degree in Math or Computer Science or the equivalent and experience with VRX COBOL, Telecommunications and SI and VRX Problem Solving, it's a plus.

We offer a highly competitive salary and benefit package. Qualified candidates should send resume and salary history for immediate consideration to:

The First, F.A.
P.O. Box 2973
Orlando, FL 32802
Director of Human Resources Dept.

Equal Opportunity Employer M/F/H

Systems Marketing Manager

Team International, a leading management and MIS Consultant in the Middle East with eight offices throughout the Arab Countries, has immediate openings for Senior Systems Consultants/Systems Marketing Manager. The applicant is expected to have a minimum of 10-12 years experience in mainframe data processing, plus experience in system management, client support or systems marketing. He should be able to perform conceptual studies of client requirements, and guide large MIS projects during their initial stages. A graduate degree in a relevant discipline is preferred. Please send detailed CV to:

Team International
Dr. Sherif Hanny
2 Ismail Fahmy Street
9th Corridor
Heliopolis, Cairo - Egypt

MIS PROFESSIONALS

Massachusetts Blue Cross Blue Shield is a dynamic leader in providing Health Care Coverage to the community. Recent promotions and continued growth have created openings for MIS professionals at our corporate headquarters. We are currently seeking experienced individuals for positions in the areas of APPLICATION DEVELOPMENT and SYSTEM SOFTWARE SUPPORT such as:

- Project Leaders
- Senior Programmer/Analysts
- Systems Designers/Analysts
- Programmer/Analysts
- Systems Programmers

All selected candidates must have at least 2 years of experience working with large applications and systems, with specific analytical and technical skills in one or more of the following areas:

- IBM-MVS, IDMS, CICS, MVS, TSO/SPF, COBOL, FORTRAN, FOCUS, 545, LIBRARIAN, IBM JCL & Utilities
- Honeywell-IDS, GCOS3, TSS, COBOL, FORTRAN, HIS JCL & Utilities
- Hewlett-Packard-3000, IMAGE, QUASAR

Complete fringe benefits package. Competitive starting salaries.

If you have the technical expertise/experience and leadership qualifications, please send your resume (including salary history and references) to Blue Cross Blue Shield, Employment Department, 100 Summer Street, Second Floor, Boston, MA 02110.

We Are An Equal Opportunity/Affirmative Action Employer

SMS

SAUDI ARABIA

YOUR TICKET FOR A UNIQUE CAREER ADVENTURE!

Saudi Medical Services, Ltd. (SMS), a wholly owned Saudi Arabian Healthcare Company, is seeking qualified computer executives with proven capabilities to participate in the management of our rapidly expanding company.

We are now accepting applications for the following position:

Director of Computer Services

- Masters degree in Business, Computer Services or related areas
- 10 years experience in information systems - emphasis on management
- Must have knowledge of hardware capabilities, configurations, and application of software usage in hospital or business

SMS can offer qualified individuals a competitive salary along with substantial leave benefits. Individuals with the above qualifications and the desire for challenge should contact:

SAUDI MEDICAL SERVICES, LTD.
Department R-35
Post Office Box 450447
Atlanta, GA 30345

An Equal Opportunity Employer

CAD/CAM engineer

FMC Corporation's Central Engineering Laboratories is a multidiscipline research center chartered to provide technical services and identify new product opportunities for the construction, defense, food, material handling and petroleum business of FMC.

We are seeking a Mechanical Engineer familiar with CAD/CAM systems who wants to become part of our corporate CAD/CAM support group. This position will be responsible for installing and maintaining CAD/CAM software and providing user training and guidance on the application of software. Additional responsibilities will include providing support with problem resolution by fault isolation and correction; determining, specifying and implementing enhancements and extensions.

This position requires a BSME or equivalent and 2-3 years FORTRAN programming experience. An understanding of engineering applications for CAD and CAM, knowledge of VAX/VMS systems, and the ability to work with large FORTRAN programs is also required.

We offer an excellent salary and benefit package as well as challenging project assignments. For confidential consideration, submit resume or call: Ms. V. Payne, (408) 289-3433, FMC Corporation, Central Engineering Laboratories, 1185 Coleman Avenue, Santa Clara, CA 95052. We are an equal opportunity employer m/f.

FMC

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

Cheryl had wanted, for a long time, to move to another city clear across the country. Her problem was that she lacked information about wage levels, cost-of-living expenses, housing, etc. Also, she was not sure of the best way to find a good EDP position in her preferred city.

She had gone to other placement firms that were not nationally structured to help her. Then she came to us... and we made it easy for her. We contacted our affiliated office in her preferred city, got all of the information she needed on wage levels, cost-of-living expenses, housing, etc. We also arranged five employment interviews for her. She accepted an EDP position she felt was ideal for her, and her new employer paid all her interview and relocation expenses.

We can do the same thing for you, as we have done for thousands of others. Come in. Call. Or mail your resume to the firm nearest to you. Confidentiality is assured. Company clients assume our fees.

ATLANTA: BAI Limited
220 Peachtree Street, Suite 1801-C
Atlanta, Georgia 30303 (404) 581-0040

BOSTON: Robert Klavan and Co., Inc.
North Brook Park, Suite One, 181 Bedford Street
Lexington, Massachusetts 02173 (617) 861-1020

CHICAGO: Thos. Hintz & Associates
150 N. Wacker Drive, Suite 1700
Chicago, Illinois 60606 (312) 977-1565

COLUMBUS: Michael Thomas, Inc.
35 E. Wilson Bridge Road, Suite 201
Worthington, Ohio 43085 (614) 846-0666

DALLAS: DataPro Personnel Consultants
12720 Hillcrest, Suite 520
Dallas, Texas 75230 (214) 991-9990

DETROIT: Electronic Systems Personnel, Inc.
3000 Town Center, Suite 2580
Southfield, Michigan 48075 (313) 353-5580

FLORIDA: Data Sciences Personnel, Inc.
P.O. Box 8577
Hollywood, Florida 33084 (305) 434-8112

HARTFORD: Compass, Inc.
990 Asylum Avenue
Hartford, Connecticut 06105 (203) 548-4240

HOUSTON: Career Consultants, Inc.
2000 South Post Oak
Houston, Texas 77056 (713) 626-4100

INDIANAPOLIS: Computer Personnel Services, Inc.
107 N. Pennsylvania
Indianapolis, Indiana 46204 (317) 634-4712

KANSAS CITY: D. P. Career Associates
6405 Metcalf, Suite 502
Shawnee Mission, Kansas 66202 (913) 236-6888

LOS ANGELES: Superior Resource, Inc.
Personnel Service
17141 Ventura Boulevard, Suite 207
Encino, California 91316 (213) 986-4480

MILWAUKEE: EDP Consultants, Inc.
7232 West State Street, Suite 3
Milwaukee, Wisconsin 53213 (414) 475-6877

MINNEAPOLIS: Electronic Systems Personnel
358 Twin City Federal Trust, 121 S. 8th St.
Minneapolis, Minnesota 55402 (612) 339-6714

NEW JERSEY: Systems Search
99 Millburn Avenue
Millburn, New Jersey 07041 (201) 761-4400

NEW YORK: Retail Associates, Inc.
7 Dey Street, Suite 410
New York, New York 10007 (212) 227-7370

NEW YORK UPSTATE:
CPA Associates Personnel, Inc.
2530 James Street
Syracuse, New York 13206 (315) 463-5225

NORTH CAROLINA: DataMasters
Div. of TaskForce, Inc., P.O. Box 8868
Greensboro, North Carolina 27405
(919) 373-1481

PHILADELPHIA: Systems Personnel, Inc.
115 West State Street
Media, Pennsylvania 19063 (215) 565-9880

PHOENIX: Professional Career Consultants
4626 North 17th Street, Suite H101
Phoenix, Arizona 85016 (602) 274-6666

SAN FRANCISCO: The Computer Resource Group
Inc. Agency, 303 Sacramento Street
San Francisco, California 94111 (415) 398-3535

SEATTLE: Hosaka, Martin, Morris & Associates
1340 116th Avenue N.E.
Bellevue, Washington 98004 (206) 453-2700

WASHINGTON D.C.: EDP Systems Corporation
914 Lumberton Drive
Silver Spring, Maryland 20902 (301) 649-6171

Call the NCA firm nearest to you for Salary Survey and Relocation Information

National Computer Associates

EDP Placement Firms in Baltimore, Cleveland and St. Louis can learn about the many advantages of being members of National Computer Associates by calling Jack Bold (602) 274-6666

Computer

ADABAS/NATURAL DBMS

Are you underutilizing your ADABAS/NATURAL talents and skills because your current involvement is a maintenance environment or your current employer doesn't have the resources to implement ADABAS to its fullest capacity? Then consider a positive career move to COMPUTER DATA SYSTEMS, INC., where you will be responsible for designing and implementing current ADABAS technology. The following positions are currently available at convenient Washington, D.C. project locations:

DATABASE ADMINISTRATOR

Work involves the design and implementation of ADABAS databases, performance tuning, and writing procedures and data dictionary. Will receive exposure to PREDICT data dictionary, NATURAL SECURITY and COM-PLETE. Requires 6-7 years of data processing experience, including 3 years total COBOL and 3 years design experience using ADABAS/NATURAL.

SR. APPLICATIONS PROGRAMMER/ANALYST

Analyze, design and implement paperless/on-line systems using structured techniques in ADABAS/NATURAL. Requires 6-7 years of data processing experience which includes 3 years IBM, COBOL, SPF, as well as 1-2 years work experience with ADABAS/NATURAL.

We are looking for employees with long-term career goals who desire advancement and technical challenge. We offer competitive salaries and an outstanding benefits package including health and dental insurance, 100% tuition assistance, and retirement profitsharing plans. For consideration, call Mark Reiss at (301) 881-7600 or forward resume to: COMPUTER DATA SYSTEMS, INC., Dept. HRD-917, Cite Corte Court, Rockville, MD 20854. EOE/M/F/H.

PROGRAMMERS, ANALYSTS AND CONSULTANTS

Established Southern California consulting firm is seeking several qualified individuals to add to its staff. Our firm shares the responsibility for implementing several large systems throughout California. WE NEED: 2 years experience in any of the following: Banking, Item Processing, Savings, Loans, Distribution, Insurance, COBOL, ASSEMBLER, CICS, IMS DB/DC and IBM Software. WE OFFER: stability, growth, high salaries, visability, advancement opportunity, and excellent fringe benefits.
Call or write:

cps
Commercial Programming Systems Inc.
3450 West 6th Street, #209
Los Angeles, California 90020
(213) 389-2951

SYSTEMS PROGRAMMERS
One Leader to Another

Exceptional IBM Talent Required

Founded 30 years ago, Planning Research Corporation provides analytical and systems services primarily to Government clients including NASA, NARDAC, Executive Office of President, OMB, EPA, NRC, NSF and many others. In the Washington metro area alone, PRC Government Information Systems is engaged in more IBM-oriented facility support services than any other company in the industry. Positions are available for the following individuals:

- Senior MVS internals systems programmer with 3 years' experience on IBM-compatible mainframe.
- MVS internals systems programmer with heavy emphasis on CICS. 1-2 years' experience on IBM-compatible mainframe.

Both positions require 7 years' related programming in DP field. IOGENS, JES2, TSO & JCL a must. TCAM, VTAM, SMP4, SPF, RMF, GTF, COBOL, PL/1, Model 204 all pluses.

For immediate consideration, call Toll Free at (800) 336-3772, Ext. 2228; in Virginia call (703) 506-2228. Or, send your resume to: Planning Research Corporation, 1500 Planning Research Drive, Department SHS-31, McLean, VA 22102. An Equal Opportunity Employer M/F/H/V.

prc
Planning Research Corporation

FOR ACHIEVERS ONLY

INTERMEDIATE to SENIOR LEVELS

- Software Development Mgr
- Technical Support Specialist
- Data Base Administration
- Voice/Data Communications
- Office Automation
- Microprocessor Software
- Systems & Programming Mgr
- EDP Audit/Security
- Systems Planning
- Manufacturing Systems

DEC, HONEYWELL, IBM, NCR, UNIVAC

BRUCE A. MONTVILLE
Managing Partner

EXETER 2100
National Recruiting Consultants
(603) 926-5712

TOLL-FREE
1-(800) 258-7328

COMPUTER PARK, P.O. BOX 4879
HAMPTON, NH 03842

EXPERIENCED SYSTEMS PROGRAMMERS, ANALYSTS AND PROGRAMMER ANALYSTS FOR SUNBELT LOCATIONS

Job dissatisfaction, complacency, and frustration are the biggest obstacles to overcome to achieve one's career goals. Everyday new career opportunities pass us by because we are unaware of their existence. Let us keep you abreast of what your true value is in the market place. Absolutely no obligations, please call or write Keith Raichle, CPC, Data Processing Specialist.

Dunhill
OF CHARLOTTE, INC.
6401 Carmel Road, Suite 107
Charlotte, North Carolina 28226
800-438-2012
(NC Call)
(704) 542-0312

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

The National Radio Astronomy Observatory is a national center providing facilities to researchers in many areas of radio astronomy in the United States. Our facilities use expertise in real-time data acquisition and control, information retrieval techniques, image enhancement techniques, graphical image displays, video cassette data storage, etc. NRAO is recruiting Senior Computer Professionals for the Very Large Array (VLA) facility and for the Very Long Baseline Array (VLBA) project. The VLA comprises twenty-eight 25m diameter antennas forming an array 36km in diameter on the Plains of San Augustin, approximately 50 miles west of Socorro, New Mexico. The computers currently in use at the VLA include an on-line system comprising 8 ModComps and data reduction systems using many PDP-11s and VAX-11/780s with FPS AP-120B array processors and a DEC-10. The observatory is now accepting applications for the following position with the VLA:

SENIOR APPLICATIONS PROGRAMMING ANALYST

Will work with a small group of programmers and astronomers to develop data reduction systems, which produces and enhances digital images from VLA observations. The position requires ability to specify, design, implement, test and document software systems, to analyze and enhance existing software and hardware procurements. A bachelor's degree in a related field together with at least 5 years' experience in scientific computing is desirable. A broad knowledge of available computer architectures would be an advantage.

The VLBA will be a transcontinental version of the VLA, comprising ten 25m antennas spaced across the nation including sites in Puerto Rico and Hawaii, the operations center to be in in Socorro.

The observatory is now accepting applications for the following position with the VLBA project:

SCIENTIFIC PROGRAMMER

The successful applicant will work with a small group of programmers and engineers to develop the on-line real-time monitor, control, and data acquisition software both at the central facility and at the remote locations. Tiers a pleasant rural environment, has an excellent climate and is the home of New Mexico Institute of Mines and Technology. The observatory offers excellent benefits and working conditions. Persons applying for these positions should send their resume and salary requirements to:

Personnel Manager
National Radio Astronomy Observatory
P.O. Box "O"
Socorro, NM 87801

National Radio Astronomy Observatory

An Equal Opportunity Employer M/F/H

UNIVERSITY OF EVANSVILLE

Growing department in small, urban, private University seeks tenure-track faculty with an interest in computer education to contribute to an applied undergraduate program in a nationally recognized graduate program in location oriented. The University of Evansville offers an extensive array of programs where high quality and unobtrusive encourage efforts to extend the University's impact beyond the Midwest. The Department of Computing Services is the largest department within the School of Engineering and Applied Science, but it serves students throughout the University. A very productive relationship has been established between the Department and the School of Business Administration, the Department of Mathematics and Physics in the College of Arts and Sciences, the School of Education and the Department of Electrical Engineering, all of which have established minors in Computing Science. The Department has an established interest in programs which address the computer education needs of faculty from small colleges, but it is also preparing a graduate program in Management Information Systems.

Doctoral-level faculty are invited to apply for Associate or full Professor appointment, based on teaching and professional stature. Appropriately experienced Masters-level faculty will be considered for Assistant or Associate level appointments. Salaries and benefits are very competitive for IIA category colleges. Address inquiries or resumes to Dr. William Mitchell, Chairman, Department of Computing Science, University of Evansville, P.O. Box 329, Evansville, IN 47702. EOE/AA Employer.

Supervisor/ Technical Services

Become part of our strong growth team in this new position at Pacific Telecom, located in the Beautiful Southern Washington Area of the Pacific Northwest.

Reporting to the Manager of Computer Operations, you will be responsible for the technical support of all hardware, software and communications networks associated with the Vancouver Data Center including:

- Supplying software system support including planning, design, problem solving and maintenance
- Matching hardware and systems software to departmental needs
- Providing technical advice to other Information Services Managers
- Establishing and controlling technical system support standards
- Assisting in capacity planning and future communications development
- Selecting, motivating and training departmental personnel

To qualify, you must have 5 years progressively responsible experience interacting with large IBM mainframe computer systems. Prior exposure to DEC, VAX/VMS or Honeywell DPS8 systems desirable. 2 years supervisory experience preferred.

PACIFIC TELECOM

We offer outstanding salaries and benefits in an unusually attractive environment. For immediate consideration, please send your resume to or phone Isaac Dixon, Personnel Analyst, PACIFIC TELECOM, P.O. Box 9901, Vancouver, WA 98668-9901. (206) 696-6891. Individuals only apply. Equal opportunity employer.

Manager Data Base Administration IDMS

Join the Space and Communications Group of Hughes Aircraft in Southern California, the people who have launched more communications satellites than all others combined. We are a rapid-growing, dynamic organization pushing data base technology to its limits. Based on IDMS, we are building one of the most advanced integrated data bases in the aerospace industry.

We are looking for a leader who will manage a team of ten or more data base administrators supporting IDMS data base development. If you have a degree in Business, Computer Science, Mathematics or Engineering, and preferably three or more years of IDMS data base development experience, Hughes is THE career opportunity for you.

Located west of Los Angeles, in El Segundo, California, Hughes' S&CG offers competitive salaries, excellent benefits, and a liberal relocation program. Send us your resume NOW, or call LARRY TOWNER, Manager of Data Administration, collect at (213) 414-7581.

Address your resume to: Judy Jones, S41/A300, Hughes Aircraft Company, Space & Communications Group, Employment Dept. WC-839, P.O. Box 92919, Los Angeles, CA 90009.

Creating a new world with electronics

HUGHES
HUGHES AIRCRAFT COMPANY

SPACE & COMMUNICATIONS

Proof of U.S. Citizenship Required
Equal Opportunity Employer

SYSTEMS ANALYST

To design and implement computer systems for East Coast wholesale distributor. Includes inventory management, physical facilities control, goods replenishment, inventory system as well as a number of other areas dealing with inventory management and customer service. Our client has put together an impressive budget to support this project. The Company is located near Columbia, Maryland. Outstanding salary and benefits.

Send resume to:

Bennett H. Goldstein
Blin & Tucker, Chartered
Charles Center South, Suite 300
36 South Charles Street
Baltimore, Maryland 21201

SR. PROG./ ANALYST

If you have 1+ yrs. w/OS/MVS or DOS/VSE & exposure to CICS or DL 1 plus seek challenging new devel. oppty's., you qualify for this exciting growth oppty. In CT. mfg. hi-tech & fin'l. co's.

ROBERT HALF OF HARTFORD, INC.

111 Pearl St.
Hartford, CT 06103
(203) 278-7170
Personnel Consultants

SYSTEMS ANALYSTS/ PROGRAMMER ANALYSTS

Midwest insurance company headquartered town of 6,000 population but close to everything has openings for individuals with COBOL background. Systems Analysts need 2 years experience in casualty insurance company environment. Programmer Analysts 1 year. In addition, 1 Systems Analyst position requires accounting background. DEC hardware experience with VAX or PDP 11/70 preferred but not required. Fringe benefits, relocation and starting salaries in $20,000 to $35,000 range. Send resumes to:

Personnel Director
Midwest Mutual Insurance Company
Interstate 39 and Highway 140
Oakwell, IA 55112

PROGRAMMER/ ANALYST

Programmer/Analyst to refine and convert data to programmable material using COBOL and IBM Assembler language on IBM mainframe equipment using OS/MVS, JES 2, Intrest, and TSO/SPF. Be responsible for providing programming and systems description support as well as assisting in development of user documentation. Bachelor's degree plus 3 years experience or combination of college credits and work experience equivalent to Bachelor's degree with 3 years experience. Fresno, CA area. $28,800-$35,000. Several positions. Send resume to:

Reply to CW-8/30
Computerworld, Box 880
Framingham, MA 01701

Selective Career Opportunities
FOR IBM SPECIALIST

As an international search firm we represent companies across a broad spectrum of industries who have operational needs and opportunities. We are currently seeking: Systems Programmers with 3+ yrs. DB/DC Systems Performance tuning, database design, Systems Analyst, design, development and implementation of MIS systems, Programmers, coding and maintaining IMS systems using COBOL.

Salaries are competitive and client companies assume all fees. Please call or send resume to:

Lesley Hampton
RUSSELL OF CALIFORNIA, INC.
Suite 1013
Texas Commerce Bank
Galleria, TX 77056
(713) 626-0842

RESULTS

Whether you're buying, selling, swapping, hiring or looking, you get results from **Computerworld classifieds.** Maybe that's why **Computerworld** gets more classified advertising than all the other computer publications put together!

Technology-Driven MIS Environment

Fairchild Digital Test Systems in San Jose California dominates the world market for LSI/VLSI test systems, with over 1,000 systems installed. Our new Sentry 50 system, far and away the most sophisticated for VLSI, demonstrates how technology drives us. It could drive you to new career heights with a proven leader.

MIS Software Supervisor MVS, CICS, IMS/DB, JES2, VTAM

Take charge of our Systems Software function, running under MVS with CICS, IMS/DB, JES2 and VTAM. Reporting directly to the MIS Manager, you will oversee installation and ongoing support of program products including performance analysis, problem-solving, programmer support, data base design/analysis, and technical planning for both hardware and software. If you have a BS in Computer Science or equivalent plus at least 5 years solid systems programming experience in an MVS environment, you could be the skilled leader we seek. Your proven background in VTAM, CICS, JES2 and IMS/DB subsystems will be essential qualifications.

Senior Programmer/Analyst

If you have 5+ years program/analysis experience and a strong Manufacturing Systems background, this diversified opportunity could be for you. You will analyze business applications and resolve problems with new program design or modification of existing software. You'll perform the entire range of programming functions from flowcharts to test/debug, with emphasis on logic problems, comprehensive documentation, test and linkage to other software. A BS in Computer Science or equivalent with programming language expertise in COBOL, CICS, IMS and DL1 essential. Proficiency in systems development methods a must. Some COPICS or Marketing Systems experience a plus.

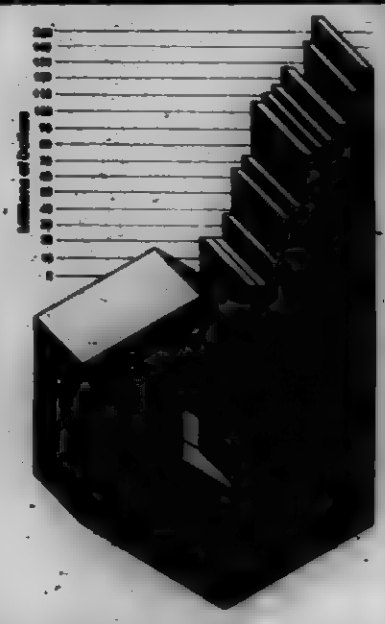
Your software expertise will expand at Fairchild Digital Test Systems. For immediate confidential consideration, please send your resume to Steve Hyndman, Fairchild Digital Test Systems, M/S 36-832P, 1725 Technology Drive, San Jose, CA 95115. (408) 998-0123. Equal opportunity employer. Principals only please.

FAIRCHILD DIGITAL TEST SYSTEMS SAN JOSE, CA

A Schlumberger Company

Software & Hardware Engineers

BE A PART OF A LIVING AMERICAN SUCCESS STORY!



Since 1961, we have grown from 11 to over 850 employees. As of 4th quarter, 1983, sales have grown from market entry to over $127 million and order backlog to over $243 million. The reason? Customer-oriented design, marketing and servicing of advanced digital switching systems that meet the needs of today...and tomorrow. If you would like to be part of a group that is writing a new chapter in telecommunications history, consider the following areas:

CALL PROCESSING
Design and development of real time telephone, attendant, trunk control and call processing software.

MAINTENANCE/DIAGNOSTICS
Design and development of configuration, control and diagnostics software for distributed processing systems.

OPERATING SYSTEM
Design and development of real-time operating systems software for distributed microprocessor based systems. Software includes: nucleus (process and memory management, inter-process communications), debugger, processor start-up, file management and utilities, data link communication protocols, and man-machine interface.

SWITCH ADMINISTRATION
Design and development of distributed processing software for database management, system performance monitoring (traffic measurements), call data recording (AMA), system overload management, and telephone network management.

HARDWARE DESIGN
Design experience should include microprocessor communication interfaces, peripheral controllers and memory systems. Minimum of three years experience designing T1 interfaces, lines or trunks for digital central offices, PABX's or subscriber carrier equipment. Familiarity with Z80, Z8000 or other microprocessors, as well as dynamic Ram components is a must.

SYSTEM INTEGRATION AND SUPPORT
Hardware and software test and integration on system level. Interface with customer and field operations.

All positions require a BS/MS CS, EE, Math or related discipline. Experience with Assembly language and/or "C" highly desirable.

We can offer competitive salaries, extensive company-paid benefits, and excellent potential for professional recognition...and advancement. For prompt consideration, please send your resume to:

Staffing Manager
Dept. 1000
Digital Switch Corporation
P.O. Box 830911
Richardson, Texas 75083-0911

equal opportunity employer

HELP WRITE A NEW CHAPTER IN TELECOMMUNICATIONS HISTORY

Senior Software Systems Engineers

Work at the cutting edge of advanced software development in a desirable sunbelt location.

The Government Systems Sector of Harris Corporation develops state-of-the-art software systems for the communications and information processing segments of government and the military.

To strengthen and complement our technology base, we are seeking several senior-level professionals to function as key consultants. They will support day-to-day issues regarding technology application, determine and lead the direction of future technologies and consult in the development of customer oriented applications and systems.

To qualify for these positions, you should have 10+ years' systems experience, and in-depth knowledge and hands-on experience in two or more of the following areas:

- UNIX tools, administration and systems internals
- Knowledge based systems
- ADA compilers and ADA support environment
- DBMS internals and applications

Harris offers a work environment well suited for leading edge technologies, in a Florida ocean-side setting that emphasizes quality of life.

If you are interested in working at the forefront of software development in a highly desirable geographic location, call P.H. Gribbin COLLECT at 305-725-7342. Or send your resume to his attention at Harris Government Systems Sector, Dept. CW, P.O. Box 37, Melbourne, FL 32902

U.S. CITIZENSHIP REQUIRED
We are an equal opportunity employer M/F/H/V

HARRIS

IF IT'S HAPPENING IN ELECTRONICS, IT'S HAPPENING AT HARRIS.

COMPUTER PROFESSIONALS

Help us build the foundation for tomorrow's software

Foundation Computer Systems is a software research and development company. Our satisfied customers include several Fortune 500 companies. Our Cary, NC location is adjacent to the Research Triangle Park and three major universities.

We work with many kinds of computers, languages, and operating systems. In the past year we have doubled the size of our technical staff, while maintaining our profitability. Our staff is still growing, and we need more good people. We have openings for hard working and experienced:

- application programmers–COBOL
- systems programmers–C
- operating systems programmers–Unix™, VMS™
- database programmers–C, relational
- software technical writers
- compiler developers–C, COBOL, Pascal, FORTRAN, BASIC

In addition to providing consulting services, we have produced our own product, called ALLY™. ALLY integrates an easy-to-use application development system with the industry's most powerful window-oriented screen management system. Several major computer manufacturers have purchased ALLY licenses.

Our exciting projects will allow you to make the most of your talents and skills. We offer the best of two worlds: a fast-moving, small-company atmosphere, along with big-company benefits, rewards and security.

To arrange an interview, send your resume to:

Foundation Computer Systems
325 Walnut Street
Cary, NC 27511

An equal opportunity employer

ALLY is a trademark of Foundation Computer Systems.
Unix is a trademark of AT&T Bell Laboratories.
VMS is a trademark of Digital Equipment Corporation.

Foundation

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

DARE TO LEAD, AND THE REST WILL FOLLOW . . .

MIS PROFESSIONALS

By allowing our employees the freedom to be creative, Haworth Inc., has risen to the top of the Office Interior Systems industry with unequaled speed and resilience. As a result of this growth, we have an immediate need for experienced professionals in our Management Information Systems Department.

SYSTEMS ANALYST II

These positions are responsible for investigating potential data processing applications and providing programming support and design assistance in the implementation of information systems. Major emphasis on systems and project coordination.

To qualify, you must possess a Bachelor's degree in computer science, business, mathematics, or a related area and a minimum of 4-6 years of systems and programming experience, OR a Master's degree in computer science, business, mathematics or a related area and at least 2-3 years experience, OR equivalent work experience. A comprehensive knowledge of data case design, structured systems analysis and design, as well as OS MVS, CICS and IMS/DB in an IBM environment is required.

SYSTEMS ANALYST I

These positions are responsible for providing programming support and design assistance in the implementation and maintenance of information systems.

To qualify, you must possess a Bachelor's degree in computer science, business, mathematics, or a related area, and a minimum of 2-3 years of systems and programming experience, OR a Master's degree in computer science and at least one year of systems and programming experience, OR equivalent work experience. Knowledge of MVS, CICS, and IMS/DB in an IBM environment is required.

PROGRAMMER ANALYSTS

These positions are responsible for providing programming support for sales and marketing or financial systems as well as providing support for staff departments.

To qualify, you must possess a degree in computer science, business, mathematics or a related area, OR an Associate's degree in data processing with 1-2 years of related work experience in systems programming, OR equivalent work experience. A strong background in COBOL, OS, JCL, file access methods, dump reading, testing methods, structured program design and coding as well as a familiarity with system design methodologies, data base access methods and documentation standards is required.

In addition to the many benefits you'll find on the job, the recreational, cultural and educational opportunities you'll enjoy in the beautiful Greater Holland, Michigan area are all second to none. So put an industry leader in your future. We offer a complete fringe benefits package, generous relocation assistance and most importantly, a chance to act on what you think. To apply, please send your resume, detailing salary history, in complete confidence to:

Sarah Larsen
Professional Recruiter

HAWORTH®

One Haworth Center
Holland, MI 49423
An Equal Opportunity Employer M F

PROGRAMMER/ANALYST

Modesto based newspaper is seeking an experienced programmer/analyst to work with on-line, applications small and unsupported in a friendly, informal environment. The challenging position requires the ability to work independently and handle projects from start to finish with a variety of applications.

Candidates should have 2 years of solid programming experience in COBOL and COBOL. Strong communications skills are essential. Familiarity with DEC hardware and RSTS a plus. Salary to $30K, DOE. Excellent company benefits.

The Modesto Bee is located in California's sunny central valley which offers an abundance of recreational opportunities.

QUALIFIED applicants send resume by Monday, April 23 to:

The Modesto Bee
Personnel Office
1325 "I" Street
P.O. Box 3929
Modesto, CA 95352

E.E.O.

Analysts

WANT REAL SL/SWL*†
Try New England.

Enjoy the cozy sophistication of New England, where everything is close by — including some outstanding career opportunities.

Several well established client firms in coastal and interior areas seek Analysts and Systems Analysts with experience on IBM 4341, 3081 or similar equipment with expert knowledge of OS/MVS, JCL, CICS, IMS, VM/CMS or COBOL. Also HP3000, DEC 11/780, IBM S/34, 36, 38 in great demand.

All fees, interview and relocation costs paid by client company. Send confidential letter or resume to: Sheehy Associates, Inc., Suite M, 465 Congress St., Portland, Maine 04101

SHEEHY ASSOCIATES INC
Representing Equal Opportunity Employers
*Quality of Life/Quality of Work Life.

Programmer/Analysts
Full Time
$25-65K
Contracts
$1600-2000/WK
IMMEDIATE NEEDS

CICS or IMS	NJ, NY
IDMS, Focus or Focus	NJ, NY
COBOL-OS or DOS	NJ, NY
PL/1 or BAL	NJ, NY
Datapoint or HP or Wang	NJ, NY
VAX/VMS or UNIX-C or REX	NJ, NY
MIS/DBA's	NJ, NY
PC's, Microframes	NJ, NY
Systems Progs	NJ, NY
VTAM, VTAM or Communities	NJ, NY

ROHN ROGERS ASSOC.
(212) 921-1310
1140 6th Ave., NYC, NY 10036

Programming Manager

Manage applications development of the headquarters office of this food industry company in midtown Manhattan. Develop the communications network support system for the offices throughout the U.S. Participate in managing a high growth business. Current hardware is a System 36. Company paid benefits and an outstanding profit-sharing plan.

Call CHUCK STAPLETON
at (212) 354-8844
or send resume to:
DAYMON ASSOC., Inc.
509 5th Ave, New York, NY 10110

Contract Programmers

Computronics, a national software contract services company, has continuing needs for Programmers and Software Engineers with any of these backgrounds:

(1) DEC VAX/VMS, Pascal Languages, Radio Communications Applications, 6-12 month duration, $325-35 week, Upstate New York.
(2) Perkin Elmer Concept, "C", Lan-Manager, UNIX, OS, Communications Switching Software Applications, 6 month minimum duration, $35-38 with.
(3) Intel 8086/8088, PL/M-86, ICE-86, RMX-86. Real-time process control software development, 1-Plus year contract, Upstate New York.
(4) DEC/MICROSYSTEM PC, CP/M, PASCAL, DOS, Customer location, 4-6 months duration, $30-35 with.

Call or send resume to:
Computronics
15851 Dallas Parkway, Suite 855
Dallas, TX 75248
(214) 458-8851

INSTRUCTOR
BUSINESS AND DATA PROCESSING

Full time Business and Data Processing instructional position at St. Mary's campus effective with the Fall Semester which begins August 1984. Teaching responsibilities will include: Principles of Accounting, Introduction to Computers, Data Processing and Microcomputer Applications to Business. The applicant should be capable of operating a small microcomputer laboratory. A Master's degree is required, experience gained by either a Bachelor's degree and extensive experience in an integrated area of business and data processing. Salary based on either Instructor or Assistant Professor depending upon experience. Send letter of interest, resume, copy of transcripts and 3 letters of reference to the Department of Personnel, Charles County Community College, P.O. Box 910, Mitchell Road, La Plata, MD 20646. The College is an equal opportunity/affirmative action employer. Salary based on qualifications and experience. Closing date April 20, 1984.

POSITION AVAILABLE
SENIOR PROFESSIONAL TECHNICAL STAFF

Princeton University Sr. Professional Technical Staff opening. Advanced communications for non-engineers, particularly in humanities. Requirements include Ph.D. in humanities or social sciences; knowledge of several high-level computer languages, telecommunications systems, and software for large data bases; sensitivity to how people use microcomputers; ability to write clear documentation; an unconventional mind and fund-raising experience. Princeton University is an equal opportunity employer. Send resume to:

Director, Center for Energy and Environmental Studies, School of Engineering, Princeton University, Princeton, NJ 08540.

SYSTEMS ANALYST

Due to expansion, small downtown insurance company is seeking experienced Systems Analyst. The successful candidate will have a minimum of 2 years related work with property casualty insurance. Salary commensurate with experience. Please send resume with salary history to:

John Colvin
Eagle Star Insurance
Company of America
111 John Street
New York, NY 10038

ASSISTANT DIRECTOR OF THE COMPUTER CENTER
USER SERVICES

Canisius College seeks a person responsible for faculty, administrative and student consulting support in the use of applications packages and programming languages. Strong communications skills required. Masters degree in computer related field, VAX VMS, microcomputer experience preferred. Salary commensurate with experience and qualifications. Excellent tuition benefits for undergraduates. Send resume and salary requirements by May 1, 1984 to Joel A. Colton, Computer Center Director, Canisius College, Buffalo, NY 14208. An Equal Opportunity Employer M/F.

D.P. OPERATORS

Seeking better opportunity? You owe it to yourself to investigate the possibilities that we have available. Several of our major clients are offering outstanding situations for qualified operators. Call or send resume in confidence. ALL FEES PAID BY CLIENT COMPANIES.

RESIDENT'S EMPLOY
[illegible]
212 Fifth Avenue
New York, N.Y. 10010
212-921-0300 Registered

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

SYSTEMS ANALYST

Blue Cross and Blue Shield of Oklahoma, a leader in health insurance, has several immediate positions for experienced Analysts. To qualify you must have five years systems and programming experience.

Bachelors or Associate Degree in Computer Science or Management. Knowledge of ROSCOE, CICS, IMS/DLI, LIBRARIAN, JCL, LARGE IBM COMPUTERS, COBOL, IMS UTILITIES, STRUCTURED METHODOLOGY, VSAM, ISAM, and TSO. Three years experience in the health care industry preferred.

We offer an excellent benefit package as well as salary commensurate with experience. Qualified applicants should submit resume including salary requirements in confidence to:

PERSONNEL DEPARTMENT
Blue Cross
Blue Shield
of Oklahoma
1215 So. Boulder
Tulsa, Okla. 74119
(918) 560-2016

AN EQUAL OPPORTUNITY AND AFFIRMATIVE ACTION EMPLOYER

HIRING?

More computer people read Computerworld than any other newspaper in the United States - more than half a million computer people every week.

And, among our 529,650 readers at user organizations about half claim to look at recruitment ads at least every other week (only a small percentage say they never look at recruitment ads).

No wonder Computerworld carries more recruitment ads for computer people than any other publication.

To place your ad or to get a rate card with complete details on Computerworld Classifieds, call or write:

Classified Advertising
Computerworld
Box 880
Framingham, MA 01701
1-800-343-6474 617-879-0700

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

SOFTWARE SUPPORT ENGINEERS

This individual will provide software technical support to customers for Motorola Microsystems Software products from the Customer Support center in Tempe, Arizona. Requires frequent telephone communication with customers and field support personnel and direct interface to Marketing and Engineering staffs.

Would prefer a BSCS/BSEE or its equivalent plus 3-5 years software development and/or customer technical support. Should be knowledgeable of UNIX or other operating system internals, Pascal, C or similar high-level languages. Motorola 68000 or other microprocessor-based systems experience is desired.

Our location in Tempe, Arizona offers the ideal lifestyle for the professional who likes to work hard and play hard. Enjoy year-round outdoor activities, splendid scenery and a wide range of cultural and educational opportunities. We offer a complete benefits package including liberal relocation allowance, profit sharing, tuition reimbursement, medical and dental insurance and much more. Submit your resume or letter of inquiry in confidence to: Professional Recruiter, Four-Phase Systems, Inc., Phoenix Operation, 3013 S. 52nd Street, P.O. Box 22345, Tempe, AZ 85282.

Equal Opportunity Employer

FOUR-PHASE SYSTEMS, INC.
Phoenix Operation

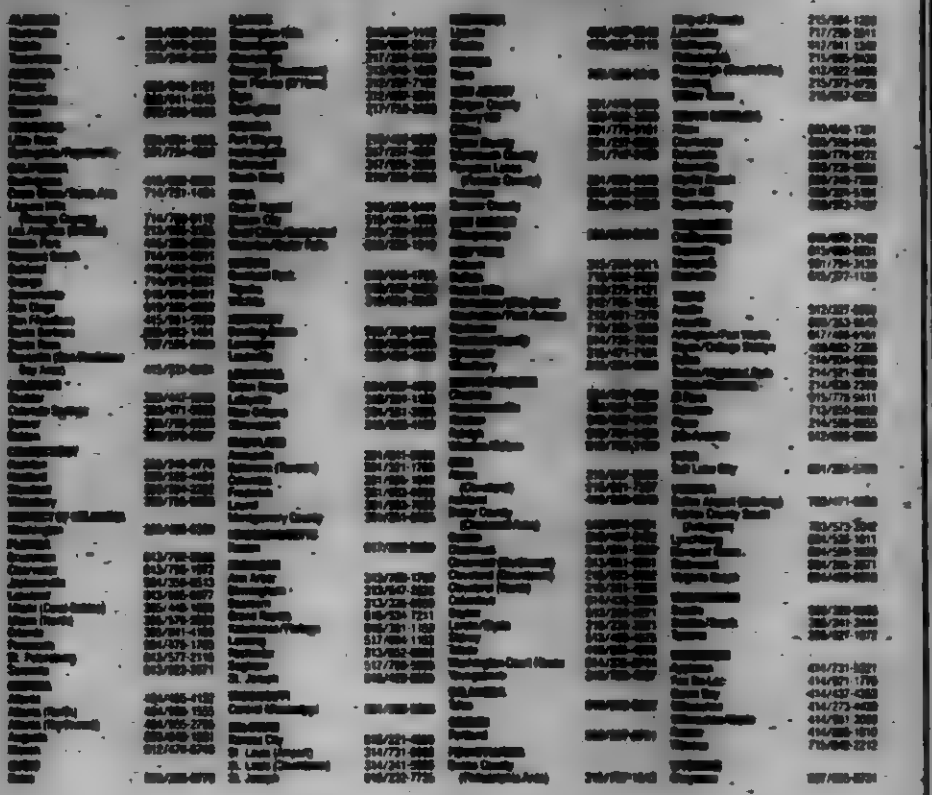
A Subsidiary of MOTOROLA INC.

SYSTEM DESIGN BEGINS AND ENDS WITH PEOPLE.

YOU CAN CALL US NOW OR YOU CAN CALL US LATER.

CompuSearch, a division of Management Recruiters, specializes in finding data processing people with the training and experience to step right into your DP staff positions and start producing — right now.

Don't be frustrated by staff vacancies or expansion needs. Call CompuSearch today! We'll find, screen and deliver the qualified people you need.



CompuSearch®
A Division of Management Recruiters International

Martin Marietta Aerospace

Computer Systems Designers

Martin Marietta Aerospace, NASA's prime Contractor for the Space Shuttle External Tank, has immediate openings at their Michoud Assembly Facility in East New Orleans for Computer Systems Designers with a B.S. in Math or a computer related field and a minimum of 5 years experience with following:

- Telecommunication networks and distributed data base technology
- Computer systems design of operating systems, processors and data base management systems
- Technical support activities
- Mainframe and mini and micro-computer knowledge

Candidates interested in learning more about these opportunities should forward their resume including salary history to: Personnel Dept., Martin Marietta Aerospace, P.O. Box 29304, Dept. CW-4/16, New Orleans, LA 70189. We are an equal opportunity employer, m/f/h.

MARTIN MARIETTA

PACIFIC NORTHWEST

HEADHUNTERS NATIONAL is a professional recruiting organization that works exclusively in the areas of Engineering, Manufacturing, Management and Executive positions within the Electronics Industry. Career opportunities available locally, throughout the Pacific NW and nationwide.

Marketing	$40K-$70K
Unix-C Software	$30K-$60K
Array Design	$32K-$42K
Diagnostics HW/SW	$28K-$36K
I/OP SW/HW	$28K-$36K
S/W Evaluation Leader	$36K-$46K
QA S/W & H/W	$28K-$46K
CPU Design	$32K-$36K
Graphics S/W	$28K-$36K

The above is just a sampling of current Pacific NW openings. Salary based on experience, companies will pay more for more experience. All jobs held in confidence. There is no charge or obligation. All fees are paid by our client companies. Call or send your resume.

(503) 297-1451
Professionals For Professionals
HEADHUNTERS
National Agency, Inc.
[illegible]
Portland, OR 97221

-IDMS-

Data Administration Manager

We are a leading Houston based NYSE service corporation with over 175 operating locations throughout North America and abroad. Our major data center in Houston consists of an IBM 3083, 4341, IDMS DBDC, ADSO, IDD, Culprit, etc.

We are seeking a Data Administration Manager to manage our newly formed IDMS database group and to be responsible for data analysis and data administration. Qualified candidates will have previous experience in the technical areas of data base as well as some data administration with at least one year on IDMS. Previous supervisory experience is a must.

For consideration or for more information, please send your resume or give us a call.

BFI

Personnel Department
Browning-Ferris Industries, Inc.
P.O. Box 3151
Houston, Texas 77253
(713) 870-7100

we are an equal opportunity employer m/f

SYSTEMS ANALYST

Measurement Concept Corporation has an immediate opening for a Systems Analyst/Designer with 5-7 years' experience in developing and implementing automated military intelligence systems. Related experience in database design and intelligence data handling systems a plus. Candidates must have U.S. citizenship with a bachelor's degree in Computer Science or related field. A current security clearance of SECRET or higher is required. Competitive salary and full package of company-paid benefits.

Send resume to:

MEASUREMENT CONCEPT CORPORATION
1721 Black River Blvd.
Rome, NY 13440

Equal Opportunity Employer

Senior Systems Programmer/Analyst

Join the Corporate Data Processing staff at National Health Laboratories in Dallas, TX. Design, program, and install on-line data systems nationwide, utilizing Digital Equipment Computers. Require college degree, preferably in Computer Science and 3 years experience. Desire mini-computer experience. Send resume to:

National Health Laboratories Incorporated
10300 N. Central Expressway
Meadows Park Central IV, Suite 220
Dallas, Texas 75231

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

Information Systems Specialists

Could your career use a world-class connection?

Where

General Electric in Waterford, NY is a recognized leader in silicones—as inventor and developer of the technology, as creator of new applications and markets, as pioneer in manufacturing process controls, as a state-of-the-art operation in every phase, every department. We now have career openings for advancing our information management systems.

Doing what

Specialist, Information Systems

To develop system design specifications for Manufacturing/Engineering Information Systems. This includes directing project teams in design, programming and documentation, creating new techniques in information systems and monitoring their effectiveness. Requires continual effective communication with user community and systems staff. You'll need a pertinent degree and 5-7 years of system/design experience in manufacturing systems, including MRP Production Control, Inventory, and Cost Systems. Knowledge of distributed systems techniques in IBM 370 environment is important.

Specialist, Data Base Administration

For administering support of a complex IDMS data base while establishing control of data access and manipulation and installing procedures for optimizing available storage space. Includes defining, installing, maintaining and documenting a system providing on line access to the data base.

You'll need a pertinent degree or equivalent with 3-5 years in Data Base/CICS; design, definition, application with IDMS or a relational DB; and knowledge of such tools as ASM/2 and ACF2 and Culinets add-on line.

Specialist, System Programmer

To be responsible for installation, maintenance and performance of the MVS operating system on the central computer. Includes problem determination and resolution, installation and documentation of procedures, determining best hardware and software for requirements, and providing documentation of host systems for operators, support personnel and users.

You'll need a college degree (or Associates with added experience) with 2-4 years in installation and maintenance of MVS operating systems, including use of SMP, experience in performance tuning and capacity planning, and knowledge of majority of: SPF, SMF/RMF, ACF2, SAS, VTAM and ASM/2.

With these advantages

Respect for creative solutions, an environment of thorough professionalism, excellent salaries and comprehensive benefits. To explore your potential here, please send resume with salary history—indicating position of interest—to Mr. David Troyner, Employee Relations, Ref. 48-S, General Electric Company, Silicone Products Division, Waterford, NY 12188.

The future is working at General Electric

An Equal Opportunity Employer

DIRECTOR, DATA PROCESSING AND COMPUTING CENTER

Southern Illinois University at Edwardsville invites applications and nominations for the position of Director, Data Processing and Computing Center. The University is a comprehensive regional institution located in a suburban setting 20 minutes from St. Louis, MO. The Director is responsible for management of academic and administrative computing, equipment and software selection, systems analysis, programming, data entry, computer operations and supervision of Center personnel. Minimum of Masters degree required. Degree in computer science, management information systems or related area preferred; degree in other disciplines acceptable with appropriate skills and experience. Minimum of five years progressively responsible positions in data processing, including three years or more in a managerial/supervisory role. Experience in higher education or IBM 4 & 9 environment preferred. Send letter of application, resume, and graduate transcripts by May 10, 1994 to: Chairperson, Computing Center Director Search Committee, Campus Box 24, Southern Illinois University at Edwardsville, Edwardsville, IL 62026. An AA/EEO Employer.

BURROUGHS/BANKING OPPORTUNITY

Large Southwestern Bank Service Bureau with extensive Burroughs Medium System network has openings for programmers & Project Leaders in Tech Support & Banking Application. Experience please are IPS, DCOM, ATM, MCP or Hardware Planning. For an opportunity to work in a dynamic, challenging, state-of-the-art environment, send resume & salary history to:

S.J. Kuebbing
First Financial Mgmt. Corp.
2995 Buford Hwy. N.E.
Atlanta, GA. 30324

Applications Engineer

Design and code programs for accounting and communication industry. Assist users. Must have MS in Computer Science, familiarity with IMS Microcomputer, Macros in general, CP/M, MS-DOS, Turbo DOS, OS, COBOL, Assembly for 8080 Series. $2,000 per month. Apply at the Texas Employment Commission, Austin, Texas or send resume to the Texas Employment Commission, TEC Building, Austin, TX 78778. J.O. #3494182. Ad paid by an equal employment opportunity employer.

CIS Instructor

Minnesota State University with strong computer science department of 16 faculty and 350 majors is expanding into a computer information systems (CIS) major program. Excellent faculty position for person with minimum of master's degree in CIS, experience in teaching, and experience with computer information systems. Salary dependent on qualifications ranging from $30,921-$39,440 for 9-month contract. Excellent fringe benefits worth 22% of salary. Write to Dr. Martin Hobden, Computer Science Search Committee, Moorhead State University, Moorhead, MN 56560. An Equal Opportunity/Affirmative Action Employer.

PROGRAMMER - Design & Code Applications w/i database Mgmt Systms pertaining to banking & insurance work with IBM 43/41, 3081, 3082. 2 Yrs or 2 Yrs exp - Analyst/Programmer. $27,500/Yr/40 hrs/5 days/wk. Must know ADS/Online Programming development Language, IDMS, VSAM, COBOL, OS, DOS. Keane, Inc., 22 Hudson Pl., Hoboken, N.J. 07030. Pls Send Resume.

Coastal Connecticut

We are the department store division of the highly successful Supermarkets General Corporation, whose sales top $3 Billion. Our divisional data center is located in BRIDGEPORT, CT with some of our systems on-line to Corporate.

TECHNICAL SUPPORT ANALYST

We are looking for a Technical Support Analyst with experience in NCR VRX Operating Systems and MCS Communications to be involved in the technical support of systems and programming staff and also to be involved in the development and implementation of new applications in both batch and on-line environment.

COBOL PROGRAMMER

We are looking for a COBOL programmer with either batch or on-line experience. We prefer retail applications such as Stock Ledger, Inventory, Price Changes, Sales/Forecasting and Open To Buy. This position requires 2 years related experience.

Excellent opportunity for growth. Competitive salary and benefits package including employee discount. If you are interested in joining an expanding organization and are looking for a challenge in your career, call collect Monday, Tuesday or Wednesday, Ted Reese ext.

(203) 366-4761

Or send your resume to: Mr. Ted Reese
HOWLAND STEINBACH HOCHSCHILD'S
[illegible] John Street, Bridgeport, CT 06604
Equal Opportunity Employer

Howland • Steinbach • Hochschild's

COMPUTERWORLD

The Recruitment Connection...

... the best connection to have when you are looking for quality computer professionals. There is a good reason why COMPUTERWORLD is the number 1 computer industry trade newspaper. No other newspaper of its kind can give you the broad exposure that you will get by advertising in COMPUTERWORLD. It is read by over half a million people, most of them top-notch professionals with top-notch computer companies.

COMPUTERWORLD publishes every Monday and the deadline for receiving your advertisement is always ten days prior to the issue date desired. The open line rate is $9.15 per line with a minimum size of 2 column inches. Send in either camera-ready material or cleanly typed copy with a layout if desired. We also have a telecopier service and adtakers who will gladly take copy over the phone.

Our mailing address is COMPUTERWORLD, Classified Advertising, 375 Cochituate Road, Box 880, Framingham, MA 01701. Or call for more information at 1-800-343-6474 or, in Massachusetts, (617) 879-0700.

COMPUTERWORLD

The best connection to have. The only connection you'll need.

SUNBELT *IMS*

California to Florida

Immediate need for application and software tech, CICS, ESA/S, IMS/S, TOTAL and ADABAS professionals. Coast to coast coverage. Contact us now and make lunch instead a necessity! Relocation assistance available.

Call Collect or Send Resume

SUPERIOR RESOURCES

Personnel Services - Employer Retained

17141 Ventura Blvd. #280
Encino-Sutro Area/Land CA 91316
(818) 990-4460

Member National Computer Assoc.
Offices Nationwide

PROGRAMMER/ANALYST

Our Company, located in suburban Minneapolis, is currently seeking a Data Processing professional with a track record of high performance. We offer the opportunity to use State of the Art Insurance and Accounting Software packages with MACRO and COMMAND LEVEL CICS on a 4381. The successful candidate should have a minimum of 2 years solid IBM, ALC, Life Insurance and Life/70 or comparable system experience. CICS, DOS/VSE, and VSAM are a plus. We offer a highly competitive salary along with a guaranteed benefits package. For further information (Principals Only), please call or write.

Bob Stevens
Data Processing Manager
MINNESOTA PROTECTIVE LIFE INSURANCE COMPANY
7901 Flying Cloud Drive
Eden Prairie, MN 55344
(612) 944-3999

M.I.S. PROFESSIONALS
HONEYWELL preferred
TECH SUPPORT
DATA BASE
ANALYSTS
& PROGRAMMERS

We are a $1.5 BILLION Southeast service related corporation. Reply in confidence with salary requirements. (EOE)

CSI-S1888
COMPUTERWORLD
Box 880
Framingham, MA 01701

ATTN:
IBM TRAINED C.E.'s

HTS needs Customer engineers with IBM training and a minimum of 3-5 years experience in the following locations: Chicago, Pittsburgh, Cleveland, Akron. Exceptional compensation, complete benefits package. Send resume and salary requirements to:

Hartford Technical Services
385 Belmonte Drive
Wood Dale, IL 60191
1-800-222-6365

MANUFACTURING REPS WANTED

Long Island based software supplier needs reps in northeast corridor. Full manufacturing financial distribution packages for companies from $1-$100,000,000. Add to your existing line.

Call Ted Hosking
(516) 864-4660

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

DATACOM
Pacific Northwest

Our client is one of the true "leading edge" companies in the world today - located in a beautiful, growing high tech (and low cost) area.

Candidates meeting their high standards will be chosen to develop data communications subsystems (I/O) for a new 32-bit computer system. Development includes: protocol selection and microcoding of implementation; VLSI definition; software/microcode/hardware partitioning; and overall system development for multiple LAN and standard communication links.

2 or more yrs. req'd in communications controller/subsystem design and specific firmware/software experience with 1 or more of the following protocols/networks: HDLC/SDCC, ethernet, SNA, x.25, bisync, sync and async byte protocols.

BSEE or BSCS is required, advanced degree a plus. Positions exist for both contributors and managers. Salaries are open to experience and outstanding benefits package is offered. Excellent full relocation. Send resume and salary requirements to:

LOWELL S. BOSS & ASSOC.
P.O. Box 629
Corte Madera, CA 94925

CLARK COUNTY COMMUNITY COLLEGE

POSITION: Data Processing Instructor, non-tenured.

RESPONSIBILITIES: Teach Data Processing courses such as Computer Concepts, COBOL, RPG II, BASIC, FORTRAN, PASCAL, and Assembler.

QUALIFICATIONS: Bachelor's degree, Master's preferred; at least 3 years of business programming experience in COBOL, RPG and BASIC; college level teaching experience desirable.

SALARY RANGE: $18,000 - $25,000. Appointment for academic year (approximately 10 months).

APPLICATIONS PROCEDURE: Letter of application, current resume, and 3 references should be forwarded to:

Personnel Office
Clark County Community College
3200 East Cheyenne Avenue
North Las Vegas, NV 89030

DEADLINE FOR APPLICANT'S COMPLETE FILE: May 4, 1984.
TARGET DATE FOR EMPLOYMENT: August 1984.

Affirmative action/equal opportunity employer

Software Professionals:

Link your Achievements to Ours

The fulfillment of a bright future doesn't just happen. It takes foresight—choosing the right company. A company that can offer the challenges, experiences and diverse exposure to take you beyond previous limits. A company like Raytheon Service Company.

At Raytheon Service Company, we provide world-wide engineering services for a broad spectrum of government and commercial customers. Services that keep, even the most advanced and sophisticated systems in top operating condition. Backed by the extraordinary range of resources of Fortune 100 Raytheon, we are constantly expanding our capabilities to meet the ever changing and challenging demands of future technology. And now we are looking for software professionals, with that same sense of challenge and ambition, to link their talents with ours.

Together, we can achieve. The following opportunities are now available:

Aegis Simulation Software

Software engineers are required to provide on-site support to the Naval Surface Weapons Center at Dahlgren, VA for the AEGIS fire control system life cycle maintenance and fire control system functional simulation programs. Requires a BSCS or equivalent experience in design and development of real-time computer programs, and 2 years experience in AEGIS computer programming.

Tomahawk Software Support

We have current opportunities available for software engineers possessing a strong background in Tomahawk Cruise Missile Software at our Dahlgren, VA facility. BSCS or equivalent is required. Additional experience in simulator programming a definite plus.

Computer Aided Instruction

We are looking for key contributors to provide both hardware and software support for our interactive videodisc CAI training programs in Burlington, MA and at Beech Aircraft Corporation in Wichita, KS. The ideal candidates will have a BSEE and programming experience in assembly, compiler languages (e.g., BASIC, PASCAL, "C") on microcomputer systems (especially SONY equipment). Digital and analog electronics experience essential. Instructor training experience in electronics preferred.

Marketing Manager

This position, located in Mt. Laurel, NJ, entails the identification and pursuit of new business opportunities and the formulation of capture plans, proposal strategies and overall marketing plans. You will provide the DoD marketplace with software engineering services including simulation modeling, scientific programming for computer-assisted engineering research, and real-time software development. This responsible position requires significant experience in marketing software or similar products/services to governmental agencies, knowledge of government procurement practices and prior experience in direct sales.

Advanced Navy Systems

We have immediate and on-going needs for software engineers with a technical degree and at least 5 years experience with Advanced Navy Systems' including surface and underwater fire control, missile guidance, radar data processing, system simulation and automatic test equipment. Proficiency in CMS-2, ULTRA-16/32, Ada, "C", JOVIAL and/or ATLAS is needed and experience in the AN/UYK-7/11/20/43/44, MB8000 or VAX 11/780 is preferred. Knowledge of MIL STD 480 and MIL STD 1679 a plus. Locations available include: Mount Laurel, NJ, Dahlgren, VA, Portsmouth/Newport, RI and Massachusetts. *Several positions offer the opportunity for travel and overseas assignment.*

Software Diagnostics

We currently have openings in Massachusetts for software engineers to design, develop and test diagnostic software for digital and analog hardware in PATRIOT, a large scale, complex, computer controlled air defense system. You will be primarily utilizing a structured, high level language as well as assembly language and microcode, and work closely with hardware engineers to define joint hardware/software requirements. A BA or BS in Math or Science, plus a minimum of 2 years of closely related experience in software development is required, along with an in-depth understanding of hardware and structured programming techniques.

These are only a few of the outstanding Software opportunities currently available. We offer competitive salaries and a comprehensive company-paid benefits package. If you qualify and are interested, please forward resumes in complete confidence to: Dr. Barbara Lashbrook, Dept. CW4, Raytheon Service Company, 2 Wayside Road, Burlington, MA 01803.

RAYTHEON COMPANY
RAYTHEON SERVICE COMPANY

An Equal Opportunity Employer

DIRECTOR OF COMPUTER SERVICES

UCI MEDICAL CENTER

The University of California, Irvine Medical Center, a progressive 493 bed teaching facility is seeking a Director of Computer Services to manage its user driven data centers which operate in a comprehensive Technicon Corporation Medical Information System on an IBM 4341 under DOS/VSE and ancillary minicomputer based satellite systems.

The candidate should have experience in the development of user oriented health care information systems, experience with a large mainframe and its related software in a hospital setting, and demonstrated managerial/administrative skills including fiscal responsibility for a computer facility.

Preferred qualifications include a familiarity with the relationships between various clinical and support services in a hospital setting, cost accounting, vendor and contract negotiations, microcomputing and word processing systems.

Please forward resume or curriculum vitae with salary history. All application material must be received by April 30, 1984.

uc i care

UCI Medical Center
Personnel Office
101 The City Drive
Mail Station 114
Orange, CA 92668
(714) 634-5628

Affirmative Action/
Equal Opportunity Employer

Telecommunications Analysts
(Voice & Data)

- Team leader with management experience.
- Senior Analyst with 7-10 years experience.
- Analyst with 3-5 years experience.

Systems Analyst for Quality Assurance position in large IBM environment. Knowledge of different System Development Methodologies required.

Programmer Analyst with 3-5 years experience in banking applications.

SAPCO

Systems Associates of Broward County
P.O. Box 20005
Melbourne, Florida 32902-005

If you have the right talent and drive, we can offer you individual career growth with a bright future. We are looking for the best people in the industry. Do you qualify?

PROGRAMMER/ ANALYST
On PDP11's Under RSX-11

Experience and working knowledge of RSX11-M, Fortran and Macro-11 required. DecNet a plus.

Excellent opportunity for middle-to-heavyweight. Position of strong responsibility in fast-moving environment, with technically challenging work on state-of-the-art turnkey systems.

Experienced applicants only. Opening is immediate, and this will be only ad. Call mon. (609) 866-8888 (collect), or send resume/salary history to:

IBS
Interactive Business Systems, Inc.
[illegible]

SCT

We Are The Company That In Just One Month...

- Was selected by the University of Pittsburgh for implementation of data base managed administrative applications as an element of their progressive "Campus of the Future" project...
- Was selected by one of the most prestigious graduate schools of business for a long term Computing Resource Management engagement...
- Was selected by Chester County, Pennsylvania, located on the rapidly growing Route 202 "High Tech Corridor" (Venture, Sept., 1983)...
- Was featured by Barron's (March 19, 1984) as the leading vertical market specialist to higher education and local government...and was endorsed by leading high technology brokerage firms as the latest recommendation on their high technology buy lists...
- Continued its record 40% growth...

Can you imagine the caliber of people who made that possible? Join us on the leading edge of computing technology for higher education and local government.

Join us during our nationwide, high technology conference schedule. Meet with our senior management and key executives from Boston to Los Angeles, to discuss our opportunities and rewarding equity participation. A successful management information systems track record is essential; an entrepreneurial style is critical.

For your appointment, write or call: Bob Keenan, Manager, Professional Recruiting (215) 647-5930, SCT, Great Valley Corporate Center, Dept. CW, 4 Country View Road, Malvern, PA 19355. An Equal Opportunity Employer, M/F.

Systems & Computer Technology Corporation

...On The Grow!

MOST $$$ SOLD NOW!

Our computer can help you get hired or stay hired. Four WATS lines; 13 years' experience; 270 affiliated offices; 300+ current job orders; 3000+ company clients from Virginia to Texas to Florida! Send resume to:

DATA RESOURCES, USA
Division of Landrum Personnel Associates
P.O. Box 1373C
Pensacola, Florida 32598-1373
CALL TOLL FREE (800) 874-9407
IN FLORIDA (904) 434-2321 COLLECT

TANDEM
Expertise?

Call or send resume to:
Mr. Neil J. Owrutsky
Director, Information Services

ENTRE[illegible]

1951 Kidwell Drive, Suite 400
Vienna, VA 22180
(703) 556-0600

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

AT FAIRCHILD WESTON: INDIVIDUALS HAVE PROJECT RESPONSIBILITY

Look to Fairchild Weston if you seek the individual challenges, responsibilities and rewards of seeing projects through from start to finish. For 38 years, we've been the leader in EMR telemetry, signal processing and data acquisition systems. Our technological excellence and innovation have resulted in steady sales growth, creating exciting career opportunities for experienced engineering and/or computer science professionals.

The following positions require U.S. citizenship, and extensive background investigations may be conducted:

SENIOR SOFTWARE Q.A. ENGINEER

An exciting career opportunity exists for an individual experienced in software quality assurance. We seek a person with strong leadership skills to develop and head our software Q.A. function. Experience with real-time software specifications, design, development and documentation desired. Experience with software Q.A. mil-standards required. The successful applicant will develop and implement a Q.A. program for our system software products. A BSEE or BSCS or applicable experience preferred.

SOFTWARE SPECIALISTS

Positions require experience in the design and implementation of large scale real-time systems utilizing structured methology. Experience with VAX-11, RSX-11M or VMS operation systems and assembly language/FORTRAN required. Knowledge of signal processing, graphics, data base implementation or large scale netted computer systems is highly desirable. Project leader position requires prior experience with proposal generation and cost estimating.

Fairchild Weston offers top compensation, liberal fringe benefits, relocation assistance, and a casual but challenging work environment.

Sarasota is a beautiful beach community on Florida's Gulf Coast. Sarasota enjoys a respected school system, attractive residential communities, a low tax structure, no state income tax, and a year 'round recreational climate.

For confidential consideration, please submit your resume, including salary history, to: Tom Salmon, Manager, Professional Employment.

FAIRCHILD WESTON SYSTEMS INC.

P.O. Box 2000,
Sarasota, Florida 33578

An Equal Opportunity Employer

RESUMES
All Writing Needs
- Effective, professional
- For today's job seeker
- Free cover letter package
- Fast, reliable, confidential
- Creative & editorial services

FORD/YOUNG ENTERPRISES
P.O. Box 157
Villa Park, IL 60181
(312) 530-6618

COMPUTER POSITIONS

SYSTEMS PROGRAMMERS
PROGRAMMER/ANALYSTS
PROGRAMMERS

THE NATIONAL FINANCE CENTER
U.S. DEPT. OF AGRICULTURE

Louisiana's Delta Region offers permanent positions available in the following areas: DATA BASE support for dual IBM/CPU's running on IBM-3081/E and IBM-4341 computer systems analysts and programming, systems software, ADP security and standards. Salary commensurate with experience. Forty hour work week with flexible hours. Full Civil Service benefits and job security. Applicants must meet qualification requirements as established by the Office of Personnel Management.

Application from employees with current U.S. Civil Service status are welcome.

Applications may be obtained by contacting:

Ms. Josie Giovanelli (CW)
Personnel Office
P.O. Box 60,000
New Orleans, LA 70160
(504) 255-4000

EQUAL OPPORTUNITY EMPLOYER M/F/H

SENIOR MANAGER S/W DEVELOPMENT

Our client, a Los Angeles based systems software firm, seeks a Senior Manager to plan, coordinate and direct the development of new/enhanced feature systems projects.

We seek an individual with 10 - 20 years software systems and operating systems architecture experience. You should possess skill in managing advanced software planning, design and/or development. Most important would be your current skills at the management level especially in DDP and Communications.

Compensation: $150K+ and executive bonus.

Please send resume with salary history or call (213) 277-7431.

Genovese & Co.
Management Consultants, Executive Search
1800 Century Park East
Los Angeles, Ca. 90067

COMPUTER. Central Wyoming College seeks applications for the position of Director of Computer Services. Position includes responsibility for all local information to an administrative system. Allocates computer, printer time of request reports and compilation of requests for modifications to existing programs. Bachelor's Degree in Computer Science or Accounting and two to four years of post experience and a computer-related/accounting emphasis must be applied. Salary commensurate with qualifications. Apply with resume of work experience and copies transcripts to Ms. Pebbie Sandoval, Personnel Officer, Central Wyoming College, 2660 Peck Avenue, Riverton, Wyoming 82501. Central Wyoming College is an Equal Opportunity Employer.

Computer Center Director of Operations. Furman University has an immediate opening for a Director of Operations. This person in this position reports to the Director of the Computer Center and is responsible for coordinating the day to day operations of the University's HP3000 Model 68 and the VAX terminals attached to it. In addition, this person interacts with the administrative users of the system to formulate and produce ad hoc reports and to schedule administrative reports. The ideal candidate will have good interpersonal skills, good writing ability, and experience with Hewlett Packard equipment. A bachelor's degree is required. The salary is competitive and is dependent upon qualifications. An excellent fringe benefits program is also available. Interested candidates should submit a resume to: Mr. Alex Williams, Director of Personnel, Furman University, Greenville, S.C. 29613 by May 7, 1984.

AN AA/EEO EMPLOYER

SYSTEMS PROGRAMMERS, SYSTEMS ANALYSTS—Progressive technical school in Metro Atlanta has openings for teaching positions. For information contact GWINNETT AREA TECHNICAL SCHOOL, 1250 Atkinson Road, Box 1505, Lawrenceville, GA 30246, (404) 962-7583.

DATA SECURITY OFFICER

Progressive Southern California data processing organization is seeking an individual to administer its data security program. Requires experience in the administration of a computer system data security program and be on IBM 370/138 or larger installation. SALARY - Up to $41,704/yr. plus $200 per mo. executive benefit plan. Apply immediately to:

COUNTY OF SAN BERNARDINO - PERSONNEL DEPT. - 157 W. 5th ST., SAN BERNARDINO, CA 92415-0440 (714) 383-2091.

EOE m/f/h

WASHINGTON D.C.

S/38

Dynamic Maryland based co. seeks experienced RPG III programmer-Analyst. Task involve design and implementation of new financial systems. Join this team of professionals! $41K.

ROBERT HALF
OF WASHINGTON, INC.
7316 Wisconsin Ave. 6th Floor
Washington, D.C. 20014
(301) 986-9600

KAMAN'S CAREER CORNER

It takes the momentum of a leader to make your career take off...and Kaman is distinguished as the undisputed pioneer in a wide range of aerospace programs. Openings are presently available offering talented professionals the best environment in which to advance their careers.

SYSTEMS PROGRAMMERS

Tired of being one of many? Join KAMAN's team and be part of a small, but sophisticated shop where immediate opportunities are available for Systems Programmers with 3 years experience. Responsibilities include implementation, table generation and maintenance of DOS/VSE systems. Hardware consists of dual 4341-11. Working knowledge of CICS Internals, VSAM, shared spooling and VM/SP a plus.

At KAMAN you'll find the challenge and responsibility you've been looking for. We offer competitive salaries and a comprehensive benefits program. If you qualify, send your resume with salary history to:

Attn: Sheila Hall, Department CWN/16, 36

KAMAN AEROSPACE CORPORATION
Old Windsor Road, Bloomfield, CT 06002

An Equal Opportunity Employer — Minorities and Females are Encouraged to Apply

---

There's No Time For DOWNTIME!

So while the industry works on your system's problems, let us work on your business problems. Advertise in—

COMPUTERWORLD CLASSIFIEDS!

One insertion will let a potential audience of over a half a million readers know what you are looking for or have to offer. Whether you are looking to recruit computer professionals, want to buy, sell or lease equipment, have computer time or services to offer, or software packages to sell, and more, Computerworld Classifieds will help you get a lot of exposure and get things done faster.

The open line rate is $9.15 per line and there is a minimum size of 1 column by 2" at a cost of $256.20. We can accomodate up to 5 columns and depth measurement increases by half inch increments.

Ads may be mailed in, clearly typewritten, with a letter stating the size desired and the issue in which it is to be run. Our adtakers will take ads that require no artwork or borders over the phone. We also provide telecopier service.

Any borders, logos, or artwork should be sent in with your ad and must be dark and clear enough to be reproduced.

Computerworld comes out every Monday and our deadline for receiving ads is 10 days (or six working days) prior to the issue date desired.

First time advertisers must send either payment or a purchase order along with their first ad.

Our mailing address is:

Classified Advertising
Computerworld
Box 880, 375 Cochituate Road
Framingham, MA 01701
800 343-6474; (617) 879-0700

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

SOFTWARE PROFESSIONALS

Where do you go for the latest thinking in SOFTWARE DEVELOPMENT?

The answer is easy...

ADR.

We are one of the largest systems software product companies in the world and year after year we maintain a leadership position focusing on a single aspect of this large and growing industry...Software Development.

If your career is oriented towards systems and software development, you will want to consider a career with ADR. Presently various development assignments are available in IBM Mainframe and Personal/Micro computer technologies.

IBM MAINFRAME
- BAL
- DOS/VSE, MVS, VS1, VM/CMS

PERSONAL/MICRO
- Unix "C"; PASCAL
- IBM PC preferred

APPLIED DATA RESEARCH offers continued opportunities for career development, a comprehensive benefits package, relocation assistance and a salary fully commensurate with your experience and potential. For consideration, please forward your resume or call Gary Johnson, (201) 874-8000, APPLIED DATA RESEARCH, INC., Route 206 & Orchard Road, CN-8, Princeton, NJ 08540.

APPLIED DATA RESEARCH

An equal opportunity employer

computer services manager

FMC Central Engineering Laboratories is an interactive, multidisciplinary research center chartered to provide technical services and identify new product opportunities for the defense, petroleum and specialized machinery divisions of FMC.

A unique opportunity exists for a Computer Services Manager to guide and direct the activities of the Computer Services department which supports our research laboratory in the areas of MIS, technical computing and office automation. Your specific responsibilities will include supervising the operations of each support department, determining the best utilization of existing and new hardware and participating in the Technical Computing Steering Committee for planning and implementation of our strategic objectives.

The successful candidate will have a B.S./M.S. in Computer Science or Engineering and be experienced in managing a department of similar scope. A thorough knowledge of DEC equipment and up-to-date familiarity with technical computing software, IBM MIS Systems and office automation options and systems are required. Strong interpersonal skills are essential to work effectively with your client, user community.

FMC offers competitive salaries and excellent benefits. For confidential consideration, please submit resume or call: Ms. V. Payne, (408) 289-3433. FMC Corporation, Central Engineering Laboratories, 1185 Coleman Avenue, Santa Clara, CA 95052. We are an equal opportunity employer m/f.

FMC

Ocean Drilling Program
Texas A&M Research Foundation

The Computer Services Group for an international scientific ocean drilling program is seeking the following computer science professionals to provide software development and support for shipboard/onboard computer systems.

The following positions are open:
- Systems Manager/Senior Programmer
- Senior Programmer (2)
- Data-gathering Programmer/Operator

All positions require appropriate education/work experience and familiarity with software design and maintenance using structured methodology, interactive programming environments, data base management, super-minis, microcomputers, and higher level languages such as FORTRAN-77, PASCAL, and BASIC.

Additional valuable skills and experience would be backgrounds in earth sciences, software engineering project management, software tools, simulation, mathematical physics, typesetting, publishing, and curation of scientific collections and/or data libraries.

Send resume and three references before May 4, 1984 to:
Dee Gardner, Personnel Supervisor
Ocean Drilling Program
Texas A&M University
P.O. Drawer CS
College Station, TX 77843

Manager Technical Support Center

Be part of the exciting new high-tech product advances at NCR.

In this new, highly visible position, combining technical and marketing skills, you will manage hardware/software technical support professionals in third party development of hardware and software packages for the NCR Personal Computer. Reporting to the General Manager, you will also be involved in product demonstrations/promotions to major customers and dealers.

Your background should include a BSEE/BSCS, MBA preferred; and experience in software development with a proven track record in marketing.

Salary is commensurate with experience. Benefits are excellent. And the location near Greenville is ideal for working and living. Send your resume with salary history/requirements to: Bill Tisdell, ISAACS, NCR Corporation, Dept. A-68, 1159 Anderson Drive, Liberty, South Carolina 29657. (No agencies, please).

NCR

1884-1984
Celebrating the future

An equal opportunity employer

— SUNBELT CAREERS —
PM's, S/P's, SW ENG's
Our clients need your experience in CICS, IMS, IDMS, S/36, PC's, HP 1000/3000, ALC, RSX-11M, VAX/VMS, UNIX, C
Hundreds of openings nationally easily searchable on our DEC PDP11/44
Call to inquire or send resume today. Our 15th year as recruiters.
TOLL FREE 800-334-4326 In NC (919)484-4104
P.O. BOX 35625 FAYETTEVILLE, N.C. 28303

We are currently recruiting for:
PROGRAMMERS, PM, S/P, SA, SW's
If we have not called you yet:
(1) We do not know who you are.
(2) Or no one has recommended you yet.
If you have one year of experience or more and want to work in N.C., S.C., VA, TN or GA call one or our D.P. Recruiters collect.
Joe Skilton, CPC
"THE SP PROS"
PERSONNEL PLACEMENT, INC.
897-D Hartsfield Rd.
Charleston, SC 29407
(803) 556-8260
Our client companies pay all of your fees, interview and relocation expenses.

FLORIDA CONNECTION
All Expenses Paid
Our clients, in urgent need of your expertise will pay all your expenses to interview you in an area of Sun & Fun, No State Tax, Average Temperature 75°
TELECOMMUNICATION PROGRAMMERS
PROGRAMMER ANALYSTS
SYSTEMS ANALYSTS
SYSTEMS PROGRAMMERS
DATA BASE ANALYSTS

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

WALKER
WALKER
WALKER
WALKER
WALKER
WALKER
INTERACTIVE PRODUCTS

TECHNICAL ANALYST
Systems Programming
San Francisco Position

In the 70's, Walker was rated at the top of *International Computer Programs'* list of the 15 leading young computer companies to watch. In the 80's. This prediction for success is being realized. Walker's extensive R&D efforts have taken it from being a one-product company to an organization which has both superior computer technology and top-rated financial applications systems. We remain committed to raising the current state of the art in computer technology and fulfilling public prediction for our continued success. To assist us in achieving our goals, we are looking for dedicated computer professionals.

We are currently seeking a Technical Analyst with systems programming experience to provide technical support to customers using on-line application in several DB/DC systems environments. You will perform analysis in system related areas, as well as define the resolution of technical problems and assist customers in applying solutions. To qualify for this position, you must have 4 or more years systems programming experience in IMS, CICS, ADABASE or other DB systems with telecommunications in an OS/DOS environment. Experience in an IBM mainframe environment is also required, as is outstanding problem solving and analytical ability. Since this is a position requiring heavy customer contact, you must possess strong written and verbal communications skills. College or related experience would be considered helpful. This position does not involve travel.

In addition to high growth potential in a progressive environment, we offer an excellent salary and benefits package. Please send your resume to the Director of Human Resources, Walker Interactive Products, 100 Mission Street, Suite 300, San Francisco, CA 94105.

We are an equal opportunity employer.

Wanted: D/P Professionals
for a PRIME INFORMATION SYSTEM

Hardware Communications Expert

We are searching nationally for the best hardware and communications expert money can buy! We need someone with at least 3 years experience on Prime Computers to administer and develop a nationwide communications network. You will be responsible for a Prime 9650 with the Information Operating System that supports over 80 users nationwide. You will research, make recommendations and negotiate for hardware and communications equipment. You will manage the hardware side of a rapidly expanding DP department.

Salary range - $30,000 to $50,000 per year based on experience and background.

Programmer/Analyst

We need a strong applications programmer with at least 2 years experience on Prime Computers to develop software on our Prime 9650 with the Information Operating System. Your responsibilities will include design and implementation of new systems, enhancement of existing systems, and interfacing with our documentation and communication personnel.

Salary range - $25,000 to $40,000 per year based on experience and background.

Benefits:
Substantial performance bonus program
Top line health and insurance benefits
Great location - Santa Cruz, California
Corporate commitment to leading edge technology
Exciting R & D atmosphere

For prompt consideration send your resume and salary history to:

SKYWAY FREIGHT SYSTEMS

J. BAKER
SKYWAY FREIGHT SYSTEMS
P.O. BOX 1810
SANTA CRUZ, CALIFORNIA 95061

UNIX + C LANGUAGE
$35,000 - $50,000

Advanced Programming Resources, Inc., a dynamic growth oriented Contract Services organization specializing in Consulting Systems Design and Programming Development, has an immediate need for seasoned Software Engineers.

Must have a degree in Computer Science or Electrical Engineering, 2 or more years programming experience using "C" Language, PASCAL, or PL/1, UNIX Operating System. Working knowledge of Network Protocol and multiprocessor systems helpful. Knowledge of VAX or other mini computers required.

APR provides above average benefits and compensation. If you feel you want to join the leader, please send your resume' in confidence to:

APR
ADVANCED PROGRAMMING RESOURCES, INC.
6650 North High Street • Worthington, Ohio 43085 • 614/888-3668

"An Equal Opportunity Employer"

SYSTEMS SOFTWARE ENGINEER

Honeywell Test Instruments Division, located in Littleton, designs, manufactures and markets data acquisition, test and measurement instrumentation, data storage and graphic recorders for industrial government and international customers.

We are currently seeking a SOFTWARE ENGINEER to develop state-of-the-art software for user oriented products. The successful applicant will have 2-5 years of experience in real-time microprocessor based systems. High and low order language experience using structured design methodologies. Familiarity with systems software or graphics applications and control systems. Experience with UNIX, C, VMS is preferred. A 4 year technical degree, preferably BSCS or BSEE, is a requirement.

Honeywell offers excellent compensation and benefit programs, including flexible hours. We are willing to work with you to solve relocation problems.

Interested and qualified candidates may send resume in confidence to Sue Wells.

Honeywell Test Instruments Division
P.O. Box 5227, Denver, CO 80217

Honeywell

Together, we can find the answers.

MANUFACTURERS REPRESENTATIVE
MICROCOMPUTER/TELECOMMUNICATIONS

We are in search of experienced professional sales support to help us bring a revolutionary new hardware and software product to market. This product combines the leading edge technology of both microcomputers and telecommunications.

Interested firms and candidates should have considerable experience in marketing to the microcomputer industry and/or to telecom distributors (Regional operating companies or interconnect).

If your qualifications and track record match our needs, we are prepared to offer exclusive regional marketing rights in return for the initial sale and follow-on support of our product.

Please send inquiries to 1009 Mansell Road, Suite I, Roswell, Georgia 30075.

air new zealand

ACP/IPARS

At the Air New Zealand Computer Centre in Auckland, we are planning further development to our Reservations and Traffic Handling systems.

If you are a project-oriented DP professional, with ACP or IPARS experience, this is your opportunity to join our enthusiastic and dedicated systems team.

We will offer you -

- A technically stimulating and motivating working environment.
- An opportunity for personal achievement within the varied aspects of our operations.
- A competitive salary with optional subsidised pension scheme and attractive airline travel benefits.
- Generous relocation assistance.
- A chance to live and work in a beautiful country with the tropical South Pacific Islands at your doorstep.

INTERESTED? then please send your resume, or write for more information to:

Manager Personnel Department
Air New Zealand
Private Bag
AUCKLAND, NEW ZEALAND

In a bind?

Do you need real professionals? Advertise in Computerworld to find exactly who you're looking for. Because...

More computer people read Computerworld than any other newspaper in the United States—more than half a million computer people every week. And, among our 529,650 readers at user organizations, about half claim to look at recruitment ads at least every other week (only a small percentage say they never look at recruitment ads).

No wonder Computerworld carries more recruitment ads for computer people than any other publication.

To place your ad or to get a rate Call or write:

Classified Advertising Computerworld Box 880 Framingham, MA 01701 (617)879-0700 (800)343-6474

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

PROGRAMMER/ANALYSTS

SIMPLY INCREDIBLE OPPORTUNITIES

are waiting for you at CHI-CHI's

Join the fastest growing, full-service restaurant chain in the U.S.A. We are looking for experienced programmer analysts. One year + System 38 RPG III. Additional experience in System 3/34/36 RPG II will be a plus.

If you have this experience coupled with a strong business sense and a desire to take charge of a project and see it through to the finish, we want you.

- Salary commensurate with experience.
- Excellent benefits.
- Degree preferred, but experience counts.

Send resume to:
Art Schmitt, Ph.D.
Director of Human Resources
CHI-CHI's
P.O. Box 32330, 10002 Shelbyville Rd.
Louisville, KY. 40232

COMPUTER-SPECIALISTS

Degree req'd. Experienced only of following categories:

COMPUTER SYSTEMS PROJECT ENGINEERS

Familiar with SBC computers, particularly VAX series. Candidates must have implemented several process control computer projects including dedicated computer & process control instrument systems.

SPECIALIST ENGINEERS

At least two years experience with digital systems: process computers, programmable logic controllers, distributed control systems.

SYSTEMS ANALYSTS/ PROGRAMMERS

- IBM 370 architecture & programming languages; or
- IBM System 1, programming language RPX & EDL; or
- INTEL 8086, PL/1 languages, process controls.

Send resume to:

ALLSTATES DESIGN & DEVELOPMENT CO., INC.
2100 Cabot Blvd. West
Box 309
Langhorne, PA 19047
Equal opportunity employer

Bryant Bureau

HAS THE COMPUTER PROGRAM FOR YOU

If you're not accomplishing your career goals, let us put you in the right environment. Our national database of client companies are constantly looking for progressive DP professionals who want to remain state of the art.

NATIONWIDE OPPORTUNITIES

IBM Engr, assem, real-time	to $40K
Real-time Sys Anal, power sys	to $40K
IBM mainframe EDP Auditor	to $40K
IBM MVS/XA Systems Progr	to $35K
IBM mainframe tape Appl Progr	to $30K
IBM 3083 PIA OS/MVS tasks	to $40K
IBM Sr Systems Anal OS/MVS	to $35K
DEC VAX VMS Proc Control Anal	to $35K
UNIVAC 1100 PIA assistant	to $30K

To become part of the growth in the 80's, call toll free or send your resume with salary history and any relocation restrictions.

Bryant Bureau
DP Division
4699 S. Tamiami Trail, S-541
Sarasota, FL 33581
(800) 237-8497

NEW 4381 INSTALLATION

The following expert staff are required to form the technical nucleus of the newly expanded Computer Department of the Royal Cimon Police. Micros, Minis and Word Processors are already in use and an IBM 4381 is on order.

The Royal Cimon Police is an expanding and progressive Force with wide ranging responsibilities, including Customs and Immigration.

A) DATABASE ADMINISTRATOR $ 42,000

Minimum of 8 years experience of which at least 3 years must have been spent as a database designer or database administrator in an online, realtime IMS/CICS environment. Must have been responsible for the design and implementation of at least one large and complex IMS/CICS database.

B) PROJECT LEADER $ 35,000

Minimum of 8 years IBM experience of which at least 3 years must have been as a chief systems analyst or project leader in an online realtime environment using MVS, IMS, CICS, and COBOL. Database design experience an advantage, as would be a knowledge of SNA and PL/1.

C) SENIOR ANALYST/PROGRAMMERS $ 29,000

Minimum of 5 years IBM experience of which at least 3 years must have been spent designing and programming online applications in a CICS/DL/1 environment using COBOL, including at least one major project from design to implementation.

D) SENIOR SYSTEMS PROGRAMMERS $ 29,000

Minimum of 5 years IBM experience of which at least 3 years must have been spent in a systems support role in an MVS, IMS, CICS environment. Experience of SNA an advantage.

These appointments are family status and offered on contract terms of service for an initial period of 2 years. The tax-free salaries shown above are calculated at current exchange rates and are inclusive of an 'end of contract' payment of 20% of the amount shown per annum. Other benefits include furnished, air-conditioned accommodation, car, medical treatment, and 60 days leave per annum for the database administrator and project leaders (45 days for the other posts).

Applications with detailed curriculum vitae attached should be forwarded not later than 30th April to:

Inspector General of Police and Customs, Attn: Assistant Inspector General (P), C/o. Gregg International, P.O. Box 11618, Kansas City, MO 64138.

TECH SUPPORT $30-45,000

Growth positions in the Twin Cities and surrounding areas. MANAGER: Supervise 4 Systems Programmers. Job planning and analysis. Requires 2 yrs in OS communications experience. 2 + yrs systems programming & strong interpersonal skills. Job #6807 IMS DATA BASE ANALYST: Must have 2 yrs IMS exposure in Data Dictionary and TSO/SPF. Job #6824 DOS/VSE SYSTEMS PROGRAMMER: Requires 2 yrs Data Communications (must be CICS/VTAM). Job #4869 DATA BASE ADMINISTRATOR: Prefer some DEC VAX 11/780 experience with VAX/VMS. Must Require: existence of theoretical data base design (logical database) systems a plus. Job #6825 FEE PAID

MARK DAVID
JOHN SELLER
ROBERT HALF
3535 IDS Center
Minneapolis, MN 55402
(612) 338-0801

UNIVAC

Programmers, Systems Analysts, Data Base Analysts, Systems Programmers-Let us update you on the rapidly changing UNIVAC market coast to coast. To confidentially explore exciting new career opportunities, rush a resume or call Gary Repetto, CPC.

1717 Louisiana NE, Bldg. C
Albuquerque, NM 87110
(505) 292-1071
Equal Opportunity Employer Rockwell

CONTRACT PROGRAMMER/ANALYSTS

For consulting firm in Charlottesville, Virginia. Individuals only. Business or industrial experience required on HP3000 or VAX Systems, in COBOL, FORTRAN or Pascal. Quality of life unbeatable in beautiful Blue Ridge mountain area. Send resumes to 310 East Main Street, Charlottesville, Virginia 22901.

BUY - SELL - SWAP

MICROPROCESSOR LABORATORIES, INC. dba MICROLABS HAS RETOOLED AND HAS THE FOLLOWING EQUIPMENT FOR SALE AT VERY REASONABLE PRICES.

HEWLETT PACKARD 1000 A-SERIES
- 512 KB MEMORY * 7906P * 2631B * 7970E
- 12920B MUX / PANEL * 2622A 8 MINI-FLOPPIES
- HP-IB * ASYNC I/F * STILL UNDER HP MAINTENANCE

HEWLETT PACKARD 1000 R-SERIES
- 2117F * 256 KB MEMORY * 7906M * 7920S
- 7970B * 2608A * 2894 (2) 8 USER MUX/PANEL
- CURRENTLY RUNNING RTE-6 * STILL UNDER HP MAINTENANCE

HEWLETT PACKARD 64000 DEVELOPMENT SYSTEM
- 7906M * 2631B * 16K BYTES EMULATION MEMORY * PROM PROGRAMMER * 64940A TAPE
- TRANSPORT * Z80 EMULATOR POD * EXCELLENT SYSTEM FOR PROM PROGRAMMING * OTHER PODS AVAILABLE FROM HP AND OTHER SOURCES

FOUR PHASE 312 SYSTEM
- 3MB MEMORY * 402MB DISK STORAGE WITH INTEGRATED CONTROLLER
- SELECTOR CHANNEL * 37 1/2 IPS TAPE UNIT WITH INTEGRATED CONTROLLER
- INTEGRATED COMMUNICATIONS CONTROLLER, PLUS EXPANSION TOTAL OF 16 PORTS * EXCELLENT VMACMS MACHINE
- SAVE YOUR MAINFRAME, USE THIS SYSTEM FOR PROGRAM DEVELOPMENT
- 300 LPM PRINTER * STILL UNDER FOUR-PHASE MAINTENANCE * THIS IS THE SYSTEM THAT WILL SAVE YOU THE MEGABUCKS NECESSARY TO UPGRADE YOUR MAINFRAME.

Call (713) 266-1418 and ask for Don Cavallaro

Or Write: Microlabs
6565 Richmond Avenue
Third Floor
Houston, TX 77057
Attn: Don Cavallaro

IN STOCK!
Fujitsu Eagle
with cabinet, cables, slides & terminator:
$13,000
New Fujitsu SP 380
80 character per second, letter quality printer:
Introductory Special - $2,999

MANRES
BUSINESS SOLUTIONS INC.
303-693-3035
2771 S. Jasper • Aurora, CO 80013

STC
TAPE/DISK
BUY · SELL · LEASE
(408) 241-3672

Control Data **SERIES I SPECIAL** **IBM**
126MB Removable Drives . . $12,900
Diskette Drives . . . . . $ 1,495
Printers & Displays
New or Used
Immediate Delivery
4956 Processors
4967 200MB Disk Drives
All Peripheral & Features

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

Will the real lessor please stand up!

Who do you want to deal with during your computer lease?

An investor? An insurance company? A consortium of banks? Or your leasing company!

As computer experts, we understand your individual equipment requirements. Hartford Computer Group doesn't sell your leased equipment to an investor who will not understand or care about your requirements.

When you sign a lease with Hartford Computer Group, you deal only with us. We maintain complete ownership and control of your leased equipment and can therefore give you the *flexibility* you want in a computer lease. We can do this only by refusing to participate in tax-advantaged leasebacks that give investors control over your leased equipment. Tax-advantaged leases allow for little or no flexibility!

We give you Hartford Computer Group. Want to lease computer equipment? Want to upgrade your computer equipment, renew your lease, or change your leased system completely? With no outside investors or participants to inhibit your transaction, Hartford Computer Group is free to offer the ultimate flexibility in customer service.

You deal with one company, before and after the lease begins, the real lessor... Hartford Computer Group!

Your questions about our unique computer leasing program are answered in our brochure. Write or call for your copy.

Hartford Computer Group **800 323 6355**

A Subsidiary of Hartford Financial Corporation
515 East Golf Road, Arlington Heights, IL 60005

or 312 364 0505

FOR SALE
3033-U16
ALL IBM MEMORY
AVAILABLE: MAY, 1984
WILL RECONFIGURE
ALL 3033 FEATURE UPGRADES
INCLUDING
S-U
AND
N-U
MODEL UPGRADES
CONTACT: DALE HAUGEN
MAJOR COMPUTER INCORPORATED
10237 Yellow Circle Drive
Minnetonka, MN 55343
(612) 933-8800

Attention to Detail
All of Our IBM Equipment is Tested/Audited/Refurbished
WANTED
SERIES 1
Immediate Cash
Buy/Sell/Lease
XERXES COMPUTER SALES
1614 Harmon Place
Minneapolis, MN 55403
800/328-3884, 612/339-3042

IBM
3270

LEASE • PURCHASE • SELL

IBM SYSTEMS

- *Purchase-Lease Back*
- *Customized Leasing*
- *Upgrade Flexibility*
- *All models and peripherals*

612-941-0510

WINTHROP
FINANCIAL CORPORATION
computer sales & leasing division

6400 Flying Cloud Drive • Eden Prairie, Minnesota 55344 • 612/941-0510

No charge to tell the DG world
what equipment you have to sell or buy.

500,000 CONTACTS
800-843-2047
CPR:RESALE
800-858-2847 California
1830 Fourteenth Street
Santa Monica, CA 90404

WANTED TO BUY
DEC Equipment
VAX and PDP-11
Systems-Components-Peripherals
New or Used
Meadowlark Enterprises Inc.
Essex Street
Middleton, MA 01949
(617) 777-4666
dda

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

Pioneer Computer Marketing
214/343-2804

BUY - SELL
LEASE
- All IBM Systems
- Peripherals
- Tapes
- Disks

SERIES/1
- Systems
- Features
- Peripherals

SYSTEM 34
- CPU
- Peripherals
- Upgrades

PIONEER COMPUTER MARKETING
11446 Pagemill Road
Dallas, Texas 75243
214/343-2804

What makes Dataserv a world leader in the IBM marketplace?

Customer satisfaction.

Over 65% of Dataserv's business comes from previous customers or customer referrals.

dataserv

HP
1000
3000

TELEX 756027
encore
(213) 452-0117

IBM
Series/1 • S/34 • S/36
S/38 • 4300
5110 - 5120 • S/32
BUY • SELL • LEASE
All models, systems & peripherals AVAILABLE NOW!
Ask about our 72 hour upgrade
(408) 425-7333
SOURCE
DATA PRODUCTS, INC.

Digital Brokers, Inc.
P.O. Box 81488/Atlanta, Georgia 30366/(404) 441-8780

COMPANY PRESIDENT JIM MOORE
invites you to try our services.
We specialize in:

SALES • PURCHASE
BROKERAGE • LEASING

- Digital Equipment Corporation
- Plug Compatibles
- Depot Repair Center

★ ★ ★ ★ DEC ★ ★ ★ ★
BUY—SELL—LEASE—TRADE—CONSIGN
SYSTEMS — PROCESSORS — OPTIONS
PERIPHERAL — MODULES — MEMORY
— SPARES —
NATIONAL COMPUTER EXCHANGE
(800) 624-9299
600 North Lunar Avenue, Brea, CA 92621
TWX: 910-596-1499 (714) 990-5988

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

WE'RE NUMBER 1 FOR SERIES/1

Computer Options, Inc. is a major remarketer of both new and used IBM SERIES/1's and related peripherals. We offer your firm the option of purchase or a variety of custom leasing programs for your hardware acquisitions. Call us toll-free for more information.

AVAILABLE NOW FOR IMMEDIATE INSTALLATION

4955-F	4964-001
4955-E	4973-2
4959-A	4974-001
4962-2	4975-2L
4963-64A	1310

ALSO AVAILABLE-SYSTEMS 34 & 38

Call toll-free 800-328-5718

(In Minnesota, 612-544-9660)

COMPUTER OPTIONS, INC.
"the best option"
1660 South Highway 100
Minneapolis, MN 55416

FOR DEC CALL SCHERERS

BRAND NEW DEC MEMORY:

MS11-LD	256 KB	$1,400.
MS11-PB	One Meg	3,800.
MK11-CE	1/2 Meg 11/70	2,800.
MK11-CF	Meg 11/70	5,800.

One Meg NEW STYLE VAX:

MS730-CA	BRAND NEW	3,000.
MS750-CA		3,000.
MS780-FD		3,000.

"UPGRADE YOUR 11/750"
from old style 16K to NEW STYLE 64K
$6,500. with DEC's MS750-DA/DC
(with trade-in of old memory)

VT100-AA @ $1,295.

SCHERERS
6145 SCHERERS PLACE
DUBLIN, OHIO 43017
(614) 889-6616

SCHERERS

DISK DRIVES • CONTROLLERS • PERIPHERALS • MEDIA

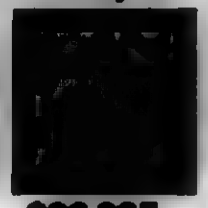
WANG • DEC

National authorized CDC OEM-Distributor (for Controllers and Media) offers *New Equipment*, fully warranted for 90 days:

$12,900
CDC Model 9762 (300 Mb.)
WANG Models 2200V-2, and 2200 (300 Mb.) DEC Model RM03 (333.1 Mb.)

$7,750
CDC Model 9766 (96 Mb.)
WANG Model 2200V-1 (76 Megabytes), DEC Model RM03 (67.1 Mb.)

$8,875
CDC Model 9448 (85 Mb.)
WANG Models 2200-3 (80.4 Mb.) WANG Models 2200 V-3, 2200 (80 Mb.) DEC Model RM03 7 (80.4 Mb.)



$20,825
CDC Model 9775 (675 Mb.)
WANG Model 2200 V-3 (640 Megabytes), DEC Model 3-RM03 5s (512.2 Mb.)

ERST

INTERNATIONAL CORPORATION
265 Lafayette Street, New York, NY 10012

ERST is the leading dealer in pre-owned WANG equipment—2200, VS, WP (CPUs, Terminals, IOPs, Controllers, Printers, Memory Upgrades).

Most times give us a call . . . Toll Free 1-800-FOR-ERST . . . In NY. 212-431-1100

3705

BUY • SELL • LEASE

Want to Buy
5291, 5251, 5256 Defective Planar Boards
$100 each
For Details Call
(915) 692-6141
Russell Sullivan
Computech

IBM SYSTEM **34**
Buy Sell **UPGRADES**
Lowest Prices
Call Collect:
404-252-7480
DATAMARC
6065 Roswell Rd.
Suite 320
Atlanta, GA. 30328
S/1
S/38

CITY OF SCOTTSDALE, ARIZONA

NORTEL AND VICTOR COMPUTER EQUIPMENT FOR SALE BY SEALED BIDS

Bid forms provided by the City. Bid opening 10 am (MST) April 27, 1984. For Sale: Nortel Model 585 Computer System with Communication Equipment and 3 Victor Model 5010 Printers. For more information contact John Conley, Purchasing Director, 3939 Civic Center Plaza, Scottsdale, AZ 85251. Phone (602) 994-7015.

USED DATAPOINT
(1) 4654 System
(2) 8605 Processors
(3) 8020 Processors
(3) 8200 Terminals
(1) 5500 Processor
General Data Processing, Inc.
3300 Main St., Ste. 204
Houston, TX 77002
(713) 523-6454

LEASING A LARGE COMPUTER?
Look for the best deal in the classified pages of *Computerworld*
Call
800-343-6474
(or 617-879-0700)

SALE CYBEREX UPS EQUIPMENT
(Uninterruptible Power System)

Two 75 KVA 415 HZ Units
One 150 KVA 60 HZ Unit

Used intermittently for less than two years
Vendor maintenance records available

Contact:
Mr. Terry Watkins, Director, Corporate Purchasing
THE SHERWIN-WILLIAMS COMPANY
101 Prospect Avenue • 1134 Midland Building
Cleveland, Ohio 44115 • Phone — 216/566-2261

We Buy & Sell
DEC
Systems
Components
Digital Computer Resale
call:713 445-0082
600 Kenrick Ste C22
Houston, Tx 77060

FIBEROPTIC MODEMS & MULTIPLEXERS
Special Pricing - Limited Qty
New Full 1 Yr Warranty
FM1, Async Fiberoptic Data Link. $995.
(DC to 19200bps)
FM1, Sync Fiberoptic Data Link. $995.
(16 Speeds to 2400bps)
FM2, Mux & Data Link,8 each Async, $1995.
DC to 2400bps Inputs)
Terminated Cables Available.
Contact: Bobbi Sokol
Goodall Data, Inc.
1919 S. Rand Ave.
Wheeling, IL 60090
(312) 541-0000

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

SYSTEMS
4341 4331
38 36 34
32 3
BUY • SELL • LEASE
COMPUTER BROKERS, INC.
2378 SHELBY ST.
MEMPHIS, TENNESSEE
CB
TOLL-FREE
800-238-6405
901-372-2622
PERIPHERALS
3203 3370
327X 3411
3350 3420
ASCO

IBM
5110 5120
3741 3742
DATAMASTER
1255 MICR
SYSTEMS
34 36 38 32 23
All Associated Peripherals
BUY SELL LEASE
• Printers • Display Stations
• Diskettes & Feature Add-ons
• Tapes/Tapes
• IBM Maintenance Considered
Call Today for Quotation
(615) 252-8565
SOUTHERN DATA SYSTEMS
Nashville, Tennessee

COMDISCO
commitment
excellence
IBM PROCESSORS IBM PERIPHERALS
Full Service

BUY · SELL · LEASE
SERIES-1
S/34 • S/36 • S/38
4300
S/23 S/32 5110-20
Tape-Disk-Printers-Tubes
AMCOM CORPORATION
5200 W 75RD ST - MINNEAPOLIS, MN 55435
(612)835-4737
CALL TOLL FREE
800-328-7723

BUY SELL LEASE
SYS/34 SYS/36
■ IMMEDIATE DELIVERY
■ GUARANTEED M/A
■ SHORT TERM RENTALS
■ PERIPHERALS
■ FEATURES-UPGRADES
MARION
84 KENNEDY STREET
HACKENSACK, N. J. 07602
(201) 343-4554
(203) 758-2409
(412) 864-6611

System/24 12MX/64MB Printer 3262_P30 8MB P/Mix Sale/Lease
Sale/Lease 4341's Models K, L, M - GRP 1 & 2 Lease Term - 1 Yr or Longer
Control Units 3880 - B13 3880 - D13 Avail. March 1984 Sale/Lease
Controllers 3880 3803 3274 3276 Immediate Delivery
DASD 3380 3375 3370 3350 3344 3310 Immediate Delivery
Tape Drives 3420 3430 3410 3800 Immediate Delivery
Display Stations 3278 3279 3178 3277 Immediate Delivery
Printers 4245 3262 3289 3211 1403 3262L 3800 3287 3820
Computer Marketing Inc
P.O. Box 262 Philadelphia PA 19105

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

Your Texas Computer Connection

Computer equipment at big savings.
Everything from PC's to Mainframes.
214/258-0541

MCC Metroplex Computer Company, Inc.
320 Decker Drive, Suite 180 • Irving, Texas 75038 • TLX 75-9774

PEARL HAS IBM SYSTEMS 34, 36, 38

and we have a large inventory of IBM 3741's, CPU's, CRT's and printers. We buy, sell, lease, rent and purchase/leaseback IBM Systems.

Call John Spight or Ken Warren
Pearl Computer Division
•P.O. Box 24026 •4717 Centennial Blvd.
Nashville, TN 37202 (615) 383-8703

DEC EQUIPMENT AT THE LOWEST PRICES-NATIONWIDE!!

CALL TOLL FREE 800-328-7000
In Minnesota (612) 894-4020 • TELEX 291084
MIDWEST SYSTEMS, INC.
13117 Riverwood Drive, Burnsville, Minnesota 55337
*A trademark of Digital Equipment Corporation
ddo

IBM UNIT RECORD EQUIPMENT

SALE OR LEASE

IBM UNIT RECORD MACHINES
026—029—082—083—084
085—087—088—129—514
519—548—557

NEW & USED
DISK PACKS—DATA MODULES
2316—3330(1)—3330(11)—3340(70)
MAG. TAPE-DISKETTES
Every Item Guaranteed

Highest Prices Paid for Used Packs & Modules

THOMAS COMPUTER CORPORATION

HUNTER

Your Full Service Computer Dealer

S/34 S/36 S/38	Series/1	3270's
— Call — RICHARD LORANG	• Systems Configured To Your Specs • All Features and Peripherals Available • Depot Repair Service — Call — JOHN BURLEW RANDY STONE	3277 • 3278 3274 • 3276 3271 • 3272 — Call — TERRY SMITH

DALLAS: 214 - 980-7243 • HOUSTON: 713 - 550-7356
OUTSIDE TEXAS TOLL FREE 800 - 527-6436
Houston, Texas 77084

ceres announces hardware made easy

- Easy to buy— most IBM products available immediately
- Easy to lease— FAS 13 Operating Leases IBM S/34, S/38, S/36, 4300, 308X
- Easy to rent— IBM 5224, 5225, 5291, 5251, 3278, 3178, 3279, 3287
- Easy to sell or trade in— best deals in town.

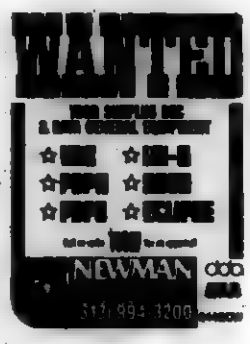
Come to Ceres for all your computer needs. Call (212) 279-4467 in New York; (713) 627-7117 in Houston.

Do it today.

ceres capital corporation

MEMBER AMERICAN SOCIETY OF COMPUTER DEALERS

WANTED



Wanted
RAYTHEON
PTS 1200 & 100
Disk Subsystems, Controllers, VDT's, etc.
DIABLO 44B DRIVES
(312) 953-1555
Dan Eremenchuk

Hardware, software, problems, people, pricing, ethics litigation, communication, macros, minis and micros.

We like to make an issue of it. EVERY WEEK.

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

IBM
SYSTEM/34
S/3 • S/32 • S/36
5291 • 5251
3741 • 3742

BUY • SELL • LEASE
REFURBISHED • RECONFIGURATED
SHORT-TERM LEASES
PURCHASE/LEASEBACK

Tennecom MARKETING INCORPORATED
210 SPACE PARK NORTH
P.O. BOX 240
GOODLETTSVILLE (NASHVILLE)
TENNESSEE 37072

800-422-1004
IN TENNESSEE CALL: (615) 859-2672

DSI
WE BUY SELL & LEASE!
BURROUGHS
Discover the DSI alternative.
800-641-5215
All equipment available immediately and guaranteed for Burroughs Maintenance.
DSI Serving the Burroughs Community Worldwide
2480 W. Alameda Ave., Denver, CO 80223 (303) 922 8331
TWX 910 931 0483

EL CAMINO RESOURCES LTD.
For Sale Now:
3178 C30 (HH)
3178 C40 (HH)
3274 A41 (2)
3274 D41 (2)
3278-02 (HH)
For Sale Soon:
4345-1 now
3211/3611 now
3203-05 4Q84 5Q84
3287-02 now
3262-2 30 days
Call: Mel Kleinman (818) 986-3411
4827 N. Sepulveda Blvd.
Sherman Oaks, CA 91403
We also buy equipment.

WANG WORD PROCESSORS
AT THOUSANDS OFF!
Guaranteed, remanufactured WPS 30, WPS 30 and Wangwriters available for immediate delivery. You don't pay a cent till Wang installs and places equipment under service contract. 15-day return privilege. Buy, Lease, Rent!
For Free info and fast response call toll-free:
1-800-321-2986
ELECTRONIC OFFICE EXCHANGE, INC.
Dept. SCICWD • Box 7337 • Ann Arbor, MI 48107

HOW TO SAVE $30,000 PER MONTH ON A 3083 LEASE.

Lease the same 3083 that IBM leases for over $92,000 per month from Randolph—for less than $62,000 per month. That adds up to savings of $1,440,000 over a four-year lease period. If you're renting an older machine, Randolph may save you even more—and you'll get about four times the throughput in the bargain.

WHEN IS THE BEST TIME TO TALK TO RANDOLPH ABOUT LEASING A 3083?
Now—because Randolph has 3083's available for 4th quarter delivery. But it's never too late, even if you already have a machine installed. Whatever your situation, we can tailor a lease that will fit your exact needs and let you start saving money right away.

TALK TO RANDOLPH NOW.
We can solve problems like these, and more . . .
Stuck with a lease on your old machine?
We'll sublease it, and provide a new lease on a 3083.
Own a 3083 but need cash?
Sell your machine to Randolph, and we'll lease it back to you.
Machine installed on a rental basis?
We'll show you how to end the lease and install a new 3083. Any termination charges can be folded into your new Randolph 3083 lease.

LEASING COMPUTERS IS OUR ONLY BUSINESS.
At Randolph, our people have an average of 18 years in the DP industry . . . from 360's to 3081's. They know all about alternative financing to be sure, but they also know their way around a DP department and the hardware in it.

WE LEASE MORE THAN 3083's.
Whatever your needs, now is the time to talk to Randolph. We provide leases for IBM 303X, 4300 and 3081 systems and peripherals—disks, tapes—as well as 3083's.

UNIQUE FINANCIAL STABILITY.
We're an important part of one of the nation's oldest and leading financial institutions . . . The First National Bank of Boston. 19 years in computer leasing gives added assurance that Randolph will continue as the leader in the computer leasing industry . . . continue to live up to the terms and conditions of our agreements . . . provide upgrades . . . fulfill all of our commitments.

LET RANDOLPH HELP YOU SAVE $30,000 PER MONTH.
We can solve a lot of problems for you, and save you money, too. Talk to Randolph now . . . call Joseph B. Kelly, Jr., Executive Vice President, 800-243-5307

537 Steamboat Road
Greenwich, Connecticut 06830
203 661-4200 • 800 243-5307

Randolph

A MEMBER OF COMPUTER DEALERS & LESSORS ASSOCIATION RANDOLPH COMPUTER CORPORATION A subsidiary of THE FIRST NATIONAL BANK OF BOSTON BANK OF BOSTON

ATTENTION TO DETAIL . . .
ALL OF OUR IBM EQUIPMENT IS:
Tested/Audited/Refurbished

SERIES 1 ✪ New or Used. CDC Peripherals—New or Used. Most I/O in Stock. Features Sold Separately: SYSTEM 34 ✪ 48 Hour Upgrades. CRT's and Printers in Stock. Any System—14 Day Delivery: SYSTEM 38 ✪ 581's in Stock. Memory, Communications, Tape, Disk, CRT's. SYSTEM 36 ✪ Trade In Your Sys/34 Operating Leases: 4300 ✪ 3380, 3370, 3420, 3350, 3375, 3430, 3278, 3276, 3274; 5110 ✪ S/23's and 5120's in Stock; P.O.S. ✪ 5265's a Specialty, Upgrades/Downgrades, Short-Term Leases. 3600/4700 ✪ Banking; LEASING ✪ Xerxes offers a complete range of financial services including leverage leases, operating leases and short-term rental; MAINTENANCE ✪ IBM maintenance at a discount. We use a combination of our engineers and ours—call for details. Attention to detail means smooth installation and full support.

XERXES COMPUTER SALES
1614 Harmon Place, Minneapolis, MN 55403
800/328-3884, 612/339-3042

You can get information on buying or leasing
IBM 34-36-38
as fast as you can dial
1/800/LEAS-PAK.
In Texas call 817/268-0023.
Up to 50% Savings
LPI
LEAS PAK INTERNATIONAL
P.O. Box 799 • Hurst, TX 76053 • 817/268-0023
Send for our free products and services brochure.
Name _____
Address _____
City _____ State _____ Zip _____
Phone _____
Leased System 36 Advertising duplicated and printed as such. We want to buy your unused or rental code equipment.

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

TexCom

WE BUY • SELL • LEASE

JOIN THE MANY FORTUNE 500 COMPANIES THAT UTILIZE IBM EQUIPMENT FROM TEXCOM... THE IBM SPECIALISTS

SERIES I

- All features and peripherals
- We buy, sell or trade
- Convenient leases available

1331 1311 • 1361 1381

- We buy, sell or lease
- Two, three, four year leases

WE'VE GOT IBM PERIPHERALS

3803	3380	3350	3211
3420	3880	3370	3811
3375	3340	3203	3262

IBM S/34 — 36 — 38

- All upgrades available now
- One, two, three year leases
- We'll take S/34 trade-ins.
- All models and peripherals

WE'VE GOT ALL IBM PRINTERS AND TERMINALS PLUS 3864 MODEMS NOW.

FOR SALE OR LEASE

IBM PC-XT'S
256K, COLOR MONITOR
AND GRAPHICS PRINTER.

Call Toll Free: 1-800-833-9119

SAN ANTONIO (512) 349-9955
MEMPHIS (901) 754-7055
HOUSTON (713) 690-8714

The nationwide market - a call away!

DEC/DG

SYSTEMS/PARTS/PERIPHERALS
NEW/USED/SURPLUS • DISCOUNT PRICES
Since 1977! Buy, Sell, Trade and Broker.

PHIL	BRYAN	JENNIFER
DG	11-VAX	8-LSI

CALL TODAY - (305) 392-2005
TELEX 568-670

thomas business systems, inc.
4301 Oak Circle - Unit 11 Boca Raton, Florida 33431

Buy - Sell - Lease

S/34
S/36
S/38

IBM 3741 3742

CPU's CRT's PRINTERS ALL MODELS

PURCHASE/LEASEBACK
SHORT & LONG TERM LEASES

Computer Marketing of America, Inc.
P.O. Box 71
610 Bryan Street
Old Hickory, Tennessee 37138

1-800-251-2670
In Tennessee: 615-847-4031

C.D. SMITH & ASSOCIATES, INC.
DEC computer systems & options
12805 East Freeway, Suite 318
Houston, Texas 77015
(713) 451-3112
TELEX 76-9547

DEC

WE ARE BUYING: VAX 11/780

WE ARE SELLING:

MS780-DC	5,000	TSV05-BA (New)	4,500
MS780-CA	7,000	11/44-FA	Call
MS780-DC	5,000	11/780-FA	Call
DW780-AA	9,500	11/780-KA	Call
RP11-Ap(new)	1,800	MS780-EC	35,575
DZ11-E	2,995	11/84A-Vp(new)	7,500

If you want on our Mailing List, call Valerie (713) 451-3112.

NPA

"Log on with NPA, we cover your DG computer needs from Coast to Coast"
SYSTEMS INC.

SPECIALIZING IN:
PURCHASE, SALE, TRADE,
LEASE, RENT
AND SERVICE OF
Data General
EQUIPMENT

FOR MORE INFORMATION CALL:
CALIFORNIA
516-457-2800 415-930-6353

ATTENTION TO DETAIL
ALL OF OUR IBM EQUIPMENT IS:
Tested/Audited/Refurbished

3101's
Immediate/New

Buy/Sell/Lease

XERXES COMPUTER SALES
1614 Harmon Place
Minneapolis, MN 55403
800/328-3884, 612/339-3042

FOR SALE
Perkin-Elmer
3250
With 2MB memory
8-Line Comm Mux
2 80mb discs
300 LPM printer
Reply to CW-B4597
Computerworld
Box 880
Framingham, MA 01701

HARTFORD COMPUTER GROUP, INC.

4381-P02
3279-02C

Ships July 6, 1984

For Sale or Lease

(312) 364-0505
Ask For Dan Jackson

CURIOUS
ABOUT
CLASSIFIED?

If you are interested in advertising with Computerworld, but don't know how to do it, give us a call! We will be glad to send you our current rate card, which explains sizes, costs, deadlines and requirements. All you have to do is ask! Our toll free number is 800-343-6474, in Massachusetts call (617)879-0700, just ask for the Classified Advertising Department. Or, you can look for our classified order form located in the classified section of Computerworld. Fill it out, attach your ad with a check, and return it to us. Computerworld Classified Advertising, 375 Cochituate Rd., Box 880, Framingham, MA 01701.

CMI

AMERICA'S LEADING SPECIALIST SERVING THE USED MARKET

Absecon, NJ (609) 646-7262
Boston, MA (617) 367-5755
Chicago, IL (312) 693-2780
Dallas, TX (214) 385-0606
Encino, CA (818) 788-0113
Houston, TX (713) 780-7468
Lebanon, TN (615) 449-6833
Miami, FL (305) 443-2966
Newport Beach, CA (714) 752-9442
New York, NY (212) 349-5718
Tampa, FL (813) 273-5026
Frankfurt, Germany Telex: 414861 LCO D
Montreal, Quebec (514) 871-1121
Nyon, Switzerland Telex: 27206 CMI CH
Paris, France Telex: 613910 CMI FR
Toronto, Ontario (416) 842-3065
(416) 863-9100
Vancouver, B.C. (604) 685-6196
Windsor, Ontario (519) 973-3910

CMI FINANCIAL SERVICES GROUP
2800 Telegraph Rd., P.O. Box 2026
Bloomfield Hills, MI 48303-2026
(313) 456-0000

CMI

A Torchmark Company
2800 Telegraph Rd., P.O. Box 2026
Bloomfield Hills, MI 48303-2026
TWX/TELEX: 810-232-1667 CMI CORP. TPMI
(313) 456-0000

3081-D16 Sale or Lease

3081-K24 Sale or Lease

For Sale/Lease **4361** 1st Quarter Delivery

3033 All Models

New **Series 1** with Basic Operating System "Unix" on the Series 1 IBM Master JAR

3350's Available Now/ On a Short Term Lease 3370 3375 3380

3880-A6 Available Now **4700** Banking Equipment Buy/Sell/Lease

3725 Lease Financing Available For your System or Ours 2,3,4 or 5 Year Terms

3800 LASER PRINTERS Model 1's Immediate Delivery Model 3's Lease Financing Available Any Term 3800-6 3211-1 & 3811-1 3262-6 4245-1

Tapes Immediate Delivery **3803-3420** Buy/Sell/Lease

Wanted **4341-M02 4341-L01** Call Now

3278, 3279 3277, 3276 Terminals All Models Immediate Availability

3705-3704 Available for Immediate Delivery Sale or Lease

SYSTEM 36 Model 7 & 8 Available Now New - Used **SYSTEM 38** 2, 3, 4 or 5 Year Terms Lower rates than IDC **5120's** Available Now - Sale or Lease

Series 1/O All IBM Peripherals Any Used Configuration CDC Rack/Removable Disks Tape Backup 9-track 800 CDC/Memorex/Peripherals IBM/Printers Buy/Sell/Lease

---

We've Got Your Number

S/34 ALL MODELS QUICK DELIVERIES

SERIES 1 CONFIGURED TO YOUR NEEDS

S/36 ATTRACTIVE LEASE RATES

S/38 NEW & USED MACHINES

5110/5120 NEW LOW PRICES

PERIPHERALS
CRT'S..PRINTERS..DISK..TAPE..MODEMS

CARLYN
COMPUTER SYSTEMS
9105-O Gerdelle Road Annandale, VA 22003
"CALL COLLECT" (703) 642-1950

DEC New and Used in Stock

COMPUTERS
Rainbow 100
DECmate I and II
Pro 350
Micro 11
WD 211
11/23 +
11/24
11/44

CRTS
VT101-AA VT102-AA
VT100-AA VT102-WA

PRINTERS
LA 34
LA 100
LQPSE

Command Data
PHONE 205/942-3155
Command Data Incorporated
165 West Valley Avenue
Suite 105
Birmingham, Alabama 35209

DEC

RENT • BUY • UPGRADE • SELL

PDP, 11/03, 11/04, 11/23, 11/24, 11/44, 11/70, VAX/730, VAX/750, VAX/780

SYSTEMS • OPTIONS • SUPPLIES

11/03	128KB, Dual RL02, DZ11-A, Dual H9642 (new)	$24,995
11/23+	256KB, Dual RL02, DZV11-C, VT102, Bootrom (new)	$16,999
11/70	512KB MOS, LA36 (new)	CALL
VAX/750	1MB, RM80, RL02, VT105 Console (new)	CALL

Customized Configurations—Call With Your Request.

In Stock		Specials		In Stock	
11/24-BC (new)	$11,399		DZ11-FB (new)	$4,195	
DZ11-A (unissued)	$ 495		DEC730-CA (new)	$4,195	
DEC730-AB (new)	$ 3,495		DEC730-BC (new)	$5,999	
DUP11-DA (new)	$ 595		DH750 (used)	$2,595	
DZ11-F (used)	$ 2,195		DEC11-EA (used)	$2,695	
H9642 (new)	$ 1,395		RL211-AK (new)	$5,499	
KT24 (new)	$ 795		RM80-AA (new)	Call	
LP11-WA (unissued)	$ 3,495		VT52-AA (new)	$ 495	

BROOKVALE
800-645-0067 NY (516) 273-7

EL CERRITO RESOURCES LTD.

offers:

For Sale
3350 A's B's (qty) now
3880-01 4/15/84
3370 A2/B2 10 days

Lease only
3380 AA4, B04 now
3880-03 now

Call: Mel Klebanoff
(818) 995-2411
4827 N. Sepulveda Blvd.
Sherman Oaks, CA 91403
We also buy equipment.

FORSYTHE McARTHUR ASSOCIATES, INC.

DEALER / LESSOR OF IBM
Computers and Peripherals
founded 1971

Home Office
Chicago
919 North Michigan Avenue
Chicago, Illinois 60611
312 943-3770

Branch Offices
Atlanta 404 953-9457
Milwaukee 414 765-0844

CDR

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

CW-1

SYSTEM/34
SYSTEM/36
SYSTEM/38
SERIES/1

SPECIAL!
Series 1 4957
w/1300 Feature at
40% List
Call Wayne Gardner

FIND IT FAST IN OUR FAMOUS COMPUTER MARKET ADVISOR
SEND US YOUR BUSINESS CARD AND WE WILL SEND YOU A FREE COPY.

ECONOCOM COMPUTER SALES, INC.
845 CROSSOVER LANE • P.O. BOX 34697 • MEMPHIS, TENNESSEE 38134 • 901-767-9130

ECONOCOM
• BUYS • SELLS
• LEASES
- QUICK DELIVERY
- COMPETITIVE PRICING
- FLEXIBLE FINANCING
- TRADE-INS ACCEPTED
- PROFESSIONAL SERVICE
- SHORT-TERM LEASING
- LONG-TERM LEASING
- PERIPHERAL LEASING
- TAKE-OUTS DONE
- MAINTENANCE GUARANTEE
- NEW OR USED

CALL TOLL FREE
800-238-3098

BUSINESS OPPORTUNITY

YOUR COMPANY PRESIDENT RESPECTFULLY REQUESTS THAT YOU IGNORE THIS AD.

You already know the frustrations inherent to your job. It's time you heard about the rewards.

Your expertise has put you in a position to take advantage of an opportunity that not too many people have in their lifetime.

To be your own boss. To call your own shots. To control your own future.

And that's what we're offering you at The Software Place.

Perhaps the finest retail source of business and personal software now expanding in selected markets across the nation, The Software Place is part of a segment that analysts project will more than double in sales each year to $2.9 billion by 1988.

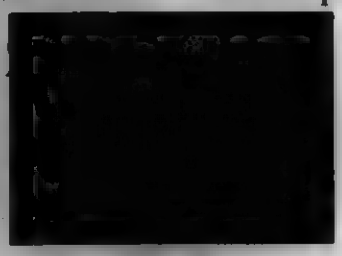
And you can be a part of it as an owner/manager of your own store.

Franchise opportunities are now available to qualified individuals with $50,000 liquid capital and the ability to obtain $110,000 additional financing.

In return, you'll receive one of the most comprehensive franchise programs in the industry. A program that analyzes your market area to determine the most advantageous site for your Software Place store and then goes on to take you through store opening and beyond. Including ongoing technical support that continues throughout the life of the store.

Give us a call. If you meet the requisites outlined in this ad, we'll send you our complete information package, including our videotaped presentation.

We think you'll find that it contains a wealth of information.



THE SOFTWARE PLACE™

8701 North MoPac Blvd, Suite 165 Austin, Texas 78759 512 343-0414

DATA GENERAL

Hanson Data Systems

REAL ESTATE

REACH THE REAL ESTATE APPRAISER/ANALYST FOR JUST $700

Print contact with 15000 professionals and one-on-one sales contact with 1000 at our annual Conference. The profession's only marketing package

SOCIETY OF REAL ESTATE APPRAISERS
Call Daryl McDonough
1-800-331-7732
(In Illinois
312-346-7422)

COMPUTERWORLD

COMPUTERWORLD's paid circulation climbed to over 125,000 this spring. Folio 400 (Folio Magazine's study of trade publication performance) placed us first in total revenue. As the industry grows, so will COMPUTERWORLD. It will continue to offer the high quality news coverage and editorial content that has attracted its readers. What does that mean to you, our advertisers? Good news...in the form of wide exposure.

The Classified section of the newspaper is laid out in an attractive format and is easy to read. It offers classifications to solve a variety of problems: Position Announcements, Positions Wanted, Buy - Sell - Swap, Software for Sale, Software Wanted, Time & Services, Real Estate, Publications, Bids & Proposals, Auctions, Seminars & Conferences.

Our BULLETIN BOARD section is ideal for the smaller companies who want a low-cost way to sell pieces of equipment (hardware or software). The BULLETIN BOARD is laid out as a quick reference for potential buyers who know what they are after.

So, as a nationwide publication, we give you the exposure you want. As a weekly publication, we give you the immediacy your advertisements need.

A number of special issues of COMPUTERWORLD are scheduled to run in 1984. Each of these issues will feature one aspect of the computer industry and give our advertisers a chance to reach a more-select audience. These are the topics the issues will cover:

- April 30 - Micros in Big Business
- May 28 - Software Productivity
- June 25 - Graphics Systems
- July 2, 9, 16 - NCC Issues
- August 27 - Minis & Small Business Systems
- September 24 - Data Base Management Systems
- October 29 - Protecting the Corporate Information Resource
- November 26 - Data Communications Terminals

COMPUTERWORLD publishes every Monday with an ad deadline of 10 days prior to each issue date. You may send in copy to be pubset or camera-ready material (velox or negative) via the mail. We provide telecopier service and will also take ads over the phone.

Information concerning classified advertising rates, color costs, ad sizes, mechanical specifications along with more detailed information on the special issues is contained in the 1984 Rate Card #19 and Media Kit.

Our mailing address is COMPUTERWORLD, Classified Advertising, 375 Cochituate Road, Box 880, Framingham, MA 01701. Or call for more information at 1-800-343-6474 or, in Massachusetts, (617) 879-0700.

The Bulletin Board

DEC

DEC BARGAINS

11/84A CPU Sys	$1,595
11/44 KE44-A "Cab"	$2,575
4A-C3780 System Kit	$6,200
BDV11-AA	$495
DR780-AA	$6,400
DZ11 MUX, Brd.	$1,125
DZ32-A	$2,175
DZ32-S	$1,870
FP11A	$1,195
IGX11-A	$1,795
IGX11-S	$2,675
KW11-W	$495
MS11-MB	$1,175
MS780-DC	$4,000
MSV11-PK	$875
MSV11-PL	$1,275
RLV11	$875
VAX 1MB MS780-CA	$2,995
VAX 1MB MS780-CA	$2,595

Call Ray
at OEI, Inc.
(617) 275-6900

DEC NEW & USED

BUY — SELL — EXCHANGE

Systems • Processors • Memory
Options • Peripherals • Modules

11/44-CA	$21,000.
11/70	CALL
DH11-AD	$2,700.
DZ11-B	$1,200.
MS11-MB	$1,150.
RL211-AK	$3,800.
RL02-AK	$1,800.
RP06-AA	$9,750.

LAKEWOOD COMPUTER CORP.
8954 Eller St., Suite Elmo, CA 92000
(408)280-2545

DEC EQUIPMENT FOR SALE

(6) RK07-FA Disk Drives in Cabinets with Controller in Dedicated Back Plane and Cables. (1) TS11-CA 1600 BPI Tape Drive in 6 Foot Cabinet with Controller, Cables and Unibus to Serial Interface Board. (22) DEC RK07 Disk Packs, 5 of which are error free. All equipment is approximately 4 years old and has been maintained under DEC service. The equipment will be de-installed by DEC and will be available in late April 1984. Send written proposal by April 27, 1984 to: Pocono Valley Storage Commissioning, Data Processing Department, 200 Wilson Ave., Newton, NJ 07860, Attn: Wm. Bass Simmons, (201) 344-1600 Ext. 370.

DEC

DEC & PRIME SPECIALS

- MS780-PD Avail Now $3,900
- MS780-E 64K Chip Memory Upgrade Kit $18,900
- 1124-DA New $24,800
- VT101-AA New $675
- RM80-AA $6,800
- PDP 11/70 CPU Core Memory KB11-C* $25,000
- RM03-AA New $5,500
- MS780 $3,395
- CDC 9766 300MB $8,900
- Dataprinter 1000LPM Band Printer $3,900
- VAX 780 1/4MB M8210 $749
- LP14-DA $6,900
- LA36 Unused $800
- Prime Computer Systems Available Upon Request
- Emulex Controllers Available

SEVCO INC.
(617) 435-6638
(617) 435-5331

We Buy and Sell DEC Systems and Components. Wanted: VAX and 11/70 Processors.

Alphabyte
650 S. State College Blvd.
Fullerton, CA 92631
(714) 680-6511

DEC VAX 11/780 SYSTEM
For Sale
Corporate DP Consolidation Allows For Sale of Excess Equipment. Includes: 4 MB Memory, Floating PT., 2 RP07 Disks, 1 REM03 Disk, 1 RM03 Disk, 2 TU78 Tape Drives, 4 DZ11-E 16 Channel MUX. Also Have VT100 CRTs And LA120 Printers. Will Sell as Pkg. or Separated. Contact: Jim Sheen at (213) 726-6223.

J-11's Available
Immediate Delivery
Turnkey O-Bus Systems
Various Configurations
All DEC Parts
- Micro-J-11's w/Winchester/Floppy
- J-11's w/RL02's

Inquire Price
M. E. C. Systems, Inc.
(617) 449-6189

DEC 11/03 System

With 32KB, RXV11-BA, Cabinet, LA36 Printer, $1,975

Call Ray
(617) 275-6900

DEC

BUY • SELL • TRADE

1170 Sys	LA36/DA	RH70
RL11-AK	MS780	RX02-AA
DSC11	MS750	RX02-C
DR11-B	MS11-MB	RP04/5-C
DZ11-E	MS11-CE	RP06-F
DE11-E	RK05	TE16 Mag.

NEW YORK COMPUTER EXCHANGE
(516)752-0555 (800)645-6188

BASIC FOUR

/BUY/ /SELL/ /LEASE/ /TRADE/

BASIC FOUR

- 510, 540, 720 Complete or Parts
- Printers, VDT, etc. B/U and Non B/U
- PRIME 400 B4000 with 8000+

MPS
(305) 473-6100 (800) 971-6110

HONEYWELL

LEVEL 6 & DPS 6 EQUIPMENT
Refurbished Like Printers

PRS1108 240 LPM, 60 Char	$4,125.
PRS1104 300 LPM, 64 Char	$4,725.
PRS1108 600 LPM, 64 Char	$5,995.

New (Never Used) Disk Drives
CDC 9114 10MB
(SF & SR) CMD $3,500 Ea.
Boudreau Computer Services Ltd.
(617) 329-4000

SPERRY UNIVAC

SALE OR LEASE NOW
UNIVAC 90-4

With (2) 2994 Disks, (6) 3690 Work Stations, (2) 8211U-10 Tape Units, and (1) 640LPM Printer.
Will Sell as Separate Units
Contact Lee Koontz
(612) 447-2888

HEWLETT PACKARD

HP3000

BUYBUYBUYBUYBUY
SELLSELLSELLSELL
RENTRENTRENTRENT
LEASELEASELEASE
HP3000/HP3000/HP3000

Complete Systems
Processors • Peripherals • Parts

ConAm Corporation
Santa Monica, California
(213) 458-2843 (800) 843-4664

Buy-Sell-Lease
HP3000 3X, III, 4X
and related peripherals
Call Carol
CSU INDUSTRIES, Inc.
516-239-4310

HP/USED
3021 A- 8MB
3000 S1000
3040 A 8MB
W/Dual Controller
7221 C 60MB

Data Remarketers, Inc.
Bob von der Linde (800) 227-3288
Steven Bonner (914) 621-0200

HEWLETT PACKARD

HP/NEW
30% Off List
7221 C Plotter
9872 C Plotter
2631 B Printer
& Associated Hardware
2382 A CRT

Data Remarketers, Inc.
Bob von der Linde (800) 227-3288
Steven Bonner (914) 621-0200

MISC.

BUY - SELL - LEASE
DATAPOINT
HARDWARE & SOFTWARE
•Turnkey Systems •PAMS Software
On-Line Accounting
(713) 529-6613

Buy • Sell • Lease
•Short Term Rentals•
DATAPOINT

FOR SALE
4200 MSI System
8200 128K Processor
8200 CRTs
5201 Disk Expansion
5600 300LPM Printer
5275 Disk Expansion
5601 128K Processors
5604 Tape Drives
8402 Multiports
Plus Misc. Memory Boards

AVAIL IMMEDIATELY
Cougar Computer Corp.
(216) 261-3600

PRINTRONIX
For Sale

P300	$2500.
P600	$5500.

Under Maintenance
Available Now
ASCOM CORP.
800-328-7722

NEW & USED
RAISED FLOORING

Install, etc. & quality install.
Serving US, Europe & Scandinavia

Related Computer Floors, Inc.
6 Sheffield Street
Wanaque, NJ 07675
(201) 835-8888, TLX 9104970

IBM

SYSTEM/34 SALE

*** CPUs ***

5340-C20	$9,500
5340-C30	$9,900
5340-D01	$12,200
5340-B06	$16,500
5340-F07	$27,000

*** Printers ***

5211-002	$4,500
5256-001	$12,000

*** CRTs ***

5251-011	$1,800

Also Available All Disk and Feature Upgrades. System 23's Available. Trade In Your System 34.

(212) 279-1717

SYSTEM 36's

Available Now
With Our Total Solution Accounting Software and Financing Arrangements.
Executive Technology Data Systems
Dallas, TX
(214) 386-1888
Detroit, MI
(313) 885-8770
Westboro, MA
(800) 271-6880
Reading, PA
(215) 376-6770
Trumbull, CT
(203) 377-8887

IBM

For Sale
IBM SERIES I
COMPUTER SYSTEM AND ACCESSORIES
(1) 4967 Bisynch Port
(1) 4966 I/O Expansion Unit
(1) 4966 Processor
(1) 4966 Diskette Unit
(1) 4966 8MB Primary Disk Unit
(2) 4974 Printer
(2) 4966 Face Stands
(1) 4973 Line Printer 160Print Unit
(1) 4978 Display Station W/Keyboard
(1) 3101 CRT W/Keyboard
Open 8M - Make Offer
National Pacific Corp.
19168 Beach Blvd.
Huntington Beach, CA 92647
(714) 841-8210 (800) 854-1084

PRINT TRAINS

IBM 1416 & 3216
Bought - Sold - Lease
Repaired - Reconditioned
COMPU-ACT COMPANY, INC.
(913) 888-6661

Buy • Sell • Lease
IBM

Cougar Computer Corp.
Suite 219
35000 Euclid Office Plaza
Euclid, OH 44132
(216) 261-3600

4341-L10

W/1870, 4MB
Now $75,000.
Or Best Offer
Call (214) 991-2911

Buy .....Sell..... Lease
IBM MICR
3890 - 1419
1255 - 3694
(818) 703-4664

Fox Computer Sales, Inc.
Buy - Sell - Rent - Lease
Datapoint - IBM
Telestype
W.T.B.: Used Equipment
196 Alpha Drive
Cleveland, OH 44143
(216) 449-6366

SYSTEM/36 LEASES

A12	$830./mo.
A22	$1,045./mo.
B23	$1,460./mo.

Immed. Del. - Flex. Terms
1-800-531-5962
(512) 822-8582 in Texas

For Sale
3803-2 (1)
3420-6 DD (2)
Mid May
S/34-D23 New
4341-L1 Juma
Call Toshi
(201) 569-6123

For Sale
3211-1
3811-1
May
Call Toshi Ando
(201) 569-6123

FOR SALE
IBM SYSTEM 34
5340 Processor Model D01 10K (6MB Disk With 1116, 5811, 5880 and 3781.
5211/002 300 LPM Printer
5251/11 Display Station
Under IBM Maintenance
No Brokers Please
Larry J. Moser
Imperial Oil Corp.
419/873-8711

SALE/LEASE
$/36
B23 & B24
Call Ron Gibb
(914) 238-8631

IBM

SALE/LEASE
4331-L2
3262-1
Available Now
FOB Colorado
Call Bill Hagan
(914) 896-8501

IBM 3375-A1

City of Tacoma is accepting bids through April 1984 on an IBM 3375-A1 Disk Storage Unit. Call RW Burns, Purchasing Manager (206) 696-8248.

IBM SYSTEM 23

5322 64K-2D Processor
5242 Matrix Printer
Immediately Available
$6,500.
(215) 687-4661

AUTOMATE DOCUMENTATION

Easy to use software package. Provides accurate record layouts. Call for free info pack.

(310) 398-6668

IBM EQUIPMENT FOR SALE
Available Immediately

2Ea. 5251-11 With Cable Thru	$1,875
2 Ea. 5251-12 Single Cluster	$4,500
3 Ea. 5262 001 Printer	$12,000
3 Ea. 5256 Mod 3 Printer	$3,000
System 34 Model C23	$6,000

Guaranteed For IBM Maintenance
(713) 530-6600
Add On Pat Mahajan

For Sale
IBM SYSTEM 34's
Any Model or Configuration
Disk and Memory Upgrades
Available Within 30 Days
Eligible For IBM Maintenance
Call Pat
(312) 882-2311 ext. 8

4361-P2 5253-013
4341-L2/M2 7113-001
5361-003 Complete System Rev

Syscomp
(813) 799-4318

IBM 4341-M02

with 3278-A02, 8MB
Avail. early May 1984
$185,000
Call Norman Lansing at
(203) 926-2166

WANG

Recent...
WANG USERS.....
HAVE YOU HEARD ABOUT THE GROUP OF FORMER WANG EMPLOYEES IN ATLANTA WHO BUY & SELL USED WANG EQUIPMENT AND PLUG COMPATIBLES?
LC.A. (404) 977-4366 or
1-800-241-3189

For Sale By Owner
WANG VS-60
256K 3 Workstations
90Meg & 75 Meg Drives
1600 bpi tape 600 lpm printer
TC IOP. Archiving WK Stn
Call Rita at (216) 666-6300

IMMEDIATE DELIVERY
ON WANG PC
20 MB F/R DISK
In Stock - Ready To Ship
Call Ylptema Corp.
(201) 575-5722

ORDER FORM
COMPUTERWORLD BULLETIN BOARD

Issue Date(s): Ads can be accepted up until the Monday preceding the issue desired. Computerworld comes out every Monday.

Classifications: Most ads will be classified according to the brand of equipment that is being bought or sold. These classifications include Burroughs, Data General, Digital/DEC, Hewlett Packard, Honeywell, IBM, NCR, Sperry Univac, Software, Terminals, Misc. Systems and Miscellaneous.

Copy: Copy sent in via the mail or telecopier (telecopier extensions are 410 and 451) should be clearly typewritten. Ads may be given over the phone to our team of ad takers. The standard size is 1 column by 1 inch deep. These units may be combined to form larger sized ads. Describe the equipment very briefly, give the price and the name of the person to contact. All ads will be set up using a standard format. No borders or logos are allowed.

Cost: The price for each standard unit is $180.00 (One unit minimum and no fractional units allowed.) There are no agency commissions and no quantity discounts.

Billing: Once you've written your ad, send (or call) it in with your name and address for billing purposes and we'll run it. (If your company has never advertised with us before, we request a check with your order.)

Issue Date(s): _____
Signature: _____
Name: _____
Title: _____
Company: _____
Address: _____
Telephone: _____

Send this form to:
COMPUTERWORLD BULLETIN BOARD
375 Cochituate Road, Box 880,
Framingham, MA 01701
617-879-0700 800-343-6474

The Bulletin Board

DATA GENERAL

Desktop Generation

16, 32, 32 Installation Delivery
Systems, Software, Service
Desktop Management
(617) 237-0432

DG ECLIPSE C/350

40 Meg Disk Plus
Diskette Drive
300LPM Printer and
4 Workstations
Call Bob Broadbent
(512) 255-0000

MISC. SYSTEMS

FOR SALE BY OWNER
COMPLETE IV-PHASE IV-60 SYSTEM
AVAILABLE NOW
WITH 7 TERMINALS, 67 MB DMD7
2 PRINTERS, COMMUNICATIONS
401-375-3000
JOHN SOBIERT

FOUR PHASE SYSTEM
Model IV/70
Includes: 1600 BPI Tape Drive, 8121
Character Printer, 5 Terminals,
13.8MB, 50K.
$30,000 or Best Offer
A & M Data Mfrg
(201) 000-0000 or
(201) 000-0000

BURROUGHS

BUY SELL LEASE
All Systems & Peripherals
AVAILABLE
• B1955 Sys • B1965 Sys
• B80s • B900s
(Configured To Your Specs.)
• Wizard 300 Terminals
• 600 Terminals model 100 & 110
• TD830s, MT983s, 5470/80s
• 300 & 307 Style Disk Drives
• Various Tape Sub-systems
• Memory Upgrades
• Printers 9260 & 9040 Styles
Guaranteed Burroughs Maint.
Depot Maintenance Available
COMPUTER PROVISIONS
(216) 248-7278
(Member ISDA)

BURROUGHS

BUY • SELL • LEASE
B1700 • B1800 • B1900
(Custom Config. Install. Avail.)
B80 through B7900
808/807/2200/825 Disk
9484/9347/40 Printers
Mag Tape Subsystems
TD830 • MT983 • 5FD • Datasaver
TU/DC/CP/TT Terminals
Installation & DEPOT M/A Available
MFP Corp. (516) 379-1166

Your ad can be here for $130

PRIME

PRIME
LARGE SELECTION
OF USED PRIME
COMPUTER SYSTEMS
...SAVINGS TO 50%
Peripherals also available:
Memories-Disk Drives-Controllers
Modems-Terminals-Printers
1st SOLUTIONS
...Your Ultimate Source
A DATAMATION SERVICES, INC., COMPANY
2001 EAST CAMPBELL AVE.
PHOENIX, ARIZONA 85016
(602) 957-0566
ASK FOR DON OR MATT

PRIME

PRIME
550-II, Processors, with 1MB memory,
16 bit AMLC, 32bit mmacs, upshift
connectors.
4450, 50 MB disk drives
4472, 300 MB disk drives
1600/6250 tape drives
PT-45 and Terminals 600 VDTs
Contact: Carl King (516) 549-2911

Call to place your ad today
(800) 343-6474
(617) 879-0700

SOFTWARE FOR SALE

AT AT&T, WE TEACH UNIX™ OPERATING SYSTEMS AS IF WE INVENTED THEM.

Announcing training from the creators of the UNIX Operating Systems.

Now everyone can get top quality UNIX Operating Systems training, from the people who created them—AT&T Bell Laboratories. Along with our certified instructors, we offer a complete curriculum for UNIX Operating Systems, including UNIX System V.

These courses are the same as those conducted internally at AT&T Bell Laboratories. And we furnish them at your location or at one of our conveniently located centers: Princeton, NJ; Chicago, IL; Columbus, OH; and Sunnyvale, CA.

We provide an individual terminal for each student. And in the evening, the use of our facilities and terminals is available at no extra cost. In addition, volume discounts are available.

All UNIX Operating Systems courses are designed and developed to high quality standards by AT&T, as part of a total commitment to UNIX Operating Systems support. Now with our training, you can learn firsthand, what everyone else has been teaching secondhand.

For information, call us at 800-221-1647 or write to AT&T, P.O. Box 2000, Hopewell, NJ 08525.

AT&T

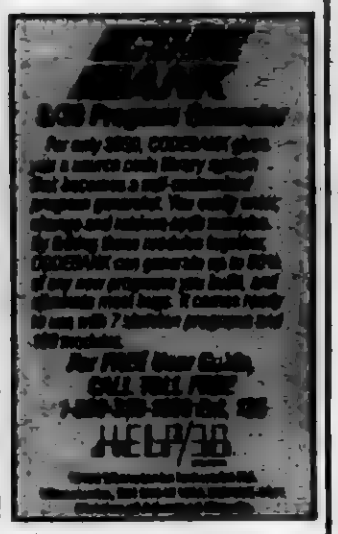
© 1983 AT&T Technologies, Inc.

More IBM System/38 Users Are Choosing RTC Systems.

For technically superior software in a wide range of Financial, Manufacturing, Distribution and Management Business Systems.

The International Software Developers.

RTC Systems, Inc.
49 Plain Street
North Attleboro, MA 02760
(617) 695-5008



RT/1 TERMINAL RESPONSE TIME MONITOR for your EDX

IBM SERIES/1

Track & Report Response Time by Terminal, Program, Time-of-Day.
Easy to Install & use.
Printed & Graphics Reports
Call or write:
H & A Computer Systems
30 Hotaling Place #204
San Francisco, CA 94111
(415)434-3617

SERIES/1 SPECIALISTS

COMPUTERWORLD CLASSIFIEDS WORK!

It's easy to advertise in COMPUTERWORLD. If you don't have an advertising agency to supply us with copy, layout and order, or camera ready mechanical, stat or film negative of your ad, just call one of our ad-takers at 1-800-343-6474. They will be glad to take your ad and typeset it in available fonts at no extra charge. If you have lengthy ads that require logos and artwork, just send a clean typewritten copy of your ad to the classified advertising department at COMPUTERWORLD (telecopier service is available); note the ad size you want; and, if you want your company logo to appear in your ad, please be sure to include a camera-ready copy with your insertion order. You should also supply any special borders, headlines and artwork that you want in your ad. Our Art Department will follow your suggested layout as closely as possible if you wish to send one.

Ad closing is every Friday, 6 working days prior to issue date.

Rates: Open rate is $128.10 per column inch. Columns are 2" wide. Minimum ad size is 2 column inches (1 column wide by 2 inches deep), and costs $256.20 per insertion. Additional space is available in half inch increments. Some sample sizes and costs are shown.

1 col X 4" - $ 512.40
2 cols X 4" -$1024.80
2 cols X 5" -$1281.00
2 cols X 8" -$2049.60

Discounts are available when you run more than 35 column inches of advertising in a year anywhere in Computerworld. Box Numbers are available, $15 per insertion.

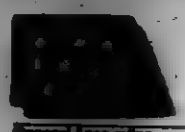
To reserve space for your ad, or if you'd like more information on Classified advertising in COMPUTERWORLD, call our office nearest you.

Boston - (617) 879-0700
or (800) 343-6474
New York - (201) 967-1330
Chicago - (312) 827-4433
San Francisco - (415) 421-7330
Los Angeles - (714) 556-6400
Atlanta - (404) 394-0758

TELECOPIER SERVICE - (617) 879-0700 or (800) 343-6474 ext. 451 or 410

Cynthia J. Delany, Classified Operations Manager

SOFTWARE FOR SALE | SOFTWARE FOR SALE | SOFTWARE FOR SALE | SOFTWARE FOR SALE | SOFTWARE FOR SALE



Elegant Software

for IBM S/34, 36 and 38

General Accounting	Payroll/Personnel
Financial Reporting	Property & Equipment
Accounts Receivable	Report Writer
Accounts Payable	Oil & Gas
Order Processing	All Systems are:
Inventory Management	RPG II/RPG III
Sales Analysis	Data Base
Job Cost	Interactive

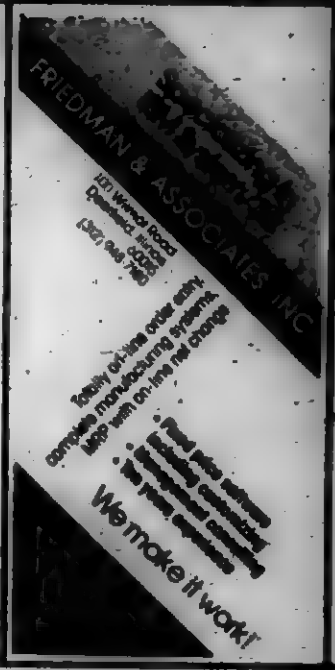
J.D. Edwards & Company

4940 South Syracuse Street/Suite 5000
Denver, CO 80237
303/770-3722

Dallas — 214/ 490-9636
Houston — 713/ 880-8276
Northern California — 415/ 957-7764
Southern California — 714/751-5802

SELL YOUR SOFTWARE IN THE CLASSIFIED PAGES OF COMPUTERWORLD

Call 800-343-6474 (or 617-879-0700) for more information



SOFTWARE CONVERSION SOLUTIONS

Datawork provides the software translation system for your complex conversion problems. Over 10 years of conversion experience has resulted in thousands of satisfied customers, worldwide.

- [illegible] to [illegible]
- [illegible]/SPG to [illegible]
- [illegible]/Trans to [illegible]
- DAL/DAS to [illegible]
- DOS/DAS to DS/DAS
- PL/I to [illegible]
- SPG/SPG II to [illegible]
- SPG/SPG II to PL/I

Datawork offers services & software to meet your needs. For more information, call or write today.

The Conversion Software People

DATAWORK, INC.

2066 Elmwood Avenue
Buffalo, New York 14207
Phone (716) 876-8732
TELEX: 91510

EQUIP YOURSELF IN THE CLASSIFIED PAGES OF COMPUTERWORLD

Need general accounting software for IBM System/38?

We've simply solved your problem.

LAWSON ASSOCIATES has solved it with the first general accounting software specifically designed for IBM System/38. Not merely compatible, but state-of-the-art to fully utilize your computer's capabilities. Compare. You won't find a total software solution like it anywhere else.

DESIGN FEATURES: They include: on line systems using data base management; menu driven, user friendly programs written in RPGII, the System/38 language; and integrated modules. Their benefits: ease of installation and use, plus maximum employee productivity.

INTEGRATED MODULES: Those available include: General Ledger and Report Writer/Accounts Payable/Accounts Receivable/Fixed Assets/Payroll/Personnel/Purchase Order/Order Entry/Inventory Control

SERVICE FEATURES: Fully documented and supported. Onsite training and implementation. One year warranty. Available now for immediate installation.

For more information, please call or write:
Lawson Associates, 2021 East Hennepin Ave., Minneapolis, MN 55413
(612) 379-2633

LAWSON ASSOCIATES
WE SIMPLY SOLVE PROBLEMS

TIME & SERVICES

COMPUTER TIME RENTAL

IBM 4331
DOS/VSE - ICCS
All Shifts Available
3370 Disk, 3420 Tape
Dual/Density
1403-N1,
3540 Reader/Punch
Reasonable Rates
Contact: Al Petro
Paratransit Data Services
(212) 997-1411

VAX 11/780 AND PDP-11 DEVELOPMENT TIME

NO KILOCORE TICK CHARGES / NO CPU CHARGES

Omnicomputer

$7/$14

RSTS/E VMS

PER HOUR CONNECT TIME

BUDGET BYTES™ 212-944-9238

Omnicomputer, Inc.
1430 Broadway, New York, N.Y. 10018

COMPUTER TIME & TIMESHARING

- We are time brokers.
- IBM timesharing our specialty.
- Also RJE & batch time.

Call John Rudder at Computer Reserves, Inc.
(201) 939-5700

VAX TIME

VAX 11/750 VMS

Available Nationwide Via Tymnet/Our Network Or Yours

- FORTRAN, Datastreve, PMS, Macro
- Polytransfer Communications With Your Micro
- Off Line Printing
- Disk/Tape Storage
- Systems, Programming & Customer Service Available
- VAX Conversion Assistance

$14. PER HOUR CONNECT TIME

Port Leasing With 10 Mb Disk $800. Per Month

I C S

1-800-237-8133

ICOTECH
Innovative Computer Techniques

COMPUTER SERVICES
IBM 3081 DEC-10

- Remote Job Entry
- Batch Processing
- Optical Mark Reading
- Online Processing
- Timesharing
- Laser Printing

COMPUTER OUTPUT MICROFILM

- Datagraphix Mini Auto-Cams
- Datagraphix Quickmaster
- 3850 MPI Capability
- Free Testing

Route 202
Raritan, NJ 08869
201-534-6153
Contact: Joyce Bagavelos

*Sperry 1100/80 Center
*Maddox *UNIS
*TIP/ICMS *DMS/DPS
Time Sharing

On-Line Manufacturing Systems
On-Line Financial Systems
"Hot Site" Back-Up Service
Peak-Load & Direct Mail Processing
Contact: Mr. Lloyd Sousa
(215) 887-4180

SDS
STANDARD DATA SERVICES inc.
771 Fifth Avenue
King of Prussia, PA 19406

VAX/VMS TIMESHARE

5c

$2 PER HOUR CONNECT TIME
ONE MB DISK STORAGE INCLUDED
AVAILABLE NATIONWIDE
VIA TELENET
LEASE-A-PORT™ WITH 10 MB DISK
& NO CPU OR CONNECT CHARGES
FOR $800 PER MONTH

MIDCOM CORPORATION
(714) 557-3011
(213) 516-6550
(714) 558-8270

DIGITAL COMPUTER REPAIRS

DEC-DG-IBM PC
ALL BOARDS
1-2 WEEK TURNAROUND
90 DAY WARRANTY
MEMORIES
POWER SUPPLIES
ANY MANUFACTURER

DATA CENTER SERVICES

BURNS

NORWOOD COMPUTER SERVICES

Franklin Square, New York
4341 DOS/VSE - DOS/VSE/VM/MS

- Computer Time - All Shifts
  Batch or CICS
  Technical Support Available
- Consulting Services
  Specializing in CICS Applications
- Communication Network
  Satellite and Telex Link

Contact Hank Pacitelli
(516) 352-1947

Rent Terminals or Time

In the Classified Pages of Computerworld.

Call 800-343-6474 (or 617-879-0700) for more information

COMMERCIAL DATA PROCESSING

4341-2 370/138-2

OS-DOS-VM/CMS
CICS-ROSCOE
REMOTE JOB ENTRY
CICS DEVELOPMENT
CUSTOMIZED SOFTWARE
XEROX LASER PRINTING

Contact Greg Gomb
(201) 777-3464

15 MINUTES FROM LINCOLN TUNNEL
ONE PASSAIC STREET
WOOD RIDGE, N.J. 07075

CLASSIFIED ADVERTISING ORDER FORM

Computerworld's Classifieds work.

Issue Dates: Ad closing is every Friday, 10 days prior to issue date.

Deadlines: Please be sure to specify the section you want: Time and Services, Software for Sale, Position Announcements and Buy/Sell/Swap. (Available upon request: Software Wanted, Business Opportunities and Real Estate).

Copy: We'll typeset your ad at no extra charge. Please attach CLEAN typewritten copy. Figure about 35 words to a column inch, not including headlines.

Cost: Our rates are $126.10 per column inch. (A column is 2" wide.) Minimum size is two column inches (2" wide by 2" deep) and costs $252.20 per insertion. Extra space is available in half-inch increments and costs $64.05. Box numbers are $15.00 extra.

Billing: If you're a first-time advertiser, (or if you have not established an account with us.) WE MUST HAVE YOUR PAYMENT IN ADVANCE.

Ad size desired: _____ columns wide by _____ inches deep.

Issue Date(s): _____

Section: _____

Signature: _____

Name: _____

Company: _____

Title: _____

Address: _____

Telephone: _____

Send this form to:

COMPUTERWORLD

CLASSIFIED ADVERTISING,

375 Cochituate Road, Box 880,
Framingham, MA 01701

Foreign Editorial/ Sales Offices

England: Martin Durham, CW Communications Ltd., 99 Grays Inn Rd., London WCI 8UT. Phone: 01-831-9252, Telex: 262340.

Euan Rose, Bill Dunlop, Stephen Thomas, Beare Hobson Assoc., 345 Goswell Rd., Islington, London EC1V FHN. Phone: 01278 3415/6 (reps for all CWCI publications except Computer Management and Computer Business Europe).

W. Germany: Eckhard Utpadel, CW Publikationens, Friedrichstrasse 31, 8000 Munich 40. Phone: (089) 36172-0. Telex: 5215350.

France: Axel Leblois, Le Monde Informatique, 185 Avenue Charles De Gaulle; 92200 Neuilly Sur Seine, Paris. Phone: 758.14.14. Telex: 613234 F.

Japan: Mr. Shuji Mizuguchi, Computerworld Japan, 7-4 Shintomi 1-Chome, Chuo-ku, Tokyo 104. Phone: (03) 551-3982, Telex: 252-4217 (Computerworld Japan only).

H. Kajiyama, Tokyo Representative Group, Sanshin Kogyo Bldg. 3F, 2-10 Kanda Jimbo-cho, Chiyoda-ku, Tokyo 101, Phone: (03) 230-4117/8, Telex: J26860 (reps for all CWCI publications except Computerworld Japan).

Australia: Alan Power, Computerworld Pty. Ltd., 37-43 Alexander Street, Crows Nest, NSW 2065. Phone: (02) 4395133, Telex: AA74752 COMWOR.

Brazil: Eric Hippeau, Data News, Computerworld do Brazil, Servicos e Publicacoes Ltda., Rua Alcindo Guanebara, 25/10th Floor 20031 Rio de Janeiro, RJ Brazil. Phone: (021) 240-8225. Telex: 2130838(WORD BR).

Mexico: Richard Small, Computerworld de Mexico, Oaxaca 21-2, Colonia Roma, Mexico City 7 D.F. Phone: (905) 514-4218, (905) 514-6309. Telex: 1771300 ACHAME, 1777809 ACHAME.

Spain: Neil Kelley, Computerworld/Espana, Gravina, 13, Madrid 4. Phone: 231-23-86; 231-23-88; 231-23-89. Telex: 47884(CW E).

Denmark: Preben Engell, Computerworld/Denmark, Gammel Strand 50, 1202 Copenhagen K. Phone: 01-1234-11. Telex: 27566 cwden.

Sweden: Bengt Mannfeldt, Nova Media, Nova Media AB, Vartavagen 55, 11538 Stockholm. Phone: 08-234280. Telex: 8105089 NOMACW.

The Netherlands: Johannes A. Witvoet, Mgr. Dir., Computerworld Benelux, Van Eeghenstraat 84, 1071 GK Amsterdam. Phone: 020-646428. Telex: (844) 18242.

Italy: Daniele Corriboni, Gruppo Editoriale Jackson, s.r.l., Via Rosellini 12, 20124 Milano.

Argentina: Ruben Argento, Gen. Mgr., Computerworld Argentina, Av. Belgrano 406-Piso 9, CP 1092 Buenos Aires. Phone: 34-5583/5584. Telex: 22644.

Norway: Mr. Per Bernstjord, Editor, CW Norge A/S, Hovinveien 43, P.O. Box 2662, Tosyen, Oslo 6. Phone: 2/647725. Telex: (856) 76476

Singapore: Mr. David Naidu, General Manager, Asia Computerworld, Pte. Ltd., 11-08/11-10 Goldhill Plaza, Newton Road, Singapore. Phone: 250-4444. Telex: (786) RS 37003

Saudi Arabia: Mr. Omar Dussuki, General Manager, Saudi Computerworld, P.O. Box 5455, Jeddah. Phone: 6675916/6650380. Telex: (926) 401205.

Hong Kong: Ian Mclean, Asia Computerworld Pte. Ltd., 2023 Swirehouse, 9 Connaught Rd. Central. Phone 210395. Telex: (780) 72827 HX COMWR.

ADVERTISERS INDEX

Agile 14
AGS 22
Applied Data Research 3
Applied Software 42
A.R.T. Research 78
AT&T Technologies 32-33

John Basil 83
B I Moyle & Associates, Inc. 16
BGS Systems, Inc. 51
BMC Software 79

Candle Corp. 45
CGA Software 76
Chicago Soft ID/2
Chubb Institute 34
Cedar Corp. 27
Collier Jackson ,Inc. 82
Cambridge ID/12
Comshare 62
Computer Concepts 49
Computer Systems Research ID/10
Computer Technology Center 80
Compuware 81
Covelsle 19
Cremenco Inc. 86-89
CS Computer Systems 85
Cullinet 17
CW 200 88
CW Micro 97
CW Supplement 87

D & B Computing Services 87
Data Base Management 18
Data Knowledge 66
Datapro/data ID/5
Datastream 67
Dayfle 70-71
DEC/Computer Systems 90
Deltak ID/4
Diablo Systems ID/3
Digital Controls Corp. ID/2
D.J.C. Corp. ID/6
Durlen Products 75
DYNA Systems 83

EDP Security 10

Fortune 18,34,35
Fusion Products ID/7

Hewlett-Packard 58-61

Infodata Systems 7
Information 50
Intel 77
International Communications Association 25
Isotron 28-29

J.W. Lampi, Inc. ID/13
Leland Computer Service 82
Lemcom Systems, Inc. 54
Local Data 74

MacMillan Book Club 15
Mathematica 60
McDonnell Douglas 32-33
Micro Craft Corp. 96
MicroAge ID/15
MicroFrame 65
Micron Systems Corp. 60
MSA ID/13,ID/14
MTI Systems Corp. 11,12,16
Multi Solutions 20

Nanolab 78
National Semi-Conductor 64
NCR Corp. 13
NMTC 96
Northern Telecom 44-45,94-95

On-Line Software 47
Oregon Software ID/16

Panasonic 40
Personnel Data Systems ID/7
Philips/ Dallas 23

R.I. Roper 8
Relm Corp. 94-95

SAS Institute ID/8-ID/9
School Library Journal ID/5
Signal Technology, Inc. 11,ID/6
Software A G 46
Software Results 60
Southern CA Delivery Service 92
Sysed 92
Syscon 5
Systems Automation 56

Tandem Computers 30-31
Tartan Labs 63
Techland 10
Tektronix Inc. 52-53
Teletype Corp. 48
Tone Software 92

Unilogic ID/4
USI. Data Systems 76

Van-Tel 120
VM Software 9

Wang Laboratories 72
Western Data Memories, Inc. ID/15
Westinghouse 64

Xerox 99-91

This index is provided as an additional service. The publisher does not assume any liability for errors or omissions.

Computerworld Sales Offices

Vice-President/Sales/Donald E. Fagan
Director/National Sales/Edward P. Marecki
Manager/Marketing & Sales Operations/Kathy Doyle
COMPUTERWORLD, 375 Cochituate Road, Box 880,
Framingham, MA 01701
(617) 879-0700

BOSTON SALES OFFICE (617) 879-0700
Northern Regional Director/Chris Lee
District Managers/Jim McClure, Ronald Mastro,
Jayne Donovan, Michael P. Kelleher
Sales Assistants/Alice Longley,
COMPUTERWORLD, 375 Cochituate Road, Box 880,
Framingham, MA 01701

CHICAGO SALES OFFICE (312) 827-4433
District Managers/Arthur Rosseck, Russ Gardner
Sales Assistant/Joan F. Broderick
Northern Regional Director/Chris Lee
COMPUTERWORLD, 2000 South River Road, Suite 204,
Des Plaines, IL 60018

NEW YORK SALES OFFICE (201) 967-1350
Eastern Regional Director/Michael J. Masiero
Senior District Manager/Doug Chaney
District Managers/Ray Cardin, Joan Daly, Fred Lo Sapio
Sales Assistant/Gale M. Palermo
COMPUTERWORLD, Paramus Plaza I,
140 Route 17 North, Paramus, NJ 07652

LOS ANGELES SALES OFFICE (714) 261-1221
Senior District Manager/Bob Fluhrer
District Manager/Bonnie Hockenberger

Western Regional Director/William J. Hadley
COMPUTERWORLD, 18005 Sky Park Circle, Suite 260,
Irvine, CA 92714

SAN FRANCISCO SALES OFFICE (415) 421-7330
Western Regional Director/William J. Hadley
Senior District Manager/Barry Wilson
District Manager/Barb Chamberlain
Account Manager, Classified/Paula Backhaus
Account Manager/Dolores Cramer
COMPUTERWORLD, 333 Battery, Suite 30,
San Francisco, CA 94133

ATLANTA SALES OFFICE (404) 394-0758
District Manager/Jeffrey Mesnick
Eastern Regional Director/Michael J. Masiero
COMPUTERWORLD, 1200 Peeler Road, Suite D,
Atlanta, GA 30338

CLASSIFIED ADVERTISING (617) 879-0700
Al DiMilla
COMPUTERWORLD, 375 Cochituate Road, Box 880,
Framingham, MA 01701

CW INTERNATIONAL MARKETING SERVICES
General Manager/Diane La Marsilia
COMPUTERWORLD, 375 Cochituate Road, Box 880,
Framingham, MA 01701
(617) 879-0700
Manager, West Coast/Peter Crockett
COMPUTERWORLD, 1080 Marsh Road
Menlo Park, CA 94025
(415) 328-8084

CW COMMUNICATIONS/INC.

Board Chairman/Publisher
Patrick J. McGovern
President
W. Walter Boyd
Senior Vice-President
Lee Vidmar

Group VP-Communication Services, Jack Edmonston. Group VP-Circulation, Margaret Phalen.
VP-Marketing, Donald E. Fagan. VP-Finance, William P. Murphy. VP-Editorial, John Wiesmach.

Computerworld Headquarters: 375 Cochituate Road, P.O. Box 880, Framingham, MA 01701
Phone: (617) 879-0700, Telex: 95-1153.

SALES — Vice-President, Donald E. Fagan. National Director, Edward P. Marecki. Corporate Advertising Administrator, Frank Collins. Manager/Marketing & Sales Operations, Kathy Doyle.
Display Advertising Supervisor, Anne Hadley.
Display Advertising, Deborah Bryer, Pam Valentinas, Carolyn Medeiros, Cindy Chakas, Mary Waddick. Classified Operations Manager, Cynthia Delany.

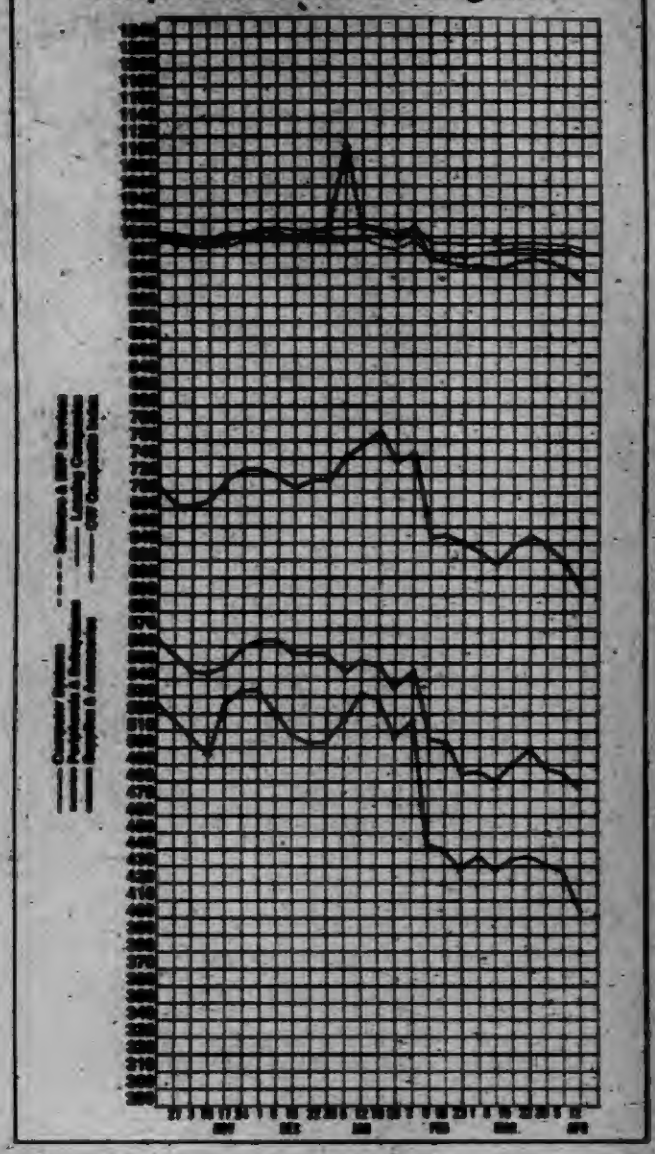
COMMUNICATION SERVICES — Group Vice-President, Jack Edmonston. Director Research, Kathryn Dinneen. Sales Promotion Director, Liz Johnson.

PRODUCTION — Production Director, Peter Hein. Production Manager, Marlene Sittel. Paste-Up Manager, Trish Gaudette. Systems Manager, Tom Pilla. Typesetting Manager, Carol Polack. Art Director, Tom Monahan. Graphic Designer, Hank Ping.

CIRCULATION — Group Vice-President, Margaret Phalen. Circulation Manager, Jane Desberg. Fulfillment Manager, Maureen Burke.

Computerworld can be purchased on 35 mm microform through University Microfilms Inc., Periodical Entry Dept., 300 North Zeb Rd., Ann Arbor, Mich. 48106. Phone (313) 761-4700. Complimentary subscriptions are available only to Computerworld readers who qualify. Others may subscribe at $75 per year. Write to Circulation Dept. for subscription information.

Computerworld Stock Trading Index



Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, APRIL 11, 1984

All statistics compiled, computed and formatted by TRADE QUOTES, INC. Cambridge, Mass. 02139

	1983-84 RANGE (1)	PRICE CLOSE APR 11 1984	WEEK NET CHANGE	WEEK PCT CHANGE
COMPUTER SYSTEMS				
ALPHA MICROSYSTEMS	11- 24	12 1/8	-1 1/2	-10.8
ALTOS COMPUTER SYST	6- 28	10 3/4	-1	-8.5
APPLE COMPUTER INC	14- 63	26 1/2	0	0.0
AT&T	18- 70	58	+ 1/4	+1.3
BARRISTER CORP	28- 89	40 1/2	-1 3/4	-3.4
COMPUTER AUTOMATION	6- 17	7 3/4	- 1/4	-3.1
COMPUTER CONSOLES	6- 28	15 3/4	-1	-5.9
CONTROL DATA CORP	21- 62	33 1/8	-2 7/8	-7.9
CONVERGENT TECHNOL	13- 41	13 1/2	- 1/2	-3.6
CRAY RESEARCH INC	20- 88	38 1/2	-3 3/8	-12.2
DATA GENERAL CORP	19- 48	42 1/4	-4 1/8	-8.9
DATAPOINT CORP	11- 30	21 1/2	-1 1/4	-5.4
DIGITAL EQUIPMENT	63-161	97	-4 3/4	-4.7
DSCO INC	9- 18	14 1/8	- 1/8	-0.8
ELECTRONIC ASSOC.	5- 15	8 1/4	- 5/8	-10.8
FLOATING POINT SYST	13- 44	18 3/8	- 5/8	-3.3
FOXBORO	22- 47	28 3/8	-1 3/8	-4.6
GENERAL AUTOMATION	3- 16	3 3/8	- 1/8	-3.6
GOULD INC	16- 44	27 1/4	-1 3/8	-4.8
HARRIS CORP	26- 91	39 1/4	- 5/8	-1.6
HEWLETT-PACKARD CO	23- 48	32 1/4	- 3/8	-1.1
HONEYWELL INC	28- 68	33 7/8	-1 7/8	-5.3
IBM	97-130	128 7/8	-2 1/8	-1.6
ICL SYSTEMS INC	4- 14	4 1/2	- 1/4	-5.2
M/A-COM INC	13- 38	14	- 1/4	-1.7
MANAGEMENT CONP SYSTS	1- 5	3/8	0	0.0
MANAGEMENT ASSIST	7- 30	23 1/2	- 3/8	-1.5
MITSUBISHI ELECTRONI	47- 80	80	-1 1/2	-1.7
MODULAR COMPUTER SYS	6- 18	8 3/4	- 1/2	-5.4
NEWARD DATA SCI	9- 19	13 1/2	- 7/8	-6.0
NOTOROLA INC	82-140	130 5/8	-2	-2.0
NAT'L SEMICONDUCTOR	13- 80	13 1/4	- 1/2	-3.6
NBI INC	17- 51	18	+ 5/8	+2.0
NCR	39-130	98 3/4	-10 1/8	-9.3
PRIME COMPUTER INC	17- 37	25 7/8	- 1/8	-0.4
PRIME COMPUTER INC	11- 30	14 1/2	-1 1/8	-7.1
SPERRY CORP	21- 54	38 3/8	-2 1/4	-5.5
STORAGE COMPUTERS INC	14- 40	17	-10	-37.0
TANDY CORP	31- 88	33 3/8	+ 1/8	+0.3
TELEVIDEO SYSTEMS	11- 41	12 1/2	- 3/4	-5.8
TELTRON CORP	6- 16	8 1/2	+ 1/2	+6.3
TEXAS INSTRUMENTS	71-170	128	-6 1/8	-4.6
ULTIMATE CORP	6- 20	17 1/8	0	0.0
VECTOR GRAPHICS INC	3- 14	1 3/8	- 1/8	-13.3
WANG LABS "B"	15- 42	23 3/8	-1 1/8	-4.6
WANG LABS "C"	11- 42	24	- 1/2	-2.0
XEROX CORP	39- 92	38 1/2	- 7/8	-2.1
LEASING COMPANIES				
AMERICAN FINANCIAL CP	11- 42	37 1/2	-1 1/2	-3.8
CONSISCO INC	9- 42	11 1/4	-1 3/8	-12.0
CONTINENTAL INFO SYS	5- 18	6 3/4	- 1/4	-3.6
DPF INC	9- 19	12 1/8	-1 1/8	-8.4
SELECTRON INC	11- 21	18 3/4	-2	-15.8
U.S. LEASING	30- 47	38 3/4	- 1/4	-0.6
COMPONENTS				
ADVANCED MICRO DEV	13- 37	38 3/8	+1	+3.8
ADV'D SEMICONDUCTOR	12- 38	32 3/4	-2 1/4	-6.4
ANALOG DEVICES INC	18- 42	33 3/8	-1 1/2	-4.3
ANALOGIC CORP	14- 27	14 1/2	-8	-23.8
APPLIED MAGNETICS CP	25- 37	16 3/8	-2 1/8	-7.0
TOMAVIDE	14- 38	23 7/8	-1 7/8	-6.7

	1983-84 RANGE (1)	PRICE CLOSE APR 11 1984	WEEK NET CHANGE	WEEK PCT CHANGE
SOFTWARE & CDP SERVICES				
ADVANCED COMP TECH	1- 8	3 3/4	- 1/4	-6.3
ADVANCED SYSTEMS INC	6- 22	18 3/8	- 1/2	-2.6
ASK COMPUTER INC	7- 32	17 1/4	-2 1/4	-11.5
AMERICAN SOFTWARE	14- 31	16 1/2	- 1/8	-12.7
AUTOMATIC INC	1- 33	2 1/2	- 3/8	-30.0
ANALYSTS INTL CORP	3- 20	8 1/2	- 1/8	-2.2
APPLIED DATA RES	3- 20	10	-2	-16.7
ASK COMPUTER SYSTEMS	11- 33	15 3/4	- 3/4	-4.5
ATTACHMATE CORP INC	1- 7	1 5/8	- 1/4	-13.3
AUTOMATIC DATA PROC	33- 68	38 1/2	-1 3/4	-4.4
CDA COMPUTER ASSOC	5- 17	9 5/8	- 1/4	-2.5
COMPUTER ASSOC INT'L	6- 28	17 3/4	-1 1/2	-7.7
COMPUTER HORIZONS	6- 28	12 3/4	- 3/8	-2.8
COMPUTER NETWORK	1- 3	1 3/8	- 1/8	-8.3
COMPUTER SCIENCES	11- 33	14 3/4	- 1/4	-1.6
COMPUTER TASK GROUP	6- 22	13 3/4	- 1/4	-1.8
COMPUTER VISION	5- 22	6 1/2	- 3/4	-10.3
COMPUTERVISION	3- 20	3 3/8	- 3/8	-8.5
CONDUCU CORP	3- 14	4 3/4	- 5/8	-11.6
COMSHARE	7- 14	9 1/8	- 1/4	-2.9
CULLINET SOFTWARE	18- 39	38 3/4	-4 7/8	-14.4
CYGNET SYSTEMS INC	6- 27	10 1/2	0	0.0
ELECTRONIC DATA SYST	14- 32	30	-2 3/8	-6.1
HUDAK SYSTEM INC	14- 37	16 1/2	-1 3/4	-10.7
GENERAL ELECTRIC CO	51- 64	61 7/8	-1 7/8	-3.0
GTE CORP	25- 48	37 1/4	0	0.0
INFORMATICS INC	15- 40	19 3/8	- 1/8	-0.6
INFORMATION SYSTEMS CAN	1- 10	1	-1 3/8	-57.8
KEANE ASSOCIATES	4- 20	7 1/4	0	0.0
LEGISLON	6- 26	10 7/8	-1 1/8	-9.4
MCI COMMUNICATIONS	6- 24	8 1/4	- 1/8	-1.5
MGT SCI AMER INC	6- 26	10 3/8	- 1/4	-2.3
MATHEMATICAL APP GRP	1- 22	4	- 1/2	-9.8
MICRO SYSTEMS INC	20- 38	32	-2 3/4	-12.0
MOREDATA-AMDD CP	1- 6	4 1/8	- 3/8	-8.3
NATIONAL DATA CORP	7- 22	17 3/8	- 1/4	-1.4
ON-LINE SOFTWARE INT	3- 17	11	-1	-8.3
PANOPTIC SYSTEMS	3- 17	11 3/4	-1 1/2	-11.3
PLANNING RESEARCH	3- 21	12 1/4	- 1/2	-3.9
POLICY MGMT SYSTS NP	15- 38	22 3/4	-1 1/4	-5.2
PERKIN-ELMER & SYS	1- 8	4 1/2	- 1/4	-5.3
REYNOLDS & REYNOLD	17- 33	30	-2 3/4	-8.3
SCI CORP	11- 36	13	- 3/8	-2.8
SHARED MEDICAL SYST	11- 45	25 3/4	0	0.0
SCIENTIFIC COMPUTERS	3- 16	8	-1	-11.1
SOFTWARE AG	5- 17	12 1/4	-1 5/8	-11.7
TYMSHARE INC	12- 28	22	0	0.0
UNIV CORP	5- 18	11 7/8	- 3/4	-5.9
WALT CORP	7- 17	10 3/8	- 1/4	-2.3
AM INTERNATIONAL	3- 7	6 7/8	- 1/8	-1.8
AMERICAN ACCOUNTS	7- 35	7 7/8	- 7/8	-10.0
AUTO-TROL TECHNOLOGY	6- 28	11	- 1/2	-4.3
BANCTEC INC	7- 33	8	- 1/4	-3.0
BENTON INT'L	1- 6	3 3/4	0	0.0
BOLT,BERANEK & NEW	6- 23	17 3/4	-1	-5.3
COMDEX CORP	1- 7	1 3/8	0	0.0
COMTECHNICS DATA CORP	6- 26	10 3/4	-1 3/4	-11.4
CETEC CORP	6- 13	7 1/8	- 3/4	-9.5
COMSTRONICS	3- 30	9 1/2	-1	-11.7
COMPUTER SERVICES INC	7- 33	8 3/4	- 1/4	-2.7
COMPUTER TRANSACTION	2- 12	3 3/8	- 1/8	-3.6
COMPUTERVISION CORP	5- 24	25 7/8	-4 1/2	-13.0
COMSONIC CORP	1- 6	2 3/8	- 3/8	-13.2
DATAPRODUCTS CORP	10- 42	22 1/8	-1 1/4	-5.3
DATAVIEW CORP	1- 6	3 3/8	- 1/8	-3.6
DATA SWITCH CORP	15- 46	32	- 1/2	-1.5
DATUM INC	7- 17	7	- 1/2	-6.6
DECISION DATA COMPUT	3- 17	6 1/2	- 1/8	-1.9
DIGITAL-DYNAMICS	3- 17	6 3/4	- 1/4	-3.6
ELECTRONIC M S P	3- 11	6 1/8	- 3/8	-5.8
ENDATA INC	3- 11	6 1/4	- 1/2	-7.4
EVANS & SUTHERLAND	7- 30	10 1/2	-1 1/2	-12.5
GANDALF TECHNOLOGIES	3- 20	12 1/2	- 1/8	-1.0
GEN'L DATA COMM INC	3- 20	12 3/8	- 1/8	-1.0
GREAT SOUTHWEST INC	1- 6	7/8	0	0.0
HASELTINE CORP	7- 25	10 1/8	-1	-9.0
ICOT CORP	3- 10	3 3/8	- 1/8	-3.6
INFORMATION INTL INC	14- 35	22	- 1/2	-2.2
INFORMATION SCIENCE	8- 17	8	- 3/4	-8.6
INTEL CORP	11- 48	38	- 1/2	-1.3
ITL SYSTEMS INC	4- 14	4 1/2	- 1/8	-2.7
LANDY ELECTRONICS	3- 10	3 7/8	- 1/8	-3.1
MEGADATA CORP	8- 18	8 1/4	- 1/8	-1.5
MEI DATA CORP	6- 27	10 1/2	0	0.0
MICRO CORP	6- 27	10 3/8	- 1/8	-1.2
NETWORK SYSTEMS CORP	9- 34	17	- 3/8	-2.2
NE ANDREWS PHILIPS	1- 4	2	0	0.0
NORTHERN TELECOM LTD	11- 46	36 1/2	-1	-2.7
OMEX	1- 6	3 1/8	- 1/8	-3.8
PANTHER CORP	1- 6	3 3/8	- 1/8	-3.6
POWERS CORP	7- 19	11 3/8	- 1/2	-4.2
PHOENIX AMERICANA INC	7- 17	8	- 1/4	-3.0
PLESSEY CO LADR	30- 51	36	- 3/4	-2.0
POINTRONIX INC	3- 11	5 1/2	- 1/4	-4.3
QUANTEL CORP	6- 20	8 3/4	- 1/4	-2.7
QUESTRON INC	3- 20	12 1/2	-1 1/4	-9.1
RECOGNITION EQUIP	6- 17	12 3/8	- 1/8	-1.0
RELM CORP	15- 60	32 3/4	- 1/8	-0.3
RANDOM ACCESSORIES	30-130	38 1/4	+ 3/4	+2.0
SCAN DATA	1- 3	1/8	- 1/8	-50.0
SCIENTRON CORP	15- 33	18	- 1/4	-1.3
SCIENTIFIC ATLANTA	9- 19	18	- 1/4	-1.3
SHAWMUT TECHNOLOGY	8- 17	8 1/2	- 3/8	-4.2
SYKES DATATRONICS	3- 7	3	0	0.0
SYSTEMS & COMP TECH	30- 90	35	- 1/2	-1.4
T SAR INC	7- 17	8	- 1/8	-1.5
TAB PRODUCTS CO	7- 30	8 7/8	- 1/2	-5.3
TANDON CORP	10- 30	8 1/2	-2 1/8	-20.0
[illegible]	3- 13	3 1/2	- 1/8	-3.4
VERITRONICS INC	24- 67	42 1/8	-1	-2.3
VIDEX	6- 30	25	-1 3/8	-5.2
TERADATA SYSTEMS CP	7- 37	9 3/8	- 1/8	-1.3
TIMEPLEX INC	7- 38	11 3/8	- 3/8	-3.2
VISUAL TECHNOLOGY	6- 38	11 3/4	-3 1/2	-22.9
AMERICAN BAR CODE	7- 23	10 1/2	0	0.0
BARRY WRIGHT	15- 33	33 3/4	-1 1/4	-3.6
DUPLEX PRODUCTS INC	15- 27	25	- 3/4	-2.9
EMBEX CORP, FORMS	15- 30	18 1/2	- 3/4	-3.9
IN COMPANY	6- 30	24 1/8	0	0.0
MARKEM CORP LTD	15- 31	28 1/8	- 1/8	-0.4
STANDARD REGISTER	11- 34	30	-1 1/4	-3.7
WALLACE BUSINESS FORMS	11- 38	38 3/4	-1	-2.5

EXCHG (WHEN ISSUE): A-AMERICAN; P-PACIFIC; B-BOSTON; I-NATIONAL; N-NASDAQ/NMS; O-OVER-THE-COUNTER.
O-TVC PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

SECURITY

Protect sensitive information with *Ven-Tel's 212 SECURITY PLUS*. Password restrict any terminal to calling only the destinations and applications you authorize. Telephone numbers, passwords, account numbers, and log-in codes are concealed to prevent unauthorized disclosure or use.

Ven-Tel security is not limited to password protection. You are secure in the confidence that your Ven-Tel modem is the most reliable and dependable in the world.

Security is the assurance that Ven-Tel has committed the investment in research, development and production facilities necessary to continued industry leadership and provide off-the-shelf delivery.

Security is knowing that the modem you buy from Ven-Tel is the most modern, technologically-advanced product available on the market today. It is knowing that when you need help, a Ven-Tel technical support specialist is as close as a telephone call. It is the confidence that Ven-Tel will be there with service and support for your equipment as long as you own it.

For information call: (800) 538-5121

CUSTOM & OEM CONFIGURATIONS AVAILABLE

Ven-Tel [illegible] (408) 727-5721

VEN-TEL IS AN OEM SUPPLIER OF INTEGRAL MODEMS TO FALCO DATA PRODUCTS TERMINALS